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Compression of diamond foils to metallic phase KEISUKE SHIGEMORI, TAKESHI SHIOTA, KAZUO A. TANAKA, ILE, Osaka Univ., Japan, MASATAKE YOSHIDA, KUNIHICO WAKABAYASHI, AIST, Japan, HIROFUMI NAGAO, KEN-ICHI KONDO, Tokyo Inst. Tech., KAZUTO OTANI, HIROSSHI AZECHI, KUNIOKI MIMA, ILE, Osaka Univ., Japan — It is suggested that carbon under extreme pressure (> 14 Mbar) will transform to metallic phase of BC8 crystal structure. We demonstrated an experiment to compress diamond foils to such a phase with intense laser by means of the shock impedance mismatch technique. Diamond foils with buffer foam ($\sim 150 \mu\text{m}^t$) and gold tamper ($5 \mu\text{m}^t$) were irradiated with laser ($\lambda: 0.35 \mu\text{m}$) at an intensity of $2 \times 10^{13} \text{ W/cm}^2$. We measured the particle velocity and the reflectivity of rear surface of the foils with a velocity interferometer system for any reflector (VISAR). We also measured the temperature at the rear surface with an optical pyrometer. The measured signal from the VISAR clearly shows increasing reflected light from the diamond foils at a certain time. Also measured from the pyrometer indicate that the temperature of the diamond was $\sim 8000\text{K}$, which is within the non-melting phase. The shock breakout time and the temperature from the measurements are in good agreements with calculations from 1-D simulation code ILESTA.

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