

Article

Fe(III) Ions-Assisted Aniline Polymerization Strategy to Nitrogen-Doped Carbon-Supported Bimetallic CoFeP Nanospheres as Efficient Bifunctional Electrocatalysts toward Overall Water Splitting

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Table S1. The comparison of HER catalytic performance between CoFeP-NC and other metal phosphides reported in the literature in 0.5 M H₂SO₄.

Catalyst	Current density (mA cm ⁻²)	η_{10} (mV)	Tafel slope (mV dec ⁻¹)	Reference
CoP/CSs-0.05	10	94	60	1
CoP/CN@MoS ₂	10	144	69	2
Co-FeP/Ti	10	126	64	3
FeP/CP	10	140	62	4
FeP- I NS	10	95	41	5
MoP/N, P-rGO	10	115	54	6
S-MoP NPL	10	86	34	7
Fe _{0.074} NiP/NWM	10	108	52	8
NiCoP/CNTs	10	267	88	9
FeCoP-NC	10	81	58	This work

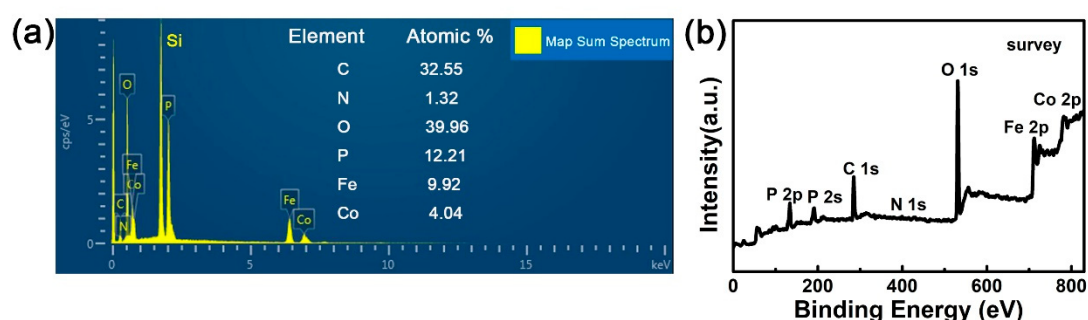
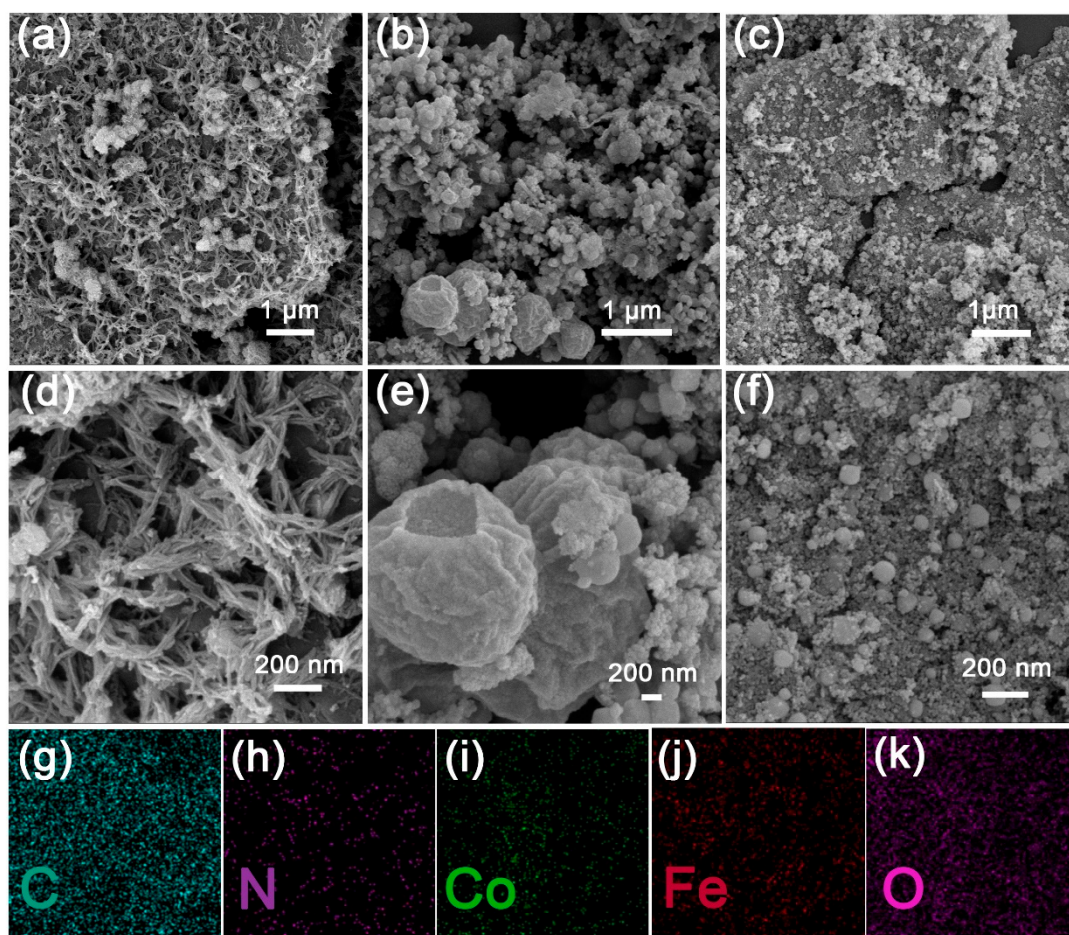


