

transcript. One can use the default name for this ("session") or choose another name. One unusual, and at first confusing, aspect of this is that the name you choose for the transcript is actually the name of a new subdirectory that will be created and will contain a file called "trans". We at first thought we had lost the transcript of one of our sessions when we could not find a file with the name we had selected for the transcript. We would prefer that the transcript be a file with the assigned name. The transcript can be printed when you are off line and will print both the text of your session and any graphics (structures) produced. You can also choose to print the session directly while on line, with or without saving it to disk. It would be useful if the status line at the bottom of the screen always indicated whether capture and/or printing was on. This does appear in the center of the screen in some instances but is not always visible. Because printing does not start until the program has queued a whole page and you can toggle printing on and off with a function key it is easy to think that you have not turned printing on and accidentally toggle it off. Another menu item under results allows you to use continuous scrolling or have the screen display occur one screen

at a time. If you do use continuous scroll you can easily stop the scrolling at any time. STN Express allows you to scroll back through the last 30K of information that has appeared on the screen. This is a very useful feature. When you are off line you can also browse any transcript by having it displayed on the screen rather than printing it. It is also possible to irreversibly split the transcript into separate text and graphic portions.

**Support.** STN International has a toll free number to reach their Search Assistance Desk. Our calls with questions about STN Express were answered immediately or we were called back and provided with the information we needed.

**Recommendation.** STN Express is a very useful program. It does exactly what it is claimed to do. In the hands of a chemist or information specialist it can greatly decrease on line time and simplify searches, particularly structure searches. For persons or organizations who do extensive on line searching this relatively expensive program will pay for itself many times over in decreased connect time and on line charges.

Robert G. Carlson and John A. Landgrebe, *University of Kansas*

## Book Reviews\*

**Quantum Theory of Polymers as Solids.** By Janos J. Ladik (University of Erlangen-Nurnberg). Plenum: New York and London. 1988. xiv + 417 pp. \$69.50. ISBN 0-306-42434-7.

The aim of this book is to present "a unified approach in one volume to the quantum theory of polymers and its applications". The theoretical chemist will find it an informative, albeit incomplete, survey of polymer calculations performed over the last 20 years. Used in this way, the book suffers by not having an author index.

The experimentalist may find it of more limited value. Although the author requires "only a knowledge of elementary quantum chemistry and linear algebra", he has adopted a rather liberal interpretation of the word "elementary". It is a pity he has chosen to use the vector notation of the physicist rather than the secular notation more familiar to the chemist. The physicist language tends more to mystify than enlighten the chemist. Thus the chemist who wishes to gain an understanding of calculation may well not, but example, reach Chapter 4 and thus miss an excellent treatment of aperiodicity in polymers. This difficulty in communication has been recognized by the *Journal of Chemical Education*; it has recently published a series of articles on the calculation and interpretation of polymer properties (1988, 65, 319, 379, 513) written specifically for the nonspecialist. The present book would find a wider audience were secular notation to be used and the vector formulation presented as an appendix.

Brian O'Leary, *The University of Alabama at Birmingham*

**Thermodynamic Data for Pure Compounds. Part A (Hydrocarbons and Ketones) and Part B (Halogenated Hydrocarbons and Alcohols).** Physical Sciences Data Series. Volumes 25A and 25B. By Buford D. Smith and Rakesh Srivastava. Elsevier: New York. 1986. Volume 25A: x + 883 pp. Volume 25B: x + 999 pp. \$294.50 (set). ISBN 0-444-42579-9 (set).

This is a computerized critical compendium of thermodynamic literature data for pure compounds: 263 hydrocarbons (methane through indene), 131 ketones (acetone through 34-benzoyloxy-2,6-dimethyl-2,5-heptadien-4-one), 91 halogenated hydrocarbons (bromomethane to 1,1,2,3,3,3-hexafluoro-1-propene), and 359 alcohols (methanol through 3-(phenylazo)phenol) for the literature up to 1983. The data are the following: vapor pressure, saturated liquid volume, second virial coefficient, enthalpy of vaporization, and saturated vapor volume as functions of absolute temperature, plus melting and normal boiling temperatures, and the critical constants (temperature, pressure, and volume), the compressibility factor, the dipole moment, and the radius of gyration, and the coefficients for the equations of state for the vapor and the liquid. The relevant literature references are given, but only the final results of the critical comparisons are shown. As discussed in the Introduction, this was to be part of a massive work for mixtures of compounds, but that task proved to be too monumental.

This reviewer would have liked to see also the enthalpies of formation, but for those there is, of course, already the excellent, if dated, compendium by J. D. Cox and G. Pilcher, *Thermochemistry of Organic and Organometallic Compounds* (Academic: New York, 1970).

The novelist hopes to entertain. The compiler of scientific data, like

the lexicographer, must hope not to mislead. The novelist, like Homer, can often doze off a bit. The presenter of data must be forever watchful.

Robert M. Metzger, *University of Alabama*

**Comprehensive B<sub>12</sub>. Chemistry-Biochemistry-Nutrition-Ecology-Medicine.** By Zenon Schneider and Andrzej Stroinski (Academy of Agricultural Sciences, Poznan). Walter de Gruyter: Berlin. 1987. xi + 409 pp. \$149.50. ISBN 0-89925-312-1.

The title of this treatise on vitamin B<sub>12</sub> is somewhat misleading. The book is too brief to be a comprehensive treatment of vitamin B<sub>12</sub>. However, it is a useful handbook of vitamin B<sub>12</sub> chemistry and biochemistry. It is replete with useful leads to the literature and tables of data and is, in short, a rich and compact reference work for those whose needs impinge on vitamin B<sub>12</sub>. The subject index seems to be reasonably complete; the absence of an author index is a drawback. An index of microorganisms is included.

