

Title : Preparation of CNT-PPy-SnNi/Pt Catalyst for Enhancing the Oxidation of Organic Compounds in Alkaline Conditions.

Author(s) : 1. Ms Rujirat Chaiphuthorn **Student ID :** 640510176

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Advisor(s) : 1. Associate Professor Dr. Surin Saipanya.

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ABSTRACT

The development of highly efficient and durable electrocatalysts for alcohol oxidation is crucial for direct alcohol fuel cell (DAFC) applications. This research focuses on the design and fabrication of an advanced electrocatalyst to enhance oxidation performance for both methanol (MeOH) and glucose in alkaline media. Specifically, CNT-PPy-SnNi/Pt catalysts were synthesized using carbon nanotube (CNT)-modified polypyrrole (PPy) as a supporting material to accelerate oxidation reactions in MeOH and glucose. The key advantage of this catalyst lies in its high surface area and enhanced electron transport, which significantly improves reaction efficiency. Cyclic voltammetry (CV) analysis indicates that the CNT-PPy-SnNi/Pt catalysts exhibit outstanding electrocatalytic activity in both methanol and glucose oxidation, delivering high current density at a lower potential, confirming its superior efficiency. The incorporation of tin (Sn) and nickel (Ni) enhances the electronic properties of the system, facilitating more efficient charge transfer and oxidation activity. Additionally, the presence of platinum (Pt) provides excellent catalytic activity and stability, further boosting the oxidation kinetics of methanol and glucose. The CNT-PPy hybrid support structure is crucial in preventing nanoparticle aggregation, enhancing electrical conductivity, and promoting uniform metal dispersion on the surface. These characteristics suggest that a CNT-PPy-SnNi/Pt is a highly promising electrocatalyst for the electrochemical oxidation of alcohols in alkaline fuel cell applications.

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