Investigation of Corrosion Behavior of X65 Steel in Simulated Deep-Sea Environment Using Electrochemical Techniques

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The corrosion behaviors of X65 steel in the simulated deep-sea environment at different temperatures are investigated using electrochemical techniques. The effect of temperature on corrosion products are also analyzed by X-ray diffraction. The results indicate that the corrosion current density decreases as the temperature decreases. The polarization resistance increases as the temperature decreases. The composition of the corrosion products formed on the surface of X65 steel remains the same as the temperature decreases, mainly composed of γ -FeOOH, γ -Fe₂O₃, and Fe₃O₄. The low temperature in the deep-sea environment retards the corrosion of X65 steel by inhibiting the anodic dissolution reaction.

Keywords: X65 steel, Deep-sea environment, Temperature, Electrochemical techniques, Corrosion

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