Electronic Supplementary Information

Shape Control of Novel Platinum Nanostructures

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Experimental Section

The electrochemical (EC) measurements were conducted on a CHI 601D electrochemical workstation equipped with a conventional three-electrode cell. A Pt wire was used as the counter electrode and Ag/AgCl as the reference. The working electrode was prepared as follows. 3 mg as-synthesized Pt nanobelt (or ETEK catalyst) was dispersed in 1 mL 0.05 wt% Nafion solution by 5 min sonication. Afterwards, 20 µL of the above dispersion was drop-casted onto a mirror-polished glassy carbon (GC) electrode (3 mm diameter). The GC electrode was left ambient dry and used as the working electrode. The EC methanol oxidation test was then performed in a mixed solution of 0.5 M MeOH and 0.5 M sulfuric acid. The potential range was set between 0-1 V and the scan rate was 50 mV s^{-1}. Prior to the methanol oxidation test, a surface activation process was required for the nanobelts. The activation process was simply by cycling the nanobelt modified GC electrode in 1 M H_2SO_4 from -0.2 V to 1.2 V for 15 cycles at a scan rate of 10 mV s^{-1}.

Transmission electron microscopy and SAED were performed on a JEOL 2100F TEM operated at 200 kV. Scanning electron microscopy and EDX analysis were performed on a JEOL JSM-7000F equipped with an EDX detector. The X-ray diffraction (XRD) pattern was obtained using a Bruker APEX single crystal X-ray diffractometer.

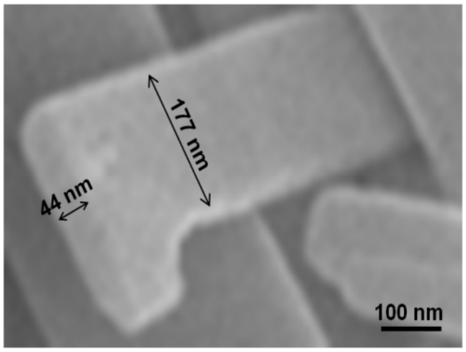

Fig. S1 Typical cross-sectional view of the as-synthesized Pt nanobelt.

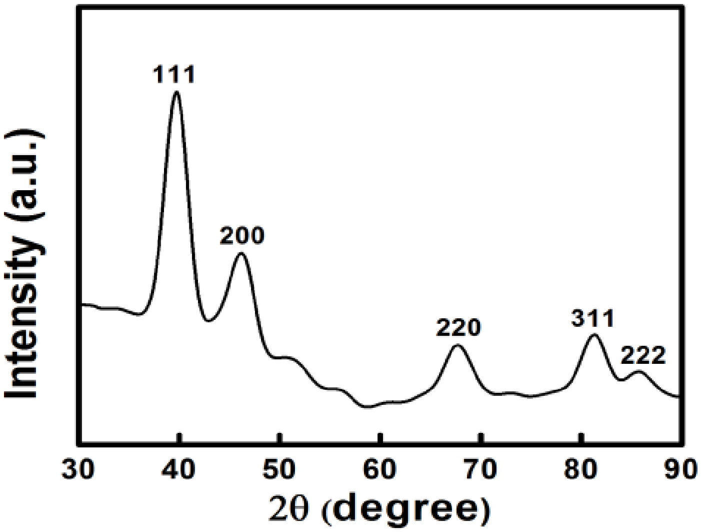

Fig. S2 XRD pattern of the as-synthesized Pt nanobelts. The peak broadening can be attributed to the internal strains arising from the unique quasi-1D nanostructure of the nanobelts.[1-3]

