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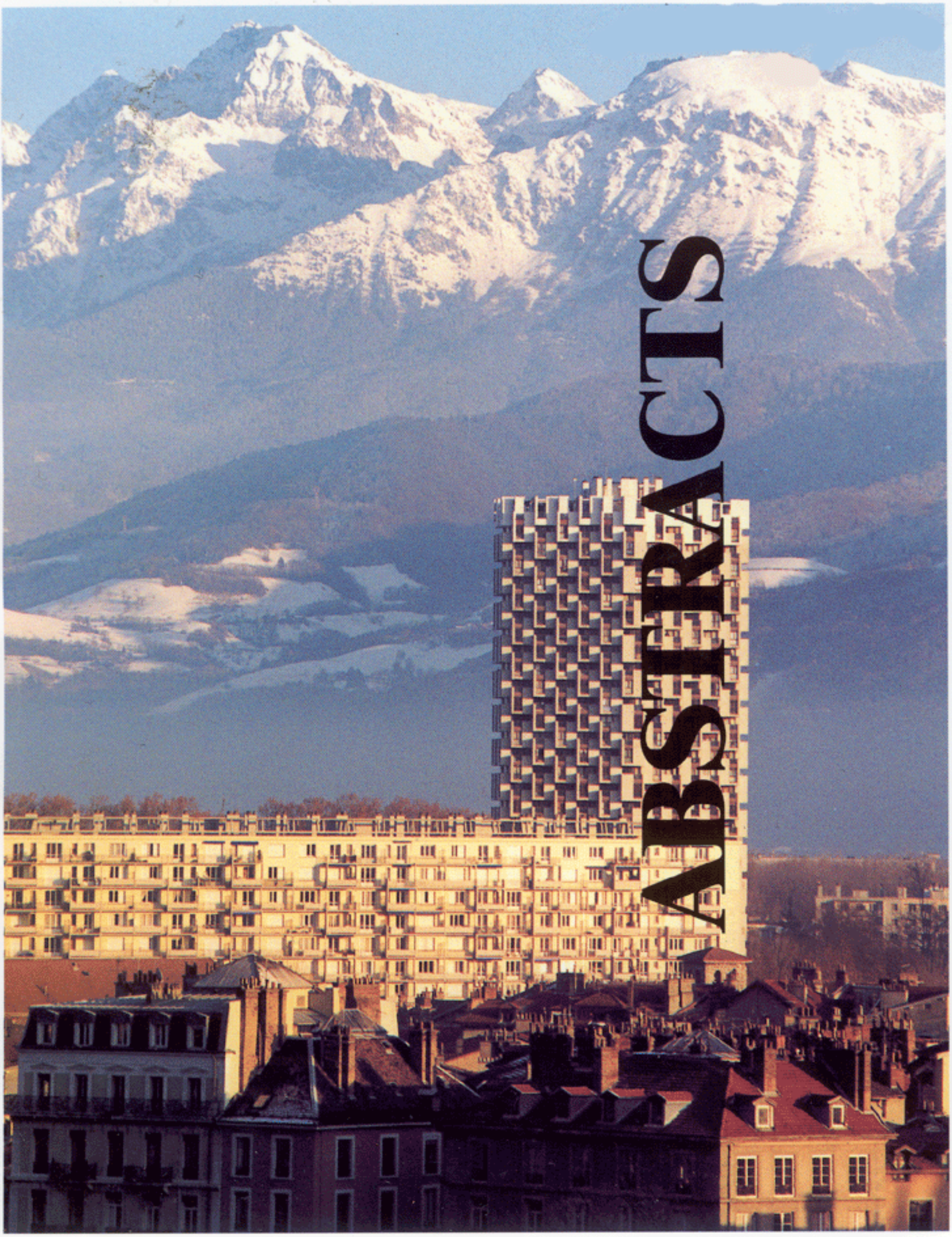

Tu-A1-P15 A008

INFLUENCE OF PbO AND Ta_2O_5 ON SOME PHYSICAL PROPERTIES OF MgCuZn FERRITES

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Two series of MgCuZn ferrites are prepared by addition of Ta^{5+} and Pb^{2+} 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 exhibit 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 Ta_2O_5 is believed to be attributed to the melting of PbO and formation of liquid phase at grain boundaries.

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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_{rev} and irreversible M_{irr} magnetizations components was determined using measurements of the first order reversal curves. The intrinsic reversible susceptibility χ^i_{rev} and the irreversible susceptibility χ^i_{irr} 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_a over a wide range of field ($0<H_a<7$kOe). The experimental result for $S(H_i)$, where H_i is the internal field, display a broad distribution centered in a maximun at H_i=2.7 kOe. However, the irreversible susceptibility is maximun at H_i=0.7 kOe, the coercivity of the material. This non-proportionality between S and χ^i_{irr} shown an strong dependence of the fluctuation field, defined by $H_f = S/\chi^i_{irr}$ with the internal field. Using the M_{rev} measurements and the inter-relation function function $\eta=(\partial M_{rev}/\partial M_{irr})_{Hi}$ 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.

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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 magnetoelastic characteristic of a substitute magnetite. Magnetoelastic properties were determined on amplitude of ultrasonic oscillations excited by ferromagnetic specimen due a magnetostriction. Additionally the relative magnetic permeability μ 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 $Co_xFe_{3-x}O_4$, where $0 < x < 0.4$, the monotonous reduction of dynamical magnetostriction λ 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 at the further increase of concentration of In ions.
In the system $Fe_{3-x}Cr_xO_4$ we find out the significant increase (more than 3 times) of the dynamical magnetostriction λ at x equal 1.2 in comparison with pure specimen and sharp decrease of a value λ at further increase of x.
The obtained results are discussed on basis of the interaction of ultrasonic oscillations with real domain structure of magnetite.

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STRUCTURAL AND MAGNETIC PROPERTIES OF $CoFe_{1.9}RE_{0.1}O_4$ (RE = Y, La) PREPARED BY A SOL-GEL METHOD

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Ultrafine $CoFe_{1.9}RE_{0.1}O_4$ (RE = Y, La) powders have been fabricated by a sol-gel method. Structural and magnetic properties of the powders were investigated by x-ray diffractometer (XRD), Mössbauer spectroscopy, and vibrating sample magnetometer (VSM). The $CoFe_{1.9}Y_{0.1}O_4$ powders that were fired at and above 923 K contained only a single spinel phase and behaved ferrimagnetically. Powders fired at 723 ~ 823 K had a spinel structure and were mixed paramagnetic and ferrimagnetic in nature. Mössbauer spectra of the $CoFe_{1.9}Y_{0.1}O_4$ 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 T_N was found to be 865 ± 2 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 $CoFe_{1.9}Y_{0.1}O_4$ powders fired at and above 1123 K and $CoFe_{1.9}La_{0.1}O_4$ 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 $CoFe_{1.9}Y_{0.1}O_4$ samples and H_c = 703 Oe and M_s = 72 emu/g in the $CoFe_{1.9}La_{0.1}O_4$ samples.