

Additions and Corrections

Zinc(II) Complexes and Aluminum(III) Porphyrin Complexes Catalyze the Epoxidation of Olefins by Iodosylbenzene [*J. Am. Chem. Soc.* **1990**, *112*, 4977–4979]. WONWOO NAM and JOAN SELVERSTONE VALENTINE*

The reported catalytic activity of AlTPPCl and AlTPPOH in the epoxidation of olefins by iodosylbenzene is incorrect. Repetition of these experiments with AlTPPCl synthesized from ultrapure aluminum gave substantial catalysis of iodosylbenzene decomposition but little or no epoxide product. Apparently the traces of iron present as contaminants in the original sample (see ref 12) were sufficient to cause the observed epoxidation.

Control experiments with FeTPPCl alone as catalyst at concentrations calculated on the basis of the level of iron impurity in our sample of AlTPPCl gave some epoxide but less than the levels observed in the original experiments. We do not at this time understand the discrepancy. We are grateful to Professor John T. Groves for communicating to us his results concerning the ability of FeTPPCl to catalyze the epoxidation of *cis*-stilbene by iodosylbenzene at extremely low catalyst concentrations.

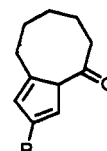
These results do not affect the majority of our conclusions in this paper concerning the ability of Lewis acidic non-porphyrin metal complexes to catalyze olefin epoxidation by iodosylbenzene.^{1,2}

(1) Yang, Y.; Diederich, F.; Valentine, J. S. *J. Am. Chem. Soc.* **1990**, *112*, 7826.

(2) Yang, Y.; Diederich, F.; Valentine, J. S. *J. Am. Chem. Soc.* In press.

Unusual Reactivity of Small Cyclophanes: Nucleophilic Attack on 11-Chloro- and 8,11-Dichloro[5]metacyclophane [*J. Am. Chem. Soc.* **1990**, *112*, 6638–6646]. PAUL A. KRAAKMAN, JEAN-MARC VALK, HARM A. G. NIEDERLÄNDER, DEBORAH B. E. BROUWER, F. MATTHIAS BICKELHAUPT, WILLEM H. DE WOLF, FRIEDRICH BICKELHAUPT,* and CASPAR H. STAM

Page 6643: Structure **22** in Scheme IX shows the wrong arrangement of double bonds in the five-membered ring and should be replaced by



22

The conversion of **22** to **21** and the mechanistic implications are not affected by this correction.

Complexation Control of Pericyclic Reactions: Supramolecular Effects on the Intramolecular Diels–Alder Reaction [*J. Am. Chem. Soc.* **1991**, *113*, 382–383]. SIMON C. HIRST and ANDREW D. HAMILTON*

Page 383: Footnote 16 should be modified to read as follows: (16) Activation parameters for the simple IMDA reaction, measured for a more soluble derivative of **1** (*N*-octyl in place of *N*-benzyl) in CDCl₃ at 298 K, were $\Delta G^\ddagger = 22.9 \text{ kcal mol}^{-1}$, $\Delta H^\ddagger = 19.3 \text{ kcal mol}^{-1}$, and $\Delta S^\ddagger = -12.1 \text{ cal K}^{-1} \text{ mol}^{-1}$.

Book Reviews*

Comprehensive Analytical Chemistry. Volume XXIV. Energy Dispersive X-ray Fluorescence Analysis. By B. Dzunikowski (Academy of Mining and Metallurgy, Warsaw). Edited by G. Svehla. Elsevier Science Publishers: New York and Amsterdam. 1990. 451 pp. \$215.50. ISBN 0-444-98897-1.

The writing of this volume was innovated by the major developments in the subject since 1971, when it was reviewed in a chapter in Volume IIC of this series by G. L. MacDonald. The fourteen chapters start with one on fundamentals, after which sources, secondary radiation, and detection are treated. A chapter on X-ray spectrometry in general is followed by chapters on selection of optimum conditions, disturbing effects, methods for eliminating matrix effects, and other sources of errors. A chapter on processing of measurement data is followed by four chapters on applications, from geological prospecting to medical applications. The subject index is extensive.

Copper Bioavailability and Metabolism. Advances in Experimental Medicine and Biology. Volume 258. Edited by C. Kies (University of Nebraska). Plenum: New York and London. 1989. xii + 307 pp. \$72.50. ISBN 0-306-43373-7.

Biology of Copper Complexes. Edited by J. R. J. Sorenson (University of Arkansas for Medical Sciences). Humana: Clifton, NJ. 1987. xix + 598 pp. \$79.50. ISBN 0-89603-123-3.

Both of these volumes are proceedings of symposiums that examined aspects of the biochemistry and metabolism of the element copper. As such they represent one-time snapshots rather than in depth, critical examinations of the status of this field. *Copper Bioavailability and Metabolism* is from the American Chemical Society Symposium of this name held in April 1989, while *Biology of Copper Complexes* is from

a conference held at the University of Arkansas in 1986 and includes transcripts of oral discussion and twelve poster presentations. The latter volume is unfortunately already somewhat out of date.

As the individual titles suggest, the emphasis of these two volumes is different. Specific topics such as antiinflammatory, analgesic, antimicrobial, anticarcinogenic, and radioprotective effects of particular copper complexes as well as copper complexes in nutrition are covered at length in *Biology of Copper Complexes*. More general topics such as the regulation of specific copper enzymes (ceruloplasmin, superoxide dismutase), copper transport (role of ceruloplasmin), and the mechanistic role of copper in copper enzymes (lysyl oxidase) are only briefly covered in this work. *Copper Bioavailability and Metabolism* includes extensive coverage of aspects of copper in foods and factors affecting its bioavailability (including an exhaustive table of copper contents of foods), copper absorption and transport (ceruloplasmin, metallothionein, and transcuprein), and the physiological effects of dietary copper (e.g. on the modulation of long chain fatty acid unsaturation or on immune function and disease resistance). The effects on copper status of some pathological or other conditions (e.g. lung injury or exercise training) are also covered.

