Effect of Surface Roughness on Pitting Corrosion of 2A12 Aluminum Alloy

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The microstructure and pitting corrosion of 2A12 aluminum alloy abraded in one-direction with abrasive paper of various grit numbers were investigated. Statistical analysis indicated that abrasion can alter surface roughness and induce partial dissolution of intermetallic particles. The electrochemical inhomogeneity resulted from intermetallic particles and roughness had significantly impact on pitting corrosion of 2A12 aluminum alloy. All the samples underwent pitting corrosion, while surface layer dissolution (except pitting) was not observed. The enhanced density, higher area fraction and bigger size of Al₂CuMg particles (S-phase) on the rougher surface made it more susceptible to pitting.

Keywords: A. Aluminum; B. Intermetallic particles; C. Roughness; D. Pitting corrosion. E. Electrochemical measurement

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