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Elasticity of MgO Under Direct Pressure Measurement: Insights on Current Pressure Scales.[1] BAOSHENG LI, Stony Brook University, KELLY WOODY, Division of Water Supply, The State of Tennessee, ROBERT LIEBERMANN, Department of Geosciences, SUNY Stony Brook — Recent high pressure studies indicated that the inaccuracy and inconsistency of the pressure scales used for pressure determination in different studies might be an importance source that gives rise to the apparent discrepancy in the derived phase equilibrium and physical properties for mantle minerals. In this study, P and S wave velocities and unit cell parameters (density) of MgO are measured simultaneously up to 11 GPa 1073K using combined ultrasonic interferometry and in-situ X-ray diffraction techniques, from which the elastic bulk and shear moduli as well as their and temperature pressure derivatives are obtained independent of pressure. These properties are subsequently used to calculate the primary pressures at the observed strains for comparison with those derived from previous proposed MgO pressure scales. Additionally, a comparison of the primary pressure obtained from MgO with those inferred from the enclosed internal pressure calibrant (NaCl) gives an opportunity to evaluate the Decker NaCl scale as well. Our results suggest that current pressure scales may bear larger uncertainties than originally claimed.

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