Electronic Supplementary Information

In situ generated amorphous CoFePi and crystalline $Ni(PO_3)_2$ heterojunction as an efficient electrocatalyst for oxygen evolution

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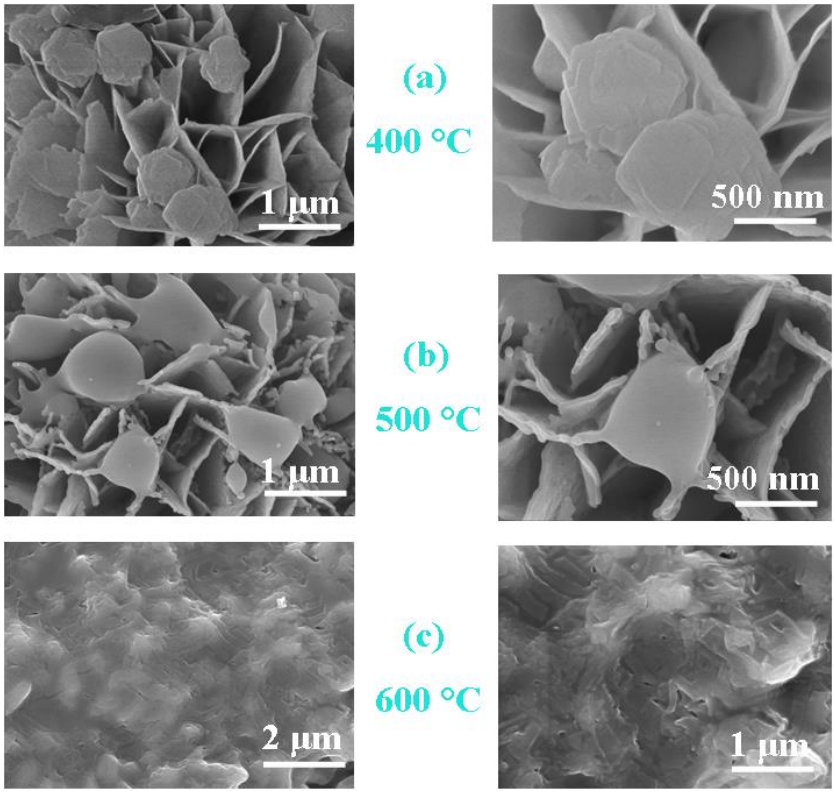

Fig. S1 SEM images of CoFePi/Ni$(PO_3)_2$/CC prepared at the phosphorization temperature of a) 400, b) 500, and c) 600 °C for 2 h, respectively.

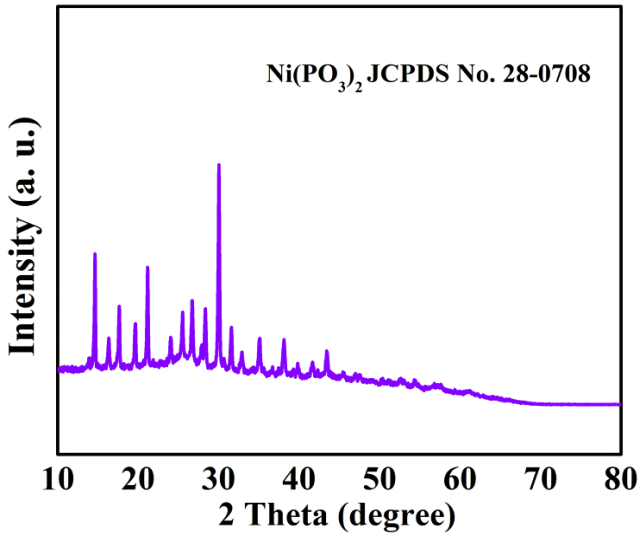

Fig. S2 XRD pattern of Ni$(PO_3)_2$ powder sample.

