

STRUCTURAL AND CONDUCTIVITY STUDIES OF $\text{La}_{0.95}\text{Sr}_{0.05}\text{GaO}_{2.975}$ GALLATE

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Abstract

$\text{La}_{0.95}\text{Sr}_{0.05}\text{GaO}_{2.975}$ has been prepared by conventional solid state reaction method. The calcined sample has been isostatically pressed into pellets at a load of 12 kN cm^{-2} and then sintered at $1400 \text{ }^\circ\text{C}$ for 12h. The crystalline phase formation and composition has been confirmed by X-ray diffraction (XRD) method and energy dispersive spectroscopy (EDS) analysis respectively. Sintered sample is found to be orthorhombic perovskite phase with density around 90 % is achieved. The ac conductivity of the sample was studied from room temperature to $600 \text{ }^\circ\text{C}$ and frequency range of $1-10^6 \text{ Hz}$. The bulk and grain boundary contribution with frequency has been studied using impedance plots. The impedance study revealed the higher grain boundary contribution to total conductivity. The activation energy has been found in the range of $E_a = 0.95 \text{ eV}$ which indicates that the prepared samples is essentially ionic conductor.

Keywords: Solid electrolyte, XRD, impedance study