

## Computer Software Reviews

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**Get-a-Ref. Version 4.2.** DatAid, Inc., P.O. Box 8865, Madison, WI. List price \$250. Graduate student price \$100.

Get-a-Ref is a reference handling program for IBM PC/XT/AT/PS and compatible computers. Get-a-Ref is RAM-resident. The program is designed to be used either alone or within word processing programs including Word Perfect 4.0–5.1, Microsoft Word, FrameWork II, Wordstar, DisplayWrite 3 and WordMarc (or any other program that operates in a text mode). Get-a-Ref is loaded before the word processing program and then activated using ALT-R. The program allows searches of the reference database and can be used to insert information from the database directly into a word processing document in a user defined format. Separate programs are included for sorting of references, defining reference formats, and converting screen dumps from electronic databases such as Chemical Abstracts, BIOSIS, IRIS and MedLine directly into Get-a-Ref records.

The memory resident program occupies 107 kB of RAM and can be unloaded during use of a word processing program, if desired. Files can

be as large as 2000 MB or 32 000 references. Individual reference records can be as large as 16 000 characters or 255 lines. The program can be used with either a two floppy drive system or a hard disk. Certainly use of a hard disk is preferable.

Get-a-Ref effectively performs the functions it claims are provided. The program is easy to learn based on pull down menus, although users must consult the manual initially. On-line context sensitive help is usually not available, although a one-sentence help line is displayed on the bottom of the screen for the currently active menu item. Most functions become quite intuitive after using the program for a short time. The software is specifically designed to be used as a scientific reference manager and performs this job well. It is not as well suited to other jobs as other text database programs such as Notebook II. The ability of Get-a-Ref to work as a RAM resident program accessed in a word processing program is very convenient. Although Get-a-Ref searches entire records rather than keywords, its selection capabilities are rapid.

John W. Olesik, *University of North Carolina at Chapel Hill*

## Book Reviews\*

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**Advances in Physical Organic Chemistry, Volume 25.** Edited by D. Bethell (University of Liverpool). Academic: London and San Diego. 1989. ix + 474 pp. \$120.00. ISBN 0-12-033525-5.

This volume is the 25th in the series which started in 1963. Each volume has presented three or four reviews of topics in the field, and this volume continues that tradition with three substantial reviews. The first review, by U. Berg and J. Sandstrom, which runs to about 100 pages, one-fifth of the volume, is titled Static and Dynamic Stereochemistry of Alkyl and Analogous Groups and is confined to orientations with respect to single bonds. After a short general discussion of intra- and intermolecular interactions, the methods of study are reviewed. Since about a dozen methods are covered, each is given only a very brief coverage. The major part of the review is made up of a discussion of the conformations about  $sp^3-sp^3$  bonds and  $sp^3-sp^2$  bonds in a selected variety of different molecules. This is a highly condensed review with a large amount of material covered in a small number of words. More than 450 references are quoted up to 1987.

The second review, by G. R. J. Thatcher and R. Kluger, on the Mechanism and Catalysis of Nucleophilic Substitution in Phosphate Esters covers more than 250 pages and constitutes half of the volume. The authors begin by tackling the problem of the name of the reaction which they are writing about, having astutely dodged the question in the title. They conclude that the reaction is "a nominal transfer of monomeric metaphosphate" or more correctly "a metaphosphatylation process". However, they admit that people will continue to refer to them as phosphate transfers or phosphorylations. The major part of this review is centered on a comprehensive account of the addition-elimination mechanisms with short sections on the dissociative mechanisms, the biological mechanisms, and the special catalysis of phosphate-ester hydrolysis. The material, based on more than 300 references through 1987 with two or three from 1988, is presented in a clear and logical sequence.

The final review is by M. Ballester, titled Perchloro-organic Chemistry: Structure and Reaction Pathways. The review is presented as "the results of variable physical organic significance reached by the author and his numerous coworkers in this domain". Indeed, over one-third of the more than 200 references are citations of the author's work. However, this is not a criticism of the review, which is enhanced by the authority of the author. The review begins with a very brief section on the perchlorination process by the reagent BMC, which is presumed to react via the chlorinating species  $SCl_3^+$ . The reader is left to deduce the origin of the BMC nomenclature of this reagent which was discovered by Ballester and Molinet in 1954. The body of the review covers nucleophilic attack, thermal and photochemical reactions, and electrophilic alkylation of chlorocarbons, followed by sections on perchloro compounds containing oxygen functions, triple bonds and nitrogen groups. It concludes with sections on perchlorinated organic radicals and the spec-

troscopy of chlorocarbons. The review is well written and the material is clearly presented.

