

论文

温度对X80管线钢钝化膜电化学性能的影响

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摘要:

应用电化学阻抗谱(EIS)技术研究了温度对X80管线钢在模拟土壤环境中所成钝化膜电化学性能的影响,同时应用点缺陷(PDM)模型分析了温度对钝化膜电化学性能的影响。结果表明:随着成膜温度的升高,钝化膜的稳态电流增大,膜内施主密度增加,膜电阻、传递电阻及离子在膜内的扩散系数 D_s 减小,其原因在于温度升高,钝化膜内的氧空位数量增加。

关键词: X80管线钢 钝化膜 点缺陷模型

INFLUENCE OF TEMPERATURE ON THE ELECTROCHEMICAL PROPERTY OF PASSIVE FILM FORMED ON X80 PIPELINE STEEL

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Abstract:

The influence of temperature on the electrochemical property of passive film formed on X80 pipeline steel in simulated soil environment was investigated by using electrochemical impedance spectroscopy (EIS) technique, and the effect of temperature on the electrochemical property of passive film was analyzed using point defect model (PDM). The results showed that the steady current density of passive film and donor density increased, film resistance, transfer resistance and diffusivity D_s decreased with increasing temperature. According to PDM, the influence of temperature on the electrochemical property of passive film was related to the increment of donor density in the film with increasing temperature.

Keywords: X80 pipeline steel passive film Point Defect Model (PDM)

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