

Effect of Grain Refinement on Electrochemical Behavior of Al–Zn–Mg–Cu Alloys

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The influence of Yb, Cr and Zr additives on electrochemical corrosion and stress cracking corrosion behavior of Al–6.2Zn–2.3Mg–2.3Cu (mass fraction) alloys was investigated using open circuit potential, electrochemical impedance spectroscopy, cyclic polarization and U-type method. Better corrosion resistance of Al alloys was obtained through grain refinement effect by adding 0.16Zr and 0.16Zr–0.18Cr–0.3Yb. Both strength and corrosion resistance are inversely proportional to grain size, showing a Hall-Petch relation. The mechanism of grain refinement effect was revealed by TEM.

Keywords: Aluminum alloy; Rare earths; Cyclic polarization; Electrochemical impedance spectroscopy; stress cracking corrosion

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