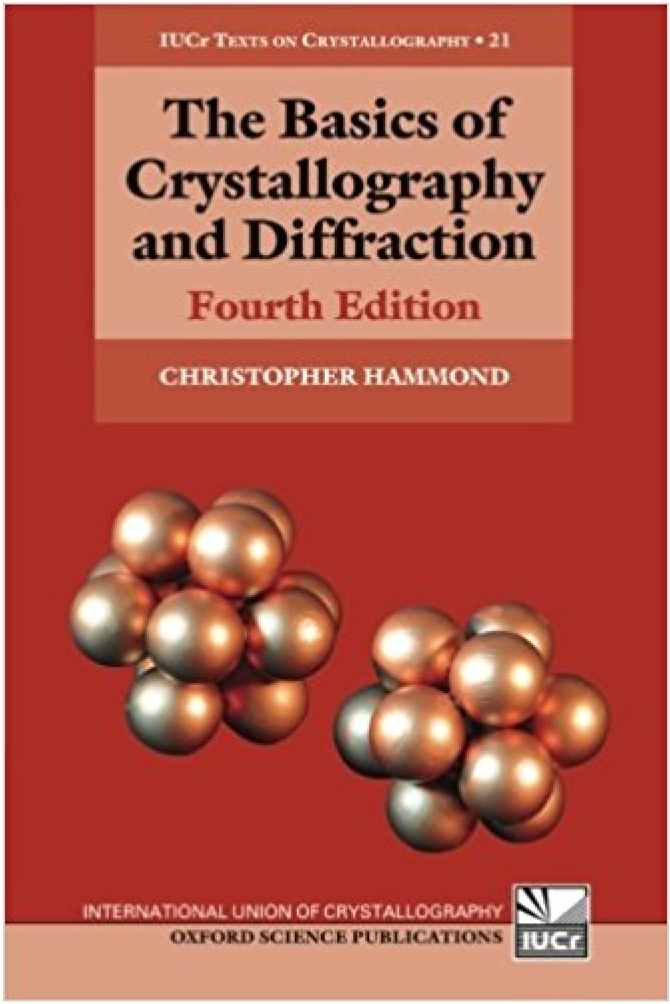
The Basics Of Crystallography And Diffraction: Fourth Edition (International Union Of Crystallography Texts On Crystallography)



Synopsis

This book provides a clear and very broadly based introduction to crystallography, light, X-ray and electron diffraction - a knowledge which is essential to students in a wide range of scientific disciplines but which is otherwise generally covered in subject-specific and more mathematically detailed texts. The text is also designed to appeal to the more general reader since it shows, by historical and biographical references, how the subject has developed from the work and insights of successive generations of crystallographers and scientists.The book shows how an understanding of crystal structures, both inorganic and organic may be built up from simple ideas of atomic and molecular packing. Beginning with (two dimensional) examples of patterns and tilings, the concepts of lattices, symmetry point and space groups are developed. 'Penrose' tilings and quasiperiodic structures are also included. The reciprocal lattice and its importance in understanding the geometry of light, X-ray and electron diffraction patterns is explained in simple terms, leading to Fourier analysis in diffraction, crystal structure determination, image formation and the diffraction-limited resolution in these techniques. Practical X-ray and electron diffraction techniques and their applications are described. A recurring theme is the common principles: the techniques are not treated in isolation.The fourth edition has been revised throughout, and includes new sections on Fourier analysis, Patterson maps, direct methods, charge flipping, group theory in crystallography, and a new chapter on the description of physical properties of crystals by tensors (Chapter 14).

