

Equation of State of NaCl From Simultaneous Ultrasonic and Synchrotron X-ray Diffraction Measurements	X17B1
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G. Chen, Y. Sinelnikov, M. T. Vaughan, and R. C. Liebermann (SUNYat Stony Brook,)

Adaptation of the ultrasonic interferometric techniques to be used in a cubic anvil high pressure apparatus installed at the National Synchrotron Light Source (X17B1) of the Brookhaven National Laboratory allows simultaneous ultrasonic and synchrotron X-ray diffraction measurements at high pressure and high temperature in polycrystalline specimens. Cold-pressed and polished NaCl pellets (with grain size on the order of microns) capable of transmitting high frequency (to 60 MHz) acoustic waves on the bench were used as the specimens. Experimental runs have been attempted to 8 GPa and 700 K with the pressure determined by the X-ray diffraction volume change of the specimen and temperature monitored actively with a W-Re thermocouple. This new development extends the measurement capability of ultrasonic equation of state experiments on NaCl at simultaneous elevated pressure and temperature by a factor of 10 in pressure and at comparable temperature, which is limited at present by the recrystallization of NaCl at higher temperature. Further development in sample handling, e.g., keeping the sample in extremely dry condition, may allow us to reach even higher temperature at high pressure, such as those reached in the MgO experiment (1500 K) reported in a separate NSLS abstract. These new velocity data will allow the determination of the cross pressure and temperature dependence of the elasticity of NaCl, and with the volume data form the basis for refining the pressure scale for this important standard material.