

SUMMARY

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In the present study a series of quaternary ammonium salts were prepared through two steps. The first step was propoxylation of the fatty amine by propylene oxide to produce the oxylated tertiary amine. The second step was quaternization of tertiary amine by benzyl chloride. The structure of the synthesized products was confirmed using Elemental Analysis, FTIR, and $^1\text{H-NMR}$.

The prepared cationic surfactants were evaluated by studying their surface properties: particularly, the surface and interfacial tensions. The obtained result indicate that the surface tension decreases by increasing the concentration of surfactant and also decreases by increasing hydrophobic chain length at constant concentration. Also the results of measured interfacial tension indicate that increasing the hydrophobic chain length of prepared cationic surfactants, decrease the interfacial values.

The critical micelle concentration (CMC) values were determined using the surface tension method. The effect of alkyl chain length on the surface properties was studied. The obtained results indicate that the increasing of the alkyl chain length lead to decrease the CMC values of the prepared compound. This indicates that they have good surface characteristics.

The prepared cationic surfactants were evaluated as corrosion inhibitors by three different techniques

A- Weight loss technique.

It was found that the prepared compounds inhibit the corrosion process in 1M H₂SO₄ as corrosive medium at different concentrations (1X10⁻⁵, 5X10⁻⁵, 1X10⁻⁴, 5X10⁻⁴, 1X10⁻³ and 5X10⁻³). The data shows that the corrosion rate was decrease by increasing the concentration of prepared compounds indicating that these compounds act as efficient corrosion inhibitor in ambient and high temperatures. The thermodynamic parameters of adsorption process was studied using Langmuir equation it was found that ΔG^0 (free energy of adsorption) values are negative indicating that the adsorption process is spontaneous process .Also all the ΔH^0 (adsorption heat) values are negative values indicating that the adsorption process is exothermic process

B- Tafel polarization measurements.

Both anodic and cathodic polarization curves for carbon steel in H₂SO₄ at same concentrations used in weight loss technique were studied. It is clear that the presence of inhibitor causes a markedly decrease in the corrosion rate, i.e. shifts the anodic curves to more positive potentials and the cathodic curves to more negative potentials. This may be ascribed to adsorption of inhibitor over the corroded surface .It is clear that the presence of inhibitor causes a markedly decrease in the corrosion current and the efficiency $\eta\%$ increases. Inhibition efficiencies obtained from weight loss and electrochemical polarization curves are in good agreement.

C- Impedance measurements.

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Impedance measurements were studied for compounds (I, II).

It was found that the values of R_t and η % increase while, the values of C_{dl} decrease in the presence of inhibitors.

The synthesized compounds were tested for their antimicrobial activity for different strains of bacteria and fungi. It was found that these compounds have good antimicrobial activity.