Japan Geoscience Union Meeting 2014
(28 April - 02 May 2014 at Pacifico YOKOHAMA, Kanagawa, Japan)

U06-15 Room:503 Time:April 28 15:15-15:30

Status report of curation of Hayabusa-returned samples

YADA, Toru[1*] ; ABE, Masanao[1] ; UESUGI, Masayuki[1] ; KAROUJI, Yuzuru[1] ; ISHIBASHI, Yukihiro[1] ; OKADA, Tatsuaki[1] ; SATAKE, Wataru[1] ; FUJIMOTO, Masaki[1]

[1]Japan Aerospace Exploration Agency

Hayabusa spacecraft returned samples from S-type Near-Earth Asteroid (NEA) Itokawa in June 2010. After the return, Extraterrestrial Sample Curation Team (ESCuTe) of JAXA have recovered particles from a sample catcher of Hayabusa, and more than 400 particles initially described have been presented in public (Yada et al., 2014a). In this presentation, we review the recovery and initial description of Hayabusa-returned samples and mention their future schedule.

A sample container had been extracted from the reentry capsule of Hayabusa and cleaned in cleanrooms of the Extraterrestrial Sample Curation Center (ESCuC) of JAXA. It was introduced into a clean chamber No.1 and opened in vacuo, and then a sample catcher, which enclosed samples captured on the surface of asteroid Itokawa, was extracted to be transferred to a clean chamber No.2 which is designed to handle Hayabusa-returned samples in highly purified nitrogen condition. The sample catcher is mainly composed of a rotational cylinder through which captured samples had been transferred, a room A in which samples obtained by the second touchdown on Itokawa and a room B in which captured those of the first one. At first, we had prepared quartz glass disks of the same size with covers of the room A and B, on which particles inside each room were fallen by tapping. The particles on the quartz disks have been picked up one by one with a specially designed electrostatically-controlled micromanipulator to be placed onto a SEM holder which can seal the samples in nitrogen condition and initially described by SEM-EDS. Then they sent back to the clean chamber No.2 to be placed onto gridded quartz glass slides to be given their ID and preserved. In fiscal year of 2013, we started to describe particles on a cover of the room B with SEM-EDS directly, utilizing a SEM holder specially designed for the cover of the catcher (Yada T. et al., 2014b).

The initial description method using the quartz glass disks has disadvantages in inefficiency and risk of particles transportation one by one with the micromanipulator. In order to resolve these disadvantages, we have developed metal disks which particles can be fallen on by tapping and can be set to the SEM holder designed for the covered of the catcher in fiscal year of 2013. We are planning to start sample recovery by the metal disks in fiscal year of 2014, and going to confirm vast majority of particles inside the catcher for more than two years (Yada T. et al., 2014a).

The ESCuTe of JAXA started the international AO for Hayabusa-returned samples in the beginning of 2012. In the international AO, worldwide researchers can apply their proposals and the committee composed manly of top scientists outside JAXA reviews the proposals to determine which proposal the precious samples should be distributed. The AO have been published approximately annually, and the third AO will be published in the beginning of fiscal year 2014. The research results of the AOs are presented in the international symposium held by JAXA, named as ”Hayabusa 2013: Symposium of Solar System Materials”, and its proceedings will be published in the international journal.

Particles having rare features have not been provided to the international AOs, but to consortium studies led by ESCuTe of JAXA until 2013. So far, four consortia, including the maximum-sized particle, a NaCl-bearing one, an iron sulfide one, and ones containing phosphates Uesugi et al., 2013; Yada et al., 2013; Karouji et al., 2013). Particles having other rare features will be provided to consortium studies in future.

References:

Abe M. et al. (2011) LPS XLII, Abstract #1638.
Karouji Y. et al. (2013) 76th Ann. Meteorit. Soc. Meeting, Abstract #5148.
Uesugi M. et al. (2013) 76th Ann. Meteorit. Soc. Meeting, Abstract #5186.
Yada T. et al. (2013) 76th Ann. Meteorit. Soc. Meeting, Abstract #5150.
Yada T. et al. (2014a) LPS XLV, Abstract #1759.
Yada T. et al. (2014b) MAPS, in press.

Keywords: Hayabusa, asteroid, curation, sample return