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Adsorption and Thermodynamic Study of Corrosion Inhibition Properties of *Mimosa pudica* on Mild Steel in 2M H₂SO₄

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Abstract:Controlling the corrosion of metals and alloys are of technical, economical and environmental importance. The use of inhibitors are the best methods to control corrosion. Introduction of green corrosion inhibitor can stop the use of expensive and toxic organic inhibitor. This study investigates the corrosion inhibition of mild steel in 2M sulphuric acid media by using ethanolic extract of *Mimosa pudica* by weight loss method. The potentiality of *Mimosa pudica* to inhibit corrosion was studied based on concentration of inhibitors in the range of 1g/l -4g/l and temperature range of 30°C-50 °C. Calculation from weight loss method revealed that inhibition efficiencies (IE %) increases with increasing inhibitor concentration. The thermodynamic and adsorption parameters of this process such as Activation Energy (E_a), Enthalpy (ΔH°), Entropy (ΔS°) and Free energy (ΔG°) were calculated. Increase in E_a values with increase in inhibitor concentration proved a physical adsorption mechanism. The ΔH°calculated proved that this is an exothermic process. The experimental data fit into the Freundlich adsorption isotherm. Surface investigation of the mild steel coupons were done by SEM analysis which showed the formation of a protective film of the inhibitor molecule on the mild steel surface.

Keywords :*Mimosa pudica*, mild steel, corrosion inhibition, green inhibitors, weightlossmethod.

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