



International Tables for Crystallography, Physical Properties of Crystals (IUCr Series. International Tables of Crystallography)

A. Authier

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International Tables for Crystallography is the definitive resource and reference work for crystallography and structural science.

Each of the eight volumes in the series contains articles and tables of data relevant to crystallographic research and to applications of crystallographic methods in all sciences concerned with the structure and properties of materials. Emphasis is given to symmetry, diffraction methods and techniques of crystal-structure determination, and the physical and chemical properties of crystals. The data are accompanied by discussions of theory, practical explanations and examples, all of which are useful for teaching.

Volume D is concerned with the influence of symmetry on the physical and tensor properties of crystals and on their structural phase transitions. This role is very important in many different disciplines of the science of materials such as crystallography, elasticity, solid-state physics, magnetism, optics, ferroelectricity and mineralogy, and Volume D deals with all these aspects in a unified way.

The volume is divided into 3 parts:

Part 1: Introduces the mathematical properties of tensors and group representations and gives their independent components for each of the crystallographic groups.

Part 2: Devoted to the symmetry aspects of excitations in reciprocal space: phonons, electrons, Raman scattering and Brillouin scattering.

Part 3: Deals with the symmetry aspects of structural phase transitions and twinning. A prominent feature is the joint description of twinning and domain structures, which are usually presented in completely separate ways in handbooks of physics and mineralogy.

Supplementary software is provided to support and enhance Chapters 1.1 and 1.2 for the determination of irreducible group representations and tensor components, and Part 3 on structural phase transitions.

New to this edition:

This second edition of **Volume D** features a new chapter (Chapter 1.11) on the tensorial properties of local crystal susceptibilities, by V. E. Dmitrienko, A. Kirfel and E. N. Ovchinnikova. This chapter describes the symmetry and physical phenomena that allow and restrict forbidden reflections excited at radiation energies close to the X-ray absorption edges of atoms. Reflections caused by magnetic scattering are also discussed.

In Part 1, Chapters 1.1 (an introduction to the properties of tensors), 1.2 (on representations of crystallographic groups), 1.3 (elastic properties), 1.5 (magnetic properties) and 1.10 (on tensors in quasiperiodic structures) have been revised. In particular, Chapter 1.5 features a new section on multiferroics

by M. Kenzelmann.

Chapter 3.3 on twinning of crystals has been updated and new sections on the effect of twinning in reciprocal space and on the relations between twinning and domain structure have been added. Chapter 3.4 on domain structures has also been updated.

More information on the series can be found at: <http://it.iucr.org>

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