Degradation of Passive Film on Low-Nickel Stainless Steel in Groundwater with Different Concentration of Chloride Ions

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The effect of chlorides on the degradation of passivation on a low-nickel stainless steel was investigated via electrochemical testing in a simulated groundwater solution. The results revealed that, with increasing chloride concentration of the groundwater, the corrosion potential, adsorption layer resistance, and the polarization resistance of the steel decreased significantly, donor density increased, whereas the thickness of the space charge layer decreased, and pitting potential decreased significantly (as determined via potential dynamic polarization measurements). The results suggest that degradation of the passive film on the low-nickel stainless steel was considerably exacerbated by increasing chloride concentration of the groundwater.

Keywords: Low-nickel stainless steel; Groundwater; Mott-Schottky; Passive film; EIS.

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