Supporting Information Available

Novel strategy for synthesis of hollow Pt-Cu tetradecahedrons as an efficient electrocatalyst toward methanol oxidation

Ruopeng Zhao,[‡a,b] Gengtao Fu,[‡d] Zhijing Chen,[a] Yawen Tang,[c,*] Yi Wang[b,*] and Shaoming Huang[a,*]

a. School of Materials and Energy, Guangdong University of Technology, Guangzhou, 510006, PR China.

b. Wenzhou Institute of Biomaterials and Engineering, Chinese Academy of Sciences, Wenzhou, 325000, PR China.

c. Jiangsu Key Laboratory of New Power Batteries, Jiangsu Collaborative Innovation Center of Biomedical Functional Materials, School of Chemistry and Materials Science, Nanjing Normal University, Nanjing 210023, PR China.

d. School of Chemical and Biomedical Engineering, Nanyang Technology University, Singapore 637459, Singapore 637459, Singapore.

E-mail: tangyawen@njnu.edu.cn (Yawen Tang); wangyi@wibe.ac.cn (Yi Wang); smhuang@gdut.edu.cn(Shaoming Huang)

‡ These authors contributed equally to this work

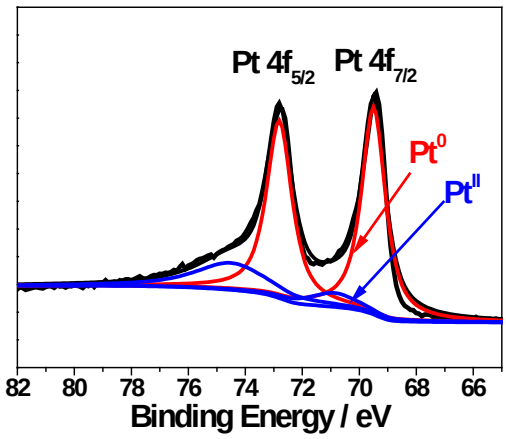

Figure S1. XPS spectra of Pt-Cu TNs in Pt 4f region.

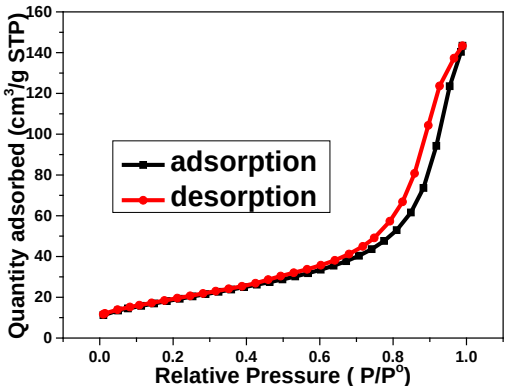

Figure S2. N_2 adsorption analysis of Pt-Cu TNs: N_2 adsorption-desorption isotherms

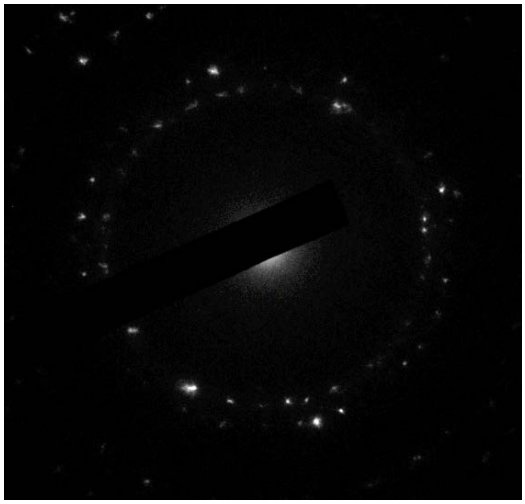

Figure S3. The SAED pattern of Pt-Cu TNs.

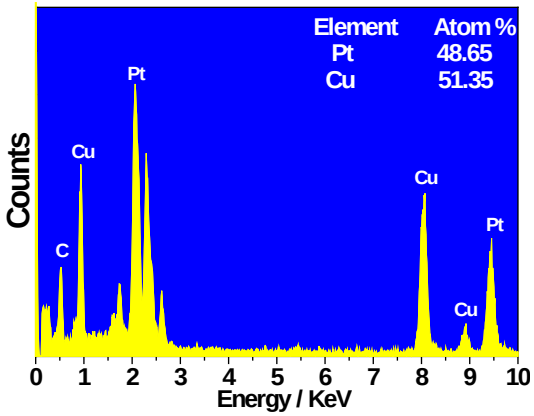

Figure S4. The EDX pattern of Pt-Cu TNs.

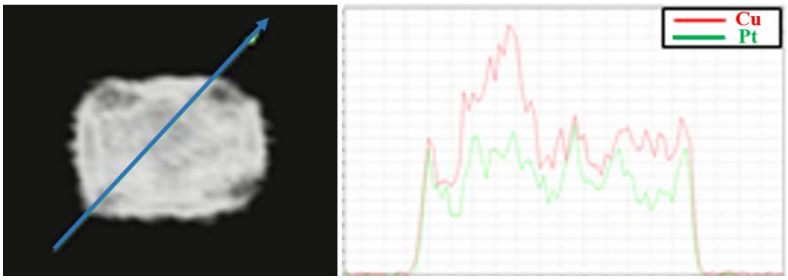

Figure S5. EDS line scanning profiles of Pt-Cu TNs.

