

## Additions and Corrections

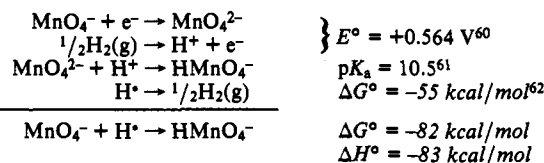
**Monophotonic Ionization of 7-Azaindole, Indole, and Their Derivatives and the Role of Overlapping Excited States** [*J. Am. Chem. Soc.* 1994, 116, 735-746]. F. GAI, R. L. RICH, AND J. W. PETRICH\*

Page 740: The variation of the fluorescence quantum yield as a function of excitation wavelength for indole and its derivatives depicted in panels a-c of Figure 5 is incorrect owing to an improper correction of the lamp intensity of our fluorimeter. There is no measurable variation of fluorescence quantum yield with excitation wavelength. Consequently these data cannot be used to argue that the  $^1L_b$  state is the origin of the solvated electron whose appearance is complete within 1 ps.

**C-H Bond Activation by Metal Oxo Species: Oxidation of Cyclohexane by Chromyl Chloride** [*J. Am. Chem. Soc.* 1994, 116, 1855-1868]. GERALD K. COOK AND JAMES M. MAYER\*

Page 1867: The calculation of  $\Delta H^\circ$  in Scheme 4 is in error. Since the normal hydrogen electrode (the second equation) relates  $H^+(aq)$  with  $H_2(g)$ , the fourth equation should relate  $H^+(aq)$  with  $H_2(g)$  and the calculation of  $\Delta G^\circ$  for this line should not include the solvation of  $H_2(g)$ . The corrected values are shown in italics in the scheme below. The expression for  $\Delta G^\circ$  in footnote 62 should be as follows:  $\Delta G^\circ [H^+(aq) \rightarrow \frac{1}{2}H_2(g)] = -48.6 - 6.6 = -55.2$  kcal/mol. This correction slightly changes the shape of Figure 5 (p 1868) but does not alter the conclusions. We are very grateful to Ms. Kimberly Gardner for finding this error.

**Scheme 4.** Calculation of  $\Delta H^\circ$  for the Addition of  $H^+$  to Permanganate



## Book Reviews \*

**Protein Kinase C. Current Concepts and Future Perspectives.** Edited by David S. Lester (CACSS, Yona Microscope and Instrument Co.) and Richard M. Epanand (McMaster University Health Sciences Centre). Ellis Horwood: New York, London, Toronto, Sydney, Tokyo, and Singapore. 1992. xii + 365 pp. \$75.00. ISBN 0-13-720186-9.

Protein kinases were the subject of 4914 articles during the past year (or more precisely, from the 13th week of 1993 through the 12th week of 1994) according to *Current Contents*. To place this number in perspective, fullerenes, which are the current rage in the chemical community, appeared in only 73 articles during the same period! Why the fascination with protein kinases? Much of their attraction is due to the general phenomenon known as signal transduction. The latter term is defined in Lester and Epanand's monograph as "events occurring at the plasma membrane whereby extracellular signal molecules (e.g. hormones, neurotransmitters, cytokines, extracellular matrix) can bring about specific intracellular events to alter cell behavior". For example, a particular signal molecule, upon binding to an appropriate receptor on the cell membrane, may trigger a series of enzyme-catalyzed events that ultimately induce the cell to divide. The vast majority of enzymes that comprise these signal transduction pathways are protein kinases. We now know that in many cancer cell lines certain signal transduction pathways are permanently turned on. The cell continues to divide even though no extracellular signal molecule is bound to the cell surface receptor. Given the relevance of protein kinases to carcinogenesis, as well as to other biological phenomena, it is not surprising that this enzyme family has received such intense scrutiny. However, of all the protein kinases that have been studied to date, none have received more attention than

protein kinase C ("PKC"). Of the 4914 articles referred to above, more than 60% directly deal with PKC. Undoubtedly, much of the interest here is due to the observation by Nishizuka and his colleagues that PKC serves as the receptor for the tumor-promoting phorbol esters. Lester and Epanand have compiled a series of 14 reviews that focus on the biochemical and biophysical properties, as well as the biological action, of protein kinase C. All of the articles cover the primary literature up to 1991. The book is divided into two main sections, the first dealing with *in vitro* properties and the second with the *in vivo* role of PKC. Rather than describe all 14 reviews in detail, I will focus on a few in order to give a general sense of the monograph.

