

Book reviews

Gmelin Handbook of Inorganic and Organometallic Chemistry. Sn. Organotin Compounds. Part 24. Dinuclear Compounds. Springer-Verlag, Berlin etc. 1996. *xiv* + 292 pages. DM1760 ISBN 3-540-93738-2.

This excellent Gmelin series on organotin compounds, started in 1975, has now reached Part 24, which is concerned with species containing two tin atoms both attached only to carbon atoms and linked through carbon atoms. Specifically they are of the type $R_3SnGSnR_3$, where $R = Me, Et, Pr, Pr^i, Bu, Bu^t$, or other alkyl or cycloalkyl groups, and where G is a single carbon atom link, such as CX_2 or $C(X)Y$, or a chain such as $(CH_2)_n, CH_2CHX, CHXCHX, CH=CH, CHXC=CH, C=C, C(X)=C=C=C(Y)^-$, or an aromatic or heterocyclic group. Compounds of the type $Me_3SnGSnMe_3$ take up 187 pages, the initial 41 of them devoted to species of the types $(Me_3Sn)_2CX_2$ and $(Me_3Sn)_2C(X)Y$, and the last 3 pages to compounds having the Me_3Sn groups on the separate cyclopentadienyl rings in metallocenes. (I was interested to find that the first example of this last type of compound, viz. $(Me_3SnC_5H_4)_2Fe$, was made by my colleagues and me in 1979, for I had forgotten about that work!). Corresponding species containing $Et_3, Pr_3Sn,$ and Bu_3Sn take up 14, 3 and 33 pages, respectively, and those with other $(alkyl)_3Sn, (cyclo-alkyl)_3Sn$ or $(vinyl)_3Sn$ groups occupy only 4 pages in total.

As usual the presentation is almost wholly in the form of tables, and a vast body of detailed information is provided in this way for each compound, mainly on its methods of preparation and physical properties, but where relevant with an outline of its reactions and biological features. I note with pleasure that, as I had advocated in earlier reviews, Gmelin has at last adopted use of common symbols such as Ne, Et, Ph etc., which is more economical and makes the text more pleasant to read. (Compare Bu^t_3Sn with $\{(CH_3)_3C\}_3Sn$ and Ph_3Sn with $(C_6H_5)_3Sn$). I do hope this new practice will apply to all volumes in the future.

The now usual, and helpful, there are lists of general articles or reviews on physical properties, analytical, environmental and toxicological aspects, and biological applications. One set of these on general aspects of organotin chemistry mainly refer to articles that were

published after the compilation of Part 23, but a second set is concerned with publications particularly relevant to binuclear compounds, with dates back to 1949; I suspect that Professors R. West and E.G. Rochow will be surprised to see that they are credited with a 1952 paper entitled "A system of bond refractivities for tin compounds"! There is a good empirical formula index.

This series on organotin compounds becomes even more valuable as it becomes more complete and as wider and wider use is made of such compounds in organic and organometallic synthesis. No doubt access to the information provided will be increasingly made through the on-line system.

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PII S0022-328X(97)00234-9

Advances in Physical Organic Chemistry, Vol. 30, D. Bethell, Editor, Academic Press, London, 1995, ix + 242 pp. £55.00. ISBN 0-12-033530-1

In view of the title of this series it is surprising to me how often the volumes contain reviews of direct interest to organometallic chemists. Thus the present volume begins with a chapter entitled "Matrix Infrared Spectroscopy of Intermediates with Low Coordinated Carbon, Silicon and Germanium Atoms", by V.A. Korolev and O.M. Nefedov. It occupies 61 pp., 6 of them taken up with an introduction outlining principles and methods of matrix isolation, 6 with carbenes and their silicon and germanium analogues, 25 with free radicals, 5 with conjugated organic radicals (allyl, propargyl, benzyl and cyclopentadienyl types), 8 with unstable compounds containing double-bonded silicon and germanium atoms (silenes, silanones, germanones, germathiones), and 5 with conclusions and references. It is authoritatively written (Professor Nefedov has made important contributions to the field) and much information is concisely

summarized. However, I counted only 7 references to publications appearing in 1991 or later, 4 of those by Professor Nefedov and more up-to-date surveys of some of the topics covered are available.

