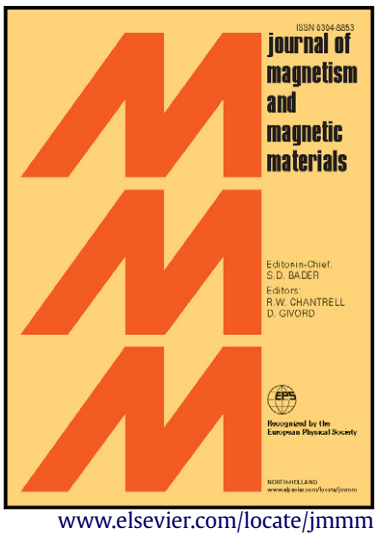

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Structure and magnetic properties of La substituted $ZnFe_2O_4$ nanoparticles synthesized by sol gel autocombustion method

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Abstract

$ZnFe_{2-x}La_xO_4$ ($0<x<0.2$) nanoparticles have been prepared by sol gel combustion method. The effects of La substitution on the cation distribution between the tetrahedral and octahedral sites in the spinel structure, and on the magnetic properties were investigated by X-ray diffraction (XRD), infrared spectroscopy and vibrating sample magnetometer methods. The XRD results showed that the single phase La^{3+} substituted zinc ferrite nanoparticles exhibit partially inverse spinel structure with the crystallite size of 10-20 nm, which also confirmed by transmission electron microscopy. The magnetic measurements exhibited that the saturation magnetization (Ms) increases till x=0.05, due to the increasing of inversity and then decreases from x=0.05 to x=0.2, because of the decreasing of the total moments with the La^{3+} substitution.

Keywords: Zinc ferrite; La substitution; Cation distribution; Magnetic property;

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