ANNUAL REPORTS ON NMR SPECTROSCOPY

Volume 10B

ANNUAL REPORTS ON

NMR SPECTROSCOPY

This Page Intentionally Left Blank

ANNUAL REPORTS ON
NMR SPECTROSCOPY

Edited by

G. A. WEBB

Department of Chemical Physics, University of Surrey, Guildford, Surrey, England

VOLUME 10B

1980

ACADEMIC PRESS

A Subsidiary of Harcourt Brace Jovanovich, Publishers

London • New York • Toronto • Sydney • San Francisco

ACADEMIC PRESS INC. (LONDON) LTD.
24–28 Oval Road,
London, NW1 7DX

U.S. Edition Published by

ACADEMIC PRESS INC.
111 Fifth Avenue
New York, New York 10003

British Library Cataloguing in Publication Data

Annual reports on NMR spectroscopy.
Vol. 10B
1. Nuclear magnetic resonance spectroscopy
I. Webb, Graham Alan
541'.28 QD96.N8 68–17678

ISBN 0–12–505348–7
ISSN 0066–4103

Printed in Great Britain by J. W. Arrowsmith Ltd.
Bristol BS3 2NT

CONTENTS

Fluorine-19 Nuclear Magnetic Resonance Spectroscopy (1976–1978)

V. WRAY

Gesellschaft für Biotechnologische Forschung mbH
Mascheroder Weg, D-3300 Braunschweig
West Germany

CONTENTS OF VOLUME 10A

PREFACE

The widespread application of the NMR spectroscopy of "other nuclei" is clearly reflected in the contributions to these volumes. As with some earlier members of this series of reports, the present volume is split into two parts.

Volume 10B is the more specific one, dealing with the ^{19}F NMR parameters of various series of compounds. It comprises extensive tabulations of ^{19}F NMR data and serves to update reports in earlier volumes of this series.

The range of topics covered in volume 10A indicates some of the numerous areas of science which are dependent upon NMR as a primary investigative tool. The areas covered include transition metal NMR, ^{13}C NMR applications to synthetic polymers, and some uses of ^{31}P NMR in biochemistry.

All the authors writing for volume 10 are new to Annual Reports and, in welcoming their contributions, I wish to thank all of them for their efforts and patience both in the preparation of their manuscripts and of this volume.

University of Surrey,
Guildford, Surrey,
England

G. A. WEBB
December 1979

This Page Intentionally Left Blank

Fluorine-19 Nuclear Magnetic Resonance Spectroscopy (1976–1978)

V. WRAY

Gesellschaft für Biotechnologische Forschung mbH., Mascheroder Weg, D-3300 Braunschweig, West Germany

I. INTRODUCTION

This Page Intentionally Left Blank

As in previous years the major objective has been to collect the scattered information on F-19 NMR parameters in a form that can readily be retrieved and used. The large volume of data has necessitated a change in policy regarding the presentation of this information. The present reviewer hopes that the use of tables classified according to the type of molecule and internal ordering according to molecular formula will ease the retrieval and comparison of data. Such an approach supplements previous data collections and will hopefully ease computation of such data in the future. The data have been compiled from the author's own records and from the literature abstracts of Current Contents (Physical Sciences), Nuclear Magnetic Resonance Literature (Preston Publications, Illinois), and CA Selects: Nuclear Magnetic Resonance (Chemical Aspects).

All chemical shifts have been converted to the δ scale, with $CFCl_3$ as reference and positive shifts to high frequency of the reference, using the conversion factors shown in Table I. The original reference has been indicated if it was not $CFCl_3$, since several authors persist in not indicating their sign convention or change their convention from paper to paper; some errors may be present in the tables as a consequence. It would be preferable if all journals insisted on the sign convention recommended by IUPAC* and used here.

TABLE I

Reference compound shifts

Index	Compound	Shift from $CFCl_3$ (ppm)	Index	Compound	Shift from $CFCl_3$ (ppm)
(a)	$CF_3 \cdot CO_2H$	−78·5(0)	(j)	$CF_2 \cdot CF_2 \cdot CF_2 \cdot CF_2$	−136·0(0)
(b)	C_6F_6	−162·9(0)	(k)	$pF \cdot C_6H_4 \cdot F$	−120·0(0)
(c)	$C_6H_5 \cdot CF_3$	−63·9(0)	(l)	$CF_3 \cdot CO_2CH_3$	−74·2(1)
(d)	C_6H_5F	−113·15	(m)	$CF_3 \cdot C(OH)_2 \cdot CF_3$	−92·7(7)
(e)	$CFCl_2 \cdot CFCl_2$	−67·3(0)	(n)	$CF_3 \cdot CCl_3$	−82·2(0)
(f)	$CF_2 \cdot CF_2 \cdot CCl_2 \cdot CCl_2$	−114·1(0)	(o)	$C_6H_5 \cdot SO_2F$	+65·5(0)
(g)	CF_2Cl_2	−6·9(0)	(p)	1-fluoronaphthalene	−123·0(0)
(h)	F_2	+422·9(0)	(q)	2-fluoronaphthalene	−117·0(0)
(i)	$CF_3 \cdot CO \cdot CF_3$	−84·6(0)			

The major part of this work consists of tables containing chemical shift and spin–spin coupling constant information for compounds in the liquid state or in solution. The remainder covers studies in solids and liquid crystals, together with biological applications and theoretical studies involving F-19 NMR. To keep this presentation manageable these latter sections either only give the relevant literature references (solids, polymers,

* "Recommendations for the presentation of NMR data for publication in chemical journals. B. Conventions relating to spectra from other nuclei", *Pure Appl. Chem.*, 1976, **45**, 217.

and liquid crystal tables) or brief descriptions with literature references (biological applications and theoretical studies). Finally a bibliography of review articles containing F-19 NMR information is presented.

The tables are arranged according to the type of carbon (or element) to which the fluorine nucleus is bound. The appearance of a compound, with more than one type of fluorine-bonded carbon, in a particular table is according to which fluorine has its chemical shift reported and/or comes higher in the list of tables found above. Thus a molecule with a trifluoromethyl group and a fluoroaromatic residue will appear in Section II provided that the shift of the trifluoromethyl group is reported, but in the fluoroaromatic table (Section V) if only the shift of the fluorine bound to the aromatic residue is reported. Similarly where only coupling constant information is reported the same priority exists. Chemical shift information takes priority over coupling constant information. The only exception to the above is Section VII where an attempt has been made to include all the data for carbonium ions and carbanions irrespective of whether fluorine is directly attached to the charged carbon or not.

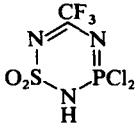
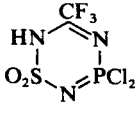
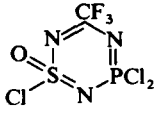
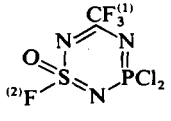
Each table, apart from those in Sections IX to XI consists of (1) the molecular formula of the compound, (2) the structure of the compound, (3) the F-19 chemical shift data, (4) the F-19 spin–spin coupling constant data, and (5) the literature reference number with the reference compound index (from Table I) given in parentheses, where applicable. In Sections IX to XI only columns (1), (2), and (5) are included. Each table is arranged according to the index of the molecular formulae, and the convention adopted for priority of the elements is C, F, H, and then the other elements in alphabetical order. Only the relevant nuclei in the molecule are numbered [column (2)]. In cases where only one number is given but the system shows two chemical shifts, for example the AB spectra from CF_2 groups, these are distinguished by letters following the number.

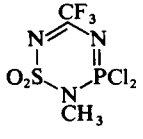
In all cases fluorine–fluorine and fluorine–hydrogen coupling constants are indicated in column (4) by two numbers separated by a hyphen [e.g. (1–2) indicates a J(F–F) or J(F–H) between nuclei numbered (1) and (2) in the structural formula in column (2)], or by numbers followed by letters for AB systems [e.g. (2A–2B) indicates a J(F–F) between fluorine nuclei of an AB system numbered (2) in the structural formula in column (2)]. Other couplings are represented by a number for the fluorine (or F) and an element symbol separated by a hyphen, with the higher atomic number nucleus having priority. The element involved in the coupling may be numbered, but the coupled nuclei, other than fluorine, are always denoted by the element symbol followed by the number [e.g. a coupling between phosphorus and fluorine may appear in column (4) as (P–z), (P–F), (Px–z), (Px–F), ^{y}J(P–z), ^{y}J(P–F), ^{y}J(Px–z), or ^{y}J(Px–F), where x, y, and z are integers]. The above should be self-evident from the tables.

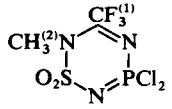
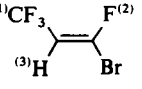
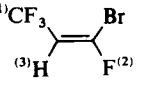
II. FLUORINE BONDED TO A CARBON OF A SATURATED ALIPHATIC HYDROCARBON

This Page Intentionally Left Blank

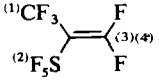
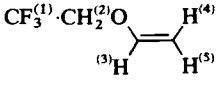
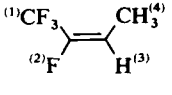
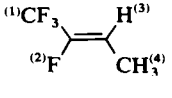
A. Fluorine nuclei in a CF_3 group

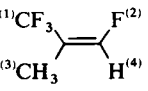
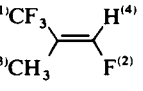
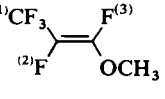
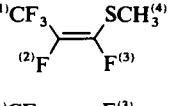
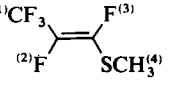
Molecular formula	Structure of compounds		Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
1. CF_3 group bonded to carbon					
$C_2F_3HBr_2$	$CF_3^{(1)}\cdot CH^{(2)}Br_2$		−75·1	(1-2) 6	23(a)
$C_2F_3HCl_2N_3O_2PS$	 and 		−73·6	(P-F) 6	30
$C_2F_3H_2NO$	$CF_3^{(1)}\cdot CH^{(2)}{=}NOH$		−67·5	(1-2) 5	32(a)
$C_2F_3H_3O$	$CF_3^{(1)}\cdot CH_2^{(2)}OH$	(neat)		(1-2) 8·94 (variation with solvent studied)	35
$C_2F_3BrCl_2$	$CF_3\cdot CBrCl_2$		−80·3		23(a)
$C_2F_3Br_2Cl$	$CF_3\cdot CBr_2Cl$		−79·1		23(a)
$C_2F_3Br_3$	$CF_3\cdot CBr_3$		−78		23(a)
$C_2F_3Cl_3$	$CF_3\cdot CCl_3$		−81·5		23(a)
$C_2F_3Cl_3N_3OPS$			−75.8	(P-F) 7·3	30
C_2F_4BrCl	$CF_3^{(1)}\cdot CF^{(2)}BrCl$		(1) −83·7 (2) −76·9	(1-2) 8	23(a)
$C_2F_4Br_2$	$CF_3^{(1)}\cdot CF^{(2)}Br_2$		(1) −81·8 (2) −77·2	(1-2) 10	23(a)
$C_2F_4Cl_2N_3OPS$			(1) −75·97 (2) +77·2	(P-1) 8·5 (P-2) 6·8	30

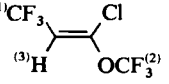
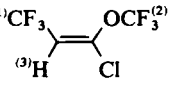
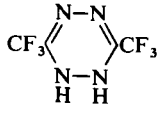
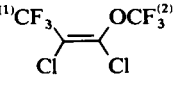
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
C_2F_7NOS	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot NSOF_2^{(3)}$	(1) −87·6 (2) −86·8 (3) −50·4	(1-3) 1·25 (2-3) 9·4	42
C_2F_7P	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot PF_2^{(3)}$	(1) −83·4 (2) −139.4 (3) −106·4	(1-2) 2·0 (1-3) 6·4 (2-3) 9·0 (P-1) 7·4 (P-2) 101·0 (P-3) 1259·3	50
$C_2F_8H_2S$	$CF_3^{(1)}\cdot CH_2^{(4)}\cdot SF_4^{(2)}F^{(3)}$	(1) −65·4 (2) +68·2 (3) +75·5	(1-2) 10·1 (1-4) 8·8 (2-3) 138 (2-4) 7·3	52
$C_2F_8O_3S$	$CF_3^{(1)}\cdot C(O)\cdot OO\cdot SF_4^{(2)}F^{(3)}$	(1) −171·8 (2) +56·7 (3) +57·9	(2-3) 154·8	18
C_2F_8Si	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot SiF_3^{(3)}$	(1) −86·5 (2) −134.4 (3) −150·2	(1-2)−3·59 (1-3) −2·81 (2-3)+4·92 (Si-3) +275·3	21
C_2F_9HS	$CF_3^{(1)}\cdot CH^{(5)}F^{(2)}\cdot SF_4^{(3)}F^{(4)}$	(1) −76·3 (2) −172·1 (3) +51·6 (4) +68·2	(1-2) 11·0 (1-3) 11·0 (1-5) 5·4 (2-3) 2·5 (2-4) 2·5 (2-5) 43·5 (3-4) 144·0 (3-5) 5·0	52
C_2F_9BrS	$CF_3^{(1)}\cdot CF^{(2)}Br\cdot SF_4^{(3)}F^{(4)}$	(1) −80·0 (2) −100·3 (3) +50·2 (4) +63·8	(3-4) 146·6	53
$C_2F_{10}O_3S$	$CF_3^{(1)}\cdot CF^{(2)}(OSO_2F^{(3)})\cdot SF_4^{(4)}F^{(5)}$	(1) −79·9 (2) −110·3 (3) +51·2 (4) +45·3 (5) +62·3	(1-2) 12·0 (1-3) 2·8 (2-3) 2·8 (2-4) 12·0 (2-5) 4·2 (3-4) 9·5 (4-5) 142	52
C_3F_3HBrN	$CF_3^{(1)}\cdot CH^{(2)}Br\cdot CN$	−71·5	(1–2) 7·0	62
$C_3F_3H_2N$	$CF_3^{(1)}\cdot CH_2^{(2)}\cdot CN$	−66·8	(1-2) 9·2	62
$C_3F_3H_3Cl_2N_3O_2PS$		−74·2	(P-F) 6·3	30

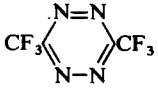
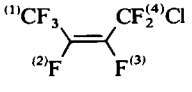
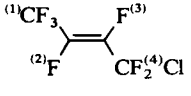
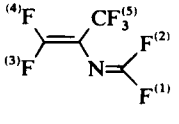
$C_3F_2H_3Cl_2N_3O_2PS$		−68·7		(1-2) 1·5	(P-1) 7·6	30
$C_3F_3Br_2N$	$CF_3{\cdot}CBr_2{\cdot}CN$	−78·1				62
$C_3F_3Cl_2N$	$CF_3{\cdot}CCl_2{\cdot}CN$	−77·1				62
$C_3F_3Cl_2NO$	$CF_3{\cdot}CO{\cdot}N{=}CCl_2$	−74.6				63
C_3F_3NO	$CF_3{\cdot}CO{\cdot}CN$	−80·63				63
C_3F_3NOS	$CF_3{\cdot}CO{\cdot}NCS$	−77·0				63
$C_3F_3NO_2$	$CF_3{\cdot}CO{\cdot}NCO$	−78·8				63
C_3F_4HBr		(1) −60·8	(2) −56·2	(1-2) 17·2 (2-3) 26·9	(1-3) 6·7	68(a)
C_3F_4HBr		(1) −60·65	(2) −57·5	(1-2) 13·4 (2-3) 10·8	(1-3) 6·4	68(a)
$C_3F_4H_3ClS$	$CF_3^{(1)}{\cdot}CF^{(2)}Cl{\cdot}SCH_3^{(3)}$	(1) −81·2	(2) −103·2	(1-2) 9·2 (2-3) 1·2	(1-3) 1·0	69(a)
$C_3F_4O_3S$	$CF_3^{(1)}{\cdot}C(SO_2F^{(2)}){=}C{=}O$	(1) −54·1	(2) +79·6	(1-2) 5		67
$C_3F_5H_3S$	$CF_1^{(3)}{\cdot}CF_2^{(2)}{\cdot}SCH_3^{(3)}$	(1) −84.0	(2) −95·9	(1-2) 3·4 (2-3) 1·4	(1-3) 0·8	69(a)
$C_3F_5NO_3S$	$CF_2^{(1)}{\cdot}CF^{(2)}(CN){\cdot}OSO_2F^{(3)}$	(1) −74·3 (3) +54·1	(2) −115·4	(1-2) 10·5	(2-3) 5·0	62
C_3F_6HCl	$(CF_3^{(1)})_2CH^{(2)}Cl$	−73·1		(1-2) 6·7		62
$C_3F_6HCl_2OP$	$[(CF_3^{(1)})_2CH^{(2)}{\cdot}O]PCl_2$	−76·5		(1-2) 5·3		72
$C_3F_6H_2$	$(CF_3^{(1)})_2CH_2^{(2)}$	−63·6		(1-2) 9·7		62
$C_3F_6H_3OP$	$(CF_3^{(1)})_2C(OH)PH_2^{(2)}$	−73·8		(1-2) 2·3		73

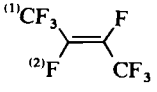
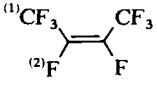
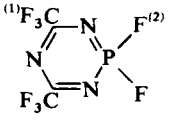
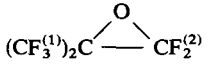
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_3F_6N_2OS$	$CF_3^{(1)}\cdot CO\cdot N{=}CF^{(2)}(N{=}SF_2^{(3)})$	(1) −79·59 (2) −16·27 (3) +44·63	(2-3) 12·6	63
C_3F_6OS	$CF_3^{(1)}\cdot CO\cdot SCF_3^{(2)}$	(1) −75.6 (2) −31·4		28
$C_3F_7HO_2S$	$(CF_3^{(1)})_2CF^{(2)}\cdot SO_2H$	(1) −72·64 (2) −187·21	(1-2) 8	75
C_3F_7Cl	$(CF_3^{(1)})_2CF^{(2)}Cl$	(1) −81·40 (2) −144.60	(1-2) 6·6	74
$C_3F_7ClO_2S$	$(CF_3^{(1)})_2CF^{(2)}\cdot SO_2Cl$	(1) −70·73 (2) −156·95	(1-2) 8	75(a)
$C_3F_7ClO_3S$	$(CF_3^{(1)})_2CCl\cdot OSO_2F^{(2)}$	(1) −78·2 (2) +52·0	(1-2) 2·5	62
C_3F_7NOS	$CF_3^{(1)}\cdot CO\cdot N{=}SF^{(3)}\cdot CF_3^{(2)}$	(1) −76·3 (2) −70·6 (3) −47.1	(1-3) 1·9 (2-3) 0·7	38
C_3F_8HOP	$(CF_3^{(1)})_2CH\cdot OPF_2^{(2)}$	(1) −77·0 (2) +47·2	(P-2) 1370	72
C_3F_8BrN	$(CF_3^{(1)})_2CBrNF_2^{(2)}$	(1) −78·40 (2) +44·60	(1-2) 12	74
C_3F_8ClN	$(CF_3^{(1)})_2CCl\cdot NF_2^{(2)}$	(1) −71·40 (2) +37.30	(1-2) 11	74
C_3F_8ClNS	$CF_3^{(1)}\cdot CF_2^{(2)(3)}\cdot N{=}S(CF_3^{(4)})Cl$	(1) −86·5 (2) −88·5 (3) −91·4 (4) −68·4	(1-2,3) 0 (2-3) 198 (2-4) 6·2 (3-4) 3·5 (1-4) 0·4	38
$C_3F_8S_2$	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot SS\cdot CF_3^{(3)}$	(1) −84·6 (2) −96·4 (3) −48·3	(2-3) 5·4	47(a)
$C_3F_8S_3$	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot SSS\cdot CF_3^{(3)}$	(1) −84·2 (2) −96·8 (3) −47·3		47(a)
C_3F_9NOS	$(CF_3^{(1)})_2CF^{(2)}\cdot NSOF_2^{(3)}$	(1) −81·2 (2) −144·7 (3) +52·1	(1-2) 4·4 (1-3) 2·2 (2-3) 11·1	42
C_3F_9NS	$CF_3^{(1)}\cdot CF_2^{(2)(3)}\cdot N{=}S(CF_3^{(4)})F^{(5)}$	(1) −87·2 (2) −87·4 (3) −90·2 (4) −73·0 (5) −17·7	(1-5) 2·6 (2-5) 22·4 (3-5) 20·6 (2-4) 2·8 (3-4) 1·8 (2-3) 197 ^1J(1-C) 286 ^2J(2,3-C) 45 ^1J(4-C) 319 ^2J(5-C) 44	38

$C_3F_{10}HClS$	$CF_3^{(1)}\cdot CH(CF_2^{(2)}Cl)\cdot SF_5^{(3)}$	(1) −61·1 (3) +71·9	(2) −45·5, −51·5			52
$C_3F_{10}O_3S$	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot CO\cdot OO\cdot SF_5^{(3)}$	(1) −82·9 (3) +56·4	(2) −119·8	(1-2) 2·0		18
$C_3F_{10}S$		(1) −57·0 (3) −67·6	(2) +72·3 (4) −57·0			52
$C_3F_{10}Si$	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot CF_2^{(3)}\cdot SiF_3^{(4)}$	(1) −83·0 (3) −131·3	(2) −127·2 (4) −148·8	(1-2) +0·3 (1-4) −1·76 (2-4) −3·57 (Si-4) +275·7	(1-3) +9·10 (2-3) 0·62 (3-4) +4·82	21
$C_3F_{11}HS$	$(CF_3^{(1)})_2CH\cdot SF_5^{(2)}$	(1) −62·8	(2) +70·8			52
$C_3F_{11}NO_3S_2$	$(CF_3^{(1)})_2CF^{(2)}\cdot N{=}SF_2^{(3)}F^{(4)}(OSO_2F^{(5)})$	(1) −67·6 (3) +69·1 (ax) (5) +36·9	(2) −144·1 (4) +67·5 (eq)	(1-2) 4·0 (1-4) 7·6 (4-5) 2·1	(1-3) 13·6 (3-4) 14·6	78
$C_3F_{11}NS$	$(CF_3^{(1)})_2CF^{(2)}\cdot N{=}SF_4^{(3)}$	(1) −80·1 (3) +81·8	(2) −148·1	(1-2) 3·8 (2-3) 19·4	(1-3) 2·0	42
$C_3F_{12}O_3S_2$	$(CF_3^{(1)})_2C(OSO_2F^{(2)})SF_4^{(3)}F^{(4)}$	(1) −66·6 (3) +58·8	(2) +51·0 (4) +65·8	(1-2) 3·0 (2-3) 2·9	(1-3) 12·4 (3-4) 131	52
$C_4F_3H_5O$	$CF_3\cdot CH_2\cdot OCH{=}CH_2$	−78·67 (shifts for several solvents reported)				61(i)
$C_4F_3H_5O$				(1-2) 8·205 (1-4) 0·162	(1-3) 0·723 (1-5) 0·151	82
$C_4F_4H_4$		(1) −70·2	(2) −131·4	(1-2) 9·0 (1-4) 2·5 (2-4) 2·4	(1-3) 1·0 (2-3) 21·8	56(a)
$C_4F_4H_4$		(1) −75·9	(2) −140·9	(1-2) 11·6 (2-3) 33·0	(1-3) 0·9 (2-4) 2·9	56(a)

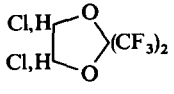
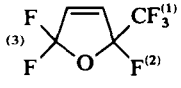
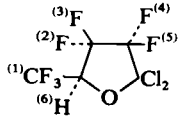
Molecular formula	Structure of compounds	Chemical shifts (ppm)		Coupling constants (Hz)		Ref.
$C_4F_4H_4$		(1) −67·1	(2) −122·3	(1-2) 22·0 (2-4) 80·5	(2-3) 4·7	56(a)
$C_4F_4H_4$		(1) −70·3	(2) −142·6	(1-2) 7·0 (2-4) 80·0	(2-3) 3·0	56(a)
$C_4F_4H_5I$	(2*R*, 3*S*)—$CF_3^{(1)}\cdot CF^{(2)}H^{(3)}\cdot CH^{(4)}I\cdot CH_3^{(5)}$	(1) −76·1	(2) −201·1	(1-2) 10·5 (1-3) 6·1 (1-5) ~0·9	(2-3) 44·4 (2-4) 23·4 (2-5) ~0·9	56(a)
	(2*R*, 3*R*)-isomer	(1) −75·9	(2) −185·5	(1-2) 10·3 (2-3) 43·0 (1-4) 1·0	(1-3) 5·5 (2-4) 17·0 (1-5) 1·0	56(a)
$C_4F_4H_5I$	(2*S*, 3*S*)—$CF_3^{(1)}\cdot CH^{(5)}(CH_3^{(4)})\cdot CF^{(2)}H^{(3)}I$	(1) −71·4	(2) −153.6	(1-2) 7·1 (2-3) 51·0	(1-5) ~7·0 (2-5) 27·5	56(a)
	(2*R*, 3*R*)-isomer	(1) −70·5	(2) −144·5	(1-2) 10·1 (2-3) 48·6	(1-5) 7·6 (2-5) 10·1	56(a)
$C_4F_4O_2$	$CF_3^{(1)}\cdot C(COF^{(2)})=C=O$	(1) −56·0	(2) +33·3	(1-2) 11·5		67
$C_4F_5HO_2$	$CF_3^{(1)}\cdot CH^{(3)}(COF^{(2)})_2$	(1) −66·0	(2) +46·4	(1-2) 10	(1-3) 7	67
$C_4F_5H_3O$		(1) −66·6 (3) −110·3	(2) −194·3			100
$C_4F_5H_3S$		(1) −68·1 (3) −141·5	(2) −107·3	(1-2) 10·5 (2-3) 19·0 (3-4) 0·9	(1-3) 11·0 (2-4) 0·7	69(a)
$C_4F_5H_3S$		(1) −69·7 (3) −127·4	(2) −162·5	(1-2) 12·1 (2-3) 143·5 (3-4) 1·9	(1-3) 21·7 (2-4) 0·8	69(a)

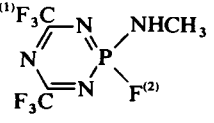
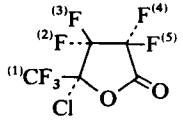
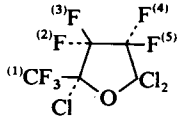
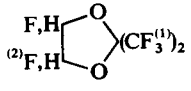
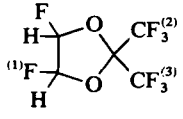
$C_4F_5H_7Si$	$CF_3^{(1)}\cdot Si(CF^{(2)}H_2^{(3)})_2CH_3^{(4)}$	(1) −63·02	(2) −278·42	(1-2) 3·2 (1-4) 1·0	(2-3) 46·3	45(a)
C_4F_6HClO		(1) −60·4	(2) −59·0	(1-3) 6·5		86
C_4F_6HClO		(1) −60·0	(2) −57·8	(1-2) 1·8	(1-3) 6·8	86
$C_4F_6HCl_3O$	$CF_3^{(1)}\cdot CH^{(3)}Cl\cdot CCl_2\cdot OCF_3^{(2)}$	(1) −68·8	(2) −56·2	(1-3) 7·7		86
$C_4F_6H_2ClI$	$CF_3^{(1)}\cdot CF^{(2)}I\cdot CF_2^{(3)(4)}\cdot CH_2Cl$	(1) −73·6 (3,4) −105·6	(2) −143·7	(1-2) 12·2 (1-4) 8·0	(1-3) 12·2	57
$C_4F_6H_2N_4$		−70·1				87(a)
$C_4F_6H_4$	$CF_3^{(1)}\cdot CF^{(2)}(CH_3^{(5)})\cdot CF_2^{(3,4)}H^{(6)}$	(1) −80·8 (3) −131·2	(2) −178·1 (4) −136·6	(1-2) 6·8 (1-4) 5·7 (2-3) 4·8 (2-5) 22·4 (3-4) 310·5 (3-6) 53·2 (4-6) 54·4	(1-3) 9·1 (1-5) ~1·0 (2-4) 11·4 (2-6) 4·0 (3-5) ~1·5 (4-5) ~1·5	83
$C_4F_6H_4$	$CF_3^{(1)}\cdot CH^{(4)}(CF_2^{(2)}H^{(5)})\cdot CF^{(3)}H_2^{(6)}$	(1) −66·7 (3) −243·5	(2) −124·0	(1-4) (1-2) (1-3) 7·9 (2-5) ~50	(3-6) ~50	83
$C_4F_6H_5OP$	$(CF_3^{(1)})_2C(OH)\cdot PH^{(2)}CH_3^{(3)}$	−71·0		(1-2) 1·8 (P-1) 12·7	(1-3) 0·7	73
$C_4F_6BrCl_3$	$CF_3^{(1)}\cdot CF^{(2)}Br\cdot CF_2^{(3)(4)}\cdot CCl_3$	(1) −76·0 (3) −104·7	(2) −133·3 (4) −93·0	(1-2) 9·5 (1-4) 7·5 (2-4) 7·5	(1-3) 18·5 (2-3) 7·5 (3-4) 254	57
$C_4F_6Cl_2O$		(1) (2) −61·0, −65·2		(1-2) 2		

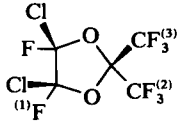
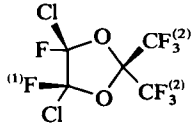
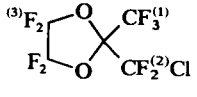
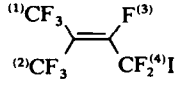
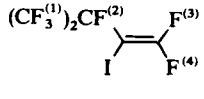
Molecular formula	Structure of compounds		Chemical shifts (ppm)		Coupling constants (Hz)		Ref.
$C_4F_6CoO_3P$	$CF_3^{(1)}\cdot Co(PF_3^{(2)})(CO)_3$		(1) +10·50	(2) −16·14	(1-2) 6 (P-2) 1371	(P-1) 59	22(c)
$C_4F_6N_4$			−68·0				87(a)
C_4F_6Ni	$Ni(CF_3\cdot C{\equiv}C\cdot CF_3)$		−57·0				88
$C_4F_6O_3S$	$CF_3^{(1)}\cdot CO\cdot O\cdot CO\cdot SCF_3^{(2)}$		(1) −75·0	(2) −40·7			28
$C_4F_7H_3$	$(CF_3^{(1)})_2CF^{(2)}\cdot CH_3^{(3)}$		(1) −79·8	(2) −178·2	(1-2) 7·1 (2-3) 22·1	(1-3) 1·2	83
$C_4F_7H_3$	$CF_3^{(1)}\cdot CF^{(2)}(CF_2^{(3)}H^{(5)})(CF^{(4)}H_2^{(6)})$		(1) −76·7 (3) −135·6	(2) −192·7 (4) −247·6	(1-2) (1-3) (1-4) 7·9 (1-5) ~1·0 (2-3) (2-4) ~7 (2-6) 18·2 (3-4) 3·5 (4-6) 53·1	(1-6) ~1·1 (2-5) 5·6 (3-5) 46·7 (3-6) (4-5) ~1·1	83
$C_4F_7H_3$	$CF_3^{(1)}\cdot CH^{(4)}(CF_2^{(2)}H^{(3)})_2$		(1) −64.5	(2) −122·6	(1-3) (1-2) 8·1 (2-4) 52·3	(2-3) 12·9	83
C_4F_7Cl			(1) −67·5 (3) −146·5	(2) −139·5 (4) −59·5	(1-2) 9·59 (1-4) 16·36 (2-4) 5·08	(1-3) 8·46 (2-3) 8·5 (3-4) 12·69	98(a)
C_4F_7Cl			(1) −71·5 (3) −161·5	(2) −155·3 (4) −60·9	(1-2) 20·30 (1-4) 1·0 (2-4) 11·28	(1-3) 7·33 (2-3) 137·6 (3-4) 29·33	98(a)
C_4F_7N		(−100°C)	(1) −54·5 (3) −84·5 (5) −65·0	(2) −39·0 (4) −86·8	(1-2) 68·0 (2-3) 24·0 (2-4) 5·1 (2-5) 2·0 (3-5) 8·6	(1-3) 1·8 (1-4) 5·1 (1-5) 0·5 (3-4) 25·0 (4-5) 24·8	85

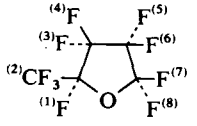
C_4F_8	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot CF^{(3)}=CF_2^{(4)}$	(1) −87·7 (3) −192	(2) −124·5 (4) −92·3, −108·5			93
C_4F_8		(1) −72·5	(2) −164·5			93
C_4F_8		(1) −70·1	(2) −147·3			93
C_4F_8HCl	$CF_3^{(1)}\cdot CF^{(2)}H^{(4)}\cdot CF_2^{(3)}CF_2Cl$	(1) −76·9 (3) −121·5	(2) −214·7	(2-4) 44·0	^1J(3-C) 284·0	98
$C_4F_8H_2$	$CF_3^{(1)}\cdot CF^{(2)}(CF_2^{(3)}H^{(4)})_2$	(1) −74·9 (3) −134·6	(2) −198·0	(1-2) 7·5 (2-3) 8·2 (2-4) ~6·5	(1-3) 8·8 (3-4) 53·3	83
$C_4F_8H_2$	$(CF_3^{(1)})_2CF^{(2)}\cdot CF^{(3)}H_2^{(4)}$	(1) −76·5 (3) −243·0	(2) −190·7	(1-2) 6·9 (1-4) ~1·0 (2-4) 16·5	(1-3) 9·4 (2-3) 12·4 (3-4) 46·4	83
$C_4F_8H_6NP$	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot PF_3^{(3)}\cdot N(CH_3)_2$	(1) −82·3 (3a) −50·9	(2) −117·8 (3e) −65·9	(3a-3e) 73 (P-3a) 910	(P-2) 113 (P-3e) 1040	71
$C_4F_8N_2OS$	$CF_3^{(1)}\cdot CF_2^{(2)(3)}\cdot NS\cdot CF_3^{(4)}\cdot NCO$	(1) −86·9 (3) −86·9	(2) −83·8 (4) −71·9	(1-2) (1-3) 0 (2-3) 195 (3-4) 4·2	(1-4) 0·5 (2-4) 8·3	38
$C_4F_8N_2O_2S$	$(CF_3^{(1)}\cdot CO\cdot N=)_2SF_2^{(2)}$	(1) −77·1	(2) +53·8	(1-2) 0·5		37
$C_4F_8N_2S_2$	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot N=S=N\cdot C(S)CF_3^{(3)}$	(1) −81·9 (3) −51·3	(2) −92·4	(1-2) 0 (2-3) 4·3	(1-3) 1·8	38
$C_4F_8N_3P$		(1) −75·2	(2) −46·2	(P-1) 6·2	(P-2) 1000	95
C_4F_8O		(1) −69·9	(2) −109·8			96

Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
C_4F_8O	$(CF_3^{(1)})_2CF^{(2)}\cdot CO\cdot F^{(3)}$	(1) −73·0 (2) −179·9 (3) +32·3		96
C_4F_8O	$CF_3^{(1)}\cdot CO\cdot CF_2^{(2)}\cdot CF_3^{(3)}$	(1) −82·1 (2) −120·4 (3) −84·6		97
C_4F_9H	$(CF_3^{(1)})_2CF^{(2)}\cdot CF_2^{(3)}H^{(4)}$	(1) −74·3 (2) −191·9 (3) −133·1	(1-2) 7·2 (1-3) 9·1 (2-3) 7·4 (2-4) 5·4 (3-4) 52·5	83
C_4F_9H	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot CF_2^{(3)}\cdot CF_2^{(4)}H$	(1) −83·7 (2) −130·9 (3) −133·7 (4) −141·3		93
$C_4F_9HN_2OS$	$(CF_3^{(1)(2)})_2C{=}N\cdot S(O)CF_3^{(3)}(=NH)$	(1) −62·9 (2) −67·5 (3) −54·9		101
C_4F_9CSO	$(CF_3^{(1)})_2CF^{(2)}\cdot CF_2^{(3)}\cdot O^-Cs^+$	(1) −73·1 (2) −180·3 (3) −19·4		96
C_4F_9IZn	$CF_3^{(1)}\cdot(CF_2^{(2)})_3\cdot ZnI$	(1) −84·0 (2) −125·5, −127·5, −130		93
C_4F_{10}	$(CF_3^{(1)})_3CF^{(2)}$	(1) −75·1 (2) −189·4	(1-2) 6·6	83
$C_4F_{10}ClN$	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot NF^{(3)}(CF_2^{(4)}CF_2^{(5)}Cl)$	(1) −85·0 (2) −110·5 (3) −93·5 (4) −108·9 (5) −72·0	(1-2) 0·9 (1-3) 15·9 (1-4) 1·6 (2-5) 2·7 (3-5) 19·5 (4-5) 1·8	99(a)
$C_4F_{10}ClNS$	$(CF_3^{(1)(2)})_2CF^{(3)}\cdot NSCl\cdot CF_3^{(4)}$	(1) −78·5 (2) −80·1 (3) −145 (4) −69·1	(1-3) (2-3)(3-4) ~4·7 (1-4) 0·8 (2-4) 0 (1-2) 8·4	38
$C_4F_{10}O_2$	$(CF_3^{(1)})_3CO\cdot OF^{(2)}$	(1) −69·5 (2) −295·0	(1-2) 6·0	105
$C_4F_{10}S_2$	$(CF_3^{(1)}\cdot CF_2^{(2)}\cdot S)_2$	(1) −84·8 (2) −96·6		47(a)
$C_4F_{11}NOS$	$(CF_3^{(1)(2)})_2C{=}N\cdot S(O)F_2^{(3)}\cdot CF_3^{(4)}$	(1) −67·1 (2) −68·6 (3) +70·8 (4) −66·3	(3-4) 22	101
$C_4F_{12}N_2S$	$(CF_3^{(1)}\cdot CF_2^{(2)}\cdot N{=})_2SF_2^{(3)}$	(1) −87·5 (2) −87·1 (3) −63·3	(1-3) 1·2 (2-3) 9·55	42

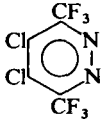
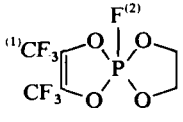
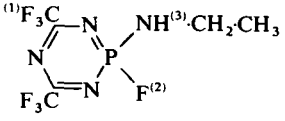
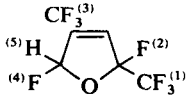
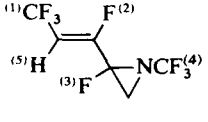
$C_4F_{13}NOS$	$(CF_3^{(1)})_2CF^{(2)}\cdot N{=}SF_2^{(3)}F^{(4)}(OCF_3^{(5)})$	(1) −69·2 (2) −144·6 (3) +58·1 (ax) (4) +51·2 (eq) (5) −83·3	(1-2) 4·2 (1-4) 7·1 (4-5) 7·2	(1-3) 12·9 (3-5) 10·1 (3-4) 148	78
$C_5F_3H_3O_3$	$CF_3C(CO_2CH_3){=}C{=}O$	−55·8			67
$C_5F_3H_7O_2$	$CF_3^{(1)}\cdot CH_2^{(2)}\cdot CH_2\cdot CO_2CH_3$	−68·0	(1-2) 10		117
$C_5F_5H_5O_3$	$CH_3O\cdot CF_2^{(2)}\cdot CH^{(3)}(CF_3^{(1)})\cdot CO_2H$	(1) −65·1 (2) −75·2 (centre AB)	(1-2) 10·5 (2-3) 7·5	(1-3) 7·5	67
$C_5F_5H_9N_2OSSi$	$CF_3^{(1)}\cdot CO\cdot N{=}SF_2^{(2)}{=}N\cdot Si(CH_3)_3$	(1) −77·0 (2) +65·8			37
$C_5F_6HCl_3O_3$	$(CF_3)_2C(OH)O\cdot CO\cdot CCl_3$	−89·28			122
$C_5F_6H_2Cl_2O_2$		−79·0			120
$C_5F_6H_2Cl_2O_3$	$(CF_3)_2C(OH)O\cdot CO\cdot CHCl_2$	−89·15			122
$C_5F_6H_2O$		(1) −83·45 (2) −121·05 (3A) −96·47 (3B) −91·50	(2-3A)(2-3B) 10 (3A-3B) 160		121(a)
$C_5F_6H_2O_5$	$HO_2C\cdot CF_2^{(3)}\cdot O\cdot CF^{(2)}(CF_3^{(1)})\cdot CO_2H$	(1) −83·56 (2) −131·56 (3A) −74·47 (3B) −81·90	(1-2) 3 (2-3B) 8	(2-3A) 15 (3A-3B) 152	121(c)
$C_5F_6H_3ClO_3$	$(CF_3^{(1)})_2C(OH)\cdot O\cdot CO\cdot CH_2Cl$	(1) −88·94			122
$C_5F_6H_3N$	$CF_3^{(1)}\cdot CH_2^{(3)}\cdot CH^{(4)}(CF_3^{(2)})\cdot CN$	(1) −66·2 (2) −70·7	(1-2) 1·3 (2-4) 7·5	(1-3) 9·8	117
$C_5F_6H_4O_2S$	$(CF_3)_2C(OH)\cdot S\cdot CO\cdot CH_3$	−87·51			122
$C_5F_6H_4O_3$	$(CF_3)_2C(OH)\cdot O\cdot CO\cdot CH_3$	−88·56			122
$C_5F_6H_7OP$	$(CF_3^{(1)})_2CH^{(2)}\cdot O\cdot P(CH_3)_2$	−77·5	(1-2) 6·5	(P-1) 6·5	124
$C_5F_7HCl_2O$		(1) −74·0 (2) −108·2 (3) −128.4 (4) −123·2 (5) −119·7	(1-2) 2·0 (1-4) 2·1 (4-5) 226	(1-3) 13·9 (2-3) 250 (1-6) 5·4	125

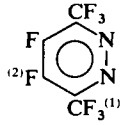
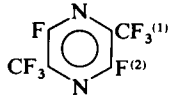
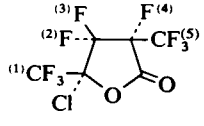
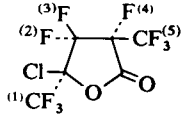
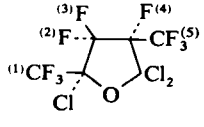
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_5F_7H_3O_3$	$(CF_3^{(1)})_2C(OH)\cdot O\cdot CO\cdot CH_2F$	(1) −89·10		122
$C_5F_7H_3S$	$(CF_3^{(1)})_2CF^{(2)}\cdot S\cdot CH{=}CH_2$	(1) −76·7 (2) −162·4	(1-2) 10·7	69
$C_5F_7H_4ClS$	$(CF_3^{(1)})_2CF^{(2)}\cdot S\cdot CH_2^{(3)}\cdot CH_2Cl$	(1) −76·9 (2) −164·3	(1-2) 10·3 (2-3) 2·0	69
$C_5F_7H_4N_4P$		(1) −74·7 (2) −44·0	(P-1) 5·5 (P-2) 948	95
$C_5F_7H_5NOS$	$(CF_3^{(1)})_2CF^{(2)}\cdot SON(CH_3)_2$	(1) −70·81, −72·90 (2) −180·21		75
$C_5F_7ClO_2$		(1) −76·8 (2) −121·8 (3) −127·8 (4) −116·5 (5) −129·9	(1-3) 16·7 (1-2) 2·8 (1-5) 2·8 (2-4) 8·6 (3-4) 7·4 (2-3) 244 (4-5) 292	125
$C_5F_7Cl_3O$		(1) −73·4 (2) −104·5 (3) −125·3 (4) −115·9 (5) −119·1	(1-3) 17·4 (1-5) 4·5 (3-5) 8·0 (3-4) 3·8 (2-4) 11·7 (2-5) 4·2 (4-5) 228 (2-3) 244	125
$C_5F_8H_2O$	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot CO\cdot CH_2^{(4)}\cdot CF_3^{(3)}$	(1) −82·4 (2) −122·2 (3) −63·5	(1-2) 1·0 (2-3) 1·2 (2-4) 0·8 (3-4) 9·2	128
$C_5F_8H_2O_2$		(1) −81·4 (2) −129·4		120
$C_5F_8H_2O_2$		(1) −139·2 (2)(3) −82·36, −80·66		120

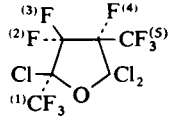
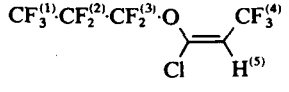
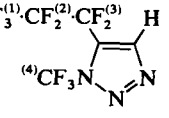
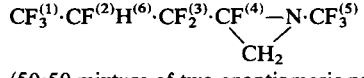
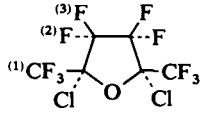
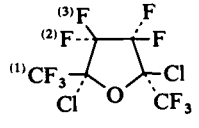
$C_5F_8H_6N_2S$	$CF_3^{(1)}\cdot CF_2^{(2)(3)}\cdot N{=}S(CF_3^{(4)})N(CH_3^{(5)})_2$	(1) −86·5 (3) −79·3	(2) −74·4 (4) −69·5	(2-3) 185	(4-5) 1·2	38
$C_5F_8Cl_2O_2$	$CF_3^{(1)}\cdot CF^{(2)}Cl\cdot CF_2^{(3)}\cdot O_2CCF_2^{(4)}Cl$	(1) −78·6 (3) −84·7	(2) −140·4 (4) −65·8	(1-2) 6·1 (2-3) 7·8	(1-3) 8·4	127
$C_5F_8Cl_2O_2$		(1) −58·5 (2)(3) −80·2, −80·6				120
$C_5F_8Cl_2O_2$		(1) −50·6	(2) −80·5			120
$C_5F_9H_3N_2OS$	$(CF_3^{(1)(2)})_2C{=}N\cdot S(O)CF_3^{(3)}(=NCH_3)$	(1) −64·8 (3) −52·7	(2) −74·5			101
$C_5F_9H_3O$	$(CF_3^{(1)})_3COCH_3^{(2)}$	−71·0		(1-2) 1		130
$C_5F_9ClO_2$	$CF_3^{(1)}\cdot CF^{(2)}Cl\cdot CF_2^{(3)}\cdot O_2CCF_3^{(4)}$	(1) −78·5 (3) −84·3	(2) −140·4 (4) −76·1	(1-2) 6·3 (2-3) 7·2	(1-3) 8·75	127
$C_5F_9ClO_2$		(1) −79·4 (3) −81·7	(2) −68·4			120
C_5F_9I		(1) −60·8 (3) −101·6	(2) −57·1 (4) −54·7	(1-2) 9·2 (2-3) 9·2 (3-4) 14·2	(1-3) 31·6 (2-4) 14·2	129(a)
C_5F_9I		(1) −76·2 (3) −62·0	(2) −158·5 (4) −56·6	(1-2) 6·8 (2-3) 30·0 (3-4) 6·8	(1-3) 13·2 (2-4) 6·8	129(a)

Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_5F_{10}H_6NP$	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot CF_2^{(3)}\cdot PF_3^{(4)}\cdot N(CH_3)_2$	(1) −81·6 (2) −125·9 (3) −115·8 (4a) −50·5 (4e) −67·7	(1-3) 10·8 (3-4a) 6·0 (4a–4e) 77 (P-1) 5·2 (P-3) 114 (P-4a) 900 (P-4e) 1000	71
$C_5F_{10}N_2OS$	$(CF_3^{(1)})_2CF^{(2)}\cdot NS\cdot CF_3^{(3)}\cdot NCO$	(1) −80·7 (2) −142·9 (3) −73·7	(2-3) 5·6	38
$C_5F_{10}N_2S_2$	$(CF_3^{(1)})_2CF^{(2)}\cdot NS\cdot NC(S)CF_3^{(3)}$	(1) −74·9 (2) −133·6 (3) −51·5	(1-2) 5·1 (1-2) 2·2 (2-3) 7·2	38
$C_5F_{10}O$		(1) −126·5 (2) −80·8 (3,4) −128·9 (5) −126·9 (6) −135·3 (7,8) −83·6	(5-6) 253	125
$C_5F_{10}O$	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot CF_2^{(3)}\cdot CO\cdot CF_3^{(4)}$	(1) −84·0 (2) −123·4 (3) −120·1 (4) −79·8		97
$C_5F_{11}I$	$(CF_3^{(1)})_2CF^{(2)}\cdot CF^{(3)}I\cdot CF_3^{(4)}$	(1) −70·7, −71·2 (2) −167·8 (3) −144·8 (4) −74·4		129(a)
$C_5F_{11}N$	$(CF_3^{(1)})_2CF^{(2)}\cdot CF^{(3)}{=}NCF_3^{(4)}$	(1) −74·5 (2) −191 (3) −17·3 (4) −59·9		132
$C_5F_{12}HOP$	$(CF_3^{(1)})_2CH^{(3)}\cdot O\cdot P(CF_3^{(2)})_2$	(1) −78·8 (2) −65·2	(1-3) 4·5 (P-2) 100	72
$C_5F_{12}ClN$	$(CF_3^{(1)}\cdot CF_2^{(2)})(CF_3^{(3)})N\cdot CF_2^{(4)}\cdot CF_2^{(5)}Cl$	(1) −85·3 (2) −94·2 (3) −52·3 (4) −91·0 (5) −71·3	(1-3) 7·4 (1-4) 8·5 (2-3) 15·6 (2-5) 13·0 (3-4) 16·1 (2-5) 9·6	99(a)
$C_5F_{12}OS$	$(CF_3^{(1)})_3COSCF_3^{(2)}$	(1) −71·0 (2) −53·8		130
$C_5F_{12}O_2$	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot O\cdot CF_2^{(2)}\cdot CF_2^{(3)}\cdot OCF_3^{(4)}$	(1) −90·7 (2) −91·9, 91·7 (3) −93·9 (4) −59·4	(3-4) 10	104
$C_5F_{13}CoO_2P$	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot CF_2^{(3)}\cdot Co(PF_3^{(4)})_2(CO)_2$	(1) −79·67 (2) −113·76 (3) −58·21 (4) −14·88	(3-4) 6 (P-3) 65 (P-4) 1348	22(c)

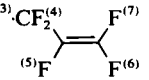
$C_5F_{13}N$	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot CF_2^{(3)}\cdot N(CF_3^{(4)})_2$	(1) −84·2 (3) −93·5	(2) −128·0 (4) −55·1	(1-3) 10·4 (3-4) 15·8	(2-4) 8·2	99(a)
$C_5F_{13}NO$	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot CF_2^{(3)}\cdot N(CF_3^{(4)})OCF_3^{(5)}$	(1) −83·4 (3) −101·5 (5) −66·3	(2) −128·4 (4) −66·3			133
$C_5F_{13}P$	$(CF_3^{(1)})_2CF^{(2)}\cdot P(CF_3^{(3)})_2$	(1) −75·0 (3) −49·2	(2) −187·2	(1-2) 10·1 (2-3) 8·7 (P-2) 56·0	(1-3) 6·1 (P-1) 15·8 (P-3) 88·8	50
$C_5F_{14}Ge$	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot Ge(CF_3^{(3)})_3$	(1) −85.26 (3) −50·8	(2) −116·9	(1-3) 2·7		45(a)
$C_5F_{15}NS$	$(CF_3^{(1)})_2CF^{(2)}\cdot N{=}SF_2^{(3)}(CF_3^{(4)})_2$	(1) −78·3 (3) +57·6	(2) −144·1 (4) −65·1	(1-2) 4·5 (1-4) 0·4	(1-3) 13·9 (3-4) 12·8	78
$C_6F_3H_7O_2$	$CF_3^{(1)}\cdot CH^{(2)}{=}CH^{(3)}\cdot CH_2^{(4)}\cdot CO_2CH_3$ (*E*)	−65·2		(1-2)(1-3) 6·4, 2·7 (1-4) 2·1		117
$C_6F_3H_7O_2$	$CF_3^{(1)}\cdot CH_2^{(2)}\cdot CH{=}CH\cdot CO_2CH_3$ (*E*)	−66·22		(1-2) 10·5		117
$C_6F_3H_9$	$CF_3^{(1)}\cdot CH{=}CH^{(2)}\cdot CH_2^{(3)}\cdot CH_2\cdot CH_3$ (*cis*) (*trans*)	−58·9 −64·8		 (1-2) 2	 (1-3) 6·5	117
$C_6F_3H_9$	$CF_3^{(1)}\cdot CH_2^{(2)}\cdot CH{=}CH\cdot CH_2\cdot CH_3$ (*cis*) (*trans*)	−67·1 −67·5		(1-2) 10·4 (1-2) 10·5		117
$C_6F_3H_9N_2OSi$	$CF_3\cdot CO\cdot N(CN)Si(CH_3)_3$	−76·84				63
$C_6F_3H_9N_2Si$	$(CH_3)_3SiN{=}C(CF_3)CN$	−77·2				63
$C_6F_3H_9O$	$CF_3^{(1)}\cdot CH^{(2)}(CH_3)\cdot CO\cdot CH_2\cdot CH_3$	−69·5		(1-2) 8·5		137
$C_6F_3H_9O_2$	$CF_3^{(1)}\cdot CH_2^{(2)}\cdot (CH_2)_2\cdot CO_2CH_3$	−67·04		(1-2) 10·2		117
$C_6F_3H_{10}NO$	$CF_3^{(1)}\cdot CH^{(2)}{=}N^+(O^-)C(CH_3)_3$	−65·7		(1-2) 6		32(a)
$C_6F_5CoO_4$	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot Co(CO)_4$	(1) −82·36	(2) −56·88			22(c)
$C_6F_6H_2N_2$		−68·5				87(a)

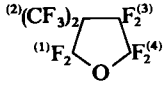
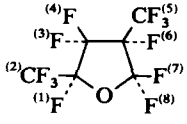
Molecular formula	Structure of compounds	Chemical shifts (ppm)		Coupling constants (Hz)		Ref.
$C_6F_6H_6O_2$	$CF_3^{(1)}\cdot CH_2^{(3)}\cdot CH^{(4)}(CF_3^{(2)})\cdot CO_2CH_3$	(1) −66·9	(2) −69·7	(1-3) 10·4	(2-4) 8·5	117
$C_6F_6H_6O_2S$	$(CF_3)_2C(OH)S\cdot CO\cdot CH_2\cdot CH_3$	−87·52				122
$C_6F_6Cl_2N_2$		−66·0				87(a)
$C_6F_7H_4O_4P$		(1) −67·0	(2) −74·3	(P-2) 1003		141
$C_6F_7H_6N_4P$		(1) −74·9	(2) −41·5	(P-1) 6·0 (2-3) 3	(P-2) 960	95
$C_6F_7H_6N_4P$	As above with $NH\cdot CH_2\cdot CH_3$ replaced by $N(CH_3)_2$	(1) −74·9	(2) −44·8	(P-1) 5·5 (2-3) 1·1	(P-2) 961	95
$C_6F_8H_2O$		(1) −82·71 (3) −93·0	(2) −111·86 (4) −112·6	(2-5) 16	(4-5) 60	121(a)
$C_6F_8H_3N$		(1)(4) −59·7 (3) −171·3	(2) −110·3	(2-5) 30	(1-5) 7·5	142
$C_6F_8H_{10}NP$	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot PF_3^{(3)}N(CH_2\cdot CH_3)_2$	(1) −82·5 (3a) −51·5	(2) −119·9 (3e) −66·9	(2-3a) 16·0 (P-2) 116 (P-3e) 1050	(3a-3e) 70 (P-3a) 897	71

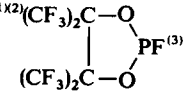
$C_6F_8N_2$		(1) −66·7	(2) −145·3			87(a)
$C_6F_8N_2$		(1) −69·5	(2) −82·0			87(a)
C_6F_9H	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot CF_2^{(3)}\cdot CF_2^{(4)}\cdot C{\equiv}CH^{(5)}$	(1) −81·6 (3) −124·0	(2) −126·2 (4) −99·6	(4-5) 5·5		144
$C_6F_9HBr_2$	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot CF_2^{(3)}\cdot CF_2^{(4)}\cdot CBr{=}CHBr$	(1) −81·6 (3) −121·4	(2) −126·2 (4) −106·1			144
$C_6F_9H_2Br_3$	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot CF_2^{(3)}\cdot CF_2^{(4)}\cdot CBr_2\cdot CH_2Br$	(1) −81·6 (3) −115·4	(2) −126·2 (4) −102·5			144
$C_6F_9H_3$	$(CF_3)_3C\cdot CH{=}CH_2$	−67·6				145
$C_6F_9H_3O_2$	$(CF_3)_3C\cdot O\cdot CO\cdot CH_3$	−70·1				130
$C_6F_9ClO_2$		(1) −75·9 (3) −125·3 (5) −74·7	(2) −115·3 (4) −174·9	(1-3) 25·2 (4-5) 9·5 (2-5) 2·3 (2-4) 18·1	(1-2) 2·5 (3-5) 15·6 (2-3) 260	125
$C_6F_9ClO_2$		(1) −77·1 (3) −108·9 (5) −74·9	(2) −118·7 (4) −181·1	(1-2) 18·0 (1-3) 2·5 (4-5) 11·5 (2-3) 262	(1-4) 7·1 (3-5) 15·0 (2-5) 2·5	125
$C_6F_9Cl_3O$		(1) −76·4 (3) −118·5 (5) −71·0	(2) −110·9 (4) −153·5	(1-3) 17·5 (3-5) 14·0 (2-4) 14·4 (4-5) 5·5	(1-2) 2·5 (3-4) 1·0 (2-5) 3·7 (2-3) 248	125

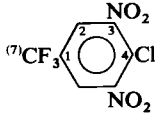
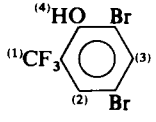
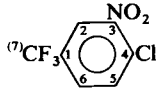
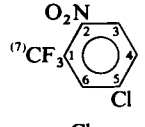
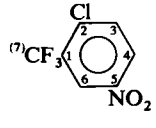
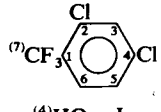
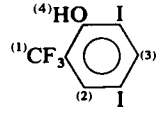
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_6F_9Cl_3O$		(1) −77·4 (2) −120·7 (3) −93·3 (4) −163·1 (5) −71·3	(1-2) 16·8 (1-4) 13·2 (1-3) 1·8 (3-5) 14·5 (3-4) 1·7 (2-4) 8·1 (2-5) 2·1 (4-5) 5·7 (2-3) 254	125
C_6F_{10}	$CF_3^{(1)}CF_2^{(2)}\cdot C(CF_3^{(3)})=C=CF_2^{(4)}$	(1) −87·7 (2) −116·5 (3) −65·7 (4) −95·7	(1-3) 3·0 (1-2) 1·2 (3-4) 3·0 (2-3) 8·1 (2-4) 4·2 (1-4) ~1	146
$C_6F_{10}HClO$		(1) −83·4 (2) −131·3 (3) −86·4 (4) −62·0	(4-5) 7·5	86
$C_6F_{10}HN_3$		(1) −80·7 (2)(3) −105·7, −125·1 (3) −57·4		142
$C_6F_{10}H_3N$	 (50:50 mixture of two enantiomeric pairs)	(1) −74·9 (2) −213·5 (3) −122·8 (AB system) −124·9 (AB system) (4) −188·4, −189·4 (5) −59·7	(2-6) 45	142
$C_6F_{10}H_6N_2S$	$(CF_3^{(1)})_2CF^{(2)}\cdot N=S(CF_3^{(3)})N(CH_3^{(4)})_2$	(1) ~−80·8 (2) −135·8 (3) −70·6	(1-2) 5·4 (3-4) 1·3	38
$C_6F_{10}Cl_2O$		(1) −77·8 (2) −107·8 (3) −128·2	(2-3) 230	125
$C_6F_{10}Cl_2O$		(1) −76·9 (2)(3) −120·4		125

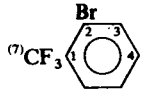
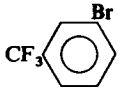
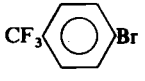
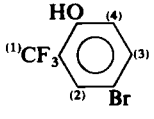
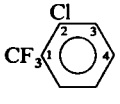
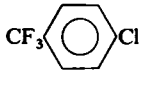
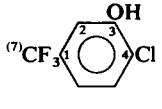
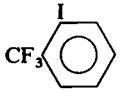
$C_6F_{10}CoO_3P$	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot CF_2^{(3)}\cdot Co(PF_3^{(4)})(CO)_3$	(1) −79·75 (3) −50·78	(2) −114·36 (4) −14·27	(3-4) 6 (P-4) 1373	(P-3) 62	22(c)
$C_6F_{10}O$	$CF_3^{(1)}\cdot C{\equiv}C\cdot O\cdot CF_2^{(2)}\cdot CF_2^{(3)}\cdot CF_3^{(4)}$	(1) −52·8 (3) −131·2	(2) −88·7 (4) −84·3			86
$C_6F_{10}O_3$	$(CF_3^{(1)})_2CF^{(2)}\cdot O_2C\cdot CF_2^{(3)}\cdot CO\cdot F^{(4)}$	(1) −79·2 (3) −111·5	(2) −142·3 (4) +20·3	(1-2) 2·4	(3-4) 10·1	147
$C_6F_{11}HO$	$(CF_3^{(1)})_2CH^{(4)}\cdot CO\cdot CF_2^{(2)}\cdot CF_3^{(3)}$	(1) −63·4 (3) −81·9	(2) −123·6	(1-2) 2·9 (1-4) 6·8 (2-4) 0·4	(1-3) 1·1 (2-3) 0·3	128
$C_6F_{11}H_3N$	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot CF_2^{(3)}\cdot CF^{(4)}(\text{—}CH_2\text{—})N\cdot CF_3^{(5)}$	(1) −81·8 (2)(3) −124·0, −126·8 (4) −189·7	(5) −60·6			142
$C_6F_{11}ClO$	$CF_2^{(1)}Cl\cdot CF_2^{(2)}\cdot CF^{(3)}(CF_3^{(4)})\cdot O\cdot CF^{(5)}{=}CF_2^{(6)}$	(1) −66·4 (3) −134.3 (5)(6) −114·0, −121·1, −132·5	(2) −117·6 (4) −77·7			148
$C_6F_{11}ClO_2$	$CF_2^{(1)}Cl\cdot CF^{(2)}(CF_3^{(3)})\cdot O\cdot CF_2^{(4)}\cdot CO\cdot CF_3^{(5)}$	(1) −68·8 (3) −79·0	(2) −140·3 (4)(5) −75·1	(2-) 21·5	(4,5-) 4·5	143
$C_6F_{11}ClO_2$	$(CF_3^{(1)})_2CF^{(2)}\cdot O\cdot CF_2^{(3)}\cdot CO\cdot CF_2^{(4)}Cl$	(1) −81·3 (3) −73·5	(2) −145·6 (4) −66·2	(1-2) 1·2 (2-3) 21·5	(1-3) 5·7 (3-4) 7·5	143
C_6F_{12}	$^{(1)}CF_3(CF_3^{(2)})C{=}C(^{(5)})CF_2^{(4)}\cdot CF_3$ $F^{(3)}$			(1-C1) 276 (3-C5) 292	(2-C2) 276 (4-C5) 33	149
C_6F_{12}	$(CF_3^{(1)})_2CF^{(2)}(F^{(4)})C{=}C(F^{(3)})CF_3^{(5)}$			(1-C1) 288 (2-C3) 25 (4-C4) 231 (5-C4) 42	(2-C1) 26 (3-C3) 231 (5-C5) 274 (4-C5) 31	149

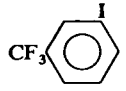
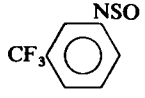
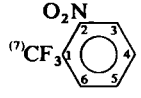
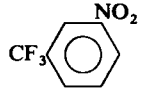
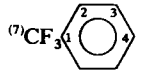
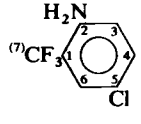
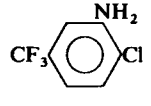
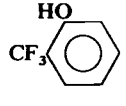
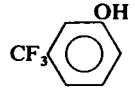
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
C_6F_{12}		(1) −83·7 (2) −129·0 (3) −127·0 (4) −120·5 (5) −193·4 (6) −91·7 (7) −108·1	(1-3) 10·7 (1-4) 2·5 (2-3) 3·5 (2-4) 12·7 (2-5) 3·6 (3-5) 7·1 (3-7) 4·0 (4-5) 14·1 (4-6) 5·8 (4-7) 28·2 (5-6) 40·2 (5-7) 117·2 (6-7) 51·8	150
C_6F_{12}	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot CF_2^{(3)}\cdot CF_2^{(4)}\cdot CF^{(5)}=CF_2^{(6)}$	(1) −83·7 (2) −129 (3) −127 (4) −120·5 (5) −193·4 (6) −91·7, −108·1		93
C_6F_{12}	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot CF^{(3)}=CF\cdot CF_2\cdot CF_3$	(1) −87·1 (2) −124·3 (3) −158·9		93
C_6F_{12}	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot CF_2^{(3)}\cdot CF^{(4)}=CF^{(5)}\cdot CF_3^{(6)}$	(1) −83·7 (2) −130·9 (3) −121·9 (4) −160·7 (5) −160·7 (6) −72·3		93
$C_6F_{12}H_2ClO_2P$	$[(CF_3)_2CH\cdot O]_2PCl$	−77·8		72
$C_6F_{12}H_3O_2P$	$[(CF_3)_2C(OH)]_2PH$	−73·8		73
$C_6F_{12}N_2O_2S$	$[(CF_3^{(1)(2)})_2C{=}N]S(O)CF_3^{(3)}[{=}NC(O)CF_3^{(4)}]$	(1) −68·1 (2) −63·5 (3) −74·5 (4) −56·8		101
$C_6F_{12}O$	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot CF^{(3)}(CF_3^{(4)})\cdot O\cdot CF^{(5)}=CF_2^{(6)}$	(1)(4) −77·8, −79·7 (2) −123·9 (3) −136·6 (5)(6) −114·2, −120·6, −133·1		148
$C_6F_{12}O$	$(CF_3^{(1)})_2CF^{(2)}\cdot CF_2^{(3)}\cdot CF_2^{(4)}\cdot CO\cdot F^{(5)}$	(1) −70·9 (2) −184·6 (3) −112·7 (4) −115·7 (5) +21·0		151
$C_6F_{12}O$	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot CF_2^{(3)}\cdot CF^{(4)}(CF_3^{(5)})\cdot CO\cdot F^{(6)}$	(1) −81·6 (2) −124·6 (3) −117·9 (4) −180·0 (5) −73·0 (6) +32·3	(1-3) 10·5 (1-4) 2·4	152

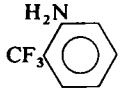
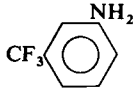
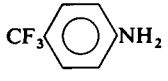
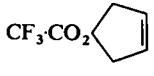
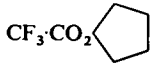
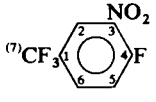
$C_6F_{12}O$	$(CF_3^{(1)})_2CF^{(2)}\cdot CF^{(3)}(CF_3^{(4)})\cdot CO\cdot F^{(5)}$	(1) −72·1 (3) −182·1 (5) +31·9	(2) −176·4 (4) −71·5			152
$C_6F_{12}O$		(1) −69·9 (3) −113·5	(2) −63·0 (4) −86·4	(1-2) 12·9 (2-4) 2·0	(2-3) 12·9 (1-3) 1·9	152
$C_6F_{12}O$		(1) −124·5 (3) −122·1 (5) −73·1 (7) −73·4	(2) −80·1 (4) −126·4 (6) −182·3 (8) −82·3	(2-4) 10·7 (3-4) 268	(2-3) 3·7 (7-8) 140	152
$C_6F_{12}O$	$CF_3^{(1)}\cdot CO\cdot CF_2^{(2)}\cdot CF_2^{(3)}\cdot CF_2^{(4)}\cdot CF_3^{(5)}$	(1) −76·4 (3) −122·4 (5) −83·2	(2) −119·1 (4) −127·1			97
$C_6F_{12}O_2$	$(CF_3^{(1)})_2CF^{(2)}\cdot O\cdot CF_2^{(3)}\cdot CO\cdot CF_3^{(4)}$	(1) −81·4 (3) −75·8	(2) −145·4 (4) −75·2	(1-3) 5·5 (2-3) 21·2	(1-2) 2·3 (3-4) 5·6	143
$C_6F_{12}O_3$	$CF_3^{(1)}\cdot CO\cdot OO\cdot C(CF_3^{(2)})_3$	(1) −70·0	(2) −69·8			153
$C_6F_{13}H$	$CF_3^{(1)}\cdot(CF_2^{(2)})_4\cdot CF_2^{(3)}H$	(1) −83·7 −132·5	(2) −126·1, −129·3 (3) −140·9			93
$C_6F_{13}H$	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot CF_2^{(3)}\cdot CH^{(5)}(CF_3^{(4)})_2$	(1) −79·4 (3) −110·1	(2) −124·0 (4) −60·7	(3-5)(4-5) 7·0		123
$C_6F_{13}H_2O_2P$	$[(CF_3^{(1)})_2CH^{(3)}\cdot O]_2PF^{(2)}$	(1) −77·3	(2) +52·0	(1-3) 6·0	(P-2) 1270	72
$C_6F_{13}Cl$	$(CF_3^{(1)})_2CCl\cdot CF_2^{(2)}\cdot CF_2^{(3)}\cdot CF_3^{(4)}$	(1) −66·7 (3) −121·7	(2) −107·5 (4) −80·1			123
$C_6F_{13}ClO_2$	$(CF_3^{(1)})_3C\cdot OO\cdot CF_2^{(2)}\cdot CF_2^{(3)}Cl$	(1) −69·42 (3) −71·1	(2) −83·0	(1-2) 2·5 (1-3) ~0	(2-3) 9·0	105
$C_6F_{13}ClO_2$	$(CF_3^{(1)})_3C\cdot OO\cdot CF^{(2)}Cl\cdot CF_3^{(3)}$	(1) −69·50 (3) −81·0	(2) −83·2	(1-2) 0·4 (1-3) ~0	(2-3) 2·5	105
$C_6F_{13}Cl_2N$	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot N(CF_2^{(3)}\cdot CF_2^{(4)}Cl)_2$	(1) −81·2 (3) −86·1	(2) −88·7 (4) −68·0			99(a)

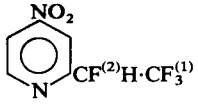
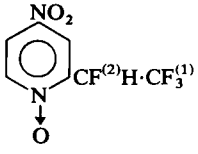
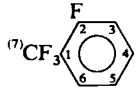
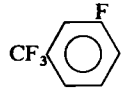
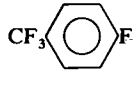
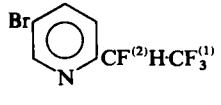
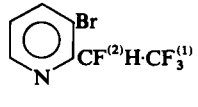
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_6F_{13}I$	$(CF_3^{(1)})_2CF^{(2)}\cdot CF^{(3)}I\cdot CF_2^{(4)(5)}\cdot CF_3^{(6)}$	(1) −69·7 (2) −168·2 (3) −143·5 (4)(5) −110·6 (6) −77·5	(4-5) 284 (4-6) 10·0 (5-6) 10·0	129(a)
$C_6F_{13}O_2P$		(1) −70·2 (2) −67·8 (3) −26·8	(P-1) 15·0 (P-3) 1425 (1-3) 8·5	155
$C_6F_{14}HN$	$(CF_3^{(1)})_2N\cdot CF_2^{(2)}\cdot CH^{(4)}(CF_3^{(3)})_2$	(1) −54·2 (2) −80·0 (3) −63·6	(1-2) 12·1 (1-3) 1·5 (2-3) 10·9 (3-4) 7·2 (2-4) 12·8	99(a)
$C_6F_{14}HNO_2$	$CF_3^{(1)}\cdot NH^{(4)}\cdot CF_2^{(2)}\cdot OO\cdot C(CF_3^{(3)})_3$	(1) −80·2 (2) −68·3 (3) −69·2	(1-2) 8·3 (1-4) 4·0 (3-4) ~4·0	153
$C_6F_{14}H_2NOP$	$\overbrace{PF_2^{(1)}(NH_2^{(3)})OC(CF_3)_2C(CF_3)_2O}^{(2)}$	(1) −61·5 (2) −68·4 At −90 °C (1a) −51·8 (1e) −69·9	(P-1) 837 (P-1a) 733 (P-1e) 950 (1a-1e) 67·1 (1a-3) 39·1	156
$C_6F_{14}ClN$	$(CF_3^{(1)})_2N\cdot CF_2^{(2)}\cdot CF^{(3)}(CF_3^{(4)})\cdot CF_2^{(5)}Cl$	(1) −54·6 (2) −84·5 (3) −174·3 (4) −73·5 (5) −62·3	(1-2) 14·4 (1-3) 17·7 (1-4) 2·6 (1-5) 3·0	99(a)
$C_6F_{14}ClN$	$(CF_3^{(1)})_2N\cdot CF_2^{(2)}\cdot CCl(CF_3^{(3)})_2$	(1) −53·8 (2) −77·3 (3) −70·1	(1-2) 16·2 (1-3) 3·2 (2-3) 12·8	99(a)
$C_6F_{14}O_2$	$CF_3^{(1)}\cdot O\cdot CF^{(2)}(CF_3^{(3)})\cdot CF(OCF_3)\cdot CF_3$	(1) −53·1, −53·2 (2) −77·0, −78·1 (3) −139·2, −141·0		151
$C_6F_{14}O_2$	$CF_3^{(1)}\cdot CF_2\cdot O\cdot CF_2^{(2)}\cdot CF_2\cdot O\cdot CF_2\cdot CF_3$	(1) −90·5 (2) −91·7		104
$C_6F_{15}H_2O_2P$	$[(CF_3^{(1)})_2\cdot CH\cdot O]_2PF_3^{(2)}$	(1) −76·0 (2) −65·0	(P-2) 845	157
$C_6F_{15}N$	$(CF_3^{(1)})_2N\cdot CF_2^{(2)}\cdot CF_2^{(3)}\cdot CF_2^{(4)}\cdot CF_3^{(5)}$	(1) −55·1 (2) −92·3 (3) −124·4 (4) −129·0 (5) −83·8	(1-2) 15·6 (1-3) 8·1 (3-5) 10·4 (2-5) 2·4 (2-4) 15·2	99(a)

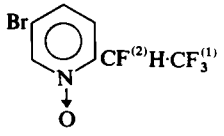
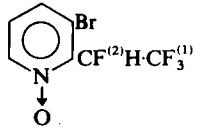
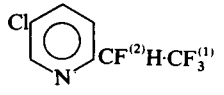
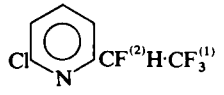
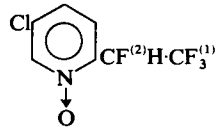
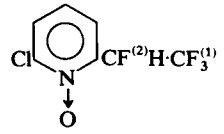
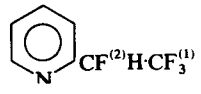
$C_6F_{15}N$	$(CF_3^{(1)})_2N{\cdot}CF_2^{(2)}{\cdot}CF^{(3)}(CF_3^{(4)})_2$	(1) −55·5 (3) −184·4	(2) −86·4 (4) −75·6	(1-2)(1-3) 14, 17 (1-4) 2·3 (2-3) 5·9 (2-4) 11·3 (3-4) 6·5	99(a)
$C_6F_{16}N_2S$	$[(CF_3^{(1)})_2CF^{(2)}{\cdot}N{=}]_2SF_2^{(3)}$	(1) −81·0 (3) +67·4	(2) −145·8	(1-2) 4·2 (1-3) 2·1 (2-3) 8·6	42
$C_7F_3H_2ClN_2O_4$				(F-C1) 36·4 (F-C2) 3·6 (F-C4) 1·0 (F-C7) 273·5	166
$C_7F_3H_3Br_2O$				(1-2) −0·641 (1-3) −0·578 (1-4) 0·271	167
$C_7F_3H_3ClNO_2$				(F-C1) 34·6 (F-C2) 4·0 (F-C4) 1·2 (F-C6) 3·5 (F-C7) 272·5	166
$C_7F_3H_3ClNO_2$				(F-C1) 34·6 (F-C4) 0·8 (F-C6) 5·6 (F-C7) 273·8	166
$C_7F_3H_3ClNO_2$				(F-C1) 33·0 (F-C2) 1·7 (F-C4) 0·7 (F-C6) 5·6 (F-C7) 273·6	166
$C_7F_3H_3Cl_2$				(F-C1) 32·1 (F-C2) 1·8 (F-C4) 1·3 (F-C6) 5·3 (F-C7) 272·8	166
$C_7F_3H_3I_2O$				(1-2) −0·680 (1-3) −0·600 (1-4) ±0.10	167

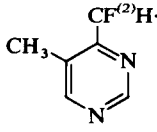
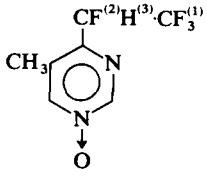
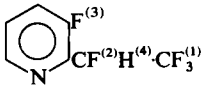
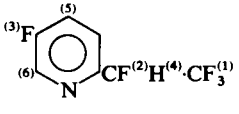
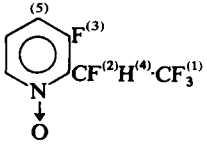
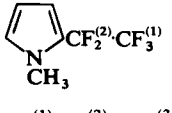
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_7F_3H_4Br$			(F-C1) 31·2 (F-C2) 2·0 (F-C4) 1·0 (F-C6) 5·5 (F-C7) 273·1	166
$C_7F_3H_4Br$			(F-C1) 33·0 (F-C2) 3·9 (F-C4) 1·2 (F-C6) 3·8 (F-C7) 272·6	166
$C_7F_3H_4Br$			(F-C1) 32·9 (F-C2) 3·8 (F-C4) 1·6 (F-C7) 272·0	166
$C_7F_3H_4BrO$			(1-2) −0·648 (1-3) −0·683 (1-4) −0·718 (1-5) −3·069	167
$C_7F_3H_4Cl$			(F-C1) 31·3 (F-C2) 2·0 (F-C4) 1·1 (F-C6) 5·3 (F-C7) 272·6	166
$C_7F_3H_4Cl$			(F-C1) 33·0 (F-C2) 3·8 (F-C4) 1·6 (F-C7) 271·7	166
$C_7F_3H_4ClO$			(F-C1) 33·1 (F-C2) 3·9 (F-C4) 1·5 (F-C6) 3·9 (F-C7) 272·0	166
$C_7F_3H_4I$			(F-C1) 30·8 (F-C2) 2·0 (F-C4) 1·0 (F-C6) 5·6 (F-C7) 273·8	166

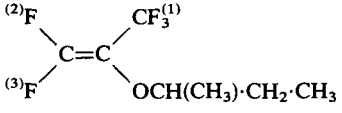
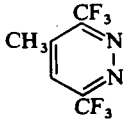
$C_7F_3H_4I$			(F-C1) 32·8 (F-C2) 3·9 (F-C4) 1·3 (F-C6) 3·8 (F-C7) 272·9	166
$C_7F_3H_4NOS$		−63·59		168
$C_7F_3H_4NO_2$			(F-C1) 33·9 (F-C4) 1·0 (F-C6) 5·3 (F-C7) 272·9	166
$C_7F_3H_4NO_2$			(F-C1) 34·0 (F-C2) 4·0 (F-C4) 1·1 (F-C6) 3·6 (F-C7) 272·4	166
$C_7F_3H_5$			(F-C1) 32·2 (F-C2) 3·9 (F-C4) 1·4 (F-C7) 271·5	166
$C_7F_3H_5ClN$			(F-C1) 30·6 (F-C2) 2·0 (F-C4) 1·1 (F-C6) 5·4 (F-C7) 272·3	166
$C_7F_3H_5ClN$			(F-C1) 32·4 (F-C2) 3·9 (F-C4) 1·7 (F-C6) 4·0 (F-C7) 272·0	166
$C_7F_3H_5O$			(F-C1) 30·5 (F-C2) 2·0 (F-C4) 1·2 (F-C6) 5·0 (F-C7) 271·9	166
$C_7F_3H_5O$			(F-C1) 32·4 (F-C2) 3·9 (F-C4) 1·2 (F-C6) 3·9 (F-C7) 272·1	166

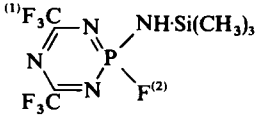
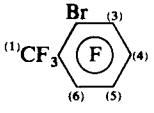
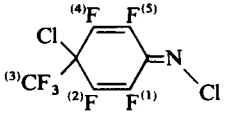
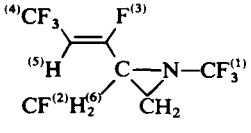
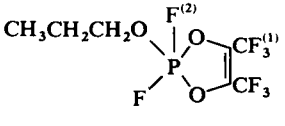
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_7F_3H_6N$			(F-C1) 29·7 (F-C2) 1·9 (F-C4) 1·1 (F-C6) 5·3 (F-C7) 271·8	166
$C_7F_3H_6N$			(F-C1) 31·6 (F-C2) 3·9 (F-C4) 1·3 (F-C6) 4·0 (F-C7) 272·0	166
$C_7F_3H_6N$			(F-C1) 32·5 (F-C2) 3·8 (F-C7) 270·3	166
$C_7F_3H_7O_2$		−76·0		117
$C_7F_3H_9O$	$CF_3^{(1)}\cdot\overline{CH^{(2)}\cdot CO\cdot(CH_2)_3\cdot CH_2}$	−69·5	(1-2) 8·5	137
$C_7F_3H_9O_2$		−76·12		117
$C_7F_3H_{11}$	$CF_3^{(1)}\cdot CH^{(2)}=CH^{(3)}\cdot CH_2^{(4)}\cdot(CH_2)_2\cdot CH_3$ (*cis*) (*trans*)	−59·6 −65·3	(1-2) 8·2 (1-2)(1-3) 5·9, 2·0 (1-4) 2·0	117
$C_7F_3H_{11}$	$CF_3^{(1)}\cdot CH_2^{(2)}\cdot CH=CH\cdot(CH_2)_2\cdot CH_3$ (*cis*) (*trans*)	−67·5 −68·0	(1-2) 10·7 (1-2) 10·8	117
$C_7F_3H_{13}$	$CF_3^{(1)}\cdot CH_2^{(2)}\cdot(CH_2)_4\cdot CH_3$	−67·9	(1-2) 10·6	117
$C_7F_3H_{14}O_3P$	$CF_3\cdot CH_2\cdot CH_2\cdot P(O)(OCH_2CH_3)_2$	−68·9	(1-2) 9·6 (1-3) 4·2	84
$C_7F_4H_3NO_2$			(7-C1) 34·8 (7-C2) 4·0 (7-C4) 1·3 (7-C6) 3·6 (7-C7) 272·0	166

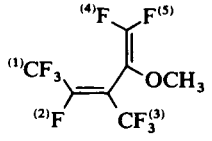
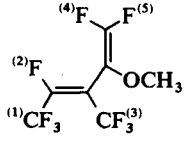
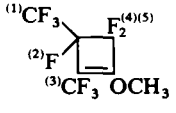
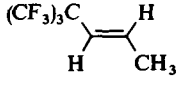
$C_7F_4H_3N_2O_2$		(1) −78·5	(2) −203·9		169
$C_7F_4H_3N_2O_2$		(1) −78·6	(2) −207·0		169
$C_7F_4H_4$				(7-C1) 32·8 (7-C2) 2·3 (7-C4) 1·0 (7-C6) 4·7 (7-C7) 271·5	166
$C_7F_4H_4$	As above	(7) −61·571	(2) −114·763	(2-7) 12·8 (2-C2) −255·5 (2-C7) −1·0 (7-C2) 2·6 (7-C7) −271·8	408
$C_7F_4H_4$				(7-C1) 33·3 (7-C2) 3·9 (7-C4) 1·2 (7-C6) 3·8 (7-C7) 271·7	166
$C_7F_4H_4$				(7-C1) 33·0 (7-C2) 3·8 (7-C4) 1·4 (7-C7) 271·7	166
$C_7F_4H_4BrN$		(1) −76·5	(2) −199·5		169
$C_7F_4H_4BrN$		(1) −79·1	(2) −202·5		169

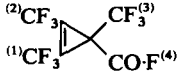
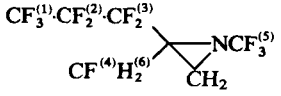
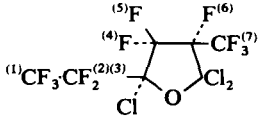
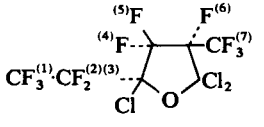
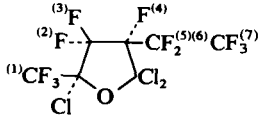
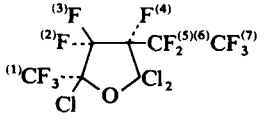
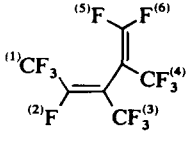
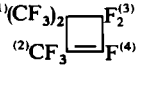
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_7F_4H_4BrNO$		(1) −73·9 (2) −206·6		169
$C_7F_4H_4BrNO$		(1) −77·9 (2) −205·5		169
$C_7F_4H_4ClN$		(1) −77·5 (2) −201·3		169
$C_7F_4H_4ClN$		(1) −78·5 (2) −202·5		169
$C_7F_4H_4ClNO$		(1) −74·9 (2) −209·1		169
$C_7F_4H_4ClNO$		(1) −78·7 (2) −202·9		169
$C_7F_4H_5N$		(1) −79·5 (2) −202·5		169

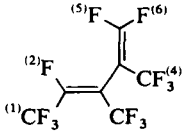
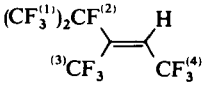
$C_7F_4H_5NO$	*N*-oxide of above	(1) −78·7	(2) −204·5			169
$C_7F_4H_6N_2$		(1) −77·5	(2) −206·0			169
$C_7F_4H_6N_2O$		(1) −77·3	(2) −204·0	(1-2) 13	(1-3) 6	169
$C_7F_4H_8O$	$CF_3^{(1)}\cdot CF^{(2)}=C(CH_3)CO\cdot CH_2\cdot CH_3$	(1) −68·4	(2) −122			137
$C_7F_5H_4N$		(1) −78·5 (3) −127·5	(2) −205·9	(1-2) 13·4 (1-4) 6·7 (2-4) 44·5	(1-3) 6·7 (2-3) 9·5	169
$C_7F_5H_4N$		(1) −80·1 (3) −128·5	(2) −202·9	(1-2) 12·4 (2-3) 3·4 (3-5) ~7	(1-4) 6·2 (2-4) 44·2 (3-6) ~3	169
$C_7F_5H_4NO$		(1) −77·0 (3) −117·0	(2) −211·5	(1-2) 13·0 (1-4) 6·7 (2-4) 42·2	(1-3) 13·0 (2-3) 26.0 (3-5) 6·0	169
$C_7F_5H_6N$		(1) −83·4	(2) −106	(1-2) 2·8		137
$C_7F_5H_7O_2$	$CF_3^{(1)}\cdot CF^{(2)}=CF^{(3)}\cdot CO_2CH_2\cdot CH_2\cdot CH_3$ (*E*)	(1) −62·5 (3) −150	(2) −151	(1-2) 5·5 (2-3) 120	(1-3) 15	170

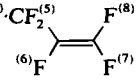
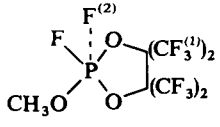
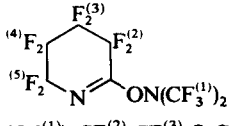
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_7F_5H_9O$		(1) −66·8 (2) −101·1 (3) −92·7	(1-2) 24·0 (1-3) 9·6 (2-3) 46·4	171(a)
$C_7F_5H_9O$	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot CH(CH_3)\cdot CO\cdot CH_2\cdot CH_3$	(1) −83·7 (2) −119·5	(2A-2B) 279	137
$C_7F_5H_9OS$	$CF_3^{(1)}\cdot CO\cdot CF_2^{(2)}\cdot SC(CH_3)_3$	(1) −73·6 (2) −83·4	(1-2) 7·9	143
$C_7F_5H_{10}ClO$	$CF_3^{(1)}\cdot C(OH)(CH_2CH_2CH_2CH_2)CF_2^{(2)}Cl$	(1) −74·4 (2) −62·0	(1-2) 11·4	4
$C_7F_6H_4N_2$		−67·4, −65·2		87
$C_7F_6H_6$	$(CF_3)_2C{=}C{=}C(CH_3)_2$	−63·5		172(a)
$C_7F_6H_8O_2$	$CF_3^{(1)}\cdot CF_2^{(2)(3)}\cdot CF^{(4)}H^{(5)}\cdot CO_2CH_2CH_2CH_3$	(1) −81 (2) −121 (3) −126·5 (4) −206	(2-3) 300 (2-4) 12 (3-4) 14 (4-5) 48	170
$C_7F_6H_9O_3PS$	$(CF_3)_2C{=}C(SCH_3)P(O)(OCH_3)_2$	−60·05, −57·72		173(e)
$C_7F_6H_{10}ClOP$	$(CF_3^{(1)(2)})_2CH^{(3)}O\cdot PCl[C(CH_3)_3]$	(1) −74·1 (2) −73·5	(1-2) 8·0 (1, 2-3) 5·7	72
$C_7F_6H_{10}N_3OP$	$(CF_3)_2C{=}N\cdot P(O)N(CH_3)_2CH_2\cdot CH_2\cdot NCH_3$	−68·3		140
$C_7F_6H_{11}O_3P$	$CF_3^{(1)}\cdot CF^{(2)}H^{(5)}\cdot CF_2^{(3)(4)}\cdot P(O)(OCH_2CH_3)_2$	(1) −75·1 (2) −216·5 (3) −123·47 (4) −129·53	(1-5) ~11 (2-5) 42·0 (3-5) ~11 (4-5) ~11 (3-4) 328 (P-3, 4) ~93	84
$C_7F_6H_{11}O_3P$	$CF_3^{(1)}\cdot CF^{(2)}(CF_2^{(3)}H)\cdot P(O)(OCH_2CH_3)_2$	(1) −74·5 (2) −200·1 (3) −133·5	(P-2) 71·0	84
$C_7F_7H_7$	$(CF_3^{(1)})_2CH^{(3)}\cdot CF^{(2)}{=}C(CH_3^{(4)})_2$	(1) −67·0 (2) −126·5	(1-2) 8·0 (1-3) 8·0 (2-4) 8·0 (2-3) 26·6	172(a)
$C_7F_7H_8NO_2S$	$(CF_3^{(1)})_2CF^{(2)}\cdot S(O)N\cdot CH_2\cdot CH_2\cdot O\cdot CH_2\cdot CH_2$	(1) −70·84, −72·75 (2) −179·32	(1-2) 10	75(a)

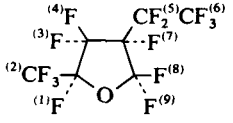
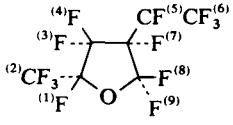
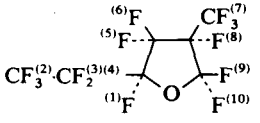
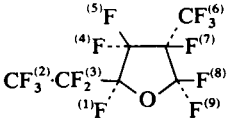
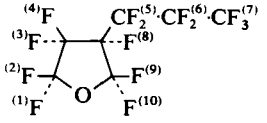
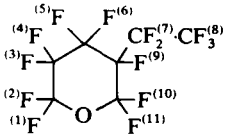
$C_7F_7H_8NO_3S$	$(CF_3^{(1)})_2CF^{(2)}\cdot SO_2\cdot N(CH_2\cdot CH_2\cdot O\cdot CH_2\cdot CH_2)$	(1) −72·13	(2) −170·36	(1-2) 8		75(a)
$C_7F_7H_{10}N_3S$	$(CF_3^{(1)})_2CF^{(2)}\cdot N{=}S\cdot N(CH_3)CH_2\cdot CH_2\cdot NCH_3$	(1) −80·6	(2) −130·0			140
$C_7F_7H_{10}N_4PSi$		(1) −75·2	(2) −29·2	(P-1) 6·0	(P-2) 970	95
$C_7F_7H_{10}OP$	$(CF_3^{(1)})_2CH^{(3)}O\cdot PF^{(2)}\cdot C(CH_3)_3$	(1) −74·0	(2) −115	(1-3) 5·7	(P-2) 1130	72
C_7F_7Br		(1) −52·6 (4)(5) −146·6, −152·8 (6) −133·2	(3) −122·4			430(b)
$C_7F_7Cl_2N$		(1) −144·3 (3) −72·7 (5) −146·0	(2) −134·7 (4) −140·6	(2-3) 12 (3-4) 12	(2-4) 4·5 (4-5) 5	174(a)
$C_7F_7Cl_2N$	As above	(1) −144·7 (3) −73·1 (5) −146·3	(2) −135·0 (4) −140·9	(2-3) 12·0 (3-4) 12·0	(2-4) 4·2 (4-5) 5·4	175(a)
$C_7F_8H_5N$		(1) −59·4 (3) −101·8	(2) −222·8 (4) −59·2	(3-4) 18 (2-6) 49	(4-5) 8	142
$C_7F_8H_6$	$(CH_3)_2C\cdot CF^{(2)}(CF_3^{(1)})\cdot CF_2^{(3)}\cdot CF_2^{(4)}$	(1) −75·9 (2)(3) −128·4, −129·8 (4) −194·0				176
$C_7F_8H_7O_3P$		(1) −66·0	(2) −59·2	(P-2) 907		141

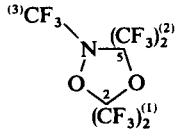
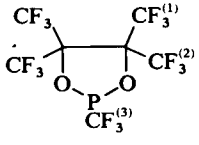
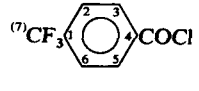
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_7F_8H_{10}N_3P$	$(CF_3^{(1)})_2C{=}N{\cdot}PF_2^{(2)}{\cdot}N(CH_3)CH_2{\cdot}CH_2{\cdot}NCH_3$	(1) −69·2 (2) −75·2	(P-2) 1067	140
$C_7F_9H_3O$		(1)(3) −64·4, −72·9 (2) −109·6 (4)(5) −58·8, −49·0	(1-2)(2-3) 21, 6 (4-5) 56 (1-3) ~2	146(a)
$C_7F_9H_3O$		(1)(3) −60·3, −70·3 (2) } −98·5, −116·5 (4)(5) } other peak not detected	(1-3) 11·5	146(a)
$C_7F_9H_3O$		(1)(3) −62·2, −77·0 (2) −172·0 (4)(5) −116·7, −118·2	(4-5) 210	146(a)
$C_7F_9H_5$		−67·9		145(a)
$C_7F_9H_9N_2OSSi$	$(CF_3^{(1)(2)})_2C{=}N{\cdot}S(O)CF_3^{(3)}[{=}NSi(CH_3)_3]$	(1) −63·1 (2) −66·8 (3) −55·1		101
$C_7F_9H_9OSi$	$(CF_3^{(1)})_3COSi(CH_3^{(2)})_3$	−74·2	(1-2) 0·2	130
$C_7F_{10}H_4O$	$CF_3^{(1)}{\cdot}CF_2^{(2)(3)}{\cdot}CH(CF_3^{(4)}){\cdot}C(OCH_3){=}CF_2^{(5)(6)}$	(1)(4) −64·5, −86·6 (2)(3) −121·25, −118·55 (5)(6) −98·5, −112·7	(2-3) 286 (5-6) 68	146(a)
$C_7F_{10}H_{10}NP$	$CF_3^{(1)}{\cdot}CF_2^{(2)}{\cdot}CF_2^{(3)}{\cdot}PF_3^{(4)}N(CH_2CH_3)_2$	(1) −81.9 (2) −126·5 (3) −116·8 (4a) −53·7 (4e) −65·9	(1-3) 11·2 (3-4a) 5·0 (4a-4e) 76 (P-1) 5·4 (P-3) 116 (P-4a) 900 (P-4e) 1003	71

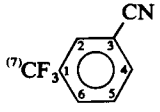
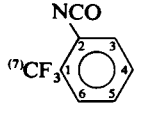
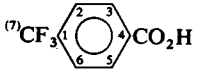
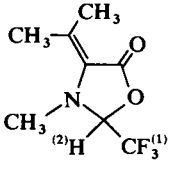
$C_7F_{10}O$		(1)(2) −63·6 (3) −70·4 (4) +29·7	(3-4) 10		177
$C_7F_{11}H_4N$		(1) −59·4 (2) −220·8 (3)(4) −119·8, −125·8 (5) −81·5	(2-6) 48		142
$C_7F_{11}Cl_3O$		(1) −78·2 (4) −109·0 (5) −117·0 (6) −152·6 (7) −70·9	(1-4) 4·1 (5-7) 14·1 (6-7) 5·2 (4-5) 254	(1-5) 4·9 (4-7) 3·6 (4-6) 14·7	125
$C_7F_{11}Cl_3O$		(1) −77·8 (4) −118·5 (5) −90·5 (6) −162·0 (7) −71·5	(5-7) 15·0 (6-7) 5·7 (4-5) 258	(4-7) 2·3 (1-6) 3·3	125
$C_7F_{11}Cl_3O$		(1) −80·6 (2) −108·0 (3) −117·1 (4) −154·1 (7) −76·6	(1-3) 16·3 (4-7) 17·9 (2-3) 254	(1-2) 12·2 (2-4) 14·7	125
$C_7F_{11}Cl_3O$		(1) −81·0 (2) −117·9 (3) −91·3 (4) −161·4 (5) −115·2 (6) −120·2 (7) −77·5	(1-2) 15·8 (1-3) 2·5 (3-6) 19·4 (4-5) 3·6 (2-3) 255	(1-4) 10·4 (3-5) 34·3 (2-7) 3·6 (4-6) 4·8 (5-6) 300	125
C_7F_{12}		(1)(3)(4) −63·0, −65·0, −72·4 (2)(5)(6) −71·3, −73·0, −105·8			146
C_7F_{12}		(1) −69·3 (2) −65·9 (3) −115·3 (4) −95·3	(1-3) 9·8 (1-4) ~2 (2-3) 3·0	(1-2) 3·0 (2-4) 9·6 (3-4) ~6	146

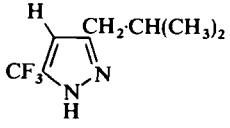
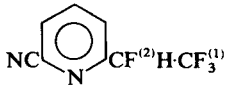
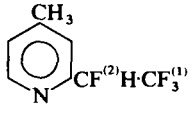
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
C_7F_{12}		(1)(3)(4) −62·0, −63·5, −70·5 (2)(5)(6) −71·6, −72·8, −103·6		146
$C_7F_{12}H_3O_2P$	$[(CF_3)_2C{\cdot}OH]_2PCH_3$	−70·0		73
$C_7F_{12}H_4N_20$	$(CF_3^{(1)})_2C(OCH_3){\cdot}NH{\cdot}N{=}C(CF_3^{(2)(3)})_2$	(1) −75·4 (2)(3) −67·3, −64·6		178
$C_7F_{12}H_5O_2P$	$[(CF_3)_2CH{\cdot}O]_2PCH_3$	−76·5		124
$C_7F_{12}H_5O_3P$	$[(CF_3^{(1)})_2CH^{(2)}{\cdot}O]_2P(O)CH_3$	−76·8	(1-2) 5·6	124
$C_7F_{12}O_3$	$(CF_3^{(1)})_2CF^{(2)}{\cdot}OCO{\cdot}(CF_2^{(3)(4)})_2{\cdot}CO{\cdot}F^{(5)}$	(1) −79·2 (2) −142·2 (3)(4) −118·7, −119·2 (5) +23·8	(1-2) 2·0	147
$C_7F_{12}O_4$	$(CF_3^{(1)})_2CF^{(2)}{\cdot}OCO{\cdot}CF_2^{(3)}{\cdot}O{\cdot}CF_2^{(4)}{\cdot}CO{\cdot}F^{(5)}$	(1) −79·0 (2) −142·5 (3)(4) −76·7, −77·3 (5) +13·0	(1-2) 2·0	147
$C_7F_{13}H$		(1) −75·7 (2) −180·8 (3)(4) −62·0, −62·5		146(a)
$C_7F_{13}ClO$	$CF_3^{(1)}{\cdot}CO{\cdot}CF_2^{(2)}{\cdot}(CF_2^{(3)})_3{\cdot}CF_2^{(4)}Cl$	(1) −76·2 (2) −120·6 (3) −122·4 (4) −69·4		97
$C_7F_{13}ClO_2$	$CF_2^{(1)}Cl{\cdot}CF_2^{(2)}{\cdot}CF^{(3)}(CF_3^{(4)}){\cdot}O{\cdot}CF^{(5)}(CF_3^{(6)}){\cdot}CO{\cdot}F^{(7)}$	(1) −67·7 (2) −116·3, −117·2 (3) −135·3, −136·2 (4)(6) −76·2, −77·4, −80·6, −81·0 (5) −124·8, −125·3 (7) +23·1, +23·0		148

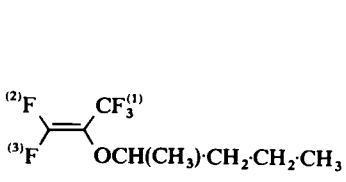
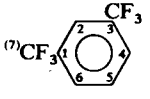
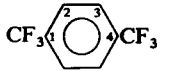
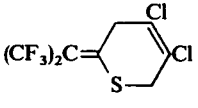
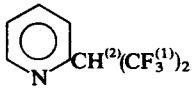
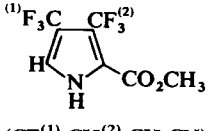
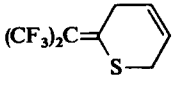
C_7F_{14}	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot CF_2^{(3)}\cdot CF_2^{(4)}\cdot CF_2^{(5)}$ 	(1) −83·7 (3) −125·9 (5) −121·1 (7) −91·5	(2) −129·5 (4) −126·9 (6) −193·0 (8) −108·1	(1-3) 10·1 (2-3) 2·5 (2-5) 3·4 (4-5) 14·7 (4-7) 28·2 (6-8) 117·5 (7-8) 53	(1-4) 2·5 (2-4) 14·7 (3-6) 3·7 (4-6) 6·2 (4-8) 3·8 (6-7) 40·6	150
$C_7F_{14}H_2$	$(CF_3^{(1)})_2CH^{(6)}\cdot CF_2^{(2)}\cdot CF_2^{(3)}\cdot CF_2^{(4)}\cdot CF_2^{(5)}H^{(7)}$	(1) −61·6 (3) −128·2 (5) −136·2	(2) −110·9 (4) −121·5	(1-6)(2-6) 7·2 (5-7) 51·0	(4-7) 6·3	123
$C_7F_{14}H_3O_3P$		(1) −68·7	(2) −64·0	(P-2) 903		155
$C_7F_{14}H_5O_2P$	$[(CF_3^{(1)})_2CH\cdot O]_2PF_2^{(2)}\cdot CH_3$	(1) −73·0	(2) −35·5	(P-2) 846		180
$C_7F_{14}N_2O$		(1) −70·3 (3)(4) −136·9, −137·8 (5) −93·9	(2) −122·7			179(a)
$C_7F_{14}O$	$(CF_3^{(1)})_2CF^{(2)}\cdot CF_2^{(3)}\cdot O\cdot C(CF_3^{(4)})=CF_2^{(5)}$	(1) −74·5 (3) −78·7 (5) −88·9, −81·1	(2) −187·8 (4) −66·7			96
$C_7F_{14}O$	$(CF_3^{(1)})_2CF^{(2)}\cdot CF_2^{(3)}\cdot CF_2^{(4)}\cdot CF_2^{(5)}\cdot CO\cdot F^{(6)}$	(1) −71·0 (3) −112·8 (5) −118·2	(2) −184·5 (4) −120·2 (6) +20·9			151
$C_7F_{14}O$	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot CF_2^{(3)}\cdot CF_2^{(4)}\cdot CF^{(5)}(CF_3^{(6)})\cdot CO\cdot F^{(7)}$	(1) −81·6 (3) −120·9 (5) −180·1 (7) +32·3	(2) −126·5 (4) −117·4 (6) −72·7	(1-3) 10·3	(1-4) 2·6	152
$C_7F_{14}O$	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot CF_2^{(3)}\cdot CF^{(4)}(CF_2^{(5)}CF_3^{(6)})\cdot CO\cdot F^{(7)}$	(1) −80·7 (3) −115·8 (5A) −117·5 (6) −80·5	(2) −123·8 (4) −178·9 (5B) −120·9 (7) +33·7	(1-3) 11·0 (4-6) 13·9	(1-4) 2·0 (5A-5B) 290	152

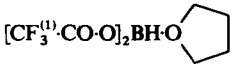
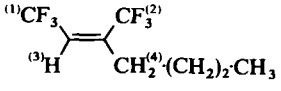
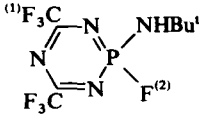
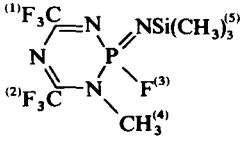
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_7F_{14}O$		(1) −124·9 (2) −80·3 (3) −121·7 (4) −126·2 (5) −121·2 (6) −81·6 (7) −182·3 (8) −72·6 (9) −77·8	(2-4) 12·4 (2-3) 3·6 (3-4) 270 (6-7) 15·5 (7-8) 11·3 (8-9) 142	152
$C_7F_{14}O$		(1) −128·8 (2) −81·7 (3) −121·9 (4) −113·6 (5) −121·4 (6) −81·5 (7) −184·2 (8) −87·2 (9) −71·7	(3-4) 272 (8-9) 142	152
$C_7F_{14}O$		(1) −121·6 (2) −81·3 (3) −122·3 (4) −127·6 (5) −120·8 (6) −126·1 (7) −73·1 (8) −182·3 (9) −75·0 (10) −78·3	(1-2) 12·5 (2-5) 2·6 (2-6) 2·6 (3-4) 296 (5-6) 268 (9-10) 144	152
$C_7F_{14}O$		(1) −126·5 (2) −81·2 (3) −123·7 (4) −116·0 (5) −121·9 (6) −74·8 (7) −186·8 (8) −81·9 (9) −73·5	(1-2) 11·8 (4-5) 266 (8-9) 140	152
$C_7F_{14}O$		(1) −92·1 (2) −79·8 (3) −125·1 (4) −125·1 (5) −117·4 (6) −125·5 (7) −81·2 (8) −183·4 (9) −73·5 (10) −82·6	(1-2) 130 (5-7) 10·5 (7-8) 2·0 (9-10) 144	152
$C_7F_{14}O$		(1) −80·9 (2) −93·4 (3) −119·2 (4) −130·2 (5) −125·0 (6) −140·1 (7) −117·9 (8) −81·4 (9) −184·4 (10) −72·3 (11) −83·1	(1-2) 160 (3-4) 290 (5-6) 274 (10-11) 170	152

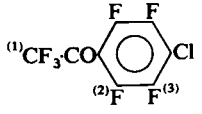
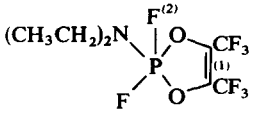
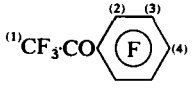
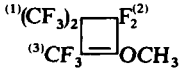
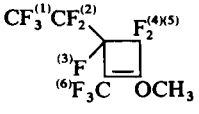
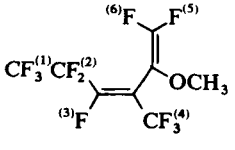
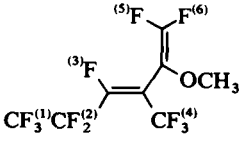
$C_7F_{14}O$	$CF_3^{(1)}\cdot CO\cdot CF_2^{(2)}\cdot (CF_2^{(3)})_2\cdot CF_2^{(4)}\cdot CF_3^{(5)}$	(1) −76·6 (2) −118·4 (3) −122·8 (4) −127·4 (5) −82·6			97
$C_7F_{14}O_3$	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot CO\cdot OO\cdot C(CF_3^{(3)})_3$	(1) −83·8 (2) −120·0 (3) −69·7	(1-2) 8·3	(1-3) ~1·0	153
$C_7F_{15}NO_2$		(1)(2) −73·37, −76·70 (3) −64·58	(1-2) 4·2 (1-C2) 37·5 ^1J(1-C) ^1J(2-C) 288·2, 288·3 ^1J(3-C) 270	(1-3) or (2-3) 9·18 (2-C5) 36·1	181
$C_7F_{15}O_2P$		(1) −66·7 (2) −65·8 (3) −65·0	(1-2) 6·2 (P-3) 75·0	(P-2) 18·8	181
C_7F_{16}	$(CF_3^{(1)})_2CF^{(2)}\cdot CF^{(3)}(CF_3^{(4)})\cdot CF_2^{(5)}\cdot CF_3^{(6)}$	(1)(4) −72·1 (2)(3) −178·1, −182·1 (5) −115·5 (6) −82·7			129(a)
$C_7F_{16}N_2OS$	$(CF_3^{(1)})_2C{=}N\cdot S(O)CF_3^{(2)}[{=}NCF^{(3)}(CF_3^{(4)})_2]$	(1)(4) −65·1, −74·9, −79·6 (2) −52·8 (3) −144·7	(2-3) 0·6	(3-4) 3·4	101
$C_7F_{16}O_3$	$CF_3^{(1)}\cdot O\cdot (CF_2^{(2)}CF_2^{(3)}O)_2\cdot CF_2\cdot CF_3^{(4)}$	(1) −59·2 (2) −93·7 (3) −91·7, −91·6 (4) −90·5	(1-2) 9		104
$C_7F_{17}NO$	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot CF_2^{(3)}\cdot N(CF_3^{(4)})O\cdot CF_2^{(5)}\cdot CF_2^{(6)}\cdot CF_3^{(7)}$	(1) −83·5 (2) −128 (3) −100·7 (4) −66·7 (5) −91 (6) −131 (7) −83·5			133
$C_7F_{17}NO$	$(CF_3^{(1)(2)})_2CF^{(3)}\cdot N(CF_3^{(4)})O\cdot CF^{(5)}(CF_3^{(6)})_2$	(1) −73·2 (2) −76·7 (3) −154·3 (4) −64·5 (5) −136·0 (6) −77·9			133
$C_8F_3H_4ClO$			(F-C1) 33·0 (F-C4) 1·3	(F-C2) 3·8 (F-C7) 272·7	166

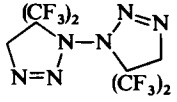
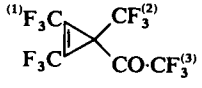
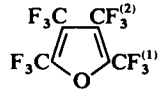
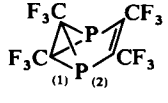
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_8F_3H_4N$			(F-C1) 33·5 (F-C2) 4·0 (F-C4) 1·1 (F-C6) 3·7 (F-C7) 272·3	166
$C_8F_3H_4NO$			(F-C1) 30·8 (F-C4) 1·3 (F-C6) 5·2 (F-C7) 272·3	166
$C_8F_3H_5O_2$			(F-C1) 32·1 (F-C2) 3·8 (F-C4) 1·4 (F-C7) 272·5	166
$C_8F_3H_7$	$CF_3^{(1)}\cdot C\equiv C\cdot C\equiv C\cdot CH^{(2)}(CH_3)_2$	−51·1	(1-2) 1·2	188(a)
$C_8F_3H_7O$	$CF_3^{(1)}\cdot CH_2^{(2)}\cdot O\cdot C_6H_5$	−73·77	(1-2) 8·3	184(e)
$C_8F_3H_7O$	As above	−75·04	(1-2) 8·0	189(e)
$C_8F_3H_7S$	$CF_3^{(1)}\cdot CH_2^{(2)}\cdot SC_6H_5$	−66·5	(1-2) 9	184(e)
$C_8F_3H_7S$	As above	−68·2	(1-2) 10	189(e)
$C_8F_3H_8N$	$CF_3\cdot CH_2\cdot NH\cdot C_6H_5$	−73·62	(1-2) 8·2	189(e)
$C_8F_3H_{10}NO_2$			(1-2) 4	190
$C_8F_3H_{11}N_2$	$CF_3\cdot \underset{\underset{NNH_2}{\|}}{C}\cdot CH_2\cdot C\equiv C\cdot CH(CH_3)_2$	−70·12		188(a)

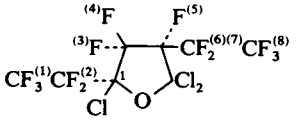
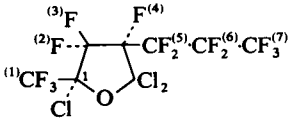
$C_8F_3H_{11}N_2$		−61·60			188(a)
$C_8F_3H_{13}$	$CF_3^{(1)}\cdot CH^{(2)}{=}CH\cdot CH_2\cdot(CH_2)_3\cdot CH_3$ (*cis*) (*trans*)	−60·6 −64·7		(1-2) ~6	117
$C_8F_3H_{13}$	$CF_3^{(1)}\cdot CH_2^{(2)}\cdot CH{=}CH\cdot(CH_2)_3\cdot CH_3$ (*cis*) (*trans*)	−66·9 −67·3		(1-2) 10·7 (1-2) 10·7	117
$C_8F_3H_{15}$	$CF_3^{(1)}\cdot CH_2^{(2)}\cdot(CH_2)_5\cdot CH_3$	−67·2		(1-2) 10·4	117
$C_8F_4H_4N_2$		(1) −78·7	(2) −204·9		169
$C_8F_4H_4N_2O$	*N*-oxide of above	(1) −77·5	(2) −208·5		169
$C_8F_4H_6$	$CF_3^{(1)}\cdot CF^{(2)}H^{(3)}\cdot C_6H_5$	(1) −79·7	(2) −197·0	(1-2) 12·8 (1-3) 6·5 (2-3) 44·5	176
$C_8F_4H_7N$		(1) −80·5	(2) −204·5		169
$C_8F_4H_7NO$	*N*-oxide of above	(1) −79·0	(2) −207·5		169
$C_8F_4H_8O$	$CF_3^{(1)}\cdot CF^{(2)}{=}\overline{C\cdot CO\cdot(CH_2)_3\cdot CH_2}$ (two isomers present)	(1) −67·4 to −68·7 (2) −125·3, −129·9		(1-2) 6·3, 8·5	137
$C_8F_5H_5ClNOS$	$CF_3^{(1)}\cdot CF_2^{(2)(3)}\cdot SO\cdot NH\cdot C_6H_4Cl(p)$	(1) −79·1 (3) −123·5	(2) −120·9	(2-3) 249	191(a)
$C_8F_5H_6NOS$	$CF_3^{(1)}\cdot CF_2^{(2)(3)}\cdot SO\cdot NH\cdot C_6H_5$	(1) −79·5 (3) −124·0	(2) −121·2	(2-3) 251	191(a)
$C_8F_5H_9O$	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot\overline{CH^{(3)}\cdot CO\cdot(CH_2)_3\cdot CH_2}$	(1) −83·3	(2) −118·7	(2A-2B) 276·7 (2-3) 15·2	137

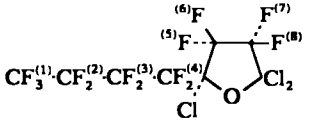
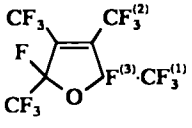
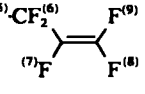
Molecular formula	Structure of compounds		Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_8F_5H_{10}NO$	$CF_3^{(1)}\cdot CF^{(2)}=CF^{(3)}\cdot CO\cdot N(CH_2CH_3)_2$	(*Z*)	(1) −67 (2) −154 (3) −127·3	(1-2) 12 (1-3) 5 (2-3) 7	170
		(*E*)	(1) −67 (2) −163 (3) −140·5	(1-2) 11 (1-3) 21 (2-3) 142	
$C_8F_5H_{11}O$			(1) −66·2 (2) −100·9 (3) −92·7	(1-2) 24·2 (1-3) 9·6 (2-3) 45·6	171(a)
$C_8F_6H_4$				(F-C1) 33·5 (F-C2) 4·0 (F-C4) 1·1 (F-C6) 3·7 (F-C7) 271·6	166 431
$C_8F_6H_4$				(7-C1) 33·8 (7-C2) 4·0 (7-C4) ~1 (7-C7) 272·1	431
$C_8F_6H_4Cl_2S$			−57·70, −54·80		173(e)
$C_8F_6H_5N$			−66·5	(1-2) 8·5	169
$C_8F_6H_5NO_2$			(1) −57·4 (2) −55·0	(1-2) 8·2	193
$C_8F_6H_6N_2$	$(CF_3^{(1)}\cdot CH_2^{(2)}\cdot CH\cdot CN)_2$	Isomer [a] [b]	−64·85 −64·97	(1-2) 9·9 (1-2) 9·8	117
$C_8F_6H_6S$			−57·61, −54·90		173(e)

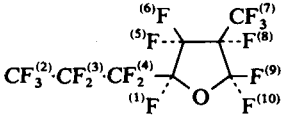
$C_8F_6H_8O$	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot CF^{(3)}=C(CH_3)CO\cdot CH_2\cdot CH_3$ (*cis* and *trans*)		(1) −83, −84 (2)(3) −116, −117		(1-2)(1-3) 2·3, 8·5 and 2·3, 7	137
$C_8F_6H_8O_4$	$(CF_3^{(1)}\cdot CH_2^{(2)}\cdot CH\cdot CO_2H)_2$	Isomer [a] [b]	−65·0 −65·08		(1-2) 10·7 (1-2) 11·0	117
$C_8F_6H_9BO_5$					(1-C1) 284 (1-C2) 40·9	194
$C_8F_6H_{10}$			(1) −58·8	(2) −63·8	(1-3) 9 (2-4) 11 (1-4) 11	117
$C_8F_6H_{10}N_2O_2$	$[CF_3\cdot CO\cdot N(CH_3)CH_2]_2$		−75·5			140
$C_8F_6H_{10}O_3$	$(CF_3)_2C(OH)\cdot O\cdot CO\cdot C(CH_3)_3$		−88·66			122
$C_8F_6H_{12}$	$CF_3^{(1)}\cdot CH_2^{(3)}\cdot CH^{(4)}(CF_3^{(2)})\cdot CH_2\cdot (CH_2)_2\cdot CH_3$		(1) −65·7	(2) −72·7	(1-3) 10·7 (2-3) 8·4 (1-4) 2·3	117
$C_8F_6H_{13}OP$	$(CF_3^{(1)})_2CH^{(2)}O\cdot P(CH_3)C(CH_3)_3$		−73·8		(1-2) 5·7	72
$C_8F_7H_9O$	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot CF_2^{(3)}\cdot CH(CH_3)\cdot CO\cdot CH_2\cdot CH_3$		(1) −81·5	(2)(3) −114, −124	(1-3) 9·8	137
$C_8F_7H_{10}N_4P$			(1) −75·1	(2) −36·2	(P-1) 5·5	(P-2) 960 95
$C_8F_7H_{12}N_4PSi$	As above with $NHBu^t$ replaced by $N(CH_3^{(3)})Si(CH_3)_3$		(1) −75·4	(2) −30·2	(P-1) 6·0 (2-3) 0·8	(P-2) 970 95
$C_8F_7H_{12}N_4PSi$			(1)(2) −68·6, −75·3 (3) −24·4		(P-1)(P-2) 3·0, 5·5 (P-3) 1002 (3-4) 0·8 (3-5) 1·8 (1-3) or (2-3) 0·4	95

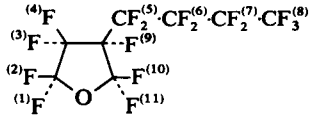
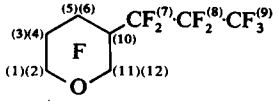
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
C_8F_7ClO		(1) −78·1 (2) −139·1 (3) −140·5	(1-2) 11·1	4
$C_8F_8H_{10}NO_2P$		(1) −67·6 (2) −57·0	(P-2) 883	141
C_8F_8O		(1) −74·7 (2) −153·4 (3) −161·9 (4) −156·0	(2-3) 16·0 (3-4) 21·0	429
$C_8F_{11}H_3O$		(1) −68·5 (2) −114·0 (3) −60·4	(1-2) 10·2 (1-3) 3·6 (2-3) 4	146(a)
$C_8F_{11}H_3O$		(1)(6) −61·8, −83·8 (2) −124·2 (3) −166·0 (4)(5) −113·4, −117·0	(4-5) 213	146(a)
$C_8F_{11}H_3O$	$(CF_3^{(1)})_2C{=}C(CF_3^{(2)})C(OCH_3){=}CF_2^{(3)(4)}$	(1) −62·5 (2) −61·5 (3) −98·0 (4) −108·0	(3-4) 66	146(a)
$C_8F_{11}H_3O$		(1)(4) −64·0, −85·6 (2) −121·2 (3) −105·8 (5)(6) −107·1, −98·1	(2-3) 11 (5-6) 59 (1-3) or (3-4) 23	146(a)
$C_8F_{11}H_3O$		(1)(4) −59·2, −71·2 (2) −120·4 (3) −102·5 (5)(6) −98·6, −107·0	(2-3) 10 (5-6) 52 (2-1 or 4) 19 (3-1 or 4) 19 (3-5 or 6) 14 (6 or 5-1 or 4) 6	146(a)

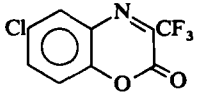
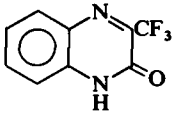
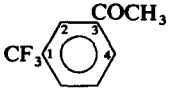
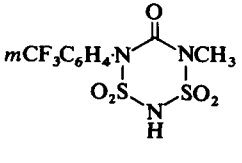
$C_8F_{12}H_4N_2O_2S$	$(CF_3^{(1)})_2C{\cdot}(SCH_2CO_2H){\cdot}NH{\cdot}N{=}C(CF_3^{(2)(3)})_2$	(1) −69·5 (2)(3) −66·3, −64·0	(2-3) 6·0		178(a)
$C_8F_{12}H_4N_6$		−72·4, −71·4			178(a)
$C_8F_{12}H_4O$	$CF_3^{(1)}{\cdot}CF_2^{(2)}{\cdot}CF_2^{(3)}{\cdot}CH(CF_3^{(4)}){\cdot}C(OCH_3){=}CF_2^{(5)(6)}$	(1)(4) −64·2, −82·8 (2)(3) −115·1, −128·8 (5)(6) −98·3, −112·2	(5-6) 64·5		146(a)
$C_8F_{12}H_6N_2O$	$(CF_3^{(1)})_2C(OCH_2CH_3)NH{\cdot}N{=}C(CF_3^{(2)(3)})_2$	(1) −76·0 (2)(3) −67·3, −64·7	(2-3) 5·7		178(a)
$C_8F_{12}H_6N_2O_2$	$(CF_3^{(1)})_2C(OCH_2CH_2OH)NH{\cdot}N{=}C(CF_3^{(2)(3)})_2$	(1) −75·7 (2)(3) −66·8, −64·7	(2-3) 5·7		178(a)
$C_8F_{12}H_6N_2S$	$(CF_3^{(1)})_2C(SCH_2CH_3)NH{\cdot}N{=}C(CF_3^{(2)(3)})_2$	(1) −72·2 (2)(3) −68·3, −65·9	(2-3) 6·0		178(a)
$C_8F_{12}O$		(1) −60·73 (2) −67·23 (3) −74·79	(1-2) 2·5 (2-3) 2·5	(1-3) 1·25	196
$C_8F_{12}O$		(1)(2) −57·70, −62·62			196
$C_8F_{12}O$	As above	(1)(2) −60, −65			197
$C_8F_{12}P_2$		(1) −74·1 (2) −69·90	(P-1) 22·6	(P-2) 5·2	198(c)
$C_8F_{12}Pd_2$	$(CF_3C{\equiv}CCF_3)_2Pd_2$	−56·2			88
$C_8F_{13}H$	$CF_3^{(1)}{\cdot}CF_2^{(2)}{\cdot}CF_2^{(3)}{\cdot}CF_2^{(4)}{\cdot}CF_2^{(5)}{\cdot}CF_2^{(6)}{\cdot}C{\equiv}CH^{(7)}$	(1) −81·6 (2) −126·6 (3) −122·9 (4) −122·9 (5) −121·6 (6) −99·9	(6-7) 5		144

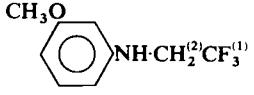
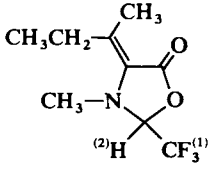
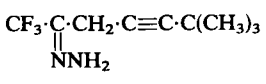
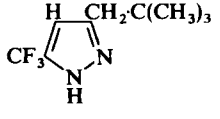
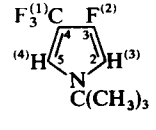
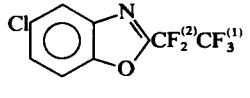
Molecular formula	Structure of compounds	Chemical shifts (pm)	Coupling constants (Hz)	Ref.
$C_8F_{13}HBr_2$	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot CF_2^{(3)}\cdot CF_2^{(4)}\cdot CF_2^{(5)}\cdot CF_2^{(6)}\cdot CBr{=}CHBr$ (*Z*)	(1) −81·6 (2) −126·4 (3) −122·2 (4) −122·2 (5) −120·1 (6) −105·9		144
$C_8F_{13}H_2Br_3$	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot CF_2^{(3)}\cdot CF_2^{(4)}\cdot CF_2^{(5)}\cdot CF_2^{(6)}\cdot CBr_2\cdot CH_2Br$	(1) −81·6 (2) −126·4 (3) −122·0 (4) −122·0 (5) −114·5 (6) −102·5		144
$C_8F_{13}H_6O_2P$	$(CF_3^{(1)})_2CH^{(4)}O\cdot PF^{(3)}(CH_3^{(5)})\cdot O\cdot C(CF_3^{(2)})_2\cdot CH_2$	(1) −72·9, −73·5 (2) −76·4, −77·0 (3) −29·6	(1-4) 5·6 (2-2') 8·0 (3-5) 11·4 (P-3) 832 ^1J(1−C),(2-C) 283, 289 ^2J(1−C) 35·0 (3-CH_2) 45·3 (3-CH_3) 26·5	199
$C_8F_{13}H_8O_2P$	$[(CF_3^{(1)})_2CH^{(3)}\cdot O]_2PF^{(2)}(CH_3^{(4)})_2$	(1) −76·0, −76·5 (2) −13·3	(1-3) 6·0 (2-4) 13·5 (P-2) 726	73
$C_8F_{13}Cl_3O$		(1) −77·0 (2) −119·9 (3) −116·8 (4) −89·2 (5) −161·7 (6) −115·7 (7) −120·3 (8) −81·1	(1-3) 3·0 (3-4) 254 (4-6) 36·7 (4-7) 19·8 (4-8) 9·8 (5-8) 16·6 (6-7) 300	125
$C_8F_{13}Cl_3O$	Groups on C1 above interchanged	(1) −78·1 (3) −106·9 (4) −116·7 (5) −153·1 (8) −80·9	(1-3) 4·3 (1-4) 4·3 (7-8) 16·4 (4-8) 12·2 (3-5) 16·2 (3-4) 256	125
$C_8F_{13}Cl_3O$		(1) −76·5 (2) −107·8 (3) −117·4 (4) −153·6 (5) −113·5 (6) −124·4 (7) −81·0	(1-2) 2·3 (1-3) 18·3 (2-3) 248 (2-4) 15·3 (4-6) 24·3 (5-7) 11·5	125
$C_8F_{13}Cl_3O$	Groups on C1 above interchanged	(1) −77·9 (2) −117·7 (3) −91·5 (4) −161·7 (5) −114·1 (6) −125·1 (7) −81·1	(1-2) 18·3 (1-3) 1·9 (1-4) 12·7 (2-3) 254 (4-7) 1·8 (5-7) 11·5	125

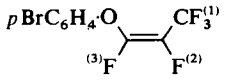
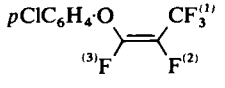
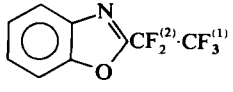
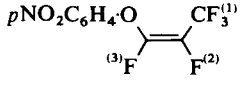
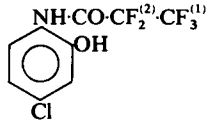
$C_8F_{13}Cl_3O$			(1) −80·7 (2) −125·9 (3) −117·5 (4) −114·4 (5) −108·2 (6) −122·1 (7) −111·4 (8) −120·0	(1-3) 10·2 (3-5) 9·0 (5-6) 242 (6-8) 8·0	(1-4) 2·4 (4-6) 27·4 (5-8) 13·8 (7-8) 226	125
$C_8F_{14}H_6NO_2P$	$PF_2^{(1)}[N(CH_3^{(3)})_2]OC\underbrace{(CF_3)_2C(CF_3)_2}_{(2)}O$		(1) −58·1 (2) −67·8 At −20 °C (2) −67·1, −68·2	(P-1) 846	(1-3) 2·2	156
$C_8F_{14}O$		[a]	(1)(2) −63, −85 (3) −122			197
		[b]	(1)(2) −62, −83 (3) −112			
	(*cis* and *trans* mixture)					
$C_8F_{14}O_3$	$(CF_3^{(1)})_2CF^{(2)}\cdot O\cdot CO\cdot(CF_2^{(3)})_3\cdot CO\cdot F^{(4)}$		(1) −79·2 (2) −142·6 (3) −118·0, −123·4 (4) +24·0	(1-2) 2·1	(3-4) 5·7	147
$C_8F_{15}HO$	$CF_3^{(1)}\cdot CO\cdot(CF_2^{(2-6)})_5\cdot CF_2^{(7)}H$		(1) −76·4 (2)-(7) −139·2 −131·1, −124·5, −122·4 −199·2 (ratio 1:1:1:2:1)			132
$C_8F_{15}ClO$	$CF_3^{(1)}\cdot CO\cdot CF_2^{(2)}\cdot(CF_2^{(3)})_4\cdot CF_2^{(4)}Cl$		(1) −75·0 (2) −119·6 (3) −122·6 (4) −68·8			97
C_8F_{16}	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot CF_2^{(3)}\cdot CF_2^{(4)}\cdot CF_2^{(5)}\cdot CF_2^{(6)}$ 		(1) −83·5 (2) −129·1 (3)(4) −124·9 (5) −126·3 (6) −120·7 (7) −192·0 (8) −91·7 (9) −108·5			150 93
C_8F_{16}	$CF_3^{(1)}\cdot(CF_2^{(2)})_4\cdot CF^{(3)}{=}CF^{(4)}\cdot CF_3^{(5)}$		(1) −83·5 (2) −121·4, −129·4 (3)(4) −160·5 (5) −71·5			93
C_8F_{16}	$CF_3^{(1)}\cdot(CF_2^{(2)})_3\cdot CF^{(3)}{=}CF^{(4)}\cdot CF_2^{(5)}\cdot CF_3^{(6)}$		(1) −83·5 (2)(5) −125·8 (3)(4) −154·5 (6) −87·5			93
$C_8F_{16}H_6NP$	$(CF_3^{(1)}\cdot CF_2^{(2)}\cdot CF_2^{(3)})_2PF_2^{(4)}N(CH_3)_2$		(1) −82·7 (2) −127·4 (3) −116·5 (4) −51·5	(3-4) 12·0 (P-4) 940	(P-3) 114	71

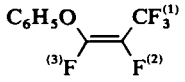
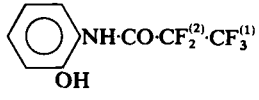
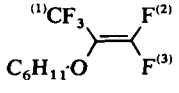
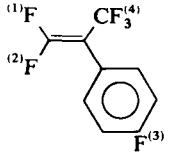
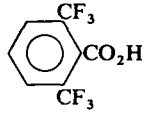
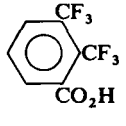
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_8F_{16}O$	$CF_3^{(1)}\cdot(CF_2^{(2)})_3\cdot CF^{(3)}(CF_3^{(4)})\cdot O\cdot CF^{(5)}=CF_2^{(6)}$	(1)(4) −77·1, −80·1 (2) −119·5, −120·0, −124·7 (3) −135·0 (5)(6) −114·2, −119·2, −133·9		148
$C_8F_{16}O$	$(CF_3^{(1)})_2CF^{(2)}\cdot CF_2^{(3)}\cdot CF_2^{(4)}\cdot CF_2^{(5)}\cdot CF_2^{(6)}\cdot CO\cdot F^{(7)}$	(1) −71·5 (2) −184·4 (3) −113·0 (4) −120·6 (5) −118·5 (6) −116·8 (7) +25·3		151
$C_8F_{16}O$	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot CF_2^{(3)}\cdot CF_2^{(4)}\cdot CF_2^{(5)}\cdot CF^{(6)}(CF_3^{(7)})\cdot CO\cdot F^{(8)}$	(1) −81·6 (2) −126·8 (3) −123·0 (4) −120·4 (5) −117·1 (B) −180·4 (7) −72·5 (8) +32·3	(1-3) 10·4 (1-4) 2·3	152
$C_8F_{16}O$	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot CF_2^{(3)}\cdot CF_2^{(4)}\cdot CF^{(5)}(CF_2^{(6)}CF_3^{(7)})\cdot CO\cdot F^{(8)}$	(1) −81·2 (2) −126·8 (3) −120·6 (4) −115·7 (5) −179·0 (6) −117·4, −120·7 (7) −80·7 (8) +33·7	(1-3) 9·9 (5-7) 12·9 (6A-6B) 294	152
$C_8F_{16}O$	$(CF_3^{(1)}\cdot CF_2^{(2)}\cdot CF_2^{(3)})_2CF^{(4)}\cdot CO\cdot F^{(5)}$	(1) −81·4 (2) −124·6 (3) −116·0 (4) −179·0 (5) +33·5		152
$C_8F_{16}O$	$CF_3^{(1)}\cdot CO\cdot CF_2^{(2)}\cdot (CF_2^{(3)})_3\cdot CF_2^{(4)}\cdot CF_3^{(5)}$	(1) −76·8 (2) −117·8 (3) −121·8 (4) −126·4 (5) −83·0		97
$C_8F_{16}O$		(2) −81·5 (3) −125·3 (7) −73·5 (8) −182·4 (9) −75·6 (10) −79·0	(3-4) 10·2 (1-2) 2·5 (7-8) 6·8 (7-9) 14·0 (8-9) 10·3 (9-10) 140	152
$C_8F_{16}O$	Groups (7) and (8) interchanged	(2) −81·5 (3) −125·2 (7) −74·7 (8) −186·6 (9) −83·5 (10) −71·7	(1-2) 2·6 (2-4) 10·2 (5-6) 274 (9-10) 148	152

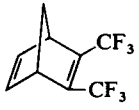
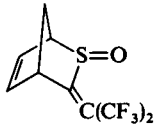
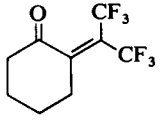
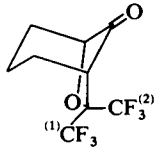
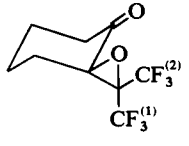
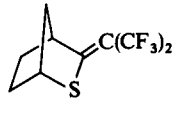
$C_8F_{16}O$		(1) −92·2 (3) −126·0 (5) −116·9 (7) −126·4 (9) −183·4 (11) −83·6	(2) −80·0 (4) −126·0 (6) −121·8 (8) −81·6 (10) −73·8	(1-2) 132 (6-9) 9·9	(5-8) 2·7 (10-11) 142	152
$C_8F_{16}O$		(1) −80·6 (3) −118·6 (5) −124·7 (7) −114·0 (9) −80·5 (11) −71·8	(2) −93·2 (4) −129·1 (6) −139·7 (8) −125·6 (10) −183·9 (12) −79·4	(1-2) 160 (5-6) 274 (11-12) 172	(3-4) 298 (7-9) 12·2	152
$C_8F_{16}O_2$	$CF_3^{(1)}\cdot CF^{(2)}(OCF_3^{(8)})\cdot CF_2^{(3)}\cdot CF_2^{(4)}\cdot CF_2^{(5)}\cdot CF_2^{(6)}\cdot CO\cdot F^{(7)}$	(1) −77·4 (3) −114·7 (5) −117·2 (7) +25·0	(2) −135·5 (4) −118·9 (6) −117·2 (8) −53·3			151
$C_8F_{16}O_2$	$(CF_3^{(1)})_2CF^{(2)}\cdot CF_2^{(3)}\cdot CF_2^{(4)}\cdot O\cdot CF^{(5)}(CF_3^{(6)})\cdot CO\cdot F^{(7)}$	(1) −73·2 (3) −119·0 (5) −128·9 (7) +25·0	(2) −188·2 (4) NA (6) −81·9			151
$C_8F_{16}O_3$	$CF_3^{(1)}\cdot CF^{(2)}(OCF_3^{(3)})\cdot O\cdot CF_2^{(4)}\cdot CF_2^{(5)}\cdot CF_2^{(6)}\cdot CF_2^{(7)}\cdot CO\cdot F^{(8)}$	(1) −80·0 (3) −54·3 (5) −116·2 (7) −118·6	(2) −136·2 (4) −113·8 (6) −119·6 (8) +25·5			200
$C_8F_{16}O_3$	$(CF_3^{(1)})_2CF^{(2)}\cdot O\cdot CF_2^{(3)}\cdot CF_2^{(4)}\cdot O\cdot CF^{(5)}(CF_3^{(6)})\cdot CO\cdot F^{(7)}$	(1) −72·5 (3) −118·6 (5) −128·8 (7) +27·8	(2) −189·6 (4) NA (6) −81·0			200
$C_8F_{17}H$	$CF_3^{(1)}(CF_2^{(2)})_4\cdot CF_2^{(3)}\cdot CF_2^{(4)}\cdot CF_2^{(5)}H$	(1) −83·5 (3) −132 (5) −141·5	(2) −125·8 (4) −133·5			93
$C_8F_{18}Cl_4N_2S_2$	$(CF_3^{(1)})_2CF^{(2)}\cdot N{=}\overline{SCl_2\cdot CF_2^{(3)}\cdot[(CF_3)_2CFN{=}]SCl_2}\cdot CF_2$	(1) −98·2 (3) −71·5	(2) −144·8	(1-2) 3·6	(2-3) 10·6	201

