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Abstracts

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MAGNETIC PROPERTIES OF CO-BI FERRITE POWDERS AND THIN FILMS BY A SOL-GEL METHOD

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Ultrathin CoFe\textsubscript{10-x}Bi\textsubscript{x}O\textsubscript{4} powders and thin films are fabricated by a sol-gel method and their magnetic and structural properties are investigated with an x-ray diffractometer (XRD), a vibrating sample magnetometer (VSM), and Mössbauer spectrometer. Co-Bi ferrite powders which were fired at and above 923 K have only a single-phase spinel structure and behave ferrimagnetically. Powders annealed at 523 - 823 K have a typical spinel structure and are simultaneously paramagnetic and ferrimagnetic in nature. The magnetic behavior of Co-Bi ferrite powders fired at and above 923 K shows that an increase of the annealing temperature yields a decrease of the coercivity and an increase of the saturation magnetization. The maximum coercivity and the saturation magnetization of Co-Bi ferrite powders are $H_c = 1368$ Oe and $M_s = 75$ emu/g, respectively. $^{57}\text{Fe}$ Mössbauer spectra of Co-Bi ferrite have been taken at various temperatures from 13 to 875 K. The isomer shifts indicates that the valence states of the Fe ions have a ferric character. Co-Bi ferrite thin films annealed at 723 - 1123 K had a single phase spinel structure without any preferred crystalline orientation.

LARGE LOW-FIELD MAGNETORESISTANCE IN ZINC FERRITE/INSULATOR NANOGRAINULAR SYSTEMS

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Large low-field magnetoresistance in (Zn\textsubscript{0.34+},Fe\textsubscript{2.5-}O\textsubscript{4})\textsubscript{0.7} (Fe\textsubscript{2}O\textsubscript{3})\textsubscript{0.3} nanograinular systems has been observed in a wide temperature range while the single-phase samples of Zn\textsubscript{0.55},Fe\textsubscript{2.5}O\textsubscript{4} shows smaller magnetoresistance (1%-2%). The system (Fe\textsubscript{2}O\textsubscript{3}) nanoparticle with size 20nm) exhibits a giant magnetoresistance (23%) in magnetic field 5kOe at room temperature. The GMR effect of the samples is attributed to the spin-polarized tunneling in Fe\textsubscript{2}O\textsubscript{3} nanoparticle located at boundary of Zn\textsubscript{0.55},Fe\textsubscript{2.5}O\textsubscript{4} grains.