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**One-pot aqueous fabrication of reduced graphene oxide supported porous PtAg alloy nanoflowers to greatly boost catalytic performances for oxygen reduction and hydrogen evolution**

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**Abstract**

Herein, reduced graphene oxide supported porous PtAg alloy nanoflowers (PtAg NFs/rGO) were synthesized by a simple one-pot aqueous method using pyridinium-based dicationic ionic liquid (1,4-bis(pyridinium)butane dibromide, Bpb-2Br) as the new structure-director and stabilizing agent. The products were characterized by a series of techniques. The obtained nanocomposite had more positive onset potential (1.03 V) for oxygen reduction reaction (ORR) in alkaline electrolyte than those of commercial Pt/C (50 wt%, 0.96 V) and home-made Pt nanoparticles (NPs)/rGO (Pt NPs/rGO, 0.97 V), showing the enhanced catalytic performance for hydrogen evolution reaction (HER) with the positive onset potential (−26 mV) and a small Tafel slope (31 mV dec<sup>−1</sup>) relative to Pt/C (−18 mV, 31 mV dec<sup>−1</sup>) and Pt NPs/rGO (−42 mV, 36 mV dec<sup>−1</sup>) in 0.5 M H<sub>2</sub>SO<sub>4</sub>.

**Keywords:** Porous alloy nanoflowers; Ionic liquid; Reduced graphene oxide;

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