Structural and Magnetic Properties of Nickel-Zinc Ferrites Substituted by Terbium and Holmium

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Abstract. NiZn ferrites in which iron is substituted by a small amount of rare-earth (RE) ions, having the chemical composition $Ni_{0.42}Zn_{0.58}RE_{0.02}Fe_{1.98}O_4$, were synthesized by means of standard ceramic technology including sintering at the temperature of 1200°C for 6 hours. Terbium and Holmium were used as RE ions. The influence of a small amount of Tb^{3+} and Ho^{3+} ions substituting Fe^{3+} on the magnetic properties of ferrite samples, such as Curie temperature, coercive field, remanent magnetic flux density, hysteresis loop area, amplitude and initial permeability, etc., was studied. The chemical composition of prepared samples was analyzed using scanning electron microscopy (SEM) and energy-dispersive X-ray spectroscopy (EDX). The measurement of magnetic parameters at room temperature indicates strong influence of RE substitution on the resulting magnetic properties of materials being tested.