Book Reviews *

Studies in Surface Science and Catalysis, No. 96. Catalysis and Automotive Pollution Control III. Edited by A. Frennet and J.-M. Bastin (Universite Libre de Bruxelles). Elsevier: Amsterdam. 1995. xvii + 940 pp. $340.75. ISBN 0-444-82019-1.

Proceedings of the Third International Symposium (CAPoC3), Brussels, Belgium, April 20−22, 1994. These proceedings are based on the third of a series of symposia devoted to the use of catalysis for the depollution of exhaust gases of motor vehicles. Although catalysts have been used for this purpose for thirty years, the subject is still very topical because of its economic impact. The increasing number of submitted, accepted, and published papers amply attests to this fact. Seventy papers are presented which discuss Model Reactions and Model Catalysts, Substrates and Washcoat Technologies, Gasoline Catalyst Technologies, Diesel Catalyst Technologies, Lean NO_x Catalyst Technologies, Catalyst Aging and Poisoning, Alternative Fuels, and Appropriate Catalysts.

JA9656199

S0002-7863(96)05619-3

Progress in the Chemistry of Organic Natural Products, No. 68. Edited by W. Herz (The Florida State University), G. W. Kirby (The University−Glasgow), R. E. Moore (University of Hawaii at Manoa), W. Steglich (Institut fur Organishche Chemie der Universitat Munchen), and Ch. Tamm. Springer: Wein. 1996. vii + 498 pp. DM330. ISBN 3-211-82702-1.

The volumes of this series, now referred to as Zechmeister after its founder, L. Zechmeister, have appeared under the Springer Imprint ever since the series inauguration in 1938. The volumes contain contributions on various topics related to the origin, distribution, chemistry, synthesis, biochemistry, function, or use of various classes of naturally occurring substances ranging from small molecules to biopolymers. Each contribution is written by a recognized authority in his field and provides a comprehensive and up-to-date review of the topic in question. Addressed to biologists, technologists, and chemists alike, the series can be used by the expert as a source of information and literature citations and by the nonexpert as a means of orientation in a rapidly developing discipline. This volume covers the Naturally Occurring Organohalogen Compounds−A Comprehensive Survey.

JA9657869

S0002-7863(96)05786-1

Metal-Containing Polymeric Materials. Edited by Charles U. Pittman, Jr. (Mississippi State University), Charles E. Carraher, Jr. (Florida Atlantic University), Martel Zeldin (City University of New York), John E. Sheats (Rider College), and Bill M. Culbertson (Ohio State University). Plenum Press: New York. 1996. x + 518 pp. $125.00. ISBN 0-306-45295-2.

This book contains papers from the International Symposium on Metal-Containing Polymeric Materials at the 208th National American Chemical Society Meeting in Washington, DC, August 20−25, 1994. Following the symposium selected authors were asked to prepare chapters both introducing and summarizing their work. This was the sixth such symposium, with the previous ones held in 1977, 1979, 1983, 1987, and 1989. There are ten chapters on synthesis and characterization of new systems and seven chapters on silicon-containing polymers, preceramic systems, 3-D cages, and networks. Eight chapters are grouped under the theme electrical, magnetic, photonic, and ion-exchange properties. There are four chapters on polyelectrolytes and ion-binding systems, one chapter on mass spectroscopy, and three chapters on biopolymers and their structure, function, and reactivity relationships. One chapter is a major review by G. B. Jameson on transition metal-containing biopolymers and models.

JA965679E

S0002-7863(96)05679-X

Electroanalytical Chemistry. Volume 19. Edited by Allen J. Bard (University of Texas at Austin) and Israel Rubinstein (Weizmann Institute of Science, Israel). Marcel Dekker: New York. 1966. xii + 525 pp. $175.00. ISBN 0-8247-9379-X.

