searching switched off, all diastereomers will be retrieved.

Queries for structural searching are created with an adaptation of the Molkick structure editor. For Current Facts, Molkick has been enhanced with the features required for the advanced search capabilities of S4, such as stereogenic searching and generic searching. For users unfamiliar with Molkick, it is easy and intuitive to use with a short learning curve.

Search times vary considerably according to the nature of the query. Presumably, faster hardware will also accelerate the search time. Current Facts was tested for this review on a slower computer, an AT clone at 12 Mhz, and a typical search for an uncomplicated query with 0–20 hits took about 40 s. Large queries with several rings took 60–90 s. If the query was tautomeric, the search time roughly doubled. In the stereo search mode, the search time was about 5 s less. Use of the predefined or user defined atom lists added no time to the search, but use of the generic groups was a problem. A test of the heterocyclic generic group (CHC) took over 11 min, but this search found 16 000 hits. It is not clear if the lengthy search was due to the generic search directly or the large number of hits that had to be posted. When several Markush structures were substituted for the CHC code, only 3 hits were retrieved and the search time dropped back to 40 s again.

Display Modes: After a search is complete, from either OptiSearch or S4, the answers are automatically passed to one of several display modes. The short display mode, designed for reviewing hits quickly, displays six structures on the screen simultaneously. There are two views in the short display mode. It is possible to view the structure only, or alternatively, the BRN, chemical name, and a short list of key fields available, such as preparation and spectral data. The full display mode shows the complete record for a compound including the structure. The structure graphic is superimposed over the identification information, but it is scalable with the mouse. There are several toggles for various features in the full display, including turning references off and turning the structure off. Printing the full display is time consuming (about 90 s per page when tested on an HP LaserJet II) but produces handsome output. The lengthy print times for graphics on LaserJet II printers is notorious, but it is reported that the LaserJet IIISi is much faster, requiring about 15 s per page.

It takes about 5 s for a record to be accessed from the CD-ROM itself. Thus, every short display screen takes 30 s to fill up and return control of the computer to the user, which seems like a very long time. After a record is displayed once, however, additional manipulation is fast, such as viewing the full display or going back to earlier records. Unfortunately, this is probably an artifact of the retrieval of data from the CD and is probably fairly constant, regardless of hardware. For some users, this sluggishness may be an obstacle to using Current Facts.

Special Uses: Current Facts may be useful as a current awareness tool. Currently, there is no real way to do a current awareness search based on a structure query. Current awareness searches of the CAS Registry file are possible but are of very limited value because CAS puts structures in the Registry file much faster than the corresponding citations appear in the CA file, so Registry file current awareness searches contain very few actual references. A structure search on Current Facts will return a citation for each structure located. However, a structure retrieved on Current Facts is not necessarily novel; it only has to be reported with new data. Unfortunately, there is no way to distinguish new and novel structures from known structures with new data. This would be a nice feature for certain current awareness searches. The inability to distinguish which update a record belongs to is another limitation of Current Facts as a current awareness tool. There are four updates on each disc, and a regular current awareness search should only retrieve records for the most recent update.

Another area with great potential, unrealized in the CD-ROM database, is reaction searching. In the online file, it is possible to search for a particular substance or group of substances as starting materials, reagents, catalysts, or products and obtain chemical reaction information. At present, Current Facts does not have the requisite linking capabilities in the OptiSearch module to perform this type of search, but this is a promised enhancement.

The Big Picture: Ultimately, the software in the Current Facts package will be the cornerstone of a search on the Beilstein system. Current Facts will be used to generate queries, including creation of structural and factual queries, creating chemical names for queries with Autonom, and generating LN's for similarity searching with Sandra. The most recent literature data will be on the Current Facts CD-ROM, with the online services readily available for a complete search of the literature from 1830. Current Facts and the online files will also provide direct references to the printed Handbook, for easier browsing and for users who prefer to use the Handbooks. The electronic databases do not obviate the desirability of a subscription to the printed Handbooks. The organization of the Handbook gives it great browsing potential, much more so than any electronic database can provide.

