Computer Software Reviews

Assayzap, Universal Assay Calculator. Elsevier-Biosoft: 68 Hills Road, Cambridge, CB2 1LA, U.K. List Price $249.00.

Assayzap is designed for the Macintosh to deal with large assays (up to 2000 samples) and to curve fit these data. There are three curve-fitting methods: the two-parameter log-logit, the four-parameter fit; and a weighted four-parameter fit to minimize the effect of outlying points. The program will fit the data interactively as opposed to the standard mathematical approach. A first approximation to a standard curve is calculated by using one of the above methods, presented on the screen (as a continuous curve) and stored as a set of 42 straight line sections. A set of tools is provided that allows the user to move the curve around, smooth, or compare to previous curves. Assayzap recognizes four general curve types: standard curve where response decreases with increasing analyte, standard curve where response increases with analyte, curves with an extended dynamic range and positive slope, and linear curves with positive slope. Accuracy is claimed to be good (~0.5%) and reproducibility very good.

The program conforms to MacIntosh guidelines, and the disk contains a "system folder", and makes extensive use of the mouse. It is non-copy protected and is Microsoft Excell compatible. It is not the easiest software program to learn but it is user friendly. It makes good use of statistics, and the ability to move the curve around is a good feature. Although primarily designed for large amounts of data it can be used with smaller amounts of data. Obviously, its main use will be for large assays, but it may be used by the chemist who prefers this approach to fitting his data as opposed to a mathematical approach.

Joseph Sneddon, *University of Lowell*

Book Reviews*

SCI-TECH: Scientific and Technical Books and Serials in Print. 1988. Three Volumes. 15th Edition. R. R. Bowker Co.: London and New York. 1988. xxvi + 4490 pp. $159.95. ISBN 0-8352-2362-9; 0-8352-2364-7; 0-8352-2365-5.

These three hard-bound volumes are indexes: Volume 1, Subjects; Volume 2, Authors; Volume 3, Titles, Vendors, Publishers, etc. They constitute an enormous work that spans a broad range of fundamental and applied science and includes books in the major languages of the areas. It can be very useful for determining sources of information, and even for fleshing out one's fragmentary recollection of a book. If only the subject (not necessarily the title) is known, or only the author, it is possible to identify a book with little effort and to find out who publishes it and how much it costs. The subtitle of the work, "An Index to Literature in Science and Technology", is apt, if one allows for the fact that it does not purport to index individual articles. Whereas the individual chemist is not likely to want a personal copy, libraries serving chemists should certainly have it immediately available. It provides a simple key to the major publications in a given field, and it can be of immense help to anyone contemplating work in a new field.

Organic Photochemistry. Volume 8. Edited by Albert Padwa (Emory University). Marcel Dekker, Inc.: New York and Basel. 1987. xi + 373 pp. $99.95. ISBN 0-8247-7702-6.

Volume 8 of this series consists of four chapters dealing specifically with the following: "Photochemical Transformations on the Primitive Earth and Other Planets", by James P. Ferris; "Photochemistry with Short UV Light", by Mark G. Steinmetz; "Matrix Isolation Photochemistry", by Robert S. Sheridan; and "The Influence of the Molecular Crystalline Environment on Organic Photorearrangements", by John R. Scheffer, Miguel Garcia-Garibay, and Omkaram Nalamasu.

The first chapter by Ferris discusses models for studying photochemical transformations occurring on primitive and, especially, prebiotic earth. The most reliable method consists of studying photochemical processes occurring in atmospheres of other planets and moons within our solar system where different levels of reducing atmospheres can be found. He outlines the photochemistry resulting from sunlight, emitting primarily in the short UV, fueling various reactions leading ultimately to the formation of small hydrocarbons.

The second chapter by Steinmetz deals primarily with solution photochemistry with short-wavelength UV irradiation, namely in the 185-nm region. He begins with a discussion of the light sources available and their emission characteristics. Product distributions from the rearrangement of acyclic alkenes upon irradiation are discussed as a function of irradiating wavelength and solvent. Similar discussions are made for cyclic alkenes, dihydropyrans, and cyclic alkanes. This section also contains a review on the more complex bichromophoric systems.

The third chapter by Sheridan focuses on IR spectroscopic analysis of intermediates trapped in an inert matrix. A good general description of the matrix isolation technique is given, elaborating its strengths as well as its weaknesses. A plethora of reactions are presented in which IR analysis of matrix isolated intermediates provided key evidence in elucidating their mechanisms. Examples include the photolytic generation of antiaromatics, especially cyclobutadiene, as well as photolysis of aryl azides yielding nitrenes as determined through the characterization of unstable products within an argon matrix. Characterization of benzynes, silenes, silylenes, and free radicals is also described. Besides simple trapping and analysis of products, the technique also allows for monitoring further rearrangements of the trapped products induced by subsequent heating or irradiation. Monitoring can be done by IR as well as UV-vis.

The final chapter by Scheffer, Garcia-Garibay, and Nalamasu presents a good review on photochemistry within the solid state. Many reactions in the gas phase have been studied to explore chemical reactivity in the absence of solvent effects. Solid-state photochemistry compliments such studies. The crystalline environment tends to limit photoreactions to only those that are topochemically allowed. These restrictions are clearly outlined in a summary of optimal parameters for intramolecular reactions such as H abstraction. Numerous photoreactions within the solid state are described, including ene-dione, Norrish Type II, and photoextrusion reactions. From a more practical side an interesting section on solid-state photochromism is also presented.

This volume presents a broad scope of topics of continuing interest within the science of photochemistry.

Peter Gottschalk, *Mead Imaging*

Molecular Foundations of Drug-Receptor Interaction. By P. M. Dean (Department of Pharmacology, University of Cambridge). Cambridge University Press: Cambridge and New York. 1987. xv + 381 pp. $75.00. ISBN 0-521-30255-2.

This is an excellent book that provides a detailed examination of a very complex and diverse subject on the interactions of a variety of ligands with biological receptor sites. In this book, the author provides the historical perspectives of this subject and its origins and early theories and details its evolution through todays computer technology and molecular modeling analyses. The author provides a generous and much welcomed intermingling of the biological and biochemical properties of these drug-receptor interactions with the in depth analysis of the physical chemical properties that dictate the thermodynamics, kinetics, and spatial geometry of the interactions. An analysis of this type provides readers who are not experts in this particular field to gain insight into the complexities surrounding the interactions of ligands with various receptor sites.

Over the course of the book, there is particular emphasis placed on the computational aspects of ligand-receptor interactions. The discussions concerning computer modeling, design, and data bases are extremely useful and provide an excellent foundation for further study and analysis. Included are in depth analyses of MO analysis, electron densities and distance geometries associated with ligand-receptor interac-

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*Unsigned book reviews are by the Book Review Editor.

tions, and solvation effects on ligand and or receptor structure. The final chapters are devoted to ligand design, based on biochemical properties of known compounds, coupled with computer modeling and QSAR analysis.

