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Book review

Organometallic Reaction Mechanisms; by Donald S. Matteson, Academic Press, New York and London, 1974, xii + 353 pages, $24.00, £11.50.

Most organometallic chemists are primarily interested in structure and synthesis and tend to ignore serious mechanistic studies. As evidence of this one needs only to scan the contents of this journal or the program of a symposium on organometallic chemistry. As a result understanding of mechanisms in the field is rather limited and somewhat scattered. This book by Matteson is only the second one published thus far which attempts to survey the area broadly, and yet critically, and to do it within volume of manageable size so as to serve as sound introduction for the uninitiated. The coverage is limited to the non-transition elements.

An initial chapter on bonding, structure and potential surfaces is followed by three on electrophilic displacement: one on NMR studies of metal exchange, a second on replacements of metal cations and a third on displacements involving neighboring sites (analogs of 1,2-shifts). A chapter on polar 1,2-additions and eliminations such as oxymetallations, dehalometallations and hydrometallations follows. Then a brief treatment of carbene transfer agents is presented. Free radical and photochemical reactions are treated in the next chapter, and free metals and metal anions in the final one.

The author's objective is "to provide a reasonable critical review of selected significant developments in the field and to outline a self-consistent set if interpretations of organometallic reaction mechanisms". One way in which this is achieved is by reinterpreting results in the older literature in the light of more recent information and newer concepts, a happy circumstance for the neophyte. When experimental information is inadequate for unambiguous interpretation the author does not hesitate to offer his own, which may or may not agree with that of the investigators whose work is under discussion. The result is often thought-provoking, and may even be just plain provoking to the individual concerned!

Some readers may not find the structural symbolism used in representation of intermediates and transition states suited to their personal tastes, but the meanings are clear enough. The book is written in a distinctive style, and sprinkled with bits of levity. Most importantly, the substance of the book comprises a most useful addition to the literature of organometallic chemistry and will be added to the libraries of those practitioners and students who are interested in the dynamics of reactions in this area which is currently enjoying an unprecedented rate of expansion.

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