Thesis Title	AuNi/C Catalyst Performance for Glucose Electrooxidation in Alkaline
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Abstract

The purpose of this research was to study the effects of Au to Ni atomic ratio of Au_xNi_y/C catalysts on their electrocatalytic activity and stability toward glucose electrooxidation in an alkali medium. The Au_xNi_y/C catalysts were prepared by polyvinyl alcohol (PVA) protection method. The atomic ratios of Au:Ni in this study were 4:1, 3:1, 2:1 and 1:1. In this study, two series of catalysts were prepared by 1) controlling the total metal loading at 20% by weight and 2) fixing the Au loading at 20% by weight. The result from the Transmission Electron Microscope (TEM) image showed a good dispersion of metal nanoparticles with small average size (3.6 to 8.7 nm). The result from X-ray diffraction (XRD) revealed the alloy formation of gold and nickel. The electrooxidation activity and stability of the catalysts were measured by cyclic voltammetry (CV) and chronoamperometry (CA) techniques, respectively. By comparing the CV results of the catalysts prepared from both series, it showed that the catalysts prepared by fixing the Au loading content provided higher specific current density (mA/mg Au) than those prepared by controlling the total metal loading content. In other words, some parts of the gold surface were covered by nickel. However, the addition of nickel at a suitable content could enhance both activity and stability of the catalysts, as found in the cases of Au_4Ni_1/C and Au_3Ni_1/C. A further increase of nickel content (Au_2Ni_1/C and Au_1Ni_1/C) would be detrimental to the catalyst performance. The specific current densities obtained from Au_2Ni_1/C and Au_1Ni_1/C catalyst were lower than that from Au/C. The most

stable catalyst at high voltage of 0.3 V was Au_4Ni_1/C where as it was Au_3Ni_1/C at the low voltage of -0.4 V. Both catalysts showed low long-term decay rates and yielded at least 3 times higher final current density than the Au/C catalyst.

Keywords: Au/C / AuNi/C / Direct glucose alkaline fuel cell /Glucose Electrooxidation/ PVA protection method.