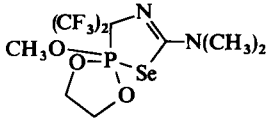
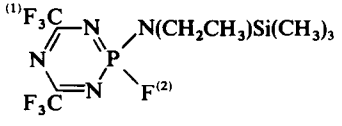
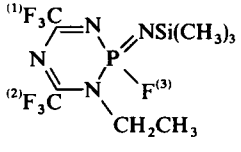
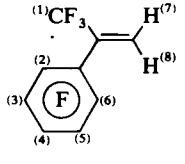
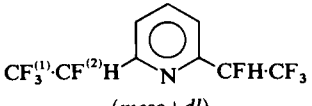
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_8F_{18}N_2OS$	$[(CF_3^{(1)(2)})_2C{=}N]_2S(O)(CF_2^{(3)})_2$	(1)(2) −70·1, −71·6 (3) −63·2		107
$C_8F_{18}O_3$	$[(CF_3)_3CO]_2O$	−69·8		105
$C_8F_{18}O_3$	$CF_3^{(1)}\cdot CF_2\cdot O\cdot(CF_2^{(2)}\cdot CF_2\cdot O)_2\cdot CF_2\cdot CF_3$	(1) −90·4 (2) −91·6		104
$C_8F_{18}O_4$	$CF_3^{(1)}\cdot O\cdot(CF_2^{(2)}\cdot CF_2^{(3)}\cdot O)_3\cdot CF_3$	(1) −59·1 (2) −93·8 (3) −91·7	(1-2) 9	104
$C_8F_{20}N_2S$	$(CF_3^{(1)})_2C{=}N\cdot C(CF_3^{(2)})_2N{=}SF_2^{(3)}(CF_3^{(4)})_2$	(1) −66·9 (2) −68·6 (3) +46·6 (4) −64·6	(2-3) 1·3 (3-4) 13·6	78
$C_8F_{22}N_2S_2$	$[-CF_2^{(1)}\cdot SF_2^{(2)}\cdot{=}(NCF^{(3)}(CF_3^{(4)})_2)-]_2$	(1) −96·1 (2) +41·0 (3) −144·5 (4) −69·1	(1-2) 11·8 (2-3) 14·8 (3-4) 3·1	78
$C_9F_3H_3ClNO_2$		−71·6		204(a)
$C_9F_3H_4NO_2$	As above with Cl replaced by H	−71·6		204(a)
$C_9F_3H_5N_2O$		−71·0		204(a)
$C_9F_3H_7O$			(F-C1) 32·8 (F-C2) 3·8 (F-C4) 1·1 (F-C6) 3·7 (F-C7) 272·1	166
$C_9F_3H_8N_3O_5S_2$		−63·26		168

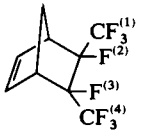
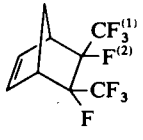
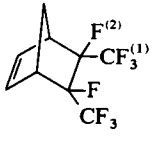
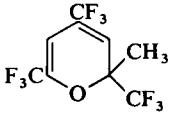
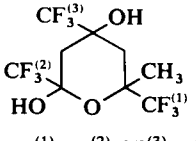
$C_9F_3H_9$	$CF_3{\cdot}C{\equiv}C{\cdot}C{\equiv}C{\cdot}C(CH_3)_3$	−50·6				188(a)
$C_9F_3H_{10}NO$		−72·79		(1-2) 9·0		205
$C_9F_3H_{12}NO_2$				(1-2) 4·2		190
$C_9F_3H_{13}N_2$		−70·1				188(a)
$C_9F_3H_{13}N_2$		−61·3				188(a)
$C_9F_4H_6O$	$CF_3^{(1)}{\cdot}CF^{(2)}H^{(3)}{\cdot}CO{\cdot}C_6H_5$	(1) −75	(2) −203	(1-2) 12 (2-3) 48	(1-3) 6·5	170
$C_9F_4H_{11}N$		(1) −57·9	(2) −167·9	(1-2) 5·6 (1-4) 1·2 (2-4) 3·9 ^2J(1−C) 37·3 ^1J(2−C) 245·1 ^2J(2-C2) 26·2 ^2J(2−C4) 12·05 ^3J(2−CF_3) 2·7	(1-3) 0·6 (2-3) 3·0 ^1J(1-C) 265·4	193
$C_9F_5H_3ClNO$		(1) −84·7	(2) −116·9			204(a)

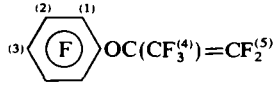
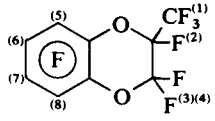
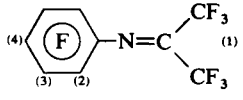
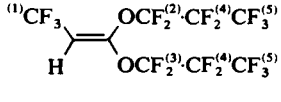
Molecular formula	Structure of compounds	Chemcal shifts (ppm)	Coupling constants (Hz)	Ref.
$C_9F_5H_4BrO$		(1) −68·3 (2) −178·6 (3) −92·0		207(a)
$C_9F_5H_4BrO$	As above with groups (1) and (2) interchanged	(1) −68·3 (2) −185·0 (3) −107·7		207(a)
$C_9F_5H_4ClO$		(1) −68·5 (2) −179·9 (3) −92·7		207(a)
$C_9F_5H_4ClO$	As above with groups (1) and (2) interchanged	(1) −68·5 (2) −186·9 (3) −108·6		207(a)
$C_9F_5H_4NO$		(1) −85·0 (2) −116·6		204(a)
$C_9F_5H_4NO_3$		(1) −69·3 (2) −178·1 (3) −93·7		207(a)
$C_9F_5H_4NO_3$	As above with groups (1) and (2) interchanged	(1) −69·3 (2) −184·5 (3) −109·1		207(a)
$C_9F_5H_5$	$CF_3^{(1)}\cdot CF^{(2)}=CF^{(3)}\cdot C_6H_5$ (*Z*)	(1) −65·8 (2) −155 (3) −108·4	(1-2) 14 (1-3) 8 (2-3) 8·4	170
	(*E*)	(1) −68 (2) −169·5 (3) −145·8		
$C_9F_5H_5ClNO_2$		(1) −84·0 (2) −123·2		204(a)

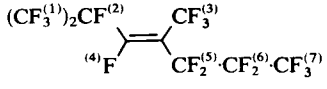
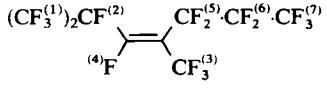
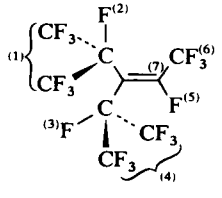
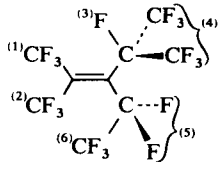
$C_9F_5H_5O$		(1) −68·7 (3) −91·7	(2) −180·6			207(a)
$C_9F_5H_5O$	As above with groups (1) and (2) interchanged	(1) −68·7 (3) −107·5	(2) −187·2			207(a)
$C_9F_5H_6BrO$	$CF_3^{(1)}\cdot C(OH)(C_6H_5)CF_2^{(2)}Br$	(1) −73·0	(2) −56·6	(1-2) 11·2		4
$C_9F_5H_6ClO$	As above with Br replaced by Cl	(1) −73·5	(2) −61·9	(1-2) 9·5		4
$C_9F_5H_6NO_2$		(1) −84·5	(2) −123·8			204(a)
$C_9F_5H_7O$	$CF_3^{(1)}\cdot CF_2^{(2)(3)}\cdot CH^{(4)}(OH)\cdot C_6H_5$	(1) −80·4 (3) −126·8	(2) −119·4	(2-3) 287 (3-4) 14	(2-4) 10	208
$C_9F_5H_{11}O$		(1) −66·4 (3) −92·4	(2) −100·6	(1-2) 24·0 (2-3) 45·6	(1-3) 10·4	171(a)
$C_9F_5H_{14}NO$	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot CH(CH_3)\cdot CO\cdot N(CH_2CH_3)_2$	(1) −83·4	(2) −119	(2-3) 4·9		137
$C_9F_6H_4$		(1) −75·11 (3) −111·82	(2) −73·25 (4) −60·12	(1-2) 11·03 (1-4) 24·27 (2-4) 11·03	(1-3) <0·5 (2-3) <0·5	326
$C_9F_6H_4O_2$		−60·98				209(a)
$C_9F_6H_4O_2$		−59·56, −56·00				209(a)

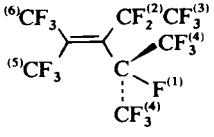
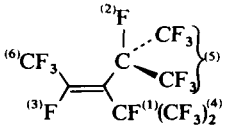
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_9F_6H_5NOS$	$(CF_3)_2C{=}NS(O)C_6H_5$	−65·3		206(a)
$C_9F_6H_6$		−61·9	^1J(F−C) 270	210
$C_9F_6H_6OS$		−59·51, −57·70		173(e)
$C_9F_6H_7NO_2S$	$(CF_3^{(1)(2)})_2C(OH)NH{\cdot}S(O)C_6H_5$	(1) −80·25 (2) −81·25	(1-2) 9·5	206(a)
$C_9F_6H_8O$		−58·7, −59·6	(1-2) 8·4	213
$C_9F_6H_8O_2$		(1)(2) −84·3, −85·7	(1-2) 7·8	213
$C_9F_6H_8O_2$		−65·8, −69·4	(1-2) 9·0	213
$C_9F_6H_8S_2$		−58·71, −55·9		173(e)

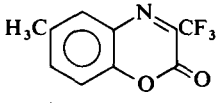
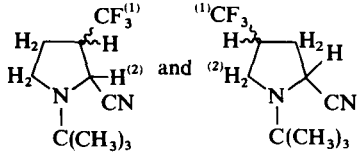
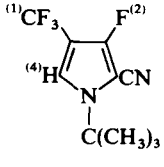
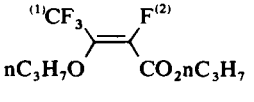
$C_9F_6H_{13}N_2O_3PSe$		−66·6 to −65·4				214(a)
$C_9F_6H_{14}$	$CF_3^{(1)}\cdot CH_2^{(3)}\cdot CH(CF_3^{(2)})\cdot(CH_2)_4\cdot CH_3$	(1) −65·3	(2) −72·2	(1-3) 9·6		117
$C_9F_7H_6FeIN_2O_2$	$CF_3\cdot CF_2\cdot CF_2\cdot Fe(CO)_2(CH_3CN)_2I$	(1) −81·5 (3) −79·3	(2) −117·7	(1-3) 11·0		215
$C_9F_7H_6NO_2$	$(CF_3^{(1)})_2CH^{(3)}\cdot CF^{(2)}{=}C(CN)CO_2CH_2CH_3$	(1) −63·9	(2) 73·1	(1-2) 8·0 (2-3) 29·2	(1-3) 8·0	172(a)
$C_9F_7H_6OP$	$(CF_3^{(1)})_2CH^{(3)}O\cdot PF^{(2)}C_6H_5$	(1) −74·8	(2) −102·8	(1-3) 6·0 (P-2) 1116	(P-1) 6·0	72
$C_9F_7H_{14}N_4PSi$		(1) −75·1	(2) −33·4	(P-1) 5·5	(P-2) 975	95
$C_9F_7H_{14}N_4PSi$		(1)(2) −67·4, −75·4 (3) −19·5		(P-1)(P-2) 3·3, 5·5 (P-3) 1012		95
$C_9F_8H_2$		(1) −68·11 (3) −163·02	(2) −139·88 (4) −153·65	(1-2) +6·76 (1-4) 0·0 (1-8) 1·415 (2-4) +2·54 (2-6) −4·02 (2-8) 0·0 (3-5) −1·26 (4-8) 0·0	(1-3) 0·0 (1-7) 1·176 (2-3) −21·44 (2-5) +8·65 (2-7) 0·0 (3-4) −19·54 (4-7) 0·0	216
$C_9F_8H_5N$	 (*meso*+*dl*)	(1) −80·5 (1) −80·7	(2) −203·9 (2) −204·2			169

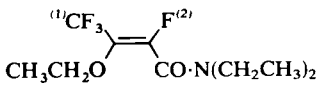
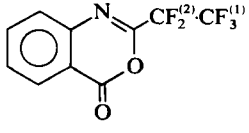
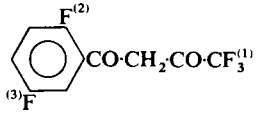
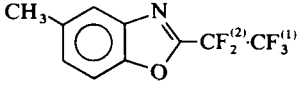
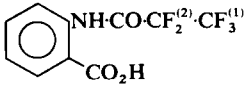
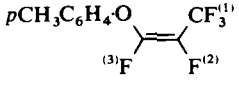
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_9F_8H_5N$	*N*-oxide of above	(1) −80·5 (2) −205·5 (1) −80·6 (2) −207·1		169
$C_9F_8H_6$		(1) −73·8 (2) −170·0 (3) −168·8 (4) −74·8	(1-2) 10·8 (1-3) 6·8 (3-4) 7·6 (2-4) 16·4 (1-4) 2·6	210
$C_9F_8H_6$		(1) −71·8 (2) −162·0		210
$C_9F_8H_6$		(1) −73·3 (2) −164·2		210
$C_9F_9H_5O$		−84·7, −75·6, −72·9		217(a)
$C_9F_9H_6OP$	$(CF_3^{(1)})_2CHO{\cdot}PF_3^{(2)}{\cdot}C_6H_5$	(1) −75·0 (2) −55·0	(P-2) 945	180
$C_9F_9H_9O_3$		(1) −86·2 (2) −86·4 (3) −88·2		217(a)
$C_9F_9H_{16}N_2P$	$CF_3^{(1)}{\cdot}CF_2^{(2)}{\cdot}CF_2^{(3)}{\cdot}PF_2^{(4)}N(CH_2CH_3)_2NH{\cdot}CH_2CH_3$	(1) −80·9 (2) −125·9 (3) −118·9 (4) −66·5, −55·7	(1-3) 11·3 (P-3) 105 (P-4) 721, 715	71

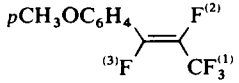
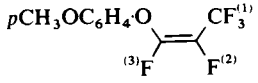
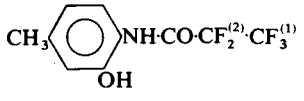
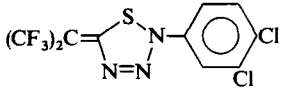
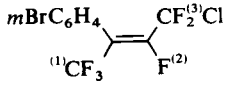
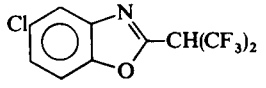
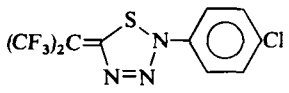
$C_9F_{10}O$		(1)(2) −159·3, −165·0 (3) −162·6 (4) −67·5 (5) −85·8, −95·4			96
$C_9F_{10}O_2$		(1) −78·3 (2) −131·4 (3) −81·0 (4) −92·0 (5-8) −158·7, −159·5, −160·5, −160·5	(3-4) 150		218
$C_9F_{11}N$		(1) −71·6 (2) −154·5 (3) −165·5 (4) −161·5			219(a)
$C_9F_{12}H_8N_2O$	$(CF_3^{(1)})_2C(OCH_2CH_2CH_3)NH{\cdot}N{=}C(CF_3^{(2)(3)})_2$	(1) −76·0 (2)(3) −67·5, −65·0			178
$C_9F_{12}H_8N_2O$	As above with nC_3H_7 replaced by iC_3H_7	(1) −76·0 (2)(3) −67·1, −64·5	(2-3) 5·7		178
$C_9F_{12}H_9O_4PSi$	$(CH_3)_3SiO{\cdot}P(O){\cdot}O{\cdot}C(CF_3)_2C(CF_3)_2{\cdot}O$	−68·8			155
$C_9F_{12}H_{11}O_4P$	$(CF_3^{(1)}CH_2^{(2)}O)_4PCH_3$		(1-2) 7·9		220
$C_9F_{13}H_7O$	$CF_3^{(1)}{\cdot}CF_2^{(2)}{\cdot}CF_2^{(3)}{\cdot}CF_2^{(4)}{\cdot}CF_2^{(5)}{\cdot}CF_2^{(6)}{\cdot}C(OH)(CH_3)_2$	(1) −80·4 (2) −125·0 (3) −121·2 (4) −121·2 (5) −120·4 (6) −117·9			208
$C_9F_{15}H_3O_3$	$(CF_3^{(1)})_2CF^{(2)}{\cdot}CF_2^{(3)}O{\cdot}C(CF_3^{(4)})_2{\cdot}CO_2CH_3$	(1)(4) −73·4, −75·1 (2) −186·7 (3) −75·1			96
$C_9F_{16}O_4$	$[(CF_3^{(1)})_2CF^{(2)}{\cdot}O{\cdot}CO]_2CF_2^{(3)}$	(1) −79·2 (2) −142·2 (3) −111·4			147
$C_9F_{16}O_4$	$(CF_3^{(1)})_2CF^{(2)}{\cdot}O{\cdot}CO{\cdot}(CF_2^{(3)})_2{\cdot}O(CF_2^{(4)})_2{\cdot}CO{\cdot}F^{(5)}$	(1) −79·2 (2) −142·3 (3)(4) −85·6, −121·3 (5) +23·5	(1-2) 1·9	(4-5) 8·3	147
$C_9F_{17}HO_2$		(1) −59·6 (2)(3) −84·0, −86·3 (4) −130·0 (5) −81·6			86

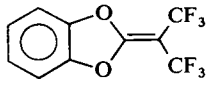
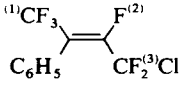
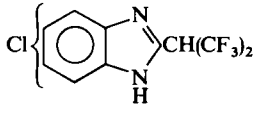
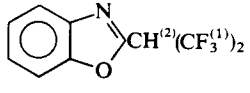
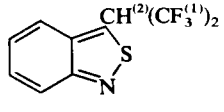
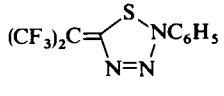
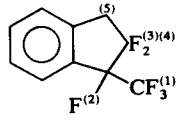
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_9F_{17}ClO_3$	$CF_3^{(1)}\cdot CO\cdot CF_2^{(2)}\cdot O\cdot CF^{(3)}(CF_3^{(4)})\cdot CF_2^{(5)}\cdot O\cdot CF^{(6)}(CF_3^{(7)})\cdot CF_2^{(8)}Cl$	(1)(2) −75·3 (3) −145·0 (4)(5) −80·6 (6) −141·4 (7) −79·2 (8) −69·0	(1, 2-) 4 (3-) 20 (6-) 19	143
C_9F_{18}		(1) −76·5 (2) −183·6 (3) −55·1 (4) −89·7 (5) −108·8 (6) −127·6 (7) −83·5	(2-3) 42·5 (3-5) 14·5 (3-6) 8·1 (4-5) 37·5 (5-6) 8·3 (5-7) 9·0 (3-6) 18·1 (1-C1) 289 (2-C1) 26 (2-C2) 257 (1-C2) 35 (2-C3) 30 (4-C4) 290 (3-C3) 274 (5-C5) 265 (6-C5) 36 (6-C7) 34 (7-C7) 286	149(a)
C_9F_{18}		(1) −76·5 (2) −183·6 (3) −59·4 (4) −87·5 (5) −103·6 (6) −124·6 (7) −83·5	(2-5) 67·7 (3-4) 28·2 (3-5) 14·1 (3-6) 9·0 (2-6) 33·1 (5-6) 8·3 (5-7) 9·8	149(a)
C_9F_{18}		(1) −75·2 (2) −169·3 (3) −172·5 (4) −75·2 (5) −80·4 (6) −65·8	(2-6) 45·1 (1-3) 26·3 (4-5) 26·3 (1-C1) 289 (2-Cl) 27 or 26 (4-C4) 289 (3-C4) 26 or 27 (5-C5) 284 (5-C6) 39 (6-C6) 277 (6-C7) 45	149(a)
C_9F_{18}		(1) −59·0 (2) −61·2 (3) −161·0 (4) −72·4 (5) −89·9 (6) −73·3	(1-2) 9·6 (1-3) 44·2 (1-C1) 277 (2-C2) 277 (5-C6) 28 (6-C6) 287	149(a)

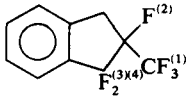
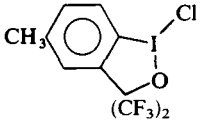
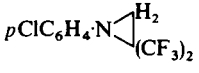
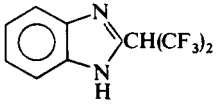
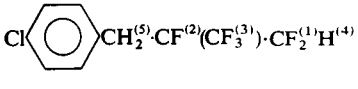
C_9F_{18}	As above	(1) −56·1 (3) −159·8 (5) −87·7	(2) −59·1 (4) −70·3 (6) −71·2	(1-2) 12 (1-4) ~2 (2-6) 13	(1-3) 52 (2-5) 13 (3-4) ~2	221
C_9F_{18}		(1) −156·1 (3) −74·1	(2) −91·5 (6) −56·4	(1-2) 40 (1-4) ~2 (2-6) 20 (3-6) 8	(1-3) 24 (2-3) 0·7 (3-4) 0·7 (5-6) 11	221
C_9F_{18}		(1) −180·8 (3) −78·9 (5) −72·9	(2) −180·2 (4) −73·2 (6) −63·5			221
$C_9F_{18}H_2$	$(CF_3)_3C{\cdot}CH_2{\cdot}C(CF_3)_3$	−66·8				222(a)
$C_9F_{18}H_3Br_2O_3P$	$[(CF_3)_2CHO]_3PBr_2$	−73·0				157
$C_9F_{18}H_3Cl_2O_3P$	$[(CF_3)_2CHO]_3PCl_2$	−77·3				157
$C_9F_{18}H_3O_3P$	$[(CF_3^{(1)})_2CH^{(2)}O]_3P$	−76·0				157
$C_9F_{18}H_3O_3P$	As above	−76·0		(1-2) 5·3		72
$C_9F_{18}H_3O_3PS$	$[(CF_3)_2CHO]_3P(S)$	−76·4				157
$C_9F_{18}H_3O_4P$	$[(CF_3)_2CHO]_3P(O)$	−75·5				157
$C_9F_{18}O_2$	$CF_3^{(1)}{\cdot}(CF_2^{(2)})_3{\cdot}CF^{(3)}(CF_3^{(4)}){\cdot}O{\cdot}CF^{(5)}(CF_3^{(6)}){\cdot}CO{\cdot}F^{(7)}$	(1)(4)(6) −76·1, −77·3, −80·1, −81·1 (2) −117·7, −118·5, −124·5, −128·8 (3) −139·4, −140·8 (5) −123·0, −125·0 (7) +29·2, +27·1				148
$C_9F_{18}O_3$	$(CF_3^{(1)})_2CF^{(2)}{\cdot}O{\cdot}CF_2^{(3)}{\cdot}CF^{(4)}(CF_3^{(5)}){\cdot}O{\cdot}CF_2^{(6)}{\cdot}CO{\cdot}CF_3^{(7)}$	(1) −81·5 (3) −81·3 (5) −80·7	(2) −145·0 (4) −146·0 (6)(7) −75·3	(2-3) 21 (6, 7-) 5	(4-6) 20	143
$C_9F_{18}O_3$	$[(CF_3^{(1)})_2CF^{(2)}{\cdot}O{\cdot}CF_2^{(3)}]_2CO$	(1) −81·4 (3) −75·0	(2) −145·3	(1-2) 2·1 (2-3) 21·5	(1-3) 5·5	143

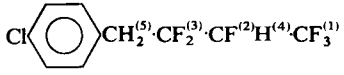
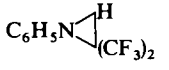
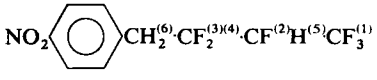
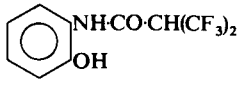
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_9F_{19}H$	$(CF_3^{(1)})_3C\cdot CF^{(2)}H\cdot C(CF_3)_3$	(1) −64·7	(1-2) 15·9	222(a)
C_9F_{20}	$(CF_3^{(1)})_3C\cdot CF_2^{(2)}\cdot C(CF_3)_3$	(1) −61·4	(1-2) 14·9	222(a)
$C_9F_{20}H_3O_3P$	$[(CF_3^{(1)})_2CHO]_3PF_2^{(2)}$	(1) −79·0 (2) −57·0	(P-2) 790	157
$C_9F_{20}O_4$	$CF_3^{(1)}\cdot O\cdot(CF_2^{(2)}\cdot CF_2^{(3)}\cdot O)_3\cdot CF_2\cdot CF_3^{(4)}$	(1) −59·0 (2) −93·7 (3) −91·6 (4) −90·4	(1-2) 9	104
$C_{10}F_3H_6NO_2$		−71·5		204(a)
$C_{10}F_3H_{15}N_2$		−72·3 −71·2 −71·0	(1-2) 7·5 7·6 9·9	193
$C_{10}F_4H_{10}N_2$		(1) −59·2 (2) −148·3	(1-2) 6·3 (2-4) 5·0	193
$C_{10}F_4H_{10}N_2$	As above but with CF_3 and F interchanged	(1) −58·0 (2) −163·0	(1-2) 8·7 (2-4) 2·6	193
$C_{10}F_4H_{14}O_3$		(1) −66·7 (2) −141·7	(1-2) 20	170
$C_{10}F_4H_{14}O_3$	$CF_3\cdot CF{=}C(OnC_3H_7)CO_2nC_3H_7$ (two isomers)	[a] (1) −64·5 (2) −147 [b] (1) −65 (2) −142	(1-2) 11 (1-2) 10	170

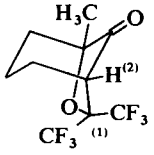
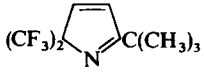
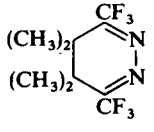
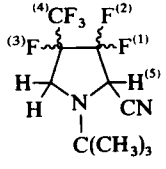
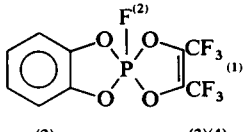
$C_{10}F_4H_{15}NO$			(1) −66·7	(2) −131	(1-2) 22		170
$C_{10}F_4H_{15}NO$	$CF_3^{(1)}\cdot CF^{(2)}{=}C(OCH_2CH_3)CO\cdot N(CH_2CH_3)_2$		(1) −68·3	(2) −126·5	(1-2) 8		170
$C_{10}F_4H_{16}O_3$	$CF_3^{(1)}\cdot CF^{(2)}H^{(3)}\cdot CH^{(4)}(OnC_3H_7)CO_2nC_3H_7$ (two isomers)	[a]	(1) −75·7	(2) −212	(1-2) 10 (2-3) 43	(1-3) 6 (2-4) 26	170
		[b]	(1) −63·5	(2) −206	(1-2) 11 (2-3) 45	(1-3) 11 (2-4) 11	
$C_{10}F_4H_{16}O_3$	$CF_3^{(1)}\cdot CH^{(3)}(OnC_3H_7)\cdot CF^{(2)}H^{(4)}\cdot CO_2nC_3H_7$		(1) −73·5	(2) −209·3	(1-2) 10 (2-3) 26	(1-3) 6 (2-4) 49	170
$C_{10}F_5H_4NO_2$			(1) −84·1	(2) −121·3			204(a)
$C_{10}F_5H_5O_2$			(1) −80·0 (2)(3) −117·5, −118·7		(2-3) 0·8		224(a)
$C_{10}F_5H_6NO$			(1) −84·9	(2) −116·9			204(a)
$C_{10}F_5H_6NO_3$			(1) −84·3	(2) −124·3			204(a)
$C_{10}F_5H_7O$			(1) −68·5 (3) −91·6	(2) −181·0			207(a)
$C_{10}F_5H_7O$	As above with groups (1) and (2) interchanged		(1) −68·5 (3) −107·5	(2) −188·1			207(a)

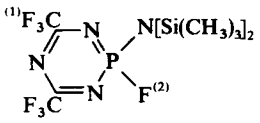
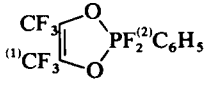
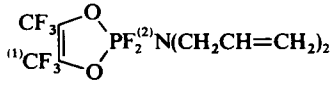
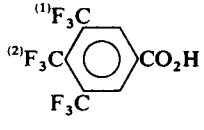
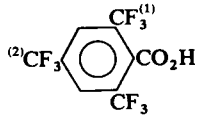
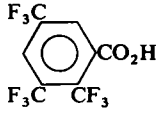
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{10}F_5H_7O$		(1) −68·2 (2) −174·3 (3) −147·9	(1-2) 10·5 (1-3) 22 (2-3) 130	100
$C_{10}F_5H_7O_2$		(1) −69·0 (2) −182·3 (3) −92·3		207(a)
$C_{10}F_5H_7O_2$	As above with groups (1) and (2) interchanged	(1) −69·0 (2) −189·3 (3) −108·1		207(a)
$C_{10}F_5H_8NO_2$		(1) −84·0 (2) −123·2		204(a)
$C_{10}F_6H_3Cl_2N_3S$		−57·15		173(e)
$C_{10}F_6H_4BrCl$		(1) −60·6 (2) −109·8 (3) −55·3	(1-2) 24·1 (1-3) 1·3 (2-3) 11·4	4
$C_{10}F_6H_4BrCl$	As above with groups (2) and (3) interchanged	(1) −55·6 (2) −106·0 (3) −57·0	(1-2) 11·3 (1-3) 15·3 (2-3) 11·3	4
$C_{10}F_6H_4ClNO$		−65·8		226(a)
$C_{10}F_6H_4ClNS$	As above with O replaced by S	−66·2		226(a)
$C_{10}F_6H_4ClN_3S$		−57·15, −56·83		173(e)

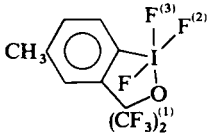
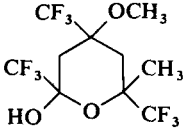
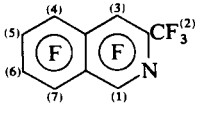
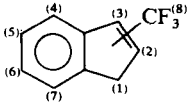
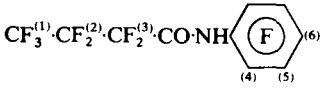
$C_{10}F_6H_4O_2$		−57·1				226(a)
$C_{10}F_6H_5Cl$		(1) −60·7 (3) −55·1	(2) −111·4	(1-2) 24·1 (2-3) 11·2	(1-3) 1·2	4
$C_{10}F_6H_5Cl$	As above with groups (2) and (3) interchanged	(1) −55·7 (3) −56·9	(2) −107·8	(1-2) 10·9 (2-3) 11·1	(1-3) 15·3	4
$C_{10}F_6H_5ClN_2$		−66·7				226(a)
$C_{10}F_6H_5NO$		−66·5				226(a)
$C_{10}F_6H_5NS$	As above with O replaced by S	−66·5				226(a)
$C_{10}F_6H_5NS$	As above	−65·1		(1-2) 6		173(e)
$C_{10}F_6H_5NS$		−62·32		(1-2) 8		173(e)
$C_{10}F_6H_5N_3S$		−57·20, −56·32				173(e)
$C_{10}F_6H_6$		(1) −77·8 (3) −111·8	(2) −172·5 (4) −114·9	(3-4) 250	(3,4-5) 18·0	176

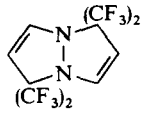
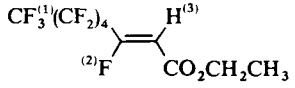
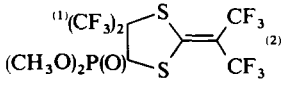
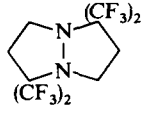
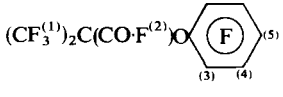
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{10}F_6H_6$		(1) −78·0 (2) −180·5 (3) −100·6 (4) −111·4	(3-4) 280	176
$C_{10}F_6H_6ClIO$		−76·13		227
$C_{10}F_6H_6ClN$		−67·5		228(a)
$C_{10}F_6H_6N_2$		−67·5		226(a)
$C_{10}F_6H_6O_2S$	$(CF_3)_2C(OH)S{\cdot}CO{\cdot}C_6H_5$	−87·15		122
$C_{10}F_6H_7Br$	$oBrC_6H_4{\cdot}CH_2^{(6)}{\cdot}CF_2^{(3)(4)}{\cdot}CF^{(2)}H^{(5)}{\cdot}CF_3^{(1)}$	(1) −74·8 (2) −208·8 (3) −107·0 (4) −109·5	(1-2) 12·0 (1-3,4) 12·0 (2-3,4) 12·0 (1-5) 6·0 (2-5) 44·0 (3-5) 12·0 (4-5) 6·0 (3-6) 20·0 (4-6) 18·0 (2-6) 2·0	176
$C_{10}F_6H_7Cl$	As above with Br replaced by Cl	(1) −77·0 (2) −216·0 (3) −108.0 (4) −113·5	(1-2) 12·0 (1-3,4) 12·0 (3-4) 270 (1-5) 6·0 (2-5) 43·5 (3-5) 12·0 (4-5) 6·0 (3-6) 21·5 (4-6) 19·0 (2-6) 2·0	176
$C_{10}F_6H_7Cl$		(1) −134·6 (2) −184·7 (3) −77·4	(1-3) 8·0 (1-4) 52·0 (2-3) 8·0 (2-4) 3·8 (3-5) 23·0	176

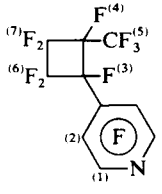
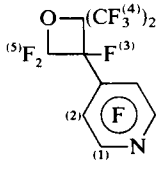
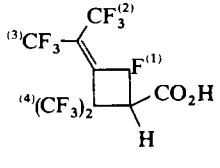
$C_{10}F_6H_7Cl$		(1) −74·9 (3) −111·0	(2) −214·0	(1-2) 12·0 (1-4) 6·0 (2-4) 43·7 (3-4) 12·0, 6·0 (3-5) 17·0, 15·5	(1-3) 12·0 (2-3) 12·0 (2-5) 3·0	176
$C_{10}F_6H_7N$		−67·5				228(a)
$C_{10}F_6H_7NOS$	$(CF_3)_2C{=}N{\cdot}S(O){\cdot}C_6H_4{\cdot}CH_3p$	−65·3				206(a)
$C_{10}F_6H_7NO_2$		(1) −74·8 (3) −108·3	(2) −213·5 (4) −111·7	(1-2) 11·5 (1-4) 11·5 (2-3) 11·5 (2-5) 45·5 (3-4) 278 (3-6) 13·0 (4-5) 13·0	(1-3) 11·5 (1-5) 6·0 (2-4) 11·5 (2-6) 3·0 (3-5) 6·0 (4-6) 14·0	176
$C_{10}F_6H_7NO_2$		−64·5				226(a)
$C_{10}F_6H_8$	$CF_3^{(1)}{\cdot}CF^{(2)}(CH_3^{(4)}){\cdot}CF_2^{(3)}{\cdot}C_6H_5$	(1) −76·9 (3) −108·1	(2) −172·1	(1-2) 7·0 (2-3) 5·0	(1-3) 11·0 (2-4) 22·5	176
$C_{10}F_6H_8$	$CF_3^{(1)}{\cdot}CF^{(2)}H^{(4)}{\cdot}CF_2^{(3)}{\cdot}CH_2^{(5)}{\cdot}C_6H_5$	(1) −75·5 (3) −111·3	(2) −214·7	(1-2) 10·5 (1-4) 5·5 (2-4) 43·5 (3-4) 10·5, 5·5 (3-5) 18·0, 16·5 (2-5) 3·0	(1-3) 10·5 (2-3) 10·5	176
$C_{10}F_6H_9NO_2S$	$(CF_3^{(1)(2)})_2C(OH)NH{\cdot}S(O){\cdot}C_6H_4CF_3p$	(1) −80·25	(2) −81·20	(1-2) 9·5		206(a)
$C_{10}F_6H_9NO_2S$	$(CF_3^{(1)(2)})_2C(OCH_3^{(3)})NH{\cdot}S(O)C_6H_5$	(1) −75·7	(2) −75·0	(1-2) 10·0	(1-3) 1·5	206(a)

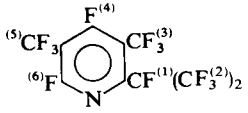
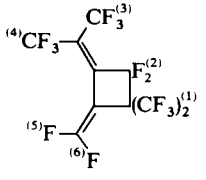
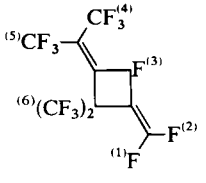
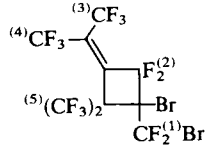
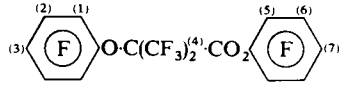
Molecular formula	Structure of compounds		Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{10}F_6H_{10}O_2$			−82·3,−83·3	(1-2) 7·8	213
$C_{10}F_6H_{11}N$			−69·7		229
$C_{10}F_6H_{12}N_2$			−66·7		87(a)
$C_{10}F_6H_{12}N_2$		(diastereoisomers)	[a] (1)(2) −119·7, −110·3 (3) −178·0 (4) ~−77 [b] (1)(2) ~−113·5 (3) −175·0 (4) ~−77 [c] (1)(2) ~−112·5 (3) −177·0 (4) ~−77	(1-2) 243 (1-4) ~13·4 (1-5) ~13·4 (2-4) 3·5 (3-4) 7 (3-4) 7	193
$C_{10}F_6H_{12}O_4$	$(CF_3{\cdot}CH_2{\cdot}CH{\cdot}CO_2CH_3)_2$ (two isomers)		[a] −66·32 [b] −66·37		117
$C_{10}F_7H_4O_4P$			(1) −66·0 (2) −66·4	(P-2) 1004	141
$C_{10}F_7H_5O$	$CF_3^{(2)}{\cdot}C_6H_4{\cdot}CO{\cdot}CF^{(3)(4)}H{\cdot}CF_3^{(1)}$		(1) −75 (2) −64 (3) −202	(1-3) 1·5 (1-4) 6·5 (3-4) 48	170
$C_{10}F_7H_5O_3$	$(CF_3^{(1)})_2C(OH)O{\cdot}CO{\cdot}C_6H_4F$		(1) −88·36		122

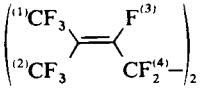
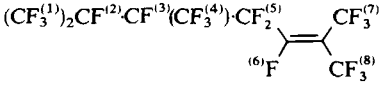
$C_{10}F_7H_{18}N_4PSi_2$		(1) −75·3	(2) −15·4	(P-1) 5·7	(P-2) 973	95
$C_{10}F_8H_4$	$CF_3^{(1)}\cdot CF^{(2)}=CF^{(3)}\cdot C_6H_4CF_3^{(4)}p$ (*Z*)	(1) −65·0 (3) −100·0	(2) −150·5 (4) −62·2	(1-2) 13 (2-3) 7·5	(1-3) 7·5	170
	(*E*)	(1) −68·4 (3) −148·5	(2) −166·5 (4) −64·3	(1-2) 12 (2-3) 142	(1-3) 24	
$C_{10}F_8H_5O_2P$		(1) −64·7	(2) −45·9	(P-2) 976		141
$C_{10}F_8H_6$	$CF_3^{(1)}\cdot CF^{(2)}H^{(6)}\cdot CF_2^{(3)(4)}\cdot CF_2^{(5)}\cdot C_6H_5$	(1) −75·9 (3) −115·8 (5) −113·1	(2) −212·5 (4) −122·8	(1-6) 6·0 (2-3) 11·0 (3-4) 264	(2-6) 44·0 (2-4) 6·5	176
$C_{10}F_8H_{10}NO_2P$		(1) −67·4	(2) −56·6	(P-2) 876		141
$C_{10}F_9H_3O_2$		(1) −63·78	(2) −60·33			209(a)
$C_{10}F_9H_3O_2$		(1) −63·78	(2) −60·33			209(a)
$C_{10}F_9H_3O_2$		−59·23, −55·83				209(a)

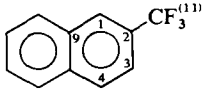
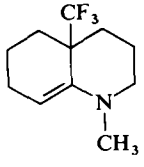
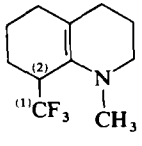
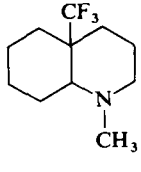
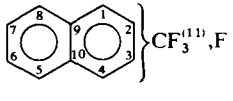
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{10}F_9H_6IO$		(1) −74·30 (2) −13·20 (3) −41·57	(1-2) 8 (2-3) 116	227
$C_{10}F_9H_6NOS$	$CF_3^{(1)}\cdot(CF_2^{(2)})_2\cdot CF_2^{(3)(4)}\cdot SO\cdot NH\cdot C_6H_5$	(1) −81·2 (2) −121·0, −125·7 (3) −117·0 (4) −120·4	(3-4) 248	191
$C_{10}F_9H_{11}O_3$		−80·7, −85·7, −86·0		217(a)
$C_{10}F_9N$		(1) −61·2 (2) −66·3 (3) −132·6 (4) −143·3 (5)(6) −148·5, −145·7 (7) −134·4	(1-3) 30 (1-7) 66 (3-4) 60	231
$C_{10}F_{10}H_{11}NO$	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot CF_2^{(3)}\cdot CF_2^{(4)(5)}\cdot CF^{(6)}H^{(7)}\cdot CO\cdot N(CH_2CH_3)_2$	(1) −79 (2)(3) −124, −121 (4) −117 (5) −121 (6) −194	(1-) 11·2 (4-5) 280 (6-7) 46	232
$C_{10}F_{11}$	 CF_3 at C2 or C3	(1) −117·3 (2) or (3) −112·9 (4)(7) −145·5, −147·7 (5)(6) −154·3 (8) −67·7		233
$C_{10}F_{12}HNO$		(1) −82·2 (2) −121·2 (3) −128·3 (4) −146·9 (5) −157·1 (6) −164·9		219(a)

$C_{10}F_{12}H_4N_2$		−73·45		234(a)
$C_{10}F_{12}H_6O$	$CF_3^{(1)}(CF_2)_4\cdot CF{=}C(CH_2CH_3)CHO$ $(Z+E)$	(1) −81·0		137
$C_{10}F_{12}H_6O_2$		(1) −81·0	(2-3) 30	137
$C_{10}F_{12}H_7O_3PS_2$		(1) −65·73, −63·52 (2) −57·75		173(e)
$C_{10}F_{12}H_8N_2$		−72·90		234(a)
$C_{10}F_{12}H_8N_2O$	$(CF_3^{(1)})_2C(\overline{N\cdot CH_2\cdot CH_2\cdot O\cdot CH_2\cdot CH_2})\cdot N{=}C(CF_3^{(2)(3)})_2$	(1) −68·3 (2)(3) −66·1, −63·6	(2-3) 5·8	178
$C_{10}F_{12}H_{10}N_2S$	$(CF_3^{(1)})_2\cdot C[S(CH_2)_3CH_3]NH\cdot N{=}C(CF_3^{(2)(3)})_2$	(1) −70·8 (2)(3) −66·8, −64·3	(2-3) 6·0	178
$C_{10}F_{12}O_2$		(1) −71·6 (2) +39·0 (3)(4) −151·0, −163·2 (5) −157·4		96
$C_{10}F_{13}H_7O$	$CF_3^{(1)}\cdot(CF_2^{(2)})_5\cdot C(CH_3)_2CHO$	(1) −80·1 (2) −117, −119, −122·8, −126·6		137
$C_{10}F_{13}H_7O$	$CF_3^{(1)}\cdot(CF_2)_5\cdot CH(CH_2CH_3)\cdot CHO$	(1) −80·5		137
$C_{10}F_{13}H_9O$	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot CF_2^{(3)}\cdot CF_2^{(4)}\cdot CF_2^{(5)}\cdot CF_2^{(6)}\cdot C(OH)(CH_3)CH_2CH_3$	(1) −80·8 (2) −124·1 (3)(4) −119·5, −120·4 (5) −118·3 (6) −116·6		208

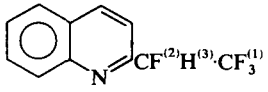
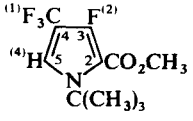
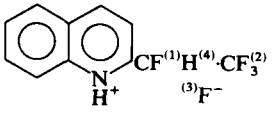
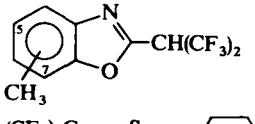
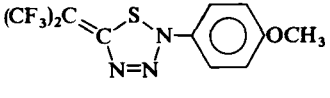
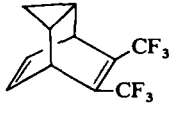
Molecular formula	Structure of compounds		Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{10}F_{13}H_{10}NOS$	$CF_3^{(1)}\cdot(CF_2^{(2)})_4\cdot CF_2^{(3)(4)}\cdot SO\cdot NH\cdot(CH_2)_3\cdot CH_3$		(1) −82·0 (2) −120·3 −122·0, −123·4, −127·1 (3) −121·7 (4) −116·5	(3-4) 251	191(a)
$C_{10}F_{13}N$	 (Two isomers)	[a]	(1) −90·6 (2) −138·8 (3)(4) −170·8, −188·4 (5) −73·1 (6)(7) −126·2, −133·0, −126·5 (1:1:2)		212
		[b]	(1) −92·6 (2) −135·6 (3)(4) −168·4, −193·8 (5) −76·6 (6)(7) −123·9, −131·6, −131·6 (1:1:2)		
$C_{10}F_{13}NO$			(1) −89·7 (2) −139·7 (3) −153·9 (4) −74·0 (5) −75·0, −76·2		212
$C_{10}F_{14}H_2O_2$			(1) −108·5 (2)(3) −67·5, −65·9 (4) −67·9		235
$C_{10}F_{14}H_{10}NO_2P$	$PF_2^{(1)}(NH^{(3)}\cdot C(CH_3)_3)\cdot O\cdot C\underbrace{(CF_3)_2C(CF_3)_2}_{(2)}O$		(1) −58·6 (2) −68·7 At −80° (1a) −51·1 (1e) −67·2	(P-1) 872 (1-3) 14·0 (P-1a) 790 (P-1e) 957 (1a-1e) 69·3 (1a-3) 34·7	156
$C_{10}F_{14}H_{10}NO_2P$	As above with $NH\cdot C(CH_3)_3$ replaced by $N(CH_2CH_3)_2$		At −20° (1) −57·5 (2) −67·4, −69·2	(P-1) 853	156

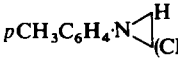
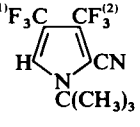
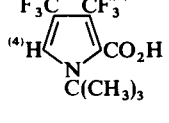
$C_{10}F_{14}H_{10}N_2S_2$	$[(CF_3^{(1)})_2CF^{(2)}\cdot S\cdot N(CH_3)CH_2]_2$	(1) −75·1 (2) −167·3			140
$C_{10}F_{15}N$		(1) −179·83 (2) −72·72 (3) −52·84 (4) −88·01 (5) −58·06 (6) −55·47	(1-3) 50 (3-4) 39·0 (5-6) 21·6	(2-3) 3·4 (4-5) 21·6 (4-6) 21·6	236
$C_{10}F_{16}$		(1) −68·5 (2) −104·8 (3)(4)(6) −63·5 to −63·7 (5) −53·9	(1-2) 9·0 (4-5) 33	(2-3) 9·0 (5-6) 33	235
$C_{10}F_{16}$		(1)(2) −65·98, −65·63 (3) −111·0 (4) −61·5 (5) −68·0 (6) −68·7	(1-2) 20 (3-6) 10·1	(3-4) 18·2 (5-6) 3·4	235
$C_{10}F_{16}H_{10}NP$	$(CF_3^{(1)}\cdot CF_2^{(2)}\cdot CF_3^{(2)})_2PF_2^{(4)}N(CH_2CH_3)_2$	(1) −81·6 (2) −126·9 (3) −116·9 (4) −52·4	(3-4) 11·5 (P-4) 927	(P-3) 115	71
$C_{10}F_{16}Br_2$		(1) −49·6 (2) −106·3 (3)(4) −68·1, −61·5 (5) −67·8			235
$C_{10}F_{16}O$		(1)(2)(5)(6) −151·6, −153·4, −162·1, −163·5 (3)(7) −155·8, −157·7 (4) −71·8			96
$C_{10}F_{17}H$	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot CF_2^{(3)}\cdot CF_2^{(4)}\cdot CF_2^{(5)}\cdot CF_2^{(6)}\cdot CF_2^{(7)}\cdot CF_2^{(8)}\cdot C\equiv CH^{(9)}$	(1) −82·0 (2) to (7) −118·3 (8) −100·3	(8-9) 5		144

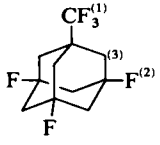
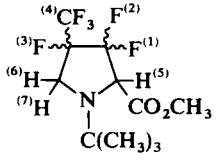
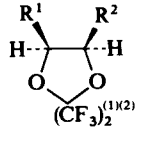
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{10}F_{17}HBr_2$	As above with $-C\equiv CH$ replaced by $-CBr=CHBr$ (Z)	(1) −81·2 (2) −126·6 (3) to (6) −122·0 (7) −120·4 (8) −105·9		144
$C_{10}F_{17}H_2Br_3$	As above with $-C\equiv CH$ replaced by $-CBr_2\cdot CH_2Br$	(1) −81·2 (2) −125·8 (3) to (6) −121·6 (7) −114·1 (8) −102·5		144
$C_{10}F_{18}$		(1) −62·0 (2) −59·1 (3) −97·8 (4) −114·1	(1-2) 10·0 (1-3) 32·0	129(a)
$C_{10}F_{18}H_2O_4$	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot O\cdot CF_2^{(3)}\cdot CF_2^{(4)}\cdot CO_2CH_2^{(9)}CF_2^{(5)}CF_2^{(6)}\cdot OCF_2^{(7)}\cdot CF_3^{(8)}$	(1)(8) −87·3 (2)(7) −89·0 (3) −86·6 (4) −121·7 (5) −124·0 (6) −85·8	(5-9) 12·0	237
$C_{10}F_{18}O_4$	$[(CF_3^{(1)})_2CF^{(2)}\cdot O\cdot CO]_2(CF_2^{(3)})_2$	(1) −79·1 (2) −142·3 (3) −118·5	(1-2) 2·1	147
$C_{10}F_{18}O_5$	$[(CF_3^{(1)})_2CF^{(2)}\cdot O\cdot CO\cdot CF_2^{(3)}]_2O$	(1) −79·2 (2) −142·8 (3) −77·4	(1-2) 1·9	147
$C_{10}F_{20}$		(1) −71·2 (2)(3) −178·5, −180·5 (4) −72·6 (5) −105·4 (6) −95·5 (7) −59·5 (8) −61·7	(6-8) 32·5 (7-8) 11·5	129(a)
$C_{10}F_{20}$	$(CF_3^{(1)})_2CF^{(2)}\cdot CF^{(3)}(CF_3^{(4)})\cdot C[CF^{(5)}\cdot(CF_3^{(6)})_2]=CF_2^{(7)}$	(1)(6) −71·0, −72·6 (2)(3)(5) −176·5, −180·5, −186·5 (4) −74·5 (7)(8) −58·5, −62·4		129(a)
$C_{10}F_{20}$	$(CF_3^{(1)})_2CF^{(2)}\cdot CF_2^{(3)}\cdot CF_2^{(4)}\cdot C[CF^{(5)}\cdot(CF_3^{(6)})_2]=CF_2^{(7)}$	(1)(6) −71·0, −72·5 (2)(5) −180·5 (3)(4) −110·5, −114·9 (7)(8) −58·5, −62·5		129(a)

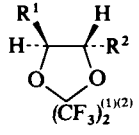
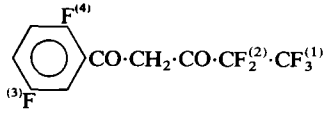
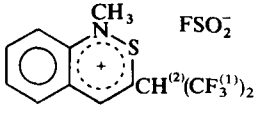
$C_{11}F_3H_7$			(11-C1) 4·5 (11-C3) 3·2 (11-C9)~0·7 (11-C11) 272·1	431
$C_{11}F_3H_{15}S$	$CF_3^{(1)}C(SCH_2CH_3)=CH^{(2)}\cdot C\equiv C\cdot C(CH_3)_3$	−66·44	(1-2) 1·5	188(a)
$C_{11}F_3H_{16}N$		−67·1		137
$C_{11}F_3H_{16}N$		−66·3	(1–2) 8·5	137
$C_{11}F_3H_{18}N$		−58·8		137
$C_{11}F_4H_6$	 F at C1 CF_3 at C4		(1-C1) 248·5 (1-C2) 21·2 (1-C3) 10·0 (1-C5) 2·5 (1-C6) <0·5 (1-C7) 1·9 (1-C8) 6·3 (11-C3) 6·2 (11-C5) 2·5 (11-C11) 272·7	431

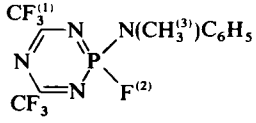
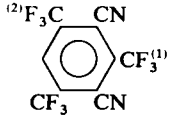
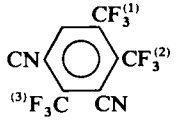
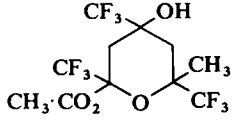
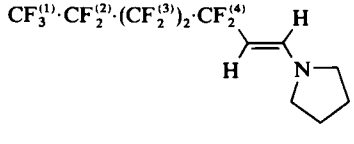
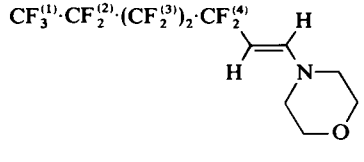
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
	F at C1 CF_3 at C5		(1-C1) 256·2 (1-C2) 19·8 (1-C3) 8·1 (1-C4) 4·4 (1-C6) 5·9 (1-C7) 2·2 (1-C8) 5·1 (11-C4) 2·9 (11-C6) <0·5 (11-C8) ~1 (11-C11) 271·4	
	F at C1 CF_3 at C7		(1-C1) 254·0 (1-C2) 19·5 (1-C3) 8·4 (1-C4) 4·3 (1-C5) 3·1 (1-C6) ~1 (1-C8) 4·6 (1-C9) ~3 (1-C10) 15 (11-C6) 2·9 (11-C7) 32·0 (11-C8) 5·3 (11-C9) ~1·5 (11-C11) 272·1	
	F at C2 CF_3 at C5		(2-C1) 25·7 (2-C2) 249·2 (2-C3) 21·2 (2-C4) 9·5 (2-C5) 1·2 (2-C7) 0·9 (2-C8) 5·9 (2-C10) 9·6 (11-C5) 3·4 (11-C7) 3·1	
	F at C2 CF_3 at C6		(2-C1) 25·3 (2-C2) 248·6 (2-C3) 21·1 (2-C4) 9·1 (2-C5) 1·2 (2-C6) 3·2 (2-C8) 5·7 (2-C9) ~6 (2-C10) 9·5 (11-C6) 2·9 (11-C8) 4·8 (11-C11) 273·5	
	F at C2 CF_3 at C6		(2-C1) 23·4 (2-C2) 248·5 (2-C3) 25·5 (2-C4) 9·6 (2-C6) 2·5 (2-C7) ~0·5 (11-C5) ~1 (11-C7) 5·9 (11-C11) 273·2	

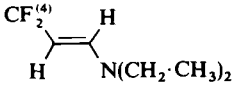
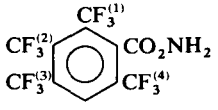
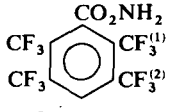
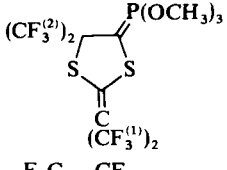
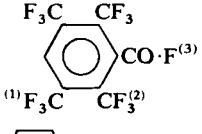
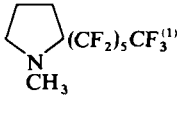
$C_{11}F_4H_7N$			(1) −77·5	(2) −201·3	(1-2) 13 (1-3) 6 (2-3) 44	169
$C_{11}F_4H_8O$	$CF_3^{(1)}\cdot CF^{(2)}=C(C_6H_5)CO\cdot CH_3$		(1) −53·5	(2) −100	(1-2) 9·15	137
$C_{11}F_4H_{13}NO_2$			(1) −57·9	(2) −142·3	(1-2) 6·5 (1-4) ~1 (2-4) 5·2 ^1J(1-C) 265·3 ^1J(2-C) 349·5 ^2J(2-C2) 27·1 ^3J(2-CO) 17·6	193
$C_{11}F_4H_{13}NO_2$	As above but with CF_3 and F interchanged		(1) −56·0	(2) −166·0	(1-2) 11·5 (2-4) 2·5 ^2J(2-C5) 15·5	193
$C_{11}F_5H_8N$			(1) −200·5 (3) −136·5	(2) −76·5	(1-2) 12·6 (1-4) 44·4 (2-4) 6·0	169
$C_{11}F_6H_6O_2$	$(CF_3^{(1)})_2CH^{(2)}\cdot CO\cdot CO\cdot C_6H_5$		−63·4		(1-2) 7·9	213
$C_{11}F_6H_6O_2$	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot CO\cdot CH_2\cdot CO\cdot C_6H_4F^{(3)}p$		(1) −86·0 (3) −105·5	(2) −127·0		224(a)
$C_{11}F_6H_7NO$		(5CH_3) (7CH_3)	−66·5 −66·2			226(a)
$C_{11}F_6H_7N_3OS$			−57·19, −56·48			173(e)
$C_{11}F_6H_7N_3S$	As above with OCH_3 replaced by CH_3		−57·74, −56·83			173(e)
$C_{11}F_6H_8$			−60·8		^1J(F-C) 272	210

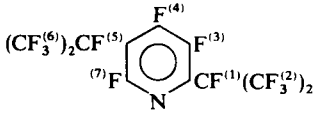
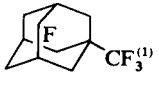
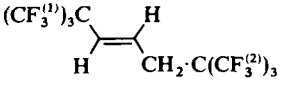
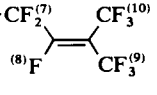
Molecular formula	Structure of compounds		Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{11}F_6H_8OS$	$(CF_3^{(1)})_2CH^{(2)}\cdot CS\cdot O\cdot C_6H_4CH_3p$		−66·11	(1-2) 6	173(a)
$C_{11}F_6H_9$	$CF_3^{(1)}\cdot CF^{(2)}H^{(4)}\cdot CF_2^{(3)}\cdot CH_2^{(5)}\cdot C_6H_4CH_3p$		(1) −75·5 (2) −214·0 (3) −111·5	(1-2) 11·0 (1-3) 11·0 (1-4) 5·5 (2-3) 11·0 (2-4) 44·0 (3-4) 11·0, 5·5 (3-5) 20·0, 15·0 (2-5) 3·0	176
$C_{11}F_6H_9N$			−67·25		228(a)
$C_{11}F_6H_9NO$	As above with CH_3 replaced by CH_3O		−67·15		228(a)
$C_{11}F_6H_{10}$	$CF_3^{(1)}\cdot CF^{(2)}H^{(5)}\cdot CF_2^{(3)(4)}\cdot CH^{(6)}(CH_3)C_6H_5$ (diastereoisomers)	[a]	(1) −75·0 (2) −214·0 (3) −118·3 (4) −125·7	(1-2) 12·5 (1-3,4) 12·5 (1-5) 6·2 (2-5) 44·7 (3-4) 270 (3-5) 18·0 (4-5) 3·0	176
		[b]	(1) −75·5 (2) −206·8 (3)(4) −117·5	(1-2) 11·0 (1-3,4) 11·0 (2-3,4) 11·0 (2-5) 43·0 (3,4-5) 11·0 (1-5) 8·5 (3,4-6) 15·5	
$C_{11}F_6H_{10}N_2$			(1) −58·2 (2) −57·5	(1-2) 6·0	193
$C_{11}F_6H_{11}NOS_2$	$(CF_3)_2C(SCH_2CH_3)NH\cdot S(O)C_6H_5$		−72·2 to −69·8		206(a)
$C_{11}F_6H_{11}NO_2$			(1) −57·3 (2) −55·4	(1-2) 6·7 (1-4) ~1	193
$C_{11}F_6H_{11}NO_2S$	$(CF_3)_2C(OC_6H_5)NH\cdot S(O)CH_2CH_3$		−75·65		206(a)
$C_{11}F_6H_{11}NO_2S$	$(CF_3)_2C(OC_6H_4CH_3p)NHS(O)CH_3$		−75.7, −74·95		206(a)

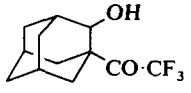
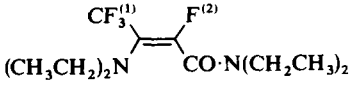
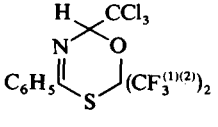
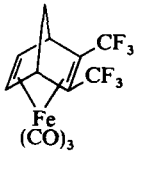
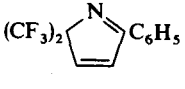
$C_{11}F_6H_{12}$			(1) −79·16 (2) −143·70	(1-3) ~2		239(c)(j)
$C_{11}F_6H_{15}NO_2$		(diastereoisomers)	[a] (1)(2) −120·25, −106·15 (3) −179·7 (4) −76·7	(1-2) 249·6 (1-3) ~0 (1-4) 14·4 (1-5) 23·3 (1-6,7) 3·5 (2-3) ~0 (2-5) ~7·8 (3-6)(3-7) 27·5, 20·5 (3-4) 7·0		193
			[b] (1)(2) −118·92, −116·08 (3) −177·1 (4) −76·7	(1-2) 248·0 (1-5) 12·5 (2-3) ~0 (2-4) 12·0 (2-5) 15·2 (3-6,7) 32·0		
			[c] (1)(2) −117·96, −112·04 (3) −183·0 (4) −77·8	(1-2) 248		
			[d] (1)(2) −126·79, −113·21 (3) −74·8	(1-2) 247		
$C_{11}F_6H_{16}O$						
	$R^1 = CH_3$ $R^2 = (CH_2)_4CH_3$ CH_2CH_3 $(CH_2)_3CH_3$ $(CH_2)_2CH_3$ $(CH_2)_2CH_3$		(1) −78·88 (2) −78·88 −78·79 −78·95 −78·78 −78·90	(1-2) 9·1 9·14 9·14		240(b)

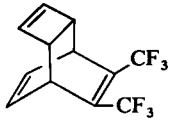
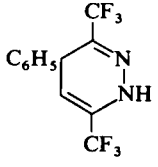
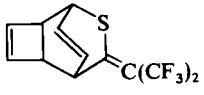
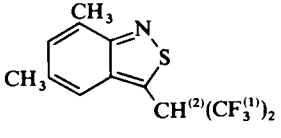
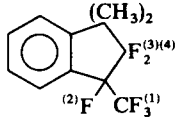
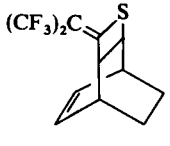
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{11}F_6H_{16}O$				
	$R^1 = CH_3$ $R^2 = (CH_2)_4CH_3$ CH_2CH_3 $(CH_2)_3CH_3$ $(CH_2)_2CH_3$ $(CH_2)_2CH_3$	(1) −79·65 (2) −79·72 −79·60 −79·62 −81·26 −81·26	(1-2) 8·41 8·4 8·4	240(b)
$C_{11}F_7H_5D_2O_3$	$C_6H_5{\cdot}CO{\cdot}CO{\cdot}CF_2^{(3)}{\cdot}CF_2^{(2)}{\cdot}CF_3^{(3)}{\cdot}D_2O$	(1) −82·9 (2) −120·9 (3) −125·9	(1-2) 10	241(b)
$C_{11}F_7H_5O_2$	$C_6H_5{\cdot}CO{\cdot}CO{\cdot}CF_2^{(3)}{\cdot}CF_2^{(2)}{\cdot}CF_3^{(1)}$	(1) −82·4 (2) −120·0 (3) −126·9	(1-2) 9·5	241(b)
$C_{11}F_7H_5O_2$		(1) −79·3 (2) −135·7 (3)(4) −134·3		224(a)
$C_{11}F_7H_6BrO$	$C_6H_5{\cdot}CHBr{\cdot}CO{\cdot}CF_2^{(3)}{\cdot}CF_2^{(2)}{\cdot}CF_3^{(1)}$	(1) −81·5 (2) −118·1 (3) −126·5	(2-3) 10	241(b)
$C_{11}F_7H_7O$	$C_6H_5{\cdot}CH_2{\cdot}CO{\cdot}CF_2^{(3)}{\cdot}CF_2^{(2)}{\cdot}CF_3^{(1)}$	(1) −81·3 (2) −120·3 (3) −126·5	(1-2) 9·5	241(b)
$C_{11}F_7H_7O_2$	$C_6H_5{\cdot}CO{\cdot}CH_2{\cdot}O{\cdot}CF^{(2)}(CF_3^{(1)})_2$	(1) −85·0 (2) −153·0	(1-2) 2·6	213
$C_{11}F_7H_7O_3$	$C_6H_5{\cdot}CO{\cdot}CO{\cdot}CF_2^{(3)}{\cdot}CF_2^{(2)}{\cdot}CF_3^{(1)}{\cdot}H_2O$	(1) −82·8 (2) −120·7 (3) −125·9	(1-2) 10	241(b)
$C_{11}F_7H_8NO_3S_2$		(1) −65·10	(1-2) 8	173(e)

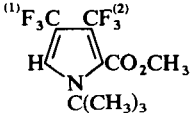
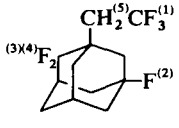
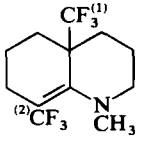
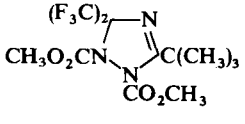
$C_{11}F_7H_8N_4P$		(1) −75·0	(2) −44·9	(P-1) 5·5 (2-3) 1·1	(P-2) 960	95
$C_{11}F_7H_{18}N_4PSi$	As above with $N(CH_3)C_6H_5$ replaced by $N[Si(CH_3^{(3)})_3]C(CH_3)_3$	(1) −75·2	(2) −19·5	(P-1) 6·0 (2-3) 0·3	(P-2) 967	95
$C_{11}F_9HN_2$		(1) −59·96	(2) −64·90			209(a)
$C_{11}F_9HN_2$		(1) −58·46 (3) −56·38	(2) −58·89			242(a)
$C_{11}F_9H_{11}O_4$		−79·2, −86·3, −88·1				217(a)
$C_{11}F_{11}H_{10}N$		(1) −80·0 (3) −120·8	(2) −124·8 (4) −102·2			243
$C_{11}F_{11}H_{10}NO$		(1) −80·0 (3) −121·0	(2) −125·2 (4) −102·4			243

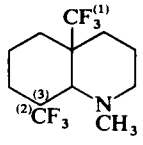
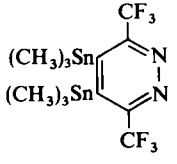
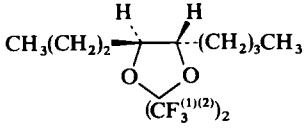
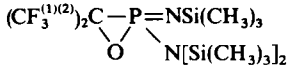
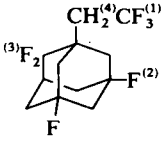
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{11}F_{11}H_{12}N$	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot(CF_2^{(3)})_2\cdot CF_2^{(4)}$ 	(1) −80·0 (2) −124·9 (3) −121·0 (4) −102·4		243
$C_{11}F_{12}H_3NO_2$		(1) −53·85 (2) −55·12 (3) −58·98 (4) −60·61		209(a)
$C_{11}F_{12}H_3NO_2$		(1)(2) −59·93, −55·33		242(a)
$C_{11}F_{12}H_5MoO_3Sb$	$[(\eta^5\text{-}C_5H_5)Mo(CO)_3CF^{(3)}\cdot CF_2^{(2)}\cdot CF_3^{(1)}]SbF_6$	(1) −80·12 (2) −106·85 (3) +106·5	(1-2) 2·4 (1-3) 8·0 (2-3) 16·1	244(a)
$C_{11}F_{12}H_8O$	$CF_3^{(1)}\cdot(CF_2)_4\cdot CF{=}C(CH_3)\cdot CO\cdot CH_2\cdot CH_3$	(1) −81·5		137
$C_{11}F_{12}H_8O_2$	$CF_3^{(1)}\cdot(CF_2)_4\cdot CF{=}C(CH_3)\cdot CO_2CH_2CH_3$	(1) −82·5		137
$C_{11}F_{12}H_9NO$	$CF_3\cdot(CF_2)_4\cdot CF{=}C(CH_3)\cdot CO\cdot N(CH_3)_2$	(1) −82		137
$C_{11}F_{12}H_9O_3PS_2$		(1) −57·72 (2) −66·51	(P-2) 1·3	173(e)
$C_{11}F_{13}HO$		(1) −59·76 (2) −55·61 (3) +56·60		242(a)(o)
$C_{11}F_{13}H_8N$		(1) −80·5		137

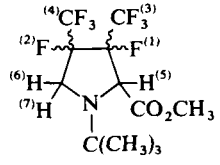
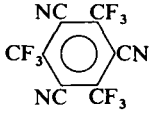
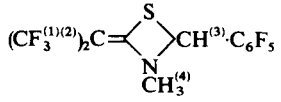
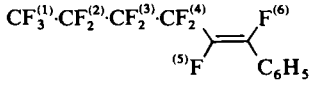
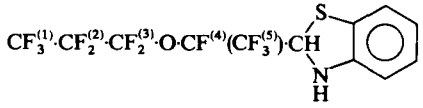
$C_{11}F_{13}H_9FeN_3O_2P$	$[CF_3^{(1)}\cdot CF_2^{(2)}\cdot CF_2^{(3)}\cdot Fe(CO)_2(CH_3CN)_3]PF_6^{(4)}$	(1) −76·9 (2) −117·4 (3) −79·4 (4) −73·3	(1-3) 11·7		215
$C_{11}F_{13}H_9O$	$CF_3^{(1)}(CF_2^{(2)})_5\cdot CH(CH_3)\cdot CO\cdot CH_2\cdot CH_3$	(1) −81·6 (2) −115·2, −121·2, −123·3, −126·6			137
$C_{11}F_{13}H_{11}O$	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot CF_2^{(3)}\cdot CF_2^{(4)}\cdot CF_2^{(5)}\cdot CF_2^{(6)}\cdot C(OH)(CH_2CH_3)_2$	(1) −80·4 (2) −124·5 (3) −120·5 (4) −120·5 (5) −117·1 (6) −108·0			208
$C_{11}F_{17}N$		(1) −186·5 (2) −76·86 (3) −144·7 (4) −108·6 (5) −180·7 (6) −77·61 (7) −56·31	(1-2) 6 (1-3) 51 (2-3) 5 (3-7) 25 (4-5) ~44 (4-6) 11·5 (5-6) 5·5 (5-7) ~44 (6-7) 13·5		236
$C_{11}F_{18}$		(1) −70·2 Rest: −125·3, −135·4, −234·0 (2:2:1)			245(n)
$C_{11}F_{18}H_4$		(1) −67·9 (2) −67·4			145(a)
$C_{11}F_{18}H_7O_3P$	$[(CF_3^{(1)})_2CH^{(3)}O]_2P(CH_3)CH_2C(CF_3^{(2)})_2O$	(1) −74·5 (2) −78·0	(1-3) 5·0 ^1J((1-C)(2-C)285, 284 ^2J(1-C) 34·4 ^2J(2-C) 33·0		199
	(at −60°)	(1) −74·1, −74·4, −74·5, −74·9 (2) −77·3, −78·7	(1-3) 5·2, 6·0 (2-2′) 8·8		
$C_{11}F_{18}H_9O_3P$	$[(CF_3^{(1)})_2CHO]_3P(CH_3)_2$	(1a) −73·0 (1e) −71·3			180
$C_{11}F_{20}O_4$	$(CF_2^{(3)(4)})_3[CO_2CF^{(2)}(CF_3^{(1)})_2]_2$	(1) −79·3 (2) −142·7 (3)(4) −118·0, −123·2	(1-2) 1·9		147
$C_{11}F_{22}$	$(CF_3^{(1)(2)})_2CF^{(3)}\cdot CF^{(4)}(CF_2^{(5)}\cdot CF_3^{(6)})\cdot CF_2^{(7)}$ 	(1)(2) −70·2, −73·0 (3)(4) −173·7, −179·0 (5) −113·0 (AB) (6) −82·0 (7) −102·7(AB) (9) −61·9 (10) −59·6	(5A-5B) 302 (7A-7B) 290 (7-9) 10·0 (8-9) 31·0 (9-10) 10·0		129(a)

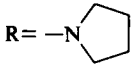
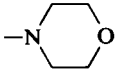
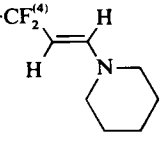
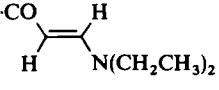
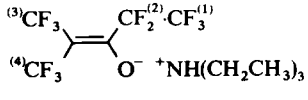
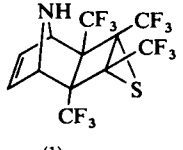
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{11}F_{24}H_3O_3P$	$[(CF_3^{(1)})_2CHO]_3P(CF_3^{(2)})_2$	(1) −74·0 (2) −61·7		180
$C_{11}F_{24}O_5$	$CF_3^{(1)}O(CF_2^{(2)}CF_2^{(3)}O)_4CF_2CF_3^{(4)}$	(1) −58·9 (2) −93·5 (3) −91·5 (4) −90·3	(1-2) 10	104
$C_{12}F_3H_{15}O_2$		−73	^2J(F-C) 35	247
$C_{12}F_3H_{18}N$	$CF_3C[N(CH_2CH_3)_2]{=}CH{\cdot}C{\equiv}C{\cdot}CH(CH_3)_2$	−65·69		188(a)
$C_{12}F_3H_{20}$	$(CF_3^{(1)}{\cdot}CH_2^{(2)}{\cdot}CH{\cdot}CH_2{\cdot}CH_2{\cdot}CH_3)_2$	−64·8	(1-2) 10·5	117
$C_{12}F_4H_{20}N_2O$		(1) −58 (2) −121	(1-2) 20	170
$C_{12}F_4H_{20}N_2O$	$CF_3^{(1)}{\cdot}CF^{(2)}{=}C[N(CH_2CH_3)_2]CO{\cdot}N(CH_2CH_3)_2$	(1) −60 (2) −104	(1-2) 5·6	170
$C_{12}F_6H_6Cl_3NOS$		(1)(2) −76·6, −74·7	(1-2) 9·5	248(a)
$C_{12}F_6H_6FeO_3$		−55·7		210
$C_{12}F_6H_7N$		−69·1		229

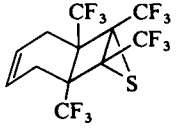
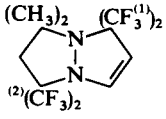
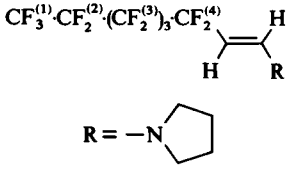
$C_{12}F_6H_8$		−60·6	^1J(F-C) 275	210
$C_{12}F_6H_8N_2$		−70·1, −68·5		87
$C_{12}F_6H_8S$		−57·1, −53·6		173(e)
$C_{12}F_6H_9NO_2$	$C_6H_5{\cdot}CO{\cdot}N(CH_3)CO{\cdot}CH^{(2)}(CF_3^{(1)})_2$	−63·72	(1-2) 7·5	173(e)
$C_{12}F_6H_9NS$		−66·32	(1-2) 8	173(e)
$C_{12}F_6H_{10}$		(1) −73·8 (2) −153·7 (3) −120·1 (4) −123·0	(1-2) 14·0 (1-3) 10·0 (1-4) 5·0 (2-3) 10·0 (3-4) 250 (2-4) 2·0	176
$C_{12}F_6H_{10}S$		−56·9, −53·4		173(e)

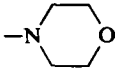
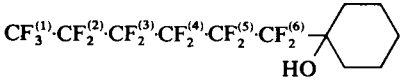
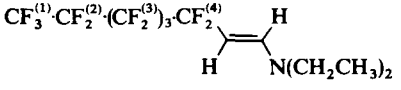
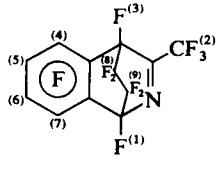
Molecular formula	Structure of compounds		Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{12}F_6H_{12}$	$CF_3^{(1)}\cdot CF^{(2)}H^{(5)}\cdot CF_2^{(3)(4)}\cdot CH^{(6)}(CH_2CH_3)\cdot C_6H_5$	[a]	(1) −74·9 (2) −215·5 (3) −116·5 (4) −121·0	(1-2) 11·0 (1-3,4) 11·0 (3-4) 260 (2-5) 43·0 (3-5) 19·5 (4-5) 1·8 (1-5) 5·5	176
	(diastereoisomers)	[b]	(1) −73·5 (2) −215·5 (3)(4) −114·5	(1-2) 11·0 (1-3,4) 11·0 (2-3,4) 11·0 (2-5) 44·0 (3,4-5) 11·0 (1-5) 5·5	
$C_{12}F_6H_{13}NO_2$			(1) −57·8 (2) −56·3	(1-2) 6·35	193
$C_{12}F_6H_{13}NO_2S$	$(CF_3)_2C(OCH_2CH_3)NH\cdot S(O)C_6H_4CH_3p$		−75·7		206(a)
$C_{12}F_6H_{14}$			(1) −97·91 (2) −144·38 (3) −115·58 (4) −109·99	(1-5) 13·0 (3-4) 236	239
$C_{12}F_6H_{15}N$			(1)(2) −62·5, −68·4		137
$C_{12}F_6H_{15}N_3O_4$			−74·40		234(a)
$C_{12}F_6H_{16}O_4$	$(CF_3^{(1)}\cdot CH_2^{(2)}\cdot C(CH_3)CO_2CH_3)_2$		−64·6	(1-2) 10·4	117

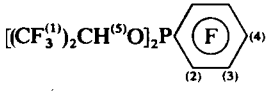
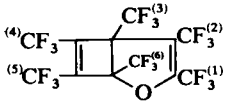
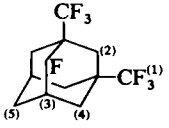
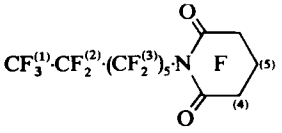
$C_{12}F_6H_{17}N$		(1) −61·7	(2) −60·4	(1-2) 11	(2-3) 11	137
$C_{12}F_6H_{18}N_2Sn_2$		−62·0				87(a)
$C_{12}F_6H_{18}O$		(1) −79·61	(2) −79·63	(1-2) 8·4		240(a)
$C_{12}F_6H_{27}N_2OPSi_3$		(1) −66·0	(2) −68·0	(1-2) 8·9 ^1J(1-C) 279·1 ^1J(2-C) 278·4 ^3J(1-C) 4·4 ^3J(2-C) 7·7 ^2J(1,2-C) 36·9	(P-1) 3·7	250
$C_{12}F_7H_{13}$		(1) −97·58 (3) −115·76	(2) −138·85	(1-4) 13		239(a)

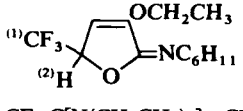
Molecular formula	Structure of compounds		Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{12}F_8H_{15}NO_2$		(diastereoisomers)	[a] (1) −182·0 (2) −175·4 (3)(4) −77·1, −78·2	(1-3) 17·6 (1-4) 5·3 (1-5) 6·8 (2-3) 4·9 (2-6) 27·8 (2-7) 23·2 (2-4) 19·4 (3-4) 2·8	193
			[b] (1) −166·3 (2) −178·8 (3) −73·8 (4) −76·6	(1-3) 13·4 (1-5) 26·3 (2-4) 19·0 (3-4) 6·7	
			[c] (1) −178·0 (2) −186 (3) −79·6 (4) −80·0	(1-3) 19·7 (1-5) 6·4 (2-4) 9·9 (3-4) 9·9	
			[d] (1) −174·0 (2) −178·8 (3) −75·8 (4) −77·3	(1-3) 9·2 (1-5) 26·6 (2-4) 18·4 (2-6) 29·0 (2-7) 25·0 (3-4) 9·2	
$C_{12}F_9H_5$	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot CF_2^{(3)}\cdot CF_2^{(4)}\cdot C{\equiv}C\cdot C_6H_5$		(1) −81·0 (2) −125·0 (3) −124·0 (4) −97·5		251
$C_{12}F_9N_3$			−58·86		242(a)
$C_{12}F_{11}H_4NS$			(1)(2) −55·86, −49·5	(1-2) 9·1 (1-3)(2-3) 1·2, 1·3 (1-4)(2-4) 0·5, 2·6	173(e)
$C_{12}F_{11}H_5$			(1) −81·0 (2) −127·5 (3) −125·5 (4) −117·0 (5) −169·5 (6) −145·0	(1-2) 140·0	251
$C_{12}F_{11}H_6NO_2S$			(1)(5) −82·0, −83·0 (2) −130·0 (3) −79·6, −82·7 (4) −123·0	(3A-3B) 140	252

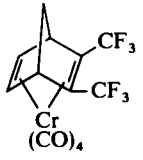
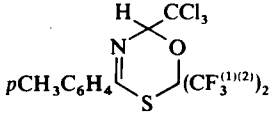
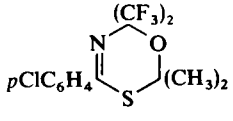
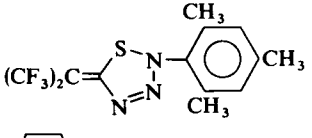
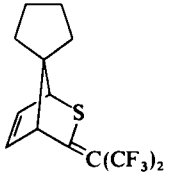
$C_{12}F_{11}H_6NO_2S$	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot CF_2^{(3)}\cdot O\cdot CF^{(4)}(CF_3^{(5)})\cdot CO\cdot NH$ 	(1)(5) −80·8, −81·6 (2) −129·0 (3) −80·1, −84·3 (4) −131·0	(3A-3B) 144	252
$C_{12}F_{11}H_{10}NO$	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot (CF_2^{(3)})_2\cdot CF_2^{(4)}\cdot CO$  	(1) −82·1 (2) −127·1 (3) −123·4 (4) −120·9		243
$C_{12}F_{11}H_{10}NO_2$	As above with R = 	(1) −82·1 (2) −127·4 (3) −123·7 (4) −121·2		243
$C_{12}F_{11}H_{12}N$	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot (CF_2^{(3)})_2\cdot CF_2^{(4)}$ 	(1) −80·0 (2) −124·9 (3) −121·1 (4) −102·0		243
$C_{12}F_{11}H_{12}NO$	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot (CF_2^{(3)})_2\cdot CF_2^{(4)}\cdot CO$ 	(1) −81·6 (2) −126·6 (3) −123·4 (4) −119·9		243
$C_{12}F_{11}H_{16}NO$		(1) −81·2 (2) −116·1 (3) −50·8 (4) −56·1	(2-3) 20·4 (2-4) 1·7 (1-3) 1·7 (3-4) 10·3	128
$C_{12}F_{12}H_5NS$		−60·98, −61·94		253(c)
$C_{12}F_{12}H_6N_2S$	$(CF_3^{(1)})_2C(SC_6H_5)NH\cdot N{=}C(CF_3^{(2)(3)})_2$	(1) −70·2 (2)(3) −66·5, −64·0	(2-3) 5·7	178

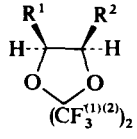
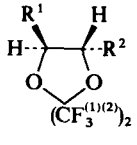
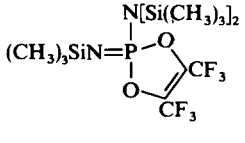
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{12}F_{12}H_6S$		−59·5, −67·9		253(c)
$C_{12}F_{12}H_7O_2P$	$[(CF_3^{(1)})_2CH^{(2)}O]_2PC_6H_5$	−74·5	(1-2) 5·0	72
$C_{12}F_{12}H_{10}N_2$		(1) −70·95 (2) −72·80		234(a) 254
$C_{12}F_{12}H_{12}N_2$	As above with reduced double bond	−73·1, −70·7		254(a)
$C_{12}F_{12}H_{14}N_2S$	$(CF_3^{(1)})_2C(SnC_6H_{13})NH{\cdot}N{=}C(CF_3^{(2)(3)})_2$	(1) −70·4 (2)(3) −66·3, −63·9		178
$C_{12}F_{13}H_6NOS$	$CF_3^{(1)}{\cdot}(CF_2^{(2)})_4{\cdot}CF_2^{(3)(4)}{\cdot}SO{\cdot}NH{\cdot}C_6H_5$	(1) −81·7 (2) −120·2, −121·5, −122·3, −126·0 (3) −120·5 (4) −116·4	(3-4) 250	191(a)
$C_{12}F_{13}H_6NO_3S_2$	$CF_3^{(1)}{\cdot}(CF_2^{(2)})_4{\cdot}CF_2^{(3)(4)}{\cdot}SO{\cdot}NH{\cdot}SO_2C_6H_5$	(1) −81·2 (2) −120·1, −121·9, −122·5, −126·0 (3) −117·6 (4) −115·5	(3-4) 237	191(a)
$C_{12}F_{13}H_9O$	$CF_3^{(1)}{\cdot}(CF_2^{(2)})_5{\cdot}\overline{CH{\cdot}CO{\cdot}(CH_2)_3{\cdot}CH_2}$	(1) −80·4 (2) −111·6, −118·2, −120·7, −124·9		137
$C_{12}F_{13}H_{10}N$		(1) −79·6 (2) −123·8 (3) −120·4 (4) −101·3		243

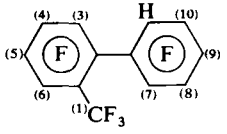
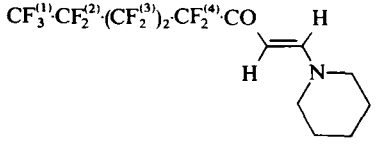
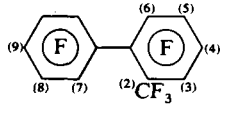
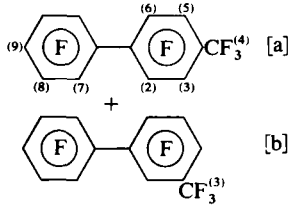
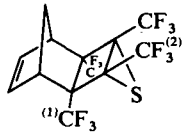
$C_{12}F_{13}H_{10}NO$	As above with R = 	(1) −80·0 (2) −123·8 (3) −120·4 (4) −102·9		243
$C_{12}F_{13}H_{10}NO$	$CF_3^{(1)}\cdot(CF_2^{(2)})_5\cdot CH\cdot CO\cdot(CH_2)_2\cdot N(CH_3)\cdot CH_2$	(1) −81 (2) −114, −119, −123		137
$C_{12}F_{13}H_{11}O$		(1) −80·0 (2) −124·1 (3)(4) −120·0, −121·6 (5) −119·5 (6) −117·0		208
$C_{12}F_{13}H_{12}N$		(1) −80·0 (2) −123·5 (3) −119·6 (4) −101·7		243
$C_{12}F_{13}H_{12}NOS$	$CF_3^{(1)}\cdot(CF_2^{(2)})_4\cdot CF_2^{(3)(4)}\cdot SO\cdot NH\cdot C_6H_{11}$	(1) −82·0 (2) −121·2, −123·0, −126·9 (1 : 1 : 2) (3) −122·9 (4) −117·7	(3-4) 248	191(a)
$C_{12}F_{13}H_{15}FeN_2O_5P_2$	$[CF_3^{(1)}\cdot CF_2^{(2)}\cdot CF_2^{(3)}\cdot Fe(CO)_2(CH_3CN)_2P(OCH_3)_3]PF_6^{(4)}$	(1) −85·4 (2) −117·4 (3) −79·3 (4) −73·3	(1-3) 11·5	215
$C_{12}F_{13}H_{15}O_2$	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot CF_2^{(3)}\cdot CF_2^{(4)}\cdot CF_2^{(5)}\cdot CF_2^{(6)}\cdot C(OH)(CH_3)\cdot CH_2\cdot C(OH)(CH_3)_2$	(1) −80·4 (2) −124·0 (3)(4) −119·5, −120·4 (5) −119·5 (6) −116·2		208
$C_{12}F_{13}N$		(1) −173·1 (2) −73·9 (3) −213·2 (4)(7) −145·8 (5)(6) −151·3 (8) −125·0, −129·4 or (9) −126·2, −127·7	(8A-8B) 230 (9A-9B) 235	231
$C_{12}F_{14}H_7O_2P$	$[(CF_3^{(1)})_2CHO]PF_2^{(2)}\cdot C_6H_5$	(1) −75·0 (2) −45·0	(P-2) 846	180
$C_{12}F_{14}H_{10}NO_2P$	$(CH_2{=}CH\cdot CH_2)_2N\cdot PF_2^{(2)}\cdot O\cdot C\underbrace{(CF_3)_2C(CF_3)_2}_{(1)}\cdot O$	(1) −70·4 (2) −59·6	(P-2) 881	141

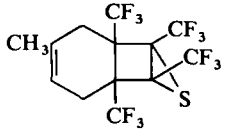
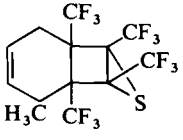
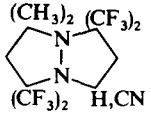
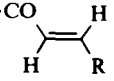
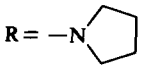
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{12}F_{14}H_{18}NO_2PSi_2$	$[(CH_3)_3Si]_2N{\cdot}\overbrace{PF_2^{(2)}{\cdot}O{\cdot}C\underbrace{(CF_3)_2C(CF_3)_2}_{(1)}{\cdot}O}$	(1) −67·0, −68·2 (2) −38·6 At −130° (2a) −25·1 (2e) −53·8	(P-2) 920 (P-2a) 772 (P-2e) 996 (2a-2e) 76·0	156
$C_{12}F_{16}H_5NO_2P_2$	$C_6H_5PF_2^{(3)}{=}N{\cdot}\overbrace{PF_2^{(2)}{\cdot}O{\cdot}C\underbrace{(CF_3)_2C(CF_3)_2}_{(1)}{\cdot}O}$	(1) −68·9 (2) −43·4 (3) −66·5	(1-2) 2·0 (P2-2) 846 (P3-2) 18·3 (P3-3) 1107	155
$C_{12}F_{17}H_2O_2P$		(1) −78·3 (2) −139 (3) −167 (3) −153	(1-5) 6·0	72
$C_{12}F_{18}O$		(1) −66·3 (2) −55·9 (3) −66·3 (4)(5) −63·18 (6) −73·5		255(c)
$C_{12}F_{18}O_2$		−52·7, −61·5, −77·5		255(c)
$C_{12}F_{20}$		(1) −57·8 (2) −101·50 (3) −220·63 (4) −113·90 (5) −123·10		256(a) 245
$C_{12}F_{21}NO_2$		(1) −81·7 (2) −126·6 (3) −119·5, −122·1, −123·2 (4) −123·9 (5) −138·1		219(a)

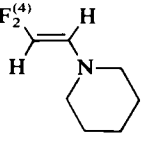
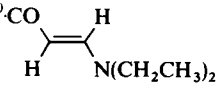
$C_{12}F_{22}O_3$	$(CF_3^{(1)})_2{\cdot}CF^{(2)}{\cdot}CO{\cdot}CF_2^{(3)}{\cdot}CF_2{\cdot}O{\cdot}CF^{(5)}(CF_3^{(4)})CO{\cdot}CF^{(7)}(CF_3^{(6)})_2$	(1) −72·3 (2) −188·7 (3) −118·1 (4) −78·7 (5) −133·8 (6) −72·3 (7) −187·0			200
$C_{12}F_{22}O_4$	$(CF_3^{(1)})_2CF^{(2)}{\cdot}CO{\cdot}CF^{(3)}(CF_3^{(4)}){\cdot}O{\cdot}CF_2{\cdot}CF_2^{(5)}{\cdot}CF_2{\cdot}O{\cdot}CF^{(6)}(CF_3^{(7)}){\cdot}CO{\cdot}F^{(8)}$	(1) −72·5 (2) −191·1 (3) −134·3 (4) −79·0 (5) −127·3 (6) −129·1 (7) −81·1 (8) +27·5			200
$C_{12}F_{22}O_4$	$[CF_3^{(1)}{\cdot}CF^{(2)}(OCF_3^{(3)}){\cdot}CO{\cdot}CF_2^{(4)}{\cdot}CF_2^{(5)}]_2$	(1) −80·1 (2) −136·4 (3) −54·6 (4) −114·7 (5) −119·0			200
$C_{12}F_{22}O_5$	$[(CF_3^{(1)})_2CF^{(2)}{\cdot}O{\cdot}CO{\cdot}(CF_2^{(3)(4)})_2]_2O$	(1) −79·2 (2) −142·3 (3)(4) −85·3, −121·2		(1-2) 1·9	147
$C_{12}F_{23}ClO_4$	$CF_2^{(1)}Cl{\cdot}CF^{(2)}(CF_3^{(3)}){\cdot}O[CF_2^{(4)}{\cdot}CF^{(5)}(CF_3^{(6)}){\cdot}O]_2CF_2^{(7)}{\cdot}CO{\cdot}CF_3^{(8)}$	(1) −69·0 (2) −141·0 (3) −79·2 (4)(6) −80·6 (5) −144·8, −145·4 (7)(8) −75·3		(7,8-) 5	143
$C_{12}F_{24}O_4$	As above with Cl replaced by F	(1) −81·5 (2) −144·9 (4) −81·2 (5) −145·8 (6) −80·7 (7)(8) −75·6		(7,9-) 5·5	143
$C_{13}F_3H_{18}NO_2$		−80·5		(1-2) 5·6	259(a)
$C_{13}F_3H_{19}N$	$CF_3{\cdot}C[N(CH_2CH_3)_2]{=}CH{\cdot}C{\equiv}C{\cdot}C(CH_3)_3$	−65·9			188(a)
$C_{13}F_3H_{21}O_4$	$CF_3{\cdot}C(OC_3H_7){=}C(OC_3H_7)CO_2C_3H_7$	[a] −67·9 [b] −69·2 (ratio 3 : 1)			170
$C_{13}F_3H_{22}NSi_2$	m-$CF_3C_6H_4{\cdot}N[Si(CH_3)_3]_2$	−62·93			168
$C_{13}F_3H_{22}NSn_2$	m-$CF_3C_6H_4{\cdot}N[Sn(CH_3)_3]_2$	−62·15			168

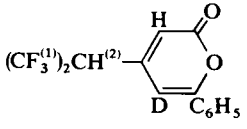
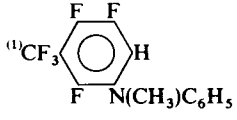
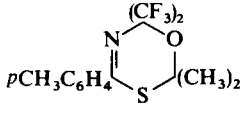
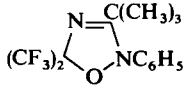
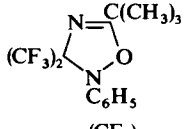
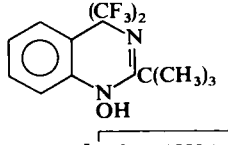
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{13}F_4H_{15}N$	$CF_3^{(1)}\cdot C[N(CH_2CH_3)_2]{=}CF^{(2)}\cdot C_6H_5$	(1) −61 (2) −115	(1-2) 19·0	170
$C_{13}F_4H_{13}N$	$CF_3^{(1)}\cdot CF^{(2)}{=}C[N(CH_2CH_3)_2]C_6H_5$	(1) −63 (2) −160	(1-2) 11·5	170
$C_{13}F_6H_6CrO_4$		−55·6		210
$C_{13}F_6H_6MnO_4$	As above with Cr replaced by Mn	−55·7		210
$C_{13}F_6H_8Cl_3NOS$		(1)(2) −76·5, −74·6	(1-2) 9·5	248(a)
$C_{13}F_6H_{10}ClNOS$		−77·1		248(a)
$C_{13}F_6H_{11}NOS$	As above with Cl replaced by H	−77·2		248(a)
$C_{13}F_6H_{11}N_3S$		−57·12, −56·62		173(e)
$C_{13}F_6H_{12}S$		−59·27, −55·0		173(e)

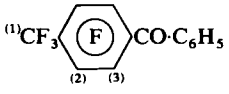
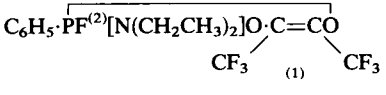
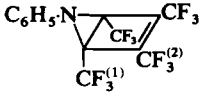
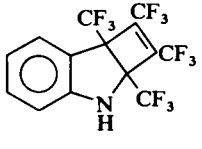
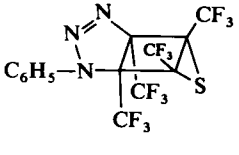
$C_{13}F_6H_{13}ClNO_4P$	pCl·C_6H_4·C=N·C$(CF_3)_2$P$(OCH_3)_3$·O	−66·5	(P-F) 4·0	261(a)
$C_{13}F_6H_{14}BrNO_2$	$(CF_3^{(1)(2)})_2$C=CH·CHBr·CO·CO·NH·C_6H_{11}	(1)(2) −64·5, −58·3	(1-2) 8·6	259(a)
$C_{13}F_6H_{14}BrNO_2$	$(CF_3)_2$CH·CH=CBr·CO·CO·NH·C_6H_{11}	−65·6	(1-2) 8·6	259(a)
$C_{13}F_6H_{14}N_2O_2S$	$(CF_3)_2$C(NCH$_2$CH$_2$OCH$_2$CH$_2$)NH·S(O)C_6H_5	−69·1		206(a)
$C_{13}F_6H_{15}Br_2NO_2$	$(CF_3)_2$CH·CHBr·CHBr·CO·CO·NH·C_6H_{11}	−65·1		259(a)
$C_{13}F_6H_{15}NO_2$	$(CF_3^{(1)})_2$CH$^{(2)}$·CH=CH·CO·CO·NH·C_6H_{11}	−67·1	(1-2) 8·6	259(a)
$C_{13}F_6H_{20}O$				
	R^1 = CH_3 / CH_2·CH_3 / $(CH_1)_2CH_3$ / $(CH_2)_3CH_3$ — R^2 = $(CH_2)_6CH_3$ / $(CH_2)_5CH_3$ / $(CH_2)_4CH_3$ / $(CH_2)_3CH_3$	(1)(2) −78·89, −78·89 −78·81, −78·96 −78·77, −78·87 −78·79, −78·87	(1-2) 9·1 9·11 9·09 9·16	240(a)
$C_{13}F_6H_{20}O$				
	R^1 = CH_3 / CH_2CH_3 / $(CH_2)_2CH_3$ / $(CH_2)_3CH_3$ — R^2 = $(CH_2)_6CH_3$ / $(CH_2)_5CH_3$ / $(CH_2)_4CH_3$ / $(CH_2)_3CH_3$	(1)(2) −79·65, −79·73 −79·63, −79·63 −79·60, −79·60 −79·59, −79·59	(1-2) 8·44 8·4 8·4 8·4	240(a)
$C_{13}F_6H_{27}N_2O_2PSi_3$		−67·5		250

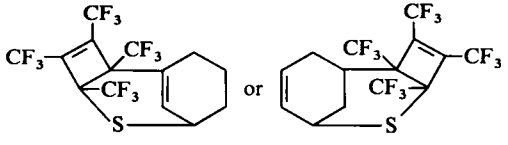
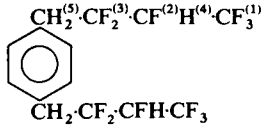
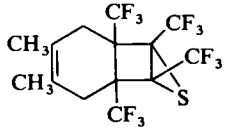
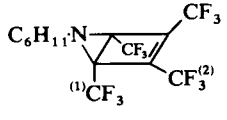
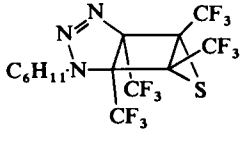
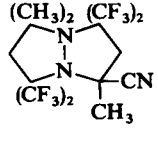
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{13}F_{11}H$		(1) −55·9 (3)(10)(6)(7) −135·2, −136·6, −138·5 (4)(8)(5)(9) −148·0, −150·9, −152·5, −154·3		430
$C_{13}F_{11}H_{12}NO$		(1) −81·6 (2) −127·1 (3) −123·4 (4) −120·9		243
$C_{13}F_{12}$		(2) −58·3 (3) −134·9 (4) −149·4 (5) −147·9 (6) −136·4 (7) −139·9 (8) −161·4 (9) −150·9		262(b)
$C_{13}F_{12}$	 [a] [b]	(2)a(6)a −138·7 (2)b −114·7 (3)a(5)a −135·9 (4)b −128·3 (5)b(8)a,b −161·3 (6)b −123·2 (7)a,b −137·5 (9)a −149·8 (9)b −150·5 (4)a(3)b −58·1		262(b)
$C_{13}F_{12}H_6S$		(1) −61·38 (2) −60·30		253(c)
$C_{13}F_{12}H_8N_2$	$(CF_3^{(1)})_2C{\cdot}NH(CH_2{\cdot}C_6H_5){\cdot}N{=}C(CF_3^{(2)(3)})_2$	(1) −74·7 (2)(3) −66·3, −64·3	(2-3) 5·7	178(a)

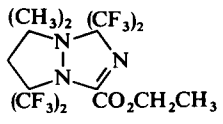
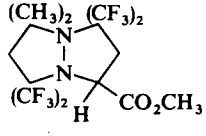
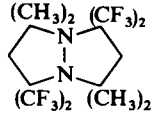
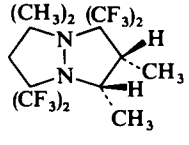
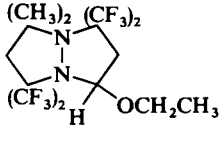
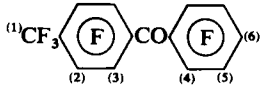
$C_{13}F_{12}H_8N_2S$	$(CF_3^{(1)})_2C{\cdot}(SCH_2C_6H_5){\cdot}NH{\cdot}N{=}C(CF_3^{(2)(3)})_2$	(1) −70·7 (2)(3) −66·7, −64·5	(2-3) 5·7	178(a)
$C_{13}F_{12}H_8S$		−58·5, −59·5, −67·5 (ratio 1 : 1 : 2)		253(c)
$C_{13}F_{12}H_8S$		−59·1, −60·3, −61·5, −67·5		253(c)
$C_{13}F_{12}H_{11}N_3$		−72·5, −71·2, −68·0, −66·7		254(a)
$C_{13}F_{13}H_7$	$C_6H_5CH_2C(CF_3^{(4)})_2CF_2^{(3)}{\cdot}CF_2^{(2)}CF_3^{(1)}$	(1) −63·6 (2)(3) −106·4, −124·4 (4) −81·7		293(a)
$C_{13}F_{13}H_7O$	$C_6H_5{\cdot}CH^{(7)}(OH){\cdot}CF_2^{(6)}{\cdot}CF_2^{(5)}{\cdot}CF_2^{(4)}{\cdot}CF_2^{(3)}{\cdot}CF_2^{(2)}{\cdot}CF_3^{(1)}$	(1) −80·8 (2) −125·0 (3) −121·2 (4) −121·2 (5) −118·3 (6A) −116·0 (6B) −124·7	(6A-6B) 308 (6A-7) 6·5 (6B-7) 17·5	208
$C_{13}F_{13}H_7O_2$	$o{HOC_6H_4}{\cdot}CH^{(7)}(OH){\cdot}CF_2^{(6)}{\cdot}CF_2^{(5)}{\cdot}CF_2^{(4)}{\cdot}CF_2^{(3)}{\cdot}CF_2^{(2)}{\cdot}CF_3^{(1)}$	(1) −80·8 (2) −126·2 (3) −122·5 (4) −122·5 (5) −122·5 (6A) −116·3 (6B) −124·5	(6A-6B) 300 (6A-7) 7 (6B-7) 17	208
$C_{13}F_{13}H_{10}NO$	$CF_3^{(1)}{\cdot}CF_2^{(2)}{\cdot}(CF_2^{(3)})_3{\cdot}CF_2^{(4)}{\cdot}CO$  $R = -N$ 	(1) −81·6 (2) −127·1 (3) −123·2 (4) −121·6		243

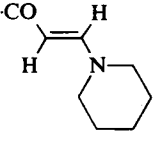
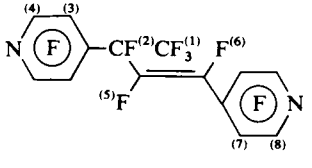
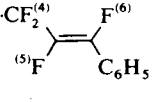
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{13}F_{13}H_{10}NO_2$	As above with R = 	(1) −82·6 (2) −127·1 (3) −122·9 (4) −120·9		243
$C_{13}F_{13}H_{12}N$	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot(CF_2^{(3)})_3\cdot CF_2^{(4)}$ 	(1) −80·0 (2) −123·8 (3) −120·0 (4) −102·1		243
$C_{13}F_{13}H_{12}NO$	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot(CF_2^{(3)})_3\cdot CF_2^{(4)}\cdot CO$ 	(1) −81·6 (2) −127·1 (3) −123·7 (4) −121·6		243
$C_{13}F_{13}H_{15}O$	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot CF_3^{(3)}\cdot CF_2^{(4)}\cdot CF_2^{(5)}\cdot CF_2^{(6)}\cdot C(OH)(iC_3H_7)_2$	(1) −80·5 (2) −124·5 (3) −120·5 (4) −120·5 (5) −117·1 (6) −108·0		208
$C_{13}F_{14}H_{18}NO_2PSi$	$PF_2^{(2)}\{NC(CH_3)_3(Si(CH_3)_3)\}OC\underbrace{(CF_3)_2C(CF_3)_2}_{(1)}O$ (at −33°)	(1) −67·1, −68·5 (2a) −35·1 (2e) −47·4	(2a-2e) 70·5 (P-2a) 906 (P-2e) 925	156
$C_{13}F_{18}H_{12}O_3P_2$	$(CF_3^{(1)})_2CH^{(4)}O\cdot P[OC(CF_3^{(3)})_2P(CH_3)_2](CH_3)\cdot CH_2\cdot C(CF_3^{(2)})_2O$	(1) −72·4, −73·1 (2) −76·5, −78·3 (3) −67·0, −67·7	(2-2′) 9·0 (1-4) 6·0 (P-3) 3·0 ^1J(1-C)(2-C)(3-C) 282, 285, 289 ^2J(1-C) 35·3 ^2J(2-C) 32·7 ^3J(3-C) 29·1	199
$C_{13}F_{23}H_3O_4$	$(CF_3)_2CF\cdot CF_2\cdot O\cdot C(CF_3)_2\cdot CF_2\cdot O\cdot C(CF_3)_2\cdot CO_2CH_3$	(1) −73·0 (2) −186·3 (3) −74·2 (4) −70·6 (5) −71·3 (6) −75·1		96
$C_{13}F_{24}H_5O_4P$	$[(CF_3^{(1)})_2CHO]_3P[OCH_2C(CF_3^{(2)})_2O]$	(1) −74·3 (2) −77·3		124
$C_{13}F_{14}H_5O_4P$	$[(CF_3)_2CHO]_2P[OCH(CH_3)OC(CF_3)_2C(CF_3)_2O]$	−74·3		124
$C_{13}F_{24}H_7O_4P$	$[(CF_3^{(1)})_2CH^{(2)}O]_4P(CH_3)$	(1a) −75·3 (1e) −74·8	(1-2) 6·0	180

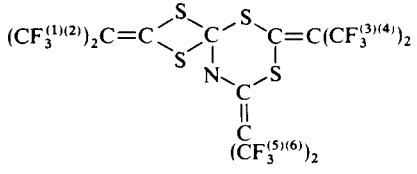
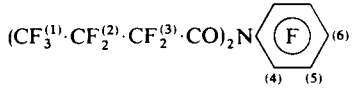
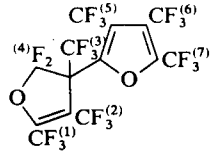
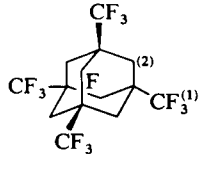
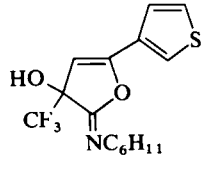
$C_{13}F_{28}O_6$	$CF_3^{(1)}\cdot O\cdot(CF_2^{(2)}\cdot CF_2^{(3)}\cdot O)_5\cdot CF_2\cdot CF_3^{(4)}$	(1) −59·0 (2) −93·6 (3) −91·5 (4) −90·3		104
$C_{14}F_6H_2O_{10}Os_3$	$HOs_3(CO)_{10}(CF_3^{(1)}\cdot C{=}CH\cdot CF_3^{(2)})$	(1) −57·93 (2) −59·51		266
$C_{14}F_6H_7DO_2$		−63·2	(1-2) 7·9	267(a)
$C_{14}F_6H_8O_2$	As above with D replaced by H	−64·4	(1-2) 7·7	267(a)
$C_{14}F_6H_9N$		(1) −58·7 Rest −123·5, −139·1, −141·0		451
$C_{14}F_6H_{10}O_2$	$(CF_3)_2C{=}C{=}C(C_6H_5)(CO_2CH_2CH_3)$	−61·0		172
$C_{14}F_6H_{13}NOS$		−77·3		248(a)
$C_{14}F_6H_{14}N_2O$		−79·1		268(a)
$C_{14}F_6H_{14}N_2O$		−74·1		268(a)
$C_{14}F_6H_{14}NO_2$		−76·9		268(a)
$C_{14}F_6H_{16}N_2OS$	$(CF_3)_2C[N\cdot CH_2\cdot(CH_2)_3\cdot CH_2]NH\cdot SO\cdot C_6H_5$	−68·9		206(a)

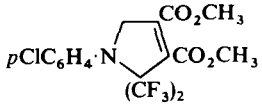
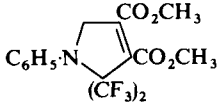
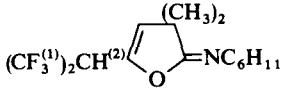
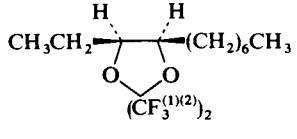
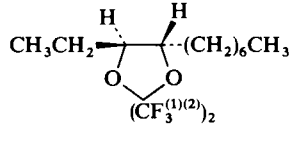
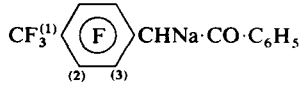
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{14}F_6H_{16}N_2O_2S$	$(CF_3)_2C[N\cdot(CH_2)_2\cdot O\cdot CH_2\cdot CH_2]NH\cdot SO\cdot C_6H_4CH_3p$	−69·25		206(a)
$C_{14}F_6H_{24}$	$[CF_3^{(1)}\cdot CH_2^{(2)}\cdot CH\cdot(CH_2)_3\cdot CH_3]_2$	−65·5	(1-2) 11·7	117
$C_{14}F_7H_5O$		(1) −56·5 (2)(3) −140·3	(1-2) 22·0	269
$C_{14}F_7H_7O$	As above with CO replaced by CHOH	(1) −56·2 (2)(3) −141·6	(1-2) 22·6	269
$C_{14}F_7H_{14}N$	$pCF_3^{(2)}C_6H_4\cdot CF^{(3)}{=}C[N(CH_2CH_3)_2]CF_3^{(1)}$	(1) −57 (2) −60 (3) −110	(1-3) 1·7	170
$C_{14}F_7H_{15}NO_2P$		(1) −65·1, −66·6 (2) −40·3	(P-2) 821	141
$C_{14}F_{12}H_5N$		(1) −63·5 (2) −66·7		270(c)
$C_{14}F_{12}H_5N$		−63·1, −63·9, −58·7, −53·1		270(c)
$C_{14}F_{12}H_5N_3S$		−60·3, −61·3, −61·9, −56·5		270(c)

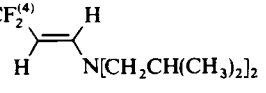
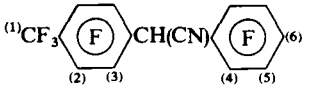
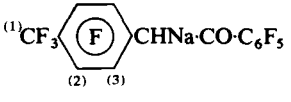
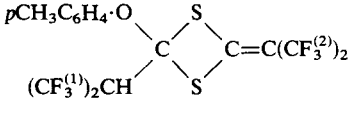
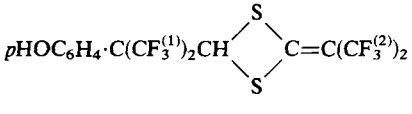
$C_{14}F_{12}H_8S$		−60·72, −62·15, −64·09, −67·38		253(c)
$C_{14}F_{12}H_{10}$		(1) −74·5 (2) −214·5 (3) −110·5	(1-2) 12·0 (1-3) 12·0 (1-4) 6·0 (2-3) 12·0 (2-4) 45·0 (2-5) 3·0 (3-4) 12·0, 6·0 (3-5) 18·0, 15·0	176
$C_{14}F_{12}H_{10}S$		−58·7, −67·3		253(c)
$C_{14}F_{12}H_{11}N$		(1) −62·38 (2) −61·18		270(c)
$C_{14}F_{12}H_{11}N_3S$		−59·3, −61·5, −62·3, −57·1		270(c)
$C_{14}F_{12}H_{13}N_3$		−70·3, −70·5, −65·6, −64·4		254(a)

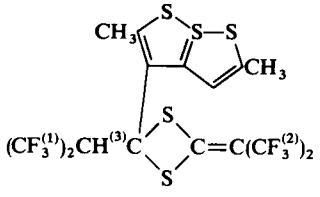
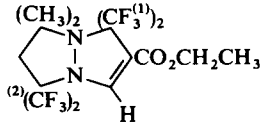
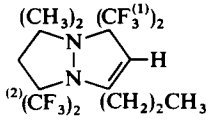
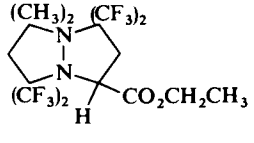
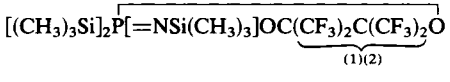
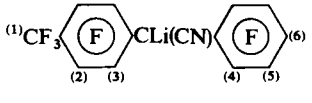
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{14}F_{12}H_{13}N_3O_2$		−74·3, −71·3		234(a)
$C_{14}F_{12}H_{13}O_4P$	$(CF_3^{(1)}\cdot CH_2^{(2)}\cdot O)_4PC_6H_5$		(1-2) 8·3	220
$C_{14}F_{12}H_{14}N_2O_2$		−73·05, −72·05, −67·8, −66·95		254(a)
$C_{14}F_{12}H_{16}N_2$		−68·10		234(a)
$C_{14}F_{12}H_{16}N_2$		−72·2, −71·4, −68·2, −61·6		254(a)
$C_{14}F_{12}H_{16}N_2O_2$		−73·1, −72·0, −68·5, −67·5		254(a)
$C_{14}F_{12}O$		(1) −56·9 (2) −139·6 (3)(4) −141·4 (5) −161·2 (6) −146·7	(1-2) 20·8 (5-6) 19·5	269

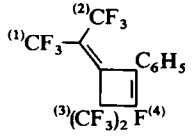
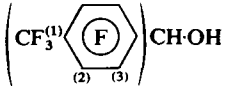
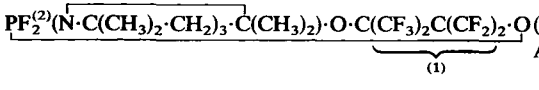
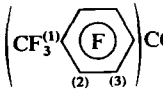
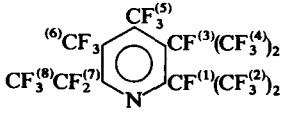
$C_{14}F_{12}O$	As above with CO replaced by CHOH	(1) −56·5 (2) −140·8 (3)(4) −142·8 (5) −163·8 (6) −155·9	(1-2) 21·9	(5-6) 20·2	269
$C_{14}F_{13}H_5$	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot (CF_2^{(3)})_3\cdot CF_2^{(4)}\cdot C\equiv C\cdot C_6H_5$	(1) −81·5 (2) −127·5 (3) −123·1 (4) −97·5			251
$C_{14}F_{13}H_9O$	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot CF_2^{(3)}\cdot CF_2^{(4)}\cdot CF_2^{(5)}\cdot CF_2^{(6)}\cdot C(OH)(CH_3)\cdot C_6H_5$ (1) −80·5 (2) −126·2 (3)(4) −122·0, −123·0 (5) −118·5 (6) −116·5				208
$C_{14}F_{13}H_{12}NO$	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot (CF_2^{(3)})_3\cdot CF_2^{(4)}\cdot CO$ 	(1) −82·1 (2) −127·1 (3) −123·7 (4) −120·9			243
$C_{14}F_{13}H_{17}O$	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot CF_2^{(3)}\cdot CF_2^{(4)}\cdot CF_2^{(5)}\cdot CF_2^{(6)}\cdot C(OH)(CH_2(CH_3)\cdot CH_2\cdot C(OH)(CH_3)\cdot CH_2\cdot CH_3$ (1) −81·6 (2) −124·5 (3)(4) −120·8, −121·6 (5) −117·9 (6) −116·2				208
$C_{14}F_{14}N_2$		(1) −78·2 (2) −167·0 (3)(7) −139·5 (4)(8) −88·0 (5)(6) −141·8, −148·6			212
$C_{14}F_{15}H_5$	$CF_3^{(1)}\cdot CF_2^{(2)}(CF_2^{(3)})_3\cdot CF_2^{(4)}$ 	(1) −81·5 (2) −127·5 (3) −123·1 (4) −117·5 (5) −170·0 (6) −145·5	(5-6) 139·0		251
$C_{14}F_{17}H_6NOS$	$CF_3^{(1)}\cdot (CF_2^{(2)})_6\cdot CF_2^{(3)(4)}\cdot SO\cdot NH\cdot C_6H_5$	(1) −82·0 (2) −120·5, −121·5, −126·2 (3) −121·1 (4) −116·7	(3-4) 250		191(a)

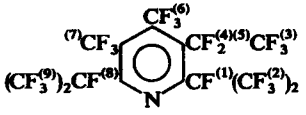
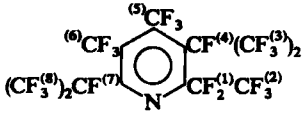
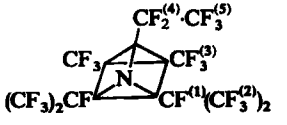
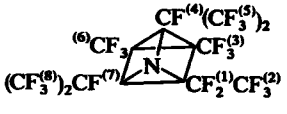
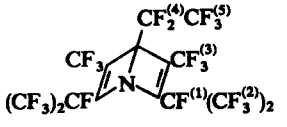
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{14}F_{18}H_3NS_4$		(1)(2) } −59·46, −54·90 (3)(4) } −57·61, −56·30 (5)(6) } −58·48	(1-2) } 8·7 (3-4) } 9·3 (5-6) }	173(e)
$C_{14}F_{19}NO_2$		(1) −82·6 (2) −126·8 (3) −115·2 (4) −141·5 (5) −163·2 (6) −150·5		219(a)
$C_{14}F_{20}O_2$		(1) −74·3 (2) −60·8 (3) −63·3 (4) −61·5, −66·3 (5) −57·3 (6) −59·3 (7) −64·5	(4A-4B) 150	177
$C_{14}F_{24}$		(1) −54·1 (2) −98·2		245(a)
$C_{15}F_3H_{16}NSO_2$		−80·8		259(a)
$C_{15}F_3H_{22}N_2OSi_2$	mCF$_3$C$_6$H$_4$·N[Si(CH$_3$)$_3$]CO·N(CH$_3$)[Si(CH$_3$)$_3$]	−62·93		168
$C_{15}F_6H_{11}NOS_2$	$(CF_3^{(1)(2)})_2C(SC_6H_5)NH{\cdot}SO{\cdot}C_6H_5$	(1)(2) −70·4, −69·2	(1-2) 10·0	206(a)

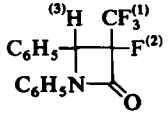
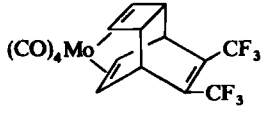
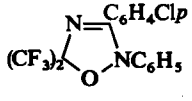
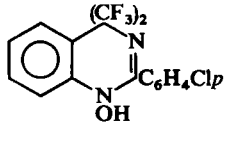
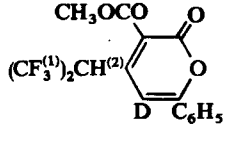
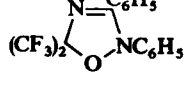
$C_{15}F_6H_{12}ClNO_4$		−68·5		228(a)
$C_{15}F_6H_{12}N_2OS$	$(CF_3^{(1)(2)})_2C(NH{\cdot}CH_2{\cdot}C_6H_5)NH{\cdot}SO{\cdot}C_6H_5$	(1)(2) −74·4, −72·9	(1-2) 10·5	206(a)
$C_{15}F_6H_{13}NO_4$		−68·9		228(a)
$C_{15}F_6H_{16}Br_2NO_4P$	$C_6H_5{\cdot}CHBr{\cdot}CHBr{\cdot}C{=}N{\cdot}C(CF_3)_2{\cdot}P(OCH_3)_2{\cdot}O$	−66·0	(P-F) 4·0	261(a)
$C_{15}F_6H_{16}NO_4P$	As above with CHBr·CHBr replaced by CH=CH	−66·5	(P-F) 4·0	261(a)
$C_{15}F_6H_{18}BrNO_2$	$(CF_3^{(1)(2)})_2C{=}CH{\cdot}CBr{=}C(OCH_2CH_3)CO{\cdot}NH{\cdot}C_6H_{11}$	(1)(2) −64·0, −60·4	(1-2) 7·5	259(a)
$C_{15}F_6H_{19}NO$		−66·5	(1-2) 8	259(a)
$C_{15}F_6H_{19}NO_2$	$(CF_3^{(1)(2)})_2C{=}CH{\cdot}CH{=}C(OCH_2CH_3)CO{\cdot}NH{\cdot}C_6H_{11}$	(1)(2) −62·0, −56·2	(1-2) 8·4	259(a)
$C_{15}F_6H_{24}O$		(1)(2) −78·81, −78·90	(1-2) 9·01	240(b)
$C_{15}F_6H_{24}O$		(1)(2) −79·63, −79·65	(1-2) 8·4	240(b)
$C_{15}F_7H_6NaO$		(1) −53·8 (2) −146·5 (2) −142·2		272(b)

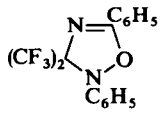
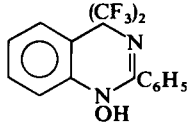
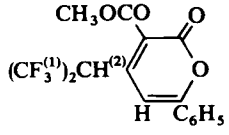
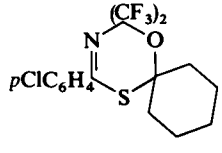
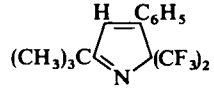
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{15}F_7H_7O$	As above with Na replaced by H	(1) −55·4 (2) −142·2 (3) −140·0	(1-2) 22·1	272(b)
$C_{15}F_7H_{17}NO_2P$	$pCH_3C_6H_4\cdot PF^{(2)}[N(CH_2CH_3)_2]OC(CF_3)_{(1)}=CO(CF_3)$	(1) −65·8, −67·5 (2) −41·5	(P-2) 823	141
$C_{15}F_9H_6NO$	$CF_3^{(1)}\cdot CF^{(2)}H^{(3)}\cdot CO\cdot N(C_6H_5)C_6F_5$		(1-3) 5·7 (2-3) 45·9	263(b)
$C_{15}F_{11}H_{20}N$	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot (CF_2^{(3)})_2\cdot CF_2^{(4)}$ 	(1) −80·0 (2) −124·8 (3) −120·8 (4) −102·4		243
$C_{15}F_{12}HN$		(1) −55·7 (2) −139·3 (3) −137·4 (4) −139·3 (5) −160·8 (6) −151·9		273
$C_{15}F_{12}HNaO$		(1) −54·4 (2) −146·0 (3) −140·3	(1-2) 21·7	272(b)
$C_{15}F_{12}H_2O$	As above with Na replaced by H	(1) −56·5 (2) −141·3 (3) −139·9	(1-2) 22·5	272(b)
$C_{15}F_{12}H_8OS_2$		(1) −61·13 (2) −58·53		173(e)
$C_{15}F_{12}H_8OS_2$		(1) −64·74 (2) −57·79		173(e)

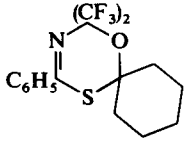
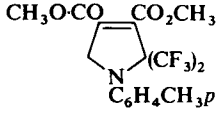
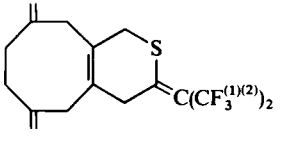
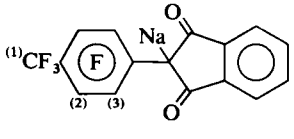
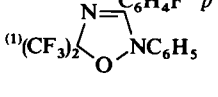
$C_{15}F_{12}H_8S_5$		(1) −62·91	(2) −57·56	(1-3) 7	173(e)
$C_{15}F_{12}H_{14}N_2O_2$		(1) −68·50	(2) −73·15		234(a)
$C_{15}F_{12}H_{14}N_2O_2$	As above with substituents on double bond interchanged	(1) −69·50	(2) −70·25		234(a)
$C_{15}F_{12}H_{16}N_2$		(1) −71·0	(2) −69·8		254(a)
$C_{15}F_{12}H_{16}N_2$	As above with substituents on double bond interchanged	(1) −68·0	(2) −72·5		254(a)
$C_{15}F_{12}H_{16}N_2O_2$		−72·9, −71·7, −67·7, −66·9			254(a)
$C_{15}F_{12}H_{27}N_2O_2PSi_3$		(1)(2) −68·4, −68·9		(1-2) 7·8	250
$C_{15}F_{12}LiN$		(1) −53·6 (3) −147·4 (5) −166·5	(2) −147·4 (4) −141·7 (6) −166·5		273
$C_{15}F_{12}NNa$	As above with Li replaced by Na	(1) −52·7 (3) −147·9 (5) −167·2	(2) −147·9 (4) −141·4 (6) −167·2		273

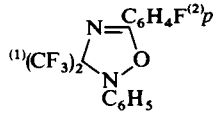
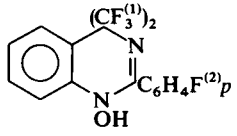
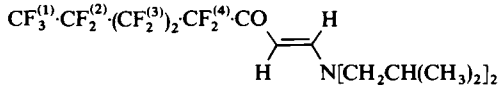
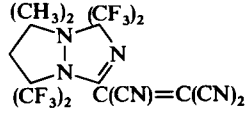
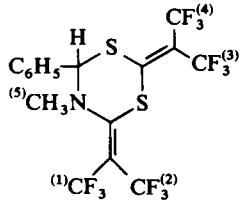
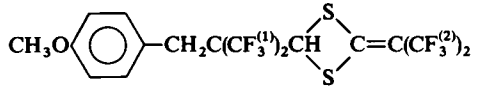
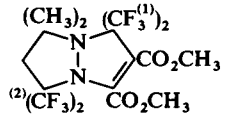
Molecular formula	Structure of compounds	Chemical shifts (pm)	Coupling constants (Hz)	Ref.
$C_{15}F_{13}H_5$		(1) −62·7 (2) −57·9 (3) −68·0 (4) −90·9	(1-2) 10·0 (1-3) 10·0 (2-3) 4·0	172(a)
$C_{15}F_{13}H_{19}O$	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot CF_2^{(3)}\cdot CF_2^{(4)}\cdot CF_2^{(5)}\cdot CF_2^{(6)}\cdot C(OH)(nC_4H_9)_2$	(1) −80·4 (2) −124·5 (3)(4) −120·0, −120·8 (4) −117·9 (5) −115·8		208
$C_{15}F_{13}H_{21}FeN_2O_5P_2$	$[CF_3^{(1)}\cdot CF_2^{(2)}\cdot CF_2^{(3)}\cdot Fe(CO)_2(CH_3CN)_2P(OCH_2CH_3)_3]PF_6^{(4)}$	(1) −85·6 (2) −117·2 (3) −78·9 (4) −72·9	(1-3) 11·0	215
$C_{15}F_{14}H_2O$		(1) −57·5 (2) −139·5	(1-2) 21·9	269
$C_{15}F_{14}H_{18}NO_2P$		(1) −67·8 (2) −38·3 At −80° (2a) −31·3 (2e) −47·4	(P-2) 910 (2a-2e) 77·6 (P-2a) 832 (P-2e) 1001	156
$C_{15}F_{14}O$		(1) −56·9 (2)(3) −138·8 to −141·0	(1-2) 21·9	269
$C_{15}F_{18}H_{12}O_3$	$[(CF_3^{(1)})_2CF^{(2)}\cdot O\cdot CF_2^{(3)}]_2C(OH)C_6H_{11}$	(1) −80·8 (2) −145·6 (3) −73·2	(1-3) 2 (2-3) 23	143
$C_{15}F_{19}H_8O_3P$	$[(CF_3^{(1)})_2CHO]_3PF^{(2)}C_6H_5$	(1) −73·8 (2) −48·8	(P-2) 860	180
$C_{15}F_{25}N$		(1) −178·12 (2) −71·75 (3) −151·30 (4) −69·04 (5) −51·43 (6) −53·61 (7) −108·30 (8) −80·33	(1-4) 47 (3-5) 51 (6-7) 23·3	236 274

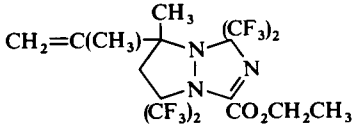
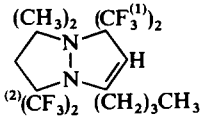
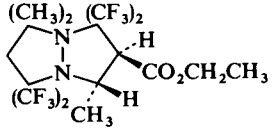
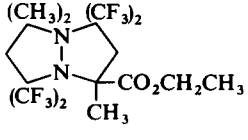
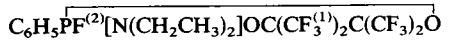
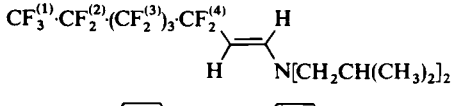
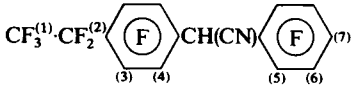
$C_{15}F_{25}N$		(1) −178·4 (2) −72·2 (3) −71·3 (4)(5) −80·6, −90·1 (6) −51·9 (7) −51·9 (8) −179·6 (9) −72·2	(1-3) 37 (3-6) 10 (4-6) 40	(1-4) 100 (4-5) 300 (7-8) 44	274
$C_{15}F_{25}N$		(1) −108·3 (2) −78·8 (3) −69·1 (4) −153·1 (5) −52·1 (6) −52·1 (7) −179·9 (8) −72·4	(1-3) 23 (6-7) 50	(4-5) 48 (7-8) 3·2	274
$C_{15}F_{25}N$		(1) −181·0 (2) −73·4 (3) −61·2 (4) −121·2 (5) −82·5			274
$C_{15}F_{25}N$		(1) −114·5, −119·3 (2) −82·5 (3)(6) −62·0 (4) −186·7 (5)(8) −73·4 (7) −183·6			274
$C_{15}F_{25}N$		(1) −188·2 (2) −77·0, −78·6 (3) −64·5 (4) −118·2 (5) −84·4	(3-4) 6		274
$C_{15}F_{28}HNO_2$	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot(CF_2^{(3)})_3\cdot CF_2^{(4)}\cdot CO\cdot NH\cdot CO\cdot CF_2^{(4)}(CF_2^{(3)})_4\cdot CF_2^{(2)}\cdot CF_3^{(1)}$	(1) −82·4 (2) −127·4 (3) −122·5 to −123·8 (4) −120·2			219
$C_{15}F_{28}O_4$	$[(CF_2^{(1)})_2CF^{(2)}\cdot CO\cdot CF^{(3)}(CF_3^{(4)})\cdot O\cdot CF_2^{(5)}]_2CF_2^{(6)}$	(1) −72·4 (2) −172·9 (3) −113·4 (4) −78·8 (5) NA (6) −125·9			200
$C_{15}F_{30}H_5O_5P$	$[(CF_3)_2CHO]_5P$	−73·0			157
$C_{15}F_{32}O_7$	$CF_3^{(1)}\cdot O\cdot(CF_2^{(2)}CF_2^{(3)}O)_6\cdot CF_2\cdot CF_3^{(4)}$	(1) −59·1 (2) −93·7 (3) −91·6 (4) −90·4	(1-2) 9		104

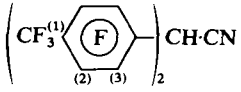
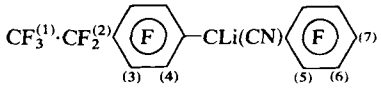
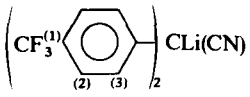
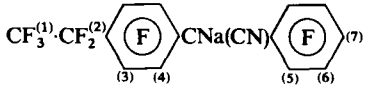
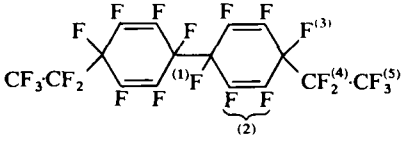
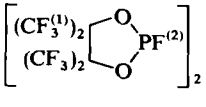
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{16}F_4H_6NO$		(1) −78·5 (2) −182·0	(1-2) 11·2 (2-3) 3·4	276(a)
$C_{16}F_6H_8MoO_4$		−60·5		210
$C_{16}F_6H_9ClN_2O$		−78·3		268(a)
$C_{16}F_6H_9ClN_2O$		−73·9		268(a)
$C_{16}F_6H_9ClN_2O$		−76·2		268(a)
$C_{16}F_6H_9DO_4$		−62·8	(1-2) 8·1	267(a)
$C_{16}F_6H_{10}N_2O$		−78·2		268(a)

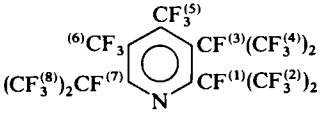
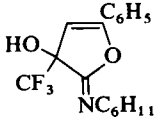
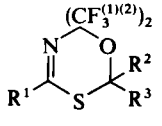
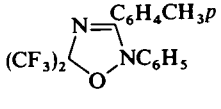
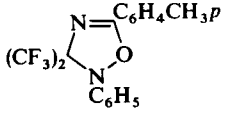
$C_{16}F_6H_{10}N_2O$		−74·1		268(a)
$C_{16}F_6H_{10}N_2O$		−76·2		268(a)
$C_{16}F_6H_{10}O_4$		−62·6	(1-2) 8·1	267(a)
$C_{16}F_6H_{14}ClNOS$		−77·3		248(a)
$C_{16}F_6H_{14}N_2OS$	$(CF_3^{(1)(2)})_2C(NH{\cdot}C_6H_5)NH{\cdot}SO{\cdot}C_6H_4CH_3p$	(1)(2) −74·1, −72·55	(1-2) 10·5	206(a)
$C_{16}F_6H_{14}N_2OS$	$(CF_3)_2C(NH{\cdot}CH_2{\cdot}C_6H_5)NH{\cdot}SO{\cdot}C_6H_5$	−75·7 to −74·2		206(a)
$C_{16}F_6H_{15}IrO_2$	$(\eta\text{-}C_5(CH_3)_5)Ir(CO)_2(CF_3^{(1)}C{\equiv}CCF_3^{(2)})$	−60·84, −63·44	(1-2) 8	277
$C_{16}F_6H_{15}N$		−66·6		229(a)
$C_{16}F_6H_{15}N$	As above with substituents about C=C interchanged	−69·7		229(a)
$C_{16}F_6H_{15}N$	$(CF_3^{(1)})_2CH^{(2)}{\cdot}N{=}C[C(CH_3)_3]{\cdot}C{\equiv}C{\cdot}C_6H_5$	−70·5	(1-2) 6·5	229(a)