Of these two volumes the much more recent *Copper Bioavailability and Metabolism* is of greater general interest due to its broader scope both in terms of the topics covered and in the depth with which they are treated. This volume and the references it contains can serve as a useful starting point for the aspects of copper metabolism and nutrition it covers.

Robert C. Rosenberg, Howard University

Methods of Surface Analysis: Techniques and Applications. Edited by J. M. Walls (VG Ionex). Cambridge University Press: Cambridge. 1989. x + 342 pp. \$24.95. ISBN 0-521-38690-X.

This book is aimed at the nonspecialist who wants to gain an overall appreciation for modern surface analytical techniques and the ways these techniques are used in research, development, and practical problem

*Unsigned book reviews are by the Book Review Editor.

solving. It concentrates on only surface techniques which have broad analytical applications—Auger electron spectroscopy (AES), X-ray photoelectron spectroscopy (XPS), static and dynamic secondary ion mass spectroscopy (SIMS), ion scattering spectroscopy (ISS), and Rutherford back-scattering spectrometry (RBS). Some material on ultra-high vacuum technology, ion erosion, and electron and ion energy analysis is given in the beginning chapters as background information for subsequent chapters which deal with each surface analytical technique individually. The remaining chapters in the book are a compilation of chapters in which each surface technique is addressed by an authority on that technique. The basic principles behind each technique are presented, the instrumentation available is reviewed, and finally, qualitative information, quantification of results, and practical considerations are described and illustrated with examples from current literature (pre-1988). The authors made good use of pictures, diagrams, equations, and graphs to explain clearly the fundamental principles behind each technique and to contrast the strength and weaknesses of each technique for a particular application. The last part of each chapter was reserved for literature examples of how each technique could be used to solve practical surface analytical problems.

Hugh H. Richardson, *Ohio University*

Comprehensive Analytical Chemistry. Volume XXVI. Radionuclide X-ray Fluorescence Analysis, with Environmental Applications. By J. Tolgyessi (Slovak Technical University) and E. Havranek and E. Dejmekova (Comenius University, Bratislava). Edited by G. Svehla. Elsevier Science Publishers: New York and Amsterdam. 1990. 282 pp. \$107.75. ISBN 0-444-98837-8.

The emphasis of this volume is the use of the technique in environmental protection. The basis for this analytical method is first presented, after which the practical features of instrumentation, procedures, and sample preparation are discussed. The final two chapters review the use of the method as applied to environmental components and biological materials and use in other branches of science and technology, such as mining, metallurgy, the petroleum industry, pharmacy, space research, and archaeology.

Reviews on Heteroatom Chemistry. Volumes 1 and 2. Edited by Shigeru Oae. Associate editors: Atsuyoshi Ohno and Naomichi Furukawa. Myu: Tokyo. 1988. Volume 1: viii + 391 pp. ISBN 4-943995-02-0. Volume 2: vii + 224 pp. ISBN 4-943995-04-7.

This softbound Volume I is the first in an open-ended series on the subject. Although it serves as the proceedings of a conference (held in Kobe in 1987), future volumes will not necessarily be proceedings. There are 24 papers, reproduced from typescripts, on such subjects as the chemistry of elemental sulfur, oxidation of alcohols, polycarbenes, and bonding in pentaphenylbismuth. It is evident that heteroatom chemistry is a quite heterogeneous area.

Volume II consists of ten reviews, covering chemistry of phosphorus, iodine, selenium, tellurium, fluorine, sulfur, and nitrogen, and ranging freely over both organic and inorganic chemistry. Neither volume is indexed.

Common Fragrance and Flavor Materials; Preparation, Properties and Uses. 2nd Edition. By Kurt Bauer, Dorothea Garbe, and Horst Surburg. VCH Publishers: New York. 1990. xi + 218 pp. \$75.00. ISBN 0-89573-919-4.

A chapter in Ullmann's *Encyclopedia of Industrial Chemistry*, having the title Single Fragrance and Flavor Compounds, plus former chapters on Essential Oils and Animal Secretions have been edited together and brought up to date to generate this edition. The organization of the book is by structural type (e.g., aromatic compounds, N- and N,S-heterocycles). There are also chapters on quality control, safety evaluation, and legal aspects. The references include the patent literature. There is a formula index giving names and CAS Registry Numbers, as well as a subject index.

Thiophene and Its Derivatives. Part 4. Edited by S. Gronowitz. John Wiley & Sons: New York. 1991. xi + 517 pp. \$225.00. ISBN 0471-61221-9.

This is the penultimate part in the comprehensive treatment of thiophene chemistry in the Taylor-Weissberger series of *The Chemistry of Heterocyclic Compounds*. Together, they bring up to date the treatment of the subject, which was last covered in this series by H. D. Hartough in 1952.

Part 4 consists of but three chapters, one of which is 294 pages long. It is a comprehensive review of the physical properties of thiophenes and covers thermodynamics, phase equilibria, dipole moments, electrochemical properties, crystallography, surface chemistry, gas chromatography, optical activity, and the wide range of spectroscopic properties. Tables,

some of them very long, are abundant. The literature citations number 1758.

A chapter on nucleophilic substitution includes mechanism and kinetics as well as a review of behavior toward nucleophiles, classified as benzenoid or nonbenzenoid. Didehydrothiophenes ("thiophynes") are discussed extensively, as are substitution reactions on the α -carbon of a side chain.

The last chapter bears the title Biologically Active Thiophene Derivatives Revisited: 1982–1988. This subject was reviewed in Part 1, published in 1985, but the field has been so active that 699 new references are cited. The chapter is organized according to function; central nervous system therapy, pharmacodynamic agents; metabolic disease therapy; infectious disease therapy; veterinary and agricultural agents; and miscellaneous properites. The standpoint, however, is chemical and the discussion is dominated by structural formulas.

The production, typography, illustration, and indexing of this volume are of the high standard that is characteristic of the series.

Organometallic Vapor-Phase Epitaxy: Theory and Practice. By Gerald B. Stringfellow (University of Utah). Academic Press, Inc.: Boston. 1989. xviii + 398 pp. \$59.50. ISBN 0-12-673840-8.

