ANNUAL REPORTS ON NMR SPECTROSCOPY

Volume 14

ANNUAL REPORTS ON

NMR SPECTROSCOPY

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ANNUAL REPORTS ON

NMR SPECTROSCOPY

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VOLUME 14

1983

ACADEMIC PRESS

A Subsidiary of Harcourt Brace Jovanovich, Publishers

London · New York

Paris · San Diego · San Francisco · São Paulo

Sydney · Tokyo · Toronto

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

ISBN 0–12–505314–2
ISSN 0066–4103

Typeset by Speedlith Photo Litho Ltd., Manchester and
printed in Great Britain by Thomson Litho Ltd.,
East Kilbride, Scotland.

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PREFACE

Volume 14 of Annual Reports is by Dr. V. Wray and deals with ^{19}F NMR Spectroscopy. It consists of extensive tabulations of ^{19}F NMR data and provides an update of previous reports on this subject in earlier volumes of this series, in particular that by the same author in volume 10B. It is a pleasure for me to thank the author for the work which he has put into the preparation of this volume.

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Guildford, Surrey,
England

G. A. WEBB
November 1982

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Fluorine-19 Nuclear Magnetic Resonance Spectroscopy (1979–1981)

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I. INTRODUCTION

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The main objective of the present review has been to collect the F-19 NMR data present in the literature between January 1979 and the end of June 1981. The format adopted follows that of the previous collection with the major portion of the information being presented in tabular form. The data have been compiled from the author's own records and from the literature abstracts of CA Selects: Nuclear Magnetic Resonance (Chemical Aspects), Carbon and Heteroatom NMR, and Proton Magnetic Resonance.

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 the table on this page. 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. Where ambiguities arose the most likely sign of the chemical shift is given in parentheses.

Reference compound shifts

Index	Compound	Shift from $CFCl_3$ (ppm)
(a)	$CF_3 \cdot CO_2H$	−78.5(0)
(b)	C_6F_6	−162.9(0)
(c)	$C_6H_5 \cdot CF_3$	−63.9(0)
(d)	C_6H_5F	−113.15
(e)	$CF_3 \cdot CCl_3$	−82.2(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, 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

* "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.

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 the table on page 5), 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-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.

In certain instances, although Chemical Abstracts references were available, the journal was not accessible for data abstraction. In these cases the nature of the compounds involved is summarized at the end of each section.

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

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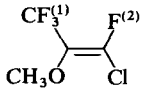
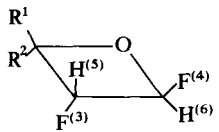
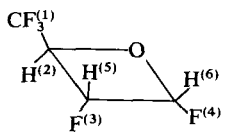
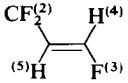
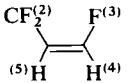
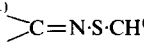
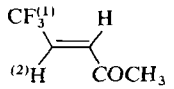
A. Fluorine nuclei in a CF_3 group

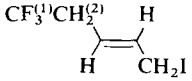
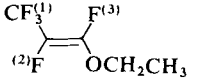
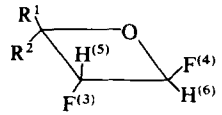
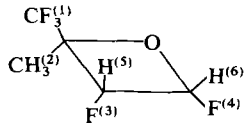
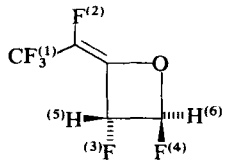
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
1. CF_3 group bonded to carbon				
$C_2F_3HN_2$	$CF_3^{(1)}\cdot CH^{(2)}N_2$		(1-2) 4	185
$C_2F_3H_2D$	$CF_3\cdot CH_2D$	−62.04 (isotope shift −0.20)		186
$C_2F_3H_3$	$CF_3^{(1)}\cdot CH_3^{(2)}$	−61.84	(1-C1) 272.3 (1-2) 12.9	186
$C_2F_3H_3O$	$CF_3\cdot CH_2OH$	−79.5		190(a)
$C_2F_3Br_3$	$CF_3^{(1)}\cdot CBr_3$	−79.3	(1-C1) 279.4	186
$C_2F_3ClO_2$	$CF_3\cdot CO_2Cl$	−70.9		192
$C_2F_3ClO_4S$	$CF_3\cdot CO\cdot OSO_2Cl$	−75.9		192
$C_2F_3Cl_3$	$CF_3\cdot CCl_3$	−82.6		191
$C_2F_3Cl_3$	$CF_3^{(1)}\cdot CCl_3$	−82.2	(1-C1) 279.4	186
$C_2F_3D_3$	$CF_3\cdot CD_3$	−62.13 (isotope shift −0.29)	(F-D) 1.97	186
$C_2F_3I_3$	$CF_3^{(1)}\cdot CI_3$	−77.0	(1-C1) 277.4	186
$C_2F_4Cl_2S$	$CF_3^{(1)}\cdot CF^{(2)}ClSCl$	(1) −90.6 (2) −124.3	(1-2) 9	195
$C_2F_5ClO_4$	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot OClO_3$	(1) −85.3 (2) −93.5	(1-2) 1.75	197
C_2F_6HN	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot NH^{(4)}F^{(3)}$	(1) −83.7 (2) −111.2 (3) −136.3	(1-3) 8.5 (2-3) 21.0 (2-4) 13.5 (3-4) 55.0	199
C_2F_9NS	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot N{=}SF_4^{(3)}$	(1) −87.4 (2) −92.8 (3) +78.3	(1-2) <0.5 (2-3) 8.9 (1-3) <1.5	205
$C_2F_{11}NS$	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot NF^{(3)}\cdot SF_4^{(4)}F^{(5)}$	(1) −81.7 (2) −109.95 (3) −51.0 (4) +61.3 (5) +58.7	(1-2) 1.25 (1-3) 18.5 (1-4) <0.3 (1-5) <0.2 (2-3) 28.3 (2-4) 13.5 (2-5) 1.7 (3-4) 2.4 (3-5) 2.5	205
C_3F_4HN	$CF_3^{(1)}\cdot CF^{(2)}H^{(3)}\cdot CN$	(1) −77.8 (2) −203.0	(1-2) 15.0 (2-3) 45.0 (1-3) 9.0	210
$C_3F_5ClO_2$	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot CO_2Cl$	(1) −83.6 (2) −118.6		192
$C_3F_5ClO_3S$	$CF_3^{(1)}\cdot CO\cdot CF_2^{(2)}\cdot SO_2Cl$	(1) −74.9 (2) −101.3	(1-2) 8.0	211
C_3F_6HD	$(CF_3^{(1)})_2CH^{(2)}D$	−63.97	(1-2) 10.4 (1-D) 1.4	212
C_3F_6HN	$(CF_3^{(1)})_2C^{(2)}{=}NH$		(1-C1) 277, 279 (1-C2) 38	182

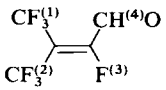
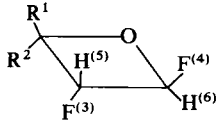
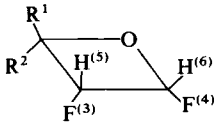
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_3F_6H_2$	$(CF_3^{(1)})_2CH_2^{(2)}$	−63.90	(1-2) 9.3	212
$C_3F_6H_2O_2$	$(CF_3^{(1)})_2C^{(2)}(OH)_2$		(1-C1) 287 (1-C2) 35	182
$C_3F_6D_2$	$(CF_3)_2CD_2$	−64.04	(F-D) 1.4	212
C_3F_6O	$(CF_3)_2CO$		^1J(F-C) 288 ^2J(F-C) 41	182
C_3F_6O	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot CO\cdot F^{(3)}$	(1) −87.1 (2) −124.9 (3) +19.2	(1-2) 1.2 (1-3) 5.5 (2-3) 9.0	215
$C_3F_6O_4S$	$CF_3\cdot CO\cdot OSO_2CF_3$	−72.90, −74.45		216
C_3F_7HS	$(CF_3^{(1)})_2CF^{(2)}\cdot SH^{(3)}$	(1) −77.03 (2) −147.07	(1-2) 9.5 (1-3) 1.5 (2-3) 5.3	217
$C_3F_7ClO_4$	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot CF_2^{(3)}\cdot OClO_3$	(1) −82.0 (2) −89.7 (3) −128.8	(1-2) 7.5 (2-3) 1.7 (1-3) 0.5	197
$C_3F_7ClO_4$	$(CF_3^{(1)})_2CF^{(2)}\cdot OClO_3$	(1) −78.9 (2) −146.0	(1-2) 2.5	197
C_3F_7I	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot CF_2^{(3)}I$	(1) −82.0 (2) −120.7 (3) −62.5		219(a)
C_3F_7I	$CF_3^{(1)}\cdot CFI^{(2)}\cdot CF_3$	(1) −76.46 (2) −148.5		219(a)
C_3F_7N	*syn*-$CF_3^{(1)}\cdot CF_2^{(2)}\cdot CF^{(3)}{=}NF^{(4)}$	(1) −83.9 (2) −121.4 (3) −79.0 (4) −14.4	(1-2) 2.0 (1-3) 4.0 (2-3) 13.5 (2-4) 2.0 (3-4) 39.0	199
C_3F_7SCl	$(CF_3^{(1)})_2CF^{(2)}\cdot SCl$	(1) −78.3 (2) −163	(1-2) 6	195
C_3F_8HN	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot CF_2^{(3)}\cdot NH^{(5)}F^{(4)}$	(1) −82.2 (2) −128.4 (3) −107.5 (4) −136.3	(1-2) ⩽1.0 (1-3) 8.0 (2-4) 6.5 (3-4) 17.0 (3-5) 13.0 (4-5) 55.0	199
$C_3F_8H_3BrS$	$CF_3^{(1)}\cdot CH^{(4)}Br\cdot CH_2^{(5)}SF_4^{(2)}F^{(3)}$	(1) −73.9 (2) +66.4 (3) +79.9	(1-4) 6.5 (2-3) 136.9 (2-5) 8.4	221
$C_3F_8O_3S$	$CF_3\cdot CF_2\cdot OSO_2CF_3$	(1) −86.76 (2) −85.41 (3) −74.38	(1-2) 2.2 (2-3) 5.7	194
$C_3F_8O_3S$	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot SO_2OCF_3^{(3)}$	(1) −80.9 (2) −110.6 (3) −55.3	(1-2) 0.9 (2-3) 5.4	223
C_3F_8S	$CF_3^{(1)}\cdot C{\equiv}C\cdot SF_4^{(2)}F^{(3)}$	(1) −53.7 (2) +78.8 (3) +68.0	(2-3) 149	224
$C_4F_3HCl_2N_2O$	$CF_3\cdot\overline{C{=}N\cdot NH\cdot CO\cdot CCl_2}$	−64.0		227

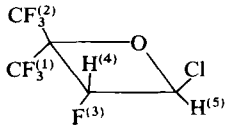
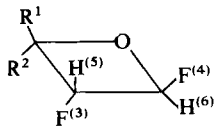
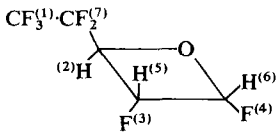
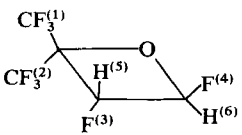
$C_4F_3H_3Cl_2O_2$	$CF_3{\cdot}CCl_2{\cdot}CO_2CH_3$		−75.3				228
$C_4F_3H_3N_2$	$CF_3{\cdot}\overline{C{=}N{\cdot}CH{=}CH{\cdot}NH}$		−62.5				229
$C_4F_3H_3N_2O$	$CF_3{\cdot}\overline{C{=}CH{\cdot}CO{\cdot}NH{\cdot}NH}$		−61.4				227
$C_4F_3H_4ClO_2$	$CF_3^{(1)}{\cdot}CH^{(2)}Cl{\cdot}CO_2CH_3$		−72.7		(1-2) 6.0		228
$C_4F_3H_4NOS$	$CF_3{\cdot}\overline{C{=}N{\cdot}S{\cdot}CH_2{\cdot}CH_2{\cdot}O}$		−74.4				231
$C_4F_3H_6NO_2$	$CF_3{\cdot}\overline{C(NH_2){\cdot}O{\cdot}CH_2{\cdot}CH_2{\cdot}O}$		−84.8				232
$C_4F_3H_6NS_2$	$CF_3{\cdot}\overline{C(NH_2){\cdot}S{\cdot}CH_2{\cdot}CH_2{\cdot}S}$		−77.4				232
$C_4F_3H_6OS$	$CF_3{\cdot}\overline{C(NH_2){\cdot}O{\cdot}CH_2{\cdot}CH_2{\cdot}S}$		−81.7				232
$C_4F_4H_3ClO$			(1) −65.1	(2) −96.4	(1-2) 24.2		235
$C_4F_4H_4O_2$	$CF_3^{(1)}{\cdot}CH^{(3)}F^{(2)}{\cdot}CO_2CH_3$		(1) −76.8	(2) −205.7	(1-2) 14 (2-3) 46	(1-3) 6	236
$C_4F_5H_2NO$	$CF_3^{(1)}{\cdot}CF_2^{(2)}{\cdot}CH_2^{(3)}{\cdot}OCN$		(1) −83.57	(2) −124.3	(1-2) 0.4	(2-3) 12.5	237
$C_4F_5H_3O$		$R^1 = CF_3, R^2 = H$	(1) −82.20 (4) −118.4	(3) −197.7	(1-2) 6 (2-4) 3.7 (3-6) 8 (4-6) 65 (1-4) 2	(2-3) 14 (3-5) 52 (4-5) 10 (1-3) 2	238(a)
		$R^1 = H, R^2 = CF_3$	(2) −77.7 (4) −116.6	(3) −203.0	(1-2) 7 (2-4) 2.5 (3-5) 51 (4-5) 11 (1-4) 2.5	(2-3) 12 (3-4) 2.5 (3-6) 7 (4-6) 67	
$C_4F_5H_3O$			(1) −82.1 (4) −134.5	(3) −203.2	(1-2) 6 (3-5) 52 (4-5) 10 (1-3) 2	(3-4) 10 (3-6) 3.5 (4-6) 68	238(a)

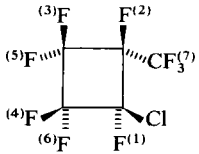
Molecular formula	Structure of compounds	Chemical shifts (ppm)		Coupling constants (Hz)		Ref.
$C_4F_5H_3O_4S$	$CF_3^{(1)}\cdot CO\cdot CF_2^{(2)}\cdot SO_2OCH_3$	(1) −75.0	(2) −106.8	(1-2) 8.1		211
$C_4F_5H_4NO_2S$	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot N{=}S(\cdot O\cdot CH_2\cdot CH_2\cdot O)$	(1) −87.4	(2) −83.7	(1-2) 0.9		230
$C_4F_6HCl_3O$	$(CF_3)_2C(CCl_3)\cdot OH$			^1J(F-C) 291	^2J(F-C) 29	182
$C_4F_6H_2$		(1) −89.3 (3) −118.9	(2) −117.5	(2-3) 3 (3-4) 77	(2-5) 12 (3-5) 14	238(a)
$C_4F_6H_2$		(1) −89.4 (3) −111.3	(2) −114.5	(1-3) 6 (2-5) 14 (3-5) 37	(2-3) 22 (3-4) 77	238(a)
$C_4F_6H_2ClNS$		(1) −71.3	(2) −73.3	(1-2) 3.0	(2-4) 6.5	240
$C_4F_6H_4ClO_3V$	$(CF_3^{(1)}\cdot CH_2^{(2)}\cdot O)_2VOCl$	−76.2		(1-2) 7.5		190(a)
$C_4F_6H_4Cl_2O_2Ti$	$(CF_3^{(1)}\cdot CH_2^{(2)}\cdot O)_2TiCl_2$	−75.1		(1-2) 8.4		241(a)
$C_4F_6H_4O$	$(CF_3)_2C(CH_3)\cdot OH$			^1J(F-C) 285	^2J(F-C) 31	182
$C_4F_6N_2S$	$CF_3\cdot C(=N\cdot N=C(CF_3)\cdot S)$	−59.6				240
$C_4F_6P_2S$	$CF_3\cdot C(=P\cdot S\cdot P=C)\cdot CF_3$	−51.1		(P-F) 51		244(c)
$C_4F_7H_3S$	$(CF_3)_2CF\cdot SCH_3$	(1) −70.5	(2) −155	(1-2) 4.5		195
$C_4F_7ClO_2$	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot CF_2^{(3)}\cdot CO_2Cl$	(1) −94.1 (3) −116.1	(2) −127.4			192
C_4F_7N	$(CF_3^{(1)})_2CF^{(2)}\cdot CN$	(1) −76.4	(2) −176.9	(1-2) 10		245
$C_4F_8N_2OS$	$(CF_3^{(1)})_2CF^{(2)}\cdot N{=}S(F)^{(3)}\cdot N{=}C{=}O$	(1) −80.5 (3) +56.6	(2) −150.0	(1-2) 4.8	(2-3) 14.1	246
$C_4F_8N_2OS$	$(CF_3^{(1)})_2CF^{(2)}\cdot N{=}S{=}N\cdot CO\cdot F^{(3)}$	(1) −79.4 (3) +16.8	(2) −142.2	(1-2) 4.8 (2-3) 4.5	(1-3) 0.7	246
C_4F_9HBrNO	$CF_3^{(1)}\cdot CH^{(3)}Br\cdot O\cdot N(CF_3^{(2)})_2$	(1) −78.3	(2) −68.7	(1-3) 5.0		222(a)
C_4F_9HClNO	$CF_3^{(1)}\cdot CH^{(3)}Cl\cdot O\cdot N(CF_3^{(2)})_2$	(1) −69.5	(2) −80.8	(1-3) 4.5		222(a)
C_4F_9HO	$(CF_3)_3C\cdot OH$			^1J(F-C) 289	^2J(F-C) 32	182

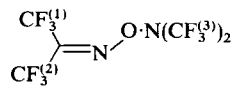
$C_4F_9H_2N$	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot N(CF_2^{(3)}H^{(4)})_2$	(1) −86.6	(2) −99.5	(1-3) 3.9	(2-3) 9.6	247
		(3) −95.5		(3-4) 58.1	(3A-3B) 5.2	
$C_4F_9BrClNO$	$CF_3^{(1)}\cdot CBrCl\cdot O\cdot N(CF_3^{(2)})_2$	(1) −81.5	(2) −66.5			222(a)
$C_4F_9ClO_3S$	$CF_3^{(1)}\cdot CF^{(2)}Cl\cdot CF_2^{(3)}\cdot OSO_2CF_3^{(4)}$	(1) −74.41	(2) −139.76	(1-2) 6.0	(1-3) 9.0	206
		(3) −77.27	(4) −74.37	(1-4) 0.5	(2-3) ~6.0	
				(2-4) ⩽0.5	(3-4) 5.5	
$C_4F_{10}HN$	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot N(CF_3^{(3)})\cdot CF_2^{(4)}H^{(5)}$	(1) −86.3	(2) −99.2	(1-3) 4.8	(1-5) 3.1	247
		(3) −52.9	(4) −96.5	(2-3) 13.0	(2-4) 8.3	
				(3-4) 9.6	(3-5) 1.1	
				(4-5) 56.0		
$C_4F_{10}HNO$	$(CF_3^{(1)})_2CF^{(3)}\cdot O\cdot NH^{(4)}\cdot CF_3^{(2)}$	(1) −78.1	(2) −71.4	(1-2) 0.8	(1-3) 2.3	178
		(3) −140.5		(1-4) 0.4	(2-3) 5.9	
				(2-4) 8.2		
$C_4F_{10}O_3S$	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot SO_2O\cdot CF_2^{(3)}\cdot CF_3^{(4)}$	(1) −80.0	(2) −113.3	(2-3) 7.7		249
		(3) −84.8	(4) −87.0			
$C_4F_{10}O_3S$	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot CF_2^{(3)}\cdot OSO_2CF_3^{(4)}$	(1) −81.82	(2) −129.98	(1-3) 8.5	(2-3) 1.2	194
		(3) −81.04	(4) −74.72	(3-4) 5.5		
$C_4F_{11}N$	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot N(CF_3^{(3)})_2$	(1) −85.0	(2) −96.0	(1-2) 0.70	(2-3) 15.8	247
		(3) −53.0				
$C_4F_{14}N_2S$	$(CF_3^{(1)}\cdot CF_2^{(2)}\cdot NF^{(3)})_2SF_4^{(4)}$	(1) −81.8	(2) −109.5	(1-2) 1.2	(1-3) 18.5	205
		(3) −49.3	(4) +63.9	(1-4) 0.5	(2-3) 27.8	
				(2-4) 14.0	(3-4) 1.5	
$C_5F_3H_3N_2O_2$	$CF_3\cdot\overline{C{=}N\cdot C(CO_2H){=}CH\cdot NH}$	−63.3				229
$C_5F_3H_5N_2$	$CF_3\cdot\overline{C{=}N\cdot CH{=}CH\cdot N}\cdot CH_3$	−61.3				229
$C_5F_3H_5O$		−65		(1-2) 4		251
	$^{(2)}H \quad COCH_3$					
$C_5F_3H_5O$	$CF_3^{(1)}\cdot CH_2^{(2)}\cdot CO\cdot CH{=}CH_2$	−64		(1-2) 10.5		252
$C_5F_3H_5O_2$	$CF_3\cdot C(OH){=}CH\cdot CO\cdot CH_3$	−77.5		^1J(F-C) 282.9 ^2J(F-C) 36.6 ^3J(F-C) 1.8		253

Molecular formula	Structure of compounds		Chemical shifts (ppm)		Coupling constants (Hz)		Ref.
$C_5F_3H_6ClO$	$CF_3^{(1)}\cdot CH_2^{(2)}\cdot CO\cdot CH_2\cdot CH_2Cl$		−64		(1-2) 10		252
$C_5F_3H_6I$			−66.9		(1-2) 10.8		254
$C_5F_3H_9$	$CF_3\cdot C(CH_3)_3$		−81		(F-C) 281		233
$C_5F_5H_5O$			(1) −67.0	(2) −108.0	(1-2) 12	(1-3) 22	256
			(3) −191.1		(2-3) 120		
$C_5F_5H_5O$		$R^1 = CF_3, R^2 = CH_3$	(1) −85.2	(3) −204.6	(2-3) 2	(3-4) ~7	238(a)
			(4) −121.4		(3-5) 52.5	(3-6) 8	
					(4-5) 10	(4-6) 67	
		$R^1 = CH_3, R^2 = CF_3$	(2) −80.2	(3) −198.6	(2-3) 14	(2-4) 2	
			(4) −116.5		(3-4) 7	(3-5) 52	
					(3-6) 7	(4-5) 12	
					(4-6) 68		
$C_5F_5H_5O$			(1) −85.1	(3) −211.2	(2-3) 2.5	(3-4) ~8	238(a)
			(4) −132.7		(3-5) 52	(3-6) 3.5	
					(4-5) 10	(4-6) 68	
$C_5F_6H_2Cl_2O$	Z-$(CF_3)_2C(OH)\cdot CCl{=}CHCl$		−76.7				257(a)
$C_5F_6H_2O$			(1) −72.9	(2) −168.8	(1-2) 16.0	(1-3) 7.0	258
			(3) −190.0	(4) −123.4	(1-5) 1.5	(4-6) 62	
					(4-5) 7	(3-4) 7	
					(3-5) 52	(3-6) 7	

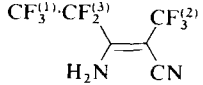
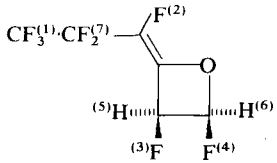
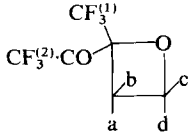
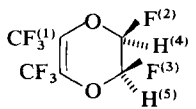
$C_5F_6H_2O$	Above structure with $CF_3^{(1)}$ and $F^{(2)}$ interchanged		(1) −71.8 (3) −190.0	(2) −168.5 (4) −123.0	(1-2) 13.2 (4-5) 7 (3-5) 52.5	(4-6) 62.4 (3-4) 7	258
$C_5F_6H_2O$	Above structure with $H^{(5)}$ and $F^{(3)}$ interchanged		(1) −73.1 (3) −200.3	(2) −168.9 (4) −137.1	(1-2) 14.2 (4-6) 63.5	(1-3) 6.0 (3-5) 52.2	258
$C_5F_6H_4O_2$	$CF_3^{(1)}\cdot\overline{CF^{(2)}\cdot CF_2^{(3,4)}\cdot O\cdot CH_2\cdot CH_2\cdot O}$		(1) −81.27 (3) −85.46	(2) −139.26 (4) −87.37	(3-4) 156		259
$C_5F_6H_6O$	$CF_3^{(1)}\cdot CF^{(2)}H^{(5)}\cdot CF_2^{(3,4)}\cdot O\cdot CH_2\cdot CH_3$		(1) −75.1 (3) −79.5	(2) −209.4 (4) −83.4	(1-2) 10 (2-3) 10 (2-5) 44 (3-5) 5	(1-5) 5 (2-4) 10 (3-4) 150 (4-5) 5	256
C_5F_7HO	$(CF_3^{(1)})_2\overline{C\cdot CF^{(2)}=CH^{(3)}\cdot O}$		(1) −77.9	(2) −137.6	(2-3) 8.0		258
C_5F_7HO			(1) −57.7 (3) −106.7	(2) −62.3	(1-2) 9 (2-3) 26	(1-3) 9 (3-4) 14	258
$C_5F_7H_2ClO$		$R^1 = CF_2Cl$, $R^2 = CF_3$	(1) −66.5 (3) −199.6	(2) −73.3 (4) −117.2	(1-2) 10 (2-4) 3 (3-5) 51 (4-5) 11	(2-3) 15.5 (3-4) ~7 (3-6) 6 (4-6) 65	238(a)
		$R^1 = CF_3$, $R^2 = CF_2Cl$	(1) −77.4 (3) −199.6	(2) −62.7 (4) −117.4	(1-2) 10 (2-4) 2 (3-5) 51 (4-5) 11	(2-3) 17 (3-4) ~7 (3-6) 6 (4-6) 65	
$C_5F_7H_2ClO$		$R^1 = CF_2Cl$, $R^2 = CF_3$	(1) −66.5 (3) −211.7	(2) −72.8 (4) −133.4	(1-2) 10 (2-4) 8 (3-5) 51 (4-5) 8	(2-3) 16 (3-4) 8 (3-6) 3.5 (4-6) 65	238(a)
		$R^1 = CF_3$, $R^2 = CF_2Cl$	(1) −77.2 (3) −210.8	(2) −62.4 (4) −134.4	(1-2) 9 (2-4) 5.5 (3-5) 51 (4-5) 8	(2-3) 22 (3-4) ~8 (3-6) 3.5 (4-6) 65	

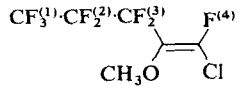
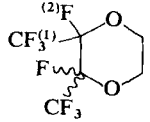
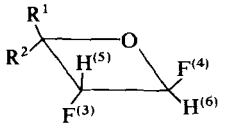
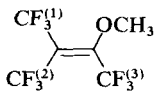
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_5F_7H_2ClO$		(1) −75.5 (2) −79.4 (3) −190.8	(1-2) 9 (1-3) 15 (2-3) 2 (3-4) 52 (3-5) 11	257(a)
$C_5F_7H_2ClO$	As above with Cl and $H^{(5)}$ interchanged	(1) −74.3 (2) −80.0 (3) −200.6	(1-2) 9 (1-3) 15 (2-3) 2 (3-4) 52 (3-5) 7.5	257(a)
$C_5F_7H_2ClO$	Z-$(CF_3^{(1)})_2C(OH)\cdot CF^{(2)} = CH^{(3)}Cl$	(1) −78.0 (2) −122.5	(1-2) 8 (2-3) 22	257(a)
$C_5F_7H_3O$	 $R^1 = CF_3^{(1)}\cdot CF_2^{(7)}$, $R^2 = H$	(1) −85.9 (3) −196.9 (4) −118.1 (7) −132.4	(7-2) 11 (2-3) 13 (3-5) 52 (3-6) 8 (4-5) 10.5 (4-6) 66	238(a)
	$R^1 = H$, $R^2 = CF_3^{(2)}\cdot CF_2^{(7)}$	(2) −86.1 (3) −201.9 (4) −115.9 (7) −129.9	(1-7) 10 (3-5) 52 (3-6) 7.5 (4-5) 11 (4-6) 68 (1-4) 3 (2-3) 5	
$C_5F_7H_3O$		(1) −86.0 (3) −202.3 (4) −135.4 (7) −132.7	(7-2) 11 (2-3) 12 (3-5) 52 (3-6) 3.5 (4-5) 10 (4-6) 68	238(a)
$C_5F_7H_3O_4S$	$CF_3^{(1)}\cdot CO\cdot CF_2^{(2)}\cdot SO_2O\cdot CF_2^{(3)}\cdot CH_3^{(4)}$	(1) −75.0 (2) −106.1 (3) −58.3	(1-2) 8.0 (2-3) 7.1 (3-4) 14.3	211
$C_5F_7ClO_3$	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot CF_2^{(3)}\cdot CO\cdot O\cdot CO\cdot Cl$	(1) −94.1 (2) −126.9 (3) −119.21	(1-2) 9.0 (2-3) ≤0.5	192
$C_5F_8H_2O$		(1) −80.0 (2) −75.7 (3) −201.1 (4) −117.3	(1-2) 9 (2-3) 15 (2-4) 3 (3-4) ~7 (3-5) 51 (3-6) 6.5 (4-5) 11 (4-6) 65	238(a)

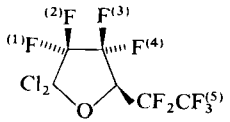
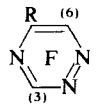
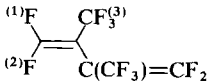
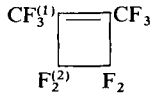
$C_5F_8H_2O$	As above with $F^{(4)}$ and $H^{(6)}$ interchanged	(1) −80.0 (3) −212.2	(2) −75.5 (4) −133.9	(1-2) 9.2 (2-4) 7.5 (3-5) 51 (4-5) 8	(2-3) 15 (3-4) 8 (3-6) 3.5 (4-6) 65	238(a)
$C_5F_8H_2O_5S$	*erythro*-$CF_3^{(1)}\cdot SO_3\cdot CH^{(5)}F^{(2)}\cdot CH^{(6)}F^{(3)}\cdot O\cdot CO\cdot CF_3^{(4)}$	(1) −75.08 (3) −147.59	(2) −138.69 (4) −75.73	(1-2) 5.3 (2-5) 51.4 (2-6) 2.8 (3-6) 51.4	(1-3) 2.1 (3-5) 3.6 (2-3) 10.8	194
	threo compound	(1) −74.79 (3) −146.9	(2) −138.6 (4) −75.73	(1-2) 5.5 (2-5) 53.0 (2-6) 3.8 (3-6) 50.8	(1-3) <0.5 (3-5) 3.4 (2-3) 10.5	
C_5F_9HClNS	$CF_3^{(1)}$ / $CF_3^{(2)}$ >=N·S·$CH^{(4)}Cl\cdot CF_3^{(3)}$	(1) −69.0 (3) −73.6	(2) −67.6	(1-2) 6.0	(3-4) 6.5	240
C_5F_9Cl		(1) −138.68 (3) −125.51 (5) −128.00 (7) −73.81	(2) −146.83 (4) −120.93 (6) −130.26	(3-5) 235	(4-6) 213	261(b)
C_5F_9Cl	As above with $CF_3^{(7)}$ and $F^{(2)}$ interchanged	(1) −140.15 (3) −124.82 (5) −128.84 (7) −74.06	(2) −137.00 (4) −121.68 (6) −129.73	(3-5) 235	(4-6) 215	261(b)
C_5F_{10}	$CF_3^{(1)}\cdot CF_2^{(2)}$, $F^{(4)}$, $CF_3^{(3)}$, $F^{(5)}$	(1) −88.3 (3) −60.2	(2) −115.1 (4)(5) −62.2	(1-3) 4 (2-3) 10.6 (3-5) 10.7 (2-5) 8.6	(1-4) 10.7 (2-4) 25.4 (1-2) 2	264(a)
$C_5F_{10}HBr$	$(CF_3^{(1)})_2CF^{(2)}\cdot CF^{(3)}H^{(5)}\cdot CF_2^{(4)}Br$	(1) −75.5, −77.9 (3) −198.5	(2) −187.8 (4) −60.9	(2-5) 10.2 (4-5) 10.2	(3-5) 42.0	262(a)
$C_5F_{10}H_2$	$(CF_3^{(1)})_2C(CF_2^{(2)}H^{(3)})_2$	(1) −64.6	(2) −127.3	(1-2) 11.0 (2-3) 54.5	(1-3) 0.8	263

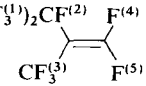
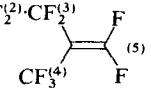
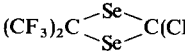
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_5F_{10}H_2$	$(CF_3^{(1)})_2CF^{(2)}\cdot CH^{(5)}F^{(3)}\cdot CF_2^{(4)}H^{(6)}$	(1) −76.0, −78.6 (2) −191.0 (3) −190.0 (4) −130.3	(3-5) 44.0 (3-6) 5.0 (4-6) 54.0	262(a)
$C_5F_{10}Br_2$	$(CF_3^{(1)})_2CF^{(2)}\cdot CF^{(3)}Br\cdot CF_2^{(4)}Br$	(1) −71.0 (2) −171.5 (3) −127.5 (4) −56.5	(1-2) 12.6 (4A-4B) 174	262(a)
$C_5F_{11}H$	$(CF_3^{(1)})_3C\cdot CF_2^{(2)}H^{(3)}$	(1) −66.01 (2) −126.6	(1-C1) 288.3 (2-C2) 257.4	233
$C_5F_{11}H$	Same as above	(1) −65.4 (2) −125.7	(1-2) 10.5 (1-3) 1.0 (2-3) 53.0	263
$C_5F_{11}H$	$(CF_3^{(1)})_2CH^{(4)}\cdot CF_2^{(2)}\cdot CF_3^{(3)}$	(1) −64.5 (2) −116.7 (3) −86.3	(1-2) 11.2 (1-3) 5.2 (1-4) 3.7	264(a)
$C_5F_{11}H$	Same as above	(1) −63.9 (2) −116.5 (3) −87.0	(1-2) 12.7 (1-3) 5.7 (1-4) 6.9 (2-4) 12.7	262(a)
$C_5F_{11}H$	$(CF_3^{(1)})_2CF^{(2)}\cdot CF^{(3)}H^{(5)}\cdot CF_3^{(4)}$	(1) −74.9, −77.1, (2) −190.1 (3) −214.0 (4) −79.0	(2-5) 6.0 (3-5) 43.5 (4-5) 6.0	262(a)
$C_5F_{11}Br$	$(CF_3^{(1)})_3C\cdot CF_2^{(2)}Br$	(1) −63.84 (2) −47.92	(1-2) 10.5	263
$C_5F_{11}I$	$(CF_3^{(1)})_3C\cdot CF_2^{(2)}I$	(1) −63.34 (2) −42.73	(1-2) 10.5	263
$C_5F_{11}NO_2$	$(CF_3^{(3)})_2CF^{(2)}\cdot O\cdot N(CF_3^{(1)})\cdot CO\cdot F^{(4)}$	(1) −63.8 (2) −142.6 (3) −78.8, −78.2 (4) −6.9	(1-2) 10 (1-3) ~2 (1-4) 15	220
C_5F_{12}	$(CF_3)_4C$	−62.9	(F-C) 289.9	233
$C_5F_{12}N_2O$		(1) −67.1 (2)(3) −70.3	(1-2) 6.8	265(a)
$C_5F_{12}O$	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot CF_2^{(3)}\cdot O\cdot CF_2^{(4)}\cdot CF_3^{(5)}$	(1) −84.9 (2) −133.2 (3) −87.5 (4) −91.7 (5) −90.7		215
$C_6F_3H_3N_2O_4$	$CF_3\cdot\overline{C{=}N\cdot C(CO_2H){=}C(CO_2H)\cdot NH}$	−63.1		229

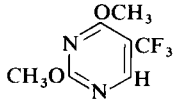
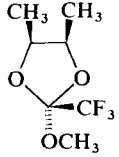
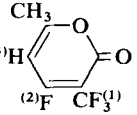
$C_6F_3H_4N_3$	$CF_3{\cdot}\overline{C{=}N{\cdot}CH{=}CH{\cdot}N}{\cdot}CH_2{\cdot}CN$	−60.6				229
$C_6F_3H_8I$	*E*-$CF_3{\cdot}CH_2{\cdot}CH{=}CH{\cdot}CHI{\cdot}CH_3$	−66.89		(1-2) 11		254
	Z-isomer	−66.58		(1-2) 11		
$C_6F_3H_9O_3$	$CF_3{\cdot}C(OH)(OCH_3){\cdot}CH_2{\cdot}CO{\cdot}CH_3$	−82.0		^1J(F-C) 288.4 ^2J(F-C) 32.0 ^3J(F-C) 0.0		253
$C_6F_3H_{10}O_5P$	$CF_3^{(1)}{\cdot}CH_2^{(2)}{\cdot}O{\cdot}P\left(\begin{smallmatrix}O\\O\end{smallmatrix}\right)_2$	−82.0		(1-2) 8.6	(P-1) 0.4	266
$C_6F_4H_6O_4$	$CF_3^{(1)}{\cdot}CF^{(2)}(CO_2CH_3)_2$	(1) −74.9	(2) −171.3	(1-2) 8		239
$C_6F_4H_7ClO$	$CF_3^{(1)}$ $F^{(2)}$ / i-$C_3H_7{\cdot}O$ Cl	(1) −64.1	(2) −96.7	(1-2) 21.3		235
$C_6F_5H_2N_3$	$CF_3^{(1)}{\cdot}CF_2^{(2)}{\cdot}C(NH_2){=}C(CN)_2$	(1) −84.6	(2) −119.0	(1-2) 2.22		268
$C_6F_5H_2N_3O$	$CF_3^{(1)}{\cdot}CF_2^{(2)}{\cdot}\overline{C{=}N{\cdot}O{\cdot}C(NH_2){=}C}{\cdot}CN$	(1) −85.2	(3) −116.4	(1-2) 2.2		268
$C_6F_5H_4N_3O_2$	$CF_3^{(1)}{\cdot}CF_2^{(2)}$ $CO{\cdot}NH_2$ / H_2N $C{=}C$ CN	(1) −84.6	(2) −120.0	(1-2) 2.20		268
$C_6F_5H_7OS$	$CF_3^{(1)}{\cdot}CF_2^{(2)}{\cdot}CO{\cdot}S{\cdot}C_3H_7$	(1) −83.8	(2) −120.8			269(a)
$C_6F_5H_7O_2$	As above with S replaced by O	(1) −84.9	(2) −122.8			269(a)
$C_6F_5H_8NO$	As above with S replaced by NH	(1) −84.7	(2) −123.9			269(a)
$C_6F_5H_{10}ISn$	$CF_3^{(1)}{\cdot}CF_2^{(2)}{\cdot}SnI(CH_2CH_3)_2$	(1) −82.51	(2) −117.90	(Sn-2) < 10	(^{119}Sn-1)241.5	270
$C_6F_5H_{10}N_3S$	$CF_3^{(1)}{\cdot}CF_2^{(2)}{\cdot}N{=}\overline{S{\cdot}N(CH_3){\cdot}CH_2{\cdot}CH_2{\cdot}N}{\cdot}CH_3$	(1) −86.4	(2) −75.0			230
$C_6F_6H_5ClO$	$CF_3^{(1)}{\cdot}CF_2^{(2)}$ $F^{(3)}$ / CH_3CH_2O Cl	(1) −83.4 (3) −93.6	(2) −116.1	(1-2) 2.8 (2-3) 29.9	(1-3) 6.8	235
$C_6F_6H_6N_2O_2$	$CF_3{\cdot}\overline{C(NH_2){\cdot}N{=}C(CF_3){\cdot}O{\cdot}CH_2{\cdot}CH_2{\cdot}O}$	−74.7, −83.6				232
$C_6F_6N_2$	*Z*-$CF_3^{(1)}{\cdot}CF^{(2)}(CN){\cdot}CF^{(3)}{=}CF^{(4)}{\cdot}CN$	(1) −78.3 (3) −169.1	(2) −121.1 (4) −170.3	(1-2) 12.0 (2-3) 19.0 (3-4) 26.0	(1-3) 6.0 (2-4) 7.0	210
	E-isomer	(1) −77.8 (3) −141.5	(2) −133.6 (4) −152.6	(1-2) 12.0	(3-4) 141.0	

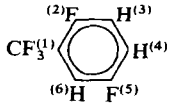
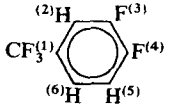
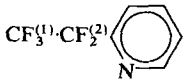
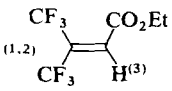
Molecular formula	Structure of compounds		Chemical shifts (ppm)		Coupling constants (Hz)		Ref.
$C_6F_8H_2N_2$			(1)(2) −59.76, −83.99 (3) −119.62				268
$C_6F_8H_2O$			(1) −87.1 (3) −199.3 (7) −124.4	(2) −166.2 (4) −136.8	(1-2) 6.5 (1-7) 2.5 (3-7) 10 (5-7) 3 (3-4) 13 (2-4) 3 (3-5) 53	(1-3) 2.0 (2-7) 18 (4-7) 1 (4-6) 64 (4-5) 6 (2-5) 3	258
$C_6F_8H_2O_2$		a = d = F, b = c = H	(1) −78.9 (a) −205.9	(2) −77.6 (d) −133.5	(a-b) 50.0 (b-d) 7.0 (2-a) 4	(a-c) 3.0 (c-d) 64.0 (2-d) 4	274(a)
		a = c = F, b = d = H	(1) −79.0 (a) −196.2	(2) −78.5 (c) −120.4	(a-b) 50.0 (b-c) 8.0 (1-a) 2.4 (2-a) 4.5	(a-d) 7.5 (c-d) 65.0 (1-c) 2.4	
		a = c = H, b = d = F	(1) −74.9 (b) −196.2	(2) −77.2 (d) −116.4	(a-b) 50.0 (b-c) 7.5 (1-b) 13.5	(a-d) 8.0 (c-d) 65.0 (1-d) 3.0	
$C_6F_8H_2O_2$			(1) −67.7	(2) −153.3	(2-3) 18 (2-5) 6.2	(2-4) 51.8	274(a)
$C_6F_8H_2O_2$	As above with $F^{(3)}$ and $H^{(5)}$ interchanged		(1) −68.0	(2) −141.3	(2-3) 24 (2-5) 2.4	(2-4) 50.4	274(a)

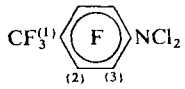
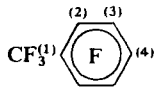
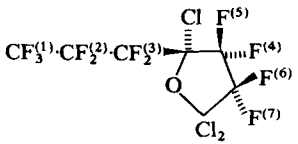
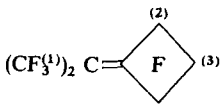
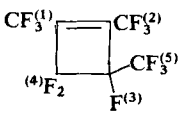
$C_6F_8H_3ClO$			(1) −81.3 (3) −127.5	(2) −120.0 (4) −115.0	(1-3) 7.4		235
$C_6F_8H_4O_2$		Isomer [a] Isomer [b]	(1) −79.76 (1) −79.98	(2) −125.35 (2) −133.37			259
$C_6F_9HN_2$	$CF_3{\cdot}\overline{C{=}N{\cdot}C(CF_3){=}C(CF_3){\cdot}NH}$		−59.7, −63.7 (2:1)				229
$C_6F_9H_3O$		$R^1 = CF_3^{(8)}{\cdot}CF_2^{(7)}{\cdot}CF_2^{(1)}$, $R^2 = H$	(1) −129.6 (4) −118.3 (8) −83.8	(3) −197.0 (7) −130.0	(1-2) 11 (3-5) 52 (4-5) 10	(2-3) 13 (3-6) 8 (4-6) 66	238(a)
		$R^1 = H$, $R^2 = CF_3^{(8)}{\cdot}CF_2^{(7)}{\cdot}CF_2^{(2)}$	(2) −126.4 (4) −116.0 (8) −83.6	(3) −201.6 (7) −129.6	(1-2) 10 (3-5) 52 (4-5) 11 (1-4) 3	(2-3) ~10 (3-6) 7 (4-6) 68 (3-7) 7	
$C_6F_9H_3O$	As above with $F^{(4)}$ and $H^{(6)}$ interchanged and $R^1 = CF_3^{(8)}{\cdot}CF_2^{(7)}{\cdot}CF_2^{(1)}$, $R^2 = H$		(1) −129.9 (4) −135.4 (8) −83.7	(3) −202.4 (7) −130.0	(1-2) 10 (3-5) 52 (4-5) 10 (1-8) 9	(2-3) 13 (3-6) 3 (4-6) 68	238(a)
$C_6F_9H_3O$			(1) −61.9 (3) −66.7	(2) −59.6	(1-2) 10.0	(2-3) 14.4	262(a)
$C_6F_9H_3O_2$	$CF_3^{(1)}{\cdot}CF_2^{(2)}{\cdot}CF_2^{(3)}{\cdot}CF_2^{(4)}{\cdot}CO_2CH_3$		(1) −80.1 (3) −122.2	(2) −124.4 (4) −117.4	(1-3) 10 (2-4) 12	(1-2 or 1-4) 2	239
$C_6F_9H_3O_2$	$CF_3^{(1)}{\cdot}CF_2^{(2,3)}{\cdot}CF^{(5)}(CF_3^{(4)}){\cdot}CO_2CH_3$		(1) −80.0 (3) −121.2 (5) −179.6	(2) −117.7 (4) −71.9	(1-3) 13 (1-) 2.5 (3-) 9	(2-3) 287 (2-) 10	239

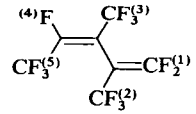
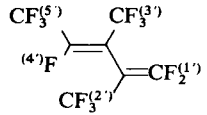
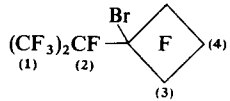
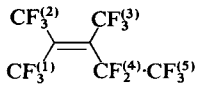
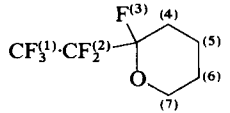
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_6F_9H_3O_3$	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot O\cdot CF_2^{(3)}\cdot CF_2^{(4)}\cdot CO_2CH_3$	(1) −85.9 (2) −87.1 (3) −84.1 (4) −120.3	(2-3) ~12.5	239
$C_6F_9H_3O_3$	$CF_3^{(1)}\cdot O\cdot CF_2^{(2,3)}\cdot CF^{(5)}(CF_3^{(4)})\cdot CO_2CH_3$	(1) −54.4 (2) −77.5 (3) −78.7 (4) −73.1 (5) −178.9	(1-2) 9 (1-3) 9 (2-3) 145 (2-4) 9 (3-4) 9 (3-5) 7.5 (4-5) 6	239
$C_6F_9H_6ClO_3Ti$	$(CF_3^{(1)}\cdot CH_2^{(2)}\cdot O)_3TiCl$	−75.3	(1-2) 7.9	241(a)
$C_6F_9H_6O_3P$	$(CF_3^{(1)}\cdot CH_2^{(2)}O)_3P$	−82.3	(1-2) 8.2 (P-1) 4.5	266
$C_6F_9H_6O_4V$	$(CF_3^{(1)}\cdot CH_2^{(2)}\cdot O)_3VO$	−77.3	(1-2) 8.0	190(a)
$C_6F_9Cl_3O$		(1) −113.1 (2) −120.3 (3) −123.5 (4) −108.3 (5) −78.3	(1-2) 228 (1-4) 14.1 (3-4) 237 (2-3) 1.9 (2-5) 5.0	275
$C_6F_9N_3$	 R = $(CF_3^{(1)})_2CF^{(2)}$	(1) −75.7 (2) −187.3 (3) −63.9 (6) −90.0	(3-6) 37 (1 or 2-6) 44	260(a)
C_6F_{10}	$CF_2^{(1,2)}=C(CF_3^{(3)})\cdot C(CF_3)=CF_2$	(1) −73.5 (2) −71.5 (3) −63.3		264(a)
C_6F_{10}		(1) −71.4 (2) −73.1 (3) −63.8	(1-2) 20	276
C_6F_{10}		(1) −66.0 (2) −117.5		276
$C_6F_{10}H_4O$	$(CF_3^{(1)})_2CF^{(2)}\cdot CH(CF_3^{(3)})\cdot OCH_3$	(1)(3) −75.6, −76.5, −78.0 (2) −190.5		262(a)

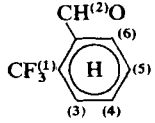
$C_6F_{10}H_4O$	$(CF_3^{(1)})_2CH^{(4)}\cdot CF_2^{(2)}\cdot CF_2^{(3)}\cdot OCH_3$	(1) −65.35 (2) −117.0 (3) −95.4	(1-2)(1-3) 11.8, 5.5 (1-4) 7.5		262(a)
$C_6F_{10}H_4S$	$(CF_3^{(1)})_2CF^{(2)}\cdot CF^{(3)}H^{(5)}\cdot CF_2^{(4)}\cdot S\cdot CH_3$	(1) −74.1, −77.76 (2) −187.5 (3) −203.8 (4) −88.6	(2-5) 12.0 (4A-4B) 230	(3-5) 42.0 (4-5) 8.0	262(a)
$C_6F_{10}O$	$CF_2^{(4)}{=}C(CF_3^{(1)})\cdot CO\cdot CF_2^{(3)}\cdot CF_3^{(2)}$	(1)(2) −60.5, −84.5 (3) −123.5 (4) −62.2			277(a)
$C_6F_{10}O_5S$	$CF_3^{(1)}\cdot CO\cdot CF_2^{(2)}\cdot SO_2O\cdot CF_2^{(3)}\cdot CO\cdot CF_3^{(4)}$	(1)(4) −75.0 (2) −104.2 (3) −74.6	(1-2) 8.0	(2-3) 7.5	211
C_6F_{12}		(1) −78.1 (2) −183.7 (3) −58.7 (4) −62.1 (5) −64.3	(1-2) 5 (2-3) 19 (3-4) 10.4 (4-5) ~0	(1-3) 4 (2-4) 19 (3-5) 33	264(a)
C_6F_{12}		(1) −83.5 (2) −129.5 (3) −111.5 (4) −59.5 (5) −63.0, −61.9			264(a)
$C_6F_{12}ClNS$	$(CF_3^{(1,2)})_2C{=}N\cdot S\cdot CCl(CF_3^{(3)})_2$	(1)(2) −66.3, −68.1 (3) −69.0	(1-2) 6.4		240
$C_6F_{12}Cl_2$	$(CF_3^{(1)})_2CF^{(2)}\cdot CCl(CF_3^{(3)})\cdot CF_2^{(4)}Cl$	(1) −68.5 (2) −165.5 (3) −64.5 (4) −51.5	(1-3) 11 (3-4) ~13	(1-4) 13	264(a)
$C_6F_{12}Se_2$		−70.5			278
$C_6F_{13}HO$	$CF_3^{(4)}\cdot CF_2^{(3)}\cdot CF_2^{(2)}\cdot C(CF_3^{(1)})_2\cdot OH$	(1) −68.9 (2)(3) −109.9, −118.9 (4) −76.8			279
$C_6F_{13}NO_2$	$(CF_3^{(1)})_3C\cdot O\cdot CO\cdot NF^{(2)}(CF_3^{(3)})$	(1) −70.0 (2) −69.3 (3) −67.2	(1-2) ≈(1-3) ≤0.5 (2-3) 10.4		220
$C_6F_{14}O$	$CF_3^{(1)}CF_2^{(2)}\cdot O\cdot CF_2^{(3)}\cdot CF^{(4)}(CF_3^{(5)})\cdot OCF_3^{(6)}$	(1) −90.6 (2) −91.7 (3) −86.0 (4) −149.0 (5) −83.4 (6) −57.2			215

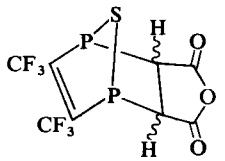
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_6F_{14}O_3S$	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot CF_2^{(3)}\cdot CF_2^{(4)}\cdot CF_2^{(5)}\cdot CF_2^{(6)}\cdot OSO_2F^{(7)}$	(1) −81.5 (2) −126.6 (3) −123.0 (4) −122.1 (5) −125.0 (6) −83.1 (7) −51.0	(6-7) 8.4	249
$C_7F_3H_4NO_2$	$pCF_3\cdot C_6H_4\cdot NO_2$	−63.4		282
$C_7F_3H_5$	$CF_3\cdot C_6H_5$	−64		283
$C_7F_3H_7N_2O_2$		−63.77		284(c)
$C_7F_3H_7N_2O_2$	As above with CF_3 and H interchanged	−72.3		284(c)
$C_7F_3H_{11}O$	$CF_3^{(1)}\cdot CH_2^{(2)}\cdot CO\cdot Bu^n$	−55	(1-2) 10.3	285
$C_7F_3H_{11}O_3$		−84.0		286
$C_7F_3H_{11}O_3$	As above with CF_3 and OCH_3 interchanged	−84.7		286
$C_7F_4H_4O_2$		(1) −60.8 (2) −86.5	(1-2) 25 (2-3) 9.5	287
$C_7F_4H_8O_2$	$CF_3^{(1)}\cdot CF^{(2)}H^{(3)}\cdot CO\cdot \overline{CH^{(4)}\cdot O\cdot CH_2\cdot CH_2\cdot CH_2}$			
	Isomer [a]	(1) −75.0 (2) −208.6	(1-2) 11.0 (1-3) 6.7 (2-3) 41.0	288
	Isomer [b]	(1) −75.2 (2) −207.3	(1-2) 11.0 (1-3) 6.4 (2-3) 41.0 (2-4) 2.5	

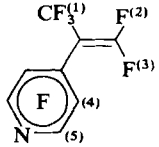
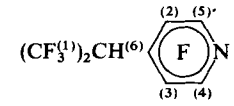
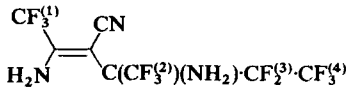
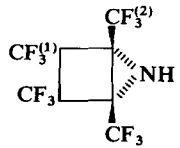
$C_7F_5H_3$			(1) −62.56 (5) −117.48	(2) −120.76	(1-2) 13.10 (1-4) −0.62 (1-6) −0.59 (2-4) 3.67 (2-6) 5.41 (4-5) 7.44	(1-3) 0.74 (1-5) 0.56 (2-3) 9.53 (2-5) 17.91 (3-5) 4.13 (5-6) 7.92	289(e)
$C_7F_5H_3$			(1) −63.19 (4) −132.74	(3) −135.70	(1-2) −0.61 (1-4) 1.89 (1-6) −0.76 (2-4) 7.20 (3-5) 7.64 (4-5) 9.83	(1-3) 0.82 (1-5) 0.86 (2-3) 10.13 (3-4) −20.30 (3-6) −1.59 (4-6) 4.03	289(e)
$C_7F_5H_4I$	$CF_3^{(1)}\cdot C_6H_4\cdot IF_2^{(2)}o$		(1) −60.3	(2) −159.7	(1-C6) 5.0		728
$C_7F_5H_4N$			(1) −84.9	(2) −122.4			282(c)
$C_7F_6H_3NO_2$	$CF_3^{(1)}\cdot CF^{(2)}(CN)\cdot CF^{(3)}=CF^{(4)}\cdot CO_2CH_3$	*cis* *trans*	(1) −78.5 (3) −154.2 (1) −76.3 (3) −121.7	(2) −139.5 (4) −155.8 (2) −130.5 (4) −122.8	(1-2) ~15 (3-4) 20.0 (1-2) 10.0	(2-3) ~5 (3-4) 125.0	210
$C_7F_6H_3NO_2$	$CF_3^{(1)}\cdot CF^{(2)}(CO_2CH_3)\cdot CF^{(3)}=CF^{(4)}\cdot CN$	*cis* *trans*	(1) −76.9 (3) −169.8 (1) −75.6 (3) −144.5	(2) −135.3 (4) −172.4 (2) −159.6 (4) −148.3	(1-2) 15.0 (3-4) 35.0 (1-2) 15.0 (3-4) 125.0	(2-3) 20.0 (2-3) ~5	210
$C_7F_6H_6O_2$			(1) −65.23	(2) −61.00	(1-2) 6.8 ^1J(F-C) 274.1, 275.5	(1-3) 1.4	290(a)
$C_7F_6H_6O_2$	$CH_3\cdot CO\cdot CH_2^{(5)}\cdot CF_2^{(2)}\cdot CH^{(4)}(CF_3^{(1)})\cdot CO\cdot F^{(3)}$		(1) −65 (3) +50.4	(2) −94.6	(1-3) 9 (2-3) 9	(1-4) 18 (2-5) 16	287

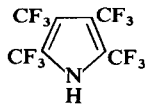
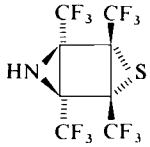
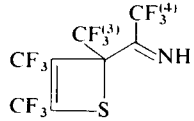
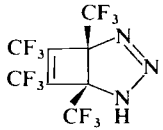
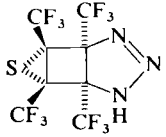
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_7F_6H_{11}O_4V$	$(CF_3^{(1)}\cdot CH_2^{(2)}\cdot O)_2VO[OCH(CH_3)_2]$	−76.7	(1-2) 8.5	190(a)
$C_7F_7Cl_2N$		(1) −56.9 (2) −138.4 (3) −140.0		542(b)
C_7F_8		(1) −56.2 (2) −140.0 (3) −160.4 (4) −147.7		291(b)
$C_7F_8H_7NO$	$(CF_3^{(1)})_2CH^{(3)}\cdot CF_2^{(2)}\cdot CO\cdot N(CH_3)_2$	(1) −63.9 (2) −108.1	(1-2) 11.0 (1-3) 8.2 (2-3) 11.0	262(a)
$C_7F_{10}H_7N$	$(CF_3^{(1)})_2CH^{(4)}\cdot CF_2^{(2)}\cdot CF_2^{(3)}\cdot N(CH_3)_2$	(1) −62.9 (2) −111.7 (3) −103.1	(1-2) 11.7 (1-4) 8.2 (2-4) 11.7	262(a)
$C_7F_{11}Cl_3O$		(1) −80.6 (2) −120.6 (3) −115.1 (4) −107.6 (5) −121.9 (6) −119.5 (7) −111.3	(1-3) 10.6 (4-5) 244 (4-7) 13.6 (6-7) 228	275
$C_7F_{11}Cl_3O$	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot CCl_2\cdot CF_2^{(3)}\cdot CF_2^{(4)}\cdot CF_2^{(5)}\cdot CO\cdot Cl$	(1) −81.3 (2) −120.1 (3) −116.9 (4) −114.3 (5) −107.1	(1-3) 3.1 (2-3) 13.2 (2-4) 6.2 (3-5) 13.1	275
C_7F_{12}		(1) −65.3 (2) −116.9 (3) −132.4		292
C_7F_{12}		(1)(2) −66.1 (3) −173.8 (4) −115.3 (5) −78.1		276

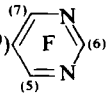
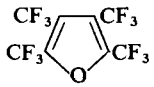
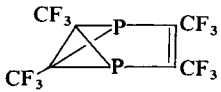
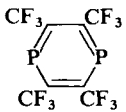
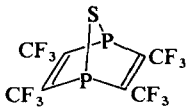
C_7F_{12}		(2)(2′)(3)(3′) −60.8, −62.5, −64.5 (1)(1′)(5)(5′) −70.8, −71.8, −73.1 (4)(4′) −102.4, −105.0	(3-4) 21	(4-5) 6	276
					
$C_7F_{13}Br$		(1) −72.3 (2) −171.6 (3) −112.1, −124.6 (4) −124.3, −128.6	(3A-3B) 220	(4A-4B) 220	293
C_7F_{14}		(1)(2)(3) −60.1, −60.9, −61.4 (4) −101.3 (5) −76.9			276
$C_7F_{14}O$		(1) −81.0 (2) −131.2 (3) −125.8 (4A) 139.3 (4B) −123.9 (5A) −141.6 (5B) −125.5 (6A) −131.4 (6B) −122.1 (7A) −92.3 (7B) −78.5	(1-4A) 2.8 (1-3) 12.5 (5A-5B) 284 (7A-7B) 156	(1-4B) 2.8 (4A-4B) 278 (6A-6B) 300	275
$C_7F_{14}O$	$(CF_3^{(1)})_2C(CO{\cdot}F^{(5)}){\cdot}CF_2^{(4)}{\cdot}CF_2^{(3)}{\cdot}CF_3^{(2)}$	(1) −63.4 (2) −82.8 (3)(4) −107.9, −124.7 (5) −44.1			268
$C_7F_{16}BrN$	$(CF_3^{(1)})_2CF^{(2)}{\cdot}CF^{(3)}Br{\cdot}CF_2^{(4)}{\cdot}N(CF_3^{(5)})_2$	(1) −71.4 (2) −173.2 (3) −134.2 (4) −84.2 (5) −53.9	(2-3) 38.0 (4-5) 16.0	(3-5) 16.0 (4A-4B) 228	262(a)

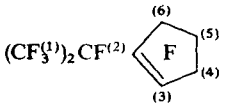
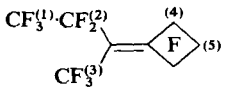
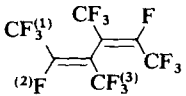
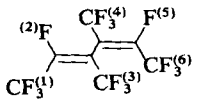
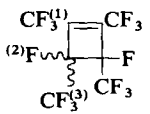
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_7F_{16}O$	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot CF_2^{(3)}\cdot CF_2^{(4)}\cdot O\cdot CF_2^{(5)}\cdot CF_2^{(6)}\cdot CF_3^{(7)}$	(1) −82.4 (2) −130.1 (3) −126.4 (4) −82.2 (5) −84.1 (6) −126.4 (7) −82.2	(1-3) 7.1 (5-7) 9.6	275
$C_7F_{16}O_3S$	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot CF_2^{(3)}\cdot CF_2^{(4)}\cdot CF_2^{(5)}\cdot CF_2^{(6)}\cdot OSO_2CF_3^{(7)}$	(1) −81.5 (2) −126.5 (3) −122.8 (4) −122.1 (5) −124.8 (6) −79.2 (7) −74.1	(6-7) 5.6	249
$C_8F_3H_5O$			(1-2) 2.23 (1-3) −0.64 (1-4) 0.93 (1-5) −0.68 (1-6) 0.75	294
$C_8F_3H_7OS$	$CF_3^{(1)}\cdot CH_2^{(2)}\cdot O\cdot S\cdot C_6H_5$	−80.7	(1-2) 8.5	266
$C_8F_3H_7Se$	$CF_3^{(1)}\cdot CH_2^{(2)}\cdot Se\cdot C_6H_5$	−65.0	(1-2) 10.5	296
$C_8F_3H_9N_2O_2$	$CF_3\cdot\overline{C=N\cdot CH=CH\cdot N}\cdot CO_2CH_2CH_3$	−60.5		229
$C_8F_3H_9O_2$	$CF_3\cdot CO\cdot O$ 	−75.74		216
$C_8F_3H_{12}N_3$	$CF_3\cdot\overline{C=N\cdot CH=CH\cdot N}\cdot CH_2CH_2N(CH_3)_2$	−60.4		229
$C_8F_3H_{13}O$	$CF_3^{(1)}\cdot CH_2^{(2)}\cdot CO\cdot CH_2Bu^t$		(1-2) 11	296
$C_8F_3H_{16}O_4V$	$CF_3^{(1)}\cdot CH_2^{(2)}\cdot O\cdot VO(OPr^i)_2$	−76.5	(1-2) 8.8	190(a)
$C_8F_4H_4O$	$CF_3^{(8)}\cdot CO$ 	−72.6	(8-C8) 291 (8-C7) 35 (4-C4) 257 (4-C3) 22 (4-C2) 9 (4-C1) 3	297(a)

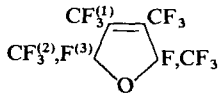
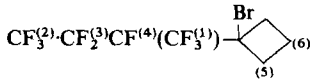
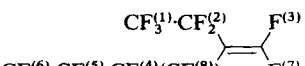
$C_8F_4H_6O_2$	$CF_3^{(8)}\cdot C^{(7)}(OH)_2$  F	−84.9		(8-C7) 31 (4-C3) 22 (4-C1) 3	(4-C4) 243 (4-C2) 9	297(a)
$C_8F_4H_7ClO_4$	$CF_3^{(1)}\cdot CH(CO_2CH_3)\cdot CF^{(2)}=CCl\cdot CO_2CH_3$ (mixture of isomers)	(1) −65.4	(2) −95.0, −87.2	(1-2) 6.5		228
$C_8F_5H_4NO_2$	p-$CF_3^{(1)}\cdot CF_2^{(2)}\cdot C_6H_4\cdot NO_2$	(1) −85.1	(2) −118.1			282(c)
$C_8F_5H_5$	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot C_6H_5$	(1) −89.1	(2) −119.5	(1-2) 1.7		282(c)
$C_8F_6H_2O_3P_2S$		−54.3		^3J(P-F) 27.1		244(c)
$C_8F_6H_6O_4$	Z-$CH_3O_2C\cdot CF^{(2)}(CF_3^{(1)})\cdot CF^{(3)}=CF^{(4)}\cdot CO_2CH_3$	(1) −75.5 (3) −139.5	(2) −128.9 (4) −163.9	(1-2) 8 (2-4) 4	(2-3) 21 (3-4) 28	236
$C_8F_6H_6O_4$	E-isomer of above	(1) −75.6 (3) −145.1	(2) −170.4 (4) −153.6	(1-2) 22	(3-4) 140	236
$C_8F_6H_8O$	$(CF_3)_2C(OH)\cdot C\equiv C\cdot CH_2\cdot CH_2\cdot CH_3$	−77.85				237
$C_8F_6H_8O_4$	$(CF_3CO_2)_2C(CH_3)\cdot CH_2\cdot CH_3$			^1J(F-C) 285.4 ^2J(F-C) 43.4		286
$C_8F_6H_8O_5$	$CF_3^{(1)}\cdot CO_2\cdot CH_2\cdot CH_2\cdot O\cdot C(CF_3^{(2)})\cdot O\cdot CH_2\cdot CH_2\cdot O$	(1) −75.4	(2) −84.5			286
$C_8F_6H_9NO$	n-$C_4H_9\cdot C(CF_3)_2\cdot OCN$	−73.68				237
$C_8F_6H_{12}O$	$C_5H_{11}\cdot C(CF_3)_2\cdot OH$	−76.02				237
$C_8F_6FeO_6$	cis-$(CF_3CO)_2Fe(CO)_4$	−79.9				273
$C_8F_7H_7O_4$	$CH_3O_2C\cdot CF^{(4)}H\cdot CF_2^{(3)}\cdot CF^{(2)}(CF_3^{(1)})\cdot CO_2CH_3$	(1) −64 (3) −82.7	(2) −146.3 (4) −205.8	(1-2) 12		301
$C_8F_8H_6O_4$	$CH_3O_2C\cdot CF_2^{(5)}\cdot CF_2^{(3,4)}\cdot CF^{(2)}(CF_3^{(1)})\cdot CO_2CH_3$	(1) −72.3 (3) −115.2 (5) −116.5	(2) −179.0 (4) −117.7	(1-5) 2 (1-4) 12 (4-) 9	(1-3) 11 (3-4) 287 (5-) 12	239
$C_8F_9H_{10}O_5P$	$(CF_3^{(1)}\cdot CH_2^{(2)}\cdot O)_3\cdot P\cdot O\cdot CH_2\cdot CH_2\cdot O$	−81.9		(1-2) 8.5		266

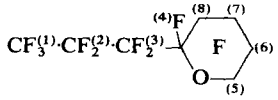
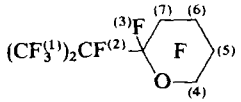
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
C_8F_9N		(1) −59.6 (2) −68.8 (3) −67.5 (4) −139.1 (5) −88.7	(1-2) 11.5 (1-3) 17.5 (2-3) 7.5 (2-4) 5.5 (1-4) 5.5	302(b)
$C_8F_{10}HN$		(1) −66.2 (2)(3) −143.9, −137.7 (4)(5) −90.7	(1-2) 20.7 (1-6) 8.0	302(b)
$C_8F_{10}H_6O_2$	$CH_3O{\cdot}CF_2^{(3)}{\cdot}C(CF_3^{(1)})=C(OCH_3){\cdot}CF_2^{(4)}{\cdot}CF_3^{(2)}$			
	Isomer [a]	(1)(2) −61.1, −82.6 (3)(4) −68.4, −114.0	(1-3) 12.0 (2-3) 4.4 (4-3) 20.4	303
	Isomer [b]	(1)(2) −57.4, −82.7 (3)(4) −71.7, −115.1	(2-1) 3.7 (3-1) 11.0 (4-1) 21.0	
$C_8F_{10}H_6Sn$	$(CF_3^{(1)}{\cdot}CF_2^{(2)})_2Sn(CH=CH_2)_2$	(1) −83.24 (2) −115.95	(^{119}Sn-2) 272.8	270
$C_8F_{10}H_{10}Si$	$(CF_3^{(1)})_2CF^{(2)}{\cdot}CF^{(3)}H^{(5)}{\cdot}CF_2^{(4)}{\cdot}Si(CH_3)_3$	(1) −74.1, −77.5 (2) −191.7 (3) −210.1 (4) −128.1	(4A-4B) 369 (3-5) 43.8	262(a)
$C_8F_{10}H_{10}Sn$	$(CF_3^{(1)}{\cdot}CF_2^{(2)})_2Sn(CH_2CH_3)_2$	(1) −83.83 (2) −116.46	(^{119}Sn-2) 228.2	270
$C_8F_{11}H_4N_3$		(1) 68.7 (2) −73.6 (3) −118.9, −119.1 (4) −80.2	(2-3) 12.5 (2-4) 4	304
$C_8F_{12}HN$		−65.5, −66.3	^1J(F-C) 272.2, 272.2 ^2J(1-C) 47.6 ^2J(2-C) 48.8	305(c)

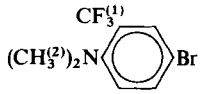
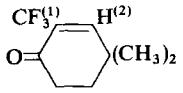
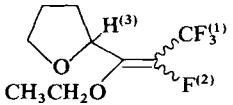
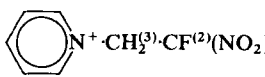
$C_8F_{12}HN$		−57.3, −60.7		306(c)
$C_8F_{12}HN$	Same as above	−56.63, −59.76		307
$C_8F_{12}HNS$		−63.9, −67.7		305(c)
$C_8F_{12}HNS$		−61.3, −66.1, −68.1, −71.1	^1J(F-C) 281.2, 282.3, 272.5, 271.6 ^2J(3-C) 35 ^2J(4-C) 36.7	306(c)
$C_8F_{12}HNS$		−67.6, −65.7, −59.5, −57.3 (1) (2) (3) (4)	(1-2) 11.3 (2-3) 2.8 (3-4) 4.5 (3-5) 8 ^2J(F-C_a) 31.7	306(c)
$C_8F_{12}HN_3$		−63.1, −71.5		306(c)
$C_8F_{12}HN_3S$		−60.7, −69.5		306(c)

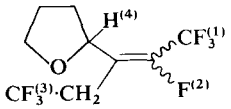
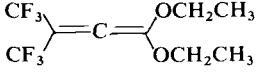
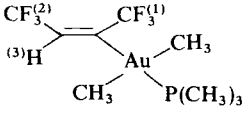
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_8F_{12}H_6ClO_2P$	$(CF_3)_2\overline{C{\cdot}C(CF_3)_2{\cdot}O{\cdot}PCl(CH_3)_2O}$	−69.2		308
$C_8F_{12}N_2$	$CF_3^{(1)}{\cdot}CF_2^{(2)}{\cdot}CF^{(3)}(CF_3^{(4)})$ 	(1) −82.2 (2) −121.6 (3) −187.7 (4) −74.1 (5) −153.0 (6) −70.6 (7) −46.2		310
$C_8F_{12}N_2$	$CF_3^{(1)}{\cdot}CF_2^{(2)}{\cdot}CF^{(3)}(CF_3^{(4)})$ 	(1) −82.2 (2) −121.6 (3) −182.7 (4) −75.3 (5)(7) −43.7, −45.4 (6) −38.4		310
$C_8F_{12}O$		−60, −65		311
$C_8F_{12}P_2$		−53.7, −57.9 (1) (2)	(P-1) + (P′-1) 22.6 (P-2) 5.2	312(c)
$C_8F_{12}P_2$		−52.30	(P-F) 66	313(c)
$C_8F_{12}P_2S$		−57.1	(P-F) 24.8	244(c)

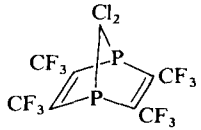
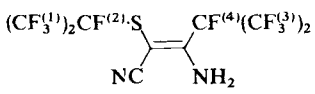
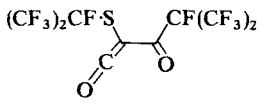
$C_8F_{12}Se_2$		−59.6				278
$C_8F_{13}H_5$	$CF_3^{(1)}\cdot\underbrace{CF_2\cdot CF_2\cdot CF_2\cdot CF_2\cdot CF_2}\cdot CH_2\cdot CH_3$	(1) −82.6	(2) −117.1, −122.1, −123.2, −123.8, −126.7			314(a)
$C_8F_{13}Cl_3O$	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot CF_2^{(3)}\cdot CCl_2\cdot CF_2^{(4)}\cdot CF_2^{(5)}\cdot CF_2^{(6)}\cdot CO\cdot Cl$	(1) −81.3 (3) −118.2 (5) −115.3	(2) −126.3 (4) −118.2 (6) −108.2	(1-3) 8.8		275
C_8F_{14}	$(CF_3^{(1)})_2CF^{(2)}\cdot C\equiv C\cdot CF(CF_3)_2$	(1) −80.1	(2) −175.6	(1-2) 10		245
C_8F_{14}	Same as above	(1) −79.3	(2) −178.3	^3J(F-F) + ^6J(F-F) = 9		260(a)
C_8F_{14}		(1) −77.1 (3) −111.4 (5) −132.4	(2) −189.2 (4) −122.1 (6) −107.5	(1-2) 9		292
C_8F_{14}		(1) −84.7 (3) −63.0 (5) −132.6	(2) −116.8 (4) −114.8			292
C_8F_{14}		(1) −73.5 (3) −64.5	(2) −106.4	(1-2) 4	(2-3) 18	276
C_8F_{14}		(1) −72.4 (3) −60.9 (5) −106.5	(2) −103.3 (4) −64.6 (6) −73.3	(1-2) 6 (4-5) 18	(1-3) 10	276
C_8F_{14}		(1) −67.2 (3) −78.8	(2) −172.2			276

Molecular formula	Structure of compounds		Chemical shifts (ppm)		Coupling constants (Hz)	Ref.
$C_8F_{14}O$		Isomer [a]	(1) −63	(2) −85		311
			(3) −122			
		Isomer [b]	(1) −62	(2) −83		
			(3) −112			
$C_8F_{15}Br$			(1) −71.3	(2) −82.5	(5A-5B) ~216 (6A-6B) 224	293
			(3) −113.0	(4) −170.6		
			(5) −112.1, −125.7	(6) −125.3, −129.7		
C_8F_{16}	Z-$CF_3^{(1)}\cdot CF_2^{(2)}\cdot C(CF_3^{(3)})=C(CF_3)\cdot CF_2\cdot CF_3$		(1) −74.5	(2) −99.8		311
			(3) −58.0			
	E-isomer		(1) −74.5	(2) −99.8		
			(3) −57.2			
C_8F_{16}	Z-$CF_3^{(6)}\cdot CF_2^{(5)}\cdot CF^{(4)}(CF_3^{(7)})\cdot C(CF_3^{(3)})=CF^{(2)}\cdot CF_3^{(1)}$		(1) −66.0	(2) −87.8	(1-4) 48 (2-3) 20	276
			(3) −60.0	(4) −183.1		
			(5) −119.7	(6) −82.7		
			(7) −75.6			
	E-isomer		(1) −67.4	(2) −90.0	(1-3) 15	
			(3) −60.0	(4) −183.1		
			(5) −119.7	(6) −82.7		
			(7) −75.6			
C_8F_{16}			(1) −88.3	(2) −109.1		276
			(3) −68.1	(4) −183.0		
			(5) −119.7	(6) −83.0		
			(7) −62.3	(8) −75.6		
$C_8F_{16}H_2O_2$	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot C(CF_3^{(3)})(OH)\cdot C(CF_3)(OH)\cdot CF_2\cdot CF_3$		(1) −80	(2) −111		311
			(3) −70			

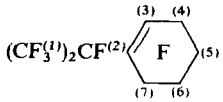
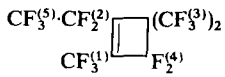
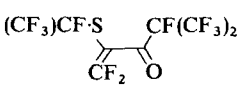
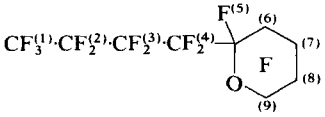
$C_8F_{16}O$		(1) −81.6 (5A) −78.6	(2) −125.6 (5B) −92.2	(1-4) 2.7 (8A-8B) 278 (5A-5B) 158	(1-3) 9.9 (7A-7B) 284	275
$C_8F_{16}O$		(1) −71.9 (4A) 91.8	(2) −185.2 (4B) 78.2	(1-3) 82 (6A-6B) 284	(4A-4B) 158 (7A-7B) 280	275
$C_8F_{17}IO_3S$	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot CF_2^{(3)}\cdot CF_2^{(4)}\cdot SO_3\cdot CF_2^{(5)}\cdot CF_2^{(6)}\cdot CF_2^{(7)}\cdot CF_2^{(8)}I$	(1) −80.5 (3) −120.2 (5) −78.2 (7) −112.6	(2) −125.5 (4) −107.3 (6) −123.0 (8) −57.8	(4-5) 8		249
$C_8F_{18}O$	$(CF_3^{(1)}\cdot CF_2^{(2)}\cdot CF_2^{(3)}\cdot CF_2^{(4)})_2O$	(1) −82.1 (3) −127.0	(2) −127.0 (4) −83.7			275
$C_8F_{18}O_2$	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot CF_2^{(3)}\cdot O\cdot CF^{(4)}(CF_3^{(5)})\cdot CF_2^{(6)}\cdot O\cdot CF_2^{(7)}\cdot CF_3^{(8)}$	(1) −85.0 (3) −86.1 (5) −83.4 (7) −91.7	(2) −132.8 (4) −148.0 (6) −84.4 (8) −90.6			215
$C_8F_{18}O_3S$	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot CF_2^{(3)}\cdot CF_2^{(4)}\cdot SO_3\cdot CF_2^{(5)}\cdot CF_2^{(6)}\cdot CF_2^{(7)}\cdot CF_3^{(8)}$	(1) −81.3 (3) −120.8 (5) −78.9 (7) −125.8	(2) −126.4 (4) −108.0 (6) −126.8 (8) −81.5			249
$C_8F_{18}O_3S$	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot SO_3CF_2^{(3)}\cdot CF_2^{(4)}\cdot CF_2^{(5)}\cdot CF_2^{(6)}\cdot CF_2^{(7)}\cdot CF_3^{(8)}$	(1) −79.7 (3) −78.8 (5) −122.2 (7) −126.5	(2) −113.2 (4) −124.8 (6) −122.8 (8) −81.5			249
$C_9F_3H_7O$	$CF_3^{(1)}\cdot CH^{(2)}(C_6H_5)\cdot CHO^{(3)}$	−63		(1-2) 9.1	(1-3) 2.5	285
$C_9F_3H_7S$	$CF_3\cdot C(S\cdot C_6H_5)=CH_2$	−66.4				315
$C_9F_3H_7Se$	As above with S replaced by Se	−65.6				315
$C_9F_3H_8ClS$	$CF_3^{(1)}\cdot CH^{(2)}(S\cdot C_6H_5)\cdot CH_2Cl$	−69.0		(1-2) 8		315
$C_9F_3H_8ClSe$	As above with S replaced by Se	−66.8				315

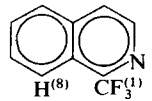
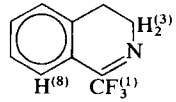
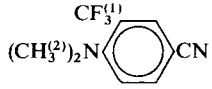
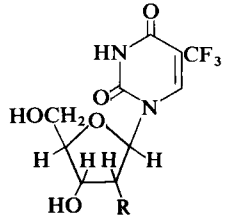
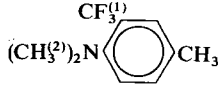
Molecular formula	Structure of compounds		Chemical shifts (ppm)		Coupling constants (Hz)		Ref.
$C_9F_3H_9BrN$					(1-2) 0.37		316
$C_9F_3H_9ClN$	As above with Br replaced by Cl				(1-2) 0.31		316
$C_9F_3H_9N_2O_2$	As above with Br replaced by NO_2				(1-9) 0.92		316
$C_9F_3H_9O$	$CF_3{\cdot}CH(C_6H_5){\cdot}OCH_3$		−78.4		(1-2) 7.4		317(a)
$C_9F_3H_{10}N$	As $C_9F_3H_9BrN$ above with Br replaced by H				(1-2) 0.31		316
$C_9F_3H_{11}O$			−66		(1-2) 1		252
$C_9F_3H_{12}O_2$		*Z*-isomer	(1) −63.4	(2) −154.4	(1-2) 9.7		288
		E-isomer	(1) −67.5	(2) −160.5	(1-2) 9.4	(2-3) 4.5	
$C_9F_3H_{13}O$	$CF_3^{(1)}{\cdot}CH_2^{(2)}{\cdot}CO{\cdot}cyclo C_6H_{11}$		−60		(1-2) 10.1		285
$C_9F_3H_{13}O$	$CF_3^{(1)}{\cdot}CH^{(2)}(cyclo C_6H_{11}){\cdot}CH^{(3)}O$		−60		(1-2) 9.8	(1-3) 1.7	285
$C_9F_4H_7ClS$	$CF_3^{(1)}{\cdot}CF^{(2)}Cl{\cdot}S{\cdot}CH_2{\cdot}C_6H_5$		(1) −76.3	(2) −95	(1-2) 8		195
$C_9F_4H_8$	$CF_3^{(1)}{\cdot}CH_2^{(4)}{\cdot}CF^{(2)}H^{(3)}{\cdot}C_6H_5$		(1) −66.75	(2) −181.5	(1-4) 18,9 (2-4) 15,9	(2-3) 46.5	318
$C_9F_4H_8O_2$	$p\text{-}CF_3^{(8)}{\cdot}C(OH)(OCH_3)$ 		(8) −84.3		(8-C8) 287 (4-C4) 247 (4-C2) 9	(8-C7) 32 (4-C3) 22 (4-C1) 3	297(a)
$C_9F_4H_{10}N_2O_6S$			(1) −78.0	(2) −137.5	(2-3) 16	(2-4) 16	231

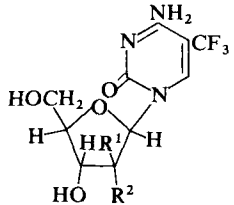
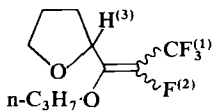
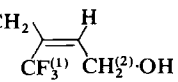
$C_9F_5H_4Br_3$	$pBr{\cdot}C_6H_4{\cdot}CBrF^{(3)}{\cdot}CBrF^{(2)}{\cdot}CF_3^{(1)}$	*erythro*	(1) −69.3	(2) −115.7	(1-2) 12.8	(1-3) 8.5	319
			(3) −124.9		(2-3) 20.6		
		threo	(1) −69.8	(2) −112.5	(1-2) 9.5	(1-3) 9.5	
			(3) −124.9		(2-3) 24.9		
$C_9F_5H_5Br_2$	$C_6H_5{\cdot}CBrF^{(3)}{\cdot}CBrF^{(2)}{\cdot}CF_3^{(1)}$	*erythro*	(1) −69.1	(2) −115.0	(1-2) 14.3	(1-3) 9.0	320
			(3) −125.0		(2-3) 22.9		
		threo	(1) −69.7	(2) −111.4	(1-2) 10.7	(1-3) 10.7	
			(3) −125.0		(2-3) 27.5		
$C_9F_5H_5O_2$	$pCF_3^{(1)}{\cdot}C_6H_4{\cdot}CF_2^{(2)}{\cdot}CO_2H$		(1) −63.8	(2) −106.5			321
$C_9F_5H_9O_6$	$CH_3O{\cdot}CO{\cdot}CF^{(2)}(CF_3^{(1)}){\cdot}CF^{(3)}(CO_2CH_3)_2$		(1) −72.1	(2) −172.4	(1-2) 7	(1-3) 16	239
			(3) −167.9		(2-3) 10		
$C_9F_6H_9N_3$	$(CF_3)_2C(NH{\cdot}C_6H_5){\cdot}NH{\cdot}NH_2$		−76.0				265(a)
$C_9F_6H_9O_2$		*Z*-isomer	(1) −64.5	(2) −149.9	(1-2) 9.2		288
			(3) −75.9				
		E-isomer	(1) −67.7	(2) −156.3	(1-2) 9.2	(2-4) 4.0	
			(3) −75.4				
$C_9F_6H_{10}O_2$			−63.98		^1J(F-C) 275.6 ^2J(F-C) 37.3		290(a)
$C_9F_6H_{10}O_4$	$(CF_3)_2C(CO_2CH_2CH_3)_2$		−66.2				302(b)
$C_9F_6H_{10}O_4$	$(CF_3CO_2)_2C(CH_3){\cdot}CH(CH_3)_2$				^1J(F-C) 286	^2J(F-C) 43	286
$C_9F_6H_{10}O_4$	$(CH_3)_2C(OCOCF_3){\cdot}CH(OCOCF_3){\cdot}CH_3$		−75.48,	−75.92			286
$C_9F_6H_{16}AuP$			(1) −53.9	(2) −58.4	(1-2) 10.8	(2-3) 9.4	323
					(P-1) 10.8		
$C_9F_6H_{16}AuP$	As above with right-hand CH_3 and $P(CH_3)_3$ interchanged		(1) −52.3	(2) −57.3	(1-2) 11.6	(2-3) 9.4	323
					(P-1) 0	(P-2) 1.4	

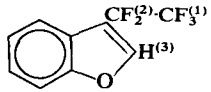
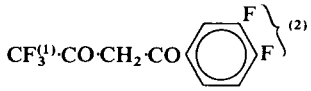
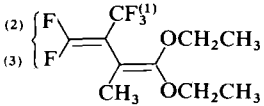
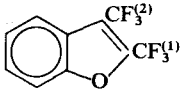
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_9F_7H_4NO_2S$	$(CF_3^{(1)})_2CF^{(2)}\cdot S\cdot C_6H_4\cdot NO_2p$	(1) −72.5 (2) −150		195
$C_9F_7H_5S$	$(CF_3)_2CF\cdot S\cdot C_6H_5$	(1) −73 (2) −155.5	(1-2) 7.5	195
$C_9F_7H_{15}IOP$	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot CF_2^{(3)}I\cdot(CH_3CH_2)_3PO$	(1) −81.74 (2) −120.88 (3) −65.82		219(a)
$C_9F_7H_{15}IOP$	$(CF_3^{(1)})_2CF^{(2)}I\cdot(CH_3CH_2)_3PO$	(1) −76.11 (2) −152.3		219(a)
$C_9F_9H_5O_2$	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot CF_2^{(3)}\cdot CF_2^{(4)}\cdot C\equiv C\cdot CO_2CH_2CH_3$	(1) −81.4 (2) −125.8 (3) −123.8 (4) −101.1		324
$C_9F_{12}HO_3P$	$(CF_3^{(2)})_2CH\cdot O\cdot\overline{PF_2^{(3)}\cdot O\cdot C(CF_3)_2\cdot C(CF_3)_2\cdot O}$	(1) −70.8 (2) −77.3 (3) −65.3	(P-3) 916	325
$C_9F_{12}H_6O_2$	$(CF_3)_2C(OH)\cdot CH{=}CH\cdot CH_2\cdot C(CF_3)_2\cdot OH$	−77.06, −76.19		237
$C_9F_{12}H_7O_3P$	$(CF_3^{(2)})_2CH\cdot O\cdot\overline{P(CH_3)_2\cdot O\cdot C(CF_3^{(1)}{=}C(CF_3)\cdot O}$	(1) −64.3 (2) −73.5		325
$C_9F_{12}H_8O_2$	$(CF_3)_2C(OH)\cdot CH_2\cdot CH_2\cdot CH_2\cdot C(CF_3)_2\cdot OH$	−76.11		237
$C_9F_{12}Cl_2P_2$		−55.90	(P-F) 22.6	313(c)
$C_9F_{13}H_5O_2$	$CF_3^{(1)}\underbrace{CF_2\cdot CF_2\cdot CF_2\cdot CF_2\cdot CF_2}_{(2)}\cdot CH_2\cdot CH_2\cdot CO_2H$	(1) −82.0 (2) −115.2, −122.0, −123.1, −123.6, −126.5		314(a)
$C_9F_{14}H_2N_2S$		(1)(3) −74.2, −73.95 (2)(4) −159.7, −179.3	(1-2) or (3-4) 10.0	268
$C_9F_{14}SO_2$		(1) −74.64 (2) −75.10 (3) −162.0 (4) −180.8 (ratio 6:6:1:1)	(1-4) 6.6 (2-3) 10.0	326

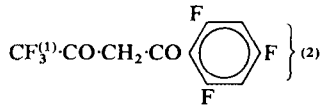
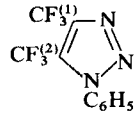
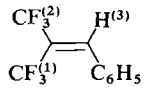
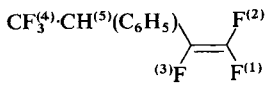
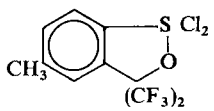
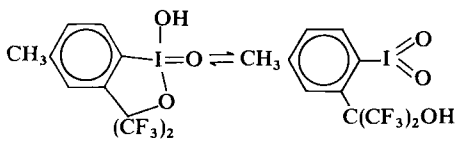
$C_9F_{15}H_2NSO$	$(CF_3^{(1)})_2CF^{(2)}\cdot S$, $CF^{(4)}(CF_3^{(3)})_2$, $H_2N\cdot OC$, $F^{(5)}$		(1)(3) −74.64 (2)(4) −157.83, −182.20 (5) −96.87			268
$C_9F_{15}H_3O$	$CF_3^{(1)}$, $CF_3^{(3)}$, $^{(2)}F$, $C(CF_3^{(4)})(CF_2^{(5)}CF_3^{(6)})\cdot OCH_3$		(1) −70 (4) −67 (6) −82	(2) −93 (5) −120	(1-2) 3	(1-3) 13	311
$C_9F_{15}H_3O$	$CF_3^{(1)}\cdot CF^{(2)}(OCH_3)\cdot C(CF_3^{(3)})=C(CF_3^{(4)})\cdot CF_2^{(5)}\cdot CF_3^{(6)}$ (mixture of *Z* and *E*)		(1) −72 or −75 (3) −58 or −59 (5) −100	(2) −112 (4) −59 or −58 (6) −75 or −72			311
$C_9F_{15}H_4N$	$CF_3^{(1)}$, $CF_3^{(3)}$, $^{(2)}F$, $C(CF_3^{(4)})(NHCH_3)\cdot CF_2^{(5)}\cdot CF_3^{(6)}$		(1) −69.70 (3) −54.79 (5) −118.44	(2) −95.39 (4) −65.07 (6) −81.31			304
$C_9F_{15}Cl_3O$	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot CF_2^{(3)}\cdot CF_2^{(4)}\cdot CF_2^{(5)}$, Cl, $F_2^{(6)}$, O, $F_2^{(7)}$, Cl_2		(1) −81.6 (3) −123.1 (5) −115.0 (6B) −122.8 (7B) −112.1	(2) −126.4 (4) −117.5 (6A) −109.8 (7A) −120.7	(1-3) 10.2 (6A-6B) 240 (6A-7B) 13.6	(1-4) 2.6 (7A-7B) 226	275
$C_9F_{15}Cl_3O$	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot CF_2^{(3)}\cdot CF_2^{(4)}\cdot CCl_2\cdot CF_2^{(5)}\cdot CF_2^{(6)}\cdot CF_2^{(7)}\cdot COCl$		(1) −81.8 (3) −122.7 (5) −117.9 (7) −108.3	(2) −126.2 (4) −117.9 (6) −115.4	(1-3) 10.1	(1-4) 1.9	275
$C_9F_{15}N_3$	R^1, N, R^2, $CF^{(2)}(CF_3^{(1)})_2$, N=N	$R^1 = (CF_3^{(3)})_2CF^{(4)}$, $R^2 = F^{(5)}$	(1) −76.9 (3) −76.3 (5) −81.2	(2) −188.0 (4) −191.3	(4-5) 44		260(a)
		$R^1 = F^{(3)}$, $R^2 = (CF_3^{(4)})_2CF^{(5)}$	(1) −76.2 (3) −62.7 (5) −190.0	(2) −188.7 (4) −76.2	(3-5) 38		

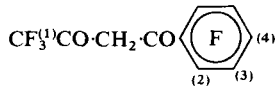
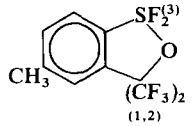
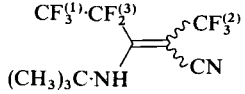
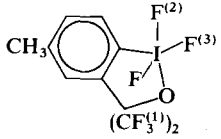
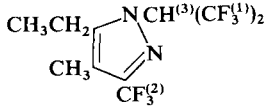
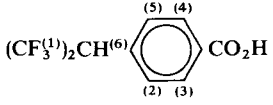
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
C_9F_{16}		(1) −78.3 (2) −186.4 (3) −107.2 (4) −125.5 (5)(6) −138.6,(7) −110.3 −137.1	(2-7) 37	292
C_9F_{16}		(1) −65.7 (2) −114.5 (3) −67.8 (4) −111.2 (5) −85.6	(1-5) 5 (1-4) 2	276
$C_9F_{16}H_4O_3S$	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot CF_2^{(3)}\cdot CF_2^{(4)}\cdot CF_2^{(5)}\cdot CF_2^{(6)}\cdot CH_2\cdot CH_2\cdot OSO_2CF_3^{(7)}$	(1) −81.2 (2) −124.4 (3) −123.2 (4) −122.5 (5) −121.4 (6) −113.5 (7) −74.9		249
$C_9F_{16}SO$		(1) −73.06 (2) −75.26 (3) −53.08 (4) −55.54 (5) −159.26 (6) −181.11 (ratio 6:6:1:1:1:1)	(1-3) 3.8 (2-) 10.0 (3-4) 44.0 (3-6) 22.0	326
$C_9F_{18}O$		(1) −81.6 (2) −126.3 (3) −121.9 (9A) −92.2 (9B) −78.6	(1-3) 10.3 (1-4) 2.5 (6A-6B) 276 (7A-7B) 284 (8A-8B) 298 (9A-9B) 158	275
$C_9F_{20}O$	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot CF_2^{(3)}\cdot CF_2^{(4)}\cdot O\cdot CF_2^{(5)}\cdot CF_2^{(6)}\cdot CF_2^{(7)}\cdot CF_2^{(8)}\cdot CF_3^{(9)}$	(1) −81.6 (2) −125.8 (3) −123.1 (4) −83.4 (5) −83.4 (6) −123.1 (7) −126.4 (8) −126.6 (9) −81.8	(1-3) 10.0 (1-4) 2.3 (7-9) 9.2	275

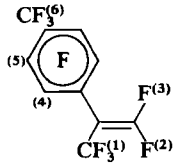
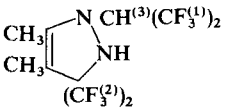
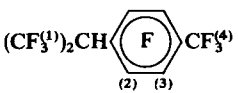
$C_{10}F_3H_6N$			−63.8	(1-8) 1.95		327
$C_{10}F_3H_8N$			−68.4	(1-3) 1.66	(1-8) ~ 1.7	327
$C_{10}F_3H_9N_2$				(1-2) 0.72		316
$C_{10}F_3H_{10}NO$	As above with CN replaced by CHO			(1-2) 0.75		316
$C_{10}F_3H_{10}NO_2$	As above with CN replaced by CO_2H			(1-2) 0.65		316
$C_{10}F_3H_{11}N_2O_5$		R = H	−63.76			284(c)
$C_{10}F_3H_{11}N_2O_6$	As above with R = OH		−63.76			284(c)
$C_{10}F_3H_{11}OSe$	$CH_3O{\cdot}CH_2{\cdot}CH(CF_3){\cdot}Se{\cdot}C_6H_5$		−66.9			315
$C_{10}F_3H_{12}N$				(1-2) 0.23		316

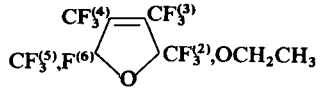
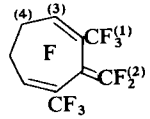
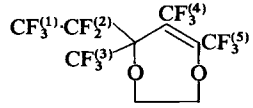
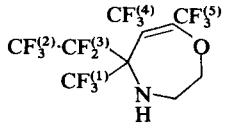
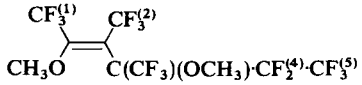
Molecular formula	Structure of compounds		Chemical shifts (ppm)		Coupling constants (Hz)		Ref.
$C_{10}F_3H_{12}N_3O_4$		$R^1 = R^2 = H$	−63.18				284(c)
$C_{10}F_3H_{12}N_3O_5$	As above with $R^1 = H$, $R^2 = OH$		−59.9				284(c)
$C_{10}F_3H_{12}N_3O_5$	As above with $R^1 = OH$, $R^2 = H$		−63.3				284(c)
$C_{10}F_3H_{14}O_2$		*Z*-isomer	(1) −63.4	(2) −155.0	(1-2) 9.2		288
		E-isomer	(1) −67.5	(2) −160.4	(1-2) 9.2	(1-3) 4.2	
$C_{10}F_3H_{14}O_2$	As above with n-C_3H_7 replaced by i-C_3H_7	*Z*-isomer	(1) −62.6	(2) −153.6	(1-2) 9.5		288
		E-isomer	(1) −66.1	(2) −160.1	(1-2) 10.0	(1-3) 4.0	
$C_{10}F_3H_{15}O$	$(CH_3)_2C{=}CHCH_2CH_2$ 		−62.5		(1-2) 2.4		227
$C_{10}F_4H_6Fe_2O_6S_2$	$\mu(SCH_3)_2\mu(CF^{(2)}{\cdot}CF_3^{(1)})Fe_2(CO)_6$	*syn*	(1) −70	(2) −138	(1-2) 7		328
		anti	(1) −68.8	(2) −136.8	(1-2) 7		
$C_{10}F_4H_8O_2$	$CF_3^{(1)}{\cdot}CO_2{\cdot}CH^{(4)}(CH_2^{(3)}F^{(2)}){\cdot}C_6H_5$		(1) −77.25	(2) −226	(2-3) 48	(2-4) 15	318
$C_{10}F_4H_8O_2$	$CF_3^{(1)}{\cdot}CO_2{\cdot}CH_2CH^{(3)}F^{(2)}{\cdot}C_6H_5$		(1) −78	(2) −193.5	(2-3) 48		318
$C_{10}F_5H_3Br_2O_2$	$CF_3^{(1)}{\cdot}CF^{(2)}Br{\cdot}CF^{(3)}Br{\cdot}C_6H_4{\cdot}CO_2Hp$	*erythro*	(1) −69.9	(2) −116.7	(1-2) 14.7	(1-3) 9.2	320
			(3) −122.6		(2-3) 23.7		
		threo	(1) −70.5	(2) −112.8	(1-2) 10.8	(1-3) 10.8	
			(3) −122.6		(2-3) 26.4		

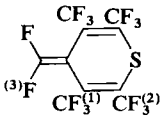
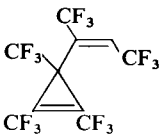
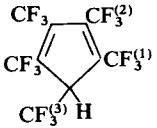
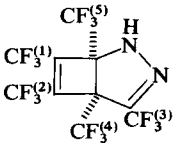
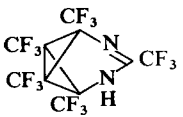
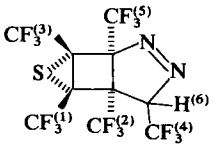
$C_{10}F_5H_5O$			(1) −88.2	(2) −119.5	(1-2) 2.9	(1-3) 1.7	282(c)
$C_{10}F_5H_5O$	As above with CF_3CF_2 and H interchanged		(1) −86.9	(2) −119.2	(1-2) 2.9		282(c)
$C_{10}F_5H_5O_2$			(1) −79.5	(2) −105.9			329
$C_{10}F_5H_5O_2$	$CF_3^{(3)}\cdot CF^{(2)}=CF^{(1)}\cdot C_6H_4\cdot CO_2H$*p*	*E*-isomer	(1) −145.0 (3) −66.1	(2) −167.0	(1-2) 132.8 (2-3) 10.7	(1-3) 22.6	320
		Z-isomer	(1) −108.5 (3) −65.0	(2) −154.1	(1-2) 8.1 (2-3) 12.4	(1-3) 8.4	
$C_{10}F_5H_7Br_2$	$CF_3^{(1)}\cdot CF^{(2)}Br\cdot CF^{(3)}Br\cdot C_6H_4\cdot CH_3$*p*	*erythro*	(1) −70.7 (3) −125.7	(2) −115.9	(1-2) 12.8 (2-3) 21.2	(1-3) 8.1	319
		threo	(1) −71.3 (3) −125.7	(2) −112.9	(1-2) 9.5 (2-3) 24.6	(1-3) 9.5	
$C_{10}F_5H_7Br_2O$	As above with CH_3 replaced by OCH_3	*erythro*	(1) −70.9 (3) −125.6	(2) −115.1	(1-2) 13.0 (2-3) 21.9	(1-3) 8.5	319
		threo	(1) −71.5 (3) −125.6	(2) −112.4	(1-2) 9.6 (2-3) 24.9	(1-3) 9.6	
$C_{10}F_5H_{10}N_3$	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot C[NH^{(3)}\cdot C(CH_3)_3]=C(CN)_2$		(1) −82.99	(2) −116.76	(1-2) 5.0	(2-3) 4.0	268
$C_{10}F_5H_{12}N_3O$	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot C[CH(CN)(CONH_2)]=N\cdot C(CH_3)_3$		(1) −83.93	(2) −120.43	(1-2) 2.2		268
$C_{10}F_5H_{13}O_2$			(1) −59.83 (2)(3) −79.10 to −77.05		(1-2) 20.0 (1-C1) 271.6 (2,3-C1) ~5.0 (2,3-C2,3) 297.5 (1-C2) ~4.0	(1-3) 11.5	290(c)
$C_{10}F_6H_4O$			(1)(2) −63.9, −58.2		(1-2) 7.9		282(c)

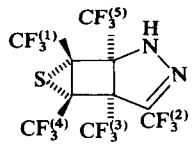
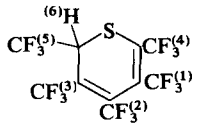
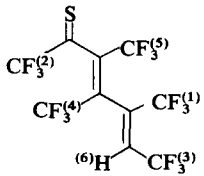
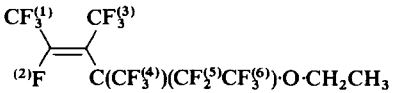
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{10}F_6H_4O_2$		(1) −79.6 (2) −105.7		329
$C_{10}F_6H_5N_3$		−55.9, −60.1	(1-2) 6.8	330
$C_{10}F_6H_6$		(1) −57.2 (2) −63.3	(1-2) 7.8 (2-3) 1.4	331
$C_{10}F_6H_6$		(1) −100.9 (2) −119.5 (3) −181.3 (4) −68.0	(1-2) 74.5 (1-3) 35.2 (1-5) 1.5 (2-3) 117.4 (2-5) 2.6 (3-5) 27.5 (3-4) 7.3	332
$C_{10}F_6H_6Cl_2OS$		−74.08, −71.77	^1J(F-C) 290 ^2J(F-C) 35	333
$C_{10}F_6H_7IO_2$		−76.10		334
$C_{10}F_6H_9O_2P$	$(CF_3^{(1)}\cdot CH_2^{(2)}\cdot O)_2P\cdot C_6H_5$	−81.5	(1-2) 8.5 (P-1) 3.4	266

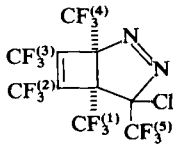
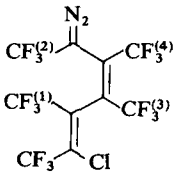
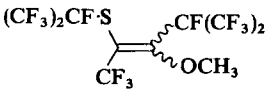
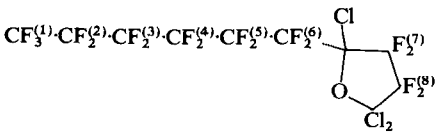
$C_{10}F_6H_{18}O_4Ti$	$(CF_3^{(1)}\cdot CH_2^{(2)}\cdot O)_2Ti(OPr^i)_2$		−75.5		(1-2) 8.7		241(a)
$C_{10}F_7H_7S$	$(CF_3^{(1)})_2CF^{(2)}\cdot S\cdot CH_2\cdot C_6H_5$		(1) −71	(2) −153	(1-2) 9		195
$C_{10}F_8H_2O_2$			(1) −76.0 (3) −150.1	(2) −147.2 (4) −152.5			329
$C_{10}F_8H_6OS$			(1) −75.2 (3_{ax}) +51.6	(2) −75.7 (3_{eq}) −14.1	(1-2) 10		333
$C_{10}F_8H_{11}N_2$		Isomer [a] Isomer [b]	(1)(2) −52.9, −81.8 (3) −116.0 (1)(2) −58.4, −82.6 (3) −112.9				268
$C_{10}F_9H_4ClS$	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot CF_2^{(3)}\cdot CF_2^{(4)}\cdot S\cdot C_6H_4\cdot Cl$*p*		(1) −82.9 (4) −89	(2)(3) −122, −127.4			195
$C_{10}F_9H_6IO$			(1) −74.30 (3) −13.20	(2) −41.57	(1-2) 116		334
$C_{10}F_9H_9N_2O$			(1) −68.85	(2) −63.6	(1-3) 6.8		335
$C_{10}F_{10}H_2O_2$			(1) −65.2 (3)(4) −136.1	(2)(5) −140.2, −133.5	(1-2) 18.0 (1-6) 8.0	(1-5) 2.0	302(b)
$C_{10}F_{10}H_3NO$	As above with CO_2H replaced by $CONH_2$		(1) −63.2 (3)(4) −139.7	(2)(5) −139.7, −135.2	(1-2) 21.5 (1-6) 8.5	(1-5) 2.0	302(b

