

## Catalytic Layer Location in MEA and Air Supply Influence on the Performance of an Open-Cathode Direct Ethanol Fuel Cell

D.A. Moreno J, Daniella E. Pacheco C., L.C. Ordoñez\*

Centro de Investigación Científica de Yucatán, A.C. Unidad de Energía Renovable, Centro de Investigación Científica de Yucatán, C. 43 No. 130 Col. Chuburná de Hidalgo, Mérida, Yucatán, 97200. México. Tel +52-999-9428330, e-mail: lcol@cicy.mx

### ABSTRACT

The influence of the catalytic layer location on the performance of an open-cathode DEFC was investigated using three different methods of preparation of MEAs. A catalytic loading of  $1\text{ mgPt cm}^{-2}$  of a commercial catalysts of PtRu/C was used in both anode and cathode electrodes. In MEA1, catalyst layers (CL) were deposited directly on the Nafion® membrane surface. MEA2 consisted of two CL's: an inner layer placed on the membrane surface and an outer CL located onto the carbon cloth diffuser (GDL). MEA3 was prepared using Pt-Black as the inner CL and PtRu/C or PtSn/C as the outer CL. Additionally, we report two approaches of the open-cathode DEFC operation: air-self breathing and forced-air convection at two temperatures: RT and 60°C. Results show an improvement on the cell performance with the combination of the inner and outer CL. The best activity was recorded with the outer CL prepared with PtSn/C. There is a strong dependence between air supply to the cathode and cell performance, however, our Open-Cathode DEFC design shows a small decrease about 24.6 % in the power density while the cell was working in air-self breathing mode respect to forced-air convection mode at RT.

*Keywords:* DEFC; Open-Cathode design; MEA preparation

