Electronic Supplementary Material (ESI) for Journal of Materials Chemistry A.

Supporting Information

Hollow platinum tetrapods: using a combination of {111} facets, surface concave topology, and ultrathin walls to boost their oxygen reduction reactivity

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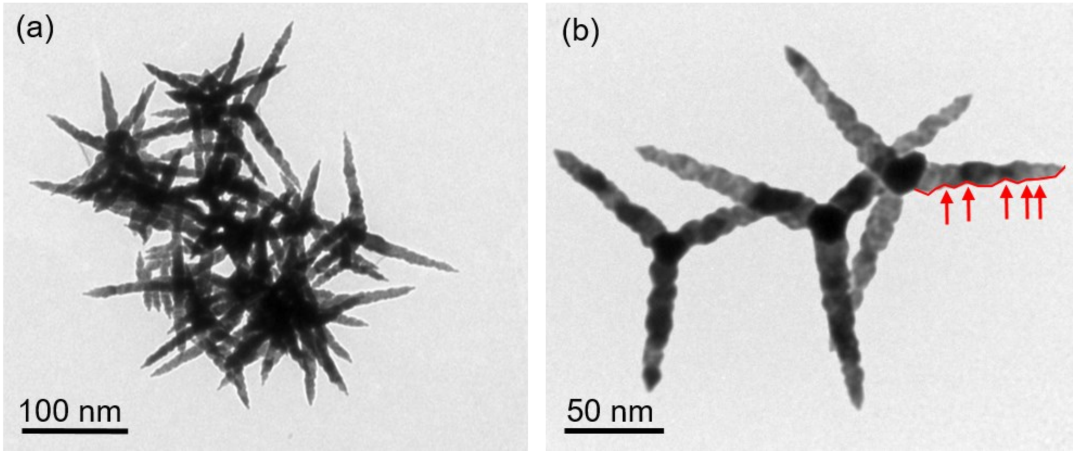

Fig. S1 TEM images of the monodispersed Pd tetrapods as seed.

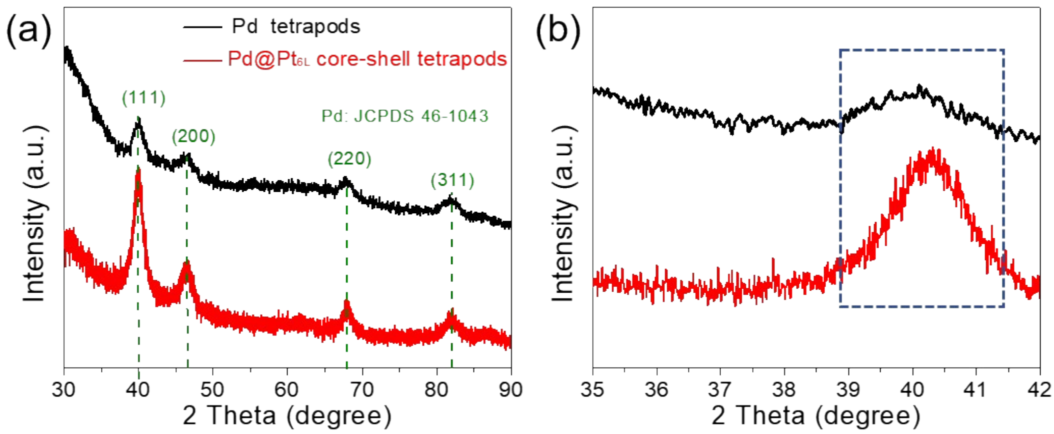

Fig. S2 XRD pattern of the Pd tetrapods and Pd@Pt_{6L} core-shell tetrapods.

