



Corrosion Protection of C-Steel in Hydrochloric Acid Solutions Using Some Pharmaceutical Compounds

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ABSTRACT

The corrosion behavior of C-steel (CS) in 1M HCl and in the presence of pharmaceutical compounds, Pancuranium Bromide and Rocuronium Bromide, as Quaternary ammonium derivatives has been investigated using, electrochemical impedance spectroscopy (EIS), potentiodynamic polarization (PP), electrochemical frequency modulation (EFM) and weight loss (WL) techniques. Polarization curves show that, Pancuranium bromide and rocuronium bromide are mixed-type inhibitors. Results of EIS showed the increase in the charge transfer resistance and the decrease in the double layer capacitance. The adsorption isotherm of these compounds was found to be Temkin adsorption isotherm. Some thermodynamic parameters were computed and explained. It was found that the adsorption process increases, in the same direction as inhibition efficiency(%IE). The results indicated that the IE increases with increasing the concentration of inhibitors and decreases with increasing the temperature. Some quantum chemical parameters were calculated by the semi-empirical AM1 method to provide further vision into the mechanism of inhibition of the corrosion process. The results obtained from chemical and electrochemical techniques are in good agreement.

Keywords: C-steel (CS), EIS, SEM, Quaternary ammonium derivatives, Pancuranium Bromide, Rocuronium Bromide, HCl.