Volume 19 of *Electroanalytical Chemistry* continues the tradition of the preceding volumes in this series of providing authoritative reviews on important topics in electroanalytical chemistry that are useful to specialists and nonspecialists. This particular volume contains three well-written, informative, and comprehensive articles of great interest to the electrochemical community. The titles of the chapters are Numerical Simulation of Electroanalytical Experiments: Recent Advances in Methodology by Bernd Speiser, Electrochemistry of Organized Monolayers of Thiols and Related Molecules on Electrodes by Harry O. Finklea, and Electrochemistry of High-T_c Superconductors by John T. McDevitt, Stephen G. Haupt, and Chris E. Jones.

Speiser's article, a welcomed update to Feldberg's chapter on digital simulation (published in 1969 in Volume 3 of this series), focuses on advances in the methodology used in electroanalytical numerical simulation. The chapter contains 275 references, roughly half from the 1990s. The review begins with a presentation of techniques employed in the simulation of standard problems in electrochemistry (i.e., first-order chemical reactions coupled to electron transfer at a planar electrode with moderate rate constants), followed by a description of the problems encountered with these standard techniques when more complicated reaction schemes are encountered. Improvements to the standard techniques and new approaches to solving the problems of more complicated systems are then described. A comparison of the numerical methods (in terms of efficiency in performing the calculations, adaptability to various situations, and stability of the numerical algorithms) is also presented. The chapter concludes with a discussion of specific simulation program packages, including a comparison of some of these programs. The scope and limitations of simulation packages in general is discussed, including the dangers of using the "black-box" approach to numerical simulations. Anybody using or planning to use electroanalytical numerical simulations will want to read this review.

Finklea's article discusses electrochemistry of organized monolayers of thiols and related molecules on electrodes. Roughly 75% of the references are from the 1990s, including several from 1995. A description of methods used for depositing organized monolayers on electrodes is followed by a brief review of the characterization of self-assembled monolayers (SAMs) by nonelectrochemical methods. The electrochemical behavior of monolayer-coated nonelectroactive (blocking) and electroactive electrodes is then discussed. The characterization of blocking electrodes by electrochemical desorption of the monolayer and by the capacitance is described. Methods for detecting pinholes and quantifying pinhole parameters are discussed in detail. This is followed by some procedures for modifying the blocking behavior, with special attention to creating molecular gates. Electron tunneling across blocking electrodes is then considered. The discussion of electroactive monolayers addresses reversible and kinetically controlled behavior of these systems. The ability to gain information regarding monolayer structure and dynamics from reversible cyclic voltammograms is presented, followed by a discussion of electron tunneling across an electroactive monolayer. The review concludes with the author's opinions on the future for research on electrodes coated with organized monolayers. This is an excellent review for introducing newcomers to this area while at the same time serving as a valuable resource for those actively involved in this exciting discipline.

The final chapter of this volume, the review by McDevitt, Haupt, and Jones on the electrochemistry of high-T_c superconductors, focuses on studies of cuprate compounds. The article has 348 references, half from the 1990s. The chapter begins with a qualitative description of the properties of superconductivity presented at a level that can be understood by newcomers to the area. This is followed by a discussion of the corrosion reactivity of high-T_c phases, a topic critical to studying

*Unsigned book reviews are by the Book Review Editor.

superconductor-based electron transfer phenomena due to the requirement of corrosion-free electrode surfaces in studying such phenomena. The remaining sections of the review address fabrication and response of high-T_c electrodes, electrochemical methods for preparing high-T_c samples, measurement and control of copper oxidation state, electrochemical measurements below T_c, and molecule−superconductor devices. The chapter contains some extremely nice illustrations, including some excellent scanning electron micrographs. It concludes with a glossary of terms important to superconductivity. Those interested in learning about this very important area will find this article informative and understandable. Researchers in this fascinating area should consider this a must-read review.

All three of the reviews published in this volume are first-rate and discuss topics that are on the cutting edge of electrochemistry today. The book will appeal to electrochemists of all types, especially those involved in the disciplines specifically addressed in the articles.

