

A CONSORTIUM STUDY FOR HAYABUSA RETURNED SAMPLES: PHOSPHATE-BEARING PARTICLES.

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Introduction: Hayabusa returned samples have been shown as Itokawa origin by the preliminary examinations [e.g. 1-6]. Furthermore, international AO study has begun last year, and a formation process of asteroid Itokawa is becoming revealed.

Hayabusa returned samples are described initially by JAXA Extraterrestrial Sample Curation Team (ESCuTe), and a sample catalogue is prepared based on the data of initial description [e.g. 7]. The samples are classified into four categories so far. A number of samples of each category to be distributed for international AO are decided based on the sample catalogue. But it is difficult to distribute such samples with rare characteristics in composition, mineralogy, structure, or size, although those samples should maintain scientifically important information.

Therefore, in JAXA, ESCuTe started to organize the consortium studies in order to obtain the scientific information as many as possible from these samples [8,9,10]. In this paper, we report the research plan for the particles which contain phosphate minerals.

Particles including phosphates: Six particles in which phosphate mineral might be included were found by our initial description, so far. Although the particle containing a phosphate mineral is discovered in the initial analysis, the size of these phosphate minerals is too small (<5 μm) to analyze. In order to study the history recorded in the phosphates, we propose the investigation of U-Pb systematics using nano-SIMS. We will perform the U-Pb dating of the phosphates as many as possible and aim to understand the thermal history of Itokawa parent body such as crystallization age and the catastrophic collision if recorded.

Because Sm-149 and Gd-157 have large neutron capture reaction cross sections in REE, isotopic compositions change during a period exposed to cosmic rays. Therefore, we plan to investigate the cosmic ray exposure age of Itokawa samples by analyzing isotopic composition of Sm and Gd in phosphate minerals.

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