Overall, this book will be of benefit to scientists and engineers in the biochemical and pharmacological areas of drug design and development. In addition, the book is written in such a way that the concepts and methods used to analyze ligand–receptor interactions could easily be applied to graduate level biochemical course work. It describes the most recent advances and technologies that are available in this field for examining this complex but fundamental topic in the fields of biochemistry and pharmacology.

David E. Graves, *University of Mississippi*

Selective Sample Handling and Detection in High-Performance Liquid Chromatography. Part A. Edited by R. W. Frei and K. Zech. Elsevier Science Publishers: Amsterdam and New York. 1988. 453 pp. $120.00. ISBN 0-444-42881-X.

This is, by and large, an outstanding research text in which it is atempted to summarize most, if not all, of what has been described in two major areas of Analytical Chemistry: selective sample handling and selective detection, both of which are interfaced off-line or on-line, pre- or post-column to some type of HPLC separation–detection scheme. The editors are each recognized experts in almost all of these areas and subtopics, and they have brought together a most impressive collection of similar experts in each subtopic. They have attempted to describe all of the major, recent advances in the areas of sample preparation, analyte extraction and pre-concentration, analyte isolation from sample components, immobilization of compounds on HPLC stationary phases, solution derivatization reagents for HPLC, solid-phase derivatization approaches for HPLC detection, selective photodiode-array detection in HPLC, electrochemical detection in HPLC, solid-phase reactors in HPLC, and finally, commercial aspects of post-column reaction detection in HPLC. The book encompasses almost too much; it is very comprehensive, very up to date, very thorough, and expertly written. Each and every chapter has a thorough bibliography of extensive, up to date references. Authors for individual chapters were carefully selected as being recognized, international authorities in each, specific area.

This is not a laboratory cookbook, not a technical how-to summary of experimental techniques, though these are included, and also not a basic textbook in chromatography. Indeed, very few chromatographic equations or principles are covered, it being assumed that chemists picking up this particular text have already read several basic, fundamental chromatography textbooks in their careers. In many ways, this is a practical book, with underlying theory included, equations where useful to explain basic concepts, but emphasizing the latest techniques, technology, instrumentation, and analytical approaches for improved, selective sample handling and selective detection in HPLC.

The book is not dedicated to undergraduates, nor even to first or second year graduate students, but rather to those who have finished most of their graduate courses. Perhaps the prospective readers have already finished their M.S. and/or Ph.D. (D.Sc.) degrees, may even be practicing chromatographic or analytical chemists. This is really a very specialized, advanced research text, designed to inform the reader about some very sophisticated analytical approaches, instrumental arrangements, solid phase extraction devices, solid phase reagents, post-column solution derivatization chemistry, and finally some real-world applications of the principles introduced. The group of readers who would benefit most from this text are those who are already practicing chromatographers, or about to start serious work in HPLC, and who will have use of the approaches and principles being described/summarized. The volume should mainly be used as a state-of-the-art summary of the field, probably not as a textbook nor reference work.

Ira Krull, *Northeastern University*

Spectroscopy of Inorganic-Based Materials. Volume 14. Advances in Spectroscopy. Edited by R. J. H. Clark (University College London) and R. E. Hester (University of York). John Wiley & Sons: New York. 1987. xix + 472 pp. $164.00. ISBN 0-471-91483-5.

This book is Volume 14 of the series that, through Volume 12, was titled *Advances in Infrared and Raman Spectroscopy*. The editors have changed the scope of the series and now intend to include reviews on any spectroscopic technique that has a bearing on the theme of the volume in the series. Volume 13 was devoted to *Spectroscopy of Biological Systems*, and future volumes, which are in preparation, include *Spectroscopy of Matrix-Isolated Species*, *Spectroscopy of Surfaces*, and *Non-Linear Spectroscopy*. With the anticipation that future volumes in this series will be of the same high quality and thoroughness of the current volume, this timely change in scope will be welcomed by specialists and generalists alike.

Volume 14 consists of seven reviews. G. A. Bowmaker presents the results of recent infrared, Raman, and NQR studies on compounds of the Groups IB and IIB metals (Cu···Hg) and gives a critical interpretation of these results in terms of structure and bonding. Bowmaker points out that although the application of vibrational spectroscopy to species in the gaseous state, the solid states, and non-aqueous solutions is a mature subject, numerous other problems exist. These include interpretation of intensities and NQR coupling constants and the nature of species in aqueous solutions.

W. P. Griffith provides a review devoted to the vibrational spectra of minerals with an emphasis on Raman studies. He systematically lists spectroscopic and crystallographic data for a wide variety of minerals. This review will be useful for identification of minerals as well as providing a convenient compilation of data for other studies.

J. R. Bartlett and R. P. Cooney concentrate on the characterization by Raman spectroscopy of supported and promoted metal and oxide catalysts, zeolites, clays, and activated adsorbates on catalytic surfaces. The tables of Raman band positions, their assignments, and comments concerning the nature of some of the observations will be of value for characterization and instructional purposes.

D. E. Morris and W. H. Woodruff survey the vibrational spectra and structure of electronically excited molecules in solution. Some of the molecules are organic, a few are of biological significance, but most of the review is devoted to transition-metal compounds. There are several tables of structural and spectral data.

J. F. Gibson provides an introduction to techniques in electron paramagnetic resonance spectroscopy and then proceeds to use EPR to characterize a number of metalloproteins. The discussions of the EPR results are brief, but, as with the rest of the volume, ample references to the literature through 1985 are provided.

M. Tasumi and M. Fujiwara summarize the available information concerning the coordination state of magnesium in chlorophylls *a* and *b* and the effects of metal substitution on the vibrational spectrum of chlorophyl *a*. Numerous tables and graphs of spectral data are presented with information concerning coordination sites and core sizes.

A. Oskam surveys the literature of ultraviolet photoelectron spectroscopy largely in the period 1983–85. He uses the He^I/He^{II} intensity variations as a guide for the assignment of spectral bands and concentrates attention on organometallic compounds of current interest. The interplay of bonding theory and experimental advances is adeptly illustrated in this review.

Volume 14 of the *Advances in Spectroscopy* series will prove to be very valuable to a wide variety of chemists. The book has an excellent index, and a useful table of spectroscopic units is also included.

William E. Hatfield, *University of North Carolina*

Advances in Chemical Physics. Volume 66. Edited by I. Prigogine (University of Brussels and University of Texas) and S. A. Rice (University of Chicago). John Wiley and Sons: New York. 1987. xii + 371 pp. $75.00. ISBN 0-471-84681-3.

This volume of *Advances in Chemical Physics* maintains the high quality of the series by providing three excellent review articles that should be of interest to both specialists in the covered topics and those who simply wish to learn more about these fields. The principles and applications of multiple-quantum NMR are discussed in the first article. The final two articles examine the response of polymer molecules in a flow and the influence of translational energy upon the reactive scattering cross sections of neutral–neutral collisions.

