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Effect of Damkohler number on miscible viscous fingering involving viscosity decrease due to chemical reaction YUSUKE KONDO, YUICHIRO NAGATSU, YOSHIHITO KATO, YUTAKA TADA, Nagoya Institute of Technology — When a reactive and miscible less-viscous liquid displaces a more-viscous liquid in a Hele-Shaw cell, reactive miscible viscous fingering takes place. We find that a chemical reaction between a polymer solution and a solution including metal ions decreases the viscosity of the polymer solution and that the rate of the decrease in the viscosity (that is the chemical reaction rate) can be changed by variation in the concentrations of the metal ions. By using the liquids and the reaction, we have succeeded in experimentally showing the effect of Damkohler number on miscible viscous fingering pattern involving the viscosity decrease due to chemical reaction in a radial Hele-Shaw cell. Results show that up to threshold value of Da , the area occupied by the fingering pattern near the injection hole is increased with Da , whereas over the threshold value of Da , the area is decreased with Da . A physical model to explain these experimental results is proposed.

Yusuke Kondo
Nagoya Institute of Technology

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