

overview of the organization of several of the commonly used databases (files) among the 200 to which STN sells access. The reader will learn many of the sometimes cumbersome intricacies of designing text and structure search queries that will yield the most useful information. Pitfalls are pointed out. An outline of the book is available at <http://www.chem.usyd.edu.au/~dritley/tocframe.html>. The book has a pleasing paucity of misprints.

Although the individual scientist can clearly benefit from reading this textbook, the book's audience includes librarians. Essential concepts of chemistry are introduced assuming no prior knowledge. The author does an excellent job of teaching in one chapter the essence of (mainly organic) chemical structure conventions. On the other hand, some terminology of the CAS chemical information specialist, such as "bound phrases", "controlled term field", etc., are used with little or no attempt to explain what they mean. Unfortunately, the subject index is only 10 pages long and is rather incomplete, so it would be impractical to use this information-packed book as a quick reference. Much important material is listed in tables, but this information cannot be quickly refound because it is not indexed. A glossary of all the terms and acronyms encountered when using STN is sorely lacking.

One of the critical issues whenever using STN is to design the searches so as to maximize the relevance of the information retrieved while minimizing the cost of the searches. The author brings up this issue as early as page 20, but the introduction to the cost structure of STN is relegated to pages 163–166. The book claims it will help the user of other chemical information database providers, such as Knight Ridder (formerly Dialog) and Orbit/Questel. However, the two pages of appendix material devoted to some of the commands of the other systems are hardly adequate. Beilstein's online Crossfire system is not mentioned, and CAS's SciFinder is heralded briefly. Covering these other systems would have made the book too long. Most chemists probably will have their needs satisfied with STN. For STN structure searching, the author assumes the reader will have STN Express running on their PCs and Macs. Users having access to STN through other machines will have to follow the author's advice to obtain the relevant manuals from STN. The value of having STN reference books is brought up at several points in the book, but the postal, telephone, fax, and e-mail addresses of STN in Australia, the United States, or elsewhere are not given.

Librarians will certainly want to have this book on their shelves for themselves as well as their clients. The book will come in handy for librarians to loan to graduate students (or professors) when they come to the library asking for help on how to get started with the modern approach to literature searching. The book is no substitute for attending STN workshops but is highly recommended to the individual who is about attend a workshop.

Donald B. Boyd, *Indiana University—Purdue University at Indianapolis*

JA965780J

S0002-7863(96)05780-0

Phthalocyanines: Properties and Applications, Volume 4.

Edited by C. C. Leznoff and A. B. P. Lever (York University, Canada). VCH: New York, 1996. vi + 524 pp. \$150.00. ISBN 1-56081-916-2.

The first thing that caught my eyes was the appropriate choice for the color of the book cover, i.e. about the same blue as on my lab coat and equipment after working with phthalocyanines. This book is the fourth of a series started in 1989. It deals with the preparation, characterization, properties, and applications of phthalocyanines. Chapters are written by different authors from various parts of the world. The topics presented cover a wide range of substituted species and applications. The breadth of aspects regarding phthalocyanines makes this book a worthwhile addition to any science library, and more particularly to anyone with an interest on phthalocyanines. Chapter length varies considerably, from 18 pages for Chapter 1 to 102 for Chapter 3. The quality of the print and of the figures is pretty uniform and makes the book enjoyable to read. Most of the references are recent, up to 1995 for most chapters, which makes the book well up to date.

The stated purpose of the book is to discuss the properties and applications of phthalocyanines. These objectives seem to have been reached. Different chapters deal with chemical properties, for example,

synthesis and chromatographic separation, acid–base and coordination, encapsulation in zeolites, molecular orbitals and electronic spectra, and single-atom bridge dimers. Others are concerned with physical properties, such as nonlinear optical properties and epitaxial growth of ultrathin films. A variety of applications are presented, including the use of the nonlinear optical (NLO) properties of metallophthalocyanines (MPcs) in photonics, their use in the fabrication of organic photovoltaic junctions, and the use of phthalocyanines and their derivatives for catalyzing various types of reactions. Examples of use in catalysis include hydrocarbon activation, chemical fixation and photoreduction of carbon dioxide, and metal–oxo chemistry as mimic of the P-450 enzyme. The application of molecular beam epitaxy for the epitaxial growth of ultrathin films of phthalocyanines is also described. Good electrical conduction properties have been obtained by appropriate stacking to give low-dimensional solids with special charge transport properties along the chain. Biomedical and biological applications are also found in the book, which describes medical imaging and therapy using radiolabeled phthalocyanines, the use of hemoproteins reconstituted with phthalocyanines for studying the biological functions of the proteins, and developments in photobiology for their tumoricidal effects, ophthalmic photodynamic applications, antihyperplasia activity, inactivation of viral pathogens, antibiotic and antifungal effects, and use as photodynamic sensitizers for treating highly pigmented lesions.