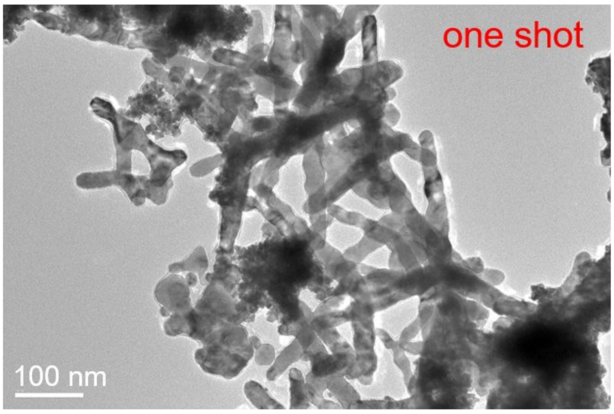

Fig. S3 TEM image of the products obtained by using the standard protocol of Pd@Pt_{6L} core-shell tetrapods except the injection rate.

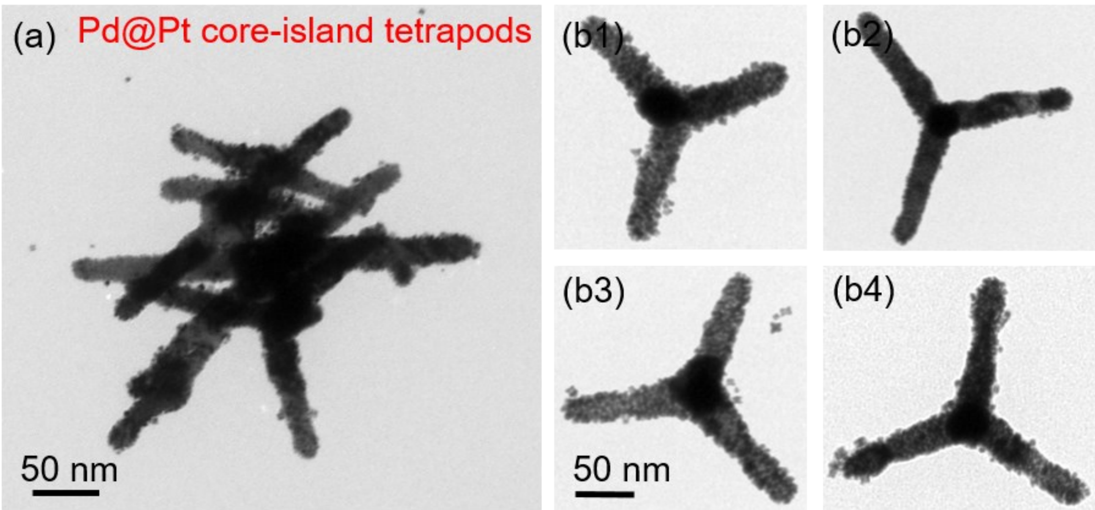

Fig. S4 TEM images of the Pd@Pt core-island tetrapods obtained by using the standard protocol of Pd@Pt_{6L} core-shell tetrapods except the reaction temperature.

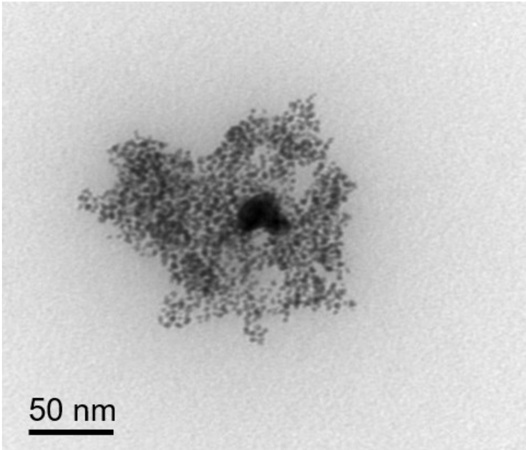

Fig. S5 TEM images of the products after etching the Pd core of Pd@Pt core-island tetrapods.

