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Foundations of Crystallography
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book reviews

Works intended for this column should be sent direct to the Book-Review Editor, whose address appears in this issue. All reviews are also available from **Crystallography Journals Online**, supplemented where possible with direct links to the publisher's information.

Single crystal neutron diffraction from molecular materials. By Chick C. Wilson. Pp. xiii + 370. Singapore: World Scientific, 2000. Price US $64.00. ISBN 981-02-3776-6.

This monograph excellently summarizes the field of single-crystal neutron diffraction. It is aimed at researchers interested in using the method to study problems in molecular structure. The author, from the Rutherford–Appleton Laboratory, has ambitious dual goals. First, to describe the state of the art and future developments in neutron sources and instrumentation and, second, to provide a detailed review of published research for a selection of the most important applications. The coverage provided is impressive and readers of this work may expect to come away with a good appreciation of what is possible in applying the neutron diffraction method to the study of molecular single crystals.

The volume has eight chapters, two appendices and a subject index. The first chapter provides a brief introduction to crystallography, including a nice review of thermal motion analysis, and a section on the practical aspects of neutron diffraction experiments. It also summarizes important applications, so that readers may obtain an overview of the contents of later chapters. The second and third chapters describe neutron sources, instrumentation – including detectors – and techniques for single-crystal neutron diffraction experiments.

The heart of the book is the four chapters that provide detailed reviews of important applications: the accurate location of atoms, hydrogen bonding, thermal motion and disorder, and material properties and crystal engineering. Taken together, the chapters constitute the most comprehensive review of the neutron crystallography literature yet undertaken. They provide an impressive account of past accomplishments and current possibilities. The author's viewpoint emphasizes the new information on atomic positions and displacement parameters coming from neutron diffraction studies, particularly for hydrogen (deuterium) atoms. The chemical or biological significance of the specific studies described is not always so apparent, especially for those cases where no figures are included, and for some readers these chapters may be heavy going in places. There are also some apparent inconsistencies when Wilson is summarizing results and discussions from the literature and there is insufficient space to put them into a uniform context.

The work ends with a short chapter on future developments that conveys the sense of excitement currently infusing the field of neutron scattering, while nicely summarizing the author's vision.

The two appendices deal with absorption coefficients and analyses of the librations of terminal groups such as $-CH_3$ and $-NH_3^+$. The extensive collection of references to the original literature is impressive. As each chapter has its own list of references, some duplication is inevitable and I would have preferred the use of an *Acta Crystallographica* style for the citations, so as to include the author's names in the text, thus making it easy to collect a global list of references and an author index.

This monograph is recommended reading for anyone considering the use of single-crystal neutron diffraction in research and it will also be a valuable reference work for professional neutron scatterers. It is particularly timely as interest in the field is exploding, driven by current developments in instrumentation that promise to bring data-collection times for many problems down to one day or less, and by anticipation that later in this decade there will be new pulsed-spallation neutron sources of unprecedented intensity.

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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.

Worked examples in the geometry of crystals. (Second edition). By H. K. D. H. Bhadeshia. London: Institute of Materials, 2001. ISBN 0-904357-94-5. The book 'deals with the mathematical crystallography of materials. It is intended for use by students and by anyone interested in phase transformations or interfaces'. The book is available for free download from URL http://www.msm.cam.ac.uk/phase-trans/2001/crystal.html.