At the moment, in the absence of a more complete Beilstein Information System, Current Facts as a stand alone product is limited. There is probably little interest in just a 1-year slice of literature. However, Current Facts is a well designed and executed package, and a very significant chemical information product. Beilstein is attempting to reassert its historical role as the most significant source of chemical information for organic chemistry, which is a role played by Chemical Abstracts in recent years. Although parts of the Beilstein's traditional product, the printed Handbook, are 30 years behind in their coverage, Beilstein is catching up fast with its electronic databases. According to Beilstein's schedule, they should be as current as Chemical Abstracts by 1995, but of course the data from a Beilstein search is much more than just a list of references; Beilstein provides edited and sorted data. Current Facts will provide high-quality current information, as well as the essential user interface for using Beilstein in the future.

Andrew H. Berks, *American Cyanamid Company*

*Book Reviews**

Molecular Thermodynamics: A Statistical Approach. By James W. Whalen (The University of Texas at El Paso). John Wiley & Sons, Inc.: New York. 1991. x + 381 pp. $49.95. ISBN 0-471-51478-0.

As one who has for many years taught courses in macroscopic thermodynamics and in statistical mechanics, I looked forward to this book with great interest. What one expects from a book with this title is the introduction of molecular and statistical insight into the formalism and precision of classical thermodynamics. Unfortunately, I found it very disappointing. It reads like an undigested amalgam of a chemical engineering thermodynamics book with a decades-out-of-date book on statistical mechanics. There are many details about thermodynamic calculations and some useful tables, but these can be found in any good book; what is missing is real molecular insight.

The author seems somewhat uncomfortable with statistical mechanics. He repeats the standard mathematical derivations, indeed somewhat repetitively, but with little insight as to their significance. For example, I could find no mention of fluctuations, a discussion of which is the essential link between molecular ideas and macroscopic thermodynamics. The reader needs to understand why fluctuations of macroscopic properties are essentially unmeasurable, so macroscopic thermodynamics is "exact". Chapter 1 perpetuates the common but incorrect derivation of the molecular partition function by applying Stirling's formula to $N_i!$ when most of the N_i's are zero. Had not quantum statistics and the grand partition function been relegated to brief mention in appendices, these important concepts could have been used for an impeccable derivation. The author even manages to take the *difference* (rather than the ratio) of two partition functions (p 229).

The book introduces the equation $E = \sum p_i \epsilon_i$, differentiates it, and identifies the two differential terms as reversible heat and work, but then fails to make use of them, as, for example, in discussing adiabatic reversible (isentropic) expansion in terms of $\sum \epsilon_i \, dp_i = 0$. The discussion of the Third Law is inadequate, and, except for a very brief mention of CO, there is no discussion of the "exceptions", the molecular explanations of which are models of molecular thinking. If there is any discussion of nuclear spin (*o*- and *p*-H_2) or of isotope effects, I could not find it.

The discussion of interacting particle systems (Chapters 7 and 8) is conventional and inadequate. The virial equation of state and the virial coefficients are briefly discussed, but only in an appendix. The section on solid state discusses heat capacities and relates the Debye and Einstein θ's incorrectly in Figure 7.4 (but correctly in Figure 7.5). The electronic heat capacity of metals is included, but there is no mention of magnetism. The section on the liquid state is similarly inadequate; some discredited

*Unsigned book reviews are by the Book Review Editor.

free-volume theories are discussed at length and more modern interpretations are given short shrift. A book titled *Molecular Thermodynamics* ought to include some discussion of computer simulations.

The book has been poorly edited. Many equations include small script symbols that are hard to read and impossible to write on a chalkboard. The text has not been proof-read carefully; some names are consistently misspelled (e.g., "Joule-Thompson", "Leonard-Jones", "Sakur-Tetrode").

In an age when any undergraduate with access to a computer can produce excellent figures, either from experimental data or from model calculations, the poor quality of the figures in this book is inexcusable. Many are sloppily sketched (e.g., 3.2, 5.4, 6.1, 6.4, 7.12, 8.2), but others are flagrantly wrong (e.g., 6.2, 10.6, 10.7ab, 10.8, 10.9, 10.12b, 10.14a).

