

9. Crystallographic computing

Edited by F. R. Ahmed (Ottawa, Canada). This book is the Proceedings of the International Summer School on Crystallographic Computing which was held in Ottawa (August 1969) under the auspices of IUCr. It was published by Munksgaard, International Publishers Ltd., Copenhagen, Denmark.

10. Early papers on diffraction of X-rays by crystals

Edited by J. M. Bijvoet (Utrecht), W. G. Burgers (Delft) and G. Hägg (Uppsala) The book was published for the IUCr by Oosthoek, Domstraat 11, Utrecht, Netherlands.

11. Travaux pratiques de cristallographie

By P. Perio, Université de Paris XI, France. A series of experiments, each requiring about eight hours and making

use of standard equipment, has been set up for students in X-ray crystallography and thoroughly tried. All enquiries should be sent to Professor P. Perio, Cristallographie et Physique Matériaux, Bât. 493, Université Paris XI, 91 Orsay, France.

Supplement to *Acta Crystallographica*, Section A

The Abstracts of the Communications to the Ninth International Congress of Crystallography to be held in Japan in August/September 1972 were published as part S3 of *Acta Crystallographica*, Section A in May 1972, and are being distributed free of charge not only to subscribers to Section A, but also to those subscribers to Section B and to the *Journal of Applied Crystallography* who do not subscribe to Section A.

Book Reviews

Works intended for notice in this column should be sent direct to the Book-Review Editor (M. M. Woolfson, Physics Department, University of York, Heslington, York YO1 5DD, England). As far as practicable books will be reviewed in a country different from that of publication.

Preparation and properties of solid state material. Vol. 1.

Edited by ROBERT A. LEFEVER. Pp.v+284. New York: Marcel Dekker, 1971 Price \$18.50

This book is intended to be the first of a series of volumes about different aspects of solid state materials, such as ceramics, metals, composites both in single crystal and polycrystalline form. It is not a general handbook but treats only three very special aspects of crystal growth each written by a specialist. These chapters are:

1. *A Review of the Preparation of Single Crystals by Fused Melt Electrolysis and Some General Properties.* By W. KUNNMANN. Pp. 32.

After an introduction about the experimental methods, a review of the preparation of sodium and potassium tungsten bronzes, of vanadium spinels, some metal borides, carbides and silicides, phosphides, sulphides and arsenides is given. 72 references are listed.

2. *The Role of Mass Transfer in Crystallization Processes.* By W. R. WILCOX. Pp. 99.

This is a more general chapter dealing with the mechanism and theory of different processes under the subject:

growth from solution and vapour. The diffusion coefficients of many substances in solution are given as well as the surface diffusion coefficients of metals on different substrates. Phenomena such as constitutional undercooling and dendritic growth are briefly treated. (516 references).

3. *Exploratory Flux Crystal Growth.* By A. B. CHASE. Pp. 79.

This section deals with growing techniques in fluxes melting between 500 and 800°C. Detailed data of e.g. an Al₂O₃ crystal growth are given. Again some growth phenomena are mentioned, e.g. spiral growth from screw dislocations, striations and habit modifications. It is emphasized that the theory is far from complete. (46 references).

The book is intended for both beginners and experienced crystal growers, material scientists and solid state physicists. The beginner in general would do better to read a textbook; this book will only be useful to him and his experienced colleague if he is interested in the specific methods and materials mentioned. Especially in the last two chapters, most of the theories on crystal growth are assumed known. One should take the volume for what it is: a collection of

three good review papers of rather specific nature.

G. D. RIECK
Technische Hogeschool Eindhoven
Postbus 513
Eindhoven
Netherlands

Physics of thin films. Volume 6. Edited by M. H. FRANCOMBE and R. W. HOFFMANN. Pp. xiv + 370. London: Academic Press, 1971. Price £9.10, \$19.50.

This is the sixth volume of a set of reviews of various aspects and applications of thin solid films. It contains reviews on Anodic Oxide Films by C. J. Dell'Oca, D. L. Pulfrey and L. Young; Size Dependent Electrical Conduction in Thin Metal Films and Wires by D. C. Larsen; Optical Properties of Metallic Films by F. Abelès; Interactions in Multilayer Magnetic Films by A. Yelon and Diffusion in Metallic Films by C. Weaver. This is a mixture of subjects so distributed that any particular reader is unlikely to be interested in more than one or two. Thus, this book is more likely to be found on the shelf of a large library than in a private collection.