Overall, these three reviews maintain the high standards established by this series. Its stated aim "to bring before a wide readership among the chemical community substantial, authoritative and considered reviews" is fully met in this 25th volume. Although a personal subscription to this series is only for the independently wealthy chemist, no chemical library can be without *Advances in Physical Organic Chemistry* on its shelves.

K. T. Leffek, *Dalhousie University*

**New Fluorinating Agents in Organic Synthesis.** Edited by L. German and S. Zemskov (Institute of Organoelement Compounds and Institute of Inorganic Chemistry). Springer-Verlag: New York and Berlin. 1989. 283 pp. \$145.00. ISBN 0-387-51160-1.

This monograph, an English version of the Russian book published in 1987, is a review of seven selected types of reagents suitable for laboratory preparations of organic fluoro compounds. The chapters Xenon Difluoride (34 pages, 136 references), Some "Electrophilic" Fluorination Agents (34 pages, 105 references), and Hypofluorites and their Applications in Organic Synthesis (48 pages, 239 references) discuss introduction of fluorine by addition and substitution reactions that occur using fluorides with fluorine bonded to xenon, oxygen, or nitrogen. These three chapters are especially welcomed because the topics discussed therein have not been reviewed in readily available journals.

The chapter Higher Fluorides of Group V and VI Elements (23 pages, 94 references) concentrates mainly on fluorides of pentavalent phosphorus, arsenic, antimony, vanadium, and others and on hexafluorides of molybdenum, tungsten, and uranium. The chapter Halogen Fluorides in Organic Synthesis (56 pages, 166 references) describes the use of fluorides of chlorine, bromine, and iodine, either as such or prepared in situ.

The two last chapters, New Uses of Sulfur Tetrafluoride in Organic Synthesis (57 pages, 133 references) and Fluorinations of Organic Compounds with Fluorosulfuranes (17 pages, 117 references) deal with replacement by fluorine of halogen, and of oxygen in hydroxy compounds, oxo compound, and carboxylic acids.

A common feature of the seven reviews is a brief description of the syntheses of the fluorinating agents, their reactions with organic compounds, and exemplification of the applications in the form of abridged experimental procedures (the total of 47). The procedures are lacking in the chapter on sulfur tetrafluoride; enough of them are in the reviews in *Organic Reactions* (Vol. 21, p 1; 34, 319).

The inclusion of the procedures makes the book especially useful to an experienced bench chemist who often does not need to see the original literature for carrying out the fluorinations. It would have been helpful to print the procedures in italics to distinguish them from the text. The

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

quality of the book would have been further enhanced if an author index had been provided.

As it easily happens in monographs with hundreds of references (990 altogether), a few errors slipped in. In some of the references, the names and initials are misspelled, e.g., in refs 52 and 53 on page 32, ref 35 on page 66; ref 196 on page 116; ref 6 on page 192; refs 17 and 18 on page 250; ref 53 on page 269, etc. What is worse is when the references quoted in the text do not coincide with those in the lists of references. Such is the case on page 222. On the second line of the first paragraph, references [90–92] should have been [76–78]; both schemes on the same page are taken from the reference [78].

Such minor deficiencies notwithstanding, this book is very useful and should have a place on the shelf of any fluorine bench chemist who can afford its high price.

Miloš Hudlický, *Virginia Polytechnic Institute and State University*

**The Fractal Approach to Heterogeneous Chemistry: Surfaces, Colloids, Polymers.** Edited by David Avnir (Hebrew University of Jerusalem). John Wiley & Sons: New York and Chichester. 1989. xvii + 471 pp. \$109.00. ISBN 0471-91723-0.

The main purpose of this book as stated by the editor is to provide chemists with an overview of how the concepts of fractal geometry can be applied to a variety of topics in heterogeneous chemistry. The resulting volume consists of a collection of refereed articles which have also been properly edited to form a rather uniform and coherent exposition of a rapidly expanding field of which every practicing chemist should at least be aware. It may even entice a number of individuals in the discipline of heterogeneous chemistry to join the fray and excitement in the further development of this area.

The book begins with a sketch of background information by the father of the field, Benoit B. Mandelbrot, and with a very easy introduction to the basic concepts by P. Pfeifer and M. Obert. Novices who desire to become familiar with the field of fractals could scarcely do better than to give this particular chapter their thorough scrutiny.