In Chapter 1, the synthesis of new unsymmetrically substituted phthalocyanines includes the Diels–Alder reaction with [60]fullerene to give unsymmetrical enophilic phthalocyanines. Chromatography is used to separate tetrasubstituted and unsymmetrically substituted phthalocyanines. The acid–base properties of azaporphyrins is presented in Chapter 2. This includes acid ionization, the methods used for estimating quantitatively the acidity or basicity, and the influence of acid–base properties on aromaticity, addition reactions, complexation reactivity, and protonation. Metal-free azaporphyrins and a theoretical approach are also given. In the very long Chapter 3, the NLO properties of MPcs are presented, including their second-order and third-order NLO, and ultrafast optical nonlinearities properties in relation to molecular symmetry and crystal symmetry, second-harmonic generation (SHG) and degenerate four-wave mixing (DFWM) for measuring the optical nonlinearities. The short Chapter 4 discusses the use of phthalocyanines for the catalytic oxidation of hydrocarbons, thiols, phenols, and indoles and for the homolytic activation of hydrocarbons. Chapter 5 describes briefly the chemical fixation and photoreduction of carbon dioxide catalyzed by phthalocyanine derivatives. Chapter 6 explains the fabrication of thin films of molecular organic semiconductors, their characterization, and their use in Schottky cells, n/p-junction cells, and photoelectrochemical cells. Chapter 7 discusses another very interesting application in catalysis: the encapsulation of metallophthalocyanines in the pores of zeolites, without chemical bonding ("ship-in-a-bottle complexes"), prevents aggregation of the catalyst in solution, or its deactivation by dimerization, and results in highly selective (including cis/trans stereospecificity) enhanced reactions. Chapter 8 discusses the epitaxial growth of ultrathin films of phthalocyanines by Organic Molecular Beam Epitaxy and compares the results to inorganic films grown by the same method, in terms of substrate/film lattice mismatch and of weak intermolecular interactions, and their implications on the strain in the films and their elastic constants. Chapter 9 is much more theoretical and provides an in-depth presentation of molecular orbital calculations and electronic spectra of phthalocyanines analogues, including deprotonated and metal-free tetraazaporphyrins and species containing carbon and/or nitrogen at the meso positions. The Symmetry-Adapted Perturbation Method in evaluating symmetry-lowering effects are also used. Chapter 10 gives recent results on metal phthalocyanine single-atom bridged dimers, with stacking properties leading to unidimensional electrical conduction and possible use as precursors for the formation of linearly elongated aggregates with interesting charge transfer properties. Characterization includes also X-ray crystal structures and Mössbauer spectroscopy. Chapters 11, 12, and 13 describe biological and biomedical applications. Labeling metallophthalocyanines with radioisotopes provides novel diagnostic and therapeutic agents in nuclear medicine and biology, particularly for cancers. The chemical modification of heme in proteins by removing the native prosthetic group and coupling the resultant apoprotein with artificial hemins, including phthalocyanines, provides an elegant method for investigating the molecular mechanism of the function. The preferential binding of some dyes to tumor, viruses, bacteria, fungi, and parasites cause their accumulation. Then, using their photosensi-

tizing properties on excitation by visible light destroys these biological contaminants and leads to the technique called photodynamic therapy.

The book provides a good balance of preparation methods, characterization, theoretical studies, and applications, in agreement with its objectives stated in the title ("properties and applications"). It will be a very valuable resource to every scientist involved in the basic science of phthalocyanines and/or in their applications. It is also a good book for any scientist who desires to learn about the amazing breadth of science and technology covered by these versatile materials.

Georges Denes, *Concordia University*

JA965771A

S0002-7863(96)05771-X

Chemistry under Extreme or Non-Classical Conditions. Edited by Rudi van Eldik and Colin D. Hubbard (University of Erlangen-Nürnberg). John Wiley: New York. 1997. xii + 555. \$99.00. ISBN 0-471-16561-1.

This book is an attempt to provide an update of chemistry performed under very unusual reactions conditions. It consists of 12 chapters by experts in their various fields. The book is actually a result of a recent European Cooperation in the Field of Scientific and Technical Research held in Lahnstein in 1995. As a result, the chapters all have references inclusive of 1995. Because of the nature of the workshop, all of the authors are European. This in no way detracts from the scope or coverage of the work, however, as all the authors seem to make every effort to be comprehensive with their defined boundaries. The book is actually one of a number of books on chemistry under extreme conditions by one of the editors (R.v.E.), and his experienced hand is evident throughout the work. It is clear the editors insisted each author provide a careful introduction to the techniques required in their respective fields. This is particularly important in such technology-driven research areas. As a result, the book is an excellent introduction for workers who are considering entering one of the areas featured in the book.

The first chapter, Chemical Synthesis using High Temperature Species, focuses on the metal atom vapor synthesis pioneered some years ago by Skell and Timms. There is an historical perspective and considerable detail devoted to technique. Much of the emphasis is on synthesis of molecular organometallic compounds, but some recent work on nanoparticles is also included. Chapter 2 is entitled Effects of Pressure on Inorganic Reactions and is written by the editors of the volume. This chapter reflects their extensive experience in investigation of the physical ramifications of high pressure on the mechanisms of inorganic reactions. Again, detailed descriptions of experimental techniques are much in evidence. The next two chapters, Effect of Pressure on Inorganic Reactions and Organic Synthesis under High Pressure, are somewhat redundant. However, the first focuses more heavily on the thermodynamic aspects of reactions at high pressure and provides considerable coverage of cycloaddition reactions such as Diels-Alder reaction, while the following chapter provides more expanded coverage of other important preparative reactions at high pressure, such as hydroboration and macrocyclic ring synthesis.

