

Supporting Information

Ultrafine Pt nanoparticle decoration with CoP as highly active electrocatalyst for alcohols oxidation

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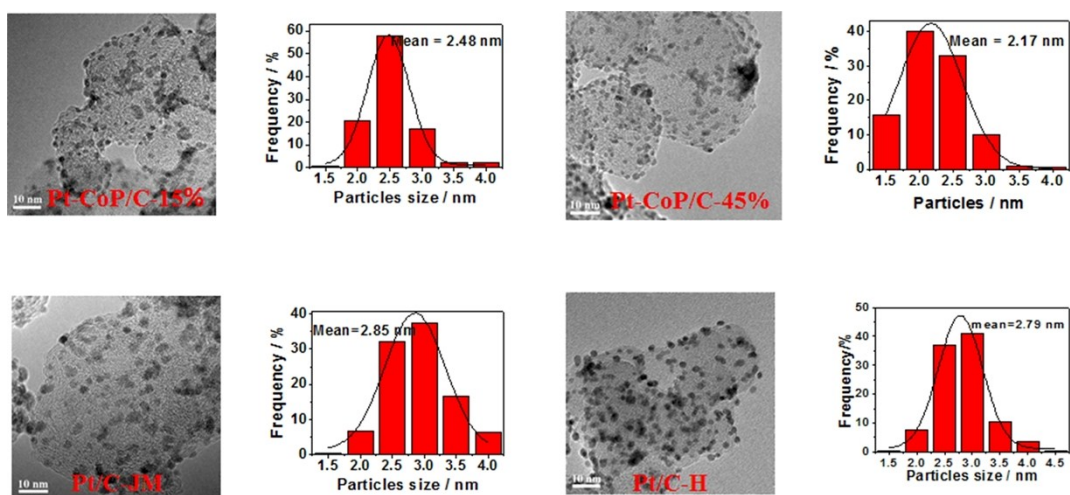


Fig. S1 TEM images and corresponding particle size distribution histograms of Pt-CoP/C-X% (X=15, 45), Pt/C-JM and Pt/C-H catalysts.

The software of 'Image J' was firstly applied to measure more than 200 randomly selected Pt nanoparticles from the TEM image. Then a particle size distribution histogram of Pt nanoparticles can be obtained through data processing by using Origin.

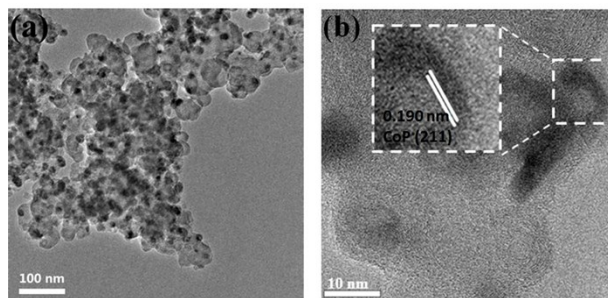


Fig. S2 (a) and (b) shows the TEM images of CoP/C at different magnification.

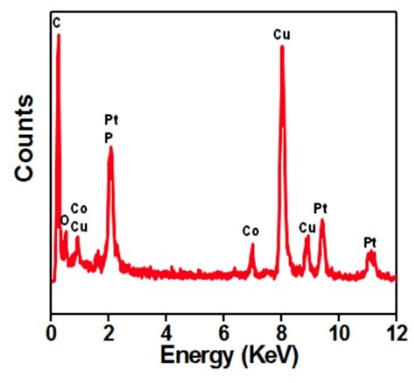


Fig. S3 EDX pattern of Pt-CoP/C-30% catalyst

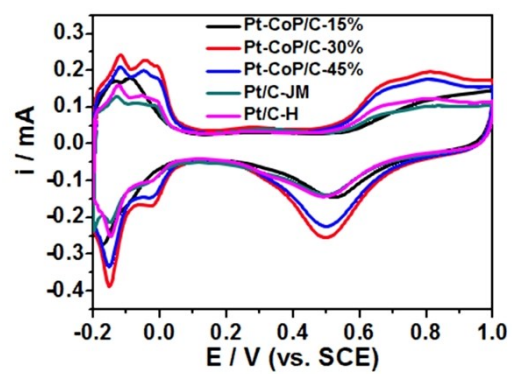


Fig. S4 Cyclic voltammograms of the Pt-CoP/C-X% (X=15, 30, 45), Pt/C-JM and Pt/C-H catalysts in 0.5 M H₂SO₄ at the scan rate of 50 mV s⁻¹.

