

**Temperature and frequency dependence dielectric and complex impedance studies on composite of lead titanate and strontium sexaferite ( $\text{PbTiO}_3 - \text{SrFe}_{12}\text{O}_{19}$ )**

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**Abstract.**

The work describes the use of dielectric and ac complex impedance spectroscopy techniques to obtain the electrical parameters like electrical conductivity and activation energy of composite multiferroic having composition (x)  $\text{PbTiO}_3 - (1-x) \text{SrFe}_{12}\text{O}_{19}$ ; where  $x = 0.10, 0.30, 0.50$  in the frequency range 10 - 1000 KHz over a temperature range of 30 - 550 °C. The coexistence of low dielectric constant region with high dielectric constant region results in Maxwell – Wagner (M-W) polarization in the composite. Complex impedance spectroscopic analysis indicated the presence of non-Debye type dielectric relaxation in the composites. The grain ( $R_g$ ) and grain boundary resistance ( $R_{gb}$ ) decreases with increase in temperature providing convincing evidence that the electrical properties of composite are temperature as well as microstructure dependent. The ac conductivity of composite calculated from dielectric loss and it shows an increase with increasing temperature suggesting semiconductor behavior.

**Keywords:** Nano composites, dielectric, ceramics.