The first chapter opens with a brief historical synopsis of the vitamin B<sub>12</sub> field with a helpful chronological outline of major developments. Chapter 2 provides a summary of the nomenclature of vitamin B<sub>12</sub> and its derivatives.

The chemistry of cobalamins with a listing of vitamin B<sub>12</sub> derivatives, their structures, spectral absorbance, occurrence, biological activity, and a discussion of their properties forms the core of chapter 3. Tables include cobalamins substituted with alkanolamines, first-order rate constants for the spontaneous decomposition of alkylcobalamins in acidic and neutral solution, vitamin B<sub>12</sub> labeled with cobalt isotopes, polarographic half-wave potentials, equilibrium and rate constants for  $\beta$ -ligand substitution and pK<sub>a</sub> values.

Chapter 4 deals with the biosynthesis of vitamin B<sub>12</sub> and contains a catalogue of the effects of growth media and aeration on cobalamin products and vitamin B<sub>12</sub> analogues. No structures are given for guidance in this chapter, except for a page of heterocyclic bases at the end of the chapter. However, there is a large, loose, folded chart at the end of the book that provides a flow-sheet diagram of the biosynthesis of vitamin B<sub>12</sub>.

Purification and estimation of vitamin B<sub>12</sub> are covered in the fifth chapter. Following a short section on the extraction of corrinoids by organic solvents, other purification techniques including paper and thin-layer chromatography, ionophoresis, column chromatography, adsorption on charcoal, adsorption on immobilized B<sub>12</sub> binding proteins, and high-pressure chromatography are described. Estimation of corrinoids by microbiological assay is buttressed by tables on the response of test microorganisms to complete and incomplete corrinoids and a table on bacterial vitamin B<sub>12</sub> and analogues containing nucleotides other than 5,6-dimethylbenzimidazole. Radioisotope dilution and enzyme assay methods for the estimation of nanomole to picomole quantities of vitamin B<sub>12</sub> are described together with spectroscopic assays, neutron activation assay, and chemical methods. Procedures for microbial production and purification of vitamin B<sub>12</sub> and other cobamides and cobinamides are included. Among the spectroscopic methods there is only brief mention of NMR, and there is no mass spectral information. Thus, the recent development of the powerful FAB and field-desorption methods have been overlooked.

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

Chapter 6 is concerned with the occurrence and distribution of corrinoids. Corrinoids produced by various microorganisms are tabulated. There is an extensive table on the occurrence of vitamin B<sub>12</sub> in soils and natural waters, algae and higher plants, leguminous plants, nodules, food, and other biological sources. Also included are estimates of cobalamins in human tissues and body fluids in both healthy and diseased states.

Chapter 7 is concerned with the enzyme reactions dependent upon adenosylcobalamin and methylcobalamin. This chapter contains, in outline form, the characteristic properties of the various rearranging enzymes in the B<sub>12</sub> series.

Chapter 8 describes nonenzymic vitamin B<sub>12</sub> binding proteins in man and animals. Biological function, methods of purification, and methods of assay as well as physical and chemical properties are included. This chapter is presented largely in tabular format and includes an excellent diagram showing the circulation of vitamin B<sub>12</sub> in mammalian systems, detailing the role of the various cobalamin receptor and transport proteins.

The first part of chapter 9 deals with the clinical features of the cobalamin deficiency syndrome including megaloblastic anemia and neurological abnormalities. The biochemical consequences of cobalamin deficiency are treated rather too briefly.

The book concludes with a section on pharmaceutical preparations of vitamin B<sub>12</sub>.

Paul Dowd, *University of Pittsburgh*

**Handbook of Conducting Polymers. Volumes I and II.** Edited by Terje A. Skotheim. Marcel Dekker: New York, 1986. \$125.00 (set). Volume I: xx + 728 pp. ISBN 0-8247-7395-0. Volume II: xx + 688 pp. ISBN 0-8247-7454-X.

This two-volume set describes admirably the status of knowledge about conducting polymers (polyacetylene, polypyrrole, polythiophene, to mention but a few). The editor has signed on most of the major players, and the contributors have outlined the chemistry (in Volume I) and the spectroscopy and the physics (in Volume II).

Although the idea of electrically conductive polymers would have seemed improbable a few years ago in the era of polyethylene and polyvinyl chloride, Nature herself has led the way in showing, in the carotenes, the importance of even short polyene strands both as sacrificial oxidizable "protect" molecules and as "molecular antennae" for electron and energy transfer. In the early 1970's, Shirakawa in Japan worked and published on polyacetylene but was not noticed; a 1-year stay at the University of Pennsylvania in 1976 with Heeger and MacDiarmid changed all that. The rest is history. With suitable doping by anionic and cationic species, these initially insulating or semiconducting polyenes become excellent conductors of electricity; by borrowing the terms "n-doping" and "p-doping", the analogy with Si and Ge semiconductors is complete: these doped conducting polymers can function as anodes and cathodes in a variety of electrochemical and electrical storage applications.

Some polymers are extremely oxygen sensitive; others are air-stable and shelf-stable and have ushered in an era of potential practical applications, limited, alas, only by the conservatism of the supporters of older technologies. We now have detectors of aging of merchandise, electromagnetic shields, photoelectrical cells (not very efficient), and light-weight batteries. Since the book was written, doped polyacetylene has reached a conductivity in excess of  $5 \times 10^5$  Siemens per centimeter (close to that of copper metal). On the theory side, the physics of solitons (do they exist? do they not?) has proved a real boon for the solid-state physics community. Skotheim very wisely includes in his volume articles by both enthusiastic supporters and firm critics.

