Supporting Information

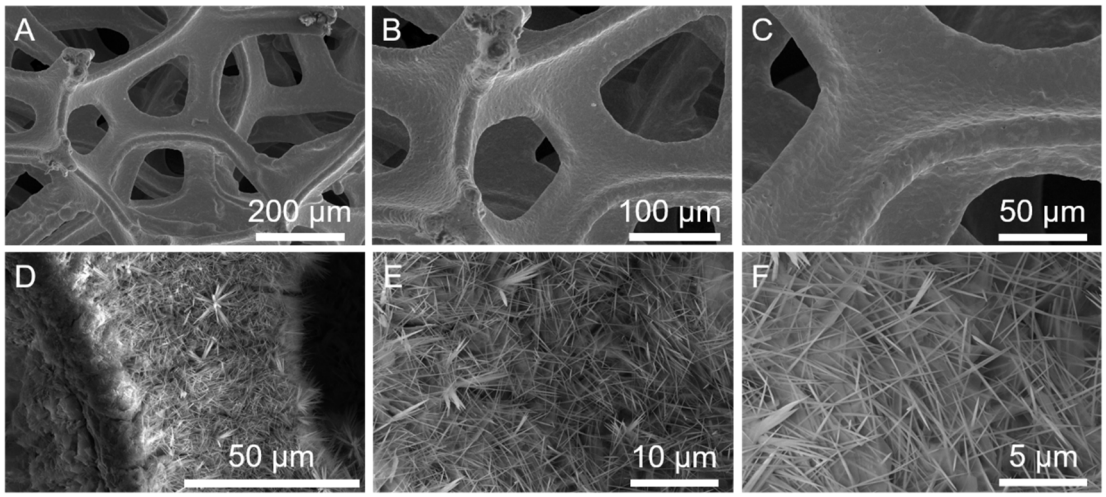

Figure S1. SEM images of different catalysts. (A-C) Nickel foam. (D-F) Fe-Co-O precursor/NF.

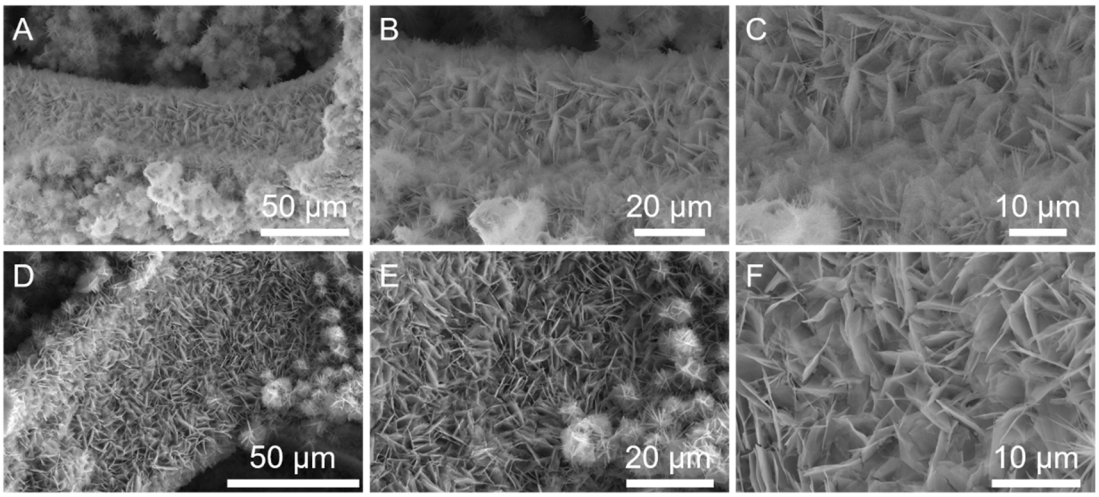

Figure S2. SEM images of different catalysts. (A-C) Fe-Co-O@CN/NF. (D-F) Fe-Co_2P/NPC/NF.

