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Dextrose assisted sol-gel auto combustion synthesis and magnetic characterizations of cobalt ferrite nanoparticles

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The nanocrystalline cobalt ferrite (CoFe_2O_4) was successfully synthesized by dextrose assisted sol-gel auto combustion method. The structural, morphological and magnetic properties of prepared sample were studied using standard technique. Pure phase formation of cobalt ferrite without additional impurity was observed in X-ray diffraction pattern. The average crystallite size ($t = 20.6 \text{ nm}$), lattice parameter ($a = 8.38 \text{ \AA}$) and other structural parameters were calculated from XRD data. The SEM image shows good homogeneity and sponge like morphology of the prepared sample with average grain size of 69.8 nm . The presence of the peak around 608 cm^{-1} and 415 cm^{-1} in IR spectrum confirmed that the formed product is spinel ferrite. The values of saturation magnetization (M_s) and remanent magnetization (M_r) were obtained from M-H curve and found to be 74.5 emu/gm and 44.1 emu/gm respectively. Thus, it is observed from experimental results that dextrose can be used as a fuel for synthesis of cobalt ferrite nanoparticles with smaller size particles and improved magnetic properties for various technological applications.

Topics

[Magnetism](#), [Combustion synthesis](#), [Nanomaterials](#), [Nanoparticle](#), [Solgels](#), [X-ray diffraction](#), [Chemical compounds](#)

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