Strontium-doped lanthanum manganite: synthesis by citrate technique and deposition by wet powder spraying

Authors:
PhD Student Rubens Chiba, Brazil – affiliations:1,2
PhD Student Reinaldo Azevedo Vargas, Brazil – affiliations:1,2
PhD Professor Emília Satoshi Miyamaru Seo, Brazil – affiliations:1
Technician Marco Andreoli, Brazil – affiliations:1

Affiliations Description:
1) Nuclear and Energy Research Institute, IPEN-CNEN/SP
2) University of São Paulo, USP

Abstract:
The $La_{1-x}Sr_xMnO_3$ - LSM deposited in the form of thin films on a ZrO_2/Y_2O_3 - YSZ substrate is an cathode of solid oxide fuel cells - SOFC. In this work, the LSM was synthesized by the citrate technique and the cathode layer was deposited by wet powder spraying. X-ray fluorescence spectroscopic analysis showed that the synthesis was efficient to obtain powders with x = 0.22 mol%. Scanning electron micrographs showed that the particles were in the form of agglomerates less than 1 μm and this was verified by phase analysis light scattering granulometry (0.50 μm). The diffractograms revealed that the main phase in LSM powders had a hexagonal crystalline structure. Thin LSM film also had the hexagonal crystalline structure. The micrograph of the LSM film also revealed a porous microstructure with thickness of 30 μm. The presence of La, Sr and Mn in the film was confirmed by energy dispersive x-ray spectroscopy. The conditions used to synthesize LSM resulted in adequate product characteristics for deposition. The wet powder spraying technique enabled the manufacture of adherent porous thin film of LSM on dense YSZ substrate.