Supporting information

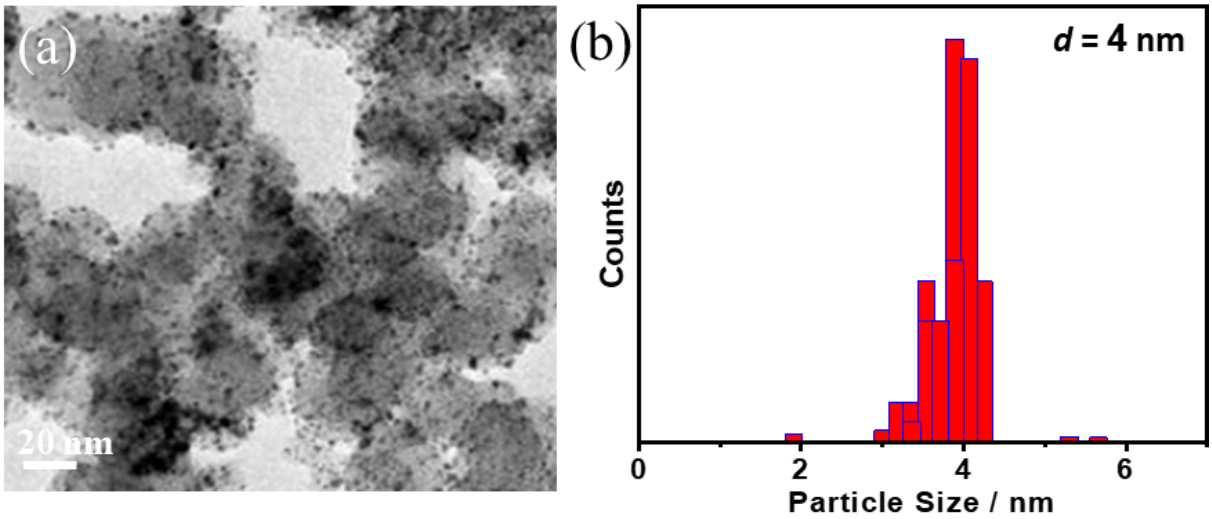

Figure S1. (a) TEM image of commercial and (b) histogram of particle size distribution of commercial Pt/C catalyst

Table S1.binding energies of Pt 4f in Pt PNDs, Pt NCs, and Pt/C catalysts.

catalyst	**Pt 4f $_{7/2}$**		**Pt 4f$_{5/2}$**	
	Pt^0	**Pt^{2+}**	**Pt^0**	**Pt^{2+}**
Pt NDs	71.31	72.2	74.66	75.55
Pt NCs	71.24	72.1	74.55	75.45
Pt/C	71.15	71.9	74.46	75.3

Table S2. The ECSA extracted form hydrogen under-potential adsorption/desorption (H-UPD) ($ECSA_{H\text{-}UPD}$) and CO under under-potential adsorption ($ECSA_{CO\text{-}UPD}$)

	$HClO_4$		KOH		Na_2HCO_3	
Catalsysts	$ECSA_{H\text{-}UPD}$ (m^2/g)	$ECSA_{CO\text{-}UPD}$ (m^2/g)	$ECSA_{H\text{-}UPD}$ (m^2/g)	$ECSA_{CO\text{-}UPD}$ (m^2/g)	$ECSA_{H\text{-}UPD}$ (m^2/g)	$ECSA_{CO\text{-}UPD}$ (m^2/g)
Pt NDs	59.1	34.23	66	30.71		19.52381
Pt NCs	52.2	15.23	65.2	22.18		18.85714
Pt/C	48.3/	14.38	52.5	18.28		11.2381

Table S3. Comparison of the electrochemical CO oxidation activities of our synthesized catalysts relative to previously reported catalysts.

Catalyst	Medium / Scan rate / reference electrode	Maximum Current (mA/cm^{-2}) / Voltage (V)	Ref
60 wt % Pt/C	0.5 H2SO4 10 mV s^{-1} SHE	0.2 mA cm^{-2} 0.64 V	[1]
Well ordered Pt(111)	0.1 M NaOH 50 mV/s RHE	0.5 mA cm^{-2} 0.8 V	[2]
PtNi multicubes	1 M KOH 50 mV/s RHE	0.58 mA cm^{-2} 0.65 V	[3]
PtPd Nanodendrites	1 M KOH 50 mV/s Ag/AgCl	5.1 mA cm^{-2} -0.15 V	[4]
Pt dendrimer-encapsulated nanoparticles	0.1m $HClO_4$ 50 mV/s Hg/Hg_2SO_4	0.2 mA cm^{-2} 0.3 V	[5]
Pt(110)–Ru	0.5 M H_2SO_4 100 mV/s RHE	0.025 mA 0.5 V	[6]
Pt/SnO_x	1 M $HClO_4$ 20 mV s^{-1} RHE	0.87 mA cm^{-2} 0.7 V	[7]
Pt-NbOx	0.5 M H_2SO_4 20 mV/s RHE	0.5 mA cm^{-2} 0.75 V	[8]
Pt(FAM)	0.1 M H_2SO_4 50 mV/s RHE	0.32 mA cm^{-2} 0.72 V	[9]
PtRu@h-BN/C	0.1 M H_2SO_4 20 mV/s RHE	1.25 mA cm^{-2} 0.6 V	[10]
Pt NDs	0.1 M $HClO_4$ 50 mV/s Ag/AgCl	2.233 mA cm^{-2} 0.496 V	Our work
	0.5 M Na_2HCO_3 50 mV/s Ag/AgCl	0.44mA cm^{-2} 0.18 V	
	0.1 M NaOH 50 mV/s Ag/AgCl	1.71mA cm^{-2} -0.228 V	

