

The Bridgmanite-Majorite-Akimotoite Triple Point Measured in Multi-Anvil Press and Laser-Heated Diamond Anvil Cell

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Abstract

We found that current calibration for the COMPRES 8/3 assembly is not sufficiently accurate for the high-resolution phase boundary determinations in the multi-anvil press. We have conducted measurements on the bridgmanite-majorite-akimotoite triple point in MgSiO₃ using the multi-anvil press and laser-heated diamond anvil cell. Pure MgSiO₃ glass was loaded in a rhenium capsule for multi-anvil press experiments at 20-22 GPa and 1600-2100 C. For phase identification, we conduct 2D Raman spectroscopy on the multi-anvil samples at Arizona State University. A series of laser-heated diamond-anvil cell (LHDAC) experiments have been performed combined with in situ X-ray diffraction. We compare the results from the LHDAC and multi-anvil press experiments. The triple point determined through these experiments will provide an important reference point in the pressure-temperature space for future high pressure experiments and allow mineral physicists to compare the P-T conditions measured in these two different methods.