

Additions and Corrections

Syn-Oxidative Polycyclizations of Hydroxypolyenes: Highly Stereoselective and Potentially Biomimetic Syntheses of all-trans-Polytetrahydrofurans [*J. Am. Chem. Soc.* **1997**, *119* (26), 6022–6028]. TIMOTHY B. TOWNE AND FRANK E. McDONALD*

The ^1H NMR data originally reported for the CHO region (3–4 ppm) of **49** were incorrectly transcribed from the spectrum, therefore the corrected tabulated spectrum is reported in the Supporting Information (see below). The ^{13}C NMR data were correctly reported.

Supporting Information Available: Tabulated NMR spectra for **47**, **49**, and **51** (1 page). See any current masthead page for ordering and Internet access instructions.

JA9754261

S0002-7863(97)05426-7

Book Reviews *

Atomic Force Microscopy/Scanning Tunneling Microscopy 2. Edited by Samuel H. Cohen and Marcia L. Lightbody (Natick Research, Development and Engineering Center). Plenum Press: New York. 1997. ix + 250 pp. \$85.00. ISBN 0-306-45596-X.

This book represents the compilation of papers presented at the second Atomic Force Microscopy/Scanning Tunneling Microscopy (AFM/STM) Symposium, held June 7–9, 1994, in Natick, Massachusetts, at Natick Research, Development and Engineering Center, now part of U.S. Army Soldier Systems Command. The chapter headings are as follows: Semiconductor Characterization and Adsorbate Characterization with nine chapters, Biological and Chemical Nanostructure with four chapters, New Developments in AFM/STM with five chapters, and AFM/STM in Materials Science with nine chapters. There is an index for the book.

JA9755976

S0002-7863(97)05597-2

Advances in Cycloaddition, Volume 4. Edited by Mark Lautens (University of Toronto). JAI: New York. 1997. ix + 210 pp. \$109.50. ISBN 1-55938-695-9.

This fourth volume in the series *Advances in Cycloaddition* continues the tradition started by Dennis Curran, editor of the first three volumes, of exploring the diverse and rapidly growing area of cycloaddition chemistry. The series is not so much a comprehensive review as a detailed account of the individual authors' own work, with different levels of introductory review material included in each chapter. This volume underscores the unique character of the topics of cycloaddition chemistry and should be a valuable source of information for the specialist and nonspecialist alike.

The work of Frederick West on the photocyclization and photoaddition reaction of 4- and 2-pyrones is covered in Chapter one. Professor West does an excellent job of telling the complete story of his work, with a good introduction to the area, and a detailed description of the problems encountered during the course of the investigation. The use of these reactions for the formation of polycyclic systems and medium-sized rings is detailed. Since many organic chemists are hesitant to make use of photochemistry in synthesis, this chapter should be valuable in pointing out the rich possibilities that exist for the use of photochemistry.

Chapter two expands on the story started in the first chapter with a thorough discussion of [4+3] cycloaddition chemistry. This is an area

which is still primarily in its infancy. Michael Harmata starts with a detailed review of the literature, summarizing most if not all that is known about intramolecular [4+3] cycloadditions of allylic cations and dienes. Stereochemical considerations of the reactions are treated with rigor. Areas that still need major investigation are pointed out. This chapter will be invaluable to any newcomer to the field. One error in the reference section is the date for reference five, which should be 1979, not 1079.

Chapter three describes the work in the area of catalytic asymmetric [2+2] cycloaddition reactions of vinyl and allenyl sulfides by Koichi Narasaka and Yujiro Hayashi. One exceptional feature of this chapter is the inclusion of representative experimental procedures. A detailed description of the studies on the titanium catalyst is well done. People interested in the synthesis of cyclobutane derivatives will find this a valuable source of information. An error in the structure at the top of Scheme 7, a missing methyl group, is relatively obvious and does not detract too much from the discussion of the work.

