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顕微分光による ”はやぶさ ”微粒子の分析
A micro-spectroscopic research for the particles returned by the HAYABUSA mission

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Introduction: We have reported on micro-spectroscopic analyses of the particles returned by the HAYABUSA mission, in search of insoluble organic matter (IOM) [1-2]. It suggests to what extent thermal metamorphism has proceeded [3-7]. Five particles from the room A (RA-QD02-0017, 0033, 0044, 0049, and 0064) were analyzed by non-destructive methods; micro-Raman and IR techniques. The major Raman bands and IR absorptions can be assigned to olivine, and it seems the major mineral. Two particles from the room B (RB-QD04-0025 and RB-QD04-0049) were also analyzed in the same manner. The Raman spectra of RB-QD04-0049 showed that olivine is its major mineral, and the Raman bands of RB-QD04-0025 can be assigned to pyroxene and merrilite. However, the spectra lack in Raman bands or IR absorptions relating to carbonaceous matter. Although the seven particles may contain trace amount of low molecular weight organic compounds, there is no evidence for chondritic IOM [2]. In addition to the particles, we examined two particles by micro-Raman and IR techniques. And four particles were investigated by photoelectron emission microscopy (PEEM).

Methods: Two particles (RA-QD02-0008 and RB-QD04-0001) are analyzed by micro-Raman and IR in the same method using the newly designed sample holder made from diamond plates without using organic resin [1]. PEEM analyses were performed at the end-station of BL17SU in SPring-8. Four particles (RA-QD02-0010, RA-QD02-0031, RA-QD02-0068, and RB-QD04-0025) were analyzed using potted butt.

Results: RA-QD02-0008 and RB-QD04-0001 showed relatively strong fluorescence background at the Raman spectra. The IR spectrum of the particle RA-QD02-0008 is characterized by broad O-H stretching, however C-H stretching was not observed, unlike chondritic IOM. A PEEM image of the particle RA-QD02-0068 showed one carbon-rich phase in the particle.

References: [1] Kitajima F. et al. (2011) Abstract #1855. 42th Lunar & Planetary Science Conference.[2] Kitajima F. et al. (2011) Abstract #5341. 74th Annual Meeting of the Meteoritical Society.[3] Kitajima F. et al. (2011) GCA, 66, 163-172. [4] Quirico E. et al. (2005) Planetary and Space Science, 53, 1443-1448. [5] Sandford S. A. et al. (2006) Science, 314, 1720-1724. [6] Cody G. D. et al. (2008) Earth Planet. Sci. Lett., 272, 446-455. [7] Kebukawa Y. et al. (2010) Meteoritics & Planet. Sci., 45, 99-113.

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