

## BOOK REVIEWS

**Chemistry of Superconductor Materials.** Edited by TERRELL A. VANDERAH. Noyes Data Corporation, Park Ridge, New Jersey, 1992. xxv + 818 pp. \$125.00.

This monograph brings together in a systematic fashion 20 chapters by experts in the field of high-temperature oxide superconducting materials, including a history of superconductors, sample characterization, structure and preparation, and structure–property relationships. Each topic is well covered but, because of the length of the book and the number of contributors, there is considerable repetition of material. On the other hand, the editor has done a remarkable job of organizing the chapters so that particular topics of interest can be found.

The chapter on history (by Chamberland) is extremely well done, weaving in crystal chemistry with historical facts. He brings in the contributions of crystallographers to the overall field of superconductivity and, at the same time, covers the significant discoveries and progress in the field.

The structures of oxide superconductors are covered in great detail in several chapters. Raveau and co-authors discuss layered cuprates, and Santoro describes the defect structures; structural information is presented in chapters throughout the book with tables of crystallographic data given by Torardi. This information can be quite useful in the preparation of new superconducting phases.

There are also chapters of value to new investigators in the field. For example, the chapter by Swinnea and Steinfink shows how X-ray diffraction and phase diagrams can be employed in superconducting studies. In addition, Schneemeyer's goes into great detail on how to synthesize powders and single crystals of the Ba, Bi, and Tl superconductors.

Chapters on sample characterization explain how X-ray diffraction and electron microscopy can be used to determine the structure of the phase, and Harris discusses the determination of the oxidation state of copper ions. The measurement of transport and magnetic properties is included in chapters by Liebenberg and Venturini. These chapters contain detailed descriptions of resistivity, critical current, thermal conductivity, and thermopower measurements. The last chapters by Sleight and Burdett cover the electronic structures of oxidic superconductors. These, like the other chapters, are well done and worth reading.

A useful feature of this monograph is a section at the

end providing references for sample preparations. A suggested list of books for more information on various topics relating to superconductivity is also presented.

This is a valuable book covering the entire field of superconducting oxides. The strength is the detailed coverage of the many topics relating to superconductivity. Its main drawbacks are that it does not present the latest information (probably because of the time in publishing) and that the topics do not fit together well enough to make it easy to use as a reference. In spite of this, this book is an important one for newcomers as well as established researchers working in this field.

FRANCIS GALASSO

*University of Connecticut  
Storrs, Connecticut 06269*

**Zeolite Microporous Solids: Synthesis, Structure and Reactivity.** Edited by ERIC G. DEROUANE, FRANCISCO LEMOS, CLAUDE NACCACHE, AND FERNANDO RAMOA RIBERIO. Kulwer Academic Publishers, Dordrecht, The Netherlands, 1991. xiii + 643 pp. \$183.00.

A search of the literature using zeolites as the key word results in a listing of over 40,000 papers. Interest in the zeolite field has greatly expanded since the first pioneering work in the 1940s and 1950s on the synthesis and applications of these materials. However, given the large volume of information being published, there have been few attempts to provide a concise up-to-date overview of the field. The editors of *Zeolite Microporous Solids* must be commended on the successful accomplishment of this task.

This publication is a result of a May 1991 NATO Advanced Studies Institute and contains the lectures presented covering the current knowledge of zeolite science. *Do not be mistaken*, this is not a typical conference proceedings publication—this work constitutes a series of critical evaluations and concise summaries of topics of importance to the field of zeolites.

*Zeolite Microporous Solids* is divided into four parts, each containing relevant lectures by researchers active in their respective fields. The section on synthesis is well represented by a discussion of thermodynamic and kinetic effects in zeolite synthesis and an excellent review of what goes on in the

synthesis *soup* and the role of inorganic and organic species. With the explosion in new materials beyond the aluminosilicates, the lecture on new materials provides a timely and concise review. It is especially well organized, making it easy to find a particular material type quickly. A brief but much needed discussion of the fundamentals of pillared clays is also included in this section. It is unfortunate that the two pillared clay lectures were not followed up in a later section by one devoted to the catalytic properties of these materials.

The sections on characterization highlight adsorption, diffusion, diffraction, spectroscopy, and NMR. Those headed *modification, reactivity and catalytic activity* include contributions on solid state ion exchange, the much needed topic of identifying framework substitution, and a welcome overview of catalysis on zeolites. Acidity is covered in two comprehensive lectures. An overview of zeolites in petroleum refining gives the novice a good feel for the role zeolites play in this important industry, though the abbreviations used could be confusing.

The reader will not be disappointed with the material under the exciting subheading *novel developments and*

*vistas*. The flurry of activity in very large pore molecular sieves (VPI-5) is succinctly summarized. Critical discussions are provided on new applications in catalysis, and a comprehensive review of *Zeozymes* helps the reader wade through terminology probably unfamiliar to most zeolite scientists.

Unfortunately, this publication suffers from camera-ready copy with loose criteria for format and typeset. I noticed a number of typographical errors, as well as improper citations, i.e., incorrect page numbers listed in the references or wrong citations. A good copy editor would have corrected a few glaring errors, such as the misuse of AIPO by several authors (it is properly  $\text{AlPO}_4$ ).

What am I going to do with this book? Use it! It constitutes an excellent sourcebook on specific topics of high interest, as well as being a good textbook for students and new researchers looking for an overview of the field. The editors and contributors are to be commended for pulling together a complex and multidimensional field and packaging it under one cover.

ROSEMARIE SZOSTAK

*Georgia Institute of Technology*  
*Atlanta, Georgia 30332*