readable and cover a range of topics which should be of interest to many workers in materials. The first is an article by Haas on *Localisation of electrons*, which deals with the important task of relating the electronic structure of atoms, molecules or atomic arrays with physical properties. Such topics as phase transitions, metal/insulator transitions in oxides and lattice distortions are discussed in terms of electron orbits and localisation of electrons in bonding.

Chevrel-phase compounds (important because of their very high superconducting transition temperatures and critical magnetic fields) are discussed by Yvon. In common with other families of materials developed in inorganic materials in recent years, a surprising number of compounds in this category have been prepared, which are built up from simple M_6X_6 units to form complex structures and formulations, the relationship between which is not always obvious. I found this to be an interesting article with some useful accumulations of structural data.

Lastly, there is a somewhat specialized article by Stoyanov dealing with developments in nucleation theory for high and low supersaturations. The author claims to outline the basic concepts of nucleation, but much preknowledge is assumed, and it would not be recommended for the beginner. To some extent this section overlaps with the article by Kern, but nucleation problems which are more relevant to crystal growth of practical importance are dealt with.

To summarize, the volume is something of a miscellany. To try to indicate to whom the book would be particularly useful is difficult. The main parts of the volume would appeal more to the specialist as a source of references rather than to a newcomer wishing to acquire the necessary background to a particular field. It is to be hoped that future volumes in this series will not suffer from the defects of Volume 3.

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Current topics in materials science, Vol. 4.

Edited by *E. Kaldis*. Pp. viii + 596. Amsterdam: North-Holland Publishing Co., 1980. Price US $ 102.50, Dfl 210.00.

'Materials science' is a loosely-defined term, generally applied to the study of condensed phases, chiefly solid, and usually involving interdisciplinary activity in the fields of physics, chemistry and metallurgy. Previous volumes in the series, of which this is the fourth, have covered topics ranging from the growth and structure of protein crystals to *Metallic Glasses – a New Technology*.

The present volume continues in this vein, including articles on crystallization processes in two-dimensional adsorbed gas layers on graphite and in crystals of long-chain alkanes. There are nine chapters, and a listing of the titles will indicate the range. Chapter 1, *Miniature neodymium lasers*; 2, Eu^{2+} *fluorescence and its application in medical X-ray intensifying screens*; 3, *Materials for open-cycle MHD generators*; 4, *Applications of low-pressure plasmas in materials science*; 5, *Phase diagrams of electronic materials*; 6, *Interfacial tension and adsorption of metallic systems*; 7, *Two-dimensional phase transitions of simple molecules adsorbed on graphite*; 8, *Defect structure and growth mechanisms of long-chain normal alkanes*; 9, *Lanthanide oxides, structural anisotropy, physical and mechanical properties*.

With the possible exception of the paper by Bienfait on the two-dimensional phase transitions in adsorbed monolayers, all the contributions are closely tied to practical applications. For the most part, the literature is carefully reviewed, even when the major part of the data presented came from the authors' own laboratories.

In a few cases, such as the article on lanthanide oxides by Lejus & Collongues, the subjects covered were too broad for more than a perfunctory coverage of many topics, although the portion covering the authors' own work is well done, and the references will be useful to the reader. An article of twice the length would be needed for adequate coverage of all the topics.

The first two articles, by Huber and by Brixner, Bierlein & Johnson, were of particular interest to me because of some current research activities. Both are well done and give excellent starting points to readers wishing to go deeper into their respective fields.

Are these matters of interest to crystallographers? I believe that most crystallographers today are engaged in the study of crystals whose structure is of interest because of some significant physical, chemical or biological properties. In this sense 'materials science' contains a large component of applied crystallography.

With such a diverse range of subject matter, the editor and publisher are to be commended for their decision to hold down the size of the volumes, lowering the cost to individuals who will not wish to purchase the complete series, and minimizing the amount of unwanted material. For those having an interest in several articles in this volume, it would make a useful addition to their personal collections.

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Handbook of semiconductors. Vol. 2. Optical properties of solids.

Edited by *M. Balkanski*. Pp. xiv + 633. Amsterdam, New York, Oxford: North Holland Publishing Company, 1980. Price US $ 122.00, Dfl 250.00.

This is the first volume to appear of a four-volume set comprising the complete *Handbook of Semiconductors* of which T. S. Moss is the overall editor. The other three volumes are *Band Theory and Transport Properties* (edited by W. Paul), *Materials Properties and Preparation* (edited by S. P. Keller) and *Device Physics* (edited by C. Hilsum). In this second volume the editor Minko Balkanski has chosen to subdivide the subject matter according to the physical phenomena involved in the interaction of photons with solids rather than having individual chapters alloted to each semiconductor. The nine chapters, all written by experts in the field cover (1) *Properties above the band edge* (Y. Petroff); (2) *N particle complexes* (G. A. Thomas and V. B. Timofeev); (3) *Semiconductor Surfaces* (R. F. Wallis and C. A. Sébenne); (4) *The effects of external forces – Electric fields* (D. E. Aspnes), *Temperature* (M. L. Cohen and D. J. Chadi) *and Pressure* (G. Martinez); (5) *Free carrier properties* (C. R. Pidgeon); (6) *Radiative recombination* (M. Voos, R. F. Leheny and J. Shah); (7) *Photoelectric effects* (Y. Marfaing); (8) *Phonon effects* (M. Balkanski) and (9) *Nonlinear properties* (D. S. Chemla and J. Jerphagnon).

The main emphasis throughout this volume is on a detailed description of the theory of optical properties in conjunction with a critical comparison with experimental results. Work up to at least 1978 is included in all chapters and current short-