

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.

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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.

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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.

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