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Physical Sciences Educational Reviews

The journal of the Physical Sciences Centre  Number 10

Reviewed in this issue:
3 software packages
40 books
Fundamentals of Crystallography

Subject area
General Science.

Description
This book is a research-level monograph in crystallography, which is an interdisciplinary area between chemistry, physics, earth sciences, biology, mathematics and materials science.

Authors
Carmelo Giacovazzo, Hugo L Monaco, Gilberto Artioli, Davide Viterbo, Giovanni Ferraris, Gastone Gilli, Giuseppe Zanotti, and Michele Catti.

Publishers/Suppliers
Oxford University Press (http://www.oup.co.uk) and International Union of Crystallography.

Date/Edition

ISBN
0-19-850958-8.

Level
Undergraduate, research.

Price
£44.50.

This is a comprehensive monograph dealing with both the theory and practise of crystallography. The content includes: the theory of X-ray, electron and neutron scattering; applications to the structures of minerals, ionic and molecular solids and proteins; various X-ray sources, including synchrotrons, and detectors; materials used for X-ray filters; the crystallography of imperfect crystals, such as twins and crystals with defects; crystallisation methods; and crystal properties.

The book consists of ten chapters by eight authors. Unlike, and better than, most edited books, each chapter has appropriate cross-references to other chapters (by different authors), giving the book unity. The many diagrams are easy to read. The monochrome photographs have good use of contrast, brightness and shade. Some of the monochrome diagrams are replicated in colour. A minor complaint is that I could not find a mention of the location (eight unnumbered pages between pages 682 and 683) of the colour plates.

Chapters 1-4 and 6, ‘Symmetry in crystals’, ‘Crystallographic computing’, ‘The diffraction of x-rays by crystals’, ‘Beyond ideal crystals’ and ‘Solution and refinement of crystal structures’ relies on knowledge of 2- and 3-dimensional geometry, vectors and matrices, symmetry and group theory, Fourier transforms, convolution/deconvolution and tensors. The level of mathematical ability required to fully comprehend this book is equivalent to or in excess of that required for advanced physical chemistry textbooks. A trap for unwary readers is the use of unusual notation for the vector cross product, instead of the normal notation. Although the book is intended for undergraduates, graduates and professionals, these chapters may be too difficult for most undergraduate students.

The remaining Chapters 5 and 7-10, ‘Experimental methods in x-ray and neutron crystallography’, ‘Mineral and inorganic crystal chemistry’, ‘Molecules and molecular crystals’, ‘Protein crystallography’ and ‘Physical properties of crystals: Phenomenology and modelling’ are more descriptive and can be easily used for middle-level and senior undergraduates. These Chapters also contain discussion of molecular structure, properties, reactivity and modelling.

The accompanying CDROM, “An interactive Book on General Crystallography (ABC)”, can be used as a stand-alone computer-aided learning resource for first- or second-year undergraduates, ie it is pitched for a more-novice readership than the book. The book and CDROM can be viewed independently as they do not appear to be cross-referenced or otherwise integrated. Note that the CDROM does not work properly on some Macintosh computers. The CDROM does not have any revision questions or problem sets.

Graduates and researchers will find the monograph to be a very useful reference book. The ideas are well-presented and well-indexed. Each chapter has an extensive list of references to the primary literature. Graduates and researchers should be the target readership, especially as there are no worked examples, exercises or problem sets.

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April 2005

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I found only two small typographical errors in the content of over 800 pages: the formula for naferisite (page 574) and the orientation of the molecule depicted in Figure 9 (d).

In summary, “Fundamentals of Crystallography” is well written and is an excellent and comprehensive reference for practising crystallographers and graduates.
This paper presents a literature review that helps to identify the main features of VLs (based on VR or AR) that have been developed in the academic field to support the learning of crystallography concepts. Keywords: crystallography; crystalline structures; Bravais lattices; materials science and engineering; virtual reality; augmented reality; virtual reality learning environments; virtual laboratory; spatial comprehension crystallography; crystalline structures; Bravais lattices; materials science and engineering; virtual reality; augmented reality; virtual reality learning environments; virtual laboratory; spatial comprehension. "Virtual and Augmented Reality Environments to Learn the Fundamentals of Crystallography." Crystals 10, no. 6: 456. Find Other Styles. High-Pressure Crystallography: From Fundamental Phenomena to Technological Applications (NATO Science for Peace and Security Series B: Physics and Biophysics) by Elena Boldyreva (Editor), Przemyslaw Dera (Editor) and a great selection of related books, art and collectibles available now at AbeBooks.com. If the original book was published in multiple volumes then this reprint is of only one volume, not the whole set. Sewing binding for longer life, where the book block is actually sewn (smythe sewn/section sewn) with thread before binding which results in a more durable type of binding. There might be delay than the estimated delivery date due to COVID-19. Pages: 16 Pages: 16 Volume: 51.