The first half of this volume (152 pp) is dedicated to an interesting and well-written review of multiple-quantum NMR, by M. Munowitz and A. Pines of Berkeley. This form of NMR involves the collective excitation of coupled groups of two or more spins. The authors clearly discuss the formal theory, the nature of the experiment, and the various applications of this type of spectroscopy. The article contains 273 references and compliments earlier reviews well.

A thorough review of NMR fundamentals is given, and the various quantum mechanical formalisms used to describe spin systems are introduced. The nature of multiple-quantum spin coherence is then examined, particularly with regard to its response to resonance offsets, chemical shifts, spin–spin couplings, and radiofrequency pulses. The experiment is described in some detail, and various methods for exciting and monitoring these multiple-quantum states are considered. The remainder of the article applies these ideas to a series of examples, such as multiple-quantum filtering and heteronuclear coherence transfer. The simplification of spectra, NMR imaging in solids, the measurement of diffusion constants, and relaxation studies are also discussed.

The second article, written by M. S. Jhon and G. Sekhon of Carnegie-Mellon University, and R. Armstrong of Sandia National Laboratories, is concerned with solutions of polymer molecules in a flow. This chapter is fairly short (58 pp) and contains 80 references. The review focuses on the theory of the dynamics of polymer molecules in Newtonian solvents when the solution is in motion, as opposed to examining the overall rheological properties of the fluid.

The article begins with a description of a single chain polymer molecule in a solvent exposed to a flow field. Equations of motion for the "beads" of the polymer are defined in terms of the undisturbed velocity profile, the hydrodynamic interaction, and the forces between the beads. The authors discuss the dynamics in a strong flow, such as through a micropore. Polymer migration in Newtonian fluids, relative to the bulk flow of the solution, is also examined. The last section addresses polymer conformation in a turbulent flow, using statistical methods to describe the random velocity fields. The authors use their models to show how the addition of high molecular weight polymers can reduce the turbulent drag of a fluid moving in a pipe.

The final article, by A. G. Ureña (Universidad Complutense, Madrid), examines how the reactive scattering cross section of colliding neutral molecules varies with translational energy. This review, which occupies the final third of the volume and includes 204 references, focuses on recent theoretical work and experimental molecular beam studies. Of particular interest is how translational energy promotes chemical reactions, and what translational energy dependence tells us about potential energy surfaces and transition states.

A brief overview is given of the experimental procedures commonly used to measure the excitation function, defined as the reactive scattering cross section as a function of translational energy. Several model calculations of this function are summarized. Statistical approaches such as microcannonical transition-state theory and RRKM theory are also discussed. Results are presented for reactive cross sections as a function of both the initial and final translational energy. The shape of the excitation function is scrutinized with regard to trends, dependence upon molecular properties, translational energy thresholds, and post threshold behavior.

Bret E. Jackson, *University of Massachusetts, Amherst*

Advances in Chemical Physics. Volume 72. Edited by I. Prigogine (University of Brussels and University of Texas) and S. A. Rice (University of Chicago). John Wiley and Sons: New York. 1988. ix + 345 pp. $75.00. ISBN 0-471-63626-6.

This 72nd edition of *Advances in Chemical Physics*, like the previous volumes in this series, contains superbly written articles that should be of interest to many people in the field of chemical physics. The first two articles are relatively brief and deal with autoionization features in atoms and the role of symmetry and angular momentum in collisions involving laser excited polarized atoms. The third and final article, which spans nearly two-thirds of the volume, examines the use of graph techniques in the study of polymers.

The opening article, by Joseph Berkowitz of Argonne National Laboratory, examines trends in the autoionization features of atoms. This 37-page review contains 43 references. By examining the results of a large number of photoionization experiments performed on noble gasses and halogen and chalcogen atoms, the author points out systematic trends in the autoionization structure which dominates the valence region. These observed "propensity rules" are explained via a simple quantum mechanical model for autoionization, which uses unmodified hydrogenic wave functions. These rules correctly predict the shape and width of observed autoionization resonances when applied to results for atoms in Groups I through V of the periodic table.

The second article, written by E. E. B. Campbell (Universität Freiburg), H. Schmidt (Braun A. G.), and I. V. Hertel (Universität Freiburg), is concerned with collisions involving electronically excited atoms. Specifically, the authors are interested in crossed beam studies where one of the collision partners is an atom that has been electronically excited by a polarized laser, and thus has a charge distribution with a well-defined alignment. By varying the initial polarization of the atom one can learn much about the nature of molecular interactions not usually available from more typical cross-section measurements. This review contains 121 references and is 78 pages in length.

The authors begin by describing methods for preparing atoms in polarized states. Results for the $Na^+ + Na^*$ system are then examined with regard to collision-induced nonadiabatic transitions and the formation of the species Na_2^+. The Ca^*–rare gas system is used to study intersystem crossing, and the associative ionization reaction of two excited Na atoms is discussed. The reviewers also consider resonant charge exchange and electronic to rovibrational energy transfer.

The final 221 pages of this volume are dedicated to a discussion of the use of graphs in the study of polymers. The authors, S. I. Kuchanov, S. V. Korolev, and S. V. Panyukov of Moscow State University, cite 221 references. Graph-theoretic methods, such as the diagram expansions of Feynman and Mayer, have proven to be useful in simplifying a variety of many-body problems. The molecular graphs used here are similar to the structural formulas of the molecules they represent. Since polymers often consist of many different molecular components, one must deal with statistical ensembles of many different graphs. Much of this review consists of original work by the authors.

The first part of the article introduces the basic ideas and models used by the authors to descibe branched and network polymers. This section contains a thorough discussion of the physical chemistry of polymers. In addition, an appendix is included that outlines the basic concepts of the theory of graphs. Thus, no specific knowledge of polymer science or graph theory is required of the reader. A new method is presented for describing the molecular structure of branched polymers. The authors apply these graph techniques to a variety of interesting problems in polymer science, clearly illustrating the potential of such an approach.

Bret E. Jackson, *University of Massachusetts, Amherst*

Elements of Solid-State Physics. By H. Y. Fan (Purdue University). John Wiley and Sons: New York. 1987. x + 211 pp. $34.95. ISBN 0-471-85987-7.

This book, which is written by one of the founders of modern solid-state theory, might be better titled, "Elements of Solid-State Theory". This statement defines the central thrust of the book and also defines its principal weakness. It is curious to find a book devoted to solid-state physics, which has often developed empirically, to be so completely lacking in reference to experiment. This almost total neglect of experimental technique and results causes the reviewer to doubt the suitability of this book as a graduate text for a course in solid-state physics. If this book were to be used, it is hoped that the instructor is proficient at supplementing the text.

A second use for this book would be as an introduction to solid-state theory. The small size of the book works in its favor for such a purpose. The lucid writing style is also favorable to such use. There is a penalty associated with the small size of the text for such use. Almost no topic is treated exhaustively. This would not be a disservice except that the author often neglects to inform the user of the limited scope of the treatment. That is, the author gives the reader a good feel for a topic but does not exhaust the topic, or point the reader in the direction of a more complete treatment. An example of this is the treatment of polarons (p 116), which ends with the well-known perturbative result for the polaron mass. The reader is told that this is good for a coupling constant of <10. However, the mass formed would diverge as the coupling constant approaches 6, and it is well-known that the formula is in significant error even for coupling constants in the range of 3 or so. Thus, the theoretical treatment is also somewhat limited in scope.

