Study of Some Physical Properties of $\text{Ni}_y\text{Fe}_{0.025}\text{Mg}_{0.975-y}\text{O}$ Nanoparticles Prepared by the Sol-Gel Method

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($\text{Ni}_y\text{Fe}_{0.025}\text{Mg}_{0.975-y}\text{O}$) nanoparticles with ($y = 0.0, 0.025, 0.050, 0.075$ and 0.1) were prepared using the sol-gel / auto-combustion method. The electrical, morphological and structural properties of the products were characterized and determined in detail by (XRD), energy dispersive X-ray spectroscopy (EDX) and scanning electron microscopy (SEM). X-ray analysis showed the lattice parameter (a) decreased from $4.218 \text{ \AA}$ to $4.207 \text{ \AA}$ with increasing nickel content. The grain size (D) was found in the range of $13.55 - 21.12 \text{ nm}$ by using Scherrer formula. Dielectric properties (dielectric constant, dielectric loss and conductivity) were studied as a function of frequency at room temperature. Significant improvements were observed in the dielectric properties with the addition of nickel ions.

Keywords: Doped-MgO, Nanoparticles, Auto-Combustion, Dielectric properties, EDX, SEM, XRD.

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