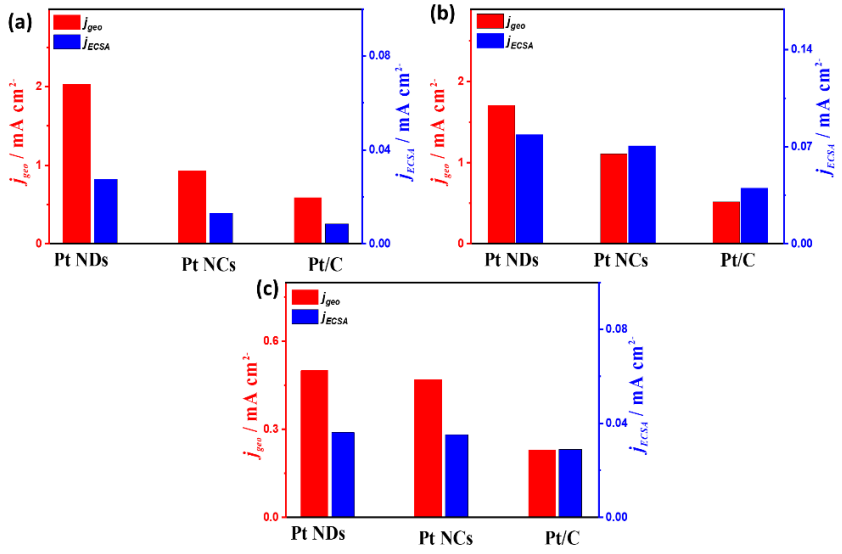

Figure S2. The current normalized by the electrode area (j_{geo}) and ECSA (j_{ECSA}) of different catalysts in (a) $HCLO_4$, (b) KOH, and (c) $NaHCO_3$ electrolytes

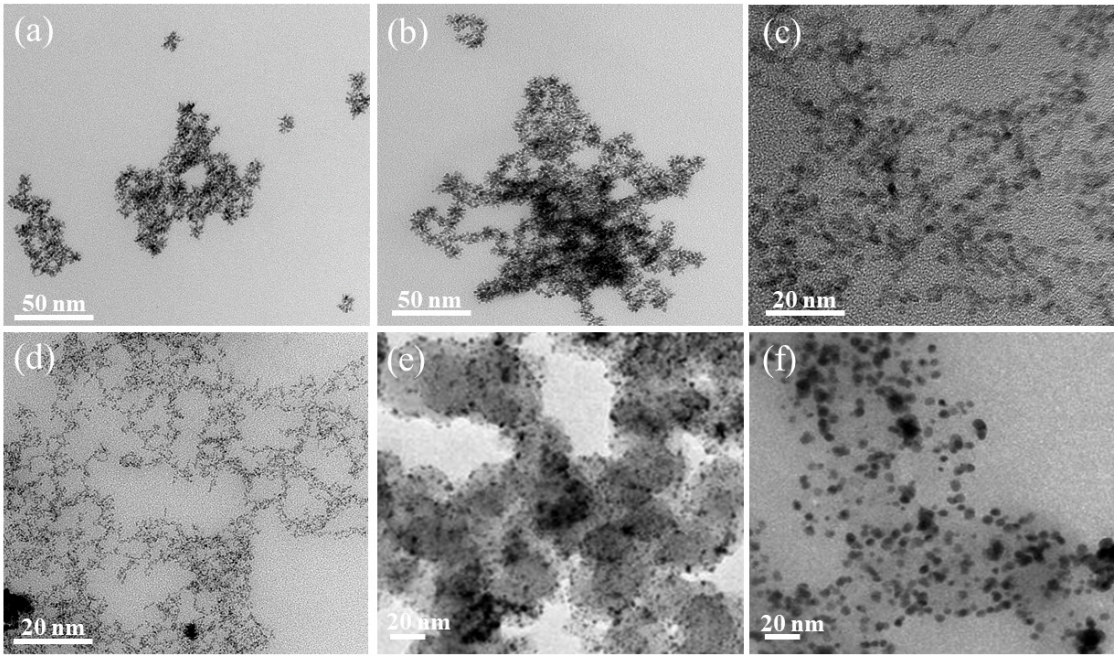

Figure S3. TEM image before and after stability tests of (a-b) Pt PNDs, (c-d) Pt NCs, and (e-f) Pt/C, respectively

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