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Optical determination of rock-forming minerals (*W. E. Tröger*). **Part 1: Determinative tables** (English edition of the 4th German edition). By *H. U. Bambauer, F. Taborzky* and *H. D. Trochim*. Pp. 188. Stuttgart: E. Schweizerbart'sche Verlagsbuchhandlung, 1979. Price DM 48.00.

Following the arrangement of Tröger, and using Strunz's mineral names and structural formulae, this is undoubtedly one of the most comprehensive set of tables for the optical determination of rock-forming minerals. The tables are clearly and logically presented and the determinative diagrams are cross-referenced by each mineral having its own number. The section on monograms contains all the standard charts, but, in the interests of completeness, could well have included the one for Tobi's method of determining the optic axial angle, 2*V* or 2*E*. This book is likely to remain the standard work for many years to come.

J. HARTLEY

Department of Earth Sciences
University of Leeds
Leeds LS2 9JT
England

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Current topics in materials science. Vol. 1. Edited by *E. Kaldis*. Pp. xi + 761. Amsterdam: North Holland 1978. Price, US $ 115.50, Dfl. 260.00.

This book is a timely collection of topics having relevance to current materials work. It is said to be the first of a planned series concerned with advanced materials technology. The approach employed in this volume is of particular value to individuals conducting materials development work since the background needed for many of the more important current materials problems is generally not covered within the training provided under a single academic discipline. This text primarily consists of topical reviews digested from the technical literature combined with experiences of the respective authors. Fundamental aspects of crystal growth mechanisms are treated in the first three chapters with particular emphasis on materials having importance to advanced electronic device technologies. An entire chapter is devoted to whisker growth processes which have not only intrinsic scientific interest but also considerable technological importance relative to electronic device reliability. The following two chapters are devoted to important special crystal film growth techniques used in the fabrication of high-frequency electronic devices. These treatments include theoretical modelling of the wide variety of atomic mechanisms taking place at silicon crystal surfaces. In addition, experimental details are discussed in sufficient detail to give a feeling for the operation of such fabrication techniques as chemical vapour deposition systems. The growth mechanism and important properties of other crystals such as $LiNbO_3$ are discussed in other chapters. Finally, one chapter discusses a few aspects of metal–hydrogen alloys. While this chapter concentrates on the Nb–H system for modelling hydrogen–lattice interactions, it includes many interesting details concerning mechanisms appropriate to storage alloy hydrides which have vast importance for potential renewable energy systems. The absorbed hydrogen atoms are pictured as residing in interstitial sites with associated large lattice expansion effects which induce observed phase transformations.

This volume is highly recommended for materials scientists and engineers whose work involves them in appropriate aspects of advanced materials technology. It should be of considerable value to individuals involved in either fundamental materials research or device fabrication technologies.

B. R. LIVESAY

Engineering Experiment Station
Georgia Institute of Technology
Atlanta
Georgia 30332
USA

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Diffraction and imaging techniques in material science. Revised second edition. Edited by *S. Amelinckx, R. Gevers* and *J. Van Landuyt*. Pp. xvii + 847. Amsterdam: North-Holland, 1978. Price $109.75, Dfl. 225.00.

The review of the first edition by M. Prutton [*Acta Cryst.* (1972), A**28**, 223–224] gave the book very high marks. The single volume contained the proceedings of a 1969 NATO summer school whose goal was to teach at an advanced level recent developments in the field. Continuing demand for copies after the first edition was exhausted has led to this second revised edition, providing ample support of the reviewers' opinions. This two-volume second edition under a slightly different title (the initial word 'modern' has now been dropped) is of a quality no less than that of the first. In many instances detail in the electron micrographs has been improved. Plaudits to the publishers who did not try to rest on their laurels. By contrast, many of the errors that inevitably slip past authors, editors and proof readers have reappeared in the revised edition. While most of the errors that have caught my eye are not likely to mislead the reader, the missing exponent 2 in equation 57 of Gevers' paper (page 28) could cause trouble. An *errata* sheet is clearly indicated.