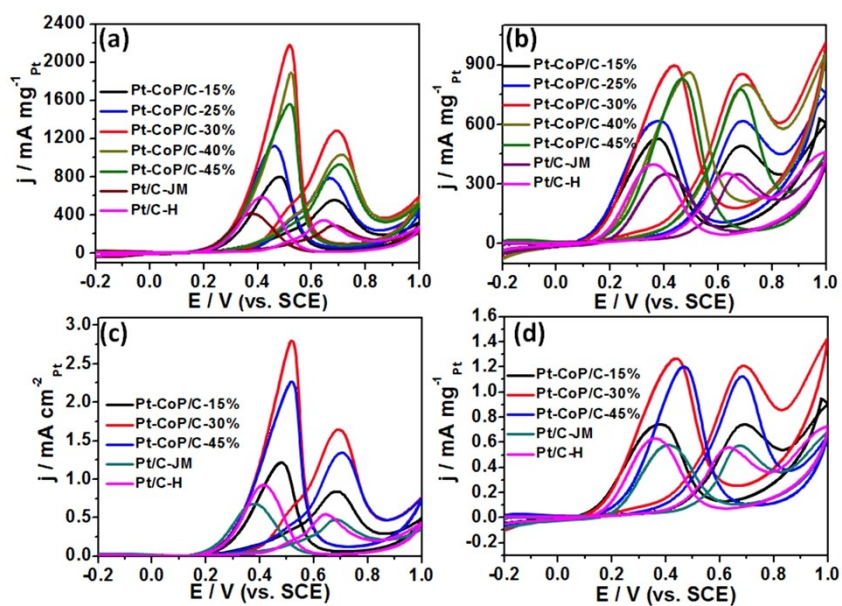


Fig. S5 (a) and (c) shows the mass activity and specific activity of Pt-CoP/C-X% (X=15, 25, 30, 40, 45), Pt/C-JM, and Pt/C-H catalysts in 0.5 M H₂SO₄ + 1 M CH₃OH; (b) and (d) shows the mass activity and specific activity of Pt-CoP/C-X% (X=15, 30, 45), Pt/C-JM, and Pt/C-H catalysts in 0.5 M H₂SO₄ + 1 M CH₃CH₂OH.

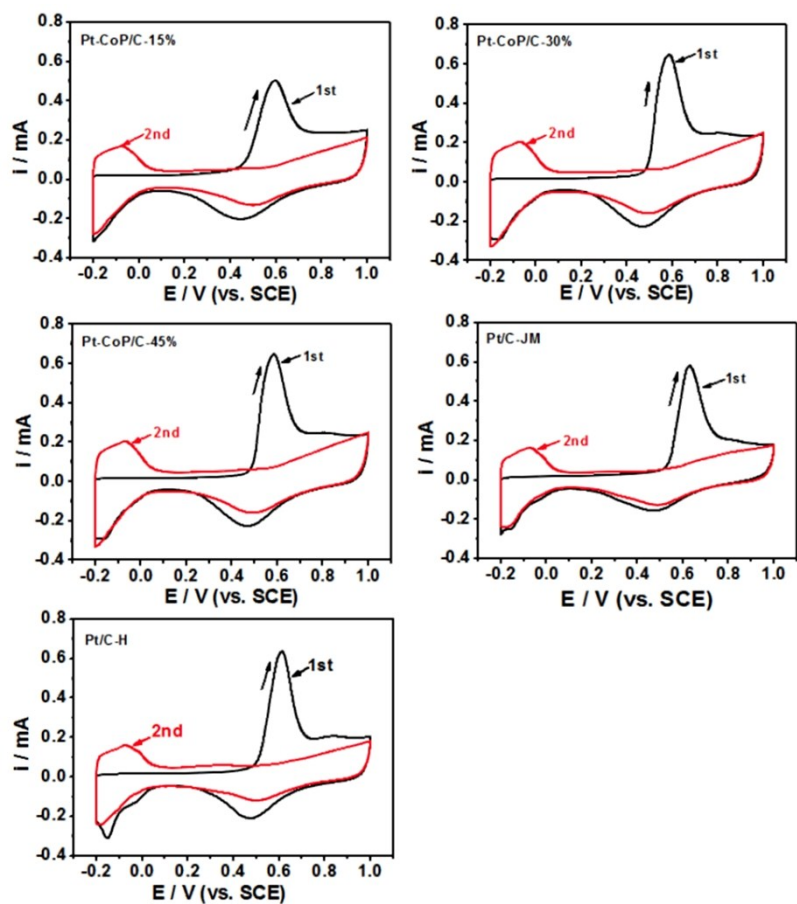


Fig. S6 CO-stripping voltammograms of Pt-CoP/C-X% (X=15, 30, 45), Pt/C-JM and Pt/C-H catalysts in 0.5 M H₂SO₄.

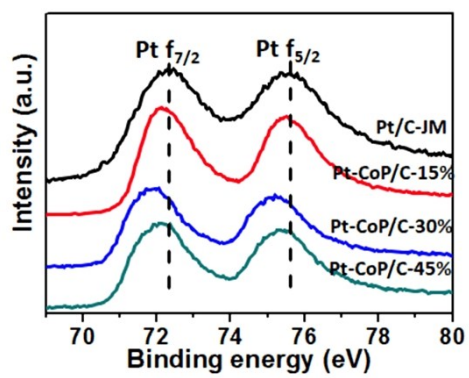


Fig. S7 XPS survey spectra of the Pt4f for the as-prepared catalysts.

Table S1 the data of EDX for the Pt-CoP/C-30%.

Elements	Wt%
C K	59.40
Co K	14.28
P K	5.93
O K	3.11
Pt K	17.28
Total	100

Table S2 The comparison of mass and specific peak current densities of different Pt-based catalysts for MOR.

Catalysts	Mass Activity (mA mg ⁻¹ _{Pt})	Specific Activity (mA cm ⁻² _{Pt})	Ref
PtNiP/C	362	0.8	22
Pt-Ni-P	360	0.65	23
Pt-Co ₂ P/C	1236	1.81	26
Pt-CoP/C-30%	1300	1.67	This work

Table S3 The comparison of mass and specific peak current densities of different Pt-based catalysts for EOR.

Catalysts	Mass Activity (mA mg ⁻¹ _{Pt})	Specific Activity (mA cm ⁻² _{Pt})	Ref
PtNWs/C	278	-	9
PtSn/XC-72	764.1	-	11
Pt-NiO /C	637	-	13
Pt-CoP/C-30%	857	1.1	This work

Table S4 Electrochemical surface area (ECSA) estimated from CO stripping experiment and the peak potential for CO stripping.

Catalysts	ECSA _{CO} (m ² g ⁻¹)	Peak Potential (V vs. SCE)
Pt/C-JM	60.80	0.629
Pt/C-H	63.35	0.612
Pt-CoP/C-15%	65.99	0.594
Pt-CoP/C-30%	77.80	0.584
Pt-CoP/C-45%	68.92	0.595