



Effect of some new diazole derivatives on the corrosion behaviour of steel in 1 M HCl

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ABSTRACT

The inhibiting properties of four diazole derivatives namely 2,2'-ethylene-bis(benzimidazole) (EBBI), 2,2'-buthylene-bis(benzimidazole) (BBBI), 2,2'-hexamethylene-bis(benzimidazole) (HBBI) and 2,2'-octamethylene-bis(benzimidazole) (OBBI), against the corrosion of mild steel in solutions of hydrochloric acid has been studied by various corrosion monitoring techniques and reported here for the first time. Preliminary screening of the inhibition efficiency was carried out using weight loss measurements. At the inhibitor concentration range of 10^{-5} – 5×10^{-4} M in 1 M HCl, the inhibitor efficiency increases with concentration of the organic substrate. Potentiodynamic polarisation studies showed that these compounds suppressed both cathodic and anodic processes of mild steel corrosion in 1 M HCl by adsorption on the metal surface according to Langmuir adsorption isotherm. The values of free energies of adsorption (ΔG_{ads}^0) suggest a mixed physisorptions and chemisorption of diazole molecules on the steel surface. The inhibition efficiency of these inhibitors increases in the order OBBI > HBBI > BBI > EBBI.

Keywords: Corrosion inhibition; Mild steel; Acidic media; Diazole derivative; Adsorption

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