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

Xingguo Feng¹,²,³, Ruilong Shi¹, Leyuan Zhang¹, Yiwen Xu¹, Xiangying Zhang¹, Jing Zhang¹, Yunan Ding¹, Da Chen¹, Nengpan Ju²,*, Xibing Zhang⁴

¹ Jiangsu Key Laboratory of Coast Ocean Resources Development and Environment Security, College of Harbour, Coastal and Offshore Engineering, Hohai University, Nanjing 210098, Jiangsu, China
² State Key Laboratory of Geohazard Prevention and Geoenvironment Protection, Chengdu University of Technology, Chengdu 610059, Sichuan, China
³ Shandong Provincial Key Lab of Ocean Engineering, Ocean University of China, Qingdao 266100, China.
⁴ Changjiang River Scientific Research Institute, Wuhan 400010, Hubei, China
*E-mail: jnp@cdut.edu.cn

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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.

FULL TEXT

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