

Pressure-induced phase transition in nanostructured ferrite

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The structure of zinc-doped ferrite $\text{Zn}_{0.34}\text{Fe}_{2.53}\square_{0.13}\text{O}_4$ (where \square represents a vacancy), synthesized in the form of spherical nanoparticles with narrow size distribution and mean size of 15 nm by thermal decomposition method, have been studied by means of x-ray diffraction and Raman spectroscopy methods in wide pressure range up to 34 GPa. The investigation provides detailed information about pressure dependences of lattice parameters, interatomic bond lengths and angles of nanostructured ferrite. The phase transition from initial phase with cubic structure (Fd-3m) to high-pressure phase with orthorhombic structure (Pnam) was found in ferrite $\text{Zn}_{0.34}\text{Fe}_{2.53}\square_{0.13}\text{O}_4$ at pressure above 18 GPa. The phase transition was accompanied by anomalies in pressure dependencies of the lattice parameters, unit cell volume, and vibration modes.

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