A laboratory simulation of space weathering: Relationship between iron contents and reflectance spectra

Erika Kurahashi[1], Sho Sasaki[2], Seiji Sugita[3]

[1] Earth and Planetary Sci. Univ. of Tokyo, [2] Earth and Planetary Sci., Univ. Tokyo, [3] Earth and Planet. Phys., Univ. of Tokyo

Space weathering is the one of causes of spectral mismatches between asteroids and meteorites. In order to simulate space weathering, we irradiate nanosecond pulse laser beam onto planetary surface materials (ex. olivine and pyroxene grains). The pulse duration is comparable with a real micrometeorite bombardment timescale. Nano phase iron particles, which are located within amorphous rim of the grains, are the cause of space weathering. Lucey et al. (1995) discussed dependence of reflectance change on iron contents and maturity using Apollo lunar samples. To verify their result, we irradiate fine-grained olivine pellet samples and measure their reflectance spectra. We found a relationship between iron contents and reflectance spectra, which is similar to Lucey et al. (1995).