

LETTERS

Structure refinement of a birefringent Cr-bearing majorite $\text{Mg}_3(\text{Mg}_{0.34}\text{Si}_{0.34}\text{Al}_{0.18}\text{Cr}_{0.14})_2\text{Si}_3\text{O}_{12}$

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ABSTRACT

A single crystal of a birefringent Cr-bearing majorite, $\text{Mg}_3(\text{Mg}_{0.34}\text{Si}_{0.34}\text{Al}_{0.18}\text{Cr}_{0.14})_2\text{Si}_3\text{O}_{12}$, was synthesized at 20 GPa and 2000 °C using “6–8” type uniaxial split-sphere apparatus. This garnet is tetragonal with the unit-cell parameters $a \approx c$ and deviates slightly from cubic symmetry. The structure refinements using single-crystal X-ray diffraction intensity data were carried out by assuming three space groups (one cubic and two tetragonal) to determine the most probable symmetry. The most probable space group is $I4_1/a$ (tetragonal). The Cr ions show a disordered distribution between the two nonequivalent octahedral sites in the $I4_1/a$ structure.