

||||| 特集：微小重力環境を利用した磁性材料の創製 |||||  
(解説)

## 微小重力環境下における $\text{TbFe}_2$ 超磁歪材料の作製

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### **Preparation of $\text{TbFe}_2$ Giant Magnetostrictive Alloys under Microgravity Conditions**

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#### **Abstract**

We conducted experiments for the solidification of a giant magnetostrictive  $\text{TbFe}_2$  alloys under a micro gravity condition using the JAMIC facility, Hokkaido, Japan. The kinetic process of the solidification of an intermetallic compound  $\text{TbFe}_2$  (C15 Laves phase) formed through a peritectic transformation was investigated. Attention was made with respect to dropping condition of a drop apparatus, and to melting and cooling manners of the alloy sample using a Cu-chill. The relation between the experimental conditions and microstructure of the samples was investigated. In the experiments from 1999 to 2001, we improved the dropping system to obtain a concrete picture of the kinetic process of solidification during under a microgravity. In addition, we measured temperature profiles of a sample during solidification process using thermocouples in order to search for an optimized experimental conditions such as drop timing and a manner of touching of the chill with a sample to cooling down in order to start of solidification accompanied by a peritectic transformation. In the microgravity condition, we were able to obtain microstructures containing high amounts of the  $\text{TbFe}_2$  phase compared with those obtained under the normal condition on the ground.