[JJ] Evening Poster | P (Space and Planetary Sciences) | P-PS Planetary Sciences

[P-PS09]Origin and evolution of materials in space

convener:Shogo Tachibana(UTokyo Organization for Planetary and Space Science, University of Tokyo), Hitoshi Miura(Graduate School of Natural Sciences, Department of Information and Basic Science, Nagoya City University), Hideko Nomura(東京工業大学理学院地球惑星科学系, 共同), Takafumi Ootsubo(Institute of Space and Astronautical Science, Japan Aerospace Exploration Agency)

Tue. May 22, 2018 5:15 PM - 6:30 PM Poster Hall (International Exhibition Hall7, Makuhari Messe)

Recent progresses of astronomical observations, laboratory experiments, solar-system exploration, and theoretical work have enabled us to attempt to understand the origin and evolution of materials (dust and gas) in space in the context of material science. It is thus important to link further planetary material science and astronomy for comprehensive understanding of dust and gas in space and their role in evolution of galaxies, stars, and planetary systems. In this session, based on latest results on observations, experiments, planetary missions, and theoretical studies on materials in space, we discuss next steps in science for materials in space.

[PPS09-P03]Formation condition of minerals of comet 17P/Holmes derived from the mid-infrared spectra

*Shinnaka Yoshiharu[1,3], Takafumi Ootsubo[2], Hideyo Kawakita[3], Mitsuhiko Honda[4], Jun-ichi Watanabe[1]
(1.National Astronomical Observatory of Japan, 2.JAXA/ISAS, 3.Kyoto Sangyo University, 4.Kurume University)

Keywords:comet, 17P/Holmes, mid-infrared spectra, mineral abundance

Dust grains of crystalline silicate, which is rarely presented in an interstellar space, were found in cometary nuclei (Messenger et al. 1996, *LPI*, **27**, 867; Wooden et al. 1999, *ApJ*, **517**, 1058, references therein). It is thought that these crystalline silicates had formed by annealing or condensations of amorphous grains near the Sun in the solar nebula, and incorporated into a cometary nucleus in a cold region (farther than formation regions of the crystalline silicates) by radial transportation in the solar nebula. It is considered that transportation mechanisms to outside of the solar nebula were turbulent and/or X-wind. An abundance of the crystalline dust grains was therefore expected to be smaller as far from the Sun (Gail, 2001, *A&A*, **378**, 192; Bockelée-Morvan et al. 2002, *A&A*, **384**, 1107). Namely, the abundance ratio of the crystalline silicate in cometary dust grains relates a degree of mass transportation and a distance from the Sun when cometary nucleus formed in the Solar nebula.

The mass ratio of crystalline silicates of dust grains is determined from by Si-O stretching vibrational bands of silicate grains around 10 μm using the difference of spectral band features between crystalline and amorphous grains. We present the crystalline-to-amorphous mass ratio of silicate grains in the comet 17P/Holmes by using the thermal emission mode of the dust grains (Ootsubo et al. 2007, *P&SS*, **55**, 1044) applied to the mid-infrared spectra of the comet. These spectra were taken by the COMICS mounted on the Subaru Telescope on 2007 October 25, 26, 27 and 28 immediately after the great outburst of the comet (started on October 23). We discuss about formation condition of minerals incorporated into the nucleus of the comet based on the derived mass ratio of silicate grains of the comet.