

Synthesis of Carbon dots/PtPd Nanoalloy Hybrid Materials with a High Catalytic Activity for Direct Methanol Fuel Cells

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The enhancement of catalyst performance for methanol oxidation reduction (MOR) still remains a huge challenge. Although numerous methods for designing new catalysts based on PtPd nanoparticles (NPs) have been suggested, their complicated synthesis procedure have still been a drawback. In this study, we report a simple reduction route for the synthesis of carbon dots (C-dots)/ PtPd NPs hybrid materials using a formic acid as a reducing reagent at room temperature. The PtPd alloy nanoparticles were stably and uniformly immobilized on the surface of C-dots without further dispersion of PtPd NPs on the carbon black after synthesizing PtPd nanoparticles. The improvement of electrocatalytic activity for the electro-oxidation reactions of methanol as chemical fuel is attributed to the presence of C-dots in the hybrid materials. Furthermore, the C-dots/PtPd NPs hybrid materials show hydrophilic property, excellent stability and high catalytic activity for electro-oxidation reactions at room temperature. Thus, it may be a promising candidate for many other electrocatalytic applications.