Book Information

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Customer Reviews

"This updated, clearly written edition of a highly successful book is nearly 100 pages longer than its predecessor... Overall, a complete and valuable resource for any practicing crystallographer or upper-level student in crystallography. Highly recommended." --CHOICE"[A] very good introduction to crystallography." --Crystallography Reviews"[T]his is a fine book for anyone wanting to learn about crystallography. It is an enjoyable and informative read, and is one of my favorite books to recommend to students and colleagues alike. It should have a place on the shelf of any physicist, chemist, materials scientist or biologist, who has to navigate this subject." --Mike Glazer, infocus

Christopher Hammond, University of Leeds, Institute for Materials ResearchChristopher Hammond was educated at The Gateway School, Leciester, The University of Cambridge (BA, 1964) and The University of Leeds (Ph.D, 1968). From 1968 to 2005 he was Lecturer, then Senior Lecturer, in the Department of Metallurgy (later the Insitute for Materials Research) and carried out research on titanium alloys. He is a Fellow of the Royal Microscopical Society and a Life Fellow of the University of Leeds. He has long experience of teaching with the University and RMS courses.

"Absolute must" for solid state physicists, materials scientists, and others who need to understand the basics of crystallography.My solid state physics background focused primarily on cubic crystals (SC, BCC, FCC), briefly touched on hexagonal close packed, and virtually completely ignored everything else. Standard solid state physics textbooks (e.g. Kittel, and Ashcroft & Mermin) are inadequate for understanding the various crystalline structures. I wish I had Hammond’s textbook to read "before" embarking on Kittel and/or Ashcroft-Mermin.THIS textbook gives you an excellent and thorough background. The first six chapters (through reciprocal space) are an absolute must as a starting point for all physical and materials scientists. There are several excellent chapters on diffraction, projections, and Fourier analysis. Of importance, which virtually all solid state physics texts ignore, is a chapter on tensors and their use in non-ideal, non-isotropic cases, which is reality.Most textbooks assume isotropic cases, and leave the reader in the dark about non-isotropic cases. 2nd, 3rd, and 4th rank tensors are covered, which is excellent. Another book that covers tensors is "Physical Properties of Crystals: Their Representation by Tensors and Matrices," by J. F. Nye (timeless classic). However Nye doesn’t cover crystalline structures (assumes you have background), which is where Hammond’s book should be read first, followed by Nye’s book for non-ideal, non-isotropic cases where tensors are vital.*Hammond includes answers to many exercises in the back, which makes this book ideal for self-study.*

The Basics of Crystallography and Diffraction: Fourth Edition (International Union of Crystallography Texts on Crystallography) The Basics of Crystallography and Diffraction: Third Edition (International Union of Crystallography Texts on Crystallography) The Basics of Crystallography and Diffraction (International Union of Crystallography Texts on Crystallography) Crystal Structure Analysis: Principles and Practice (International Union of Crystallography Monographs on Crystallography) The Rietveld Method (International Union of Crystallography Monographs on Crystallography) International Tables for Crystallography, Space-Group Symmetry (IUCr Series. International Tables of Crystallography) Minerals and Rocks: Exercises in Crystal and Mineral Chemistry, Crystallography, X-ray Powder Diffraction, Mineral and Rock Identification, and Ore Mineralogy Structure of Materials: An Introduction to Crystallography, Diffraction and Symmetry Astrometric Techniques: Proceedings of the 109th Symposium of the International Astronomical Union Held in Gainesville, Florida, U.S.A., 9Ã¢â ¬â œ12 January 1984 (International Astronomical Union Symposia) X-Ray Crystallography: An Introduction to the Investigation of Crystals by Their Diffraction of Monochromatic X-Radiation Books of Breathing and Related Texts -Late Egyptian Religious Texts in the British Museum Vol.1 (Catalogue of the Books of the Dead and Other Religious Texts in the British Museum) The Government and Politics of the European Union (The European Union Series) Be Free or Die: The Amazing Story of Robert Smalls' Escape from Slavery to Union Hero: The Amazing Story of Robert Smalls' Escape from Slavery to Union Hero The Political System of the European Union (The European Union Series) One Big Union: A History of the Australian Workers Union 1886-1994 Principles of Protein X-ray Crystallography (Springer Advanced Texts in Chemistry) Fundamentals of Powder Diffraction and Structural Characterization of Materials, Second Edition High Energy Electron Diffraction and Microscopy (Monographs on the Physics and Chemistry of Materials) X-Ray Diffraction by Disordered Lamellar Structures: Theory and Applications to Microdivided Silicates and Carbons X-Ray Diffraction and the Identification and Analysis of Clay Minerals