Title: Spontaneous weaving: 3D porous PtCu networks with ultrathin jagged nanowires for highly efficient oxygen reduction reaction

Authors: Jie Ying, Gaopeng Jiang, Zachary P. Cano, Zhong Ma, Zhongwei Chen

PII: S0926-3373(18)30364-3
DOI: https://doi.org/10.1016/j.apcatb.2018.04.035
Reference: APCATB 16606

To appear in: *Applied Catalysis B: Environmental*

Received date: 3-1-2018
Revised date: 13-4-2018
Accepted date: 17-4-2018

Please cite this article as: Ying J, Jiang G, Cano ZP, Ma Z, Chen Z, Spontaneous weaving: 3D porous PtCu networks with ultrathin jagged nanowires for highly efficient oxygen reduction reaction, *Applied Catalysis B: Environmental* (2010), https://doi.org/10.1016/j.apcatb.2018.04.035

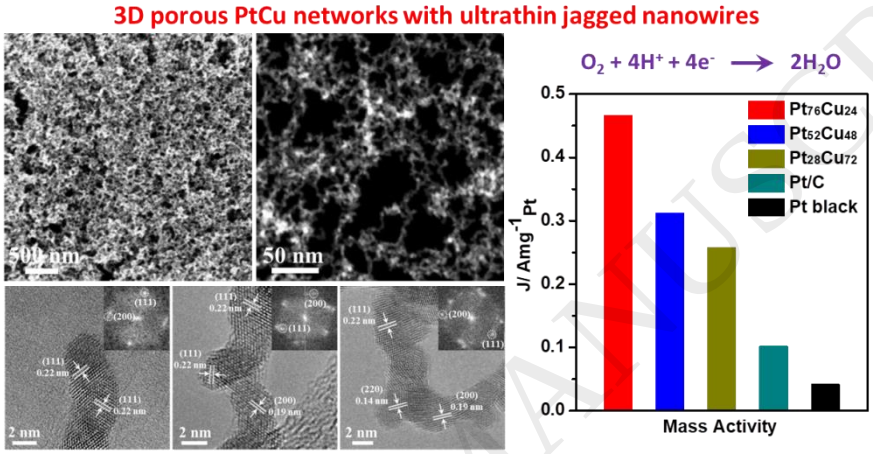
Spontaneous weaving: 3D porous PtCu networks with ultrathin jagged nanowires for highly efficient oxygen reduction reaction

Jie Ying, Gaopeng Jiang, Zachary P. Cano, Zhong Ma, Zhongwei Chen*

Department of Chemical Engineering, University of Waterloo, Ontario N2L 3G1, Canada

*Corresponding authors.
E-mail addresses: *zhwchen@uwaterloo.ca* (Z.Chen).

Graphical Abstract



Highlights

- • PtCu networks with ultrathin jagged nanowires and controllable composition are obtained.
- • The sample displays remarkable catalytic activity for the oxygen reduction reaction.
- • The sample exhibits outstanding catalytic durability and stability.
- • This method can be facilely extended to prepare PtCuAu networks with high porosity.

Abstract

We report a simple and efficient surfactant-free method to prepare 3D porous PtCu networks with ultrathin jagged nanowires and controllable composition. The morphological evolution and the influential effects of the important experimental parameters on the PtCu networks have been systematically studied. Relative to commercial Pt/C and Pt black catalysts, these porous PtCu networks exhibit much better activity and remarkably improved durability towards the oxygen reduction reaction (ORR). The excellent ORR performance could be attributed to their structural features, including the core-shell nanostructures with a Pt-skin, the 3D porous networks with high surface area, and the ultrathin (3.6 nm) jagged nanowires with plentiful edge/corner atoms. Notably, this method can be facilely extended to obtain