

Single-crystal elastic property of silicate perovskites

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Information of single-crystal elasticity of silicate perovskite is essential for comprehensive understanding of the lower mantle. We have measured single-crystal elastic property of $\text{Mg}_{1-x}\text{Fe}_x\text{SiO}_3$ perovskite ($x = 0$ or 0.035) by means of inelastic x-ray scattering at the ambient condition. The present results show relatively low values compared to previous reports for the iron free sample. The effect of iron increases both adiabatic bulk modulus and shear modulus. Combining the present results with pressure and temperature derivatives reported in literature, the chemical composition of the lower mantle will be discussed.

Keywords: silicate perovskite, single-crystal elasticity, the lower mantle, inelastic x-ray scattering