A SIMULATION STUDY OF CO2 FLOODING FOR EOR AND SEQUESTRATION IN BOTTOM WATER-DRIVEN RESERVOIR

Eshragh Ghoodjani\textsuperscript{1*}, Seyed Hamed Bolouri\textsuperscript{2}

\textsuperscript{1}Sharif University of Technology, Tehran, Iran
\textsuperscript{2}Shahid Bahonar University, Kerman, Iran

Abstract

CO2 flooding has been recognized widely as one of the most effective enhanced oil recovery (EOR) technologies for reducing greenhouse emissions while increasing the ultimate recovery of oil reservoirs. Because of the wide variety of parameters that can influence, the outcome of CO2 storage projects reservoir simulation has gained wide popularity. In this study, a fully compositional reservoir simulation model was used to simulate various operational conditions, reservoir properties and fluid composition, and their effects on the amount of CO2 stored and oil recovered. The results can be used for selection of best reservoir candidates for carbon storage and optimization of operational parameters in CO2-EOR and sequestration. The results show as injection pressure approaches oil minimum miscibility pressure, both CO2 sequestered and oil recovery factor approaches to their maximum value. Also, injection of CO2 in lower layers of reservoir (or in aquifer) delays breakthrough time and maximizes CO2 solubility in water and storage capacity. Simulation results show as pore size distribution index decreases, both oil recovery factor and CO2 storage capacity decreases. Early implementation of CO2 flooding maximizes CO2 sequestration and leads to lower recovery than CO2 flooding of water flooded reservoir.

Key words: bottom water reservoir, CO2 sequestration, enhanced oil recovery (EOR), simulation, storage

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* Author to whom all correspondence should be addressed: e-mail: e.ghoodjani@gmail.com; Phone: +989132001208