Within its limited range, this book provides a strong, individual insight into several key areas of solid-state theory. The insights are particularly useful in areas relating to transport theory. The treatment is not complete. This is a book for the experienced practitioner of solid-state physics.

A. Barry Kunz, *Michigan Technological University*

Chromatographic Theory and Basic Principles. Chromatographic Science Series. No. 38. Edited by Jan Åke Jönsson (University of Lund). Marcel Dekker Inc.: New York and Basel. 1987. xi + 396 pp. $79.75. ISBN 0-8247-7673-9.

This monograph is an unusual contribution to the field of chromatography in that it covers only theoretical aspects, both those common to all types of chromatography as well as those peculiar to individual types. Despite the restriction to theory, the scope of the material and the coordination of multiple contributors make this an ambitious project, which is successful in several respects.

The first two chapters, written by the editor, deal with concepts and theoretical developments common to all types of chromatography. These chapters are valuable in providing a detailed review of mechanistic approaches to describing and analyzing chromatographic behavior in addition to the more common phenomenological treatments. The emphasis is on isocratic operation, although other effects, including non-linearities, are discussed as well. The result is a very nice summary of the current state of the field, and it should be read and understood by the average chromatographer despite perpetuating some questionable conventional wisdom.

The rest of the book comprises chapters on retention in gas–liquid, gas–solid, liquid, ion exchange, and steric exclusion chromatography. By their nature these chapters are more heterogeneous than the first two and of less general interest, with analytical chemists the likely core readership. Full coverage of every type of chromatography is obviously impossible, with an obvious gap being the sparse treatment of biological macromolecules (except in the SEC chapter). However, some chapters succeed, like the first two, in providing broad and detailed reviews.

This book, particularly the first two chapters, can be valuable in helping practicing chromatographers to think rationally about their art.

In addition to the material explicitly covered, the extensive bibliography in each chapter is a good starting point for a closer examination of the literature on chromatographic theory.

A. M. Lenhoff, *University of Delaware*

Isotopes in Organic Chemistry. Volume 7. Secondary and Solvent Isotope Effects. Edited by E. Buncel (Queen's University) and C. C. Lee (University of Saskatchewan). Elsevier Science Publishers: Amsterdam and New York. 1987. 485 pp. $173.75. ISBN 0-444-42770-8.

The volume consists of the following individual chapters: Mechanistic deductions from solvent isotope effects (F. J. Alvarez and R. L. Schowen); Secondary isotope effects on enzymatic reactions (W. W. Cleland); Hydrogen isotope effects in thermal pericyclic reactions (J. J. Gajewski); Solvent isotope effects, fractionation factors and mechanisms of proton transfer reactions (A. J. Kresge, R. A. More O'Ferrall, M. F. Powell); Secondary hydrogen–deuterium isotope effects and transition state structure in S_N2 processes (K. C. Westaway); and Model calculations of secondary isotope effects (D. J. McLennan).

The chapters are well-written, contain very few typographical errors, and cover an impressively large amount of material in considerable depth. As one would expect, deuterium isotope effects receive most of the attention. There is some overlap of subject matter by the various authors, but when it was apparent, the differing approaches and emphases were interesting rather than annoying. The 5-page index covers the entire volume.

G. David Mendenhall, *Michigan Technological University*

Chemical Sensors. Edited by T. E. Edmonds (Loughborough University of Technology). Chapman and Hall: New York. 1988. xiv + 326 pp. $127.00. ISBN 0-216-92255-0.

Although discovery of the selective potentiometric proton response of glass membranes took place more than 80 years ago, concerted research efforts to devise analogous sensing devices for other chemical species has only occurred within the past quarter century. This new monograph surveys the current state of such research with particular emphasis on the two fundamental processes required for developing useful chemical sensors: (a) selective chemical recognition and (b) subsequent transduction of the recognition process into a measurable signal. The book is divided into five sections encompassing 14 chapters. The first two sections (written by L. J. Kricka and P. D. Beer, respectively) provide an excellent overview of the various biological systems (enzymes, antibodies, receptors, etc.) and synthetic host species (crowns, cryptands, etc.) that may be used to gain selective molecular and ionic recognition. The third section provides examples of how such chemical recognition can be applied in analytical sensing schemes, e.g., ion-selective electrodes, chemically modified electrodes, immunoassay techniques, etc. Contributions in the final two sections focus on the operating principles and response properties of varous transduction elements, including voltammetric and potentiometric electrodes, solid-state devices, optical fiber systems, and mass detectors based on piezoelectric crystals.

Overall, this book offers an honest and stimulating review of the problems and challenges faced in developing practical chemical sensors. In the preface, the editor refers to an unfortunate "High-Tech Gloss" which has surrounded recent advances reported in this field. Others might term such reports "Hype-Technology". In either case, it is refreshing to read an edited book on this subject that puts things into proper perspective and emphasizes the fundamental chemical and physical principles of sensor design rather than providing exaggerated statements on a particular sensor's performance, potential applications, and manufacturability. In short, this monograph represents a timely and much welcome addition to the analytical literature, and it is must reading for anyone now engaged in chemical sensor research activities or thinking of getting into this expanding field in the future.

Mark E. Meyerhoff, *The University of Michigan*

Modern Synthetic Methods 1986. Edited by R. Scheffold. Springer-Verlag: New York. 356 pp. $29.00. ISBN 0-387-16526-6.

This book is the conference documentation of the Fourth Seminar on Modern Synthetic Methods. The areas covered in the six chapters are sound and light in synthesis and the synthesis of enantiomerically pure compounds (EPC).

In the first chapter, the use of ultrasound in synthesis is presented by K. S. Suslick. The occurrence and nature of sonochemistry and the various ultrasonic devices available are discussed. Synthetic applications of both a homogeneous and a heterogeneous nature are presented with the advantages and limitation of ultrasound discussed in each area.

The use of light in synthesis, covered in Chapters 2 and 3, entitled, "Photochemically Generated Building Blocks", is presented by K. Schaffner and M. Demuth. The first of these two chapters summarizes the photochemistry of β,γ-unsaturated ketones and then discusses in detail the experimental and mechanistic aspects of the photochemical rearrangement of bicyclo[2.2.2]octanone deivatives to their respective photoproducts, the tricyclooctanones. The second of the photochemical chapters discusses the application of the tricyclooctanones with regard to cyclopentanoid natural product synthesis, reviewing the wide range of possible functional group transformations of tricyclooctanones. Several examples of natural-product synthesis by this approach are presented and compared with other photochemical methods.