The combination of the chemists (who know how "messy" such systems can be, with their filamentary nature, large void volume, and residues of the polymerization catalysts) and the physicists (who can test their one-dimensional and quasi-one-dimensional theories) produced in this two-volume set a very valuable resource, which has enjoyed excellent sales within the specialist community and deserves wide circulation and careful reading.

Robert M. Metzger, *University of Alabama*

**High Performance Liquid Chromatography.** Edited by Phyllis R. Brown (University of Rhode Island) and Richard A. Hartwick (Rutgers University). John Wiley & Sons: New York, 1989. xii + 688 pp. \$75.00. ISBN 0-471-84506-X.

This book is Volume 98 in the series *Chemical Analysis* (a series of monographs on analytical chemistry and its applications). The aim of the book, as stated in the Preface, is to "... consolidate the basic theories of chromatography along with the more exciting (recent) technical developments in the field.". Moreover, it was intended to address several questions: "What is the current state-of-the-art in liquid chromatography? Has the development of liquid chromatography plateaued? If so,

what new methods will take its place or complement it? If not, where will the new frontiers be and what direction will liquid chromatography take?"

In seeking to answer these questions, the book provides a collection of 16 chapters: (1) The Theory of the Dynamics of Liquid Chromatography by S. G. Weber and P. W. Carr; (2) Mechanism of Solute Retention in Chromatography by R. P. W. Scott; (3) Oxide Stationary Phases by K. K. Unger and U. Truedinger; (4) Carbon in Liquid Chromatography by J. H. Knox and B. Kauer; (5) Organic Polymeric Stationary Phases by D. J. Pietrzyk; (6) Size-Exclusion Liquid Chromatography by W. W. Yau, J. J. Kirkland, and D. D. Bly; (7) High Performance Affinity Chromatography by I. M. Chaiken, G. Fassina, and P. Caliceti; (8) Separation of Chiral Compounds with  $\alpha$ -Acid Glycoprotein as Selector by J. Hermansson and G. Schill; (9) High Speed Liquid Chromatography by R. C. Simpson; (10) A Theoretical Approach to Derivatizations for HPLC by I. S. Krull, S. T. Colgan, and C. M. Selavka; (11) Preparative Liquid Chromatography by H. Colin; (12) Process High Performance Liquid Chromatography by W. M. Skea; (13) Precision in HPLC by E. Grushka and I. Zamir; (14) HPLC as a Source of Information About Chemical Structure of Solutes by R. Kaliszan; (15) Field-Flow Fractionation: an HPLC Analogue by L. F. Kesner and J. C. Giddings; and (16) Multidimensional Techniques in Chromatography by N. Sagliano, Jr., T. V. Raglione, and R. A. Hartwick. The text concludes with an extensive subject index.

The first two chapters (pages 1-144) present some of the relevant theory of liquid chromatography, while the next three (pages 145-276) are devoted to the theory as well as use of stationary packings. Chapters on size-exclusion and affinity chromatography (pages 277-336) complete the first half of the book. Selected applications of HPLC are covered in the next several chapters, including chiral compounds, high-speed LC, derivatization, and preparative and process HPLC (pages 337-528). Variables that affect the reproducibility of the technique, as well as some of the physicochemical factors that govern retentions, are presented in the following two chapters (pages 529-600). Ancillary techniques, such as field-flow fractionation and multidimensional methods (pages 601-668) then finish the work.

My choice of the order of the chapters would have been somewhat different: precision and physicochemical topics would have followed the first two chapters on theory. In addition, some very important areas are covered only weakly (if at all), such as physicochemical (as opposed to analytical) applications (see recent work by D. C. Locke et al.), the use of cyclodextrins (D. W. Armstrong) to complement the chapter on chiral separations, the systematic optimization (e.g., window diagrams) of HPLC separations (H. J. Issaq et al.), and, if field-flow fractionation is considered an ancillary technique to HPLC, the same must also be said of modern countercurrent distribution methods (Armstrong; J. Cazes et al.). The most glaring omission, however, concerns the question that lies at the heart of all forms of liquid chromatography, namely, how is the interface to be defined (D. E. Martire; E. sz. Kovats)?

Despite the above, this book was a delight to read and a joy to study. The editors have done a heroic job in gathering widely recognized experts and their collaborators to write up-to-date topical chapters on their fields of expertise. Moreover, most of the authors offer a refreshingly opinionated spectrum of thought (with gratifyingly little overlap from one chapter to the next) on at least most of the important areas of interest in HPLC and, in doing so, provide the reader with new directions for study and investigation. As a result, the editors have admirably accomplished their major objective, viz., to provide a comprehensive treatise on the fundamentals of state-of-the-art HPLC and related techniques.

The reader should be warned that this book is not for beginners, nor was it intended to be. Also, because it was meant to be useful 10 years from now as well as the present, there is very little of the usual clutter on instrumentation or extensive details of specific separations. Instead, it was written by and for experts at the cutting edge of the field, particularly those who teach graduate-level separations science. As such, it is an enormously successful work and can be recommended without reservation for all who desire an advanced level of understanding of liquid chromatography.

