Effects of the additions of strontium gallate on Electrical conductivity of $La_{0.9}Sr_{0.1}Ga_{0.8}Mg_{0.2}O_{3-\delta}$

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Strontium and magnesium-doped lanthanum gallate $La_{1-x}Sr_xGa_{1-y}Mg_yO_{3-\delta}$ (LSGM) is a promising solid electrolyte for using in solid oxide fuel cells, due to its high ionic conductivity at intermediate temperatures (600 – 800 ºC) compared to yttria-stabilized zirconia (YSZ). In addition, LSGM has negligible electronic conductivity and high chemical stability over a broad range of oxygen partial pressures [1-3]. In this work, the composition $La_{0.9}Sr_{0.1}Ga_{0.8}Mg_{0.2}O_{3-\delta}$ with small additions of strontium gallate was prepared by solid-state reaction and the influence of the additive on the ionic conductivity and phase composition was investigated. The sintered solid electrolytes achieved densities higher than 95% of the theoretical value and the average grain size amounts 2.40 µm after sintering at 1350°C. The contents of secondary phases decreased with increasing strontium gallate additions. The additive was found to have a beneficial effect on the bulk ionic conductivity.

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