INFLUENCE OF PbO AND Ta₂O₅ ON SOME PHYSICAL PROPERTIES OF MgCuZn FERRITES
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Two series of MgCuZn ferrites are prepared by addition of Tₐ⁺³ and Pb²⁺ ions, separately. The variations of the sintered density, initial permeability, saturation magnetization, Curie temperature and electrical resistivity with the dopant concentration have been studied.

The sintered density was found to increase when PbO content is 0.6 wt% or larger. Samples doped with PbO exhibited an appreciable higher resistivity compared to Ta-doped and undoped samples as a result of the insulating layers on the grain boundaries. The temperature dependence of the electrical resistivity shows a change in slope in the neighbourhood of Curie temperature for all samples and this has been attributed to the influence of the magnetic ordering on the conduction mechanism. Also PbO addition improves the temperature dependence of the initial permeability.

The origin of the beneficial effect of PbO compared to Ta₂O₅ is believed to be attributed to the melting of PbO and formation of liquid phase at grain boundaries.

MAGNETIZATION REVERSAL IN Co-PRECIPITATED COBALT FERRITE
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A study about the process of magnetization reversal in a co-precipitated cobalt ferrite material was carried out. The evolution of the reversible M_r, and irreversible M_m, magnetizations components was determined using measurements of the first order reversal curves. The intrinsic reversible susceptibility χ_r and the irreversible susceptibility χ_m was calculated from this set of measurements. Also, measurements of the magnetic viscosity S were performed at room temperature along the demagnetization curve for different applied field H, over a wide range of field (0-14kOe). The experimental result for S(H), where H_r is the internal field, display a broad distribution centered in a maximum at H_r=2.7 kOe. However, the irreversible susceptibility is maximum at H_r=0.7 kOe, the coercivity of the material. This non-proportionality between S and χ_m shown a strong dependence of the fluctuation field, defined by H_f = S/χ_m, with the internal field. Using the M_r measurements and the inter-relation function function η=∂M_r/∂H|H=0 as an indicator of the reversal mechanism in the material, is shown that its non-traditional behavior of magnetic after-effect is consequence of interparticle interactions and the wide distributions of nucleation fields of reversal domain in the material.

EFFECT OF COBALT, INDIUM AND CHROMIUM IMPURITIES ON MAGNETIC AND MAGNETOELASTIC PROPERTIES OF POLYCRYSTALLINE MAGNETITE
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The present work reports the results of experimental studies of the magnetic and nonmagnetic ions with various valence influence on magnetoelectric characteristic of a substitute magnetite. Magnetoelectric properties were determined on amplitude of ultrasonic oscillations excited by ferromagnetic specimen due a magnetoelectric effect. Additionally the relative magnetic permeability μ_r was determined by help of Q-meter. The researches were made at the room temperature in the range of frequencies of ultrasound of 5 – 50 MHz.

In the system Cu₇Fe₅₋ₓCrₓO₁₂, where 0 < x < 0.4, the monotonous reduction of dynamical magnetostriction β with growth of the cobalt ions content and similar behavior of a magnetic permeability were detected.

The replacement of iron ions by nonmagnetic of indium ions in magnetite results in significant growth of the dynamical magnetostriction at change of the content of In ions from 0 to 0.1 and in diminishing of the further increase of concentration of In ions.

In the system Fe₇₋ₓCrₓO₁₂ we found out the significant increase (more than 3 times) of the dynamical magnetostriction β at x equal 1.2 in comparison with pure specimen and sharp decrease of a value β at further increase of x.

The obtained results are discussed on basis of the interaction of ultrasonic oscillations with real domain structure of magnetite.

STRUCTURAL AND MAGNETIC PROPERTIES OF CoFe₂₋ₓReₓO₄ (RE = Y, La) PREPARED BY A SOL-GEL METHOD
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Ultrasonic CoFe₂₋ₓReₓO₄ (RE = Y, La) powders have been fabricated by a sol-gel method. Structural and magnetic properties of the powders were investigated by x-ray diffraction method (XRD), Mössbauer spectroscopy, and vibrating sample magnetometer (VSM). The CoFe₂₋ₓYₓO₄ powders that were fired at and above 923 K contained only a single spinel phase and behaved ferrimagnetically. Powders fired at 722 ~ 823 K had a spinel structure and were mixed paramagnetic and ferrimagnetic in nature. Mössbauer spectra of the CoFe₂₋ₓYₓO₄ powder annealed at 923 K were taken at various temperatures ranging from 18 to 865 K. The iron ions at both A (tetrahedral) and B (octahedral) sites were found to be in ferric high-spin states. The Néel temperature TN was found to be 865 ± 1 K. Debye temperatures for A and B sites were found to be θ_A = 695 ± 5 K and θ_B = 279 ± 5 K, respectively. The magnetic behaviors of the CoFe₂₋ₓYₓO₄ powders fired at and above 1123 K and CoFe₂₋ₓLaₓO₄ powders fired at and above 923 K, respectively, showed that an increase of the firing temperature yielded a decrease in the coercivity and an increase in the saturation magnetization. The maximum coercivity and the saturation magnetization were H_c = 1208 Oe and M_s = 69 emu/g in the CoFe₂₋ₓYₓO₄ samples and H_c = 703 Oe and M_s = 72 emu/g in the CoFe₂₋ₓLaₓO₄ samples.