Short Communication

Investigation of C-Glycosidic Ketone as a Corrosion Inhibitor for Carbon Steel in 3.5% NaCl Saturated Ca(OH)₂ Solution

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In this study, a polyhydroxy C-glycosidic ketone (CGK) was synthesized under mild reaction conditions and its activity towards carbon steel in 3.5% NaCl saturated Ca(OH)₂ solution was investigated. Concentration and time dependence of the inhibition effectiveness was acquired by potentiodynamic polarization, electrochemical impedance spectroscopy and cyclic voltammetry. The inhibitor exhibited excellent chemical stability and inhibition efficiency in strong alkaline solution containing high concentration of chloride even after a long exposure time. Results indicated that the CGK acted as a cathodic inhibitor by both physical and chemical adsorption on the steel surface according to the Langmuir adsorption isotherm. The effect of inhibitor addition on the threshold chloride concentration was also assessed, and the CGK could delay corrosion initiation significantly. For further confirming the results obtained from electrochemical measurements, surface morphological observation and analysis were performed using scanning electron microscope, energy dispersive spectroscopy and X-ray diffraction.

Keywords: carbon steel; corrosion inhibitor; simulated concrete pore solution; polyhydroxy derivatives

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