

Professor **N. Kato**, Ordinary Members – **Professor S. Amelinckx**, Professor **Th. Hahn**, Professor **M. Nardelli**, Professor **H. Neels**, Dr **V. I. Simonov**, Professor **M. M. Woolfson**.

Dr **S. C. Abrahams** was reappointed Editor of *Acta Crystallographica* and Chairman of the Commission on Journals, Professor **M. Hart** was reappointed Editor of the *Journal of Applied Crystallography* and Co-Chairman of the Commission on Journals. Professor **M. Nardelli** and Professor **R. Norrestam** were appointed as Co-Editors of *Acta Crystallographica* and Professor **G. Allegra** and Dr **S. Jagner** have retired. Professor **G. Ferguson** was appointed as Editor of *Structure Reports*, succeeding Professor **J. Trotter** who has retired as Editor of this publication. Professor **M. G. Rossman** was elected Chairman of the new Commission on Biological-Macromolecule Crystallography, Dr **M. J. Cooper** was elected Chairman of the Commission on Charge, Spin and Momentum Densities, Dr **E. Kaldis** was re-elected Chairman of the Commission on Crystal Growth and Characterization of Materials (formerly the Commission on Crystal Growth), Professor **S. Abrahamsson** was reelected Chairman of the Commission on Crystallographic Apparatus, Dr **S. R. Hall** was elected Chairman of the Commission on Crystallographic Computing, Dr **I. D. Brown** was elected Chairman of the Commission on Crystallographic Data, Dr **S. C. Abrahams** continues as Chairman of the Commission on Crystallographic Nomenclature as a result of his reappointment as Chairman of the Commission on Journals, Dr **B. Buras** was elected Chairman of the Commission on Crystallographic Studies at Controlled Pressures and Temperatures, Professor **P. Krishna** was elected Chairman of the Commission on Crystallographic Teaching, Dr **P. Goodman** was elected Chairman of the Commission on Electron Diffraction and Dr **M. S. Lehmann** was elected Chairman of the Commission on Neutron Diffraction.

The full membership of the Commissions of the Union, and the Union representatives on other bodies, will be given in the Report of the Twelfth General Assembly and International Congress of Crystallography, which will be published in Section A of *Acta Crystallographica* in due course.

Professor **P. P. Ewald** was unable to attend the Twelfth International Congress of Crystallography but sent the following message: "Feeling too old for joining in the celebrations of the XII Congress, I still

remain interested in the success of this International Congress of Crystallography. May its dealings not only show the advances in the understanding of the material properties of condensed matter but, beyond this, show how only through world-wide peaceful cooperation a thorough understanding can be gained. I wish you good results for your deliberations".

Professor **E. F. Bertaut**, Director of the Laboratoire de Cristallographie, Centre de Tri, Grenoble has received the degree of Doctor of Philosophy *Honoris Causae* from the Johann Wolfgang Goethe University, Frankfurt.

Professor **T. L. Blundell**, Birkbeck College, London has been appointed Director of the International School of Crystallography at the Ettore Majorana Centre for Scientific Culture at Erice, Sicily.

## International Union of Crystallography

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### World Directory of Crystallographers Sixth Edition

The Sixth Edition of the *World Directory of Crystallographers and of Other Scientists Employing Crystallographic Methods*, General Editor A. L. Bednowitz, has just been published on behalf of the International Union of Crystallography by D. Reidel Publishing Company, PO Box 17, 3300 AA Dordrecht, The Netherlands and 160 Old Derby Street, Hingham, MA 02043, USA, from whom copies may be ordered direct at a price of US \$10 (25 Netherlands Guilders) post free. It contains short biographical data on over 8100 scientists from 68 countries. The biographical data include full name and title, address, year of birth, highest degree, field of study, university and year of highest degree, present position, telephone number and major scientific interests. There is also a comprehensive name index.

For those crystallographers whose names have not been included in the Sixth Edition and for any whose entries contain errors, Data Entry forms for the Seventh Edition are available from Dr Allan L. Bednowitz, General Editor, IUCr World

Directory of Crystallographers, c/o IBM T. J. Watson Research Center, PO Box 218, Yorktown Heights, NY 10598, USA.

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### Delays in Publication

Median publication time for full articles in *Acta Crystallographica* and *Journal of Applied Crystallography* (JAC), based on the elapsed time between final acceptance of manuscripts and their nominal date of publication, has been close to five months in Section A and JAC and four months in Section B in recent years. Short communications and short structural papers have experienced slightly shorter median publication times. It is deeply regretted that publication times will increase later this year to about eight months on average as a consequence of the reduced number of pages that can be published in 1981 without incurring an unsustainable loss, as large and unfavourable movements in international exchange rates have resulted in a substantial deficit in the publication of Volume 36 of *Acta Crystallographica* and have already nullified the effect of the increase in subscription rates for Volume 37. Various alternative procedures for the production of the journals are being investigated with the aim of reducing costs and reducing the effect of variations in exchange rates, and every effort will be made to return to normal publication schedules with least delay.

### 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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**Crystals: growth, properties and applications, Vol. 3.** Edited by *H. C. Freyhardt*. Pp. iv + 163. Berlin, Heidelberg, New York: Springer-Verlag, 1980. Price DM 72.80, US \$ 43.00.