Figure S1. (a) EDX spectrum of CoFeP-NC and (b) XPS survey spectrum.**Table S2.** The OER catalytic performance of CoFeP-NC in 1 M KOH was compared with that reported recently.

Catalyst	Current density (mA cm ⁻²)	η_{10} (mV)	Tafel slope (mV dec ⁻¹)	Reference
CoP-TiO _x	10	337	72	10
CoPS@C	10	313	90	11
CoP/NC-400	10	320	89	12
porous Ni ₂ P	10	320	105	13
NiCoP/C@FeOOH	10	271	69	14
Fe-NiCoP/PBA HNCs	10	290	70	15
V-CoP	10	340	96	16
CoNiP/NC700	10	300	66	17
CoNiP NWs	10	301	54	18
CoFeP-NC	10	283	64	This work

**Figure S2.** SEM images of (a, d) CoFeO_x-PANI (water / ethanol), (b, e) CoFeO_x-PANI (water) and (c, f) CoFeO_x-PANI (ethanol). (g–k) EDX elemental mapping images for CoFeO_x-PANI.

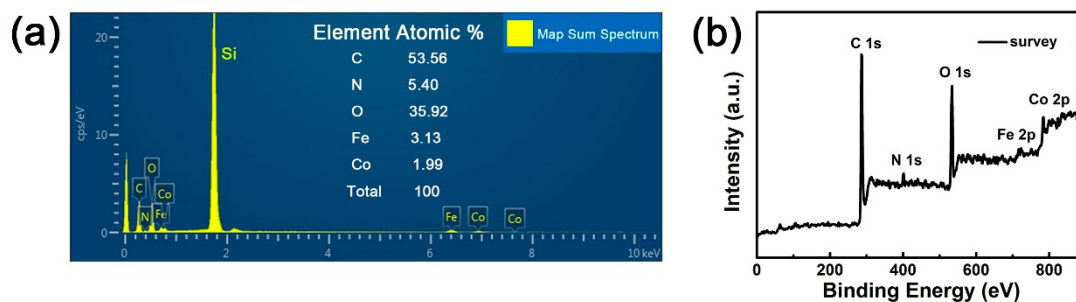


Figure S3. (a) EDX spectrum of CoFeO_x-PANI and (b) XPS survey spectrum.