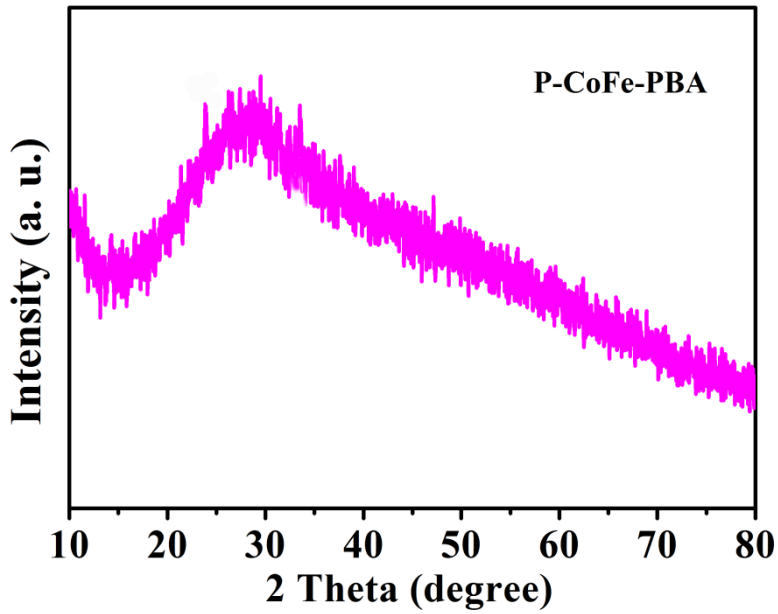

Fig. S3 XRD pattern of P-CoFe-PBA powder.

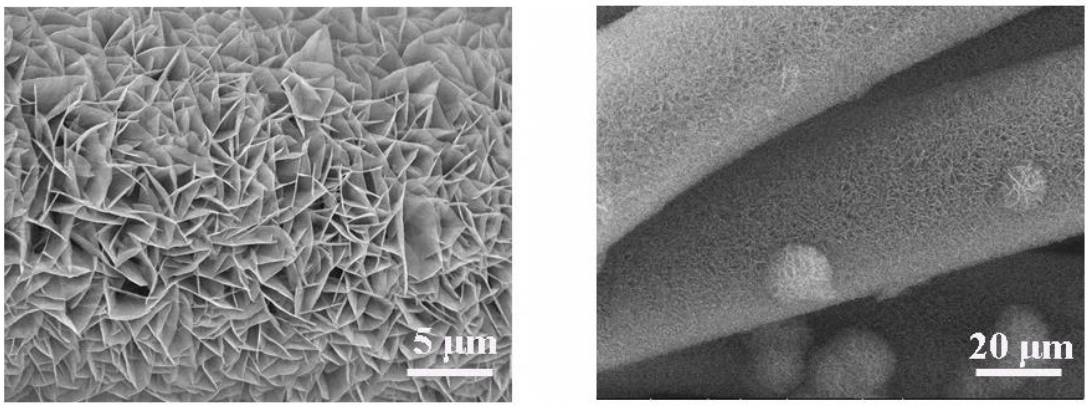

Fig. S4 SEM images of $Ni(OH)_2$/CC.

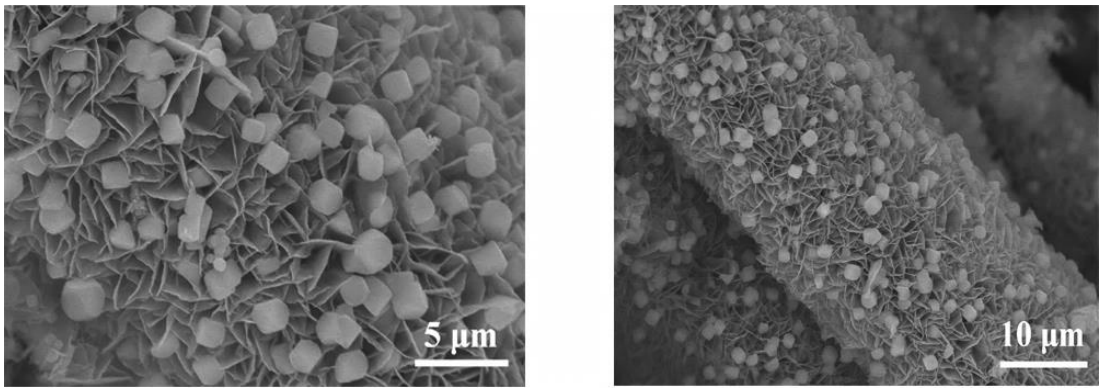

Fig. S5 SEM images of CoFe-PBA/$Ni(OH)_2$/CC.

