similarly good job of iron-based model studies of the dioxygenases, with a worthy description of various model compounds and proposed mechanisms of oxygenation. This is complemented by the fourth chapter which covers all the non-iron model complexes for dioxygenase activity.

Chapter 5 on cytochrome *P*-450, however, is a little bit of a disappointment. The cytochromes *P*-450 are a vast class of enzymes with many hundreds of examples known. These mono-oxygenases use the same basic chemistry to catalyse the oxygenation of a huge variety of compounds. There is an intense research effort throughout the world on these enzymes from both prokaryotic and eukaryotic sources and high-resolution crystal structures have been determined for four different cytochromes *P*-450. I had expected therefore that this chapter would contain a similar level of detail as chapter 2 for dioxygenases. Unfortunately this was not the case; in fact, this is one of the shorter chapters in the book. Cytochrome *P*-450cam (the enzyme from *P. putida* which converts camphor to 5-*exo*-hydroxycamphor) is the most studied of all the *P*-450 enzymes and not surprisingly this is the *P*-450 described in this section. The chapter focuses almost entirely on the mechanism of oxygen activation by *P*-450cam. This is fair enough, I suppose, but for a reader wishing to learn more about these enzymes it might have helped to have more detail on the variety of *P*-450s and their range of substrates. The actual description of oxygen activation by *P*-450 is quite good, and the coverage of the role of certain active-site residues in catalysis is also well presented.

Following on from *P*-450 is a chapter on model studies of haem mono-oxygenases. This covers most aspects of synthetic haem models for *P*-450-like activity, including the formation of oxyferryl porphyrin -cation radical species analogous to the so-called compound I seen in catalases and peroxidases. This is a worthy chapter with good diagrams of the various metalloporphyrin models and an extensive reference list.

Chapter 7 is concerned with non-haem mono-oxygenases. These are a fascinating group of enzymes and one of the most interesting is methane mono-oxygenase. This enzyme uses oxygen to convert methane into methanol. The properties and mechanism of action of the enzyme are described in detail and there are useful tables and figures which summarize the various organic compounds on which methane mono-oxygenase can act. The copper-containing mono-oxygenases, tyrosinase and dopamine-β-mono-oxygenase, are briefly described towards the end of this chapter. The book closes with a section on chemical models for the non-haem iron and copper mono-oxygenases.

So what is the overall verdict? In many ways reading this book can be a little irritating: the tenses seem to chop and change, and plurals and singulars appear to be used randomly at times, particularly in certain chapters. This is however a very minor criticism. In fact, some of the chapters are really excellent and on balance one has to say that the volume is well put together. The other nice thing worth mentioning is that the book has just the right mixture of chemistry and biology to make it of interest and of value to chemists and biochemists alike. I am sure that both groups will find it extremely useful as a reference text. I would, therefore, recommend that anybody working in the field should get hold of it, or at least make sure their library has a copy.

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Gmelin Handbook of Inorganic and Organometallic Compounds

Series editors: U. Krüerke, C. Siebert and B. Woebke

Part 6. Germanium-Fluorine Compounds and Triorganogermanium Chlorides

P. Mazerolles, C. Siebert and B. Woebke
Springer-Verlag, Berlin, 1996, 8th Edn.
260 pages. £658.50
ISBN 3-540-93730-7

This volume is devoted to organogermanium fluorides of all types and to triorganogermanium chlorides (R_3GeCl, R_2RGeCl, RRRGeCl and germacyclic compounds); the literature is covered to the end of 1994. Like earlier volumes in this series, it is logically structured: data on given types of compounds appear in tables, each of which is followed by general remarks and, where appropriate, supplementary data on individual compounds. Separate tables/diagrams are devoted to such things as vibrational- and mass-spectroscopic data. Each section ends with a list of references, arranged in order of year of publication and alphabetically by author within each year, making it very user-friendly. In addition an invaluable empirical formula index is included at the end of the book.

This, again like all earlier volumes of Gmelin, is a book all university libraries should possess, but regrettably the very high price will make this impossible.

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Main Group Elements and their Compounds

V. G. Kumar Das (ed.)
Springer-Verlag, Heidelberg, 1997
525 pages. £83
ISBN 3-540-61425-7

This book is largely the outcome of the International Conference on Materials Science and Environmental Chemistry of Main Group Elements organized by the Asian Network for Analytical and Inorganic Chemistry (ANAIC) under the chairmanship of Professor Kumar Das in Kuala Lumpur, Malaysia, in November 1993. It

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 $A1H_3$ 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 $Na_3(Bu_4N)_5[M(\alpha\text{-}Nb_3P_2W_{15}O_{62})(\eta^4\text{-}C_8H_{12})]$ (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, η^5-C_5Me_5 and η^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