

2nd World Congress on Petrochemistry and Chemical Engineering

October 27-29, 2014 Embassy Suites Las Vegas, USA

Effect of miscibility condition for CO₂ flooding on gravity drainage in 2D vertical system

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 $In CO_2$ miscible flooding process, gravity drainage, viscous fingering and miscibility condition are the main factors on the efficiencies of CO₂ storage and oil recovery. These factors are strongly dependent upon CO₂ injection rate. That is, storage efficiency might be decreased when injection rate is too high or too low. In this study, the improved strategy for CO₂ storage and oil recovery process was proposed. This was investigated in two dimensional vertical sandstone slab, where unstable gravity drainage phenomena can be formed. A series of experiments at various injection rates for immiscible and near-miscible conditions were performed. From the experimental results, it indicated that injection rate was found to be a sensitive factor to storage efficiency at different miscibility conditions in vertical system. The results also revealed that oil recovery increases considerably once miscibility is reached. However, in the case of low injection rate, miscibility condition is achieved long time after production open. Also, the miscibility condition besides injection rate is significantly important on oil recovery as well as CO₂ storage efficiencies, especially in thick reservoir.

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