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Pressure-induced phase transitions in NaMgF3 post-perovskite[1]
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— Understanding the behavior of $MgSiO_3$ postperovskite(PPV) under extreme pressures is fundamental for modeling the interiors of solar giants and extrasolar planets. In 2006, $MgSiO_3$ post-perovskite was predicted to dissociate into MgO and SiO_2 at 1.1 TPa (Umemoto et al., Science 311, 983 (2006)). However, the predicted dissociation pressure is too high to be easily verified experimentally. Instead, a low-pressure analog, $NaMgF_3$ neighborite, has been studied to test for structural predictions in $MgSiO_3$. $NaMgF_3$ was predicted to dissociate at $\sim$40 GPa (Umemoto et al., Geophys. Res. Lett. 33, L15304 (2006)), but this has not been confirmed experimentally (Martin et al., Geophys. Res. Lett. 33, L11305 (2006); Grocholski et al. Geophys. Res. Lett. 37, L14204 (2010)) and the dissociation $MgSiO_3$ PPV is now being questioned. Here, we reexamine in detail the pressure dependence of crystal structures and phonon frequencies in $NaMgF_3$ and reveal the apparent reason why dissociation was not observed in this material.

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