

Mid-Infrared Spectroscopy of Main-Belt Asteroids

Jun Takahashi[1]; Yoichi Itoh[2]; Shigeru Takahashi[3]

[1] Earth & Planetary Sciences, Kobe Univ; [2] Grad. School Sci/Tech, Kobe Univ.; [3] NRO

The mineral composition of asteroids is thought to possibly contain information about thermal process at the time and/or after their formation. It could be a clue for understanding the evolutionary history of the solar system. Previous mineralogical studies on asteroids surface have been based on observations mainly in visible to near-infrared region. On the other hand, mid-infrared spectroscopy has distinctive benefits; (1) Asteroids have effective temperatures of 200-300 K and their radiation peak lies in mid-infrared region. (2) Emission band of silicate lies around 10 micron and it would be possible to estimate the mineral composition if the data is accurate enough. Cohen et al.(1998), Dotto et al.(2000), Barucci et al.(2002) and Lim et al.(2005) have carried out the mid-infrared spectroscopic studies on asteroids. However, the published papers cover only a fraction of the known asteroids.

We have conducted mid-infrared (8-13 micron) spectroscopic observation of asteroids in order to verify the previous studies and to obtain spectral data of asteroids which have never been observed in this region. The observation has been made at United Kingdom Infra-Red Telescope(UKIRT) using spectrometer Michelle. Our targets are a total of 11 asteroids; 1 Ceres, 3 Juno, 7 Iris, 11 Parthenope, 20 Massalia, 24 Themis, 41 Daphne, 42 Isis, 44 Nysa, 67 Asias and 88 Thisbe. We have attempted to detect 10 micron emission band by fitting the Standard Thermal Model (STM) to the observed spectra. So far, an emission feature has been detected in the analysis of our 1 Ceres observation. It resembles those detected in previous studies. In the presentation, we also report the results on other asteroids.