

Abstract

In this work some Ketene dithioacetal derivatives namely (MDYO, DYCD, DYCD1 and DYCD2), were synthesized and tested at various concentrations as possible corrosion inhibitors for 316 L stainless steel in 1M HCL. We conducted this study using the following methods: weight loss, electrochemical impedance spectroscopy, potentiodynamic polarization, surface analysis techniques (SEM/EDX scanning electron microscopy and Raman spectroscopy) and Functional Density Theory (DFT) were also used to calculate quantum parameters. The results obtained prove that the corrosion of stainless steel in the 1M HCl medium is reduced in the presence of these inhibitors. The adsorption mechanism of these molecules on the metal surface follows the Langmuir isotherm, the thermodynamic data of the adsorption of compounds and the activation energies were determined and then discussed. The existence of an inhibitor protective film on the stainless steel surface was confirmed by SEM/EDX and Raman observations. The results of the theoretical calculations supported the experimental results.

Keywords: Corrosion Inhibition, Ketene Dithioacetal, Stainless Steel.