

## BOOK REVIEW

**Ligand Reactivity and Catalysis.** By MARK M. JONES, Academic Press, New York and London, 1968. viii + 272 pp. \$14.00.

The author states his aim is not only to review the literature but also to organize it into a logical framework. He warns that he will emphasize those aspects of the field that are closest to his own research interests. Taking into account the limitation of scope specified in the last sentence, this reviewer believes the author has fulfilled his objectives admirably. This book gives an excellent coverage of catalysis by classic types of complexes. I believe the author has made a wise decision in limiting the topics he discusses in detail. Although the scope of the book is more limited than the title would suggest, the book is a much more valuable contribution than if it were an encyclopedic review of all aspects of ligand reactivity. However, if the reader is interested in a discussion of catalysis which, for instance, involves metal-carbon bonds, he should be warned that this book is not for him. As Professor Jones points out, there are many good recent reviews of other aspects of catalysis.

The presentation is somewhere between a review and a textbook. General principles are put forth but, in keeping with another stated aim of encouraging research in the field, the author continuously emphasizes areas where further work is required.

The book contains 6 chapters. The first chapter consists of a concise historical introduction and classification schemes for the various types of reactions. The next chapter deals with equilibrium shifts upon coordination. This chapter includes an excellent discussion of the increases in strengths of protonic acids by coordination; a section of tautomeric shifts upon chelation (i.e., acetylacetone); equilibria favoring product formation and finally steric interactions. The third chapter on ligand reactivity is the longest of the book. After an introductory section on polarization effects on ligand reactivity, there is an excellent section on electrophilic reagents which includes a number of examples from the author's own extensive work in this field. There is a fairly extensive section on Masking and shorter treatments of a number of other topics including Nucleophilic Reagents, Redox Reactions, Ligand Polarography, Free Radical Reactions, Internal

Ligand Reactions, Macrocyclic Synthesis, and Reactions of Coordinated Ammonia.

The fourth chapter deals with Catalysis via Coordination. After a well-written introduction which considers kinetic factors in catalysis, several sections considering various aspects of the subject are considered. Most of the treatment is good but in this chapter the author uses more examples from organometallic chemistry than he had in the previous chapter and in this field the author is not as much at home as in classic complexes. Thus, in the Wacker reaction discussion (page 162) the author seemed to have missed the point that the important step is the attack of *complexed hydroxide* on *complexed olefin*. Also, the reviewer found the sections on nitrogen fixation and stereospecific polymerization not up to the general high standards of the book.

The fifth chapter gives a short survey of the various tools, both theoretical and experimental, for studying ligand reactivity. Although the author can do little more than give a short sketch of each experimental tool, he does give a good overall picture of the methods available and their limitations. Finally, in the last chapter, entitled "The Prediction of the Effects of Coordination on Ligand Reactivity," the various approaches to predicting quantitatively the thermodynamic and kinetic effects of coordination are reviewed.

The book is generally written in a clear, concise, and very readable fashion. There were few typographical errors noted by this reviewer.

The few criticisms (such as the use of hydrolysis to describe the Wacker reaction which is, in fact, an oxidation) generally come in sections in which the author is discussing chemistry which is not close to his own research interests, and are minor compared to the general excellence of the book. Although the reviewer's and author's research interests do not greatly overlap, this reviewer found much of interest in the book.

Certainly this book should be in the library of any establishment interested in metal ion catalysis and in the personal library of researchers interested in ligand reactions of classic complexes.

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