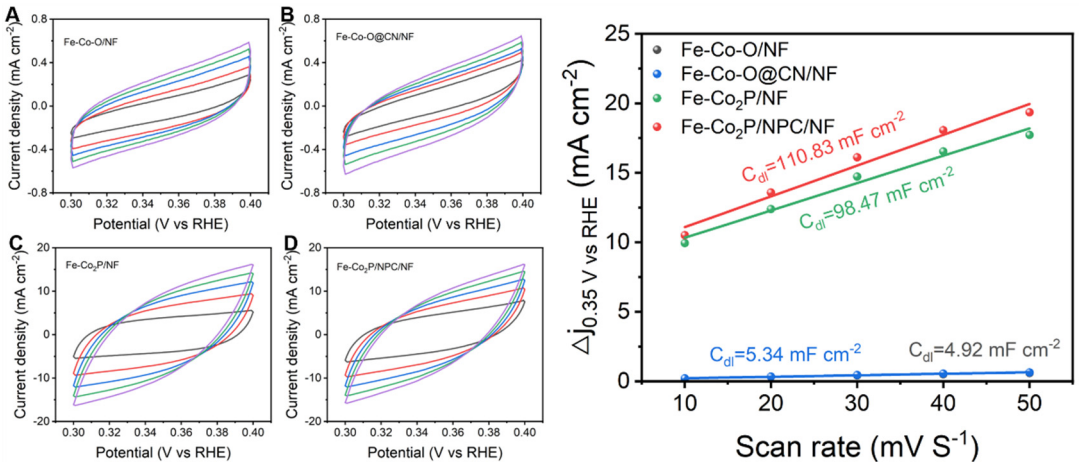

Figure S3. Cyclic voltammograms (CV) curves of different catalysts between 0.3 to 0.4 V vs RHE at five different scan rates (10, 20, 30, 40, and 50 mV s^{-1}) and electrochemical double layer capacitances (C_{dl}). (A) Fe-Co-O/NF. (B) Fe-Co-O@CN/NF. (C) Fe-Co_2P/NF. (D) Fe-Co_2P/NPC/NF. (E) The current density variation ($\Delta j = j_a - j_c$) at the potential of 0.35 V vs RHE with varied scan rates fitted to estimate the electrochemical double layer capacitances (C_{dl}).

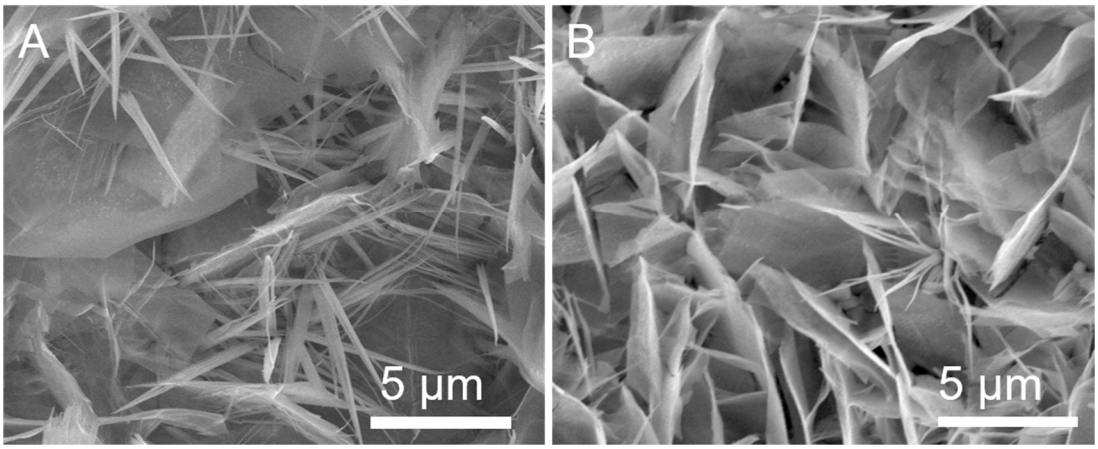

Figure S4. (A) SEM patterns of Fe-Co_2P/NPC/NF before the HER stability test. (B) after the HER stability test.

