

Book Reviews

Second Supplements to the 2nd Edition of Rodd's Chemistry of Carbon Compounds, Vol. III. Edited by M. Sainsbury (University of Bath, U.K.). Elsevier: Amsterdam. 1995. xiv + 368 pp. \$235.25. ISBN 0-444-82249-9.

Part B, Benzoquinones and Related Compounds: Derivatives of Mononuclear Benzenoid Hydrocarbons with Nuclear Substituents Attached through an Element other than the Non-metals in Group VI and VII of the Period Table. Part C, Nuclear-substituted Benzenoid Hydrocarbons with more than one Nitrogen Atom in a Substituent Group. Part D, Monobenzenoid and Phenolic Aralkyl Compounds, their Derivatives and Oxidation Products: Depsides, Tannins, Lignans, Lignin and Humic acid. Chapter 8. Benzoquinones and Related Compounds by J. M. Bruce. Chapter 9. Derivatives of Benzenoid Hydrocarbons with Substituents containing a single Nitrogen Atom by S. M. Fortt. Chapter 10. Aromatic Compounds of the Non-Transition Metals by S. T. Mullins. Chapter 11. Aromatic Compounds of the Transition Elements by A. J. Pearson and P. D. Woodgate. Chapter 12. Nuclear Substituted Benzenoid Hydrocarbons with more than one Nitrogen Atom in the Substituent by M. Sainsbury.

This new Volume of "Rodd" continues to be a major service to organic chemistry, since it collects very specialized aromatic and heteroaromatic chemistry into a single and palatable format. The chapters are uniformly well written and remarkably free from errors, both in the text and in the structures. It is very pleasing to see that the text discusses structures that are usually on the same page, and does so with admirable clarity. It is obvious that a great deal of common sense has gone into producing this series, which serves as a model for other lesser works. While the price of the books makes individual ownership virtually impossible, they should be a standard component of any good organic chemical library.

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JA955384L

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The Chemistry of the Atmosphere: Its Impact on Global Change. Edited by Jack G. Calvert (National Center for Atmospheric Research). Blackwell: Oxford, U.K. 1994. xxi + 394 pp. £89.50. ISBN 0-632-03779-2.

This book is a very good introduction to global change, and chemists of all flavors will find it interesting and useful. The global Earth system is extraordinarily complex and the term "global change" can take on many meanings. Chemistry plays a dominant role in some parts of the system and a supporting role in many other parts. This book offers chapters outlining the various roles chemistry plays, and it does an excellent job of placing chemistry in perspective, relative to other scientific disciplines. The book consists of nearly 30 chapters grouped in five sections. The first section is a succinct outline (by Daniel Albritton) of global change issues relevant to chemistry. The remaining sections address stratospheric ozone depletion, trace species measurements, global warming, tropospheric oxidants, and acid deposition. All of the chapters were written by acknowledged experts, and all are intended to be accessible to nonexperts. The authors succeed admirably.

One of the most attractive features of this volume is that it includes interesting topics which are unconventional for a technical book on atmospheric chemistry. In addition to the more conventional chapters on atmospheric photochemistry, laboratory techniques, observations, and computational models, there are also chapters on the search for halocarbon replacements, the earth radiation budget, pollutant emission controls, ecological impacts, and the effects of air pollution on cultural artifacts. These additional topics add considerable leavening and a wide perspective.

The book is of uniformly high quality. The chapters are all very readable, and they cover the material in such a way that the book will not soon become outdated. Despite a number of typographical errors,

the production standards are high. This volume will occupy a prominent position on my bookshelf.

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JA955328K

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Pesticides—Developments, Impacts, and Controls. Edited by G. A. Best (Clyde River Purification Board) and A. D. Ruthven (Scottish Agricultural Science Agency). The Royal Society of Chemistry: Cambridge, U.K. 1995. x + 180 pp. £49.50. ISBN 0-85404-785-9.

"There have been great advances in the nature of pesticides since the first examples were synthesized over 60 years ago. Of particular significance in recent years has been the move to produce substances that attack the target pest but do not adversely affect the environment."

These words from the preface of the book capture the essence of this conference proceedings. With the possible exception of a chapter on synthetic pyrethroids, these 17 articles do not describe pesticide chemistry or mode of action, but instead discuss environmental fate, monitoring, risk assessment, and regulatory efforts that have evolved to address pesticide use in Great Britain. The parallels and differences with the American system of pesticide controls makes an interesting comparison illustrating strengths and weaknesses of both systems.

