

as thermionic and field emission cathodes. LaB_6 cathodes are, however, not yet optimally developed. As is often the case with potentially useful solid-state materials much research and development work has to be done before complete control of the material properties can be obtained. The authors review the part of the La-B phase diagram which is of importance for synthesizing LaB_6 and next consider methods for producing single crystals of the compound. Vapour phase growth, zone melting and solution methods have all been used. Apparently, no method appears to be better than any other. The results indicate that it is difficult to obtain samples which give reproducible results for important physical parameters. Good single crystals used as cathodes appear to give better brightness than W (six-ten times better) and a much longer lifetime. If (or when) production of LaB_6 crystals with controlled and optimal properties becomes a routine matter they will out-compete other materials for producing high density electron beams.

The chapter on lanthanum hexaboride is much shorter than the previous ones and it appears to be a little out of context with them. It would have been preferable to have a volume dedicated to insulating magnetic materials alone. However, anyone who has tried to extract manuscripts from colleagues knows how difficult it is to get manuscripts delivered for a fixed date, and an editor must often make the best he can of the material available.

Professor Kaldis is to be congratulated on being able to get so much material on important compounds collected in one volume.

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Current topics in materials science, Vol. 12. Edited by E. Kaldis. Pp. vii + 483. Amsterdam: North Holland, 1985. Price US \$101.75, Dfl 275.00.

This volume treats a great variety of subjects and several of them may not be

familiar to many readers of the *Journal of Applied Crystallography*. As the reviewer is a crystallographer writing for crystallographers, he necessarily concentrates on those subjects which are of obvious crystallographic interest. The review may therefore not do justice to the scientific merits of the volume.

Chapter 1 by K. Sattler is entitled *Metallic, ionic and van der Waals clusters*. It presents results in microcluster research. Molecular beams are produced in e.g. double cells and size distributions of clusters are analyzed by mass spectrometry. Apparently, the beam fluxes are not large enough for complementary electron diffraction studies which could otherwise give interesting structural information. Although the subject seems to be fairly remote from crystallography, it may have some bearing on surface phenomena and on nucleation processes which could be of interest for the study of crystal growth mechanisms.

The next chapter is by R. Kern on *Metastable phases in the bulk and on substrates*. This is a rather short review, 35 pages, and may be too short. At least in one place (p. 98) some lines are obviously missing. Otherwise, the author gives a very stimulating account of kinetic and other properties of metastable phases. Stabilizing and destabilizing agents are considered, and a number of chemical systems are discussed. Examples are given which show that epitaxial growth and structural metastability are interrelated.

The third chapter is called *Vapour pressure investigation of P-T-X phase equilibria and non-stoichiometry in binary systems*. It is written by J. H. Greenberg & V. B. Lazarev. About one third of the 83 pages is a fairly elementary introduction to a thermodynamic description of P-T-X phase diagrams of binary systems. The general description gradually deals with more and more complicated systems, and the remaining part of the chapter, about 50%, deals with selected narrow regions in the phase diagrams of the systems Zn-P, Cd-P, Cr-Se, Cd-As and Zn-As. The authors deal with a number of compounds of nearly stoichiometric composition like Zn_3P_2 , CdP_2 , Cr_2Se_3 and some arsenides. They describe how they are able to determine small deviations from stoichiometry using vapour pressure measurements and, when possible, by

determining the composition of the vapour. This chapter gives a useful review of the physical chemistry of several potentially useful semiconducting compounds.

The fourth chapter could have been published as a book on its own. It comprises 267 pages and is entitled *Mechanical properties of brittle materials - Modern theories and experimental evidence*. The authors are W. Pompe, H.-A. Bahr, G. Gille, W. Kreher, B. Schultrich & H.-J. Weiss. The chapter is divided into six subchapters dealing with theoretical foundations, modern testing methods, thermal stress cracking, strength of ceramics, strength of cemented carbides, and strength of thin films and coatings. Crystallographic and mechanical properties of materials are undoubtedly interrelated, but very few crystallographic concepts are directly involved in the discussions. Stress-strain relationships are dealt with extensively, but they are not in general related to structural concepts. Phase transformations are considered briefly in the section on ceramics.

The reviewer thinks that this last chapter will mainly appeal to crystallographers who also have a strong background in mechanical engineering. He does not feel qualified himself to offer an opinion on the scientific quality of this chapter.

The preceding volumes in this series have all contained abundant material of interest to crystallographers, but the reviewer thinks that rather few crystallographic departments would consider this particular volume a must, in spite of its other scientific merits.

In order to end this review in a more positive way, it should be remarked that this volume, like the previous ones, is very well produced. The printing quality is high and the figures and photographs are clear and distinct.

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