

Book Reviews

Fullerenes. Synthesis, Properties, and Chemistry of Large Carbon Clusters. ACS Symposium Series 481. Edited by George S. Hammond and Valerie J. Kuck. American Chemical Society, Washington, DC. 1992. xiii + 195 pp. 15.5 × 23 cm. ISBN 0-8412-2182-0. \$44.95.

This volume in the ACS Symposium Series derives from a special Fast Breaking Events Symposium held in April 1991 at the American Chemical Society National Meeting in Atlanta, Georgia. In 1990, astrophysicists W. Krätschmer, D. R. Huffman, and their co-workers first reported the isolation from graphite soot of stable molecules having the composition C_{60} and C_{70} . Although chemists R. E. Smalley, H. W. Kroto, and their co-workers had detected these compounds by mass spectrometry and proposed what is now their accepted structures 5 years earlier, it was the production of macroscopic amounts of these new allotropic forms of elemental carbon that triggered intense interest by the research community and led to a flood of publications on the topic.

Chemists take special delight in the beauty of symmetry that is particularly evident in C_{60} , which resembles the geodesic domes of Buckminster Fuller (hence the generic name, fullerenes, for this series of stable forms of carbon and their more playful designation as "bucky balls", which also takes into account the structural similarity of C_{60} to the familiar black and white pattern of pentagons and hexagons used in the fabrication of soccer balls). The symmetry of C_{60} has been clearly shown by X-ray diffraction of crystalline derivatives and the presence of a single sharp resonance in the ^{13}C NMR spectrum of C_{60} .

This volume presents much valuable background information for anyone interested in the fullerenes, but it is chapter 11, Survey of the Chemical Reactivity of C_{60} , Electrophile and Dienophile Par Excellence, that will be of most interest to medicinal chemists since it is C_{60} derivatives with functionalized appendages and some water solubility that are most likely to find use in biological applications. As George Hammond points out in his overview for this book, "For example, it does not a priori seem likely that fullerenes will have notable pharmacological properties. However, it is inevitable that sooner or later water-soluble derivatives will be subjected to biological screening; after all, few people predicted that aminoadamantane would be a potent antiviral agent." Chapter 11 demonstrates that primary and secondary amines readily add to C_{60} at room temperature to produce polyfunctional derivatives with an average of about six ligands per molecule. Thus, the globular fullerenes with an array of functionalized appendages might serve as vehicles for the presentation of antigens or for targeted drug-delivery systems.

Since publication of this book many articles and reviews on fullerenes have appeared, entire issues of some journals have been devoted to the topic, and *Science* chose C_{60} as "molecule of the year". In addition, new geometric forms of carbon such as tubes, capsules, and concentric cages have been produced, and improved methods for the preparation and purification of C_{60} and C_{70} have been described. In spite of very rapid progress in the field, the volume under review provides an important overview and

is recommended for those who desire an introduction to the fascinating world of bucky balls.

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Free Radical Mechanisms of Tissue Injury. Edited by M. T. Moslen and C. V. Smith. CRC Press, Boca Raton, FL. 1992. 224 pp. 16.5 × 24.5 cm. ISBN 0-8493-5161-8. \$97.50.

This book contains updated and expanded versions of selected presentations from the 199th National Meeting of the American Chemical Society. The editors intended purpose of the symposium and this book was to present an overview of the involvement of free radicals and reactive oxygen species in the injury of specific tissues. Accordingly, each of the 11 chapters in the book deals with a specific tissue. For example, the topics of free-radical involvement in hemoglobin-induced damage to the central nervous system; ethanol-induced liver injury; myocardial ischemia and reflow; asbestos-induced lung injury; retinopathy; muscular dystrophy; and activation of xenobiotics by granulocytes are each depicted in separate chapters. The book is efficiently designed so that there is no duplication of material from one chapter to another. Of particular interest is a chapter on lipid peroxide-dependent modifications of lipoproteins in atherosclerosis. This chapter is subdivided into the following subjects: the role of lipid peroxidation in the formation of macrophage-derived foam cells and the triggering of early cellular events associated with atherosclerosis, cytotoxicity of oxidized low-density lipoproteins, and a rather unique section which describes the physical interaction of lipoproteins with the vessel wall as interfacial rather than solution chemistry. Most chapters contain 40-60 references, while the chapter on myocardial ischemia has an impressive 440 references. Citations are generally limited to 1990 and older. Due to the number of reference books available on the topic of free-radical-induced tissue injury, as well as the cost of this book, this book is recommended for institutional library purchase rather than inclusion in one's personal library.

