

## International Union of Crystallography

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### Structure Reports

Volume 43B of *Structure Reports* has recently been published. It covers the literature for organic compounds for 1977, is bound in two parts (vi + 804 pages and vi + 799 pages) and costs 306 Netherlands guilders for subscribers with standing orders. The full price for individual copies is 360 guilders but personal subscribers may buy a copy for their own use at 180 guilders.

Orders for *Structure Reports* may be placed direct with the publisher, D. Reidel Publishing Company, PO Box 17, 3300 AA Dordrecht, The Netherlands, with Polycrystal Book Service, PO Box 11567, Pittsburgh, PA 15238, USA, or with any bookseller. Trade orders should be sent to Reidel.

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### Molecular Structures and Dimensions

The International Union of Crystallography and the Cambridge Crystallographic Data Centre announce the publication of the latest volume in this series: Volume 11, entitled *Bibliography 1978–79, Organic and Organometallic Crystal Structures*. It contains bibliographic information on 3023 structures published during 1978–1979. As in previous volumes the entries are arranged in 86 chemical classes and cover organic compounds, complexes and organometallic compounds. There are extensive indexes for authors, compound names and formulae.

The price of the new volume is 100 Netherlands guilders (about US\$53 at current rates of exchange). Personal copies may be purchased at a reduced price of 75 Netherlands guilders. Copies are available directly from D. Reidel Publishing Company, PO Box 17, 3300 AA Dordrecht. The

Netherlands. Alternatively, orders may be placed with Polycrystal Book Service, PO Box 11567, Pittsburgh, PA 15238, USA, or with any bookseller. Trade orders should be sent to Reidel.

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### Co-Editors of *Acta Crystallographica*

Dr P. J. Wheatley, Department of Physical Chemistry, University of Cambridge, England, has resigned as a Co-Editor of *Acta Crystallographica* with effect from the end of 1980 and Dr T. J. Hamor, Department of Chemistry, University of Birmingham, England, has been appointed to succeed him, along with Dr S. Jagner and Dr B. T. M. Willis, whose appointments have been announced previously.

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### Submission of papers for publication in *Acta Crystallographica*

The unhindered selection by authors of the most convenient Co-editor for the submission of papers is one of the policies of *Acta Crystallographica* stated on the inside front cover of all issues. In recent years, a disproportionate number of papers have been submitted to Dr P. J. Wheatley and Professor M. M. Woolfson. Many of these papers originated in countries outside the United Kingdom. With the resignations of Professor Woolfson and Dr Wheatley it would be helpful if the authors of such papers, particularly those resident in other European countries, would select a Co-editor not resident in the United Kingdom. Manuscripts receive comparable treatment from all Co-editors, and possible delays in handling or by manuscript transfer will be avoided by a more random manuscript distribution.

## 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.*

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**Electronic and vibrational properties of point defects in ionic crystals.** By Y. FARGE and M. P. FONTANA. Pp. xix + 262. Amsterdam, New York, Oxford: North-Holland, 1979. Price US \$48.75, Dfl 100.00.

This book is Volume 11 in the series *Defects in Crystalline Solids* and is based on a graduate course at Orsay. Dr Farge and Professor Fontana have significantly contributed to this field and thus are well suited to discussing work of the last

several years, which is emphasized throughout the book. The authors claim that only selected topics are discussed and that this is not a review book. Nevertheless, a great deal of experimental information is presented on numerous materials. Each chapter is independently referenced with a total of almost 600 references. In addition, many fundamental concepts of point defects in solids are presented succinctly. This edition is an English version of the same book published in French in 1974. It has been updated to include more recent work.

There are five chapters. The first consists of descriptions of a large number of the usual point defects in alkali halides. Each description is, of necessity, superficial. Many effects are

presented in terms of both experimental and theoretical work which sometimes leads to a disjointed discussion.  $F^-$ ,  $F_2^-$ ,  $F_3^-$ ,  $F_3^+$ ,  $F^-$ ,  $H^-$ ,  $V_k^-$ -centers and impurity defect centers are noted. Color centers in alkali-earth fluorides and oxides and in silver halides are also described. As noted earlier, there is an ample reference list.

Chapter 2 is a pedagogical approach to vibrational perturbations of defects in ionic crystals. There is a clear discussion of the two important approximations needed in the development – the adiabatic and the harmonic approximations. Several models for calculating the density of states are presented. Theory is applied to the examples of  $H^-$  and  $OH^-$  substitutional impurities. Other examples have less detail including gap modes as found in Cl in KI and resonant modes as found in  $Ag^+$  or  $Li^+$  in alkali halides. Raman scattering and tunneling are introduced and examples of their uses are given.

