

PROGRESSES OF CONSORTIUM STUDIES FOR HAYABUSA RETURNED SAMPLES: TROILITE AND PHOSPHATE-BEARING PARTICLES.

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Introduction: As for the consortium studies started in 2013, it is pushed forward by the Extraterrestrial Sample Curation Team (ESCuTe) of JAXA leadership [e.g., 1-9]. The particles used for the consortium studies are very interesting scientifically, but is not distributed into international AO because they have rare characteristics in composition, mineralogy, structure, or size. In this paper, we report the progresses of these consortium studies of particle mainly consisting of troilite and particles including phosphates.

Particles mainly consisting of troilite: The particle, RA-QD02-0245, consist mainly of FeS (~40 μm size). According to initial description by SEM-EDS, olivine and pyroxene of around 10 μm size appeared embedded in main phase of FeS. X-ray CT method was applied to this particle. As a result, the olivine and the pyroxene were not embedded in FeS, but were small pieces attached on FeS surface. Next step, the detailed observation of the particle surface by FESEM was done. By this observation, the effect of the space weathering was not confirmed, but the shock texture was observed on the surface.

As for this particle, analysis is going to be carried out as follows; (1) TEM observation of two samples sliced from the edge of the particle by FIB observed for shock texture, and (3) applying of INAA to a remaining particle for chemical composition.

Particles including phosphates: Some particles in which phosphate mineral might be included were found by our initial description. In order to study the history recorded in the phosphates, we propose the investigation of U-Pb systematics using 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.

X-ray CT method was applied to two particles, RB-CV-0025 and RB-QD04-0088. As a result of this observation, the three-dimensional geometry of the phosphate minerals in these particles was confirmed. Now, particles were polished down to make the phosphates appear on the surface. These phosphates will be analyzed for U-Pb isotopes by SIMS.

References: [1] Karouji et al. (2013) *76th Annual Meeting of the Meteoritical Society*, #5148, [2] Uesugi et al. (2013) *76th Annual Meeting of the Meteoritical Society*, #5146, [3] Yada et al. (2013) *76th Annual Meeting of the Meteoritical Society*, #5150, [4] Karouji et al. (2013) *Hayabusa Symposium 2013*, #P202, [5] Karouji et al. (2013) *Hayabusa Symposium 2013*, #P203, [6] Uesugi et al. (2013) *Hayabusa Symposium 2013*, #P204, [7] Yada et al. (2013) *Hayabusa Symposium 2013*, #P201, [8] Karouji et al. (2014) *77th Annual Meeting of the Meteoritical Society*, #5240. [9] Uesugi et al. (2014) *77th Annual Meeting of the Meteoritical Society*, #5226.