

Book reviews

Inorganic and Organometallic Reaction Mechanisms; by J.D. Atwood, Brooks/Cole Publishing Company, Monterey, California, 1985, xi + 322 pages, \$26.50. ISBN 0-534-03777-1.

This book is stated by the author to be designed for students who have had one semester of Inorganic Chemistry after General Chemistry; for American students, the level is therefore clearly that of seniors or graduate students. There are eight chapters with the following headings (the number of pages and references are shown in parentheses): Chemical Kinetics (43 pages, 32 refs.); Ligand Substitution Reactions on Square Planar Complexes (30 pages, 34 refs.); Substitution Reactions of Octahedral Werner-type Complexes (26 pages, 32 refs.); Organometallic Substitution Reactions (60 pages, 93 refs.); Oxidative-addition and Reductive-elimination (34 pages, 65 refs.); Homogeneous Catalysis (43 pages, 70 refs.); Stereochemical Nonrigidity (44 pages, 50 refs.); and Oxidation—Reduction Reactions — Electron Transfer (26 pages, 43 refs.).

The author is, of course, well known as an authority in various areas relating to inorganic reaction mechanisms, particularly concerning metal carbonyls, and his coverage of aspects of chemistry dealing particularly with reaction kinetics is therefore authoritative. The organometallic content starts with Chapter 4, a large part of which is concerned with displacement of CO ligands from a metal carbonyl, including the insertion of CO into a metal—alkyl bond. The title of the chapter is therefore significantly misleading. (Indeed, one should point out that the title of the book is also incorrect, in that the author restricts his attention to aspects of the chemistry of transition metals; there is no coverage of main group metals.)

Chapter 5 is firmly in the area of organometallic chemistry, and provides a reasonable account of addition of alkyl halides to low oxidation state metal complexes.

Chapter 6 is somewhat disappointing, not least because the role of the metal is explained in terms of a simplified potential energy diagram, Fig. 6.1, which is quite misleading. The implication is that the function of the catalyst is simply to lower the activation energy for a particular organic reaction, rather than to do so as a consequence of the formation of various (organometallic) intermediates. It is surprising to the reviewer that little is said about selectivity. A modern treatment of asymmetric hydrogenation of prochiral substrates would have been particularly informative for students, and the author seems to have missed a useful opportunity to have dealt with this topic in detail.

Chapter 7 is valuable, with many of the examples of fluxionality, quite reasonably, taken from areas other than that of organometallic chemistry (which, in any case, is here restricted to some cyclopentadienyls and carbonyls). By and large, the data discussed refer to fairly old work.

The remaining sections deal with some classical problems of transition metal

inorganic systems in a very reasonable, but relatively elementary, fashion.

In spite of some limitations, this should provide to be a useful teaching text. Each chapter ends with a list of problems, and this is one of the most valuable features of the book.

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Organometallic Chemistry, Volume 13; E.W. Abel and F.G.A. Stone, Senior Reporters. The Royal Society of Chemistry, 1985, xv + 491 pages. ISBN 0-85186-611-5.

This is the latest in a well known series of books; it covers the literature of organometallic chemistry for the year 1983. The major departures from previous practice are, firstly, that the book is produced by a "camera ready" method and, secondly, that an author index is no longer present.

The coverage of the field is based on the same pattern as in Vol. 12. However, a section has been introduced (as in Vol. 11) on "Organometallic Compounds in Biological Chemistry" (by B. Ridge; this deals also with the 1982 literature and is primarily concerned with B_{12} systems, or models thereof). New contributors are J.W. Wilson ("Boron with the Exception of the Carbaboranes"), T.R. Spalding ("Carbaboranes, including their Metal Complexes"), W.E. Lindsell ("Organometallic Compounds containing Metal-Metal Bonds"), K.J. Karel and P.L. Watson ("Complexes containing Metal-Carbon σ -Bonds of the Groups Scandium to Manganese"), and D.R. Russell ("Structures of Organometallic Compounds determined by Diffraction Methods").

To cover the whole breadth of organometallic chemistry in a single volume is, of course, a massive task; it can only be achieved within certain limitations in a somewhat staccato fashion. As for the new method of presentation, one difficulty with providing the camera ready copy, apart from the obvious one of it being less attractive for the reader, is that authors no longer have an opportunity to spot mistakes which they made in their manuscripts by correcting them at the proof stage. For instance, I notice that on page 310 there are several errors in the references (in the spelling); furthermore, the abbreviations used by journals for different authors are no longer uniform, as can again be seen by comparing, for example, page 310 with page 373.

The field, of course, is growing at an incredible rate. This is nowhere more obvious than in the section dealing with X-ray structures. Dr. Russell mentions 1409 structures which have been described in 1074 papers.

This series continues to be invaluable.

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