The final three chapters discuss the synthesis of enantiomerically pure compounds. The chapter entitled "EPC Synthesis with C,C Bond Formation via Acetals and Enamines", by D. Seebach, is an excellent review of the area. After a brief survey of the types of reaction available to the synthetic chemist, a comparison of the three methods of EPC Synthesis (resolution, chiral auxiliaries and chiral building blocks) is provided for the synthesis of 1-substituted tetrahydrocarbolines and -isoquinolines. The major part of the review involves discussion on C,C bond forming reactions using enolates of cyclic acetal derivatives of α-hydroxy and α-amino acids, C,C bond formation at acetal centers, and the use of enamines in EPC synthesis. Each of these areas is discussed in a step-by-step manner, including the preparation and use of the chiral components as well as a thorough discussion of the stereochemical aspects of their use. Many examples are provided and comparisons with alternative approaches are presented.

The second of the EPC Chapters, entitled "Asymmetric Diels–Alder reactions with chiral enoates as dienophiles", is presented by G. Helmchen. Although this review covers only intermolecular asymmetric Diels–Alder reactions involving esters of α,β-unsaturated carboxylic acids (enoates) as dienophiles, it covers the area in detail. A consideration of the effect of conformation (of the enoate), on mechanistic aspects, is followed by the classification, into four groups, of the chiral alcohols (used as auxiliaries) based not only in regard to their Prelog type ligands (H, R^M, R^L) but taking into account shape, polarity, and basicity. Non-catalyzed, Lewis acid catalyzed and high-pressure Diels-Alder reactions are reviewed in each of the four categories. Results are analyzed with respect to stereochemical outcome. This review provides a comparison of the various chiral alcohols and experimental methods in use for the intermolecular asymmetric Diels–Alder reaction.

The final chapter, entitled "Enantionmerically Pure Compounds via Chiral Organoboranes", by H. C. Brown, reviews the preparation of a variety of chiral boranes for asymmetric reduction, alkylboration, and hydroboration. This excellent review provides a comparison of the reagents available and their synthetic utility. Reflecting the extremely wide scope of organoboranes in chemistry, the author's statement "...that they are among the most versatile intermediates available to the organic chemist" is confirmed by this review.

This volume is recommended, particularly for anyone interested in the synthesis of enantiomerically pure compounds.

Alan Miller, *Parke-Davis*

Dictionary of Organophosphorus Compounds. Edited and compiled by R. S. Edmundson. Chapman and Hall: London and New York. 1988. xxiii + 1347 pp. $725.00. ISBN 0-412-25790

This hefty volume is offered as a "companion" to the multi-volume *Dictionary of Organic Compounds* ("Heilbron") and the *Dictionary of Organometallic Compounds*. It includes the same type of data for over 20000 compounds classified under over 5000 entries. That is, structural formulas, alternative names, molecular weight, simple physical properties, derivatives, and key references are given. The entries are in alphabetical order of the names, but indexes of alternative names, formulas, CAS Registry Numbers, and compound type (e.g., "tertiary phosphine oxides") make it easy to find a compound. The formula index has its pitfalls, however; for example, $C_6H_6Cl_2NP$ is identified as "*N*-benzoyl-*P*-phenylphosphonimidic dichloride", an obvious impossibility, for that name corresponds to $C_{13}H_{10}Cl_2NOP$.

There exists nothing comparable to this remarkable compendium. It is reasonably current (references in to 1986), and the material is conveniently laid out. The fact that it includes not only compounds with C–P bonds but also such compounds as esters of inorganic phosphorus acids makes it especially satisfying. It should see steady use in chemical libraries.

Organic Syntheses. Collective Volume VI. Edited by Wayland E. Noland. John Wiley and Sons: New York. 1988. xviii + 1208 pp. $59.95. ISBN 0-471-85243-0.

What a rich source of practical information this is, and at only 5¢ a page! It is compiled from ten annual volumes (50–59, 1970–1979), but it is much more than a simple reprinting of their contents. The Editor-in-Chief wrote to each senior submitter of each preparative procedure and asked for corrections, improvements, and new references. Although not all responded, the result is a substantial improvement over the individual volumes. At the same time, some standardization in style and presentation has been achieved, and nearly everything outside of experimental directions seems to have been re-checked, and many hazard warnings have been added and considerably expanded.

To those who have become familiar with the previous Collective Volumes through frequent use, the most apparent changes will be found in the indexes. The old thumbholes are gone, and the former indexes of Type of Reaction, Type of Compound, Solvents, and Apparatus have been consolidated into the General Index. The Formula and Author Indexes remain separate, and a new index of Hazards has been added. Of special note is a Concordance Index, which allows one to match a reference to a procedure in one of the annual volumes to the corresponding one in the Collective Volume.

The General Index seems to be reasonably easy to use and is probably more convenient than the older divisions. It is not without its problems, however, and there are some inconsistencies in nomenclature that are potentially misleading. For example, the compound p-$CH_3C_6H_4SO_2NHNH_2$ is indexed as "tosylhydrazide" with one page reference, and as "*p*-toluenesulfonylhydrazide" with a different one! The strictly correct IUPAC name, *p*-toluensulfonohydrazide, is not listed at all. The user should be imaginative, persistent, and somewhat wary.

This is the sort of book that is so heavily used that library copies rapidly wear out (or disappear altogether). Every practicing experimental organic chemist should have a personal copy.

The Collected Papers of Peter J. W. Debye. By Peter J. W. Debye. Ox Bow Press: Woodbridge, CT. 1988. (Reprint of the 1954 edition.) xii + 700 pp. $85.00. ISBN 0-918024-58-7.

This book, a collection of the principal papers of one of the most influential physical chemists of this century, is a reprint of the original, published in 1954, which has long been out of print.

Techniques of Melt Crystallization: Volume XIX of Techniques of Chemistry. By Gilbert J. Sloan (E. I. DuPont de Nemours & Co.) and Andrew R. McGhie (University of Pennsylvania). John Wiley & Sons: New York. 1988. xi + 532 pp. $85.00. ISBN 0471-07875-1.

This book concentrates on apparatus and methods for crystallization from the melt. Chapter I provides a history and overview. Chapter II covers solid-liquid phase diagrams, their relevance to melt crystallization, and techniques for determining them. It includes many photographs of contact preparations. These were prepared by the authors for the book because there is little published literature on the method. Chapter III introduces the notion of redistribution of components during directional solidification, discusses the experimental parameters influencing this redistribution, and describes different types of apparatus used for carrying out directional solidification. Chapter IV gives many examples of applications of directional solidifcation to purification, chemical analysis, determination of phase diagrams, and growth of single crystals of particular elements, inorganic compounds, organic compounds, and polymers. Chapters V through VIII have the same type of materials for zone melting, and together they account for almost 40% of the text of the book. Chapter IX covers other melt crystallization techniques, with emphasis on those useful for industrial scale separation of organic compounds. Chapter X presents the methods by which one can obtain the distribution coefficient for an impurity, especially from concentration profiles resulting from directional solidification and zone melting experiments. Chapter XI contains a brief summary of techniques that can be used to ascertain the purity of solids. The appendices give examples of computed concentration profiles resulting from zone melting, lists of suppliers of crystallization equipment and supplies, and a short list of sources of information on crystal growth.

