

much, if not all, of the work described, but it is easy to see that this outstanding school played a very great part in laying the foundations of our present day understanding of the deformation behaviour of metals and alloys. Moreover, there are many topics discussed such as (i) the intersection of twins to nucleate cracks (Rose's channels, 1922), (ii) deformation twinning in face-centred cubic metals (1924) and (iii) 'amorphous' plasticity accompanying recrystallization or phase transformation (1926-31), which were more or less forgotten for 30 years until rediscovered during the 1950s.

It is difficult to recommend the book to students because of its limited usefulness as a text book covering the modern aspects of crystal plasticity. Its main worth is in providing an account, now somewhat historical, of the ideas and results developed by the German school. The re-issue will however delight many research workers who were previously unable to obtain a copy of this classic book for themselves and hence get a feeling for the atmosphere of this exciting period of metal science.

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**Growth of crystals, Volumes 5A** (155 pp), **5B** (193 pp), **6A** (182 pp) and **6B** (189 pp). Edited by N. N. SHEFTAL'. Translated from Russian. New York: Consultants Bureau, 1968. Price \$ 72.00 the set; separate volumes 5A \$ 17.50, 5B \$ 22.50, 6A \$ 20.00, 6B \$ 20.00.

These four volumes contain the 124 papers presented at the third Moscow Conference on Crystal Growth held in November 1963 and attended by over 800 people. Earlier similar conferences took place in 1956 and 1960. With the exception of an article by Prof. J. Bernal on the structure of liquids all the papers are written by scientists from Russia or the East European socialist republics. The objectives of the conference were to assess the experimental and theoretical bases for crystal growth, to discuss the most important methods for producing single crystals and the evaluation of crystal perfection.

Volume 5A covers growth theory and general aspects of crystal formation in 17 papers, whereas five papers are devoted to the structure of liquids and solutions. In Volume 5B the accent is on methods for the study and evaluation of crystal perfection, and some 22 papers cover metallography, X-ray, resonance and optical techniques. In the same volume growth mechanisms are discussed in 11 papers.

Techniques for growing crystals are described in Volumes 6A and 6B, the former being primarily concerned with growth from solutions and composite melts, the interest

being centred on oxides of various types, *e.g.*  $Al_2O_3$ ,  $ZnO$ , garnets and aluminates. Growth from single-phase melts is concerned chiefly with the alkali halides. In all, Volume 6A contains 32 papers.

The preparation of crystals of semiconductors, mostly *via* growth from the melt, is treated in 23 papers of Volume 6B; attention is given to Ge, SiC, GaAs, GaP, CdS and other substances of importance in semiconductor technology. Metals receive scant attention but three papers covering the production of monocrystals of high melting points metals (W, Mo) and the chemically reactive rare earth metals are included. The final section of 6B comprises 11 papers concerning the growth of dendrites, profiled crystals and films.

The objectives of this Russian conference were the same as those of the International Conference on Crystal Growth held in Boston, U.S.A., during 1966. In spite of the three-year interval separating them the Russian work foreshadows the interests of the later conference, no doubt because of similar convictions regarding the importance of crystals for basic research and technological devices. The Russian papers, with few exceptions, make little reference to Western work, but an inspection of the proceedings of the Boston conference shows the converse to be equally true. These translations (which incidentally read very well as far as language is concerned), although appearing long after the original papers, should help to remedy this situation.

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**Growth and imperfections of metallic crystals.** Edited by D. E. OVSIENKO. Translated from Russian. Pp. 260. New York: Consultants Bureau, 1968.

If metals receive little attention in the above conference proceedings then the present collection of papers, first published in 1966, affords compensation. Roughly one half is devoted to growth mechanisms and growth procedures, the latter involving growth from the melt or *via* recrystallization. Apart from one paper on the rare earth metals the work described concerns non-transition metals with low melting points. Little reference is made to the preparation of single crystals of alloys. The latter half of the book treats dislocations in crystals, their occurrence, and dependence upon growth conditions; reference is made not only to metals but also to diamond, silicon and graphite.

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