Equation-of-state measurements for magnesium hydride up to 320 GPa shock pressure

S.MORIOKA[1], N.OZAKI[1,2], M.HOSOMI[1], T.OKUCHI[3], T.SANO[2], T.MATSUOKA[4],K.MIYANISHI[2], Y.UMEDA[1] R.HAZAMA[1], K.KATAGIRI[1], T.NISHIKAWA[1], K.MUKAI[1], K.MUKAI[1], N.KAMIMURA[1], D.SAGAE[1], R.MAKI[1], K.FUKUI[1], R.KODAMA[1,2]

[1]Graduate School of Engineering, Osaka Univ., Osaka, Japan
[2]Institute of Laser Engineering, Osaka Univ., Osaka, Japan
[3]Institute for Planetary Materials, Okayama University, Misasa, Tottori, Japan,
[4]Open and Transdisciplinary Research Initiatives, Osaka Univ., Osaka, Japan

Hydrogen is the most abundant atom in the universe. It has many fascinating features. It is also known that hydride has interesting physical properties, for example, high-T_c superconductivity, reflecting the characteristic behavior of hydrogen etc. In fact, it has been reported that hydrogen sulfide (H_2S) undergoes structural change under static super-high pressure (approximately 150 GPa) and shows an extremely high T_C (203 K). Studies of hydride can lead to understand not only hydride but also hydrogen. In order to understand behavior of hydride in extreme conditions, the experimental data of hydride in the high-pressure region is necessary.

We for the first-time obtained shock Hugoniot data of magnesium hydride (MgH_2) up to 320 GPa using laser-driven shock waves. We developed the samples and targets of the hydride with enough low porosity. The shock velocities of MgH_2 and reference material (quartz) were measured with velocity interferometers. The Hugoniot curve determined from the experiments was consistent with the prediction based on the porosity model.

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