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## Relative permeability prediction considering complex pore geometry and wetting characteristics in carbonate reservoirs

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The measurement of  $k_r$  (relative permeability) in carbonate rock is difficult and has great uncertainties due to the complex pore system such as dissolved pore, cavity and fractures. Several equations for the calculation of  $k_r$  are developed, but they assume single pore system that it cannot be applied directly to the complex pore system. Furthermore, the wetting characteristics have to be considered because most carbonate rocks tend to oil-wet. This study presents the method of  $k_r$  estimation with respect to the heterogeneous pore network. Firstly, the wetting characteristics are determined by the measurement of contact angle. For each core, pore size distribution,  $P_c$  (capillary pressure) and residual oil saturation are measured. From the estimated contact angle, all the samples are determined as an oil-wet. It is observed that  $P_c$  has different curve according to the macro and micro-pore, respectively. Then,  $k_r$  is generated from  $P_c$  by using Brook-Corey equation for each pore size. As a result, for the macro-pore, the water has higher  $k_r$  than oil that it can be displaced easily by only the small reduction of oil saturation. In contract, the micro-pore has general shape of  $k_r$  curve. Consequently, it is found that oil flows differently through macro and micro-pore according to the oil saturation.

### Biography

Sun-lee Han received her BS from Chonbuk National University. She is MS student in Petroleum Engineering Lab. of Chonbuk National University. She is studying about fluid flow in complex pore network, CO<sub>2</sub> EOR and reservoir simulation.

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