

Mössbauer Study of the Dynamics in BaFe₁₂O₁₉ Single Crystals

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Mössbauer spectra of hexagonal BaFe₁₂O₁₉ single crystals were studied at various temperatures (4-300 K). It was found that the spin states in Fe atoms were parallel to the γ -ray's direction into a single crystal along the c-axis. The location of the Fe ion in the 2b site is unusual in an oxide structure and has strong anisotropic lattice vibrations. Moreover, at room temperature, the zero absorption lines of the Fe ions at the 2b site were observed due to fast diffusion motion in a double well atomic potential. The two Fe ions of the single crystal mainly enter into the sites in the mirror plane of the trigonalbipyramidal structure.

Keywords : spin state, anisotropic lattice vibration, bipyramidal structure