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JA9656863

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Bioorganic Chemistry: Nucleic Acids. Edited by Sidney M. Hecht (University of Virginia). Oxford University Press: New York. 1996. viii + 500 pp. $59.95. ISBN 0-19-508467-5.

This book, devoted to the bioorganic chemistry of nucleic acids, is the first in a series that will include at least two additional volumes covering peptides and proteins and carbohydrates. In the preface, the editors note that this book, and the series in general, is "written to support the teaching of graduate students in bioorganic chemistry". The book is ideal for the stated goal and should become a standard for courses in this area. In addition, the book should find further, widespread use because it is an excellent starting point for any chemist seeking to familiarize him- or herself with current topics related to the chemistry, enzymology, molecular recognition, and structure of nucleic acids. The reasonable price of the book is consistent with use as a textbook and in personal libraries.

In accord with its teaching mission, the book is divided into fourteen chapters, the approximate number of weeks in an average academic semester. The chapters are arranged in logical order beginning with a chapter providing a broad overview of nucleic acid structure, function, chemistry, and interaction with small organic and inorganic molecules and a discussion of some common methods used in the study of nucleic acids. Subsequent chapters cover chemical and enzymatic synthesis of DNA and RNA, followed by chapters that discuss helical nucleic acid structures and alternative nucleic acid structures. Methods used in nucleic acid structure analysis are covered in these chapters, as well as in three additional chapters dedicated to chemical mapping, proton NMR, and the use of reporter groups. The consideration of DNA-binding interactions is divided into four excellent chapters devoted to the interactions of metal ions, small molecules, proteins, and nucleic acids (e.g., antisense and antigene oligonucleotides), respectively, with DNA. The book concludes with two chapters that provide thorough coverage of catalytic RNA and use of the polymerase chain reaction for *in vitro* selection experiments.

Each chapter in this volume is clearly written and well illustrated. Careful editing has ensured that there is no needless repetition of material among the chapters. The utility of the volume as a text and a reference source is greatly enhanced by the fact that each chapter contains an average of about 100 citations to the original literature. These references are up to date and are compiled at the end of the text, conveniently segregated by chapter. The fact that many chapters show and discuss primary data should provide a useful teaching device. In addition, the volume is well indexed.

Each of the topics covered in this book have been extensively covered, separately, in a host of books and review articles; however, there have been very few attempts to assemble an overview of this broad field in a single textbook. This book succeeds in presenting a clear, yet suitably advanced, view of modern nucleic acid chemistry and, thus, will prove very useful to educators, students, and established researchers who are interested in this field.

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Nonlinear Computer Modeling of Chemical and Biochemical Data. By James F. Rushing (University of Connecticut) and Thomas F. Kumosinski (USDA). Academic Press: San Diego. 1996. xv + 26 pp. $64.95. ISBN 0-12-604490-2.

The book is divided into two parts: part I deals with the general theory of regression analysis while part II presents several applications. Part I has some informative and interesting information, but it falls short of giving methods or algorithms that the reader might use to actually solve nonlinear regression problems. Instead, the authors refer to several commercial and/or freeware programs for nonlinear regression. The example applications of part II are the real strength of the book; these alone make this an excellent reference for those doing similar work.

The weakness of part I stems from giving extreme details of some items (e.g., matrix representations of nonlinear regression) and then not following through with even simple explanations of algorithms to solve such problems (e.g., Gauss−Newton, Marquardt−Levenburg). However, the discussions of residual weighting and the consequences of linearizing nonlinear models is excellent. The suggestion of constructing a "deviation plot", which graphs the regression residuals versus the independent variable, is very good, and readers are encouraged to pay special attention to the discussions associated with these plots.

In part II, ten chapters are each dedicated to giving a detailed presentation of a real world application (mostly of nonlinear modeling and associated parameter estimation by nonlinear regression). This is an excellent collection of practical examples and makes the book a valuable addition to the library of anyone involved with modeling and the associated data analysis and parameter estimation.

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