

Copper Electroplating on Mg Alloy in Pyrophosphate Solution

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초 록 : In this work, uniform thickness and good adhesion of electrodeposited copper layer were achieved on AZ91 Mg alloy in alkaline noncyanide copper solution containing pyrophosphate ion by employing appropriate zincate pretreatment. Without zincate pretreatment, the electrodeposited copper layer on AZ91 Mg alloy was porous and showed poor adhesion which was explained by small number of nucleation sites of copper due to rapid dissolution of the magnesium substrate in the pyrophosphate solution. The zincate pretreatment was found as one of the most important steps that can form a conducting layer to cover AZ91 surface which decreased the dissolution rate of AZ91 Mg alloy about 40 times in the copper pyrophosphate solution. Electrodeposited copper layer on AZ91 Mg alloy after an appropriate zincate pretreatment showed good adhesion and uniform thickness with bright surface appearance, independent of the deposition time but the surface roughness of the electrodeposited copper layer increased with increasing Cu deposition time.

Effect of Fluoride Conversion Coating on the Corrosion Resistance and Adhesion of E-painted AZ31 Magnesium Alloy

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초 록 : Corrosion resistance and adhesion of electro-paint (E-paint) with fluoride conversion coating (FCC) on AZ31 Mg alloy were studied. Corrosion resistance and adhesion were studied as a function of FCC-treatment time and concentration of FCC-bath. Aqueous hydrogen fluoride (HF) solutions, with concentrations ranging from 0.5 M to 5 M, were used to form FCC on chemically polished AZ31 Mg alloy samples for six different times; 10, 30, 60, 90, 120, and 180s. The results from salt spray test (SST) showed that corrosion resistance of E-paint appeared to decrease with increasing FCC treatment times in low concentration FCC baths. The number of blisters formed on the FCC-treated samples increased with increasing FCC treatment time of more than 1 min in low concentration (0.5 M to 1 M) solutions. On the other hand, samples treated in the 5 M HF solution for 120s showed no delamination or blistering even after 1200h of SST.