Cryst. Res. Technol.	30	1995	8	1110

Book Review

A. J. GROVEN (ed.)

Electron Microscopy and Analysis 1993

Proceedings of the Institute (Series Number 138), Electron microscopy and analysis group conference, University of Liverpool, 14–17 september 1993

Institute of Physics Publishing, Bristol and Philadelphia, 546 pages. Price £ 99.00, US $ 199.00. ISBN 0-7503-0321-2.

These proceedings comprise 128 several pages. They are subdivided into the following sections: planary lectures (3), microanalysis (23), electron diffraction (17), surface analysis (9), high resolution imaging (12), scanned probe techniques (5), materials analysis (21), composite materials (4), metals and alloys (15), catalysis (7), and new instrumentation and techniques (12). As shown by the numbers inside the parenthesis an increased value of contributions deel with problems of microanalysis and materials analysis, where no certain material is favoured there.

All papers present the very latest developments in the whole field of electron microscopy and analysis, respectively. In particular, in the field of microanalysis, high spatial resolution mapping of EELS (electron energy spectroscopy) fine structures and PEELS as well as in oxides, superconductors, crystalline and amorphous silicon oxides, copper compounds and various aluminates have been very detailed reported. Accurate structure factor determination and refinement were obtained from zone axis convergent beam electron diffraction (CBED) patterns. On the other hand it is possible to measure and to determine the space group and Debye Waller factor using CBED, too. CBED is also enabled to measure the chemical composition and internal strain in epitaxial layers with a very high local resolution. However, in high resolution transmission electron microscopy (HRTEM) some researchers reported on their effort to improve the resolution of the TEM's. So, it was shown that the use of field emission guns (FEG) in HRTEM improve the point to point resolution up to e.g. 0.11 nm (at 300 kV), respectively. Image reconstruction experiments on a FEG-TEM further show that also light atoms as oxygen and Na can be detected in a heavy-atom environment (e.g. Ba–Cu–Y–Nb) in HRTEM. Moreover, image filtering techniques were discussed to improve the contrast in HRTEM where simulated HRTEM defocus series are commonly used to find the optimum of imaging conditions. The investigation of epitaxial layers with respect to interface problems, i.e., dislocations, interface roughness etc. has been focused to the systems $CuInSe_2$/GaAs, InGaAs grown on InP, strain relaxation in InGaAs/GaAs-MQW structures, GaP/Si, GaInAs/InP multiple quantum well laser structures grown under various stress conditions, and the characterization of twin boundaries in superconductors as $YBa_2Cu_3O_{7-\delta}$. Furthermore, it was reported on the investigation of different kinds of grain boundaries and seggregation effects at interfaces in metal alloys. Ordering phenomena in semiconductors as well as metals, and the detailed characterization of the dislocation structure are a further field of conventional TEM and HRTEM, the latter for the quantitative understanding of the plasticity and strength. Finally, structural studies of catalysts and layered coatings by means of HRTEM become more interest.

In summary, these proceedings provide a very impressive survey for all those working in the field of material science, electron microscopy and analysis, because all new developments have been considered in the most contributions.

G. WAGNER