J|A|C|S
BOOK REVIEWS

Modern Styrenic Polymers: Polystyrenes and Styrenic Copolymers. Edited by John Scheirs (ExcelPlas Australia, Edithvale) and Duane Priddy (Priddy & Associates, LLC, Midland, MI). J. Wiley and Sons, Ltd: Chichester. 2003. xxxiv + 758 pp. $330.00. ISBN 0-471-49752-5.

This book encompasses many aspects of the broad area of styrenic polymers and is a valuable resource in the field of polymer science and engineering. The book is divided into seven sections: (I) Introduction to Styrenic Polymers; (II) Preparation of Styrenic Polymers; (III) Major Classes of Styrenic Polymers; (IV) Syndiotactic Polystyrene; (V) Styrenic Block Copolymers; (VI) Novel Polystyrenes; and (VII) Properties of Styrenic Polymers. Each section is further divided into chapters written by experts in their fields. The collection of chapters brings together many diverse topics that touch on practically all aspects of polystyrene and polystyrene containing materials.

Although polystyrene could be considered a mature polymer, many recent advances regarding it are presented within the context of commercial applications and the potential for manufacturing new polystyrene products. This adds value to the literature references. Because polystyrene has such a long history of production and many of the chapters deal with manufacturing processes, material properties, and applications, many of the references are necessarily to early literature and patents. Chapters that deal with more recent advances such as living radical polymerizations, new architectures, syndiotactic polystyrene, and synthesis and properties of various copolymers include references to the latest innovations presented in the literature. Some of them, however, are not entirely comprehensive and lack the most up-to-date references.

This book should be useful for practicing polymer scientists and engineers who desire a wide-ranging resource on polystyrene materials. While the book is focused around the topic of styrenic polymers, the broad range of subjects addressed support its use as a textbook for studying the general field of polymer science and engineering through the examination of a single material.

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JA033590K

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Topics in Current Chemistry, 229: New Aspects in Phosphorus Chemistry III. Edited by J.-P. Majoral (Laboratoire de Chimie de Coordination du CNRS, Toulouse). Springer-Verlag: Berlin, Heidelberg, New York. 2003. xii + 214 pp. $189.00. ISBN 3-540-00714-8.

According to the Editor's Preface, this collection of reviews, part of a series covering recent developments in phosphorus chemistry, is "intended to provide coverage of some of the highlights of contemporary phosphorus chemistry chosen from the entire range of current interest." The individual chapters succeed in this aim by presenting clear descriptions of recent research activity. The references are current, considering that the Preface is dated January 2003, with several from 2002 in almost all of the chapters. There are only a few typographical errors, and in general each short review includes a wealth of information.

The diversity of modern phosphorus chemistry is reflected in chapters covering both applications-oriented and exploratory research. Under the former category, there is a chapter on synthesis and catalytic applications of *P*-chirogenic phosphines by Crépy and Imamoto, a review of difunctionalized organophosphorus and -sulfur compounds, which includes many examples in organic synthesis, by Gulea and Masson, and a summary by Katti, Pillarsetty, and Raghuraman of their group's work on primary phosphines as precursors to multidentate ligands for use in catalysis and biomedicine. In the second area, chapters by Lammertsma on phosphinidenes and their metal complexes and by Schoeller on donor−acceptor complexes of low-coordinate π-bonded phosphorus systems show how computational chemistry complements experiments on these unusual compounds. The inorganic side of phosphorus chemistry, highlighting structural diversity, is also covered in reviews by Chivers on phosphorus-imido and -chalcogenido anions and by Taillefer and Cristau on ylides; the latter also shows that ylides have uses in organic synthesis beyond the Wittig reaction.

The book is attractively produced and includes a useful subject index as well as outlines for each chapter. Unfortunately, my review copy included pages 181−188 bound between pages 148−149, instead of in their rightful position. The book will be of greatest value to researchers in the relatively narrow fields covered by the individual chapters, or to those with a general interest in phosphorus chemistry. I recommend it and the others in the "New Aspects in Phosphorus Chemistry" series for libraries, but individuals will need to consider the expense and their personal interest in the varied subjects of the reviews before purchasing.

