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Dynamic behavior of bismuth under shock loading YUYING YU, CHENGDA DAI, YE TAN, QINGSONG WANG, QIANG WANG, HUA TAN, XUEMEI LI, JUN LI, JIANBO HU, Institute of Fluid Physics, CAEP — Reverse-geometry impact experiments were performed on a powder gun or a two-stage light gas gun to examine the dynamic behavior of bismuth over the pressure range of 10-60 GPa. The particle velocity profiles were obtained at the bismuth/LiF window interface using DISAR system. A transition from elastic to plastic release structure shown in wave profile indicates that bismuth is in solid state at 15.7 GPa and in liquid state at 30.8 GPa. Results also showed a phase transition occurring on release from the principal Hugoniot both at 13.4 GPa and 15.7 GPa. Combined with the measured projectile velocity and the known Hugoniot for LiF crystal, the shock Hugoniot of bismuth was yield. The obtained Hugoniot data indicate that the $D - u$ curve does have a discontinuity at the particle velocity of ~ 0.9 km/s, which is potentially caused by the shock-induced solid-liquid phase transformation.

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