The remainder of the book is devoted to a large variety of diverse applications. Several topics, namely scattering as a tool for determining fractal dimensions, diffusion via percolation through fractal spaces, molecular diffusion and chemical reactions, and multilayer gas absorption on porous surfaces of fractal dimensions are presented on a quantitative basis of varying degrees of complexity. For the above chapters in this assortment some background reading is required. The remainder of the book is written at a rather qualitative level which provides more of a survey than an in-depth treatment of topics dealing with growth of fractals, polymers, particle aggregation, corrosion, caves, dissolution of porous media, surface roughness, irreversibility of electrodes, and several miscellaneous topics. Altogether, the book serves as a very useful survey to the field. It is highly recommended to anyone who desires to become familiar with the basic concepts and applications of fractals.

J. M. Honig, *Purdue University*

**Time-Resolved Spectroscopy. Advances in Spectroscopy, Volume 18.** Edited by R. J. H. Clark (University College London) and R. E. Hester (University of York). John Wiley: New York and Chichester. 1989. xxi + 406 pp. \$207.00. ISBN 0-471-92293-5.

This book is a diverse collection of chapters covering recent developments in spectroscopy and chemical dynamics. Methodologies span 9 orders of magnitude in time resolution, from femtosecond pulsed-laser methods to microsecond FTIR spectroscopy. An equally eclectic range of chemical systems is reviewed, from rotational-state dephasing of small molecules in the gas phase to time-resolved vibrational spectroscopy of bacterial reaction centers. The chapters are uniformly up-to-date and clearly written, to the credit of the authors and editors. For chemists casually interested in the field, the book is a readable collection; for those who are active in one of the many areas covered, the reviews provide valuable surveys of the recent literature. The following is a brief summary of the nine chapters.

The first chapter, by R. J. D. Miller, is an overview of a new field, picosecond-phase grating spectroscopy, used to study nonradiative relaxation in condensed phase. The chapter emphasizes thermal-phase gratings that arise from changes in density of the sample upon relaxation of optically excited states. The dynamics of the grating formation process are outlined in detail so that the acoustic limits on time resolution can be modeled and controlled. Recent applications of the method to study weak optical absorption in liquids, including excited-state transitions, picosecond protein dynamics, and carrier relaxation at semiconductor/liquid interfaces, are described.

L. D. Ziegler and colleagues have contributed an interesting chapter on rotational resonance Raman spectroscopy of small molecules which

photodissociate or predissociate in the gas phase. Here, a high-resolution, frequency-domain measurement of rotational line widths in resonance Raman spectra is related to the quantum-specific, sub-picosecond dynamics of energy redistribution of the electronically excited species. The chapter presents a comprehensive theoretical treatment of the problem, and detailed examples of the dissociation dynamics of ammonia and methyl iodide.

Another clever approach to accessing sub-picosecond dynamics without the need for femtosecond laser pulses is described by T. Kobayashi and co-workers, who measure vibrational dephasing and orientational relaxation in liquids by degenerate four-wave mixing of temporally incoherent radiation. The authors present the theory of four-wave scattering from a nonresonant medium having a dynamic, nonlinear susceptibility. They used a density-matrix, autocorrelation approach which allows sub-picosecond processes to be probed with broadband, nanosecond dye laser pulses. Example studies of vibrational dephasing in DMSO and optical Kerr relaxation in CS<sub>2</sub> and nitrobenzene are presented.

Three chapters cover traditional means of obtaining vibrational spectra of transient species on a microsecond to millisecond time scale. G. N. R. Tripathi describes the use of time-resolved resonance Raman spectroscopy to acquire spectra of radical intermediates generated by pulsed radiolysis and pulsed-laser photolysis. J. J. Sloan and E. J. Kruus review two approaches to obtaining chemical kinetics by FTIR methods, step-and-sample techniques, and continuous scanning methods. The time response of both techniques can be microseconds; applications to gas-phase reactions and polymer deformation kinetics are described. Bruno Robert and co-workers review the vibrational spectroscopy of photosynthetic transients in bacterial reaction centers by transient and steady-state resonance Raman and FTIR difference spectroscopies.