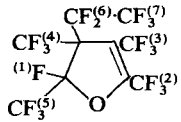
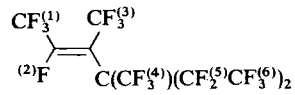
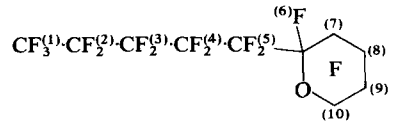
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{10}F_{10}H_9N$	$CF_3^{(2)}\cdot CF_2^{(3)}\cdot CF_2^{(4)}\cdot C(CF_3^{(1)})=C=N\cdot C(CH_3)_3$	(1)(2) −54.1, −80.9 (3)(4) −103.9, −126.5		268
$C_{10}F_{10}H_{11}NO$	$CF_3^{(2)}\cdot CF_2^{(3)}\cdot CF_2^{(4)}\cdot CH(CF_3^{(1)})\cdot CO\cdot N(CH_2CH_3)_2$	(1)(2) −61.82, −82.92 (3) −125.42 (4A) −110.4 (4B) −114.9		268
$C_{10}F_{11}H_{10}N$	$CF_3^{(2)}\cdot CF_2^{(3)}\cdot CF_2^{(4)}\cdot C(CF_3^{(1)})=CF^{(5)}\cdot N(CH_2CH_3)_2$	(1)(2) −53.65, −81.30 (3)(4) −103.04, −124.82 (5) −53.65		268
$C_{10}F_{12}$		(1) −56.7 (2) −65.3 (3) −66.9 (4) −132.7 (5) −135.9 (6) −54.2	(1-2) 18.0 (1-3) 11.0 (2-3) 5.5 (3-4) 5.5 (1-4) 20.7, 5.0 (5-6) 22.8 (1-6) 8.0	302(b)
$C_{10}F_{12}H_6N_2O$		(1) −64.8 (2) −64.1	^1J(1-C) 270 ^2J(1-C) 38 ^1J(2-C) 296 ^2J(2-C) 31	336(a)
$C_{10}F_{12}H_8$		(1) −67.0 (2) −73.8	(1-3) 7.0 (1-2) 1.30 to 1.85	335
$C_{10}F_{12}H_{12}O_4P_2$	$[(CH_3)_2P(O)\cdot O\cdot C(CF_3)_2]_2$	−65.9		308
$C_{10}F_{13}H$		(1) −65.8 (2) −141.5, −135.0 (3) −140.2 (4) −59.6	(3-4) 22.4 (1-2) 18.0, 2.0 (1-4) 8.0	302(b)

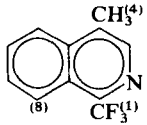
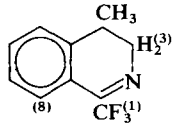
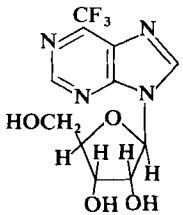
$C_{10}F_{13}H_5O_2$		Isomer [a]	(2) −80 or −81	(3) −61		311
			(4) −61	(5) −81 or −80		
			(6) −106			
		Isomer [b]	(2) −82	(3) −62		
			(4) −62	(5) −82		
			(6) −114			
$C_{10}F_{14}$			(1) −64	(2) −67	(1-) 20, 12	337
			(3) −110	(4) −124		
$C_{10}F_{14}H_4O_2$			(1) −80	(2) −118		311
			(3) −67	(4) −53		
			(5) −70			
$C_{10}F_{14}H_4SO_3$	$(CF_3)_2CF{\cdot}S{\cdot}CH(CO_2CH_3){\cdot}CO{\cdot}CF(CF_3)_2$		(1) −75.3, −75.6, −76.0, 77.3			326
			(2) −162.0, −163.5			
			(3) −177.0, −184.4			
			(ratio 12:1:1)			
$C_{10}F_{14}H_5NO$			(1) −65	(2) −79		311
			(3) −117	(4) −53		
			(5) −70			
$C_{10}F_{14}H_6O_2$			(1) −63	(2) −53	(1-2) 17	311
			(3) −64	(4) −118		
			(5) −80			
$C_{10}F_{14}H_9O_2P$	$(CF_3)_2\overline{C{\cdot}C(CF_3)_2{\cdot}O{\cdot}PF_2(Bu^t){\cdot}O}$		−69.4			325
$C_{10}F_{14}FeO_4$	$(CF_3^{(1)}{\cdot}CF_2^{(2)}{\cdot}CF_2^{(3)})_2Fe(CO)_4$	*cis*	(1) −79.3	(2) −116.0	(1-3) 11.9	273
			(3) −68.1			
		trans	(1) −79.2	(2) −116.0	(1-3) 11.5	
			(3) −65.0			

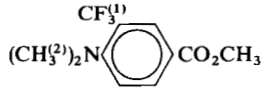
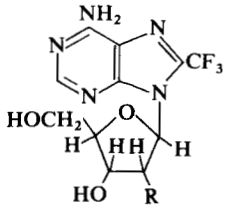
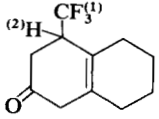
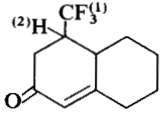
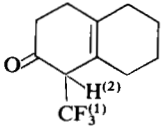
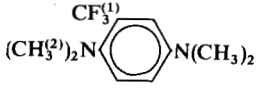
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{10}F_{14}S$		(1) −55.94 (2) −57.77 (3) −71.22	(1-2) 11.3 (1-3) 12.7	338
$C_{10}F_{15}H$		−60.23, −63.14, −67.78, −68.08 (ratio 2:1:1:1)		338
$C_{10}F_{15}H$		(1) −57.05 (2) −60.75 (3) −59.94		307
$C_{10}F_{15}HN_2$		(1) −62.48 (2) −62.93 (3) −63.65 (4) −67.02 (5) −72.38	(1-2) ~6 (1-5) ~3.2 (2-3) ~6 (2-4) ~4 to 5 (3-4) ~7 (4-5) ~10.8	307
$C_{10}F_{15}HN_2$		(1) −72.9 (2) −72.23 (3) −70.97 (4) −52.57 (ratio 1:1:1:2)	(2-) 6.3 (3-) 6.3 (4-) 6.3	339(c)
$C_{10}F_{15}HN_2S$		(1) −56.92 (2) −60.08 (3) −60.16 (4) −64.37 (5) −67.64	(1-2) ~3.0 (1-3) ~4.7 (2-4) ~16.4 (2-5) ~6.1 (3-5) ~2.7 (4-6) 7.0 (4-5) ~1.2 (1-6) 1	307

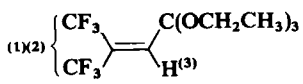
$C_{10}F_{15}HN_2S$		(1) −59.07 (3) −62.50 (5) −71.80	(2) −60.77 (4) −63.47	(1-4) ~5.5 (2-3) ~8 (3-4) ~3	(1-5) ~2.8 (2-4) ~6 (3-5) ~6.7	307
$C_{10}F_{15}HS$		(1) −54.22 (3) −60.23 (5) −70.15	(2) −55.68 (4) −63.45	(1-2) ~11.8 (2-3) ~14.6 (5-6) ~6.7	(1-4) 12.0 (3-5) ~4.4	338
$C_{10}F_{15}HS$		(1) −57.67 (3) −59.41 (5) −67.62	(2) −58.46 (4) −65.71	(1-2) ~12.0 (2-4) ~6.0 (3-6) ~8.0	(1-5) ~8.0 (2-5) ~5.2	338
$C_{10}F_{15}H_5O$		(1) −68 (3) −54 (5) −118	(2) −92 (4) −66 (6) −81	(1-2) 2	(1-3) 15	311
$C_{10}F_{15}H_5O$	$CF_3^{(1)}\cdot CF^{(2)}(OCH_2CH_3)\cdot C(CF_3^{(3)})=C(CF_3^{(4)}\cdot CF_2^{(5)}\cdot CF_3^{(6)}$	(1) −72 or −75 (3) −58 or −59 (5) −101	(2) −112 (4) −59 or −58 (6) −75 or −72			311
$C_{10}F_{15}H_6N$		(1) −68.8 (3) −53.7 (5) −117.6	(2) −96.4 (4) −63.8 (6) −80.3	(1-2) 2	(1-3) 15	304

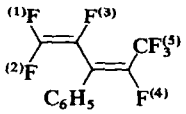
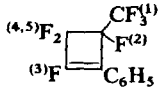
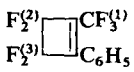
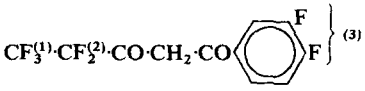
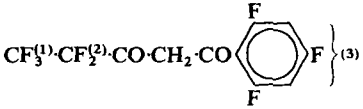
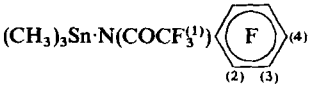
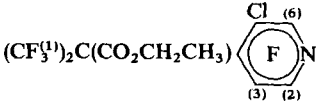
Molecular formula	Structure of compounds		Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{10}F_{15}H_{10}O_5P$	$(CF_3^{(1)}\cdot CH_2^{(2)}\cdot O)_5P$		−82.3	(1-2) 8.3	266
$C_{10}F_{15}ClN_2$			(1) −59.92 (2) −60.77 (3) −64.72 (4) −68.26 (5) −71.33	(1-2) ~5.4 (1-4) ~9.4 (1-5) 13.8 (2-3) ~5.1 (3-4) ~3.7 (4-5) 4.4	338
$C_{10}F_{15}ClN_2$			(1) −56.2 (2) −57.0 (3) −58.1 (4) −61.4		338
$C_{10}F_{17}H_3SO$		Isomer [a]	(1) −60.4 (2) −75.2 (3) −75.7 (4) −158.9 (5) −170.0 (ratio 3:6:6:1:1)	(1-) 13.8 (2-) 6.0 (3-) 8.0	326
		Isomer [b]	(1) −54.6 (2) −74.6 (3) −77.0 (4) −162.7 (5) −180.3 (ratio 3:6:6:1:1)	(1-5) 45.0 (3-) 10.0 (5-) 4.9	
$C_{10}F_{17}ClO_3$			(1) −81.6 (2) −126.6 (3) −122.7 (4) −122.0 (5) −117.6 (6) −114.9 (7A) −109.1 (7B) −122.5 (8A) −116.2 (8B) −112.6	(1-4) 2.5 (1-3) 10.1 (7A-7B) 240 (8A-8B) 230 (7A-8B) 14.1	275

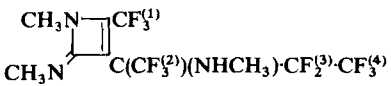
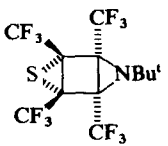
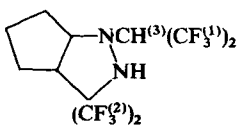
$C_{10}F_{17}ClO_3$	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot CF_2^{(3)}\cdot CF_2^{(4)}\cdot CF_2^{(5)}\cdot CCl_2\cdot CF_2^{(6)}\cdot CF_2^{(7)}\cdot CF_2^{(8)}\cdot CO\cdot Cl$	(1) −80.9 (2) −125.9 (3) −121.8 (4) −121.0 (5) −116.9 (6) −116.9 (7) −114.5 (8) −107.5	(1-3) 9.9	(1-4) 2.6	275
$C_{10}F_{18}$	$CF_3^{(1)}\cdot(CF_2^{(4)})_2\cdot C(CF_3^{(2)})_2$ 	(1) −83.0 (2) −64.8 (3) −95.7 (4)–(6) 109.2, −115.3, −123.9, −125.4 (ratio 1:1:1:1)			292
$C_{10}F_{18}$	$(CF_3^{(1)})_2CF^{(2)}\cdot C(CF_3^{(3)})_2$ 	(1) −72.0 (2) −171.2 (3) −63.4 (4) −95.5 (5)(6) −115.1, −124.5			292
$C_{10}F_{18}O$		(1) 717 (2) −69 (3) −57 (4) −66 (5) −77 (6) −103 (7) −79	(2-3) 9	(1-5) 36	311
$C_{10}F_{20}$		(1) −67.4 (2) −75.9 (3) −51.9 (4) −56.9 (5) −105.8 (6) −79.2	(1-2) 1.5	(1-3) 15.7	311
$C_{10}F_{20}O$		(1) −81.5 (2) −126.2 (3) −122.6 (4) −120.8 (10A) −92.1 (10B) −78.4	(1-3) 10.4 (7A-7B) 278 (10A-10B) 160	(1-4) 2.5 (8A-8B) 286	275
$C_{10}F_{20}O_3S$	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot CF_2^{(3)}\cdot CF_2^{(4)}\cdot SO_3\cdot CF_2^{(5)}\cdot CF_2^{(6)}\cdot CF_2^{(7)}\cdot CF_2^{(8)}\cdot CF_2^{(9)}\cdot CF_3^{(10)}$	(1) −81.4 (2) −126.3 (3) −120.5 (4) −108.1 (5) −78.4 (6) −124.7 (7) −122.2 (8) −122.8 (9) −126.5 (10) −81.5	(4-5) 8.5		249

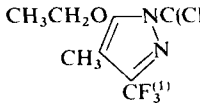
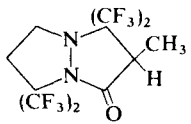
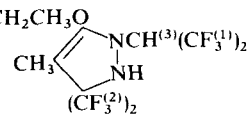
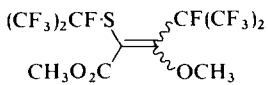
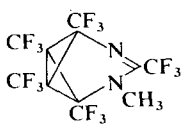
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{10}F_{22}O$	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot CF_2^{(3)}\cdot CF_2^{(4)}\cdot O\cdot CF_2^{(5)}\cdot CF_2^{(6)}\cdot CF_2^{(7)}\cdot CF_2^{(8)}\cdot CF_2^{(9)}\cdot CF_3^{(10)}$	(1) −82.0 (2) −126.0 (3) −123.1 (4) −83.3 (5) −83.3 (6) −123.1 (7) −123.1 (8) −126.7 (9) −127.2 (10) −82.3	(1-3) 10.3 (1-4) 2.9 (8-10) 9.4	275
$C_{10}F_{24}N_2O_2$	$(CF_3^{(2)})_2N\cdot O\cdot C(CF_3^{(1)})_2\cdot N{=}N\cdot C(CF_3)_2\cdot O\cdot N(CF_3)_2$	(1) −73.43 (2) −68.92		265(a)
$C_{10}F_{24}N_4O_3$	$(CF_3^{(1)})_2N\cdot O\cdot C(CF_3^{(2)})_2\cdot N^+(O^-){=}N\cdot C(CF_3^{(3)})_2\cdot O\cdot N(CF_3^{(4)})_2$	(1) −68.3 (2) −70.5 (3) −71.7 (4) −68.6		265(a)
$C_{10}F_{24}O_2S_2$	$[(CF_3^{(1)})_3C\cdot O]_2S(CF_3^{(2)})\cdot SCF_3^{(3)}$	(1) −71.4 (2) −59.2 (3) −74.9		340
$C_{11}F_3H_7O_2$	$CF_3\cdot C{\equiv}C\cdot CO_2\cdot CH_2\cdot C_6H_5$	−52.8		227
$C_{11}F_3H_8N$		−63.0	(1-4) 0.82 (1-8) 1.86	327
$C_{11}F_3H_{10}N$		−68.2	(1-3) 1.80 (1-8) ~1.8	327
$C_{11}F_3H_{11}N_4O_4$		−64.8		284(c)

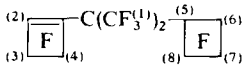
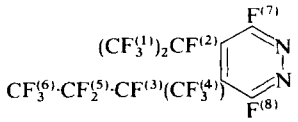
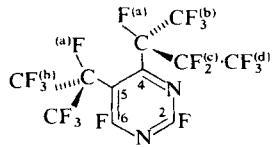
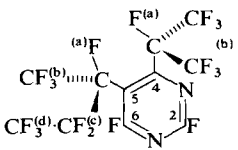
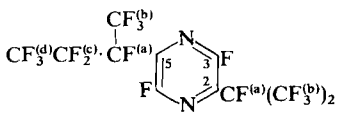
$C_{11}F_3H_{12}NO_2$				(1-2) 0.60	316
$C_{11}F_3H_{12}N_5O_3$		R = H	−67.1		284(c)
$C_{11}F_3H_{12}N_5O_4$	As above with R = OH		−68.3		284(c)
$C_{11}F_3H_{13}O$			−68.0	(1-2) 8.5	251
$C_{11}F_3H_{13}O$			−69.0	(1-2) 7	251
$C_{11}F_3H_{13}O$			−68	(1-2) 9	252
$C_{11}F_3H_{15}N_2$				(1-2) 0.25	316

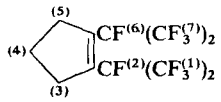
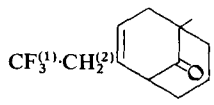
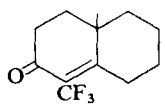
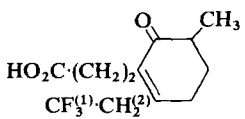
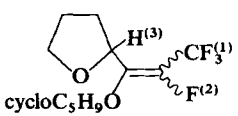
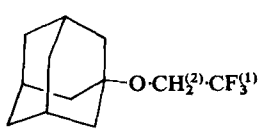
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{11}F_3H_{15}O_2$	$CF_3^{(1)}\cdot CH_2^{(2)}\cdot CO\cdot(CH_2)_2\cdot\overline{CH\cdot(CH_2)_4\cdot CO}$	−63	(1-2) 10	252
$C_{11}F_3H_{23}O_4Ti$	$CF_3^{(1)}\cdot CH_2^{(2)}\cdot OTi(OPr^i)_3$	−75.1	(1-2) 8.4	241(a)
$C_{11}F_4H_{18}O_2$	$CF_3^{(1)}\cdot CF^{(2)}H^{(3)}\cdot C(OCH_2CH_3)$– 			
	Diastereoisomer [a]	(1) −72.1 (2) −204.8	(1-2) 10.2 (1-3) 7.4 (2-3) 48.5	288
	Diastereoisomer [b]	(1) −72.4 (2) −206.2	(1-2) 9.4 (1-3) 7.4 (2-3) 48.5	
$C_{11}F_5H_9O_2$	$pCF_3^{(1)}\cdot C_6H_4\cdot CF_2^{(2)}\cdot CO_2CH_2CH_3$	(1) −63.9 (2) −105.0		321
$C_{11}F_5H_{10}BrO$	$CF_3^{(1)}\cdot CF^{(2)}Br\cdot CF^{(3)}(OCH_3)\cdot C_6H_4\cdot CH_3p$	(1) −72.7 (2) −119.7 (3) −134.3	(1-2) 9.6 (1-3) 8.1 (2-3) 9.3	319
$C_{11}F_6H_8N_2$		−75.0		344(a)
$C_{11}F_6H_8O$	$CF_3\cdot CH(C_6H_5)\cdot\overline{CH\cdot CH(CF_3)\cdot O}$	(1) −65 (2) −71		285
$C_{11}F_6H_8O_2$	$CF_3^{(1)}\cdot CH_2\cdot CH^{(3)}(OCOCF_3^{(2)})\cdot C_6H_5$	(1) −77.6 (2) −66.75	(1-3) 9	318
$C_{11}F_6H_{16}O_3$		(1) −64.18 (2) −57.93	(1-2) 8.2 (1-3) 1.5 ^1J(1-C) 276.1	290(a)
$C_{11}F_6H_{18}N_4O_3S_2$	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot N{=}\overline{S\cdot NBu^t\cdot CO\cdot NBu^t}$ $F^{(3)}\cdot SO_2$	(1) −87.3 (2) −87.6 (3) +58.6		345

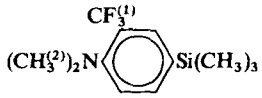
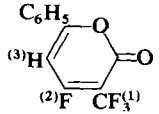
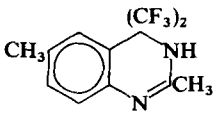
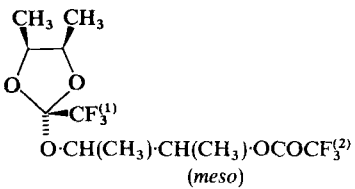
$C_{11}F_7H_5$		(1) −98.4 (3) −167.5 (5) −69.4	(2) −114.2 (4) −120.2	(1-2) 65.2 (2-3) 118.7	(1-3) 32.3	332
$C_{11}F_7H_5$		(1) −74.7 (3) −107.2 (5) −114.8	(2) −177.0 (4) −114.4	(4-5) 212		332
$C_{11}F_7H_5$		(1) −61.8	(2)(3) −113.3; −115.1			332
$C_{11}F_7H_5O_2$		(1) −85.9 (3) −105.7	(2) −127.2			329
$C_{11}F_8H_4O_2$		(1) −79.6 (3) −106.4	(2) −124.8			346
$C_{11}F_8H_9NOSn$		(1) −69 (3) −162	(2) −147 (4) −155			597
$C_{11}F_9H_5ClNO_2$		(1) −66.9 (6) −69.9	(2) −86.5 (3) −133.1	(1-3) 33.0 (3-6) 26.5 (1-1′) 10.0	(2-3) 22.0 (2-6) 13.5	302(b)
$C_{11}F_9H_5O_2$	$p(CF_3^{(1)})_2CF^{(2)}\cdot C_6H_4\cdot CF_2^{(3)}\cdot CO_2H$	(1) −76.1 (3) −106.3	(2) −182.9			321

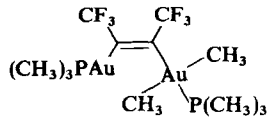
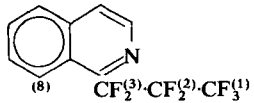
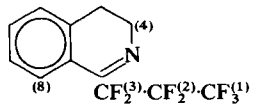
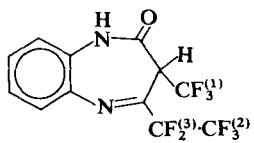
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{11}F_9H_7S$	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot CF_2^{(3)}\cdot CF_2^{(4)}\cdot S\cdot CH_2\cdot C_6H_5$	(1) −78.4 (2)(3) −122.6 (4) −84.6		195
$C_{11}F_{10}H_5NO_2$	$(CF_3^{(1)})_2C(CO_2CH_2CH_3)$ 	(1) −65.8 (2) −135.2 (3) −88.4	(1-2) 13.1	302(b)
$C_{11}F_{10}H_{11}NO$	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot CF_2^{(3)}\cdot CH(CF_3^{(4)})\cdot CO\cdot NC_5H_{10}$	(1)(4) −62.03, −80.98 (2) −125.57 (3) −109.9, −115.1		268
$C_{11}F_{11}H_{10}N$	$CF_3^{(2)}\cdot CF_2^{(3)}\cdot CF_2^{(4)}\cdot C(CF_3^{(1)})=CF^{(5)}\cdot NC_5H_{10}$	(1)(2) −53.10, −81.31 (3)(4) −103.04, −124.97 (5) −56.87		268
$C_{11}F_{11}H_{10}N_3$		(1) −67.0 (2) −70.4 (3) −118.3 (4) −82.3	(1-2) 10	304
$C_{11}F_{12}H_6NS$		−57.78, −65.58		305(c)
$C_{11}F_{12}H_8N_2$		(1) −67.0 (2) −74.3	(1-3) 7.0 (1-2) 1.30 to 1.85	335

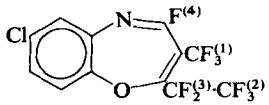
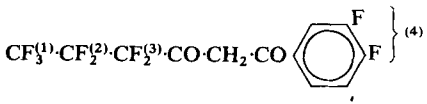
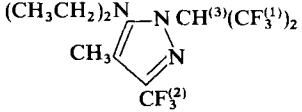
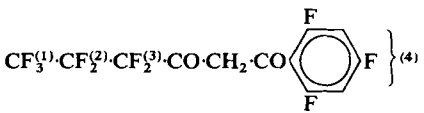
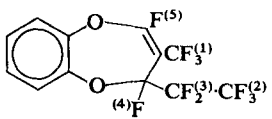
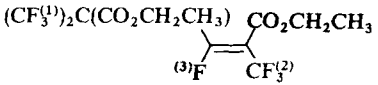
$C_{11}F_{12}H_8N_2O$			(1) −64.3 (2) −64.2	^1J(1-C) 270 ^2J(1-C) 37 ^1J(2-C) 284 ^2J(2-C) 34		336(a)
$C_{11}F_{12}H_8N_2O$			−72.5 to −71.7, −71.4, −64.0 (ratio 2:1:1)			347(a)
$C_{11}F_{12}H_{10}N_2O$			(1) −67.3 (2) −74.5	(1-3) 7.5	(1-2) 1.30 to 1.85	335
$C_{11}F_{12}H_{12}ClO_2P$	$(CF_3)_2C{\cdot}C(CF_3)_2OPCl(CH_3)(Bu^t){\cdot}O$		−66.4, −66.1			325
$C_{11}F_{12}H_{12}ClO_2P$	$(CF_3^{(1)})_2CH{\cdot}O{\cdot}PCl(Bu^t)OC(CF_3^{(2)})_2{\cdot}CH_2$		(1) −73.0 (2) −75.9			325
$C_{11}F_{12}H_{15}O_3PSi$	$(CF_3)_2C{\cdot}C(CF_3)_2OP(CH_3)_2[OSi(CH_3)_3]{\cdot}O$		−68.7			308
$C_{11}F_{13}H_5O_2$	$CF_3^{(1)}{\cdot}CF_2^{(2)}{\cdot}CF_2^{(3)}{\cdot}CF_2^{(4)}{\cdot}CF_2^{(5)}{\cdot}CF_2^{(6)}{\cdot}C{\equiv}C{\cdot}CO_2CH_2CH_3$		(1) −81.5 (2)(3) −123.2, −126.9 (4)(5) −121.8, −122.8 (6) −101.0			324
$C_{11}F_{14}H_6SO_3$		Isomer [a]	(1) −73.8 (2) −74.9 (3) −162.7 (4) −173.9 (ratio 6:6:1:1)	(1-4) 6.7 (2-4) 7.0	(2-3) 10.8	326
		Isomer [b]	(1) −74.0 (2) −74.8 (3) −177.0 (4) −173.3 (ratio 6:6:1:1)	(1-3) 6.0	(2-4) 10.5	
$C_{11}F_{15}H_3N_2$			−72.5, −67.2, −62.6, −52.4			339(c)

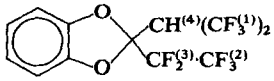
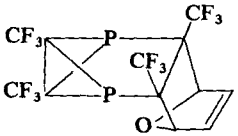
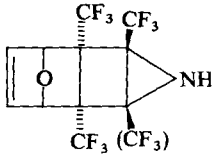
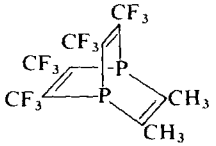
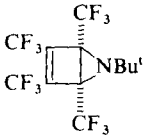
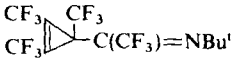
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{11}F_{18}$		(1) −65.4 (2) −91.2 (3)(4) −114.1, −124.0 (5) −179.9 (6)(7)(8) −130.3 and −134.2, −130.5	^2J(F-F) for (6), (7), or (8) 223	292
$C_{11}F_{18}N_2$		(1)(4) −73.1, −73.8 (2)(3) −167.9, −172.5 (5) −115.2 (6) −82.0 (7)(8) −69.9	(2-3) 225	310
$C_{11}F_{18}N_2$		(2) −37.3 (6) −35.8 (4a)(5a) −168.6, −174.3 (4b) −69.0 (4c) −112.2, −116.5 (5b′) −72.3 (5b″) −73.7	(4cA-4cB) 295 (4a-5a) 202 (6-5b) 30	310
$C_{11}F_{18}N_2$		(2) −37.0 (6) −34.3 (4a)(5a) −172.7 (4b) −71.1 (5b) −72.1 (5c) −113.2, (5d) −79.4 −116.3	(5cA-5cB) 300 (6-5b) 34 (5b-) 30 (5cA-) 38 (5cB-) 42, 14 (6-5c) 34	310
$C_{11}F_{18}N_2$		(2a)(5a) −187.0 (2b) −76.4 (3)(6) −76.0, −76.8 (5b) −74.2 (5c) −121.4 (5d) −82.3		310
$C_{11}F_{18}N_2$	As above with F(6) and R(5) group interchanged	(2a)(6a) −186.3, −187.3 (2b) −76.1 (3)(5) −65.1, −65.9 (6b) −73.9 (6c) −120.1, −122.3 (6d) −81.6	(2a-3) 60 (6cA-6cB) 296 (6a-5) 60	310

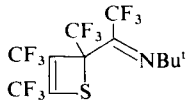
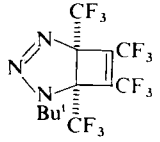
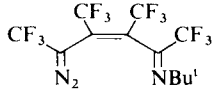
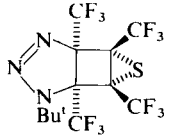
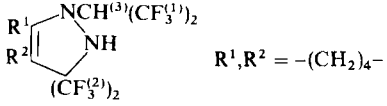
$C_{11}F_{20}$	 (mixture of rotamers)	Isomer [a]	(1)(7) −73.7 (2)(6) −169.0 (3)(5) −110.6 (4) −137.2			292
		Isomer [b]	(1) −72.7 (2)(6) −175.8, −170.5 (3) −109.6 (4) −136.7 (5) −111.4 (7) −73.7	(1-2) 47	(6-7) 47	
$C_{12}F_3H_{14}OP$	$CF_3CO{\cdot}P(C_6H_5)Bu^t$		−73.5	(P-F) 15		348
$C_{12}F_3H_{14}O_2P$	$CF_3CO{\cdot}P(O)(C_6H_5)Bu^t$		−71.8			348
$C_{12}F_3H_{15}O$			−68	(1-2) 10		252
$C_{12}F_3H_{15}O$			−55			252
$C_{12}F_3H_{15}O_3$	$CF_3^{(1)}{\cdot}CH_2^{(2)}{\cdot}CO{\cdot}(CH_2)_2{\cdot}\overline{C(CH_3){\cdot}CO{\cdot}(CH_2)_3{\cdot}CO}$		−64	(1-2) 11		252
$C_{12}F_3H_{15}O_3$			−62	(1-2) 10		252
$C_{12}F_3H_{16}O_2$		*Z*-isomer	(1) −62.8 (2) −154.8	(1-2) 9.5		288
		E-isomer	(1) −66.5 (2) −160.1	(1-2) 9.5	(2-3) 4.0	
$C_{12}F_3H_{17}O$			−83.6	(1-2) 8		349

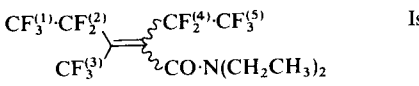
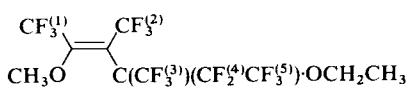
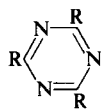
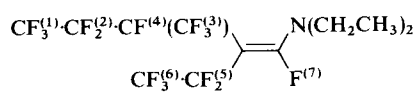
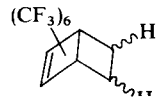
Molecular formula	Structure of compounds		Chemical shifts (ppm)		Coupling constants (Hz)		Ref.
$C_{12}F_3H_{17}O_2$	$CF_3^{(1)}\cdot CH_2^{(2)}\cdot CO\cdot(CH_2)_2\cdot\overbrace{C(CH_3)\cdot(CH_2)_4\cdot CO}$		−63		(1-2) 10		252
$C_{12}F_3H_{18}NSi$					(1-2) 0.48		316
$C_{12}F_4H_6O_2$			(1) −60.3	(2) −85.7	(1-2) 25.0	(2-3) 10.4	287
$C_{12}F_5H_{10}BrO_2$	$pCH_3\cdot C_6H_4\cdot CF^{(3)}(O_2CCH_3)\cdot CF^{(2)}Br\cdot CF_3$	(*R*, *S*)	(1) −72.9 (3) −136.7	(2) −117.8	(1-2) 12.5 (2-3) 12.7	(1-3) 8.1	319
		(*R*, *R*)	(1) −72.7 (3) −135.8	(2) −118.3	(1-2) 9.8 (2-3) 9.9	(1-3) 8.1	
$C_{12}F_6H_6O$			(1) −58.0 (3) −102	(2) −38.9	(1-2) 16.0 (2-3) 26.0	(1-3) 37.0	287
$C_{12}F_6H_{10}N_2$			−74.9				344(a)
$C_{12}F_6H_{16}O_5$			(1) −84.0	(2) −75.6			286
$C_{12}F_6H_{16}O_5$	As above with $CF_3^{(1)}$ and OR group interchanged		(1) −84.7	(2) −75.6			286

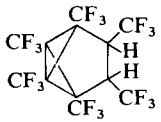
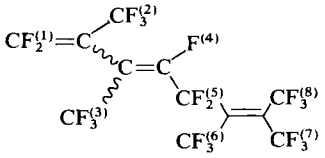
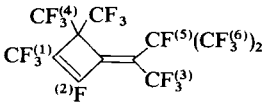
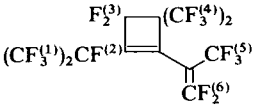
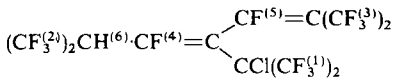
$C_{12}F_6H_{24}Au_2P_2$		−51.7				323
$C_{12}F_6H_{24}Au_2P_2$	As above with lower CH_3 and $P(CH_3)_3$ interchanged	−52.4				323
$C_{12}F_7H_6N$		(1) −80.50 (3) −106.80	(2) −125.40	(1-3) 10	(3-8) 2.0	327
$C_{12}F_7H_8N$		(1) −80.0 (3) −110.5	(2) −124.9	(1-3) 9.75 (3-4) 2.60	(2-8) ~2.2	327
$C_{12}F_7H_{21}IOP$	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot CF_2^{(3)}I\cdot Pr^n{}_3PO$	(1) −81.62 (3) −66.24	(2) −120.85			219(a)
$C_{12}F_7H_{21}IOP$	$CF_3\cdot CF_2\cdot CF_2I\cdot Pr^i{}_3PO$	(1) −81.55 (3) −67.00	(2) −120.99			219(a)
$C_{12}F_7H_{21}IOP$	$(CF_3^{(1)})_2CF^{(2)}I\cdot Pr^n{}_3PO$	(1) −75.82	(2) −152.74			219(a)
$C_{12}F_7H_{21}IOP$	$(CF_3^{(1)})_2CF^{(2)}I\cdot Pr^i{}_3PO$	(1) −75.80	(2) −153.7			219(a)
$C_{12}F_8H_6N_2O$		(1) −63.0 (3) −116.1	(2) −82.8			350(a)
$C_{12}F_8H_6O_2$	$pF^{(4)}\cdot C_6H_4\cdot CO\cdot CH_2\cdot CO\cdot CF_2^{(3)}\cdot CF_2^{(2)}\cdot CF_3^{(1)}$	(1) −84.2 (3) −130.3	(2) −125.2 (4) −105.8			329

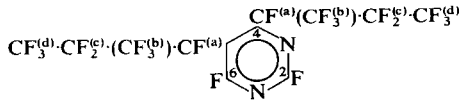
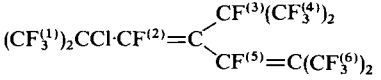
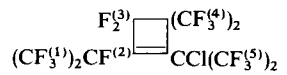
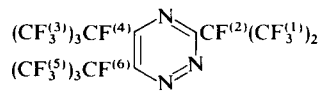
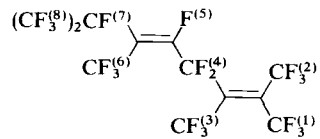
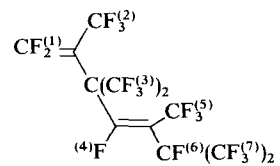
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{12}F_9H_3ClNO$		(1) −57.9 (2) −82.2 (3) −115.9 (4) −26.5		350(a)
$C_{12}F_9H_4NO$	As above with Cl replaced by H	(1) −58.1 (2) −82.2 (3) −115.8 (4) −27.8	(1-2) 3 (1-3) 17 (1-4) 15	350(a)
$C_{12}F_9H_5O_2$		(1) −84.9 (2) −124.3 (3) −129.3 (4) −105.7		329
$C_{12}F_9H_{14}N_3$		(1) −68.5 (2) −63.2	(1-3) 6.75	335
$C_{12}F_{10}H_4O_2$		(1) −80.0 (2) −124.3 (3) −128.4 (4) −106.5		346
$C_{12}F_{10}H_4O_2$		(1) −56.9 (2) −80.6 (3) −122.8, (4) −108.8 −126.0 (5) −48.8	(1-4) 16.8 (1-3A) 10.1 (1-3B) 17.9 (4-5) 19.1 (2-4) 8.0 (3-4) 10.4 (3A-3B) 286 (4-5) 10.7	350(a)
$C_{12}F_{10}H_{10}O_4$		(1) −64.9 (2) −59.9 (3) −90.2	(1-3) 12.5 (2-3) 24.5	302(b)

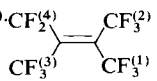
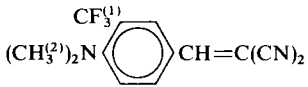
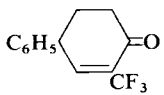
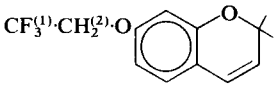
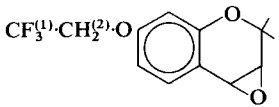
$C_{12}F_{11}H_5O_2$		(1) −63.0 (2) −81.1 (3) −125.8	(1-3) 6.5	(1-4) 7.7	350(a)
$C_{12}F_{12}H_4OP_2$		(1) −53.1 (2) −55.1	(P-1) 31.6		312(c)
$C_{12}F_{12}H_5NO$		−63.1, −66.7			305(c)
$C_{12}F_{12}H_6O_2$	$[(CF_3)_2C(OH)\cdot C{\equiv}C\cdot CH_2]_2$	−78.10			237
$C_{12}F_{12}H_6P_2$		−57.60	$\frac{1}{2}[J(P\text{-}F) + J(P\text{-}F')]$ 37		313(c)
$C_{12}F_{12}H_9N$		−64.1, −66.3			305(c)
$C_{12}F_{12}H_9N$		−60.3, −60.02, −67.9 (ratio 2:1:1)			306(c)

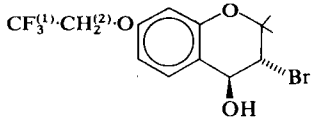
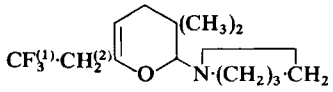
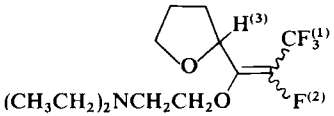
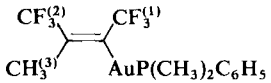
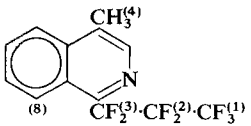
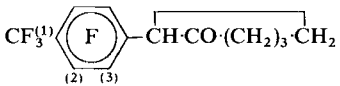
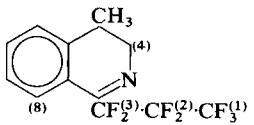
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{12}F_{12}H_9NS$		−59.3, −59.5, −66.3, −67.3		306(c)
$C_{12}F_{12}H_9N_3$		−61.5, −62.9, −65.7, −70.3		306(c)
$C_{12}F_{12}H_9N_2$		−56.1, −61.3, −68.9 (ratio 2:1:1)		306(c)
$C_{12}F_{12}H_9N_3S$		−58.3, −60.02, −61.78, −70.98		306(c)
$C_{12}F_{12}H_{10}N_2$	 $R^1,R^2 = -(CH_2)_4-$	(1) −67.2 (2) −74.0	(1-3) 7.0 (1-2) 1.30 to 1.85	335
$C_{12}F_{12}H_{12}N_2$	As above with $R^1 = C(CH_3)_3$, $R^2 = H$	(1) −67.0 (2) −76.5	(1-3) 6.9 (1-2) 1.30 to 1.85	335
$C_{12}F_{12}H_{12}N_2$	As above with $R^1 = (CH_3)_2CHCH_2$, $R^2 = H$	(1) −67.4 (2) −76.5	(1-3) 7.0 (1-2) 1.30 to 1.85	335

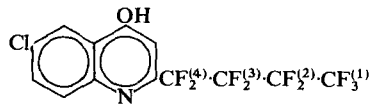
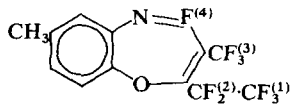
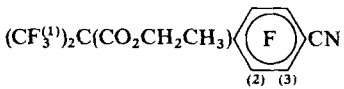
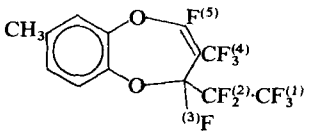
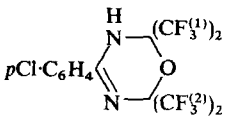
$C_{12}F_{12}H_{13}O_3P$	$CF_3^{(1)}\cdot\overline{C{=}C(CF_3^{(1)})OP(Bu^t)(CH_3)[OCH(CF_3^{(2)})_2]}\cdot O$		(1) −66.0, −63.3 (2) −74.0, −72.8	(1-1′) 9.8 (at −50°C)	325
$C_{12}F_{12}H_{14}O_2$	$[(CF_3)_2C(OH)CH_2CH_2CH_2]_2$		−76.89		237
$C_{12}F_{13}H_{10}NO$		Isomer [a]	(1)(5) −81.1, −82.2 (2)(4) −106.3, −110.5 (3) −58.0		304
		Isomer [b]	(1)(5) −81.1, −82.2 (2)(4) −106.3, −110.5 (3) −60.2		
$C_{12}F_{14}H_{10}O_2$			(1) −62 (2) −53 (3) −63 (4) −117 (5) −80	(1-2) 17	311
$C_{12}F_{14}H_{20}SO_4$	$(CF_3)_2CF\cdot S\cdot CH(CO_2CH_3)\cdot C(OCH_3)_2\cdot CF(CF_3)_2$		(1) −71.46 (2) −74.85 (3) −75.42 (4) −180.9 (5) −164.3 (ratio 6:3:3:1:1)		326
$C_{12}F_{14}FeO_6$	*cis*-$(CF_3^{(1)}\cdot CF_2^{(2)}\cdot CF_2^{(3)}\cdot CO)_2Fe(CO)_4$		(1) −81.5 (2) −126.8 (3) −111.3	(1-3) 9.5	273
$C_{12}F_{15}H_6N_3O_3$	 R = $CF_3^{(1)}\cdot CF_2^{(2)}\cdot CH_2^{(3)}\cdot O$		(1) −83.45 (2) −123.02	(2-3) 13.2	237
$C_{12}F_{15}H_{10}N$			(1)(6) −82.5, −84.1 (2) −117.0, −122.4 (3) −77.5 (4) −181.5 (5) −103.5 (7) −42.0		304
$C_{12}F_{18}H_2$			−64.3, −65.5, −71.1 (ratio 1:1:1)		351(c)

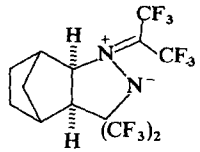
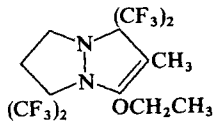
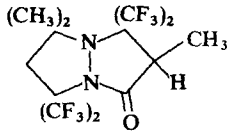
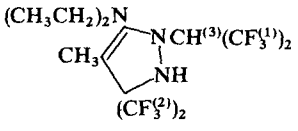
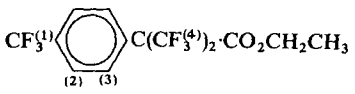
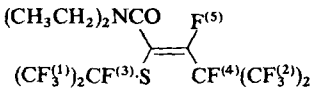
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{12}F_{18}H_2$		−52.3, −55.9, −63.9 (ratio 1:1:4)		352(c)
$C_{12}F_{18}H_{12}N_3O_6P_3$	$(CF_3^{(1)}\cdot CH_2^{(2)}\cdot O)_6P_3N_3$	−75.1	(1-2) 7.5	353
$C_{12}F_{20}$		(*cis* and *trans* isomers) (6)(7) or (7)(8) −58.2, −60.5 (3) −62.0, −62.8 (1)(2) −64.9 (6) or (8) −67.8 (4) −88.2, −90.0 (5) −103.1		355
$C_{12}F_{20}$		(1) −62.7 (2) −77.1 (3) −56.8 (4) −68.1 (5) −174.5 (6) −74.6	(5-6) 8 (4-5) 38	355
$C_{12}F_{20}$	As above with $CF_3^{(3)}$ and $CF(CF_3)_2$ interchanged	(1) −62.7 (2)(3) −56.8, −58.6 (4) −68.1 (5) −167.7 (6) −75.4	(2-5) 136	355
$C_{12}F_{20}$		(1) −77.8 (2) −188.5 (3) −108.5 (4) −68.0 (5) −59.8 (6) −67.4		354(a)
$C_{12}F_{20}HCl$		(1A) −72.6 (1B) −70.2 (2A) −66.7 (2B) −65.0 (3) −61.8 (4) −78.9 (5) −63.2	(1A-1B) 11.3 (1B-4) 11.3 (1A-4) 29.0 (4-6) 26.4 (2-6) 6.7	354(a)

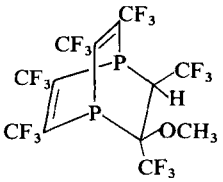
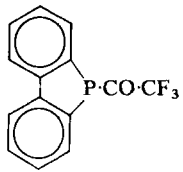
$C_{12}F_{20}N_2$	 (diestereoisomeric mixture)	(2) −40.1 (6) −36.8 (4b) −71.6 (5b) −73.9, −75.3 (4d)(5d) −81.8 (5c)(4c) −116.9 (4a)(5a) −175.4			310
$C_{12}F_{21}Cl$		(1) −71.1, −71.6 (2) −76.7 (3) −171.5 (4) −73.6, −78.0 (5) −63.5 (6) −62.1	(4A-4B) 8.4	(4A-2) 32.6	354(a)
$C_{12}F_{21}Cl$		(1) −75.9 (2) −179.0 (3) −107.2 (4) −65.0 (5) −70.9	(2-5) 43.3		354(a)
$C_{12}F_{21}N_3$		(1) −76.4 (2) −189.8 (3) −74.8 (4) −185.4 (5) −75.0 (6) −185.4	(4-6) 156		260(a)
$C_{12}F_{21}N_3$	Same as above	(1) 77.3 (2) −185.9 (3)(5) −75.3, −76.1 (4)(6) −181.2	(1-2) 7		245
$C_{12}F_{22}$		(1)(2) −60.7 (3)(6) −64.7 (4) −93.0 (5) −87.4 (7) −171.4 (8) −72.1			355
$C_{12}F_{22}$		(1)(2)(3)(5) −60 to −66 (4)(6)(7) −76.0 (6) −180.0			355

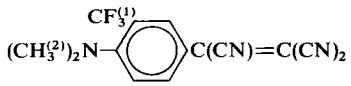
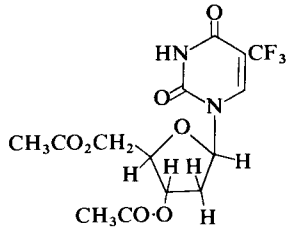
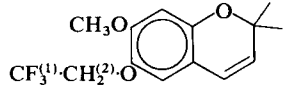
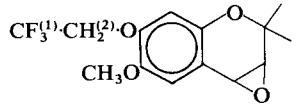
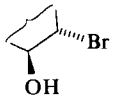
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{12}F_{24}$	$(CF_3^{(8)})_2CF^{(7)}\cdot CF^{(9)}(CF_3^{(6)}\cdot CF_2^{(5)}\cdot CF_2^{(4)}$  $CF_3^{(2)}$ $CF_3^{(3)}$ $CF_3^{(1)}$	(1)(2) −59.7 (3) −58.2 (4) −89.0 (5) −106.8 (6) −68.8 (7)(9) −166.2 −174.1 (8) −71.5, −72.5	(6-8) 13.5 (6-9) or (6-7) 13.5	355
$C_{12}F_{25}H_2O_4P$	$[(CF_3^{(2)})_2CH\cdot O]_2\overline{P(F^{(3)})\cdot O\cdot C(CF_3^{(1)})_2\cdot C(CF_3)_2\cdot O}$	(1) −68.3 (2) −74.3 (3) −56.3	(P-3) 784	325
$C_{12}F_{26}O_6S_2$	$(CF_3^{(1)}\cdot CF_2^{(2)}\cdot CF_2^{(3)}\cdot CF_2^{(4)}\cdot SO_3\cdot CF_2^{(5)}\cdot CF_2^{(6)})_2$	(1) −81.0 (2) −125.9 (3) −120.4 (4) −107.5 (5) −78.5 (6) −124.5	(4-5) ~8	249
$C_{13}F_3H_{10}N_3$	 $CF_3^{(1)}$ $(CH_3^{(2)})_2N$ $CH{=}C(CN)_2$		(1-2) 0.95	316
$C_{13}F_3H_{11}O$	 C_6H_5 $=O$ CF_3	−66		252
$C_{13}F_3H_{13}O_2$	 $CF_3^{(1)}\cdot CH_2^{(2)}\cdot O$ O	−73.50	(1-2) 8	356(a)
$C_{13}F_3H_{13}O_2$	$CF_3^{(1)}\cdot CH_2^{(2)}\cdot CO\cdot(CH_2)_2\cdot CH(C_6H_5)\cdot CHO$	−63	(1-2) 10.5	252
$C_{13}F_3H_{13}O_3$	 $CF_3^{(1)}\cdot CH_2^{(2)}\cdot O$ O O	−73.50	(1-2) 8	356(a)

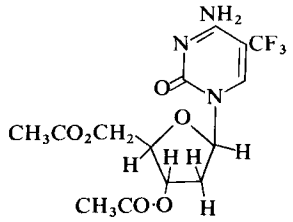
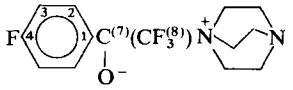
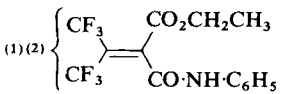
$C_{13}F_3H_{14}BrO_3$			−73.52		(1-2) 8		356(a)
$C_{13}F_3H_{20}NO$			−68		(1-2) 11		252
$C_{13}F_3H_{21}NO_2$		*Z*-isomer *E*-isomer	(1) −63.3 (1) −67.2	(2) −154.7 (2) −161.1	(1-2) 9.8 (1-2) 9.8	(2-3) 4.6	288
$C_{13}F_6H_{14}AuP$			(1) −50.4	(2) −60.8	(P-1) 6.2 (1-3) 2.4	(1-2) 14.6	323
$C_{13}F_6H_{18}N_4O_3S$			−77.2				345
$C_{13}F_7H_8N$			(1) −78.6 (3) −103.7	(2) −122.2	(3-4) 0.94 (1-8) 2.30	(1-3) 10	327
$C_{13}F_7H_9O$			(1) −55.0 (3) −137.0	(2) −135.6	(1-2) 15.8		357(b)
$C_{13}F_7H_{10}N$			(1) −79.8 (3) −109.3	(2) −123.5	(1-3) 9.75 (3-4) 2.64	(1-8) ~2.1 to 2.2	327

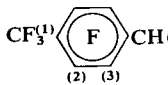
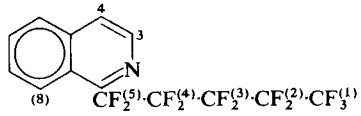
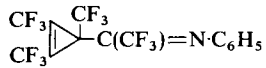
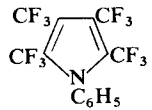
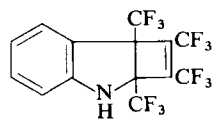
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{13}F_7H_{24}BFe_2O_3P_2S_2$	$[\mu(SCH_3)_2Fe_2(CO)_3(P(CH_3)_3)_2(CCF_3)][BF_4]$	−78.4		328
$C_{13}F_9H_5ClNO$		(1) −80.2 (2) −124.9 (3) −121.9 (4) −112.7		324
$C_{13}F_9H_6NO$	As above with Cl replaced by H	(1) −80.1 (2) −124.9 (3) −121.8 (4) −112.8		324
$C_{13}F_9H_6NO$		(1) −82.1 (2) −116.0 (3) −57.9 (4) −28.0		350(a)
$C_{13}F_9H_9O_2$	$p(CF_3^{(1)})_2CF^{(2)}\cdot C_6H_4\cdot CF_2^{(3)}\cdot CO_2CH_2CH_3$	(1) −76.1 (2) −182.9 (3) −104.8		321
$C_{13}F_{10}H_5NO_2$		(1) −65.7 (2) −131.5 (3) −131.5	(1-2) 12.7	302(b)
$C_{13}F_{10}H_6O_2$		(1) −80.6 (2) −122.75, −124.5 (3) −108.1 (4) −57.5 (5) −49.5		350(a)
$C_{13}F_{12}H_5ClN_2O$		−80.1, −81.0	(1-2) 3	344(a)
$C_{13}F_{12}H_6N_2O$	As above with Cl replaced by H	−80.1, −81.0		344(a)

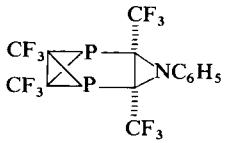
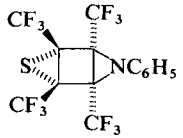
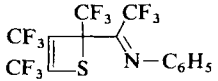
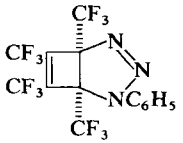
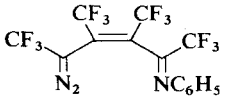
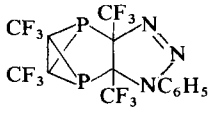
$C_{13}F_{12}H_{10}N_2$		−74.4, −66.85, −66.0, −53.3				335
$C_{13}F_{12}H_{10}N_2O$	$(CF_3^{(1,2)})_2C{=}C(CH_3^{(5)})\cdot C(OCH_2CH_3){=}N\cdot N{=}CH\cdot CH^{(6)}{=}C(CF_3^{(3,4)})_2$	(1) −62.0 (2) −58.3 (3) −64.9 (4) −57.9		(1-2) 8.5 (3-4) 7 (1-5) 2 (2-5) 2 (4-6) 1.5		347(a)
$C_{13}F_{12}H_{12}N_2O$		−72.1, −71.9				347(a)
$C_{13}F_{12}H_{12}N_2O$		(1) −70.8 (2) −69.6 (3) −69.3 (4) −65.9		(1-2) 9	(3-4) 10.5	347(a)
$C_{13}F_{12}H_{15}N_3$		(1) −67.2	(2) −74.3	(1-3) 7.8	(1-2) 1.30 to 1.85	335
$C_{13}F_{13}H_5O_2$		(1) −56.9 (2) −138.8 (3) −131.1 (4) −65.1		(1-2) 22.0	(4-3) 13.6	302(b)
$C_{13}F_{15}H_{10}NSO$		(1)(2) −74.67, −75.04 (3)(4) −157.90, −183.40 (5) −96.48				268

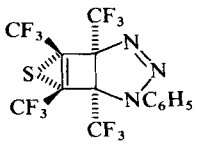
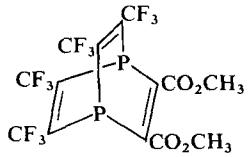
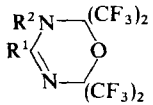
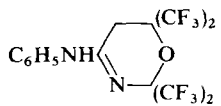
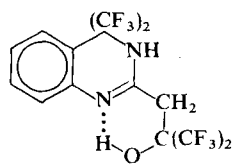
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{13}F_{16}H_9NS$	$(CH_3)_2C{\cdot}N{=}C{=}C[SCF^{(2)}(CF_3^{(1)})_2]{\cdot}CF_2^{(5)}{\cdot}CF^{(4)}(CF_3^{(3)})_2$	(1)(3) −72.94, −75.23 (2)(4) −163.25, −182.81 (5) −93.97		268
$C_{13}F_{17}H_5O_2$	$CF_3^{(1)}{\cdot}CF_2^{(2)}{\cdot}(CF_2^{(3)})_4{\cdot}CF_2^{(4)}{\cdot}CF_2^{(5)}{\cdot}C{\equiv}C{\cdot}CO_2CH_2CH_3$	(1) −82.0 (2) −126.9 (3) −122.6 (4) −121.5 (5) −101.1		324
$C_{13}F_{17}H_{10}NO$	$(CH_3CH_2)_2N{\cdot}CF^{(5)}{=}$ $C[SCF^{(3)}(CF_3^{(1)})_2]{\cdot}CF_2^{(6)}{\cdot}CF^{(4)}(CF_3^{(2)})_2$	(1)(2) −73.4, −74.6 (3)(4) −163.5, −181.8 (5) −47.4 (6) −85.0, −95.0		268
$C_{13}F_{18}H_4OP_2$		−67.26, −57.1 (ratio 1:6)	^3J(F-H) 9	313(c)
$C_{13}F_{19}H_{10}O_3P$	$(CF_3^{(2)})_2CH{\cdot}O{\cdot}\overline{PF^{(3)}(Bu^t){\cdot}O{\cdot}C(CF_3^{(1,1')})_2{\cdot}C(CF_3^{(1'')})_2}{\cdot}O$	(1) −68.2 (2) −73.2 (3) −49.5	(1-3) 12.2 (2-3) 12.2 (1-1′) 10.2 (1-1″) 10.2 (2-2′) 9.8 (2-4) 1.0	325
$C_{13}F_{21}H_5$	$CF_3^{(1)}{\cdot}CF_2^{(2)}{\cdot}(CF_2^{(3)})_7{\cdot}CF_2^{(4)}{\cdot}CH_2^{(5)}{\cdot}CH{=}CH_2$	(1) −81.52 (2) −126.47 (3) −121.52 to −124.26 (4) −113.79	(1-2) 10 (4-5) 18	358
$C_{14}F_3H_8OP$		−74.1	(P-F) 11	359
$C_{14}F_3H_8O_2P$	As above with $>P(O)COCF_3$	−72.5		359

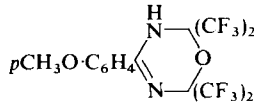
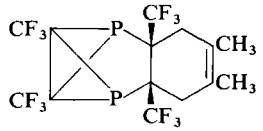
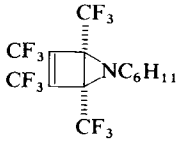
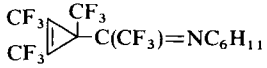
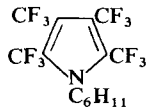
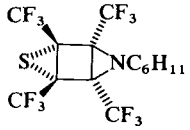
$C_{14}F_3H_9N_4$			(1-2) 1.10		316
$C_{14}F_3H_{12}OP$	$(C_6H_5)_2P(OCH_2^{(2)}CF_3^{(1)})$	−80.9	(1-2) 8.0	(P-1) 6.0	266
$C_{14}F_3H_{15}N_2O_7$		−64.7			284(c)
$C_{14}F_3H_{15}O_3$		−73.82	(1-2) 8		356(a)
$C_{14}F_3H_{15}O_3$	As above with OCH_3 and OCH_2CF_3 groups interchanged.	−73.97	(1-2) 8		356(a)
$C_{14}F_3H_{15}O_4$		−73.76	(1-2) 8		356(a)
$C_{14}F_3H_{16}BrO_4$	As above with 	−73.55	(1-2) 8		356(a)

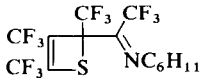
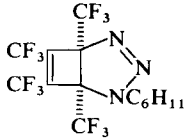
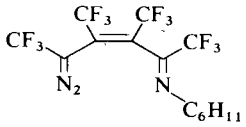
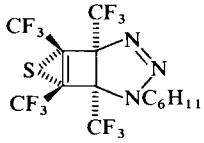
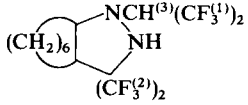
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{14}F_3H_{16}N_3O_6$		−63.22		284(c)
$C_{14}F_3H_{16}OP$	$CF_3{\cdot}CO{\cdot}P(C_6H_5){\cdot}cycloC_6H_{11}$	−72.6	(P-F) 15	348
$C_{14}F_3H_{16}O_2P$	$CF_3{\cdot}CO{\cdot}P(O)(C_6H_5){\cdot}cycloC_6H_{11}$	−71.7		348
$C_{14}F_3H_{17}$	$C_6H_5{\cdot}CH^{(2)}(CF_3^{(1)}){\cdot}cycloC_6H_{11}$	−64.0	(1-2) 8	317(a)
$C_{14}F_4H_{16}N_2O$		(8) −81.2	(8-C8) 285 (8-C7) 28 (4-C4) 246 (4-C3) 22 (4-C2) 9 (4-C1) 3	297(a)
$C_{14}F_4H_{24}Fe_2O_4P_2S_2$	$\mu(SCH_3)_2\mu(F^{(2)}CCF_3^{(1)})Fe(CO)_4[P(CH_3)_3]_2$	(1) −66.6 (2) −130		328
$C_{14}F_5H_{12}NO_4S$	$C_6H_5{\cdot}C(CF_3^{(1)})(OH){\cdot}CF_2^{(2)}{\cdot}SO_3^-\ C_5H_5\overset{+}{N}H$	(1) −72.1 (2A) −108.1 (2B) −108.40	(1-2A) 9.6 (1-2B) 12.1	211
$C_{14}F_6H_9O_2P$	$(m\text{-}CF_3{\cdot}C_6H_4)_2P(O)OH$	−84.6		348
$C_{14}F_6H_{11}NO_3$		(1) −60.62 (2) −59.75	(1-2) 7.7 (1-C1) 277.0	290(a)
$C_{14}F_6H_{16}MoN_2O_2S_2$	$[Mo(\eta^5\text{-}C_5H_5)\{\overline{CH{\cdot}CH_2{\cdot}C(CF_3)_2{\cdot}O{\cdot}CH_2}\}(NO)(S_2CN(CH_3)_2)]$	−75.30, −76.44	^4J(F-F) 9.0	361

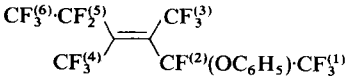
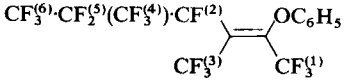
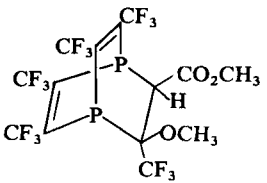
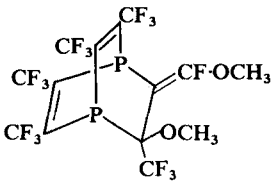
$C_{14}F_7H_{14}NO$	 $CH(CH_3)\cdot CO\cdot N(CH_2CH_3)_2$	(1) −58.7 (2) −142.2 (3) −140.2	(1-2) 21.1		357(b)
$C_{14}F_8H_{18}N_2$	$(CH_3)_3C\cdot N{=}C{=}C(CF_3^{(1)})\cdot C(CF_2^{(3)}CF_3^{(2)}){=}N\cdot C(CH_3)_3$	(1)(2) −80.88, −53.60 (3) −114.42			268
$C_{14}F_{11}H_6N$	 $CF_2^{(5)}\cdot CF_2^{(4)}\cdot CF_2^{(3)}\cdot CF_2^{(2)}\cdot CF_3^{(1)}$	(1) −81.4 (2) −126.4 (3) −121.8 (4) −120.2 (5) −105.6	(1-3) 10 (2-3) 3.4 (2-4) 15.3 (5-8) 2.60	(1-4) 2.5 (2-5) 3 (3-5) ~14.1	327
$C_{14}F_{11}H_8N$	As above with 3,4 double bond replaced by $CH_2\cdot CH_2^{(6)}$	(1) −81.8 (2) −127.1 (3) −121.8 (4) −120.6 (5) −109.8	(5-8) 2.6	(5-6) 2.58	327
$C_{14}F_{12}H_5N$	 $C(CF_3){=}N\cdot C_6H_5$	Isomer [a] −60.3, −67.5, −71.1 (ratio 2:1:1) Isomer [b] −60.5, −62.78, −67.5 (ratio 2:1:1)			362
$C_{14}F_{12}H_5N$		−54.30			362
$C_{14}F_{12}H_5N$	As above	−54.3			306(c)
		−63.1, −63.9, −69.1, −74.7			305(c)

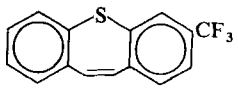
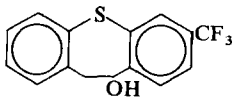
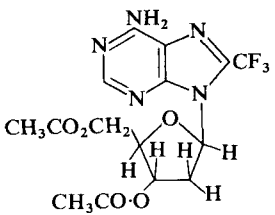
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{14}F_{12}H_5NP_2$		(1) −56.7 (2) −57.9 (3) −61.1 (ratio 1:1:2)	(P-3) 21.4	312(c)
$C_{14}F_{12}H_5NS$		−58.3, −66.7		305(c)
$C_{14}F_{12}H_5NS$		(1) −59.9 (2) −60.5 (3) −66.3 (4) −67.5	(1-4) 7.2 (2-3) 4.5 (2-4) 4.5	306(c)
$C_{14}F_{12}H_5N_3$		−62.7, −63.22, −67.9, −70.5		306(c)
$C_{14}F_{12}H_5N_3$		−57.7, −58.3, −61.7, −68.18		306(c)
$C_{14}F_{12}H_5N_3P_2$		−53.1, −53.9, −58.7 to −61.1 (ratio 1:1:2)		312(c)

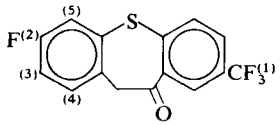
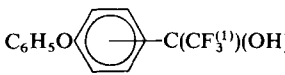
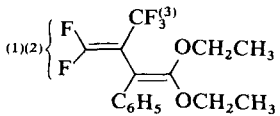
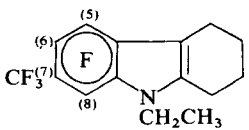
$C_{14}F_{12}H_5N_3S$		−60.3, −61.3, −61.9, −71.3		306(c)
$C_{14}F_{12}H_6O_4P_2$		−57.30	$\frac{1}{2}[J(P\text{-}F) + J(P\text{-}F')]$ 40	313(c)
$C_{14}F_{12}H_7ClN_2O$		$R^1 = pClC_6H_4$, $R^2 = CH_3$ −79.2, −75.3	^6J(F-F) 3	344(a)
$C_{14}F_{12}H_8N_2O$	As above with $R^1 = pCH_3C_6H_4$, $R^2 = H$	−80.1, −81.0	^6J(F-F)3	344(a)
$C_{14}F_{12}H_8N_2O$	As above with $R^1 = CH_3$, $R^2 = C_6H_5$	−79.3, −74.0	^6J(F-F)3	344(a)
$C_{14}F_{12}H_8N_2O$	As above with $R^1 = C_6H_5$, $R^2 = CH_3$	−79.4, −75.5	^6J(F-F) 2.8	344(a)
$C_{14}F_{12}H_8N_2O$		−79.1, −77.6	^6J(F-F) 3	344(a)
$C_{14}F_{12}H_8N_2O$		−79.2, −75.4		344(a)

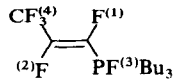
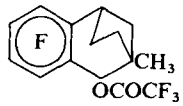
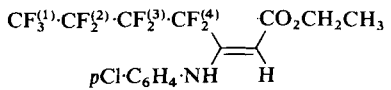
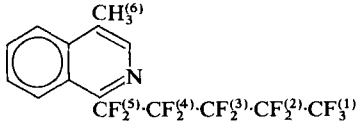
Molecular formula	Structure of compounds		Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{14}F_{12}H_8N_2O_2$			−80.1, −80.9	^6J(F-F) 3	344(a)
$C_{14}F_{12}H_{10}P_2$			(1) −54.7 (2) −60.7	(P-2) 22.6	312(c)
$C_{14}F_{12}H_{11}N$			−65.42, −66.62	^1J(F-C) 274, 272 ^2J(F-C) 45, 45	305(c)
$C_{14}F_{12}H_{11}N$		Isomer [a] Isomer [b]	−60.9, −64.5, −67.7 (ratio 2:1:1) −60.5, −68.3, −71.3 (ratio 2:1:1)		306(c)
$C_{14}F_{12}H_{11}N$			−54.5		306(c)
$C_{14}F_{12}H_{11}NS$			−61.5, −66.7		305(c)

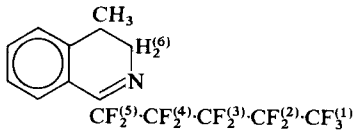
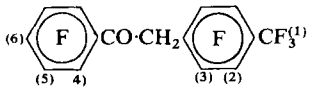
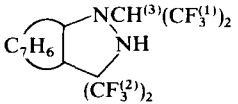
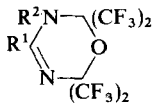
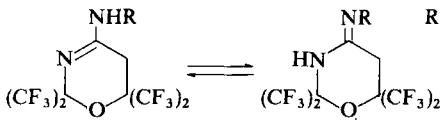
$C_{14}F_{12}H_{11}NS$			−60.1, −62.1, −66.3, −67.5			306(c)
$C_{14}F_{12}H_{11}N_3$			−63.1, −69.9, −71.5 (ratio 2:1:1)			306(c)
$C_{14}F_{12}H_{11}N_3$		Isomer [a] Isomer [b]	−57.1, −58.3, −61.1, −68.5 −57.9, −59.5, −61.9, −63.7			306(c)
$C_{14}F_{12}H_{11}N_3S$			−59.3, −61.5, −65.5, −70.7			306(c)
$C_{14}F_{12}H_{12}N_2O_2$	$[NCOC(CF_3)_2(CH_2)_3]_2$		−73.07			237
$C_{14}F_{12}H_{13}O_4P$	$C_6H_5{\cdot}P(OCH_2^{(2)}{\cdot}CF_3^{(1)})_4$		−82.1	(1-2) 8.5		266
$C_{14}F_{12}H_{13}O_4PS$	As above with C_6H_5 replaced by C_6H_5S		−81.7	(1-2) 8.2		266
$C_{14}F_{12}H_{14}N_2$			(1) −67.0 (2) −73.8	(1-3) 7.1	(1-2) 1.30 to 1.85	335
$C_{14}F_{12}H_{18}ClO_2P$	$Bu^t{}_2\overline{PCl{\cdot}O{\cdot}C(CF_3)_2{\cdot}C(CF_3)_2{\cdot}O}$		−65.1			325
$C_{14}F_{12}H_{18}Mo_2O_8P_2$	$(CF_3CO_2)_4Mo_2[P(CH_3)_3]_2$		−69.9, −73.1, −73.8 (ratio 1:0.3:0.7)			363

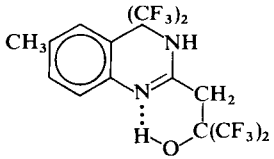
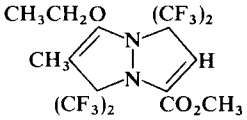
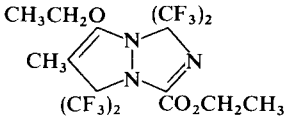
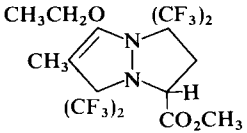
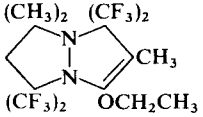
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{14}F_{12}H_{18}Mo_2O_{10}P_2$	$(CF_3CO_2)_4Mo_2[OP(CH_3)_3]_2$	−70.6		363
$C_{14}F_{15}H_5O$		(1) −71 (2) −106 (3) −58 (4) −58 (5) −100 (6) −76		311
$C_{14}F_{15}H_5O$	*Z*-isomer of above	(1) −71 (2) −106 (3) −59 (4) −59 (5) −99 (6) −75	(2-6) 21	311
$C_{14}F_{15}H_5O$		(1) −60 (2) −181 (3) −59 (4) −73 (5) −118 (6) −83	(4-6) 18	311
$C_{14}F_{15}H_7O_3P_2$		−67.78, −57.50 (ratio 1:4)		313(c)
$C_{14}F_{15}NOS$	$(CF_3^{(2)})_2CF^{(4)}\cdot CF^{(5)}{=}C[SCF^{(3)}(CF_3^{(1)})_2]\cdot CO\cdot NC_5H_{10}$	(1)(2) −74.88, −75.23 (3)(4) −158.30, −184.20 (5) −96.70		268
$C_{14}F_{16}H_6O_2P_2$		−66.10, −58.10 (ratio 3:13)		313(c)

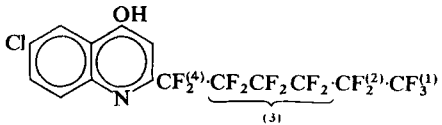
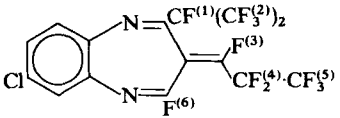
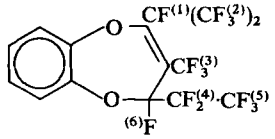
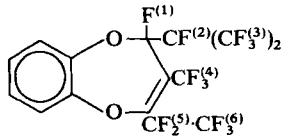
$C_{14}F_{17}H_{10}NS$	$(CF_3^{(3)})_2CF^{(4)}\cdot CF_2^{(5)}\cdot C[SCF^{(3)}(CF_3^{(1)})_2]=CF^{(6)}\cdot NC_5H_{10}$		(1)(2) −73.30, −74.82 (3)(4) −164.22, −183.27 (5) −87.6, −96.3 (6) −46.88	(3-6) 42	268
$C_{14}F_{18}H_{13}OP$	$[(CF_3^{(2)})_2CH\cdot O]_2\overline{PBu^t\cdot CH_2\cdot C(CF_3^{(1)})_2\cdot O}$		(1) −73.8 (2) −71.3		325
$C_{14}F_{30}O_4$	$CF_3^{(3)}\cdot CF_2^{(7)}\cdot CF_2^{(4)}\cdot O[CF^{(8)}(CF_3^{(1)})CF_2^{(2)}O]_3\cdot CF_2^{(6)}\cdot CF_3^{(5)}$		(1)(2)(3)(4) −83.2, −84.3, −84.9, −86.0 (5) −90.5 (6) −91.4 (7) −132.7 (8) −147.9		215
$C_{15}F_3H_9$	$CF_3\cdot C_6H_4\cdot C\equiv C\cdot C_6H_5$	Isomer [a] Isomer [b]	−64 −64.5		318
$C_{15}F_3H_9S$			−63.6		364
$C_{15}F_3H_{11}OS$			−63.4		364
$C_{15}F_3H_{11}O_2S$	$m CF_3\cdot C_6H_4\cdot S\cdot C_6H_4\cdot CH_2\cdot CO_2H o$		−63.6		364
$C_{15}F_3H_{12}OP$	$CF_3CO\cdot P(C_6H_5)\cdot CH_2\cdot C_6H_5$		−72.9	(P-F) 15	348
$C_{15}F_3H_{12}O_2P$	$CF_3CO\cdot P(O)(C_6H_5)\cdot CH_2\cdot C_6H_5$		−71.4		348
$C_{15}F_3H_{16}N_5O_5$			−62.5		284(c)

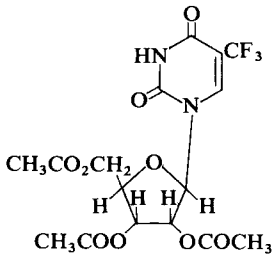
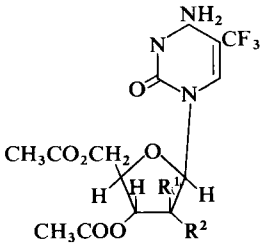
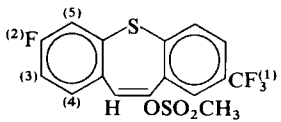
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{15}F_3H_{17}O_3Se$	$C_6H_5{\cdot}Se{\cdot}CH^{(2)}(CF_3^{(1)}){\cdot}CH_2{\cdot}CH(COCH_3){\cdot}CO_2CH_2CH_3$	−68.99, −69.20	(1-2) 9	315
$C_{15}F_4H_8OS$		(1) −63.6 (2) −114.3	(2-3) 8.0 (2-4) 5.5 (2-5) 8.0	365
$C_{15}F_4H_8S$	As above with $CH_2{\cdot}C(O)$ replaced by $CH{=}CH$	(1) −63.6 (2) −113.0	(2-3) 8.0 (2-4) 4.5 (2-5) 8.0	365
$C_{15}F_4H_9ClS$	As above with $CH_2{\cdot}C(O)$ replaced by $CH_2{\cdot}CHCl$	(1) −63.6 (2) −114.9	(2-3) 8.0 (2-4) 5.5 (2-5) 8.0	365
$C_{15}F_4H_{10}$	$C_6H_5(CF_3^{(1)})C{=}CF^{(2)}C_6H_5$	(1) −58 (2) −80	(1-2) 12	318
$C_{15}F_4H_{10}OS$	As structure above with $CH_2{\cdot}C(O)$ replaced by $CH_2{\cdot}CH(OH)$	(1) −63.4 (2) −115.6	(2-3) 8.0 (2-4) 5.5 (2-5) 8.0	365
$C_{15}F_5H_{10}NaO_5S$		(1) −71.5 (2A) −108.5 (2B) −108.9	(1-2A) 10.0 (1-2B) 11.6	211
$C_{15}F_5H_{15}O_2$		(1) −77.75 (2) −76.32 (3) −59.06	(1-2) 11.0 (1-3) 11.0 (2-3) 17.1 ^1J(1,2-C) 300.5 ^3J(3-C1) ~4	290(a)
$C_{15}F_6H_{13}N$		(5) −156.4 (6) −155.2 (7) −55.2 (8) −148.6	(5-6) 21.7 (5-8) 17.3 (5-7) 21.7 (6-8) 6.2 (6-7) 21.7 (7-8) 24.3	357(b)
$C_{15}F_6H_{16}MoN_2OS_2$	$[Mo(\eta^5\text{-}C_5H_5)\{C(CF_3){=}C(CF_3){\cdot}CH_2{\cdot}CH{=}CH_2\}(NO)(S_2CN(CH_3)_2)]$	−58.14, −58.22	^5J(F-F) 8.8	361

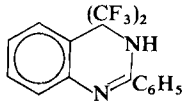
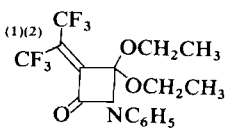
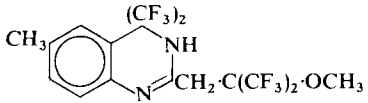
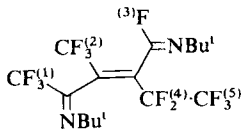
$C_{15}F_6H_{27}P$		(1) −142.0 (2) −170.0 (3) −16.7 (4) −67.6	(1-2) 131 (1-4) 23 (P-3) 609	(1-3) 23 (2-4) 11	367
$C_{15}F_7H_{11}O_2$		−75.9, −143.6, −147.8, −154.6, −159.4			368(b)
$C_{15}F_7H_{27}IOP$	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot CF_2^{(3)}I\cdot Bu^n{}_3PO$	(1) −81.52 (2) −120.76 (3) −65.62			219(a)
$C_{15}F_7H_{27}IOP$	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot CF_2^{(3)}I\cdot Bu^i{}_3PO$	(1) −81.38 (2) −120.76 (3) −65.32			219(a)
$C_{15}F_7H_{27}IOP$	$(CF_3^{(1)})_2CF^{(2)}I\cdot Bu^n{}_3PO$	(1) −75.90 (2) −152.12			219(a)
$C_{15}F_7H_{27}IOP$	$(CF_3)_2CFI\cdot Bu^i{}_3PO$	(1) −75.72 (2) −151.9			219(a)
$C_{15}F_9H_{11}ClNO_2$		(1) −81.2 (2) −126.3 (3) −121.7 (4) −109.2			324
$C_{15}F_9H_{11}ClNO_2$	$pCl\cdot C_6H_4\cdot N{=}C(CF_2^{(4)}\cdot CF_2^{(3)}\cdot CF_2^{(2)}\cdot CF_3^{(1)})\cdot CH_2CO_2CH_2CH_3$	(1) −81.2 (2) −126.3 (3) −121.7 (4) −113.8			324
$C_{15}F_9H_{12}AlO_6$	$[RC(O{-}){=}CHC(O{-}){=}R']_3Al$ R = CH_3, R′ = CF_3 (mixture of isomers)	−76.35, −76.44, −76.47, −76.48			369
$C_{15}F_9H_{12}NO_2$	As first $C_{15}F_9H_{11}ClNO_2$ above with Cl replaced by H	(1) −81.5 (2) −126.6 (3) −122.4 (4) −109.4			324
$C_{15}F_9H_{12}NO_2$	As second $C_{15}F_9H_{11}ClNO_2$ above with Cl replaced by H	(1) −81.5 (2) −126.6 (3) −122.4 (4) −114.4			324
$C_{15}F_{11}H_8N$		(1) −81.9 (2) −127.5 (3) −122.6 (4) −121.3 (5) −104.6	(1-3) 10.5 (3-5) 15.6	(1-4) 2.60 (5-6) 0.9	327

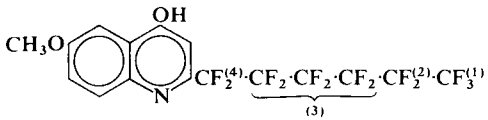
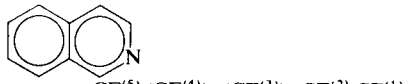
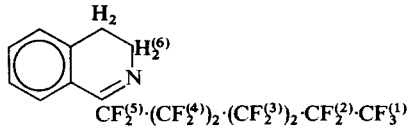
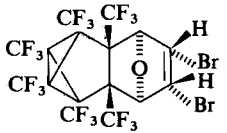
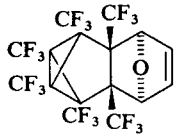
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{15}F_{11}H_{10}N$		(1) −81.8 (2) −127.3 (3) −121.7 (4) −120.7 (5) −109.4	(5-6) 2.55	327
$C_{15}F_{12}H_2O$		(1) −56.5 (2) −141.3 (3) −139.9 (4) −139.9 (5) −160.8 (6) −151.9	(1-2) 22.5 (5-6) 21.0 (4-6) 4.7	603(b)
$C_{15}F_{12}H_2O$	As above with $CO{\cdot}CH_2$ replaced by $C(=CH_2){\cdot}O$	(1) −55.2 (2) −140.3 (3) −151.4 (4) −139.2 (5) −161.9 (6) −152.4	(1-2) 23.6 (5-6) 20.5 (4-6) 3.0	603(b)
$C_{15}F_{12}H_8N_2$		(1) −67.3 (2) −74.2	(1-3) 6.9 (1-2) 1.30 to 1.85	335
$C_{15}F_{12}H_{10}N_2O$		$R^1 = CH_3$, $R^2 = pCH_3C_6H_4$ −79.5, −74.1 $R^1 = pCH_3C_6H_4$, $R^2 = CH_3$ −79.4, −75.6	J(F-F) 2.6 J(F-F) 2.8	344(a)
$C_{15}F_{12}H_{10}N_2O$		$R = pCH_3C_6H_4$ −79.1, −77.5	J(F-F) 3	344(a)

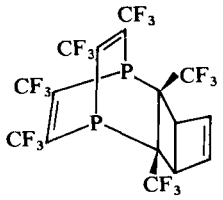
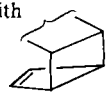
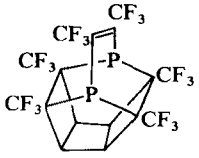
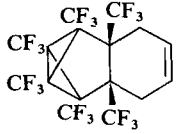
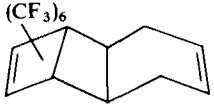
$C_{15}F_{12}H_{10}N_2O$		−79.2, −75.3		344(a)
$C_{15}F_{12}H_{10}N_2O_2$	As first $C_{15}F_{12}H_{10}N_2O$ above with $R^1 = pCH_3OC_6H_4$ and $R^2 = CH_3$	−79.0, −75.1	J(F-F) 2.8	344(a)
$C_{15}F_{12}H_{12}N_2O_3$		−70.8, −69.35		347(a)
$C_{15}F_{12}H_{12}N_2O_3$	As above with H and CO_2CH_3 interchanged	−72.1, −69.95		347(a)
$C_{15}F_{12}H_{12}O_2$	$[(CF_3)_2C(OH)C{\equiv}CCH_2CH_2]_2CH_2$	−77.93		237
$C_{15}F_{12}H_{13}N_3O_3$		−74.3, −70.1		347(a)
$C_{15}F_{12}H_{14}N_2O_3$		(1) −74.8 (2) −74.1 (3) −67.5 to −66.4 (4) −66.4 to −65.4	(1-2) 9.5	347(a)
$C_{15}F_{12}H_{16}N_2O$		−70.4, −68.6		347(a)

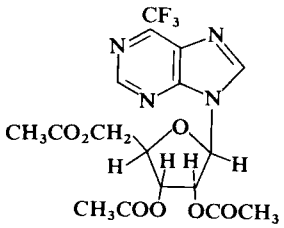
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{15}F_{12}H_{20}O_2$	$[(CF_3)_2C(OH)(CH_2)_4]_2CH_2$	−76.19		237
$C_{15}F_{13}H_5ClNO$		(1) −79.9 (2) −125.3 (3) −122.2, −121.0 (4) −112.4		324
$C_{15}F_{13}H_6NO$	As above with Cl replaced by H	(1) −80.2 (2) −125.6 (3) −122.3, −121.2 (4) −112.4		324
$C_{15}F_{14}H_3ClN_2$		(1) −186.9 (2) −76.9 (3) −108.7 (4) −116.4 (5) −83.8 (6) −29.8		350(a)
$C_{15}F_{14}H_4N_2$	As above with Cl replaced by H	(1) −186.5 (2) −77.0 (3) −110.0 (4) −116.2 (5) −83.9 (6) −31.2		350(a)
$C_{15}F_{16}H_4O_2$		(1) −177.6 (2) −72.9, −74.0 (3) −57.2 (4) −123.8 (5) −80.8 (6) −104.4	(1-2) 15.1 (1-3) 46.9 (2A-2B) 5.6 (3-4) 13.2 (3-6) 27.3 (4-6) 7.3	350(a)
$C_{15}F_{16}H_4O_2$		(1) −120.7 (2) −174.5 (3) −73.0 (4) −54.9 (5) −124.8 (6) −80.7	(1-2) 4.7 (2-3) 6.6 (4-5) 6.6	350(a)

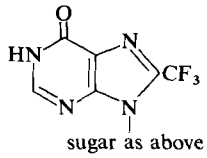
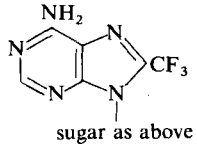
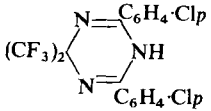
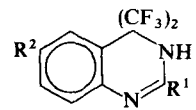
$C_{15}F_{19}H_6O_3P$	$(CF_3^{(2)})_2CHOPF^{(3)}(C_6H_5)\cdot O\cdot C(CF_3^{(1)})_2\cdot C(CF_3)_2\cdot O$	(1) −67.8, −66.8 (2) −73.3, −71.5 (3) −45.5		(P-3) 846		325
$C_{16}F_3H_{17}N_2O_9$		−64.7				284(c)
$C_{16}F_3H_{18}N_3O_8$		$R^1 = H, R^2 = CH_3COO$ −62.94 $R^1 = CH_3COO, R^2 = H$ −62.9				284(c)
$C_{16}F_3H_{19}O_4Se$	$CF_3^{(1)}\cdot CH^{(2)}(SeC_6H_5)\cdot CH_2\cdot CH(CO_2CH_2CH_3)_2$	−69.3		(1-2) 9		315
$C_{16}F_4H_{10}O_2$	$CF_3^{(1)}CO_2\cdot C(C_6H_5)=CF^{(2)}\cdot C_6H_5$	(1) −76.0	(2) −115			318
$C_{16}F_4H_{10}O_3S_2$		(1) −63.6	(2) −111.4	(2-3) 8.0 (2-4) 5.5	(2-5) 8.0	365
$C_{16}F_4H_{12}O_2$	$C_6H_5\cdot CF^{(2)}H^{(3)}\cdot CH^{(4)}(OCOCF_3^{(1)})\cdot C_6H_5$	(1) −75.5	(2) −181.2	(2-3) 47	(2-4) 13	376

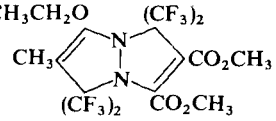
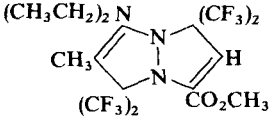
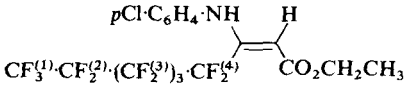
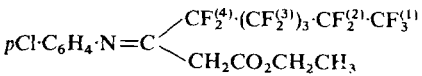
Molecular formula	Structure of compounds		Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{16}F_6H_{10}N_2$			−73.6		344(a)
$C_{16}F_6H_{10}O_2Rh_2$	$(\eta C_5H_5)_2Rh_2(CO)_2(CF_3C_2CF_3)$	*trans* *cis*	−55.09 −55.12		371
$C_{16}F_6H_{12}N_2O$	$(CF_3)_2C(OH)\cdot N{=}C(C_6H_5)\cdot NHC_6H_5$		−83.3		344(a)
$C_{16}F_6H_{15}NO_3$			(1) −61.37 (2) −58.18	(1-2) 7.8 ^1J(F-C) 275.4, 276.9	290(a)
$C_{16}F_6H_{24}N_2O$	$cyclo C_6H_{11}\cdot NH\cdot C[OCH(CF_3)_2]{=}N\cdot C_6H_{11}cyclo$		−66.3	^1J(F-C) 236	372
$C_{16}F_8H_{27}P$	$CF_3^{(1)}\cdot CF_2^{(3)}\cdot C(CF_3^{(2)}){=}PBu_3$		(1) −85.5 (2) −37.0 (3) −90.7	(1-2) 7.8 (1-3) 4.1 (2-3) 16.7	367
$C_{16}F_9H_8OP$	$CF_3^{(1)}\cdot CO\cdot P(C_6H_4\cdot CF_3^{(2)}m)_2$		(1) −73.5 (2) −84.4	(P-1) 15	348
$C_{16}F_9H_8O_2P$	$CF_3^{(1)}\cdot CO\cdot P(O)(C_6H_4\cdot CF_3^{(2)}m)_2$		(1) −71.3 (2) −84.5		348
$C_{16}F_{12}H_5CoO_3W$	$[W(\eta^5C_5H_5)CO(CF_3C{\equiv}CCF_3)_2Co(CO)_2]$		−48.68, −49.56 (ratio 1:1)		373
$C_{16}F_{12}H_{11}O_2PRh_2$	$[(\eta C_5H_5)_2Rh_2(CO)_2(CF_3^{(1)}CCH^{(3)}CF_3^{(2)})]PF_6$		(1) −51.2 (2) −54.4	(1-2) 12.5 (Rh-1) ~1.5 (2-3) 8.5 (Rh-2) ~1.5	371
$C_{16}F_{12}H_{12}N_2O$			−74.9, −73.4		344(a)
$C_{16}F_{12}H_{18}N_2$			(1) −69.3 (2) −59.5 (3) −11.8 (4) −107.7 (5) −81.9	(1-2) 8.5 (2-3) 15	304

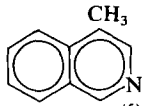
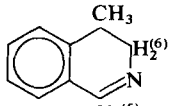
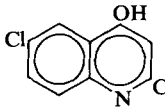
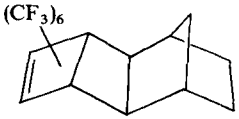
$C_{16}F_{13}H_8NO_2$		(1) −80.1 (2) −125.5 (3) −122.2, −121.1 (4) −111.9	324
$C_{16}F_{14}H_6N_2$	As $C_{15}F_{14}H_3ClN_2$ above with Cl replaced by CH_3	(1) −186.6 (2) −76.9 (3) −110.7 (4) −116.4 (5) −84.0 (6) −31.9	350(a)
$C_{16}F_{15}H_6N$		(1) −81.9 (2) −127.0 (3) −122.9 (4) −120.7 (5) −106.0	327
$C_{16}F_{15}H_8N$		(1) −81.9 (2) −127.8 (5-6) 2.50 (3) −123.5 (4) −120.9 to −121.4 (5) −109.6	327
$C_{16}F_{18}H_4BrO_2$		−54.3, −56.3, −59.5, −66.5 (ratio 1:1:2:2)	352(c)
$C_{16}F_{18}H_4O$		−54.7, −56.7, −61.5 (ratio 1:1:4)	352(c)

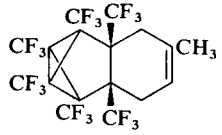
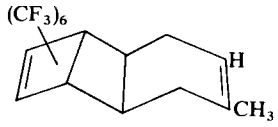
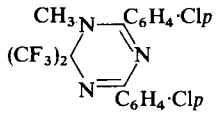
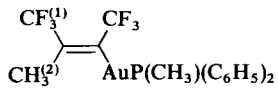
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{16}F_{18}H_4P_2$		−58.5, −57.84, −57.74	$\frac{1}{2}[J(P\text{-}F) + J(P\text{-}F')]$ 40.6, 38.4, 33.8	374(c)
$C_{16}F_{18}H_4P_2$	As above with 	−61.06, −57.86, −57.82	$\frac{1}{2}[J(P\text{-}F) + J(P\text{-}F')]$ 41.7, 39.5, 39.5	374(c)
$C_{16}F_{18}H_4P_2$		−62.84, −59.10 (ratio 2:1)	$\frac{1}{2}[J(P\text{-}F) + J(P\text{-}F')]$ 41.3, 38.6	374(c)
$C_{16}F_{18}H_6$		−53.5, −55.1, −60.7, −66.9 (ratio 1:1:2:2)		352(c)
$C_{16}F_{18}H_6$		−59.5, −61.9, −65.9 (ratio 1:1:1)		351(c)

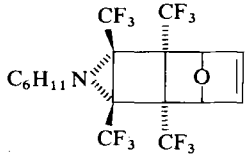
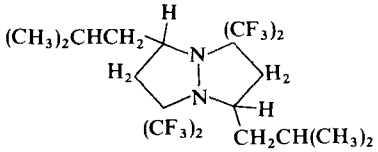
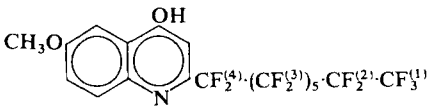
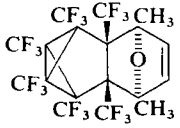
$C_{16}F_{18}H_6O$	$CF_3^{(5)}\cdot(CF_2)_4\cdot CF_2^{(3)}$ (1)F, F(2), $C(CF_3^{(4)})(C_6H_5)\cdot OH$	(1) −143.5 (2) −159.9 (3) −117.9 (4) −76.7 (5) −81.5	(1-2) 147.0	375
$C_{16}F_{24}H_{12}O_5P$	$[(CF_3)_2C\cdot C(CF_3)_2\cdot O\cdot P(CH_3)_2\!-\!]_2O$	−68.4		308
$C_{16}F_{26}H_8$	$CF_3^{(1)}\cdot(CF_2^{(2)})_4\cdot CF_2^{(3)}\cdot(CH_2)_4\cdot CF_2\cdot(CF_2)_4\cdot CF_3$	(1) −82.5 (2) −122.9, −124.4, −127.2 (ratio 1:2:1) (3) −115.1		314(a)
$C_{16}F_{26}H_8O_2S_2$	$CF_3^{(1)}\cdot(CF_2^{(2)})_4\cdot CF_2^{(3)}\cdot CH_2\cdot CH_2\cdot SO_2\cdot S\cdot CH_2\cdot CH_2\cdot CF_2^{(4)}\cdot(CF_2^{(5)})_4\cdot CF_3^{(6)}$	(1)(6) −82.2 (3)(4) −113.2, −114.2 (2)(5) −122.1, −123.4, −126.5 (ratio 1:2:1)		314(a)
$C_{16}F_{26}H_8S_2$	$[CF_3^{(1)}(CF_2^{(2)})_4\cdot CF_2^{(3)}\cdot CH_2\cdot CH_2\cdot S\!-\!]_2$	(1) −82.0 (2) −122.0, −123.6, −126.6 (ratio 1:2:1) (3) −113.9		314(a)
$C_{16}F_{34}O_3S$	$CF_3^{(1)}\cdot CF_2^{(2)}\cdot CF_2^{(3)}\cdot CF_2^{(4)}\cdot SO_3\cdot CF_2^{(5)}\cdot CF_2^{(6)}\cdot CF_2^{(7)}\cdot(CF_2^{(8)})_7\cdot CF_2^{(9)}\cdot CF_3^{(10)}$	(1) −81.4 (2) −125.8 (3) −120.3 (4) −107.6 (5) −78.6 (6) −124.2 (7) −122.3 (8) −121.2 (9) −125.8 (10) −81.5	(4-5) 8.5	249
$C_{16}F_{34}O_6S_2$	$(CF_3^{(1)}\cdot CF_2^{(2)}\cdot CF_2^{(3)}\cdot CF_2^{(4)}\cdot SO_3\cdot CF_2^{(5)}\cdot CF_2^{(6)}\cdot CF_2^{(7)}\cdot CF_2^{(8)})_2$	(1) −81.0 (2) −125.9 (3) −120.5 (4) −107.6 (5) −78.3 (6) −124.3 (7) −121.5 (8) −121.5	(4-5) ~8	249
$C_{17}F_3H_{17}N_4O_7$		−67.9		284(c)

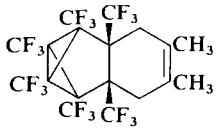
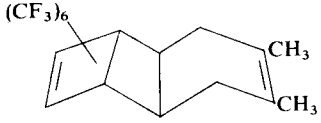
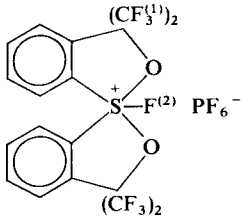
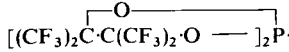
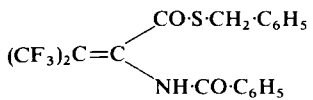
Molecular formula	Structure of compounds	Chemical shifts (ppm)		Coupling constants (Hz)		Ref.
$C_{17}F_3H_{17}N_4O_8$	 sugar as above	−62.3				284(c)
$C_{17}F_3H_{17}N_5O_7$	 sugar as above	−62.7				284(c)
$C_{17}F_3H_{19}O_2$	Z-CF_3·C[CH_2CH_2CH=$C(CH_3)_2$]=$CHCO_2CH_2C_6H_5$	−64.1				227
$C_{17}F_4H_{14}O_2$	pCH_3·C_6H_4·$CH^{(4)}(OCOCF_3^{(1)})$·$CH^{(3)}F^{(2)}$·C_6H_5 *threo*	(1) −76.4	(2) −180.7	(2-3) 47	(2-4) 13	376
$C_{17}F_4H_{14}O_2$	As above with F and OR group interchanged *threo*	(1) −75.5	(2) −180	(2-4) 47	(2-3) 13	376
$C_{17}F_6H_9Cl_2N_3$		−80.2				344(a)
$C_{17}F_6H_{10}O_2$	C_6H_5·$C(CF_3^{(2)})$=$C(C_6H_5)$·$OCOCF_3^{(1)}$	(1) −77.5	(2) −59			318
$C_{17}F_6H_{11}N_3$	As $C_{17}F_6H_9Cl_2N_3$ above with Cl replaced by H	−80.1				344(a)
$C_{17}F_6H_{12}N_2$	 R^2 = H, R^1 = $pCH_3C_6H_4$ R^2 = CH_3, R^1 = C_6H_5	−73.6 −73.6				344(a)

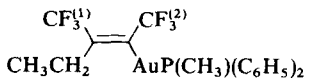
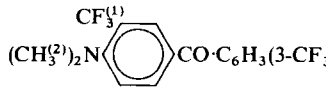
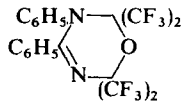
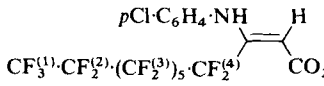
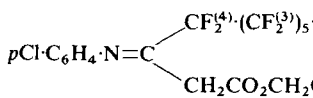
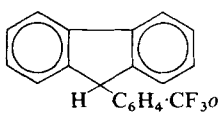
$C_{17}F_6H_{14}N_2O$	$(CF_3)_2C(OH)\cdot N{=}C(R^1)NHR^2$ $R^1 = C_6H_5$, $R^2 = pCH_3C_6H_4$ $R^1 = pCH_3C_6H_4$, $R^2 = C_6H_5$	-83.3 -83.4	344(a)
$C_{17}F_{12}H_{14}N_2O_5$		-70.5, -69.4	347(a)
$C_{17}F_{12}H_{17}N_3O_2$		-69.5, -69.2	347(a)
$C_{17}F_{12}H_{17}N_3O_2$	As above with H and CO_2CH_3 group interchanged	-71.9, -68.5	347(a)
$C_{17}F_{12}H_{18}N_2O_2$	$[NCOC(CF_3)_2(CH_2)_4]_2CH_2$	-73.34	237
$C_{17}F_{12}H_{27}Mo_2O_8P_3$	$Mo_2(O_2CCF_3)_4[P(CH_3)_3]_3$	-69.8, -72.5, -73.3, -73.8 (ratio 2:3:5:10)	363
$C_{17}F_{13}H_{11}ClNO_2$		(1) -81.1 (2) -126.1 (3) -123.2, -121.8 (4) -108.9	324
$C_{17}F_{13}H_{11}ClNO_2$		(1) -81.1 (2) -126.1 (3) -123.2, -121.8 (4) -114.1	324
$C_{17}F_{13}H_{12}NO_2$	As first $C_{17}F_{13}H_{11}ClNO_2$ above with Cl replaced by H	(1) -81.5 (2) -126.5 (3) -122.9, -121.3 (4) -109.5	324
$C_{17}F_{13}H_{12}NO_2$	As second $C_{17}F_{13}H_{11}ClNO_2$ above with Cl replaced by H	(1) -81.5 (2) -126.5 (3) -122.9, -121.3 (4) -113.9	324

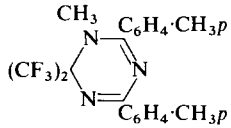
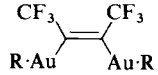
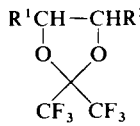
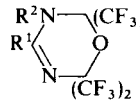
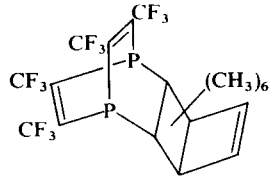
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{17}F_{14}H_{18}N_2S$	$(CH_3)_3C{\cdot}N{=}C{=}C$ $[SCF^{(2)}(CF_3^{(1)})_2]{\cdot}C[CF^{(4)}(CF_3^{(3)})_2]{=}NC(CH_3)_3$	(1)(3) −74.16, −75.79 (2)(4) −164.30, −172.44		268
$C_{17}F_{15}H_8N$	 $CF_2^{(5)}{\cdot}(CF_2^{(4)})_2{\cdot}(CF_2^{(3)})_2{\cdot}CF_2^{(2)}{\cdot}CF_3^{(1)}$	(1) −82.0 (2) −127.6 (3) −123.7 (4) −121.1 (5) −104.6		327
$C_{17}F_{15}H_{10}N$	 $CF_2^{(5)}{\cdot}(CF_2^{(4)})_2{\cdot}(CF_2^{(3)})_2{\cdot}CF_2^{(2)}{\cdot}CF_3^{(1)}$	(1) −81.9 (2) −127.5 (3) −123.5 (4) −120.6 to −121.1 (5) −109.3	(5-6) 2.48	327
$C_{17}F_{15}H_{19}N_2S$	$(CH_3)_3C{\cdot}N{=}CF{\cdot}CH[SCF^{(2)}(CF_3^{(1)})_2]{\cdot}C$ $[CF^{(4)}(CF_3^{(3)})_2]{=}N{\cdot}C(CH_3)_3$	(1)(3) −73.03, −75.19 (2)(4) −158.80, −183.39		268
$C_{17}F_{17}H_5ClNO$	 $CF_2^{(4)}{\cdot}(CF_2^{(3)})_5{\cdot}CF_2^{(2)}{\cdot}CF_3^{(1)}$	(1) −81.0 (2) −124.3 (3) −120.1, −119.1 (4) −111.6		324
$C_{17}F_{17}H_6NO$	As above with Cl replaced by H	(1) −80.0 (2) −125.2 (3) −121.0 (4) −112.3		324
$C_{17}F_{18}H_6$		−59.5, −63.3 (ratio 1:2)		351(c)

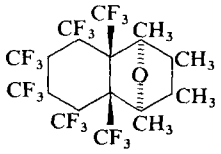
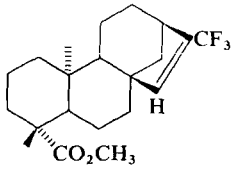
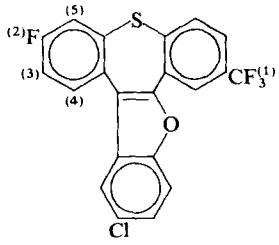
$C_{17}F_{18}H_8$		−53.5, −55.1, −60.3, −66.7 (ratio 1:1:2:2)				352(c)
$C_{17}F_{18}H_8$		−61.1, −63.9, −66.7 (ratio 1:1:1)				351(c)
$C_{17}F_{18}H_{19}O_3P$	$(CF_3^{(2)})_2CH{\cdot}O{\cdot}PBu^t_2{\cdot}O{\cdot}C(CF_3^{(1)})_2{\cdot}C(CF_3)_2{\cdot}O$	(1) −64.8	(2) −70.8			325
$C_{18}F_4H_{14}O_3$	$pCH_3CO{\cdot}C_6H_4{\cdot}CF^{(2)}H^{(3)}{\cdot}CH^{(4)}(OCOCF_3^{(1)}){\cdot}C_6H_5$ *threo*	(1) −75.5	(2) −183.9	(2-3) 47	(2-4) 13.8	376
$C_{18}F_4H_{14}O_4$	As above with pCH_3CO replaced by pCH_3OCO *threo*			(2-3) 47	(2-4) 13.8	376
$C_{18}F_4H_{14}O_4$	As above with pCH_3CO replaced by oCH_3OCO *threo*	(1) −75.3	(2) −197.3	(2-3) 45	(2-4) 24	376
	erythro	(1) −75.5	(2) −193.7	(2-3) 47	(2-4) 22.5	
$C_{18}F_6H_{11}Cl_2N_3$		−74.5				344(a)
$C_{18}F_6H_{13}N_3$	As above with Cl replaced by H	−74.5				344(a)
$C_{18}F_6H_{14}AsClN_4O_2$	$[pCF_3{\cdot}C_6H_4N{\cdot}CO{\cdot}N(CH_3)—]_2AsCl$	−62.9				377
$C_{18}F_6H_{16}AuP$				(1-2) 2		323
$C_{18}F_6H_{20}N_4P_2$	$R_2N{\cdot}P{\cdot}N(R'){\cdot}P(NR_2){\cdot}NR'$ R = CH_3, R′ = $oCF_3C_6H_4$	−60.1		(P-F) 33		378(a)
$C_{18}F_9H_{16}O_3P$	$(CF_3CH_2O)_3P(C_6H_5)_2$	−80.7				266
$C_{18}F_{12}H_{10}Mo_2N_2O_8$	$Mo_2(O_2CCF_3)_4(NC_5H_5)_2$	−69.8				363