The book is targeted at a technical or regulatory audience rather than professional chemists, although the discussions of analytical monitoring methods, environmental fate and impact assessment, and remediation methods will be of interest. The need for further development of analytical capability is highlighted by the fact that less than half of all approved pesticides, and 12 of the 20 most-used pesticides, do not have analytical methods adequate for detection at the levels mandated by European Community standards.

As is often the case with conference proceedings, the articles range in quality from excellent to merely adequate. Although not overwhelming in technical detail, the book is useful in highlighting the diversity of environmental circumstances where nontarget impacts of pesticides occur. Its greatest value will be to illustrate the breadth of environmental aspects of pesticides and the variety of viewpoints, approaches, and programs available to address these problems.

Some of the chapters provide insight into novel pesticide-environment interactions, particularly chapters dealing with pesticide use in sheep-dip operations or marine fish farming. Others give detailed risk assessment approaches, especially articles on standard setting, water monitoring, and operator exposure. Unfortunately, a few articles seemed to consist mostly of rambling philosophical musings and isolated anecdotes or exhibited outright bias toward corporate or institutional products.

Overall, the book is informative and up to date. The editing produced few errors, and these were generally minor—no small accomplishment for articles from diverse authors in a conference proceedings format. Several of these chapters will be useful for the insights they bring to those working in the pesticide and environmental regulatory communities.

James Kotcon, *West Virginia University*

JA9655146

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Diazo Chemistry II: Aliphatic, Inorganic and Organometallic Compounds. By Heinrich Zollinger (Swiss Federal Institute of Technology). VCH: New York. 1995. xiii + 522 pp. \$125.00. ISBN 3-527-29222-5.

Heinrich Zollinger, who is a master of diazo group chemistry, has authoritatively and critically reviewed the broad subject in two volumes. The first contained the chemistry of aromatic and heteroaromatic diazo compounds. The second volume, which is the subject of this review, is devoted to aliphatic, inorganic, and organometallic diazo compounds.

In the 11 chapters that constitute this volume, Zollinger provides detailed descriptions of the synthesis of aliphatic diazonium ions and diazo compounds, the kinetics and mechanisms of diazotization reactions and deamination mechanisms, the structures of diazo compounds and their reactions, including dipolar cycloadditions and those involving carbene and carbenoid intermediates, and a diversity of topics such as transition metal complexes, ion radicals, and nitrogen fixation that are intimately linked to a comprehensive survey of diazo chemistry but rarely found, if at all, in reviews.

Zollinger as a master teacher is evident in the construction of this volume and in its content. Beginning with a history of diazo compounds, he describes nomenclature, provides an overview, and, as an epilogue, gives a view toward the future. The topical development of each section provides the reader with the intellectual evolution that has led to current understanding. The nearly 2000 literature references which extend into 1994 are given in alphabetical order with respect to the first-mentioned author (annotated by citation within chapters for ease in discovery).

Significant insight into the structure and reactivities of diazo compounds is characteristically provided in this book. Sections on isomers of diazomethane, theoretical investigations on aliphatic diazonium salts and diazo compounds, acid-base equilibria of diazo compounds, and the *N*-electrophilicity of aliphatic diazo compounds provide fundamental understanding critical to evaluation of reactions and reactivities of diazo compounds. Extensive treatment is given to modern topics in carbene chemistry that include addition to aromatic hydrocarbons and fullerene[60] and to enantioselective reactions of carbenoids.

Zollinger has incorporated examples and applications of diazo compounds in inorganic and organometallic chemistry, and he thereby broadens the subject from what has previously been thought to have been reserved for organic chemistry. Descriptions of diazo derivatives of polyhedral boron hydrides, metal dinitrogen compounds, including nitrogen fixation, and aryldiazene complexes, among others, are integrated into the general framework of this book. Their relationship to fundamental concepts in diazo chemistry is clearly presented.

Diazo Chemistry II: Aliphatic, Inorganic, and Organometallic Compounds will be an invaluable reference for anyone involved in the chemistry of dinitrogen compounds. The critical assessment and objective overview provided by Heinrich Zollinger sets the stage for future action in this continuing drama.

Michael P. Doyle, *Trinity University*

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Motor Gasoline. Edited by E. L. Marshall and K. Owen (The College of Petroleum and Energy Studies). The Royal Society of Chemistry: Cambridge, U.K. 1995. xx + 282 pp. £99.50. ISBN 0-85404-409-4.

