Contribution ID: **964** Type: **Poster + 3 Minute Pitch**

Effect of select naphthenic acids on oil-water interfacial dynamics

Tuesday, 15 May 2018 16:52 (2 minutes)

Injection of a generic naphthenic acid blend to injection brine has been shown to increase oil recovery. The purpose of this work is to analyze the effect of several individual naphthenic acids on the oil-water interfacial dynamics. Acids were selected based on water solubility and structure; analysis of different structural characteristics of various acid groups was made to determine a possible connection of the interfacial response with respect to molecular structure. Oil-brine Interfacial visco-elasticity data were collected for the select acids using an AR-G2 rheometer with the double-wall ring geometry. High-field Nuclear Magnetic Resonance (NMR) and pH measurements were taken on the aqueous phase of the rheology experiments to quantify acid concentration. Low-field NMR droplet size distribution measurements were conducted on water-in-oil emulsions prepared with different acids. High-field NMR data show that added acids tended to partition into the oil phase or to the interface at the end of the five-day experiments. pH is measured for both the before and after instances and was found to correlate with NMR observations. Generally, acids lower the visco-elasticity compared to the un-acidified brine; acids with similar structures induce similar dynamic interfacial responses. High visco-elasticity values have been shown to increase connectivity of the oil phase in microfluidic devices in past experiment. Low-field NMR droplet size distribution measurements indicate that acids in bulk destabilize emulsions, while most individual acids examined show an increase in stability, compared to the low-salinity brine in which they are solubilized. Emulsion stability data also show a dependence on acid structure. Data show that even small concentrations of individual naphthenic acids affect the visco-elasticity and the stability of emulsions. Based on the fluid-fluid interactions examined, the effective core-flood acid blend contained several of the acids examined in this work.

References

Acceptance of Terms and Conditions

Click here to agree

Primary authors: Ms REILLY, Teresa (University of Wyoming); Prof. LEHMANN, Teresa (University of Wyoming); ALVARADO, Vladimir (University of Wyoming)

Presenter: Ms REILLY, Teresa (University of Wyoming)

Session Classification: Parallel 5-G

Track Classification: MS 1.17: Flow of Non-Newtonian and Complex Fluids Through Porous Media