Corrosion Inhibition Performance of Coconut Leaf Extract as a Green Corrosion Inhibitor for X65 Steel in Hydrochloric Acid Solution

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In this paper, coconut leaf extract was extracted with absolute ethanol. The corrosion inhibition performance of coconut extract on X65 steel in the corrosive medium of HCl was studied using electrochemical ways, surface morphology analysis, and theoretical calculations. Experimental data of potentiodynamic polarization curves indicated that coconut extract is a mixed-type corrosion inhibitor. Surface morphology analysis test results showed that coconut leaf extract can effectively inhibit the corrosion of X65 steel. The adsorption of coconut leaf extract on the X65 steel surface conforms to the Langmuir single layer adsorption. Quantum chemical calculations and molecular dynamics simulations can effectively demonstrate that coconut leaf extracts exhibit excellent corrosion inhibition performance.

Keyword: Coconut leaf extract; X65 steel; Corrosion inhibitor; Langmuir adsorption model; Quantum chemical calculations; Molecular dynamics simulations

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