

Kinetics of the passivation of molybdenum in acids and alkali solutions as inferred from impedance and potential measurements

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Abstract

The electrochemical behaviour of mechanically polished molybdenum electrodes in different acid and alkali solutions was investigated using open-circuit potential and impedance measurements. The effect of the concentration of acid (HCl) and alkali (NaOH) on the electrochemical behaviour of the molybdenum electrodes was also studied. The various kinetic parameters, *i.e.* capacitance, resistance and potential, controlling the mechanism of oxide film growth were monitored as functions of time.

Complex plane analysis reflects the high passivation properties of the naturally formed oxide film on molybdenum irrespective of the dissolution medium. The results showed also that the passive films undergo structural changes during the course of measurements which may be attributed to a further oxidation of the passive MoO_2 film to MoO_3 .

The electrode potential was found to be sensitive to variations in pH. In highly concentrated NaOH solution, the passive film is subject to continuous dissolution.

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