David S. Glueck, *Dartmouth College*

JA033638U

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Catalysis and Electrocatalysis at Nanoparticle Surfaces. By Andrzej Wieckowski (University of Illinois, Urbana-Champaign), Elena R. Savinova (Boreskov Institute of Catalysis, Russian Academy of Sciences), and Constantinos G. Vayenas (University of Patras). Marcel Dekker, Inc.: New York, Basel. 2003. xviii + 970 pp. $225.00. ISBN 0-8247-0879-2.

The authors conclude the preface of this nearly 1000-page tome with a lofty aim: to "facilitate the researcher's task of

Unsigned book reviews are by the Book Review Editor.

10.1021/ja033590k CCC: $27.50

improving catalytic materials, in particular for fuel cell applications, based on scientific logic rather than expensive Edisonian trial-and-error methods." Unfortunately, the book falls significantly short of its stated goal. While the book is typical of compilations by a plethora of authors, and there are exceptions, it consists principally of phenomenological descriptions, with only cursory attempts at establishing the fundamental models that would be most useful to the reader. Indeed, it is difficult to draw anything that would constitute a conceptual framework from the book, despite significant repetition of the need to do so in the introductions to each chapter.

Notwithstanding this criticism, the book does have some value. The references are comprehensive and timely, and the volume is filled with experimental details. These features alone make the book worthwhile for any investigator working in the areas of electrocatalysis and fuel cell research. There are also a few chapters that do have reasonable model discussions, despite the overall failure of the book to bring these models together in a comprehensive manner.

Dennis W. Bennett, *University of Wisconsin-Milwaukee*

JA0336123

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Handbook of Reagents for Organic Synthesis: Chiral Reagents for Asymmetric Synthesis. Edited by Leo A. Paquette (The Ohio State University). John Wiley & Sons, Ltd.: Chichester. 2003. xiv + 594 pp. $150.00. ISBN 0-470-85625-4.

This aim of this handbook is to provide indispensable information about many of the optically active reagents and catalysts presently in use. To achieve this goal, the Editor selected qualifying reagents, which are presented in alphabetical order, from two sources: *Encyclopedia of Reagents for Organic Synthesis*, which was published in 1995, and *e-EROS*, the electronic version of the same work. A narrative describing the applications of each reagent and written by experts in the use of them is provided. This book also includes a listing of "Recent Review Articles and Monographs" related to the topic at hand as well as the section "Organic Syntheses Procedures Featuring Chiral, Non-Racemic Reagent Preparation, Volumes 68−78". A list of contributors, a reagent formula index, and a subject index complete the book.

JA033660N

10.1021/ja033660n

Comprehensive Asymmetric Catalysis, Supplement 1. Edited by Eric N. Jacobsen (Harvard University), Andreas Pfaltz (University of Basel), and Hisashi Yamamoto (University of Chicago). Springer-Verlag: Berlin, Heidelberg. 2004. xiv + 238 pp. $199.00. ISBN 3-540-00333-9.

This book is the first supplement to the three-volume reference set *Comprehensive Asymmetric Catalysis* published in 1999. Updates have been made to 11 chapters to reflect substantial recent progress, and five entirely new chapters have been added. Their titles and authors are as follows: "C−H Insertion Reactions, Cycloadditions and Ylide Formation of Diazo Compounds" by Davies; "Direct Catalytic Asymmetric Aldol Reaction" by Shibasaki, Yoshikawa, and Matsunaga; "Mannich Reaction" by Kobayashi and Ueno; "Acylation Reactions" by Jarvo and Miller; and "Metathesis Reactions" by Hoveyda and Schrock. The book also includes a listing of the contents of the original three volumes and a subject index.

JA033659O

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Annual Review of Biophysics and Biomolecular Structure, Volume 32. Edited by Robert M. Stroud (University of California, San Francisco), Wilma K. Olson (Rutgers University), and Michael P. Sheetz (Columbia University). Annual Reviews: Palo Alto, CA. 2003. xvi + 534 pp. $80.00 Print Version for Individuals, $180 Print Version for Institutions. ISBN 0-8243-1832-3.

