

Corrosion inhibition of mild steel in hydrochloric acid solution using fatty acid derivatives

ABSTRACT

The inhibitive actions of fatty acid derivatives namely palmitate hydrazide (PH), N-ethylidene palmitate hydrazide (EPH) and N-phenylmethylidene palmitate hydrazide (PPH) on mild steel in 1 M hydrochloric acid were investigated using open circuit potential, linear polarisation and electrochemical impedance spectroscopy techniques. It was observed that the percentage of inhibition efficiency ($\eta\%$) increased with increasing concentrations of inhibitor and temperature of test medium. The maximum $\eta\%$ approaches 85% in the presence of 200 mg litre⁻¹ of inhibitors EPH and PPH at $308 \pm 1\text{K}$. The inhibitor efficiencies were found to be in the following order: PPH>EPH>PH. The adsorption of these inhibitors on mild steel surface obeys Langmuir adsorption isotherm. They act as mixed-type inhibitors. Scanning electron microscopy-energy dispersive X-ray (SEM-EDX) was also carried out on polished mild steel coupons and those immersed in the test medium with the absence and presence of 200 mg litre⁻¹ of the inhibitors studied.

Keyword: Corrosion inhibition; Fatty acid derivatives; Mild steel; Schiff base