The readers of the *Journal of the American Chemical Society* and, in particular, organic chemists will find Rando and Kishi's article *The Structural Basis of Protein Kinase C Activation by Diacylglycerols and Tumor Promoters* an absolute joy to read. Rando and Kishi nicely demonstrate that organic synthesis can serve as a powerful tool in addressing questions of biological significance. Indeed, this article could have easily been entitled "Advice to young natural products chemists" given the current funding situation. The authors propose a model for PKC activation by tumor promoters and diacylglycerol based upon the activity of a series of phorbol ester and glycerol derivatives. The narrative in this article is crisp and easy to follow. Unfortunately, not all of the reviews in this monograph live up to the standard set by Rando and Kishi. In particular, the article entitled *Membrane-Associated Protein Kinase C* is somewhat disappointing. In the resting cell, PKC is primarily located in the cytosol. Upon activation, PKC undergoes a net transfer to the plasma membrane. The expressed purpose of this review is to "correlate the factors controlling cellular localization with the cellular activity". Unfortunately, the extraordinarily stilted sentence structure contained

\*Unsigned book reviews are by the Book Review Editor.

throughout this article is not conducive to easy comprehension. In short, comments such as "The constitutive PKC activity, biochemical studies that suggest that it is the lipid composition which determines the Ca<sup>2+</sup>-dependence of PKC, and the cofactor-dependence of some of the exogenous substrates, all question the designated role of Ca<sup>2+</sup> in PKC activation" make for rough going. Fortunately, the majority of reviews do not generally suffer from this difficulty. Epanand's contribution concerning the Effect of PKC Modulators on Membrane Properties is well written and contains simple diagrams that are easy to follow. This article is a nice distillation of the literature concerning the activity of this membrane-bound enzyme and the way it is modulated by specific alterations in membrane structure. For example, lipid chemists will be especially intrigued by the observation that substances which lower the bilayer to hexagonal phase transition temperature activate PKC (whereas raising the transition temperature inhibits PKC). Obviously, there are implications here for the design of novel PKC inhibitors. Parker's presentation is a nice overview of the entire protein kinase C family, which consists of several closely related enzymes. O'Brian discusses the enzymology of PKC both from a standard perspective (i.e. its ability to catalyze the phosphorylation of protein substrates) and from a unique one (i.e. its ability to serve as an ATPase). Overall, the editors have done a nice job in identifying an array of scientists that approach the analysis of protein kinase C from a diverse range of viewpoints and methodologies. Nevertheless, the casual observer should be cautioned that this is not an introductory text for the uninitiated but rather consists of a series of detailed scholarly reports. There are some minor annoyances that are typical for monographs composed of reviews written by different authors. This includes a tendency to be repetitive. For example, nearly all of the authors mention that the family of PKCs are divided into Ca<sup>2+</sup>-independent and Ca<sup>2+</sup>-dependent forms and that all are activated by diacylglycerol. In addition, when reading the text straight through, it is sometimes difficult to adjust to the different cadence of the individual writing styles. One particularly irksome feature is the use of the *Biochemistry* format for citing references. This disruptive format (Parker, 1992; Burns & Bell, 1992; Rando & Kishi, 1992) makes it difficult (Shah & Shipley, 1992; Lester, 1992) to follow (Boni, 1992; O'Brian & Ward, 1992) the point (Epanand, 1992; Mosior & McLaughlin, 1992) the authors (Rasmussen et al., 1992; Jaken, 1992; Aderem & Seykora, 1992) are trying to make (Knox & Kaczmarek, 1992; Borner & Fabbro). However, these are minor inconveniences. Most importantly, *Protein Kinase C. Current Concepts and Future Perspectives* provides a nice summary of what is known and what is still unknown about this fascinating enzyme family.