Not only have the authors updated and expanded their original contributions to varying degree in the texts (15% increase) and especially in the bibliographies (42% increase) but three additional articles have been added while the three-article set on the scanning electron microscope (Booker) has been omitted. In the preface to the second edition the editors provide no explanation or reason for this last change.

The additions clearly enhance the value of the new edition because the articles added are significant parts of the field. The most important is a masterful presentation on the weak-beam method (Cockayne). The paper on direct structure imaging (van Dyck) may present many readers with problems since it does not use the terminology and mathematical forms developed in the introductory chapters on electron diffraction. It also provides insufficient introduction to the crystallographic concepts required to follow the explanation of the examples used in the experimental section. However, the addition of the computer program in the appendix will be appreciated by many a student in the field. Advanced workers may appreciate the essentially theoretical presentation of the study of substitutional order–disorder by diffraction (de Ridder).

The absence of the SEM contributions (Booker) is difficult to understand and represents a genuine loss. In particular, the absence of the discussion on electron channelling effects introduces a major gap in the otherwise excellent coverage of all pertinent electron diffraction pheno-

mena. The removal of the first two SEM chapters where principles and applications are set out very clearly could be understood on the basis that these matters are already well covered in the literature. However, they serve as a most useful basis for the chapter on channelling patterns as well as providing a most orderly and succinct introduction to SEM use. If it were a question of what to omit, perhaps due to reasons of space, then a more logical candidate for omission would have been the chapter on X-ray and neutron diffraction (Guinier). This general discussion of X-ray diffraction concepts is misnamed in that it deals with neither the advances nor the techniques of X-ray diffraction. Although it is eminently acceptable as a sophisticated discussion of basic diffraction concepts, it does not seem to be particularly essential or even closely related to the following two chapters on X-ray topography (Lang and Authier).

The extent of revision of the body of the text ranges from none as for example the papers on the kinematical theory (Gevers), the dynamical theory of electron diffraction (Whelan) and the description of mirror electron microscopy (Bok) to a complete rewriting of the text. Topics receiving the most changes were planar interfaces (Amelinckx & Van Landuyt), martensitic transformations (Wayman) and the two papers on X-ray topography (Lang and Authier). The contribution by Lang is especially notable not only for its beautiful literary style but also for the care and completeness of the bibliography; it was the most comprehensive in the original version and underwent the greatest numerical increase in the second. This has been a very active area! The three contributions by Professor E. W. Müller on field emission and field ion microscopy were reduced to two with the two papers on the latter subject being combined to one more coherent presentation. Several of the remaining chapters were modified only to the extent of the addition of a section or an appendix. These include identification of defect clusters (Williams), phase transitions and Kikuchi effects (Thomas) and computed electron micrographs (Humble). The contribution to the theory of high-energy electron diffraction (Howie) was partially augmented both in text and references. High-voltage applications (Cosslett) showed a modest increase. Of the topics where there is still much that is not known the area of low-energy electron diffraction (Estrup) appears to have been most static. It is interesting that this author in the first edition concluded that 'LEED is in a stage of rapid development...'; the extent of changes in his review (*Surface characterization by LEED*) does not support that statement, especially since there was only one additional reference.

In summary, those who have the first edition will find that the principal value of owning the second is in the updated bibliography and the three additional chapters. However, in consideration of value, it is lamentable that the cost of special technical books such as these has effectively priced them out of most individual researchers' private libraries. For sponsored research, the question of whether the grant money is more wisely spent on these books or on the computerized bibliographical searches that most technical libraries now provide has become an open issue because of the cost of the two volumes. For those who do not have the earlier work this new edition can be strongly recommended if there is serious interest in mastering the details of electron diffraction and microscopy. Libraries will find acquisition of this series useful, even necessary, despite the steep price tag.

L. F. VASSAMILLET

Department of Metallurgy of Materials Science
Carnegie–Mellon University
Pittsburgh
PA 15213
USA

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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.

CALPHAD: Computer Coupling of Phase Diagrams. An international journal edited by *L. Kaufman*. Pergamon Press, from 1977. Price, US $ 75.00 *p.a.*