Except for the wrong figures, the chapters on macroscopic thermodynamics appear satisfactory, but they are difficult to read because of the detailed and repetitive mathematics. The book seems designed for those who need to calculate, not those who need to understand.

This book might have been useful if there were no good books in the field. As it is, I cannot recommend it to anyone.

Robert L. Scott, *University of California, Los Angeles*

Techniques for Characterization of Electrodes and Electrochemical Processes. Edited by Ravi Varma (Los Alamos National Laboratory) and J. R. Selman (Illinois Institute of Technology). John Wiley and Sons: New York. 1991. xii + 780 pp. $115.00. ISBN 0-471-82499-2.
Electrochemical Interfaces: Modern Techniques for In-Situ Interface Characterization. Edited by H. D. Abruña (Cornell University). VCH Publishers, Inc.: New York. 1991. xviii + 589 pp. $95.00. ISBN 0-89573-715-9.

The importance of the electrode/solution (or more generally, the solid/liquid) interface has led to the introduction in recent years of a number of new techniques for characterizing these interfaces in situ. These new methods complement the well-established electrochemical and spectroelectrochemical techniques that are discussed extensively in textbooks and the review literature. Both of these books address these new methods, introduce the principles, instrumentation, and applications, and represent excellent starting points for nonspecialists interested in using them.

The books are largely complementary, with the only overlap in chapters on X-ray methods (EXAFS, diffraction), surface enhanced Raman scattering, and Mössbauer spectroscopy. Abruña (10 chapters) also deals with surface forces, nonlinear (second harmonic) optical methods, radioactive labeling, infrared spectroelectrochemistry, and the quartz crystal microbalance. Varma and Selman (15 chapters) cover ellipsometry, photothermal deflection spectroscopy, neutron scattering, and laser interferometry. In addition to these this volume also contains chapters on electrochemical methods, especially as applied to the characterization of molten salts and solid ionic conductors, and applied problems (e.g., a.c. impedance methods) applied to corrosion, batteries, and electrodeposition. The two chapters on numerical techniques for treating current density distributions and porous electrodes, although well done, seem a bit out-of-place.

As in most multiauthored works, the quality and scope of the chapters vary, and some of the topics treated in these volumes have been reviewed elsewhere (sometimes by the same authors). Some of the methods discussed (e.g., surface forces, X-ray standing waves) are only just beginning to be used in the field of electrochemistry, and so the described applications are few. Other methods such as the scanning probe microscopies (tunneling, force, electrochemical), mass spectroscopy, magnetic resonance, and the extensive ex situ surface spectroscopic (Auger, XPS) techniques are not covered in either volume. However, both of these books serve as very useful introductions and reviews of modern methods of characterizing interfaces and are sources to which I would send students who expressed interest in these fields.

Allen J. Bard, *The University of Texas, Austin*

Studies in Surface Science and Catalysis. Volume 64. New Trends in CO Activation. Edited by L. Guczi (Institute of Isotopes of the Hungarian Academy of Sciences). Elsevier: Amsterdam. 1991. xiii + 490 pp. $200.00. ISBN 0-444-88238-3.

The aim of this book was to provide scientists with a comprehensive summary of new developments on the area of CO activation, and it has met that goal as well as any single volume could cover such an extensive area as CO activation. It is certainly comprehensive, covering topics ranging from quantum chemistry to discussions of new commercial processes and reactor design. There are almost 1800 reference citations in the book, a number which strongly indicates the depth of coverage.

The chapter on the quantum chemistry of CO adsorption and activation by R. A. van Santen and A. de Koster (Eindhoven University) is a thorough coverage of the many theoretical approaches which have been applied to the problem of CO activation on metal surfaces. The use of metal single crystals in the study of CO reactions is discussed in two chapters. One, by M. Kiskinova (Bulgarian Academy of Sciences), describes the effect of additives and other experimental factors on CO adsorption and the instrumental techniques used in such studies. The second, by J. A. Rodriquez and D. W. Goodman (Texas A&M University), discusses the use of these single crystal catalysts in the development of a more complete understanding of CO–H_2 reactions. An extensive review of syngas reactions run over metal catalysts is provided by V. Ponec (Leiden University) while the chapter by C. H. Bartholomew (Brigham Young University) is a review of the developments in Fischer-Tropsch chemistry that have taken place in the last 10–15 years. This includes not only developments in catalyst preparations and reaction processes but also some discussion of reactor design for these processes.

