Study of Electrical and Magnetic Properties of Cerium Doped Nano Smart Magnesium Ferrite Material

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Abstract

Nano Smart Magnesium Cerium ferrite material had been synthesized by sol-gel route. The crystalline structure and grain size of these particles were analyzed by using XRD, the particle size ranged from 46.61nm to 82.12 nm. The decrease in value of the lattice parameter with doping suggests that the shrinkage in unit cell and the crystallite size increase with Ce3+ concentration. The SEM and EDAX studies helped in confirming the presence of elements and the size of the material particles. The permittivity, dielectric loss, capacitance and inductance of these four ferrite samples with different concentration of cerium were studied within the frequency range of 2.4 to 4 GHz. The Magnetic measurements revealed through hysteresis suggests the B-site substitution of Ce3+ ions in the series MgCexFe2-x O4. The variation of magnetic parameters with doping concentration is explained with the help of particle size.
dependence. Piezo properties confirmed the smart behaviour of the material.

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**Index Terms**

Computer Science                   Applied Sciences

**Keywords**

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Sol-Gel route

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