

عنوان مقاله:

Green in-situ Fabrication of PtW/Poly Ethylen Dioxy Thiophene/Graphene Nanoplates/Gas Diffusion Layer (PtW/PEDOT /GNP/GDL) Electrode and its Electrocatalytic Property for Direct Methanol Fuel Cells Application

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خلاصه مقاله:

In this study nanocomposite films of PtW nanoparticles deposited on a poly ethylen dioxy thiophene/graphene nanoplates/gas diffusion layer (PEDOT/GNP/GDL) electrode are fabricated via an electrochemical route involving a series of electrochemical process. GNPs are in situ reduced on carbon paper covered with 3, 4 ethylen dioxy thiophene during the in situ polymerization of EDOT. PtW nanoparticles 18.57nm in average size are prepared by electrodeposition on the surface of PEDOT/GNP/GDL. Field emission scanning electronic microscopy (FESEM) images showed spongy aggregates of PEDOT densely cover the surface and edges of the GNP layers, implying the existence of a strong interaction between PEDOT and GNP. Based on electrochemical characterization, it was found that the as prepared electrode exhibited comparable activity for the methanol oxidation (MEOH) reaction with respect to commercial Pt/C/GDL based on the traditional sprayed method. A significant reduction in the potential of the CO electro-oxidation peak from 0.92V for Pt/C to 0.75V for the PtW/PEDOT/GNP/GDL electrode indicates that an increase in the activity for CO electro-oxidation is achieved by replacing Pt with PtW. This may be attributed to structural changes caused by alloying and the increased conductivity and high specific surface area of PEDOT and GNPs catalyst support, respectively. CV scanning results showed that the PtW/PEDOT/GNP/GDL electrode has greater stability than the Pt/C/GDL electrode.

کلمات کلیدی:

Direct Methanol Fuel Cell (DMFC), Galvanostatic Electrodeposition, graphene nanoplates, Platinum-Tungsten (PtW) (Nanoparticles, fuel cell, Poly Ethylen Dioxy Thiophene (PEDOT

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