

Present status of curation of the Hayabusa-returned samples and development of the Hayabusa2 curation facility

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The Hayabusa-returned samples are only the regolith samples returned from surface of an asteroid at present on the Earth since its return in 2010 [1]. Their preliminary examination revealed that they were comparable to equilibrated LL chondrites in mineralogy, petrology and chemical and oxygen isotopic compositions [2-4]. The Astromaterial Science Research Group (ASRG) of JAXA has continued their initial descriptions using FE-SEM/EDS without exposing to air, stored them in highly purified N₂ environment and distributed them to the world-wide researchers, as the international announcement of opportunity (AO) for their researches [5]. So far more than 700 of particles have been described by FE-SEM/EDS, and more than 80% of them are Itokawa origin. And more than 160 of them have been distributed during the four times of the international AO. The latest international AO was performed in 2016 and six proposals have been selected for sample allocation. The fifth international AO will start soon in this year.

The Hayabusa2 is heading toward near-Earth C-type asteroid Ryugu, previously named 1999JU3, to reach there in 2018 and try to touchdown onto its surface for sample recovery [6]. It will return the captured samples to the Earth in 2020. The ASRG is now preparing for the curation facility to receive the recovered samples under the supervision of the Hayabusa2 project, the steering committee of the ASRG, and the advisory committee for specifications of the Hayabusa2 curation facility. One cleanroom will be newly constructed next to the one where clean chambers for the Hayabusa returned samples is situated. In the cleanroom, new clean chambers for the curation of Hayabusa2-returned samples have been developed. Because the target body Ryugu is C-type asteroid, which is thought to be related to carbonaceous chondrites, some fraction of samples will be obtained in vacuum condition to avoid terrestrial N₂ contamination to volatile and organic materials in them. After taking some fractions in vacuo, rest of the samples will be processed in highly purified N₂ condition as well as the Hayabusa-returned samples. One of the chamber is for handling mm-size samples, which has different shape from that of μ m-size samples. The construction of the new cleanroom will start in this year and all the clean chambers will be set in the middle of 2018. After the establishment of them, their functional checks and then rehearsal for receiving returned samples will be performed until the Hayabusa2 sample return in 2020.

References: [1] Abe et al. (2011) Abstract #1638. 42nd LPSC. [2] Nakamura et al. (2011) Science 333: 1113. [3] Ebihara et al. (2011) Science 333: 1119. [4] Yurimoto et al. (2011) Science 333: 1116. [5] Yada et al. (2014) Meteoritics Planet. Sci. 49: 135. [6] Yoshikawa M. et al. (2015) Abstract id.2254481. IAU General Assembly, Meeting #29.

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