

Abstract

This article outlines the behaviour of water-soluble chitosan as an effective inhibitor on aluminium alloy in 3.65% NaCl at room temperature. The inhibitive ability of water-soluble chitosan was examined using electrochemical potentiodynamic polarization techniques, mass loss measurements and computational studies. The outcome of the experiment reveals that chitosan inhibited aluminium alloy in sodium chloride solution exhibits better corrosion protection than the uninhibited because chitosan nanoparticles minimize the ingress of chloride ion into the active sites of aluminium alloy by forming thin film on its surface. The losses in mass by the inhibited aluminium alloy were found to reduce as the concentration of chitosan increases. Results obtained showed that chitosan could offer inhibition efficiency above 70%. Polarization curve demonstrated that chitosan in 3.65% NaCl at room temperature acted as a mixed-type inhibitor. Adsorption of chitosan nanoparticles on the aluminium alloy was found to follow Langmuir adsorption isotherm with correlation regression coefficient (R^2) value of 0.9961.