

Book Reviews

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.

Acta Cryst. (1982). B38, 348

Liquid crystals of one- and two-dimensional order.

Edited by W. HELFRICH and G. HEPPKE. Pp xii + 416. Springer-Verlag, 1980. Price DM69.00, US \$39.50.

This book compiles the abstracts and papers of a conference on liquid crystals of one- and two-dimensional order and their applications. The papers were presented at the Third European Conference on Liquid Crystals which was held at Garmisch-Partenkirchen, Federal Republic of Germany, January 21–25, 1980. Although the meeting was limited to smectogenic mesomorphs, some nematogenic and cholesteric ones were discussed at the meeting and are consequently included in the book. The abstracts of the papers are grouped into ten sections on the basis of the mesomorphic substance studied or the property investigated.

The first of these sections includes those papers that deal with ordered smectic phases and their structures. Here the historical accidents which resulted in the present ambiguity of smectic nomenclature are enumerated. The characterizations of phases based on miscibility and on structure investigations have resulted in a double use of the terms smectic *G* and *H* phases. After evidence for this multiple use is presented, a joint paper recommends a unified nomenclature in this area. Such uniformity in nomenclature will reduce future ambiguity in the literature of these mesomorphic phases. Other papers in the first section present structural data on smectic liquid crystals and plastic crystals gathered mainly by X-ray and neutron diffraction experiments and by magnetic resonance experiments.

Part II of the book includes papers describing *A* and *C* smectic phases and their structures. Here the reader will find techniques in addition to X-ray diffraction used to illuminate these structures. Included are data from dielectric properties, molecular-packing coefficients, refractive indices, far infrared, nuclear magnetic resonance, and theoretical considerations of packing and molecular motion.

Papers on defects, elasticity, rheology, and special phase transitions are grouped in parts III and IV. The special transitions include a description of re-entrant nematics and $S_{A1} \rightarrow S_{A2}$ transitions, and they include theoretical discussions of order parameters, simple free-energy functions, and transition entropy.

The remaining five parts of the book group papers presenting special applications of mesomorphic structures. Here one finds papers on electro-optical applications of smectogenic compounds with commercial possibilities, cholesteric 'blue phases', polymers that exhibit liquid-crystalline behavior, nematic gels, lyotropic liquid-crystalline materials, applications to biological systems including interfaces, vesicles, and bilayers, and finally the disk-like molecules that also exhibit mesophases.

The papers collected in this book summarize the present state of research in the area. Since 42 of the 83 papers are

presented only as one- or two-page abstracts, and as such are limited in the amount of data that can be included, the reading is sometimes frustrating, since it leaves the reader wanting more information. Nevertheless, in each section there are invited papers and other papers that are of sufficient length for both the ideas and the supporting data to be presented.

The final tenth section lists the titles and authors of 28 additional papers which were presented at the meeting.

P. G. BARBER

*Department of Natural Sciences
Longwood College
Farmville
VA 23901
USA*

Acta Cryst. (1982). B38, 348–349

Solid state chemistry: a contemporary overview. Edited by SMITH L. HOLT, JOSEPH B. MILSTEIN and MURRAY ROBBINS. Pp. x + 437. American Chemical Society (Washington, DC), 1980. Price US \$59.50.

This interesting and well produced book consists of 21 papers presented at the *First Summer Symposium on Solid State Chemistry*, sponsored by the Solid State Subdivision of the American Chemical Society's Division of Inorganic Chemistry, and held at Laramie, Wyoming, in 1978.

Modern solid-state chemistry is as much a mission as a field. Its fast growth in the last twenty years and its present technological bias are a direct result of the electronic industry's need for large crystals with precisely defined composition and defect structure, plus a more recent, powerful impulse towards the chemical problems that arise in the search for new ways of extracting, storing, and transmitting energy. Such an orientation requires that theorists and practitioners from widely different fields of study be brought together; and the result in this case is a book as stimulating and enlightening as the meeting no doubt was – if, perhaps, a little hard to digest.

The book is divided into three sections: *Application of Physical Techniques to Solid State Chemistry*, *Materials for Energy Conversion, Storage, and Transmission*, and *Preparation and Properties of Diverse Solids* (a subdivision that seems something of an editorial afterthought, needed to put some structure on a stubbornly heterogeneous collection). The first contains papers on some relatively new or unusual techniques. A. B. Denison describes muon spin rotation – 'an exotic probe of the atomic environment': muons (generated with intrinsic spin polarization as a result of the non-conservation of parity) interact with the electrons and local electric and magnetic fields in a solid, and by following their precession and depolarization (actually one traces the positron offspring of their brief lives) one can monitor these fields at various sites. The author suggests that