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# Program



**CRYSTALLOGRAPHIC AND MÖSSBAUER STUDIES OF  $\text{TbFe}_{0.75}\text{Mn}_{0.25}\text{O}_3$** 

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$\text{Mn}^{3+}$  substituted orthoferrites  $\text{TbFe}_{0.75}\text{Mn}_{0.25}\text{O}_3$  were prepared by the sol-gel method. The crystallographic and magnetic properties of powders were characterized by x-ray diffraction (XRD), Mössbauer spectroscopy, and vibrating sample magnetometry (VSM). The crystalline structure was found to be a single phase of orthorhombic structure. The crystal structure at room temperature is determined by the Rietveld method. It is found that the space group  $Pbnm$  and resulting lattice constants  $a_0=5.317 \text{ \AA}$ ,  $b_0=5.604 \text{ \AA}$ , and  $c_0=7.598 \text{ \AA}$ , respectively. Mössbauer spectrum of  $\text{TbFe}_{0.75}\text{Mn}_{0.25}\text{O}_3$  have been taken at various temperatures ranging from 4.2 to 550 K. For Mössbauer spectra, we have fitted the spectra to a model based on a random distribution of Fe and Mn ions on the octahedral sites. Isomer shift at room temperature is 0.25 mm/s, which mean that the valence state of Fe ions is ferric ( $\text{Fe}^{+3}$ ). The Néel temperature was determined to be  $T_N=550\pm 5 \text{ K}$  by the Mössbauer thermal scan method and VSM.

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Oral  Poster  Invited Talk

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