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Phase transitions and melting on the Hugoniot of Mg2SiO4 forsterite: new diffraction and temperature results P. D. ASIMOW, Caltech, M. C. AKIN, M. HOMEL, R. S. CRUM, D. PAGAN, J. LIND, J. BERNIER, LLNL, J. L. MOSENFELDER, A. M. DILLMAN, U. Minnesota, B. LAVINA, S. LEE, UNLV, O. V. FAT'YANOV, M. G. NEWMAN, Caltech — The phase transitions of forsterite under shock were studied by x-ray diffraction and pyrometry. Samples of 2 mm thick, near-full density (>98% TMD) polycrystalline forsterite were characterized by EBSD and computed tomography and shock compressed to 50 and 75 GPa by two-stage gas gun at the Dynamic Compression Sector, Advanced Photon Source, with diffraction imaged during compression and release. Changes in diffraction confirm a phase transition by 75 GPa. In parallel, single-crystal forsterite shock temperatures were taken from 120 to 210 GPa with improved absolute calibration procedures on the Caltech 6-channel pyrometer and two-stage gun and used to examine the interpretation of superheating and P-T slope of the liquid Hugoniot. This work performed under the auspices of the U.S. Department of Energy (DOE) by Lawrence Livermore National Laboratory under Contract DE-AC52-07NA27344, supported in part by LLNL's LDRD program under grants 15-ERD-012 and 16-ERD-010. The Dynamic Compression Sector (35) is supported by DOE / National Nuclear Security Administration under Award Number DE-NA0002442. This research used resources of the Advanced Photon Source, a U.S. DOE Office of Science User Facility operated for the DOE Office of Science by Argonne National Laboratory under Contract No. DE-AC02-06CH11357. Caltech lab supported by NSF EAR-1426526.

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