

W.A. Badawy, M.M. El-Rabiei, H.Nady, M.A. Samy, Comparison of Electrochemical Behavior of Cu-10Ni-10Zn Alloy and Cu in Aqueous Solutions, Zeitschrift für Physikalische Chemie 229 (2015) 351-363

الملخص الانجلىزى للبحث:

The electrochemical behavior of Cu-10Ni-10Zn alloy and Cu was investigated in acidic, neutral and basic solutions. The effect of chloride ions in neutral solutions was also studied. Conventional electrochemical techniques and electrochemical impedance spectroscopy were used. The corrosion rate of these materials in acidic solutions is relatively high compared to that in neutral or basic solutions. The open-circuit potential of the alloy is nearly the same as that of pure copper in the different media, indicating that the processes which occur on the alloy surface are mainly governed by copper dissolution. In chloride solutions the rate of Cu corrosion is remarkably high. In the alloy, the copper dissolution was suppressed by the presence of nickel and zinc, due to the formation of complex oxide layers. The impedance data were fitted to equivalent circuit models that explain the different electrochemical processes occurring at the electrode/electrolyte interface. SEM and EDAX have shown that the alloy surface is enriched with Ni. In neutral solutions the chloride ions are penetrating the metallic surface.