Oral | Symbol P (Space and Planetary Sciences) | P-PS Planetary Sciences

[P-PS22_1AM2]Planetary processes from meteorites and experimental works

Convener:*Makoto Kimura(Faculty of Science, Ibaraki University), Eiji Ohtani(Department of Earth and Planetary Materials Science, Graduate School of Science, Tohoku University), Masaaki Miyahara(Department of Earth and Planetary Systems Science, Graduate School of Science, Hiroshima University), Chair:Makoto Kimura(Faculty of Science, Ibaraki University), Eiji Ohtani(Department of Earth and Planetary Materials Science, Graduate School of Science, Tohoku University)
Thu. May 1, 2014 11:00 AM - 12:45 PM 415 (4F)
In order to explore the planetary materials and their evolution, both meteorites and experimental studies are necessary. In this session, we will discuss these topics from meteorites and experimental works. The reserach works on differentiated meteorites and parent body processes for chondrites are especially included in this session.

12:30 PM - 12:45 PM

[PPS22-P01_PG]Laboratory impact experiments of rock projectiles onto simulated asteroid regolith: Impactor fragmentation and capture

3-min talk in an oral session
Hiroki NAGAOKA[1], *Akiko NAKAMURA[1], Ayako SUZUKI[2], Sunao HASEGAWA[2] (1.Graduate School of Science, Kobe University, 2.Institute of Space and Astronautical Science)
Keywords:meteorites, impact process, asteroids

We conducted laboratory impact experiments of rock projectiles onto target consist of silica sand used as simulated regolith surface. We investigate the relationship between degree of projectile fragmentation and impact velocity and particle size of silica sand.Laboratory impact experiments have been performed to study the degree of target fragmentation, however, much less attention has been paid to the fate of the impactors. Experiments with impact velocity lower than 1 km/s were conducted using a powder gun and a gas gun at Kobe University, while experiments with higher impact velocity up to 5 km/s were conducted using a two-stage light-gas gun at Institute of Space and Astronautical Science. We collected the projectile fragments in the sand and weighed the mass of the largest fragments. Destruction of rock projectiles is found to occur when the peak pressure is about equal to the dynamic tensile strength of the rock in the low velocity impact experiments (Nagaoka et al., 2014, MAPS). The largest fragment mass fractions in the high velocity impact experiments are higher than the expected from the result of low velocity impact experiments. The discrepancy is larger for the target with smaller silica sand particles. The larger fragments consist of multiple fragments and silica sand particles which were consolidated into larger particles by compression and the heating due to compaction of silica sand.