Chapter 3 discusses the electron–vibration interaction and its effects on optical transitions associated with defect states. The basic theory of optical band shapes is presented along with examples of defects with strong and weak coupling to the lattice. The Jahn–Teller effect is covered in some detail. Defect-induced Raman scattering is treated with special emphasis on resonance Raman scattering from  $F$  centers.

Chapter 4 discusses the electronic states of defects in ionic solids beginning with the  $F$ -center in the alkali halides and continuing with the Th impurity in alkali halides. Two problems are discussed in detail; self-trapped excitons in alkali halides and non-radiative transitions. This chapter presents theory and experiment in a readable, logical sequence. Apparently, this chapter has been completely rewritten since the French version.

Chapter 5 describes the creation of color centers by ionizing radiation and very briefly discusses several applications, including X- and  $\gamma$ -ray dosimetry, geology, optical memories, dielectric thermometers and broadly tunable lasers. Certainly, a great deal more is known about these applications than is presented here, especially tunable lasers which are now becoming commercially available.

There are some problems with the book. There are a number of cases of incorrect English grammar which probably came about in the translation process. There are also a number of errors connected with the figures; for examples, curve (b) of Figure 2.5 is referred to in the text while there is no curve (b) in the figure, and Figure 2.14, referred to on page 139, appears to be missing. In a work of this type the references are invariably incomplete. In this case, however, enough references are given so that works which may have been overlooked will certainly be referenced in the articles referred to in the text.

This is a valuable book as a general introduction to the subject of localized states in insulators. The text is especially useful because of the extensive bibliography. I recommend it to scientists who are interested in doing research in this field or who want to apply concepts of this field to other areas.

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**The molecular physics of liquid crystals.** Edited by G. R. LUCKHURST and G. W. GRAY. Pp. xii + 494. London: Academic Press, Inc., 1979. Price £20.00, US \$46.00.

Books on the subject of liquid crystals have been appearing at a rather rapid pace in recent years. Their appearance is a measure of the current interest in liquid crystals, which did not exist in years gone by. To illustrate the status of liquid crystals in the 1960's the reviewer refers to an article written in *Angewandte Chemie* (1966), 14, 29 entitled *Liquid Crystals ... A Research Field of Low Return* in which the anonymous author referred to the 'Liquid Crystal Conference' called by G. Brown of Kent State University in August 1965. The author of this article writes 'the conference constitutes a gratifying indication of the renewed interest in crystalline liquids'. The author writes that it may be expected that this field, which is of interest in research and in practice, will again be taken up with greater enthusiasm. This greater enthusiasm has come to pass and a dynamic field of research is with us.

The source of material for this volume was the NATO Advanced Study Institute which met at Corpus Christi College, Cambridge at the end of August 1977. The book is written by an impressive list of scholars. There are 20 chapters and a subject index and a chemical index. The subject index is adequate but the chemical index is very limited. Since the topics covered in this book are diverse, we list the titles of the chapters and the authors as follows: (1) G. W. Gray, *Liquid crystals and molecular structure – nematics and cholesterics*; (2) A. J. Stone, *Intermolecular forces*; (3) C. Zannoni, *Distribution functions and order parameters*; (4) G. R. Luckhurst, *Molecular field theories of nematics*; (5) H. Schröder, *A molecular field theory of the cholesteric liquid crystal state*; (6) B. W. van der Meer & G. Vertogen, *A molecular model for the cholesteric mesophase*; (7) M. A. Cotter, *Hard particle theories of nematics*; (8) M. A. Cotter, *The van der Waals approach to nematic liquids*; (9) C. Zannoni, *Computer simulations*; (10) D. E. Martire, *Thermodynamics of phase transitions*; (11) D. E. Martire, *Statistical mechanics of binary mixtures*; (12) G. W. Gray, *Liquid crystals and molecular structure – smectics*; (13) A. J. Leadbetter, *Structural studies of nematic, smectic A and smectic C phases*; (14) J. Doucet, *X-ray studies of ordered smectic phases*; (15) J. Charvolin & B. Deloche, *Nuclear magnetic resonance studies of molecular behaviour*; (16) P. L. Nordio & U. Segre, *Magnetic resonance spectroscopy – static behaviour*; (17) P. S. Pershan, *Raman studies of orientational order in liquid crystals*; (18) P. L. Nordio & U. Segre, *Rotational dynamics*; (19) P. L. Nordio & U. Segre, *Magnetic resonance spectroscopy – dynamical aspects*; (20) A. J. Leadbetter & R. M. Richardson, *Incoherent quasielastic neutron scattering*.

On perusing the chapters one is of the opinion that very little new material was included by the authors. This was probably on purpose since the NATO meeting focused mostly on the idea of a school and not the idea of a research program.

G. W. Gray in his two chapters set out to relate molecular geometry and liquid crystallinity. As always, Gray writes scholarly chapters which are valuable to the organic chemist as well as to the theoretician.