The work of Daniel Singleton on the use of vinylboranes as Diels–Alder dienophiles is described in Chapter four. This work is intriguing since vinylboranes have been found to be very unusual dienophiles. Professor Singleton suggests [4+3] transition structures for these reactions, which provides new insight into the reactivity of the Diels–Alder cycloaddition. He has done a very nice job of describing the process of determining a working understanding of the reactivity of the vinylboranes based on the reactivity observed, and how initial ideas had to be reworked on the basis of later results. A good description for understanding the reactivity seen on the basis of theoretical calculation is provided.

The last chapter describes the work of Mark Welker and his group on the preparation and cycloaddition reactions of cobaloxime-substituted 1,3-dienes. The chapter deals first with the preparation of the cobaloxime-substituted 1,3-dienyl complexes and discusses the cycloaddition reactions of these complexes, and then the demetalation of the complexes is described. Representative reaction conditions are presented throughout the chapter, again a very helpful feature of the work. A detailed description of the effect of Lewis acid catalysis on the reaction is described. The fact that high exo selectivity is seen in the products makes this work especially interesting.

This book will be a valuable addition to any chemistry library. However, the price tag (\$109.50) probably will preclude this volume from ending up on most individual's bookshelves.

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JA975588X

S0002-7863(97)05588-1

*Unsigned book reviews are by the Book Review Editor.

Fuzzy Logic in Chemistry. Edited by Dennis H. Rouvray (The University of Georgia). Academic Press: San Diego. 1997. xxii + 364 pp. \$80.00. ISBN 0-12-598910-5.

Fuzzy logic has been viewed as a system of concepts, principles, and methods for dealing with modes of reasoning and computing that are approximate rather than exact. The basis of fuzzy logic is fuzzy set theory which was introduced by Professor Lotfi A. Zadeh in 1965. During the last two decades, a very strong growth of theoretical development and engineering applications has been witnessed. This book is the first one addressing the notion of fuzzy logic and exploring application opportunities in the science of chemistry. The book is edited on the basis of the Sixth International Conference on Mathematical Chemistry which was held in Pitlochry, Scotland, on July 10–14, 1995.

The book is organized in nine chapters which are the contributions from the individual presenters in the conference. The first chapter is an exposition of the philosophy for fuzzy logic in the treatment of uncertainty in sciences in general. Chapter 2 presents the basic notions of fuzzy sets and fuzzy logic with a focus on uncertainty. These two very readable chapters discuss the uncertainty issue from various aspects in chemistry. The discussion concludes that fuzzy logic is an attractive paradigm deserving study. The chapters greatly help readers understand the rationale of using fuzzy logic in chemistry research. The major portion of the book is the presentation of different applications in several subfields of chemistry. These include chirality study, quantum system analysis, and molecular structural classification and recognition. It is evident that the available information for these studies is almost always incomplete, redundant, ambiguous, impure, and in different forms. Thus, classical mathematical methods may be feeble in applications. In contrast, fuzzy logic is a viable alternative technique for seeking a much more acceptable solution. Chapter 3 is concerned with the concept of chirality. It concludes that chirality in a real system is a primitive fuzzy concept. Chapter 4 discusses a quantum-theoretical concept. It is intended to investigate some particular pure state, such as the ground state, of a molecular species, using fuzzy logic notions. Admittedly, it is a very difficult task. As the author points out, a precise connection of the study on quantum mechanics to fuzzy sets theory is still lacking. However, this explores the opportunities of using fuzzy logic to understand the fuzziness of chemical structures, and to reduce the fuzziness with an increasing number of spins in a magnet or increasing nuclear molecular masses. Chapters 5–8 focus on molecular recognition and classification by using fuzzy linguistic variables, fuzzy clustering techniques, and fuzzy graph theory. While these applications have shown an initial success, all demonstrate that fuzzy logic theory should be highly recommended for further study. They believe that fuzzy logic techniques may make a great impact on molecular recognition and classification. Different from other chapters, the last chapter focuses more specifically on hierarchical fuzzy clustering techniques as applied to a broad area of analytical chemistry. These include the selectivity control in acrylonitrile electroreduction, the provenance of archaeological artifacts, the optimal choice of solvent systems, and the classifications of mineral waters, Roman pottery, and therapeutic muds. It seems that the advent of fuzzy logic concepts and models can give a new flavor to classification techniques in analytical chemistry. Reading these interesting chapters, we can predict that fuzzy logic will play an important role in developing more systematic and promising new techniques in mathematical chemistry research.

