

Exploration of highly hydrophobic aminophenyl urea derivatives as new corrosion inhibitors in 1 M HCl

Research Article Published: 07 October 2022

Volume 53, pages 359–378, (2023) Cite this article



Journal of Applied
Electrochemistry

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Abstract

In this study, different aminophenyl urea derivatives (1-4-APADU, 1-4-APOU, 1-4-APDDU, 1-4-APODU and 1-4-APFPEU) were synthesized, characterized, and tested for the inhibition of mild steel corrosion in 1 M HCl. Gravimetric monitoring, electrochemical impedance analysis, and potentiodynamic polarization were performed to test their effectiveness. A better level of protection was provided by the inhibitors. The corrosion protection efficiency of 1-4-APOU was the best of the inhibitors studied. A contact angle measurement confirmed the formation of hydrophobic film. The inhibitors used in this study displayed mixed-type inhibitor behavior based on polarization measurements. There was a sharp agreement between the adsorption processes observed in this study and Langmuir's adsorption isotherm.

Graphical abstract