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MODELING OF LOW SALINITY WATERFLOODING THROUGH FRACTURED CORES

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In this work a methodology is presented for modeling a fractured porous media and to simulate oil recovery by low salinity water injection through a fractured core. To represent the porous matrix a continuum approach is employed whereas for the fractures a discrete one. Thus, the fractured core is modeled with mixed dimensions elements, representing the fractures as elements of n−1 dimensions immersed in a porous matrix of n dimensions by isolated internal boundaries, where the equations that govern the flow of fluids in the matrix and the fractures are coupled by means of jump and average equations, taking into account interactions between the fractures and the surrounding porous media. The derived flow model in fractured porous media is bi-phasic, based on the saturation and total velocity. The effect of the salinity reduction on the relative permeability and capillary pressure curves, one of most relevant mechanisms for oil recovery by low salinity waterflooding at laboratory scale, are introduced as parametric changes in standard models. The model is based on some previous models [1] [2]. Finally, the dynamics of the process is presented for some core flood study cases with different brine salinity.

References

[1] Coronado M., Diaz-Viera, M., Modeling fines migration and permeability loss caused by low salinity in porous media. Journal of Petroleum Science and Engineering, 150, 355-365, 2017.

[2] Martin, V., Jaffré, J. & Roberts, J. E. Modeling Fractures and Barriers as Interfaces for Flow in Porous Media. SIAM Journal on Scientific Computing 26(5): 1667-1691, 2005.

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