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Book reviews

Handbook of Organosilicon Compounds. Advances Since 1961. Vol. 1; by V. Bažant, M. Horák, V. Chvalovský and J. Schraml; *Vol. 2, 3 and 4;* by V. Bazant, J. Hetflejš, V. Chvalovský, J. Joklík, O. Kruchňa, J. Rathouský and J. Schraml, Marcel Dekker, Inc., New York, 1973; Vol. 1, 761 pages; Vol. 2, 619 pages; Vol. 3, 728 pages; Vol. 4, 1002 pages, each volume $75.

Organosilicon chemists were greatly aided by the publication in 1965 of "Organosilicon Compounds" by Bažant, Chvalovský and Rathouský, a three-volume compendium of all organosilicon compounds that had been described in the literature through September 1961, together with a 354 page discussion of the chemistry of organosilicon compounds. This compendium now has been updated through 1969 in this four volume set entitled "Handbook of Organosilicon Compounds. Advances Since 1961". An original printing in Czechoslovakia was followed, with some delay, by the publication of this set by Dekker in 1975.

The format of the original compendium is followed in these volumes. In Volume 1 there are 170 pages of textual material which provide discussions of NMR spectroscopy of organosilicon compounds (J. Schraml), IR and Raman spectroscopy (M. Horák), π-bonding (V. Chvalovský), penta- and hexa-coordinate silicon (V. Chvalovský) and organosilicon stereochemistry (V. Bažant). The remainder of Volume 1 brings all of the references for the compound register portion of this set, an author index for the register references and a subject index for the textual material of Volume 1.

Volumes 2, 3 and 4 contain the register of inorganic and organic silicon compounds mentioned in the 1961—1969 literature, about 20 000 of them ranging from the simplest (SiI_4 is the lead-off compound) to the very complicated ($Si_{13}C_{34}H_{98}N_{10}$, dimethylbis[2,2,4,4-tetramethyl-3-{dimethyl(2,2,4,4-tetramethyl-3-[dimethyl(diethylamino)silyl]cyclodisilazanyl)silyl }cyclodisilazanyl]silane is the last). For each compound are listed, with appropriate references, the methods of preparation, its calculated analysis, its physical constants, an indication of other physical and spectroscopic methods used in its study and the types of reactions in which it was used. An "Introduction to the Register" explains the abbreviations and number and letter codes used in the register, as well as the writing of structural formulae and nomenclature.

Organosilicon chemists will welcome these volumes as invaluable additions to their libraries since they will make it so much easier to deal with the voluminous organosilicon literature. The authors deserve our thanks and our admiration for undertaking such a Herculean task and for doing their job so thoroughly and so well. We greatly regret the untimely death of the leader of this project, Professor V. Bažant, but we hope that his colleagues will be able to continue this task. Continued periodic updating of this series would be immensely useful to organosilicon chemists throughout the world.

These books are photocopies of the original typescript. The reduction in

size has been rather overdone: very good eyes are needed to read these books without difficulty for any length of time. The price of these books is not high when one compares it with those of other compound compendia.

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Methodicum Chimicum, Vol. 5, C—O Verbindungen, F. Korte, editor-in-chief, J. Falbe, volume editor, Georg Thieme Verlag, Stuttgart and Academic Press, New York/San Francisco/London, 1975, viii + 818 pages, DM 420.

Last year, Volume 6 of the Methodicum Chimicum, which dealt with C—N compounds appeared*. The present addition to the Methodicum Chimicum series deals with the synthesis of C—O compounds in a very similar way. In 13 chapters involving the participation of 40 authors, 29 of them chemists from German industry, are covered all the major classes of organooxygen derivatives: alcohols, phenols, ethers and epoxides, aldehydes, ketones, acetals, carboxylic acids and their esters and anhydrides, lactones, oxides of carbon and carbonic acid esters and peroxy compounds. We are given a critical discussion of the preparative routes to these compounds, but preparative details and long tables of data are not provided. However, copious literature citations will steer the interested chemist to the right source of detailed information (the literature is covered through 1972). The emphasis is on modern developments, although the old and traditional synthetic procedures are covered as well. In view of the industrial importance of so many organooxygen compounds, the strong industrial component among the authors makes good sense. Here, of course, organometallic chemistry plays an important role and metal reagents are given their due in these discussions.

This will be a useful book for the synthetic chemist, a good starting point in the literature search, providing, as it does, general, well-referenced information on the syntheses of C—O compounds. But eventually one will want details, so why not go to Houben—Weyl directly? One advantage of this Methodicum Chimicum volume is that it is up-to-date; the Houben—Weyl volumes are not. Much of the Houben—Weyl coverage of aldehydes dates back to 1954, of ketones to the 50's, of carboxylic acids to 1952. Now, many newer procedures, many of them based on organometallics, are available, and so the present volume will have special utility, at least for a few years.