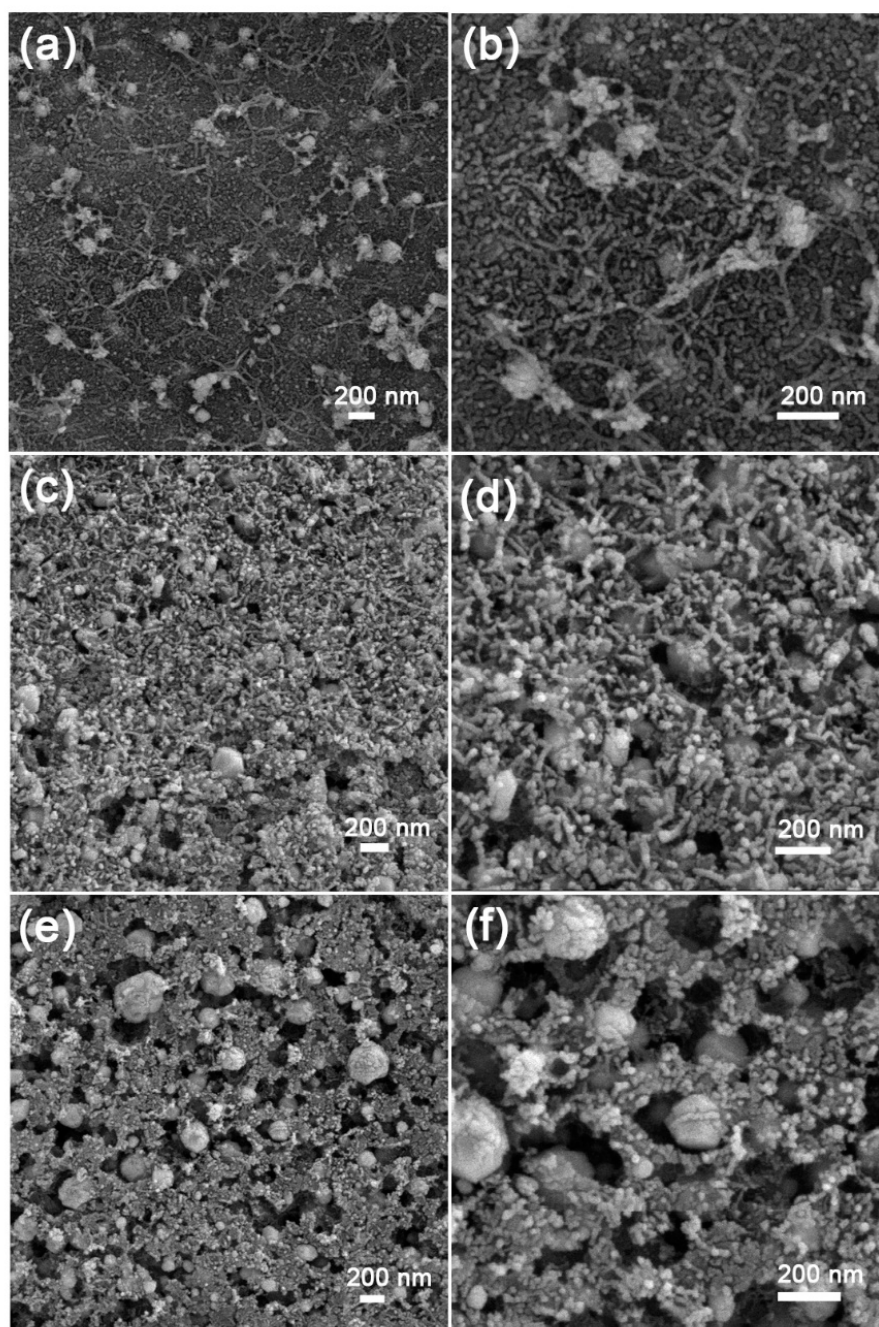


Figure S4. (a, b) SEM images of CoFe-NC-700. (c, d) SEM images of CoFe-NC-800. (e, f) SEM images of CoFe-NC-900.