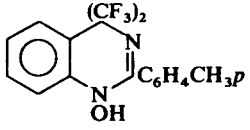
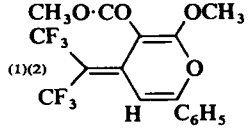
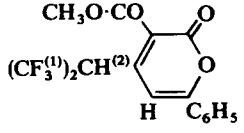
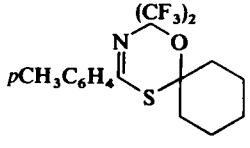
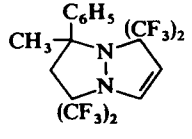
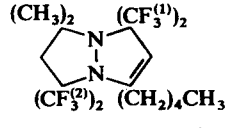
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{16}F_6H_{15}NOS$		−77·4		248(a)
$C_{16}F_6H_{15}NO_4$		−68·6		228(a)
$C_{16}F_6H_{15}NO_5$	As above with $C_6H_4CH_3p$ replaced by $C_6H_4OCH_3p$	−68·75		228(a)
$C_{16}F_6H_{16}S$		−57·1, −53·9	(1-2) 11	173(e)
$C_{16}F_6H_{28}$	$(CF_3{\cdot}CH_2{\cdot}CH{\cdot}(CH_2)_4{\cdot}CH_3)_2$	−64·8	(1-2) 10·8	117
$C_{16}F_7H_4NaO_2$		(1) −55·1 (2) −144·5 (3) −134·2		272(b)
$C_{16}F_7H_5O_2$	As above with Na replaced by H	(1) −56·1 (2) −140·4 (3) −138·3		272(b)
$C_{16}F_7H_9N_2O$		(1) −77·9 (2) −103·6		268(a)

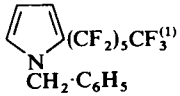
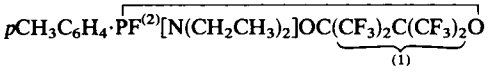
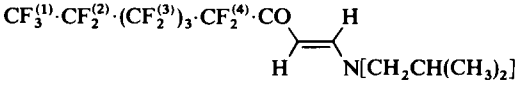
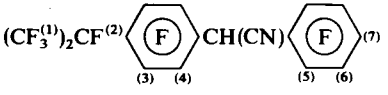
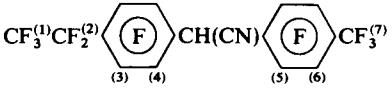
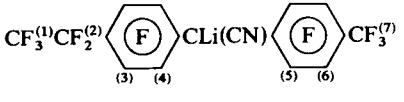
$C_{16}F_7H_9N_2O$		(1) −73·6 (2) −102·3		268(a)
$C_{16}F_7H_9N_2O$		(1) −75·9 (2) −106·6		268(a)
$C_{16}F_{11}H_{20}NO$		(1) −81·6 (2) −127·4 (3) −123·4 (4) −120·9		243
$C_{16}F_{12}H_8N_6$		−73·65, −70·35		234(a)
$C_{16}F_{12}H_9NS_2$		(1)(2) −58·1, −53·9 (3)(4) −57·1, −56·0	(1-2) 8 (3-4) 9 (3,4-1 or 2) 4·5 (1 or 2-5) 1·3	173(e)
$C_{16}F_{12}H_{10}OS_2$		(1) −64·86 (2) −67·40		173(e)
$C_{16}F_{12}H_{14}N_2O_4$		(1) −68·30 (2) −70·70		234(a)

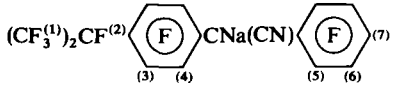
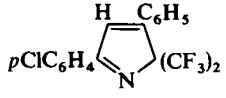
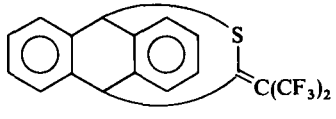
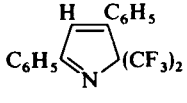
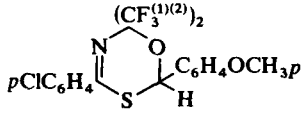
Molecular formula	Structure of compounds	Chemcal shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{16}F_{12}H_{15}N_3O_2$		−75·45, −72·15, −70·65, −68·80		234(a)
$C_{16}F_{12}H_{18}N_2$		(1) −71·0 (2) −69·8		254(a)
$C_{16}F_{12}H_{18}N_2$	As above with double-bond substituents interchanged	(1) −68·0 (2) −72·5		254(a)
$C_{16}F_{12}H_{18}N_2O_2$		−70·5, −67·5, −65·1 (1:2:1)		254(a)
$C_{16}F_{12}H_{18}N_2O_2$		−71·0, −70·4, −67·8, −66·5		254(a)
$C_{16}F_{13}H_{15}NO_2P$		(1) −68·1, −70·9 (2) −39·3	(P-2) 819	141
$C_{16}F_{13}H_{20}N$		(1) −80·0 (2) −123·8 (3) −119·6 (4) −101·7		243
$C_{16}F_{14}HN$		(1) −85·3 (2) −110·1 (3) −137·5 (4) −137·1 (5) −139·3 (6) −160·8 (7) −152·0	(1-2) 2·2 (1-3) 6 (2-3) 31·7 (5-7) 3·5 (6-7) 21·4	273

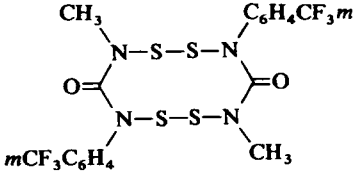
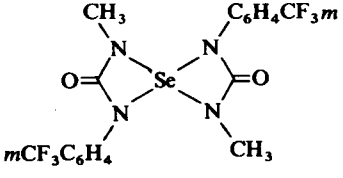
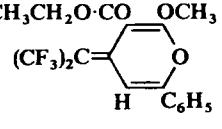
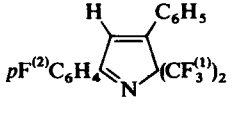
$C_{16}F_{14}HN$			(1) −55·8 (2) −139·3 (3) −137·0	(1-2) 21·9		273
$C_{16}F_{14}LiN$			(1) −85·8 (2) −107·8 (3) −146·3 (4) −147·3 (5) −141·5 (6) −166·4 (7) −166·4	(2-3) 29 (1-3) 7	(1-2) 3·3	273
$C_{16}F_{14}LiN$			(1) −54·3 (2) −146·4 (3) −143·0	(1-2) 21·5		273
$C_{16}F_{14}NNa$	As above with Li replaced by Na		(1) −54·1 (2) −146·8 (3) −143·4	(1-2) 21·2		273
$C_{16}F_{14}NNa$			(1) −85·7 (2) −107·5 (3) −146·8 (4) −147·7 (5) −141·3 (6) −166·7 (7) −166·7	(2-3) 29		273
$C_{16}F_{18}O_4Pd$	$Pd(CO)_4(CF_3{\cdot}C{\equiv}C{\cdot}CF_3)_3$		−56·2			88
$C_{16}F_{22}$		Isomer [a]	(1)(3) −176·2, −167·6 (2) −141·5 (4) −118·8 (5) −81·6			278(b)
		[b]	(1)(3) −174·4, −168·2, −164·7 (2:1:1) (2) −141·6, −138·4 (6:2) (4) −117·9 (5) −81·4			
		[c]	(1)(3) −174·8, −163·8 (1:1) (2) −141·1, −139·6 (2:2) (4) −117·9 (9) −80·6			
$C_{16}F_{26}MoO_8P_2$			(1) −66·2, −68·5 (2) +18·5	$[^1J(P\text{-}F)+{}^3J(P\text{-}F)]$ 1285		155

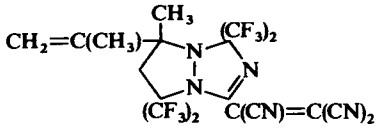
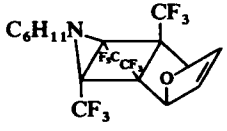
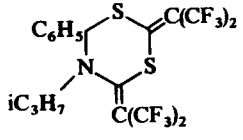
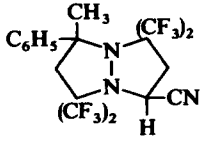
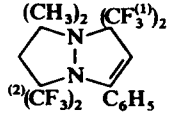
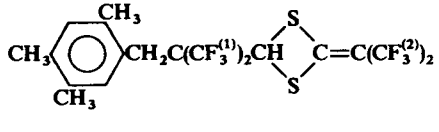
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{16}F_{27}N$		(1) −179·8 (2) −72·7 (3) −152·1 (4) −69·8 (5)(6) −50·7, −52·6 (7) −180·8 (8) −73·3	(1-4) 47 (3-5) 55 (6-7) 55	274
$C_{17}F_3H_{18}NO_2$		−80·7		259(a)
$C_{17}F_3H_{20}NO_3$	$CF_3{\cdot}C(OH)(CO{\cdot}NH{\cdot}C_6H_{11}){\cdot}CH_2{\cdot}CO{\cdot}C_6H_5$	−79·8		259(a)
$C_{17}F_6H_9ClN_2O_3S$				248(a)
	$R^1 = pClC_6H_4$; $R^2 = mNO_2C_6H_4$; $R^3 = H$	(1)(2) −77·4, −76·0	(1-2) 9	
$C_{17}F_6H_{10}ClNOS$	As above with $R^1 = pClC_6H_4$; $R^2 = C_6H_5$; $R^3 = H$	(1)(2) −77·3, −75·8	(1-2) 9	248(a)
$C_{17}F_6H_{10}N_2O_3S$	As above with $R^1 = C_6H_5$; $R^2 = mNO_2C_6H_4$; $R^3 = H$	(1)(2) −77·4, −76·1	(1-2) 9	248(a)
$C_{17}F_6H_{11}NOS$	As above with $R^1 = C_6H_5$; $R^2 = C_6H_5$; $R^3 = H$	(1)(2) −77·4, −75·8	(1-2) 9	248(a)
$C_{17}F_6H_{12}N_2O$		−78·2		268(a)
$C_{17}F_6H_{12}N_2O$		−73·2		268(a)

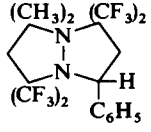
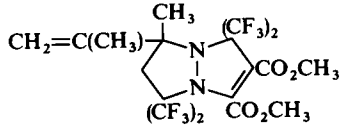
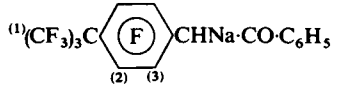
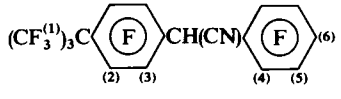
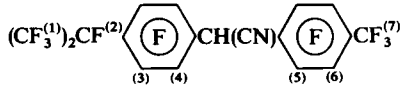
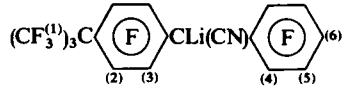
$C_{17}F_6H_{12}N_2O$		−76·3		268(a)
$C_{17}F_6H_{12}O_4$		(1)(2) −56·5, −53·5	(1-2) 8·5	267(a)
$C_{17}F_6H_{12}O_4$		−63·1	(1-2) 7·5	267(a)
$C_{17}F_6H_{17}NOS$		−77·4		248(a)
$C_{17}F_{12}H_{12}N$		−72·6, −71·0, −69·95 (1:1:2)		254(a)
$C_{17}F_{12}H_{14}N$	As above with CH=CH replaced by CH_2CH_2	−73·1, −70·7, −67·7, −66·4		254(a)
$C_{17}F_{12}H_{20}N_2$		(1) −70·95 (2) −69·8		254(a)
$C_{17}F_{12}H_{20}N_2$	As above with substituents about double bond interchanged	(1) −68·0 (2) −72·5		254(a)

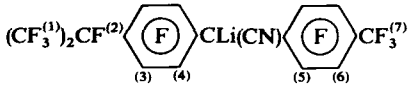
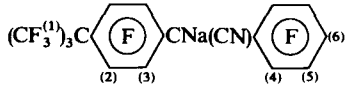
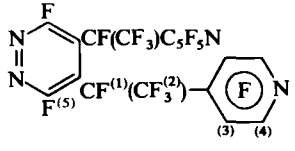
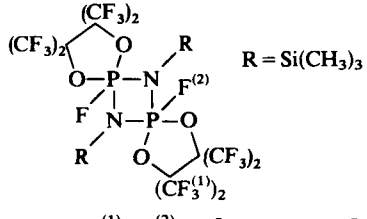
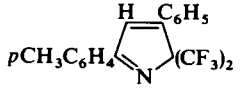
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{17}F_{13}H_{10}N$		(1) −82·2		137
$C_{17}F_{13}H_{17}NO_2P$		(1) −68·0, −70·7 (2) −39·9	(P-2) 826	141
$C_{17}F_{13}H_{20}NO$		(1) −81·2 (2) −127·1 (3) −123·4 (4) −120·9		243
$C_{17}F_{16}HN$		(1) −74·5 (2) −177·2 (3) −134·5 (4) −136·8 (5) −139·3 (6) −160·9 (7) −152·0	(1-2) 5·8 (1-3) 13·5 (2-3) 46·5 (5-7) 3 (6-7) 21·2	273
$C_{17}F_{16}HN$		(1) −85·1 (2) −110·2 (3) −136·8 (4) −136·8 (5) −136·8 (6) −139·3 (7) −56·2	(1-2) 2·2 (1-3) 6 (2-3) 31·7 (6-7) 22·8	273
$C_{17}F_{16}H_{22}Cl_2OSi_2$	$CH_3{\cdot}SiCl(CH_2{\cdot}CH_2{\cdot}CF_3^{(1)})CH_2{\cdot}CH_2{\cdot}CF_2^{(2)}{\cdot}CF_2^{(3)}{\cdot}CF_2^{(4)}{\cdot}O{\cdot}CF_2^{(5)}{\cdot}CF_2^{(6)}{\cdot}CH_2{\cdot}CH_2SiCl(CH_3)(CH_2{\cdot}CH_2{\cdot}CF_3^{(4)})$	(1)(7) −68·9 (2)(6) −116, −119 (3) −127 (4)(5) −83·5, −87·8		131
$C_{17}F_{16}LiN$		(1) −85·7 (2) −108·5 (3) −144·9 (4) −142·9 (5) −142·9 (6) −146·2 (7) −54·7	(2-3) 29·5 (6-7) 20·5	273
$C_{17}F_{16}NNa$	As above with Li replaced by Na	(1) −85·6 (2) −108·2 (3) −145·4 (4) −143·0 (5) −143·0 (6) −146·1 (7) −54·0		273

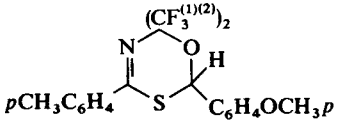
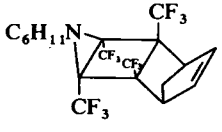
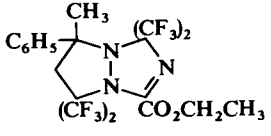
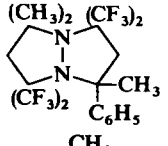
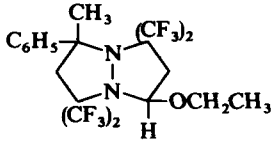
$C_{17}F_{16}NNa$		(1) −75·0 (2) −174·3 (3) −142·9 (4) −147·1 (5) −141·3 (6) −166·9 (7) −166·9		273
$C_{18}F_6H_{10}ClN$		−67·0		229(a)
$C_{18}F_6H_{10}ClN$	As above with H and C_6H_5 interchanged	−69·0		229(a)
$C_{18}F_6H_{10}ClN$	$(CF_3^{(1)})_2CH^{(2)}\cdot N{=}C(C_6H_4Clp)C{\equiv}C\cdot C_6H_5$	−69·8	(1-2) 6·5	229(a)
$C_{18}F_6H_{10}S$		−57·61, −52·50		173(e)
$C_{18}F_6H_{11}N$		−66·9		229(a)
$C_{18}F_6H_{11}N$	As above with groups about C=C interchanged	−69·0		229(a)
$C_{18}F_6H_{11}N$	$(CF_3^{(1)})_2CH^{(2)}\cdot N{=}C(C_6H_5)\cdot C{\equiv}C\cdot C_6H_5$	−69·9	(1-2) 6·5	229(a)
$C_{18}F_6H_{12}ClNO_2S$		(1)(2) −77·6, −76·0	(1-2) 9	248(a)
$C_{18}F_6H_{12}N_2O_3S$	As above with Cl replaced by CH_3 and OCH_3 replaced by mNO_2	(1)(2) −77·5, −76·2	(1-2) 9	248(a)
$C_{18}F_6H_{13}NOS$	As above with Cl replaced by CH_3 and OCH_3 replaced by H	(1)(2) −77·4, −75·9	(1-2) 9	248(a)
$C_{18}F_6H_{13}NO_2S$	As above with Cl replaced by H	(1)(2) −77·6, −76·0	(1-2) 9	248(a)

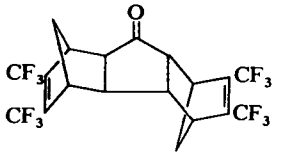
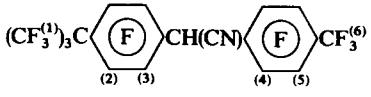
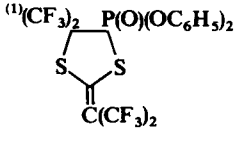
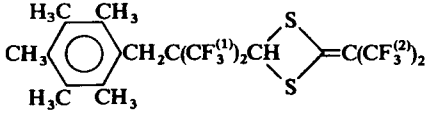
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{18}F_6H_{14}N_4O_2S_4$		−61·91		168
$C_{18}F_6H_{14}N_4O_2Se$		−63·42		168
$C_{18}F_6H_{14}O_4$		(1)(2) −54·5, −57·5	(1-2) 8·8	267(a)
$C_{18}F_6H_{15}ClNO_3P$	pClC$_6$H$_4$C=NC(CF$_3$)$_2$P(OCH$_3$)$_2$C$_6$H$_5$O	−64·9		261(a)
$C_{18}F_6H_{16}NO_3P$	C$_6$H$_5$C=NC(CF$_3$)$_2$P(OCH$_3$)$_2$C$_6$H$_5$O	−65·4		261(a)
$C_{18}F_7H_{10}N$		(1) −67·2 (2) −103·8		229(a)
$C_{18}F_7H_{10}N$	As above with H and C$_6$H$_5$ interchanged	(1) −69·2 (2) −105·7		229(a)
$C_{18}F_7H_{10}N$	(CF$_3^{(1)}$)$_2$CH$^{(3)}$·N=C(C$_6$H$_4$F$^{(2)}$$p$)C≡C·C$_6H_5$	(1) −69·9 (2) −104·8	(1-3) 6·5)	229(a)

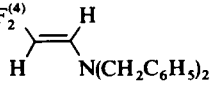
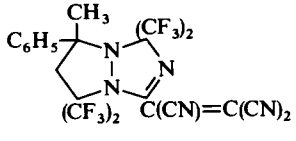
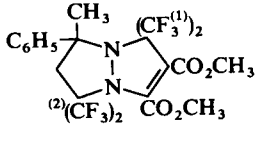
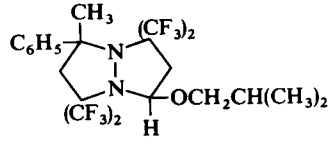
$C_{18}F_{12}H_{10}N_6$		−74·95, −71·20, −70·25, −68·30	234(a)
$C_{18}F_{12}H_{11}NO$		−60·1, −63·7	270(c)
$C_{18}F_{12}H_{13}NS_2$		−57·67, −56·52, −55·93 −52·46	173(e)
$C_{18}F_{12}H_{13}N_3$		−71·2, −70·4, −66·3, (fourth signal obscured by signals from other compounds)	254(a)
$C_{18}F_{12}H_{14}N_2$		(1) −70·75 (2) −69·0	254(a)
$C_{18}F_{12}H_{14}S_2$		(1) −67·40 (2) −57·83	173(e)

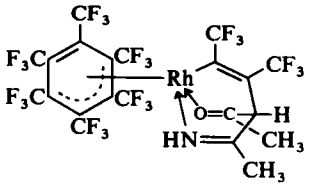
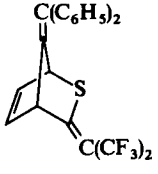
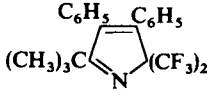
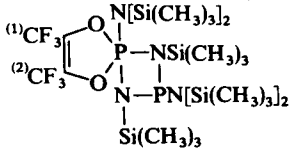
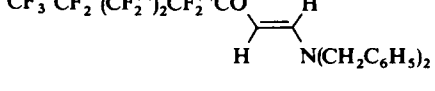
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{18}F_{12}H_{16}N_2$		−73·1, −70·2, −67·0 (1:1:2)		254(a)
$C_{18}F_{12}H_{16}N_2O_4$		−71·75, −70·95, −69·55, −65·75		234(a)
$C_{18}F_{13}H_6NaO$		(1) −60·9 (2) −134·4 (3) −140·7	(1-2) 26	272(b)
$C_{18}F_{13}H_7O$	As above with Na replaced by H	(1) −60·4 (2) −129·4 (3) −138·8	(1-2) 26	272(b)
$C_{18}F_{18}HN$		(1) −60·2 (2) −126·5 (3) −136·3 (4) −139·5 (5) −161·1 (6) −152·2	(1-2) 26·4 (4-5) 20·7 (4-6) 3·5	273
$C_{18}F_{18}HN$		(1) −74·1 (2) −177·4 (3) −134·4 (4) −136·7 (5) −136·7 (6) −139·1 (7) −55·9	(1-2) 6 (1-3) 13·5 (2-3) 44·5 (6-7) 22·2	273
$C_{18}F_{18}H_{22}Cl_2O_2Si_2$	$[(CF_3^{(1)}\cdot CH_2\cdot CH_2)CH_3SiCl(CH_2)_2CF_2^{(2)}CF_2^{(3)}OCF_2^{(4)}]$	(1) −69·0 (2) −118, −120 (3)(4) −88·0, −89·0		131
$C_{18}F_{18}LiN$		(1) −60·9 (2) −135·2 (3) −146·0 (4) −141·1 (5) −166·2 (6) −166·2	(1-2) 25·7 (2-3) 14·5	273

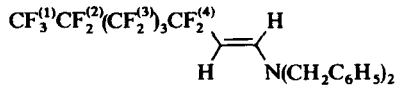
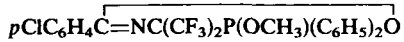
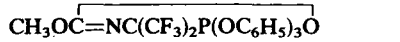
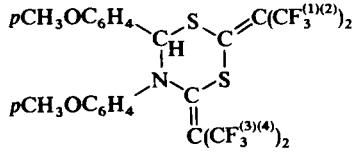
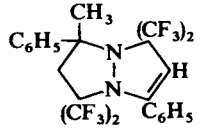
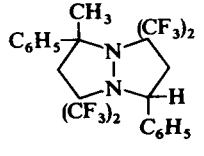
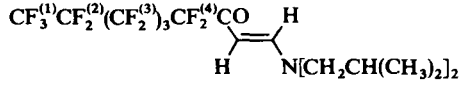
$C_{18}F_{18}LiN$		(1) −74·9 (3) −141·8 (5) −142·7 (7) −53·8	(2) −175·7 (4) −142·7 (6) −146·1	(1-2) 6 (2-3) 39·5	(1-3) 12·5 (6-7) 21·0	273
$C_{18}F_{18}NNa$	As above with Li replaced by Na	(1) −75·0 (3) −142·8 (5) −142·8 (7) −53·9	(2) −175·4 (4) −142·8 (6) −146·4			273
$C_{18}F_{18}NNa$		(1) −61·4 (3) −146·7 (5) −166·5	(2) −135·8 (4) −141·3 (6) −166·5			273
$C_{18}F_{18}N_4$		(1) −158·8 (3) −140·9 (5) −73·7	(2) −75·8 (4) −91·3			212
$C_{18}F_{24}H_9O_4P$	$[(CF_3)_2CHO]_4PC_6H_5$	−72·5				180
$C_{18}F_{26}H_{18}N_2O_4P_2Si_2$	 $R = Si(CH_3)_3$	(1) −67·1, −70·3 (2) −69·5		(1-2) 12·3 ^1J(P-F) 1018·5 ^3J(P-F) 23·7 $[^4J$(F-F)+^5J(F-F)] 8		281
$C_{19}F_3H_{24}ClIOP_2Rh$	$RhClI(CF_3^{(1)}CH_2^{(2)})CO[P(CH_3)_2C_6H_5]_2$	−56·05		(1-2) 15·0	(Rh-F) 3·8	279
$C_{19}F_5H_{22}ClIOP_2Rh$	As above with CH_2 replaced by CF_2(2)	(1) −79·2	(2) −62·3	(P-F) 26		279
$C_{19}F_6H_{13}N$		−66·9				229(a)
$C_{19}F_6H_{13}N$	As above with H and C_6H_5 group interchanged	−69·2				229(a)

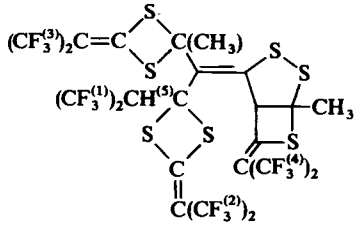
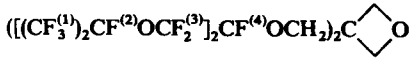
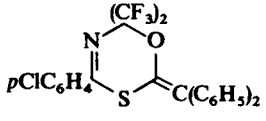
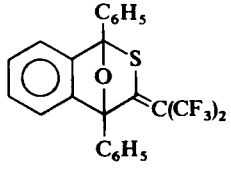
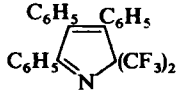
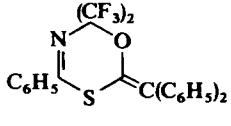
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{19}F_6H_{13}N$	$(CF_3^{(1)})_2CH^{(2)}\cdot N{=}C(pCH_3C_6H_4)\cdot C{\equiv}C\cdot C_6H_5$	−69·9	(1-2) 6·5	229(a)
$C_{19}F_6H_{15}NO_2S$		−77·7, −76·2	(1-2) 9	248(a)
$C_{19}F_6H_{18}NO_3P$	$pCH_3C_6H_4C{=}N{-}C(CF_3)_2P(OCH_3)_2C_6H_5O$	−64·9		261(a)
$C_{19}F_6H_{18}NO_4P$	As above with pCH_3 replaced by pCH_3O	−65·5		261(a)
$C_{19}F_{12}H_{13}N$		−60·4, −62·1		270(c)
$C_{19}F_{12}H_{15}CoO$	$[\eta\text{-}C_5(CH_3)_5]Co[C_4(CF_3)_4CO]$	−51·84, −54·40		277
$C_{19}F_{12}H_{15}N_3O_2$		−75·30, −72·15, −71·20, −69·00		234(a)
$C_{19}F_{12}H_{15}ORh$	$[\eta\text{-}C_5(CH_3)_5]Rh[C_4(CF_3)_4CO]$	−52·34, −55·35		277
$C_{19}F_{12}H_{18}N_2$		−70·1, −69·6, −66·0, −65·0	(F-H) 11·0, 11·0	254(a)
$C_{19}F_{12}H_{18}N_2O$		−72·65, −72·2, −67·35, −63·9	(F-H) 10·5, 12·0	254(a)

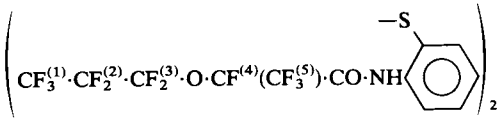
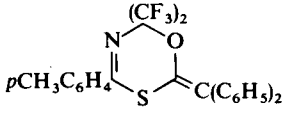
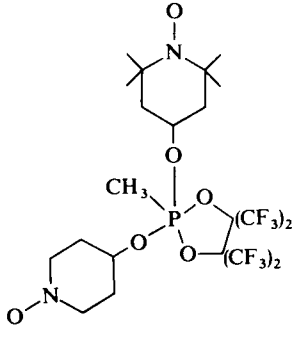
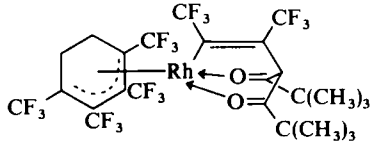
$C_{19}F_{12}O$		−60·3, −60·4	(F-F) 7		210
$C_{19}F_{20}HN$		(1) −60·1 (2) −126·5 (3) −135·7 (4) −137·1 (5) −137·1 (6) −139·2	(1-2) 26·5	(5-6) 23·0	273
$C_{19}F_{20}LiN$	As above with H replaced by Li	(1) −60·5 (2) −134·0 (3) −142·0 (4) −142·3 (5) −146·1 (6) −53·9	(1-2) 25·9 (5-6) 21·5	(2-3) 11·0	273
$C_{19}F_{20}NNa$	As above with H replaced by Na	(1) −61·1 (2) −134·7 (3) −142·5 (4) −142·5 (5) −146·6 (6) −54·0			273
$C_{20}F_5H_{24}ClIOP_2Rh$	$RhCl(CF_3^{(1)}\cdot CF_2^{(2)}\cdot CH_2^{(3)})CO[P(CH_3)_2C_6H_5]_2$	(1) −85·1 (2) −101·3	(2-3) 26·0		279
$C_{20}F_6H_{28}NO_4P$	$pCH_3C_6H_4\overline{C{=}N{-}C(CF_3)_2P[OCH(CH_3)_2]_3O}$	−65·8	(P-F) 4·0		261(a)
$C_{20}F_6H_{28}NO_5P$	As above with pCH_3 replaced by pCH_3O	−65·9	(P-F) 4·0		261(a)
$C_{20}F_7H_{22}ClIOP_2Rh$	$RhCl(CF_2^{(1)}\cdot CF_2^{(2)}\cdot CF_3^{(3)})CO[P(CH_3)_2C_6H_5]_2$	(1) −65·6 (2) −115·3 (3) −79·1	(1-3) 12		279
$C_{20}F_{12}H_{11}O_3PS_2$		(1) −64·84, −62·93 (2) −57·45			173(e)
$C_{20}F_{12}H_{18}S_2$		(1) −64·67 (2) −67·40			173(e)

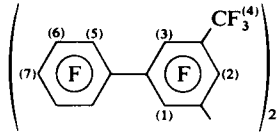
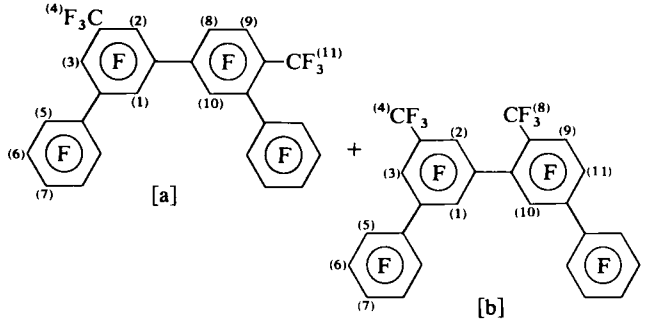
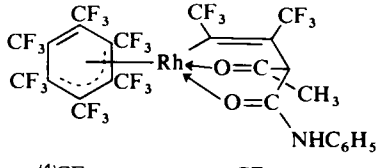
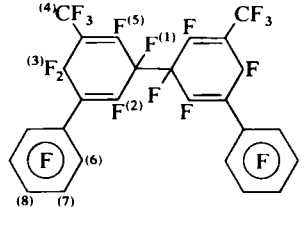
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{20}F_{26}H_{18}N_2O_4P_2$	As $C_{18}F_{26}H_{18}N_2O_4P_2Si_2$ above with R = $C(CH_3)_3$	(1) −66·5, −69·9 (2) −70·4	(1-2) 12·3 ^1J(P-F) 1032·3 ^3J(P-F) 32·6 [^4J(F-F)+^5J(F-F)]8	281
$C_{21}F_6H_{26}N_2OSn_2$	[*m*$CF_3C_6H_4N{\cdot}Sn(CH_3)_3]_2CO$	−62·87		168
$C_{21}F_7H_{24}BrIOP_2Rh$	$RhBrI(CF_3^{(1)}{\cdot}CF_2^{(2)}{\cdot}CF_2^{(3)}{\cdot}CH_2^{(4)})CO[P(CH_3)_2C_6H_5]_2$	(1) −80·8 (2) −126·2 (3) −97·7	(1-3) 10 (3-4) 28·0	279
$C_{21}F_7H_{24}ClIOP_2Rh$	As above with Br replaced by Cl	(1) −80·9 (2) −126·4 (3) −97·5	(1-3) 10 (3-4) 28·0	279
$C_{21}F_{11}H_{16}N$	$CF_3^{(1)}{\cdot}CF_2^{(2)}{\cdot}(CF_2^{(3)})_2{\cdot}CF_2^{(4)}$ 	(1) −80·0 (2) −125·2 (3) −121·1 (4) −102·1		243
$C_{21}F_{12}H_{10}N_6$		−74·95, −71·20, −70·25 −68·30		234(a)
$C_{21}F_{12}H_{16}N_2O_4$		(1)(2) −71·70, −68·85, −64·05 (2:1:1)		234(a)
$C_{21}F_{12}H_{22}N_2O$		−73·0, −72·2, −67·05, −63·5		254(a)

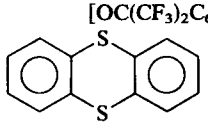
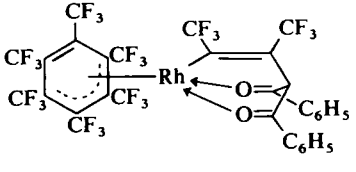
$C_{21}F_{24}H_7NORh$		−77·35, −74·75, −71·30, −68·63, −67·06 (ratio 3:1:2:1:1)		284(c)
$C_{21}F_{24}H_{22}Cl_2O_2Si_2$	$[(CF_3^{(1)}CH_2CH_2)CH_3SiCl(CH_2)_2CF_2^{(2)}CF_2^{(3)}OCF_2^{(4)}CF_2^{(5)}]_2CF_2^{(6)}$	(1) −68·9 (2) −120 (3)(4) −83·0, −87·0 (5) −126 (6) −123		131
$C_{22}F_6H_{14}S$		−58·7, −54·8		173(e)
$C_{22}F_6H_{19}N$		−67·5		229(a)
$C_{22}F_6H_{54}N_4O_2P_2Si_6$		(1)(2) −58·5, −63·6	(1-2) 12·7	250
$C_{22}F_{11}H_{16}NO$		(1) −82·6 (2) −127·8 (3) −124·2 (4) −121·7		243

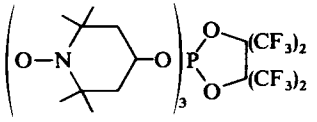
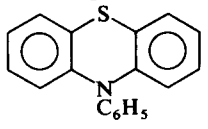
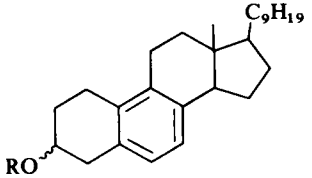
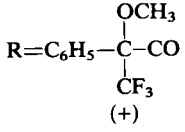
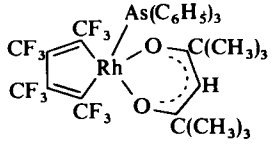
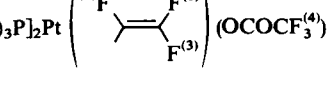
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{22}F_{13}H_{16}N$		(1) −80·4 (2) −124·6 (3) −120·4 (4) −102·9		243
$C_{22}F_{18}H_{15}Co$	$[\eta\text{-}C_5(CH_3)_5]Co[C_6(CF_3)_6]$	−50·64, −51·36, −56·91 (1:1:1)		277
$C_{22}F_{18}H_{15}Rh$	As above with Co replaced by Rh	−51·75, −51·78, −56·34 (1:1:1)		277
$C_{23}F_6H_{17}ClNO_2P$		−63·6	(P-F) 3·2	261(a)
$C_{23}F_6H_{18}NO_2P$	As above with Cl replaced by H	−63·9	(P-F) 3·2	261(a)
$C_{23}F_6H_{18}NO_5P$		−66·5	(P-F) 3·5	261(a)
$C_{23}F_{12}H_{15}NO_2S_2$		(1)(2) −58·9, −56·7 (3)(4) −55·5, −54·3		173(e)
$C_{23}F_{12}H_{16}N_2$		−70·5, −69·0, −68·65, −67·6		254(a)
$C_{23}F_{12}H_{18}N_2$		[a] −70·4, −69·7, −66·1 (1:1:2) [b] −70·6, −68·9, −66·7, −65·3		254(a)
$C_{23}F_{13}H_{16}NO$		(1) −81·6 (2) −127·1 (3) −123·7 (4) −120·9		243

$C_{23}F_{24}H_8S_7$		(1) −64·37 (2)(3) −57·67, −57·56 (4) −57·74	(1-5) 6	173(e)
$C_{23}F_{38}H_8O_7$		(1) −81·4 (2) −146·0 (3) −78·8 (4) −142·6	(2-3) 21·8	143
$C_{24}F_6H_{14}ClNOS$		−76·9		248(a)
$C_{24}F_6H_{14}OS$		−60·56, −53·5		173(e)
$C_{24}F_6H_{15}N$		−66·7		229(a)
$C_{24}F_6H_{15}NOS$		−76·80		248(a)
$C_{24}F_6H_{20}NO_2P$	$pCH_3C_6H_4C{=}NC(CF_3)_2POCH_3(C_6H_5)_2O$	−63·6	(P-F) 3·0	261(a)
$C_{24}F_6H_{20}NO_3P$	As above with pCH_3 replaced by pCH_3O	−64·0	(P-F) 3·0	261(a)

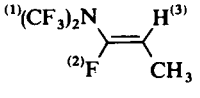
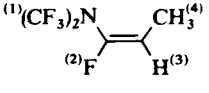
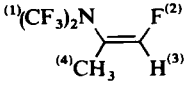
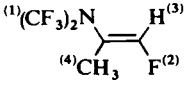
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{24}F_{18}H_{16}Ir_2O_2$	$[\eta\text{-}C_5(CH_3)_5]Ir_2(CO)_2(CF_3C{\equiv}CCF_3)_3H$	−47·4, −52·7, −57·92, −58·4 (2:2:1:1)	(3-4) 9 (3-H) 3 (4-H) 8	277
$C_{24}F_{22}H_{10}N_2O_4S_2$		(1)(5) −81·9, −82·5 (2) −130·0 (3) −79·8, −85·3 (4) −133·0	(3A-3B) 142	252
$C_{25}F_6H_{17}NOS$		−76·9		248(a)
$C_{25}F_{12}H_{37}N_2O_6P$		−70·3		286
$C_{25}F_{18}H_{22}O_2Rh$		−74·19, −72·15, −70·45, −67·14 (1:2:1:2)		284(c)
$C_{26}F_8H_{17}N_2O_2P_2Ru$	$[Ru(O_2C\text{-}CF_3^{(1)})_2\{PF_2^{(2)}(N(CH_3)_2)_2\}P(C_6H_5)]$	(1) −76·5 (2) +1·7	$[^1J(P\text{-}1)+^3J(P\text{-}1)]$ 1189	288

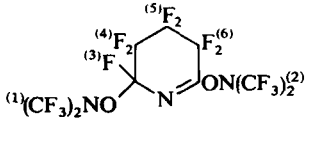
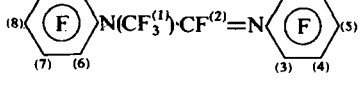
$C_{26}F_{24}$		(1) −99·4 (4) −57·2 (6) −161·1	(2)(3) −103·3 (5) −137·5 (7) −150·2	(2-4) = (3-4) 22	262(b)
$C_{26}F_{24}$		(1)a −100·2 (1)b −99·0 (2)(3)a,b −103·2 (4)a,b −56·9 (5)a,b −137·7 (6)a,b −161·1 (7)a,b −150·3 (8)a −125·4 (8)b(11)b −57·9 (9)a,b −138·9 (10)a,b −109·7 (11)b −125·4		(8-9)a = (9-11)b = 21 (8-10)a = (10-11)b = 2·5	262(b)
$C_{26}F_{24}H_{10}NO_2Rh$		−75·8, −74·3, −73·34, −69·6, −67·68 (3 : 1 : 1 : 2 : 1)			284(c)
$C_{26}F_{26}$		(1) −174·8 (2)(5) −108·8, −103·3 (3) −97·0, −90·4 (4) −58·6 (7) −160·1	(6) −137·5 (8) −148·7		262(b)
$C_{27}F_{13}H_{21}A_5FeN_2O_2P$ $[CF_3^{(1)}\cdot CF_2^{(2)}\cdot CF_2^{(3)}\cdot Fe(CO)_2(CH_3CN)_2As(C_6H_5)_3]PF_6^{(4)}$		(1) −78·8 (3) −79·6	(2) −117·5 (4) −73·5		215

Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{27}F_{13}H_{21}FeN_2O_2P_2$	As above with As replaced by P	(1) −80·2 (2) −117·2 (3) −79·1 (4) −73·1		215
$C_{27}F_{13}H_{21}FeN_2O_5P_2$	As above with As replaced by P and C_6H_5 by OC_6H_5	(1) −83·1 (2) −117·8 (3) −79·8 (4) −73·5	(1-3) 11·2	215
$C_{28}F_6H_{20}NO_5P$	$C_6H_5O\overline{C=NC(CF_3)_2P(OC_6H_5)_3O}$	−66·5	(P-F) 3·5	261(a)
$C_{29}F_6H_{22}NO_5P$	$p CH_3OC_6H_4\overline{C=NC(CF_3)_2P(OC_6H_5)_3O}$	−65·2	(P-F) 3·3	261(a)
$C_{29}F_{12}H_{30}ORh_2$	$[\eta\text{-}C_5(CH_3)_5]Rh(CF_3C{\equiv}CCF_3)_2CO$	−52·30, −55·48 (1:1)		277
$C_{30}F_6H_{22}NO_4P$	$C_6H_5CH{=}CH\overline{C=NC(CF_3)P(OC_6H_5)_3O}$	−65·2	(P-F) 3·4	261(a)
$C_{30}F_6H_{22}N_2NiO_4$	$Ni(C_6H_5{\cdot}CO{\cdot}CH{\cdot}CO{\cdot}CF_3)_2{\cdot}2C_5H_5N$	−51·2		289
$C_{30}F_{12}H_{18}O_2S_2$		−70·1		290
$C_{30}F_{12}H_{18}O_3S$	As above with lower —S— replaced by —O—	−70·1		290
$C_{30}F_{12}H_{30}O_2Rh_2$	$[\eta\text{-}C_5(CH_3)_5]Rh_2(CF_3C{\equiv}CCF_3)_2(CO)_2$	−47·73, −51·51 (1:1)		277
$C_{31}F_{24}H_{11}O_2Rh$		−75·60, −73·75, −69·45, −59·80 (3:2:2:1)		284(c)
$C_{32}F_6H_{26}N_2NiO_4$	$Ni(C_6H_5{\cdot}CO{\cdot}CH{\cdot}CO{\cdot}CF_3)_2{\cdot}2CH_3C_5H_4N$ (β)	−52·5		289
$C_{32}F_6H_{26}N_2NiO_4$	As above with $CH_3C_5H_4N(\beta)$ replaced by $CH_3C_5H_4N(\gamma)$	−53·0		289

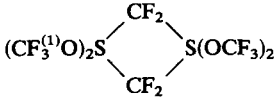
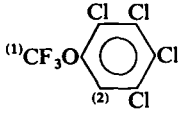
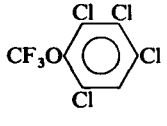
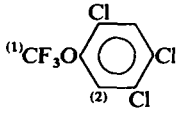
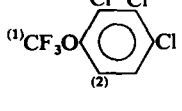
$C_{33}F_{12}H_{51}N_3O_8P$			−69·3			286
$C_{36}F_{12}H_{23}NO_2S$	$[OC(CF_3)_2C_6H_5]_2$ 		−70·1			290
$C_{37}F_3H_{49}O_3$		RO	−74·75			291
		RO	−74·55			
	 (+)					
$C_{37}F_{12}H_{34}AsO_2Rh$			−75·38, −70·06			284(c)
$C_{39}F_5H_{30}ClOPPt$	*cis*-$[PtCl(CF_2^{(1)}COCF_3^{(2)})(P(C_6H_5)_3)_2]$		(1) −92·5	(2) −75·7	(1-2) 6 (Pt-2) 9 (P-1)*trans* 36	(Pt-1) 360 (P-1)*cis* 26	292(c)
$C_{40}F_6H_{30}O_2P_2Pt$	*trans*-$[(C_6H_5)_3P]_2Pt$  $(OCOCF_3^{(4)})$		(1) −100·2 (3) −148·5	(2) −130·1 (4) −75·5	(1-2) 90·1 (2-3) 106·2 (P-2) 4·0	(1-3) 28·9 (P-1) 5·0 (P-3) 2·0	334

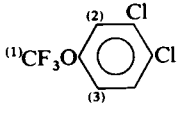
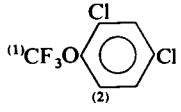
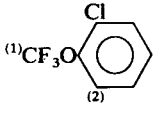
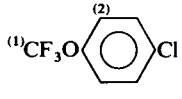
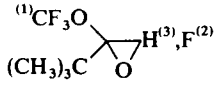
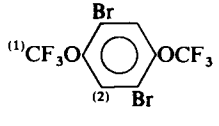
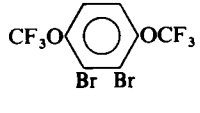
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{40}F_9H_{30}O_4P_3Ru$	$[Ru(O_2CCF_3^{(1)})_2(PF_3^{(2)})(P(C_6H_5)_3)_2]$	(1) −75·5 (2) −8·6	(P-2) 1283	288
$C_{40}F_{11}H_{30}O_4P_4Ru^+$	$[Ru(O_2CCF_3^{(1)})\{PF_2^{(3)}(O_2CCF_3^{(2)})\}(PF_3^{(4)})(P(C_6H_5)_3)_2]^+$	(1) −78·1 (2) −77·2 (3) +3·9 (4) −5·9	(P-3) 1206 (P-4) 1276	288
$C_{42}F_8H_{36}NO_2P_3Ru$	$[Ru(O_2CCF_3^{(1)})_2\{PF_2^{(2)}(N(CH_3)_2)\}(P(C_6H_5)_3)_2]$	(1) −77·0 (2) −7·8	(P-2) 1177	288
$C_{44}F_{26}H_{32}Fe_2N_4O_4P_4$	$\{[CF_1^{(3)}CF_2^{(2)}CF_2^{(3)}Fe(CO)_2(CH_3CN)_2]_2(C_6H_5)_2PCH_2CH_2P(C_6H_5)_2\}(PF_6^{(4)})_2$	(1) −80·3 (2) −115·5 (3) −77·7 (4) −71·0	(1-3) 11·3	215
$C_{188}F_{180}H_{238}O_{31}Si_{22}$	$CH_2{=}CHSi(CH_3)_2O[Si(CH_3)(CH_2CH_2CF_3^{(1)})(CH_2)_2CF_2^{(2)}CF_2^{(3)}OCF_2^{(4)}CF_2OCF_2CF_2(CH_2)_2Si(CH_3)$ $\cdot(CH_2CH_2CF_3)O]_{10}Si(CH_3)_2CH{=}CH_2$	(1) −88·4 (2) −119·8 (3)(4) −90·0		131
2. CF_3 group bonded to iodine				
CF_3ClINO_3	$CF_3{\cdot}ICl(NO_3)$	−28·4		9
CF_3Cl_2I	$CF_3{\cdot}ICl_2$	−30·9		9
CF_3I	CF_3I	−7·6		9
$CF_3IN_2O_6$	$CF_3{\cdot}I(NO_3)_2$	−25·4		9
CF_4INO_3	$CF_3^{(1)}{\cdot}IF^{(2)}(NO_3)$	(1) −29·3 (2) −165·2	(1-2) 8·3	9
CF_5I	$CF_3^{(1)}{\cdot}IF_2^{(2)}$	(1) −33·7 (2) −175·7	(1-2) 6·5	9
3. CF_3 group bonded to nitrogen				
CF_3H_2N	$CF_3^{(1)}{\cdot}NH_2^{(2)}$	−48·9	(1-2) 10·4	13
C_2F_3N	$CF_3{\cdot}NC$	−51·2		31

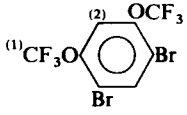
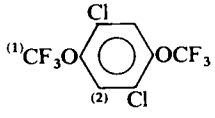
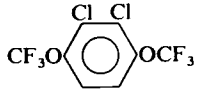
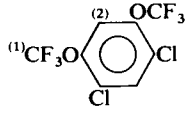
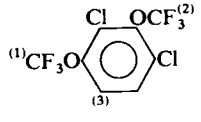
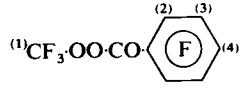
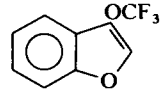
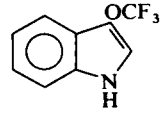
C_2F_5NO	$CF_3^{(1)}\cdot N\cdot CF_2^{(2)}\cdot O$	(1) −67·9 (2B) −108·1	(2A) −91·8	(1-2A) 3·1 (2A-2B) 1·8(?) ^1J(1-C) 293 ^1J(2A-C) 295 ^1J(2B-C) 280	(1-2B) 15·8	39
$C_2F_{10}HNO_2S$	$CF_3^{(1)}\cdot NH^{(5)}\cdot CF_2^{(2)}\cdot OO\cdot SF_4^{(3)}F^{(4)}$	(1) −55·9 (3) +56·1	(2) −70·0 (4) +59·2	(1-2) 8·5 (3-4) 154·5	(1-5) 4·2	39
$C_3F_8HNO_2$	$CF_3^{(1)}\cdot NH^{(4)}CF_2^{(2)}\cdot OO\cdot CF_3^{(3)}$	(1) −55·9 (3) −68·7	(2) −70·2	(1-2) 8·5 (1-4) 4·25	(2-3) 4·0	39
C_3F_9NS	$(CF_3^{(1)})_2N\cdot SCF_3^{(2)}$	(1) −56·9	(2) −52·6	(1-2) 3·45		38
$C_3F_9N_3O$	$(CF_3^{(1)})_2N\cdot N(CF_3^{(2)})NO$	(1) −59·3	(2) −62·5			76
$C_3F_9N_3O_2$	$(CF_3^{(1)})_2N\cdot N(CF_3^{(2)})NO_2$	(1) −61·0	(2) −59·8			76
$C_4F_6H_5NO$	$(CF_3)_2N\cdot CH_2\cdot CH_2\cdot OH$	−59·7				91
$C_4F_{10}ClN$	$(CF_3^{(1)})_2N\cdot CF_2^{(2)}\cdot CF_2^{(3)}Cl$	(1) −54·7 (3) −72·7	(2) −94·5	(1-2) 16·1 (2-3) ≤1·7	(1-3) 8·2	99(a)
$C_5F_3H_{10}N$	$CF_3\cdot N(CH_2\cdot CH_3)_2$	−60·5				111
$C_5F_7H_4N$		(1) −60·5	(2) −97·9	(1-2) 4·0	(2-3) 25·2	126(a)
$C_5F_7H_4N$		(1) −59·0	(2) −92·9	(1-2) 3·5 (2-4) 3·5	(2-3) 6·0	126(a)
$C_5F_7H_4N$		(1) −58·5	(2) −127·8	(2-3) 77·4	(2-4) 5·7	126(a)
$C_5F_7H_4N$		(1) −58·5	(2) −130·3	(2-3) 78·8	(2-4) 5·2	126(a)

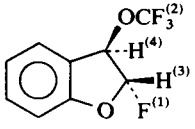
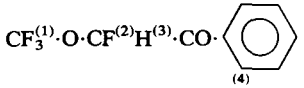
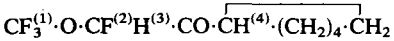
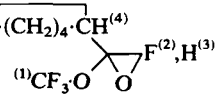
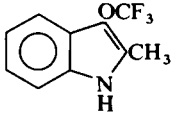
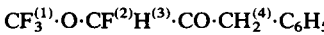
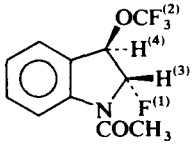
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_5F_7H_5BrN$	$(1R, 2S)$-$CH_3^{(5)}\cdot CH^{(4)}Br\cdot CF^{(2)}H^{(3)}\cdot N(CF_3^{(1)})_2$	(1) −56·7 (2) −149·5	(1-2) 6·3 (2-3) 45·0 (2-4) 6·3	126(a)
	$(1R, 2R)$-isomer	(1) −56·1 (2) −145·3	(1-2) 6·7 (2-3) 46·2 (2-5) 1·7	126(a)
$C_5F_7H_5BrN$	$(1R, 2S)$-$CF^{(2)}BrH^{(3)}\cdot CH^{(4)}(CH_3)\cdot N(CF_3^{(1)})_2$	(1) −56·2 (2) −143·2	(1-2) 3·8 (2-3) 48·0 (2-4) 12·6	126(a)
	$(1R, 2R)$-isomer	(1) −55·8 (2) −141·7	(1-2) 3·5 (2-3) 51·0 (2-4) 7·0	126(a)
$C_5F_{11}Cl_2N$	$CF_3^{(1)}\cdot N(CF_2^{(2)}\cdot CF_2^{(3)}Cl)_2$	(1) −51·5 (2) −89·8 (3) −70·3	(1-2) 15·9 (1-3) 10·6 (2-3) 6·4	99(a)
$C_5F_{12}ClN$	$(CF_3^{(1)})_2N\cdot CF_2^{(2)}\cdot CF_2^{(3)}\cdot CF_2^{(4)}Cl$	(1) −54·5 (2) −91·2 (3) −121·3 (4) −70·4	(1-2) 15·6 (1-3) 8·4 (2-4) 14·1	99(a)
$C_6F_{12}H_3ClN_2O_2$	$(CF_3^{(1)(2)})_2NO\cdot CHCl\cdot CH_2\cdot ON(CF_3^{(3)})_2$	(1) −67·6 (2) −69·2 (3) −70·0		133
$C_6F_{13}H_3N_2O_2$	$(CF_3^{(1)(2)})_2NO\cdot CHF^{(3)}\cdot CH_2\cdot ON(CF_3^{(4)})_2$	(1) −68·65 (2) −69·8 (3) −136·0 (4) −69·9		133
$C_6F_{15}HN_2O_2$	$(CF_3^{(1)(2)})_2NO\cdot CHF^{(3)}\cdot CF_2^{(4)}\cdot ON(CF_3^{(5)})_2$	(1) −69·0 (2) −70·1 (3) −143·8 (4) −91·3 (5) −68·6		133
$C_9F_{19}N_3O_2$		(1)(2) −69·1, −70·1 (3) −97·5 (4)(5) −134·5 to −137·7 (6) −122·2		179(a)
$C_{14}F_{14}N_2$		(1) −55·9 (2) −40·9 (3) −149·9 (4) −163·4 (5) −160·4 (6) −144·0 (7) −160·4 (8) −148·5	(1-2) 16·5	271(b)

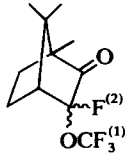
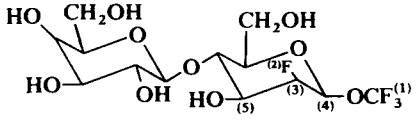
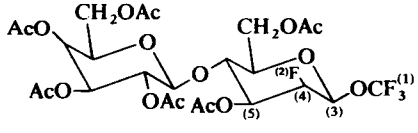
4. *CF_3 group bonded to oxygen*

CF_3HO	$CF_3{\cdot}OH$	−54·5		(F-C) 256	12
$C_4F_{10}O_2$	$CF_3^{(1)}{\cdot}O{\cdot}CF_2^{(2)}{\cdot}CF_2{\cdot}OCF_3$	(1) −59·4	(2) −94·0	(1-2) 10	104
$C_4F_{12}O_2S$	$(CF_3^{(1)}O)_2S(CF_3^{(2)})_2$	(1) −73·6	(2) −56·2	(1-2) 7·2	107
$C_4F_{12}O_3S$	$(CF_3^{(1)}O)_2S(O)(CF_3^{(2)})_2$	(1) −74·1	(2) −67·4	(1-2) 9·6	107
$C_5F_3H_{11}O_3SSi$	$CF_3O{\cdot}SO_2{\cdot}CH_2{\cdot}Si(CH_3)_3$	−74·3			80
$C_6F_{14}O_3$	$CF_3^{(1)}{\cdot}O{\cdot}(CF_2^{(2)}{\cdot}CF_2^{(3)}{\cdot}O)_2{\cdot}CF_3$	(1) −59·3 (3) −91·8	(2) −93·8	(1-2) 9	104
$C_6F_{16}O_4S_2$		(1) −72·1	(2) −96·2	(1-2) 12·1	107
$C_7F_3HCl_4O$		−57·0		(1-2) 1·3	165
$C_7F_3HCl_4O$		−56·6			165
$C_7F_3H_2Cl_3O$		−59·2		(1-2) 1·3	165
$C_7F_3H_2Cl_3O$		−58·6		(1-2) 1·3	165

Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_7F_3H_3Cl_2O$		−58·7	(1-2)(1-3) 0·7	165
$C_7F_3H_3Cl_2O$		−58·8	(1-2) 1·3	165
$C_7F_3H_4ClO$		−58·8	(1-2) ~1	165
$C_7F_3H_4ClO$		−58·4	(1-2) 1·3	165
$C_7F_4H_{10}O$	$CF_3^{(1)}O{\cdot}CF^{(2)}H{\cdot}CO{\cdot}C(CH_3)_3$	(1) −61·5 (2) −137·5		134
$C_7F_4H_{10}O_2$		(1) −53·6 (2) −163·1	(1-2) 8·8 (2-3) 85·0	134
$C_8F_6H_2Br_2O_2$		−58·6	(1-2) 1·2	165
$C_8F_6H_2Br_2O_2$		−59·9		165

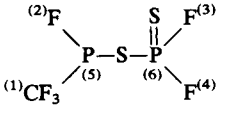
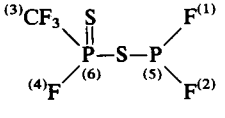
$C_8F_6H_2Br_2O_2$		−58·6		(1-2) 1·3		165
$C_8F_6H_2Cl_2O_2$		−58·9		(1-2) 1·4		165
$C_8F_6H_2Cl_2O_2$		−58·8				165
$C_8F_6H_2Cl_2O_2$		−59·2		(1-2) 1·2		165
$C_8F_6H_2Cl_2O_2$		(1) −58·6	(2) −56·6	(1-3) 1·2		165
$C_8F_8O_3$		(1) −69·5 (3) −161·9	(2) −153·9 (4) −156·1	(2-3) 15·6	(3-4) 20·7	429
$C_9F_3H_5O_2$		−61				495
$C_9F_3H_6NO$		−61				495

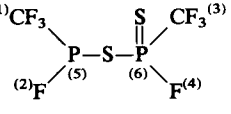
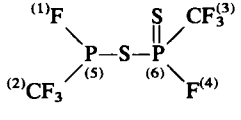
Molecular formula	Structure of compounds	Chemical shifts (ppm)		Coupling constants (Hz)		Ref.
$C_9F_4H_6O_2$		(1) −138	(2) −59	(1-3) 60	(1-4) 15	495
$C_9F_4H_6O_2$	As above with groups (2) and (4) interchanged	(1) −140	(2) −60	(1-3) 62 (1-2) 3·5	(1-4) 17	495
$C_9F_4H_6O_2$		(1) −60·2	(2) −135·5	(1-2) 4·9 (2-4) 0·9	(2-3) 56	134
$C_9F_4H_{12}O$		(1) −60·7	(2) −138·2	(1-2) 4·6 (2-4) 1·6	(2-3) 56	134
$C_9F_4H_{12}O$		(1) −54·8	(2) −163·0	(1-2) 3·9 (2-4) 1·7	(2-3) 84·0	134
$C_{10}F_3H_8NO$		−60				495
$C_{10}F_4H_8O$		(1) −60·0	(2) −137·5	(1-2) 4·9 (2-4) 1·5	(2-3) 56	134
$C_{11}F_4H_9NO_2$		(1) −139	(2) −59	(1-3) 70		495
$C_{11}F_4H_9NO_2$	As above with groups (2) and (4) interchanged	(1) −154	(2) −61	(1-3) 70		495

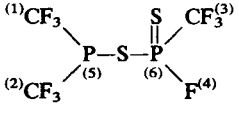
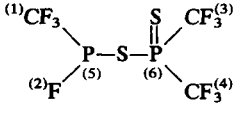
$C_{11}F_4H_{14}O_2$		[a] (1) −52·8 [b] (1) −53·7	(2) −113 (2) −115·4	(1-2) 9·4 (1-2) 9·5		134
$C_{12}F_{26}O_6$	$CF_3^{(1)}\cdot O\cdot(CF_2^{(2)}\cdot CF_2^{(3)}\cdot O)_5\cdot CF_3$	(1) −58·9 (3) −91·5	(2) −93·5	(1-2) 10		104
$C_{13}F_4H_{19}O_9$		(1) −74·8	(2) −238·1	(2-3) 50 (2-5) 32	(2-4) 18	260
$C_{14}F_{30}O_7$	$CF_3^{(1)}\cdot O\cdot(CF_2^{(2)}\cdot CF_2^{(3)}\cdot O)_6\cdot CF_3$	(1) −59·0 (3) −91·4	(2) −93·6	(1-2) 9		104
$C_{25}F_4H_{32}O_{16}$		(1) −59·5	(2) −219·9	(2-3) 16 (2-5) 27	(2-4) 51	260
$C_{25}F_4H_{32}O_{16}$	As above with OCF_3 axial and F equatorial	(1) −58·9	(2) −202·0	(2-3) 12	(2-4) 48	260

5. CF_3 group bonded to phosphorus

CF_3Br_2P	$CF_3\cdot PBr_2$	−67·0		(F-C) 323·6	(P-F) 67·9	6
CF_3Br_4P	$CF_3\cdot PBr_4$	−66·8		(P-F) 142		8
CF_3Cl_2P	$CF_3\cdot PCl_2$	−72·8		(F-C) 323·0	(P-F) 79·5	6
CF_3Cl_4P	$CF_3\cdot PCl_4$			(P-F) 151		8
CF_3I_2P	$CF_3\cdot PI_2$	−57·9		(F-C) 324·5	(P-F) 48·4	6
CF_4HPS_2	$(CF_3^{(1)})F^{(2)}PS_2H$	(1) −75·0	(2) −54·1	(1-2) 3·1 (P-2) 1169	(P-1) 132	14

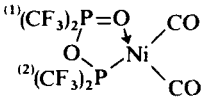
Molecular formula	Structure of compounds	Chemical shifts (ppm)		Coupling constants (Hz)		Ref.
CF_5Cl_2P	$CF_3^{(1)}\cdot PF_2Cl_2$			(P-1) 155		8
CF_5P	$CF_3^{(1)}\cdot PF_2^{(2)}$	(1) −84·3	(2) −106·7	(1-2) 5·92 (2-C) 21·8 (P-2) 1240	(1-C) 318·4 (P-1) 88·4	6
$CF_6P_2S_2$		(1) −64·1 (3) −16·1	(2) −167·1 (4) −18·0	(1-2) 4·2 (1-5) 72·6 (2-4) 1·3 (2-6) 1·2 (3-5) 0·5 (4-5) 16·3	(1-4) 1·3 (2-3) 8·8 (2-5) 1154·0 (3-4) 82·5 (3-6) 1224·0 (4-6) 1203·0	14
$CF_6P_2S_2$		(1) −59·3 (3) −80·1	(2) −63·7 (4) −56·3	(1-2) 92·5 (1-5) 1370·0 (2-4) 7·0 (2-6) 23·0 (3-6) 136·0 (4-6) 1174·0	(1-4) 6·0 (1-6) 9·0 (2-5) 1291·0 (3-4) 2·6 (4-5) 22·0	14
CF_7P	$CF_3^{(1)}\cdot PF_4$			(P-1) 170		8
$C_2F_3H_3ClOP$	$CF_3\cdot PCl\cdot OCH_3$	−72·3		(P-F) 73·3		6
$C_2F_3H_3IOP$	$CF_3^{(1)}\cdot PI\cdot OCH_3^{(2)}$	−65·5		(1-2) 0·8	(P-1) 61·9	6
$C_2F_3H_4OP$	$CF_3^{(1)}\cdot PH^{(2)}\cdot OCH_3^{(3)}$	−61·4		(1-2) 12·0 (P-1) 60·3	(1-3) 1·1	6
$C_2F_4H_3OP$	$CF_3^{(1)}\cdot PF^{(2)}\cdot OCH_3^{(3)}$	(1) −78·1	(2) −119·4	(1-2) 5·17 (2-3) 1·9 (P-2) 1138	(1-3) 0·76 (P-1) 82·6	6
C_2F_6HP	$(CF_3^{(1)})_2PH^{(2)}$	−48·9		(1-2) 10	(P-1) 70	6
C_2F_6BrP	$(CF_3)_2PBr$	−59·8		(P-F) 80·7		6
$C_2F_6Br_3P$	$(CF_3)_2PBr_3$	−81·4		(P-F) 182		8
C_2F_6ClOP	$(CF_3)_2P(O)Cl$	−72·3		(P-F) 129·8		44

C_2F_6ClP	$(CF_3)_2PCl$	−63·3		(P-F) 85·1		44, 6
$C_2F_6Cl_3P$	$(CF_3)_2PCl_3$			(P-F) 190		8
C_2F_6IP	$(CF_3)_2PI$	−55·0		(P-F) 72		6
$C_2F_7Br_2P$	$(CF_3^{(1)})_2PF^{(2)}Br_2$	(1) −78·6	(2) −101·5	(P-1) 179 (1-2) 13·0	(P-2) 1255	8
$C_2F_7Cl_2P$	$(CF_3^{(1)})_2PFCl_2$			(P-1) 183		8
C_2F_7P	$(CF_3^{(1)})_2PF^{(2)}$	(1) −68·3	(2) −221·6	(1-2) 3·4 (P-2) 1002	(P-1) 89·9	6
$C_2F_8P_2S_2$		(1) −63·6 (3) −74·1	(2) −164·8 (4) −59·1	(1-2) 5·0 (2-3) 1·2 (2-6) 5 (3-5) 5·2 (4-6) 1165	(1-5) 74 (2-5) 1156 (3-4) 2·8 (3-6) 134	14
$C_2F_8P_2S_2$		(1) −166·4 (3) −74·5	(2) −63·6 (4) −58·9	(1-2) 4·3 (1-5) 1148 (2-5) 75 (3-5) 2·8 (4-6) 1180	(1-3) <0·5 (1-6) 4 (3-4) 2·8 (3-6) 134	14
C_2F_9P	$(CF_3^{(1)})_2PF_3$			(P-1) 176		8
$C_3F_3H_6O_2P$	$(CF_3^{(1)}\cdot P(OCH_3^{(2)})_2$	−74·0		(1-2) 0·7	(P-1) 80·4	6
$C_3F_3H_6PS_2$	$CF_3^{(1)}\cdot P(SCH_3^{(2)})_2$	−59·0		(1-2) 0·74	(P-1) 65·8	6
$C_3F_3H_8NPS_2^-$	$(CH_3)_2NH_2^+ F^{(2)}(CF_3^{(1)})PS_2^-$	(1) −77·8	(2) −37·4	(1-2) 1 (P-2) 1071	(P-1) 103	14
$C_3F_5H_8NP$	$CF_3^{(1)}\cdot PF_2^{(2)}(NH\cdot CH_3)_2$	(1) −70·9	(2) −66·9	(1-2) 14·7 (P-2) 870	(P-1) 148	71
$C_3F_6H_3OP$	$(CF_3^{(1)})_2POCH_3^{(2)}$	−66·3		(1-2) 0·4	(P-1) 85·8	6
$C_3F_6H_3PS$	$(CF_3^{(1)})_2PSCH_3^{(2)}$	−57·8		(1-2) 0·5	(P-1) 79	6

Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_3F_6H_6NP$	$CF_3^{(1)}\cdot PF_3^{(2)}\cdot N(CH_3)_2$	(1) −71·2 (2a) −55·5 (2e) −71·2	(1-2a) 17·5 (2a-2e) 76 (P-1) 165 (P-2a) 883 (P-2e) 995	71
$C_6F_6H_6NP$	$CF_3^{(1)}\cdot PF_3^{(2)}\cdot NH\cdot CH_2\cdot CH_3$	(1) −69·9 (2a) −64·5, −56·1 (2e) −74·8	(1-2a) 16·0 (2a-2e) 70 (P-1) 166 (P-2a) 860, 815 (P-2e) 1000	71
$C_3F_8H_4NP$	$(CF_3^{(1)})_2PF_2^{(2)}\cdot NH\cdot CH_3$	(1) −70·7 (2) −67·3	(1-2) 16·5 (P-1) 157 (P-2) 849	71
$C_3F_9Br_2P$	$(CF_3)_3PBr_2$	−65·6	(P-F) 127	8
$C_3F_9Cl_2P$	$(CF_3)_3PCl_2$		(P-F) 139	8
C_3F_9P	$(CF_3)_3P$	−50·7	(P-F) 85·7	6
$C_3F_{10}P_2S_2$		(1) −54·2 (2) −54·5 (3) −74·0 (4) −59·2	(1-5) 78·5 (1-2) 9·0 (1-4) 1·2 (3-5) 7·0 (3-6) 134·5 (4-5) 10·5 (4-6) 1173·4	14
$C_3F_{10}P_2S_2$		(1) −62·0 (2) −164·7 (3) −68·5 (4) −68·7	(1-2) 3·4 (1-5) 77·8 (2-3) 1·4 (2-5) 1161·2 (2-6) 3·8 (3-4) 7·2 (3-5) 6·0 (3-6) 112·5 (4-5) 2·5	14
$C_3F_{11}P$	$(CF_3^{(1)})_3PF_2$		(P-1) 167	8
$C_4F_6H_4ClOP$	$(CF_3)_2P\cdot O\cdot CH_2\cdot CH_2Cl$	−64·6	(P-F) 86	90
$C_4F_6H_6ClP$	$(CF_3)_2P(CH_3)_2Cl$		(P-F) 79	8
$C_4F_8H_6NP$	$(CF_3^{(1)})_2PF_2^{(2)}\cdot N(CH_3)_2$	(1) −69·5 (2) −59·9	(1-2) 17·5 (P-1) 158 (P-2) 880	71
$C_4F_9H_3ClP$	$(CF_3^{(1)})_3P(CH_3^{(3)})Cl$	−63·3	(P-F) 101 (1-2) 0·8	8,102, 103

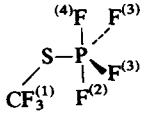
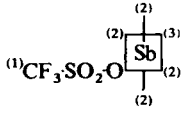
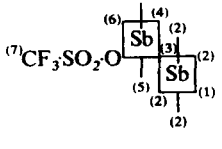
$C_4F_{10}H_3OP$	$(CF_3^{(1)})_2PCF_3^{(2)}(F^{(3)})(OCH_3^{(4)})$	(1) −63·0(eq) (2) −67·0(ax) (3) −51·4	(1-2) 12·0 (1,2-4) 1·2 (P-2) 72·0	(1,2-3) 15·5 (P-1) 133·0 (P-3) 909	106
$C_4F_{10}H_3P$	$(CF_3^{(1)(2)})_3PF^{(3)}\cdot CH_3^{(4)}$	(1) −59·7(eq) (2) −68·2(ax) (3) −13·3	(1-2) 12·5 (P-1) 135·5 (3-4) 8·7	(1-3) 12·5 (P-3) 843 (P-2) 35	102, 8, 103
$C_4F_{10}H_3PS$	$(CF_3^{(1)})_2PCF_3^{(2)}(F^{(3)})(SCH_3)$	(1)(2) −60·3(eq), −59·9(ax)	(1-2) 13·0 (P-eq) 134·0	(P-3) 973 (P-ax) 33·8	106
$C_4F_{12}H_2BP_2^-$	$[(CF_3)_2P]_2BH_2^-$	−52·7			108
$C_4F_{12}H_8B_3P_2^-$	$[(CF_3)_2PBH_3]_2BH_2^-$	−62·8	(P-F) 58·5		108
$C_4F_{12}OP_2$	$[(CF_3)_2P]_2O$	−66·5			44
$C_4F_{12}O_2P_2$	$(CF_3^{(1)})_2P\cdot O\cdot P(O)(CF_3^{(2)})_2$	(1) −65·6 (2) −72·5	(P-1) 93·1	(P-2) 131·9	44
$C_4F_{12}O_3P_2$	$[(CF_3)_2PO]_2O$	−72·03	(P-F) 137·5		44
$C_4F_{12}P_2$	$(CF_3)_4P_2$	−47			44
$C_5F_5H_{12}N_2P$	$CF_3^{(1)}\cdot PF_2^{(2)}[N(CH_3)_2]_2$	(1) −69·5 (2) −59·5	(1-2) 16·5 (P-2) 770	(P-1) 146	71
$C_5F_5H_{12}N_2P$	$CF_3^{(1)}\cdot PF_2^{(2)}\cdot N(CH_3)_2\cdot NH\cdot CH_2\cdot CH_3$	(1) −71·6 (2) −71·5, −59·9	(1-2) 14·7 (P-2) 710, 697	(P-1) 148	71
$C_5F_6H_9P$	$(CF_3)_2P(CH_3)_3$		(P-F) 6·3		8
$C_5F_6H_{10}NP$	$CF_3^{(1)}\cdot PF_3^{(2)}\cdot N(CH_2\cdot CH_3)_2$	(1) −69·9 (2ax) −57·9 (2eq) −69·9	(1-2ax) 16·0 (P-1) 166 (P-2eq) 1004	(2ax-2eq) 72 (P-2ax) 897	71
$C_5F_6H_{10}NP$	$CF_3^{(1)}\cdot PF_3^{(2)}\cdot NH\cdot iC_4H_9$	(1) −69·3 (2ax) −64·5, −56·2 (2eq) −74·4	(1-2ax) 16·7 (P-1) 164 (P-2eq) 1000	(2ax-2eq) 72 (P-2ax) 860, 820	71
$C_5F_6H_{11}BNP$	$(CF_3)_2P\cdot BH_2\cdot N(CH_3)_3$	−52·0	(P-F) 63		108
$C_5F_6H_{11}BP_2$	$(CF_3)_2P\cdot BH_2\cdot P(CH_3)_3$	−52·9	(P-F) 63		108

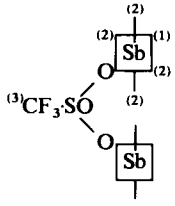
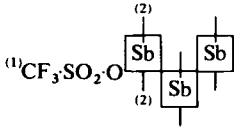
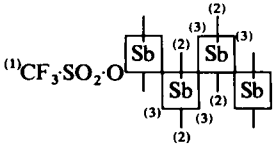
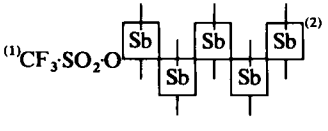
Molecular formula	Structure of compounds		Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_5F_6H_{14}B_2NP$	$(CH_3)_3N{\cdot}BH_2{\cdot}P(CF_3)_2{\cdot}BH_3$		−61·8	(P-F) 58	108
$C_5F_6H_{14}B_2P_2$	$(CH_3)_3P{\cdot}BH_2{\cdot}P(CF_3)_2{\cdot}BH_3$		−63·0	(P-F) 60	108
$C_5F_9H_3NP$	$(CF_3)_3P(CH_3)CN$			(P-F) 69	8
$C_5F_9H_6ClNP$	$(CF_3^{(1)})_3{\cdot}PCl{\cdot}N(CH_3^{(2)})_2$	(30°C)	−59·0	(P-1e) 130 (P-1a) 53 (1-2) 0·7 (P-1) 107·0	8 106
$C_5F_9H_6OP$	$(CF_3^{(1)(2)})_3P(CH_3)OCH_3$	(−40°C)	(1) −60·0(e) (2) −66·9(a)	(P-1) 108·5 (P-2) 62	102, 8, 103
$C_5F_9H_6O_2P$	$(CF_3^{(1)})_2P(CF_3^{(2)})(OCH_3^{(3)})_2$	(−80°C)	(1) −63·6(a) (2) −61·7(e)	(1-2) 13·5 (P-1) 88 (P-2) 108·0 (1,2-3) 0·8	106
$C_5F_9H_6P$	$(CF_3)_3P(CH_3)_2$			(P-Fe) 114 (P-Fa) 23·5	8, 103
$C_5F_9H_6PS$	$(CF_3^{(1)(2)})_3P(CH_3)(SCH_3)$	(−10°C)	(1) −58·9(e) (2) −63·5(a)	(P-1) 106·0 (P-2) 33·5	102, 8, 103
$C_5F_{10}H_6NP$	$(CF_3^{(1)})_2P(CF_3^{(2)})(F^{(3)})N(CH_3)_2$	(−40°C)	(1) −62·3(e) (2) −59·6(a) (3) −32·3	(1-2) 16·0 (1,2-3) 16·0 (P-1) 130·0 (P-2) 54·0 (P-3) 849	106
$C_6F_6H_4ClCoNO_4P$	$Co(CO)_2NO{\cdot}P(CF_3)_2(O{\cdot}CH_2{\cdot}CH_2Cl)$		−68·6	(P-F) 95	90
$C_6F_6H_{10}NP$	$CF_3^{(1)}{\cdot}PF_3^{(2)}{\cdot}N{\cdot}(CH_2)_4{\cdot}CH_2$		(1) −68·5 (2a) −57·9 (2e) −69·9	(1-2a) 14·0 (2a-2e) 70 (P-1) 166 (P-2a) 910 (P-2e) 1050	71
$C_6F_8H_{10}NP$	$(CF_3^{(1)})_2{\cdot}PF_2^{(2)}{\cdot}N(CH_2{\cdot}CH_3)_2$		(1) −69·3 (2) −65·9	(1-2) 17·0 (P-1) 156 (P-2) 870	71
$C_6F_9H_9NP$	$(CF_3^{(1)(2)})_3P(CH_3^{(3)})N(CH_3^{(4)})_2$		(1) −57·6(e) (2) −65·3(a)	(1-3)(2-3) 1·0 (1-4)(2-4) 1·1 (P-1) 110·0 (P-2) 36·5	102 103, 8
$C_6F_{10}H_9OPSi$	$(CF_3^{(1)})_3P(F^{(2)})OSi(CH_3)_3$		(1) −66·7 (2) −45·5	(1-2) 13·5 (P-1) 120·5 (P-2) 979	106

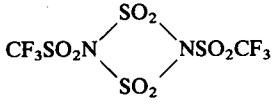
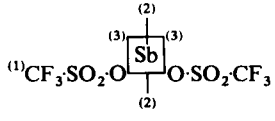
$C_6F_{12}NiO_4P$		(1) −72·6	(2) −70·0	(P-1) 130·6	(P-2) 101·3	44
$C_6F_{18}H_4B_2P_3$	$[(CF_3^{(1)})_2P^{(3)}BH_2P^{(4)}(CF_3^{(2)})_2BH_2P(CF_3)_2]^-$	(1) −53·3	(2) −60·0	(P3-1) 64·5 (P4-2) 57·0	(P3-2) 11·0	108
$C_6F_{18}H_{10}B_4P_3$	$[(CF_3^{(1)})_2P^{(3)}(BH_3)BH_2]_2P^{(4)}(CF_3^{(2)})_2^-$	(1) −62·5	(2) −59·2	(P3-1) 59	(P4-2) 67	108
$C_7F_5H_{16}N_2P$	$CF_3^{(1)}\cdot PF_2^{(2)}\cdot N(CH_3)_2NH\cdot iC_4H_9$	(1) −69·9	(2) −68·9, −58·5	(1-2) 14·7 (P-2) 720, 697	(P-1) 149	71
$C_7F_6MnO_5P$	$(CF_3)_2PMn(CO)_5$	−44·0		(P-F) 57·4		135
$C_7F_6O_5PRe$	$(CF_3)_2PRe(CO)_5$	−44·7		(P-F) 59·6		135
$C_7F_9H_{12}N_2P$	$(CF_3^{(1)})_2PCF_3^{(2)}[N(CH_3)_2]_2$	(1) −57·0(a)	(2) −55·6(e)	(P-1) 50·8	(P-2) 107·0	106
$C_7F_{12}H_{13}B_2P_3$	$(CF_3^{(1)})_2P^{(3)}BH_2P^{(4)}(CF_3^{(2)})_2BH_2P(CH_3)_3$	(1) −53·5	(2) −60·0	(P3-1) 66·0 (P4-2) 66·0	(P3-2) 13·4	108
$C_8F_5H_{16}N_2P$	$CF_3^{(1)}\cdot PF_2^{(2)}\cdot\overline{N\cdot(CH_2)_4\cdot CH_2}\cdot NH\cdot CH_2\cdot CH_3$	(1) −70·4	(2)−69·9, −58·7	(1-2) 14·5 (P-2) 725, 695	(P-1) 148	71
$C_8F_6H_4Cl_2MnO_5P$	$[MnCl(CO)_4L]$ $L = (CF_3)_2P\cdot OCH_2\cdot CH_2Cl$	−62·7 (*trans*) −63·6 (*cis*)		(P-F) 80 (P-F) 83		90
$C_8F_6H_5ClMnO_5P$	$[MnH(CO)_4L]$	−66·6(*trans*) −66·3(*cis*)		(P-F) 85 (P-F) 86		90
$C_9F_5H_{20}N_2P$	$CF_3^{(1)}\cdot PF_2^{(2)}[N(CH_2\cdot CH_3)_2]_2$	(1) −70·2	(2) −59·9	(1-2) 15·3 (P-2) 780	(P-1) 147	71
$C_9F_6H_9AsMnO_4P$	*cis*-$(CF_3)_2P\cdot Mn(CO)_4As(CH_3)_3$	−43·7		(P-F) 57·4		135
$C_9F_6H_9MnO_4P_2$	As above with As replaced by P	−44·0		(P-F) 55·8		135
$C_{10}F_6H_{13}Cl_2MnNO_4P$	$[MnCl(CO)_3N(CH_3)_3L]$ $L = (CF_3)_2P\cdot OCH_2\cdot CH_2Cl$	−65·2 −68·9		(P-F) 96 (P-F) 81		90
$C_{10}F_6BrO_8PRe_2$	$Re_2(CO)_8P(CF_3)_2Br$	−53·0		(P-F) 63·2		225
$C_{10}F_6ClO_8PRe_2$	As above with Br replaced by Cl	−52·6		(P-F) 65·0		225

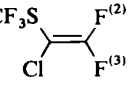
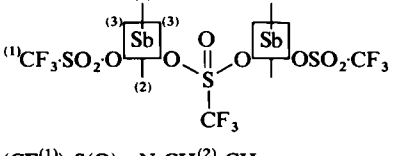
Molecular formula	Structure of compounds	Chemical shifts (ppm)		Coupling constants (Hz)		Ref.
$C_{12}F_{12}A_5O_8PRe_2$	$Re_2(CO)_8As(CF_3^{(2)})_2P(CF_3^{(1)})_2$	(1) −54·0	(2) −48·7	(P-1) 64·3	(P-2) 1·5	225
$C_{13}F_3H_{10}Hg_2P^{2+}$	$[Hg—Hg—P(CF_3)(C_6H_5)_2]^{2+}$	−53·7		(P-F) 93 ^4J(Hg-F) 46	^3J(Hg-F) 94	258
$C_{13}F_3H_{10}P$	$CF_3{\cdot}P(C_6H_5)_2$	−54·6		(P-F) 73		258
$C_{26}F_6H_{20}HgP_2^{2+}$	$[CF_3P(C_6H_5)_2HgP(CF_3)(C_6H_5)_2]^{2+}$	−53·3		^2J(P-F) 77	^4J(P-F) 18	258

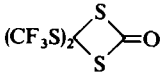
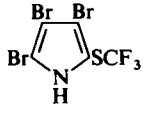
6. *CF_3 group bonded to sulphur*

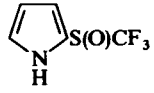
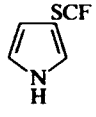
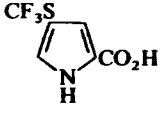
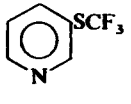
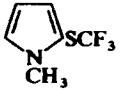
CF_3ClS	$CF_3{\cdot}SCl$	−49·4				10
$CF_3N_5O_4S_6$	$CF_3{\cdot}SO_2{\cdot}NSO_2{\cdot}S_4N_4$	−79·2				11
CF_7PS		(1) −37·4 (3) −61·4	(2) −14·2 (4) −5·4	(P-1) 22 (P-3) 1057 (1-2) 22 (1-4) 22 (2-4) 22	(P-2) 923 (P-4) 1058 (1-3) 0 (2-3) 99 (3-4) 116	15
CF_8OSSb^-		(1) −69·9 (3) −135·4	(2) −100·9	(2-3) 101		19
$CF_{13}O_3SSb_2^-$		(1) −140·4 (3) −80·2 (5) −90·9 (7) −68·6	(2) −109·4 (4) −127·7 (6) −114·9	(2-3) 52 (3-5) 90 (4-5) 135 (1-2) 100	(3-4) 75 (4-6) 100 (5-6) 135	19

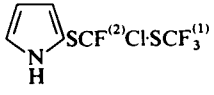
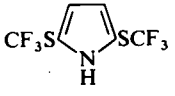
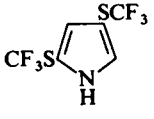
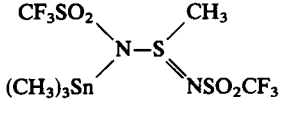
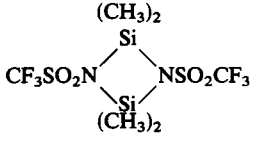
$CF_{13}O_3SSb_2^-$		(1) −131·4 (3) −70·9	(2) −103·1	(1-2) 102	19
$CF_{18}O_3SSb_3^-$		(1) −68·3	(2) −84·9		19
$CF_{23}O_3SSb_4^-$		(1) −67·9 (3) −122·6	(2) −102·4		19
$CF_{28}O_3SSb_5^-$		(1) −67·8	(2) −140·2		19
$C_2F_3H_2NOS$	$CF_3{\cdot}S{\cdot}C(O)NH_2$	−47			28
$C_2F_3H_3OS$	$CF_3^{(1)}{\cdot}S(O)CH_3^{(2)}$	−78·3		(1-2) 1·0	36
$C_2F_3H_3S_2$	$CF_3^{(1)}{\cdot}SS{\cdot}CH_3^{(2)}$	−47·4		(1-2) 0·6	10
C_2F_3BrOS	$CF_3{\cdot}S{\cdot}C(O)Br$	−43·0			28
$C_2F_3ClS_2$	$CF_3{\cdot}S{\cdot}C(S)Cl$	−47·7			29
$C_2F_3Cl_3S_2$	$CF_3{\cdot}S{\cdot}CCl_2{\cdot}SCl$	−42·0			29
$C_2F_4N_2S$	$CF_3^{(1)}{\cdot}SF^{(2)}{=}N{\cdot}CN$	(1) −70·0	(2) −35·2	(1-2) 2·3	38

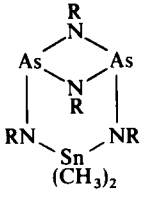
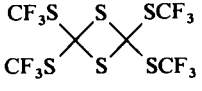
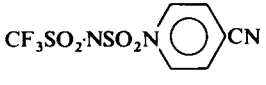
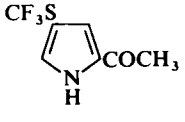
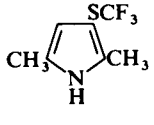
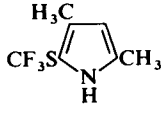
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_2F_5H_3OS$	$CF_3^{(1)}\cdot SF_2^{(2)(3)}\cdot OCH_3$	(1) −69·28 (2) +51·54 (3) +50·87	(1-2) 23·96 (1-3) 21·04	40
$C_2F_5H_3OS$	$CF_3^{(1)}(CH_3^{(3)})\cdot S(O)F_2^{(2)}$	(1) −69·94 (2) +24·67	(1-2) 21·6 (2-3) 1·2	40
C_2F_6HNS	$(CF_3)_2S{=}NH$	−68·4		48
$C_2F_6H_2BNS_2$	$(CF_3S)_2NBH_2$	−52·5		41
$C_2F_6BBr_2NS_2$	$(CF_3S)_2NBBr_2$	−51·8		41
$C_2F_6BCl_2NS_2$	$(CF_3S)_2NBCl_2$	−52·1		41
$C_2F_6ClNO_2S$	$(CF_3)_2S{=}NSO_2Cl$	−57·8		43
$C_2F_6N_2O_8S_4$		−73·6		11
$C_2F_6OS_2$	$CF_3^{(1)}\cdot S(O)S\cdot CF_3^{(2)}$	(1) −69·5 (2) −34·2	(1-2) 1·5 ^1J(1-C) 336·9 ^1J(2-C) 311·3	46
$C_2F_6S_2$	$(CF_3S)_2$	−46·6	^1J(F-C) 313·7	46, 2
$C_2F_6S_3$	$CF_3\cdot S\cdot S\cdot S\cdot CF_3$	−47·7		47(a)
$C_2F_6S_4$	$CF_3\cdot S\cdot S\cdot S\cdot S\cdot CF_3$	−45·9		47(a)
$C_2F_8BNS_2$	$(CF_3^{(1)}S)_2NBF_2^{(2)}$	(1) −52·9 (2) −113·4	(1-2) 2·22	41
C_2F_8NOPS	$(CF_3^{(1)})_2S{=}NP(O)F_2^{(2)}$	(1) −62·4 (2) −70·2	(P-2) 988	43
$C_2F_{10}O_6S_2Sb^-$		(1) −68·8 (2) −78·8 (3) −114·4	(2-3) 130	19
$C_3F_3H_6NOS$	$CF_3\cdot S\cdot NH\cdot CH_2\cdot CH_2\cdot OH$	−52·97		65
C_3F_3NOS	$CF_3\cdot S\cdot CO\cdot CN$	−44·6		28

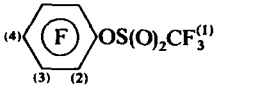
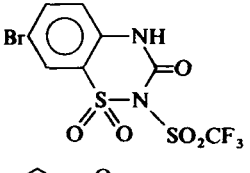
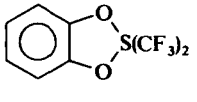
$C_3F_3NOS_2$	$CF_3{\cdot}S{\cdot}CO{\cdot}NCS$		−41·8				28
$C_3F_3NO_2S$	$CF_3{\cdot}S{\cdot}CO{\cdot}NCO$		−46·3				28
$C_3F_4O_2S_2$	$CF_3^{(1)}{\cdot}SS{\cdot}CO{\cdot}CO{\cdot}F^{(2)}$		(1) −45·1	(2) +16·3			66
$C_3F_5H_6NS$	$CF_3^{(1)}{\cdot}SF_2^{(2)}{\cdot}N(CH_3)_2$		(1) −63·94	(2) −1·84	(1-2) 12·4		40
C_3F_5ClS			(1) −43·32 (3) −67·05	(2) −72·54	(1-2) 3	(1-3) 2·6	70
$C_3F_6H_3NS$	$(CF_3^{(1)})_2S{=}NCH_3^{(2)}$		−58·0		(1-2) 2·26		48
$C_3F_6N_2S$	$(CF_3)_2S{=}N{\cdot}CN$		−57·6				43
C_3F_6OSSe	$CF_3^{(1)}S{\cdot}CO{\cdot}SeCF_3^{(2)}$		(1) −39·1	(2) −31·8			28
$C_3F_6OS_2$	$CF_3^{(1)}{\cdot}SS{\cdot}CO{\cdot}CF_3$		(1) −44·7				66
$C_3F_6OS_4$	$CF_3{\cdot}SS{\cdot}CO{\cdot}SS{\cdot}CF_3$		−46·4				66
$C_3F_7H_2NS_3$	$(CF_3^{(1)}S)_2CF^{(2)}{\cdot}S{\cdot}NH_2$		(1) −37·1	(2) −96·4	(1-2) 9·3		29
$C_3F_7ClS_2$	$(CF_3^{(1)}S)_2CF^{(2)}Cl$		(1) −39·5	(2) −30·0	(1-2) 9·3		29
$C_3F_7ClS_3$	$(CF_3^{(1)}S)_2CF^{(2)}{\cdot}SCl$		(1) −37·46	(2) −91·9	(1-2) 9·3		29
$C_3F_9BClNS_3$	$(CF_3^{(1)}S)_2NBCl(SCF_3^{(2)})$		(1) −51·6	(2) −35·5			41
$C_3F_9NO_2S_2$	$(CF_3)_2S{=}NSO_2CF_3$		−58·3, −76·2				43
$C_3F_9NS_3$	$(CF_3S)_3N$	(−96·1°C)	−51·7, −53·3 (ratio 2:1)				77
$C_3F_{10}BNS_3$	$(CF_3^{(1)}S)_2NBF^{(3)}(SCF_3^{(2)})$		(1) −52·0 (3) −66·6	(2) −33·3	(1-3) 2·25	(2-3) 9·95	41
$C_3F_{17}O_9S_3Sb_2^-$			(1) −68·4 (3) −118·4	(2) −79·9	(2-3) 125		19
$C_4F_6H_5NOS$	$(CF_3^{(1)})_2S(O){=}N{\cdot}CH_2^{(2)}{\cdot}CH_3$		−73·1		(1-2) 0·77		48

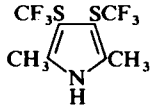
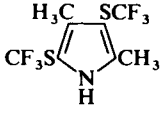
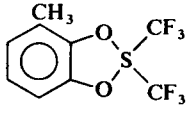
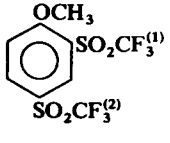
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_4F_6H_5NS$	$(CF_3^{(1)})_2S{=}N{\cdot}C\,H_2^{(2)}{\cdot}CH_3$	−58·7	(1-2) 2·14	48
$C_4F_6H_6BNS_2$	$(CF_3S)_2N{\cdot}B(CH_3)_2$	−53·1		41
$C_4F_6OS_4$		−44·7		89
$C_4F_6O_2S_4$	$(CF_3{\cdot}SS{\cdot}C(O))_2$	−44·3		66
$C_4F_7NOS_3$	$(CF_3^{(1)}S)_2CF^{(2)}{\cdot}SOCN$	(1) −37·16 (2) −89·7	(1-2) 9·3	29
$C_4F_7NS_3$	$(CF_3^{(1)}S)_2CF^{(2)}{\cdot}SCN$	(1) −37·6 (2) −77·1	(1-2) 9·3	29
$C_4F_7NS_3Se$	$(CF_3^{(1)}S)_2CF^{(2)}{\cdot}SSeCN$	(1) −37·6 (2) −84·8	(1-2) 9·3	29
$C_4F_7NS_4$	$(CF_3S)_2CF{\cdot}SSCN$	(1) −36·8 (2) −88·1	(1-2) 9·3	29
$C_4F_8S_2$	$(CF_3^{(1)}S)_2C{=}CF_2^{(2)}$	(1) −43·68 (2) −52·0	(1-2) 3·2	89
$C_4F_9ClS_4$	$(CF_3S)_3CSCl$	−37·6		29
C_4F_9NOS	$(CF_3)_2S{=}N{\cdot}CO{\cdot}CF_3$	−56·7, −74·7		43
$C_4F_{12}HBN_2S_4$	$[(CF_3^{(1)}S)_2N]_2BH^{(2)}$	−53·1	(1-2) 0·25	41
$C_4F_{12}BNS_4$	$(CF_3^{(1)}S)_2N{\cdot}B(SCF_3^{(2)})_2$	(1) −52·2 (2) −31·5	(1-2) 1·01	41
$C_4F_{12}N_2S_2$	$[(CF_3)_2S{=}N]_2$	−60·0		43
$C_4F_{13}BN_2S_4$	$[(CF_3^{(1)}S)_2N]_2BF^{(2)}$	(1) −52·5 (2) −87·2	(1-2) 1·35	41
$C_5F_3HBr_3NS$		−43·92		109
$C_5F_3HI_3NS$	As above with Br replaced by I	−44·25		109

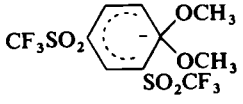
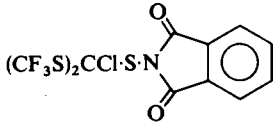
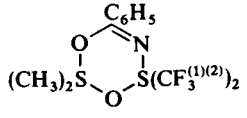
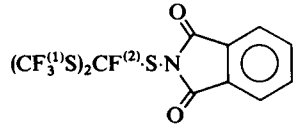
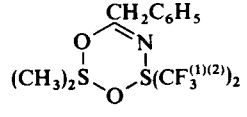
$C_5F_3H_4NOS$		−74·07		109
$C_5F_3H_4NOS$	As above with $S(O)CF_3$ replaced by SO_2CF_3	−79·21		109
$C_5F_3H_4NS$	As above with $S(O)CF_3$ replaced by SCF_3	−46·02		109
$C_5F_3H_4NS$		−46·35		109
$C_5F_3H_8NO_2S$	$CF_3S{\cdot}NH{\cdot}CH_2{\cdot}CO_2{\cdot}CH_2{\cdot}CH_3$	−54·27		65
$C_5F_3H_{10}NOS$	$CF_3S{\cdot}NH{\cdot}C(CH_3)_2{\cdot}CH_2{\cdot}OH$	−54·34		65
$C_5F_3H_{12}ClN_2OS$	$CF_3S(O)[N(CH_3)_2]_2Cl$	−80·6		118
$C_5F_3H_{12}ClN_2S$	$CF_3S[N(CH_3)_2]_2Cl$	−73·6		118
$C_5F_3H_{12}NO_2S$	$CF_3SO_2^-\,N(CH_3)_4^+$	−78·6		119
$C_5F_6H_7NOS$	$(CF_3^{(1)})_2S(O){=}NCH^{(2)}(CH_3)_2$	−73·5	(1-2) 0·93	48
$C_5F_6H_7NS$	$(CF_3^{(1)})_2S{=}NCH^{(2)}(CH_3)_2$	−59·8	(1-2) 0·62	48
$C_5F_6H_9NSSi$	$(CF_3)_2S{=}NSi(CH_3)_3$	−69·6		43
$C_6F_3H_4NO_2S$		−45·42		109
$C_6F_3H_4NS$		−43·05		136
$C_6F_3H_5N_2O_4S_2$	$CF_3{\cdot}SO_2{\cdot}NSO_2{\cdot}C_6H_5N$	−79·5		11
$C_6F_3H_6NS$		−46·09		109

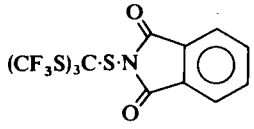
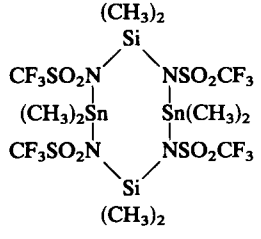
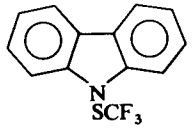
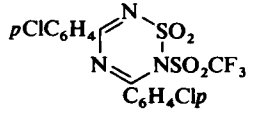
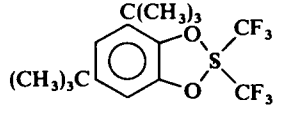
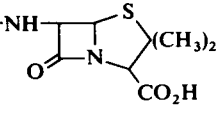
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_6F_3H_{10}Cl_2NS_2$	$CF_3S{\cdot}CCl_2{\cdot}SN(CH_2CH_3)_2$	−41·4		29
$C_6F_3MnO_5S$	$CF_3SMn(CO)_5$	−24·4		135
$C_6F_3O_5ReS$	$CF_3SRe(CO)_5$	−26·7		135
$C_6F_4H_4ClNS_2$		(1) −39·11 (2) −48·52	(1-2) 9·0	109
$C_6F_6H_3NS_2$		−44·82		109
$C_6F_6H_3NS_2$		−45·18, −45·85		109
$C_6F_6H_9N_2O_4S_3Sn$		−77·8		139
$C_6F_6H_{10}N_2S_2$	$[CF_3SN(CH_3)CH_2]_2$	−48·7		140
$C_6F_6H_{12}BBr_2N_2S_2$	$(CF_3S)_2NBBr_2^-N(CH_3)_4^+$	−48·0		41
$C_6F_6H_{12}BCl_2N_2S_2$	$(CF_3S)_2NBCl_2^-N(CH_3)_4^+$	−49·1		41
$C_6F_6H_{12}N_2O_4S_2Si_2$		−79·2		154

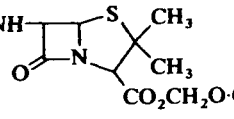
$C_6F_{10}O_2S_2$	$CF_3^{(1)}S{\cdot}S{\cdot}CO{\cdot}CF_2^{(2)}{\cdot}CF_2^{(3)}{\cdot}CF_2^{(4)}{\cdot}CO{\cdot}F^{(5)}$	(1) −44·7 (3) −122·2 (5) +23·95	(2) −114·7 (4) −117·3	(2-4) 11·2 (2-5) 6·8	(2-5) 1·8 (4-5) 8·4	66
$C_6F_{12}H_6As_2N_4O_8S_4Sn$	 $R = SO_2CF_3$	−79·1				154
$C_6F_{12}H_6N_2S_2Si$	$[(CF_3)_2S{=}N]_2Si(CH_3)_2$	−74·4				43
$C_6F_{12}S_6$		−39·7				89
$C_7F_3H_3S$	$CF_3S{\cdot}(CH_2)_5{\cdot}CH_3$	−42·4				36
$C_7F_3H_4N_3O_4S_2$		−79·3				11
$C_7F_3H_6NOS$		−45·76				109
$C_7F_3H_8NS$		−45·78				109
$C_7F_3H_8NS$		−46·08				109

Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_7F_3H_{13}OS$	$CF_3S(O)(CH_2)_5CH_3$	−74·9		36
$C_7F_3H_{18}NO_2SSi_2$	$CF_3SO_2{\cdot}N[Si(CH_3)_3]_2$	−76·7		154
$C_7F_3H_{18}NO_2SSn_2$	As above with Si replaced by Sn	−78·5		154
$C_7F_3H_{18}NSSi_2$	$CF_3SN[Si(CH_3)_3]_2$	−52·25		65
$C_7F_6H_3Br_2HgNS_2$	$Hg(SCF_3)_2{\cdot}3,5\text{-}Br_2C_6H_3N$	−21·60		136
$C_7F_6H_4BrHgNS_2$	$Hg(SCF_3)_2{\cdot}2\text{-}BrC_6H_4N$	−22·25		136
$C_7F_6H_4BrHgNS_2$	$Hg(SCF_3)_2{\cdot}3\text{-}BrC_6H_4N$	−22·38		136
$C_7F_6H_5BCl_2N_2S_2$	$(CF_3S)_2NB^-Cl_2\ N^+C_5H_5$	−51·0		41
$C_7F_6H_5HgNS_2$	$Hg(SCF_3)_2{\cdot}C_6H_5N$	−22·32		136
$C_7F_6H_{10}ClNS_3$	$(CF_3S)_2CCl{\cdot}SN(CH_2CH_3)_2$	−39·4		29
$C_7F_8O_3S$		(1) −73·4 (2) −151·2 (3) −161·0 (4) −154·1	(1-2) 6·6 (2-3) 16·5 (3-4) 20·5	419
$C_7F_{12}O_2S_4$	$[CF_3^{(1)}{\cdot}S{\cdot}S{\cdot}CO{\cdot}CF_2^{(2)}]_2CF_2^{(3)}$	(1) −46·0 (2) −119·2 (3) −133·5	(2-3) 10·0	66
$C_7F_{14}H_2N_2OS_6$	$[(CF_3^{(1)}S)_2CF^{(2)}S{\cdot}NH]_2CO$	(1) −37·2 (2) −88·8	(1-2) 9·3	29
$C_8F_3H_4BrN_2O_5S_2$		−73·6		11
$C_8F_6H_4O_2S$		−58·6		192

$C_8F_6H_7NS_2$		−45·33			109
$C_8F_6H_7NS_2$		−45·26, −45·49			109
$C_8F_9H_{10}NS_4$	$(CF_3S)_3C{\cdot}S{\cdot}N(CH_2CH_3)_2$	−37·8			29
$C_8F_{12}S_6$	$(CF_3^{(1)}S{\cdot}CS{\cdot}C(SCF_3^{(2)})=)_2$	(1) −62·4	(2) −40·7	^1J(1-C)(2-C) 313·32, 314·1	89
$C_9F_3H_6NS$		−45·07			109
$C_9F_3H_8NO_2S$	$CF_3S{\cdot}NH{\cdot}CH(C_6H_5){\cdot}CO_2H$	−53·94			65
$C_9F_3H_{10}NOS$	$CF_3S{\cdot}NH{\cdot}CH_2{\cdot}CH(OH){\cdot}C_6H_5$	−53·31			65
$C_9F_3H_{20}ClN_2OS$	$CF_3S(O)Cl[N(CH_2CH_3)_2]_2$	−81·5			118
$C_9F_3H_{20}ClN_2S$	$CF_3SCl[N(CH_2CH_3)_2]_2$	−77·6			118
$C_9F_6H_6O_2S$		−57·6			192
$C_9F_6H_6O_5S_2$		(1) −76·09	(2) −78·11		211(c)
$C_{10}F_3H_9N_2O_3S$	$CF_3SNH{\cdot}CO{\cdot}NH{\cdot}CH(C_6H_5){\cdot}CO_2H$	−52·89			65
$C_{10}F_3H_9N_2O_5S$	$CF_3SO_2NH{\cdot}CO{\cdot}NH{\cdot}CH(C_6H_5){\cdot}CO_2H$	−76·62			65

Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{10}F_6H_9NOS_2$	$CF_3S{\cdot}NH{\cdot}CH_2{\cdot}CH(C_6H_5){\cdot}OSCF_3$	−54·05, −53·06		65
$C_{10}F_6H_9O_6S_2^-$		−76·72, −79·31		211(c)
$C_{11}F_3H_{12}NO_2S$	$CF_3S{\cdot}NH{\cdot}CH(C_6H_5){\cdot}CO_2CH_2CH_3$	−54·27		65
$C_{11}F_6H_4ClNO_2S_3$		−39·4		29
$C_{11}F_6H_{11}NO_2S_2$		(1) −55·2 (2) −57·3	(1-2) 3·2	192
$C_{11}F_6H_{13}NO_4S_2$	As above with CH_3 replaced by OCH_3	(1) −55·9 (2) −57·6	(1-2) 3·3	192
$C_{11}F_7H_4NO_2S_3$		(1) −37·0 (2) −86·5	(1-2) 9·3	29
$C_{12}F_6H_{13}NO_2S_2$		(1) −56·8 (2) −58·9	(1-2) 3·1	192
$C_{12}F_6H_{13}NO_4S_2$	As above with CH_3 replaced by OCH_3	(1) −56·1 (2) −58·2	(1-2) 3·1	192

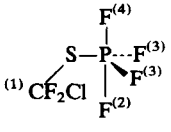
$C_{12}F_9H_4NO_2S_4$		−36·5	29
$C_{12}F_{12}H_{24}N_4O_8Si_2Sn_2$		−79·8	154
$C_{13}F_3H_8NS$		−50·32	109
$C_{14}F_6H_{36}N_2O_4S_4Sn_4$	$[CF_3SO_2N(Sn(CH_3)_3)_2S-]_2$	−75·0	154
$C_{15}F_3H_8Cl_2N_3O_4S_2$		−71·3	11
$C_{15}F_3H_{10}N_3O_4S_2$	As above with Cl replaced by H	−71·3	11
$C_{16}F_6H_{20}O_2S$		−58·1	192
$C_{18}F_3H_{19}N_4O_5S_2$		−53·20	65

Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{18}F_3H_{19}N_4O_7S_2$	As above with CF_3 replaced by CF_3SO_2	−76·22		65
$C_{23}F_3H_{28}N_3O_6S_2$		−52·90		65
$C_{24}F_3H_{29}N_4O_7S_2$	As above with $CF_3S{\cdot}NH$ replaced by $CF_3SNH{\cdot}CO{\cdot}NH$	−53·47		65
$C_{24}F_3H_{29}N_4O_9S_2$	As above with $CF_3S{\cdot}NH$ replaced by $CF_3SO_2NH{\cdot}CO{\cdot}NH$	−77·61		65
7. CF_3 group bonded to any other element				
CF_3Br_3Ge	$CF_3{\cdot}GeBr_3$	−65·2		7(a)
CF_3Br_3Sn	$CF_3{\cdot}SnBr_3$	−47·7	(Sn-F) 871/835	7(a)
CF_6Se	$CF_3^{(1)}{\cdot}SeF_2^{(2)}F^{(3)}$	(1) −65·08 (2) −21·93 (3) −59·66	(2-3) 94·4	16
CF_8Si_2	$CF_3^{(1)}{\cdot}SiF_2^{(2)}{\cdot}Si_3^{(3)}$	(1) −69·8 (2) −142·4 (3) −123·3	(1-2) +6·09 (1-3) +1·91 (2-3) +13·27	21
$CF_{15}CoP_4$	$CF_3^{(1)}{\cdot}Co(PF_3^{(2)})_4$	(1) +17·71 (2) −13·79	(1-2) 6 (P-1) 46 (P-2) 1319	22
$C_2F_3H_3Hg$	$CF_3^{(1)}{\cdot}Hg{\cdot}CH_3^{(2)}$	−36·3	(1-2) 0·45 (Hg-1) 940	34(a)
$C_2F_6Br_2Ge$	$(CF_3)_2GeBr_2$	−59·4		7(a)
$C_2F_6Br_2Sn$	$(CF_3)_2SnBr_2$	−43·8		7(a)
C_2F_6Hg	$(CF_3)_2Hg$	−40·8	(Hg-F) 1251	45(a)
$C_2F_{12}CoOP_3$	$CF_3Co(PF_3)_3CO$	(1) +15·27 (2) −16·58	(1-2) 4 (P-1) 41 (P-2) 1395	22(c)
C_3F_9HGeO	$(CF_3)_3GeOH$	−56·9		45

C_3F_9BrGe	$(CF_3)_3GeBr$	−55·4				7(a)
$C_3F_9CoO_2P_2$	$CF_3^{(1)}Co(PF_3^{(2)})_2(CO)_2$	(1) +12·89	(2) −16·83	(P-1) 47	(P-2) 1337	22(c)
$C_4F_3H_9Pb$	$CF_3{\cdot}Pb(CH_3)_3$	−42·9		(Pb-F) 240·6		34(a)
$C_4F_3H_9Sn$	$CF_3{\cdot}Sn(CH_3)_3$	−49·3		(^{119}Sn-F) 270		34(a)
$C_4F_6H_6Ge$	$CF_3^{(1)}{\cdot}Ge(CF_2^{(2)}H^{(4)})(CF^{(3)}H_2^{(5)})CH_3$	(1) −56·2 (3) −271·0	(2) −132·2	(1-2) ~3·1 (2-3) ~3·1 (3-5) 46·0	(1-3) ~3·1 (2-4) 46·0	45(a)
$C_4F_6H_6Pb$	$(CF_3)_2{\cdot}Pb(CH_3)_2$	−39·5		(Pb-F) 379		34(a)
$C_4F_6H_6Si$	$CF_3^{(1)}{\cdot}Si(CF_2^{(2)}H^{(4)})(CF^{(3)}H_2)CH_3$	(1) −61·97 (3) −279·69	(2) −139·65	(1-3) 3·0 (2-4) 45·0	(1-3) 3·0	45(a)
$C_4F_6H_6Sn$	$(CF_3)_2Sn(CH_3)_2$	−47·0		(^{119}Sn-F) 346·0 (^{117}Sn-F) 330·4		34(a)
$C_4F_7H_5Ge$	$CF_3^{(1)}{\cdot}Ge(CF_2^{(2)}H^{(3)})_2CH_3$	(1) −55·0	(2) −131·5	(1-2) 3·3	(2-3) 46·5	45(a)
$C_4F_7H_5Ge$	$CF_3^{(1)}{\cdot}Ge(CF_2^{(2)}H^{(4)})(CF^{(3)}H_2^{(5)})_2$	(1) −53·3 (3) −270·5	(2) −130·3	(1-2) ~3 (2-4) 45·5	(2-3) ~3 (3-5) 46·0	45(a)
$C_4F_8H_4Ge$	$(CF_3^{(1)})_2Ge(CF^{(2)}H_2^{(3)})_2$	(1) −53·7	(2) −271·5	(1-2) 3·4	(2-3) 47·0	45(a)
$C_4F_8H_4Ge$	$CF_3^{(1)}{\cdot}Ge(CF_2^{(2)}H^{(4)})_2CF^{(3)}H_2^{(5)}$	(1) −51·7 (3) −271·5	(2) −129·0	(1-2) ~3·0 (2-4) 45·6	(1-3) ~3·0 (3-5) 46·0	45(a), 92
$C_4F_9H_3Ge$	$CF_3^{(1)}{\cdot}Ge(CF_2^{(2)}H^{(3)})_3$	(1) −50·6	(2) −128·2	(1-2) 3·2	(2-3) 46·0	92, 45(a)
$C_4F_9H_3Ge$	$(CF_3^{(1)})_2Ge(CF_2^{(2)}H^{(4)})CF^{(3)}H_2^{(5)}$	(1) −52·2 (3) −271·7	(2) −129·1	(1-2)(1-3) 3·3 (2-3) 3·0 (2-4) 45·5	(3-5) 46·5	92, 45(a)
$C_4F_{10}H_2Ge$	$(CF_3^{(1)})_2Ge{\cdot}CFH_2$	(1) −52·7				45(a)
$C_4F_{10}H_2Ge$	$(CF_3^{(1)})_2Ge(CF_2^{(2)}H^{(3)})_2$	(1) −50·9	(2) −127·9	(1-2) 3·2	(2-3) 46·0	45(a), 92
$C_4F_{11}HGe$	$(CF_3^{(1)})_3Ge{\cdot}CF_2^{(2)}H^{(3)}$	(1) −51·30	(2) −127·5	(1-2) 3·0	(2-3) 45·5	45(a), 92
$C_4F_{12}Ge$	$(CF_3)_4Ge$	−50·9				7(a)

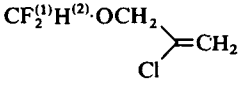
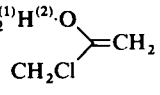
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_4F_{12}Ge$	$(CF_3)_4Ge$	−51·5		45(a), 92
$C_4F_{12}Sn$	$(CF_3)_4Sn$		(^{119}Sn−F) 531	34
$C_6F_3MnO_5Se$	$CF_3Se{\cdot}Mn(CO)_5$	−22·4		135
$C_6F_3O_5ReSe$	$CF_3Se{\cdot}Re(CO)_5$	−23·0		135
$C_7F_3H_5Hg$	$CF_3{\cdot}Hg{\cdot}C_6H_5$		(Hg-F) 1000	34
$C_7F_6AsMnO_5$	$(CF_3)_2As{\cdot}Mn(CO)_5$	−40·2		135
$C_7F_6AsO_5Re$	$(CF_3)_2As{\cdot}Re(CO)_5$	−40·5		135
$C_9F_6H_9AsMnO_4P$	*cis*-$(CF_3)_2As{\cdot}Mn(CO)_4P(CH_3)_2$	−40·2		135
$C_9F_6H_9AsO_4PRe$	*cis*-$(CF_3)_2As{\cdot}Re(CO)_4P(CH_3)_2$	−40·2		135
$C_{10}F_6AsBrMnO_8$	$Mn(CO)_8As(CF_3)_2Br$	−46·1		225
$C_{10}F_6AsBrO_8Re_2$	$Re_2(CO)_8As(CF_3)_2Br$	−48·5		225
$C_{10}F_6AsClMnO_8$	$Mn(CO)_8As(CF_3)_2Cl$	−45·6		225
$C_{18}F_3H_{22}BrIOP_2Rh$	$RhBrI(CF_3^{(1)})CO[P(CH_3^{(2)})_2C_6H_5]_2$	−1·28	(P-F) 17·8 (Rh-F) 14·5	279
$C_{18}F_3H_{22}BrIOP_2Rh$	As above		(P-F) +16·8 (Rh-F) −14·1 (1-2) ≤0·1, 0·2	280
$C_{18}F_3H_{22}ClIOP_2Rh$	As above with Br replaced by Cl	−3·63	(P-F) 18·0 (Rh-F) 14·5	279
$C_{18}F_3H_{22}ClIOP_2Rh$	As above with Br replaced by Cl		(P-F) +18·0 (Rh-F) −14·2 (1-2) ≤0·1, 0·2	280
$C_{18}F_3H_{22}Cl_2OP_2Rh$	As above with Br and I replaced by Cl	−1·75	(P-F) 17·6 (Rh-F) 14·0	279
$C_{18}F_3H_{22}I_2OP_2Rh$	As above with Br replaced by I		(P-F) +17·8 (Rh-F) −14·5 (1-2) ≤0·1, 0·2	280
$C_{28}F_3H_{26}ClIOP_2Rh$	$RhClI(CF_3)CO[P(CH_3)(C_6H_5)_2]_2$	−1·2	(P-F) 18·3 (Rh-F) 13·8	279

B. Fluorine nuclei in a CF_2 group

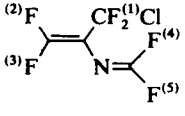
CF_2HCl	$CF_2^{(1)}H^{(2)}Cl$	−72·6		(1-2) 62·6		4
$CF_2ClN_3O_2S$	$CF_2Cl{\cdot}SO_2N_3$	−96·26				3
CF_2Cl_2S	$CF_2Cl{\cdot}SCl$	−37·4		(F-C) 329		2
CF_3ClOS	$CF_2^{(1)}Cl{\cdot}S(O)F^{(2)}$	(1) −67·7	(2) −16·0	(1A-1B) 134	(1A,1B-2) 1·4	5
CF_3ClO_2S	$CF_2^{(1)}Cl{\cdot}SO_2F^{(2)}$	(1) −98·43	(2) +98·61			3
CF_3ClS	$CF_2^{(1)}Cl{\cdot}SF^{(2)}$	(1) −43·0	(2) −293·7	(1-2) 6·85	(1-C) 327	2
CF_5ClS	$CF_2^{(1)}Cl{\cdot}SF_2^{(2)}F^{(3)}$	(1) −52·8 (3) −36·4	(2) +47·2	(1-2) 25·0 (2-3) 42·9	(1-3) 0	5
CF_6ClPS		(1) −37·4 (3) −61·4	(2) −14·2 (4) −5·4	(P-1) 3·7 (P-3) 1063 (1-2) 3·7 (1-4) 28 (2-4) 28	(P-2) 937 (P-4) 1072 (1-3) 0 (2-3) 100 (3-4) 117	15
CF_8O_3S	$CF_2^{(3)}OF^{(4)}{\cdot}OOSF_4^{(1)}F^{(2)}$	(1)(2) +56·4 (4) +156·8	(3) −80·2	(1-3) 3·8 (3-4) 33·8	(2-3) 3·8	18
CF_8S_2	$CF_2^{(1)}(SF_3^{(2)})_2$	(1) −88·2	(2) +6·6			20
CF_8Si_2	$SiF_3^{(2)}{\cdot}CF_2^{(1)}{\cdot}SiF_3^{(3)}$	(1) −146·6	(2) −150·5	(1-2) 2·97 (Si-2) 281·0	(2-3) 1·66	21
$C_2F_2HBr_2Cl$	$CF_2^{(1)}Br{\cdot}CH^{(2)}BrCl$	(1A) −52·2	(1B) −55·5	(1A-1B) 161	(1A-2), (1B-2) 6, 8	23(a)
$C_2F_2HCl_3$	$CF_2^{(1)}Cl{\cdot}CH^{(2)}Cl_2$	−62·5		(1-2) 6		23(a)
C_2F_2HN	$CF_2^{(1)}H^{(2)}{\cdot}CN$	−119·8		(1-2) 52·0		25
$C_2F_2BrCl_3$	$CF_2Cl{\cdot}CBrCl_2$	−62·5				23(a)
$C_2F_2Br_2Cl_2$	$CF_2Cl{\cdot}CBr_2Cl$	−61·1				23(a)
$C_2F_2Br_2Cl_2$	$CF_2Br{\cdot}CBrCl_2$	−55·6				23(a)
$C_2F_2Br_3Cl$	$CF_2Br{\cdot}CBr_2Cl$	−54·1				23(a)

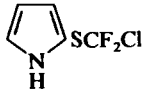
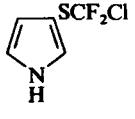
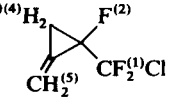
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_2F_2Cl_4$	$CF_2Cl{\cdot}CCl_3$	−64·3		23(a)
$C_2F_3Br_2Cl$	$CF_2^{(1)}Br{\cdot}CF^{(2)}BrCl$	(1A) −60·0 (1B) −58·3 (2) −68·3	(1A-1B) 167 (1A-2)}14,13 (1B-2)}	23(a)
$C_2F_3Cl_3$	$CF_2^{(1)}Cl{\cdot}CF^{(2)}Cl_2$	(1) −67·4 (2) −71·4		23(a)
$C_2F_4H_2BrNOS$	$CF_2^{(1)}Br{\cdot}CH_2{\cdot}NSOF_2^{(2)}$	(1) −69·8 (2) +50·7	(1-2) 10	33
$C_2F_4H_2BrNOS$	$CH_2^{(3)}Br{\cdot}CF_2^{(1)}{\cdot}NSOF_2^{(2)}$	(1) −55·8 (2) +46·8	(1-3) 4	33
$C_2F_4H_2ClNOS$	$CF_2^{(1)}Cl{\cdot}CH_2^{(3)}{\cdot}NSOF_2^{(2)}$	(1) −62·3 (2) +45·3	(1-2) 1·9 (1-3) 11	33
$C_2F_4Br_2$	$CF_2Br{\cdot}CF_2Br$	−62·8		23(a)
C_2F_6BrNOS	$CF_2^{(1)}Br{\cdot}CF_2^{(2)}{\cdot}NSOF_2^{(3)}$	(1) −68·9 (2) −83·6 (3) +50·6	(1-2) 5·5 (1-3) 1·5 (2-3) 9·2	42
$C_2F_6Cl_2S_2$	$CF_2^{(1)}Cl{\cdot}SF_2^{(3)}SCF_2^{(2)}Cl$	(1) −27·6 (2) −49·2 (3) +8·2	(1-3) 19·5 (2-3) 21	2
$C_2F_7H_2ClO_2S$	$F^{(1)}SF_4^{(2)}{\cdot}OO{\cdot}CF_2^{(3)}{\cdot}CH_2^{(4)}Cl$	(1)(2) +56·43 (3) −83·66	(1-3) 0·8 (2-3) 4 (3-4) 8·2	561
$C_2F_7H_2ClS$	$F^{(3)}SF_4^{(2)}{\cdot}CH_2^{(4)}{\cdot}CF_2^{(1)}Cl$	(1) −55·7 (2) +68·7 (3) +77·4	(1-2) 11·6 (1-4) 12·4 (2-3) 139 (2-4) 7·2	52
C_2F_7ClSi	$CF_2^{(1)}Cl{\cdot}CF_2^{(2)}{\cdot}SiF_3^{(3)}$	(1) −71·0 (2) −126·5 (3) −147·3	(1-2) 8·7	49
$C_2F_7Cl_3O_2S$	$F^{(1)}SF_4^{(2)}{\cdot}OO{\cdot}CF_2^{(3)}CCl_3$	(1)(2) +57·47 (3) −89·85		561
$C_2F_7Cl_3O_2S$	$F^{(1)}SF_4^{(2)}{\cdot}OO{\cdot}CCl_2{\cdot}CF_2^{(3)}Cl$	(1)(2) +58·74 (3) −62·83		561
$C_2F_8Cl_2O_2S$	$F^{(1)}SF_4^{(2)}{\cdot}OO{\cdot}CF_2^{(3)}{\cdot}CF^{(4)}Cl_2$	(1)(2) +55·30 (3) −91·85 (4) −73·00		561
$C_2F_8Cl_2O_2S$	$F^{(1)}SF_4^{(2)}{\cdot}OO{\cdot}CF^{(3)}Cl{\cdot}CF_2^{(4)}Cl$	(1)(2) +57·23 (3) −78·90 (4) −66·42	(2-3) ~4 (3-4) 6·75	561

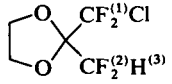
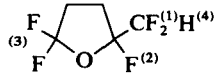
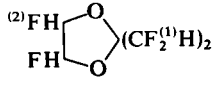
$C_2F_9ClO_2S$	$F^{(1)}SF_4^{(2)}\cdot OO\cdot CF_2^{(3)}\cdot CF_2^{(4)}Cl$	(1)(2) +57·12 (3) −93·87	(4) −70·56	(2-3) ~4	(3-4) 2·7	561
$C_2F_{17}CoP_4$	$CF_2^{(1)}(CF_3)Co(PF_3^{(2)})_4$	(1) −47·76	(2) −12·50	(P-1) 51	(P-2) 1329	22(c)
$C_3F_2H_3BrCl_2$	$CH^{(2)}BrCl\cdot CF_2^{(1)}\cdot CH_2Cl$			(1-2) 10·0		24
$C_3F_2H_3Cl_3$	$CH^{(2)}Cl_2\cdot CF_2^{(1)}\cdot CH_2Cl$			(1-2) 8·3		24
$C_3F_2H_3N$	$CH_3^{(2)}\cdot CF_2^{(1)}\cdot CN$	−85·4		(1-2) 18·1		25
$C_3F_2H_4ClI$	$CF_2^{(1)}I\cdot CH_2\cdot CH_2Cl$	−37·9		(1-2) 14·2		57
$C_3F_2H_4Cl_2O$	$CH^{(2)}Cl_2\cdot CF_2^{(1)}\cdot OCH_3$	−89·46		(1-2) 4·5		61(i)
$C_3F_3HCl_4$	$CF_2^{(1)(2)}Cl\cdot CH^{(4)}Cl\cdot CF^{(3)}Cl_2$	(1) −52·85 (3) −56·16	(2) −56·79	(1-2) 196·06 (1-4) 9·27 (2-4) 3·83	(1-3) 19·03 (2-3) 12·33 (3-4) 5·43	54
$C_3F_3H_2N$	$CF_2^{(1)}H^{(3)}\cdot CF^{(2)}H^{(4)}\cdot CN$	(1) −131·5	(2) −208·4	(1-2) 7·9 (1-4) 6·0 (2-4) 43·5	(1-3) 52·5 (2-3) 10·8	25
$C_3F_3H_2N$	$CF^{(2)}H_2^{(3)}\cdot CF_2^{(1)}\cdot CN$	(1) −102·9	(2) −236·5	(1-2) 18·9 (2-3) 45·4	(1-3) 11·7	25
$C_3F_3H_3ClI$	$CF_2^{(1)(2)}I\cdot CF^{(3)}H^{(4)}\cdot CH_2Cl$	(1)(2) −54·5	(3) −184·4	(1-2) 198·5 (2-3) 22·0 (2-4) 8·5	(1-3) 21·0 (1-4) 3·0 or 7·5 (3-4) 48·0	57
$C_3F_3H_3ClI$	$CF^{(3)}H^{(4)}I\cdot CF_2^{(1)(2)}\cdot CH_2Cl$	(1)(2) −109·3	(3) −166·3	(1-3) 21·5 (1-4) 11·0 (3-4) 47·0	(2-3) 21·5 (2-4) 8·5	57
$C_3F_3H_3I_2$	$CF^{(2)}H^{(3)}I\cdot CF_2^{(1)}\cdot CH_2I$			(1-3) 8·5	(2-3) 46	57
$C_3F_3H_4BrO$	$CF^{(2)}H^{(3)}Br\cdot CF_2^{(1)}\cdot CH_2^{(4)}OH$			(1-4) 12·0	(2-3) 48·0	64
C_3F_4HN	$CF_2^{(1)}H^{(3)}\cdot CF_2^{(2)}\cdot CN$	(1) −135·1	(2) −109·6	(1-2) 5·6 (2-3) 1·9	(1-3) 53·6	25
$C_3F_4H_6Si$	$CF_2^{(1)}H\cdot SiF^{(2)}(CF^{(3)}H_2)CH_3^{(4)}$	(1) −141·8 (3) −282·39	(2) −179·6	(2-4) 6·9	(3-4) 5·5	45(a)

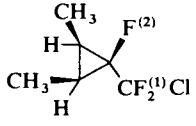
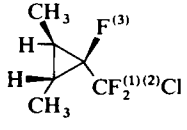
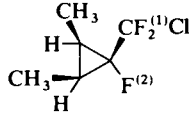
Molecular formula	Structure of compounds		Chemical shifts (pm)	Coupling constants (Hz)		Ref.
$C_3F_5H_2ClO$	$CF_2^{(1)}H^{(4)}\cdot OCF_2^{(2)}\cdot CF^{(3)}H^{(5)}Cl$	(neat)	(1) −89·18 (2) −89·49 (3) −159·36 (shifts in several solvents reported)	(1-4) 70·7	(3-5) 48·0	61(i)
$C_3F_{14}CoOP$	$CF_3\cdot CF_2^{(1)}\cdot Co(PF_3^{(2)})_3(CO)$		(1) −52·63 (2) −14·22	(P-1) 57	(P-2) 1342	22(c)
$C_3F_{19}CoP_4$	$CF_3\cdot CF_2\cdot CF_2^{(1)}\cdot Co(PF_3)_4$			(P-1) 52		22
$C_4F_2H_4Cl_2O_2$	$CH^{(2)}Cl_2\cdot CF_2^{(1)}\cdot CO_2CH_3$			(1-2) 11·5		64
$C_4F_2H_5ClO$				(1-2) 74·5 ^3J(1-C) 5	^1J(1-C) 261	81
$C_4F_2H_5ClO$				(1-2) 74·5	^1J(1-C) 258	81
$C_4F_2H_6Cl_2O$	$CF_2^{(1)}H^{(2)}\cdot OCH(CH_2Cl)_2$			(1-2) 74·5		81
$C_4F_2H_6Cl_2O$	$CH^{(3)}Cl_2\cdot CF_2^{(1)}\cdot CH_2^{(2)}\cdot OCH_3$			(1-2) 10·5	(1-3) 8·5	64
$C_4F_3H_6BrO$	$CF^{(2)}H^{(3)}Br\cdot CF_2^{(1)}\cdot CH_2^{(4)}\cdot OCH_3$			(1-4) 12·0	(2-3) 47·5	64
$C_4F_3H_6ClO$	$CF^{(2)}H^{(3)}Cl\cdot CF_2^{(1)}\cdot CH_2\cdot OCH_3$			(1-4) 12·0	(2-3) 48·0	64
$C_4F_3H_6ClS_2$	$CH_3^{(3)}S\cdot CF_2^{(1)}\cdot CF^{(2)}Cl\cdot SCH_3^{(4)}$		(1) −83·9 (2) −91·2	(1-2) 17·9 (1-4) 1·1 (2-4) 1·3	(1-3) 1·2 (2-3) 1·2	69
$C_4F_3H_9Si$	$CF_2^{(1)}H^{(3)}\cdot Si(CH_2^{(4)}F^{(2)})(CH_3)_2$		(1) −139·67 (2) −275·11	(1-3) 45·6	(2-4) 46·4	45
$C_4F_4H_2Cl_4O$	$CF_2^{(1)}H^{(3)}\cdot CF_2^{(2)}\cdot CH^{(4)}Cl\cdot OCCl_3$			(1-3) 53·5	(2-4) 8·0	64
$C_4F_4H_3Cl_3O$	$CF_2^{(1)}H^{(3)}\cdot CF_2^{(2)}\cdot CH_2^{(4)}\cdot OCCl_3$			(1-3) 53·5	(2-4) 15·5	64
$C_4F_4H_3Cl_3O$	$CF_2^{(1)}H^{(3)}\cdot CF_2^{(2)}\cdot CH^{(4)}Cl\cdot OCHCl_2$			(1-3) 53·5	(2-4) 8·0	64
$C_4F_4H_3Cl_3O$	$CF_2^{(1)}H^{(2)}\cdot CF_2\cdot CCl_2\cdot OCH_2Cl$			(1-2) 53·0		64
$C_4F_4H_4Cl_2O$	$CF_2^{(1)}H^{(3)}\cdot CF_2^{(2)}\cdot CH_2^{(4)}\cdot OCH_3$			(1-3) 49·5	(2-4) 11·0	64

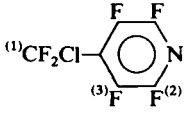
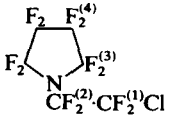
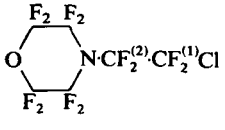
$C_4F_4H_6$	$CF_2^{(1)(2)}H^{(5)}\cdot CF^{(3)}(CH_3^{(6)})\cdot CF^{(4)}H_2^{(7)}$	(1) −132·6 (3) −173·1	(2) −139·0 (4) −237·7	(1-2) 302·0 (1-6) ~1·0 (2-5) 54·0 (3-4) 11·7 (4-6) 2·2	(1-5) 54·0 (2-3) 9·0 (2-6) ~1·0 (3-6) 21·5 (4-7) 52·5	83
$C_4F_4H_6O$	$CF_2^{(1)}H^{(3)}\cdot CF_2^{(2)}\cdot CH_2^{(4)}\cdot OCH_3$			(1-3) 53·5	(2-4) 12·0	64
$C_4F_4H_7O_3P$	$CF_2^{(1)}H^{(3)}\cdot CF_2^{(2)}\cdot P(O)(OCH_3)_2$	(1) −139·9	(2) −130·7	(1-2) 5·6 (2-3) 5·7	(1-3) 52·8 (P-2) 91·3	84(a)
$C_4F_4H_8Ge$	$CF_2^{(1)}H^{(3)}\cdot Ge(CF^{(2)}H_2^{(4)})_2CH_3$	(1) −132·4	(2) −271·0	(1-2) 2·1 (2-4) 46·5	(1-3) 46·2	45(a)
$C_4F_4H_8Si$	$(CF_2^{(1)}H^{(2)})_2Si(CH_3)_2$	−137·72		(1-2) 46·0		45(a)
$C_4F_4H_8Si$	$CF_2^{(1)}H^{(3)}\cdot Si(CF^{(2)}H_2^{(4)})_2\cdot CH_3^{(5)}$	(1) −139·58	(2) −278·10	(1-2) 1·5 (2-4) 47·0	(1-3) 45·8 (2-5) 1·0	45(a)
$C_4F_5H_5$	$(CF_2^{(1)}H^{(3)})_2CF^{(2)}\cdot CH_3^{(4)}$	(1) −138·0	(2) −184·0	(1-2) ~(2-3) ~7·5 (1-3) ~50 (2-4) 21·7	(1-4) 1·3	83
$C_4F_5H_5$	$CF_2^{(1)}H^{(4)}\cdot CF^{(2)}(CF^{(3)}H_2^{(5)})_2$	(1) −136·2 (3) −245·2	(2) −187·3	(1-2) 6·1 (2-4) 5·5 (2-5) 20·7 (3-5) 48·0	(1-4) 52·5 (2-3) 12·0 (3-4) 1·4	83
$C_4F_5H_7Ge$	$CF_2^{(1)}H^{(3)}\cdot Ge(CF^{(2)}H_2^{(4)})_3$	(1) −130·5	(2) −270·4	(1-2) 2·0 (2-4) 46·6	(1-3) 46·0	45(a)
$C_4F_5H_7Si$	$(CF_2^{(1)}H^{(3)})_2Si(CF^{(2)}H_2^{(4)})CH_3^{(5)}$	(1) −139·35	(2) −279·50	(1-2) 1·4 (2-4) 46·7	(1-3) 45·7 (2-5) 0·5	45(a)
$C_4F_5H_7Si$	$CF_2^{(1)}H^{(3)}\cdot Si(CF^{(2)}H_2^{(4)})_3$	(1) −138·53	(2) −279·92	(1-2) 1·7 (2-4) 46·6	(1-3) 45·4	45(a)
$C_4F_6H_2Cl_2O$	$CF_2^{(1)}H^{(3)}\cdot CF_2\cdot CCl_2\cdot OCF_2^{(2)}H^{(4)}$			(1-3) 52	(2-4) 68	64
$C_4F_6H_2Cl_2O$	$CF_2^{(1)}H^{(3)}\cdot CF_2^{(2)}\cdot CH^{(4)}Cl\cdot OCF_2Cl$			(1-3) 53·5	(2-4) 8·0	64
$C_4F_6H_3ClO$	$CF_2^{(1)}H^{(4)}\cdot O\cdot CF^{(2)}H^{(5)}\cdot CF_2\cdot CF^{(3)}H^{(6)}Cl$			(1-4) 70·5 (3-6) 48·0	(2-5) 56·0	64

