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P.S.C.15.

THE INFLUENCE OF In^{3+} AND Y^{3+} IONS ON STRUCTURE AND MAGNETIC PROPERTIES OF NANOCRYSTALLINE $ZnFe_2O_4$

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The fascinating structural, magnetic and electronic behaviour of ferrite compounds have long been of interest to solid state scientists. These materials exhibit a complex relationship between preparation method, form (single-, poly- or nano-crystalline), composition, crystal structure and physical properties. We present here the results of the investigation of the structural and magnetic properties of nanostructured zinc ferrites, $ZnFe_2O_4$ and zinc ferrites supstituted with indium and yttrium, $Zn_{0.85}In_{0.15}Fe_2O_4$ and $ZnY_{0.15}Fe_{1.85}O_4$. Powders based on zinc ferrites were synthesized by a coprecipitation method. The results of X-ray and TEM analyses confirmed the nanosized nature and spinel type structure of the investigated samples. Mössbauer spectroscopy studies revealed that there is a disorder among the cations between tetrahedral and octahedral sites in the spinel structure. The study of the magnetic properties showed that hysteresis loops do not saturate even in the presence of high magnetic fields, which confirmed the superparamagnetic and single domain nature of the samples. Addition of indium results in a decrease of the particle size and magnetisation and increase of coercitivity of the nanoparticles. Yttrium has an opposite effect. This observation implies that, besides size, composition causes also significant structural rearrangements which in turn induce changes in magnetic behavior of the investigated nanoparticulate systems.

P.S.C.16.

NANOSTRUCTURED RELIEF TO ORIENT LIQUID CRYSTALS MATERIALS

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Electrooptical nematic liquid crystal (LC) cells, which can be used as laser switching devices, electrically and optically addressed spatial light modulators, and analogs of display elements, mostly operate in *S* and *T* configurations, which realize a planar orientation of the LC mesophase on the aligning substrate surface. However, the solution of some problems, where the initial black field is necessary for the regime of light transmission through the cell structure, requires a homeotropic alignment of LC molecules on the substrate. In the present paper the possibility of obtaining homeotropic orientation in thin_film nematic liquid crystal cells using carbon nanotubes is considered. The results of this investigation can be used to develop optical elements for displays with vertical orientations of NLC molecules (MVA-display technology).