

Adsorption and Corrosion Inhibition of New Synthesized Thiophene Schiff Base on Mild Steel in HCL Solution

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Abstract : The synthesis of new organic molecules offers various molecular structures containing heteroatoms and substituents for corrosion protection in acid pickling of metals. The most synthesized compounds are the nitrogen heterocyclic compounds, which are known to be excellent complex or chelate forming substances with metals. The choice of the inhibitor is based on two considerations: first it could be synthesized conveniently from relatively cheap raw materials, secondly, it contains the electron cloud on the aromatic ring or, the electro negative atoms such as nitrogen and oxygen in the relatively long chain compounds. In the present study, (NE)-2-methyl-N-(thiophen-2-ylmethylidene) aniline(T) was synthesized and its inhibiting action on the corrosion of mild steel in 1 M hydrochloric acid was examined by different corrosion methods, such as weight loss, potentiodynamic polarization and electrochemical impedance spectroscopy (EIS). The experimental results suggest that this compound is an efficient corrosion inhibitor and the inhibition efficiency increases with the increase in inhibitor concentration. Adsorption of this compound on mild steel surface obeys Langmuir's isotherm. Correlation between quantum chemical calculations and inhibition efficiency of the investigated compound is discussed using the Density Functional Theory method (DFT).

Keywords : mild steel, Schiff base, inhibition, corrosion, HCl, quantum chemical

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