

Effect of TEA on the structural and magnetic properties of ferromagnetic ZnFe₂O₄ nanoparticles

ABSTRACT

Ferromagnetic ZnFe₂O₄ nanoparticles were synthesized by surfactant assisted hydrothermal method using different amount of triethylamine (TEA). The synthesized nanoparticles were characterized by powder X-ray diffraction, Fourier transform infrared spectroscopy, field emission scanning electron microscopy, transmission electron microscopy (TEM), high-resolution transmission electron microscopy and vibrating sample magnetometer. The formation of single phase ZnFe₂O₄ was investigated by addition of different amount of TEA. Regular spinel structure was obtained for all synthesized product except for lower amount of TEA, owing to the less alkaline atmosphere. All the synthesized nanoparticles were spherical in shape with a small aggregation. Observed size of the nanoparticles was 10 nm as determined from TEM measurement for the sample synthesized with a higher amount of TEA. Room temperature ferromagnetic behavior was observed in all the samples.

Keyword: Ferromagnetic ZnFe₂O₄ nanoparticles; TEA