

Synthesis and characterization of nickel zinc spinel ferrite synthesized by inverse co-precipitation method

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Abstract

Nickel zinc ferrite (NZFO) nanoparticles were synthesized by an inverse chemical co-precipitation method. Effects of synthesis conditions on the mean crystallite size, phase composition and morphology were investigated by X-ray diffraction analysis (XRD), scanning electron microscope (SEM) and vibrating sample magnetometer (VSM), respectively. XRD diffraction pattern exhibited representative diffraction peaks corresponding to as-dried powder and heat-treated powders. Regardless of heat-treatment, NZFO formed completely. SEM analysis studied morphology of nanoparticles with particle size of about 10 to 110 nm depended on the heat-treatment temperature. Results of VSM reveal the magnetic properties of produced compound in various heat-treatment temperature. It was shown that increasing the heat-treatment temperature from 100°C to 1000°C caused increasing of saturation magnetization (M_s) from 25 to 73 emu/g and mean crystallite size from 11 nm to 35 nm.

Keywords: Nickel Zinc Ferrite (NZFO), Inverse co-precipitation method, Spinel ferrite

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