R. N. Grimes, in Chapter 11, describes his group's extensive work on multidecker/multicluster sandwich compounds derived from cyclocarboranes.

T. P. Fehlner, in Chapter 12, discusses recent progress in synthesising new metal-rich metallaboranes, and other derivatives with metal–boron bonds.

It is clear that the book contains a wealth of recent information and discussion on electron deficient clusters. It will be an essential reference book for researchers in the general area of clusters, and should also be read by all practicing organic, inorganic and theoretical chemists.

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Aquatic Chemical Kinetics. Reaction Rates of Processes in Natural Waters

Edited by W. Stumm, published by John Wiley, New York, 1990.

The objectives of this book are to treat features of chemical kinetics in aquatic systems, to improve the understanding of reaction rates and mechanisms in natural water, and to stimulate innovative research in aquatic chemical kinetics. To achieve these objectives the editor has selected 23 authors that contribute 18 chapters to this volume, emphasizing explanation and intellectual stimulation over extensive documentation. The authors include physical and inorganic chemists, surface and colloid chemists, geochemists, oceanographers, aquatic chemists, chemical engineers and environmental engineers. This book is the offspring of a workshop and its stimulating discourses which took place in March 1989 in Switzerland. With such a multi-author production, the book reminds one of a 'Conference proceedings', although the editor strongly denies this in his editorial remarks. The styles and presentation of the different chapters are indeed very different and do not produce a continuity as one would like to have seen for a teaching book. On the other hand it really presents a complete cover of all relevant aspects of chemical kinetics that concerns aquatic systems.

The first five chapters deal with the basic principles of aquatic chemical kinetics in which the authors focus on the kinetics of chemical transformation in the environment, the formulation and calibration of environmental reaction kinetics, catalysis in aquatic environments, the kinetics of trace metal complexation, and the principles of linear free-energy and structure–reactivity relationships. Chapter 6 is devoted to the frontier-molecular orbital approach in geochemical processes and presents important theoretical information for the understanding of observed kinetic behaviours. The following two chapters deal with chemical transformations of organic pollutants and the role of extracellular enzymatic reactions in natural waters. The remaining ten chapters all deal directly or indirectly with multiphase systems, starting with a treatment of *ab initio* quantum-mechanical calculations of surface reactions. Topics treated thereafter include: adsorption kinetics of organic solutes at phase boundaries; redox reactions of metal ions at mineral surfaces; modelling of dissolution of multiple oxides; dissolution of oxide and silicate minerals; photoredox reactions at hydrous metal oxide surfaces; dissolution of carbonates; kinetics of colloid chemical processes; kinetics of chemical weathering; and transport and kinetics in surficial processes.

The authors of the various chapters have all done a good job in presenting their material and citing appropriate literature for more detailed information. The editor should be complimented on achieving a high standard of presentation in such a multidisciplinary edition. This book is a must for all environmental students and scientists dealing with aquatic systems.

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Inorganic Syntheses. Volume 27

Edited by Alvin P. Ginsberg (AT & T Bell Laboratories), published by John Wiley & Sons, New York, 1990, XXV + 433 pp., £47.50, ISBN 0-471-50976-0.

This book is a continuation in the series of monographs devoted to Inorganic Syntheses and maintains the tradition of earlier volumes by compiling recently developed procedures for the synthesis of inorganic and organometallic compounds of current interest. The present volume contains over 200 preparative procedures organized in 68 numbered sections in the usual carefully described manner, and they are, as always, independently checked for reproducibility. They correspond for the most part of currently active areas of research. Each contribution includes a brief introduction, a detailed

description of the synthetic procedure, a summary of physical properties for each compound, followed eventually by a list of references. Specific safety precautions emphasizing hazards associated with these syntheses are highlighted within the text. Separate Contributors, Subject, and Formula Indexes are provided. The Formula Index, as well as the Subject Index, is a Cumulative Index for Volumes 26–30.

This volume is subdivided into nine chapters. The first (Preparations 1–7) is devoted to transition metal polyhydride complexes. Chapter two (8–13) illustrates the synthesis of transition metal chalcogenide complexes. Chapter three (14–24) focuses on the early transition metal polyoxanions and addresses the synthesis of a class of compounds that are notably difficult to prepare in a pure form. Chapter four (25–35) offers preparations of a diverse assortment of lanthanide and actinide complexes. Chapter five (36–42) is concerned with transition metal cluster complexes. Chapter six (43–51) is devoted exclusively to phosphorous complexes and compounds. Chapter seven (52–53) deals with several compounds of transition metal complexes of biological interest. Chapter eight (54–63) will be of primary interest to true organometallic chemists; this section includes the Vaska-type rhodium complexes, *trans*-$RhX(CO)L_2$, and a variety of other transition metal species. The final chapter (64–68) is concerned with the synthesis of various ligands and other main group compounds.

The latest volume of this excellent series maintains the same high standards set by previous volumes and is strongly recommended for people working or/ and involved in any of the above mentioned research fields.

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