

# Preliminary Study on Pd-Based Catalysts Supported with Carbon Nanofiber for the Electrooxidation of Glycerol

Norilhamiah, Y., Kamaruddin, S.K., Karim, N.A., Masdar, M.S., Loh, K.S.

## Abstract

In this study, Aurum (Au) was used as the second metal in palladium catalyst (Pd) and carbon nanofiber (CNF) as catalyst support for glycerol oxidation. Second metal and catalyst support will help to improve catalytic activity and decrease adsorbed oxidation intermediates species. Carbon nanofiber supported PdAu nanoparticles was synthesized by using trisodium citrate as stabilizing agent and sodium borohydride as reducing agent. Physicochemical characterizations of the catalyst were performed by X-ray Diffraction (XRD), Transmission Electron Microscope (TEM), Field Emission Scanning Electron Microscope (FESEM) and Brunauer-Emmett-Teller (BET) to study the nature of the catalysts. The electrochemical activity for oxidation of glycerol on PdAu/CNF was evaluated in half cell under alkaline media by cyclic voltammetry potentiostat. The densities and mass activity obtained from half-cell analysis were 73.81 mA cm<sup>-2</sup> @ 492.04 mA mg<sup>-1</sup>, 63.82 mA cm<sup>-2</sup> @ 425.44 mA mg<sup>-1</sup> and 55.73 mA cm<sup>-2</sup> @ 371.54 mA mg<sup>-1</sup> for PdAu/CNF, Pd/CNF and Au/CNF, respectively in 1 M KOH + 0.5 M glycerol electrolyte. The electrochemical study, exhibited the superior performance of bimetallic PdAu/CNF catalyst as compared to monometallic Pd/CNF. This indicate that the electronic coupling between Pd and Au can promote the electrocatalytic activity for glycerol oxidation. © 2017, Malaysian Society of Analytical Sciences. All rights reserved.

## Author keywords

Alkaline media, Carbon nanofiber, Glycerol oxidation, PdAu

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