Corrosion Inhibition Effect of Expired Levothyroxine Drug on Stainless Steel 304L in 0.5 M H₂SO₄ Solution

M. M. Motawea

Department of Chemistry, College of Science, University of Bisha, Bisha, Kingdom of Saudi Arabia
and Delta Higher Institute of Engineering & Technology Mansoura, Egypt

E-mail: dr_mmm_2018@yahoo.com

doi: 10.20964/2021.02.17

Received: 1 October 2020 / Accepted: 22 November 2020 / Published: 31 December 2020

The inhibition of Stainless Steel 304L (SS (304L)) in 0.5 M H₂SO₄ was study by use expired levothyroxine drug as eco-friendly inhibitor. There are many techniques ((Mass loss (ML), potentiodynamic polarization (PP) tests and electrochemical impedance spectroscopy (EIS)) utilized in this study to explain the protection process. The corrosion inhibition (%IE) rise with improving doses of the expired levothyroxine drug and reduction by temperature raising. The activation and adsorption parameters were calculated and discussed. %IE of SS (304L) occurs by the adsorption process, and this SS (304L) is subject to the adsorption of Langmuir. From the EIS examination, we notice the reduction of the double layer by raising the concentration of expired levothyroxine drug, on the other hand, the charge transfer resistance is increased. The surface morphology of SS (304L) metal was examined by employing various techniques such as AFM, FTIR, SEM and EDX. Results were of all techniques used are in excellent coherence.

Keywords: Expired levothyroxine, SS (304L), H₂SO₄, SEM, EDX, AFM.

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