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A study of effect of size of divalent metal on structural and magnetic properties of synthesized MFe_2O_4 (M=Mg, Ni, Cu and Ca) ferrite nanomaterials using citrate approach and annealed at 450°C.

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Abstract : *Ferrite nanoparticles, $MFeO_4$ (M=Mg, Ni, Cu and Ca) were synthesized using chemical based citrate precursor method.The citrate precursor was annealed at a single temperature 450℃ only. The annealed powder was characterized using X-ray diffraction (XRD), Vibrating sample magnetometer(VSM) and Scanning Electron Microscopy (SEM). The average particle size was determined using Scherrer equation. They were found to be 13 nm, 23 nm, 11 nm and 43 nm for $MgFeO_4$, $NiFeO_4$, $CaFeO_4$, $CuFeO$ respectively and the prominent peak position for each ferrite was found at 35.355° 35.645° 35.697 and 35.975 respectively. The height of the intensity peak position was largest (2700 cps) for Nickel ferrite and lowest for Cu-ferrite (880 cps). Magnetization, retentivity, coercivity and particle size have different values for each ferrite while annealing temperature 450C was kept constant for all ferrite samples. Range of magnetization, retentivity and coercivity was observed from 10.486 emu/g to 32.727 emu/g, 0.108 emu/g to 6.283 emu/g and 13.382 G to 481.56 G respectively.*

Keywords : Ferrite, Nanoparticles, Divalent cations, Structural and Magnetic properties.

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