International Union of Crystallography

Commission on Crystallographic Apparatus

Microdensitometer intensity project

Microdensitometers are now widely used to measure the intensities of reflexions from single crystals, particularly where large unit cells are concerned. The Commission on Crystallographic Apparatus has decided to make a study of the performance of existing instruments, similar to that undertaken some years ago for single-crystal diffractometers.

All crystallographers using microdensitometers are cordially invited to take part in the project. Though the main aim is to evaluate automatic instruments, laboratories with manual densitometers can also participate.

Two sets of screened non-integrated precession films containing reflexions with two different spot sizes will be distributed. Each set contains two films with different exposure times. Thus each participant will have to measure four films. The film sets will be circulated as long as they – after inspection – are considered to be undamaged. A standard scale exposed on a film of the same batch will be provided.

The results of the measurements shall be delivered on cards in the form of centred x, y coordinates, indices, integrated intensities and, if possible, estimated intensity errors. In addition scaled intensities from the films with different exposure times should be given.

Crystallographers interested in taking part in the project should contact the following Commission member: Professor Sixten Abrahamsson, Department of Structural Chemistry, Faculty of Medicine, University of Göteborg, P.O. Box, S-400 33 Göteborg 33, Sweden.

Anomalous Scattering Errata

A list of corrections to errors noted in *Anomalous Scattering* (1975), edited by S. Ramaseshan and S. C. Abrahams and published for the International Union of Crystallography by Munksgaard, Copenhagen, has been compiled. As one of the corrections is substantial, readers already possessing a copy are advised to write requesting a list of the errata. Copies are available from Munksgaard International Publishers Ltd., 35 Nørre Søgade, DK-1370 Copenhagen K, Denmark or Polycrystal Book Service, P.O. Box 11567, Pittsburgh, Pa. 15238, U.S.A.

Book Review

Works intended for notice in this column should be sent direct to the Book-Review Editor. (J. H. Robertson, School of Chemistry, University of Leeds, Leeds LS2 9JT, England). As far as practicable books will be reviewed in a country different from that of publication.

The physics of liquid crystals. By *P. G. de Gennes*. Pp. xi + 333, Figs. 130. Oxford Univ. Press, 1974. Price: £11.50.

This book is based on Professor de Gennes's lecture notes on the physics of liquid crystals. Anyone who has attended his lectures knows what an inspiring teacher he is and how much he has influenced recent researches in this field. The book certainly succeeds in conveying the author's enthusiasm for the subject and also in highlighting some of the important questions that still remain to be answered.

Chap. 1 describes the main types of liquid crystals, their structural features and properties, with typical examples of the 'building blocks' that give rise to the mesophases. Chap. 2 deals with long and short-range orientational order in nematics. The order parameter is defined and related to macroscopic properties, such as the anisotropy of the diamagnetic susceptibility, *etc.* Statistical theories of long-range order – the hard rod model and the Maier–Saupe treatment – are then outlined briefly. This is followed by a discussion of the Landau–de Gennes model and its applications to static pretransitional short-range order effects in the isotropic phase.

The principles of the continuum theory of nematics are introduced in Chap. 3. The Oseen–Zocher–Frank equations of curvature elasticity are set up and applied to various problems, *e.g.* the static theory of distortions, the orienting influence of walls, magnetic and electric field effects, fluctuations and light scattering. The chapter ends with a discussion of Ericksen's general definitions of stresses and torques. Chap. 4 describes with illustrative photographs the various types of defects and textures in nematics arising from singularities and discusses their significance in terms of the continuum theory. Chap. 5 deals with the dynamical properties of nematics. The basic equations in the Ericksen–Leslie as well as the Harvard formulations are examined and compared, and the various techniques of measuring the coefficients of viscosity are surveyed. The problem of electrohydrodynamic instabilities, which is a topic of importance in electro-optic display technology, is considered in detail and finally methods of studying relaxation phenomena in nematics are reviewed.

Chap. 6 is devoted to the cholesteric liquid crystal which is the twisted form of the nematic. It begins with a theoretical treatment of the unique optical properties of this phase and then goes on to discuss the extension of the continuum theory of nematics to allow for the helical symmetry. The rest of the chapter covers the static theory of distortion by magnetic fields, flow and permeation, electric field effects and convective instabilities, thermomechanical coupling and the Lehmann rotation phenomenon, defects and textures.

The last chapter deals with smectics. Attention is confined mainly to the *A* and *C* types as the structures of the other smectic modifications are not yet completely understood. The continuum theory of smectics is developed and applied to problems of static and dynamic distortions in the structure. The chapter concludes with a discussion of phase transitions and precritical behaviour. In particular, the smectic *C*–smectic *A*, the smectic *A*–nematic and the smectic *C*–nematic transitions are considered and formal analogy is drawn with transitions in superconductors and superfluids.

There is one unfortunate feature of the book which it is the reviewer's duty to record. It contains an inordinately large number of 'typographical' errors, many of which are by no means of a trivial nature and might be disconcerting to a beginner. There are some 50 errors in the mathematical expressions and 17 errors in the figure and equation numbers referred to in the text. The figures themselves are carelessly drawn. For example, in Fig. 3.7 showing the twisted nematic, the axis of twist is marked as 'the easy axis of wall 2'; in Fig. 3.20(*b*) illustrating the origin of flexoelectricity in a nematic subjected to a bend deformation, some banana-shaped molecules have their dipoles pointing out from the concave side and others from the convex side; in Fig. 7.4 giving phase diagrams for mixtures of smectics *A* and *C*, the latter is shown as the higher-temperature phase.

It is nevertheless a valuable book written in an inimitable, 'open-ended' style and studded with beautiful examples and solved problems. Altogether, it is a must for everyone interested in liquid crystals.

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