Effect of Zincate Treatment Time on Dissolution Behavior and Deposition of Copper on AZ31 Mg alloy in Pyrophosphate Bath

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초 록 : The present study investigated the effect of zincate treatment time on the dissolution behavior and the deposition of copper by immersion process and electroplating process on AZ31 Mg alloy substrate in a copper pyrophosphate bath. Without zincate pretreatment, the AZ31 Mg substrate quickly dissolved in the copper pyrophosphate solution although an external cathodic current was applied. The copper layers deposited on non-zincate treated AZ31 Mg alloy substrate by both immersion and electroplating processes showed very porous structure and very poor adhesion. With increasing zincate treatment time up to 2 min, the dissolution of AZ31 substrate in pyrophosphate solution rapidly decreased and the deposited copper layer was less porous and exhibited stronger adhesion. The immersion of AZ31 Mg sample in zincate solution for 5 min was found as a critical time for producing a non-porous and adherent electrodeposited copper layer on AZ31 Mg alloy. The optimum zincating time can be determined by observing the open circuit potential (OCP) of AZ31 Mg alloy samples in a copper pyrophosphate electroplating bath. The OCP reached a stable value of about -0.10 V (vs. SCE) after 5 min of immersion in the copper pyrophosphate electroplating solution.

Corrosion protection of magnesium alloys by organic coatings

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초 록 : Magnesium has many desirable properties of which the high strength/weight ratio makes it extremely valuable in automobile and aerospace industry. However, the high corrosion susceptibility of magnesium and its alloys has greatly limited their large scale use for various applications. Organic coating is one of the most effective ways to prevent magnesium alloys from corrosion. An organic coating is normally used in the final stage of a coating process. It can enhance corrosion resistance of magnesium and its alloys. Organic coating involves a variety of process such as painting, powder coating, cathodic electrocoating (E-painting) and the application of lacquers, enamel and varnishes.