



Corrosion Protection of Carbon Steel by using Simvastatin Drug in HCl Medium

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ABSTRACT

Simvastatin drug was utilized as an inhibitor for carbon steel (CS) corrosion in 1 M HCl by utilizing many techniques: weight loss (WL), hydrogen evaluation (HE), open circuit potential (E_{ocp}), electrochemical frequency modulation (EFM), electrochemical impedance spectroscopy (EIS) and potentiodynamic polarization (PP) techniques. WL is investigated at various temperatures between (25–45°C) but hydrogen evaluation and all electrochemical studies at room temperature. The inhibition efficiency (% IE), increases with expanding doses of the Simvastatin drug. The activation and the variables of adsorption were investigated and calculated by the effect of temperature on the inhibition of corrosion. The adsorption of the Simvastatin on CS surface was found to obey with Langmuir adsorption model. The morphology of inhibited CS was analyzed by the energy dispersive X-ray spectroscopy (EDX), atomic force microscopy (AFM) and scanning electron microscope (SEM). All techniques were utilized to examine the corrosion inhibition of the drug. Polarization data revealed that this drug affect both anodic and cathodic reactions.

Keywords: Corrosion inhibition, HCl, CS, Adsorption, SEM, EDX, AFM.