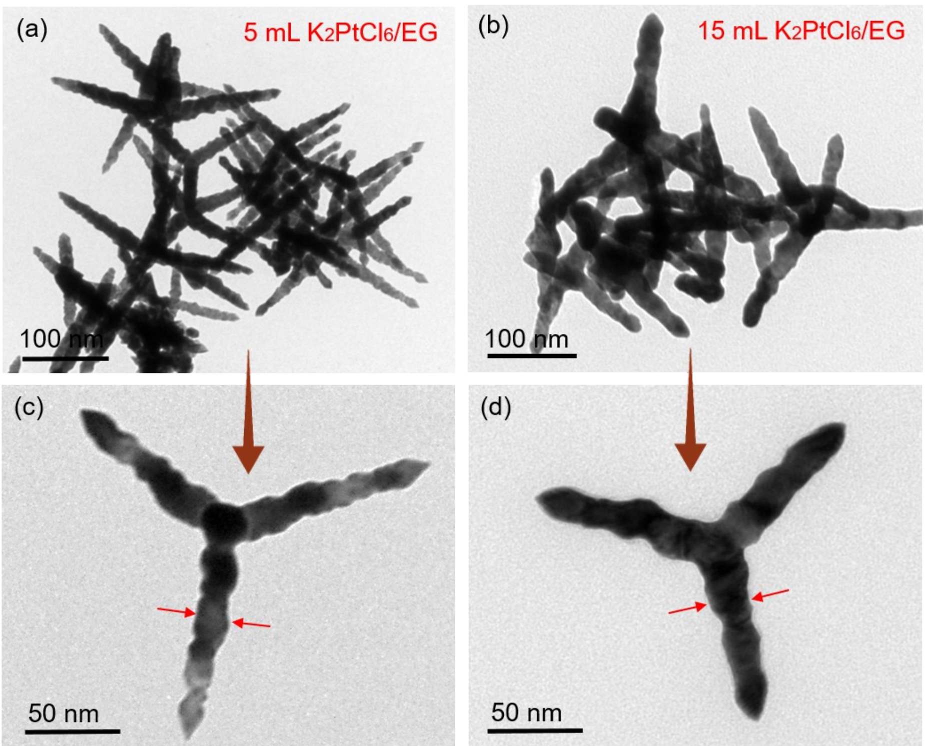

Fig. S6 TEM images of the products obtained by using the standard protocol of Pd@Pt_{6L} core-shell tetrapods except the volume of precursor. (a), (c) 5 mL of K_2PtCl_6/EG solution. (b), (d) 15 mL of K_2PtCl_6/EG solution.