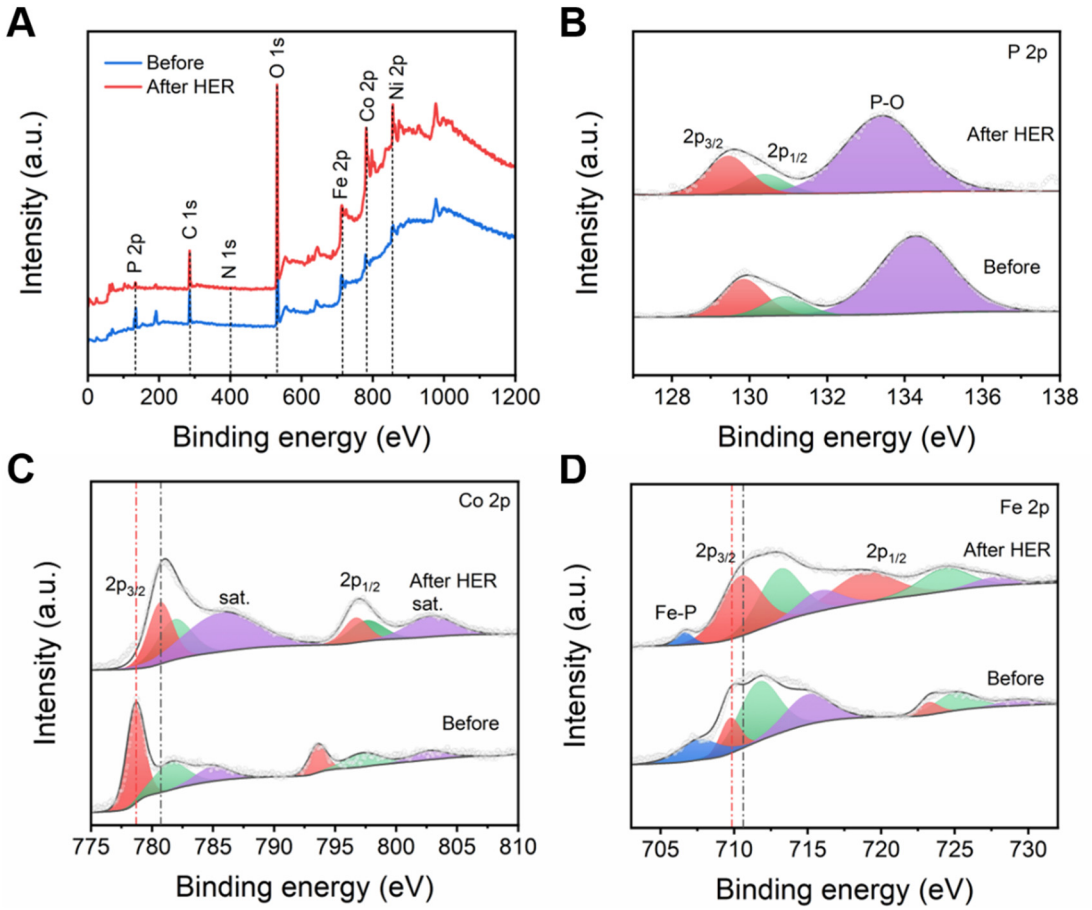

Figure S5. (A) XPS scanning full spectrum of Fe-Co_2P/NPC/NF before and after HER stability test. (B) P 2p, (C) Co 2p and (D) Fe 2p.

