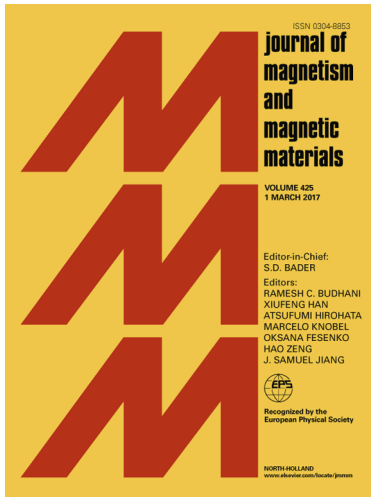

Research articles

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Investigation of physical properties of SnS:Fe diluted magnetic semiconductor nanoparticles for spintronic applications

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Abstract

As the doped semiconductors can induce and tune the novel physical characteristics. Therefore, we present the investigation of Fe doped SnS nano-crystallites, with x_{Fe} = 0.00-0.10, synthesized by using cost-effective and simple co-precipitation method. X-ray diffraction (XRD) has confirmed the orthorhombic single phase formation with nano-crystalline nature that is consistent with the surface structure revealed using SEM. NEXAFS spectroscopy has demonstrated that Fe retains +2 oxidation states. The dielectric response measured within 1 kHz-20MHz depicts that the specimens respond well to the low energies indicating potential applications in the optical devices. Complex impedance study has elucidated dominant contribution from the grain resistance, while the complex modulus analysis confirmed the role of grains capacitance, suggesting that the polarization effect of such electrodes could have practical utilities. The ferromagnetism exhibited at 300K also has revealed data storage device applications of the studied compounds.

Keywords: spintronics, data storage devices, optoelectronics, NEXAFS, impedance spectroscopy, RTFM.