

**A nature of particles in the Hayabusa sample catcher and contamination controls for Hayabusa 2 sample containers.**

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**Introduction:** Hayabusa had returned samples from the surface of S-type near earth asteroid Itokawa [1]. From its sample catcher, JAXA's Extraterrestrial Sample Curation Team (ESCuTe) has recovered more than 400 Itokawa particles [2]. In a part of the sample catcher, a cover of the catcher room B is only one which can be observed by SEM-EDS directly. From results of observation of this part, we could understand a nature of particles inside the catcher.

**Methods:** The sample catcher of Hayabusa is mainly composed of room A and B and a rotational cylinder. Samples from the surface of Itokawa should have gone through the rotational cylinder to be captured into room A and B at the time of the second and the first touchdown sampling on Itokawa, respectively. We firstly handpicked particles one by one from the cover of the catcher room B and described them with FE-SEM/EDS. In order to increase the efficiency of the description, we developed a special SEM holder to observe the room B's cover directly by the FE-SEM/EDS. So far, we have described all particles larger than 15  $\mu\text{m}$  on almost a third of area of the room B's cover.

**Results:** The total number of the handpicked particles from the room B's cover is 79. 39 of them are Itokawa particles, 27 are carbon-rich ones, and 13 are artificial ones. On the other hand, a total number of particles described on the room B's cover is 651, including crashed and/or implanted ones on its surface. 173 of them are Itokawa particles, 51 of them are carbon-rich ones, 414 of them are artificial ones and 13 of them are unknown origin, such as ones only composed of NaCl or Ca-phosphate.

**Contaminations in the Hayabusa's sample catcher and revision for that of Hayabusa 2:** The carbon-rich particles found in the Hayabusa sample catcher have been studied by [3], which indicated that they should be terrestrial contamination. Excluding ones of unknown origin, 30% of all described particles on the room B's cover are Itokawa origin, and rest of them are terrestrial contaminations. Around half of the terrestrial contaminations are aluminum particles, which should be originated from materials of the sample catcher, which is made of aluminum alloy A6061 and coated by pure aluminum on its surface. For the Hayabusa 2 mission [4], which is planning to be launched in 2014, no aluminum coating has been done on the surface of its sample catcher in order to decrease these contaminations. Because a target body of Hayabusa 2 is C-type asteroid 1999JU3, carbon-rich terrestrial contaminations like those found in the Hayabusa's sample catcher is problematic. In order to improve cleanliness of the sample catcher of Hayabusa 2, the sample catcher are cleaned in highly purified 2-propanol and methanol/dichloromethane by an ultrasonic cleaner of 38 kHz frequency, which has been checked by a series of test analyses.

**References:** [1] Fujimura A. et al. 2011. Abstract #1829. 42nd Lunar & Planetary Science Conference. [2] Yada T. et al. 2014. Abstract #1759. 45th Lunar & Planetary Science Conference. [3] Uesugi M. et al. 2014. Earth Planet. Space., submitted. [4] Yoshikawa M. et al. 2012. Abstract #6188. Asteroids, Comets, Meteors 2012.