Pressure (P) and Temperature (T) Dependence of Polycrystalline $MgSiO_3$ Majorite Garnet to P = 8.5 GPa and T = 1000K in a DIA-Type Cubic-Anvil Apparatus Interfaced with Synchrotron X-radiation.	X17B1

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Dense isotropic Polycrystalline specimens of $MgSiO_3$ majorite garnet were fabricated in a uniaxial split-sphere anvil apparatus USSA-2000 at 18.5 GPa and 1850°C for 4 hours within the stability field of majorite garnet.

These specimens are single-phased, fine-grained ($\sim$ 5 mm), free of microcracks and have bulk densities identical to the x-ray density and exhibit compressional (P) wave and shear (S) wave velocities within 0.2% of single crystal elastic moduli of Pacalo and Weidner (1997).

Recent high pressure ultrasonic interferometry technological development in our laboratory has enabled precise measurement of travel times of acoustic P wave and S wave in minerals to pressures of 9 GPa and temperatures of 1500K in a DIA-type, cubic anvil apparatus (SAM-85), interfaced with white x-ray radiation from the superconducting wiggler port of the National Synchrotron Light Source at Brookhaven National Laboratory.

Using a 40 MHz $LiNbO_3$ dual-mode (P and S vibrational modes) piezo electric transducer, we have obtained new data on the pressure and temperature dependence of both the P wave and S wave velocities, simultaneously, in the $MgSiO_3$ majorite to 8.5 GPa and 1000K.

The new data are compared with previous estimates using elasticity systematic (Duffy and Anderson, 1989) and acoustic and PVT data for other compositions in the Pyrope-majorite solid solution series, especially those for a $Py_{62}Mj_{38}$ specimen studies by Rigden, Gwanmesia and Liebermann (1994) and Wang *et al.* (1996).