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Multiferroic and magnetoelectric properties of BCT-ZF ceramics

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Multiferroic BCT-ZF ceramics were prepared from ferromagnetic (FM) zinc ferrite (ZF) and ferroelectric (FE) barium calcium titanate (BCT) with different mole % age of x, $((1-x)\text{BaO} \cdot 0.96\text{CaO} \cdot \text{O}_4\text{TiO}_3 - (x)\text{ZnFe}_2\text{O}_4)$ by using solid state reaction method. The preliminary structural studies were carried out by using x-ray diffraction technique, which confirm that the samples have a tetragonal structure along with the cubic spinel ferrite phase at room temperature with the average crystallite size of 22-32 nm. Raman spectra of these composites also confirm the existence of BCT phase and ZF phase respectively. Room temperature ferroelectric characterizations have shown that the samples are ferroelectric along with an adequate magnetoelectric coupling of 10.85 mV/(cm. Oe). The strong dependence of electric parameters on applied magnetic DC bias fields provides a framework for the development of potential magnetoelectric devices. Also, the high sensitivity of magnetoelectric coupling to the applied AC magnetic field can be used for its application in magnetoelectric sensors.

Biography

Rashmi Rani has completed PhD dual degree in Physics (from India and Italy) under the Erasmus Mundus (European Commission) scholarship in May 2015. She has experience in synthesis and the morphological, structural and electrical characterization of electro-ceramics and nanocrystalline ceramics for memory device applications. Further, she has also worked extensively on ferroelectric thin-films, polymers and metal oxide nano-fibers for biomedical applications and tissue engineering. The core area of her experimental expertise is in preparation of electro-ceramics by solid state reaction, sol-gel technology and hydrothermal method, Microwave Assisted Radiant Heating (MARH), thin films, spin coating technique, electrospinning and electrodeposition. Her experience in experimental techniques is as follows: XRD, TEM, SEM, TGA-DSC, Impedance Spectroscopy, LCR Meter, DC resistivity, FTIR, Raman analysis and UV-Vis spectroscopy. She has published 13 research papers in international refereed journals.

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