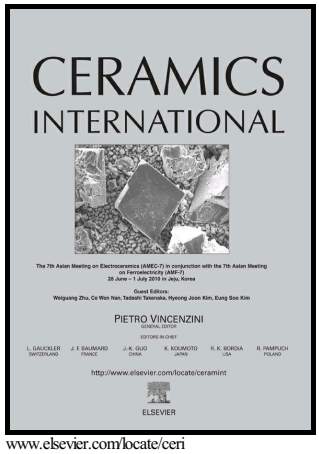

www.elsevier.com/locate/ceri

Ionic Conductivities and High Resolution Microscopic Evaluation of Grain and Grain Boundaries of Cerium- Based Codoped Solid Electrolytes

Paola Cristina Cajas Daza, Rodrigo Arbey Muñoz Meneses, Ana Candida Martins Rodrigues, Cosme Roberto Moreira da Silva

PII: S0272-8842(18)31083-6
DOI: https://doi.org/10.1016/j.ceramint.2018.04.210
Reference: CERI18127

To appear in: *Ceramics International*

Received date: 5 March 2018
Revised date: 24 April 2018
Accepted date: 24 April 2018

Cite this article as: Paola Cristina Cajas Daza, Rodrigo Arbey Muñoz Meneses, Ana Candida Martins Rodrigues and Cosme Roberto Moreira da Silva, Ionic Conductivities and High Resolution Microscopic Evaluation of Grain and Grain Boundaries of Cerium- Based Codoped Solid Electrolytes, *Ceramics International,* https://doi.org/10.1016/j.ceramint.2018.04.210

Ionic Conductivities and High Resolution Microscopic Evaluation of Grain and Grain Boundaries of Cerium- Based Codoped Solid Electrolytes

Paola Cristina Cajas Daza[1]; Rodrigo Arbey Muñoz Meneses[1]; Ana Candida Martins Rodrigues.[2] Cosme Roberto Moreira da Silva.[1(*)]

[1.] University of Brasília, Brasília, DF, 70940-910, Brazil.

[2.], Federal University of São Carlos, São Carlos, SP, 13565-905, Brazil.

*corresponding author – e-mail: cosmeroberto@gmail.com .

Tel: +55 (61) 981741053 – FAX: +55 (61) 31075673

Keywords- solid electrolyte; ceramic; ionic conductivity

Abstract

Doped CeGdO and codoped CeGdOSmO compositions were synthesized, giving rise to nanoparticulate powders. Ionic conductivities at bulk and grain boundaries of the sintered samples were determined, exhibiting increased conductivity in the samaria-codoped samples. Scanning electron microscopy (SEM) showed a significant reduction in the grain size of samaria-codoped electrolytes. This reduced grain size of the codoped samples caused a reduction in Schottky barrier height, increasing oxygen vacancy concentration in the space-charge layer of the grain boundary and culminating in greater ionic conductivity in the boundary region. For the gadolinium doped samples, high resolution transmission electron microscopy images at grains showed the presence of large cluster of defects (nanodomains), hindering the movement of charge carriers and reducing ionic conductivity. However, the samaria-codoped system displayed better