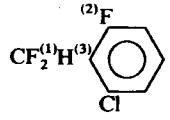
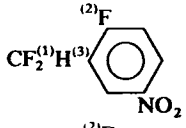
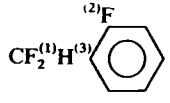
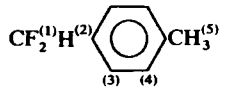
Molecular formula	Structure of compounds		Chemical shifts (ppm)		Coupling constants (Hz)		Ref.
$C_4F_6H_3ClO$	$CF_2Cl{\cdot}CF_2^{(1)}{\cdot}CH_2^{(2)}{\cdot}OCF_2H$				(1-2) 13·0		64
$C_4F_6H_4$	$(CF_2^{(1)}H^{(4)})_2CF^{(2)}{\cdot}CF^{(3)}H_2^{(5)}$		(1) −135·7 (3) −248·7	(2) −193·8	(1-2) 7·0 (1-4) 52·0 (2-3) 11·5 (2-5) 19·5	(1-3) 2·5 (1-5) 1·4 (2-4) 5·6 (3-5) 46·5	83
$C_4F_6H_6Ge$	$(CF_2^{(1)}H^{(3)})_2Ge(CF^{(2)}H_2^{(4)})_2$		(1) −129·9	(2) −271·0	(1-2) 2·5 (2-4) 46·6	(1-3) 46·0	45(a), 92
$C_4F_6H_6Si$	$(CF_2^{(1)}H^{(3)})_2Si(CF^{(2)}H_2^{(4)})_2$		(1) −137·38	(2) −281·37	(1-3) 45·4 (1-2) 1·9	(2-4) 46·4	45(a)
C_4F_6ClN		(−100 °C)	(1) −54·0 (3) −84·0 (5) −52·5	(2) −88·0 (4) −37·0	(1-2) 34·4 (2-3) 24·6 (2-5) 3·4 (3-5) 1·6	(1-3) 6·2 (2-4) 5·5 (3-4) 23·0 (4-5) 69·0	85
$C_4F_7H_2ClO$	$CF_2^{(1)}H^{(3)}{\cdot}CF_2^{(2)}{\cdot}CH^{(4)}Cl{\cdot}OCF_3$				(1-3) 53·5	(2-4) 6·6	64
$C_4F_7H_2ClO$	$CF_2^{(1)}H^{(3)}{\cdot}CF_2{\cdot}CFCl{\cdot}OCF_2^{(2)}H^{(4)}$				(1-3) 49·5	(2-4) 61·0	64
$C_4F_7H_2ClO$	$CF_2Cl{\cdot}CF_2{\cdot}CF^{(2)}H^{(4)}{\cdot}OCF_2^{(1)}H^{(3)}$				(1-3) 71·0	(2-4) 54·5	64
$C_4F_7H_3$	$(CF_2^{(1)}H^{(3)})_3CF^{(2)}$		(1) −135·1	(2) −202·1	(1-2) 7·9 (2-3) 6·5	(1-3) 53·0	83
$C_4F_7H_3O$	$CF_2^{(1)}H^{(4)}{\cdot}CF_2{\cdot}CF^{(2)}H^{(5)}{\cdot}OCF_2^{(3)}H^{(6)}$				(1-4) 52·0 (3-6) 72·0	(2-5) 55·0	64
$C_4F_7H_3O$	$CF_2^{(1)}H^{(3)}{\cdot}CF_2^{(2)}{\cdot}CH_2^{(4)}{\cdot}OCF_3$				(1-3) 53·0	(2-4) 12·0	64
$C_4F_7H_5Ge$	$(CF_2^{(1)}H^{(3)})_3GeCF^{(2)}H_2^{(4)}$		(1) −129·0	(2) −271·4	(1-2) 2·3 (2-4) 46·0	(1-3) 46·2	45(a), 92
$C_4F_7H_5Si$	$(CF_2^{(1)}H^{(3)})_3SiCF^{(2)}H_2^{(4)}$		(1) −138·07	(2) −282·89	(1-2) 2·1 (2-4) 46·6	(1-3) 45·0 (2-3) 0·4	45(a)
C_4F_8HHgI	$CF_2^{(1)}H^{(5)}{\cdot}CF_2^{(2)}{\cdot}CF_2^{(3)}{\cdot}CF_2^{(4)}{\cdot}HgI$		(1) −137·7 (3) −119·9	(2) −132·4 (4) −101·4	(1-5) 59·0 (Hg-4) 1020	(Hg-3) 150	94

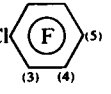
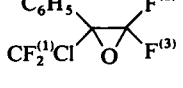
C_4F_8HI	$CF_2^{(1)}H^{(5)}\cdot CF_2^{(2)}\cdot CF_2^{(3)}\cdot CF_2^{(4)}I$	(1) −137·7 (3) −121·0	(2) −130·8 (4) −63·9	(1-5) 59·0		94
$C_4F_8Cl_2N_2S$	$(CF_2^{(1)}Cl\cdot CF_2^{(2)}\cdot N=)_2SF_2^{(3)}$	(1) −73·7 (3) +63·2	(2) −84·7	(1-2) 4·1 (2-3) 9·6	(1-3) 1·4	42
$C_4F_8I_2$	$CF_2^{(1)}I\cdot CF_2^{(2)}\cdot CF_2\cdot CF_2I$	(1) −59·9	(2) −112·7			94
$C_4F_9Cl_2N$	$(CF_2^{(1)}Cl\cdot CF_2^{(2)})_2NF^{(3)}$	(1) −70·9 (3) −92·0	(2) −107·5	(1-3) 20·0	(2-3) 22·6	99(a)
$C_4F_{10}Br_2N_2S$	$(CF_2^{(1)}Br\cdot CF_2^{(2)}\cdot N=)_2SF_2^{(3)}$	(1) −68·9 (3) +63·2	(2) −83·7	(1-2) 5·6 (2-3) 9·4	(1-3) 1·5	42
$C_4F_{11}CoO_2P_2$	$CF_3\cdot CF_2^{(1)}\cdot Co(PF_3^{(2)})_2CO$	(1) −54·79	(2) −14·87	(P-1) 63	(P-2) 1348	22(c)
$C_4F_{16}CoOP_3$	$CF_3\cdot CF_2\cdot CF_2^{(1)}\cdot Co(PF_3)_3CO$			(P-1) 56		22
$C_5F_2H_4ClNS$		−30·56				109
$C_5F_2H_4ClNS$		−30·53				109
$C_5F_2H_6O_S$	$CF_2^{(1)}H^{(2)}\cdot C(OH)=CH\cdot COCH_3$ (*Z*)	−127·09		(1-2) 55		113
$C_5F_2H_{12}P_2$	$[(CH_3)_2P]_2CF_2$	−116·8		(P-F) 58·3		115(a)
$C_5F_3H_4Cl$		(1) −63·5	(2) −191·5	(1-2) 13·5 (2-4) ~3	(2-3) 10·0 (2-5) 1·5	49
$C_5F_3H_4Cl_3O_2$	$CF^{(2)}H^{(4)}Cl\cdot CF_2^{(1)}\cdot CH_2^{(3)}\cdot O\cdot CO\cdot CHCl_2$			(1-3) 12·5	(2-4) 48·0	111
$C_5F_3H_7Cl_2$	$CF^{(2)}H^{(3)}Cl\cdot CF_2^{(1)}\cdot CH(CH_3)\cdot CH_2Cl$			(1-3) 7·0	(2-3) 48	116
$C_5F_3H_{10}ClSi$	$CF_2^{(1)(2)}Cl\cdot CF^{(3)}H^{(4)}\cdot Si(CH_3)_3$	(1) −57·0 (3) −222·5	(2) −58·8	(1-3) 21·4 (1-4) 15·2 (3-4) 45·0	(2-3) 22·6 (2-4) 12·8	49

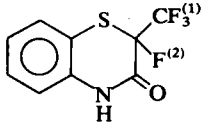
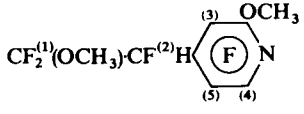
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_5F_4H_4Cl_2O_2$	$CF_2^{(1)}H^{(3)}\cdot CF_2^{(2)}\cdot CH_2^{(4)}\cdot O\cdot CO\cdot CHCl_2$		(1-3) 52·5 (2-3) 3·6 (2-4) 12·5	111
$C_5F_4H_5ClO_2$		(1) −67·8 (2) −135·2	(1-2) 8·4 (2-3) 54	120
$C_5F_4H_6O_2$	As above with CF_2Cl replaced by CF_2H	−137·5	(2-3) 56·4	120
$C_5F_5H_3O$		(1) −133·8 (2) −119·05 (3A) −92·65 (3B) −84·68	(1-4) 55 (3A-3B) 160	121(a)
$C_5F_6H_4O$	$CF_2^{(3)}H^{(4)}\cdot CF_2^{(2)}\cdot CF_2^{(1)}\cdot COCH_3$	(1) −120·2 (2) −130·1 (3) −136·5	(2-4) 5·6 (3-4) 52·0	43
$C_5F_6H_4O_2$		(1) −136·0 (2) −127·8		120
$C_5F_8CoO_3P$	$CF_3\cdot CF_2^{(1)}\cdot Co(PF_3^{(2)})(CO)_3$	(1) −55·46 (2) −14·24	(1-2) 6 (P-1) 63 (P-2) 1371	22(c)
$C_5F_{10}BrIO$	$CF_2^{(1)}Br\cdot CF_2^{(2)}\cdot CF_2^{(3)}\cdot O\cdot CF_2^{(4)}\cdot CF_2^{(5)}I$	(1)(5) −63·5, −64·0 (3)(4) −81·8, −85 (2) −122		131
$C_5F_{10}Br_2O$	$CF_2^{(1)}Br\cdot CF_2^{(2)}\cdot CF_2^{(3)}\cdot O\cdot CF_2^{(4)}\cdot CF_2^{(5)}Br$	(1)(5) 63·4, −69·1 (3)(4) −81·4, −86·0 (2) −122		131
$C_5F_{12}O_4S$	$F^{(1)}CO\cdot CF_2^{(2)}\cdot CF_2^{(3)}\cdot CF_2^{(4)}\cdot CO\cdot OOSF_5^{(5)}$	(1) +23·6 (2) −118·6 (3) −123·7 (4) −116·8 (5) +56·2	(1-4) 1·6 (1-3) 6·4 (1-2) 7·5	18
$C_5F_{16}O_6S_2$	$CF_2^{(1)}(CF_2^{(2)}\cdot CO\cdot OOSF_5^{(3)})_2$	(1) −122·6 (2) −116·1 (3) +56·8		18
$C_6F_2H_8O_2$	$CF_2^{(1)}H^{(2)}\cdot C(OH)=CH\cdot CO\cdot CH_2CH_3$ (*Z*)	−127·07	(1-2) 55	113

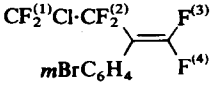
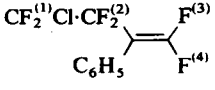
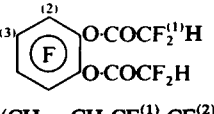
$C_6F_2H_{10}O$	$CF_2^{(1)}H^{(2)}\cdot CO\cdot C(CH_3)_3$	−126·8		(1-2) 53·5	(1-3) 0·75	134
$C_6F_2H_{11}Cl_2N$	$CH^{(2)}Cl_2\cdot CF_2^{(1)}\cdot N(CH_2^{(3)}CH_3)_2$	−86·0		(1-2) 7·0	(1-3) 1·5	111
$C_6F_2H_{13}O_3P$	$CF_2^{(1)}H^{(2)}\cdot CH_2^{(3)}\cdot P(O)(OCH_2CH_3)_2$	−111·3		(1-2) 56·5 (P-1) 27·6	(1-3) 17·2	84(a)
$C_6F_2H_{15}GeP$	$(CH_3)_3Ge\cdot CF_2\cdot P(CH_3)_2$	−119·3		(P-F) 59·7		115(a)
$C_6F_3H_8Cl$		(1) −64·3	(2) −222·5			49
$C_6F_3H_8Cl$		(1) −57·9 (3) −202·5	(2) −59·9	(1-3)(2-3) 12·0, 10·5		49
$C_6F_3H_8Cl$		(1) −56·3	(2) −201·5			49
$C_6F_3H_9O_2$	$CH_3\cdot CH_2\cdot CF_2^{(1)}\cdot CF^{(2)}H\cdot CO_2CH_3$	(1) −106·6	(2) −202·5	(1-2) 11		138
$C_6F_3H_{11}$	$CF_2^{(1)}H^{(3)}\cdot CF^{(2)}H^{(4)}\cdot C(CH_3)_3$	(1) −128·5	(2) −208·7	(1-3) 50·8	(2-4) 46·2	93(a)
$C_6F_3H_{11}$	$CF^{(2)}H_2^{(3)}\cdot CF_2^{(1)}\cdot C(CH_3)_3$	(1) −120·7	(2) −238·9	(2-3) 47·7		98(a)
$C_6F_3H_{11}ClO_3P$	$CF^{(2)}H^{(3)}Cl\cdot CF_2^{(1)}\cdot P(O)(OCH_2CH_3)_2$	(1) −124·5	(2) −154·7	(1-2) 16·9 (1-3) 5·6, 12·2 (P-1) 93·7	(2-3) 47·1	84(a)
$C_6F_4H_{10}$	$CF_2^{(1)}H^{(3)}\cdot CF_2^{(2)}\cdot C(CH_3)_3$	(1) −132·7	(2) −124·9	(1-3) 53·4		98(a)
$C_6F_4H_{11}O_3P$	$CF_2^{(1)}H^{(3)}\cdot CF_2^{(2)}\cdot P(O)(OCH_2CH_3)_2$	(1) −139·3	(2) −131·1	(1-2) 6·5 (2-3) 5·9 (P-2) 92·0	(1-3) 52·5 (P-1) 2·0	84(a)

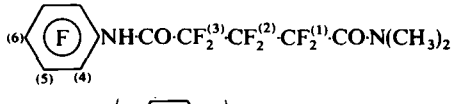
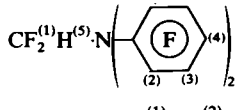
Molecular formula	Structure of compounds	Chemcal shifts (ppm)	Coupling constants (Hz)	Ref.
C_6F_6ClN		(1) −48·7 (2) −86·4 (3) −140·2	(1-3) 26·8	4
$C_6F_8H_6S_2$	$(CH_3S{\cdot}CF_2^{(1)}{\cdot}CF_2^{(2)})_2$	(1) −91·3 (2) −120·1		36
$C_6F_9Cl_3O_2$	$(CF_2^{(1)}Cl)_2CF^{(2)}{\cdot}O{\cdot}CF_2^{(3)}{\cdot}CO{\cdot}CF_2^{(4)}Cl$	(1)(4) −65·9 (2) −135·4 (3) −72·2	(2-3) 21·3 (1-3) ~6·5 (3-4) ~6·5 (1-2) 5·4	143
$C_6F_{11}ClO$	$CF_2^{(1)}Cl{\cdot}CF_2^{(2)}{\cdot}CF_2^{(3)}{\cdot}CF_2^{(4)}{\cdot}CF_2^{(5)}{\cdot}COF^{(6)}$	(1) −61·8 (2) −130·3 (3)(4) −123·2 (5) −116·4 (6) +21·0		97
$C_6F_{12}Br_2O_2$	$(CF_2^{(1)}Br{\cdot}CF_2^{(2)}{\cdot}OCF_2^{(3)})_2$	(1) −69·5 (2)(3) −86·7, −89·3		131
$C_6F_{12}ClN$		(1) −73·1 (2) −61·8 (3) −92·5 (3) −135·2		135(a)
$C_6F_{12}ClNO$		(1) −73·9 (2) −94·0 (3) −93·7 (4) −89·2		135(a)
$C_6F_{12}I_2O_2$	$(CF_2^{(1)}I{\cdot}CF_2^{(2)}{\cdot}O{\cdot}CF_2^{(3)})_2$	(1) −64·4 (2)(3) −86·5, −101		131
$C_7F_2H_6S$	$C_6H_5{\cdot}S{\cdot}CF_2H$	−121		161
$C_7F_2H_{15}Br_2P$	$(CH_3CH_2)_3P^+CF_2Br\ Br^-$	−52·2	(P-F) 59·1	192
$C_7F_2H_{18}Br_2N_3P$	$[(CH_3)_2N]_3P^+CF_2Br\ Br^-$	−49·0	(P-F) 87·1	192
$C_7F_2H_{18}Cl_2N_3P$	As above with Br replaced by Cl	−51·3	(P-F) 95·4	192
$C_7F_2H_{18}I_2N_3P$	As above with Br replaced by I	−58·1	(P-F) 86·6	192
$C_7F_2H_{19}BrN_3P$	$[(CH_3)_2N]_3P^+CF_2^{(1)}H^{(2)}\ Br^-$	−129·3	(P-1) 84·6 (1-2) 47·2	192

$C_7F_3H_4Cl$		(1) −115·00	(2) −113·39	(1-2) 13·43	(1-3) 52·67	164
$C_7F_3H_4NO_2$		(1) −115·92	(2) −109·73	(1-2) 2·25	(1-3) 54·50	164
$C_7F_3H_5$		(1) −120·51	(2) −114·81	(1-2) 1·26	(1-3) 54·78	164
$C_7F_3H_{11}O_2$	$CH_3{\cdot}(CH_2)_2{\cdot}CF_2^{(1)}{\cdot}CF^{(2)}H^{(3)}{\cdot}CO_2CH_3$	(1) −108·5	(2) −202·5	(1-2) 12	(2-3) 46	138
$C_7F_4H_8Cl_2O_2$	$CF^{(1)}H^{(4)}Cl{\cdot}CF_2^{(2)}{\cdot}CH(CH_3){\cdot}CH_2{\cdot}O{\cdot}CO{\cdot}CF^{(3)}H^{(5)}Cl$			(1-4) 48 (3-5) 50	(2-4) 7	116
$C_8F_2H_6O$	$CF_2^{(1)}H^{(2)}{\cdot}CO{\cdot}C_6H_5$	−123·7		(1-2) 53		134
$C_8F_2H_7IO$	$CH_2^{(2)}I{\cdot}CF_2^{(1)}{\cdot}O{\cdot}C_6H_5$	−68·37		(1-2) 9·6		184(e)
$C_8F_2H_8$				(1-2) 56·622 (1-4) 0·891	(1-3) −1·169 (1-5) 1·46	186
$C_8F_2H_9P$	$CF_2^{(1)}H{\cdot}CH_2{\cdot}PH{\cdot}C_6H_5$	−110·7 (AB system)		(1A-1B) 280		187(a)
$C_8F_2H_{12}O$	$CF_2^{(1)}H^{(2)}{\cdot}CO{\cdot}C_6H_{11}$	−128·6		(1-2) 53·6		134
$C_8F_2H_{12}O_2$	$CF_2^{(1)}H^{(2)}{\cdot}C(OH){=}CH{\cdot}CO{\cdot}R\,(Z)$ $R = nC_4H_9$, iC_4H_9	−127.07		(1-2) 55		113
$C_8F_3H_{15}$	$CF_2^{(1)}H^{(3)}{\cdot}CF^{(2)}H^{(4)}{\cdot}CH(CH_3){\cdot}C(CH_3)_3$	(1) −130·5	(2) −204·5	(1-2) ~13 (1-4) ~12 (2-3) ~10	(1-3) 56·0 (2-4) 46·0	49
$C_8F_3H_{15}$	$CF_2^{(1)}H^{(3)}{\cdot}CF^{(2)}H^{(4)}{\cdot}CH_2{\cdot}CH_2{\cdot}C(CH_3)_3$	(1) −133·0	(2) −206·5	(1-2) ~13 (1-4) ~12 (2-3) ~10	(1-3) 56·0 (2-4) 46·0	49

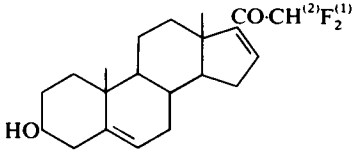
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_8F_4H_7P$	$CF_2^{(2)}H^{(3)}\cdot CF_2^{(1)}\cdot PH^{(4)}\cdot C_6H_5$	(1) −110·9 (2) −134·9	(1-3) 4·6 (2-3) 53·8 (1-4) 18·6 (2-4) 3·0 (P-1) 82·6 (1A-1B) 298	187
$C_8F_8H_6O$	$CF_2^{(1)}H^{(5)}\cdot CF_2^{(2)}\cdot CF_2^{(3)}\cdot CF_2^{(4)}\cdot C(OH)=CH\cdot CO\cdot CH_3$ (*Z*)	(1) −139·9 (2-4) −128·8, −139·9, −120·0	(1-5) 55	113
C_8F_8BrCl	$CF_2^{(1)}Br\cdot CF^{(2)}Cl$ 	(1) −62·9, −61·8 (2) −115·3 (3) −134·9 (4) −161·5 (5) −149·2	(1A-1B) 178	195(b)
$C_8F_{15}ClO$	$CF_2^{(1)}Cl\cdot(CF_2^{(2)})_4\cdot CF_2^{(3)}\cdot CF_2^{(4)}\cdot CO\cdot F^{(5)}$	(1) −68·2 (2) −126·4 (3) −121·4 (4) −117·1 (5) +22·8		97
$C_8F_{16}H_2Hg$	$Hg(CF_2^{(1)}\cdot CF_2^{(2)}\cdot CF_2^{(3)}\cdot CF_2^{(4)}H^{(5)})_2$	(1) −108·0 (2) −121·9 (3) −132·4 (4) −137·7	(4-5) 59·0 (Hg-1) 746 (Hg-2) 148·0	94
$C_9F_2H_8Cl_2$	$C_6H_5CH_2^{(2)}\cdot CF_2^{(1)}\cdot CH^{(3)}Cl_2$	−104·8	(1-2) 16 (1-3) 8	203(a)
$C_9F_2H_8O$	$CF_2^{(1)}H^{(2)}\cdot CO\cdot CH_2^{(3)}\cdot C_6H_5$	−127·6	(1-2) 53·6 (1-3) 1·1	134
$C_9F_3H_5Cl_2O$	$CF_2^{(1)(2)}Cl\cdot CCl(C_6H_5)\cdot CO\cdot F^{(3)}$	(1) −60·0 (2) −59·8 (3) +32·9	(1-2) 169·7 (1-3) 9·1	4
$C_9F_3H_{10}OP$	$CF_2^{(1)}H^{(3)}\cdot CF^{(2)}H^{(4)}\cdot P(OCH_3)C_6H_5$ [two diastereoisomers (60 : 40); minor values given first]	(1) −127·3 (2) −218·5	(1-2) 17, 18 (2-3) 9, 10 (2-4) 46, 47 (P-2) 117, 103	187(a)
$C_9F_3H_{11}NP$	$CF_2^{(1)}H\cdot CF^{(2)}H\cdot P(NHCH_3)C_6H_5$	(1) −126·5 (2) −216·5		325(a)
$C_9F_3H_{17}$	$CF_2^{(1)}H^{(3)}\cdot CF^{(2)}H^{(4)}\cdot C(CH_3)_2C(CH_3)_2$	(1) −127·5 (2) −203·0	(1-2) 15·0 (1-3) 55·5 (1-4) ~13·5 (2-3) 10·5 (2-4) 45·6	49
$C_9F_4H_5ClO$		(1) −59·4 (2) −101·8 (3) −109·5	(1-2) 2·1 (1-3) 19·4 (2-3) 41·2	4

$C_9F_4H_5NOS$		(1) −76·2	(2) −148·7			204(a)
$C_9F_4H_7Cl_2NO_2S$	$(CF_2Cl)_2C(OH)NH{\cdot}S(O)C_6H_5$	−62·7 to −60·65				206(a)
$C_9F_5H_{14}Cl_2NO$	$CF_2^{(1)}H^{(4)}{\cdot}CF_2^{(2)}{\cdot}CH_2^{(5)}{\cdot}O{\cdot}CF^{(3)}(CHCl_2)N(CH_2CH_3)_2$	(1) −141 (3) −111 to −113·5	(2) −126	(1-4) 53·5 (1-5) 1·5	(2-5) 12·0	111
$C_9F_6H_7NO_2$		(1) −89·5 (3) −143·4 (5) −154·1	(2) −206·8 (4) −98·1			212
$C_9F_8H_8O_2$	$CF_2^{(1)}H^{(3)}{\cdot}(CF_2^{(2)})_3{\cdot}C(OH){=}CH{\cdot}CO{\cdot}CH_2CH_3$ (*Z*)	(1) −139·9 (2) −128·8, −139·9, −120·0		(1-3) 55		113
$C_9F_{18}Br_2O_2$	$(CF_2^{(1)}Br{\cdot}CF_2^{(2)}{\cdot}O{\cdot}CF_2^{(3)}{\cdot}CF_2^{(4)})_2CF_2^{(5)}$	(1) −70 (3) −84	(2) −87 (4)(5) −124, −128			131
$C_9F_{18}I_2O_2$	As above with Br replaced by I	(1) −65·5 (3) −83·5 (5) −123	(2) −87·6 (4) −126			131
$C_{10}F_2H_{10}Cl_2$	$C_6H_5{\cdot}CH^{(3)}(CH_3){\cdot}CF_2^{(1)(2)}{\cdot}CH^{(4)}Cl_2$	(1) −112·1	(2) −116·3	(1-2) 247 (1-4) 4 (2-4) 15	(1-3) 23 (2-3) 8	203(a)
$C_{10}F_2H_{21}Br_2P$	$(iC_3H_7)_3P^+CF_2Br\ Br^-$	−43·7		(P-F) 56·4		162
$C_{10}F_3H_{13}NP$	$CF_2^{(1)}H^{(3)}{\cdot}CF^{(2)}H^{(4)}{\cdot}P(C_6H_5)N(CH_3)_2$ (diastereoisomers)	(1) −126·7	(2) −216·1	(2-4) ~48 [a] (1A-1B) 292 (2-4) 47·4 (P-2) 71	(1-3) ~55 (1-2) 19 (2-3) 9·2	325(a)
				[b] (1-2) 16·5 (2-3) 10·6 (P-2) 125 (1-4)(P-1) 15·1, 19·8	(1-3) 54·6 (2-4) 47·6	

Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{10}F_3H_{19}$	$CF_2^{(1)}H^{(3)}\cdot CF^{(2)}H^{(4)}\cdot C(CH_3)_2\cdot CH_2\cdot C(CH_3)_3$	(1) −128·0 (2) −204·5	(1-3) 56·0 (2-4) 46·0 (1-4) 12·0, 9·0	49
$C_{10}F_3H_{19}$	$CF_2^{(1)}H^{(3)}\cdot CF^{(2)}H^{(4)}\cdot CH[CH(CH_3)_2]\cdot C(CH_3)_3$	(1) −131·5 (2) −207·5	(1-3) 56·0 (2-4) 46·0	49
$C_{10}F_4H_9Cl_2NO_2S$	$(CF_2Cl)_2C(OH)NH\cdot S(O)C_6H_4\cdot CH_3\,p$	−62·5 to −60·8		206(a)
$C_{10}F_6H_4BrCl$		(1) −69·4 (2) −106·7 (3) −72·4 (4) −71·0	(1-2) 4·7 (1-3) 10·0 (2-3) 9·3 (2-4) 28·0 (3-4) 5·1	4
$C_{10}F_6H_4I_2O_2$	$(CH_2I\cdot CH_2\cdot CF_2^{(1)}\cdot CF_2^{(2)}\cdot OCF_2^{(3)})_2$	(1) −119 (2)(3) −87·8, −89·3		131
$C_{10}F_6H_5Cl$		(1) −69·4 (2) −106·7 (3) −73·8 (4) −72·4	(1-2) 4·6 (1-3) 9·4 (2-3) 27·4 (2-4) 8·6 (3-4) 8·3	4
$C_{10}F_6H_7Br$	$pBrC_6H_4\cdot CH_2^{(6)}\cdot CF_2^{(3)(4)}\cdot CF^{(2)}H^{(5)}\cdot CF_3^{(1)}$	(2) −211·5 (3) −108·7 (4) −111·3	(3-4) 260 (2-3,4) 11·5 (1-5) 6·0 (2-5) 44·0 (3-5) 12·0 (4-5) 6·0 (2-6) 3·0 (3-6) 16·0 (4-6) 15·0	176
$C_{10}F_6H_8$	$CH_3^{(4)}\cdot CF_2^{(1)}\cdot CF^{(2)}(CF_3^{(3)})\cdot C_6H_5$	(1) −130·1 (2) −180·5 (3) −75·2	(1-3) 14·0 (1-4) 19·0 (2-3) 8·0 (2-4) 2·5	176
$C_{10}F_6H_8$	$CF_2^{(1)}H^{(4)}\cdot CF^{(2)}(CF_3^{(3)})\cdot CH_2^{(5)}\cdot C_6H_5$	(1) −136·5 (2) −187·0 (3) −77·0	(1-2) 21·0 (1-3) 8·0 (1-4) 54·0 (2-3) 8·0 (2-4) 4·0 (2-5) 24·5	176
$C_{10}F_8H_2O_4$		(1) −91·8 (2)(3) −136·6, −152·3		230
$C_{10}F_{12}H_6O_2$	$(CH_2{=}CH\cdot CF_2^{(1)}\cdot CF_2^{(2)}\cdot OCF_2^{(3)})_2$	(1) −117 (2)(3) −87·4, −88·3		131
$C_{10}F_{18}O_2$	$(COF^{(1)}\cdot CF_2^{(2)}\cdot CF_2^{(3)}\cdot CF_2^{(4)}\cdot CF_2^{(5)})_2$	(1) +25·4 (2) −116·7 (3) −119·6 (4) −119·6 (2) −120·8		151

$C_{11}F_4H_8Cl_2$	$C_6H_5{\cdot}CH_2^{(3)}{\cdot}CF_2^{(1)}{\cdot}CCl_2{\cdot}CF_2^{(2)}{\cdot}CH^{(4)}Cl_2$	(1)(2) −100·5 to −103·5	(1-3) 19	(2-4) 9	203(a)
$C_{11}F_8H_{12}O_2$	$CF_2^{(1)}H^{(3)}{\cdot}(CF_2^{(2)})_3{\cdot}C(OH)=CH{\cdot}CO{\cdot}R$ (*Z*) R = nC_4H_9, iC_4H_9, tC_4H_9	(1) −139·9 (2) −128·8, −139·9, −120·0	(1-3) 55		113
$C_{12}F_3H_{17}NP$	$CF_2^{(1)}H^{(3)}{\cdot}CF^{(2)}H^{(4)}{\cdot}P[N(CH_2CH_3)_2]C_6H_5$	(1) −126·3 (2) −215·5	(1-3) 55	(2-4) 47	325(a)
$C_{13}F_2H_{27}Br_2P$	$[nC_4H_9P^+CF_2Br]\,Br^-$	−53·0	(P-F) 66·8		162
$C_{13}F_2H_{27}Br_2P$	$[tC_4H_9P^+CF_2Br]\,Br^-$	−38·4	(P-F) 53·2		162
$C_{13}F_2H_{27}I_2P$	$[nC_4H_9P^+CF_2I]\,I^-$	−62·0	(P-F) 64·7		102
$C_{13}F_2H_{28}BrP$	$[nC_4H_9P^+CF_2^{(1)}H^{(2)}]\,Br^-$	−128·1	(P-1) 64·2	(1-2) 46·5	162
$C_{13}F_2H_{30}Br_2NP$	$[(CH_3CH_2)_2NP^+CF_2Br]\,Br^-$	−47·4	(P-F) 88·4		162
$C_{13}F_2H_{31}BrNP$	$[(CH_3CH_2)NP^+CF_2^{(1)}H^{(2)}]\,Br^-$	−127·8	(P-1) 88·6	(1-2) 48·5	162
$C_{13}F_8H_8O_2$	$CF_2^{(1)}H^{(3)}{\cdot}(CF_2^{(2)})_4{\cdot}C(OH)=CH{\cdot}CO{\cdot}C_6H_5$ (*Z*)	(1) −139·9 (2) −128·8, −139·9, −120·0	(1-3) 55		113
$C_{13}F_8H_8O_3$	$C_6H_5CH_2{\cdot}CO{\cdot}CF_2^{(1)}{\cdot}CF_2^{(2)}{\cdot}CF_2^{(3)}{\cdot}CF_2^{(4)}{\cdot}CO_2H$	(1)(2) −123·7 (3) −121·3 (4) −120·9			241(a)
$C_{13}F_9H_{16}NO_3$	$\overline{O{\cdot}CH_2{\cdot}CH_2{\cdot}O{\cdot}CH(CF_2^{(1)})_4}{\cdot}CF^{(2)}H{\cdot}CO{\cdot}N(CH_2CH_3)_2$	(1) −119, −121, −124 (2) −197			232
$C_{13}F_{11}H_7N_2O_2$		(1)(3) −118·7 (2) −125·7 (4) −146·1 (5) −157·9 (6) −165·1			219(a)
$C_{13}F_{12}HN$		(1) −89·8 (2) −145·1 (3) −161·9 (4) −153·9	(1-5) 60·3	(2-5) 0·8	263(b)
$C_{13}F_{18}H_6O_2$	$(CH_2=CH{\cdot}CF_2^{(1)}{\cdot}CF_2^{(2)}{\cdot}O{\cdot}CF_2^{(3)}{\cdot}CF_2^{(4)})_2CF_2^{(5)}$	(1) −122 (2)(3) −83·5, −87·8 (4) −130 (5) −127			131
$C_{14}F_3H_{11}$	$(C_6H_5)_2CF^{(2)}{\cdot}CF_2^{(1)}H^{(3)}$	(1) −141·7 (2) −172·5	(1-2) 11·7 (2-3) 5·5	(1-3) 54	185

Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{14}F_4H_{12}P_2$	$(C_6H_5PH{\cdot}CF_2)_2$	−100·5		187
$C_{14}F_6H_{22}N_2O_2$	$[(CH_3CH_2)_2NCO{\cdot}CF^{(2)}H^{(3)}{\cdot}CF_2^{(1)}]_2$	(1) −122 to −123 (2) −197	(2-3) 45·8	232
$C_{15}F_9H_{21}N_2O_2$	$(CH_3CH_2)_2N{\cdot}CO{\cdot}CF_2^{(6)}{\cdot}CF_2^{(5)}{\cdot}CF_2^{(4)}{\cdot}CF_2^{(2)(3)}{\cdot}CF^{(1)}H^{(7)}{\cdot}CO{\cdot}N(CH_2CH_3)_2$ (1) −197 (2)(3) −117, −122 (4-6) −119 to −121		(1-7) 46 (2-3) 310	232
$C_{15}F_{28}O_7$	$F^{(1)}CO{\cdot}CF_2^{(2)}{\cdot}CF_2^{(3)}{\cdot}CF_2^{(4)}CF_2^{(5)}{\cdot}O{\cdot}(CF_2^{(6)}{\cdot}CF_2^{(6)}{\cdot}O)_4{\cdot}CF_2^{(7)}{\cdot}CO{\cdot}F^{(8)}$ (1) +21·2 (2) −120·6 (3) −124·9 (4) −127·6 (5) −85·4 (6) −90·8 (7) −79·2 (8) +10·45			275(a)
$C_{16}F_5H_{20}NO_2$	$C_6H_5CH_2{\cdot}O{\cdot}CH_2{\cdot}CF_2^{(1)}{\cdot}CF_2^{(2)(3)}{\cdot}CF^{(4)}H^{(5)}{\cdot}CO{\cdot}N(CH_2CH_3)_2$ (1) −121 (2) −122 (3) −127		(2-3) 294 (4-5) 47 (2-5) 15 (3-5) 7	232
$C_{16}F_6H_{19}NO$	$C_6H_5{\cdot}CH_2{\cdot}O{\cdot}CH_2{\cdot}CF_2^{(4)}{\cdot}CF_2^{(3)}{\cdot}CF^{(2)}{=}CF^{(1)}{\cdot}N(CH_2CH_3)_2$ (1)(2) −115, −120 (3)(4) −117, −122		(1-2) 12	232
$C_{19}F_2H_{12}Br_2ClP$	$[(pClC_6H_4)_3P^+CF_2Br]\,Br^-$	−52·8	(P-F) 86·0	162
$C_{19}F_2H_{15}Br_2P$	$[(C_6H_5)_3P^+CF_2Br]\,Br^-$	−50·5	(P-F) 84·5	162
$C_{19}F_2H_{15}I_2P$	As above with Br replaced by I	−58·1	(P-F) 86·6	162
$C_{19}F_2H_{16}BrP$	$[(C_6H_5)_3P^+CF_2^{(1)}H^{(2)}]\,Br^-$	−126·2	(P-1) 79·7 (1-2) 46·6	162
$C_{19}F_2H_{33}BrP$	$[(C_6H_{11})_3P^+CF_2Br]\,Br^-$	−42·5	(P-F) 55·2	162
$C_{20}F_8H_{10}D_4O_6$	$[D_2O{\cdot}C_6H_5{\cdot}CO{\cdot}CO{\cdot}CF_2^{(1)}{\cdot}CF_2^{(2)}]_2$	(1) −117·6 (2) −118·8		241(b)
$C_{20}F_8H_{10}O_4$	$[C_6H_5{\cdot}CO{\cdot}CO{\cdot}CF_2^{(1)}{\cdot}CF_2^{(2)}]_2$	(1) −118·4 (2) −121·3	(1-2) 13·5	241(b)
$C_{20}F_8H_{14}O_2$	$[C_6H_5CH_2{\cdot}CO{\cdot}CF_2^{(1)}{\cdot}CF_2^{(2)}]_2$	(1) −121·4 (2) −123·4	(1-2) 12·5	241(b)
$C_{20}F_8H_{14}O_6$	$[H_2O{\cdot}C_6H_5{\cdot}CO{\cdot}CO{\cdot}CF_2^{(1)}{\cdot}CF_2^{(2)}]_2$	(1) −119·5 (2) −121·6		241(b)

$C_{21}F_2H_{28}O_2$				(1-2) 53	283
$C_{22}F_2H_{21}Br_2OP$	$[(p CH_3OC_6H_4)_3P^+CF_2Br]\,Br^-$	−52·8		(P-F) 86·6	162
$C_{22}F_2H_{21}Br_2P$	$[(p CH_3C_6H_4)_3P^+CF_2Br]\,Br^-$	−50·8		(P-F) 83·5	162
$C_{23}F_4H_{34}Ge_2P_2$	$[(CH_3)_2GeF(CH_3)_2PC_6H_5]_2CF_2$		[a] [b]	(P-F) 69 (P-F) 70	115
$C_{25}F_2H_{51}Br_2P$	$[(nC_8H_{17})_3P^+CF_2Br]\,Br^-$	−52·3		(P-F) 64	162
$C_{26}F_8H_{20}MoO_2PSb$	$[(\eta\text{-}C_5H_5)Mo(CO)_2(P(C_6H_5)_3)CF_2^{(1)}]SbF_6$	(1) +160·54		^1J(1-C) 392	244(a)
$C_{39}F_4H_{30}Cl_2OPPt$	*cis*-$[PtCl(CF_2^{(1)}\cdot CO\cdot CF_2^{(2)}Cl)(P(C_6H_5)_3)_2]$	(1) −86·3 (2) −62·8		(1-2) 7·8 (Pt-1) 373 (Pt-2) 17 (P-1) *cis* 27 (P-1) *trans* 37	292(c)

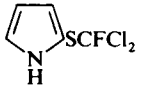
C. Fluorine nuclei in a CF group

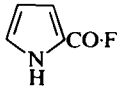
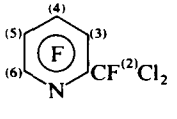
$CFBr_3$	$CFBr_3$			(Br-F) 30·5 (±1·5)	1
$CFCl_3S$	$CFCl_2\cdot SCl$	−29·3		(F-C) 329	2
CF_6H_3As	$CH_3^{(2)}F \rightarrow AsF_5$ (in SO_2ClF) (in SO_2F_2)	 −198·4		(1-2) 41·4 (1-C) 133·7 (1-2) 41·3 (1-C) 134·1	17
CF_6H_3Sb	$CH_3^{(2)}F^{(1)} \rightarrow SbF_5$	−162·2		(1-2) 41·2 (1-C) 126·0	17
$CF_{12}O_5S_2$	$CF^{(1)}OF^{(2)}\cdot(OOSF_4^{(3)}F^{(4)})_2$	(1) −90·8 (2) +169·6 (3)(4) +57·1		(1-2) 20·0 (1-3) 4	18
$C_2FH_2BrCl_2$	$CF^{(1)}Cl_2\cdot CH_2^{(2)}Br$			(1-2) 13·8	24
$C_2FH_2BrCl_2$	$CF^{(1)}H^{(2)}Cl\cdot CH^{(3)}BrCl$ (*erythro*) (*threo*)			(1-2) 53·6 (1-3) 16·2 (1-2) 51·2 (1-3) 12·5	24

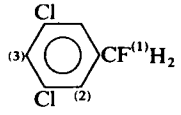
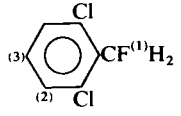
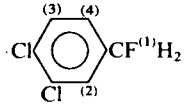
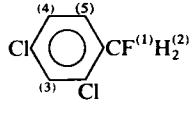
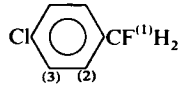
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_2FH_2Cl_3$	$CF^{(1)}Cl_2{\cdot}CH_2^{(2)}Cl$		(1-2) 13·4	24
$C_2FH_2Cl_3$	$CF^{(1)}H^{(2)}Cl{\cdot}CH^{(3)}Cl_2$		(1-2) 52·6 (1-3) 13·0	24
C_2FH_2N	$CF^{(1)}H_2^{(2)}{\cdot}CN$	−232·3	(1-2) 45·0	25
$C_2FH_4Cl_3Si$	$CF^{(1)}H_2^{(2)}{\cdot}CH_2^{(3)}{\cdot}SiCl_3$	−210·51	(1-2) 46·92 (1-3) 20·42 (Si-1) 20·42 ^1J(F-C) 171·3 ^2J(F-C) 22·1	26
C_2FH_5	$CF^{(1)}H_2^{(2)}{\cdot}CH_3^{(3)}$		(1-2) +47·0 (1-3) +26·7 ^1J(F-C) −160·1 ^2J(F-C) +21·1	27
C_2FCl_5	$CFCl_2{\cdot}CCl_3$	−62·4		23(a)
$C_2F_2Br_2Cl_2$	$CFBrCl{\cdot}CFBrCl$ (*meso*) (*dl*)	−63·8 −62·9		23(a)
$C_2F_2Cl_4$	$CFCl_2{\cdot}CFCl_2$	−67·0		23(a)
$C_2F_3H_3ClNOS$	$CF^{(1)}H^{(3)}Cl{\cdot}CH_2{\cdot}NSOF_2^{(2)}$	(1) −139·3 (2) +45·6	(1-2) 3·25 (1-3) 50	33
$C_2F_3H_3ClNOS$	$CH_2^{(3)}Cl{\cdot}CHF^{(1)}{\cdot}NSOF_2^{(2)}$	(1) −140·6 (2) +45·6	(1-3) 18·5 (2-3) 4·25	33
$C_2F_4N_2O_2S$	$CF^{(1)}(O)N{=}SF_2^{(2)}{=}NCF(O)$	(1) +17·9 (2) +51·2	(1-2) 9·5	37
$C_2F_5HClNOS$	$CF_2^{(3)}Cl{\cdot}CF^{(1)}H^{(4)}{\cdot}NSOF_2^{(2)}$	(1) −81·8 (2) +46·8	(3-4) 4·0 (1-4) 55 (1-2) 2·8	33
$C_2F_5HClNOS$	$CF^{(1)}H^{(4)}Cl{\cdot}CF_2^{(3)}{\cdot}NSOF_2^{(2)}$	(1) −73·0 (2) +47·0	(1-4) 51 (3-4) 4·0	33
$C_2F_7H_2BrS$	$CF^{(1)}H^{(5)}Br{\cdot}CH^{(6)}F^{(2)}{\cdot}SF_4^{(3)}F^{(4)}$ (*erythro*)	(1) −145·0 (2) −152·1 (3) +49·5 (4) +70·9	(1-2) 37 (1-3) 11 (1-4) 1 (2-4) 1 (3-4) 145 (1-5) 47 (1-6) 5 (2-6) 38 (3-6) 4·5 (4-6) 4·6 (2-5) 5	51

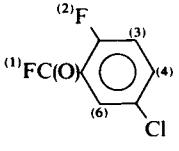
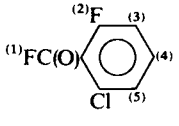
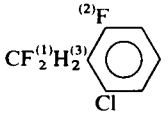
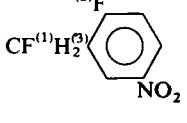
		(*threo*)	(1) −158·5 (2) −171·7 (3) +49·4 (4) +70·6	(1-2) 11 (3-4) 144 (1-6) 18 (3-6) 6	(1-3) 11 (1-5) 46 (2-6) 43 (2-5) 19	51
$C_2F_7H_2ClO_2S$	$F^{(1)}SF_4^{(2)}\cdot OO\cdot CF^{(3)}H^{(5)}\cdot CF^{(4)}H^{(6)}Cl$		(1)(2) +57·50 (3) −135·40 (4) −152·98	(1-3) 4·0 (3-4) 14·1 (3-6) 3·5 (4-6) 49·2	(2-3) 4 (3-5) 59·0 (4-5) 4·0	561
C_3FHCl_6	$CF^{(1)}Cl_2\cdot CH^{(2)}Cl\cdot CCl_3$		−50·08	(1-2) 2·67 Calculated: (1-2) *gauche* −1 ± 0·8 (1-2) *trans* +14·0 ± 1·6		54
$C_3FH_2LiO_3$	$CF^{(1)}H_2^{(2)}\cdot C(O)CO_2^-\ Li^+$			(1-2) 46		55
$C_3FH_4BrCl_2$	$CF^{(1)}H^{(2)}Cl\cdot CH^{(3)}Br\cdot CH_2Cl$	(*erythro*) (*threo*)		(1-2) 48·7 (1-2) 49·5	(1-3) 9·2 (1-3) 14·8	24
$C_3FH_4Cl_3$	$CF^{(1)}H^{(2)}Cl\cdot CH^{(3)}Cl\cdot CH_2Cl$	(*erythro*) (*threo*)		(1-2) 48·7 (1-2) 49·3	(1-3) 9·4 (1-3) 13·4	24
$C_3FH_4LiO_4$	$CF^{(1)}H_2^{(2)}\cdot C(OH)_2CO_2^-\ Li^+$			(1-2) 47		55
C_3FH_4N	$CH_3^{(3)}\cdot CF^{(1)}H^{(2)}\cdot CN$		−182·2	(1-2) 46·8	(1-3) 23·4	25
$C_3FH_5Br_2$	(1*S*, 2*S*)-$CF^{(1)}BrH^{(2)}\cdot CH^{(3)}Br\cdot CH_3$ (1*R*, 2*S*)-isomer		−128·5 −145·5	(1-2) 49·8 (1-2) 50·3	(1-3) 9·1 (1-3) 21·6	56(a)
C_3FH_5ClI	$CF^{(1)}H^{(2)}I\cdot CH_2^{(3)(4)}\cdot CH_2Cl$		−143·6	(1-2) 50·0 (1-4) 15·0	(1-3) 21·5	57
C_3FH_5ClI	$CH_2^{(3)}I\cdot CF^{(1)}H^{(2)}\cdot CH_2^{(4)}Cl$		−170·2	(1-2) 46·2 (1-4) 17·5	(1-3) 17·5	57
$C_3FH_5DNO_2$	$CF^{(1)}H_2^{(2)}\cdot CD(NH_2)\cdot CO_2H$		−227·3	(1-2) 46		58
C_3FH_6Br	$CF^{(1)}BrH^{(2)}\cdot CH_2^{(3)}\cdot CH_3$		−132·0	(1-2) 50·5	(1-3) 18·0	56
C_3FH_6Br	$CH_3^{(3)}\cdot CF^{(1)}H^{(2)}\cdot CH_2^{(4)}Br$		−170·4	(1-2) 47·8 (1-4) 18·2	(1-3) 23·0	59
C_3FH_6Cl	$CF^{(1)}H_2^{(2)}\cdot CH^{(3)}Cl\cdot CH_3$		−215·8	(1-2) 46·7	(1-3) 14·3	59

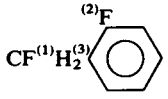
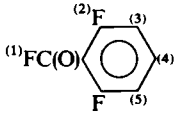
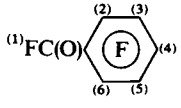
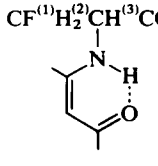
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_3FH_6Cl_3Si$	$CF^{(1)}H_2^{(2)}\cdot CH_2\cdot CH_2\cdot SiCl_3$	−219·85	(1-2) 46·5 ^1J(1-C) 169·9 ^2J(1-C) 21·3 ^3J(1-C) 5·1	26
C_3FH_6I	$CH_3^{(3)}\cdot CF^{(1)}H^{(2)}\cdot CH_2^{(4)}I$	−162·3	(1-2) 47·6 (1-3) 22·7 (1-4) 17·1	59
$C_3FH_6NO_2$	$CF^{(1)}H_2^{(2)}\cdot CH^{(3)}(NH_2)\cdot CO_2H$	−233·2, −233·5	(1-2) 46 (1-3) 29·5	58
$C_3FH_6NO_2$	$CF^{(1)}H_2^{(2)(3)}\cdot CH^{(4)}(NH_2)\cdot CO_2H$	(1-2) (1-3) (1-4) ^1J(1-C) ^2J(1-C) ^3J(1-C) (neutral) 45·98 47·40 29·55 169 20·0 6·3 (acid) 45·51 47·25 30·10 171 20·0 5·2 (alkaline) 46·81 47·49 29·94 166 19·4 7·6		60
$C_3FH_6NO_2$	$CH_2^{(3)(4)}NH_2\cdot CF^{(1)}H^{(2)}\cdot CO_2H$	(1-2) (1-3) (1-4) ^1J(1-C2) ^2J(1-C1) ^2J(1-C3) (neutral) −188·45 50·58 28·11 17·73 184 21·3 21·3 (acid) −189·83 49·92 27·77 18·54 184 22·5 21·1 (alkaline) −188·13 51·33 26·56 25·32 181 21·0 21·4		60
C_3FH_7	$CF^{(1)}H_2^{(2)}\cdot CH_2^{(3)}\cdot CH_3^{(4)}$		(1-2) +48·0 (1-3) +25·2 (1-4) 0·5 ^1J(1-C) −163·3 ^2J(1-C) +19·5 ^3J(1-C) +6·7	27
C_3FH_7	$CF^{(1)}H^{(2)}\cdot(CH_3^{(3)})_2$		(1-2) +48·4 (1-3) +23·2 ^1J(1-C) −162·1 ^2J(1-C) +22·4	27
$C_3FH_9N_2O_3$	$CF^{(1)}H_2\cdot C(OH)(NH_2)CO_2^-\ NH_4^+$		^1J(F-C) 172 ^2J(F-C) 19 ^3J(F-C) 3	55
$C_3FH_{10}N_3O_2$	$CFH_2\cdot C(NH_2)_2CO_2^-\ NH_4^+$		^1J(F-C) 173 ^2J(F-C) 19 ^3J(F-C) 3	55

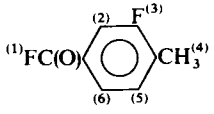
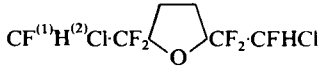
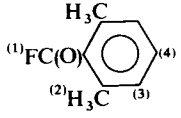
$C_3F_2HCl_5$	$CF^{(1)}Cl_2{\cdot}CH^{(3)}Cl{\cdot}CF^{(2)}Cl_2$	−54·54		(1-2) 20·9 Calculated: (1-3) *gauche* 3·3 ± 0·3 in both conformers (1-3) *trans* 15·5 ± 0·6	(1-3) 4·93	54
$C_3F_2H_3N$	$CF^{(1)}H_2{\cdot}CF^{(2)}H{\cdot}CN$	(1) −244·7	(2) −196·6			25
$C_3F_3H_7Si$	$(CH_2F^{(1)})_2SiF^{(2)}{\cdot}CH_3^{(3)}$	(1) −280·0	(2) −176·0	(1-3) 4·8	(2-3) 5·8	45(a)
C_4FH_6N	$CF^{(1)}H_2^{(2)}{\cdot}CH_2^{(3)}{\cdot}CH_2{\cdot}CN$			(1-2) 47	(1-3) ~32	79
$C_4FH_7Br_2N_2O_4Si$	$F^{(1)}C(NO_2)_2{\cdot}CH_2^{(2)}{\cdot}CH_2{\cdot}SiBr_2{\cdot}CH_3$	−103·5		(1-2) 17		80
$C_4FH_{11}Si$	$CF^{(1)}H_2^{(2)}{\cdot}Si(CH_3^{(3)})_3$	−270·37		(1-2) 47·53 (Si-1) 21·0 ^3J(1-C) 2·2	(1-3) 0·64 ^1J(1-C) 161·0	26
$C_4F_2H_{10}Si$	$(CF^{(1)}H_2^{(2)})_2Si(CH_3)_2$	−273·64		(1-2) 47·1		45(a)
$C_4F_3H_4BrO_2$	$CF^{(1)}H^{(2)}Br{\cdot}CF_2{\cdot}CO_2CH_3$			(1-2) 47·5		64
$C_4F_3H_5BrNO$	$CF^{(1)}H^{(2)}Br{\cdot}CF_2{\cdot}C(=NH)OCH_3$			(1-2) 45·5		64
$C_4F_3H_7N_2O_4Si$	$F^{(1)}C(NO_2)_2{\cdot}CH_2^{(3)}{\cdot}CH_2{\cdot}SiF_2^{(2)}{\cdot}CH_3^{(4)}$	(1) −104·5	(2) −132·3	(1-3) 16	(2-4) 6	80
$C_4F_3H_9Si$	$(CF^{(1)}H_2^{(2)})_3SiCH_3$	−276·23		(1-2) 46·8		45
$C_4F_4H_6$	$(CF^{(1)}H_2^{(3)})_3CF^{(2)}$	(1) −240·6	(2) −181·9	(1-2) 12·5 (2-3) 17·9	(1-3) 48·4	83
$C_4F_4H_8Ge$	$(CF^{(1)}H_2^{(2)})_4Ge$	−269·9		(1-2) 46·7		45(a)
$C_4F_4H_8Si$	$(CF^{(1)}H_2^{(2)})_4Si$	−279·63		(1-2) 46·9		45(a)
$C_4F_7H_2ClO$	$CF^{(1)}H_2^{(2)}{\cdot}O{\cdot}CF_2{\cdot}CF_2{\cdot}CF_2Cl$			(1-2) 51·0		64
$C_5FH_4Cl_2NS$		−22·51				109

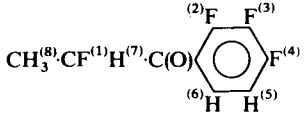
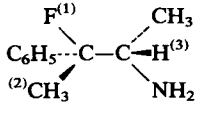
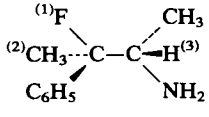
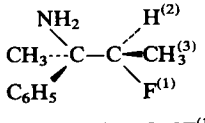
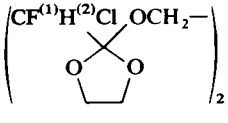
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
C_5FH_4NOS		+41·11		109
C_5FH_8ClO	$CH_2^{(3)}Cl{\cdot}CF^{(1)}H^{(2)}{\cdot}CO{\cdot}CH_2{\cdot}CH_3$	−196	(1-2) 48 (1-3) 22	110
$C_5FH_{10}NO$	$(CH_3CH_2)_2N{\cdot}CO{\cdot}F$	−23·1		111
$C_5FH_{10}NO_2$	$(CH_3^{(2)})_2CF^{(1)}{\cdot}CH^{(3)}(NH_2){\cdot}CO_2H$	−143·5	(1-2) 22·5, 24 (1-3) 14	112
C_5FH_{11}	$(CH_3)_3C{\cdot}CH_2^{(2)}F^{(1)}$	−222·23	(1-2) 48·0 ^1J(1-C) 173·5 ^2J(1-C) 17·6 ^3J(1-C) 4·4	26
$C_5F_2H_8N_2O_2S$	$CF^{(1)}(O){\cdot}N{=}SF^{(2)}{\cdot}\overline{N{\cdot}CH_2{\cdot}CH_2{\cdot}O{\cdot}CH_2{\cdot}CH_2}$	(1)(2) +11·5, +27·9		114(c)
$C_5F_2H_{10}N_2O_5Si$	$CF^{(1)}(NO_2)_2CH_2^{(3)}{\cdot}CH_2{\cdot}SiF^{(2)}(CH_3^{(4)}){\cdot}OCH_3$	(1) −104·7 (2) −138·1	(1-3) 16 (2-4) 6	80
$C_5F_4H_7Cl$	$CF^{(1)}H^{(3)}Cl{\cdot}CF_2{\cdot}CH(CH_3){\cdot}CF^{(2)}H_2^{(4)}$		(1-3) 48 (2-4) 48	116
$C_6FH_{10}ClO_2$	$CF^{(1)}H^{(2)}Cl{\cdot}CO{\cdot}O{\cdot}(CH_2)_3{\cdot}CH_3$		(1-2) 50	111
$C_6FH_{13}N_2O_4Si$	$CF(NO_2)_2{\cdot}CH_2{\cdot}CH_2{\cdot}Si(CH_3)_3$	−106·0		80
$C_6FH_{13}N_2O_5Si$	$CF(NO_2)_2CH_2{\cdot}O{\cdot}CH_2{\cdot}Si(CH_3)_3$	−110·25		80
$C_6FH_{15}Si$	$CF^{(1)}H_2^{(2)}{\cdot}(CH_2)_2{\cdot}Si(CH_3)_3$	−215·09	(1-2) 48·0 (Si-1) 1·0 ^1J(1-C) 169·9 ^2J(1-C) 19·8 ^3J(1-C) 4·4	26
$C_6F_2H_{10}N_2OS$	$CF(O){\cdot}N{=}SF{\cdot}N(CH_2)_5$	+11·4, +30·0		114(c)
$C_6F_5Cl_2N$		(2) −60·7 (3) −139·4 (4) −137·1 (5) −153·1 (6) −83·4	(2-3) 29·8 (3-4) 17·6 (3-5) 9·3 (3-6) 26·8 (4-5) 16·4 (4-6) 17·5 (5-6) 23·0	320(a)
C_7FH_5BrD	pBrC$_6$H$_4{\cdot}$CH$^{(2)}$DF$^{(1)}$	−208·42	(1-2) 47·9 (1-D) 7·2	158

C_7FH_5ClD	$pClC_6H_4\cdot CH^{(2)}DF^{(1)}$	−207·90	(1-2) 47·7	(1-D) 7·3	158
$C_7FH_5Cl_2$			(1-2) −1·34	(1-3) 1·11	159
$C_7FH_5Cl_2$			(1-2) 1·25	(1-3) −2·43	159
$C_7FH_5Cl_2$			(1-2) −1·58 (1-4) −1·49	(1-3) 1·12	159
$C_7FH_5Cl_2$			(1-2) 47·17 (1-4) 0·71	(1-3) 1·35 (1-5) −0·70	159
$C_7FH_5DNO_2$	$pNO_2C_6H_4\cdot CH^{(2)}DF^{(1)}$	−208·42	(1-2) 47·9	(1-D) 7·2	158
C_7FH_6Cl	$pClC_6H_4\cdot CFH_2$	−208·34			160
C_7FH_6Cl			(1-2) −1·67	(1-3) 1·11	159
C_7FH_6D	$C_6H_5\cdot CH^{(2)}DF^{(1)}$	−207·11	(1-2) 48·4	(1-D) 7·6	158
$C_7FH_6NO_2$	$pNO_2C_6H_4\cdot CFH_2$	−216·46			160
C_7FH_7	$C_6H_5\cdot CFH_2$	−207·60			160
C_7FH_7S	$C_6H_5\cdot S\cdot CF^{(1)}H_2^{(2)}$	−185·3	(1-2) 60		161
$C_7FH_{12}ClO$	$CH_3\cdot(CH_2)_3\cdot CO\cdot CF^{(1)}H^{(2)}\cdot CH_2^{(2)}Cl$	−195·1	(1-2) 50	(1-3) 24	110

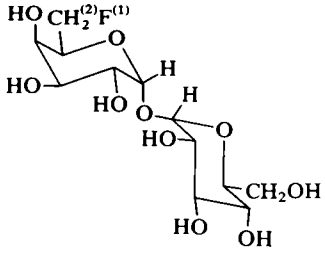
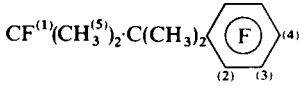
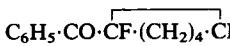
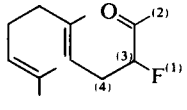
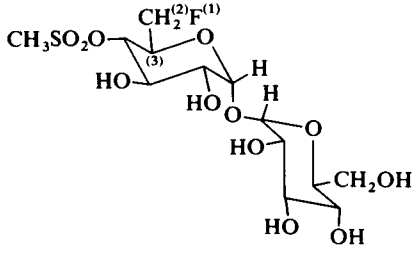
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
C_7FH_{15}	$CF^{(1)}H_2^{(2)}\cdot(CH_2)_5\cdot CH_3$	−218·9	(1-2) 47·5 ^1J(1-C) 164·8 ^2J(1-C) 19·5 ^3J(1-C) 4·9	26
$C_7FH_{15}N_2O_4Si$	$CF^{(1)}(NO_2)_2\cdot CH_2^{(2)}\cdot CH_2\cdot CH_2\cdot Si(CH_3)_3$	−102·8	(1-2) 19	80
$C_7FH_{18}Br_3NP$	$[(CH_3)_2N]_3P^+CFBr_2\ Br^-$	−67·6	(P-F) 76·7	162
$C_7FH_{18}Cl_3NP$	As above with Br replaced by Cl	−58·8	(P-F) 84·2	162
$C_7FH_{19}Br_2NP$	$[(CH_3)_2N]_3P^+CF^{(1)}H^{(2)}Br\ Br^-$	−145·6	(P-1) 72·0 (1-2) 46·1	162
$C_7FH_{19}Cl_2NP$	As above with Br replaced by Cl	−153·6	(P-1) 78·0 (1-2) 43·0	162
$C_7FH_{20}BrNP$	$[(CH_3)_2N]_3P^+CF^{(1)}H_2^{(2)}\ Br^-$	−244·7	(P-1) 59·9 (1-2) 45·4	162
$C_7F_2H_3ClO$		(1) +31·14 (2) −109·15	(1-2) 43·56 (1-3) 0·89 (1-4) <0·03 (1-6) −0·68 (2-3) 9·76 (2-4) 4·11 (2-6) 5·95	163(n)
$C_7F_2H_3ClO$		(1) +51·15 (2) −107·28	(1-2) 30·60 (1-3) 0·76 (1-4) −0·29 (1-5) 0·82 (2-3) 9·30 (2-4) 5·83 (2-5) −1·43	163(n)
$C_7F_2H_5Cl$		(1) −211·71 (2) −113·81	(1-2) 2·86 (1-3) 47·47 (2-3) 2·07	164
$C_7F_2H_5NO_2$		(1) −219·67 (2) −109·19	(1-2) 1·10 (1-3) 46·65 (2-3) 1·28	164

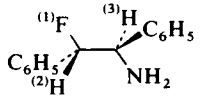
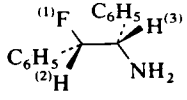
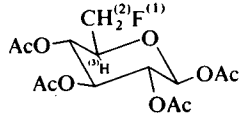
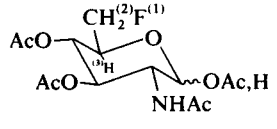
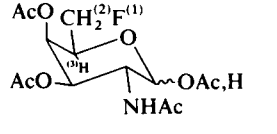
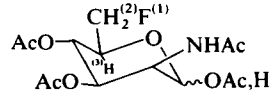
$C_7F_2H_6$		(1) −216·72	(2) −119·28	(1-2) 0·82 (2-3) 1·13	(1-3) 46·90	164
$C_7F_2H_6$	$pFC_6H_4\cdot CF^{(1)}H_2$	(1) −204·86				160
$C_7F_3H_3O$		(1) +46·98	(2) −106·0	(1-2) 37·53 (1-4) <0·03 (2-4) 6·03 (2-5) −1·32	(1-3) 1·00 (2-3) 9·63 (2-6) 0·51	163(n)
$C_7F_3H_8Cl_3O_2$	$CF^{(1)}H^{(2)}Cl\cdot CF_2\cdot CH(CH_3)\cdot CH_2\cdot O\cdot CO\cdot CHCl_2$			(1-2) 48		116
C_7F_6O		(1) +47·08 (3) −160·55	(2) −134·74 (4) −143·92	(1-2) 38·84 (1-4) 1·13 (2-4) 7·88 (3-4) −19·60 (2-5) 8·92	(1-3) 2·59 (2-3) −20·64 (2-6) −8·57 (3-5) −0·54	163
C_8FH_6N	$pCNC_6H_4\cdot CFH_2$	−216·01				160
C_8FH_8D	$pCH_3C_6H_4\cdot CF^{(1)}H^{(2)}D$	−204·23		(1-2) 48·4	(1-D) 7·6	158
C_8FH_9	$pCH_3C_6H_4\cdot CFH_2$	−204·57				160
C_8FH_9O	$pCH_3OC_6H_4\cdot CFH_2$	−200·14				160
$C_8FH_{11}KNO_3$				(1-2) ~46	(1-3) ~31	182
$C_8FH_{13}O$	$CF^{(1)}H_2^{(2)}\cdot CO\cdot C_6H_{11}$	−277		(1-2) 48		183
$C_8FH_{14}ClO$	$CH_2^{(3)}Cl\cdot CF^{(1)}H^{(2)}\cdot CO\cdot (CH_2)_4\cdot CH_3$	−195·4		(1-2) 49	(1-3) 23	110
$C_8FH_{19}Si$	$CF^{(1)}H_2^{(2)}\cdot (CH_2)_4\cdot Si(CH_3)_3$	−218·06		(1-2) 48·0		26

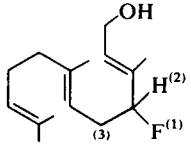
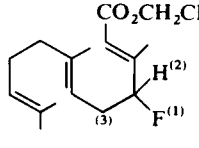
Molecular formula	Structure of compounds		Chemical shifts (ppm)		Coupling constants (Hz)		Ref.
$C_8F_2H_6O$			(1) +17·16	(3) −114·87	(1-2) −0·481 (1-4) <0·03 (1-6) −0·592 (3-4) 2·119 (3-6) −0·531	(1-3) 4·516 (1-5) 1·563 (2-3) 9·516 (3-5) 7·310	163(n)
$C_8F_2H_8$	$CF^{(1)}H_2^{(3)}\cdot CF^{(2)}H^{(4)}\cdot C_6H_5$		(1) −247·5	(2) −208·5	(1-2) 16 (2-4) 50	(1-3) 48 (2-3) 22	185
$C_8F_4H_{14}N_4O_9Si_2$	$[CF^{(1)}(NO_2)_2\cdot CH_2^{(3)}\cdot CH_2\cdot SiF^{(2)}(CH_3^{(4)})]_2O$		(1) −105·5	(2) −132·0	(1-3) 20	(2-4) 6	80
$C_8F_6H_8Cl_2O$					(1-2) 48		116
C_9FH_8ClO	$CH_2^{(3)}Cl\cdot CF^{(1)}H^{(2)}\cdot CO\cdot C_6H_5$		−188·6		(1-2) 47	(1-3) 23	110
C_9FH_9O					(1-2) −3·091 (1-4) −0·370	(1-3) 1·087	202
C_9FH_9O	$CF^{(1)}H_2^{(2)}\cdot CO\cdot CH_2^{(3)}\cdot C_6H_5$		−228		(1-2) 47	(1-3) 3	183
$C_9FH_{16}N_3O_3S$	$F\cdot CO\cdot N{=}S(N\cdot CH_2\cdot CH_2\cdot O\cdot CH_2\cdot CH_2)_2$		+3·8				114(c)
$C_9F_2H_8Cl_2$	$CF^{(2)}H^{(3)}Cl\cdot CF^{(1)}Cl\cdot CH_2^{(4)}\cdot C_6H_5$	[a]	(1) −116·8	(2) −143·9	(1-2) 20 (1-4) 21, 16	(1-3) 6 (2-3) 49	203(a)
		[b]	(1) −117·4	(2) −143·0	(1-2) 20 (1-4) 20	(1-3) 5 (2-4) 49	
$C_9F_2H_{10}$	$CF^{(1)}H_2^{(3)}\cdot CF^{(2)}(CH_3^{(4)})\cdot C_6H_5$		(1) −246	(2) −172·5	(1-2) 13·5 (1-4) 3 (2-4) 21	(1-3) 48 (2-3) 33	185

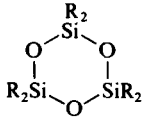
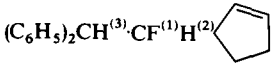
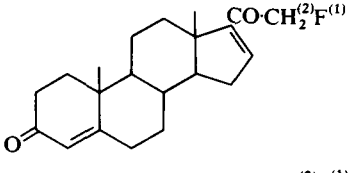
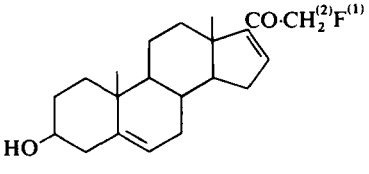
$C_9F_4H_6O$		(1) −184·4 (3) −162·3	(2) −133·3 (4) −128·7	(1-2) 15·5 (1-8) 23·0 (2-4) 12·0 (3-5) 6·5 (4-5) 9·2	(1-7) 48·0 (2-3) 20·0 (3-4) 19·0 (3-6) 1·5 (4-6) 6·2	424
$C_{10}FH_{10}ClO$	$CH_2^{(3)}Cl{\cdot}CF^{(1)}H^{(2)}{\cdot}CO{\cdot}CH_2{\cdot}C_6H_5$	−193·9		(1-2) 49	(1-3) 22	110
$C_{10}FH_{11}O$	$(CH_3^{(2)})_2CF^{(1)}{\cdot}CO{\cdot}C_6H_5$	−144		(1-2) 22		223
$C_{10}FH_{14}N$	$C_6H_5{\cdot}CF(CH_2CH_3){\cdot}CH_2{\cdot}NH_2$	−170·8				223
$C_{10}FH_{14}N$	$C_6H_5{\cdot}CF^{(1)}H^{(2)}{\cdot}C(CH_3)_2{\cdot}NH_2$	−186·4		(1-2) 45		223
$C_{10}FH_{14}N$	$C_6H_5{\cdot}CH^{(2)}(NH_2){\cdot}CF^{(1)}(CH_3^{(3)})_2$	−141·5		(1-2) 12	(1-3) 21	223
$C_{10}FH_{14}N$		−159·1		(1-2) 23	(1-3) 16	223
$C_{10}FH_{14}N$		−158·3		(1-2) 23	(1-3) 16	223
$C_{10}FH_{14}N$		−180·8		(1-2) 48	(1-3) 24	223
$C_{10}FH_{20}NO$	$CH_3{\cdot}(CH_2)_4{\cdot}CO{\cdot}CF^{(1)}H^{(2)}{\cdot}CH_2^{(3)}{\cdot}N(CH_3)_2$	−191·7		(1-2) 50	(1-3) 26	110
$C_{10}F_2H_{14}Cl_2O_6$		−149		(1-2) 49·5		116
$C_{10}F_3H_{17}ClNO_2$	$CF^{(1)}H^{(2)}Cl{\cdot}CF_2{\cdot}CH(CH_3){\cdot}CH_2{\cdot}O{\cdot}CO{\cdot}N(CH_2CH_3)_2$			(1-2) 48		116
$C_{10}F_5H_{10}Cl_3O_4$	$CF^{(1)}H^{(4)}Cl{\cdot}CF_2{\cdot}CH(OCO{\cdot}CF^{(2)}H^{(5)}Cl){\cdot}(CH_2)_3{\cdot}O{\cdot}CO{\cdot}CF^{(3)}H^{(6)}Cl$			(1-4) 48 (3-6) 50	(2-5) 50	116

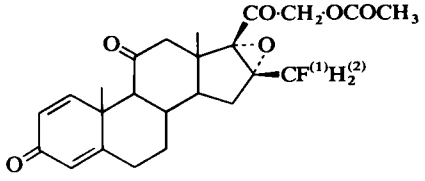
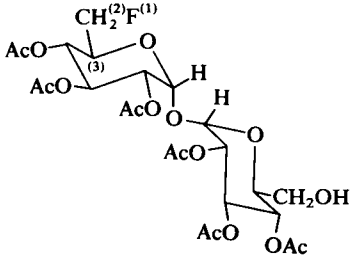
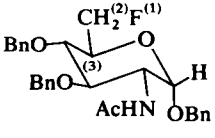
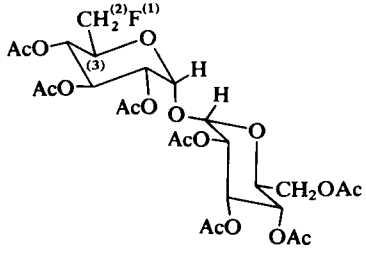
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{11}FH_{12}BrO_2$	o-$BrC_6H_4{\cdot}CF^{(1)}H^{(2)}{\cdot}CH_2{\cdot}CO_2CH_2CH_3$	−181·36	(1-2) 49·35	238(b)
	m-isomer	−175·92	45·05	
	p-isomer	−175·01	46·0	
$C_{11}FH_{12}ClO_2$	o-$ClC_6H_4{\cdot}CF^{(1)}H^{(2)}{\cdot}CH_2{\cdot}CO_2CH_2CH_3$	−182·01	(1-2) 48·90	238(b)
	m-isomer	−175·62	45·59	
	p-isomer	−173·05	45·80	
$C_{11}FH_{12}NO_3$	o-$NO_2C_6H_4{\cdot}CF^{(1)}H^{(2)}{\cdot}CH_2{\cdot}CO_2CH_2CH_3$	−178·06	(1-2) 49·50	238(b)
	m-isomer	−177·62	47·0	
	p-isomer	−178·98	47·0	
$C_{11}FH_{13}O_2$	$C_6H_5{\cdot}CF^{(1)}H^{(2)}{\cdot}CH_2{\cdot}CO_2CH_2CH_3$	−174·14	(1-2) 46·50	238(b)
$C_{11}FH_{14}NO$	$C_6H_5{\cdot}CO{\cdot}CF^{(1)}H^{(2)}{\cdot}CH_2^{(3)}{\cdot}N(CH_3)_2$	−189·2	(1-2) 49 (1-3) 26	110
$C_{11}FH_{16}N$	$C_6H_5{\cdot}CF^{(1)}(CH_3^{(2)}){\cdot}C(NH_2)(CH_3)_2$	−155·1	(1-2) 24	223
$C_{11}FH_{16}N$	$C_6H_5{\cdot}C(NH_2)(CH_3){\cdot}CF^{(1)}(CH_3^{(2)})_2$	−149·1	(1-2) 22	223
$C_{11}FH_{20}N_3OS$	$C(O)F{\cdot}N{=}S[N(CH_2)_5]_2$	+5·3		114(c)
$C_{11}F_2H_{12}O_2$	o-$FC_6H_4{\cdot}CF^{(1)}H^{(2)}{\cdot}CH_2{\cdot}CO_2CH_2CH_3$	−181·16	(1-2) 47·94	238(b)
	m-isomer	−174·63	46·0	
	p-isomer	−172·23	46·0	
$C_{12}FH_{14}ClO$	$C_6H_5{\cdot}(CH_2)_3{\cdot}CO{\cdot}CF^{(1)}H^{(2)}{\cdot}CH_2^{(3)}Cl$	−195·8	(1-2) 50 (1-3) 23	110
$C_{12}FH_{15}O_2$	m-$CH_3C_6H_4{\cdot}CF^{(1)}H^{(2)}{\cdot}CH_2{\cdot}CO_2CH_2CH_3$	−174·36	(1-2) 47·95	238(b)
$C_{12}FH_{15}O_3$	m-$CH_3OC_6H_4{\cdot}CF^{(1)}H^{(2)}{\cdot}CH_2{\cdot}CO_2CH_2CH_3$	−173·45	(1-2) 47·48	238(b)
$C_{12}FH_{16}NO$	$C_6H_5{\cdot}CH_2{\cdot}CO{\cdot}CF^{(1)}H^{(2)}{\cdot}CH_2^{(3)}{\cdot}N(CH_3)_2$	−190·6	(1-2) 49 (1-3) 24	110

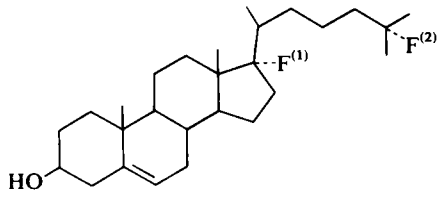
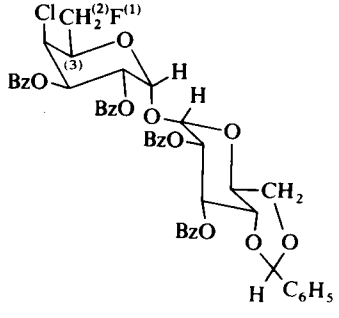
$C_{12}FH_{21}O_{10}$		−231·8		(1-2) ~40	(1-3) ~17	246(b)
$C_{12}F_6H_{12}$		(1) −150 (3) −170	(2) −139 (4) −165	(1-2) 3·5 (2-3) 20	(1-5) 22 (3-4) 20	249
$C_{13}FH_{15}O$		−165				223
$C_{13}FH_{17}O_2$	$C_6H_5{\cdot}CF^{(1)}H^{(2)}{\cdot}C(CH_3)_2CO_2CH_2CH_3$	−174·65		(1-2) 45·75		238(b)
$C_{13}FH_{21}O$				(1-2) 4·5 (1-4) 26	(1-3) 50	257
$C_{13}FH_{23}O_{12}S$		−239·0		(1-2) 50	(1-3) 27	246(b)
$C_{14}FH_{11}Br_2$	$(C_6H_5)_2CF^{(1)}{\cdot}CH_2^{(2)}Br$	−158		(1-2) 22·5		264
$C_{14}FH_{11}O$	$C_6H_5{\cdot}CO{\cdot}CF^{(1)}H^{(2)}{\cdot}C_6H_5$	−175·4		(1-2) 50		223

Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{14}FH_{14}N$		−180·5	(1-2) 47 (1-3) 14	223
$C_{14}FH_{14}N$		−182·6	(1-2) 47 (1-3) 14	223
$C_{14}FH_{19}O_9$		−233·5	(1-2) 48·2 (1-3) 22·0	265
$C_{14}FH_{20}NO$	$C_6H_5{\cdot}(CH_2)_3{\cdot}CO{\cdot}CF^{(1)}H^{(2)}{\cdot}CH_2^{(3)}{\cdot}N(CH_3)_2$	−192	(1-2) 50 (1-3) 24	110
$C_{14}FH_{20}NO_8$		(α) −233·1 (β) −232·5	(1-2) 46·9 (1-3) 23·0 (1-2) 48·2 (1-3) 21·8	265
$C_{14}FH_{20}NO_8$		−230·8	(1-2) 47·5 (1-3) 18·5	265
$C_{14}FH_{20}NO_8$		−234·0, −233·3	(1-2) 49·5, 47·5 (1-3) 26·0, 23·5	265
$C_{14}F_2H_{11}Cl$	$(mClC_6H_4)C_6H_5CF^{(1)}{\cdot}CH_2^{(3)}F^{(2)}$	(1) −169·5 (2) −245	(1-2) 18 (1-3) 24 (2-3) 47	185
$C_{14}F_2H_{11}Cl$	As above but with $pClC_6H_4$	(1) −169·5 (2) −245	(1-2) 18 (1-3) 23 (2-3) 47	185

$C_{14}F_2H_{12}$	As above with Cl replaced by H	(1) −169·5	(2) −245	(1-2) 18 (2-3) 47	(1-3) 22	185
$C_{15}FH_{16}N$	$(C_6H_5)_2CF^{(1)}\cdot CH^{(2)}(CH_3)\cdot NH_2$	−174·5		(1-2) 25		223
$C_{15}FH_{25}O$				(1-2) ~48	(1-3) 26	257
$C_{15}F_2H_{14}$	$(p CH_3C_6H_4)C_6H_5\cdot CF^{(2)}\cdot CH_2^{(3)}F^{(1)}$	(1) −254	(2) −169·5	(1-2) 18 (2-3) 22·5	(1-3) 47	185
$C_{15}F_2H_{14}$	As above but *m*CH_3	(1) −245	(2) −170	(1-2) 18 (2-3) 24	(1-3) 47	185
$C_{15}F_2H_{14}$	$(C_6H_5)_2CF^{(1)}\cdot CF^{(2)}H^{(3)}\cdot CH_3$	(1) −173·3	(2) −194·3	(1-2) 17 (2-3) 45	(1-3) 18	185
$C_{15}F_2H_{14}O$	$(p CH_3OC_6H_4)C_6H_5\cdot CF^{(2)}\cdot CH_2^{(3)}F^{(1)}$	(1) −254	(2) −167·5	(1-2) 18 (2-3) 22	(1-3) 47	185
$C_{16}FH_{17}N_2O_4Si$	$CF^{(1)}(NO_2)_2\cdot CH_2^{(2)}\cdot CH_2\cdot Si(CH_3)(C_6H_5)_2$	−104·4		(1-2) 22		80
$C_{16}F_2H_{22}O_2$	$C_6H_{11}\cdot C(OH)(CF^{(1)}H_2^{(3)})\cdot CF^{(2)}H^{(4)}\cdot C_6H_{11}$	(1) −200·75, −204·1 (2) −228·25, −231·6		(1-3) 48, 48 (2-4) 48, 48		183
$C_{17}FH_{27}O_2$				(1-2) ~50	(1-3) 23	257
$C_{18}F_2H_{18}N_4O_8Si$	$[CF^{(1)}(NO_2)CH_2^{(2)}CH_2]_2Si(C_6H_5)_2$	−105·7		(1-2) 18		80
$C_{18}F_2H_{18}O_2$	$CF^{(1)}H_2^{(3)}\cdot C(OH)(CH_2C_6H_5)\cdot CF^{(2)}H^{(4)}\cdot CO\cdot CH_2\cdot C_6H_5$	(1) −193 and −200·8 (2) −226·2 and −231·2		(1-3) 48 and 49 (2-4) 47 and 48		183

Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)		Ref.
$C_{18}F_6H_{24}N_{12}O_{27}Si_3$	 $R=CF(NO_2)_2CH_2CH_2$	−106·0			80
$C_{19}FH_{15}Br_3P$	$[(C_6H_5)_3P^+CFBr_2]\,Br^-$	−74·2	(P-F) 77·9		162
$C_{19}FH_{16}Br_2P$	$[(C_6H_5)_3P^+CF^{(1)}H^{(2)}Br]\,Br^-$	−162·6	(P-1) 72·9	(1-2) 44·4	162
$C_{19}FH_{16}I_2P$	As above with Br replaced by I	−184·4	(P-1) 66·0	(1-2) 45·5	162
$C_{19}FH_{17}BrP$	$[(C_6H_5)_3P^+CF^{(1)}H_2^{(2)}]\,Br^-$	−242·9	(P-1) 57·7	(1-2) 44·1	162
$C_{19}FH_{19}$		−184·8	(1-2) 57	(1-3) 19·5	282
$C_{21}FH_{27}O_2$			(1-2) 47		283
$C_{21}FH_{29}O_2$			(1-2) 48		283
$C_{22}FH_{21}Br_3P$	$[(pCH_3C_6H_4)_3P^+CFBr_2]\,Br^-$	−78·2			162
$C_{22}FH_{22}Br_2P$	$[(pCH_3C_6H_4)_3P^+CF^{(1)}H^{(2)}Br]\,Br^-$	−162·2	(P-1) 72·5	(1-2) 44·9	162

$C_{24}FH_{27}O_6$			(1-2) 47		285
$C_{24}FH_{33}O_{16}$		−231·5	(1-2) 45	(1-3) 21	246(b)
$C_{26}FH_{26}NO_8$	 Bn = CO·C$_6$H$_5$	−233·7	(1-2) 47·5	(1-3) 22·5	265
$C_{26}FH_{35}O_{17}$		−237·9	(1-2)+(1-3) 92·5 (1-4) 21·5		287(b)

Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{27}F_2H_{44}O$		(1) −170 (2) −135·5		393
$C_{47}FH_{48}ClO_9$	 $Bz = CH_2C_6H_5$	−230·9		246(b)
$C_{48}FH_{51}O_{12}S$	As above with Cl replaced by equatorial SO_2CH_3	−237·9	(1-2) 50 (1-3) 24	246(b)
$C_{54}FH_{53}O_{11}$	As above with Cl replaced by $OCH_2C_6H_5$	−231·3		246(b)

D. Miscellaneous studies

The temperature and pressure dependence of the F-19 chemical shifts of CF_4, CF_3H, CF_3Cl, CF_3Br, CH_3F, and $CF_3 \cdot CF_3$ have been studied in the gas phase.(294–297) The angular momentum correlation time for CF_4 was deduced from the F-19 spin–lattice relaxation times. (298, 299) Other F-19 and H-1 relaxation studies have been made of *o*-, *m*-, and *p*-chlorobenzotrifluorides in which the individual contributions to the relaxation rate were evaluated. (300)

Several studies of the solvent effects upon the shifts of 1,1,1,10,10,10-hexafluorodecane and difluorobromomethane have been reported and empirical correlations with solvent refractive index and cohesive energy density have been made. (301–303, 484) Various association processes have been investigated and the relevant thermodynamic data evaluated. Thus the self association of sodium perfluorophosphinate and its association with $p\text{-}R \cdot C_6H_4 \cdot CF_3$ ($R = H$, Cl, CF_3), (304) and the ionic association of lithium, sodium, potassium, and rubidium trifluoroacetates in propylene carbonate solutions (305) have been studied. Reversible proton transfer and ion-pair formation with no hydrogen bonding was observed in the $CF_3CH_2NO_2$–Bu_3N system. (306) Multinuclear studies of Et_3N–CF_3CO_2H have shown that the system is best described as a basic salt of 1 : 1 composition. (307) The effect of solvent and temperature upon the shift of the trifluoromethyl group of various substituted trifluoromethylphenyl isocyanates has been continued. (479) The shift to higher frequency of the signal with increasing temperature for the *ortho*-substituted compounds was attributed to intramolecular interactions, while the reverse situation for *meta*- and *para*-substituted compounds was attributed mainly to intermolecular interactions.

Variable-temperature studies of the reaction of various *o*-alkyl phenols and hexafluoroacetone have been reported and the importance of steric interactions has been enumerated. (308) The reaction of the benzyl ethers of phloroglucinol carboxylic acid, methyl ethers of phloroglucinol and trifluoroacetic anhydride has been monitored by F-19 NMR and shown to produce α,α,α-trifluoro-2,4,6-trimethoxyacetophenone. (309)

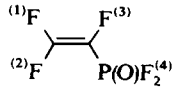
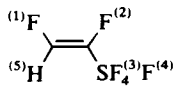
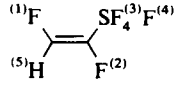
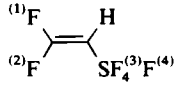
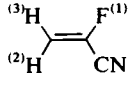
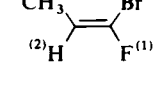
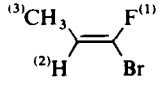
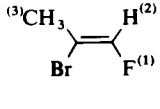
Dynamic polarization studies using F-19 NMR have been reported for CF_3CH_2OH, $(CF_3)_2CHOH$, and $m\text{-}(CF_3)_2C_6H_4$ doped with free radicals,(310) for the interaction of photoexcited α,α,α-trifluoroacetophenone with strong electron donors, (311–313) and for the anodic oxidation of 1H-perfluoroalkanes in HSO_3F–KSO_3F. (314).

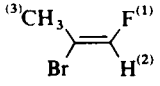
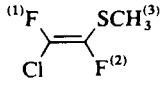
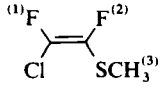
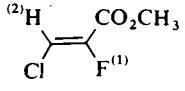
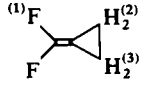
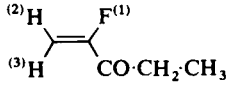
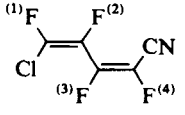
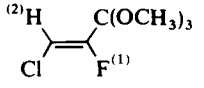
Lanthanide shift reagent effects upon various alkyl fluorides have been measured (315) and their use in assigning the absolute configuration of the *R*-(+)-α-methoxy-α-trifluoromethylphenyl acetate esters of different stereoisomeric secondary alcohols has been evaluated. (316, 317)

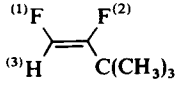
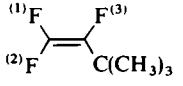
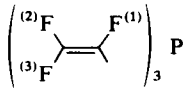
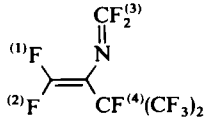
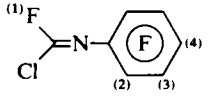
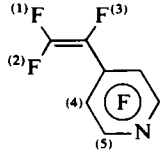
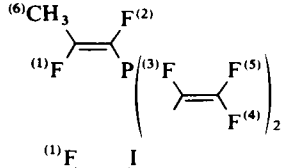
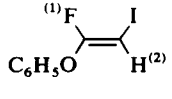
This Page Intentionally Left Blank

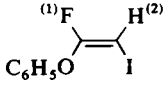
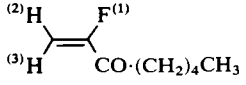
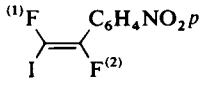
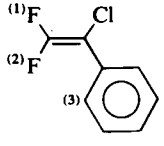
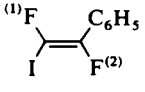
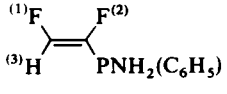
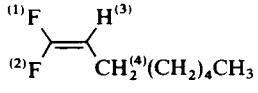
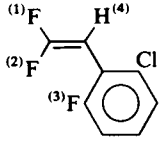
III. FLUORINE BONDED TO A CARBON OF AN OLEFIN

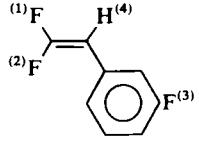
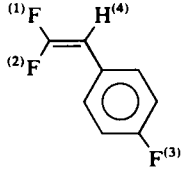
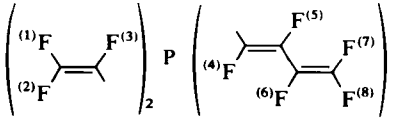
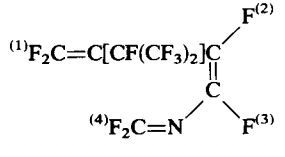
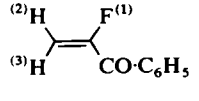
This Page Intentionally Left Blank

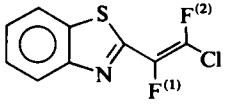
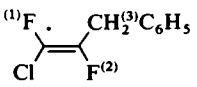
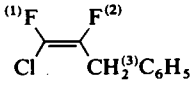
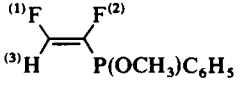
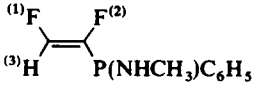
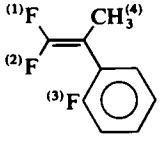
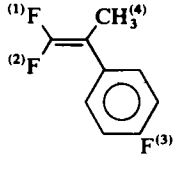
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
C_2F_5OP		(1) −71·6 (2) −92·9 (3) −199·8 (4) −65·2	(1-2) 16·1 (1-3) 29·5 (1-4) 11·9 (2-3) 121·3 (2-4) 4·2 (3-4) 8·1 (P-2) 20·1 (P-3) <1 (P-4) 1090	50
C_2F_7HS		(1) −158·7 (2) −128·2 (3) +59·5 (4) +72·1	(1-2) 12 (1-3) 12 (1-5) 69·3 (2-3) 4 (2-5) 13·5 (3-4) 145	51
C_2F_7HS		(1) −160·7 (2) −153·5 (3) +56·3 (4) +69·6	(1-2) 133 (1-3) 19 (1-5) 69·0 (2-5) 4·3 (3-5) 22 (3-4) 146	51
C_2F_7HS		(1) −85·8 (2) −67·0 (3) +72·0 (4) +78·0		52
C_3FH_2N		−111·6	(1-2) 43·9 (1-3) 13·2	25
C_3FH_4Br		−73·2	(1-2) 13·0 (1-3) 3·0	56(a)
C_3FH_4Br		−77·5	(1-2) 31·0 (1-3) 7·0	56(a)
C_3FH_4Br		−120·4	(1-2) 82·3 (1-3) 4·8	56(a)

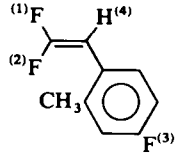
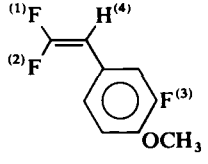
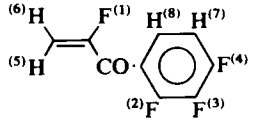
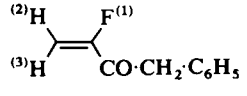
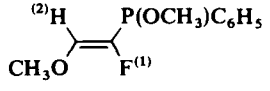
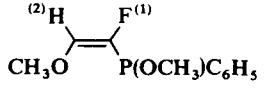
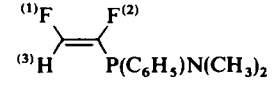
Molecular formula	Structure of compounds	Chemical shifts (ppm)		Coupling constants (Hz)		Ref.
C_3FH_4Br		−119·8		(1-2) 83·3	(1-3) 4·1	56(a)
$C_3F_2H_3ClS$		(1) −108·9	(2) −128·1	(1-2) 139·4	(2-3) 2·5	69(a)
$C_3F_2H_3ClS$		(1) −91·7	(2) −116·9	(1-2) 16·9	(2-3) 2·1	69(a)
$C_4FH_4ClO_2$		−124·2		(1-2) 20		318
$C_4F_2H_4$		−87·63		(1-2) 4	(1-3) 4	319
C_5FH_7O		−117·9		(1-2) 14	(1-3) 46	110
C_5F_4ClN		(1) −86·9 (3) −174·6	(2) −147·0 (4) −141·7	(1-2) 11·2 (1-4) 13·6 (2-4) 3·2	(1-3) 3·4 (2-3) 38·4 (3-4) 10·6	320(a)
$C_6FH_{10}ClO_3$		−122·4		(1-2) 23		318

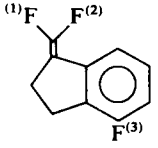
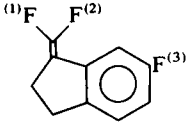
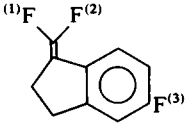
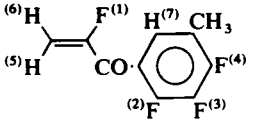
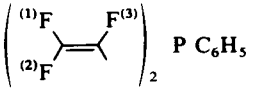
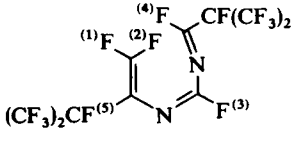
$C_6F_2H_{10}$		(1) −172·7	(2) −141·9	(1-2) 11·28 (2-3) 19·74	(1-3) 74·68	98(a)
$C_6F_3H_9$		(1) −106·3 (3) −178·3	(2) −121·7	(1-2) 85·0 (2-3) 110·0	(1-3) 45·0	98(a)
C_6F_9P				^1J(1-C) 292 ^1J(3-C) 207·6 ^2J(1-C) 40 ^2J(2-C) 8·5	^1J(2-C) 288·1 ^2J(3-C) 8·5	321
$C_6F_{11}N$		(1)(2) −83·1, −93·0 (3) −42·6, −55·9		(1-2) 29 (2-3) 15	(1-4) 59	322
C_7F_6ClN		(1) −4·70 (3) −165·6	(2) −153·9 (4) −162·3			320(a)
C_7F_7N		(1)(2)(3) −93·8, −124·1, −175·6 (4) −138·8	(5) −89·2			212
$C_7F_8H_3P$		(1) −153·6 (3) −173·1 (5) −82·2	(2) −121·9 (4) −104·9	(1-2) 140 (2-6) 6	(1-6) 24	323
C_8FH_6IO		−72·24		(1-2) 26·3		184(e)

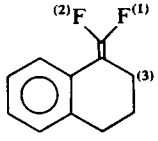
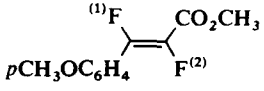
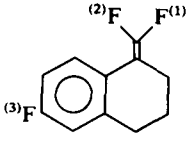
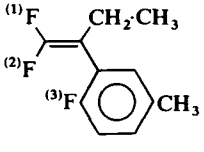
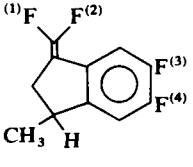
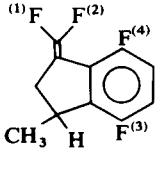
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
C_8FH_6IO		−69·43	(1-2) 1·9	184(e)
$C_8FH_{13}O$		−117·7	(1-2) 14 (1-3) 45	110
$C_8F_2H_4INO_2$		(1) −112·8 (2) −135·9	(1-2) 142	324(a)
$C_8F_5H_5Cl$		(1) −83·5 (2) −89·1	(1-2) 33·2 (1 or 2-3) 1·2	4
$C_8F_2H_5I$		(1) −117·3 (2) −132·4	(1-2) 142	324(a)
$C_8F_2H_8NP$		(1) −142·9 (2) −150·7	(1-2) 18·6 (1-3) 74·4 (2-3) 19 (P-1) 26·0 (P-2) 10·7	325(a)
$C_8F_2H_{14}$		(1) −91·02 (2) −93·38	(1-2) 49·76 (1-3) 3·03 (1-4) 1·56 (2-3) 25·13 (2-4) 2·02	326
$C_8F_3H_4Cl$		(1) −82·41 (2) −77·44 (3) −108·47	(1-2) 18·88 (1-3) 4·78 (1-4) 2·14 (2-3) 33·34 (2-4) 26·08	327

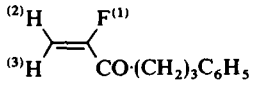
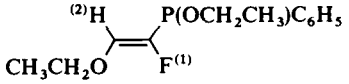
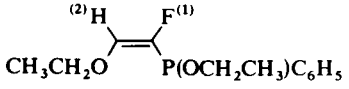
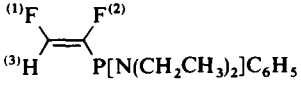
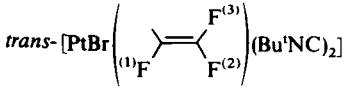
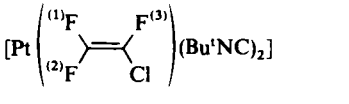
$C_8F_3H_4NO_2$	As above with Cl replaced by NO_2	(1) −78·24 (2) −77·77 (3) −107·61	(1-2) 18·52 (1-3) 4·10 (1-4) 3·13 (2-3) 5·51 (2-4) 25·09	327
$C_8F_3H_5$	As above with Cl replaced by H	(1) −81·39 (2) −81·08 (3) −117·50	(1-2) 27·85 (1-3) 4·87 (1-4) 3·43 (2-3) 4·28 (2-4) 26·23 (2-H*ortho*) 1·25	327
$C_8F_3H_5$		(1) −83·61 (2) −81·45 (3) −113·45	(1-2) 28·68 (1-3) 1·47 (1-4) 3·87 (2-3) 1·11 (2-4) 25·56	326
$C_8F_3H_5$		(1) −85·46 (2) −84·04 (3) −115·20	(1-2) 33·46 (1-3) 4·08 (1-4) 4·11 (2-3) 1·98 (2-4) 25·59	326
$C_8F_{11}P$		(1) −80·4 (2) −104·9 (3) −174·3 (4) −183·9 (5) −135·0 (6) −148·8 (7) −104·9 (8) −92·5		323
$C_8F_{13}N$		(1)(2)(3) −96·1, −113·8, −114·3, −136·7 (4) −32·9, −51·2	(2-3) 19 (3-4) 7·5	322
C_9FH_7O		−111·5	(1-2) 15 (1-3) 47	110

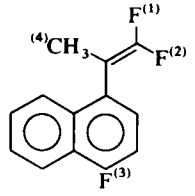
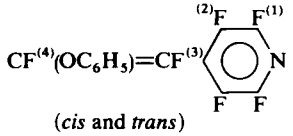
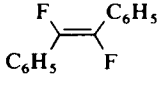
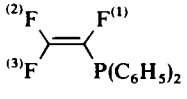
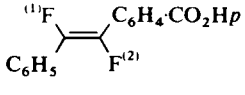
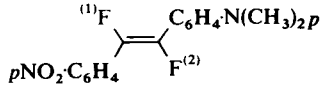
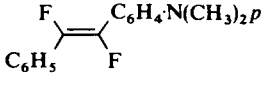
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_9F_2H_4ClNS$		(1)(2) −106·3, −148·8	(1-2) 125	328(a)
$C_9F_2H_7Cl$		(1)(2) −142·1, −125·9	(1-2) 124 (1-3) 5 (2-3) 22	203(a)
$C_9F_2H_7Cl$		(1) −108·8 (2) −130·8	(1-2) 14 (1-3) 2 (2-3) 23	203(a)
$C_9F_2H_9OP$		(1) −137·9 (2) −148·4	(1-2) 17·5 (1-3) 74·2 (2-3) 17·4 (P-1) 29·4 (P-2) ~17	187
$C_9F_2H_{10}NP$		(1) −140·3 (2) −144·5	(1-2) 17·5 (1-3) 75·6 (2-3) 16·8 (P-1) 28·2 (P-2) ~17	325(a)
$C_9F_3H_7$		(1) −92·53 (2) −89·54 (3) −113·91	(1-2) 40·62 (1-3) 2·06 (1-4) 3·36 (2-3) 11·83 (2-4) 3·36	327
$C_9F_3H_7$		(1) −91·28 (2) −91·69 (3) −115·50	(1-2) 44·60 (1-3) 2·08 (1-4) 3·54 (2-3) 0·64 (2-4) 3·54	326

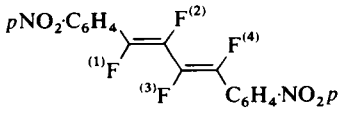
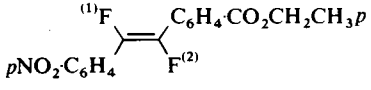
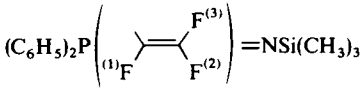
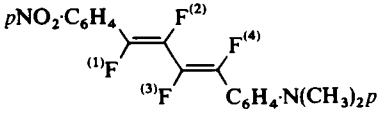
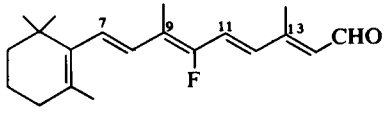
$C_9F_3H_7$		(1) −85·23 (3) −115·50	(2) −86·36	(1-2) 32·65 (1-4) 3·57 (2-4) 24·99	(1-3) 2·54 (2-3) 0·87	326
$C_9F_3H_7O$		(1) −85·73 (2) −135·33	(2) −83·94	(1-2) 33·82 (1-4) 3·98 (2-4) 25·37	(1-3) 1·10 (2-3) 1·10	326
$C_9F_4H_4O$		(1) −115·1 (3) −160·3	(2) −134·2 (4) −128·1	(1-2) 17·0 (1-6) 12·0 (2-4) 12·0 (2-8) 3·0 (3-7) 6·0 (4-7) 9·0	(1-5) 45·0 (2-3) 20·5 (2-7) 6·0 (3-4) 20·5 (3-8) 3·0 (4-8) 5·5	424
$C_{10}FH_9O$		−116·7		(1-2) 15	(1-3) 45	110
$C_{10}FH_{12}O_2P$		−150·9		(1-2) 22·7	(P-1) 10·2	187(a)
$C_{10}FH_{12}O_2P$		−162·3		(1-2) 24	(P-1) 55	187(a)
$C_{10}F_2H_{12}NP$		(1) −138·9 (3)	(2) −142·3	(1-2) 16·4 (2-3) 16·8 (P-2) ~16·5	(1-3) 73·6 (P-1) 29·6	325(a)

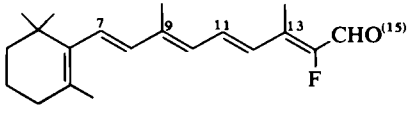
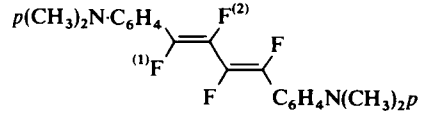
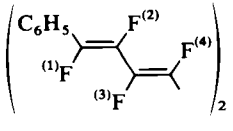
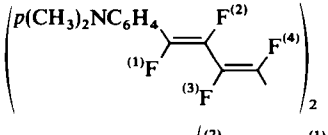
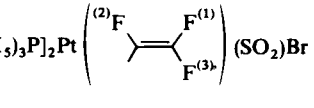
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{10}F_3H_7$		(1)(2) −87·70 (3) −118·70	(1-2)+(2-3) 2·94	326
$C_{10}F_3H_7$		(1)(2) −88·03 (3) −117·12	(1-2)+(2-3) 3·68	326
$C_{10}F_3H_7$		(1) −89·91 (2) −90·32 (3) −115·68	(1-2) 51·77 (1-3) 6·10 (2-3) 2·84	326
$C_{10}F_4H_6O$		(1) −116·5 (2) −139·6 (3) −162·1 (4) −132·8	(1-2) 13·0 (1-5) 45·0 (1-6) 13·0 (2-3) 19·0 (2-7) 7·0 (3-4) 19·0 (3-7) 2·5 (4-7) 7·0	329
$C_{10}F_6H_5P$		(1) −84·04 (2) −107·00 (3) −176·48	(1-2) 44·06 (1-3) 33·97 (2-3) −124·31 (3-3′) 12·21 (3-2′) −1·02 (3-1′) 4·35	321
$C_{10}F_{18}N_2$		(1)(2) −77·7, −91·3 (3)(4) −41·8	(1-2) 26 (1-5) 62	322

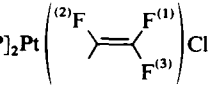
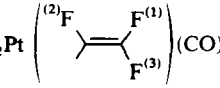
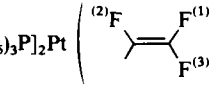
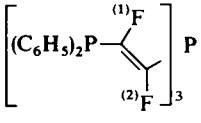
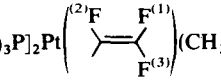
$C_{11}F_2H_{10}$		(1) −88·40 (2) −88·77	(1-2) 42·50 (1-3) 2·76 (2-H) 1·1	326
$C_{11}F_2H_{10}O_3$		(1)(2) −164·2, −135·4	(1-2) 130	100
$C_{11}F_3H_9$		(1) −89·15 (2) −89·39 (3) −116·33	(1-2) 44·12 (1-3) 3·48 (2-3) 1·67	326
$C_{11}F_3H_{11}$		(1) −93·54 (2) −90·07 (3) −119·53	(1-2) 42·09 (1-3) 1·84 (2-3) 9·56 (2-H) 2·15	327
$C_{11}F_4H_8$		(1) −88·68 (2) −89·25 (2) −140·14 (4) −138·78	(1-2) 48·77 (1-3) 1·96 (1-4) 6·61 (2-3) 1·35 (2-4) 2·76 (3-4) −19·94	326
$C_{11}F_4H_8$		(1) −86·40 (2) −79·81 (3) −119·00 (4) −126·83	(1-2) 37·09 (1-3) 1·70 (1-4) 8·00 (2-3) 1·50 (2-4) 68·51 (3-4) 22·00	326 327

Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{12}FH_{13}O$		−117·5	(1-2) 14 (1-3) 45	110
$C_{12}FH_{16}O_2P$		−150·9	(1-2) 22·6 (P-1) 9·6	187(a)
$C_{12}FH_{16}O_2P$		−164·1	(1-2) 24 (P-1) 64	187(a)
$C_{12}F_2H_{16}NP$		(1) −139·7 (2) −142·9	(1-2) 18·3 (1-3) 76·2 (2-3) 17·9 (P-1) 33·9 (P-2) 18	325(a)
$C_{12}F_3H_{18}BrN_2Pt$		(1) −146·5 (2) −98·8 (3) −124·4	(1-2) 40 (1-3) 109 (2-3) 92 (Pt-1) 598 (Pt-2) 73 (Pt-3) 39	330
$C_{12}F_3H_{18}ClN_2Pt$	As above with Br replaced by Cl	(1) −146·0 (2) −98·3 (3) −125·6	(1-2) 39 (1-3) 109 (2-3) 92·7 (Pt-1) 568 (Pt-2) 66 (Pt-3) 44	330
$C_{12}F_3H_{18}ClN_2Pt$	As above with Br replaced by Cl and *cis*-compound	(1) −162·3 (2) −96·8 (3) −125·7	(1-2) 35 (1-3) 107 (2-3) 91·6 (Pt-1) 396 (Pt-2) 84 (Pt-3) 49	330
$C_{12}F_3H_{18}ClN_2Pt$		(1) −114·6 (2) −115·4 (3) −138·4	(1-2) 186·8 (1-3) <1 (2-3) 52·6 (Pt-1) 297 (Pt-2) 257 (Pt-3) 211	330

$C_{13}F_3H_9$		(1) −89·74 (2) −93·81 (3) −123·53	(1-2) 45·49 (1-4) 3·29 (2-4) 3·29 (1-H) 1·29		326
$C_{13}F_6H_5NO$	 (*cis* and *trans*)	(1) −90·9 (2) −137·3 (3)(4) −94·6, −161·4 and −114·4, −166·4			212
$C_{14}F_2H_{10}$		−151·76			331(a)
$C_{14}F_3H_{10}P$		(1) −178·70 (2) −85·45 (3) −108·46	(1-2) 29·92 (1-3) 125·05 (2-3) 46·40 (P-1) 11·8 (P-2) 9·19 (P-3) 61·36		321
$C_{15}F_2H_{10}O_2$		(1) −149·20 (2) −154·56	(1-2) 120		331(a)
$C_{15}F_2H_{12}$	As above with CO_2H replaced by CH_3	(1) −152·40 (2) −151·46	(1-2) 120		331(a)
$C_{16}F_2H_{14}N_2O_2$		(1) −158·20 (2) −145·50	(1-2) 120		331(a)
$C_{16}F_2H_{15}N$		(1) −156·66 (2) −150·56	(1-2) 120		331(a)

Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{16}F_4H_8N_2O_4$		(1) −141·54 (2) −155·94	(1-2) 130	331(a), 324
$C_{16}F_4H_9NO_2$	As above with pNO_2 replaced by H	(1) −140·60 (2) −161·00 (3) −153·80 (4) −143·40	(1-2)(3-4) 129	331(a), 324
$C_{16}F_4H_{10}$	As above with each NO_2 replaced by H	(1) −141·71 (2) −158·70	(1-2) 120	331(a)
$C_{17}F_2H_{14}O_2$		(1) −148·26 (2) −152·61	(1-2) 120	331(a)
$C_{17}F_3H_{19}NPSi$		(1) −175·8 (2) −83·7 (3) −106·3		321
$C_{18}F_4H_4N_2O_2$		(1) −140·30 (2) −152·30 (3) −165·90 (4) −144·90	(1-2)(3-4) 120	331(a)
$C_{18}F_4H_{15}N$	As above with NO_2 replaced by H	(1) −142·50 (2) −157·70 (3) −164·50 (4) −143·70	(1-2)(3-4) 130	331(a)
$C_{20}FH_{27}O$				
	7*E*, 9*Z*, 11*E*, 13*E*		(F-11) 25·1	332
	7*Z*, 9*Z*, 11*E*, 13*E*		25·6	

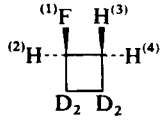
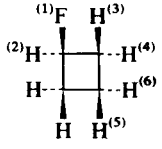
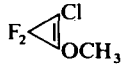
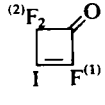
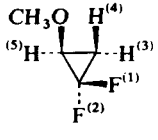
	7*E*, 9*Z*, 11*Z*, 13*E*		30·6	
	7*E*, 9*Z*, 11*E*, 13*Z*		27·5	
	7*Z*, 9*E*, 11*E*, 13*E*		27·5	
	7*E*, 9*E*, 11*E*, 13*Z*		26·2	
	7*Z*, 9*E*, 11*E*, 13*Z*		25·0	
	7*E*, 9*E*, 11*E*, 13*E*		27·3	
$C_{20}FH_{27}O$				332
	7*E*, 9*E*, 11*E*, 13*Z*		(F-15) 11·5	
	7*E*, 9*Z*, 11*E*, 13*Z*		11·0	
	7*E*, 9*E*, 11*Z*, 13*Z*		11·8	
	7*E*, 9*E*, 11*E*, 13*E*		11·0	
	7*E*, 9*E*, 11*Z*, 13*E*		11·7	
$C_{20}F_4H_{20}N_2$		(1) −143·54 (2) −161·74	(1-2) 120	331(a)
$C_{20}F_8H_{10}$		(1) −139·2 (2) −163·62 (3) −152·36 (4) −147·97	(1-2)(3-4) 130	333(a)
$C_{24}F_8H_{20}N_2$		(1) −140·26 (2) −167·66 (3) −147·26 (4) −152·86	(1-2)(3-4) 130	333(a)
$C_{38}F_3H_{30}BrO_2P_2PtS$	*trans*-$[(C_6H_5)_3P]_2Pt$  $(SO_2)Br$	(1) −100·2 (2) −128·6 (3) −149·0	(1-2) 93·2 (1-3) 30·8 (2-3) 109·7 (P-1) 6·0 (P-2) 3·8 (P-3) 1·5	334

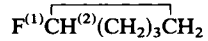
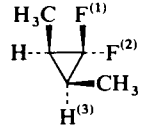
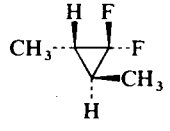
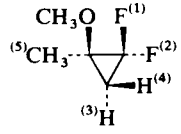
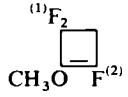
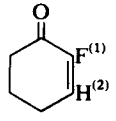
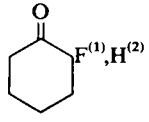
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{38}F_3H_{30}ClP_2$	*cis*-[$(C_6H_5)_3P$]$_2$Pt()Cl	(1) −100·1 (2) −127·4 (3) −152·3	(1-2) 95·2 (1-3) 29·7 (2-3) 101·5 (P-1) 18·0 (P-2) 0·5 (P-3) 26·0	334
$C_{39}F_3H_{30}ClO_5P_2Pt$	[$(C_6H_5)_3P$]$_2$Pt()(CO)(ClO_4)	(1) −93·1 (2) −120·8 (3) −162·3	(1-2) 92·0 (1-3) 29·0 (2-3) 107·5 (P-1) 6·5 (P-2) 5·5 (P-3) 2·8	334
$C_{39}F_3H_{30}NP_2Pt$	*trans*-[$(C_6H_5)_3P$]$_2$Pt()(CN)	(1) −96·3 (2) −126·0 (3) −154·3	(1-2) 96·0 (1-3) 30·8 (2-3) 107·4 (P-1) 5·9 (P-2) 4·6 (P-3) 2·0	334
$C_{39}F_3H_{30}NP_2PtS$	As above with (CN) replaced by (NCS)	(1) −101·0 (2) −128·7 (3) −147·0	(1-2) 98·5 (1-3) 31·0 (2-3) 105·5	334
$C_{42}F_6H_{33}P_4$		(1)(2) −132·5		323
$C_{43}F_3H_{37}O_2P_2Pt$	*trans*-[$(C_6H_5)_3P$]$_2$Pt()($CH_3COCHCOCH_3$)	(1) −99·8 (2) −128·0 (3) −149·2	(1-2) 98·0 (1-3) 32·2 (2-3) 106·8 (P-1) 6·1 (P-2) 4·0 (P-3) 1·8 (Pt-1) 70·2 (Pt-2) 65·0 (Pt-3) 549·0	334

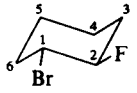
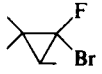
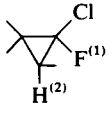
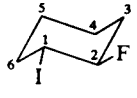
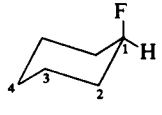
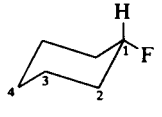
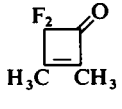
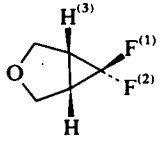
IV. FLUORINE BONDED TO A CARBON OF AN ALICYCLIC NON-AROMATIC SYSTEM

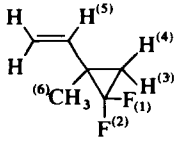
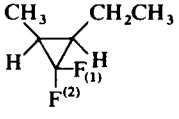
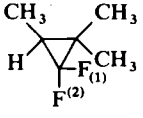
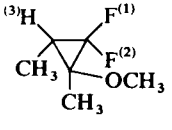
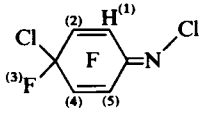
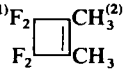
This Page Intentionally Left Blank

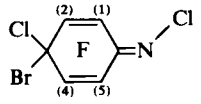
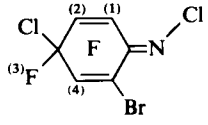
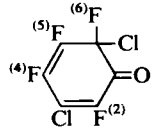
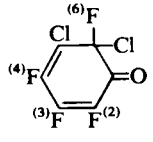
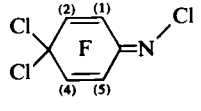
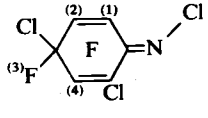
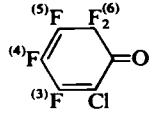
A. Data

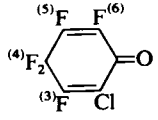
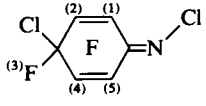
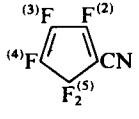
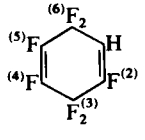
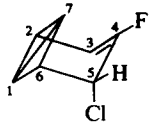
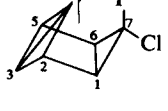
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_4FH_3D_4$			(1-2) 55·34 (1-3) 20·67 (1-4) 6·17	335
C_4FH_7			(1-2) 55·32 (1-3) 20·63 (1-4) 6·14 (1-5) 8·54 (1-6) −0·03 ^1J(F-C) 214·55 ^2J(F-C) ^3J(F-C) 20·35 18·49	335
C_4FH_7	As above	−160·22	^1J(F-C) ^2J(F-C) 19·1 214·7 (1-2) 55	336
$C_4F_2H_3ClO$		−99		318
$C_4F_2H_4$		−131·5		319(a)
C_4F_3IO		(1) −92·5 (2) −113·3	(1-2) 21·1	337(a)
$C_4F_6H_4O$		(1) −149 (2) −130	(1-2) 165 (1-3) 7 (1-4) 16 (1-5) 2·5 (2-3) 14·5 (2-4) 6 (2-5) 11	81

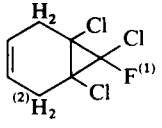
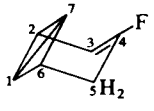
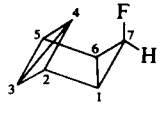
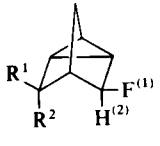
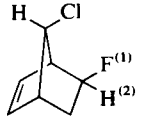
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
C_5FH_9		−170·54	(1-2) 53 ^1J(1-C) 173·5 ^2J(1-C) 22·1 ^3J(1-C) <1·5	336
$C_5F_2H_8$		(1) −158·3 (2) −128·7	(1-2) 158·7 (2-3) 12·0	338
$C_5F_2H_8$		−143·1		338
$C_5F_2H_8O$		(1) −144·9 (2) −135·8	(1-2) 159 (1-3) 6·1 (1-4) 16·1 (1-5) 2·9 (2-3) 14·2 (2-4) 5·5 (2-5) 1·8	81
$C_5F_3H_3O_2$		(1) −118·2 (2) −141·7		100
C_6FH_7O		−132·96	(1-2) 14	339
C_6FH_9O		−189·4	(1-2) 49·5	340(a)

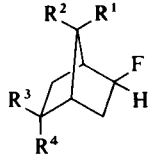
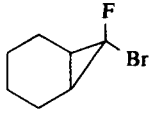
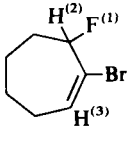
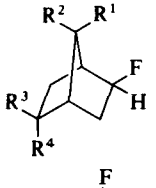
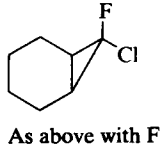
$C_6FH_{10}Br$		−167·98	(F-C1) 20 (F-C2) 181 (F-C3) 19 (F-C4) 10·3 (F-C6) 5	336
$C_6FH_{10}Br$		−149·5		341
$C_6FH_{10}Cl$		−138·2	(1-2) 20·4	341
$C_6FH_{10}I$		−160·06	(F-C1) 19 (F-C2) 181 (F-C3) 17·7 (F-C4) 11·8 (F-C6) 5	336
C_6FH_{11}		−185·8	(F-C1) 167·9 (F-C2) 21·1 (F-C3) <1·8 (F-H1) 49	336
C_6FH_{11}		−165·4	(F-C1) 172·6 (F-C2) 17·6 (F-C3) 11·0 (F-H1) 49	336
$C_6F_2H_6O$		−110·8		100
$C_6F_2H_6O$		(1) −129·1 (2) −172·1	(1-2) 173·0 (1-3) 13·2 (2-3) 2·0	338

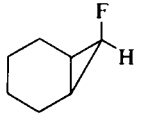
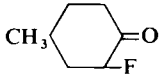
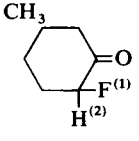
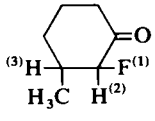
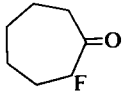
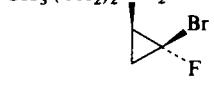
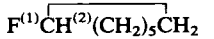
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_6F_2H_8$		(1)(2) −137·1 (Centre AB)	(1-2) 156 (1-3) 7·6 (1-4) 10·2 (1-5) ~1·5 (2-3) 10·2 (2-4) 7·6 (2-5) 1·5 (2-6) ~2·4	81
$C_6F_2H_{10}$		(1) −157·2 (2) −126·6	(1-2) 156	81
$C_6F_2H_{10}$		(1)(2) −150·8, −139·0	(1-2) 150·4	338
$C_6F_2H_{10}O$		(1) −143·8 (2) −147·5	(1-2) 159 (2-3) 20·0	338
$C_6F_4HCl_2N$		(2) −114·5 (3) −116·7 (4) −148·9 (5) −153·3	(1-2) 10·1 (1-3) 0·9 (1-4) 0·9 (1-5) 5·1 (2-3) 27·2 (2-4) 1·6 (3-4) 25·5 (3-5) 6·8 (4-5) 5·9	175(a)
$C_6F_4H_6$		−115·6	(1-2) 1·25	100
$C_6F_4H_6O_2$	As above with CH_3 replaced by OCH_3	−111·4		100

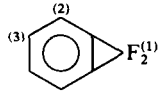
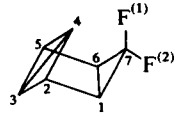
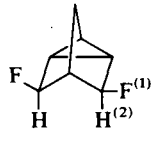
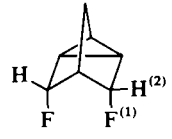
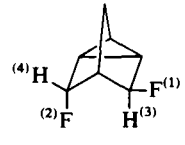
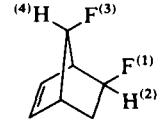
$C_6F_4BrCl_2N$		(1) −151·4 (4) −141·8	(2) −136·2 (5) −153·2	(1-2) 2·8 (4-5) 7·5	(2-4) 4·8	175(a)
$C_6F_4BrCl_2N$		(1) −146·5 (3) −113·1	(2) −143·2 (4) −106·6	(1-2) 2·2 (2-3) 26·0	(1-3) 6·4 (3-4) 29·0	175(a)
$C_6F_4Cl_2O$		(2) −131·9 (5) −147·7	(4) −144·8 (6) −129·2	(2-4) 4·5 (2-6) 8·5 (4-6) 9	(2-5) 23 (4-5) 1·5 (5-6) 25·5	342(b)
$C_6F_4Cl_2O$		(2) −155·5 (4) −127·9	(3) −130·7 (6) −122·5	(2-3) 3 (3-4) 6·5	(2-6) = (4-6) 7·5 (3-6) 3	342(b)
$C_6F_4Cl_3N$		(1) −151·6 (4) −142·1	(2) −136·5 (5) −152·8	(1-2) ~1·5 (4-5) 6·8	(2-4) 6·0	175(a)
$C_6F_4Cl_3N$		(1) −147·1 (3) −113·4	(2) −143·4 (4) −116·9	(1-3) 6·0 (3-4) 29·0	(2-3) 26·8	175(a)
C_6F_5ClO		(3) −103·4 (5) −150·2	(4) −152·8 (6) −110·9	(3-4) 6·5 (3-6) 3·5 (4-6) 13·5	(3-5) 4·5 (4-5) 1·5 (5-6) 22·5	342(b)

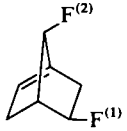
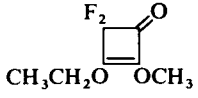
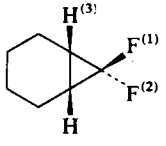
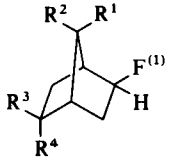
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
C_6F_5ClO		(3) −117·4 (4) −114·2 (5) −149·1 (6) −148·1	(3-4) 23 (3-5) 4·5 (3-6) 2·5 (4-5) 21 (4-6) 10 (5-6) 4·5	342(b)
$C_6F_5Cl_2N$		(1) −150·1 (2) −143·1 (3) −113·6 (4) −148·7 (5) −151·3	(1-2) 1·2 (1-3) 6·0 (1-5) 2·6 (2-3) 26·2 (2-4) 4·2 (2-5) 1·2 (3-4) 25·9 (3-5) 6·0 (4-5) 6·3	175(a), 174
C_6F_5N		(2) −106·5 (3) −154·8 (4) −151·5 (5) −133·1	(2-3) 9·0 (2-4) 2·0 (2-5) 8·3 (3-4) 14·2 (3-5) 5·5 (4-5) 8·6	320(a)
C_6F_7H		(2) −129 (3) −116 (4) −156 (5) −161 (6) −102	(2-3) 21 (2-4) 1 (2-6) 10·5 (3-4) 21 (3-6) 5·25 (5-6) 21 (4-6) 10·5	343
C_6F_7Cl	As above with H replaced by Cl	(2) −131 (3) −115 (4) −156 (5) −161 (6) −108	(2-3) 24 (2-4) 3 (2-6) 10·5 (3-4) 21·5 (3-6) 5·25 (5-6) 21·5	343
C_7FH_6Cl			(F-C1) 2·2 (F-C2) 6·4 (F-C3) 9·6 (F-C4) 258·8 (F-C5) 20·6 (F-C6) 4·4 (F-C7) 1·5	344
C_7FH_6Cl			(F-C1) 13·2 (F-C2) 1·5 (F-C4) 5·9 (F-C7) 319·9	344

C_7FH_6Cl	As above with F and Cl interchanged		(F-C1) 7·4 (F-C3) 6·6 (F-C7) 280·0	344
$C_7FH_6Cl_3$		−65·4	(1-2) 2·0	345(b)
C_7FH_7			(F-C1) 2·2 (F-C2) 8·1 (F-C3) 8·1 (F-C4) 260 (F-C5) 19·1 (F-C6) 10·6 (F-C7) 2·2	344
C_7FH_7			(F-C1) 14·0 (F-C2) 2·9 (F-C3) 1·5 (F-C4) 5·1 (F-C7) 244·1	344
C_7FH_7	As above with F and H at C7 interchanged		(F-C1) 8·1 (F-C2) 2·2 (F-C3) 10·3 (F-C7) 222·1	344
C_7FH_8Br		$R^1=Br$ $R^2=H$ −194·25 $R^1=H$ $R^2=Br$ −200·25	(1-2) 60 (1-2) 60	346
C_7FH_8Cl	As above with $R^1=Cl$ $R^2=H$ $R^1=H$ $R^2=Cl$	−195 −200·25	(1-2) 60 (1-2) 60	346
C_7FH_8Cl		−184·5		346

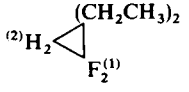
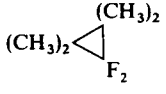
Molecular formula	Structure of compounds		Chemical shifts (pm)	Coupling constants (Hz)	Ref.
$C_7FH_{10}Br$		R^1 R^2 R^3 R^4 Br H H H H Br H H H H Br H H H H Br	 −162 −162·75 −167·25 −163·5		347
$C_7FH_{10}Br$				^1J(F-C) 305·6 ^2J(F-C) 10·2 ^3J(F-C) 3·1 ^4J(F-C) 1·7	348
$C_7FH_{10}Br$	As above with F and Br interchanged			^1J(F-C) 295·6 ^3J(F-C) 10·5 ^3J(F-C) 2·6 ^4J(F-C) 0	348
$C_7FH_{10}Br$				(1-2) 47 (1-3) 2	349
$C_7FH_{10}Cl$		R^1 R^2 R^3 R^4 Cl H H H H Cl H H H H Cl H H H H Cl	 −163·5 −162·75 −167·25 −162·75		347
$C_7FH_{10}Cl$				^1J(F-C) 289·8 ^2J(F-C) 11·0 ^3J(F-C) 2·8 ^4J(F-C) 2·0	348
$C_7FH_{10}Cl$	As above with F and Cl interchanged			^1J(F-C) 282·4 ^2J(F-C) 11·3 ^3J(F-C) 2·7 ^4J(F-C) 0	348

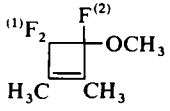
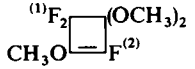
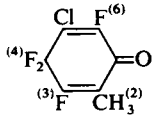
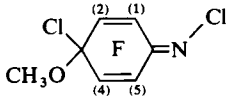
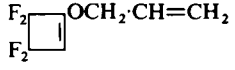
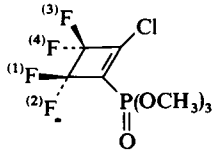
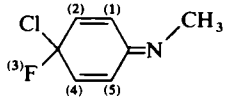
C_7FH_{11}			^1J(F-C) 221·6 ^2J(F-C) 10·6 ^3J(F-C) 4·8 ^4J(F-C) 1·1	348
C_7FH_{11}	As above with F and H interchanged		^1J(F-C) 221·6 ^2J(F-C) 10·6 ^3J(F-C) 3·4 ^4J(F-C) 0	348
$C_7FH_{11}O$		−187·0(a), −188·5(e)		340(a)
$C_7FH_{11}O$		−186·6(a), −189·5(e)	(1-2) 47·9	340(a)
$C_7FH_{11}O$		−196·6(a), −194·3(e)	$(1\text{-}2)_a$ 50·5 $(1\text{-}2)_e$ 50·5 $(1\text{-}3)_e$ 17·7	340(a)
$C_7FH_{11}O$		−183·8		340(a)
$C_7FH_{12}Br$		−126·5		341
$C_7FH_{12}Br$	As above with Br and F interchanged	−149·4		341
C_7FH_{13}		−164·92	^1J(1-C) 167·7 ^2J(1-C) 20·6 ^3J(1-C) 8·8 (1-2) 47·5	336

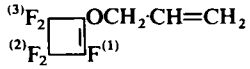
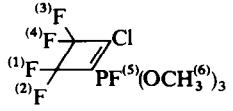
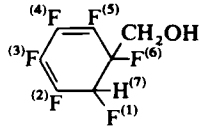
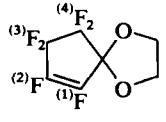
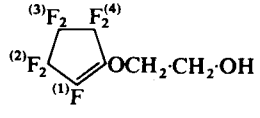
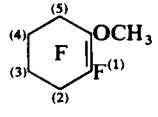
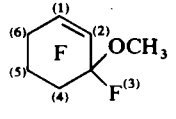
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_7F_2H_4$			(1-2) 3·5 ^1J(1-C) 303 ^2J(1-C) 20 ^3J(1-C) 1 ^4J(1-C) 2·9	350
$C_7F_2H_6$			(1-C7) 314·0 (2-C7) 281·7 (1-C1) 13·2 (2-C1) 8·1 (1-C4) 4·4 (2-C3) 10·3	344
$C_7F_2H_8$		−201·4	(1-2) 60	346, 352
$C_7F_2H_8$		−201·8	(1-2) 60	352
$C_7F_2H_8$		(1) −201·8 (2) −213	(1-3) 60 (2-4) 60	346, 352
$C_7F_2H_8$		(1) −180	(1-2) 57 (3-4) 60·0 (3-H) 12	346

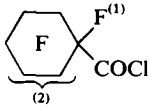
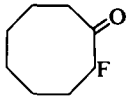
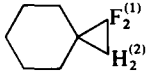
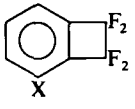
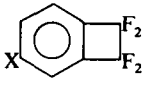
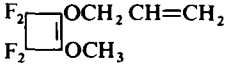
$C_7F_2H_8$		(1) −187·5	(2) −180		347
$C_7F_2H_8O_2$		−113·2			337(a)
$C_7F_2H_{10}$		(1) −129·2	(2) −159·0	(1-2) 163·2 (1-3) 14·0	338
$C_7F_2H_{10}$					347

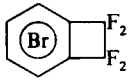
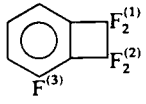
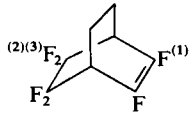
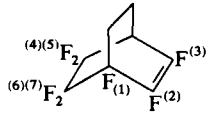
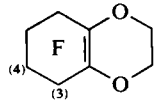
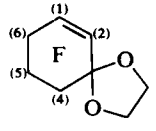
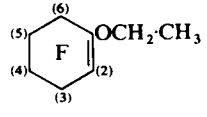
R^1	R^2	R^3	R^4		
$F^{(2)}$	H	H	H	(1) −179·5 (2) −223·5	
H	$F^{(2)}$	H	H	(1) −176·2 (2) −232·3	
H	H	$F^{(2)}$	H	(1)(2) −181·5	
H	H	H	$F^{(2)}$	(1)(2) −175·1	

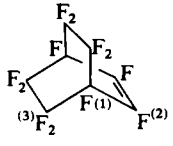
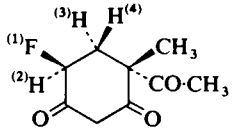
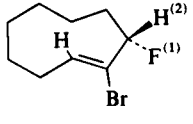
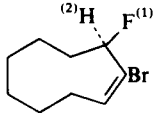
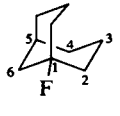
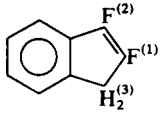
$C_7F_2H_{12}$		−145·2		(1-2) 8·4	338
$C_7F_2H_{12}$		−148·9			81, 338

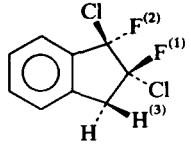
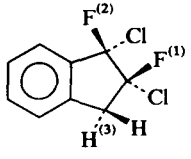
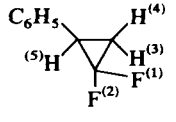
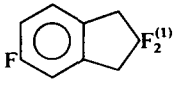
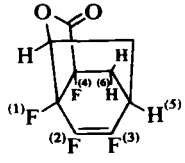
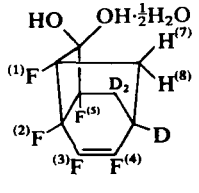
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_7F_3H_9O$		(1) −115·3 (2) −111·26		100
$C_7F_3H_9O_3$		(1) −117·0 (2) −135·2		100
$C_7F_4H_3ClO$		(3) −120·8 (4) −107·3 (6) −114·6	(2-3) 3 (2-4) 2 (3-4) 25 (3-6) 2·5 (4-6) 10	351(b)
$C_7F_4H_3Cl_2NO$		(1) −153·2 (2) −137·0 (4) −142·6 (5) −154·9	(1-2) ~2 (2-4) 5·4 (4-5) 7·4	175
$C_7F_4H_6O$		−109·1, −118·1		337(a)
$C_7F_4H_9ClO_4P$		(1)(2) or (3)(4) −112·090 (3)(4) or (1)(2) −116·982	(1-2) 197·04 (1-3) −12·57 (1-4) 27·88 (3-4) 196·41 (1,2-P) ∓4·86 (3,4-P) ±12·24	353(b)
$C_7F_5H_3ClN$		(1) −150·6 (2) −153·3 (3) −110·2 (4) −155·4 (5) −152·5	(1-2) 3·1 (1-3) 6·4 (1-5) ~1·4 (2-3) 26·0 (2-4) 1·2 (3-4) 25·6 (3-5) 6·4 (4-5) 7·5	175

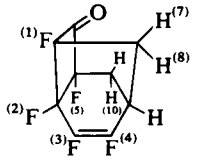
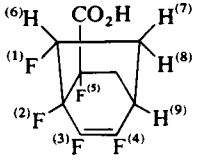
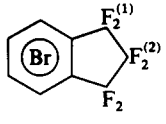
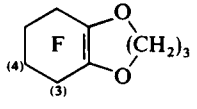
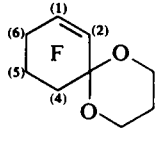
$C_7F_5H_5O$		(1) −140·7 (2)(3) −113·9, −117·3		337(a)
$C_7F_5H_9ClO_3P$		(1)(2) or (3)(4) −113·164 (3)(4) or (1)(2) −117·361 (5) −75·40	(1-2) 195·27 (1-3) −14·59 (1-4) 25·96 (1,2-5) 0·7 (3-4) 190·23 (5-6) 1·81 (1,2-P) ∓3·88 (3,4-P) ±12·59 (5-P) −845	353(b)
$C_7F_6H_4O$		(1) −169·9 (2)(3)(4)(5) −139·5, −154·9 (6) −167·25	(1-7) 50 (1-6) 24 (6-7) 24	354
$C_7F_6H_4O_2$		(1)(2) −142·4, −151·8 (3)(4) −113·2, −124·0	(1-2) 4·5 (3-4) 2·4 (1-3 or 4), (2-3 or 4) } 12·0	355
$C_7F_7H_5O_2$		(1) −162·3 (2)(3)(4) −116·2, −117·0, −130·6		355
$C_7F_9H_3O$		(1) −160·7 (2)(5) −117·2 (3)(4) −134·2		356
$C_7F_9H_3O$		(1)(2) −145·9, −157·8 (3) −130·0 (4)(5) −130·0, −131·1, 135·7 (2:1:1) (6A) −116·5 (6B) −122·0	(4A-4B) or (5A-5B) 265 (6A-6B) 285	356