The structure and kinetics of excited electronic states can be probed on a picosecond time scale using coherent anti-Stokes Raman spectroscopy (CARS) or its Stokes analogue (CSRS), as described by V. F. Kamalov and colleagues. Important theoretical details are covered in this chapter, including the phase relations between the nonresonant and resonant susceptibilities leading to polarization suppression of nonresonant background and an analysis of bandshapes. Applications of the method include the study of photoisomerization of stilbene and the excited triplet chemistry of porphyrins. A simpler approach to acquiring vibrational spectra of excited states on a sub-picosecond time scale is spontaneous resonance Raman scattering, as reviewed in a chapter by J. W. Petrich and J. L. Martin. Their review focuses on the use of resonance Raman spectroscopy to study the structure and kinetics of heme protein excited states and photoproducts.

The volume ends with an outstanding chapter written by C. V. Shank, which outlines the development of femtosecond optical spectroscopy. The chapter begins with a description of the mode-locking and compression methods for generating subpicosecond optical pulses. This technology has produced new experiments in chemical dynamics, including the observation of spectral hole burning within excited electronic states of molecules in liquids; the subsequent dynamics of dephasing, energy relaxation, or photoisomerization of the initial state can be monitored with femtosecond resolution. Other novel experiments are described, including impulse-stimulated Raman spectroscopy for measuring librational dynamics in liquids and luminescence up-conversion methods to observe carrier relaxation in semiconductors on a sub-picosecond time scale.

Joel M. Harris, *University of Utah*

**Chemistry and Physics of Carbon. Volume 22.** Edited by P. A. Thrower (Pennsylvania State University). Marcel Dekker: New York and Basel. 1989. xii + 247 pp. \$135.00. ISBN 0-8247-8113-9.

This volume contains three separate chapters, each written by a long-standing authority on the respective subject.

The volume begins with the longest chapter (143 pages) on High-Resolution TEM Studies of Carbonization and Graphitization, by Dr. Agnes Oberlin of Laboratoire Marcel Mathieu, CNRS-Université, Pau, France. This chapter covers the characterization of TEM of a wide spectrum of industrial carbons ranging from the traditional carbon blacks, electrodes, to the more modern carbon fibers. Different stages during the formation of these materials are also discussed. The author defines "basic structural unit" (BSU) as the building block for all forms of carbon materials. The BSU is a small crystallite of less than 10–20 polynuclear aromatic rings in each layer and 2–4 layers thick. She illustrates how all microtextures in industrial carbons derive from two basic arrangements of the BSU's: spherical and cylindrical. Examples for these two arrangements are, respectively, carbon blacks and carbon fibers. An excellent account is given on the principles of techniques (and precautions) for imaging the microstructures by TEM, including dark field, selected-area electron diffraction, and tilt stage. The objective of this research, as described by the author, is to quantify the relationship between microtexture and physicochemical properties of the carbon, and

possibly to predict the latter. Excellent progress has indeed been made toward this objective. This chapter is not only a must reading for those who deal with industrial carbon materials, but will be useful for those who use TEM for high-resolution imaging of carbon as well as other materials.

The second chapter, Mechanisms and Physical Properties of Carbon Catalysts for Flue Gas Cleaning, is a German contribution by Drs. Harald Jüntgen and Helmut Köhl of Bergbau-Forschung GmbH. It addresses the interesting subject of carbon as a catalyst. More specifically, rate data from the authors' laboratory on the selective catalytic reduction (SCR) of NO by NH<sub>3</sub> (in the presence of O<sub>2</sub>) and the SO<sub>2</sub> + O<sub>2</sub> reactions are given. The SCR reaction is of increasing interest in catalysis, which is being commercially performed at 300–400 °C on V<sub>2</sub>O<sub>5</sub>/TiO<sub>2</sub>. To prevent oxidation of carbon, the temperature of the SCR reaction on carbon catalyst is limited to 120 °C. This process cannot be commercialized because (1) the rate is low and (2) a sulfate is simultaneously formed on the carbon surface which must be removed at a higher temperature. The mechanism is not understood for either reactions on carbon as the catalyst. However, by using different carbons, the catalytic activity has been correlated with the active surface area (ASA), determined by chemisorption of oxygen at 300 °C. The ASA was first defined by P. L. Walker, Jr., and co-workers for correlating reactivities in gas-carbon reactions. The ASA consists of, for graphite, the edge sites of graphite which are unsaturated carbon atoms with a free sp<sup>2</sup> electron. Upon comparison of the rate data on the SCR reaction for the two catalysts (carbon and V<sub>2</sub>O<sub>5</sub>/TiO<sub>2</sub>) at the same temperature of 100 °C (from data on carbon given in this chapter and data on V<sub>2</sub>O<sub>5</sub>/TiO<sub>2</sub> given in the catalysis literature), it is seen that their activities are actually of the same order of magnitude. The mechanism of the SCR reaction on carbon should continue to be of scientific interest.

