

**CURRENT STATUS AND FUTURE PROSPECTS OF JAXA'S ASTROMATERIALS SCIENCE RESEARCH GROUP.** M. Abe<sup>1,2</sup>, T. Okada<sup>1</sup>, T. Yada<sup>1</sup>, M. Uesugi<sup>1</sup>, Y. Karouji<sup>1</sup>, A. Nakato<sup>1</sup>, M. Hashiguchi<sup>1</sup>, T. Matsumoto<sup>1</sup>, M. Nishimura<sup>1</sup>, K. Kumagai<sup>1</sup>, S. Matsui<sup>1</sup>, Y. Nakauchi<sup>2</sup>, and H. Yurimoto<sup>3</sup>, <sup>1</sup>Japan Aerospace Exploration Agency, <sup>2</sup>SOKENDAI, <sup>3</sup>Hokkaido University (abe@planeta.sci.isas.jaxa.jp).

**Introduction:** We report the activity and current status of JAXA's Astromaterials Science Research Group (ASRG). JAXA curation facility of Extraterrestrial Sample Curation Center (ESCuC) was completed in 2008 for Hayabusa return sample acceptance. It's conceptual examination was started in 2005, and the specification was decided in 2007 by advisory committee of the Curation Facility [1].

**Special feature of JAXA curation facility:** The feature of JAXA curation facility is the ability to be able to observe, and take out and keep a precious return sample scientifically, without being exposed to the atmosphere. Thereby, for example, noble-gas analysis and space weathering observation were enabled while they are difficult in the meteorite research due to the influence of terrestrial contamination. Moreover, in this facility the handling of the 10-micrometer sized particle is also possible using electrostatically controlled micromanipulation system installed in clean chamber under N<sub>2</sub> atmosphere. The curation facility in which handling of such small samples without exposing to the atmosphere is available is the only one in the world [1].

**Initial description of Hayabusa sample:** About 500 particles of Hayabusa sample of 10 to 300-micrometer size are collected until now. Optical and SEM/EDS observations have been carried out in almost all those particles, and these Hayabusa samples information are catalogued. Statistical discussion in the initial description was executed using the mineral composition of the 1 to 40-micrometer sized particles scratched by Teflon spatula. Using these information, it is judged that recovered samples were returned from asteroid Itokawa [1,2].

**Detailed analyses of Hayabusa sample:** In the preliminary examination phase started about six months after Hayabusa return, detailed analyses by XCT/XRD, TEM, EPMA, SIMS, FTIR, NAA, noble-gas-MS, ToF-SIMS, etc were conducted [2]. In these examinations, they are resolved the relationship between S type asteroid and ordinary chondrite, the figure of pre-rubble-pile body, and the occurrence of the space weathering phenomenon. After the sample distribution to NASA following the preliminary examination, international AO analyses have been started and offer of the analysis opportunity to the global researchers has been performed from 2012.

In the international AO research, age information other than surface exposure ages, such as an Ar-Ar

isotope age, is being extracted [3], and the investigations of the formation history of small bodies are progressing. Furthermore, in the curation facility, consortium researches on the rare particles which are not distributed for the international AO are also advanced, and the effort to obtain the maximum scientific result about a precious sample is made.

**Future plan of curation facility:** There is still recovery of the Hayabusa return sample on the way, and it is expected that more than 500 particles are remaining into the sample catcher. Therefore, at least two years are needed to clarify the total amount of the Hayabusa return samples. We are planning to carry out the distribution for the international AO research with succeeding renewal of the sample catalog.

**Preparation plan for Hayabusa 2 return sample receiving:** We have started examination of receiving facility of Hayabusa 2 return sample. We are going to launch the specification examination committee of the curation facility for Hayabusa 2 with the preliminary examination team of Hayabusa 2 project. Since Hayabusa 2 is a sample return mission from C type asteroid, it is necessary to ensure recovery of the volatile matter from the samples containing organic matter and water. Moreover, since recovery of the mm-sized particles which was not able to be performed by Hayabusa is expected, the technical development (for example sample cutting) of the handling method for the large particles is required.

In Hayabusa 2, more attention is paid to contamination control than in Hayabusa mission. Final cleaning of the sample catcher was executed in the curation facility and its cleaning level is known. Moreover, the contaminant has been monitored with contamination coupon during the construction of the sampling devices.

**Organization of Astromaterials Science Research group:** JAXA organized Astromaterials Science Research Group as a new group in last year. In this group, we collect the knowledge for planetary materials, based on non-destructive and uncontaminated precious description. We not only allocate the samples for researchers but also put emphasis on studies by ourselves to maximize the scientific outcomes.

**References:** [1] Yada et al. (2014) *Meteorit. Planet. Sci.*, 49, 135–153. [2] Nakamura et al. (2011) *Science*, 333, 1113–1116. [3] Park et al. (2015) *Meteorit. Planet. Sci.*, 50, 2087-2098.