



Study of Structural and Magnetic Behaviour of $\text{Ni}_{0.75}\text{Zn}_{0.25}\text{Fe}_2\text{O}_4$ and $\text{Ni}_{0.25}\text{Zn}_{0.75}\text{Fe}_2\text{O}_4$ Ferrite Nanoparticles Annealed at 550°C, 650°C and 700°C, Synthesized by Citrate Precursor Method

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Abstract : $\text{Ni}_{0.75}\text{Zn}_{0.25}\text{Fe}_2\text{O}_4$ and $\text{Ni}_{0.25}\text{Zn}_{0.75}\text{Fe}_2\text{O}_4$ ferrite nanoparticles were synthesized using citrate precursor method. The citrate precursor was annealed at temperature 550°C, 650°C and 700°C. The annealed powders were characterized using X-ray diffractometer. (XRD) and vibrating sample magnetometer (VSM). Observed XRD data display cubic spinel structure. The average particle size was observed 34nm, 35nm and 35 nm for $\text{Ni}_{0.75}\text{Zn}_{0.25}\text{Fe}_2\text{O}_4$ ferrite and 34nm, 36nm and 36nm for $\text{Ni}_{0.25}\text{Zn}_{0.75}\text{Fe}_2\text{O}_4$ ferrite at the given annealing temperatures 550°C, 650°C and 700°C. The

Magnetization, Retentivity and Coercivity for $\text{Ni}_{0.75}\text{Zn}_{0.25}\text{Fe}_2\text{O}_4$ was found 61.38 emu/g, 13.11 emu/g and 113G at annealing temperature 550°C, 39.09 emu/g, 8.10 emu/g and 80G at annealing temperature 650°C and 43.21emu/g, 6.77 emu/g and 90G at annealing temperature 700°C respectively. Similarly the Magnetization, Retentivity and Coercivity for $\text{Ni}_{0.25}\text{Zn}_{0.75}\text{Fe}_2\text{O}_4$ ferrite were found to be 15.05 emu/g, 1.35 emu/g and 55G at annealing temperature 550°C, 29.16emu/g, 1.27 emu/g and 43G at annealing temperature 650°C and 32.08emu/g, 2.12 emu/g and 55G at annealing temperature 700°C, respectively

Key words: Ni-Zn Ferrite Nanoparticles, Citrate precursor method, Magnetic properties.

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Introduction:

Ferrites are technologically important engineering material and an object of study for quite long time (Ishino and Narumiya, 1987; Sugimoto, 1999). Nickel-Zinc ferrite has been extensively used as high permeability material and low eddy current loss. Research in this field has received a major boost in the recent years when new methods for synthesis and characterization of small size nanoparticles were developed. Several research groups are exploring the possibility of