The role of Ni in the surface stability of Cu–Al–Ni ternary alloys in sulfate–chloride solutions

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Abstract

The stability of Cu–Al–Ni ternary alloys used in the manufacturing of NaCl and Na\textsubscript{2}SO\textsubscript{4} from Lake Qaroun in Egypt was investigated in sulfate–chloride electrolytes. Different electrochemical techniques were used. The results show that the increase in the nickel content improves the stability of the ternary alloys due to formation of a stable barrier film. The barrier film behaves like an ideal capacitor and its stability is affected by the chloride ion concentration. An equivalent circuit model for the electrode/electrolyte interface was proposed and the experimental impedance data were fitted to theoretical data according to this model. The surface morphology and barrier layer constituents were investigated by SEM/EDAX unit.