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Polymer Enhanced CO_2-Foam Stability in Presence and Absence of Oil

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Foam flow in porous media and the effect of oil on foam performance in enhanced oil recovery, have been subject to extensive investigation for many years (Simjoo, M. 2013). There are many valuable works in the literature that studied the various aspects of foam dynamics at bubble scale, but not many have investigated and compared the foam stability results at bulk and bubble-scale (Osei-Bons, K. 2015). Therefore, this study conducts a wide-range of experiments at bulk and bubble-scale to investigate the foam stability of number of surfactants in conjunction with polymers in the absence and presence of oil. As the relationship between the physical characteristics of polymer thickened foam and its performance in porous media are still unclear this study concentrates on understanding of the interaction of polymer thickened foam with the rock. The oil displacement performance of CO_2-Foam was experimentally studied and compared with surfactant/polymer CO_2-Foam results. For the bulk foam stability experiments, foam was generated by injecting CO_2 into surfactant solution or surfactant/polymer solution in a chromatography column. The foam decay was recorded by camera as a function of time. For this study (in house) synthesized hydrophobic modified polyacrylamide was used as a polymer. For bubble scale, unconsolidated sand pack was used foam generation with and without the addition of polymers for added stability was performed. The results showed the significant impact of the type of the surfactant on foam stability. Besides, presence of polymer in the solution has significantly improved the apparent viscosity of the solution, which led to foam stability enhancement. This indicates that stronger foam was generated across the sand pack using combination of surfactant and polymer. Our results showed less stable foam in the presence of light oil and less adverse impact on foam stability as oil viscosity and density increased.

Biography:

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