This book, written by a true expert in the field of growing semiconductors, provides an up-to-date summary of the current state of understanding of the principles, the problems as well as the latest developments in organometallic vapor-phase epitaxy (OMVPE). Thus, after reading this book one should be able to interconnect the chemistry of the precursor molecules with the thermodynamic, hydrodynamic, and kinetic aspects of the OMVPE process. This book includes nine chapters entitled (1) Overview of the OMVPE Process, (2) Source Molecules, (3) Thermodynamics, (4) Kinetics, (5) Hydrodynamics and Mass Transport, (6) Design of the OMVPE Process, (7) Specific Materials, (8) Superlattice Structures, and (9) Devices and a glossary of acronyms that are commonly used in the field. Crystal growers, engineers, physicists, and chemists should find this book useful. The deficiencies of the book from a chemist's perspective arise from errors of simplicity in explaining and/or relating the structures, the bonding, and the physical and chemical properties of precursors and semiconductors. This book also contains many graphs and corresponding mathematical equations that are commonly used by engineers in the field. Chemists apparently prefer to develop and then describe a picture of the process by which precursors are transformed into semiconductor materials by means of chemical equations and structures. Even so, this book should be exceedingly useful to anyone interested in OMVPE and is a welcome addition to the library. The author must be complimented for sharing his knowledge and understanding of the OMVPE process with the scientific community.

O. T. Beachley, Jr., *State University of New York at Buffalo*

Selective Fluorination in Organic and Bioorganic Chemistry. ACS Symposium Series 456. Edited by John T. Welch (State University of New York at Albany). American Chemical Society: Washington, DC. 1991. viii + 216 pp. \$57.95. ISBN 0-8412-1948-6.

This book was developed from a symposium sponsored by the Division of Fluorine Chemistry at the 199th National Meeting of the ACS in Boston, MA, April 22–27, 1990. It consists of a Preface (1 page) and 14 chapters in typescript form that are grouped under the following headings: Theory, Synthesis, and Biological Applications. There are indexes of authors, affiliations, and subjects.

Pulse Method of Measuring Basic Thermophysical Parameters. By L'Udovit Kubicar (Institute of Physics of the Slovak Academy of Sciences). Elsevier: New York. 1990. xx + 341 pp. \$148.75. ISBN 0-444-98851-3.

This monograph contains a very detailed analysis of the pulse method for measuring specific heat, thermal diffusivity, thermal conductivity, contact thermal resistance, and the coefficient of surface heat loss. The pulse method refers to the use of heat pulses which give rise to a dynamic rather than a stationary temperature field within the sample. Detailed analysis of this dynamic temperature field as a function of time allows calculation of the several thermophysical properties of the sample. Sources of error in the method are carefully analyzed, and means of minimizing these are discussed.

The first half of the book develops and discusses the theory, and the second half describes equipment and results of actual measurements on ruby and poly(methyl methacrylate). A brief review of data on some other materials previously studied by the pulse method is included to illustrate various applications. Computer programs for calculation of correction factors dependent on experimental variables are given at the end of the book. The methods and apparatus described are applicable to solids of various shapes in the temperature range 80–1300 K.

The major thesis of the book, i.e. the pulse method is superior to static

methods when properly used, is fully justified by the theory and data included. This book is of interest to anyone directly involved in the measurement of thermophysical properties of solids.

Lee D. Hansen, Brigham Young University

Plasma Source Mass Spectrometry. Edited by K. E. Jarvis, A. L. Gray, and J. G. Williams (Royal Holloway and Bedford New College) and I. Jarvis (Kingston Polytechnic). Royal Society of Chemistry: Guilford, England. 1990. viii + 172 pp. £35.00. ISBN 0-85186-567-4.

This book is a proceedings volume of the Third Surrey Conference on Plasma Source Mass Spectrometry which was held in July 1989. The Third Surrey Conference is the most recent of the biennial conferences devoted to this relatively new and exciting area of analytical science. Over forty scientists contributed to the dozen chapters contained within the volume.

The nature of sample introduction in plasma source mass spectrometry is covered in the first two contributions with special consideration given to laser ablation and electrothermal vaporization. The reduction of spectral interferences in inductively coupled plasma/mass spectrometry (ICP-MS) and the analytical performance of analogue detection in ICP-MS are the focus of the two remaining contributions dealing with analytical development. The final eight contributions center upon the wide and varied applications of plasma source mass spectrometry. Applied areas receiving special attention include geological materials analysis, ultra-trace elemental analysis of human serum, plant sample analysis, the analysis of plutonium and uranium at the femtogram level, iron material analysis, and environmental analysis.

In view of the scope of the contributions within, this book should prove to be invaluable to those involved in the development and application of ICP-MS. Furthermore, each contribution possesses an extensive introductory section and is replete with literature citations, such that those attempting to initiate themselves with the field will also find the book to be of value.

Robert W. Holman, Western Kentucky University

Interfacial Phenomena in Coal Technology, Surfactant Science Series. Volume 32. Edited by G. D. Botsaris and Y. M. Glazman. Marcel Dekker: New York. 1989. 451 pp. \$125.00. ISBN 0-8247-7853-7.

This very useful addition to a well-known series in surface science comprises eleven chapters. Unlike the preceding volumes in this series which dealt with surfactants and their applications, the scope of the present 32nd volume covers various aspects of coal surface chemistry. The multi-author effort edited by Gregory D. Botsaris and Yuli M. Glazman, both of Tufts University, is intended primarily for those involved in researching coal slurry fuels.

The eleven chapters are grouped in four parts: Surface Characterization of Coal, Interfacial Phenomena in Coal Preparation and Beneficiation, Interfacial Phenomena in Coal Slurries, and Other Applications. Inevitably some of the chapters reach a higher overall standard than others. I personally found the part on surface characterization of coal to be somewhat disappointing. Also, the second part with three papers is far from being complete and ignores many important surface chemistry related aspects of conventional coal flotation. The third part and the chapter written by the editors themselves on Stability and Rheology of Coal Slurries is especially noteworthy.