David S. Lawrence,  
State University of New York at Buffalo

**Physical Properties of Polymers. Second Edition.** By James E. Mark (University of Cincinnati), Adi Eisenberg (McGill University), William W. Graessley (Princeton University), Leo Mandelkern (Florida State University), Edward T. Samulski (University of North Carolina, Chapel Hill), Jack L. Koenig (Case Western Reserve University), and George D. Wignall (Oak Ridge National Laboratory). American Chemical Society: Washington, DC. 1993. xii + 410 pp. \$44.95. ISBN 0-8412-2506-0.

This book is designed as an introduction to the physical properties of polymers and how they fit into the general subject of polymer science. After a preface by Mark, there are seven chapters organized under the following two headings: Physical State of Polymers and Some Characterization Techniques. There is also a subject index.

**Advances in Steroid Analysis '93. Proceedings of the 5th Symposium on the Analysis of Steroids.** Edited by S. Görög (Semmelweis University Medical School). Akademiai Kiado: Budapest. 1994. xiv + 623 pp. \$65.00. ISBN 963-05-6721-0.

This book was developed from the Proceedings of the 5th Symposium on the Analysis of Steroids held on 3–5 May 1993 in Szombathely, Hungary. After a preface by the editor, there are 65 papers in typescript form organized under the following headings: Receptor Binding Studies; Immunoassays (Radio Immunoassay, Enzyme Immunoassay, Chemiluminescent Immunoassay, and Comparison of Various Immunoassays); Chromatography (High-performance Liquid Chromatography, Thin-layer Chromatography, and Gas Chromatography-Mass Spectrometry); Spectroscopy (Mass Spectrometry and Complex Application of Spectroscopic Techniques); Biosynthesis and Metabolism; Clinical Studies; Environment—Steroids and Cancer; and Miscellaneous. There is also a subject index.

**Nitrosamines and Related N-Nitroso Compounds. Chemistry and Biochemistry. ACS Symposium Series 553.** Edited by Richard N. Loeppky (University of Missouri) and Christopher J. Michejda (National Cancer Institute). American Chemical Society: Washington, DC. 1994. xii + 388 pp. \$89.95. ISBN 0-8412-2856-6.

This book was developed from a symposium sponsored by the Division of Agricultural and Food Chemistry at the 204th National Meeting of the American Chemical Society held on 23–28 August 1992 in Washington, DC. After a preface by the editors and an introductory chapter by Loeppky, there are 45 additional chapters organized under the following headings: N-Nitroso Compound Exposure, Formation, and Blocking; Nitric Oxide Chemistry and Biochemistry; Chemistry and Biochemistry of Nitrosamine Activation and Detoxication; Toxic, Mutagenic, and Carcinogenic Effects of N-Nitroso Compounds; Reactive Intermediates—Brief Discussions of Research; N-Nitroso Compound Formation and Inhibition: Brief Discussions of Research; Chemical and Biochemical Models and DNA Adduct Formation—Brief Discussions of Research; and Nitrosamine Occurrence—Brief Discussions of Research. There are author, affiliation, and subject indexes.

**Emerging Technologies in Hazardous Waste Management IV. ACS Symposium Series 554.** Edited by D. William Tedder (Georgia Institute of Technology) and Frederick G. Pohland (University of Pittsburgh). American Chemical Society: Washington, DC. 1994. x + 318 pp. \$89.95. ISBN 0-8412-2857-4.

This book was developed from a symposium sponsored by the Division of Industrial and Engineering Chemistry, Inc., of the American Chemical Society at the Industrial and Engineering Chemistry Special Symposium held on 21–23 September 1992 in Atlanta, GA. After a preface and an introductory chapter by the editors, there are 17 additional chapters organized under the following headings: Remedial Technologies for Soils and Sediments; Waste Minimization and Management Technologies; and Radioactive and Mixed-Waste Management. There are author, affiliation, and subject indexes.

