

Glycerol and Ethanol Oxidation in Alkaline Medium Using PtCu/C Electrocatalysts

C.A. Ottoni¹, C.E.D. Ramos², R.F.B. de Souza³, S.G. da Silva², E.V. Spinace² and A.O. Neto^{2*}

¹ Bioscience Institute, São Paulo State University, 11380-972 São Vicente, SP, Brazil.

² Instituto de Pesquisas Energéticas e Nucleares, IPEN/CNEN-SP, Av. Prof. Lineu Prestes, 2242 Cidade Universitária, CEP 05508-900 São Paulo, SP, Brazil.

³ Department of Chemistry, Federal University of Amazonas, Av. General Rodrigo Octávio, 6200, Coroado I CEP: 69080-900, Manaus, AM, Brazil.

*E-mail: aolivei@ipen.br

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The performance of platinum-copper electrocatalysts synthesized in different ratios (100:0, 90:10, 70:30, 50:50, and 0:100), using a borohydride reduction method for electrochemical oxidation of different fuels, was evaluated in an alkaline direct alcohol fuel cell. X-ray diffraction of Pt/C and PtCu/C showed a face-centered cubic structure (fcc) of the platinum and its alloys. Transmission electron microscopy analysis allowed us to see a good dispersion of metallic particles with some regions with clusters of nanoparticles, for all the synthesised materials in the presence of copper. Cyclic voltammetry and chronoamperometry tests demonstrated that the PtCu/C (50:50) and PtCu/C (70:30) electrocatalysts exhibited the highest activity and stability for the glycerol and ethanol oxidation, respectively. The tests made in fuel cells, directly fed with glycerol and ethanol, presented the PtCu/C (90:10) electrocatalyst as the most effective on the oxidation reaction of the fuels when compared with Pt/C and Cu/C.

Keywords: Direct ethanol fuel cell, direct glycerol fuel cell, PtCu electrocatalysts, alkaline fuel cell

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