Techniques of Melt Crystallization is well-written and easy to read beginning at almost any point. This makes it a useful reference work for the experienced practitioner as well as a textbook for the beginner. Reflecting the backgrounds of the authors, it is particularly strong in its descriptions of experimental methods and results for organic compounds. Many of these methods were pioneered by the authors themselves. On the other hand, the coverage of growth of single crystals of electronic and optical materials (my specialty) is weak. For example, there is no description of the methods used for commercial floating-zone melting of large-diameter silicon crystals. The discussion on crystal growth in space is highly incomplete. There is also very little on transport phenomena (convection, heat, and mass transfer) in crystallization. Of course, it is impossible for a single volume to cover everything in the massive field of crystallization from the melt; for example, entire books have been written on float zoning of silicon and crystal growth in space. The authors cite a lot of Soviet literature, reflecting their judgment that several groups in the USSR are contributing very practical methods. In writing the book the authors had many papers translated into English.

In this era of the computer, it probably would have been more appropriate to give a computer program for computation of the concentration profile resulting from zone melting rather than devoting 49 pages (Appendix I) to graphical presentations of particular examples of such profiles. It would have been possible, then, to include non-idealities such as non-constant distribution coefficient and zone length.

This book is a worthy successor to that written by the creator of zone melting, William G. Pfann, some 25 years ago. I am pleased to have it on my bookshelf.

William R. Wilcox, *Clarkson University*

Handbook of Water Purification. Second Edition. By Walter Lorch (University of Buckingham). John Wiley & Sons: New York and Chichester. 1987. 777 pp. $105.00. ISBN 0-470-20899-6.

The tone of this revised handbook is established perfectly by the first paragraph of the Preface. It is a volume intended for the users of purified water. The title suggests some association with potable water; such is not the case. The audience is to be found among water users in industry and health services. To reach this audience effectively, the authors have preserved simplicity and stressed utility and convenience. To achieve the announced goals, the editor has allowed excessive redundance to creep into the text and has underestimated the skills of the reader. Necessary information has been omitted and subject matter is structured heterogeneously, leading to difficulty in putting problems and processes in suitable combinations. Some examples are trivial and many are poorly explained.

Chapters One and Two are first-rate primers on the hydrologic cycle and water physics. The use of India as a case study in the former is in part illegible and for the greater part of no interest. The latter chapter requires all or most of freshman college chemistry and should say so. Thus, the variability of content/context quality is evident in the very beginning. Chapter Three is interesting; however, Tables 3.1 and 3.2 are useless without much more thorough discussion. The first three sections of this chapter could be conveniently expanded to provide information on water sources; the rest of the chapter serves no purpose.

Chapter Four should be tied to earlier material. Table 4.1 is unnecessary and CCE and BOD should be deleted as arcane. Why is Table 4.2 included; it appears only to fill space. Chapter is essential; it is at the core of user needs. The text is of variable quality. The discussion of physical chemical theory is brief and does not fit the instrumental context smoothly. Tables 5.2 and 5.6 are cluttered and provide little help. Assessment of organic matter is difficult at best. Section 5.12 is too casual. I simply do not believe the monitor limits proposed on Page 167 can be met in practice; yes, with great care in laboratory but, no, not in the plant.

To keep comment brief, Chapters Six and Seven will be used as prototypes for the remainder of Parts II and III. In both cases, the historical perspective is of no value and should be ignored; it is much wasted space. Theoretical discussions are adequate, but they wander off target and tend to confuse. Section 6.3 is excellent and Sections 6.4 and 6.5 are of minimal quality, with Figure 6.14 the nadir. Elaborations on equipment and process schemes are generally good. However, the Tables of Chapter Seven are cluttered, poorly explained, and of little use, even to a specialist.

In summary, I found the Handbook of Water Purification to contain a wealth of interesting information, some useful. It includes data and design and operating concepts that the user community can consult beneficially. However, the Handbook has major failures: poor organization, redundance, omissions, variable quality, cluttered tabulations (Table 12.1 may be classic), and confusing flow sheets. The editor allowed his enthusiasm to undermine an otherwise important project. The book appears never to have had a rigid outline. It is put together as a series of poorly matched chapters from the work of authors of obvious ability, varying breadths of knowledge and experience, and frequent misconception of the target readers' abilities or needs. With the information it contains, the Handbook deserves a place on the water users book shelf. The reader must be prepared to put time and effort into making this information available for practical process analysis and day-to-day operating problem solution.

Robert C. Ahlert, *Rutgers University*

Functional Monomers and Polymers. Edited by Kiichi Takemoto, Yoshiake Inaki, and Raphael M. Ottenbrite. Marcel Dekker: New York. 1987. viii + 555 pp. $125.00. ISBN 0-8247-7373-X.

Unlike most monographs of review chapters, "Functional Monomers and Polymers" contains many well-selected, abbreviated experimental procedures that will inform the reader about what is really involved in the preparation and modification of functional polymers. Selected applications of the functional polymers are described. A short introduction to each chapter gives the history and importance of the topic. The book appears to be a translation of a Japanese book from about late 1983, although neither the book nor the publisher's announcement say so. The references generally cover papers of 1982, with only a few more recent additions of papers from the authors' own laboratories. The chapter titles are the following: 1. Introduction; 2. Polymeric Reagents for Organic Synthesis; 3. Polymeric Catalysts; 4. The Preparation of Nucleic Acid Analogs; 5. Photoresponsive Polymers; 6. Electrically Conducting Polymers; 7. Crown Ether Polymers as Functional Polymers in Analytical Chemistry; 8. Biomedical Polymers and Polycarboxylic Acid Polymer Drugs; 9. The Immobilization of Enzymes; 10. The Synthesis of Enzymelike Polymers.

Warren T. Ford, *Oklahoma State University*

Gas-Phase Chemical Physics Database. Part A: Systems with one element. Part B: Systems with two elements. Part C: Systems with three or four elements. By J. L. Delcroix (Université de Paris Sud). Elsevier Science Publishers: Amsterdam and New York. 1988. Part A: xxxii + 552 pp. $218.50. ISBN 0-444-42923-4. Part B: xxxii + 744 pp. $294.75. ISBN 0-444-42924-4. Part C: xxxii + 442 pp. $173.75. ISBN 0-444-42920-4. Three-volume set: $552.75. ISBN 0-444-42925-5.

These volumes are a hardcopy of the GAPHYOR literature database, which is a more specific and informative type of abstract than Chemical Abstracts and is available on-line, covering the years 1970–1986. The volumes are geared specifically toward those interested in finding information on literature references of physical-chemical properties and reactions of atoms and molecules (ions and neutrals) in the gas phase. It provides presorted literature references on the properties of, photon collisions with, electron collisions with, and collisions and reactions between atoms and molecules in the gas phase, as well as macroscopic properties of gases. Thus one can find lists of literature references on a specific molecular or ionic system in varied subject areas including, for example, its thermochemistry, one or multiphoton dissociation, potential curves or structure, or elastic or reative collisions with another specific ion or molecule. The references are listed along with key descriptors of the type of information available in each reference, e.g., theoretical or experimental work, whether work included state-selected reactants or products, etc.