The other chapters deal with: Acid-base behaviour in Macrocycles and other Concave Structures (U. Lüning); Photodimerization and Photopolymerization of Dimerization of diolefin crystals (M. Hasegawa); and ionic dissociation of Carbon-Carbon sigma Bonds in Hydrocarbons and the Formation of Authentic Hydrocarbon Salts (K. Okamoto, K. Takeuchi and T. Kitigawa). The last of these will be of indirect interest to some organometallic chemists in that some of it is concerned with carbonium stability. I was surprised to see how many salts in which both cation and anion are wholly hydrocarbon species, or hydrocarbons that readily undergo dissociation to such ion, are known.

The volumes in this series are well produced, and reasonably priced by today's standards.

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PII S0022-328X(97)00102-2

Applied homogeneous catalysis with organometallic compounds. Vols. 1 and 2. Edited by B. Cornils/W.A. Herrmann, VCH Weinheim, 1996, 1246 pages, DM 748.00, ISBN: 3-527-29286-1.

This two volume compendium seeks to provide a comprehensive handbook dealing with an important topic.

Volume 1 is entitled 'Applications' and that name really refers to 'applied homogeneous catalysis'. The use of the word 'applied' is intended to provide the flavour that the examples chosen are of industrial importance. Thus, successive chapters deal with: Carbon Monoxide and Synthesis Gas Chemistry (172pp) Hydrogenation (19pp) Reactions of Unsaturated Compounds (154pp) Oxidations (91pp) Reactions with Hydrogen Cyanide (Hydrocyanation) (22pp) Hydrosilylation and Related Reactions of Silicon Compounds (20pp) Reaction with Nitrogen Compounds: Hydroamination (14pp) Reactions of Hydrocarbons and Other Saturated Compounds (31pp) Asymmetric Syntheses (16pp)

Some of the above shorter sections are written by a single author or a collaborative pair. Thus H. Brunner deals with Hydrogenation; K. Huthmacher and S. Krill with Hydrocyanation; B. Marciniak with Hydrosilylation; R. Taube with Hydroamination; and R. Noyori and S. Hashiguchi with Asymmetric Syntheses. The other sections have a multiplicity of authors who are no less expert and come from both industrial and academic sectors.

There are 570 pages in Volume 1 and each chapter has an abundance of references.

Volume 2 is entitled 'Developments' with emphasis on recent progress in homogeneous catalysis. Successive chapters deal with:

Development of Methods (about 200 pp.)

Special Catalysts and Processes (about 230 pp.)

Special Products (about 170 pp.)

Finally there is a so-called epilogue in which the editors look forward to some future possible developments and requirements (25 pp.). There is a 47 page Index which covers both the Volumes.

The contributors to Volume 2 are equally distinguished as those in Volume 1 but are too numerous to be mentioned by name. However without exception they are among the most significant practitioners in this important area.

In conclusion these are immensely important books which fulfil a function which has hitherto lacked such powerful focus. They are strongly recommended.

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PII S0022-328X(97)00300-8

Advances in transition metal coordination chemistry. Vol. 1. Series Editor: Chi-Ming Che, Volume Co-Editor: Vivian W.W. Yam, Jai Press Inc., Hampton Hill, UK 1996, 293 pages, £69.50, ISBN: 1-55938-335-6.

This book is the first in a new series. The present volume deals with transition metal compounds having a metal-ligand multiple bond; each chapter focuses on an area of particular interest to the author. It is the Editors wish that in this as in some of the later volumes there should be a contribution from Chinese scientists.

For readers of this journal the most relevant chapter is the first, by A. Mayr and S. Ahn, which is concerned with the chemistry of carbyne-metal complexes and does so in 100 pages with 187 references taking the literature up to 1994. Some of the other chapters are equally up-to-date and in some cases even provide references to