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Catalysis by Metal Complexes. Volume 13. Catalytic Activation of Dioxygen by Metal Complexes. By László I. Simándi. Kluwer Academic Publishers, Norwell, MA. 1992. x + 396 pp. 15.5 × 23 cm. ISBN 0-7923-1896-x. \$128.00.

The utilization of metal complexes to activate molecular oxygen for catalysis of oxidations under mild conditions

bears a striking resemblance to enzymic systems. This methodology is developing rapidly and its application is being employed with increasing frequency in organic synthesis. Almost all major classes of organic compounds can now be oxygenated, or dehydrogenated, by catalytic systems for which transition-metal complexes are the primary components. Further, the observation that dioxygen may be a useful and versatile oxidant offers promise in assisting in a world where environmental pollution is such a terrible concern.

In this book the author has summarized developments in the catalytic activation of dioxygen radicals, with particular emphasis on advances of the past decade. Major focus is directed toward mechanistic considerations and applicability of the reactions in organic syntheses. This review of the subject is covered in 12 chapters. Individual chapters address the oxidation of broad chemical classes, i.e. saturated hydrocarbons, alkenes, aromatics, phenols, catechols, alcohols, diols and polyols, aldehydes and ketones, nitrogen compounds, tertiary phosphines, and sulfur derivatives. A chapter is also devoted to the physical and chemical properties of transition-metal dioxygen complexes. Each chapter is thoroughly referenced and an adequate subject index is included.

Library access, at least, is clearly recommended for both organic and medicinal chemists. Medicinal chemists will find the resemblance of these reactions to enzymic processes of particular interest.

Staff

Biomedical Applications of Biotechnology. Volume 1. Biologically Active Peptides: Design, Synthesis, and Utilization. Edited by William V. Williams and David B. Weiner. Technomic Publishing Co., Inc., Lancaster, PA. 1993. xiv + 360 pp. 15.5 × 23 cm. ISBN 0-87762-935-8. \$85.00.

The objective of this series is to review specific aspects of biotechnology as applied to experimental and clinical medicine. This first volume is devoted to biologically active peptides; it is divided into three sections, "Structural Approaches to Peptide Design", "Chemical Synthetic Aspects of Peptide Production", and "Utilization of Bioactive Peptides". The first section is comprised of four excellent chapters that describe the strategies, including computational chemistry, antibody-based, and NMR-derived structure-based approaches, used for the rational design of bioactive peptides. Section II likewise consists of four informative chapters that address large-scale synthesis of peptides, advances in peptide synthesis, the synthesis of chemically modified peptides, such as glycopeptides and phosphopeptides, and synthesis of a variety of peptide mimics and inhibitors. The final section is made up of five lucid and significant chapters that address synthetic peptide-based vaccines and antiviral agents, the use of peptides as molecular probes of immune responses, MHC binding peptides, extracellular matrix cell attachment peptides, and the design of peptide analog inhibitors of proteolytic processes. Each chapter is followed by a large list of timely, up-to-date references. A comprehensive subject index is included for the entire book.

The current revolution in biotechnology has profoundly altered the approach of experimental biologists and medicinal chemists to the development of new diagnostic and therapeutic agents. *Biologically Active Peptides*

addresses the design, synthesis, and use of peptides, one of the most dynamic areas of current drug research. All scientists concerned with the development of new drug products will benefit from at least perusal of and library access to this book. Those in the immediate area of peptide research clearly will want their own desk copy.

