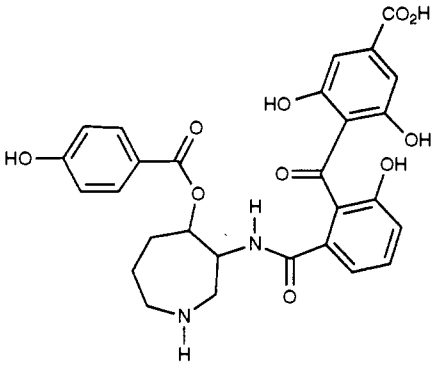
Additions and Corrections

Balanol: A Novel and Potent Inhibitor of Protein Kinase C from the Fungus *Verticillium balanoides* [*J. Am. Chem. Soc.* **1993**, *115*, 6452–6453]. PALANIAPPAN KULANTHAIVEL,* YALI F. HALLOCK, CHRISTIE BOROS, SEAN M. HAMILTON, WILLIAM P. JANZEN, LAWRENCE M. BALLAS, CARSON R. LOOMIS, JACK B. JIANG, BARRY KATZ, JORGE R. STEINER, AND JON CLARDY

Page 6453: We inadvertently misplaced a hydroxyl functionality in structure **4**. The correct structure is as shown below.



4

This correction does not affect the conclusions of the present paper.

Book Reviews *

Advances in Gas Phase Ion Chemistry. Volume 1. By Nigel Adams and Lucia M. Babcock (University of Georgia). JAI Press Inc.: Greenwich, CT. 1992. xii + 330 pp. $78.50. ISBN 1-55938-331-3.

There is not any secret about the way to establish a successful new series of scholarly reviews in an area of chemistry: choose editors with outstanding scientific credentials who have the ability to persuade the best people to write comprehensive articles on their specialties. If you can combine this with a reasonable price, you have the start of a great series. JAI Press has launched *Advances in Gas Phase Ion Chemistry* with these ingredients well in mind, and Volume 1 should be of interest to all gas phase ion chemists and to many others as well. In Nigel Adams and Lucia Babcock, of the University of Georgia, they have chosen editors who have made remarkable contributions to the field and who have broad views of what is interesting and important. To inaugurate the series they have put together an eclectic mixture of reviews which combine the familiar with subjects which are less well-known.

Among the former, Kent Ervin and Carl Lineberger bring the subject of photoelectron spectroscopy of molecular anions up to date from earlier reviews. They give references to the many new papers in the field, but the emphasis is on a readable summary of the experimental methods now being used, together with case studies of specific examples of the application of the technique. The article should serve as an excellent introduction to the subject as well as a useful overview of new developments. Similarly, Diethard Bohme reviews gas phase chemistry initiated by atomic silicon cations, species of particular interest from the standpoint of interstellar chemistry. Rate constants and branching ratios for over 100 reactions of positively charged silicon ions and substituted silicon ions are given. This chapter is paired with one by Mark Gordon, Larry Davis, and Larry Burggraf on theoretical studies of hypervalent silicon anions in which semiempirical and ab initio computational methods are used to investigate the structure, energetics, and reactivity of anions like SiH_4F^-. These more or less inorganic articles are complemented by that of Joe Grabowski on reactive anionic intermediates in organic chemistry. Again the article is noteworthy for its careful attention to discussions of how the data are obtained and interpreted and what are the pitfalls and limitations of the flowing afterglow technique. As in all the articles, the emphasis is on work from the author's laboratory, but related work is also covered where appropriate. Peter Armentrout provides a masterful survey of the work of his group on thermochemical measurements by guided ion beam mass spectrometry. The ion chemistry and thermochemistry of many metal ions as well as those of carbon, silicon, and nitrogen are covered.

The other articles in this volume are perhaps in less familiar fields and therefore are especially welcome. Murray McEwan discusses flow tube studies of small isomeric ions, as for instance HCN^+ and CNH^+. Techniques had to be devised to generate these isomeric species, many of which have been observed in space, and differences in their chemical behavior are described. Mark Smith and Michael Hawley survey their work on ion chemistry at extremely low temperatures, where ions are formed in a cold gaseous reaction mixture formed by a free jet expansion, subsequent ion molecule reactions occur, and these are monitored by time of flight mass spectrometry. Rate constants and branching ratios for a variety of reactions are reported and discussed. The volume is concluded by a particularly interesting article by Nigel Adams on the determination of the neutral products of electron–ion recombination. Since the neutral products of any type of ion reaction in the gas phase are formed in exceedingly small amounts, their detection poses formidable experimental problems. This chapter concludes with a discussion of the role electron–ion recombination may play in modifying the atmospheres of the planets.

