

## A CONSORTIUM STUDY OF AN AGGLUTINATE GRAIN FOUND IN HAYABUSA RETURNED SAMPLES.

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**Introduction:** Hayabusa spacecraft brought back regolith particles of S-type asteroid 25143 Itokawa to the Earth. The preliminary examinations (PEs) and international announcement of opportunity (AOs) showed that Itokawa particles are consistent with LL chondrites [e.g., 1]. Team of Extraterrestrial Sample Curation Center (ESCuC) of JAXA has organized the consortium studies for the returned samples, which show rare features in composition, mineralogy and structures, or size, in order to maximize scientific gain [2]. Here, we introduce one of the consortium particles and a tentative research plan.

**RB-CV-0128:** The size of this particle is approximately 50  $\mu\text{m}$ . Initial description by SEM-EDS shows that most part of this grain has rounded molten shape with abundant vesicles and submicron-sized Fe and FeS grains. Fractured mineral grains are attached to the molten surfaces. The features are consistent with agglutinates of lunar soils, which are formed by melting and mixing by micro-meteorite bombardment into the lunar regolith [3]. RB-CV-0128 is the only agglutinate-like grain found in more than 500 Itokawa grains described so far, despite of its absence in regolith breccias of ordinary chondrites [4]. In order to discuss the existence of the agglutinate in Itokawa samples, it is necessary to identify its origin. Possible origins we consider are Itokawa, Itokawa's parent body, or another celestial body.

**Research plan:** (1) Morphological and mineralogical features will be obtained using X-ray CT, XRD, SEM, and TEM/STEM. (2) Comparison between oxygen isotope ratio of RB-CV-0128 and those of Itokawa regolith particles and LL chondrites [5] can examine whether RB-CV-0128 come from another celestial body or not, using SIMS. In the later case, (3) we will calculate solar flare track density by observation of TEM/STEM, which can estimate duration of solar-wind exposure, in order to determine whatever the origin is Itokawa or Itokawa's parent body.

The research plan is tentative and we welcome research plan proposal from anyone interesting.

**References:** [1] Nakamura et al. (2011) *Science* 333: 1113-1116. [2] Yada et al. (2013) *LPS XLIV*, #1948. [3] Papike. et al. 1981. [4] Noble. et al. 2011. *Meteoritics & Planetary Science* 32:A74. [5] Yurimoto et al. (2011) *Science* 333: 1116-1119. [6] Nagao. et. al. 2011. *Science* 333:1128-1131.