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X-ray diffraction of MgO along the shock Hugoniot

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The structure of MgO upon shock compression was interrogated at the Omega Laser at the Laboratory for Laser Energetics, University of Rochester. Laser drives of up to 2 kJ over 7 ns focused onto a polyimide ablator were used to shock compress 50-μm thick polycrystalline or single-crystal MgO. Scattered He-α X-rays from an Fe backlighter timed with maximum compression were collected using the PXRDiP diagnostic, in which image plates line the inner walls of a box attached to the target package. Other diagnostics utilized were VISAR (velocity history) and Streaked Optical Pyrometry (temperature). We will present experiments probing the $B1-B2$ phase transition of MgO and discuss the implications for detection of melting.

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