

## Experimental and Graphical Investigation on Oil Recovery by Buckley-Leveret Theory

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**Abstract :** Recently increasing oil production from petroleum reservoirs is one of the most important issues in the global energy sector. So, in this paper, the recovery of oil by the waterflooding technique from petroleum reservoir are considered. To investigate the aforementioned phenomena, the relative permeability of two immiscible fluids in sand is measured in the laboratory based on the steady-state method. Two sorts of oils, kerosene and heavy oil, and water are pumped simultaneously into a vertical sand column with different pumping ratio. From the change in fractional discharge measured at the outlet, a method for determining the relative permeability is developed focusing on the displacement mechanism in sand. Then, displacement mechanism of two immiscible fluids in the sand is investigated under the Buckley-Leveret frontal displacement theory and laboratory experiment. Two sorts of experiments, one is the displacement of pore water by oil, the other is the displacement of pore oil by water, are carried out. It is revealed that the relative permeability curves display tolerably different shape owing to the properties of oils, and produce different amount of residual oils and irreducible water saturation.

**Keywords :** petroleum reservoir engineering, relative permeability, two-phase flow, immiscible displacement in porous media, steady-state method, waterflooding

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