

Study on the ORR Activity of Platinum-tin Alloy Deposited on Graphene by Alcohol Reduction Method

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Abstract

Graphene powder was used as the catalyst support. The electrocatalysts were synthesized by using alcohol-reduction process and applied for the oxygen reduction reaction (ORR). The physical and morphological properties of the synthesized catalysts were characterized by energy dispersive spectrometer, X-ray diffraction, and high resolution transmission electron microscope. The electrochemical performances were analyzed by cyclic voltammetry, linear scan voltammetry and long-term durability. Results show that samples prepared at pH 12 have smaller particle size than those prepared at pH 9 due to the formation of SnO₂ phases in PtSn/C catalysts. Furthermore, the long-term stability of Pt/OPC is also better than that of commercial E-Tek sample. The nanoparticles were well-dispersed on the graphene support with an average size of 2.5 nm. The PtSn/G catalyst is more chemically stable in the acid environment than JM Pt/C.