SAMPLING SYSTEM FOR HAYABUSA2 AND SCIENTIFIC GOALS OF RETURN SAMPLE ANALYSES. S. Tachibana[1], H. Sawada[2], R. Okazaki[3] and Hayabusa-2 Sampler Team, [1]Department of Earth and Planetary Science, The University of Tokyo (7-3-1 Hongo, Tokyo 113-0033, Japan; tachi@eps.s.u-tokyo.ac.jp), [2]Department of Earth and Planetary Sciences, Kyushu University, [3]JSPEC, Japan Aerospace Exploration Agency.

Hayabusa-2 is the future Japanese asteroidal sample return mission heading for the near Earth asteroid 1999JU3. The asteroid 1999JU3 (~1 km in size) is classified as a C-type asteroid, of which reflectance spectra resemble carbonaceous chondrites. A ground-based spectroscopic observation indicates the presence of the 0.7-micron absorption [1]. The 0.7-micron absorption is attributed to a charge transfer absorption between ferrous and ferric iron, and it has been known that the presence of a 0.7-micron band guarantees the presence of a 3-micron band, which is cause by the presence of hydrated minerals or water [2]. The 1999JU3 is thus the asteroid that suffered much less degree of thermal metamorphism than the asteroid Itokawa [3], but experienced aqueous alteration to form hydrated silicates.

Recent progresses in research of extraterrestrial materials have shown that an interacted mixture of minerals, ice, and organic matter is contained in pristine solar-system materials. It is accordingly important to study the interactions between minerals, ice, and organic matter within the pristine materials in the dynamically active protosolar disk to understand the very early evolution of minerals, ice, and organic matter, which would have later evolved to the Earth, ocean, and life, respectively. Especially, the evolution of organic materials in asteroids could determine the final diversity of organic matter prior to the delivery to the early Earth. However, there have been no returned samples keeping the interactions between inorganic materials, ice, and organic matter intact.

Not only the organic evolution but the long history from the galactic evolution to the dynamical evolution of asteroid could also be preserved in samples from C-type asteroids because they are likely to be less heated. Presolar grains, organic matter with the parental molecular cloud origin, high-temperature protosolar disk objects (CAIs and chondrules), parent-body alteration minerals, impact-related textures, and space-weathering products are expected to be present in returned samples. Detailed return sample analyses, combining the global remote-sensing observation data, will thus significantly contribute to reveal the long history of the solar system, especially (1) Destruction and accumulation of rubble-pile body, (2) Thermal evolution from planetesimal to near Earth asteroid, (3) Material circulation in the early solar system, and (4) diversification of organic matter through the reaction with minerals and ice [4].

In this presentation, we will illustrate the importance of sample-return return from undifferentiated primitive asteroids and introduce the sampling device for Hayabusa-2 to obtain enough amount of samples with minimal contamination.

References: [1] Vilas F. (2008) *Astrophys. J.* **135,** 1101-1105. [2] Burbine T. H. et al. (2008) in *Rev. Mineral. Geochem*. pp. 273-343. [3] Nakamura T. et al. (2011) *Science* **135,** 1101-1105. [4] Abe M. et al. (2012) *Asteroids, Comets, Meteors 2012*, this volume.