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Petroleum quaternary ammonium surfactants mixture synthesized from light naphtha as corrosion inhibitors for carbon steel in 1 m HCl

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Abstract: A quaternary ammonium cationic surfactants mixture was synthesized from light naphtha, petroleum fraction. The mixture was analyzed by Fourier transform infrared spectroscopy and UV/Visible spectroscopy and was evaluated as a corrosion inhibitor for carbon steel in 1 m HCl, by gravimetry, potentiodynamic polarization and electrochemical impedance spectroscopy. The results showed that inhibiting efficiency increased with inhibitor concentration and temperature, and was independent of pH (in the range of 0 – 4) and immersion time; its optimal value was up to 84% for 560 mg/l at 25 ° C. Experimental data showed that the cationic surfactants mixture acts as a mixed (anodic and cathodic) inhibitor and conformed to the Langmuir adsorption isotherm. Scanning electron microscopy images revealed the inhibiting capacity of the mixture against carbon steel acid corrosion.

Keywords : adsorption; carbon steel; cationic surfactants mixture; corrosion inhibition; surfactants synthesis.