

عنوان مقاله:

Effect of Deformation-Induced Defects on the Microstructure and Pitting Corrosion Behavior of Al-Ag Alloy

محل انتشار:

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خلاصه مقاله:

In this study, a wide range of combined ageing treatments and cold work deformations in the Al 4.2 wt% Ag alloy matrix were proposed, aiming to investigate the effect of defects such as precipitates (Ag₂Al plates) and dislocations on the mechanical and electrochemical behavior of Al-4.2 wt% Ag alloys. Further reductions of thickness from 10 to 60%, decreases the mean size of Ag₂Al plates, along with a denser distribution. The inductive loop at lower frequencies in Nyquist plot attributed to localized corrosion that clearly testified the fluctuations of the anodic branch in the Tafel diagram and the FE-SEM images for the presence of pitting corrosion. Additionally, the pit propagation grade expands repetitively with cold work reduction and fragmentation of pre-precipitates. This was related to an extreme amount of dislocations induced by deformation and fragmented pre-precipitates, which created more preferable locations for the nucleation of pits. Furthermore, Energy Dispersive X-ray Spectroscopy of pits, revealed that the presence of Al-Ag containing particles acted as cathodic sites and caused the anodic matrix dissolution.

کلمات کلیدی:

corrosion, Pitting, Al-Ag, Cold Work Deformation, Precipitation

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