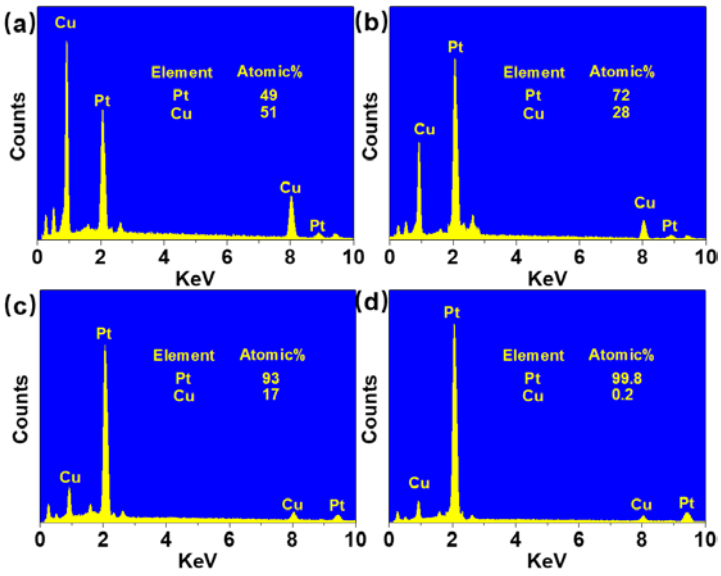

Figure S6. (a, b, c, d) EDX results of the Pt-Cu TNs tailored by different amounts of the K_2PtCl_6.

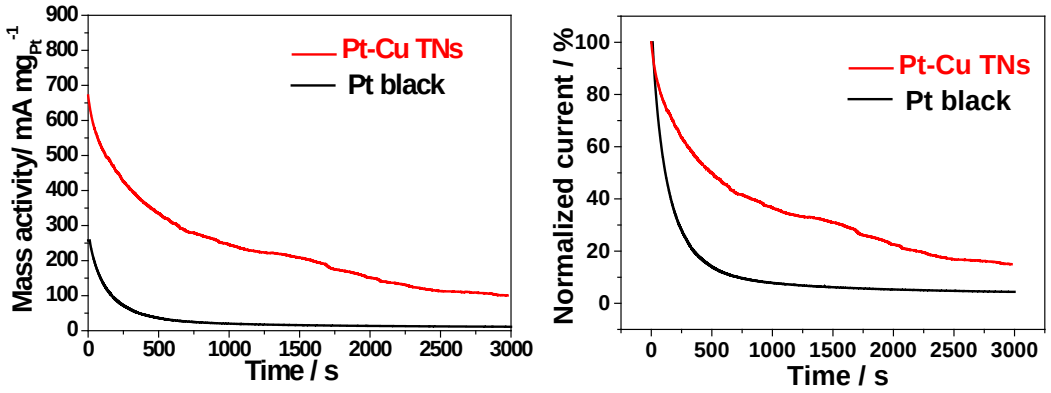

Figure S7. Chronoamperometry curves for Pt-Cu TNs and Pt black measured in a solution of 1 M methanol and 0.5 M H_2SO_4 for 3000 s at 0.65 V and its time-dependent relative current curves

Table S1 Activity comparison of Pt-based catalysts toward methanol oxidation reaction

No	Catalysts	Mass Activity ($A\ mg^{-1}_{Pt}$)	Specific Acitvity ($mA\ cm^{-2}$)	Electrolyte	Ref.
1	Pt-Cu TNs	0.88	2.5	1 M CH_3OH and 0.5 M H_2SO_4 solution	Our work
2	stars-like PtCu/rGO	0.67	/	1 M CH_3OH and 0.5 M H_2SO_4 solution	Electrochimica Acta, 2015, **177** , 86-92
3	$Pt_{17}Pd_{16}Ru_{22}Te_{45}$ NTs	1.26	2.96	1 M CH_3OH and 0.5 M H_2SO_4 solution	J. Am. Chem. Soc. 2017, 139, 5890-5895
4	$Pt_{95}Co_5$ nanowires	0.49	2.13	1 M CH_3OH and 0.5 M H_2SO_4 solution	Nano Research 2018, **11**, 2562-2572
5	Pt-Ru Nanocrystals	0.82	1.16	0.1 M $HClO_4$ and 0.5 M CH_3OH solution	J. Am. Chem. Soc. 2018, **140**, 1142-1147
6	Pt/S-MWCNT	0.80	/	0.5 M CH_3OH and 0.5 M H_2SO_4 solution	J. Mater. Chem. A, 2017, **5**, 19467-19475
7	hierarchical Pt–Ni nanoroses	0.35	/	1 M CH_3OH and 0.5 M H_2SO_4 solution	CrystEngComm, 2017, **19**, 4964-4971
8	Pd@Pt core-shell hexapods	0.52	1.97	0.5 M CH_3OH and 0.5 M H_2SO_4 solution	Nanoscale, 2017, **9**, 11077-11084
9	bimetallic Au@Pt core-shell nanoparticle	0.4	0.68	0.5 M CH_3OH and 0.5 M H_2SO_4 solution	Scientific Reports, 2017, **7**, 6347-6356
10	Pt-Co-P-11.9/CNT	0.53	0.62	0.5 M CH_3OH and 0.5 M H_2SO_4 solution	Electrochimica Acta, 2017, 215, 447-454
11	Pt Nanowires with Ordered Large Mesopores	0.4	1	1 M CH_3OH and 0.5 M H_2SO_4 solution	Scientific Reports 2016, 6, 31440-31448