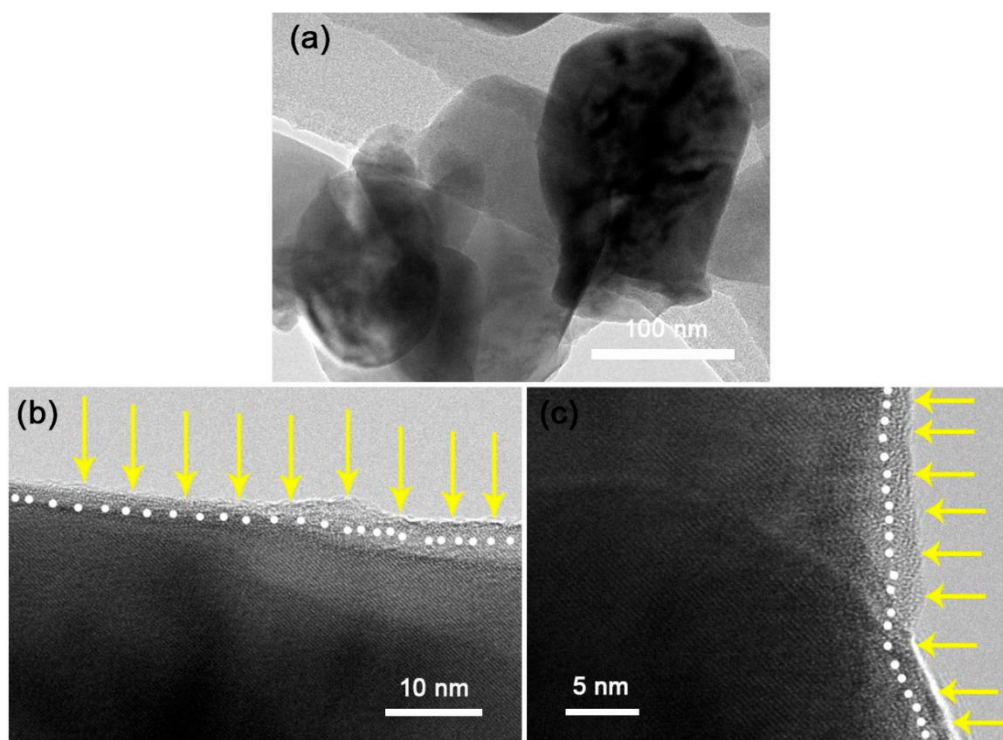


Figure S5. TEM images of (a, b, c) CoFe-NC.

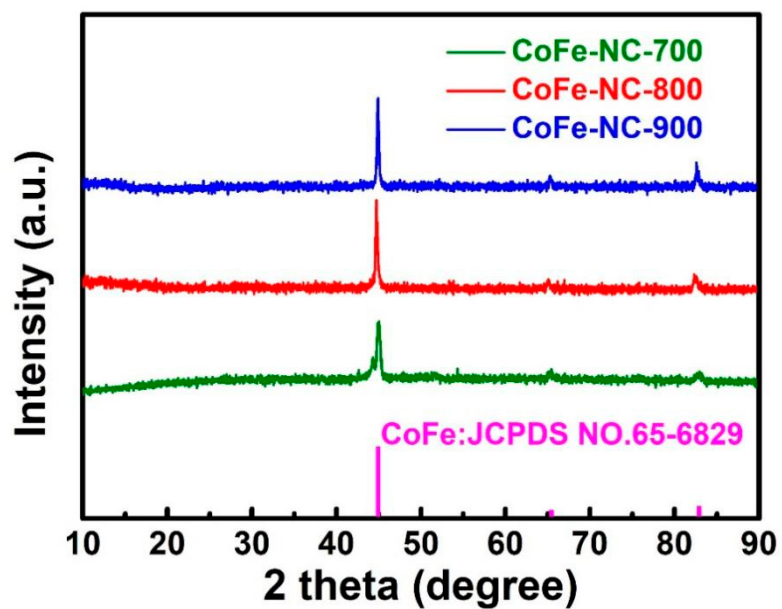


Figure S6. XRD patterns of CoFe-NC-700, CoFe-NC-800 and CoFe-NC-900.