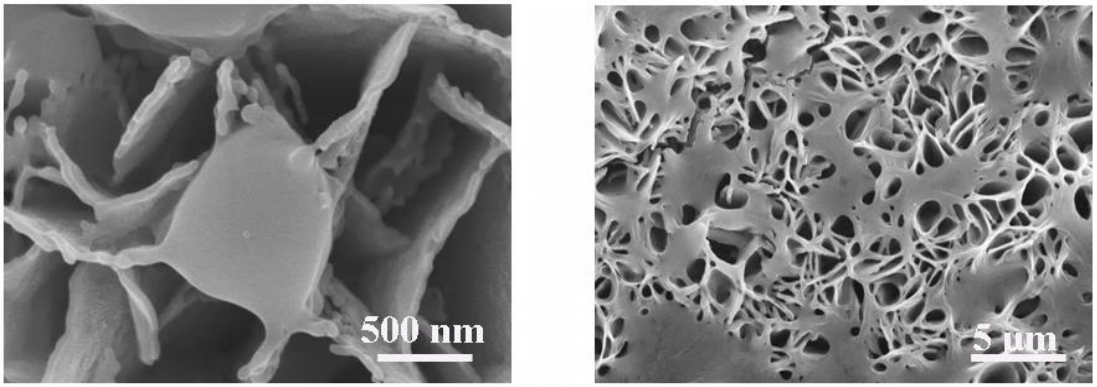

Fig. S6 SEM images of CoFePi/$Ni(PO_3)_2$/CC.

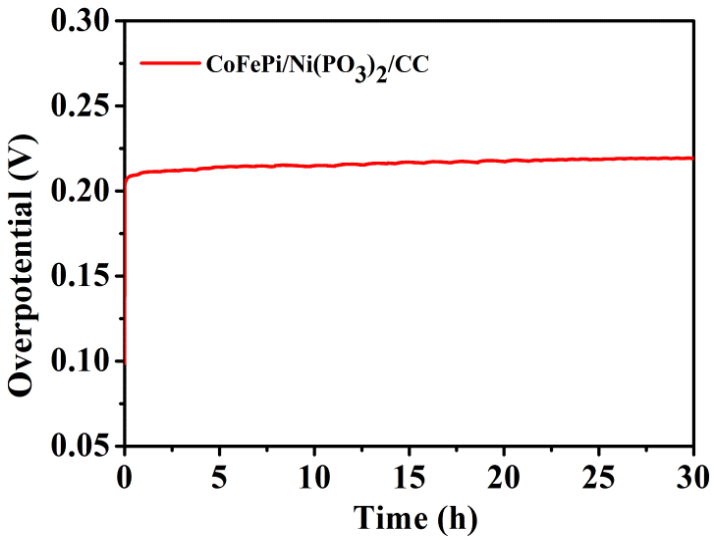

Fig. S7 Current density trace of CoFePi/$Ni(PO_3)_2$/CC for 30 h.