Richard J. Laub, *San Diego State University*

**Chromatographic Chiral Separations. Chromatographic Science Series 40.** Edited by Morris Zief and Laura J. Crane. Marcel Dekker: New York and Basel, 1988. vii + 410 pp. \$119.50. ISBN 0-8247-7786-7.

In this book, 20 scientists from universities as well as from industry describe the actual state of the art in enantiomeric separations by liquid-chromatographic techniques. In spite of the general title of this book, no gas chromatographic resolutions are discussed. The LC techniques discussed include direct separations on chiral stationary phases, indirect separations of diastereoisomeric derivatives on achiral stationary phases,

and separations by addition of chiral components to the mobile phase. A great effort is made to explain the interactions between solutes and stationary phases, which are responsible for the chiral separations. Insight into the separation mechanism is important for choosing the appropriate stationary phase and the components of the mobile phase: solvent, modifiers, buffers, etc. Analytical as well as preparative-scale separations are discussed. Many examples are given, especially for the resolution of amino acids and drugs, but also for other organic compounds such as natural products, synthons for natural products, etc. The examples given in figures are accompanied by legends giving the experimental circumstances. For more details each chapter has a well-elaborated reference list of original papers. This book is a welcome supplement on the bookshelf of chemists and chromatographers working in the fields of food and nutrition chemistry, pharmaceutical and clinical chemistry, agricultural and environmental chemistry, biotechnology, and even space and geochemistry. Furthermore, this book is a recommendable source for teachers giving advanced undergraduate and postgraduate courses.

Guy Lemière, *University of Antwerp*

**Elementary Equilibrium Chemistry of Carbon.** By Grant Urry (Tufts University). John Wiley and Sons: New York and Chichester. 1989. xv + 223 pp. \$39.95. ISBN 0-471-84740-2.

The contents of this book are broader and deeper than the deceptively simple title suggests. It is rather a research monograph in which the abundant early literature of organic chemistry frames a presentation of some very recent work on equilibrium redox disproportionation reactions of graphite and some of its relatively simple derivatives.

The tone is often personal; citing, for example, the "simple" reaction,  $\text{CH}_3\text{COONa} + \text{NaOH} \rightarrow \text{CH}_4 + \text{Na}_2\text{CO}_3$ , which was apparently "well known" in 1924 as a laboratory source of pure methane, the author informs us that in "a rapid informal survey of colleagues across the country" he "failed to discover anyone aware" of it. He justifiably bemoans this "encryption of valuable scientific knowledge", chiding "the previous generation of chemists for choosing not to transmit this knowledge to currently active chemists".

The writing is, not infrequently, charmingly reminiscent of older chemistry texts, but the solid underlying scholarship is evident from the voluminous end-of-chapter bibliographies; references in the first chapter, for example, extend from F. Wöhler (1828) to R. Hoffmann (1987). The result is a fascinating discourse on some extremely interesting and essential chemistry.

Chapter I is an introduction in which the author outlines the abundance, uses, and fundamental properties of carbon. It includes also an engaging and reflective justification for writing the monograph.

Chapter II reviews the structures of graphite and their chemistry with respect to reaction with oxygen, water, and nitrogen. The chapter includes an interesting discussion of the useful products derived from the reaction of active graphite with quartz and acetylene.

Chapter III examines the properties of carbohydrates, which the author defines literally as hydrates of elemental carbon, e.g., acetic acid,  $\text{C}_2[\text{H}_2\text{O}]_2$ .

Chapter IV explores many redox reactions of carbon-containing materials, especially graphite and cellulose. The emphasis is on increased production of useful products by judicious application of Le Chatelier's principle.

Chapter V is a discussion of nitrogen fixation by carbon. There is a particularly interesting exposition of reactions of graphite dispersed in solid sodium carbonate, a system in which the yield of useful products may be enhanced by adjusting the size of the cavity in the lattice. This chapter and the one preceding also contain some detailed descriptions and illustrations of experimental procedures employed by the author in his own studies.

Chapter VI is a continuation of the presentation of Chapter V focusing on the chemistry of CO and  $\text{H}_2\text{O}$  in solid sodium carbonate and in zeolites. The role of carbon suboxide,  $\text{C}_3\text{O}_2$ , as an intermediate is discussed mechanistically at some length.

This is a very readable and very interesting book whose title belies the range and depth of its supporting scholarship; it may be profitably read by every chemist.

N. Mammano, *SUNY-Plattsburgh*

**Preparative Acetylenic Chemistry. Second Edition. Studies In Organic Chemistry 34.** By Lambert Brandsma. Elsevier: Amsterdam and New York. 1988. xii + 321 pp. \$115.75. ISBN 0-444-42960-3.

This book provides detailed experimental procedures for the preparation of a wide range of acetylenic compounds and updates the first edition, published in 1971. It contains several new or improved procedures reflecting the current state of the art.

This edition is divided into 12 chapters: 1, General Practical Information; 2, Metallation of Acetylenes; 3, Functionalization of Metallated

Acetylenes with Alkyl Halides,  $\alpha$ -Haloethers, Epoxides, and Alkyl Orthoformates; 4, Ethynylation and Alkynylation of Carbonyl Compounds; 5, Carboxylation, Alkylation and Related Reactions; 6, Silylation, Stannylation and Phosphorylation; 7, Sulfonylations and Related Reactions; 8, Halogenation and Cyanation; 9, Introduction of the Triple Bond by Elimination and Addition-Elimination Reactions; 10, Couplings of Acetylenes Assisted by Copper and Palladium; 11, Base-Promoted Interconversions of Acetylenes; 12, Miscellaneous Preparations of Acetylenic Derivatives.

