JOURNAL OF SOLID STATE CHEMISTRY 74, 438–439 (1988)

BOOK REVIEWS

Conducting Polymers: Special Applications. Edited by LUIS ALCACER. Reidel, Dordrecht, 1987. ix + 220 pp. $69.00.

This interesting book represents the proceedings of a workshop held in Portugal in July of 1986. The book's principal detraction is its title, since it implies, with little subsequent evidence, a considerable discussion of applications of conducting polymers. Only three of the fifteen chapters (and two abstracts) place a major emphasis on applications. The book is instead a collection of good papers with particular attention given to the chemistry and physics of electrically conducting polymers, although two chapters are dedicated to ionic conductors. The discussion of both types of materials in a single volume is long overdue.

The first chapter (Bockris and Miller) is an entertaining review of the electrochemistry of conducting polymers, which, in fact, discusses applications (both actual and possible), including biosensors, batteries, and corrosion protection. Other chapters which specifically speak to the theme of applications deal with the use of conducting polymers as catalytic electrodes (Mammone) and gas sensors (Miasik *et al.*). Three chapters are devoted to polyacetylene and discuss Raman studies of electrochemical doping (LeFrant) and electrical properties of oriented films (Theophilou *et al.*). Two chapters discuss new prophyrin and phenothiazene polymers (Geib *et al.*) and polyphthalocyanines (Hanack *et al.*). MacDiarmid *et al.* and Epstein *et al.* treat the synthesis, electrochemistry, and physics of polyaniline in two chapters, while Wudl presents convincing evidence for structure of emeraldine (essentially polyaniline), thereby legitimizing dozens of papers in the literature. Finally, one chapter discusses the preparation of functionalized thin films using the Langmuir–Blodgett technique (Morgan *et al.*).

Ionically conducting polymers are represented with three chapters, the first of which discusses the preparation and conductivity of poly(etyhlene oxide) complexes of divalent cations (Farrington *et al.*). Alkali metal–silver halide complexes with poly(ethylene oxide) are discussed by Stevens and Mellander. Spindler and Shriver discuss the preparation and conductivities of alkali metal complexes of low T_g polysiloxanes having ether side chains.

The book concludes with brief (1–3 page) reports on panel discussions which focus on (1) preparative methods and properties of well-oriented conducting polymers, (2) prospectives of realization of polymer electrolytes with amorphous structures and high room temperature conductivities, (3) interfaces and contact problems, and (4) cyclability, power efficiency, and energy density of polymer electrolyte cells. The reports are intelligently written and nicely summarize the papers of the Proceedings in the context of applications.

The data presented are new enough to make the book a welcome addition to the growing collection of books devoted to conducting polymers.

GARY WNEK

Rensselaer Polytechnic Institute

Studies in Surface Science and Catalysis, Vol. 33, Synthesis of High-Silica Aluminosilicate Zeolites. By P. A. Jacobs and J. A. Martens. Elsevier, Amsterdam/New York, 1987. xvi + 390 pp. ISBN 0-444-42814-3. $136.50.

This is a very appealing book, published as Volume 33 in the series "Studies in Surface Science and Catalysis," with many graphs and halftone pictures (some of them not very well reproduced), printed on good semigloss paper. The thin paper makes leafing through this book very easy despite the over 400 pages of text and figures.

Research on high-silica zeolites has soared during the last 10 years and by now constitutes the bulk of both academic and (published) industrial research. Many laboratories are actively synthesizing new materials but proven recipes are difficult to extract from the jungle of patent literature, or even from published literature reports. However, the synthesis of good and representative samples is the most important aspect of characterization or catalysis. This is where this new book will be very useful for both the novice and the advanced synthetic chemist. The authors are two experienced zeolite chemists from the University of Leuven in Belgium, known primarily for their work on characterization of catalytic materials.

0022-4596/88 $3.00

The book presents an overview of the high-silica zeolite literature between roughly 1975 and 1985 and is organized into three parts. The first part contains the real essence of the book—25 proven recipes for the preparation of 14 different high-silica zeolites. The second, and by far the longest part (over 300 pages), is an overview of the patent and journal literature with many details of the synthesis and characterization of high-silica zeolites, in particular of Mobil's ZSM-5 and ZSM-11. Five other framework types are discussed in some detail, and a few common zeolites not belonging to the class of high-silica zeolites are highlighted. The third part of the book contains a very brief description of a handful of zeolites with unknown structures.

The recipes are fairly clear, but some experience in the preparation of gels and heterogeneous catalysts is necessary to fully grasp the procedures. Most of the recipes are taken (or sometimes modified) from the original patents which may offer more detail. Many tables summarize the synthetic conditions or characteristics of the products and X-ray stick patterns (I vs 2θ) and abbreviated X-ray tables (I vs d-spacings) are given for each product.

The large section on the characteristics of selected high-silica zeolites cannot be described easily. It contains a lot of pertinent synthesis data and background information, yet this reviewer feels that it is either too much to digest (if one is only interested in making the materials for catalytic experiments), or offers few new insights for real experts in the field who know the original literature. Researchers in between these two categories can profit a great deal from the depth of the 11 chapters.

Two minor points of criticism: The authors failed to clearly distinguish between their own work or interpretations and data published by others. This makes going back to the original literature more difficult than necessary. I recommend the use of the good lists of references and the consultation of the original work as much as possible for additional details. Another area of concern is the sensitivity of some of the presented data extracted from patents or merely from published patent applications. The attempts to identify proprietary materials (often from published d-space tables only) and assign them to a particular structure type may be welcomed by readers because they bring some order to the very confusing naming schemes. However, these assignments may not be correct in each case and it is extremely difficult to verify them. Furthermore, some of these materials are the subject of interferences and lawsuits and a scientific publication is hardly the place for an author to take sides.

Overall, this book is highly recommended to all zeolite researchers and a must for those involved in synthesis. But, even if you are not doing your own syntheses, this book contains a wealth of useful information and references.

ROLAND VON BALLMOOS

Mobil Research & Development Corporation
Central Research Laboratory
Princeton, New Jersey 08540