The database provides some clear advantages over Chemical Abstracts to physical chemists, particularly for those needing information on gas-phase processes or properties.

(1) The material abstracted is quite focussed; you will not have to wade through pages of references on the molecule as used in paint manufacture if it happens to have that particular application.

(2) A reference on a particular process is listed whether or not it appeared in the paper's abstract. Thus you can easily find relevant papers not retrievable through Chemical Abstracts.

(3) The literature references are sorted by type and number of elements in the system of interest, then by type of process, so one can find all references on, for example, photon collisions with a particular molecule grouped together, and then subdivided according to 19 different areas of interest in photon collisions such as absorption, line emission, one or multiphoton dissociation, nonlinear effects, etc.

(4) The literature reference is also given with additional descriptions that can be quite specific and useful, such as the energy domain of the electron collision or the type of work (theoretical, experimental, review, etc.).

The ease of use of this literature database depends somewhat on the patience and on the specific needs of the user. If one is interested in learning about the photodissociation of a particular molecule, for instance, one is certainly interested in its potential surfaces, structure, thermochemistry and also absorption spectrum, as well as previous photodissociation references. As the literature references are sorted first by which of the five types of information (listed in the first paragraph of the review) are contained in the paper referenced, and then by molecule, you will need to look in several different parts of the database for your reference, i.e., the database does not list all the information on a specific system in one continuous place like Chemical Abstracts. Even once one has found the several subsections of the database of interest, one can often find, for instance, references on CH_2FCl interspersed with CH_2IBr under the specific subheading, as the database orders these molecules according to how many halogens they have and not what type (although the type is given). Also, although in some cases extremely detailed descriptions are included for some processes, such as whether or not reactants are state selected by vibration or rotation, in other cases an obvious potential description is not included. For example a photon in a photon collision is only given as $h\nu$, the wavelength is not given, only a broad energy range descriptor where one category includes all infrared visible and UV photons! The method of sorting results in huge lists of papers with "unspecified reactant" and "unspecified product" that turn out to be theoretical papers, thus evidencing how useless this one criteria for ordering the references is for those of us not centered on one specific molecular or ionic system. Finally, the claim that the database includes chemical reactions not given in the paper's abstract is true in some cases but not all by any means.

Despite these difficulties, the advantages of the literature database outweigh its sometimes tricky organization. As the final test, a co-worker used our sample volume for a literature search on a system of interest to us and quickly found several crucial references. Overall, references are easier to find and more complete than those of Chemical Abstracts for people in this broadly defined area of chemical physics.

Laurie Butler, *University of Chicago*

The Alkaloids. Volume 29. Edited by Arnold Brossi (National Institutes of Health, Bethesda, Maryland). Academic Press, Inc.: Orlando, Florida. 1986. vii + 333 pp. $89.50. ISBN 0-12-469529-9.

This is a collection of detailed accounts of six alkaloid families. The volume is divided as follows:

Chapter 1, by V. Preininger, reviews the chemotaxonomy of Papaveraceae and Fumariaceae. The text consists mostly of tables listing the origin of these alkaloids in plant species. The amount of information presented is great and the reference listing extensive. Previous volumes of this series (namely Volumes 21, 24, and 26) would complement this review.

Chapter 2, by S. Johne, reviews the research efforts since 1960 on the quinazoline family of alkaloids. This chapter covers the sources, isolation, and syntheses of quinazolin-4-ones, pyrroloquinazolines, pyrido[2,1-*b*]-quinazolines, and indoloquinazolines. Key physical and spectral data are included in many cases. The chapter concludes with discussions of the biosynthesis and biological activities of these alkaloids.

The naphthylisoquinoline alkaloids are the topic of Chapter 3 (G. Bringmann). The reader is first presented with an account on the isolation of these alkaloids. The rest of the chapter is very well-written text documenting the biosynthesis and chemical syntheses of these compounds. The approaches utilized in context to enantioselective total syntheses complete this chapter.

Chapter 4, by Y. Yamamoto and K. Arai, is titled "Alkaloidal substances from Aspergillus Species". The reader will find a variety of information on pyrazine metabolites (i.e., aspergillic acid), diketopiperazine metabolites (e.g., echinulins, austamides, gliotoxins, etc.), and other compounds of interest (cytochalasins).

The isolation and identification of novel Daphniphyllum alkaloids is the subject of Chapter 5 (S. Yamamura). The known compounds of this family are classified into six types depending upon their (nitrogen) heterocyclic systems. As there is relatively little synthetic information available, the author discusses physical and biochemical properties of these structurally intriguing compounds.

In the final chapter (6), L. Castedo and K. Suau give a brief view of the Cularine alkaloids. After presenting structural and spectral data, the authors close with summaries of the syntheses and proposed biosyntheses of these compounds.

Scott L. Dax, *Roche Research Center*

Volumes of Proceedings

F.E.C.S. Third International Conference on Chemistry and Biotechnology of Biologically Active Natural Products. Volumes 1 to 5. Edited by the Bulgarian Academy of Sciences. VCH Publishers: New York. 1988. Vol. 1, 280 pp; Vol. 2, 344 pp; Vol. 3, 447 pp; Vol. 4, 540 pp; Vol. 5, 565 pp. $295.00 per set. ISBN 0-89573-619-5.

The conference of which this set is the proceedings took place in 1985 in Sofia. Volume 1 is made up of the typescripts of the fourteen main plenary lectures, which cover a range of topics from synthesis to biotechnology, and it contains the typescripts of half-hour lectures given by invited speakers. Volume 3 is similar, but the topics are bioorganic chemistry and structural elucidation and chemical transformation of natural products. In Volume 4 are found a large number of short communications in the areas of synthesis of biologically active natural products and of biotechnology. Volume 5 is parallel, but it is devoted to the same areas as Volume 3.

For such a large quantity of material, the lack of indexes, even of contributors, is immediately felt. It is asking a lot of the reader to examine seven pages of a single-spaced table of contents (for just one volume) in the hope of finding something pertinent to his search for information. Nevertheless, the large number of contributors from Eastern European scientists makes this set a useful source of knowledge of "recent" (up to 1985) research in Eastern Europe.

Biophysics and Synchrotron Radiation. Edited by A. Bianconi and A. Congiu Castellano. Springer-Verlag: New York and Berlin. 1987. xii + 333 pp. $75.00. ISBN 0-387-16948-2.

In this book are found the contributions made at a conference held in Italy in 1986. They are grouped under the headings "X-ray Diffraction", "X-ray Spectroscopy", "X-ray Scattering", "X-ray Microscopy", and

"Time-Resolved Fluorescence". Not indexed.