The discussion of bimetallic catalysts by J. Schwank (University of Michigan), while centered on the use of such materials for CO activation, provides an excellent review of the many problems associated with the preparation and use of bimetallic species as catalysts. The hydrogenation of CO for alcohol synthesis is extensively covered in a chapter by R. G. Herman (Lehigh University) and, in a change of pace, the chapter by L. Guczi (Hungarian Academy of Sciences) discusses the other half of the CO–H_2 reaction mixture, the various aspects of H_2 chemisorption and its effect on CO activity. To round out the coverage of CO chemistry there are chapters on homogeneously catalyzed CO reactions by M. Roper (BASF) and on the use of CO chemistry in specialty chemical production by H. Papp and M. Baerns (Ruhr University). The book ends with an overview and indication of future directions for catalyzed CO chemistry provided by G. Somorjai (University of California, Berkeley).

As in any multicontributor book, the writing styles vary from chapter to chapter. While a more thorough editing may have smoothed out some of the style differences, given the stature of the contributors and the thoroughness with which the topics were covered, this is a minor point. Even though the title says that this book is about CO activation, there is much more present in this volume. In addition to the discussion on bimetallic catalysts mentioned previously there are also basic treatments of a number of other topics of general interest in catalysis. Of particular importance are the discussions in several chapters of the basic aspects of support and additive effects, factors which are of importance in most catalytic processes. This book is a significant contribution not only to the field of CO chemistry but also to catalysis in general.

Robert L. Augustine, *Seton Hall University*

Analytical Raman Spectroscopy. Chemical Analysis Series. Volume 114. Edited by Jeanette G. Grasselli (Ohio University) and Bernard J. Bulkin (BP Research Centre, Middelsex, England), with 14 contributing authors. John Wiley & Sons: New York. 1991. xviii + 462 pp. $85.00. ISBN 0-471-51955-3.

This collection of 12 chapters, by 14 contributing authors and including over 1100 references, deals specifically with Raman spectroscopy as an analytical method. This emphasis results in the inclusion of detailed material not found in many other books dealing with Raman spectroscopy, including practical instructions for correct instrument alignment, explanations of factor analysis, and procedures for quantitative analysis. The book begins with a discussion of modern instrumentation and measurement techniques. Identification and quantitative analysis of inorganic species in solution is discussed. A comprehensive chapter on the characterization of semiconductors by Raman spectroscopy, including both a theoretical background and numerous applications, provides a rather complete presentation of an application that is probably not familiar to most practicing Raman spectroscopists. Two chapters on polymer applications demonstrate how Raman spectroscopy is used to provide information on structure, conformation, chain orientation, and mechanical properties; tables for assigning symmetry species for bands observed for measurements in various polymer and scattering orientations are included. Analytical applications of surface enhanced Raman spectroscopy, time-resolved studies of reacting systems, and Raman microscopy are highlighted in a chapter covering organic and petrochemical applications. The use of Raman spectroscopy in scrutinizing both the surface and bulk molecular structure of catalysts and in monitoring heterogeneous processes is provided in a chapter on catalytic studies, which includes 350 references. The volume concludes with a brief, rather narrow chapter on biological applications (which, however, have been previously reviewed in depth in numerous other books) and a short summary of applications of gas-phase Raman spectroscopy.

