Mass Ratio of Crystalline to Amorphous Silicates for the Ejecta Dust of Comet 9P/Tempel 1 induced by Deep Impact

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We carried out mid-infrared observations (multi-band imaging and N-band spectroscopy) of the Deep Impact collision with a Jupiter family comet 9P/Tempel 1 using the Cooled Mid-Infrared Camera and Spectrometer (COMICS) on the 8.2 m Subaru Telescope. We present the spectroscopic results here. The N-band spectrum of the dust ejecta from the comet nucleus 3.5 hours after the Deep Impact event shows a strong crystalline olivine feature. The spectra 24 hours before and 28 hours after the impact have no evident silicate feature in 10 micron region. We present several spectra at the different positions from the comet nucleus, and report the preliminary result of our fitting analysis using a thermal emission model of cometary dust grains. The mass ratio of crystalline to amorphous silicate grains for the dust ejected from the subsurface of 9P/Tempel 1 is much larger than the dust in the coma of other Jupiter family comet, such as 78P/Gehrels 2, but similar to Oort cloud comets, such as Hale-Bopp.