Influence of Temperature on the Corrosion Behavior of X80 Steel in an Acidic Soil Environment

Yuanhui Wu^{1,2,*}, Suxing Luo^{1,2}, Qingsong Mou^{1,2}

¹ Department of Chemistry and Chemical Engineering, Zunyi Normal College, Zunyi, 563006, P. R. China.

² Special Key Laboratory of Electrochemistry for Materials of Guizhou Province, Zunyi, 563006, P. R. China

*E-mail: yhwull@126.com

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The influence of temperature on the corrosion behavior of X80 steel in an acidic soil environment was determined using electrochemical and surface analysis methods. The results revealed that the corrosion rate of X80 steel increased with increasing soil temperature from 25 °C to 75 °C, and the corrosion rate of X80 steel at 75 °C was 19 times higher than that at 25 °C. The charge transfer resistance decreased with increasing soil temperature, and the control step for corrosion was the activation polarization process. The kinetics of the corrosion process complied with the Arrhenius law, and the activation energy E_a was 50.7 kJ·mol⁻¹. In addition, the compositions of corrosion products consisted of Fe₂O₃, Fe₃O₄, SiO₂ and Al₂O₃.

Keywords: X80 steel; soil; corrosion; temperature

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