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**PREPARATION AND CHARACTERIZATION OF SOLID ELECTROLYTE COMPOUNDS CONSISTING OF DOPED LANTHANUM GALLATE AND YTTRIA STABILIZED ZIRCONIA**

T. FUJIMOTO, E. Muccillo

*Energy and Nuclear Research Institute - Center of Science and Technology Materials, São Paulo, BRAZIL*

Strontium- and magnesium- doped lanthanum gallates have attracted great attention in recent years due to their high ionic conductivity, about twice that of yttria stabilized zirconia, and possible application in intermediate temperature solid oxide fuel cells. In this work, the ionic conductivity, hardness and microstructure of compound solid electrolytes consisting of doped lanthanum gallate and yttria stabilized zirconia were investigated aiming to improve the overall performance of this ceramic material.

$\text{La}_{0.9}\text{Sr}_{0.1}\text{Ga}_{0.8}\text{Mg}_{0.2}\text{O}_{3-\delta}$  was prepared by the mixed oxide method, commercial yttria stabilized zirconia being introduced in the ratios of 1, 10 and 20 wt.%. The sintering of green compacts was performed at 1450°C for 4 h. Characterization of sintered samples were carried out by density measurement, X-ray diffraction, scanning electron microscopy, impedance spectroscopy and Vickers hardness.

The relative density increases with increasing amounts of yttria stabilized zirconia achieving ~99% with 10 wt.% addition. X-ray diffraction patterns exhibit the characteristic orthorhombic structure of doped lanthanum gallate as the major phase. The average grain size and the hardness also increase with increasing the content of the additive electrolyte. The highest ionic conductivity was obtained for samples with 1wt.% of yttria stabilized zirconia.

The compound solid electrolyte shows enhanced properties compared to the parent doped lanthanum gallate. Its properties may be tuned with suitable choice of the additive content.

**Keywords:** lanthanum gallate, microstructure, ionic conductivity