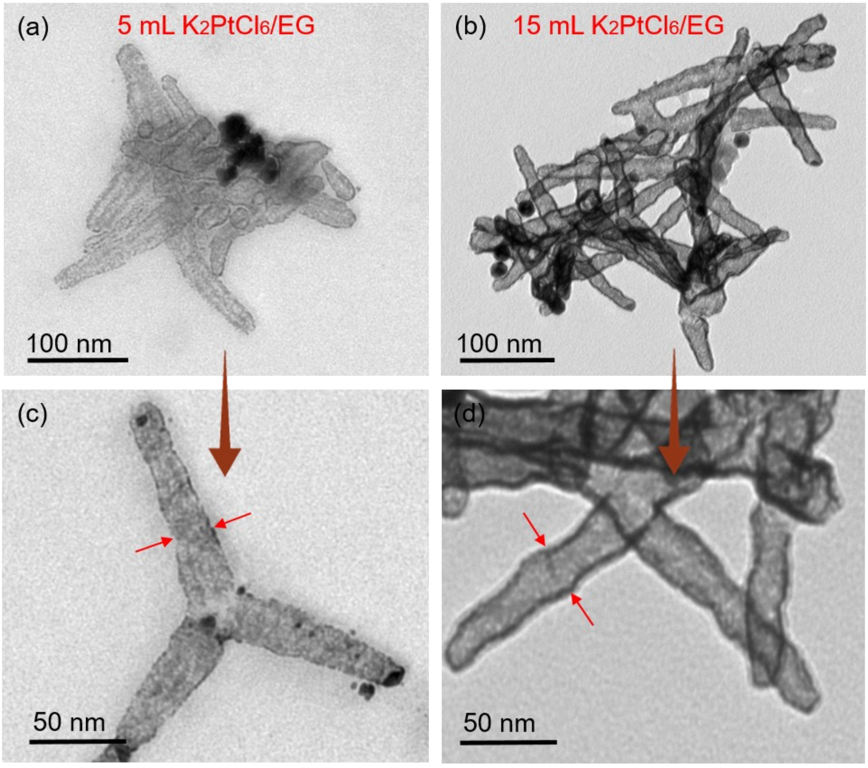

Fig. S7 TEM images of the products obtained by etching the sample from Fig. S6.

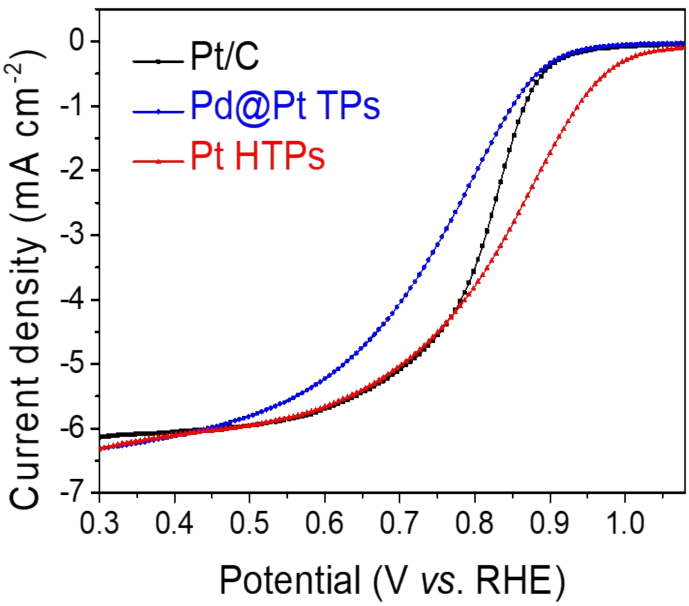

Fig. S8 ORR polarization curves recorded in O_2-saturated 0.1 M $HClO_4$ solution.

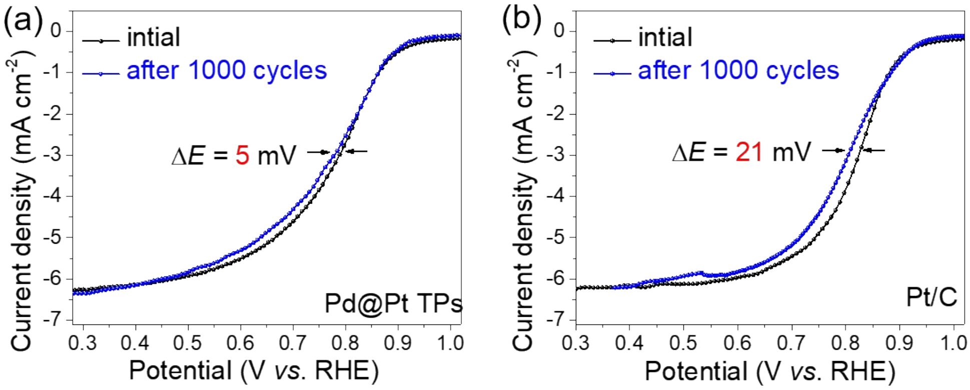

Fig. S9 ORR polarization curves of the (a) Pd@Pt TPs, and (b) Pt/C before and after 1000 cycles at a scan rate 100 mV s^{-1}.