The third chapter, Theory of Gas Adsorption on Structurally Heterogeneous Solids and Its Application for Characterizing Activated Carbon, is written by Dr. M. Jaroniec of M. Curie-Skłodowska University and Dr. J. Choma of Military Technical Academy, both of Poland. This is an excellent review of the theories on adsorption in micropores and mesopores, which together account for the majority of the adsorption capacities of important sorbents. Two types of heterogeneity are associated with these pores: energetic heterogeneity and structural heterogeneity. The former is caused by a distribution of the adsorption energy. The latter derives from the size distribution of the micropores. The content of the chapter is actually broader than that indicated by the title. Both types of heterogeneity, as well as theories on adsorption in homogeneous micropores, are covered. This is one of the most comprehensive (and readable) reviews of the theories on adsorption in micropores. The theories are equally applicable to sorbents other than activated carbon.

Ralph T. Yang, State University of New York at Buffalo

**Practical Raman Spectroscopy.** Edited by D. J. Gardner (Newcastle upon Tyne Polytechnic) and P. R. Graves (U.K. Atomic Energy Authority). Springer-Verlag: New York and Berlin. 1989. iv + 157 pp. \$39.50. ISBN 0-387-50254-8.

*Practical Raman Spectroscopy* is a short, edited book composed of six chapters by D. J. Gardner (1), G. Turrell (2), D. L. Gerrard and H. J. Bowley (3), P. R. Graves (4), D. J. Gardner (5), and J. D. Loudon (6). Suggestions for further reading, Chapter 7, are listed by subject, pages 153 and 154. A short index appears on pages 155–157.

A surprising omission for further reading in Chapter 7 is *Laboratory Raman Spectroscopy*, by D. P. Strommen and K. Nakamoto (Wiley-Interscience: New York, 1986), because it would almost seem to constitute a prologue for the Gardner and Graves book.

Chapter 1 constitutes a very short introduction in which some highlights of Raman spectroscopy are reviewed. It includes, in part, a classical derivation of the Raman effect, polarizability tensors, and resonance Raman scattering.

Chapter 2 is the longest (and possibly the best) chapter in the book, pages 13–54. This chapter covers a wide range of subjects, both theoretical and experimental. The discussion of polarizability tensors is carried out in a nice way, and Table 2.2, Raman-Active Vibrational Symmetries and Raman Tensors for the Crystal Classes, is very useful.

Unfortunately, neither Chapter 1 nor Chapter 2 mentions the fact that phonons obey Bose-Einstein statistics. That is, measured Raman intensities,  $I(w)$ , must be multiplied by  $1 - \exp(-hcw/kT)$ , where  $w$  is the Raman shift in cm<sup>-1</sup>, to correct for thermal effects. This seems to constitute an important oversight in view of the low- and high-temperature techniques discussed in following chapters.

Chapters 3–6 deal with instrumental and experimental details as follows: Instrumentation for Raman Spectroscopy (3), Calibration and Data Handling (4), Nonstandard Physical and Chemical Environments (5), and Raman Microscopy (6). Each of these chapters contains important material, but this material is highly specialized, and is primarily

useful only if a specific detail is of immediate interest to the reader. Further, although several important techniques are described in Chapter 5, good research almost always involves unusual "physical or chemical environments", by definition, and thus any choice of a few "nonstandard" conditions cannot satisfy many research demands. In addition, detailed descriptions of experimental apparatus and techniques tend to become dated rather quickly.

In summary, this is a useful book for beginners in Raman spectroscopy, but an experienced Raman spectroscopist might also find the book useful for obtaining information on specific instrumentation, or techniques, of immediate interest. The printing is excellent—all equations and symbols are unusually clear—and the figures are thoughtful and uniformly informative. On the other hand, although *Practical Raman Spectroscopy* contains material which *Laboratory Raman Spectroscopy* does not contain, the selection of chapters, although logical, seems to be less coherent, and much material that could have been included comes to mind. However, the two books, together, make a nice set, which I recommend, and which I am pleased to own.

George E. Walrafen, Howard University

### Volumes of Proceedings

**Mechanisms of Reactions of Organometallic Compounds with Surfaces. NATO ASI Series B: Physics Volume 198.** Edited by D. J. Cole-Hamilton (University of St. Andrews) and J. O. Williams (University of Manchester). Plenum: New York and London. 1989. xiii + 299 pp. \$72.50. ISBN 0-306-43205-6.

