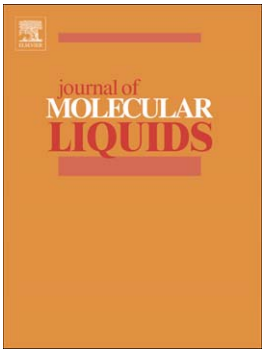

Effect of novel cytosine-L-ALANINE DERIVATIVE BASED CORROSION INHIBITOR ON STEEL SURFACE IN ACIDIC SOLUTION

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Effect of novel cytosine-L-alanine derivative based corrosion inhibitor on steel surface in acidic solution

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Abstract

A novel environmental-friend corrosion inhibitor named cytosine-L-alanine derivative (CLAD) was synthesized by using small biological molecules to protect the X80 steel surface in HCl solution. The weight loss measurement, polarization curves, electrochemical impedance spectroscopy (EIS) and SEM measurement were used to systematically investigate the inhibition performance of CLAD. The results showed that the corrosion inhibition efficiency of CLAD reached 91%, which was 78% higher than that of L-alanine. And it was found that the impeded electron transfer, reduced metal dissolution and inhibited corrosion progress of metal surface were derived from the compact and uniform protective film. The adsorption of CLAD obeyed the Langmuir adsorption isotherm, and adsorption behaviors included physical adsorption and chemical adsorption. Moreover, the quantum chemistry calculation parameters (E_{HOMO}, E_{LUMO} *and* ΔN) proved that the high corrosion inhibition efficiency of CLAD was associated with its strong adsorption as a barrier film on the steel surface. The results further demonstrated that the KI mixed CLAD was an alternative strategy to enhance the inhibition efficiency and reduce the cost.

Keywords:

Organic corrosion inhibitor; Cytosine-L-alanine derivative; EIS; SEM; Quantum chemical calculations;

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