

Reflectance spectroscopy of CM2 chondrite (Nogoya) using the Hayabusa2 ONC-T Flight Model

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Hayabusa successfully brought samples from the S-type asteroid Itokawa. Based on the technology of Hayabusa, Hayabusa-2 is designed to collect samples of surface material from the near-Earth asteroid 1999JU3 and return them to Earth. 1999JU3 is classified as a C-type asteroid, which differs from S-type asteroids in their degree of thermal metamorphism. There is a possibility that primitive samples exist on 1999JU3, because C-type asteroids are less thermally metamorphosed than S-type asteroids. Ground-based observations have indicated, the presence of hydrated materials on 1999JU3's surface. However, these materials are not distributed over the entire surface of the asteroid. To bring the primitive samples to Earth, we observed the asteroid using the optical navigation camera (ONC) mounted on Hayabusa-2. ONC-T's effective wavelength are same as those of the Hayabusa Asteroid Multiband Imaging Camera (AMICA); however, it differs from AMICA in the 430 and 750 nm wavelengths, and the neutral density (ND) filter. Hayabusa-2 ONC-T has seven filters and one glass cover, with effective wavelengths of 390, 480, 550, 589.5, 700, 860, and 950 nm. Hayabusa-2 enables to find the place on the asteroid surface where aqueously altered minerals are concentrated, observing the absorption band of phyllosilicate around 700nm. This will be helpful for us to decide the landing point of Hayabusa2. We examined the Hayabusa-2 ONC-T calibration and imaged meteorites via multi-band imaging. The purpose of this study is to determine the feasibility of detecting primitive rocks on 1999JU3 using Hayabusa-2 ONC-T. We also examined the spectral reflectance properties of the meteorite Nogoya, which is similar to C-type asteroids. We directly compared ONC-T's images with the spectroscopic data; our results indicate that ONC-T can detect an absorption feature centered near 700 nm.

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