# Microstructure and electrical conductivity of sol-gel synthesized and spark plasma sintered doped-lanthanum gallate

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Perovskite ceramics consisting of lanthanum gallate with partial substitutions for strontium and magnesium are candidates as solid electrolyte for application in solid oxide fuel cells operating at intermediate temperatures (~550 to ~750ºC). The main concern related to the application of this perovskite solid electrolyte is impurity phases, usually detected even in chemically synthesized powders. The La0.9Sr0.1Ga0.8Mg0.2O3-d (LSGM) composition display relatively low contents of impurity phases. In this work, the LSGM composition was synthesized by the sol-gel method and consolidated by spark plasma sintering to optimize the microstructure and electrical properties of this solid electrolyte. Chemically synthesized powders were consolidated in the 1100 to 1250ºC for 5 min. Sintered specimens with relative densities higher than 98% were obtained. Rietveld analysis of X-ray diffraction data revealed no detectable impurity phases. The microstructure evolution exhibited submicron sized grains with mixed fracture mode. High values of the electrical conductivity were obtained for all specimens.

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