

STRUCTURE AND MAGNETIC PROPERTIES OF BiFeO_3 AND $\text{Bi}_{0.9}\text{Sm}_{0.1}\text{FeO}_3$

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ABSTRACT

In this work, we have reported that Sm doping can contribute a good effect on magnetic properties of BiFeO_3 (BFO) ceramics. The effect of substitution of Sm^{3+} ion on Bi^{3+} site were investigated based on the structure and magnetic properties. Multiferroic BFO and $\text{Bi}_{0.9}\text{Sm}_{0.1}\text{FeO}_3$ samples were prepared by conventional solid state reaction. The phase exists and the crystal structure was confirmed by X-Ray Diffraction and has showed that the both samples were polycrystalline with rhombohedral R3C structure. By using Scanning Electron Microscope (SEM), the average grain size obtained for $\text{Bi}_{0.9}\text{Sm}_{0.1}\text{FeO}_3$ is smaller (0.5-1.5 μm) than pure BFO (1-3 μm). Vibrating Sample Magnetometer (VSM) measurement at room temperature showed that $\text{Bi}_{0.9}\text{Sm}_{0.1}\text{FeO}_3$ have higher magnetization saturation of 11.181×10^{-2} emu/g remnant magnetization (1.84×10^{-2}) and coercivity field (1541.9 Oe) than pure BiFeO_3 .

Keywords: multiferroic; structure; magnetism; BiFeO_3

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