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Multiple shock compression of diamond single crystal over 1 TPa with shaped laser pulse K. SHIGEMORI, ILE, Osaka Univ., K. SHIMIZU, Y. NAKAMOTO, KYOKUGEN, Osaka Univ., A. SHIROSHITA, ILE, Osaka Univ., N. OZAKI, T. KIMURA, K. MIYANISHI, T. ENDO, R. KODAMA, GSE, Osaka Univ., T. IRIFUNE, GRC, Ehime Univ., H. SUMIYA, Sumitomo Electric Industries Inc., T. SAKAIYA, H. TAKAHASHI, T. KONDO, GSS, Osaka Univ., Y. HIRONAKA, T. KADONO, ILE, Osaka Univ. — Experiments on off principal Hugoniot conditions of shock compression were performed with shaped laser pulse. Experiments were done on GEKKO-XII HIPER glass laser facility at Institute of Laser Engineering, Osaka University. Single crystal diamond foils (surface orientation:[100]) were irradiated by third harmonics of Nd: Glass laser (λ: 0.35 μm) at an intensity of above 10^{14} W/cm^2. The baseline of the pulse duration was 2.5 ns. We added a weak "foot pulse" prior to the main drive laser pulse for low entropy compression. Diamond foils were coated with Ti (thickness: 0.5 μm) on the half side of the rear surface for shock velocity measurements. Thin Au (5 μm) coatings were also made on the laser irradiation surface in order to eliminate preheating due to ablation plasmas. Two VISARs (velocity interferometer system for any reflector) were employed for measurements of shock velocity and reflectivity. We observed strong reflectivity for multiple shock compression conditions whereas no clear reflectivity was observed by single-shock compression up to 2 TPa.

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