SYNTHESIS OF NANOSIZED Mg$_{x}$Mn$_{1-x}$Fe$_2$O$_4$ (x = 0.5 AND 0.7) FERRITES BY THERMAL DECOMPOSITION METHOD AND STUDY OF THEIR MAGNETIC PROPERTIES

L. E. De-León-Prado$^1$, D. A. Cortés-Hernández$^1$, J. M. Almanza-Robles$^1$, J. Sánchez$^1$, P. Y. Reyes-Rodríguez$^1$, R. A. Jasso-Terán$^1$, G. F. Hurtado López$^2$

$^1$Centro de Investigación y de Estudios Avanzados del IPN-Unidad Saltillo, Av. Industria Metalúrgica #1062, Parque Industrial Saltillo-Ramos Arizpe, C.P. 25900, Ramos Arizpe, Coah., México, $^2$Centro de Investigación en Química Aplicada, Blvd. Enrique Reyna Hermosillo #140, C.P. 25294, Saltillo, Coah., México

The remarkable properties of ferrites, such as high chemical stability and significant values of saturation magnetization, have attracted interest for using these materials in biomedical applications. In addition, the feasibility of preparing ferrites in a wide range of solid solutions opens up the possibility for obtaining different properties and adjust them for specific applications. For this reason, in this work the synthesis of Mg$_{x}$Mn$_{1-x}$Fe$_2$O$_4$ (x = 0.5 and 0.7) nanoparticles by thermal decomposition method is reported. The materials obtained were characterized by X-ray diffraction (XRD), vibrating sample magnetometry (VSM), Fourier transform infrared spectroscopy (FT-IR), thermogravimetric analysis (TGA) and transmission electron microscopy (TEM). From the results obtained, it was found that the ferrites synthesized have a single crystalline phase with a cubic spinel structure and exhibit a behavior near to that of superparamagnetic materials, with saturation magnetization values of 24.94 and 27.61 emu/g and remanence and coercivity values close to zero. Furthermore, by this method is possible to synthesize, in a single step, particles with a functionalized surface by means of an oleic acid coating. Nanoparticles size is around 15 nm and they exhibit a spherical-like morphology. Hence, the materials obtained are considered as potential candidates for their use in biomedical applications, such as magnetic hyperthermia and contrast agents for magnetic resonance imaging (MRI).

**Keywords:** Ferrites, Nanoparticles, Magnetic properties

**Presenting author's email:** laura.elena.prado@gmail.com