Corrosion Inhibition of Stainless Steel Type 316 L in 1.0 M HCl Solution Using 1,3-Thiazolidin-5-one Derivatives

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Ten compounds of 1,3-thiazolidin-5-one derivatives has been evaluated as an inhibitor for corrosion of stainless steel type 316L (316SS) in 1.0 M HCl solution by means of weight loss and electrochemical impedance spectroscopy techniques. The surface examination and morphological studies were studied using scanning electron microscope (SEM) and energy dispersive X-ray (EDX). It has been found that the percentage inhibition efficiency increases with increasing the concentration of inhibitors and with decreasing temperature. These compounds acted as mixed type inhibitors. The inhibition process was explained due to the adsorption of these compounds at the 316 SS surface. The adsorption obeys Temkin's isotherm. The effect of substituted group and substituted position on the inhibition efficiency were explained. SEM and EDS confirmed that the rate of 316SS corrosion in 1.0 M HCl solution is reduced due to the formation of the protective film on its surface.

Keywords: 316 stainless steel, 1,3-thiazolidin-5-one derivatives, corrosion inhibitors, adsorption.

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