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Research Article

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Aniline as Corrosion Inhibitor for Zinc in H_2SO_4 Solutions: Kinetic, Adsorption and Thermodynamic Considerations

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Abstract: The inhibition of the corrosion of zinc in H_2SO_4 acid by aniline has been investigated by using weight loss, temperature effect, kinetic, adsorption and thermodynamic techniques. Corrosion rate increases with the increase in acid concentration and temperature. As inhibitor concentration increases corrosion rate decreases while percentage of inhibition efficiency (I.E.) increases. As temperature increases I.E. decreases. Maximum I.E. of aniline was found up to 83.79 % at 60 mM inhibitor concentration in 0.1 M H_2SO_4 solution. The value of free energy of adsorption (ΔG_{ads}^0), heat of adsorption (Q_{ads}), energy of activation, (E_a), enthalpy of adsorption (ΔH_{ads}^0) and entropy of adsorption (ΔS_{ads}^0) were calculated. The inhibition effect is discussed in view of aniline molecules adsorbed on the metal surface and it obeys Langmuir adsorption isotherm. The results obtained showed that the aniline could serve as an effective inhibitor for corrosion of zinc in H_2SO_4 .

Key words: Zinc, H_2SO_4 , Aniline, Corrosion, Weight loss, Kinetic, Adsorption.