Electronic Supplementary Material (ESI) for Inorganic Chemistry Frontiers.

Supporting Information

PtPd Nanoframes Derived from Pd@PdPt Core-Shell Rhombic Dodecahedrals with Excellent Catalytic Performance toward Methanol Oxidation

Yangyang Ren, Chuanliang Li, Baosong Li, Fan Gao, Xinghua Zhang, Xiaojing Yang, Lanlan Li, Zunming Lu, Xiaofei Yu*

Determination of d-band center.

The d-band centers are obtained from the XPS valence band spectrum and the data ranging from 0 to -9 eV are imported into XPS peak software to create a baseline. Then, the d-band centers are calculated by the following equation:

$$\int N(\varepsilon)\varepsilon d\varepsilon / \int N(\varepsilon) d\varepsilon$$

where N(ε) is the density of states (i. e. the photoelectron intensity after subtracting the background).[29]

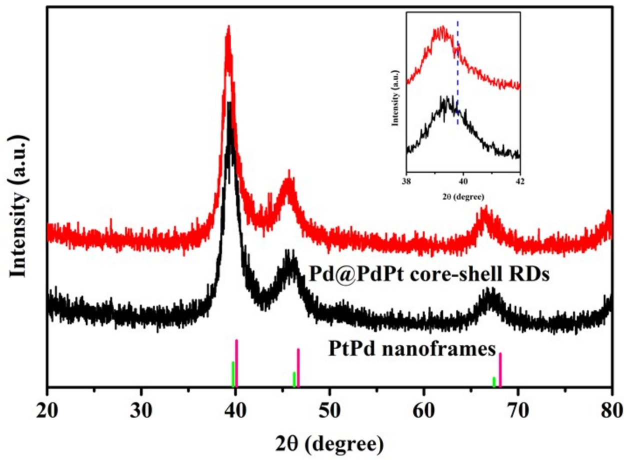

Fig. S1 XRD patterns of Pd@PdPt core-shell RDs and PtPd nanoframes. The inset shows the clear shift of the (111) peaks of Pd@PdPt core-shell RDs and PtPd nanoframes. Besides, the peak of PtPd nanoframes has a positive shift compared with that of Pd@PdPt core-shell RDs.

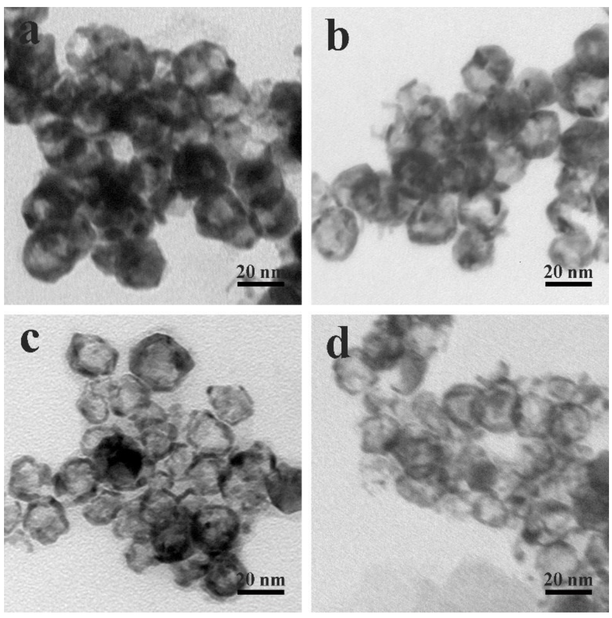

Fig. S2 TEM images obtained with different use of $FeCl_3$•$6H_2O$: (a) 20 mg; (b) 35 mg; (c) 65 mg and (d) 80 mg.

