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# Effect of Al2O3 Nanoparticles on Corrosion Behavior of Aluminum Alloy Fabricated by Powder Metallurgy

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**Abstract :** In this research the effect of Al2O3 nanoparticles on corrosion behavior of aluminum base alloy(Al-4.5wt%Cu-1.5wt%Mg) has been investigated. Nanocomopsites reinforced with variable contents of 1,3 & 5wt% of Al2O3 nanoparticles were fabricated using powder metallurgy. All samples were prepared from the base alloy powders under the best powder metallurgy processing conditions of 6 hr of mixing time , 450 MPa of compaction pressure and 560°C of sintering temperature. Density and micro hardness measurements, and electrochemical corrosion tests are performed for all prepared samples in 3.5wt%NaCl solution at room temperature using potentiostate instrument. It has been found that density and micro hardness of the nanocomposite increase with increasing of wt% Al2O3 nanoparticles to Al matrix. It was found from Tafel extrapolation method that corrosion rates of the nanocomposites reinforced with alumina nanoparticles were lower than that of base alloy. From results of corrosion test by potentiodynamic cyclic polarization method, it was found the pitting corrosion resistance improves with adding of Al2O3 nanoparticles . It was noticed that the pits disappear and the hysteresis loop disappears also from anodic polarization curve.

**Keywords :** powder metallurgy, nano composites, Al-Cu-Mg alloy, electrochemical corrosion
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