Contribution ID: **352** Type: **Poster Presentation**

The Effect of Interfacial Elasticity of a Nanofluid/Surfactant system for EOR through a Visual Micromodel Study

Wednesday, 1 June 2022 14:50 (1h 10m)

Nanoparticles have proven to overcome several challenges above traditional chemicals used for EOR. Silicates compounds are the most abundant on earth, making silicon-based nanoparticles highly compatible with most of the reservoirs, environmentally friendly, and a cost-effective nanofluid option for EOR. Silicon-based nanofluids coupled with other chemicals such as surfactants and polymers can effectively recover extra amounts of oil compared to the chemicals with no nanoparticles. Silicon dioxide nanoparticles, on their own and combined, have shown a significant improvement in the characteristics required to improve the oil displacement such as ultra-low IFT levels, change in wettability, increase viscosity, and reduce the chemical adsorption into the surface. Despite the considerable benefits and the extensive proven in lab results for this technology, there are no infield trials to prove their performance. Some of the recovery mechanisms remain unclear and still unexplored. The interfacial rheological properties of silicon oxide nanoparticles have been mostly neglected. Herein as a first stage I aim to provide fundamental insight into the interfacial and bulk viscoelastic response of water/oil interface in the presence of silicon oxide nanoparticles utilizing dilatational rheology. Then salt will be added to the nanofluid to simulate reservoir water conditions, the nanoparticles will be coupled with a surfactant to improve the stability and maximize their oil recovery performance. Finally, I will conduct a series of visual micromodel resembling the network of pores and throats in a target sandstone rock. An advanced imaging system is built to record the flow events in micromodels. The developed technique can be readily utilized for the rapid screening for other mechanism occurring systems or suspended particles used for heavy oil recovery. The results single out the ability of silicon dioxide nanoparticles to alter the interfacial viscoelasticity and to quantify its effects displacing oil.

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Time Block Preference

Time Block C (18:00-21:00 CET)

Participation

In person

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