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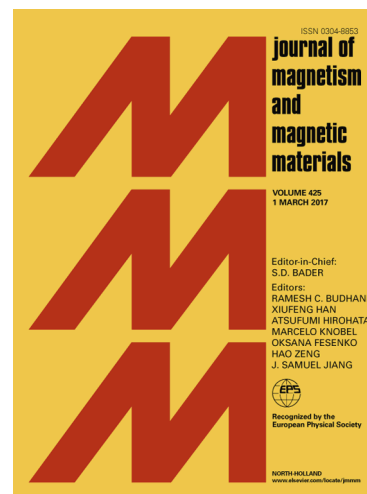
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**A study on impact of zinc substitution on magneto-optic properties of manganese ferrite nanoferrofluids**

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**Abstract**

$Mn_{1-x}Zn_xFe_2O_4$  nanoparticles ( $x = 0.1, 0.3, 0.5, 0.7$  and  $0.9$ ) were synthesized using chemical co-precipitation method. X-ray diffraction (XRD) analysis confirmed the cubic spinel structure of synthesized nanoparticles. The crystallite size and lattice parameter were found to decrease with increase in zinc substitution. Surface morphology by scanning electron microscope (SEM) and energy dispersive analysis of X-ray (EDAX) confirmed the presence of substituted metal ions in all the samples. Magnetic parameters at room temperature using vibrating sample magnetometer (VSM) are found to decrease with increasing zinc substitution. Faraday rotation of  $Mn_{1-x}Zn_xFe_2O_4$  nanoferrofluids is found to vary with zinc substitution under applied magnetic field. Verdet constant obtained from Faraday rotation are found to vary from 5.35 to 2.71 deg./T cm with zinc substitution.

**Keywords:** Co-precipitation, Saturation Magnetization, Coercivity, Superparamagnetism, Faraday rotation, Verdet constant.

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