

## Salad dressing tells us differentiation of the Earth: laboratory experiments on differentiation process of multiphase fluids

# Ichiro Kumagai[1], Takatoshi Yanagisawa[2]

[1] Inst. Geotherm. Sci., Kyoto Univ., [2] Earth and Planetary Sci., Univ. of Tokyo

<http://www.vgs.kyoto-u.ac.jp>

After shaking a bottle of salad dressing, the oil separates from the other ingredients such as water, soy sauce and sometimes sesames. This is analogous to differentiation process of the magma ocean that consists of multiphase fluids and solid particles. In order to identify the main parameters that control the rate of differentiation and the mode of separation, we have conducted laboratory fluid experiments on differentiation process of the multiphase fluids. We also discuss influences on stirring of multiphase fluids, because the rate of differentiation in the Earth's interior depends on the competition between processes tending to differentiate components and other tending to homogenize everything such as mantle convection.

After shaking a bottle of salad dressing, the oil separates from the other ingredients such as water, soy sauce and sometimes sesames. This is analogous to differentiation process of the magma ocean that consists of multiphase fluids and solid particles. In order to identify the main parameters that control the rate of differentiation and the mode of separation, we have conducted laboratory fluid experiments on differentiation process of the multiphase fluids (silicone oil, glycerol and water mixture, perfluorocarbon) with varying density, viscosity and volume fraction. We also discuss influences on stirring of multiphase fluids, because the rate of differentiation in the Earth's interior depends on the competition between processes tending to differentiate components and other tending to homogenize everything such as mantle convection. This connects with production and removal of geochemical heterogeneities in the Earth's mantle.