hydrolysis conversion), propyl (99% de; 47.5% hydrolysis conversion), or butyl (>98% de; 48% hydrolysis conversion) (see Table II). Not surprisingly, an extreme deterioration in selectivity was observed on changing the substituent from fluorine to another group such as hydrogen or chlorine. The diastereoselectivity decreased from 99% de (48% hydrolysis conversion) to 31% de (with hydrogen) and diastereoisomeric mixture (with chlorine). When a methyl group attached to the tertiary carbon was replaced by other alkyl groups such as ethyl (9% de), propyl (nonselective), or butyl (nonselective), the diastereoselectivity also decreased markedly.

We found that we could similarly achieve a 1,3-double asymmetric selection. In this case, we selected haptens[10] (Figure 1) induced by a 1,3-amino alcohol moiety[11] bearing a trifluoromethyl group at the hydroxyl carbon. (2*R*,3*R*)-(+)-4-(Acetylamino)-1,1,1-trifluoro-2-decanol (>97% ee) was separated from the racemate by hydrolysis of 2-(benzyloxy)-4-(acetylamino)-1,1,1-decane (conversion 23%) by the antibody induced from the 2*R*,3*R* (+) hapten (>98% ee). Then, 2*S*,3*S* (−), 2*R*,3*S*, and 2*S*,3*R* (+) isomers were separated from the recovered ester by use of the respective antibodies (see Table III).

Supplementary Material Available: Experimental details for the synthesis of **5**, **8**, **11**, **14**, **17**, **20**, **23**, and **26** and for asymmetric hydrolysis with antibody (9 pages). Ordering information is given on any current masthead page.

(10) The hapten antigens containing a 1,3-amino alcohol moiety were prepared by using 4-(acetylamino)-1,1,1-trifluoro-2-decanol instead of 1-(benzyloxy)-2-fluoro-2-methyl-3-butanol in Scheme I.

(11) Lin, J.-T.; Yamazaki, T.; Kitazume, T. *J. Org. Chem.* **1987**, *52*, 3211.

*Book Reviews**

Chemistry of Complex Equilibria. By M. T. Beck (Kossuth Lajos University) and I. Nagypál (Jôseph Attila University). Ellis Horwood Ltd.: Chichester, U.K. 1990. 402 pp. $93.50. ISBN 0-85312-143-5.

This book presents a unified treatment of all types of complex equilibria. With a few exceptions, the various subjects presented are well balanced. The most valuable concepts are as follows:

a. Initially, each topic is introduced by means of simple examples. More complex procedures are built on these examples. Thus, a guided tour is available for novices, but the book is also useful for experts.

b. The topics are illustrated with numerous figures (there are 162 figures) making it easier to visualize the sometimes complicated mathematical functions.

c. The book emphasizes the significance of manual (graphical) evaluation of experimental data in order to obtain reliable equilibrium models (e.g., pages 110 and 247). On the other hand, the principles of sophisticated computer programs are also discussed.

d. The authors also demonstrate conceptually that there is no difference between acid–base and complex equilibria (in the earlier literature, this approach did not always prevail). The authors provide valuable guidance to chemists who need to understand complex equilibria for their research.

Chapters 1 and 2 contain basic definitions. The confusion related to concentration, activity, and mixed stability constants is clarified. Chapter 3 is perhaps the best chapter. It discusses basic equilibrium properties of relatively simple systems in considerable detail. It also provides a description of complicated equilibria such as concentration distribution with extrema, systems of unusual concentration distributions, and the like.

Chapter 4 presents a summary of the most important experimental methods. Both the chemical principles and the experimental limitations along with calibration problems are discussed. Chapter 5 gives a reasonable description of both older (graphical) and modern (computer) evaluation techniques. The difficulties with model selection and data transformation are nicely discussed.

Chapter 6 does not appear to be very well focused. Some of the subjects are discussed in considerably more detail in widely used reference books. Perhaps Section 6.4 could have been discussed more appropriately in Chapter 2.

Generally speaking, the biographical citations are current through 1985 with several isolated examples of more recent citations.

Gilbert Gordon, *Miami University*

Chemical Modeling of Aqueous Systems II. ACS Symposium Series 416. Edited by Daniel C. Melchoir and R. L. Bassett. American Chemical Society: Washington, D.C. 1989. xvi + 556 pp. $89.95. ISBN 0-8412-1729-7.

A group of 41 papers given at a symposium, held during the National Meeting of the ACS in Los Angeles in 1988, make up this volume. They are arranged under eight headings: Aqueous Thermodynamics and Theoretical Advancements, Code Development and Documentation, Applications to Modeling: Equilibrium and Mass Transfer, Applications to Modeling: Transport and Coupled Codes, Applications to Modeling: Surface Chemistry, Advancements in Modeling: Modeling Sensitivities, Advancements in Modeling: Thermodynamic and Kinetic Advances, and Advancements in Modeling: Organic Compounds. A thorough index completes the book.

Nuclear Measurements in Industry. Studies in Physical and Theoretical Chemistry 61. By S. Rózsa (Institute of Isotopes of the Hungarian Academy of Sciences). Elsevier: Amsterdam and New York. 1989. xiv + 310 pp. $134.25. ISBN 0-444-98873-4.

