

# **Selective Leaching of Copper Based Alloys and the Control of the Corrosion Process in Aqueous Solutions**

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Copper based alloys represent an important category of technologically useful materials not only for their use in different industrial applications but also due to their excellent electrical, electrochemical and engineering characteristics. Like most metallic components, these alloys suffer from different types of corrosion, especially the selective leaching of active components, e.g. Zn from brasses and Ni from cupronickels, which leads to the deterioration of the alloy properties and its complete failure [1]. Such processes have a negative impact on the economical use of these materials.

In the present paper the de-alloying processes and their mechanisms in aqueous media were discussed. The effect of different ratios of alloying elements on the corrosion and passivation behaviors of these alloys was investigated. The corrosion parameters, corrosion potential,  $E_{\text{corr}}$ , corrosion current density,  $i_{\text{corr}}$ , and corrosion resistance,  $R_{\text{corr}}$ , were calculated. Conventional electrochemical techniques and electrochemical impedance spectroscopy, EIS, were applied [2]. The experimental impedance data were fitted to theoretical values according to suitable electrical equivalent circuits

which explain the mechanisms of the corrosion and passivation processes occurring at the alloy/solution interface [3]. Scanning electron microscopy, SEM, and x-ray photoelectron spectroscopy, XPS, were used to emphasize and to elucidate the suggested mechanisms [4]. The surface analytical techniques enable understanding the role of corrosion inhibitors, especially environmentally safe materials like amino-acids which show promising action as anti-corrosion materials. These inhibitors form adsorbed layers on the active corrosion centers of the alloy surface [5]. A model for the alloy/solution interface explaining the role of the adsorbed layer was suggested. The validity of the model in the explanation of the corrosion and corrosion inhibition processes was discussed.

**Key words: Copper alloys, corrosion, corrosion inhibition, impedance, polarization,**

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