No subject index is given; however, two fully referenced compound indices are provided. The first is a limited selection of simple compounds, and the second is a complete listing of all derivatives described in this edition plus many literature compounds organized by chemical class.

The first chapter describes many experimental techniques of general use and gives illustrated descriptions of the recommended equipment to be used in the experiments. Each of the subsequent chapters contains a brief introduction followed by an extensive experimental section containing detailed preparations of specific derivatives. The experiments are written for relatively large scale (0.1–4.0 mol) and, accordingly, most of the purification procedures involve either distillation or recrystallization rather than chromatography. In addition, it is noted that many of the procedures should be amenable to further scale-up. The text covers the synthesis of most major classes of acetylenic compounds. Through these experiments a number of useful laboratory techniques are introduced in detail including the handling of acetylene gas, liquid ammonia, alkali metals, volatile products, and air-, moisture-, and heat-sensitive materials.

The strength of this book is found in the excellent experimental sections, which include: (1) a recommended reaction apparatus referenced to the illustrations found in the first chapter; (2) real yields based upon repetitive runs at a meaningful laboratory scale; (3) discussions on the scope and limitations of each general method and comparisons to alternative synthetic approaches; (4) a variety of useful "tricks of the trade" based upon careful observation, details which are too often omitted in standard literature procedures.

This book could serve as a laboratory manual for advanced organic chemistry students provided the experiments are chosen with care. Careful screening is recommended because several of the preparations involve the use or generation of extremely toxic, irritating, or unstable compounds. Furthermore, important safety considerations and warnings are frequently absent or inadequate.

One criticism is that too many specific procedures are given for the synthesis of similar homologues (i.e., methyl, ethyl, propyl, etc.). Although the large database becomes repetitive, there is sufficient variation that a careful examination will yield a good sense of trends in the physical characteristics of related compounds. This knowledge can be readily extrapolated to develop rational synthetic approaches to compounds that are not specifically described. To supplement this practical synthetic value, it would have been beneficial to expand several areas of the text. There are only limited discussions of the theoretical aspects of acetylenic chemistry, often leaving the reader with a good impression of "how" but not "why". Also, more emphasis could have been focused on the new and important areas of phase-transfer catalysis and palladium-mediated transformations.

Overall, this book is an excellent reference for anyone interested in practical preparations of multigram quantities of acetylenic derivatives.

Thomas A. Mulhern, *Parke-Davis/Warner-Lambert Co.*

**Molecular Luminescence Spectroscopy. Methods and Applications: Part 2. Chemical Analysis Volume 77.** Edited by S. G. Schulman (University of Florida). John Wiley & Sons: New York and Chichester. 1988. xi + 526 pp. \$79.95. ISBN 0-471-63684-3.

This book, volume 77 of the monograph series on analytical chemistry and its applications from Wiley & Sons, covers what the editor of the book terms "hot" areas of analytical luminescence spectroscopy. The various chapters are written by scientists who are at the "cutting edges" of their respective areas, as the editor of the book points out. The book has six chapters, of which the last two chapters deal with applications other than to chemical analysis. Authors of the first four chapters discuss theoretical aspects, instrumentation, and applications to the analysis of real samples so that the "uninitiated" may not go astray.

The titles and authors of the chapters in this monograph are as follows: 1, Luminescence from Solid Surfaces (72 pages with 156 references) by R. J. Hurtubise; 2, Time-Resolved and Phase-Resolved Emission Spectroscopy (50 pages with 58 references) by J. N. Demas; 3, Fiber Optical Fluorosensors in Analytical and Clinical Chemistry (154 pages with 253 references) by O. S. Wolfbeis; 4, Highly Resolved Molecular Luminescence Spectroscopy (118 pages with 406 references) by J. W. Hofstraat, C. Gooijer, and N. H. Velthorst; 5, Applications of Lanthanide Ion Luminescence from Inorganic Solids (60 pages with 344 references) by H. G. Britain; 6, Proton Transfer Kinetics of Electronically Excited Acids

and Bases (50 pages with 56 references) by R. N. Kelly and S. G. Schulman. As pointed out, the areas covered in the last two chapters differ from the rest in that major applications dealt with are not analytical. Nevertheless, the topics discussed in these two chapters should be of interest to many industrial researchers (Chapter 5) and to some analytical as well as physical chemists (Chapter 6). References cited in these two chapters are not as recent as those in other chapters; this could be an indication that somewhat less attention is being paid to these areas by current researchers. It is a bit disappointing that some analytical applications of lanthanide luminescers such as chemical sensors have not even been mentioned in Chapter 5. Materials covered in Chapters 2 and 4 should present a solid background to analytical chemists wishing to resolve luminescent organic compounds, whose chromophores are very similar or practically identical. Many of these compounds cannot be resolved by conventional spectroscopic, differential pulse polarographic, or high-performance liquid chromatographic techniques. An excellent discussion on data treatment is found in Chapter 2. Chapter 4 discusses an outline of four highly resolved spectroscopic techniques: matrix isolation fluorescence spectroscopy, Shpol'skii spectroscopy, fluorescence and phosphorescence line-narrowing spectroscopy, and supersonic jet spectroscopy. As the authors of this chapter point out, luminescence spectroscopic techniques have been used mostly for quantitative analysis; the potentials of these techniques for applications to qualitative as well as quantitative analyses of compounds having very similar or nearly identical luminescence are well covered in this chapter.

