

## Corrosion resistance behavior of newly fabricated nanocrystalline Al-Fe-Cr alloy produced by mechanical alloying and High Frequency Induction Sintering

Asiful Hossain Seikh<sup>1</sup>, Muneer Baig<sup>1</sup> and Hany Rizk Ammar<sup>2</sup>

<sup>1</sup>Centre of Excellence for Research in Engineering Materials, Advanced Manufacturing Institute, King Saud University, Kingdom of Saudi Arabia

<sup>2</sup>Metallurgical and Materials Engineering Department, Faculty of Petroleum and Mining Engineering, Suez University, Egypt

In this study, nanocrystalline aluminium alloy was produced from metallic powders with addition of 10wt. %Fe and 5wt. %Cr processed using mechanical alloying (MA) technique. The initial powders were processed in a planetary ball mill for 150 hours at room temperature in an inert atmosphere. The processed powders were consolidated and sintered using a high frequency induction heat sintering (HFIHS) machine to form bulk samples. The crystallize size of the bulk samples was calculated from the peak profile obtained through X-Ray diffraction (XRD). The corrosion resistance of nanocrystalline aluminium alloy was studied in 3.5% NaCl solution at room and higher temperatures using electrochemical impedance spectroscopy (EIS) and linear polarization resistance (LPR) techniques. Linear polarization resistance curves, Nyquist data and Bode curves obtained by electrochemical impedance spectroscopy, suggest that the alloy have good resistance to corrosion in sodium chloride solution at room temperature as well as at higher temperatures.

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

### Biography

Dr. Asiful Hossain Seikh is an experienced result oriented Researcher with a professional background comprising 18years of research, technical and supervisory experience in materials, corrosion, mechanical, chemical and metallurgy engineering. His areas of technical experience include materials/polymer research and testing, failure analysis, materials specification and selection, corrosion control and monitoring, paints and coating evaluation, inhibitor evaluation and chemical treatment. Dr. Seikh has completed his Bachelor degree (1994) in Materials & Metallurgy from National Institute of Technology, Durgapur, India and Master (1997) & PhD (2005) in Materials & Metallurgical Engineering from Jadavpur University, Kolkata, India. During his professional career in KACST (2003-2005), Riyadh, KSA, UAE University (2005-2010), Al Ain, UAE and King Saud University (2011-Present), he has been involved in a number of research and industrial projects related to corrosion and metallurgy. Based on the results of his research work, a number of research papers (20 Journals & 6 Conferences) have been published.