**Shikimic Acid. Metabolism and Metabolites.** By Edwin Haslam (University of Sheffield). John Wiley and Sons: Chichester, New York, Brisbane, Toronto, and Singapore. 1993. xii + 387 pp. \$120. ISBN 0-471-93999-4.

Twenty years ago Professor Haslam "wrote the book", as they say, on the shikimate pathway. His 1974 volume of this title has become the bible for all who work in this field. A tremendous amount of work has since been done on this subject, and the appearance of a successor volume is therefore welcome news. The new book, although it can stand on its own, emphasizes mainly the new knowledge gained during the last two decades. It is newly written and somewhat differently organized than its predecessor and brings the reader up to date on the chemistry, mechanistic enzymology, and aspects of the molecular genetics of this important pathway of primary metabolism, and it provides quite extensive coverage of secondary metabolites derived from the pathway. Just as its predecessor does, it presents a wealth of information in a very comprehensive form with extensive use of well drawn formulas. At the same time the book is eminently readable, often loosened up by quotations and occasional banter with an eminent colleague. The subject coverage and the references are very current, and the book does an excellent job of bringing out the essential without being encyclopedic. Given the continued interest in the shikimate pathway as a target for intervention in the design of herbicides and chemotherapeutic agents and as a source of bioactive natural products, this book should have broad appeal to the chemical community.

Heinz G. Floss, University of Washington

**Colloid-Polymer Interactions: Particulate, Amphiphilic, and Biological Surfaces. ACS Symposium Series 532.** Edited by Paul Dubin (Indiana University-Purdue University) and Penger Tong (Oklahoma State University). American Chemical Society: Washington, DC. 1993. xii + 290 pp. \$79.95. ISBN 0-8412-2696-2.

This book was developed from a symposium sponsored by the Divisions of Polymer Chemistry, Inc., and of Colloid and Surface Chemistry at the 203rd National Meeting of the American Chemical Society held on 5–10 April 1992 in San Francisco, CA. After a preface by the editors and a chapter by William B. Russel (Macroscopic Consequences of Polymer-Particle Interactions), there are 19 additional chapters organized under

the following headings: Theory and Simulation; Kinetics and Configurations of Adsorbed Chains; Flocculation and Stabilization; and Interactions with Micelles, Bilayers, Liposomes, and Proteins. There are also author, affiliation, and subject indexes.

**Thermochemistry and Equilibria of Organic Compounds.** Edited by Michael Frenkel (Texas A & M University). VCH: New York, Weinheim, and Cambridge. 1993. xv + 584 pp. \$150.00. ISBN 1-56081-559-0.

This text comprises three separate books published originally in the USSR. As the editor notes, by concentrating attention on organic compounds, some parts of the original text have, however, been deleted, especially those parts dealing with inorganic compounds.

The first book, *Bomb Calorimetry*, written by S. N. Hajiev, provides an in-depth commentary on all aspects of the design of this class of calorimeters. An interesting chapter comments on calibration methods and on the problems associated with determining energies of combustion for organic compounds containing non-metallic heteroatoms and for a selected group of organometallic compounds. A separate chapter indicates how the relevant calculations are completed, two examples being given of calculations involving 100 steps.

The second book, *Thermochemistry of Organic Substance Evaporation*, by Yu. A. Lebedev and E. A. Miroshnichenko, describes how experimentalists have met the challenge of measuring enthalpies of vaporization using calorimetric and vapour pressure methods. Extensive tables report enthalpies of vaporisation including details from the authors' laboratory. These data are subjected to a critical review and examined using an extrathermodynamic approach based on group contributions. Some interesting patterns emerge.

