Corrosion Inhibition Effect of Three Imidazolium Ionic Liquids On Carbon Steel In Chloride Contaminated Environment

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Three imidazolium-type ionic liquids, substituted with polar groups at N1 and alkyl chains at N3 were synthesized under mild reaction conditions. The corrosion inhibition of carbon steel in 0.3 M NaCl saturated Ca(OH)₂ solution was investigated. Influence of concentration corrosion inhibition effectiveness was obtained by potentiodynamic polarization and electrochemical impedance spectroscopy. Imidazolium ionic liquid acted as a mixed type of inhibitor by both chemical and physical adsorption on the steel surface in terms of the Langmuir adsorption isotherm. All ionic liquids showed appreciable inhibition efficiency, and the relationship between chemical structure and inhibition activity was revealed. Surface analysis suggested that imidazolium ionic liquids could effectively inhibit the formation of corrosion products.

Keywords: carbon steel; corrosion inhibitor; imidazolium ionic liquid; synthesis

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