particularly interesting in view of the relatively poor sensitivity of the technique for the noble metals Cu, Ag, Pt, Au, etc., when using bombardment with ions of the usual gases argon, nitrogen, or oxygen. It is sometimes possible to achieve better sensitivity by observing the negative ions of these elements [3] and it is hoped to apply the ion analyser in this mode to studies of the distribution of other additives such as gold in the near future.

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# Short notices

## Electronic Structures of Point Defects

*G. K. Wertheim, A. Hausmann and W. Sander*

North-Holland, Amsterdam (1971). Dfl. 65.00 ($20.25 approx)

This is the third book in the series on Defects in Crystalline Solids, edited by Amelinckx, Gevers and Nihoul, and is in two parts. Both are concerned with the study of crystal defects, the first part by Wertheim dealing with applications of the Mössbauer effect, and the second, by Hausmann and Sander, on spin resonance methods.

Mössbauer spectrometry depends upon the resonant absorption of very sharply monochromatic gamma rays, the gamma ray source and the crystal absorber undergoing the same nuclear transition. The energy of the gamma rays emitted by the source is Doppler – modulated by mechanically moving the source, and the transmitted gamma rays are detected by a proportional counter connected to a multi-channel analyser, so that absorption peaks can be located Structural information is derived from the magnitude of the Doppler shift at peak positions.

Today there are a whole variety of defects which can be studied using the Mössbauer effect. For example, radiation-damaged source material, which was originally considered a problem in gamma ray sources, is now itself a topic of study. Investigations have, for example, been made of the damage associated with ion implantation. The technique has been applied to defects in alkali halide crystals, especially aliovalent-doped crystals, confirming many of the findings obtained by other methods regarding the association of extrinsic vacancies with impurity ions. ($Co^{2+}$ is the most commonly used impurity.) In metallic systems, long and short-range ordering has been followed by the Mössbauer effect, so too have the complex transformations in Fe/C alloys following the tempering of martensite. In this monograph numerous examples are given of experimental applications of the Mössbauer effect and the principal findings listed.

The monograph on spin resonance first of all gives a description of *electron spin paramagnetism*, *electron nuclear double resonance* and *nuclear magnetic resonance*. This is followed by an account of experiments using spin resonance to study colour centres in alkali halides including impurity centres, and paramagnetic defects in II-IV compounds, III-V semiconducting compounds, group IV elements and compounds and in a number of oxide crystals. As in the first monograph, the principal experimental findings are described briefly and many subjects covered.

It is not altogether clear to whom these monographs, which in the main part describe a wide range of experimental findings based on a

technique, will be of value. Most researchers are likely to be interested in particular materials and in more detailed information. The book does, however, provide a very comprehensive collection of experimental findings on point defects obtained by use of the Mössbauer effect and by spin resonance methods.

E.L.

## Electrodeposition and Corrosion Processes (2nd Edition)

*J. M. West*

Van Nostrand Reinhold. 206 pp. £4·00

This sound, thorough and well written work is now available in its second edition and it should, in the opinion of this reviewer, be at least as successful as was the first edition. It is now more comprehensive and includes recent developments in the understanding of, for example, passivity, film breakdown, electrodeposit stress and structure, bacterial corrosion, electrochemical machining and fracture mechanics. Basic thermodynamics and electrochemical concepts are considered in chapter I ("Metals in Equilibrium") while the second chapter deals with a number of departures from equilibrium such as complexants, concentration overpotential etc. Electrochemical corrosion is discussed in chapter 3, first in general terms then more specifically in relation to topics such as oxygen reduction and galvanic attack. Chapter 4 deals with surface films and various aspects of passivation, film breakdown and film repair, while electropolishing and bright electrodeposition are covered in detail in chapter 5. Corrosion prevention and the influence of stress are considered in chapters 6 and 7, respectively, and there are also two short appendices on elementary valency theory and metal deformation. All in all a very useful volume for the students and research and development technologists for whom it is intended.

D.A.W.