THE INFLUENCE OF SYNTHESIS PARAMETERS ON THE STRUCTURE AND ACB RESPONSE OF $Mn_{0.75}Zn_{0.25}Fe_yO_4$ FERRITE

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The interest to use magnetic nanoparticles in biomedicine has increased due to their inducible magnetic properties[1-4]. In the treatment of certain diseases as cancer, it has been used to constitute drug carrier systems[2,3] as well as hyperthermia agents[3,4]. These materials can also be used as a tracer in the diagnosis by Magnetic Resonance Imaging (MRI)[3,4] and Alternating Current Biosuceptometry (ACB)[5], which are techniques that do not use ionizing radiation. Neverthless, the sensitivity of these techniques depend on the magnetic susceptibility of tracers. In this work, the ferrite nanoparticles with the composition of $Mn_{0.75}Zn_{0.25}Fe_yO_4$ (ferrite), where 1.5 ? y ? 2.8, were synthesized by the co-precipitation method and the influence of iron content, reaction time and concentration of precipitating agent on the structure and ACB response was analyzed. It was noted that the synthesis using alkaline metal hydroxide between 0.1 and 0.2 mol/L provides single-phase materials with spinel structure [ICSD 28515 (PDF - 742 402), space group Fd3m]. The higher concentration (0.2 mol/L) leads to materials with higher crystallinity and adequate performance for the ACB technique. The longer the reaction time the greater is the magnetic susceptibility for compositions wherein the iron is in excess (y>2.0). Also, the susceptibility is higher for ferrites with excess of iron.

Keywords: Mn and Zn ferrite, nanoparticles, coprecipitation

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