ISSN 1822-7759

Joint International Summer School-Conference

The 12-th International Conference "ADVANCED MATERIALS AND TECHNOLOGIES"

and

Summer School "EUROPEAN DOCTORATE IN PHYSICS AND CHEMISTRY OF ADVANCED MATERIALS"

27-31 August 2010, Palanga, Lithuania

P41. Combustion Synthesis, Electrical and Microstructural Properties of $Ni_{1-x}Zn_xFe_2O_4$ Ferrites

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NiZn ferrites have been commercially used for many years as high frequency materials [1]. Dielectric properties of Ni-Zn ferrites mainly depend on microstructure and stoichiometry [2]. To use these materials in modern technology there is a need to obtain fine-grained structure what can be provided by selection of appropriate synthesis method [3].

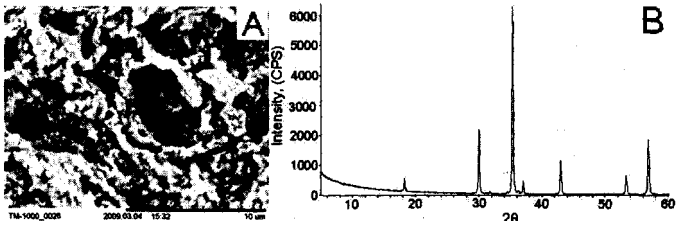

Fig. 1. A - Image of As-burnt powder; B - XRD pattern of calcinated $Ni_{0,3}Zn_{0,7}Fe_2O_4$

The electric resistivity and its dependence from temperature, as well as activation energies of $Ni_{1-x}Zn_xFe_2O_4$ (where x = 0,3; 0,5 and 0,7) prepared by auto-combustion method were studied. The obtained ferrite powders were cold pressed at 5 MPa and sintered at 800 °C temperature. As-burnt powders were characterized by scanning electron microscopy (Fig. 1. a). For crystalline phase characterization X-ray diffraction (XRD) technique was used. The XRD patterns indicate that pure cubic spinel structure forms after sintering (Fig. 1. b). The lattice parameter increases with increase in Zn^{2+} content. Surface microstructure of the sintered pellets was investigated by using atomic force microscopy. From electrical measurements it is observed that resistivity increase with decreasing zinc content. Obtained resistivity values are comparatively higher than resistivity of ferrites prepared by the conventional ceramic method due to fine grained microstructure and chemical homogeneity.

Keywords: *Nickel-Zinc ferrite, atomic force microscopy, nano-materials.*

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