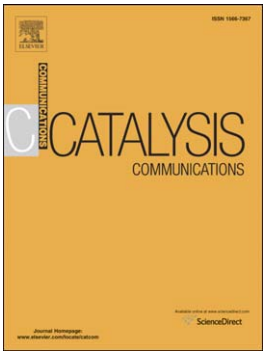

Ultra-fine Pt nanoparticles supported on 3D porous N-doped graphene aerogel as a promising electro-catalyst for methanol electrooxidation

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Ultra-fine Pt nanoparticles supported on 3D porous N-doped graphene aerogel as a promising electro-catalyst for methanol electrooxidation

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Abstract:

Three dimensional porous nitrogen-doped graphene aerogel (3D-NGA) was successfully fabricated via a combined hydrothermal self-assembly, thermal treatment and template-removing process. The as-synthesized Pt/3D-NGA catalysts exhibit an interconnected 3D porous structure, high N-doped level and uniform dispersion of Pt NPs. In studying the electrocatalytic performance of samples toward methanol electrooxidation, we found that Pt/3D-NGA hold a high electrochemical active surface area (ECSA) of 90.7 m^2g^{-1} and better catalytic activity as well as stability compared to Pt/G and Pt/3D-GA catalysts. Our studies provide a simple approach to synthesize 3D metal or metal oxide/graphene-based composites, holding great potential for fuel cell applications.

Keywords: Graphene aerogel; 3D architecture structure; Nitrogen-doping; Fe_2O_3 spacer; Ultra-fine Pt; Methanol electrooxidation

1. Introduction

Proton exchange membrane fuel cells (PEMFCs) are in rapid development for transport