

Ultrasonic Acoustic Wave Velocities of Neighborite (NaMgF_3) Across Orthorhombic and Cubic Phase Boundary at High P-T

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Neighborite perovskite (NaMgF_3) is a close analogue to Mg or Ca silicate perovskite. It experiences a second-order phase transition at high T which may have a significant effect on the acoustic velocities. Here we report the measurement of elastic wave velocities of neighborite perovskite using multi-anvil high pressure apparatus located in beamline BM6 Advance Photon Source. We use the newly installed ultrasonic equipment using pulse-echo-overlap method coupled with D-DIA device. X-ray radiograph is used to measure sample length at high P-T. X-ray diffraction spectrum is used to determine the pressure and sample conditions. Precise measurements of P and S wave velocities are at 60 and 35 MHz respectively and are nearly simultaneous. We use a double reflector method to enable measurement of elastic wave velocities of cold-pressed polycrystalline sample which is sintered in situ at high P-T. Experiments were carried out up to 3 GPa and 1100 °C. Our preliminary results indicated that at MHz frequencies the change in acoustic velocities across the orthorhombic-cubic phase boundaries is very smooth, with no indication of a velocity minimum at the transition, nor velocity increase for the cubic phase.