Corrosion Inhibition Performance on Tubing Steel in Oil Wells Based on Schiff Base Surfactants

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The corrosion inhibition of mild steel at 25 °C in 1 M HCl with benzylidene-pyridine-2-yl-amine, (4-benzylidene)-pyridine-2-yl-amine, and (4-chloro-benzylidene)-pyridine-2-yl-amine were investigated in this study. Electrochemical and weight loss characterizations were employed to test the corrosion inhibition properties. The polarization curve indicates that the compounds used in this study are mixed type inhibitors. Moreover, the results suggest that the inhibition efficiency gradually increases with an increase in inhibitor concentration. Obvious differences in inhibition efficiencies were obtained by changing the functional group on the benzene ring. The corrosion behavior in the presence of inhibitors (10^{-2} M) was also investigated at various temperatures ranging from 25 to 43 °C. In addition, adsorption isotherms were calculated, using the Langmuir equation. Thermodynamic parameters and the associated activation energy of corrosion were determined. All results reveal that as currently used, Schiff base compounds show excellent corrosion inhibition properties.

Keywords: Schiff base surfactant; Corrosion; Deep oil well; Tubing steel; Surface tension

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