

HAYABUSA2 SAMPLER: CURRENT STATUS

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Introduction: Hayabusa2 launched off on December 3, 2014 to return surface samples of a near-Earth C-type asteroid 1999 JU₃ [1]. The spacecraft will fully investigate the asteroid for 18 months from mid-2018, and sample the asteroid at three different locations. The samples from 1999 JU₃ will be delivered to the Earth in December 2020.

Hayabusa2 Samples: Hayabusa2 returned samples would be classified into three categories based on the characteristics of the Hayabusa2 sampler [1-3]. (1) Millimeter-sized coarse grains stored separately in three chambers, (2) <100 μm-sized fine particles that could be mixed in the sample container, and (3) volatiles released from the samples in the sealed container. Millimeter-sized coarse grains collected at different locations would represent the material properties at different locations, and petrologic and mineralogical studies of them would allow us to constrain the history of the asteroid and material evolution in the early solar system. Fine particles would possess the information on the global average surface feature and surface geologic processes such as space weathering and regolith evolution. Volatile components released from the samples would be the first returned volatiles from space and would thus be an important target to investigate the origin and evolution of organic matter and water in the solar system.

Capsule Recovery, Curation and Sample Analysis: Volatile components would be extracted first prior to the opening of the sample container soon after the re-entry capsule recovery. The sample container would be opened in a Hayabusa2 sample curation chamber at the JAXA Curation Facility. Curation work of the returned samples will be first done for subsequent studies (phase 1 curation). The curation work for a fraction of the samples would be done in collaboration with institutes outside JAXA for *broad thorough analysis* (phase 2 curation). A different fraction of samples would be investigated by the Initial Analysis team in the Hayabusa2 project to accomplish the scientific goal of the mission (*focused sample analysis*) [1]. A team to integrate all the results and link to remote-sensing data is also important, which can be done only for return samples.

References: [1] Tachibana S. et al. (2014) *Geochem. J.* **48**, 571-587. [2] Sawada H. et al. (2015) submitted to *Space Science Review*. [3] Okazaki R. et al. (2015) submitted to *Space Science Review*.