

## Book Reviews

*Works intended for notice in this column should be sent direct to the Book Review Editor (R. O. Gould, Department of Chemistry, University of Edinburgh, West Mains Road, Edinburgh EH9 3JJ, Scotland). As far as practicable books will be reviewed in a country different from that of publication.*

*J. Appl. Cryst.* (1989). **22**, 518

**Occurrence, properties and utilization of natural zeolites.** Edited by *D. Kalló* and *H. S. Sherry*. Pp. xiii + 857. Budapest: Akadémiai Kiadó, 1988. Price UK £45.00.

This book contains a collection of papers presented at the Second International Conference on the Occurrence, Properties and Utilization of Natural Zeolites which took place in Budapest, Hungary, in 1985. There are sections on Geology and Mineralogy (10 papers), Synthesis and Stability (6 papers), and Crystal Chemistry and Physical Properties (10 papers), but the major part (some 508 pages) is concerned with work directed at practical applications of natural zeolites. These are divided into Applications in general (3 papers), Ion exchange (12 papers), Adsorption (10 papers), Agriculture (7 papers), and Miscellaneous (8 papers).

Although natural zeolites can occur as attractive large crystals, it is the big sedimentary deposits of microcrystalline zeolites that are the concern of the majority of researchers. These materials are cheap, readily mined, and widely distributed throughout the world. The hope is that these natural zeolites will find large-scale applications and ultimately enjoy the same commercial success as the well known synthetic ones. However, as pointed out by Mumpton in his paper on 'Development of Uses for Natural Zeolites', much harm has been done by organizations keen to market natural zeolites without carrying out the fundamental scientific research that is essential for their successful exploitation. Nevertheless, as is clear from the other papers in this book, much good fundamental work is in progress, and the wide range of experimental techniques being employed is quite remarkable. Furthermore, the scientists engaged in this work are very imaginative in their search for applications – far more so than those who work on synthetic zeolites – and they deserve to be successful.

The book is well produced, and there are few errors of any kind. It is a worthy successor to the published proceedings of the First International Conference on Natural Zeolites (Tucson, AZ, USA, 1976) and anyone interested in zeolites (natural or synthetic) will find it well worth reading. Even though it has taken three years to produce it is not out of date; indeed it contains much that will stand the test of time.

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*J. Appl. Cryst.* (1989). **22**, 518

**Neutron scattering at a pulsed source.** Edited by *R. J. Newport*, *B. D. Rainford* and *R. Cywinski*. Pp. xiv + 413. Bristol: Adam Hilger, 1988. Price UK £32.50.

This book provides a very readable compilation of lecture papers from a summer school held at the Rutherford Laboratory in late 1986. As with all such compilations, the style necessarily changes with each author, but the standard of the presentations is uniformly high and even the odd poorly reproduced diagram does not detract from the overall appeal of the book.

The opening chapters (*ca* 100 pages) by J. M. F. Gunn provide a detailed introduction to diffraction theory in general, and to neutron diffraction in particular. The basic concepts are thoroughly, but fairly rapidly, built upon and most aspects of neutron scattering theory are covered. There are good examples and exercises for the student throughout these early chapters.

The chapter on data acquisition is a clear description of the current technology available to handle very large amounts of data fast, and while some of the specific hardware examples will become dated, they do represent up-to-date facilities now. The concepts and problems of data manipulation are well explained.

After the first part of the book, which covers clearly the design and techniques related to experiments and data acquisition, the authors concentrate on specific topics for scientific applications of pulsed neutron scattering.

Single-crystal and powder diffraction are well presented, with good worked examples on the Rietveld analysis for time-of-flight neutron diffraction powder data. The potential and applications of high-resolution powder diffraction studies are specifically detailed.

Biological systems, liquids and amorphous matter, neutron optics, neutron spectroscopy and small-angle scattering are amongst the other topics ably discussed. The penultimate chapter covers magnetism and neutron scattering in a comprehensible manner, while the final chapter looks a little into the future and what we might do with high-energy neutron sources such as ISIS.

This book undoubtedly will be most useful to any novice in the field for its clear teaching style of the presentations, but also to the more experienced experimentalist in explaining well the relatively new techniques of pulsed neutron scattering and encouraging the application and exploitation of such potential.

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## Books Received

*The following books have been received by the Editor. Brief and generally uncritical notices are given of works of marginal crystallographic interest; occasionally a book of fundamental interest is included under this heading because of difficulty in finding a suitable reviewer without great delay.*

*J. Appl. Cryst.* (1989). **22**, 518

**Handbook of the physics and chemistry of rare earths.** Vol. 11. Edited by *K. A. Gschneider* and *L. Eyring*. Pp. v + 612. Amsterdam: Elsevier Science Publishers, 1988. Price Dfl 350.00. A review of this book, by Stephen Craddock, has been published in the September issue of *Acta Crystallographica*, Section A, pages 659–660.

**Modern crystallography. IV. Physical properties of crystals.** By *L. A. Shuvalov*. Pp. xviii + 583. **Springer series in solid state sciences 37.** Berlin: Springer-Verlag, 1988. Price DM 198.00. A review of this book, by Kálmán Simon, has been published in the September issue of *Acta Crystallographica*, Section A, page 659.