A large number of papers, most of which appear to be reports of original research, were given at a NATO Advanced Research Workshop held in Scotland in 1988 and are reproduced in typescript form in this volume. They are grouped under five headings: Metallisation and Related Reactions, Techniques for Studying Silicon Deposition, Growth of Semi-Conductors by Gas Phase MOVPE, Photochemical MOVPE Growth of Compound Semi-Conductors, and Alternative Growth Techniques to Atmospheric Pressure MOVPE. There is a good subject index.

**Biologically Active Molecules. Identification, Characterization and Synthesis.** Edited by Urs Peter Schlunegger (University of Bern). Springer-Verlag: New York and Berlin. 1989. viii + 282 pp. \$76.20. ISBN 0-387-50919-4.

A seminar with the title From Biological Activity to Structure, held in Switzerland in 1988, consisted of 11 papers, which appear in typescript form in this volume. Four of the papers are substantial reviews, ranging in length from 8 to 56 pages. There is no index.

**Drugs, Systemic Diseases, and the Kidney. Advances in Experimental Medicine and Biology Volume 252.** Edited by Albert Amerio (University of Bari), Pasquale Coratelli (University of Bari), Vito M. Campese (University of Southern California), and Shaul G. Massry (University of Southern California). Plenum: New York and London. 1989. xii + 405 pp. \$89.50. ISBN 0-306-43219-6.

The Third Bari Seminars in Nephrology, held in 1988, generated this collection of typescript papers. A substantial number of them have a chemical, biochemical, or pharmaceutical connection, especially with respect to nephrotoxicology and medicinal agents. There is a substantial index.

**Silicon-Based Polymer Science. A Comprehensive Resource. Advances in Chemistry Series 224.** Edited by John M. Zeigler (Sandia National Laboratories) and F. W. Gordon Fearon (Dow Corning, Japan, Ltd.). American Chemical Society: Washington, DC. 1989. xxii + 801 pp. \$129.95. ISBN 0-8412-1546-4.

An International Topical Workshop held in Hawaii in 1987 was the source of the 42 papers that make up this volume. They are mostly reports of original research, complete with abstract and experimental detail. Two, however, are extensive reviews of fundamentals: Organosilicon Chemistry: A Brief Overview (T. J. Barton and P. Boudjouk) and Silicon-Containing Polymers (J. E. Mark). All are set in type. A charming 6-page introduction, which serves as a sort of foreword, My Favorite Element, by E. G. Rochow, is included in the forepages. The index is thorough.

**Radiation Curing of Polymeric Materials. ACS Symposium Series 417.** Edited by Charles E. Hoyle (University of Southern Mississippi) and James F. Kinstle (James River Corporation). American Chemical Society: Washington, DC. 1989. xiv + 567 pp. \$99.95. ISBN 0-8412-1730-0.

This volume consists of 36 papers reproduced from typescript, and indexes of authors, affiliation, and subjects, derived from an ACS symposium held in Dallas in 1989. The papers are generally reports of original research, and include information on experimental methods as well as an abstract. They are arranged in seven groups: Photoinitiators, Novel Radiation Photocurable Systems, Properties of Radiation-Cured

Materials, Photodegradation of Radiation-Cured Films, Radiation Curing of Cationic Polymerization, Laser-Initiated Polymerization, and High-Energy Radiation Curing.

**The Hydrogen Atom.** Edited by G. F. Bassani (Scuola Normale Superiore), M. Inguscio (Università di Napoli), and T. W. Hänsch (Max-Planck-Institut für Quantenoptik). Springer-Verlag: New York and Berlin. 1989. xi + 353 pp. \$56.00. ISBN 0-387-50579-2.

This volume of 33 typescript papers arises from a symposium held in Pisa, apparently in 1988. They are grouped under four headings: Precision Spectroscopy of Hydrogen: Fundamental Physics and Universal Constants; Positronium, Muonium, and Other Hydrogen-Like Systems; Quantum Electrodynamics and Beyond; and Hydrogen in Strong Fields and Chaos. Both experimental and theoretical aspects are included. There is a photograph of the participants standing on a medieval flight of stairs, and an index of contributors, but unfortunately, no subject index.

**Organic Materials for Non-Linear Optics.** Edited by R. A. Hann (ICI Electronics) and D. Bloor (Queen Mary College). Royal Society of Chemistry: London. 1989. xiv + 423 pp. \$90.00. ISBN 0-85186-806-1.