Radiometric measurements, by which trace amounts of radioactive isotopes can be used to monitor technological processes for such characteristics as flow, composition, thickness of coatings, and package filling. All aspects of the subject are treated, including basic concepts, detection and measuring instruments, and various applications.

Bubble Wake Dynamics in Liquids and Liquid–Solid Suspensions. By Liang-Shih Fan and Katsumi Tsuchiya. Butterworths: Stoneham, MA. 1990. xv + 363 pp. $95.00. ISBN 0-409-90286-1.

Chemical reactions and mass transfer that accompany the movement of the gas bubbles through fluids are the subject of this book. The wake behind a moving bubble may have a dominating influence. The fundamental phenomena are addressed in the nine chapters. The viewpoint is that of the chemical engineer, but the subject has obvious significance in some biological systems.

Progress in C_1 Chemistry in Japan. Edited by The Research Association for C_1 Chemistry. Elsevier: Amsterdam and New York. 1989. 408 pp. $156.00. ISBN 0-444-98848-3.

The seven chapters in this typescript volume are strongly oriented toward the catalytic conversion of synthesis gas into commercially important chemicals such as ethanol, ethylene glycol, acetic acid, and olefins.

Advances in Polymer Science. Volume 97: Synthesis, Mechanism, Polymer Drugs. With contributions by M. Akashi, H. K. Hall, C. Lee, T. Li, W. Kamińska, P. Penczek, A. D. Pomogailo, K. Takemoto, and I. E. Uflyand. Springer-Verlag: New York. 1990. vi + 165 pp. $85.00. ISBN 3-540-52834-2.

Volume 97 of this popular series is comprised of four papers encompasing a broad range of topics, from synthetic and mechanistic aspects of polymer science to polymeric drugs. Contributions are from China, Poland, the U.S.S.R., and Japan. Each paper stands independently of the others in the book and includes a reasonable introduction and review of the pertinent scientific literature. The entire volume is indexed, enhancing its usefulness as a reference work.

The titles of the four papers included in this work are the following: The Role of Tetramethylene Diradicals in Photo-induced 'Charge-Transfer' Cycloadditions and Copolymerization; Polyfunctional Cyanate Monomers as Components of Polymer Systems; Polymers Containing Metallochelate Units; and New Aspects of Polymer Drugs.

For the researcher with a specific interest in one of these areas or for the scientist keeping up with developments in polymer science, this book

*Unsigned book reviews are by the Book Review Editor.

will be a useful reference.

David S. Allan, *Northwestern University*

Handbook of Natural Products Data. Volume 1. Diterpenoid and Steroidal Alkaloids. By Atta-Ur-Rahman (University of Karachi). Elsevier: Amsterdam and New York. 1990. vii + 962 pp. $394.50. ISBN 0-444-88173-5.

This volume begins a new series devoted to spectroscopic information on natural products. A total of 971 diterpenoid and steroidal alkaloids that have been reported through 1988 are included. For each are given the source, molecular and structural formula, melting (boiling) point, specific rotation, CAS Registry Number, and numerical data on the IR, NMR, and mass spectra. The arrangement is by structural type, but there are indexes of names, formulas, molecular weight, plant source, and compound type. Key references for each compound are also given.

Short-Lived Molecules. By Matthew J. Almond (University of Reading, England). Ellis Horwood: Chichester, U.K. 1990. 194 pp. $59.95. ISBN 0-13-798554-1.

The title of this book has been abbreviated to an extent that is somewhat misleading. It is primarily an introduction to studies of matrix-isolated short-lived molecules by infrared absorption spectroscopy. For this purpose, a short-lived molecule is considered to be a species that, under ambient conditions, decays on a time scale ranging from nanoseconds to minutes. This definition includes high-temperature species, radicals, molecular ions, and photochemical intermediates. Mostly small molecules (those containing between two and twenty atoms) are discussed. Give the enormous range of information available for such species, the author has chosen a few subtopics to illustrate techniques for species generation, identification, structure determination, and studies of reactivity. The topics covered are the following: (1) Introduction; (2) Experimental Techniques; (3) Photochemistry of Metal Carbonyls; (4) Reactivity of Metal Atoms; (5) Divalent Silicon Chemistry; (6) Aspects of Organic Photochemistry; (7) High-Temperature Molecules; (8) Ions and Radicals; (9) Routes to Inorganic Materials; (10) Atmospheric and Interstellar Chemistry.

As the headings for Chapters 3–10 could be used as monograph titles, the treatment is necessarily superficial. Unfortunately, the selected material does not provide a balanced overview of the field, or of the subtopics. Despite this drawback the book is well-written and pitched at a level suitable for an introductory text. Many example studies are considered in each section, and the material is presented in an interesting and informative style. This book should be of value to students entering the field of matrix-isolation spectroscopy.

Michael C. Heaven, *Emory University*

International Encyclopedia of Composites. Volume 1. Edited by Stuart M. Lee. VCH Publishers: New York. 1990. xvi + 563 pp. $250.00. ISBN 0-89573-0.

