Corrosion Inhibition of Mild Steel in 1.0 M HCl by two Hydrazone Derivatives

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In this paper, a combined experimental and theoretical study was conducted to explain the scientific mechanism of adsorption of two hydrazone derivatives (HDZs) containing mefenamic acid (MA) namely, (E)-2-((2,3-dimethylphenyl)amino)-N'-(thiophen-2-ylmethylene)benzohydrazide (HDZ-S) and (E)-2-((2,3-dimethylphenyl)amino)-N'-(furan-2-ylmethylene)benzohydrazide (HDZ-O) on mild steel (MS) in 1.0 M HCl. Electrochemical techniques and scanning electron microscope (SEM) were performed to evaluate the corrosion inhibition performances. Electrochemical results disclosed that the two compounds could effectively control the dissolution rate of mild steel in acidic medium through physicochemical adsorption following Langmuir adsorption model. Potentiodynamic polarization curves indicated that the furocoumarin molecules could be classified as mixed-type inhibitors by preventing anodic metal dissolution and cathodic hydrogen evolution reaction. The results of SEM experiment agree with electrochemical results and confirm the effective adsorption of both compounds on the steel surface.

Keywords: Corrosion inhibition; Mild steel; Hydrazone derivative; HCl; SEM.

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