NEWS

Book reviews

Corrosion and Electrochemical Behaviour of Metals in Non-aqueous Solvents, Capri, Italy, 3–6 June 1986. F. Belluci (Ed.), *Electrochimica Acta*, **6** (1987) 841–985.

This issue of *Electrochimica Acta* brings three plenary lectures and 17 of the communications presented at the meeting on Corrosion and Electrochemical Behaviour of Metals in Non-aqueous solvents held in Capri, in June 1986. Besides the published articles, the abstracts of eight other presentations are given. The purpose of the meeting was to discuss the current state of knowledge on problems of materials in contact with non-aqueous media and it highlighted some of the electrochemical applications where non-aqueous solvents are of interest. The plenary lectures by S. Trasatti and by T. Mussini and F. Mazza dealt with the general problems of the physical chemistry of interfaces and the transpositions of equilibrium thermodynamic data to different solvents. These papers provide a good introduction to general questions relating to non-aqueous solvents, such as solvent orientation at interfaces and the often debated problems of 'absolute' potential scales.

Besides the fun of it, the quest for universal potential scales is a problem of practical implications since it allows to predict thermodynamic electrode properties from solvation models. An interesting application of ultramicroelectrodes to the study of low dielectric constant aromatic compounds as electrochemical solvents was presented by Mann and Bond who studied the oxidation of ferrocene in benzene, toluene and xylene. Although the dielectric constant is close to 2 for these solvents and hence, the conductance of electrolytes is very low, reversible behaviour could be observed in dilute solutions, as predicted from the theory of the electrodes.

Six papers dealt with corrosion and the anodic behaviour of metals in contact with acid solutions. The paper by Tzinman *et al.* on the correlation of the Hammett acidity functions to corrosion rates in hydro-organic mixtures is of general interest, since it provides a clear relationship between dissolution rates of iron and a property of the mixture that can be measured spectrophotometrically. Obviously, in these experiments, more than one parameter is being varied when both the solvent and the rates of the two reactions that determine the corrosion couple are changed. However, the reasonable linear relationship obtained over two orders of magnitude of corrosion rate gives credence to the approach taken by these authors. Other papers presented discuss the corrosion and passivity of Fe, Ni and stainless steels in alcohols $-H_2O-H_2SO_4$ systems and in all cases, as it has been previously observed, passivation is not observed below a critical water content.

Although a great deal of information was presented in the other papers, i.e. describing the corrosion and electrochemical behaviour of Zn, Cu, Fe, Li, brass and zincalog-Y, there is a lack of fundamental mechanistic studies; the problems of obtaining reliable kinetic information in media of high resistivity can be clearly seen in the work of Biallozor and Bandura, where the polarization curves for the Zn/Zn^{2+} couple obviously exhibit severe ohmic drop problems. This shortcoming in the background knowledge of anodic dissolution reactions will necessarily hamper efforts at understanding the role of the solvent in the performance of materials. In spite of these problems, this volume of *Electrochimica Acta* brings a reasonable summary of some aspects of non-aqueous corrosion behaviour and will be mainly of interest to technologists working with non-aqueous media.

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