Стендовый доклад

THE EFFECTS OF HIGH PRESSURE ON THE CRYSTAL STRUCTURE AND VIBRATION SPECTRA OF MAGNETOPLUMBITE $PbFe_{12}O_{19}$

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The response of magnetoplumbite ($PbFe_{12}O_{19}$ or related hexaferrites) to high-pressure conditions is critical for understanding its structural resilience and functional adaptability in extreme environments. This study investigates the pressure-induced crystal structure evolution, lattice distortions, and possible phase transitions of magnetoplumbite using synchrotron X-ray diffraction (XRD) and Raman spectroscopy calculations. High-pressure experiments reveal anisotropic compression behavior, with notable distortions in the FeO_6 octahedra and PbO_{12} polyhedra that govern the magnetoplumbite lattice [1]. A gradual reduction in unit cell volume is observed, accompanied by a shift in Fe–O bond lengths and angles, indicating pressure-driven distortion of the hexagonal close-packed framework [2]. Above a critical pressure thres- hold (∼20 GPa), a reconstructive phase transition occurs, destabilizing the magnetoplumbite structure in favor of a high-pressure polymorph with modified magnetic properties. These findings highlight the interplay between structural integrity and external pressure [3], providing key insights for designing hexaferrite-based materials for high-pressure applications, such as magnetic sensors and data storage devices.

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