

Construction of the initial description analysis flow for Hayabusa2 sample

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The Hayabusa 2 was successfully launched in December 2014, and now it is heading to the C-type asteroid 1999JU3. Before the spacecraft will return to the Earth in 2020, the extraterrestrial sample curation team (ESCuTe) of JAXA is planning to work on designing a new clean chamber during FY2015. We present the initial description analysis flow (IDAF) draft of Hayabusa 2 returned sample.

The IDAF is a flow that most of the returned samples follow. Essentially, in this flow, non-destructive and non-atmospheric exposure analysis must be carried out by ESCuTe. Both initial analysis and international Announcement of Opportunity (AO) for “Hayabusa” sample investigation has been performed based on the information obtained by the IDAF. In Hayabusa 2 mission, it is also expected that the IDAF would be performed by ESCuTe before the any other detailed analysis. Since the IDAF is the most upstream in all analysis flows, not only the acquisition of information for sample allocation, but also minimizing contamination and damage has been required.

The IDAF has been studied to date is as follows.

1. Assembling of sample container to clean chamber in JAXA curation facility.
2. Analysis of volatile elements released from samples into sample container during transformation from the landing site to JAXA.
3. Optical microscopic observation for identification of sample size and volume after opening the sample container.
4. X-ray CT in descending order for understanding of detailed sample texture.
5. Analyses for organic and inorganic components. As analysis for inorganics, we observe petrography and mineralogy by using SEM/EDS and identify constituent minerals of the sample. On the other hand for organic components, analysis technique has been still studying in cooperation with experts in that field.
6. Separating the sample into roughly equal parts. One is for storage and the remaining is for a detailed analysis such as initial analysis and international AO.

ESCuTe has constructed the IDAF in consultation with researchers from various fields. To maximize science gain from the Hayabusa 2 returned sample, damage evaluation of each analysis and development of non-atmospheric exposure container becomes necessary at the same time with the specification examination of the clean chamber. We introduce the analysis flow of the latest version including these problems that should be resolved in the near future.

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