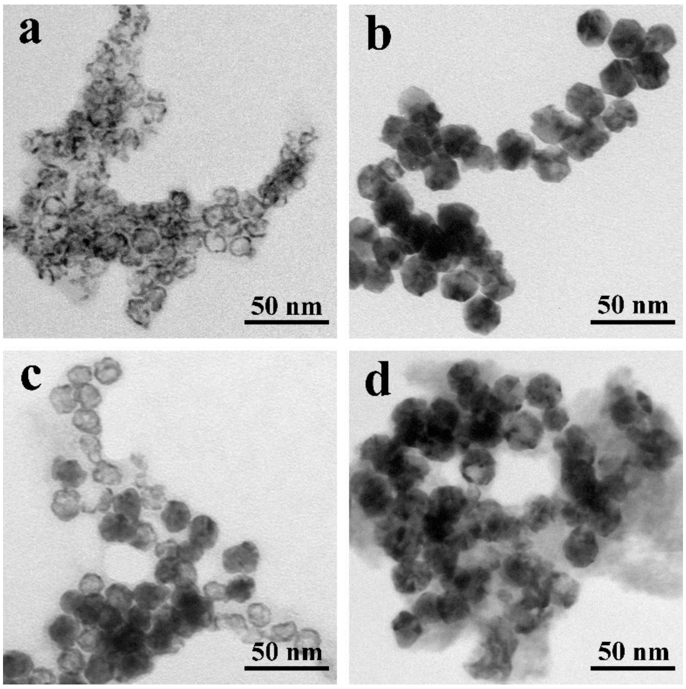

Fig. S3 TEM images obtained with different etching agents: (a) $FeCl_3$•$6H_2O$+HNO_3; (b) $ZnCl_2$+HCl; (c) $Fe(NO_3)_3$•$9H_2O$+HCl and (d) $FeCl_3$•$6H_2O$.

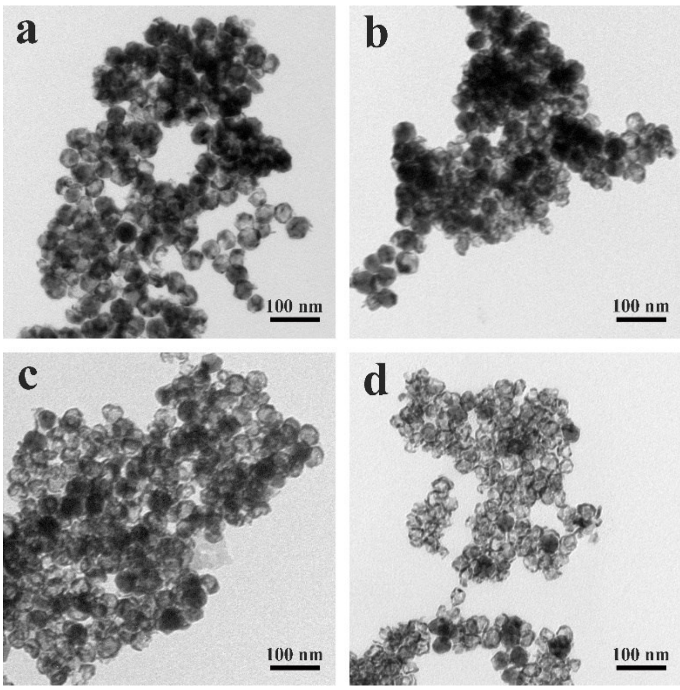

Fig. S4 TEM images obtained at different etching time: (a) 0.5 h; (b) 1 h; (c) 1.5 h and (d) 2 h.