The next three chapters provide an excellent introduction to descriptive chemistry in supercritical fluids. The chapter entitled Inorganic and Related Chemical Reactions in Supercritical Fluids is an outstanding introduction to the nuances of using various supercritical fluids in preparative inorganic chemistry. A number of new techniques are highlighted, such as rapid expansion of supercritical solutions as an alternative to CVD, and NMR of high pressure fluids. The following chapter, Organic Chemistry in Supercritical Fluids, provides the organic counterpoint to the previous chapter. Again, the authors take care to cover a breadth of nonclassical areas such electrochemical synthesis and enzymatic reactions in supercritical fluids. The third chapter in this section, Industrial and Environmental Applications of Supercritical Fluids, highlights the rapidly expanding area of industrial use of high-pressure fluids. The chapter is divided into two parts, industrial processing and environmental remediation. The chapter is significant because this technology will begin to assume enormous importance in the coming years as workers begin to get more comfortable with the technology, and the authors do a good job of summarizing the field to date.

The focus of the next three chapters is on ultrasound and chemical reactivity. The first chapter of this section, Ultrasound as New Tool

for Synthetic Chemists, provides an excellent summary of a fascinating and somewhat under appreciated field. The authors provide a very readable introduction for chemists not familiar with the topic (like this reviewer), followed by extensive coverage of the descriptive chemistry made available by this technique. The following two chapters, Applications of High Intensity Ultrasound in Polymer Chemistry and Chemistry under Extreme Conditions in Water Electrohydraulic Cavitation and Pulsed-Plasma Discharges, are more specialized, technical descriptions of specific aspects of the field. Nevertheless, the casual reader can get considerable feeling for the particular subject. There follows a chapter on microwave heating as a synthetic tool. Again, the author takes great pains to introduce the field and provides very illustrative descriptions of the techniques required. The focus is on inorganic rather than organic reactions. The final chapter, Biomolecules Under Extreme Conditions, is a shorter chapter which really focuses on polypeptides rather than actual living cells. Most of the emphasis is on the reactivity and stability of such polypeptides under high pressure. There is not much mention made of the various extremophilic bacteria, which are rapidly gaining attention.

The experienced editorship is clearly apparent throughout this book. All of the chapters contain clear introductions to readers who may be new to the field, followed by broad based coverage of the particular field. It appears that the reference area is reasonably complete and up to date. The end result is a series of highly readable chapters on a variety of fields which may be new to a number of chemists. To those more expert in the field, they provide an excellent summary of the work up to 1995. It should serve as an excellent inspiration for research proposals and seminar titles for graduate students and those new to the field. The book is well produced, with clear figures, ample references, and few typos. The editors' claim to try to pique the interest and curiosity of a broad range of students and chemists should be fulfilled by this interesting work.

Joseph W. Kolis, *Clemson University*

JA975512I

S0002-7863(97)05512-1

Resins for Coatings: Chemistry, Properties Applications. Edited by Dieter Stoye and Werner Freitag. Hanser-Gardner: Cincinnati. 1996. xvii + 458 pp. \$169.50. ISBN 1-56990-209-7.

The first addition of this book was written in 1971, and this work is an updated version of the earlier work. This book is described by the authors as a "textbook" but does not appear suitable for either a graduate class or a special topics short course. Although many of the chapters are written in a textbook style, there are no problems or examples given. The subtitle contains the additional words "Chemistry, Properties and Applications". While the book does an adequate job describing the chemistry of the resin systems, it contains very few practical applications or properties of films. The book has many shortcomings; for example, the five chapters which are devoted to the principles of resin chemistry are contained in 45 pages. Each of the chapters on resin chemistry is written by a different set of authors, but in general the references cited by the various authors are old: for example, the chapter on polycondensates contains 120 references, but only 2 are later than 1990. Chapter 3, Basic Properties, is a 20 page discussion on the elementary physical chemistry of polymers. It contains little or no information specifically related to the physics or chemistry of polymer films. Furthermore, only 3 of the 44 references cited are later than 1980!

Two very important areas of concern for the resin chemist are solventless castings and surface preparation, neither of which is described in detail; i.e., no chapters or major sections of the book are devoted to either subject. Although some of the chapters contain the general structure or formulation of commercially available resins, they are not listed in the index or in an appendix; unless one knows the basic structure of the commercial material, it cannot be found.

The general chemistry of the various classes of resins used for coatings are discussed. However, none of the specific compounds mentioned in the book contains the chemical abstract registry number, an invaluable aid for a literature search.

Clarence J. Wolf, *Washington University*

JA9755673

S0002-7863(97)05567-4