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The Use of Impedance Measurements in the Electrochemistry of the Dissolution of Sulphide Minerals.

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Abstract

Capacitance measurements made in previous studies of the anodic behaviour of chalcopyrite in dilute sulfuric acid solutions have been compared. The results have shown considerable variability in both the absolute value of the capacitance as well as variations with potential. A limited study has been made of such capacitance measurements largely with the aim of establishing the effect of non-steady-state conditions on the capacitance. Potentiostatic measurements at a carefully selected frequency have shown that there is significant variation of the capacitance with time that follows similar trends to the measured current densities. The capacitance decreases with increasing potential in the range 0.40V to 0.95V but increases rapidly with increasing potential above 1.0V. The results of the previous capacitance measurements have been questioned due to a combination of a lack of steady-state conditions and the choice of the measurement frequency. The present results have been interpreted in terms of a previously published model that is similar to the well-known de-alloying of some binary alloys.

Keywords: chalcopyrite; electrochemistry; anodic behaviour; capacitance; semiconductor

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