The third book, *Thermodynamics and Equilibria of Isomers*, by G. Ya. Kabo, G. N. Roganov, and M. L. Frenkel, has a theme based on statistical thermodynamics and on classification of molecular geometry. The objective of the theoretical chapters becomes clear in Chapter 6, where, for example, procedures are discussed in which the dependence on temperature and pressure is examined for the products of dehydrogenation of 2-methylbutane.

Chemists with an enthusiasm for thermodynamics will delight over the description of the care and attention given to experimental design, operation, and data analysis. There are, unfortunately, many cases—particularly in the first book—where translation has produced some strangely constructed sentences.

Michael J. Blandamer, *The University of Leicester*

**Advances in the Synthesis and Reactivity of Solids. Volume 2.** Edited by Thomas E. Mallouk (Pennsylvania State University). JAI Press: Greenwich, CT. 1994. xii + 284 pp. \$90.25. ISBN 1-55938-330-5.

This book is Volume 2 in a continuing series of reviews on recent work on the preparation, characterization, structure, and reaction chemistry of solid materials. After a list of contributors and a series preface and introduction by the editor, there are five chapters covering the topics of synthesis, structure, and reaction mechanisms in solid state chemistry. There is a subject index.

**Quantities, Units, and Symbols in Physical Chemistry.** By Ian Mills, Tomislav Cvitas, Klaus Homann, Nikola Kallay, and Kozo Kuchitsu. Blackwell: London. 1993. x + 166 pp. \$29.95. ISBN 0-632-03583-8.

This book was developed by the Commission on Physicochemical Symbols, Terminology, and Units of IUPAC. After a preface by the editors and a historical introduction by Cvitas, there are nine chapters with the following headings: Physical Quantities and Units; Tables of Physical Quantities; Definitions and Symbols for Units; Recommended Mathematical Symbols; Fundamental Physical Constants; Properties of Particles, Elements, and Nuclides; Conversion of Units; Abbreviations and Acronyms; and References. There are also a list of the Greek alphabet, an index of symbols, a subject index, notes, pressure conversion factors, and energy conversion factors.

**Organic Materials for Non-Linear Optics III.** Edited by G. J. Ashwell (University of Cranfield) and D. Bloor (University of Durham). Royal Society of Chemistry: Cambridge, U.K. 1993. xii + 362 pp. £59.50. ISBN 0-85186-625-5.

This book was developed from the proceedings of the Third International Symposium on Organic Materials for Non-linear Optics organized by the Applied Solid State Chemistry Group of the Dalton Division of the Royal Society of Chemistry held on 19–21 August 1992 in Oxford, U.K. After a preface by the editors, there are 51 chapters written by chemists, materials scientists, physicists, and theoreticians covering second-order and third-order effects. There are an author index and a subject index.

**Modern Analytical Chemistry: Computer Enhanced Analytical Spectroscopy. Volume 4.** Edited by Charles L. Wilkins (University of California, Riverside). Plenum Press: New York. 1993. xviii + 308 pp. \$89.50. ISBN 0-306-44456-9.

This book was developed from the Fourth Symposium on Computer-Enhanced Analytical Spectroscopy held on 17–19 June 1992 in Salt Lake City. After a preface by the editor, there are 12 chapters, contributed by experts on analytical spectroscopy and chemometrics, covering the topics ranging from nuclear magnetic resonance to mass spectrometry and optical spectroscopy, with emphasis on computer-assisted interpretation methodologies. There is a subject index.

**Handbook of Natural Products Data. Volume 2. Pentacyclic Triterpenoids.** By Viqar Uddin Ahmad and Atta-ur-Rahman (University of Karachi). Elsevier: Amsterdam, The Netherlands. 1994. x + 1556 pp. \$685.75. ISBN 0-444-88200-6.

This book is the second in the continuing series on spectral data of natural products containing data of about 1500 pentacyclic triterpenes. After a forward by the editors, there are spectral data and other physical characteristics on the pentacyclic triterpenes, most of which are derived from plant sources. There are also compound, molecular formula, molecular weight, compound-type, plant source, and numbering system indexes.

