

Preparation and Fluorite-pyrochlore Phase Transformation in $\text{Gd}_2\text{Zr}_2\text{O}_7$

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$\text{Gd}_2\text{Zr}_2\text{O}_7$ prepared by a polymeric citrate precursor method has a defect fluorite phase if it is calcined in static air between 700 and 1200°C; it has a disordered pyrochlore phase, if sample is heat treated at 1300 or 1400°C. Phase transformation is accelerated by increasing the preparation temperature and heat treatment period. Sample prepared at 1400°C is more ordered than that calcined at 1300°C. Unit cell *a*-axis dimension of the pyrochlore phase is slightly longer than

the *2a* of the fluorite phase. Expansion of the unit cell is probably due to the different distribution of the oxygen atoms in these two phases and also the preparation method. Samples were quenched from the preparation temperature to room temperature. Particle size analysis on the maximum intense XRD peak by the Scherrer formula is in the range of 6–68 nm, grain grows with increasing the preparation temperature and prolonged heat treatment time.