To sum it up, it is a good buy and it will be a very useful addition to the shelves of all libraries. It is highly recommended to all those who are working in the area of coal utilization and coal slurry fuels in particular.

J. S. Laskowski, The University of British Columbia, Vancouver

Chemical Information: A Practical Guide to Utilization. 2nd revised edition. By Yechezkel Wolman (Hebrew University of Jerusalem). Wiley: New York. 1988. xii + 291 pp.

This book presents a detailed and comprehensive account of the entire field of chemical information, with emphasis on the changes brought about by the increasing use of computers in the last decade. Both primary and secondary sources are covered, as well as patents and other major reference works. In addition to general discussions of search strategy, approximately 300 sources are described. Practical examples of search problems are included, and different methods of obtaining the same information are critically evaluated. A new chapter describes the basics of expert systems and their applications to chemical literature searching. Rather than being treated in a separate chapter, online searching is discussed throughout the book along with parallel manual sources. An especially interesting chapter considers trends and perspectives in chemical information. The book is primarily arranged by the type of information desired (e.g., numerical data) and further broken down into subcategories such as crystallographic data and kinetic data. Major sections include the following: synthetic reaction searches, structural and substructural searches, environmental and toxicity infor-

mation, numerical data, chemical marketing, and biographical information. Several major sources dealing with more than one type of information (e.g., Beilsteins) are discussed in various places in the book but are linked through the index. The index is thorough, but it may be confusing in a few cases when sources are entered by the initial article in their titles (e.g., The Chemist's Companion is entered under T rather than C). A helpful acronym dictionary precedes the index. Recommended.

Margaret Manion, University of Lowell

Organic Electronic Spectral Data. Volume XXVI. 1984. Edited by John P. Phillips, Dallas Bates, Henry Feuer, and B. S. Thyagarajan. John Wiley & Sons, Inc.: New York. 1990. xiii + 932 pp. \$135.00. ISBN 0-471-51941-3.

Volume XXVI of this continuing work covers the data published in 1984. As customary, spectra of pure substances are reported in tabular form, giving the name of the compound, the solvent, the wave lengths of the maxima and extinction ($\log \epsilon$), and the references to the original publication. The arrangement is in formula index order (but not consistently). The names used are largely Chemical Abstracts index names, in *inverted* form. This choice is unfortunate, since the names are not in index order, and the sole advantage of this type of name is lost, as is ease of comprehension. Nevertheless, locating desired data is relatively simple.

Chiral Molecules. Edited by M. Simonyi. Akadémiai Kiadó: Budapest. 1990. x + 400 pp. \$48.00. ISBN 963-05-5881-5.

At first glance, this collection of typescript papers looks like a volume of proceedings, but in fact it is composed of invited chapters on a wide variety of fundamental and applied consequences of chirality. They have been written with entertainment (or beguilement) in mind as well as instruction, by an international selection of chemists. They are fun to read, but one learns from them, too.

The Editor's foreword is itself worthy of comment. In it, he points out the fundamental connection of chirality with the rotation of the earth, by which "clockwise" refers to the movement of the shadow in a sundial. It is a most enjoyable exposition. The chapters are grouped, somewhat loosely, under three headings: Chemistry and Biochemistry; Drugs, Medicinal Chemistry, and Pharmacology; and Industrial Aspects. Many of them start with a story, fictional or historical, and then move smoothly into serious science. The story snares the attention, and before the reader has realized it, a new insight has been unfolded. The result is a book that is appealing both to the mature chemist and the undergraduate. For the latter, a smattering of organic chemistry and a willingness to be led into wonder are all that are necessary.

Although this book is not meant to be a reference, literature references are included. Appropriately, the full title of each article cited is given. There is an index also. That is good, for this is a book that will be consulted again after the initial enjoyment of reading and browsing.

Photochemistry. Volume 21. Edited by D. Bryce-Smith and A. Gilbert (University of Reading). The Royal Society of Chemistry: London. 1990. xxii + 580 pp. £130.00. ISBN 0-85186-195-4.

For most photochemists, this is a familiar and much-appreciated series. Newcomers to the field should become aware of it. The authors provide a genuine service in abstracting, sorting, and compiling a year's worth of literature in the field of photochemistry. In this case the coverage is from July 1988 to June 1989, and the appearance of the volume in a little over a year makes it reasonably timely. The two main authors provide an Introduction and Review of the Year, which is useful. A complete author index is also provided. Unlike previous editions, the typeface from the multiple authors is almost uniform and there is little problem with readability. Numerous pages are dedicated to collections of numbered structural drawings, which are very clear and handy for browsing.

The coverage is now pretty well standardized: Part I—Physical Aspects of Photochemistry (1 chapter); Part II—Photochemistry of Inorganic and Organometallic Compounds (3 chapters); Part III—Organic Aspects of Photochemistry (7 chapters); and Part IV—Polymer Photochemistry (1 chapter). In general, the approach is to cover basic photochemistry organized along the lines of the periodic table and the organic functional groups. The relative number of chapters in each part gives a rough idea as to the balance of the coverage.

Within the confines of this organization, the coverage is very complete, with the exception of what could be considered the fringes of photochemistry. There is intentionally little or no coverage of gas-phase reactions or related atmospheric photochemistry; this subject would probably require a volume of its own of comparable size. There is also little photobiology and very little of the current technological developments in solid-state photochemistry and photonics applications. For the second consecutive year, what usually constituted a fifth part dealing with solar

energy is unfortunately absent (the introduction includes a call to any interested party who might be willing to cover that field). The book is already large and certainly represents a major annual effort by the authors. So I would not consider it advisable or possible to include more of the fields that might be called applications of photochemistry. However, I would suggest that the overall coverage might be more comprehensive and more accessible, and still in keeping with the book's emphasis on fundamental photochemistry, if an additional section on electron-transfer photochemistry were added. This is a major thrust of current photochemistry, yet such references are scattered among the various parts and the lack of a subject index makes locating them difficult. Alternatively, an organization of the photochemistry literature along the lines of the Notre Dame Radiation Center Database may be more appropriate for the current status of photochemistry.

