

## Book reviews

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### **Molecular Sieves: Principles of Synthesis and Identification**

R. Szostak

2nd edn, Blackie Academic and Professional, London, 1998

xiv + 359 pages. £79

ISBN 0-7514-0480-2

Over 100 books have been published on zeolites, in the English language alone. Most of them are multi-authored works or conference proceedings. Single-authored, well-structured texts such as this are rarities — Hirsch (1961), Breck (1974), Jacobs (1977), Barrer (1978), Dyer (1988), and Vansant (1990). Such a plethora of precedents presents an author with the problem of choosing a title, as all the obvious ones have been used at least once before. The main title of the present work is perhaps misleading because molecular sieves other than zeotypes, e.g. carbons and layered compounds, are excluded, but one can appreciate the problem; the subtitle is the key.

This is a book packed with detailed information; it includes 1279 references, 69 tables and numerous figures and diagrams, yet it is eminently readable. The author has been an active member of the international zeolite community for many years and her book is an up-to-date summary of the science of zeotypes. Her historical approach helps to make this complex subject understandable.

Readers of *Applied Organometallic Chemistry* may first turn to the chapter on organosilicates and organoaluminosilicates. This discusses the roles of organic compounds in the synthesis of the many silica and aluminosilicate molecular sieves, clathrasils, and the more recently discovered mesoporous materials. Many different types of organic compounds have been used: tertiary amines, quaternary ammonium salts, alcohols, nitrogen heterocycles, DABCOs, adamantanes, crown ethers, surfactants and even bis(cyclopentadienyl)cobalt (III)<sup>+</sup>. Tetramethylammonium hydroxide remains the most popular 'template', capable of catalysing the crystallization of 17 different frameworks.

This is essential reading, and reference, for all students of zeolite molecular sieves and related materials.

ALAN E. COMYNS  
*Comyns & Associates, Chester*

### **Techniques and Experiments for Advanced Organic Laboratory**

C. M. Garner,

Wiley, Chichester, 1997

vii + 128 pages. £21.95

ISBN 0-471-17045-3

The aim of this book is to provide a laboratory manual for an organic laboratory course intermediate between an introductory laboratory class and a research project. The manual focuses particularly on advanced techniques for instrumental analysis, such as NMR and capillary GC, and on the use of such techniques to illustrate reaction mechanisms and solve problems in organic chemistry.

The text is divided into four chapters. The short introduction goes over the basics of laboratory safety and good practice in writing the laboratory notebook and in the characterization of products. The second chapter deals with the preparation and isolation of products, again at a fairly basic level. Both of these chapters are clearly written, with emphasis on explaining practical details that more experienced workers would take for granted but that are often confusing to the novice organic chemist. The third chapter details the separation and analysis techniques to be used in the experimental procedures of the final section. Again, the emphasis is on the practical details; for instance, issues of sample concentration, shimming and so forth necessary to obtain good NMR spectra. The student is expected to use this laboratory manual in conjunction with an appropriate spectroscopy text.

The final section consists of a series of 12 experimental procedures. They start with relatively simple GC and TLC analyses and a flash column separation of reaction mixtures, and then become progressively more complex; for example, reaction of 4-*tert*-butylcyclohexanone with a Grignard reagent is followed firstly by separation of the resulting isomers by column chromatography, and then by identification of these isomers by NMR. All of the experiments carry a series of questions at the end designed to encourage the student to think about the reaction, and many have suggestions for how the experiment could be extended.

With its emphasis on the use of advanced analytical techniques to analyse organic reactions and solve problems, this text is an important addition to the practical textbooks that are currently available, and that do not, in general, cover these aspects so well or in such detail. Conversely, it does not have the comprehensive coverage of synthetic techniques found in texts such as Harwood and Moody, and it would therefore not be suitable as a basis for a complete undergraduate course in organic chemistry. However, it would make a good text

for a course component focused on analytical techniques or conformational analysis, and would also make a good source of individual experiments for lecturers planning a complete course. The manual is reasonably priced, well-written and produced.

ALETHEA B. TABOR  
*University College London*

### **Advances in Boron Chemistry**

W. Siebert, (ed.)

The Royal Society of Chemistry, London, 1997

xiv + 530 pages. £79.50

ISBN 0-85404-722-0

This book consists of a series of articles which give a summary of the new results presented at the *9th International Meeting on Boron Chemistry* which was held at Heidelberg in 1996. All of the important areas of the subject are covered in the 74 articles presented. The authors are leaders in the field and the breadth of interest in the area today is reflected by the fact that 11 different chapters, each of which includes a plenary lecture, are required to cover the topics discussed. Apart from the well established areas such as the organoboranes and their use in organic synthesis, polyhedral boranes, metallaboranes and carboranes, and boron heterocycles, several recent developments (including chiral organoboranes, transition-metal boryl complexes and boron-containing polymers and materials) are also covered. Even the application of boron compounds as reagents for the boron neutron capture therapy of cancer, which is currently being investigated by groups around the world,

is highlighted in several of the contributions, and the theoretical and computational aspects of the subject are not forgotten.

No single section has been allowed to dominate the meeting and, as a consequence, the total contents of the book, of over 500 pages, gives the reader an excellent opportunity to get a feel for the current developments within the subject area. A particularly useful feature for the reader is the inclusion of over 1200 references, up to 1996, in the articles presented, which reflects the conscientious manner and good style in which each author has written their individual chapter.

The editor of this volume, Walter Siebert, is to be congratulated on bringing together such a valuable collection of original papers. All those associated with this work, especially the authors themselves, can be rightly proud of their efforts, which have resulted in both a very readable and informative volume. It can also act as a useful source book for those wishing to gather information on current developments in the range of topics covered. For the amount of data presented the book is moderately priced, and is especially good value for members of the Royal Society of Chemistry. There is a subject index, but unfortunately no author index, which would have been useful, and reasonably easy to compile. However, that minor criticism should not deflect from the fact that this book offers an excellent opportunity for those who wish to gain some insight into what boron chemistry has to offer in the current scene, be they researchers who are already working in the area, or those with a more general interest.

M. G. H. WALLBRIDGE  
*University of Warwick, UK*