Synthesis and physicochemical characterization of manganese ferrites doped with Mg^{2+} and Zn^{2+} ions with controlled magnetic response in the context of their potential biomedical applications.

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Magnetic hyperthermia is a promising therapeutic technique for cancer treatment based on materials capable of generating heat under alternating magnetic field. In this study, manganese ferrites doped with Mg^{2+} and Zn^{2+} ions ($A_xMn_{1-x}Fe_2O_4$, A = Mg, Zn and x = 0.3 - 0.7) using the modified Pechini method will be synthesized and investigated [1-3]. Controlled ions doping of ferrite structures is applied to investigate its impact on the structural properties and magnetic behavior of materials. Structural and morphological analyses will be used to evaluate the impact of the synthesis pathway on particle size and shape, which directly influence magnetic efficiency and thermal energy distribution. Thermal analysis will be used to evaluate the stability of the obtained materials. Additionally, the magnetocaloric effect of the samples will be determined [4].

References:

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