

Structural and Morphological Investigation of $Ba_3Yb_2Zn_5O_{11}$ Frustrated Oxide

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Abstract

In the present work, $Ba_3Yb_2Zn_5O_{11}$ frustrated oxide was successfully synthesized using the conventional solid-state reaction method. X-ray diffraction was performed to assess phase purity. The Crystallography Open Database (COD) was used to identify the possible space group associated with the XRD pattern. The Le Bail algorithm was performed for profile matching of the XRD pattern with space group F-43m. To get the structural information Rietveld refinement was performed using this space group. The GFourier program was used to examine the electron density distribution inside the unit cell. The atomic arrangement within the unit cell was analysed using the VESTA software. Field Emission Scanning Electron Microscopy (FESEM) was used to analyze the surface morphology of the sample. These combined structural and microstructural analyses confirmed the successful synthesis of $Ba_3Yb_2Zn_5O_{11}$ frustrated oxide. The Rietveld refinement and surface morphology provide a base for other properties of the material.

Keywords

X-ray diffraction, Crystal structure, Rietveld refinement, Frustrated.