

BOOK REVIEWS

Journal of Organometallic Chemistry Library: Volume 1, Editor D. Seyferth. 1976, 488 pages, Dfl. 116.00; *Volume 2*, Editors D. Seyferth, A.G. Davies, E.O. Fischer, J.F. Normant and O.A. Reutov. 1976, 404 pages, Dfl. 150.00; *Volume 3*, Editors D. Seyferth, A.G. Davies, E.O. Fischer, J.F. Normant and O.A. Reutov. 1977, 342 pages, Dfl. 150.00; *Volume 4*, Editors D. Seyferth and R.B. King. 1977, 540 pages, Dfl. 150.00. Elsevier Scientific Publishing Co., Amsterdam.

The intent of this series seems to be the generation of a library of hard bound volumes covering aspects of organometallic chemistry of general interest to organometallic chemists. The first four volumes reviewed here contain proceedings of a Symposium (Vol. 1), reviews in organo-silicon chemistry (Vol. 2), a collection of reviews of various topics (Vol. 3), and annual surveys of silicon-tin-lead chemistry for 1975 (Vol. 4).

Volume 1: *New Applications of Organometallic Reagents in Organic Synthesis*, is the proceedings of an A.C.S. Conference held in New York, 6-9 April 1976. This volume contains 12 chapters written by leading practitioners in the world of utilization of organometallic derivatives for organic synthesis. The chapters cover the use of organolithium reagents (Seebach and Geiss), organoboron and organoaluminium (Negishi), organosilicon (Hudrlik), organotin (Pereyre and Pommier), organocopper (Normant), organomercurials (Larock), transition metal carbonyls (Alper), π allyl transition metal complexes (Hegedus), arene metal complexes (Semmelhack), metal carbene anions (Casey), and transition metal hydrides (Schwartz). There is also a chapter dealing with the olefin metathesis reaction (Grubbs). This group of chapters is a must for organic chemists who wish to benefit from the bounty of organometallic chemical reagents available for organic synthesis these days. It is also fascinating and informative reading for the organometallic chemist wishing to learn more about the reactivity of his systems.

Volume 2 presents a series of reviews in Organosilicon Chemistry. Carbon to silicon double bonds are discussed by Ballard and Wheatley (12 pages, 78 references). This is a study of the factors determining the stability of silicon analogs of alkenes or acetylenes. The authors conclude that there is no intrinsic instability for the silicon analogs of the alkenes, but merely a thermodynamically based propensity towards polymerization. They propose, therefore, that such silicon alkene analogs might be prepared through the use of bulky ligands which suppress polymerization. Chapter 2 deals with metal and metalloid dialkylamides containing silyl-amido ligands, and is by Harris and Lappert (90 pages, 148 references). This is a most interesting presentation of what might be viewed as the coordination chemistry of dialkylamide ligands. These bind to a wide range of metal ions spanning the main groups, lanthanides, and transition metals. The chapter is primarily synthetic, with many X-ray observations

to confirm some unusual structures. This area is ripe for more detailed physical chemical study. The third chapter by George and Balasubramanian deals with organosilacyclenes (174 pages, 280 references). This is the first review of the now extensive series of organosilacyclenes. The presentation of a very large number of compounds is fairly comprehensive and provides many experimental details. The final chapter, by Calas and Dunoguès, deals with the novel applications of chloro-silane/magnesium or lithium/donor solvent systems in synthesis (127 pages, 496 references). This is an extensive and detailed discussion of the reactivity of chlorosilane magnesium systems, an elaboration in the organosilicon area of a chemistry comparable to Grignard reagents. Much of the work reported in this review was carried out at the University of Bordeaux in France.

Volume 3 contains a series of critical in-depth reviews and includes: organometallic chemistry of the alkaline earth metals, by Gowenlock and Lindsell (74 pages, 173 references); organic peroxides of the main group II elements, by Alexandrov and Maslennikov (27 pages, 78 references); organic peroxides of the main group III elements, by Alexandrov and Maslennikov (53 pages, 101 references); metal complexes of polypyrazolyborates, by Shaver (31 pages, 81 references); recent advances in the organometallic chemistry of the lanthanides and actinides, by Cotton (33 pages, 144 references); recent advances in the organometallic chemistry of titanium, by Clark, Moorhouse and Stockwell (87 pages, 329 references); and η -Arene- η -cyclopentadienyl iron cations and related systems, by Sutherland (31 pages, 69 references).

A number of the authors of the above chapters have presented quite extensive tables of compounds, together with appropriate physical properties and references. This is a most acceptable way of presenting data of this kind and should be encouraged. In this fashion, information is more readily obtainable than having to delve through the text looking for specific compounds.

Volume 4. This is an extension of the well known series of Annual Survey volumes published by the Journal of Organometallic Chemistry. These fill an important niche in the literature and are valuable both to workers in the field and to those who merely wish to keep abreast of important developments in the area. This volume covers organosilicon, organotin and organolead chemistry for 1975, but omits organogermanium, which data were not available for publication at the time. The silicon chemistry is split into several sections: synthesis and reactivity, by Corey (118 pages, 394 references); reaction mechanisms, by Steward (83 pages, 519 references); bonding and structure, by Jones (59 pages, 271 references); and applications to organic synthesis, by Washburne (92 pages, 345 references). Tin is covered by Harrison (127 pages, 342 references), and lead by Wolters (24 pages, 174 references). The page numbers and reference numbers provide an immediate insight into the enormous activity in silicon, and to a lesser extent tin, chemistry and the relative inactivity in lead chemistry, much of which seems to originate from one laboratory.