Several of the authors emphasize the advantages Raman spectroscopy has over other methods of analysis, including remote sensing by employing fiber optic probes, in situ noninvasive measurements at a wide variety of temperatures and pressures, the spacial resolution of Raman microscopy, the ability to investigate aqueous systems due to the poor Raman scattering by water, the advantage of emission compared to

absorption measurement, the additional information available by varying both the incident and scattering polarizations, and the ease of sampling materials in various shapes and physical states. Disadvantages of the technique for analytical applications (principally interfering sample fluorescence, thermal degradation and the detection of weak signals) and methods of dealing with these problems are also covered.

As stressed by several of the contributing authors, the analytical and quantitative applications of Raman spectroscopy have not kept pace with other techniques such as FTIR spectroscopy, or with the growth in the qualitative and structural applications of Raman spectroscopy. This book demonstrates where Raman spectroscopy may in fact be the preferred method. It should promote the interest in the technique both of analytical chemists who are not familiar with the advantages and versatility of Raman spectroscopy as an analytical technique and of practicing vibrational spectroscopists who may not appreciate the quantitative aspects of Raman spectroscopy.

Teresa B. Freedman, *Syracuse University*

Bioprocess Technology Series. Volume 12. Purification and Analysis of Recombinant Proteins. Edited by Ramnath Seetharam and Satish K. Sharma. Marcel Dekker Inc.: New York. 1991. iv + 344 pp. $99.75. ISBN 0-8247-8277-1.

For anyone who has ever isolated the gene of his dreams, then spent months or years trying to produce a usable gene product, a book titled *Purification and Analysis of Recombinant Proteins* might appear to be a gift from above. This volume seems intended to fill the void between theoretical textbooks on molecular biology and the numerous practical methods books which assume one already knows which techniques to use. What value is there in yet one more volume on protein purification? Most of the problems and opportunities special to recombinant protein purification are problems of expression. If protein is available in stable soluble form at high yield, then purification of recombinant protein is no different a problem than purification of any other protein, and a host of good reviews on protein purification are available. The authors appear to realize this, and the reviews in this volume summarize a great deal of experience in the field of recombinant protein expression, without being bogged down in detail. Most are written from an industrial perspective, emphasizing large-scale, economical production for commercial and pharmaceutical use.

The first section of the book, a broad overview of the basic methodologies that have been used for recombinant protein production, sets the industrial/pharmaceutical tone of the book and includes several examples of successful products. The next section addresses several of the most common difficulties encountered in cloning and expression projects, including a good review on cell disruption techniques at both laboratory and industrial scales. A chapter on intracellular proteases and inhibitors also includes a description of several protease-deficient expression systems. There is a good section on inclusion body formation in *E. coli*, emphasizing the potential value of these structures as a means of storing recombinant proteins in stable form away from the degradatory apparatus of the cell. Relegating the question of resolubilization and renaturation to a single paragraph, however, seems a bit overoptimistic. The path from the denatured to the renatured state is at best a bumpy one and is often impassable. Arie Ben-Bassat's review, discussing methods for generating a native N-terminus with the initiator methionine removed, may well be the first review of this subject and is a worthwhile addition to the literature.

A third section of the book deals with specific host systems for protein expression. *E. coli* secretion systems, *Saccharomyces*, and the special systems for monoclonal antibody production are dealt with as well as the less well known (by this reviewer, at least) methylotrophic yeast *Pichia pastoris*. A final section deals with some newer methods and applications of recombinant protein techniques: receptor–affinity chromatography, directed mutagenesis, and the use of crystallographic structure determination. The ability to alter protein sequences raises the possibility of engineering proteins for improved physical properties. Experience at our current level of knowledge, however, indicates that proteins are more often "engineered" for lower activity, decreased stability, and greater difficulty in isolation than for any improvements. Structure–function analysis combining X-ray crystallographic methods with directed mutagenesis represents the most powerful tool available for dissecting the architecture and mechanism of proteins, and the best hope for making rational changes in sequence and structure.

There are a surprisingly large number of typographical and editing errors in the text, such as misspellings, mislabeled figures, etc. This reviewer knows personally only a handful of the authors referenced in the various chapters. That one had his name spelled incorrectly bodes ill for the remainder. In all, however, this book is a valuable overview of a large and rapidly expanding field with a good introduction to the literature. It is a pity that those who would find the book most valuable, such as graduate students, postdocs, and new investigators, are those least likely to afford its $100 price tag. A paperback version at a much reduced price would be a pleasant development.

