

## レーザー衝撃圧縮を受けた物質の回収技術の開発

### Development of Recovery technique of laser-shocked materials

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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 far 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.