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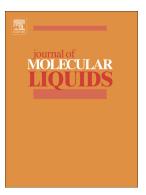
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ACCEPTED MANUSCRIPT

Gelatin: A Green Corrosion Inhibitor for Carbon Steel in Oil Well Acidizing Environment

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Abstract

Corrosion inhibition performance of an environmentally benign compound, gelatin on X60 steel

in 15% hydrochloric acid (HCl) at 25°C, which simulate oil well acidizing environment was

investigated in this study. The inhibition efficiency of the gelatin was examined using weight

loss, potentiodynamic polarization (PDP), linear polarization (LPR), and electrochemical

impedance spectroscopy (EIS) measurements techniques. Both the weight loss and the

electrochemical results showed that the gelatin exhibits high inhibition efficiency and the

inhibition efficiency increases with increasing gelatin concentration. The addition of low

concentration of potassium iodide improves the inhibition efficiency of gelatin considerably. The

ATR and SEM/EDX surface morphology analyses of the provide evidence of formation of

protective gelatin film on the metal surface. The gelatin molecules are predicted to adsorb on the

metal surface through an interaction between the nitrogen and oxygen atoms of gelatin and the

metal surface to form a metal/gelatin complex on the metal surface.

Keywords: Gelatin; Carbon Steel; Corrosion Inhibitors; Acidizing; Electrochemical Techniques.

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