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Autocombustion synthesis and characterization of $\text{Ni}_{1-x}\text{Zn}_x\text{Fe}_2\text{O}_4$

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Nickel ferrite(NF) and nickel zinc ferrite(NZF) powders were prepared by autocombustion method starting from nickel, zinc and iron nitrates [1]. After the process of self – ignition, fine precursor powder was thermally treated at 1000 °C for 1 h, forming nickel ferrite and nickel zinc ferrite powders. XRD characterization showed the formation of well crystallized nickel ferrite and nickel zinc ferrite inverse spinel structure [2] without presence of secondary phases. Ceramic materials were obtained by uniaxial pressing at 196 MPa and sintering at 1250 °C for 4 h in the tube furnace. SEM images at the free surface showed that substitution of Ni^{2+} ions with Zn^{2+} ions results in larger grains and lower porosity, confirmed by density measurements.

Magnetization results showed ferromagnetic behavior of the NF and NZF materials. Magnetic measurements of ferrites were carried out and presented in Figure 1. Saturation magnetization moment of NF was lower than for $\text{N}_{0.7}\text{Z}_{0.3}\text{F}$ and $\text{N}_{0.5}\text{Z}_{0.5}\text{F}$, but slightly higher than for $\text{N}_{0.3}\text{Z}_{0.7}\text{F}$. The fields at which saturation occur was almost the same for all materials.

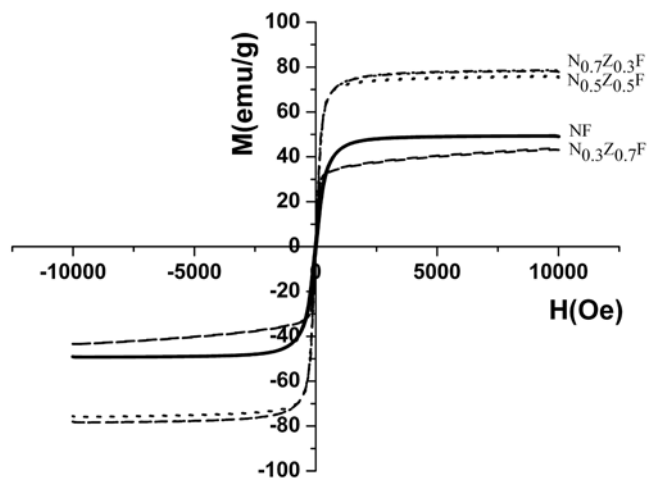


Fig. 1: Magnetic measurements of $\text{Ni}_{1-x}\text{Zn}_x\text{Fe}_2\text{O}_4$ ceramics.

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- [2] S. Maensiri, C. Masingboon, B. Bonchom and S. Seraphin, *Scripta Materialia* **56**, 727 (2007).