2ndCOST MP0904 Workshop, Single and Multiphase Ferroics and Multiferroics with restricted Geometries, 22-23. April 2013., Faenca, Italy, Book of abstracts, p. 47

Synthesis and Properties of $NiFe_2O_4$ and $Ni_{0.5}Zn_{0.5}Fe_2O_4$ Prepared by Auto-combustion Method

M.M. Vijatović Petrović[1], A. Džunuzović[1], J.D. Bobić[1], L. Curecheriu[2], J. Koruza[3], B.D. Stojanović[1]

[1]*Institute for multidisciplinary research, Belgrade University, Kneza Višeslava 1, Belgrade, Serbia*
[2]*Faculty of Physics, Alexandru Ioan Cuza University of Iasi, Romania*
[3] *Jožef Stefan Institute, Jamova Cesta 39, Ljubljana, Slovenia*

$NiFe_2O_4$ (NF) and $Ni_{0.5}Zn_{0.5}Fe_2O_4$ (NZF) powders as a part of multiferroic composites were prepared by auto-combustion method starting from nickel, zinc and iron nitrates. After the process of self-ignition, fine precursor powders were thermally treated at 1000 ^oC for 1h forming the nickel ferrite and nickel-zinc ferrite powders [1]. XRD analysis proved the formation of well crystallized cubic spinel structure in both ferrites. Particle size distribution measurements showed the existence of agglomerates. SEM micrographs showed the existence of polygonal grains ~ 100-500 nm. The results of powders characterization are presented in the table I.

SAMPLE	D_{V50} (μm)	SSA (m^2/g)	D_{BET} (nm)	F_{agg}
NF	29.4	1.601	693	42.4
NZF	14.3	1.903	588	24.3

Table I: Results obtained from powders characterization

Ceramics materials were obtained by sintering at 1250 ^oC for 4 h in the tube furnace. XRD analysis showed the formation of well crystalline spinel structure in both materials. Magnetic measurements of ferrites were carried out and presented in Figure 1. Saturation magnetization moment of NF was lower than for NZF and the fields at which saturation occur was almost the same for both ceramics. The coercivity H_C (Oe) was higher for the NZF indicating that it is "softer" than NF [2]. Permeability vs. frequency measurements showed that NZF possesses much higher permeability that NF. On the other hand, the NF permeability value keeps constant values in a broader frequency range than NZF ceramics.

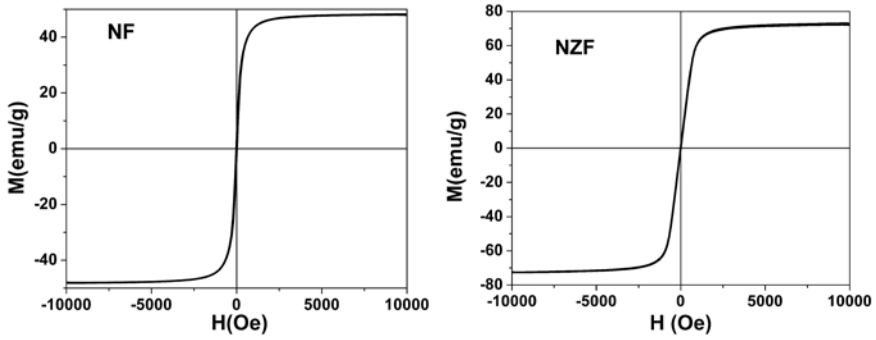

Figure 1 Magnetic measurements of NF and NZF ferrite sintered samples

Acknowledgements
The authors gratefully acknowledge the Ministry of Education, Science and Technological Development of Republic of Serbia for the financial support of this work (projects III45021) and COST MP0904.

References
[1] J. Azadmanjiri, S.A. Seyyed Ebrahimi, H.K. Salehani, Ceram Inter, 1623 (2007)
[2] N.A. Spaldin, Magnetic materials (Cambridge University Press, UK), 2011