Supporting Information

Electrocatalytic activity sites for the oxygen evolution reaction on binary cobalt and nickel phosphides

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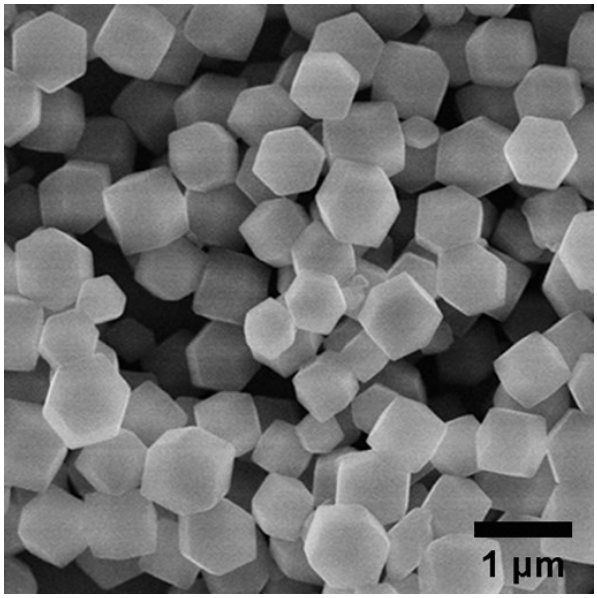

Fig. S1 SEM image of ZIF-67 crystals.

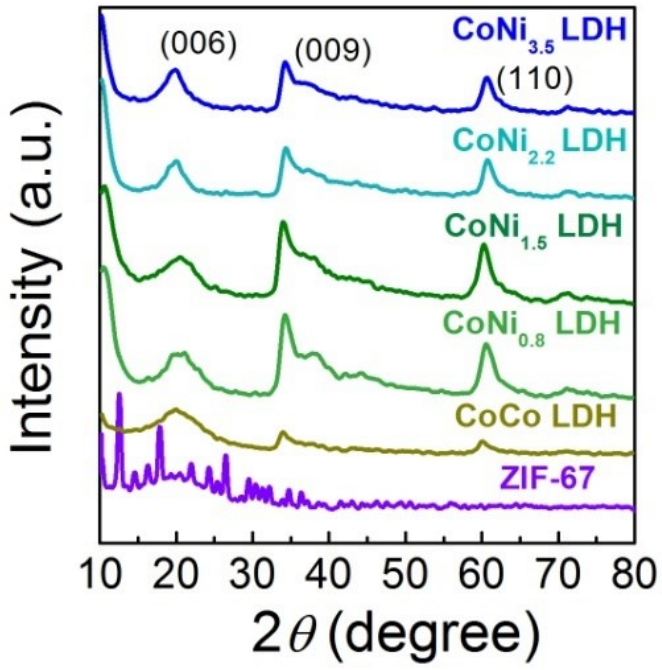

Fig. S2 XRD patterns of ZiF-67, CoCo-, $CoNi_{0.8}$-, $CoNi_{1.5}$-, $CoNi_{2.2}$-, and $CoNi_{3.5}$-LDHs.