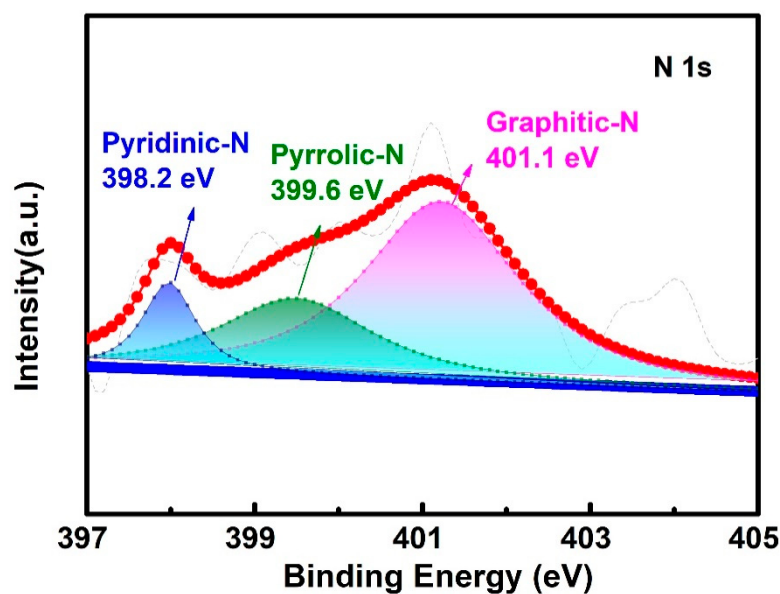
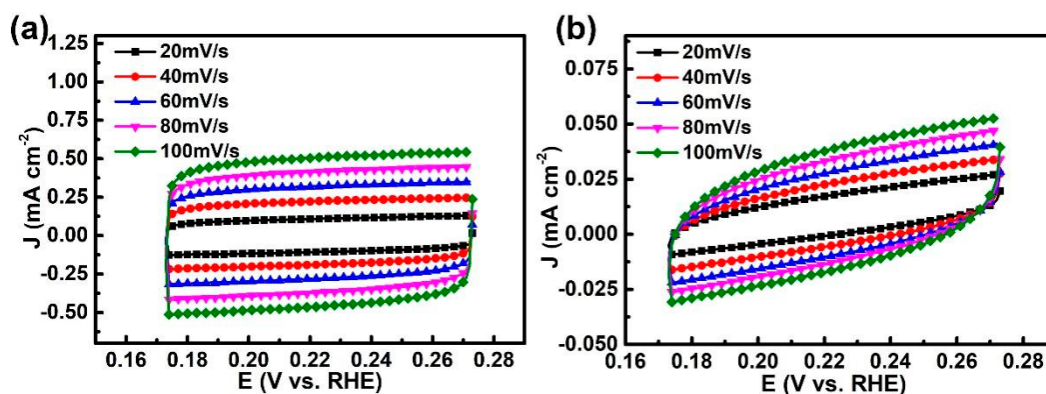
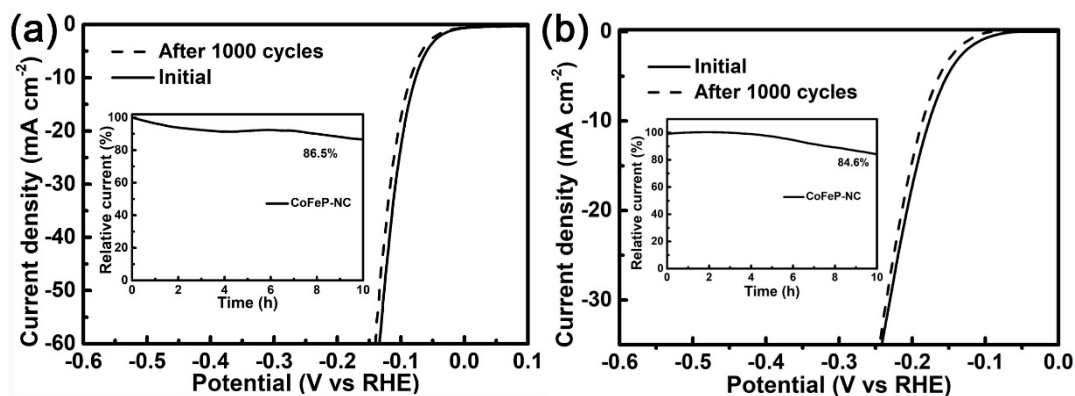


Figure S7. XPS spectrum of N 1s for CoFeP-NC.

