

# Superparamagnetic properties Ni–Zn ferrite for nano-bio fusion applications

Seung Wha Lee<sup>a</sup>, Chul Sung Kim<sup>b,\*</sup>

<sup>a</sup>*Department of Electronic Engineering, Chungju National University, Chungju 380-702, Korea*

<sup>b</sup>*Department of Physics, Kookmin University, Seoul 136-702, Korea*

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## Abstract

$\text{Ni}_{0.7}\text{Zn}_{0.3}\text{Fe}_2\text{O}_4$  nanoparticles were fabricated by a sol–gel method.  $\text{Ni}_{0.7}\text{Zn}_{0.3}\text{Fe}_2\text{O}_4$  powders annealed at 300 °C compose a spinel structure and behaved superparamagnetically, while annealed at 400 and 500 °C have typical spinel structure with ferrimagnetism in nature. The mean size of  $\text{Ni}_{0.7}\text{Zn}_{0.3}\text{Fe}_2\text{O}_4$  nanoparticle is about 11 nm. The hyperfine fields at 13 K for the tetrahedral (*A*) and the octahedral (*B*) patterns were found to be 499 and 523 kOe, respectively. Blocking temperature ( $T_B$ ) of  $\text{Ni}_{0.7}\text{Zn}_{0.3}\text{Fe}_2\text{O}_4$  nanoparticle is about 260 K. Also, temperature increased up to 43 °C within 7 min under AC magnetic field of 7 MHz.

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