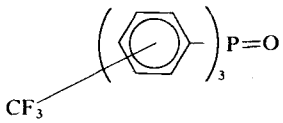
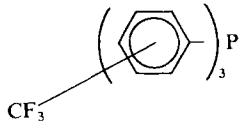
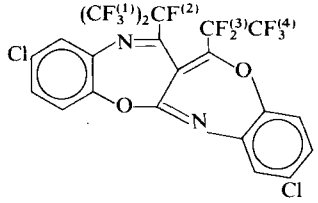
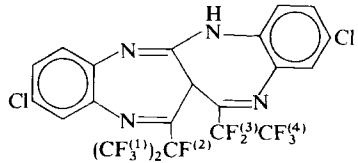
Molecular formula	Structure of compounds		Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{18}F_{12}H_{15}NO$			−59.9, −63.5		305(c)
$C_{18}F_{12}H_{24}N_2$		*trans* *cis*	−73.0, −68.9 −72.5, −67.4	*J*(F-F) 10 *J*(F-F) 9	335
$C_{18}F_{12}H_{28}Mo_2O_8P_4$	$Mo_2(O_2CCF_3)_4[(CH_3)_2PCH_2P(CH_3)_2]_2$		−69.5, −69.9, −73.6 (ratio 1:2:10)		363
$C_{18}F_{13}H_{14}NO_3$	As first $C_{17}F_{13}H_{11}ClNO_2$ above with Cl replaced by OCH_3		(1) −81.4 (2) −126.6 (3) −123.2, −121.6 (4) −109.4		324
$C_{18}F_{13}H_{14}NO_3$	As second $C_{17}F_{13}H_{11}ClNO_2$ above with Cl replaced by OCH_3		(1) −81.4 (2) −126.6 (3) −123.2, −121.6 (4) −113.9		324
$C_{18}F_{17}H_8NO_2$			(1) −80.6 (2) −125.6 (3) −124.7, −121.1 (4) −111.9		324
$C_{18}F_{18}H_8O$			−52.7, −57.1, −61.5 (ratio 1:1:4)		352(c)

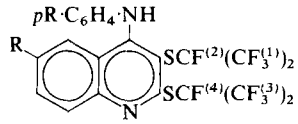
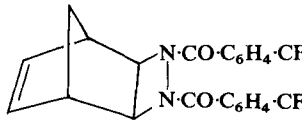
$C_{18}F_{18}H_{10}$		−53.2, −55.2, −60.3, −66.8 (ratio 1:1:2:2)		352(c)
$C_{18}F_{18}H_{10}$		−60.3, −63.6, −67.3		351(c)
$C_{18}F_{19}H_8O_2PS$		(1) −70.9, −72.0 (2) +89.5		379
$C_{18}F_{24}H_5O_4P$		−69.8, −70.3	$^{4,5}J$(F-F) 8.0	380
$C_{18}F_{30}H_{12}N_3O_6P_3$	$(CF_3^{(1)}\cdot CF_2^{(2)}\cdot CH_2^{(3)}\cdot O)_6P_3N_3$	(1) −82.9 (2) −123.5	(2-3) 12.0	353
$C_{19}F_4H_{37}N_3Si_3$	$Me_3^{(3)}Si\cdot NR\cdot SiF^{(2)}(NR'SiMe_3)\cdot NHR$ (R = Pr^i, R′ = $mCF_3^{(1)}C_6H_4$)	(1) −63.15 (2) −119.25	(2-3) 0.9 ^1J(Si-F) 236.6 ^3J(Si-F) 1.3	381(b)
$C_{19}F_6H_{13}NO_2S$		−57.9	^4J(F-F) 8	382(a)
$C_{19}F_6H_{15}NO_3S$	$(CF_3)_2CH\cdot C(CO_2H)(SCH_2C_6H_5)\cdot NH\cdot CO\cdot C_6H_5$	−59.9		382(a)
$C_{19}F_6H_{15}N_3$	As $C_{17}F_6H_9Cl_2N_3$ with Cl replaced by CH_3	−80.1		344(a)

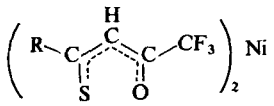
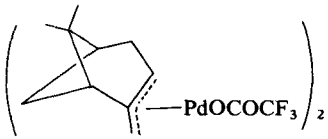
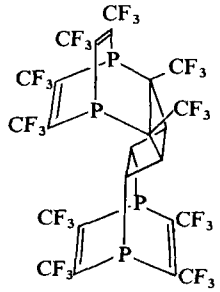
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{19}F_6H_{18}AuP$		(1) −56.9 (2) −47.6	(1-2) 14.7 (P-2) 8	323
$C_{19}F_6H_{18}N_2O$			(1-2) 0.65	316
$C_{19}F_{12}H_{10}N_2O$		−78.9, −74.2	*J*(F-F) 2.6	344(a)
$C_{19}F_{17}H_{11}ClNO_2$		(1) −81.3 (2) −126.7 (3) −123.5, −122.5, −121.6 (4) −109.3		324
$C_{19}F_{17}H_{11}ClNO_2$		(1) −81.3 (2) −126.7 (3) −123.5, −122.5, −121.6 (4) −114.5		324
$C_{19}F_{17}H_{12}NO_2$	As first $C_{19}F_{17}H_{11}ClNO_2$ above with Cl replaced by H	(1) −81.5 (2) −126.8 (3) −123.3, −122.4, −121.8 (4) −109.8		324
$C_{19}F_{17}H_{12}NO_2$	As second $C_{19}F_{17}H_{11}ClNO_2$ above with Cl replaced by H	(1) −81.5 (2) −126.8 (3) −123.3, −122.4, −121.8 (4) −114.4		324
$C_{20}F_3H_{13}$		−57.0		383
$C_{20}F_3H_{13}O$	As above with H replaced by OH	−55.2		383

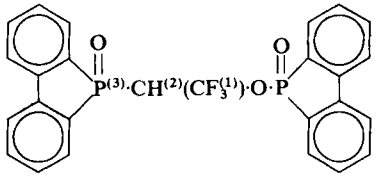
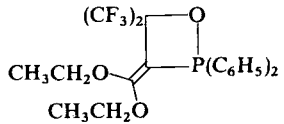
$C_{20}F_3H_{15}$	$(C_6H_5)_2CH{\cdot}C_6H_4{\cdot}CF_3o$	−58.1			383
$C_{20}F_3H_{15}O$	$(C_6H_5)_2C(OH){\cdot}C_6H_4{\cdot}CF_3o$	−54.4			383
$C_{20}F_3H_{22}OP$	$CF_3CO{\cdot}P(C_6H_2Me_3\text{-}2,4,6)_2$	−72.6		(P-F) 18	348
$C_{20}F_3H_{22}O_2P$	$CF_3CO{\cdot}P(O)(C_6H_2Me_3\text{-}2,4,6)_2$	−71.2			348
$C_{20}F_5H_{16}NO_5S$	$(p\text{HO}{\cdot}C_6H_4)_2C(CF_3^{(1)}){\cdot}CF_2^{(2)}{\cdot}SO_3^-\ C_5H_5NH^+$	(1) −60.6	(2) −91.0	(1-2) 13.3	211
$C_{20}F_6H_{17}N_3$		−74.6			344(a)
$C_{20}F_6H_{22}Au_2P_2$		$R = P(CH_3)_2C_6H_5$	−50.5	^4J(P-F) 1.5	323
$C_{20}F_6H_{32}O_4$		$R^1 = C_6H_{13}$, $R^2 = C_7H_{14}CO_2CH_3$	−78.82		384
$C_{20}F_{12}H_{12}N_2O$		$R^1 = C_6H_5$, $R^2 = pCH_3C_6H_4$	−79.0, −74.4	J(F-F) 2.6	344(a)
		$R^1 = pCH_3C_6H_4$, $R^2 = C_6H_5$	−79.0, −74.3	J(F-F) 2.8	
$C_{20}F_{12}H_{18}P_2$			−58.14, −57.54	$\frac{1}{2}[J(\text{P-F}) + J(\text{P-F}')]$ 49.6, 54.1	313(c)
$C_{20}F_{12}H_{30}Mo_2O_8P_2$	$Mo_2(O_2CCF_3)_4[P(CH_2CH_3)_3]_2$		−69.8, −73.7		363
$C_{20}F_{12}H_{32}Mo_2O_8P_2$	$Mo_2(O_2CCF_3)_4[Me_2PCH_2CH_2PMe_2]_2$		−74.1, −75.8		362

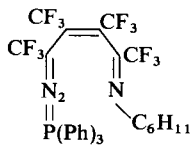
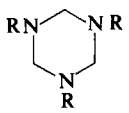
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{20}F_{17}H_{14}NO_3$	As first $C_{19}F_{17}H_{11}ClNO_2$ above with Cl replaced by OCH_3	(1) −81.5 (2) −126.9 (3) −123.4, −122.5, −121.6 (4) −109.1		324
$C_{20}F_{17}H_{14}NO_3$	As second $C_{19}F_{17}H_{11}ClNO_2$ above with Cl replaced by OCH_3	(1) −81.5 (2) −126.9 (3) −123.4, −122.5, −121.6 (4) −114.0		324
$C_{20}F_{18}H_{12}O$		−53.5, −54.7, −56.7, −60.3 (ratio 1:1:2:2)		352(c)
$C_{21}F_3H_{29}O_3$		−67.25		385
$C_{21}F_4H_9ClOS$		(1) −63.5 (2) −113.0	(2-3) 8.0 (2-4) 5.5 (2-5) 8.0	365

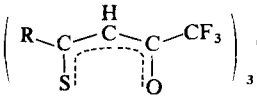
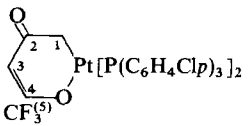
$C_{21}F_9H_{12}OP$		*ortho* −55.8 *meta* −63.5 *para* −63.9				386
$C_{21}F_9H_{12}P$		*ortho* −58.0 *meta* −63.4 *para* −63.6		(P-F) 55		386
$C_{21}F_{12}H_6Cl_2N_2O_2$		(1) −74.1	(2) −177.2 (4) −82.5			350(a)
		(3) −115.0				
$C_{21}F_{12}H_7Cl_2N_4$		(1) −74.0, −75.0	(2) −177.5			350(a)
		(3) −113.3	(4) −84.0			
$C_{21}F_{12}H_8N_2O_2$	As $C_{21}F_{12}H_6Cl_2N_2O_2$ above with Cl replaced by H	(1) −74.0 (3) −115.0	(2) −177.0 (4) −82.0	(1-2) 6.8		350(a)
$C_{21}F_{12}H_9N_4$	As $C_{21}F_{12}H_7Cl_2N_4$ above with Cl replaced by H	(1) −74.1, −75.1	(2) −178.0	(1-3) 5.8	(2-3) 9.2	350(a)
		(3) −113.5	(4) −81.9			

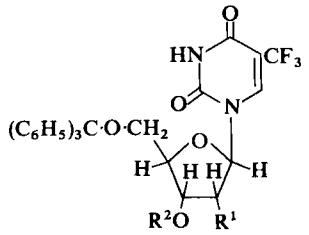
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{21}F_{14}H_{10}N_2S$	 $pR{\cdot}C_6H_4{\cdot}NH$ R = H	(1)(3) −71.24, −74.46, −75.56 (ratio 3:6:3) (2)(4) −156.68, −174.38		268
$C_{22}F_6H_{19}O_2P$	$(CF_3^{(1)}{\cdot}CH_2^{(2)}{\cdot}O)_2P(C_6H_5)_3$	−80.3	(1-2) 8.9	266
$C_{22}F_6H_{26}Cl_2N_4P_2$	As $C_{18}F_6H_{20}N_4P_2$ above with R = CH_2CH_3 and R′ = $2CF_3$,4Cl-C_6H_3	−60.5	(P-F) 33	378
$C_{22}F_6H_{28}Au_2P_2$	As $C_{12}F_6H_{24}Au_2P_2$ above with a ligand of $P(CH_3)_2C_6H_5$	−53.9		323
$C_{22}F_6H_{28}N_4P_2$	As $C_{18}F_6H_{20}N_4P_2$ above with R = CH_2CH_3 and R′ = $oCF_3C_6H_4$	−59.2	(P-F) 33	378
$C_{22}F_6H_{36}O_4$	As $C_{20}F_6H_{32}O_4$ above with $R^1 = C_{11}H_{23}$ and $R^2 = C_4H_8CO_2CH_3$	−78.89		384
$C_{22}F_6H_{36}O_4$	As $C_{20}F_6H_{32}O_4$ above with $R^1 = C_8H_{17}$ and $R^2 = C_7H_{14}CO_2CH_3$	−78.82		384
$C_{22}F_6H_{36}O_4$	As $C_{20}F_6H_{32}O_4$ above with $R^1 = C_8H_{17}$ and $R^2 = C_7H_{14}CO_2CH_3$	−79.66		384
$C_{22}F_{12}H_{26}Mo_2N_2O_8$	$Mo_2(O_2CCF_3)_4{\cdot}$ 	−70.3		363
$C_{23}F_6H_{16}N_2O_2$	 $N{\cdot}CO{\cdot}C_6H_4{\cdot}CF_3p$ $N{\cdot}CO{\cdot}C_6H_4{\cdot}CF_3p$		^1J(F-C) 272 ^2J(F-C) 35.7 ^3J(F-C) 2.7	387
$C_{23}F_6H_{20}N_2$	As above with CO replaced by CH_2		^1J(F-C) 271 ^2J(F-C) 32.3 ^3J(F-C) 4.0	387
$C_{23}F_{12}H_{12}N_2O_2$	As $C_{21}F_{12}H_6Cl_2N_2O_2$ above with Cl replaced by CH_3	(1) −74.0 (2) −176.6 (3) −114.5 (4) −82.3		350(a)
$C_{23}F_{12}H_{13}N_4$	As $C_{21}F_{12}H_7Cl_2N_4$ above with Cl replaced by CH_3	(1) −74.5, −75.2 (2) −178.0 (3) −113.3 (4) −81.9		350(a)

$C_{23}F_{14}H_{14}N_2S$	As $C_{21}F_{14}H_{10}N_2S$ above with R = CH_3	(1)(3) −70.48, −73.69, −75.13 (ratio 3:6:3) (2)(4) −157.43, −172.17		268
$C_{24}F_6H_{20}NiO_6S_2$		R = 3,5$(CH_3O)_2C_6H_3$	−74.8	^1J(F-C) 283.9 ^2J(F-C) 34.2 ^3J(F-C) 2.0	388
$C_{24}F_6H_{20}O_2S_2Zn$	As above with Ni replaced by Zn and R = $pCH_3CH_2{\cdot}C_6H_4$		−76.1	^1J(F-C) 285.8 ^2J(F-C) 33.2 ^3J(F-C) 2.0	388
$C_{24}F_6H_{20}O_4PdS_2$	As above with Ni replaced by Pd and R = $pCH_3CH_2O{\cdot}C_6H_4$		−73.7	^1J(F-C) 285.1 ^2J(F-C) 33.2 ^3J(F-C) 2.0	388
$C_{24}F_6H_{20}O_4PtS_2$	As above with Ni replaced by Pt and R = $pCH_3CH_2O{\cdot}C_6H_4$		−73.6	^1J(F-C) 286.1 ^2J(F-C) 33.7 ^3J(F-C) 2.0	388
$C_{24}F_6H_{20}O_4S_2Zn$	As above with Ni replaced by Zn and R = $pCH_3CH_2O{\cdot}C_6H_4$		−76.0	^1J(F-C) 286.1 ^2J(F-C) 33.1 ^3J(F-C) 2.0	388
$C_{24}F_6H_{30}O_4Pd_2$				^1J(F-C) 293 ^2J(F-C) 41	389
$C_{24}F_{12}H_{22}Mo_2O_8P_2$	$Mo_2(O_2CCF_3)_4[P(CH_3)_2C_6H_5]_2$		−69.7, −72.7, −73.2		363
$C_{24}F_{18}H_{27}N_3O_3$	As $C_{12}F_{15}H_6N_3O_3$ above with R = n-$C_4H_9{\cdot}C(CF_3)_2{\cdot}O$		−73.03		237
$C_{24}F_{30}H_4P_4$			−61.18, −58.17, −57.93, −57.58, −56.52 (ratio 1:1:1:1:1)	$\frac{1}{2}[J$(P-F) + J(P-F′)] 40.6, 37.2, 37.2, 40.6, 38.6	374(c)

Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{24}F_{42}H_{12}N_8O_6P_3$	$(CF_3^{(1)}\cdot CF_2^{(2)}\cdot CF_2^{(3)}\cdot CH_2^{(4)}\cdot O)_6P_3N_3$	(1) −80.3 (2) −126.2 (3) −120.2	(1-3) 9.0 (3-4) 12.5	353
$C_{26}F_3H_{17}O_3P_2$		−78.3	(1-2) 8 (P3-1) 4	359
$C_{26}F_3H_{33}O_3P_2$	$cyclo C_6H_{11}\cdot P(O)(Ph)\cdot C(CF_3)(OH)\cdot P(O)(Ph)(cyclo C_6H_{11})$	−85.5		348
$C_{26}F_6H_{24}O_8PdS_2$	As $C_{24}F_6H_{20}NiO_6S_2$ above with Ni replaced by Pd and R = $3,4,5(CH_3O)_3C_6H_2$	−73.7	^1J(F-C) 285.2 ^2J(F-C) 34.2 ^3J(F-C) 2.0	388
$C_{26}F_6H_{24}O_8S_2Zn$	As $C_{26}F_6H_{24}O_8PdS_2$ above with Pd replaced by Zn	−76.1	^1J(F-C) 286.1 ^2J(F-C) 33.8 ^3J(F-C) 2.0	388
$C_{26}F_6H_{44}O_4$	As $C_{20}F_6H_{32}O_4$ above with $R^1 = C_8H_{17}$ and $R^2 = C_{11}H_{22}CO_2CH_3$	−78.84		384
$C_{26}F_{12}H_{48}Mo_2O_8P_6$	$Mo_2(O_2CCF_3)_4[Me_2PCH_2CH_2PMe_2]_3$	−75.1		363
$C_{26}F_{12}H_{54}Mo_2O_8P_2Si_6$	$Mo_2(O_2CCF_3)_4[PSi(CH_3)_3]_2$	−70.1		363
$C_{27}F_6H_{25}O_3P$		−84.36		290(a)
$C_{27}F_{14}H_{17}N_3S$	$pR\cdot C_6H_4\cdot NH\cdot C(=CN\cdot C_6H_4\cdot Rp)\cdot C[SCF^{(2)}(CF_3^{(1)})_2]=C[SCF^{(4)}(CF_3^{(3)})_2]\cdot NH\cdot C_6H_4\cdot Rp$ R = H	(1)(3) −73.56, −75.45 (2)(4) −163.60, −174.53		268
$C_{28}F_3H_{25}O_3P_2$	$PhCH_2\cdot P(O)(Ph)\cdot C(CF_3)(OH)\cdot P(O)(CH_2Ph)(Ph)$	−85.4		348
$C_{28}F_3H_{25}O_3P_2$	$PhCH_2\cdot P(O)(Ph)\cdot CH(CF_3)\cdot O\cdot P(O)(CH_2Ph)(Ph)$	−79.6	(1-2) 8 (P-1) 1	348

$C_{28}F_6H_{20}BrP$	$[CF_3^{(1)}\cdot C(C_6H_5)=CF^{(2)}\cdot CF_2^{(3)}\cdot P(C_6H_5)_3]Br$					332
		Z-isomer	(1) −60.6 (2) −93.4 (3) −106.6	(1-3) 23 (P-2) 87	(2-3) 19	
		E-isomer	(1) −55.3 (2) −95.0 (3) −102.0	(1-2) 12 (P-2) 78	(1-3) 17	
$C_{30}F_9H_{18}AlO_6$	As $C_{15}F_9H_{12}AlO_6$ above with R = C_6H_5 and R′ = CF_3		−76.03, −76.09, −76.14, −76.21 (mixture of isomers)			369
$C_{30}F_{10}H_{26}Au_2P_2$	As $C_{20}F_6H_{22}Au_2P_2$ above with R = $PCH_3(C_6H_5)_2$		−52.9	^4J(P-F)$_3$		323
$C_{30}F_{12}H_{15}AlO_6$	As $C_{15}F_9H_{12}AlO_6$ above with R = $pF^{(2)}\cdot C_6H_4$ and R′ = $CF_3^{(1)}$		(1) −76.07, −76.12, −76.17, −76.22 (2) −102.67, −102.80, −102.88, −103.01			369
$C_{30}F_{14}H_{23}N_3S$	As $C_{27}F_{14}H_{17}N_3S$ above with R = CH_3		(1)(3) −72.80, −74.84 (2)(4) −163.86, −174.36			268
$C_{30}F_{15}H_{17}O_3P_2$	$(mCF_3C_6H_4)_2P(O)\cdot CH^{(2)}(CF_3^{(1)})\cdot O\cdot PO(mCF_3C_6H_4)_2$		(1) −80.5	(1-2) 7	(P-1) 2	348
$C_{32}F_6H_{32}Au_2P_2$	As $C_{12}F_6H_{24}Au_2P_2$ above with a ligand of $PCH_3(C_6H_5)_2$		−50.8			323
$C_{32}F_{12}H_{26}N_3P$			−58.3, −59.7, −63.7, −68.3			306(c)
$C_{32}F_{12}H_{54}Mo_2O_8P_2$	$Mo_2(O_2CCF_3)_4(PBu^t{}_3)_2$		−70.6			363
$C_{33}F_9H_{24}AlO_6$	As $C_{15}F_9H_{12}AlO_6$ above with R = $pCH_3C_6H_4$ and R′ = CF_3		−76.00, −76.08, −76.12, −76.23 (mixture of isomers)			369
$C_{33}F_9H_{24}AlO_9$	As $C_{15}F_9H_{12}AlO_6$ above with R = $pCH_3OC_6H_4$ and R′ = CF_3		−75.89, −75.98, −76.02, −76.12 (mixture of isomers)			369
$C_{33}F_{12}H_{22}Mo_2O_8P_2$	$Mo_2(O_2CCF_3)_4(Ph_2PCH_2PPh_2)$		−70.6, −72.8 (ratio 10:1)			363
$C_{33}F_{18}H_{24}N_6$		R = $(CF_3)_2CH\cdot N{=}C(C_6H_5)$—	−71.4			344(a)

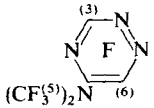
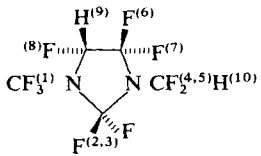
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{34}F_6H_{36}Au_2P_2$	As $C_{12}F_6H_{24}Au_2P_2$ above with a ligand of $PCH_3(C_6H_5)_2$, and with CH_3 on Au replaced by CH_2CH_3	−53.1		323
$C_{34}F_{12}H_{24}Mo_2O_8P_2$	$Mo_2(O_2CCF_3)_4[PCH_3(C_6H_5)_2]_2$	−70.5		363
$C_{35}F_6H_{30}FeP_2$	$Fe(C_5H_5)(CF_3CH{=}CHCF_3)[(C_6H_5)_2PCH_2]_2$	−55.3 (*gem* to Fe, *trans* to H) −61.5 (*gem* to H, *trans* to Fe)	J(F-F) 14	390
$C_{36}F_9H_{30}CoO_6S_3$	 CO	R = $pCH_3CH_2OC_6H_4$ −75.1	^1J(F-C) 286.1 ^2J(F-C) 34.2 ^3J(F-C) 2.0	388
$C_{36}F_{18}H_{30}N_6$	As $C_{33}F_{18}H_{24}N_6$ above with R = $(CF_3)_2CH{\cdot}N{=}C(C_6H_5CH_3p)$—	−71.5		344(a)
$C_{39}F_9H_{36}CoO_{12}S_3$	As $C_{36}F_9H_{30}CoO_6S_3$ above with R = 3,4,5$(CH_3O)_3C_6H_2$	−75.2	^1J(F-C) 284.2 ^2J(F-C) 34.2 ^3J(F-C) 2.0	388
$C_{40}F_6H_{30}P_2Pt$	$(Ph_3P)_2\overline{PtC(CF_3){=}C}{\cdot}CF_3$		^3J(Pt-F) + 66.5 ^3J(P-F) + $^3J'$(P-F) + 10.6	391
$C_{41}F_3H_{27}Cl_6O_2P_2Pt$	 $Pt[P(C_6H_4Clp)_3]_2$	−70.15	(F-C4) 32 (P-F) 0.9 (Pt-F) 11.4	392(b)
$C_{41}F_3H_{33}As_2O_2Pt$	As above with Cl replaced by H and P by As	−70.34	(F-C5) 281 (F-C4) 32 (Pt-F) ~9	392(b)
$C_{41}F_3H_{33}O_2P_2Pt$	As above with Cl replaced by H	−69.74	(F-C5) 279 (F-C4) 32 (F-C3) ~3 (P-F) 1.1 (Pt-F) 11.4	392(b)
$C_{42}F_9H_{24}AlO_6$	As $C_{15}F_9H_{12}AlO_6$ above with R = β-$C_{10}H_7$ and R′ = CF_3	−75.85, −75.90, −75.93, −76.00		369
$C_{44}F_{12}H_{30}Mo_2O_8P_2$	$Mo_2(O_2CCF_3)_4[P(C_6H_5)_3]_2$	−70.1		363

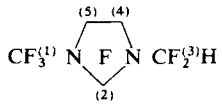
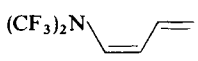
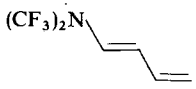
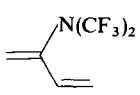
$C_{44}F_{12}H_{66}Mo_2O_8P_2$	$Mo_2(O_2CCF_3)_4[P(cyclo C_6H_{11})_3]_2$		−70.7				363
$C_{46}F_3H_{39}N_2O_5$		$R^1 = H$ $R^2 = (C_6H_5)_3C$	−64.3				284(c)
$C_{46}F_3H_{39}N_2O_6$	As above with $R^1 = OC(C_6H_5)_3$ and $R^2 = H$		−64.3				284(c)
$C_{50}F_6H_{32}BrNO_{10}Os_3P_2$	$[(Ph_3P)_2N][Os_3(CO)_{10}\{CF_3CH{=}CHCF_3\}Br]$				^3J(F-H) 8.6, 8.2		393
$C_{58}F_9H_{51}N_2O_6P_4W$	$\{W(N_2H_2)(Ph_2PCH_2CH_2PPh_2)_2(CF_3CO_2)\}^+\{(CF_3CO_2)_2H\}^-$		−72.7, −74.0 (ratio 1:2)				394
$C_{60}F_3H_{51}N_4O_6P_4W$	$W(N_2C_6H_3(NO_2)_2)(Ph_2PCH_2CH_2PPh_2)_2(CF_3CO_2)$		−74.5				394
$C_{62}F_7H_{53}N_4O_8P_4W$	$\{W(HN_2C_6H_3(NO_2)_2)(Ph_2PCH_2CH_2PPh_2)_2F\}^+\{(CF_3CO_2)_2H\}^-$		−76.2				394

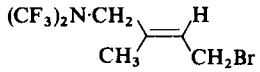
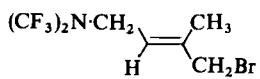
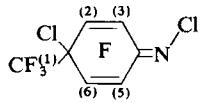
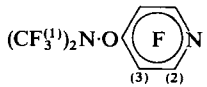
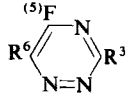
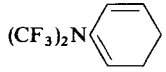
2. *CF_3 group bonded to nitrogen*

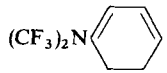
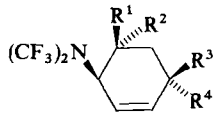
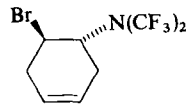
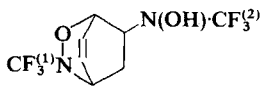
CF_3H_2N	$CF_3^{(1)}{\cdot}NH_2^{(2)}$		−49.9		(1-2) 10.4		174
CF_4HN	$CF_3^{(1)}{\cdot}NH^{(3)}F^{(2)}$	(1)	−74.2	(2) −127.6	(1-2) 26.7 (2-3) 51.0	(1-3) 9.5	178
CF_5NOS	$CF_3^{(1)}{\cdot}NSOF_2^{(2)}$	(1)	−48.3	(2) +47.3	(1-2) 8		181
CF_5NS	$CF_3^{(1)}{\cdot}NSF_2^{(2)}$				(1-C) 264	(2-C) 8.3	182
CF_7NS	$CF_3^{(1)}{\cdot}NSF_4^{(2)}$				(1-C) 264	(2-C) 7.4	182
$C_2F_3H_3N_2O$	$CF_3^{(1)}{\cdot}NH^{(2)}{\cdot}CONH_2$		−57.06		(1-2) 3.6		174
$C_2F_3H_4NO$	$CF_3{\cdot}NH{\cdot}OCH_3$		−71.3				178

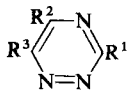
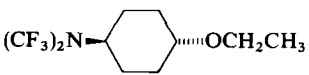
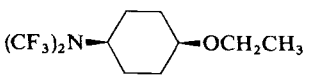
Molecular formula	Structure of compounds	Chemical shifts (ppm)		Coupling constants (Hz)		Ref.
C_2F_5NO	$CF_3^{(1)}\cdot NF^{(2)}\cdot CO\cdot F^{(3)}$	(1) −67.9	(2) −71.5	(1-2) 13.2	(1-3) 13.2	198
		(3) −7.9		(2-3) 46.3		
C_2F_6HNO	$CF_3^{(1)}\cdot NH^{(3)}\cdot OCF_3^{(2)}$	(1) −71.5	(2) −67.7	(1-2) 2.8	(1-3) 8.3	178
				(2-3) ~0		
$C_3F_3HN_2O$	$CF_3^{(1)}\cdot NH^{(2)}\cdot CO\cdot CN$	−59.4		(1-2) 4		174
$C_3F_3H_4NO_2$	$CF_3^{(1)}\cdot NH^{(2)}\cdot CO_2CH_3$	−57.7		(1-2) 3.5		174
$C_3F_3H_6NO$	$CF_3^{(1)}\cdot NH^{(2)}\cdot OCH_2CH_3$	−70.9		(1-2) 9.6		178
$C_3F_6H_3N$	$CF_3^{(1)}\cdot N(CF_2^{(2)}H^{(4)})\cdot CF^{(3)}H_2^{(5)}$	(1) −59.1	(2) −96.75	(2-4) 59	(3-5) 51	213
		(3) −170.9				
$C_3F_7H_2N$	$CF_3^{(1)}\cdot N(CF_2^{(2)}H^{(3)})_2$	(1) −57.0	(2) −97.6	(1-2) 6.0	(2-3) 58.1	213
$C_3F_7H_2N$	$CF_3^{(1)}\cdot N(CF_2^{(2)}H^{(3)})_2$	(1) −57.0	(2) −97.7	(1-2) 6.9	(2-3) 57.6	218
				(1-C1) 264.0	(2-C2) 250.2	
				(2-C1) 1.93		
$C_3F_7NO_2$	$CF_3^{(1)}\cdot N(OCF_3^{(2)})\cdot CO\cdot F^{(3)}$	(1) −64.4	(2) −67.2	(1-2) 4.3	(1-3) 14.5	198
		(3) −8.2		(2-3) 5.2		
$C_3F_7NO_3$	$CF_3^{(1)}\cdot NF^{(2)}\cdot CO\cdot OOCF_3^{(3)}$	(1) −67.9	(2) −75.1	(1-2) 11.9		220
		(3) −69.0		(1-3) ≈(2-3) ≤0.5		
C_3F_8HN	$(CF_3^{(1)})_2N\cdot CF_2^{(2)}H^{(3)}$	(1) −56.3	(2) −98.0	(1-2) 8.00	(2-3) 56.4	218
				(1-3) 0.67	(1-C1) 267.5	
				(2-C2) 254.1	(1-C2) 2.04	
C_3F_8ClNO	$(CF_3^{(1)})_2N\cdot O\cdot CF_2^{(2)}Cl$	(1) −69.5	(2) −39.4	(1-2) 8		222(a)
C_3F_9N	$(CF_3)_3N$	−55.8		(F-C) 269		218
$C_4F_3H_8NO$	$CF_3^{(1)}\cdot NH^{(2)}\cdot O\cdot CH(CH_3)_2$	−70.5		(1-2) 9.6		178
$C_4F_6H_4ClNO$	$(CF_3)_2N\cdot O\cdot CHCl\cdot CH_3$	−69.5				222(a)
$C_4F_6H_5NOS$	$(CF_3)_2N\cdot O\cdot CH_2\cdot SCH_3$	−70.0				243(a)
$C_4F_6H_5NO_2$	$(CF_3)_2N\cdot O\cdot CH_2\cdot OCH_3$	−70.1				242(a)
$C_4F_7H_4NO$	$(CF_3^{(1)})_2N\cdot O\cdot CF^{(2)}H^{(3)}\cdot CH_3^{(4)}$	(1) −70.2	(2) −125.1	(2-3) 60	(2-4) 18	222(a)
$C_4F_8H_3NO$	$(CF_3^{(1)})_2N\cdot O\cdot CF_2^{(2)}\cdot CH_3^{(3)}$	(1) −69.6	(2) −74.8	(1-2) 8.5	(2-3) 14	222(a)

$C_4F_{10}N_2O$	$CF_3^{(1)}\cdot N{=}CF^{(3)}\cdot O\cdot N(CF_3^{(2)})_2$	(1) −58.3 (3) −44.5	(2) −71.0	(1-3) 11.5		248(a)
$C_4F_{11}HN_2O$	$CF_3^{(1)}\cdot NH\cdot CF_2^{(2)}\cdot O\cdot N(CF_3^{(3)})_2$	(1) −57.8 (3) −69.4	(2) −67.8			248(a)
$C_4F_{11}ClN_2O$	$CF_3^{(1)}\cdot NCl\cdot CF_2^{(2)}\cdot O\cdot N(CF_3^{(3)})_2$	(1) −64.6 (3) −71.9	(2) −69.7			248(a)
$C_4F_{12}N_2$	$(CF_3^{(1)})_2N\cdot CF_2^{(2)}\cdot NF^{(3)}\cdot CF_3^{(4)}$	(1) −83.9	(4) −68.9	(1-2) 12.0 (2-4) 12.0	(2-3) 29.0 (3-4) 12.0	250
$C_5F_3H_{10}N$	$CF_3^{(1)}\cdot NH^{(2)}\cdot C(CH_3)_3$	−51.0		(1-2) 7.0	(1-C1) 254.9	255
$C_5F_3H_{10}NO$	$CF_3^{(1)}\cdot NH^{(2)}\cdot O\cdot C(CH_3)_3$	−69.7		(1-2) 9.5		178
$C_5F_6HN_3O_2$	$CF_3\cdot\overline{N\cdot CO\cdot C(=NH)\cdot N(CF_3)\cdot CO}$	−58.9, −58.1				174
$C_5F_6N_2O_3$	$CF_3\cdot\overline{N\cdot CO\cdot CO\cdot N(CF_3)\cdot CO}$	−59.06				174
$C_5F_8N_4$		(3) −64.8 (6) −95.9	(5) −57.8	(3-6) 35	(5-6) 7	260(a)
$C_5F_8N_4$		(3) −56.3 (6) −58.5	(5) −67.5	(3-5) <4	(5-6) 3	260(a)
$C_5F_9H_3ClNO_2$	$(CF_3^{(1)})_2N\cdot O\cdot CH_2\cdot O\cdot CF_2^{(2)}\cdot CH^{(4)}F^{(3)}Cl$	(1) −70.1 (3) −156.5	(2) −88.6	(2-3) 11 (3-4) 48	(2-4) 4	242(a)
$C_5F_9H_3ClNO_2$	$(CF_3^{(1)})_2N\cdot O\cdot CF^{(2)}Cl\cdot CF_2^{(3)}\cdot OCH_3$	(1) −68.3, −68.8 (2) −78.3	(3) −92.0			242(a)
$C_5F_{10}H_2N_2$		(1) −57.7 (3) −58.5 (5) −97.65 (7) −79.7	(2) −65.7 (4) −102.0 (6) −101.05 (8) −145.2	(2-3) 126 (4-10) 55 (6-7) 181	(4-5) 228 (5-10) 59 (8-9) 64	213

Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_5F_{11}HN_2$		(1) −56.55 (2) −62.65 (3) −99.9 (4) −91.65 (5) −93.35		213
$C_6F_3H_9NOSi$	$CF_3{\cdot}N{=}C(CN){\cdot}OSi(CH_3)_3$	−56.2		174
$C_6F_3H_{10}NO_2$	$CF_3^{(1)}{\cdot}NH^{(2)}{\cdot}CO{\cdot}OC(CH_3)_3$	−57.28	(1-2) 3.2	174
$C_6F_6H_5N$		−62.0		271(a)
$C_6F_6H_5N$		−61.1		271(a)
$C_6F_6H_5N$		−57.7		271(a)
$C_6F_6H_6BrN$	$(CF_3)_2N{\cdot}CH(CH_2Br){\cdot}CH{=}CH_2$	−56.5		271(a)
$C_6F_6H_6BrN$	E-$(CF_3)_2N{\cdot}CH_2{\cdot}CH{=}CHCH_2Br$	−59.8		271(a)
$C_6F_6H_9NO_2$	$(CF_3)_2N{\cdot}O{\cdot}CH(CH_3){\cdot}OCH_2CH_3$	−69.12		242(a)
$C_6F_{10}N_3O_2$	$(CF_3^{(1)})_2N{\cdot}O{\cdot}CF_2^{(2)}{\cdot}N{=}CF^{(3)}{\cdot}ON(CF_3^{(4)})_2$	(1) −70.3 (2) −65.5 (3) −42.9 (4) −71.1		248(a)
$C_6F_{11}H_2N_2$	$CF_3^{(1)}{\cdot}N(CF_2^{(2)}H^{(6)}){\cdot}CF_2^{(3)}{\cdot}CF_2^{(4)}{\cdot}N(CF_2^{(5)}{\cdot}H^{(7)})_2$	(1) −52.9 (2) −96.45 (3)(4) −98.4 (5) −94.9	(2-6) 55 (5-7) 58	213
$C_6F_{12}H_2Cl_2N_2O_2$	$(CF_3^{(1)})_2N{\cdot}O{\cdot}CH_2{\cdot}CCl_2{\cdot}ON(CF_3^{(2)})_2$	(1) −70.38 (2) −66.88		222(a)
$C_6F_{12}H_4N_2O_3$	$[(CF_3)_2N{\cdot}OCH_2]_2O$	−68.3		242(a)
$C_6F_{14}H_2N_2O_2$	$(CF_3^{(1)})_2N{\cdot}O{\cdot}CH_2{\cdot}CF_2^{(3)}{\cdot}ON(CF_3^{(2)})_2$	(1) −71.2 (2) −86.15 (3) −69.75		222(a)
$C_7F_3H_5ClN$	p-$CF_3NH{\cdot}C_6H_4{\cdot}Cl$	−57.3		255

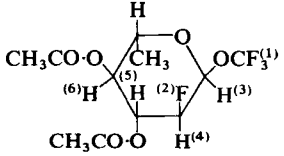
$C_7F_3H_6N$	$CF_3{\cdot}NH{\cdot}C_6H_5$	−55.7			255
$C_7F_4H_5N$	$o{CF_3^{(1)}}NH{\cdot}C_6H_4{\cdot}F^{(2)}$	(1) −56.7	(2) −132.2		255
$C_7F_6H_8BrN$	$(CF_3)_2N{\cdot}CH(CH_2Br){\cdot}C(CH_3){=}CH_2$	−55.0			271(a)
$C_7F_6H_8BrN$		−58.9			271(a)
$C_7F_6H_8BrN$		−58.2			271(a)
$C_7F_6H_8BrN$	$(CF_3)_2N{\cdot}C(CH_3)(CH_2Br){\cdot}CH{=}CH_2$	−48.6			271(a)
$C_7F_6H_9ClN_2O$	$(CF_3)_2N{\cdot}O{\cdot}C(Cl){=}N{\cdot}C(CH_3)_3$	−69.4			248(a)
$C_7F_7Cl_2N$		(1) −71.1 (3) −144.5 (6) −132.8	(2) −138.8 (5) −142.9		542(b)
$C_7F_{10}N_2O$		(1) −70.5 (3) −159.1	(2) −66.0		248(a)
$C_7F_{12}H_6N_2O_2S$	$(CF_3)_2N{\cdot}O{\cdot}CH_2{\cdot}CH[ON(CF_3)_2]{\cdot}SCH_3$	−68.8, −70.3			243(a)
$C_7F_{12}H_6N_2O_3S$	$(CF_3)_2N{\cdot}O{\cdot}CH_2{\cdot}CH[ON(CF_3)_2]{\cdot}S(O)CH_3$	−68.45, −68.4			243(a)
$C_7F_{12}H_6N_2O_4S$	$(CF_3)_2N{\cdot}O{\cdot}CH_2{\cdot}CH[ON(CF_3)_2]{\cdot}SO_2CH_3$	−69.2, −68.1			243(a)
$C_7F_{13}N_5$	 $R^3 = R^6 = (CF_3)_2N$	(3) −57.3 (6) −57.8	(5) −69.7	(5-6) 4	260(a)
$C_8F_6H_7N$		−58.0			299(a)

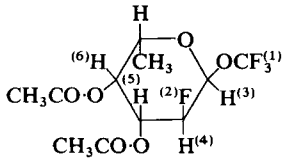
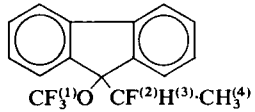
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_8F_6H_7N$		−57.7		299(a)
$C_8F_6H_8BrN$	 R^1 R^2 R^3 R^4 H Br H H H H H Br H H Br H	 −55.0 −55.4 −55.5		299(a)
$C_8F_6H_8BrN$		−55.2		299(a)
$C_8F_6H_8ClN$	As first $C_8F_6H_8BrN$ above with R^1 R^2 R^3 R^4 H Cl H H H H H Cl H H Cl H	 −55.2 −55.8 −55.8		299(a)
$C_8F_6H_8ClN$	As second $C_8F_6H_8BrN$ above with Br replaced by Cl	−55.5		299(a)
$C_8F_6H_8IN$	As first $C_8F_8H_8BrN$ above with $R^1 = H$, $R^2 = I$, $R^3 = H$, $R^4 = H$	−54.9		299(a)
$C_8F_6H_8IN$	As second $C_8F_6H_8BrN$ above with Br replaced by I	−55.2		299(a)
$C_8F_6H_8N_2O_2$		(1) −67.6 (2) −74.7		300(a)
$C_8F_6H_9N_3O_2Si$	$CF_3{\cdot}N{\cdot}CO{\cdot}C[{=}NSi(CH_3)_3]{\cdot}N(CF_3){\cdot}CO$	−58.1, −58.5		174
$C_8F_6H_{10}BrN$	$CH_2{=}C(CH_3){\cdot}C(CH_3)(CH_2Br){\cdot}N(CF_3)_2$	−48.1		271(a)
$C_8F_6H_{10}BrN$	Z-$(CF_3)_2N{\cdot}CH_2{\cdot}C(CH_3){=}C(CH_3){\cdot}CH_2Br$	−58.5		271(a)
	E-isomer	−58.7		

$C_8F_6H_{10}BrN$		−54.7				271(a)
$C_8F_{12}H_8N_2O_3$	$(CF_3)_2N{\cdot}O{\cdot}CH_2{\cdot}CH[ON(CF_3)_2]{\cdot}OCH_2CH_3$	−71.00				242(a)
$C_8F_{18}N_4O_3$	$\{CF_3^{(1)}{\cdot}N{=}C[ON(CF_3^{(2)})_2]\}_2O$	(1) −57.5	(2) −70.7			248(a)
$C_8F_{22}HgN_4O_2$	$\{[(CF_3^{(2)})_2N{\cdot}OCF_2^{(3)}][(CF_3^{(1)})N\}_2Hg$	(1) −48.3 (3) −59.1	(2) −68.7	(1-3) 9.5 (Hg-1) 73.3	(2-3) 7.6	248(a)
$C_9F_6H_6ClNO$	$(CF_3)_2N{\cdot}O{\cdot}CHCl{\cdot}C_6H_5$	−67.7, −69.0				322(a)
$C_9F_6H_7NO_2$	$(CF_3)_2N{\cdot}O{\cdot}CH_2{\cdot}O{\cdot}C_6H_5$	−69.25				242(a)
$C_9F_9H_7N_2O$		(1) −57.8	(2) −70.7			299(a)
$C_9F_{12}H_9N_3O_2$	$[(CF_3)_2N{\cdot}O]_2C{=}N{\cdot}C(CH_3)_3$	−70.34				248(a)
$C_9F_{18}N_6$	 $R^1 = R^2 = R^3 = (CF_3)_2N$	(1) −57.4 (3) −57.1	(2) −58.3	(2-3) 2		260(a)
$C_{10}F_4H_{18}N_2$	$CF_3^{(1)}{\cdot}NBu^t{\cdot}CF^{(2)}{=}NBu^t$	(1) −67.5	(2) −90.5	(1-2) 14.7		255
$C_{10}F_6H_6N_2O$	$(CF_3)_2N{\cdot}O{\cdot}CH(CN){\cdot}C_6H_5$	−68.3				322(a)
$C_{10}F_6H_{13}NO$		−55.3				299(a)
$C_{10}F_6H_{13}NO$		−55.6				299(a)
$C_{11}F_6H_{18}N_4OS$	$(CF_3N{=})_2S{\cdot}N(CH_2CH_3){\cdot}CO{\cdot}NBu^t$	−46.6				345
$C_{12}F_{12}H_5N_3O_2$	$[(CF_3)_2NO]_2C(C_6H_5){\cdot}CN$	−66.5				322(a)
$C_{12}F_{24}H_6N_4O_6S$	$[(CF_3)_2N{\cdot}O{\cdot}CH_2{\cdot}CH(ON(CF_3)_2)]_2SO_2$	−70.5, −69.1				243(a)
$C_{14}F_4H_{10}N_2$	$C_6H_5{\cdot}N{=}CF^{(2)}{\cdot}N(C_6H_5){\cdot}CF_3^{(1)}$	(1) −56.2	(2) −46.3	(1-2) 14.1		255

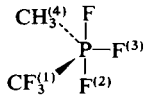
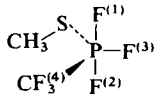
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{16}F_6H_{10}ClNO$	$(CF_3)_2N{\cdot}O{\cdot}C(C_6H_5)_2{\cdot}CO{\cdot}Cl$	−65.70		370(a)
$C_{16}F_6H_{11}NO_3$	$(CF_3)_2N{\cdot}O{\cdot}C(C_6H_5)_2{\cdot}CO_2H$	−65.62		370(a)
$C_{16}F_6H_{12}N_2O_2$	$(CF_3)_2N{\cdot}O{\cdot}C(C_6H_5)_2{\cdot}CO{\cdot}NH_2$	−65.3		370(a)
$C_{18}F_{12}H_{10}N_2O_3$	$(CF_3)_2N{\cdot}O{\cdot}CO{\cdot}C[ON(CF_3)_2](C_6H_5)_2$	−67.3, −66.05		370(a)

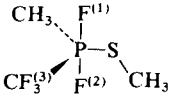
3. CF_3 group bonded to oxygen

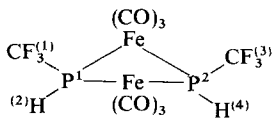
CF_4O_3S	$CF_3^{(1)}OSO_2F^{(2)}$	(1) −59.45 (2) +43.71	(1-2) 6.9 (1-C) 272.1	179(a)
$C_2F_5HO_4S$	$CF_3^{(1)}OSO_2OCF_2^{(2)}H^{(3)}$	(1) −58.54 (2) −87.03	(2-C2) 270.6 (2-3) 68.1	179(a)
$C_2F_6O_3S$	$CF_3^{(1)}OSO_2CF_3^{(2)}$	(1)(2) −74.7, −53.1	(1-2) 3.8	203(c)
$C_2F_6O_4S$	$(CF_3O)_2SO_2$	−59.13		179(a)
$C_3F_9O_4P$	$(CF_3O)_3PO$	−55.6	(P-F)6	226
$C_4F_4H_5NO_6S$	$CF_3^{(1)}SO_2O{\cdot}CH_2^{(3)}{\cdot}CF^{(2)}(NO_2){\cdot}CH_2^{(4)}{\cdot}OH$	(1) −72.0 (2) −139.4	(2-3) 14 (2-4) 14	231
$C_4F_5H_3O_3$	$CF_3^{(1)}O{\cdot}CF_2^{(2)}{\cdot}CO_2CH_3$	(1) −55.1 (2) −78.7	(1-2) 10	239
$C_4F_6H_4O_6S_2$	$(CF_3SO_3CH_2)_2$	−75.3		207
$C_5F_7H_3O_3$	$CF_3^{(1)}O{\cdot}CF_2^{(2)}{\cdot}CF_2^{(3)}{\cdot}CO_2CH_3$	(1) −54.8 (2) −86.6 (3) −120.3	(1-2) 9 (2-3) 2	239
$C_6F_4H_6O_5$	$CF_3^{(1)}O{\cdot}CF^{(2)}(CO_2CH_3)_2$	(1) −54.6 (2) −120.4	(1-2) 9	239
$C_7F_3H_4ClO$	$pCF_3O{\cdot}C_6H_4{\cdot}Cl$	−58.76		280
$C_7F_3H_4NO_3$	$pCF_3O{\cdot}C_6H_4{\cdot}NO_2$	−58.41		280
$C_7F_3H_6NO$	$pCF_3O{\cdot}C_6H_4{\cdot}NH_2$	−58.98		280
$C_7F_6H_6O_5$	$CF_3^{(1)}O{\cdot}CF_2^{(2)}{\cdot}CF^{(3)}(CO_2CH_3)_2$	(1) −54.5 (2) −78.2 (3) −170.2	(1-2) 9 (2-3) 7	239
$C_{11}F_4H_{14}O_6$		(1) −58.9	(1-2) 0.8 (2-3) <0.5 (2-4) 48.0 (2-5) 12.0	342

$C_{11}F_4H_{14}O_6$	As above with OCF_3 and $H^{(3)}$, and $F^{(2)}$ and $H^{(4)}$ interchanged		(1) −54.3	(2) −220.8	(2-3) 17 (2-5) 30.0	(2-4) 50.5 (2-6) ~2	342
$C_{11}F_4H_{14}O_6$			(1) −58.8	(2) −209.9	(1-2) 1.25 (2-5) 13.0 (2-3) <0.2	(2-4) 48.5 (2-6) 3.5	342
$C_{15}F_4H_{12}O$	$(C_6H_5)_2C(OCF_3^{(1)})\cdot CF^{(2)}H_2$		(1) −48.0	(2) −212.4			366
$C_{15}F_5H_{11}O$	$(C_6H_5)_2C(OCF_3^{(1)})\cdot CF_2^{(2)}H$		(1) −49.2	(2) −124.8			366
$C_{16}F_4H_{12}O$			(1) −50.0	(2) −181.6	(2-3) 47	(2-4) 7	366
$C_{16}F_5H_{11}O$	As above with CFH replaced by CF_2		(1) −49.3	(2) −101.0	(2-4) 18		366

4. *CF_3 group bonded to phosphorus*

$C_2F_3H_3Cl_3P$	$CF_3^{(1)}(CH_3^{(2)})PCl_3$	(several isomers possible)	+30°C −80°C	−74.1 −76.7	(P-1) 114.6 90.5	(1-2) 0.7	188
$C_2F_6H_3P$			(1) −69.0 (3) −86.5	(2) −25.9 (−100°C)	(P-1) 157.5 (P-3) 1026 (1-2) 17.0 (2-3) 50.80	(P-2) 909 (2-4) 9.0 (1-3) 2.2	188
$C_2F_6H_3PS$			(1) −16.1 (3) −76.2 (at −90°C)	(2) −24.8 (4) −69.2	(P-1) 927 (P-3) 1081.5 (1-3) 71.0 (2-3) 82.0 (3-4) 4.0	(P-2) 1057 (1-2) 41.0 (1-4) 12.0 (2-4) 16.0 (P-4) 168.8	201

Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
C_2F_6IP	$(CF_3)_2PI$	−55.6	(P-F) 76	176(a)
$C_3F_5H_6PS$		(1) −18.0 (2) −26.4 (3) −69.8 (at −90°C)	(P-1) 728 (P-2) 860 (1-2) 50	201
$C_3F_6H_3OP$	$(CF_3^{(1)})_2POCH_3^{(2)}$	−64.4	(P-1) 86.1 (1-2) 0.5	214
$C_3F_6H_3OPS$	$(CF_3^{(1)})_2P(S)OCH_3^{(2)}$	−71.6	(P-1) 116.5 (1-2) 0.4	214
$C_3F_6H_3OPS$	$(CF_3^{(1)})_2P(O)SCH_3^{(2)}$	−70.6	(P-1) 109.0 (1-2) 0.6	214
$C_3F_6H_3PS$	$(CF_3)_2PSCH_3$	−56.0	(P-F) 78.0	189, 208, 209
$C_3F_6H_3PS_2$	$(CF_3)_2P(S)SCH_3$	−70.0	(P-F) 104.5	214
$C_3F_6H_3PSe$	$(CF_3)_2PSeCH_3$	−54.6	(P-F) 73.3	189, 209
$C_3F_6H_3PTe$	$(CF_3)_2PTeCH_3$	−51.1	(P-F) 65.9	189, 209
$C_3F_8H_3PS$	$(CF_3^{(1)})_2PF_2^{(2,3)}SCH_3$	(1) −67.4 (2) −38.7 (3) −45.1 (at −100°C)	(P-1) 130.5 (P-2) 867 (P-3) 906	201
C_3F_9PSe	$(CF_3^{(1)})_2PSeCF_3^{(2)}$	(1) −53.8 (2) −31.2	(P-1) 78.0 (P-2) 19.2	209
C_3F_9PSe	$(CF_3^{(1)})_2PSeCF_3^{(2)}$	(1) −46.0 (2) −31.2	(P-1) 78.0 (P-2) 19.0 (1-2) 1.1	189
$C_4F_3H_9P_2$	$CF_3^{(1)}P^{(2)}P^{(3)}(CH_3)_3$	−26.7	(P2-1) +37.2 (P3-1) +23.6 (1-C1) 319.1	234
$C_4F_6H_5OP$	$(CF_3)_2POCH_2CH_3$	−65.0	(P-F) 87.2 ^5J(F-H) or ^6J(F-H) 0.3	214
$C_4F_6H_5OPS$	$(CF_3)_2P(O)SCH_2CH_3$	−71.1	(P-F) 108.5	214
$C_4F_6H_5OPS$	$(CF_3)_2P(S)OCH_2CH_3$	−72.0	(P-F) 116.3	214
$C_4F_6H_5O_2P$	$(CF_3)_2P(O)OCH_2CH_3$	−73.5	(P-F) 121.8	214

$C_4F_6H_5PS$	$(CF_3)_2PSCH_2CH_3$	−57.1		(P-F) 79.4		214
$C_4F_6H_5PS_2$	$(CF_3)_2P(S)SCH_2CH_3$	−70.4		(P-F) 103.7		214
$C_4F_6H_6AsP$	$(CF_3)_2PAs(CH_3)_2$	−46.9		(P-F) 60.0		208, 209
$C_4F_6H_6P_2$	$(CF_3)_2PP(CH_3)_2$	−46.4		^2J(P-F) 64.3	^3J(P-F) 7.9	208, 209
$C_4F_{10}H_3PS$	$(CF_3^{(1)})_2PF^{(2)}(SCH_3^{(3)})$	(1) −61.7 (at +30°C)	(2) −7.92	(P-1) 103.7 (1-2) 16.5	(P-2) 980 (2-3) 2.5	201
$C_5F_6H_7OP$	$(CF_3^{(1)})_2POCH(CH_3^{(2)})_2$	−65.6		(P-1) 88.0	(1-2) 0.2	214
$C_5F_6H_7OPS$	$(CF_3)_2P(O)SCH(CH_3)_2$	−71.3		(P-F) 107.8		214
$C_5F_6H_7OPS$	$(CF_3)_2P(S)OCH(CH_3)_2$	−72.6		(P-F) 114.1		214
$C_5F_6H_7O_2P$	$(CF_3)_2P(O)OCH(CH_3)_2$	−72.4		(P-F) 118.3		214
$C_5F_6H_7PS$	$(CF_3)_2PSCH(CH_3)_2$	−57.0		(P-F) 80.3		214
$C_5F_6H_7PS_2$	$(CF_3)_2P(S)SCH(CH_3)_2$	−70.5		(P-F) 103.0		214
$C_6F_6H_9OP$	$(CF_3^{(1)})_2POC(CH_3^{(2)})_3$	−65.9		(P-1) 88.3	(1-2) 0.2	214
$C_6F_6H_9OPS$	$(CF_3^{(1)})_2P(O)SC(CH_3^{(2)})_3$	−64.7		(P-1) 84.7	(1-2) 0.8	214
$C_6F_6H_9PS$	$(CF_3)_2PSC(CH_3)_3$	−56.7		(P-F) 81.2		214
$C_6F_6H_9PS_2$	$(CF_3)_2P(S)SC(CH_3)_3$	−70.7		(P-F) 103.4		214
$C_8F_3H_6CrO_5P$	$[CF_3P(CH_3)_2]Cr(CO)_5$	−67.6		(P-F) 64.4		295
$C_8F_3H_6MoO_5P$	As above with Cr replaced by Mo	−67.8		(P-F) 67.8		295
$C_8F_3H_6O_5PW$	As above with Cr replaced by W	−67.4		(P-F) 68.8		295
$C_8F_6H_2Fe_2O_6P_2$		−47.0		(1-2) 7.5	(P1-1) 67	298
$C_8F_6H_2Fe_2O_6P_2$	As above with $CF_3^{(3)}$ and $H^{(4)}$ interchanged	(1) −48.3	(2) −44.2	(1-2) 7.5 (P1-1) 62	(3-4) 8 (P2-2) 63	298
$C_8F_6H_3CrO_5P$	$[(CF_3)_2PCH_3]Cr(CO)_5$	−60.7		(P-F) 72.3		295
$C_8F_6H_3CrO_5PS$	$[(CF_3)_2PSCH_3]Cr(CO)_5$	−57.8		(P-F) 74.1		208
$C_8F_6H_3CrO_5PSe$	As above with S replaced by Se	−56.6		(P-F) 70.5		208
$C_8F_6H_3CrO_5PTe$	As above with S replaced by Te	−54.8		(P-F) 62.8		208

Molecular formula	Structure of compounds		Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_8F_6H_3MoO_5P$	$[(CF_3)_2PCH_3]Mo(CO)_5$		−61.5	(P-F) 76.7	295
$C_8F_6H_3MoO_5PS$	$[(CF_3)_2PSCH_3]Mo(CO)_5$		−58.0	(P-F) 76.8	209
$C_8F_6H_3MoO_5PSe$	As above with S replaced by Se		−57.4	(P-F) 74.6	209
$C_8F_6H_3MoO_5PTe$	As above with S replaced by Te		−56.0	(P-F) 66.9	209
$C_8F_6H_3O_5PW$	$[(CF_3)_2PCH_3]W(CO)_5$		−62.1	(P-F) 76.7	295
$C_8F_9CrO_5P$	$[(CF_3)_3P]Cr(CO)_5$		−54.3	(P-F) 84.0	295
$C_8F_9MoO_5P$	As above with Cr replaced by Mo		−55.5	(P-F) 85.0	295
$C_8F_9MoO_5PSe$	$[(CF_3^{(1)})_2PSeCF_3^{(2)}]Mo(CO)_5$		(1) −68.4 (2) −33.0	(P-1) 83.2 (P-2) 5.7	209
$C_8F_9O_5PW$	$[(CF_3)_3P]W(CO)_5$		−56.2	(P-F) 85.0	295
$C_8F_{12}H_{12}N_2P_2$	$[(CF_3)_2P(CH_3)NCH_3]_2$	Isomer [a]	−61.8 (eq)	^2J(P-F) 108 ^4J(F-H) 10	309
			−64.6 (ax)	32 14	
		Isomer [b]	−60.3 (eq)	112 10	
			−64.8 (ax)		
$C_9F_6H_6AsCrO_5P$	$[(CF_3)_2PAs(CH_3)_2]Cr(CO)_5$		−43.5	(P-F) 65	208
$C_9F_6H_6AsMoO_5P$	As above with Cr replaced by Mo		−51.0	(P-F) 58.0	209
$C_9F_6H_6CrO_5P_2$	$[(CF_3)_2PP(CH_3)_2]Cr(CO)_5$		−43.6	(P-F) 58.8	208
$C_9F_6H_6MoO_5P_2$	As above with Cr replaced by Mo		−44.8	(P-F) 61.0	209
$C_{10}F_6H_{12}CrO_4P_2$	$[CF_3P(CH_3)_2]_2Cr(CO)_4$	*cis*	−68.0	(P-F) 61.0	295
		trans	−68.2	(P-F) 61.0	
$C_{10}F_6H_{12}MoO_4P_2$	As above with Cr replaced by Mo	*cis*	−67.4	(P-F) 64.9	295
		trans	−68.8	(P-F) 65.4	
$C_{10}F_6H_{12}O_4P_2W$	As above with Cr replaced by W	*cis*	−67.8	(P-F) 65.4	295
		trans	−69.1	(P-F) 66.1	
$C_{10}F_{12}H_6CrO_4P_2$	$[(CF_3)_2PCH_3]_2Cr(CO)_4$	*cis*	−60.2	(P-F) 68.8	295
		trans	−61.2	(P-F) 70.0	
$C_{10}F_{12}H_6MoO_4P_2$	As above with Cr replaced by Mo	*cis*	−60.9	(P-F) 73.3	295
		trans	−61.4	(P-F) 76.3	
$C_{10}F_{12}H_6O_4P_2W$	As above with Cr replaced by W	*cis*	−63.3	(P-F) 73.3	295
		trans	−64.5	(P-F) 74.5	
$C_{10}F_{18}CrO_4P_2$	$[(CF_3)_3P]_2Cr(CO)_4$	*trans*	−54.2	(P-F) 79.0	295

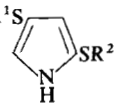
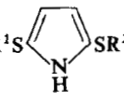
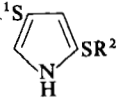
$C_{10}F_{18}MoO_4P_2$	As above with Cr replaced by Mo	*cis*	−54.4	(P-F) 82.3		295
		trans	−55.1	(P-F) 83.4		
$C_{10}F_{18}O_4P_2W$	As above with Cr replaced by W	*cis*	−55.2	(P-F) 83.4		295
		trans	−55.7	(P-F) 84.6		

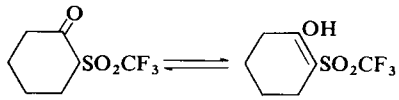
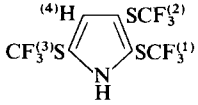
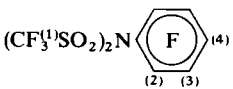
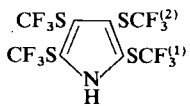
5. CF_3 group bonded to sulphur

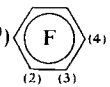
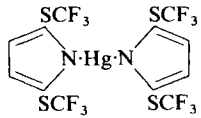
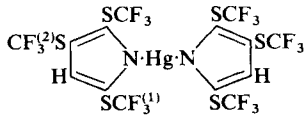
CF_3H_3GeS	$CF_3^{(1)}S{\cdot}GeH_3^{(2)}$	−33.0		(1-2) 1.85		173
$CF_3H_5Ge_2S$	$CF_3^{(1)}S{\cdot}GeH_2^{(2)}{\cdot}GeH_3^{(3)}$	−29.4		(1-2) 1.85	(1-3) 1.50	173
CF_4O_2S	$CF_3^{(1)}SO_2F^{(2)}$	(1) −81.21	(2) +35.29	(1-2) 17.9		179(a)
CF_4O_2S	$CF_3^{(1)}SO_2F^{(2)}$	(1) −73.32	(2) +37.90	(1-2) +18.3	(1-C) −318.0	180
				(2-C) +54.9		
CF_4O_2S	$CF_3^{(1)}SO_2F^{(2)}$	(1) −72.8	(2) +38.3	(1-2) 18.1		171
$C_2F_3H_3SSe$	$CF_3^{(1)}S{\cdot}SeCH_3^{(2)}$	−44.1		(1-2) 0.5		189
$C_2F_3H_3STe$	$CF_3S{\cdot}TeCH_3$	−37.2				189
$C_2F_4Cl_2O_3S$	$CF_3^{(1)}SO_3CF^{(2)}Cl_2$	(1) −74.4	(2) −10.6	(1-2) 5.4		194
$C_2F_4O_4S$	$CF_3^{(1)}SO_3COF^{(2)}$	(1) −72.6	(2) −8.68			194
$C_2F_5BrO_3S$	$CF_3^{(1)}SO_3CF_2^{(2)}Br$	(1) −74.4	(2) −16.8	(1-2) 4.4		194
$C_2F_5ClO_3S$	$CF_3^{(1)}SO_3CF_2^{(2)}Cl$	(1) −74.3	(2) −25.0	(1-2) 4.2		194
$C_2F_6H_2GeS_2$	$(CF_3^{(1)}S)_2GeH_2^{(2)}$	−28.0		(1-2) 2.10		173
$C_2F_6H_2S_2Si$	$(CF_3^{(1)}S)_2SiH_2^{(2)}$	−31.0		(1-2) 2.02	(Si-1) 4.15	200
C_2F_6ClNS	$(CF_3)_2S{=}NCl$	−66.8				202
$C_2F_6O_2S$	$(CF_3)_2SO_2$	−81.62		(F-C) 327.4		179(a)
$C_2F_6O_2SSe$	$CF_3^{(1)}SO_2SeCF_3^{(2)}$	(1) −77.9	(2) −30.2	(1-2) 4.2	(Se-1) 9.2	172,
				(Se-2) 14.6	(1-C1) 329	193
				(2-C2) 337		
C_2F_6SSe	$CF_3^{(1)}S{\cdot}SeCF_3^{(2)}$	(1) −43.85	(2) −39.65	(1-2) 3.8		196,
						172
C_2F_6SSe	$CF_3^{(1)}S{\cdot}SeCF_3^{(2)}$	(1) −43.6	(2) −39.3			189
C_2F_7NS	$(CF_3^{(1)})_2S{=}NF^{(2)}$	(1) −66.4	(2) −50.0			202
$C_3F_3H_2BrCl_2O_3S$	*threo*-$CF_3SO_3{\cdot}CHCl{\cdot}CHBrCl$	−74.00				206

Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_3F_3H_2Cl_3O_3S$	$CF_3SO_3{\cdot}CHCl{\cdot}CHCl_2$	−74.40		206
$C_3F_3H_4ClO_3S$	$CF_3SO_3{\cdot}CH_2CH_2Cl$	−75.41		206, 207
$C_3F_3H_6AsS$	$CF_3S{\cdot}As(CH_3)_2$	−32.0		208, 209
$C_3F_3H_6PS$	$CF_3S{\cdot}P(CH_3)_2$	−35.4	(P-F) 15.0	189
$C_3F_3H_6PS$	$CF_3S{\cdot}P(CH_3)_2$	−34.5		209
$C_3F_5H_2BrO_3S$	$CF_3^{(1)}SO_3{\cdot}CF^{(2)}H^{(4)}{\cdot}CH^{(5)}F^{(3)}Br$	(1) −74.84 (2) −130.74 (3) −159.08	(1-2) 6.0 (1-3) 1.0 (2-3) 19.5 (2-4) 53.0 (2-5) 6.4 (3-4) 4.4 (3-5) 48.4	206
$C_3F_5H_2BrO_3S$	*threo*-$CF_3^{(1)}SO_3{\cdot}CF^{(2)}H^{(4)}{\cdot}CF^{(3)}H^{(5)}Br$	(1) −74.90 (2) −131.14 (3) −159.34	(1-2) 5.8 (1-3) 1.8 (2-3) 25.5 (2-4) 52.5 (2-5) 6.2 (3-4) 4.4 (3-5) 49.0	206
$C_3F_5H_2BrO_3S$	$CF_3^{(1)}SO_3{\cdot}CF_2^{(2)}{\cdot}CH_2^{(3)}Br$	(1) −74.86 (2) −67.66	(1-2) 5.7 (2-3) 10.1	206
$C_3F_5H_2ClO_3S$	$CF_3^{(1)}SO_3{\cdot}CF^{(2)}H^{(4)}{\cdot}CH^{(5)}F^{(3)}Cl$	(1) −74.93 (2) −132.48 (3) −154.18	(1-2) 6.0 (1-3) 0.8 (2-3) 15.8 (2-4) 56.1 (2-5) 3.1 (3-4) 5.2 (3-5) 48.0	206
$C_3F_5H_2ClO_3S$	*threo*-$CF_3^{(1)}SO_3{\cdot}CF^{(2)}H^{(4)}{\cdot}CH^{(5)}ClF^{(3)}$	(1) −75.01 (2) −133.68 (3) −154.66	(1-2) 5.4 (1-3) 1.8 (2-3) 20.5 (2-4) 54.5 (2-5) 3.2 (3-4) 6.0 (3-5) 48.0	206
$C_3F_5H_2ClO_3S$	$CF_3^{(1)}SO_3{\cdot}CF_2^{(2)}{\cdot}CH_2^{(3)}Cl$	(1) −74.87 (2) −70.30	(1-2) 5.7 (2-3) 10.4	206
$C_3F_5H_3O_3S$	$CF_3^{(1)}SO_3{\cdot}CF_2^{(2)}{\cdot}CH_3^{(3)}$	(1) −75.56 (2) −58.64	(1-2) 5.3 (2-3) 14.4	206
$C_3F_5BrCl_2O_3S$	$CF_3^{(1)}SO_3{\cdot}CCl_2{\cdot}CF_2^{(2)}Br$	(1) −74.38 (2) −61.95		206
$C_3F_5Cl_3O_3S$	$CF_3^{(1)}SO_3{\cdot}CCl_2CF_2^{(2)}Cl$	(1) −74.47 (2) −67.78		206
$C_3F_6H_2O_6S_2$	$(CF_3SO_3)_2CH_2$	−75.5		207
$C_3F_6BrClO_3S$	$CF_3^{(1)}SO_3{\cdot}CF^{(2)}Cl{\cdot}CF_2^{(3,4)}Br$	(1) −74.36 (2) −72.66 (3) −65.33 (4) −65.29	(1-2) 7.0 (2-3) 6.7	206

$C_3F_6Cl_2O_3S$	$CF_3^{(1)}SO_3\cdot CF^{(2)}Cl\cdot CF_2^{(3)}Cl$	(1) −74.38 (3) −70.59	(2) ~ −74.4	(1-2) 1.0		206
$C_3F_7BrO_3S$	$CF_3^{(1)}SO_3\cdot CF_2^{(2)}\cdot CF_2^{(3)}Br$	(1) −74.35 (3) −69.51	(2) −82.89	(1-2) 5.5	(2-3) 3.2	194, 206
$C_3F_7ClO_3S$	$CF_3^{(1)}SO_3\cdot CF_2^{(2)}\cdot CF_2^{(3)}Cl$	(1) −74.37 (3) −73.86	(2) −83.87	(1-2) 5.7	(2-3) 1.8	206
$C_3F_8O_6S_2$	$(CF_3^{(1)}SO_3)_2CF_2^{(2)}$	(1) −73.75	(2) −46.70	(1-2) 4.0		194
$C_3F_9HS_3Si$	$(CF_3^{(1)}S)_3SiH^{(2)}$	−27.8		(1-2) 1.65	(Si-1) 7.1	200
C_3F_9AsS	$CF_3^{(1)}SAs(CF_3^{(2)})_2$	(1) −30.4	(2) −49.6	(1-2) 1.3		189
$C_3F_9N_3O_6S_9$	$(CF_3SO_2NSS)_3$	−72.0, −72.9 (2:1)				225
$C_4F_3H_5N_2O_8S$	$CF_3SO_2OCH_2\cdot C(NO_2)_2\cdot CH_2OH$	−72.4				231
$C_4F_8H_2O_6S_2$	$(CF_3^{(1)}SO_3CH^{(3)}F^{(2)})_2$	(1) −74.84	(2) −138.65	(1-2) 7.5	(2-3) 55.1	194
$C_4F_9BrO_3S$	$CF_3^{(1)}SO_3\cdot CF_2^{(2)}\cdot CF^{(3)}Br\cdot CF_3^{(4)}$	(1) −74.36 (3) −142.35	(2) −75.50	(1-2) 5.6 (2-3) 9.0 (3-4) 9.0	(1-4) 0.6 (2-4) 9.0	206
$C_4F_{10}O_6S_2$	$(CF_3^{(1)}SO_3CF_2^{(2)})_2$	(1) −74.18	(2) −84.93	(1-2) 5.5		194
$C_4F_{12}N_2S_2$	$[(CF_3)_2S{=}N{-}]_2$	−67.3				202
$C_4F_{12}N_4O_8S_{10}$	$CF_3SO_2\cdot N\cdot S\cdot N(SO_2CF_3)\cdot S\cdot S\cdot N(SO_2CF_3)\cdot S\cdot N(SO_2CF_3)\cdot S\cdot S$		−71.9			225
$C_4F_{12}N_4O_8S_{12}$	$(CF_3SO_2N(S-)-S-)_4$	−79.2				225
$C_4F_{12}S_4Si$	$(CF_3S)_4Si$	−27.0		(Si-F) 5.15		200
$C_5F_3H_8NO_7S$	$CF_3SO_2OCH_2C(NO_2)(CH_2OH)_2$	−74.8				231
$C_5F_4H_7NO_6S$	$CF_3^{(1)}SO_2O\cdot CH_2^{(3)}\cdot CF^{(2)}(NO_2)\cdot CH_2^{(4)}\cdot OCH_3$	(1) −72.9	(2) −138.0	(2-3) 15	(2-4) 15	231
$C_5F_6H_4N_2O_{10}S_2$	$(CF_3SO_2OCH_2)_2C(NO_2)_2$	−72.0				231
$C_5F_6H_6O_6S_2$	$(CF_3SO_2OCH_2)_2CH_2$	−75.5				207
$C_5F_7H_4NO_8S_2$	$(CF_3^{(1)}SO_2OCH_2^{(3)})_2CF^{(2)}NO_2$	(1) −71.8	(2) −136.7	(2-3) 14		231
$C_6F_3H_{15}ClNO_2SSiSn$	$CF_3SO_2N(Sn(CH_3)_2Cl)(Si(CH_3)_3)$	−79.2				225

Molecular formula	Structure of compounds		Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_6F_4H_3Cl_2NS_2$		$R^1 = CF_3$, $R^2 = CFCl_2$ $R^1 = CFCl_2$, $R^2 = CF_3$	(1) −44.85 (2) −22.53 (1) −22.16 (2) −45.60		267
$C_6F_4H_3Cl_2NS_2$		$R^1 = CF_3$, $R^2 = CFCl_2$	(1) −44.60 (2) −21.91		267
$C_6F_5H_3ClNS_2$	As above with $R^1 = CF_3$ and $R^2 = CF_2Cl$		(1) −44.82 (2) −29.48		267
$C_6F_5H_3ClNS_2$		$R^1 = CF_3$, $R^2 = CF_2Cl$ $R^1 = CF_2Cl$, $R^2 = CF_3$	(1) −45.76 (2) −29.75 (1) −30.24 (2) −45.15		267
$C_6F_6H_7NO_9S_2$	$(CF_3SO_2OCH_2)_2C(NO_2)(CH_2OH)$		−72.4		231
$C_6F_6H_{12}Ge_2N_2O_4S_2$	$CF_3SO_2{\cdot}\overline{N{\cdot}Ge(CH_3)_2{\cdot}N(SO_2CF_3){\cdot}Ge(CH_3)_2}$		−79.6		225
$C_6F_6H_{18}N_2O_5S_2Si_2Sn$	$CF_3SO_2{\cdot}\overline{N{\cdot}Sn(CH_3)_2{\cdot}N(SO_2CF_3){\cdot}Si(CH_3)_2{\cdot}O{\cdot}Si(CH_3)_2}$		−77.1		225
$C_6F_{11}BrO_3S$	$CF_3^{(1)}SO_3{\cdot}\overline{CF{\cdot}(CF_2)_3{\cdot}CFBr}$		(1) −73.82 (remainder −110.93 to −138.55)		206
$C_6F_{11}ClO_3S$	As above with Br replaced by Cl		(1) −73.96 (remainder −115.55 to −139.50)		206
$C_7F_3H_4ClS$	$pCF_3S{\cdot}C_6H_4{\cdot}Cl$		−42.4		281(c)
$C_7F_3H_4NO_2S$	$pCF_3S{\cdot}C_6H_4{\cdot}NO_2$		−41.0		281(c)
$C_7F_3H_5OS$	p-$CF_3S{\cdot}C_6H_4{\cdot}OH$		−43.3		281(c)
$C_7F_3H_5S$	$CF_3S{\cdot}C_6H_5$		−42.9		281(c)
$C_7F_3H_6NS$	$pCF_3S{\cdot}C_6H_4{\cdot}NH_2$		−43.9		281(c)

$C_7F_3H_9O_3S$		−75.3 (keto), −48.9 (enol)		203(c)
$C_7F_9H_2NS_3$		(1) −44.08 (2) −42.96 (3) −44.10	(1-2) 1.78	267
$C_7F_9H_2NS_3$	As above with $CF_3^{(3)}S$ and $H^{(4)}$ interchanged	(1)(3) −43.99, −45.00 (2) −43.84		267
$C_8F_3H_6AsCrO_5S$	$[Cr_3SAs(CH_3)_2]Cr(CO)_5$	−29.4		208
$C_8F_3H_6AsMoO_5S$	As above with Cr replaced by Mo	−29.6		209
$C_8F_3H_6CrO_5PS$	$[CF_3SP(CH_3)_2]Cr(CO)_5$	−31.8	(P-F) 3.2	208
$C_8F_3H_6MoO_5PS$	As above with Cr replaced by Mo	−33.5		209
$C_8F_6H_4O_2S_2$	$pCF_3^{(1)}S{\cdot}C_6H_4{\cdot}SO_2CF_3$	(1) −40.3		281(c)
$C_8F_6H_4S$	$pCF_3^{(1)}S{\cdot}C_6H_4{\cdot}CF_3$	(1) −41.4		281(c)
$C_8F_6H_4S_2$	$pCF_3S{\cdot}C_6H_4{\cdot}SCF_3$	−41.6		281(c)
$C_8F_6H_{18}N_2O_4S_4Sn_2$	$[CF_3SO_2N(Sn(CH_3)_3)S-]_2$	−75.9		225
$C_8F_6H_{18}N_2O_5S_3Sn_2$	$[CF_3SO_2N(Sn(CH_3)_3)-]_2S{=}O$	−79.1		225
$C_8F_6H_{18}N_2O_6S_3Sn_2$	$[CF_3SO_2N(Sn(CH_3)_3)-]_2SO_2$	−74.6		225
$C_8F_{11}NO_4S_2$		(1) −70.5 (2) −138 (3) −158 (4) −144		597
$C_8F_{12}HNS_4$		(1) −43.26 (2) −42.16		267
$C_8F_{12}AgNS_4$	As above with H replaced by Ag	−42.85, −44.08		267
$C_9F_9H_{18}N_3O_6S_3Sn_3$	$CF_3SO_2{\cdot}\overline{N{\cdot}Sn(CH_3)_2{\cdot}N(SO_2CF_2){\cdot}Sn(CH_3)_2{\cdot}N(SO_2CF_3){\cdot}Sn(CH_3)_2}$	−81.4		255

Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{10}F_8H_9NO_2SSn$	$(CH_3)_3SnN(SO_2CF_3^{(1)})$ 	(1) −78 (2) −146 (3) −165 (4) −158		597
$C_{11}F_3H_{17}HgS_3O_5$	$(CF_3SO_3)HgC_6H_5{\cdot}[(CH_3)_2SO]_2$	−77.7		341
$C_{11}F_6H_{18}N_4O_5S_3$	$(CF_3SO_2{\cdot}N{=})_2S{\cdot}NBu^t{\cdot}CO{\cdot}NBu^t$	−78.1		345
$C_{12}F_{12}H_4HgN_2S_4$		−44.26		267
$C_{14}F_3H_{33}P_2PtS$	*cis*-$[Pt(CH_3)(SCF_3)(P(CH_2CH_3)_2)]$		(Pt-F) 93.0	360
$C_{14}F_6H_{36}HgO_{12}S_8$	$[Hg((CH_3)_2SO)_6](CF_3SO_3)_2$	−78.0		341
$C_{14}F_{18}H_2HgN_2S_6$		(1) −43.54 (2) −42.42		267
$C_{16}F_{24}HgN_2S_8$	As above with H replaced by SCF_3	−41.82, −43.47		267

6. CF_3 group bonded to any other element

CF_3H	$CF_3^{(1)}H^{(2)}$	−78.6	(1-2) 79		171
CF_3HSe	CF_3SeH	−24.9			172
$CF_3H_2BrGeSe$	$CF_3Se{\cdot}GeH_2Br$	−24.1			173
CF_3H_3GeSe	$CF_3^{(1)}Se{\cdot}GeH_3^{(2)}$	−25.5	(1-2) 1.60	(Se-1) 25.5	173

$CF_3H_5Ge_2Se$	$CF_3^{(1)}Se{\cdot}GeH_2^{(2)}{\cdot}GeH_3^{(3)}$	−28.2	(1-2) 1.60 (1-3) 1.30 (Se-1) 27.3	173
CF_3BrHg	CF_3HgBr	−33.53	(Hg-F) 1862.2	175
CF_3BrSe	CF_3SeBr	−39.6		172
CF_3Br_3Sn	CF_3SnBr_3	−48.7	(^{119}Sn-F) 868 (^{117}Sn-F) 822	176(a)
CF_3Cl	CF_3Cl	−30		171
CF_3ClHg	CF_3HgCl	−33.21	(Hg-F) 1912.6	175
CF_3ClOSe	$CF_3Se(O)Cl$	−66.5		172
CF_3ClSe	CF_3SeCl	−41.9		172
CF_3Cl_2OPSe	$CF_3SeP(O)Cl_2$	−27.4	(P-F) 8	177
CF_3HgI	CF_3HgI	−34.38	(Hg-F) 1744.1	175
CF_3I	CF_3I	−7.3		176(a)
CF_3NOSSe	$CF_3Se{\cdot}NSO$	−41.4		172
CF_4	CF_4	−66		171
CF_6BK	$CF_3^{(1)}BF_3^{(2)-}\ K^+$	(1) −77.3 (2) −156.0	(1-B) 33.6 (2-B) 40.7	183
CF_7GeNa_2	$CF_3^{(1)}GeF_4^{(2)}F^{(3)2-}\ Na^+{}_2$	(1) −14.05 (2) +45.4 (3) +42.1 ($CF_3CO_2NH_4$ internal reference)	(1-2) 14.6 (1-3) <0.3 (2-3) 23.7	184
$C_2F_3H_3Cd$	CF_3CdCH_3	−31.1	(^{111}Cd-F) 301(^{113}Cd-F) 316	187
$C_2F_3H_3Hg$	CF_3HgCH_3	−35.6	(Hg-F) 941	187
$C_2F_3H_3Hg$	$CF_3^{(1)}HgCH_3^{(2)}$	−38.57	(1-C1) −360.2 (1-C2) +12.2 (1-2) −0.5	175
$C_2F_3H_3SSe$	$CF_3^{(1)}Se{\cdot}SCH_3^{(2)}$	−40.2	(1-2) 0.5	189
$C_2F_3H_3Se$	$CF_3Se{\cdot}CH_3$	−37.5		172
$C_2F_3H_3Se_2$	$CF_3^{(1)}Se{\cdot}SeCH_3^{(2)}$	−38.3	(1-2) 0.4	189
$C_2F_3H_3Te$	$CF_3Se{\cdot}TeCH_3$	−33.0		189
$C_2F_3H_3Zn$	CF_3ZnCH_3	−37.8		187
$C_2F_3Cl_3SSe$	$CF_3Se{\cdot}SCCl_3$	−37.8		172
$C_2F_3Cl_3Se$	$CF_3Se{\cdot}CCl_3$	−50.6		172
C_2F_3HgN	CF_3HgCN	−35.95	(Hg-F) 1603.2	175
C_2F_3NOSe	$CF_3Se{\cdot}NCO$	−43.3		172
C_2F_3NSe	$CF_3Se{\cdot}CN$	−31.2		172

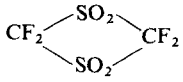
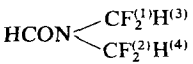
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_2F_4Cl_2O_2SSe$	$CF_3^{(1)}Se{\cdot}SO_2CF^{(2)}Cl_2$	(1) −30.6 (2) −58.4	(1-2) 7.1 (Se-1) 10.0 (Se-2) 8.5 (1-C1) 338 (2-C2) 342 (1-C2) 1.6	172, 193
$C_2F_4Cl_2SSe$	$CF_3^{(1)}Se{\cdot}SCF^{(2)}Cl_2$	(1) −38.47 (2) −23.0	(1-2) 7	196
$C_2F_4Cl_2SSe$	$CF_3^{(1)}Se{\cdot}SCF^{(2)}Cl_2$	(1) −38.8 (2) −23.4		172
$C_2F_4Cl_2Se$	$CF_3^{(1)}Se{\cdot}CF^{(2)}Cl_2$	(1) −34.6 (2) −19.5	(1-2) 7.0 (Se-1) 3.5 (Se-2) 27.7 (1-C1) 334.0 (1-C2) 2.5 (2-C2) 349 (2-C1) 1.3	172, 193
$C_2F_5ClO_2SSe$	$CF_3^{(1)}Se{\cdot}SO_2CF_2^{(2)}Cl$	(1) −30.3 (2) −60.4	(1-2) 5.6 (Se-1) 12.7 (Se-2) 6.9 (1-C1) 338 (1-C2) 1.2 (2-C2) 340	172, 193
C_2F_5ClSSe	$CF_3^{(1)}Se{\cdot}SCF_2^{(2)}Cl$	(1) −39.3 (2) −29.5	(1-2) 5	196
C_2F_5ClSSe	$CF_3^{(1)}Se{\cdot}SCF_2^{(2)}Cl$	(1) −39.3 (2) −29.6		172
C_2F_5ClSe	$CF_3^{(1)}Se{\cdot}CF_2^{(2)}Cl$	(1) −32.5 (2) −20.2	(1-2) 7.5 (Se-1) 3.9 (Se-2) 7.8 (1-C1) 333.5 (1-C2) 2.9 (2-C2) 345	172, 193
C_2F_5ClTe	$CF_3^{(1)}Te{\cdot}CF_2^{(2)}Cl$	(1) −23.2 (2) −14.4		172
$C_2F_6H_2GeSe_2$	$(CF_3^{(1)}Se)_2GeH_2^{(2)}$	−24.3	(1-2) 1.94	173
$C_2F_6H_2Se_3Si$	$(CF_3^{(1)}Se)_2SiH_2^{(2)}$	−25.3	(1-2) 1.77 (Si-1) 5.4	200
$C_2F_6Br_2Te$	$(CF_3)_2TeBr_2$	−45.5		172
C_2F_6Cd	$(CF_3)_2Cd$	−30.4	(^{111}Cd-F) 355(^{113}Cd-F) 372	187
$C_2F_6Cl_2Te$	$(CF_3)_2TeCl_2$	−48.2		172
C_2F_6Hg	$(CF_3)_2Hg$	−33.0	(Hg-F) 1290	187
C_2F_6Hg	$CF_3^{(1)}HgCF_3^{(2)}$	−36.43	(1-C1) −355.3 (2-C1) +24.5 (1-2) +4.9 (Hg-1) +1263.6	175
C_2F_6Se	$CF_3^{(1)}SeCF_3^{(2)}$	−31.9	(Se-1) 1.1 (1-C1) 331.5 (2-C1) 4.1	172, 193
C_2F_6SeO	$(CF_3)_2SeO$	−59.2		172
$C_2F_6Se_2$	$CF_3Se{\cdot}SeCF_3$	−38.0		172

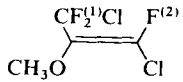
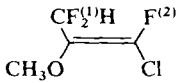
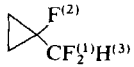
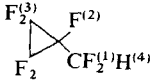
C_2F_6Te	$(CF_3)_2Te$	−21.8			172
$C_2F_6Te_2$	$CF_3Te{\cdot}TeCF_3$	−26.6			172
C_2F_6Xe	$(CF_3)_2Xe$	−9.6	(Xe-F) 1940		204
C_2F_6Zn	$(CF_3)_2Zn$	−38.0			187
C_2F_8BK	$(CF_3^{(1)})_2BF_2^{(2)-}\ K^+$	(1) −76.0 (2) −181.3	(1-B) 29.6	(2-B) 58.3	183
C_2F_8Se	$(CF_3^{(1)})_2SeF_2^{(2)}$	(1) −53.2 (2) −68.8			172
C_2F_8Te	$(CF_3^{(1)})_2TeF_2^{(2)}$	(1) −53.6 (2) −125.3			172
$C_2F_{10}GeNa_2$	$(CF_3^{(1)})_2GeF_4^{(2)2-}\ Na^+{}_2$	(1) −14.13 (2) +47.1 ($CF_3CO_2NH_4$ as internal reference)	(1-2) 14.5		184
$C_3F_3H_6AsSe$	$CF_3Se{\cdot}As(CH_3)_2$	−26.0			189
$C_3F_3H_6AsSe$	$CF_3Se{\cdot}As(CH_3)_2$	−25.8			209
$C_3F_3H_6PSe$	$CF_3Se{\cdot}P(CH_3)_2$	−29.0			189, 209
$C_3F_6H_3AsS$	$(CF_3^{(1)})_2As{\cdot}SCH_3^{(2)}$	−52.1	(1-2) 0.5		189
$C_3F_6H_3AsSe$	$(CF_3^{(1)})_2As{\cdot}SeCH_3^{(2)}$	−50.0	(1-2) 0.49		189, 209
$C_3F_6H_3AsTe$	$(CF_3^{(1)})_2As{\cdot}TeCH_3^{(2)}$	−46.6	(1-2) 0.44		189
$C_3F_6Se_3$	$(CF_3Se)_2CSe$	−37.17			196
$C_3F_9HSe_3Si$	$(CF_3Se)_3SiH$	−23.3	(1-2) 1.2	(Si-1) 5.14	200
C_3F_9AsSe	$(CF_3^{(1)})_2As{\cdot}SeCF_3^{(2)}$	(1) −47.6 (2) −24.8	(1-2) 1.1		189
$C_3F_9AsSe_3$	$(CF_3Se)_3As$	−28.1			172
C_3F_9BrSn	$(CF_3)_3SnBr$	−42.2	(^{117}Sn-F) 656	(^{119}Sn-F) 678	176(a)
C_3F_9GeI	$(CF_3)_3GeI$	−55.1			176(a)
$C_3F_9NSe_3$	$(CF_3Se)_3N$	−45.4			172
$C_3F_9PSe_3$	$(CF_3Se)_3P$	−29.8			172
$C_3F_{11}GeNa$	$(CF_3^{(1)})_3GeF_2^{(2)-}\ Na^+$	(1) −15.10 (2) +60.5 ($CF_3CO_2NH_4$ as internal reference)	(1-2) 9.5		184
$C_4F_3H_9Ge$	$CF_3Ge(CH_3)_3$	−61	(F-C) 338		233
$C_4F_3H_9HgNO_3P$	$[CF_3HgP(CH_3)_3]NO_3$	−34.14	(Hg-F) 1411.6	(P-F) 43	175
$C_4F_3H_9Sn$	$CF_3Sn(CH_3)_3$	−49.3	(F-C) 356		233
$C_4F_6H_6AsP$	$(CF_3)_2As{\cdot}P(CH_3)_2$	−43.6	(P-F) 7.5		208, 209

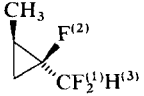
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	
$C_4F_6H_6As_2$	$(CF_3)_2As{\cdot}As(CH_3)_2$	−41.8		208, 209
$C_4F_9H_3Ge$	$(CF_3)_3GeCH_3$	−54.5		176(a)
$C_4F_{12}Ge$	$(CF_3)_4Ge$	−46	(F-C) 330.7	233
$C_4F_{12}Ge$	$(CF_3)_4Ge$	−51.1		176(a)
$C_4F_{12}Se_4Si$	$(CF_3Se)_4Si$	−22.5	(Si-F) 3.31	200
$C_4F_{12}Sn$	$(CF_3)_4Sn$	−43	(F-C) 349.2	233
$C_4F_{12}Sn$	$(CF_3)_4Sn$	−39.7	(^{117}Sn-F) 514 (^{119}Sn-F) 537	176(a)
$C_6F_6H_{10}CdO_2$	$(CF_3)_2Cd(CH_3OCH_2)_2$	−36.3	(^{111}Cd-F) 461(^{113}Cd-F) 493	272, 176(a)
$C_6F_6FeO_4$	*cis*-$(CF_3)_2Fe(CO)_4$	+2.9	^1J(F-C) 365 ^3J(F-C) 4.4	273
$C_7F_3H_5Hg$	$CF_3HgC_6H_5$	−36.71	(Hg-F) 1006.8	175
$C_8F_3H_6AsCrO_5Se$	$[CF_3SeAs(CH_3)_2]Cr(CO)_5$	−25.2		208
$C_8F_3H_6AsMoO_5Se$	As above with Cr replaced by Mo	−24.8		209
$C_8F_3H_6MoO_5PSe$	$[CF_3SeP(CH_3)_2]Mo(CO)_5$	−27.8		209
$C_8F_6H_3AsCrO_5S$	$[(CF_3)_2AsSCH_3]Cr(CO)_5$	−54.3		208
$C_8F_6H_3AsCrO_5Se$	As above with S replaced by Se	−52.4		208
$C_8F_6H_3AsCrO_5Te$	As above with S replaced by Te	−50.8		208
$C_8F_6H_3AsMoO_5Se$	$[(CF_3)_2AsSeCH_3]Mo(CO)_5$	−52.0		209
$C_8F_6H_{14}CdO_3$	$(CF_3)_2Cd{\cdot}[CH_3OCH_2CH_2OCH_2CH_2OCH_3]$	−34.4	(^{111}Cd-F) 448(^{113}Cd-F) 471	176(a)
$C_9F_6H_6AsCrO_5P$	$[(CF_3)_2AsP(CH_3)_2]Cr(CO)_5$	−40.0	(P-F) 1.2	208
$C_9F_6H_6AsMoO_5P$	As above with Cr replaced by Mo	−41.3	(P-F) 3.9	209
$C_9F_6H_6As_2CrO_5$	$[(CF_3)_2AsAs(CH_3)_2]Cr(CO)_5$	−40.8		208
$C_9F_6H_6As_2MoO_5$	As above with Cr replaced by Mo	−40.0		209
$C_{10}F_6H_{16}CdO_2$	$(CF_3)_2Cd{\cdot}2$	−34.0	(^{111}Cd-F) 457 (^{113}Cd-F) 476	176(a)
$C_{12}F_6H_{10}CdN_2$	$(CF_3)_2Cd{\cdot}2C_5H_5N$	−31.8	(^{111}Cd-F) 354 (^{113}Cd-F) 374	176(a)
$C_9F_6H_{10}NPSe$	$CF_3SeNP(C_2H_5)_2$	−45.1		172

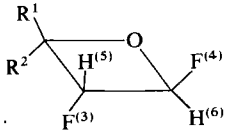
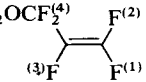
B. Fluorine nuclei in a CF_2 group

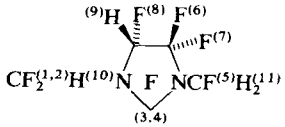
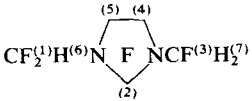
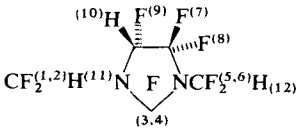
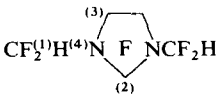
CF_2HCl	$CF_2^{(1)}H^{(2)}Cl$	−72.8		(1-2) 62.7		171
CF_2HClO_2	$CF_2^{(1)}H^{(2)}\cdot CO_2Cl$	−123.7		(1-2) 52.9		192
CF_2H_2	$CF_2^{(1)}H_2^{(2)}$	−143.6		(1-2) 50.1		171, 283
CF_2Br_2	CF_2Br_2			^1J(F-C) 357		182
CF_2ClNaO_3S	$CF_2Cl\cdot SO_3Na$	−63.1				171
CF_2Cl_2	CF_2Cl_2			^1J(F-C) 325		182
CF_2O	$CF_2{=}O$			^1J(F-C) 309		395
CF_2S	$CF_2{=}S$			^1J(F-C) 367		395
CF_2Se	$CF_2{=}Se$			^1J(F-C) 408		395
CF_3HClN	$CF_2^{(1)}Cl\cdot NH^{(3)}F^{(2)}$	(1) −77.0	(2) −127.7	(1-2) 27 (2-3) 50	(1-3) 12.8	199
CF_3HO_2S	$CF_2^{(1)}H^{(3)}\cdot SO_2F^{(2)}$	(1) −119.93	(2) +37.70	(1-2) +3.9 (2-3) +3.9 ^2J(F-C) +39.1	(1-3) +51.9 ^1J(F-C) −285.0	180
CF_3HO_3S	$CF_2^{(1)}H^{(3)}\cdot OSO_2F^{(2)}$	(1) −86.77	(2) +42.89	(1-2) 5.3 ^1J(F-C) 276.5	(1-3) 68.2	179(a)
CF_3ClO_2S	$CF_2^{(1)}Cl\cdot SO_2F^{(2)}$	(1) −59.5	(2) +31.6	(1-2) 8.7		171
CF_4O_2	$CF_2(OF)_2$			^1J(F-C) 273	^2J(F-C) 6.2	182
$CF_6N_2O_2S_2$	$CF_2^{(1)}(NSOF_2^{(2)})_2$	(1) −40.9	(2) +46.4	(1-2) 9.5		181
$C_2F_2H_3Cl$	$CF_2^{(1)}H^{(2)}\cdot CH_2^{(3)}Cl$	−120.1		(1-2) 55.6	(1-3) 13.4	396
$C_2F_2H_4$	CF_2HCH_3	−110				283
$C_2F_2Cl_2O_2$	$CF_2Cl\cdot CO_2Cl$	−60.4				192
$C_2F_2Cl_4$	$CF_2Cl\cdot CCl_3$	−65.1				191
$C_2F_3Cl_3$	$CF_2^{(1)}Cl\cdot CF^{(2)}Cl_2$	(1) −68.0	(2) −72.0			191
$C_2F_4H_2ClNO_4S_2$	$CH_2^{(3)}Cl\cdot CF_2^{(1)}\cdot N(SO_2F^{(2)})_2$	(1) −75.5	(2) +63.0	(1-2) 9.6	(1-3) 15.0	397
$C_2F_4H_2O_4S$	$(CF_2^{(1)}H^{(2)}O)_2SO_2$	−86.42		(1-2) 69.0		179(a)
$C_2F_4H_3NO_4S_2$	$CH_3^{(3)}\cdot CF_2^{(1)}\cdot N(SO_2F^{(2)})_2$	(1) −63.0	(2) +61.9	(1-2) 9.3	(1-3) 15.6	397
$C_2F_4I_2$	$CF_2I\cdot CF_2I$	−59.6				398

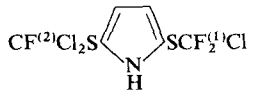
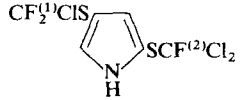
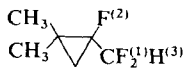
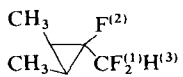
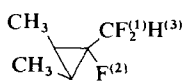
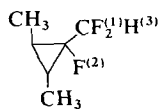
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_2F_4O_4S_2$		−95.7		399
$C_2F_7HBrClS$	$CH^{(5)}BrCl{\cdot}CF_2^{(1)(2)}{\cdot}SF_4^{(3)}F^{(4)}$	(1) −79.3 (2) −88.5 (3) +43.2 (4) +66.0	(3-4) 145 (2-3) 16.2 (1-4) 5.7 (2-4) 5.7 (1-3) 14.0 (1-2) 188 (2-5) 5.5 (1-5) 12.8	221
$C_2F_7HBrClS$	$CF_2^{(1,2)}Br{\cdot}CH^{(5)}Cl{\cdot}SF_4^{(3)}F^{(4)}$	(1) −49.3 (2) −58.2 (3) +60.5 (4) +71.9	(3-4) 144 (2-5) 17 (1-5) 8 (1-2) 174	221
C_2F_8BrClS	$CF^{(2)}ClBr{\cdot}CF_2^{(1)}{\cdot}SF_4^{(3)}{\cdot}F^{(4)}$	(1) −86, −88 (2) −76.4 (3) +48.7 (4) +64.7	(1-2) 25.4 (1A-1B) 195.6 (1-3) 5.95 (1A-4) 4.23 (1B-4) 4.23 (3-4) 149.9	221
$C_3F_2H_2Cl_2$	$E\text{-}CF_2^{(1)}H^{(2)}{\cdot}CCl{=}CH^{(3)}Cl$	−116.8	(1-2) 55 (1-3) 2	400(a)
$C_3F_2H_4Cl_2$	$CH_3^{(3)}{\cdot}CF_2^{(1)}{\cdot}CH^{(2)}Cl_2$	−97.9	(1-2) 6 (1-3) 18	401(a)
$C_3F_2H_4O$	$CF_2^{(1)}H^{(2)}{\cdot}COCH_3$	−128.3	(1-2) 53.6	253
$C_3F_2H_6$	$CF_2^{(1)}H^{(2)}{\cdot}CH_2^{(3)}{\cdot}CH_3$	−120.0	(1-2) 57 (1-3) 17.5	283
$C_3F_2H_6$	$(CH_3^{(2)})_2CF_2^{(1)}$	−84.5	(1-2) 18	283
$C_3F_4H_2Cl_2O$	$(CF_2Cl)_2CH{\cdot}OH$		^1J(F-C) 298 ^2J(F-C) 28	182
$C_3F_4H_3NO$		(1) −95.6 (2) −104.7	(1-3) 58 (2-4) 58	213
$C_3F_4Cl_2O$	$(CF_2Cl)_2CO$		^1J(F-C) 304 ^2J(F-C) 34	182
$C_3F_5H_2Cl_5N_3OP_3$	$(CF_3CF_2^{(1)}CH_2^{(2)}O)P_3N_3Cl_5$		(1-2) 11.5	353
$C_3F_5H_3O_3S$	$CH_3O{\cdot}CF_2^{(1)}{\cdot}CF_2^{(2)}{\cdot}SO_2F^{(3)}$	(1) −87.6 (2) −112.1 (3) +43.2	(1-3) 11.8 (2-3) 9.7	402
$C_3F_6H_3N$	$(CF_2^{(1)}H^{(2)})_3N$	−96.4	(1-2) 59.1 ^1J(F-C) 247.0 ^3J(F-C) 2.08	218

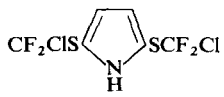
$C_3F_6H_3N$	$(CF_2^{(1)}H^{(2)})_3N$	−96.2		(1-2) 61.5		213
$C_3F_8O_6S$	$(F^{(3)}O_3S{\cdot}CF_2^{(2)})_2CF_2^{(1)}$	(1) −128 (3) +50.8	(2) −83.7			403
$C_4F_2H_6Cl_2$	$CCl_2H^{(2)}{\cdot}CF_2^{(1)}{\cdot}CH_2^{(3)}CH_3$	−108.6		(1-2) 7	(1-3) 17	401(a)
$C_4F_2H_8$	$CF_2^{(1)}H^{(2)}{\cdot}CH_2^{(3)}CH_2CH_3$	−116.8		(1-2) 57	(1-3) 17	283
$C_4F_2H_8$	$CH_3^{(3)}{\cdot}CF_2^{(1)}{\cdot}CH_2^{(2)}CH_3$	−93.3		(1-2) 15.5	(1-3) 18.5	283
$C_4F_2H_8$	$CF_2^{(1)}H^{(2)}{\cdot}CH^{(5)}(CH_3^{(4)})_2$	−126.7		(1-2) 57.5 (1-4) 0.7	(1-3) 14.5	283
$C_4F_2H_8O_2$	$CF_2^{(1)}H^{(2)}{\cdot}C(CH_3)(OCH_3){\cdot}OH$	(1A) −132.07	(1B) −134.33	(1A-1B) 273	(1-2) 55.4	253
$C_4F_3H_3Cl_2O$		(1) −52.9	(2) −94.8	(1-2) 34.0		235
$C_4F_3H_4ClO$		(1) −120.8	(2) −92.5	(1-2) 15.0		235
$C_4F_3H_5$		(1) −128.7	(2) −224.5	(1-2) 12 (2-3) 7	(1-3) 54	404(a)
$C_4F_3H_7$	$CF_2^{(1,2)}H^{(4)}{\cdot}CF^{(3)}H^{(5)}{\cdot}CH_2CH_3$	(1) −132.3 (3) −205.4	(2) −134.1	(1-2) 298 (2-3) 12 (1-5) 10 (2-5) 10	(1-3) 11 (1-4) 55 (2-4) 55	405(a)
C_4F_7H		(1) −132.4 (3) −156.8	(2) −211.8	(1-4) 51.0 (3A-3B) 210	(2-4) 13.1	404
$C_4F_7H_2Cl_5N_3OP_3$	$(CF_3CF_2CF_2^{(1)}CH_2^{(2)}O)P_3N_3Cl_5$			(1-2) 12.5		353
$C_4F_7H_3N$	$(CF_2^{(1)}H^{(4)})_2N{\cdot}CF_2^{(2)}{\cdot}CF_2^{(3)}H^{(5)}$	(1) −94.3 (3) −136.6	(2) −99.2	(1-4) 58	(3-5) 54	213

