

## **Hayabusa2 returned samples from C-type near-Earth asteroid (162173) Ryugu: Preliminary report of initial analysis**

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JAXA's Hayabusa2 spacecraft returned the sample from C-type (carbonaceous) near-Earth asteroid (162173) Ryugu in December 2020. The total weight of samples collected from two surface locations of the asteroid exceeds 5 grams, which is the largest ever from deep space. The Hayabusa2 project has begun a year-long analysis of returned samples on a priority basis (initial analysis). In order to unravel the nature of C-type asteroid and the origin and evolution of Solar System, the Hayabusa2 initial analysis team consists of six sub-teams focusing on 1) chemistry (elements and isotopes), 2) petrology and mineralogy of coarse grains (mm-sized grains referred as 'Stone'), 3) petrology and mineralogy of fine grains (<100  $\mu\text{m}$ -sized grains referred as 'Sand'), 4) volatiles, 5) insoluble organic matter (macromolecular organics), and 6) soluble organic matter (organic molecules).

After six-month initial description inside clean chambers at Institute of Space and Astronautical Science (ISAS), JAXA, ~6 % of the samples (0.3 g out of total 5 g) was allocated to the initial analysis team and has been investigated since June 2021. Twenty-two particles were individually photographed, weighed, and spectroscopically described without exposure to air at ISAS in advance of allocation to the team. Most of individual particles are one to a few millimeter in size except for a centimeter-sized grain obtained during the second landing at Ryugu. Along with the individual particles, ten sets of aggregate samples, consisting of grains with <1 mm diameter, were allocated to the team. The aggregate samples range from 0.3 to 38.8 mg.

We will present current status of initial analysis and discuss some preliminary results at the workshop.