

## **Influence of La<sup>3+</sup> on Structural, Magnetic, Optical and Dielectric Properties in CoFe<sub>2</sub>O<sub>4</sub> Nanoparticles Synthesized by Starch-Assisted Sol-Gel Combustion Method**

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**Abstract :** Herein, we reported the influence of La<sup>3+</sup> substitution on structural, magnetic and dielectric properties of CoFe<sub>2</sub>O<sub>4</sub> nanoparticles synthesized by starch-assisted sol-gel combustion method. X-ray diffraction pattern confirmed the formation of cubic spinel structure of La<sup>3+</sup> ions doped CoFe<sub>2</sub>O<sub>4</sub> nanoparticles. Raman and Fourier Transform Infrared spectroscopy study also confirmed cubic spinel structure of La<sup>3+</sup> substituted CoFe<sub>2</sub>O<sub>4</sub> nanoparticles. The field emission scanning electron microscopy study revealed that La<sup>3+</sup> substituted CoFe<sub>2</sub>O<sub>4</sub> nanoparticles were in the range of 10-40 nm. The magnetic properties of La<sup>3+</sup> substituted CoFe<sub>2</sub>O<sub>4</sub> nanoparticles were investigated by using vibrating sample magnetometer. The variation in saturation magnetization, coercivity and remanent magnetization with La<sup>3+</sup> concentration in CoFe<sub>2</sub>O<sub>4</sub> nanoparticles was observed. The variation of real and imaginary part of dielectric constant, tan δ, and AC conductivity were studied with change of concentration of La<sup>3+</sup> ions in CoFe<sub>2</sub>O<sub>4</sub> nanoparticles. The variation in optical properties was studied via UV-Vis absorption spectroscopy. Acknowledgment: This work was supported by the Ministry of Education, Youth and Sports of the Czech Republic - Program NPU I (LO1504).

**Keywords :** starch, sol-gel combustion method, nanoparticles, magnetic properties, dielectric properties

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