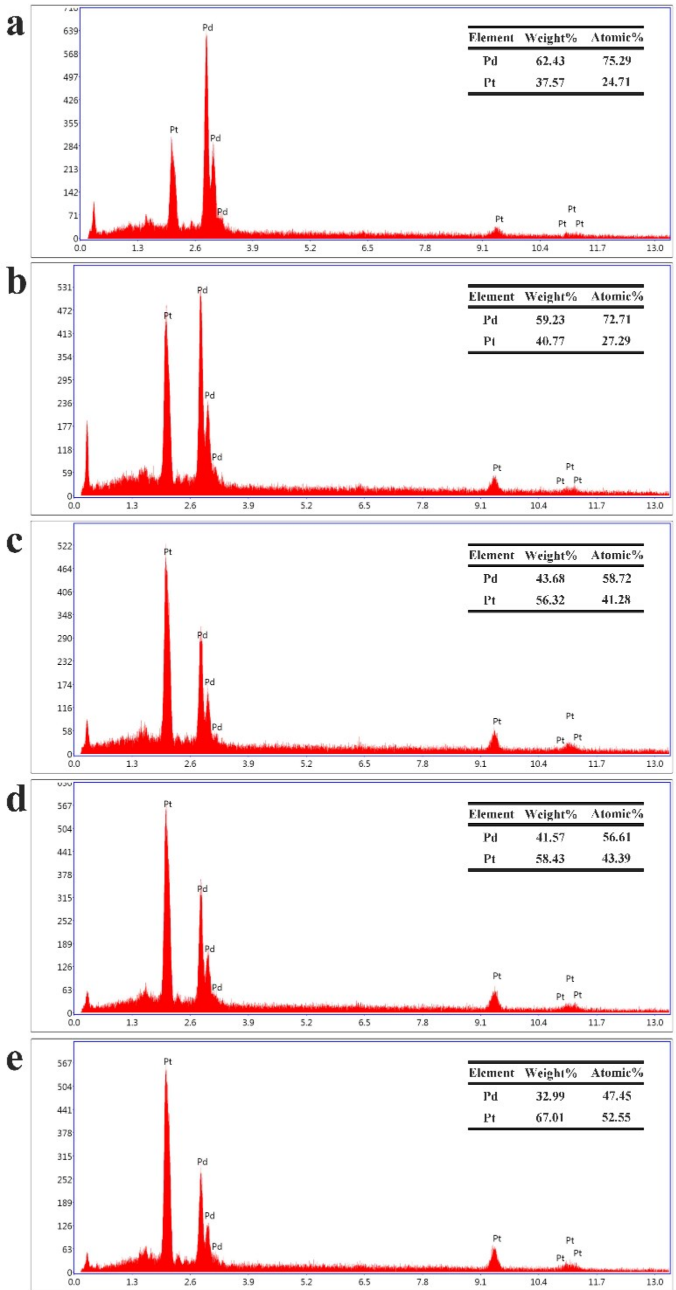

Fig. S5 EDS results obtained at different etching time: (a) 0 h; (b) 0.5 h; (c) 1 h; (d) 1.5 h and (e) 2 h.

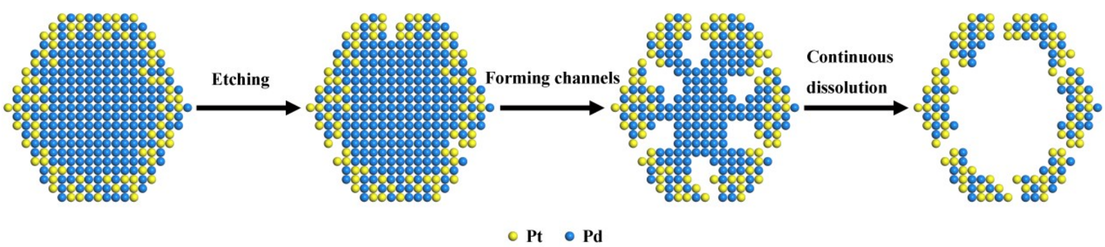

Fig. S6 The formation mechanism of PtPd nanoframes.

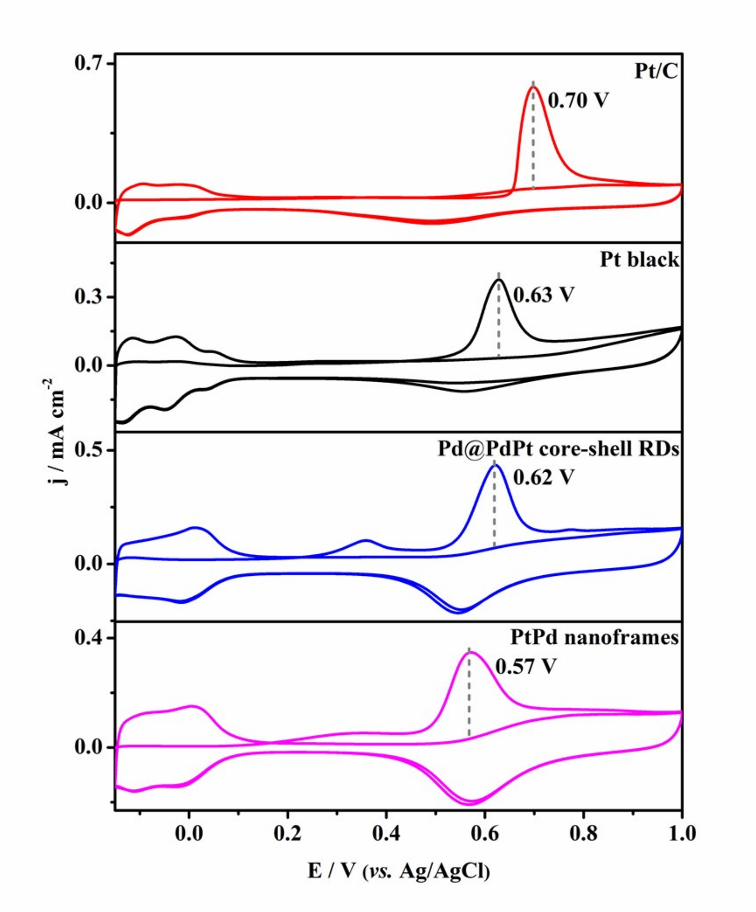

Fig. S7 CO-stripping curves of Pt/C, Pt black, Pd@PdPt core-shell RDs and PtPd nanoframes in 0.5 M H_2SO_4.