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Crystallographic and magnetic properties of nanocrystalline perovskite structure SmFeO_3 orthoferrite

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Abstract: In this article, we present the structural and magnetic studies of pristine SmFeO_3 nanocrystalline ceramic samples as sintered at temperature 850 °C and 1000 °C. X-ray powder diffraction data confirm the existence of single-phase nature with orthorhombic ($Pbnm$) structure of the samples. The SEM image reveals spherical particles with a size range of 60–130 nm for SFO-850 and SFO-1000 samples. X-ray absorption spectroscopy studies on Fe $L_{3,2}$ and O K -edges of SmFeO_3 sample revealed the homo-valence state of Fe in these materials. From magnetization studies it has been observed the materials exhibit ferromagnetic and antiferromagnetic (canted spin structure) sub-lattices, which results strong magnetic anisotropy in the system.

Keywords: A1. Crystal Structure, B1. Perovskites, B1. Nanomaterials, B2. Magnetic materials

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