Methyl Acrylate Derivatives as Corrosion Inhibitors for X-65 Type Carbon Steel in 1 M HCl

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Inhibition efficiency of prepared Methyl acrylate derivatives named 2-Methacryloyloxyethyloctadecyldimethylammonium Bromide (MEODAB), poly(2-Methacryloyloxyethyloctadecyldimethylammonium Bromide) (PMEODAB) for X-65 type carbon steel in 1 M HCl has been investigated by potentiodynamic polarization and electrochemical impedance spectroscopy (EIS) measurements. The prepared acrylate derivatives act as mixed-type inhibitors, which suppresses both cathodic and anodic processes by its adsorption on the electrode surface according to Langmuir adsorption isotherm, together with a slight positive shift in corrosion potential (E_{corr}). The inhibition efficiency IE% reached 89.3% for compound (MEODAB) and 88.1 % for compound (PMEODAB) at 150 ppm. The data obtained from electrochemical impedance spectroscopy (EIS) was analyzed to model the corrosion inhibition process through equivalent circuit. The nature of the protecting film formed on carbon steel was investigated by SEM and EDX techniques.

Keywords: Methyl acrylate derivatives, Impedance spectroscopy, Corrosion, SEM.

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