

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.

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### **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),  $\beta$ -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.

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### **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