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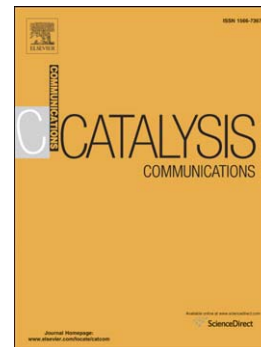
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Ultra-fine Pt nanoparticles supported on 3D porous N-doped graphene aerogel as a promising electro-catalyst for methanol electrooxidation

Lei Zhao,¹ Xu-Lei Sui,¹ Jia-Long Li,¹ Jing-Jia Zhang¹, Li-Mei Zhang¹, Zhen-Bo Wang^{1, *}

¹ School of Chemistry and Chemical Engineering, Harbin Institute of Technology, No. 92

West-Da Zhi Street, Harbin, 150001 China

* Corresponding author. Tel.: +86-451-86417853; Fax: +86-451-86418616.

Email: wangzhibo@hit.edu.cn (Z.B. Wang)

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 $90.7 \text{ m}^2 \text{ g}^{-1}$ 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

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