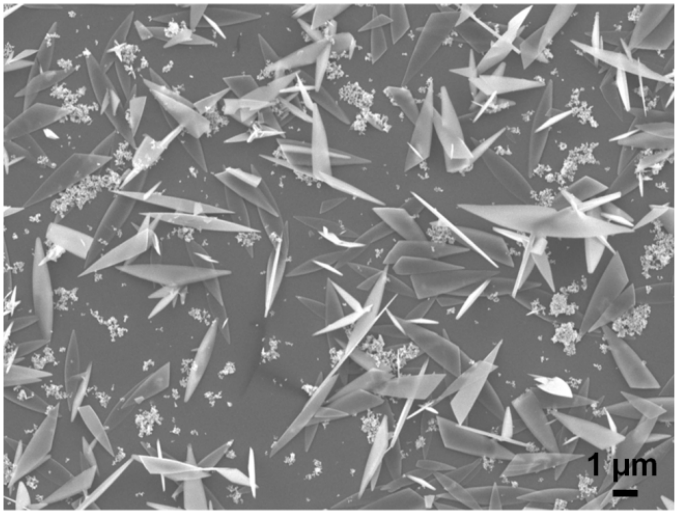

Fig. S3 Copper (Cu) nanoflakes synthesized in alkaline solution using EDA.

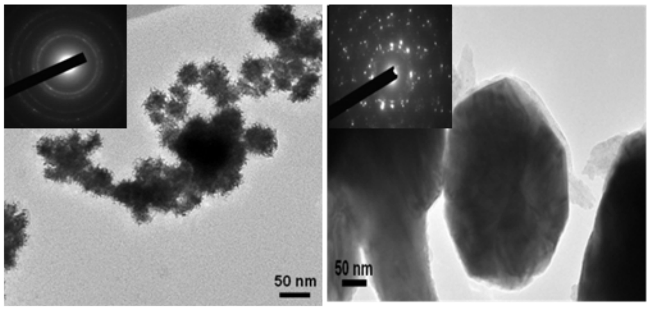

Fig. S4 TEM images of the Pt nanoparticles synthesized without adding CTAB (left) and aggregated Pt particles synthesized without the addition of both CTAB and EDA. Inset: the corresponding SAED pattern.

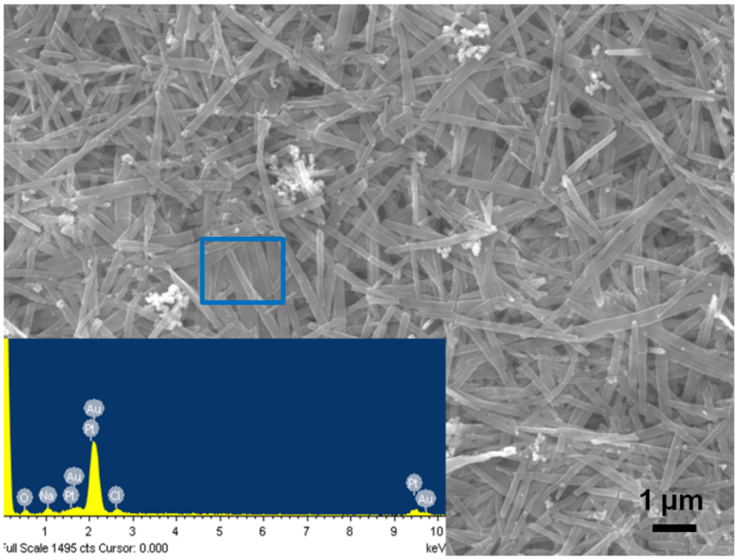

Figure S5. EDX spectrum of Pt nanobelt for the selected area, the Au signal is due to gold sputter coating.

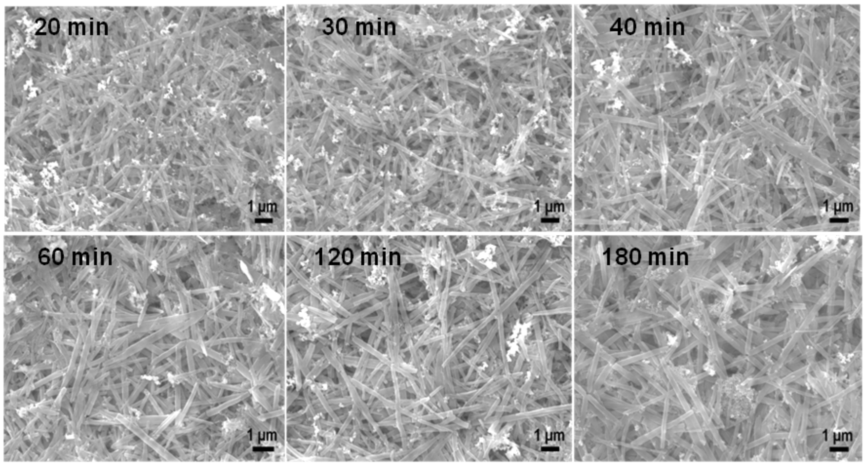

Figure S6. Pt nanobelt synthesized with different reaction time.