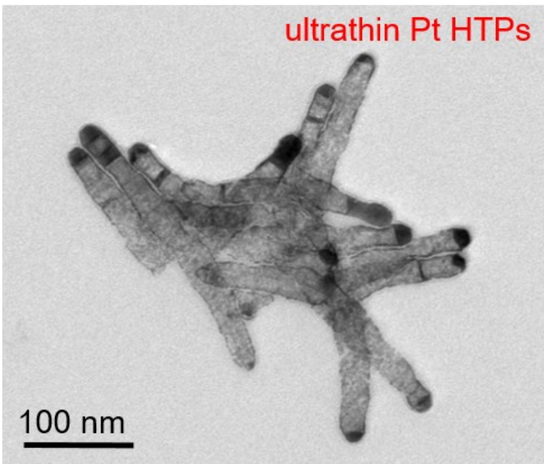

Fig. S10 TEM image of the ultrathin Pt HTPs after ADTs.

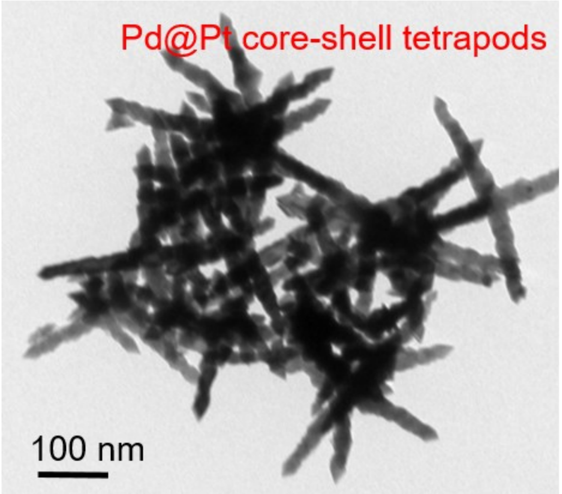

Fig. S11 TEM image of the Pd@Pt core-shell tetrapods after ADTs.

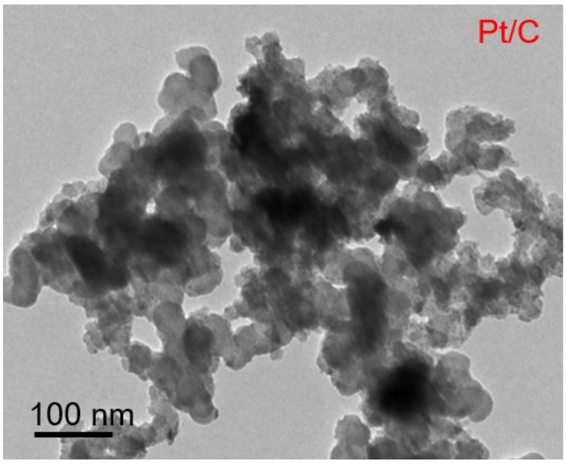

Fig. S12 TEM image of the Pt/C after ADTs.

Table S1 Comparison of the ORR performance of the ultrathin Pt HTPs with some previously reported noble metal-based catalysts in 0.5 M H_2SO_4 solution.

Number	Catalysts	E_{onset} (V *vs.* RHE)	$E_{1/2}$ (V *vs.* RHE)	Reference
1	Pd@Pt TPs	0.995	0.789	This work

2	Pt HTPs	1.014	0.836	This work
3	Pt/C	1.009	0.825	This work
4	Pt-WP-CL/AEG-3	0.720	0.610	[1]
5	Pt/TiO_2-2/C	0.880	0.727	[2]
6	Pt/OMC	~ 0.930	~ 0.750	[3]
7	5 wt % Pt-CeO_x NW/C	0.890	0.750	[4]
8	tensile strained 5 nm Pt	~ 0.890	0.672	[5]
9	Pt/C-$(NH_4)_2PtCl_6$	~ 0.950	~ 0.810	[6]

References

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