

## ABSTRACT:

Low salinity water flooding is a novel technology for enhanced oil recovery (EOR). However, the possible mechanisms of this process are debatable. Wettability alteration by reduction of divalent cation concentrations could play a key role, since these species can bind oil molecules to the rock surface. We address the chemical specificity of the process, using Confocal Raman Imaging and the aspect of rock porosity, using a microfluidic channel. Clay deposition, oil filling and water flooding is done in the microfluidic channels to mimic EOR. Our results reveal that clay is strongly adsorptive to hydrocarbons and surface active molecules, which supports that clay is crucial for the low salinity effect. In addition, we show that fatty acids representing oil are only retained during high salinity water flooding. These preliminary results clearly support the wettability alteration mechanism and the efficiency of microfluidics combined with Raman to study the low salinity EOR.