Carl C. Wamser, *Portland State University*

Bimolecular Collisions. Edited by M. N. R. Ashfold (School of Chemistry, University of Bristol) and J. E. Baggott (Department of Chemistry, University of Reading). The Royal Society of Chemistry: London, 1989. xvii + 416 pp. \$174.00. ISBN 0-85186-393-0.

This is the second volume of an informal series of reviews in the field of gas-phase photochemistry and kinetics. Eight chapters treat a wide range of topics of great current interest among gas-phase physical chemists. The new volume emphasizes bimolecular and termolecular collisions. Topics include the dynamics of the $H + H_2$ reaction (J. J. Valentini and D. L. Phillips); product vibrational distributions in simple bimolecular reactions (I. W. M. Smith); association reactions (J. W. Davies and M. J. Philling); application of transition-state theory to association reactions lacking potential barriers (W. L. Hase and D. M. Wardlaw); collisional energy transfer in highly excited vibrational states of polyatomics (H. Hippler and J. Troe); quenching the reactivity of electronically excited alkaline earth atoms (D. Husain and G. Roberts); metal cluster reactivity (M. F. Jarrold); and laser probes of the details of ion collisions in drift fields (S. R. Leone). All of the authors are truly experts in their chosen areas.

The book provides up-to-date coverage of progress in understanding the dynamics of both simple and complex chemical reactions in the gas phase. In general, I found the chapters to be authoritative and concise, yet sufficiently detailed to stand alone. The book will age well, since each author takes a fundamental viewpoint. The mix of experimental and theoretical topics is also appealing.

It seems clear that no comprehensive chemistry library should be without this book. On the other hand, the price will make it difficult for many individuals to place this worthy book on their own shelves.

James C. Weisshaar, *University of Wisconsin—Madison*

An Introduction to Applications of Light Microscopy in Analysis. By Diana Simpson and W. Gordon Simpson (Analysis for Industry, Thorpe-le-Soken, Essex, UK). Royal Society of Chemistry: London, 1988. x + 215 pp. \$63.00. ISBN 0-85186-987-4.

This treatise meets a substantial need in the analytical literature. Although light microscopic procedures are important activities of many analytical laboratories, among four analytical chemistry texts I examined at random from my bookshelf, not one contained the words "microscope" or "microscopy" in its index. This volume contains a comprehensive discussion of such activities. In addition to an introductory section on the light microscope, 14 separate chapters cover examination of mineralogical, metallurgical, plastic, fiber and textile, clinical, water, food, forensic, and other types of samples. Specific examples are provided throughout, often taken from the authors' personal experiences. A topical index helps the reader find his way around the volume and a 6-page bibliography provides a guide to further study.

I suspect that this book is aimed primarily at the British student reading for a chemistry Honours Degree. Such a student would find the topical coverage, the wealth of specific examples, and the level of the book ideal to his needs. In the United States the book might usefully supplement a high-level survey course in instrumental analysis. Microbiology students would find this book useful for exploring the uses of microscopy in nonbiological areas.

Some weaknesses of the work should be noted. A more solid technical introduction to the microscope would be helpful. For example, fluorescence microscopy and contrast enhancement methods (phase contrast, differential interference contrast, etc.) are not discussed. It is difficult to envision a work on light microscopy without halftone photographs, yet this volume contains only rather casual drawings. The focus of the work is squarely on visual microscopy as used for morphological characterizations. This is good to the extent that it prevents the text from straying from the microscope to other analytical instruments. However, on the negative side, no contemporary techniques in quantitative microscopy are addressed and this is a serious omission. Interesting chapters on analyses

for health, safety, and forensic purposes are included. These sections address a number of concerns specific to the British workplace and legal system and overseas readers should be aware of this focus.

In summary, this volume provides a useful introduction to the role of microscopic examinations in the analytical laboratory and, as such, will interest both science students and practicing scientists.

B. George Barisas, *Colorado State University*

Catalysis by Metal Complexes. Volume 11. Transition Metal Complexes as Drugs and Chemotherapeutic Agents. By Nicholas Farrell (The University of Vermont). Kluwer Academic Publishers: Dordrecht, Boston, London, 1989. xii + 291 pp. \$89.00. ISBN 90-277-2828-3.

The major emphasis of the book is on metal complexes in cancer chemotherapy; seven of the twelve chapters cover various aspects of this subject. Considerable attention within this section is given to the platinum-amine complexes (e.g. cisplatin), including proposed mechanisms of action. Chapter eight covers radiation applications of metal complexes (both sensitization to and protection from radiation effects). The four remaining chapters briefly address the use of metal complexes as antibacterial agents, antiviral and antiparasitic drugs, arthritis treatments, and miscellaneous other uses. There are four useful sections at the end of the book. These include a list of abbreviations used in the text, a glossary of terms with definitions, an appendix which gives an overview of some basics of DNA and RNA structure, and a second appendix explaining some of the cancer cell culture nomenclature and pharmacological parameters used in the book.

The book was designed so that the chapters can be read in any order. While this is true to some extent, it has the disadvantage that reading the chapters in the normal order does not necessarily give the reader the background needed to understand the current chapter. The reader is referred forward as well as backward, and concepts are often briefly mentioned in passing but not defined or explained until several chapters later. This can lead to some confusion. In addition, the seven chapters that deal primarily with cancer treatment are interrelated; reading only one or two chapters could lead to misunderstanding by a reader not already familiar with the area. The later chapters are somewhat more independent, but to a small extent they do rely on the general concepts developed in earlier chapters.

The glossary and appendices are included "for the benefit of those who are new to the field", however, they are not complete enough for a reader without some background in the area. In many instances where they could be helpful, these materials are not referenced, therefore it is advisable to read them before reading the chapters.