To be commended are the bibliographies of review-type references at the end of each chapter and the detailed subject index of 56 pages which greatly helps the reader. An English version of this book will appear in due course.

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*For a review of Vol. 6, see J. Organometal. Chem., 88 (1975) C10.

Landolt—Börnstein, Numerical Data and Functional Relationships in Science and Technology. New Series (Ed. in Chief K.-H. Hellwege). *Group III. Crystal and Solid State Physics. Vol. 7. Crystal Structure Data of Inorganic Compounds. Part e (Key elements: d^9-, d^{10}-, d^1-d^3, and f-elements);* by W. Pies and A. Weiss, Springer-Verlag, Berlin/Heidelberg/New York, 1976, xxvi + 739 pages, DM 680.

This is a companion volume to those previously reviewed in this Journal (73 (1974) C21; 104 (1976) C14). It deals with oxo-, hydroxo-, and halogenoxo- compounds of Cu, Ag, Au, Zn, Cd, Hg, Sc, Y, Ti, Zr, Hf, V, Nb, Ta, the lanthoids, and the actinoids. It lists all data on the relevant structures which have been determined by X-ray, neutron, or electron diffraction. Literature coverage extends to the end of 1971. Compounds are systematically listed, but volume III/7g must be available to provide the references, and the indexes will appear in Vol. III/7h. The series of which this forms a part is essential to any comprehensive chemical reference library.

It is a high-quality production, and will survive when the paper of many other contemporary scientific publications has decayed. This, and the painstaking work involved in compiling the data and in type-setting and proof-reading no doubt contribute to the very high cost; this must be impressive even to German purchasers, but is, as a result of the devaluation of the pound sterling, positively startling to British eyes.

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Coordination Polymerization — (A Memorial to Karl Ziegler); edited by J.C.W. Chien, Academic Press, New York/San Francisco/London, 1975, xii + 353 pages, $16.00.

The book edited by Prof. Chien does not deal with the plastics and rubber industrial technologies that have developed from the happy accident in Prof. Ziegler's laboratory. Probably no one book could deal with all the ramifications and techniques, and perhaps the title of this book is too general. Instead, the book limits itself to questions of theory and the enigmas: What causes active sites to polymerize monomers? What is an active catalytic site? What is the chemistry of and coordination field of an active metal site? How does one deliberately create such sites?

As pointed out in the Preface, the chapters proceed in logical order, each being a review written by a worker pursuing his own approach to the mechanism. The topics are mostly available in other articles, but the present book presents somewhat more succinct reviews by the various authors themselves under a single cover. As such, the book seems to be suited to an inquiry into the mechanism of insertion polymerization. Indeed, it might serve as a good text for advanced students or for chemists needing to know the 1975 concepts of "theory" as opposed to "what to throw into the reactor". The book is a series of reviews, not a cookbook.

Wilke introduces the work with a short biography of Ziegler, but, unfortunately, modestly omits all his own important contributions to the field. Pino discusses the insertion of monomer and the geometrical requirements at an individual site, each site producing polymer with its own special stereochemistry.

Kinetics and mechanism are attacked in various ways by investigation of ratios of reactants and monomers and calculation of equilibrium coverage of the catalyst surface by monomer versus activator molecules in chapters by Fuji, Tait, and Keii, with additional insight into chain transfer by Henrici-Olivé and Olivé.

However, how many of the transition metal atoms are functioning as active sites? Active center counting is a major portion of the book with another good review by Yermakov and Zakharov. Their work helps to let us drop the term "coordinated anionic" in favor of "coordination" or even "insertion" polymerization.

Attempts to elucidate mechanism by means of soluble catalysts have their own difficulties, as presented well by Dyachkovskii for the $(C_5H_5)_2$-$TiCl_2$-derived catalysts. The field of peralkyl transition metal compounds has not yet provided model active systems for mono-olefin polymerization; Ballard gives work on these compounds along with the apparent requirement of avoiding metal—metal interactions by means of depositing the transition metal atoms on a support in order to obtain high activity. Together with this work, a chapter by Chien makes it clear that activity on a support depends on the environment of the attached atom on that support and that stoichiometry of the system as a whole provides no definition of the environment of the few atypical but active atoms.

After twenty years of metal halides, soluble species, or supports, we do not yet know what an active site is. In a final chapter, Teyssié reviews the application of insertion polymerization to dienes with excellent emphasis on the changes in polymer structure effected by "slight" catalyst changes. If Teyssié can make it amply clear that the well-characterized isolable soluble catalysts have many areas yet to be explained, when will the heterogeneous systems be defined?

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