**Topics in Stereochemistry. Volume 21.** Edited by E. L. Eliel (University of North Carolina) and S. H. Wilen (City College, City University of New York). J. Wiley and Sons: New York. 1994. xiv + 534 pp. \$135.00. ISBN 0-471-52120-5.

This book is the 21st in an ongoing series compiling the new stereochemical developments found in standard monographs as well as others published more recently. After an introduction to the series and a preface by the editors, there are the following five chapters written by experts in the field: Stereochemistry and Mechanism of the Wittig Reaction by E. Vedejs and M. J. Peterson; Anomeric Effect—Origin and Consequences by Piotr R. Graczyk and Marian Mikolajczyk; Unusual Saturated Hydrocarbons—Interaction Between Theoretical and Synthetic Chemistry by Helena Dodziuk; Stereochemistry of Metabolic Reactions of Amino Acids by Douglas W. Young; and Searching Techniques for Databases of Three-Dimensional Chemical Structures by Mark G. Bures, Yvonne C. Martin, and Peter Willett. There are a cumulative title index (Volumes 1–21) and a subject index.

**Progress in Inorganic Chemistry. Volume 41.** Edited by Kenneth D. Karlin (The John Hopkins University). John Wiley and Sons: New York. 1994. x + 848 pp. \$125.00. ISBN 0-471-59699-x.

This book is Volume 41 in the ongoing series covering current articles in the area of organometallic, solid state, and bioorganic chemistries. After a preface by the editor, there are nine chapters with the following headings: X-ray Crystallography—A Fast, First-Resort Analytical Tool by Hakon Hope; Principles and Applications of Semiconductor Photoelectrochemistry by Ming X. Tan, Paul E. Laibinis, Sonbinh T. Nguyen, Janet M. Kesselman, Colby E. Stanton, and Nathan S. Lewis; Chemical Vapor Deposition of Metal-Containing Thin-Film Materials from Organometallic Compounds by James T. Spencer; Construction of Small Polynuclear Complexes with Trifunctional Phosphine-Based Ligands as Backbones by Alan L. Balch; The Chemistry of Transition Metal Complexes Containing Catechol and Semiquinone Ligands by Cortlandt G. Pierpont and Christopher W. Lange; Macrocyclic Polyamine Zinc(II) Complexes as Advanced Models for Enzymes by Eiichi Kimura; The Chemistry of Nickel-Containing Enzymes by Andrew F. Kolodziej; The Chemistry of Peroxonitrites by John O. Edwards and Robert C. Plumb;

and Metal Chalcogenide Cluster Chemistry by Ian Dance and Keith Fisher. There are a subject index and a cumulative index of Volumes 1-41.

**Advances in Enzymology. Volume 68.** Edited by Alton Meister (Cornell University). J. Wiley and Sons: New York. 1994. viii + 238 pp. \$113.00. ISBN 0-471-31071-9.

This book is Volume 68 in an ongoing series which publishes reviews on enzymology and related areas of molecular biology. There are four chapters with the following titles: Protein Tyrosine Phosphatases—Mechanism of Catalysis and Substrate Specificity by Zhong-Yin Zhang and Jack E. Dixon; Heterologous Expression of Mammalian P450 Enzymes by Michael R. Waterman; Aspartate Transcarbamylase from *Escherichia Coli*—Activity and Regulation by William N. Lipscomb; Structure and Mechanism of Bovine Lens Leucine Aminopeptidase by Hidong Kim and William N. Lipscomb. There are author and subject indexes.

**Polyurethanes: Chemistry, Technology, and Applications.** Zygmunt Wirpsza (Translation editor: T. J. Kemp). Ellis Horwood Publishers: New York. 1993. xv + 517 pp. \$94.00. ISBN 0136831869.