The book should serve as an excellent introduction to the subject with plenty of applications to real samples. Particularly, Chapters 1 and 3 present many good examples. I think the book would fit as an excellent supplement to an entry-level course on the subject, in which the major audience would be the students majoring in analytical and physical chemistry. The book is recommended to all who are interested in using luminescence spectroscopy for chemical analysis and who are performing research in this field.

Su-Moon Park, *University of New Mexico*

**Laboratory Studies of Heterogeneous Catalytic Processes. Studies in Surface Science and Catalysis. Volume 42.** By Erhard G. Christoffel (University Witten), revised and edited by Zoltán Paál (Hungarian Academy of Sciences). Elsevier: Amsterdam and New York. 1989. xiii + 260 pp. \$155.25. ISBN 0-444-43025-3.

The continuing development of novel and improved surface analytical techniques during the past 10–15 years has produced a spate of books and review articles detailing these specialized instrumental methods and their applications to catalytic research. Kinetic modeling of catalytic reactions, however, has received far less recent attention, and there has remained a paucity of monographs dealing with rigorous treatment of kinetic data. This book, originally prepared by the late Erhard Christoffel and subsequently edited into final form by Paál, represents an effective contribution to this field. Following a brief description in Chapter 1 of the need for rigorous kinetic models, using the industrial production of C<sub>8</sub> aromatics as a numerical example, Chapter 2 provides a categorization of the similarities and differences among enzyme, homogeneous, and heterogeneous catalysis. The principal focus of the book is contained in its final two chapters. Chapter 3 begins with a treatment of methods aimed at obtaining information about catalytic reaction mechanisms, touching briefly on the use of infrared spectroscopic and temperature-programmed techniques, but centering primarily on the applications of model compound reactions and graph theory, and including a very useful discussion of the analysis of conversion vs time data. There follows a detailed mathematical treatment of rate and reactor models that will be of particular interest to engineers in the development of rigorous kinetic rate expressions. The treatment includes both linear and nonlinear systems, and contains procedures for the estimation of kinetic parameters by the two-point method and by the methods of Galvalas and of Prater and Wei. The techniques are illustrated by application to a nontrivial three-component system. The chapter concludes by detailing mathematical approaches for incorporating diffusion effects and the kinetics of catalyst deactivation into reactor models. The final chapter will be of particular value to experimentalists, since it provides an effective summary of the type and mathematical treatment of kinetic data that can be obtained from a variety of laboratory-scale reactors, including micropulse, single-pellet diffusion, fixed bed, and recycle reactors, as well as a discussion of the transient response technique. Applications of the material in the final two chapters are liberally illustrated by a variety of real systems and case studies, taken primarily from Christoffel's extensive experience in reforming and other hydrocarbon conversion reactions. This book provides an excellent overview of the application of rigorous kinetic models to heterogeneous catalytic reaction data and, because of its engineering emphasis, serves as a useful complement to more fundamentally oriented works, such as Boudart's and

Djéga-Mariadassou's *Kinetics of Heterogeneous Catalytic Reactions*. Michael P. Rosynek, *Texas A&M University*

#### Volumes of Proceedings

**The Physics and Chemistry of SiO<sub>2</sub> and the Si–SiO<sub>2</sub> Interface.** Edited by C. Robert Helms (Stanford University) and Bruce E. Deal (National Semiconductor). Plenum: New York and London. 1988. xiii + 556 pp. \$115.00. ISBN 0-306-43032-0.

The 173rd Meeting of the Electrochemical Society, held in Atlanta in 1988, was the occasion for the symposium from which this book of typescript contributions evolved. It contains a large number of papers arranged under six headings, curiously referred to as "chapters" in the preface: Growth Mechanisms of SiO<sub>2</sub> Films; Thermal and Structural Properties of SiO<sub>2</sub>; The Atomic and Electronic Structure of the Si–SiO<sub>2</sub> Interface; Defects, Impurities, and Damage Mechanisms in Si–SiO<sub>2</sub> Systems; Effects of Preoxidation Substrate Quality, Surface Treatments, and Oxidation-Induced Point-Defect Generation; and Electron and Hole Transport and Tunneling in SiO<sub>2</sub>. The index is 4 pages.

**Alloy Phase Stability. NATO ASI Series E: Applied Sciences—Volume 163.** Edited by G. M. Stocks (Oak Ridge National Laboratory) and A. Gonis (Lawrence Livermore National Laboratory). Kluwer: Dordrecht and Boston. 1989. xi + 655 pp. \$173.00. ISBN 0-7923-0142-0.

The large number of short papers in this typescript volume are grouped under seven headings: Alloy Design; Experimental Probes of Atomic and Electronic Structure; Thermodynamics and Statistical Mechanics; Electronic Theories of Phase Stability, Semi-Phenomenological and Model Hamiltonians; Electronic Theories of Phase Stability: First Principles Theory; The Effects of Strain and Macroscopic Defects on Phase Stability; and General Topics. They are the proceedings of a NATO Advanced Study Institute held on Crete in 1987. There is no index.

**Biological and Artificial Intelligence Systems.** Edited by E. Clementi and S. Chin (IBM). ESCOM: Leiden. 1988. xiii + 584 pp. \$130.00. ISBN 90-72199-02-2.

This typeset volume contains 28 papers from the Fourth International Symposium on the title subject, held in Trento, Italy, at an unspecified date. The papers are grouped under seven headings: Biological Systems: Proteins, Biological Systems: DNA, Bridge From Biological to Artificial Intelligence Systems, Artificial Intelligence Systems: Parallel Computers, Artificial Intelligence Systems: Pattern Recognition, Artificial Intelligence Systems: Voice Recognition, and Artificial Intelligence Systems: Robotics. The book opens with 8 pages of remarkable color-graphic illustrations of computed electron density in such molecules as guanine and adenine, and closes with a 6-page subject index.

