

NaClの弾性波速度と密度の同時測定による絶対圧力スケールの構築

Brillouin scattering and X-ray diffraction of NaCl: a construction of primary pressure scale

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An accurate pressure determination is very important to all high pressure experiments. Uncertainties of pressure scale are problem for determination of pressure. An essential and fundamental problem to determine a P-V-T equation of state of pressure scale is that it depends on another pressure scale based on the P-V-T relation of metals determined by shock-wave experiments. Simultaneous sound velocity and XRD measurements provide a direct determination of pressure without recourse to any prior pressure standards, thus creating a primary pressure scale. The primary pressure scale of MgO with integration of Brillouin scattering and XRD data has been reported until 55 GPa (Zha et al., 2000). NaCl is one of the most important pressure scales for high pressure experiments using DAC. In order to construct a primary pressure scale of NaCl, we determined the elastic wave velocities and lattice parameters of polycrystalline NaCl simultaneously up to ~30 GPa using the Brillouin scattering and XRD measurements at SPring-8. A newly developed in-situ Brillouin scattering and XRD measurement system at SPring-8 enables us to explore both elastic velocities and densities under high-pressure, simultaneously. In this report, we will present preliminary results on a primary pressure scale of the B1 phase of NaCl. The effect of anisotropy of the B1-phase on the data quality will be also discussed.