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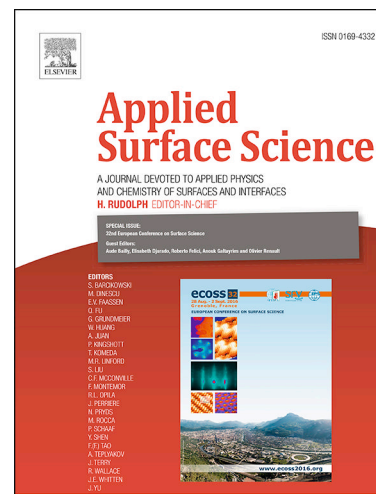
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Dicationic ionic liquid mediated fabrication of Au@Pt nanoparticles supported on reduced graphene oxide with highly catalytic activity for oxygen reduction and hydrogen evolution

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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-methylimidazolium-1-yl)butylene bromide, [C₄(Mim)₂]²⁺Br⁻) 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

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