This collection of 46 typescript papers from a conference organized by the Applied Solid State Chemistry Group of the Dalton Division of the Royal Society of Chemistry in 1988 is divided into eight sections: Theory of Non-Linear Properties, Crystals and Crystal Structure, Characterization of Non-Linear Optical Properties, Small Organic Molecules, Organometallics, Polymers, Monolayers and Langmuir-Blodgett Films, and Devices. Regrettably, there is no index.

**The Enzyme Catalysis Process. Energetics, Mechanism, and Dynamics.** NATO ASI Series A: Life Sciences Volume 178. Edited by Alan Cooper (Glasgow University), Julien L. Houben, and Lisa C. Chien (Consiglio Nazionale delle Ricerche). Plenum: New York and London. 1989. ix + 493 pp. \$110.00. ISBN 0-306-43331-1.

Thirty papers (including two introductory lectures), all in typescript form, make up this volume of proceedings of a NATO Advanced Study Institute held in Italy in 1988. The papers are divided into two sections: Protein Structure, Spectroscopy, and Dynamics, and Reactivity and Catalysis. A list of poster presentations and a subject index are included.

**Enzymes Hydrolysing Organophosphorus Compounds.** Edited by Elsa Reiner (University of Zagreb), W. Norman Aldridge (University of Surrey), and Francis C. G. Hoskin (Illinois Institute of Technology). John Wiley & Sons: New York and Chichester. 1989. x + 266 pp. ISBN 0-470-21447-3.

The 27 typescript papers in this volume, called "chapters", came from the International Meeting on Esterases Hydrolysing Organophosphorus Compounds, held in Dubrovnik in 1988. A list of poster presentations and very short subject index are included. The purpose of the meeting was "to examine...biological functions, toxicological impact, differences among species, and recent advances in purification".

**Zeolites: Facts, Figures, Future. Studies in Surface Science and Catalysis 49. Parts A and B.** Edited by P. A. Jacobs (Katholieke Universiteit) and R. A. van Santen (Eindhoven University of Technology). Elsevier: Amsterdam and New York. 1989. xx + 1466 pp. (2 vols.). \$302.75. ISBN 0-444-87466-6.

The 8th International Zeolite Conference was held in Amsterdam in 1989. Five plenary lectures and a large number of research papers make up this volume, reproduced from typescripts. The papers are grouped under eight headings: Synthesis and Modification, New Materials and Pillared Clays, Natural Zeolites and Utilization, Characterization, Structure and Theory, Adsorption and Diffusion, Metals in Zeolites, and Catalysis. A keyword index and an index of contributing authors complete the work.

**Magnetic Resonance and Related Phenomena. Studies in Physical and Theoretical Chemistry 67.** Edited by J. Stankowski, N. Piślewski, S. K. Hoffman, and S. Idziak (A. Mickiewicz University). Elsevier: Amsterdam and New York. 1989. xiii + 1050 pp. \$333.25. ISBN 0-444-98870-X.

This ponderous book contains the proceedings of the XXIVth Congress AMPERE, which was held in Poznań in 1988. The table of contents fills over 6 pages, but the papers are not grouped under headings and do not appear to be in any logical order, except for the invited papers, which are in alphabetical order of the authors' names. Since there is no subject index, finding a topic of interest is challenging! The subjects range from instrumentation through computer simulation, physical aspects of NMR and EPR, and structural investigations to biochemical applications, but the tilt is toward the physical side. The papers are set in type and well illustrated.

**Polyimides: Materials, Chemistry and Characterization.** Edited by Claudius Feger (IBM Corporation), Mahmoud M. Khojasteh (IBM Corporation), and James E. McGrath (Virginia Polytechnic Institute and State University). Elsevier: Amsterdam and New York. 1989. xii +

788 pp. \$241.50. ISBN 0-444-88241-3.

The Third International Conference on Polyimides was held in Ellenville, NY, in 1988 and hosted the large number of typescript papers collected in this volume. The quality of presentation is unfortunately diminished by the fact that the structural formulas in a number of the papers are hand-drawn with a crudeness that should never have been allowed past the Editors' desk. The papers are grouped under eight headings: New Materials, Synthesis, Curing Studies, Structure-Property Relationships, Properties, Characterization, Interfaces and Adhesion, and Application. The subjects of the papers reflect the growing importance of polyimides in electronics and aerospace industries. There is a 4.5-page subject index.

