

Effects of Annealing Temperature on the Size of Zinc Doped Cobalt Ferrite Nanoparticles Synthesized using Green Binder

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Abstract: Zinc doped cobalt ferrite nanoparticles have been synthesized by sol-gel auto combustion method from nitrate salts of respective metal ions using lemon as a green binder. The nanoparticles synthesized were annealed at different annealing temperatures of 873K, 973K, 1073K, 1173K and 1273K. The size of nanoparticles was also analyzed at a constant annealing temperature for different duration of time. X-ray diffraction pattern confirmed the formation of single-phase nanoparticles of Zinc doped cobalt ferrite. Fourier transform infrared study was performed to ascertain the structure of the nanoparticles. FT-IR studies also supported the trend of increasing size as shown by XRD results. Scanning Electron Microscopic (SEM) studies revealed nano crystalline nature of the sample. Energy dispersion X-ray analysis (EDAX) was performed to know an elemental composition of the sample and to confirm the stoichiometry. The study revealed that crystallinity enhanced and size of the nanoparticles increased with increasing annealing temperature due to coercivity.

Keywords: Zinc Doped cobalt Ferrite Nanoparticles, sol-gel technique, XRD, FT-IR, EDAX

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