

the commercial forces which have provided most of the financial support.

Typical of a journal, each of the seven articles is quite independent; there is little cross referencing, there is much repetition. The sequence of the articles seems to be random. For example, both the first and last articles deal with modulated structures. The former describes layered structures having periodic compositional modulation, while the latter describes periodic doping. Such structures are receiving a good deal of attention these days because they may prove useful in new electronic and optoelectronic devices and because they exhibit interesting semiconductor phenomena. MBE is well suited to the preparation of these complex structures, especially when the modulation period is in the range of monolayer spacings. However, many interesting structures involve layer thicknesses in the range of hundreds or even thousands of ångströms. In this range MBE is not unique. Chemical vapor deposition using metalorganic sources has been used to prepare structures having layer thicknesses of less than 100 Å. This alternative to MBE is referred to only once in the book, although the failure of earlier chemical vapor deposition techniques is mentioned.

A focus on the capabilities of MBE rather than an objective description of the method and comparison with other methods is, perhaps, to be expected in articles written by 'leading practitioners of the art.' The first two articles, the former describing the compositionally modulated structures and the latter describing MBE hardware, tend to convey the idea that all of the problems of preparing materials by MBE have been solved. It is only upon reaching the third article, which is a very clearly written introduction to the thermodynamic basis for controlling point defects and dopants in compound semiconductors, that some of the difficulties and limitations of MBE become obvious. In particular, many atomic or molecular species are not compatible with each other or with existing MBE technology.

The third article thus deals with certain aspects of crystal growth by MBE. Some other aspects form the subject of the sixth article, which presents some results from studies of surface physics and chemistry. This article would have been better if it included more introductory material for the benefit of readers who are not familiar with the rather broad range of surface analytical techniques involved.

The other two articles in this book consider the application of MBE to optical

devices of a more conventional nature than the modulated structures. One of these articles is a well written introduction to integrated optics employing III-V semiconductors, specifically $Ga_{1-x}Al_xAs$. The various optical components are described along with methods for their fabrication by such means as MBE through shadow masks.

The remaining article, which is a good review of IV-VI optoelectronic devices, is remarkable for several reasons. It is by far the longest article; occupying more than one quarter of the volume's 170 pages. It is the only article which does not primarily focus on III-V materials. It is an article in which the authors state that 'the choice of vacuum deposition technique . . . may be regarded as a matter of taste,' rather than positing the superiority of MBE. In fact, the growth technique employed by these authors is so much different from the one used for III-V's that it hardly seems correct to call both techniques MBE. This is the point in the book where the reader wishes there had been an introduction in which the term MBE were clearly defined. In any case, readers who are interested in MBE are likely to find that this lengthy article tells them more than they ever wanted to know about IV-VI devices. This article also suffers from a severe case of a syndrome which afflicts the entire book and which is commonly observed in journals that are produced by photocomposition from the authors' typescripts; namely typographical (and lay-out) errors.

The reader of this review may now wish to return to the first paragraph and underline 'collection of articles,' 'III-V,' and 'integrated optics reasons for using the technique', for these are the key words in describing this book. Potential readers of the book would do well to treat it for what it is, an issue of a journal which is dedicated to publishing brief introductory reviews. Readers who seek the general introduction to MBE which this book lacks may find a recent review by M. B. Panish (*Science*, Vol. 208, 23 May 1980, pp. 916-922) to be useful. However, in common with most of the articles in the book, Panish's review is one-sidedly pro-MBE, in spite of the fact that his laboratory is known to be expanding its research on metalorganic chemical vapor deposition.

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Asbestos. Vol. 1. Final report of the Advisory Committee; Vol. 2. Papers prepared for the Advisory Committee. Committee Chairman *W. Simpson*, Health and Safety Commission of Great Britain. Pp. 100 (Vol. 1), pp. 103 (Vol. 2). Her Majesty's Stationery Office, 49 High Holborn, London, WC1V 6HB, 1979. £5.00 each volume.

These two volumes comprise the report of the Advisory Committee on the use, control, and health effects of asbestos in society. This work should be of interest to those who work with asbestos and other fibrous materials as well as those who have a general interest in environmental health problems. An extensive summary of the health effects associated with inhalation of asbestos dust by workers in many industries and in many parts of the world is given. Asbestos, considered to be the fibrous form of any one of six minerals, chrysotile, amosite, crocidolite, tremolite, actinolite, and anthophyllite, may cause asbestosis (a scarring of the lung), lung cancer, or mesothelioma (a cancer of the lining of the chest and abdominal cavity). Certain physical properties such as size and shape, and possibly certain chemical and structural properties, are suggested as reasons why these fibrous minerals are particularly dangerous to humans.

The Simpson Report, which is written by a large number of experts in the various fields of asbestos use, gives a description of the asbestos minerals, the distribution of asbestos in the workplace, the problems of asbestos dust measurement and control, a discussion of asbestos exposure to the general public, the health effects of asbestos, the nature of asbestos products and their possible substitutes, and new proposals for legal and administrative control of asbestos use.

In this reviewer's opinion there is no document to compare with the Simpson Report in its evenhanded and scientifically thorough presentation of the complex problem of asbestos and health. The Report clearly recognizes the significant differences in the health effects of the various forms of commercial asbestos; crocidolite is considered so dangerous that its complete ban is proposed whereas the use of chrysotile within

present technologically feasible dust control limits is recommended. The conclusions of the Report are wide ranging and the new proposals on asbestos control are based on good science and not on vague unwarranted fear.

Some medical scientists, for example M. F. Stanton of the National Cancer Institute, Bethesda, Maryland, hold to the theory that size and shape are the important factors controlling the incidence of asbestos-related diseases. If so, other fibrous materials may also be dangerous to human health; minerals such as the fibrous zeolites, clays, and amphiboles, wollastonite, sepiolite, and inorganic substances such as fiber glass, mineral wool, and fibers of aluminum oxide, silicon carbide, and dihydroxy sodium aluminum carbonate. There is a

great need to study such materials in detail in order to relate particular properties to the potential for causing disease. The Simpson Report should serve as a guide for such studies.

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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.

Growth and properties of metal clusters: applications to catalysis and the photographic process. Edited by *J. Bourdon*. Pp. xviii + 549. Amsterdam, Oxford, New York: Elsevier, 1980. Price US \$97.50, Dfl 200.00. A review of this book, by M. J. Harding, has been published in the January 1981 issue of *Acta Crystallographica*, Section A, page 141.

Handbook of liquid crystals. By *H. Kelker* and *R. Hatz*. Pp. xviii + 917. Weinheim: Verlag Chemie, 1980. Price DM 420.00. A review of this book, by G. W. Gray, has been published in the November 1980 issue of *Acta Crystallographica*, Section B, page 2861.