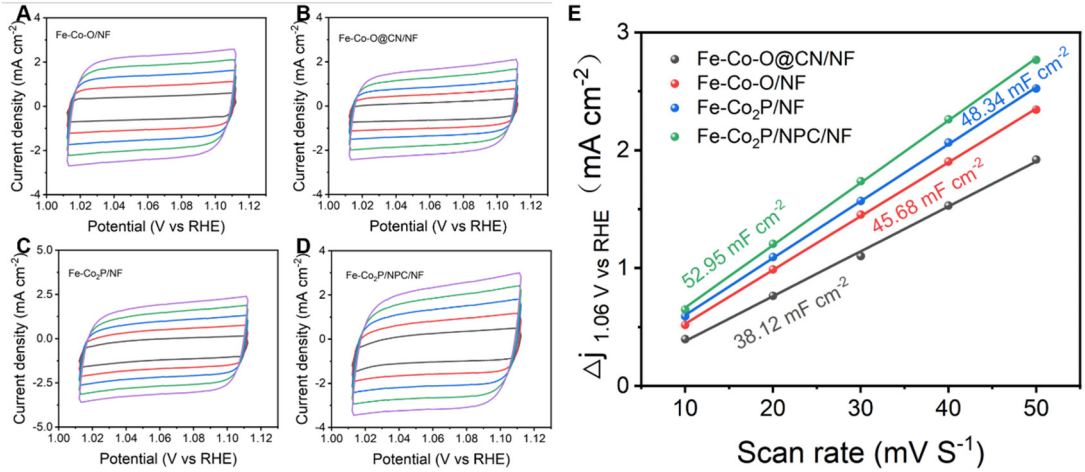

Figure S6. Cyclic voltammograms (CV) curves of different catalysts between 1.01 to 1.11 V vs RHE at five different scan rates (10, 20, 30, 40, and 50 mV s^{-1}) and electrochemical double layer capacitances (C_{dl}). (A) Fe-Co-O/NF. (B) Fe-Co-O@CN/NF. (C) Fe-Co_2P/NF. (D) Fe-Co_2P/NPC/NF. (E) The current density variation ($\Delta j = j_a - j_c$) at the potential of 1.06 V vs RHE with varied scan rates fitted to estimate the electrochemical double layer capacitances (C_{dl}).

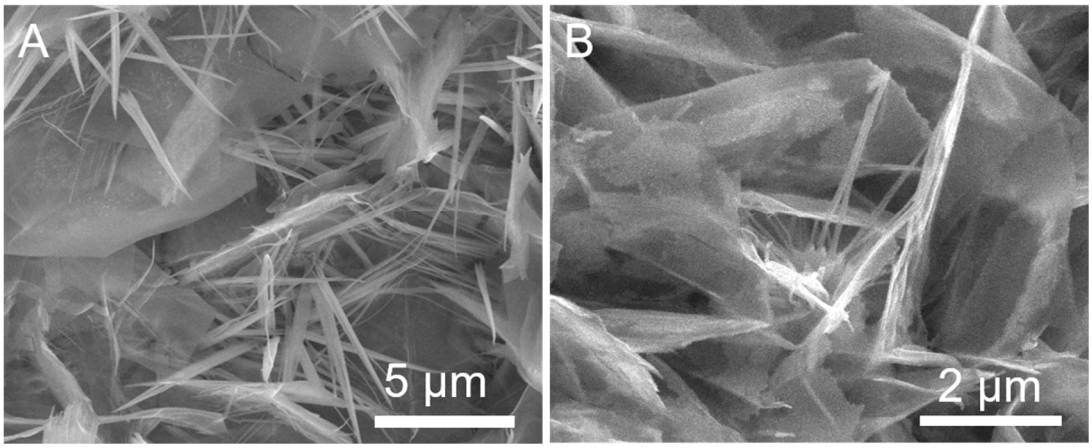

Figure S7. (A) SEM patterns of Fe-Co_2P/NPC/NF before the OER stability test, (B) after the OER stability test.

