The Application of Zinc Oxide Nanoparticles as An Eco-Friendly Inhibitor for Steel in Acidic Solution

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In this study, zinc oxide nanoparticles were prepared using a natural extract of Myrrh as green capping agent. The synthesized ZnO-NPs (Zinc Oxide Nanoparticles) were characterized using XRD and scanning electron microscopy, and the results revealed the synthesis of hexagonal wurtzite ZnO-NPs. The corrosion inhibition of steel in 1.0 M HCl using an aqueous extract of natural Myrrh and the green-synthesized ZnO-NPs was investigated at various concentrations using electrochemical impedance spectroscopy (EIS) measurements and potentiodynamic polarization (PDP). The results revealed that the corrosion inhibition process is exponentially increased with the inhibitor concentrations, and an inhibition effectiveness of 92% could be acquired. Polarization curves showed that the eco-friendly inhibitors perform as a cathodic inhibitor. Consequently, the obtained inhibition efficiency values derived from all chosen analysis techniques were in reasonably good agreement.

Keywords: corrosion; steel, *Myrrh*, green synthesis, zinc oxide nanoparticles

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