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# 熱エネルギー貯蔵開発に向けたきぼう実験棟での非平衡溶融合金の熱物性計測

# Thermophysical Properties Measurements of Non-Equilibrium Molten Alloys Using ELF in ISS for Developing Thermal Energy Storage Materials

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Despite the drastic increase of the social importance for installing renewable energy, there is still a difficulty to increase the proportion of corresponding storage capacity for generated electric energy[1)]. Thermal storage materials allow the storage energy, otherwise lost, in form of heat, ideally exhaust heat that is then, e.g., recovered by making industrial processes significantly more sufficient and environmentally friendly or used for the generation of electrical energy[2)]. To introduce the technology, thermal storage materials[3,4)] are required that operate at high-temperature and provide a high heat exchange rate. The metallic phase change materials (PCM) are appropriate candidates due to their high energy density at the melting temperature and high thermal conductivity, both properties needed to achieve high energy exchange efficiency[3)].

Among metallic PCMs, miscible gap alloys (MGAs), which are self-compacting PCMs, have attracted much attention[3)]. The alloys are processed by quenching a homogeneous liquid in a metastable miscibility gap. The alloy can be processed by quenching a homogeneous liquid in a metastable miscibility gap. The two separated liquid phases solidify by equilibrium invariant reactions at low temperatures and can be reversibly used for heat storage. An understanding of solidification and thermophysical properties from supercooled liquids is essential for designing such microstructures and tailoring their properties.

To find the manner to control the structure and the capacities of the material of MGAs as thermal storage material, we have launched the project to measure the thermophysical properties of liquid alloy systems having the miscibility gap. In the we will present the preliminary experiments on the ground for the microgravity experiments.

## References

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