

# Evidence of Multiferroicity in Zn/La Doped CoF<sub>2</sub>O<sub>4</sub> Nanoparticles

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**Abstract**—Nanoparticles of Co<sub>1-x</sub>Zn<sub>x</sub>Fe<sub>2-x</sub>La<sub>x</sub>O<sub>4</sub> (x=0.0, 0.1 and 0.3) were synthesized by co-precipitation route. Effects of Zn/La co-doping on structural and multiferroic properties of Co<sub>1-x</sub>Zn<sub>x</sub>Fe<sub>2-x</sub>La<sub>x</sub>O<sub>4</sub> nanoparticles have been investigated. The powder XRD confirms the phase purity, particle size and cubic spinal structure of the nanoparticles. The size of particles decreases with increase in Zn/La co-doping, indicates the short range ordering in CoFe<sub>2</sub>O<sub>4</sub>. Room temperature magnetic measurements confirm the stable saturation magnetization and low coercivity. Ferroelectric P–E loops measurement shows the rounded corners of the loops, which may be due to the aggregation of CoFe<sub>2</sub>O<sub>4</sub> nanoparticles with each other resulting out of their strong magnetization. Simultaneous occurrence of saturation magnetization and weak ferroelectricity (P-E loop) confirm the signature of multiferroicity in the Zn/La doped CoFe<sub>2</sub>O<sub>4</sub> nanoparticles.

**Keywords:** Co-precipitation; Multiferroics; Structural properties.