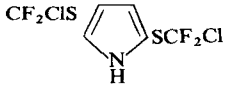
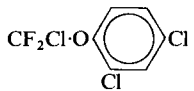
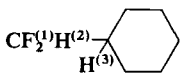
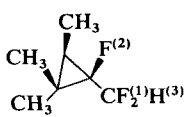
Molecular formula	Structure of compounds	Chemical shifts (ppm)		Coupling constants (Hz)		Ref.
$C_4F_7H_3O_5S_2$	$F^{(1)}SO_2{\cdot}CF_2^{(2)}{\cdot}CF^{(3)}(OCH_3){\cdot}CF_2SO_2F$	(1) +44.0	(2) −104.12			402
		(3) −134.2	(centre AB system)			
$C_4F_8I_2$	$CF_2^{(1)}I{\cdot}CF_2^{(2)}{\cdot}CF_2CF_2I$	(1) −65.0	(2) −114.4	(1-2) 0.2		398
$C_4F_9IO_3S$	$F^{(1)}SO_3{\cdot}CF_2^{(2)}{\cdot}CF_2^{(3)}{\cdot}CF_2^{(4)}{\cdot}CF_2^{(5)}I$	(1) +51.3	(2) −82.3	(1-2) 9.5		249
		(3) −123.0	(4) −112.3			
		(5) −57.8				
$C_4F_{10}O_6S_2$	$(F^{(1)}SO_3CF_2^{(2)}CF_2^{(3)})_2$	(1) +50.7	(2) −82.8	(1-2) 8.5		249
		(3) −124.0				
$C_5F_2H_6$	$CH_2{=}CH{\cdot}C(CF_2^{(1)}H^{(2)}){=}CH_2$	−119.3		(1-2) 55		404(a)
$C_5F_2H_6O_2$	$CF_2^{(1)}H^{(2)}{\cdot}C(OH){=}CH{\cdot}COCH_3$	−127.9		(1-2) 53.9	^1J(F-C) 245.4	253
				^2J(F-C) 36.7	^3J(F-C) 2.7	
$C_5F_2H_7ClO_3$	$CH_3O{\cdot}CF_2^{(1,2)}{\cdot}CH^{(3)}Cl{\cdot}CO_2CH_3$	(1) −83.5	(2) −80.1	(1-2) 139.0	(1,2-3) 6.0	228
$C_5F_2H_8Cl_2$	$CCl_2H^{(2)}{\cdot}CF_2^{(1)}{\cdot}CH_2^{(3)}{\cdot}CH_2CH_3$	−106.4		(1-2) 7	(1-3) 17	401(a)
$C_5F_2H_8Cl_2$	$CCl_2H^{(2)}{\cdot}CF_2^{(1)}{\cdot}CH^{(3)}(CH_3)_2$	−116.7		(1-2) 9	(1-3) 15	401(a)
$C_5F_2H_{10}$	$CF_2^{(1)}H^{(2)}{\cdot}CH_2^{(3)}{\cdot}CH_2CH_2CH_3$	−118.5		(1-2) 57	(1-3) 17.5	283
$C_5F_2H_{10}$	$CF_2H{\cdot}CH(CH_3){\cdot}CH_2CH_3$	−124.0				283
$C_5F_2H_{10}$	$CF_2^{(1)}H^{(2)}{\cdot}CH_2^{(3)}{\cdot}CH(CH_3)_2$	−115.5		(1-2) 57	(1-3) 17.2	283
$C_5F_2H_{10}$	$CF_2^{(1)}H^{(2)}{\cdot}C(CH_3^{(3)})_3$	−128.6		(1-2) 57	(1-3) 1.2	283
$C_5F_2H_{10}$	$CH_3CF_2CH_2CH_2CH_3$	−91.0				283
$C_5F_2H_{10}$	$CH_3CH_2{\cdot}CF_2^{(1)}{\cdot}CH_2^{(2)}CH_3$	−102.4		(1-2) 21.5		283
$C_5F_3H_7$		(1) −128.7	(2) −219.5	(1-2) 9	(1-3) 56	404, 405 (a)
				(2-3) 6		
$C_5F_3H_7$		(1A) −125.6	(1B) −130.3	(1A-1B) 295	(1A-2) 10	404, 405 (a)
		(2) −201.7		(1B-2) 11	(1-3) 53.7	
				(2-3) 12.3		

$C_5F_3H_9$	$CF_2^{(1)}H^{(3)}\cdot CF^{(2)}H^{(4)}\cdot CH(CH_3)_2$	(1) −104.3 (2) −182.7 (referenced to $pCF_2ClSC_6H_4Cl$)	(1A-2) 13 (1-3) 54.7 (1B-4) 11.0	(1B-2) 12 (1A-4) 9.5 (2-3) 7.8	405(a)
$C_5F_3H_9$	$C_2^{(1)}H^{(3)}\cdot CF^{(2)}H^{(4)}\cdot CH_2CH_2CH_3$	(1) −133.4 (2) −204.5	(1-2) 13 (1-3) 54.7 (2-3) 6.8	(1-4) 10 (2-4) 45	405(a)
$C_5F_5H_2Cl_3O$	 $R^1 = CFCl_2$, $R^2 = CF_2Cl$	(1) −74.2 (2) −66.3 (3) −196.1 (4) −116.8	(1-2) 9 (2-4) 2 (3-6) 6 (4-6) 66	(2-3) 18 (3-5) 51 (4-5) 12	238(a)
	$R^1 = CF_2Cl$, $R^2 = CFCl_2$	(1) −59.7 (2) −60.3 (3) −195.8 (4) −117.1	(1-2) 6 (3-5) 51 (4-5) 12	(2-3) 25 (3-6) 6 (4-6) 66	
$C_5F_5H_2Cl_3O$	As above with $F^{(4)}$ and $H^{(6)}$ interchanged $R^1 = CFCl_2$, $R^2 = CF_2Cl$	(1) −64.2 (2) −55.7 (3) −208.3 (4) −133.5	(1-2) 8.5 (3-5) 51 (4-5) 6.5	(2-3) 21 (3-6) 3 (4-6) 64	238(a)
	$R^1 = CF_2Cl$, $R^1 = CFCl_2$	(1) −59.7 (2) −58.9 (3) −208.3 (4) −134.8	(1-2) 8 (3-5) 51 (4-5) 6.5	(2-3) 24 (3-6) 3 (4-6) 64	
$C_5F_5H_5O$	$CH_3CH_2OCF_2^{(4)}$ 	(1) −96.1 (2) −107.4 (3) −187.0 (4) −73.5	(1-2) 62 (1-4) 8 (2-4) 18	(1-3) 40 (2-3) 115 (3-4) 22	256
$C_5F_6H_2Cl_2O$	As first $C_5F_5H_2Cl_3O$ above with $R^1 = R^2 = CF_2Cl$	(1) −63.2 (2) −59.6 (3) −197.9 (4) −117.0	(1-2) 9 (2-4) 2.5 (3-6) 6 (4-6) 65	(2-3) 17.5 (3-5) 51 (4-5) 11.5	238(a)
$C_5F_6H_2Cl_2O$	As first $C_5F_5H_2Cl_3O$ above with $F^{(4)}$ and $H^{(6)}$ interchanged and $R^1 = R^2 = CF_2Cl$	(1) −63.1 (2) −59.3 (3) −210.0 (4) −133.9	(1-2) 9.5 (2-4) 5.5 (3-6) 4 (4-6) 64	(2-3) 19.5 (3-5) 50.5 (4-5) 8	238(a)

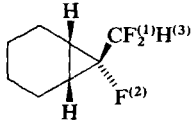
Molecular formula	Structure of compounds		Chemical shifts (ppm)		Coupling constants (Hz)		Ref.
$C_5F_8H_4N_2$			(1) −100.75 (3) −66.9 (5) −172.6 (7) −80.2	(2) −95.45 (4) −60.7 (6) −103.6 (8) −144.0	(1-2) 221 (3-4) 132 (6-7) 179.4	(1-10)(2-10) ~58.5 (5-11) 54.5 (8-9) 65.5	213
$C_5F_9H_3N_2$			(1) −99.9 (3) −173.6 (5) −92.6	(2) −64.4 (4) −93.4	(1-6) 57.5	(3-7) 53.5	213
$C_5F_9H_3N_2$			(1) −100.7 (3) −65.8 (5) −101.8 (7) −101.1 (9) −143.7	(2) −95.3 (4) −56.6 (6) −98.0 (8) −79.9	(1-2) 221 (3-4) 134 (5-12)(6-12) ~57 (9-10) 65	(1-11)(2-11) ~58.5 (5-6) 225 (7-8) 180	213
$C_5F_{10}H_2N_2$			(1) −99.9 (3) −92.35	(2) −61.95	(1-4) 58.0		213
$C_6F_2H_8$	$CH_2{=}C(CH_3)C(CF_2^{(1)}H^{(2)}){=}CH_2$		−115.8		(1-2) 55		404(a)
$C_6F_2H_8$	$Z\text{-}CH_2{=}CH\cdot C(CF_2^{(1)}H^{(2)}){=}CHCH_3$		−114.1		(1-2) 55.5		404(a)
$C_6F_2H_{10}Cl_2$	$CCl_2H^{(2)}\cdot CF_2^{(1)}R^{(3)}$	R = n-C_4H_9	−106.6		(1-2) 7	(1-3) 17	401(a)
		s-C_4H_9	−114.9		(1-2) 9.5	(1-3) 14	
		i-C_4H_9	−104.7		(1-2) 7	(1-3) 19	
		t-C_4H_9	−111.6		(1-2) 9		
$C_6F_2H_{10}O_3$	$CF_2^{(1,2)}H^{(3)}\cdot C(OCH_3)(OH)\cdot CH_2COCH_3$		(1) −132.8	(2) −135.8	(1-2) 279	(1,2-3) 55.5	253
$C_6F_2H_{11}NO_2$	$CH_3\cdot CF_2^{(1,2)}\cdot CH^{(3)}(NH_2)\cdot CO_2CH_2CH_3$		(1) −97.6	(2) −100.6	(1-2) 247.0 (2-3) 11.8	(1-3) 11.0	406, 407

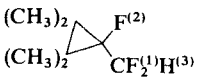
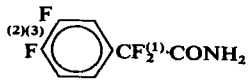
$C_6F_2H_{12}$	$CF_2^{(1)}H^{(2)}\cdot CH_2^{(3)}\cdot(CH_2)_3CH_3$	−118.0	(1-2) 57	(1-3) 17	283
$C_6F_2H_{12}$	$CF_2^{(1)}H^{(2)}\cdot CH_2^{(3)}\cdot CH(CH_3)\cdot CH_2CH_3$	−117.3	(1-2) 57	(1-3) 17.5	283
$C_6F_2H_{12}$	$CF_2^{(1)}H^{(2)}\cdot CH^{(3)}(CH_2CH_3)_2$	−123.3	(1-2) 57	(1-3) 15	283
$C_6F_2H_{12}$	$CH_3CF_2C(CH_3)_3$	−102.2	(1-2) 20		283
$C_6F_2H_{12}$	$CH_3CF_2CH_2CH(CH_3)_2$	−87.7			283
$C_6F_2H_{12}$	$CH_3CF_2CH(CH_3)CH_2CH_3$	−95.1			283
$C_6F_3H_3Cl_3NS_2$		(1) −30.24 (2) −22.09			267
$C_6F_3H_3Cl_3NS_2$		(1) −30.24 (2) −22.09			267
$C_6F_3H_5Cl_4$	$CCl_2{=}CF^{(2)}\cdot CH_2^{(5)}\cdot CH_2^{(3)}\cdot CF_2^{(1)}\cdot CCl_2H^{(4)}$	(1) −107.1 (2) −102.7	(1-3) 17 (2-5) 19	(1-4) 7	401(a)
$C_6F_3H_7O_3$	$CH_3O\cdot CF_2^{(1)}\cdot CF^{(2)}{=}CH^{(3)}\cdot CO_2CH_3$	(1) −82.18 (2) −110.27	(1-2) 12	(2-3) 31	410
$C_6F_3H_9$		(1A) −123.6 (1B) −128.1 (2) −212.4	(1A-1B) 294 (1B-2) 11 (2-3) 13.4	(1A-2) 9 (1-3) 54	404(a)
$C_6F_3H_9$		(1) −129.1 (2) −232.8	(1-2) 9 (2-3) 7.2	(1-3) 54	404(a)
$C_6F_3H_9$		(1) −129.9 (2) −198.3	(1-2) 12 (2-3) 16.2	(1-3) 52	404(a)
$C_6F_3H_9$		(1A) −124.6 (1B) −129.1 (2) −215.6	(1A-1B) 292 (1B-2) 11 (2-3) 12.8	(1A-2) 10 (1-3) 53.7	404(a)

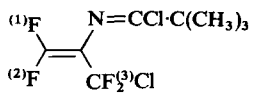
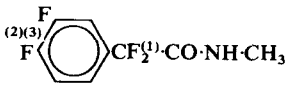
Molecular formula	Structure of compounds		Chemical shifts (ppm)	Coupling constants (Hz)		Ref.
$C_6F_3H_{11}$	$CF_2^{(1,2)}H^{(4)}\cdot CF^{(3)}H^{(5)}\cdot C(CH_3)_3$		(1) −98.9 (2) −101.4 (3) −179.7 (referenced to $pCF_2ClSC_6H_4Cl$)	(1-2) 301 (2-3) 8-9 (2-4) 53.8 (2-5) 12.7	(1-3) 8-9 (1-4) 53.8 (1-5) 9.0 (3-5) 45.3	405(a)
$C_6F_3H_{11}$	$CF_2^{(1,2)}H^{(4)}\cdot CF^{(3)}H^{(5)}\cdot CH^{(6)}(CH_3)\cdot CH_2CH_3$	Isomer [a]	(1) −130.6 (2) −132.0 (3) −213.6	(1-2) 300 (1-5) 11 (2-5) 8.2 (3-5) 47	(1-4) 55.1 (2-4) 55.1 (3-4) 6.2 (3-6) 5	405(a)
		Isomer [b]	(1)(2) −131.7 (3) −207.3	(1-3) 11 (1-4) 54.3 (1-5) 10 (3-5) 46.2 (3-6) 8-10	(2-3) 11 (2-4) 54.3 (2-5) 11 (3-4) 8.5	
$C_6F_3H_{11}$	$CF_2^{(1,2)}H^{(4)}\cdot CF^{(3)}H^{(5)}\cdot (CH_2)_3CH_3$		(1) −129.6 (2) −133.0 (3) −201.2	(1-2) 301 (1-4) 55.5 (2-3) 13 (2-5) 11	(1-3) 13 (1-5) 10 (2-4) 55.5 (3-5) 47	405(a)
$C_6F_3H_{11}$	$(CH_3)_3C\cdot CF_2^{(2)}\cdot CH_2^{(3)}F^{(1)}$		(1) −229.2 (2) −139.5	(1-2) 13.7	(1-3) 46	411
$C_6F_3H_{11}O$	$CF_2^{(1,2)}H^{(4)}\cdot CF^{(3)}H^{(5)}\cdot CH(CH_3)\cdot OCH_2CH_3$	Isomer [a]	(1)(2) −134.0 (3) −214.2	(1-3) 12 (1-4) 55.2 (1-5) 9 (3-5) 46.2	(2-3) 12 (2-4) 55.2 (2-5) 9	405(a)
		Isomer [b]	(1) −134.1 (2) −135.3 (3) −217.5	(1-2) 291 (2-3) 16 (2-5) 11 (3-5) 46	(1-3) 12 (1-5) 8 (1-4)(2-4) 53.8 (3-4) 10.8	
$C_6F_4H_3Cl_2NS_2$			−29.66			267

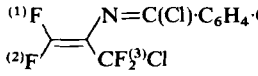
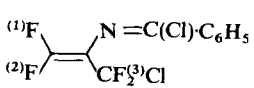
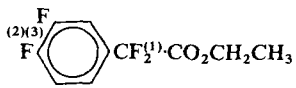
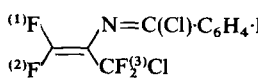
$C_6F_4H_3Cl_2NS_2$		−29.85, −30.33			267
$C_6F_4H_{10}S$	$CF_2^{(1)}H^{(3)}\cdot CF_2^{(2)}\cdot SBu^n$		(1-3) 54	(2-3) 3	217
$C_6F_4H_{10}S$	$CF_2^{(1)}H^{(2)}\cdot CF_2^{(3)}\cdot SCH(CH_3)CH_2CH_3$		(1-3) 54	(2-3) 3	217
$C_6F_{11}H_3O_6S_2$	$F^{(1)}SO_2\cdot CF_2^{(3)}\cdot CF_2^{(4)}\cdot O\cdot CF_2^{(6)}\cdot CF^{(5)}(OCH_3)\cdot CF_2^{(7)}\cdot SO_2F^{(2)}$	(1)(2) +45.1, +43.9 (3) −113.0 (4) −82.5 (5) −138.9 (6) −78.40 (centre AB system) (7) −105.94 (centre AB system)			402
$C_6F_{12}H_4N_2$	$(CF_2^{(1)}H^{(3)})_2N\cdot CF_2^{(2)}\cdot CF_2\cdot N(CF_2H)_2$	(1) −94.85 (2) −98.45	(1-4) 57.0	(1-2) 6.9	213
$C_6F_{12}I_2$	$CF_2^{(1)}I\cdot CF_2^{(2)}\cdot (CF_2^{(3)})_2\cdot CF_2CF_2I$	(1) −65.0 (2) −115.0 (3) −122.4			398
$C_7F_2H_3Cl_3O$		−26.44			280
$C_7F_2H_6$	$CF_2^{(1)}H^{(2)}\cdot C_6H_5$	−111.2	(1-2) 57		283
$C_7F_2H_{10}$	$Z\text{-}CH_2{=}C(CH_3)\cdot C(CF_2^{(1)}H^{(2)}){=}CHCH_3$	−112.7	(1-2) 55		404(a)
$C_7F_2H_{10}$	$CH_2{=}CH\cdot C(CF_2^{(1)}H^{(2)}){=}C(CH_3)_2$	−114.7	(1-2) 54		404(a)
$C_7F_2H_{12}$		−126.3	(1-2) 57	(1-3) 13	283
$C_7F_2H_{14}$	$(CH_3CH_2CH_2)_2CF_2$	−98.6			283
$C_7F_3H_7Cl_4$	$CCl_2{=}CF^{(2)}\cdot CH^{(3)}(CH_3)\cdot CH_2\cdot CF_2^{(1)}\cdot CCl_2H$	(1) −105.8 (2) −115.2	(1-2) 2.7	(2-3) 29	401(a)
$C_7F_3H_{11}$		(1A) −125.1 (1B) −127.8 (2) −224.7	(1A-1B) 292 (1B-2) 12 (2-3) 13.9	(1A-2) 10 (1-3) 53.5	404(a)
$C_7F_3H_{11}$	As above with F and CF_2H interchanged	(1) −128.8 (2) −211.8	(1-2) 13 (2-3) 17.2	(1-3) 52	404(a)

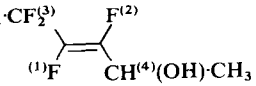
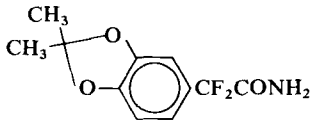
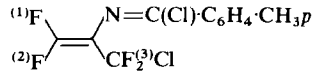
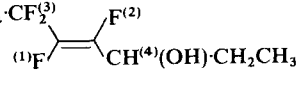
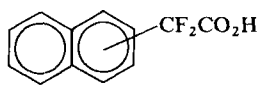
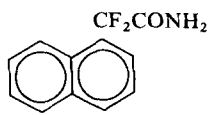
Molecular formula	Structure of compounds		Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_7F_3H_{11}$	$CF_2^{(1,2)}H^{(4)}\cdot CF^{(3)}H^{(5)}\cdot\overline{CH^{(6)}\cdot(CH_2)_3\cdot CH_2}$		(1)(2) −131.4 (3) −205.6	(1-3) 11 (1,2-4) 54.5 (2-3) 12 (1-5) 10.5 (3-4) 7.7 (5-6) 18 (3-5) 46.8	405(a)
$C_7F_3H_{13}$	$CF_2^{(1)}H^{(3)}\cdot CF^{(2)}H\cdot CH(CH_2CH_3)_2$		(1) −131.1 (2) −210.5	(1-3) 54.5 (2-3) 8.3	405(a)
$C_7F_3H_{13}$	$CF_2^{(1,2)}H^{(4)}\cdot CF^{(3)}H^{(5)}\cdot CH^{(6)}(CH_3)\cdot(CH_2)_2CH_3$				405(a)
		Isomer [a]	(1)(2) −131.0 (3) −212.7	(1-3)(2-3) 10-11 (1-4)(2-4) 54.7 (1-5) 9.0 (2-5) 10.7 (3-4) 6.3 (3-5) 46.8 (3-6) 5.5	
		Isomer [b]	(1)(2) −131.3 (3) −207.1	(1-3) 11 (2-3) 12 (1-4)(2-4) 54.7 (1-5) 10.0 (2-5) 11.5 (3-4) 7.8 (3-5) 46.5	
$C_7F_3H_{13}$	$CF_2^{(1)}H^{(3)}\cdot CF^{(2)}H^{(4)}\cdot CH_2(CH_2)_3CH_3$		(1) −132.4 (2) −202.5	(1-3) 56 (2-4) 44	405(a)
$C_7F_3H_{13}$	$CF_2^{(1,2)}H^{(4)}\cdot CF^{(3)}H^{(5)}\cdot C(CH_3)_2CH_2CH_3$		(1)(2) −127.4 (3) −209.0	(1-3) 10.0 (2-3) 10.5 (1-5) 9.0 (2-5) 12.7 (1-4)(2-4) 54.0 (3-5) 45.7 (3-4) 8.4	405(a)
$C_7F_3H_{13}$	$CF_2^{(1,2)}H^{(4)}\cdot CF^{(3)}H^{(5)}\cdot CH(CH_3)CH(CH_3)_2$				
		Isomer [a]	(1)(2) −131.5 (3) −212.1	(1-3) 10.8 (2-3) 11.3 (1-4)(2-4) 54 (1-5) 9.6 (2-5) 10.1 (3-4) 6.5	405(a)
		Isomer [b]	(1)(2) −131.1 (3) −212.9	(1-3) 10.7 (2-3) 11.0 (1-4)(2-4) 55 (1-5) 10.1 (2-5) 10.0 (3-5) 46 (3-4) 8.5	
$C_8F_2H_6Br_2$	$CF_2^{(1,2)}Br\cdot CH^{(3)}Br\cdot C_6H_5$		(1) −46.6 (2) −55.2	(1-2) 157 (1-3) 5.5	408

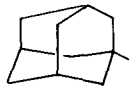
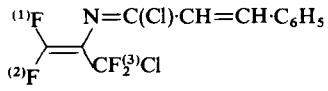
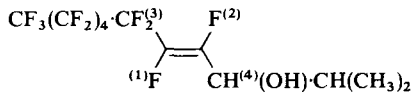
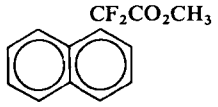
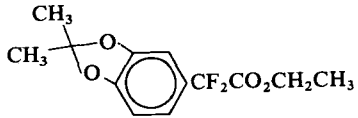
$C_8F_2H_6Cl_2$	$CF_2^{(1,2)}Cl{\cdot}CH^{(3)}Cl{\cdot}C_6H_5$	(1) −58.2	(2) −61.3	(1-2) 164 (2-3) 7.4	(1-3) 10.6	408
$C_8F_2H_6O_2$	$C_6H_5CF_2CO_2H$	−105.7				321
$C_8F_2H_7BrSe$	$C_6H_5Se{\cdot}CH_2^{(2)}{\cdot}CF_2^{(1)}Br$	−44.45		(1-2) 15		296
$C_8F_2H_7ClS$	$C_6H_5S{\cdot}CH_2^{(2)}{\cdot}CF_2^{(1)}Cl$	−53.08		(1-2) 12.5		296
$C_8F_2H_7ClSe$	As above with S replaced by Se	−50.6				296
$C_8F_2H_7NO$	$C_6H_5CF_2CONH_2$	−103.4				321
$C_8F_2H_8$	$C_6H_5{\cdot}CH_2^{(3)}{\cdot}CH^{(2)}F_2^{(1)}$	−115.0		(1-2) 57	(1-3) 12	283
$C_8F_2H_8$	$C_6H_5{\cdot}CF_2^{(1)}{\cdot}CH_3^{(2)}$	−87.7		(1-2) 18		283
$C_8F_2H_8O_2S$	$CF_2^{(1)}H^{(2)}{\cdot}SO_2CH_2C_6H_5$			(1-2) 52		409
$C_8F_2H_8S$	$CF_2^{(1)}H^{(2)}{\cdot}SCH_2C_6H_5$			(1-2) 57		409
$C_8F_2H_9N$	$C_6H_5{\cdot}CF_2^{(1)}{\cdot}CH_2^{(2)}{\cdot}NH_2$	−106.5		(1-2) 14.9		406
$C_8F_2H_{12}$	$CH_2{=}C(CH_3){\cdot}C(CF_2^{(1)}H^{(2)}){=}C(CH_3)_2$	−113.6		(1-2) 56		404(a)
$C_8F_2H_{12}O$	$CF_2^{(1)}H^{(2)}{\cdot}CO{\cdot}CH_2CH_2CH{=}C(CH_3)_2$	−126.4		(1-2) 53.9		227
$C_8F_2H_{13}ClO$	$Bu^tCH_2{\cdot}CO{\cdot}CH_2^{(2)}CF_2^{(1)}Cl$			(1-2) 12		296
$C_8F_2H_{13}NO_2$	$CH_3CH_2OCF_2C(NH_2){=}CHCO_2CH_2CH_3$	−74.64				410
$C_8F_2H_{14}N$	$\overline{CF_2^{(1,2)}{\cdot}CH^{(3)}(NH_2){\cdot}(CH_2)_6}$	(1) −96.2	(2) −113.0	(1-2) 239.7	(1,2-3) 20.0	406
$C_8F_2H_{16}$	$CF_2^{(1)}H^{(2)}{\cdot}CH_2^{(3)}{\cdot}C_6H_{11}$cyclo	−123.6		(1-2) 57	(1-3) 16	283
$C_8F_2H_{17}N$	$CH_3CH_2CH_2{\cdot}CF_2^{(1,2)}{\cdot}CH(NH_2){\cdot}CH_2CH_2CH_3$	(1) −110.3	(2) −110.5	(1-2) 243.0		406
$C_8F_3H_7$	$C_6H_5{\cdot}CF_2^{(2)}{\cdot}CF^{(1)}H_2^{(3)}$	(1) −229	(2) −108	(1-2) 18 (2-3) 12	(1-3) 45.5	411
$C_8F_3H_9Cl_4$	$CCl_2{=}CF^{(2)}{\cdot}CH^{(5)}(CH_2CH_3){\cdot}CH_2^{(3)}{\cdot}CF_2^{(1)}{\cdot}CCl_2H^{(4)}$	(1) −106.0	(2) −114.7	(1-3) 17 (2-5) 29	(1-4) 7	401(a)
$C_8F_3H_9Cl_4$	$CCl_2{=}CF^{(2)}{\cdot}CH^{(3)}(CH_3){\cdot}CH(CH_3){\cdot}CF_2^{(1)}{\cdot}CCl_2H$	(1) −112.3	(2) −109.5	(2-3) 28		401(a)
$C_8F_3H_{11}$		(1) −130.3	(2) −228.0	(1-2) 10 (2-3) 7.8	(1-3) 54.0	404(a)
$C_8F_3H_{11}$	As above with F and CF_2H interchanged	(1) −130.8	(2) −198.5	(1-2) 12 (2-3) 18	(1-3) 52.0	404(a)

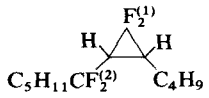
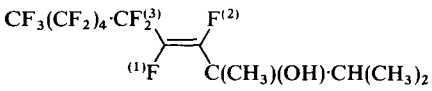
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_8F_3H_{11}O_3$	$CH_3CH_2O{\cdot}CF_2^{(1)}{\cdot}CF^{(2)}{=}CH^{(3)}{\cdot}CO_2CH_2CH_3$	(1) −79.39 (2) −110.32	(1-2) 12.5 (2-3) 30	410
$C_8F_3H_{13}$		(1) −128.7 (2) −224.5	(1-2) 13 (1-3) 54 (2-3) 18	404(a)
$C_8F_3H_{13}$	$CF_2^{(1,2)}H^{(4)}{\cdot}CF^{(3)}H^{(5)}{\cdot}\overline{CH^{(6)}{\cdot}(CH_2)_4{\cdot}CH_2}$	(1)(2) −131.3 (3) −209.3	(1-3) 11 (2-3) 12 (1-4)(2-4) 54.5 (1-5) 10.5 (2-5) 0.5 (3-5) 46.7 (3-4) 7.6 (5-6) 18	405(a)
$C_8F_3H_{13}$	$CF^{(1)}H_2^{(3)}{\cdot}CF_2^{(2)}{\cdot}\overline{CH^{(4)}{\cdot}(CH_2)_4{\cdot}CH_2}$	(1) −235.5 (2) −115	(1-2) 14.8 (1-3) 46 (2-3) 12 (2-4) ~12.7	411
$C_8F_3H_{15}$	$CF_2^{(1,2)}H^{(4)}{\cdot}CF^{(3)}H^{(5)}{\cdot}CH(CH_3)(CH_2)_3{\cdot}CH_3$ Isomer [a]	(1)(2) −131.1 (3) −212.5	(1-3) 11 (2-3) 12 (1-4)(2-4) 54 (1-5) 11 (2-5) 11 (3-4) 6.1	405(a)
	Isomer [b]	(1)(2) −131.2 (3) −206.8	(1-3) 11 (2-3) 12 (1-4)(2-4) 54.2 (1-5) 9 (2-5) 10 (3-4) 8.1 (3-5) 46	
$C_8F_3H_{15}$	$CF_2^{(1,2)}H{\cdot}CF^{(3)}H{\cdot}CH(CH_2CH_3){\cdot}(CH_2)_2CH_3$ (two diastereoisomers)	(1)(2) −131.4 and −131.7 (3) −209.7 and −209.9		405(a)
$C_8F_3H_{15}$	$CF_2^{(1,2)}H^{(4)}{\cdot}CF^{(3)}H^{(5)}{\cdot}(CH_2)_5CH_3$	(1)(2) −130.7 (3) −203.7	(1-3) 12 (2-3) 13 (1-5) 10 (2-5) 11 (3-4) 6 (3-5) 45	405(a)
$C_8F_4H_5NO$		(1) −102.8 (2)(3) −134.1, −136.3		321

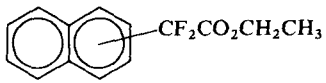
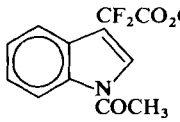
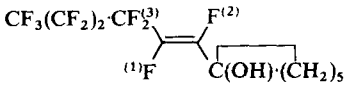
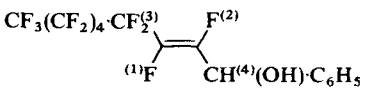
$C_8F_4H_9Cl_2N$		(1) −87.1 (3) −52.1	(2) −93.5	(1-2) 31.5 (2-3) 33.5	(1-3) 7.5	412(a)
$C_8F_{16}I_2$	$CF_2^{(1)}I{\cdot}CF_2^{(2)}{\cdot}(CF_2^{(3)})_4{\cdot}CF_2CF_2I$	(1) −65.0 (3) −123.2	(2) −115.0			398
$C_9F_2H_8Cl_2$	$CCl_2H^{(2)}{\cdot}CF_2^{(1)}{\cdot}CH_2^{(3)}{\cdot}C_6H_5$	−105.2		(1-2) 8	(1-3) 16	401(a)
$C_9F_2H_8O_2$	$C_6H_5CF_2CO_2CH_3$	−104.38				321
$C_9F_2H_{10}$	$C_6H_5CF_2CH_2CH_3$	−97.9				283
$C_9F_2H_{10}$	$C_6H_5CH_2^{(3)}{\cdot}CF_2^{(1)}{\cdot}CH_3^{(2)}$	−89.6		(1-2) 18	(1-3) 16	283
$C_9F_2H_{10}OSe$	$C_6H_5Se{\cdot}CH_2^{(2)}{\cdot}CF_2^{(1)}{\cdot}OCH_3$	−75.6		(1-2) 10		296
$C_9F_2H_{11}N$	$C_6H_5{\cdot}CF_2^{1,2)}{\cdot}CH^{(3)}(CH_3){\cdot}NH_2$	−110.77 (centre of AB system)				413
$C_9F_2H_{11}N$	Same as above	(1) −106.4	(2) −113.3	(1-2) 243.7	(1,2-3) 10.1	406
$C_9F_2H_{11}NO$	$C_6H_5CF_2{\cdot}CH(NH_2){\cdot}CH_2OH$	−108.69 (centre of AB system)				413
$C_9F_2H_{16}N_2$	$C_6H_{13}{\cdot}CH_2^{(3)}{\cdot}CF_2^{(1)}{\cdot}\overline{CH^{(2)}{\cdot}N{=}N}$	−99		(1-2) 5.7	(1-3) 14.7	414
$C_9F_2H_{17}NO$	$C_6H_{13}{\cdot}CH_2^{(3)}{\cdot}CF_2^{(1)}{\cdot}CH^{(2)}{=}N{\cdot}OH$	−95		(1-2) 5.6	(1-3) 15.4	414
$C_9F_2H_{20}O_6P_2$	$[(CH_3CH_2O)_2P(O)]_2CF_2$	−122.0		(P-F) 87	^1J(F-C) 279	415
$C_9F_3H_{17}$	$CF_2^{(1,2)}H^{(4)}{\cdot}CF^{(3)}H^{(5)}{\cdot}C(CH_3)_2CH_2CH(CH_3)_2$	(1)(2) −126.5	(2) −207.1	(1-3) 11 (1-4)(2-4) 54 (2-5) 13 (3-4) 7.9	(2-3) 10 (1-5) 9.0 (3-5) 45.6	405(a)
$C_9F_3H_{17}$	$CF_2^{(1)}H^{(3)}{\cdot}CF^{(2)}H^{(4)}{\cdot}CH[CH(CH_3)_2]_2$	(1) −131.5	(2) −211.3	(1-3) 53.5 (2-3) 7.7	(2-4) 44	405(a)
$C_9F_4H_7NO$		(1) −102.7	(2)(3) −134.2, −136.3			321
$C_9F_4H_8S$	$CF_2^{(1)}H^{(3)}{\cdot}CF_2^{(2)}{\cdot}SCH_2C_6H_5$			(1-3) 55	(2-3) 3	217
$C_9F_9H_{10}NO$	$CF_3(CF_2)_2{\cdot}CF_2^{(1)}{\cdot}CO{\cdot}NH(CH_2)_3CH_3$	(1) −125				416
$C_{10}F_2H_{10}DNO_2$	$C_6H_5CF_2CD(NH_2)CO_2CH_3$	−108.3				406
$C_{10}F_2H_{10}O_2$	$C_6H_5CF_2CO_2CH_2CH_3$	−103.9				321

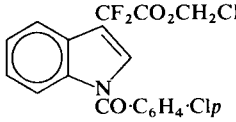
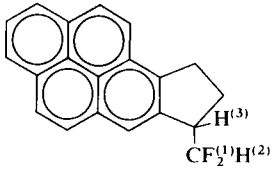
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{10}F_2H_{11}NO_2$	$C_6H_5{\cdot}CF_2^{(1,2)}{\cdot}CH^{(3)}(NH_2){\cdot}CO_2CH_3$	*(1)* −105.46 (2) −105.53	(1-3) 11.4 (2-3) 11.7	406, 407
$C_{10}F_2H_{16}O$	$Z\text{-}CH_2(OH){\cdot}C{=}C(CF_2^{(1)}H^{(2)}){\cdot}CH_2CH_2CH{=}C(CH_3)_2$	−116.2	(1-2) 56	227
$C_{10}F_2H_{16}O_4$	$CH_3CH_2OCF_2C(OCH_2CH_3){=}CHCO_2CH_2CH_3$	−78.70		410
$C_{10}F_2H_{18}Cl_2$	$CCl_2H^{(2)}{\cdot}CF_2^{(1)}{\cdot}CH_2^{(3)}{\cdot}(CH_2)_6CH_3$	−106.4	(1-2) 7 (1-3) 17	401(a)
$C_{10}F_2H_{21}N$	$C_8H_{17}{\cdot}CF_2^{(1)}{\cdot}CH_2^{(2)}{\cdot}NH_2$	−107.8	(1-2) 14.9	406
$C_{10}F_4H_4Cl_3N$		(1) −84.0 (2) −91.8 (3) −50.5	(1-2) 27.0 (1-3) 7.5 (2-3) 33.0	412(a)
$C_{10}F_4H_5Cl_2N$		(1) −84.1 (2) −91.8 (3) −51.6	(1-2) 27.0 (1-3) 7.5 (2-3) 33.0	412(a)
$C_{10}F_4H_8O_2$		(1) −103.99 (2)(3) −134.03, −135.96		321
$C_{10}F_5H_4Cl_2N$		(1) −83.6 (2) −91.0 (3) −51.6	(1-2) −26.5 (1-3) 7.5 (2-3) 33.0	412(a)
$C_{10}F_5H_4Cl_2NO$	$(CF_2^{(1)}Cl)_2C{=}N{\cdot}CO{\cdot}C_6H_4{\cdot}F^{(2)}p$	(1) −57.2 (2) −100.8		412(a)

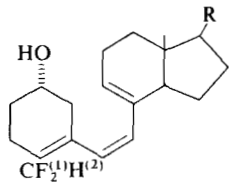
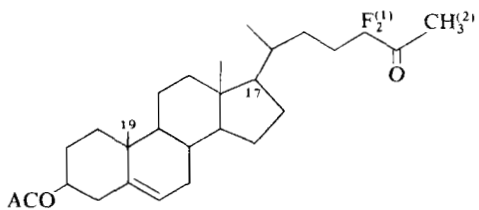
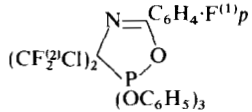
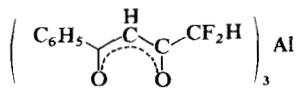
$C_{10}F_{15}H_5O$	$CF_3(CF_2)_4{\cdot}CF_2^{(3)}$  $CH^{(4)}(OH){\cdot}CH_3$	(1) −154.5 (3) −117.9	(2) −169.3	(1-2) 138.7	(1-4) 22.5	375
$C_{10}F_{20}I_2$	$CF_2^{(1)}I{\cdot}CF_2^{(2)}{\cdot}(CF_2^{(3)})_6{\cdot}CF_2CF_2I$	(1) −65.0 (3) −123.2	(2) −115.0			398
$C_{11}F_2H_{11}NO_3$		−100.5				321
$C_{11}F_4H_7Cl_2N$	 $N{=}C(Cl){\cdot}C_6H_4{\cdot}CH_3p$	(1) −84.3 (3) −51.7	(2) −91.5	(1-2) 28.0 (2-3) 33.2	(1-3) 7.5	412(a)
$C_{11}F_4H_7Cl_2NO$	As above with CH_3 replaced by OCH_3	(1) −86.0 (3) −51.2	(2) −93.5	(1-2) 28.5 (2-3) 33.0	(1-3) 7.5	412(a)
$C_{11}F_{13}H_{12}N$	$CH_3N[(CH_2)_3CH_3]{\cdot}CF_2^{(1)}{\cdot}(CF_2)_4CF_3$	(1) −123				416
$C_{11}F_{15}H_7O$	$CF_3(CF_2)_4{\cdot}CF_2^{(3)}$  $CH^{(4)}(OH){\cdot}CH_2CH_3$	(1) −156.3 (3) −118.3	(2) −175.5	(1-2) 144.0	(1-4) 27.0	375
$C_{12}F_2H_8O_2$		α −99.8 β −102.44				321
$C_{12}F_2H_9NO$		−99.1				321

Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{12}F_2H_{14}O_2$	p-$CH_3CH_2CH(CH_3)\cdot C_6H_4\cdot CF_2CO_2H$	−105.2		321
$C_{12}F_2H_{18}O_2$	$(CH_3)_2C{=}CHCH_2CH_2C(CF_2^{(1)}H^{(2)}){=}CHCO_2CH_2CH_3$			227
	Z-isomer	−120.8	(1-2) 55.2	
	E-isomer	−117.0	(1-2) 56	
$C_{12}F_3H_{17}$	 $CF_2^{(2)}\cdot CH_2^{(3)}F^{(1)}$	(1) −228.3 (2) −119.2	(1-2) 14.8 (1-3) 46.5 (2-3) 13.0	411
$C_{12}F_4H_7Cl_2N$		(1) −84.0 (2) −91.5 (3) −51.9	(1-2) 27.0 (1-3) 7.5 (2-3) 33.0	412(a)
$C_{12}F_{15}H_9O$		(1) −153.5 (2) −173.5 (3) −117.9	(1-2) 140.9 (1-4) 28.5	375
$C_{12}F_{24}I_2$	$CF_2^{(1)}I\cdot CF_2^{(2)}\cdot(CF_2^{(3)})_8\cdot CF_2CF_2I$	(1) −65.0 (2) −115.0 (3) −123.2		398
$C_{13}F_2H_{10}$	$(C_6H_5)_2CF_2$	−88.5		283
$C_{13}F_2H_{10}O_2$		−100.6		321
$C_{13}F_2H_{14}O_4$		−102.3		321
$C_{13}F_4H_{22}$	$C_5H_{11}\cdot CF_2^{(2)}\cdot C(C_5H_{11}){=}CF_2^{(1)}$	(1) −82.2, −86.9	(1A-1B) 39	414

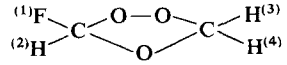
$C_{13}F_4H_{22}$		(1) −121.40, −152.61 (2) −91.2, −98.2	(1A-1B) 162	(2A-2B) 254	414
$C_{13}F_4H_{22}$	As above with H and C_4H_9 interchanged	(1) −137.55, −138.55 (2) −94.9, −100.9	(1A-1B) 166	(2A-2B) 252	414
$C_{13}F_4H_{22}N_2$	$(C_4H_9CH_2CF_2)_2\overline{C{\cdot}N{=}N}$	−88	(1-2) 16.5		414
$C_{13}F_4H_{22}N_2$	$(C_4H_9CH_2CF_2)_2C{=}N{=}N$	−87.9	(1-2) 16.5		414
$C_{13}F_{13}H_{12}NO$	$CF_3(CF_2)_4{\cdot}CF_2^{(1)}{\cdot}CO{\cdot}NH{\cdot}C_6H_{11}$cyclo	(1) −125			416
$C_{13}F_{13}H_{14}NO$	$CF_3(CF_2)_4{\cdot}CF_2^{(1)}{\cdot}C(OCH_2CH_3){=}N(CH_2)_3CH_3$	(1) −117			416
$C_{13}F_{15}H_{11}O$		(1) −142.7 (2) −169.9 (3) −117.1	(1-2) 139.8		375
$C_{13}F_{17}H_{10}NO$	$CF_3(CF_2)_6{\cdot}CF_2^{(1)}{\cdot}CO{\cdot}NH(CH_2)_3CH_3$	(1) −127			416
$C_{13}F_{18}H_8N$	$CF_3(CF_2)_6{\cdot}CF_2^{(1)}{\cdot}CF^{(2)}{=}N(CH_2)_3CH_3$	(1) −50 (2) −122			416
$C_{14}F_2H_{10}Br_2$	*p*Br·$C_6H_4{\cdot}CF_2{\cdot}C_6H_4$·Br*p*	−93.3	(1-2) 18		417
$C_{14}F_2H_{10}O$		−122.3	(1-2) 52		418
$C_{14}F_2H_{10}O_2$	As above with $COCF_2H$ replaced by CF_2CO_2H	−105.6			321
$C_{14}F_2H_{11}Br$	$C_6H_5{\cdot}CF_2^{(1,2)}{\cdot}CH^{(3)}Br{\cdot}C_6H_5$	(1)(2) −97.5, −104.5	(1-2) 258 (2-3) 9	(1-3) 16.5	419
$C_{14}F_2H_{11}Cl$	*p*Cl·$C_6H_4{\cdot}CF_2^{(1)}{\cdot}CH_2^{(2)}{\cdot}C_6H_5$	−94.0	(1-2) 18		417
$C_{14}F_2H_{11}Cl$	$C_6H_5{\cdot}CF_2^{(1)}{\cdot}CH_2^{(2)}{\cdot}C_6H_4$·Cl*p*	−95.0	(1-2) 18		417
$C_{14}F_2H_{12}$	As above with Cl replaced by H	−95.2	(1-2) 18		417
$C_{14}F_2H_{12}$	As above with Cl replaced by H	−94.9	(1-2) 21		283
$C_{14}F_2H_{12}$	$(C_6H_5)_2CH^{(3)}{\cdot}CF_2^{(1)}H^{(2)}$	−118.6	(1-2) 57	(1-3) 16	283
$C_{14}F_2H_{12}O$	$(C_6H_5)_2C(OH){\cdot}CF_2^{(1)}H^{(2)}$	−125.5	(1-2) 54 ^2J(F-C) 20	^1J(F-C) 250	366

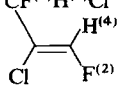
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{14}F_2H_{12}O_2$		α −100.4 β −100.4		321
$C_{14}F_2H_{13}NO_3$		−100.9		321
$C_{14}F_2H_{18}O_2$	$pCH_3CH_2CH(CH_3)\cdot C_6H_4\cdot CF_2CO_2CH_2CH_3$	−103.5		321
$C_{14}F_3H_{11}$	$C_6H_5\cdot CF^{(1)}H^{(3)}\cdot CF_2^{(2)}\cdot C_6H_5$	(1) −198 (2) −109.53, −113.75	(1-2) 16.5, 15.0 (1-3) 49.5 (2-3) 9 (2A-2B) 276	419
$C_{14}F_4H_{10}$	$(C_6H_5CF_2)_2$	−120		318
$C_{14}F_{15}H_{11}O$		(1) −142.3 (2) −169.9 (3) −117.5	(1-2) 144.0	375
$C_{15}F_2H_{13}ClO$	$pCl\cdot C_6H_4\cdot CF_2^{(1)}\cdot CH_2^{(2)}\cdot C_6H_4\cdot OCH_3p$	−94.0	(1-2) 18	417
$C_{15}F_2H_{14}$	$(C_6H_5\cdot CH_2^{(2)})_2CF_2^{(1)}$	−95.9	(1-2) 17	283
$C_{15}F_2H_{14}O$	$C_6H_5\cdot CF_2^{(1)}\cdot CH_2^{(2)}\cdot C_6H_4\cdot OCH_3p$	−95.0	(1-2) 18	417
$C_{15}F_{13}H_{19}N_2$	$CF_3(CF_2)_4\cdot CF_2^{(1)}\cdot C(NEt_2)=N(CH_2)_3CH_2$	(1) −112		416
$C_{15}F_{15}H_7O$		(1) −154.7 (2) −172.3 (3) −119.1	(1-2) 142.1 (1-4) 22.2	375
$C_{16}F_2H_{14}O_2$		−103.8		321

$C_{16}F_2H_{16}O_2$	$pCH_3O{\cdot}C_6H_4{\cdot}CF_2^{(1)}{\cdot}CH_2^{(2)}{\cdot}C_6H_4{\cdot}OCH_3p$	−93.0		(1-2) 18		417
$C_{16}F_{15}H_9O$	$CF_3(CF_2)_2{\cdot}CF_2^{(3)}$ (1)F; $F^{(2)}$; $CH^{(4)}(OH){\cdot}CH_2C_6H_5$	(1) −155.8 (3) −118.8	(2) −169.0	(1-2) 141.0	(1-4) 25.5	375
$C_{16}F_{15}H_9O$	$CF_3(CF_2)_2{\cdot}CF_2^{(3)}$ (1)F; $F^{(2)}$; $C(CH_3)(OH){\cdot}C_6H_5$	(1) −142.3 (3) −117.9	(2) −167.5	(1-2) 138.0		375
$C_{17}F_2H_{32}O_2$	$CH_3(CH_2)_8CF_2(CH_2)_5CO_2CH_3$	−98.0		^3J(F-H) 16		420
$C_{17}F_2H_{36}O_6P_2$	$[(BuO)_2P(O)]_2CF_2$	−121.6		(P-F) 87	^1J(F-C) 279	415
$C_{18}F_{24}H_{18}N_3O_6P_3$	$(CF_2^{(2)}H^{(3)}{\cdot}CF_2^{(1)}{\cdot}CH_2^{(4)}{\cdot}O)_6P_3N_3$	(1) −137.1		(1-3) 2.8 (2-3) 51	(1-4) 11.5	353
$C_{19}F_2H_{14}ClNO_3$		−98.3				321
$C_{19}F_2H_{36}O_2$	$CH_3(CH_2)_5CF_2(CH_2)_{10}CO_2CH_3$	−97.3		^3J(F-H) 16		420
$C_{20}F_2H_{14}$		−120		(1-2) 57 (1-) 2.5	(1-3) 14.5	421
$C_{21}F_{15}H_{11}O$	$CF_3(CF_2)_4{\cdot}CF_2^{(3)}$ (1)F; $F^{(2)}$; $C(OH)(C_6H_5)_2$	(1) −135.5 (3) −117.1	(2) −162.7	(1-2) 151.5		375

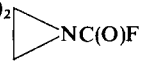
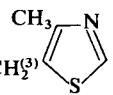
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{27}F_2H_{44}O$	 $R = C_8H_{17}$		(1-2) 55.5	422
$C_{27}F_2H_{44}O$	As above with central double bond *trans*		(1-2) 55.5	422
$C_{28}F_2H_{42}O_3$			(1-2) 1	423
$C_{28}F_5H_{19}Cl_2NO_4P$		(1) −104.8 (2) −48.7	(P-2) 2.7	412(a)
$C_{29}F_2H_{46}O_2$	As $C_{28}F_2H_{42}O_3$ above with a C(17) side-chain of C_8H_{17} and a C(19) group of $CF_2^{(1)}H^{(2)}$		(1-2) 56	422
$C_{30}F_6H_{21}AlO_6$		−124.92, −125.09, −125.23, −125.27 (mixture of isomers)		369

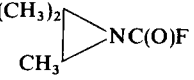
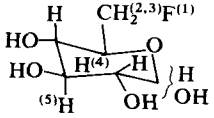
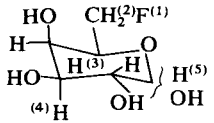
C. Fluorine nuclei in a CF group

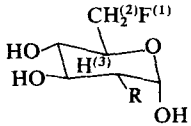
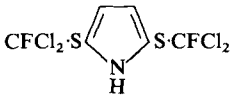
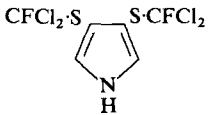
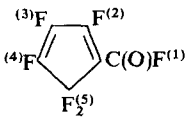
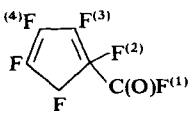
CFH_2Cl	$CF^{(1)}H_2^{(2)}Cl$		−168.7		(1-2) 49.4		171
CFH_3	CFH_3		−267.9				283
CFBrS	CFBr=S		+119.2				177
CFClO	CFCl=O				^1J(F-C) 366		395
CFClS	CFCl=S		+98.8		^1J(F-C) 389		395
$CF_2H_2O_2S$	$CF^{(1)}H_2^{(3)}\cdot SO_2F^{(2)}$		(1) −214.65	(2) +47.72	(1-2) −9.4 (2-3) +7.1 ^2J(F-C) +26.4	(1-3) +45.8 ^1J(F-C) −222.3	180
CF_3NOS	$FCO\cdot NSF_2$				^1J(F-C) 313		182
$CF_7N_3O_3S_3$	$CF^{(1)}(NSOF_2^{(2)})_3$		(1) −35.2	(2) +46.3	(1-2) 9.8		181
C_2FH_3O	$CH_3C(O)F$		+47.0		(1-2) 7.5		176(a)
$C_2FH_3O_2$					(1-2) 86.4	(1-4) 8.5	424
C_2FH_5	$CF^{(1)}H_2^{(2)}\cdot CH_3^{(3)}$		−211.5		(1-2) 48.5	(1-3) 27	283
$C_2F_2Cl_4$	$CFCl_2\cdot CFCl_2$		−67.8				191
$C_2F_4H_2ClNO_4S_2$	$CFHCl\cdot CHF^{(1)}\cdot N(SO_2F^{(2)})_2$	(isomer mixture)	(1) −133.5 −144.0 −147.0 −154.2	(2) +53.9 +54.8 +59.5 +60.8			397
$C_2F_6H_2BrClS$	$CH^{(5)}ClBr\cdot CF^{(1)}H^{(4)}\cdot SF_4^{(2)}F^{(3)}$	Isomer [a]	(1) −164 (3) +71.4	(2) +48.5	(1-4) 48.0 (1-3) 2.8 (2-4) 4.9	(1-2) 5.6 (2-3) 145 (1-5) 21.2	221
		Isomer [b]	(1) −152 (3) +71.6	(2) +49.0	(1-4) 56.4 (1-3) 2.8 (2-4) 4.2	(1-2) 5.6 (2-3) 145 (1-5) 17.4	
$C_2F_6H_2BrClS$	$CF^{(1)}ClBr\cdot CH_2^{(4)}\cdot SF_4^{(2)}F^{(3)}$		(1) −58 (3) −77	(2) +68.0	(1-2) 12 (1-4) 12, 18 (2-4) 7.5	(1-3) 2 (2-3) 150	221

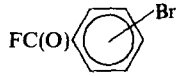
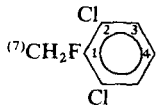
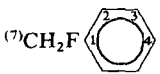
Molecular formula	Structure of compounds		Chemical shifts (ppm)		Coupling constants (Hz)		Ref.
$C_2F_7HBrClS$	$CF^{(1)}ClBr{\cdot}CH^{(5)}F^{(2)}{\cdot}SF_4^{(3)}F^{(4)}$	Isomer [a]	(1) −71.1	(2) −152.5	(1-4) 1.4	(1-3) 14.1	221
			(3) +53.5	(4) +70.2	(1-2) 31.6	(1-5) 2.4	
					(2-4) 2.5	(2-5) 42.7	
					(3-4) 147	(3-5) 4.5	
		Isomer [b]	(1) −73.0	(2) −149.1	(1-4) 1.4	(1-3) 12.7	
			(3) +54.2	(4) +70.3	(1-2) 26.0	(1-5) 4.5	
					(2-4) 2.8	(2-5) 42.9	
					(3-4) 147	(3-5) 4.5	
C_3FH_3	$CF^{(1)}H_2^{(2)}{\cdot}C{\equiv}CH^{(3)}$		−217.5		(1-2) 48	(1-3) 6.5	283
C_3FH_4ClO	$CF^{(1)}ClH^{(2)}{\cdot}COCH_3^{(3)}$		−147.16		(1-2) 51.60	(1-3) 2.50	425
$C_3FH_4N_7O_2$	$(N_3CH_2^{(2)})_2CF^{(1)}{\cdot}NO_2$		−133.8		(1-2) 16		231
C_3FH_5	$CF^{(1)}H_2^{(2)}{\cdot}CH{=}CH_2$		−216.0		(1-2) 48		283
$C_3FH_5BrNO_3$	$CH_2^{(2)}Br{\cdot}CF^{(1)}(NO_2){\cdot}CH_2^{(3)}OH$		−134.0		(1-2) 16	(1-3) 16	231
$C_3FH_5ClNO_3$	As above with Br replaced by Cl		−137.4		(1-2) 16	(1-3) 16	231
$C_3FH_6NO_4$	$(HO{\cdot}CH_2^{(2)})_2CF^{(1)}{\cdot}NO_2$		−145.6		(1-2) 16		231
C_3FH_7	$CF^{(1)}H_2^{(2)}{\cdot}CH_2^{(3)}{\cdot}CH_3$		−218.6		(1-2) 48.5	(1-3) −24.5	283
C_3FH_7	$(CH_3)_2CFH$		−165.2				283
C_3FH_7O	$CF^{(1)}H_2^{(2)}{\cdot}CH_2^{(3)}{\cdot}OCH_3$		−223.1		(1-2) 49	(1-3) 31	283
$C_3F_2H_2Cl_2$			(1) −136.8	(2) −122.3	(1-2) 2.3	(1-3) 48	400(a)
					(2-3) 1.6	(2-4) 77.6	
$C_3F_2H_2Cl_2$	As above with $F^{(2)}$ and $H^{(4)}$ interchanged		(1) −130.7	(2) −124.5	(1-2) 5.9	(1-3) 48	400(a)
					(2-3) 0.9	(2-4) 77.6	
$C_4FH_4DO_4$	(2*R*,3*S*)-$HO{\cdot}CO{\cdot}CH^{(2)}F^{(1)}{\cdot}CH^{(3)}D{\cdot}CO_2H$		−115.1		(1-2) 50.0	(1-3) 25.0	426
					(1-D) 4.0		
C_4FH_6ClO	$CH_3^{(2)}{\cdot}CF^{(1)}Cl{\cdot}CO{\cdot}CH_3^{(3)}$		−110.67		(1-2) 22.88	(1-3) 4.00	425
C_4FH_6NO			(+) 6.0				427

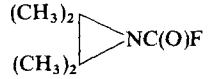
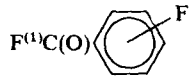
C_4FH_7	E-$CFH_2{\cdot}CH{=}CH{\cdot}CH_3$		−209.7			283
C_4FH_7	$CH_2{=}CH{\cdot}CFH{\cdot}CH_3$		−171.6			283
C_4FH_7O	$CH_3^{(3)}{\cdot}CF^{(1)}H^{(2)}{\cdot}CO{\cdot}CH_3^{(4)}$		−182.73	(1-2) 50.0 (1-4) 4.0	(1-3) 24.0	425
C_4FH_7O	Same as above		−180.4	(1-2) 50 (1-4) 5	(1-3) 25	428(b)
C_4FH_7O	$CH_3{\cdot}CH_2^{(4)}{\cdot}CH^{(2)}F^{(1)}{\cdot}CH^{(3)}O$		−201.50	(1-2) 48.8 (1-4) 24.4	(1-3) 6.22	425
$C_4FH_7O_2$	$CH_3^{(3)}{\cdot}CF^{(1)}H^{(2)}{\cdot}CH^{(4)}(OH){\cdot}CO_2H$		−184	(1-2) 50 (1-4) 15	(1-3) 24	429
$C_4FH_7O_2$	$CF^{(1)}H_2^{(2)}{\cdot}CO_2CH_2CH_3$		−228	(1-2) 47		430
C_4FH_8Br	$CH_3^{(3)}{\cdot}CF^{(1)}H^{(2)}{\cdot}CH^{(4)}Br{\cdot}CH_3$	*erythro*		(1-2) 47.4 (1-4) 10.2	(2-3) 23.5	431
		threo		(1-2) 47.0 (1-4) 17.9	(1-3) 23.2	
C_4FH_8Br	As above	*erythro* + *threo*	−168.2, −172.2			428(*b*)
$C_4FH_8NO_2$	$CH_3{\cdot}CFH{\cdot}CH(CO_2^-)\,NH_3^+$		−183.0			432
C_4FH_9	$CF^{(1)}H_2^{(2)}{\cdot}CH_2^{(3)}{\cdot}CH_2CH_3$		−218.6	(1-2) 48.2	(1-2) 25	283
C_4FH_9	$CF^{(1)}H_2^{(2)}{\cdot}CH^{(3)}(CH_3)_2$		−220.3	(1-2) 48	(1-2) 17	283
C_4FH_9	$CH_3{\cdot}CFH{\cdot}CH_2CH_3$		−173.2			283
C_4FH_9	$(CH_3)_3CF$		−130.8			283
$C_4FH_{10}N$	$F^{(1)}CH_2^{(2)}{\cdot}CH_2^{(3)}{\cdot}N(CH_3)_2$			(1-2) 47.0	(1-3) 30.8	433
$C_4FH_{11}BrN$	$F^{(1)}CH_2^{(2)}{\cdot}CH_2^{(3)}{\cdot}NH(CH_3)_2^+\ Br^-$			(1-2) 46.8	(1-3) 27.9	433
$C_4F_2H_2Br_6O$	$(CBr_3{\cdot}CH^{(2)}F^{(1)})_2O$			(1-2) 63		396
$C_4F_2H_2Cl_6O$	$CCl_3{\cdot}CH^{(2)}F^{(1)}{\cdot}O{\cdot}CH^{(3)}F{\cdot}CCl_3$	*R,R*(*S,S*)	−124.6	(1-2) 57.9	(1-3) 4.6	396
		R,S(*S,R*)	−131.2	(1-2) 60.3	(1-3) 8.5	
$C_4F_2H_2Cl_6O$	$CF^{(1)}HCl{\cdot}CCl_2{\cdot}O{\cdot}CF^{(2)}H{\cdot}CCl_3$		(1) −139.4 (2) −128.4			396
$C_4F_2H_4Cl_4O$	$(CHCl_2{\cdot}CH^{(2)}F^{(1)})_2O$			(1-2) 63		396
$C_4F_2H_6Cl_2O$	$(CH_2Cl{\cdot}CH^{(2)}F^{(1)})_2O$			(1-2) 60		396
$C_4F_8H_2O$	$(CF_3{\cdot}CH^{(2)}F^{(1)})_2O$			(1-2) 57		396
C_5FH_7	$(CH_3)_2CF{\cdot}C{\equiv}CH$		−129.3			283
$C_5FH_7O_4$	$CH^{(2)}F^{(1)}(CO_2CH_3)_2$		−199.6	(1-2) 48.0		228
C_5FH_8ClO	$CH_3^{(2)}{\cdot}CF^{(1)}Cl{\cdot}CO{\cdot}CH_2CH_3$		−123.04	(1-2) 19.28		425

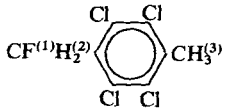
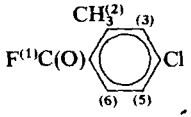
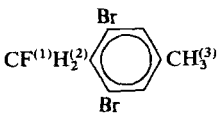
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
C_5FH_8ClO	$CH_3^{(3)}\cdot CO\cdot CF^{(1)}Cl\cdot CH_2^{(2)}\cdot CH_3$	−121.41	(1-2) 20.35 (1-3) 3.49	425
C_5FH_8NO	$(CH_3)_2$  $NC(O)F$	(+) 8.9		427
C_5FH_9	$CH_2{=}CH\cdot CH_2\cdot CHF\cdot CH_3$	−172.4		283
$C_5FH_9O_2$	$S(-)$-$CH_3^{(3)}\cdot CF^{(1)}H^{(2)}\cdot CO_2CH_2CH_3$	−183.1	(1-2) 47.4 (1-3) 21.7	434(a)
$C_5FH_{10}NO_2$	$CH_3^{(3)}\cdot CF^{(1)}H^{(2)}\cdot CH^{(4)}(NH_2)\cdot CO_2CH_3$	−170.37	(1-2) 46.8 (1-3) 24.4 (1-4) 26.8	435
$C_5FH_{10}NO_4$	$(CH_3OCH_2^{(2)})_2CF^{(1)}\cdot NO_2$	−138.6	(1-2) 16	231
C_5FH_{11}	$CF_2H\cdot CH_2\cdot CH(CH_3)_2$	−218.6		283
C_5FH_{11}	$CF_2H\cdot C(CH_3)_3$	−222.8		283
C_5FH_{11}	$CH_3\cdot CFH\cdot CH_2CH_2CH_3$	−172.8		283
C_5FH_{11}	$(CH_3CH_2)_2CFH$	−182.7		283
C_5FH_{11}	$CH_3\cdot CF(CH_3)\cdot CH_2CH_3$	−139.2		283
$C_5FH_{11}O$	$(CH_3^{(2)})_2CF^{(1)}\cdot CH(OH)\cdot CH_3$		(1-2) 22	436
$C_5FH_{13}BrN$	$CH_2^{(2)}F^{(1)}\cdot CH_2^{(3)}\cdot N(CH_3)_3^+\ Br^-$		(1-2) 47.1 (1-3) 28.7	433
$C_5F_2H_3Cl_2NO_2$	$CH_3O\cdot CO\cdot CF^{(1)}Cl\cdot CF^{(2)}Cl\cdot CN$	−111.1, −116.3	(1-2) 20	437
$C_5F_7H_3ClNO_3$	$CH^{(1)}F^{(2)}Cl\cdot CO_2\cdot CH_2\cdot O\cdot N(CF_3)_2$		(1-2) 55	242
$C_6FH_7O_2$	$CH_2^{(2)}F^{(1)}\cdot C{\equiv}C\cdot CO_2CH_2CH_3$	−226.6	(1-2) 47.1	227
$C_6FH_8BrO_2$	$CH_3\cdot CFH\cdot C(CH_3){=}CBr\cdot CO_2H$	−171.6, −177.9, −179.7		428(b)
C_6FH_8ClO	$\overline{CH_2\cdot CH_2\cdot CH_2\cdot CH_2\cdot CFCl\cdot CO}$	−115.00		425
$C_6FH_8DO_4$	$(2R,3S)$-$CH_3O\cdot CO\cdot CH^{(2)}F^{(1)}\cdot CH^{(3)}D\cdot CO_2CH_3$	−115.9	(1-2) 49.0 (1-3) 27.0 (1-D) 3.2	426
C_6FH_8NS	 $CF^{(1)}H_2^{(2)}\cdot CH_2^{(3)}$	−218.5	(1-2) 47.5 (1-3) 24.0	438(a)
$C_6FH_9O_2$	$CH_3^{(3)}\cdot CF^{(1)}H^{(2)}\cdot C(CH_3){=}CH\cdot CO_2H$ *E*-isomer	−173.5	(1-2) 48 (1-3) 24	428(b)

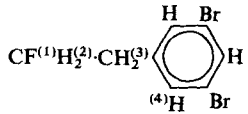
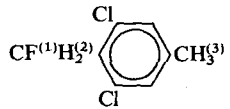
$C_6FH_{10}ClO$	$CH_3{\cdot}CH_2{\cdot}CO{\cdot}CF^{(1)}Cl{\cdot}CH_2^{(2)}{\cdot}CH_3$		−123.04	(1-2) 22.89		425
$C_6FH_{10}NO$			(+) 8.4			427
$C_6FH_{11}O$	$(CH_3)_3C{\cdot}CO{\cdot}CF^{(1)}H_2^{(2)}$		−227.3	(1-2) 46.5		411
$C_6FH_{11}O$	Same as above		−231.72	(1-2) 45.77		425
$C_6FH_{11}O$	$(CH_3)_3C{\cdot}CF^{(1)}H^{(2)}{\cdot}CHO$			(1-2) 43		436
$C_6FH_{11}O_2$	$CH_3^{(3)}{\cdot}CF^{(1)}H^{(2)}{\cdot}CH^{(4)}(CH_3){\cdot}CH_2{\cdot}CO_2H$	*threo*	−176.2	(1-2) 48 (1-4) 14	(1-3) 24	428(b)
		erythro	−183.0	(1-2) 48	(1-3) 24	
$C_6FH_{11}O_5$		α		(1-2) 46.7 (1-4) 28.6	(1-3) 48.0 (1-5) 0.7	439
		β		(1-2) 47.4 (1-4) 26.0	(1-3) 47.5	
$C_6FH_{11}O_5$			−231.2	(1-2) 46.2, 47.1 (1-4) 1.0	(1-3) 13.5 (1-5) 1.0	434(a)
$C_6FH_{12}NO_2$	$CH_3{\cdot}CFH{\cdot}CH(CH_3){\cdot}CH(NH_2){\cdot}CO_2H$		−168.5			428(b)
$C_6FH_{12}O_2$	$CF^{(1)}H_2^{(2)}{\cdot}CH^{(3)}(NH_2){\cdot}CO_2Pr^i$		−248.5, −248.8	(1-2) 48	(1-3) 30.5	435
C_6FH_{13}	$CFH_2{\cdot}CH(CH_3){\cdot}CH_2CH_2CH_3$		−222.7	(1-2) 49	(1-3) 19	283
C_6FH_{13}	$CFH_2{\cdot}CH(CH_2CH_3)_2$		−226.4			283
C_6FH_{13}	$CF^{(1)}H_2^{(2)}{\cdot}CH_2^{(3)}{\cdot}C(CH_3)_3$		−217.6	(1-2) 47	(1-3) 26	283
C_6FH_{13}	$CH_3{\cdot}CFH{\cdot}CH_2{\cdot}CH(CH_3)_2$		−173.0			283
C_6FH_{13}	$(CH_3)_2CH{\cdot}CHF{\cdot}CH_2CH_3$		−188.9			283
C_6FH_{13}	$CH_3{\cdot}CF(CH_3){\cdot}CH_2CH_2CH_3$		−137.1			283

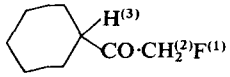
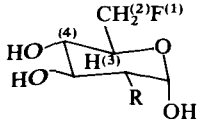
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_6FH_{13}ClNO_4$	 R = NH_2,HCl	−239.9	(1-2) 49.5 (1-3) 30.5	440(b)
$C_6FH_{14}BrN$	$(CH_2^{(2)}F^{(1)}\cdot CH_2^{(3)})_2N(CH_3)_2^+\ Br^-$		(1-2) 47.4 (1-3) 29.1	433
$C_6FH_{15}ClN$	$(CH_3^{(2)})_2CF^{(1)}\cdot CH^{(3)}(CH_2CH_3)\cdot NH_2$,HCl	−179.0	(1-2) 23 (1-3) 10.7	441
$C_6F_2H_3Cl_4NS_2$		−21.71		267
$C_6F_2H_3Cl_4NS_2$		−21.89, −22.57		267
$C_6F_2H_3Cl_9O_2$	$(CCl_3\cdot CH^{(2)}F^{(1)}\cdot O)_2CH\cdot CCl_3$		(1-2) 59.4	396
$C_6F_2H_6Cl_2O_4$	$CH_3O\cdot CO\cdot CF^{(1)}Cl\cdot CF^{(2)}Cl\cdot CO_2CH_3$	−124.4, −117.1	(1-2) 5.0	437
C_6F_6O		(1) +31.4 (2) −95.1 (3) −157.0 (4) −148.4 (5) −136.0		442(a)
C_6F_6O		(1) +16.9 (2) −196.1 (3) −150.0 (4) −167.1		442(a)

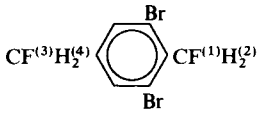
C_7FH_4BrO		*para*	+17.92			443
		meta	+18.56			
C_7FH_4ClO	As above with Br replaced by Cl	*para*	+17.92			443
		meta	+18.65			
$C_7FH_4NO_3$	As above with Br replaced by NO_2	*para*	+20.84			443
		meta	+19.68			
$C_7FH_5Cl_2$				(F-C7) 167.4	(F-C1) 14.8	444
				(F-C2) 3.9	(F-C3) 2.9	
				(F-C4) 4.0	(F-H7) 48	
C_7FH_5O	$FCO{\cdot}C_6H_5$		+18.2			176(a)
C_7FH_6Cl	$CF^{(1)}H_2^{(2)}{\cdot}C_6H_4{\cdot}Cl$*p*		−211	(1-2) 47		430
C_7FH_6NO	$FCO{\cdot}C_6H_4{\cdot}NH_2$*m*		+17.65			443
$C_7FH_6NO_2$	$FCH_2{\cdot}C_6H_4{\cdot}NO_2$*p*		s.c.s. −8.78 (22°), −12.69 (−80°)			445
C_7FH_7	$F^{(1)}CH_2^{(2)}{\cdot}C_6H_5$		−206.3	(1-2) 49		283
C_7FH_7	Same as above			(1-2) 47.8		446
C_7FH_7				(F-C7) 166.5	(F-C1) 16.7	444
				(F-C2) 5.9	(F-C3) 1.3	
				(F-C4) 3.0		
C_7FH_7	$FCH_2{\cdot}C_6H_4{\cdot}OH$*p*		s.c.s. +7.57 (22°), +8.95 (−80°)			445
$C_7FH_{10}BrO_2$	$CH_3^{(3)}{\cdot}CF^{(1)}H^{(2)}{\cdot}C(CH_3){=}CBr{\cdot}CO_2CH_3$		−173.2	(1-2) 46	(1-3) 23	428(b)
$C_7FH_{11}Br_2O_2$	$CH_3^{(3)}{\cdot}CF^{(1)}H^{(2)}{\cdot}CBr(CH_3){\cdot}CHBr{\cdot}CO_2CH_3$					
	(*mixture of isomers*)		−174.8	(1-2) 49	(1-3) 24.5	428(b)
			−176.6	48	24	
			−181.1	45	22.5	
$C_7FH_{11}O_2$	$CH_3^{(3)}{\cdot}CF^{(1)}H^{(2)}{\cdot}C(CH_3^{(4)}){=}CH{\cdot}CO_2CH_3$	*E*-isomer	−173.3	(1-2) 48	(1-3) 24	428(b)
		Z-isomer	−179.6	(1-2) 50	(1-3) 24	
				(1-4) 6		

Molecular formula	Structure of compounds		Chemical shifts (ppm)	Coupling constants (Hz)		Ref.
$C_7FH_{12}BrO_2$	$CH_3^{(3)}\cdot CF^{(1)}H^{(2)}\cdot CH^{(4)}(CH_3)\cdot CHBr\cdot CO_2CH_3$ (mixture of isomers)		−172.7	(1-2) 50	(1-3) 25	428(b)
			−175.1	49	24.5	
			−186.2	49	24.5	
			−193.3	51	25.5	
$C_7FH_{12}IO_2$	As above with Br replaced by I		−172.7, −177.4, −189.1, −192.7			428(b)
$C_7FH_{12}NO$			(+) 9.0			427
$C_7FH_{12}N_3O_2$	As $C_7FH_{12}BrO_2$ above with Br replaced by N_3		−172.2, −175.3, −182.1, −186.9, −191.3			428(b)
$C_7FH_{13}O_2$	As $C_7FH_{12}BrO_2$ above with Br replaced by H	*threo*	−175.4	(1-2) 48 (1-4) 14	(1-3) 24	428(b)
		erythro	−181.7	(1-2) 48 (1-4) 0	(1-3) 24	
$C_7FH_{13}O_5$	$(CH_3O)_3C\cdot CF^{(1)}H^{(2)}\cdot CO_2CH_3$		−198.5	(1-2) 48.0		228
C_7FH_{15}	$(CH_3CH_2)_3CF$		−156.2			283
C_7FH_{15}	$(CH_3)_2CF\cdot C(CH_3)_3$		−147.8			283
$C_7FH_{18}Br_2Cl_2N_3PZn$	$[((CH_3)_3N)_3P^+CFBrCl]ZnCl_2Br^-$		−61.3	(P-F) 73.1		235
$C_7FH_{18}CdCl_3N_3P$	$[((CH_3)_2N)_3P^+CFClCdCl]Cl^-$		−147.3	(P-F) 67.6	(Cd-F) 145	235
$C_7FH_{18}Cl_3HgN_3P$	As above with Cd replaced by Hg		−126.3	(P-F) 65.9	(Hg-F) 698	235
$C_7FH_{18}Cl_3N_3P$	As above with CdCl replaced by Cl		−58.8	(P-F) 83.7		235
$C_7FH_{18}Cl_3N_3PZn$	As above with Cd replaced by Zn		−149.9	(P-F) 65.6		235
$C_7F_2H_4O$		*para* *meta*	(1) +17.51 (1) +18.86			443

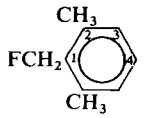
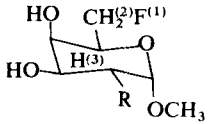
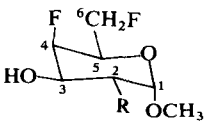
$C_7F_2H_6$	$FCH_2{\cdot}C_6H_4{\cdot}Fp$		s.c.s. +2.36 (+22°), +2.89 (−80°)			445
$C_7F_3H_8N_5O_{12}$	$[CF^{(1)}(NO_2)_2{\cdot}CH_2{\cdot}O{\cdot}CH_2^{(3)}]_2CF^{(2)}{\cdot}NO_2$		(1) −109.4 (2) −138.7	(2-3) 16		231
$C_8FH_4Cl_3O_3$	$(2,4,5\text{-}Cl_3C_6H_2{\cdot}O)CF^{(1)}H^{(2)}{\cdot}CO_2H$		−132.9	(1-2) 59		447
C_8FH_4NO		*para* *meta*	+19.70 +18.92			443
$C_8FH_5Br_3Cl$	$R,R\text{-}p\text{Br}{\cdot}C_6H_4{\cdot}CH^{(2)}\text{Br}{\cdot}CF^{(1)}\text{ClBr}$		−50.5	(1-2) 11.5		319
	R,S-isomer		−55.2	(1-2) 16.4		
$C_8FH_5Cl_2O_3$	$(2,4\text{-}Cl_2C_6H_3{\cdot}O)CF^{(1)}H^{(2)}{\cdot}CO_2H$		−131.5	(1-2) 59		447
$C_8FH_5Cl_4$				(1-2) 47.35	(1-3) 2.81	448
C_8FH_6BrO	$p\text{Br}{\cdot}C_6H_4{\cdot}CH_2C(O)F$		s.c.s. +0.06			449
C_8FH_6ClO				(1-2) 1.84 (1-5) 0.56	(1-3) 1.67 (1-6) −0.43	294
$C_8FH_6ClO_2$	$Cl{\cdot}C_6H_4{\cdot}CF^{(1)}H^{(2)}{\cdot}CO_2H$	*meta* *para*	−179.8 −182.6	(1-2) 47 (1-2) 47		447
C_8FH_6N	$p\text{CN}{\cdot}C_6H_4{\cdot}CFH_2$		s.c.s. −8.12 (+22°), −11.43 (−80°)			445
$C_8FH_6NO_3$	$p\text{NO}_2{\cdot}C_6H_4{\cdot}CH_2C(O)F$		s.c.s. +0.98			449
$C_8FH_7Br_2$				(1-2) 47.8	(1-3) 2.96	448
$C_8FH_7Br_2$	As above with CFH_2 and CH_3 interchanged			(1-2) 47.39	(1-3) 1.65	448

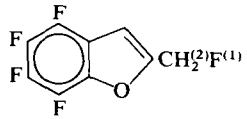
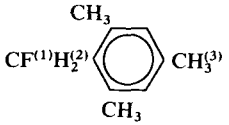
Molecular formula	Structure of compounds		Chemical shifts (ppm)	Coupling constants (Hz)		Ref.
$C_8FH_7Br_2$				(1-2) 47.0 (1-4) +0.45	(1-3) 24.4	450
$C_8FH_7Cl_2$				(1-2) 47.74	(1-3) 2.83	448
$C_8FH_7Cl_2$	As above with CFH_2 and CH_3 interchanged			(1-2) 47.39	(1-3) 1.62	448
C_8FH_7O	$C_6H_5{\cdot}CO{\cdot}CH_2^{(2)}F^{(1)}$		−233	(1-2) 48		430
C_8FH_7O	Same as above		−231.9	(1-2) 47		447
C_8FH_7O	$C_6H_5{\cdot}CF^{(1)}H^{(2)}{\cdot}CH^{(3)}O$		−178.8	(1-2) 49	(1-3) 24	447
C_8FH_7O	$FCO{\cdot}C_6H_4{\cdot}CH_3$	*para* *meta*	+16.94 +17.74			443
$C_8FH_7O_2$	$C_6H_5{\cdot}CF^{(1)}H^{(2)}{\cdot}CO_2H$		−181.4	(1-2) 48		447
$C_8FH_7O_2$	$FCO{\cdot}C_6H_4{\cdot}OCH_3$	*para* *meta*	+15.46 +18.09			443
$C_8FH_7O_3$	$C_6H_5O{\cdot}CF^{(1)}H^{(2)}{\cdot}CO_2H$		−130.1	(1-2) 59		447
C_8FH_9	$C_6H_5{\cdot}CH_2^{(3)}{\cdot}CH_2^{(2)}F^{(1)}$		−216.0	(1-2) 47	(1-3) 29	283
C_8FH_9	$C_6H_5{\cdot}CF^{(1)}H^{(2)}{\cdot}CH_3^{(3)}$		−166.8	(1-2) 48	(1-2) 24	283
C_8FH_9	$pCH_3^{(3)}{\cdot}C_6H_4{\cdot}CF^{(1)}H_2^{(2)}$		s.c.s. +2.83 (+22°) +3.61 (−80°)			445
C_8FH_9	Same as above			(1-2) 48.0	(1-3) 2.15	448
$C_8FH_{10}N$	$C_6H_5{\cdot}CF^{(1)}H^{(2)}{\cdot}CH_2^{(3,4)}{\cdot}NH_2$		−185.5	(1-2) 47.5 (1-4) 25	(1-3) 22	441
$C_8FH_{11}Br_2O_4$	$CH_3CH_2O{\cdot}CF^{(1)}Br{\cdot}CH^{(2)}Br{\cdot}CO_2CH_2CH_3$		−124.31, −129.81 (ratio 1:4)	(1-2) 22		410
$C_8FH_{12}BrO_2$	$CH_3{\cdot}CFH{\cdot}C(CH_3){=}CBr{\cdot}CO_2CH_2CH_3$		−173.5, −179.9			428(b)
$C_8FH_{12}ClO_2$	As above with Br replaced by Cl		−174.4, −180.9			428(b)

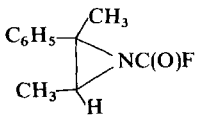
$C_8FH_{13}Br_2O_2$	$CH_3{\cdot}CFH{\cdot}CBr(CH_3){\cdot}CHBr{\cdot}CO_2CH_2CH_3$	−170.7, −172.5, −177.3			428(b)
$C_8FH_{13}O$		−229	(1-2) 47	(1-3) 3.2	411
$C_8FH_{13}O_2$	$CH_3^{(3)}{\cdot}CF^{(1)}H^{(2)}{\cdot}C(CH_3^{(4)})=CH{\cdot}CO_2CH_2CH_3$				
	E-isomer	−174.4	(1-2) 47	(1-3) 23.5	428(b)
	Z-isomer	−181.3	(1-2) 50	(1-3) 25	
$C_8FH_{14}BrO$	$CH_3CO{\cdot}CF(CH_2Br){\cdot}C(CH_3)_3$	−149.5			451
$C_8FH_{14}BrO_2$	$CH_3^{(3)}{\cdot}CF^{(1)}H^{(2)}{\cdot}CH(CH_3){\cdot}CHBr{\cdot}CO_2CH_2CH_3$				
	(mixture of isomers)	−172.4	(1-2) 47	(1-3) 23.5	428(b)
		−174.8	51	25.5	
		−185.6	47	23.5	
		−192.5	50	25	
$C_8FH_{14}IO_2$	As above with Br replaced by I				
	(mixture of isomers)	−185.1	(1-2) 49	(1-3) 24.5	428(b)
		−189.5	47	23.5	
		−169.3			
		−189.5			
$C_8FH_{14}NO_5$	 R = NH·CO·CH_3	−238.9	(1-2) 48.5	(1-3) 29.3	440(b)
$C_8FH_{14}N_3O_2$	As $C_8FH_{14}BrO_2$ above with Br replaced by N_3	−172.2, −174.5, −185.3, −192.2			428(b)
$C_8FH_{15}O_2$	As $C_8FH_{14}BrO_2$ above with Br replaced by H *threo*	−177.3			428(b)
	erythro	−183.9			
$C_8FH_{16}NO_2$	As $C_8FH_{14}BrO_2$ above with Br replaced by NH_2				
	(mixture of isomers)	−176.9	(1-2) 52.8	(1-3) 26.4	428(b)
		−183.7	50.8	25.4	
		−188.0	50.8	25.4	
		−173.5			

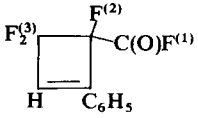
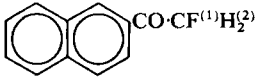
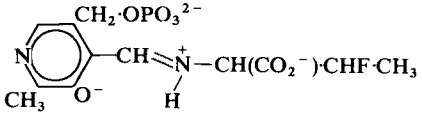
Molecular formula	Structure of compounds		Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
C_8FH_{17}	$CH_3CH_2{\cdot}CFH{\cdot}(CH_2)_4CH_3$		−181.3		283
C_8FH_{17}	Same as above		−174		452
C_8FH_{17}	S-$CH_3^{(3)}{\cdot}CF^{(1)}H^{(2)}{\cdot}(CH_2)_5CH_3$		−165	(1-2) 48 (1-3) 23	430, 452
C_8FH_{17}	R-$CH_3{\cdot}CF^{(1)}H^{(2)}{\cdot}(CH_2)_5CH_3$			(1-2) 48	434(a)
$C_8FH_{19}BrN$	$CH_2^{(2)}F^{(1)}{\cdot}CH_2^{(3)}{\cdot}N(CH_2CH_3)_3^+\ Br^-$			(1-2) 47.0 (1-3) 28.2	433
$C_8FH_{21}Cl_3IN_3PZn$	$[((CH_3)_2N)_3P^+CF^{(1)}Cl{\cdot}CH_3^{(2)}]ZnCl_2I^-$		−100.1	(P-F) 84.6 (1-2) 23.0	235
$C_8F_2H_4Br_3Cl$	p-$BrC_6H_4{\cdot}CF^{(1)}Br{\cdot}CF^{(2)}BrCl$	*erythro*	(1) −112.4 (2) −63.6	(1-2) 23.7	319
		threo	(1) −111.1 (2) −62.6	(1-2) 22.8	
$C_8F_2H_4Cl_4$	$pCF^{(1)}H_2{\cdot}C_6Cl_4{\cdot}CF^{(2)}H_2$			(1-2) 8.32	453
$C_8F_2H_4O_2$	$FC(O){\cdot}C_6H_4{\cdot}C(O)F$	*para*	+20.38		443
	meta	*meta*	+19.03		
$C_8F_2H_5Br_2Cl$	$C_6H_5{\cdot}CF^{(1)}Br{\cdot}CF^{(2)}BrCl$	*erythro*	(1) −113.6 (2) −66.8	(1-2) 25.3	320
		threo	(1) −112.1 (2) −65.5	(1-2) 25.2	
$C_8F_2H_6Br_2$				(1-2) 46.9 (1-4) 2.60 (3-4) 47.5	448
$C_8F_2H_6Cl_2$	As above with Br replaced by Cl			(1-2) 47.0 (1-4) 2.55 (3-4) 47.5	448
$C_8F_2H_6O$	$pF^{(2)}{\cdot}C_6H_4{\cdot}CO{\cdot}CH_2^{(2)}F^{(1)}$		(1) −232.0 (2) −105.0	(1-2) 47	447
$C_8F_2H_6O$	$pF{\cdot}C_6H_4{\cdot}CH_2C(O)F^{(1)}$		(1) s.c.s. −0.34		449
$C_8F_2H_8$	$CF^{(2)}H_2^{(4)}{\cdot}CH^{(3)}F^{(1)}{\cdot}C_6H_5$		(1) −247.5 (2) −208.5	(1-3) 50 (1-2) 16 (1-4) 30, 22 (2-3) 16 (2-4) 48	318
$C_8F_2H_8$	$CF^{(1)}H_2{\cdot}C_6H_4{\cdot}CF^{(2)}H_2$	*ortho*		(1-2) 4.05	453
		meta		1.04	
		para		4.77	

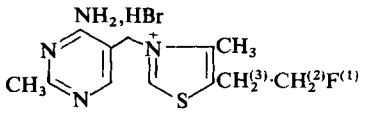
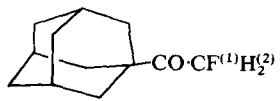
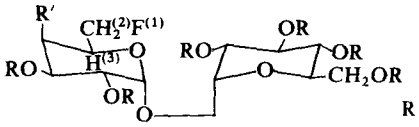
$C_8F_4H_4O$	$F^{(1)}CO{\cdot}C_6H_4{\cdot}CF_3$	*para*	(1) +19.49			443
		meta	(1) +18.65			
$C_8F_4H_6$	$F^{(1)}CH_2{\cdot}C_6H_4{\cdot}CF_3$		(1) s.c.s. −6.53 (+22°)	−9.18		445
			−9.18 (−80°)			
$C_9FH_6Br_2ClO_2$	$pHO_2C{\cdot}C_6H_4{\cdot}CH^{(2)}Br{\cdot}CF^{(1)}ClBr$			(1-2) 17.4		454
$C_9FH_7O_2$	$pFCO{\cdot}C_6H_4{\cdot}COCH_3$		+19.71			443
$C_9FH_8Br_2Cl$	*R,R-p*$CH_3{\cdot}C_6H_4{\cdot}CH^{(2)}Br{\cdot}CF^{(1)}ClBr$		−51.2	(1-2) 11.5		319
	R,S-isomer		−55.9	(1-2) 16.0		
C_9FH_8ClO	$C_6H_5{\cdot}CF^{(1)}Cl{\cdot}COCH_3^{(2)}$		−115.98	(1-2) 3.48		425
C_9FH_8NO	$C_6H_5{\cdot}CH^{(2)}F^{(1)}{\cdot}CH^{(3)}(OH){\cdot}CN$	*erythro*	−181.8	(1-2) 47	(1-3) 15.0	455
		threo	−193.2	46.5	21.2	
C_9FH_9O	$C_6H_5{\cdot}CO{\cdot}CF^{(1)}H^{(2)}{\cdot}CH_3^{(3)}$			(1-2) 48.2	(1-3) 24.5	406
C_9FH_9O	Same as above		−185	(1-2) 48.5	(1-3) 24	430
C_9FH_9O	Same as above		−182.9	(1-2) 48.7	(1-2) 23.98	425
C_9FH_9O	$pCH_3{\cdot}C_6H_4{\cdot}CH_2{\cdot}C(O)F$		s.c.s. −0.37			449
C_9FH_9O	$CH_3^{(3)}{\cdot}CO{\cdot}CF^{(1)}H^{(2)}{\cdot}C_6H_5$		−183.34	(1-2) 49.0	(1-3) 4.0	425
$C_9FH_9O_2$	$CF^{(1)}H_2^{(2)}{\cdot}CH^{(3)}(C_6H_5){\cdot}CO_2H$		−243.6	(1-2) 47	(1-3) 15	429
$C_9FH_9O_2$	$pCH_3O{\cdot}C_6H_4{\cdot}CH_2{\cdot}C(O)F$		s.c.s. −0.79			449
$C_9FH_9O_3$	$CF^{(1)}H_2^{(2)}{\cdot}CH^{(3)}(C_6H_4{\cdot}OHp){\cdot}CO_2H$		−241.7	(1-2) 47.5	(1-3) 18	429
$C_9FH_{10}NO_2$	$C_6H_5{\cdot}CF^{(1)}H^{(2)}{\cdot}CH^{(3)}(NH_2){\cdot}CO_2H$	*threo*	−188.2	(1-2) 45	(1-3) 27	456,
		erythro	−184.2	(1-2) 44	(1-3) 16	457(b)
$C_9FH_{10}NO_2$	Same as above		−193.6			432
$C_9FH_{10}NO_2$	$C_6H_5{\cdot}CH^{(2)}F^{(1)}{\cdot}CH^{(3)}(OH){\cdot}CO{\cdot}NH_2$	*erythro*	−182.43	(1-2) 45.0	(1-3) 22.9	455
		threo	−195.27	45.6	11.3	
C_9FH_{11}	$C_6H_5{\cdot}CH^{(2)}F^{(1)}{\cdot}CH_2^{(3)}{\cdot}CH_3$		−175.4	(1-2) 44	(1-3) 25, 19	283
C_9FH_{11}	$C_6H_5{\cdot}CH_2^{(3)}{\cdot}CH^{(2)}F^{(1)}{\cdot}CH_3^{(4)}$		−171.3	(1-2) 48	(1-3) 24	283
				(1-4) 20		
C_9FH_{11}	$C_6H_5{\cdot}CF^{(1)}(CH_3^{(2)})_2$		−135.0	(1-2) 23		283
C_9FH_{11}	$F^{(1)}C(CH_3^{(2)})_2$ 			(1-2) 22	(1-C1) 21.9	444
				(1-C2) 8.8	(1-C3) 1.2	
				(1-C4) 1.4		

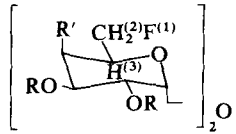
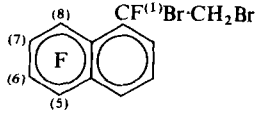
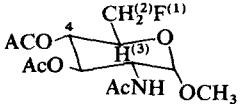
Molecular formula	Structure of compounds		Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
C_9FH_{11}				(F-C7) 161.1 (F-C1) 14.3 (F-C2) 3.5 (F-C3) 3.3 (F-C4) 4.3 (F-H7) 48	444
$C_9FH_{12}N$	$C_6H_5{\cdot}CF^{(1)}H^{(2)}{\cdot}CH^{(3)}(CH_3){\cdot}NH_2$	*threo*	−183.3	(1-2) 47.7 (1-3) 15.7	441
		erythro	−184.7	(1-2) 47.1 (1-3) 13.9	
$C_9FH_{12}N$	Same as above	*threo*	−183	(1-2) 48 (1-3) 15	458
$C_9FH_{12}N$	$C_6H_5{\cdot}CF^{(1)}(CH_3^{(3)}){\cdot}CH_2^{(2)}{\cdot}NH_2$		−158.0	(1-2) 21.7 (1-3) 22.2	441
$C_9FH_{16}NO_5$		R = NH·CO·CH$_3$	−235.0	(1-2) 47.5 (1-3) 15.8	440(b)
$C_9FH_{19}O$	$n\text{-}C_7H_{15}{\cdot}CH_2^{(3)}{\cdot}O{\cdot}CH_2^{(2)}F^{(1)}$		−152	(1-2) 57 (1-3) 1	430
$C_9FH_{22}NO_4Si_2$	$(CH_3)_3Si{\cdot}O{\cdot}CH_2^{(2)}{\cdot}CF^{(1)}(NO_2){\cdot}CH_2{\cdot}O{\cdot}Si(CH_3)_3$		−141.2	(1-2) 16	231
$C_9F_2H_5Br_2ClO_2$	$pHO_2C{\cdot}C_6H_4{\cdot}CF^{(1)}Br{\cdot}CF^{(2)}BrCl$	*threo*	(1) −106.7 (2) −57.1	(1-2) 25.2	320
		erythro	(1) −109.8 (2) −59.2	(1-2) 25.3	
$C_9F_2H_7Br_2Cl$	$pCH_3{\cdot}C_6H_4{\cdot}CF^{(1)}Br{\cdot}CF^{(2)}BrCl$	*threo*	(1) −113.0 (2) −60.6	(1-2) 23.3	319
		erythro	(1) −114.4 (2) −61.8	(1-2) 23.0	
$C_9F_2H_7Br_2ClO$	$pCH_3O{\cdot}C_6H_4{\cdot}CF^{(1)}BrCF^{(2)}BrCl$	*threo*	(1) −110.1 (2) −62.0	(1-2) 23.3	319
		erythro	(1) −111.5 (2) −63.3	(1-2) 23.4	
$C_9F_2H_{15}NO_4$		R = NH·CO·CH$_3$	(4) −225.00 (6) 236.70	(4F-3H) 33.8 (4F-4H) 63.0 (4F-5H) 33.8 (6F-5H) 13.5 (6F-6H) 47.3	440
$C_9F_4H_6O$	$pCF_3{\cdot}C_6H_4{\cdot}CH_2{\cdot}C(O)F$		s.c.s. · +0.57		449

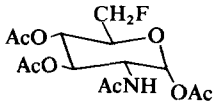
$C_9F_5H_3O$			−211.4, −147.3, −160.3, −161.7, −164.1	(1-2) 48.0		459
$C_{10}FH_{10}NO$	$C_6H_5{\cdot}CF^{(1)}(CH_3^{(2)}){\cdot}CH^{(3)}(OH){\cdot}CN$	*erythro*	−155.92	(1-2) 22.9	(1-3) 13.0	455
		threo	−157.25	(1-2) 23.0	(1-3) 17.2	
$C_{10}FH_{10}NO$	$C_6H_5{\cdot}CH^{(2)}F^{(1)}{\cdot}C(OH)(CH_3){\cdot}CN$	*erythro*	−169.6	(1-2) 46.5		455
		threo	−172.41	(1-2) 46.0		
$C_{10}FH_{11}O_2$	$C_6H_5{\cdot}CF^{(1)}H^{(2)}{\cdot}CO_2CH_2CH_3$		−180.1	(1-2) 48		447
$C_{10}FH_{11}O_3$	$C_6H_5{\cdot}CF^{(1)}H^{(2)}{\cdot}CH^{(3)}(OH){\cdot}CO_2CH_3$	*erythro*	−189.0	(1-2) 45.6	(1-3) 26.0	455
		threo	−194.9	(1-2) 45.5	(1-3) 15.8	
$C_{10}FH_{12}NO$	$C_6H_5{\cdot}CF^{(1)}H^{(2)}{\cdot}CO{\cdot}N(CH_3)_2$		−175.9	(1-2) 50		447
$C_{10}FH_{12}NO$	$CF^{(1)}H_2^{(2)}{\cdot}CH^{(3)}(NH{\cdot}CO{\cdot}C_6H_5){\cdot}CH_3$		−233.6	(1-2) 48	(1-3) 24	458
$C_{10}FH_{12}NO$	$CH_3^{(3)}{\cdot}CF^{(1)}H^{(2)}{\cdot}CH_2{\cdot}NH{\cdot}CO{\cdot}C_6H_5$		−179.47	(1-2) ~50	(1-3) 24	458
$C_{10}FH_{12}NO_2$	$C_6H_5{\cdot}CF^{(1)}H^{(2)}{\cdot}CH^{(3)}(NH_2){\cdot}CO_2CH_3$		−195.3	(1-2) 45.9	(1-3) 26.5	435
$C_{10}FH_{13}$				(1-2) 48.8	(1-3) 3.15	448
$C_{10}FH_{14}N$	$C_6H_5{\cdot}CF^{(1)}(CH_2^{(3)}CH_3){\cdot}CH_2^{(2)}{\cdot}NH_2$		−171.1	(1-2) 20, 24	(1-3) 17.2, 28.5	441
$C_{10}FH_{14}N$	$C_6H_5{\cdot}CF^{(1)}H^{(2)}{\cdot}CH_2^{(3,4)}{\cdot}NH{\cdot}CH_2CH_3$		−180.5	(1-2) 48.5 (1-4) 29.4	(1-3) 18.5	441
$C_{10}FH_{14}N$	$C_6H_5{\cdot}CF^{(1)}H^{(2)}{\cdot}C(CH_3)_2{\cdot}NH_2$		−186.4	(1-2) 45.8		441
$C_{10}FH_{14}N$	$C_6H_5{\cdot}CH^{(3)}(NH_2){\cdot}CF^{(1)}(CH_3^{(2)})_2$		−146.7	(1-2) 22	(1-3) 13.2	441
$C_{10}FH_{14}N$	$C_6H_5{\cdot}CF^{(1)}(CH_3^{(2)}){\cdot}CH^{(3)}(CH_3){\cdot}NH_2$	Isomer [a]	−144	(1-2) 22.7	(1-3) 17.5	441
		Isomer [b]	−146	(1-2) 22.7	(1-3) 15.4	
$C_{10}FH_{17}O$	Z-$HO{\cdot}CH_2{\cdot}CH^{(8)}{=}C(CF^{(1)}H_2^{(2)}){\cdot}CH_2^{(4)}{\cdot}CH_2{\cdot}CH_2{\cdot}CH{=}C(CH_3)_2$		−212.9	(1-2) 47 (1-4) 2.9	(1-3) 2.9	227

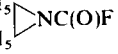
Molecular formula	Structure of compounds		Chemical shifts (ppm)	Coupling constants (Hz)		Ref.
$C_{10}FH_{17}O_2$	$CH_3^{(3)}\cdot CF^{(1)}H^{(2)}\cdot C(CH_3)=CH\cdot CO_2Bu^t$	*E*-isomer	−172.2	(1-2) 48	(1-3) 24	428(b)
		Z-isomer	−178.7	(1-2) 50	(1-3) 25	
$C_{10}FH_{18}BrO_2$	$CH_3^{(3)}\cdot CF^{(1)}H^{(2)}\cdot CH(CH_3)\cdot CHBr\cdot CO_2Bu^t$		−175.5, −172.5, −186.1, −192.9	(1-2) 47	(1-3) 2.5	428(b)
$C_{10}FH_{19}O_2$	As above with Br replaced by H	*threo*	−176.1			428(b)
		erythro	−181.9	(1-2) 48	(1-3) 24	
$C_{10}FH_{20}NO_2$	As above with Br replaced by NH_2		−184.4	(1-2) 50	(1-3) 25	428(b)
			−186.7	(1-2) 50	(1-3) 25	
			−173.9, −176.4			
$C_{10}F_2H_7Br_2ClO_2$	$pBr\cdot C_6H_4\cdot CF^{(1)}(O_2CCH_3)\cdot CF^{(2)}BrCl$	*R,S*	(1) −113.8 (2) −70.3	(1-2) 13.6		319
		R,R	(1) −112.8 (2) −70.8	(1-2) 12.4		
$C_{10}F_2H_8BrClO_2$	$C_6H_5\cdot CF(O_2CCH_3)\cdot CFBrCl$	*R,S*	(1) −119.2 (2) −73.7	(1-2) 12.6		319
		R,R	(1) −118.2 (2) −74.2	(1-2) 12.4		
$C_{10}F_2H_{10}BrClO$	$pCH_3\cdot C_6H_4\cdot CF^{(1)}(OCH_3)\cdot CF^{(2)}BrCl$		(1) −120.9 (2) −68.0	(1-2) 11.3		319
$C_{11}FH_{12}ClO_3$	$pCl\cdot C_6H_4\cdot CH^{(2)}F^{(1)}\cdot CH^{(3)}(OH)\cdot CO_2CH_2CH_3$	*erythro*	−186.7	(1-2) 45.0	(1-3) 18.5	455
		threo	−192.1	(1-2) 44.5	(1-3) 16.0	
$C_{11}FH_{12}NO$			(+) 8.1			427
$C_{11}FH_{13}O_2$	$C_6H_5\cdot CF^{(1)}H^{(2)}\cdot CH^{(3)}(CH_3)\cdot CO_2CH_3$	*threo*	−168.56	(1-2) 46.8	(1-3) 9.60	460
		erythro	−188.63	(1-2) 46.87	(1-3) 21.48	
$C_{11}FH_{13}O_3$	$C_6H_5\cdot CF^{(1)}H^{(2)}\cdot CH^{(3)}(OH)\cdot CO_2CH_2CH_3$	*threo*	−193.7	(1-2) 45.3	(1-3) 15.2	455
		erythro	−188.90	(1-2) 45.0	(1-3) 25.5	
$C_{11}H_{13}O_3$	$C_6H_5\cdot CH^{(2)}F^{(1)}\cdot C(CH_3)(OH)\cdot CO_2CH_3$	*threo*	−182.8	(1-2) 44.0		455
		erythro	−170.1	(1-2) 44.3		
$C_{11}FH_{13}O_3$	$C_6H_5\cdot CF^{(1)}(CH_3^{(3)})\cdot CH^{(2)}(OH)\cdot CO_2CH_3$	*threo*	−157.9	(1-2) 20.5		455
		erythro	−162.18	(1-3) 23.0		
$C_{11}FH_{14}NO_2$	$C_6H_5\cdot CFH\cdot CH(OH)\cdot CNH(OCH_2CH_3)$	*threo*	−194.2	(1-2) 45.5	(1-2) 16.5	455
		erythro	−181.5	(1-2) 41.5	(1-2) 26.0	

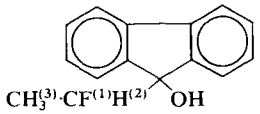
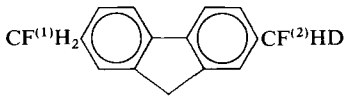
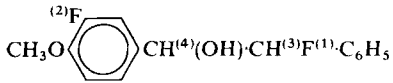
$C_{11}F_2H_8BrClO_4$	$pHO_2C{\cdot}C_6H_4{\cdot}CF^{(1)}(O_2CCH_3){\cdot}CF^{(2)}BrCl$	*R,S*	(1) −112.7	(2) −64.6	(1-2) 12.5		319
		R,R	(1) −113.6	(2) −66.6	(1-2) 12.4		
$C_{11}F_2H_{10}BrClO_2$	$pCH_3{\cdot}C_6H_4{\cdot}CF^{(1)}(O_2CCH_3){\cdot}CF^{(2)}BrCl$	*R,S*	(1) −117.5	(2) −70.0	(1-2) 11.9		319
		R,R	(1) −116.4	(2) −70.4	(1-2) 11.7		
$C_{11}F_2H_{17}NO_5$	As $C_9F_2H_{15}NO_4$ above with OH replaced by $OCOCH_3$		(4) −222.90	(6) −222.70	(4F-3H) 28.1 (4F-5H) 28.1 (6F-6H) 45.0	(4F-4H) 54.0 (6F-5H) 13.5	440(b)
$C_{11}F_2H_{17}NO_5$	As $C_9F_2H_{15}NO_4$ above with OH replaced by $OCOCH_3$, and F equatorial		(4) −200.40	(6) −240.75	(4F-3H) 13.5 (4F-5H) 2.8 (6F-6H) 47.3	(4F-4H) 48.4 (6F-5H) 24.8	440(b)
$C_{11}F_4H_6O$			(1) +30.5 (3A) −102.5	(2) −162.5 (3B) −107.8	(1-2) 18.0 (2-3A) 18 (2-4) 5.5	(1-3A) 9 (2-3B) 9.5 (3A-4) 2.0	287
$C_{12}FH_9O$					(1-2) 48		418
$C_{12}FH_9O_3$	As above with $CO{\cdot}CFH_2$ replaced by $O{\cdot}CF^{(1)}H^{(2)}{\cdot}CO_2H$			−130.7	(1-2) 60		447
$C_{12}FH_{13}N_2O_7P^{3-}$			−179.8				432
$C_{12}FH_{15}O_2$	$p(CH_3)_2CHCH_2{\cdot}C_6H_4{\cdot}CF^{(1)}H^{(2)}{\cdot}CO_2H$		−179.9		(1-2) 4.8		447
$C_{12}FH_{15}O_2$	$C_6H_5{\cdot}CF^{(1)}H^{(2)}{\cdot}CH^{(3)}(CH_2CH_3){\cdot}CO_2CH_3$	*threo*	−167.93		(1-2) 45.60	(1-3) 11.85	460
		erythro	−181.73		(1-2) 46.25	(1-3) 13.90	
$C_{12}FH_{15}O_3$	$C_6H_5{\cdot}CF^{(1)}(CH_3^{(2)}){\cdot}C(CH_3)(OH){\cdot}CO_2CH_3$	*threo*	−157.8		(1-2) 23.5		455
		erythro	−156.1		(1-2) 23.0		

