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Electrochemical Studies of Mild Steel Corrosion Inhibition By 1-Butyl-3-Methylimidazolium Chloride In 2M H_2SO_4 medium

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ABSTRACT

The influence of 1-butyl-3-methylimidazolium chloride (1-BMIC) on corrosion inhibition of mild steel in 2M H_2SO_4 was studied by weight loss, effect of temperature, potentiodynamic polarization and electrochemical impedance spectroscopy. The experimental results showed that the inhibition efficiency increases with increasing of 1-BMIC concentrations but decreases with increasing temperatures. The adsorption of 1-BMIC on the mild steel surface obeyed the Freunlich adsorption isotherm. Potentiodynamic polarization curves showed that 1-BMIC acted as mixed type inhibitor in acid medium. This was supported by the impedance which showed a change in the charge transfer resistance and double layer capacitance indicating adsorption of 1-BMIC on the mild steel surface. Scanning electron microscopy (SEM) technique is used to confirm the effectiveness of inhibition of mild steel in sulphuric acid medium. The effects of nitrogen atom in 1-BMIC on the ability to act as a corrosion inhibitor were investigated by theoretical calculations. The thermodynamic functions of the adsorption processes were calculated from the weight loss and the effect of temperature data.

Keywords: Inhibitor, Mild steel, Corrosion, Polarization, Impedance, Adsorption.