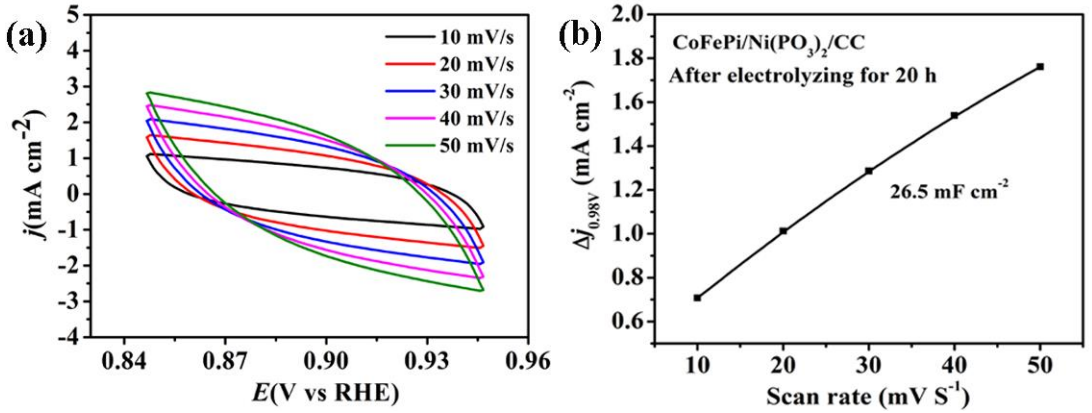

Fig. S8 (a) CVs of CoFePi/Ni$(PO_3)_2$/CC after OER for 20h. (b) The capacitive current density $\triangle j_{0.98\ V}$ as a function of scan rate in the range of 0.85-0.95 V vs. RHE.

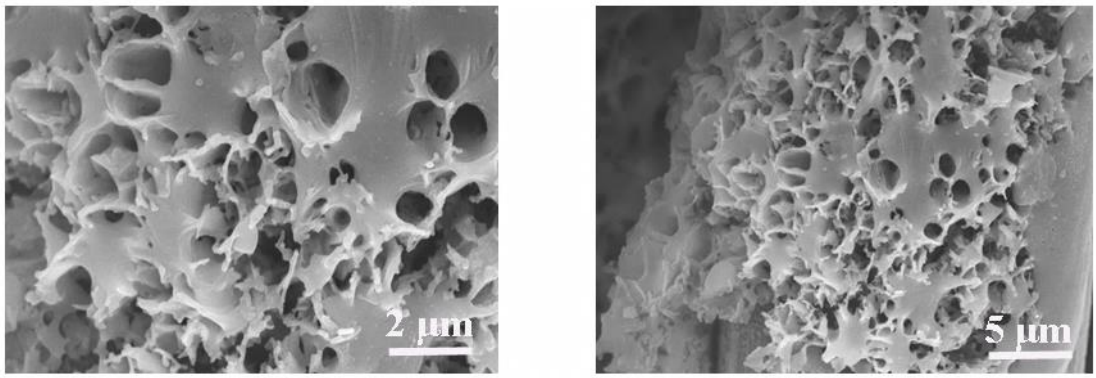

Fig. S9 SEM images of CoFePi/Ni$(PO_3)_2$/CC after OER for 20h.

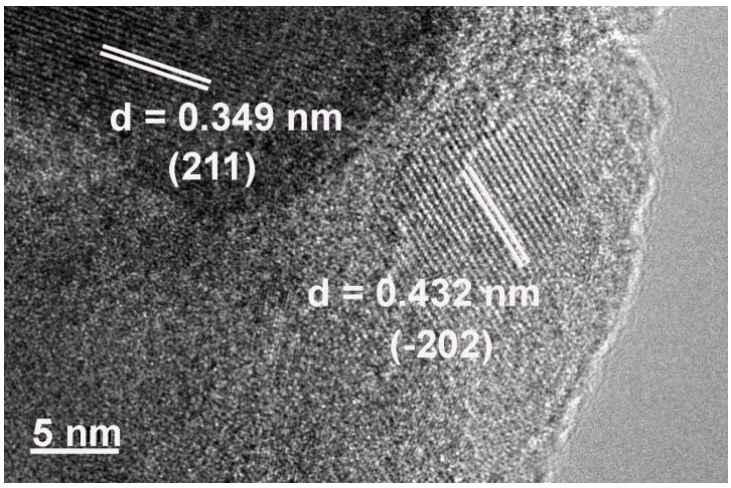

Fig. S10 HRTEM image of CoFePi/Ni$(PO_3)_2$/CC after OER for 20h.

