Electronic Supplementary Information

Regenerated CO Anti-poisoning Ability by Anchoring High Oxidized Platinum on Oxygen Functionalized Carbon Spheres in One-step & Two-phase Synthesis for Methanol Electro-oxidation

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Fig. S1. TEM images of as-obtained carbon nanostructures in typical synthesis without platinum precursor in (a-c) CHCl₃-glycerol mixture, and (d-f) CCl₄-glycerol mixture.



Fig. S2. TEM images of the as-obtained Pt@C-O composite nanostructure in typical synthesis for (a-b) 4 hours; (c-d) 130°C; (e-f) the substitute of glycerol by ethylene glycol.



Fig. S3. FT-IR spectra of the as-prepared products in typical synthesis without adding $Pt(acac)_2$ for different reaction duration.



Fig. S4. TEM and HRTEM images of the commercial Pt/C.



Fig. S5. Raman spectra of (a) commercial Pt/C, and (b) as-prepared Pt@C-O (CHCl₃).



Fig. S6. Full XPS spectrum of (a) commercial Pt/C and the obtained Pt@C-O composites of (b) Pt@C-O (CH₂Cl₂), (c) Pt@C-O (CHCl₃), (d) Pt@C-O (CCl₄).

Catalyst	Species	Binding	Relative	
		energy/ev	Intensity/%	
Pt@C-O (CHCl ₃)	С	284.54	54.28%	
	C-O	286.14	39.32%	
	C=O	288.87	6.40%	
	Pt(0)	71.11/74.46	52.24%	
	Pt(II)	71.73/75.08	33.66%	
	Pt(IV)	73.25/76.60	14.10%	
Pt@C-O (CH ₂ Cl ₂)	С	284.62	86.93%	
	C-O	285.85	13.07%	
	Pt(0)	71.28/74.63	73.69%	
	Pt(II)	72.45/75.80	17.77%	
	Pt(IV)	73.50/76.85	8.54%	
Pt@C-O (CCl ₄)	С	284.59	80.12%	
	C-O	286.07	19.88%	
	Pt(0)	70.80/74.15	58.49%	
	Pt(II)	71.77/75.12	33.93%	
	Pt(IV)	72.83/76.18	7.58%	
commercial Pt/C	С	284.52	92.84%	
	C-O	286.09	7.16%	
	Pt(0)	71.74/74.82	71.41%	
	Pt(II)	72.70/76.05	24.45%	
	Pt(IV)	74.00/77.35	4.14%	

 Table S1. Binding energies and relative integrated area of commercial Pt/C and the obtained

 Pt@C-O (CHCl₃), Pt@C-O (CCl₄), Pt@C-O (CH₂Cl₂) from C 1s and Pt 4f XPS spectra.

Table S2. The electrochemically active surface area (ECSA) calculated by the cyclic voltammetric curves in Fig. 8 and the onset potential, peak potential, current density and the tolerance (I_f/I_b) of commercial Pt/C catalyst and three as-prepared Pt@C-O composite catalysts.

Type of Pt/C catalyst	ECSA/m ³ · g ⁻¹ Pt	Oneset potential/V	Peak potential/V	Current density /mAmg ⁻¹ Pt	I _f /I _b
Pt@C-O (CHCl ₃)	114.31	0.175	0.725	212	1.28
$Pt@C-O(CH_2Cl_2)$	21.93	0.275	0.675	55.6	1.16
Pt@C-O (CCl ₄)	49.36	0.245	0.685	85.5	1.25
commercial Pt/C	44.29	0.225	0.665	107	0.62