**Applied Bioactive Polymeric Materials. Polymer Science and Technology. Volume 38.** Edited by Charles G. Gebelein (Youngstown State University) et al. Plenum: New York and London. 1988. x + 334 pp. \$69.50. ISBN 0-306-43101-7.

This typescript book of 23 contributed papers is represented as a reference book, and the preface mentions "chapters" by number, but neither the table of contents nor the contributions include identification by chapter number. The two initial contributions are reviews, the first one on bioactive polymers (natural and synthetic) and the second on pesticide-polymer research during 1976–1987. The other contributions are reports of original research, derived, apparently, from a symposium held at the American Chemical Society Meeting in New Orleans in 1987. The 8-page index is commendably thorough.

**Organometallic Chemistry and Organic Synthesis.** Edited by M. L. H. Green and S. G. Davies (University of Oxford). The Royal Society: London. 1988. vii + 151 pp. £31.95. ISBN 0-85403-365-3.

This attractively produced book records the contributions from a discussion meeting held at the Royal Society's premises in 1988, and which were first published in *The Philosophical Transactions of the Royal Society, Series A*, Volume 326. Introductory and closing remarks, and transcripts of the discussions of each paper, are included. Many of the best known chemists in the subject area are represented.

**Stable Isotopes in Ecological Research. Ecological Studies 68.** Edited by P. W. Rundel (University of California) et al. Springer-Verlag: New York and Berlin. 1989. xv + 525 pp. \$89.00. ISBN 0-387-96712-5.

The origin of the 28 papers in this book was a workshop held in Los Angeles in 1986. The papers are grouped under three headings: Ecophysiological Studies in Plants, Animal Food Webs and Feeding Ecology, and Ecosystem Process Studies. The importance of the subject is the increasing need to trace the fate of materials, especially pollutants, in the environment, without at the same time, contributing new contaminants in the form of radioactive elements. Stable isotopes of common elements offer a possible solution.

The papers are set in type, and a substantial index is provided.

**Biocatalysis and Biomimetics.** ACS Symposium Series 392. Edited by James D. Burrington (B.P. America) and Douglas S. Clark (University of California). American Chemical Society: Washington, DC. 1989. xiii + 169 pp. \$39.95. ISBN 0-8412-1611-8.

A 1988 symposium was the source of the 12 typescript papers in this volume. They are mostly reports of original research and are organized under four headings: Bioscience and Biotechnology, Structure-Function Relationships, Water-Restricted Media, and Biomimetics. A paper on biocatalysis and biomimetics is strikingly embellished with plates of color graphics.

**The Expanding Role of Folates and Fluoropyrimidines in Cancer Chemotherapy.** *Advances in Experimental Medicine and Biology*. Volume 244. Edited by Youcef Rustum and John J. McGuire (Roswell Park Memorial Institute). Plenum: New York and London. 1988. x + 336 pp. \$69.50. ISBN 0-306-43100-9.

The 31 typescript papers in this volume are derived from a symposium held in Buffalo in 1988. The papers are grouped under three headings: Determinants of Response to Fluoropyrimidines in Combination With CF, Evidence for Thymidylate Synthase as the Critical Site of Action of Fluoropyrimidines in Combinations With CF, and Therapeutic Efficacy and Toxicity of Fluoropyrimidines in Combination With CF. Short summaries of the first two sessions and a panel discussion of future directions are included. A list of authors, a glossary of abbreviations, and a 4-page subject index complete the work.

**Supercritical Fluids. Chemical and Engineering Principles and Applications.** ACS Symposium Series 329. Edited by Thomas G. Squires (Iowa State University) and Michael E. Paulaitis (University of Delaware). American Chemical Society: Washington, DC. 1987. x + 302 pp. \$59.95. ISBN 0-8412-1010-1.

The American Chemical Society National Meeting in Chicago in 1985 was the occasion for the symposium that produced the 22 typescript papers in this volume. They are arranged under six headings: Physicochemical Properties, Chemical Reactions, Phase Equilibria, Chromatography, Fractionation and Separation, and Fuel Applications. A thorough index is provided.

**Phase-Transfer Catalysis. New Chemistry, Catalysts, and Applications.** ACS Symposium Series 326. Edited by Charles M. Starks (Vista Chemical Company). American Chemical Society: Washington, DC. 1987. ix + 195 pp. \$36.95. ISBN 0-8412-1007-1.

The importance of phase-transfer catalysis seems to increase steadily with the increased range of its application. In this volume, 14 typescript papers, one of which is an overview, report the proceedings of a symposium held in Chicago in 1985. A substantial subject index enhances its usefulness.

**Fluorinated Carbohydrates. Chemical and Biochemical Aspects.** ACS Symposium Series 374. Edited by N. F. Taylor (University of Windsor). American Chemical Society: Washington, DC. 1988. x + 213 pp. \$49.95. ISBN 0-8412-1492-1.

The subject of the 1987 symposium that provided the 11 typescript papers in this volume would have seemed highly improbable two decades ago, but it has grown in importance because of generalization that the fluoro group may replace hydroxyl with minimal conformational disturbance. The hard-core organic chemist will be uncomfortable with the use of "fluorinated" to mean such replacement, because "halogenation" has the precise meaning of replacement of hydrogen by halogen. Perhaps the carbohydrate chemists should try harder to find an acceptable alternative.