Figure S8. CVs of (a) CoFe-NC and (b) CoFeO_x-PANI at different scan rates from 20 to 100 mV s⁻¹ in 0.5 M H₂SO₄.Figure S9. (a, b) The polarization curve for the CoFeP-NC before and after 1000 cycles in 0.5 M H₂SO₄ and in 1 M KOH, respectively. The insets in (a, b) show long term electrolysis curves for CoFeP-NC at overpotentials of 90 and 180 mV, respectively.

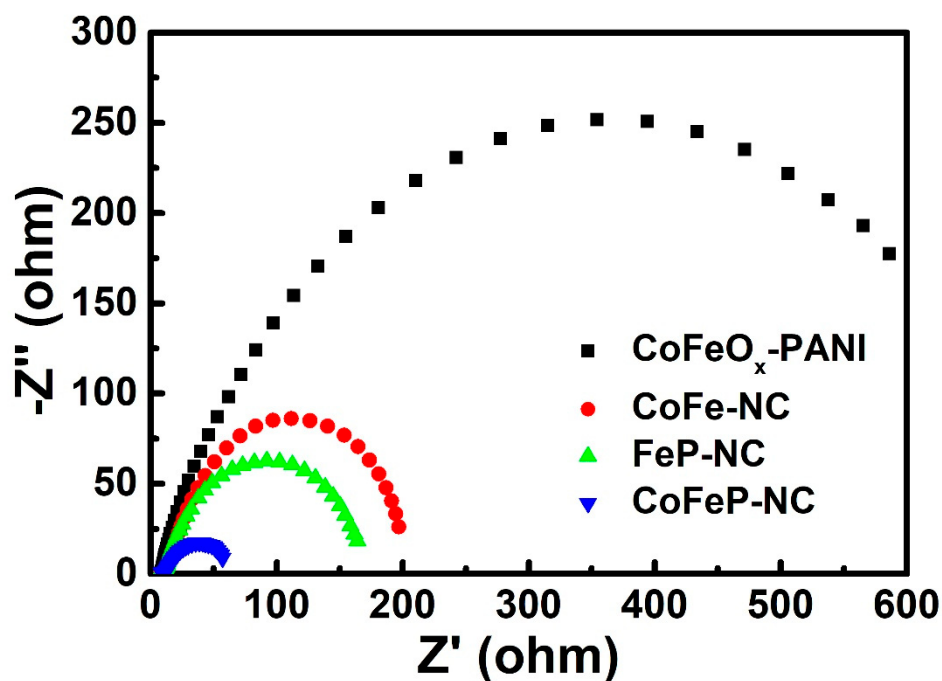


Figure S10. Nyquist plots of CoFeO_x-PANI, CoFe-NC, FeP-NC and CoFeP-NC in KOH.

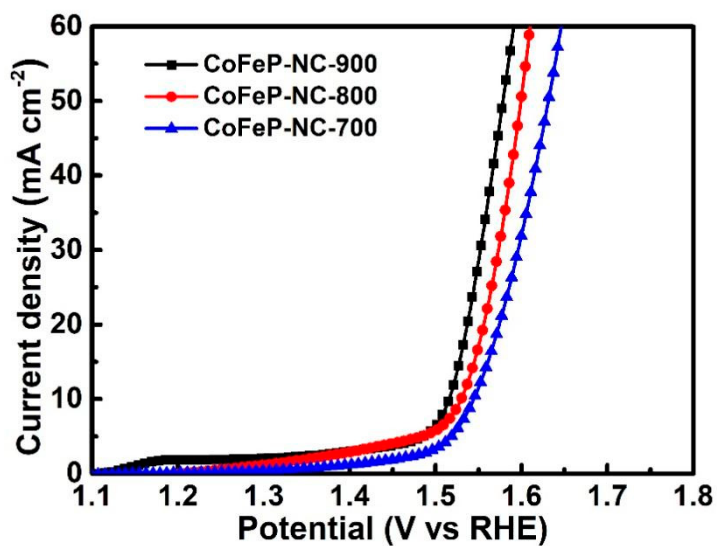


Figure S11. LSV curves of CoFeP-NC-700, CoFeP-NC-800 and CoFeP-NC-900.