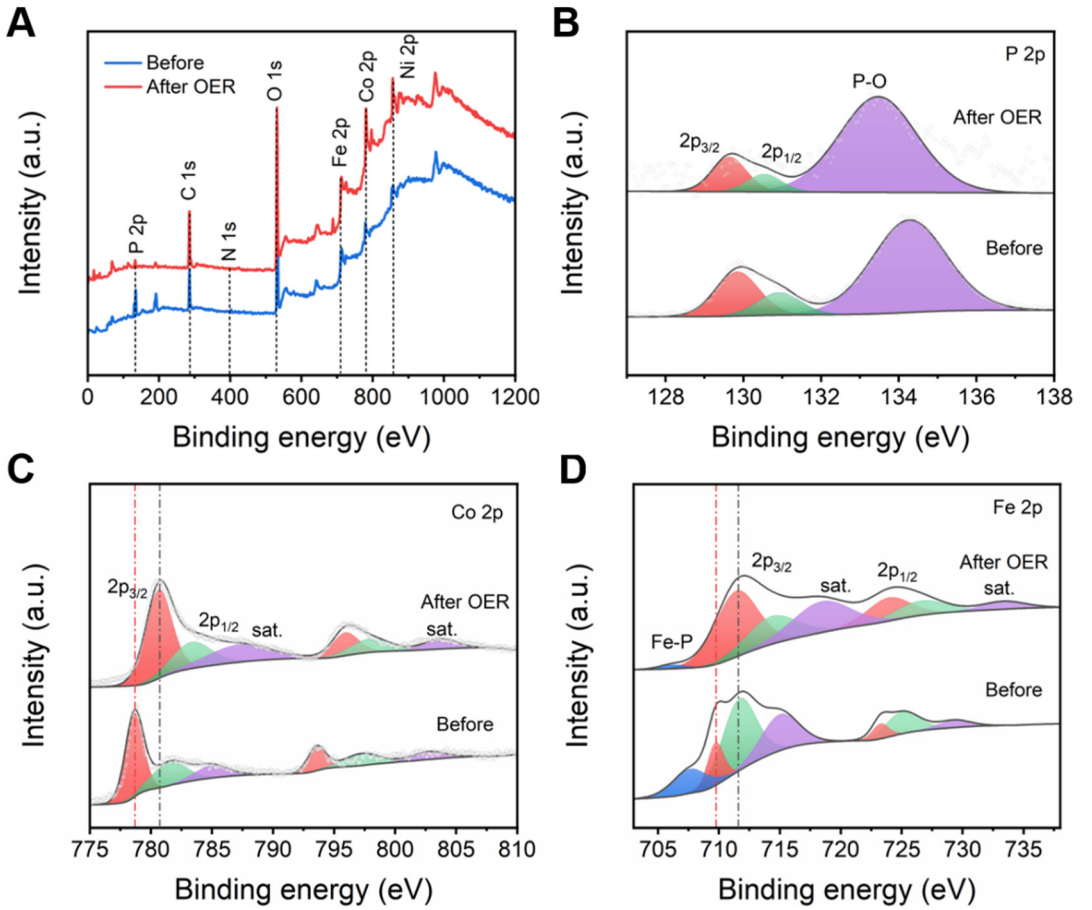

Figure S8. (A) XPS scanning full spectrum of Fe-Co_2P/NPC/NF before and after OER stability test. (B) P 2p, (C) Co 2p and (D) Fe 2p.

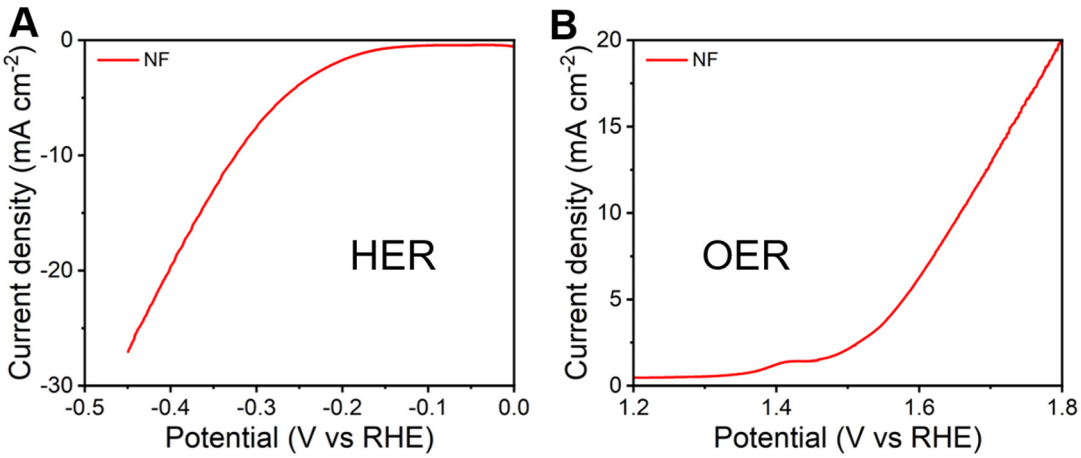

Figure S9. polarization curves of NF. (A) HER. (B) OER.