Michael P. Ready, *University of Texas at Austin*

New Developments in Ion Exchange. Edited by Mitsuo Abe (Tokyo Institute of Technology), Takeshi Kataoka (University of Osaka Prefecture), and Takashi Suzuki (Yamanashi University). Elsevier: Amsterdam. 1991. xlii + 636 pp. $218.00. ISBN 0-444-98688-X.

This book contains the Proceedings of the International Conference on Ion Exchange, ICIE '91, held in Tokyo, Japan, October 2–4, 1991. The first part of the book lists the Organizing Committee, Acknowledgments of Support, List of Contributors (alphabetical) with their affiliations, and a Preface by the editors. The 108 papers, in typescript form, are organized under the following sections: 1. Fundamentals (Ion Exchange Theory and Process); 2. Synthesis of New Materials; 3. Chromatography (Ion and Liquid Chromatography, and Associated Techniques); 4. Water Purifications; 5. Environmental; 6. Membrane; 7. Hydrometallurgy; 8. Separation Science and Technology (Food, Pharmaceutical, Biological, and others). There is no subject index.

Polyimides and Other High-Temperature Polymers. Edited by Marc J. M. Abadie (University of Montpellier, France) and Bernard Sillion (CEMOTA, France). Elsevier: Amsterdam. 1991. xiv + 550 pp. $202.00. ISBN 0-444-88880-2.

This book contains the Proceedings of the 2nd European Technical Symposium on Polyimides and High-Temperature Polymers (STEPI 2) held in Montpellier, France, June 4–7, 1991. After a Preface by the editors, it contains 56 chapters (papers) in typescript form organized according to the sessions as follows: I. Linear Polymers: Chemistry and physico-chemistry; II. Thermosetting Polymers: Chemistry and physico-chemistry; III. New Materials for Electronics; IV. Membranes. There is an author index, but no subject index; affiliations of authors are given in the headings of each chapter.

Fundamental Aspects of Heterogeneous Catalysis Studied by Particle Beams. NATO ASI Series B. Physics. Volume 265. Edited by H. H. Brongersma and R. A. van Santen (Eindhoven University of Technology). Plenum Press: New York and London. 1991. x + 462 pp. $120.00. ISBN 0-306-44002-4.

This book contains the Proceedings of a NATO Advanced Study Institute on Fundamental Aspects of Heterogeneous Catalysis Studied by Particle Beams held in Alicante, Spain, September 3–14, 1990. It consists of 36 chapers in typescript form organized under the headings as follows: General Catalysis; Reactivity; Catalyst Characterization: Nuclear Magnetic Resonance, Photons, Electrons, Neutrons, Ions. There is a list of Directors and Lecturers, with their affiliations, and a brief subject index.

Emerging Technologies for Materials and Chemicals from Biomass. ACS Symposium Series 476. Edited by Roger M. Rowell (U.S. Department of Agriculture), Tor P. Schultz (Mississippi State University), and Ramani Narayan (Michigan Biotechnology Institute and Michigan State University). American Chemical Society: Washington, DC. 1991. x + 470 pp. $99.95. ISBN 0-8412-2171-5.

This book was developed from a symposium sponsored by the Cellulose, Paper, and Textile Division of the ACS at the 200th Meeting of the Society in Washington, DC, August 26–31, 1990. Following a preface and an introductory chapter by Narayan, it contains 24 chapters, in typescript form, organized under the following headings: Lignocellulosic Materials and Composites; Biopolymers: Alloys, Derivatives, and Blends; and Chemicals and Fuels From Biomass and Wastes. There are indexes of authors, their affiliations, and subjects.

Chirality and Optical Activity in Organometallic Compounds. By V. I. Sokolov (Institute of Organo-Element Compounds, Moscow). Gordon and Breach Science Publishers: New York. 1990. viii + 145 pp. $66.00. ISBN 2-88124-774-1.

