Japan Geoscience Union Meeting 2010
(May 23-28 2010 at Makuhari, Chiba, Japan)

PPS004-P08 Room: Convention Hall Time: May 25 17:15-18:45

Development of Recovery technique of laser-shocked materials

Keita Nagaki[1*], Tatsuhiro Sakaiya[2], Tadashi Kondo[2], Toshihiko Kadono[3], Yoichiro Hironaka[3], Keisuke Shigemori[3]

[1]Science, Osaka Univ, [2]Osaka Univ, [3]ILE

It is important to recover the samples which are transformed by shock compression for understanding the origin of high-pressure minerals in meteorite and their synthetic mechanism. Although high-pressure minerals is often recovered by impact experiments using light-gas gun, the produced conditions in this method is limited below 11km/s of projectile velocity which is less than second escape velocity. High-power laser can accelerate projectile beyond the limited of light-gas gun. [1].
Therefore, we developed the recovery technique of the laser-shocked materials at high-power laser system. We used single crystal olivine (San Carlos, USA) which is a major material of meteorites and the mantle of the Earth. We used GXII/HIPER laser system at Institute of Laser Engineering, Osaka University [2]. The deformation, fracture and phase identification of the recovered olivine were observed comprehensively by optical microscopy, field emission-scanning electron microscopy, and micro-Raman spectroscopy.
We could recover 90wt% of the sample by the recovery cell made of Al. No high-pressure phase has been observed so for in the recovered sample by micro-Raman analysis. Therefore, to recover the lost sample in the laser-shock experiment, we made the newly designed recovery system. We will report the detail of the recovery technique and the results of the observation of the recovered sample.

Reference
[1]Kadono,T et al., The Japanese Society for Planetary Science,vol18,2009.
[2]Yamanaka,C. et al., Nucl. Fusion,27,19-30,1987.