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Impact of Aqueous-phase Ions on Asphaltenic Crude Oil-Water Interfaces

Tuesday, 31 May 2022 16:30 (15 minutes)

Displacement of crude oil with brine is one of the most widely implemented methods of oil production. The process is governed by the competition of surface and viscous forces. The polar components of crude oil adsorb at the oil/water interfaces, developing viscoelastic films that affect emulsion stability and adhere to reservoir rock minerals, making them more oil-wet and hindering oil extraction. Despite the substantial research conducted in this area, the underlying mechanisms are still unclear.

We look into the formation of crude oil/water interfacial films and show that it is a complex process ruled by competition among distinct species of polar molecules. Varying the chemical composition of the aqueous phase and the concentration of polar species in the oil, we demonstrate the impact on adsorption kinetics and the film elasticity. This study highlights the relation between the interfacial rheology and the chemical composition of the developed films. Also, the role of different salts in determining the composition of the interfacial films and the potential to tune this composition by adjusting the aqueous phase chemistry will be presented. Thus, this study provides insight into the mechanism behind rock wettability and emulsion stability, which are key in enhancing the oil recovery from mixed-wet reservoirs.

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Time Block Preference

Time Block B (14:00-17:00 CET)

Participation

In person

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