Professor Sokolov's book covers the growing area of organometallic stereochemistry, focusing on chirality, optical properties, and applications of organometallic transition metals. The range of compounds covered is tightly defined to limit the breadth of the subject. Thus, germanium, tin, arsenic, lanthanides, and actinides are excluded, as well as borderline elements such as boron and silicon.

The book is organized into four chapters. The first chapter provides a traditional view of chirality as it applies to organometallic compounds and includes the authors own work on how to "chiralize" n-dimensional isotropic space.

The second chapter, written by Dr. A. P. Klyagina (Institute of Inorganic Chemistry, Academy of Sciences, Moscow), covers optical ac-

tivity and the electronic structure of organometallic compounds. The beginning of this chapter summarizes a quantum mechanical treatment of optical activity. This is followed by several examples of interpreting circular dichroism (CD) spectra for binuclear molybdenum and rhodium clusters, polyatomic clusters, alkene complexes of platinum, and metallocenes. Limitations of both current theoretical models and the interpretation of CD spectra are discussed.

The third chapter contains numerous examples of chiral, optically active transition metals, including platinum and iron alkene complexes, ferrocenes, chromium arenes, and chiral metal clusters. These examples illustrate that the metal may be chiral by virtue of being in the center of a tetrahedron, a trigonal pyramid, or an octahedral environment. The chapter concludes by briefly examining chiral palladium and platinum complexes where a chiral carbon is directly bound to the metal.

The fourth and final chapter covers applications of optically active transition metal complexes in organic synthesis. Examples are given for ferrocenes, chromium arenes, dieneiron, and π-allyl complexes along with iron acyls, iron carbenes, and alkyl zinc reagents.

The scope of the book is very broad, ranging from the quantum mechanics of optical activity to synthetic organic applications of optically active transition metal complexes. However, since this material is presented in a fairly brief number of pages, it is neither a comprehensive nor an in-depth treatment of these subjects. An appendix at the end of the book partially alleviates this shortcoming by providing additional references to those in the chapters.

Overall, this book is very readable and serves as a good introduction to the scope of chiral and optically active transition metals and their applications. The authors have selected an area of chemistry which is a cornerstone of future developments in synthetic organic methodology. The book is recommended to those with a background in organic and inorganic chemistry who are unacquainted with this specific area of stereochemistry.

Eric J. Roskamp, *Northwestern University*

Element-Specific Chromatographic Detection by Atomic Emission Spectroscopy. ACS Symposium Series 479. Edited by Peter C. Uden (University of Massachusetts at Amherst). American Chemical Society: Washington, DC. 1992. x + 350 pp. $74.95. ISBN 0-8412-2174-X.

This book was developed from a symposium sponsored by the Division of Analytical Chemistry at the 199th National Meeting of the ACS in Boston, Massachusetts, April 22–27, 1990. After a short preface by the editor, the book consists of 19 chapters in typescript form followed by indexes of authors, their affiliations, and subjects.

Polyelectrolyte Gels: Properties, Preparation, and Applications. ACS Symposiums Series 480. Edited by Ronald S. Harland (KV Pharmaceutical Company) and Robert K. Prud'homme (Princeton University). American Chemical Society: Washington, DC. 1991. x + 318 pp. $79.95. ISBN 0-8412-2176-6.

This book was developed from a symposium sponsored by the American Institute of Chemical Engineers at the American Institute of Chemical Engineers Meeting at Chicago, Illinois, November 11–16, 1990. After a preface by the editors and an introductory chapter by T. Tanaka, it contains 16 chapters in typescript form organized under the following headings: Synthesis and Characterization; Thermodynamics and Mass Transport; and Fundamentals of Novel Applications. There are indexes of authors, their affiliations, and subjects.

Solid State NMR of Polymers. Edited by Lon J. Mathias (University of Southern Mississippi). Plenum Press: New York and London. 1991. ix + 408 pp. $95.00. ISBN 0-306-44015-6.