Parts of the book will be difficult reading for most chemists, as few will have sufficient background in organic chemistry, inorganic chemistry, nucleic acid structure and function, and biomedical science to feel completely comfortable with all the material. On the other hand, each chapter contains a large number of references for the reader who wishes to learn more. Review of relevant topics in text books would also help with this difficulty. Even without the additional reading, most chemists will be able to follow the general concepts of the book, if not all the details. It will be particularly useful for chemists doing basic research on transition-metal complexes who would like a brief overview of the possible medical uses of these complexes for purposes such as grant proposals or introductions to papers. Those chemists willing to read the references and some additional background material will obtain a more complete understanding of the field.

Jeanne Buccigross, *College of Mount St. Joseph*

Safer Insecticides Development and Use (Drug and Chemical Toxicology Series, Volume 7). Edited by E. Hodgson and R. J. Kuhr (North Carolina State University). Marcel Dekker, Inc.: New York and Basel, 1990. xi + 593 pp. \$135.00. ISBN 0-8247-7884-7.

The stated aim of this book is to explore toxicological, regulatory, commercial, and attitudinal factors in insecticide development and how they apply to safety. The early chapters focus on toxicology. W. C. Dauterman and E. Hodgson provide a comprehensive and useful summary of xenobiotic metabolism. K. Nishimura, H. Iwamura, and T. Fujita describe quantitative structure-activity relationships of insecticides. Other chapters individually describe development of insecticides based on the endocrine system, the nervous system, and on differences in metabolic pathways of insects from other organisms. Other approaches described in subsequent chapters include proinsecticides (metabolically activated toxicants), induction of plant resistance to insects, natural products as potential insecticides, viruses and bacteria as sources of insecticides, and use of spider toxins as lead structures for novel pesticides. In these chapters primary emphasis is given to development of more effective insecticides, with safety as a secondary concern.

Safety is a primary concern in the later chapters: improved application techniques, methods for reducing the use of existing insecticides,

safety considerations in the manufacture of agrichemicals, and marketing considerations from the industrial viewpoint.

Although most of the authors are from academia rather than industry, this book is clearly a response of the pesticide industry to recent public concerns about health and environmental problems associated with pesticide use. The last chapter closes with the industry view that since the 1940s new, more effective insecticides have been increasingly available, including insecticides that are safer for the grower and for the environment, and that even safer insecticides will continue to be developed in the future. Consumers whose environmental sensitivities have been aroused will question whether intensification of the current industrial approaches to insect control are adequate and prudent for the future.

Larry G. Butler, *Purdue University*

Lasers and Mass Spectrometry. Edited by David M. Lubman (University of Michigan). Oxford University Press: Oxford and New York. 1990. xiii + 545 pp. \$75.00. ISBN 0-19-505929-8.

This volume is a collection of short review articles by 55 contributors comprising 23 chapters, a preface by the Editor, and an index. What this volume has are very good contributions from all the authors and a good index. What this volume lacks is organization and an overview chapter. Consequently there is some redundancy in the introductions and content of the various chapters. This is not a serious drawback because to a certain extent the reader will benefit from the different points of view that are expressed.

The contributions represent a range of applications which offer much more coverage to the subject of laser mass spectrometry from the point of view of the analytical chemistry of condensed phases than to purely gas-phase applications. I found the contributions to be useful in introducing me to the literature of the field of "laser microprobe" analysis of solids and surfaces. Although I was aware of the technique before, a number of chapters review the chronology of its development and other important technical details. In this respect, the volume will be very useful to anyone interested in this potentially important, rapidly developing, surface/bulk material analytical technique. Potential researchers will find a series of good introductions and literature references. There are two kinds of contributed chapters. Some authors have built an apparatus and are busy putting anything into it that might give some insight into how the technique works. Others are focused on some application. This is particularly true of those attempting to analyze biological samples. Graduate students and even undergrads to some extent will find this volume understandable although reference to other reference/teaching texts may be needed for some individuals. I could envision teaching an advanced undergraduate/graduate student Special Topics course with this volume as the central text. Supplementary materials would be needed depending on the course and the audience.

Joseph Chaiken, *Syracuse University*

Introduction to Nonlinear Optical Effects in Molecules & Polymers. By Paras N. Prasad (SUNY, Buffalo) and David J. Williams (Eastman Kodak Corporate Research). John Wiley & Sons, Inc.: New York. 1991. xii + 307 pp. \$49.95. ISBN 0-471-51562-0.

This book represents the first serious attempt to create a guidebook for entrants into this complex integrated interdisciplinary field. Coverage appears to be thorough up through 1988 with some references to work from 1989. The authors have made no attempt to be comprehensive since their primary aim appears to have been the development and presentation of concepts in a textbook type format. Despite this, referencing seems to be adequate, so that even the expert in the field will consider this book a valuable organized reference source. In particular, there are extensive references to molecules and materials for both second-order and third-order nonlinear optical effects. The authors have admitted a bias in including some of their own work, though I did not find this a distraction or detraction.

The book is organized in 13 chapters with Chapters 1-5 and 8 dealing with background and fundamental theory in a fairly conceptual equation-nondependent format. In addition to the fundamental physics there is a brief section on the application of quantum chemical calculations. Testing my own grayest areas of understanding, I did not find the conceptual theoretical discourse any more or less enlightening than I have read elsewhere. This is not a criticism, since the burden placed upon an author to write fairly complex optical physics intelligibly for the average chemist or materials scientist is daunting. It is, however, well organized and well enough referenced that the reader will necessarily have to do what we have all done: basically sit and think a lot about it. One could devote a whole book to the conceptual presentation of NLO theory. The authors have apparently decided rather to center this text around the more recent experimental developments in the field over the last decade. With this in mind, Chapters 6, 7, 9, and 11 present an intensive survey of nonlinear optical molecules, materials, and measurements for both

second- and third-order processes. Chapters 5-11 appear to be the strength of this book with no important area being excluded. For me, some of the most helpful aspects of this book were the well-organized summaries of the nonlinear optical processes (Chapters 5 and 8) and measurements presented in these chapters. The final two chapters (12 and 13) deal with devices and a restrained look into the future, respectively. The device specialist will find Chapter 12 a bit sparse, but a thorough enough introductory presentation for the general reader. One presumes the device engineer would consult this book to understand more fully the materials aspects rather than to learn his own trade.

