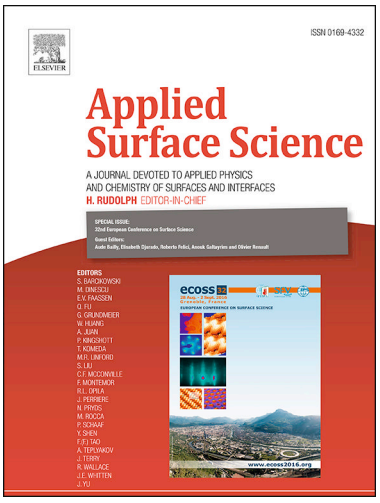

Full Length Article

Dicationic ionic liquid mediated fabrication of Au@Pt nanoparticles supported on reduced graphene oxide with highly catalytic activity for oxygen reduction and hydrogen evolution

Ya-Cheng Shi, Sai-Sai Chen, Jiu-Ju Feng, Xiao-Xiao Lin, Weiping Wang, Ai-Jun Wang

PII: S0169-4332(18)30258-7
DOI: https://doi.org/10.1016/j.apsusc.2018.01.240
Reference: APSUSC 38379

To appear in: *Applied Surface Science*

Received Date: 7 October 2017
Revised Date: 10 January 2018
Accepted Date: 27 January 2018

Please cite this article as: Y-C. Shi, S-S. Chen, J-J. Feng, X-X. Lin, W. Wang, A-J. Wang, Dicationic ionic liquid mediated fabrication of Au@Pt nanoparticles supported on reduced graphene oxide with highly catalytic activity for oxygen reduction and hydrogen evolution, *Applied Surface Science* (2018), doi: https://doi.org/10.1016/j.apsusc.2018.01.240

Dicationic ionic liquid mediated fabrication of Au@Pt nanoparticles supported on reduced graphene oxide with highly catalytic activity for oxygen reduction and hydrogen evolution

Ya-Cheng Shi, Sai-Sai Chen, Jiu-Ju Feng, Xiao-Xiao Lin, Weiping Wang, Ai-Jun Wang*

College of Geography and Environmental Science, College of Chemistry and Life Science, Zhejiang Normal University, Jinhua 321004, China

**Corresponding Author: ajwang@zjnu.cn.*

Abstract

Ionic liquids as templates or directing agents have attracted great attention for shaping-modulated synthesis of advanced nanomaterials. In this work, reduced graphene oxide supported uniform core-shell Au@Pt nanoparticles (Au@Pt NPs/rGO) were fabricated by a simple one-pot aqueous approach, using *N*-methylimidazolium-based dicationic ionic liquid (1,1-bis(3-methylimadazoilum-1 -yl)butylene bromide, $[C_4(Mim)_2]2Br$) as the shape-directing agent. The morphology evolution, structural information and formation mechanism of Au@Pt NPs anchored on rGO were investigated by a series of characterization techniques. The obtained nanocomposites displayed superior electrocatalytic features toward hydrogen evolution reaction (HER) and oxygen reduction reaction (ORR) compared with commercial Pt/C catalyst. This approach provides a novel route for facile synthesis of nanocatalysts in fuel cells.

Keywords: Dicationic ionic liquid; Core-shell nanoparticles; Reduced graphene oxide; Hydrogen evolution reaction; Oxygen reduction reaction