

硫酸溶液中1,1'-硫代羰基二咪唑在碳钢上的吸附及缓蚀影响和碘离子的增强效应

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摘要:

The inhibition effect of 1,1'-thiocarbonyldiimidazole (TCDI) on the corrosion behaviors of mild steel (MS) in 0.5 mol·L⁻¹ H₂SO₄ solution was studied with the help of potentiodynamic polarization, electrochemical impedance spectroscopy (EIS), and linear polarization resistance (LPR) techniques. The effect of immersion time on the inhibition effect of TCDI was also investigated over 72 h. For the long-term tests, hydrogen evolution with immersion time (VH₂-t) was measured in addition to the three techniques already mentioned. The thermodynamic parameters, such as adsorption equilibrium constant (K_{ads}) and adsorption free energy (ΔG_{ads}) values, were calculated and discussed. To clarify inhibition mechanism, the synergistic effect of iodide ion was also investigated. The potential of zero charge (PZC) of the MS was studied by electrochemical impedance spectroscopy method, and a mechanism of adsorption process was proposed. It was demonstrated that inhibition efficiency increased with the increase in TCDI concentration and synergistically increased in the presence of KI. The inhibition efficiency was discussed in terms of adsorption of inhibitor molecules on the metal surface and protective filmformation.

关键词: Corrosion inhibitor 1,1'-Thiocarbonyldiimidazole Adsorption Inhibition mechanism Synergistic effect Potential of zero charge

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