Many of the papers are concerned with enzyme chemistry and metabolism, and interest in chemotherapeutic agents can also be noted. The opening paper, Retrospect and Prospect, gives a good orientation to the area.

**Biotechnology in Agricultural Chemistry.** ACS Symposium Series 334. Edited by Homer M. LeBaron (CIBA-GEIGY Corporation) et al. American Chemical Society: Washington, DC. 1987. xxii + 367 pp. \$64.95. ISBN 0-8412-1019-5.

One review paper and 28 reports of original research reproduced from typescript make up this volume, which was derived from a symposium held at the Chicago American Chemical Society Meeting in 1985. The papers are grouped under four headings: Plant Cell and Tissue Culture; Microbial Applications; Economic, Legal, and Safety Issues For Biotechnology Related to Agriculture; and Genetic Engineering and Selection. The subject index of nearly 14 pages is exemplary.

**Pesticides. Minimizing the Risks.** ACS Symposium Series 336. Edited by Nancy N. Ragsdale (U.S. Department of Agriculture) and Ronald J. Kuhr (North Carolina State University). American Chemical Society: Washington, DC. 1987. vii + 183 pp. \$34.95. ISBN 0-8412-1022-5.

There are 14 typescript papers in this volume, including a 13-page overview and a 7-page summary and discussion, derived from a symposium held in New York in 1986. They are grouped under the general headings: Toxicology, Pests, Chemicals, and Potential Hazards. The subjects range from experiment to publicity and education.

**Surfactant-Based Mobility Control. Progress in Miscible-Flood Enhanced Oil Recovery.** ACS Symposium Series 373. Edited by Duane H. Smith (U.S. Department of Energy). American Chemical Society: Washington, DC. 1988. x + 449 pp. \$94.95. ISBN 0-8412-1491-3.

The 22 typescript papers in this volume are arranged under four headings: Need For Dispersion-Based Mobility Control; Phase Behavior, Surfactant Design, and Adsorption; Mechanisms and Theory of Dispersion Flow; and Dispersion Floods In the Laboratory and Field. They arose from the 61st Annual Colloid and Surface Science Symposium held in Ann Arbor in 1987. Much interest in foams is evident in the individual titles. One paper, tucked away near the end, might have a major impact on the future of cosmetic surgery: Use of Crude Oil Emulsions to Improve Profiles.

**Particle Size Distribution. Assessment and Characterization.** ACS Symposium Series 332. Edited by Theodore Provder (The Glidden Company). American Chemical Society: Washington, DC. 1987. x + 308 pp. \$59.95. ISBN 0-8412-1016-0.

The American Chemical Society Division of Polymeric Materials sponsored the 1985 symposium that generated the 20 typescript papers in this volume. They are grouped under four headings: Image Analysis, Photon Correlation Spectroscopy and Light-Scattering Methods, Disc Centrifuge Photosedimentometry and Sedimentation Field-Flow Fractionation, and Column Chromatography Methods. A 10-page subject index makes it easy to find derived information.

**Biocatalysis in Agricultural Biotechnology.** ACS Symposium Series 389. Edited by John R. Whitaker (University of California) and Philip E. Sonnet (U.S. Department of Agriculture). American Chemical Society: Washington, DC. 1989. x + 397 pp. \$84.95. ISBN 0-8412-1571-5.

The 26 typescript papers in this book were part of a symposium held at the Third Chemical Congress of North America in 1988. After an introductory paper on the interdependence of enzymology and agricultural biotechnology, the papers are grouped under five headings: Tailoring Enzymes for Industrial Uses, Enzymatic Biosynthesis and Degradation of Polymers, Specialty Uses of Enzymes, Insect and Plant Enzymology, and Biocatalytic Synthesis of Agrochemicals. An extensive index completes the book.

**Biogenic Sulfur in the Environment.** ACS Symposium Series 393. Edited by Eric S. Saltzman (University of Miami) and William J. Cooper (Florida International University). American Chemical Society: Washington, DC. 1989. xi + 572 pp. \$99.95. ISBN 0-8412-1612-6.

The American Chemical Society Division of Environmental Chemistry sponsored the symposium held in New Orleans in 1987 that gave rise to the 34 typescript papers that make up this volume. They are grouped under seven headings: Terrestrial and Freshwater Systems: Emissions, Terrestrial and Freshwater Systems: Transformations, The Oceans: Distributions, The Oceans: Biological Transformations, The Oceans: Chemical Transformations, The Atmosphere: Distribution, The Atmosphere: Gas-Phase Transformations, and The Atmosphere: Aqueous-Phase Transformations. The titles of the papers indicate that dimethyl sulfide is very widely distributed. The 12-page index is very thorough.

**Flavor Chemistry. Trends and Developments.** ACS Symposium Series 388. Edited by Roy Teranishi (U.S. Department of Agriculture) et al. American Chemical Society: Washington, DC. 1989. viii + 246 pp. \$54.95. ISBN 0-8412-1570-7.

A 1988 symposium held at the Third Chemical Congress of North America, in Toronto, was the origin of the 18 typescript papers presented in this book. The first paper is an overview of new trends and developments, and the remaining papers are grouped under two headings: Formation of Flavor Compounds and Recent Investigations of Specific Flavors. The latter group includes material on herbs and spices, cooked meats, truffles, tomatoes, and pineapple. In a remarkable table are listed about 80 compounds that have been detected as constituents of pineapple aroma. Although nearly all of them are C,H,O compounds, chloroform and  $\alpha$ - and  $\beta$ -selenene are among the constituents.