In summary, this volume contains articles which will appeal to almost anyone with an interest in chemistry and should serve as an impressive launch vehicle for a welcome new series.

Charles H. DePuy, *University of Colorado at Boulder*

Crystal Fields for Transition-Metal Ions in Laser Host Materials. By Clyde Arthur Morrison (Harry Diamond Laboratories, Adelphi, MD). Springer-Verlag: New York and Berlin. 1992. xviii + 190 pp. $69.00. ISBN 3-540-55465-3.

Morrison's monograph is composed of three sections: a brief introduction, a detailed description of the treatment of the compiled data, and a listing of 47 solid-state host materials and their associated transition-metal guest ions. In the introduction he adds several points to ponder:

*Unsigned book reviews are by the Book Review Editor.

(1) many of these reported compounds had been investigated as laser host materials but were discarded before the advent of pumping lasers (i.e. Ti-doped Al_2O_3), and (2) these compounds may be worth examining as hosts for transition-metal ions for laser-pumped tunable lasers.

The second section of the book includes a detailed, 10-page explanation of the current theory and treatment of the compiled data found in the third section. Morrison provides 35 pertinent references for the second section, including classic papers by Orgel, Figgis, Slater, and Tanabe and Sugano. Of these references, only 13 are less than 10 years old; not much new there, but this book should be considered a reference compendium rather than a review of "what's new". He also provides a *caveat*—not all of the data for each element (guest ion) was available.

In the second section, crystal field parameters (D_q or B_{40}) are reported, and the simple conversion from one system to the other is offered for comparison. This section of the book concludes with tables of free-ion parameters presented as $F^{(k)}$, α, and ζ for the Nd^n configurations (N = 3, 4, 5) of the M^{m+} (m = 2, 3, 4) transition-metal cations. Hartree–Fock values for the three ionization states, as well as $\langle r^k \rangle$ values, as reported by Fraga et al., are presented in three easy-to-decipher tables.

The data in the third section is well presented and heavily referenced. Morrison provides crystallographic data (including crystal class, space group symbols, Wyckoff positions, fractional coordinates), charges, and polarizabilities for each of 47 different host materials. Examples of host materials include $Y_3Al_5O_{12}$ (YAG), $Be_3Al_2(SiO_3)_6$ (beryl), $Na_3M_2Li_3F_{12}$ (fluoride garnets), and Al_2O_3 (corundum), among others.

For each host, the crystal fields calculated at each cationic crystallographic site are reported along with approximate Slater parameters of the common transition-metal guest(s) presumed to reside on the site. Other parameters include, for example, point charge, dipole components, and B_{40} values. In addition, Slater integral values, $F^{(k)}$, are also reported as described in the second section of the book. Finally, in the last section for each host material, a very thorough bibliography is presented, providing references of both experimental and theoretical work that has been reported. A second *caveat* is that a more thorough search of the recent literature should be done, as these references are "far from exhaustive".

The positive aspects of this book are that it is well researched but, as the author admits, not entirely comprehensive. Morrison presents a detailed but concise collection of data tables for the scientist whose interests lie in laser host materials and spectroscopy. However, this book is not for the neophyte. Expository writing is kept to a minimum. One negative point is apparent: A quick perusal through the index provides the reader with a list of all of the ions found in the text; however, there are no cross references to structure type or common mineral name, so don't try to find "garnet" or "corundum" in the index. The Table of Contents is exhaustive. I would certainly recommend this book for every university library, but its esoteric nature might limit sales for personal libraries.

Peter K. Dorhout, *Colorado State University*

Carbohydrate Chemistry. Volume 23. Monosaccharides, Disaccharides, and Specific Oligosaccharides. A Review of the Recent Literature Published During 1989. By R. J. Ferrier (Victoria University of Wellington, New Zealand). The Royal Society of Chemistry: Cambridge, U.K. 1991. xvi + 307 pp. £95.00 (ca. $150.00). ISBN 0-85186-172-5.

