

PREPARATION FOR CURATING SAMPLES RECOVERED FROM C-TYPE ASTEROID RYUGU BY HAYABUSA2 AND PRESENT STATUS OF CURATION OF SAMPLES RETURNED FROM S-TYPE ASTEROID ITOKAWA BY HAYABUSA.

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Introduction: Hayabusa2 spacecraft successfully performed the touchdown sampling onto the surface of its target C-type asteroid Ryugu on Feb 22, 2019 [1]. A series of images shot by its onboard cameras indicate that it should have recovered the surface regolith grains into its sample catcher successfully. Additionally, Ryugu's reflectance spectra taken by the Near Infrared Spectrometer (NIRS3) show a weak but clear global adsorption feature at 2.72 μm , which indicates the presence of OH-bearing minerals [2]. Together with its low albedo, surface materials of Ryugu are similar either to thermally- and/or shock-metamorphosed carbonaceous chondrites or to materials with weak aqueous alteration [3]. The Ryugu samples will be returned to the Earth at the end of 2020. We Astromaterial Science Research Group (ASRG) are now preparing for handling and curating them in the Extraterrestrial Sample Curation Center (ESCuC) at JAXA Sagamihara campus.

Curation Plan for Returned Ryugu Samples: Due to the plausible volatile-containing property of Ryugu, contamination of volatiles, such as H₂O and organics, should be minimal. The samples will thus be enclosed into a sample container using a metal sealing mechanism [4, 5]. Volatile components released inside the sample container will be collected via a gas extraction line, prior to the container opening, at the quick-look facility near the landing site of the reentry capsule. The container will be then carried into the cleanroom of the ESCuC and introduced into the clean chambers (CCs) for sample handling after a series of cleaning and disassembling process [6]. The CCs for Ryugu samples are composed of five components; CC3-1 for opening of the container to extract the sample catcher in vacuum, CC3-2 for removal of the cover of catcher and picking up of a certain amount of samples from the catcher for storage in vacuum, CC3-3 for change of the environment from vacuum to purified nitrogen atmosphere, CC4-1 and CC4-2 for disassembly of the sample catcher, catcher handling and description. The initial description of the samples in CCs 4-1 and 4-2 is planned to include weighing by a microbalance, observing by an optical microscope and spectroscopic analysis by the FT-IR. A infrared spectral imager, equivalent to MicrOmega on board the MASCOT lander, will be equipped to CC3-3 for non-destructive sample description [7].

Some fractions of the samples will be distributed to initial analyses and phase 2 curation team after 6 month from the capsule recovery. Ten percent will be distributed to NASA after a year from the capsule recovery based on the MOU between JAXA and NASA. The Ryugu samples will be available to the community through the international announcement of opportunity (AO) after one and a half years from the capsule recovery.

Curation of Returned Itokawa Samples: ASRG has continuing description of Itokawa samples since their return in 2010. The number of those initially described reaches more than 650. More than 100 of Itokawa particles whose size range from 11 to 238 μm were newly described in 2018. Their details including SEM images and EDS spectra are available at the ASRG website (<https://curation.isas.jaxa.jp/curation/hayabusa/index.html>). Research proposals for Itokawa particles can be submitted anytime through the website (<https://curation.isas.jaxa.jp/ao/index.html>).

References: [1] Watanabe S. et al. (2019) *LPS L*: abstract #1265. [2] Kitazato K. et al. (2019) *Science* 364:272. [3] Sugita S. et al. (2019) *Science* 364:252. [4] Okazaki R. et al. (2017) *Space Sci. Rev.* 208, 107. [5] Sawada T. et al. (2017) *Space Sci. Rev.* 208, 81. [6] Yada T. et al. (2019) *LPS L*: abstract #1795. [7] Bibring J. -P. et al. (2019) *this meeting*.