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Some Plants Extracts as Green Inhibitors to Mitigate the Corrosion of Mild Steel in H3PO4 Acid Solutions

Aisha H. Al-Moubaraki * and Wesam A. Al-hammadi

Abstract

This research attempts to application of three different plants extracts called Fraxinus excelsior L. (FEAE), Zingiber zerumbet L. (ZZAE) and, Isatis tinctoria L. (ITAE) as green inhibitors to mitigate the corrosion of mild steel in H3PO4 acid solutions. Some factors included in the current research such as acid concentration, inhibitor concentration, and temperature using weight loss (WL) and electrochemical measurements (electrochemical impedance spectroscopy, EIS, and potentiodynamic polarization, PDP). To confirm the performance of these plants extracts for protection of mild steel in H3PO4 acid, the morphology of mild steel without and with low and high concentrations of plants extracts was studied using the scanning electron microscopy (SEM). FTIR was used to demonstrate the adsorption of plants extracts components onto the mild steel surface. The results showed that the three extracts serve as excellent inhibitors for corrosion of mild steel in H3PO4. All measurements appeared that the corrosion rate decreases and accordingly the inhibition efficiency increases with increasing of inhibitors concentration. The FTIR and SEM surface morphology analyses provide evidence of formation of protective inhibitors film on the metal surface. The effect of temperature (30-60oC) revealed that the inhibitor film still protected the mild steel even at high temperature.

Biography:

Aisha H. Al-Moubaraki is from Department of Chemistry,Faculty of Sciences–Alfaisaliah Campus, University of Jeddah, Jeddah, Saudi Arabia

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