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

[P-PS03]Small Bodies in the Solar System: Current Understanding and Future Prospects

convener:Masateru Ishiguro(Department of Physics and Astronomy, Seoul National University), Taishi Nakamoto(Tokyo Institute of Technology), Masahiko Arakawa(神戸大学大学院理学研究科, 共同), Masanao Abe(Institute of Space and Astronautical Science, Japan Aerospace Exploration Agency)
Wed. May 23, 2018 5:15 PM - 6:30 PM Poster Hall (International Exhibition Hall7, Makuhari Messe)
In this session, we welcome presentations regarding small bodies in the Solar System from a variety of approaches (i.e., laboratory experiments, observations, explorations, theoretical modeling, and sample analyses). Especially this year, the Hayabusa2 spacecraft is about to rendezvous with its mission target (Ryugu, C-type asteroid), and ready to make remote-sensing observations for acquiring detailed information of the primordial body. Taking account of the situation, we aim to organize our current understanding of these primordial bodies and further discussing future prospects in this research field.

[PPS03-P28]Phase relation of $MgSO_4$–H_2O system under low temperature and high pressure

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In order to estimate the internal structure of icy bodies, we investigated phase transition of $MgSO_4$-H_2O system under low temperature and high pressure. A diamond anvil cell was used for high-pressure generation. A low-temperature circulating system and a Peltier device were used for temperature control. The experimental temperature and pressure range were from -40 °C to room temperature and ambient pressure to 5 GPa, respectively. We used 0, 5, 10, 15, 17, 20, and 25 wt% $MgSO_4$ aqueous solutions to evaluate the influence of $MgSO_4$ on the phase diagram of pure H_2O.
The pressure was calculated using the ruby fluorescence method. Raman spectroscopy and textural change in the sample room under optical microscope were used for phase identification in laboratory experiments.
To confirm the results of phase identification, we also conducted X-ray diffraction experiments of the solid phases of $MgSO_4$-H_2O system up to about 5GPa at room temperature, at NE-1A station, PF-AR, KEK. We identified Ices VI and VII, magnesium pentahydrate, $MgSO_4 \cdot 5H_2O$, $Mg(HSO_4)_2$ in the samples at high pressure.
Our results were different from previous study by Ohtani and Nakamura(2011), who identified magnesium heptahydrate, $MgSO_4 \cdot 7H_2O$ as the high-pressure phase .
We will report the detailed results of both Raman spectroscopy and X-ray diffraction experiments and possible phase diagram of $MgSO_4$-H_2O system and their application to the icy bodies.