This twenty-third volume of the Specialist Periodical Reports devoted to carbohydrate chemistry surveys the literature published during 1989 on the simpler sugars and complements the previous volumes in the series in providing a comprehensive account of practically all of the literature published in the sugar field since the inception of the series.

Ferrier as Senior Reporter, together with collaborating Reporters R. Blattner, R. H. Furneaux, P. C. Tyler, R. H. Wightman, and N. R. Williams, has assembled, under 24 individual chapter headings, the work described in some 1662 separate published articles. Although there is no separate subject index, the chapters themselves provide a very good organization of the subject material. The larger chapters are devoted to Glycosides, Esters, Amino Sugars, Alditols and Cyclitols, Antibiotics, Nucleosides, and Synthesis of Enantiomerically Pure Non-carbohydrate Compounds. Each chapter has its own reference list. There is a complete author index keyed to the individual chapters.

Ferrier and his team focus strongly on the structural, synthetic, and mechanistic organic aspects of sugar chemistry within the context of "mainstream" organic chemistry. Readers familiar with the previous volumes in this series will be comfortable with the logical organization of the subject material, which closely follows the format earlier established by this well-coordinated group of authors.

The overall balance and integration is excellent; the reader is provided with a uniform, clear presentation, in good English, of the essential novelty in each article cited. In this respect, the expertise of the reporters contributes a major advantage of this series over summaries from abstracting services that merely compile, without critical input, the authors' own abstracts. Indeed, as original articles are not guaranteed to be models of clear, concise English presentation, these reports provide valuable service to both the carbohydrate specialist and the general reader in presenting new information in authoritative and rapidly accessible form.

The book is produced from "camera-ready" text, which is a minor disadvantage in that the italic and special typeface characters important in carbohydrate terminology are not presented consistently in all chapters. In contrast, the formula schemes used so abundantly and effectively are all beautifully hand-drawn by N. R. Williams with total uniformity, clarity, and economy of style throughout the book. The rapid and accurate presentation of this type of chemical information by computerized drafting methods remains difficult.

The carbohydrate field is multidisciplinary and has been in a major growth phase during the past several years. The authors of this series admit to increasing difficulty in covering all aspects of the published literature. The emphasis throughout is on organic chemical aspects; the very extensive biochemical literature is not cited in any detail, although reference is made to important review articles.

This book is a key reference tool for any researcher working in the carbohydrate field, as well as for the general organic chemist or biochemist seeking to comprehend the scope and significance of current research in sugar chemistry. It is a pity that the publishers have not sustained the remarkably low price that characterized the initial volumes in this series and which made acquisition for a personal library practicable for any researcher interested in the organic chemistry and stereochemistry of polyfunctional molecules.

Derek Horton, *The American University*

Nucleoside Synthesis. Organosilicon Methods. By Edmunds Lukevics and Alla Zablocka (Institute of Organic Synthesis, Riga, Latvia). Ellis Horwood Limited: London. 1992. $129.50. ISBN 0-13-812652-6.

The synthesis of nucleosides is a topic of considerable interest to a large body of chemists around the world. Though the area has evolved dramatically from its beginnings, and though many innovative approaches to nucleosides have been developed over the last decade, the standard approach for the synthesis of a nucleoside is still the coupling of a nitrogen heterocycle with an appropriately substituted carbohydrate. The most generally useful method for this coupling involves the utilization of silylated nitrogen heterocycles with a Lewis acid catalyst under a variety of reaction conditions. This book provides a thorough examination and review of the literature relative to the utilization of silylated nitrogen heterocycles to prepare nucleosides.

The original version of the book was published as a Soviet monograph in 1985. This English translation has been updated and somewhat expanded on the basis of the recent literature and now includes over one thousand references up to 1990. It is included in the series of Ellis Horwood Books in Organic Chemistry, now numbering over thirty, Series Editor Dr. J. Mellor of the University of Southampton.

The book is divided into two parts. Part I consists of six chapters that provide a readable narrative covering the following topics: (1) General methods of nucleoside synthesis; (2) Glycosylation of silylated heterocyclic bases; (3) Synthesis of pyrimidine nucleosides; (4) Synthesis of nucleosides containing condensed pyrimidine systems; (5) Synthesis of nucleosides derived from other heterocyclic bases; and (6) The synthesis of nucleotides. Part II is a series of tables covering the synthesis of the specific types of nucleosides and nucleotides covered in the first six chapters. These tables, which are assembled according to the types of silylated bases utilized, provide specific information with regard to the coupling reactions used to prepare the nucleosides/tides from the silylated heterocycles and the carbohydrate. The information provided includes the carbohydrate, the reaction product(s), the catalyst, time, temperature, ratio of reactants, yields, α/β isomer distribution, and references for all coupling reactions.

