

BOOK REVIEWS

Studies in Inorganic Chemistry. Edited by F. R. HARTLEY. **Chemistry of the Platinum Group Metals**, Vol. 11. Elsevier, Amsterdam, 1991. 642 pp.

The aim of this book is to cover the development of platinum group metal (PGM) chemistry over the past 20 years in the areas of occurrence, extraction, and use; organometallic chemistry and catalysis; and coordination chemistry and biochemistry of platinum group metals. In general, this book has accomplished its goals.

The chapter on "Occurrence, Extraction, Properties and Uses" (F. R. Hartley) is a thorough and interesting review of the history of PGM, their uses, and their properties with references spanning the period from 1751 to 1988. Heterogeneous catalysis is covered under "General Introduction to Catalysis by PGM" (G. C. Bond) with a number of significant general references and the chapter on "Catalytic Combustion" (D. L. Trimm), which discusses not only the catalytic process but also the problems associated with reactor and turbine design.

Homogeneous catalysis and organometallic chemistry occupy the bulk of the book with chapters on "PGM Catalysts in the Synthesis of Chemicals from Synthesis Gas" (G. R. Steinmetz and J. R. Zoeller), "PGM Catalysis in the Petrochemical Industry" (A. W. Parkins), "PGM Catalysis in Melts" (J. F. Knifton), "C-H Bond Activation" (J. R. Chipperfield), "Catalytic Oxidation" (E. S. Gore), "PGM Carbonyl Compounds" (J. A. Davies and C. T. Eagle), "PGM in the Photodecomposition of Water" (A. Mills), and, particularly, "Organometallic and Homogeneous Catalytic Chemistry of Palladium and Platinum" (G. K. Anderson) and "Homogeneous Catalytic Chemistry of Rhodium and Iridium" (F. H. Jardine). These chapters all provide a thorough coverage of their respective topics and are extensively referenced.

Biochemical applications are described under chapters on "Amino Acid and Protein PGM Complexes" (H. Kozlowski and L. D. Pettit) and the use of "PGM in Cancer Chemotherapy" (C. A. McAuliffe, H. I. Sharma, and N. D. Tinker). These chapters give complete coverage of the biologically important application of PGM compounds.

Other chapters in the book are on "PGM Coated Anodes" (E. N. Balko), "Platinum Metals in High Oxidation States" (W. Levason), and "PGM in Electronics" (P. D. Gurney and R. J. Seymour).

As in any multicontributor book there is some disparity in ease of reading and extent of coverage from

chapter to chapter but, taken as a whole, this text provides comprehensive reviews of almost all aspects of PGM chemistry and should be of interest to anyone working with PGM in any way.

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Elements of Chemical Reaction Engineering. By H. SCOTT FOGLER. 2nd ed. Prentice-Hall, New York, 1992. xxii + 838 pp.

This book attempts to combine presentation of principles with problem-solving techniques. The aspects of reaction engineering covered tend to be largely conventional, but the presentation is very appealing and will go well with the student community. An interesting feature of the book is the author's attempt to introduce the student to the need for a critical analysis of published information. The educational value of such an approach in the present times when rushing to print is more the rule than the exception cannot be overemphasized.

In view of its emphasis on teaching and the consequent need for a detailed exposition of principles, the book tends to be somewhat restrictive in coverage. For instance, gas-liquid, liquid-liquid, and gas-liquid-solid reactions are scantily covered, and the almost ubiquitous gas-solid noncatalytic reaction barely touched upon. Also, in these days of semiconductors, silicon chips, and computer parts, an introduction to solid-solid reactions in the compelling style of the book would have been most useful. Chemical vapor deposition has been treated but not solid-solid reactions. An aspect of the book that needs special mention is the section on simultaneous reaction and separation. This is an area of growing industrial relevance, and an introduction to it at the beginning level is indeed timely.

Where catalysis is concerned, the book contains a very well written chapter on catalytic reactors, but there is very little on catalysis per se. Considering that almost 80% of industrial processes involve catalysis in one form or another, a slightly greater emphasis on catalysis would have been desirable. Where rate modeling is concerned, just as the students are "educated" to critically examine any given publication, it is equally important to educate them on the tenu-

ousness of some of the methods of modeling, nowhere more apparent than in the modeling of catalytic reactions. It is this reviewer's opinion that, in view of the astonishing rate at which new information is accumulating on catalysis (a fact that actually applies to all areas of reaction engineering and one that seems to have prompted the second edition), at least a listing of the assumptions with remarks on each, in the easy, instructional format of the book, would have been most welcome.

Considered as a whole, this is indeed a fine book for undergraduate chemical reaction engineering, with an approach that is not only elegant but bound to be highly

effective as an instructional vehicle. Regarding the book's value to the catalytic community, it does not address catalysis specifically enough to be of interest to it. However, the treatment of catalytic reactors is impressive. The printing, presentation, and illustrations are most appealing and help to increase the educational value.

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