

## Dielectric and Impedance Spectroscopy of Samarium and Lanthanum Doped Barium Titanate at Room Temperature

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**Abstract :** Dielectric ceramic samples in the BaO-Re<sub>2</sub>O<sub>3</sub>-TiO<sub>2</sub> ternary system were synthesized with structural formula Ba<sub>2-x</sub>Re<sub>4+2x/3</sub>Ti<sub>8</sub>O<sub>24</sub> where Re= rare earth metal and Re= Sm and La where x varies from 0.0 to 0.6 with step size 0.1. Polycrystalline samples were prepared by the conventional solid state reaction technique. The dielectric, electrical and impedance analysis of all the samples in the frequency range 1KHz- 1MHz at room temperature (25°C) have been done to get the understanding of electrical conduction and dielectric relaxation and their correlation. Dielectric response of the samples at lower frequencies shows dielectric dispersion while at higher frequencies it shows dielectric relaxation. The ac conductivity is well fitted by the Jonscher law ( $\sigma_{ac} = \sigma_{dc} + A\omega^n$ ). The spectroscopic data in the impedance plane confirms the existence of grain contribution to the relaxation. All the properties are found out to be function of frequency as well as the amount of substitution.

**Keywords :** dielectric ceramics, dielectric constant, loss tangent, AC conductivity, impedance spectroscopy

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