In celebration of the 50th anniversary of Rosalind Franklin's experimental work, which led to the prediction of the double-helix structure of B-form DNA, Volume 32 of this continuing series strives to be, according to the editor, a representative collection of today's studies into subcellular structures and machineries, initiated by this groundbreaking discovery 50 years ago. In accord with this aim, this volume, like its predecessors, covers a wide range of topics encompassing new developments in state-of-the-art biophysical methods as well as important advancements in elucidating the structures of and interactions between biomolecules.

There are 20 review articles by internationally renowned contributors, a comprehensive subject index, an author index, and a keyword index covering chapter titles of contributions to the series from 1999 to 2003 (Volumes 28−32). The physical methods covered include fluorescence microscopy, mass spectrometry applied to protein and proteome analysis, volumetric characterization of proteins, and methods used to study the interplay between molecular dynamics and enzyme catalysis. For the researcher mainly interested in computational applications, recent progress in quantum mechanics/molecular mechanics methods for simulations of enzyme catalysis and new molecular docking methodologies are summarized. The papers addressing methodology provide useful brief descriptions of the theoretical background and/or relevant instrumental details. Most of the contributions give examples of applications of the respective methods from the pertinent recent literature. In some cases, however, more examples and less experimental detail would have been appropriate.

The majority of the chapters of this volume are devoted to structural and dynamical aspects of membrane-bound proteins and receptors and transport through membranes (e.g., calcium pump, rhodopsin, natural killer cell-surface receptors, acetylcholine-binding protein, bacteriorhodopsin purple membrane) as well as physical phenomena in lipid monolayers and bilayers. The nature of enzyme−inhibitor and enzyme−cofactor interactions is beautifully reviewed for mammalian cyclooxygenase and photosystem I, and three valuable reviews deal with structural aspects of DNA−cation interactions and the DNA complexes formed by OB-fold proteins and lambda integrase.

Overall, the reviews are well written and free of typos and grammatical errors. Figures and schemes are of high quality

throughout the volume, especially the stereoviews of the crystal structures, which are presented on glossy paper. Literature citations, which reference work through 2002 (only a few 2003 citations were found), are given in full-title format, which facilitates further research of the respective topics.

This volume will appeal to a broad audience, especially researchers in the biomedical sciences, as well as bioorganic, bioinorganic, and medicinal chemists, and everyone interested in gaining insight into important biological processes at the molecular level. DNA-related topics, however, are clearly underrepresented in the opinion of this (admittedly biased) reviewer. Nevertheless, the current volume is undoubtedly a useful addition to any chemistry library and, at $80.00 for the *print and online* version, quite affordable for the individual researcher. Perhaps, a topical volume commemorating the 50th anniversary of the discovery of DNA might have been even more attractive for individuals to purchase.

Ulrich Bierbach, *Wake Forest University*

JA033618S

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Oxazoles: Synthesis, Reactions and Spectroscopy. Part A. The Chemistry of Heterocyclic Compounds, Volume 20. Edited by David C. Palmer (Johnson & Johnson Pharmaceutical R&D, L.L.C., Raritan, NJ). John Wiley and Sons, Inc.: Hoboken. 2003. xx + 640 pp. $325.00. ISBN 0-471-39494-7.

This book is the 60th volume in the series *The Chemistry of Heterocyclic Compounds*, a long, venerable, and definitive set of monographs on heterocycle chemistry. It is comprised of four chapters: "Synthesis and Reactions of Oxazoles" by Palmer and Venkatraman, "Spectroscopic Properties of Oxazoles" by Lowe, "Oxazole Diels−Alder Reactions" by Levin and Laakso, and "Mesoionic Oxazoles" by Gribble. The last definitive review in this area was volume 45 of this series, published in 1986. Since that volume, over 250 review articles on some chemical or biological aspect of oxazoles have appeared. Although not meant to be comprehensive, the current volume is a review of the literature through 2001, with a focus on the more recent literature.