This book is a compilation of papers presented at a symposium at the 3rd Chemical Congress of North America held in Toronto, Ontario, June 5–10, 1988. The symposium was sponsored by the Division of Polymer Chemistry of the ACS. The 25 papers are organized under the following headings: Overviews; ^{13}C CP/MAS Applications; Deuterium NMR; Multinuclear CP/MAS; and Imaging of Polymers. There is a list of contributors, with their affiliations, and a subject index.

Chemistry of Energetic Materials. Edited by G. A. Olah (University of Southern California) and D. R. Squire (Defense Sciences Office) Academic Press: San Diego. 1991. xi + 212 pp. $69.00. ISBN 0-12-525440-7.

This is a collection of essays on aspects of explosives ("energetic materials") written by well-chosen authorities in the individual fields. It starts with a dedication to Richard S. Miller, a manager in the Office of Naval Research, by its Director, F. E. Saalfeld.

The first chapter, by Richard D. Gilardi and Jerome Karle (Naval Research Laboratory), discusses the structural properties of energetic materials, derived from X-ray crystallography of over 500 molecules, with emphasis on density and energy storage by angle strain. There are 44 references.

The second chapter, by D. S. Anex, J. C. Allman, and Y. T. Lee (University of California, Berkeley), describes a study of the photofragmentation of 1,3,3-trinitroazetidine as a model of the initial step involved in the detonation of an explosive. The main interest here lies in the technique (photofragmentation translational spectroscopy) where a molecular beam of the material is heated by an infrared laser and the fragments, and their velocities, are determined by a mass spectrometer set up to accept fragments deflected through various angles from the direction of the beam. This is a novel and powerful technique for studying the mechanisms of thermolytic reactions. There are 11 references.

The third chapter, by P. M. Rentzepis and B. V. Wontergheim (University of California, Irvine), covers two topics: first, the study of photolytic reactions by ultrafast absorption/emission spectroscopy of the fragments; second, a method for carrying out X-ray diffraction on the picosecond time scale. These again are interesting techniques which should have many applications. There are 18 references.

The fourth chapter, by P. Politzer, J. S. Murray, M. E. Grice, and P. Sjoberg (University of New Orleans), discusses the computer-aided design of monopropellants, i.e. materials used on their own as propellants in guns, etc., as opposed to mixtures like gunpowder. Calculations are reported for a number of exotic molecules as well as for some conventional materials. There are 13 references.

The fifth chapter, by A. T. Nielsen (Naval Weapons Center), summarizes the present position concerning caged nitramine compounds, which are expected to be exceptionally powerful explosives. There are 123 references.

The sixth chapter, by R. Khattar, M. J. Manning, and M. F. Hawthorne (University of California at Los Angeles), gives a brief summary of metallacarboranes derived from the lanthanide and alkaline-earth metals, as "potential high energy fuel additives". There are 36 references.

The last chapter, by G. A. Olah (University of Southern California), provides a brief but comprehensive summary of the methods available for introducing nitro groups into hydrocarbons and amines. There are 155 references.

This is a strange book. It is difficult to see its purpose. It is clearly not intended for specialists in the chemistry of explosives, as a review of recent developments, because it contains too much introductory material and because it does not cover the ground comprehensively. Equally, it would be of limited value to chemists in other fields because it provides no historical or background information and because it does not provide a general account of the chemistry of explosives. It also leaves the reader in the dark concerning the "tremendous new knowledge" hinted at in the dedication.

Some of the individual chapters are interesting and some could serve as a useful course of references, and the book as a whole makes good reading. However, I would hesitate to advise anyone to add it to their personal libraries, particularly in view of its price.

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Bioorganic Chemistry in Healthcare and Technology. Edited by Upendra K. Pandit (University of Amsterdam) and Frank C. Alderweireldt (University of Antwerp). Plenum Press: New York and London. 1991. ix + 324 pp. $89.50. ISBN 0-306-44007-5.

This book contains the Proceedings of a NATO Advanced Workshop on the title subject held in Houthalen-Helthteren, Belgium, September 18–21, 1990. It consists of a 1-page preface by the editors, 37 chapters in typescript form, and an account of the closing session in which considerable discussion took place. There are indexes of participants, other authors, and subjects.