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STRUCTURAL ANALYSIS AND SINTERING AIDS EFFECTS IN $La_2Ce_2O_7$ PROTON CONDUCTORS

J. Zamudio-García[1], J.M. Porras-Vázquez[1], Enrique R. Losilla[1], D. Marrero-López[2].

[1] *Universidad de Málaga, Dpto. de Química Inorgánica, Cristalografía y Mineralogía, 29071-Málaga, Spain, zamudio@uma.es*
[2] *Universidad de Málaga, Dpto. de Física Aplicada I, 29071-Málaga, Spain.*

Global warming is an important problem that has to be solved without delay. The development of environmental-friendly energy technology is needed to deal with this issue. Solid Oxide Fuel Cells (SOFC) technology has been proposed as a real alternative to fossil fuel combustion. Proton conductors like $La_2Ce_2O_7$ (LDC), has several advantages in comparison with $BaCeO_3$ due to its high stability in H_2O or CO_2 conditions [1]. Furthermore, for industry application is necessary to low the high sintering temperature of typical electrolyte materials.

$La_2Ce_2O_7$ was synthesized by the freeze-drying precursor method and calcination conditions have been optimized to obtain single phase with high compaction at 1400 ^oC for 1h. A fully characterization has been carried out using X-ray powder diffraction and scanning electron microscopy. The total conductivity was determined by complex impedance spectroscopy in dry and wet air. Transmission Electron Microscopy (TEM) was used to clarify certainly the structure of $La_2Ce_2O_7$ due to its still unknown. SAEDs patterns revealed a disordered fluorite, not appearing secondary reflections typical of pyrochlore superstructure, finishing the controversy around the correct structure in this material [2,3].

Moreover, an exhaustive study about lowering the sintering temperature with Co and Zn as sintering aids has been investigated obtaining electrolytes that can be used for SOFC. The sintering aids were impregnated using cobalt and zinc nitrates in ethanol media. Both sintering aids allow for obtain high dense pellets lowering the sintering temperature 300 ^oC and 400 ^oC for samples with cobalt and zinc, respectively, without compromising the electrical and microstructural properties (Fig 1).

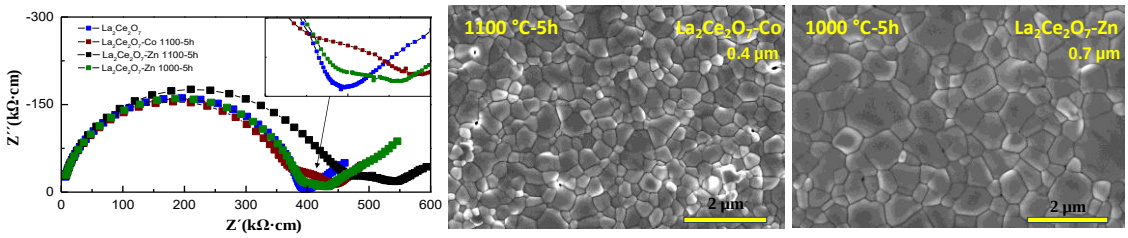

Figure 1. Nyquist diagrams and SEM micrographs of selected samples of LDC, LDC-Co and LDC-Zn.

Referencias

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