Effects of Magnetic Field on Open-Circuit Potential of the Ni | HNO₃ + NaCl System

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The effects of the magnetic field on the open-circuit potential (OCP) of the Ni | HNO₃ + Cl⁻ system were studied by using the electrochemical method, the surface analysis, and the nonconvective electrode. Although OCP was always shifted positively when the magnetic field was applied in the direction parallel ($B_{//}$) or perpendicular ($B_{\perp}$) to the electrode surface, the reasons were quite different. With the application of $B_{//}$, the anodic shift of OCP was attributed to the positive shift of the cathodic overpotential (η_c) because the Lorentz force (F_L) was too low to affect the anodic reaction. However, with the application of $B_{\perp}$, it was attributed to the positive shift of the anodic overpotential (η_a) because the field gradient force ($F_{\nabla B}$) affects η_c slightly.

Keywords: Nickel; open-circuit potential; corrosion; magnetic field

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