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# Physical Sciences Educational Reviews

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Reviewed in this issue:

3 software packages

40 books

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# 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

2002/2nd Edition.

## ISBN

0-19-850958-8.

## Level

Undergraduate, research.

## Price

£44.50.

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April 2005

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  $\mathbf{a} \wedge \mathbf{b}$  for the vector cross product, instead of the normal  $\mathbf{a} \times \mathbf{b}$  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.

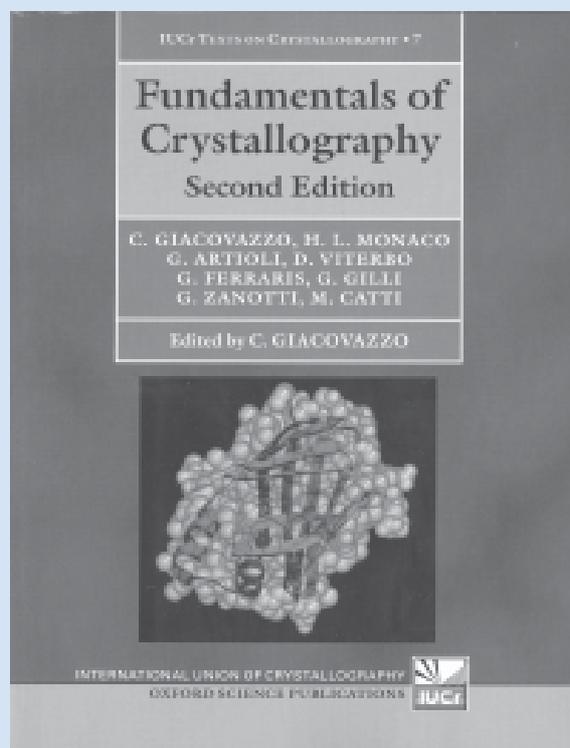
## Summary Review

range: \* poor to \*\*\*\*\* good

Academic content	*****
Usefulness to student	***
Usefulness to teacher	*****
Meets objectives	****
Accuracy	*****

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# Fundamentals of Crystallography



From the publisher...

## **Fundamentals of Crystallography**

By C. Giacovazzo, H.L. Monaco, G. Artioli, D. Viterbo, G. Ferraris, G. Gilli, G. Zanotti, and M. Catti

This book offers a comprehensive account of the wide range of crystallography in many branches of science. The fundamentals, the most frequently used procedures and experimental techniques are all described in a detailed way. A number of appendices are devoted to more specialist aspects. The book is an updated and fully revised new edition with emphasis on the wide range of topical applications and current areas of research. Ample illustrations help clarify the subject matter. To provide a better understanding of the basics of crystallography, a compact disk has been added to this new edition, offering the facilities of modern graphics to simulate experiments, show complex images, and provide a number of exercises.

0-19-850958-8 844pp 2002 £44.50

*Continued from page 25*

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.

Fundamentals of Crystallography book. Read reviews from world's largest community for readers. Crystallography and structure theory have recently received... Let us know what's wrong with this preview of Fundamentals of Crystallography by Carmelo Giacovazzo. Problem: It's the wrong book It's the wrong edition Other. The crystalline state and isometric operations. Matter is usually classified into three states: gaseous, liquid, and solid. Gases are composed of almost isolated particles, except for occasional collisions; they tend to occupy all the available volume, which is subject to variation following changes in pressure. In liquids the attraction between nearest-neighbour particles is high enough to keep the particles almost in contact. As a consequence liquids can only be slightly compressed. The thermal motion has sufficient energy to move the molecules away from the attractive field of their neighbors.