Table S1. Average width and standard deviation (SD) of width for Pt nanobelt obtained at different time

	20 min	30 min	40 min	60 min	120 min	180 min
avg. width (nm)	102	132	142	146	151	178
SD (nm)	28	33	35	30	35	46

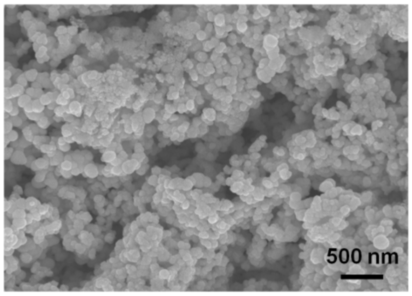

Figure S7. Pt nanoparticles obtained without the addition of CTAB.

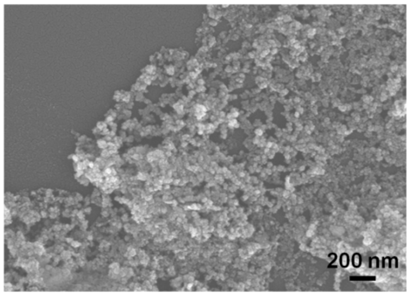

Figure S8. Aggregated Pt nanoparticles obtained without the addition of EDA.

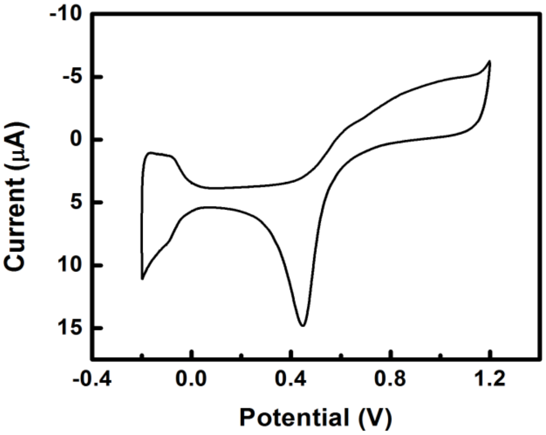

Figure S9. Cyclic voltammogram of Pt nanobelt in 0.1 M sulfuric acid (scan rate: 10 mV s^{-1}). Characteristic peaks of Pt can be observed including hydrogen adsorption region (-0.2-0 V), double layer region and oxide formation region can be observed (cited).

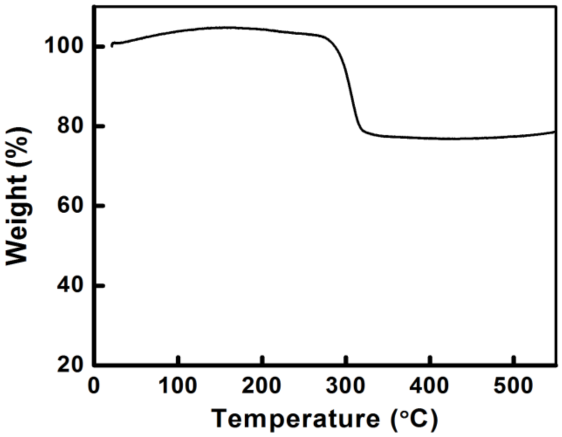

Figure S10. TGA curve of Pt nanobelt under air flow. Flow rate: 60 mL/min.

References

[1] T. Ungar, *Scr. Mater.*, 2004, **51**, 777-781.

[2] Z. Budrovic, H. V. Swygenhoven, P. M. Derlet, S. V. Petegem, B. Schmitt, *Science*, 2004, **304**, 273-276.

[3] P. Scardi, M. Leoni, *J. Appl. Cryst.*, 1999, **32**, 671-682.