

Effect of Immersion Time and Temperature on Corrosion Behaviour of Nanocrystalline Al-Fe-Cr Alloy

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doi: 10.20964/2017.04.14

Received: 4 January 2017 / Accepted: 16 February 2017 / Published: 12 March 2017

The corrosion behavior of Al-10wt.%Fe-5wt.%Cr nanocrystalline aluminium alloy was studied by cyclic potentiodynamic polarization (CPP) and electrochemical impedance spectroscopy (EIS) methods. The nanocrystalline bulk alloy used in this investigation was fabricated by processed metallic powder via mechanical alloying (MA) technique followed by compaction and sintering in a high frequency induction heat sintering (HFIHS) system. The corrosion behavior of the alloy was tested in a 3.5% NaCl solution for different immersion time and temperatures. The outcomes showed that the developed alloy possess good resistance to uniform corrosion at all temperatures. It is also found that increasing the immersion time, results in moving the corrosion potential (E_{corr}) towards a higher negative value that leads to decrease the corrosion current (j_{corr}) and consequently increase the corrosion resistance (R_p) of the alloy.

Keywords: Nanocrystalline aluminium alloy, mechanical alloying, corrosion, polarization, EIS.

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