Those who are interested in understanding the commercial market for polyurethanes or the properties of variously constituted polyurethane composites will find much of interest in this text. Only about 50 pages, however, are devoted to chemical synthesis or the reactions of polyurethanes or their precursors, with a chapter on Basic Polyurethane Intermediates providing an overview listing of isocyanates that have been used as commercial intermediates. This treatment could be criticized pedagogically for assuming knowledge of what is being described in the chapter (the authors, for example, never give the structure of the most common commercial isocyanate, toluene diisocyanate, and merely refer to it by an abbreviation, and one must search hard to find a chemical structure of a polyisocyanate), but a practicing chemist can easily follow the synthetic methods outlined for preparation and polymerization of isocyanates and can speculate reasonably on the mechanisms involved in the catalytic polymerizations described. Although there are a few structural errors, e.g., omission of unsaturation in phenyl substituents, these do not significantly detract from the readability of the chemistry sections.

Of more significance to the quality of the text is the fact that this book is a translation of a Polish work published originally in 1991 and, as such, contains relatively few references after the mid-80s. The references in several chapters, moreover, cite patents only by their country of issue and number, omitting authorship of the patent and the year in which the patent was issued. Some of the chapters also emphasize the Polish and Eastern European literature to the exclusion of other work. For example, Chapter 12 on Polycondensation Polyurethanes lists only one reference, from 1984, that could reasonably be expected to be available in a typical North American, European, or Asian library.

Even with these misgivings, however, the book does provide a thorough introduction to the properties of polyurethanes and will be of value,

particularly to chemical engineers who seek to employ polyurethanes in specific applications. The translation is a very good one, having produced clear-flowing and colloquial English. As one volume of a series on polymers from Ellis Horwood, PTR, Prentice-Hall, this book does provide a valuable repository for the properties of polyurethanes and urethane composites.

Marye Anne Fox, *University of Texas at Austin*

**Modern Nonlinear Optics, Part 3. Volume LXXXV. Advances in Chemical Physics.** Edited by Myron Evans (University of North Carolina) and Stanislaw Kielich (Adam Mickiewicz University). Wiley Interscience: New York. 1994. xiv + 824 pp. \$195.00. ISBN 0-471-30499-9.

This book spans a broad range of topics that include applications of nonlinear-optical techniques to the study of materials; how nonlinear optics can be used to understand fundamental questions about interactions between light and matter; and how statistics and quantum mechanics effects light, matter, and its interactions. While such a volume cannot cover all important subject areas in nonlinear optics, the editors have assembled contributions from many distinguished researchers who have each made a significant impact on the specific areas that they represent.

In any book whose chapters are authored by many individuals, it is difficult, if not impossible, to gauge its overall effectiveness in meeting its objectives. While this volume generally deals with topics that would be considered related to chemical physics, a minority of the chapters concentrate on nonlinear optics with little emphasis on how a material medium would affect the observed nonlinear-optical response. Such information, however, would be of use to chemical physicists who wish to gain a deeper understanding of the available experimental tools. In this regard, such chapters provide a useful, albeit less central, role.

As with the subject matter, the quality and style of the individual chapters is also, to some extent, variable. Some chapters appear to be a patchwork of the authors' own published papers while other chapters present the material with historical perspective and pedagogical clarity. As a whole, the authors do a good job of presenting the essentials of their topics while relegating details to the references. The referencing is also somewhat variable. Most chapters provide a rich mixture of current references while others are minimal and somewhat dated. A short list of references, however, is by no means a sign of inadequacy. The chapter on Hyper-Raleigh Scattering is a case in point. The authors have resurrected an older technique to study new and interesting problems. Because they are the leaders in this field and the subject of their work is relatively new, the existing literature base is small. There is no doubt that this technique will grow in popularity because of its ability to characterize new classes of molecules.

To summarize, this volume presents many interesting topics that include femtosecond dynamics; critical phenomena and light squeezing; bistability and chaos; and Raman, circular dichroism, four wave mixing, hyper-Rayleigh scattering, and other techniques. Both experiments and theory are treated. Generally, the research areas encompassed by this volume would be of interest to all chemical physicists who use light to study materials, and the presentation is more than adequate to bring researchers up to speed. The areas covered are interesting, and many chapters have implications in both basic science and applications.

Mark G. Kuzyk, *Washington State University*