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Miguel A. Laguna-Bercero, Amir R. Hanifi, Lucile Menand, Navjot K. Sandhu, Neil E. Anderson, Thomas H. Etsell, Partha Sarkar



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**The Effect of Pore-former Morphology on the Electrochemical Performance of Solid Oxide Fuel Cells under Combined Fuel Cell and Electrolysis Modes**

Miguel A. Laguna-Bercero<sup>1\*</sup>, Amir R. Hanifi<sup>2</sup>, Lucile Menand<sup>3</sup>, Navjot K. Sandhu<sup>2</sup>, Neil E. Anderson<sup>2</sup>, Thomas H. Etsell<sup>2</sup>, and Partha Sarkar<sup>4</sup>

<sup>1</sup>Instituto de Ciencia de Materiales de Aragón (ICMA), CSIC- Universidad de Zaragoza,  
C/ Pedro Cerbuna 12, E-50009, Zaragoza, Spain

<sup>2</sup>Department of Chemical & Materials Engineering, University of Alberta, Edmonton, Alberta  
T6G 1H9, Canada

<sup>3</sup>Institut Universitaire de Technologie de Bordeaux (IUT), Université Bordeaux, 15 rue Naudet -  
CS 10207, 33 175 Gradignan Cedex, France

<sup>4</sup>InnoTech Alberta, Edmonton, Alberta. T6N 1E4, Canada

\*Corresponding author's e-mail: malaguna@unizar.es

**Abstract**

The effect of the pore-former used in the Ni-YSZ fuel electrode on the electrochemical performance of solid oxide cells is studied. Three cells with the configuration of Ni-YSZ/YSZ/Nd<sub>2</sub>NiO<sub>4+δ</sub>-YSZ were fabricated with different pore-formers, such as graphite, PMMA (polymethyl methacrylate) or an equal mixture of both, which were added to the Ni-YSZ support during the fabrication process. The results show that the Ni-YSZ support containing graphite leads to a more porous support and formation of coarser pores in the vicinity of the electrolyte. This leads to a reduction in the triple phase boundary (TPB) length with a corresponding increase of activation polarization and, as a consequence, the overall cell performance decreases in both

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