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Structural, Electrical and Spectral Studies on Double Rare-Earth Orthoferrites $\text{La}_{1-x}\text{Nd}_x\text{FeO}_3$

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Abstract: Samples of double rare-earth ferrite $\text{La}_{1-x}\text{Nd}_x\text{FeO}_3$ are synthesized by a high-temperature double sintering ceramic technique. X-ray diffraction shows that all compounds have an orthorhombic structure. The values of lattice parameter and the volume of the unit cell, changes with increasing Nd^{3+} content. The Goldschmidt tolerance factor decreases and goes far from unity with increasing Nd content. The samples containing Nd ions with $x = 0.1, 0.2$ and 0.3 have higher resistivity than that of LaFeO_3 , but for $x \geq 0.4$ the resistivity decreases. The results indicate the presence of extrinsic semiconducting properties up to 100°C above which the hopping conduction appears. Thermoelectric power measurements show that the main charge carriers are electrons. The decrease of the Seebeck coefficient and the concentration of charge carrier in the region above 100°C , indicates the weakening of the hopping conduction mechanism. The samples were characterized for pyroelectric voltage and IR absorption spectra.

Key Words: Orthoferrite, X-ray, Electrical properties, IR.

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