

# Structural, Dielectric and Optical Properties of a Site Doped $\text{La}_2\text{NiMnO}_6$ Double Perovskite

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**Abstract**—In this study we investigate the structural, dielectric and optical behaviour of the Rare Earth based double perovskite (general formula  $\text{A}_2\text{BB}'\text{O}_6$ ),  $\text{La}_2\text{NiMnO}_6$  and comparatively study the modification in each property of the system by doping with Sr at the A site. We synthesized the double perovskite  $\text{La}_2\text{NiMnO}_6$  by conventional Solid State technique by mixing the precursors  $\text{La}_2\text{O}_3$ ,  $\text{NiO}$ ,  $\text{Mn}_2\text{O}_3$  in the stoichiometric ratio and then finally heating the thoroughly ground mixture at 1400 degree centigrade. The polycrystalline phase of the prepared sample was confirmed by the XRD. Rietveld analysis of the XRD data revealed that the  $\text{La}_2\text{NiMnO}_6$  sample is biphasic having presence of an Orthorhombic and a Monoclinic phase. The EDAX revealed the chemical composition of all the elements present in the sample. We investigated the particle size variation in the pristine and the doped sample by performing SEM. The study revealed that the Particle size decreases considerably in the doped sample owing to the less porosity in the doped sample. UV-Vis spectroscopy was used to find the bandgap, which is decreasing in the case of doped sample thus leading to its semiconducting behaviour rather than pristine  $\text{La}_2\text{NiMnO}_6$  which is a ferromagnetic insulator. Dielectric study was carried out by applying silver paste on both sides of the pelletized samples to make the electrical contacts. Both of the pristine and doped samples show relaxator like behaviour which is consistent with Maxwell Wagner theory.

**Keywords:** Double Perovskite, Solid State Reaction, Ferromagnetic Insulator.