Chapter 1 gives a broad background on nucleoside synthesis in general, and Chapter 2 provides some information on the silylation of heterocycles as well as a reasonable discussion of the mechanism of glycosylation with details not found in many other reviews. The last four chapters of Part I provide a specific discussion of selected examples of nucleoside synthesis utilizing the various categories of silylated heterocycles. The examples chosen offer a good sampling of nucleoside syntheses focusing on α/β ratios as well as, where appropriate, providing comments on ratios of products derived from coupling at the different nitrogens in a given heterocycle.

For a researcher at all involved with nucleoside synthesis, this volume would be an extremely valuable reference source. The information contained in it is easily accessible, and the translation to English has been

well done and is easy to read. The book provides a useful discussion of the problems and solutions involved in maximizing the yields of a desired nucleoside product and makes excellent background reading in the area. The authors have done a thorough job of assembling relevant material, and no other single source makes available in such a valuable format the voluminous literature on nucleoside synthesis using silylated heterocycles.

Chemistry libraries at institutions with active research programs in the nucleoside area should acquire a copy of this volume, and individual researchers in the area will certainly want to obtain a personal copy.

John A. Secrist III, *Southern Research Institute*

Studies of High Temperature Superconductors. Volume 8. Edited by Anant Narlikar (National Physical Laboratory, New Delhi). Nova Science Publishers: New York. 1991. xx + 414 pp. $74.00. ISBN 1-56072-019-0.

Volume 8 of the series titled *Studies of High Temperature Superconductors* consists of 11 completely independent chapters. This book carries on the tradition of providing in depth discussions of quite diverse subjects related to the study of superconductors. This volume's major emphasis is on experimental techniques used in material characterization. Topics described, discussed, reviewed, and evaluated include Magnetization, Vibrating-Reed, Conductivity, and Positron Annihilation studies. There are three theory-based chapters which are noteworthy for their detail, covering topics including the Metal–Insulator Phase Transition, Real Space Pairing, Band Structure-Experiment Result Comparisons for simple transition metal oxides, and the Polaronic Theory of High Tc. The two chapters on synthesis would be of most interest to the traditional synthetic chemist. These chapters cover recent advances in Chemical Vapor Deposition and Thick Film Formation Utilizing Inks. The substrate/superconductor chemical interactions, so important in thin film production, are well discussed here. There is a strong emphasis on the 123 phase materials, which parallels the worldwide research trend.

Since the objective of the series is to cover all the important subjects of study in the field of superconductivity, each volume only covers a small number of experimental techniques and theoretical methods. This volume is not for the general reader. Although a number of the chapters begin with a good tutorial as the introduction, the depth of the coverage is expressly for scientists employing, or considering employing, one of the techniques or methods listed above. Each chapter has the flavor of a highly focused, highly technical review article, and I would most highly recommend this volume as good reading for graduate students beginning their research in the area of superconductor materials.

Michael L. Norton, *Marshall University*

Irradiation of Polymeric Materials: Processes, Mechanisms, and Applications. ACS Symposium Series 527. Edited by Elsa Reichmanis (AT&T Laboratories), Curtis W. Frank (Stanford University), and James H. O'Donnell (University of Queensland). American Chemical Society: Washington, D.C. 1993. xii + 338 pp. $89.95. ISBN 0-8412-2662-8.

This book was developed from a symposium sponsored by the Polymer Division of the Royal Australian Chemical Institute, the National Science Foundation of the United States, and the Department of Industry, Technology, and Commerce of the Australian Government. After a preface by the editors, there are 21 chapters with emphasis on polymer radiation chemistry and the technological significance of the effects of radiation on polymers. There is also an author, affiliation, and subject index.

New Aspects of Organic Chemistry II. Organic Synthesis for Materials and Life Sciences. Edited by Zen-ichi Yoshida (Kyoto University) and Yoshiki Ohshiro (Osaka University). VCH: New York. 1992. xiv + 522 pp. $155.00. ISBN 1-56081-702-X.