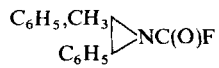
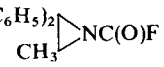
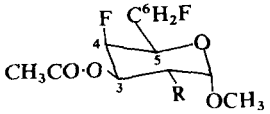
Molecular formula	Structure of compounds		Chemical shifts (ppm)		Coupling constants (Hz)		Ref.
$C_{12}FH_{16}NO_2$	$C_6H_5{\cdot}CF^{(1)}H^{(2)}{\cdot}CH^{(3)}(NH_2){\cdot}CO_2Pr^i$	Isomer [a] Isomer [b]	−194.4 −184.1		(1-2) 46.7 (1-2) 45.5	(1-3) 25.5 (1-3) 13	441
$C_{12}FH_{16}NO_2$	Same as above	Isomer [a]	−200		(1-2) 47.6	(1-3) 26.6	461
$C_{12}FH_{17}Br_2N_4S$			−220.5		(1-2) 47.5	(1-3) 24.0	438(a)
$C_{12}FH_{17}O$			−231.5		(1-2) 46.5		411
$C_{12}FH_{19}O_2$	$Z\text{-}CH_3CO_2CH_2CH^{(3)}{=}C(CF^{(1)}H_2^{(2)}){\cdot}CH_2^{(4)}CH_2CH{=}C(CH_3)_2$			−214.5	(1-2) 46.9 (1-4) 2.6	(1-3) 2.6	227
$C_{12}FH_{25}$	$n\text{-}C_{10}H_{21}{\cdot}CH_2^{(3)}{\cdot}CH_2^{(2)}F^{(1)}$		−208		(1-2) 48.5	(1-3) 25	430
$C_{12}FH_{27}ClNO_9$		R = H, R′ = NH_3Cl	−233.1		(1-2) 47	(1-3) 30	462(b)
$C_{12}F_2H_{10}$		1,7-isomer 2,6-isomer			(1-2) 0.96 (1-2) 2.32		453

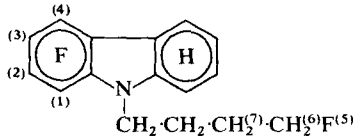
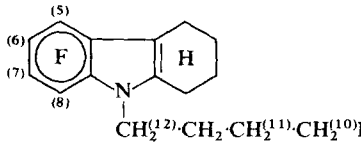
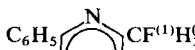
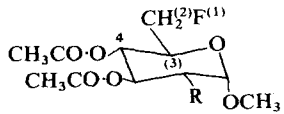
$C_{12}F_2H_{24}Cl_2N_2O_7$		R = H,R′ = NH_3Cl	−234.3	(1-2) 52	(1-3) 33	462(b)
$C_{12}F_5H_5Br_2$			(1) −95.4 (5) −146.8 (6)(7) −154.8, −157.4 (8) −130.2			463
$C_{13}FH_{11}$	$(C_6H_5)_2CF^{(1)}H^{(2)}$		−167.4	(1-2) 48		283
$C_{13}FH_{17}O_2$	$C_6H_5{\cdot}CF^{(1)}H^{(2)}{\cdot}CH^{(3)}[CH(CH_3)_2]{\cdot}CO_2CH_3$	*threo*	−171.49	(1-2) 46.50	(1-3) 14.65	460
		erythro	−178.56	(1-2) 47.50	(1-3) 9.39	
$C_{13}FH_{17}O_2$	$CH_3^{(3)}{\cdot}CF^{(1)}H^{(2)}{\cdot}C(CH_3){=}CH{\cdot}CO_2CH_2C_6H_5$	*E*-isomer	−174.1	(1-2) 48	(1-3) 24	428(b)
		Z-isomer	−180.5	(1-2) 48	(1-3) 24	
$C_{13}FH_{17}O_3$	$C_6H_5{\cdot}CF^{(1)}[CH^{(3)}(CH_3)_2]{\cdot}CH^{(2)}(OH){\cdot}CO_2CH_3$	*threo*				
		erythro		(1-2) 19.0	(1-3) 25.0	455
				(1-2) 17.0	(1-3) 26.0	
$C_{13}FH_{20}NO_7$		Ac = $CO{\cdot}CH_3$	−236.7	(1-2) 23.5	(1-3) 48.5	440(b)
$C_{13}FH_{20}NO_7$	As above with 4-OAc axial		−238.0			440(b)
$C_{13}FH_{23}Cl_4HgN_3PZn$	$[((CH_3)_2N)_3P^+CFClHgC_6H_5]ZnCl_3^-$		−132.3	(P-F) 65.9	(Hg-F) 363	235
$C_{14}FH_{11}O$	$C_6H_5{\cdot}CF^{(1)}H^{(2)}{\cdot}CO{\cdot}C_6H_5$		−176.3	(1-2) 49		376
$C_{14}FH_{11}O$	Same as above		−176.7	(1-2) 49.7		406
$C_{14}FH_{11}O$	Same as above		−176.5	(1-2) 49		447
$C_{14}FH_{11}O$	$pC_6H_5{\cdot}C_6H_4{\cdot}CO{\cdot}CF^{(1)}H_2^{(2)}$		−230.8	(1-2) 48		418
$C_{14}FH_{12}ClO$	$pCl{\cdot}C_6H_4{\cdot}CF^{(1)}H^{(2)}{\cdot}CH^{(3)}(OH){\cdot}C_6H_5$	*threo*	−181.5	(1-2) 47	(1-3) 13	376
$C_{14}FH_{12}ClO$	$pCl{\cdot}C_6H_4{\cdot}CH^{(3)}(OH){\cdot}CF^{(1)}H^{(2)}{\cdot}C_6H_5$	*threo*	−180.9	(1-2) 47	(1-3) 12.7	376

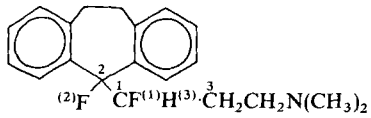
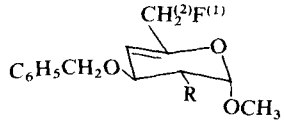
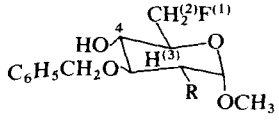
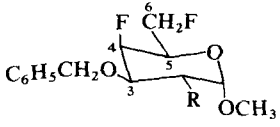
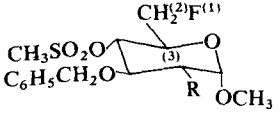
Molecular formula	Structure of compounds		Chemical shifts (ppm)	Coupling constants (Hz)		Ref.
$C_{14}FH_{13}$	$C_6H_5{\cdot}CH_2^{(3)}{\cdot}CF^{(1)}H^{(2)}{\cdot}C_6H_5$		−173.1	(1-2) 48	(1-3) 23, 19	283
$C_{14}FH_{13}$	$(C_6H_5)_2CF^{(1)}{\cdot}CH_3^{(2)}$		−135.0	(1-2) 23		283
$C_{14}FH_{13}O$	$C_6H_5{\cdot}CF^{(1)}H^{(2)}{\cdot}CH^{(3)}(OH){\cdot}C_6H_5$	*threo*	−180.5	(1-2) 47	(1-3) 13	376
		erythro	−183	(1-2) 47	(1-3) 12.5	
$C_{14}FH_{13}O$	$(C_6H_5)_2C(OH){\cdot}CF^{(1)}H_2^{(2)}$		−216.0	(1-2) 48 ^2J(F-C) 14	^1J(F-C) 183	366
$C_{14}FH_{14}N$	$(C_6H_5)_2CF^{(1)}{\cdot}CH_2^{(2)}{\cdot}NH_2$		−156.8	(1-2) 22.9		441
$C_{14}FH_{14}N$	$C_6H_5{\cdot}CF^{(1)}H^{(2)}{\cdot}CH^{(3)}(C_6H_5){\cdot}NH_2$	*threo*	−183.0	(1-2) 47.2	(1-3) 14.2	441
		erythro	−181.0	(1-2) 46.7	(1-3) 13.2	
$C_{14}FH_{18}NO_5$	As $C_8FH_{14}NO_5$ above with R = $NH{\cdot}CH_2{\cdot}C_6H_5$		−239.0	(1-2) 49.5	(1-3) 26.0	440(b)
$C_{14}FH_{18}NO_5$	As $C_8FH_{14}NO_5$ above with R = $NH{\cdot}CH_2{\cdot}C_6H_5$ and 4-OH axial		−234.9	(1-2) 46.0	(1-3) 14.5	440(b)
$C_{14}FH_{18}O_2$	Z-$(CH_3)_2C{=}CH{\cdot}CH_2CH_2{\cdot}C(CF^{(1)}H_2^{(2)}){=}CH{\cdot}CO_2CH_2CH_3$		−230.1	(1-2) 48.9		227
$C_{14}FH_{19}O_2$	$C_6H_5{\cdot}CF^{(1)}H^{(2)}{\cdot}CH^{(3)}[C(CH_3)_3]{\cdot}CO_2CH_3$	*threo*	−167.80	(1-2) 45.70	(1-3) 16.40	460
		erythro	−174.27	(1-2) 46.92	(1-3) 9.05	
$C_{14}FH_{20}NO_2$	$C_6H_5{\cdot}CF^{(1)}H^{(2)}{\cdot}CH^{(3)}(CH_3){\cdot}NH{\cdot}CO_2C(CH_3)_3$	*R,S*	−191.55	(1-2) 48	(1-3) 15	458
$C_{14}FH_{20}NO_8$		Ac = $CO{\cdot}CH_3$	−238.0	(1-2) 48.5	(1-3) 25	440(b)
$C_{14}FH_{28}NO_{10}$	As $C_{12}FH_{27}ClNO_9$ above with R = H and R′ = $NH{\cdot}CO{\cdot}CH_3$		−233.0	(1-2) ~48	(1-3) ~15	462(b)
$C_{14}F_2H_{11}Br$	$C_6H_5{\cdot}CH^{(3)}F^{(2)}{\cdot}CF^{(1)}Br{\cdot}C_6H_5$	*S,R*	(1) −125.8 (2) −179.5	(1-2) 25.5 (2-3) 48	(1-3) 14	419
		S,S	(1) −126.2 (2) −180.5	(1-2) 22.5 (2-3) 48	(1-3) 18	
$C_{14}F_2H_{11}Br$	$(C_6H_5)_2CF^{(1)}{\cdot}CF^{(2)}BrH^{(3)}$		(1)(2) −156, −161.5	(1-2) 27 (2-3) 48	(1-3) 10.5	419
$C_{14}F_2H_{11}Cl$	$C_6H_5{\cdot}CH^{(3)}F^{(2)}{\cdot}CF^{(1)}Cl{\cdot}C_6H_5$	*S,R*	(1) −123.5 (2) −182.3	(1-2) 21 (2-3) 49.5	(1-3) 12	419
		S,S	(1) −122.5 (2) −183.7	(1-2) 19.5 (2-3) 48	(1-3) 12	

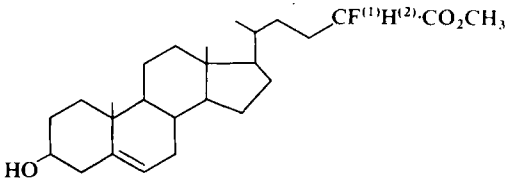
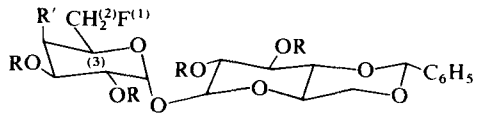
$C_{14}F_2H_{11}Cl$	$(C_6H_5)_2CF^{(1)}\cdot CF^{(2)}ClH^{(3)}$	(1)(2) −161, −168.5	(1-2) 21 (2-3) 49.5	(1-3) 9	419
$C_{14}F_2H_{12}$	$(C_6H_5)_2CF^{(1)}\cdot CF^{(2)}H_2^{(3)}$	(1) −151.7 (2) −218.9	(1-2) 20 (2-3) 48 ^1J(1-C) 149 ^2J(1-C2) 28	(1-3) 18 ^1J(2-C) 183 ^2J(2-C) 28	366
$C_{14}F_2H_{12}$	$C_6H_5\cdot CFH\cdot CFH\cdot C_6H_5$	*S,S* −203.3 *S,R* −206.3			419
$C_{14}F_2H_{12}$	$pCF^{(1)}H_2\cdot C_6H_4\cdot C_6H_4\cdot CF^{(2)}H_2p$		(1-2) 0.64		453
$C_{15}FH_{11}BrClO$	$pR^1\cdot C_6H_4\cdot CO\cdot \overset{8}{C}HBr\cdot \overset{7}{C}HF$  R^2	R^1 = Cl, R^2 = H R^1 = H, R^2 = Cl	(F-C1) 19.9 (F-C7) 175.0 (F-C8) 36.0 (F-C1) 19.9 (F-C7) 175.7 (F-C8) 36.0	(F-C2) 5.9 (F-C8) 35.3	464
$C_{15}FH_{11}BrClO$	As above with	R^1 = Cl, R^2 = H −158.15 R^1 = H, R^2 = Cl −158.68	(F-H7) 44.56 (F-H7) 44.44	(F-H8) 6.96 (F-H8) 6.84	465
$C_{18}FH_{11}BrIO$	As above with R^1 = Br, R^2 = H, and Br replaced by I	−150.96	(F-H7) 45.17	(F-H8) 8.55	465
$C_{15}FH_{11}Br_2O$	As above with	R^1 = H, R^2 = Br R^1 = Br, R^2 = H	(F-C7) 176.5 (F-C1) 19.9 (F-C7) 175.8	(F-C8) 36.0 (F-C2) 5.9 (F-C8) 35.3	464
$C_{15}FH_{11}Br_2O$	As above with	R^1 = H, R^2 = Br −159.06 R^1 = Br, R^2 = H −158.07	(F-H7) 44.90 (F-H7) 44.75	(F-H8) 7.34 (F-H8) 6.96	465
$C_{15}FH_{12}BrO$	As above with	R^1 = H, R^2 = H	(F-C1) 19.1 (F-C4) 2.2 (F-C8) 35.3	(F-C2) 5.9 (F-C7) 175.0	464
$C_{15}FH_{12}BrO$	As above with	R^1 = H, R^2 = H −157.82	(F-H7) 44.80	(F-H8) 6.96	465
$C_{15}FH_{12}NO$	C_6H_5  C_6H_5	(+) 4.2			427

Molecular formula	Structure of compounds		Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{15}FH_{13}O$			−181.6	(1-2) 46 (1-3) 6 ^1J(F-C) 177 ^2J(F-C3) 23	366
$C_{15}FH_{13}O$	$C_6H_5{\cdot}CF^{(1)}H^{(2)}{\cdot}COCH_2C_6H_5$		−183.5	(1-2) 48	418
$C_{15}FH_{15}$	$(C_6H_5{\cdot}CH_2^{(2)})_2CF^{(1)}H$		−178.3	(1-2) 24	283
$C_{15}FH_{15}O$	$pCH_3{\cdot}C_6H_4{\cdot}CH^{(3)}(OH){\cdot}CF^{(1)}H^{(2)}{\cdot}C_6H_5$	*threo*	−181	(1-2) 48 (1-3) 13	376
		erythro	−183.6	(1-2) 45 (1-3) 12	
$C_{15}FH_{15}O$	$pCH_3{\cdot}C_6H_4{\cdot}CF^{(1)}H^{(2)}{\cdot}CH^{(3)}(OH){\cdot}C_6H_5$	*threo*	−180	(1-2) 48 (1-3) 13	376
$C_{15}FH_{16}N$	$(C_6H_5)_2CF^{(1)}{\cdot}CH^{(2)}(CH_3){\cdot}NH_2$		−159.9	(1-2) 22	441
$C_{15}FH_{16}N$	$C_6H_5{\cdot}CF^{(1)}(CH_3^{(2)}){\cdot}CH^{(3)}(C_6H_5){\cdot}NH_2$	Isomer [a]	−139.3	(1-2) 22.2 (1-3) 22.1	441
		Isomer [b]	−146.6	(1-2) 23 (1-3) 15	
$C_{15}FH_{20}NO_3$	$pNO_2{\cdot}C_6H_4{\cdot}CO{\cdot}CH(CH_3){\cdot}(CH_2)_2{\cdot}CH_2{\cdot}CF^{(1)}(CH_3^{(2)})_2$		−138.8	(1-2) 21	466
$C_{15}FH_{21}O_2$	$p(CH_3)_2CHCH_2{\cdot}C_6H_4{\cdot}CF^{(1)}(CH_3^{(2)}){\cdot}CO_2CH_2CH_3$		−150.9	(1-2) 22	447
$C_{15}F_2H_{11}BrO$	As $C_{15}FH_{11}BrClO$ above with $R^1 = F$, $R^2 = H$		(7) −158.11	(F-H7) 45.16 (F-H8) 7.32	465
$C_{15}F_2H_{11}D$				(1-2) 1.45	453
$C_{15}F_2H_{14}O_2$		*threo*	(1) −180 (2) −134.8	(1-3) 48 (1-4) 12.3	376
		erythro	(1) −183.3 (2) −135	(1-3) 47 (1-4) 12	
$C_{16}FH_8BrD_6O$	$C_6D_5{\cdot}CO{\cdot}CDBr{\cdot}CF^{(1)}H^{(2)}{\cdot}C_6H_4{\cdot}CH_3p$		−156.62	(1-2) 44.44	465
$C_{16}FH_{14}BrO$	As $C_{15}FH_{11}BrClO$ above with	$R^1 = CH_3$, $R^2 = H$		(F-C1) 19.1 (F-C2) 5.2 (F-C7) 175.0 (F-C8) 35.3	464
		$R^1 = H$, $R^2 = CH_3$		(F-C1) 19.9 (F-C2) 5.9 (F-C7) 173.6 (F-C8) 36.8	

$C_{16}FH_{14}BrO$	As $C_{15}FH_{11}BrClO$ above with	$R^1 = CH_3$, $R^2 = H$	−158.01	(F-H7) 44.68 (F-H8) 6.84	465
		$R^1 = H$, $R^2 = CH_3$	−156.44	(F-H7) 44.44 (F-H8) 6.1	
$C_{16}FH_{14}BrO_2$	As $C_{15}FH_{11}BrClO$ above with	$R^1 = OCH_3$, $R^2 = H$		(F-C1) 19.9 (F-C2) 5.2 (F-C7) 174.3 (F-C8) 35.3	464
$C_{16}FH_{14}BrO_2$	As $C_{15}FH_{11}BrClO$ above with $R^1 = OCH_3$, $R^2 = H$		−157.99	(F-H7) 44.68 (F-H8) 6.83	465
$C_{16}FH_{14}ClO$	As $C_{15}FH_{11}BrClO$ above with Br replaced by Cl and $R^1 = H$ and $R^2 = CH_3$			(F-C1) 19.9 (F-C2) 5.2 (F-C7) 174.3 (F-C8) 38.2	464
$C_{16}FH_{14}ClO$	As $C_{15}FH_{11}BrClO$ above with Br replaced by Cl and $R^1 = H$ and $R^2 = CH_3$		−163.16	(F-H7) 44.19 (F-H8) 6.35	465
$C_{16}FH_{14}NO$			(+) 7.5		427
$C_{16}FH_{14}NO$			(+) 10.1		427
$C_{16}FH_{15}O_2$	$pCH_3O{\cdot}C_6H_4{\cdot}CF^{(1)}H^{(2)}{\cdot}CH^{(3)}(OH){\cdot}C_6H_5$	*threo*	−183.9	(1-2) 47 (1-3) 13.2	376
$C_{16}FH_{15}O_3$	$pCH_3O{\cdot}CO{\cdot}C_6H_4{\cdot}CF^{(1)}H^{(2)}{\cdot}CH^{(3)}(OH){\cdot}C_6H_5$	*threo*	−183.9	(1-2) 47 (1-3) 13	376
		erythro	−186.5	(1-2) 45 (1-3) 13	
$C_{16}FH_{15}O_3$	*ortho*-isomer of above	*threo*	−180.8	(1-2) 47 (1-3) 20	376
		erythro	−180.4	(1-2) 47 (1-3) 16	
$C_{16}FH_{15}O_3$	$C_6H_5{\cdot}CH^{(2)}F^{(1)}{\cdot}C(OH)(C_6H_5){\cdot}CO_2CH_3$	*threo*	−171.0	(1-2) 44.0	455
		erythro	−168.8	(1-2) 44.3	
$C_{16}F_2H_{19}NO_5$		$R = NH{\cdot}CH_2{\cdot}C_6H_5$	(4) −223.40 (6) −237.75	(F4-H3) 25.9 (F4-H4) 54.0 (F4-H5) 25.9 (F6-H5) 12.4 (F6-H6) 47.3	440(b)
$C_{16}F_2H_{19}NO_5$	As above with 4-F equatorial		(4) −200.30 (6) −240.85	(F4-H3) 15.8 (F4-H4) 48.4 (F4-H5) 1.1 (F6-H5) 25.9 (F6-H6) 47.3	440(b)

Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{16}F_5H_{12}N$	 $CH_2{\cdot}CH_2{\cdot}CH_2^{(7)}{\cdot}CH_2^{(6)}F^{(5)}$	(1) −165.2 (2) −161.5 (3) −170.9 (4) −149.1 (5) −218.9	(1-2) 19.8 (1-3) 4.6 (1-4) 15.2 (2-3) 21.1 (3-4) 20.8 (5-6) 48.3 (5-7) 26.1	357(b)
$C_{16}F_5H_{16}N$	 $CH_2^{(12)}{\cdot}CH_2{\cdot}CH_2^{(11)}{\cdot}CH_2^{(10)}F^{(9)}$	(5) −156.0 (6) −173.1 (7) −169.9 (8) −166.2 (9) −217.6	(5-6) 20.9 (5-7) 3.0 (5-8) 15.4 (6-7) 20.3 (6-8) 4.4 (7-8) 20.4 (8-12) 0.9 (9-10) 45.9 (9-11) 26.1	357(b)
$C_{17}FH_{15}N_2O_7P^{3-}$	As $C_{12}FH_{13}N_2O_7P^{3-}$ above with $CHF{\cdot}CH_3$ replaced by $CHF{\cdot}C_6H_5$	−192.0		432
$C_{17}FH_{16}NO$		(+) 0.14		427
$C_{18}FH_{15}N_2$		−203.6	(1-2) 48 (1-3) 2	413
$C_{18}FH_{22}NO_7$	 R = $NH{\cdot}CH_2{\cdot}C_6H_5$,	−237.3	(1-2) 23.5 (1-3) 48.5	440(b)
$C_{18}FH_{22}NO_7$	As above with 4-OAc axial	−236.2		440(b)
$C_{18}F_4H_{14}O_4$	$pCH_3OCO{\cdot}C_6H_4{\cdot}CF^{(1)}H^{(2)}{\cdot}CH^{(3)}(OCOCF_3){\cdot}C_6H_5$ ***threo***		**(1-2) 47 (1-3) 13.8**	376

$C_{19}FH_{15}$	$(C_6H_5)_3CF$		−126.7			283
$C_{20}FH_{18}N$	$(C_6H_5)_2CF^{(1)}\cdot CH^{(2)}(C_6H_5)\cdot NH_2$		−154.4	(1-2) 26.4		441
$C_{20}F_2H_{23}N$			(1) −196.0 to −198.0 (2) −159.2	(1-2)(2-3) 11, 26 ^1J(1-C1) 130 ^1J(2-C2) 192 ^2J(2-C1) 22 ^2J(1-C2) 22 ^2J(1-C3) 18		366
$C_{21}FH_{22}NO_4$		R = NH·CH$_2$·C$_6$H$_5$	−224.05	(1-2) 48.1		440(b)
$C_{21}FH_{24}NO_5$		R = NH·CH$_2$·C$_6$H$_5$	−239.7	(1-2) 28.0	(1-3) 49.5	440(b)
$C_{21}FH_{24}NO_5$	As above with 4-OH axial		−235.2	(1-2) 48.5	(1-3) 14.5	440(b)
$C_{21}F_2H_{23}NO_4$		R = NH·CH$_2$·C$_6$H$_5$	(4) −223.95 (6) −236.45	(F4-H3) 26.4 (F4-H4) 55.1 (F4-H5) 26.4 (F6-H5) 16.9 (F6-H6) 48.9		440(b)
$C_{21}F_2H_{23}NO_4$	As above with 4-F equatorial		(4) −198.05 (6) −240.10			440(b)
$C_{22}FH_{26}NO_7S$		R = NH·CH$_2$·C$_6$H$_5$	−237.8	(1-2) 47.5	(1-3) 22.5	440(b)
$C_{26}FH_{36}NO_{16}$	As $C_{12}FH_{27}ClNO_9$ above with R = CO·CH$_3$ and R′ = NH·CO·CH$_3$		−230.7	(1-2) ~50	(1-3) ~15	462(b)

Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)		Ref.
$C_{27}FH_{41}O_3$			(1-2) 48		423
$C_{28}FH_{23}$	$(C_6H_5)_2C(CFH_2)\cdot CH{=}C(C_6H_5)_2$	−212.6			366
$C_{28}FH_{28}NO_6$	As $C_{21}FH_{24}NO_5$ above with 4-OH replaced by axial $CO\cdot C_6H_5$	−236.2			440(b)
$C_{29}FH_{45}O_3$	As $C_{27}FH_{41}O_3$ above with OH replaced by $O\cdot CO\cdot CH_3$, and CO_2CH_3 replaced by $C(OH)(CH_3)_2$		(1-2) 48		423
$C_{40}F_2H_{42}N_6O_7$	As $C_{12}F_2H_{24}Cl_2N_2O_7$ above with $R = CH_2C_6H_5$ and $R' = N_3$	−232.7	(1-2) 45	(1-3) 10	462(b)
$C_{44}F_2H_{50}N_2O_9$	As $C_{12}F_2H_{24}Cl_2N_2O_7$ above with $R = CH_2C_6H_5$ and $R' = NH\cdot CO\cdot CH_3$	−230.1	(1-2) 46	(1-3) 15	462(b)
$C_{47}FH_{48}N_3O_9$	 $R = CH_2C_6H_5$, $R' = N_3$	−231.30	(1-2) ~49	(1-3) ~10	462(b)
$C_{49}FH_{52}NO_{10}$	As above with $R = CH_2C_6H_5$ and $R' = NH\cdot CO\cdot CH_3$	−232.7			462(b)
$C_{3n}F_nH_{4n+2}O_{3n+1}$	$H\cdot[O\cdot CH_2\cdot CF(NO_2)\cdot CH_2]_n\cdot OH$	−139.8			231

D. Miscellaneous studies

Various measurements have been made of F-19 spin–lattice relaxation times in CF_3CO_2H,[467,468] $C_6H_5CF_3$,[469] and $(CF_3)_3COH$,[470] and there have been investigations of the dynamic processes involved in the ligand exchange in the $Mo(CF_3CO_2)_4/CF_3CO_2Na$ system,[471] the intramolecular CF_3 group exchange in a platinum complex,[472] the proton transfer in CF_3CO_2H systems,[473] the hydrogen bonding in CF_3SO_3H and its tetramethylguanidinium salt,[474] the conformational change in 4-chloro-1,1-bis(trifluoromethyl)cyclohexane,[475] the rotational isomerism in $RCONHN(CH_3)_2$ and $RCON(CH_3)NHCH_3$ ($R = CF_2H$ and CF_3),[476] the equilibrium between $Eu(fod)_3$ and 4-chloro-3,3,4-trifluoro-2-methyl-2-butanol and 2,2,3,3-tetrafluoropropanol,[477] the keto–enol equilibrium in 1,1,1,5,5,5-hexafluoroacetylacetone,[480] the equilibrium between trialkyl phosphites and perfluoroalkyl iodides,[493] and the acid-catalysed mechanism of the reaction using trifluoromethanesulphonic anhydride to synthesize symmetrical 1,1′-glycosylglycosides.[481]

F-19 CIDNP effects have been observed during the irradiation of α,α,α-trifluoroacetophenone and several of its ring derivatives,[478] on $(CF_3)_3COH$ in the presence of free radicals,[470] and in the dimerization of α-fluorobenzyl radicals.[479] F-19 shifts have been used to study mixing processes in binary solutions of hexane and perfluorohexane,[482] in aqueous solutions of 2-(2,2,2-trifluoroethoxy)ethanol,[483] and to study the gas to liquid transition at various temperatures and pressures of CF_3H, CF_3CF_3, CFH_3, CF_3Cl, and CF_3Br,[484] and the distribution of alcohol in microemulsions.[490] Solvent effects upon $^2J(FH)$ in CF_3H have also been reported.[491]

Several papers have shown that trifluoroacetate derivatization is a useful method of characterizing alcohols, phenols, thiols, and primary and secondary amines,[485–488] while hexafluoroacetone adducts of phenols are also helpful.[489]

F-19 data have been reported for the following: $Zr(tfac)_4$, $Ce(tfac)_4$, and $Th(tfac)_4$ ($tfac = CF_3COCHCOCH_3^-$);[492] $CF_3CBrClH$;[494] $RO_2CCH(CF_3)CONR^1R^2$ ($R = Me$, Et; $R^1 = R^2 = H$, Et; $R^1 = Me$, $PhSO_2$, Ac; $R^2 = H$);[495] the platinum complexes of 2-methyl-2,4,6-tris(trifluoromethyl)pyran;[496] $(CF_3)_3CCF_2CF_2C(CF_3)_3$;[497] $RCONR^1NHR^2$ ($R = Me$, CFH_2, CF_2H, CF_3; $R^1 = H$, Me, Ac; $R^2 = H$, Me, Ac, CF_3CO);[498] various fluorinated triazines;[499] $[(CF_3)_2C{=}CFC(CF_3)_2]^-Cs^+$ and $(CF_3)_2CRCF{=}C(CF_3)_2$ ($R = Me$, allyl, $MeOCH_2$);[500] $R^1C_6H_4CF{=}CRCF_3$ ($R^1 = m$-F, p-F; $R = CF_3$, CO_2Me);[501] $R^1\overline{C{=}CHCH{=}C(R^2)}NR$ (R, R^1, $R^2 = H$, Me, $COCF_3$; H, Ph, $COCF_3$; $CH{=}CH_2$, Me, $COCF_3$; $CH{=}CH_2$, Ph, $COCF_3$);[502] $R^1CONHNHR$, $R^1CONHNRCOR^1$, and $R^1CONRNH_2$ ($R = H$, Me, Me_2CH, Ph; $R^1 = CF_3$, CF_2CF_3, n-C_3F_7, n-C_6F_{13});[503] $MeP(O)(OCHRR^1)_2$ ($R = CF_3$;

R^1 = Ph, *m*-$CF_3C_6H_4$; R = C_3F_7, R^1 = Ph);[504] $HOCHRCF_2NO_2$ (R = Ph, *o*-HOC_6H_4, *o*-ClC_6H_4, *o*- and *m*-$O_2NC_6H_4$, *p*-$CH_3C_6H_4$, 2,4-$(MeO)_2C_6H_3$);[505] *m*- and *p*-substituted benzotrifluorides and *p*-substituted benzal fluorides;[506] various pentakis(polyfluoroalkoxy)phosphoranes derived from 1H,1H,3H-tetrafluoro-1-propanol and 1H,1H,5H-octafluoro-1-pentanol;[507] products of the ortho-metallation reactions of palladium bis(hexafluoroacetylacetone);[508] TiL_2F_2 (HL = 1,1,1-trifluoro-4-(2-thienyl)butane-2,4-dione);[509] and UL_4 (HL = $RCOCH_2COR^1$; R = $CF_3(CF_2)_2$, R^1 = CMe_3; R = CF_3, R^1 = Me, Ph).[510]

The absolute F-19 frequency of $CFCl_3$ relative to tetramethylsilane has been measured.[511,512]

III. FLUORINE BONDED TO A CARBON OF AN OLEFIN

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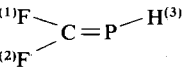
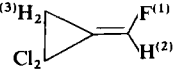
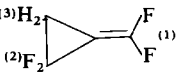
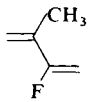
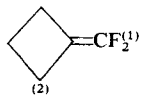
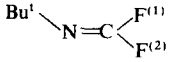
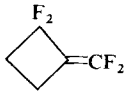
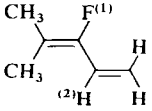
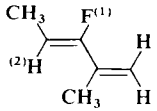
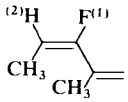
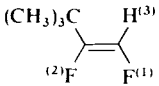
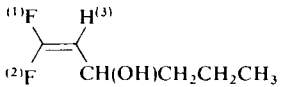
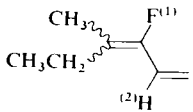
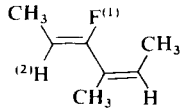
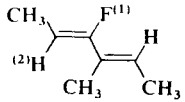
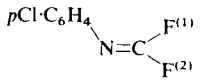
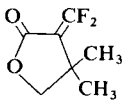
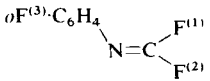
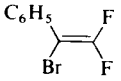
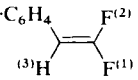
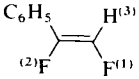
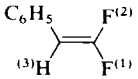
A. Data

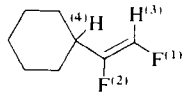
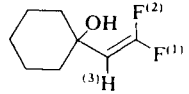
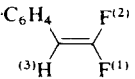
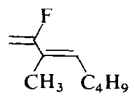
Molecular formula	Structure of compounds		Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
CFP	$FC\equiv P$		−96.6	(P-F) 182.0	513
CF_2HP			(1) +4.2 (2) −24.6	(1-2) 25.4 (1-3) 19.2 (2-3) 40.0 (P-1) 213.6 (P-2) 82.3	513
CF_7NS	$CF_2=NSF_5$			^1J(F-C) 352, 267	182
C_2F_4	$CF_2=CF_2$		−135.2		176(a)
C_3FH_3	$CF^{(1)}H^{(2)}=C=CH_2^{(3)}$		−176.3	(1-2) 86 (1-3) 2.8	400(a)
$C_3FH_3Cl_2$	$CH_3^{(2)}\cdot CF^{(1)}=CCl_2$		−94.1	(1-2) 16	401(a)
C_3FH_4I	$CH_2I\cdot CF=CH_2$		−99.5		451(a)
C_3FH_5O	$CH_2(OH)\cdot CF=CH_2$		−110.5		451(a)
$C_4FH_3Cl_2$			−128.5	(1-2) 87.0 (1-3) 7.0	400(a)
$C_4FH_3Cl_2$	As above with F and H interchanged		−114.9	(1-2) 87.0 (1-3) 7.0	400(a)
$C_4FH_5Cl_2$	$CH_3\cdot CH_2^{(2)}\cdot CF^{(1)}=CCl_2$		−102.9	(1-2) 22	401(a)
$C_4F_2H_3ClO_2$	$CFCl=CF\cdot CO_2CH_3$	*Z*-isomer	(1) −155.8 (2) −96.3	(1-2) 130.5	228
		E-isomer	(1) −146.1 (2) −81.8	(1-2) 18.0	
$C_4F_2H_3ClO_2$	$CF_2=CCl\cdot CO_2CH_3$		−68.2, −66.8	(1-2) 16.0	228
$C_4F_4H_2$			(1A) −71.5 (1B) −85.3 (2) −131.3	(1A-1B) 32.5 (1A-3) 6.5 (1B-3) 6.5 (1-2) 6.5 (2-3) 1.8	514
C_4F_6	$CF_2=CF\cdot CF=CF_2$		(1) −93.35 (2) −107.60 (3) −179.95	(1-2) 50 (1-3) 31 (2-3) 117.0	410

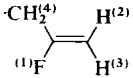
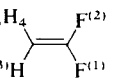
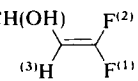
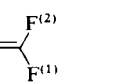
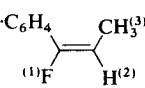
Molecular formula	Structure of compounds		Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
C_5FH_7			−109.5	(F-H) 50, 16	515(a)
$C_5FH_7Br_2$	$CH_2^{(2)}Br{\cdot}CF^{(1)}{=}C(CH_3){\cdot}CH_2Br$	*Z,E* mixture	(1) −108.5 (1) −110.5	(1-2) 23 (1-2) 23	515(a)
$C_5FH_7Cl_2$	$CH_3{\cdot}CH_2{\cdot}CH_2^{(2)}{\cdot}CF^{(1)}{=}CCl_2$		−100.9	(1-2) 22	401(a)
$C_5FH_7Cl_2$	$(CH_3)_2CH^{(2)}{\cdot}CF^{(1)}{=}CCl_2$		−114.7	(1-2) 29	401(a)
$C_5F_2H_3NO_2$	$CH_3OCO{\cdot}CF^{(1)}{=}CF^{(2)}{\cdot}CN$	*Z*-isomer *E*-isomer	−135.0, −124.9 −147.7, −144.9	(1-2) 3.0 (1-2) 136.0	437
$C_5F_2H_6$			−99.24	(1-2) 3.6	516
$C_5F_2H_9N$			(1) −57.5 (2) −42.3	(1-2) 22.0	255
$C_5F_4H_4$			(1) −91.11 (2) −85.0 (centre of AB system)	(2A-2B) 36	517
C_6FH_7	$CH_2{=}CH{\cdot}C(=CH^{(2)}F^{(1)}){\cdot}CH{=}CH_2$		−130.0	(1-2) 78	404(a)
$C_6FH_7O_4$	$CH_3OCO{\cdot}CF^{(1)}{=}CH^{(2)}{\cdot}CO_2CH_3$		−107.02	(1-2) 29	410
C_6FH_9			−129.5	(1-2) 29	518(a)

C_6FH_9			−121.5		(1-2) 37	519(a)
C_6FH_9			−106.5		(1-2) 23	519(a)
$C_6FH_9Cl_2$	$CH_3CH_2CH_2{\cdot}CH_2^{(2)}{\cdot}CF^{(1)}{=}CCl_2$		−100.8		(1-2) 22	401(a)
$C_6FH_9Cl_2$	$CH_3CH_2{\cdot}CH^{(2)}(CH_3){\cdot}CF^{(1)}{=}CCl_2$		−114.3		(1-2) 30	401(a)
C_6FH_9Cl	$(CH_3)_2CH{\cdot}CH_2^{(2)}{\cdot}CF^{(1)}{=}CCl_2$		−98.6		(1-2) 23	401(a)
$C_6FH_9Cl_2$	$(CH_3^{(2)})_3C{\cdot}CF^{(1)}{=}CCl_2$		−94.2		(1-2) 2.0	401(a)
$C_6F_2H_6O_4$	$CH_3O_2C{\cdot}CF^{(1)}{=}CF^{(2)}{\cdot}CO_2CH_3$	*Z*-isomer	−137.5		(1-2) 8.0	437
		E-isomer	−146.2		(1-2) 130.0	
$C_6F_2H_{10}$	$CF_2{=}CH{\cdot}C(CH_3)_3$		−89.5			405
$C_6F_2H_{10}$			(1) −170.2	(2) −140	(1-2) 10 (2-3) 17.5	(1-3) 75 411
$C_6F_2H_{10}O$			(1)(2) −87.9		(1-2) 40 (2-3) 24	(1-3) 3.5 520(c)
C_7FH_9	$CH_2{=}CH{\cdot}C(=CH^{(2)}F^{(1)}){\cdot}C(CH_3){=}CH_2$		−131.3		(1-2) 82	404(a)
C_7FH_{11}		Isomer [a]	−129.5		(1-2) 30	518(a)
		Isomer [b]	−130.5		(1-2) 30	

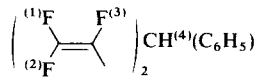
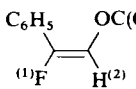
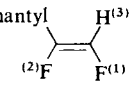
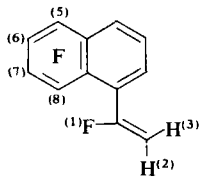
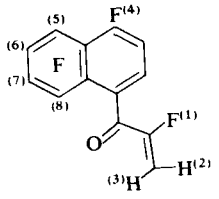
Molecular formula	Structure of compounds		Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
C_7FH_{11}			−112.5	(1-2) 39	519(a)
C_7FH_{11}	As above with $H^{(2)}$ and adjacent CH_3 interchanged		−105.5	(1-2) 18	519(a)
C_7FH_{11}			−122.5	(1-2) 37	519(a)
C_7FH_{11}	As above with $H^{(2)}$ and adjacent CH_3 interchanged		−103.5	(1-2) 21	519(a)
$C_7F_2H_4ClN$			(1) −57.7 (2) −48.8	(1-2) 54.4	255
$C_7F_2H_5N$	As above with $pCl{\cdot}C_6H_4$ replaced by C_6H_5		(1) −57.7 (2) −48.5	(1-2) 56.0 ^3J(F-C) 7.0 ^4J(F-C) 2.5	255
$C_7F_2H_8O_2$			−73.4, −67.3	^2J(F-F) 5.2	521(a)
$C_7F_2H_{10}$	$CF^{(1)}H^{(3)}{=}CF^{(2)}{\cdot}CH(CH_3){\cdot}C(CH_3){=}CH_2$	*Z*-isomer	(1) −169.4 (2) −141.5	(1-2) 10 (1-3) 74 (2-3) 17	404(a)
		E-isomer	(1) −184.4 (2) −170.0	(1-2) 127.6 (1-3) 76 (2-3) 5	
$C_7F_3H_4N$			(1) −55.8 (2) −43.3 (3) −125.0	(1-2) 62.0 (2-3) 14.1	255

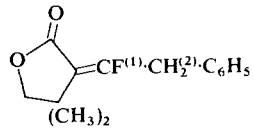
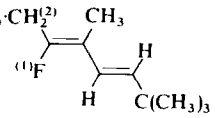
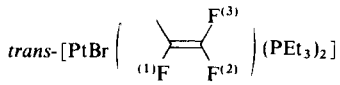
C_8FH_5BrCl	$pBr{\cdot}C_6H_4{\cdot}CH^{(2)}{=}CF^{(1)}Cl$	*E*-isomer	−70.4		(1-2) 30.1	319
		Z-isomer	−67.3		(1-2) 12.4	
C_8FH_{11}	$CH_2{=}C(CH_3){\cdot}C(=CF^{(1)}H^{(2)}){\cdot}C(CH_3){=}CH_2$		−130.0		(1-2) 83	404(a)
$C_8FH_{11}O_4$	$CH_3CH_2OCO{\cdot}CF^{(1)}{=}CH^{(2)}{\cdot}CO_2CH_2CH_3$		−107.13		(1-2) 29	410
$C_8FH_{13}O$	$C_5H_{11}{\cdot}CH^{(2)}{=}CF^{(1)}{\cdot}CH^{(3)}O$		−63		(1-2) 33 (1-3) 18	414
$C_8F_2H_5Br$			−78.9, −85.2		(F-F) 30	408
$C_8F_2H_5Cl$	As above with Br replaced by Cl		−83.7, −89.2		(F-F) 35	408
$C_8F_2H_5Cl$			(1) −84.52	(2) −82.91	(1-2) +30.3 (1-3) +3.5 (2-3) +25.6 ^1J(1-C) −289.1 ^1J(2-C) −298.5	522
$C_8F_2H_5NO_2$	As above with Cl replaced by NO_2		(1) −80.41	(2) −79.23	(1-2) +20.2 (1-3) +3.2 (2-3) +25.2 ^1J(1-C) −292.6 ^1J(2-C) −301.2	522
$C_8F_2H_6$			(1) −168.8	(2) −145.8	(1-2) 11.5 (1-3) 71 (2-3) 17	411
$C_8F_2H_6$			(1) −85.48	(2) −87.70	(1-2) +32.4 (1-3) +3.8 (2-3) +25.9 ^1J(1-C) −288.8 ^1J(2-C) −298.8	522
$C_8F_2H_6Se$	As above with C_6H_5 replaced by C_6H_5Se		(1) −77.5	(2) −77.6	(1-2) 24 (1-3) 2.4 (2-3) 21	522
$C_8F_2H_{12}$	$CF^{(1)}H^{(3)}{=}CF^{(2)}{\cdot}C(CH_3)_2{\cdot}C(CH_3){=}CH_2$	*Z*-isomer	(1) −172.0	(2) −139.8	(1-2) 8 (1-3) 74 (2-3) 17	404(a)
		E-isomer	(1) −180.0	(2) −162.7	(1-2) 128 (1-3) 76 (2-3) 8	

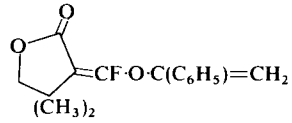
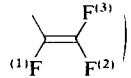
Molecular formula	Structure of compounds		Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_8F_2H_{12}$			(1) −168.3 (2) −138	(1-2) 11 (1-3) 74 (1-4) 3.8 (2-3) 18 (2-4) 15	411
$C_8F_2H_{12}O$			(1) −86.6 (2) −84.3	(1-2) 45 (1-3) 5 (2-3) 27	520(c)
$C_8F_3H_5$			(1) −85.87 (2) −84.60	(1-2) +33.5 (1-3) +3.7 (2-3) +25.6 ^1J(1-C) −288.6 ^1J(2-C) −297.5	522
$C_8F_3H_6ClO_4$	$CF_2^{(1,2)}=C(CO_2CH_3)\cdot CF^{(3)}=CCl\cdot CO_2CH_3$		(1,2) −73.5, −63.0 (3) −70.1	(1-2) 17.0 (1 or 2-3) 7.0	228
$C_9FH_6ClO_2$	Z-$CF^{(1)}Cl=CH^{(2)}\cdot C_6H_4\cdot CO_2Hp$			(1-2) 13.1	454
$C_9FH_7Cl_2$	$C_6H_5\cdot CH_2^{(2)}\cdot CF^{(1)}=CCl_2$		−99.5	(1-2) 22	401(a)
C_9FH_8Cl	$pCH_3\cdot C_6H_4\cdot CH^{(2)}=CF^{(1)}Cl$	*E*-isomer	−73.8	(1-2) 31.3	319
		Z-isomer	−71.0	(1-2) 13.0	
C_9FH_9OSe	$C_6H_5Se\cdot CH^{(2)}=CF^{(1)}\cdot OCH_3$	*E*-isomer	−76.9	(1-2) 5	296
		Z-isomer	−73.0	(1-2) 30	
C_9FH_{15}			−92.5	(F-H) 47,18	515(a)
$C_9FH_{15}O$	$CH_2=C(CH_3)\cdot CH(OH)\cdot CH_2CH_2\cdot CH^{(2)}=CF^{(1)}\cdot CH_3$				523
		E-isomer		(1-2) 21.5	
		Z-isomer		(1-2) 37.3	
C_9FH_{17}	$C_7H_{15}\cdot CF=CH_2$		−97.5		451(a)

C_9FH_{17}	$nC_6H_{13}\cdot CH_2^{(4)}$  $H^{(2)}$ $^{(1)}F$ $H^{(3)}$		−93.6		(1-2) 49 (1-4) 16 (1-3) 16	520(c)
$C_9F_2H_5ClO_2$	$pHO_2C\cdot C_6H_4\cdot CF^{(1)}=CF^{(2)}Cl$	*E*-isomer *Z*-isomer	(1) −134.1 (2) −101.2 (1) −148.6 (2) −114.6		(1-2) 13.9 (1-2) 127.4	320
$C_9F_2H_5N$	$pNC\cdot C_6H_4$  $^{(3)}H$ $F^{(1)}$ $F^{(2)}$		(1) −81.07	(2) −79.60	(1-2) +22.3 (1-3) +3.3 (2-3) +25.3 ^1J(1-C) −292.6 ^1J(2-C) −301.2	522
$C_9F_2H_8$	As above with CN replaced by CH_3		(1) −86.47	(2) −84.47	(1-2) +34.7 (1-3) +3.8 (2-3) +26.2 ^1J(1-C) −287.6 ^1J(2-C) −297.4	522
$C_9F_2H_8O$	As above with CN replaced by CH_3O		(1) −87.77	(2) −86.10	(1-2) +37.9 (1-3) +3.7 (2-3) +26.1 ^1J(1-C) −287.0 ^1J(2-C) −296.4	522
$C_9F_2H_8O$	$C_6H_5\cdot CH(OH)$  $^{(3)}H$ $F^{(1)}$ $F^{(2)}$		(1) −88.6	(2) −89.7	(1-2) 41 (1-3) 3 (2-3) 23	520(c)
$C_9F_2H_{16}$	$C_7H_{15}\cdot CH=CF_2$		−82, −84			414
$C_9F_5H_5$	pCF_3  $^{(3)}H$ $F^{(1)}$ $F^{(2)}$		(1) −82.39	(2) −81.00	(1-2) +25.5 (1-3) +3.3 (2-3) +25.5 ^1J(1-C) −291.1 ^1J(2-C) −300.0	522
$C_{10}FH_{11}O$	$pCH_3O\cdot C_6H_4$  $CH_3^{(3)}$ $^{(1)}F$ $H^{(2)}$				(1-2) 21.3 (1-3) 2.3 ^1J(1-C) 237.5 ^2J(1-C2) 28.7 ^2J(1-C_{ar}) 30.9 ^3J(1-C3) 8.8 ^3J(1-C_{ar}) 5.1	524
$C_{10}FH_{15}O_4$	$CH_3(CH_2)_2OCO\cdot CF^{(1)}=CH^{(2)}\cdot CO_2(CH_2)_2CH_3$		−106.78		(1-2) 29	410
$C_{10}FH_{17}Cl_2$	$nC_7H_{15}\cdot CH_2^{(2)}\cdot CF^{(1)}=CCl_2$		−100.9		(1-2) 22	401(a)
$C_{10}FH_{17}Cl_2$	$nC_6H_{13}\cdot CH^{(2)}(CH_3)\cdot CF^{(1)}=CCl_2$		−114.4		(1-2) 29	401(a)

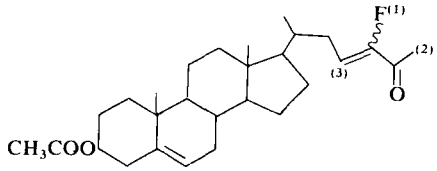
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{10}F_2H_{11}N$	$p(CH_3)_2N{\cdot}C_6H_4$, $F^{(2)}$, $^{(3)}H$, $F^{(1)}$	(1) −89.27 (2) −87.29	(1-2) +41.2 (1-3) +4.0 (1-3) +26.5 ^1J(1-C) −286.1 ^1J(2-C) −295.3	522
$C_{10}F_4H_4ClNO$	$F^{(2)}$, $^{(1)}F$, N, $^{(3)}F_2$, O, $C_6H_4{\cdot}Cl p$	(1) −90.4 (2) −80.5 (3) −68.9	(1-2) 17.5 (1-3) 9 (2-3) 6	525(a)
$C_{10}F_4H_5NO$	As above with Cl replaced by H	(1) −91.9 (2) −81.8 (3) −69.6	(1-2) 19.5 (1-3) 9 (2-3) 6	525, 412(a)
$C_{10}F_4H_6Fe_2O_6S_2$	$\mu(SCH_3)_2\mu(C_2F_4)Fe_2(CO)_6$	(1) −56.4 (2) −61.9	(1-2) 227	328
$C_{10}F_5H_5$	$^{(1)}F$, $F^{(3)}$, $F^{(4)}$, $^{(2)}F$, C_6H_5, $F^{(5)}$	(1) −98.5 (2) −113.9 (3) −168.4 (4) −81.5 (5) −76.3	(1-2) 65.9 (1-3) 32.0 (2-3) 117.8 (2-4) 11.5	332
$C_{11}FH_{11}$	F, CH_3, C_6H_5	−92.5	(F-H) 52, 18	515(a)
$C_{11}FH_{11}O_2S$	F, $SO_2C_6H_5$, CH_3	−108.5	(F-H) 48, 18	515(a)
$C_{11}FH_{13}$	$pCH_3{\cdot}C_6H_4$, β, $CH_3^{(3)}$, $^{(1)}F$, $CH_3^{(2)}$		(1-2) 2.8 (1-3) 3.5 ^1J(1-C) 236.2 ^2J(1-C$_\beta$) 20.5 ^2J(1-C$_{ar}$) 30.8 ^3J(1-C2) 4.4 ^3J(1-C3) 8.8 ^3J(1-C$_{ar}$) 4.4	524

$C_{11}FH_{13}O$	As above with pCH_3 replaced by pCH_3O		(1-2) 2.9 (1-3) 3.4 ^1J(1-C) 236.8 ^2J(1-C$_\beta$) 20.6 ^2J(1-C$_{ar}$) 30.9 ^3J(1-C2) 4.4 ^3J(1-C3) 9.6 ^3J(1-C$_{ar}$) 4.4	524
$C_{11}F_4H_7NO$	As $C_{10}F_4H_4ClNO$ above with Cl replaced by CH_3	(1) −92.3 (2) −82.2 (3) −69.6	(1-2) 19.5 (1-3) 9 (2-3) 6	525(a)
$C_{11}F_6H_6$		(1) −102.6 (2) −120.4 (3) −177.9	(1-2) 77.5 (1-3) 35.8 (2-3) 114.4 (2-4) 6.3 (3-4) 25.0	332
$C_{12}FH_{15}O$		−141.3	(1-2) 21	411
$C_{12}F_2H_{16}$		(1) −172.1 (2) −146.3	(1-2) 11.6 (1-3) 74 (2-3) 18	411
$C_{12}F_5H_5$		(1) −83.3 (5) −149.7 (6)(7) −157.7, −158.2 (8) −143.0	(1-2) 13 (1-3) 45 (1-8) 45	463
$C_{13}F_2H_{16}S$	$C_6H_5S{\cdot}C(=CF_2){\cdot}(CH_2)_4CH_3$	−83.07, −82.15	(F-F) 27	315
$C_{13}F_6H_4O$		(1) −115.8 (5) −144.3 (6)(7) −155.2, −157.0 (8) −137.1 (4) −112.7	(4-5) 68 (1-2) 14 (1-3) 46	463

Molecular formula	Structure of compounds		Chemical shifts (ppm)		Coupling constants (Hz)		Ref.
$C_{14}FH_{11}$	$(C_6H_5)_2C{=}CF^{(1)}H^{(2)}$		-126.4		(1-2) 81	^1J(1-C) 269	366
$C_{14}FH_{15}O_2$			-81.65		(1-2) 27		521(a)
$C_{14}FH_{25}$			-86.5		(1-2) 24		515(a)
$C_{14}F_2H_{10}$	$C_6H_5{\cdot}CF{=}CF{\cdot}C_6H_5$	*E*-isomer *Z*-isomer	-157.5 -133				419
$C_{14}F_3H_{30}BrP_2Pt$			(1) -146.7 (3) -129.3	(2) -104.8	(Pt-1) 519 (Pt-3) 60 (P-2) 6.1 (1-2) 32 (2-3) 103	(Pt-2) 57 (P-1) <1 (P-3) 3.5 (1-3) 105	360
$C_{14}F_3H_{30}ClP_2Pt$	As above with Br replaced by Cl		(1) -147.9 (3) -130.5	(2) -100.8	(Pt-1) 512 (Pt-3) 61 (P-2) 6.0 (1-2) 31 (2-3) 105	(Pt-2) 56 (P-1) 1.5 (P-3) 3.5 (1-3) 105	360
$C_{14}F_3H_{30}IP_2Pt$	As above with Br replaced by I		(1) -145.6 (3) -128.9	(2) -102.3	(Pt-1) 510 (Pt-3) 59 (P-2) 6.0 (1-2) 33 (2-3) 102	(Pt-2) 57 (P-1) 4.8 (P-3) 4.2 (1-3) 103	360

$C_{14}F_3H_{30}N_3P_2Pt$	As above with Br replaced by N_3		(1) −152.7 (3) −131.7	(2) −102.0	(Pt-1) 468 (Pt-3) 59 (P-2) 5.4 (1-2) 30 (2-3) 105	(Pt-2) 46 (P-1) 2.3 (P-3) 3.6 (1-3) 104	360
$C_{14}F_3H_{30}NO_2P_2Pt$	As above with Br replaced by NO_2		(1) −158.0 (3) −128.4	(2) −95.3	(Pt-1) 422 (Pt-3) 52 (P-2) 6.0 (1-2) 31 (2-3) 101	(Pt-2) 38 (P-1) 6.4 (P-3) 4.2 (1-3) 105	360
$C_{14}F_3H_{30}NO_3P_2Pt$	As above with Br replaced by NO_3		(1) −151.5 (3) −131.7	(2) −102.9	(Pt-1) 538 (Pt-3) 60 (P-2) 5.9 (1-2) 32 (2-3) 102	(Pt-2) 52 (P-1) 2.3 (P-3) 4.2 (1-3) 105	360
$C_{14}F_4H_{24}Fe_2O_4P_2S_2$	$\mu(SCH_3)_2\mu(C_2F_4)Fe_2(CO)_4[P(CH_3)_3]_2$		−49.4				328
$C_{15}FH_{15}O_3$		Isomer [a] Isomer [b]	−67.7 −68.3				521(a)
$C_{15}F_3H_{30}ClO_4P_2Pt$	*trans*-[Pt()$(PEt_3)_2$L][ClO_4]	L = CO	(1) −164.4 (3) −122.7	(2) −96.7	(Pt-1) 378 (Pt-3) 31 (P-2) 6.6 (1-2) 33 (2-3) 89	(Pt-2) 65 (P-1) 4.1 (P-3) 3.5 (1-3) 105	360
$C_{15}F_3H_{30}NP_2Pt$	As $C_{14}F_3H_{30}BrP_2Pt$ above with Br replaced by CN		(1) −160.1 (3) −128.6	(2) −95.5	(Pt-1) 350 (Pt-3) 43 (P-2) 5.6 (1-2) 30 (2-3) 101	(Pt-2) 46 (P-1) 4.9 (P-3) 3.9 (1-3) 103	360

Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)		Ref.
$C_{15}F_6H_{30}P_2PtS$	As $C_{14}F_3H_{30}BrP_2Pt$ above with Br replaced by SCF_3	(1) −153.0 (2) −99.0 (3) −129.0	(Pt-1) 441 (Pt-3) 51 (P-2) 5.6 (1-2) 32 (2-3) 105	(Pt-2) 44 (P-1) 3.1 (P-3) 3.6 (1-3) 104	360
$C_{16}F_2H_{18}O_4Se$	$CF_2{=}C(SeC_6H_5){\cdot}CH_2{\cdot}CH(CO_2CH_2CH_3)_2$	−76.10, −80.06	(F-F) 24		315
$C_{17}FH_{25}S$	$CH_3(CH_2)_4{\cdot}C(SC_6H_5){=}CF(CH_2)_3CH_3$ *Z*-isomer *E*-isomer	−92.78 −90.75	^3J(F-H) 23 ^3J(F-H) 23	^4J(F-H) 3.5	315
$C_{17}F_3H_{39}ClO_7P_3Pt$	As $C_{15}F_3H_{30}ClO_4P_2Pt$ above with L = $P(OCH_3)_3$	(1) −159.0 (2) −90.9 (3) −124.7 P1 = P *cis* to C_2F_3 P2 = P *trans* to C_2F_3	(Pt-1) 309 (Pt-3) 37 (P1-2) 5.8 (P2-1) 51 (P2-3) 4.2 (1-3) 103	(Pt-2) 35 (P1-1) 5.2 (P1-3) 4.2 (P2-2) 22 (1-2) 33 (2-3) 96	360
$C_{19}FH_{35}O_2$	$CH_3(CH_2)_4{\cdot}CH{=}CF{\cdot}(CH_2)_{10}CO_2CH_3$ + $CH_3(CH_2)_5{\cdot}CF{=}CH{\cdot}(CH_2)_9CO_2CH_3$	−110.3			420
$C_{19}F_3H_{35}ClNO_4P_2Pt$	As $C_{15}F_3H_{30}ClO_4P_2Pt$ above with L = C_5H_5N	(1) −157.2 (2) −95.9 (3) −127.2	(Pt-1) 452 (Pt-3) 51 (P-2) 6.0 (1-2) 33 (2-3) 102	(Pt-2) 41 (P-1) 4.0 (P-3) 4.0 (1-3) 107	360
$C_{20}F_3H_{45}ClO_4P_3Pt$	As $C_{15}F_3H_{30}ClO_4P_2Pt$ above with L = PEt_3	(1) −151.6 (2) −92.1 (3) −123.5 P1 = P *cis* to C_2F_3 P2 = P *trans* to C_2F_3	(Pt-1) 282 (Pt-3) 45 (P1-2) 6.2 (P2-1) 33 (P2-3) 3.2 (1-3) 103	(Pt-2) 22 (P1-1) 6.2 (P1-3) 3.2 (P2-2) 13 (1-2) 33 (2-3) 95	360

$C_{20}F_3H_{45}ClO_7P_3Pt$	As $C_{15}F_3H_{30}ClO_4P_2Pt$ above with L = P $(OCH_2CH_3)_2$	(1) −158.8 (2) −93.2 (3) −124.8 P1 = P *cis* to C_2F_3 P2 = P *trans* to C_2F_3	(Pt-1) 306 (Pt-3) 37 (P1-2) 6.0 (P2-1) 50 (P2-3) 4.2 (1-3) 102	(Pt-2) 33 (P1-1) 5.2 (P1-3) 4.2 (P2-2) 22 (1-2) 33 (2-3) 96	360
$C_{28}FH_{41}O_3$	 *E*-isomer *Z*-isomer		(1-2) 5 (1-2) 3	(1-3) 22 (1-3) 34	423
$C_{32}F_3H_{45}ClO_4P_3Pt$	As $C_{15}F_3H_{30}ClO_4P_2Pt$ above with L = $P(C_6H_5)_3$	(1) −152.7 (2) −92.9 (3) −123.1 P1 = P *cis* to C_2F_3 P_2 = P *trans* to C_2F_3	(Pt-1) 320 (Pt-3) 39 (P1-2) 6.9 (P2-1) 35 (P2-3) 4.2 (1-3) 104	(Pt-2) 29 (P1-1) 6.2 (P1-3) 4.2 (P2-2) 14 (1-2) 35 (2-3) 96	360
$C_{32}F_3H_{45}ClO_7P_3Pt$	As $C_{15}F_3H_{30}ClO_4P_2Pt$ above with L = $P(OC_6H_5)_3$	(1) −158.6 (2) −91.5 (3) −123.0 P1 = P *cis* to C_2F_3 P2 = P *trans* to C_2F_3	(Pt-1) 316 (Pt-3) 35 (P1-2) 6.7 (P2-1) 54 (P2-3) 5.0 (1-3) 104	(Pt-2) 38 (P1-1) 5.7 (P1-3) 4.2 (P2-2) 22 (1-2) 34 (2-3) 94	360

3. Miscellaneous studies

A liquid–liquid phase transition has been followed by the measurement of F-19 spin–lattice relaxation times in α,β,β-trifluoroacrylonitrile,[526] and F-19 CIDNP effects were observed in the *cis* and *trans* isomers of stilbene on photoisomerization.[527]

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

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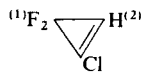
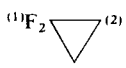
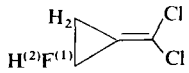
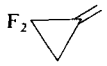
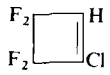
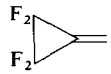
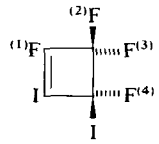
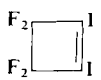
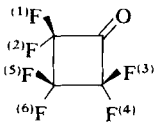
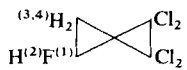
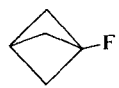
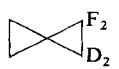
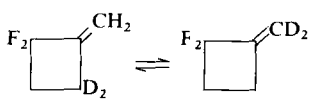
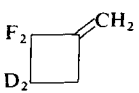
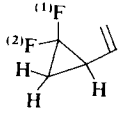
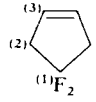
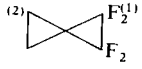
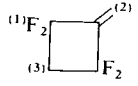
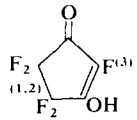
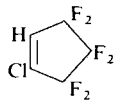
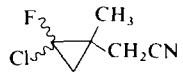
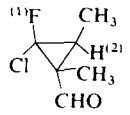
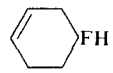
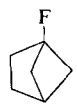
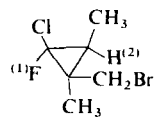
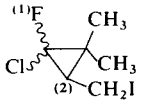
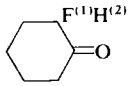
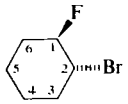
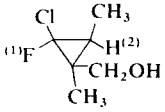
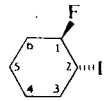
A. Data

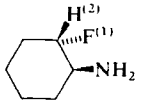
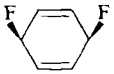
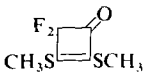
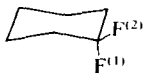
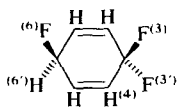
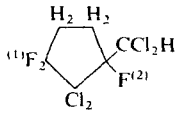
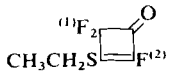
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
C_3F_2HCl		−102.8	(1-2) 2	528
$C_3F_2H_2$	As above with Cl replaced by H	−104.0	(1-2) 1.8	529
$C_3F_2H_4$		−93.5	(1-2) 4.2	530(a)
$C_4FH_3Cl_2$		−131.6	(1-2) 68.5	400(a)
$C_4F_2H_4$		−133.7		530(a)
C_4F_4HCl		−112.8, −117.2		528
$C_4F_4H_2$		−141.33		514
$C_4F_4I_2$		(1) −105.9 (2) −115.1 (3) −100.4 (4) −102.4		531(a)

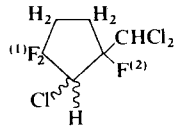
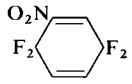
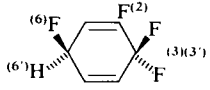
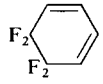
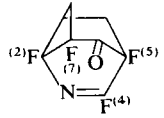
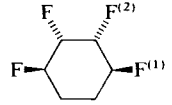
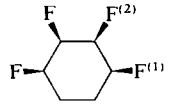
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_4F_4I_2$		−111.7		531(a)
C_4F_6O			(5-6) +327.6 (3-4) +340.7 (3-5) +0.687 (4-5) −5.274 (1-3) −4.688 (2-3) +5.199	532
$C_4F_9NO_3S$	$F_2^{(1)}N{\cdot}\overline{CF^{(2)}{\cdot}CF_2^{(3)}{\cdot}CF_2^{(4)}}{\cdot}CF^{(6)}(OSO_2F^{(5)})$	(1) +22.0 (2) −133.3 (3)(4) −126.1, −125.1 (5) +50.5 (6) −176.5		664
$C_5FH_3Cl_4$		−210.5	(1-2) 64.6 (1-3) 18.5 (1-4) 10.3	400(a)
C_5FH_7		−132.46		533
$C_5F_2H_4D_2$		−135.69		516
$C_5F_2H_4D_2$		−94.49	^3J(F-H) 11.8	516
$C_5F_2H_4D_2$		−94.85		516

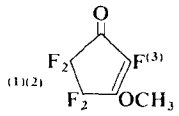
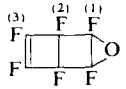
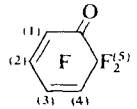
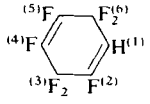
$C_5F_2H_6$			−132.89			516
$C_5F_2H_6$			−94.49			516
$C_5F_2H_6$			(1)(2) −135.0 (centre of AB system)		(1-2) 156.5	534
$C_5F_2H_6$			−70.42	(1-2) 16	(1-3) 2.5	534
$C_5F_2H_8$	$CH_3{\cdot}\overline{CH{\cdot}CF_2^{(1,2)}{\cdot}CH}^{(3)}{\cdot}CH_3^{(4)}$	*cis* *trans*	−126.0, −155.0 −142.3	(1-2) 151 (1,2-4) 3	(1,2-3) 15	176(a)
$C_5F_4H_4$			−133.4			517
$C_5F_4H_4$			−142.82	(1-2) 2.4		517
$C_5F_4H_4$	Same as above		−149.3			530(a)
$C_5F_4H_4$			−97.98	(1-2) 2	(1-3) 9	517

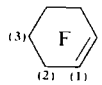
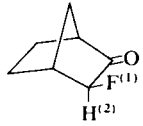
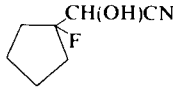
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_5F_5HO_2$		(1)(2) −124.6(3) −155.8	(1-3)(2-3) 8	535
C_5F_6HCl		−108.8, −115.8, −130.9		528
C_6FH_7ClN		−141.5, −142.5		515(a)
C_6FH_8ClO		−147.5		519(a)
C_6FH_8ClO	As above with F and Cl interchanged	−134.5	(1-2) 18	519(a)
C_6FH_9		−175.4		283
C_6FH_9		−153.37		533
C_6FH_9BrCl		−133.5	(1-2) 18	519(a)

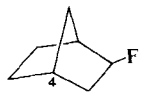
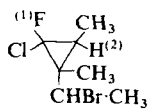
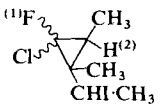
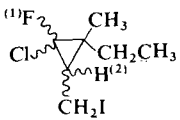
C_6FH_9BrCl	As above with F and Cl interchanged	−172.5			519(a)
C_6FH_9BrCl	As above with CH_2Br and adjacent CH_3 interchanged	−149.5			519(a)
C_6FH_9ClI	As above with Br replaced by I, and CH_3 and CH_2I interchanged	−138.5		(1-2) 18	519(a)
C_6FH_9ClI		(1) −138.5	(2) −155.5	(1-2) 18	518(a)
$C_6FH_9Cl_2$	As above with I replaced by Cl	(1) −139.5	(2) −155.5	(1-2) 18	518(a)
C_6FH_9O		−188.8		(1-2) 51	447
$C_6FH_{10}Br$				(F-C1) 180.90 (F-C2) 19.85 (F-C3) 4.41 (F-C5) 10.3 (F-C6) 19.1	431
$C_6FH_{10}ClO$		−136.5		(1-2) 18	519(a)
$C_6FH_{10}ClO$	As above with F and Cl interchanged	−154.5			519(a)
$C_6FH_{10}ClO$	As above with CH_2OH and adjacent CH_3 interchanged	−139.5		(1-2) 21	519(a)
$C_6FH_{10}ClO$	As above with F and Cl, and CH_3 and CH_2OH, interchanged	−152.5			519(a)
$C_6FH_{10}I$				(F-C1) 180.9 (F-C2) 18 (F-C5) 11.8 (F-C6) 17.65	431

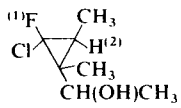
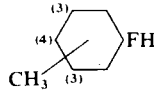
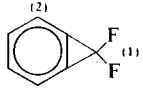
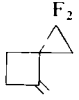
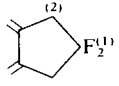
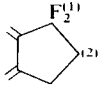
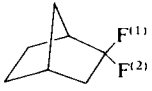
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
C_6FH_{11}	cyclo$C_6H_{11}F$	186.0(ax), −165.5(eq)		283
$C_6FH_{12}N$		−179.7	(1-2) 51	441
$C_6F_2H_6$		−174.42		536
$C_6F_2H_6OS_2$		−102		535
$C_6F_2H_{10}$		(1) −104 (2) −88		283
$C_6F_3H_5$		(3) −91.12 (3′) −85.09 (6) −181.82	(3-3′) 318.9 (3-6) 15.3 (3′-6) 11.3 (3′-6′) 14.4 (6-6′) 43.5 (3-6′) 8.85 (3′-4) 3.6	536
$C_6F_3H_5Cl_4$		(1A) −91.9 (1B) −107.9 (2) −156.9	(1A-1B) 227	401(a)
$C_6F_3H_5OS$		(1) −110.12 (2) −107.3	(1-2) 23	535

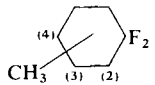
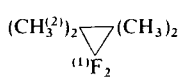
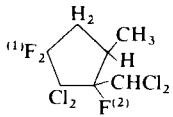
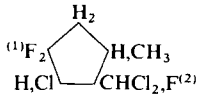
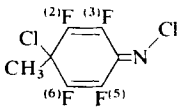
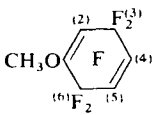
$C_6F_3H_6Cl_3$		Isomer [a]	(1A) −88.7 (1B) −99.1 (2) −158.8 or −156.5	(1A-1B) 235	401(a)
		Isomer [b]	(1A)(1B) −98.0 (2) −156.5 or −158.8		
$C_6F_4H_3NO_2$			−94.55, −101.44		537
$C_6F_4H_4$			(2) −129.73 (3) −103.16 (3′) −99.33 (6) −179.24	(3-3′) 315.5 (3-6) 13.8 (3′-6) 10.8 (6-6′) 43.3 (2-3) 21.2 (2-3′) 20.5 (2-6) 1.7	536
$C_6F_4H_4$			−122.74		536
$C_6F_4H_5NO$			(2) −163.5 (4) −61.5 (5) −192.2 (7) −176.2		538
$C_6F_4H_8$			(1) −187.74 (2) −208.76		536
$C_6F_4H_8$			(1) −194.20 (2) −215.17		536

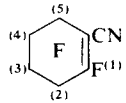
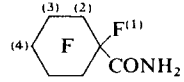
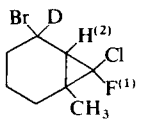
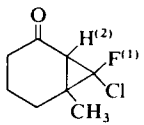
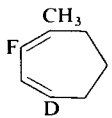
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_6F_5H_3O_2$		(1) −120.8 (2) −127.4 (3) −155.6	(1-3) 10 (2-3) 5.9	535
C_6F_6O		(1) −175.5 (2) −197.5 (3) −121.8		442(a)
C_6F_6O		(1) −163.4 (2) −133.9 (3) −156.8 (4) −155.8 (5) −114.4		442(a)
C_6F_6O	Same as above	(1-4) −134.5, −155, −157, −162 (5) −114		539
C_6F_6O		(2) −152 (3) −146 (4) −116	(2-4) 10 (3-4) 20	539
C_6F_7H		(2) −129 (3) −116 (4) −156 (5) −161 (6) −102	(2-3) 21.0 (2-4) 2.0 (2-6) 10.5 (3-4) 21.1 (3-5) 10.5 (3-6) 5.25 (4-5) 6.0 (4-6) 10.5 (5-6) 21.0 (2-1) 10.5 (3-1) 2 (6-1) 5.25	539

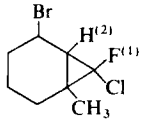
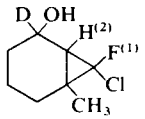
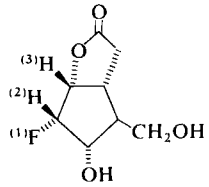
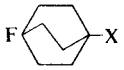
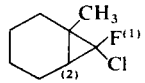
C_6F_7Br	As above with H replaced by Br	(2) −122 (4) −156 (6) −105	(3) −115 (5) −162	(2-3) 24.0 (2-6) 11.5 (3-5) 12.0 (4-5) 6.0 (5-6) 24.0	(2-4) 3.0 (3-4) 30.0 (3-6) 6.0 (4-6) 11.5	539
C_6F_7Cl	As above with H replaced by Cl	(2) −131 (4) −156 (6) −108	(3) −115 (5) −161	(2-3) 24.0 (2-6) 10.5 (3-5) 10.5 (4-5) 6.0 (5-6) 22.5	(2-4) 3.0 (3-4) 21.5 (3-6) 5.25 (4-6) 10.5	539
C_6F_8HCl		−108.1, −113.6, −134.1, −135.3				528
C_6F_{10}		(1) −151.9 (3) −142.8	(2) −119.0			291(b)
C_7FH_9		−162.90				533
C_7FH_9O		−190.0		(1-2) 53		447
$C_7FH_{10}NO$		−154.7		(1-2) 15.5		455

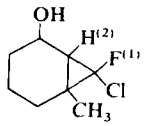
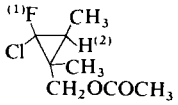
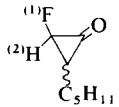
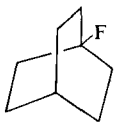
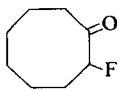
Molecular formula	Structure of compounds		Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
C_7FH_{11}			−158.9		283
C_7FH_{11}	As above with F at C(4)		−182.04		533
C_7FH_{11}			−125.13		533
$C_7FH_{11}BrCl$		Diastereoisomers	−147.5, −153.5		519(a)
$C_7FH_{11}BrCl$	As above with F and Cl interchanged	Isomer [a] Isomer [b]	−141.5 −144.5	(1-2) 21 (1-2) 18	519(a)
$C_7FH_{11}ClI$			−140.5 −142.5 −147.5, −152.5	(1-2) 18 (1-2) 20	519(a)
$C_7FH_{11}ClI$			−131.5 −133.5 −147.5	(1-2) 18 (1-2) 18	518(a)
$C_7FH_{11}Cl_2$	As above with I replaced by Cl		−131.5 −132.5 −146.5	(1-2) 16 (1-2) 18	518(a)

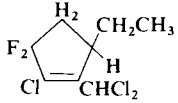
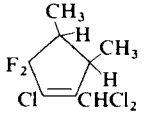
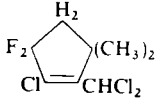
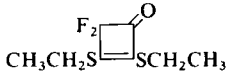
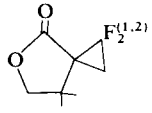
$C_7FH_{12}ClO$		Diastereoisomers	−153.5, −154.5			519(a)
$C_7FH_{12}ClO$	As above with F and Cl interchanged		−141.5 −139.5	(1-2) 18 (1-2) 24		519(a)
C_7FH_{13}		*cis*-3 *trans*-3 *cis*-4 *trans*-4	−182.4 −165.7 −168.1 −184.8			283
$C_7F_2H_4$				(1-2) 3.5 ^2J(F-C) 20 ^4J(F-C) 2.9	^1J(F-C) 303 ^3J(F-C) 1	540
$C_7F_2H_8$			−137.0 (centre of AB system)	(F-F) 151.9		534
$C_7F_2H_8$			−98.7	(1-2) 13.9		534
$C_7F_2H_8$			−97.28	(1-2) 12.65		534
$C_7F_2H_{10}$			(1) −86 (2) −109			283

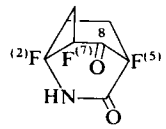
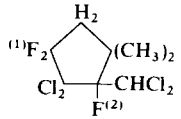
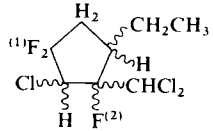
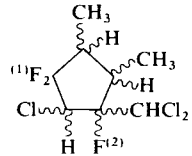
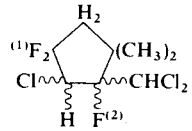
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_7F_2H_{12}$		2- −117.1(ax) −97.9(eq) 3- −102.0(ax), −90.2(eq) 4- −102.9(ax), −91.2(eq)		283
$C_7F_2H_{12}$		−148.9	(1-2) 2.1	176(a)
$C_7F_3H_7Cl_4$		(1A) −81.1 (1B) −111.4 (2) −162.8	(1A-1B) 227	401(a)
$C_7F_3H_8Cl_3$		(1A) −92.0 (1B) −111.2 −96.0 −107.3 −93.8 −103.2 −109.8 −121.1 (2) −153.4, −159.2, −164.9, −145.5	(1A-1B) 231 232 239 221	401(a)
$C_7F_4H_3Cl_2N$		(2) −140.7 (3) −152.8 (5) −151.4 (6) −134.3		541, 542(b)
$C_7F_4H_3Cl_2NO$	As above with CH_3 replaced by CH_3O	(2) −140.5 (3) −153.5 (5) −151.7 (6) −135.0		541, 542(b)
$C_7F_7H_3O$		(2) −167.5 (3) −112.5 (4) −159 (5) −160.5 (6) −111.5		539

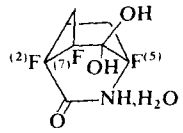
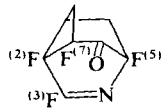
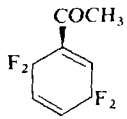
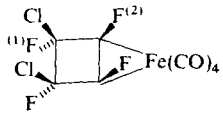
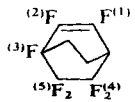
C_7F_9N			(1) −103.1 (2-5) −108.3, −120.6, −134.4 (ratio 1:1:2)			543
$C_7F_{11}H_2NO$			(1) −178.1 (2) −118.6, −131.6 (3) −122.3, −138.0 (4) −123.2, −140.4	(2A-2B) 291 (4A-4B) 282	(3A-3B) 282	543
$C_7F_{11}H_3N_2$	As above with $CONH_2$ replaced by $C(NH_2)=NH$		(1) −173.3 (2) −116.8, −133.1 (3) −121.9, −138.9 (4) −121.4, −141.6	(2A-2B) 321 (4A-4B) 290	(3A-3B) 313	543
$C_7F_{11}H_4N$	As above with $CONH_2$ replaced by CH_2NH_2		(1) −191.8 (2) −120.3, −133.5 (3) −124.0, −140.2 (4) −125.1, −142.3	(2A-2B) 293 (4A-4B) 284	(3A-3B) 285	543
$C_7F_{11}N$	As above with $CONH_2$ replaced by CN		(1) −177.6 (2) −118.1, −130.1 (3) −125.8, −137.4 (4) −126.1, −140.7	(2A-2B) 293 (4A-4B) 287	(3A-3B) 292	543
$C_8FH_{10}BrClD$		*syn/endo* *exo* *anti/endo* *exo*	−132.5 −134.5 −148.5 −150.5	(1-2) 18 (1-2) 18		518(a)
$C_8FH_{10}ClO$		Isomer [a] Isomer [b]	−131.5 −141.5	(1-2) 18		518(a)
$C_8FH_{10}D$			−108.5			518(a)

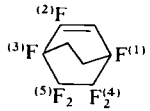
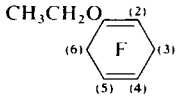
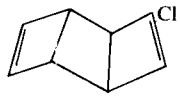
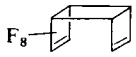
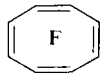
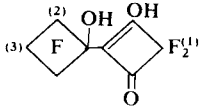
Molecular formula	Structure of compounds		Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
C_8FH_{11}	As above with D replaced by H		−108.5		518(a)
$C_8FH_{11}BrCl$		Cl *syn/endo* Br	−129.5	(1-2) 21	518(a)
		exo	−133.5	(1-2) 18	
		anti/endo	−147.5		
		exo	−149.5		
$C_8FH_{11}ClDO$		Cl *syn/endo* OH	−132.5	(1-2) 18	518(a)
		exo	−135.5	(1-2) 21	
		anti/endo	−147.5		
		exo	−149.5		
$C_8FH_{11}O_4$				(1-2) 54 (1-3) 18	544
$C_8FH_{12}Br$		X = Br	s.c.s. −5.94		545
$C_8FH_{12}Cl$	As above with X = Cl		s.c.s. −6.97		545
$C_8FH_{12}Cl$		Isomer [a]	−135.5	(1-2) 19	518(a)
		Isomer [b]	−149.5		

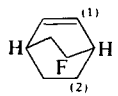
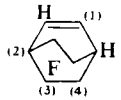
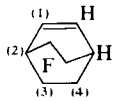
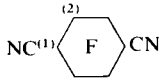
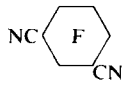
$C_8FH_{12}ClO$		Cl *syn/exo* OH *anti/exo*	−134.5 −149.5		518(a)
$C_8FH_{12}ClO$			−153.5		519(a)
$C_8FH_{12}ClO_2$	As above with F and Cl interchanged		−138.5	(1-2) 21	519(a)
$C_8FH_{12}ClO_2$	As above with CH_3 and H interchanged		−155.5	(1-2) 18	519(a)
$C_8FH_{12}ClO_2$	As above with CH_3 and CH_2OCOCH_3 interchanged		−172.5		519(a)
$C_8FH_{12}I$	As $C_8FH_{12}Br$ above with X = I		s.c.s. −3.35		545
$C_8FH_{12}NO$	$\overline{CH_2\cdot(CH_2)_4\cdot CF^{(1)}\cdot CH^{(2)}(OH)\cdot CN}$		−168.25	(1-2) 16.0	455
$C_8FH_{12}NO_2$	As $C_8FH_{12}Br$ above with X = NO_2		s.c.s. −8.39		545
$C_8FH_{12}O$				(1-2) 18	414
C_8FH_{13}			−147.60		533
$C_8FH_{13}O$			−191.8	^2J(F-H) 48 ^3J(F-H) 24	418
$C_8FH_{13}O$	As $C_8FH_{12}Br$ above with X = OH		s.c.s. −8.06		545
$C_8FH_{14}N$	As $C_8FH_{12}Br$ above with X = NH_2		s.c.s. −6.60		545

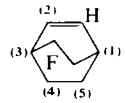
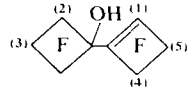
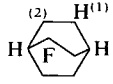
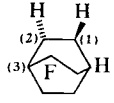
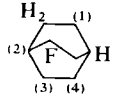
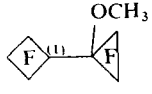
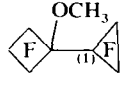
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_8FH_{14}NO_2$	$\overline{CH_2\cdot(CH_2)_4\cdot CF^{(1)}\cdot CH^{(2)}(OH)\cdot CONH_2}$	−167.1	(1-2) 22.0	455
C_8FH_{15}	$\overline{CH_2\cdot(CH_2)_6\cdot CHF}$	−179.6, −159.2, −150.6		283
$C_8F_2H_9Cl_3$		−93.4, −105.1	(F-F) 249	401(a)
$C_8F_2H_9Cl_3$		−95.2, −107.2		401(a)
$C_8F_2H_9Cl_3$		−107.4		401(a)
$C_8F_2H_{10}OS_2$		−102.65		535
$C_8F_2H_{10}O_2$		(1) −132.3 (2) −136.7	(1-2) 162 (1-H) 12,6 (2-H) 12, 8, 2	521(a)
$C_8F_2H_{12}$	As $C_8FH_{12}Br$ above with X = F	s.c.s. −8.90		545

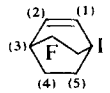
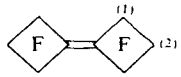
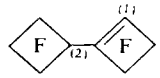
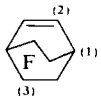
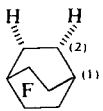
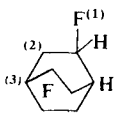
$C_8F_3H_6NO_2$		(2) −179.8 (5) −186.5 (7) −176.3		538(b)
$C_8F_3H_8NO_3$	As above with 8-CO replaced by $C(OH)_2$	(2) −176.5 (5) −191.5 (7) −176.9		538(b)
$C_8F_3H_9Cl_4$		(1A) −91.2 (1B) −111.9 (2) −163.3	(1A-1B) 229	401(a)
$C_8F_3H_{10}Cl_3$		(1A) −88.7 (1B) −110.5 −92.1 −106.4 −94.4 −103.2 −106.3 −120.1 (2) −153.7, −160.3, −161.7, −146.2	(1A-1B) 238 228 232 233	401(a)
$C_8F_3H_{10}Cl_3$		(1A) −103.9 (1B) −118.3 (2) −151.7	(1A-1B) 228	401(a)
$C_8F_3H_{10}Cl_3$		(1A) −107.0 (1B) −113.3 −112.7 −115.1 (2) −145.4, −150.2	(1A-1B) 232 224	401(a)

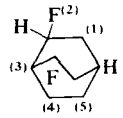
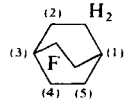
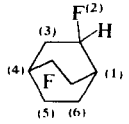
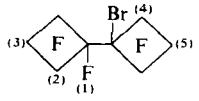
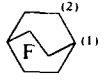
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_8F_3H_{10}NO_4$		(2) −204.6 (7) −173.6		538
$C_8F_4H_5NO$		(2) −203.8 (3) −57.4 (5) −147.7 (7) −175.9		538
$C_8F_4H_6O$		−95.27, −96.77		537
$C_8F_4Cl_2FeO_4$		(1) −87.1 (2) −157.5		531(a)
$C_8F_6H_6$		(1) −139.2 (2A) −114.3 (2B) −118.1		546
$C_8F_7H_5$		(1) −139.1 (2) −153.6 (3) −203.1 (4A) −114.7 (4B) −116.4 (5A) −128.9 (5B) −130.7		546

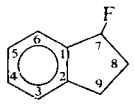
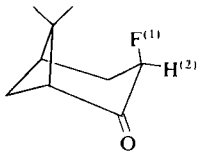
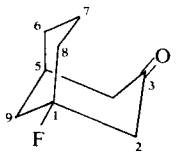
$C_8F_7H_5$		(1) −185.6 (2) −120.1 (3) −202.1 (4) −127.8 (5A) −128.2 (5B) −131.9	546
$C_8F_7H_5O$		(2) −166.5 (3) −113.5 (4) −159.5 (5) −161 (6) −112.5	539
C_8F_7Cl		−101.37, −119.51, −179.05, −184.26, −186.25 (ratio 1:2:1:2:1)	547
C_8F_8	As above with Cl replaced by F	−118.2, −182.1	547
C_8F_8		−113.2, −197.1	547
C_8F_8		−123.5	531(a)
$C_8F_8H_2O_3$		(1) −131.6 (2) −125.9, −132.5 (2A-2B) 222 (3) −115.3	548
$C_8F_8H_4$		(1) −200.7 (2) −152.8 (3) −129.4	546

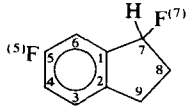
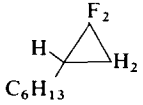
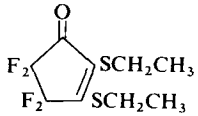
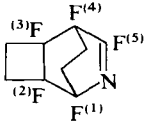
Molecular formula	Structure of compounds		Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_8F_{10}H_2$			(1) −134.0 (2A) −110.0 (2B) −112.4		546
$C_8F_{10}H_2$			(1) −99.8 (2) −210.8 (3) −122.6, −125.7 (4) −110.2, −114.9		546
$C_8F_{10}H_2$			(1) −115.0 (2) −222.3 (4) −122.7, −125.9 (5) −109.4, −111.8		546
$C_8F_{10}H_4$			(1) −201.8 (2) −128.8		546
$C_8F_{10}N_2$		Isomer [a] Isomer [b]	(1) −175.0 or −183.2 (2) −114.3, −127.1 (1) −183.2 or −175.0 (2) −118.1, −126.0	(2A-2B) 294 (2A-2B) 285	543
$C_8F_{10}N_2$			−108.6 to −135.7, −174.6, −179.8 (ratio 4:0.3:0.7)		543
$C_8F_{11}H$			(1) −134.3 (2) −147.2 (3) −221.9 (4) −122.8, −125.1 (5) −110.8, −113.2		546

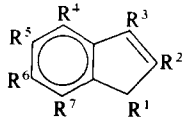
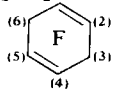
$C_8F_{11}H$		(1) −211.4 (2) −116.3 (3) −222.2 (4) −123.7, −128.0 (4) −122.7, −125.4		546
$C_8F_{11}HO$		(1) −99.9 (2) −127.5 (3) −132.6 (4) −121.5 (5) −116.3	(2A-2B) 225	548
$C_8F_{11}H_3$		(1) −208.3 (2) −93.2, −109.4		546
$C_8F_{11}H_3$		(1) −193.0 (2) −204.3 (3) −214.2		546
$C_8F_{11}H_3$		(1) −86.8 (2) −205.5 (3) −128.1 (4) −111.4		546
$C_8F_{11}H_3O$		(1) −182.7 (others) −124 to −138		549
$C_8F_{11}H_3O$		(1) −185.6 (others) −122 to −132		549
$C_8F_{11}H_4NO$	As $C_7F_{11}H_2NO$ with $CONH_2$ replaced by $C(OCH_3)=NH$	(1) −175.0 (2A) −118.6 (2B) −133.0 (3A) −123.6 (3B) −139.9 (4A) −122.9 (4B) −142.3	(2A-2B) 296 (3A-3B) 279 (4A-4B) 279	543

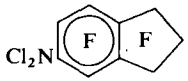
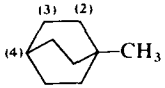
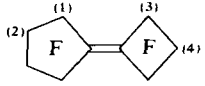
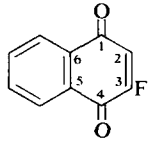
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_8F_{11}I$		(1) −117.3 (2) −147.0 (3) −222.0 (4) −120.5, −122.7 (5) −104.5, −109.5		546
C_8F_{12}		(1) −117.8 (2) −132.0		550
C_8F_{12}		(1) −98.5 (2) −189.6 (remainder) −116.5, −121.7, −128.3 and −134.3, −131.1 and −134.7 (ratio 2:2:4:2)	^2J(F-F) 232, 231	550
C_8F_{12}		(1) −223.8 (2) −149.3 (3) −124.3, −126.7		546
$C_8F_{12}H_2$		−109.8		546
$C_8F_{12}H_2$		(1) −213.5 (2) −224.1		546
	trans-isomer	(1) −212.7 (2) −204.4		
$C_8F_{12}H_2$		(1) −208.8 (2) −107.6, −121.0 (3) −221.6		546

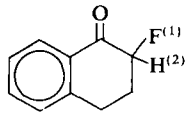
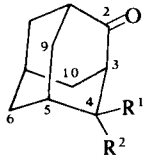
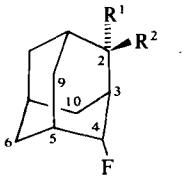
$C_8F_{12}H_2$		(1) −93.4, −109.4 (2) −216.5 (3) −213.3 (4) −122.8, −125.5 (5) −111.0	546
$C_8F_{12}H_2$		(1) −205.0 (2) −101.2 (3) −221.3 (4) −124.0 (5) −127.7	546
$C_8F_{13}H$		(1) −110.7 (2) −122.3 (3) −221.7	546
$C_8F_{13}H$		(1) −213.0 (2) −217.3 (3) −107.9, −127.2 (4) −221.3 (5)(6) −122.0, −123.7 and −120.3, −123.9	546
$C_8F_{13}Br$		(1) −168.3 (2) −126.3 (4A-4B) 220 (5A-5B) 223 (3) −131.1 (4) −108.4, −122.1 (5) −125.5, −130.7	293
C_8F_{14}		(1) −221.9 (2) −123.2	546
C_8F_{16}	cycloC_8F_{16}	−158.2 (high temp.) −153.3 and −162.8 (−100°C) (*ratio* 43:57) −150.6 and −159.2, −179.1 (ratio of latter 90:10) (−170°C)	551

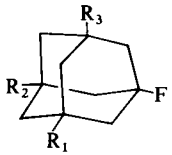
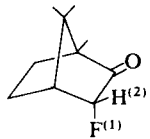
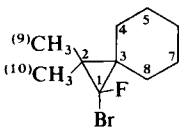
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
C_9FH_9		−159.9		283
C_9FH_9	Same as above		(F-C1) 17.4 (F-C2) 4.5 (F-C3) 2.3 (F-C4) 3.9 (F-C5) 3.1 (F-C6) 2.0 (F-C7) 172.7 (F-C8) 22.6 (F-H7) 58	444
$C_9FH_{12}N$	As $C_8FH_{12}Br$ above with X = CN	s.c.s. −4.15		545
$C_9FH_{13}O$		−165.3	(1-2) 49	418
$C_9FH_{13}O$			(F-C1) 181.5 (F-C2) 21.2 (F-C3) 13.7 (F-C5) 10.5 (F-C7) 11.1 (F-C8) 20.9 (F-C9) 17.4	552
$C_9FH_{13}O$	As $C_8FH_{12}Br$ above with X = CHO	s.c.s. −3.09		545
$C_9FH_{13}O_2$	As $C_8FH_{12}Br$ above with X = CO_2H	s.c.s. −4.75		545
C_9FH_{15}	As $C_8FH_{12}Br$ above with X = CH_3	s.c.s. −3.81		545
$C_9FH_{15}O$	As $C_8FH_{12}Br$ above with X = OCH_3	s.c.s. −6.40		545
$C_9FH_{15}O_3$	$\overline{CH_2{\cdot}(CH_2)_3{\cdot}CF^{(1)}}{\cdot}CH^{(2)}(OH){\cdot}CO_2CH_2CH_3$	−154.7	(1-2) 14.50	455

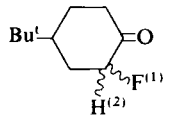
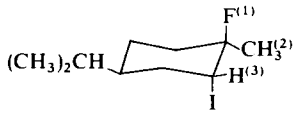
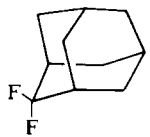
$C_9F_2H_8$			(7-C1) 17.5 (7-C2) ~5.0 (7-C3) 1.8 (7-C4) 3.7 (7-C5) 3.1 (7-C6) 1.8 (7-C7) 174.3 (5-C1) 7.5 (5-C2) ~2.5 (5-C3) 8.6 (5-C4) 22.9 (5-C5) 244.2 (5-C6) 22.0 (5-C7) 1.8 (7-C8) 22.6 (7-H7) 57	444
$C_9F_2H_8$	As above with F at C(3)		(7-C1) ~17.5 (7-C3) 2.4 (7-C4) 3.7 (7-C5) 3.1 (7-C6) 1.8 (7-C7) 174.3 (7-C8) 23.2 (3-C1) ~5.0 (3-C2) 18.3 (3-C3) 247.80 (3-C4) 20.1 (3-C5) 6.7 (3-C6) 3.4 (3-C7) 1.8 (7-H7) 58	444
$C_9F_2H_{16}$		−125, −143	(F-F) 147	414
$C_9F_4H_{10}OS_2$		−108.7, −125.2	(F-F) 1.5	535
$C_9F_4H_{12}$	As $C_8FH_{12}Br$ above with X = CF_3	s.c.s. −5.08		545
$C_9F_5H_8N$		(1) −153.6 (2) −173.9 (3) −186.3 (4) −198.8 (5) −56.0		553(a)

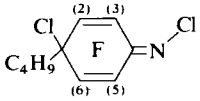
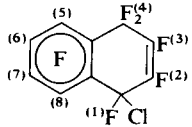
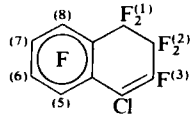
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_9F_6H_2$	 R^1, R^4 to R^7 = F	(1) −121.08 (4) −145.39 (5) −150.80 (6) −155.38 (7) −141.62		554
$C_9F_6H_2$	As above with R^1 to R^4, R^7 = F	(1) −126.22 (2) −161.56 (3) −144.71 (4) −127.29 (7) −121.31		554
C_9F_7H	As above with R^1, R^2, R^4 to R^7 = F	(1) −126.56 (2) −133.09 (4) −145.32 (5) −148.54 (6) −155.31 (7) −139.97		554
C_9F_7H	As above with R^1, R^3 to R^7 = F	(1) −118.56 (3) −120.22 (4) −146.49 (5) −151.42 (6) −153.93 (7) −141.89		554
C_9F_7H	As above with R^1 to R^4, R^6, R^7 = F	(1) −125.30 (2) −161.04 (3) −144.23 (4) −122.84 (6) −128.65 (7) −142.68		554
C_9F_7H	As above with R^1 to R^5, R^7 = F	(1) −125.30 (2) −158.17 (3) −145.02 (4) −149.41 (5) −124.17 (7) −116.28		554
$C_9F_7H_7O$	$CH_3CH_2CH_2O$ 	(2) −165.5 (3) −112 (4) −159 (5) −160.5 (6) −111		539
C_9F_8	As $C_9F_6H_2$ above with R^1 to R^7 = F	(1) −124.62 (2) −158.05 (3) −144.34 (4) −145.23 (5) −147.04 (6) −151.74 (7) −138.10		554

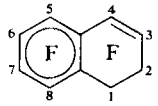
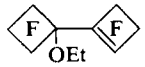
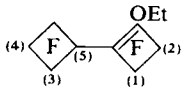
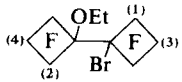
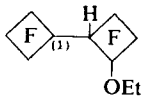
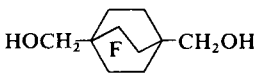
$C_9F_9Cl_2N$		−139.0, −130.5, −129.7 −123.4, −107.2 (ratio 1:1:2:1:4)			541(a)
$C_9F_9Cl_3NP$		−105.4, −106.4, −126.8 −129.3, −132.2, −141.4 (ratio 2:2:1:2:1:1)			589(b)
$C_9F_{11}H_6NO$	As $C_7F_{11}H_2NO$ above with $CONH_2$ replaced by $C(OCH_2CH_3)=NH$	(1) −175.0 (2) −118.6, −132.9 (3) −123.5, −139.5 (4) −123.4, −142.1	(2A-2B) 293 (4A-4B) 288	(3A-3B) 282	543
$C_9F_{11}H_6NO$	As $C_7F_{11}H_2NO$ above with $CONH_2$ replaced by $CH_2NHCOCH_3$	(1) −187.6 (2) −118.8, −133.8 (3) −122.7, −139.5 (4) −123.9, −141.9	(2A-2B) 299 (4A-4B) 291	(3A-3B) 285	543
$C_9F_{13}H_3$		(2) −118.3 (3) −122.2 (4) −223.0			546
$C_9F_{13}H_3O$	As above with CH_3 replaced by CH_2OH	(2) −116.8 (3) −122.7 (4) −223.4			546
C_9F_{14}		(1)(2) −136.9, −114.2 (3) −117.1 (4) −132.1			292
$C_{10}FH_5O_2$			(F-C1) 14 (F-C3) 293 (F-C5) 4	(F-C2) 9 (F-C4) 23	555

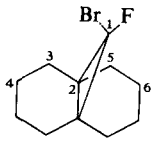
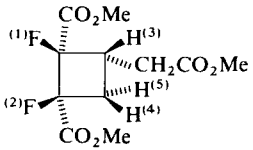
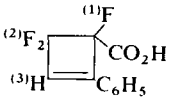
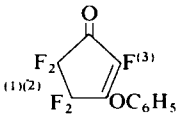
Molecular formula	Structure of compounds		Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{10}FH_9O$				(1-2) 48	418
$C_{10}FH_{13}O$		$R^1 = H, R^2 = F$		(F-C4) 187.4 (F-C3) 19.2 (F-C5) 18.4 (F-C2) 9.9 (F-C9) 9.8	552
		$R^1 = F, R^2 = H$		(F-C4) 181.2 (F-C3) 21.0 (F-C5) 17.6 (F-C6) 8.3 (F-C10) 8.8	
$C_{10}FH_{13}S$	As above with O replaced by S	$R^1 = H, R^2 = F$		(F-C4) 189.1 (F-C3) 20.6 (F-C5) 18.5 (F-C2) 8.5 (F-C9) 8.5	552
		$R^1 = F, R^2 = H$		(F-C4) 183.4 (F-C3) 19.6 (F-C5) 17.4 (F-C6) 8.4 (F-C10) 7.6	
$C_{10}FH_{14}Br$		$R^1 = Br, R^2 = H$		(F-C4) 184.6 (F-C3) 19.5 (F-C5) 18-19 (F-C2) 10.7 (F-C9) 9.8	552
		$R^1 = H, R^2 = Br$		(F-C4) 176.9 (F-C3) 21.0 (F-C5) 18.0 (F-C2) 9.6 (F-C2) 9.2	
$C_{10}FH_{14}Cl$	As above with $R^1 = Cl, R^2 = H$			(F-C4) 184.1 (F-C3) 19.5 (F-C5) 18.1 (F-C2) 11.2 (F-C9) 10.3	552
$C_{10}FH_{15}$	As above with $R^1 = H, R^2 = H$			(F-C4) 178.8 (F-C3) 17.8 (F-C2) 8.9	552

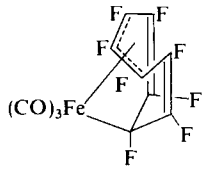
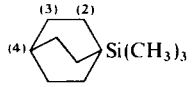
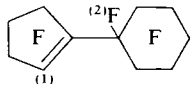
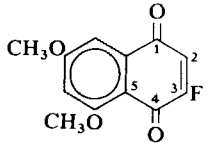
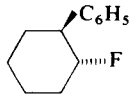
$C_{10}FH_{15}$		$R^1,R^2,R^3 = H$	−130.0		283
$C_{10}FH_{15}$	Same as above		−129.8		556
$C_{10}FH_{15}$	Same as above		−127.78		533
$C_{10}FH_{15}O$			−202.7	(1-2) 53	418
$C_{10}FH_{15}O$	As $C_{10}FH_{14}Br$ above with $R^1 = H$, $R^2 = OH$			(F-C4) 179.5 (F-C3) 16.8 (F-C5) 17.5 (F-C2) 8.8 (F-C9) 8.0	557
$C_{10}FH_{15}O$	As $C_{10}FH_{14}Br$ above with $R^1 = OH$, $R^2 = H$			(F-C4) 180.3 (F-C3) 17.8 (F-C5) 18.2 (F-C2) 11.4 (F-C9) 10.5	552
$C_{10}FH_{15}O$	As $C_{10}FH_{14}Br$ above with $R^1 = H$, $R^2 = OH$			(F-C4) 175.5 (F-C3) 18.0 (F-C5) 18-19 (F-C2) 9.8 (F-C9) 9.2	552
$C_{10}FH_{15}O$	As $C_8FH_{12}Br$ above with $X = COCH_3$		s.c.s. −4.15		545
$C_{10}FH_{15}O_2$	As $C_8FH_{12}Br$ above with $X = CO_2CH_3$		s.c.s. −4.38		545
$C_{10}FH_{15}O_2$	As $C_8FH_{12}Br$ above with $X = OCOCH_3$		s.c.s. −6.08		545
$C_{10}FH_{16}Br$				(F-C1) 309.1 (F-C2) 8.8 (F-C3) 8.5 (F-C4) 4.2 (F-C5) 3.4 (F-C7) 3.5 (F-C9) 9.4 (F-C10) 1.6	558
$C_{10}FH_{16}NO$	As $C_8FH_{12}Br$ above with $X = NHCOCH_3$		s.c.s. −4.66		545