I believe the authors have largely succeeded in their endeavor to create a textbook for organic NLO and that both experts and new entrants will find this book a valuable and necessary addition to their library. The uninitiated will still need to consult the primary work, and I do not see this book obviating the utility of earlier texts like that of Chemla and Zyss or outliving the need for periodic updates. However, given only 307 pages to work with, the authors have done the best job that probably could be done with such a difficult subject area. One thing that might be particularly helpful in a second edition would be a selected plug in the numbers type approach so that the novice can see, for instance, how the two-level model works and why the apparently strange units come about. This presumes the publisher will give them more pages to work with.

The reasonable price possibly makes this book a candidate as a text for a special topics graduate course taught at the university level, although I do not believe the nonexpert lecturer could necessarily depend on it as such. The text is completed with a short subject index which could be expanded. A comprehensive author index is missing and might be desirable, although each chapter is accompanied by an alphabetical bibliographical style list of references.

Carl W. Dirk, *University of Texas at El Paso*

Ignition of Solids. By V. N. Vilyunov and V. E. Zarko (Institute of Chemical Kinetics and Combustion, Siberian Branch, USSR Academy of Sciences). Elsevier Science Publishing Co. Inc.: Amsterdam and New York. 1989. xvi + 442 pp. \$155.25. ISBN 0-444-87289-2.

This book is the latest contribution to the English language literature from the Soviet Ignition School and will be of interest to both students and researchers alike in the area of fire and explosion initiation (and prevention). The book provides a readable, thorough summary of theoretical developments of the past six or seven decades in this important area of combustion.

This summary is drawn from the extensive Soviet literature and, to a lesser extent, from Western contributions to the topic. As stated by the authors in their preface, technological applications of the theory are beyond the scope of their book, but it is the opinion of this reviewer that designers of combustors and engines utilizing condensed phase (C-substance) fuels will also find much of interest, if not directly useful, in this book.

The most satisfying aspect of the book is that it provides a reasonably complete, systematically organized view of the theory of solid ignition, although this view is somewhat biased by the authors' particular, special interests. The least satisfying aspect is that there is little comparison of theory with experiment. This latter point is not a fault of the authors, but it is due to the fact that computer technology and software have provided the theoretician with a powerful tool during the past 20 years or so and, as a consequence, the production of theoretical results has outpaced the generation and reporting of experimental results, at least in the open literature.

The five chapters are titled Condensed Phase Ignition by Conductive Heat Transfer from Hot Media; Thermal Radiative and Convective Ignition of C-Substance; The General Problem of Ignition Theory in Solid and Gas Phases; Ignition of Chemical Reactions in Active Media: Macroscopic Aspects in the Problem of Spark and Hot Spot Ignition; and Experimental Studies of C-Substance Ignition. The first three chapters were published previously by the first author under a different title but were revised and supplemented with new material for the present book. A comprehensive list of references is provided at the end of each chapter. While the many mathematical symbols are defined in the text as they are introduced, the inclusion of a table of symbols for ready reference would have been useful to this reader.

The authors begin by distinguishing between two regimes of thermal ignition of exothermic reactions in active media: self ignition, by relatively low heating rates, with heat accumulation throughout the medium largely due to internal sources, and ignition by relatively high intensity heat transfer from an external source, resulting in nonuniform temperature distribution in the substance, and localized rapid reaction, or thermal explosion, in a surface layer of the material. It is this second process which the authors address and term "ignition". Unfortunately, a universal criterion by which the instant of ignition can be determined has not been suggested to date. As a consequence the authors, as have

others, use a variety of criteria, each tailored to the problem and situation of interest. The result is that more than ten theoretical ignition criteria have been put forward in the literature. The determination of the extent to which each of the current ignition criteria is valid must await adequate test of theoretical results against experimental data and, on examining Chapter 5, one finds the experimental data base appropriate for test of the theory is meager at best.

In their concluding remarks, Vilyunov and Zarko point out that there is still a large gap between results obtained from theoretical models and those observed by experimentalists, and suggest several areas for additional theoretical development which should be possible by means such as matched asymptotic expansions or by "modern methods of mathematical simulation and powerful computation techniques". Just what this latter method is, is not explained, but presumably it refers to or includes the numerical method of finite elements, which has been successfully applied during the past 10–15 years to so many nonlinear problems in hydrodynamics. Finally on the experimental side, the authors see a future for the further development and application of optical techniques for temperature and concentration measurement by the use of lasers equipped with fiber optics and interfaced with automated data collection and processing equipment.

This book is highly recommended for those whose interests lie in the area of ignition of condensed phases as well as those with interests in fire and explosion prevention.

George C. Frazier, *The University of Tennessee*

Principles of Dielectrics. Monographs on the Physics and Chemistry of Materials 45. By B. K. P. Scaife (Trinity College). Oxford University Press: Oxford and New York, 1989. xxxii + 384 pp. \$105.00. ISBN 0-19-851380-1.

This book is an excellent treatment of the subject. Scaife states in the preface that this book is intended to be used as a textbook. The order and flow of topics is appropriate, and the presentation of the material is sufficiently clear so that this book might indeed be used in a course. The scope of the book is restricted to electrically insulating media with the consequence that optical phenomena are not considered. Therefore the choice of this book as a textbook might depend on the length of time available for instruction. For a two-semester course, I would seriously consider using this book for the first semester and then developing a treatment of electrically conducting materials during the second semester using other sources. For a one-semester treatment of dielectric phenomena, I would prefer to use a text with coverage of electrically conducting media, at the expense of giving up some of the thoroughness and rigor that is the hallmark of Dr. Scaife's book. In any case I would not hesitate in recommending this book as a superb reference given the extensive coverage of the fundamentals underlying dielectric phenomena in electrically non-conducting media. The only quibble I have with this book as a textbook is a minor one. Dr. Scaife states that the level of this book is pitched to students of the physical sciences in their final undergraduate year. This book offers a sound treatment of the material, and the promised development of fundamental electrostatics is quite thorough. The density of material might prove to be somewhat intimidating to the undergraduate, even in the final year. Mediating this criticism are the number of important problems, and examples are worked out in detail both in the body of the text and in the excellent appendices.

