High Activity of Helical Carbon Nanotube supported Pd Nanoparticles for Ethanol Electro-oxidation in Alkaline Media

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Well-dispersed nanoparticles supported on carbon materials are synthesized successfully with a simple and facile method. Poly diallyldimethylammonium chloride (PDDA) functionalized helical carbon nanotubes (HCNTs) were used as the support material for the deposition of Pd nanoparticles by means of chemical reduction. The catalyst was characterized by scanning electron microscopy, transmission electron microscopy, energy dispersive X-ray spectroscopy, X-ray diffraction and X-ray photoelectron spectroscopy. The electrocatalytic activities of the prepared nanocomposites towards ethanol electro-oxidation were studied by cyclic voltammetry and chronoamperometry. The results indicated that Pd nanoparticles, with an average size of 4 nm, were uniformly dispersed onto the HCNTs/PDDA with a metal weight percentage of 20 wt. %. The method provides a new vision for decentralization of the metal nanoparticles upon functionalized carbon supports for application as electrocatalyst in fuel cells.

Keywords: Pd nanoparticles, Helical carbon nanotubes, Ethanol oxidation

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