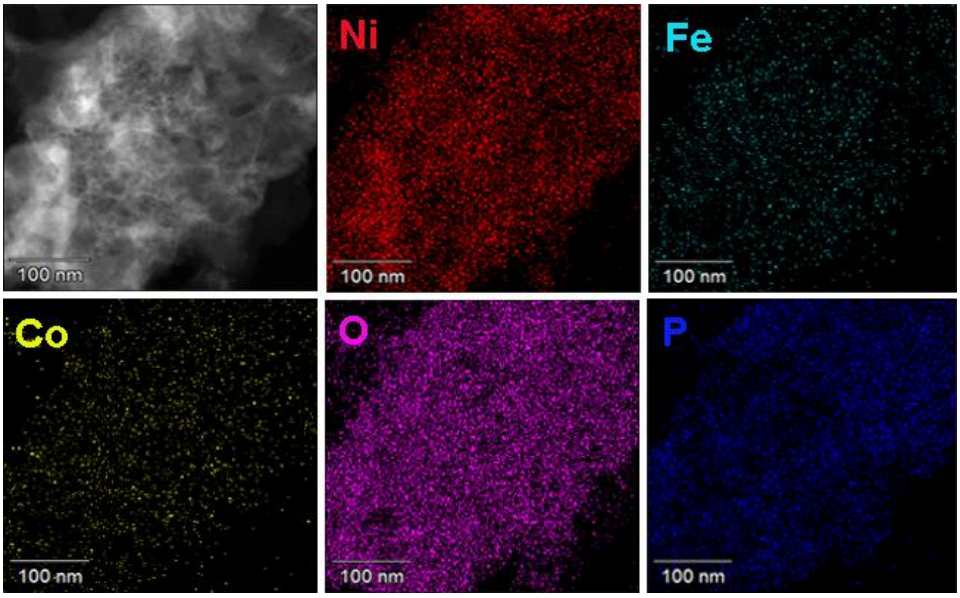

Fig. S11 STEM images and the corresponding elemental mapping of CoFePi/Ni$(PO_3)_2$/CC after OER for 20h.

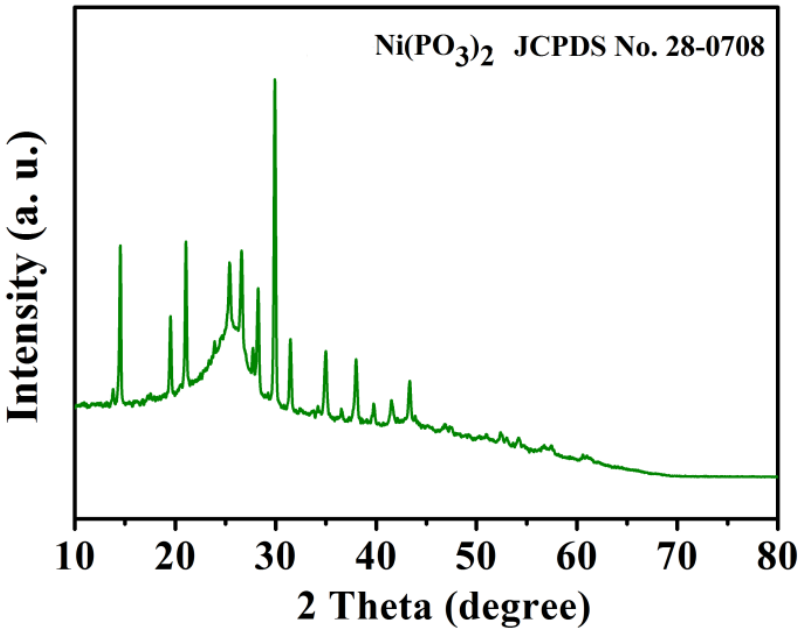

Fig. S12 XRD pattern of CoFePi/Ni$(PO_3)_2$/CC after OER for 20h.

