

additionally includes a number of invited papers by scientists in the Main Group field.

Of the 44 chapters in the book, almost half are devoted to compounds of tin. Aspects of Main Group compounds discussed include superconductivity, semiconductor and photovoltaic technologies, ceramic materials, environmental analysis, biological properties, polymers and catalysts, photoelectrochemistry, and microwave synthesis.

This interdisciplinary and not too-highly-priced book will be an invaluable source of reference for materials scientists, chemists and physicists. The three-year interval between the conference and its publication date, however, has meant that few references after 1993 have been included.

P. J. SMITH

University College London

Inorganic Syntheses Volume 31

Alan H. Cowley (Editor-in-Chief)

Wiley-Interscience, New York, 1997

xix + 347 pages. £50

ISBN 0-471-15288-9

Here is the latest volume in this prestigious and eminently practical series, which fully maintains the high standards we associate with the title. In the present case, Professor Cowley has selected a wide range of compounds which are of particular current interest but are not commercially available; a little over half of these are derivatives of Main Group elements.

A long Chapter 1 deals with compounds which have found particular application as precursors in the preparation of electronic materials, usually via chemical vapour deposition (CVD). Thus here we find routes to such compounds as volatile complexes of calcium, strontium and barium (needed for high- T_c superconducting films), complexes of zinc, cadmium and mercury with sulphur, selenium and tellurium ligands (needed for II–VI materials), and complexes of AlH_3 and GaH_3 with N-, P- and As-donors (for metal or III–V deposition). Two particularly detailed sections deal with the difficult syntheses of ultra-pure trialkyl derivatives of aluminium, gallium and indium and dialkyl-zinc and -cadmium; intermediate complex formation is the key step by which impurity concentrations are reduced to the parts-per-billion range. Some Group 14 compounds are also featured, including a stable silirane, with a three-membered SiC_2 ring, and precursors to SnS and $SnSe$.

Chapter 2 features a wide variety of ligands, including porphine derivatives, macrocyclic polyalkynes, a bidentate chiral bis(diphenylphosphine), β -keto phosphines, compounds with Si–As or Si–Te bonds, and $ArEH$ species, where Ar is a bulky aryl group and $E = S, Se$ or Te . Demanding syntheses of large heteropolytungstate anions and their complexes with transition metals

are also featured, and two notable products are $Na_3(Bu_4N)_5[M(\alpha-Nb_3P_2W_{15}O_{62})(\eta^4-C_8H_{12})]$ ($M = Rh, Ir$), containing only about 2% (Rh) or 3% (Ir) of metal; these can be used to prepare effective catalysts, some of which contain stabilized nanoclusters of $M(0)$.

The final one-third of the volume comprises Chapters 3 and 4: the former is devoted to organometallic compounds of Fe, Co, Ru, Rh and Pt with ligands such as carbonyl, pyrazolato, $\eta^5-C_5Me_5$ and $\eta^5-C_5Me_4(CF_3)$, while the latter includes a wide variety of complexes of Fe, Co, Ni, Cu, Y, Mo, Re, Pt and U, together with some rhenate anions. Some of these complexes have important applications as CVD precursors for films of metal (Cu, Pt) or oxides [$Cu(II), Y(III)$], while others have been used in sol-gel processes (e.g. for cuprates). Indexes to contributors, compound names, formulae and CA Registry numbers are provided.

The volume represents a huge amount of experimental work: the submitters and checkers are an international group, coming from 14 countries, although those from North America and the UK are in a considerable majority. Perhaps the unsung heroes are the checkers—not only must they often divert effort from their most pressing current research work to add extra authenticity to the syntheses, but they also frequently provide helpful modifications and extra information. The editor and his whole team are to be congratulated on the resulting quality of the volume; inorganic, organometallic and materials chemists will be grateful for it.

B. J. AYLETT

Queen Mary and Westfield College, London

Homogeneous Photocatalysis

M. Chanon (Ed.)

John Wiley, Chichester, 1997

xi + 413 pages £80.

ISBN 0-471-96753-X

This book is published as Volume 2 of the Wiley series on *Photoscience and Photoengineering* and comprises ten chapters covering a wide range of material under the general heading of photocatalysis.

It starts with two useful chapters containing introductory material, a general introduction to photocatalysis (Chanon and Schiavello) and a discussion of the fundamentals, e.g. the Franck–Condon Principle, selection rules and energy transfer, behind the interaction between light and matter (Mialocq). There then follow articles on proton transfer photocatalysis (Arnaut and Formosinho) and electron transfer photosensitization in organic synthesis (Santamaria and Ferroud), the latter giving a large number of useful examples and references to reactions of synthetic potential. A related chapter on transition metal complexes and their use in photocatalytic processes involving organic compounds (Kutal) provides further useful reading for the organic chemist.

