CURRENT STATUS OF HAYABUSA2 RETURNED SAMPLES CURATION FACILITY

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History of JAXA curation facility: Astromaterials Science Research Group (ASRG), established in last year, is continuing curatorial work for Hayabusa returned samples and developing the curation facility for Hayabusa2 returned samples. JAXA curation facility of Extraterrestrial Sample Curation Center (ESCuC) was completed in 2008 for Hayabusa returned samples acceptance. It's conceptual examination was started in 2005, and the specification was decided in 2007 by advisory committee of the Curation Facility [1]. After receiving the Hayabusa returned samples and curatorial work for them, we are going to research using these samples, such as international announcement of opportunity.

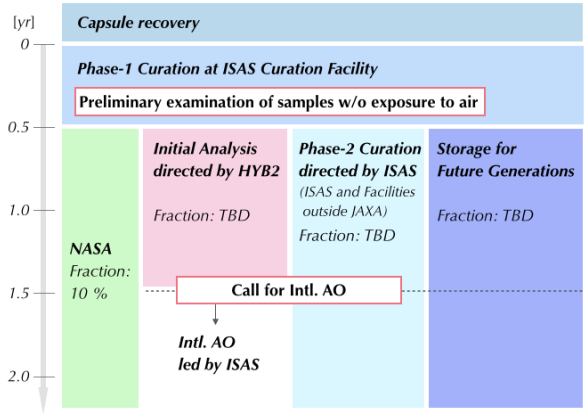
Hayabusa2 mission: Hayabusa2 spacecraft will bring back surface samples of a near-Earth C-type asteroid (162173) Ryugu at the end of 2020. Because the C-type asteroids, of which reflectance spectra are similar to carbonaceous chondrites, are highly likely to record the long history of the solar system from the beginning to planet formation including the supply of volatiles to terrestrial planets, the main scientific goals of the Hayabusa2 mission are the investigations of (I) the origin and evolution of the solar system and (II) the formation process and structure of the asteroid.

Curatorial work of Hayabusa2 returned samples: After receiving the returned samples of the Hayabusa2 mission, prior to the initial analysis, the phase-1 curation (sample description) will be done at the JAXA curation facility. Along with the initial analysis, the phase-2 curation of returned samples will be done for integrated thorough analysis and description of samples to build a sample database and to obtain new scientific perspective from thorough analysis of samples. The phase-2 curation will be done both in JAXA and also in several research institutes outside JAXA led by the JAXA curation facility.

Preparation of curation facility for Hayabusa2: We have started examination of receiving facility of Hayabusa2 returned sample in last year. Since Hayabusa2 is a sample return mission from C-type asteroid, it is necessary to ensure recovery of the volatile matter from the samples containing an organic components 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 the description and the handling method for large particles is required.

In Hayabusa2 mission, more attention is paid to contamination control than Hayabusa mission. Final cleaning of the sample catcher is executed in the curation facility and cleaning level is known. Moreover, the contamination coupon is monitoring the contaminant during the construction of the sampling devices.

Conceptual design of clean chamber for Hayabusa2: After examination of receiving facility for Hayabusa2, we almost fixed the specification and conceptual design of the clean chambers for Hayabusa2. The clean chambers are consisted of mainly two part. One is CC3 in vacuum environment, the other one is CC4 in ultra-pure nitrogen gas environment. CC3 is separated to 3 rooms, one is used for opening sample container, second one is used for sampling in high vacuum environment, third one is used for sample storage. CC4 is separated to 2 rooms, one is micrometer-size samples handling and sealing of sample holders similar to Hayabusa CC2 clean chamber, second one is millimeter-size samples handling.



Schedule until receiving of returned samples: We have started detailed design of clean cambers and clean room for the receiving facility from this year. Manufacturing of them will be started by the middle of next year and it will be completed by the middle of 2018. After the manufacturing of the curation facility for Hayabusa2, we will execute the rehearsal of the operation to succeed the curatorial work of the retuned samples of Hayabusa2 until the return of the Hayabusa2 spacecraft to the Earth.

References: [1] Yada et al. (2014) Meteorit. Planet. Sci., 49, 135–153.