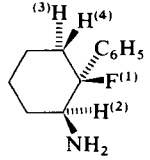
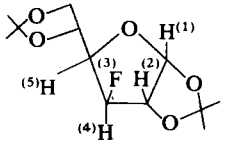
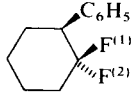
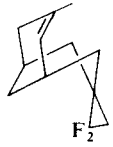
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{10}FH_{17}O$		F axial F equatorial	(1-2) 48 (1-2) 48	418
$C_{10}FH_{17}O_3$	$\overline{CH_2{\cdot}(CH_2)_4}{\cdot}CF^{(1)}{\cdot}CH^{(2)}(OH){\cdot}CO_2CH_2CH_3$	−158.8	(1-2) 14.2	455
$C_{10}FH_{18}I$		−145.5	(1-2) 22 (1-3) 9	559
$C_{10}FH_{18}N$	As $C_8FH_{12}Br$ above with $X = N(CH_3)_2$	s.c.s. −4.66		545
$C_{10}F_2H_{14}$	As $C_{10}FH_{15}$ above with $R^1 = F$	−138.9		556
$C_{10}F_2H_{14}$			^1J(F-C) 246 ^2J(F-C) 21	557
$C_{10}F_2H_{14}$	As $C_{10}FH_{14}Br$ above with $R^1 = F$, $R^2 = H$		(F4-C4) 182.0 (F4-C3) 17-19 (F4-C5) 17-19 (F4-C2) 12.5	552
$C_{10}F_2H_{14}$	As $C_{10}FH_{14}Br$ above with $R^1 = H$, $R^2 = F$		(F4-C4) 176.9 (F4-C3) 16.5 (F4-C5) 17.7 (F4-C2) 9.9 (F4-C9) 9.6 (F2-C2) 179.4 (F2-C1) 18.4 (F2-C3) 16.5 (F2-C8) 8.8 (F2-C10) 8-10	552
$C_{10}F_3H_{13}$	As $C_{10}FH_{15}$ above with R^1, $R^2 = F$	−143.3		556

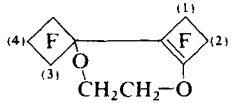
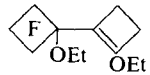
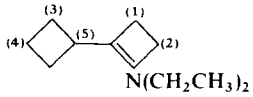
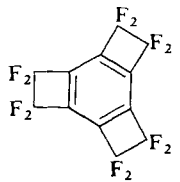
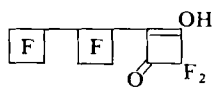
$C_{10}F_4H_9Cl_2N$		(2) −141.4 (3) −150.9 (5) −149.1 (6) −135.4	542, 541(b)
$C_{10}F_4H_{12}$	As $C_{10}FH_{15}$ above with R^1, R^2, R^3 = F	−151.6	556
$C_{10}F_6H_2$	As $C_9F_6H_2$ above with $R^1 = CH_2=$, R^2 to R^7 = F	(2) −158.52 (3) −150.55 (4) −149.97 (5) −154.73 (6) −157.83 (7) −143.48	554
$C_{10}F_6H_3$	As $C_9F_6H_2$ above with R^1, R^2, R^4 to R^7 = F and $R^3 = CH_3$	(1) −127.20 (2) −147.71 (4) −150.33 (5) −151.68 (6) −158.30 (7) −143.49	554
$C_{10}F_6H_3O$	As $C_9F_6H_2$ above with R^1, R^2, R^4 to R^7 = F and $R^3 = CH_3O$	(1) −121.73 (2) −173.74 (4) −146.14 (5) −148.66 (6) −153.97 (7) −140.93	554
$C_{10}F_7H_9O$	As $C_7F_7H_3O$ above with CH_3 replaced by $(CH_2)_2CH_3$	(2) −165 (3) −112 (4) −159.5 (5) −161 (6) −111	539
$C_{10}F_9Cl$		(1) −108.4 (2) −148.5 (3) −159.9 (4) −98.3 (5) −138.6 (6) −148.5 (7) −148.5 (8) −134.3	684(b)
$C_{10}F_9Cl$		(1) −118.5 (2) −127.0 (3) −126.3 (5) −134.7 (6)(7) −147.6, −149.8 (8) −136.7	684(b)

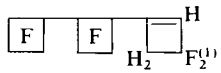
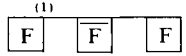
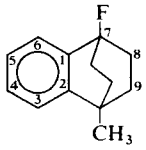
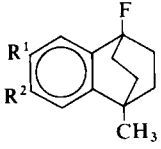
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{10}F_{10}$		(1) −117.12 (2) −125.49 (3) −158.58 (4)(5) −138.53, −140.56 (6)(7) −146.20, −148.33 (8) −135.71	(4-5) 62 (1-8) 32.2	554
$C_{10}F_{11}H_5O$		−98.9, −116.1, −121.1 −123.8, −133.3 −131.5, −133.8 (ratio 1:2:2:2:2:1:1)	*J*(AB) 228, 223	548
$C_{10}F_{11}H_5O$		(1) −116.3 (2) −111.2 (3) −127.2, −133.8 (4) −130.8, −134.4 (5) −179.4	(3A-3B) 229 (4A-4B) 229	548
$C_{10}F_{12}H_5BrO$		(1) −109.7, −119.3, (2) −125.7 (3) or (4) −126.0, −128.7 (4) or (3) −131.2	(1A-1B) 216 (3A-3B) or (4A-4B) 221	548
$C_{10}F_{12}H_6O$		(1) −195.5 (remainder) −113.6 to −138.5		548
$C_{10}F_{13}H_6O_2$		−116.3		546
$C_{11}FH_{15}$	As $C_{10}FH_{13}O$ above with O replaced by $CH_2=$ and R^1 = H, R^2 = F		(F-C4) 183.4 (F-C3) 19.8 (F-C5) 17.9 (F-C2) 9.4 (F-C9) 8.0	552

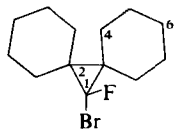
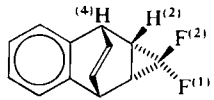
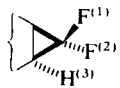
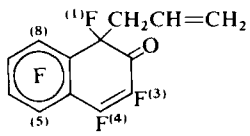
$C_{11}FH_{15}$	As $C_{10}FH_{13}O$ above, with O replaced by $CH_2=$ and $R^1 = F$, $R^2 = H$			(F-C4) 180.7 (F-C3) 18.9 (F-C5) 17.7 (F-C6) 8.9 (F-C10) 8.2	552
$C_{11}FH_{16}Br$				(F-C1) 303.8 (F-C2) 8.6 (F-C4) 1.7 (F-C5) 5.6 (F-C6) 2.5	558
$C_{11}FH_{17}$	As $C_{10}FH_{14}Br$ above with $R^1 = CH_3$, $R^2 = H$			(F-C4) 179.0 (F-C3) 17 (F-C5) 17-18 (F-C2) 8.3 (F-C9) 9.5	552
	$R^1 = H$, $R^2 = CH_3$			(F-C4) 175.8 (F-C3) 19.8 (F-C5) 17-18 (F-C2) 9.5 (F-C9) 9.3	
$C_{11}FH_{21}Sn$	As $C_8FH_{12}Br$ above with $X = Sn(CH_3)_3$	s.c.s. −3.67			545
$C_{11}F_2H_{14}O_6$		(1) −159.4	(2) −173.2	(1-3) 21 (2-4) 26 (2-5) 26 (1-2) ~0	463, 538
$C_{11}F_3H_7O_2$		(1) −163.1 (2B) −107.5	(2A) −102.8	(1-2A) 18 (1-2B) 8 (1-3) 5.5 (2A-3) 1.5	287
$C_{11}F_5H_5O_2$		(1) −120.5 (3) −144.98	(2) −127.2	(1-3) 9	(2-3) 6 535
$C_{11}F_5H_6NO$	As above with OC_6H_5 replaced by NHC_6H_5	(1) −117.8 (3) −147.4	(2) −126.8	(1-3) 9	(2-3) 7 535

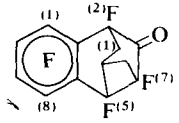
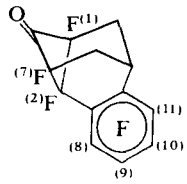
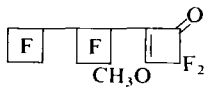
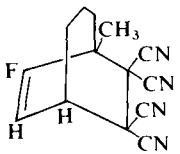
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{11}F_8FeO_3$		−113.0, −127.9, −161.9, −170.4 (ratio 2:3:2:1)		560
$C_{11}F_{13}H_9Si$		(2) −108.8 (3) −123.3 (4) −225.4		546
$C_{11}F_{18}$		(1) −108.3 (2) −187.4 (remainder) −115 to −148		292
$C_{11}F_{19}Cl$		(1) −174.6 (remainder) −101 to −149		293
$C_{12}FH_9O_3$			(F-C1) 17 (F-C2) 11 (F-C3) 291 (F-C4) 21 (F-C5) 5	555
$C_{12}FH_{15}$		−171.1		283

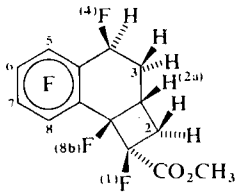
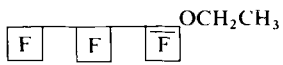
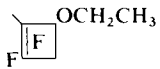
$C_{12}FH_{16}N$		−183.6	(1-2) 28 (1-4) 13.5	(1-3) 38	441
$C_{12}FH_{19}$	As $C_{10}FH_{15}$ above with $R^1 = R^2 = CH_3$	−134.2			561
$C_{12}FH_{19}O_5$		−208.66	(3-4) 49.87 (3-5) 10.70	(3-2) 28.22 (3-1) 2.4	434(a)
$C_{12}FH_{21}O$	$\overline{CF^{(1)}H^{(2)}\cdot CH_2^{(3)}\cdot(CH_2)_9\cdot CO}$	−189.9	(1-2) 48	(1-3) 18	418
$C_{12}F_2H_{14}$		(1) −113.2 (2) −93.0	(1-2) 236		283
$C_{12}F_2H_{16}$		−141.3			562
$C_{12}F_2H_{16}$		−141.7			562
$C_{12}F_5H_9N_2O_3S$	As $C_6F_5H_3O_2$ above with OCH_3 replaced by $NHNHSO_2C_7H_7$	(1) −116.1 (2) −125 (3) −153.6			535

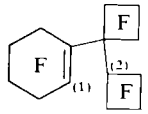
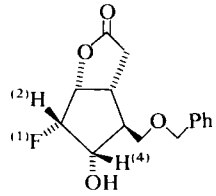
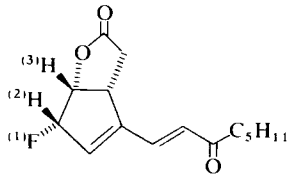
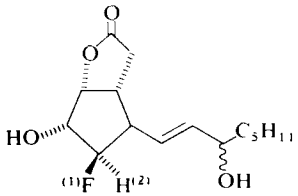
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{12}F_8FeO_4$	cyclo$C_8F_8Fe(CO)_4$	−97.0, −135.3, −142.1 (ratio 2:4:2)		560
$C_{12}F_{10}H_4O_2$		(1) −121.4 (2) −109.3 (3) −124.9, −132.4 (4) −131.2, −133.3	(3A-3B) 221 (4A-4B) 224	548
$C_{12}F_{10}H_{10}O_2$		−111.2, −116.1, −123.9, −133.3 −131.7, −133.8 (ratio 2:2:2:2:1:1)		548
$C_{12}F_{11}H_{10}N$		(1) −116.0 (2) −104.2 (3) −125.9, −132.0 (4) −130.1, −133.6 (5) −159.2	(3A-3B) 226 (4A-4B) 228	548
$C_{12}F_{12}$	As C_6F_7H above with H replaced by C_6F_5	(2) −124 (3) −116 (4) −156 (5) −161 (6) −107	(2-3) 22.5 (2-4) 3.0 (2-6) 11.25 (3-4) 22.5 (3-5) 11.25 (3-6) 5.5 (4-5) 5.5 (4-6) 11.25 (5-6) 22.5	539
$C_{12}F_{12}$		−105.7		531(a)
$C_{12}F_{15}HO_2$		−178.2, −115 to −137 (ratio 1:4)		548

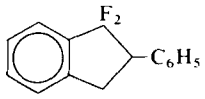
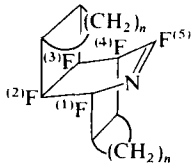
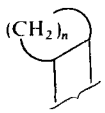
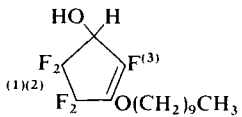
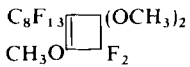
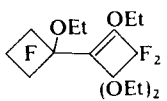
$C_{12}F_{15}H_3$		(1) −109.6, −176.1 (remainder) −118 to −133		548
$C_{12}F_{18}$		(1) −180.0 (remainder) −112.6, −127.0 and −133.0, −130.3 and −134.0 (ratio 4:8:4)	(A-B) 232 (A-B) 230	550
$C_{12}F_{21}Cl$		(1) −166.0 (remainder) −101 to −149		293
$C_{13}FH_{13}$			(F-C1) 18.5 (F-C2) 6.5 (F-C3) 2.6 (F-C4) 0.5 (F-C5) 0.7 (F-C6) 8.3 (F-C7) 191.4 (F-C8) 19.4 (F-C9) 11.1	444
$C_{13}FH_{13}N_2$	As $C_{10}FH_{13}O$ above with C=O replaced by $C=C(CN)_2$, and	$R^1 = H, R^2 = F$ $R^1 = F, R^2 = H$	(F-C4) 190.4 (F-C3) 24.4 (F-C5) 18.5 (F-C2) 9.2 (F-C9) 8.3 (F-C4) 185.0 (F-C3) 18.7 (F-C5) 20.0 (F-C6) 8.1 (F-C10) 7-8	552
$C_{13}FH_{14}Br$		$R^1 = H, R^2 = Br$ s.c.s. −0.18 $R^1 = Br, R^2 = H$ s.c.s. +0.46		563
$C_{13}FH_{14}NO_2$	As above with	$R^1 = H, R^2 = NO_2$ s.c.s. +0.69 $R^1 = NO_2, R^2 = H$ s.c.s. +0.21		563
$C_{13}FH_{16}N$	As above with	$R^1 = H, R^2 = NH_2$ s.c.s. −0.29 $R^1 = NH_2, R^2 = H$ s.c.s. +0.73		563
$C_{13}FH_{19}O_2$	As $C_{10}FH_{15}$ above with $R^1 = CH_3CO_2CH_2$ and $R^2, R^3 = H$	−132		561

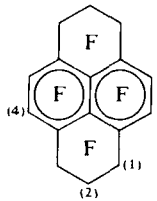
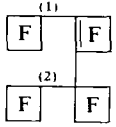
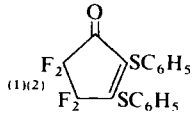
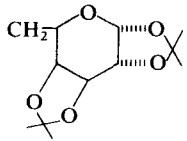
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{13}FH_{20}Br$			(F-C1) 309.5 (F-C2) 8.1 (F-C4) 7.4 (F-C5) 8.1 (F-C7) 8.1 (F-C8) 1.0	558
$C_{13}F_2H_{10}$		(1) −149.0 (2) −101.6	(1-2) 159 (1-3) 1.7 (2-3) 15	529
$C_{13}F_2H_{10}$	As above with 	(1) −143.1 (2) −102.1	(1-2) 158 (1-3) 1.8 (2-3) 15.2 (1-4) 1.8	529
$C_{13}F_2H_{14}$	As $C_{13}FH_{14}Br$ above with $R^1 = H$, $R^2 = F$ $R^1 = F$, $R^2 = H$	s.c.s. −0.04 s.c.s. +0.79		563
$C_{13}F_4H_{16}$		−141.9		562
$C_{13}F_7H_5O$		(1) −155.4 (3) −157.0 (4) −122.6 (5) −138.9 (6) −150.4 (7) −148.3 (8) −135.0	(1-8) 25 (4-5) 75.7 (1-5) 0.6 (1-6) 2.3 (1-7) 1.1 (3-4) 9.4 (3-5) 7.4 (3-6) 1.5 (3-7) 8.3 (4-6) 0.8 (4-7) 3.9 (4-8) 8.0	463, 554

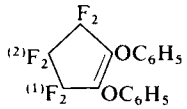
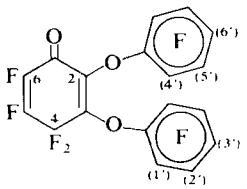
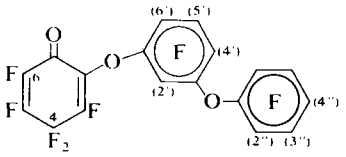
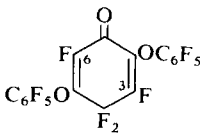
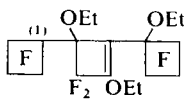
$C_{13}F_7H_5O$		(2) −199.3 (7) −174.0 (8) (11) 145.7	(5) −185.7 (9) (10) −152.9, 153.9	(2-11) 46 (2-H1) 14	(5-8) 45	463
$C_{13}F_7H_5O$		(1)(7) −185.1 (8)(11) −147.0	(2) −208.7 (9)(10) −155.9, −157.6	(2-8) 45		463
$C_{13}F_{15}H_3O$		−178.6, −111 to −133 (ratio 1:14)				548
$C_{14}FH_{11}N_4$		−92.5				518(a)
$C_{14}FH_{14}N$	As $C_{13}FH_{14}Br$ above with $R^1 = H$, $R^2 = CN$ $R^1 = CN$, $R^2 = H$	s.c.s. +0.09 s.c.s. −0.20				563
$C_{14}FH_{17}$	As $C_{13}FH_{14}Br$ above with $R^1 = H$, $R^2 = CH_3$ $R^1 = CH_3$, $R^2 = H$	s.c.s. −0.07 s.c.s. +0.11				563
$C_{14}FH_{17}$	As $C_8FH_{12}Br$ above with $X = C_6H_5$	s.c.s. −3.37				545
$C_{14}FH_{25}O_4Si$	As $C_8FH_{11}O_4$ above with CH_2OH replaced by $CH_2OSi(CH_3)_2Bu^t$			(1-2) 55		544

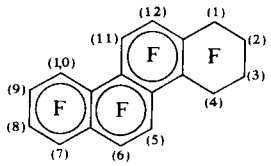
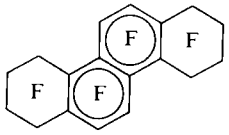
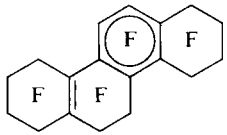
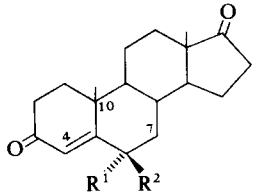
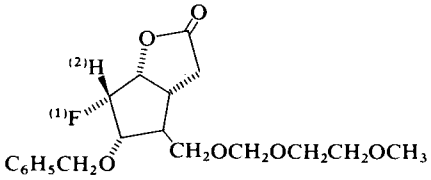
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{14}F_7H_9O_2$		(1) −180.8 (4) −161.9 (5) −142.6 (6)(7) −153.3, −154.5 (8) −137.8 (8b) −140.3	(8-8b) 20 (8b-2a) 20 (4-H4) 50 (4-H3α) 42 (4-H3β) 20 (1-H2α or β) 25	463
$C_{14}F_7H_9O_2$	As above with CO_2CH_3 and H(4) interchanged	(1) −170.1 (4)(8b) −150.4, −163.2 (5)(8) −138.5, −143.6 (6)(7) −151.7, −152.5	(1-H1) 47 (1-H2α or β) 39	463
$C_{14}F_{11}H_8NO$	As $C_7F_{11}H_2NO$ above with $CONH_2$ replaced by $CH_2NHCOC_6H_5$	(1) −187.0 (2A) −118.7 (2B) −133.9 (3A) −122.5 (3B) −139.3 (4A) −123.9 (4B) −141.9	(2A-2B) 299 (3A-3B) 288 (4A-4B) 289	543
$C_{14}F_{17}H_4NO_2$	As $C_7F_{11}H_2NO$ above with $CONH_2$ replaced by $CH_2NHCH{=}\overline{C{\cdot}CO{\cdot}CF_2^{(5)})_3{\cdot}CO}$	(1) −186.6 (2A) −118.1 (2B) −131.7 (3A) −122.5 (3B) −139.1 (4A) −123.8 (4B) −141.6 (5) −124.0, −124.7, −135.2 (ratio 2:2:2)	(2A-2B) 294 (3A-3B) 287 (4A-4B) 281	543
$C_{14}F_{17}H_5O$		−174.2, −108 to −133 (ratio 1:16)		548
$C_{14}F_{17}H_5O$	As above with 	−98.0, −174.5, −112 to −134 (ratio 1:1:15)		548

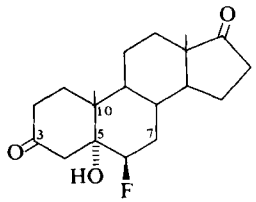
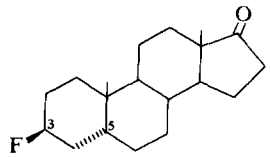
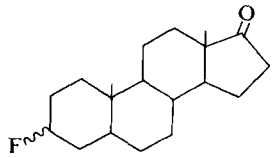
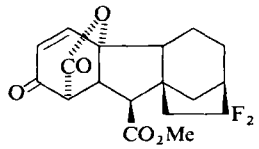
$C_{14}F_{22}$		(1) −86.8 (2) −181.0 (remainder) −110 to −142			292
$C_{15}FH_{17}O$	As $C_{13}FH_{14}Br$ above with $R^1 = H$, $R^2 = COCH_3$	s.c.s. +0.59			563
	$R^1 = COCH_3$, $R^2 = H$	s.c.s. 0.00			
$C_{15}FH_{17}O_2$	As $C_{13}FH_{14}Br$ above with $R^1 = H$, $R^2 = CO_2CH_3$	s.c.s. +0.52			563
	$R^1 = CO_2CH_3$, $R^2 = H$	s.c.s. +0.07			
$C_{15}FH_{17}O_4$			(1-2) 52		564
$C_{15}FH_{17}O_4$	As above with $F^{(1)}$ and $H^{(4)}$, and $H^{(2)}$ and OH, interchanged		(1-2) 52		564
$C_{15}FH_{18}NO$	As $C_{13}FH_{14}Br$ above with $R^1 = H$, $R^2 = NHCOCH_3$	s.c.s. +0.04			563
	$R^1 = NHCOCH_3$, $R^2 = H$	s.c.s. −0.15			
$C_{15}FH_{19}O_3$			(1-2) 52	(1-3) 16	564
$C_{15}FH_{23}O_4$			(1-2) 48		564

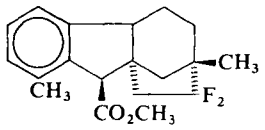
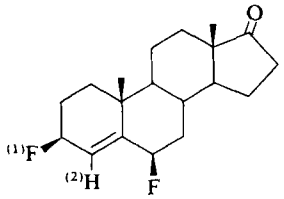
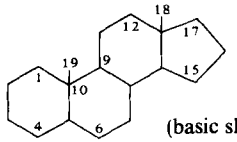
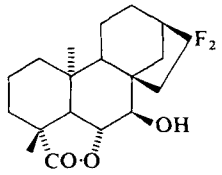
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{15}F_2H_{12}$		−90.8, −96.0	(F-F) 126 ^3J(F-H) 13	417
$C_{15}F_5H_{16}N$		$n = 3$ (1) −160.9 (2) −197.4 (3) −206.6 (4) −204.7 (5) −47.5		553(a)
$C_{15}F_5H_{16}N$	As above with 	$n = 3$ (1) −159.4 (2) −168.2 (3) −179.9 (4) −204.2 (5) −47.9		553(a)
$C_{15}F_5H_{21}O_2$	As $C_6F_5H_3O_2$ above with OCH_3 replaced by $O(CH_2)_9CH_3$	(1) −120.95 (2) −127.3 (3) −154.9	(1-3) 10 (2-3) 6	535
$C_{15}F_5H_{23}O_2$		(1)(2) −114.7, −124.6 (3) −147.4	(1A-1B)(2A-2B) 246, 242	535
$C_{15}F_{15}H_9O_3$		−172.6, −111 to −133 (ratio 1:14)		548
$C_{16}F_8H_{20}O_4$		−112.7, −122.8 and −133.1, −130.5 and −133.2 (ratio 2:2:2:2:2)	J(F-F) 219 J(F-F) 219	548

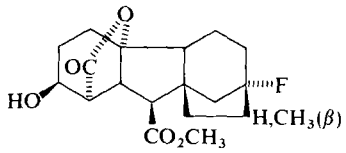
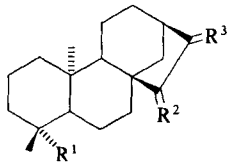
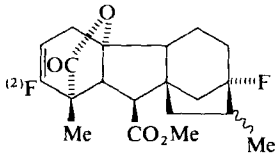
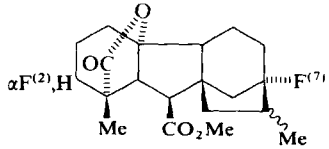
$C_{16}F_{16}$		(1) −112.2 (2) −138.0 (4) −125.9			565
$C_{16}F_{17}H_{10}N$	C_8F_{13}(F)NEt_2	−172.9, −103 to −113 (ratio 1:16)			548
$C_{16}F_{24}$		(1)(2) −183.1, −175.3 (remainder) −110 to −138.0	(1-) 62	(2-) 62	550
$C_{17}F_4H_{10}OS_2$		(1) −109.4 (2) −126.3	(1-2) 3.3		535
$C_{17}F_4H_{12}OS_2$	As above with C=O replaced by CH(OH)	(1A) −102.5 (1B) −114.03 (2A) −121.04 (2B) −131.28	(1A-1B) 253 (1B-2B) 3 (1A-2B) ~11.2	(2A-2B) 240 (1B-2A) ~11.2	535
$C_{17}F_4H_{19}O_7$	As $C_{11}F_5H_5O_2$ above with OC_6H_5 replaced by 	(1) −120.7 (2) −127.3 (3) −152.3	(1-3) 9	(2-3) 6	535
$C_{17}F_5H_{20}N$	As first $C_{15}F_5H_{16}N$ above with $n = 4$	(1) −162.2 (2) −191.7 (3) −199.8 (4) −205.6 (5) −49.4			553(a)
	Alternative structure with $n = 4$	(1) −157.9 (2) −164.6 (3) −174.4 (4) −202.7 (5) −48.0			

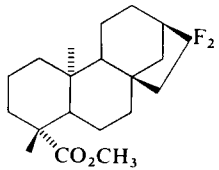
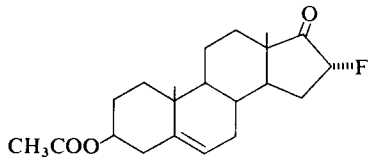
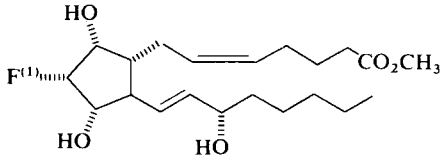
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{17}F_6H_{10}O_2$		(1) −115.3 (2) −130.8		535
$C_{18}F_{14}O_3$		(1')(4') −156.1, −155.0 (2')(5') −163.2, −162.3 (3')(6') −160.1, −158.0 (4) −110.8 (5) −148.6 (6) −150.9	(4-5) ~22.3 (4-6) 10.5 (5-6) 6.0 (4-1') 4.0	566(b)
$C_{18}F_{14}O_3$		(3) −138.0 (4) −115.1 (5) −145.5 (6) −151.2 (2') −151.2 (4') −154.0 (5') −162.4 (6') −154.7 (2'') −157.0 (3'') −162.4 (4'') −160.1	(3-4) ≈ (4-5) 21.5 (4-6) 10.0 (3-5) 7.0 (3-6) 2.5 (5-6) 5.0 (5'-6') 21.5 (4'-6') ≈ (2'-6') 2.5 (4'-5') 21.5 (2'-5') 5.0	566(b)
$C_{18}F_{14}O_3$		(3) −136.9 (4) −111.9 (6) −151.4 (*m*) −162.4, −161.4 (*o*,*p*) −159.8, −157.2, −155.5 (ratio 1:3:2)	(4-6) 9.0 (3-6) ~2.5 (3-4) 23.0 (4-*o*) ~3.0	566(b)
$C_{18}F_{15}H_{15}O_3$		(1) −176.4 (remainder) −107.9, −122 to −136 (ratio 2:12)		548

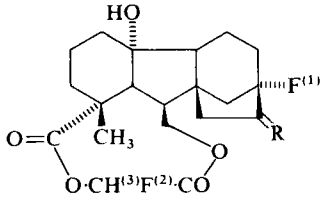
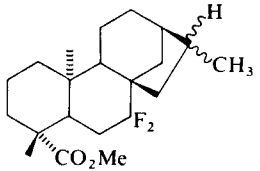
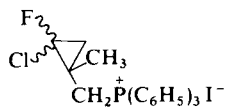
$C_{18}F_{16}$			(1) −104.4 (2)(3) −134.0, −134.4 (4) −100.3 (5) −134.6 (6)(7) −141.0, −144.7 (8)(9) −150.4, −153.4 (10)(11) −115.3, −125.7 (12) −138.2	(6-7) 68	(10-11) 166	567
$C_{18}F_{20}$	 (numbering as above)		(1) −105.8 (2)(3) −134.6 (4) −100.8 (5) −117.2 (6) −136.0	(4-5) 82		567
$C_{18}F_{22}$	 (numbering as above)		(1) −105.2 (2)(3)(8)(9) −133.9, −135.3 (4) −102.4 (5)(6) −121.5, −123.7 (7)(10) −111.2 (11) −114.0	(10-11) 64	(11-12) 18	567
$C_{19}FH_{25}O_2$		$R^1 = H, R^2 = F$ $R^1 = F, R^2 = H$		(F-C4) 9 (F-C6) 167 (F-C10) 2.0 (F-C4) 14.5 (F-C6) 185.5 (F-C8) 11	(F-C5) 12 (F-C7) 23 (F-C5) 11 (F-C7) 18.3 (F-C10) 2.7	568
$C_{19}FH_{25}O_6$				(1-2) 55		544

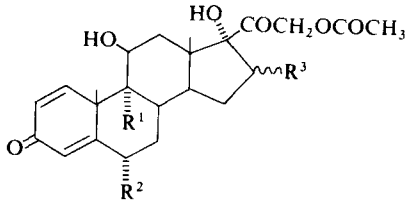
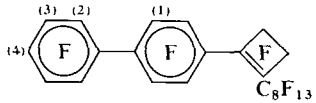
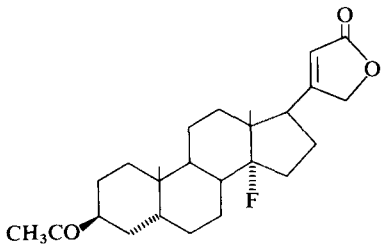
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{19}FH_{27}O_3$			(F-C5) 23 (F-C6) 179 (F-C7) 21 (F-C10) 1.8 (F-C19) 9.2	568
$C_{19}FH_{29}O$		−182.9	(F-3H) 48 ^3J(F-H_{ax}) 42 ^3J(F-H_{eq}) 13	569
$C_{19}FH_{29}O$		3β −167.7 3α −206.62	(F-3H) 54.20 (F-3H) 48.0 ^3J(F-H_{ax}) 42.0 ^3J(F-H_{eq}) 15.1	434(a)
$C_{19}FH_{29}O_3$	As $C_{19}FH_{27}O_3$ above with 3-C=O replaced by 3-CH(OH) (with OH β)		(F-C5) 19.3 (F-C6) 178 (F-C7) 20.2 (F-C10) 1.8 (F-C19) 9.2	568
$C_{19}F_2H_{20}O_5$		−102.0, −85.1	(F-F) 229	570

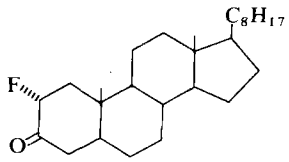
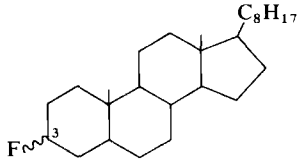
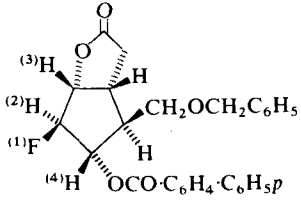
$C_{19}F_2H_{22}O_2$		−110.58, −94.01	(F-F) 224	(F-H) 12	420
$C_{19}F_2H_{26}O$			(1-2) 11		571
$C_{19}F_2H_{26}O_2$	 (basic skeleton)				
	16,16-Difluoro-5α-androstane-3,11-dione	−82.3			572(a)
$C_{19}F_2H_{26}O_3$		−99.28, −84.36	(F-F) 226		570
$C_{19}F_2H_{28}O_2$	(see $C_{19}F_2H_{26}O_2$ for basic skeleton) 12,12-Difluoro-7β-hydroxy-5α-androstan-17-one	−107.67 (eq), −110.53 (ax)	(F-F) 236.9 $^3J(F_{eq}\text{-H})$ 4 $^3J(F_{ax}\text{-H})$ 30, 14		572(a)
$C_{19}F_2H_{28}O_2$	(see $C_{19}F_2H_{26}O_2$ for basic skeleton) 3,3-Difluoro-11α-hydroxy-5α-androstan-17-one	−88.83 (eq), −100.27 (ax)	(F-F) 245.3		572(a)

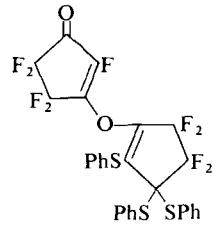
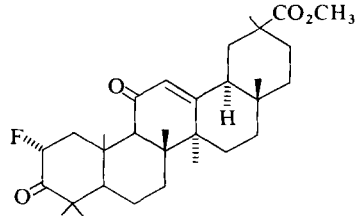
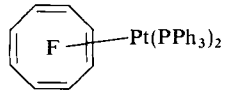
Molecular formula	Structure of compounds		Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{19}F_2H_{28}O_3$	(see $C_{19}F_2H_{26}O_2$ for basic skeleton) 3,3-Difluoro-1β,6α-hydroxy-5α-androstan-17-one		−84.77 (eq), −63.33 (ax)	(F-F) 228.4	572(a)
$C_{19}F_2H_{28}O_3$	(see $C_{19}F_2H_{26}O_2$ for basic skeleton) 17,17-Difluoro-11α,16β-dihydroxy-5α-androstan-3-one		−126.9 (eq), −109.61 (ax)	(F-F) 236.9 $^3J(F_{ax}$-H) 19	572(a)
$C_{19}F_2H_{30}O_3$	(see $C_{19}F_2H_{26}O_2$ for basic skeleton) 7,7-Difluoro-5α-androstane-3β,12β,15α-triol		−87.44 (eq), −109.11 (ax)	(F-F) ~232.7	572(a)
$C_{20}FH_{27}O_5$			−147.05		573
$C_{20}FH_{29}O_3$		$R^1 = CO_2CH_3$ $R^2 = \alpha F,\beta H$, $R^3 = 0$	−202.06	^2J(F-H) 50	385
$C_{20}F_2H_{24}O_4$			(2) −113.29		420
$C_{20}F_2H_{26}O_4$		8αMe 8βMe	(2) −152.70 (7) −159.36 (2) −152.70 (7) −146.95	^2J(2-H) 47	574

$C_{20}F_2H_{30}O_2$			−84.68, −109.47	(F-F) 230	(F-H) 16	570, 385
$C_{20}F_3H_{25}O_4$	As $C_{20}F_2H_{26}O_4$ above with H(2) replaced by F					
		8αH, 8βMe	(2α) −102.26 (2β) −109.38 (7) −159.40	(2α-2β) 238	(2α-10αH) 10	420
		8βH, 8αMe	(2α) −102.26 (2β) −109.38 (7) −146.95	(2α-2β) 238	(2α-10αH) 10	
$C_{21}FH_{29}O_3$				^2J(F-H) 48		418, 844
$C_{21}FH_{29}O_3$	(see $C_{19}F_2H_{26}O_2$ for basic skeleton)		6αF	^2J(F-H) 48		844
	16-Acetyl-6-fluoro-5α-androst-4-en-3-one		6βF	48		
$C_{21}FH_{30}BrO_3$	(see $C_{19}F_2H_{26}O_2$ for basic skeleton)			(F5-6H) 10		571
	3-Acetyl-7β-bromo-5α-fluoro-5α-androstan-17-one					
$C_{21}FH_{31}O_3$	(see $C_{19}F_2H_{26}O_2$ for basic skeleton)		−192.5	^2J(F-H) 48		418, 844
	17-Acetoxy-2α-fluoro-5α-androstan-3-one					
$C_{21}FH_{35}O_5$				^2J(F-H) 51		544, 564

Molecular formula	Structure of compounds		Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{21}F_2H_{28}O_5$		R = αMe,βH	(1) −160.43 (2) −147.58	(2-3) 50	574
$C_{21}F_2H_{32}O_2$			−105.26		420
$C_{21}F_5H_{28}N$	As first $C_{15}F_3H_{16}N$ above with $n = 6$		(1) −158.8 (2) −197.3 (3) −205.9 (4) −202.4 (5) −50.5		553(a)
	Alternative structure with $n = 6$		(1) −156.0 (2) −169.5 (3) −178.8 (4) −198.3 (5) −50.5		
$C_{23}FH_{22}ClIP$			−127.5, −120.5		515(a)
$C_{23}F_2H_{32}O_5$	(see $C_{19}F_2H_{26}O_2$ for basic skeleton) 1β,6α-Diacetoxy-12,12-difluoro-5α-androstan-17-one		−106.51(eq), −110.59(ax)	(F-F) 245.3	572(a)
$C_{23}F_2H_{32}O_5$	(see $C_{19}F_2H_{26}O_2$ for basic skeleton) 3α,11α-Diacetoxy-7,7-difluoro-5α-androstan-17-one		−92.15(eq), −113.35(ax)	(F-F) 245.3	572(a)

$C_{23}F_2H_{32}O_5$	(see $C_{19}F_2H_{26}O_2$ for basic skeleton) 4α,11α-Diacetoxy-7,7-difluoro-5α-androstan-17-one	−92.30(eq), −113.55(ax)	(F-F) ~241.1	572(a)
$C_{23}F_2H_{32}O_5$	(see $C_{19}F_2H_{26}O_2$ for basic skeleton) 4α,16β-Diacetoxy-12,12-difluoro-5α-androstan-17-one	−104.08 (eq), −114.62 (ax)	(F-F) 236.9 $^3J(F_{ax}$-H) 32, 16	572(a)
$C_{24}FH_{32}O_6$		R^1 = F R^2 = H R^3 = αCH$_3$ F H βCH$_3$ H F αCH$_3$	(F-C8) 18.0 (F-C9) 176.2 (F-C10) 19.4 (F-C11) 37.5 (F-C19) 2.8 (F-C8) 19.4 (F-C9) 176.2 (F-C10) 19.4 (F-C11) 36.1 (F-C19) 2.8 (F-C4) 13.9 (F-C5) 24.6 (F-C6) 181.7 (F-C7) 11.1 (F-C8) 16.7 (F-C10) 1.5	575
$C_{24}F_{26}$		(1) −136.4 (2) −138.1 (3) −161.8 (4) −150.5 (remainder) −171.7, −109 to −128 (ratio 1:16)		548
$C_{25}FH_{35}O_4$		−149.5	^3J(F-H15$_{ax}$) 26 ^3J(F-H15$_{eq}$) 8	576
$C_{25}F_2H_{36}O_6$	(see $C_{19}F_2H_{26}O_2$ for basic skeleton) 1β,6α,17β-Triacetoxy-12,12-difluoro-5α-androstane	−104.80(eq), −114.50(ax)	(F-F) 236.9 $^3J(F_{ax}$-H) 19	572(a)
$C_{25}F_2H_{36}O_6$	(see $C_{19}F_2H_{26}O_2$ for basic skeleton) 3β,7β,15α-Triacetoxy-12,12-difluoro-5α-androstane	−108.38(eq), −115.02(ax)	(F-F) 236.9 $^3J(F_{ax}$-H) 32, 16	572(a)

Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{25}F_2H_{36}O_6$	(see $C_{19}F_2H_{26}O_2$ for basic skeleton) $3\beta,11\alpha,16\beta$-Triacetoxy-17,17-difluoro-5α-androstane	−122.41 (eq), −107.69(ax)	(F-F) 245.3 $^3J(F_{ax}$-H) 19	572(a)
$C_{25}F_2H_{36}O_6$	(see $C_{19}F_2H_{26}O_2$ for basic skeleton) $3\beta,12\beta,15\alpha$-triacetoxy-7,7-difluoro-5α-androstane	−91.37(eq), −108.13(ax)	(F-F) 245.3	572(a)
$C_{27}FH_{45}O$			^2J(F-H) 48	418, 844
$C_{27}FH_{47}$		3α −180.9 3β −167.5	^2J(F-H) 47.2 $^3J(F-H_{ax})$ 47.8 $^3J(F-H_{eq})$ 14.0 ^3J(F-H) 55 ^3J(F-H) ~36	434(a)
$C_{27}F_2H_{46}$	As above with H(3) replaced by F	−126.35, −116.14	(F-F) 233	420
$C_{28}FH_{25}O_5$			(1-2) 53 (1-3) 14 (1-4) 16	564
$C_{28}FH_{29}O_5$	As above with CH_2OR side chain replaced by $CH{=}CHCOC_5H_{11}$		(1-2) 50	564

$C_{28}F_9H_{15}O_2S$		(1) −108.6 (2) −114.6 (3) −120.4 (4) −126.9 (5) −145.3	(1-) 6, 6 (3-) 9	(2-) 6, 6, 6 (4-) 6	535
$C_{31}FH_{43}O_4$			^2J(F-H) 48		844
$C_{44}F_8H_{30}P_2Pt$		(1) −115.6 (2) −139.1 (3) −160.2 (4) −186.5 (ratio 2:2:2:2)	(Pt-2) 256		560
$C_{44}F_8H_{30}P_2Pt$	As $C_{11}F_8FeO_3$ above with $Fe(CO)_3$ replaced by $Pt(PPh_3)_2$	(1) −135.4 (2) −141.3 (3) −159.1 (4) −185.9 (5) −193.3 (ratio 2:1:2:2:1)	(Pt-1) 50 (Pt-3) 69	(Pt-2) 350 (Pt-4) 233	560

B. Miscellaneous studies

The conformational free energy difference between the equatorial and axial forms of 4-chloro-1,1-difluorocyclohexane has been measured,[475] and CIDNP effects have been observed in the decomposition of bis-(4H-decafluorobicyclo [2.2.1]heptane-1-carbonyl) peroxide.[577] A study of the F-19 NMR data of 38 fluoro-steroids (ketones, alcohols, and acetates) showed that the disposition of various substituents can be deduced from the F-19 chemical shift and magnitude of the geminal and vicinal J(FH) values.[578] Other studies have been made of 1,2-difluorocyclohexane[579] and of the free radical additions of methanol and acetaldehyde to perfluorinated cycloalkenes.[580]

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

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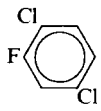
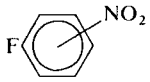
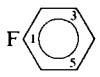
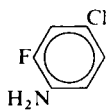
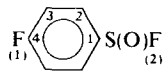
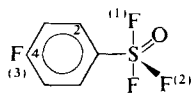
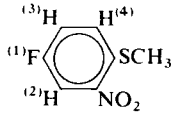
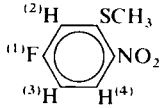
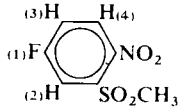
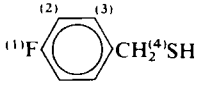
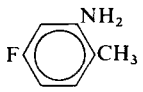
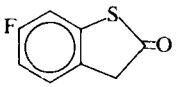
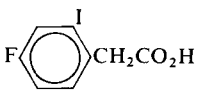
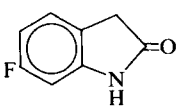
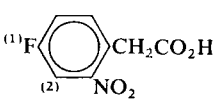
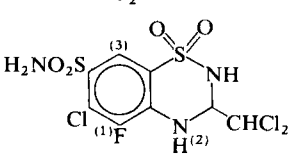
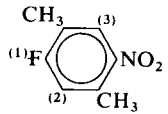
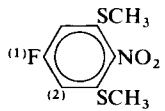
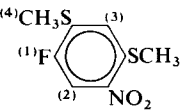
A. Fluorine nuclei in monofluorobenzene derivatives

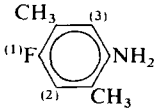
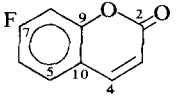
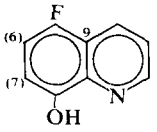
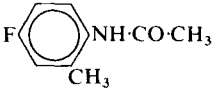
Molecular formula	Structure of compounds		Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_6FH_3Cl_2$			−112.57		536
C_6FH_4Cl				(F-C1) −248.13 (F-C2) +17.47 (F-C3) <0.3 (F-C4) +4.00 (F-C5) +7.17 (F-C6) +20.84	581
C_6FH_4Cl	*meta*-isomer of above			(F-C1) −249.19 (F-C2) +24.77 (F-C3) +10.07 (F-C4) +3.37 (F-C5) +8.86 (F-C6) +21.16	581
$C_6FH_4NO_2$		*ortho* *meta* *para*	−118.6 −109.7 −102.7		537, 536
$C_6FH_4NO_2$	*meta*-isomer of above		−109.5		582
C_6FH_5				(F-C1) −245.07 (F-C2) +21.02 (F-C3) +7.79 (F-C4) +3.20 (F-H4) +0.28	581
C_6FH_5ClN			−133.3		583
$C_6FH_5N_2O_2$	$pF{\cdot}C_6H_4{\cdot}NH{\cdot}NO_2$		−114.42		584(b)

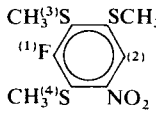
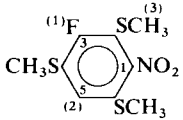
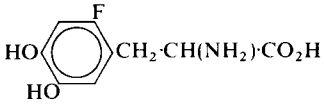
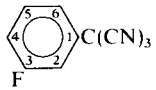
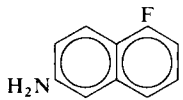
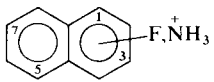
Molecular formula	Structure of compounds		Chemical shifts (ppm)		Coupling constants (Hz)		Ref.
C_6FH_5O	$pF{\cdot}C_6H_4{\cdot}OH$		−126.35				584(b)
C_6FH_6N	$pF{\cdot}C_6H_4{\cdot}NH_2$		−130.02				584, 585(b)
C_6FH_6N	Same as above				(F-N) 1.5		586
C_6FH_6N	*ortho*-isomer of above				(F-N) 0		586
	meta-isomer of above				0		
C_6FH_6NO	$pF{\cdot}C_6H_4{\cdot}NH{\cdot}OH$		−125.69				585(b)
$C_6FH_7N^+$	$F{\cdot}C_6H_4{\cdot}NH_3^+$	*ortho*			(F-N) 1.3		586
		meta			0.2		
		para			0		
$C_6FH_7N_2$	$pF{\cdot}C_6H_4{\cdot}NH{\cdot}NH_2$		−128.54				585(b)
$C_6F_2H_4OS$			(1) −102.5	(2) +8.8	(1-2) 8.0	(1-C1) 3.0	588
					(1-C2) 9.5	(1-C3) 22.7	
					(1-C4) 255.6	(2-C1) 8.8	
					(2-C2) 4.1	(2-C3) 1.4	
					(2-C4) 3.0		
$C_6F_2H_4O_2S$	As above with S(O)F replaced by SO_2F		(1) −99.7	(2) +66.0	(1-C2) 10.3	(1-C3) 23.4	588
					(1-C4) 259.7	(2-C1) 25.6	
					(1-C1) 2.9		
$C_6F_3H_4I$	$F^{(1)}{\cdot}C_6H_4IF_2^{(2)}o$		(1) −97.0	(2) −165.0	(1-C1) 255.6	(1-C2) 22.8	728
					(1-C4) 3.4	(1-C5) 8.1	
					(1-C6) 22.0	(2-C2) 13.8	
$C_6F_4H_4OS$			(1) +100.0	(2) +67.2	(1-2) 164.0	(1-C1) 22.5	588
			(3) −101.5		(1-C3) 3.0	(1-C2) 9.5	
					(1-C4) 1.0	(3-C2) 7.4	
					(3-C3) 23.4	(3-C4) 259.0	
$C_6F_4H_4Se$	$pF^{(1)}{\cdot}C_6H_4{\cdot}SeF_3^{(2)}$		(1) −104.5	(2) −25.4			731
C_7FH_3	$pF{\cdot}C_6H_4{\cdot}CH_3$		−118.47				585(b)

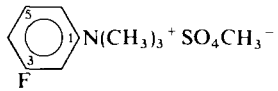
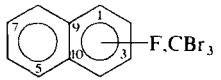
C_7FH_4N	$pF{\cdot}C_6H_4{\cdot}CN$		−103.05			536
$C_7FH_5N_2$	$pF{\cdot}C_6H_4{\cdot}NH{\cdot}CN$		−121.25			584(b)
$C_7FH_5O_2$	$F{\cdot}C_6H_4{\cdot}CO_2H$	*ortho*	−108.4			536
		meta	−112.5			
		para	−104.7			
$C_7FH_5O_2$	$pF{\cdot}C_6H_4{\cdot}CO_2H$		−104.18			590(d)
C_7FH_6Br	$pF{\cdot}C_6H_4{\cdot}CH_2Br$		−113.27			585(b)
C_7FH_6NO	$pF{\cdot}C_6H_4{\cdot}NH{\cdot}CHO$		−118.77			584(b)
$C_7FH_6NO_2S$			−117.38	(1-2) 8.4 (1-4) 6.1	(1-3) 6.1	591
$C_7FH_6NO_2S$			−103.30	(1-2) 7.0 (1-4) 5.4	(1-3) 9.8	591
$C_7FH_6NO_4S$			−101.29	(1-2) 7.8 (1-4) 4.4	(1-3) 6.9	591
C_7FH_7O	$pF{\cdot}C_6H_4{\cdot}CH_2OH$		−116.41			585(b)
C_7FH_7O	$pF{\cdot}C_6H_4{\cdot}OCH_3$		−124.39			584(b)
$C_7FH_7O_3S$	$pF{\cdot}C_6H_4{\cdot}OSO_2CH_3$		−114.87			584(b)
C_7FH_7S				(1-2) 8.406 (1-4) 0.719	(1-3) 5.242	592
C_7FH_8N	$pF{\cdot}C_6H_4{\cdot}NH{\cdot}CH_3$		−130.24			585, 584(b)

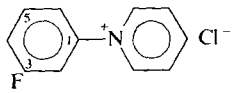
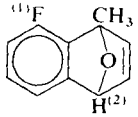
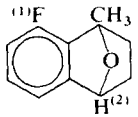
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
C_7FH_8N			^5J(F-N) 1.5	586
C_7FH_8NO	$pF{\cdot}C_6H_4{\cdot}NH{\cdot}OCH_3$	−124.17		585(b)
$C_7FH_8NO_2S$	$pF{\cdot}C_6H_4{\cdot}NH{\cdot}SO_2CH_3$	−119.07		584(b)
C_8FH_5OS		−113.1		365
$C_8FH_6IO_2$		−113.9		594
C_8FH_6N	$pF{\cdot}C_6H_4{\cdot}CH_2CN$	−114.83		585(b)
C_8FH_6NO		−113.6		594
$C_8FH_6NO_4$			(1-2) 9	594
$C_8FH_7Cl_3N_3O_4S_2$		−128.5	(1-2) 2 (1-3) 2	595

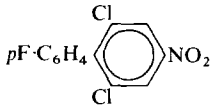
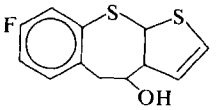
C_8FH_7O	$F{\cdot}C_6H_4{\cdot}CO{\cdot}CH_3$	*ortho*	−110.30			536
		meta	−112.66			
		para	−106.29			
C_8FH_7O	Same as above	*ortho*	−106.1			537
		meta	−112.7			
		para	−110.1			
$C_8FH_7O_2$	$pF{\cdot}C_6H_4{\cdot}O{\cdot}COCH_3$		−117.35			584(b)
$C_8FH_7O_2$	$pF{\cdot}C_6H_4{\cdot}CO_2CH_3$		−105.93			590(d)
$C_8FH_7O_3$	$pF{\cdot}C_6H_4{\cdot}O{\cdot}CO_2CH_3$		−116.70			584(b)
C_8FH_8NO	$pF{\cdot}C_6H_4{\cdot}NH{\cdot}CO{\cdot}CH_3$		−119.67			584(b)
C_8FH_8NO	$F{\cdot}C_6H_4{\cdot}NH{\cdot}CO{\cdot}CH_3$	*ortho*		(F-N) 1.0		586
		meta		0.9		
		para		0.5		
$C_8FH_8NO_2$	$pF{\cdot}C_6H_4{\cdot}NH{\cdot}CO_2CH_3$		−120.85			584(b)
$C_8FH_8NO_2$				(1-2) 17	(1-3) 12	596
$C_8FH_8NO_2S_2$				(1-2) 9.0		591
$C_8FH_8NO_2S_2$			−117.30	(1-2) 10.2 (1-4) 0.8	(1-3) 7.0	591
$C_8FH_9N_2O$	$pF{\cdot}C_6H_4{\cdot}NH{\cdot}NH{\cdot}CO{\cdot}CH_3$		−126.71			585(b)
C_8FH_9OS	$pF{\cdot}C_6H_4{\cdot}CH_2{\cdot}S(O)CH_3$		−114.48			585(b)

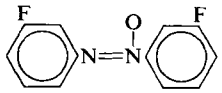
Molecular formula	Structure of compounds		Chemical shifts (ppm)	Coupling constants (Hz)		Ref.
$C_8FH_{10}N$	$F{\cdot}C_6H_4{\cdot}N(CH_3)_2$	*ortho* *meta* *para*		(F-N) 0 0 0.5		586
$C_8FH_{10}N$				(1-2) 17	(1-3) 10	596
$C_8F_4H_4O_2$	$pF{\cdot}C_6H_4{\cdot}O{\cdot}CO{\cdot}CF_3$		−114.85			584(b)
$C_8F_4H_5NO$	$pF{\cdot}C_6H_4{\cdot}NH{\cdot}CO{\cdot}CF_3$		−116.16			584(b)
$C_9FH_5O_2$				(F-C3) 3 (F-C5) 10.5 (F-C7) 251.5 (F-C9) 13.0	(F-C4) 1 (F-C6) 23.0 (F-C8) 25.5 (F-C10) 3.0	598
C_9FH_6NO				(5-6) 9.3 (5-C5) 240.9 (5-C9) 17.7	(5-7) 5.3 (5-C6) 24.3 (5-C7) 8.8	599
C_9FH_9O	$pF{\cdot}C_6H_4{\cdot}CH_2{\cdot}CO{\cdot}CH_3$		−116.49			585(b)
$C_9FH_9O_2$	$pF{\cdot}C_6H_4{\cdot}CH_2{\cdot}CO_2CH_3$		−116.03			585(b)
$C_9FH_{10}NO$				(F-N) 0.2		586
$C_9FH_{10}NO_2$	$pF{\cdot}C_6H_4{\cdot}O{\cdot}CO{\cdot}N(CH_3)_2$		−118.6			584(b)
$C_9FH_{10}NO_2$	$pF{\cdot}C_6H_4{\cdot}CH_2{\cdot}CH(CO_2^-)NH_3^+$		−117.4			432

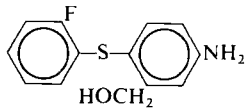
$C_9FH_{10}NO_2S_3$			−94.86	(1-2) 1.8 (1-4) 1.1	(1-3) 1.4	591
$C_9FH_{10}NO_2S_3$			−103.43	(1-2) 7.0 (1-C2) 24.2 (1-C4) 20.0 (1-C6) 4.9	(1-3) 0.7 (1-C3) 247.3 (1-C5) 3.6	591
$C_9FH_{10}NO_4$			−126.5			600(b)
$C_9FH_{11}N_2O$	$pF{\cdot}C_6H_4{\cdot}NH{\cdot}CO{\cdot}N(CH_3)_2$		−121.81			584(b)
$C_9FH_{14}NO_4S$	$pF{\cdot}C_6H_4{\cdot}N(CH_3)_3^+\ HSO_4^-$			(F-C1) 248.2 (F-C3) 8.9	(F-C2) 23.2	582
$C_{10}FH_4N_3$				(F-C1) 8.08 (F-C3) 252.97 (F-C5) 8.83	(F-C2) 25.74 (F-C4) 20.60 (F-C6) 3.67	601
$C_{10}FH_8N$			s.c.s. −0.62			601
$C_{10}FH_9N^+$	 (CF_3CO_2H solvent)	1-F, 3-NH_3^+ 1-F, 4-NH_3^+ 1-F, 6-NH_3^+ 1-F, 7-NH_3^+	s.c.s. +7.87 +7.11 +2.16 +1.59			601
		2-F, 4-NH_3^+ 2-F, 5-NH_3^+ 2-F, 8-NH_3^+	s.c.s. +2.55 +4.21 +6.98			

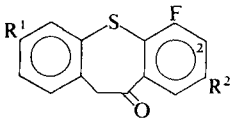
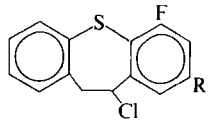
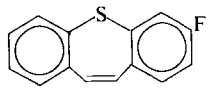
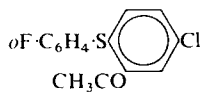
Molecular formula	Structure of compounds		Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{10}FH_{12}NO$	$pF{\cdot}C_6H_4{\cdot}CH_2{\cdot}CO{\cdot}N(CH_3)_2$		−116.95		585(b)
$C_{10}FH_{14}O_4P$	$pF{\cdot}C_6H_4{\cdot}O{\cdot}P(O)(OEt)_2$		−117.99		584(b)
$C_{10}FH_{15}NO_3P$	$pF{\cdot}C_6H_4{\cdot}NH{\cdot}P(O)(OEt)_2$		−123.1		584(b)
$C_{10}FH_{16}NO_4S$				(F-C1) 9.1 (F-C2) 27.9 (F-C3) 246.3 (F-C4) 20.2 (F-C5) 8.8	582
$C_{11}FH_6Br_3$		1-F, 4-CBr_3	s.c.s. +6.14		601
		2-F, 6-CBr_3	+3.25		
		2-F, 7-CBr_3	+1.78		
$C_{11}FH_7Br_2$	As above with F,$CHBr_2$	1-F, 4-$CHBr_2$	s.c.s. +4.85		601
		1-F, 7-$CHBr_2$	+1.30		
		2-F, 6-$CHBr_2$	+2.31		
		2-F, 7-$CHBr_2$	+1.40		
$C_{11}FH_7O$	As above with F,CHO	1-F, 6-CHO	s.c.s. +1.56		601
$C_{11}FH_8Br$	As above with F,CH_2Br	1-F, 3-CH_2Br	s.c.s. +0.99		601
		1-F, 4-CH_2Br	+2.65		
		1-F, 5-CH_2Br	+1.67		
		1-F, 6-CH_2Br	+0.41		
		1-F, 7-CH_2Br	+0.69		
		2-F, 4-CH_2Br	−0.52		
		2-F, 5-CH_2Br	+0.05		
		2-F, 6-CH_2Br	+1.07		
		2-F, 7-CH_2Br	+0.73		
		2-F, 8-CH_2Br	+2.86		

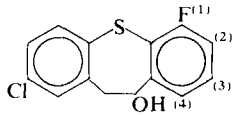
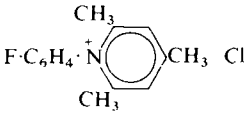
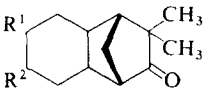
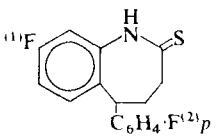
$C_{11}FH_9$	As above with F,CH_3	1-F, 3-CH_3	s.c.s. −1.09		601
		1-F, 5-CH_3	+1.06		
		1-F, 6-CH_3	−0.27		
		1-F, 7-CH_3	−0.75		
		2-F, 4-CH_3	−0.78		
		2-F, 5-CH_3	−1.20		
		2-F, 6-CH_3	−1.45		
		2-F, 7-CH_3	−0.20		
		2-F, 8-CH_3	+0.88		
$C_{11}FH_9$	As above with F,CH_3	1-F, 8-CH_3		(1-8) 7.5	602
$C_{11}FH_9ClN$				(F-C1) 9.5 (F-C2) 26.9 (F-C3) 246.9 (F-C4) 20.9 (F-C5) 8.7 (F-C6) 3.0	582
$C_{11}FH_9ClN$	As above with F at C(4)			(F-C1) 2.1 (F-C2) 9.5 (F-C3) 23.7 (F-C4) 249.3	582
$C_{11}FH_9N_2$	pF·C_6H_4·NH·C=N·CH=CH·CH=CH		−123.17		584(b)
$C_{11}FH_9N_2$	pF·C_6H_4·NH·C=CH·CH=N·CH=CH		−120.06		584(b)
$C_{11}FH_9O$				(1-2) 2.0	602
$C_{11}FH_{11}O$				(1-2) 1.8	602
$C_{11}FH_{16}O_3P$	pF·C_6H_4·CH_2P(O)$(OEt)_2$		−116.42		585(b)

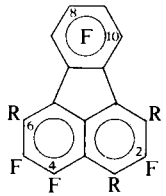
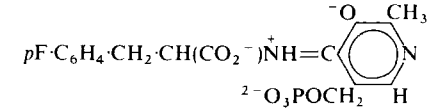
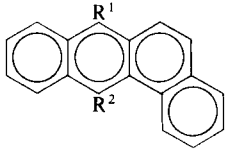
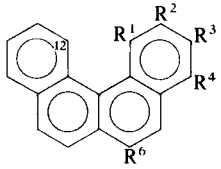
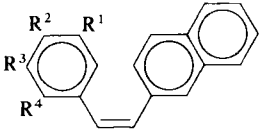
Molecular formula	Structure of compounds		Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{12}FH_6Cl_2NO_2$				(F-H*o*) 8.91 (F-H*m*) 5.31	606
$C_{12}FH_8N$	As $C_{11}FH_6Br_3$ above with F,CH_2CN	6-F, 2-CH_2CN		(6-C4) 5.55 (6-C5) 20.35 (6-C6) 247.84 (6-C7) 25.89 (6-C8) 9.25 (6-C10) 9.0	601
		1-F, 3-CH_2CN	s.c.s. +1.27		
		1-F, 4-CH_2CN	+0.84		
		1-F, 5-CH_2CN	+2.09		
		1-F, 6-CH_2CN	+0.36		
		1-F, 7-CH_2CN	+0.32		
		2-F, 4-CH_2CN	+0.32		
		2-F, 5-CH_2CN	+0.28		
		2-F, 6-CH_2CN	+0.79		
		2-F, 7-CH_2CN	+1.16		
		2-F, 8-CH_2CN	+2.69		
$C_{12}FH_9OS_2$			−115.6		607
$C_{12}FH_9O_3S$	$pF{\cdot}C_6H_4{\cdot}OSO_2C_6H_5$		−114.35		584(b)
$C_{12}FH_9S$	$pF{\cdot}C_6H_4{\cdot}S{\cdot}C_6H_5$		−113.81	(F-H*o*) 8.5 (F-H*m*) 5.4	608
$C_{12}FH_{10}N$	$pF{\cdot}C_6H_4{\cdot}NH{\cdot}C_6H_5$		−123.67		584(b)
$C_{12}FH_{10}NOS$	$pF{\cdot}C_6H_4{\cdot}NH{\cdot}S(O)C_6H_5$		−119.48		584(b)
$C_{12}FH_{10}NO_2S$	$pF{\cdot}C_6H_4{\cdot}NH{\cdot}SO_2C_6H_5$		−118.23		584(b)
$C_{12}FH_{10}NO_2S$	$F{\cdot}C_6H_4{\cdot}NH{\cdot}SO_2C_6H_5$	*ortho*		(F-N) 1.9	586
		meta		0.5	
		para		0.8	

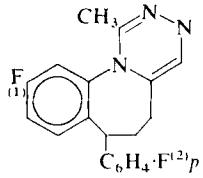
$C_{12}FH_{11}O$	As $C_{11}FH_9O$ above with CH_3 replaced by CH_2CH_3				(1-2) 2.0	602
$C_{12}FH_{13}O$	As $C_{11}FH_{11}O$ above with CH_3 replaced by CH_2CH_3				(1-2) 2.0	602
$C_{12}F_2H_8N_2O$			(1) −94.71	(2) −93.7	(1-H*o*) 10.7, 8.1 (1-H*m*) 6.3 (2-H*o*) 10.1, 8.1 (2-H*m*) 5.7 (2-H*p*) 0.3	591
$C_{12}F_2H_8O_2S$	$(pF{\cdot}C_6H_4)_2SO_2$		−104.3			609
$C_{12}F_2H_9N_3$	$F{\cdot}C_6H_4{\cdot}N_3HC_6H_4F$	*ortho*	−129.55			610(d)
		meta	−112.05			
		para	−117.55			
$C_{12}F_2H_9NOS$	$(pF{\cdot}C_6H_4)_2S(O)NH$		−106.3			609
$C_{12}F_2H_{10}ClNOS$	$(pF{\cdot}C_6H_4)_2S(O)NH_2^+\ Cl^-$		−99.2			609
$C_{12}F_4H_8OS$	$(pF^{(1)}{\cdot}C_6H_4)_2SF_2^{(2)}(O)$		(1) −105.0	(2) +102.0		609
$C_{12}F_7H_8BOS$	$(pF^{(1)}{\cdot}C_6H_4)_2S(O)F^{(2)+}\ BF_4^{(3)-}$		(1) −89.5 (3) −149.0	(2) +35.8		609
$C_{12}F_9H_8OPS$	$(pF^{(1)}{\cdot}C_6H_4)_2S(O)F^{(2)+}\ PF_6^{(3)-}$		(1) −89.5 (3) −71.5	(2) +35.8	(P-3) 713	609
$C_{13}FH_7N_2$	As $C_{11}FH_6Br_3$ above with F,$CH(CN)_2$6-F, 2-$CH(CN)_2$				(6-C4) 5.55 (6-C5) 20.35 (6-C6) 249.69 (6-C7) 25.9 (6-C8) 9.15 (6-C10) ~10.0	601
		2-F, 6-$CH(CN)_2$	s.c.s. +3.05			
		2-F, 7-$CH(CN)_2$	+2.55			
$C_{13}FH_9HgO_2$	$pF{\cdot}C_6H_4{\cdot}CO_2HgC_6H_5$		−107.45			590(d)
$C_{13}FH_9O_2$	$pF{\cdot}C_6H_4{\cdot}O{\cdot}CO{\cdot}C_6H_5$		−116.90			584(b)
$C_{13}FH_{10}NO$	$pF{\cdot}C_6H_4{\cdot}NH{\cdot}CO{\cdot}C_6H_5$		−118.79			584(b)
$C_{13}FH_{11}$	$pF{\cdot}C_6H_4{\cdot}CH_2{\cdot}C_6H_5$		−117.31			585(b)
$C_{13}FH_{11}$	As $C_{11}FH_6Br_3$ above with F,$C(CH_3){=}CH_2$					612
		2-$C(CH_3){=}CH_2$, 6-F	−115.22			
$C_{13}FH_{11}OS$	$pF{\cdot}C_6H_4{\cdot}CH_2{\cdot}S(O)C_6H_5$		−114.26			585(b)
$C_{13}FH_{11}O_2S$	$pF{\cdot}C_6H_4{\cdot}CH_2{\cdot}SO_2C_6H_5$		−113.42			585(b)
$C_{13}FH_{11}S$	$pF{\cdot}C_6H_4{\cdot}CH_2{\cdot}SC_6H_5$		−115.43			585(b)

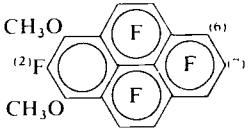
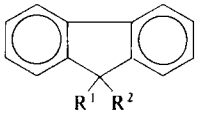
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{13}FH_{12}NOS$		−113.0		583
$C_{13}FH_{13}O$	As $C_{11}FH_6Br_3$ above with $F,C(CH_3)_2Br$			612
	$2\text{-}C(CH_3)_2Br$, F-6	−115.67	(6-C2) 2.34 (6-C4) 5.41 (6-C5) 20.13 (6-C6) 245.33 (6-C7) 25.48 (6-C8) 8.87 (6-C9) 9.0	
$C_{13}F_2H_{10}$	$(pF{\cdot}C_6H_4)_2CH_2$		(F-F) 0.808 (250°K) 0.879 (370°K)	613
$C_{14}FH_6N_3$	As $C_{11}FH_6Br_3$ above with $F,C(CN)_3$			601
	6-F, $2\text{-}C(CN)_3$		(6-C5) 20.6 (6-C6) 256.02 (6-C7) 24.0 (6-C8) ~10 (6-C10) ~10	
	7-F, $2\text{-}C(CN)_3$		(7-C1) 6.8 (7-C5) 10.3 (7-C6) 24.1 (7-C7) 248.82 (7-C8) 20.60 (7-C9) ~10	
	3-F, $1\text{-}C(CN)_3$		(3-C2) 20.52 (3-C3) 249.69 (3-C4) 19.42 (3-C5) 5.55 (3-C7) 1.85 (3-C10) 8.33	
	4-F, $1\text{-}C(CN)_3$		(4-C1) ~5 (4-C2) ~10 (4-C3) 20.63 (4-C4) 258.0 (4-C5) 6.9 (4-C9) ~6 (4-C10) ~18	
	6-F, $1\text{-}C(CN)_3$		(6-C4) 3.70 (6-C5) 20.34 (6-C6) 251.54 (6-C7) 25.9 (6-C8) 9.25 (6-C10) 9.25	

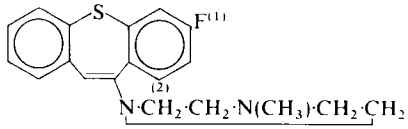
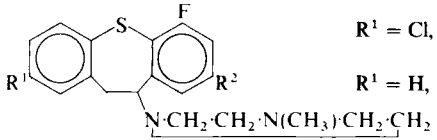
$C_{14}FH_6N_3$	As $C_{11}FH_6Br_3$ above with $F.C(CN)_3$					601
		1-F, 3-$C(CN)_3$	s.c.s. +7.64			
		1-F, 4-$C(CN)_3$	+9.25			
		1-F, 5-$C(CN)_3$	+5.14			
		1-F, 6-$C(CN)_3$	+2.33			
		1-F, 7-$C(CN)_3$	+2.55			
		2-F, 4-$C(CN)_3$	+2.43			
		2-F, 5-$C(CN)_3$	+4.04			
		2-F, 6-$C(CN)_3$	+6.17			
		2-F, 7-$C(CN)_3$	+5.23			
$C_{14}FH_8ClOS$		$R^1 = H$, $R^2 = Cl$	−104.8			583
		$R^1 = Cl$, $R^2 = H$	−107.4			
$C_{14}FH_9Cl_2S$		R = Cl	−105.2	(F-H*o*) 8.0	(F-H*p*) 1.5	583
$C_{14}FH_9OS$	As $C_{14}FH_8ClOS$ above with $R^1 = R^2 = H$ and F at C(2)			−106.0	(F-H*m*) 6.0	364
$C_{14}FH_9OS$	As $C_{14}FH_8ClOS$ above with $R^1 = F$, $R^2 = H$, and F replaced by H			−114.9		594
$C_{14}FH_9OS$	As $C_{14}FH_8ClOS$ above with $R^1 = H$, $R^2 = H$		−107.6			583
$C_{14}FH_9S$			−114.0			364
$C_{14}FH_{10}ClOS$			−106.7			583

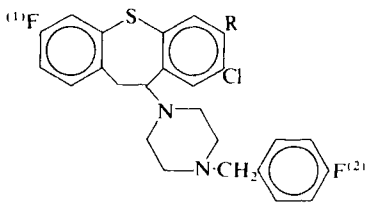
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{14}FH_{10}ClOS$		−108.6	(1-2) 8.5 (1-3) 6.5 (1-4) 1.0	583
$C_{14}FH_{10}ClO_2S$	As first $C_{14}FH_{10}ClOS$ above with $COCH_3$ replaced by CH_2CO_2H	−109.9		583
$C_{14}FH_{10}ClS$	As $C_{14}FH_9Cl_2S$ above with R = H	−105.2	(F-H*o*) 8.5 (F-H*m*) 6.5 (F-H*p*) 1.0	583
$C_{14}FH_{11}O$	$pF{\cdot}C_6H_4{\cdot}CH_2{\cdot}CO{\cdot}C_6H_5$	−116.48		585(b)
$C_{14}FH_{15}ClN$	 3-F		(3-C1) 10.1 (3-C2) 25.6 (3-C3) 247.8 (3-C4) 21.0 (3-C5) 9.2 (3-C6) 9.3	582
	4-F		(4-C1) 3.1 (4-C2) 9.3 (4-C3) 23.5 (4-C4) 248.5	
$C_{15}FH_{13}$	As $C_{11}FH_6Br_3$ above with 6-F, 2-C(cycloC_3H_5)=CH_2	−114.82		612
$C_{15}FH_{15}O$	As $C_{11}FH_6Br_3$ above with 6F, 2-C(OH)(CH_3)(cycloC_3H_5)	−115.68	(6-C2) 2.13 (6-C4) 5.8 (6-C5)	612
$C_{16}FH_{19}O_2$	 $R^1 = F$, $R^2 = Pr^iO$ $R^1 = Pr^iO$, $R^2 = F$	−134.8, −135.2		614
$C_{16}F_2H_{13}NS$		(1) −114.6 (2) −115.7		623

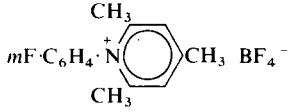
$C_{16}F_7H_3$		R = H	(2) −106.4 (5) −135.0 (8) −153.4	(4) −143.2 (10)(7) −140.1, −141.1 (9) −154.9	(1-2) 7.5 (5-6) 8.5	(4-5) 12.5 (7-8)(8-9)(9-10) 19	622
$C_{17}FH_{15}N_2O_7P^{3-}$			−118.0				432
$C_{17}FH_{19}N_2S_2$	As $C_{12}FH_9OS_2$ above with OH replaced by $\overline{N{\cdot}CH_2{\cdot}CH_2{\cdot}N(CH_3){\cdot}CH_2{\cdot}CH_2}$			−116.8			607
$C_{18}FH_{11}$		$R^1 = F, R^2 = H$ $R^1 = H, R^2 = F$	−132.13 −119.70				624(b)
$C_{18}FH_{11}$		$R^1 = F$ $R^2 = F$ $R^3 = F$ $R^4 = F$ $R^6 = F$	−99.92 −113.30 −116.08 −122.89 −126.43		(1-2) 13 (1-12) 14 (1-2) 12 (2-4) 6.5 (1-3) 5.8 (3-4) 11 (2-4) 6 (5-6) 10.8	(1-3) 5.8 (2-3) 12 (2-3) 12 (2-3) 11	625(b)
$C_{18}FH_{13}$		R^1 or $R^3 = F$ $R^2 = F$ $R^4 = F$	−119.01 −114.57 −115.30				625(b)

Molecular formula	Structure of compounds		Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{18}FH_{14}N$				(1-C1) 241.8 (1-C2) 22.7 (1-C3) 7.9 (1-C4) 2.8	626
$C_{18}FH_{14}N$	*ortho*-isomer of above			(1-C1) 250.0 (1-C2) 10.7 (1-C3) 1.8 (F-C4) 7.7 (1-C5) 3.8 (F-C6) 19.6	626
$C_{18}FH_{14}O_2P$	$pF{\cdot}C_6H_4{\cdot}OP(O)Ph_2$		−118.20		584(b)
$C_{18}FH_{14}P$	$F{\cdot}C_6H_4{\cdot}P(C_6H_5)_2$	*meta* *para*	−112.75 (−0.4) −112.75 (−0.4)		627(d)
$C_{18}FH_{15}NOP$	$pF{\cdot}C_6H_4{\cdot}NH{\cdot}P(O)Ph_2$		−123.24		584(b)
$C_{18}FH_{15}O$	As $C_{11}FH_6Br_3$ above with F-6, 2-(C(OH)(CH_3)(C_6H_5)		−115.27	(6-C2) 2.31 (6-C4) 6.0 (6-C5) 20.08 (6-C6) 245.9 (6-C7) 25.08 (6-C8) 9.65 (6-C10) 9.0	612
$C_{18}FH_{17}ClNOS_2$	As first $C_{14}FH_{10}ClOS$ above with $COCH_3$ replaced by $CH_2{\cdot}C(S){\cdot}N{\cdot}CH_2{\cdot}CH_2{\cdot}O{\cdot}CH_2{\cdot}CH_2$		−109.8		583
$C_{18}F_2H_{13}HgN_3$	$oF{\cdot}C_6H_4{\cdot}N_3{\cdot}C_6H_4{\cdot}Fo{\cdot}HgC_6H_5$			^4J(Hg-F) 46	610
$C_{18}F_2H_{15}N_3$			(1) −114.2 (2) −115.7		623
$C_{18}F_2H_{37}N_3Si_3$	$(CH_3^{(3)})_3Si{\cdot}N[CH(CH_3)_2]{\cdot}SiF^{(2)}(NH{\cdot}C_6H_4{\cdot}F^{(1)}p){\cdot}N[CH(CH_3)_2][Si(CH_3)_3]$		(1) −127.3 (2) −118.63	(2-3) 0.8 ^1J(Si-F) 236.1	381(b)

$C_{18}F_2H_{37}N_3Si_3$	$(CH_3^{(3)})_3Si{\cdot}N[CH(CH_3^{(5)})_2]{\cdot}SiF^{(2)}[NH{\cdot}CH(CH_3^{(6)})_2]{\cdot}N(C_6H_4{\cdot}F^{(1)}p)[Si(CH_3^{(4)})_3]$		(1) −120.25 (2) −118.98	(2-3)(2-4) 0.6, 1.0 (2-5)(2-6) 1.2, 1.2 ^1J(Si-F) 240.7 ^3J(Si-F) 3.1, 1.3	381(b)
$C_{18}F_3H_{12}OP$	$(F{\cdot}C_6H_4)_3PO$	*meta* *para*	−110.25 (−2.9) −106.35 (−6.8)		627(d)
$C_{18}F_3H_{12}P$	$(F{\cdot}C_6H_4)_3P$	*meta* *para*	−112.15 (−1.0) −112.15 (−1.0)		627(d)
$C_{18}F_8H_6O_2$			(2) −144.4 (7) −158.1	(6-7) 18.0	565
$C_{19}FH_{13}$		$R^1 = pF{\cdot}C_6H_4$, $R^2 = H$	−116.8	(F-C1) 0 (F-C2) 7.8 (F-C3) 21.4 (F-C4) 246.1	383
		$R^1 = mF{\cdot}C_6H_4$, $R^2 = H$	−113.5	(F-C1) 6.8 (F-C2) 21.4 (F-C3) 247.4 (F-C4) 21.2 (F-C5) 8.2 (F-C6) 0	
$C_{19}FH_{13}O$	As above with	$R^1 = pF{\cdot}C_6H_4$, $R^2 = OH$	−117.0	(F-C1) 0 (F-C2) 8.0 (F-C3) 21.4 (F-C4) 245.9	383
		$R^1 = mF{\cdot}C_6H_4$, $R^2 = OH$	−113.8	(F-C1) 7.1 (F-C2) 23.6 (F-C3) 246.0 (F-C4) 20.9 (F-C5) 8.4 (F-C6) 2.6	
$C_{19}FH_{14}O_2Sb$	$pF{\cdot}C_6H_4{\cdot}CO_2Sb(C_6H_5)_2$		−106.20		590(d)
$C_{19}FH_{15}$	$(C_6H_5)_2CH{\cdot}C_6H_4{\cdot}F$	*para*	−116.6	(F-C1) 3.0 (F-C2) 7.6 (F-C3) 21.3 (F-C4) 246.0	383
		meta	−113.4	(F-C1) 6.7 (F-C2) 21.7 (F-C3) 247.0 (F-C4) 21.2 (F-C5) ~6.3 (F-C6) 2.3	

Molecular formula	Structure of compounds		Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{19}FH_{15}O$	$(C_6H_5)_2C(OH)(C_6H_4{\cdot}F)$	*para*	−115.6	(F-C1) 3.1 (F-C2) 7.9 (F-C3) 21.3 (F-C4) 248.6	383
		meta	−114.0	(F-C1) 6.5 (F-C2) 22.9 (F-C3) 246.4 (F-C4) 21.3 (F-C5) 7.9 (F-C6) 2.3	
$C_{19}FH_{15}O$	$C_6H_5CH(pHO{\cdot}C_6H_4)(pF{\cdot}C_6H_4)$		−116.7	(F-C1) 2.8 (F-C2) ~9 (F-C3) 20.9 (F-C4) 253.9	383
$C_{19}FH_{19}N_2S$			−113.4	(1-2) 6.0	364
$C_{19}FH_{20}ClN_2S$		$R^1 = Cl, R^2 = H$	−108.4	(F-H*o*) 8.5 (F-H*m*) 6.5 (F-H*p*) 1.0	583
		$R^1 = H, R^2 = Cl$	−105.6	(F-H*o*) 8.5	
$C_{19}FH_{21}N_2S$	As $C_{19}FH_{19}N_2S$ above with CH=C—N replaced by CH_2—CH—N		−116.6		364
$C_{19}F_2H_{14}$	$C_6H_5CH(C_6H_4{\cdot}Fp)_2$		−116.3	(F-C1) 3.2 (F-C2) 7.8 (F-C3) 21.3 (F-C4) 246.5	383
$C_{19}F_2H_{14}O$	$pHO{\cdot}C_6H_4{\cdot}CH(C_6H_4{\cdot}Fp)_2$		−116.4	(F-C1) 3.0 (F-C2) 7.8 (F-C3) 21.2 (F-C4) 246.3	383
$C_{19}F_2H_{14}O$	$C_6H_5C(OH)(C_6H_4{\cdot}Fp)_2$		−115.1	(F-C1) 3.4 (F-C2) 7.9 (F-C3) 21.3 (F-C4) 247.9	383
$C_{19}F_3H_{13}$	$(pF{\cdot}C_6H_4)_3CH$		−115.9	(F-C1) 3.0 (F-C2) 7.7 (F-C3) 21.3 (F-C4) 247.0	383
$C_{19}F_3H_{13}O$	$(pF{\cdot}C_6H_4)_3C{\cdot}OH$		−114.7	(F-C1) 3.2 (F-C2) 7.9 (F-C3) 21.4 (F-C4) 248.1	383

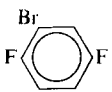
$C_{19}F_3H_{15}PI$	$(FC_6H_4)_3PCH_3^+ I^-$	*meta* *para*	−106.75 (−6.4) −99.65 (−13.5)				627(d)
$C_{19}F_7H_9O_3$	As $C_{18}F_8H_6O_2$ above with F(8) replaced by OCH_3		(2) −143.7 (4)(5)(9)(10) −146.5 to −148.0 (7) −150.8	(6) −139.1	(5-6) ~60	(6-7) ~20	565
$C_{19}F_7H_9O_3$	As $C_{16}F_7H_3$ above with R = OCH_3		(2) −147.6 (5) −152.6 (8) −157.3 (10) −134.8	(4) −137.6 (7) −134.8 (9) −157.3	(4-5) 12		622
$C_{20}FH_{22}ClN_2OS$	As $C_{19}FH_{20}ClN_2S$ above with R^1 = Cl, R^2 = H, and CH_3 replaced by CH_2CH_2OH		−108.3		(F-H*o*) 8.5 (F-H*p*) 1.0	(F-H*m*) 6.5	583
$C_{20}FH_{23}N_2OS$	As $C_{19}FH_{20}ClN_2S$ above with R^1 = CH_3, R^2 = H		−108.4		(F-H*o*) 8.5 (F-H*p*) 1.0	(F-H*m*) 6.5	583
$C_{20}F_6H_{12}O_4$	As $C_{16}F_7H_3$ above with R = OCH_3 and F(4) replaced by OCH_3		(2) −147.1 (7) −134.6	(5) −147.1 (8) −157.3	(7-8) + (7-9) 17.2		622
$C_{22}F_2H_{32}N_4P_2$	$Et_2N{\cdot}\overline{P{\cdot}NR{\cdot}P(NEt_2){\cdot}NR}$	R = 2-CH_3, 3-F-C_6H_3	−114.5				378(a)
$C_{25}FH_{19}O_2Pb$	$pF{\cdot}C_6H_4{\cdot}CO_2Pb(C_6H_5)_3$		−108.57				590(d)
$C_{25}FH_{19}O_2Sn$	As above with Pb replaced by Sn		−106.50				590(d)
$C_{25}F_3H_{22}ClN_2S$		R = $F^{(3)}$	(1) −116.4 (3) −118.6	(2) −116.6	(1-H*o*) 8.0 (3-H*o*) 8.5	(1-H*m*) 5.5 (3-H*m*) 6.5	631

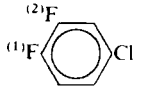
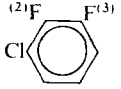
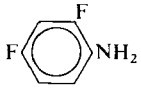
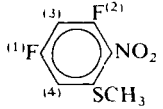
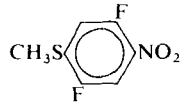
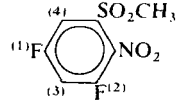
Molecular formula	Structure of compounds		Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{26}FH_{19}O_2$	$pF{\cdot}C_6H_4{\cdot}CO_2C(C_6H_5)_3$		−105.99		590(d)
$C_{26}F_2H_{25}ClN_2OS$	As $C_{25}F_3H_{22}ClN_2S$ above with R = H, and CH_2 replaced by CH_2CH_2O		(1) −116.6 (2) −124.6	(1-H*o*) 9.0 (1-H*m*) 5.5	631
$C_{26}F_2H_{25}ClN_2S_2$	As $C_{25}F_3H_{22}ClN_2S$ above with R = H, and CH_2 replaced by CH_2CH_2S		(1) −116.6 (2) −116.3	(1-H*o*) 9.0 (1-H*m*) 5.5	631
$C_{26}F_3H_{24}ClN_2S$	As $C_{25}F_3H_{22}ClN_2S$ above with R = F[3] and CH_2 replaced by CH_2CH_2		(1) −116.3 (2) −118.0 (3) −118.6	(1-H*o*) 8.0 (1-H*m*) 5.5 (3-H*o*) 8.5 (3-H*m*) 6.5	631
$C_{28}F_2H_{27}ClN_2OS$	As $C_{25}F_3H_{22}ClN_2S$ above with R = H and CH_2 replaced by $CH_2CH_2CH_2C(O)$		(1) −116.6 (2) −106.5	(1-H*o*) 9.0 (1-H*m*) 5.5	631
$C_{28}F_3H_{26}ClN_2OS$	As $C_{25}F_3H_{22}ClN_2S$ above with R = F and CH_2 replaced by $CH_2CH_2CH_2C(O)$		(1) −116.3 (2) −106.5 (3) −118.7	(1-H*o*) 8.0 (1-H*m*) 5.5 (3-H*o*) 8.5 (3-H*m*) 6.5	631
$C_{29}F_5H_{21}BN$			−111.0		582
$C_{29}F_5H_{21}BN$	*para*-isomer of above		−109.8	(F-C1) 2.8 (F-C2) 8.8 (F-C3) 23.4 (F-C4) 248.9	582
$C_{31}FH_{24}O_2Sb$	$pF{\cdot}C_6H_4{\cdot}CO_2Sb(C_6H_5)_4$		−111.27		590(d)
$C_{36}F_2H_{28}Cl_2P_2Pd$	$[F{\cdot}C_6H_4{\cdot}P(C_6H_5)_2]_2PdCl_2$	*meta* *para*	−111.95 (−1.2) −109.15 (−4.0)		627(d)
$C_{36}F_2H_{28}Cl_2P_2Pt$	As above with Pd replaced by Pt	*meta* *para*	−111.55 (−1.6) −108.55 (−4.6)		627(d)
$C_{36}F_2H_{28}O_2P_2Pt$	$[F{\cdot}C_6H_4{\cdot}P(C_6H_5)_2]_2PtO_2$	*meta* *para*	−111.15 (−2.0) −107.05 (−6.1)		627(d)
$C_{36}F_6H_{24}Br_2P_2Pd$	$[(F{\cdot}C_6H_4)_3P]_2PdBr_2$	*meta* *para*	−111.02 (−2.13) −108.31 (−4.84)		627(d)
$C_{36}F_6H_{24}Br_2P_2Pt$	As above with Pd replaced by Pt	*meta* *para*	−110.55 (−2.6) −107.15 (−6.0)		627(d)

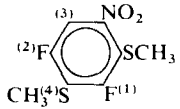
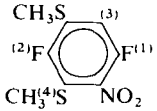
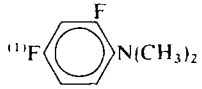
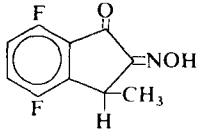
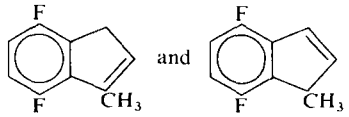
$C_{36}F_6H_{24}Cl_2P_2Pd$	$[(F{\cdot}C_6H_4)_3P]_2PdCl_2$	*meta*	−111.04 (−2.11)	627(d)
		para	−107.74 (−5.41)	
$C_{36}F_6H_{24}Cl_2P_2Pt$	As above with Pd replaced by Pt	*meta*	−110.85 (−2.3)	627(d)
		para	−107.25 (−5.9)	
$C_{36}F_6H_{24}I_2P_2Pd$	$[(F{\cdot}C_6H_4)_3P]_2PdI_2$	*meta*	−111.15 (−2.00)	627(d)
		para	−108.60 (−4.55)	
$C_{36}F_6H_{24}I_2P_2Pt$	As above with Pd replaced by Pt	*meta*	−111.55 (−1.6)	627(d)
		para	−108.35 (−4.8)	
$C_{36}F_6H_{24}O_2P_2Pt$	$[(F{\cdot}C_6H_4)_3P]_2PtO_2$	*meta*	−110.55 (−2.6)	627(d)
		para	−104.85 (−8.3)	
$C_{36}F_6H_{25}ClP_2Pt$	$[(F{\cdot}C_6H_4)_3P]_2PtHCl$	*meta*	−110.95 (−2.2)	627(d)
		para	−108.15 (−5.0)	
$C_{37}F_6H_{24}BrIrO_3P_2$	$[(F{\cdot}C_6H_4)_3P]_2Ir(CO)BrO_2$	*meta*	−110.76 (−2.39)	627(d)
		para	−107.42 (−5.73)	
$C_{37}F_6H_{24}ClIrOP_2$	$[(F{\cdot}C_6H_4)_3P]_2Ir(CO)Cl$	*meta*	−111.20 (−1.95)	627(d)
		para	−109.00 (−4.15)	
$C_{37}F_6H_{24}ClIrO_3P_2$	$[(F{\cdot}C_6H_4)_3P]_2Ir(CO)ClO_2$	*meta*	−110.77 (−2.38)	627(d)
		para	−107.53 (−5.62)	
$C_{37}F_6H_{24}Cl_3IrOP_2$	$[(F{\cdot}C_6H_4)_3P]_2Ir(CO)Cl_3$	*meta*	−110.31 (−2.84)	627(d)
		para	−107.30 (−5.85)	
$C_{37}F_6H_{24}IIrO_3P_2$	$[(F{\cdot}C_6H_4)_3P]_2Ir(CO)IO_2$	*meta*	−110.40 (−2.75)	627(d)
		para	−107.40 (−5.75)	
$C_{37}F_6H_{24}P_2PtS_2$	$[(F{\cdot}C_6H_4)_3P]_2PtCS_2$	*meta*	−110.95 (−2.2)	627(d)
		para	−108.75 (−4.4)	
$C_{37}F_6H_{25}Cl_2IrOP_2$	$[(F{\cdot}C_6H_4)_3P]_2Ir(CO)HCl_2$	*meta*	−110.54 (−2.61)	627(d)
		para	−107.35 (−5.80)	
$C_{38}F_6H_{24}N_2NiP_2S_2$	$[(F{\cdot}C_6H_4)_3P]_2Ni(NCS)_2$	*meta*	−110.75 (−2.4)	627(d)
		para	−108.75 (−4.4)	
$C_{38}F_6H_{24}N_2P_2PdS_2$	As above with Ni replaced by Pd	*meta*	−109.75 (−3.4)	627(d)
		para	−106.15 (−7.0)	
$C_{38}F_6H_{24}N_2P_2PtS_2$	As above with Ni replaced by Pt	*meta*	−109.75 (−3.4)	627(d)
		para	−106.35 (−6.8)	
$C_{38}F_6H_{27}ClIrOP_2$	$[(F{\cdot}C_6H_4)_3P]_2Ir(CO)ClCH_3I$	*meta*	−110.42 (−2.73)	627(d)
		para	−107.99 (−5.16)	

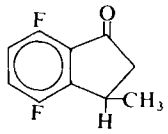
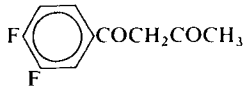
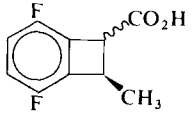
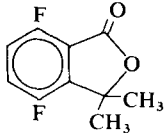
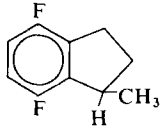
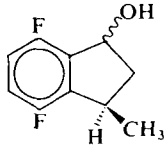
Molecular formula	Structure of compounds		Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{38}F_8H_{24}Cl_4P_2Pt$	$[(F{\cdot}C_6H_4)_3P]_2PtFCl(CF_2ClCCl_2)$	*meta*	−110.35 (−2.8)		627(d)
		para	−106.85 (−6.3)		
$C_{50}F_6H_{34}P_2Pt$	$[(F{\cdot}C_6H_4)_3P]_2Pt(PhC{\equiv}CPh)$	*meta*	−112.15 (−1.0)		627(d)
		para	−111.25 (−1.9)		
$C_{54}F_9H_{36}BrP_3Rh$	$[(F{\cdot}C_6H_4)_3P]_3RhBr$	*meta*	−110.25 (−2.9)		627(d)
		para	−110.75 (−2.4)		
$C_{54}F_9H_{36}ClP_3Rh$	As above with Br replaced by Cl	*para*	−111.05 (−2.1)		627(d)
$C_{54}F_9H_{36}Cl_3IrP_3$	$[(F{\cdot}C_6H_4)_3P]_3IrCl_3$	*meta*	−111.80 (−1.35)		627(d)
		para	−109.90 (−3.25), −109.73 (−3.42) (ratio 2:1)		
$C_{54}F_9H_{36}Cl_3P_3Rh$	As above with Ir replaced by Rh	*meta*	−111.75 (−1.4)		627(d)
		para	−109.35 (−3.80)		
$C_{54}F_9H_{36}IP_3Rh$	$[(F{\cdot}C_6H_4)_3P]_3RhI$	*meta*	−110.65 (−2.5)		627(d)
		para	−108.85 (−4.3)		
$C_{55}F_9H_{36}ClOP_3Rh$	$[(F{\cdot}C_6H_4)_3P]_3Rh(CO)Cl$	*meta*	−111.16 (−1.99)		627(d)
		para	−109.30 (−3.85)		
$C_{55}F_9H_{37}IrOP_3$	$[(F{\cdot}C_6H_4)_3P]_3Ir(CO)H$	*meta*	−112.44 (−0.71)		627(d)
		para	−112.92 (−0.23)		

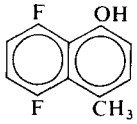
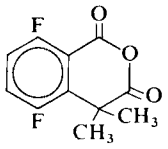
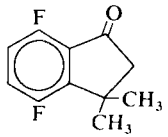
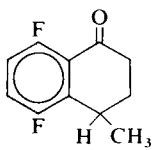
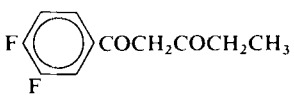
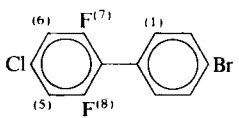
B. Fluorine nuclei in difluorobenzene derivatives

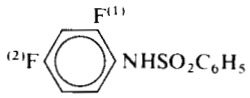
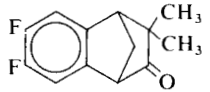
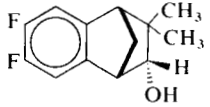
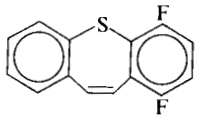
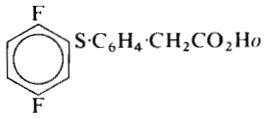
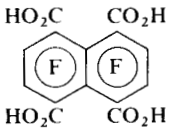
$C_6F_2H_3Br$		−114.14, −117.59	(F-F) 15.3	587
$C_6F_2H_3Cl$	As above with Br replaced by Cl	−117.53, −122.07	(F-F) 15.4	587

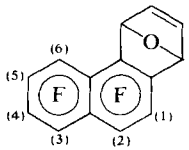
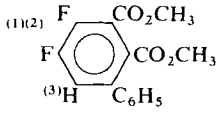
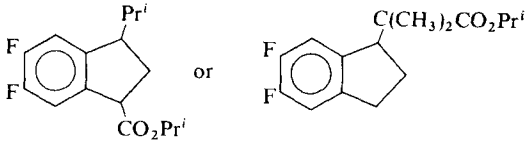
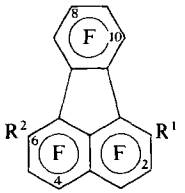
$C_6F_2H_3Cl$		(1) −135.08 (2) −140.41	(1-2) 20.6		536
$C_6F_2H_3Cl$		(2) −143.73 (3) −133.58			536
$C_6F_2H_3NO_2$	As $C_6F_2H_3Br$ above with Br replaced by NO_2	−110.46, −118.49	(F-F) 16.8		587
$C_6F_2H_4$	mF·C_6H_4·F	−117.9			291(b)
$C_6F_2H_4$	pF·C_6H_4·F		(F-F) 17.7		587
$C_6F_2H_5N$	As $C_6F_2H_3Br$ above with Br replaced by NH_2	−118.94, −141.68	(F-F) 15.8		587
$C_6F_2H_5N$			^5J(F-N) 1.5		586
$C_7F_2H_3N$	As $C_6F_2H_3Br$ above with Br replaced by CN	−112.83, −116.22	(F-F) 16.5		587
$C_7F_2H_4O_2$	As $C_6F_2H_3Br$ above with Br replaced by CO_2H	−114.22, −118.16	(F-F) 18.2		587
$C_7F_2H_5NO_2S$		(1) −102.3 (2) −115.1	(1-2) 11.5 (1-4) 9.8 (2-4) 1.8	(1-3) 9.1 (2-3) 9.8	591
$C_7F_2H_5NO_2S$		(1) −115.7 (2) −121.3	(1-H*o*) 9.1 (F-F) 15.5 (2-H*m*) 6.2	(1-H*m*) 6.2 (2-H*o*) 11.0	591
$C_7F_2H_5NO_4S$		(1) −87.24 (2) −103.54	(1-2) 10.47 (1-4) 7.3 (2-4) 1.7	(1-3) 7.3 (2-3) 8.8	591

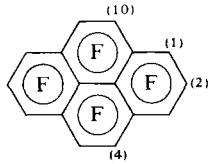
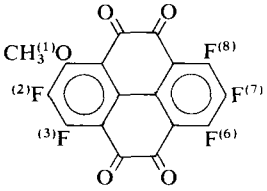
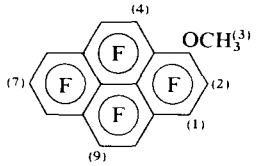
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_7F_2H_6$	As $C_6F_2H_3Br$ above with Br replaced by CH_3		(F-F) 17.9	587
$C_8F_2H_6O$	As $C_6F_2H_3Br$ above with Br replaced by $COCH_3$	−115.42, −118.04	(F-F) 18.9	587
$C_8F_2H_7NO_2S_2$		(1) −93.0 (2) −104.0	(1-2) 8.1 (1-3) 2.0 (2-3) 8.1 (2-4) 1.1 (1-4) 2.0	591
$C_8F_2H_7NO_2S_2$		(1) −126.8 (2) −114.9	(1-2) 14.0 (1-3) 9.5 (2-3) 5.9 (2-4) 1.0	591
$C_8F_2H_8$	As $C_6F_2H_3Br$ above with Br replaced by CH_2CH_3	−120.42, −126.06	(F-F) 17.6	587
$C_8F_2H_9N$			(1-N) 0.6	586
$C_{10}F_2H_7NO_2$		−119.7, −124.4	(F-F) 23.2	587
$C_{10}F_2H_8$		−126.08, −131.54	(F-F) 21.9	587

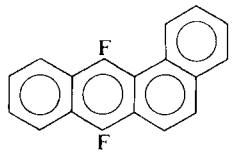
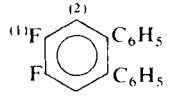
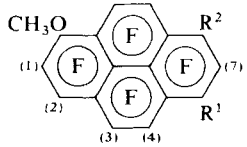
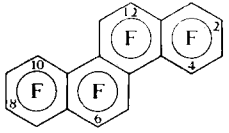
$C_{10}F_2H_8O$				(F-F) 23.9	587
$C_{10}F_2H_8O_2$			−105.9		346
$C_{10}F_2H_8O_2$		Isomer [a] Isomer [b]	−110.77, −112.71 −110.98, −112.63	(F-F) 28.7 (F-F) 28.7	587
$C_{10}F_2H_8O_2$				(F-F) 24.2	587
$C_{10}F_2H_{10}$			−124.96, −127.08	(F-F) 22.4	587
$C_{10}F_2H_{10}O$		Isomer [a] Isomer [b]		(F-F) 22.8 (F-F) 22.8	587

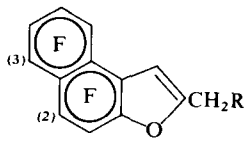
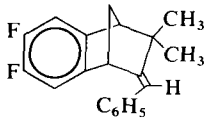
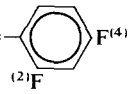
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{11}F_2H_8O$		−115.7, −126.0	(F-F) 21.5	587
$C_{11}F_2H_8O_3$			(F-F) 18.9	587
$C_{11}F_2H_{10}O$		−120.72, −124.22	(F-F) 24.1	587
$C_{11}F_2H_{10}O$		−117.05, −123.23	(F-F) 19.4	587
$C_{11}F_2H_{10}O_2$		−105.4		346
$C_{12}F_2H_6BrCl$			(1-7) 1.32 (5-7) −1.78 (6-7) 9.54 (7-8) 6.40	606

$C_{12}F_2H_9NO_2S$			(1-N) 1.3	(2-N) 1.8	586
$C_{13}F_2H_{12}O$		−140.1, −140.5			614
$C_{13}F_2H_{14}O$		−142.2, −142.4			614
$C_{14}F_2H_8S$		−115.2, −119.5			618
$C_{14}F_2H_{10}OS$	As above with CH=CH replaced by $CH_2CH(OH)$	−112.5, −118.4			618
$C_{14}F_2H_{10}O_2S$		−117.9, −118.4			618
$C_{14}F_2H_{16}O$	As $C_{13}F_2H_{12}O$ above with O replaced by CH_2	−142.3, −143.4			614
$C_{14}F_4H_4O_8$		−131.6			565

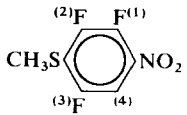
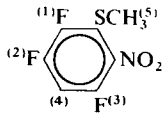
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{14}F_6H_4$		(1) −143.9 (2)(3)(6) −147.6 (4)(5) −158.6, −159.4		621
$C_{16}F_2H_{12}O_4$		(1) −135.5 (2) −141.4	(1-2) 21.0 (1-3) 11.0 (2-3) 8.0	287
$C_{16}F_2H_{20}O_2$		−141.1, −141.9		614
$C_{16}F_8H_2$	 $R^1 = R^2 = H$	(2) −132.1 (3) −139.1 (7) −139.5 (8) −152.8	(1-2) 7-8 (7-8) 20.3 (7-9) −3.1 (7-10) 13.9 (8-9) 16.3	622
$C_{16}F_9H$	As above with $R^1 = H$, $R^2 = F$	(2)(4)(7) −132.8 to −133.5 (3) −138.8 (5) −152.9 (6) −119.1 (8) −152.0 (9) −152.0 (10) −139.7	(1-2) 9 (1-3) 5.5	622

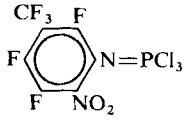
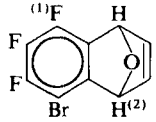
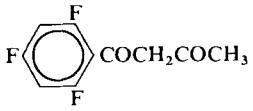
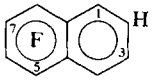
$C_{16}F_9H_3N_2$	As above with $R^1 = NHNH_2$, $R^2 = F$	(2) −143.8 (3)(10) −137.1 to −137.9 (4)(7) −134.8 to −136.6 (5) −156.3 (6) −122.1 (8) −162.1 (9) −157.8	(4-5)(5-6) 20.5 (6-7) 50 (7-8)(8-9)(9-10) 19	622
$C_{16}F_{10}$		(1) −137.1 (2) −155.8 (4) −146.7	(1-2) 21.2 (1-10) ~70	565
$C_{17}F_5H_3O_5$		(2) −149.6 (3) −126.2 (6) −124.3 (7) −155.2 (8) −124.4	(2-3) 19.5 (6-7) 20.3 (7-8) 20.7 (1-2) 2.9	565
$C_{17}F_9H_3O$		(1)(6)(8) −138.5 to −139.5 (2) −150.8 (7) −157.2 (4)(5)(9)(10) −147.0 to −148.5	(6-7)(7-8) 19.2(1-2) 19.0 (2-3)(3-4) ~0.2	565
$C_{17}F_9H_3O$	As $C_{16}F_8H_2$ above with $R^1 = OCH_3$, $R^2 = F$	(2) −151.1 (5) −154.7 (3)(4)(7) −135.5 to −137.5 (6) −120.9 (8) −158.6 (9) −155.9 (10) −133.7	(6-7) 50 (4-5)(5-6)(8-9) 19 (7-10) 15 (9-10) 17 (2-1) 3.0	622

