Effect of Passivation Potential on Passive Behavior and Corrosion Resistance of Ni-Cu-P Amorphous Coating in Alkaline Solution

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Corrosion resistance and passive behavior of electroless Ni–Cu–P amorphous coating have been investigated in 10 wt.% NaOH solution by using electrochemical impedance spectroscopy, Mott–Schottky and X-ray photoelectron spectroscopy analysis. The result that the corrosion resistance is increased firstly and then exhibits an opposite trend with the increasing passive potential is resulted from the variation of passive film on the coating. Passive films formed at lower potential possess n–type and p–type bipolar semiconductor characteristics, but the passive films formed at higher potential have only p–type semiconductor characteristics. The thickness of passive films was increased with the increase of passive potential. The corrosion resistance of passivation films is combined affected by their thickness and their semiconductor type.

Keywords: Ni–Cu–P; Amorphous coating; Corrosion resistance; Passive films; XPS

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