Elasticity of Polycrystalline Beta-Mg_2SiO_4 From Simultaneous X-ray and Ultrasonic Measurements to 7 GPa and 900 K in a Multi-Anvil Apparatus	X17B1

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Polycrystalline specimens of the beta phase of Mg_2SiO_4 have been hot-pressed in a multi-anvil high pressure apparatus using the techniques described previously by Gwanmesia and Liebermann (1992). These specimens have bulk densities which are 99.8% of the theoretical density and, compressional and shear wave velocities which are within 0.5% of the of Hashin-Shtrikman bounds calculated from the single-crystal elastic moduli of Sawamoto *et al.* (1984). 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 for a polycrystalline beta phase specimen to 7 GPa and 900 K. In the figure below, we plot the travel time of shear waves *vs.* pressure at room temperature for the beta phase.

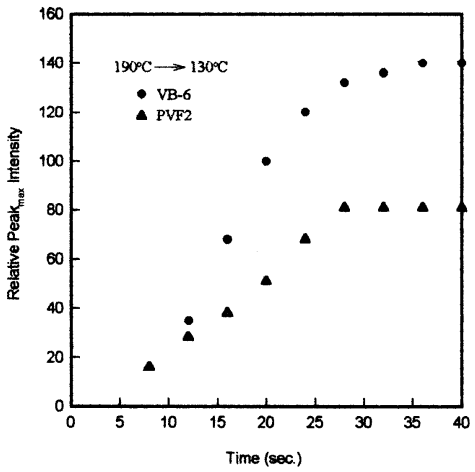

Figure 1. S-wave Travel Time vs. Pressure at Ambient T for beta phase.