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Article

Investigation of structural properties and corrosion inhibition mechanism of green corrosion inhibitors for mild steel in acidic media

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Abstract: Mild steel is often used in the construction of reaction vessels, storage tanks, and petroleum refineries, but it is heavily damaged by acid solutions. Despite ongoing developments in the production of corrosion-resistant materials, chemical inhibitors are also the most realistic and cost-effective method of corrosion prevention. Mild steel corrosion has been shown to be inhibited by organic compounds containing nitrogen, sulphur, oxygen, and heterocyclic compounds with a polar functional group and a conjugated double bond. Organic inhibitors come in a variety of forms, but the majority of them are both costly and harmful. As a result, finding low-cost and environmentally sustainable inhibitors remains a priority. A small number of non-toxic compounds from the pharmaceutically active compounds have been studied for their mild steel corrosion inhibition properties in acid media. Plant extracts are abundant in corrosion inhibitors that are safe for the environment. The extracts from the plant are non-toxic and easy to obtain. Many organic compounds with polar atoms like O, N, P, and S can be found in these extracts. Protective films are created as they are adsorbed onto the metal surface by these polar atoms. These ingredients adsorb according to a number of isotherms. By analysing data from weight loss measurements, tafel polarisation, and EIS investigations, we have studied structural features of a few green corrosion inhibitors and their mechanism of corrosion inhibition.

Keywords: mild steel; acid corrosion; adsorption isotherm; corrosion inhibitors; tafel polarization