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 *s*olute, *s*ynthesis and *d*iffusion 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 temperature 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 apears 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!

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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 Nd^{3+}) in laser crystals, a summary of the properties of laser crystals, the laser crystals in the Y_2O_3–Al_2O_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

systematized in a single publication. The present book is a successful attempt to bridge this gap and, together with such monographs as, for example, *Solid-state laser engineering* by W. Koechner (Springer, 1976), enables one to judge the possibilities of contemporary crystalline active laser materials. The technique and main results of the stimulated emission spectroscopy of activated dielectric crystals are described systematically. It is to be noted that the book deals with 'perfect' crystals, so the information about defects of laser crystals is limited. Nevertheless, the classification of the crystals suggested in this book is useful in the physics and applications of lasers. The data are presented mostly in the form of tables, which condense a large amount of information taken from 832 references, including the author's own pioneering studies.

This book, therefore, can be used by scientists and students in the field of quantum electronics, as well as those engaged in studies in related fields of solid-state physics or materials science.

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Books Received

The following books have been received by the Editor. Brief and generally uncritical notices are given of works of marginal crystallographic interest, occasionally a book of fundamental interest is included under this heading because of difficulty in finding a suitable reviewer without great delay.

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Physics of nonlinear transport in semiconductors. Edited by *David K. Ferry, J. R. Barker* and *C. Jacoboni*. Pp. xx + 614. New York: Plenum Press, 1980. Price $65.00. A review of this book, by T. Mitsuishi, has been published in the September 1981 issue of *Acta Crystallographica*, Section A, pages 767–768.