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Poly(4-vinylpyridine-hexadecyl bromide) as corrosion inhibitor for mild steel in acid chloride solution

Abstract

The influence of the addition of poly(4-vinylpyridine-hexadecyl bromide) P4VP-Alkyl 50 % newly synthesized on the corrosion of mild steel in molar hydrochloric acid has been investigated by weight-loss measurements combined with linear potential scan voltammetry ($I-E$) and electrochemical impedance spectroscopy (EIS). The polymer reduces the corrosion rate and the inhibition efficiency (E %) of P4VP-Alkyl 50 % increases with its concentration and attains 95 % at 300 mg/L. E % obtained from cathodic Tafel plots, EIS, and gravimetric methods were in good agreement. The inhibitor was adsorbed on the iron surface according to the Langmuir adsorption isotherm model. Polarization measurements also show that the compound acts as a cathodic inhibitor.

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