**Recent Advances in Zeolite Science. Studies in Surface Science and Catalysis 52.** Edited by J. Klinowski and P. J. Barrie (University of Cambridge). Elsevier: Amsterdam and New York. 1989. viii + 310 pp. \$151.25. ISBN 0-444-88129-8.

The British Zeolite Association met in Cambridge in 1989 and enjoyed a program of four plenary lectures and 19 submitted papers, all of which are set in type in this volume. The catalytic behavior of zeolites is a prominent theme in the program. Regrettably, there is no index.

**Biochemical Approaches to Cellular Calcium. Methodological Surveys in Biochemistry and Analysis. Volume 19.** Edited by Eric Reid (Guildford Academic Associates), G. M. W. Cook (University of Cambridge), and J. P. Luzio (Addenbrooke's Hospital). Royal Society of Chemistry: London. 1989. xvi + 495 pp. \$125.00. ISBN 0-85186-926-2.

The 11th International Subcellular Methodology Forum bore the title Study of Cellular Roles of Calcium and took place in Guildford, Surrey, in 1988. The typescript papers are arranged under five headings: Plasma Membrane;  $Ca^{2+}$  Movement; Muscle and Nerve, Cytosolic and Sequestered  $Ca^{2+}$ ; Inositol Phosphates, Secretory and Other Processes Involving  $Ca^{2+}$ ; Mitochondrial Calcium, and Cell Protection; Pathology, Including Cardiovascular. They were evidently edited with unusual care, as implied by a preface note on abbreviations and conventions used in them. A noteworthy paper is a historical survey of the subject, by A. K. Campbell, which opened the program. The indexes (author and subject) have been constructed with special care.

**Bioluminescence and Chemiluminescence: Studies and Applications in Biology and Medicine.** Edited by M. Pazzagli (Università di Firenze), E. Cadenas (University of Linköping), L. J. Kricka (University of Pennsylvania), A. Roda (University of Messina), and P. E. Stanley. John Wiley & Sons: Chichester and New York. 1989. vi + 646 pp. \$154.00. ISBN 0-471-92264-1.

This hardbound book also serves as Volume 4 of the *Journal of Bioluminescence and Chemiluminescence*, which published the proceedings of the Vth International Symposium on the same subject, held in Italy in 1988. The Table of Contents requires 6 pages to list all the papers included. The titles range from Firefly Flashes and Royal Flushes to Magic Lite Design and Development, with many less flashy topics in between. They are divided into seven sections: Dedication to Marlene DeLuca, Session in Honor of Professor W. D. McElroy, Luminescence Immunoassay, Low-Level Chemiluminescence, Phagocytosis, Genetic Engineering and Nucleic Acid Hybridization, and Bioluminescence and Chemiluminescence Applications. All are set in type, and there is a combined author and subject index.

**Archaeological Wood. Properties, Chemistry, and Preservation. Advances in Chemistry Series 225.** Edited by Roger M. Rowell (U.S. Department of Agriculture) and R. James Barbour (Forintek Canada Corporation). American Chemical Society: Washington, DC. 1990. xii + 472 pp. \$79.95. ISBN 0-8412-1623-1.

This book, dealing with the conservation of wooden remains from archaeological sites, is derived from a symposium held at the ACS National Meeting in 1988. Sixteen topical discussions or reports of original research are grouped under five headings: Properties and Chemistry, Preservation Overview, Preservation of Waterlogged Wood, Preservation of Dry Wood, and Future Research. Subjects covered include chemical and morphological changes as wood ages, radiation curing, poly(ethylene glycol) preservation, consolidation techniques, and conservation ethics. An excellent subject index is provided.

**Math/Chem/Comp 1988. Studies in Physical and Theoretical Chemistry 63.** Edited by A. Graovac (Ruder Boskovic Institute). Elsevier: Amsterdam and New York. 1989. xvi + 572 pp. \$223.75. ISBN 0-444-88009-7.

This volume is the proceedings of an International Course and Conference on the Interfaces Between Mathematics, Chemistry and Computer Sciences, held in Dubrovnik in 1988. The 41 papers are reproduced from typescripts, and include a large proportion of original research. They are grouped under seven headings: Discrete Mathematics with Applications; Enumeration in Chemistry; Mathematical Models in Pharmacology and Biology; Polyhedra, Polymers and Crystals; Statistical and Time Evolution Problems; Quantum Chemistry and Spectroscopy; and Reflections. There is an index of contributors, but a subject index is regrettably missing.