Corrosion Behavior of Al–Mg–Zn-Si Alloy Matrix Composites Reinforced with Y_2O_3 in 3.5% NaCl Solution

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The corrosion behavior of the Al-Mg-Zn-Si composite reinforced with Y_2O_3 particles and the unreinforced Al-Mg-Zn-Si alloy was studied through electrochemical and surface analysis techniques. The samples were manufactured by the Mechanical alloying (MA) technique and were heat treated at 350 ˚C, 400 ˚C and 500 ˚C during 60 min followed by water quenching. The corrosion behavior of the samples was investigated in 3.5 wt.% NaCl by using electrochemical methods such as poteniodynamic polarization curves, linear polarization resistance and electrochemical impedance spectroscopy measurements. In the as-received condition the corrosion resistance for base alloy was lower than the composite, however, when composite was heat treated, its corrosion résistance was higher than that for base alloy, but it was susceptible to localized type of corrosion at the matrix/ Y_2O_3 particles interface.

FULL TEXT