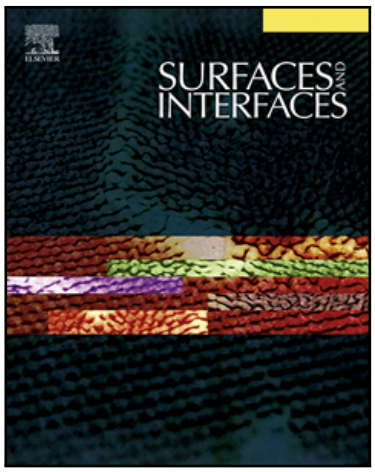

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Evaluation of chromotrope FB dye as corrosion inhibitor using electrochemical and theoretical studies for acid cleaning process of petroleum pipeline.

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Abstract

In this work a new and eco-friendly organic dye namely chromotrope FB was used as an inhibitor for acid corrosion of petroleum pipeline steel. The effect of concentration of chromotrope FB was determined by weight-loss measurement. The weight-loss of the metal is decreased with increasing chromotrope FB concentration. Electrochemical studies of impedance and polarization techniques were performed on steel in 1 N HCl acid medium and the values of charge transfer resistance was increased and corrosion current decreased as the inhibitor concentration increased. The highest resistance and lowest corrosion current were attained at 250 ppm. This can be considered as an optimum concentration. Apparently, chromotrope FB shows mixed inhibitor behavior in acid medium on pipeline steel. Temperature study confirms the adsorptions of the chromotrope FB on the steel was physisorption and obeys Langmuir isotherms. Some other activation parameters like entropy and enthalpy were calculated to find thermodynamic behavior of the chromotrope FB in the adsorption reaction. FTIR and SEM/EDX analysis were validated the surface protection effect of chromotrope FB in acidic condition. More so, hydrogen gas evolution method substantiated the least surface area was offered by the inhibitor than that of the blank medium due to the adsorption chromotrope. In addition, the