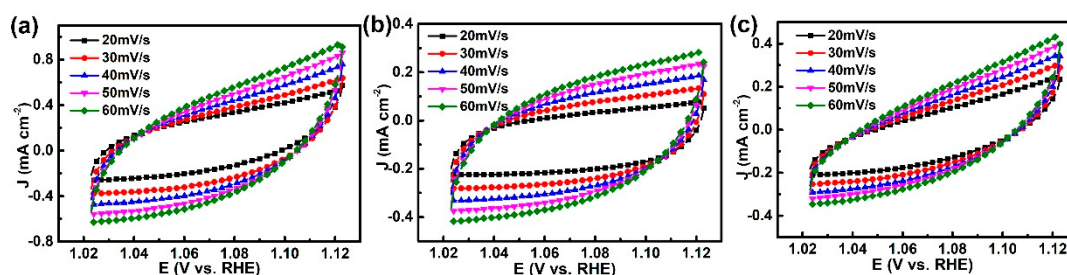


Figure S12. CVs of (a) CoFeP-NC, (b) CoFe-NC and (c) CoFeO_x-PANI at different scan rates from 20 to 60 mV s⁻¹ for OER in 1M KOH.

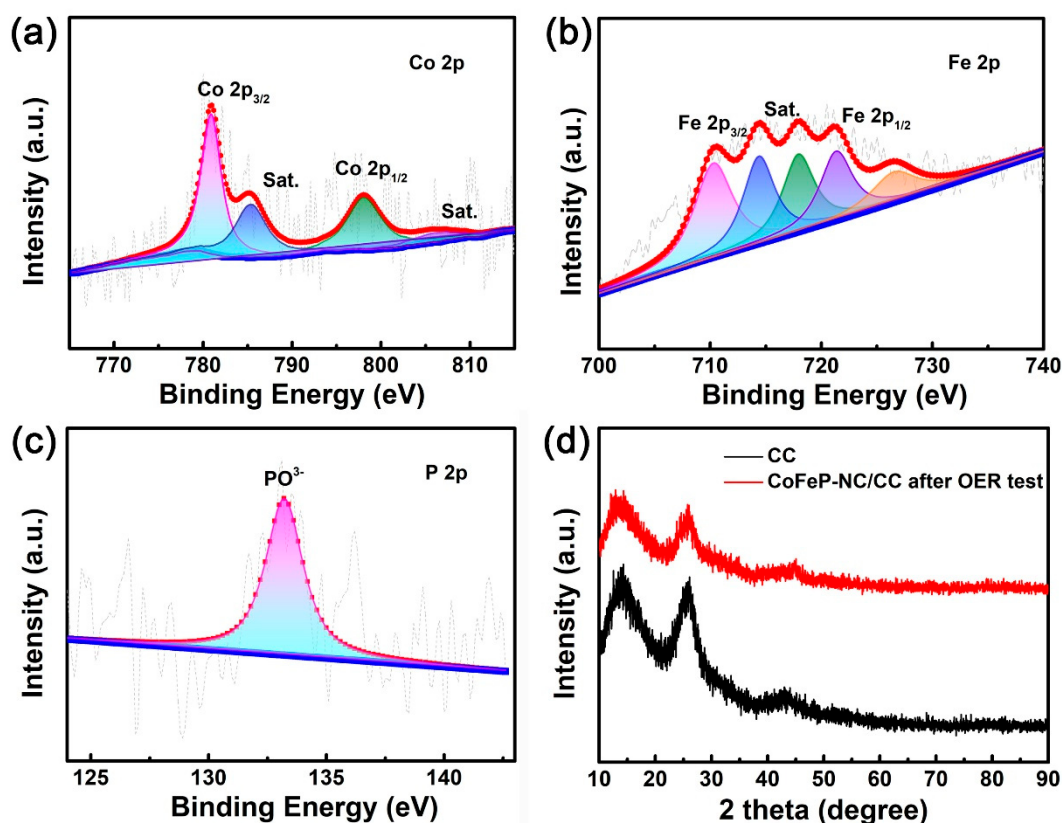


Figure S13. (a) Co 2p, (b) Fe 2p, and (c) P 2p XPS spectra of CoFeP-NC after OER catalysis. (d) XRD images of CoFeP-NC after OER.

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