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Anisotropic elasto-plastic transition of MgO single crystal TSUTOMU MASHIMO, MITSURU MURAI, NAOTO KAWAYANAGI, Shock Wave and Condensed Matter Research Center, Kumamoto University — The elasto-plastic transition of ceramics has not been well understood, and the yield mechanism has been further unknown. Magnesium oxide (MgO) has been used as a pressure -scale material, and the Hugoniot data have been measured on single crystal and polycrystal. In this study, we performed the Hugoniot-measurement experiments on MgO single crystals for <100> and <110> axis directions, etc., using the powder gun and two-stage light gas gun, to study the elasto-plastic transition and the equation of state (EOS). The Hugoniot data were measured by the inclined-mirror method combined with the long-pulsed dye laser and mirror-rotating type streak camera. The Hugoniot-elastic limits along <110> axis were much larger than those along <100> axis, and the difference increased with driving stress. This suggests that the dynamic strength should be carefully considered to draw the EOS of MgO. In the plastic region, the present Hugoniot data showed some differences from the previous data.

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