Kinetics of Interface Reactions. Edited by M. Grunze and H. J. Kreuzer. Springer-Verlag: New York and Berlin. 1987. xi + 299 pp. $55.00. ISBN 0-387-17821-X.

This is the proceedings of a workshop held in Canada in 1986. One group of papers comes under the heading "Adsorption–Desorption Kinetics: Dynamics vs. Thermodynamics"; another group is headed "Precursors: Myth or Reality?"; and the third group is "Kinetics of Phase Transitions at Surfaces". Not indexed.

Selforganization. Edited by Sidney W. Fox. Adenine Press: Guilderland, New York. 1986. ix + 203 pp. $55.00. ISBN 0-940030-13-6.

The nine papers in this volume are the proceedings of the Liberty Fund Conference on Selforganization, held in Key Biscayne in 1984. The scope ranged from galaxies to molecular evolution and from quantum theory to the British Empire, and there is much in the book to interest the thoughtful chemist.

Toxicology of the Nasal Passages. Edited by Craig S. Barrow. Hemisphere Publishing Corporation: Washington and New York. 1986. xvi + 317 pp. $61.95. ISBN 0-89116-397-2.

The papers in this volume originated at the Seventh CIIT Conference on Toxicology, held in Raleigh, NC, in 1984. They are arranged as "chapters", but they appear to be reports of original research. Several of the papers have a substantial chemical content and are concerned with exposure to chemical substances, especially formaldehyde and acrolein, and the transformations of xenobiotics in the nasal mucosa. Well indexed.

Coal Science and Technology II. Edited by J. A. Moulijn, K. A. Nater, and H. A. G. Chermin. Elsevier Science Publishers: Amsterdam and New York. 1987. xxii + 962 pp. $231.75. ISBN 0-444-42893-3.

The 1987 International Conference on Coal Science was held in Maastricht, The Netherlands. These proceedings include the typescripts of no less than 220 papers, which are arranged into several broad groups: Coal Structure and Characterisation; Coal Liquefaction; Coal Beneficiation; Gasification; Basic Coal Science; and Other Topics. It is a pity that this large quantity of material has no index.

Nutrition and Aging. Edited by Martha L. Hutchinson and Hamish N. Munro. Academic Press: Orlando. 1986. xx + 287 pp. $32.50. ISBN 0-12-36875-X.

The 19 papers in this volume originated with the Fifth Bristol-Myers Symposium in Nutritional Research, held in Boston in 1985. They have been carefully edited and re-cast as chapters, and all are set in type. The subjects range from Vitamin D, osteoporosis, trace elements, and antioxidants to the Elderly Alcoholic. Thoroughly indexed.

Occurrence, Properties and Utilization of Natural Zeolites. Edited by D. Kallo and H. S. Sherry. Akademiai Kiado: Budapest. 1988. xii + 857 pp. $69.00. ISBN 963-05-4862-3.

Zeolites are minerals of the clay type and have a structure that gives them important properties as catalysts, ion-exchange agents, molecular sieves, etc. An international conference on them was held in Budapest in 1985 and gave rise to the large number of papers in this volume, reproduced from pleasingly uniform typescript. The areas covered are the following: Geology and Mineralogy; Crystal Chemistry Physical Properties; Applications in General; Ion-exchange; Adsorption; Catalysis; and Agricultural Applications. The index is substantial.

New Developments in Zeolite Science and Technology. Studies in Surface Science and Catalysis 28. Edited by Y. Murakami, A. Iijima, and J. W. Ward. Elsevier Science Publishers: Amsterdam and New York. 1986. xxviii + 1092 pp. $214.00. ISBN 0-444-98981-1.

A conference held in Tokyo in 1986 is the source of the large number of typescript papers in this volume. They include two plenary lectures and presentations grouped under the following headings: Geology and Mineralogy; Synthesis; Ion Exchange and Modification; Structure; Adsorption and Diffusion; Catalysis; and Application. The subject index is substantial.

Innovation in Zeolite Materials Science. Studies in Surface Science and Catalysis. Edited by P. J. Grobet, W. J. Moritier, E. F. Vansant, and G. Schulz-Ekloff. Elsevier Science Publishers: Amsterdam and New York. 1988. xiv + 542 pp. $150.00. ISBN 0-444-42919-0.

The popular subject of zeolites was explored in a symposium held in Belgium in 1987, which included papers organized under the following categories: Synthesis; Modification and Characterization; Structure and Structural Chemistry; Acidity–Basicity; Catalysis; and Catalyst Testing. The papers are provided with abstracts and, in some cases, experimental procedures. There is an index of contributors only.

Transition Metals and Organometallics as Catalysts for Olefin Polymerization. Edited by W. Kaminsky and H. Sinn. Springer-Verlag: Berlin, Heidelberg, and New York. 1988. xix + 442 pp. $77.00. ISBN 0-387-18548-8.

This book is composed of a large number of papers, in varied typescripts, given at the International Symposium on Transition Metals and Organometallics as Catalysts for Olefin Polymerization, held in Hamburg in 1987. The papers are grouped in three general areas: Studies of the Active Sites, and Kinetics and Mechanism in Heterogeneous Catalysts; New Aspects in the Heterogeneous Catalysts Polymerization of Olefins; Homogeneous Catalysts for Olefin Polymerization; and The Influence of the Reactor Design, Polyolefin Characterization. Not indexed.

Proceedings of the International Conference on Plasma Science and Technology. Edited by Wu Chengkang. Science Press: Beijing, China. (VCH Publishers: Deerfield Beach, FL.) 1986. viii + 630 pp. $95.00. ISBN 0-89573-590-3.

This volume of typescript papers arises from a conference held in Beijing in 1986. Six survey papers are followed by a large number of reports of original research, the majority of which are by Chinese investigators (altogether 19 countries are represented, however). The papers are arranged under two headings: Thermal Plasmas (Near Equilibrium) and Low-Pressure Plasmas (Non-Equilibrium). Not indexed.

Polynuclear Aromatic Compounds. Advances in Chemistry Series. 217. Edited by Lawrence B. Ebert. American Chemical Society: Washington, D.C. 1988. xii + 396 pp. $99.95. ISBN 0-8412-1014-4.

This book consists of 21 papers that are largely reports of original research. The topics cover a broad range, from electron affinities and reductive alkylation to petroleum constituents and carbonization. The symposium at which the papers were originally delivered was held at the 192rd meeting of the ACS, in 1986. The subject index is very thorough.

Interbiotech '87 Enzyme Technologies. Proceedings of the International Symposium on Biotechnology, Bratislava, Czechoslovakia. June 25–26, 1987. Progress in Biotechnology. Volume LV. Edited by A. Blazey and J. Zemek. Elsevier Science Publishers: New York. 1987. 535 pp. $171.00. ISBN 0-444-98924-2.

This book contains 34 papers dealing with a wide variety of topics related to enzyme activity. A few of these are flax, hemp, and leather technology, lignocellulosic materials, starch, and biosensors. A number of papers concerned with laboratory techniques are included. This book will be useful to anyone interested in current enzyme research.