Chapter 1 comprises about two-thirds of the book and has three parts: synthesis, reactions, and oxazole-containing natural products. The authors of this chapter have made the good choice to present chemistry that is broadly applicable as opposed to highlighting esoteric or system-specific reactivity. Their focus is on general methodology. The section on reactions is organized according to reactivity type, such as cycloadditions, oxidation, reduction, organometallic, and a few others. This is quite useful if you are searching for a specific reactivity or if you just want to understand oxazole chemistry in general. There is an emphasis on mechanistic detail throughout the chapter, which makes it interesting and helpful in understanding the reactivity patterns of oxazoles. The section on natural products deals with synthesis as well as isolation; only a few complete synthetic sequences are illustrated, with most examples only highlighting the key oxazole chemistry performed. The addendum to the chapter, which contains the most recent work, is fairly lengthy, indicating that the field is quite active. This highly readable and interesting chapter is long and detailed enough to justify being a book itself.

Chapter 2 is relatively short and covers the spectroscopy of oxazoles. It contains some useful tables of ^{1}H and ^{13}C NMR chemical shifts, which are handy for assisting in making quick structural assignments. Much less emphasis is placed on other forms of spectroscopy and mass spectrometry. This chapter is more of a high level overview and an update to the previous edition in this series.

Oxazole Diels−Alder reactions are the subject of Chapter 3, which is an update on work since 1985. Oxazoles are examined as both the 2π and 4π component of the cycloaddition. This section contains much general methodology as well as some cycloadditions involving relatively rare partners.

The final chapter is primarily a review of the chemistry of munchnones and isomunchnones and covers the literature since 1983. Each section contains discussions of synthesis, reactions, structure, and spectroscopy. This well-written chapter perfectly illustrates the ability of these oxazole-like intermediates to participate in the formation of complex polycycles. The book concludes with an author index and a cross-referenced subject index.

Although this volume contains only 640 pages, it is densely packed with information. Overall, the quality and layout of the drawings is exceptional throughout, which makes the book highly readable. This is a very well-written and well-produced work that is easy to use as a reference. Considering the importance of heterocycles in general and oxazoles in particular to medicinal and process chemistry, this series of reviews should be of considerable interest to organic chemists. It should strongly appeal to hard-core aficionados of oxazole chemistry and to those working extensively in this field. It should also serve as a reference work for generalists or those who only occasionally prepare oxazoles in the course of their research in other areas.

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JA033588T

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Inorganic Electrochemistry: Theory, Practice and Application. By Piero Zanello (University of Siena, Italy). Royal Society of Chemistry: Cambridge. 2003. xiv + 616 pp. $199.00. ISBN 0-85404-661-5.

There has been a proliferation of interest in the use of electrochemical techniques to extract information related to the redox activity of inorganic compounds, with investigations ranging from probes of the active sites of metalloproteins to understanding the electrocatalytic activity of inorganic clusters, to name just two areas. In this context, this book is a compilation of topics relating to the electrochemistry of inorganic complexes, broadly defined. Its first 150 pages are devoted to a review of electrochemical principles, including potentials, kinetics, and mass transport in Chapter 1, and various aspects of cyclic voltammetry in Chapter 2. Chapter 3 provides insight into some practical aspects of performing the electrochemical measurement. These first three chapters are not innovative with respect to material or to pedagogy, however, when compared to other available books on electrochemical methods.

The strength of this book lies in the remaining chapters, which are devoted to the voltammetric behavior of many different inorganic systems. Topics covered include metallocenes, mono

nuclear and polynuclear coordination complexes, and complexes with redox active ligands, including ferrocenes, dioxolenes, dithiolenes, and porphyrins. Chapters on electrochemically induced structural modifications, clusters, reactivity of transition metal complexes with small molecules, superconductors, molecular wires, and the direct electrochemistry of redox proteins form the remainder of the descriptive part of the book. These chapters provide a fairly comprehensive picture of the work performed in electrochemical characterization of a variety of inorganic systems. Finally, in the penultimate chapter, the author describes efforts utilizing linear free energy relationships to correlate redox potentials with physical properties of both solvent and analyte. This chapter is unique to electrochemical texts and quite useful as a reference.

