

Synthesis of CeO_2/C and $\text{Pt-CeO}_2/\text{C}$ Nanoparticles by the Microwave Assisted Polyol Method and Evaluation of their Electrocatalytic Activity.

J. E. López Martínez¹, F.J. Rodríguez-Varela^{1,2,*}

¹Programa de Nanociencias y Nanotecnología, Cinvestav Unidad Saltillo,
Av. Industrial Metalúrgica No. 1062, Parque Industrial Saltillo-Ramos Arizpe,
Ramos Arizpe, Coah., México, 25900.

²Grupo de Sustentabilidad de los Recursos Naturales, Cinvestav Unidad Saltillo,
Av. Industrial Metalúrgica No. 1062, Parque Industrial Saltillo-Ramos Arizpe,
Ramos Arizpe, Coah., México, 25900.

*Tel: +52 844 4389600; e-mail: javier.varela@cinvestav.edu.mx

ABSTRACT

Cerium oxide has been usually obtained by pyrolysis at temperatures as high as 600 °C, in a H_2 atmosphere during experiments lasting 3 – 6 h. In this work Vulcan-supported CeO_2 nanoparticles (CeO_2/C) were synthesized by the intermittent microwave assisted polyol method, in a 20 min on/off pulses procedure. In order to obtain the $\text{Pt-CeO}_2/\text{C}$ electrocatalyst, CeO_2/C powders and $\text{H}_2\text{PtCl}_6 \cdot 6\text{H}_2\text{O}$ were dispersed by magnetic stirring and submitted to microwave irradiation during 5 min. CeO_2/C and $\text{Pt-CeO}_2/\text{C}$ were characterized by XRD, SEM-EDS and TEM. The catalytic activity of the electrocatalysts for the Ethanol and Methanol Oxidation Reaction (EOR and MOR, respectively) in acid and alkaline medium was evaluated by cyclic and linear scan voltammetry.

Keywords: CeO_2 nanoparticles, $\text{Pt-CeO}_2/\text{C}$ electrocatalyst, Intermittent Microwave Heating, DAFC.

