

11. Moving an Ionized Liquid (Videos: 21 and 22)

<Explanation>

When a solution of gadolinium chloride is added to an ionized liquid, the substances do not mix. The gadolinium chloride solution moves above the ionized liquid, which has a greater density, and they are separated in two phases. If a downward magnetic force is applied at that time, the paramagnetic gadolinium chloride solution is attracted downwards by this magnetic force and pushes the ionized liquid aside as it moves. As a result, the ionized liquid moves above the gadolinium chloride solution.

In this experiment, 0.80 mL of ionized liquid of 1-ethyl-3-methylimidazolium trifluoromethanesulfonate (EMI-TMS) and the same amount of gadolinium chloride solution (0.60 mol/kg) were put in a 1cm-sided cubic vessel and the magnetic flux density was increased from 0 T to 10 T (**Video 21**), then decreased from 10 T to 0 T (**Video 22**). These videos show images taken at intervals of one minute. In both cases, the videos show both liquids always keeping a clear separation while moving.

<Place of execution>

National Institute of Advanced Industrial Science and Technology, Kansai

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