

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.

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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.*

**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.