The current importance of III–V compounds for the development of advanced semiconductor devices makes this third

volume in this Springer-Verlag series very topical. Apart from GaAs and (Ga, Al)As, the growing importance of InP as a substrate material for epitaxial layers of ternary and quaternary compositions from the system Ga-In-As-P certainly warrants a detailed survey of the latest developments in the preparative techniques used for these materials. Admittedly, to do this adequately would require a volume at least an order of magnitude larger than the slim 'Crystal 3', but the omissions are surprising. Notably, there is no mention of conventional bulk growth techniques, nor of the typical defects in such crystals. Also conspicuous by its absence is any mention of vapour transport or metal organic deposition, although both processes are capable of yielding device-quality materials. In fact one wonders why the particular topics were chosen, since they represent extremes in several respects: near and far from equilibrium processes, bulk crystal growth and epitaxy, solution and ultra-high vacuum.

The first contribution on the growth of III-V materials from solution is clearly important, particularly as so many devices are currently fabricated from LPE-grown heterostructures. However, anyone entering the field would find the article to be of limited help. It deals with the growth of bulk crystals from solution by the travelling solvent and related methods, and the so-called solute, synthesis and diffusion technique (SSD). The latter is aesthetically appealing, but with growth rates measured in mm per day it has understandably not replaced the more conventional bulk growth processes. The article then goes on to deal rather superficially with LPE growth. Several very beautiful illustrations are used, which are indicative of the standard of work carried out by the authors, but these are inadequately described or explained in the text, as indeed are many of the other aspects of LPE briefly mentioned. I found it irritating to have to look up several of the numerous references given in order to obtain details pertinent to the figures.

It is a great pity that the authors did not accord to this section the detailed and careful treatment that would be warranted by the mass of confusing and relatively uninformative papers that have been published on the topic of LPE. The rather quaint English employed also tends to detract from a favourable appreciation of this section.

The second article deals with what at first sight appears to be a different solution-growth technique, namely tem-

perature gradient solution growth (TGS). However, one quickly discovers that this is none other than the technique referred to in the previous contribution as SSD. The details of the various variations of the process are given in a satisfactory and detailed manner, and even some of the defect and impurity contents of the products are given for GaP and (Ga,In)P crystals used for LED fabrication.

The final article, comprising over one half of the volume, deals with molecular beam epitaxy (MBE) of III-V compounds. This is a very competent work which deals in a detailed and comprehensive manner with the technique. This will certainly be of value to the non-specialist who wishes to know the state-of-the-art, as well as providing a useful summary and reference source for the specialist.

No attempt is made to discuss the theoretical bases of the processes involved in MBE, but this would perhaps require an equally long treatment. The experimental aspects of the equipment and procedures are described in a clear and detailed manner, and the comparative merits of variations discussed. The associated monitoring and analytical techniques which make MBE such a powerful process are also treated, and a very informative section deals with the characterization of the materials which have been prepared. While the article appears to be as up-to-date as possible in such a developing field, there is no description of the currently available 'second generation' equipment, although the desirable features of such equipment are discussed.

The uses of MBE-grown materials are described in some detail for the various types of devices that are now being fabricated, and recent developments in the preparation of thin multilayer quantum-well structures are given. The quality of the 'superlattice' materials that have been prepared by MBE illustrates the potential of the technique for achieving precise control of growth. Finally, the geometrical constraint of growth using masks is described which could offer an important advantage over conventional vapour transport techniques for device circuitry fabrication. The emergence of MBE from an expensive research tool to a production process is clearly imminent, which makes this article particularly timely. The volume is worth reading for this contribution alone.

This volume can hardly be said to present a balanced picture of III-V compound growth. A contribution on alternative - and possibly cheaper - processes such as MOCVD would have left the

reader better able to judge the relative importance and potential of each process for the formation of epilayers of good crystallographic quality and high purity in a well controlled manner. However, it is clearly a difficult task to maintain a high standard in the currently fashionable continuing series of publications on specialized interdisciplinary topics, and an occasional lapse from grace is to be expected. At least there is a possibility for rectifying the lapse in subsequent volumes!

E. A. D. WHITE

*British Telecom Research Laboratories  
Martlesham Heath  
Ipswich IP5 7RE  
England*

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**Laser crystals.** By A. A. Kaminskii. Pp. 456. Berlin, Heidelberg, New York: Springer-Verlag, 1981. Price DM 128.00, US \$ 75.60.

This book, one of the Springer series in *Optical Sciences*, gives excellent and comprehensive information on the physics of laser crystals. Because of the importance of solid-state lasers, particularly those using crystalline active materials, laser crystals attract many workers from disciplines such as quantum electronics, spectroscopy and crystallography, and to a great extent also crystal growth and laser applications. It is of great importance that a book is now available which is comprehensible to workers from all these various disciplines.

The book itself is divided into nine chapters dealing with such aspects as spectral and laser characteristics of the laser crystals, operating schemes and types of lasers based on activated crystals, Stark levels and optical transition intensities of activator ions (particularly  $\text{Nd}^{3+}$ ) in laser crystals, a summary of the properties of laser crystals, the laser crystals in the  $\text{Y}_2\text{O}_3\text{-Al}_2\text{O}_3$  system, self-activated laser crystals, etc. It is well known that most laser crystals have been investigated only in the past few years. So far, the results of these studies have been available mostly as original papers or reviews: they have not, until now, been