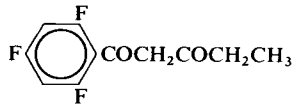
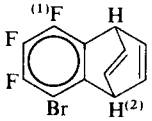
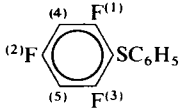
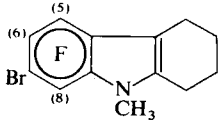
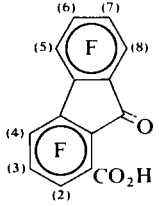
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{18}F_2H_{10}$		−124.23, −135.93	(F-F) 23.5	624(b)
$C_{18}F_2H_{12}$		−139.3	(1-2) 9.3	287
$C_{18}F_8H_6O_2$	 $R^1 = OCH_3$, $R^2 = F$ + $R^1 = F$, $R^2 = OCH_3$	(1)(3)(6) −139.1 to −140.1 (2)(7) −151.7 (4)(5)(9)(10) −146.9 to −149.7	(5-6) ~60 (6-7) ~18 (7-8) 1.4 and 1.8	565
$C_{18}F_8H_6O_2$	As $C_{16}F_8H_2$ above with $R^1 = R^2 = OCH_3$	(2) −153.4 (3) −138.4 (7)(8) −134.8, −157.3	(2-3)(2-4) 5.3 (2-H) 2.8 (7-8)(7-9) 17.3	622
$C_{18}F_{12}$		(1) −145.9 (2) −152.9 (3) −154.8 (4) −130.0 (5) −133.3 (6) −144.8	(1-6) 63.0 (4-5) 153.0	567
$C_{19}F_2H_{20}N_2S$	As $C_{14}F_2H_{10}OS$ above with OH replaced by $-N{\cdot}CH_2{\cdot}CH_2{\cdot}N(CH_3){\cdot}CH_2{\cdot}CH_2$	−107.5, −108.3		618

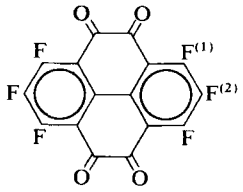
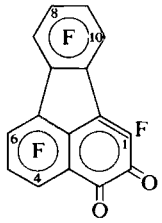
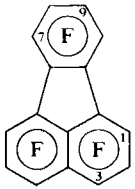
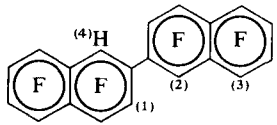
$C_{19}F_6H_8O$		$R = C_6H_5$	−146 to −147.4, −151.9, −158.8 to −159.7 (ratio 2:1:3)	(2-3) 60		459
$C_{20}F_2H_{18}$			−142.0, −142.9			614
$C_{20}F_4H_{26}N_4P_2$	$Et_2N{\cdot}\overline{P{\cdot}NR{\cdot}P(NEt_2){\cdot}NR}$ R= 		(2) −116.9 (4) −118.4	(P-2) 70		378(a)
$C_{21}F_6H_{12}O$	As $C_{19}F_6H_8O$ above with $R = 2,5\text{-}(CH_3)_2C_6H_3$		−145.5 to −146.5, −151.4 −158.0 to −158.9 (ratio 2:1:3)	(2-3) 61		459

C. Fluorine nuclei in trifluorobenzene derivatives

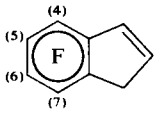
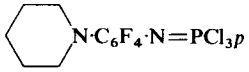
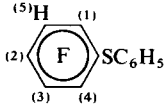
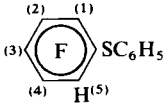
$C_6F_3H_3$	$1,3,5\text{-}C_6F_3H_3$		−106.6			291(b)
$C_7F_3H_4NO_2S$			(1) −146.1 (2) −125.9 (3) −109.9	(1-2) 21.1 (1-4) 5.7 (2-4) 2.4	(1-3) 13.3 (2-3) 1.0 (3-4) 9.0	591
$C_7F_3H_4NO_2S$			(1) −132.5 (2) −127.1 (3) −123.8	(1-2) 22.0 (1-4) 6.4 (2-4) 9.1 (1-5) 1.1	(1-3) 13.2 (2-3) 4.8 (3-4) 8.5	591

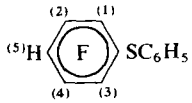
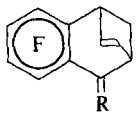
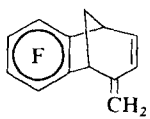
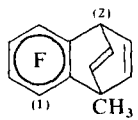
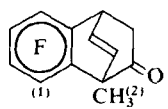
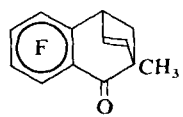
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_7F_6Cl_3N_2O_2P$		−122.2, −141.3, −149.3		589(b)
$C_{10}F_3H_4BrO$			(1-2) 2.5	602
$C_{10}F_3H_7O_2$		−106.0		346
$C_{10}F_7H$		(1) −116.0 (3) −134.0 (4)(5) −146.0, −150.1 (6)(7) −153.0, −156.7 (8) −144.0	(1-8) 65 (3-4)(5-6)(7-8) 17 (6-7) 19 (4-5) 58 (1-2)(2-3) 10.8(2-4) 6	604
$C_{10}F_7Br$	As above with H replaced by Br	(1) −111.6 (3) −129.7 (4) −147.0 (5) −147.0 (6) −154.6 (7) −155.6 (8) −145.0	(1-8) 65 (6-7) 17	604
$C_{10}F_7Cl_2N$	As above with H replaced by NCl_2	−145.9, −145.4, −136.1, −131.4, −130.8, −111.9, −109.9		541(b)

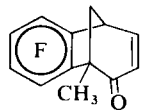
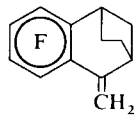
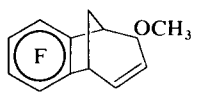
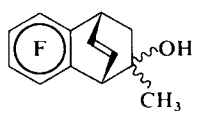
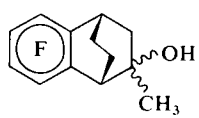
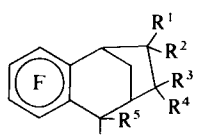
$C_{11}F_3H_9O_2$		−105.7			346
$C_{11}F_7HO_2$	As $C_{10}F_7H$ above with H replaced by CO_2H	(1) −117.4 (3) −138.3 (4)(5) −146.7, −149.5 (6)(7) −152.7, −156.2 (8) −144.1	(1-8) 72.2 (4-5) 58.7	(3-4)(5-6)(7-8) 17 (6-7) 19.2	604
$C_{12}F_3H_6Br$			(1-2) 1.9		602
$C_{12}F_3H_8S$		(1) −100.31 (2) −105.01	(1-2) 8.3 (1-3) 1.9 (1-5) 1.9	(2-4) 8.3 (1-4) 6.2	608
$C_{13}F_3H_{11}BrN$		(5) −155.7 (6) −147.1 (8) −136.4	(5-6) 20.6 (6-8) 5.3	(5-8) 15.2 (8-9) 2.8	357(b)
$C_{14}F_7HO_3$		(2) −135.3 (3) −147.1 (4) −128.4 (5) −133.9 (6) −143.5 (7) −151.6 (8) −138.8	(2-3) 19.8 (3-4) 19.8 (5-6) 20.6 (5-8) 15.0 (6-8) 9.6	(2-4) 8.6 (4-5) 68 (5-7) ~2.0 (6-7) 18.3 (7-8) 21.4	622

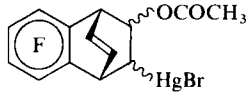
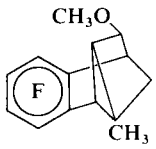
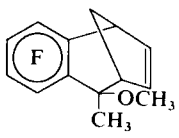
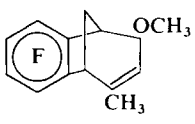
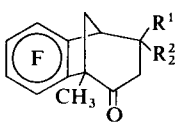
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{16}F_6O_4$		(1) −124.2 (2) −154.6	(1-2) 20.5	565
$C_{16}F_8O_2$		(1) −107.0 (4) −133.6 (5) −156.3 (6) −121.1 (7) −134.8 (8) −148.0 (9) −153.2 (10) −130.4	(1-5)(1-8) 7 (1-10) 53 (4-5) 19.6 (4-6) 15.0 (5-6) 19.9 (6-7) 54 (7-8) 21.2 (7-9) 6.5 (7-10) 14.4 (8-9) 19.5 (8-10) 7.0 (9-10) 20.5	622
$C_{16}F_{10}$		(1) −119.2 (2) −156.7 (3) −135.0 (7) −135.4 (8) −153.8	(1-10) 38 (1-2) 17 (1-3) 9.5 (2-3)+(2-4) 5.5 (7-8)+(7-9)16	622
$C_{20}F_{13}H$		(2) −118.3	(1-4) 5.4 (2-3) 67	621
$C_{20}F_{13}H$	As above with H and $C_{10}F_7$ group interchanged	(2) −119.6	(1-4) 11.1 (2-3) 71	621

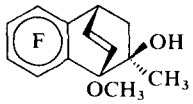
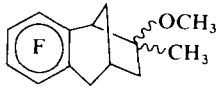
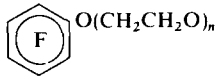
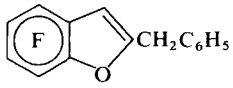
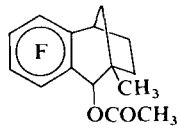
D. Fluorine nuclei in tetrafluorobenzene derivatives

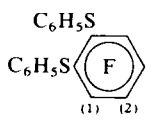
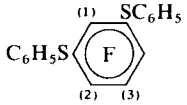
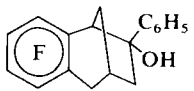
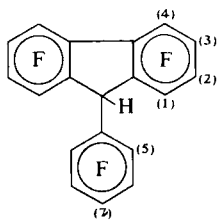
$C_6F_4Cl_2N_2O_2$	$pNO_2{\cdot}C_6F_4{\cdot}NCl_2$		−145.5, −136.0			541, 542(b)
$C_6F_4Cl_3N_2O_2P$	$NO_2{\cdot}C_6F_4{\cdot}N{=}PCl_3$	*ortho* *para*	−143.3, −146.7, −149.1, −159.7 −148.4, −148.7			589(b)
$C_7F_4H_3Cl_2N$	$pCH_3{\cdot}C_6F_4{\cdot}NCl_2$		−143.5, −138.4			541, 542(b)
$C_7F_4H_3Cl_3NOP$	$pCH_3O{\cdot}C_6F_4{\cdot}N{=}PCl_3$		−151.9, −159.9			589(b)
$C_7F_4H_3Cl_3NP$	$pCH_3{\cdot}C_6F_4{\cdot}N{=}PCl_3$		−145.5, −151.6			589(b)
$C_7F_4Cl_2N_2$	$pNC{\cdot}C_6F_4{\cdot}NCl_2$		−139.8, −131.3			541(b)
$C_7F_4Cl_3N_2P$	$pNC{\cdot}C_6F_4{\cdot}N{=}PCl_3$		−135.0, −147.3			589(b)
$C_8F_4H_6Cl_3N_2P$	$p(CH_3)_2N{\cdot}C_6F_4{\cdot}N{=}PCl_3$		−151.9			589(b)
$C_9F_4H_4$			(4) −148.15 (5) −161.67 (6) −159.23 (7) −144.36			554
$C_{10}F_4H_9Cl_2N$	$pC_4H_9{\cdot}C_6F_4{\cdot}NCl_2$		−143.2, −138.5			541(b)
$C_{11}F_4H_{10}Cl_3NP$			−151.9			589(b)
$C_{12}F_4H_6S$			(1) −107.65 (2) −130.00 (3) −163.37 (4) −123.96	(1-2) 3.4 (1-5) 8.1 (2-4) 7.7 (3-4) 23.1 (4-5) 2.4	(1-3) 11.4 (2-3) 21.5 (2-5) 10.2 (3-5) 6.1	608
$C_{12}F_4H_6S$			(1) −134.96 (2) −155.12 (3) −157.38 (4) −139.11	(1-2) 21.3 (1-4) 11.8 (2-3) 19.5 (2-5) 2.5 (3-5) 8.0	(1-3) 3.2 (1-5) 6.3 (2-4) 2.5 (3-4) 20.9 (4-5) 10.3	608

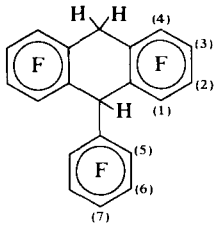
Molecular formula	Structure of compounds		Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{12}F_4H_6S$			(1) −133.06 (2) −138.11	(1-2) 21.4 (1-3) 1.8 (1-4) 10.5 (1-5) 7.3 (2-5) 9.6	608
$C_{13}F_4H_8$		$R = CH_2$	−160.8, −158.6, −149.6, −137.7		615(b)
$C_{13}F_4H_8$			−159.0, −158.3, −146.6, −143.1		615(b)
$C_{13}F_4H_8$				(1-2) 1.8	602
$C_{13}F_4H_8O$			−159.0, −158.1, −148.9, −145.1	(1-2) 5	615(b)
$C_{13}F_4H_8O$			−158.3, −149.4, −147.5, −136.3		616(b)

$C_{13}F_4H_8O$			−157.2, −156.2, −145.5, −143.4	616(b)
$C_{13}F_4H_{10}$			−161.3, −158.6, −148.0, −139.1	368(b)
$C_{13}F_4H_{10}O$	As first $C_{13}F_4H_8$ above with R = CH_3, OH		−160.2, −159.4, −149.6, −141.8	615(b)
$C_{13}F_4H_{10}O$			−159.7, −158.7, −148.5, −142.7	615(b)
$C_{13}F_4H_{10}O$		*exo* OH *endo* OH	−160.4, −149.5 (ratio 2:2) −161.5, −150.3 (ratio 2:2)	616(b)
$C_{13}F_4H_{12}O$		*exo* OH *endo* OH	−161.0, −160.1, −150.6, −149.4 −160.95, −150.5 (ratio 1:1)	368(b)
$C_{13}F_4H_{12}O$				
		$R^1 = CH_3$, R^2 = OH, R^3 to R^6 = H	−162.2, −161.5, −147.5, −145.3	
		R^1, R^2, R^5, R^6 = H R^3 = OH, $R^4 = CH_3$	−161.6, −160.4, −149.6, −144.5	
		R^1 to R^4 = H, $R^5 = CH_3$, R^6 = OH	−160.8, −158.8, −147.7, −143.0	

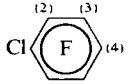
Molecular formula	Structure of compounds		Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{13}F_9H_2Br$	$oC_6F_5{\cdot}C_6F_4{\cdot}CH_2Br$			^4J(F-H) 2.0	617
$C_{14}F_4H_9BrHgO_2$		Both *exo* Both *endo*	−159.7, −158.8, −148.4, −146.8 −159.4, −158.3, −149.1, −148.2		619(b)
$C_{14}F_4H_{12}O$			−161.7, −150.7		615(b)
$C_{14}F_4H_{12}O$			−163.0, −162.79, −152.2 (ratio 1:1:2)		615(b)
$C_{14}F_4H_{12}O$			−160.8, −159.5, −150.5, −137.9		615(b)
$C_{14}F_4H_{12}O$			−159.0, −157.9, −147.1, −143.4		615(b)
$C_{14}F_4H_{12}O_2$		$R^1 = OCH_3$, $R^2 = H$ $R^1 = H$, $R^2 = OCH_3$	−156.1, −145.1 −156.7, −155.8, −146.4, −142.7		615(b)

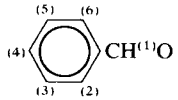
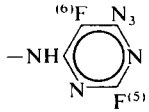
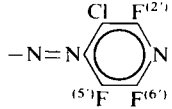
$C_{14}F_4H_{12}O_2$			−160.6, −159.2, −149.8 (ratio 1:1:2)		616(b)
$C_{14}F_4H_{12}O_2$	As above with OH and CH_3 interchanged		−161.3, −160.1, −150.8 (ratio 1:1:2)		616(b)
$C_{14}F_4H_{14}O$			−161.1, −147.8, −145.0 (ratio 2:1:1)		368(b)
$C_{14}F_4H_{16}O_5$		$n = 4$	−158.4, −165.3		620
$C_{14}F_9H_3O_2$	As $C_{13}F_9H_2Br$ above with Br replaced by CO_2H			(1-2) 1.8	617
$C_{15}F_4H_8O$			−148.5, −162.4, −163.4, −165.4		459
$C_{15}F_4H_{14}O_2$			−160.8, −158.1, −149.1, −147.3		368(b)
$C_{16}F_4H_{20}O_6$	As $C_{14}F_4H_{16}O_5$ above with $n = 5$		−158.4, −165.2		620
$C_{16}F_9H_7O_2$	As $C_{13}F_9H_2Br$ above with Br replaced by CO_2Et			(1-2) 2.0	617
$C_{17}F_4H_{12}O$	As $C_{15}F_4H_8O$ above with C_6H_5 replaced by $C_6H_3(CH_3)_2$-2,5		−148.3, −162.0, −163.2, −165.1		459

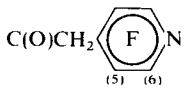
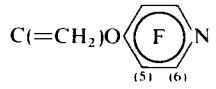
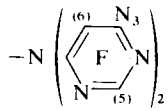
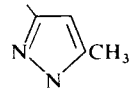
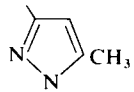
Molecular formula	Structure of compounds		Chemical shifts (ppm)	Coupling constants (Hz)		Ref.
$C_{18}F_4H_{10}S_2$			(1)(2) −152.98, −125.97	(1-2) 23.3 (1-2′) 4.8	(1-1′) 11.8 (2-2′) 19.6	608
$C_{18}F_4H_{10}S_2$			(1) −100.04 (2) −122.42 (3) −161.20	(1-2) 1.6 (2-3) 23.4	(1-3) 11.3	608
$C_{18}F_4H_{14}O$			−161.7, −160.8, −147.3, −145.5			368(b)
$C_{18}F_{12}H_6N_3P$		R = NH_2	(2) −135.2 (3) −162.5	(2-3) 20.1 (2-6) 3.43	(3-6) 6.85 (P-2) 37.8	628
$C_{18}F_{12}H_9N_6P$	As above with R = $NHNH_2$		(2) −134.1 (3) −155.6	(2-3) 19.6 (3-6) 6.5 (P-2) 37.2	(3-5) 3.2 (2-6) 3.4	628
$C_{19}F_{13}H$			(1) −143.2 (2) −153.8 (3) −153.8 (4) −134.6 (5) −142.0 (6) −161.4 (7) −153.8			630(b)

$C_{20}F_{13}H_3$		(1) −143.1 (2)(3) −158.6, −157.2 (4) −142.3 (5) −142.3 (6) −162.0 (7) −154.6	(1-2)(3-4) 19, 20 (2-3) 20.5 (6-7) 21.5	630(b)
$C_{21}F_{12}H_9O_3P$	As $C_{18}F_{12}H_6N_3P$ above with R = OCH_3	(2) −133.3 (3) −157.9	(2-3) 16.7 (3-6) 6.7 (2-6) 3.45 (P-2) 35.8 (3-H) 1.72	628
$C_{24}F_{12}H_{18}N_3P$	As $C_{18}F_{12}N_6N_3P$ above with R = $N(CH_3)_2$	(2) −134.8 (3) −152.7	(2-3) 19.0 (3-6) 6.8 (2-6) 3.2 (P-2) 36.0 (3-H) 2.4	628
$C_{24}F_{12}H_{21}N_6P$	As $C_{18}F_{12}H_6N_3P$ above with R = $NHN(CH_3)_3$	(2) −134.3 (3) −156.9	(2-3) 21.0 (3-5) 3.2 (3-6) 7.0 (2-6) 3.5 (P-2) 36.6	628
$C_{24}F_{16}S_8$		−131.2 (55°)		632
$C_{30}F_{12}H_{30}N_3P$	As $C_{18}F_{12}H_6N_3P$ above with R = $N(CH_2CH_3)_2$	(2) −134.7 (3) −150.8	(2-3) 20.0 (3-5) 0.6 to 2.5 (3-6) 6.0 (2-6) 3.2 (P-2) 36.3	628

E. Fluorine nuclei in pentafluorobenzene derivatives

C_6F_5Cl		(2) −139.6 (3) −161.82 (4) −156.3		291(b)
C_6F_9Br	As above with Cl replaced by BrF_4	(2) −132.70 (3)(4) −154.98, −160.96		735

Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
C_7F_5HO		(2) −145.16 (3) −161.96 (4) −145.83	(1-2) −1.066 (1-3) 1.369 (1-4) −0.243 (2-3) −21.033 (2-4) 6.271 (2-5) 9.279 (2-6) −4.568 (3-4) −20.019 (3-5) −1.200	593(b)
$C_8F_5H_5O$	As C_6F_5Cl above with Cl replaced by $CH(CH_3)OH$	(2) −143.5 (2) −163.6 (4) −157.9	(3-4) 21.5	603(b)
$C_9F_5H_{10}NSn$	As C_6F_5Cl above with Cl replaced by $NHSn(CH_3)_3$	(2) −165 (3) −166 (4) −181		597
$C_{10}F_5H_5O_2$	As C_6F_5Cl above with Cl replaced by $COCH_2COCH_3$	(2) −140.5 (3) −161.8 (4) −151.5		603(b)
$C_{10}F_7HN_6$	As C_6F_5Cl above with Cl replaced by 	(2)(3)(4) −144.6, −155.0, −162.0 (5) −47.7 (6) −168.7	(5-6) 28 (3-4) 21	605(a)
$C_{11}F_8ClN_3$	As C_6F_5Cl above with Cl replaced by 	(2)(4) −149.0 (3) −163.0 (2′) −76.0 (5′) −157.0 (6′) −90.0	(2′-6′) 13.5 (2′-5′) 28	605(a)
$C_{12}F_5H_{18}BClNSi_2$	As C_6H_5Cl above with Cl replaced by $BCl{\cdot}N(SiMe_3)_2$	(2) −133.52 (3) −162.15 (4) −153.52		611(b)
$C_{12}F_5H_{18}NSn_2$	As C_6H_5Cl above with Cl replaced by $N(SnMe_3)_2$	(2) −152 (3) −166 (4) −173		597
$C_{12}F_{10}N_4S_3$	$(C_6F_5N{=}S{=}N)_2S$	(2) −145 (3) −162 (4) −158		597

$C_{13}F_5H_{14}NO$	As C_6F_5Cl above with Cl replaced by $CH(CH_3)\cdot CO\cdot NEt_2$	(2) −139.9 (4) −155.7	(3) −161.6			357(b)
$C_{13}F_5H_{18}BClNSi$	As C_6F_5Cl above with Cl replaced by $N(Bu^t)(SiMe_3)$	(2) −125.65 (4) −149.90	(3) −157.90			611(b)
$C_{13}F_9H_2O$	As C_6F_5Cl above with Cl replaced by 	(2) −140.7 (4) −147.7 (6) −90.9	(3) −160.2 (5) −144.5			603(b)
$C_{13}F_9H_2O$	As C_6F_5Cl above with Cl replaced by 	(2) −139.3 (4) −151.5 (6) −88.3	(3) −161.4 (5) −154.0			603(b)
$C_{14}F_9N_{11}$	As C_6F_5Cl above with Cl replaced by 	(2)(3)(4) −146.0, −151.9, −161.2 (5) −48.0	(6) −153.7	(5-6) 28	(3-4) 21	605(a)
$C_{16}F_5H_7N_4O_4$	As C_6F_5Cl above with Cl replaced by  $C_6H_3(NO_2)_2$-2,4	(2) −138.1 (4) −151.4	(3) −161.1			603(b)
$C_{16}F_5H_9N_2$	As C_6F_5Cl above with Cl replaced by  C_6H_5	(2) −139.1 (4) −153.5	(3) −162.2	(2-4) 3.0	(3-4) 21.0	603(b)

Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)		Ref.
$C_{17}F_{10}H_{12}B_2N_2O$	As C_6F_5Cl above with Cl replaced by $-\overline{B{\cdot}N(CH_3){\cdot}O{\cdot}B(C_6F_5){\cdot}N}Bu^t$	(2) −130.6 (3) −162.2 (4) −152.9 and (2′) −129.7 (3′) −161.6 (4′) −152.4			611(b)
$C_{18}F_{10}H_{18}B_2N_2Si_2$	As C_6F_5Cl above with Cl replaced by $-\overline{B{\cdot}N(SMe_3){\cdot}B(C_6F_5){\cdot}N}{\cdot}SiMe_3$	(2) −138.9 (3) −162.9 (4) −155.1			611(b)
$C_{18}F_{15}P$	As C_6F_5Cl above with Cl replaced by $P(C_6F_5)_2$	(2) −130.6 (3) −159.8	(2-3) 24.2 (3-6) 8.8 (P-2) 36.5	(3-5) 4.6 (3-4) 20.0	628
$C_{19}F_5H_9$	As $C_{19}FH_{13}$ above with $R^1 = C_6F_5$, $R^2 = H$	(2) −137.7 (3) −161.4 (4) −156.0			383
$C_{19}F_5H_{11}O$	As C_6F_5Cl above with Cl replaced by $C(OH)(C_6H_5)_2$	(2) −137.7 (3) −162.4 (4) −154.5			383
$C_{19}F_5H_{20}BClNSi$	As C_6H_5Cl above with Cl replaced by $BCl{\cdot}N(Bu^t)$ $[2,4,6\text{-}(CH_3)_3C_6H_2]$	(2) −132.08 (3) −162.69, −161.73 (2:3) (4) −154.53, −153.60 (2:3)			611(b)
$C_{19}F_{10}H_{21}N_3SSn_2$	$[C_6F_5{\cdot}N(SnMe_3)]_2S{=}NR$ R=CH_3	(2) −150.05 (3) −165.37 (4) −167.10	(2-3) 22.5 (3-4) 20	(2-4) 5	629
$C_{19}F_{15}H$	As C_6F_5Cl above with Cl replaced by $CH(C_6F_5)_2$	(2) −140.5 (3) −162.1 (4) −154.1			630(b)
$C_{21}F_{10}H_{27}N_3SSn_3$	As $C_{19}F_{10}H_{21}N_3SSn_2$ above with R = $Sn(CH_3)_3$	(2) −149.2 (3) −165.1 (4) −167.4	(2-3) 21 (3-4) 21.5	(2-4) 5	629
$C_{24}F_{15}H_{18}N_3SSn_2$	As $C_{19}F_{10}H_{21}N_3SSn_2$ above with R = C_6F_5	(2) −147.5 (3) −163.4 (4) −161.5	(2-3) 21	(3-4) 21	629
$C_{26}F_{15}H_{11}Br_2P_2Pt$	$PtBr_2PMe_2PhP(C_6F_5)_3$	(2) −119.1, −130.0, −126.0 (3) −157.6, −158.0, −158.5 (4) −143.5, −145.1			633
$C_{27}F_5H_{28}BN_2$	$C_6F_5{\cdot}\overline{B{\cdot}NBu^t{\cdot}C(C_6H_5)_2{\cdot}N}Bu^t$	(2) −131.7 (3) −162.5 (4) −154.5			611(b)

$C_{36}F_{15}H_{15}Cl_2P_2Pt$	$(C_6F_5)_3PPtCl_2PPh_3$	(2) −120.4, −130.0, −127.4 (3) −157.5, −158.1, −158.7 (4) −143.4, −145.2		633
$C_{36}F_{30}Cl_2P_2Pt$	$[(C_6F_5)_3P]_2PtCl_2$	(2) Isomer [a] −119.8, −130.0, −128.4 Isomer [b] −120.9, −130.0, −127.2 (3) −156.6, −157.2, −158.3 (4) −141.6, −143.1		633
$C_{36}F_{30}I_2P_2Pt$	$[(C_6F_5)_3P]_2PtI_2$	(2) Isomer [a] −115.6, −130.3, −124.1 Isomer [b] −115.8, −130.3, −123.5 (3) −156.8, −157.8, −158.3 (4) −142.5, −143.6		633
$C_{37}F_{15}H_{18}ClP_2Pt$	$(C_6F_5)_3PPtClPh(PMePh_2)$	(2) −118.6, −121.2, −123.0, −125.4, −128.3, −133.1 (3) −156.0, −156.6, −156.9, −157.2, −158.1, −158.9 (4) −142.0, −144.2, −144.6		633
$C_{48}F_{10}H_{30}Cl_2P_2Pd_2S_2$	$[(C_6F_5S)PdCl(PPh_3)]_2$	(4) −162.5	(3-4) 20.9	634

F. Miscellaneous studies

The behaviour of C_6F_6 in the presence of di-t-butyl nitroxide[469] and with respect to oxygen at various pressures[635,636] has been monitored by F-19 NMR. Similar studies have been made of its self-diffusion and density as a function of pressure and temperature both alone[637] and as a binary liquid with n-paraffins.[638] A dynamic F-19 NMR investigation has been made of the torsional barriers in pentafluorobenzaldehyde, its conjugate acid, and protonated pentafluoroacetophenone.[639]

Various linear free energy relationships have been used to describe substituent effects upon chemical shifts in monosubstituted fluorobenzenes,[640] bridgehead-substituted fluorophenyl[2.2.1]octyltricarbonyl chromium(0) derivatives,[641] bridgehead metalloidal-substituted fluorobicyclo-[2.2.2]octyl derivatives,[642] aryl-*p*-fluorophenylmercury compounds,[643] $RXN(SO_2Ph)C_6H_4F$-*p* (R = substituted Ph; X = Hg, CH_2),[644] 4-substituted 2-fluorophenylpyrimidine,[645] $4\text{-}FC_6H_4XC_6H_4R$ (X = SHg, Hg),[646] $4\text{-}FC_6H_4X(C_6H_4R)_3$ (X = SSn, Sn),[646] and $4\text{-}FC_6H_4XC_6H_4R$ (X = Te, $TeCl_2$).[647]

Other studies have been made of the inclusion system *trans*-diiodo(1,2-dimethoxyethane)nickel(II)/1,2-diiodotetrafluorobenzene in dimethoxyethane,[648] the reaction of fluoroxysulphate ion with aromatic compounds,[649] $(C_6F_5X)CrC_6H_6$,[650] the structure and dimer–monomer transitions of trichlorophosphazopentafluorobenzene,[651] the reaction of polyfluorinated ketones with bis(triethylsilyl)- and bis(trimethylgermyl)-mercury,[652] carbon–fluorine coupling constants in *p*-fluorophenylcyclopentadienyl metal compounds,[653] and fluorine–fluorine coupling constants in substituted 1,4-difluorobenzenes[654] and aza-aromatic systems.[680]

VI. FLUORINE BONDED TO A CARBON OF A HETEROCYCLIC SYSTEM

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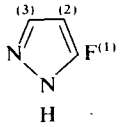
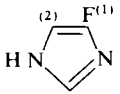
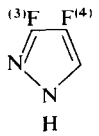
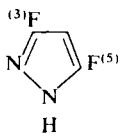
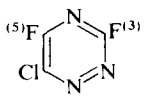
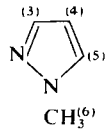
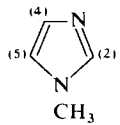
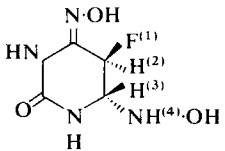
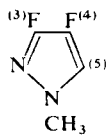
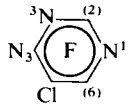
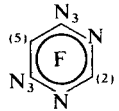
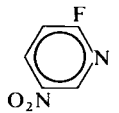
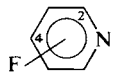
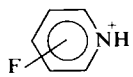
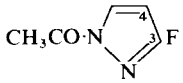
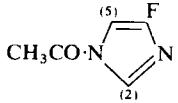
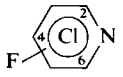
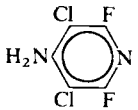
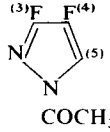
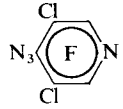
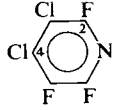
A. Nitrogen heterocycles

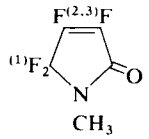
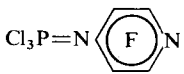
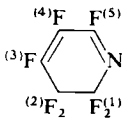
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_3FH_3N_2$		−133.5	(1-2) 6.0 (1-3) 2.7	656(a)
$C_3FH_3N_2$		−139.1	(1-2) 8.0	657
$C_3F_2H_2N_2$		(3) −65.0 (4) −111.0	(3-4) ~9	658
$C_3F_2H_2N_2$		(3) −44.5	(3-5) ~5.5	658
$C_3F_2ClN_3$		(3) −60.2 (5) −62.0	(3-5) <4	260(a)
$C_3F_3N_3$	As above with Cl replaced by $F^{(6)}$	(3) −62.6 (5) −73.9 (6) −103.4	(3-5) <3 (5-6) 24	260(a)

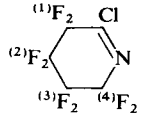
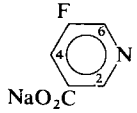
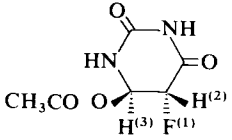
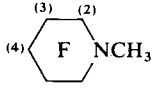
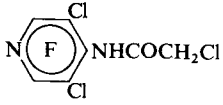
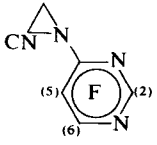
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_4FH_5N_2$		3-F −131.5 4-F −177.5 5-F −138.1	(3-4) 6.0 (3-5) 2.5 (3-6) 1.1 (3-4) 4.6 (4-5) 4.6 (4-5) 6.0 (3-5) 2.3 (5-6) 1.2	656(a)
$C_4FH_5N_2$		2-F −117.3 4-F −134.4 5-F −154.8	(2-4) ~1.2 (2-5) 1.6 (4-5) 8.0 (4-5) 8.0	657
$C_4FH_7N_4O_3$			(1-2) 49.0 (1-3) 21.0	660
C_4FClN_8		−43.9		605(a)
$C_4F_2H_4N_2$		(3) −63.6 (4) −109.1	(3-4) ~9	658
$C_4F_2H_4N_2$	As above with $F^{(3)}$ and $H^{(5)}$ interchanged	(4) −108.8 (5) −67.1	(4-5) ~0	658
$C_4F_2H_4N_2$	As above with $F^{(4)}$ and $H^{(5)}$ interchanged	(3) −43.4 (5) −48.1	(3-5) ~5.5	658

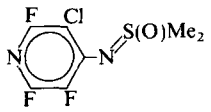
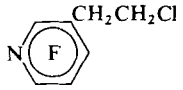
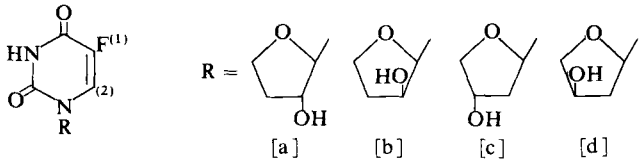
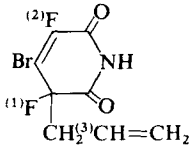
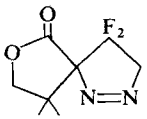
$C_4F_2ClN_5$					^2J(F-N1) 52.1 ^2J(F-N3) 53.6	662
$C_4F_2ClN_5$	Same as above	(2) −45.1	(6) −59.2			605(a)
$C_4F_2N_8$		(2) −48.1	(5) −163.3		(2-5) 27	605(a)
$C_4F_3N_5$	As above with N_3(6) replaced by F				^2J(F-N1) 50.6 ^2J(F-N3) 59.5	662
$C_4F_3N_5$	As above with N_3(6) replaced by F	(2) −48.9 (6) −78.5	(5) −168.9		(2-5) 25 (2-6) 2.5 (5-6) 17	605(a)
C_4F_7NO	$\overline{NF^{(4)}\cdot CF_2^{(1)}\cdot CF_2^{(2)}\cdot CF_2^{(3)}\cdot C(O)}$	(1) −105.2 (3) −123.5	(2) −130.5 (4) −89.4			664
$C_5FH_3N_2O_2$		−59				430
C_5FH_4N		2-F 3-F			(F-N) −52.5 (F-N) 3.6	586
C_5FH_4N	As above	2-F			(F-N) −52.64	666
C_5FH_4N	As above	2-F			(F-C2) −236.8 (F-C3) +37.55 (F-C4) +7.75 (F-C5) +4.16 (F-C6) +14.88	667
$C_5FH_5N^+$		2-F 3-F			(F-N) 23.1 (F-N) 3.1	586

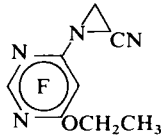
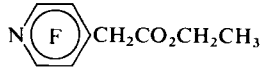
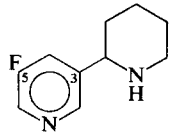
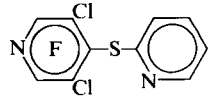
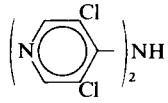
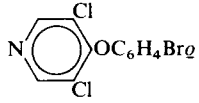
Molecular formula	Structure of compounds		Chemical shifts (ppm)	Coupling constants (Hz)		Ref.
$C_5FH_5N_2O$			−122.5	(3-4) 6.0	(3-5) 2.8	656(a)
$C_5FH_5N_2O$				(2-4) 1.5	(4-5) 8.2	657
C_5FCl_4N		2-F		(F-C2) 244 (F-C4) 14 (F-C6) 15	(F-C3) 35 (F-C5) 6	668
		3F		(F-C3) 266	(F-C6) 4	
C_5FCl_4N	As above	2-F		(F-C2) 245		669
		3-F		(F-C2) 21 (F-C4) 19 (F-C6) 4	(F-C3) 266 (F-C5) 3	
		4-F	−99.2	(F-C4) 267		
$C_5F_2H_2Cl_2N_2$				(2-C2) 238 (2-C3) + (6-C3) 41	(2-C6) 18	668
$C_5F_2H_3N$				(F-N) 52.3		586

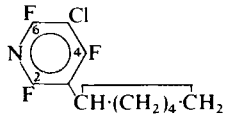
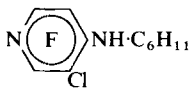
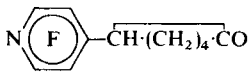
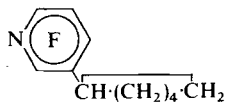
$C_5F_2H_4N_2O$		(3) −53.5	(4) −101.0	(3-4) ~9	658
$C_5F_2H_4N_2O$	As above with $F^{(4)}$ and $H^{(5)}$ interchanged	(3) −36.4	(5) −36.7	(3-5) ~5.5	658
$C_5F_2Cl_2N_4$				(F-N) 52	662
$C_5F_2Cl_3N$	As above with N_3 replaced by F	−68.04		(2-C2) 249 (2-C6) 15	669
$C_5F_2Cl_3N$	As above with N_3 replaced by F			(2-C2) 247 (2-C6) 15.6 (2-C3) + (6-C3) 40	668
$C_5F_2Cl_3NO_2S$	As above with N_3 replaced by SO_2Cl			(2-C2) 248 (2-C6) 14 (2-C3) + (6-C3) 36	668
$C_5F_3Cl_2N$	As above with N_3 replaced by F	(2) −69.88	(4) −93.37	(2-C2) 246 (4-C4) 266 (4-C2) 7 (6-C2) 18 (2-C4) 5	669
$C_5F_3Cl_2N$	As above with N_3 replaced by F			(2-C2) 246 (2-C4) 7 (2-C2) 17 (4-C2) 7 (4-C3) 21 (4-C4) 264	668
$C_5F_3Cl_2N$		(2) −70.90 (6) −87.05	(5) −140.87	(2-C2) 244 (5-C5) 261 (6-C6) 248 (5-C2) 3 (6-C2)(2-C6) 14, 15 (6-C5)(2-C3) 29, 37 (5-C3) 4 (6-C3) 7 (2-C4) (6-C4) 3,4	669
$C_5F_3Cl_2N$		(3) −120.36 (6) −85.80	(5) −138.32	(3-C3) 264 (5-C5) 267 (6-C6) 244 (3-C2) 18 (6-C2) 18 (2-C3) 31 (6-C3) 4 (3-C4) 18	669

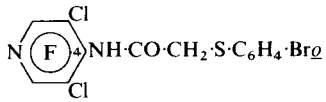
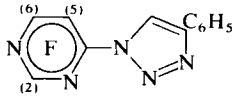
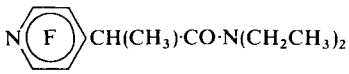
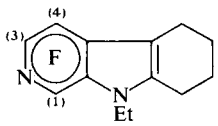
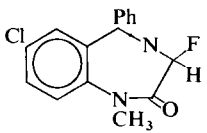
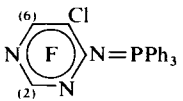
Molecular formula	Structure of compounds		Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_5F_4H_3NO$			(1) −105 (2) −150 (3) −155.9	(1-2) 12 (1-3) 6 (2-3) 7	670
C_5F_4ClN		3-Cl	(2) −71.71 (4) −113.47 (5) −163.44 (6) −85.25	(2-C2) 243 (4-C4) 266 (5-C5) 263 (6-C6) 246 (3-C2) 16 (4-C2)(4-C6) 7,6 (5-C2) 4 (6-C2)(2-C6) 15,13 (5-C3) 3 (6-C5)(2-C3) 38,30 (4-C3)(4-C5) 18,14 (C3-C4) 12 (6-C3)(2-C5) 8,8 (6-C4)(2-C4) 6,6	669
		4-Cl	(2) −89.19 (3) −142.42	(2-C2) 245 (3-C3) 262 (3-C2) 16 (5-C2) 3 (6-C2) 16 (2-C4) 5 (3-C4) 18	
$C_5F_4Cl_3N_2P$			−88.8, −148.6		589(b)
$C_5F_4N_4$				^2J(F-N) 50	662
C_5F_5N	As above with N_3 replaced by F		(2) −86.72 (3) −160.91 (4) −132.82	(2-C2) 244 (3-C3) 264 (4-C4) 268	669
C_5F_7N			(1) −101.4 (2) −123.2 (3) −151.9 (4) −140.5 (5) −43.6		671

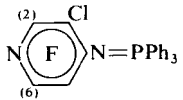
C_5F_8ClN		(1) −116.0 (2)(3) −136.2 (4) −93.9			672(a)
$C_6FH_3NNaO_2$			(5-C4) 19.5 (5-C5) 254 (5-C6) 25		673
$C_6FH_7N_2O_4$		−205	(1-2) 45	(1-3) 2	576
$C_6FH_9N_2O_3$	As above with $COCH_3$ replaced by CH_2CH_3	−208	(1-2) 46	(1-3) 2.2	674
$C_6F_{10}H_3N$		(2) −100.1 (3) −133.8 (4) −135.7			672(a)
$C_7F_2H_3Cl_3N_2O$			(F-C2) 237 (F-C6) 19 (2-C3) + (6-C3) 39		668
$C_7F_2H_5Cl_2NS$	As above with $NHCOCH_2Cl$ replaced by SCH_2CH_3		(FC2) 248 (F-C6)15 (2-C3) + (6-C3) 39		668
$C_7F_3H_3N_4$		(2) −49.0 (5) −171.0 (6) −74.2			605(a)

Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_7F_3ClN_2OS$		(2) −75.3 (5) −151.5 (6) −91.8		605(a)
$C_7F_4H_4ClN$		(2) −74.8 (4) −119.1 (5) −169.4 (6) −89.0		675(a)
$C_8FH_9N_2O_4$	 [a] [b] [c] [d]		[a] (1-2) 7 [b] 5 [c] 7 [d] 7	676
$C_8F_2H_6BrNO_2$		(1) −142.6 (2) −116.4	(1-3) 9.6	538
$C_8F_2H_{10}N_2O_2$		(1) −101.5 (2) −134.5	(F-F) 259 (1-H) 26.5, 20 (2-H) 5.5, 2	521(a)
$C_8F_{12}H_2N_2O_2$	$HN\overline{\cdot CF_2^{(1)}\cdot CF_2^{(2)}\cdot CF_2^{(3)}\cdot CO\cdot NH\cdot CF_2\cdot CF_2\cdot CF_2\cdot CO}$	(1) −92.5 (2) −127.5 (3) −134.1	(2-3) 5.8	664

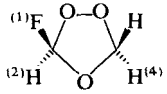
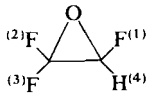
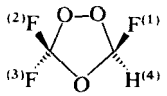
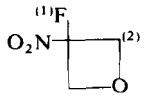
$C_9F_2H_8N_4O$		(2) −46.7	(5) −169.4	(2-5) 27	605(a)
$C_9F_4H_7NO_2$		(2) −90.7	(3) −143.2		357(b)
$C_{10}FH_{13}N_2$				(F-C2) 3.8 (F-C3) 2.5 (F-C4) 19 (F-C5) 257 (F-C6) 27	673
$C_{10}F_2H_4Cl_2NS$				(2-C2) 246 (2-C6) 14 (2-C3) + (6-C3) 36	668
$C_{10}F_4HCl_4N_3$				(2-C2) 244 (2-C6) 18 (2-C3) + (6-C3) 43	668
$C_{10}F_4H_9N$	As $C_7F_4H_4ClN$ above with CH_2CH_2Cl replaced by $-\overline{CH\cdot(CH_2)_3\cdot CH_2}$	(2) −72.2 (5) −171.1	(4) −119.8 (6) −91.1		675(a)
$C_{11}F_2H_4BrCl_2NO$				(2-C2) 245 (2-C6) 17 (2-C3) + (6-C3) 42	668

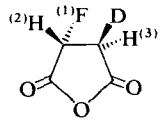
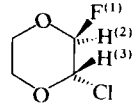
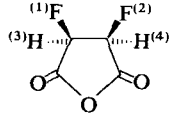
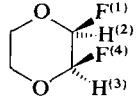
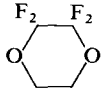
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{11}F_2H_4BrCl_2NS$	As above with O replaced by S		(2-C2) 232 (2-C6) 14 (2-C3) + (6-C3) ~40	668
$C_{11}F_2H_4Cl_3NO$	As above with Br replaced by Cl		(2-C2) 245 (2-C6) 17 (2-C3) + (6-C3) 42	668
$C_{11}F_2H_5Cl_2NS$	As above with Br replaced by H, and O by S		(2-C2) 248 (2-C6) 15 (2-C3) + (6-C3) 39	668
$C_{11}F_2Cl_7NO$	As above with OC_6H_4Br replaced by OC_6Cl_5		(2-C2) 245 (2-C6) 17 (2-C3) + (6-C3) 41	668
$C_{11}F_3H_{11}ClN$		(2) −73.6 (4) −98.7 (6) −69.4		675(a)
$C_{11}F_3H_{12}ClN_2$		(2) −77.0 (5) −166.0 (6) −93.0		605(a)
$C_{11}F_4H_9NO$		(2) −92.0 (3) −184.2		357(b)
$C_{11}F_4H_{11}N$		(2) −72.1 (4) −119.7 (5) −169.9 (6) −90.8		675(a)
$C_{12}FH_{23}N_4O_3$	As $C_4FH_7N_4O_3$ above with OH replaced by OBu^i		(1-2) 49.0 (1-3) 18.0 (1-4) 1.5	660

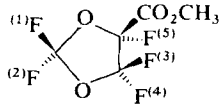
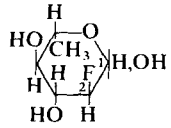
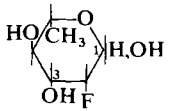
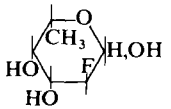
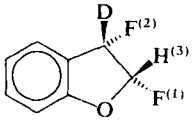
$C_{12}F_2H_7BrCl_2N_2OS$				(2-C2) 244 (2-C6) 17 (2-C3) + (6-C3) 39	668
$C_{12}F_2H_7BrCl_2N_2O_3S$	As above with S replaced by SO_2			(2-C2) 244 (2-C6) 17 (2-C3) + (6-C3) 38	668
$C_{12}F_2H_7Cl_2NO$	As above with 4-substituent of OCH_2Ph			(2-C2) 245 (2-C6) 18 (2-C3) + (6-C3) 37	668
$C_{12}F_3H_6N_5$		(2) −48.8 (6) −84.0	(5) −174.4		605(a)
$C_{12}F_4H_{14}N_2O$		(2) −93.8	(3) −143.7		357(b)
$C_{13}F_3H_{13}N_2$		(1) −92.9 (4) −163.2	(3) −114.2	(1-3) 13.4 (1-4) 30.1 (3-4) 20.6	357(b)
$C_{16}FH_{12}ClN_2O$		−161.7		^2J(F-H) 57	447
$C_{18}FH_{19}N_4O_3$	As $C_4FH_7N_4O_3$ above with OH replaced by $OCH_2C_6H_5$			(1-2) 49.0 (1-3) 20.0 (1-4) 2.0	660
$C_{22}F_2H_{15}ClN_3P$		(2) −48.4	(6) −61.0		605(a)

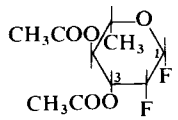
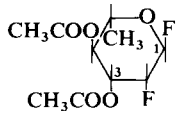
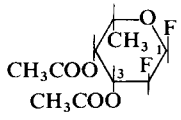
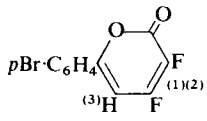
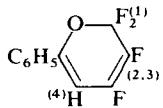
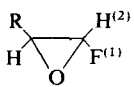
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{22}F_3H_{15}N_3P$	As above with Cl replaced by F	(2) −51.3 (5) −174.7 (6) −91.7		605(a)
$C_{23}F_3H_{15}ClN_2P$		(2) −77.3 (5) −154.9 (6) −95.2		605(a)

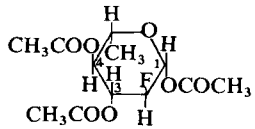
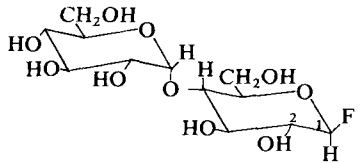
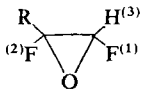
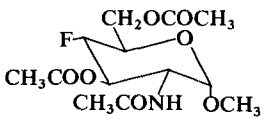
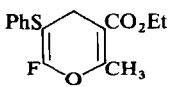
B. Oxygen heterocycles

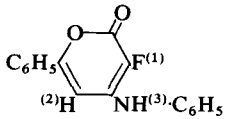
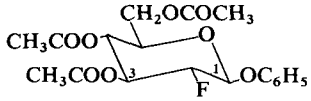
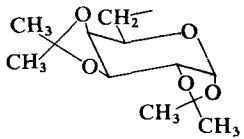
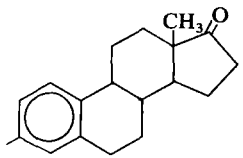
$C_2FH_3O_3$			(1-2) 86.4 (1-4) 8.5	424
C_2F_3HO			(1-4) 78.6 (2-4)(3-4) 5.1, 2.7	655
$C_2F_3HO_3$			(1-4) 75.8 (2-4) 2.4 (3-4) 0	655
$C_3FH_4NO_3$		−127.7	(1-2) 14	231

$C_4FH_2DO_3$		−116.5	(1-2) 55 (1-3) 25	426
$C_4FH_3O_3$	As above with D replaced by $H^{(4)}$	−117.3	(1-2) 52.5 (1-3) 24.9 (1-4) 13.5	426
$C_4FH_6ClO_2$		−125.6	(1-2) 52.3 (1-3) 3.7 (1-C1) 225.5 (1-C2) 44.0	659
$C_4F_2H_2O_3$		−112.9	(1-2) 2.8 (or 5.6) (1-3) 49.2 (1-4) 9.3	661(b)
$C_4F_2H_2O_3$	As above with $F^{(1)}$ and $H^{(3)}$ interchanged	−121.4	(1-2) 4.5 (or 7.0) (1-3) 50.0 (1-4) 17.3	
$C_4F_2H_6O_2$		−150.7	(1-2) 52.5 (1-3) 8.3 (1-4) 18.3 (1-C1) 227.5 (1-C2) 26.0	659
$C_4F_2H_6O_2$	As above with $F^{(1)}$ and $H^{(2)}$ interchanged	−141.6	(1-2) + (1-3) 52.2 (1-C1) 221.2 (1-4) + (2-3) ~8 (1-C2) 47.0	659
$C_4F_4H_4O_2$		−93.73		259

Molecular formula	Structure of compounds		Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_5F_5H_3O_4$			(1) −52.9 (2) −58.2 (3) −77.7 (4) −88.9 (5) −117.2	(1-2) 71 (3-4) 137 (3-5) 13.5 (4-5) 6.5 (2-4) 6.5 (2-3) or (2-5) 9 (1-3) or (1-5) 9	239
$C_6FH_{11}O_4$		α		(F-H1) 2.5 (F-H2) 50.5 (F-H3) 16.0	342
		β		(F-H1) <0.1 (F-H2) 49.5 (F-H3) 14.5	
$C_6FH_{11}O_4$		α	−202.7	(F-H1) 8.0 (F-H2) 49.5 (F-H3) 30.5	342
		β	−221.2	(F-H1) 20.0 (F-H2) 51.0 (F-H3) 30.0	
$C_6FH_{11}O_4$		α	−205.8	(F-H1) <0.2 (F-H2) 50.0 (F-H3) 14.0 (F-H4) 4.0	343
		β	−206.1	(F-H1) 4.0 (F-H2) 50.5 (F-H3) 14.5 (F-H4) 4.0	
$C_8F_2H_5DO$				(1-3) 61.2 (2-3) 2.9	677
$C_8F_2H_6O$	As above with D replaced by $H^{(4)}$			(1-3) 61.2 (1-4) 14.1 (2-3) 2.9 (2-4) 54.9	677
$C_8F_2H_6O$	As above with D replaced by $H^{(4)}$, and $F^{(1)}$ and $H^{(3)}$ interchanged			(1-3) 58.2 (1-4) 11.4 (2-3) 11.4 (2-4) 54.6	677

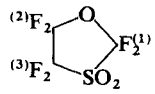
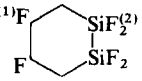
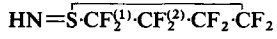
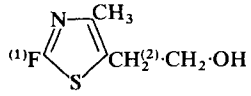
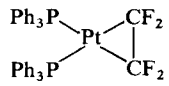
$C_{10}F_2H_{14}O_5$			(1) −148.3	(2) −221.6	(1-2) 13.0 (1-H2) 4.2 (2-H2) 52.0	(1-H1) 48.5 (2-H1) 17.0 (2-H3) 28.0	342
$C_{10}F_2H_{14}O_5$					(1-2) 19.0 (1-H2) 24.0 (2-H2) 48.0	(1-H1) 53.5 (2-H1) 0.2 (2-H3) 12.5	342
$C_{10}F_2H_{14}O_5$			(1) −148.1	(2) −211.7	(1-2) 18.5 (1-H2) 23.5 (2-H2) 49.0 (2-H4) 4.3	(1-H1) 54.0 (2-H1) <0.2 (2-H3) 11.5	343
$C_{11}F_2H_5BrO_2$			(1) −123	(2) −164	(1-2) 16 (2-3) 5	(1-3) 9	287
$C_{11}F_2H_5ClO_2$	As above with Br replaced by Cl		(1) −118	(2) −164	(1-2) 16 (2-3) 5	(1-3) 9	287
$C_{11}F_2H_6O_2$	As above with Br replaced by H		(1) −121.8	(2) −167.6	(1-2) 16 (2-3) 5	(1-3) 9	287
$C_{11}F_4H_6O$			(1) −48.4 (3) −139.9	(2) −175.8	(1-2) 20 (2-3) 9 (3-4) 9	(1-3) 12 (2-4) 5	287
$C_{12}FH_{17}O$		R = 1-adamantyl	−149		(1-2) 86		430

Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{12}FH_{17}O_7$			(2-H1) 3.5 (2-H2) 51.5 (2-H3) 14.5	342
$C_{12}FH_{17}O_7$	As above with H(1) and $OCOCH_3$ interchanged		(2-H1) <0.5 (2-H2) 49.0 (2-H3) 12.5	342
$C_{12}FH_{17}O_7$	As above with H(1) and $OCOCH_3$, and F(2) and H(2) interchanged		(2-H1) 7.5 (2-H2) 49.0 (2-H3) 30.0	342
$C_{12}FH_{17}O_7$	As above with H(1) and $OCOCH_3$, and H(4) and $OCOCH_3$ interchanged	−209.9	(2-H1) <0.5 (2-H2) 49.5 (2-H3) 11.5 (2-H4) 3.8	343
$C_{12}FH_{21}O_{10}$		−136.4	(1-H1) 53.8 (1-H2) 9.7	678
$C_{12}F_2H_{16}O$	 R = 1-adamantyl	(1) −159.6 (2) −155.8	(1-2) 36.7 (1-3) 82.5 (2-3) ~1	411
$C_{13}FH_{20}NO_7$		−198.30	(4-H3) 14.7 (4-H4) 49.7	440(b)
$C_{15}FH_{15}O_3S$		−91.2	^4J(F-H) 5	315

$C_{15}FH_{15}O_3Se$	As above with S replaced by Se	−87.5	^4J(F-H) 5		315
$C_{17}FH_{12}NO_2$		−168	(1-2) 5.5		287
$C_{18}FH_{14}NO_2$	As above with NH replaced by $NHCH_2$	−177	(1-2) 4.0	(1-3) 4.0	287
$C_{18}FH_{21}O_8$			(2-H1) 3.2 (2-H3) 14.1	(2-H2) 50.4	679
$C_{18}FH_{22}NO_7$	As $C_{13}FH_{20}NO_7$ above with $NHCOCH_3$ replaced by $NHCOC_6H_5$	−199.75	(4-H3) 16.4	(4-H4) 50.8	440(b)
$C_{24}FH_{35}O_{13}$	As $C_{18}FH_{21}O_8$ above with C_6H_5 replaced by 		(2-H1) 3.2	(2-H3) 14.2	679
$C_{30}FH_{37}O_9$	As $C_{18}FH_{21}O_8$ above with C_6H_5 replaced by 		(2-H1) 3.0 (2-H3) 14.5	(2-H2) 50.0	679

C. Other systems

$C_2F_4Se_2$	$\overline{CF_2{\cdot}Se{\cdot}CF_2{\cdot}Se}$		(Se-F) 68		196

Molecular formula	Structure of compounds		Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_3F_6O_3S$			(1)(2) −76.7, −83.9 (3) −120.9		402
$C_4F_6H_6Si_2$		Both isomers	(1) −126 (2) −140	^2J(F-H) 48 ^3J(F-H) 34 ^1J(F-C) 180 ^2J(F-C) 30	663
C_4F_8HNS			(1) −116.8, −118.3 (2) −130.8, −133.8	(1A-1B) 231 (2A-2B) 266	665
C_6FH_8NOS			−84.5	(1-2) 3	438(a)
$C_{38}F_4H_{30}P_2Pt$				^2J(Pt-F) + 279.4 [^2J(P-F) + $^2J'$(P-F)] + 61.6	391

D. Miscellaneous studies

The products of the iodine catalysed rearrangement of polyfluorinated 2-(dichloroamino)pyridines have been investigated by F-19 NMR.[681]

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

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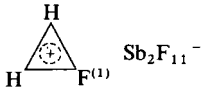
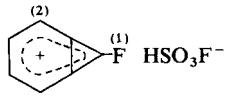
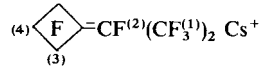
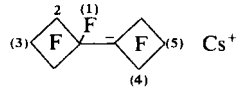
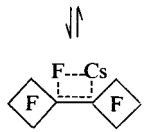
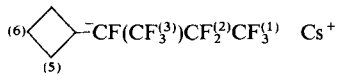
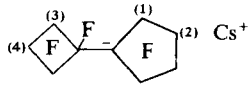
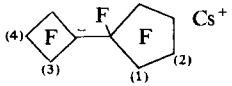
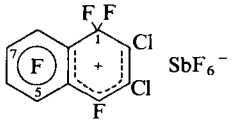
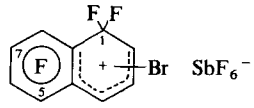
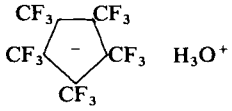
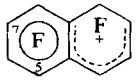
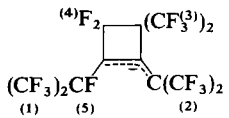
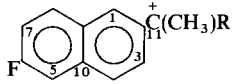
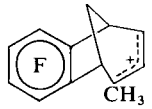
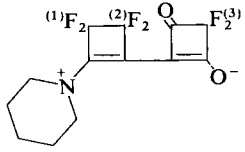
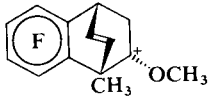
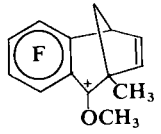
A. Data

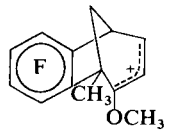
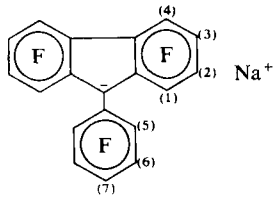
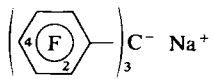
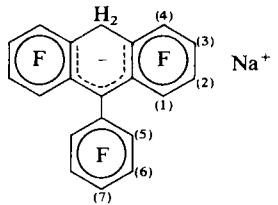
Molecular formula	Structure of compounds		Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
CFH_4O^+	$FCH_2\overset{+}{O}H_2$	(SO_2 at −80°)		^1J(F-C) 248.0	682
$C_3F_{12}H_2Sb_2$	 $Sb_2F_{11}^-$		(1) −67	^3J(F-H) 1.9	683
$C_6F_{11}CsO$	$(CF_3^{(1,2)})_2C{=}C{\cdot}CF_2^{(4)}{\cdot}CF_3^{(3)}$ $O^-\quad Cs^+$		(1,2,3) −52.5, −57.3, −84.1 (4) −119.7		277(a)
$C_7F_3H_5O_3S$	 HSO_3F^-			(1-2) 9.0	540
$C_7F_{13}Cs$			(1) −74.4 (3) −88.6 (4) −125.3		293
$C_8F_{13}Cs$	 Cs^+ 		(2)(3)(5) −119 to −137 (4) −86.6		293

Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_8F_{15}Cs$		(1) −74.6 (2) −81.2 (3) −118.5 (5) −88.6 (6) −126.1		293
$C_9F_{15}Cs$		(1) −81.8 (2) to (4) −117 to −138		293
$C_9F_{15}Cs$		(1)(2)(4) −117 to −138 (3) −89.4		293
$C_{10}F_{11}H_{11}OSb_2$			(1-2) 24.3	524
$C_{10}F_{13}Cl_2Sb$		(1) −102.6 (4) +12.3 (5) −92.5 (6) −139.0 (7) −98.9 (8) −120.6	(4-5) 148	684(b)
$C_{10}F_{14}BrSb$		2-Br (1) −98.4 (3) −110.8 (4) −12.4 (5) −89.1 (6) −136.0 (7) −96.1 (8) −116.4 3-Br (1) −113.3 (2) −27.4 (4) +33.5 (5) −89.1 (6) −136.0 (7) −96.1 (8) −116.4	(4-5) ~150 (2-4) 94 (4-5) 45	684(b)

		6-Br	(1) −113.6	(2) −71.8	(2-4) ~100	(4-5) ~150	
			(3) −143.4	(4) −2.3	(5-7) ~40		
			(5) −54.3	(7) −61.1			
			(8) −117.0				
		7-Br	(1) −115.0	(2) −69.9	(2-4) ~100	(4-5) ~150	
			(3) −143.6	(4) +2.3			
			(5) −94.7	(6) −107.0			
			(8) −89.5				
		5-Br	(1) −116.6	(2) −74.9	(2-4) ~115		
			(3) −143.5	(4) −0.2			
			(6) −104.6	(7) −103.1			
			(8) −114.6				
		8-Br	(1) −120.3	(2) −69.1	(2-4) ~100	(4-5) ~150	
			(3) −145.2	(4) +0.8	(5-7) ~50		
			(5) −87.9	(6) −140.0			
			(7) −63.3				
$C_{10}F_{14}ClSb$	As above with Br replaced by Cl	2-Cl	(1) −104.2	(3) −114.2	(4-5) ~150		684(b)
			(4) −8.7	(5) −89.2			
			(6) −137.2	(7) −96.1			
			(8) −117.6				
		3-Cl	(1) −114.3	(2) −39.0	(2-4) 96	(4-5) 146	
			(4) +23.7	(5) −89.1			
			(6) −137.2	(7) −96.1			
			(8) −117.6				
		6-Cl	(1) −113.9	(2) −69.4	(2-4) ~100	(4-5) ~150	
			(3) −143.4	(4) +3.3			
			(5) −63.3	(7) −69.8			
			(8) −117.1				
		7-Cl	(1) −113.8	(2) −68.8	(2-4) ~100	(4-5) ~150	
			(3) −143.2	(4) +3.1			
			(5) −92.4	(6) −117.0			
			(8) −96.7				

Molecular formula	Structure of compounds		Chemical shifts (ppm)		Coupling constants (Hz)		Ref.
		5-Cl	(1) −115.7	(2) −71.9	(2-4) ~120		
			(3) −142.9	(4) +3.7			
			(6) −112.9	(7) −100.7			
			(8) −114.0				
		8-Cl	(1) −19.3	(2) −67.9	(2-4) ~100	(4-5) ~150	
			(3) −144.3	(4) +2.6	(5-7) ~50		
			(5) −87.3	(6) −139.0			
			(7) −71.9				
		4-Cl	(1) −114.5	(2) −83.3	(5-7) 48		
			(3) −124.7	(5) −91.4			
			(6) −138.4	(7) −100.3			
			(8) −120.6				
$C_{10}F_{15}H_3O$	 H_3O^+		−48.59				307
$C_{10}F_{15}Sb$	 SbF_6^-		(1) −115.4	(2) −69.2	(2-4) ~100	(4-5) 150	684(b)
			(3) −144.5	(4) +4.5	(5-7) ~50		
			(5) −88.1	(6) −137.9			
			(7) −95.7	(8) −118.0			
$C_{11}F_7H_{14}OSb$	$[p\mathrm{CH_3O{\cdot}C_6H_4{\cdot}\overset{+}{C}F{\cdot}CH(CH_3)_2}]\ SbF_6^-$				^1J(F-C) 344	^2J(F-C) 16	524
$C_{11}F_7H_{14}Sb$	As above with CH_3O replaced by CH_3				^7J(F-H) 2.0	^3J(F-H) 32.9	524
$C_{11}F_{11}H_{13}OSb_2$	$[p\mathrm{CH_3O{\cdot}C_6H_4{\cdot}\overset{+}{C}F{\cdot}C(CH_3)_2{\cdot}SbF_4}]\ SbF_6^-$				^1J(F-C) 329		524
$C_{11}F_{11}H_{13}Sb_2$	As above with CH_3O replaced by CH_3				^7J(F-H) 2.6	^4J(F-H) 2.6	524
					^1J(F-C) 342	^2J(F-C) 24.5	
$C_{12}F_{21}^-$	$(CF_3^{(1)})_2CF^{(4)}{\cdot}\bar{C}[{=}CF^{(3)}{-}C(CF_3^{(2)})_2]_2$		(1) −76.4	(2) −59.0			354(a)
			(3) −60.3	(4) −169.5			

$C_{12}F_{21}^-$			(1) −76.2 (2) −52.0 (3) −60.0 (4) −88.5 (5) −177.5		354(a)
$C_{13}FH_{12}^+$		R = CH_3		(6-C4) 4.3 (6-C5) 22.1 (6-C6) 271.2 (6-C7) 25.6 (6-C8) 12.5 (6-C10) 13.8 (6-C11) 3.4	612
$C_{13}F_4H_{11}^+$			−152.3, −150.1, −132.7, −130.6		615(b)
$C_{13}F_6H_5NO_2$			(1)(2) −109.6, −113.1 (3) −118.9		685
$C_{14}F_4H_{11}O^+$			−155.0, −153.15, −144.8, −140.7		615(b)
$C_{14}F_4H_{11}O^+$			−152.7, −139.2, −128.9, −112.7		615(b)

Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{14}F_4H_{11}O^+$		−153.78, −151.5, −138.8, −137.9		615(b)
$C_{15}FH_{14}^+$	As $C_{13}FH_{12}^+$ above with R = cycloC_3H_5		(6-C2) 1.7 (6-C4) 5.0 (6-C5) 21.5 (6-C6) 261.3 (6-C7) 25.7 (6-C8) 11.1 (6-C10) 12.0 (6-C11) 3.6	612
$C_{18}FH_{14}^+$	As $C_{13}FH_{12}^+$ above with R = C_6H_5		(6-C4) ~5 (6-C5) 21.8 (6-C6) 264.6 (6-C7) 25.6 (6-C8) 11.7 (6-C10) 12.42	612
$C_{19}F_{13}Na$		(1) −160.1 (2) −169.4 (3) −180.1 (4) −143.1 (5) −140.0 (6) −166.8 (7) −162.9		630(b)
$C_{19}F_{15}Na$		(2) −145.4 (3) −169.0 (4) −177.5		630(b)
$C_{20}F_{13}H_2Na$		(1) −147.6 (2) −158.3 (3) −183.0 (4) −142.9 (5) −140.8 (6) −163.7 (7) −168.8		630(b)

B. Miscellaneous studies

Other studies have been made of $[C_6F_5SeHR]^+ \cdot SbF_5 \cdot OSO_2F^-$,[686] $C_6F_5CONSX^+SBX_6^-$ (X = F, Cl),[687] the protonated cations of $(C_6F_5)_{3-n}$ ($n = 0$ to 2),[688] heptafluoroindenyl-2-dichloromethyl cation and 1,3-dichloroperfluoro-2-methylindenyl ion,[689] and the carbanions of various fluorinated fluorenes.[690]

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VIII. FLUORINE BONDED TO AN ELEMENT OTHER THAN CARBON

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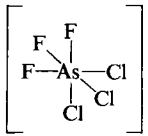
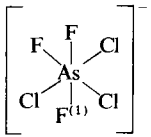
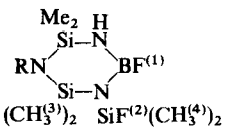
Fluorine bonded to arsenic

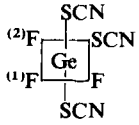
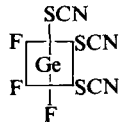
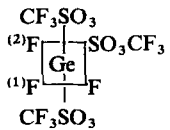
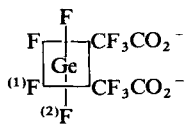
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_2F_2H_3AsCl_3N$	$AsF_2Cl_3 \cdot CH_3CN$	+7.06		703
$C_2F_4H_3AsClN$	$AsF_4Cl \cdot CH_3CN$	−29.04		703
$C_2F_5H_3AsN$	$F^{(2)}AsF_4^{(1)} \cdot CH_3CN$	(1) −43.29 (2) −82.5		703
$F_2AsCl_4^-$	*cis*-$F_2AsCl_4^-$	+21.56		703
$F_3AsCl_3^-$		−11.44		703
$F_3AsCl_3^-$		(1) +11.06		703
$F_4AsCl_2^-$	*cis*-$AsF_4Cl_2^-$	−55.11, −20.24		703
F_5AsCl^-	$AsF_4^{(1)}F^{(2)}Cl^-$	(1) −47.64 (2) −80.7		703
F_6As^-	AsF_6^-	−65.94		703
$F_9HAsBrO$	$[BrF_2^{(1)}O]^+$ $\underbrace{AsF_6 \underset{HF_2^-}{\overset{HF}{\rightleftharpoons}} AsF_5}_{(2)}$	(1) +202 (2) −112		768

Molecular formula	Structure of compounds		Chemical shifts (ppm)		Coupling constants (Hz)		Ref.
Fluorine bonded to boron							
CF_3H_4BO	$CH_3OH{\cdot}BF_3$		−155.5 (MeCN solvent)				694
$C_2F_3H_3BN$	$CH_3CN{\cdot}BF_3$		−145.8 (MeOH solvent) −143.0 (MeCN solvent)				694
$C_2F_3H_6BCl_2OSSn$	$BF_3{\cdot}SnCl_2{\cdot}OS(CH_3)_2$		−147.9				707(a)
$C_2F_3H_6BO$	$CH_3CH_2OH{\cdot}BF_3$		−153.3 (MeCN solvent) −152.3 (EtOH solvent)				694
$C_2F_3H_6BOS$	$BF_3{\cdot}OS(CH_3)_2$		−150.0				707(a)
$C_3F_2H_5B$	$cycloC_3H_5{\cdot}BF_2$		−94.16				712(a)
$C_3F_3H_9BCl_2NSn$	$BF_3{\cdot}SnCl_2{\cdot}N(CH_3)_3$		−163.36		(F-B) 16.2		707(a)
$C_3F_3H_9BN$	$BF_3{\cdot}N(CH_3)_3$		−142.98		(F-B) 15.38		707(a)
$C_4F_3H_{10}BO$	$Et_2O{\cdot}BF_3$		−153.9				694
$C_6F_2H_{14}BP$	$cycloC_3H_5BF_2{\cdot}P(CH_3)_3$		−156.55				712(a)
$C_6F_2H_{20}BN_3Si_3$		R = H	(1) −106.3	(2) −140.6	(2-3) 2.4 (2-4) 7.5	(1-4) 2.7	730
$C_6F_2H_{20}BN_3Si_3$	As above with R and $SiF(CH_3)_2$ interchanged		(1) −122.9	(2) −134.8	(2-3) 1.1	(2-4) 7.2	730
$C_6F_6H_5BOS$	$C_6H_5SOF_2^{(2)+}BF_4^{(1)-}$		(1) +149.5	(2) +54.0	(2-C2) 1.4	(2-C4) 1.1	588
$C_8F_3H_{25}BN_3Si_4$	$F^{(3)}Si(CH_3^{(5)})_2{\cdot}\overline{N{\cdot}Si(CH_3)_2{\cdot}N[Si(CH_3^{(4)})_2F^{(2)}]{\cdot}BF^{(1)}{\cdot}NH{\cdot}Si(CH_3^{(6)})_2}$						730
			(1) −106.3	(2)(3) −134.2, −138.7	(1-4) 2.8 (3-5) 7.4	(2-4) 7.4 (3-6) 1.3	
$C_9F_2H_{28}BN_3Si_4$	As $C_6F_2H_{20}BN_3Si_3$ above with R = $Si(CH_3)_3$		(1) −108.0	(2) −139.1	(1-4) 2.8 (2-3) 2.4	(2-4) 7.5	730
$C_{12}FH_{38}BN_4Si_5$	$[(CH_3^{(2)})_3Si]_2N{\cdot}BF^{(1)}{\cdot}\overline{N{\cdot}Si(CH_3^{(3)})_2{\cdot}NH{\cdot}Si(CH_3)_2{\cdot}NH{\cdot}Si(CH_3)_2}$			−64.9	(1-2) 0.6	(1-3) 1.5	730
$C_{12}F_2H_{36}BN_3Si_5$	$F_2^{(1)}B{\cdot}\overline{N{\cdot}Si(CH_3^{(2)})_2{\cdot}NSi(CH_3)_3{\cdot}Si(CH_3)_2{\cdot}NSi(CH_3)_3{\cdot}Si(CH_3)_2}$			−107.5	(1-2) 1.6		730

$C_{12}F_3H_{27}BOP$	$BF_3{\cdot}(C_4H_9)_3P(O)$	−141.1				718
$C_{12}F_6H_{27}B_2OP$	$(BF_3)_2{\cdot}(C_4F_9)_3P(O)$	−136.1				718
$C_{16}F_3H_{50}BN_6Si_8$	$(Me_2Si{\cdot}NSiMe_2F^{(2)}{\cdot}SiMe_2{\cdot}NH{\cdot}SiMe_2{\cdot}N-)_2BF^{(1)}$	(1) −62.0	(2) −142.7	^3J(2-H) 7.4		730
$C_{17}F_2H_{35}BN_2Si_3$	$(CH_3^{(4)})_2SiF^{(2)}{\cdot}N(C_6H_2Me_3\text{-}2,4,6){\cdot}BF^{(1)}{\cdot}N[Si(CH_3^{(3)})_3]_2$	(1) −80.3	(2) −140.1	(1-3) 1.2 (1-4) 1.2 ^3J(Si2-1) 7.0 ^3J(Si3-1) 4.7	(2-4) 10.6 ^1J(Si-F) 285.1	733(b)
$C_{18}F_3H_{15}BOP$	$BF_3{\cdot}(PhO)_3P(O)$	−142.1				718
$C_{20}F_2H_{41}BN_2Si_3$	$(CH_3^{(3)})_3C{\cdot}SiF^{(2)}(C_6H_5){\cdot}N(C_6H_2Me_3\text{-}2,4,6){\cdot}BF^{(1)}{\cdot}NSiC(CH_3^{(4)})_3$	(1) −59.7	(2) −151.6	(2-3) 2.2	(1-4) 1.5	733(b)
$C_{38}F_3H_{50}BN_2Si_2$	$[(CH_3)_3C{\cdot}SiF^{(2)}(C_6H_5){\cdot}N(C(CH_3)_3)]_2BF^{(1)}$	(1) −194.6	(2) −163.3	^1J(Si-F) 286.3	^3J(Si-1) 4.3	733(b)
F_3H_2BO	$H_2O{\cdot}BF_3$	−152.2				694
F_4H_4BN	NH_4BF_4	−146.9				762(b)
F_4BCs	$CsBF_4$	−141.9				762(b)
F_4BK	KBF_4	−152.9				762(b)
F_4BK	Same as above	−154.5		(B-F) 4.2		183
F_4BNa	$NaBF_4$	−158.9				762(b)
F_4BRb	$RbBF_4$	−149.9				762(b)
F_7HBBrO	$[BrF_2^{(1)}O]^+$ $\underbrace{BF_4^- \overset{HF}{\underset{HF_2}{\rightleftharpoons}} BF_3}_{(2)}$	(1) +192	(2) −190			768

Fluorine bonded to germanium

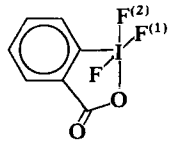
CF_5GeN^{2-}	$F^{(1)}GeF_4^{(2)}CN^{2-}$	(1) −121.8	(2) −99.7	(1-2) 38.8	695
CF_5GeNS^{2-}	$F^{(1)}GeF_4^{(2)}SCN^{2-}$	(1) −129.0	(2) −109.5	(1-2) 48.3	695
$C_2F_4GeN_2^{2-}$	$F_4Ge(CN)_2^{2-}$	−84.2			695
$C_2F_4GeN_2^{2-}$	$F_2^{(1)}GeF_2^{(2)}(CN)_2^{2-}$ (1) *trans* to CN	(1) −103.7	(2) −91.0	(1-2) 36.8	695
$C_2F_4GeN_2S_2^{2-}$	As above with CN replaced by SCN	(1) −115.9	(2) −97.4	(1-2) 50.7	695
$C_2F_4GeN_2S_2^{2-}$	$F_4Ge(SCN)_2^{2-}$	−99.3			695
$C_2F_4GeO_4^{2-}$	*cis*-$[GeF_2F_2(CO_2{\cdot}CO_2)]^{2-}$	(1) −119.0	(2) −134.8	(1-2) 45	710

Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_2F_5H_6GeO^-$	$[GeF_4^{(1)}F^{(2)}(EtOH)]^-$	(1) −127.5 (2) −136.2	(1-2) 45	710
$C_2F_{10}GeO_6S_2^{2-}$	*cis*-$[GeF_2F_2CF_3SO_3]^{2-}$	(1) −126.5 (2) −103.6	(1-2) 69.0	695
	trans-isomer	−106.3		
$C_3F_3GeN_3S_3^{2-}$		(1) −102.5 (2) −87.9	(1-2) 48.7	695
$C_3F_3GeN_3S_3^{2-}$		−101.8		695
$C_3F_{12}GeO_9S_3^{2-}$		(1) −114.5 (2) −96.7	(1-2) 85.8	695
$C_4F_2GeO_8^{2-}$	*cis*-$[GeF_2(CO_2{\cdot}CO_2)_2]^{2-}$	−130.3		710
$C_4F_4H_{12}GeO_2$	*cis*-$[GeF_2^{(1)}F_2^{(2)}(EtOH)_2]$	(1) −131.2 (2) −136.0	(1-2) 54	710
	trans-isomer	−127.1		
$C_4F_{10}GeO_4^{2-}$	*trans*-$F_4Ge(CF_3CO_2)_2^{2-}$	−100.5		695
$C_4F_{10}GeO_4^{2-}$		(1) −122.3 (2) −111.9	(1-2) 57.1	695

$C_5F_4H_7GeO_2^-$	*cis*-$[GeF_2^{(1)}F_2^{(2)}(CH_3COCHCOCH_3)]^-$	(1) −118.1 (2) −132.3	(1-2) 46	710
$C_6F_3H_{18}GeO_3^+$	*cis*-$[GeF_3(EtOH)_3]^+$	−133.3		710
$C_8F_4H_{16}GeO_4$	*cis*-$[GeF_2^{(1)}F_2^{(2)}(CH_3CO_2CH_2CH_3)_2]$	(1) −129.1 (2) −138.8	(1-2) 67	710
	trans-isomer	−125.2		
$C_8F_7H_4GeO_2S^-$	*cis*-$[GeF_2^{(1)}F_2^{(2)}(CF_3COCHCO{\cdot}\overline{C{=}CH{\cdot}CH{=}CH{\cdot}S})]^-$	(1) −117.5 (2) −137.0	(1-2) 52	710
$C_8F_8H_{18}GeO_8P_2$	*trans*-$[GeF_4((BuO)_3PO)_2]$	−140.0		710
$F_4GeN_2O_4^{2-}$	*cis*-$GeF_2F_2(NO_2)_2^{2-}$	(1) −122.9 (2) −117.4	(1-2) 57	695
		(1) *trans* to ligand		
$F_4GeN_2O_6^{2-}$	*cis*-$GeF_2F_2(NO_3)_2^{2-}$	(1) −126.4 (2) −121.3	(1-2) 64.1	695
		(1) *trans* to ligand		
$F_4GeN_6^{2-}$	*cis*-$GeF_2F_2(N_3)_2^{2-}$	(1) −112.9 (2) −105.5	(1-2) 52.6	695
		(1) *trans* to ligand		
$F_4GeN_6^{2-}$	*trans*-$GeF_4(N_3)_2^{2-}$	−108.2		695
$F_5GeNO_2^{2-}$	$GeF_4^{(1)}F^{(2)}(NO_2)^{2-}$	(1) −117.9 (2) −125.7	(1-2) 48.5	695
$F_5GeNO_3^{2-}$	$GeF_4^{(1)}F^{(2)}(NO_3)_2^-$	(1) −118.6 (2) −130.8	(1-2) 52	695
$F_5GeN_3^{2-}$	$GeF_4^{(1)}F^{(2)}N_3^{2-}$	(1) −110.2 (2) −121.8	(1-2) 43.6	695
$F_6H_8GeN_2$	$(NH_4)_2GeF_6$	−129.9		762(b)
F_6Cs_2Ge	Cs_2GeF_6	−102.9		762(b)
F_6GeK_2	K_2GeF_6	−137.9		762(b)
F_6GeNa_2	Na_2GeF_6	−171.9		762(b)
$F_6GeO_6S_2^{2-}$	*cis*-$GeF_2F_2(FSO_3)_2^{2-}$	(1) −130.9 (2) −110.5	(1-2) 72.5	695
		(1) *trans* to ligand		
$F_6GeO_6S_2^{2-}$	*trans*-$GeF_4(FSO_3)_2^{2-}$	−112.9		695
F_6GeRb_2	Rb_2GeF_6	−108.9		762(b)
$F_8Ge_2N_6^{2-}$	$F_2^{(1)}GeF_2^{(2)}(N_3)_2F_2GeF_2^{2-}$	(1) −131.7 (2) −104.2	(1-2) 70.8	695
		(1) *trans* to ligand		

Fluorine bonded to hydrogen

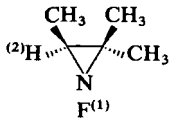
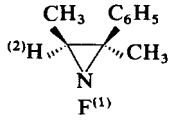
FH	HF (30% pyridine–70% HF)	(F-H) 120	754

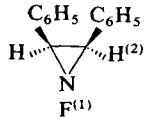
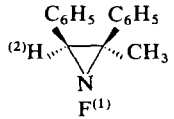
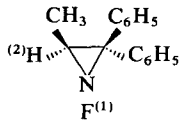
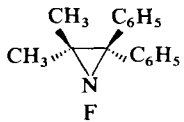
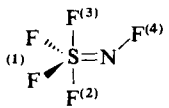
Molecular formula	Structure of compounds		Chemical shifts (ppm)		Coupling constants (Hz)	Ref.
Fluorine bonded to iodine						
$C_6F_2H_4BrI$	pBr·$C_6H_4IF_2$		−173.5			727
$C_6F_2H_4ClI$	pCl·$C_6H_4IF_2$		−173.4			727
$C_6F_2H_4ClI$	Cl·$C_6H_4IF_2$	*ortho*	−175.0			728
		meta	−175.7			
		para	−178.2		^4J(F-C) 4.4	
$C_6F_2H_4INO_2$	pNO$_2$·$C_6H_4IF_2$		−172.8			727
$C_6F_2H_5I$	$C_6H_5IF_2$		−174.0			727
$C_6F_2H_5I$	Same as above		−175.9		^3J(F-C) 10	728
$C_6F_3H_4I$	F·$C_6H_4IF_2$	*ortho*	−162.4			727
		meta	−172.7			
		para	−172.3			
$C_6F_4H_4I_2$	$C_6H_4(IF_2)_2$	*ortho*	−158.8			727
		para	−173.6			
$C_7F_2H_7I$	pCH$_3$·$C_6H_4IF_2$	*para*	−174.3			727
$C_7F_2H_7I$	CH$_3$·$C_6H_4IF_2$	*ortho*	−167.0			728
		para	−176.6		^3J(F-C) 12.0	
$C_7F_2H_7IO$	oCH$_3$O·$C_6H_4IF_2$		−167.3		(F-C1) 13.0	728
$C_7F_3H_4IO_2$			(1) −26.7	(2) −36.5	(1-2) 118	334
$C_9F_3H_{10}IO$	As $C_7F_3H_4IO_2$ above with C=O replaced by $C(CH_3)_2$		(1) −15.80	(2) −29.90	(1-2) 110	334

Fluorine bonded to molybdenum

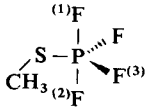
$C_{18}F_6H_{40}MoN_2O_6Ti$	$[F_2^{(3)}O_2Mo(C_2O_4)TiF_2^{(1)}F_2^{(2)}][NEt_4]_2$		(1) +131.6 (3) −52.7	(2) +192.9			747
F_6MoOXe	$F^{(1)}XeF^{(2)}MoOF_4^{(3)}$	(in BrF_5)	(1) −223.1 (3) +141.8	(2) −170.0	(1-2) 264 (Xe-1) 6140	(2-3) 50 (Xe-2) 5117	755
$F_{10}Mo_2O_2Xe$	$F_4^{(1)}Mo(O)F^{(2)}MoF_2^{(3)}F^{(4)}(O)F^{(5)}XeF^{(6)}$ (4) *trans* to (5)		(1) +150.1 (3) +195.1 (5) −167.1	(2) −37.7 (4) +207.9 (6) −229.1	(3-6) 8 (1-4) 8 (2-5) 50 (3-5) 46 (Xe-6) 5197	(1-2) 47 (2-3) 100 (2-4) 100 (3-4) 102 (Xe-5) 5110	755
$F_{14}Mo_3O_3Xe$	$F^{(1)}XeF^{(2)}Mo(O)F_2^{(3)}F^{(4)}F^{(5)}(MoF_3)F^{(6)}MoF_4^{(7)}(O)$ (2) *trans* to (4)		(1) −230.4 (5) −28.9 (7) +150	(2) −167 (6) −62.8	(1-2) 266 (2-5) 50 (2-4) 50 (Xe-2) 5110	(6-7) 47 (2-3) 50 (Xe-1) 6210	755
$F_{18}Mo_4O_4Xe$	$F^{(1)}XeF^{(2)}Mo(O)F_2^{(3)}F^{(4)}F^{(5)}(MoF_3)F^{(6)}(MoF_3)F^{(7)}MoF_4^{(8)}(O)$ (2) *trans* to (4)		(1) −230.8 (5) −29 (7) −64.9	(2) −167 (6) −55.2 (8) +150	(1-2) 258 (Xe-1) 6200	(7-8) 48 (Xe-2) 5000	755

Fluorine bonded to nitrogen

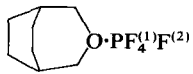
$C_5FH_{10}N$		(−)109	(1-2) 22		427
$C_{10}FH_{12}N$		(−)92	(1-2) 20		427

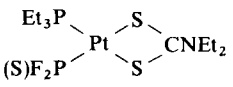
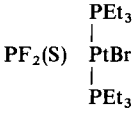
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{14}FH_{12}N$		(−)104	(1-2) 24	427
$C_{15}FH_{14}N$		(−)92	(1-2) 22	427
$C_{15}FH_{14}N$		(−)92	(1-2) 22	427
$C_{16}FH_{16}N$		(−)89		427
F_2HN	NF_2H	−11.2	(F-H) ~23 to 24	757
F_5NS		(1) (+)52 (2) (+)45.0 (3) (+)13.2 (4) (−)43.9	(1-2) 213.9 (1-3) 194.6 (1-4) −19.6 (2-3) 20.7 (2-4) −92.7 (3-4) 226.8	767
$F_{14}MnN_2$	$[NF_4^{(1)}]_2^+ MnF_6^{2-}$	(1) −218		772

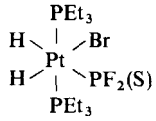
Fluorine bonded to phosphorus

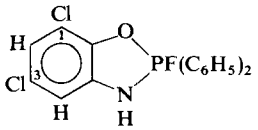
CFH_3BrOP	CH_3OPFBr			−53.2		(P-F) 1250	691(a)
CFH_3ClOP	CH_3OPFCl			−53.7		(P-F) 1253	691(a)
CF_2NOPS	POF_2NCS					(P-F) 1090	693
$CF_4H_2O_2P_2$	$CH_2P(O)F_2$			−57.1		(F-H) 3.5 ^1J(P-F) −1117.3 ^3J(P-F) +9.7 ^4J(F-F) 6.0	696
CF_4H_3PS		(−90°)		(1) −14.1 (3) −58.2	(2) −7.5	(P-1) 1055 (P-2) 917 (P-3) 1044 (2-3) 90.5 (1-3) 105.0 (1-2) 19.0	201
$CF_5HO_2P^-$	$F^{(2)}PF_4^{(1)}HCO_2^-$			(1) −64.3	(2) −72.1		698
CF_5NP^-	$F^{(2)}PF_4^{(1)}CN^-$			(1) −47.6	(2) −75.3		698
CF_5NPS^-	$F^{(2)}PF_4^{(1)}SCN^-$					(P-1) 725 (P-2) 740 (1-2) 54	693
CF_5NPS^-	Same as above			(1) −52.2	(2) −84.1		698
$CF_8H_2P_2$	$CH_2(PF_4)_2$			−40.2		(F-H) 6.0 ^1J(P-F) + ^3J(P-F) 965.3	696
$C_2FH_4Cl_2OP$	CH_2ClCH_2OPFCl			−50.7		(P-F) 1259	691(a)
C_2FH_5BrOP	CH_3CH_2OPFBr			−50.2		(P-F) 1250	691(a)
C_2FH_5ClOP	CH_3CH_2OPFCl			−51.3		(P-F) 1253	691(a)
$C_2F_2H_5O_2P$	$CH_3CH_2OP(O)F_2$					(P-F) 1012	705
$C_2F_4H_2O_2P_2$	$F_2P(O)CH{=}CHP(O)F_2$			−65.5		^1J(P-F) −1107.5 ^4J(P-F) +8.0	696
$C_2F_4H_2O_4P^-$	$PF_4(HCO_2)_2^-$		*cis*	−58.3			698
			trans	−57.4			
$C_2F_4H_4O_2P_2$	$F_2P(O)CH_2CH_2P(O)F_2$			−64.9		^1J(P-F) −1129.8 ^4J(P-F) +3.8	696
$C_2F_4H_5OP$	$CH_3CH_2OPF_4$					(P-F) 875	705
$C_2F_4N_2PS_2^-$	*cis*-$PF_4(NCS)_2^-$ *trans*-isomer					(P-F_{eq}) 730 (P-F_{ax}) 745 (F-F) 51 (P-F) 730	693
$C_2F_4N_2PS_2^-$	*cis*-$PF_4(SCN)_2^-$ *trans*-isomer			−35.9, −55.5 −34.9			698

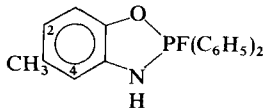
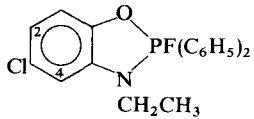
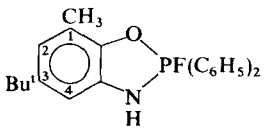
Molecular formula	Structure of compounds		Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_2F_5H_3NP$	$PF_5{\cdot}CH_3CN$			(P-F) 770	705
$C_2F_5H_3O_2P^-$	$F^{(2)}PF_4^{(1)}CH_3CO_2^-$		(1) −58.88 (2) −66.44		698
$C_2F_5H_5OP^-$	$PF_5OCH_2CH_3^-$			($P\text{-}F_{eq}$) 730 ($P\text{-}F_{ax}$) 675 (F-F) 41	705
$C_2F_5H_6OP$	$PF_5{\cdot}HOCH_2CH_3$			($P\text{-}F_{eq}$) 780 ($P\text{-}F_{ax}$) 752 (F-F) 62.5	705
$C_2F_8H_2P_2$	$F_4PCH{=}CHPF_4$		−51.0	^1J(P-F) −968.1 ^4J(P-F) +1.7 ^5J(F-F) 2.5	696
$C_2F_8H_4P_2$	$F_4PCH_2CH_2PF_4$		−50.5	^1J(P-F) −976 ^4J(P-F) +7	696
$C_3F_2H_9NO_2P_2$	$CH_3N[PF(OCH_3)]_2$		−82.2, −83.3		713(a)
$C_3F_3N_3PS_3^-$	*cis*-$PF_3(NCS)_3^-$			(P-F) 745	693
$C_3F_4H_9NP_2Si$	$(CH_3)_3SiN(PF_3)_2$		−59.2	^1J(P-F) −1254 ^3J(P-F) +57.2 ^4J(F-F) 10.6, 5.8 ^2J(F-F) 50 (assumed)	714
C_4FH_9ClOP	Bu^nOPFCl		−50.6	(P-F) 1259	691(a)
$C_4FH_{10}O_3P$	$(EtO)_2P(O)F$			(P-F) 977	705
$C_4F_2H_4NP$	$F_2P(NC_4H_4)$		−64.6	(P-F) 1256.9	716
$C_4F_2H_7BF$	$F_2^{(1)}P(NC_4H_4)BH_3^{(2)}$		−69.6	(P-F) 1228.5 (1-2) 17.6	716
$C_4F_4H_6O_4P^-$	*cis*-$F_4P(CH_3CO_2)_2^-$		−52.63, −57.93		698
	trans-isomer		−51.6		
$C_4F_{16}H_{12}Cl_2Mo_2N_4P_8$	$Mo_2[F_2PN(CH_3)PF_2]_4Cl_2$		−52.8	^1J(P-F) 1182	721
$C_5FH_{15}NOPSi$	$CH_3OPFN(CH_3)Si(CH_3)_3$			(P-F) 1130	713
$C_5F_2H_5P$	$cycloC_5H_5PF_2$		−72.4	(P-F) 1183 ^3J(F-H) 10 ^2J(F-C) 6	722
$C_5F_2H_6NNiO_3P$	$Ni(Me_2NPF_2)(CO)_3$		−44.8	(P-F) 1157	723
$C_5F_2H_8BP$	$cycloC_5H_5PF_2^{(1)}{\cdot}BH_3^{(2)}$		−81.9	(P-F) 1184 (1-2) 22 ^3J(F-H) 10	722
$C_5F_2H_{13}NO_2P_2$	$CH_3N[PF(OCH_2CH_3)]_2$	[A]	−79.6	^1J(P-F) ±1149 ^3J(P-F) ±38.0 ^4J(F-F) 13	713(a)
		[B]	−81.5	^1J(P-F) ±1147 ^3J(P-F) ±43.5 ^4J(F-F) 15	

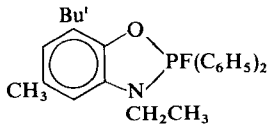
$C_6FH_4Br_3O_2PPt$	$PtBr_3(FPO{\cdot}C_6H_4{\cdot}O)$	−26.3	(P-F) −1299	725
$C_6FH_4Cl_3O_2PPt$	As above with Br replaced by Cl	−30.7	(P-F) −1297 (Pt-F) +773	725
$C_6FH_4I_3O_2PPt$	As above with Br replaced by I	−22.4	(P-F) −1305 (Pt-F) +746	725
$C_6FH_{10}O_2P$	$(CH_2{=}CHCH_2O)_2PF$	(−)60.3	(P-F) 1235	726
$C_6FH_{17}NOPSi$	$CH_3CH_2OPF{\cdot}N(CH_3){\cdot}Si(CH_3)_3$		(P-F) 1150	713(a)
$C_6F_2H_5Cl_3OPPt$	$PtCl_3\{PF_2(OPh)\}$	−45.3	(P-F) −1241 (Pt-F) +696	725
$C_6F_2H_7P$	$cycloMeC_5H_4PF_2$	−73.7	(P-F) 1152 ^3J(F-H) 9 ^2J(F-C) 6	722
		−74.4	1152 9	
$C_6F_2H_{10}BP$	$cycloMeC_5H_4PF_2^{(1)}{\cdot}BH_3^{(2)}$	−81.9	(P-F) 1114 (1-2) 19	722
$C_6F_3H_{15}NPSi$	$(CH_3^{(3)})_2SiF^{(1)}{\cdot}N(Bu^t){\cdot}PF_2^{(2)}$	(1) −141.3 (2) −58.6	(1-3) 7.2 (2-3) 1.6	733(b)
			(Si-1) 285 (Si-2) 8.9	
			(P-2) 1215 (P-1) 36	
$C_6F_4H_{12}N_2NiO_2P_2$	$Ni(Me_2NPF_4)_2(CO)_2$	−43.3	(P-F) 1150	723
C_7FH_8OP	$C_6H_5{\cdot}PF{\cdot}OCH_3$	−111	(P-F) 1076	736
$C_7FH_{18}P$	$(CH_3CH_2)_3PF(CH_3)$	+5.8		430
$C_7F_2H_9OP$	$C_6H_5PF_2^{(1)}H^{(2)}(OCH_3)$	−38.2	(P-F) 733 (1-2) 123	736
$C_7F_6H_{18}N_3NiOP_3$	$Ni(Me_2NP_2)_3CO$	−41.6	(P-F) 1137	723
$C_8FH_{10}OP$	$C_6H_5PF{\cdot}OCH_2CH_3$		(P-F) 1076	736
$C_8FH_{11}OP$	$C_6H_5PF_2^{(1)}H^{(2)}(OCH_2CH_3)$	−37.8	(P-F) 735 (1-2) 122	736
$C_8F_4H_7OP$	$C_6H_5PF^{(1)}{\cdot}OCH_2CF_3$	(1) −109	(P-1) 1099	736
$C_8F_5H_8OP$	$C_6H_5PF_2^{(1)}H^{(2)}(OCH_2CF_3)$	(1) −35.9	(P-1) 764 (1-2) 122	736
$C_8F_5H_{14}OP$		(1) −71.6 (+6.9)	(1-2) 66 (P-1) 843	738(a)
		(2) −87.7 (−9.2)	(P-2) 788	
$C_8F_8H_{24}N_2NiP_4$	$Ni(Me_2NPF_2)_4$	−38.9	(P-F) 1104	723
$C_9FH_{14}P$	$(CH_3)_3PFC_6H_5$	+52		430
$C_9F_7H_6OP$	$C_6H_5PF{\cdot}OCH(CF_3)_2$	−102	(P-F) 1126	736
$C_9F_8H_7OP$	$C_6H_5PF_2^{(1)}H^{(2)}{\cdot}OCH(CF_3)_2$	−38.9	(P-F) 794 (1-2) 122	736
$C_{10}FH_{10}P$	$(cycloC_5H_5)_2PF$	−102	(P-F) 1119 ^3J(F-H) 6	722
			^2J(F-C) 4	
$C_{10}FH_{14}OP$	$C_6H_5PF{\cdot}OC(CH_3)_3$	−98.1	(P-F) 1073	736

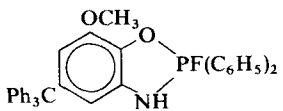
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{10}F_2H_{11}P$	$C_6H_5PF_2(CH{=}CH_2)_2$	−50.7	(P-F) 620	741
$C_{10}F_2H_{15}OP$	$C_6H_5PF_2^{(1)}H^{(2)}OC(CH_3)_3$	−26.7	(P-F) 728 (1-2) 122	736
$C_{11}F_2H_{25}NP_2PtS_3$		−13.1	^1J(P-F) 1196 ^3J(P-F) 0 ^2J(Pt-F) 711	744
$C_{12}FH_{10}Cl_3O_2PPt$	$PtCl_3\{PF(OPh)_2\}$	−46.1	(P-F) −1194 (Pt-F) +692	725
$C_{12}FH_{10}I_3O_2PPt$	$PtI_3\{PF(OPh)_2\}$	−33.0	(P-F) −1191 (Pt-F) +689	725
$C_{12}FH_{14}P$	$(cycloMeC_5H_4)_2PF$	−101.8 −103.7	(P-F) 1107 (P-F) 1105 ^3J(F-H) 10 ^2J(F-C) 6	722
$C_{12}F_2H_{10}Br_2O_2PPd$	$PdBr_2\{PF_2(OPh)\}_2$	−33.9	^1J(P-F) −1335.7 ^3J(P-F) +22.2 ^4J(F-F) +7, +6	745
$C_{12}F_2H_{10}Br_2O_2PPt$	As above with Pd replaced by Pt	−38.3	^1J(P-F) −1260.6 ^3J(P-F) +9.5 ^4J(F-F) +7.0, +6.3 ^2J(Pt-F) +634.1	745
$C_{12}F_2H_{10}Cl_2O_2PPt$	As above with Pd replaced by Pt, and Br by Cl	−39.3	^1J(P-F) −1225 ^3J(P-F) +7.7 ^4J(F-F) +6, +5 ^2J(Pt-F) +640	745
$C_{12}F_2H_{30}BrP_3PtS$		−5.2	^1J(P-F) 1169 ^3J(P-F) 10 (Pt-F) 796	744
$C_{12}F_2H_{30}BrP_3PtSe$	As above with S replaced by Se	−6.9	^1J(P-F) 1191 ^3J(P-F) 10 (Pt-F) 725	744
$C_{12}F_2H_{30}ClP_3PtS$	As above with Br replaced by Cl	−5.7	^1J(P-F) 1162 ^3J(P-F) 10 (Pt-F) 792	744
$C_{12}F_2H_{30}ClP_3PtSe$	As above with Br replaced by Cl, and S by Se	−7.0	^1J(P-F) 1181 ^3J(P-F) 10 (Pt-F) 720	744
$C_{12}F_2H_{30}IP_3PtS$	As above with Br replaced by I	−5.1	^1J(P-F) 1184 ^3J(P-F) 10 (Pt-F) 772	744

$C_{12}F_2H_{30}IP_3PtSe$	As above with Br replaced by I, and S by Se	−6.1	^1J(P-F) 1201 ^3J(P-F) 10 (Pt-F) 699	744
$C_{12}F_2H_{31}P_3PtS$	As above with Br replaced by H	−13.0	^1J(P-F) 1199 ^3J(P-F) 4 (Pt-F) 400 ^3J(F-H) 38	744
$C_{12}F_2H_{31}P_3PtSe$	As above with Br replaced by H, and S by Se	−16.0	^1J(P-F) 1210 ^3J(P-F) 5 (Pt-F) 358 ^3J(F-H) 34	744
$C_{12}F_2H_{32}BrP_3PtS$		−10.6	^1J(P-F) 1231 (Pt-F) 233 ^3J(F-H) 40	744
$C_{12}F_2H_{32}BrP_3PtSe$	As above with S replaced by Se	−14.1	^1J(P-F) 1236 (Pt-F) 212 ^3J(F-H) 37	744
$C_{12}F_2H_{32}ClP_3PtS$	As above with Br replaced by Cl	−11.6	^1J(P-F) 1234 (Pt-F) 240 ^3J(F-H) 41	744
$C_{12}F_2H_{32}ClP_3PtSe$	As above with Br replaced by Cl, and S by Se	−15.5	^1J(P-F) 1234 (Pt-F) 210 ^3J(F-H) 36	744
$C_{12}F_2H_{32}IP_3PtS$	As above with Br replaced by I	−8.8	^1J(P-F) 1230 (Pt-F) 245 ^3J(F-H) 40	744
$C_{12}F_2H_{32}IP_3PtSe$	As above with Br replaced by I, and S by Se	−11.9	^1J(P-F) 1228 (Pt-F) 210 ^3J(F-H) 36	744
$C_{12}F_4H_{10}NP$	$PF_4N(C_6H_5)_2$		(P-F) 770(eq), 960(ax) (F-F) 60	705
$C_{12}F_5H_{27}OP_2$	$PF_5{\cdot}(C_4H_9)_3P(O)$		($P\text{-}F_{eq}$) 750 ($P\text{-}F_{ax}$) 740 (F-F) 54 ^2J($P\text{-}F_{eq}$) 6.0	693
$C_{12}F_5H_{27}P_2$	$PF_5{\cdot}(C_4H_9)_3P$		($P\text{-}F_{eq}$) 765 ($P\text{-}F_{ax}$) 745 (F-F) 60 ^2J($P\text{-}F_{eq}$) 8.2	693
$C_{13}FH_{30}P$	$(n\text{-}C_4H_9)_3CH_3PF$	+8		430
$C_{14}F_2H_{13}P$	$(C_6H_5)_2PF_2(CH{=}CH_2)$	−44.9	(P-F) 636	741
$C_{14}F_3H_{23}NPSi$	$(CH_3)_3C{\cdot}SiF^{(3)}(C_6H_5){\cdot}N[C(CH_3)_3]{\cdot}PF_2^{(1,2)}$	(1) −59.77 (2) −63.82 (3) −158.7	(1-2) 9.5 (1,2-3) 8 (P-1,2) 1260 (P-3) 17.6 (Si-3) 293.5 (Si-1,2) 8.1	733(b)

