

Influence of La- and Al-Dopant Substitutions on Morphology and Magnetic Characteristics of High Temperature Yttrium Iron Garnet

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ABSTRACT

The optimization of magnetic uses of magnetic garnet type ferrites is largely known depending on their microstructure, synthesis process and chemical composition of the materials. This research investigates the effect of dopants substitution on microstructure and magnetic properties of Yttrium Iron Garnet (YIG). The oxide-mixture route was employed in synthesizing the YIG powders using Aluminium and Lanthanum as dopants with concentration of 0.5 prior to sintering at 1400 °C. The samples were characterized in several testing applications in order to study the structural, microstructural, magnetic properties and density effects toward the samples workability as ferromagnetic materials. Characterization of the samples were carried out by using Transmission Electron Microscopy (TEM), Field Emission Scanning Electron Microscopy (FESEM), X-Ray Diffraction (XRD), Impedance/Materials Analyzer and density measurement. The results showed that La-doped YIG shows an incredible achievement as a new ferromagnetic material, meanwhile with the substitution of Aluminum ion would increase the magnetic response of YIG.

KEYWORDS: ferrites; Yttrium Iron Garnet; ferromagnetism; ferromagnetic resonance frequency

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