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**Effect of Pr3+-Doping on the Structural, Elastic and Magnetic Properties of Mn–Zn Ferrite Nanoparticles Prepared By Solution Combustion Synthesis Method**

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**Abstract**

Ferrite nanoparticles are currently used for important applications in the field of medical particularly, target-directed medicine and cancer treatment. Keeping this in mind, in the present work we prepared Pr3+ doped Mn0.5Zn0.5Fe2O4 nanoparticles by combustion route. The crystallinity and structure were confirmed by XRD. The Elastic properties are estimated by using FTIR data and reveals that variation of elastic constants has been interpreted in terms of strength of inter-atomic bonding and electronic configuration of the cations involved in the samples. Further variation of stiffness constants, Poison's ratio, elastic constants, longitudinal and transverse wave velocity is studied with respect to Pr3+content. Significant influence is observed in elastic values due to the addition of larger ionic radii of Pr3+ in spinel lattice. The intensity of magnetization, remanence, and coercivity was found to be decreasing with increasing Pr3+ concentration. Hence these samples are potential candidates for medical applications i.e. magnetic resonance imaging.

**Keywords:**

Ferrites, Stiffness constants, Poison's ratio, Elastic constants, Longitudinal elastic wave velocity, Transverse wave velocity

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