

الملخص الانجليزى للبحث:

Copper alloys are important materials for many industrial applications. The addition of Al, Ni and Zn to Cu either as single alloying element in binary alloys like brasses and bronzes or the well-known Cu-Ni alloys or as couples in ternary alloys leads to specific properties important for different applications. In this paper we are interested to investigate the effect of the presence two alloying elements with copper and to investigate the electrochemical behavior of these alloys in chloride containing solutions. It is important to compare the corrosion behavior and the stability of each alloy in these media. For this reason we have used Cu-10Al-10Ni, Cu-10Al-10Zn and Cu-10Ni-10Zn, in which the ratio of Cu is kept constant and the two alloying elements of equal percentage. All investigations were carried out in stagnant naturally aerated neutral 3.5 mass to volume % NaCl solutions. Different electrochemical techniques and electrochemical impedance spectroscopy, EIS, were used. It was found that the Cu-10Al-10Zn alloy is more stable than both the Cu-10Al-10Ni and Cu-10Al-10Zn alloys in this chloride solution. EIS measurements have shown that a thicker and more resistive passive film is formed on the Cu-10Ni-10Zn alloy surface. The formation of such passive film was discussed and the different alloy surfaces examined by scanning electron microscopy and subjected to EDAX analysis. The surface analysis has shown the participation of the different alloying elements in the passive film according to the alloy constituents and also that the chloride ions are deeply penetrated in the alloy.