The chapter by Belloni gives an excellent, although

rather specialized, account of the photocatalytic aspects of silver photography, and, as with other chapters in the book, the author concentrates on the molecular basis of the application. This is followed by a description of immobilized photosensitizers and photocatalysis (Julliard); although these topics do not strictly speaking fall under the title of the book, they are useful here and are not out of place. The final three chapters cover photochemical water splitting (Amouyal), organized media and photocatalysis (Rico-Lattes and Lattes) and photosynthesis (Mathis). The article on water splitting covers many aspects from relatively simple molecular to supramolecular systems, and gives a good account of the problems encountered and how they may be tackled. Homogeneous and heterogeneous media are well described, with micelles, microemulsions, surfactants and polymers all being covered. The final chapter, concerning photosynthesis, covers a variety of aspects of this important area but the size of this field of research means that anyone with a serious interest in the subject would be better directed to one of the specialist texts available. The book concludes with an adequate index.

The book is well produced with uniformly clear text and figures throughout. It is, inevitably, not without errors; for example, the structure of the important $\text{Ru}(\text{bpy})_3^{2+}$ ion is drawn incorrectly on p. 225 and some of the structural formulae on p. 211 are rather confusing, but these are relatively minor mistakes in an otherwise excellent volume. A wide range of chemists will find at least one or two chapters of interest, and the book is a useful addition to the first in the series, *Surface Photochemistry*.

PAUL D. LICKISS
Imperial College, London, UK

Advanced Applications of NMR to Organometallic Chemistry

M. Gielen, R. Willem and B. Wrackmeyer (Eds)
John Wiley, Chichester, 1996
396 pages. £100
ISBN 0471-959-38-3

This book is one of a series on physical organometallic chemistry intending to offer 'State of the art reviews of recent developments in methods and techniques applied to organometallic chemistry'. Some emphasis is given in the Preface to developments beyond the normal one-dimensional techniques and this is reflected in several of the chapters. Well-known techniques such as COSY and NOESY are not discussed in detail; this is a text on advanced applications.

The book is grouped into chapters dealing with particular topic areas. The first is concerned with new methodologies: Selective Excitation and Selective Detection in ^{29}Si NMR (Kupce and Wrackmeyer), Two-dimensional ^{13}C -Metal Nuclear Correlation (Berger *et al.*), Two-dimensional H - ^{119}Sn Proton Detect Correla-

tion Spectroscopy.... in Organotin Compounds (Kayser *et al.*), Indirect Nuclear ^{119}Sn -X Spin-Spin Coupling (Wrackmeyer).

A second set of chapters is concerned with applications to solids and those under exceptional conditions: Solid-state NMR Applications in Organotin and Organolead Chemistry (Sebald), Solid-state NMR Investigations of Metal Carbonyl Complexes (Aime *et al.*), High-pressure NMR in Organometallic Chemistry (Frey *et al.*), Multinuclear NMR Spectroscopy in Supercritical Fluids (Waugh and Lawless).

The third general theme covers a fairly disparate series of 'hot topics' related to particular elements: High-resolution $^6,^7\text{Li}$ NMR of Organolithium Compounds (Gunther), Metal NMR of Organo-vanadium, -niobium and -tantalum Compounds (Rehder and Rodewald), NMR of Metallic Nuclei in Clusters (Granger) and ^{171}Yb NMR Spectroscopy (Keates and Lawless).

In my view the book is a pretty specialist work, making it likely that either you will really need it or you can get by without it. It is a useful addition to libraries but many groups would probably want to prioritize on simpler spectroscopic works first, e.g. for the general benefit of the graduate students. The coverage of the book cannot readily be assessed as complete, or otherwise. It is a useful but fairly eclectic compilation of aspects of this growing and important field: if the hot topics are in your area, you need it; otherwise you can take a more relaxed view.

P. J. CRAIG
De Montfort University, Leicester, UK

Organolanthoid Chemistry: Synthesis, Structure, Catalysis

W. A. Herrmann (ed.)
Springer-Verlag, Heidelberg, 1996
Topics in Current Chemistry, Vol. 179
285 pages, £88.50
ISBN 3-540-61009-X

This book is a timely addition to the literature of lanthanide chemistry and will be of interest to practising lanthanide chemists as well as to those venturing into the area for the first time. The use of the word 'organolanthoid' in the title is misleading as the scope of the book goes beyond compounds with lanthanide-carbon bonds: the topics covered include lanthanide amides and alkoxides as well as complexes with heteroallylic ligands.

The opening chapter is a concise introduction to the area, dealing with properties of the lanthanide ions, and kinetic and thermodynamic aspects (frequently ignored), as well as giving some general comments on ligand types. A short section on preparation of suitable lanthanide starting materials will be particularly useful for readers new to the field.

The chapter on lanthanide amides covers not only the