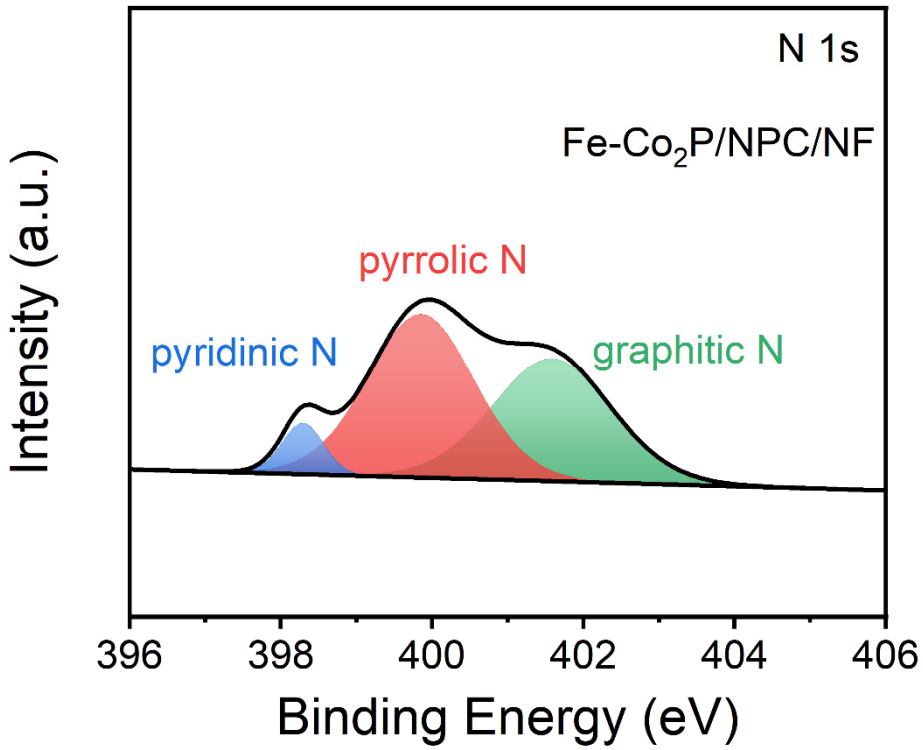

Figure S10. N 1s XPS result of Fe-Co2P/NPC/NF.

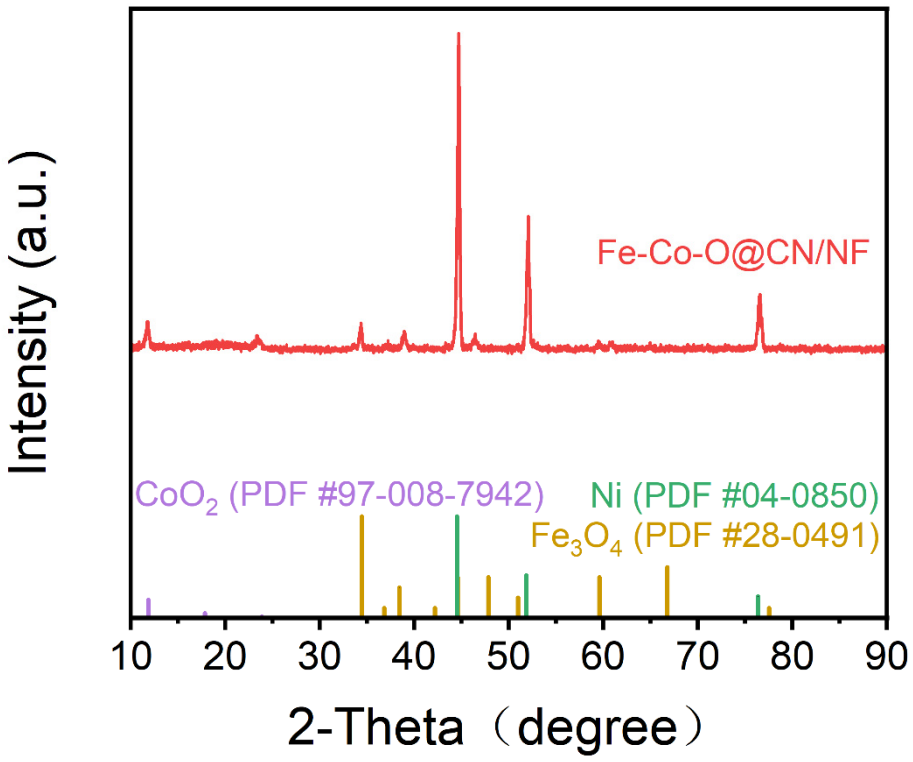

Figure S11. XRD patterns of Fe-Co-O@CN/NF.

