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Overview of initial analysis of Hayabusa2-returned sample from C-type near-Earth asteroid (162713) Ryugu

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C-type asteroids have been hypothesized as parent bodies of carbonaceous chondrites, of which constituting materials record the early evolution of the solar system and the delivery of volatiles to the inner solar system. The JAXA's Hayabusa2 spacecraft explored C-type near-Earth asteroid (162713) Ryugu and delivered surface samples, collected at two locations, to the Earth in December 2020. The returned 5-gram samples well represent the Ryugu surface from spectroscopic and morphological perspectives [1-3].

The Hayabusa2 initial analysis team has been investigating allocated Ryugu sample (0.3 gram in total) to characterize the returned samples chemically, mineralogically, and petrologically and to understand the origin and evolution of Ryugu and the solar system. The initial analysis team consists of six sub-teams that analyze the samples with different approaches and focuses: Chemistry (Lead: H. Yurimoto), Petrology and mineralogy of coarse grains (Lead: T. Nakamura) and fine grains (Lead: T. Noguchi), Volatiles (Lead: R. Okazaki), Organic macromolecules (Lead: H. Yabuta), and Soluble organic matter (Lead: H. Naraoka).

Analysis by the team has found that Ryugu, belonging to one of the most common asteroid groups, is a parent body of CI chondrites, the chemically most primitive (least fractionated from the Sun's elemental abundance) but the rarest group of carbonaceous chondrites and that Ryugu is the freshest CI chondrite. This presentation will give an overview of the initial analysis activity of Hayabusa2-returned Ryugu sample on behalf of the Hayabusa2 initial analysis team and the Hayabusa2 mission team. Detailed results, interpretation, and discussion from the team will be presented in a series of talks/posters at the meeting [e.g., 4].

[1] Yada T. et al. (2021) *Nat. Astron.* doi.org/10.1038/s41550-021-01550-6. [2] Pilorget C. et al. (2021) *Nat. Astron.* doi.org/10.1038/s41550-021-01549-z. [3] Tachibana S. et al. (2022) *Science.* doi.org/ 10.1126/science.abj8624. [4] Yurimoto H. et al. (2022) This meeting.