Corrosion Inhibition of Aluminum in Hydrochloric Acid Solution Using Some Pyrazolocarbothioamide Derivatives

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The corrosion performance of Al in 2M HCl in presence of pyrazolocarbothioamide derivatives have been investigated using electrochemical frequency modulation (EFM), Tafel polarization (PP), AC impedance (EIS) and mass reduction (MR) techniques. From polarization studies, the adsorption of heterocyclic compounds retard liberation of hydrogen and decrease the metal dissolution i.e. they performance as mixed kind. The protection action of the (pyrazolocarbothioamide) was examined in view of the adsorbed of its parts on Al surface and follows kinetic-thermodynamic model isotherm. The inhibition efficiency (IE) increment as the pyrazolocarbothioamide derivatives concentration was increasing. The IE decreases with increasing the temperature, showing that it is physically adsorbed. It was revealed that the existence of these pyrazolocarbothioamide derivatives rise the energy of activation. Pyrazolocarbothioamide derivatives run as excellent coating film to Al versus corrosion in chloride containing solutions. Surface analysis was examined using atomic force microscopy (AFM) analysis. The obtained data from all investigated tests are in great agreement.

Keywords: Al corrosion, HCl, PYRAZOLOCARBOTHIOAMIDE DERIVATIVES, EIS, EFM, AFM

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