The presentation of material in the first half of the book follows a standard and logical flow. A quick review of fundamentals, definitions, and nomenclature is followed by an examination of dielectrics in static fields with basic electrostatics interwoven throughout this topic. The basics of dielectrics in time-dependent fields are then carefully and compactly given. Dispersion relations are discussed and several interesting cases of resonance absorption are treated. This chapter is followed by a treatment of heterogeneous dielectrics, including a treatment of layered systems as well as a two- and three-dimensional treatment of binary systems.

The chapter on equilibrium polarization fluctuations relates the microscopic properties of the constituent molecules and atoms to the macroscopic properties which characterize bulk dielectrics. This is followed by a chapter on the spectral properties of equilibrium fluctuations, which introduces the autocorrelation function and the spectral density. Here the material might be compact for an undergraduate, but it is an excellent overview for someone using this as a reference.

The gap between the macroscopic description of dielectric phenomena and the constituent microscopic entities is again bridged in the chapter on the calculation of relative permeability. The treatment of the local field is carefully done, and the equations developed by Mossotti and Poisson, Maxwell, Lorenz and Lorentz, and Rayleigh are summarized. This is followed by a discussion of the difficulties of the Clausius-Mossotti equation and a more complete treatment based on the Kirkwood model.

The theory of orientational polarization is discussed in the context of Onsager's work and the later theories of Kirkwood and Frölich.

In the latter part of the book are brief chapters covering electromechanical effects and dielectric saturation in dipolar liquids. The last chapter again returns to the theme of the electromagnetic field in matter. The derivation of Maxwell's equations is followed by a general solution. The calculation of the current density and the charge distribution density is given careful attention. Spatial averaging, or spatial smoothing as the author prefers, is introduced leading to the set of equations describing the fields, charges, and currents inside matter as introduced in the first chapter.

In the first chapter a careful distinction is drawn between the form of Maxwell's equations in free space, designated with a tilde, and the form of Maxwell's equations in matter, which carry no special notation symbol. In Chapter 6 the author reintroduces quantities with a tilde, only now the tilde symbol refers to microscopic or molecular entities. The tilde reappears in Chapter 10 to distinguish between the actual value of a physical variable and a smoothed value, that is, with the same meaning as its original use in Chapter 2. This dual usage of the tilde might tend to confuse a student. However in fairness to Dr. Scaife, he is careful to spell out the precise usage of the tilde at each point when it is introduced.

Roger Frech, *University of Oklahoma*

Organometallic Chemistry of the Transition Elements. Modern Inorganic Chemistry Series. By F. P. Pruchnik (Wrocław University, Poland). Translated by S. Duraj (Ohio State University). Series editor John P. Fackler, Jr. Plenum Press: New York, 1990. xvi + 757 pp. \$150.00. ISBN 0-306-43192-0.

This interesting textbook widely reviews the different aspects of reactivity, applications to homogeneous catalysis, physical properties, spectroscopic data, and reaction mechanisms of organometallic compounds and clusters.

The book is divided into 13 chapters: Introduction to Organometallic Chemistry; Metal Carbonyls; Metal-Metal Bond and Clusters; Compounds Containing One-Electron Carbon-Donor Ligands; Carbene and Carbyne Complexes; Compounds Containing Two-Electron π -Ligands (Olefin, Acetylene, and Allene Complexes); Complexes Containing Three-Electron π -Ligands; Compounds Containing Four-Electron π -Ligands; Compounds Containing Five-Electron π -Ligands; Complexes Containing Six-Electron π -Ligands; Complexes Containing Seven or Eight-Electron π -Ligands; Isocyanide Complexes; and Application of Organometallic Chemistry in Homogeneous Catalysis. Extensive literature citations covering up to 1985 are provided at the bottom of the tables and at the end of the chapters.

This manual can be regarded as a sort of mini-encyclopedia of Organometallic Chemistry, along the lines of the much larger Comprehensive Organometallic Chemistry but in a very condensed form. It is very handy, rich in examples, and documented with reasonably updated literature. The theoretical part on each topic is satisfactorily treated at an adequate introductory level and is clearly presented. Especially useful are the extensive tables of physical, structural, and spectroscopic data. They may be helpful as quick references for the preparation of general and introductory parts of lectures and seminars in different domains of Organometallic Chemistry.

This book may serve also as an excellent guide for teachers of advanced undergraduate and graduate Inorganic Chemistry courses covering both theory and applications to real scientific problems.

Although the price may discourage students from purchasing this text which is based on the lectures of the author, it should be a good companion for each student dedicated to Inorganic Chemistry during his advanced undergraduate and graduate studies.

I believe this book to be an important addition to any library collection in Inorganic Chemistry.

Sandro Gambarotta, *University of Ottawa*

Advances in Polymer Science. No. 96: Filled Polymers I. Science and Technology. Edited by N. S. Enikolopyan (USSR Academy of Sciences, Moscow). Springer-Verlag: New York, Berlin, Heidelberg, 1990. xii + 166 pp. \$79.00. ISBN 0-387-52791-5.

This book contains reviews of papers published in the last ten years in the USSR under the following headings: Filled Polymers: Mechanical Properties and Processability, by N. S. Enikolopyan, M. L. Fridman, I. O. Stalnova, and V. L. Popov; Rheology of Filled Polymers, by A. Y. Malkin; Rheology of Gas-Containing Polymer Systems, by O. Y. Sabsai, N. E. Nikolaeva, and M. L. Fridman; and Formation Processes and Properties of Conducting Polymer Composites, by A. T. Ponomarenko, V. G. Shevchenko, and N. S. Enikolopyan. There is an author index for Volumes 1–96 and a subject index for this volume.