High pressure experiment was performed using 80-ton uni-axial press (Urakawa et al. 2010) installed at X-ray CT beamline (BL20B2), SPring-8. High pressure was generated using opposed cupped anvils. The Ni-S with an eutectic composition was enclosed in hBN capsule and single crystal sapphire rods were placed at top and bottom of the sample for ultrasonic measurement. P-wave signals with frequencies of 37 MHz were generated by LiNbO$_3$ transducer. The echo signals from the sample were detected using high-resolution digital oscilloscope. CT measurement was carried out by rotating the press from 0 to 180 degree with 0.2-0.3 degree steps. Monochromatized X-ray of 51 keV was used. X-ray absorption profile was obtained from the X-ray radiograph and the sample thickness in X-ray direction was directly measured from the CT slice image.

Sound velocity and density measurements at room temperature was performed up to 1.4 GPa and those at high temperature was carried out up to 0.4 GPa and 1673 K. P-wave signal was clearly observed at the present conditions. $V_P$ of Ni-S suddenly dropped after melting of the sample. The $V_P$ of liquid Ni-S decreases slightly with increasing temperature in the range of 1273-1673 K. Density of Ni-S decreased slightly after melting. The present measurement can provide the relationship between $V_P$ and $\rho$ for alloys under pressure.

Keywords: Sound velocity, Density, Liquid, Core