Gasoline production can financially make or break an oil company. Therefore, it is important that anyone involved in this process be well-versed in the science and technology used in producing various gasolines. Since 1989 the oil industry has been altering the composition of gasoline in response to environmental pressures. Consequently, it is necessary to stay up-to-date with changes in the industry as clean gasolines become more important in the global market place. This volume of the *Critical Reports on Applied Chemistry* series provides an excellent snapshot of the evolution of gasoline technology through mid-1994.

This volume is based on a course on motor gasoline technology organized by the College of Petroleum and Energy Studies in Oxford. Many of the authors in this volume lecture in this course. Chapter 1, by Kailash Salooja, provides an overview of the chemistry of gasoline combustion and some recent developments in the field. In Chapter 2, Alf Cluer outlines the general processes involved in the manufacture of gasoline and then addresses how the production of reformulated gasolines is altering these processes. Oxygenated blending components (alcohols and ethers) for reformulated gasolines is the topic of Chapter 3. In this chapter, Maurice Houben examines oxygenate production routes and capacity, chemical and physical properties, and worldwide legislation. Octane quality and knock are the topics of Chapter 4 by George Searle. In Chapter 5, Edward Marshall and Keith Owen examine the effect of gasoline volatility on engine performance and

emissions. In Chapters 6–8, the use of additives to meet gasoline specifications is explored. David Snelgrove examines worldwide gasoline specifications and then briefly addresses gasoline oxidative stability in Chapter 6. Precombustion gasoline additives (antioxidants, biocides, detergents, etc.) is the topic of Chapter 7 by Robin Landells. Chapter 8 by David Blackmore addresses the use of additives to influence the combustion process (antiknock additives, anti-ORI additives, driveability additives, etc.). The impact of gasoline on the environment is the topic of Chapter 9 by Peet Quintus-Wessels. This chapter reviews worldwide emissions legislation and examines how vehicle and fuel technology effects emissions. Finally, in Chapter 10, Robert Riley examines alternate fuels for spark-ignition engines.

The editors have done a fine job with this volume in that each chapter is well-written and self-contained. The chapters are written by experts in their respective fields in such a manner that nonexperts can rapidly gain a basic understanding of the topic and then are given access to some important literature references for deeper inquiry. Since the global production of motor gasoline is a process in great flux and this volume does a good job documenting and discussing these changes, I highly recommend this book.

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Zeolites: A Refined Tool for Designing Catalytic Sites. Studies in Surface Science and Catalysis, Volume 97. Edited by Laurent Bonneviot (Université Laval) and Serge Kaliaguine (Université Laval). Elsevier: Amsterdam. 1995. xii + 572 pp. ISBN 0-444-82130-9.

A collection of 74 papers constitutes Volume 97 of the *Studies in Surface Science* series and is the Proceedings of the International Zeolite Symposium held in Québec, Canada, during October 15–20, 1995. This volume is the latest in the continuing series of proceedings of international zeolite meetings that have been published in *Stud. Sur. Sci. Catal.* since 1980. Except for Volume 85, these books contain either short reviews or state-of-the-art research papers. Thus, they are not texts containing entry-level material on zeolite science and technology (Volume 85 serves this purpose).

The book contains papers dealing with all aspects of both theoretical and experimental issues in zeolites and zeolite-like molecular sieves: 16 concern synthesis, 37 involve characterization/adsorption/modeling, and 21 involve catalysis. Thus, the coverage of the field is nicely distributed. There is a clear emphasis on fundamental aspects of zeolite science rather than commercial applications and/or processes. Additionally, there are no major discoveries contained within these papers. However, the collective work does show that the field is moving forward in the sense that long-standing problems are finding solutions and new types of catalysis with zeolites are being pursued.

In addition to numerous good papers containing previously unpublished work, the volume contains eight papers that are concise overviews (from plenary and keynote lectures). Papers from plenary lectures include those of C. Fyfe and co-workers on solid-state NMR, R. Catlow and colleagues on modeling, and D. M. Ruthven on diffusion. The keynote presentations are by M. E. Davis on synthesis, F. Fajula on catalytic-active sites, A. Zecchina and co-workers on host-guest interactions, T. Inui on deNO_x catalysts, and P. Ratnasamy and R. Kumar on selective oxidation. The combined works of this volume do present a fairly accurate picture of zeolites and zeolite-like molecular sieves as refined tools for designing catalytic sites.

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