

Synthesis of Platinum-Carbon Aerogel Catalysts for PEMFC

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Proton exchange membrane fuel cells (PEMFCs) currently use platinum catalysts supported on high surface area carbons as active catalyst layers for hydrogen oxidation and oxygen reduction. To meet the commercial application of PEMFC electrocatalyst, it is very critical to reduce the platinum metal loadings by higher dispersion of platinum nanoparticles on the carbon surface.

In this work, we synthesized highly dispersed platinum-carbon aerogel catalysts for PEMFC by sol-gel method. We obtained platinum-organic aerogels by carbon dioxide supercritical drying of platinum-organic alcogels. Then platinum-carbon aerogel catalysts were prepared by carbonization of platinum-organic aerogels. The physical properties of the catalysts were measured by XRD, TEM and nitrogen adsorption-desorption. And the electrochemical property such as electrochemical active surface (EAS) of platinum in the catalysts was determined by cyclic voltammetry and CO stripping techniques. The EAS of the prepared catalyst was 51 m²/g, while that of the commercial catalyst was 30 m²/g.