

SMP044-P01

Room:Convention Hall

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Synthesis of polycrystalline sintered stishovite and its physical property measurements

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We synthesized polycrystalline sintered stishovite at pressure of 15 GPa and temperature of 1473 K. The starting material was a silica glass rod with diameter of 2.5 mm and height of 2.7 mm in. This was enclosed in a platinum capsule. The recovered sample was a whitish translucent rod with diameter of about 2 mm and height of about 2.3 mm. The recovered sample was examined by micro-focused X-ray diffraction and micro-Raman spectroscopic measurements. The results indicate that the recovered sample is a pure polycrystalline stishovite. Ultrasonic measurements were carried out at ambient conditions. We determined compressional wave velocity of 11.776 km/s and shear wave velocity of 7.174 km/s. We measured bulk density of this sintered stishovite by Archimedian method. The density is 4.282 g/cm³. Using these parameters, we calculated elastic moduli of this sample: Bulk modulus, 300 GPa; shear modulus, 220 GPa; Youngs modulus, 531 GPa; Poissons ratio, 0.204. These values are consistent with those obtained by previous studies. We have also conducted X-ray diffraction measurements under low and high temperature between 90 and 1000 K at BL02B2, SPring-8. We are going to report temperature dependence of thermal expansivity of stishovite in the session.

Keywords: stishovite, sintered polycrystalline sample, elastic wave velocity, thermal expansivity