Correlation of magnetic properties, morphology and structural parameters in \( \text{Mn}_{0.5}\text{Zn}_{0.5}\text{Fe}_2\text{O}_4 \) nanoparticles\(^1\) P. PRIETO, Excellence Center for Novel Materials, J. PRADO, J. LOPEZ, M.E. GOMEZ, Department of Physics, Universidad del Valle, A.A. 25360 Cali, Colombia, G.A. MENDOZA, Department of Physics, Universidad Nacional, Bogota, Colombia — The effect of structural and morphology parameters on the magnetic behavior of \( \text{Mn}_{0.5}\text{Zn}_{0.5}\text{Fe}_2\text{O}_4 \) Nanoparticles is presented. The samples were prepared by chemical co-precipitation method on mica substrates at temperatures between 60-90 °C. The particle sizes were obtained using AFM (\( \sim 3\text{-}15 \text{ nm} \)) and MFM. Magnetization measurements have been adjusted for a system of non-interacting nanoparticles with a volume distribution according to:

\[
M(T, H, t) = \frac{m_o H}{2T} \int_0^{V_C} dV f(V) V^2
\]

Where \( m_o \) is magnetization of the single particle, \( V_c \) is critical volume and \( f(V) \) is distribution size function. Blocking temperature \( T_B \), magnetization of the single particle, anisotropy energy density and size distribution were obtained as function of the average particle size. The dependence of parameters such as \( M_s \) and \( H_c \) has been determines as function of the temperature and correlated with the particle sizes.

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