

Competitive Adsorption of Cationic Surfactants onto Different Solid Surfaces

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Corrosion is one of the most common, costly and widespread industrial problems in the oil and gas production industry. Surfactant addition is one of many ways to inhibit the corrosion of metals, especially on hard to reach surfaces such as the inside of a pipe through which fluid is flowing. Despite the popularity of surfactants as corrosion inhibitors, their actual behaviour inside a pipeline is not well understood¹. This work addresses some of the surfactant properties of corrosion inhibitors. The adsorption behaviour of corrosion inhibitors at the air-water interface is discussed as a function of their structure, temperature and salinity. The effect of surfactant structure, temperature and salinity on the adsorption behaviour of alkylbenzyltrimethylammonium chlorides on sand, stainless steel and mild steel particles using a depletion method has been investigated. Additionally, an interactive spreadsheet was developed to simulate the change in the adsorbed inhibitor amounts on different surfaces, with changes in production variables. Studies performed in the presence alkylbenzyltrimethylammonium chlorides and sand indicate that these inhibitors have a strong affinity for sand particularly at low temperatures and dilute inhibitor concentrations.

Reference:

[1] D.I. Horsup, J.C. Clark, B.P. Binks, P.D.I. Fletcher, and J.T. Hicks, "I Put It in, but Where Does It Go?" – the Fate of Corrosion Inhibitors in Multiphase Systems, Paper No. 07617, *NACE Corrosion/2007*, Nashville, USA, (2007).