Table S1. HER performances of different electrocatalysts in alkaline media (1 M KOH). The Fe-Co_2P/NPC is superior to previously reported low-cost and Co-based HER catalysts that lack the introduction of a noble metal.

Catalyst	**η_{10}(mV)** (***j*=10 mA cm^{-2}**)	**η_{100}(mV)** (***j*=100 mA cm^{-2}**)	**Tafel slope** (**mV dec^{-1}**)	**Ref.**
Fe-Co_2P/NPC	73	185	92.7	**This work**
Co-P@PC	76	-	49	[46]
Co_xP/N-doped C	187	-	58.5	[47]
CoP/NCNHP	115	-	66	[48]
CoP_h/NG	83	-	57	[49]
NiCoFeP/C	149	-	89	[50]
CoFeP/CNT	178	-	71	[51]
$NiCo_2Px$/CNT	47	-	67.3	[52]
Co_2P/Co	157	-	59	[53]
Fe_3O_4-CoP_x/TiN	174	-	65	[54]
Co-Pi/CoP/Ti	68	-	-	[55]
N-CoO@CoP	-	201	37	[56]
CoP–FeP	71	-	67	[57]
f-CoP/CoP_2/Al_2O_3	138	-	73	[58]
CoP-Mo_2C@NC/CC	74	-	79.4	[59]

Table S2. OER performances of different electrocatalysts in alkaline media (1 M KOH). The Fe-Co_2P/NPC is superior to previously reported low-cost and Co-based OER catalysts that lack the introduction of a noble metal.

Catalyst	**η_{10}(mV)** (***j*=10 mA cm^{-2}**)	**η_{100}(mV)** (***j*=100 mA cm^{-2}**)	**Tafel slope** (**mVdec^{-1}**)	**Ref.**
Fe-Co_2P/NPC	217	262	38.4	**This work**
Co-P@PC	282	-	53	[46]
Co_xP/N-doped C	380	-	68.1	[47]
CoP/NCNHP	310	-	70	[48]
CoP_h/NG	262	-	54	[49]
NiCoFeP/C	270	-	65	[50]
CoFeP/CNT	323	-	38	[51]
$NiCo_2Px$/CNT	284	-	56	[52]
Co_2P/Co	319	-	79	[53]
Fe_3O_4-CoP_x/TiN	331	-	122	[54]
Co-Pi/CoP/Ti	310	-	58	[55]
N-CoO@CoP	-	332	81.5	[56]
CoP–FeP	250	-	131	[57]
f-CoP/CoP_2/Al_2O_3	300	-	63	[58]
CoP-Mo_2C@NC/CC	265	-	71.6	[59]

Table S3. Overall water splitting performances of different electrocatalysts in alkaline media (1 M KOH). The Fe-Co_2P/NPC is superior to previously reported low-cost and Co-based water splitting catalysts that lack the introduction of a noble metal.

Catalyst	***Cell voltage(V)*** ***(j=10mA cm^{-2})***	***Cell voltage(V)*** ***(j=100 mA cm^{-2})***	**Stablity (h)**	**Ref.**
Fe-Co_2P/NPC	1.56	1.68	20	**This work**
Co-P@PC	1.6	-	60	[46]
Co_xP/N-doped C	1.71	-	10	[47]
CoP/NCNHP	1.64	-	36	[48]
CoP_h/NG	1.58	-	65	[49]
NiCoFeP/C	1.60	-	18	[50]
CoFeP/CNT	1.74	-	20	[51]
$NiCo_2P_x$/CNT	1.61	-	48	[52]
Co_2P/Co	1.71	-	15	[53]
Fe_3O_4-CoP_x/TiN	1.75	-	11	[54]
Co-Pi/CoP/Ti	1.60	-	24	[55]
N-CoO@CoP	1.79	-	50	[56]
CoP–FeP	1.55	-	24	[57]
f-CoP/CoP_2/Al_2O_3	1.65	-	24	[58]
CoP-Mo_2C@NC/CC	1.64	-	40	[59]