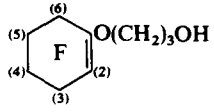
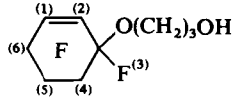
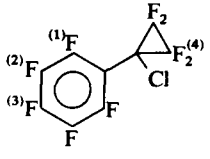
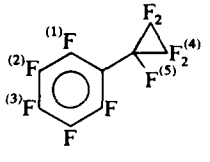
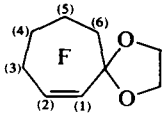
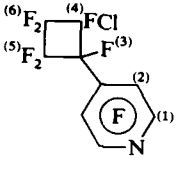
Molecular formula	Structure of compounds		Chemcal shifts (ppm)	Coupling constants (Hz)	Ref.
$C_7F_{11}ClO$			(1) −167·0 (2) −119·0 and −131·0, −123·5 and −138·9, −122·9 and −141·6	^2J(F-F) 294, 292, 291	237
$C_8FH_{13}O$			−189·9		340(a)
C_8FH_{15}	$F^{(1)}\overline{CH^{(2)}(CH_2)_6CH_2}$		−160·16	^1J(1-C) 164·8 ^2J(1-C) 22·0 ^3J(1-C) 8·9 (1-2) 46·5	336
$C_8F_2H_{12}$			−140·1	(1-2) 8·5	338
$C_8F_4H_3Br$		X = Br	−106·5, −104·4		357(b)
$C_8F_4H_3NO_2$	As above with X=NO_2		−106·1, −105·2		357(b)
$C_8F_4H_3NO_2$		X = NO_2	−107·1		357(b)
$C_8F_4H_4$	As above with X = H	X = H	−104·4		357(b)
$C_8F_4H_8O_2$			−116·7 (centre of multiplet)		337(a)

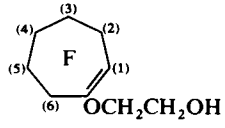
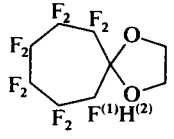
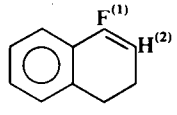
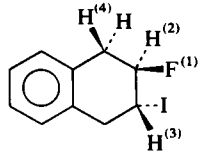
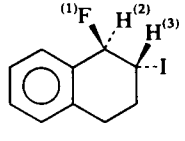
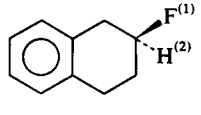
$C_8F_4Br_4$		−107·7			357(b)
$C_8F_5H_3$		(1)(2) −106·4, −105·1 (3) −113·2			357(b)
$C_8F_6H_6$		(1) −139·2 (2)(3) −115·0, −110·0	(2-3) 235		358
$C_8F_7H_5$		(1) −205·0 (2)(3) −155·0, −140·0 (4)(5) −132·0, −130·0 (6)(7) −117·0, −115·0	(4-5) 225	(6-7) 225	358
$C_8F_8H_4O_2$		(3) −116·4 (4) −134·2			356
$C_8F_8H_4O_2$		(1)(2) −146·7, −159·8 (4)(5) −131·2, −132·4 (6) −117·8			356
$C_8F_9H_5O$		(2) −159·3 (3)(6) −117·0 (4)(5) −134·1			356
$C_8F_9H_5O$	As above	(2) −151·7 (3)–(6) −117·6, −126·7			355

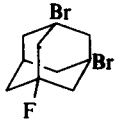
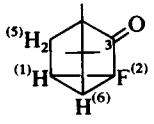
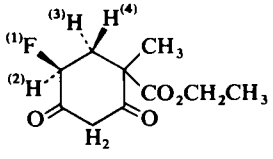
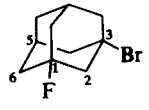
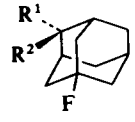
Molecular formula	Structure of compounds		Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
C_8F_{12}			(1) −198·0 (2) −150·5 (3) −128·0		358
$C_9FH_{11}O_3$		(axial F) (equatorial F)	−189 −188·5	(1-2) 49 (1-3) 30 (1-4) 15 (1-2) 49 (1-3) 10 (1-4) 10	359
$C_9FH_{14}Br$				(1-2) 47	349
$C_9FH_{14}Br$				(1-2) 47	349
C_9FH_{15}				(F-C1) 175·0 (F-C2) 22·1 (F-C3) 13·2 (F-C4) 2·9 (F-C5) 8·8 (F-C6) 16·2	336, 367
$C_9F_2H_6$			(1) −156·2 (2) −146·2	(1-2) 2 (1-3) 5 (2-3) 2	203(a)

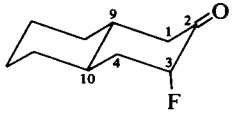
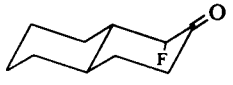
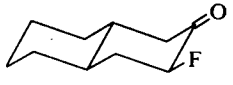
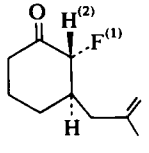
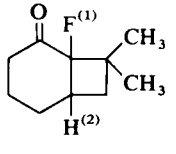
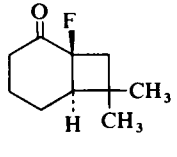
$C_9F_2H_6Cl_2$		(1) −108·9	(2) −93·9	(1-2) 12 (2-3) <1	(1-3) 18	203(a)
$C_9F_2H_6Cl_2$		(1) −119·1	(2) −113·6	(1-2) 11 (2-3) <1	(1-3) 15, 16	203(a)
$C_9F_2H_8$		(1) −142·5	(2) −125·8	(1-2) 152·5 (1-4) 11·9 (2-3) 11·7 (2-5) 13·4	(1-3) 6·2 (1-5) 0 (2-4) 5·1	81
$C_9F_3H_7$		(1) +0·50 relative to compound with aromatic F replaced by H				360
$C_9F_4H_6O_2$		(1) −205·1 (3) −135·5	(2) −161·3 (4) −184·7	(3-5) 16·0	(4-6) 27·0	361
$C_9F_5H_5D_3O_{2.5}$		(1) −192·4 (3) −162·7 (5) −192·6	(2) −217·0 (4) −139·6	(1-7 or 8) 18·5		361

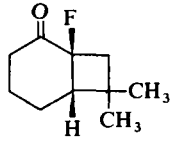
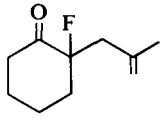
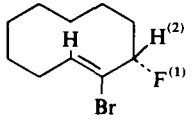
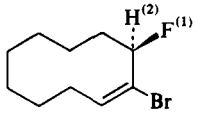
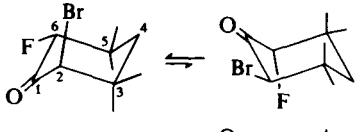
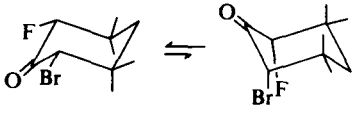
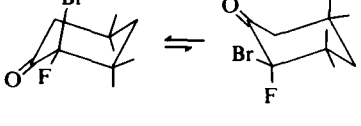
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_9F_5H_5O$		(1)(5) −186·6 (2) −216·1 (3) −161·0 (4) −131·7	(1-8)(5-10) 15·0	361
$C_9F_5H_7O_2$		(1) −184·4 (2) −204·6 (3) −158·6 (4) −141·4 (5) −155·8	(1-5) 37·5 (1-6) 56·0 (1-7) 13·0 (1-8) 20·0 (4-9) 16·0	361
$C_9F_5H_8O_{2\cdot5}$	As $C_9F_5H_5D_3O_{2\cdot5}$ above with D replaced by H	(1)(5) −193·5 (2) −218·0 (3) −164·5 (4) −140·6	(1-2) 5 (1-7)(5-9) 5 (1-8)(5-10) 18 (2-5) 5 (4-6) 14·0	361
$C_9F_6Br_4$		(1) −107·7 (2) −126·9		357(b)
$C_9F_8H_6O_2$		(3) −117·0 (4) −134·6		356
$C_9F_8H_6O_2$		(1)(2) −143·0, −161·8 (4)(5) −125·2, −131·8 (6) −118·1		356

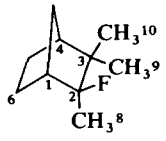
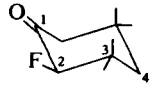
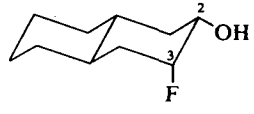
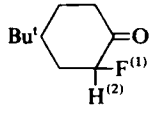
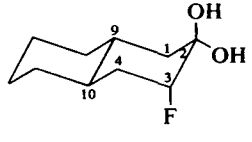
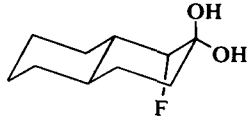
$C_9F_9H_7O_2$		(2) −158·8 (3)(6) −117·1 (4)(5) −134·3		356
$C_9F_9H_7O_2$		(1)(2) −144·6, −156·4 (3) −126·7 (4)(5) −130·7, −130·7, −134·3 (2:1:1) (6) −116·2, −120·4	(4A-4B) or (5A-5B) 268 (6A-6B) 283	356
C_9F_9Cl		(1) −136·5 (2) −159·1 (3) −142·6 (4) −145·0, −147·2	(4A-4B) 179	195(b)
C_9F_{10}		(1) −136·4 (2) −159·6 (3) −145·1 (4) −147·9, −156·5 (5) −145·9	(4A−4B) 205	195(b)
$C_9F_{10}H_4O_2$		(1)(2) −137·5, −150·3 (3)–(6) −114·7, −126·5, −126·5, −128·6		355
$C_9F_{10}ClN$		(1) −89·8 (2) −137·6 (3) −154·6, −160·6 (4) −141, −144 (5)(6) −117 to −136		212

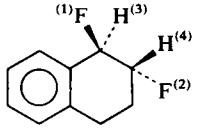
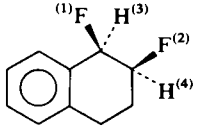
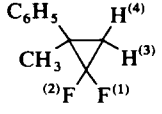
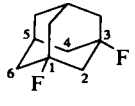
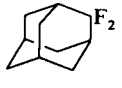
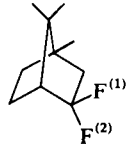
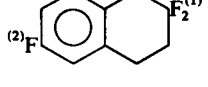
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_9F_{11}H_5O_2$		(1) −139·8, (2)–(6) −112·0, −113·6, −128·7 (2:2:6)		355
$C_9F_{11}H_5O_2$		(1) −223·1	(1-2) 48	355
$C_{10}FH_9$		−123·75	(1-2) 15	362
$C_{10}FH_{10}I$		−165	(1-2) 52·5 (1-3) 7 (1-4) 26	363
$C_{10}FH_{10}I$		−139	(1-2) 54 (1-3) 9	363
$C_{10}FH_{11}$		−181·1	(1-2) 51	362

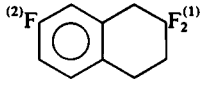
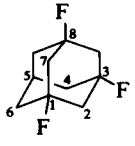
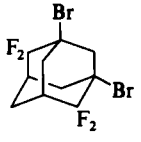
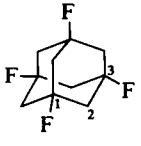
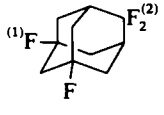
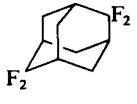
$C_{10}FH_{13}Br_2$			−133·2		364
$C_{10}FH_{13}Cl_2$	As above with Br replaced by Cl		−136·4		364
$C_{10}FH_{13}O$			−234	(1-2) 10·6 (2-6) 10·6 (2-5) 2 (2-C1)(2-C6) 7·1, 6·0 (2-C2) 270 (2-C3) 8·1	134
$C_{10}FH_{13}O_4$		(axial F) (equatorial F)	−195 −193	(1-2) 48 (1-3) 21 (1-4) 14 (1-2) 48 (1-3) 14 (1-4) 14	359
$C_{10}FH_{14}Br$			−131·6	(F-C1) 188·7 (F-C2) 20·0 (F-C3) 10·8 (F-C5) 9·6 (F-C6) 16·8	364
$C_{10}FH_{14}Cl$	As above with Br replaced by Cl		−133·0	(F-C1) 188·5 (F-C2) 19·5 (F-C3) 11·7 (F-C5) 9·8 (F-C6) 18·0	364
$C_{10}FH_{14}Cl$		$R^1=H$ $R^2=Cl$ $R^1=Cl$ $R^2=H$	−137·2 −132·4		364
$C_{10}FH_{15}$	As above with $R^1=R^2=H$		−128·0	(F-C1) 184 (F-C2) 17·8 (F-C3) 10·6	364

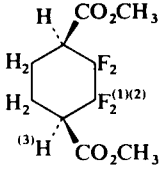
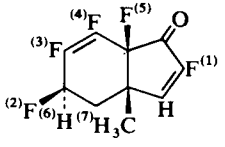
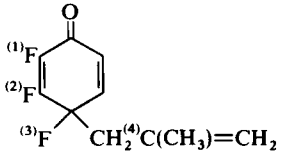
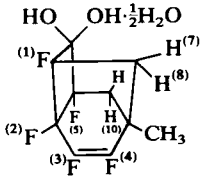
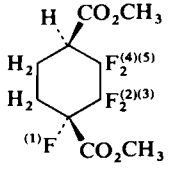
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{10}FH_{15}O$			(F-C1) 2 (F-C2) 21 (F-C3) 175 (F-C4) 21	365
$C_{10}FH_{15}O$			(F-C1) 177 (F-C2) 22 (F-C3) 2·5 (F-C9) 21	365
$C_{10}FH_{15}O$			(F-C2) 19 (F-C3) 172	365
$C_{10}FH_{15}O$		−196·5	(1-2) 47	339
$C_{10}FH_{15}O$		−152·52	(1-2) 22	339
$C_{10}FH_{15}O$		−173·2		339

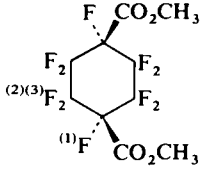
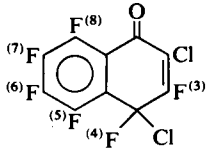
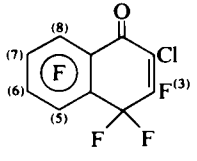
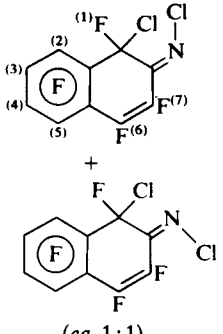
$C_{10}FH_{15}O$		−149·9		339
$C_{10}FH_{15}O$		−155·6		339
$C_{10}FH_{16}Br$			(1-2) 47	349
$C_{10}FH_{16}Br$			(1-2) 47	349
$C_{10}FH_{16}BrO$			(F-C1) 17·4 (F-C4) 4·4 (F-C5) 18·8 (F-C6) 193·0	366
$C_{10}FH_{16}BrO$			(F-C1) 15·9 (F-C4) 5·8 (F-C5) 18·1 (F-C6) 201·2	366
$C_{10}FH_{16}BrO$			(F-C1) 18·4 (F-C2) 274·8 (F-C3) 17·2 (F-C4) 4·2	366

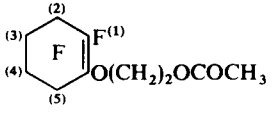
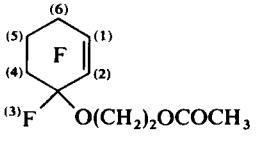
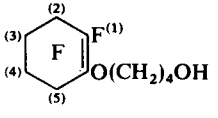
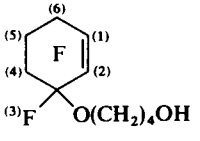
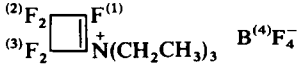
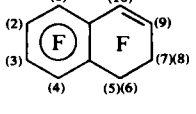
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{10}FH_{17}$		−134·28	(F-C1) 24·8 (F-C2) 180·0 (F-C3) 17·4 (F-C6) 9·0 (F-C9) 1·3 (F-C10) 14·3	336
$C_{10}FH_{17}O$			(F-C1) 14·5 (F-C2) 194·7 (F-C3) 18·0 (F-C4) 5·3	366
$C_{10}FH_{17}O$			(F-C2) 19 (F-C3) 172	365
$C_{10}FH_{17}O$		−184·1(a), −186·9(e)	(1-2) 47·7	340(a)
$C_{10}FH_{17}O_2$			(F-C1) 0 (F-C2) 23 (F-C3) 174 (F-C4) 18	365
$C_{10}FH_{17}O_2$			(F-C1) 178·5 (F-C2) 22·5 (F-C9) 19·5	365

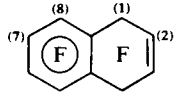
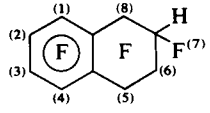
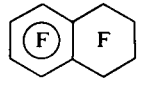
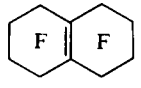
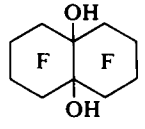
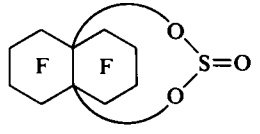
$C_{10}F_2H_{10}$		(1)(2) −180·4, −195	(1-2) 15 (2-3) 12	(1-4) 15	362
$C_{10}F_2H_{10}$		(1)(2) −183, −200·3	(1-2) 18 (2-3) 12	(1-4) 18	362
$C_{10}F_2H_{10}$		(1) −132·4 (2) −137·5	(1-2) 149 (1-4) 13 (2-4) 4·5	(1-3) 5 (2-3) 11·5	81
$C_{10}F_2H_{14}$		−132·5	(F-C1) 188 (F-C3) 13·3 (F-C6) 16·0	(F-C2) 19·0 (F-C5) 10·3	364
$C_{10}F_2H_{14}$		−99·75			239(a)
$C_{10}F_2H_{14}O$		(1) −109·3 (2) −115·5	(1-2) 280		134
$C_{10}F_3H_9$		(1) −0·32 relative to compound with aromatic F replaced by H (2) −116·81			360(d)

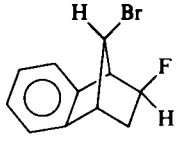
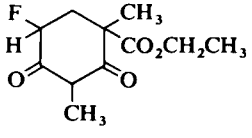
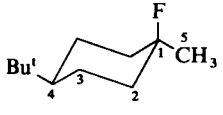
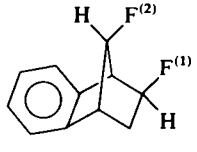
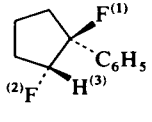
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{10}F_3H_9$		(1) −0·39 relative to compound with atomatic F replaced by H (2) −117·32		360(d)
$C_{10}F_3H_{13}$		−138·9	(F-C1) 191 (F-C2) 18·8 (F-C3) 14·8 (F-C6) 16·9 (F-C5) 12·0	364
$C_{10}F_4H_{10}Br_2$		−105·73, −110·16	(F-F) 234	239(a)
$C_{10}F_4H_{12}$		−148·5	(F-C1) 192 (F-C2) 19·4 (F-C3) 17·2	364
$C_{10}F_4H_{12}$		(1) −143·2 (2) −107·21		239(a)
$C_{10}F_4H_{12}$		−102·07		239(a)

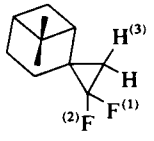
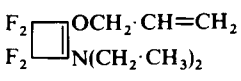
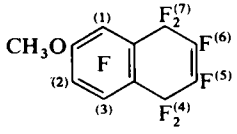
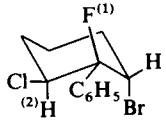
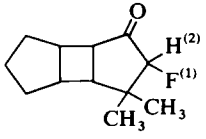
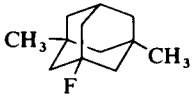
$C_{10}F_4H_{12}O_4$		−124·0, −116·0	(1-2) 260	(1 or 2-3) 15	358
$C_{10}F_5H_5O$		(1) −139·7 (2) −193·4 (3) −143·4 (4) −153·8 (5) −177·5	(2-3) 24·0 (4-5) 29·0	(2-6) 52·0 (5-7) 6·0	329
$C_{10}F_5H_7O$		(1) −157·4 (2) −137·6 (3) −159·3	(2-3) 31·0	(3-4) 11·0	329
$C_{10}F_5H_{10}O_{2\cdot5}$		(1)(5) −192·4 (2) −215·6 (3) −163·4 (4) −155·7	(1-2) 5 (2-5) 5	(1-8)(5-10) 18 (2-4) 8	361
$C_{10}F_5H_{11}O_4$		(1) −175·0 (2)(3) −130·2 (4)(5) −122·0, −114·0	(2-3) or (4-5) 260		358

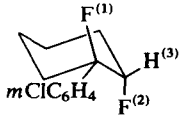
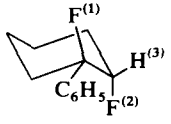
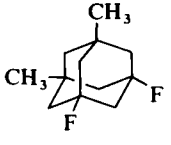
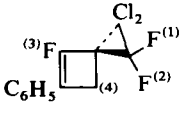
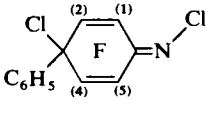
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{10}F_6H_{10}O_4$		(1) −177·0 (2) −129·0 (3) −130·0	(2-3) 235	358
$C_{10}F_6Cl_2O$		(3) −103·5 (4) −110·6 (5) −132·6 (6) −143·0 (7) −147·6 (8) −136·7	(3-4) 28 (3-6) 4 (4-5) 20 (5-6) 20 (5-7) 8·5 (5-8) 12·5 (6-7) 20 (6-8) 12·5 (7-8) 20	342(b)
$C_{10}F_7ClO$		(3) −114·1 (4) −99·7 (5) −137·7 (6) −143·9 (7) −147·5 (8) −137·7	(3-4) 25 (3-6) 4 (4-5) ~16 (5-6) ~19 (5-7) ~7 (6-7) ~19 (6-8) 12 (7-8) ~19	342(b)
$C_{10}F_7Cl_2N$	 (*ca.* 1:1)	(1) −115·8, −116·0 (2)(3)(4) −133·5, −134·9, −149·5 to −151·5 (5) −140·0, −141·5 (6) −133·0, −136·2 (7) −152·3, −149·5 to −151·5	(1-2) 46 and 32 (5-6) 70 and 72	368(a)

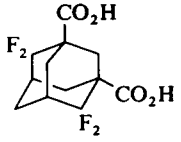
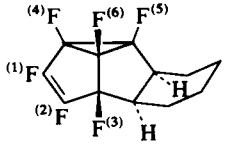
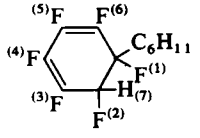
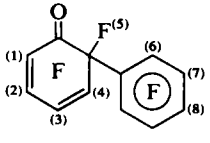
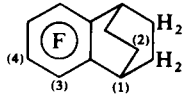
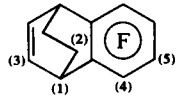
$C_{10}F_9H_7O_3$		(1) −156·5 (2)(5) −117·0 (3)(4) −133·9		356
$C_{10}F_9H_7O_3$		(1)(2) −146·0, −156·8 (3) −127·8 (4)(5) −131·3, −131·3 and −133·5 (6) −116·8, −121·0	(4A-4B) or (5A-5B) 273 (6A-6B) 282	356
$C_{10}F_9H_9O_2$		(1) −158·5 (2)(5) −116·8 (3)(4) −133·9		356
$C_{10}F_9H_9O_2$		(1)(2) −145·0, −157·3 (3) −126·2 (4)(5) −132·4, −132·4 and −134·9 (6) −116·5, −121·1	(4A-4B) or (5A-5B) 274 (6A-6B) 282	356
$C_{10}F_9H_{15}BN$		(1) −95·8 (2) −119·2 (3) −112·4 (4) −153·3		369
$C_{10}F_{10}$		(1)(2)(3)(4) −136·7, −147·2, −149·2, −158·8 (5)(6) −118·1 (7)(8) −126·6		230
$C_{10}F_{10}$	As above	(1)(10) −138·5, −140·6 (2)(3) −146·2, −148·3 (4) −135·7 (5)(6) −117·1 (7)(8) −125·5 (9) −158·6	(4-5,6) 32 (1-10) 62	233

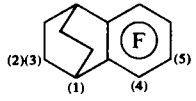
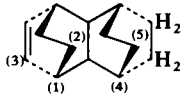
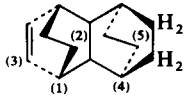
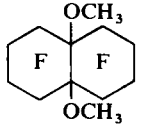
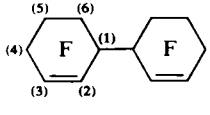
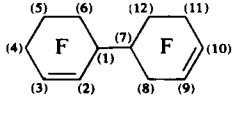
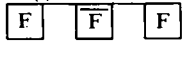
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{10}F_{10}$		(1) −99·5 (2) −155·5 (7) −147·7 (8) −137·2		233
$C_{10}F_{11}H$		(1)(2)(3)(4) −136·6, −146·6 (2:2) (5) −92·4, −103·4 (6) −105·7, −110·7 (8) −127·4, −131·8 (7) −217·6	(5A-5B) 296 (6A-6B) 299 (8A-8B) 274	230
$C_{10}F_{11}Br$	As above with H replaced by Br	(1)(2)(3)(4) −146·7, −136·8 (2:2) (5) −81·7, −113·8 (6) −95·0, −107·3 (8) −117·3, −131·3 (7) −136·4	(5A-5B) 299 (6A-6B) 307 (8A-8B) 279	230
$C_{10}F_{12}$		−106·9, −136·1, −145·2 (2:3:1)		370
$C_{10}F_{16}$		−111·3, −135·3 (1:1)		370
$C_{10}F_{16}H_2O_2$		−116·9 and −121·7 −128·3 and −130·6	(A-B) 285 (A-B) 282	370
$C_{10}F_{16}O_3S$		−110·0 and −120·6, −131·5 (1:1)	(A-B) 307	370

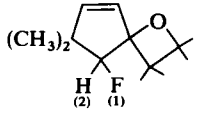
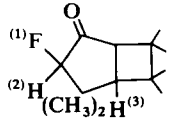
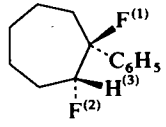
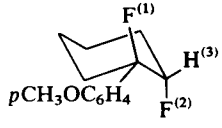
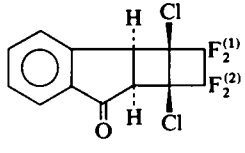
$C_{11}FH_{10}Br$			−177·75			347
$C_{11}FH_{10}Cl$	As above with Br replaced by Cl		−179·25			347
$C_{11}FH_{15}O_4$		(axial F) (equatorial F)	−185 −182·5			359
$C_{11}FH_{21}$			−153·77	(F-C1) 167·7 (F-C2) 22·8 (F-C3) <0·8 (F-C5) 25·0		336
$C_{11}FH_{21}$	As above with F and CH_3 interchanged		−127·6	(F-C1) 167·7 (F-C2) 20·6 (F-C3) 11·6 (F-C5) 25·7		336
$C_{11}F_2H_{10}$			(1) −182·25	(2) −183		347, 352
$C_{11}F_2H_{12}$			(1) −157·9	(2) −186·4	(1-3) 7·5 (2-3) 52	371
$C_{11}F_2H_{12}$	As above with F(2) and H(3) interchanged		(1) −172·5	(2) −207·4	(1-3) 18 (2-3) 54	371

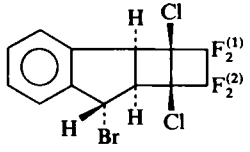
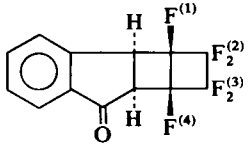
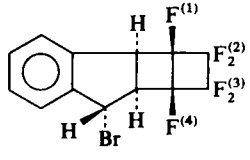
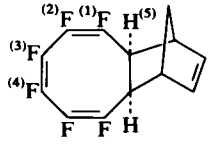
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{11}F_2H_{16}$		(1)(2) −137·7, −140·2	(1-2) 158·7 (1-3) 10·5 (2-3) 7·5	81
$C_{11}F_4H_{15}NO$		−106·5, −114·2		337(a)
$C_{11}F_9H_3O$		(1)(2)(3) −132·4, −139·4, −143·7 (4)(7) −99·0 (5)(6) −155·4		230
$C_{12}FH_{13}BrCl$		−154·0	(1-2) 45	372
$C_{12}FH_{13}Br_2$	As above with Cl replaced by Br	−155·5	(1-2) 30	372
$C_{12}FH_{14}Br$	As above with Cl replaced by H	−157·3	(1-2) 45	372
$C_{12}FH_{17}O$		Isomer [a] [b]	(1-2) 52·0 (1-2) 52·0	373
$C_{12}FH_{19}$		−132·9		364

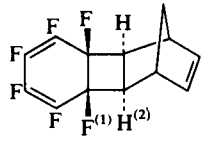
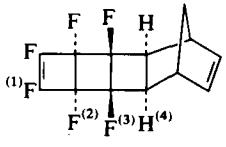
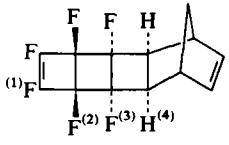
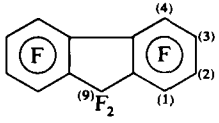
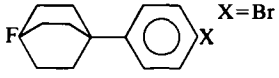
$C_{12}FH_{23}$	$F^{(1)}\overline{CH^{(2)}(CH_2)_{10}CH_2}$			(1-2) 47 ^2J(1-C) 20·6	^1J(1-C) 166·2 ^3J(1-C) 5·9	336
$C_{12}F_2H_{13}Cl$		(1) −178·5	(2) −211	(1-3) <1	(2-3) 48	371
$C_{12}F_2H_{13}Cl$	As above with F(2) and H(3) interchanged	(1) −198	(2) −204	(1-3) 25	(2-3) 48	371
$C_{12}F_2H_{14}$		(1) −178·4	(2) −212·0	(1-3) <1	(2-3) 49·5	371
$C_{12}F_2H_{14}$	As above with F(2) and H(3) interchanged	(1) −197·5	(2) −205·5	(1-3) 25	(2-3) 48	371
$C_{12}F_2H_{18}$		−139·8				364
$C_{12}F_3H_7Cl_2$		(1) −129·29 (3) −95·43	(2) −133·70	(1-2) 228·4 (2-4) 1·50	(2-3) 2·93 (3-4) 12·52	374
$C_{12}F_4H_5Cl_2N$		(1) −151·1 (4) −137·5	(2) −131·7 (5) −152·0	(1-2) 5·4 (2-4) 4·3 (4-5) 9·8	(1-5) ~1 (2-5) ~1	175(a)

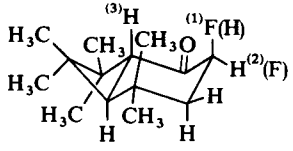
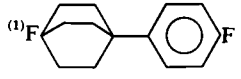
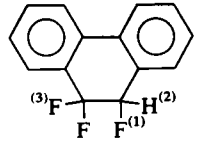
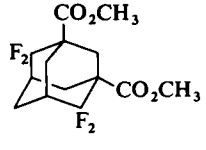
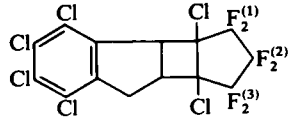
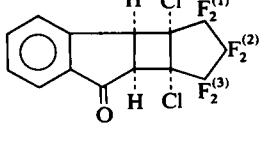
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)		Ref.
$C_{12}F_4H_{12}O_4$		−107·87, −110·81	(F-F) 236		239(a)
$C_{12}F_6H_{10}$		(1)(2) −145, −147 (3) −170 (4) −198 (5)(6) −222·5, −239			249
$C_{12}F_6H_{12}$		(1) −164·25 (2) −170·25 (3)–(6) −152·25, −153·75, −146·25, −146·85	(1-2) 21	(2-7) 60	375
$C_{12}F_{10}O$		(1) −159·0 (2) −132·0 (3) −155·3 (4) −147·7 (5) −124·2 (6) −152·4 (7) −162·2 (8) −156·2			376
$C_{12}F_{10}H_4$		(1) −193·4 (2) −127·5, −129·6 (3) −146·6 (4) −153·1	(1-3) 46	(2A-2B) 232	377
$C_{12}F_{12}$		(1) −218·2 (2) −124·2, −125·0 (3) −158·0 (4) −146·0 (5) −154·8	(1-4) 36	(2A-2B) 215	377

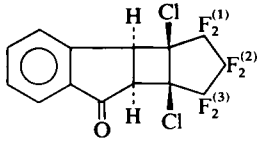
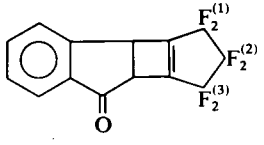
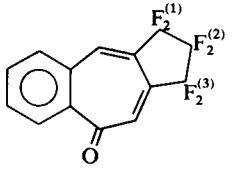
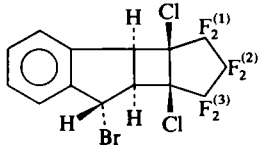
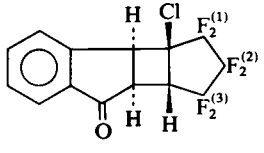
$C_{12}F_{14}$		(1) −219·6 (2) −125·3 (3) −127·6 (4) −145·0 (5) −147·9	(1-4) 38 (2-3) 250	231
$C_{12}F_{14}H_4$		(1) −218·3 (2) −123·4, −124·8 (3) −153·1 (4) −198·6 (5) −131·6, −133·5	(2A-2B) 215 (1-4) 30 (5A-5B) 240	377
$C_{12}F_{14}H_4$		(1) −218·1 (2) −120·7, −122·8 (3) −152·9 (4) −197·6 (5) −125·3, −128·3	(2A-2B) 225 (1-4) 32 (5A-5B) 230	377
$C_{12}F_{16}H_6O_2$		−114, −129·5 (1:1)		370
$C_{12}F_{18}$		(1) −161·5 (2)(3) −139·7, −147·9 (4)–(6) −106 to −146		378
$C_{12}F_{18}$		(1) −163·1 (2)(3) −138·3 and −140·7, −146·9 and −148·3 (7) −173·5, −175·3 Rest −106 to −146		378
$C_{12}F_{18}$		(1) −180		379

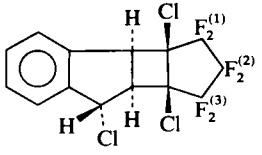
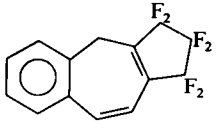
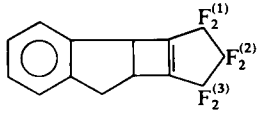
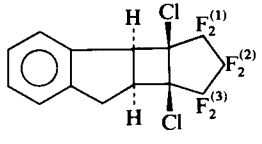
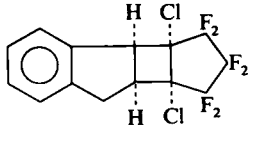
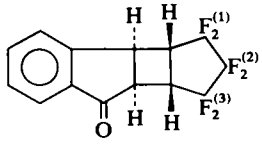
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{13}FH_{21}O$		Isomer [a] [b]	(1-2) 50·0 (1-2) 50·0	373
$C_{13}FH_{21}O$			(1-2) 51 (1-3) 6·0	373
$C_{13}F_2H_{16}$		(1) −159·4 (2) −189·4	(1-3) 6 (2-3) 45	371
$C_{13}F_2H_{16}$	As above with F(2) and H(3) interchanged	(1)(2) −181·1	(1-3) 27 (2-3) 45	371
$C_{13}F_2H_{16}O$		(1) −178 (2) −211	(1-3) <1 (2-3) 48	371
$C_{13}F_2H_{16}O$	As above with F(2) and H(3) interchanged	(1) −197 (2) −205	(1-3) 24·5 (2-3) 48	371
$C_{13}F_4H_6Cl_2O$		(1) −116·3 (2) −115·5 and −118·6	(1A-1B) or (2A-2B) 203	380(a)

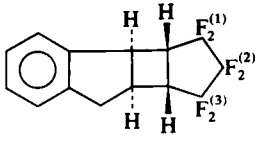
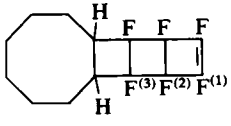
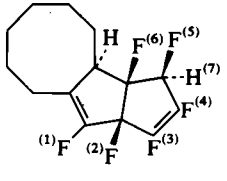
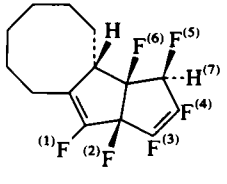
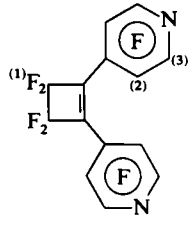
$C_{13}F_4H_7BrCl_2$		(1) −114·9 and −119·7, (2) −116·5 and −118·0	(1A-1B) 203 (2A-2B) 183		380(a)
$C_{13}F_4H_7Cl_3$	As above with Br replaced by Cl	(1) −115·0 and −119·3, (2) −116·2 and −118·0	(1A-1B) 203 (2A-2B) 172		380(a)
$C_{13}F_4H_{10}$	As above with Br and Cl replaced by H	(1) −115·5, (3) −114·9 and −119·6	(1A-1B) or (2A-2B) 209		380(a)
$C_{13}F_6H_6O$		(1)(4) −176·4, −179·6 (2)(3) −119·8 and −132·4, −120·9 and −131·6	(1-4) 26	(2A-2B) 214 (3A-3B) 218	380(a)
$C_{13}F_6H_7Br$		(1)(4) −177·4, −190·1 (2)(3) −121·6 and −134·4, −123·0 and −131·7	(1-4) 28	(2A-2B) 218 (3A-3B) 223	380(a)
$C_{13}F_6H_8$	As above with Br replaced by H	(1)(4) −178·3, −190·4 (2)(3) −122·5 and −132·4, −122·6 and −133·8	(1-4) 26	(2A-2B) 219 (3A-3B) 219	380(a)
$C_{13}F_6H_8$		−159, −161·25, −168	(1-2)(3-4) 13 (1-5) 26		381

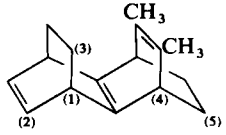
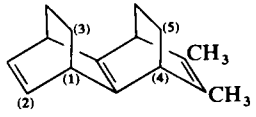
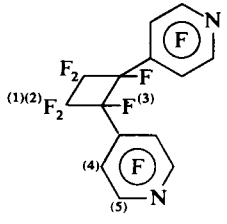
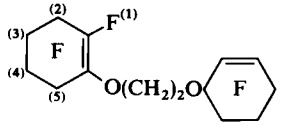
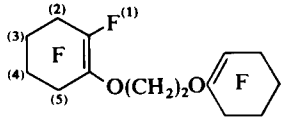
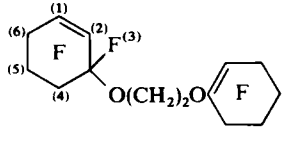
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{13}F_6H_8$		−162·3, −163·9, −188·62	(1-2) 7·5	381
$C_{13}F_6H_8$		(1) −123·75 (2) −180·75 (3) −194·25	(1-2) 9 (2-3) 15 (3-4) 7·5	381
$C_{13}F_6H_8$		(1) −125·25 (2) −180 (3) −164·25	(1-2) 4·5 (2-3) 15 (3-4) 24	381
$C_{13}F_{10}$		(1) −140·0 (2) −150·5 (3) −146·9 (4) −133·4 (9) −108·8		430
$C_{14}FH_{16}Br$		−153·11		382
$C_{14}FH_{16}NO_2$	As above with X=NO_2	−153·42		382
$C_{14}FH_{17}$	As above with X=H	−152·77		382
$C_{14}FH_{18}N$	As above with X=NH_2	−152·59		382

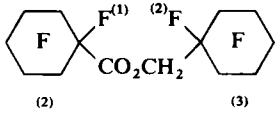
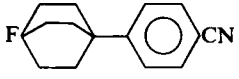
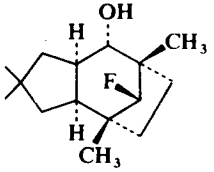
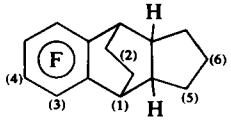
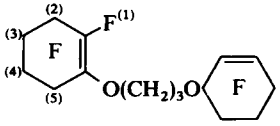
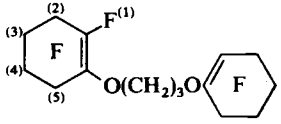
$C_{14}FH_{23}O$			Isomer [a] [b]	(1-2) 49·0 (1-2) 48·0	(1-3) 5·5 (1-3) 0	373
$C_{14}F_2H_{16}$		(1) −153·05				382
$C_{14}F_3H_9$		(1) −194·6		(1-2) 50·1	(1-3) 15·6	463
$C_{14}F_4H_{16}O_4$		−106·90, −109·95		(F-F) 237		239(a)
$C_{14}F_6H_4Cl_6$		(1) −109·8 and −132·8 (2) −110·4 and −131·7 (3) −122·8 and −137·7		(1A-1B) 244 (2A-2B) 241 (3A-3B) 263		380(a)
$C_{14}F_6H_6Cl_2O$		(1) −100·6 and −127·1 (2) −124·6 and −135·2 (3) −103·6 and −124·6		(1A-1B) 254 (2A-2B) 255 (3A-3B) 253		380(a)

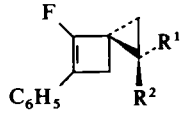
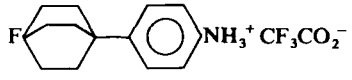
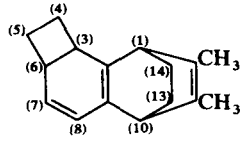
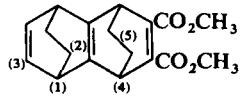
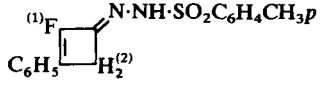
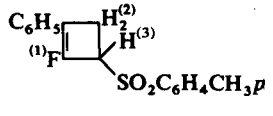
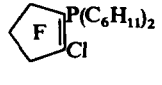
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{14}F_6H_6Cl_2O$		(1) −109·0 and −131·8, (2) −122·3 and −137·7, (3) −112·4 and −131·8	(1A-1B) 243 (2A-2B) 254 (3A-3B) 243	380(a)
$C_{14}F_6H_6O$		(1) −111·3, (2) −110·8 and −113·3, (3) −124·6	(1A-1B) or (2A-2B) or (3A-3B) 248	380(a)
$C_{14}F_6H_6O$		(1) −111·3, (2) −114·1, (3) −136·2		380(a)
$C_{14}F_6H_7BrCl_2$		(1) −107·6 and −132·6, (2) −111·9 and −130·1, (3) −122·0 and −137·1	(1A-1B) 247 (2A-2B) 245 (3A-3B) 263	380(a)
$C_{14}F_6H_7ClO$		(1) −109·6 and −133·0, (2) −111·2 and −127·3, (3) −123·9 and −138·1	(1A-1B) 248 (2A-2B) 256 (3A-3B) 261	380(a)

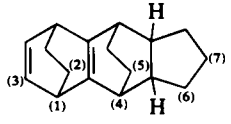
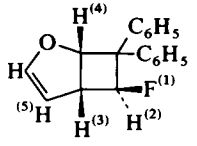
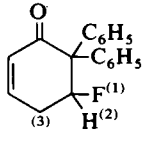
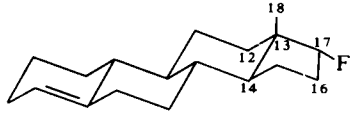
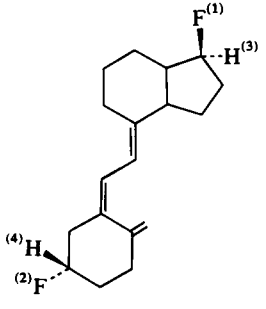
$C_{14}F_6H_7Cl_3$		(1) −107·9 and −132·8 (2) −111·9 and −130·6 (3) −122·2 and −137·4	(1A-1B) 250 (2A-2B) 246 (3A-3B) 261	380(a)
$C_{14}F_6H_8$		−110·1, −110·6, −128·8		380(a)
$C_{14}F_6H_8$		(1) −110·5, (2) −110·3 and −112·3, (3) −124·7	(1A-1B) or (2A-2B) or (3A-3B) 248	380(a)
$C_{14}F_6H_8Cl_2$		(1) −109·0 and −133·2 (2) −122·0 and −137·3 (3) −110·8 and −130·6	(1A-1B) 247 (2A-2B) 260 (3A-3B) 241	380(a)
$C_{14}F_6H_8Cl_2$		(1) −98·3 and −126·9 (2) −127·7 and −135·8 (3) −100·3 and −127·0	(1A-1B) 257 (2A-2B) 253 (3A-3B) 252	380(a)
$C_{14}F_6H_8O$		(1) −111·2 and −128·0 (2) −111·2 and −128·6 (3) −124·8 and −142·1	(1A-1B) 254 (2A-2B) 254 (3A-3B) 265	380a

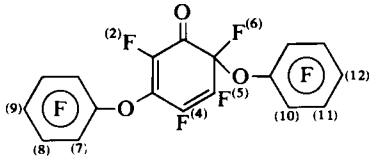
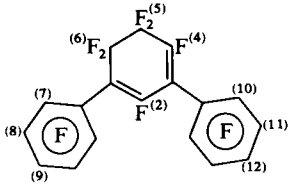
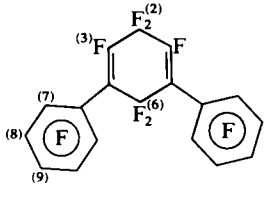
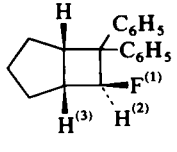
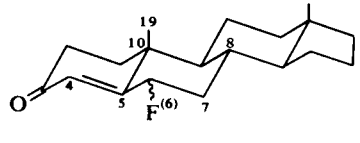
Molecular formula	Structure of compounds		Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{14}F_6H_{10}$			(1) −109·2 and −129·8 (2) −111·6 and −127·2 (3) −124·7 and −135·9	(1A-1B) 248 (2A-2B) 255 (3A-3B) 257	380(a)
$C_{14}F_6H_{14}$		Isomer [a] [b]	(1) −121·5 (2) −191 (3) −170 (1) −123 (2) −186 (3) −160		249
$C_{14}F_6H_{14}$			(1)(3)(4) −141, −146, −148·5 (2) −164·5 (5) −190 (6) −195·5	(5-7) 53	249
$C_{14}F_6H_{14}$			(1)(3)(4) −139, −142, −147 (2) −164 (5) −197 (6) −178	(5-7) 55	249
$C_{14}F_{12}N_2$			(1) −113·0 (2) −138·6 (3) −91·1		212

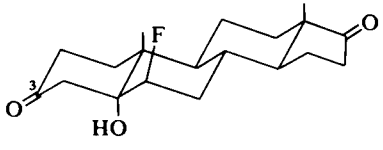
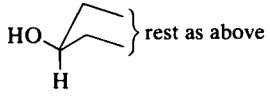
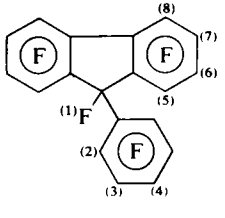
$C_{14}F_{14}H_6$		(1) −218·5 (2) −153·4 (3) −121·6, −122·9 (4) −208·9 (5) −120·9, −124·2	(1-4) 28 (3A-3B) 220 (5A-5B) 225	377
$C_{14}F_{14}H_6$		(1) −218·0 (2) −153·5 (3) −123·0 (4) −209·0 (5) −123·0		377
$C_{14}F_{14}N_2$		(1)(2) −121·1, −131·8 (3) −164·3 (4) −138·5 (5) −97·5		212
$C_{14}F_{18}H_4O_2$		(1) −153·4 (2)(5) −115·5 (3)(4) −132·1		356
$C_{14}F_{18}H_4O_2$		(1) −155·8 (2)(5) −117·0 (3)(4) −134·1		356
$C_{14}F_{18}H_4O_2$		(1)(2) −145·5, −153·4 (3) −126·1 (4)(5) −127·8, −128·7 and −133·5 (6) −114·3 and −119·3	(4A-4B) or (5A-5B) 282 (6A-6B) 282	356

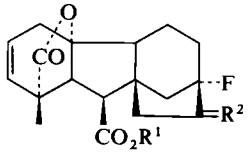
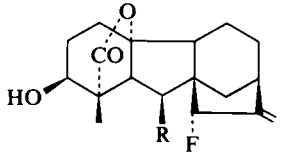
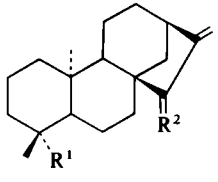
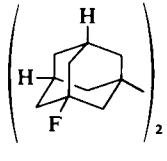
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{14}F_{22}H_2O_2$		(1) −180·2 (2) −189·2 (3) −115 to −150	^2J(F-F) 290	237
$C_{15}FH_{16}N$		−153·35		382
			^2J(F-H) 53	383
$C_{15}FH_{25}O$				
$C_{15}F_{16}H_2$		(1) −199·1 (2) −126·8 (3) −145·2 (4) −150·1 (5) −116·3 and −121·4 (6) −133·9 and −142·9	(1-3) 40 (5A-5B) 254 (6A-6B) 252	377
$C_{15}F_{18}H_6O_2$		(1) −157·1 (2)(5) −117·2 (3)(4) −134·4		356
$C_{15}F_{18}H_6O_2$		(1) −157·1 (2)(5) −117·3 (3)(4) −134·3		356

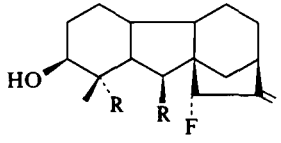
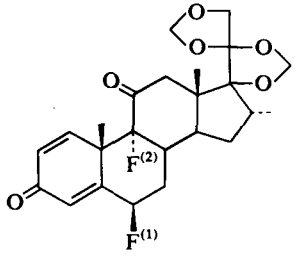
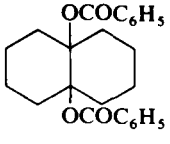
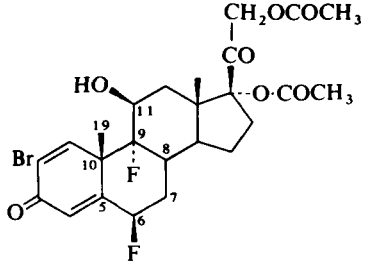
$C_{16}FH_{15}$					374
	$R^1 = H$ $R^2 = C_6H_5$		−91·02		
	$R^1 = C_6H_5$ $R^2 = H$		−98·84		
$C_{16}F_4H_{19}NO_2$			−154·70		382
$C_{16}F_{14}H_6$			(1) −205·5 (3)(5) −176·0, −189·7 (4)(5)(13)(14) −120·9, −123·8 (7) −151·1 (8) −124·0 (10) −205·3		233
$C_{16}F_{16}H_6O_4$		Isomer [a]	(1) −218·1 (2) −120·9, −122·5 (3) −152·1 (4) −208·2 (5) −120·7	(2A-2B) 230 (1-4) 30	377
		[b]	(1) −218·5 (2) −120·0 (3) −150·2 (4) −207·8 (5) −120·0	(1-4) 30	
$C_{17}FH_{15}N_2SO_2$				(1-2) 13·20	374
$C_{17}FH_{15}O_2S$			−92·64	(1-2) 13·98 (1-3) 6·23	374
$C_{17}F_6H_{22}ClP$			−105·2, −114, −129·6 (1:1:1)		384

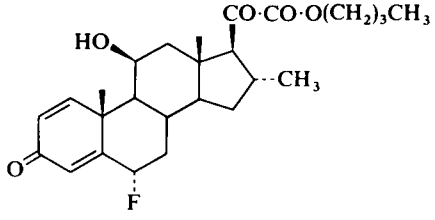
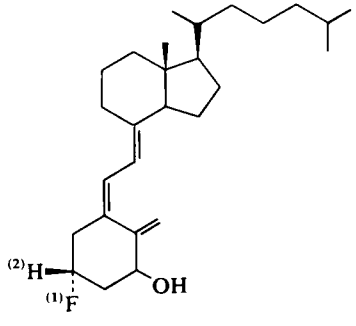
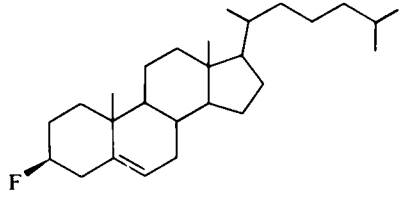
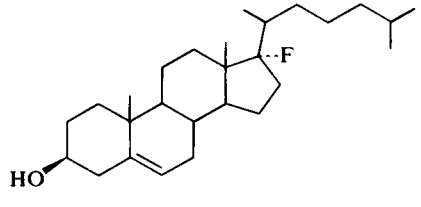
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{17}F_{20}H_2$		(1) −216·8 (2) −121·3, −122·3 (3) −153·0 (4) −201·4 (5) −124·3 (6) −117·0, −119·7 (7) −132·6, −142·7	(2A-2B) 218 (6A-6B) 256 (7A-7B) 254	377
$C_{18}FH_{15}O$		−187·5	(1-2) 57 (1-3) 12 (1-4) 6 (1-5) 4·5	282
$C_{18}FH_{15}O$		−187·13	(1-2) 57 (1-3) 10	282
$C_{18}FH_{27}$			(F-C12) 8·6 (F-C13) 16·2 (F-C16) 15·8 (F-C17) 180·5 (F-C18) 6·9	336
$C_{18}F_2H_{24}$			(1-3) 50 (2-4) 50	385

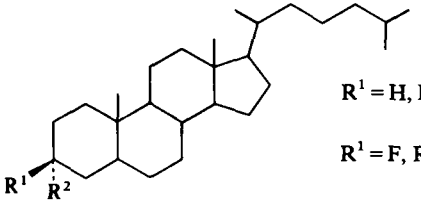
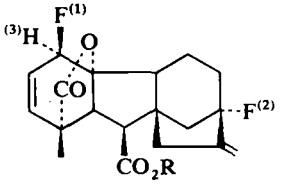
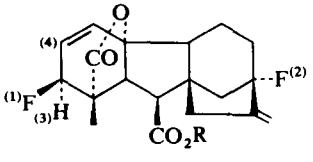
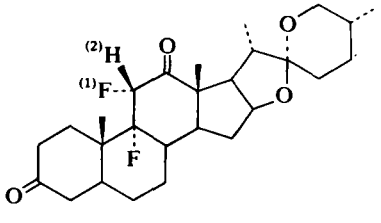
$C_{18}F_{14}O_3$		(2) −159·7 (4) −152·1 (5) −148·1 (6) −123·9 (7)(10) −155·8, −152·1 (8)(11) −162·3, −161·3 (9)(12) −157·0, −156·5	(2-5) 20	(5-6) 20	376
$C_{18}F_{16}$		(2) −100·3 (4) −113·7 (5) −130·5 (6) −119·0 (7)(10) −136·4, −137·4 (8)(11) −144·9, −160·3 (9)(12) −148·7, −150·0			386(b)
$C_{18}F_{16}$		(2) −120·5 (3) −113·6 (6) −92·9 (7) −137·3 (8) −160·2 (9) −148·5			386(b)
$C_{19}FH_{19}$		−232·5	(1-2) 60	(1-3) 18	282
$C_{19}FH_{25}O_2$		(axial F)	(6-4H) 5 (6-19H) 2·2 (6-C4) 9·2 (6-C6) 167 (6-C8) <1 (6-C19) <1	(6-6H) 50 (6-C3) <1 (6-C5) 12·0 (6-C7) 23 (6-C10) 2·0	387

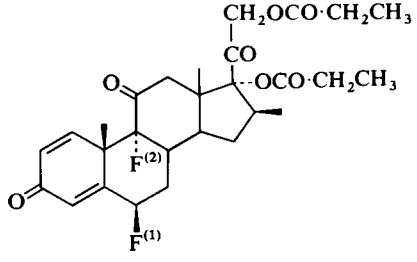
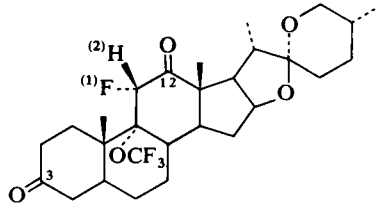
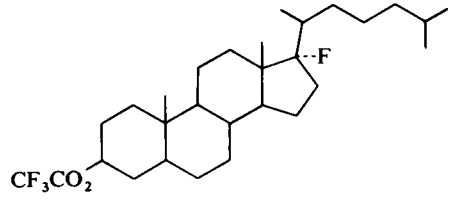
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
		(equatorial F)	(6-4H) <1 (6-6H) 49 (6-19H) 0 (6-C3) <1 (6-C4) 14·7 (6-C5) 11·0 (6-C6) 185 (6-C7) 18·4 (6-C8) 11·0 (6-C10) 2·7 (6-C19) 0	
$C_{19}FH_{27}O_3$	 (numbering as above)		(6-6H) 49 (6-19H) 3·6 (6-C4) <1 (6-C5) 23 (6-C6) 179 (6-C7) 27 (6-C8) <1 (6-C10) 1·8 (6-C19) 9·2	387
$C_{19}FH_{29}O_3$	 rest as above		(6-6H) 50 (6-19H) 4·4 (6-C4) <1 (6-C5) 19·3 (6-C6) 178 (6-C7) 20 (6-C8) <1 (6-C10) 1·8 (6-C19) 9·2	387
$C_{19}F_{14}$		(1) −158·4 (2) −141·8 (3) −160·7 (4) −151·5 (5) −140·2 (6) −151·5 (7) −148·4 (8) −132·9		430(b)

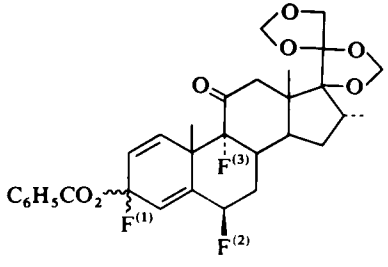
$C_{20}FH_{25}O_4$				388
	$R^1 = CH_3$ $R^2 = \alpha H, \beta CH_3$	−147·1		
	$R^1 = CH_3$ $R^2 = \alpha CH_3, \beta H$	−159·7		
$C_{20}FH_{25}O_5$	 $R = CO_2CH_3$		^2J(F-H) 55	389
$C_{20}FH_{29}O_2$				389
	$R^1 = CO_2H$, $R^2 = \alpha F, \beta H$		^2J(F-H) 55	
$C_{20}FH_{31}O$	As above with $R^1 = CH_2OH$, $R^2 = \alpha F, \beta H$		^2J(F-H) 55	389
$C_{20}F_2H_{28}$		−127·8		364

Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{21}FH_{29}O_5$	 $R = CO_2CH_3$		^2J(F-H) 55	389
$C_{21}FH_{31}O_2$	As $C_{20}FH_{29}O_2$ above with $R^1 = CO_2CH_3$, $R^2 = \alpha F, \beta H$		^2J(F-H) 55	389
$C_{24}F_2H_{28}O_6$		(1) −169 (2) −167·6	(1-6H) 50 (1-7H) 35, 17 (2-8H) 30	390
$C_{24}F_{16}H_{10}O_4$		−111·1 and −118·1, −131·9 (1:1)	(A-B) 296	370
$C_{25}F_2H_{29}BrO_7$		(6) −152·9 (9) −156·0	(6-6H) 50 (6-4H) 4 (9-19H) 2 (6-7H) 50, 14 (9-8H) 28 (9-11H) 8 (6-4C) 7·5 (6-5C) 12·6 (6-6C) 168·8 (6-7C) 20·2 (9-8C) 25·2 (9-9C) 173·9 (9-10C) 22·7 (9-11C) 35·3 (9-19C) 5·4	391(a)

$C_{26}FH_{35}O_5$			^2J(F-H) 49	392
$C_{27}FH_{43}O$			(1-2) 50	385
$C_{27}FH_{45}$		−168·4	(F-C1) 5·2 (F-C2) 18·1 (F-C3) 174·5 (F-C4) 18·9 (F-C5) 12·9 ^2J(F-H) 48	336
$C_{27}FH_{45}O$		−170	(F-16αH) = (F−16βH) = (F-20H) = 31	393

Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{27}FH_{47}$		$R^1 = H, R^2 = F$ −181·4	(F-C2) 21·3 (F-C3) 166·9 (F-C4) 22·1 ^2J(F-H) 49	336
		$R^1 = F, R^2 = H$ −168·2	(F-C2) 22·1 (F-C3) 172·2 (F-C4) 22·1 (F-C1) 8·8	336
$C_{27}F_2H_{25}BrO_5$	 R = pBrC$_6$H$_4$CO·CH$_2$	(1) −176·0 (2) −147·3	(1-3) 47	388
$C_{27}F_2H_{25}BrO_5$	 R = pBrC$_6$H$_4$CO·CH$_2$	(1) −179·3 (2) −147·3	(1-3) 47 (1-4) 9	388
$C_{27}F_2H_{38}O_4$			(1-2) 45	285

$C_{28}F_2H_{34}O_7$		(1) −169·3	(2) −168·2	(1-6H) 50 (2-8H) 30	(1-7H) 40	390
$C_{28}F_4H_{38}O_5$				(1-2) 43		285
$C_{28}F_4H_{40}O_5$	As above with 12βOH,12αH			(1-2) 46		285
$C_{28}F_4H_{42}O_5$	As above with 12βOH,12α*H* and 3βOH,3αH			(1-2) 55		285
$C_{28}F_4H_{44}P_2$	$(C_6H_{11})_2PC{=}CP(C_6H_{11})_2CF_2CF_2$	−106·4				384
$C_{29}F_4H_{46}O_2$		−170				393
$C_{29}F_6H_{44}P_2$	$(C_6H_{11})_2PC{=}CP(C_6H_{11})_2CF_2CF_2CF_2$	−107·7, −134 (2:1)				384

Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{31}F_3H_{33}O_7$		(1) −86 (2) −165·8 (3) −168·4	(2-6H) 50 (2-7H) 35 (3-8H) 30	390
$C_{32}F_8H_{44}P_2$	$[(C_6H_{11})_2PC{=}C{\cdot}CF_2CF_2]_2$	−105·8, −109·4 (1 : 1)		384

B. Miscellaneous studies

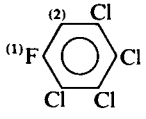
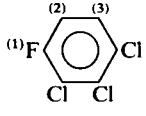
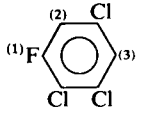
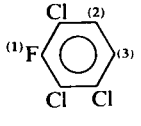
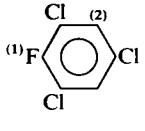
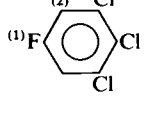
F-19 CIDNP studies have been made of the interaction of radicals with perfluorocycloalkanes, perfluorocycloalkenes, and their partially chlorinated analogues. (394) Dynamic F-19 NMR has been used to determine the rates of ring inversion of some isomeric octa- and deca-fluorocyclohexanes, and perfluorocyclohexane. (395)

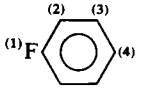
Association constants for the weak 1 : 1 complexes formed between 2,3,5,6-tetrafluoro-1,4-benzoquinone and benzene substituted and non-benzenoid macrocyclic ethers have been determined. (480)

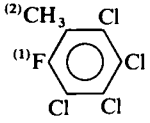
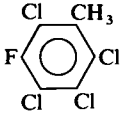
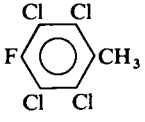
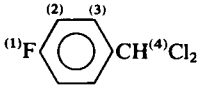
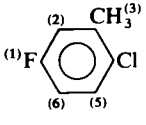
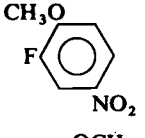
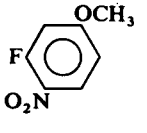
V. FLUORINE BONDED TO A CARBON OF AN AROMATIC SYSTEM, INCLUDING CONDENSED ALICYCLIC AROMATIC SYSTEMS

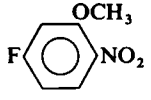
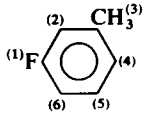
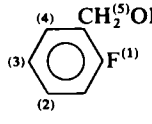
This Page Intentionally Left Blank

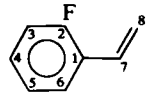
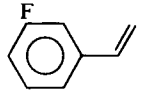
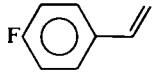
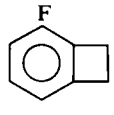
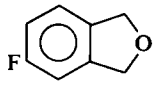
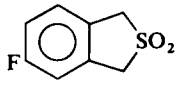
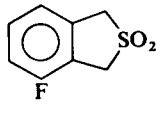
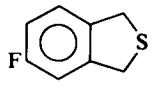
A. Fluorine nuclei in monofluorobenzene derivatives

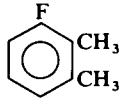
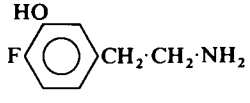
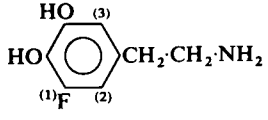
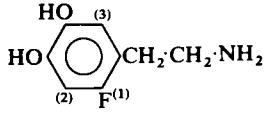
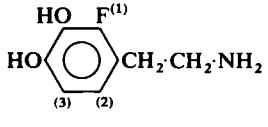
Molecular formula	Structure of compounds	Chemical shifts (pm)	Coupling constants (Hz)		Ref.
C_6FHCl_4		−109·5	(1-2) 9·6		397
C_6FHCl_4	*m*-isomer of above	−110·0	(1-2) 7·2		397
C_6FHCl_4	*p*-isomer of above	−103·7	(1-2) 2·4		397
$C_6FH_2Cl_3$		−107·2	(1-2) 7·8	(1-3) 4·2	398
$C_6FH_2Cl_2$		−106·1	(1-2) 8·2	(1-3) 1·9	398
$C_6FH_2Cl_3$		−106·0	(1-2) 4·2	(1-3) 1·4	398
$C_6FH_2Cl_3$		−116·6	(1-2) 6		398
$C_6FH_2Cl_3$		−110·6	(1-2) 8		398

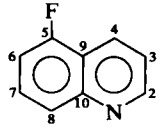
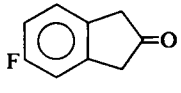
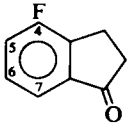
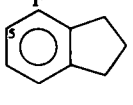
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_6FH_4Cl_3Sn$	mF·C_6H_4·$SnCl_3$	−118·36		399(d), 400
$C_6FH_4Cl_3Sn$	p-isomer of above	−122·92		399(d), 400
C_6FH_4NO	mF·C_6H_4·NO	−111·24		401
C_6FH_4NO	p-isomer of above	−102·32		401
$C_6FH_4N_2^+$	pF·C_6H_4·N_2^+	−82·8	(F-C4) 271·9 (F-C3) 25·2 (F-C2) 13·0	502
$C_6FH_4N_3$	mF·C_6H_4·N_3	−111·81		401
$C_6FH_4N_3$	p-isomer of above	−118·56		401
C_6FH_5			(1-2) 9·176 (1-3) 5·759 (1-4) 0·348 (1-C1) −244·70 (1-C2) 20·98 (1-C3) 7·81 (1-C4) 3·18	402 403
C_6FH_5	As above		(1-C1) −245.07 (1-C2) 21·02 (1-C3) 7·79 (1-C4) 3·20	404
C_6FH_5S	mF·C_6H_4·SH	−113·02		405(d)
C_6FH_5S	p-isomer of above	−118·16		405(d)
C_6FH_6NO	mF·C_6H_4·NH·OH	−113·56		401
C_6FH_6NO	p-isomer of above	−124·94		401
C_6FBr_5	C_6FBr_5	−80·3		396
$C_6F_3H_4NS$	$m\mathrm{F}^{(1)}$·C_6H_4·$SF_2^{(2)}N$	(1) −108·3 (2) +109·0		414
$C_6F_3H_4NS$	p-isomer of above	(1) −100·3 (2) +103·4		414

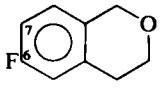
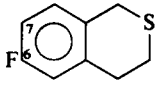
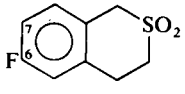
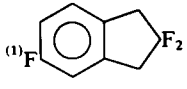
$C_7FH_3Cl_4$		−110	(1-2) 2·5	398
$C_7FH_3Cl_4$		−107		398
$C_7FH_3Cl_4$		−108·3		398
$C_7FH_5Cl_2$			(1-4) 0·22	420
C_7FH_6Br	As above with $CHCl_2$ replaced by CH_2Br		(1-4) 0·545	420
C_7FH_6Cl	As above with $CHCl_2$ replaced by CH_2Cl		(1-2) 8·416 (1-3) 5·204 (1-4) 0·652	420
C_7FH_6Cl			(1-2) 8·858 (1-3) −0·226 (1-5) 5·169 (1-6) 7·735	421
$C_7FH_6NO_3$		−121·9		407
$C_7FH_6NO_3$		−113·4		407

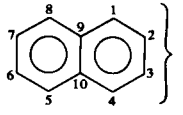
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_7FH_6NO_3$		−101·0		407
C_7FH_7			(1-2) 9·732 (1-3) −0·253 (1-4) 0·144 (1-5) 6·008 (16) 8·529	421
C_7FH_7NO	mF·C_6H_4·NH·CO·NH_2	−113·05		401
C_7FH_7NO	pF·C_6H_4·NH·CO·NH_2	−122·04		401
$C_7FH_7N_4O_2$	mF·C_6H_4·N=C(NH_2)·NH·NO_2	−112·01		422(d)
$C_7FH_7N_4O_2$	pF·C_6H_4·N=C(NH_2)·NH·NO_2	−117·09		422(d)
C_7FH_7O		−119·39	(1-2) 5·301 (1-3) −0·203 (1-4) 7·477 (1-5) 1·233 (1-6) −0·78 (1-C5) 10·050	423(n)
$C_7FH_7O_2S$	mF·C_6H_4·SO_2CH_3	−110·19		405
$C_7FH_7O_2S$	pF·C_6H_4·SO_2CH_3	−105·35		405
C_7FH_7S	mF·C_6H_4·SCH_3	−112·88		405
C_7FH_7S	pF·C_6H_4·SCH_3	−118·01		405
$C_7FH_8N_3$	mF·C_6H_4·N=C(NH_2)$_2$	−113·82		422(d)
$C_7FH_8N_3$	pF·C_6H_4·N=C(NH_2)$_2$	−124·68		422(d)
$C_7FH_9N_4O_3$	mF·C_6H_4·N=C(NH_2)$_2$·HNO_3	−111·34		422(d)
$C_7FH_9N_4O_3$	pF·C_6H_4·N=C(NH_2)$_2$·HNO_3	−115·42		422(d)
C_8FH_6N	pF$^{(1)}$·C_6H_4·$CH_2^{(2)}$CN		(1-2) 1·06	420

C_8FH_7			(F-C1) 12·4 (F-C2) 252·4 (F-C3) 21·3 (F-C4) 3·6 (F-C5) 3·5 (F-C6) 9·0 (F-C7) 4·7 (F-C8) 5·3	431
C_8FH_7			(F-C1) 8·3 (F-C2) 21·8 (F-C3) 248·2 (F-C4) 21·3 (F-C5) 8·3 (F-C6) 2·6 (F-C7) 2·4	431
C_8FH_7			(F-C1) 3·3 (F-C2) 8·1 (F-C3) 21·1 (F-C4) 249·7 (F-C8) 1·9	431
C_8FH_7		−123·32		360(d)
C_8FH_7O		−116·54		360(d)
$C_8FH_7O_2S$		−113·04		360(d)
$C_8FH_7O_2S$		−115·17		360(d)
C_8FH_7S		−117·60		360(d)
C_8FH_8N	As above with S replaced by NH	−117·50		360(d)
$C_8FH_8NO_2$	*p*F·C_6H_4·NH·CO_2CH_3	−121·1		401

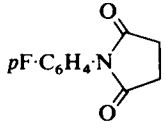
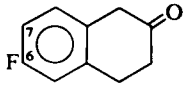
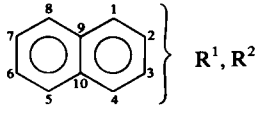
Molecular formula	Structure of compounds	Chemcal shifts (ppm)	Coupling constants (Hz)	Ref.
$C_8FH_8N_3O_2$	*m*F·C_6H_4·NH·CO·NH·CO·NH_2	−111·68		401
$C_8FH_8N_3O_2$	*p*-isomer of above	−120·22		401
C_8FH_9		−118·16		360(d)
$C_8FH_9Cl_2Sn$	*p*F·C_6H_4·$SnCl_2$·CH_2·CH_3	−119·44		400(d)
$C_8FH_9N_2O$	*m*F·C_6H_4·NH·CO·NH·CH_3	−112·76		422(d)
$C_8FH_9N_2O$	*p*-isomer of above	−122·51		422(d)
$C_8FH_{10}NO$		−133·2		432(b)
$C_8FH_{10}NO_2$		−131·9	(1-2) ±10·8 (1-3) ∓1·6	432(b)
$C_8FH_{10}NO_2$		−125·9	(1-2) 11·0 (1-3) 7·6	432(b)
$C_8FH_{10}NO_2$		−136·6	(1-2) ±8·2 (1-3) ∓1·8	432(b)
$C_8FH_{10}N_3$	*m*F·C_6H_4·CH_2·N=C(NH_2)$_2$	−114·4		422(d)
$C_8FH_{10}N_3$	*p*-isomer of above	−117·33		422(d)

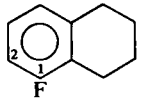
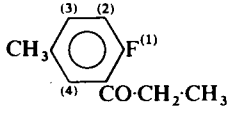
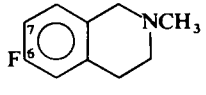
$C_8FH_{11}N_4O_3$	mF·C_6H_4·CH_2·N=C(NH_2)$_2$·HNO_3	−113·15		422(d)
$C_8FH_{11}N_4O_3$	p-isomer of above	−115·14		422(d)
C_9FH_6N			(F-C3) 3·5 (F-C4) 4·7 (F-C5) 250 (F-C6) 19·2 (F-C7) 9·1 (F-C8) 2·4 (F-C9) 2·5 (F-C10) 16·4	431
C_9FH_6N	As above with F at C6		(F-C4)5·3 (F-C5) 21·8 (F-C6) 250·1 (F-C7) 26·5 (F-C8) 9·1 (F-C9) 2·3 (F-C10) 10·0	431
C_9FH_6N	As above with F at C7		(F-C4) 2·7 (F-C5) 4·8 (F-C6) 7·5 (F-C7) 19·3 (F-C8) 259·9 (F-C9) 11·9 (F-C10) 2·3	431
C_9FH_7O		−115·38		360(d)
C_9FH_7O		−119·73		360(d)
C_9FH_7O	As above with F at C5	−104·66		360(d)
C_9FH_7O	As above with F at C6	−115·60		360(d)
C_9FH_9		−118·57		360(d)
C_9FH_9	As above with F at C5	−115·5		434

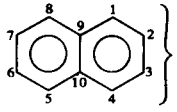
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
C_9FH_9O		−116·87		360(d)
C_9FH_9O	As above with F at C7	−116·87		360(d)
C_9FH_9S		−116·54		360(d)
C_9FH_9S	As above with F at C7	−117·18		360(d)
$C_9FH_9SO_2$		−114·59		360(d)
$C_9FH_9SO_2$	As above with F at C7	−116·31		360(d)
$C_9FH_{10}NO$	pF·C_6H_4·N=CH·O·CH_2CH_3	−120·4		401
C_9FH_{11}	pF$^{(1)}$·C_6H_4·CH$^{(4)}$$(CH_3)_2$		(1-4) 0·56	420
$C_9FH_{11}N_2$	pF·C_6H_4·N=CH·N$(CH_3)_2$	−123·9		401
$C_9FH_{11}O_2Si$	pF·C_6H_4·Si$(CH_3)_2$O·CO·H	−116·81		435(d)
$C_9FH_{13}IP$	mF·C_6H_4·$P^+(CH_3)_3$ I^-	−110·95		405
$C_9FH_{13}IP$	p-isomer of above	−104·95		405
$C_9FH_{13}Sn$	mFC_6H_4·Sn$(CH_3)_3$	−113·78		399(d)
$C_9FH_{13}Sn$	p-isomer of above	−113·38	(^{119}Sn-F) 9 (^{117}Sn-F) 9	399(d), 436
$C_9F_3H_7$		(1) −115·26		360(d)

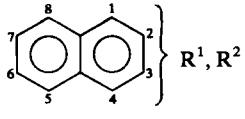
$C_9F_3H_9$	$mF{\cdot}C_6H_4{\cdot}CH_2{\cdot}CF_2{\cdot}CH_3$	0·38 relative to *m*-fluoroethylbenzene		360(d)
$C_9F_3H_9$	*p*-isomer of above	2·40 relative to *p*-fluoroethylbenzene		360(d)
$C_{10}FH_6Br$	 R^1, R^2			405
	1-F, 5-Br	−121·12		(p)
	2-F, 5-Br	−116·09		(q)
$C_{10}FH_6Br$	As above with 2-F, 3-Br	−110·6	(F-H) 7·2, 9·3	439
$C_{10}FH_6Cl$	As above with 1-F, 4-Cl	−122·81		405(p)
$C_{10}FH_6Cl$	As above with 2-F, 6-Cl	−116·09		405(q)
$C_{10}FH_6Cl$	As above with 2-F, 7-Cl	−115·26		405(q)
$C_{10}FH_6Cl$	As above with 2-F, 8-Cl	−113·80		405(q)
$C_{10}FH_6I$	As above with 1-F, 4-I	−121·92		405(p)
$C_{10}FH_6I$	As above with 2-F, 6-I	−115·49		405(q)
$C_{10}FH_6I$	As above with 2-F, 7-I	−115·19		405(q)
$C_{10}FH_6I$	As above with 2-F, 8-I	−113·95		405(q)
$C_{10}FH_6NO_2$	As above with 1-F, 5-NO_2	−119·53		405(p)
$C_{10}FH_6NO_2$	As above with 2-F, 5-NO_2	−114·66		405(q)

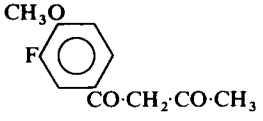
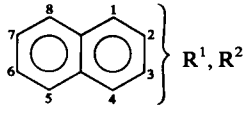
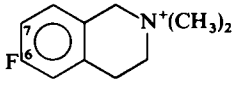
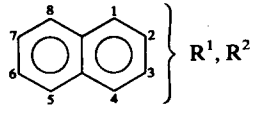
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{10}FH_7$	As above with 1-F, H		(1-2) +11·0 (1-3) +5·6 (1-4) 0·3 (1-5) +1·8 (1-7) 0·4 (1-8) 0·5 (1-C1) −251·18 (1-C2) +19·81 (1-C3) +8·36 (1-C4) +4·10 (1-C5) +3·18 (1-C6) 0·94 (1-C7) 1·82 (1-C8) +5·14 (1-C9) +16·40 (1-C10) +4·78	404
$C_{10}FH_7$	As above with 1-F, H		(1-2) 10·72 (1-3) 5·35 (1-4) 0 (1-C1) 251·5 (1-C2) 19·9 (1-C3) 8·3 (1-C4) 4·0 (1-C5) 3·3 (1-C6) ~0 (1-C7) 1·7 (1-C8) 5·2 (1-C9) 16·5 (1-C10) 4·9	440
$C_{10}FH_7$	As above with 1-F, H		Assignments wrong; see ref. 440	431
$C_{10}FH_7$	As above with 2-F, H		(2-C1) 20·2 (2-C2) 245·7 (2-C3) 25·3 (2-C4) 9·0 (2-C5) 1·2 (2-C6) 2·5 (2-C7) 0·9 (2-C8) 5·4 (2-C9) 9·1 (2-C10) 0·7	440
$C_{10}FH_7$	As above with 2-F, H		(1-2) +10·0 (2-3) +8·9 (2-4) +5·5 (2-C1) +20·24 (2-C2) −246·02 (2-C3) +25·26 (2-C4) +8·93	404

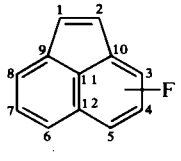
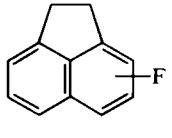
			(2-C5) 1·22 (2-C6) 2·63 (2-C7) 0·79 (2-C8) +5·39 (2-C9) +9·10 (2-C10) 0·98	
$C_{10}FH_7$	As above with 2-F, H		Assignments wrong; see ref. 440	431
$C_{10}FH_7S$	As above with 1-F, 4-SH	−127·30		405(p)
$C_{10}FH_7S$	As above with 2-F, 6-SH	−117·75		405(q)
$C_{10}FH_7S$	As above with 2-F, 7-SH	−116·05		405(q)
$C_{10}FH_8N$	As above with 1-F, 5-NH_2	−121·91		405(p)
$C_{10}FH_8N$	As above with 2-F, 5-NH_2	−118·78		405(q)
$C_{10}FH_8NO_2$		−114·2		401
$C_{10}FH_9O$		−116·88		360(d)
$C_{10}FH_9O$	As above with F at C7	−116·97		360(d)
$C_{10}FH_9O_2$	$pF{\cdot}C_6H_4{\cdot}CO{\cdot}CH_2{\cdot}CO{\cdot}CH_3$	−108·56		224(a)
$C_{10}FH_9Si$				441(q)
	2-F, 6-SiH_3	−118·77		
	2-F, 7-SiH_3	−117·84		

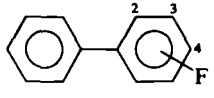
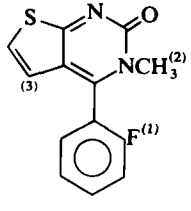
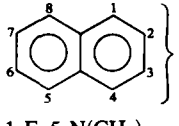
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{10}FH_{11}$		−119·27		360(d)
$C_{10}FH_{11}$	As above	−120·75		434
$C_{10}FH_{11}$	As above with F at C2	−121·8		434
$C_{10}FH_{11}O$			(1-2) 11·02 (1-3) 4·61 (1-4) 6·97	327
$C_{10}FH_{12}ClO_2Si$	$pF{\cdot}C_6H_4{\cdot}Si(CH_3)_2{\cdot}O{\cdot}CO{\cdot}CH_2Cl$	−117·04		435(d)
$C_{10}FH_{12}N$		−117·39		360(d)
$C_{10}FH_{12}N$	As above with F at C7	−117·91		360(d)
$C_{10}FH_{12}S^+$	As above with N replaced by S^+	−112·20		360(d)
$C_{10}FH_{12}S^+$	As above with N replaced by S^+ and F at C7	−115·81		360(d)
$C_{10}FH_{13}O_2Si$	$pF{\cdot}C_6H_4{\cdot}Si(CH_3)_2O{\cdot}CO{\cdot}CH_3$	−116.23		435(d)
$C_{10}FH_{14}ClSn$	$pF{\cdot}C_6H_4{\cdot}SnCl(CH_2CH_3)_2$	−116·14		400(d)
$C_{10}FH_{15}Pb$	$mF{\cdot}C_6H_4{\cdot}CH_2{\cdot}Pb(CH_3)_3$	−114·04		442(d)
$C_{10}FH_{15}Pb$	*p*-isomer of above	−120·70		442(d)
$C_{10}FH_{15}Sn$	$pF{\cdot}C_6H_4{\cdot}CH_2{\cdot}Sn(CH_3)_3$	−121·08	(^{119}Sn-F) 24·5 (^{117}Sn-F) 23·5	436

$C_{10}F_2H_6$	 R^1, R^2			
	1-F, 5-F	(1) −120·85		405(p)
	1-F, 6-F	(1) −121·78		
	1-F, 7-F	(1) −122·40		
	2-F, 5-F	(2) −115·26		405(q)
	2-F, 6-F	(2) −118·04		
	2-F, 7-F	(2) −115·69		
	2-F, 8-F	(2) −114·81		
$C_{10}F_2H_6$	As above with 1-F, 8-F	−115·814	(1-8) 58·8 (1-C1) −255·4 (1-C8) −1·6	408
$C_{10}F_2H_6$	As above with 1-F, 5-F		(1-C1) 254·5 (1-C3) 4·8 (1-C4) 4·8 (1-C5) 5·6	431
	1-F, 6-F		(1-C1) 256·9 (1-C2) 20·0 (1-C3) 17·7 (1-C4) 8·3 (1-C7) 2·3 (1-C9) 9·4 (6-C2) 2·6 (6-C5) 26·2 (6-C6) 252·3 (6-C7) 21·0 (6-C9) 4·4 Assignments may be in error; see ref. 440	
	1-F, 7-F		(1-C1) 250·7 (1-C2) 19·6 (1-C3) 9·1 (1-C4) 4·1 (1-C7) 6·1 (1-C8) 6·0 (1-C9) 8·8 (1-C10) 16·7 (7-C3) 3·0 (7-C5) 4·9 (7-C6) 25·6 (7-C7) 255·3 (7-C8) 18·2 (7-C9) 3·0 (7-C10) 9·1	

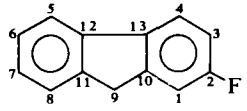
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
	2-F, 6-F		(2-6) 7 (2-C1) 25·4 (2-C2) 246·9 (2-C3) 19·9 (2-C4) 6·1 (2-C6) 3·1 (2-C8) 6·1 (2-C9) 4·2 (2-C10) 4·2 Assignments may be in error; see ref. 440	
	2-F, 7-F		(2-C1) 25·6 (2-C2) 258·8 (2-C3) 21·6 (2-C4) 9·7 (2-C6) 5·2 (2-C8) 2·4 (2-C10) 10 Assignments may be in error; see ref. 440	
$C_{11}FH_6N$	 R^1, R^2			405
	1-F, 5-CN	−120·59		(p)
	2-F, 5-CN	−116·84		(q)
$C_{11}FH_7O_2$	As above with 1-F, 5-CO_2H	−121·20		405(p)
	2-F, 5-CO_2H	−116·84		(q)
$C_{11}FH_9$	As above with 1-F, 3-CH_3	−123·96		405(p)
	1-F, 5-CH_3	−121·97		
	1-F, 7 CH_3	−123·60		
	2-F, 4-CH_3	−117·68		(q)
	2-F, 5-CH_3	−118·09		
$C_{11}FH_9O_2S$	As above with 1-F, 4-SO_2CH_3	−111·88		405(p)
	2-F, 6-SO_2CH_3	−111·78		(q)
	2-F, 7-SO_2CH_3	−114·18		

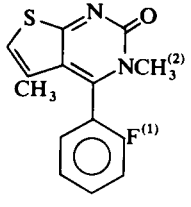
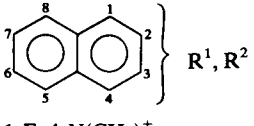
$C_{11}FH_9S$	As above with 1-F, 4-SCH_3	−125·87	405(p)
	2-F, 6-SCH_3	−118·01	(q)
	2-F, 7-SCH_3	−116·28	
$C_{11}FH_{11}O_3$		−137·5	224(a)
$C_{11}FH_{11}Si$			441(q)
	2-F, 6-SiH_2CH_3	−118·40	
	2-F, 7-SiH_2CH_3	−117·60	
$C_{11}FH_{15}N^+$		−113·88	360(d)
$C_{11}FH_{15}N^+$	As above with F at C7	−115·33	360(d)
$C_{11}FH_{16}N_3$	*m*F·C_6H_4·NH·C(NH_2)=N·C(CH_3)$_3$	−114·17	422(d)
$C_{11}FH_{16}N_3$	*p*-isomer of above	−125·27	422(d)
$C_{11}FH_{17}N_4O_3$	*m*F·C_6H_4·NH·C(NH_2)=N·C(CH_3)$_3$·HNO_3	−111·87	422(d)
$C_{11}FH_{17}N_4O_3$	*p*-isomer of above	−115·35	422(d)
$C_{11}F_4H_6$			405
	1-F, 3-CF_3	(1) −119·30	(p)
	1-F, 4-CF_3	(1) −114·72	
	1-F, 5-CF_3	(1) −119·97	
	1-F, 7-CF_3	(1) −121·29	

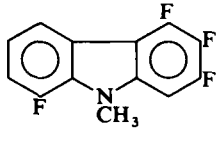
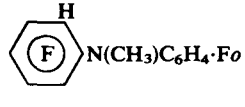
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)		Ref.
	2-F, 4-CF_3	(2) −116·91			(q)
	2-F, 5-CF_3	(2) −115·33			
	2-F, 6-CF_3	(2) −113·01			
	2-F, 7-CF_3	(2) −114·63			
	2-F, 8-CF_3	(2) −112·28			
$C_{12}FH_7$		F at C3	(3-C1) 2·44	(3-C2) 2·36	404
			(3-C3) −263·34	(3-C4) +25·78	
			(3-C5) +8·05	(3-C6) 0·52	
			(3-C7) 2·02	(3-C8) 1·21	
			(3-C9) +4·20	(3-C10) +14·37	
			(3-C11) +10·14	(3-C12) 1·00	
		F at C4	(4-C1) 0·54	(4-C2) 2·92	
			(4-C3) +27·71	(4-C4) −245·0	
			(4-C5) +22·75	(4-C6) +5·40	
			(4-C7) 0·61	(4-C8) 2·12	
			(4-C9) 1·01	(4-C10) +9·79	
			(4-C11) <0·15	(4-C12) +10·25	
		F at C5	(5-C1) 2·87	(5-C2) 0·44	
			(5-C3) +8·09	(5-C4) +21·54	
			(5-C5) −259·9	(5-C6) 1·56	
			(5-C7) 1·11	(5-C8) 0·92	
			(5-C9) 2·23	(5-C10) +3·95	
			(5-C11) +6·45	(5-C12) +19·34	
$C_{12}FH_9$	 (Numbering as above)	F at C3	(3-C1) 0·57	(3-C2) 1·61	404
			(3-C3) −245·48	(3-C4) +25·12	
			(3-C5) +6·93	(3-C6) 1·10	
			(3-C7) 2·76	(3-C8) 0·58	
			(3-C9) +4·98	(3-C10) +17·22	
			(3-C11) +8·26	(3-C12) 1·48	

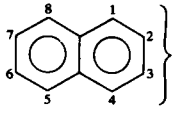
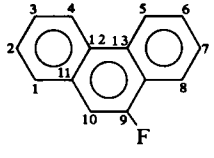
		F at C4		(4-C1) 0·39 (4-C2) 2·53 (4-C3) +27·24 (4-C4) −245·5 (4-C5) +22·70 (4-C6) +5·70 (4-C7) 0·74 (4-C8) 2·42 (4-C9) 1·33 (4-C10) +10·18 (4-C11) <0·12 (4-C12) +10·77	
		F at C5		(5-C1) <0·3 (5-C2) 29·92 (5-C3) +7·43 (5-C4) +20·46 (5-C5) −249·64 (5-C6) 0·90 (5-C7) 1·47 (5-C8) 1·46 (5-C9) +3·14 (5-C10) +3·66 (5-C11) +6·94 (5-C12) +19·18	
$C_{12}FH_9$		F at C2 F at C3 F at C4	−118·2 −113·3 −116·1		448
$C_{12}FH_9N_2OS$				(1-2) 1·2 (1-3) 0·6	449
$C_{12}FH_{12}N$	 R^1, R^2 1-F, 5-$N(CH_3)_2$		−121·81		405
$C_{12}FH_{12}S$	As above with 1-F, 3-$S(CH_3)_2^+$ 2-F, 6-$S(CH_3)_2^+$ 2-F, 7-$S(CH_3)_2^+$		−112·09 −111·00 −113·59		405(p) (q)
$C_{12}FH_{13}Si$	As above with 2-F, 6-$SiH(CH_3)_2$ 2-F, 7-$SiH(CH_3)_2$		−118·05 −117·38		441(q)

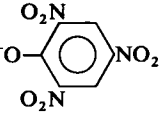
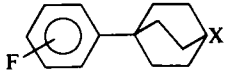
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{12}FH_{19}Sn$	*o*F·C_6H_4·Sn(CH_2CH_3)$_3$	−93·38	(^{119}Sn-F) 34 (^{117}Sn-F) 33	436
$C_{12}FH_{19}Sn$	*m*-isomer of above	−112·41		400, 399(d)
$C_{12}FH_{19}Sn$	*p*-isomer of above	−112·62		400, 399(d)
$C_{12}F_2H_8Cl_2Sn$	(*m*F·C_6H_4)$_2$$SnCl_2$	−116·94		400, 399(d)
$C_{12}F_2H_8Cl_2Sn$	*p*-isomer of above	−116·14		400, 399(d)
$C_{12}F_2H_8N_2$	*m*F·C_6H_4·N=N·C_6H_4·F*m* (*cis*) (*trans*)	−111·05 −112·04		401
$C_{12}F_2H_8N_2$	*p*F·C_6H_4·N=N·C_6H_4·F*p* (*cis*) (*trans*)	−112·25 −109·71		401
$C_{12}F_2H_8N_2$	*m*F$^{(1)}$·C_6H_4·N=N(→O)·C_6H_4·F$^{(2)}$*m*	(1) −111·72 (2) −110·87		401
$C_{12}F_2H_8N_2O$	*p*F·C_6H_4·N=N(→O)·C_6H_4·F*p*	−109·26, −108·93		401
$C_{12}F_2H_8N_2O$	(*m*F·C_6H_4)$_2$N·NO	−111·42, −110·98		401
$C_{12}F_2H_8N_2O$	*p*-isomer of above	−115·79, −111·66		401
$C_{12}F_2H_9N$	(*m*F·C_6H_4)$_2$NH	−111·77		401
$C_{12}F_2H_9N$	*p*-isomer of above	−122·45		401
$C_{12}F_2H_{10}N_2$	(*p*F·C_6H_4·NH)$_2$	−126·9		401
$C_{12}F_2H_{10}N_2$	(*p*F·C_6H_4)$_2$N·NH_2	−121·6		401
$C_{12}F_5H_6N$	*o*F·C_6H_4·NH(F)H	−130·0, −140·5, −157·1, −159·6, −168·5		451

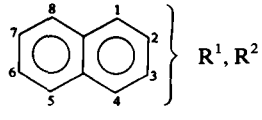
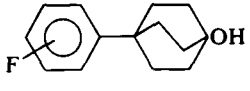
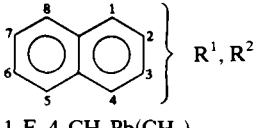
$C_{13}FH_9$			(F-C1) +22·88 (F-C3) +23·00 (F-C5) 1·00 (F-C7) 1·01 (F-C9) +2·50 (F-C11) +1·99 (F-C13) +2·28	(F-C2) −245·0 (F-C4) +8·84 (F-C6) 0·50 (F-C8) 0·48 (F-C10) +8·68 (F-C12) 0·52	404
$C_{13}FH_9BrCl$	 R = Br, X = Cl	−113·32			454(b)
$C_{13}FH_9BrNO_2$	As above with R = Br, X = NO_2	−112·35			454(b)
$C_{13}FH_9ClNO_2$	As above with R = Cl, X = NO_2	−112·41			454(b)
$C_{13}FH_9Cl_2$	As above with R = Cl, X = Cl	−113·45			454(b)
$C_{13}FH_{10}Br$	As above with R = Br, X = H	−113·96			454(b)
$C_{13}FH_{10}Cl$	As above with R = Cl, X = H	−114·09			454(b)
$C_{13}FH_{10}Cl$	As above with R = H, X = Cl	−116·52			454(b)
$C_{13}FH_{10}ClO$	As above with R = OH, X = Cl	−114·47			454(b)
$C_{13}FH_{10}N$	*p*F·C_6H_4·N=CH·C_6H_5	−117·5			401
$C_{13}FH_{10}NO$	*p*F·C_6H_4·NH·CO·C_6H_5	−119·1			401
$C_{13}FH_{10}NO_2$	As $C_{13}FH_9BrCl$ above with R=H, X=NO_2	−115·50			454(b)
$C_{13}FH_{10}NO_3$	As $C_{13}FH_9BrCl$ above with R = OH, X = NO_2	−113·12			454(b)
$C_{13}FH_{11}$	As $C_{13}FH_9BrCl$ above with R = H, X = H	−117·17			454(b)
$C_{13}FH_{11}N_2O$	*m*F·C_6H_4·NH·CO·NH·C_6H_5	−112·90			401
$C_{13}FH_{11}N_2O$	As above	−112·33			422(d)

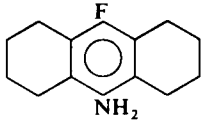
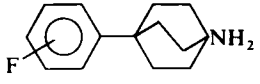
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{13}FH_{11}N_2O$	$pF{\cdot}C_6H_4{\cdot}NH{\cdot}CO{\cdot}NH{\cdot}C_6H_5$	−121·95		401
$C_{13}FH_{11}N_2O$	As above	−121·48		422(d)
$C_{13}FH_{11}N_2OS$			(1-2) 0·5	449
$C_{13}FH_{11}O$	$pF{\cdot}C_6H_4{\cdot}CH(OH){\cdot}C_6H_5$	−115·30		454(d)
$C_{13}FH_{12}N_3$	$pF{\cdot}C_6H_4{\cdot}N{=}N{\cdot}N(CH_3)C_6H_5$	−117·0		401
$C_{13}FH_{12}N_3$	$mF{\cdot}C_6H_4{\cdot}N{=}C(NH_2){\cdot}NH{\cdot}C_6H_5$	−113·15		422(d)
$C_{13}FH_{12}N_3$	*p*-isomer of above	−123·85		422(d)
$C_{13}FH_{13}N_4O_3$	$mF{\cdot}C_6H_4{\cdot}N{=}C(NH_2)NH{\cdot}C_6H_5{\cdot}HNO_3$	−111·59		422(d)
$C_{13}FH_{13}N_4O_3$	*p*-isomer of above	−115·90		422(d)
$C_{13}FH_{15}N^+$	 R^1, R^2			405
	1-F, 4-$N(CH_3)_3^+$	−116·56		(p)
	1-F, 5-$N(CH_3)_3^+$	−116·98		
	2-F, 6-$N(CH_3)_3^+$	−113·60		(q)
	2-F, 7-$N(CH_3)_3^+$	−114·31		
$C_{13}FH_{15}P^+$	As above with 1-F, 4-$P(CH_3)_3^+$	−111·75		405(p)
	2-F, 6-$P(CH_3)_3^+$	−111·45		(q)
	2-F, 7-$P(CH_3)_3^+$	−114·11		

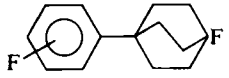
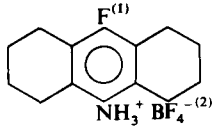
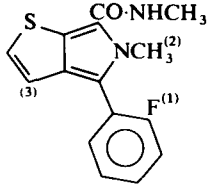
$C_{13}FH_{15}Si$	As above with 1-F, 5-$Si(CH_3)_3$	−121·47	405(p)
	2-F, 5-$Si(CH_3)_3$	−117·92	(q)
	1-F, 7-$Si(CH_3)_3$	−123·23	(p)
	2-F, 8-$Si(CH_3)_3$	−115·78	(q)
$C_{13}FH_{15}Si$	As above with 2-F, 6-$Si(CH_3)_3$	−117·77	441(q)
	2-F, 7-$Si(CH_3)_3$	−117·17	
$C_{13}F_2H_8N_2$	(mF·C_6H_4·N=)$_2$C	−111·51	401
$C_{13}F_2H_8N_2$	p-isomer of above	−117·12	401
$C_{13}F_2H_9Br$	(pF·C_6H_4)$_2$CHBr	−113·53	454(b)
$C_{13}F_2H_9Cl$	As above with Br replaced by Cl	−113·65	454(b)
$C_{13}F_2H_{10}$	As above with Br replaced by H	−116·73	454(b)
$C_{13}F_2H_{10}N_2O$	(mF·C_6H_4·NH)$_2$CO	−112·87	401
$C_{13}F_2H_{10}N_2O$	p-isomer of above	−120·98	401
$C_{13}F_2H_{10}O$	(pF·C_6H_4)$_2$CH·OH	−114·75	454(b)
$C_{13}F_4H_7N$		−136·6, −143·3, −173·8 (1:1:2)	451
$C_{13}F_4H_8$	pF·C_6H_4·C_6H_4·CF_3m	+1·35 relative to compound with CF_3 replaced by H	405
$C_{13}F_4H_8$	pF·C_6H_4·C_6H_4·CF_3p	+1·65 relative to compound with CF_3 replaced by H	405
$C_{13}F_5H_8N$		−118·7, −137·3, −146·2. −157·1, −166·5	451

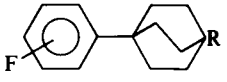
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{14}FH_6N_3$	 R^1, R^2			457
	1-F, 4-$C(CN)_3$	−114·26		(p)
	2-F, 6-$C(CN)_3$	−111·78		(q)
	2-F, 7-$C(CN)_3$	−113·11		
$C_{14}FH_8Br$	*p*F·C_6H_4·C≡C·C_6H_4·X*p* X=Br	−110·79		454(b)
$C_{14}FH_8Cl$	As above with X = Cl	−110·85		454(b)
$C_{14}FH_8NO_2$	As above with X = NO_2	−109·25		454(b)
$C_{14}FH_9$	As above with X = H	−111·49		454(b)
$C_{14}FH_9$			(9-C1) +5·50 (9-C2) 0·71 (9-C3) 2·42 (9-C4) 1·41 (9-C5) +3·19 (9-C6) 0·52 (9-C7) 1·40 (9-C8) +6·29 (9-C9) −251·63 (9-C10) +19·81 (9-C11) +9·88 (9-C12) 1·09 (9-C13) +5·68 (9-C14) +18·79	404
$C_{14}FH_{10}Br$	*p*F·C_6H_4·CH=CH·C_6H_4·Br*p*	*cis* −113·77 *trans* −113·54		454(b)
$C_{14}FH_{10}Br_2Cl$	*p*F·C_6H_4·CHBr·CHBr·C_6H_4·Cl*p*	*erythro* −111·94 *threo* −111·99		454(b)
$C_{14}FH_{10}Br_2NO_2$	*p*F·C_6H_4·CHBr·CHBr·C_6H_4·NO_2 *p*	*erythro* −111·44 *threo* −111·08		454(b)
$C_{14}FH_{10}Br_3$	*p*F·C_6H_4·CHBr·CHBr·C_6H_4·Br*p*	*erythro* −111·92 *threo* −111·90		454(b)
$C_{14}FH_{10}Cl$	*p*F·C_6H_4·CH=CH·C_6H_4·Cl*p*	*cis* −113·83 *trans* −113·62		454(b)

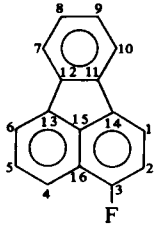
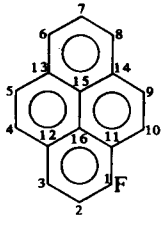
$C_{14}FH_{10}NO_2$	*p*F·C_6H_4·CH=CH·C_6H_4·NO_2*p*		*cis* −112·55 *trans* −111·87	454(b)
$C_{14}FH_{11}$	*p*F·C_6H_4·CH=CH·C_6H_5		*cis* −114·51 *trans* −114·28	454(b)
$C_{14}FH_{11}Br_2$	*p*F·C_6H_4·CHBr·CHBr·C_6H_5		*erythro* −112·36 *threo* −112·55	454(b)
$C_{14}FH_{12}Br$	*p*F·C_6H_4·CHBr·C_6H_4·CH_3*p*		−114·18	454(b)
$C_{14}FH_{12}BrO$	*p*F·C_6H_4·CHBr·C_6H_4·OCH_3*p*		−114·27	454(b)
$C_{14}FH_{12}Cl$	*p*F·C_6H_4·CHCl·C_6H_4·CH_3*p*		−114·33	454(b)
$C_{14}FH_{12}Cl$	*p*F·C_6H_4·CH_2·CH_2·C_6H_4·Cl*p*		−116·86	454(b)
$C_{14}FH_{12}ClO$	*p*F·C_6H_4·CHCl·C_6H_4·OCH_3*p*		−114·42	454(b)
$C_{14}FH_{12}N$	*p*F·C_6H_4·CH=CH·C_6H_4·NH_2*p*		*cis* −115·35 *trans* −115·63	454(b)
$C_{14}FH_{12}N_3O_7S$	*m*F·C_6H_4·$S(CH_3)_2^+$ $^-$O– 		−108·18	422(d)
$C_{14}FH_{12}N_3O_7S$	*p*-isomer of above		−104·56	422(d)
$C_{14}FH_{13}$	*p*F·C_6H_4·CH_2·CH_2·C_6H_5		−117·32	454(b)
$C_{14}FH_{13}$	*p*F·C_6H_4·CH_2·C_6H_4·CH_3*p*		−117·39	454(b)
$C_{14}FH_{13}O$	*p*F·C_6H_4·CH_2·C_6H_4·OCH_3*p*		−117·43	454(b)
$C_{14}FH_{13}O$	*p*F·C_6H_4·CH(OH)·C_6H_4·CH_3*p*		−115·61	454(b)
$C_{14}FH_{13}O_2$	*p*F·C_6H_4·CH(OH)·C_6H_4·OCH_3*p*		−115·73	454(b)
$C_{14}FH_{14}N$	*p*F·C_6H_4·CH_2·CH_2·C_6H_4·NH_2*p*		−117·71	454(b)
$C_{14}FH_{16}Br$		X = Br *o* *m* *p*	−109·94 −113·91 −119·70	459(f) 458 460

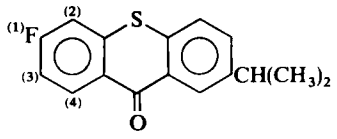
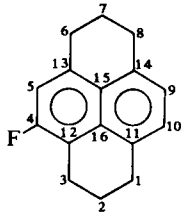
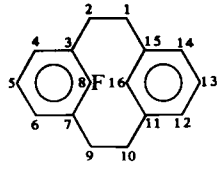
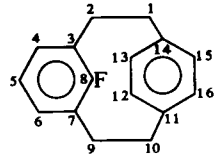
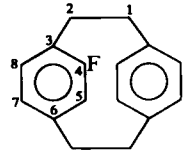
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{14}FH_{16}Cl$	As above with X = Cl	*o* −109·95		459(f)
		m −113·92		458
		p −119·01		460
$C_{14}FH_{16}I$	As above with X = I	*o* −109·97		459(f)
		m −113·92		458
		p −119·05		460
$C_{14}FH_{16}NO_2$	As above with X = NO_2	*o* −109·89		459(f)
		m −113·81		458
		p −118·73		
$C_{14}FH_{17}$	As above with X = H	*o* −109·42		459(f)
		m −114·21		
		p −119·71		
$C_{14}FH_{17}Ge$				442
	1-F, 4-$CH_2Ge(CH_3)_3$	−127·73		(p)
	2-F, 6-$CH_2Ge(CH_3)_3$	−119·23		(q)
	2-F, 7-$CH_2Ge(CH_3)_3$	−117·31		
$C_{14}FH_{17}O$		*o* −109·83		459(f)
		m −114·17		460
		p −119·48		
$C_{14}FH_{17}Pb$				442
	1-F, 4-$CH_2Pb(CH_3)_3$	−128·21		(p)
	2-F, 6-$CH_2Pb(CH_3)_3$	−119·62		(q)
	2-F, 7-$CH_2Pb(CH_3)_3$	−117·25		

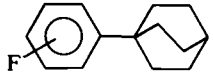
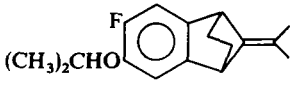
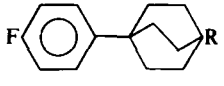
$C_{14}FH_{17}Si$	As above with 1-F, 4-$CH_2Si(CH_3)_3$		−127·73	442(p)
	2-F, 6-$CH_2Si(CH_3)_3$		−119·17	(q)
	2-F, 7-$CH_2Si(CH_3)_3$		−117·33	
$C_{14}FH_{17}Sn$	As above with 1-F, 4-$CH_2Sn(CH_3)_3$		−128·49	442(p)
	2-F, 6-$CH_2Sn(CH_3)_3$		−119·63	(q)
	2-F, 7-$CH_2Sn(CH_3)_3$		−117·28	
$C_{14}FH_{18}N$			−131·1	461
$C_{14}FH_{18}N$		*o*	−109·76	459(f)
		m	−114·20	458
		p	−119·57	460
$C_{14}FH_{19}N^+$	As above with NH_2 replaced by NH_3^+	*o*	−110·50	459(f)
		m	−113·17	458
		p	−117·53	460
$C_{14}F_2H_8$	*p*F·C_6H_4·C≡C·C_6H_4·F*p*		−111·17	454(b)
$C_{14}F_2H_8N_2O_2$	(*m*F·C_6H_4·NCO)$_2$		−110·82	401
$C_{14}F_2H_8N_2O_2$	*p*-isomer of above		−117·85	401
$C_{14}F_2H_{10}$	*p*F·C_6H_4·CH=CH·C_6H_4·F*p*		*cis* −114·10 *trans* −114·01	454(b)
$C_{14}F_2H_{10}Br_2$	*p*F·C_6H_4·CHBr·CHBr·C_6H_4·*p*		*erythro* −112·05 *threo* −112·10	454(b)
$C_{14}F_2H_{11}N_3O_2$	(*m*F·C_6H_4·NH·CO)$_2$NH		−112·47	401
$C_{14}F_2H_{11}N_3O_2$	*p*-isomer of above		−119·69	401
$C_{14}F_2H_{12}$	*p*F·C_6H_4·CH_2·CH_2·C_6H_4·F*p*		−117·00	454(b)
$C_{14}F_2H_{14}Sn$	(*p*F·C_6H_4)$_2$Sn$(CH_3)_2$		−112·65	399(d)
$C_{14}F_2H_{14}Sn$	*m*-isomer of above		−113·22	399(d)

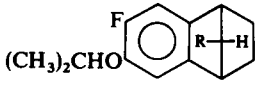
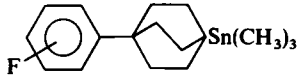
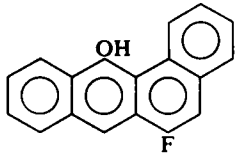
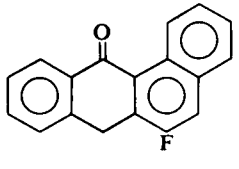
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{14}F_2H_{16}$		*o* −109·97 *m* −113·98 *p* −119·05		459(f) 458 460
$C_{14}F_5H_{19}BN$		(1) −120·4 (2) −146·2		461
$C_{15}FH_8N$	*p*F·C_6H_4·C≡C·C_6H_4·CN*p*	−109·54		454(b)
$C_{15}FH_{10}Br_2N$	*p*F·C_6H_4·CHBr·CHBr·C_6H_4·CN*p*	*erythro* −111·54 *threo* −111·25		454(b)
$C_{15}FH_{10}N$	*p*F·C_6H_4·CH=CH·C_6H_4·CN*p*	*cis* −112·82 *trans* −112·20		454(b)
$C_{15}FH_{11}$	*p*F·C_6H_4·C≡C·C_6H_4·CH_3*p*	−111·86		454(b)
$C_{15}FH_{11}O$	*p*F·C_6H_4·C≡C·C_6H_4·OCH_3*p*	−112·17		454(b)
$C_{15}FH_{13}$	*p*F·C_6H_4·CH=CH·C_6H_4·CH_3*p*	*cis* −114·77 *trans* −114·68		454(b)
$C_{15}FH_{13}Br_2$	*p*F·C_6H_4·CHBr·CHBr·C_6H_4·CH_3*p*	*erythro* −112·50 *threo* −112·81		454(b)
$C_{15}FH_{13}Br_2O$	*p*F·C_6H_4·CHBr·CHBr·C_6H_4·OCH_3*p*	*erythro* −112·57 *threo* −112·90		454(b)
$C_{15}FH_{13}N_2OS$			(1-2) 1·8 (1-3) 0·8	559

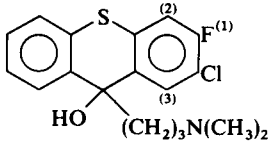
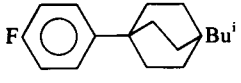
$C_{15}FH_{13}O$	$pF{\cdot}C_6H_4{\cdot}CH{=}CH{\cdot}C_6H_4{\cdot}OCH_3p$			*cis* −114·93 trans −115·04	454(b)
$C_{15}FH_{15}$	$pF{\cdot}C_6H_4{\cdot}CH_2{\cdot}CH_2{\cdot}C_6H_4{\cdot}CH_3p$			−117·45	454(b)
$C_{15}FH_{15}O$	$pF{\cdot}C_6H_4{\cdot}CH_2{\cdot}CH_2{\cdot}C_6H_4{\cdot}OCH_3p$			−117·47	454(b)
$C_{15}FH_{16}N$		R = CN	*m* *p*	−113·84 −118·94	459(f) 458
$C_{15}FH_{16}N$	As above with R = NC		*m*	−113·86	459(f)
$C_{15}FH_{17}O$	As above with R = CHO		*p*	−119·25	459(f)
$C_{15}FH_{17}O_2$	As above with R = CO_2H		*p*	−119·37	459(f)
$C_{15}FH_{18}Cl$	As above with R = CH_2Cl		*p*	−119·35	459(f)
$C_{15}FH_{19}$	As above with R = CH_3		*o* *m* *p*	−109·59 −114·24 −119·63	459(f) 464
$C_{15}FH_{19}O$	As above with R = OCH_3		*o* *m* *p*	−109·86 −114·10 −119·33	459(f) 458 460
$C_{15}FH_{19}O$	As above with R = CH_2OH		*p*	−119·62	459(f)
$C_{15}F_4H_{10}$	$pF{\cdot}C_6H_4{\cdot}CH{=}CH{\cdot}C_6H_4{\cdot}CF_3p$			*cis* −113·27 *trans* −112·78	454(b)
$C_{15}F_4H_{10}Br_2$	$pF{\cdot}C_6H_4{\cdot}CHBr{\cdot}CHBr{\cdot}C_6H_4{\cdot}CF_3p$			*erythro* −111·64 *threo* −111·42	454(b)
$C_{15}F_4H_{12}$	$pF{\cdot}C_6H_4{\cdot}CH_2{\cdot}CH_2{\cdot}C_6H_4{\cdot}CF_3p$			−116·57	454(b)

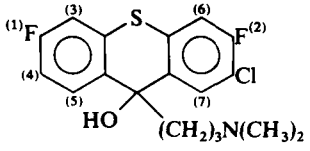
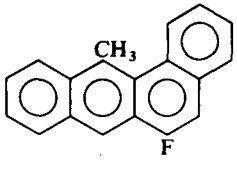
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)		Ref.
$C_{16}FH_9$			(3-C1) +8·00 (3-C3) −257·4 (3-C5) 1·44 (3-C7) 0·25 (3-C9) 0·59 (3-C11) 0·85 (3-C13) 3·96 (3-C15) +6·73	(3-C2) +21·40 (3-C4) 1·00 (3-C6) 1·50 (3-C8) 1·07 (3-C10) 1·05 (3-C12) 2·14 (3-C14) +2·81 (3-C16) +19·41	404
$C_{16}FH_9$			(1-C1) −251·1 (1-C3) +8·21 (1-C5) 2·99 (1-C7) 1·08 (1-C9) 2·45 (1-C11) +15·36 (1-C13) 0·60 (1-C15) +3·70	(1-C2) +22·17 (1-C4) 1·75 (1-C6) 2·06 (1-C8) 2·44 (1-C10) +4·59 (1-C12) +2·97 (1-C14) 1·11 (1-C16) +5·65	404
$C_{16}FH_9$	As above with F at C2		(2-C1) +22·75 (2-C4) +3·91 (2-C6) 1·03 (2-C11) +9·58 (2-C15) 0·92	(2-C2) −244·46 (2-C5) 0·70 (2-C7) 1·11 (2-C13) 1·37 (2-C16) 0·79	404
$C_{16}FH_9$	As above with F at C4		(4-C1) 1·20 (4-C3) +4·42 (4-C5) +19·96 (4-C7) <0·2 (4-C9) 0·75 (4-C11) +3·15 (4-C13) +9·68 (4-C15) 0·63	(4-C2) 1·12 (4-C4) −253·0 (4-C6) +6·06 (4-C8) 2·58 (4-C10) 0·44 (4-C12) +20·07 (4-C14) 1·3	404

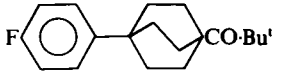
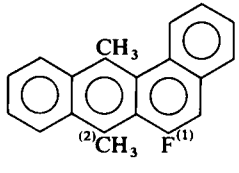
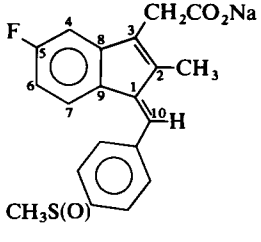
$C_{16}FH_{13}OS$		−116·8	(1-2) 8·5 (1-3) 8·5 (1-3) 6·0	465
$C_{16}FH_{15}$			(4-C1) <0·3 (4-C2) 0·42 (4-C3) +3·56 (4-C4) −242·10 (4-C5) +25·68 (4-C6) +1·81 (4-C7) <0·3 (4-C8) <0·3 (4-C9) 2·41 (4-C10) 0·86 (4-C11) +6·75 (4-C12) +16·55 (4-C13) +8·74 (4-C14) 1·91 (4-C15) 1·11 (4-C16) +6·75	404
$C_{16}FH_{15}$			(8-C3) 18·3 (8-C4) 4·9 (8-C5) 4·9 (8-C8) 248·4 (8-C16) 3·7	466
$C_{16}FH_{15}$			(8-C3) 19·5 (8-C4) 4·9 (8-C5) 3·7 (8-C8) 246·6 (8-C15) 4·9	466
$C_{16}FH_{15}$			(4-C3) 18·3 (4-C4) 245·5 (4-C5) 22·0 (4-C6) 7·3 (4-C7) 2·4 (4-C8) 6·1	466
$C_{16}FH_{16}N$	$pF{\cdot}C_6H_4{\cdot}CH{=}CH{\cdot}C_6H_4{\cdot}N(CH_3)_2p$	*cis* −115·57 *trans* −115·91		454(b)

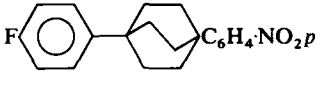
Molecular formula	Structure of compounds			Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{16}FH_{18}N$	$pF{\cdot}C_6H_4{\cdot}CH_2{\cdot}CH_2{\cdot}C_6H_4{\cdot}N(CH_3)_2p$			−117·79		454(b)
$C_{16}FH_{18}N$		R = CH_2CN	*p*	−119·30		459(f)
$C_{16}FH_{19}O$	As above with R = $CO{\cdot}CH_3$		*p*	−119·28		459(f)
$C_{16}FH_{19}O_2$	As above with R = $O{\cdot}CO{\cdot}CH_3$		*o*	−109·97		459(f)
			m	−114·01		458
			p	−119·16		460
$C_{16}FH_{20}NO$	As above with R = $NH{\cdot}CO{\cdot}CH_3$		*o*	−109·83		459(f)
			m	−114·12		460
			p	−119·43		
$C_{16}FH_{21}$	As above with R = $CH_2{\cdot}CH_3$		*m*	−114·24		459(f)
			p	−119·64		464
$C_{16}F_2H_{18}Sn$	$(oF{\cdot}C_6H_4)_2Sn(CH_2CH_3)_2$			−93·18	(^{119}Sn-F) 34 (^{117}Sn-F) 33	436, 399, 400
$C_{16}F_2H_{18}Sn$	*m*-isomer of above			−112·87	(^{119}Sn-F) 21·5 (^{117}Sn-F) 20·5	436, 399, 400
$C_{16}F_2H_{18}Sn$	*p*-isomer of above			−112·49	(^{119}Sn-F) 8·5 (^{117}Sn-F) 8·5	436, 399, 400
$C_{17}FH_{21}O$				−137·3		462
$C_{17}FH_{21}O_2$		R = $CO_2{\cdot}CH_2{\cdot}CH_3$		−119·27		459(f)

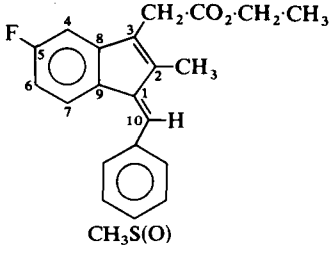
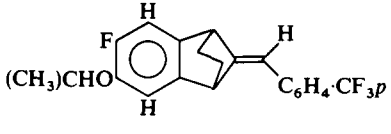
$C_{17}FH_{22}Cl$	As above with $R = CCl(CH_3)_2$		−119·41		459(f)
$C_{17}FH_{22}NO$	As above with $R = CO{\cdot}N(CH_3)_2$		−119·41		459(f)
$C_{17}FH_{23}$	As above with $R = (CH_2)_2{\cdot}CH_3$		−119·65		459(f), 464
$C_{17}FH_{23}O$	As above with $R = C(OH)(CH_3)_2$		−119·70		459(f)
$C_{17}FH_{23}O$		$R = CH(CH_3)_2$	−137·6		462
$C_{17}FH_{25}$		*o* *p*	−109·35 −119·71		459(f)
$C_{18}FH_8BiCl_6$	$pF{\cdot}C_6H_4{\cdot}Bi(3,4,5\text{-}Cl_3C_6H_2)_2$		−110·49		467(d)
$C_{18}FH_8Cl_6P$	As above with Bi replaced by P		−108·75		468(d)
$C_{18}FH_{10}BiCl_4$	$pF{\cdot}C_6H_4{\cdot}Bi(3,4\text{-}Cl_2C_6H_3)_2$		−111·55		467(d)
$C_{18}FH_{10}Cl_4N$	As above with Bi replaced by N		−116·43		467(d)
$C_{18}FH_{10}Cl_4P$	As above with Bi replaced by P		−110·05		468(d)
$C_{18}FH_{11}O$			−124·0	(F-H) 13·3	439
$C_{18}FH_{11}O$			−121·0	(F-H) 7,12	439(b)
$C_{18}FH_{12}BiCl_2$	$pF{\cdot}C_6H_4{\cdot}Bi(C_6H_4{\cdot}Cl\textit{m})_2$		−114·2		467(d)

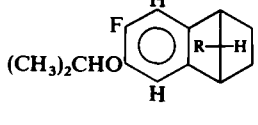
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{18}FH_{12}BiCl_2$	pF·C_6H_4·Bi(C_6H_4·Clp)$_2$	−113·78		467(d)
$C_{18}FH_{12}Cl_2N$	pF·C_6H_4·N(C_6H_4·Clp)$_2$	−118·29		467(d)
$C_{18}FH_{12}Cl_2N$	pF·C_6H_4·N(C_6H_4·Clm)$_2$	−117·37		467(d)
$C_{18}FH_{12}Cl_2P$	pF·C_6H_4·P(C_6H_4·Clp)$_2$	−111·45		468(d)
$C_{18}FH_{12}Cl_2P$	pF·C_6H_4·P(C_6H_4·Clm)$_2$	−110·75		468(d)
$C_{18}FH_{12}Cl_2Sb$	pF·C_6H_4·Sb(C_6H_4·Clp)$_2$	−111·53		467(d)
$C_{18}FH_{12}Cl_2Sb$	pF·C_6H_4·Sb(C_6H_4·Clm)$_2$	−111·10		467(d)
$C_{18}FH_{14}Bi$	pF·C_6H_4·Bi(C_6H_5)$_2$	−113·26		467(d)
$C_{18}FH_{14}N$	As above with Bi replaced by N	−119·75		467(d)
$C_{18}FH_{14}P$	As above with Bi replaced by P	−112·15		468(d)
$C_{18}FH_{14}Sb$	As above with Bi replaced by Sb	−112·57		467(d)
$C_{18}FH_{19}ClNOS$		−120·0	(1-2) 8·5 (1-3) 6·5	465
$C_{18}FH_{25}$		−119·72		459(f) 464
$C_{18}FH_{25}$	As above with Bu^i replaced by Bu^t	−119·65		459(f) 464
$C_{18}FH_{31}Sn$	mF·C_6H_4·Sn[$(CH_2)_3CH_3$]$_3$	−113·58		399(d)
$C_{18}FH_{31}Sn$	p-isomer of above	−113·52		399(d)
$C_{18}FH_{34}NO_2P_2Pt$	*trans*-[$P(CH_2CH_3)_3$]$_2$Pt(C_6H_4F)NO_2	m −115·07 p −122·13		469(d)

$C_{18}FH_{34}N_3P_2Pt$	As above with NO_2 replaced by N_3	*m* −115·33 *p* −122·96				469(d)
$C_{18}F_2H_{18}ClNOS$		(1) −117·0	(2) −119·6	(1-3) 8·0 (1-5) 5·5 (2-7) 6·5	(1-4) 8·0 (2-6) 8·5	465
$C_{18}F_3H_{12}Bi$	$(pF{\cdot}C_6H_4)_3Bi$	−112·83				467(d)
$C_{18}F_3H_{12}ClSn$	$(mF{\cdot}C_6H_4)_3SnCl$	−111·92				399(d), 400
$C_{18}F_3H_{12}ClSn$	*p*-isomer of above	−110·15				399(d), 400
$C_{18}F_3H_{12}N$	$(mF{\cdot}C_6H_4)_3N$	−111·13				401
$C_{18}F_3H_{12}N$	*p*-isomer of above	−119·83				401
$C_{18}F_3H_{12}N$	As above	−120·05				467(d)
$C_{18}F_3H_{12}P$	As above with N replaced by P	−111·85				468(d)
$C_{18}F_3H_{12}P$	$pF^{(1)}{\cdot}C_6H_4{\cdot}P(C_6H_4{\cdot}Fm)$	(1) −111·25				468(d)
$C_{18}F_3H_{12}Sb$	$(pF{\cdot}C_6H_4)_3Sb$	−112·02				468(d)
$C_{19}FH_9Cl_6$	$pF{\cdot}C_6H_4{\cdot}CH(3,4,5\text{-}Cl_3C_6H_2)_2$	−113·88				467(d)
$C_{19}FH_{11}Cl_4$	$pF{\cdot}C_6H_4{\cdot}CH(3,4\text{-}Cl_2C_6H_3)_2$	−114·96				467(d)
$C_{19}FH_{13}$		−123·6		(F-H) 10·3		439
$C_{19}FH_{13}Cl_2$	$pF{\cdot}C_6H_4{\cdot}CH(C_6H_4{\cdot}Clm)_2$	−115·90				467(d)
$C_{19}FH_{13}Cl_2$	$pF{\cdot}C_6H_4{\cdot}CH(C_6H_4{\cdot}Clp)_2$	−115·97				467(d)

Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)		Ref.
$C_{19}FH_{15}$	As above with Cl replaced by H	−116·90			467(d)
$C_{19}FH_{16}N_3O$	$pF{\cdot}C_6H_4{\cdot}NH{\cdot}CO{\cdot}N(C_6H_5)NH{\cdot}C_6H_5$	−120·8			401
$C_{19}FH_{25}O$		−119·40			459(f)
$C_{19}F_3H_{13}$	$(pF{\cdot}C_6H_4)_3CH$	−116·32			467(d)
$C_{19}F_3H_{13}N_2O$	$(pF{\cdot}C_6H_4)_2N{\cdot}CO{\cdot}NH{\cdot}C_6H_4{\cdot}Fp$	−120·5, −116·0			401
$C_{19}F_3H_{15}Sn$	$(mF{\cdot}C_6H_4)_3SnCH_3$	−112·58			399(d)
$C_{20}FH_{15}$		−110·6	(1-2) 6·3	(F-H) 15·4	439
$C_{20}FH_{16}NaO_3S$			(5-C3) 2 (5-C5) 243 (5-C7) 8 (5-C9) 3	(5-C4) 23 (5-C6) 23 (5-C8) 9	475
$C_{20}FH_{17}O_2S$	As above with Na replaced by H and $S(O)CH_3$ replaced by SCH_3	(Z)-isomer	(5-C3) 3 (5-C5) 243 (5-C7) 9 (5-C9) 3	(5-C4) 24 (5-C6) 23 (5-C8) 9	475

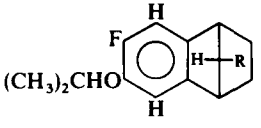
			(*E*)-isomer	(5-C3) 2 (5-C5) 241 (5-C7) 9 (5-C9) 3	(5-C4) 24 (5-C6) 23 (5-C8) 9	475
$C_{20}FH_{17}O_3S$	As above with Na replaced by H		(*Z*)-isomer	(5-C3) 2 (5-C5) 245 (5-C7) 9 (5-C9) 3	(5-C4) 24 (5-C6) 23 (5-C8) 9	475
			(*E*)-isomer	(5-C3) 2 (5-C5) 244 (5-C7) 9 (5-C9) 2	(5-C4) 24 (5-C6) 24 (5-C8) 7	475
$C_{20}FH_{18}Bi$	pF·C_6H_4·Bi(C_6H_4·CH_3 p)$_2$	−113·65				467(d)
$C_{20}FH_{18}BiO_2$	pF·C_6H_4·Bi(C_6H_4·OCH_3 p)$_2$	−113·56				467(*d*)
$C_{20}FH_{18}N$	pF·C_6H_4·N(C_6H_4·$CH_3$$p$)$_2$	−120·92				467(d)
$C_{20}FH_{18}P$	As above with N replaced by P	−112·65				468(*d*)
$C_{20}FH_{18}P$	pF·C_6H_4·P(C_6H_4·$CH_3$$m$)$_2$	−112·45				468(d)
$C_{20}FH_{18}Sb$	pF·C_6H_4·Sb(C_6H_4·CH_3 p)$_2$	−112·57				467(d)
$C_{20}FH_{20}NO_2$		−119·23				459(f)
$C_{20}FH_{21}$	As above with NO_2 replaced by H	−119·42				459(d)
$C_{20}F_2H_{26}Sn$	(mF·C_6H_4)$_2$Sn(CH_2·CH_2·CH_2·CH_3)$_2$	−112·99				399(d)
$C_{20}F_2H_{26}Sn$	p-isomer of above	−112·70				399(d)
$C_{20}F_3H_{14}N_3O_2$	mF$^{(1)}$·C_6H_4·N(CO·NH·C_6H_4·Fm)$_2$	(1) −111·60				401
$C_{20}F_3H_{14}N_3O_2$	pF·C_6H_4·N(CO·NH·C_6H_4·Fp)$_2$	−112·90, −119·0				401
$C_{20}F_3H_{17}Sn$	(mF·C_6H_4)$_3$Sn·CH_2·CH_3	−112·45				399(d)
$C_{20}F_3H_{17}Sn$	p-isomer of above	−111·84				400, 399(d)

Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{21}FH_{19}$	$pF{\cdot}C_6H_4{\cdot}CH(C_6H_4{\cdot}CH_3m)_2$	−117·09		400, 467(d)
$C_{21}FH_{19}$	$pF{\cdot}C_6H_4{\cdot}CH(C_6H_4{\cdot}CH_3p)_2$	−117·13		467(d)
$C_{21}FH_{19}O_2$	$pF{\cdot}C_6H_4{\cdot}CH(C_6H_4{\cdot}OCH_3m)_2$	−116·83		467(d)
$C_{21}FH_{19}O_2$	$pF{\cdot}C_6H_4{\cdot}CH(C_6H_4{\cdot}OCH_3p)_2$	−117·28		467(d)
$C_{21}F_3N_3O_3$	$(mF{\cdot}C_6H_4{\cdot}NCO)_3$	−112·30		401
$C_{21}F_3N_3O_3$	*p*-isomer of above	−112·76		401
$C_{21}F_7H_{13}$	$pF{\cdot}C_6H_4{\cdot}CH(C_6H_4{\cdot}CF_3m)_2$	−113·56		467(d)
$C_{22}FH_{21}O_3S$			(5-C3) 3 (5-C4) 24 (5-C5) 247 (5-C6) 23 (5-C7) ~9 (5-C8) 9 (5-C9) 3 (5-C10) 1·5	475
$C_{22}FH_{24}BiN_2$	$pF{\cdot}C_6H_4{\cdot}Bi[C_6H_4{\cdot}N(CH_3)_2p]_2$	−114·35		467(d)
$C_{22}FH_{24}N_2P$	As above with Bi replaced by P	−114·35		468(d)
$C_{22}FH_{24}N_3$	As above with Bi replaced by N	−124·45		467(d)
$C_{22}F_3H_{21}Sn$	$(mF{\cdot}C_6H_4)_3Sn(CH_2)_3CH_3$	−112·40		399(d)
$C_{22}F_3H_{21}Sn$	*p*-isomer of above	−111·86		399(d)
$C_{22}F_4H_{20}O$		−136·1		462

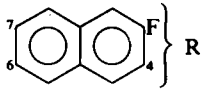
$C_{23}FH_{25}N_2$	pF·C_6H_4·CH[C_6H_4·N$(CH_3)_3$ p]$_2$	−117·90	467(d)
$C_{24}FH_{10}Cl_9Si$	pF·C_6H_4·Si(3,4,5-$Cl_3C_6H_2)_3$	−106·75 (−6·4)	476(d)
$C_{24}FH_{13}Cl_6Si$	pF·C_6H_4·Si(3,4−$Cl_2C_6H_3)_3$	−108·15 (−5·0)	476(d)
$C_{24}FH_{16}ClNp$	mF·C_6H_4·N=P(C_6H_4·Clp)$_3$	−114·20	477(d)
$C_{24}FH_{16}ClNP$	p-isomer of above	−127·01	477(d)
$C_{24}FH_{16}Cl_3Si$	pF·C_6H_4·Si(C_6H_4·Clm)$_3$	−109·15 (−4·0)	476(d)
$C_{24}FH_{16}N_4O_6P$	mF·C_6H_4($C_6H_5)_2$P=N[2,4,6-$(NO_2)_3C_6H_2$]	−109·60	477(d)
$C_{24}FH_{16}N_4O_6P$	p-isomer of above	−104·90	477(d)
$C_{24}FH_{18}ClNP$	mF·C_6H_4($C_6H_5)_2$P=N·C_6H_4·Clp	−110·62	477(d)
$C_{24}FH_{18}ClNP$	p-isomer of above	−106·83	477(d)
$C_{24}FH_{18}ClNP$	mF·C_6H_4·N=P($C_6H_5)_2$·C_6H_4·Clp	−114·66	477(d)
$C_{24}FH_{18}ClNP$	p-isomer of above	−127·76	477(d)
$C_{24}FH_{18}N_2O_2P$	mF·C_6H_4($C_6H_5)_2$P=N·C_6H_4·NO_2p	−109·89	477(d)
$C_{24}FH_{18}N_2O_2P$	p-isomer of above	−105·57	477(d)
$C_{24}FH_{19}Np$	mF·C_6H_4($C_6H_5)_2$P=N·C_6H_5	−110·88	477(d)
$C_{24}FH_{19}NP$	mF·C_6H_4·N=P($C_6H_5)_3$	−114·84	477(d)
$C_{24}FH_{19}NP$	p-isomer of above	−128·20	477(d)
$C_{24}FH_{19}Si$	pF·C_6H_4·Si($C_6H_5)_3$	−110·85 (−2·3)	476(d)
$C_{24}FH_{19}Sn$	mF·C_6H_4·Sn($C_6H_5)_3$	−113·58	399(d)
$C_{24}FH_{19}Sn$	p-isomer of above	−111·46	400, 399(d)
$C_{24}FH_{27}O_3$		R = C_6H_4·$CO_2Pr^i p$ −137·0	462

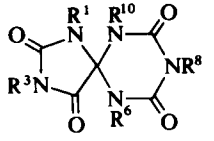
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{24}F_2H_{18}NP$	$mF^{(1)}\cdot C_6H_4\cdot N{=}P(C_6H_5)C_6H_4\cdot F^{(2)}m$	(1) −114·66 (2) −110·63		477(d)
$C_{24}F_2H_{18}NP$	$mF^{(1)}\cdot C_6H_4\cdot N{=}P(C_6H_5)C_6H_4\cdot F^{(2)}p$	(1) −114·68 (2) −106·85		477(d)
$C_{24}F_2H_{18}NP$	$pF^{(1)}\cdot C_6H_4\cdot N{=}P(C_6H_5)C_6H_4\cdot F^{(2)}m$	(1) −127·76 (2) −110·77		477(d)
$C_{24}F_2H_{18}NP$	$pF^{(1)}\cdot C_6H_4\cdot N{=}P(C_6H_5)C_6H_4\cdot F^{(2)}p$	(1) −127·82 (2) −107·06		477(d)
$C_{24}F_2H_{18}Sn$	$(mF\cdot C_6H_4)_2Sn(C_6H_5)_2$	−112·16		399(d), 400
$C_{24}F_2H_{18}Sn$	*p*-isomer of above	−111·42		399(d)
$C_{24}F_3H_{14}N_4O_6P$	$(mF\cdot C_6H_4)_3P{=}N[2,4,6\text{-}(NO_2)_3C_6H_2]$	−108·81		400, 477(d)
$C_{24}F_3H_{14}N_4O_6P$	*p*-isomer of above	−104·11		477(d)
$C_{24}F_3H_{16}ClNP$	$(mF\cdot C_6H_4)_3P{=}N\cdot C_6H_4\cdot Clp$	−109·89		477(d)
$C_{24}F_3H_{16}ClNP$	*p*-isomer of above	−106·12		477(d)
$C_{24}F_3H_{16}N_2O_2P$	$(mF\cdot C_6H_4)_3P{=}N\cdot C_6H_4\cdot NO_2p$	−109·17		477(d)
$C_{24}F_3H_{16}N_2O_2P$	*p*-isomer of above	−104·86		477(d)
$C_{24}F_3H_{17}NP$	$(mF\cdot C_6H_4)_3P{=}N\cdot C_6H_5$	−110·15		477(d)
$C_{24}F_3H_{17}NP$	*p*-isomer of above	−106·58		477(d)
$C_{24}F_3H_{17}Sn$	$(mF\cdot C_6H_4)_3SnC_6H_5$	−114·32		399(d), 400
$C_{24}F_3H_{17}Sn$	*p*-isomer of above	−111·30		399(d), 400
$C_{24}F_4H_{16}NP$	$(mF^{(1)}\cdot C_6H_4)_3P{=}N\cdot C_6H_4\cdot F^{(2)}m$	(1) −109·89 (2) −114·31		477(d)
$C_{24}F_4H_{16}NP$	$(mF^{(1)}\cdot C_6H_4)_3P{=}N\cdot C_6H_4\cdot F^{(2)}p$	(1) −110·00 (2) —		477(d)
$C_{24}F_4H_{16}NP$	$(pF^{(1)}\cdot C_6H_4)_3P{=}N\cdot C_6H_4\cdot F^{(2)}m$	(1) −106·10 (2) −114·32		477(d)
$C_{24}F_4H_{16}NP$	$(pF^{(1)}\cdot C_6H_4)_3P{=}N\cdot C_6H_4\cdot F^{(2)}p$	(1) −106·36 (2) −127·32		477(d)