Although space constraints at times limit the presentation of specific systems to a voltammogram or redox potential and a reference, this compilation will be extremely useful to workers in inorganic chemistry because it groups diverse efforts into one place. References are current through the year 2002.

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JA0336022

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Affinity Capillary Electrophoresis in Pharmaceutics and Biopharmaceutics. Drugs and the Pharmaceutical Sciences, Volume 128. Edited by Reinhard H. H. Neubert and Hans-Hermann Ruttinger (Martin Luther University, Halle-Wittenberg, Germany). Marcel Dekker, Inc.: Basel, New York. 2003. xiv + 362 pp. $175. ISBN 0-8247-0951-9

During the past decade, advances in the techniques for molecular biology have led to the discovery of a myriad of biological interactions. These interactions, which are mostly of the noncovalent type, are broad in nature and include, but are not limited to, protein−ligand, peptide−peptide, carbohydrate−drug, and antigen−antibody. The large number of biological interactions (and those yet to be discovered) has warranted the development of new analytical techniques that can expeditiously assess the extent of interaction. In this process, affinity capillary electrophoresis (ACE) has emerged as one of the techniques of choice. ACE uses the resolving power of CE to distinguish between free and bond-bound forms of a receptor (ligand) as a function of concentration of free ligand (receptor) in the electrophoresis buffer.

There have been a number of reviews on ACE; however, none is as exhaustive as the present text. Fortunately, the authors have taken a liberal view in their definition of ACE, which has allowed the inclusion of relevant background information and CE techniques.

Part I presents the theoretical basis needed to understand the principles and applications of CE and ACE. The authors provide a brief summary of CE that is frequently omitted in some ACE reviews. In addition, there is a relevant discussion of affinity electrophoresis that is helpful for scientists not traditionally involved in affinity measurements. This knowledge lays the foundation of the potential of ACE and forms of data analysis.

Part II focuses on the application of ACE in pharmaceutics, beginning with Chapter 3 on the use of ACE to determine physicochemical properties such as lipophilicity and solubility. Chapters 4−7 summarize the work on the use of ACE to examine excipient-drug interactions and the application of micelles, microemulsions, liposomes, and proteoliposomes as vehicles in separations. Although there is some redundancy between Chapter 8 ("Interactions Between Chiral Drugs and Cyclodextrins") and Chapter 4 ("Affinity of Drugs to Excipients") in their coverage of cyclodextrins (CDs) in ACE, the former presents a nice discussion on the separation of chiral drugs by CDs.

In Part III, the use of ACE in biopharmaceutics is examined. Chapters 9−11 focus on traditional applications of ACE in the analysis of protein−ligand, protein−protein, DNA interactions with peptides and proteins, and polysaccharide interactions. It is in this section of the book that chemists will see the wide-ranging potential of ACE in the analysis of biological interactions. The final chapter of this section covers ACE investigations of antigen−antibody interactions.

Part IV contains two chapters. The first covers the coupling of ACE to mass spectroscopy to examine affinity constants, and the second concludes with a summary of ACE.

Overall, Neubert and Ruttinger's book fulfills the need for a simple and comprehensive text devoted to ACE, its principles, and applications. One criticism of it is the lack of discussion on the biological relevancy of ACE in the biomedical sciences. Although this is not the focus, the book would have benefited from a more exhaustive treatment of the implications of ACE in the areas of medicine, biochemistry, and public health. All chapters have many up-to-date references, making it easy for the reader to research a topic further. The book is well written and can serve to supplement a college course in bioseparations and/or biochemical techniques. Academic and industrial chemists and biochemists will find this book an invaluable resource. It should have wide appeal and become an essential read in analytical laboratories focusing on separations.

