Investigation of 5-aminosalicylic acid (Mesalazine Drug) as a Corrosion Inhibitor for Carbon Steel in Sulfuric Acid Solution

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The techniques of polarization, electrochemical impedance spectroscopy (EIS) and Fourier transform infrared (FTIR) spectroscopy were employed for investigating the behavior of mesalazine drug (5-aminosalicylic acid) on the corrosion protection of carbon steel in 0.5 M H₂SO₄ solution. The corrosion protection was increased with increasing mesalazine concentration in both acid solutions. As evidenced by polarization data, mesalazine behaves as a mixed-type inhibitor and retards both anodic and cathodic processes. The inhibition efficiency of the drug decreased as the temperature increased up to 55 °C. The activation energies for the corrosion of carbon steel in the sulfuric acid solution were increased in the presence of the drug. The thermodynamic parameters for the corrosion process of carbon steel in sulfuric acid medium were calculated from the effect of temperature on the corrosion process. The adsorption of mesalazine on carbon steel in acid solution obeyed the Langmuir adsorption isotherm. The results extracted from the polarization data were in agreement with those obtained from EIS data. FTIR spectroscopy revealed the possible active center sites of mesalazine molecule during adsorption on the steel surface.

Keywords: Mesalazine drug; Potentiodynamic polarization; Electrochemical impedance spectroscopy; Green inhibitor.

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