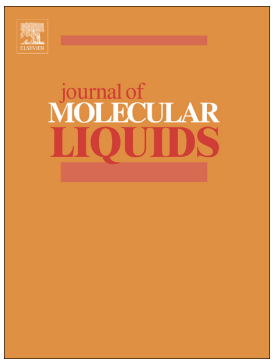

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Influence of different counterions on gemini surfactants with polyamine platform as corrosion inhibitors for stainless steel AISI 304 in 3M HCl

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Abstract

The corrosion inhibition efficiency of two cationic gemini surfactants with different counterions with polyamine platform on AISI 304 stainless steel in 3 M HCl was investigated by polarisation measurements and electrochemical impedance spectroscopy (EIS). The surface of the samples was characterised before and after the corrosion experiments using scanning electron microscopy (SEM) and confocal laser scanning microscopy (CLSM). The results showed that the effectiveness of corrosion inhibiton depends on counterion belongs to surfactant molecule. The dimeric surfactant with the iodine counterion out–performs its bromine counterpart with respect to providing corrosion inhibition of stainless steel, in 3M HCl. In the present study, the Langmuir adsorption isotherm was found to be suitable parameter for the correlating the experimental results with a possible mechanism of protection. In the case of two tested compounds the highest inhibition efficiency was found around the critical micelle concentration. Critical micelle concentration was determined using conductometric titration.

Highlights

- New surfactants with polyamine platform were synthesized.
- Critical Micelle Concentration was determined for two gemini surfactants with different counterion.
- Polarisation and EIS measurement were used for analysis.
- The surface of AISI 304 specimen was characterized using SEM and CLSM.

Keywords

Surfactants, Stainless steel, CMC, corrosion inhibitors