The first volume of this projected set covers subjects from Acetal Resins and Composites to Cyanate Ester Resins. Processes, such as Autoclave Processing, Braiding, and Characterization, are also included, as are some more general topics, such as Aging and Creep. The entries are article length, include formulas and equations where appropriate, tables of data, information on such topics as properties, applications, and analysis, as well as bibliographies. The subject "composites" is loosely treated, to maximize usefulness, and even "Carbon Fibers" are included. Numerous illustrations enhance the quality of articles.

Nitro Compounds. Recent Advances in Synthesis and Chemistry. Edited by Henry Fever and Arnold T. Nielsen. VCH Publishers: New York. 1990. xvi + 636 pp. $125.00. ISBN 0-89573-270-X.

This is the third volume in a continuing series that reviews the chemistry of nitro compounds and related structures. It consists of four contributed chapters.

Chapter 1, by N. Ono, treats in detail the behavior of the nitro function as a leaving group. Denitrohydrogenation, whereby the nitro group is replaced by hydrogen, is given special attention, for it has a variety of applications in synthesis. The activating influence of the nitro group may be utilized to elaborate a desired carbon skeleton, after which the nitro group can be removed. Replacement of the nitro group by carbon or heteroatoms and formation of alkenes by elimination of nitro groups are also reviewed at length.

P. A. Wade reviews the role of the nitro group in carbohydrate chemistry. This chapter is mostly concerned with nitro sugars, in which a hydroxy group has been replaced by a nitro group. Nitro sugars are important in the synthesis of amino sugars and some of them are biologically important.

The chemistry of dinitrogen pentoxide is the subject of a chapter by J. W. Fischer. Its greatest significance is in aromatic nitration and in preparation of nitric esters and nitramines. The last chapter is on aliphatic fluoro nitro compounds, by H. G. Adolph and W. A. Koppes. It may be surprising to note that this somewhat obscure subject requires 200 pages for comprehensive review, until one learns that these compounds are primarily of interest as energetic materials (there are 597 references.)

A large amount of data is presented in tables throughout the chapters. Most of these tables are devoted to yields and products, but some give physical properties. There is a complete author index and a thorough subject index, as befits a valuable work of reference.

Thermodynamic Properties of Inorganic Materials. Parts A and B. Physical Sciences Data 38A and 38B. By B. Cheynet (Thermodata). Elsevier: Amsterdam and New York. 1989. xvi + 2401 pp. Two volumes. $683.00. ISBN 0-444-88036-4.

In two fat volumes, one being a comprehensive list of titles of articles arranged in the order of a formula index of substrates treated, and the other being a list of the references cited, a key is provided to articles on the thermodynamic properties of inorganic compounds, gases, solutions, metals, and alloys, published between 1970 and 1987. The magnitude of the work can be grasped from the fact that 25 846 references are cited, covering over 13 400 systems. This is the sort of compilation that is only feasible because of modern computer technology. However, the inability of many computers to handle subscripts and upper-case and lower-case letters has led to some curious features; e.g., in the present book, "ON THE ROLE OF HYDROGEN IN THE MOCVD OF GAAS", an article not about "gaases", but, gallium arsenide. Another nearly inscrutable example is "VERRES DU SYSTEMEAS253-TL2S."

Carbon Disulphide in Organic Chemistry. By A. D. Dunn (Dundee College of Technology) and W.-D. Rudorf (Martin-Luther Universität). John Wiley & Sons: New York. 1989. x + 389 pp. $89.98. ISBN 0470-21441-4.

The chemistry of carbon disulfide is covered rather comprehensively in this typescript book. A general introduction presents information on physical properties, hazards, purification, detection, manufacture, and structure. This is followed by a chapter on carbon disulfide as a solvent, principally but not exclusively in Friedel–Crafts reactions. The following seven chapters are classified according to reactant: inorganic reagents; carbon–carbon multiple bonds; 1,3-dipolar compounds; carbon nucleophiles; nitrogen compounds, and oxygen and sulfur compounds. A final chapter covers miscellaneous reactions.

The pages are covered with equations and well-drawn structural formulas, although some take more than a second glance to figure out; e.g., MeS_2CO^- for xanthates. There are no tables; yields are given in the text, albeit rather loosely. The bibliographies are extensive and include much patent literature. The subject is intriguing and enjoyable to read about; one cannot help being impressed by the versatility of this simple compound.

Solubility Behavior of Organic Compounds. Techniques of Chemistry. Volume 21. By David J. W. Grant (University of Minnesota) and Takeru Higuchi (University of Kansas). John Wiley & Sons: New York and Chichester. 1990. iii + 600 pp. $99.95. ISBN 0471-61314-2.

This is a book consisting largely of text, rather than tables as the title might suggest. It treats solubility from the standpoint of intermolecular forces and thermodynamics, and is concerned with solvation, complexation, polarities, dissolution, and diffusion rates. Relations to chromatography, partitioning, and extraction are considered. There are, indeed, some tables, but they are outnumbered by the equations and graphs. There is a subject index of uncommon thoroughness.