

Phase transitions and melting of SiC and MgO along the shock hugoniot

June Wicks

Hopkins Extreme Materials Institute, The John Hopkins University, Baltimore, United States

Abstract

The phase diagrams of planet-forming minerals are integral to our understanding of the processes of planetary formation and subsequent evolution. Recent experimental advances in laser-driven dynamic compression enables unprecedented access to conditions relevant to planetary interiors. Here we report on experiments that measure the temperature and crystal structure of MgO and SiC along the shock hugoniot. Laser-driven shock compression paired with pyrometry, X-ray diffraction, and velocimetry allows us to monitor the temperature, structure, and pressure, respectively. We will discuss these results in the context of kinetics, optical depth and the implications for planetary dynamics.