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Handbook of Chemoinformatics: From Data to Knowledge, Volumes 1−4. Edited by Johann Gasteiger (University of Erlangen-Nürnberg). Wiley-VCH Verlag GmbH & Co. KGaA: Weinheim. 2003. xlvii + 1870 pp. $750.00. ISBN 3-527-30680-3.

Chemoinformatics (or, in more common U.S. usage, cheminformatics) is a new term for a fairly old idea. It can be defined rather broadly as the manipulation of chemical information using computers—something that has been going on since at least the early 1960s. The tremendous diversity of chemical information—bibliographic, structural, spectral, crystallographic, quantitative, nomenclatural, sequential, etc.—makes chemoinformatics an inherently fragmented field, however. What began as a way to represent, store, and retrieve chemical structural information electronically has become a burgeoning research front in its own right, populated by computer scientists as well as chemists and encompassing computational chemistry, molecular modeling, proteomics, combinatorial chemistry, and much more. One of the primary goals of this research, as the subtitle suggests, is to

find ways to manage and utilize the mountains of chemical data being generated and turn it into useful knowledge.

This weighty four-volume set is not really a handbook, despite its title. It is more of a treatise on the current state of computer applications in chemistry, written by a who's-who of authorities and innovators in the field. In this context, it follows Wiley's earlier *Encyclopedia of Computational Chemistry* (1998). As with any book that focuses on technology, some content will quickly be out-of-date, but it does have value as an overview and historical survey.

The formidable table of contents, helpfully reprinted in the front of each volume, stretches to 45 pages of detailed outline and is twice as long as the index in Volume 4. There is not an obvious thematic sequence of topics from volume to volume, but almost every aspect of chemoinformatics is represented. Following an interesting chapter on the history of the field, there are multiple chapters covering aspects of chemical structure and reaction representation, spectral data, chemical databases of all stripes (bibliographic, structural, reaction, spectroscopic, etc.), and LIMS. The sections on XML and the Internet should be informative for chemists who wish to present their research on the Web. Volumes 3 and 4 delve into the complex world of computational chemistry: quantum mechanics, topological indices, molecular geometry and chirality, machine learning, multivariate data analysis, neural networks, expert systems, property prediction, structure−spectra correlation, computer-assisted synthesis design, and several chapters on drug design, QSAR, and high-throughput chemistry. The last volume concludes by linking chemoinformatics with its cousin bioinformatics by covering protein structure prediction and genome sequencing.

As with any large work with such a broad scope and multiple authors, the quality is not uniform. Some chapters are quite thorough and informative, whereas others seem more cursory. Most chapters include ample literature references, although some of the bibliographies that were spot-checked seem dated for such cutting-edge topics. The quality of the images is substandard in a few places.

A handful of universities now offer advanced specializations in chemoinformatics, and there is a demand for these specialists in industry. This set, along with a companion textbook published simultaneously, will appeal most to those interested in pursuing this career path and to chemists and information specialists looking for a survey of the field. It is a useful but uneven overview and, despite its hefty price tag, is recommended for libraries serving chemists and information scientists.

David Flaxbart, *The University of Texas at Austin*

JA0336527

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Classics in Total Synthesis II: More Targets, Strategies, Methods. By K. C. Nicolaou (The Scripps Research Institute and University of California, San Diego) and Scott A. Snyder (The Scripps Research Institute). Wiley-VCH Verlag GmbH & Co KGaA: Weinheim. 2003. xx + 640 pp. $64.95. ISBN 3-527-30684-6.

This book provides complete and authoritative discussions of over 30 syntheses that have been published from 1993 to 2003. It follows the same general format as *Classics I*, but includes new mini-review sections, "which cover important new synthetic reactions, emerging trends, and additional syntheses of the chapter molecule," to quote from the preface. Each chapter is extensively referenced, and there is both an author and a subject index. This book should be useful to both students and practitioners in the field of organic synthesis.