Staff

Caffeine, Coffee, and Health. Edited by Silvio Garattini. Raven Press, New York. 1993. xii + 420 pp. 16 × 24 cm. ISBN 0-88167-961-5. \$99.00.

Even today, with the world's consumption of coffee in excess of 6 million metric tons per year, debate about its beneficial effects and possible risks continues. Not only have an enormous number of studies been completed, but many experimental, clinical, and epidemiological research investigations of this widely consumed beverage remain in progress. This book assesses the great amount of data that have been accumulated, summarizes current knowledge, and addresses areas in which additional studies are needed. To accomplish this, experts have reviewed various aspects of the chemical, pharmacological, and clinical actions of caffeine and coffee. The 15 chapters that constitute the book address the composition and consumption of coffee, the metabolism of caffeine and other components of coffee, the mechanism of action of caffeine, various cardiovascular effects and diseases possibly associated with coffee consumption and caffeine, effects of caffeine on the central nervous system, and the results of epidemiological and experimental studies of the effect of coffee and caffeine on reproduction, carcinogenicity, and mutagenicity. The book concludes with an "Overview" by the Editor. Each chapter is thoroughly referenced and a comprehensive subject index is included.

This volume represents an authoritative source of information on the health effects of caffeine and coffee. Institutional library access to the book is recommended. Medicinal chemists will probably find the chapters dealing with the metabolism and mechanism of action of caffeine of particular interest.

Staff

Books of Interest

Molecular Recognition: Chemical and Biochemical Problems II. Edited by S. M. Roberts. Royal Society of Chemistry, Cambridge, U.K. 1992. 199 pp. 15.5 × 23.5 cm. ISBN 0-85186-226-8. £39.50.

Drug Master Files. Global Harmonization of Quality Standards. Band 30. Edited by H. Moller and Walter H. Oeser. CRC Press, Inc., Boca Raton, FL. 1992. 213 pp. 15 × 23 cm. ISBN 3-8047-1207-X. \$59.95 (Pbk).

Methods in Molecular Biology. Volume 13. Protocols in Molecular Neurobiology. Edited by Alan Longstaff and Patricia Revest. The Humana Press, Inc., Totowa, NJ. 1992. xvii + 373 pp. 16 × 22.5 cm. ISBN 0-89603-199-3. \$49.50.

Neuromethods. 21. Animal Models of Neurological Disease I. Neurodegenerative Diseases. Edited by

Alan A. Boulton, Glen B. Baker and Roger F. Butterworth. *The Humana Press, Inc., Totowa, NJ.* 1992. xvi + 368 pp. 15.5 × 23 cm. ISBN 0-89603-208-6. \$79.50.

Neuromethods. 22. Animal Models of Neurological Disease II. Metabolic Encephalopathies and the Epilepsies. Edited by Alan A. Boulton, Glen B. Baker and Roger F. Butterworth. *The Humana Press, Inc., Totowa, NJ.* 1992. xviii + 373 pp. 15.5 × 23 cm. ISBN 0-89603-211-6. \$79.50.

Receptor-Ligand Interactions. A Practical Approach. Edited by E. C. Hulme. *Oxford University Press, Inc., New York.* 1992. xx + 458 pp. 18.5 × 24.5 cm. ISBN 0-19-963090-9. \$75.00.

Membrane Proteins: Structures, Interactions and Money. The Jerusalem Symposia on Quantum Chemistry and Biochemistry. Volume 25. Edited by A. Pullman, J. Jortner and B. Pullman. *Kluwer Academic Publishers Group, The Netherlands.* 1992. x + 506 pp. 16.5 × 24.5 cm. ISBN 0-7923-1951-6. \$199.00.

Chromatography of Pharmaceuticals. Natural, Synthetic and Recombinant Products. ACS Symposium Series 512. Edited by Satinder Ahuja. *American Chemical Society, Washington, D.C.* 1992. x + 211 pp. 15.5 × 23 cm. ISBN 0-8412-2498-6. \$59.95.