Proceedings of the 3rd Pan American Materials Congress
Proceedings of the 3rd Pan American Materials Congress pp 179-189| Cite as

Cassia fistula Leaf-Extract Effect on Corrosion-Inhibition of Stainless-Steel in 0.5 M HCl

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Conference paper
First Online: 10 February 2017

Part of the The Minerals, Metals & Materials Series book series (MMMS)

Abstract

This paper investigates *Cassia fistula* leaf-extract effects on the inhibition of stainless-steel corrosion in 0.5 M HCl. Measurements of corrosion rate were obtained through linear sweep voltammetry (LSV) technique, at the ambient temperature of 28 °C from stainless-steel specimens immersed in the acidic medium, containing different *Cassia fistula* leaf-extract concentrations. Results showed that inhibition effectiveness on stainless-steel corrosion increases with increasing concentration of the leaf-extract. The 10 g/L *Cassia fistula* leaf-extract, the highest concentration of the leaf-extract employed in the study, exhibited optimal inhibition efficiency η = 88.46% on the corrosion of the stainless-steel metal. Adsorption isotherm modelling shows that the experimental data followed the Flory-Huggins isotherm with excellent model efficiency, r^2 = 90.27%, and the Langmuir model with very good model efficiency, r^2 = 78.83%. Other isotherm parameters indicate favourable adsorption and suggest physisorption as the prevalent mechanism of corrosion protection by the leaf-extract on stainless-steel in the acidic chloride environment.

Keywords

Linear sweep voltammetry Corrosion rate *Cassia fistula* leaf-extract Stainless steel Inhibition efficiency Acidic chloride medium Adsorption isotherm modelling

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