

BOOK REVIEW

Surface and Defect Properties of Solids. Volume 1. M. W. ROBERTS AND J. M. THOMAS (Senior Reporters), Chemical Society, London, 1972. viii + 264 pp. £6.00.

This volume appears in the new series 'Specialist Periodical Reports,' which aims at providing critical accounts of progress in the major areas of chemical research less than 12 months after the termination of the period of literature coverage. Readers will be particularly interested, of course, in the survey of recent literature on their own research topic, if covered in this first or subsequent volumes, and in addition they will be seeking authoritative accounts of progress in related fields of research. In my view, the authors of the nine chapters in this volume have succeeded admirably in meeting both these requirements, placing the recent literature in the context of earlier work.

In the first of four chapters dealing with the defect properties of solids, the formation and occurrence of crystallographic shear, which has relevance for the understanding of some non-stoichiometric oxides, is reviewed by J. S. Anderson. The next chapter, on the direct study of structural imperfections by high resolution electron microscopy (L. L. Ban), is specially concerned with its application to various forms of carbon, with some discussion also of the microstructure of organic polymers. The third chapter (C. H. Bamford and G. C. Eastmond) summarizes much of the information available on solid-phase polymerization and shows how defects, especially extended defects, and molecular mobility are important factors. The last of these four chapters (J. M. Thomas and J. O. Williams) describes the various structural imperfections which may occur in organic molecular crystals.

Two chapters follow on the application to surface studies of photo-stimulated electron emissions (M. W. Roberts) and of various techniques grouped under the heading of electron spectroscopy, e.g., electron impact Auger spectroscopy,

ion neutralization spectroscopy, ESCA, etc. (C. R. Brundle). Many catalyst researchers will appreciate, at this particular time, the succinct accounts given of the processes involved and what might be achieved using each technique, as well as the reviews of surface-related work carried out so far. Infrared spectroscopy continues to be extensively used for the study of adsorbed species on metal surfaces, and the chapter by J. Pritchard included in this volume, which cites 73 references, mostly from 1970 and 1971, reflects this situation. Transmission spectra of supported metal samples provide the basis of most investigations, although recent work by reflectance spectroscopy from films, etc., is also covered.

The first of the chapters on catalytic reactions deals mainly with isotope equilibration reactions on metal surfaces, i.e., the hydrogen-deuterium reaction and nitrogen, carbon monoxide, or oxygen isotope reactions (R. P. H. Gasser). The final chapter (P. B. Wells) is an interesting discussion of the selectivity exhibited by metal catalysts due to various factors (other than the effect of diffusion). It begins with a well-balanced account of the current situation regarding the possible effect of metal crystallite size in supported metal catalysts on specific activity and selectivity. Selectivity in relation to reaction mechanism with special reference to the factors influencing the selective hydrogenation of disubstituted hydrocarbons forms the main part of the chapter, but selective poisoning and shape-selective catalysts are also considered.

Heterogeneous catalysis makes interfaces with many other fields of research, in which the literature is also rapidly expanding. It is, therefore, reassuring to have the first of these compact volumes which promise to provide readable digests of recent work on a variety of relevant topics.

R. L. Moss

*Warren Spring Laboratory
Stevenage SG1 2BX
England*