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Modified Sol-Gel Processing of $NiCr_2O_4$ Nanoparticles; Structural Analysis and Optical Band Gap

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Nickel Chromite nanoparticles were successfully synthesized via a modified sol-gel method using nickel acetate and ammonium dichromate in melted stearic acid as a complexing agent. The diffractograms of the nanoparticles confirmed a pure formation of $NiCr_2O_4$ spinel without any minor phase. The coordination structure of as prepared nanoparticles shows a series of absorption bands below 1,000 cm^{-1} were evidenced the M-O (Cr-O, Ni-O) bond in the sample. Optical band gap, magnetic properties and color parameters (L*.a*.b*) indicates that the final nanoparticles are optically and magnetically active. The particle size of $NiCr_2O_4$ was calculated using Scherrer equation at about 24 nm. Optical band gap obtained at 1.7 eV indicating that $NiCr_2O_4$ nanoparticles are semiconductor material and can be used in electrical devices.

Keywords: $NiCr_2O_4$ spinel, optical band gap, sol-gel, nanoparticles

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