

## Thermal Properties of $\text{Co}_{0.5}\text{Zn}_{0.5}\text{Fe}_2\text{O}_4$ Nanoparticles for Hyperthermia Applications

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$\text{Co}_{0.5}\text{Zn}_{0.5}\text{Fe}_2\text{O}_4$  nanoparticles (NPs) were prepared by using a high-temperature thermal decomposition method. The crystal structure was found to be cubic spinel with space group  $Fd-3m$  and the lattice constant ( $a_0$ ) to be 8.40 Å by using a Rietveld refinement analysis. Based on the Scherrer equation, we obtained the average size of NPs a 9.4 nm. The magnetic properties were characterized using a vibrating sample magnetometer (VSM) as well as external magnetic field Mössbauer spectroscopy taken at 4.2 K. The saturation magnetization ( $M_s$ ) and coercivity ( $H_c$ ) of the NPs were 78.7 emu/g and 21.0 Oe, respectively. The thermal properties of the NPs were measured by using a magneTherm device within the physiologically safe ranges of the frequency and the amplitude. The self-heating temperatures of the NPs were found to be 104 and 119 °C at 50 and 112 kHz, respectively, under on applied field of 25 mT.

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