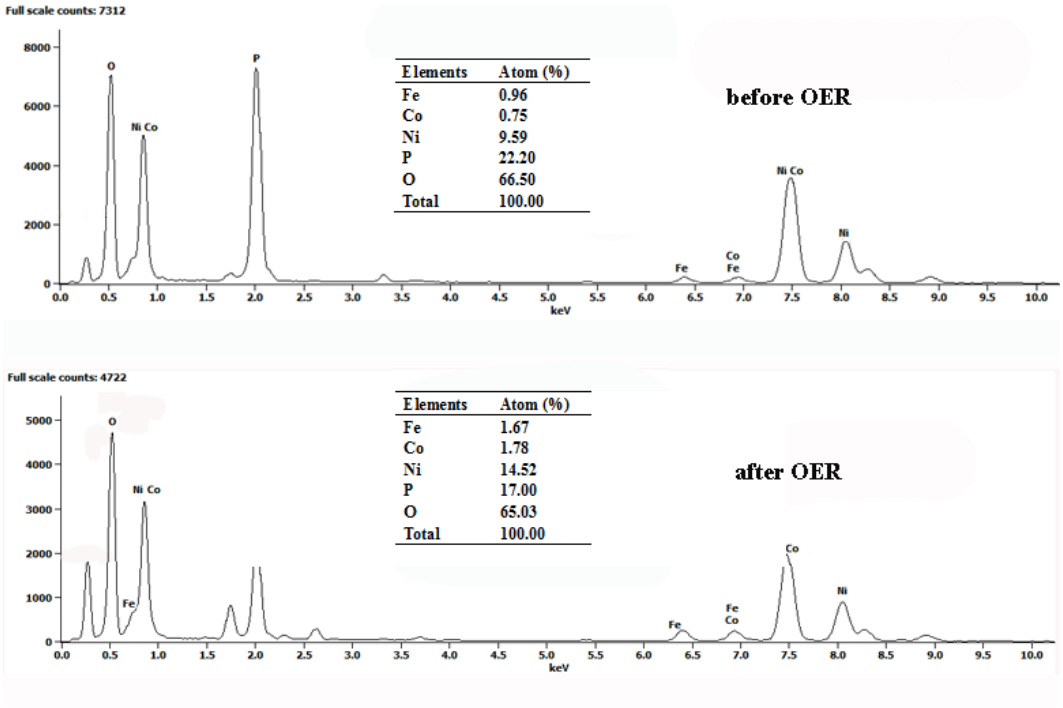

Fig. S13 EDS of CoFePi/Ni$(PO_3)_2$/CC before and after OER for 20h.

