

Science of small bodies opened by Hayabusa

Akira Fujiwara[1]

[1] none

Small bodies are considered to retain physical and chemical state from early times of the solar system. Among them, concerning asteroids, wealth of astronomical data have accumulated since their first discovery. Many asteroids are categorized into taxonomic classes such as S, C, D, etc according to their spectra. Meteorites, most of which are considered to come from asteroids, have long been the precious sample for the research of origin and evolution of the solar system. Clear correspondence between meteorite class and asteroid spectral class should be clarified by direct space missions. Hayabusa was designed to access a near-earth asteroid Itokawa of the S-type, the most popular type in the inner solar system, and return its surface sample to the earth. The spacecraft was launched in 2003, arrived at the asteroid in 2003, and will return to the earth in 2010. Information about shape, size, mass, density, surface topography of Itokawa has been obtained through the boarded instruments. One of surprising results was that the density is as low as 1.9g/cc and it suggests that Itokawa has the rubble-pile structure. Through the Hayabusa mission many problems are newly provoked on the interior, surface and evolution of Itokawa and also for the general asteroid science.