

Y@Pt/C Core-Shell Electro-Catalyst for Oxygen Reduction Reaction

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ABSTRACT

The catalyst for oxygen reduction reaction (ORR) plays an important role in determining the performance of a fuel cell. At present, platinum (Pt) is still the best ORR catalyst. However, the prohibitive price of Pt limits the commercialization of fuel cells. To reduce the amount of the Pt used in fuel cells, one approach is to introduce an additional metal to form Pt based alloy as a substitute for pure Pt. Because it, Pt-M alloys (M is the transition metals) have been extensively investigated as cathode electrocatalysts. However, the loss of the guest metal from the Pt based alloy is a significant problem in an acidic fuel cell operation environment. In the last years, it has been shown that by forming a monolayer-submonolayer of Pt on other metal, the Pt usage could be reduced considerably without scarifying the activity. In this work the synthesis and characterization of the yttrium decorated platinum core-shell nanocatalyst supported on carbon Vulcan for the oxygen reduction reaction (ORR) in acid media was evaluated. The core was synthesized by chemical reduction with NaBH₄ of the precursor salt, while the shell was deposited by galvanic displacement in the surface atoms of Y in the particles. The material was characterized by XRD, TEM and EDAX. The electrochemical performance of Pt@Y/C is evaluated by cyclic voltammetry, CO stripping and RDE.

Keywords: Y@Pt / C; ORR; core-shell.

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