All four volumes are photo-offset directly from the authors manuscripts;

most of the print is sufficiently clear if often weak. Only Volume 4 has an author index and none of the volumes have a subject index.

Inorganic Chemistry: The Transition Elements, Volume 6, Specialist Periodical Reports. The Chemical Society, London, 1978, Price: £ 35.00.

This volume of a continuing series covers literature published between October 1975 and September 1976. Its format is similar to previous volumes. The coverage is not comprehensive. The authors, by their choice of papers to include, exercise judgement to distinguish trivial from non-trivial contributions. Nevertheless, these accounts of a prodigious amount of chemistry are generally non-critical. The book covers the traditional Coordination Chemistry (not organometallic chemistry) of the first, second and third row transition elements including zinc, cadmium, and mercury, and lanthanides and actinides. The book is essential browsing for the aficionado. It is too pricey for the individual library, but is a must for the departmental library.

Metal Alkoxides, by D.C. Bradley, R.C. Mehrotra and D.P. Gaur. Academic Press, London, 1978, Price: £ 28.50.

This book represents the first comprehensive coverage of this topic. Two of the authors are acknowledged world authorities in the field. Most of the book is devoted to a study of physical and chemical properties of simple and double alkoxides.

Synthesis and chemistry of these metal alkoxides are explored in depth and make interesting reading. The authors clearly present and discuss a very considerable volume of information which will be invaluable to both established workers and newcomers in the field.

Discussion of the physical properties does not read so effortlessly, and would have been better presented more extensively in tabular form with a reduction in text. In addition, there are a number of typographical errors in the state labels for the proposed electronic spectral assignments, making comprehension more difficult. It is curious that on the basis of magnetic evidence, $\text{CoCl}(\text{OMe})$ is regarded as octahedral on page 115 and is regarded to be tetrahedral on the basis of spectroscopic data on page 138.

The book is supplied with both an author and a subject index. This is an important contribution to the field and should be on major library shelves. Its very narrow nature will limit its utility to individual purchasers.

Classics in Coordination Chemistry, Parts 2 & 3 (Classics of Science, Volumes 7 & 8), by G.B. Kauffman. Dover, New York, 1976 (Part 2), 1978 (Part 3), Price: Part 2, U.S. \$ 4.50; Part 3, U.S. \$ 6.00.

These two volumes bring together a series of classical papers dealing with various aspects of early Coordination Chemistry. Each is prefaced by an introductory preamble by George Kauffman, a world authority on the history of Coordination Chemistry. This preamble sets the scene in summarizing the state of knowledge at the time the article was written and focusing on the key issues involved. In addition, Kauffman has critically footnoted the articles, showing how their content relates to work published both in their past and in their future. The books are illustrated with contemporary photographs of the authors. They present a fascinating historical introduction to the modern theories of coordination chemistry.

Part 2 includes papers (translated where necessary into English) by Magnus, Zeise, Graham, Claus, Blomstrand and Jorgensen, originally published between 1829 and 1899. The Jorgensen article is of special interest in that it is the final article by this author to defend the Blomstrand-Jorgensen chain theory against the modern interpretation introduced by Werner.

Part 3 contains articles by Ley, Chugaev, Friend, Pfeiffer, Wyckoff, Posnjak, Dickinson, Sidgwick, Chernyaev, Mills and Quibell, published between 1904 and 1935. This volume follows the development of coordination chemistry into the 20th Century, emphasising structural aspects of the theory with emphasis on early crystal structure, analysis and consideration of optical activity.

Kauffman is to be heartily commended for these volumes, which are a must for any serious science historian.

The Chemistry of Gold, by Richard J. Puddephatt. This is monograph No. 16 in the series *Topics in Inorganic and General Chemistry*, Editor R.J.H. Clark. Elsevier Scientific Publishing Co., Amsterdam, 1978, Price: Dfl. 119.00.

This volume is very refreshingly written in the old style of synthetic inorganic chemistry texts such as Sidgwick. This is an easily readable book full of detailed useful information. It begins with an introductory chapter covering the occurrence, extraction and purification of gold, etc., and continues to deal with the coordination chemistry of gold subdivided according to oxidation level. Following these chapters, are discussions of organo-gold compounds, compounds with gold-metal bonds, reaction mechanisms in gold chemistry and spectroscopic and analytical aspects. The strength of the book lies in the descriptive chemistry which it covers, and although physical chemical aspects such as infrared, visible and UV spectroscopy, etc., are covered, they are somewhat more superficially treated.

The Donor—Acceptor Approach to Molecular Interactions, by Viktor Gutmann. Plenum, New York, 1978, Price: U.S. \$ 33.00.

Viktor Gutmann is an acknowledged world leader in the field of donor—acceptor interactions and this book represents his personal view of this area. The opening chapters introduce the concepts of Donor Number, Acceptor Number and Bond Length Variation Rules, which are used in the latter chapters to rationalize donor—acceptor behaviour.

Specifically, Gutmann considers molecular adducts, bond length variations in crystals, interface phenomena, molecular association, ion solvation, redox phenomena, solvation and solvent mixtures, ionization equilibria, complex stabilities in solution, various aspects of kinetics and mechanisms, catalysis and even some biochemical applications.

There is no doubt that the concept of donor and acceptor number as deduced by Gutmann has an important role to play in our understanding of donor—acceptor behaviour. This book is invaluable in showing how such concepts might be applicable to the general field.

The Editor's Desk