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Effect of wettability alteration in low salt water injection modeling

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By the adsorption of polar compounds and/or the deposition of organic material, the wettability of originally water-wet reservoir rock can be altered. The degree of alteration is determined by the interaction of the oil constituents, the mineral surface, and the brine chemistry. Recently improving oil recovery by tuning wettability alteration is believed as a new recovery method. Various researchers has demonstrated that low salt water injection has significant impact on oil recovery. It has been shown, for instance, that additional oil can be produced from reservoir rock by managing the injection water. Large wettability sensitivity has been observed, indicating that the oil/water capillary pressure profiles play a major role during low saline water injection simulation. Although the exact physics on how this alteration occurs is still a research topic, however it has been reported that some of its effect can be captured by a relative permeability shift from an oil-wet system to a water-wet system. Modeling of low salt water injection mainly is based on the theory of wettability alteration, and is hence strongly dependent on the wettability of the reservoir. In this article combination of different wettabilities has been simulated and it is observed that the highest recoveries was from the cases were the reservoir initially was water-wet, and the lowest recoveries was from the cases were the reservoir initially was considered oil-wet. However for the cases where the reservoir initially was oil-wet, the effect of low salinity waterflooding was the largest.

Biography

Beigluo is professor at Sahand University, Iran. He has published more than 30 papers in reputed journals.

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