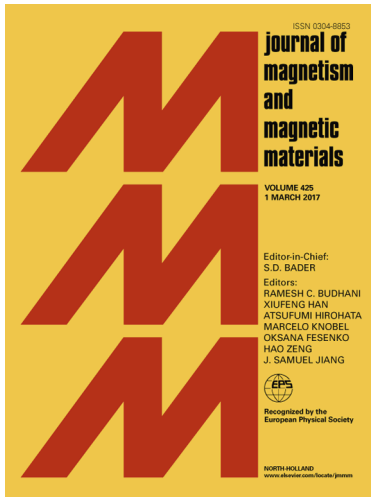

Research articles

Effect of annealing on structural and magnetic properties of $NiFe_2O_4/ZnFe_2O_4$ nanocomposites

C.N. Anumol, M. Chithra, M. Govindaraj Shalini, Subasa C. Sahoo

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Effect of annealing on structural and magnetic properties of $NiFe_2O_4/ZnFe_2O_4$ nanocomposites

C.N. Anumol[1], M. Chithra[1], M. Govindaraj Shalini[1], Subasa C. Sahoo[1*]

[1]Department of Physics, Central University of Kerala, Riverside Transit Campus,

P.O. Padnekkad, Kasaragod, Kerala - 671314, India

*Corresponding author; subasa.cs@gmail.com (S.C.Sahoo)

Abstract: Nanocomposites of Ni-ferrite (NF) and Zn-ferrite (ZF) were prepared by mixing them at different ratio and were subsequently annealed at different temperatures. Structural studies showed the appearance of NiZn-ferrite along with the constituent ferrites in the nanocomposite samples with the increase in annealing temperature. Magnetization value increased and the coercivity showed a peak around 750 °C with the increase in annealing temperature. Both the magnetization and coercivity decreased with the increase in ZF concentration in these samples annealed at temperatures lower than 900°C. The highest magnetization value of 52 emu/g and the lowest coercivity of 40 Oe were observed at 300 K in the nanocomposite sample with NF:ZF = 3:2 and annealed at 900 °C. The observed magnetization value was higher than the expected values whereas the observed coercivity was lower than the expected values in the annealed samples. Grain growth, intergranular interactions, formation of NiZn-ferrite and cation distribution in the spinel structure explain the observed magnetic behaviour in these nanocomposites.

Keywords: Ferrites, Sol-gel method, Nanocomposites, Magnetic properties