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Synthetic $MgAl_2O_4$ (spinel) at high-pressure conditions (0.0001–30 GPa): A synchrotron X-ray powder diffraction study

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ABSTRACT

The equation of state and the structural behavior of synthetic $MgAl_2O_4$ have been investigated using synchrotron X-ray powder diffraction data collected to 30 GPa at room temperature. The Birch-Murnaghan, Vinet, and Poirier-Tarantola models have been fitted to the observed *P*-*V* data. The Birch-Murnaghan equation of state, with V_0 fixed at its experimental value, yields $K_0 = 190.8(\pm 1.2)$ GPa, $K_0' = 6.77(\pm 0.15)$ and $K_0'' = -0.075$ GPa^{-1} (implied value). The compression of spinel occurs with a negligible change of the fractional coordinate of oxygen. Therefore the structural shrinking is a function of cell edge shortening alone. The results presented here are compared with those from the literature.