Ketamine Drug as an Inhibitor for the Corrosion of 316 Stainless Steel in 2M HCl Solution

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Ketamine drug was examined as an inhibitor of the corrosion of 316 stainless steel in 2MHCl solution using weight loss, galvanostatic polarization, potentiodynamic anodic polarization and electrochemical impedance spectroscopy measurements. The inhibitory efficiency was increased with increased concentration of ketamine and reduced at high temperature. The ketamine acted as mixed inhibitor. The inhibitory mechanism was interpreted by the formation of chelating compound strongly adsorbed onto the 316SS surface. The adsorption conformed Langmuir isotherm. Ketamine drug inhibits the pitting corrosion of 316SS by converting the pitting potential in the positive direction. The activation and adsorption of thermodynamic parameters were computed and clarified. A quantum calculation and its relationship to the inhibition efficiency of the ketamine drug was carried out using the density functional theory (DFT) by Hartree Fock (HF) level and Becke three-parameter DFT/B3LYP [26], together with Valence Triple Zeta plus Polarization and Diffuse 6-311++G (d, p).

Keywords: Ketamine drug, corrosion inhibitors, polarization, adsorption, DFT

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