What is missed in this book is a clear discussion about what Professor Lotfi A. Zadeh called computing with words. Note that the uniqueness and the strength of fuzzy logic is to compute with words in which a variety of uncertainties exist. This is in certain sense a focal point to distinguish fuzzy logic from classical mathematical methods. It is expected chemists may find values of computing with words by fuzzy logic and approximate reasoning in their fields in the near future. Chemistry is probably the discipline in sciences least affected by the emergence of fuzzy logic. However, the situation may change in the following decade or so that chemists may more extensively use fuzzy logic, or fuzzy mathematics in large, to cope with uncertainty and complexity encountered in their study. Needless to say, this book will greatly benefit researchers, students, and practitioners in the chemistry

community who are looking for nonconventional mathematical approaches in their research.

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JA9755469

S0002-7863(97)05546-7

Handbook of Physical Properties of Liquids and Gases: Pure Substances and Mixtures. Third Augmented and Revised Edition. By N. B. Vargaftik, Y. R. Vinogradov, and V. S. Yargin (Moscow Aviation Institute). Begell House: New York. 1996. 1370 pp. \$165.00. ISBN 1-56700-063-0.

This book has evolved from the basic reference *Handbook of Physical Properties of Liquids and Gases* that was published between 1963 and 1975 in four editions. Since the last edition, both the scope of the experimental material and the methods of processing and compilation of data have undergone considerable changes. The experimentally studied regions of the reference parameters have been expanded to cover higher pressures as well as the regions of both high and very low temperatures, including the extreme states. The handbook gives the data in the form of both detailed tables and correlation equations demonstrating the temperature and pressure dependences of the properties. In some regions extrapolated values are given which, as a rule, are indicated in the text.

JA975545G

S0002-7863(97)05545-5

Chemical, Structural and Electronic Analysis of Heterogeneous Surfaces on Nanometer Scale. NATO ASI Series E: Applied Sciences, Volume 333. Edited by Renzo Rosei (University of Trieste). Kluwer: Dordrecht. 1997. x + 132 pp. \$99.00. ISBN 0-7923-4489-8.

This book is the result of the proceedings of the NATO Advances Research Workshop on Chemical, Structural and Electronic Analysis of Heterogeneous Surfaces on Nanometer Scale held in Trieste, Italy, April 24–26, 1995. Some of the chapter headings are Surface State Electrons: Transport Through Dangling Bonds on Silicon, and Scattering and Confinement on Metals; SFFM and SNOM of Heterogeneous Materials; Synchrotron Radiation Spectromicroscopy: Opportunities, Limitations and Data Taking Strategies; and Scanning Spectromicroscopy with 250 to 800 eV X-rays.

JA975664W

S0002-7863(97)05664-3

Properties of Complex Inorganic Solids. Edited by Antonios Gonis, Annemarie Meike, and Patrice E. A. Turchi (Lawrence Livermore National Laboratory). Plenum Press: New York. 1997. xii + 510 pp. \$135.00. ISBN 0-306-45606-0.

This book represents the compilation of papers presented at the proceedings of the First International Alloy Conference held June 16–21, 1996, in Athens, Greece. The chapter headings are as follows: Characterization and Phase Stability: Part 1—Theory and Computational Methods with nineteen chapters. Part 2—Spectroscopy and Characterization with six chapters. Part 3—Experimental Determination and Assessment of Phase Diagrams with four chapters. Electronic Structure and Transport: Part 1—Theory and Computational Methods with five chapters. Part 2—Electrical Conductivity: Experiment and Theory with three chapters. Part 3—Electronic topological transitions with two chapters. Mechanical Properties: Part 1—Micromechanics and Microstructural Characterization: Nucleation and Morphology of Growth Processes with three chapters. Part 2—Theory and Computational Methods with seven chapters. Part 3—Superplasticity with three chapters. Multiple Scattering Theory and Applications with eight chapters.

JA975638Y

S0002-7863(97)05638-2