

The usual problem of authors' different styles, abilities, and emphases is tolerable in view of the wealth of information within.

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Comprehensive Organometallic Chemistry. The Synthesis, Reactions and Structures of Organometallic Compounds. Vol. 8. Edited by G. Wilkinson, F. G. A. Stone, and E. W. Abel. Pergamon Press, Oxford. 1982. 1106 pages. \$2150 for 9 volume set.

In this volume the authors attempt to cover several important areas of catalysis as well as the use of organometallic complexes in organic syntheses.

The first four chapters concern carbon monoxide and carbon dioxide. They are entitled "Preparation and Purification of CO and CO₂", "Organic Syntheses where CO is the Unique Source of Carbon", and "Reactions of CO₂" all by R. P. A. Sneeden and "Synthesis with CO and a Petroleum Product" by I. Tkatchenko. The accounts are well balanced, thorough, and especially informative (complete with compact flow charts) about real processes in use in industry today. Everything is here, from methanation to azacarbonylation.

The article by B. R. James, "Addition of H₂ and HCN to Carbon-Carbon Double Bonds", relies heavily on the many previous reviews of homogeneous hydrogenation, as well as James' book, now about 10 years old. However, the article provides a nice summary of even some of the very early work on homogeneous hydrogenation starting with Calvin in 1938.

W. Keim's article on "Alkene and Alkyne Oligomerization, Co-oligomerization and Telomerization Reactions" deals mainly with group 8 catalysts, but Ziegler-Natta and other metal systems are outlined nicely. The section on telomerization is especially welcome, as a review of this subject is relatively uncommon. Keim presents a balanced view of olefin dimerization including some of the more recent and unique metallocycle mechanisms.

"Asymmetric Synthesis using Organometallic Catalysts" by H. B. Kagan concerns primarily hydrogenation and hydrosilylation of olefins. The asymmetric reduction of ketones, addition of carbenoids to olefins, and epoxydation of olefins are among the understandably shorter parts of the review. Kagan is cautious about overinterpretation concerning the source of asymmetric induction. Most important references are included, even though the total number is only 125.

"Alkene and Alkyne Metathesis Reactions" by R. H. Grubbs is a relatively concise (50 pages), factual, historical overview of the olefin metathesis reaction. (Acetylene metathesis occupies only 1 page, as little was known about the reaction at that time.) The coverage is selective, he does not get overly involved in what are now thought to be defunct theories, and he emphasizes more recent findings concerning isolable alkylidene complexes.

C. U. Pittman's article entitled "Polymer Supported Catalysts" is in general less messianic than previous articles on this subject. One still gets the feeling that the results are sometimes overinterpreted on the basis of the level of detailed knowledge we have for these systems. All in all, it is a fairly balanced, useful appraisal of progress in the area.

The several thorough articles by P. W. Jolly on nickel chemistry cover nearly 200 pages. They largely update the information in the two books entitled "The Organic Chemistry of Nickel" published by Jolly and Wilke in 1975. Some of the material presented here overlaps with that presented by Keim in the earlier article.

The next three articles by B. M. Trost ("Organopalladium Compounds in Organic Synthesis and in Catalysis"), A. J. Pearson ("Organoiron Compounds in Stoichiometric Organic Synthesis"), and W. E. Watts ("Organic Chemistry of Metal-Coordinated Cyclopentadienyl and Arene Ligands") explore the use of specific organometallic compounds in organic syntheses. The most thorough from an organic chemist's point of view is the first of these articles. Pearson's is more selective, often deferring to the chapter on iron chemistry in Volume 4 of this series. Watts' article is probably the most selective of the three.

The last article by J. R. Dilworth and R. L. Richards entitled "Reactions of Dinitrogen Promoted by Transition Metal Compounds" is relatively short with a good historical survey and a compact organization according to metal triads.

In general these articles supplement and update others, some of them elsewhere in this series. The referencing is thorough, usually through 1979, sometimes well into 1980. One annoying feature is a lack of attention to detail in a (fortunately small) number of equations and drawings, an inevitable result of the apparently tight publishing schedule. Overall this book is an excellent contribution to the series. Even someone relatively familiar with catalysis and the applications of organometallics to organic synthesis will find much to ponder in the heaps of information within. In some articles the newcomer can also be relatively comfortable with the selective, well-organized, historical approach to the subject.

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Inorganic Syntheses. Volume 22. S. L. Holt, Jr., Editor-in-Chief. Wiley, New York. 1983. xv + 278 pp. \$42.50.

Volume 22 of this tried-and-true series brings useful syntheses for inorganic chemists of all kinds: for the solid-state chemist (notably rare-earth halides and zeolite molecular sieves), for the coordination chemist, for the main-group chemist, for the organometallic chemist, and, more narrowly, for the boron chemist. The preparative recipes that will be of special interest to the readers of this journal include those for dimethylphenylphosphine, μ -nitrido complexes of iron and ruthenium, metallacyclopentane derivatives of palladium, cobalt, rhodium, and iridium (albeit only in low yield), cycloolefin complexes of ruthenium, mononuclear pentacarbonyl hydrides of the group 6 metals, and various organoboron and metallacarborane compounds and decaborane(14).

As usual, the preparations are described clearly in great detail; the properties of the compounds in question are given; and leading references are provided. The reported syntheses should be reliable and repeatable since all have been checked by independent workers. This, of course, is why "Inorganic Syntheses" is such a valuable aid to the chemist who needs to prepare an inorganic compound. Things will be much easier for him if he can find this compound in one of the volumes of this series.

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Gmelin Handbook of Inorganic Chemistry. 8th Edition. Sc, Y, La-Lu Rare Earth Elements. Part D6. Ion Exchange and Solvent Extraction Reactions. Organometallic Compounds. J. H. Forsberg, Y. Marcus, and T. Moeller, volume authors. T. Moeller, U. Krüerke, and E. Schleitzer-Rust, volume editors. Gmelin Institut für Anorganische Chemie der Max-Planck-Gesellschaft zur Förderung der Wissenschaften and Springer-Verlag, Berlin/Heidelberg/New York. 1983. xii + 304 pages. DM 1012, \$392.70.

For the organometallic readers of this journal, the primary interest in this Gmelin volume is the chapter on organometallic compounds of Sc, Y, and La-Lu by Forsberg and Moeller. This is an excellent compilation of the organometallic chemistry of these elements and is differentiated from the other available reviews of this area in that much of the data is presented in tabular form. The comprehensive tables of published compounds are efficiently organized to present a substantial amount of synthetic and spectroscopic information in a format that still allows one to rapidly scan them to determine which complexes are known and which are not. When appropriate, additional comment on each class of complexes is provided at the end of the table in an orderly fashion. The commentary highlights the special features of each class and also discusses how well the identity of the compounds has been established. An additional distinguishing feature of this review is that the authors have taken the time to prepare excellent, original drawings of crystallographically characterized complexes. Since structural parameters are included and thermal ellipsoids are avoided, these new structural pictures are particularly clear and informative. This chapter is an excellent addition to the review literature on organometallic complexes of scandium, yttrium, and the lanthanides and will be valuable to anyone who wants to know or reference the literature in this area.

The other chapter in this volume describes scandium, yttrium, and lanthanide metal ion exchange and solvent extraction reactions that have not been discussed in other Gmelin volumes.

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