

Preparation of Pd-based electrocatalysts by borohydride reduction method to application in ethylene glycol electro-oxidation in alkaline medium

Michele Brandalise¹, Marcelo Marques Tusi², Estevam Vitorio Spinacé¹, Mauro Coelho dos Santos³, Almir Oliveira Neto¹

¹Instituto de Pesquisas Energéticas e Nucleares, São Paulo, SP, Brazil

²Universidade Regional Integrada do Alto Uruguai e das Missões, Santiago, RS, Brazil

³Universidade Federal do ABC, Santo André, SP, Brazil

Direct alcohol fuel cells (DAFCs) are very attractive as power sources for portable applications. The ethylene glycol is a promising alternative as fuel because it is less toxic than the methanol and it has an energetic power density similar to other alcohols (methanol and ethanol). Recently, the development of new ionic exchange membranes increased the interest by alkaline medium studies. The use of Pd-based electrocatalysts is a good alternative in alkaline medium [1,2]. In this work, Pd-based electrocatalysts were prepared by borohydride reduction method using Vulcan XC 72 as support [1,2]. The electrocatalysts were characterized by EDX, XRD, TEM and cyclic voltammetry. The electro-oxidation of ethylene glycol was studied in alkaline medium by chronoamperometry.

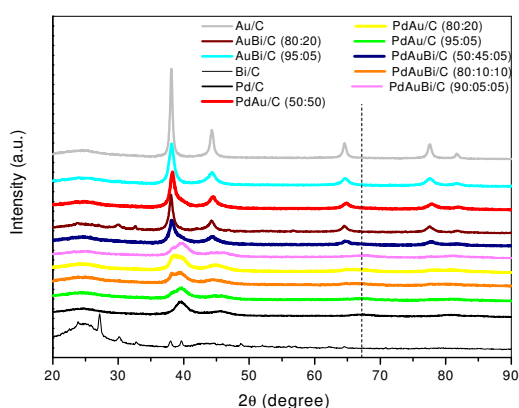


Figure 1. X-ray diffraction of obtained electrocatalysts.

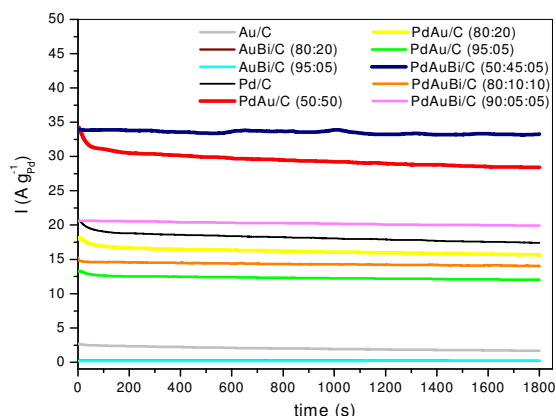


Figure 2. Chronoamperometry of the ethylene glycol electro-oxidation on obtained electrocatalysts.

Atomic ratios determined by EDX were similar to nominal values. The XRD analysis indicated the presence of carbon support phase, face-centered cubic structures of platinum and palladium and bismuth oxide (Bi_2O_3) phases. No bismuth phases were observed in PdAuBi/C electrocatalysts. The higher electroactivity was observed to PdAuBi/C (50:45:05) electrocatalyst possibly due to the bifunctional mechanism and structural changes in the electrocatalyst.

Keywords: alkaline fuel cells, ethylene glycol electro-oxidation, Pd-based electrocatalysts

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[2] BRANDALISE, M; TUSI, M.M.; RIBEIRO, V.A.; SANTOS, M.C.; SPINACÉ, E.V. and NETO, A.O. *Proceedings of XVIII SIBEE, Vol. 1* (2011) 237-239.

brandalise@usp.br – CCCH, IPEN-CNEN/SP, CEP 05508-900, São Paulo, SP, Brazil