Electrochemical Corrosion Behavior of Fe64/Ni36 and Fe55/Ni45 Alloys in 4.0% Sodium Chloride Solutions

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The electrochemical corrosion behavior of two iron/nickel alloys namely, Fe64/Ni36 and Fe55/Ni45, in 4.0% NaCl solution was reported. The study was conducted using open-circuit potential, electrochemical impedance spectroscopy, cyclic polarization, and chronoamperometric current-time measurements. The surface of the alloys after 7 days immersion in the solution was investigated by scanning electron microscope and energy dispersive X-ray analyzer. It was found that the corrosion resistance for Fe55/Ni45 alloy was higher than that for Fe64/Ni36 one. This was confirmed by the low corrosion current and corrosion rate as well as the high corrosion resistance for Fe55/Ni45 compared to Fe64/Ni36 alloy. Moreover, the less negative potential and the low absolute current obtained for Fe55/Ni45 alloy by the open-circuit potential and chronoamperometric experiments, respectively.

Keywords: corrosion; iron-nickel alloys; polarization; EIS; chronoamperometry

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