as thermionic and field emission cathodes. LaB₆ 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 LaB₆ 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 high quality crystals of LaB₆ which is of importance for synchrotron work. It may therefore not do justice to the scientific merits of the volume.

Chapter 1 is by K. Sattler is entitled Metalic, 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, Cd–Se, Cd–As and Zn–As. The authors deal with a number of compounds of nearly stoichiometric composition like Zn₄P₂, CdP₂, Cr₃Se₃ 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.

SVEND ERIK RASMUSSEN
Department of Inorganic Chemistry
Aarhus University
DK-8000 Aarhus C
Denmark