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Inhibitive Corrosion Performance of the Eco-Friendly Aloe Vera in Acidic Media of Mild and Stainless Steels

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Abstract

The inhibitive behaviour of aloe vera as an eco-friendly inhibitor was studied in the corrosion of mild and stainless steel in 0.5 M H<sub>2</sub>SO<sub>4</sub> medium. The varied aloe vera inhibitor concentrations were studied using weight loss (gravimetric) and linear polarization methods. The methods showed that the inhibition efficiency increased with an increase in the concentration of the inhibitor (up to 10 vol/vol%) for both the mild and stainless steels. Stainless steel was found to exhibit a lower corrosion rate compared to mild steel. The results showed that Langmuir adsorption isotherm was obeyed by the inhibition of mild and stainless steel using aloe vera in 0.5 M H<sub>2</sub>SO<sub>4</sub> with the values of the regression coefficients near unity. The negative values of  $\Delta G_{ads}$  show the spontaneous adsorption of inhibitor on the mild and stainless steel surfaces and a physisorption adsorption mechanism of the aloe vera inhibitor since the values of  $\Delta G_{ads}$  obtained are more than  $-20$  kJ/mol, that is, aloe vera is an efficient corrosion inhibitor with mixed-type inhibition property.

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