$C_{24}F_4H_{16}Si$	$(pF{\cdot}C_6H_4)_4Si$	−110·05 (−3·1)	476(d)
$C_{24}F_4H_{16}Si$	$pF^{(1)}{\cdot}C_6H_4{\cdot}Si(C_6H_4{\cdot}Fm)_3$	(1) −109·45 (−3·7)	476(d)
$C_{24}F_4H_{16}Sn$	$(mF{\cdot}C_6H_4)_4Sn$	−111·89	399(d), 400
$C_{24}F_4H_{16}Sn$	$(mF^{(1)}{\cdot}C_6H_4)_3SnC_6H_4{\cdot}F^{(2)}p$	(1) −111·90 (2) −110·62	399(d), 400
$C_{24}F_4H_{16}Sn$	$(mF^{(1)}{\cdot}C_6H_4)_2Sn(C_6H_4{\cdot}F^{(2)}p)_2$	(1) −111·96 (2) −110·77	399(d), 400
$C_{24}F_4H_{16}Sn$	$mF^{(1)}{\cdot}C_6H_4{\cdot}Sn(C_6H_4{\cdot}F^{(2)}p)_3$	(1) −111·95 (2) −110·89	399(d), 400
$C_{24}F_4H_{16}Sn$	$(pF{\cdot}C_6H_4)_4Sn$	−111·07	399(d) 400
$C_{25}FH_{18}N_2P$	$mF{\cdot}C_6H_4(C_6H_5)_2P{=}N{\cdot}C_6H_4{\cdot}CNp$	−110·12	477(d)
$C_{25}FH_{18}N_2P$	*p*-isomer of above	−106·83	477(d)
$C_{25}FH_{19}Cl_3INP$	$mF{\cdot}C_6H_4{\cdot}N(CH_3)P^+(C_6H_4{\cdot}Clp)_3\ I^-$	−108·79	477(d)
$C_{25}FH_{19}Cl_3INP$	*p*-isomer of above	−110·92	477(d)
$C_{25}FH_{21}ClINP$	$mF{\cdot}C_6H_4(C_6H_5)_2P^+N(CH_3)C_6H_4{\cdot}Clp\ I^-$	−106·68	477(d)
$C_{25}FH_{21}ClINP$	*p*-isomer of above	−98·67	477(d)
$C_{25}FH_{21}NOP$	$mF{\cdot}C_6H_4(C_6H_5)_2P{=}N{\cdot}C_6H_4{\cdot}OCH_3p$	−110·95	477(d)
$C_{25}FH_{21}NOP$	*p*-isomer of above	−107·38	477(d)
$C_{25}FH_{21}NP$	$mF{\cdot}C_6H_4(C_6H_5)_2P{=}N{\cdot}C_6H_4{\cdot}CH_3p$	−110·96	477(d)
$C_{25}FH_{21}NP$	*p*-isomer of above	−107·39	477(d)
$C_{25}FH_{21}N_2O_2P$	$mF{\cdot}C_6H_4(C_6H_5)_2P^+NCH_3(C_6H_4{\cdot}NO_2p)\ I^-$	−106·17	477(d)
$C_{25}FH_{21}N_2O_2P$	*p*-isomer of above	−98·00	477(d)
$C_{25}FH_{22}INP$	$mF{\cdot}C_6H_4(C_6H_5)_2P^+N(CH_3)C_6H_5\ I^-$	−106·96	477(d)
$C_{25}FH_{22}INP$	*p*-isomer of above	−99·00	477(d)

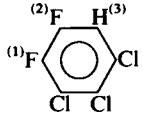
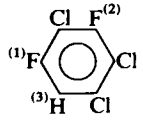
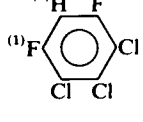
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{25}FH_{22}INP$	$(C_6H_5)_3P^+N(CH_3)C_6H_4{\cdot}Fm\ I^-$	−109·43		477(d)
$C_{25}FH_{22}INP$	*p*-isomer of above	−111·71		477(d)
$C_{25}FH_{29}O_3$	 R = $CH_2C_6H_4CO_2Pr^ip$	−137·4		462
$C_{25}F_2H_{21}INP$	$mF^{(1)}{\cdot}C_6H_4(C_6H_5)_2P^+N(CH_3)C_6H_4{\cdot}F^{(2)}m\ I^-$	(1) −106·69 (2) −109·17		477(d)
$C_{25}F_2H_{21}INP$	$mF^{(1)}{\cdot}C_6H_4(C_6H_5)_2P^+N(CH_3)C_6H_4{\cdot}F^{(2)}p\ I^-$	(1) −106·80 (2) −111·34		477(d)
$C_{25}F_2H_{21}INP$	$pF^{(1)}{\cdot}C_6H_4(C_6H_5)_2P^+N(CH_3)C_6H_4{\cdot}F^{(2)}m\ I^-$	(1) −98·62 (2) −109·33		477(d)
$C_{25}F_2H_{21}INP$	$pF^{(1)}{\cdot}C_6H_4(C_6H_5)_2P^+N(CH_3)C_6H_4{\cdot}F^{(2)}p\ I^-$	(1) −98·85 (2) −111·59		477(d)
$C_{25}F_3H_{16}N_2P$	$(mF{\cdot}C_6H_4)_3P{=}N{\cdot}C_6H_4{\cdot}CNp$	−109·39		477(d)
$C_{25}F_3H_{16}N_2P$	*p*-isomer of above	−105·26		477(d)
$C_{25}F_3H_{19}ClINP$	$(mF{\cdot}C_6H_4)_3P^+N(CH_3)C_6H_4{\cdot}Clp\ I^-$	−105·89		477(d)
$C_{25}F_3H_{19}ClINP$	*p*-isomer of above	−98·06		477(d)
$C_{25}F_3H_{19}IN_2O_2P$	$(mF{\cdot}C_6H_4)_3P^+N(CH_3)C_6H_4{\cdot}NO_2p\ I^-$	−105·47		477(d)
$C_{25}F_3H_{19}IN_2O_2P$	*p*-isomer of above	−97·36		477(d)
$C_{25}F_3H_{19}NOP$	$(mF{\cdot}C_6H_4)_3P{=}N{\cdot}C_6H_4{\cdot}OCH_3p$	−110·25		477(*d*)
$C_{25}F_3H_{19}NOP$	*p*-isomer of above	−106·75		477(d)
$C_{25}F_3H_{19}NP$	$(mF{\cdot}C_6H_4)_3P{=}N{\cdot}C_6H_4{\cdot}CH_3p$	−110·24		477(d)
$C_{25}F_3H_{19}NP$	*p*-isomer of above	−106·73		477(d)
$C_{25}F_3H_{20}INP$	$(mF{\cdot}C_6H_4)_3P^+N(CH_3)C_6H_5\ I^-$	−106·25		477(d)
$C_{25}F_3H_{20}INP$	*p*-isomer of above	−98·44		477(d)
$C_{25}F_4H_{19}INP$	$(mF^{(2)}{\cdot}C_6H_4)_3P^+NCH_3(C_6H_4{\cdot}Fm)\ I^-$	(1) −108·69 (2) −105·97		477(d)

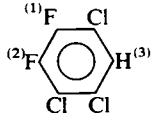
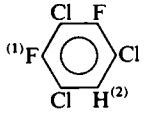
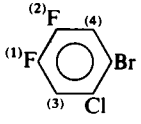
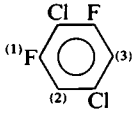
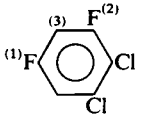
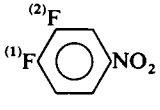
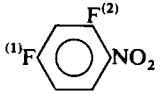
$C_{25}F_4H_{19}INP$	$(pF^{(2)}\cdot C_6H_4)_3P^+NCH_3(C_6H_4\cdot F^{(1)}m)\,I^-$	(1) −109·02 (2) −98·09	477(d)
$C_{25}F_4H_{19}INP$	$(mF^{(2)}\cdot C_6H_4)_3P^+NCH_3(C_6H_4\cdot F^{(1)}p)\,I^-$	(1) −110·61 (2) −105·99	477(d)
$C_{25}F_4H_{19}INP$	$(pF^{(2)}\cdot C_6H_4)_3P^+NCH_3(C_6H_4\cdot F^{(1)}p)\,I^-$	(1) −111·18 (2) −98·20	477(d)
$C_{25}F_6H_{16}NP$	$(mF^{(1)}\cdot C_6H_4)_3P{=}N\cdot C_6H_4\cdot CF_3p$	(1) −109·67	477(d)
$C_{25}F_6H_{16}NP$	$(pF^{(1)}\cdot C_6H_4)_3P{=}N\cdot C_6H_4\cdot CF_3p$	(1) −105·80	477(d)
$C_{26}FH_{21}IN_2P$	$mF\cdot C_6H_4(C_6H_5)P^+NCH_3(C_6H_4\cdot CNp)\,I^-$	−106·22	477(d)
$C_{26}FH_{21}IN_2P$	*p*-isomer of above	−98·11	477(d)
$C_{26}FH_{24}INOP$	$mF\cdot C_6H_4(C_6H_5)_2P^+NCH_3(C_6H_4\cdot OCH_3p)\,I^-$	−106·99	477(d)
$C_{26}FH_{24}INOP$	*p*-isomer of above	−99·10	477(d)
$C_{26}FH_{24}INP$	$mF\cdot C_6H_4(C_6H_5)_2P^+NCH_3(C_6H_4\cdot CH_3p)\,I^-$	−107·01	477(d)
$C_{26}FH_{24}INP$	*p*-isomer of above	−99·05	477(d)
$C_{26}F_3H_{19}IN_2P$	$(mF\cdot C_6H_4)_3P^+NCH_3(C_6H_4\cdot CNp)\,I^-$	−105·53	477(d)
$C_{26}F_3H_{19}IN_2P$	*p*-isomer of above	−97·50	477(d)
$C_{26}F_3H_{22}INOP$	$(mF\cdot C_6H_4)_3P^+NCH_3(C_6H_4\cdot OCH_3p)\,I^-$	−106·26	477(d)
$C_{26}F_3H_{22}INOP$	*p*-isomer of above	−98·61	477(d)
$C_{26}F_3H_{22}INP$	$(mF\cdot C_6H_4)_3P^+NCH_3(C_6H_4\cdot CH_3p)\,I^-$	−106·25	477(d)
$C_{26}F_3H_{22}INP$	*p*-isomer of above	−98·59	477(d)
$C_{26}F_4H_{17}N_3O_2$	$(pF\cdot C_6H_4)_2N\cdot CO\cdot N(pF\cdot C_6H_4)CO\cdot NH\cdot C_6H_4\cdot Fp$	−119·8, −115·6, −115·3	401
$C_{26}F_6H_{19}INP$	$(mF^{(1)}\cdot C_6H_4)_3P^+NCH_3(C_6H_4\cdot CF_3p)\,I^-$	(1) −105·78	477(d)
$C_{26}F_6H_{19}INP$	*p*-isomer of above	(1) −97·82	477(d)
$C_{27}FH_{25}NO_3P$	$(pCH_3O\cdot C_6H_4)_3P{=}N\cdot C_6H_4\cdot Fm$	−114·92	477(d)
$C_{27}FH_{25}NO_3P$	*p*-isomer of above	−128·68	477(d)
$C_{27}FH_{25}NP$	$(pCH_3\cdot C_6H_4)_3P{=}N\cdot C_6H_4\cdot Fm$	−115·00	477(d)
$C_{27}FH_{25}NP$	*p*-isomer of above	−128·67	477(d)

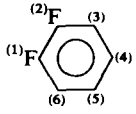
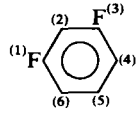
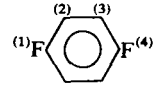
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{27}FH_{25}O_3Si$	$(pCH_3O{\cdot}C_6H_4)_3Si{\cdot}C_6H_4{\cdot}Fp$	−111·35 (−1.8)		476(d)
$C_{27}FH_{25}Si$	As above with OCH_3 replaced by CH_3	−111·45 (−1·7)		476(d)
$C_{27}FH_{25}Si$	As above with pCH_3O replaced by mCH_3	−111·35 (−1·8)		476(d)
$C_{28}FH_{28}INOP$	$(pCH_3O{\cdot}C_6H_4)_3P^+NCH_3(C_6H_4{\cdot}Fm)\,I^-$	−109·74		477(d)
$C_{28}FH_{28}INOP$	*p*-isomer of above	−112·31		477(d)
$C_{28}FH_{28}INP$	$(pCH_3{\cdot}C_6H_4)_3P^+NCH_3(C_6H_4{\cdot}Fm)\,I^-$	−109·69		477(d)
$C_{28}FH_{28}INP$	*p*-isomer of above	−112·09		477(d)
$C_{29}FH_{23}Ge$				442(q)
	4-$CH_2Ge(C_6H_5)_3$	−121·03		
	6-$CH_2Ge(C_6H_5)_3$	−118·89		
	7-$CH_2Ge(C_6H_5)_3$	−117·25		
$C_{29}FH_{23}Pb$	As above with Ge replaced by Pb			442(q)
	4-$CH_2Pb(C_6H_5)_3$	−121·11		
	6-$CH_2Pb(C_6H_5)_3$	−119·01		
	7-$CH_2Pb(C_6H_5)_3$	−117·11		
$C_{29}FH_{23}Si$	As above with Ge replaced by Si			442(q)
	4-$CH_2Si(C_6H_5)_3$	−121·09		
	6-$CH_2Si(C_6H_5)_3$	−118·89		
	7-$CH_2Si(C_6H_5)_3$	−117·30		
$C_{29}FH_{23}Sn$	As above with Ge replaced by Sn			442(q)
	4-$CH_2Sn(C_6H_5)_3$	−121·73		
	6-$CH_2Sn(C_6H_5)_3$	−119·17		
	7-$CH_2Sn(C_6H_5)_3$	−117·13		
$C_{30}FH_{34}N_3Si$	$[p(CH_3)_2N{\cdot}C_6H_4]_3Si{\cdot}C_6H_4{\cdot}Fp$	−112·35 (−0·8)		476(d)

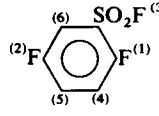
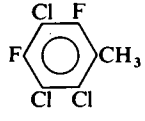
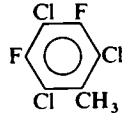
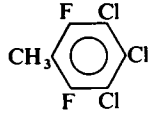
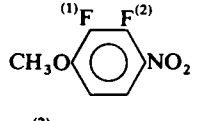
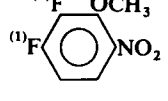
$C_{34}F_3H_{22}N_5O_4$		(6)(10) (8) } −111·6, −112·7	401
	$R^1 = R^3 = C_6H_5$; $R^6 = R^8 = R^{10} = mF{\cdot}C_6H_4$		
$C_{34}F_3H_{22}N_5O_4$	*p*-isomer of above	(6)(10) (8) } −111·3, −109·4	401
$C_{34}F_5H_{20}N_5O_4$	As above with $R^1 = R^3 = R^6 = R^8 = R^{10} = mF{\cdot}C_6H_4$	(1) −109·10 (3) −110·70 (6)(10) −110·40 (8) −112·50	401
$C_{34}F_5H_{20}N_5O_4$	As above with $R^1 = R^3 = R^6 = R^8 = R^{10} = pF{\cdot}C_6H_4$	(1) −112·40 (3) −111·40 (6)(10) −110·50 (8) −113·30	401

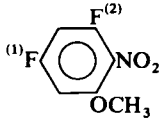
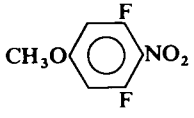
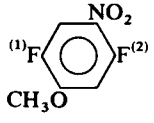
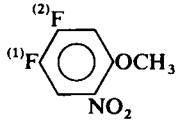
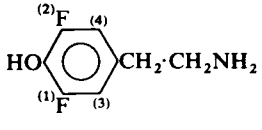
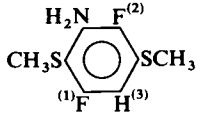
B. Fluorine nuclei in difluorobenzene derivatives

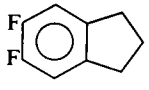
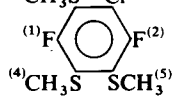
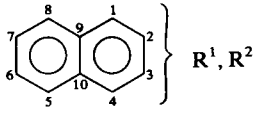
$C_6F_2HCl_3$		(1) −132·2	(2) −133·9	(1-2) 21·6 (2-3) 10·0 (1-3) 7·8	397
$C_6F_2HCl_3$		(1) −113·0	(2) −106·7	(1-2) 2·0 (2-3) 2·0 (1-3) 8·4	397
$C_6F_2HCl_3$		−107·8		(1-2) 9·6	397

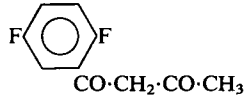
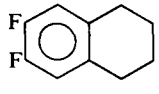
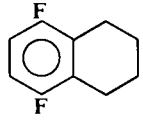
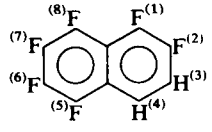
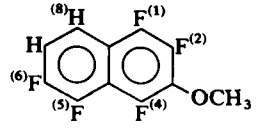
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_6F_2HCl_3$		(1) −135·5 (2) −128·8	(1-2) 19·0 (1-3) 7·0 (2-3) 2·0	397
$C_6F_2HCl_3$		−112·6	(1-2) 7·2	397
$C_6F_2H_2BrCl$			(1-2) −20·633 (1-3) +10·228 (1-4) +7·907 (2-3) +7·588 (2-4) +9·904	406
$C_6F_2H_2Cl_2$		−109·7	(1-2) 8 (1-3) 1	398
$C_6F_2H_2Cl_2$		(1) −104·6 (2) −108·5	(1-3) 6 (2-3) 8	398
$C_6F_2H_3NO_2$		(1) −128·7 (2) −135·0		407
$C_6F_2H_3NO_2$		(1) −98·2 (2) −111·9		407

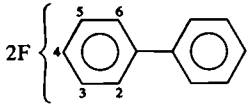
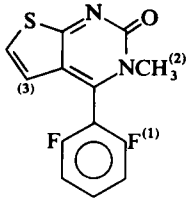
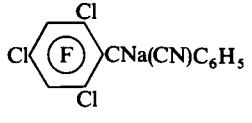
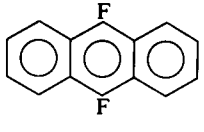
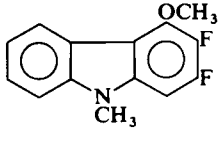
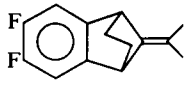
$C_6F_2H_4$		−138·619	(1-2) −20·5 (1-C1) −247·1 (1-C2) 12·5	408
$C_6F_2H_4$	As above		(1-2) −20·821 (1-3) 8·060 (1-4) −1·395 (1-5) 4·527 (1-6) 10·846 (1-C1) −246·64 (1-C2) 12·50 (1-C3) 0·53 $\frac{1}{2}$[(1−C4)+(1-C5)] 5·19 (1-C6) 17·02	409 402
$C_6F_2H_4$		−119·848	(1-3) 6·6 (1-C1) −246·8 (1-C3) 11·8	408
$C_6F_2H_4$	As above		(1-2) 9·419 (1-3) 6·515 (1-4) −0·807 (1-5) 6·627 (1-6) 8·433 (1-C1) −247·55 (1-C2) 25·36 (1-C3) 11·88 (1-C4) 3·54 (1-C5) 9·80 (1-C6) 21·26	402
$C_6F_2H_4$		−110·879	(1-4) 17·8 (1-C1) −241·2 (1-C4) 2·5	408
$C_6F_2H_4$	As above		(1-2) 8·092 (1-3) 4·157 (1-4) 17·646 (1-C1) −240·89 (1-C2) 24·36 (1-C3) 8·52 (1-C4) 2·42	402
$C_6F_2Br_4$		−118·0		396

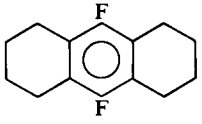
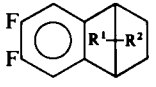
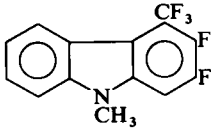
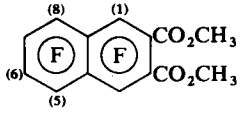
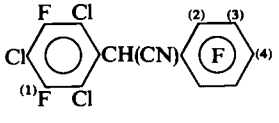
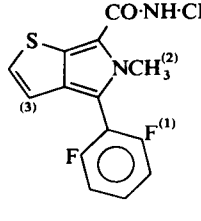
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
C_6F_2Br		−88·4		396
$C_6F_3H_3O_2S$		(1) −113·008 (2) −114·679 (3) 63·681	(1-2) 17·569 (1-3) 11·594 (1-4) 8·746 (1-5) 3·699 (1-6) 5·018 (2-3) 1·690 (2-4) 3·892 (2-5) 7·198 (2-6) 6·988 (3-4) 0·781 (3-5) −0·583 (3-6) −0·225	413(n)
$C_7F_2H_3Cl_3$		−114, −111·9		398
$C_7F_2H_3Cl_3$		−111·3		398
$C_7F_2H_3Cl_3$		−112·1		398
$C_7F_2H_5NO_3$		(1) −155·0 (2) −140·6		407
$C_7F_2H_5NO_3$		(1) −126·8 (2) −150·1		407

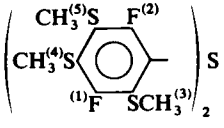
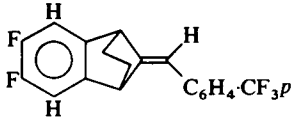
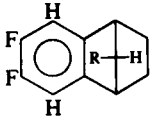
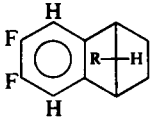
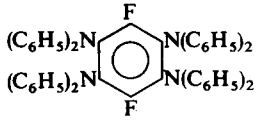
$C_7F_2H_5NO_3$		(1) −102·0	(2) 119·7			407
$C_7F_2H_5NO_3$		−117·0				407
$C_7F_2H_5NO_3$		(1) −117·6	(2) −136·8			407
$C_7F_2H_5NO_3$		(1) −145·4	(2) −125·4			407
$C_8F_2H_9NO$		−129·4		(1-2) 12·6 (1-4) ∓2·1	(1-3) ±11·3	432(b)
$C_8F_2H_9NS_2$		(1) −112·3	(2) −137·8	(1-2) 14·2 (2-3) 5·9	(1-2) 9·1	425
$C_8F_2H_{10}O_3S_2$	*m*F·C_6H_4·$S^+(CH_3)_2$ FSO_3^-	−108·52				405
$C_8F_2H_{10}O_3S_2$	*p*-isomer of above	−104·69				405

Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_8F_2N_8$		−118·4		410
$C_9F_2H_8$		−139·5		434
$C_9F_2H_9ClS_3$		(1) −99·4 (2) −107·6	(1-2) 14·8 (1-3) 1·55 (1-4) 1·55 (2-5) 2·3	427
$C_9F_2H_9NO_2S_3$	As above with Cl replaced by NO_2	(1) −100·3 (2) −122·0	(1-2) 15·5 (1-3) 1·0 (1-4) 2·65 (2-5) 2·65	427
$C_9F_2H_{10}OS_3$	As above with Cl replaced by OH	(1) −100·4 (2) −129·9	(1-2) 14·5 (1-4) 0·7 (2-5) 2·5	427
$C_{10}F_2H_6$				405
	1-F, 3-F	(1) −118·10		(p)
	1-F, 4-F	(1) −119·07		
	2-F, 4-F	(2) −114·48		(q)
$C_{10}F_2H_6$	As above with 1-F, 4-F	−127·9		443
$C_{10}F_2H_6$	As above with 1-F, 3-F		(1-C1) 248·1 (1-C2) 24·2 (1-C3) 13·2 (1-C4) 5·1 (1-C6) 1·7 (1-C9) 10·9	431

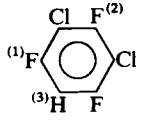
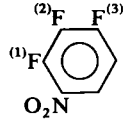
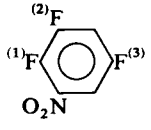
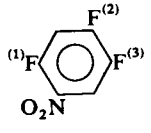
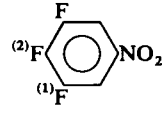
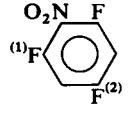
				(1-C10) 6·7 (3-C1) 12·6 (3-C2) 29·5 (3-C3) 256·7 (3-C4) 20·9 (3-C9) 5·8 (3-C10) 4·8	
	1-F, 4-F			(1-C1) 254 (1-C2) 16·0 (1-C4) 5·9 (1-C5) 3·0 (1-C8) 3·0 (1-C10) 11·7	
	2-F, 3-F			(2-C1) 7·0 (2-C2) 255·2 (2-C3) 17·7 (2-C10) 3·8	
$C_{10}F_2H_8O_2$		−119·12, −119·71			224(a)
$C_{10}F_2H_{10}$		−127			434
$C_{10}F_2H_{10}$		−101·25			434
$C_{10}F_6H_2$		(1) −137·2 (5) −148·5 (7) −155·8	(2) −144·3 (6) −158·0 (8) −146·8	(1-8) 53 (5-7) 3 (6-7) 17 (7-8) 17	(5-6) 17 (5-8) 16 (6-8) 3·5 (4-5) 17	433
$C_{11}F_5H_5O$		(1) −151·0 (4) −141·4 (6) −139·0	(2) −153·2 (5) −145·4	(1-2) 17 (3-4) 17 (5-6) 16	(1-8) 17 (4-5) 56	433

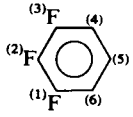
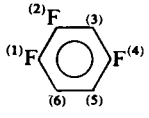
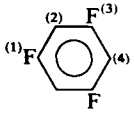
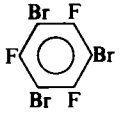
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{12}F_2H_8$		2-F, 3-F (2) −144·2 (3) −138·6 2-F, 4-F (2) −113·5 (4) −112·2 2-F, 5-F (2) −124·2 (5) −120·1 2-F, 6-F −114·8 3-F, 4-F (3) −138·1 (4) −139·9 3-F, 5-F −109·4		448
$C_{12}F_2H_8N_2OS$			(1-2) 0·8 (1-3) 1·0	449
$C_{14}F_2H_5Cl_3NNa$		−113·6		444(b)
$C_{14}F_2H_8$		−131·9		461
$C_{14}F_2H_{11}NO$		−138·5, −169·6		451
$C_{14}F_2H_{14}$		−143·5		462

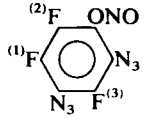
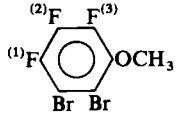
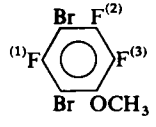
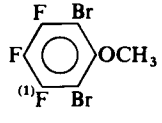
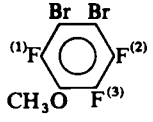
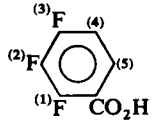
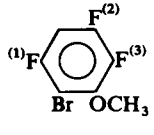
$C_{14}F_2H_{16}$			−126·2			461
$C_{14}F_2H_{16}$		$R^1 = (CH_3)_2CH$, $R^2 = H$ $R^1 = H$, $R^2 = (CH_3)_2CH$	−143·4 −143·9			462
$C_{14}F_5H_8NO$			−138·0, −150·8			451
$C_{14}F_6H_4O_4$			(1) −119·5 (5) −141·3 (6) −151·2	(1-8) 70		377
$C_{14}F_7HCl_3N$			(1) −108·7 (2) −138·1 (3) −161·7 (4) −153·0	(2-4) 3·5	(3-4) 21	444(b)
$C_{14}F_7Cl_3LiN$	As above with H replaced by Li		(1) −114·0 (2) −145·2 (3) −167·5 (4) −172·8	(3-4) 22	(2-4) 6·1	444(b)
$C_{14}F_7Cl_3NNa$	As above with H replaced by Na		(1) −116·6 (2) −145·5 (3) −168·0 (4) −174·1			444(b)
$C_{15}F_2H_{12}N_2OS$				(1-2) 1·3	(1-3) 1·0	449

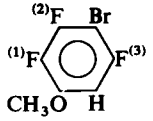
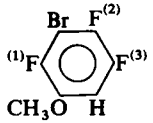
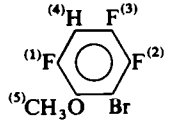
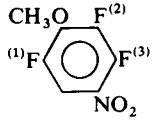
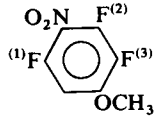
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{18}F_4H_{18}S_7$		(1) −101·0 (2) −100·9	(1-2) 14·63 (1-3) 1·21 (1-4) 1·97 (2-5) 1·99	427
$C_{19}F_5H_{13}$		−142·0		462
$C_{19}F_5H_{15}$	 R = $pCF_3 \cdot C_6H_4$	−142·5		462
$C_{21}F_2H_{20}O_2$	 R = $C_6H_4 \cdot CO_2Pr^ip$	−142·8		462
$C_{22}F_2H_{22}O_2$	As above with R and H interchanged and R = $CH_2 \cdot C_6H_4 \cdot CO_2Pr^ip$	−143·5		462
$C_{54}F_2H_{40}N_4$		−123·8		471(b)

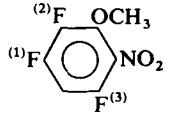
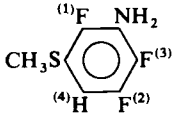
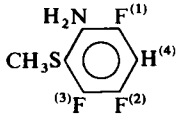
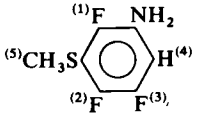
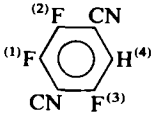
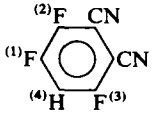
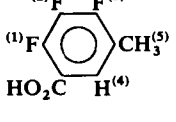
C. Fluorine nuclei in trifluorobenzene derivatives

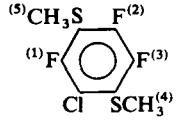
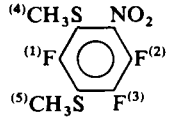
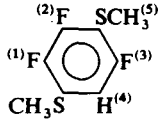
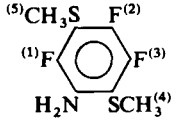
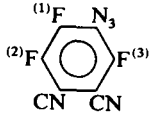
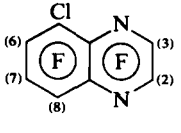
$C_6F_3HCl_2$		(1) −111·8	(2) −110·4	(1-2) 2·0	(1-3) 7·2	397
$C_6F_3H_2NO_2$		(1) −137·5 (3) −122·8	(2) −155·9			407
$C_6F_3H_2NO_2$		(1) −147·8 (3) −111·6	(2) −129·8			407
$C_6F_3H_2NO_2$		(1) −117·6 (3) −138·2	(2) −121·8			407
$C_6F_3H_2NO_2$		(1) −130·6	(2) −150·1			407
$C_6F_3H_2NO_2$		(1) −115·3	(2) −98·8			407

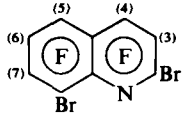
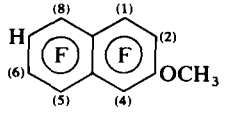
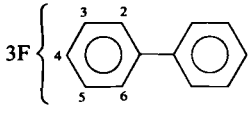
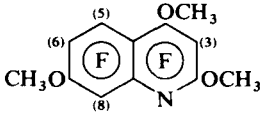
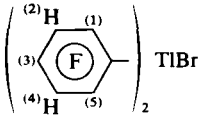
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)		Ref.
$C_6F_3H_3$			(1-2) −19·640 (1-4) −2·033 (1-6) 9·989 (1-C2) 15·22 (1-C4) 3·51 (1-C6) 17·60 (2-C2) −249·68 (2-C5) 5·12	(1-3) 6·135 (1-5) 5·730 (1-C1) −248·66 (1-C3) 3·25 (1-C5) 8·40 (2-C1) 9·76 (2-C4) −0·73	411
$C_6F_3H_3$			(1-2) −20·424 (1-4) 15·094 (1-6) 10·086 (2-4) 3·190 (2-6) 8·975 (4-5) 7·864 (1-C1) −243·08 (1-C3) 0·53 (1-C5) 6·42 (2-C1) 12·51 (2-C3) 21·00 (2-C5) 4·00 (4-C1) 3·91 (4-C3) 27·83 (4-C5) 23·95	(1-3) 6·352 (1-5) 3·310 (2-3) 10·652 (2-5) −2·012 (3-4) 8·384 (4-6) 5·090 (1-C2) 14·45 (1-C4) 2·71 (1-C6) 19·69 (2-C2) −249·95 (2-C4) 9·59 (2-C6) 1·39 (4-C2) 12·53 (4-C4) −244·41 (4-C6) 9·88	402
$C_6F_3H_3$			(1-2) 9·122 (1-4) −1·682 (1-C2) 25·91 (1-C4) 4·34	(1-3) 5·828 (1-C1) −248·66 (1-C3) 15·11	402, 408
$C_6F_3Br_3$		−95·4			396

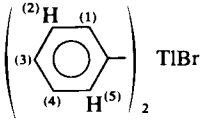
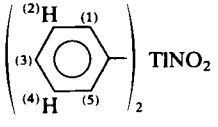
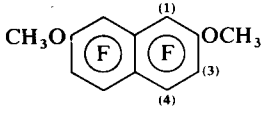
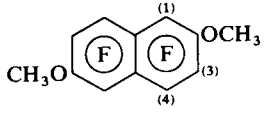
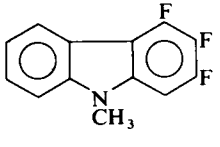
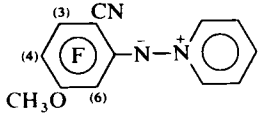
$C_6F_3N_7O_2$		(1) −138·4 (3) −139·9	(2) −149·5	(1-2) 24·0 (2-3) 9·8	(1-3) 2·6	410
$C_7F_3H_3Br_2O$		(1) −125·8 (3) −149·2	(2) −156·2			396
$C_7F_3H_3Br_2O$		(1) NA (3) −156·0	(2) −128·3			396
$C_7F_3H_3Br_2O$		(1) −125·4				396
$C_7F_3H_3Br_2O$		(1) −119·5 (3) −150·1	(2) −126·9			396
$C_7F_3H_3O_2$		(1) −132·1 (3) −130·4	(2) −163·0	(1-2) 19·0 (1-4) 2·5 (2-3) 19·0 (2-5) 2·5 (3-5) 6·0	(1-3) 12·5 (1-5) 7·0 (2-4) 6·5 (3-4) 8·5	424
$C_7F_3H_4BrO$		(1) −109·0 (3) −158·2	(2) −135·2			396

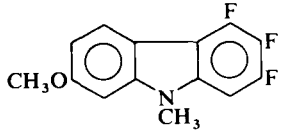
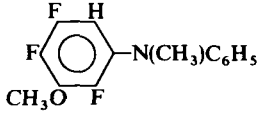
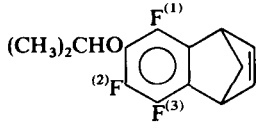
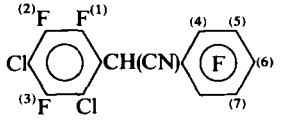
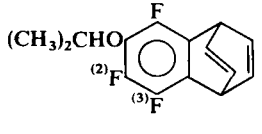
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_7F_3H_4BrO$		(1) −161·8 (2) −129·5 (3) −111·5		396
$C_7F_3H_4BrO$		(1) −130·9 (2)(3) −140·0		396
$C_7F_3H_4BrO$		(1) −130·9 (2) −132·7 (3) −139·1	(1-2) 11·2 (1-3) 0·5 (1-4) 11·3 (1-5) 1·2 (2-3) 22·6 (2-4) 7·3 (3-4) 9·8	396
$C_7F_3H_4NO_3$		(1) −139·5 (2) −141·5 (3) −158·4		407
$C_7F_3H_4NO_3$		(1) −132·5 (2) −150·3 (3) −145·7		407
$C_7F_3H_4NO_3$		(1) −118·9 (2) −142·8 (3) −161·5		407

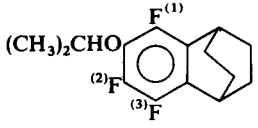
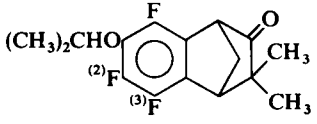
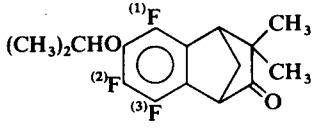
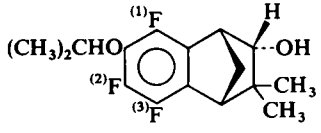
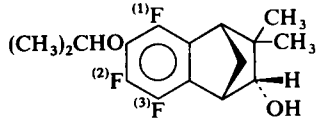
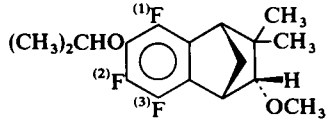
$C_7F_3H_4NO_3$		(1) −128·3 (2) −157·1 (3) −126·0		407
$C_7F_3H_6NS$		(1) −135·9 (2) −143·2 (3) −159·0	(1-4)(3-4) 6·8, 8·3 (1-2) 12·0 (1-3) 9·6 (2-3) 19·8 (2-4) 10·1	425
$C_7F_3H_6NS$		(1)(2)(3) −136·5, −149·6	(1-4)(2-4) 10·6, 9·8 (3-4) 7·1	425
$C_7F_3H_6NS$		(1) −133·9 (2) −145·5 (3) −142·1	(1-4)(2-4) 7·8, 8·3 (1-2) 4·3 (1-3) 12·7 (1-5) 0·6 (2-3) 23·6 (2-5) 1·0 (3-4) 11·1	425
$C_8F_3HN_2$		(1) −118·0 (2) −129·8 (3) −105·3	(1-2) 20·0 (1-3) 9·3 (1-4) 9·3 (2-3) 12·9 (2-4) 6·5 (3-4) 8·3	410
$C_8F_3HN_2$		(1) −122·7 (2) −134·6 (3) −107·6	(1-2) 21·7 (1-3) 10 (1-4) 10 (2-3) 13·3 (2-4) 6·8 (3-4) 9	410
$C_8F_3H_5O_2$		(1) −136·2 (2) −162·6 (3) −132·4	(1-2) 19·0 (1-3) 12·0 (1-4) 8·0 (2-3) 19·0 (2-4) 3·0 (3-4) 8·0 (3-5) 2·0	329

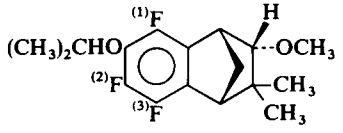
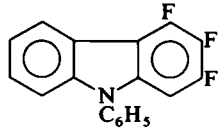
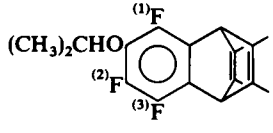
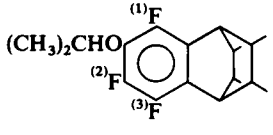
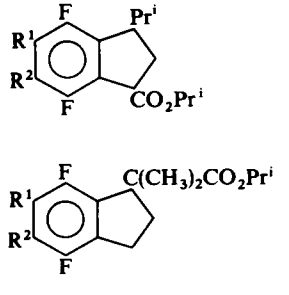
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_8F_3H_6ClS_2$		(1) −108·5 (2) −130·3 (3) −132·9	(1-2) 2·65 (1-3) 12·6 (1-5) 0·9 (2-3) 25·3 (2-5) 0·9 (3-4) 1·85	427
$C_8F_3H_6NO_2S$		(1) −100·1 (2) −126·8 (3) −149·8	(1-2) 5·3 (1-3) 13·2 (1-4) 0·8 (1-5) 1·3 (2-3) 24·3 (2-5) 1·3	427
$C_8F_3H_7S_2$		(1) −139·9 (2) −128·9 (3) −110·0	(1-2) 22·8 (1-3) 12·9 (1-4) 5·8 (1-5) 0·6 (2-3) ~2 (2-4) 2·4 (3-4) 9·2	425
$C_8F_3H_8NS_2$		(1) −132·8 (2) −146·2 (3) −135·7	(1-2) 5·0 (1-3) 13·0 (1-5) 1·0 (2-3) 25·5 (2-5) 0·96	427
$C_8F_3N_5$		(1) −127·7 (2) −128·7 (3) −116·6	(1-2) 18·8 (1-3) 11·3 (2-3) 11·0	410
$C_8F_5ClN_2$		(2) −80·74 (3) −78·82 (6) −128·38 (7) −153·38 (6) −146·20	(3-6) −1·13 (3-7) +8·20 (3-8) −4·10 (6-7) −20·85 (6-8) +5·48 (7-8) −17·53 (2-3) −29·7 (2-6) +8·45 (2-7) −1·15 (2-8) +7·70	496

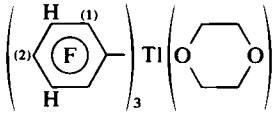
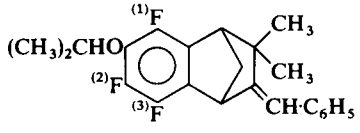
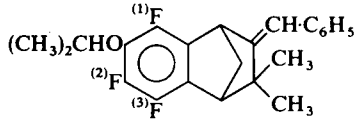
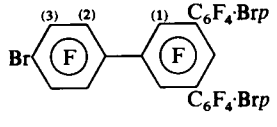
$C_9F_5Br_2N$		(3) −137·7 (5) −141·2 (7) −117·2	(4) −128·6 (6) −155·0	(3-4) 15·8 (3-6) 2·8 (4-5) 49·5 (4-7) 3·6 (5-7) 7·0	(3-5) 6·7 (3-7) 8·4 (4-6) 5·3 (5-6) 16·8 (6-7) 22·2	499
$C_{11}F_6H_4O$		(1) −147·3 (4) −141·0 (6) −135·8	(2) −151·2 (5) −151·2 (8) −117·5	(1-8) 65	(4-5) 63·7	433
$C_{12}F_3H_7$						448
	2-F, 3-F, 4-F	(2) −139·3	(3) −160·7	(4) −136·5		
	2-F, 3-F, 5-F	(2) −149·0	(3) −133·5	(5) −116·2		
	2-F, 3-F, 6-F	(2) −138·1	(3) −142·8	(6) −120·1		
	2-F, 4-F, 5-F	(2) −120·1	(4) −135·7	(5) −143·5		
	2-F, 4-F, 6-F	(2)(6) −111·5	(4)−109·8			
$C_{12}F_4H_9NO_3$		(3) −159·8 (6) −157·0	(5) −147·9 (8) −146·6	(3-5) 6·3 (3-8) 3·0 (5-8) 14·7	(3-6) 1·2 (5-6) 17·8 (6-8) 2·8	499
$C_{12}F_6H_4BrTl$		(1) −88·7	(3) −106·8	(1-2) ±7·0 (1-4) ∓1·5 (2-3) 9·1 (^{205}Tl-1) +785·8 (^{203}Tl-1) +778·7 (Tl-2) −22·5	(1-3) 8·2 (1-5)(2-4) 0, 3·6	453

Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{12}F_6H_4BrTl$		(1) −94·7 (3) −131·9 (4) −142·6	(1-2) 5·4 (1-3) 4·7 (1-4) 15·5 (1-5) 2·4 (2-3) 10·4 (2-4) 5·8 (3-4) 20·1 (3-5) 9·7 (4-5) 9·3 (Tl-1) +1087 (Tl-3) −48·2 (Tl-4) +141·5	453
$C_{12}F_6H_4NO_2Tl$		(1) −89·4 (3) −104·8	(^{205}Tl-1) 950·5 (^{203}Tl-1) 938·5 (Tl-2) 26·3	453
$C_{12}F_6H_6O_2$		(1) −140·5 (3) −151·0 (4) −148·8		433
$C_{12}F_6H_6O_2$		(1) −141·2 (3) −151·0 (4) −148·0	(1-8) 68	433
$C_{13}F_3H_8N$		−137·5, −143·1, −175·4		451
$C_{13}F_3H_8N_3O$		(3) −132·8 (4) −152·2 (6) −143·7		447(a)

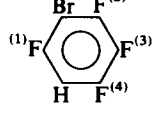
$C_{14}F_3H_{10}NO$		−138·0, −144·2, −175·2				451
$C_{14}F_3H_{12}NO$		−147·4, −156·8 (2:1)				451
$C_{14}F_3H_{13}O$		(1) −139·4 (2) −154·5 (3) −147·6				446
$C_{14}F_3H_{15}O$	As above with double bond reduced	(1) −140·0 (2) −153·7 (3) −148·6				446
$C_{14}F_8HCl_2N$		(1) −135·3 (2) −134·1 (3) −114·4 (4) −139·1 (5) −161·2 (6) −152·4	(1-2) 20 (4-7) 11	(4-6) 3·3 (5-6) 21		444(b)
$C_{14}F_8Cl_2LiN$	As above with H replaced by Li	(1) −140·1 (2) −142·1 (3) −119·2 (4) −144·3 (5) −167·6 (6) −172·1	(1-2) 22 (1-4) 0 (5-6) 21·4	(1-3) 8·5 (4-6) 5·5		444(b)
$C_{14}F_8Cl_2NNa$	As above with H replaced by Na	(1) −140·4 (2) −142·5 (3) −119·3 (4) −144·3 (5) −167·9 (6) −173·1	(1-2) 23 (1-4) 0 (5-6) 22·2	(1-3) 8·5 (4-6) 6·1		444(b)
$C_{15}F_3H_{13}O$		(1) −143·9 (2) −157·0 (3) −152·3				446

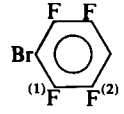
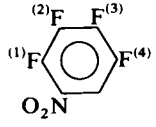
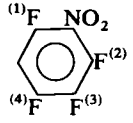
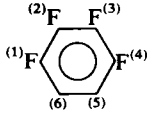
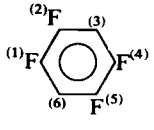
Molecular formula	Structure of compounds	Chemical shifts (pm)	Coupling constants (Hz)	Ref.
$C_{15}F_3H_{17}O$		(1) −143·9 (2) −155·7 (3) −152·7		446
$C_{16}F_3H_{17}O$		(1) −136·2 (2) −150·4 (3) −146·7		446
$C_{16}F_3H_{17}O$		(1) −130·3 (2) −150·7 (3) −144·7		446
$C_{16}F_3H_{19}O$		(1) −139·1 (2) −153·0 (3) −148·6		446
$C_{16}F_3H_{19}O$		(1) −140·0 (2) −152·8 (3) −147·6		446
$C_{17}F_3H_{21}O_2$		(1) −140·6 (2) −153·4 (3) −147·8		446

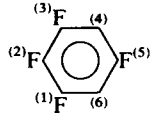
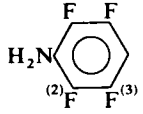
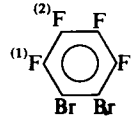
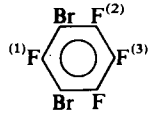
$C_{17}F_3H_{21}O_2$		(1) −139·2 (2) −153·8 (3) −149·2	446
$C_{18}F_3H_{10}N$		−136·9, −142·8, −172·2	451
$C_{19}F_3H_{12}N$	As above with C_6H_5 replaced by $CH_2{\cdot}C_6H_5$	−136·8, −144·6, −173·8	451
$C_{19}F_3H_{21}O$		(1) −145·1 (2) −157·1 (3) −153·3	446
$C_{19}F_3H_{25}O$		(1) −144·6 (2) −155·2 (3) −153·5	446
$C_{19}F_3H_{25}O_3$		$R^1 = Pr^iO$, $R^2 = F$ −130·2, −145·2, −151·9 $R^1 = F$, $R^2 = Pr^iO$ and −136·4, −139·7, −152·8	446

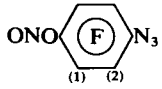
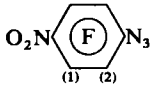
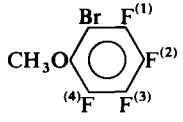
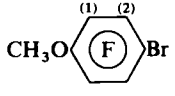
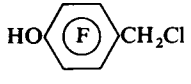
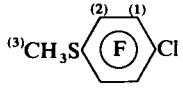
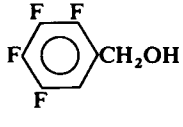
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{22}F_9H_{14}O_2Tl$		(1) −86·8 (2) −108·5	(Tl-1) 497 (Tl-2) 14·3	453
$C_{23}F_3H_{23}O$		(1) −139·5 (2) −152·3 (3) −145·4		446
$C_{23}F_3H_{23}O$		(1) −137·2 (2) −153·1 (3) −148·0		446
$C_{24}F_{15}Br_3$		(1) −101·3 (2) −136·6 (3) −132·2		386(b)
$C_{24}F_{18}$	As above with Br replaced by F(4)	(1) −102·3 (2) −137·5 (3) −161·3 (4) −150·9		386(b)

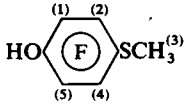
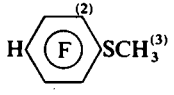
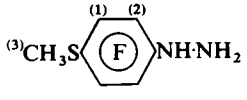
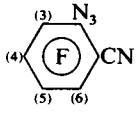
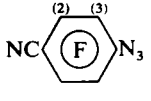
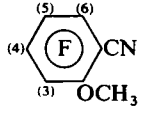
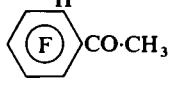
D. Fluorine nuclei in tetrafluorobenzene derivatives

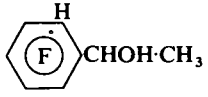
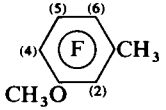
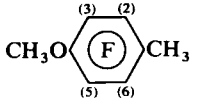
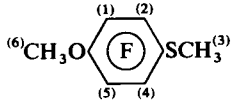
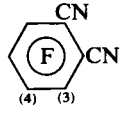
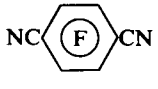
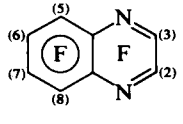
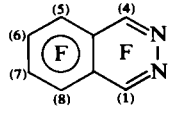
C_6F_4HBr		(1) −109·7 (2) −125·5 (3) −163·2 (4) −133·2		396

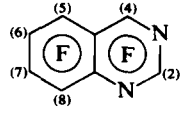
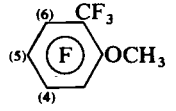
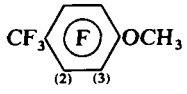
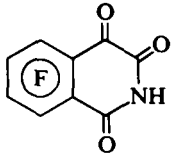
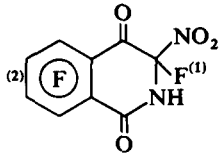
C_6F_4HBr		(1) −133·4 (2) −137·9		396
$C_6F_4HClO_5S_2$		−139·98, −140·92		415(a)
$C_6F_4HNO_2$		(1) −145·1 (2) −154·2 (3) −148·8 (4) −138·8		407
$C_6F_4HNO_2$		(1) −128·8 (2) −141·0 (3) −163·5 (4) −125·6		407
$C_6F_4H_2$			(1-2) −19·517 (1-3) 2·547 (1-4) 12·706 (1-5) 4·459 (1-6) 9·807 (2-3) −18·487 (2-5) −2·698 (2-6) 8·149 (1-C1) −245·87 (1-C2) 16·85 (1-C3) 3·61 (1-C4) 3·67 (1-C5) 7·81 (1-C6) 19·73 (2-C1) 10·16 (2-C2) −252·11 (2-C3) 12·32 (2-C4) 1·52 (2-C5) 4·06 (2-C6) 0·15	402
$C_6F_4H_2$			(1-2) −20·736 (1-3) 7·449 (1-4) 13·334 (1-5) −0·224 (1-6) 10·063 (1-C1) −247·00 (1-C2) 14·10 (1-C3) 1·05 (1-C4) 3·89 (1-C5) 9·57 (1-C6) 22·98	402

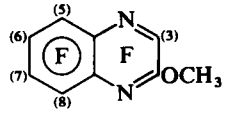
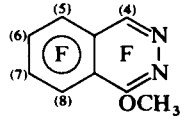
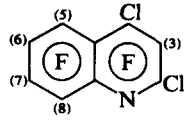
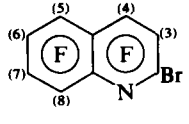
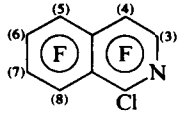
Molecular formula	Structure of compounds		Chemcal shifts (ppm)	Coupling constants (Hz)	Ref.
$C_6F_4H_2$				(1-2) −19·735 (1-3) 5·557 (1-4) −2·439 (1-5) 1·780 (1-6) 10·419 (2-4) 5·599 (2-5) 10·901 (1-C1) −250·38 (1-C2) 15·34 (1-C3) 5·34 (1-C4) 3·96 (1-C5) 13·08 (1-C6) 21·93 (2-C1) 11·09 (2-C2) −246·89 (2-C4) −1·12 (2-C5) 3·82 (5-C1) 14·99 (5-C2) 5·72 (5-C4) 27·83 (5-C5) −246·35	402
$C_6F_4H_2O_3S_2$			−141·75, −147·02		415(a)
$C_6F_4H_2O_6S_2$			−145·15		415(a)
$C_6F_4H_3N$		(HSO_3F / solvent)	(2) −146·8 (3) −134·1		416(a)
$C_6F_4Br_2$			(1) −125·0 (2) −154·3		396
$C_6F_4Br_2$			(1) −102·3 (2) −125·1 (3) −159·4		396

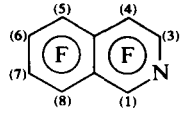
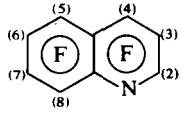
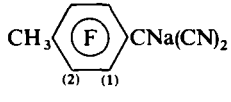
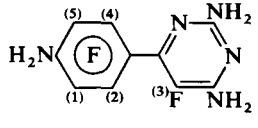
$C_6F_4K_2O_3S_2$		−65·77, −74·88 relative to CF_3CO_2K		415
$C_6F_4N_4O_2$		(1) −161·1 (2) −152·4		410
$C_6F_4N_4O_2$		(1) −149·6 (2) −147·0		410
$C_7F_4H_3BrO$		(1) −132·1 (2) −161·4 (3) −161·1 (4) −156·0		396
$C_7F_4H_3BrO$		(1) −156·7 (2) −135·2		396
$C_7F_4H_3ClO$		−162·0, −144·9		426(b)
$C_7F_4H_3ClS$		(1) −146·6 (2) −134·3	(2-3) 1·0	427
$C_7F_4H_3NO_2S$	As above with Cl replaced by NO_2	(1) −148·1 (2) −133·3	(2-3) 1·6	427
$C_7F_4H_4O$		−139·8, −146·3, −157·0, −157·9		428

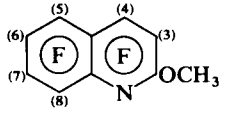
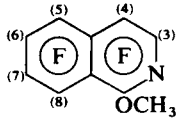
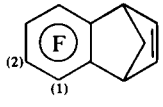
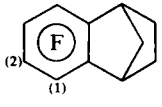
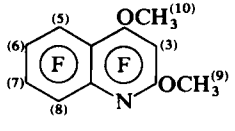
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_7F_4H_4OS$		(1) −161·8 (2) −134·7	(1-2) 23·7 (1-4) 8·5 (1-5) 2·7 (2-3) 0·4 (2-4) 2·7	427
$C_7F_4H_4O_2$		−164·0, −148·6		426(b)
$C_7F_4H_4S$			(2-3) 0·95	427
$C_7F_4H_6N_2S$		(1) −158·5 (2) −135·9	(1-3) 0·4	425
$C_7F_4N_4$		(3) −155·0 (4) −145·6 (5) −155·0 (6) −134·0		410
$C_7F_4N_4$		(2) −133·6 (3) −149·6		410
$C_8F_4H_3NO$		(3) −156·2 (4) −146·4 (5) −162·8 (6) −134·0	(3-4) 18 (3-5) 1 (3-6) 8·7 (4-5) 19·7 (4-6) 4·8 (5-6) 20·3	410
$C_8F_4H_4O$		−136·9, −138·3, −148·8, −155·0		428

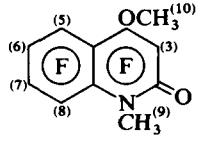
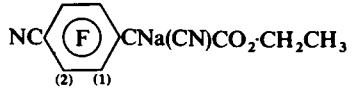
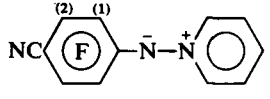
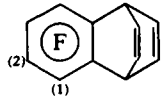
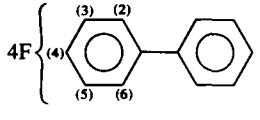
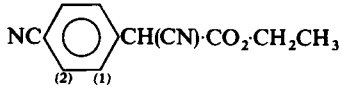
$C_8F_4H_6O$		−139·4, −146·7, −157·0 −158·0				428
$C_8F_4H_6O$		(2) −137·8 (5) −166·0	(4) −155·0 (6) −145·8	(2-5) 8·5 (5-6) 19·6	(4-5) 19·6	433
$C_8F_4H_6O$		(2) −145·8	(3) −159·5	(2-3) 20 (2-6) 1	(2-5) 9	433
$C_8F_4H_6OS$		(1) −156·9	(2) −135·2	(1-2) 22·8 (1-5) 3·0 (2-3) 0·6	(1-4) 8·4 (1-6) 1·45 (2-4) 0·9	427
$C_8F_4N_2$		(3) −126·3	(4) −141·6			410
$C_8F_4N_2$		−129·2				410
$C_8F_6N_2$		(2) −79·09 (6) −153·83	(5) −151·03	(5-6) −17·8 (5-8) +14·0	(5-7) +1·3 (6-7) −19·6	496
$C_8F_6N_2$		(1) −79·67 (6) −143·57	(5) −138·83	(5-6) −18·45 (5-8) +17·00 (6-8) +8·45	(5-7) +8·45 (6-7) −19·7 (7-8) −18·45	496

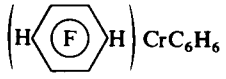
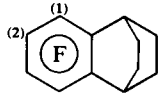
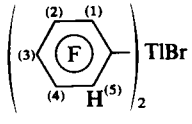
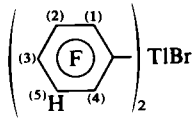
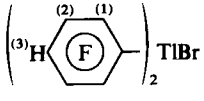
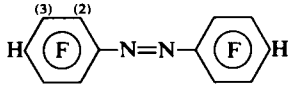
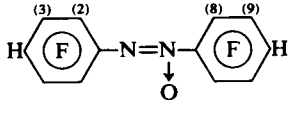
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_8F_6N_2$		(2) −43·31 (4) −47·04 (5) −139·68 (6) −155·77 (7) −143·20 (8) −150·62	(2-5) −4·00 (2-6) 6·76 (2-7) −1·82 (2-8) 4·92 (4-5) 50·75 (4-6) 2·55 (4-7) 0·48 (4-8) 0·80 (5-6) −18·80 (5-7) 6·77 (5-8) 16·00 (6-7) −19·17 (6-8) 2·08 (7-8) −17·10	497
$C_8F_7H_3O$		(5) −162·0	(4-5) 22 (5-6) 22	433
$C_8F_7H_3O$		(2) −142·4 (3) −157·0		433
$C_9F_4HNO_3$		−140·2, −141·7, −147·8, −150·7		437
$C_9F_5HN_2O_4$		(1) −119·5 (2) −138·1, −140·2, −147·3, −149·4		437

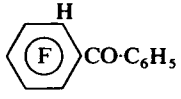
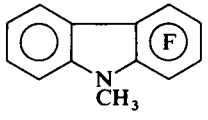
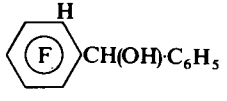
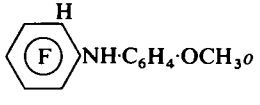
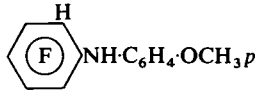
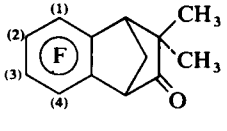
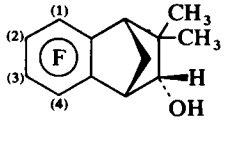
$C_9F_5H_3N_2O$		(3) −77·25 (5) −152·70 (6) −159·52 (7) −156·77 (8) −153·49	(3-5) +7·75 (3-6) −0·50 (3-7) +7·90 (3-8) −3·50 (5-6) −18·45 (5-7) +0·55 (5-8) +13·45 (6-7) −19·90 (6-8) −0·60 (7-8) −18·30	496
$C_9F_5H_3N_2O$		(4) −86·05 (5) −140·47 (6) −147·02 (7) −146·38 (8) −136·36	(4-5) +55·84 (4-6) +0·90 (4-7) −2·83 (4-8) +3·15 (5-6) −19·28 (5-7) +6·81 (5-8) +16·51 (6-7) −19·47 (6-8) +8·24 (7-8) −18·57	496
$C_9F_5Cl_2N$		(3) −116·62 (5) −145·41 (6) −153·98 (7) −153·19 (8) −148·57	(3-5) 8·9 (3-6) −2·1 (3-7) 7·0 (3-8) −4·2 (5-6) −16·8 (5-7) 1·8 (5-8) 15·0 (6-7) −19·0 (6-8) 2·1 (7-8) −17·4	499
C_9F_6BrN		(3) −136·87 (4) −129·32 (5) −146·89 (6) −154·73 (7) −152·76 (8) −149·53	(3-4) −15·4 (3-5) 6·8 (3-6) −2·8 (3-7) 7·6 (3-8) −4·3 (4-5) 45·8 (4-6) 5·0 (4-7) −3·5 (4-8) 1·4 (5-6) −17·4 (5-7) 1·4 (5-8) 15·4 (6-7) −19·0 (6-8) 3·0 (7-8) −16·6	499
C_9F_6ClN		(3) −96·65 (4) −153·0 (5) −146·31 (6) −147·67 (7) −153·5 (8) −138·68		500

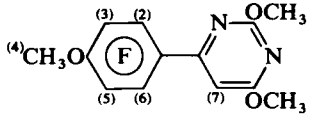
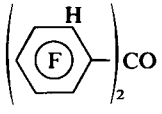
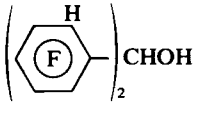
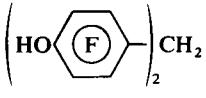
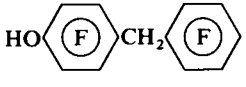
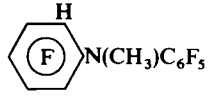
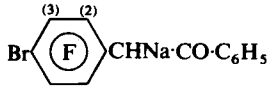
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
C_9F_7N		(1) −62·94 (3) −98·57 (4) −155·93 (5) −145·82 (6) −146·78 (7) −153·45 (8) −140·70	(1-3) 12 (1-4) 32·2 (1-5) 1·7 (1-6) −2·5 (1-7) 3·3 (1-8) 61·5 (3-4) −16·6 (3-5) 4·3 (3-6) −3·5 (3-7) 6·4 (3-8) −4·7 (4-5) 46·4 (4-6) 5·0 (4-7) −4·6 (4-8) 1·5 (5-6) −19·3 (5-7) 1·8 (5-8) 16·4 (6-7) −20·0 (6-8) 7·9 (7-8) −19·0	500
C_9F_7N		(2) −73·98 (3) −161·93 (4) −125·73 (5) −147·06 (6) −156·25 (7) −152·60 (8) −149·77	(2-3) −27·6 (2-4) 26·5 (2-5) −3·1 (2-6) 8·3 (2-7) −1·5 (2-8) 6·1 (3-4) −14·5 (3-5) 7·0 (3-6) −2·5 (3-7) 8·15 (3-8) −4·05 (4-5) 48·0 (4-6) 4·55 (4-7) −3·4 (4-8) 1·5 (5-6) −17·9 (5-7) 1·9 (5-8) 14·95 (6-7) −19·15 (6-8) 2·45 (7-8) −17·1	499
$C_{10}F_4H_3N_2Na$		(1) −146·6 (2) −148·0		444(b)
$C_{10}F_4H_4N_2$	As above with Na replaced by H	(1) −141·3 (2) −141·3		444(b)
$C_{10}F_5H_6N_5$		(1) −164·7 (2) −146·4 (3) −167·9	(1-2) 21·2 (1-4) 8·6 (1-5) 8·1 (2-3) 9·3 (2-4) 2·3	445(a)

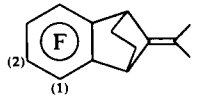
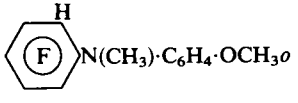
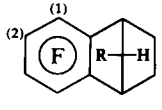
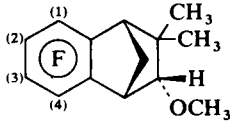
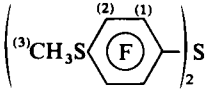
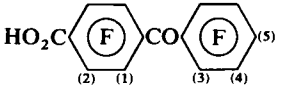
$C_{10}F_6H_3NO$		(3) −161·5 (4) −134·6 (5) −148·5 (6) −160·8 (7) −155·1 (8) −151·9	(3-4) 12·6 (3-5) 7·4 (3-6) 1·5 (3-7) 7·6 (3-8) 3·6 (4-5) 47·8 (4-6) 3·4 (4-7) 3·4 (4-8) 1·6 (5-6) 18·4 (5-7) 1·4 (5-8) 14·8 (6-7) 18·5 (6-8) 1·5 (7-8) 17·0		499
$C_{10}F_6H_3NO$		(3) −99·37 (4) −166·37 (5) −148·60 (6) −150·17 (7) −157·86 (8) −137·69	(3-4) −18·5 (3-5) 4·8 (3-6) −3·2 (3-7) 6·4 (3-8) −4·8 (4-5) 50·2 (4-6) 4·0 (4-7) −4·0 (4-8) 1·5 (5-6) −17·9 (5-7) ±0·5 (5-8) 16·0 (6-7) −19·3 (6-8) 8·0 (7-8) −17·9		500
$C_{11}F_4H_6$		(1) −146·2 (2) −160·9			446
$C_{11}F_4H_8$		(1) −147·3 (2) −160·4			446
$C_{11}F_5H_6NO_2$		(3) −159·06 (5) −146·38 (7) −157·69 (8) −152·86 (6) −163·28	(3-5) +6·45 (3-6) −1·62 (3-7) +6·55 (3-8) −3·20 (5-6) −18·58 (5-7) +1·74 (5-8) +13·96 (6-7) −19·84 (6-8) <0·2 (7-8) −18·53 (3-9) <0·1 (3-10) 4·58 (5-10) 0·38		496 499

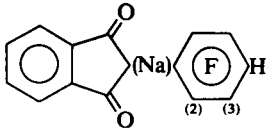
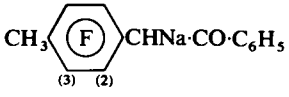
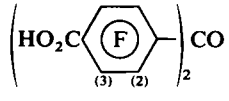
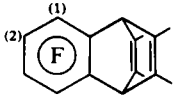
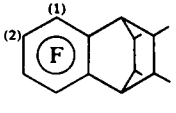
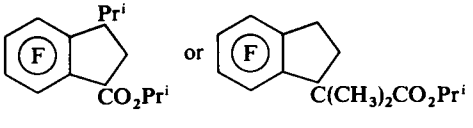
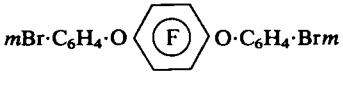
Molecular formula	Structure of compounds		Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{11}F_5H_6NO_2$			(3) −151·04 (5) −143·39 (6) −165·23 (7) −154·54 (8) −149·12	(3-5) +5·70 (3-6) −1·10 (3-7) +7·19 (3-8) 2·70 (5-6) −20·59 (5-7) +4·23 (5-8) +10·70 (6-7) −21·30 (6-8) −1·15 (7-8) −19·15 (3-9) 0·50 (3-10) 4·40 (5-10) 0·37 (8-9) 9·82	496
$C_{12}F_{14}H_5N_2NaO_2$			(1) −136·6 (2) −138·8		444(b)
$C_{12}F_4H_5N_3$			(1) −152·5 (2) −132·3		447(a)
$C_{12}F_4H_6$			(1) −150·9 (2) −163·5		446
$C_{12}F_4H_6$		2-F, 3-F, 4-F, 5-F	(2) −143·8 (3) −156·2 (4) −158·5 (5) −140·5		448
		2-F, 3-F, 4-F, 6-F	(2) −135·8 (3) −165·5 (4) −134·1 (6) −118·5		
		2-F, 3-F, 5-F, 6-F	(2) −144·5 (3) −140·0		
$C_{12}F_4H_6N_2O_2$			(1) −137·6 (2) −132·5		444(b)

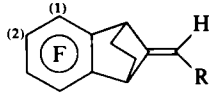
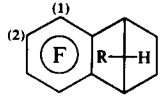
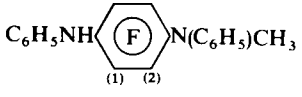
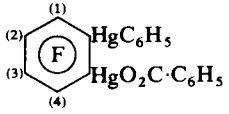
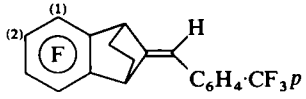
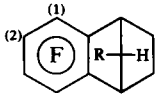
$C_{12}F_4H_8Cr$			−178·0				450
$C_{12}F_4H_{10}$			(1) −150·9	(2) −162·2			446
$C_{12}F_8H_2BrTl$			(1) −117·8 (3) −154·3	(2) −154·9 (4) −138·2	(1-2) 26·8 (1-4) 13·6 (2-4) ~1·5 (3-4) 19·7 (4-5) 8·6 (Tl-2) +525 (Tl-4) +205·4	(1-3) 2·4 (2-3) 19·3 (2-5) ~2 (3-5) 8·2 (Tl-1) +1188 (Tl-3) −93·5	453
$C_{12}F_8H_2BrTl$			(1) −114·2 (3) −131·2	(2) −165·5 (4) −94·4	(1-2) 25 (1-5) ~2 (2-5) 7 (3-5) 11 (4-5) 7 (Tl-2) +282 (Tl-4) +709	(1-3) 7 (2-3) 19 (2-4) 11 (3-4) 4 (Tl-1) +792 (Tl-3) −67	453
$C_{12}F_8H_2BrTl$			(1) −120·7	(2) −137·8	(1-3) 7·1 (Tl-1) 783	(2-3) 9·8 (Tl-2) 369	453
$C_{12}F_8H_2N_2$		(HSO_3F solvent)	(2) −131·7	(3) −135·9			416(a)
$C_{12}F_8H_2N_2O$		(HSO_3F solvent)	(8) −130·1 (2) −133·6	(9) −134·0 (3) −140·4			416(a)

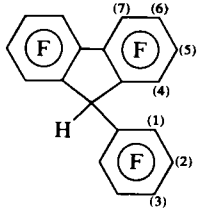
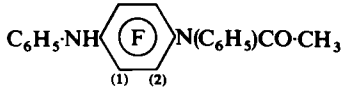
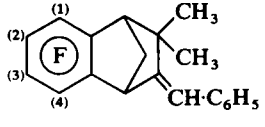
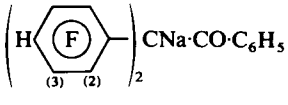
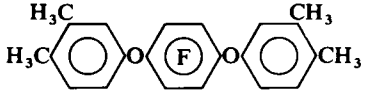
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{13}F_4H_6O$		−137·1, −138·4, −151·5, −154·7		428
$C_{13}F_4H_7N$		−151·7, −162·5, −165·3, −171·7		451
$C_{13}F_4H_8O$		−139·4, −145·1, −156·6, −157·7		428
$C_{13}F_4H_9NO$		−141·0, −158·0, −160·3, −170·8		451
$C_{13}F_4H_9NO$		−140·8, −158·4, −163·7, −172·4		451
$C_{13}F_4H_{10}O$		(1) −145·0 (4) −143·0	(2)(3) −156·7	446
$C_{13}F_4H_{12}O$		(1) −147·0 (4) −146·1	(2)(3) −159·3	446

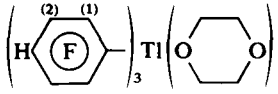
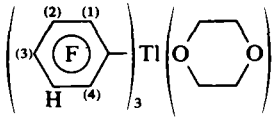
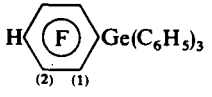
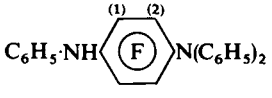
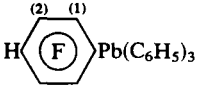
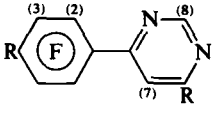
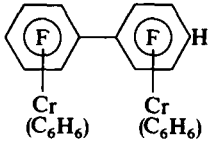
$C_{13}F_5H_9N_2O_3$		(2) −142·3 (3) −158·6 (4) −160·4	(2-3) 21·3 (2-5) 9·1 (2-6) 4·1 (3-5) 0·9 (2-7) 11·4 (3-4) 1·6		445(a)
$C_{13}F_8H_2O$		−139·3, −140·6, −149·7, −156·4			428
$C_{13}F_8H_4O$		−138·5, −144·6, −155·6, −155·6			428
$C_{13}F_8H_4O_2$		−162·6, −145·7			426(b)
$C_{13}F_9H_3O$		−164·2, −162·9, −156·3, −145·3, −143·1 (2:2:1:2:2)			426(b)
$C_{13}F_9H_4N$		−140·1, −148·8, −153·4, −156·1, −158·7, −163·0, −166·0 (1:2:1:1:1:2:1)			451
$C_{14}F_4H_6BrNaO$		(2) −140·4 (3) −138·3			272(b)
$C_{14}F_4H_6ClNaO$	As above with Br replaced by Cl	(2) −140·8 (3) −146·0			272(b)
$C_{14}F_4H_7BrO$	As above with Na replaced by H	(2) −141·1 (3) −135·1			272(b)
$C_{14}F_4H_7ClO$	As above with Na replaced by H and Br by Cl	(2) −141·3 (3) −142·6			272(b)
$C_{14}F_4H_7NaO$	As above with Br replaced by H	(2) −142·4 (3) −142·4			272(b)

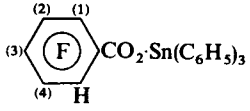
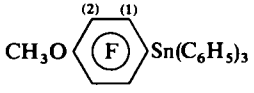
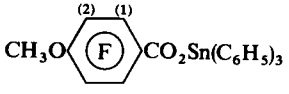
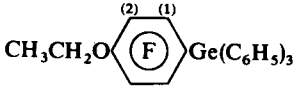
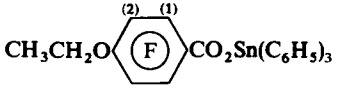
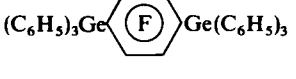
Molecular formula	Structure of compounds		Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{14}F_4H_8O$	As above with Br and Na replaced by H		(2) −142·8 (3) −139·9		272(b)
$C_{14}F_4H_{10}$			(1) −147·7 (2) −160·8		462
$C_{14}F_4H_{11}NO$			−141·7, −152·5, −158·0, −169·9		451
$C_{14}F_4H_{11}NO$	*p*-OCH_3 isomer of above		−140·8, −148·1, −158·1, −165·8		451
$C_{14}F_4H_{14}$		$R = CH(CH_3)_2$	(1) −147·7 (2) −160·3		462
$C_{14}F_4H_{14}O$			(1) −147·5 (2)(3) −160·0 (4) −146·1		446
$C_{14}F_8H_6S_3$			(1)(2) −132·5	(2-3) 1·01	427
$C_{14}F_9HO_3$			(1)(3) −142·1 (2) −139·5 (4) −161·0 (5) −146·8	(3-5) 5·2 (4-5) 18·8	269

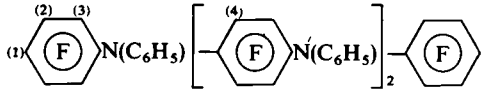
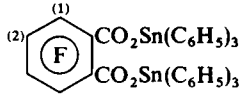
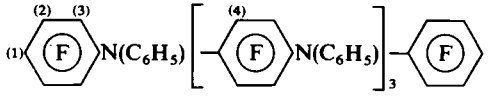
$C_{15}F_4H_5NaO_2$		(2) −137·2 (3) −142·1	272(b)
$C_{15}F_4H_6O_2$	As above with Na replaced by H	(2) −141·4 (3) −138·9	272(b)
$C_{15}F_4H_9NaO$		(2) −143·4 (3) −147·4	272(b)
$C_{15}F_4H_{10}O$	As above with Na replaced by H	(2) −144·7 (3) −144·7	272(b)
$C_{15}F_8H_2O_5$		(2) −142·4 (3) −139·9	269
$C_{16}F_4H_{14}$		(1) −152·2 (2) −163·9	446
$C_{16}F_4H_{18}$		(1) −151·8 (2) −161·8	446
$C_{16}F_4H_{18}O_2$		−137·9, −143·4, −158·2, −159·0	446
$C_{18}F_4H_8Br_2O_2$		−155·2	470
$C_{18}F_4H_8N_2O_6$	As above with Br replaced by NO_2	−154·5	470

Molecular formula	Structure of compounds		Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{18}F_4H_{11}NO_2$		R = $pNO_2 \cdot C_6H_4$	(1) −147·5 (2) −158·8		462
$C_{18}F_4H_{12}$	As above with R = C_6H_5		(1) −146·8 (2) −159·6		462
$C_{18}F_4H_{13}N$	As above with R = $pNH_2 \cdot C_6H_4$		(1) −147·0 (2) −159·7		462
$C_{18}F_4H_{14}$		R = $CH_2C_6H_5$	(1) −147·1 (2) −159·4		462
$C_{19}F_4H_9N_2$			(1) −151·2 (2) −147·9		452
$C_{19}F_4H_{10}Hg_2O_2$			(1) −131·3 (2)(3) −150·2, −155·4 (4) −115·0		473
$C_{19}F_7H_{11}$			(1) −147·0 (2) −159·3		462
$C_{19}F_7H_{13}$		R = $pCF_3 \cdot C_6H_4$	(1) −146·9 (2) −159·1		462

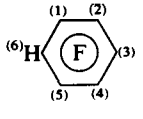
$C_{19}F_{13}H$		(1) −142·0 (2) −161·4 (3) −153·8 (4) −143·2 (5) −153·8 (6) −153·8 (7) −134·6	474(b)
$C_{20}F_4H_{10}O_6$		−151·3	470
$C_{20}F_4H_{14}N_2O$		(1) −151·45 (2) −147·55	452(b)
$C_{20}F_4H_{14}O_2$		−149·6	470
$C_{20}F_4H_{16}$		(1) −146·3 (2) −159·5 (3) −158·5 (4) −144·0	446
$C_{20}F_8H_7NaO$		(2) −137·1 (3) −142·1	272(b)
$C_{20}F_8H_8O$	As above with Na replaced by H	(2) −138·5 (3) −140·1	272(b)
$C_{22}F_4H_{18}O_2$		−150·5	470

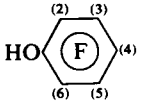
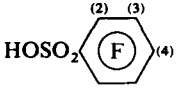
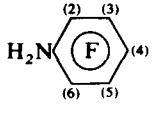
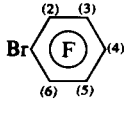
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{22}F_{12}H_{11}O_2Tl$		(1) −119·3 (2) −137·6	(Tl-1) 529 (Tl-2) 232	453
$C_{22}F_{12}H_{11}O_2Tl$		(1) −112·1 (2) −165·2 (3) −131·8 (4) −93·4	(Tl-1) 530 (Tl-2) 472 (Tl-3) 46 (Tl-4) 175	453
$C_{24}F_4H_{16}Ge$		(1) −123·6 (2) −138·4		473
$C_{24}F_4H_{16}N_2$		(1) −151·10 (2) −147·75		452(b)
$C_{24}F_4H_{16}Pb$		(1) −119·2 (2) −137·8		473
$C_{24}F_4H_{16}Sn$	As above with Pb replaced by Sn	(1) −120·0 (2) −137·8		473
$C_{24}F_6H_{10}Fe_2N_2O_4$	 $R = Fe(CO)_2C_5H_5$	(2) −145·7 (3) −108·6 (7) −114·5 (8) −55·0	(2-7) 11·5 (7-8) 30·6	445(a)
$C_{24}F_9H_{13}Cr_2$		−185, −195 to −205 (ratio 2:7)		450

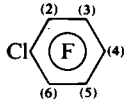
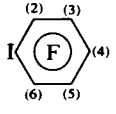
$C_{25}F_4H_{16}O_2Sn$		(1)(4) −137·4, −139·4 (2)(3) −152·3, −155·2	473
$C_{25}F_4H_{18}OSn$		(1) −120·3 (2) −156·2	473
$C_{26}F_4H_{18}O_3Sn$		(1) −139·7 (2) −158·5	473
$C_{26}F_4H_{20}GeO$		(1) −124·5 (2) −156·3	473
$C_{26}F_4H_{20}OSn$	As above with Ge replaced by Sn	(1) −120·5 (2) −155·4	473
$C_{27}F_4H_{20}O_3Sn$		(1) −140·0 (2) −157·9	473
$C_{30}F_4H_{20}N_2$		−146·80	471(b)
$C_{30}F_{14}H_{10}N_2$		(1) −157·40 (2) −162·35 (3)(4) −146·55, −146·75	471(b)
$C_{42}F_4H_{30}Ge_2$		−122·6	473
$C_{42}F_4H_{30}Pb_2$	As above with Ge replaced by Pb	−117·7	473

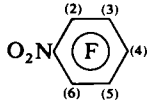
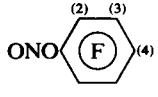
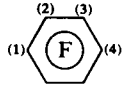
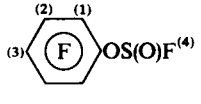
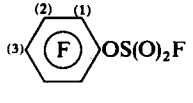
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{42}F_4H_{30}Sn_2$	As above with Ge replaced by Sn	−118·6		473
$C_{42}F_{18}H_{15}N_3$		(1) −157·35 (2) −162·30 (3) −146·65 (4) −147·00		471(b)
$C_{44}F_4H_{30}O_4Sn_2$		(1) −137·7 (2) −151·9		473
$C_{63}F_{22}H_{20}N_4$		(1) −157·35 (2) −162·30 (3) −146·60 (4) −146·95, −147·05		471(b)

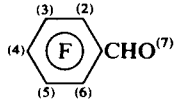
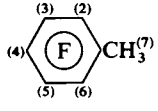
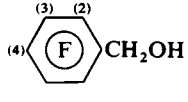
E. Fluorine nuclei in pentafluorobenzene derivatives

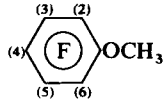
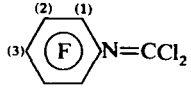
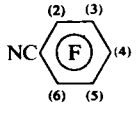
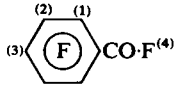
C_6F_5H		(1-2) −20·566	(1-3) 1·213	402
		(1-4) 8·782	(1-5) −2·041	417
		(1-6) 10·416	(2-3) −18·747	
		(2-4) −1·230	(2-6) 7·004	
		(3-6) −2·656	(1-C1) −248·09	
		(1-C2) 16·67	(1-C3) 5·17	
		(1-C4) 5·21	(1-C5) 12·32	
		(1-C6) 23·44	(2-C1) 11·22	
		(2-C2) −249·76	(2-C3) 13·39	
		(2-C4) 1·41	(2-C5) 4·25	
		(2-C6) 0·50	(3-C1) 3·78	
		(3-C2) 12·86	(3-C3) −252·89	
		(3-C6) 3·56		

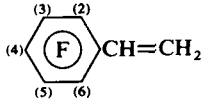
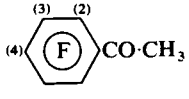
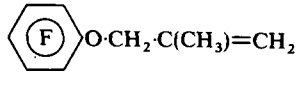
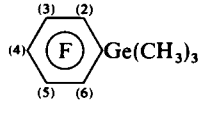
C_6F_5HO				417
		(2-3) −20·65	(2-4) −5·73	
		(2-5) 4·40	(2-6) 2·24	
		(3-4) −20·75	(3-5) −3·19	
		(2-C1) 14·27	(2-C2) −242·76	
		(2-C3) 14·57	(2-C4) 3·82	
		(2-C5) 4·96	(2-C6) 5·25	
		(3-C1) 2·38	(3-C2) 12·78	
		(3-C3) −247·48	(3-C4) 13·33	
		(3-C5) 3·72	(3-C6) 4·57	
		(4-C1) 4·08	(4-C2) 3·24	
		(4-C3) 13·44	(4-C4) −245·10	
$C_6F_5HO_3S$		(2)(3) −147·70, −169·97		415(a)
		(4) −158·88		
$C_6F_5H_2N$				417
		(2-3) −20·52	(2-4) −7·33	
		(2-5) 5·13	(2-6) 4·64	
		(3-4) −20·75	(3-5) −2·40	
		(2-C1) 14·52	(2-C2) −238·90	
		(2-C3) 14·65	(2-C4) 4·30	
		(2-C5) 4·71	(2-C6) 7·21	
		(3-C1) 2·10	(3-C2) 13·23	
		(3-C3) −245·42	(3-C4) 13·94	
		(3-C5) 3·58	(3-C6) 4·21	
		(4-C1) 3·29	(4-C2) 3·29	
		(4-C3) 13·38	(4-C4) −241·64	
C_6F_5Br		(2) −132·7	(3) −160·9	396
		(4) −154·9		

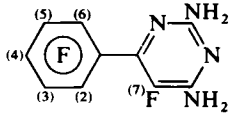
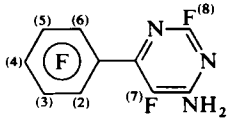
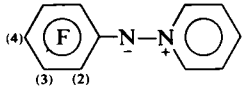
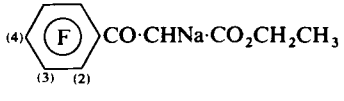
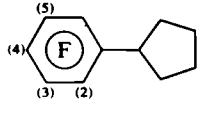
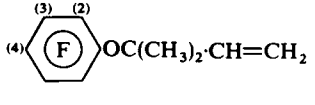
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)		Ref.
C_6F_5Br	As above		(2-3) −21·47	(2-4) 1·22	417
			(2-5) 6·28	(2-6) −5·30	
			(3-4) −19·62	(3-5) −1·65	
			(2-C1) 23·02	(2-C2) −247·71	
			(2-C3) 17·29	(2-C4) 4·40	
			(2-C5) 5·24	(2-C6) 4·07	
			(3-C1) 0·00	(3-C2) 12·54	
			(3-C3) −253·53	(3-C4) 13·56	
			(3-C5) 2·17	(3-C6) 4·68	
			(4-C1) 5·10	(4-C2) 3·47	
			(4-C3) 13·36	(4-C4) −254·61	
C_6F_5Cl			(2-3) −20·63	(2-4) 0·47	417
			(2-5) 5·99	(2-6) −5·29	
			(3-4) −19·77	(3-5) −1·96	
			(2-C1) 19·44	(2-C2) −249·91	
			(2-C3) 16·24	(2-C4) 4·18	
			(2-C5) 5·24	(2-C6) 3·18	
			(3-C1) 1·07	(3-C2) 12·85	
			(3-C3) −252·51	(3-C4) 13·63	
			(3-C5) 2·48	(3-C6) 5·14	
			(4-C1) 5·14	(4-C2) 3·31	
			(4-C3) 13·43	(4-C4) −254·34	
C_6F_5I			(2-3) −22·91	(2-4) 1·97	417
			(2-5) 7·28	(2-6) −4·72	
			(3-4) −19·46	(3-5) −1·25	
			(2-C1) 28·44	(2-C2) −244·58	
			(2-C3) 18·83	(2-C4) 4·79	
			(2-C5) 5·21	(2-C6) 6·15	
			(3-C1) 1·44	(3-C2) 11·96	
			(3-C3) −254·66	(3-C4) 13·57	
			(3-C5) 1·69	(3-C6) 4·48	
			(4-C1) 4·75	(4-C2) 3·59	
			(4-C3) 13·24	(4-C4) −254·84	

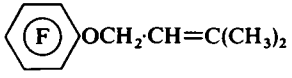
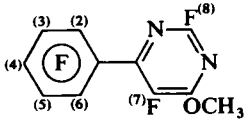
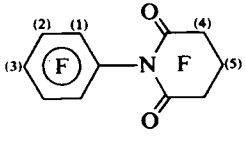
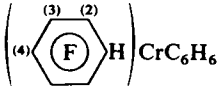
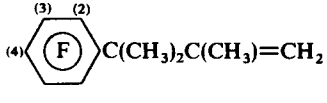
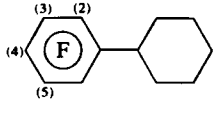
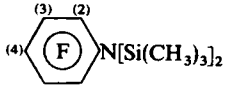
$C_6F_5NO_2$		(2) −146·4 (4) −147·6	(3) −158·6		410
$C_6F_5NO_2$	As above			(2-3) −21·24 (2-4) 5·40 (2-5) 6·68 (2-6) −9·98 (3-4) −19·94 (3-5) −0·37 (2-C2) −262·12 (2-C3) 15·39 (2-C4) 4·26 (2-C5) 5·31 (2-C6) 2·30 (3-C2) 14·06 (3-C3) −255·29 (3-C4) 13·42 (3-C5) 1·82 (3-C6) 2·30 (4-C2) 3·79 (4-C3) 13·41 (4-C4) −261·95	417
$C_6F_5NO_2$		(2) −160·2 (4) −143·3	(3) −161·0		410
C_6F_6				(1-2) −20·282 (1-3) −3·003 (1-4) 3·869 (1-C1) −251·13 (1-C2) 13·73 (1-C3) 3·19 (1-C4) 5·21	402 417
C_6F_6	As above			(1-2) −21·65 (1-3) −2·84 (1-4) 3·98	418
$C_6F_6O_2S$		(1) −151·0 (3) −155·7	(2) −162·0 (4) +69·6	(1-2) 16·8 (1-4) 9·0 (2-3) 20·8	419
$C_6F_6O_3S$		(1) −151·8 (3) −153·3	(2) −160·6 (4) +42·0	(1-2) 16·2 (1-4) 11·2 (2-3) 20·5	419

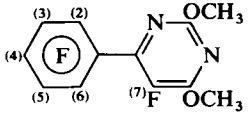
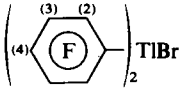
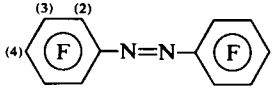
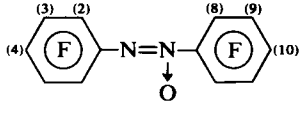
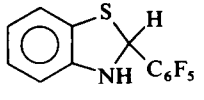
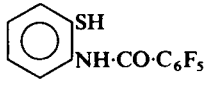
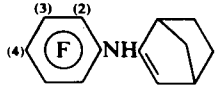
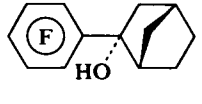
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
C_7F_5HO			(2-3) −20·18 (2-4) 6·46 (2-5) 9·49 (2-6) −4·82 (3-4) −19·13 (3-5) −1·11 (2-7) 1·05 (3-7) −1·34 (4-7) 0·21 (2-C1) 10·21 (2-C2) −261·33 (2-C3) 16·16 (2-C4) 5·29 (2-C5) 5·28 (2-C6) 6·69 (3-C1) 1·86 (3-C2) 11·47 (3-C3) −252·90 (3-C4) 13·46 (3-C5) 1·33 (3-C6) 4·32 (4-C1) 3·83 (4-C2) 4·12 (4-C3) 12·98 (4-C4) −261·22	417
$C_7F_5H_3$			(2-3) −20·89 (2-4) −0·06 (2-5) 8·55 (2-6) −0·63 (3-4) −19·43 (3-5) −2·27 (2-7) 2·28 (3-7) 0·25 (4-7) 1·38 (2-C1) 19·49 (2-C2) −244·66 (2-C3) 17·47 (2-C4) 5·19 (2-C5) 5·09 (2-C6) 8·76 (3-C1) 0·86 (3-C2) 11·02 (3-C3) −248·70 (3-C4) 13·54 (3-C5) 2·06 (3-C6) 4·26 (4-C1) 3·94 (4-C2) 3·61 (4-C3) 12·76 (4-C4) −250·03	417
$C_7F_5H_3O$		(2)(3) −150·0, −168·0 (4) −159·75		354

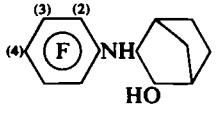
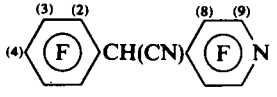
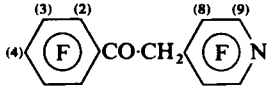
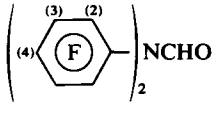
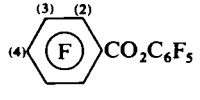
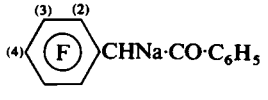
$C_7F_5H_3O$				(2-3) −20·44	(2-4) −3·20	417
				(2-5) 4·65	(2-6) −0·44	
				(3-4) −20·62	(3-5) −3·36	
				(2-C1) 12·51	(2-C2) −247·70	
				(2-C3) 14·97	(2-C4) 3·95	
				(2-C5) 5·03	(2-C6) 5·22	
				(3-C1) 1·75	(3-C2) 12·00	
				(3-C3) −248·67	(3-C4) 13·84	
				(3-C5) 3·66	(3-C6) 4·48	
				(4-C1) 4·49	(4-C2) 3·36	
				(4-C3) 13·21	(4-C4) −248·21	
$C_7F_5Cl_2N$		(1) −150·1	(2) −162·7			271(b)
		(3) −159·1				
C_7F_5N		(2) −131·9	(3) −163·5			410
		(4) −143·4				
C_7F_5N	As above			(2-3) −20·12	(2-4) 5·88	417
				(2-5) 8·05	(2-6) −7·85	
				(3-4) −19·47	(3-5) 0·28	
				(2-C2) −260·00	(2-C3) 15·01	
				(2-C4) 4·94	(2-C5) 5·11	
				(2-C6) 4·98	(3-C2) 13·04	
				(3-C3) −253·59	(3-C4) 13·33	
				(3-C5) 1·97	(3-C6) 4·03	
				(4-C2) 4·29	(4-C3) 13·32	
				(4-C4) −262·85		
C_7F_6O		(1) −154·1	(2) −161·8	(1-2) 15·6	(2-3) 20·6	429
		(3) −156·1	(4) −22·6			

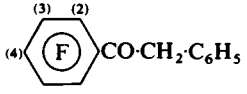
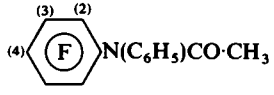
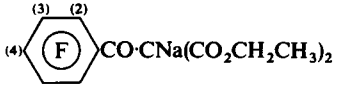
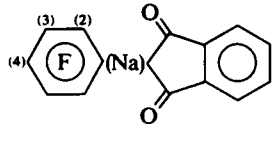
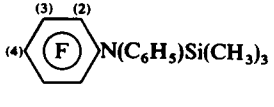
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_8F_5H_3$			(2-3) −20·47 (2-4) 1·37 (2-5) 8·22 (2-6) −2·20 (3-4) −19·66 (3-5) −2·00 (2-C1) 13·95 (2-C2) −250·41 (2-C3) 17·30 (2-C4) 13·67 (2-C5) 5·13 (2-C6) 7·89 (3-C1) 0·79 (3-C2) 11·49 (3-C3) −249·37 (3-C4) 13·67 (3-C5) 2·22 (3-C6) 4·32 (4-C1) 4·26 (4-C2) 3·35 (4-C3) 12·88 (4-C4) −253·75	417
$C_8F_5H_3O$		(2) −154·0 (3) −164·1 (4) −159·6	(2-3) 19·0 (3-4) 22·0	429
$C_9F_5H_7O$		−159·7 and −167·8 (2:3)		329
$C_9F_5H_9Ge$		(2) −127·9 (3) −161·51 (4) −153·4	(2-3) −23·9 (2-4) 2·5 (2-5) 10·7 (2-6) −4·2 (3-4) −20·2 (3-5) −1·2	438(b)
$C_9F_5H_9Si$	As above with Ge replaced by Si	(2) −127·8 (3) −161·75 (4) −152·5	(2-3) −23·9 (2-4) 3·3 (2-5) 10·7 (2-6) −4·2 (3-4) −19·2 (3-5) −1·2	438(b)
$C_9F_5H_9Sn$	As above with Ge replaced by Sn	(2) −121·9 (3) −160·66 (4) −152·96	(2-3) −27·25 (2-4) 1·97 (2-5) 11·58 (2-6) −4·38 (3-4) −19·7 (3-5) −1·37	438(b)

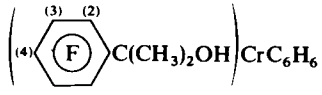
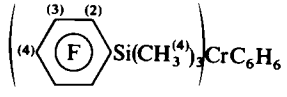
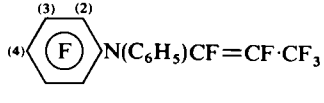
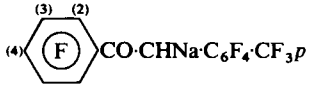
$C_{10}F_6H_4N_4$		(2) −142·8 (3) −165·0 (4) −156·3 (7) −168·4	(2-3) 21·7 (2-5) 8·1 (3-5) 0·8 (2-7) 7·9	(2-4) 2·1 (2-6) 3·4 (3-4) 20·5	445(a)
$C_{10}F_7H_2N_3$		(2) −142·3 (3) −164·4 (4) −154·4 (7) −156·5 (8) −51·7	(2-3) 21·5 (2-5) 7·9 (2-7) 10·9 (3-5) 1·2	(2-4) 3·2 (2-6) 4·4 (3-4) 19·9 (7-8) 27·6	445(a)
$C_{10}F_8N_2$	As above with NH_2 replaced by F(9)	(2) −142·5 (3) −164·1 (4) −152·0 (7) −154·4 (8) −48·7 (9) −75·4	(2-3) 20·4 (2-5) 8·2 (2-7) 13·0 (7-8) 28·0 (8-9) 2·4	(2-4) 4·2 (2-6) 5·8 (3-4) 19·0 (7-9) 20·3	445(a)
$C_{11}F_5H_5N_2$		(2) −153·5 (3) −167·0 (4) −177·4			447(a)
$C_{11}F_5H_6NaO_3$		(2) −142·9 (3) −163·8 (4) −160·0	(3-4) 20·5		272(b)
$C_{11}F_5H_7O_3$	As above with Na replaced by H (50% enol)	(2) −139·4, −140·4 (3) −161·7 (4) −152·0, −149·9	(2-4) 3·5	(3-4) 21	272(b)
$C_{11}F_5H_9$		(2) −145·5 (3) −165·75 (4) −152·25	(2-3) 24	(2-5) 9	375
$C_{11}F_5H_9O$		(2) −153·4 (3) −165·7 (4) −167·8	(2-3) 20·0 (2-4) 3·0	(3-4) 20·0	329

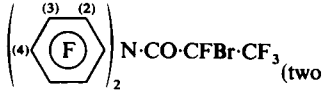
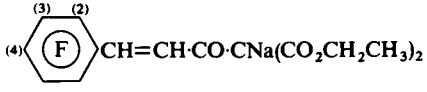
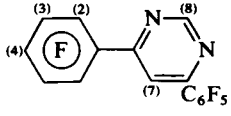
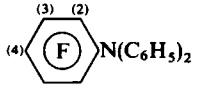
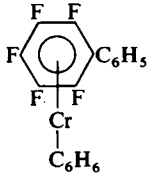
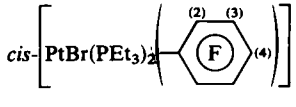
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{11}F_5H_9O$		−158·4, −167·0 (2:3)		329
$C_{11}F_7H_3O$		(2) −140·3 (3) −162·1 (4) −151·3 (7) −153·6 (8) −48·0	(2-3) 21·8 (2-4) 3·5 (2-5) 8·2 (2-6) 4·5 (3-4) 19·7 (3-5) 0·5 (2-7) 11·7 (7-8) 27·4	445(a)
$C_{11}F_{11}NO_2$		(1) −143·4 (2) −147·3 (3) −159·4 (4) −121·3 (5) −137·1		219(a)
$C_{12}F_5H_7Cr$		(2) −185·0 (3) −194·9 (4) −196·8		450
$C_{12}F_5H_{11}$		(2) −152 (3) −177 (4) −172	(2-3) 20 (3-4) 20	249
$C_{12}F_5H_{11}$		(2) −148·5 (3) −169·5 (4) −165	(2-3) 24 (2-5) 9 (3-4) 24	375
$C_{12}F_5H_{18}NSi_2$		(2) −147·9 (3) −162·75 (4) −165·4		452

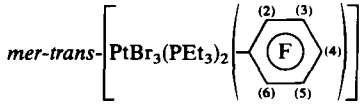
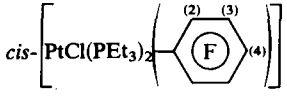
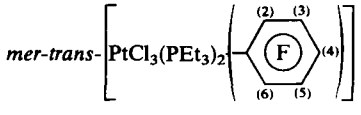
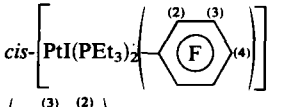
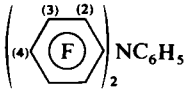
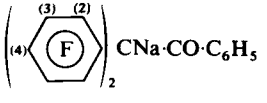
$C_{12}F_6H_6N_2O_2$			(2) −140·5 (3) −162·6 (4) −152·7 (7) −160·4	(2-3) 21·3 (2-4) 2·6 (2-5) 8·1 (2-6) 4·3 (3-4) 20·6 (3-5) 0·8 (2-7) 10·7		445(a)
$C_{12}F_6H_6Cr$	$C_6F_6 \cdot Cr \cdot C_6H_6$		−193·3	^1J(F-C) 303		624
$C_{12}F_{10}BrTl$			(2) −119·7 (3) −160·4 (4) −152·5	(2-4) ~0 (3-4) 19·1 (Tl-2) 780 (Tl-3) 339 (Tl-4) 82		453
$C_{12}F_{10}N_2$		(HSO$_3$F solvent)	(2) −133·9 (3) −154·4 (4) −123·7			416(a)
$C_{12}F_{10}N_2O$		(HSO$_3$F solvent)	(2) −140·0 (3) −157·4 (4) −141·6 (8) −133·1 (9) −154·4 (10) −134·1			416(a)
$C_{13}F_5H_4NS$			−139·0, −151·0, −161·0			252
$C_{13}F_5H_6NOS$			−131·0, −143·0, −152·0			252
$C_{13}F_5H_{10}N$			(2) −161·5 (3) −166·5 (4) −175·0			455(a) (?)
$C_{13}F_5H_{11}O$			Centre of signals −138·9			456

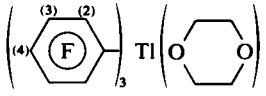
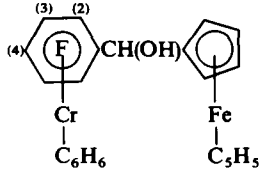
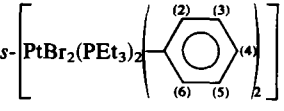
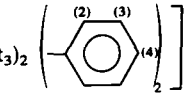
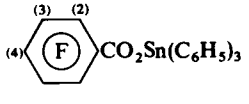
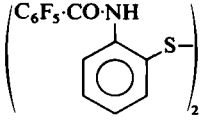
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{13}F_5H_{12}NO$		(2) −163·0 (3) −166·5 (4) −175·0		455(a)
$C_{13}F_9HNNaO$		(2) −142·8 (3) −163·7 (4) −160·0 (8) −145·2 (9) −98·4		272(b)
$C_{13}F_9HN_2$		(2) −139·2 (3) −160·7 (4) −151·6 (8) −139·6 (9) −89·7	(2-4) 3·2 (3-4) 21	444(b)
$C_{13}F_9H_2NO$		(2) −139·9 (3) −160·8 (4) −148·7 (8) −142·9 (9) −91·8	(3-4) 20·5	272(b)
$C_{13}F_9N_2Na$		(2) −140·5 (3) −166·6 (4) −165·1 (8) −153·1 (9) −100·6	(3-4) 20	444(b)
$C_{13}F_{10}HNO$	 (two sets of signals)	[a] (2) −146·8 (3) −161·8 (4) −152·7 [b] (2) −144·0 (3) −160·5 (4) −152·0	(2-4) 2·6	263(b)
$C_{13}F_{10}O_2$		(2) −153·9 (3) −162·2 (4) −156·7	(2-3) 16·5 (3-4) 20·7	429
$C_{14}F_5H_6NaO$		(2) −142·0 (3) −166·4 (4) −170·3	(2-4) 3·5 (3-4) 20·5	272(b)

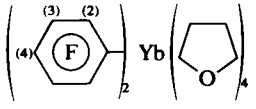
$C_{14}F_5\dot{H}_7O$	As above with Na replaced by H	(2) −142·3 (4) −157·0	(3) −163·7	(3-4) 20·5		272(b)
$C_{14}F_5H_7O$		(2) −141·1 (4) −151·0	(3) −161·1	(2-4) 3·4	(3-4) 20	272(b)
$C_{14}F_5H_8NO$		(2) −145·5 (4) −163·1	(3) −155·85			452(b)
$C_{14}F_5H_{10}NaO_5$		(2) −143·9 (4) −161·6	(3) −165·3			272(b)
$C_{14}F_5H_{11}O_5$	As above with Na replaced by H	(2) −140·0 (4) −151·8	(3) −162·0	(2-4) 2·5	(3-4) 22	272(b)
$C_{14}F_{10}HNaO$		(2) −140·6 (4) −169·2 (7) −164·1	(3) −166·4 (6) −142·8 (8) −160·9	(2-4) 3·5 (6-8) 0	(3-4) 20·4 (7-8) 20	272(b)
$C_{14}F_{10}H_2O$	As above with Na replaced by H	(2) −141·9 (4) −155·6 (7) −160·9	(3) −163·1 (6) −140·3 (8) −149·5	(2-4) 0 (6-8) 4·5	(3-4) 20 (7-8) 20·4	272(b)
$C_{15}F_5H_4NaO_2$		(2) −136·1 (4) −161·9	(3) −165·7			272(b)
$C_{15}F_5H_5O_2$	As above with Na replaced by H	(2) −140·6 (4) −154·3	(3) −162·3	(2-4) 1·5	(3-4) 20·7	272(b)
$C_{15}F_5H_{11}NSi$		(2) −147·1 (4) −163·85	(3) −158·9			452(b)

Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{15}F_5H_{13}CrO$		(2) −182·3 (2) −194·5 (3) −198·8		450
$C_{15}F_5H_{15}CrSi$		(2) −175·2 (2) −193·7 (3) −200·7	(2-4) 1·5	450
$C_{15}F_{10}HNaO_2$		(2) −142·7 (3) −163·1 (4) −158·1	(2-4) 0 (3-4) 19·8	272(b)
$C_{15}F_{10}H_2O_2$	As above with Na replaced by H	(2) −139·1 (3) −161·1 (4) −149·5	(2-4) 4·4 (3-4) 20·5	272(b)
$C_{15}F_{10}H_3NaO$		(2) −142·6 (3) −166·8 (4) −171·7	(2-4) 4·5 (3-4) 21·7	272(b)
$C_{15}F_{10}H_4O$	As above with Na replaced by H	(2) −142·2 (3) −163·3 (4) −156·5	(2-4) 0 (3-4) 21	272(b)
$C_{15}F_{10}H_5N$		(2) −146·7 (3) −161·7 (4) −155·0		263(b)
$C_{15}F_{12}HNaO$		(2) −142·9 (3) −164·0 (4) −160·4	(2-4) 0 (3-4) 21	272(b)
$C_{15}F_{12}H_2O$	As above with Na replaced by H	(2) −139·9 (3) −160·8 (4) −148·9	(2-4) 4·7 (3-4) 21	272(b)

$C_{15}F_{14}BrNO$	 (two sets of signals)	[a]	(2) −143·3 (3) −160·9 (4) −151·3			263(b)
		[b]	(2) −141·3 (3) −160·5 (4) −149·5			
$C_{16}F_5H_{12}NaO_5$			(2) −141·6 (3) −163·7 (4) −158·0	(2-4) 0	(3-4) 21·5	272(b)
$C_{16}F_5H_{13}O_5$	As above with Na replaced by H (enol form)		(2) −140·8 (3) −162·4 (4) −153·1	(2-4) 2·3	(3-4) 21·0	272(b)
$C_{16}F_{12}N_2$			(2) −142·1 (3) −163·9 (4) −151·7 (7) −134·5 (8) −51·3	(2-3) 22·4 (2-4) 3·6 (2-5) 8·3 (2-6) 5·8 (3-4) 19·8 (2-7) 15·0 (7-8) 28·6		445(a)
$C_{17}F_7H_5FeN_2O_2$	As above with C_6F_5 replaced by $Fe(CO)_2C_5H_5$		(2) −142·5 (3) −164·6 (4) −154·6 (7) −114·3 (8) −54·7	(2-3) 20·9 (2-4) 2·7 (2-5) 7·7 (2-6) 3·7 (3-4) 20·3 (2-7) 11·8 (3-7) 0·8 (7-8) 30·1		445(a)
$C_{18}F_5H_{10}N$			(2) −145·30 (3) −163·05 (4) −159·10			471(b)
$C_{18}F_5H_{11}Cr$			−181·9, −194·5, −196·6 (ratio 2:2:1)			624
$C_{18}F_5H_{30}BrP_2Pt$			(2) −119·0 (3) −164·3 (4) −162·8	(2-3) 21 (Pt-2) 309	(3-4) 20 (Pt-3) 62	472

Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{18}F_5H_{30}Br_3P_2Pt$	*mer-trans*- 	(2) −106·5 (3) −161·4 (4) −157·3	(2-3) 22 (3-4) 21 (Pt-2) 93 (Pt-3) 38	472
$C_{18}F_5H_{30}Br_3P_2Pt$	As above but *mer-cis*-compound (at 180 K)	(2) −108·4 (3) −162·1 (4) −157·9 (5) −161·4 (6) −105·6	(2-3) 29 (3-4) 22 (5-6) 29 (Pt-2) ~85 (Pt-6) ~60	472
$C_{18}F_5H_{30}ClP_2Pt$	*cis*- 	(2) −119·6 (3) −163·7 (4) −162·2	(2-3) 20 (3-4) 20 (Pt-2) 307 (Pt-3) 70	472
$C_{18}F_5H_{30}Cl_3P_2Pt$	*mer-trans*- 	(2) −111·5 (3) −162·8 (4) −159·0	(2-3) 22 (3-4) 21 (Pt-2) 85 (Pt-3) 39 (Pt-4) 20	472
$C_{18}F_5H_{30}Cl_3P_2Pt$	As above but *mer-cis*-compound (at 180 K)	(2) −115·3 (3) −162·0 (4) −157·9 (5) −161·3 (6) −113·9	(2-3) 27 (3-4) 20 (5-6) 23 (4-5) 20 (Pt-2) ~65 (Pt-6) ~50	472
$C_{18}F_5H_{30}IP_2Pt$	*cis*- 	(2) −116·5 (3) −165·0 (4) −163·9	(2-3) 23 (3-4) 20 (Pt-2) 311 (Pt-3) 61	472
$C_{18}F_{10}H_5N$		(2) −146·50 (3) −162·4 (4) −157·35		471(b)
$C_{20}F_{10}H_5NaO$		(2) −139·2 (3) −166·3 (4) −164·4	(3-4) 20·7	272(b)
$C_{20}F_{10}H_6O$	As above with Na replaced by H	(2) −139·2 (3) −162·0 (4) −153·9	(2-4) 1·5 (3-4) 20·5	272(b)

$C_{22}F_{15}H_8O_2Tl$		(2) −118·1 (4) −151·5	(3) −159·3	(Tl-2) 546 (Tl-4) 58	(Tl-3) 217	453
$C_{23}F_5H_{17}CrFeO$		(2) −187·3 (4) −200·6	(3) −197·3			450
$C_{24}F_{10}H_{30}Br_2P_2Pt$	*cis-cis-trans*- 	(2) −115·9 (4) −157·8 (6) −100·8	(3) −160·9 (5) −160·7	(2-3) 25 (2-5) = (3-5) = (3-6) ~5 (5-6) 25 (Pt-3) 45 (Pt-5) 40	(3-4) ≈ (4-5) 21 (Pt-2) 136 (Pt-4) 19 (Pt-6) 102	472
$C_{24}F_{10}H_{30}ClP_2Pt$	As above with Br replaced by Cl	(2) −116·3 (4) −157·9 (6) −106·7	(3) −163·2 (5) −160·9	(2-3) 24 (2-5) = (3-5) = (3-6) ~5 (5-6) 26 (Pt-3) 45 (Pt-5) 40	(3-4) ≈ (4-5) 20 (Pt-2) 145 (Pt-4) 18 (Pt-6) 95	472
$C_{24}F_{10}H_{30}P_2Pt$	*cis* 	(2) −117·6 (4) −163·0	(3) −163·7	(3-4) 20 (Pt-3) 68	(Pt-2) 354 (Pt-4) 13	472
$C_{25}F_5H_{15}O_2Sn$		(2) −138·3 (4) −150·9	(3) −161·8			473
$C_{26}F_{10}N_2O_2S_2$		−141·0, −153·0, −162·0				252

Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{28}F_{10}H_{32}O_4Yb$		(2) −108·3 (3)(4) −161·4		478

F. Miscellaneous studies

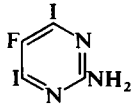
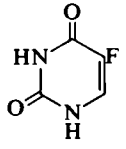
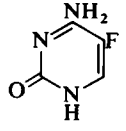
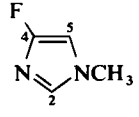
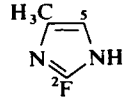
A review of fluorine coupling constant data (481) has enabled the additivity of substituent effects J(F-H) in polysubstituted fluorobenzenes to be demonstrated (482) and those upon J(F-F) to be updated. (483)

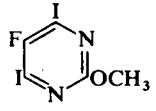
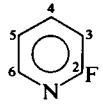
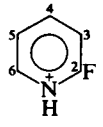
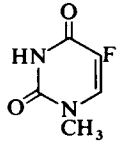
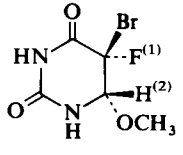
Solvent effects upon the shifts of hexafluorobenzene, (484) fluoroaniline, (479) fluoronitrobenzene, (479) and 2,3,4,5,6-pentafluorodiphenylamine (485) have been reported. A dynamic polarization study of C_6F_6, doped with free radicals, has been performed. (310)

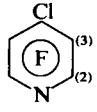
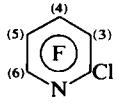
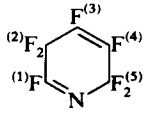
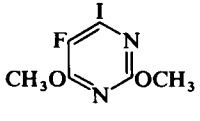
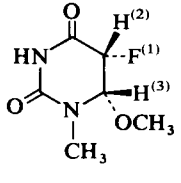
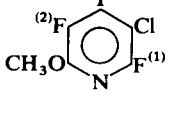
VI. FLUORINE BONDED TO A CARBON OF A HETEROCYCLIC SYSTEM

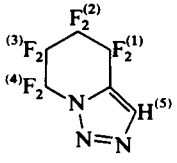
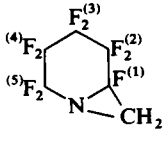
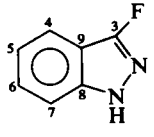
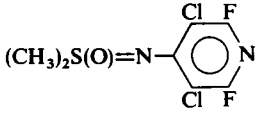
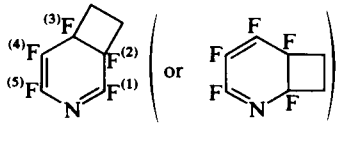
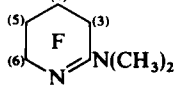
This Page Intentionally Left Blank

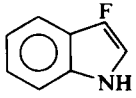
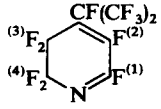
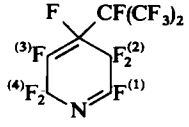
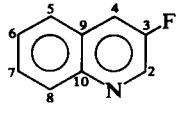
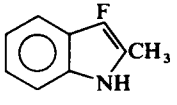
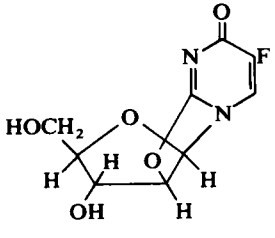
A. Nitrogen heterocycles

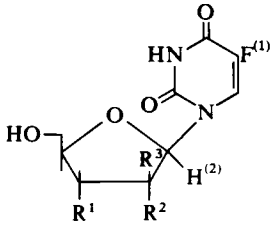
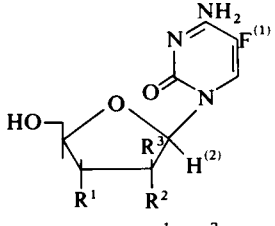
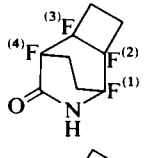
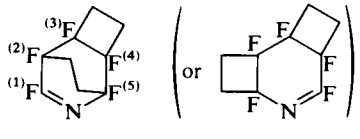
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)		Ref.
$C_4FH_2I_2N_3$		−117·0			486(a)
$C_4FH_3N_2O_2$		−171			487
$C_4FH_4N_3O$		−171			487
$C_4FH_5N_2$			(2-4) 1·8	(4-5) 8·0	488
$C_4FH_5N_2$	As above with F at C2		(2-4) 1·6	(2-5) ~0	488
$C_4FH_5N_2$	As above with F at C5		(4-5) 7·5	(2-5) ~0	488
$C_4FH_5N_2$			(2-5) 1·3		488

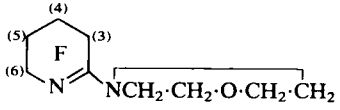
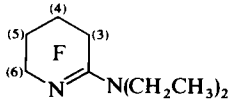
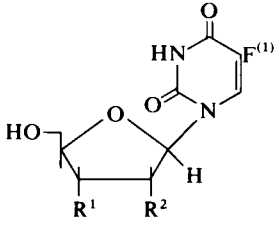
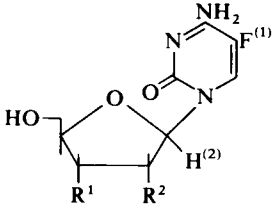
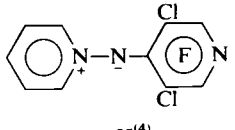
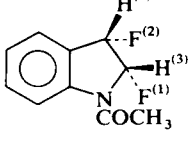
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_5FH_3I_2N_2O$		−109·5		486(a)
C_5FH_4N			(F-C2) 238·3 (F-C3) 37·8 (F-C4) 8·0 (F-C5) 3·8 (F-C6) 15·5	431
C_5FH_4N	As above with F at C3		(F-C2) 23·3 (F-C3) 258·8 (F-C4) 18·2 (F-C5) 3·8 (F-C6) 3·6	431
$C_5FH_5N^+$			(F-C2) 250·8 (F-C3) 32·6 (F-C4) 8·9 (F-C5) 4·4 (F-C6) 10·0	431
$C_5FH_5N^+$	As above with F at C3		(F-C2) 34·4 (F-C3) 257·2 (F-C4) 18·2 (F-C5) 7·1 (F-C6) 3·6	431
$C_5FH_5N_2O_2$		−170		487
$C_5FH_6BrN_2O_3$		−139	(1-2) ~0·7	487

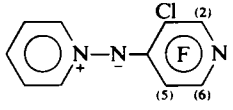
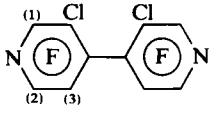
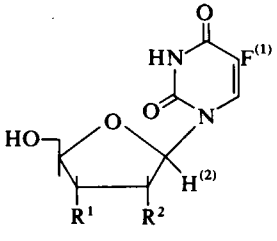
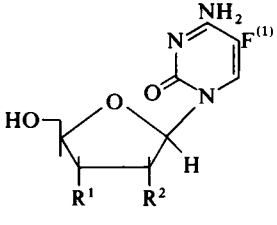
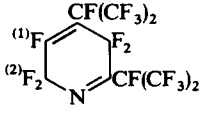
$C_5FH_7N_2O_3$	As above with Br replaced by H(3)	−208		(1-2) 2·2	(1-3) 45·5	487
$C_5F_2H_6N_2O_3$	As above with Br replaced by F(3)	(1) −131	(3) −112	(1-2) 2 (2-3) 6	(1-3) 274	487
C_5F_4ClN		(2) −87·5	(3) −141·5			4
C_5F_4ClN		(3) −141·6 (5) −160·8	(4) −138·3 (6) −86·2	(3-4) 17·6 (3-6) 25·6 (4-6) 15·7	(3-5) 4·2 (4-5) 17·0 (5-6) 22·2	320(a)
C_5F_7N		(1) −57·8 (3) −159·1 (5) −85·9	(2) −113·2 (4) −144·5			489
$C_6FH_6IN_2O_2$		−145·0				486(a)
$C_6FH_9N_2O_3$		−209		(1-2) 46	(1-3) ~2	487
$C_6F_2H_3ClIN$		(1) −74·2	(2) −119·1	(1-2) 27		490(a)

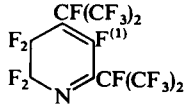
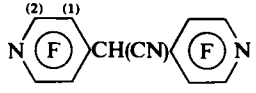
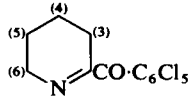
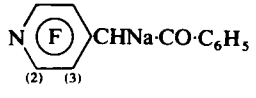
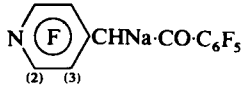
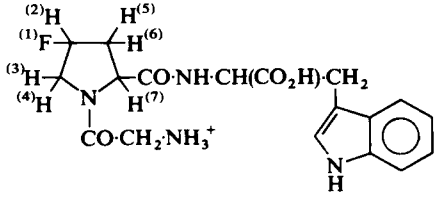
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_6F_8HN_3$		(1) −106·9 (2)(3) −132·5, −134·8 (4) −92·4	(1-5) 2	142
$C_6F_9H_2N$		(1) −164·3 (2) −118·8 (3) −134·77, −129·63 (4) −141·31, −126·70 (5) −93·11, −88·89	(3A-3B) 288 (4A-4B) 300 (5A-5B) 228	142
$C_7FH_5N_2$			(F-C3) 244 (F-C4) 4 (F-C9) 25·5	491
$C_7F_2H_6Cl_2N_2OS$		−74·6		492(a)
$C_7F_5H_4N$		(1) −64·6 (2)(3)(4) −149·5, −151·7, −159·8 (5) −140·7		493(a) 494
$C_7F_8H_6N_2$		(3) −112·5 (4)(5) −133·5 (6) −81·5		179(a)

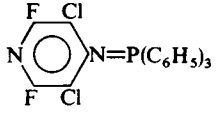
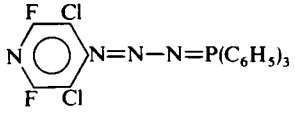
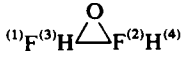
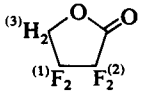
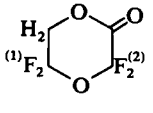
C_8FH_6N		−175		495
$C_8F_{13}N$		(1)(2) −53, −108 (3)(4) −103, −115	(1-2) 20	498
$C_8F_{13}N$		(1)(3) −58, −110 (2)(4) −88, −103	(1-2) 26	498
C_9FH_6N			(F-C2) 27·0 (F-C3) 257·0 (F-C4) 16·1 (F-C5) 3·6 (F-C9) 1·7 (F-C10) 5·3	431
C_9FH_8N		−180		495
$C_9FH_{10}N_2O_5$		−131		487

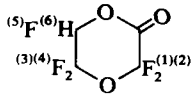
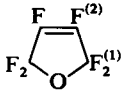
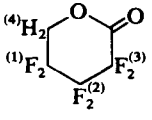
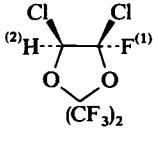
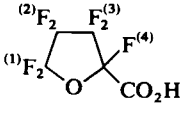
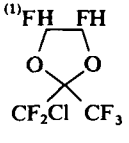
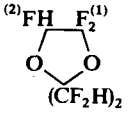
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_9FH_{11}N_2O_5$	 $R^1 = OH, R^2 = H, R^3 = H$	−166	(1-2) 1·6	487
$C_9FH_{11}N_2O_6$	As above with $R^1 = R^2 = OH, R^3 = H$	−166	(1-2) 1·6	487
$C_9FH_{11}N_2O_6$	As above with $R^1 = R^3 = OH, R^2 = H$	−169	(1-2) 1·8	487
$C_9FH_{12}N_3O_4$	 $R^1 = OH, R^2 = H, R^3 = H$	−165	(1-2) 1·8	487
$C_9FH_{12}N_3O_5$	As above with $R^1 = R^2 = OH, R^3 = H$	−166	(1-2) 1·6	487
$C_9FH_{12}N_3O_5$	As above with $R^1 = R^3 = OH, R^2 = H$	−167	(1-2) 1·6	487
$C_9F_4H_9NO$		(1) −166·0 (2) −175·5 (3) −185·3 (4) −195·2		494(a)
$C_9F_5H_8N$		(1) −56·0 (2) −198·8 (3) −186·3 (4) −173·9 (5) −153·6		494(a)

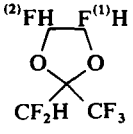
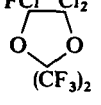
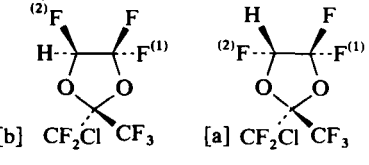
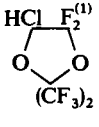
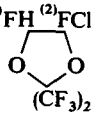
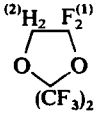
$C_9F_8H_8N_2O$			(3) −112·5 (6) −82·5	(4)(5) −134·5			179(a)
$C_9F_8H_{10}N_2$			(3) −113·5 (6) −80·7	(4)(5) −135·0			179(a)
$C_{10}FH_{13}N_2O_6$		$R^1 = OH, R^2 = OCH_3$ $R^1 = OCH_3, R^2 = OH$	−168 −168		(1-2) 1·8 (1-2) 2·0		487
$C_{10}FH_{14}N_3O_5$		$R^1 = OH, R^2 = OCH_3$ $R^1 = OCH_3, R^2 = OH$	−165 −169		(1-2) 1·6 (1-2) 1·6		487
$C_{10}F_2H_5Cl_2N_3$			−77·2				447(a)
$C_{10}F_2H_9NO$			(1) −158	(2) −203	(1-3) 70	(2-4) 70	495

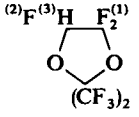
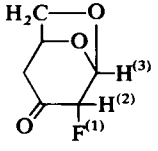
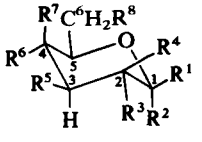
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{10}F_3H_5ClN_3$		(2) −80·5 (5) −167·0 (6) −98·0		447(a)
$C_{10}F_4H_5N_3$	As above with Cl replaced by F(3)	(2) −98·9 (3) −163·3		447(a)
$C_{10}F_6Cl_2N_2$		(1) −74·8 (2) −89·4 (3) −142·5		490(a)
$C_{11}FH_{15}N_2O_6$	 $R^1 = R^2 = OCH_3$	−166	(1-2) 1·5	487
$C_{11}FH_{16}N_3O_5$	 $R^1 = R^2 = OCH_3$	−168	(1-2) ~1·6	487
$C_{11}F_{19}N$		(1) −102	(1-2) 27	498

$C_{11}F_{19}N$		(1) −101		498
$C_{12}F_8HN_3$		(1) −140·1	(2) −89·7	444(a)
$C_{12}F_8Cl_5NO$		(2) −119·8 (5) −133·5	(4) −134·9 (6) −89·5	179(a)
$C_{12}F_8N_3Na$		(1) −146·8	(2) −98·5	444(a)
$C_{13}F_4H_6NNaO$		(2) −99·4	(3) −147·3	272(b)
$C_{13}F_4H_7NO$	As above with Na replaced by H	(2) −92·9	(3) −143·6	272(b)
$C_{13}F_9HNNaO$		(2) −98·4	(3) −145·2	272(b)
$C_{13}F_9H_2NO$	As above with Na replaced by H	(3) −91·8	(3) −142·9	272(b)
$C_{18}FH_{22}N_4O_4^+$		Two forms, arising probably from restricted rotation about glycyl-fluoroprolyl bond $\delta_{(minor-major)} = -0{\cdot}1063$ ppm	Major / Minor (1-2) 51·8 / 51·8 (1-3) 38·0 / 37·3 (1-4) 20·9 / 21·4 (1-5) 41·5 / 40·8 (1-6) 19·2 / 20·4 (1-7) −0·4 / −0·4	501

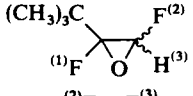
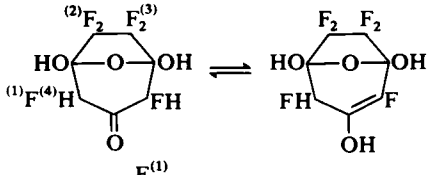
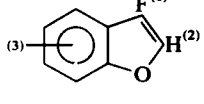
Molecular formula	Structure of compounds		Chemical shifts (ppm)		Coupling constants (Hz)		Ref.
$C_{23}F_2H_{15}Cl_2N_2P$			−77·3				492(a)
$C_{23}F_2H_{15}Cl_2N_4P$			−71·3				492(a)
B. Oxygen heterocycles							
$C_2F_2H_2O$		*cis*	−165		(1-2) 40·3 (1-4) −3·8	(1-3) 85·9	506
		trans	−83·7		(1-2) 15·3 (1-4) −0·5	(1-3) 82·0	
$C_4F_4H_2O_2$			(1) −127·1	(2) −131·1	(1-2) 6·2	(1-3) 11·6	237
$C_4F_4H_2O_3$			(1) −75·8	(2) −76·3			237

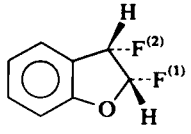
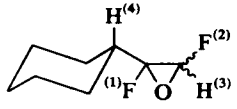
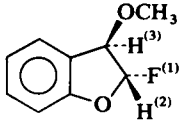
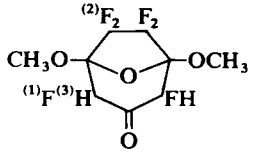
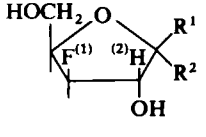
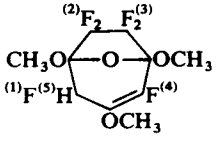
$C_4F_5HO_3$		(1) −69·62 (3) −78·26 (5) −135·58	(2) −70·54 (4) −89·51	(1-2) 177·6 (1-4) 2·16 (1-6) 0·50 (2-4) 2·15 (2-6) 0·15 (3-5) 9·34 (4-5) 12·94 (5-6) 51·25	(1-3) 4·34 (1-5) 3·23 (2-3) 8·88 (2-5) 8·02 (3-4) 165·1 (3-6) 1·44 (4-6) 1·64	237
C_4F_6O		(1) −77·7	(2) −155·3			508
$C_5F_6H_2O_2$		(1) −125·0 (3) −121·2	(2) −135·7	(1-4) 11·0		237
$C_5F_7HCl_2O_2$		(1) −57·28		(1-2) 7·0		120
$C_5F_7HO_3$		(1) −83·7, −84·3 (2) −126·4, −134·8 (3) −126·9, −131·5 (4) −120·8		(1A-1B) 150 (2A-2B) 250 (3A-3B) 250		508
$C_5F_7H_2ClO_2$		(1a) −127·4	(1e) −128·2			120
$C_5F_7H_3O_2$		(1a) −75·3 (2) −128·1	(1e) −89·9	(1a-2) 7·0	(1e-2) 11·5	120

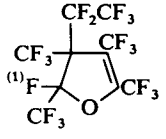
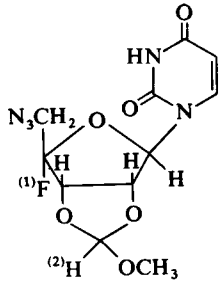
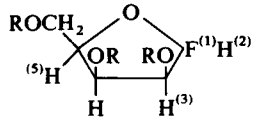
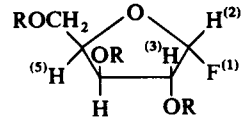
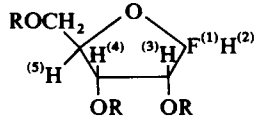
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_5F_7H_3O_2$		(1)(2) −128·1, −128·8		120
$C_5F_7Cl_3O_2$		(1) −44·2		120
$C_5F_8HClO_2$		[a] (1a) −85·2 (1e) −86·1 (2) −129·4 [b] (1a) −75·1		120
$C_5F_8HClO_2$		(1a) −72·07 (1e) −77·11		120
$C_5F_8HClO_2$		(1a) −118·2 (2a) −58·9	(1-2) 1·6	120
$C_5F_8H_2O_2$		(1) −75·4	(1-2) 9·0	120

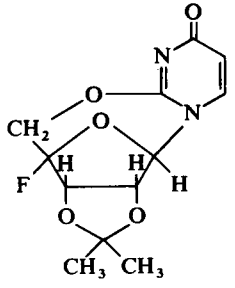
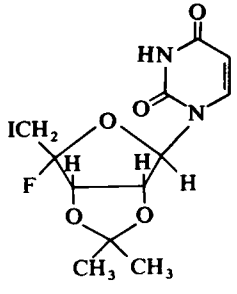
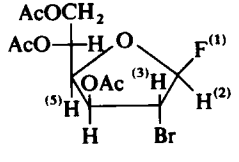
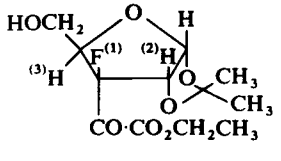
$C_5F_9HO_2$		(1a) −76·5 (1e) −89·3 (2a) −129·6		(1a-2a) 6·7	(1e-2a) 9·0	120
$C_6FH_7O_3$				(1-2) 49	(1-3) 2·0	509
$C_6FH_{11}O_5$						510

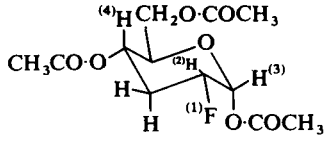
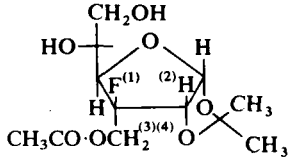
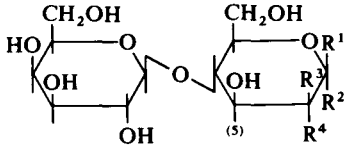
R^1	R^2	R^3	R^4	R^5	R^6	R^7	R^8			
F	H	OH	H	OH	OH	H	OH		(F-C1) 210·6 (F-C3) 11·7	(F-C2) 21·6 (F-C5) 4·7
H	OH	F	H	OH	OH	H	OH		(F-C1) 21·4 (F-C3) 17·5 (F-C5) 1·3	(F-C2) 185·9 (F-C4) 8·0
OH	H	F	H	OH	OH	H	OH		(F-C1) 23·0 (F-C3) 17·3 (F-C5) 1·2	(F-C2) 183·1 (F-C4) 8·2
H	OH	OH	H	F	OH	H	OH		(F-C1) 10·9 (F-C3) 178·6 (F-C5) 7·3	(F-C2) 16·8 (F-C4) 17·6 (F-C6) 1·5
OH	H	OH	H	F	OH	H	OH		(F-C1) 12·4 (F-C3) 180·5 (F-C5) 8·2	(F-C2) 17·2 (F-C4) 17·6 (F-C6) 1·9
H	OH	OH	H	OH	F	H	OH	*interchangeable	(F-C1) 1·4 (F-C3) 17·6* (F-C5) 23·9*	(F-C2) 8·3 (F-C4) 179·9