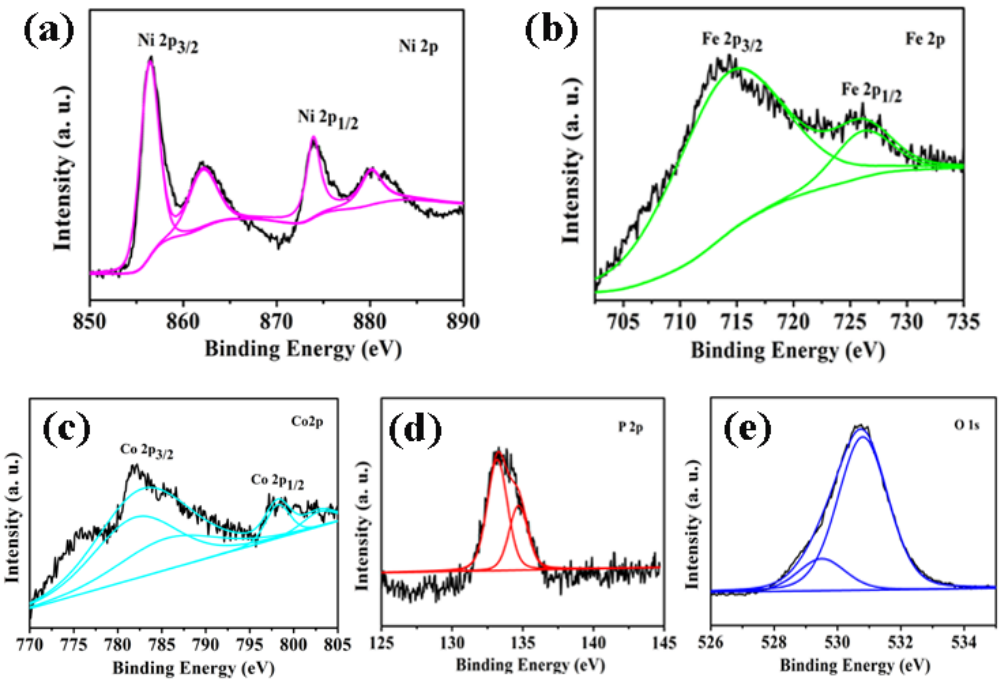

Fig. S14 High resolution XPS spectra of (a) Ni 2p, (b) Fe 2p, (c) Co 2p, (d) P 2p, and (e) O1s for CoFePi/Ni$(PO_3)_2$/CC after OER for 20h.

Table S1. The performance of CoFePi/$Ni(PO_3)_2$ and reported electrocatalysts for OER.[a]

Catalyst	η at 10 mA cm^{-2} (mV)	Tafel slope (mV del^{-1})	Mass loading (mg cm^{-2})	Substrate[b]	Reference
CoFePi/$Ni(PO_3)_2$	**213**	**39**	**1.37**	**CC**	**This work**
$Co_3(PO_4)_2$@N-C	317	62	N.A.	GCE	*J. Mater. Chem. A*, **2016**, *4*, 8155-8160.
NiFe LDH@NiCoP	220	88.2	2.0	NF	*Adv. Funct. Mater.* **2018**, *28*, 1706847.
NiFePi/P	230	57	N.A.	NF	*J. Mater. Chem. A*, **2018**, *6*, 7509-7516.
Ni:Pi-Fe	220	37	N.A.	NF	*Chem. Mater.*, **2016**, *28*, 5659-5666.
Ni_5P_4	290	40	3.48	Ni foil	*Angew. Chem. Int. Ed.*, **2015**, *54*, 12361-12365.
Ni_2P	290	47	0.14	GCE	*Energy Environ. Sci.*, **2015**, *8*, 2347-2351.
Co-Fe-P	244	58	1.03	NF	*ACS Appl. Mater. Interf.*, **2017**, *9*, 362-370.
NiCoP	242	64.2	2.0	CC	*ACS Catal.*, **2017**, *7*, 413-420.
$Ni_{1.5}Fe_{0.5}P$	264	55	1.38	CFP	*Nano Energy*, **2017**, *34*, 472-480.
CoMnP	330	61	0.28	GCE	*J. Am. Chem. Soc.*, **2016**, *138*, 4006-4009.
NiCoP@C	330	96	0.25	GCE	*Angew. Chem. Int. Ed.*, **2017**, *56*, 3897-3900.
FeP@rGO	260	175	~0.71	CFP	*J. Mater. Chem. A*, **2016**, *4*, 9750-9754.
MoS_2/Ni_3S_2	218	88	9.7	NF	*Angew. Chem. Int. Ed.* **2016**, *55*, 6702-6707.
S-NiCoFe LDH	206	46	1.05	CC	*J. Mater. Chem. A*, 2**018**, *6*, 3224-3230.
$NiFeO_x$	230	31.5	1.6	CFP	*Nat. Commun.*, **2015**, *6*, 7261.
$CoFe_2O_4$/C NRAs	240	45	0.424	NF	*Adv. Mater.*, **2017**, *29*, 1604437.
Gelled FeCoW	191	37	0.21	NF	*Science*, **2016**, *352*, 333-337.

[a]The electrolyte is 1.0 M KOH unless otherwise stated. *η* is overpotential. [b]NF = nickel foam; CFP = carbon fiber paper; CC = carbon cloth； GCE = glassy carbon electrode.