

Electrical and Magnetic Properties of Neodymium and Erbium Doped Bismuth Ferrite Multifunctional Materials for Spintronic Devices

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Abstract : Nd and Er substituted bismuth nano crystalline multifunctional materials were prepared by citrate gel autocombustion technique. The structural characterization was carried out by XRD and SEM. Electrical properties such as electrical conductivity and dielectric properties have been measured. Plots of electrical conductivity versus temperature increases with increasing temperature and shown a transition near Curie temperature. Dielectric properties such as dielectric constant and dielectric loss tangent have been measured from 20Hz to 2 MHz at room temperature. Plots of dielectric constant versus frequency show a normal dielectric behaviour of multifunctional materials. Temperature dependence of magnetic properties of Bi-Nd and Bi-Er multi-functional materials were carried out by using Vibrating sample magnetometer (VSM). The magnetization as a function of an applied field ± 100 Oe was carried out at 3K and 360 K. Zero field Cooled (ZFC) and Field Cooled (FC) magnetization measurements under an applied field of 100Oe a in the temperature range of 5-375K. The observed results can be explained for spintronic devices.

Keywords : Bi-Nd and Bi-Er Multifunctional Materia, Citrate Gel Auto combustion Technique, FC-ZFC magnetization, Dielectric constant

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