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Miscible viscous fingering involving viscosity changes of the displacing fluid by chemical reactions YUICHIRO NAGATSU, KENJI MATSUDA, CHIKA IGUCHI, YOSHIHITO KATO, YUTAKA TADA, Nagoya Institute of Technology — We experimentally studied the effects of changes in the viscosity of the displaced more-viscous liquid by instantaneous reactions on miscible viscous fingering pattern (Nagatsu et al., J. Fluid Mech., 571, 475 (2007)). In the present study, experiments have been performed on the miscible viscous fingering involving changes in the viscosity of the displacing less-viscous liquid by instantaneous reactions in a Hele-Shaw cell. We have found that the shielding effect is suppressed and the fingers are widened when the viscosity of the displacing less-viscous liquid is increased. In contrast, the shielding effect is enhanced and the fingers are narrowed when the viscosity is decreased. These results are essentially same as those obtained by the above-mentioned previous study. This shows that the effects of changes in the viscosity due to the instantaneous reactions are independent of whether the changes occurs in the displaced more-viscous liquid or in the displacing less-viscous liquid. A reason is proposed to explain these results.

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