

Topic The Effect of Heat Treatment on Activity of Pt-Au/C Electrocatalyst for Glycerol Electrooxidation in Alkaline.

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ABSTRACT

The Au-based catalysts were prepared by using the polyvinyl alcohol protected method. The physical and electrochemical properties of the as-prepared catalysts were measured. The catalytic activity and stability of the catalysts having different Au:Pt ratios toward glycerol electrooxidation were measured using cyclic voltammetric and chronoamperometric methods. The CV results showed that the 10%PtAu/C provided the highest current density and the lowest onset potential as compared to the others. The stability of 10%PtAu/C was high which was observed from the chronoamperometric results. To promote the alloy formation between Au and Pt, heat treatment of the catalyst was performed with 10%PtAu/C in a temperature range of 300-700 °C at a heating rate of 10 °C/min of under nitrogen atmosphere. The alloying degree of the heat-treated catalyst increased with increasing heat treatment temperature. Consequently, the significant enhancement of the onset potential of glycerol oxidation was achieved for the catalyst treated at 700°C. However, the heat treatment also promoted sintering phenomenon of the metal particles leading to the decrease of the maximum current density. Therefore, the untreated PtAu/C showed higher performance than the heat-treated one.

Keywords: glycerol electrooxidation, thermal treatment, polyvinyl alcohol (PVA) protection, PtAu/C, Direct Alkaline fuel cell