JA033664S

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Solvents and Solvent Effects in Organic Chemistry: Third, Updated and Enlarged Edition. By Christian Reichardt (Philipps-Universität Marburg). Wiley-VCH Verlag GmbH & Co. KgaA: Weinheim. 2003. 653 pp. $135.00. ISBN 3-527-30618-8.

Fifteen years have elapsed since the publication of the previous edition of Reichardt's quasi-exhaustive review of solvents and solvent effects. The discovery of the spectacular negative solvatochromic effect of the Dimroth−Reichardt 2,4,6-triphenylpyridinium *N*-phenolate betaines caused by increasing polarity of various solvents prompted Reichardt to survey the field with more extensive reviews. As a consequence, he has revised and expanded almost every page of the previous edition, added almost 1000 new references, and included two new sections on (i) solvent effects on equilibria in host/guest complexation and (ii) reactions in biphasic solvent systems and in neoteric solvents. The latter term describes the newly introduced "green solvents", that is, ionic liquids, fluorous solvents, and supercritical fluids. Therefore, even those who own the second edition will certainly benefit from the third.

The book opens with a list of fundamental constants, abbreviations, and symbols for units and properties. Chapter 1 then provides a brief description of (i) the role of solvents in life processes, (ii) studying physical-chemical phenomena such as NMR spectra, (iii) carrying out chemical reactions, and (iv) how solvents influence chemical kinetics and equilibria. The succeeding chapter contains descriptions of the interactions between solvents and solutes and an excellent review of all types of intermolecular forces. Unfortunately, this reviewer was unable to find any reference to methane hydrates, and only one general sentence alluded to the importance of hydrogen bonding in proteins, nucleic acids, and polysaccharides.

Chapter 3, entitled "Classification of Solvents", is a comprehensive review of all of the systems devised to classify liquids that can be used as solvents. Of the three main classes of solvents, defined according to their chemical bonding (molecular, ionic, and metallic bonds), molecular solvents are most often used, and the other types of solvents are often ignored. Recently, however, ionic liquids (molten salts that may be liquid at room temperature) have become popular as environmentally friendly solvents because they are practically nonvolatile. With some reservations, Reichardt seems to consider Chastrette's classification of solvents into nine groups as one of the most expressive, and the clustering of solvents by Katritzky et al. into five groups as being the most evocative yet economical in terms of properties.

The effect of solvents on the position of homogeneous chemical equilibria, discussed separately for acid/base, keto/enol or other tautomerization, *E*/*Z* isomerization, conformational,

electron-transfer, host−guest complexation, and other equilibria, is the topic of Chapter 4, and solvent effects on the kinetics of homogeneous chemical reactions are reviewed in Chapter 5. Here, gas-phase reactivities (where homolytic processes invariably occur without interference from solvent interactions) are discussed, and then the complicated case of liquid-phase reactions is considered, starting with the qualitative Hughes−Ingold Rules. Quantitative theories of solvent effects on reaction rates are also reviewed separately for reactions involving neutral molecules (apolar and then dipolar), neutral molecules plus ions, and finally organic or inorganic ions. A detailed survey of specific effects of solvation on the rates of nucleophilic substitutions and many other types of chemical reactions, including stereochemical aspects, micellar and solvophobic interactions, liquid crystals, solvent cages, and solvent isotope effects, concludes this chapter.

Solvent effects on absorption spectra (UV/vis, ORD-CD, IR, ESR, and NMR spectra) of organic compounds are the subject of Chapter 6, and extensive tables of solvatochromic compounds are presented. The last chapter covers the available empirical parameters of solvent polarity. These include those based on equilibrium measurements, including Gutmann's donor number, Hansch and Leo's hydrophobicity parameter, Marcus' scale of solvent softness, Dimroth−Reichardt $E_T(30)$ values, and kinetic data, for example, Grunwald and Winstein's Y-parameter.

The book concludes with an extremely useful Appendix on properties, purification, use, and toxicity of organic solvents. The references are grouped according to chapter at the end of the book. A subject and an author index are provided.

Because reactions in chemical and biochemical laboratories are mostly performed in solution, this book is highly recommended to all chemists or biochemists involved in teaching or research.

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