Preparation and investigation of magnetic properties of Manganese Cadmium ferrite nanoparticles by Sol-gel method

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Abstract: In the present investigation, manganese ferrite nanoparticles substituted by cadmium with \( \text{Mn}_{1-x}\text{Cd}_x\text{Fe}_2\text{O}_4 \) composition and substituted amount \( x=(0, 0.1, 0.3, 0.5) \) were prepared by Sol-gel method. Pattern analysis of X-ray diffraction (XRD) confirmed ferrite single phase structure in all samples. The average crystal size was estimated from 17 to 22 nm. The chemical bonds and ferrite formation phase of samples were analyzed by Far-FTIR and FT-IR analyses. The prepared magnetic properties of nanoparticles were analyzed by Vibrating Sample Magnetometer (VSM) which shows that saturation magnetization changes by substitution of \( \text{Cd}^{2+} \) in manganese ferrite. These changes are formed by cation distribution among tetrahedral and octahedral sites and superexchange interaction decrease.

Keywords: Nanoparticles; Mn-Cd ferrite; magnetic properties; spinel structure.

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