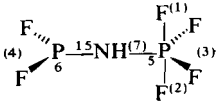
Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{14}F_3H_{24}N_2PSi$	$(CH_3^{(3)})_3C{\cdot}SiF^{(2)}(C_6H_5){\cdot}N[C(CH_3)_3]{\cdot}PF_2^{(1)}{=}NH$	(1) −62.4 (2) −151.7	(P-1) 967 (Si-2) 285.7 (2-3) 1	733(a)
$C_{14}F_4H_{11}OP$	$C_6H_5PF{\cdot}OCH(CF_3)C_6H_5$		(P-F) 1105, 1107	736
$C_{14}F_5H_{12}OP$	$C_6H_5PF_2^{(1)}H^{(2)}{\cdot}OCH(CF_3)C_6H_5$	−36.8	(P-F) 768 (1-2) 122	736
$C_{15}FH_{42}N_3P_2Si_3$	$(Me_3Si)_2NPH[PFN(CHMe_2)_2]{=}NSiMe_3$		^1J(P-F) 941 ^2J(P-F) 103.3	748
$C_{15}FH_{46}N_3P_2Si_5$	$(Me_3Si)_2NPH[PFN(SiMe_3)_2]{=}NSiMe_3$		^1J(P-F) 965 ^2J(P-F) 74.2	748
$C_{16}FH_{40}N_2OPS_2$	$[(C_2H_5)_4N]_2PS_2OF$	+7.1	(P-F) 1034	749(a)
$C_{16}FH_{40}N_2O_2PS$	$[(C_2H_5)_4N]_2PSO_2F$	−26.6	(P-F) 1000	749(a)
$C_{16}FH_{40}N_2O_3P$	$[(C_2H_5)_4N]_2PO_3F$	−71.9	(P-F) 889	749(a)
$C_{16}FH_{40}N_2PS_3$	$[(C_2H_5)_4N]_2PS_3F$	+24.2	(P-F) 1045	749(a)
$C_{16}F_6H_{36}Br_2NP_2Rh$	$[Bu^n{}_4N][RhBr_2(PF_3)_2]$	−19.9	^2J(Rh-F) −31.7 ^1J(P-F) −1319.9 ^3J(P-F) +18.1 ^4J(F-F) +4.8	745
$C_{16}F_6H_{36}Br_4NP_2Rh$	As above with Br_2 replaced by Br_4	−29.5	^2J(Rh-F) −12.8 ^1J(P-F) −1364.1 ^3J(P-F) +8.5 ^4J(F-F) +3.2	745
$C_{16}F_6H_{36}Cl_2NP_2Rh$	As above with Br replaced by Cl	−20.6	^2J(Rh-F) −31.6 ^1J(P-F) −1312.7 ^3J(P-F) +15.7 ^4J(F-F) +4.4	745
$C_{16}F_6H_{36}Cl_4NP_2Rh$	As above with Br_2 replaced by Cl_4	−34.5	^2J(Rh-F) −12.6 ^1J(P-F) −1375.3 ^3J(P-F) +7.9 ^4J(F-F) +2.7	745
$C_{18}FH_{13}Cl_2NOP$		−32.8	(P-F) 683.6	750
$C_{18}FH_{14}N_2O_3P$	As above with Cl(1) replaced by H, and Cl(3) by NO_2	−32.0	(P-F) 690.7	750
$C_{18}FH_{14}N_2O_3P$	As above with Cl replaced by H, and H(2) by NO_2	−30.6	(P-F) 687.8	750

$C_{18}F_2H_{15}Cl_2O_4P_2Pt$	$PtCl_2\{PF^{(1)}O(OPh)\}\{PF^{(2)}(OPh)_2\}$	(1) −21.8	(2) −40.6	(1-2) 7 (P1-2) 7 (P2-1) 12 (Pt-2) 764	(P1-1) 1144 (P2-2) 1184 (Pt-1) 843	725
$C_{18}F_2H_{35}N_2PSi$	$(CH_3^{(3)})_2SiF^{(1)}{\cdot}N[C(CH_3)_3]{\cdot}PF^{(2)}{\cdot}N[Si(CH_3^{(4)})_3]{\cdot}C_6H_2(CH_3)_3$—2,4,6	(1) −156.0	(2) −89.0	(1-3) 8 ^3J(Si3-2) 7.0 (P-2) 1025.6	^1J(Si-F) 287.4 ^3J(Si4-2) 2.0 (P-1) 9	733(b)
$C_{19}FH_{17}NOP$		−28.3		(P-F) 665.3		750
$C_{19}FH_{17}NOP$	As above with CH_3 at C(2)	−28.2		(P-F) 669.2		750
$C_{20}FH_{17}Cl_2NOP$	As above with Cl at C(1) and C(3), and CH_3 at C(2) and C(4)		−32.2	(P-F) 689.8		750
$C_{20}FH_{18}ClNOP$		−36.9		(P-F) 735.4		750
$C_{20}FH_{19}ClNOP$	As above with Cl replaced by H	−35.9		(P-F) 726.5		750
$C_{20}F_2H_{17}P$	$Ph_2PF_2(C_6H_4CH{=}CH_2)$	−40.8		(P-F) 663		741
$C_{20}F_4H_{36}Cl_2N_2O_2P_2Pd$	$[PdCl_2(PF_2O)_2][NBu^nMe_3]_2$	−12.9		^1J(P-F) −1265 ^4J(F-F) +11.5, +8.5	^3J(P-F) +50.7	745
$C_{20}F_4H_{36}Cl_2N_2O_2P_2Pt$	As above with Pd replaced by Pt	−20.0		^1J(P-F) −1172 ^4J(F-F) +6, +5	^3J(P-F) +13.5 ^2J(Pt-F) + 1045	745
$C_{21}FH_{21}NOP$	As $C_{20}FH_{18}ClNOP$ above with Cl replaced by CH_3	−35.5		(P-F) 726.5		750
$C_{21}FH_{21}NOP$	As $C_{20}FH_{18}ClNOP$ above with Cl replaced by CH_3 and moved to C(2)		−36.1	(P-F) 724.2		750
$C_{23}FH_{25}NOP$		−28.5		(P-F) 666.0		750

Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{24}FH_{25}NOP$	As above with CH_3 replaced by H, and Bu^t by cycloC_6H_{11}	−28.4	(P-F) 669.6	750
$C_{24}F_2H_{20}Br_2O_4P_2Pd$	*cis*-$[PdBr_2\{PF(OPh)_2\}_2]$	−30.5	^1J(P-F) −1267.6 ^3J(P-F) +37.6 ^4J(F-F) +21.5	745
$C_{24}F_2H_{20}Br_2O_4P_2Pt$	As above with Pd replaced by Pt	−35.6	^1J(P-F) −1199.9 ^3J(P-F) +15.0 ^4J(F-F) +21.2 ^2J(Pt-F) +691.2	745
$C_{24}F_2H_{20}Br_4O_4P_2Pt$	As above with Pd replaced by Pt, and Br_2 by Br_4	−46.3	^1J(P-F) −1282.8 ^3J(P-F) +1.9 ^4J(F-F) +1.9 ^2J(Pt-F) +312.5	745
$C_{24}F_2H_{20}Cl_2O_4P_2Pd$	As above with Br replaced by Cl	−32.1	^1J(P-F) −1264.2 ^3J(P-F) +36.6 ^4J(F-F) +19.5	745
$C_{24}F_2H_{20}Cl_2O_4P_2Pt$	As above with Br replaced by Cl, and Pd by Pt	−37.0	^1J(P-F) −1193.4 ^3J(P-F) +12.7 ^4J(F-F) +18.9 ^2J(Pt-F) +706.5	745
$C_{24}F_2H_{20}Cl_4O_4P_2Pt$	As above with Br_2 replaced by Cl_4, and Pd by Pt	−49.4	^1J(P-F) −1288.5 ^3J(P-F) +1.9 ^4J(F-F) +1.9 ^2J(Pt-F) +312.2	745
$C_{24}F_2H_{20}I_2O_4P_2Pd$	As above with Br replaced by I	−29.3	^1J(P-F) −1276 ^3J(P-F) +34 ^4J(F-F) +23	745
$C_{24}F_2H_{20}I_2O_4P_2Pd$	As above with Br replaced by I, and *trans*-isomer	−26.9	^1J(P-F) −1261 ^3J(P-F) +71 ^4J(F-F) +5.4	745
$C_{24}F_2H_{20}I_2O_4P_2Pt$	As above with Br replaced by I, and Pd by Pt	−34.5	^1J(P-F) −1211.5 ^3J(P-F) +17.7 ^3J(P-F) +24.2 ^2J(Pt-F) +646.8	745
$C_{24}F_4H_{54}O_2P_3^+$	*trans*-$[PF_4((C_4H_9)_3PO)_2]^+$		^1J(P-F) 780 ^3J(P-F) 4.6	693
$C_{25}FH_{28}NOP$		−32.5	(P-F) 720.8	750

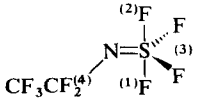
$C_{26}F_2H_{24}P$	$Ph_2PF_2(CH_2)_2PPh_2$	−39.8	(P-F) 645	741
$C_{26}F_2H_{24}P_2S$	$Ph_2PF_2(CH_2)_2P(S)Ph_2$	−45.5	(P-F) 653	741
$C_{26}F_4H_{24}O_2P_4Pd$	*cis*-$(Ph_2PCH_2)_2Pd(POF_2)_2$	(−)9.4	^1J(P-F) 1310 ^3J(P-F) 65	726
$C_{28}FH_{35}NOP$	As $C_{25}FH_{28}NOP$ above with CH_3 replaced by Bu^t	−32.8	(P-F) 718.3	750
$C_{34}F_4H_{33}P_3$	$[Ph_2PF_2(CH_2)_2]_2PPh$	−45.1	(P-F) 648	741
$C_{34}F_4H_{33}P_3S$	$[Ph_2PF_2(CH_2)_2]_2P(S)Ph$	−46.0	(P-F) 654	741
$C_{36}F_2H_{30}ClOP_3Pd$	*trans*-$(Ph_3P)_2PdCl(POF_2)$	(−)10.5	^1J(P-F) 1268 ^3J(P-F) 23	726
$C_{36}F_2H_{30}ClOP_3Pt$	As above with Pd replaced by Pt	(−)15.5	^1J(P-F) 1177 ^3J(P-F) 10 ^2J(Pt-F) 890	726
$C_{36}F_2H_{30}ClO_7P_3Pd$	*trans*-$[(PhO)_3P]_2PdCl(POF_2)$	(−)13.9	^1J(P-F) 1282 ^3J(P-F) 27.2	726
$C_{36}F_2H_{30}ClO_7P_3Pt$	As above with Pd replaced by Pt	(−)13.1	^1J(P-F) 1165 ^3J(P-F) 9 ^2J(Pt-F) 900	726
$C_{36}F_3H_{30}Br_3O_6P_3Rh$	*fac*-$[RhBr_3\{PF(OPh)_2\}_3]$	−38.6	^1J(P-F) −1260.1 ^3J(P-F) +2.1 ^4J(F-F) +2.0 ^2J(Rh-F) −12.4	745
$C_{36}F_3H_{30}Cl_3O_6P_3Rh$	As above with Br replaced by Cl	−41.6	^1J(P-F) −1274.1 ^3J(P-F) +1.8 ^4J(F-F) +1.6 ^2J(Rh-F) −12.2	745
$C_{36}F_4H_{30}O_2P_4Pt$	*trans*-$(Ph_3P)_2Pt(POF_2)_2$	(−)19.1	^1J(P-F) 1250 ^3J(P-F) 126 (*trans*), 4.5 (*cis*) ^2J(Pt-F) 537	726
$C_{36}F_4H_{30}O_8P_4Pd$	*trans*-$[(PhO)_3P]_2Pd(POF_2)_2$	(−)11.8	^1J(P-F) 1337 ^3J(P-F) 146	726
$C_{36}F_4H_{30}O_8P_4Pt$	As above with Pd replaced by Pt	(−)15.6	^1J(P-F) 1235 ^3J(P-F) 94 ^2J(Pt-F) 572	726
$C_{38}FH_{31}NO_2P$		−30.2	(P-F) 678.0	750
$C_{39}FH_{35}ClO_2P_2Pt$	*trans*-$(Ph_3P)_2PtCl[(CH_2{=}CHCH_2O)(F)PO]$	(−)17.6	^1J(P-F) 1110 ^3J(P-F) 13.5 ^2J(Pt-F) 859	726
$C_{40}FH_{39}ClO_2P_3Pt$	*trans*-$(Ph_3P)_2PtCl[(Bu^nO)(F)PO]$	(−)18.7	^1J(P-F) 1102 ^3J(P-F) 14.3 ^2J(Pt-F) 852	726

Molecular formula	Structure of compounds		Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{41}FH_{37}NOP$	As $C_{38}FH_{31}NO_2P$ above with OCH_3 replaced by Bu^t		−28.1	(P-F) 669.2	750
$C_{43}FH_{41}NOP$	As $C_{25}FH_{28}NOP$ above with CH_3 replaced by $C(C_6H_5)_3$		−34.4	(P-F) 720.0	750
$(C_{20}F_2H_{17}P)_n$	$[-CH_2\dot{C}H(C_6H_4)PF_2Ph_2]_n$		−40.4	(P-F) 665	741
FBrClPS	FPCl(Br)(S)		−62.4	(P-F) 950	177
F_2H_4NP	$PF_2^{(1)}H_2^{(2),15}NH_2$		−57.3	(P-F) 598.6 (1-2) 89.6 ^2J(F-N) 13.2 ^2J(F-F) <1 ^3J(F-H) 17.2, 21.5	758
$F_2H_6NPSi_2$	$PF_2{}^{,15}N(SiH_3)_2$		−51.6	(P-F) −1237 (F-N) −2.6 (Si-F) 7.5 (F-H) +2.9	759
$F_2H_9BNPSi_2$	$PF_2[^{15}N(SiH_3)_2]BH_3$		−60.2	(P-F) 1209 ^3J(F-H) 16 ^4J(F-H) 2.1	759
F_2ClOP	$P(O)F_2Cl$		−47.9	(P-F) 1137	700
F_3Cl_3PPd	$PdCl_3PF_3$		−34.7	(P-F) −1408	725
$F_3N_9P^-$	$PF_3(N_3)_3^-$	*mer*	−41.00, −45.47 (ratio 2:1)		698
		fac	−39.4		
F_3OP	$P(O)F_3$		−93.2	(P-F) 1062	700
$F_4H_3NP_2Si$	$^{15}N(PF_2)_2SiH_3$		−62.3	^1J(P-F) −1255 (F-N) 3.2 (Si-F) 11.6 ^3J(P-F) +24.9 (F-H) 3.7 (F-F) 3.7, 8.0	759
$F_4H_6BNP_2Si$	$PF_2^{(1)}[N(PF_2^{(2)})(SiH_3)]BH_3$		(1) −64.4 (2) −60.2	^1J(P-1) 1205 ^1J(P-2) 1288 ^3J(F-H) 17	759
$F_4H_9B_2NP_2Si$	$N[PF_2(BH_3)]_2SiH_3$		−60.7	$[^1J$(P-F) + ^3J(P-F)] 1250 ^3J(F-H) 16	759
$F_4N_6P^-$	$PF_4(N_3)_2^-$	*cis*	−51.67, −57.14		698
		trans	−49.2		
F_5BrP^-	$PF_4^{(1)}FBr^-$		(1) −13.8		698

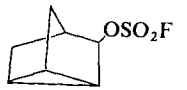
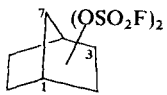
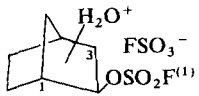
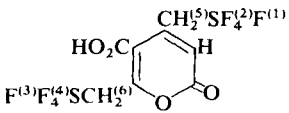
$F_5Br_2OP_2Pt$	$PtBr_2(PF_2^{(1)}O)PF_3^{(2)}$	(1) −36.6	(2) −33.8	(1-2) 6 (P2-2) 1324 (P2-1) 15 (Pt-2) 674	(P1-1) 1225 (P1-2) 9 (Pt-1) 656	725
$F_5ClO_4P^-$	$PF_4^{(1)}F^{(2)}ClO_4^-$	(1) −61.1	(2) −82.9			698
$F_5Cl_2OP_2Pt$	$PtCl_2(PF_2^{(1)}O)PF_3^{(2)}$			(P-1) 1212	(P2-2) 1318	725
$F_5NO_2P^-$	$PF_4^{(1)}F^{(2)}NO_2^-$	(1) −65.2	(2) −76.6			698
$F_5NO_3P^-$	$PF_4^{(1)}F^{(2)}NO_3^-$	(1) −66.3				698
$F_5N_3P^-$	$PF_4^{(1)}F^{(2)}N_3^-$	(1) −57.6	(2) −71.6			698
F_6HNP_2		(1) −48.3 (3) −73.4	(2) −41.8 (4) −61.2	(1-2) <0.2 (2-3) 79.7 (2-N) 3.9 (4-N) 3.4 (P6-1) ±14.7 (P6-3) <0.2 (2-7) 31.0 (4-7) 6.3 (2-4) 14.0	(1-3) 88.2 (1-N) 11.5 (3-N) <0.2 (P5-4) 16.1 (P6-2) ∓209.2 (1-7) 1.0 (3-7) <0.2 (1-4) <0.2 (3-4) <0.2	764
$F_6Br_2P_2Pt$	$PtBr_2(PF_3)_2$	−33.9		^1J(P-F) −1331.4 ^3J(P-F) +8.7 ^4J(F-F) +4.2 ^2J(Pt-F) +617.0		745
$F_6Cl_2P_2Pd$	$PdCl_2(PF_3)_2$	−34.5		^1J(P-F) −1406 ^3J(P-F) +22.8 ^4J(F-F) +4.3		745
$F_6Cl_2P_2Pt$	As above with Pd replaced by Pt	−35.0		^1J(P-F) −1325.9 ^3J(P-F) +7.0 ^4J(F-F) +3.8 ^2J(Pt-F) +629.0		745
F_6NP_3	$N(PF_2)_3$	−63.3				714
F_6P^-				(P-F) 770		705
F_7O_2PSe	$POF_2^{(1)}OSeF_5$	(1) −93.0		(P-1) 1064		700
F_7O_2PTe	$POF_2^{(1)}OTeF_4^{(3)}F^{(2)}$	(1) −81.1 (3) −43.2	(2) −53.5	(1-3) 1.9 (P-1) 1042	(2-3) 178	700

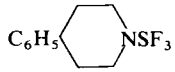
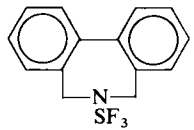
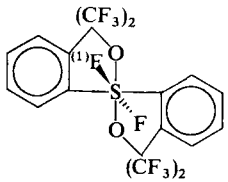
Molecular formula	Structure of compounds	Chemical shifts (ppm)		Coupling constants (Hz)		Ref.
$F_8H_4NiP_4$	$Ni(PF_2H)_4$	−77.1		^1J(P-F) 1040 ^3J(P-F) 48 ^2J(F-H) 50		769
F_8OPV	$F_3VOPF_4^{(1)}F^{(2)}$	(1) −72.7	(2) −74.8	(1-2) 80 (P-1) = (P-2) = 938		770
$F_{12}Br_2P_4Rh_2$	$[RhBr(PF_3)_2]_2$	−15.8		^1J(P-F) −1332.6 ^3J(P-F) +21.1 ^4J(F-F) +4.7 ^2J(Rh-F) −31.4		745
$F_{12}Cl_2P_4Rh_2$	As above with Br replaced by Cl	−16.9		^1J(P-F) −1328.7 ^3J(P-F) +19.1 ^4J(F-F) +4.4 ^2J(Rh-F) −31.6		745
$(F_7NP_2)_n$	$(F_2^{(3)}P{=}NPF_5^{(1,2)})_n$	(1) −59.0 (3) −71.0	(2) −84.4	(P-1) 783 (P-3) 977	(P-2) 769	774

Fluorine bonded to sulphur

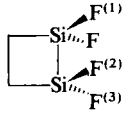
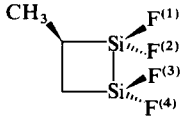
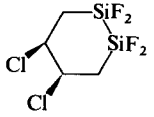
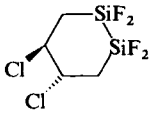
CFH_3O_2S	$CH_3^{(2)}{\cdot}SO_2F^{(1)}$	+60.24		(1-2) +5.4	(F-C) +22.1	180
$CF_2H_4ClN_4O_2PS_2$	*cis,cis*-$NPClNHCH_3(NSOF)_2$	+72.5		(P-F) 2.5		692
CF_5H_2BrS	$F^{(1)}SF_4^{(2)}{\cdot}CH_2^{(3)}Br$	(1) −75.5	(2) +60.1	(1-2) 150.2	(2-3) 7.4	699
CF_5H_3S	$F^{(1)}SF_4^{(2)}{\cdot}CH_3^{(3)}$	(1) +80.7	(2) +70.5	(1-2) 150	(2-3) 9.75	699
$CF_8N_4O_4S_4$	$C(NSOF_2)_4$	+46.0				181
$C_2F_2H_6ClN_4O_2PS_2$	*cis,cis*-NPClNHEt$(NSOF)_2$	+72.4		(P-F) 2.6		692
	trans,trans-isomer	+72.6		(P-F) 1.3		
$C_2F_2H_8N_5O_2PS_2$	*cis*-$NP(NHMe)_2(NSOF)_2$	+73.2		(P-F) 2.3		692
$C_2F_5H_2ClOS$	$F^{(1)}SF_4^{(2)}{\cdot}CH_2^{(3)}{\cdot}COCl$	(1) +76.9	(2) +71.1	(1-2) 157	(2-3) 6.0	699
$C_2F_5H_3O_2S$	$F^{(1)}SF_4^{(2)}{\cdot}CH_2^{(3)}{\cdot}CO_2H$	(1) +77.6	(2) +70.9	(1-2) 154	(2-3) 6.5	699
C_2F_9NS		(1) +98.5 (3) +66.7	(2) +77.2	(1-2) 31.2 (2-3) 208.0 (2-4) 3.6	(1-3) 210.6 (1-4) 21.6 (3-4) 3.0	205

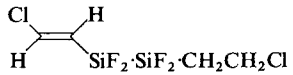
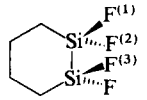
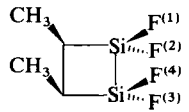
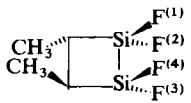
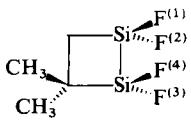
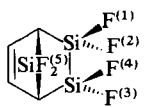
$C_2F_{10}HBrS_2$	$F^{(1)}F_4^{(2)}S{\cdot}C(Br){=}CH{\cdot}SF_4^{(3)}F^{(4)}$	(1)(4) +73.2 (2)(3) +64.7, +60.4		(1-2)(3-4) 154, 155		224
$C_2F_{10}S_2$	$F^{(1)}F_4^{(2)}S{\cdot}C{=}C{\cdot}SF_4F$	(1) +67.1	(2) +79.7	(1-2) 148		224
$C_3F_5H_5OS$	$F^{(1)}SF_4^{(2)}{\cdot}CH_2^{(3)}{\cdot}COCH_3$	(1) +80.0	(2) +70.4	(1-2) 151	(2-3) 9	699
C_4FH_8NOS		(−)39.7				715
$C_4F_2H_8ClNO_4S_2$	$CH_3{\cdot}CHCl{\cdot}CH(CH_3){\cdot}N(SO_2F)_2$	+59.0				397
$C_4F_2H_9NO_4S_2$	$CH_3{\cdot}CH_2{\cdot}CH(CH_3){\cdot}N(SO_2F)_2$	+59.2				397
$C_4F_2H_{12}N_5O_2PS_2$	*cis*-$NP(NHEt)_2(NSOF)_2$	+72.9		(P-F) 2.1		692
$C_4F_3H_6NS$		(−)57.8				715
$C_4F_3H_8NS$		(1) (−)60.8	(2) (−)33.18	(1-2) 54.1	(2-H) 13.3	715
$C_4F_5H_4ClO_2S$	$F^{(1)}SF_4^{(2)}{\cdot}CH_2^{(3)}{\cdot}\overline{CCl{\cdot}CH_2{\cdot}CO{\cdot}O}$	(1) +80.1	(2) +68.9	(1-2) 152	(2-3) 7.5	699
$C_4F_{10}N_2OS$	$(CF_3)_2CF{\cdot}N{=}SF_2^{(1)}{=}N{\cdot}COF$	(1) +58.9				246
$C_5F_8HAsNO_6ReS$	$[Re(CO)_5HNSOF_2^{(1)}]^+\ AsF_6^-$	(1) +52.5				724
C_6FH_5OS	$C_6H_5S(O)F$	+6.5		(F-C1) 8.2 (F-C3) 1.9	(F-C2) 4.1 (F-C4) 3.2	588
$C_6FH_5O_2S$	$C_6H_5SO_2F$	+65.3		(F-C1) 24.3 (F-C4) 0.5	(F-C2) 0.4	588
$C_6F_3H_5OS$	$C_6H_5S(O)F_2^{(1)}F^{(2)}$	(1) +102.0	(2) +66.0	(1-2) 162.4 (1-C2) 6.5 (2-C1) 0.5	(1-C1) 20.1 (1-C4) 1.4	588
$C_6F_8AsMnN_2O_5S$	$[Mn(CO)_5NC{\cdot}NSF_2^{(1)}]^+\ AsF_6^-$	(1) +48.6				734
$C_6F_8AsMnO_6S$	$[Mn(CO)_5NC{\cdot}NSOF_2^{(1)}]^+\ AsF_6^-$	(1) +48.4				734
$C_6F_8AsN_2O_5ReS$	$[Re(CO)_5NC{\cdot}NSF_2^{(1)}]^+\ AsF_6^-$	(1) +46.3				734

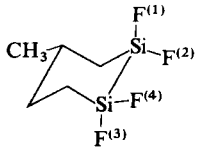
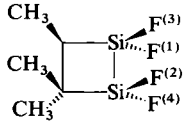
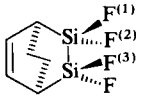
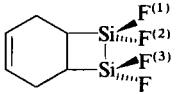
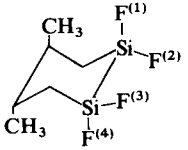
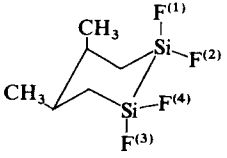
Molecular formula	Structure of compounds		Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_7FH_9O_3S$			+38.15		737
$C_7FH_{11}O_3S$			+38.5		737
$C_7F_2H_7NS$	$C_6H_5{\cdot}CH_2^{(2)}{\cdot}N{=}SF_2^{(1)}$		(−)67.4	(1-2) 10.2	715
$C_7F_2H_{10}O_6S_2$		*2-exo,5-exo*	(2)(5) +38.4		737
		2-exo,5-endo	(2) +38.6 (5) +37.3		
		2-exo,7-anti	(2) +38.6 (7) +37.3		
		2-exo,7-syn	(2) +37.8 (7) +37.15		
$C_7F_2H_{12}O_7S_2$		*5-exo*	(1) +38.4		737
		5-endo	(1) +38.65		
		7-anti	(1) +38.5		
		7-syn	(1) +37.55		
$C_7F_2H_{14}N_4O_5S_3$	$(FSO_2N{=})_2\overline{S{\cdot}NEt{\cdot}CO{\cdot}NBu^t}$		+60.16		345
$C_8F_{10}H_6O_4S_2$			(1)(3) +80.8, +78.5 (2)(4) +71.9, +67.4	(1-2)(3-4) 153, 160 (2-5)(4-6) 7.4, 7.6	699
$C_9F_2H_{18}N_4O_5S_3$	$(FSO_2N{=})_2\overline{S{\cdot}NBu^t{\cdot}CO{\cdot}NBu^t}$		+60.7		345
$C_9F_{10}H_{18}N_4OS_3$	$(F^{(2)}F_4^{(1)}SN{=})_2\overline{S{\cdot}NBu^t{\cdot}CO{\cdot}NBu^t}$		(1) +83.65 (2) +81.88	(1-2) 160.9	345

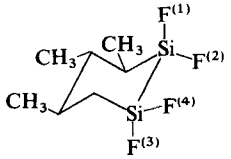
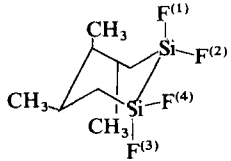
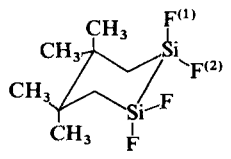
$C_{11}F_3H_{14}NS$		(−) 41.5			715
$C_{12}F_2H_{10}OS$	$(C_6H_5)_2SF_2(O)$	+100.7			609
$C_{12}F_2H_{10}S$	$(C_6H_5)_2SF_2$	+6.8	(F-C1) 4.5 (F-C4) 1.7	(F-C2) 4.5	706
$C_{14}F_3H_{12}NS$		(−) 47.2			715
$C_{18}FH_{15}Cl_3N_4OP_3S$	$NPCl_2NPCl(NPPh_3)NSOF$	+72.7	^3J(P-F) 5	$^5J(P_c$-F) 2	751
$C_{18}F_2H_{15}ClN_4O_2P_2S_2$	$NPCl(NPPh_3)(NSOF)_2$	+70.0	^3J(P-F) 3		751
$C_{18}F_{14}O_2S$		(1) +104			379
FHO_3S	FSO_2OH	+41.5			724
$FCl_4N_3OP_2S$	$(NPCl_2)_2NSOF$	+75.9	^3J(P-F) 3		751
F_2H_2NOS	H_2NSOF_2	+48.5			724
$F_2Cl_2N_3O_2PS_2$	*cis*-$NPCl_2(NSOF)_2$	+73.2	(P-F) 1		692, 751
F_2O_2S	SO_2F_2	+33.5			171
F_3NOS_2	$F^{(1)}S(O)NSF_2^{(2)}$	(1) +53.0	(2) +58.4	(1-2) 16	760
$F_4HAuO_{12}S_4$	$H[Au(SO_3F)_4]$	+46.5			761
$F_4AuCuO_{12}S_4$	$Cu[Au(SO_3F)_4]$	+45.4			761

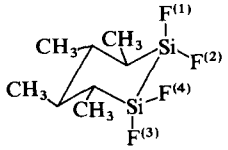
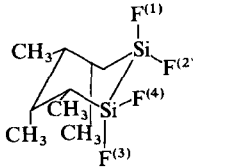
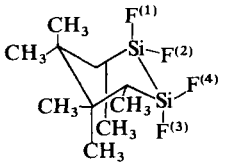
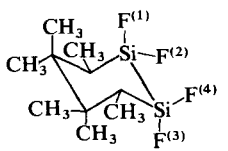
Molecular formula	Structure of compounds	Chemical shifts (ppm)		Coupling constants (Hz)		Ref.
$F_5N_2S_3$	$F^{(1)}SF_4^{(2)}\cdot N{=}SF^{(3)}\cdot N{=}SF_2^{(4,5)}$	(1) +76.3	(2) +81.5	(1-2) 155.5	(1-3) 0.9	760
		(3) +39.5	(4) +57.7	(1-4) <1	(1-5) 0.2	
		(5) +56.0		(2-3) 12.0	(2-4) 3.3	
				(2-5) 4.9	(3-4) 17.0	
				(3-5) 3.9	(4-5) 11.5	
F_6O_3SSb	$F^{(1)}SbF_4^{(2)}OSO_2F^{(3)}$	(1) −129.8	(2) −114.8	(1-2) ~100	(2-3) 2.2	724
		(3) +40.6				
F_6S	SF_6	+50				171
$F_7HNOSSb$	$SbF_4^{(2)}F\cdot HNSOF_2^{(1)}$	(1) +50.8		(1-2) 5.5		724
Fluorine bonded to selenium						
CF_5H_3OSe	$CH_3^{(3)}OSeF_4^{(2)}F^{(1)}$	(1) +73.6	(2) +49.2	(1-2) 228	(2-3) 1.7	700
				(Se-1) 1309	(Se-2) 1324	
$C_6F_3H_4NO_2Se$	$o NO_2\cdot C_6H_4SeF_2^{(1)}F^{(2)}$	(1) +3.1	(2) −70.0	(1-2) 128.9		731
$C_6F_3H_5Se$	$C_6H_5SeF_3$	−24.0				731
$C_7F_2H_8Se$	$C_6H_5SeF_2^{(1)}CH_3^{(2)}$	−68.3		(1-2) 9.9	(Se-F) 581	706
				(1-C*o*) 7.0	(F-C*m*) 1.1	
				(1-C*p*) 1.3	(F-C2) 8.8	
				(1-C*i*) 4.7		
$C_7F_3H_7Se$	$p CH_3\cdot C_6H_4SeF_3$	−22.6				731
$C_8F_3H_9Se$	$o CH_3CH_2\cdot C_6H_4SeF_2^{(1)}F^{(2)}$	(1) +6.9	(2) −70.5			731
$C_{12}F_2H_{10}Se$	$(C_6H_5)_2SeF_2$	−66.8		(Se-F) 581	(F-C1) 4.9	706
				(F-C2) 6.5	(F-C3) 1.0	
				(F-C4) 1.4		
Fluorine bonded to silicon						
$CF_4HO_2Si^-$	SiF_4OOCH^-	−117.8				695

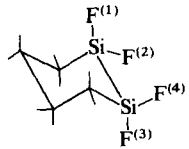
CF_4N^-	SiF_4SCN^-	−148.7		695
CF_4NSi^-	SiF_4CN^-	−130.1	(Si-F) 105	695
$C_2FH_3Cl_2Si$	$CH_2{=}CH{\cdot}SiFCl_2$	−125.6	^3J(F-H) ≈ ^4J(F-H) ∼2.8	663
$C_2F_2H_3ClSi$	$CH_2{=}CH{\cdot}SiF_2Cl$	−138.9	^3J(F-H) ≈ ^4J(F-H) ∼3.0	663
$C_2F_2H_3ClSi$	Same as above	−126.9		704
$C_2F_3H_3Si$	$CH_2{=}CH{\cdot}SiF_3$	−142.7	^3J(F-4) ≈ ^4J(F-H) ∼3.2	663
$C_2F_4H_3O_2Si^-$	$SiF_4{\cdot}CH_3CO_2^-$	−120.8	(Si-F) 155	695
$C_2F_4H_4Si_2$		−125.6	(1-2) −3.0 (1-3) −13.5 ^1J(Si-F) 408 ^2J(Si-F) 33.0	708, 709
$C_2F_7O_2Si^-$	$SiF_4{\cdot}CF_3CO_2^-$	−124.9	(Si-F) 92	695
$C_3F_4H_6Si_2$		(1) −124.2 (2) −127.4 (3) −128.6 (4) −133.2	(1-2) ±41.08 (3-4) +41.88 (1-4) −1.95 (2-3) −2.10 (1-3) −15.32 (2-4) −15.83 ^1J(Si-F) ±405, ±413 ^2J(Si-F) ±32.0, ±30.1	708, 709
$C_4F_2H_6Si$	$(CH_2{=}CH)_2SiF_2$	−143.8	^2J(F-C) 20 ^3J(F-C) 3.6	663
$C_4F_4H_6Cl_2Si_2$		−135.2, −136.2, −140.2, −140.9		704
$C_4F_4H_6Cl_2Si_2$		−136.2, −138.0		704

Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_4F_4H_6Cl_2Si_2$		−135.7, −136.7		704
$C_4F_4H_8Si_2$		−140.0	(1-2) +6.8 (1-3) +2.2 (2-3) −14.6 ^1J(Si-F) ±348 ^2J(Si-F) ±39.4	717, 709
$C_4F_4H_8Si_2$		(1) −132.7 (2) −130.2	(1-2) +42.78 (1-3) −15.11 (1-4) −2.30 ^1J(Si-F) ±413 ^2J(Si-F) ±31.7	708, 709
$C_4F_4H_8Si_2$		(1) −125.0 (2) −137.0	(1-2) +41.70 (1-3) −15.23 (1-4) −2.08 ^1J(Si-F) ±409, ±416 ^2J(Si-F) ±32.1, ±29.1	708, 709
$C_4F_4H_8Si_2$		(1) −126.1 (3) −134.2	(1-2) +37.0 (1-3) −13.8 (1-4) −3.7 (3-4) +37.0	708, 709
$C_4F_6H_4Si_3$			(1-2) +33.0 (5A-5B) +61.0 (1-4) <0.5 (1-3) −15.6 ^1J(Si-F) ±367, ±333, ±355, ±354 ^2J(Si-F) ±55.2, ±34.7 ^3J(Si-F) ±10.5, ±1.5 (Si of bridgehead) ±7.5, ±2.5 (Si of Si_2F_4)	709

$C_5F_4H_{10}Si_2$		(1) −143.0 (2) −139.2 (3) −142.0 (4) −137.0	(1-2)(3-4) +6, +7 (1-4)(2-3) +2, +2 (1-3) −18 (2-4) 11	717, 709
$C_5F_4H_{10}Si_2$		(1) −125.2 (2) −131.4 (3) −135.6 (4) −139.0	(1-2) −14.56 (1-3) +43.97 (1-4) −2.30 (2-3) −2.22 (2-4) +45.05 (3-4) −14.50	717, 709
$C_6F_3H_{14}NSi$	$[(CH_3)_2CH]_2NSiF_3$	−145.8	^4J(F-H) 2.0	732
$C_6F_4H_5SSi^-$	$SiF_4SC_6H_5^-$	−125.5		695
$C_6F_4H_8Si_2$			(1-2) +2.5 (1-3) −1.5 (2-3) −13.5	709
$C_6F_4H_8Si_2$			(1-2) +14.8 (1-3)(2-3) −17.1, −9.2	709
$C_6F_4H_{12}Si_2$		(1) −135.7 (2) −137.7	(1-2) +7 (1-3) +3 (1-4) −14.5 (2-3) 11.0 ^1J(Si-F) ±347 ^2J(Si-F) ±37.4	717
$C_6F_4H_{12}Si_2$		(1) −133.9 (2) −139.2 (3) −142.2 (4) −136.8	(1-2) +6.4(av.) (1-4)(2-3) +3.4, +2.9 (1-3) −13.8(av.) ^1J(Si-F) ±348(av.) ^2J(Si-F) ±36.6	717, 709

Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_6F_4H_{12}Si_2$	$CH_2{=}CH{\cdot}CH_2{\cdot}SiF_2{\cdot}SiF_2{\cdot}CH_2CH_2CH_3$	−135.4, −136.2		708
$C_7F_2H_{12}NSi$	$(CH_3CH_2CH_2^{(3)})_2NSiF_2^{(1)}CH_3^{(2)}$	−135.5	(1-2) 4.5 (1-3) 2.5 (Si-F) 262	732
$C_7F_4H_{14}Si_2$		(1) −150.5 (2) −141.5 (3) −144.2 (4) −136.4	(1-2)(3-4) +10, +6 (1-4)(2-3) +2, +2 (1-3) −15 (2-4) −11	717
$C_7F_4H_{14}Si_2$		(1) −139.8 (2) −144.2 (3) −135.0 (4) −136.2	(1-2)(3-4) +8, +7 (1-4)(2-3) ~0 (1-3) −18 (2-4) −8	717
$C_8F_2H_{24}N_2Si_4$	$F^{(1)}Si(CH_3^{(2)})_2\overline{N{\cdot}Si(CH_3)_2{\cdot}N(SiMe_2F)}{\cdot}Si(CH_3)_2$	−134.6	(1-2) 6.2	730
$C_8F_3H_{18}NSi$	$[CH_3CH(CH_2CH_3)]_2NSiF_3$ Isomer [a] Isomer [b]	−145.7 −145.0	^4J(F-H) 2.0 (Si-F) 207.6	732
$C_8F_3H_{25}N_2Si_4$	$F^{(2)}(CH_3^{(4)})_2Si{\cdot}NH{\cdot}Si(CH_3^{(5)})_2{\cdot}N[Si(CH_3^{(3)})_2F^{(1)}]_2$	(1) −133.5 (2) −131.9	(1-3)(2-4) 7.4, 6.15 (1-5)(2-5) 1.2, 1.0	730
$C_8F_4H_{16}Si_2$		(1) −135.9 (2) −138.4		717

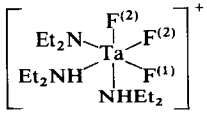
$C_8F_4H_{16}Si_2$		(1) −151.7 (2) −139.9	(1-2) +8 (1-4) +2.5 (1-3) −14.0 (2-4) −12.4 ^1J(Si-F) ±351 ^2J(Si-F) ±35	717
$C_8F_4H_{16}Si_2$		(1) −147.6 (2) −144.6 (3) −135.2 (4) −142.5	(1-2)(3-4) +10, +3 (1-4)(2-3) ~0 (1-3) −17 (2-4) −10	717
$C_8F_4H_{16}Si_2$	$CH_2{=}C(CH_3){\cdot}CH_2{\cdot}SiF_2{\cdot}SiF_2{\cdot}CH_2CH(CH_3)_2$	−129.7, −131.6		708
$C_9FH_{26}N_3Si_3$	$[(CH_3^{(2)})_3Si]_2N{\cdot}\overline{SiF^{(1)}{\cdot}CH_2^{(3)}{\cdot}C(CH_3){=}N}{\cdot}NCH_3^{(4)}$	−120.62	(1-2) 1.3 (1-3) 10.5 (1-4) 1.9 ^1J(Si-1) 279.88 ^3J(Si-1) 4.22	739(b)
$C_9F_2H_{24}N_2OSi_3$	$(CH_3)C{=}N{\cdot}O{\cdot}SiF_2^{(1)}{\cdot}N[Si(CH_3^{(2)})_3]_2$	−137.1	(1-2) 0.85	740(b)
$C_{10}F_2H_{27}N_3Si_3$	$[(CH_3^{(2)})_3Si]_2N{\cdot}SiF_2^{(1)}{\cdot}N(CH_3^{(3)}){\cdot}N{=}C(CH_3^{(4,5)})_2$	−133.02	(1-2) 0.95 (1-3) 1.3 (1-4 or 5) 0.75 ^1J(Si-1) 226.3 ^3J(Si-1) 1.1	739(b)
$C_{10}F_4H_{20}Si_2$		(1) −144.7 (2) −144.9 (3) −135.5 (4) −143.4	(1-2)(3-4) +10, +6 (1-4)(2-3) +4, +4 (1-3) −14 (2-4) −10	717, 709
$C_{10}F_4H_{20}Si_2$		(1) −146.1 (2) −143.7	(1-2) +4 (1-4) +4 (1-3) −14.0 (2-4) −8.5 ^1J(Si-F) ±350	717, 709

Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)		Ref.
$C_{10}F_4H_{20}Si_2$	$CH_2{=}C(CH_3)\cdot CH(CH_3)\cdot SiF_2\cdot SiF_2\cdot CH(CH_3)\cdot C(CH_3)_2H$	−133.6, −135.2			708
$C_{10}F_4H_{30}N_2Si_5$	$[((CH_3^{(2)})_2F^{(1)}Si)_2N]_2Si(CH_3^{(3)})_2$	−133.0	(1-2) 7.6	(1-3) 0.6	730
			^5J(1-2) 1.4		
$C_{11}FH_{17}N_2Si$	$C_6H_5N[SiF^{(1)}(CH_3^{(2)})_2]\cdot N{=}C(CH_3)_2$	−137.2	(1-2) 6.2	(Si-1) 283.2	742(b)
$C_{11}FH_{19}NSi$	$C_6H_5SiF^{(1)}[C(CH_3^{(2)})_3]\cdot NH\cdot CH_3$	−158.48	(1-2) 0.9	(Si-1) 299.3	743(b)
$C_{11}FH_{24}NOSi$	$[(CH_3^{(2)})_3C]_2SiF^{(1)}\cdot O\cdot N{=}C(CH_3)_2$	−157.6	(1-2) 1.3		740(b)
$C_{12}FH_{30}N_3O_2Si_3$	$[(CH_3)_2C{=}N\cdot O]_2SiF^{(1)}\cdot N[Si(CH_3^{(2)})_3]_2$	−135.5	(1-2) 1.0		740(b)
$C_{12}FH_{34}N_3Si_3$	$[CH_3NSi(CH_3^{(2)})_3]_2SiF^{(1)}\cdot NHC(CH_3)_3$	−122.82	(1-2) 1.2		743(b)
$C_{12}F_2H_{28}N_2Si$	$[(n\text{-}C_3H_7)_2N]_2SiF$	−146.2	^4J(F-H) 1.5	(Si-F) 221	732
$C_{12}F_2H_{32}N_2Si_3$	$[(CH_3^{(4)})_2CH^{(3)}\cdot N\cdot Si(CH_3^{(2)})_3]_2SiF_2^{(1)}$	−121.12	(1-2) 0.7	(1-3) 1.75	381(b)
			(1-4) 0.6	(Si-F) 238.0	
$C_{12}F_4H_{24}Si_2$		(1) −136.8 (2) −149.7	(1-2) +10	(1-4) −3.5	717,
			(1-3) −17.0	(2-4) −8.6	709
			(Si-F) ±353		
$C_{12}F_4H_{24}Si_2$	$CH_2{=}C(CH_3)\cdot C(CH_3)_2\cdot SiF_2\cdot SiF_2\cdot C(CH_3)_2\cdot CH(CH_3)_2$	−134.5, −136.3, −138.8, −139.9			708
$C_{12}F_6H_{24}Si_3$	$CH_2{=}C(CH_3)\cdot C(CH_3)_2\cdot SiF_2\cdot SiF_2^{(1)}\cdot SiF_2\cdot C(CH_3)_2\cdot CH(CH_3)_2$	(1) −135.4			708
$C_{13}FH_{20}NOSi$	$(CH_3)_2C{=}N\cdot O\cdot SiF^{(1)}(C_6H_5)\cdot C(CH_3^{(2)})_3$	−159.3	(1-2) 0.9		740(b)
$C_{13}FH_{26}NOSi$	$(CH_2)_4C{=}NO\cdot SiF^{(1)}[C(CH_3^{(2)})_3]_2$	−157.2	(1-2) 1.2		740(b)
$C_{13}F_2H_{28}N_2OSi_2$	$(CH_2)_5C{=}N\cdot O\cdot SiF_2^{(1)}\cdot N[C(CH_3^{(2)})_3]\cdot Si(CH_3^{(3)})_3$	−134.3	(1-2) 0.85	(1-3) 1.1	740(b)
$C_{14}FH_{23}ClNPSi$	$(CH_3)C\cdot SiF(C_6H_5)\cdot N[C(CH_3)_3]\cdot PCl_2$	−155.1	(P-F) 36		733(b)
$C_{14}FH_{23}Cl_3GeNSi$	$(CH_3^{(2)})_3C\cdot Si(C_6H_5)F^{(1)}\cdot N[C(CH_3)_3]\cdot GeCl_3$	−138.4	(1-2) 1.2	(Si-F) 275.4	733(b)
$C_{14}FH_{23}N_2Si$	$(CH_3)_3C\cdot C(CH_3){=}N\cdot N(C_6H_5)\cdot SiF^{(1)}(CH_3^{(2)})_2$	−137.6	(1-2) 6.2	(Si-F) 282.6	742(b)
$C_{14}FH_{28}NOSi$	$(CH_2)_5C{=}N\cdot O\cdot SiF^{(1)}[C(CH_3^{(2)})_3]_2$	−157.2	(1-2) 1.1		740(b)
$C_{14}F_3H_{24}NSi_2$	$(CH_3^{(5)})_3C\cdot SiF^{(3)}(C_6H_5)\cdot N[CH(CH_3)_2]\cdot SiF_2^{(1,2)}CH_3^{(4)}$	(1) −123.29 (2) −121.78	(1,2-4) 5.5	(4-5) 1.1	743(b)
		(3) −160.07	(3-4) 2.2	(1-2) 40	
			(Si-1,2) 275.0	(Si-3) 283.1	
			^3J(Si-1,2) 1.5		

$C_{14}F_3H_{24}NSi_2$	$(CH_3^{(3)})_3C{\cdot}SiF^{(1)}(C_6H_5){\cdot}N[C(CH_3)_3]{\cdot}SiF_2^{(2)}H^{(4)}$	(1) −71.73		(1-3) 1.25 (1-4) 5 (Si-2) 280.1	(2-4) 84 (Si-1) 284.89	743(b)
$C_{15}FH_{40}N_3Si_3$	$[(CH_3^{(2)})_2CH{\cdot}N{\cdot}Si(CH_3^{(3)})_3]_2SiF^{(1)}{\cdot}NH{\cdot}CH(CH_3)_2$	−116.85		(1-2) 1.3 ^1J(Si-F) 242.9 ^3J(Si-F) 1.2	(1-3) 0.7	381(b)
$C_{15}F_3H_{26}NSi_2$	$(CH_3^{(5)})_3C{\cdot}SiF^{(1)}(C_6H_5){\cdot}N(CH_3^{(3)}){\cdot}SiF_2^{(2)}{\cdot}C(CH_3^{(4)})_3$	(1) −163.5	(2) −143.9	(1-2) 7.5 (1-5) 1 (Si-2) 298.1	(1-3) 1.1 (2-4) 1 (Si-1) 284.8	743(b)
$C_{15}F_3H_{26}NSi_2$	$(CH_3^{(4)})_3C{\cdot}SiF^{(1)}(C_6H_5){\cdot}N[C(CH_3)_3]{\cdot}SiF_2^{(2)}CH_3^{(3)}$	(1) −151.05	(2) −118.8, −117.9	(2A-2B) 36 (1-3) 1.8 ^1J(Si-1) 280 ^3J(Si-1) 6.7	(2-3) 5.2 (1-4) 1.6 ^1J(Si-2) 274.4 ^3J(Si-2) 1.9	743(b)
$C_{16}FH_{19}N_2Si$	$C_6H_5N[SiF^{(1)}(CH_3^{(2)})(C_6H_5)]N{=}C(CH_3)_2$	−146.3		(1-2) 6.3	(Si-F) 283.2	742(b)
$C_{16}FH_{20}NSi$	$(CH_3^{(2)})_3C{\cdot}SiF^{(1)}(C_6H_5){\cdot}NH{\cdot}C_6H_5$	−160.95		(1-2) 0.7	(Si-F) 296.1	743(b)
$C_{16}FH_{24}NOSi$	$(CH_2)_5C{=}N{\cdot}O{\cdot}SiF^{(1)}[C(CH_3^{(2)})_3]{\cdot}C_6H_5$	−159.5		(1-2) 1.0		740(b)
$C_{16}F_3H_{42}N_3Si_4$	$[(CH_3^{(3)})_3Si{\cdot}N(CH_3)]_2SiF^{(1)}{\cdot}N[(C(CH_3^{(5)})_3]{\cdot}SiF_2^{(2)}{\cdot}C(CH_3^{(4)})_3$	(1) −113.4	(2) −128.52	(1-3) 1.0 (1-5)(2-5) 0.8 ^1J(Si-1) 230.7 ^3J(Si-) 2.9	(2-4)(1-4) 1.3, 0.4 ^2J(Si-2) 295.4	381(b)
$C_{17}FH_{37}N_3Si_3$	$[(CH_3^{(2)})_3Si{\cdot}N(CH_3^{(3)})]_2SiF^{(1)}{\cdot}NH{\cdot}C_6H_2(CH_3)_3$−2,4,6	−118.77		(1-2) 1.1 ^1J(Si-F) 227.1	(1-3) 1.5 ^3J(Si-F) 0.6	381(b)
$C_{17}F_3H_{22}NSi_2$	$(CH_3^{(3)})_3C{\cdot}SiF^{(1)}(C_6H_5){\cdot}N(C_6H_5){\cdot}SiF_2^{(2)}CH_3^{(4)}$	(1) −158.53	(2) −129.0, −127.8	(2A-2B) 42 (1-4) 0.65 (1-3) 1.1 ^1J(Si-2) 273.6	(1-2) 4.5, 5 (2-4) 5 ^1J(Si-1) 295.7	743(b)
$C_{18}FH_{16}NSi$	$(C_6H_5)_2SiF{\cdot}NH{\cdot}C_6H_5$	−151.55		(Si-F) 282.3		743(b)
$C_{18}FH_{38}N_3Si_3$	$(CH_3^{(2)})_3Si{\cdot}N[CH(CH_3^{(3)})_2]{\cdot}SiF^{(1)}[NH{\cdot}CH(CH_3)_2]{\cdot}N(C_6H_5){\cdot}Si(CH_3^{(4)})_3$	−119.14		(1-2)(1-4) 0.65, 1.0 ^1J(Si-F) 239.7	(1-3) 1.2 ^3J(Si-F) 3.0	381(b)

Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_{18}FH_{38}N_3Si_3$	$(CH_3^{(2)})_3Si{\cdot}N[CH(CH_3)_2]{\cdot}SiF^{(1)}(NH{\cdot}C_6H_5){\cdot}N[CH(CH_3)_2]{\cdot}Si(CH_3)_3$	−118.87	(1-2) 0.85 ^1J(Si-F) 235.7 ^3J(Si-F) 1.1	381(b)
$C_{18}F_3H_{38}N_3Si_2$	$[(CH_3^{(3)})_3Si{\cdot}N(CH_3^{(4)})]_2SiF^{(1)}{\cdot}N[C(CH_3)_3]{\cdot}SiF_2^{(2)}{\cdot}C_6H_5$	(1) −113.05 (2) −124.3	(1-3) 1.3 (1-4) 1.8 ^1J(Si-1) 236.9 ^1J(Si-2) 269.9 ^3J(Si-2) 2.2	743(b)
$C_{19}FH_{38}N_3O_2Si_2$	$[(CH_2)_5C{=}N{\cdot}O]_2SiF^{(1)}{\cdot}N[Si(CH_3^{(2)})_3]{\cdot}C(CH_3^{(3)})_3$	−133.0	(1-2) 1.1 (1-3) 0.9	740(b)
$C_{19}F_3H_{48}N_3Si_4$	$[(CH_3^{(3)})_3Si{\cdot}N{\cdot}CH(CH_3)_2]_2SiF^{(1)}{\cdot}N[CH(CH_3)_2]{\cdot}SiF_2^{(2)}{\cdot}C(CH_3)_3$	(1) −112.6 (2) −133.6	(1-3) 1.4 ^1J(Si-1) 234.9 ^1J(Si-2) 299.4	381(b)
$C_{20}FH_{42}N_3Si_3$	$(CH_3^{(2)})_3Si{\cdot}N[CH(CH_3^{(4)})_2]{\cdot}SiF^{(1)}[NH{\cdot}CH(CH_3^{(5)})_2]{\cdot}N[Si(CH_3^{(3)})_3]{\cdot}C_6H_3(CH_3)_2$-3,5	−119.28	(1-2)(1-3) 0.6, 0.9 (1-4)(1-5) 1.4, 1.4 ^1J(Si-F) 239.9 ^3J(Si-F) 3.4	381(b)
$C_{20}F_2H_{28}OSi_2$	$[Bu^tSiF(C_6H_5)]_2O$	−152.3, −152.2	^4J(F-H) 0.7	740(b)
$C_{20}F_3H_{28}NSi_2$	$(CH_3)_3C{\cdot}SiF^{(1)}(C_6H_5){\cdot}N[C(CH_3)_3]{\cdot}SiF_2^{(2)}{\cdot}C_6H_5$	(1) −153.57 (2) −126.1	^1J(Si-1) 283.2 ^1J(Si-2) 270.4	743(b)
$C_{21}FH_{44}N_3Si_3$	$(CH_3^{(2)})_3Si{\cdot}N[CH(CH_3^{(4)})_2]{\cdot}SiF^{(1)}[NH{\cdot}CH(CH_3)_2]{\cdot}N[Si(CH_3^{(3)})_3]{\cdot}C_6H_2(CH_3)_3$—2,4,6	−117.97	(1-2)(1-3) 1.2, 1.1 (1-4) 1.0 ^1J(Si-F) 235.9 ^3J(Si-F) 2.7, 0.5	381(b)
$C_{21}FH_{44}N_3Si_3$	$(CH_3^{(2)})_3Si{\cdot}N[C(CH_3^{(4)})_3]{\cdot}SiF^{(1)}[NH{\cdot}C(CH_3^{(5)})_3]{\cdot}N[Si(CH_3^{(3)})_3]{\cdot}C_6H_4{\cdot}CH_3$-*p*	−112.00, −111.80	(1-2)(1-3) 0.7, 1.5 (1-4)(1-5) 0.7, 0.8 ^1J(Si-F) 236.8 ^3J(Si-F) 3.5, 0.9	381(b)
$C_{22}F_2H_{36}N_2Si_3$	$[(CH_3^{(2)})_3Si{\cdot}N{\cdot}C_6H_3Me_2$-3,5$)]_2SiF_2^{(1)}$	−130.07	(1-2) 0.8 ^1J(Si-F) 229.1 ^3J(Si-F) 0.7	381(b)

$C_{24}F_3H_{42}N_3Si_4$	$(CH_3^{(3)})_3Si{\cdot}N[CH(CH_3)_2]{\cdot}SiF^{(1)}[NCH(CH_3)_2{\cdot}Si(CH_3)_3]{\cdot}N(C_6H_5){\cdot}SiF_2^{(2)}{\cdot}C_6H_5$			381(b)
		(1) −112.5 (2) −131.0	(1-3) 1.3 ^1J(Si-1) 235.9 ^1J(Si-2) 271.3 ^3J(Si-F) 1.8	
$C_{24}F_3H_{42}N_3Si_4$	$(CH_3^{(3)})_3Si{\cdot}N[CH(CH_3)_2]{\cdot}SiF^{(1)}[N(C_6H_5)(Si(CH_3^{(4)})_3)]{\cdot}N[CH(CH_3)_2]{\cdot}SiF_2^{(2)}{\cdot}C_6H_5$			381(b)
		(1) −116.0 (2) −126.8, −128.1	(1-3)(1-4) 1.2, 1.5 ^1J(Si-1) 271.7 ^1J(Si-2) 235.1	
$C_{24}F_3H_{50}N_3Si_4$	$(CH_3^{(3)})_3Si{\cdot}N[CH(CH_3)_2]{\cdot}SiF^{(1)}[N(Si(CH_3)_3)(CH(CH_3)_2)]{\cdot}N(C_6H_3Me_2\text{-}3,5){\cdot}SiF_2^{(2)}{\cdot}C(CH_3^{(4)})_3$			381(b)
		(1) −112.6 (2) −137.7	(1-3) 1.4 (2-4) 1.0 ^1J(Si-1) 236.9 ^1J(Si-2) 296.3 ^3J(Si-F) 1.8	
$C_{26}FH_{46}N_3Si_3$	$[(CH_3^{(2)})_3Si{\cdot}N(C_6H_3Me_2\text{-}3,5)]_2SiF^{(1)}{\cdot}NH{\cdot}C(CH_3)_3$	−121.6	(1-2) 1.0 ^1J(Si-F) 232.2 ^3J(Si-F) 0.4	381(b)
$C_{30}FH_{46}N_3Si_3$	$[(CH_3^{(2)})_3Si{\cdot}N(C_6H_3Me_2\text{-}3,5)]_2SiF^{(1)}{\cdot}NH{\cdot}C_6H_3Me_2\text{-}3,5$	−124.07	(1-2) 1.1 ^1J(Si-F) 228.9	381(b)
$C_{34}F_3H_{54}N_3Si_4$	$[(CH_3^{(3)})_3Si{\cdot}N{\cdot}C_6H_3Me_2\text{-}3,5]_2SiF^{(1)}{\cdot}N(C_6H_3Me_2\text{-}3,5){\cdot}SiF_2^{(2)}{\cdot}C(CH_3^{(4)})_3$			381(b)
		(1) −118.9 (2) −142.3	(1-3) 1.4 (2-4) 0.9 ^1J(Si-1) 231.1 ^1J(Si-2) 297.2	
$(C_3F_2H_6Si)_n$	$-[CH(CH_3){\cdot}CH_2{\cdot}SiF_2]_n-$		^2J(F-F) 21 ^1J(Si-F) +314	709
$(C_4F_2H_8Si)_n$	$-[CH(CH_3){\cdot}CH(CH_3){\cdot}SiF_2]_n-$		^1J(Si-F) +324.5	709
$(C_4F_2H_8Si)_n$	$-[C(CH_3)_2{\cdot}CH_2{\cdot}SiF_2]_n-$		^1J(Si-F) +323.7	709
$(C_4F_4H_8Si)_n$	$-[CH(CH_3){\cdot}CH(CH_3){\cdot}Si_2F_4]_n-$	*cis*-butene polymer	^1J(Si-F) 353.2	709
		trans-butene polymer	354.9	
$(C_5F_2H_{10}Si)_n$	$-[C(CH_3)_2{\cdot}CH(CH_3){\cdot}SiF_2]_n-$		^1J(Si-F) 332.9	709
$F_4ClO_3Si^-$	$SiF_4ClO_3^-$	−135.7		695
$F_4NO_2Si^-$	$SiF_4NO_2^-$	−136.5	(Si-F) 150	695
$F_4NO_3Si^-$	$SiF_4NO_3^-$	−142.3		695
$F_4N_3Si^-$	$SiF_4N_3^-$	−136.0	(Si-F) 132	695
F_4Si	SiF_4	−158.8	(Si-F) 172	695
$F_6H_8N_2Si$	$(NH_4)_2SiF_6$	−139.9		762(b)
F_6Cs_2Si	Cs_2SiF_6	−121.9		762(b)
F_6K_2Si	K_2SiF_6	−136.9		762(b)

Molecular formula	Structure of compounds	Chemical shifts (ppm)		Coupling constants (Hz)	Ref.
F_6Na_2Si	Na_2SiF_6	−158.9			762(b)
F_6Rb_2Si	Rb_2SiF_6	−138.9			762(b)
F_6Si^{2-}	SiF_6^{2-}	−125.0		(Si-F) 110	762(b)
Fluorine bonded to tin					
F_2Sn	SnF_2	−87.0			756
$F_6H_8N_2Sn$	$(NH_4)_2SnF_6$	−163.9			762(b)
F_6BSn	$SnF_2^{(1)}BF_4$	(1) −189.7			756
F_6Cs_2Sn	Cs_2SnF_6	−141.9			762(b)
F_6Na_2Sn	Na_2SnF_6	−194.9			762(b)
F_6Rb_2Sn	Rb_2SnF_6	−154.9			762(b)
F_9BSn_3	$Sn_3F_5^{(1)}BF_4$	(1) −89.0			756
$F_{11}BSn_4$	$Sn_4F_7^{(1)}BF_4$	(1) −87.7			756
$F_{13}BSn_5$	$Sn_5F_9^{(1)}BF_4$	(1) −88.8			756
Fluorine bonded to tantalum					
$CF_5H_3OTa^-$	$FTaF_4OCH_3^-$	(1) +11	(2) +16	(1-2) 37	701
$C_3F_5H_6NOTa^-$	$[Ta(ON{=}CMe_2)F_4^{(1)}F^{(2)}]^-$	(1) +13	(2) +33	(1-2) 51	701
$C_4F_5H_8O_2Ta$	$TaF_4^{(1)}F^{(2)}{\cdot}CH_3CO_2CH_2CH_3$	(1) +70.9	(2) +107.7		718
$C_4F_5H_{10}NTa$	$TaF_4^{(1)}F^{(2)}{\cdot}NEt_2$	(1) +32.8	(2) +3.2		720
$C_6F_5H_5OTa^-$	$[Ta(OPh)F_4^{(1)}F^{(2)}]^-$	(1) +29.5	(2) +17	(1-2) 35	701
$C_8F_4H_{21}N_2Ta$	$[TaF_4NEt_2{\cdot}HNEt_2]$	+41.1			720
$C_8F_{10}H_{22}N_2Ta_2$	*trans*-$[TaF_4^{(1)}(HNEt_2)_2]^+TaF_6^-$	(1) +46.3			720
$C_{12}F_3H_{32}N_3Ta^+$		(1) −12.3	(2) +42.6		720

$C_{18}F_5H_{12}Cl_3OPTa$	$TaF_4^{(1)}F^{(2)}\cdot(pCl\cdot C_6H_4)_2PO$		(1) +60.0	(2) +87.3	(1-2) 26		752
$C_{18}F_5H_{12}Cl_3PSTa$	As above with O replaced by S		(1) +83.9	(2) +103.0	(1-2) 25		752
$C_{18}F_5H_{15}OPTa$	As above with Cl replaced by H		(1) +56.8	(2) +81.6	(1-2) 26		752, 718
$C_{18}F_5H_{15}O_4Ta$	$TaF_4^{(1)}F^{(2)}\cdot(C_6H_5O)PO$		(1) +69.6	(2) +106.0			718
$C_{18}F_5H_{15}PSeTa$	$TaF_4^{(1)}F^{(2)}\cdot(C_6H_5)_3PSe$		(1) +82.6	(2) +92.9	(1-2) 25		752
$C_{21}F_5H_{21}OPTa$	$TaF_4^{(1)}F^{(2)}\cdot(CH_3\cdot C_6H_4)_3PO$	*ortho*	(1) +54.0	(2) +75.4	(1-2) 26		752
		meta	+55.7	+79.8	28		
		para	+55.1	+77.9	28		
$C_{21}F_5H_{21}O_3PSTa$	$TaF_4^{(1)}F^{(2)}\cdot(pCH_3O\cdot C_6H_4)_3PS$		(1) +79.2	(2) +86.3	(1-2) 25		752
$C_{21}F_5H_{21}O_4PTa$	$TaF_4^{(1)}F^{(2)}\cdot(pCH_3O\cdot C_6H_4)_3PO$		(1) −53.7	(2) +68.6	(1-2) 26		752
$C_{21}F_5H_{21}PSTa$	$TaF_4^{(1)}F^{(2)}\cdot(CH_3\cdot C_6H_4)_3PS$	*ortho*	(1) +80.5	(2) +90.4	(1-2) 25		752
		meta	+81.5	+94.1	26		
		para	+80.7	+93.1	26		
$C_{24}F_4H_{54}P_2Ta^+$	$[Bu_3P\cdot TaF_4\cdot PBu_3]^+$		+63.8				753
$C_{24}F_5H_{62}N_6Ta_2$	$(Et_2N)_2TaF_2^{(1)}(NHEt_2)\cdot F^{(2)}\cdot TaF_2(NHEt_2)(NEt_2)_2$		(1) +28.7	(2) −64.6			720
F_5OTa^{2-}	$TaF_4^{(1)}F^{(2)}(O)^{2-}$		(1) −16.5	(2) −100	(1-2) 37.5		701
F_6Ta^-	TaF_6^-		+39				701, 753
$F_{10}OTa^{2-}$	$[F^{(1)}TaF_4^{(2)}\cdot O\cdot F_4TaF]^{2-}$		(1) +8.3	(2) +32	(1-2) 34		701

Fluorine bonded to tellurium

$CF_4H_4O_2Te$	*cis*-$HO\cdot TeF^{(1)}F_2^{(2)}F^{(3)}\cdot OCH_3^{(4)}$		(1) −34.4	(2) −49.5	(1-2) 167	(1-3) 145	697
			(3) −50.3		(2-3) 79	(-4) 1.2	
					(Te-1) 3250	(Te-2,3) 3464	
	trans-$HO\cdot TeF_4^{(1)}\cdot OCH_3^{(2)}$		−51.5		(1-2) 1.6	(Te-1) 3569	
$C_2F_2H_6Te$	$(CH_3^{(2)})_2TeF_2^{(1)}$		−123.5		(1-2) 7.5	(F-C) 10.5	706
$C_2F_4H_6O_2Te$	*cis*-$(Me^{(2)}O)_2TeF_2^{(1)}F_2^{(2)}$		(1) −52.0	(2) −62.0	(1-2) 150	(2-3) 1.4	697
					(Te-1) 3348	(Te-2) 3519	
	trans-$(Me^{(2)}O)_2TeF_4^{(1)}$		−68.8		(1-2) 1.7	(Te-1) 3672	

Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)	Ref.
$C_4F_5H_{10}NO_2Te$	$(CH_3OCHNMe_2)^+$ $(TeOF^{(1)}F_4^{(2)})^-$	(1) (−)24.5 (2) (−)40.1	(1-2) 175	719
$C_6F_5H_8NOTe$	$(C_5H_5NCH_3)^+$ $(TeOF^{(1)}F_4^{(2)})^-$	(1) (−)23.2 (2) (−)38.8	(1-2) 175	719
$C_7F_2H_8Te$	$C_6H_5TeF_2^{(1)}CH_3^{(2)}$	−123.5	(1-2) 8.0 (1-C2) 9.7 (1-C*i*) 5.8 (1-C*o*) 6.1 (1-C*m*) 1.3 (1-C*p*) 1.0	706
$C_{12}F_2H_{10}Te$	$(C_6H_5)_2TeF_2$	−126.7	(Te-F) 540 (F-C1) 5.3 (F-C2) 6.1 (F-C3) 1.2 (F-C4) 1.1	706
$F_4H_2O_2Te$	*cis*-$(HO)_2TeF_2F_2$	(1) −33.0 (2) −42.0	(1-2) 155 (Te-1) 3247 (Te-2) 3307	697
	trans-isomer	−41.0	(Te-F) 3443	
F_5Cl_3OTeTi	$TiCl_3OTeF_4^{(1)}F^{(2)}$	(1) −43.2 (2) −43.7		766
F_9OSbTe	$SbF_4OTeF_4^{(1)}F^{(2)}$	(1) −40.5 (2) −50.8	(1-2) 188	771
$F_{10}Cl_2O_2Te_2Ti$	$TiCl_2(OTeF_4^{(1)}F^{(2)})_2$	(1) −44.6 (2) −44.1	(Te-2) 3600	766
$F_{13}O_2SbTe_2$	$SbF_3(OTeF_4^{(1)}F^{(2)})_2$	(1) −39.9 (2) −50.0	(1-2) 188	771
$F_{15}ClO_3Te_3Ti$	$TiCl(OTeF_4^{(1)}F^{(2)})_3$	(1) −45.0 (2) −45.5		766
$F_{15}IO_4Te_3$	$(O)I(OTeF_4^{(1)}F^{(2)})_3$	(1) −33.9 (2) −43.9	(1-2) 179	700
$F_{20}O_4Te_4Ti$	$Ti(OTeF_4^{(1)}F^{(2)})_4$	(1) −45.1 (2) −47.8	(1-2) 188 (Te-1) 3595	766
$F_{20}O_4Te_4Xe$	As above with Ti replaced by Xe	(1) −39.4 (2) −47.2	(1-2) 188 (Xe-1) 59	763
$F_{20}O_5Te_4Xe$	As above with Ti replaced by Xe(0)	(1) −35.8 (2) −47.8	(1-2) 183 (Xe-1) 55 (Xe-2) 4	763, 773
$F_{25}IO_5Te_5$	$I(OTeF_4^{(1)}F^{(2)})_5$	(1) −28.0(ax), −34.6(eq) (2) −35.8(ax), −45.5(eq)	(1_{eq}-2_{eq}) 188	700
$F_{30}C_5O_6Te_6Ti$	$Cs_2[Ti(OTeF_4^{(1)}F^{(2)})_6]$	(1) −46.3 (2) −34.5	(1-2) 181	766

Fluorine bonded to titanium

$C_2F_4N_2S_2Ti^{2-}$	*cis*-$TiF_4(SCN)_2{}^{2-}$	(1) +154.6 (2) +207.7 (1) *trans* to ligand	(1-2) 39.0	695
	trans-isomer	+230.6		

$C_4F_{10}O_4Ti^{2-}$	*cis*-$TiF_4(CF_3CO_2)^{2-}$	(1) +145.2 (2) +180.3 (1) *trans* to ligand +203.4	(1-2) 38.2	695
	trans-isomer			
$C_{12}F_4H_{36}N_6O_2P_2Ti$	$TiF_4\{[CH_3)_2N]_3P(O)\}_2$	(1) +132.0 (2) +186.6	(1-2) 40	746
$C_{13}F_5H_{25}N_2OTi$	$[TiF_4^{(1)}F^{(2)}C_5H_5NO]NEt_4$	(1) +102.5 (2) +142.0	(1-2) 39	747
$C_{18}F_6H_{40}N_2O_6TiW$	$[F_2^{(3)}O_2W(C_2O_4)TiF_2^{(1)}F_2^{(2)}][NEt_4]_2$	(1) +135.2 (2) +192.6 (3) +66.5	(W-3) 103	747
$C_{18}F_8H_{40}N_2O_4Ti_2$	$[F_2^{(1)}F_2^{(2)}Ti(C_2O_4)TiF_2F_2][NEt_4]_2$	(1) +203.0 (2) +137.5	(1-2) 39.5	747
$C_{24}F_4H_{54}O_2P_2Ti$	$TiF_2F_2[(C_4H_9)_3PO]_2$	(1) +128.5 (2) +174.1	(1-2) 4	746
$C_{24}F_4H_{54}O_8P_2Ti$	$TiF_2F_2[(C_4H_9O)_3PO]_2$	(1) +141.2 (2) +208.0	(1-2) 40	746
$C_{36}F_4H_{30}O_2P_2Ti$	$TiF_2F_2[(C_6H_5)_3PO]_2$	(1) +135.6 (2) +192.0	(1-2) 42	746
$F_4Cl_2O_8Ti^{2-}$	$TiF_2F_2(ClO_4)_2^{2-}$	(1) +150.5 (2) +215.4	(1-2) 34.6	695
$F_4N_6Ti^{2-}$	$TiF_2F_2(N_3)_2^{-}$	(1) +140.8 (2) +163.0	(1-2) 35.4	695

Fluorine bonded to uranium

CF_5H_3OU	$F^{(1)}UF_4^{(2)}OCH_3$	(1) +707.7 (2) +647	(1-2) 16.9	702

Fluorine bonded to tungsten

$C_2F_8H_4O_4W_2^{2-}$	$[WOF_4OCH_2CH_2OWOF_4]^{2-}$	(1) +0.5 (2) −11.0 (3) −106.0 (ratio 2:1:1)	(1-2) 75 (2-3) 66	(1-3) 55	711
$C_3F_4H_7N_2O_2W^{-}$	$[W(NCONH_2)F_4(OEt)]^{-}$	(1) −10.0 (2) −28.0 (3) −67.0 (ratio 2:1:1)	(1-2) 70 (2-3) 70	(1-3) 70	711
$C_3F_4H_7N_2O_3W^{-}$	$[W(NCONH_2)F_4(OCH_2CH_2OH)]^{-}$	(1) −2.5 (2) −23.0 (3) −73.5 (ratio 2:1:1)	(1-2) 70 (2-3) 72	(1-3) 70	711
$C_4F_4H_9OSW^{-}$	$[WOF_4(SBu)]^{-}$	(1) +10.0 (2) −22.0 (3) −100.0 (ratio 2:1:1)	(1-2) 90 (2-3) 45	(1-3) 50	711
$C_4F_4H_{10}NOW^{-}$	$[WOF_4(NEt_2)]^{-}$	(1) −53.0 (2) −79.5 (3) −93.0 (ratio 2:1:1)	(1-2) 78 (2-3) 60	(1-3) 55 (W-1) 78	711
$C_6F_2H_{18}O_4P_2W$	$WO_2F_2(OPMe_3)_2$	−66.9			729(a)

Molecular formula	Structure of compounds	Chemical shifts (ppm)	Coupling constants (Hz)		Ref.
$C_6F_4H_{14}NOW^-$	$[W(NBu)F_4(OCH_2CH_3)]^-$	(1) −27.0 (2) −50.5 (3) −108.0 (ratio 2:1:1)	(1-2) 60 (2-3) 62	(1-3) 68	711
$C_6F_4H_{14}NO_2W^-$	$[W(NBu)F_4(OCH_2CH_2OH)]^-$	(1) −20.0 (2) −38.0 (3) −101.5 (ratio 2:1:1)	(1-2) 63 (2-3) 62	(1-3) 59	711
$C_8F_4H_{19}N_2W^-$	$[W(NBu)F_4(NEt_2)]^-$	(1) −77.0 (2) −86.5 (3) −104.0 (ratio 2:1:1)	(1-2) 81 (2-3) 60	(1-3) 58	711
$C_{10}F_2H_{10}N_2O_4W$	$[WO_2F_3(C_5H_5NO)]NEt_4$	−65.7			729(a)
$C_{10}F_8H_{14}N_2O_2W_2^{2-}$	$[W(NBu)F_4OCH_2CH_2OW(NBu)F_4]^{2-}$	(1) −14.5 (2) −35.5 (3) −97.5 (ratio 2:1:1)	(1-2) 63 (2-3) 62	(1-3) 59	711
$C_{11}F_3H_{29}NO_3PW$	$[WO_2F_3(OPMe_3)]NEt_4$	−74.0(ax), −92.8(eq)			729(a)
$C_{12}F_2H_{14}N_2O_4W$	$WO_2F_2(2\text{-}CH_3C_5H_4NO)_2$	−64.9			729(a)
$C_{12}F_2H_{14}N_2O_4W$	$WO_2F_2(3\text{-}CH_3C_5H_4NO)_2$	−65.8			729(a)
$C_{12}F_2H_{14}N_2O_4W$	$WO_2F_2(4\text{-}CH_3C_5H_4NO)_2$	−65.6			729(a)
$C_{12}F_2H_{14}N_2O_6W$	$WO_2F_2(4\text{-}CH_3OC_5H_4NO)_2$	−67.2			729(a)
$C_{13}F_3H_{25}N_2O_3W$	$[WO_2F_3(C_5H_5NO)]NEt_4$	−74.9(ax), −92.1(eq)	(F-F) 65		729(a)
$C_{14}F_3H_{27}N_2O_3W$	$[WO_2F_3(2\text{-}CH_3C_5H_4NO)]NEt_4$	−73.2(ax), −93.6(eq)			729(a)
$C_{14}F_3H_{27}N_2O_3W$	$[WO_2F_3(3\text{-}CH_3C_5H_4NO)]NEt_4$	−75.1(ax), −92.0(eq)	($W\text{-}F_{ax}$) 107		729(a)
$C_{14}F_3H_{27}N_2O_3W$	$[WO_2F_3(4\text{-}CH_3C_5H_4NO)]NEt_2$	−74.6(ax), −92.8(eq)	($W\text{-}F_{eq}$) 73		729(a)
$C_{14}F_3H_{27}N_2O_4W$	$[WO_2F_3(4\text{-}CH_3OC_5H_4NO)]NEt_2$	−76.1(ax), −91.4(eq)			729(a)
$C_{58}FH_{51}N_4O_4P_4W$	$W(N_2C_6H_3(NO_2)_2)(Ph_2PCH_2CH_2PPh_2)_2F$	−173.9	(P-F) 40		394
$F_6H_{10}O_{56}W_{18}$	$[H_2W_{18}F_6O_{56}]H_8$	±82.5 relative to CF_3CO_2H			765
F_6OWXe	$F^{(1)}XeF^{(2)}WOF_4^{(3)}$ (in BrF_5)	(1) −228.9 (2) −168.8 (3) +135.8	(1-2) 275 (Xe-1) 6150	(2-3) 50 (Xe-2) 5016	755
$F_9O_2W_2Xe$	$F^{(1)}XeOWF_4^{(2)}F^{(3)}WF_4^{(4)}(O)$	(1) −240.2 (2) +97.1 (3) −72.0 (4) +73	(3-4) 61 (Xe-1) 6315	(2-3) 64	755
$F_{10}O_2W_2Xe$	$F_4^{(1)}W(O)F^{(2)}WF_2^{(3)}F^{(4)}(O)F^{(5)}XeF^{(6)}$ (4) *trans* to (5)	(1) +73.2 (2) −107.8 (3) +119 (4) +121 (5) −168.4 (6) −236.7	(5-6) 267 (2-5) 60 (1-5) 60 (2-4) 60 (Xe-5) 5000	(4-5) 47 (1-2) 60 (2-3) 60 (Xe-6) 6260	755

Fluorine bonded to xenon

F_2O_3SXe	$F^{(1)}XeOSO_2F$			(Xe-1) 6051		755
F_4OXe	$Xe(O)F_4$	+100.8		(Xe-F) 1115		763
F_6MoO_4SXe	$FXeO(F)S(O)OMoOF_4$			^1J(Xe-F) 5971		755
F_6O_4SWXe	$FXeO(F)S(O)OWOF_4$			^1J(Xe-F) 6131		755
F_8O_2TeXe	$F^{(1)}F_2^{(2)}Xe(O)OTeF_4^{(3)}F$	(1) +101.9	(2) +106.9	(1-2) 75	(Xe-2) 1127	763
				(Xe-3) 50		
$F_{12}O_3Te_2Xe$	*cis*-$F_2^{(1)}Xe(O)(OTeF_4^{(2)}F)_2$	(1) +107.1		(Xe-1) 986	(Xe-2) 51	763
	trans-isomer	(1) +110.4		(Xe-1) 1197	(Xe-2) 53	
$F_{16}O_4Te_3Xe$	$F^{(1)}X(O)(OTeF_4^{(2)}F)_3$	(1) +111.8		(Xe-1) 1056	(Xe-2) 52	763

Miscellaneous studies

F-19 NMR has been used to study the behaviour of various fluorine-containing systems. Thus the following have been investigated: hydrogen bonding in $KF{\cdot}H_3BO_3$;[776] fluoride ion binding to formamide and derivatives;[777] the hexafluoro complexes of Pt(IV) and Pd(IV) in acidic and neutral aqueous solutions of various salts;[778] the aquation and chloride ion substitution in the hexafluoro complex of Rh(III);[779] the fluxional behaviour of the adducts of uranylhexafluoroacetylacetonate ion with Lewis bases;[780] the self-diffusion of SF_6;[781] the interaction of AlX_3 ($X = NO_3^-, Cl^-$) with NH_4F or HF;[782] the ligand distribution in the systems WSF_4–$WSCl_4$–CH_3CN and WS_4–$WOCl_4$–CH_3CN;[783] the temperature dependence of fluoroborate complexes in aqueous solution;[784] the ionic character of the $AuF_4{\cdot}BF_2$ and $PtF_6{\cdot}(BF_2)_2$ systems;[792] and the temperature-dependent gas phase shifts of NF_3, PF_3, POF_3, and PF_5.[785] Two general papers have appeared dealing with the correlation of the atomic charge on fluorine and the chemical shift in binary fluorides and complex fluoride ions[786] and the dependence of the chemical shift upon the nature of the ligand in pseudooctahedral fluoro complexes of transition and main group elements.[787] Relaxation phenomena have been investigated in aqueous beryllium fluoride solutions.[788]

Further data are found in the following papers, where F-19 NMR has been used to characterize the various species: the fluoro complexes of aluminium with oxygen- and nitrogen-donor ligands;[789] L_2HMF_6 ($M = As, P, Sb$; $L = CH_3CON(CH_3)_2$);[790] the products of the reaction of AsF_3 with SeO_3 in liquid SO_2;[791] methoxyfluoroborates;[793] hydroxytrifluoroborates;[794,797] BF_4^-;[795] azine derivatives of boron;[796] $N_2F_3SnF_5$;[798] the complexes of niobium and tantalum pentafluorides with a cyclic tridentate phosphoryl-containing ligand;[799] the reaction products of $PClF_4$ and Me_3N;[800] tetrafluorodiazadiphosphetidines;[841] derivatives of acetamide containing difluorophosphine groups;[801] $PF_2P(GeH_3)_2$ and $C_6H_6PF_2P(SiH_3)_2$;[802] $(Et_2N)_2FP{=}NH$ and $(Et_2N)F_2PNH_2$;[803] some platinum(IV) fluorobromo complexes;[804] SF_6 arc-decomposition products;[805] S_2F_4 and SF_4;[806] complexes from SbF_5 with EtOH[807] and UF_4O;[808] complexes from SbF_3 with SO_3 and SeO_3;[809] tantalum and tungsten phenoxyfluorides;[810] pentafluorotellurate(IV) ion;[811] various oxide, hydroxide, and oxide hydroxide fluoride compounds of tellurium(IV);[812] UF_6;[813] VF_5;[814,815] and $K_2ZrF_5(OOH)$.[816]

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

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A. Data

Molecular formula	Structure	Ref.
CF_3Cl_5NP	$CF_3{\cdot}CCl_2{\cdot}N{=}PCl_3$	1
CF_4	CF_4	2
$C_2F_2Cl_4$	$CFCl_2{\cdot}CFCl_2$	3, 4
$C_2F_3H_6BOS$	$(CH_3)_2SO{\cdot}BF_3$	5
$C_2F_6Cl_4NP$	$(CF_3)_2CCl{\cdot}N{=}PCl_3$	1
C_3FH_9Sn	$(CH_3)_3SnF$	6
$C_3F_9Cl_3NP$	$(CF_3)_3C{\cdot}N{=}PCl_3$	1,7
$C_5F_6H_6NNb$	$C_5H_5NH^+\ NbF_6^-$	8
$C_5F_6H_6NTa$	$C_5H_5NH^+\ TaF_6^-$	8
$C_6F_2H_8BrN$	mBr·$C_6H_4NH_3^+\ HF_2^-$	9
$C_6F_2H_8ClN$	mCl·$C_6H_4{\cdot}NH_3^+\ HF_2^-$	9
$C_6F_2H_8ClN$	pCl·$C_6H_4{\cdot}NH_3^+\ HF_2^-$	9
$C_6F_2H_9N$	$C_6H_5NH_3^+\ HF_2^-$	9
$C_6F_4H_{12}N_2$	$oC_6H_4(NH_3^+)_2\ (HF_2^-)_2$	9
$C_6F_4H_{12}N_2$	$mC_6H_4(NH_3^+)_2\ (HF_2^-)_2$	9
$C_7F_2H_{11}N$	pCH$_3$·$C_6H_4NH_3^+\ HF_2^-$	9
$C_7F_2H_{11}N$	$C_6H_5CH_2NH_3^+\ HF_2^-$	9
$C_7F_2H_{11}NO$	pCH$_3$O·$C_6H_4{\cdot}NH_3^+\ HF_2^-$	9
$C_8F_6H_{20}NSb$	$(CH_3CH_2)_4NSbF_6$	10
$C_{10}F_6H_{12}N_2Ti$	$(C_5H_5NH)_2TiF_6$	11
$C_{14}F_2H_{17}N$	$(C_6H_5CH_2)_2NH_2^+\ HF_2^-$	9
FH_2LaO_2	$LaF(OH)_2$	16
FAg	AgF	12, 13
FAg_2	Ag_2F	14, 17
FClPb	PbFCl	15
F_2HCs	$CsHF_2$	70
F_2HK	KHF_2	19, 70
F_2HLaO	$LaF_2(OH)$	16
F_2HRb	$RbHF_2$	70
F_2H_5N	NH_4HF_2	20
$F_2Al_2O_4Si$	$Al_2F_2SiO_4$	18
F_2Ca	CaF_2	21, 22, 23
F_2Fe	FeF_2	24, 25, 26
F_2Mn	MnF_2	27
F_2NaRb_2Tb	Rb_2NaTbF_2	28
F_2Pb	PbF_2	29, 30
$F_2Pb_{0.9}Sn_{0.1}$	$Pb_{0.9}Sn_{0.1}F_2$	31
F_2Sn	SnF_2	32
F_3HBa	$BaF_2{\cdot}HF$	33
F_3HSr	$SrF_2{\cdot}HF$	33
$F_3H_6InO_3$	$InF_3{\cdot}3H_2O$	34
F_3Ce	CeF_3	11, 23
F_3CoK	$KCoF_3$	35
F_3CsMn	$CsMnF_3$	36
F_3CsRb	$CsRbF_3$	37
F_3Fe	FeF_3	24, 38
F_3La	LaF_3	41, 16

Molecular Formula	Structure	Ref.
F_3MnRb	$RbMnF_3$	42
F_3Nd	NdF_3	43, 11
F_3NiK	$KNiF_3$	39, 40
F_3Pr	PrF_3	43, 11, 44
F_4H_2Ca	$CaF_2 \cdot 2HF$	33
F_4H_4BN	NH_4BF_4	45, 46
$F_4H_8N_2$	$N_2H_6F_2 \cdot 2HF$	47
F_4AgB	$AgBF_4$	46
F_4BCs	$CsBF_4$	46
F_4CuK_2	K_2CuF_4	48
F_4HoLi	$LiHoF_4$	49
$F_4K_2O_9Ta_4$	$K_2Ta_4O_9F_4$	50
F_4LiTb	$LiTbF_4$	49
F_5K_2Sb	K_2SbF_5	51
F_5Mo	MoF_5	52
F_5RbSn_2	$RbSn_2F_5$	53
F_5Sn_2Tl	$TlSn_2F_5$	54
F_6H_4NP	NH_4PF_6	45
$F_6H_8GeN_2$	$(NH_4)_2GeF_6$	45
$F_6H_8N_2Ti$	$(NH_4)_2TiF_6$	45, 55
$F_6H_9K_3O_{13}Zr_3$	$K_3Zr_3O_4(H_2O_2)_4(OH)F_6$	56
$F_6H_{12}FeO_6Si$	$FeSiF_6 \cdot 6H_2O$	57, 58
$F_6H_{12}O_6TiZn$	$ZnTiF_6 \cdot 6H_2O$	59
F_6AsCs	$CsAsF_6$	61
F_6AsK	$KAsF_6$	61
F_6AsRb	$RbAsF_6$	61
F_6Cs_2KPr	Cs_2KPrF_6	28, 63
F_6Cs_2Si	Cs_2SiF_6	62
$F_6D_8N_2Ti$	$(ND_4)_2TiF_6$	60
$F_6D_{12}O_6TiZn$	$ZnTiF_6 \cdot 6D_2O$	59
$F_6D_{34}O_{17}Si$	$SiF_6 \cdot 17D_2O$	64
$F_6D_{40}O_{20}Se$	$SeF_6 \cdot \sim 20D_2O$	64
$F_6D_{50}O_{25}Te$	$TeF_6 \cdot \sim 25D_2O$	64
$F_6DyNaCs_2$	Cs_2NaDyF_6	65
F_6DyNaK_2	K_2NaDyF_6	65
$F_6DyNaRb_2$	Rb_2NaDyF_6	65
$F_6ErNaRb_2$	Rb_2NaErF_6	28, 63
$F_6HoNaRb_2$	Rb_2NaHoF_6	28, 63
F_6KP	KPF_6	60
F_6K_2Si	K_2SiF_6	62
F_6K_2Ti	K_2TiF_6	66
F_6Li_2Si	Li_2SiF_6	67
F_6MnPb_2	Pb_2MnF_6	68
$F_6NaTaRu_2$	Ru_2NaTaF_6	63
F_6Na_2Si	Na_2SiF_6	62, 67
F_6Rb_2Si	Rb_2SiF_6	62
F_7I	IF_7	69

B. Miscellaneous studies

Various solid solutions have been studied: $CaF_{1.06}H_{0.94}$;[71] $K_xRb_{1-x}HF_2$;[70] $KMg_{1-x}Mn_xF_3$ ($x = 0.9$ to 0.01);[72] $Tl_xNbO_{2+x}F_{1-x}$ ($x = 0.5, 0.55, 0.6, 0.7, 0.8$);[73] $Tl_{3.5}TaO_{2.5}F_{0.5}$;[73] $Y_{0.36}Lu_{0.35}Sr_{0.29}F_{2.71}$ with NdF_3;[74] $Y_{0.71}Sr_{0.29}F_{2.71}$ with NdF_3;[74] fluorinated graphite;[75,76] fluorinated amorphous silicon;[77] fluorinated alumina catalyst;[78] and palladium bis(hexafluoroacetylacetonate) complex on the surface of colloidal silica particles.[79] Great interest has also been shown in intercalating fluorine compounds into graphite [AsF_5,[80–82] BrF_3,[83–85] ClF_3,[84,775] ClF_3/HF,[86] HF,[84] $NOSbF_6$,[81] NO_2PF_6,[87] NO_2SbF_6,[81] SbF_5,[81,88] and TaF_5[89]] and polyacetylene [AsF_5[81] and $NOSbF_6$[81]]. Miscellaneous studies of the fluorine-containing salts of tetramethyltetraselenafulvalene,[90] of ABF_3 perovskites (A = K, Rb, Cs; B = Mg, Ca, Sr, Zn, Cd, Pb),[91] of $CFCl_3$ and $FClO_3$ enclathrated in D_2O hydrates,[92] of p-$FC_6H_4NH_2$ adsorption on aluminosilicate,[93] of $CFCl_3$ adsorbed by LiX, NaX, CaX, and strongly dealuminated zeolites,[94] and of the reaction product of pyrene and AsF_5[170] have been reported.

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

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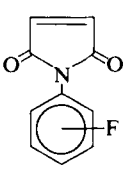
A. Data

Molecular formula of monomer components	Structure of monomer components of polymer	Ref.
$C_2F_2H_2/C_2F_4/C_3F_6$	$CF_2{=}CH_2/CF_2{=}CF_2/CF_3{\cdot}CF{=}CF_2$	95, 96, 97
$C_2F_2H_2/C_2F_3H$	$CF_2{=}CH_2/CF_2{=}CFH$	98
$C_2F_2H_2/C_2F_4$	$CF_2{=}CH_2/CF_2{=}CF_2$	95
$C_2F_2H_2/C_3F_6$	$CF_2{=}CH_2/CF_3{\cdot}CF{=}CF_2$	96, 97
$C_2F_2H_2$	*cis*- and *trans*-$CFH{=}CFH$	99
$C_2F_2H_2$	$CF_2{=}CH_2$	100, 101
C_2F_3H	$CF_2{=}CFH$	103
C_2F_3Cl	$CF_2{=}CFCl$	102, 104
$C_2F_4/C_2H_4/C_3H_6$	$CF_2{=}CF_2/CH_2{=}CH_2/CH_3{\cdot}CH{=}CH_2$	105
$C_2F_4/C_2H_4/C_4H_8$	$CF_2{=}CF_2/CH_2{=}CH_2/(CH_3)_2C{=}CH_2$	105
$C_2F_4/C_3H_6/C_4H_8$	$CF_2{=}CF_2/CH_3CH{=}CH_2/(CH_3)_2C{=}CH_2$	105
C_2H_4/C_2F_4	$CF_2{=}CF_2/CH_2{=}CH_2$	106
C_2F_4/C_3F_6	$CF_2{=}CF_2/CF_3{\cdot}CF{=}CF_2$	107, 106
C_2F_4	$CF_2{=}CF_2$	108, 109, 107, 110, 111, 112, 102, 113 106
C_2H_4/F_2Si	$SiF_2/CH_2{=}CH_2$	114, 115
C_2H_4/C_3F_6O	$CF_3CO{\cdot}CF_3/CH_2{=}CH_2$	116
C_4H_6/C_3F_6O	$CF_3CO{\cdot}CF_3/CH_2{=}CH{\cdot}CH{=}CH_2$	117
C_3H_6/F_2Si	$SiF_2/CH_3{\cdot}CH{=}CH_2$	114, 115
$C_4F_3H_3O_2$	$CF_3CO{\cdot}O{\cdot}CH{=}CH_2$	118
C_4F_6	$CF_2{=}CF{\cdot}CF{=}CF_2$	119
C_4H_8/F_2Si	*cis*-$CH_3{\cdot}CH{=}CH{\cdot}CH_3/SiF_2$	114, 115
C_4H_8/F_2Si	*trans*-$CH_3{\cdot}CH{=}CH{\cdot}CH_3/SiF_2$	114, 115
C_4H_8/F_2Si	$(CH_3)_2C{=}CH_2/SiF_2$	114, 115
F_2Si/C_5H_{10}	$(CH_3)_2C{=}CH{\cdot}CH_3/SiF_2$	114, 115
$C_4H_6/C_6F_6/C_{12}H_{26}$	C_6F_6/*cis*-$CH_2{=}CH{\cdot}CH{=}CH_2/C_{12}H_{26}$	120
$C_4H_6/C_6F_6/C_{36}H_{74}$	C_6F_6/*cis*-$CH_2{=}CH{\cdot}CH{=}CH_2/C_{36}H_{74}$	120
F_2Si/C_6H_{12}	$(CH_3)_2C{=}C(CH_3)_2$	114, 115
$C_{10}FH_6NO_2$		121

B. Miscellaneous studies

Various fluorinated polymers[122] have been studied, and the interactions of *p*-fluorocinnamate with poly(*N*-substituted)acrylamides,[167] fluorobenzyloxycarbonyl and 2-(4-fluorophenyl)-2-propyloxycarbonyl amino acids with cross-linked polystyrene,[168] and fluoride ion mobility in ion exchange membranes[169] have been investigated.

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XI. FLUORINE NMR STUDIES USING LIQUID CRYSTAL SOLUTIONS

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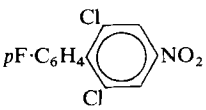
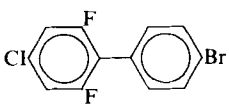
Molecular formula	Structure	Ref.
$C_2F_3H_3Hg$	CF_3HgCH_3	817
$C_4F_2H_4$	$CH_2{=}CF{\cdot}CF{=}CH_2$	818
C_5FH_4N		819
C_6FH_5	C_6FH_5	820
$C_6F_2H_4$	*o*-, *m*-, and *p*-$C_6F_2H_4$	821
$C_8FH_{20}N$	$C_8H_{17}NH_3F$	822
$C_{12}FH_6Cl_2NO_2$		606
$C_{12}FH_{28}N$	$C_{12}H_{25}NH_3F$	823
$C_{12}F_2H_6BrCl$		606
F_2HPSe	PF_2HSe	824

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XII. BIOLOGICAL APPLICATIONS OF F-19 NMR

As in previous years, space prevents any detailed review of the continuing interest in biological F-19 NMR. Here we summarize the available data for the large biological molecules and their interactions, while data for the smaller molecules, such as fluoro carbohydrates and steroids, are found in the preceding tables.

The majority of studies have concerned the binding of smaller molecular weight compounds with proteins. Thus the following have been studied: binding of fluoride ion to galactose oxidase copper(II),[123–125] to bovine cuprozinc superoxide dismutase,[126,127] and to oxyhemocyanin,[142] fluoroquine with DNA, tRNA, and poly(A),[128] trifluoromethyl-substituted nitroaniline diamines with synthetic DNA poly(dA-dT),[129] 5-fluorodeoxyuridylate with thymidylate synthetase-5,10-methylene-tetrahydrofolate[130,140] and with thymidylate synthetase alone,[131,141] 1-*O*-methyl-di-*N*-trifluoroacetyl-β-chitobioside with wheat germ agglutinin,[132] trifluoroacetylated ferrocytochrome c with yeast cytochrome peroxidase,[133] *p*-fluorocinnamate with conjugates formed from α-chymotrypsin and poly(*N*-acryloyl-β-alanine),[134] trifluoroacetyl dipeptide anilides with elastase,[135] 5-fluoro-L-tryptophan with human serum albumin,[136] fluorine labelled nitrophenylhaptens with mouse plasmacytoma antibody,[137] fluoropyruvate with pyruvate kinase and with methylmalonyl-CoA transcarboxylase,[138] *N*-trifluoroacetyltryptophan and *N*-trifluoroacetylphenylalanine with chymotrypsin,[139] trifluoroacetyl peptide chloromethyl ketones with porcine pancreatic elastase,[143] and 2-fluoroadenosine triphosphate and 4,6-difluoroserotin with human platelets.[144] Similar studies have been conducted on the *in vivo* effects of 3-deoxy-3-fluoro-D-glucose on respiration in *Locusta migratoria*,[145] on the effects of paramagnetic ions on F-19 nuclei located at the N- and C-termini of a gramicidin A channel of a lecithin membrane,[146,147] on bovine serum albumin [derivatized with *N*-(4-trifluoromethylphenyl)-maleimide] in the presence of guanidine hydrochloride,[148] and on the iron–sulphur cores extruded with *p*-fluoromethylthiophenol from the active centres of milk xanthine oxidase and the iron–molybdenum proteins of nitrogenase.[149,150]

Several derivatized proteins have been studied: fluorocinnamoyl-α-chymotrypsins,[151,152] 4-trifluoromethylbenzenesulphonyl-α-chymotrypsin,[153–157] F-19 labelled [methionine-192]-α-chymotrypsin,[158,159] *E. coli* 5-fluorouracil 5S ribonucleic acid,[160] alkaline phosphatase,[161] and 3-fluorotyrosine-substituted lactose repressor protein.[842]

Phospholipid membranes have been further studied by incorporation of various fluorinated compounds. Thus 8,8-difluoromyristic acid incorporated into the membrane of two strains of *E. coli*,[162] fluorotyrosyl residues of M13 coat protein reconstituted in synthetic phospholipid vesicles,[163,164] and

difluorotetradecanoyl acyl-carrier protein of *E. coli*[165] have been investigated, while transmembrane pH gradients in human erythrocytes have been measured using the F-19 resonance of trifluoroethylamine.[166]

XIII. THEORETICAL STUDIES

Theoretical studies involving F-19 are only briefly surveyed here, since more detailed reviews of all theoretical aspects of coupling and shielding are available elsewhere.[825]

The concept of nuclear shielding density difference maps has been propounded and shown to be promising in providing a physical basis for the interpretation of NMR shifts.[826] The F-19 chemical shift difference between HF and F^- ion was used to illustrate the method. *Ab initio* calculations of the linear and quadratic electric field dependence of the nuclear magnetic shielding have been performed for HF.[827] Coupled Hartree–Fock calculations of the magnetic shielding in HF have also been performed.[831]

Semiempirical calculations of F-19 chemical shifts, using MINDO/3 parametrization, in a variety of compounds were shown to be overestimated and hence the method is unsuitable for such calculations.[828] Solvent effects upon F-19 shifts have been calculated, using the "solvaton" model, by the sum-over-states perturbation method, incorporating INDO/S parameters, and by the finite perturbation method, with revised INDO parameters.[829] A general review of the quantum chemical aspects of solvent effects upon NMR parameters has appeared.[830] A correlation between fluorine charges, calculated by the Del Re method, and F-19 chemical shifts in fluoro- and chlorofluoro-alkanes has been presented.[843]

Ab initio calculations of J(FH) using a finite perturbation method have been performed on HF,[832,833] and inclusion of configuration interactions and non-contact contributions gives good agreement with experimental data.[832] The magnitude of ^1J(FH) in HF as a function of interatomic distance and various methods of vibrational averaging have been calculated.[834]

INDO self-consistent perturbation theory of all the contributions to coupling for $^{19}F-^{13}C$ couplings in monofluoropyridines and fluorobenzene have been reported.[835] A reasonable correlation between the theoretical and experimental magnitudes, signs, and trends of the couplings was obtained apart from ^2J(FC). A similar method, together with the INDO sum-over-states method, has been employed to calculate $^{19}F-^{15}N$ couplings in various compounds.[836] All ^1J(FN) values are predicted to be positive in sign whereas couplings over more than one bond can have either sign. Non-contact contributions can be very important in certain cases. Only the Fermi-contact term was found to be important in the INDO MO study of the conformational and substituent effects upon $^{19}F-^{13}C$ coupling constants in aliphatic

compounds.[837] Various experimental results were well reproduced and deviations from angular dependence of the Karplus type are explained. The influence of the INDO parametrization on the indirect spin–spin coupling constants as calculated by the finite perturbation theory method has been reported.[840]

An analytical perturbation theory of the Fermi-contact contributions to reduced spin–spin coupling constants has been extended to planar trigonal and tetrahedral main group element fluorides[838] and to octahedral fluorides.[839]

XIV. INDEX OF REVIEWS

The following comprises a list of reviews, containing F-19 NMR data, that have appeared during 1979–1981.

General

(a) V. Wray, *Annual Reports NMR Spectroscopy*, 1980, **10B**, 1. Fluorine nuclear magnetic resonance spectroscopy (1976–1978).
(b) R. J. Abraham (ed.), *Nuclear Magnetic Resonance* (Specialist Periodical Reports), The Chemical Society, London, 1979, Vol. 8.
(c) G. A. Webb (ed.), *Nuclear Magnetic Resonance* (Specialist Periodical Reports), The Chemical Society, London, 1980, Vol. 9.
(d) G. A. Webb (ed.), *Nuclear Magnetic Resonance* (Specialist Periodical Reports), The Chemical Society, London, 1981, Vol. 10.

Fluorine Chemical Shifts

(a) D. F. Ewing, in *Correlation Analysis in Chemistry: Recent Advances* (ed. N. B. Chapman and J. Shorter), Plenum, New York, 1978, p. 357. Correlation of NMR chemical shifts with Hammett σ values and analogous parameters.

Other Aspects

(a) I. Ando and G. A. Webb, *Org. Magn. Resonance*, 1981, **15,** 111. Some quantum chemical aspects of solvent effects on NMR parameters.
(b) R. A. Byrd, W. H. Dawson, P. D. Ellis and R. B. Dunlop, *Rev. Biochem.*, 1978, **4,** 367. Investigations of the 5-fluoro-deoxyuridylate:5,10-methylenetetrahydrofolate:thymidylate synthetic ternary complex by ^{19}F NMR.
(c) J. E. Coleman, I. M. Armitage, J. F. Chlebowski, J. D. Otves and A. J. M. Schoot Uiterkamp, in *Biological Applications of Magnetic Resonance* (ed. R. G. Shulman), Academic Press, New York, 1979, p. 345. Multinuclear

NMR approaches to the solution structure of alkaline phosphatase: ^{13}C, ^{19}F, ^{31}P, and ^{113}Cd NMR.

(d) J. Feeney, *Jerusalem Symp. Quantum Chem. Biochem.*, 1978, **11** (Nucl. Magn. Reson. Spectrosc. Mol. Biol.), 297. NMR studies of selectively deuteriated and fluorine labelled dihydrofolate reductase.

(e) S. P. Gabuda, Y. O. Gagorinskii and S. A. Polishchuk, *NMR in Inorganic Fluorides: Structure and Chemical Bonding*, Atomizadat, Moscow, 1978 (in Russian).

(f) M. Hajek and I. Mohyla, *Sb. Vys. Sk. Chem.-Technol. Praze, Technol. Paliv*, 1978, **D39**, 77. Shift reagents in the NMR spectroscopy of carbon-13, fluorine-19, phosphorus-31, nitrogen-14, and oxygen-17 nuclei (in Czech).

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(i) F. Millett, A. Ahmed, H. Smith, M. Smith, S. Ng and N. Staudenmayer, in *Biomolecular Structure and Function* (ed. P. F. Agris), Academic Press, New York, 1978, p. 423. ^{19}F NMR and enzyme kinetic studies of cytochrome c derivatives.

(j) B. D. Sykes and W. E. Hull, *Methods Enzymol.*, 1978, **49**, 270. Fluorine nuclear magnetic resonance studies of proteins.

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