

Electrochemical Studies of the Inhibition Effect of 2-Dimethylamine on the Corrosion of Austenitic Stainless Steel Type 304 in Dilute Hydrochloric Acid

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Abstract : The inhibiting action of 2-dimethylamine on the electrochemical behaviour of austenitic stainless steel (type 304) in dilute hydrochloric was evaluated through weight-loss method, open circuit potential measurement and potentiodynamic polarization tests at specific concentrations of the organic compound. Results obtained reveal that the compound performed effectively giving a maximum inhibition efficiency of 79% at 12.5% concentration from weight loss analysis and 80.9% at 12.5% concentration from polarization tests. The average corrosion potential of -321 mV was obtained the same concentration from other tests which is well within passivation potentials on the steel thus, providing good protection against corrosion in the acid solutions. 2-dimethylamine acted through physiochemical interaction at the steel/solution interface from thermodynamic calculations and obeyed the Langmuir adsorption isotherm. The values of the inhibition efficiency determined from the three methods are in reasonably good agreement. Polarization studies showed that the compounds behaved as cathodic type inhibitor.

Keywords : corrosion, 2-dimethylamine, inhibition, adsorption, hydrochloric acid, steel

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