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Testing and Comparing the Inhibitory Action of Red Onion Seeds and Peels Extracts on the Corrosion of Steel in Phosphoric Acid

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Abstract

The inhibitory action of Red onion seeds and peels extracts (ROSE & ROPE) was testing and comparing on the corrosion of steel in 0.75 M H₃PO₄ using chemical measurements (hydrogen evolution, HE and mass loss, ML) and SEM technique. The effect of temperature on the corrosion of steel in 0.75 M H₃PO₄ without and with certain concentration of each extract was studied in the temperature range of 303-333 K. Generally, the inhibition efficiency (i.e. surface coverage) increases with extracts concentration and fits the Langmuir adsorption isotherm. The results of HE, ML and SEM showed that ROSE has a capability to protect steel surface in 0.75 M H₃PO₄ more than ROPE. Good agreement between HE and ML measurements was obtained. Temperature coefficients without and with each extract revealed somewhat chemisorptive and physisorptive behavior of ROSE and ROPE, respectively. Good correlation between the major effective constituents of each extract and the inhibition mechanism was obtained.

Keywords

Author Keywords: steel; corrosion inhibition; phosphoric acid; red onion; SEM

KeyWords Plus: ECO-FRIENDLY INHIBITOR; LOW-CARBON STEEL; MILD-STEEL; HYDROCHLORIC-ACID; SULFURIC-ACID; ANTIOXIDANT PROPERTIES; AQUEOUS EXTRACT; H₃PO₄ SOLUTION; ALLIUM-CEPA; ADSORPTION

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