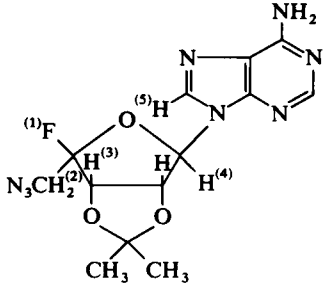
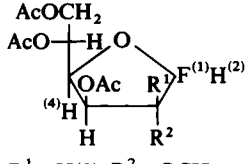
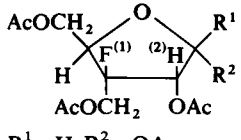
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
	OH H OH H OH F H OH	*interchangeable	(F-C1) 1·4 (F-C2) 8·8 (F-C3) 18·0* (F-C4) 180·0 (F-C5) 24·5*	
	H OH OH H OH OH H F		(F-C3) 0·7 (F-C4) 6·6 (F-C5) 17·2 (F-C6) 167·2	
	OH H OH H OH OH H F		(F-C4) 6·9 (F-C5) 18·7 (F-C6) 167·6	
	H OH H F OH OH H OH		(F-C1) 29·6 (F-C2) 172·2 (F-C3) 17·5 (F-C4) 1·4	
	OH H H F OH OH H OH		(F-C1) 15·8 (F-C2) 180·0 (F-C3) 17·6 (F-C4) 1·5	
	H OH OH H OH H F OH		(F-C2) 2·2 (F-C3) 17·6 (F-C4) 177·0 (F-C5) 17·6 (F-C6) 5·5	
	OH H OH H OH H F OH		(F-C2) 1·1 (F-C3) 18·0 (F-C4) 177·7 (F-C5) 17·3 (F-C6) 5·5	
$C_6F_2H_{10}O$		(1) −155·5 (2) −163·0	(1-2) 36·0 (1-3) 2·5 (1-4) 0·8 (2-3) 85·0	134
$C_7F_6H_4O_4$		(1) −205·4 (2)(3) −126·5, −126·7	(1-4) 45	511
C_8FH_5O		−177	(1-2) 4·5 (1-3) 1·5	495

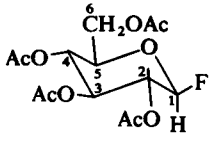
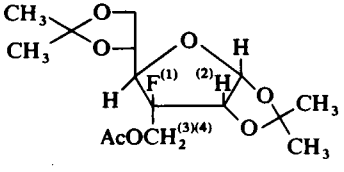
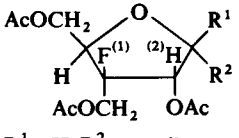
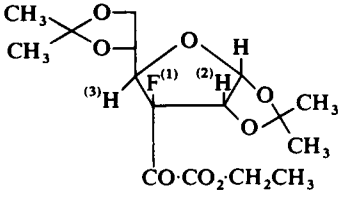
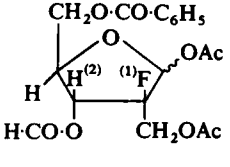
$C_8F_2H_6O$			(1) −145 (2) −198			495
$C_8F_2H_{12}O$			(1) −152·0 (2) −163·5	(1-2) 35·3 (1-3) 2·2	(1-4) 12·0 (2-3) 84·0	134
$C_9FH_9O_2$			−127	(1-2) 60	(1-3) 15	495
$C_9F_6H_8O_4$			(1) −206·3 (2A) −124·5 (2B) −127·7	(1-3) 45 (2A-2B) 250	(2A-3) 22·5	511
$C_{10}FH_{13}N_2O_6$		R^1 = H, R^2 = uracil R^1 = uracil, R^2 = H		(1-2) 24 (1-2) 16		512
$C_{10}F_6H_{10}O_4$			(1) 206·4 (2) } −110·9 and −127·1 (3) } −131·1 and −131·2 (4) −156·0	(1-5) 51 (2A-2B) } 254 (3A-3B) } 250		511

Molecular formula	Structure of compounds		Chemical shifts (pm)	Coupling constants (Hz)	Ref.
$C_{10}F_{18}O$			(1) −117		197
$C_{11}FH_{12}N_5O_5$				(1-2) 1·5	513
$C_{11}FH_{15}O_7$		$R = CO{\cdot}CH_3$	(α) −122 (β) −128·7	(1-2) 63·0 (1-3) 10·0 (1-2) 67·0 (1-3) 22·5 (1-5) 6·5	504
$C_{11}FH_{15}O_7$		$R = CO{\cdot}CH_3$	−134·8	(1-2) 61·8 (1-3) 17·2 (1-5) 1·4	504
$C_{11}FH_{15}O_7$			(α) −133·1 (β) −116·6	(1-2) 67·7 (1-3) 20·7 (1-2) 61·8 (1-3) 4·2 (1-4) 2·3 (1-5) 6·9	504

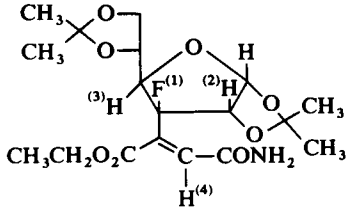
$C_{12}FH_{13}N_2O_5$		−141·76			513
$C_{12}FH_{14}IN_2O_5$		−101·8			513
$C_{12}FH_{14}N_5O_5$	As above with I replaced by N_3	−109·5			513
$C_{12}FH_{16}BrO_7$	 Ac = CO·CH$_3$	−99·7	(1-2) 64·5 (1-5) 6·5	(1-3) 6·0	504
$C_{12}FH_{17}O_7$			(1-2) 12	(1-3) 27	514

Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{12}FH_{17}O_7$			(1-2) 47 (1-3) 0 (1-4) 1·4	509
$C_{12}FH_{19}O_7$			(1-2) 11 (1-3) 14 (1-4) 34	512
$C_{12}F_2H_{20}O_9$				260
	$R^1 = R^3 = F, R^2 = R^4 = H$	(1) −164·9 (3) −239·0	(1-2) 49 (1-3) 13·5 (1-4) 5 (2-3) 18 (3-4) 52 (3-5) 32·5	
	$R^2 = R^4 = F, R^1 = R^3 = H$	(2) −166·3 (4) −219·8	(1-2) 52 (1-4) 13 (2-3) 22 (2-4) 18 (3-4) 48	

$C_{13}FH_{15}N_8O_3$			−105·01	(1-2) 17 (1-4) 2·5	(1-3) 6	515
$C_{13}FH_{17}N_6O_3$	As above but with N_3 replaced by NH_2			(1-4) 2	(1-5) 2	515
$C_{13}FH_{19}O_8$	 Ac=CO·CH$_3$					504
	R^1 = H(3), R^2 = OCH_3	(α)	−138·8	(1-2) 62·5 (1-4) ~1	(1-3) 14·5	
		(β)	−119·7	(1-2) 62·0 (1-4) 6·0	(1-3) 5·0	
	R^1 = OCH_3, R^2 = H(3)	(α)	−122·3	(1-2) 64·7 (1-4) 2·0	(1-3) 16·1	
		(β)	−128·0	(1-2) 65·8 (1-4) 7·0	(1-3) 22·6	
$C_{14}FH_{19}O_9$	 Ac = CO·CH$_3$					512
	R^1 = H, R^2 = OAc			(1-2) 24		
	R^1 = OAc, R^2 = H			(1-2) 14		

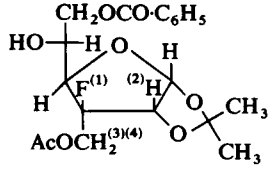
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{14}FH_{19}O_9$		Ac = CO·CH$_3$	(F-C1) 219·4 (F-C2) 29·3 (F-C3) 8·8 (F-C5) 4·4	510
$C_{14}FH_{20}O_7$		Ac = CO·CH$_3$	(1-2) 11 (1-3) 13 (1-4) 34	512
$C_{16}FH_{19}N_2O_9$		Ac = CO·CH$_3$		512
	R^1 = H, R^2 = uracil		(1-2) 24	
	R^1 = uracil, R^2 = H		(1-2) 18	
$C_{16}FH_{23}O_8$			(1-2) 13·5 (1-3) 27	514
$C_{18}FH_{19}O_9$		Ac = CO·CH$_3$ (α) (β)	 (1-2) 16 (1-2) 21	512

$C_{18}FH_{26}NO_8$



(1-2) 10 (1-3) 31 514
(1-4) 1

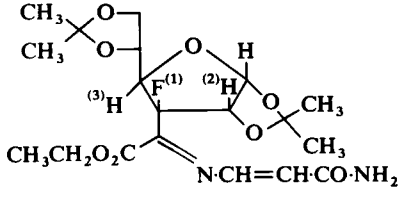
$C_{19}FH_{23}O_8$



Ac = CO·CH$_3$

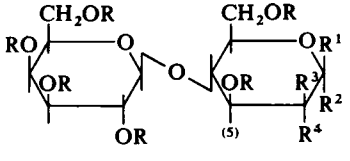
(1-2) 10 (1-3) 14 512
(1-4) 34 (1-5) 25

$C_{19}FH_{27}N_2O_8$



(1-2) 14·5 (1-3) 29 514

$C_{24}F_2H_{32}O_{15}$

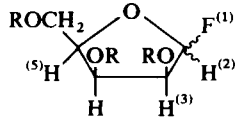
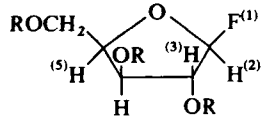
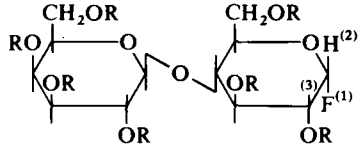
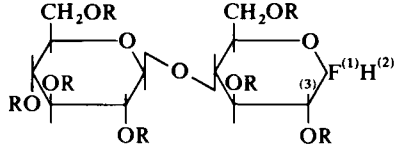
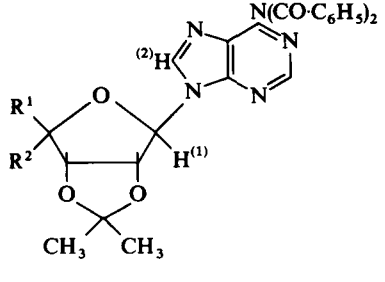


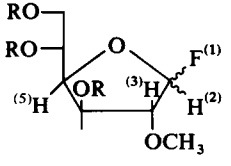
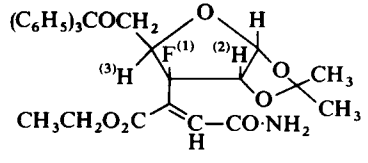
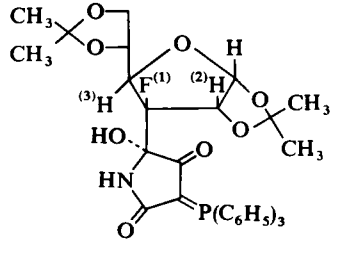
R = CO·CH$_3$

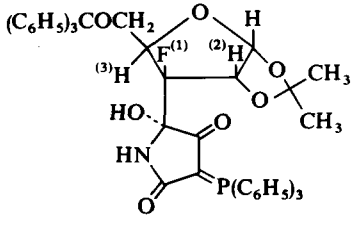
260

$R^1 = R^3 = F, R^2 = R^4 = H$ (1) −147·8 (3) −219·5 (1-2) 50 (1-3) 15 (1-4) 9 (2-3) 12 (3-4) 49 (3-5) 21

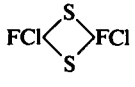
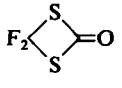
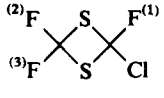
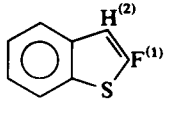
$R^2 = R^4 = F, R^1 = R^3 = H$ (2) −151·2 (4) −203·9 (1-2) 53 (1-4) 12·2 (2-3) 23·7 (2-4) 19 (3-4) 48

Molecular formula	Structure of compounds		Chemcal shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{26}FH_{21}O_7$		$R = CO{\cdot}C_6H_5$	(α) −121·0 (β) −133·8	(1-2) 61·0 (1-3) 8·5 (1-5) 2·2 (1-2) 67·0 (1-3) 21·5 (1-5) 6·0	504
$C_{26}FH_{21}O_7$			−118·5	(1-2) 61·5 (1-3) 4·5 (1-5) 6·0	504
$C_{26}FH_{35}O_{17}$		$R = CO{\cdot}CH_3$	−149·3	(1-2) 53·5 (1-3) 24·5	260
$C_{26}FH_{35}O_{17}$			(α) −147·6 (β) −136·4	(1-2) 53·8 (1-3) 24·5 (1-2) 53·8 (1-3) 9·7	516
$C_{27}FH_{22}I_2N_5O_5$		$R^1 = F(3)$ $R^2 = CHI_2$		(1-3) 2·5 (2-3) ~0·5	515

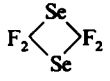
$C_{27}FH_{23}ClN_5O_5$	As above with $R^1 = F$, $R^2 = CH_2Cl$			(1-3) 2·5	(2-3) ~0·5	515
$C_{27}FH_{23}IN_5O_5$	As above with $R^1 = CH_2I$, $R^2 = F$		−103·6			515
$C_{27}FH_{23}IN_5O_5$	As above with $R^1 = F$, $R^2 = CH_2I$		−97·3	(1-3) 2·5	(2-3) ~0·5	515
$C_{27}FH_{24}N_5O_6$	As above with $R^1 = F$, $R^2 = CH_2OH$			(1-3) 2·5	(2-3) 1·5	515
$C_{27}FH_{25}N_5O_8S$	As above with $R^1 = F$, $R^2 = CH_2 \cdot OSO_2 \cdot NH_2$			(1-3) 2·5	(2-3) 1·5	515
$C_{28}FH_{22}O_8$		$R = CO \cdot C_6H_5$	(α) −137·5	(1-2) 62·5 (1-5) ~1	(1-3) 16·5	504
			(β) −119·5	(1-2) 62·5 (1-5) 6·5	(1-3) 5·3	
$C_{29}FH_{26}N_5O_7$	As $C_{27}FH_{22}I_2N_5O_5$ above but with $R^1 = F$, $R^2 = CH_2O \cdot CO \cdot CH_3$			(1-3) 2	(2-3) 1	515
$C_{33}FH_{34}NO_7$				(1-2) 11	(1-3) 28	514
$C_{34}FH_{35}NO_8P$				(1-2) 10	(1-3) 7·5	514

Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{49}FH_{43}NO_7P$			(1-2) 10·5 (1-3) 26	514

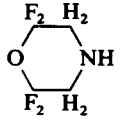
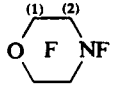
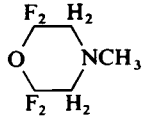
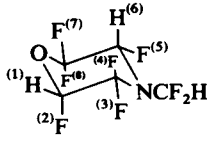
C. Sulphur heterocycles

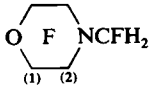
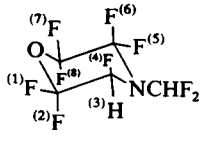
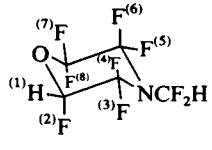
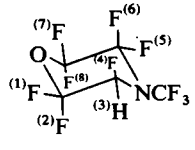
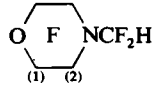
$C_2F_2Cl_2S_2$		*cis* −34·4 *trans* −43·8		89
$C_2F_2OS_2$		−64·3		89
$C_2F_3ClS_2$		(1) −42·7 (2) −54·9 (3) −44·9	(1-2) 31·5 (1-3) 4·7 (2-3) 135·5	89
$C_2F_8Cl_4S_2$	$S(F_2^{(2)}Cl_2)CF_2^{(1)}S(F_2Cl_2)CF_2$	(1) −102·2 (2) +148·3		201
$C_4F_4H_6Cl_4N_2S_2$	$(CH_3N{=})SCl_2CF_2(CH_3N{=})SCl_2{\cdot}CF_2$	−97·6		201
C_8FH_5S		−130·2	(1-2) 2·5	340(a)

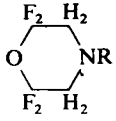
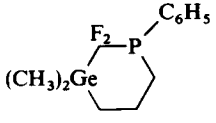
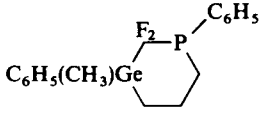
D. Seleneium heterocycles

$C_2F_4Se_2$		−45·7		(F-Se) 67·9		507

E. Mixed systems

$C_4F_4H_5NO$		−73·7				517
C_4F_9NO		(1) −85·9	(2) −110·0			518
$C_5F_4H_7NO$		−72·4				517
$C_5F_8H_3NO$		(2) −134·4 (4) −82·15 (7) −73·3	(3) −90·15 (5) −145·1 (8) −78·9	(1-2) 52 (5-6) 52	(3-4) 202 (7-8) 162·8	518
$C_5F_8H_3NO$	As above with H(6) and F(5) interchanged	(2) −139·0 (4) −73·8 (7) −87·15	(3) −109·8 (5) −152·5 (8) −73·55	(1-2) 50·3 (5-6) 54	(3-4) 208·0 (7-8) 163·3	518

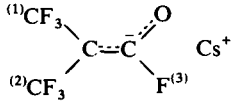
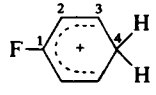
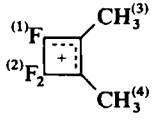
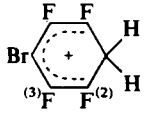
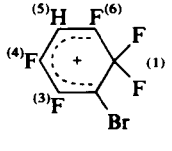
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_5F_9H_2NO$		(1) −88·6 (2) −96·9		518
$C_5F_9H_2NO$		(1) −84·6 (2) −76·3 (4) −151·6 (5) −106·3 (6) −84·7 (7) −88·7 (8) −84·9	(1-2) 161·0 (3-4) 52·3 (5-6) 197 (7-8) 146	518
$C_5F_9H_2NO$	As above with F(5) replaced by H(5) and CHF_2 by CF_3	(1) −85·3 (2) −75·4 (4) −152·8	(1-2) 166·0 (3-4) 53·8	518
$C_5F_9H_2NO$		(2) −139·4 (3) −101·1 (4) −78·5 (5) −100·5 (6) −89·7 (7) −91·3 (8) −82·1	(1-2) 50·4 (3-4) 209 (5-6) 198 (7-8) 151	518
$C_5F_{10}HNO$		(1) −83·5 (2) −74·8 (4) −150·6 (5) −104·35 (6) −88·95 (7) −88·0 (8) −86·0	(1-2) 162·35 (3-4) 53·0 (5-6) 190 (7-8) 146	518
$C_5F_{10}HNO$		(1) −87·75 (2) −95·45		518
$C_5F_{11}NO$	As above but with H replaced by F	(1) −86·1 (2) −93·9		518

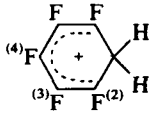
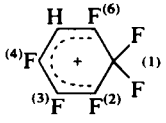
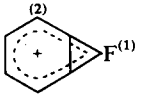
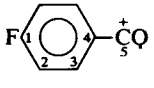
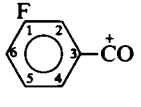
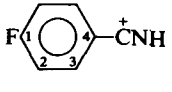
$C_6F_4H_9NO$		$R = CH_2{\cdot}CH_3$	−71·8		517
$C_7F_4H_{11}NO$	As above with $R = CH(CH_3)_2$		−72·5		517
$C_8F_4H_{13}NO$	As above $R = C(CH_3)_3$		−72·8		517
$C_{10}F_4H_9NO$	As above with $R = C_6H_5$		−72·7		517
$C_{10}F_4H_{15}NO$	As above with $R = C_6H_{11}$		−72·7		517
$C_{11}F_4H_{11}NO$	As above with $R = CH_2{\cdot}C_6H_5$		−72·7		517
$C_{12}F_2H_{17}GeP$				(P-F) 69	115
$C_{17}F_2H_{19}GeP$		(diastereoisomers)		[a] (P-F) 69 [b] (P-F) 72	115

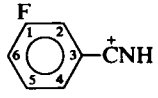
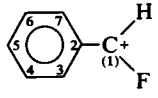
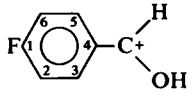
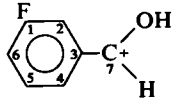
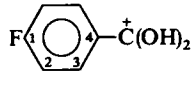
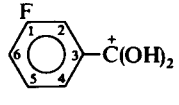
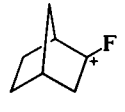
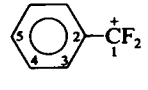
This Page Intentionally Left Blank

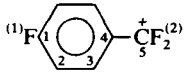
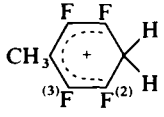
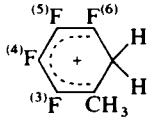
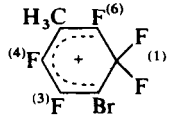
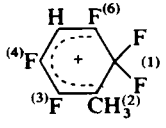
VII. FLUORINE BONDED TO A CARBON OF A CARBONIUM IONIC OR CARBANIONIC SYSTEM

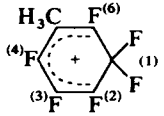
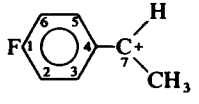
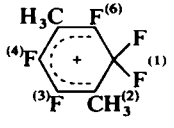
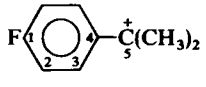
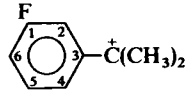
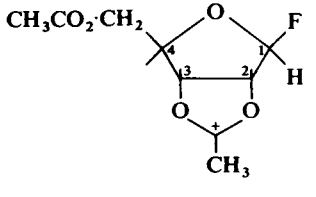
This Page Intentionally Left Blank

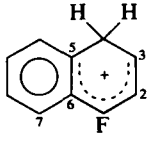
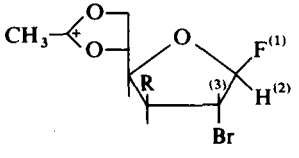
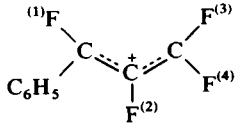
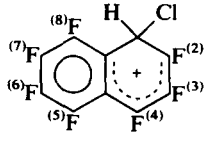
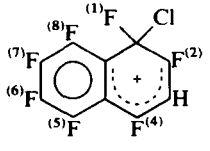
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_4F_4H_3O^+$	$CH_3O{\cdot}CF^{(1)}{=}\overset{+}{C}F^{(2)}{=}CF_2^{(3)}$	(1)(2) −76·4, −73·7 (3) −74·2		100
C_4F_7CsO		(1) −50·8 (2) −49·5 (3) +0·5	(1-2) 10·7 (1,2-3) 19·4, 12·1	145(a)
$C_6FH_6^+$		−11·0	(F-C1) 324·8 (F-C2) 19·7 (F-C3) 26·7	502
$C_6F_3H_6^+$		(1) 18·2 (2) −98·0	(1-2) 10 (1-3) 4·5 (2-3) 3·9	100
$C_6F_3H_6O_2^+$	As above with CH_3 replaced by OCH_3	(1) −41·1 and −31·6 (2) −102·3 and −86·5	(1-2) 10·5 and 10·5	100
$C_6F_4H_2Br^+$		(2) −56·3 (3) −119·1		503(b)
$C_6F_4H_2Cl^+$	As above with Br replaced by Cl	(2) −53·6 (3) −126·4		503(b)
$C_6F_4H_3^+$	As above with Br replaced by H	(2) −43·6 (3) −123·2		503(b)
$C_6F_5HBr^+$		(1) −119·7 (3) −115·6 (4) +26·3 (6) −14·9	(1-3) 7 (1-4) 2 (1-5) 3 (1-6) 28 (3-4) 30 (3-5) 45 (3-6) 9 (4-5) 9 (4-6) 103 (5-6) 6	351(b)

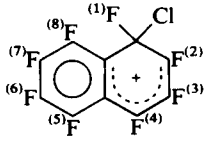
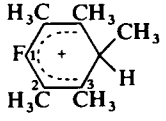
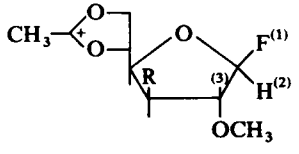
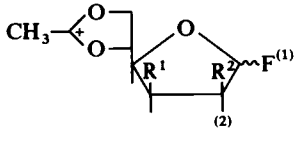
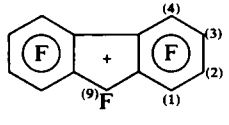
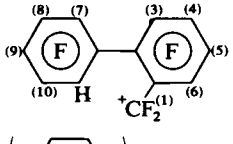
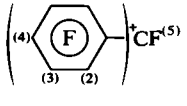
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_6F_5HCl^+$	As above with Br replaced by Cl	(1) −124·1 (3) −122·6 (4) +32·2 (6) −16·5	(1-3) 6·5 (1-4) 1·5 (1-5) 3 (1-6) 27·5 (3-4) 28·5 (3-5) 4·5 (3-6) 9 (4-5) 9·5 (4-6) 104·5 (5-6) 6	351(b)
$C_6F_5H_2^+$	As above with Br replaced by H	(1) −131·3 (3) −119·8 (4) +44·8 (6) +0·2	(1-6) 23 (4-6) 136–137	351(b)
$C_6F_5H_2^+$		(2) −45·5 (3) −144·6 (4) −31·5		503(b)
$C_6F_6H^+$		(1) −133·8 (2) −71·9 (3) −144·0 (4) +48·7 (6) −23·9	(1-3) 7 (1-6) 26 (3-4) 28 (4-6) 102	351(b)
$C_7FH_4^+$			(1-2) 9·0	350
$C_7FH_4O^+$		−69·3	(F-C1) 285 (F-C2) 24·6 (F-C3) 14·8 (F-C5) <1	502
$C_7FH_4O^+$		−102·2	(F-C1) 259·2 (F-C2) 28·0 (F-C3) 10·5 (F-C4) 3·0 (F-C5) 9·1 (F-C6) 21·0 (F-C7) 3·8	502
$C_7FH_5N^+$		−88·2	(F-C1) 268·4 (F-C2) 23·7 (F-C3) 11·9 (F-C4) 2·9	502

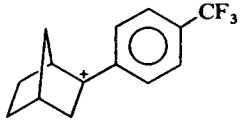
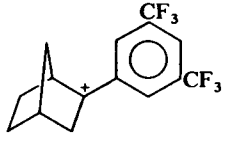
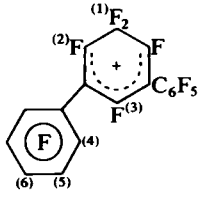
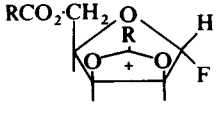
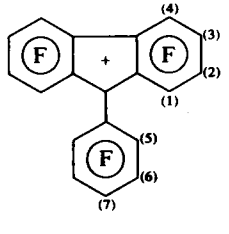
$C_7FH_5N^+$		−107·2	(F-C1) 253·8 (F-C2) 26·9 (F-C3) 9·0 (F-C5) 8·6 (F-C6) 21·0	502
$C_7FH_6^+$		+21·0	(F-C1) 375·5 (F-C2) <1 (F-C3) 14·2 (F-C5) 8·4 (F-C7) 23·5	502
$C_7FH_6O^+$		−71·8	(F-C1) 278·1 (F-C2) 24·8 (F-C3) 13·4 (F-C4) <1 (F-C5) 13·6 (F-C6) 24·8	502
$C_7FH_6O^+$		−106·6	(F-C1) 254·5 (F-C2) 22·9 (F-C3) 8·8 (F-C5) 7·8 (F-C6) 22·6 (F-C7) 2·3	502
$C_7FH_6O_2^+$		−89·2	(F-C1) 268·8 (F-C2) 23·2 (F-C3) 11·7	502
$C_7FH_6O_2^+$		−108·4	(F-C1) 251·4 (F-C2) 24·7 (F-C3) 8·7 (F-C5) 7·2 (F-C6) 21·7	502
$C_7FH_{10}^+$			^1J(F-C) 424·1	456
$C_7F_2H_5^+$		+12·2	(F-C1) 361·7 (F-C2) 8·2 (F-C3) 10·7 (F-C4) <1 (F-C5) 5·7	502

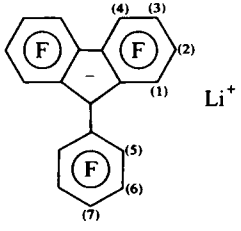
Molecular formula	Structure of compounds	Chemical shifts (ppm)		Coupling constants (Hz)		Ref.
$C_7F_3H_4^+$		(1) −47·6	(2) −7·3	(1-C1) 301 (1-C3) 18·8 (1-C5) 5·6 (2-C2) <1 (2-C4) 9·8	(1-C2) 22·8 (1-C4) <1 (2-C1) 6·0 (2-C3) 9·9 (2-C5) 358·0	502
$C_7F_4H_5^+$		(2) −56·7	(3) −129·1			503(b)
$C_7F_4H_5^+$		(3) −112·4 (5) −142·7	(4) −32·9 (6) −43·0			351(b)
$C_7F_5H_3Br^+$		(1) −121·5 (4) +21·8	(3) −116·6 (6) −20·5	(1-3) 6·5 (3-4) 28 (4-6) 112	(1-6) 29 (3-6) 12 (5-6) 2·5	351(b)
$C_7F_5H_3Cl^+$	As above with Br replaced by Cl	(1) −125·5 (4) +27·1	(3) −123·4 (6) −22·1	(1-3) 6·5 (3-4) 27 (4-6) 112·5	(1-6) 28 (3-6) 11·5 (5-6) 2·5	351(b)
$C_7F_5H_4^+$		(1) −130·7 (4) +31·5	(3) −129·0 (6) −20·1	(1-3) 7·5 (1-5) 3 (2-4) 3 (3-4) 28 (4-5) 9 (5-6) 6	(1-4) 1·5 (1-6) 28 (2-6) 3 (3-6) 9 (4-6) 112	351(b)

$C_7F_6H_3^+$			(1) −134·1 (2) −78·2 (3) −145·0 (4) +43·4 (6) −30·1	(1-6) 25 (3-4) 26 (4-6) 113		351(b)
$C_7F_7CsN_2$	$[(CF_3^{(1)})_2C{=}CF^{(2)}{-}C(CN)_2]^-Cs^+$		(1) −53·5 (2) −81·1			172(a)
$C_8FH_8^+$				(F-C1) 303·6 (F-C2) 24·5 (F-C3) 18·8 (F-C4) <1 (F-C5) 19·4 (F-C6) 24·5 (F-C7) 6·5		502
$C_8F_5H_6^+$			(1) −131·2 (3) −128·7 (4) +26·7 (6) −25·5	(1-3) 6·5 (1-6) 26·5 (2-3) 3·5 (2-4) 3 (2-6) 3 (3-4) 25·5 (3-6) 12 (4-6) 117 (5-6) 2·5		351(b)
$C_9FH_{10}^+$			−60·9	(F-C1) 294·2 (F-C2) 22·1 (F-C3) 16·9 (F-C4) <1 (F-C5) 5·3		502
$C_9FH_{10}^+$			−106·8	(F-C1) 256·3 (F-C2) 22·0 (F-C3) ~8 (F-C5) 7·6 (F-C6) 21·6		502
$C_9FH_{12}O_5^+$		(HF solvent)		(F-C1) 230·9 (F-C2) 47·1 (F-C4) 2·9		504
$C_9F_7H_5CsNO_2$	$[(CF_3^{(1)})_2C{=}CF^{(2)}{-}C(CN)CO_2{\cdot}CH_2{\cdot}CH_3]^-Cs^-$		(1) −54·7, −57·2 (2) −72·7			172(a)
$C_9F_7H_6CsO_4$	$[(CF_3^{(1)})_2C{=}CF^{(2)}{-}C(CO_2{\cdot}CH_3)_2]^-Cs^+$		(1) −57·2, −60·3 (2) −57·2			172(a)

Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{10}FH_8^+$		−24·2	(F-C1) 329·0 (F-C2) 21·0 (F-C3) 28·6 (F-C5) 18·2 (F-C6) 8·5 (F-C7) 15·4	502
$C_{10}FH_{13}BrO_5^+$	 R = O·CO·CH$_3$ (HF solvent)		(1-2) 62 (1-3) 6·5	504
$C_{10}FH_{13}ClO_5^+$	As above with Br replaced by Cl		(1-2) 56 (1-3) ~5	504
$C_{10}F_4H_7O^+$		(1) −53·1 (2) −180·6 (3) −64·8 (4) −68·6	(1-2) 22 (1-3) 59 (1-4) 3 (2-3) 97·5 (2-4) 70·5 (3-4) 105·5	100
$C_{10}F_7HCl^+$		(2) −39·1 (3) −147·8 (4) −10·9 (5) −106·0 (6) −142·3 (7) −107·7 (8) −122·4	(2-4) 90 (4-5) 130–140	505(b)
$C_{10}F_7HCl^+$		(1) −137·9 (2) −28·9 (4) +21·6 (5) −100·9 (6) −140·4 (7) −106·7 (8) −121·7	(2-4) 100 (4-5) 120–150	505(b)

$C_{10}F_8Cl^+$			(1) −115·4 (2) −69·2 (3) −144·5 (4) +4·6 (5) −88·4 (6) −137·9 (7) −95·1 (8) −118·0			505(b)
$C_{11}FH_{16}^+$			−31·3	(F-C1) 313·3 (F-C2) 17·1 (F-C3) 23·1		502
$C_{11}FH_{16}O_6^+$		R = O·CO·CH$_3$		(1-2) 60	(1-3) 5·3	504
$C_{11}FH_{16}O_6^+$		R^1 = O·CO·CH$_3$ R^2 = OCH$_3$		(1-2) 23		504
$C_{13}F_9^+$			(1) −95·5 (2) −144·5 (3) −102·1 (4) −115·5 (9) −4·9	(1-2) 23 (1-9) 58	(1-3) 39	430(b)
$C_{13}F_{10}H^+$			(1) −28·6 (3) −119·8 (4)(6) −88·2, −84·9 (5)(7)-(10) −135·8, −134·4, −140·9, −145·6, −151·3			430(b)
$C_{13}F_{11}^+$			(2) −114·1 (3) −151·3 (4) −102·3 (5) −36·4			430(b)

Molecular formula	Structure of compounds		Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{14}F_3H_{14}^+$				^1J(F-C) 282 ^2J(F-C) 33·8	456
$C_{15}F_6H_{13}^+$				^1J(F-C) 272·7 ^2J(F-C) 35·3	456
$C_{18}F_{15}^+$			(1) −133·2 (2) −28·4 (3) +65·6 (4) −133·2 (5) −157·1 (6) −141·7		386(b)
$C_{19}FH_{16}O_5^+$		R = C_6H_5 (HF solvent)		^1J(F-C) 229·4 ^2J(F-C) 47·1	504
$C_{19}F_{13}^+$			(1) −97·8 (2) −147·3 (3) −106·4 (4) −118·1 (5) −123·8 (6) −156·8 (7) −130·7		430

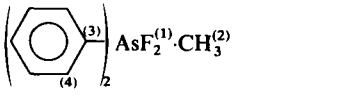
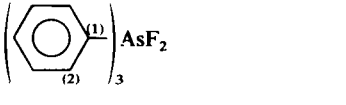
$C_{19}F_{13}Li$		(1) −160·0 (3) −180·2 (5) −139·7 (7) −162·9	(2) −169·5 (4) −143·1 (6) −166·7	(1-2) 20·5 (1-4) ~9 (3-4) 19 (6-7) 21·5	(1-3) 9 (2-3) 20·5 (1-5) ~4	474(b)

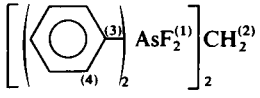
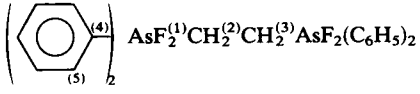
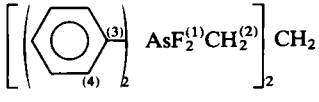
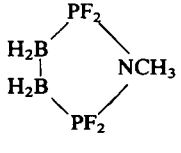
This Page Intentionally Left Blank

VIII. FLUORINE BONDED TO AN ELEMENT OTHER THAN CARBON

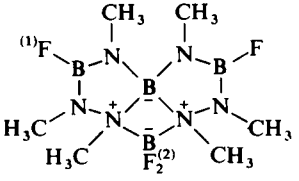
This Page Intentionally Left Blank

Fluorine bonded to arsenic

Molecular formula	Structure of compounds	Chemical shifts (ppm)		Coupling constants (Hz)		Ref.
CF_6H_3As	$CH_3F^{(1)}\cdot As\cdot F_4^{(2)}\cdot F^{(3)}$	(1) −176 (3) −94	(2) −47	(1-2) 30	(2-3) 124	532
CF_9H_3AsNS	$CH_3^{(3)}\cdot NSF_3^{(1)+}\ AsF_6^{(2)-}$	(1) +48·2	(2) −60·85	(1-3) 8·7	(As-2) ~900	552
$CF_{13}H_3As_2OS$	$CH_3OSF_2^{(1)+}\ F^{(2)}F_4^{(3)}AsF^{(4)}AsF_4F^-$	(1) +21 (3) −46	(2) −83 (4) −17	(2-3) 125	(3-4) 50	537
$C_2F_8AsO_2^-$	$F^{(1)}AsF_4^{(2)}(CF_3CO_2)^-$	(1) −66·3	(2) −54·4	(1-2) 125		526
$C_4F_6H_6AgAsN_2$	$Ag(AsF_6)\cdot 2CH_3CN$	−72		(As-F) 948		572
$C_4F_6H_{12}AsNO_3S$	$AsF_4^{(2)}F^{(1)}(FSO_2)^-\ (CH_3)_4N^+$	(1) −69·6	(2) −47·5	(1-2) 100		119
$C_5F_4H_{14}As_2$	$(CH_3^{(2)})_2AsF_2^{(1)}\cdot CH_2^{(3)}\cdot AsF_2(CH_3)_2$	−46·3		(1-C2) 18·0	(1-C3) 22·0	575
$C_5F_8H_{12}AsNO_3S$	$AsF_4^{(1)}F^{(2)}(CF_3SO_3)^-\ (CH_3)_4N^+$	(1) −41·4	(2) −69·1	(1-2) 124		119
$C_6F_6H_9AgAsN_3$	$Ag(AsF_6)\cdot 3CH_3CN$	−72		(As-F) 948		572
$C_9F_4H_{22}As_2$	$[(CH_3CH_2^{(2)})_2AsF_2^{(1)}]_2^{(3)}CH_2$	−72·2		(1-C2) 15·5	(1-C3) 22·5	575
$C_{12}F_3H_{15}A_6$	$(C_6H_5)_2AsF_3$	−69·1				599
$C_{13}F_2H_{13}As$		−78·0		(1-2) 7·0 (1-C3) 16·1	(1-C2) 21·5 (1-C4) 6·6	575
$C_{13}F_4H_{30}As_2$	$([(CH_3)_2CH^{(2)}]_2AsF_2^{(1)})_2^{(3)}CH_2$	−89·0		(1-C2) 15·0	(1-C3) 23·4	575
$C_{16}F_{11}H_{36}As_2N$	$(CH_3\cdot CH_2\cdot CH_2\cdot CH_2)_4N^+\ F^{(1)}F_4^{(2)}AsF^{(3)}AsF_4F^-$	(1) −85 (3) −21	(2) −48	(1-2) 127	(2-3) 51	537
$C_{18}F_2H_{15}As$		−88·9		(F-C1) 18·3	(F-C2) 7·0	575

Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{25}F_4H_{22}As_2$		−74·1	(1-2) 10·0 (1-C2) 25·6 (1-C3) 15·5 (1-C4) 7·8	575
$C_{26}F_4H_{24}As_2$		−89·9	(1-C2) 20·7 (1-C3) 4·8 (1-C4) 16·0 (1-C5) 7·5	575
$C_{27}F_4H_{26}As_2$		−88·8	(1-2) 10·0 (1-C2) 18·0 (1-C3) 15·0 (1-C4) 6·0	575
F_7AsOS	$F_4^{(1)}AsF^{(2)}{\cdot}SOF_2^{(3)}$	(1) −32 (2) −88 (3) +43	(1-2) 130	537
F_8AsBr	$F_2^{(1)(2)}Br\cdots\underbrace{F\text{-}AsF_5}_{(3)}$ (−120° in SO_2ClF)	(1) −61·0 (2) −68·3 (3) −56·3		531
$F_{10}AsIO$	$IOF^{(1)}F_4^{(2)}{\cdot}AsF_5^{(3)}$ (−110° in SO_2F_2)	(1) +96·8 (2) +65·9 (3) −57·9	(1-2) 253	542
Fluorine bonded to gold				
F_6Au^-	AuF_6^-	−108·9		535
Fluorine bonded to boron				
$CF_4H_3B_2P_2^-$		−77·3	(P-1) 1207 (1-2) 14	553

CF_7H_3BNS	$CH_3^{(3)}NSF_3^{(1)+}\ BF_4^{(2)-}$	(1) +47·90	(2) −145·7	(1-3) 8·6	552
$C_2F_6H_6BNS$	$[(CH_3^{(3)})_2NSF_2^{(1)}]^+\ BF_4^{(2)-}$	(1) +12·46	(2) −149·06	(1-3) 7·5	562
$C_2F_6BO_2^-$	$^{11}BF_3^{(1)}(CF_3CO_2)^-$ $^{10}BF_3(CF_3CO_2)^-$	−141·00 −140·98		(1-B) 4·5	526
C_4FH_9BCl	$CH_3(CH_2)_3BFCl$	−33·3			569(a)
$C_4F_2H_9B$	$CH_3(CH_2)_3BF_2$	−75·2			569(a)
$C_4F_2H_{12}BN_3O_4$	$BF_2(NO_2)_2^-\ (CH_3)_4N^+$	−92		(F-B) 55·1	570
$C_4F_2H_{12}BN_7$	$BF_2(N_3)_2^-\ (CH_3)_4N^+$	−133·0		(F-B) 18	570
$C_4F_3H_{12}BClO_4$	$BF_3ClO_4^-\ (CH_3)_4N^+$	−141·0			570
$C_4F_3H_{12}BNO_3$	$BF_3NO_3^-\ (CH_3)_4N^+$	−141·7			570
$C_4F_3H_{12}BN_2O_2$	$BF_3NO_2^-\ (CH_3)_4N^+$	−112·2		(F-B) 25·1	570
$C_4F_3H_{12}BN_4$	$BF_3N_3^-\ (CH_3)_4N^+$	−133·0		(F-B) 18	570
$C_4F_4H_{12}BN$	$BF_4^-\ (CH_3)_4N^+$	−139·8			570
$C_4F_4H_{12}BNO_3S$	$BF_3FSO_4^-\ (CH_3)_4N^+$	−140·2			119
$C_4F_6H_8BNOS$	$[\overline{CH_2\cdot CH_2\cdot O\cdot CH_2\cdot CH_2}NSF_2^{(1)}]^+\ BF_4^{(2)-}$	(1) +109	(2) −148·7		562(j)
$C_4F_6H_{10}BNS$	$(CH_3CH_2^{(3)})_2NSF_2^{(1)+}BF_4^{(2)-}$	(1) +13·27	(2) −149·05	(1-3) 6·0	562(j)
$C_4F_8BO_4^-$	$BF_2(CF_3CO_2)_2^-$	−142·3		(F-B) 9	526
$C_5FH_7BClO_2$	$(CH_3\cdot CO\cdot CH\cdot CO\cdot CH_3)BFCl$	−123·9			569(a)
$C_5F_2H_7BO_2$	$(CH_3\cdot CO\cdot CH\cdot CO\cdot CH_3)BF_2$	−138·2			569(a)
$C_5F_3H_{12}BN_2$	$BF_3CN^-\ (CH_3)_4N^+$	−127·5		(F-B) 26·8	570
$C_5F_3H_{12}BN_2O$	$BF_3OCN^-\ (CH_3)_4N^+$	−136·9			570
$C_5F_3H_{12}BN_2S$	$BF_3SCN^-\ (CH_3)_4N^+$	−125·9			570
$C_5F_3H_{13}BNO_2$	$BF_3HCO_2^-\ (CH_3)_4N^+$	−137·4		(F-B) 6	570
$C_5F_6H_{10}BNS$	$\overline{CH_2^{(3)}(CH_2)_4}NSF_2^{(1)+}\ BF_4^{(2)-}$	(1) +13·17	(2) −148·7	(1-3) 5·5	562(j)
$C_5F_6H_{12}BNO_3S$	$BF_3CF_3SO_3^-\ (CH_3)_4N^+$	−137·5			119

Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_6F_2H_{12}BN_3$	$BF_2(CN)_2^-\ (CH_3)_4N^+$	−132·7		570
$C_6F_3H_{15}BNO_2$	$BF_3CH_3CO_2^-\ (CH_3)_4N^+$	−135·6	(F-B) 7·3	570
$C_6F_4H_{18}B_4N_6$		(1) −156·8 (2) −157·7	(2-B) 43	581
$C_6F_6H_{18}B_3P_3$	$[(CH_3)_2PBF_2]_3$	−158·0	(F-B) 96	584(b)
$C_8F_2H_{18}BNO_4$	$BF_2(CH_3CO_2)_2^-\ (CH_3)_4N^+$	−135·2	(F-B) 15·9	570
$C_8F_2H_{22}B_4N_6$	As $C_6F_4H_{18}B_4N_6$ above with two single F's replaced by CH_3	−158·4	(F-B) 43	581
$C_{10}FH_{21}BNO_6$	$BF(CH_3CO_2)_3^-\ (CH_3)_4N^+$	−136·9	(F-B) 22	570
$C_{10}F_3H_{17}BNS$	$BF_3SC_6H_5^-\ (CH_3)_4N^+$	−135·4		570
$C_{11}F_4H_5BO_4W$	*trans*-$BF_4(CO)_4WCC_6H_5$ (−50 °C)	−173·5		596(a)
$C_{16}F_6H_{34}BMgO_6$	$Mg(BF_3OH)_2(OCH_2{\cdot}CH_2{\cdot}CH_2{\cdot}CH_2)_4$	−156		602
F_4B^-	$^{11}BF_4^-$	−139·80		526
F_4B^-	$^{10}BF_4^-$	−139·75		526
F_5BBr	$F_2^{(1)(2)}Br\cdots\underbrace{FBF_3}_{(3)}$ (−120 °C in SO_2ClF)	(1) −60·6 (2) −70·5 (3) −127·7		531

Fluorine bonded to bismuth

$C_{18}F_2H_{15}Bi$	$(C_6H_5)_3BiF_2$	−161·3		575

Fluorine bonded to bromine

$FBrO_2$	$FBrO_2$	+210			519
F_3BrO	F_3BrO	+152			519
F_8BrP	$F_2^{(1)(2)}Br \cdots \underbrace{F\text{-}PF_5}_{(3)}$ (−130° in SO_2ClF)	(1) −59·9 (3) −64·5	(2) −69·2		531

Fluorine bonded to chlorine

FCl	FCl			(Cl-F) 770±10 (liquid) 855±10 (gas)	520

Fluorine bonded to germanium

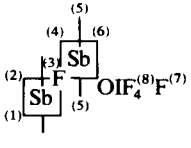
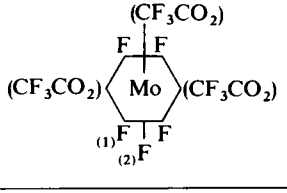
$C_{22}F_2H_{34}Ge_2P_2$	$[(CH_3^{(2)})_2GeF^{(1)}(CH_2)_3PC_6H_5]_2$ (diastereoisomers)			[a] (1-2) 7·0 [b] (1-2) 6·2	115

Fluorine bonded to hydrogen

$C_{12}F_2H_{29}N$	$(CH_3{\cdot}CH_2CH_2)_4N^+ HFH^-$	−149·4			522

Fluorine bonded to iodine

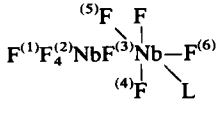
$C_2F_8IO_2^-$	$F^{(1)}IF_4^{(2)}(CF_3CO_2)^-$	(1) +53·6	(2) +4·1	(1-2) 68	526
$C_5F_5H_5IN$	$IF_5{\cdot}C_5H_5N$	+10·9			532

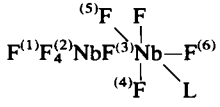
Molecular formula	Structure of compounds		Chemical shifts (ppm)		Coupling constants (Hz)		Ref.
$C_{10}F_6I_2N_2$	$IF{\cdot}IF_5{\cdot}(C_5H_5N)_2$	(−40 °C)	+11·4, −102				532
$C_{25}F_{15}H_{25}I_5N_5$	$I_2{\cdot}3IF_5{\cdot}(C_5H_5N)_5$		+4·9				532
F_5I	IF_5		+52·6, +3·4				532 533
F_9I_3O6	$(IO_2F^{(1)}F_2^{(2)})_2$ (molten)		(1) +66·2	(2) +105·2	(1-2) 173		540
$F_{10}IOSb$	$IOF^{(1)}F_4^{(2)}{\cdot}Sb\,F^{(3)}F_4^{(4)}$ (−110° in SO_2F_2)		(1) +94·0 (3) −146·1	(2) +68·7 (4) −106·9	(1-2) 278	(3-4) 91	542
$F_{15}IOSb_2$			(1) −146·1 (3) −87·2 (5) −97·2 (7) +91·2	(2) −114·9 (4) −134·5 (6) −127·3 (8) +71·2	(1-2) 90 (7-8) 257	(2-3) 49	542
Fluorine bonded to iridium							
F_6Ir	IrF_6		−205				535
Fluorine bonded to molybdenum							
$C_2F_8MoO_2^-$	$F^{(1)}MoF_4^{(2)}(CF_3CO_2)^-$		(1) +134·8	(2) −60·3	(1-2) 54		526
$C_2F_{10}MoO_2^{2-}$	$F^{(2)}MoF_6^{(1)}(CF_3CO_2)^{2-}$		(1) +142·8	(2) −129·1	(1-2) 54	(Mo-1) 69	526
$C_6F_{14}MoO_6^{2-}$			(1) +134·8	(2) −60·3	(1-2) 54		526

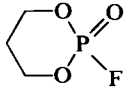
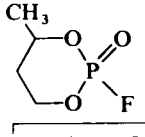
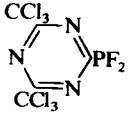
Fluorine bonded to nitrogen

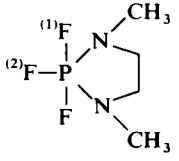
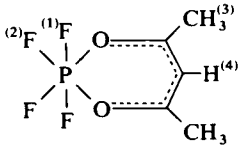
$C_4FH_{12}NO_3S$	$(CH_3)_4NFSO_3$	+41·2				119
$C_{12}FH_{28}N$	$(CH_3{\cdot}CH_2{\cdot}CH_2)_4NF$	−114·6				522

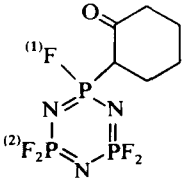
Fluorine bonded to niobium

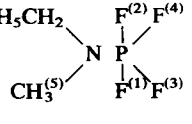
$C_2F_8NbO_2^-$	$F_5Nb(CF_3CO_2)^-$	−128				526
$C_4F_6H_{12}NNbO_3S$	$F^{(1)}F_4^{(2)}Nb(FSO_3)^-\ (CH_3)_4N^+$	(1) +184	(2) +143·6			119
$C_5F_8H_{12}NNbO_3S$	$F^{(1)}F_4^{(2)}Nb(CF_3SO_3)^-\ (CH_3)_4N^+$	(1) +181·7	(2) +143·5			119
$C_{14}F_5H_{15}NbOPS$	$NbF^{(2)}F_4^{(1)}OP(C_6H_5)_2SCH_2{\cdot}CH_3$	(1) +120·3	(2) +151·8	(1-2) 49		544(h)
$C_{14}F_5H_{15}NbO_2P$	As above with S replaced by O	(1) +121·8	(2) +156·2	(1-2) 49		544, 543(h)
$C_{14}F_5H_{15}NbPS_2$	As above with O replaced by S	(1) +120·3	(2) +151·8	(1-2) 49		543(h)
$C_{14}F_{10}H_{15}Nb_2OPS$	 $L = OP(C_6H_5)_2SCH_2{\cdot}CH_3$	(1) +186·0 (3) −60·1 (5) +177·1	(2) +141·5 (4) +159·5 (6) +215·4	(1-2) 55 (3-6) 185	(1-3) 60	544(h)
$C_{14}F_{10}H_{15}Nb_2O_2P$	As above with S replaced by O	(1) +186·8 (3) −59·6 (5) +177·3	(2) +141·8 (4) +161·1 (6) +216·2	(1-2) 55 (3-6) 200	(1-3) 175	544, 543(h)
$C_{14}F_{10}H_{15}Nb_2PS_2$	As above with O replaced by S	(1) +186·0 (3) −60·1 (5) +177·1	(2) +141·5 (4) +159·5 (6) +215·4	(1-3) 160	(3-6) 185	543(h)
$C_{18}F_5H_{15}NbOP$	$NbF_4^{(1)}F^{(2)}OP(C_6H_5)_3$	(1) +117·8	(2) +148·3	(1-2) 49		544, 543(h)

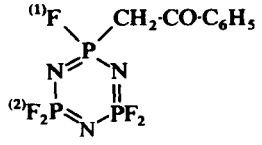
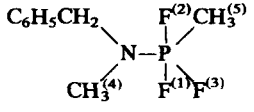
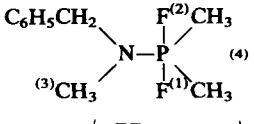
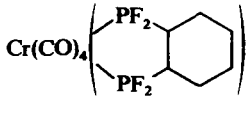
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{18}F_{10}H_{15}Nb_2OP$	 $L = OP(C_6H_5)_3$	(1) +185·5 (2) +141·3 (3) −60·9 (4) +155·8 (5) +176·3 (6) +213·8	(1-2) 55 (1-3) 200 (3-6) 200	544, 543(h)
$C_{28}F_4H_{30}NbO_2P_2S_2^+$	*trans*-$[NbF_2^{(1)}F_2^{(2)}(OP(C_6H_5)_2SCH_2{\cdot}CH_3)_2]^+$	(1) +143·3 (2) +171·8		544(h)
$C_{28}F_4H_{30}NbO_4P_2^+$	As above with S replaced by O	(1) +144·6 (2) +174·7	(1-2) 49	544, 543(h)
$C_{28}F_4H_{30}NbP_2S_4^+$	As above with O replaced by S	(1) +143·3 (2) +171·8	(1-2) 50	543(h)
$C_{36}F_4H_{30}NbO_2P_2^+$	*cis*-$[NbF_2^{(1)}F_2^{(2)}(OP(C_6H_5)_3)_2]$	(1) +141·9 (2) +167·3	(1-2) 49	544, 543(h)
$F_{11}Nb_2^-$	$F^{(1)}F_4^{(2)}NbF^{(3)}NbF_4F^-$	(1) +183·6 (2) +137·9 (3) −64·1	(1-3) 200	543 544
Fluorine bonded to osmium				
F_6Os	OsF_6	−88·7		535
Fluorine bonded to phosphorus				
CF_2H_2BNPSe	$PF_2(NCSe)BH_2$	−62·2	(P-F) −1278 (F-H) 17·3	549
CF_2NPSe	$PF_2(NCSe)$	−56·05	(P-F) 1134	549
C_2F_2HOP	$HC{\equiv}CP(O)F_2$	−55·5	(P-F) 982	556
$C_2F_2H_3OP$	$CH_2{=}CHP(O)F_2$	−66·2	(P-F) 1078·5	556
$C_2F_2H_3PS$	$CH_2{=}CHP(S)F_2$	−47·3	(P-F) 1118·0	556
$C_2F_2H_{14}B_4N_2P$	$B_4H_8PF_2N(CH_3)_2$ (−125°C)		(P-F) 1080, 1150 (F-F) 40	557

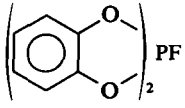
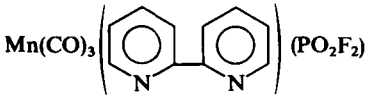
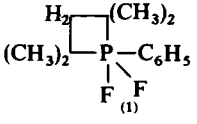
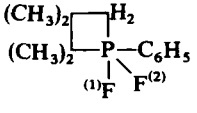
$C_2F_3H_6P$	$(CH_3^{(2)})_2PF_3^{(1)}$		(1a) −4·14	(1e) −86·2	(1a-2) 13·0 (P-1a) 777	(1e-2) 3·3 (P-1e) 966	558
C_2F_4HP	$H^{(2)}C{\equiv}CPF_4^{(1)}$		−40·1		(1-2) 1·9	(P-1) 950·4	556
$C_2F_4H_3P$	$CH_2{=}CH{\cdot}PF_4$		−54·8		(P-F) 941·3		556
$C_2F_8O_2P^-$	$F^{(1)}PF_4^{(2)}(CF_3CO_2)^-$		(1) −78·0	(2) −63·2	(1-2) 60 (P-2) 770	(P-1) 74·0	526
$C_3FH_6O_3P$			−69·7		(P-F) 998		563(a)
$C_3F_2H_9P$	$(CH_3^{(2)})_3PF_2^{(1)}$				(1-2) 11·4		558
$C_3F_8H_6FeNP_4O$	$[CH_3N(PF_2)_2]_2FeCO$				(P-F) 1250		567
$C_3F_{12}H_9CrN_3P_6$	$[CH_3N(PF_2)_2]_3Cr$				(P-F) 1250		567, 568
$C_3F_{12}H_9MoN_3P_6$	As above with Cr replaced by Mo				(P-F) 1220		567, 568
$C_3F_{12}H_9N_3P_6W$	As above with Cr replaced by W				(P-F) 1226		567, 568
$C_4FH_8O_3P$		(*cis*) (*trans*)	−85·5 −69·8		(P-F) 990 (P-F) 1005		563(a)
$C_4FH_{10}N_2OP$	$\overline{N(CH_3)CH_2{\cdot}CH_2{\cdot}N(CH_3)}P(O)F$		−75·6		(P-F) 933		140
$C_4FH_{10}N_2P$	$\overline{N(CH_3)CH_2{\cdot}CH_2{\cdot}N(CH_3)}PF$		−67·0		(P-F) 1137		140
$C_4FH_{10}O_2P$	$CH_3P(O)FOCH(CH_3)_2$		−97·7		(P-F) 1045		563(a)
$C_4F_2Cl_6N_3P$			−48·9		(P-F) 995		95

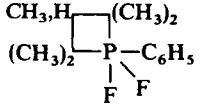
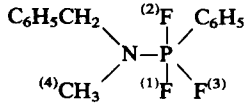
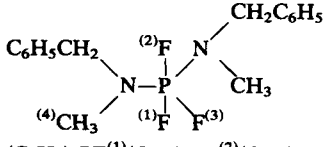
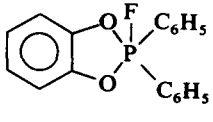
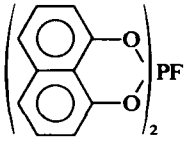
Molecular formula	Structure of compounds		Chemical shifts (ppm)		Coupling constants (Hz)		Ref.
$C_4F_3H_{10}N_2P$			(1) −112·6	(2) −48·7	(1-2) 47 (P-2) 1133	(P-1) 711	140
$C_4F_3H_{12}N_2P$	$[(CH_3^{(2)})_2N]_2PF_3^{(1)}$				(1a-2) 2·6	(1e-2) 1·6	558
$C_4F_4MoO_4P_4S$	$[Mo(PF_2^{(1)})(PF_2^{(2)})S(CO)_4]$		−27·6		(1-2) 7·5, 0·0 (P1-1) −1299 (P2-1) +47		523
$C_4F_4MoO_4P_2Se$	As above with S replaced by Se		−20·6		(1-2) 7·7, 0·7 (P1-1) −1292 (P2-1) +48 (Se-F) 27		523
$C_4F_6H_{12}NO_3PS$	$F^{(1)}PF_4^{(2)}(FSO_3)^-\ (CH_3)_4N^+$		(1) −82·6	(2) −60·1	(1-2) 63·0 (P-2) 791	(P-1) 750	119
$C_5FH_{12}O_2P$	$CH_3P(O)FOCH(CH_3)CH_2CH_3$ (diastereoisomers)	[a] [b]	−99·3 −100·3		(P-F) 1012 (P-F) 1012		563(a)
$C_5F_2MnO_7P$	$Mn(CO)_4(PO_2F_2)$		−77·8		(P-F) 968		573(a)
$C_5F_4H_7O_2P$			(1) −49·7	(2) −73·1	(1-2) 59·0 (P-2) 762 (2-4) 3·0	(P-1) 823 (1-2) 3·0	574
$C_5F_8H_6N_2Ni_2O_3$	$[CH_3N(PF_2)_2]_2Ni_2(CO)_3$				^1J(P-F) 1238 ^3J(P-F) 54		567
$C_5F_8H_7O_2P$	$CH_3^{(2)}PF_2^{(1)}(OCH_2^{(4)}\cdot CF_3^{(3)})_2$		(1) −30·1		(1-2) 12·7 (P-1) 819	(3-4) 7·9	220

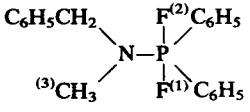
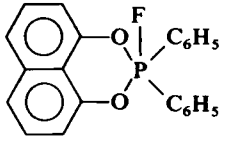
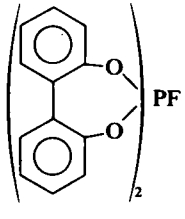
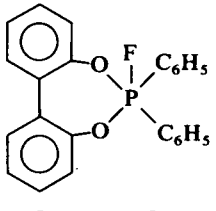
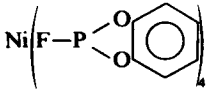
$C_5F_8H_{12}NO_3PS$	$F^{(1)}PF_4^{(2)}(CF_3SO_3)^-(CH_3)_4N^+$		(1) −82·7	(2) −56·4	(1-2) 62·6 (P-1) 762 (P-2) 792	119
$C_6FH_{14}O_2P$	$CH_3P(O)FOCH(CH_2{\cdot}CH_3)_2$		−100·5		(P-F) 1095	563(a)
$C_6F_3H_{13}NP$	$CH_2{=}CH{\cdot}PF_3^{(1)}N(CH_2CH_3)_2$		(1a) −47·3	(1e) −66·9	(1a-1e) 51·7 (P-1a) 796 (P-1e) 951	556
$C_6F_3H_{15}NP$	$CH_3{\cdot}CH_2{\cdot}CH^{(2)}(CH_3)PF_3^{(1)}N(CH_3)_2$		(1a) −45·6 (1e) −85·0	(1a′) −46·3	(1a-1e) = (1a′-1e) 52 (1a-1a′) 23 (1-2) 13 (P-1a) 818 (P-1a′) 820 (P-1e) 994	580
$C_6F_4H_{18}Ga_2N_2O_2P_2$	$[(CH_3)_2GaN(CH_3)P(O)F_2]_2$		−79·45		(P-F) 1027	582(a)
$C_6F_5H_9N_3OP_3$			(1) −59·0	(2) −61·0	(P-1) 765 (P-2) 760	583
$C_6F_{24}H_{18}N_6Ni_2P_{12}$	$[CH_3N(PF_2)_2]_6Ni_2$				(P-F) ~1250, 1270	567
$C_7FH_{14}O_2P$	$CH_3P(O)FOC_6H_{11}$		−98·5		(P-F) 1040	563(a)
$C_7FH_{16}O_2P$	$CH_3P(O)FOCH(CH_3)C(CH_3)_3$ (diastereoisomers)	[a]	−97·2		(P-F) 1045	563(a)
		[b]	−100·0		(P-F) 1045	
$C_7F_2H_9ClFeNOP$	$C_5H_5{\cdot}Fe(CO)[PF_2{\cdot}NHCH_3]Cl$				(P-F) 1138	586
$C_7F_3H_{17}NP$	$CH_3CH_2{\cdot}CH^{(2)}(CH_3)PF_3^{(1)}NHCH(CH_3)_2$		(1a) −47·0 (1e) −76·6	(1a′) −58·0	(1a-1e) = (1a′-1e) 52 (1a-1a′) 21 (1a′-2) 13 (P-1a) 792 (P-1a′) 836 (P-1e) 1009	580
$C_7F_4H_8ClFeNOP_2$	$C_5H_5{\cdot}Fe(CO)[(PF_2)_2NCH_3]Cl$				(P-F) 1168 (complexed P atom) 1258 (uncomplexed P atom)	586
$C_7F_4H_8MnNOP_2$	$C_5H_5{\cdot}Mn(CO)(PF_2)_2NCH_3$				(P-F) ~1270	586

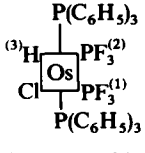
Molecular formula	Structure of compounds		Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_7F_4H_8MoN_2O_2P_2$	$C_5H_5{\cdot}Mo(CO)(NO)(PF_2)_2NCH_3$			(P-F) 1156 (complexed P atom) 1255 (uncomplexed P atom)	586
$C_7F_4H_{18}P_2$	$(CH_3)_2PF_2(CH_2)_3PF_2(CH_3)_2$		−17·4	(P-F) 550	587
$C_7F_8H_{11}ClFeN_2P_4$	$C_5H_5{\cdot}Fe[(PF_2)_2NCH_3]_2Cl$			(P-F) 1162 (complexed P atom) 1251 (uncomplexed P atom)	586
$C_7F_8H_{11}ClMoN_2P_4$	$C_5H_5{\cdot}Mo[(PF_2)_2NCH_3]_2Cl$			(P-F) ~1170, ~1190, 1300, 1245	586
$C_7F_8H_{11}ClN_2P_4W$	$C_5H_5{\cdot}W[(PF_2)_2NCH_3]_2Cl$			(P-F) ~1150, ~1270, ~1240	586
$C_7F_8H_{11}MnN_2P_4$	$C_5H_5{\cdot}Mn[(PF_2)_2NCH_3]_2$			(P-F) ~1300 (complexed P atom) 1235 (uncomplexed P atom)	586
$C_7F_{10}H_9O_3P$	$CH_3^{(2)}PF^{(1)}(OCH_2^{(4)}{\cdot}CF_3^{(3)})_3$		(1) −34·0	(P-F) 813 (1-2) 14·2 (3-4) 7·9	220
$C_8FH_{10}FeN_2O_4P$	$CH_3N{\cdot}CH_2{\cdot}CH_2{\cdot}N(CH_3^{(2)})PF^{(1)}{\cdot}Fe(CO)_4$		+7·3	(P-F) 1165 (1-2) 2·5	588
$C_8FH_{12}FeN_2O_4P$	$[(CH_3^{(2)})_2N]_2PF^{(1)}{\cdot}Fe(CO)_4$		−48·7	(P-F) 1085 (1-2) 2·5	588
$C_8F_2H_9ClMoNO_2P$	$C_5H_5{\cdot}Mo(CO)_2[PF_2NHCH_3]Cl$			(P-F) 1134	586
$C_8F_4H_3Fe_2NO_7P_2$	$CH_3N(PF_2)_2Fe_2(CO)_7$			^3J(P-F) 16	567
$C_8F_4H_8ClMoNO_2P_2$	$C_5H_5{\cdot}Mo(CO)_2[(PF_2)_2NCH_3]Cl$			(P-F) ~1150 (complexed P atom) 1247 (uncomplexed P atom)	586
$C_8F_4H_8ClNO_2P_2W$	$C_5H_5{\cdot}W(CO)_2[(PF_2)_2NCH_3]Cl$			(P-F) 1136 (complexed P atom) 1260 (uncomplexed P atom)	586
$C_8F_4H_{10}NP$		(−80 °C)	(1) −55·8 (2) −58·4 (3)(4)$_{av}$ −72·2	(1-3,4) 64 (2-3,4) 72 (P-1) 779 (P-2) 779 (P-3,4)$_{av}$ 915 (1,2,3,4-5) 2·5 (room temp.)	591

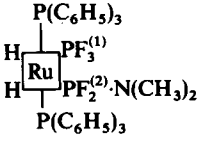
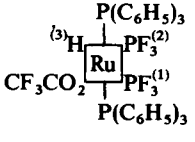
$C_8F_5H_7N_3OP_3$			(1) −58·0	(2) −62·0	(P-1) 778	(P-2) 788	583
$C_8F_6H_{12}CuN_4P$	$CuPF_6{\cdot}4CH_3CN$		−77		(P-F) 735		572
$C_8F_{12}Co_2O_8P_4Rh_2$	$Co_2Rh_2(Co)_8(PF_3^{(1)(2)})_4$		(1) −10·3	(2) −13·8	(P-1) 1410	(P-2) 1465	593
$C_9FH_{11}ClO_4PW$	$C_5H_5{\cdot}W(CO)_2[PF(OCH_3)_2]Cl$				(P-F) 1157		586
$C_9F_3H_{13}NP$		(−60 °C)	(1) −26·9 (3) −65·5	(2) −29·2	(1-3) 49 (P-1) 808 (p-3) 957	(2-3) 58 (P-2) 800	591
				(room temp.)	(1,2-4) 3·0 (3-4) 3·0	(1,2-5) 12·5 (3-5) 1·5	
$C_9F_3H_{13}NP$	$C_6H_5PF_3^{(1)}NH^{(2)}CH(CH_3)_2$		(1a) −39·0 (1e) −70·7	(1a′) −50	(1a-1e) = (1a′-1e) 52 (1a-1a′) 12 (P-1a) 764 (P-1e) 980	(1a′-2) 27 (P-1a′) 796	580
$C_9F_6H_{27}I_2NiP_3$	$NiI_2[PF_2C(CH_3)_3]_3$		−75·1		(P-F) ~1180		594
$C_{10}F_2H_9Cl_6O_2P$	$C_6H_5PF_2(OCH_2{\cdot}CCl_3)_2$		−38·0		(P-F) 824		220
$C_{10}F_2H_{11}Cl_4O_2P$	$C_6H_5PF_2(OCH_2{\cdot}CHCl_2)_2$		−41·9		(P-F) 822		220
$C_{10}F_2H_{16}NP$		(−120 °C)	(1) −14·4	(2) −16·8	(P-1) 655	(P-2) 652	591
				(room temp.)	(1,2-3) 3·0	(1,2-4) 13·0	
$C_{10}F_4H_{10}CrO_4P_2$		[a]	−63·6		(P-F) 1180		595
		[b]	−64·7		(P-F) 1158		
$C_{10}F_4H_{10}MoO_4P_2$	As above with Cr replaced by Mo	[a]	−64·7		(P-F) 1170		595
		[b]	−65·4		(P-F) 1156		

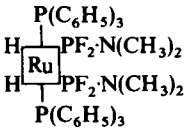
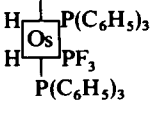
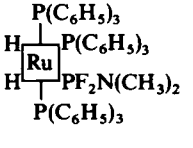
Molecular formula	Structure of compounds		Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{10}F_4H_{10}O_4P_2W$	As above with Cr replaced by W	[a]	−66·1	(P-F) 1160	595
		[b]	−66·1	(P-F) 1141	
$C_{10}F_6Co_2O_{10}P_2Rh_2$	$Co_2Rh_2(CO)_{10}(PF_3)_2$ −40 °C	[a]	−10·5	(P-F) 1416	593
	(several isomers)	[b]	−11·5	(P-F) 1431	
		[c]	−13·6	(P-F) 1460	
		[d]	−14·7	(P-F) 1460	
$C_{10}F_8H_9O_2P$	$C_6H_5{\cdot}PF_2^{(1)}(OCH_2^{(3)}{\cdot}CF_3^{(2)})_2$		(1) −43·2	(2-3) 8·3 (P-1) 808	220
$C_{10}F_{12}H_{15}CuN_5P_2$	$Cu(PF_6)_2{\cdot}5CH_3CN$		−78	(P-F) 729	572
$C_{11}FH_{15}ClO_4PW$	$C_5H_5{\cdot}W(CO)_2[PF(OCH_2{\cdot}CH_3)_2]Cl$			(P-F) 1155	586
$C_{12}FH_8O_4P$			−70·4	(P-F) 1011	597
$C_{12}F_2H_{13}N_2O_2P$	$C_6H_5PF_2[OCH(CH_3)CN]_2$		−39·8	(P-F) 826	220
$C_{12}F_{10}H_{11}O_3P$	$C_6H_5PF^{(1)}(OCH_2^{(3)}{\cdot}CF_3^{(2)})_3$		(1) −40·5	(2-3) 8·3 (P-1) 820	220
$C_{13}F_2H_8MnO_5P$			−77·3	(P-F) 962	573(a)
$C_{13}F_2H_{19}P$		(−95 °C)	−36·3 and −63·5 (ratio 1:2:4)	(P-F) 775 and 933	600
$C_{13}F_2H_{19}P$		(−80 °C)	(1) −46 (2) −58·6	(1-2) 15·7 (P-1) 875 (P-2) 987	600

$C_{14}F_2H_{21}P$		(−90 °C)	−58·8 and −71·2 (ratio 4 : 1)		(P-F) 922 and 900	600
$C_{14}F_3H_{15}NP$		(−50 °C)	(1) −40·8 (3) −65·6	(2) −43·2	(1-2) 14 (1-3) 55 (2-3) 56 (P-1) 823 (P-2) 821 (P-3) 961 (room temp.){(1,2-5) 3·0 (3-5) 3·0	591
$C_{14}F_3H_{15}NP$	$C_6H_5PF_3^{(1)}NH^{(2)}\cdot CH(CH_3)C_6H_5$		(1a) −39·8 (1e) −70·0	(1a′) 47·6	(1a-1e) = (1a′-1e) 52 (1a-1a′) 15 (1a′-2) 23 (P-1a) 775 (P-1a′) 806 (P-1e) 972	580
$C_{16}F_3H_{20}NP$			$(1,2)_{av}$ −54·4	(3) −68·8	$(1,2\text{-}3)_{av}$ 4·7 (1,2-4) 3·0 (3-4) 3·0 (P-1,2) 753 (P-3) 870	591
$C_{16}F_4H_{20}P_2$	$(C_6H_5)_2PF_2^{(1)}(CH_2)_2PF_2^{(2)}(CH_3)_2$		(1) −40·1	(2) −18·0	(P-1) 640 (P-2) 550	587
$C_{16}F_6H_{22}Cl_2OsP_4$	*cis*-$[OsCl_2(PF_3)_2[P(CH_3)_2C_6H_5]_2]$		−18·8		(P-F) 1230 ^3J(P-F) 5·0 ^4J(F-F) 4·0	601
$C_{16}F_6H_{22}Cl_2OsP_4$	*trans*-isomer of above		−32·9		(P-F) 1453	601
$C_{18}FH_{14}O_2P$			−26·2		(P-F) 772	597
$C_{19}F_2H_{15}OP$	$(C_6H_5)_2PF_2\cdot CO\cdot C_6H_5$		−58·8		(P-F) 705	606
$C_{20}FH_{12}O_4P$			−85		(P-F) 1061	597

Molecular formula	Structure of compounds	Chemical shifts (pm)	Coupling constants (Hz)	Ref.
$C_{20}F_2H_{20}NP$		(−80 °C) (1) −37·1 (2) −40·0 (room temp.){(1,2-3) 3·0	(P-1) 708 (P-2) 711	591
$C_{22}FH_6OP$		−12	(P-F) 698	597
$C_{24}FH_{16}O_4P$		−72·1	(P-F) 736	597
$C_{24}FH_{18}O_2P$		−2·8	(P-F) 723	597
$C_{24}F_3H_{33}Cl_2OsP_4$	*cis*-$[OsCl_2(PF_3)[P(CH_3)_2C_6H_5]_3]$	−13·1	(P-F) 1208	601
$C_{24}F_3H_{33}Cl_2OsP_4$	*trans*-isomer of above	−25·4	(P-F) 1267	601
$C_{24}F_4H_{16}NiO_8P_4$		−14·0	^1J(P-F) −1288·3 ^3J(P-F) +29·2 ^4J(F-F) +5·8	607

$C_{24}F_4H_{16}O_8P_4Pt$	As above with Ni replaced by Pt	−13·8		^1J(P-F) −1359·3 ^3J(P-F) +34·2 ^4J(F-F) +8·4 ^2J(Pt-F) ±1445·1		607
$C_{24}F_8H_{20}Br_2FeP_4$	$FeBr_2(PF_2C_6H_5)_4$	−55·1, −38·8				594
$C_{24}F_8H_{20}Cl_2FeP_4$	$FeCl_2(PF_2C_6H_5)_4$	−59·2, −40·3				594
$C_{24}F_8H_{20}CoIP_4$	$CoI(PF_2C_6H_5)_4$	−44·8		(P-F) ~1080		594
$C_{24}F_8H_{20}FeI_2P_4$	$FeI_2(PF_2C_6H_5)_4$	−46·6, −35·4				594
$C_{25}F_4H_{22}P_2$	$[(C_6H_5)_2PF_2]_2CH_2$	−27·8		(P-F) 656		587
$C_{26}F_4H_{24}P_2$	$[(C_6H_5)_2PF_2{\cdot}CH_2]_2$	−40·8		(P-F) 648		587
$C_{27}F_4H_{26}P_2$	$[(C_6H_5)_2PF_2{\cdot}CH_2]_2CH_2$	−40·0		(P-F) 644		587
$C_{27}F_4H_{28}P_2$	$[(C_6H_5)_2PF_2{\cdot}CH_2{\cdot}CH_2]_2$	−39·9		(P-F) 645		587
$C_{30}F_6H_{25}P_3$	$[(C_6H_5)_2PF_2^{(1)}]_2PF_2^{(2)}C_6H_5$	(1) −40·3	(2) −39·0	(P1-1) 650	(P2-2) 635	587
$C_{30}F_{10}H_{25}FeP_5$	$Fe(PF_2C_6H_5)_5$	−31·3		(P-F) ~1100		594
$C_{30}F_{10}Cl_5Fe_2P_5$	$[FeCl(C_6H_5PF_2)_5]FeCl_4$	−38		(P-F) ~1120		610
$C_{36}F_6H_{30}Cl_2OsP_4$	*cis*$[OsCl_2(PF_3)_2(P(C_6H_5)_3)_2]$	−18·4		(P-F) 1234		601
$C_{35}F_6H_{30}Cl_2P_4Ru$	As above with Os replaced by Ru	−12·4		^1J(P-F) 1285 ^3J(P-F) 3·5		601
$C_{36}F_6H_{31}ClOsP_4$		(1) −7·4	(2) −10·3	(1-3) 37·0 (P1-1) 1346 (P1-2) 10·9	(2-3) 15·9 (P2-2) 1254 (P2-1) 3·5	288
$C_{36}F_6H_{31}ClP_4Ru$	As above with Os replaced by Ru	(1) −13·2	(2) −4·2	(1-3) 36·0 (P-1) 1350 (P1-2) 5·0	(2-3) 4·9 (P2-2) 1244 (P2-1) 1·0	288
$C_{36}F_6H_{32}OsP_4$	As above with Cl replaced by H	−8·3		(P1-1) +(P1-2) } 1296 (P1-2)~2		611

Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{36}F_6H_{32}P_4Ru$	As above with Os replaced by Ru and Cl replaced by H	−6·8	(P1-1) +(P1-2) } 1291 (P1-2) 5·1	611
$C_{36}F_{10}H_{31}BP_4Ru$	As above with Os replaced by Ru and Cl replaced by BF_4	(1) −13·3 (2) −1·1	(1-3) 28·0 (2-3) 3·0 (P1-1) 1281 (P2-2) 1211 (P1-2) 2·0 (P-2) 1·0	288
$C_{37}F_3H_{30}Cl_2OP_3Ru$	$[RuCl_2(CO)(PF_3)(P(C_6H_5)_3)_2]$	−12·6	(P-F) 1305	
$C_{38}F_5H_{38}NP_4Ru$		(1) −6·2 (2) −27·9	(P1-1) 1300 (P2-2) 1096 (P2-1) 5·7	611
$C_{38}F_9H_{31}O_2P_4Ru$		(1) −13·4 (2) −1·8	(1-3) 36·0 (2-3) 10·5 (P-1) 1351 (P2-2) 1244	
$C_{39}F_2H_{30}MnO_5P_3$	$Mn(CO)_3[P(C_6H_5)_3]_2PO_2F_2$	−78·8	(P-F) 954	573(a)
$C_{39}F_2H_{30}MnO_{11}P_3$	$Mn(CO)_3[P(OC_6H_5)_3]_2PO_2F_2$	−80·0	(P-F) 957	573(a)
$C_{39}F_3H_{37}Cl_2NOP_3Ru$	*cis*-$[RuCl_2(H{\cdot}CO{\cdot}N(CH_3)_2)PF_3(P(C_6H_5)_3)_2]$	−4·7	(P-F) 1257	601
$C_{40}F_4H_{42}Cl_2N_2P_4Ru$	$[RuCl_2\{PF_2{\cdot}N(CH_3)_2\}_2(P(C_6H_5)_3)_2]$	−21·8 −22·2 −32·3 −33·3	(P-F) 1079 ^4J(F-F) 21 (P-F) 1137 (P-F) 1131 (P-F) 1116	601

$C_{40}F_4H_{44}N_2P_4Ru$		−30·8		(P-F) 1082 ^3J(P-F) 6·0	611
$C_{42}F_8H_{42}P_4$	$[(C_6H_5)_2PF_2^{(1)}(CH_2)_2]_3PF_2^{(2)}$	(1) −42·7	(2) −41·8	(P1-1) 650 (P2-2) 620	587
$C_{48}F_4H_{40}NiO_8P_4$	$Ni[PF(OC_6H_5)_2]_4$	−29·9		^1J(P-F) −1205·8 ^3J(P-F) +34·7 ^4J(F-F) +5·1	607
$C_{48}F_4H_{40}O_8P_4Pt$	$Pt[PF(OC_6H_5)_2]_4$	−22·5		^1J(P-F) −1269·4 ^3J(P-F) +40·3 ^4J(F-F) +7·8 ^2J(Pt-F) ±1371·6	607
$C_{48}F_{16}H_{40}Co_2HgP_8$	$Hg[Co(PF_2C_6H_5)_4]_2$	−34·3		(P-F) ~1070	594
$C_{54}F_3H_{47}OsP_4$		−7·4		^1J(P-F) 1248 ^3J(P-F) ~2	611
$C_{54}F_3H_{47}P_4Ru$	As above with Os replaced by Ru	−4·8		^1J(P-F) 1285 ^3J(P-F) 5·8	611
$C_{54}F_4H_{45}Cl_4P_5Ru_2$	$[((C_6H_5)_3P)_2(PF_3^{(1)})RuCl_3RuCl(PF_3^{(2)})(P^{(3)}(C_6H_5)_3)]$				
	Isomer [a]	(1) −8·6	(2) −11·9	(P1-1) 1282 (P2-2) 1292	612
	[b]	(1) −8·2	(2) −10·0	(P1-1) 1283 (P2-2) 1287 (P3-2) 4·0	
	[c]	(1) −6·7	(2) −10·0	(P1-1) 1283 (P2-2) 1287 (P3-2) 4·0	
$C_{56}F_2H_{53}NP_4Ru$		−24·5		(P-F) 1094	611

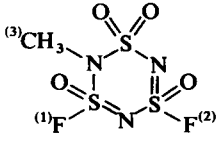
Molecular formula	Structure of compounds		Chemical shifts (ppm)		Coupling constants (Hz)		Ref.
$C_{58}F_4H_{57}Cl_4N_2P_5Ru_2$	$[((C_6H_5)_3P)_2\{((CH_3)_2N)PF_2^{(1)}\}RuCl_3RuCl\{PF_2^{(2)}(N(CH_3)_2)\}P(C_6H_5)_3]$						
		Isomer [a]	(1) −18·8	(2) −27·2	(P1-1) 1138 ^3J(P-F) 4·5	(P2-2) 1157	612
		[b]	(1) −23·8	(2) −29·1	(P1-1) 1153 ^3J(P-F) 4·5	(P2-2) 1193	
$C_{58}F_4H_{57}Cl_4N_2P_5Ru_2$	$[((C_6H_5)_3P)\{((CH_3)_2N)PF_2\}_2RuCl_3RuCl(P(C_6H_5)_3)_2]$						
			−22·0		(P-F) 1111		612
			−23·7		1122		
			−27·2		1139		
			−31·5		1148		
			−34·2		1104		
			−36·7		1094		
$C_{72}F_3H_{60}Cl_4P_5Ru_2$	$[((C_6H_5)_3P)_2(PF_3)RuCl_3RuCl(P(C_6H_5)_3)_2]$		−8·5		(P-F) 1284		612
F_2ClPSe	$F_2PCl(Se)$		−2·4		(P-F) 1304	(Se-F) 165	527
F_4H_2CsP	$F_4^{(1)}PH_2^{(2)-}\,Cs^+$		−49·1		(P-F) 798·7	(1-2) 120·8	530
F_4H_2KP	$F_4^{(1)}PH_2^{(2)-}\,K^+$		−47·6		(P-F) 799·3	(1-2) 119·8	530
$F_4H_3BP_2S$	$F_2^{(1)}P{\cdot}S{\cdot}PF_2^{(2)}{\cdot}BH_3^{(3)}$		(1) −57·8	(2) −56·6	(P1-1) 1336 (2-3) 19	(P-2-2) 1267	523
$F_4H_3BP_2Se$	$F_2^{(1)}P{\cdot}Se{\cdot}PF_2^{(2)}{\cdot}BH_3^{(3)}$		(1) −59·2	(2) −55·2	(P1-1) 1320 (2-3) 21	(P2-2) 1277	523
$F_4Cl_8O_4P_2Sb_2$	$[Cl_4Sb(O_2PF_2)]_2$				(P-F) 1013		527
F_7O_2PSe	$F_2^{(1)}P(O){\cdot}OSeF_4^{(2)}{\cdot}F^{(3)}$		(1) −81·7 (3) +61·2	(2) +75·3	(P-1) 1078 (2-3) 219	(1-2) 2·0 (Se-2) 1407	539
$F_{12}HP_4Rh$	$H^{(2)}Rh(PF_3^{(1)})_4$	(−38 °C)	−4·3		(1-2) 16	(Rh-1) 16	545
		(−104 °C)	−4·1, −8·0				
$F_{12}ClIrP_4$	$IrCl(PF_3)_4$		−19·0				545
$F_{12}O_4P_2Sb_2$	$[F_4Sb(O_2PF_2)]_2$				(P-F) 1039		527

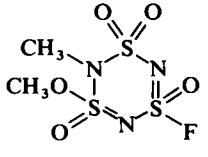
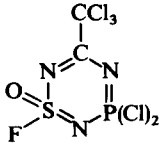
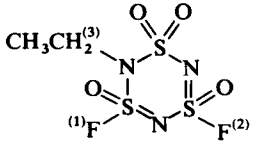
$F_{24}P_8Ir_2$	$Ir_2(PF_3)_8$	(24 °C) (−20 °C)	−4·4 −4·0, −4·6				545
$F_{24}P_8Rh_2$	$Rh_2(PF_3)_8$	(24 °C) (−20 °C)	−2·8 −0·5, −4·4				545

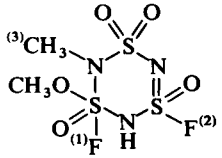
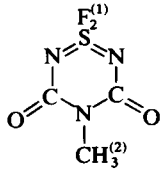
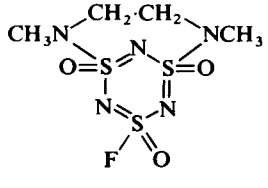
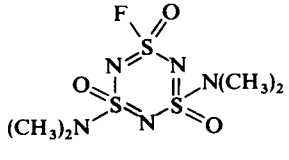
Fluorine bonded to platinum

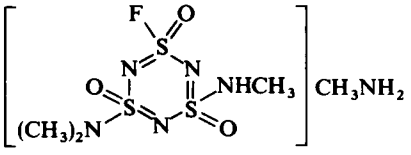
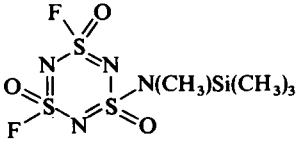
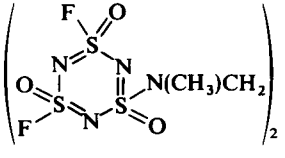
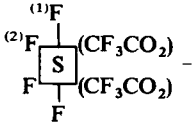
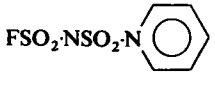
$C_6F_6H_{30}O_6Pt_3$	$[(CH_3)_3Pt(H_2O)_3]_2PtF_6$		−364				585(h)
F_6Pt	PtF_6		+3966±50		(Pt-F) 1072		535

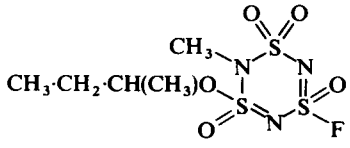
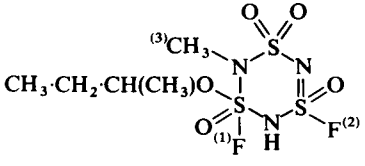
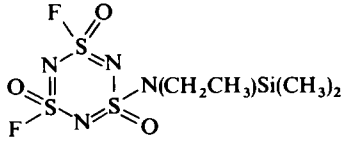
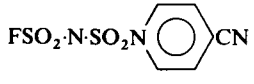
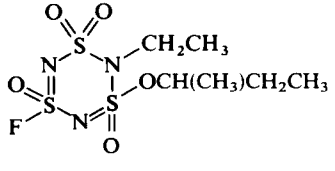
Fluorine bonded to sulphur

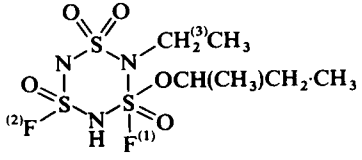
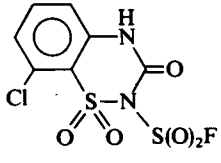
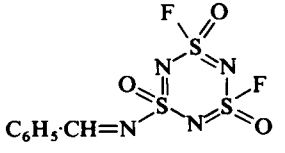
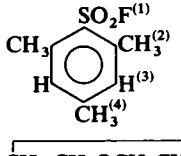
CFH_3ClO_2S	$CH_3^+\ OSOClF^-$		+90·8				17
$CF_2H_3N_3O_4S_3$			(1) +63·9	(2) +65·2	(1-2) 3·75	(1-3) 2·6	550
CF_3H_3S	$CH_3^{(2)}SF_3^{(1)}$	(−100 °C)	(1a) +58·0	(1e) −51·8	(1a-1e) 72·0 (1e-2) 12·2	(1a-2) 15·5	10
CF_4H_2S	$CH_2^{(3)(4)}{=}SF_4^{(1)(2)}$	(−150 °C)	(1) +59·0	(2) +53·6	(1-2) 154·4 (2-3) 9·7	(1-3) 10·5 (2-4) 58·1	551
CF_4H_3NS	$CH_3^{(2)}N{=}SF_4^{(1)}$		+71·3		(1-2) 3·65		552

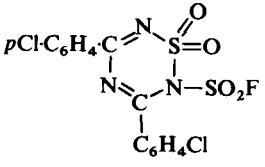
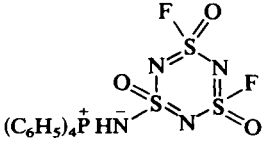
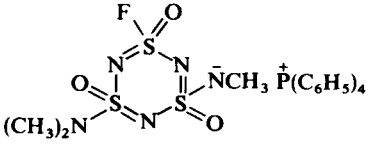
Molecular formula	Structure of compounds		Chemical shifts (ppm)		Coupling constants (Hz)		Ref.
CF_5H_3S	$CH_3^{(2)}SF_4^{(1)}F$				(1-2) 9·8		551
CF_6S	$CF_3^{(2)}SF_3^{(1)}$	(−100 °C)	(1a) +45·8	(1e) −47·7	(1a-1e) 62·7		10
CF_6S	As above		(1a) +52	(1e) −48	(1a-1e) 67 (1e-C) 19·1	(1a-C) 11·8 (2-C) 323·6	555
$CF_{10}O_5S$	$(F^{(1)}SF_4^{(2)}OO)_2CO$		(1) +57·3	(2) +55·9	(1-2) 153·3		18
$CF_{12}H_3ClO_2SSb_2$	$CH_3OS(O)F^{(1)}Cl^+ F^{(2)}F_4^{(3)}SbF^{(4)}SbF_4F^-$		(1) +92 (3) −113	(2) −136 (4) −90	(2-3) 100	(3-4) 60	537
$CF_{13}H_3OSSb_2$	$CH_3OSF_2^{(1)+} F^{(2)}F_4^{(3)}SbF^{(4)}SbF_4F^-$		(1) +22 (3) −112	(2) −134 (4) −89	(2-3) 100	(3-4) 60	537
$C_2FH_6N_3O_5S_3$			+64·0				550
$C_2FCl_5N_3OPS$			+76·9		(P-F) 7·0		30
$C_2F_2H_4ClNOS$	$CH_2Cl{\cdot}CH_2{\cdot}NS(O)F_2$		+46·3				33
$C_2F_2H_5N_3O_4S_3$			(1) +69·86	(2) +65·0	(1-2) 4	(1-3) 3·5	550

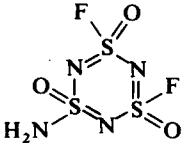
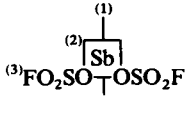
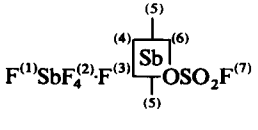
$C_2F_2H_7N_3O_5S_3$		(1) +60·96	(2) +69·15	(1-2) 8·5	(1-3) 3·1	550
$C_2F_5H_3O_3S$	$F^{(1)}SF_4^{(2)}\cdot OO\cdot CO\cdot CH_3$	(1) +62·4	(2) +50·2	(1-2) 156·6		18
$C_2F_5H_4ClO_2S$	$F^{(1)}SF_4^{(2)}\cdot OOCH_2^{(3)}\cdot CH_2Cl$	(1) +63·6	(2) +45·6	(1-2) 155	(2-3) 0·9	561
$C_3FH_{10}N_5O_3S_3$		+78·8				525
$C_3F_2H_3N_3O_2S$		+50·8		(1-2) 0·9		37
$C_4FH_{10}N_5O_3S_3$		+76·05				525
$C_4FH_{12}N_5O_3S_3$		+72·2				525

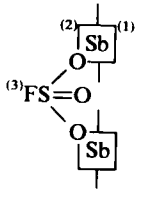
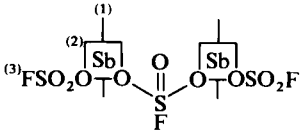
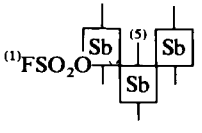
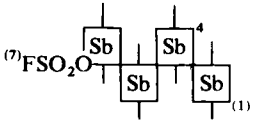
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_4FH_{15}N_6O_3S_3$		+75·8		525
$C_4F_2H_{10}N_2S$	$(CH_3{\cdot}CH_2)_2NSF_2N$	+84·9		414
$C_4F_2H_{12}N_4O_3S_3Si$		+73·8		525
$C_4F_2H_{12}N_4O_3S_3Sn$	As above with Si replaced by Sn	{A+71·55 B+71·90 +73·87} (two isomers)	(A-B) 19	525
$C_4F_3H_9N_2OSSi$	$(CH_3)_3SiN{=}SF_2^{(1)}{=}N{-}CF(O)$	(1) +63·3		37
$C_4F_4H_{10}N_8O_6S_6$		+73·95		525
$C_4F_{10}O_4S^-$		(1) +32·5 (2) +72·6	(1-2) 60	526
$C_5FH_5N_2O_4S_2$		+53·5		521 11

$C_5FH_{12}N_3O_5S_3$		+64·0, +64·17			550
$C_5F_2H_{13}N_3O_5S_3$		(1) +60·79, +60·74 (2) +69·74, +69·63	(1-2) 9·3	(1-3) 3·2	550
$C_5F_2H_{14}N_4O_3S_3Si$		{A +72·85 B +72·00 +73·10 (two isomers)}	(A-B) 20		525
$C_6FH_4N_3O_4S_2$		+54·1			11
C_6FH_5OS	$C_6H_5S(O)F$	+6			576
$C_6FH_5O_2S$	$C_6H_5S(O)_2F$	+65			576
$C_6FH_{14}N_3O_5S_3$		+64·13, +64·28			550
$C_6F_2H_5NS$	$C_6H_5SF_2N$	+97·5			414

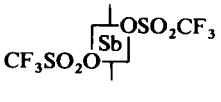
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_6F_2H_{14}N_3O_5S_3$		(1) +65·91, +65·96 (2) +69·29, +69·44	(1-2) 9·4 (1-3) 3·0	550
$C_6F_2H_{18}N_2SSi_2$	$(CH_3)_3SiN{=}SF_2{=}NSi(CH_3)_2$	+77·4		37
$C_7FH_4ClN_2O_5S_2$		+64·9		11
$C_7F_2H_6N_4O_3S_3$		+73·7, +71·6		525
$C_7F_4H_{18}N_4OS_2Si_2$	$[(CH_3)_3SiNSF_2N]_2CO$	+64·2		37
$C_7F_5H_4NS$	m-$CF_3{\cdot}C_6H_4{\cdot}SF_2^{(1)}N$	(1) +113·4		414
$C_8F_6H_{24}N_2O_6S_3$	*cis*-$SF_2^{(1)}F_2^{(2)}(FSO_3)_2^{2-}[(CH_3)_4N^+]_2$ (F(1) *trans* to FSO_3)	(1) +33·1 (2) +85·6	(1-2) 75	119
$C_9FH_{11}O_2S$		+67·74	(1-2) 1·90 (1-3) 0·96 (14) 0·68	413(n)
$C_9FH_{16}N_3O_3S$	$\overline{CH_2{\cdot}CH_2OCH_2CH_2N}{\cdot}SF{=}N{\cdot}CO{\cdot}\overline{NCH_2{\cdot}CH_2OCH_2{\cdot}CH_2}$	+39·0		114(c)

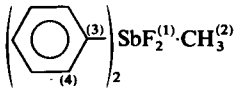
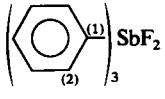
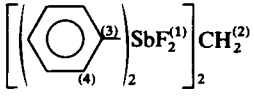
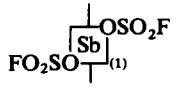
$C_{10}F_{10}H_{24}N_2O_6S_3$	*cis* $SF_2^{(1)}F_2^{(2)}(CF_3SO_3)_2^{2-}[(CH_3)_4N^+]_2$ (F(1) *trans* to CF_3SO_3)	(1) −39·3	(2) +13·3	(1-2) 74	119
$C_{11}FH_{20}N_3OS$	$\overbrace{CH_2(CH_2)_4}NSF{=}N{\cdot}CO{\cdot}\overbrace{N(CH_2)_4}CH_2$	+39·0			114(c)
$C_{12}FH_{10}NS$	$(C_6H_5)_2SFN$	+102·9			414
$C_{14}FH_8Cl_2N_3O_4S_2$		+60·5			11
$C_{14}FH_8N_5O_8S_2$	As above with Cl replaced by NO_2	+62·0			11
$C_{14}FH_{10}N_3O_4S_2$	As above with Cl replaced by H	+59·9			11 521
$C_{16}FH_{14}N_3O_6S_2$	As above with Cl replaced by OCH_3	+58·9			11
$C_{24}FH_{20}N_3S$	$[(C_6H_5)_2N]_2SFN$	+92·9			414
$C_{24}F_2H_{21}N_4O_3PS_3$		+67·9			525
$C_{24}F_8H_{20}BN_4O_4PS_4$	$(C_6H_5)_4P[B(NSOF_2)_4]$	+51·8			609
$C_{27}FH_{29}N_5O_3PS_3$		+74·7			525
$C_{48}F_8H_{40}As_2CoN_4O_4S_4$	$[(C_6H_5)_4As]_2[Co(NSOF_2)_4]$	+24·5			613

Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{48}F_8H_{40}As_2N_4O_4PdS_4$	$[(C_6H_5)_4As]_2[Pd(NSOF_2)_4]$	+69·9		613
$C_{48}F_8H_{40}HgN_4O_4P_2S_4$	$[(C_6H_5)_4P]_2[Hg(NSOF_2)_4]$	+67·1		613
$FN_5O_4S_6$	$FSO_2{\cdot}NSO_2{\cdot}N_4S_4$	+55·8		521 11
FO_3S^-	FSO_3^-	+44·9		19
$F_2H_2N_4O_3S_3$		+73·0		525
$F_2H_5N_5O_3S_3$	As above with NH_2 replaced by $NH_2{\cdot}NH_3$	+66·7		525
$F_2O_6S_2$	$S_2O_6F_2$	+43		524
$F_4O_{12}S_4U$	$U(SO_3F)_4$	+39·6		528
$F_6O_3SSb^-$	$F^{(1)}SbF_4^{(2)}{\cdot}OSO_2F^{(3)-}$	(1) −136·3 (2) −97·6 (3) +46·5		19
$F_6O_6S_2Sb^-$		(1) −85·0 (2) −118·8 (3) +47·0	(1-2) 135	19
$F_{11}O_3SSb^-$		(1) −140·3 (2) −109·6 (3) −79·8 (4) −127·9 (5) −95·1 (6) −119·2 (7) +47·4	(1-2) 105 (2-3) 52 (3-4) 75 (3-5) 95 (4-6) 105	19

$F_{11}O_3SSb_2^-$		(1) −132·10 (3) +45·7	(2) −106·0	(1-2) 105		19
$F_{11}O_9S_3Sb_2^-$		(1) −88·6 (3) +48·2	(2) −120·3	(1-2) 135		19
$F_{16}O_3Sb_3S^-$		(1) +47·90	(5) −102·5			19
$F_{21}O_3Sb_4S^-$		(1) −139·2 (7) +48·1	(4) −123·3			19

Fluorine bonded to antimony

CF_6H_3Sb	$CH_3F^{(1)}\cdot SbF_4^{(2)}F^{(3)}$	(1) −196 (3) −141	(2) −115	(1-2) 48	(2-3) 94	537
$C_2F_{10}O_6S_2Sb^-$		−87·3				19
$C_4F_{11}H_9Sb_2$	$(CH_3)_3C^+\ F^{(1)}SbF_4^{(2)}\cdot F^{(3)}\cdot SbF_4F^-$	(1) −136 (3) −90	(2) −113	(1-2) 101	(2-3) 60	537

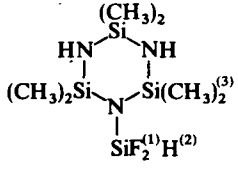
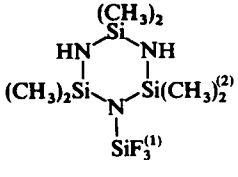
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{12}F_2H_5CrFeO_7Sb$	$C_5H_5(CO)_2FeSbF_2Cr(CO)_5$	−103·4		598
$C_{12}F_2H_5FeO_7SbW$	$C_5H_5(CO)_2FeSbF_2W(CO)_5$	−108·0		598
$C_{13}F_2H_5CrMoO_8Sb$	$C_5H_5(CO)_3MoSb_2{\cdot}Cr(CO)_5$	−106·3		598
$C_{13}F_2H_5CrO_8SbW$	$C_5H_5(CO)_3WSbF_2Cr(CO)_5$	−108·8		598
$C_{13}F_2H_5MoO_8SbW$	$C_5H_5(CO)_3MoSbF_2W(CO)_5$	−110·4		598
$C_{13}F_2H_{13}Sb$		−137·1	(1-2) 5·0 (1-C2) 16·7 (1-C3) 13·8 (1-C4) 5·0	575
$C_{18}F_2H_{15}Sb$		−153·2	(F-C1) 15·4 (F-C2) 4·9	575
$C_{21}FH_{10}CrMo_2O_{11}Sb$	$[C_5H_5(CO)_3Mo]_2SbFCr(CO)_5$	−234·0		598
$C_{21}FH_{10}CrO_{11}SbW_2$	$[C_5H_5(CO)_3W]_2SbFCr(CO)_5$	−234·6		598
$C_{21}FH_{10}Mo_2O_{11}SbW$	$[C_5H_5(CO)_3Mo]_2SbFW(CO)_5$	−237·0		598
$C_{25}F_4H_{22}Sb_2$		−127·7	(1-C2) 21·0 (1-C3) 13·5 (1-C4) 4·5	575
$F_6O_6S_2Sb^-$		(1) −91·9		19
F_6Sb^-	SbF_6^-	−115·8		19

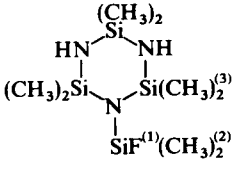
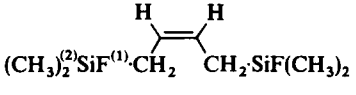
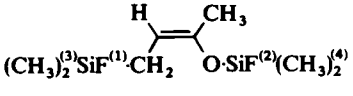
Fluorine bonded to selenium

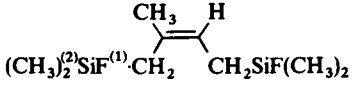
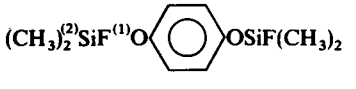
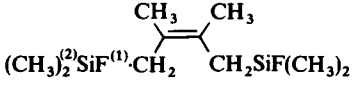
$F_{15}AsO_3Se_3$	$As(OSeF_4^{(1)}F^{(2)})_3$	(1) +78·2	(2) +74·3	(1-2) 230 (Se-1) 1316 (Se-2) 1351	539

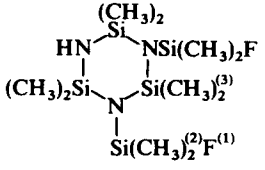
Fluorine bonded to silicon

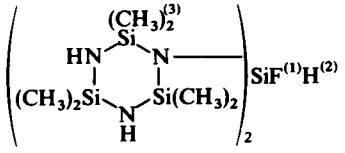
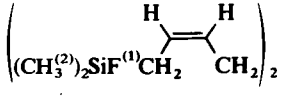
CF_3H_3Si	$CH_3{\cdot}SiF_3$	−134·6			522
$CF_5H_3Si_2$	$CH_3^{(3)}{\cdot}SiF_2^{(2)}{\cdot}SiF_3^{(1)}$	(1) −125·7	(2) −131·9	(1-2) 14·80 (2-3) 7·41	554
$C_2F_4H_6Si_2$	$CH_3{\cdot}SiF_2^{(1)(2)}{\cdot}SiF_2^{(3)}{\cdot}CH_3$			$\frac{1}{2}[J(Si\text{-}F)+J(Si\text{-}SiF)]$ 194 (1-2) +4·8 or −5·9 (1-3) 17·1 (2-3) 9·2	560
$C_2F_4H_6Si_2$	$(CH_3^{(3)})_2Si^{(5)}F^{(2)}Si^{(4)}F_3^{(1)}$	(1) −124·3	(2)−173·0	(1-2) 9·85 (2-3) 8·15 (Si4-1) 368·4 (Si4-2) 56·6 (Si5-1) 42·4 (Si5-2) 296·2	554
$C_2F_4H_6Si_2$	$CH_3^{(2)}Si^{(3)}F_2^{(1)}{\cdot}Si^{(4)}F_2^{(5)}CH_3$	−133·7		(1-2) 8·03 (1-5) 13·13 (Si3-1) 334·2 (Si4-1) 53·8	554
$C_3F_3H_9NPSi$	$(CH_3)_3P{=}NSiF_3$	−147·5			565
$C_3F_3H_9Si_2$	$(CH_3)_3SiSiF_3$	−122·7		(1-2) 0·9	554
$C_3F_3H_9Si_2$	$(CH_3)_2Si^{(4)}F^{(1)}{\cdot}Si^{(5)}F_2^{(2)}CH_3^{(3)}$	(1) −176·3	(2) −133·9	(1-2) 9·63 (2-3) 8·33 (Si5-2) 341·8 (Si4-2) 39·4	554
$C_4F_2H_{12}NPSi$	$(CH_3)_3P{=}NSiF_2^{(1)}{\cdot}CH_3^{(2)}$	−124·1		(1-2) 4·3 (P-F) 3·8 (Si-F) 259	565
$C_4F_2H_{12}Si_2$	$(CH_3)_3Si^{(4)}{\cdot}Si^{(3)}F_2^{(1)}{\cdot}CH_3^{(2)}$	−132·8		(1-2) 8·12 (Si3-1) 347·7 (Si4-1) 29·6	554
$C_4F_2H_{12}Si_2$	$(CH_3^{(3)})_2Si^{(4)}F^{(1)}{\cdot}Si^{(5)}F^{(2)}{\cdot}(CH_3)_2$	−176·0		(1-2) 9·02 (1-3) 8·93 (Si4-1) 302·8 (Si5-1) 35·08	554

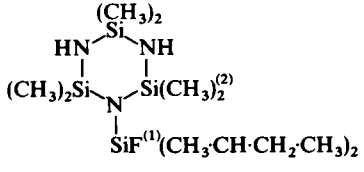
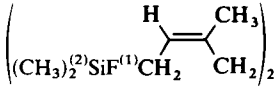
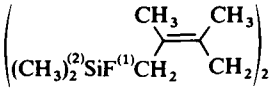
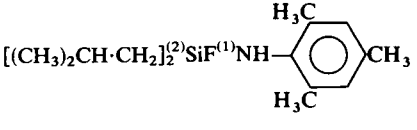
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_4F_3H_9Si$	$(CH_3)_3C{\cdot}SiF_3$	−106·7		571(b)
$C_4F_3H_{11}NPSi$	$CH_3{\cdot}CH_2P(CH_3)_2{=}NSiF_3$	−146·2	(P-F) 6·1	565
$C_5FH_{15}NPSi$	$(CH_3)_3P{=}NSiF^{(1)}(CH_3^{(2)})_2$	−128·8	(1-2) 5·85 (P-F) 3·35 (Si-F) 267·5	565
$C_5FH_{15}Si_2$	$(CH_3)_3Si^{(4)}Si^{(3)}F^{(1)}(CH_3^{(2)})_2$	−175·7	(1-2) 8·57 (Si3-1) 307·1 (Si4-1) 26·7	554
$C_6F_2H_{15}NSi$	$CH_3{\cdot}CH_2{\cdot}CH(CH_3)SiF_2^{(1)}{\cdot}N(CH_3^{(2)})_2$	−145·9	(1-2) 1·6	577(b)
$C_6F_2H_{16}N_2Si$	$CH_3{\cdot}CH_2{\cdot}CH(CH_3)SiF_2{\cdot}NH{\cdot}N(CH_3)_2$	−146·63		578(b)
$C_6F_2H_{21}N_3Si_4$		−197·6	(1-2) 88·0 (1-3) 0·7	579(b)
$C_6F_3H_5Si$	$C_6H_5SiF_3$	−143·1		522
$C_6F_3H_{15}NPSi$	$(CH_3{\cdot}CH_2)_3P{=}N{\cdot}SiF_3$	−146·7	(P-F) 5·2 (Si-F) 185	565
$C_6F_3H_{15}NPSi$	$(CH_3)_3CP(CH_3)_2{=}NSiF_3$	−146·2	(P-F) 5·55 (Si-F) 184·5	565
$C_6F_3H_{20}N_3Si_4$		−187·1	(1-2) 1·0	579(b)
$C_6F_6H_{30}O_6Pt_2Si$	$[(CH_3)_3Pt(H_2O)_3]_2SiF_6$	−137		585(h)
$C_7F_2H_{18}NPSi$	$(CH_3{\cdot}CH_2)_3P{=}N{\cdot}SiF_2^{(1)}{\cdot}CH_3^{(2)}$	−123·6	(1-2) 4·0 (P-F) 1·15 (Si-F) 257·5	565

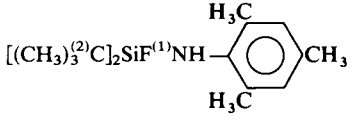
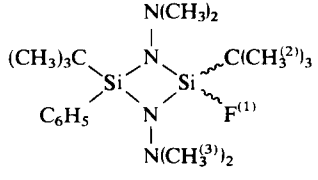
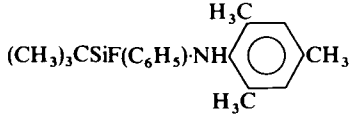
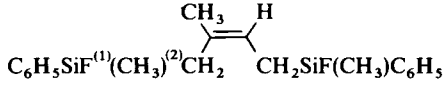
$C_7F_2H_{18}NPSi$	$(CH_3)_3CP(CH_3)_2{=}N{\cdot}SiF_2^{(1)}{\cdot}CH_3^{(2)}$	−123·5	(1-2) 4·2 (Si-F) 256·5	(P-F) 1·7	565
$C_8FH_{17}SSi$	$CH_3^{(2)}(CH_2)_2SiF^{(1)}(CH_3){\cdot}CH^{(3)}(CH_3){\cdot}SCH{=}CH_2$ (mixture of diastereoisomers)		(1-2) 7·3	(1-3) ~1·8	589
$C_8FH_{21}NPSi$	$(CH_3{\cdot}CH_2)_3P{=}N{\cdot}SiF^{(1)}(CH_3^{(2)})_2$	−127·6	(1-2) 5·9 (Si-F) 267	(P-F) 0·3	565
$C_8FH_{21}NPSi$	$(CH_3)_3CP(CH_3)_2{=}N{\cdot}SiF^{(1)}(CH_3^{(2)})_2$	−127·7	(1-2) 5·9 (Si-F) 267	(P-F) 0·8	565
$C_8FH_{26}N_3Si_4$		−190·8	(1-2) 7·2	(1-3) 1·0	579(b)
$C_8F_2H_{18}$			(1-2) 7·5		590
$C_8F_2H_{18}OSi_2$			(1-3) 7·5	(2-4) 6·0	590
$C_8F_2H_{19}NSi$	$CH_3{\cdot}CH_2{\cdot}CH(CH_3)SiF_2^{(1)}{\cdot}NH^{(2)}C(CH_3^{(3)})_3$	−138·3	(1-2) 3·0 (Si-1) 277·7	(1-3) 0·5	577(b)
$C_8F_2H_{19}NSi$	$CH_3{\cdot}CH_2{\cdot}CH(CH_3)SiF_2^{(1)(2)}{\cdot}N(CH_2^{(3)}CH_3)_2$	−144·2	(1-2) 42 (Si-1,2) 286·9	(1,2-3) 1·5	577(b)
$C_8F_2H_{21}NSi_2$	$CH_3{\cdot}CH_2{\cdot}CH(CH_3){\cdot}SiF_2^{(1)(2)}{\cdot}NCH_3^{(3)}[Si(CH_3^{(4)})_3]$	(1) −140·9 (2) −139·0	(1-2) 4·2 (1,2-4) 0·7 (Si-1,2) 288·7	(1,2-3) 1·2	577(b)
$C_8F_3H_{11}NPSi$	$C_6H_5P(CH_3)_2{=}N{\cdot}SiF_3$	−145·7			565
$C_8F_4H_{24}N_2Si_4$	$[CH_3^{(3)}SiF_2^{(1)(2)}N(Si(CH_3)_3)]_2$	(1)(2) −127·6, −128·8	(1-2) 39 (1-3)(2-3) 4·6 (Si-1)(Si-2) 274		592(b)

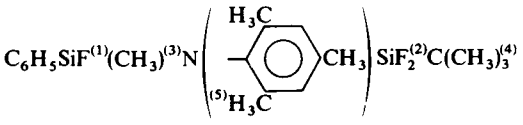
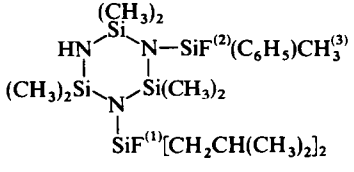
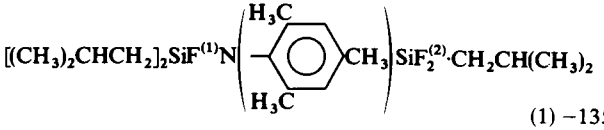
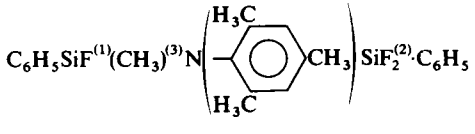
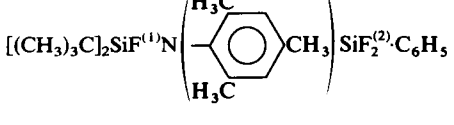
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)		Ref.
$C_9FH_{15}N_2Si$	$CH_3^{(2)}SiF^{(1)}(C_6H_5)NH^{(3)}N(CH_3)_2$	−143·83	(1-2) 5·6	(1-3) 1·2	578(b)
$C_9F_2H_{14}NPSi$	$C_6H_5P(CH_3)_2{=}N{\cdot}SiF_2^{(1)}{\cdot}CH_3^{(2)}$	−123·7	(1-2) 4·3 (Si-F) 258	(P-F) 3·2	565
$C_9F_2H_{20}Si_2$			(1-2) 7·5		590
$C_9F_3H_{21}NPS$	$(CH_3{\cdot}CH_2{\cdot}CH_2)_3P{=}N{\cdot}SiF_3$	−146·4	(P-F) 5·25	(Si-F) 184·5	565
$C_9F_3H_{21}NPS$	$[(CH_3)_2CH]_3P{=}N{\cdot}SiF_3$	−146·6	(P-F) 4·5	(Si-F) 180·5	565
$C_9F_3H_{21}NPS$	$[(CH_3)_3C]_2P(CH_3){=}N{\cdot}SiF_3$	−146·7	(P-F) 4·8	(Si-F) 181	565
$C_{10}FH_{17}NPS$	$C_6H_5P(CH_3)_2{=}N{\cdot}SiF^{(1)}{\cdot}(CH_3^{(2)})_2$	−128·2	(1-2) 6·05 (Si-F) 267	(P-F) 2·2	565
$C_{10}FH_{25}N_2Si$	$(CH_3{\cdot}CH_2{\cdot}CH{\cdot}CH_3)_2SiF{\cdot}NHN(CH_3)_2$	−152·48, −152·68			578(b)
$C_{10}F_2H_{15}NSi$	$C_6H_5{\cdot}SiF_2^{(1)}{\cdot}NH^{(2)}C(CH_3^{(3)})_3$	−136·5	(1-2) 3·5	(1-3) 0·5	571(b)
$C_{10}F_2H_{16}O_2Si_2$			(1-2) 6·0		590
$C_{10}F_2H_{22}Si_2$			(1-2) 7·5		590
$C_{10}F_2H_{24}NPSi$	$(CH_3{\cdot}CH_2{\cdot}CH_2)_3P{=}N{\cdot}SiF_2^{(1)}{\cdot}CH_3^{(2)}$	−123·7	(1-2) 4·2 (Si-F) 259	(P-F) 0·85	565
$C_{10}F_2H_{24}NPSi$	$[(CH_3)_2CH]_3P{=}N{\cdot}SiF_2^{(1)}{\cdot}CH_3^{(2)}$	−123·4	(1-2) 4·1 (Si-F) 256	(P-F) 1·5	565
$C_{10}F_2H_{24}NPSi$	$[(CH_3)_3C]_2P(CH_3){=}N{\cdot}SiF_2^{(1)}{\cdot}CH_3^{(2)}$	−123·7	(1-2) 4·1 (Si-F) 256	(P-F) 0·45	565

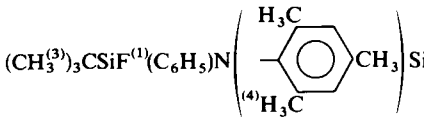
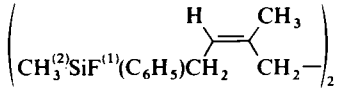
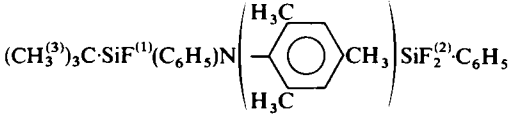
$C_{10}F_2H_{25}NSi_2$	$CH_3{\cdot}CH_2{\cdot}CH(CH_3)SiF_2^{(1)(2)}{\cdot}NCH^{(4)}(CH_3^{(3)})_2[Si(CH_3^{(5)})_3]$	(1) −133·3	(2) −129·9	(1-2) 40 (1,2-4) 2·5 (Si-1,2) 293·9	(1,2-3) 0·7 (1,2-5) 0·5	577(b)
$C_{10}F_2H_{27}NSi_3$	$CH_3{\cdot}CH_2{\cdot}CH(CH_3)SiF_2^{(1)(2)}{\cdot}N[Si(CH_3^{(3)(4)})_3]_2$	(1) −130·2	(2) −127·9	(1-2) 41 (2-4) 0·9	(1-3) 0·7 (Si-1,2) 291·7	577(b)
$C_{10}F_2H_{28}N_4Si_2$	$(CH_3)_2N{\cdot}NHSi(CH_3^{(2)})_2N[SiF_2^{(1)}C(CH_3^{(3)})_3]N(CH_3)_2$	−146·88		(1-2) 0·8	(1-3) 1·1	578(b)
$C_{10}F_2H_{31}N_3Si_5$		−191·2		(1-2) 5·7	(1-3) 0·6	579(b)
$C_{10}F_4H_{24}N_2Si_2$	$(CH_3^{(2)})_2N{\cdot}NSiF_2^{(1)}(CH_3{\cdot}CH{\cdot}CH_2{\cdot}CH_3)_2$	−139·35		(1-2) 0·9		578(b)
$C_{11}FH_{18}NSi$	$C_6H_5{\cdot}SiF^{(1)}CH_3^{(2)}{\cdot}NHC(CH_3^{(3)})_3$	−139·6		(1-2) 5·4	(1-3) 0·3	571(b)
$C_{11}FH_{27}NPS$	$(CH_3{\cdot}CH_2{\cdot}CH_2)_3P{=}N{\cdot}SiF^{(1)}(CH_3^{(2)})_2$	−127·8		(1-2) 5·75 (Si-F) 267	(P-F) 0·2	565
$C_{11}FH_{27}NPS$	$[(CH_3)_2CH]_3{\cdot}P{=}N{\cdot}SiF^{(1)}(CH_3^{(2)})_2$	−126·5		(1-2) 5·7 (Si-F) 264·5	(P-F) 3·25	565
$C_{11}FH_{27}NPS$	$[(CH_3)_3C]_2P(CH_3){=}N{\cdot}SiF^{(1)}(CH_3^{(2)})_2$	−127·2		(1-2) 5·8 (Si-F) 264·5	(P-F) 2·15	565
$C_{11}F_2H_{17}NSi$	$CH_3{\cdot}CH_2{\cdot}CH(CH_3){\cdot}SiF_2^{(1)(2)}{\cdot}N(CH_3^{(3)})C_6H_5$	(1) −141·1	(2) −139·9	(1-2) 41 (Si-1,2) 289·3	(1,2-3) 1·5	577(b)
$C_{11}F_2H_{27}NSi_2$	$(CH_3^{(4)})_3C{\cdot}SiF_2^{(1)}{\cdot}N[Si(CH_3^{(2)})_3]C(CH_3^{(3)})_3$	−126·6		(1-2) 1·4 (1-4) 0·8	(1-3) 1·4	571(b)
$C_{11}F_2H_{27}NSi_2$	$CH_3{\cdot}CH_2{\cdot}CH(CH_3){\cdot}SiF_2^{(1)(2)}{\cdot}N[SiCH_3^{(3)})_3]C(CH_3^{(4)})_3$	(1) −128·8	(2) −126·3	(1-2) 40 (1,2-4) 0·7	(1,2-3) 1·1 (Si-1,2) 294·8	577(b)
$C_{12}FH_{21}N_2Si$	$(CH_3^{(2)})_3CSiF^{(1)}(C_6H_5)NHN(CH_3)_2$	−152·62		(1-2) 0·9		578(b)

Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{12}FH_{33}N_2Si_3$	$CH_3{\cdot}CH_2CH(CH_3)SiF^{(1)}[NCH_3^{(2)}(Si(CH_3^{(3)})_3)]_2$	−139·9	(1-2) 1·6 (1-3) 1·0 (Si-1) 267·9	577(b)
$C_{12}FH_{41}N_6Si_7$		−200·90	(1-2) 73·0 (1-3) 0·7	579(b)
$C_{12}F_2H_{24}Si_2$			(1-2) 7·5	590
$C_{12}F_2H_{27}NSi$	$CH_3{\cdot}CH_2{\cdot}CH(CH_3)SiF_2^{(1)(2)}{\cdot}N[C(CH_3^{(3)(4)})_3]_2$	(1) −126·0 (2) −123·4	(1-2) 40 (1-3) 0·8 (2-4) 0·7 (Si-1,2) 296·0	577(b)
$C_{12}F_3H_{27}NPSi$	$(CH_3{\cdot}CH_2{\cdot}CH_2{\cdot}CH_2)_3P{=}N{\cdot}SiF_3$	−146·4	(P-F) 5·25 (Si-F) 185·5	565
$C_{12}F_3H_{27}NPSi$	$[(CH_3)_2CH{\cdot}CH_2]_3P{=}N{\cdot}SiF_3$	−146·3	(P-F) 4·8 (Si-F) 182·5	565
$C_{12}F_3H_{27}NPSi$	$[(CH_3)_3C]_3P{=}N{\cdot}SiF_3$	−146·9	(P-F) 3·7 (Si-F) 175	565
$C_{12}F_5H_{28}NSi$	$(CH_3{\cdot}CH_2{\cdot}CH_2)_4N^+SiF_5^-$	−137·4		522
$C_{13}F_2H_{23}NSi_2$	$C_6H_5{\cdot}SiF_2^{(1)}N[Si(CH_3^{(2)})_3]C(CH_3^{(3)})_3$	−123·9	(1-2) 1·0 (1-3) 0·7	571(b)
$C_{13}F_2H_{30}NPSi$	$(CH_3{\cdot}CH_2{\cdot}CH_2{\cdot}CH_2)_3P{=}N{\cdot}SiF_2^{(1)}{\cdot}CH_3^{(2)}$	−123·7	(1-2) 4·15 (P-F) 0·9 (Si-F) 259	565
$C_{13}F_2H_{30}NPSi$	$[(CH_3)_2CH{\cdot}CH_2]_3P{=}N{\cdot}SiF_2^{(1)}CH_3^{(2)}$	−123·7	(1-2) 4·2 (P-F) 0·9 (Si-F) 256·5	565
$C_{13}F_2H_{30}NPSi$	$[(CH_3)_3C]_3P{=}N{\cdot}SiF_2^{(1)}CH_3^{(2)}$	−122·7	(1-2) 4·05 (P-F) 3·2 (Si-F) 253	565
$C_{13}F_4H_{28}NSi$	$(CH_3{\cdot}CH_2{\cdot}CH_2)_4N^+\ CH_3SiF_4^-$	−111·0		522
$C_{14}FH_{24}NSi$	$C_6H_5{\cdot}SiF^{(1)}(CH_2^{(2)}{\cdot}CH_2{\cdot}CH_2{\cdot}CH_3)NHC(CH_3^{(3)})_3$	−145·2	(1-2) 3·5 (1-3) 0·3	571(b)

$C_{14}FH_{33}NPSi$	$(CH_3{\cdot}CH_2{\cdot}CH_2{\cdot}CH_2)_3P{=}N{\cdot}SiF^{(1)}(CH_3^{(2)})_2$	−127·8	(1-2) 5·85 (P-F) 0·2 (Si-F) 267·5	565
$C_{14}FH_{33}NPSi$	$[(CH_3)_2CH{\cdot}CH_2]_3P{=}N{\cdot}SiF^{(1)}(CH_3^{(2)})_2$	−127·4	(1-2) 5·7 (P-F) 2·15 (Si-F) 266·5	565
$C_{14}FH_{33}NPSi$	$[(CH_3)_3C]_3P{=}N{\cdot}SiF^{(1)}(CH_3^{(2)})_2$	−126·0	(1-2) 5·9 (P-F) 5·65 (Si-F) 264·5	565
$C_{14}FH_{38}N_3Si_4$		−166·4	(1-2) 1·3 ^1J(Si-F) 286·4 ^3J(Si-F) 7·3	579(b)
$C_{14}F_2H_{25}NSi_2$	$CH_3{\cdot}CH_2{\cdot}CH(CH_3){\cdot}SiF_2^{(1)(2)}{\cdot}NSi(CH_3^{(3)})_3(C_6H_4CH_3\,p)$	(1) −137·5 (2) −136·5	(1-2) 41 (1,2-3) 0·8 (Si-1,2) 289·3	577(b)
$C_{14}F_2H_{28}Si_2$			(1-2) 7·5	590
$C_{14}F_4H_{16}N_2Si_2$	$[CH_3^{(3)}SiF_2^{(1)(2)}N(C_6H_5)]_2$	(1)(2) −131·6, −128·7	(1-2) 45 (Si-1,2) 281 (1-3)(2-3) 4·7	592(b)
$C_{14}F_4H_{16}N_2Si_2$	$(CH_3)_2N{\cdot}N(SiF_2C_6H_5)_2$	−145·20		578(b)
$C_{16}FH_{20}NSi$	$(C_6H_5)_2SiF^{(1)}NHC(CH_3^{(2)})_2$	−146·6	(1-2) 0·4	571(b)
$C_{16}F_2H_{32}Si_2$			(1-2) 7·5	590
$C_{17}FH_{30}NSi$		−132·2	(1-2) 5·3 (Si-F) 296·6	603(b)

Molecular formula	Structure of compounds		Chemical shifts (ppm)	Coupling constants (Hz)		Ref.
$C_{17}FH_{30}NSi$			−152·2	(1-2) 1·0		603(b)
$C_{17}FH_{36}N_3Si_3$	$(CH_3)_3CNHSi(CH_3)_2NC_6H_5N[Si(CH_3)_3]SiF^{(1)}(CH_3^{(2)})_2$		−128·0	(1-2) 6·3		604(b)
$C_{18}FH_{25}N_2Si$	$CH_3{\cdot}CH_2{\cdot}CH(CH_3)SiF^{(1)}[NC_6H_5(CH_3^{(2)})]_2$		−142·2	(1-2) 1·7	(Si-F) 277·7	577(b)
$C_{18}FH_{35}N_4Si_2$	 (*cis* and *trans*)	[a] [b]	−129·70 −129·30	(1-2) 1·2 (1-2) 1·0	(1-3) 0·5 (1-3) 0·6	578(b)
$C_{18}F_4H_{28}N_2Si_4$	$[C_6H_5SiF_2^{(1)(2)}N(Si(CH_3)_3)]_2$		(1)(2) −133·9, −137·7	(1-2) 39·5		592(b)
$C_{18}F_4H_{33}NSi$	$(CH_3{\cdot}CH_2{\cdot}CH_2)_4N^+\ C_6H_5SiF_4^-$		−118·7			522
$C_{19}FH_{26}NSi$			−150·0			603(b)
$C_{19}F_2H_{24}Si_2$				(1-2) 7·5		590
$C_{20}F_2H_{26}Si_2$	As above with H on double bond replaced by CH_3			(1-2) 7·5		590
$C_{20}F_2H_{28}N_2Si_2$	$[C_6H_5SiFNC(CH_3)_3]_2$ (*cis* and *trans* isomers)		−137·8, −128·8			571(b)

$C_{20}F_3H_{28}NSi_2$		(1) −141·0	(2) −137·4	(1-3) 6·4 (Si1-1) 2881	(2-4) 1·2 (Si2-2) 293·0	603(b)
$C_{20}F_3H_{28}NSi_2$	As above with C_6H_5 and $C(CH_3)_3$ groups interchanged	(1) −143·8 (2B) −131·7	(2A) −133·9	(1-2) 0·6 (1-4) 1·0 (Si1-1) 302·6 (Si-2A) 272·1	(1-3) 6·2 (2A-2B) 42	603(b)
$C_{20}F_3H_{28}NSi_2$	As above with CH_3 and $C(CH_3)_3$ groups interchanged	(1) −151·0 (2B) −124·0	(2A) −128·0	(2A-2B) 43 (2B-3) 1·0	(2A-3) 5·1 (2-5) 2·5	603(b)
$C_{21}F_2H_{45}N_3Si_5$		(1) −190·4	(2) −189·1	(2-3) 7·5		579(b)
$C_{21}F_3H_{38}NSi_2$		(1) −135·9	(2) −128·8	(Si-1) 304·0	(Si-2) 284·4	603(b)
$C_{22}F_3H_{24}NSi_2$		(1) −140·3	(2) −135·2	(1-2) 0·7 (Si-1) 287·5	(1-3) 6·4 (Si2-2) 269·8	603(b)
$C_{23}F_3H_{34}NSi_2$		(1) −153·4	(2) −129·4	(Si-1) 313·7	(Si-2) 274·5	603(b)

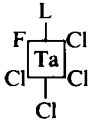
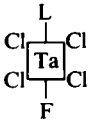
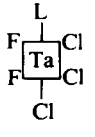
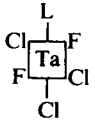
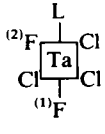
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{23}F_3H_{34}NSi_2$				
		(1) −150·7 (2A) −129·8 (2B) −126·0	(1-3) 1·1 (2A-2B) 44 (2-4) 3·0	603(b)
$C_{23}F_3H_{34}NSi_2$	As above with $CH_2CH(CH_3)_2$ replaced by $C(CH_3^{(5)})_3$	(1) −152·0 (2A) −135·4 (2b) −134·4	(1-3) 1·0 (2-5) 1·0 (2A-2B) 39·0	603(b)
$C_{24}F_2H_{32}Si_2$			(1-2) 7·5	590
$C_{24}F_6H_{56}N_2Si$	$[(CH_3{\cdot}CH_2{\cdot}CH_2)_4N]_2SiF_6$	−127·4		522
$C_{25}F_3H_{30}NSi_2$		(1) −149·7 (2A) −135·3 (2B) −133·3	(1-3) 1·0 (2A-2B) 42	603(b)
$C_{30}F_5H_{61}N_2Si$	$[(CH_3{\cdot}CH_2{\cdot}CH_2)_4N]_2[C_6H_5SiF^{(1)}F_4^{(2)}]$	(1) −121·3 (2) −114·5	(1-2) 11·0	608
F_4Si	SiF_4	−162		522
F_9Si_3P	$P(^{28}SiF_3)_3$	−113·7	(P-F) 1·8	541
F_9Si_3P	$F_3^{29}SiP(^{28}SiF_3)_2$		(Si-F) 308·0 (F-F) 2·6	541

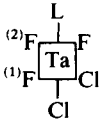
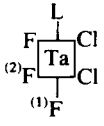
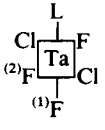
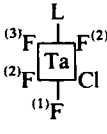
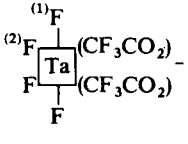
Fluorine bonded to tin

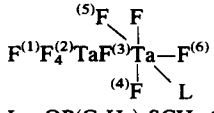
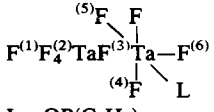
$C_8F_6H_{24}N_2O_6S_2Sn$	*cis*-$SnF_2^{(1)}F_2^{(2)}(FSO_3)^{2-}$ $[(CH_3)_4N^+]_2$ (F(1) *trans* to FSO_3)	(1) −142·6 (2) −134·9	(1-2) 54	119
$C_8F_6H_{24}N_2O_6S_2Sn$	*trans*-$SnF_4(FSO_3)^{2-}$ $[(CH_3)_4N^+]_2$	−134·7		119

$C_{10}F_{10}H_{24}N_2O_6S_2Sn$	*cis*-$SnF_2^{(1)}F_2^{(2)}(CF_3SO_3)_2^{2-}$ $[(CH_3)_4N^+]_2$ (F(1) trans to CF_3SO_3)	(1) −139·1	(2) −129·8	(1-2) 55		119
$C_{10}F_{10}H_{24}N_2O_6S_2Sn$	*trans*-$SnF_4(CF_3SO_3)_2^{2-}$ $[(CH_3)_4N^+]_2$	−130·3				119

Fluorine bonded to tantalum

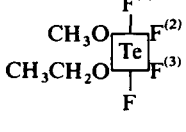
$C_2F_8O_2Ta^-$	$F^{(1)}TaF_4^{(2)}(CF_3CO_2)^-$	(1) +73·7	(2) +56·6	(1-2) 27·5		526
$C_3FH_9Cl_4O_4PTa$	 L = $(CH_3O)_3PO$	+115·44				564
$C_3FH_9Cl_4O_4PTa$	 L = $(CH_3O)_3PO$	+179·52		(P-F) 9		564
$C_3F_2H_9Cl_3O_4PTa$	 L = $(CH_3O)_3PO$	+103·06				564
$C_3F_2H_9Cl_3O_4PTa$	 L = $(CH_3O)_3PO$	+123·88				564
$C_3F_2H_9Cl_3O_4PTa$	 L = $(CH_3O)_3PO$	(1) +161·86	(2) +99·4	(1-2) 33	(P-1) 9	564

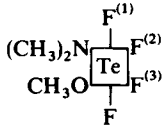
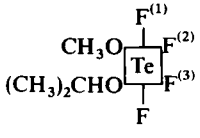
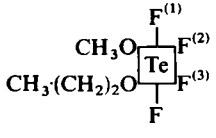
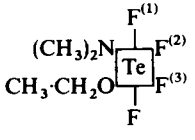
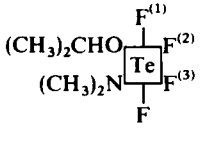
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_3F_3H_9Cl_2O_4PTa$	 L = $(CH_3O)_3PO$	(1) +105·94 (2) +87·20	(1-2) 36	564
$C_3F_3H_9Cl_2O_4PTa$	 L = $(CH_3O)_3PO$	(1) +142·85 (2) +86·70	(1-2) 36 (P-1) 9	564
$C_3F_3H_9Cl_2O_4PTa$	 L = $(CH_3O)_3PO$	(1) +140·85 (2) +103·83	(1-2) 25 (P-1) 9	564
$C_3F_4H_9ClO_4PTa$	$TaF_4Cl(CH_3O)_3PO$	+85·44		564
$C_3F_4H_9ClO_4PTa$		(1) +120·1 (2) +84·37 (3) +70·16	(1-2) 27 (1-3) 35 (2-3) 35 (P-1) 9	564
$C_3F_5H_9O_4PTa$	$TaF_4^{(1)}F^{(2)}(CH_3O)_3PO$	(1) +62·36 (2) +96·70	(1-2) 25 (P-1) 7	564
$C_4F_6H_{12}NO_3STa$	$TaF_4^{(1)}F^{(2)}(FSO_2)^-\ (CH_3)_4N^+$	(1) +70·4 (2) +103·9	(1-2) 24	119
$C_4F_{10}O_4Ta^-$		(1) +86·9 (2) +70·3	(1-2) 26·5	526
$C_5F_8H_{12}NO_3STa$	$TaF_4^{(1)}F^{(2)}(CF_3SO_2)^-\ (CH_3)_4N^+$	(1) +70·4 (2) +103·5	(1-2) 25	119
$C_6F_{10}H_{12}NO_6S_2Ta$	*cis* $TaF_2^{(1)}F_2^{(2)}(CF_3SO_2)_2^-\ (CH_3)_4N^+$	(1) +92·5 (2) +127·2	(1-2) 26	119