This book was developed from the Fifth International Kyoto Conference on New Aspects of Organic Chemistry held in Kyoto on November 11–15, 1991. After a list of contributors with their affiliations and a preface by the editors, there are 23 chapters organized under the following headings: Efficiency in Organic Synthesis; Organic Synthesis for Materials Science; and Organic Synthesis for Life Science. There is also a short subject index.

Catalytic Chemistry. By Bruce C. Gates. J. Wiley and Sons: New York. 1991. xxii + 458 pp. $49.95. ISBN 0-471-51761-5.

In the preface of this excellent book, the author states that catalysis as a subject in chemical eduction is both neglected and fragmented. This is certainly a true statement, and this book is a worthy attempt to remedy these challenges. Although the author has aimed for an audience of students at the advanced undergraduate level, this book could very well be used in a challenging graduate level course. The book is presented in six chapters: an introduction, with definitions and illustrations; solution catalysis; enzymatic catalysis; catalysis in and on synthetic polymers; catalysis by zeolites and other molecular sieves; and inorganic solids surface catalysis. For chemical engineering students this book could serve to integrate some aspects of organic and inorganic chemistry into chemical processes of interest to the engineer. For chemistry students there are interesting examples of applied chemical processing and chemical engineering that could serve a "taste" of industrial chemistry.

The chapter on Catalysis in Solutions is the longest of the book. The examples of this chapter are interesting and varied, but they are almost all from industrial process chemistry. This is not meant as a criticism; in fact, it is revealing to see large-scale industrially important processes, such as the Halpern cycle for the Wilkinson hydrogenation of olefins, being analyzed by molecular orbital methods. From a physical-organic perspective, an excellent discussion of general and specific acid and base catalysis and the Bronsted relationship is balanced against a very small and not too useful section on phase transfer catalysis. There is little discussion about soluble catalysis topics of interest to synthetic organic chemists, such as the use of chiral auxiliaries.

The chapter on catalysis by enzymes treats a huge and complicated subject area in a very competent introductory manner. There are many references cited to direct the interested reader to more extensive treatments of enzyme catalysis. There is not much mathematical analysis of enzyme kinetics. For example, a short section on saturation kinetics does not include double-reciprocal or Eadie–Hofstee analysis of the Michaelis–Menten kinetic expression. After a general introduction to enzyme structures and mode of operation, some nice examples, such as lysozyme, ribonuclease, and carbonic anhydrase, are discussed in organic mechanistic detail.

The chapter on catalysis by polymers is one of the strongest of the book. There are insightful and interesting discussions of fixed-bed flow reactor systems, Langmuir adsorption isotherms and Langmuir-Hinshelwood kinetics, physical effects of polymer supports (and the desirability of keeping catalytic active sites apart for some applications), multifunctional catalysts and intraparticle and interparticle mass transport phenomena and their effects on catalysis. Throughout these discussions are interesting real-world examples, with accompanying data to be analyzed, such as the dehydration of *tert*-butyl alcohol, ethanol dehydration to form diethyl ether, bisphenol A synthesis, methanol carbonylation, and sucrose inversion.

An extensive chapter on zeolites covers catalysis in molecular scale cavities. Included in this chapter are discussions of the preparation and physical nature of zeolites and the concept of supercages. Zeolite-catalyzed reactions include industrial hydrocarbon cracking reactions, reactions of olefins, toluene disproportionation, and xylene isomerizations as examples of transport effects.

The last chapter in the book is on the catalysis of surfaces. After listing some methods of determination of the crystalline properties of metals and metal oxides, surface effects and reactivities of magnesium oxides and silicon oxides are discussed. A nice section on adsorption uses a discussion about adsorption isotherms to lead into an interesting section on the structures of adsorbed organic species on metal surfaces. A section of the last chapter is devoted to examples of catalysis on functionalized solids surfaces, with some useful comparisons of surface and molecular catalyses of common reactions. The chapter concludes with useful discussions (with some classic organic and inorganic chemical processes) of catalysis on the surfaces of metals, supported metals, metal oxides, mixed metal oxides, and metal sulfides.

In summary, the goal of this book was not to be all things regarding catalysis to all chemists and chemical engineers. It is an excellent introductory text, with a nice balance of theoretical, mechanistic, and applied catalysis chemistry, with many opportunities for the reader to "practice" the book's ideas on experimental data.

Richard Wolf, *Dow Chemical Company*