The longest review is that by Yelon who describes the theory and experimental study of various forms of coup-

ling between two overlaid magnetic films. As well as the basic interest in the interactions between spin systems across an interface, a great deal of incentive for the kind of work Yelon describes came from the computer industry and the need for high packing density magnetic film memories with non-destructive read-out of information. The coupled structure made of two magnetic films separated by a non-magnetic layer can be arranged to be almost flux-closed and this closure is essential if packing densities are to be high. Yelon describes the application of magnetic film pairs to such computer memories and his review is an excellent demonstration of how much physical insight and technical ingenuity has been deployed in the design and construction of magnetic film memories. This review could be one of the last to be published on magnetic film memory devices as the development of semiconductor memory systems is proceeding with great success.

Thin films are interesting and useful vehicles for the study of diffusion processes over distances short compared with those used in observations of bulk

diffusion. Additionally, the fabrication of thin films which could be used as diffusion barriers between two miscible systems would be an important contribution to the technology of micro-electronics. Weaver's article is confined to diffusion in metallic films and mostly to the geometry in which one film is produced on top of another at low temperatures and diffusion processes studied as the temperature is raised. Most data on this kind of system are obtained by electron diffraction studies although X-ray diffraction is possible for thicker films and indirect methods such as resistance and adhesion measurements are also described. Surprisingly, no mention is made of modern surface techniques for surface structural and chemical analysis such as low energy electron diffraction and Auger electron spectroscopy. These techniques have amply demonstrated the rich complexity of structural and chemical states at a surface and this demonstration must lead one to be exceedingly wary of the interpretation of many experimental studies on alloy systems with poorly defined and atomically dirty interfaces.

Larson examines the experimental evidence for the Fuchs theory of electron scattering at a specimen surface and the Fuchs-Dingle theory for the effective free electron density in polyvalent metals. Abelès gives a mostly theoretical treatment of the observable optical properties of isotropic and anisotropic metallic films. Dell'Oca, Pulfrey and Young describe the technique of preparing anodic oxide films and outline the theories of the growth process.

The level of knowledge assumed in the reader varies considerably from one article to another but this is probably unavoidable. Abelès's review is clearly intended for workers in the field whereas both the reviews on anodic oxidation and multilayer magnetic films are useful to, say, a new post-graduate student. As usual, the book is prohibitively expensive for the individual, impecunious scientist.

M. PRUTTON

*Department of Physics
University of York
Heslington
York YO1 5DD
England*

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.

X-ray Spectrometry - an International Journal. Edited by R. JENKINS. Pp.46. London: Heyden & Son, 1972. Price £ 10.00, \$25.00, DM 90.00 per volume (4 issues to each volume).

The first issue of this new journal (Vol. 1, No. 1, January 1972) contains the following articles.

✓ Editorial.

Submitted papers: An evaluation of the suitability of X-ray fluorescence spectroscopy in the analysis of complex alloy systems, by L. Bäckerud. Analogien zwischen der Röntgenstreuungsanalyse und der Röntgenfluoreszenanalyse, von H. Ebel und M. F. Ebel. Recent developments in analysing crystals for X-ray spectrometry, by R. Jenkins. Some applications of a computer program for quantitative spectrochemical analysis, by R. W. Gould and S. R. Bates. An element-specific X-ray fluorescence scanner for thin-layer chromatograms, by P. M. Houpt. A die for pelletizing samples

for X-ray fluorescence analysis, by B. P. Fabbri.

Columns and features: Notes and comments: Training of X-ray spectroscopists by H. Chessin. Conference report. Book reviews. Bibliography of useful reference books in X-ray spectrometry. News and events.

The non-commercial material occupies 46 pages and both paper and printing are of high quality.

Instrumental and radiochemical activation analysis. By J. HOSTE, J. OP. DE BEECK, R. GIJBELS, F. ADAMS, P. VAN DEN WINKEL, AND D. DE SOETE. Pp. 147. London: Butterworths, 1972. Price £5.00.

Contents: I. Instrumental neutron activation analyses; II. Computer applications; III. Radiochemical separations; IV. Activation analysis with neutron generators; V. Photon and charged particle activation analysis.

Handbook of electronic materials. Volume 5. Group IV semiconducting materials. By M. NEUBERGER. Pp. viii + 67. New York: IFI/Plenum, 1971. Price \$11.20

This book is a compilation of physical data on diamond, silicon, silicon carbide and germanium. An extensive bibliography for each material is given.

Advances in X-ray analysis. Vol. 14. Edited by CHARLES S. BARRETT and CLAYTON RUUD. Pp. ix + 500. New York: Plenum Press, 1971. Price \$28.

This volume describes the proceedings of the Nineteenth Annual Conference on applications of X-ray analysis held August 5-7, 1970.

The topics covered include X-ray diffraction, fluorescence analysis, diffraction and excitation, bonding and long-wavelength phenomena, instrumentation and distortion and stress effects.