

# The influence of iron content and alkaline concentration on $\text{Mn}_{0.75}\text{Zn}_{0.25}\text{Fe}_y\text{O}_4$ structure, surface charge and acb response

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Nanotechnology applied on magnetic material provide a good opportunity to develop biomaterials as tracers for Alternating Current Biosuceptometry (ACB) and Magnetic Resonance Imaging (MRI) to diagnose certain diseases as cancer. The magnetic nanoparticles can still constitute drug carrier systems and hyperthermia agent for cancer treatment.

Nevertheless, the efficiency for therapy and diagnosis depends on the magnetic susceptibility. In this work, the ferrite nanoparticles with nominal composition  $\text{Mn}_{0.75}\text{Zn}_{0.25}\text{Fe}_y\text{O}_4$ , where  $1.5 \leq y \leq 2.8$ , were synthesized by the co-precipitation method and, the influence of iron content and concentration of precipitating agent on the structure, ACB response and surface charge was analyzed. It was noted that the synthesis using alkaline metal hydroxide between 0.1, 0.15 and 0.2 mol/L provides single-phase materials [ICSD 28515 (PDF - 742 402), space group Fd3m]. The higher concentration (0.25 mol/L) leads to materials with higher crystallinity and similar ACB response to those precipitated by lower concentration base, despite the secondary phase. A surface charge of 30 mV in module was achieved, which decreased as the concentration of the precipitating agent increased.