Elasticity of Polycrystalline $MgSiO_3$-Majorite from Simultaneous X-ray and Ultrasonic Measurements to 9 GPa and 1000 K in a Multi-Anvil Apparatus	X17B1

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Polycrystalline specimens of $MgSiO_3$-majorite have been hot-pressed in a 2000-ton uniaxial split-sphere apparatus (USSA-2000) using a 10 mm MgO octahedral cell assembly and the techniques developed previously by Gwanmesia and Liebermann (1992; see also Gwanmesia *et al.*, 1993). These specimens have bulk densities identical to the X-ray density and exhibit compressional and shear wave velocities within 0.2% of the Hashin-Shtrikman bounds calculated from the single-crystal elastic moduli of Pacalo and Weidner (1996). In our laboratory, we have developed techniques to enable precise ultrasonic interferometeric measurements of wave velocities in minerals to be performed to pressures of 9 GPa and temperatures of 1500 K using a DIA-type, cubic-anvil apparatus (SAM 85) installed on the superconducting wiggler beamline (X17B) at the National Synchrotron Light Source of the Brookhaven National Laboratory. X-ray spectra of both the polycrystalline specimen and the NaCl medium which surrounds it are monitored continuously; the former provides PVT data to compliment the velocity measurements and the latter the pressure standard. We have obtained new data on P and S velocities in the polycrystalline $MgSiO_3$-majorite to 7 GPa at 1000 K. An example of the high quality of the acoustic interference patterns is given in the figure below.

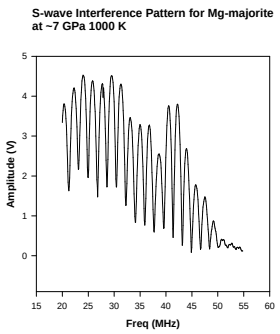

Figure 1.