$C_8F_6H_{12}CuN_4Ta$	$Cu(TaF_6)\cdot 4CH_3CN$	+37				572
$C_{10}F_{12}H_{15}CuN_5Ta_2$	$Cu(TaF_6)_2\cdot 5CH_3CN$	+37				572
$C_{14}F_5H_{15}OPSTa$	$TaF^{(2)}F_4^{(1)}\cdot OP(C_6H_5)_2SCH_2\cdot CH_3$	(1) +50·7	(2) +77·5	(1-2) 28		544, 543(h)
$C_{14}F_5H_{15}O_2PTa$	As above with S replaced by O	(1) +51·2	(2) +79·4	(1-2) 28		544(h)
$C_{14}F_5H_{15}PS_2Ta$	As above with O replaced by S	(1) +50·7	(2) +77·5	(1-2) 28		543(h)
$C_{14}F_{10}H_{15}OPSTa$	 $L = OP(C_6H_5)_2SCH_2\cdot CH_3$	(1) +111·7 (3) −86·4 (5) +102·3	(2) +65·9 (4) +79·5 (6) +122·7	(1-2) 30 (3-6) 175	(1-3) 160	544(h)
$C_{14}F_{10}H_{15}O_2PTa_2$	As above with S replaced by O	(1) +112·0 (3) −86·1 (5) +103·4	(2) +66·2 (4) +80·3 (6) +123·7	(1-2) 30 (3-6) 180	(1-3) 140	544, 543(h)
$C_{14}F_{10}H_{15}PS_2Ta_2$	As above with O replaced by S	(1) +111·7 (3) −86·4 (5) +102·3	(2) +65·9 (4) +79·5 (6) +122·7	(1-3) 160	(3-6) 175	543(h)
$C_{18}F_5H_{12}Cl_3OPTa$	$TaF^{(1)}F_4^{(2)}(pClC_6H_4)_3PO$	(1) +52·3	(2) +79·6	(1-2) 26		605(h)
$C_{18}F_5H_{12}Cl_3OPTa$	As above with *m*-isomer	(1) +54·0	(2) +83·2	(1-2) 26		605(h)
$C_{18}F_5H_{12}N_3O_7PTa$	As above with *p*Cl replaced by mNO_2	(1) +54·6	(2) +87·5	(1-2) 26		605(h)
$C_{18}F_5H_{15}OPTa$	$TaF_4^{(1)}F^{(2)}OP(C_6H_5)_3$	(1) +49·1	(2) +73·9	(1-2) 29		544, 543, 605(h)
$C_{18}F_{10}H_{15}OPTa_2$	 $L = OP(C_6H_5)_3$	(1) +110·9 (3) −87·0 (5) +99·9	(2) +65·5 (4) +77·9 (6) +119·5	(1-2) 30 (3-6) 200	(1-3) 165	544, 543(h)
$C_{21}F_5H_{21}OPTa$	$TaF^{(1)}F_4^{(2)}(pCH_3C_6H_4)_3PO$	(1) +47·4	(2) +70·2	(1-2) 28		605(h)
$C_{21}F_5H_{21}OPTa$	*m*-isomer of above	(1) +48·0	(2) +72·1	(1-2) 28		605(h)

Molecular formula	Structure of compounds	Chemical shifts (ppm)		Coupling constants (Hz)	Ref.
$C_{21}F_5H_{21}O_4PTa$	$TaF^{(1)}F_4^{(2)}(pCH_3OC_6H_4)_3PO$	(1) +46·0	(2) +60·9	(1-2) 26	605(h)
$C_{28}F_4H_{30}O_2P_2S_2Ta^+$	*cis*-$[TaF_2^{(1)}F_2^{(2)}(OP(C_6H_5)_2SCH_2{\cdot}CH_3)_2]^+$	(1) +67·5	(2) +93·3	(1-2) 28	544(h)
$C_{28}F_4H_{30}O_2P_2S_2Ta^+$	*trans*-isomer of above	+66·5			544(h)
$C_{28}F_4H_{30}O_4P_2Ta^+$	*cis*-$[TaF_2^{(1)}F_2^{(2)}(OP(C_6H_5)_2OCH_2CH_3)_2]^+$	(1) +69·4	(2) +96·5	(1-2) 28	544, 5543(h)
$C_{28}F_4H_{30}O_4P_2Ta^+$	*trans*-isomer of above	+68·5			544, 543(h)
$C_{28}F_4H_{30}P_2S_4Ta^+$	*cis*-$[TaF_2^{(1)}F_2^{(2)}(SP(C_6H_5)_2SCH_2CH_3)_2]^+$	(1) +67·5	(2) +93·3	(1-2) 28	543(h)
$C_{28}F_4H_{30}P_2S_4Ta^+$	*trans*-isomer of above	+66·5			543(h)
$C_{36}F_4H_{30}O_2P_2Ta^+$	*cis*-$[TaF_2^{(1)}F_2^{(2)}(OP(C_6H_5)_3)_2]^+$	(1) +66·1	(2) +85·9	(1-2) 28	544, 543(h)
$F_{11}Ta_2^-$	$[F^{(1)}F_4^{(2)}TaF_4F]^-$	(1) +108·0 (3) −88·8	(2) +63·8	(1-3) 165	543 544

Fluorine bonded to tellurium

$C_2F_4H_6O_2Te$	*trans*-$TeF_4(OCH_3)_2$	−61·6			559
$C_3F_3H_9O_3Te$	*fac*-$TeF_3(OCH_3)_3$	−58·1			559
$C_3F_3H_9O_3Te$	*mer*-$TeF^{(1)}F_2^{(2)}(OCH_3)_3$	(1) −59·7	(2) −67·9	(1-2) 134	559
$C_3F_4H_8O_2Te$		(1) −58·72 (2)(3) −48·39, −50·57		(1-2)(1-3) 152·7, 155·4 (2-3) 171·3	566

$C_3F_4H_9NOTe$		(1) −67·02 (2)(3) −47·49, −53·59	(1-2)(1-3) 145·7, 137·9 (2-3) 162·9	566
$C_4F_2H_{12}O_4Te$	*cis*-$TeF_2(OCH_3)_4$	−66·8	(Te-F) 3300	559
$C_4F_2H_{12}O_4Te$	*trans*-$TeF_2(OCH_3)_4$	−72·3		559
$C_4F_4H_8Br_2O_2Te$	*cis*-$TeF_4^{(1)(2)}(OCH_2{\cdot}CH_2Br)_2$	(1) −45·1 (2) −52·5	(1-2) 159	559
$C_4F_4H_{10}O_2Te$		(1) −55·83 (2)(3) −45·89, −49·51	(1-2)(1-3) 153·3, 154·6 (2-3) 174·2	566
$C_4F_4H_{10}O_2Te$		(1) −59·89 (2)(3) −48·80, −50·62	(1-2)(1-3) 154·6, 153·0 (2-3) 173·9	566
$C_4F_4H_{11}NOTe$		(1) −64·36 (2)(3) −44·37, −53·00	(1-2)(1-3) 148·5, 138·9 (2-3) 162·6	566
$C_5FH_{15}O_5Te$	$TeF(OCH_3)_5$	−75·8	(Te-F) 3240	559
$C_5F_4H_{13}NOTe$		(1) −61·64 (2)(3) −41·90, −52·07	(1-2)(1-3) 147·9, 137·0 (2-3) 162·8	566
$C_6F_3H_{12}Br_3O_3Te$	*mer*-$TeF_2^{(1)}F^{(2)}(OCH_2{\cdot}CH_2Br)_3$	(1) −54·3 (2) −49·9	(1-2) 136	559
$C_6F_3H_{12}Br_3O_3Te$	*fac*-$TeF_3(OCH_2{\cdot}CH_2Br)_3$	−50·9		559

Molecular formula	Structure of compounds	Chemical shifts (ppm)		Coupling constants (Hz)		Ref.
$C_6F_3H_{12}Cl_3O_3Te$	*mer*-$TeF_2^{(1)}F^{(2)}(OCH_2{\cdot}CH_2Cl)_3$	(1) −55·9	(2) −51·1	(1-2) 137		559
$C_6F_3H_{12}Cl_3O_3Te$	*fac*-$TeF_3(OCH_2{\cdot}CH_2Cl)_3$	−49·6				559
$C_6F_4H_{14}O_2Te$	*trans*-$TeF_4[OCH(CH_3)_2]_2$	−38·3				559
$C_6F_4H_{14}O_2Te$	*cis*-$TeF_2^{(1)}F_2^{(2)}(OCH_2CH_2CH_2CH_3)_2$	(1) −48·0	(2) −56·9	(1-2) 158		559
$C_6F_{12}H_6O_3Te$	*mer*-$TeF_2^{(1)}F^{(2)}(OCH_2{\cdot}CF_3)_3$	(1) −58·9	(2) −56·5	(1-2) 143		559
$C_6F_{12}H_6O_3Te$	*fac*-$TeF_3(OCH_2{\cdot}CF_3)_3$	−54·7				559
$C_8F_2H_{16}Br_4O_4Te$	*cis*-$TeF_2(OCH_2{\cdot}CH_2Br)_4$	−54·1				559
$C_8F_2H_{16}Br_4O_4Te$	*trans*-$TeF_2(OCH_2{\cdot}CH_2Br)_4$	−58·9				559
$C_8F_2H_{16}Cl_4O_4Te$	cis-$TeF_2(OCH_2{\cdot}CH_2Cl)_4$	−54·1				559
$C_8F_2H_{16}Cl_4O_4Te$	*trans*-$TeF_2(OCH_2{\cdot}CH_2Cl)_4$	−59·1				559
$C_8F_{14}H_8O_4Te$	*cis*-$TeF_2(OCH_2{\cdot}CF_3)_4$	−58·7				559
$C_8F_{14}H_8O_4Te$	*trans*-$TeF_2(OCH_2{\cdot}CF_3)_4$	−60·6				559
$C_9F_3H_{21}O_3Te$	*fac*-$TeF_3[OCH(CH_3)_2]_3$	−46·3				559
$C_9F_3H_{21}O_6Te$	*fac*-$TeF_3(OCH_2{\cdot}CH_2OCH_3)_3$	−53·4				559
$C_{10}FH_{20}Br_5O_5Te$	$TeF(OCH_2{\cdot}CH_2Br)_5$	−58·4				559
$C_{10}FH_{20}Cl_5O_5Te$	$TeF(OCH_2{\cdot}CH_2Cl)_5$	−60·5				559
$C_{12}F_2H_{28}O_4Te$	*fac*-$TeF_2[OCH(CH_3)_2]_4$	−49·9				559
$C_{12}F_2H_{28}O_8Te$	*cis*-$TeF_2(OCH_2{\cdot}CH_2OCH_3)_4$	−56·4				559
$C_{12}F_2H_{28}O_8Te$	*trans*-$TeF_2(OCH_2{\cdot}CH_2OCH_3)_4$	−64·0				559
$C_{15}FH_{35}O_{10}Te$	$TeF(OCH_2{\cdot}CH_2OCH_3)_5$	−60·5				559
$F_{14}O_2Te_3$	*cis*-$F^{(3)}F_4^{(4)}TeO{\cdot}TeF_2^{(1)}F_2^{(2)}{\cdot}OTeF_4F$	(1) −27·7 (3) −51·8	(2) −35·9 (4) −40·7	(1-2) 174	(2-3) 181	546, 547

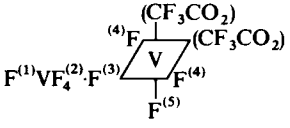
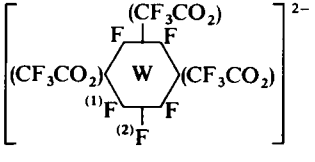
$F_{14}O_2Te_3$	*trans*-$F^{(2)}F_4^{(3)}TeO{\cdot}TeF_4^{(1)}{\cdot}OTeF_4F$	(1) −20·7 (3) −40·3	(2) −51·7	(2-3) 182		546, 547
$F_{15}AsO_3Te_3$	$As(OTeF_4^{(1)}F^{(2)})_3$	(1) −37·5	(2) −47·6	(1-2) 193 (Te-2) 3568	(Te-1) 3643	539
$F_{20}O_4Te_4Xe$	$Xe(OTeF_4^{(1)}F^{(2)})_4$	(1) −39·4	(2) −47·2	(1-2) 188	(Xe-1,2) 61±1	548
$F_{20}O_4Te_5$	$Te(OTeF_4^{(1)}F^{(2)})_4$	(1) −34·3	(2) −44·1	(1-2) 183		547
$F_{22}O_4Te_5$	*cis*-$F_2^{(5)}Te(OTeF^{(1)}F_4^{(2)})_2(OTeF^{(3)}F_4^{(4)})_2$	(1) −51·5 (2)(4) −39·7	(3) −51·6 (5) −3·3	(1-2) 174	(3-4) 174	546, 547
$F_{22}O_4Te_5$	*trans*-$F_2^{(3)}Te(OTeF^{(1)}F_4^{(2)})_4$	(1) −50·6 (3) +3·9	(2) −38·2	(1-2) 177	(Te-1,2) 3587	539, 547
$F_{26}O_5Te_6$	$F^{(5)}Te(OTeF^{(1)}F_4^{(2)})(OTeF^{(3)}F_4^{(4)})_4$	(1) −48·0 (2)(4) −36·9	(3) −48·1 (5) +14·2			546, 547
$F_{30}O_6Te_6U$	$U(OTeF^{(1)}F_4^{(2)})_6$	(1)(2) −48·5		(Te-1,2) 3715		536
$F_{30}O_6Te_7$	$Te(OTeF^{(1)}F_4^{(2)})_6$	(1) −49·4	(2) −37·3	(1-2) 189		547

Fluorine bonded to titanium

$C_6F_6H_{30}O_6Pt_2Ti$	$[(CH_3)_3Pt(H_2O)_3]_2TiF_6$	+121				585(h)
$C_8F_6H_{24}N_2O_6S_2Ti$	*trans*-$TiF_4(FSO_3)_2^{2-}[(CH_3)_4N^+]_2$	+277·5				119
$C_{10}F_{10}H_{24}N_2O_6S_2Ti$	*trans*-$TiF_4^{(1)}(CF_3SO_3)_2^{2-}[(CH_3)_4N^+]_2$	(1) +276·9				119

Fluorine bonded to uranium

F_6U	UF_6	+764				536, 524
F_6U	$^{238}UF_6$ $^{235}UF_6$	+764±5 +764±5				535
$F_{10}OTeU$	$F^{(1)}UF_4^{(2)}{\cdot}OTeF_5$	(1) +759·5	(2) +785·7	(1-2) 9		536

Molecular formula	Structure of compounds	Chemical shifts (ppm)		Coupling constants (Hz)		Ref.
$F_{14}O_2Te_2U$	*cis*-$F_2^{(1)}UF_2^{(2)}(OTeF_5)_2$	(1) +772·5	(2) +796·4	(1-2) 14		536
$F_{14}O_2Te_2U$	*trans*-$F_4U(OTeF_5)_2$	+802·4				536
$F_{18}O_3Te_3U$	*sym*-$F_3^{(1)}U(OTeF_5)_3$	(1) +778·3				536
$F_{18}O_3Te_3U$	*asym*-$F^{(1)}UF_2^{(2)}(OTeF_5)_3$	(1) +783·7	(2) +806·2	(1-2) 22		536
$F_{22}O_4Te_4U$	*cis*-$F_2U(OTeF_5)_4$	+784·5				536
$F_{22}O_4Te_4U$	*trans*-$F_2U(OTeF_5)_4$	+811·4				536
$F_{26}O_5Te_5U$	$FU(OTeF_5)_5$	+787·0				536
Fluorine bonded to vanadium						
$C_4F_{11}H_{12}NO_3SV_2$	$F^{(1)}VF_4^{(2)}\cdot F^{(3)}\cdot VF_4^{(4)}(FSO_3)^-(CH_3)_4N^+$	(1) +489 (4) +416	(2) +421	(1-2) 110	(3-4) 120	119
$C_4F_{15}O_4V_2^-$		(1) +492 (3) −14 (5) +236	(2) +421 (4) +254	(1-2) 90		526
$C_5F_{13}H_{12}NO_3SV_2$	$F^{(1)}VF_4^{(2)}\cdot F^{(3)}\cdot VF_4^{(4)}(CF_3SO_3)^-(CH_3)_4N^+$	(1) +492 (4) +416·8	(2) +422·2	(1-2) 120	(3-4) 120	119
Fluorine bonded to tungsten						
$C_2F_{10}O_2W^{2-}$	$F^{(2)}WF_6^{(1)}(CF_3CO_2)^{2-}$	(1) +65·6	(2) −145·0	(1-2) 57·3 (W-2) 48	(W-1) 72	526
$C_6F_{14}O_6W^{2-}$		(1) +57·3	(2) −67·1	(1-2) 51 (W-2) 60	(W-1) 73	526

$C_{10}F_7H_{15}Cu_5W$	$[Cu(CH_3CN)_5]WF_7$	+142			538
F_4SeW	$WF_4(Se)$		(W-F) 36		529
$F_5H_3O_2W$	$WOF^{(1)}F_4^{(2)-}H_3O^+$		(1-2) 70·2	(W-F) 48·8	534
F_7MW	$M^+WF_7^-$ (M = Li, Na, K, Rb, Cs)	+134 ± 2			538
F_7TlW	$TeWF_7$	+144			538
F_8W^{2-}	WF_8^{2-}	+63·8	(W-F) 68		526

Fluorine bonded to xenon

F_6Xe	XeF_6	+109·3	(Xe-F) 325		535
$F_{11}Xe_2^+$	$Xe_2F_{11}^+$	+74·0			535

Miscellaneous studies

F-19 NMR has been used to characterize various organometallic species in solution. Thus the reaction of KrF_2 with AsF_5, SbF_5, and PtF_6 gives salts of the form $KrF^+MF_6^-$, $KrF^+Sb_2F_{11}^-$, $Kr_2F_3^+MF_6^-$, and $Kr_2F_3^+ \cdot xKrF_2 \cdot MF_6^-$. (614) The exchange products between GeF_6^{2-} and $Ge(NCS)_4$, in various ratios, have been studied, (615) as have the gaseous products formed during the exposure of SF_6 to a high-current arc. (616) Equilibrium studies have been made of the covalent and ionic forms of various alkoxyphosphoranes (617) and the investigation of HF and neutral organophosphorus compounds has shown the formation of solvates with subsequent dissociation and association of HF in the organic phase. (618) Structural studies have shown that $-OSeF_5$ and $-OTeF_5$ groups have higher electronegativities than F. (619)

Thermodynamic parameters, determined by F-19 NMR, for the exchange of the fluoro ligands of BeF_4^{2-} (620) and methyl tetrafluorosilicate anions (621) have been reported, as have the equilibrium constants for the interconversion of HF, HF_2^-, and H_2F_2. (622)

Rotational and vibrational motion in SiF_4, BF_3, and SF_6 have been examined by the observation in the change of the F-19 chemical shifts with temperature and pressure. (294, 295) Contributions of $^7Li^+$ to F-19 relaxation rates in $^7LiBF_4$ and $^6LiBF_4$ solutions in D_2O have been evaluated. (623)

IX. FLUORINE NMR STUDIES IN THE SOLID STATE, EXCLUDING POLYMERS

This Page Intentionally Left Blank

Molecular formula	Structure	Ref.
$C_2F_3AgO_2$	CF_3CO_2Ag	723
$C_2F_4S_2$	$S_2C_2F_4$	724
C_6F_6	C_6F_6	725
$C_6F_6H_{20}N_2Sn$	$(Me_3NH)_2SnF_6$	726
$C_8F_6H_{24}As_2Si$	$(Me_4As)_2SiF_6$	727
$C_8F_6H_{24}N_2Si$	$(Me_4N)_2SiF_6$	727
$C_8F_6H_{24}P_2Si$	$(Me_4P)_2SiF_6$	727
$C_8F_6H_{24}Sb_2Si$	$(Me_4Sb)_2SiF_6$	727
$C_{12}F_2H_8$	$pF{\cdot}C_6H_4{\cdot}C_6H_4{\cdot}Fp$	728
$FCa_5O_{12}P_3$	$Ca_5(PO_4)_3F$	691
FH_2AlO_2	$AlF(OH)_2$	696
FH_2O_2Si	$SiF(OH)_2$	696
FK	KF	692
FLi	LiF	693, 694
FNa	NaF	692
FOYb	YbOF	695
F_2HAlO	AlF_2OH	696
F_2HCs	$CsHF_2$	702, 703
F_2HK	KHF_2	704, 703
F_2HLi	$LiHF_2$	703
F_2HNa	$NaHF_2$	703
F_2HOCs	CsF_2OH	696
F_2HRb	$RbHF_2$	703
F_2HTl	$TlHF_2$	703
$F_2H_8O_4Zn$	$ZnF_2{\cdot}4H_2O$	705
F_2Ba	BaF_2	697, 692
F_2Ca	CaF_2	698, 699, 692
F_2Cd	CdF_2	692
F_2Kr	KrF_2	700
F_2Pb	PbF_2	701
F_2Sr	SrF_2	692
$F_{1+2x}Na_{1-x}Y_x$ $(0{\cdot}5<x<0{\cdot}62$	$Na_{1-x}Y_xF_{1+2x}$	719
F_3HBa	$BaFHF_2$	703
F_3HSr	$SrFHF_2$	703
F_3Al	AlF_3	696
F_3CoK	$KCoF_3$	706
F_3CsNi	$CsNiF_3$	707
F_3CuK	$KCuF_3$	708
F_3Er	ErF_3	709
F_3Ho	HoF_3	710
F_3KMn	$KMnF_3$	711
F_3La	LaF_3	712
F_3MnRb	$RbMnF_3$	713
F_3NiK	$KNiF_3$	714
F_3Sc	ScF_3	696
F_3Tb	TbF_3	710
F_3Ti	TiF_3	692
F_4BK	KBF_4	692

Molecular formula	Structure	Ref.
F_4BLi	$LiBF_4$	692
F_4BNa	$NaBF_4$	692
F_4BRb	$RbBF_4$	692
F_4CuK_2	K_2CuF_4	715
F_4Si	SiF_4	716
F_5CsOU	$CsUOF_5$	717
$F_6AsHg_{2\cdot86}$	$Hg_{2\cdot86}AsF_6$	718
F_6BaSi	$BaSiF_6$	692
F_6KP	KPF_6	692
F_6KSi	$KSiF_6$	692
F_6LiP	$LiPF_6$	692
F_6S	SF_6	720
F_6U	UF_6	721
F_6W	WF_6	729
$F_{10}H_4Cs_2Ge$	$Cs_2GeF_6\cdot4HF$	722
$F_{10}H_4Cs_2Sn$	$Cs_2SnF_6\cdot4HF$	722
$F_{10}H_4K_2Sn$	$K_2SnF_6\cdot4HF$	722

X. FLUORINE NMR STUDIES OF POLYMERS

The table is ordered according to the monomers forming the polymer, with the lowest molecular weight monomer appearing first.

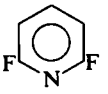
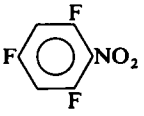
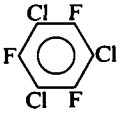
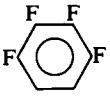
This Page Intentionally Left Blank

Molecular formula of monomer components	Structure of monomer components of polymer	Ref.
C_2FH_3/C_3F_6	$CH_2{=}CHF/CF_3{\cdot}CF{=}CF_2$	730
$C_2FH_3/C_4F_6H_2$	$CH_2{=}CHF/(CF_3)_2C{=}CH_2$	731
C_2FH_3	$CH_2{=}CHF$	732, 733
C_2F_4/C_3F_6	$CF_2{=}CF_2/CF_3{\cdot}CF{=}CF_2$	734
C_2F_4/C_3F_6	$CF_2{=}CF_2/CF_3{\cdot}CF{=}CF_2$	735
C_2F_4/C_3H_6	$CF_2{=}CF_2/CH_3{\cdot}CH{=}CH_2$	736
C_4F_6	$CF_2{=}CF{\cdot}CF{=}CF_2$	737
C_8FH_7	$p\text{F}{\cdot}C_6H_4{\cdot}CH{=}CH_2$	738
C_8FH_7	$m\text{F}{\cdot}C_6H_4{\cdot}CH{=}CH_2$	738
Miscellaneous studies: various fluorinated polymers have been studied		756

This Page Intentionally Left Blank

XI. FLUORINE NMR STUDIES USING LIQUID CRYSTAL SOLUTIONS

This Page Intentionally Left Blank

Molecular formula	Structure	Ref.
CFH_3	CFH_3	740
CF_2H_2	CF_2H_2	740
CF_3H	CF_3H	740
CF_3Br	CF_3Br	741
CF_3Cl	CF_3Cl	741
CF_3I	CF_3I	741
$C_2F_3Cl_3$	CF_3CCl_3	741
$C_2F_4S_2$	$S_2C_2F_4$	724
$C_5F_2H_3N$		742
$C_5F_3H_2N$		742
C_6FH_4Br	pBr·C_6H_4·F	743
C_6FH_4Cl	pCl·C_6H_4·F	743
C_6FH_4I	pI·C_6H_4·F	743
$C_6FH_4NO_2$	$p$$NO_2$·$C_6H_4$·F	743, 744
C_6FH_5	PhF	745, 746
C_6FH_6N	$p$$NH_2$·$C_6H_4$·F	743
$C_6F_2H_4$	oF·C_6H_4·F	746
$C_6F_2H_4$	mF·C_6H_4·F	746
$C_6F_2H_4$	pF·C_6H_4·F	746
$C_6F_3H_2$·NO_2		748
$C_6F_3Cl_3$		747
$C_6F_4H_2$		
$C_6F_4H_2$		746, 749
		746
C_6F_5H	C_6F_5H	746, 749
C_6F_6	C_6F_6	746, 749

Molecular formula	Structure	Ref.
C_7FH_4DO	pF·C_6H_4·CDO	750
C_7FH_5O	pF·C_6H_4·CHO	750
C_7FH_5O	C_6H_5·COF	751
$C_7F_3H_4Cl$	$p$$CF_3$·$C_6H_4$·Cl	752
$C_8F_{15}CsO_2$	CF_3·$(CF_2)_6$·CO_2Cs	753
$C_8F_{15}LiO_2$	CF_3·$(CF_2)_6$·CO_2Li	754
$C_8F_{15}H_4NO_2$	CF_3·$(CF_2)_6$·CO_2NH_4	753
F_3PS	P(S)F_3	739

XII. BIOLOGICAL APPLICATIONS OF F-19 NMR

F-19 NMR continues to be a useful method of studying various biological phenomena. In the present section we summarize the papers pertaining to these studies. Limitations of space prevent any detailed review and only the larger biological molecules and their reactions are mentioned. Data for the smaller molecules, such as the fluoro carbohydrates and steroids, are found in the preceding tables.

The incorporation of fluoroamino acids into various proteins has proved useful in the study of their structures and interactions. Thus 6-fluorotryptophan and 3-fluorotyrosine have been incorporated into alkaline phosphatase (625, 626) and dihydrofolate reductase. (627–629) The latter amino acid has also been incorporated into the lipoprotein of *E. coli* in order to study the *in situ* structure of its membrane. (630) Fluorotyrosyl derivatives of M13 coat protein have been incorporated into small phospholipid vesicles in order to study the motional properties within these membranes. (667) 5-Fluorouridine has been used to replace all the uridine and uridine-derived residues of the valine-specific $tRNA_I$ of *E. coli* (631) and 5-fluorouracil has also been incorporated into RNA. (632)

3-Bromo-1,1,1-trifluoropropanone has been shown to react specifically with SH groups and as such allows quantitation and characterization of cysteine residues. (633) This particular reagent has been used to trifluoroacetonylate the cysteine residues of aspartate transaminase, (634) parvalbumin from carp, (635) haemoglobin, (636) glyceraldehyde phosphate dehydrogenase, (637) coenzyme A, (638) and several others mentioned below, and as such has allowed F-19 NMR investigations of their structures to be made. Trifluoroacetyl derivatives of neurotoxin II have been used to analyse partially the backbone folding in solution. (639) *S*-Trifluoromethylmercuric trifluoroacetate has been used to derivatize papain, (640) while the structure of the iron–sulphur proteins, *Clostridium pasteurianum* F_{dox} and *spinach* F_{dox}, has been investigated by the preparation of paramagnetic complexes containing the $pCF_3 \cdot C_6H_4$ group. (641) The lysine residues of human serum albumin showed differential rates of reaction with 2,6-dinitro-4-trifluoromethylbenzene sulphonate. (642)

As in previous years, F-19 NMR has proved an invaluable tool for the investigation of the binding of smaller molecular weight compounds with proteins. Thus the following have been studied: binding of *p*-fluorocinnamate, (643) derivatives of tryptophan and phenylalanine, (668) ring-fluorinated derivatives of *N*-trifluoroacetylphenylalanine, (669) and *N*-acetyl derivatives of fluorophenylalanines (670) with chymotrypsin; difluorooxaloacetate (644, 645) and phosphopyridoxyl trifluoroethylamine (646, 647) with aspartate transaminase; fluoride ion with oxyhaemocyanin;

(648) various trifluoroacetylpeptide chloromethyl ketones with porcine pancreatic elastase; (649, 650) various trifluoromethyl analogues of nitrophenylhaptens with mouse myeloma immunoglobins; (651, 652) cytochrome c derivatives, having single lysine residues modified by trifluoroacetylation or trifluoromethylphenyl carbamylation, with cytochrome oxidase and succinate-cytochrome c reductase; (653, 654) trifluoroacetonylated derivatives of histone H3 with histone H4 and other histones; (655) Ca^{2+} and Mg^{2+} with trifluoromethylacetonylated troponin C; (656) oligonucleotide with gene 5 of filamentous bacteriophages; (657, 658) the ternary complex between 5-fluoro-2'-deoxyuridylate, 5,10-methylene tetrahydrofolate, and native thymidylate synthetase; (659) and 5-fluorodeoxyuridylate-thymidylate synthetase binary complex. (666)

Phospholipid membranes have received a certain amount of attention. Halothane interaction with dipalmitoylphosphatidylcholine liposomes (660, 661, 665) has been studied. 8,8-Difluoromyristate has been incorporated into the phospholipids of *E. coli* and has been used to study intramembrane interactions, (662, 663) while motion within the lipid bilayer of synthetic 1-palmitoyl-2-(8,8-difluoropalmitoyl)-*sn*-glycero-3-phosphorylcholine (664) has been monitored.

Theoretical calculations of fluorine–proton nuclear Overhauser effects in fluorine-labelled macromolecular systems have been reported. (671)

Zeumatography, using F-19 NMR, has been shown to be possible by a variant of the sensitive point method. (755)

XIII. THEORETICAL STUDIES

Various reviews dealing with theoretical work have appeared. These deal with nuclear shielding, (763) semi-empirical calculations of the chemical shifts of nuclei other than protons, (672) calculation of coupling constants, (673) and coupling between carbon and first-row nuclei. (674) During the review period no new aspects of basic theory have been propounded. Indeed most of the work reported involving fluorine has used existing methods in an attempt to assess their applicability to predict chemical shifts and coupling constants. As such this has meant that the greatest use has been made of semi-empirical molecular orbital methods which allow comparative calculations to be made in quite large molecules in reasonable computation times.

Ab initio calculations of nuclear shielding have been restricted to small molecules. In particular the H-1 and F-19 nuclear shielding in HF has received considerable attention. (675, 757–760) Other small molecules that have been investigated are F^-, F_2, FOH, (760, 762) and FHF^-. (675, 760, 761) Semi-empirical calculations, using INDO MO theory, have shown that

the diamagnetic component of the nuclear screening constant for F-19 remains roughly constant as its chemical environment changes and that chemical shift differences are mainly due to the paramagnetic component. (676) Consequently the latter contribution to screening constants and their anisotropies has been calculated, employing INDO and CNDO/2 methods, for 50 fluorine molecular environments including binary fluorides and fluorocarbons. (677) Although agreement with experimental data for the former is reasonably good the presence of electric field effects in the latter is not accounted for. A more limited series of calculations (SCF LCGO MO) have been performed on fluoroethane, ethylene, and acetylene. (678)

Ab initio SCF perturbation theory of nuclear spin–spin coupling constants continues to be available only for small molecules. The difficulties encountered in the calculation of the coupling in HF, even by the most sophisticated methods, emphasize the limitations of our present knowledge. (679, 680) Calculations in larger molecules invariably employ semi-empirical methods. Many calculations have been performed using SCF perturbation theory, working within the INDO MO framework, to calculate the Fermi contact, spin dipolar, and orbital contributions to J, by the calculational procedures of Blizzard and Santry. (681) The latter two contributions are particularly important for J(FF) and J(FC) calculations. Thus the variation of J(FF) and J(FH) in all the fluorobenzenes (402) and the effects of substituents upon J(FF) in the pentafluorobenzenes (417) and fluoro-substituted furans (682) were successfully reproduced. More difficulty has been experienced in the calculation of J(FC) values in aromatic systems. (402, 417, 683, 684) Although the importance of the spin-dipolar and orbital contributions was evident the trends in the couplings were poorly reproduced. More success has been achieved with the long-range J(FC) and J(FH) values in aliphatic molecules. Thus substituent trends upon ^3J(FC), ^4J(FC), and ^5J(FH) in various deoxyfluoropyranoses were well reproduced. (510) A Karplus type angular dependence for ^3J(FC) was predicted (510) and found experimentally. (685, 686) Substituent effects upon *trans* ^3J(FC) were shown to be complex and analogous to those of ^3J(CH) and ^3J(CC). (687)

Many papers have appeared dealing with the transmission of substituent effects through non-conjugated and conjugated systems using the fluorine nucleus as a probe of the electronic environment. All the data in these papers are included in the tables, and their contents will not be considered further here. The relationship between NMR substituent chemical shift data and substituent reactivity parameters has been reconsidered in terms of a general theory for structure–property relationships. (688) Literature data for F-19, C-13, and H-1 chemical shifts in aromatic and olefinic systems have been correlated using a multi-parameter equation, (689) and a generalized attempt has been made to explain γ-effects upon F-19, C-13, and P-31 chemical shifts in terms of bond angle changes. (690)

XIV. INDEX OF REVIEWS

The following comprises a list of reviews, containing F-19 NMR data, that have appeared during 1976–1978.

General

(a) L. Cavalli, *Annual Reports NMR Spectroscopy*, 1976, **6B**, 43. Fluorine-19 NMR spectroscopy.
(b) R. Fields, *Annual Reports NMR Spectroscopy*, 1977, **7**, 1. Fluorine-19 NMR spectroscopy of fluoroalkyl and fluoroaryl derivatives of transition metals.
(c) P. W. Hickmott, M. Cais, and A. Modiano, *Annual Reports NMR Spectroscopy*, 1976, **6C**, 1. NMR data on organic–metal carbonyl complexes (1965–1971).
(d) *Pure Appl. Chem.*, 1976, **45**, 217. Recommendation for the presentation of NMR data for publication in chemical journals. B. Conventions relating to spectra from other nuclei.
(e) R. K. Harris (ed.), *Nuclear Magnetic Resonance* (Specialist Periodical Reports), The Chemical Society, London, 1976, Vol. 5.
(f) R. J. Abraham (ed.), *Nuclear Magnetic Resonance* (Specialist Periodical Reports), The Chemical Society, London, 1977, Vol. 6.
(g) R. J. Abraham (ed.), *Nuclear Magnetic Resonance* (Specialist Periodical Reports), The Chemical Society, London, 1978, Vol. 7.
(h) J. R. Wasson and D. R. Lorenz, *Analyt. Chem.*, 1976, **48**, 246R. NMR spectroscopy.

Fluorine Chemical Shifts

(a) K. A. K. Ebraheem and G. A. Webb, *Progr. Nucl. Magn. Res. Spectroscopy*, 1977, **11**, 149. Semi-empirical calculations of the chemical shifts of nuclei other than protons.
(b) W. J. Hehre, R. W. Taft, and R. D. Topsom, *Progr. Phys. Org. Chem.*, 1976, **12**, 159. *Ab initio* calculations of charge distributions in monosubstituted benzenes and in *meta*- and *para*-substituted fluorobenzenes. Comparison with H-1, C-13, and F-19 NMR substituent shifts.

Fluorine Coupling Constants

(a) J. W. Emsley, L. Phillips, and V. Wray, *Progr. Nucl. Magn. Res. Spectroscopy*, 1976, **10**, 85. Fluorine coupling constant.
(b) J. Hilton and L. H. Sutcliffe, *Progr. Nucl. Magn. Res. Spectroscopy*, 1976, **10**, 27. The "through-space" mechanism in spin–spin coupling.

(c) J. Kowalewski, *Progr. Nucl. Magn. Res. Spectroscopy*, 1977, **11**, 1. Calculations of nuclear spin–spin coupling constants.
(d) R. E. Wasylishen, *Annual Reports NMR Spectroscopy*, 1977, **7**, 1. Spin–spin coupling between carbon-13 and the first-row nuclei.

Other Aspects

(a) U. Haeberlen, *Adv. Magn. Resonance*, 1976, **8**, Suppl. 1. High resolution NMR in solids: selective averaging.
(b) C. L. Khetrapal and A. C. Kunwar, *Adv. Magn. Resonance*, 1977, **9**, 301. NMR studies of molecules oriented in thermotropic liquid crystals.
(c) B. Unterhalt and U. Pindur, *Dtsch. Apoth.-Ztg.*, 1977, **117**, 1317. The importance of fluoro organic compounds for drugs.
(d) J. S. Cohen, *CRC Crit. Rev. Biochem.*, 1978, **5**, 25. Nuclear magnetic resonance studies of biologically relevant isotopes other than hydrogen.
(e) P. Bouchet, C. Coquelet, and J. Elguero, *Bull. Soc. Chim. France*, 1977, 171. The fluoroazoles: synthesis, properties and applications.
(f) S. V. Zemskov and S. P. Gabuda, *J. Struct. Chem.* (*U.S.S.R.*), 1976, **17**, 772. Characteristic structural features of the hexafluoro complexes of noble metals.
(g) J. T. Gerig. *Biol. Magn., Resonance*, 1978, **1**, 139. Fluorine magnetic resonance in biochemistry.

This Page Intentionally Left Blank

REFERENCES

1. S-G. Huang and M. T. Rogers, *J. Chem. Phys.*, 1978, **68**, 5601.
2. W. Gombler, *Z. Anorg. Chem.*, 1978, **439**, 193.
3. N. D. Volkov, V. P. Nazaretyan and L. M. Yagupolskii, *J. Org. Chem.* (*U.S.S.R.*), 1977, **13**, 1655.
4. G. A. Wheaton and D. J. Burton, *J. Org. Chem.*, 1978, **43**, 2643.
5. W. Gombler, *J. Fluorine Chem.*, 1977, **9**, 233.
6. A. B. Burg, *Inorg. Nuclear Chem. Letters*, 1977, **13**, 199.
7. J. A. Morrison, L. L. Gerchman, R. Eujen and R. L. Lagow, *J. Fluorine Chem.*, 1977, **10**, 333.
8. R. G. Cavell, J. A. Gibson and K. I. The, *J. Amer. Chem. Soc.*, 1977, **99**, 7841.
9. D. Naumann, H. H. Heinsen and E. Lehmann, *J. Fluorine Chem.*, 1976, **8**, 243.
10. W. Gombler and R. Budenz, *J. Fluorine Chem.*, 1976, **7**, 115.
11. H. W. Roesky, M. Aramaki and L. Schoenfelder, *Z. Naturforsch.*, 1978, **33b**, 1072.
12. K. Seppelt, *Angew. Chem.*, 1977, **89**, 325.
13. G. Kloeter, W. Lutz, K. Seppelt and W. Sundermeyer, *Angew. Chem.*, 1977, **89**, 754.
14. R. G. Cavell and L. F. Doty, *Inorg. Chem.*, 1978, **17**, 3086.
15. W. Gombler, *Z. Anorg. Chem.*, 1978, **439**, 207.
16. E. Lehmann, *J. Chem. Res.*, 1978, 42.
17. G. A. Olah and D. J. Donovan, *J. Amer. Chem. Soc.*, 1978, **100**, 5163.
18. M. J. Hopkinson and D. D. Desmarteau, *J. Fluorine Chem.*, 1976, **7**, 501.
19. D. Brunel, A. Germain and A. Commeyras, *Noveau J. Chim.*, 1978, **2**, 275.
20. L. A. Shimp and R. J. Lagow, *Inorg. Chem.*, 1977, **16**, 2974.
21. K. G. Sharp, S. Li and R. B. Johannesen, *Inorg. Chem.*, 1976, **15**, 2295.
22. C. A. Udovich, M. A. Krevalis and R. J. Clark, *Inorg. Chem.*, 1976, **15**, 900.
23. K. Okuhara, *J. Org. Chem.*, 1978, **43**, 2745.
24. L. S. Boguslavskaya, N. B. Malnikova, A. P. Voronin and V. R. Kartashov, *J. Fluorine Chem.*, 1978, **12**, 257.
25. J. Burdon, J. R. Knights, I. W. Parsons and J. C. Tatlow, *J. Chem. Soc., Perkin I*, 1976, 1930.
26. J. Schraml, J. Vcelak, G. Engelhardt and V. Chvalovsky, *Coll. Czech. Chem. Comm.*, 1976, **41**, 3758.
27. T. Spoormaker and M. J. A. de Bie, *Rec. Trav. Chim.*, 1978, **97**, 135.
28. A. Haas and M. Lieb, *Chem. Ber.*, 1978, **111**, 2891.
29. A. Haas and M. Yazdanbakhsch, *Chem. Ber.*, 1976, **109**, 1976.
30. W. Heider and O. Glemser, *Chem. Ber.*, 1978, **111**, 731.
31. J. Lee and B. G. Willoughby, *Spectrochim. Acta*, 1977, **33A**, 395.
32. R. E. Banks, R. N. Haszeldine and P. E. Jackson, *J. Fluorine Chem.*, 1978, **12**, 153.
33. H. Kluever and O. Glemser, *Chem. Ber.*, 1977, **110**, 1597.
34. R. Eujen and R. J. Lagow, *J. Chem. Soc., Dalton*, 1978, 541.
35. S. Ng, *J. Magn. Resonance*, 1978, **30**, 139.
36. B. Haley, R. N. Haszeldine, B. Hewitson and A. E. Tipping, *J. Chem. Soc., Perkin I*, 1976, 525.
37. I. Stahl, R. Mews and O. Glemser, *J. Fluorine Chem.*, 1978, **11**, 455.
38. I. Stahl, R. Mews and O. Glemser, *Z. Naturforsch.*, 1978, **33b**, 1417.
39. E. R. Falardeau and D. D. DesMartean, *J. Amer. Chem. Soc.*, 1976, **98**, 3529.
40. G. H. Sprenger and A. H. Cowley, *J. Fluorine Chem.*, 1976, **7**, 333.
41. A. Haas, M. Haeberlein and C. Krueger, *Chem. Ber.*, 1976, **109**, 1769.
42. I. Stahl, R. Mews and O. Glemser, *J. Fluorine Chem.*, 1976, **7**, 55.

43. S. D. Morse and J. M. Shreeve, *Inorg. Chem.*, 1978, **17**, 2169.
44. A. B. Burg, *Inorg. Chem.*, 1978, **17**, 2322.
45. E. K. S. Liu and R. J. Lagow, *J. Organometal. Chem.*, 1978, **145**, 167.
46. W. Gombler, *Angew. Chem.*, 1977, **89**, 740.
47. T. Yasumura and R. J. Lagow, *Inorg. Chem.*, 1978, **17**, 3108.
48. S. D. Morse and J. M. Shreeve, *Inorg. Chem.*, 1977, **16**, 33.
49. R. N. Haszeldine, C. R. Pool, A. E. Tipping, and R. O'B. Watts, *J. Chem. Soc., Perkin I*, 1976, 513.
50. K. G. Sharp and I. Schwager, *Inorg. Chem.*, 1976, **15**, 1697.
51. A. D. Berry and W. B. Fox, *J. Org. Chem.*, 1978, **43**, 365.
52. R. A. De Marco and W. B. Fox, *J. Fluorine Chem.*, 1978, **12**, 137.
53. R. E. Noftle and W. B. Fox, *J. Fluorine Chem.*, 1977, **9**, 219.
54. R. J. Abraham and P. Loftus, *J. Chem. Soc., Perkin II*, 1976, 1142.
55. U-H. Dolling, A. W. Douglas, E. J. J. Grabowski, E. F. Schoenewaldt, P. Sohar and M. Sletzinger, *J. Org. Chem.*, 1978, **43**, 1634.
56. R. N. Haszeldine, I. Mir and A. E. Tipping, *J. Chem. Soc., Perkin I*, 1976, 2349.
57. N. McMurray, J. M. Tedder, L. L. T. Vertommen and J. C. Walton, *J. Chem. Soc., Perkin II*, 1976, 63.
58. J. Kollonitsch and L. Barash, *J. Amer. Chem. Soc.*, 1976, **98**, 5591.
59. B. W. Bycroft, A. Chowdhury and M. F. A. Dove, *J. Fluorine Chem.*, 1978, **12**, 45.
60. R. J. Abraham, P. Loftus and W. A. Thomas, *Tetrahedron*, 1977, **33**, 1227.
61. K. A. Koehler, E. E. Stone, R. A. Shelton, F. Jarnagin, L. S. Koehler and E. T. Fossel, *J. Magn. Resonance*, 1978, **30**, 75.
62. N. P. Aktaev, G. F. Ilin, G. A. Sokolskii and I. L. Knunyants, *Izv. Akad. Nauk S.S.S.R., Ser. Khim.*, 1977, 1112.
63. W. Lidy and W. Sundermeyer, *Chem. Ber.*, 1976, **109**, 1491.
64. R. D. Bagnall, W. Bell and K. Pearson, *J. Fluorine Chem.*, 1978, **11**, 93.
65. A. Haas, D. Kortmann and W. Voemel, *J. Fluorine Chem.*, 1978, **11**, 337.
66. C. A. Burton and J. M. Shreeve, *J. Amer. Chem. Soc.*, 1976, **98**, 6545.
67. C. G. Krespan, *J. Fluorine Chem.*, 1976, **8**, 105.
68. R. E. Banks, W. D. Davies, R. N. Haszeldine and D. R. Taylor, *J. Fluorine Chem.*, 1977, **10**, 487.
69. R. N. Haszeldine, B. Hewitson and A. E. Tipping, *J. Chem. Soc., Perkin I*, 1976, 1178.
70. G. Didernich, A. Haas and M. Yazdanbakhsch, *Chem. Ber.*, 1977, **110**, 916.
71. A. V. Fokin, G. I. Drozd and M. A. Landau, *J. Struct. Chem.* (*U.S.S.R.*), 1976, **17**, 336.
72. D. Dakternieks, G-V. Roeschenthaler and R. Schmutzler, *Z. Naturforsch.*, 1978, **33b**, 507.
73. G-V. Roeschenthaler, *Z. Naturforsch.*, 1978, **33b**, 311.
74. C. L. Bumgardner and J. C. Wozny, *J. Fluorine Chem.*, 1978, **11**, 527.
75. O. A. Radchenko, A. Ya. Ilchenko, L. N. Markovskii and L. M. Yagupolskii, *J. Org. Chem.* (*U.S.S.R.*), 1978, **14**, 251.
76. M. G. Barlow and K. W. Cheung, *J. Fluorine Chem.*, 1977, **10**, 191.
77. C. J. Marsden and L. S. Bartell, *J. Chem. Soc., Dalton*, 1977, 1582.
78. T. Kitazume and J. M. Shreeve, *J. Amer. Chem. Soc.*, 1978, **100**, 492.
79. A. E. Kemppainen, M. J. Thomas and P. J. Wagner, *J. Org. Chem.*, 1976, **41**, 1294.
80. K. Baum, D. A. Lerdal and J. S. Horn, *J. Org. Chem.*, 1978, **43**, 203.
81. M. Karnel, W. Kimpenhaus and J. Buddrus, *Chem. Ber.*, 1976, **109**, 2351.
82. T. Schaefer and W. J. E. Parr, *Canad. J. Chem.*, 1977, **55**, 2835.
83. J. Burdon, T. N. Huckerby and R. Stephens, *J. Fluorine Chem.*, 1977, **10**, 523.
84. R. N. Haszeldine, D. L. Hobson and D. R. Taylor, *J. Fluorine Chem.*, 1976, **8**, 115.
85. M. G. Barlow and K. W. Cheung, *J. Fluorine Chem.*, 1977, **10**, 111.
86. S. Trofimenko, R. W. Johnson and J. K. Doty, *J. Org. Chem.*, 1978, **43**, 43.

87. M. G. Barlow, R. N. Haszeldine and J. A. Pickett, *J. Chem. Soc., Perkin I*, 1978, 378.
88. K. J. Klabunde, T. Groshens, M. Brezinski and W. Kennelly, *J. Amer. Chem. Soc.*, 1978, **100**, 4437.
89. G. Didernich, A. Haas and M. Yazdanbakhsch, *Chem. Ber.*, 1977, **110**, 916.
90. W. Clegg and S. Morton, *J. Chem. Soc., Dalton*, 1978, 1452.
91. T. R. Fernandes, R. N. Haszeldine and A. E. Tipping, *J. Chem. Soc., Dalton*, 1978, 1024.
92. E. K. Liu and R. J. Lagow, *J. Chem. Soc., Chem. Comm.*, 1977, 450.
93. H. Blancou, P. Moreau and A. Commeyras, *Tetrahedron*, 1977, **33**, 2061.
94. P. Calas, P. Moreau and A. Commeyras, *J. Fluorine Chem.*, 1978, **12**, 67.
95. G. Schoening and O. Glemser, *Chem. Ber.*, 1977, **110**, 1148.
96. J. T. Hill, *J. Fluorine Chem.*, 1977, **9**, 97.
97. A. Ya. Zapevalov, I. P. Kolenko, V. S. Plashkin and P. G. Neifeld, *J. Org. Chem. (U.S.S.R.)*, 1978, **14**, 239.
98. B. Modarai, *J. Org. Chem.*, 1976, **41**, 1980.
99. T. Omori, S. Nagase, H. Baba, K. Kodaira and T. Abe, *J. Fluorine Chem.*, 1977, **9**, 279.
100. R. D. Chambers, A. Parkin and R. S. Matthews, *J. Chem. Soc., Perkin I*, 1976, 2107.
101. T. Kitazume and J. M. Shreeve, *Inorg. Chem.*, 1977, **16**, 1818.
102. K. I. The and R. G. Cavell, *Inorg. Chem.*, 1977, **16**, 2887.
103. R. G. Cavell, J. A. Gibson and K. I. The, *Inorg. Chem.*, 1978, **17**, 2880.
104. G. E. Gerhardt and R. J. Lagow, *J. Org. Chem.*, 1978, **43**, 4505.
105. S-L. Yu and D. D. DesMarteau, *Inorg. Chem.*, 1978, **17**, 2484.
106. K. I. The and R. G. Cavell, *Inorg. Chem.*, 1976, **15**, 2518.
107. T. Kitazume and J. M. Shreeve, *Inorg. Chem.*, 1978, **17**, 2173.
108. A. B. Burg, *Inorg. Chem.*, 1978, **17**, 593.
109. A. Haas and U. Niemann, *Chem. Ber.*, 1977, **110**, 67.
110. E. Elkik, R. Dahan and A. Parlier, *Compt. Rend. (C)*, 1978, **286**, 353.
111. V. Dedek, F. Liska and L. Cvak, *Coll. Czech. Chem. Comm.*, 1978, **43**, 985.
112. J. Kollonitsch, S. Marburg and L. M. Perkins, *J. Org. Chem.*, 1976, **41**, 3107.
113. K. I. Pashkevich, V. I. Saloutin and I. Ya. Postovskii, *J. Org. Chem. (U.S.S.R.)*, 1977, **13**, 45.
114. L. M. Markovskii, V. E. Pashinnik and N. A. Kirsanova, *J. Org. Chem. (U.S.S.R.)*, 1977, **13**, 963.
115. J. Escudie, C. Couret and J. Satge, *Bull. Soc. Chim. France II*, 1978, 361.
116. V. Dedek, F. Liska and L. Cvak, *Coll. Czech. Chem. Comm.*, 1978, **43**, 2649.
117. C. J. Brookes, P. L. Coe, A. E. Pedler and J. C. Tatlow, *J. Chem. Soc., Perkin I*, 1978, 202.
118. T. Kitazume and J. M. Shreeve, *J. Fluorine Chem.*, 1977, **9**, 175.
119. S. Brownstein, J. Bornais and G. Latremouille, *Canad. J. Chem.*, 1978, **56**, 1419.
120. R. D. Bagnall, W. Bell and K. Pearson, *J. Fluorine Chem.*, 1977, **9**, 359.
121. R. V. Grigorash, V. V. Lyalin, L. A. Alekseva and L. M. Yagupolskii, *J. Org. Chem. (U.S.S.R.)*, 1978, **14**, 782.
122. N. Pellissier, *Org. Magn. Resonance*, 1977, **9**, 563.
123. Yu. Ya. Sudenkor, *J. Org. Chem. (U.S.S.R.)*, 1978, **14**, 1240.
124. G-V. Roeschenthaler, *Z. Naturforsch.*, 1978, **33b**, 131.
125. T. Abe and S. Nagase, *J. Fluorine Chem.*, 1978, **12**, 359.
126. R. N. Haszeldine, I. Mir and A. E. Tipping, *J. Chem. Soc., Perkin I*, 1976, 556.
127. C. J. Schack and K. O. Christe, *J. Fluorine Chem.*, 1978, **12**, 325.
128. T. Martini and C. Schumann, *J. Fluorine Chem.*, 1976, **8**, 535.
129. R. N. Haszeldine, I. Mir, A. E. Tipping and A. G. Wilson, *J. Chem. Soc., Perkin I*, 1976, 1170.
130. S. D. Morse, K. A. Laurence, G. H. Sprenger and J. M. Shreeve, *J. Fluorine Chem.*, 1978, **11**, 327.
131. M. O. Riley, Y. K. Kim and O. R. Pierce, *J. Fluorine Chem.*, 1977, **10**, 85.

132. J. A. Young and M. H. Bennett, *J. Org. Chem.*, 1977, **42**, 4055.
133. M. G. Barlow and K. W. Cheung, *J. Fluorine Chem.*, 1978, **12**, 35.
134. J. Leroy and C. Wakselman, *J. Chem. Soc., Perkin I*, 1978, 1224.
135. J. Grobe and R. Rau, *J. Fluorine Chem.*, 1978, **11**, 265, 291.
136. A. Haas and U. Niemann, *J. Fluorine Chem.*, 1978, **11**, 509.
137. D. Cantacuzene, C. Wakselman and R. Dorme, *J. Chem. Soc., Perkin I*, 1977, 1365.
138. V. P. Shendrik, J. Svoboda, O. Paleta and V. Dedek, *J. Fluorine Chem.*, 1978, **11**, 485.
139. H. W. Roesky, M. Diehl, H. Fuess and J. W. Bats, *Angew. Chem.*, 1978, **90**, 73.
140. T. Kitazume and J. M. Shreeve, *J. Fluorine Chem.*, 1976, **8**, 437.
141. H.-B. Eikmeier, K. C. Hodges, O. Stelzer and R. Schmutzler, *Chem. Ber.*, 1978, **111**, 2077.
142. P. L. Coe and A. G. Holton, *J. Fluorine Chem.*, 1977, **10**, 553.
143. C. G. Krespan, *J. Org. Chem.*, 1978, **43**, 637.
144. M. Le Blanc, G. Santini, F. Jeanneaux and J. G. Riess, *J. Fluorine Chem.*, 1976, **8**, 525.
145. L. L. Gervits, K. N. Makarov, Yu. A. Cheburkov and I. L. Knunyants, *J. Fluorine Chem.*, 1977, **9**, 45.
146. P. W. L. Bosbury, R. Fields and R. N. Haszeldine, *J. Chem. Soc., Perkin I*, 1978, 422.
147. T. S. Croft, *J. Fluorine Chem.*, 1976, **7**, 433.
148. T. B. Zapevalova, A. Ya. Zapevalov, V. P. Sass, I. P. Kolenko, V. S. Plashkin and S. V. Sokolov, *J. Org. Chem.* (*U.S.S.R.*), 1978, **14**, 451.
149. N. Ishikawa and M. Maruta, *Nippon Kagaku Kaishi*, 1977, 1411.
150. A. Battais, B. Boutevin and P. Moreau, *J. Fluorine Chem.*, 1978, **12**, 481.
151. T. B. Zapevalova, V. S. Plashkin, A. Ya. Zapevalov and S. V. Sokolov, *J. Org. Chem.* (*U.S.S.R.*), 1978, **14**, 900.
152. T. Abe, K. Kodaira, H. Baba and S. Nagase, *J. Fluorine Chem.*, 1978, **12**, 1.
153. S-L. Yu and D. D. DesMarteau, *J. Fluorine Chem.*, 1978, **12**, 315.
154. H. W. Roesky, M. Diehl and M. Banek, *Chem. Ber.*, 1978, **111**, 1503.
155. G-V. Roeschenthaler, J. A. Gibson and R. Schmutzler, *Chem. Ber.*, 1977, **110**, 611.
156. J. A. Gibson, G-V. Roeschenthaler, R. Schmutzler and R. Starke, *J. Chem. Soc., Dalton*, 1977, 450.
157. D. Dakternieks, G-V. Roeschenthaler and R. Schmutzler, *J. Fluorine Chem.*, 1978, **11**, 387.
158. C. Beguin and R. Dupeyre, *Mol. Phys.*, 1976, **32**, 699.
159. T. Schaefer, J. B. Rowbotham, W. J. E. Parr, K. Marat and A. F. Janzen, *Canad. J. Chem.*, 1976, **54**, 1322.
160. J. Bromilow, R. T. C. Brownlee and A. V. Page, *Tetrahedron Letters*, 1976, 3055.
161. M. Zupan, *J. Fluorine Chem.*, 1976, **8**, 305.
162. M. J. Van Hamme, D. J. Burton and P. E. Greenlimb, *Org. Magn. Resonance*, 1978, **11**, 275.
163. T. Schaefer, K. Marat, K. Chum and A. F. Janzen, *Canad. J. Chem.*, 1977, **55**, 3936.
164. D. A. Burgess and I. D. Rae, *Austral. J. Chem.*, 1977, **30**, 1611.
165. F. E. Herkes, *J. Fluorine Chem.*, 1977, **9**, 113.
166. R. A. Newmark and J. R. Hill, *Org. Magn. Resonance*, 1977, **9**, 589.
167. T. Schaefer and J. B. Rowbothom, *Canad. J. Chem.*, 1976, **54**, 2243.
168. H. W. Roesky and K. Ambrosius, *Z. Naturforsch.*, 1978, **33b**, 759.
169. R. E. Banks R. N. Haszeldine and J. M. Robinson, *J. Chem. Soc., Perkin I*, 1976, 1226.
170. T. Nguyen, M. Rubinstein and C. Wakselman, *J. Fluorine Chem.*, 1978, **11**, 573.
171. R. A. Bekker, Sh. O. Badanyan, G. G. Melikyan and I. L. Knunyants, *J. Org. Chem.* (*U.S.S.R.*), 1977, **13**, 1461.
172. I. L. Knunyants, L. A. Rozov, Yu. V. Zeifman and Yu. A. Cheburkov, *J. Fluorine Chem.*, 1977, **10**, 351.
173. M. S. Raasch, *J. Org. Chem.*, 1978, **43**, 2500.

174. Yu. G. Shermolovich, O. M. Polumbrik, L. M. Markovskii, E. P. Saenko, G. G. Furin and G. G. Yakobson, *J. Org. Chem.* (*U.S.S.R.*), 1977, **13**, 2404.
175. R. E. Banks, M. G. Barlow and T. J. Noakes, *J. Fluorine Chem.*, 1977, **10**, 45.
176. R. N. Haszeldine, A. J. Mitchinson, R. Rowland and A. E. Tipping, *J. Chem. Soc., Perkin I*, 1976, 517.
177. R. D. Chambers, A. A. Lindley and H. C. Fielding, *J. Fluorine Chem.*, 1978, **12**, 337.
178. K. Burger, S. Tremmel and H. Schickaneder, *J. Fluorine Chem.*, 1976, **7**, 471.
179. R. E. Banks and C. Oppenheim, *J. Fluorine Chem.*, 1978, **12**, 27.
180. D. Dakternieks, G-V. Roeschenthaler and R. Schmutzler, *J. Fluorine Chem.*, 1978, **12**, 413.
181. J. Varwig and R. Mews, *Angew. Chem.*, 1977, **89**, 675.
182. G. Cal, J. M. Chemerda, D. F. Reinhold and R. M. Purick, *J. Org. Chem.*, 1977, **42**, 143.
183. E. Elkik and H. Assadifar, *Bull. Soc. Chim. France II*, 1978, 129.
184. T. Nakai, K. Tanaka and N. Ishikawa, *J. Fluorine Chem.*, 1977, **9**, 89.
185. M. Zupan and A. Pollak, *J. Org. Chem.*, 1976, **41**, 4002.
186. T. Schaefer, W. Danchura and W. Niemczura, *Canad. J. Chem.*, 1978, **56**, 36.
187. R. N. Haszeldine, D. R. Taylor and E. W. White, *J. Fluorine Chem.*, 1977, **10**, 27.
188. E. S. Turbanov, N. A. Orlova and A. A. Petrov, *J. Org. Chem.* (*U.S.S.R.*), 1978, **14**, 1089.
189. T. Nakai, K. Tanaka and N. Ishikawa, *Nakai Nippon Kagaku Kaishi*, 1976, 1888.
190. W. A. Konig and U. Hess, *Annalen*, 1977, 1087.
191. K. V. Werner, *J. Fluorine Chem.*, 1976, **8**, 451.
192. T. Kitazume and J. M. Shreeve, *J. Amer. Chem. Soc.*, 1978, **100**, 985.
193. J. Leroy and C. Wakselman, *Canad. J. Chem.*, 1976, **54**, 218.
194. B. E. Maryanoff and D. F. McComsey, *J. Org. Chem.*, 1978, **43**, 2733.
195. K. V. Dvornikova, V. E. Platonov and G. G. Yakobson, *J. Fluorine Chem.*, 1978, **11**, 1.
196. C. J. Boriack, E. D. Laganis and D. M. Lernal, *Tetrahedron Letters*, 1978, 1015.
197. R. D. Chambers, A. A. Lindley, P. D. Philpot, H. C. Fielding, J. Hutchinson and G. Whittaker, *J. Chem. Soc., Chem. Comm.*, 1978, 431.
198. Y. Kobayashi, S. Fujino, H. Hamana, I. Kumadaki and Y. Hanzawa, *J. Amer. Chem. Soc.*, 1977, **99**, 8511.
199. J. A. Gibson, G-V. Roeschenthaler and V. Wray, *J. Chem. Soc., Dalton*, 1977, 1491; J. A. Gibson, G-V. Roeschenthaler and R. Schmutzler, *Z. Naturforsch.*, 1977, **32b**, 599.
200. T. B. Zapevalova, V. S. Plashkin, L. N. Senyushov, V. P. Sass and S. V. Sokolov, *J. Org. Chem.* (*U.S.S.R.*), 1977, **13**, 909.
201. T. Kitazume and J. M. Shreeve, *J. Chem. Soc., Chem. Comm.*, 1978, 154.
202. T. Schaefer, K. Chum, K. Marat and R. E. Wasylishen, *Canad. J. Chem.*, 1976, **54**, 800.
203. H. Kimoto, H. Muramatsu and K. Inukai, *Nippon Kagaku Kaishi*, 1977, 684.
204. N. Ishikawa and S. Sasaki, *Bull. Chem. Soc. Japan*, 1977, **50**, 2164.
205. E. R. Bissell, *J. Fluorine Chem.*, 1977, **9**, 5.
206. K. Burger, J. Albanbauer, F. Kaefig and S. Penninger, *Annalen*, 1977, 624.
207. H-O. Harada and N. Ishikawa, *J. Fluorine Chem.*, 1978, **11**, 87.
208. G. Santini, M. Le Blance and J. G. Riess, *J. Organometal. Chem.*, 1977, **140**, 1.
209. V. G. Lukmanov, L. A. Alekseeva and L. M. Yagupolskii, *J. Org. Chem.* (*U.S.S.R.*), 1977, **13**, 1979.
210. A. R. L. Bursics, E. Bursics-Szekeres, M. Murray and F. G. A. Stone, *J. Fluorine Chem.*, 1976, **7**, 619.
211. V. N. Boiko, G. M. Shchupak and L. M. Yagupolskii, *J. Org. Chem.* (*U.S.S.R.*), 1978, **14**, 621.
212. R. D. Chambers, J. Hutchinson and P. D. Philpot, *J. Fluorine Chem.*, 1977, **9**, 15.
213. C. Wakselman and J. Leroy, *J. Fluorine Chem.*, 1978, **12**, 101.
214. K. Burger, R. Ottlinger, A. Frank and U. Schubert, *Angew. Chem.*, 1978, **90**, 824.
215. D. W. Hensley and R. P. Stewart, *Inorg. Chem.*, 1976, **15**, 2418.

216. J. Hilton and L. H. Sutcliffe, *Spectrochim. Acta*, 1976, **32A**, 201.
217. M. M. Dhingra and K. R. Tatta, *Org. Magn. Resonance*, 1977, **9**, 23.
218. S. A. Lopyreva, T. I. Ryabtseva, V. P. Sass, A. V. Tumanova and S. V. Sokolov, *J. Org. Chem.* (*U.S.S.R.*), 1977, **13**, 1032.
219. R. J. De Pasquale, *J. Fluorine Chem.*, 1976, **8**, 311.
220. D. D. Poulin, C. Demay and J. G. Riess, *Inorg. Chem.*, 1977, **16**, 2278.
221. F. Cavagna and C. Schumann, *J. Magn. Resonance*, 1976, **22**, 333.
222. L. A. Shimp and R. J. Lagow, *J. Org. Chem.*, 1977, **42**, 3437.
223. G. Alvernhe, E. Kozlowska, S. Lacome-bar and A. Laurent, *Tetrahedron Letters*, 1978, 5203.
224. K. C. Joshi, V. N. Pathak and S. Bhargava, *J. Inorg. Nuclear Chem.*, 1977, **39**, 803.
225. J. Grobe and W. Mohr, *J. Fluorine Chem.*, 1976, **8**, 341.
226. H. Harada, S. Mizutaki, S. Hayashi and N. Ishikawa, *J. Fluorine Chem.*, 1978, **12**, 211.
227. R. L. Amey and J. C. Martin, *J. Amer. Chem. Soc.*, 1978, **100**, 300.
228. K. Burger, A. Meffert and S. Bauer, *J. Fluorine Chem.*, 1977, **10**, 57.
229. K. Burger, W-D. Roth and K. Neumayr, *Chem. Ber.*, 1976, **109**, 1984.
230. T. W. Bastock, A. E. Pedler and J. C. Tatlow, *J. Fluorine Chem.*, 1976, **8**, 11.
231. W. T. Feast, R. R. Hughes and W. K. R. Musgrave, *J. Fluorine Chem.*, 1977, **9**, 271.
232. C. Wakselman and T. Nguyen, *J. Org. Chem.*, 1977, **42**, 565.
233. W. J. Feast, R. R. Hughes and W. K. R. Musgrave, *J. Fluorine Chem.*, 1977, **10**, 585.
234. K. Burger, H. Schickaneder and M. Pinzel, *Annalen*, 1976, 30.
235. P. W. L. Bosbury, R. Fields, R. N. Haszeldine and D. Moran, *J. Chem. Soc., Perkin I*, 1976, 1173.
236. R. S. Matthews, *J. Magn. Resonance*, 1978, **30**, 537.
237. T. S. Croft and J. J. McBrady, *J. Org. Chem.*, 1976, **41**, 2256.
238. A. I. Ayi, R. Condom, P. C. Maria, T. N. Wade and R. Guedj, *Tetrahedron Letters*, 1978, 4507.
239. A. M. Aleksandrov, V. P. Kukhar, G. I. Danilenko and A. P. Krasnoshchek, *J. Org. Chem.* (*U.S.S.R.*), 1977, **13**, 1505.
240. M. V. Buchanan, D. F. Hillenbrand and J. W. Taylor, *Analyt. Chem.*, 1977, **49**, 2146.
241. P. M. Hergenrother and M. Hudlicky, *J. Fluorine Chem.*, 1978, **12**, 439.
242. L. M. Yagupolskii, V. G. Lukmanov, V. N. Boiko and L. A. Alekseeva, *J. Org. Chem.* (*U.S.S.R.*), 1977, **13**, 2221.
243. M. Le Blanc, G. Santini, J. Gallucci and J. G. Riess, *Tetrahedron*, 1977, **33**, 1453.
244. D. L. Reger and M. D. Dukes, *J. Organometal. Chem.*, 1978, **153**, 67.
245. R. E. Moore and G. L. Driscoll, *J. Org. Chem.*, 1978, **43**, 4978.
246. A. F. Hadfield, L. Hough and A. C. Richardson, *Carbohydrate Res.*, 1978, **63**, 51.
247. N. A. Marron and J. E. Gano, *J. Amer. Chem. Soc.*, 1976, **98**, 4653.
248. K. Burger and R. Ottlinger, *J. Fluorine Chem.*, 1978, **11**, 29.
249. D. Bryce-Smith, A. Gilbert, B. H. Orger and P. J. Twitchett, *J. Chem. Soc., Perkin I*, 1978, 232.
250. G-V. Roeschenthaler, K. Sauerbrey and R. Schmutzler, *Chem. Ber.*, 1978, **111**, 3105.
251. P. Moreau, R. Albadri and A. Commeyras, *Nouveau J. Chim.*, 1977, **1**, 497.
252. K. C. Eapen and C. Tamborski, *J. Fluorine Chem.*, 1978, **12**, 271.
253. Y. Kobayashi, I. Kumadaki, A. Chsawa, Y. Sekine and A. Ando, *J. Chem. Soc., Perkin I*, 1977, 2355.
254. K. Burger, H. Schickaneder, W. Threnn, G. Ebner and C. Zettl, *Annalen*, 1976, 2156.
255. Y. Kobayashi, Y. Hanzawa and Y. Nakanishi, *Tetrahedron Letters*, 1977, 3371.
256. G. Robertson, E. K. S. Liu and R. J. Lagow, *J. Org. Chem.*, 1978, **43**, 4981.
257. P. R. Ortiz de Montellano and W. A. Vinson, *J. Org. Chem.*, 1977, **42**, 2013.
258. P. A. W. Dean and D. G. Ibbott, *Canad. J. Chem.*, 1976, **54**, 177.

259. L. A. Simonyan, E. A. Avetisyan, Z. V. Safronova and N. P. Gambaryan, *Bull Acad. Sci., U.S.S.R.*, 1977, **26**, 1906.
260. P. W. Kent and S. D. Dimitrijevich, *J. Fluorine Chem.*, 1977, **10**, 455.
261. J. Albanbauer, K. Burger, E. Burgis, D. Marquarding, L. Schabl and I. Ugi, *Annalen*, 1976, 36.
262. L. S. Kobrina, V. L. Salenko and G. G. Yakobson, *J. Org. Chem.*, 1977, **13**, 1565.
263. R. Koppang, *J. Fluorine Chem.*, 1978, **11**, 19.
264. S. Stauber and M. Zupan, *J. Fluorine Chem.*, 1977, **10**, 271.
265. M. Sharma and W. Korytnyk, *Tetraheron Letters*, 1977, 573.
266. M. Laing, P. Sommerville, Z. Dawoodi, M. J. Mays and P. J. Wheatley, *J. Chem. Soc., Chem. Comm.*, 1978, 1035.
267. N. S. Mirzabekyants, Yu. A. Cheburkov and I. L. Knunyants, *Bull. Acad. Sci., U.S.S.R.*, 1978, **26**, 2332.
268. K. Burger, K. Einhellig, W-D. Roth and E. Daltrozzo, *Chem. Ber.*, 1977, **110**, 605.
269. G. E. Ditchfield and A. E. Pedler, *J. Fluorine Chem.*, 1977, **10**, 447.
270. Y. Kobayashi, I. Kurnadaki, A. Ohsawa and A. Ando, *J. Amer. Chem. Soc.*, 1977, **99**, 7350.
271. T. I. Savchenko, T. D. Petrova, V. E. Platonov and G. G. Yakobson, *J. Fluorine Chem.*, 1977, **9**, 505.
272. V. M. Vlasov, O. V. Zakharova and G. G. Yakobson, *J. Org. Chem.* (*U.S.S.R.*), 1977, **13**, 2206.
273. V. M. Vlasov, O. V. Zakharova and G. G. Yakobson, *J. Fluorine Chem.*, 1977, **9**, 257.
274. R. D. Chambers and R. Middleton, *J. Chem. Soc., Perkin I*, 1977, 1500.
275. R. Anderson, K. B. Baucom, T. Psarras, C. E. Snyder and R. E. Cochy, *J. Fluorine Chem.*, 1976, **7**, 581.
276. K. Tada and F. Toda, *Tetrahedron Letters*, 1978, 563.
277. P. A. Corrigan, R. S. Dickson, G. D. Fallon, L. J. Michel and C. Mok, *Austral. J. Chem.*, 1978, **31**, 1937.
278. L. S. Kobrina, V. P. Sass, S. V. Sokolov and G. G. Yakobson, *J. Org. Chem.* (*U.S.S.R.*), 1977, **13**, 1145.
279. H. C. Clark and K. J. Reimer, *Canad. J. Chem.*, 1976, **54**, 2077.
280. E. M. Hyde, J. D. Kennedy, B. L. Shaw and W. McFarlane, *J. Chem. Soc., Dalton*, 1977, 1571.
281. J. A. Gibson, G-V. Roeschenthaler, D. Schomburg and W. S. Sheldrick, *Chem. Ber.*, 1977, **110**, 1887.
282. B. Sket and M. Zupan, *Tetrahedron Letters*, 1978, 2607.
283. P. Wieland, *Helv. Chim. Acta*, 1976, **59**, 1027.
284. A. C. Jarvis and R. D. W. Kemmitt, *J. Organometal. Chem.*, 1977, **136**, 121.
285. D. H. R. Barton, L. J. Danks, A. K. Ganguly, R. H. Hesse, G. Tarzia and M. M. Pechet, *J. Chem. Soc., Perkin I*, 1976, 101.
286. W. Storzer and G-V. Roeschenthaler, *Z. Naturforsch*, 1978, **33b**, 305.
287. J. Defaye, H. Driguez, B. Henrissat, J. Gelas and E. Bar-Guilloux, *Carbohydrate Res.*, 1978, **63**, 61.
288. A. R. Al-Ohaly, R. A. Head and J. F. Nixon, *J. Chem. Soc., Dalton*, 1978, 889.
289. A. P. Gulya, D. G. Batyr and E. V. Iorga, *Russ. J. Inorg. Chem.*, 1976, **21**, 567.
290. E. F. Perozzi and J. C. Martin, *J. Org. Chem.*, 1977, **42**, 3222.
291. G. Felsky, P. M. Fredericks and G. D. Meakin, *J. Chem. Soc., Perkin I*, 1978, 1529.
292. J. Burgess, J. G. Chambers, D. A. Clarke and R. D. W. Kemmitt, *J. Chem. Soc., Dalton*, 1977, 1906.
293. K. N. Makarov, L. L. Gervits and I. L. Knunyants, *J. Fluorine Chem.*, 1977, **10**, 157.
294. C. J. Jameson, A. K. Jameson and S. M. Cohen, *J. Chem. Phys.* 1977, **67**, 2771.
295. C. J. Jameson, *J. Chem. Phys.*, 1977, **67**, 2814.

296. C. J. Jameson, A. K. Jameson and H. Parker, *J. Chem. Phys.*, 1978, **69**, 1318.
297. C. J. Jameson and A. K. Jameson, *J. Chem. Phys.*, 1978, **69**, 1655.
298. R. J. Finney, M. Wolfe and J. Jonas, *J. Chem. Phys.*, 1977, **67**, 4004.
299. M. Wolfe, E. Arndt and J. Jonas, *J. Chem. Phys.*, 1977, **67**, 4012.
300. J. Angerer and W. Suchanski, *J. Magn. Resonance*, 1976, **21**, 57.
301. N. Muller, *J. Magn. Resonance*, 1976, **22**, 479.
302. N. Muller, *J. Magn. Resonance*, 1976, **23**, 327.
303. N. Muller, *J. Magn. Resonance*, 1977, **28**, 203.
304. N. N. Kalibabchuk, V. Ya. Semenii, V. S. Kuts, L. K. Dyachek and V. N. Zavatskii, *Teor. Eksp. Khim.*, 1977, **13**, 774.
305. H. L. Yeager and H. Reid, *J. Phys. Chem.*, 1976, **80**, 850.
306. N. S. Golubev and N. A. Saforov, *React. Kinet. Catal. Lett.*, 1977, **7**, 451.
307. A. A. Samoilenko, A. I. Serebryanskaya, Yu. S. Bogachev, N. N. Shapetko and A. I. Shatenshtein, *Dokl. Akad. Nauk S.S.S.R.*, 1978, **239**, 388.
308. F. F-L. Ho, *Talanta*, 1976, **23**, 734.
309. E. G. Sundholm, *Tetrahedron*, 1977, **33**, 991.
310. J. Svoboda, *Czech. J. Phys.*, 1978, **B28**, 476.
311. M. J. Thomas, P. J. Wagner, M. L. Manion-Schilling and H. D. Roth, *J. Amer. Chem. Soc.*, 1977, **99**, 3842.
312. M. J. Thomas and P. J. Wagner, *J. Amer. Chem. Soc.*, 1977, **99**, 3845.
313. M. L. Manion-Schilling, R. S. Hutton and H. D. Roth, *J. Amer. Chem. Soc.*, 1977, **99**, 7792.
314. A. Germain and A. Commeyras, *J. Chem. Soc., Chem. Comm.*, 1978, 118.
315. J. San Filippo, R. G. Nuzzo and L. J. Romano, *J. Org. Chem.*, 1976, **41**, 392.
316. A. J. Van de Wal, E. M. Merckx, G. L. Lemiere, T. A. Van Osselaer, J. A. Lepoivre and F. C. Alderweireldt, *Bull. Soc. Chim. Belges*, 1978, **87**, 545.
317. E. M. Merckx, A. J. Van de Wal, J. A. Lepoivre and F. C. Alderweireldt, *Bull. Soc. Chim. Belges*, 1978, **87**, 21.
318. R. L. Soulen and D. W. Paul, *J. Fluorine Chem.*, 1977, **10**, 261.
319. W. R. Dolbier and T. H. Fielder, *J. Amer. Chem. Soc.*, 1978, **100**, 577.
320. B. Al-Saleh, R. E. Banks, M. G. Barlow and J. C. Hornby, *J. Fluorine Chem.*, 1978, **12**, 341.
321. H-G. Horn, R. Koentges, F. Kolkmann and H. C. Marsmann, *Z. Naturforsch.*, 1978, **33b**, 1422.
322. R. D. Chambers, R. D. Hercliffe and R. Middleton, *J. Chem. Soc., Chem. Comm.*, 1978, 305.
323. H-G. Horn and F. Kolkmann, *Z. Naturforsch.*, 1978, **33b**, 1427.
324. A. P. Sevastyan, Yu. A. Fialkov, V. A. Khranovskii and L. M. Yagupolskii, *J. Org. Chem. (U.S.S.R.)*, 1978, **14**, 191.
325. R. N. Haszeldine, D. R. Taylor and E. W. White, *J. Fluorine Chem.*, 1978, **11**, 441.
326. D. A. Burgess, I. D. Rae and J. D. Snell, *Austral. J. Chem.*, 1977, **30**, 543.
327. D. A. Burgess, I. D. Rae, L. K. Smith and J. D. Snell, *Austral. J. Chem.*, 1976, **29**, 1435.
328. L. M. Yagupolskii and Yu. L. Yagupolskii, *J. Org. Chem. (U.S.S.R.)*, 1977, **13**, 1853.
329. G. M. Brooke and D. H. Hall, *J. Fluorine Chem.*, 1977, **10**, 495.
330. J. Fornies, M. Green, A. Laguna, M. Murray, J. L. Spencer and F. G. A. Stone, *J. Chem. Soc., Dalton*, 1977, 1515.
331. Yu. A. Fialkov, A. P. Sevastyan, V. A. Khranovskii and L. M. Yagupolskii, *J. Org. Chem. (U.S.S.R.)*, 1978, **144**, 939.
332. A. E. Asato, H. Matsumoto, M. Denny and R. S. H. Liu, *J. Amer. Chem. Soc.*, 1978, **100**, 5957.
333. L. M. Yakupolskii, M. M. Kremlev, Yu. A. Failkov, V. A. Khranovskii and V. M. Yurchenko, *J. Org. Chem. (U.S.S.R.)*, 1977, **13**, 1438.

334. V. A. Mukhedkar, B. J. Kavathekar and A. J. Mukhedkar, *J. Inorg. Nuclear Chem.*, 1977, **39**, 1003.
335. K. B. Wiberg, D. E. Barth and W. E. Pratt, *J. Amer. Chem. Soc.*, 1977, **99**, 4287.
336. H-J. Schneider, W. Gschwendtner, D. Heiske, V. Hoppen and F. Thomas, *Tetrahedron*, 1977, **33**, 1769; H-J. Schneider private communication.
337. R. A. Bekker, V. Ya. Popkova and I. L. Knunyants, *J. Org. Chem.* (*U.S.S.R.*), 1977, **13**, 1956.
338. G. A. Wheaton and D. J. Burton, *J. Fluorine Chem.*, 1977, **9**, 25.
339. M. L. Greenlee, E. L. Fritzen and J. S. Swenton, *J. Org. Chem.*, 1978, **43**, 4512.
340. J. Bensoam and F. Mathey, *Tetrahedron Letters*, 1977, 2797.
341. D. J. Burton and J. L. Hahnfeld, *J. Org. Chem.*, 1977, **42**, 828.
342. N. E. Akhmetova and V. D. Shteingarts, *J. Org. Chem.* (*U.S.S.R.*), 1977, **13**, 1172.
343. S. Stavber and M. Zupan, *J. Chem. Soc., Chem. Comm.*, 1978, 969.
344. M. Christl and W. Buchner, *Org. Magn. Resonance*, 1978, **11**, 461.
345. P. Mueller, R. Etienne, J. Pfyffer, N. Pineda and M. Schipoff, *Tetrahedron Letters*, 1978, 3151.
346. A. Gregorcic and M. Zupan, *Tetrahedron*, 1977, **33**, 3243.
347. A. Gregorcic and M. Zupan, *Coll. Czech. Chem. Comm.*, 1977, **42**, 3192.
348. T. Ishihara, T. Ando, T. Muranaka and K. Saito, *J. Org. Chem.*, 1977, **42**, 666.
349. H. J. J. Loozen, W. M. M. Robben and H. M. Buck, *Rec. Trav. Chim.*, 1976, **95**, 248.
350. P. Mueller, J. Pfyffer, E. Wentrup-Byrne and U. Burger, *Helv. Chim. Acta*, 1978, **61**, 2081.
351. A. A. Shtark and V. D. Shteingarts, *J. Org. Chem.* (*U.S.S.R.*), 1977, **13**, 1536.
352. A. Gregorcic and M. Zupan, *J. Chem. Soc., Perkin I*, 1977, 1446.
353. G. Bauer and G. Haegele, *Angew. Chem.*, 1977, **89**, 493.
354. M. Zupan, B. Sket and B. Pahor, *Tetrahedron Letters*, 1977, 4541.
355. R. G. Plevey and R. E. Talbot, *J. Fluorine Chem.*, 1977, **10**, 577.
356. R. G. Plevey and D. J. Sparrow, *J. Chem. Soc., Perkin I*, 1976, 573.
357. T. V. Senchenko, V. E. Platonov, and G. G. Yakobson, *J. Org. Chem.* (*U.S.S.R.*), 1977, **13**, 1765.
358. J. Battersby, R. Stephens, and J. C. Tatlow, *J. Fluorine Chem.*, 1977, **9**, 127.
359. E. Elkik, A. Parlier, and R. Dahan, *Compt. Rend.* (*C*), 1977, **284**, 141.
360. W. Adcock, B. D. Gupta and T-C. Khor, *Austral. J. Chem.*, 1976, **29**, 2571.
361. G. M. Brooke, D. H. Hall and H. M. M. Shearer, *J. Chem. Soc., Perkin I*, 1978, 780.
362. B. Sket and M. Zupan, *J. Chem. Soc., Perkin I*, 1977, 2169.
363. S. Stavber and M. Zupan, *J. Fluorine Chem.*, 1978, **12**, 307.
364. R. R. Perkins and R. E. Pincock, *Org. Magn. Resonance*, 1976, **8**, 165.
365. P. Metzger and E. Casadevall, *Bull. Soc. Chim. France II*, 1978, 109.
366. J. P. Zahra, B. Waegell, J. Reisse, G. Pouzard and J. Fournier, *Bull. Soc. Chim. France*, 1976, 1896.
367. H-J. Schneider and W. Ansorge, *Tetrahedron*, 1977, **33**, 265.
368. R. E. Banks, M. G. Barlow and M. M. Saleh, *J. Fluorine Chem.*, 1977, **10**, 81.
369. D. J. Burton, R. D. Howells, P. D. Van der Valk, *J. Amer. Chem. Soc.*, 1977, **99**, 4830.
370. R. G. Plevey, I. J. Sallomi, D. F. Thomas and J. C. Tatlow, *J. Chem. Soc., Perkin I*, 1976, 2270.
371. M. Zupan and B. Sket, *J. Org. Chem.*, 1978, **43**, 696.
372. M. Zupan, *J. Fluorine Chem.*, 1977, **9**, 177.
373. G. V. Thi and P. Margaretha, *Helv. Chim. Acta*, 1976, **59**, 2236.
374. V. T. Yue, C. J. Courson, M. R. Brinkman and P. P. Gaspar, *J. Org. Chem.*, 1978, **43**, 4873.
375. M. Zupan, B. Sket and B. Pahor, *J. Org. Chem.*, 1978, **43**, 2297.
376. L. S. Kobrina, V. N. Kovtonyuk and G. G. Yakobson, *J. Org. Chem.* (*U.S.S.R.*), 1977, **13**, 1331.

377. W. J. Feast, R. R. Hughes and W. K. R. Musgrave, *J. Chem. Soc., Perkin I*, 1977, 152.
378. I. J. Hotchkiss, R. Stephens and J. C. Tatlow, *J. Fluorine Chem.*, 1976, **8**, 379.
379. R. D. Chambers, G. Taylor and R. L. Powell, *J. Chem. Soc., Chem. Comm.*, 1978, 433.
380. H. Kimoto, H. Muramatsu and K. Inukai, *J. Fluorine Chem.*, 1977, **9**, 417.
381. B. Sket and M. Zupan, *Tetrahedron Letters*, 1977, 2811.
382. W. Adcock and T-C. Khor, *J. Org. Chem.*, 1977, **42**, 218.
383. K. Hayano, Y. Ohfune, H. Shirahama and T. Matsumoto, *Tetrahedron Letters*, 1978, 1991.
384. W. R. Cullen, M. Williams, F. W. B. Einstein and C-H. Huang, *J. Fluorine Chem.*, 1978, **11**, 365.
385. M. Sheves, B. Sialom and Y. Mazur, *J. Chem. Soc., Chem. Comm.*, 1978, 554.
386. Yu. V. Pozdnyakovich and V. D. Shteingarts, *J. Org. Chem.* (*U.S.S.R.*), 1977, **13**, 1772.
387. H. L. Holland, *Tetrahedron Letters*, 1978, 881.
388. R. E. Banks and B. E. Cross, *J. Chem. Soc., Perkin I*, 1977, 512.
389. B. E. Cross and A. Erasmuson, *J. Chem. Soc., Chem. Comm.*, 1978, 1013.
390. D. H. R. Barton, L. J. Danks, R. H. Hesse, M. M. Pechet and C. Wilshire, *Noveau J. Chim.*, 1977, **1**, 315.
391. L. Toscano, G. Guadagnini and G. Grisanti, *Arzneim.-Forsch.*, 1977, **27**, 1636.
392. G. Cleve, E. Frost, G-A. Hoyer, D. Rosenberg and A. Seeger, *Arzneim.-Forsch.*, 1977, **27**, 2188.
393. D. H. R. Barton, R. H. Hesse, R. E. Markwell, M. M. Pechet and S. Rozen, *J. Amer. Chem. Soc.*, 1976, **98**, 3036.
394. R. D. Bates, B. E. Wagner and E. H. Poindexter, *J. Phys. Chem.*, 1976, **80**, 320.
395. J. Burdon, J. C. Hotchkiss and W. B. Jennings, *Tetrahedron*, 1977, **33**, 1745.
396. R. Bolton and J. P. B. Sandall, *J. Chem. Soc., Perkin II*, 1978, 137.
397. R. Bolton, S. M. Kazeroonian and J. P. B. Sandall, *J. Fluorine Chem.*, 1976, **8**, 471.
398. R. Bolton, S. M. Kazeroonian and J. P. B. Sandall, *J. Fluorine Chem.*, 1978, **11**, 9.
399. J. M. Angelelli, M. A. Delmas, J. C. Maire and J. P. Zahra, *J. Organometal. Chem.*, 1977, **128**, 313.
400. J. M. Angelelli, M. A. Delmas and J. C. Maire, *J. Organometal. Chem.*, 1978, **154**, 79.
401. F. J. Weigert and W. A. Sheppard, *J. Org. Chem.*, 1976, **41**, 4006.
402. V. Wray, L. Ernst and E. Lustig, *J. Magn. Resonance*, 1977, **27**, 1.
403. V. A. Chertkov and N. M. Sergeyev, *J. Magn. Resonance*, 1976, **21**, 159.
404. P. E. Hansen, A. Berg, H. J. Jakobson, A. P. Manzara and J. Michl, *Org. Magn. Resonance*, 1977, **10**, 179.
405. W. Adcock, J. Alste, S. Q. A. Rizvi and M. Aurangzeb, *J. Amer. Chem. Soc.*, 1976, **98**, 1701.
406. E. Lustig, D. N. Lincoln and V. Wray, *J. Magn. Resonance*, 1976, **21**, 509.
407. R. Bolton and J. P. B. Sandall, *J. Chem. Soc., Perkin II*, 1978, 141.
408. S. L. Manatt and M. A. Cooper, *J. Amer. Chem. Soc.*, 1977, **99**, 4561.
409. L. Ernst, D. N. Lincoln and V. Wray, *J. Magn. Resonance*, 1976, **21**, 115.
410. R. Bolton and J. P. B. Sandall, *J. Chem. Soc., Perkin II*, 1978, 1288.
411. L. Ernst and V. Wray, *J. Magn. Resonance*, 1977, **28**, 373.
412. V. Wray and D. N. Lincoln, *J. Magn. Resonance*, 1975, **18**, 374.
413. W. J. E. Parr and T. Schaefer, *Canad. J. Chem.*, 1976, **54**, 3564.
414. A. F. Clifford, J. L. Howell and D. L. Wooton, *J. Fluorine Chem.*, 1978, **11**, 433.
415. P. Sartori and G. Bauer, *J. Fluorine Chem.*, 1978, **12**, 203.
416. O. I. Andreevskaya, G. G. Furin and G. G. Yakobson, *J. Org. Chem.* (*U.S.S.R.*), 1977, **13**, 1558.
417. V. Wray, *J. Chem. Soc., Perkin II*, 1978, 855.
418. G. J. Den Otter and C. Maclean, *J. Mol. Struct.*, 1976, **31**, 47.
419. E. R. Falardeau and D. D. DesMarteau, *J. Chem. Eng. Data*, 1976, **21**, 386.

420. T. Schaefer, W. Danchura, W. Niemczura and J. Peeling, *Canad. J. Chem.*, 1978, **56**, 2442.
421. T. Schaefer, W. Danchura and W. Niemczura, *Canad. J. Chem.*, 1978, **56**, 2233.
422. A. Heesing and W. Schmaldt, *Chem. Ber.*, 1978, **111**, 320.
423. T. Schaefer and W. J. E. Parr, *J. Chem. Phys.*, 1976, **65**, 1197.
424. G. M. Brooke and D. H. Hall, *J. Chem. Soc., Perkin I*, 1976, 1464.
425. W. J. Frazee, M. E. Peach and J. R. Sweet, *J. Fluorine Chem.*, 1977, **9**, 377.
426. A. G. Budnik, S. L. Rusakov, E. I. Khomenko and G. G. Yakobson, *J. Org. Chem. (U.S.S.R.)*, 1978, **14**, 1185.
427. B. C. Musial and M. E. Peach, *J. Fluorine Chem.*, 1976, **7**, 459.
428. T. N. Gerasimova, N. V. Semikolenova and E. P. Fokin, *J. Org. Chem. (U.S.S.R.)*, 1978, **14**, 91.
429. E. R. Falardeau and D. D. DesMarteau, *J. Fluorine Chem.*, 1976, **7**, 409.
430. Yu. V. Pozdnyakovich and V. D. Shteingarts, *J. Org. Chem. (U.S.S.R.)*, 1978, **14**, 559.
431. D. Doddrell, M. Barfield, W. Adcock, M. Aurangzeb and D. Jordan, *J. Chem. Soc., Perkin II*, 1976, 402.
432. K. L. Kirk, *J. Org. Chem.*, 1976, **41**, 2373.
433. R. Bolton and J. P. B. Sandall, *J. Chem. Soc., Perkin II*, 1978, 746.
434. B. Sket and M. Zupan, *J. Org. Chem.*, 1978, **43**, 835.
435. A. V. Varlamov, Z. Papouskova, J. Pola, P. Trska and V. Chvalovsky, *Coll. Czech. Chem. Comm.*, 1977, **42**, 489.
436. J. M. Angelelli, M. A. Delmas and J. C. Maire, *J. Organometal. Chem.*, 1977, **131**, 225.
437. P. Sartori, K. Ahlers and H-J. Frohn, *J. Fluorine Chem.*, 1976, **8**, 457.
438. J. C. Maire and Y. Limouzin, *J. Organometal. Chem.*, 1976, **122**, 21.
439. W. Girke and E. D. Bergmann, *Chem. Ber.*, 1976, **109**, 1038.
440. L. Ernst, *Z. Naturforsch.*, 1975, **30b**, 788.
441. W. Adcock, G. L. Aldous and W. Kitching, *Tetrahedron Letters*, 1978, 3387.
442. W. Adcock, D. P. Cox and W. Kitching, *J. Organometal. Chem.*, 1977, **133**, 393.
443. M. Rabinovitz, I. Agranat, H. Selig and C-H. Lin, *J. Fluorine Chem.*, 1977, **10**, 159.
444. V. M. Vlasov, O. V. Zakharova and G. G. Yakobson, *Izvest. Sibirsk. Otdel. Akad. Nauk, Ser. Khim. Nauk*, 1977, 127.
445. R. E. Banks, M. G. Barlow, R. N. Haszeldine and J. C. Massey, *J. Fluorine Chem.*, 1978, **12**, 53.
446. G. M. Brooke, R. S. Matthews and A. C. Young, *J. Chem. Soc., Perkin I*, 1977, 1411.
447. R. E. Banks and S. M. Hitchen, *J. Fluorine Chem.*, 1978, **12**, 159.
448. R. Bolton, J. P. B. Sandall and G. H. Williams, *J. Fluorine Chem.*, 1978, **11**, 591.
449. T. Hirohashi, S. Inabe and H. Yamamoto, *Bull. Chem. Soc. Japan*, 1976, **49**, 1395.
450. A. Agarwal, M. J. McGlinchey and T-S. Tan, *J. Organometal. Chem.*, 1977, **141**, 85.
451. E. P. Fokin, T. N. Gerasimova, T. V. Fomenko and N. V. Semikolenova, *J. Org. Chem. (U.S.S.R.)*, 1978, **14**, 772.
452. R. Koppang, *J. Fluorine Chem.*, 1977, **9**, 449.
453. G. B. Deacon, R. M. Slade and D. G. Vince, *J. Fluorine Chem.*, 1978, **11**, 57.
454. J. M. Gascoyne, P. J. Mitchell and L. Phillips, *J. Chem. Soc., Perkin II*, 1977, 1051.
455. A. Prakash, *J. Fluorine Chem.*, 1977, **9**, 81.
456. G. A. Olah, G. K. S. Prakash and G. Laing, *J. Amer. Chem. Soc.*, 1977, **99**, 5683.
457. W. Adcock and D. P. Cox, *Tetrahedron Letters*, 1976, 2719.
458. W. Adcock and T-C. Khor, *Tetrahedron Letters*, 1977, 3769.
459. W. Adcock and T-C. Khor, *J. Amer. Chem. Soc.*, 1978, **100**, 7799.
460. W. Adcock and T-C. Khor, *Tetrahedron Letters*, 1976, 3063.
461. L. M. Stock and M. R. Wasielewski, *J. Org. Chem.*, 1976, **41**, 1660.
462. G. M. Brooke and A. C. Young, *J. Fluorine Chem.*, 1976, **8**, 223.

463. H. Selig, M. Rabinovitz, I. Agranat, C -H. Lin and L. Ebert, *J. Amer. Chem. Soc.*, 1976, **98**, 1601.
464. W. Adcock and T-C. Khor, *J. Org. Chem.*, 1978, **43**, 1272.
465. M. Protiva, I. Cervena, M. Rajsner, J. Metysova and M. Hrubantova, *Coll. Czech. Chem. Comm.*, 1978, **43**, 2656.
466. T. Takemura and N. Mori, *Chem. Letters*, 1978, 857.
467. S. I. Pombrik, D. N. Kravtsov, B. A. Kvasov and E. I. Fedin, *J. Organometal. Chem.*, 1977, **136**, 185.
468. S. I. Pombrik, V. F. Ivanov, A. S. Peregudov, D. N. Kravtsov, A. A. Fedorov and E. I. Fedin, *J. Organometal. Chem.*, 1978, **153**, 319.
469. G. W. Parshall, private communication reported in D. R. Coulson, *J. Amer. Chem. Soc.*, 1976, **98**, 3111.
470. B. F. Malichenko, G. A. Chernjavskaja, A. E. Borodin and N. N. Kalibabchuk, *Dopovidi Akad. Nauk Ukrain. R.S.R.*, Ser. B, 1977, 809.
471. R. Koppang, *J. Fluorine Chem.*, 1976, **8**, 389.
472. C. Crocker, R. J. Goodfellow, J. Gimeno and R. Uson, *J. Chem. Soc., Dalton*, 1977, 1448.
473. G. B. Deacon and G. J. Farquharson, *J. Organometal. Chem.*, 1977, **135**, 73.
474. V. M. Vlasov, G. G. Yakobson, E. S. Petrov and A. I. Shatenshtein, *J. Fluorine Chem.*, 1977, **9**, 321.
475. A. W. Douglas, *Canad. J. Chem.*, 1978, **56**, 2129.
476. S. I. Pombrik, D. N. Kravtsov, A. S. Peregudov, E. I. Fedin and A. N. Nesmeyanov, *J. Organometal. Chem.*, 1977, **131**, 355.
477. I. Schuster, *Tetrahedron*, 1977, **33**, 1075.
478. G. B. Deacon, W. D. Raverty and D. G. Vince, *J. Organometal. Chem.*, 1977, **135**, 103.
479. R. Kosfeld and L. Henke, *Org. Magn. Resonance*, 1976, **8**, 141.
480. Y. Jayathirtha and V. Krishnam, *Z. Naturforsch.*, 1978, **33a**, 243.
481. J. W. Emsley, L. Phillips and V. Wray, Progr. *N.M.R. Spectroscopy*, 1977, **10**, 85.
482. V. Wray and D. N. Lincoln, *J. Chem. Soc., Perkin II*, 1976, 1307.
483. V. Wray and D. N. Lincoln, *Org. Mag. Resonance*, 1977, **9**, 155.
484. N. Muller, *J. Magn. Resonance*, 1977, **25**, 111.
485. R. Koppang, C. G. Russell and D. G. Lee, *Acta Chem. Scand.*, 1977, **B31**, 491.
486. R. E. Banks, R. N. Haszeldine and J. C. Massey, *J. Fluorine Chem.*, 1978, **12**, 331.
487. M. J. Robins, M. MacCoss, S. R. Naik and G. Ramani, *J. Amer. Chem. Soc.*, 1976, **98**, 7381.
488. Y. Takeuchi, K. L. Kirk and L. A. Cohen, *J. Org. Chem.*, 1978, **43**, 3570.
489. I. J. Hotchkiss, R. Stephens and J. C. Tatlow, *J. Fluorine Chem.*, 1977, **10**, 541.
490. R. E. Banks, R. N. Haszeldine and E. Phillips, *J. Fluorine Chem.*, 1977, **9**, 243.
491. P. Bouchet, A. Fruchier, G. Joncheray and J. Elguero, *Org. Magn. Resonance*, 1977, **9**, 716.
492. R. E. Banks, R. I. Higgons, A. Prakash, M. Rawstron and G. R. Sparkes, *J. Fluorine Chem.*, 1977, **9**, 327.
493. M. G. Barlow, D. E. Brown and R. N. Haszeldine, *J. Chem. Soc., Chem. Comm.*, 1977, 669.
494. M. G. Barlow, D. W. Brown and R. N. Haszeldine, *J. Chem. Soc., Perkin I*, 1978, 363.
495. D. H. R. Barton, R. H. Hesse, G. P. Jackman and M. M. Pechet, *J. Chem. Soc., Perkin I*, 1977, 2604.
496. R. S. Matthews, *J. Magn. Resonance*, 1978, **29**, 65.
497. R. S. Matthews, *Org. Magn. Resonance*, 1977, **9**, 318.
498. R. D. Chambers, R. D. Hercliffe and W. K. R. Musgrave, *J. Chem. Soc., Chem. Comm.*, 1978, 304.
499. R. S. Matthews, *Org. Magn. Resonance*, 1976, **8**, 240.
500. R. S. Matthews, *Org. Magn. Resonance*, 1976, **8**, 628.

501. J. T. Gerig and R. S. McLeod, *J. Amer. Chem. Soc.*, 1976, **98**, 3970.
502. R. J. Spear, D. A. Forsyth and G. A. Olah, *J. Amer. Chem. Soc.*, 1976, **98**, 2493.
503. A. A. Shtark, Yu. V. Pozdnyakovich and V. D. Shteingarts, *J. Org. Chem.* (*U.S.S.R.*), 1977, **13**, 1544.
504. K. Bock and C. Pedersen, *Acta Chem. Scand.*, 1976, **B30**, 727.
505. P. N. Dobronravov and V. D. Shteingarts, *J. Org. Chem.* (*U.S.S.R.*), 1977, **13**, 1553.
506. C. W. Gillies, *J. Amer. Chem. Soc.*, 1977, **99**, 7239.
507. T. Wehrung, H. Oberhammer, A. Haas, B. Koch and N. Welcman, *J. Mol. Struct.*, 1976, **35**, 253.
508. T. B. Zapevalova, V. S. Plashkin, B. N. Selishchev, K. N. Bildinov and M. S. Shcherbakova, *J. Org. Chem.* (*U.S.S.R.*), 1977, **13**, 2389.
509. J. Dolezalova, M. Cerny, T. Trnka and J. Pacak, *Coll. Czech. Chem. Comm.*, 1976, **41**, 1944.
510. V. Wray, *J. Chem. Soc., Perkin II*, 1976, 1598.
511. M. J. Hamor, T. A. Hamor, C. M. Jankins, R. Stephens and J. C. Tatlow, *J. Fluorine Chem.*, 1977, **10**, 605.
512. A. J. Brink, O. G. de Villiers and A. Jordan, *Carbohydrate Res.*, 1977, **54**, 285.
513. G. R. Owen, J. P. H. Verheyden and J. G. Moffat, *J. Org. Chem.*, 1976, **41**, 3010.
514. J. C. A. Boeyens, A. J. Brink and J. Jordan, *S. African J. Chem.*, 1978, **31**, 7.
515. I. D. Jenkins, J. P. H. Verheyden and J. G. Moffat, *J. Amer. Chem. Soc.*, 1976, **98**, 3346.
516. D. S. Genghof, C. F. Brewer and E. J. Hehre, *Carbohydrate Res.*, 1978, **61**, 291.
517. R. A. Kolinski, H. Plenkiewicz, H. Voellnagel-Neugebauer and R. Wozniacki, *Roczniki Chem.*, 1977, **51**, 1365.
518. R. W. Rendell and B. Wright, *Tetrahedron*, 1978, **34**, 197.
519. R. J. Gillespie and P. H. Spekkens, *J. Chem. Soc., Dalton*, 1977, 1539.
529. K. T. Gillen, D. C. Douglass and J. E. Griffiths, *J. Chem. Phys.*, 1978, **69**, 461.
521. H. W. Roesky and M. Aramaki, *Angew. Chem.*, 1978, **90**, 127.
522. R. K. Marat and A. F. Janzen, *Canad. J. Chem.*, 1977, **55**, 3845.
523. D. J. Arnold, E. R. Cromie and D. W. H. Rankin, *J. Chem. Soc., Dalton*, 1977, 1999.
524. W. W. Wilson, C. Naulin and R. Bougon, *Inorg. Chem.*, 1977, **16**, 2252.
525. H. Wagner, D-L. Wagner and O. Glemser, *Chem. Ber.*, 1977, **110**, 683.
526. S. Brownstein, *Canad. J. Chem.*, 1978, **56**, 343.
527. N. Krueger, K. Dehnicke and A-F. Shihada, *Z. Anorg. Chem.*, 1978, **438**, 169.
528. L. M. Emme and G. L. Gard, *J. Fluorine Chem.*, 1978, **12**, 77.
529. M. J. Atherton and J. H. Holloway, *Inorg. Nuclear Chem. Letters*, 1978, **14**, 121.
530. K. O. Christie, C. J. Schack and E. C. Curtis, *Inorg. Chem.*, 1976, **15**, 843.
531. T. Cyr and S. Brownstein, *J. Inorg. Nuclear Chem.*, 1977, **39**, 2143.
532. E. Lehmann, D. Naumann and M. Schmeisser, *J. Fluorine Chem.*, 1976, **7**, 135.
533. E. Lehmann, D. Naumann and M. Schmeisser, *J. Fluorine Chem.*, 1976, **7**, 33.
534. H. Selig, W. A. Sunder, F. C. Schilling and W. E. Falconer, *J. Fluorine Chem.*, 1978, **11**, 629.
535. K. Seppelt and N. Bartlett, *Z. Anorg. Chem.*, 1977, **436**, 122.
536. K. Seppelt, *Chem. Ber.*, 1976, **109**, 1046.
536. J-Y. Calves and R. J. Gillespie *J. Amer. Chem. Soc.*, 1977, **99**, 1788; *J. Chem. Soc., Chem. Soc., Chem. Comm.*, 1976, 506.
538. A. R. Grimmer, L. Friedrich and H. Meinert, *Z. Chem.*, 1977, **17**, 150.
539. K. Seppelt, *Chem. Ber.*, 1977, **110**, 1470.
540. R. J. Gillespie and J. P. Krasznai, *Inorg. Chem.*, 1976, **15**, 1251.
541. K. G. Sharp, *J. Chem. Soc. Chem. Comm.*, 1977, 564.
542. M. Brownstein, R. J. Gillespie and J. P. Krasznai, *Canad. J. Chem.*, 1978, **56**, 2253.
543. Yu. A. Buslayev, E. G. Ilyin, M. E. Ignatov, L. S. Buturina and T. A. Mastryukova, *J. Fluorine Chem.*, 1978, **12**, 381.

544. E. G. Ilin, M. E. Ignatov, L. S. Butorina, T. A. Mastryukova and Yu. A. Buslaev, *Dokl. Akad. Nauk S.S.S.R.*, 1978, 537.
545. M. A. Bennett, R. N. Johnson and T. W. Turney, *Inorg. Chem.*, 1976, **15**, 2938.
546. D. Lentz, H. Pritzkow and K. Seppelt, *Angew. Chem.*, 1977, **89**, 741.
547. D. Lentz, H. Pritzkow and K. Seppelt, *Inorg. Chem.*, 1978, **17**, 1926.
548. D. Lentz and K. Seppelt, *Angew. Chem.*, 1978, **90**, 391.
549. S. Cradock, E. A. V. Ebsworth, M. L. McConnell, D. W. H. Rankin and M. R. Todd, *J. Chem. Soc., Dalton*, 1977, 1925.
550. D-L. Wagner, H. Wagner and O. Glemser, *Z. Naturforsch.*, 1978, **33b**, 300.
551. G. Kleemann and K. Seppelt, *Angew. Chem.*, 1978, **90**, 547.
552. R. Mews, *Angew. Chem.*, 1978, **90**, 561.
553. R. T Paine, *J. Amer. Chem. Soc.*, 1977, **99**, 3884.
554. K. G. Sharp and P. A. Sutor, *J. Amer. Chem. Soc.*, 1977, **99**, 8046.
555. R. W. Braun, A. H. Cowley, M. C. Cushner and R. J. Lagow, *Inorg. Chem.*, 1978, **17**, 1679.
556. W. Althoff, M. Fild, H-P. Rieck and R. Schmutzler, *Chem. Ber.*, 1978, **111**, 1845.
557. T. F. Moore, A. R. Garber and J. D. Odom, *Inorg. Nuclear Chem. Letters*, 1978, **14**, 45.
558. C. G. Moreland, G. O. Doak, L. B. Littlefield, N. S. Walker, J. W. Gilje, R. W. Braun and A. H. Cowley, *J. Amer. Chem. Soc.*, 1976, **98**, 2161.
559. G. W. Fraser and G. D. Meikle, *J. Chem. Soc., Dalton*, 1977, 1985.
560. K. G. Sharp and K. L. Servis, *J. Magn. Resonance*, 1977, **28**, 295.
561. M. J. Hopkinson, N. S. Walker and D. D. DesMarteau, *J. Org. Chem.*, 1976, **41**, 1407.
562. L. N. Markovskii, V. E. Pashinnik and E. P. Saenko, *J. Org. Chem. (U.S.S.R.)*, 1977, **13**, 1025.
563. Y. Margalit, G. Amitai and Y. Ashani, *Phosphorus and Sulfur*, 1977, **3**, 315.
564. C. M. P. Favez and A. E. Merbach, *J. Fluorine Chem.*, 1976, **8**, 409.
565. W. Wolfsberger, *J. Fluorine Chem.*, 1978, **11**, 159.
566. J. Dalton, W. McFarlane, C. R. Wickens, G. W. Fraser and J. B. Millar, *Org. Magn. Resonance*, 1976, **8**, 522.
567. R. B. King and J. Gimeno, *Inorg. Chem.*, 1978, **17**, 2390.
568. R. B. King and J. Gimeno, *J. Chem. Soc., Chem. Comm.*, 1977, 142.
569. J-P. Costes and G. Cros, *Compt. Rend. (C)*, 1978, **286**, 39.
570. S. Brownstein and G. Latremouille, *Canad. J. Chem.*, 1978, **56**, 2764.
571. U. Klingebiel and A. Meller, *Chem. Ber.*, 1976, **109**, 2430.
572. A. C. Baxter, J. H. Cameron, A. McAuley, F. M. McLaren and J. M. Winfield, *J. Fluorine Chem.*, 1977, **10**, 289.
573. F. L. Wimmer and M. R. Snow, *Austral. J. Chem.*, 1978, **31**, 267.
574. W. S. Sheldrick and M. J. C. Hewson, *Z. Naturforsch.*, 1978, **33b**, 834.
575. I. Ruppert and V. Bastian, *Angew. Chem.*, 1978, **90**, 226.
576. F. Seel, R. Budenz, R. D. Flaccus and R. Staab, *J. Fluorine Chem.*, 1978, **12**, 437.
577. U. Klingebiel, *Z. Anorg. Chem.*, 1978, **442**, 130.
578. U. Klingebiel, H. Hluchy and A. Meller, *Chem. Ber.*, 1978, **111**, 906.
579. U. Klingebiel, D. Enterling, L. Skoda and A. Meller, *J. Organometal. Chem.*, 1977, **135**, 167.
580. M. Sanchez and A. H. Cowley, *J. Chem. Soc., Chem. Comm.*, 1976, 690.
581. H. Fussstetter, H. Noth and W. Winterstein, *Chem. Ber.*, 1977, **110**, 1931.
582. H. Schrem and J. Weidlein, *J. Organometal Chem.*, 1977, **133**, C13.
583. J. G. Dupont and C. W. Allen, *Inorg. Chem.*, 1977, **16**, 2964.
584. M. A. Sens, J. D. Odom and M. H. Goodrow, *Inorg. Chem.*, 1976, **15**, 2825.
585. G. I. Zharkova and S. V. Zemskov, *Izvest. Sibirsk. Otdel. Akad. Nauk, Ser. Khim. Nauk*, 1977, 105.
586. R. B. King and J. Gimeno, *Inorg. Chem.*, 1978, **17**, 2396.

587. I. Ruppert and V. Bastian, *Angew. Chem.*, 1977, **89**, 763.
588. R. G. Montemayor, D. T. Sauer, S. Fleming, D. W. Bennett, M. G. Thomas and R. W. Parry, *J. Amer. Chem. Soc.*, 1978, **100**, 2231.
589. M. G. Voronkov, G. V. Dmitrieva, G. M. Gavrilova, V. V. Keiko, E. O. Tsetlina and B. A. Trofimov, *Bull. Acad. Sci. U.S.S.R.*, 1978, **26**, 2361.
590. K. Tamao, S. Okazaki and M. Kumada, *J. Organometal. Chem.*, 1978, **146**, 87.
591. S. C. Peake, M. J. C. Hewson, O. Schlak, R. Schmutzler, R. K. Harris and M. I. M. Wazeer, *Phosphorus and Sulfur*, 1978, **4**, 67.
592. U. Klingebiel, *Z. Naturforsch.*, 1977, **32b**, 1212.
593. H. Eshtiagh-Hosseini and J. F. Nixon, *J. Organometal. Chem.*, 1978, **150**, 129.
594. R. Bartsch, M. Hausard and O. Stelzer, *Chem. Ber.*, 1978, **111**, 1420.
595. D. L. Gallup and J. G. Morse, *Inorg. Chem.*, 1978, **17**, 1340.
596. E. O. Fisher, S. Walz, A. Ruhs and F. R. Kreissl, *Chem. Ber.*, 1978, **111**, 2765.
597. L. B. Littlefield and G. O. Doak, *Phosphorus and Sulfur*, 1977, **3**, 35.
598. P. Panster and W. Malisch, *Chem. Ber.*, 1976, **109**, 2112.
599. L. B. Littlefield and G. O. Doak, *J. Amer. Chem. Soc.*, 1976, **98**, 7881.
600. N. J. De'Ath, D. B. Denney, D. Z. Denney and Y. F. Hsu, *J. Amer. Chem. Soc.*, 1976, **98**, 768.
601. R. A. Head and J. F. Nixon, *J. Chem. Soc., Dalton*, 1978, 895.
602. P. Paetzold, W-G. Druckenbrodt and A. Richter, *Chem. Ber.*, 1978, **111**, 189.
603. U. Klingebiel, J. Neemann and A. Meller, *J. Fluorine Chem.*, 1978, **12**, 427.
604. U. Klingebiel, G. Wendenberg and A. Meller, *Z. Naturforsch.*, 1977, **32b**, 1482.
605. M. E. Ignatov, E. G. Ilin, A. A. Shvets and Yu A. Buslaev, *Dokl. Akad. Nauk S.S.S.R.*, 1978, **240**, 865.
606. S. Neumann, D. Shomburg, G. Richtarsky and R. Schmutzler, *J. Chem. Soc., Chem. Comm.*, 1978, 946.
607. C. Crocker and R. J. Goodfellow, *J. Chem. Soc., Dalton*, 1977, 1687.
608. R. K. Marat and A. F. Janzen, *J. Chem. Soc., Chem. Comm.*, 1977, 671.
609. R. Eisenbarth and W. Sundermeyer, *Angew. Chem.*, 1978, **90**, 226.
610. W. S. Sheldrick and O. Stelzer, *Chem. Ber.*, 1977, **110**, 3421.
611. R. A. Head and J. F. Nixon, *J. Chem. Soc., Dalton*, 1978, 885.
612. R. A. Head and J. F. Nixon, *J. Chem. Soc., Dalton*, 1978, 901.
613. R. Eisenbarth and W. Sundermeyer, *Z. Naturforsch.*, 1978, **33b**, 1194.
614. R. J. Gillespie and G. J. Schrobilgen, *Inorg. Chem.*, 1976, **15**, 22.
615. Y. A. Buslaev, V. O. Gelmboldt and S. P. Petrosyants, *Dokl. Akad. Nauk S.S.S.R.*, 1977, **236**, 880.
616. K. Hirooka, H. Kuwahara, M. Noshiro and Y. Jitsugiri, *Asahi Garasu Kenkyu Hokoku*, 1977, **27**, 39.
617. F. Jeanneaux and J. G. Riess, *Tetrahedron Letters*, 1978, 4845.
618. L. S. Bulyanitsa, G. P. Savoskina, E. N. Sventitskii and O. V. Andreeva, *Russ. J. Inorg. Chem.*, 1976, **21**, 694.
619. D. Lentz and K. Seppelt, *Angew. Chem.*, 1978, **90**, 390.
620. S. F. Lincoln, A. C. Sandercock and D. R. Stranks, *Austral. J. Chem.*, 1977, **30**, 271.
621. R. K. Marat and A. F. Janzen, *Canad. J. Chem.*, 1977, **55**, 1167.
622. C. Coulombeau, *J. Fluorine Chem.*, 1977, **9**, 483.
623. M. Contreras and H. G. Hertz, *J. Solution Chem.*, 1978, **7**, 99.
624. M. J. McGlinchey and T-S. Tan, *J. Amer. Chem. Soc.*, 1976, **98**, 2271.
625. D. T. Browne and J. D. Otvos, *Biochem. Biophys. Res. Comm.*, 1976, **68**, 907.
626. W. E. Hull and B. D. Sykes, *Biochemistry*, 1976, **15**, 1535.
627. J. B. Kimber, D. V. Griffiths, B. Birdsall, R. W. King, P. Scudder, J. Feeney, G. C. K. Roberts and A. S. V. Burgen, *Biochemistry*, 1977, **16**, 3492.

628. G. C. K. Roberts, J. Feeney, B. Birdsall, J. B. Kimber, D. V. Griffiths, R. W. King and A. S. V. Burgen, *NMR Biol.* (Proc. Br. Biophys. Soc. Spring Meet.) 1977, 95 (ed. R. A. Dwek, I. D. Campbell and R. E. Richards), Academic Press, London.
629. J. B. Kimber, J. Feeney, G. C. K. Roberts, B. Birdsall, D. V. Griffiths, A. S. V. Burgen and B. D. Sykes, *Nature*, 1978, **271**, 184.
630. N. Lee, M. Inouye and P. C. Lauterbur, *Biochem. Biophys. Res. Comm.*, 1977, **78**, 1211.
631. J. Horowitz, J. Ofengand, W. E. Daniel and M. Cohn, *J. Biol. Chem.*, 1977, **252**, 4418.
632. A. G. Marshall and J. L. Smith, *J. Amer. Chem. Soc.*, 1977, **99**, 635.
633. W. E. Brown and K. B. Seamon, *Analyt. Biochem.*, 1978, **87**, 211.
634. W. J. Critz and M. Martinez-Carrion, *Biochemistry*, 1977, **16**, 1559.
635. D. J. Nelson, *Inorg. Chim. Acta*, 1978, **27**, L71.
636. W. H. Huestis and M. A. Raftery, *Biochem. Biophys. Res. Comm.*, 1978, **81**, 892.
637. J. W. Long and F. W. Dahlquist, *Biochemistry*, 1977, **16**, 3792.
638. K. K. Yabusaki and C. E. Ballou, *Biochemistry*, 1978, **17**, 875.
639. V. F. Bystrov, A. S. Arseniev and Yu. D. Gavrilov, *J. Magn. Resonance*, 1978, **30**, 151.
640. R. M. Bendall and G. Lowe, *FEBS Letters*, 1976, **72**, 231.
641. D. M. Kurtz, G. B. Wong and R. H. Holm, *J. Amer. Chem. Soc.*, 1978, **100**, 6777.
642. J. T. Gerig, K. E. Katz and J. D. Reinheier, *Biochim. Biophys. Acta*, 1978, **534**, 196.
643. J. T. Gerig, B. A. Halley and C. E. Ortiz, *J. Amer. Chem. Soc.*, 1977, **99**, 6219.
644. P. A. Briley, R. Eisenthal, R. Harrison and G. D. Smith, *Biochem. J.*, 1977, **163**, 325.
645. G. D. Smith, R. Eisenthal and R. Harrison, *Biochem. Soc. Trans.*, 1978, **6**, 190.
646. J. C. Slebe and M. Martinez-Carrion, *J. Biol. Chem.*, 1978, **253**, 2093.
647. M. Martinez-Carrion, J. C. Slebe, B. Boettcher and A. M. Relimpio, *J. Biol. Chem.*, 1976, **251**, 1853.
648. J-M. Guo, C. Chang, N. C. Li and K. T. Douglas, *Biochemistry*, 1978, **17**, 452.
649. J-L. Dimicoli, J. Bieth and J-M. Lhoste, *Biochemistry*, 1976, **15**, 2230.
650. A. Renaud, J-L. Dimicoli, P. Lestienne and J. Bieth, *J. Amer. Chem. Soc.*, 1978, **100**, 1005.
651. R. R. Hardy and J. H. Richards, *Biochemistry*, 1978, **17**, 3866.
652. D. A. Kooistra and J. H. Richards, *Biochemistry*, 1978, **17**, 345.
653. N. Saudenmayer, M. B. Smith, H. T. Smith, F. K. Spies and F. Millett, *Biochemistry*, 1976, **15**, 3198.
654. F. Millet, A. Ahmed, H. Smith, M. Smith, S. Ng and N. Staudenmayer, *Biomol. Struct. Funct.* (Symp.), 1977, 423 (ed. P. F. Agris), Academic Press, New York.
655. P. Puigdomenech, J. R. Daban, J. Palau, F. Podo, L. Guidoni and P. A. Temussi, *Biochim. Biophys. Acta*, 1977, **492**, 12.
656. K. B. Seamon, D. J. Hartshorne and A. A. Bothner-By, *Biochemistry*, 1977, **16**, 4039.
657. J. E. Coleman, R. A. Anderson, R. G. Ratcliffe and I. M. Armitage, *Biochemistry*, 1976, **15**, 5419.
658. J. E. Coleman and I. M. Armitage, *NMR Biol.* (Proc. Br. Biophys. Soc. Spring Meet.), 1977, 171 (ed. R. A. Dwek, I. D. Campbell and R. E. Richards), Academic Press, London.
659. R. A. Byrd, W. H. Dawson, P. D. Ellis and R. B. Dunlap, *J. Amer. Chem. Soc.*, 1977, **99**, 6139.
660. L. S. Koehler, E. T. Fossel and K. A. Koehler, *Biochemistry*, 1977, **16**, 3700.
661. L. S. Koehler, W. Curley and K. A. Koehler, *Mol. Pharm.*, 1977, **13**, 113.
662. M. P. N. Gent, P. F. Cottam and C. Ho, *Proc. Nat. Acad. Sci. USA*, 1978, **75**, 630.
663. M. P. N. Gent and C. Ho, *Biochemistry*, 1978, **17**, 3023.
664. M. P. N. Gent, I. M. Armitage and J. H. Prestegard, *J. Amer. Chem. Soc.*, 1977, **99**, 3749.
665. K. A. Koehler, M. K. Jain, E. E. Stone, E. T. Fossel and L. S. Koehler, *Biochim. Biophys. Acta*, 1978, **510**, 177.

666. C. A. Lewis, P. D. Ellis and R. B. Dunlap, *Biochem. Biophys. Res. Comm.*, 1978, **83**, 1509.
667. D. S. Hagen, J. H. Weiner and B. D. Sykes, *Biochemistry*, 1978, **17**, 3860.
668. B. C. Nicholson and T. M. Spotswood, *Austral. J. Chem.*, 1978, **31**, 2167.
669. M. Tsavalos, B. C. Nicholson and T. M. Spotswood, *Austral. J. Chem.*, 1978, **31**, 2179.
670. H. J. Knight, E. H. Williams and T. M. Spotswood, *Austral. J. Chem.*, 1978, **31**, 2187.
671. J. T. Gerig, *J. Amer. Chem. Soc.*, 1977, **99**, 1721.
672. K. A. K. Ebraheem and G. A. Webb, *Progr. NMR Spectroscopy*, 1977, **11**, 149.
673. J. W. Emsley, L. Phillips and V. Wray, *Progr. NMR Spectroscopy*, 1976, **10**, 83; J. Kowalewski, *ibid.*, 1977, **11**, 1.
674. R. E. Wasylishen, *Ann. Rep. NMR*, 1977, **7**, 245.
675. R. Ditchfield, *Chem. Phys. Lett.*, 1976, **40**, 53.
676. K. A. K. Ebraheem, G. A. Webb and M. Witanowski, *Org. Magn. Resonance*, 1976, **8**, 317.
677. K. A. K. Ebraheem and G. A. Webb, *Org. Magn. Resonance*, 1977, **10**, 70.
678. H. Sterk, W. Fabian, J. J. Suschnigg and R. Janoschek, *Org. Magn. Resonance*, 1977, **9**, 389.
679. M. F. Guest, V. R. Saunders and R. E. Overill, *Mol. Phys.*, 1978, **35**, 427.
680. H. Fukui, A. Sanyoshi and K. Miura, *J. Chem. Phys.*, 1978, **69**, 943.
681. A. C. Blizzard and D. P. Santry, *J. Chem. Phys.*, 1971, **55**, 950.
682. I. Brown and D. W. Davies, *Chem. Phys. Lett.*, 1976, **37**, 132.
683. P. E. Hansen, A. Berg, H. J. Jakobsen, A. P. Manzara and J. Michl, *Org. Magn. Resonance*, 1977, **10**, 179.
684. D. Doddrell, M. Barfield, W. Adcock, M. Aurangzeb and D. Jordan, *J. Chem. Soc., Perkin II*, 1976, 402.
685. V. Wray, unpublished data.
686. H. J. Schneider and W. Ansorge, *Tetrahedron*, 1977, **33**, 265.
687. M. Barfield, J. L. Marshall, E. D. Canada and M. R. Willcott, *J. Amer. Chem. Soc.*, 1978, **100**, 7075.
688. M. Godfrey, *J. Chem. Soc., Perkin II*, 1977, 769.
689. W. B. Smith and T. W. Proulx, *Org. Magn. Resonance*, 1976, **8**, 567.
690. D. G. Gorenstein, *J. Amer. Chem. Soc.*, 1977, **99**, 2254.
691. A. M. Vakhrameev, S. P. Gabuda and R. G. Knuborets, *Zh. Strukt. Khim.*, 1978, **19**, 298.
692. D. P. Burum, D. D. Elleman and W-K. Rhim, *J. Chem. Phys.*, 1978, **68**, 1164, see comment R. E. J. Sears, *J. Chem. Phys.*, 1978, **69**, 4321.
693. H. T. Stokes and D. C. Ailion, *Phys. Rev.* (*B*), 1977, **16**, 4746.
694. V. M. Buznik, Y. N. Ivanov, A. Kriger and Y. N. Mosvich, *Tezisy Dokl.-Vses. Soveshch. Radiats. Fiz. Khim. Ionnykh Krist.*, III, 1975, **2**, 225.
695. Y. N. Moskvich, V. M. Buznik, P. P. Fedorov and B. P. Sobolev, *Kristallografiya*, 1978, **23**, 416.
696. G. A. Kirakosyan, L. N. Komissarova, L. A. Nesterova, G. Ya. Pushkina, V. F. Chubaev and V. M. Shatskii, *Russ. J. Inorg. Chem.*, 1977, **22**, 795.
697. D. R. Figueroa and J. H. Strange, *J. Phys.* (*C*), 1976, **9**, L203.
698. R. J. Booth, M. R. Mustafa and B. R. McGarvey, *Phys. Rev.* (*B*), 1978, **17**, 4150.
699. K. F. Lau and R. W. Vaughan, *J. Chem. Phys.*, 1976, **65**, 4825.
700. H. Selig, P. K. Gallagher and L. B. Ebert, *Inorg. Nuclear Chem. Lett.*, 1977, **13**, 427.
701. J. B. Boyce, J. Mikkelsen and M. O'Keefe, *Solid State Commun.*, 1977, **21**, 955.
702. B. D. Zilberman, T. D. Fedotova and S. P. Gabuda, *J. Struct. Chem.* (*U.S.S.R.*), 1976, **17**, 238.
703. C. J. Ludman, T. C. Waddington, E. K. C. Pang and J. A. S. Smith, *J. Chem. Soc., Faraday II*, 1977, **73**, 1003.

704. P. van Hecke, H. W. Spiess, U. Haeberlen and S. Haussuhl, *J. Magn. Resonance*, 1976, **22**, 93.
705. L. M. Avkhutskii, G. A. Oktyabrskii and Y. V. Gagarinskii, *Proc. Acad. Sci. U.S.S.R., Phys. Chem. Sect.*, 1977, **234**, 522.
706. R. D. Hogg, S. P. Vernon and V. Jaccarino, *Solid State Commun.*, 1977, **23**, 781.
707. M. Hamashima, Y. Ajiro, T. Kubo and Y. Yamaguchi, *J. Phys. Soc. Japan*, 1978, **45**, 1057.
708. H. Kubo, F. Tanake, N. Kaneshima and K. Hirakawa, *Solid State Commun.*, 1976, **18**, 79.
709. M. R. Mustafa, B. R. McGarvey and E. Banks, *J. Magn. Resonance*, 1977, **25**, 341.
710. A. Reuveni and B. R. McGarvey, *J. Magn. Resonance*, 1978, **29**, 21.
711. T. Horiguchi and T. Morita, *Phys. Letters* (*A*), 1978, **66**, 223.
712. E. Ildstad, I. Svare and T. Fjeldly, *Phys. Stat. Sol.* (*A*), 1977, **43**, K65.
713. T. Horiguchi and T., Morita, *J. Phys. Soc. Japan*, 1977, **43**, 1485.
714. Y. Onoda and S. Minomura, *J Phys. Soc. Japan*, 1976, **40**, 463.
715. L. D. Khoi and P. Veillet, *Phys. Rev.* (*B*), 1976, **13**, 1919.
716. J. Makela and L. Niemela, *Phys. Letters* (*A*), 1976, **56**, 307.
717. P. Joubert, J-M. Weulersse, R. Bougon and B. Gaudreau, *Canad. J. Chem.*, 1978, **56**, 2546.
718. E. Ehrenfreund, P. R. Newman, A. J. Heeger, N. D. Miro and A. G. MacDiarmid, *Phys. Rev.* (*B*), 1977, **16**, 1781.
719. Y. Chabre and C. Berthier, *Colloq. Metall.*, 1976, **19**, 897.
720. S. K. Garg, *J. Chem. Phys.*, 1977, **66**, 2517.
721. I. Ursu, D. E. Demco, V. Simplaceanu and N. Valcu, *Rev. Roum. Phys.*, 1977, **22**, 705.
722. N. K. Moroz, A. M. Panich and S. P. Gabuda, *Zhur. Strukt. Khim.*, 1978, **19**, 293.
723. M. Punkkinen and L. P. Ingman, *Chem. Phys. Letters*, 1976, **38**, 138.
724. H. Raber and M. Mehring, *Chem. Phys. Letters*, 1977, **49**, 498.
725. J. A. Ripmeester, D. A. Wright, C. A. Fyfe and R. K. Boyd, *J. Chem. Soc., Faraday II*, 1978, **74**, 1164.
726. V. A. Varnek, S. P. Gabuda and L. I. Obmoin, *J. Struct. Chem.* (*U.S.S.R.*), 1977, **18**, 213.
727. H. Rager and A. Weiss, *Ber. Bunsenges. Phys. Chem.*, 1978, **82**, 535.
728. T. K. Halstead, H. W. Spiess and U. Haeberlen, *Mol. Phys.*, 1976, **31**, 1569.
729. S. A. Seryshev, A. G. Lundin and M. L. Afanasev, *Phys. Stat. Sol.* (*B*), 1978, **90**, K35.
730. W. W. Schmiegel, *Kautsch. Gummi, Kunstst.*, 1978, **31**, 137.
731. M. F. Froix, A. O. Goedde and J. M. Pochan, *Macromolecules*, 1977, **10**, 778.
732. V. J. McBrierty, D. C. Douglass and T. A. Webber, *J. Polymer Sci. A2*, 1976, **14**, 1271.
733. D. C. Douglass and V. J. McBrierty, *Macromolecules*, 1978, **11**, 766.
734. K. Yamaguchi, N. Hayakawa and J. Okamoto, *J. Appl. Polymer Sci.*, 1978, **22**, 2653.
735. Y. Akatsuka, M. Noshiro and Y. Jitsugiri, *Asahi Garasu Kenkyu Hokoku*, 1976, **26**, 111.
736. G. Kojima, H. Wachi, K. Ishigure and Y. Tabata, *J. Polymer Sci. A1*, 1976, **14**, 1317.
737. M. S. Toy and R. S. Stingham, *J. Polymer Sci., Polymer Letters*, 1976, **14**, 717.
738. K. Matsuo, K. F. Kuhlmann, H. W. H. Yang, F. Geny, W. H. Stockmayer and A. A. Jones, *J. Polymer Sci., Polym. Phys. Ed.*, 1977, **15**, 1347.
739. A. J. Montana and N. Zumbulyadis, *J. Chem. Phys.*, 1976, **65**, 4756.
740. A. J. Montana and B. P. Dailey, *J. Chem. Phys.*, 1977, **66**, 989.
741. A. J. Montana and B. R. Appleman, *J. Chem. Phys.*, 1977, **66**, 1850.
742. M. Duchene, J. W. Emsley, J. C. Lindon, D. S. Stephenson and S. R. Salman, *J. Magn. Resonance*, 1976, **22**, 207.
743. S. A. Spearman and J. H. Goldstein, *J. Magn. Resonance*, 1978, **30**, 59.
744. J. Van der Giessen and C. A. De Lange, *Chem. Phys. Lett.*, 1978, **56**,121.
745. A. S. Tracey, *Mol. Phys.*, 1977, **33**, 339.
746. S. A. Spearman and J. H. Goldstein, *J. Magn. Resonance*, 1977, **26**, 237.
747. J. W. Emsley and J. C. Lindon, *J. Chem. Soc., Faraday II*, 1976, **72**, 1436.

748. G. J. Den Otter, J. Bulthius, C. A. De Lange and C. Maclean, *Chem. Phys. Lett.*, 1977, **45**, 603.
749. G. J. Den Otter and C. Maclean, *J. Mol. Struct.* 1976, **81**, 47.
750. M. Duchene, J. W. Emsley, J. C. Lindon, J. Overstall, D. S. Stephenson and S. R. Salman, *Mol. Phys.*, 1977, **33**, 281.
751. T. C. Wong and E. E. Burnell, *J. Magn. Resonance*, 1977, **22**, 227.
752. Y. Sugino and K. Takahashi, *Bull. Chem. Soc. Japan*, 1978, **51**, 2527.
753. A. Jasinksi, P. G. Morris and P. Mansfield, *Mol. Cryst. Liq. Cryst.*, 1978, **45**, 183.
754. G. J. T. Tiddy, *J. Chem. Soc., Faraday*, 1977, **73**, 1731.
755. G. N. Holland, P. A. Bottomley and W. S. Hinshaw, *J. Magn. Resonance*, 1977, **28**, 133.
756. K. Ishigure, H. Ohashi, Y. Tabata and K. Oshima, *Macromolecules*, 1977, **10**, 567.
757. A. J. Sadlej, *Acta Phys. Polon.*, 1976, **A49**, 667.
758. B. Day and A. D. Buckingham, *Mol. Phys.*, 1976, **32**, 343.
759. P. Swanstrom, W. P. Kraemer and G. H. F. Diercksen, *Theor. Chim. Acta*, 1977, **44**, 109.
760. M. Zaucer, D. Pumpernik, M. Hladnik and A. Azman, *Z, Naturforsch.*, 1977, **32a**, 411.
761. P. Van Hecke, H. W. Spiess and U. Haeberlen, *J. Magn. Resonance*, 1976, **22**, 93, 103.
762. M. Zaucer, D. Pumpernik, M. Hladnik and A. Azman, *Z. Naturforsch.*, 1976, **31a**, 1727.
763. W. T. Raynes, in "Nuclear Magnetic Resonance (Specialist Periodical Reports)", R. J. Abraham (ed.), The Chemical Society, London, 1978, Ch. 1.

This Page Intentionally Left Blank

Cumulative index of authors who have contributed to Volumes 1–10

Cumulative index of topics covered in Volumes 1–10 of this series

This Page Intentionally Left Blank