

1. Experiment Title

Study on Soret effect (thermal diffusion process) for the mixed solution by the in-situ observation technique facilitated at SCOF

2. Principal Investigator

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3. Abstract

This research focuses on the comprehensive understanding of the Soret physics, which will be the first verification result to link the Soret physics and thermodynamics.

"Soret effect" is explained as a thermodynamic effect, where concentration gradient occurs by temperature gradient in a liquid mixture. Historically, there has been several approaches for the Soret effect, however precise experiment data were not obtained because of the technical difficulty, such as "convection control" on the ground. We will use ideal micro-G condition in JEM to suppress the convection. In addition to this, the in-situ observation technique using SCOF/FACET Mach-Zehnder interferometer can be applied to precise measurements of the Soret coefficients. We are considering following objectives for the experiments;

- Investigation of Soret physics under various conditions (steady/non-steady/ transient conditions) to consider the universal relation between the Soret physics and thermodynamic expressions.

- Application of knowledge on Soret Physics to prediction of crystal growth.

- Discussion for convection effect by the comparison between micro-G and 1G data.

The research results will be applied to understanding of the mass transport phenomena in planets and the ocean, as well as the refinement process of the crude oil, etc.