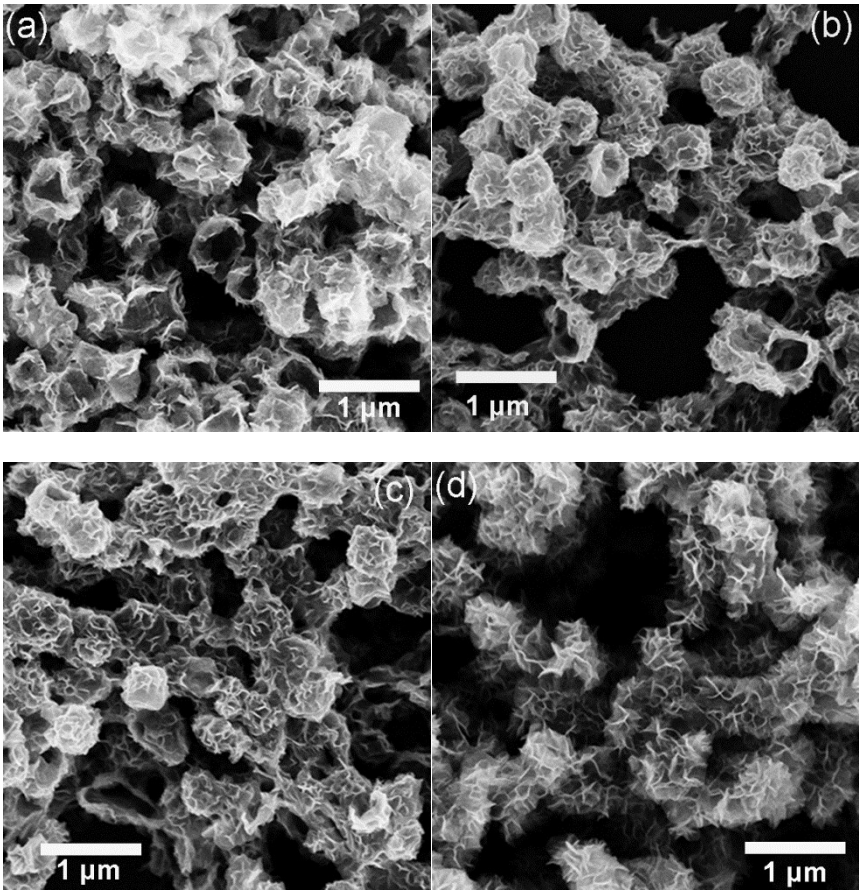

Fig. S3 SEM images (a–d) of $CoNi_{0.8}P$ (a), $CoNi_{1.5}P$ (b), $CoNi_{2.2}P$ (c) and $CoNi_{3.5}P$ (d).

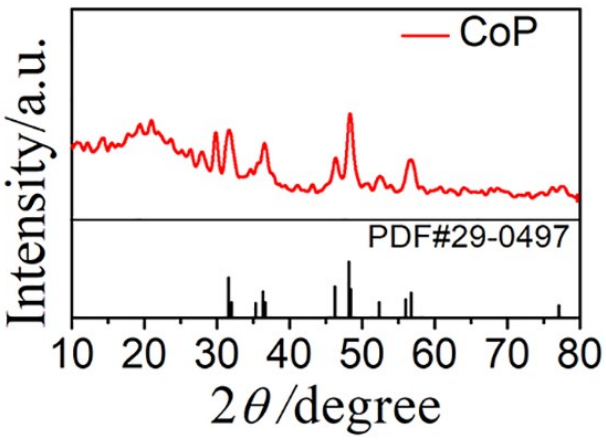

Fig. S4 XRD pattern of CoP.

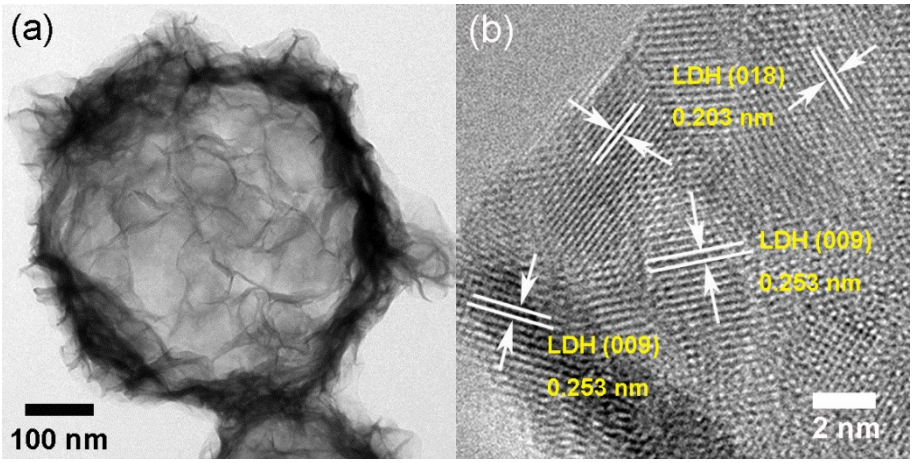

Fig. S5 TEM images of $CoNi_{1.5}$-LDH.

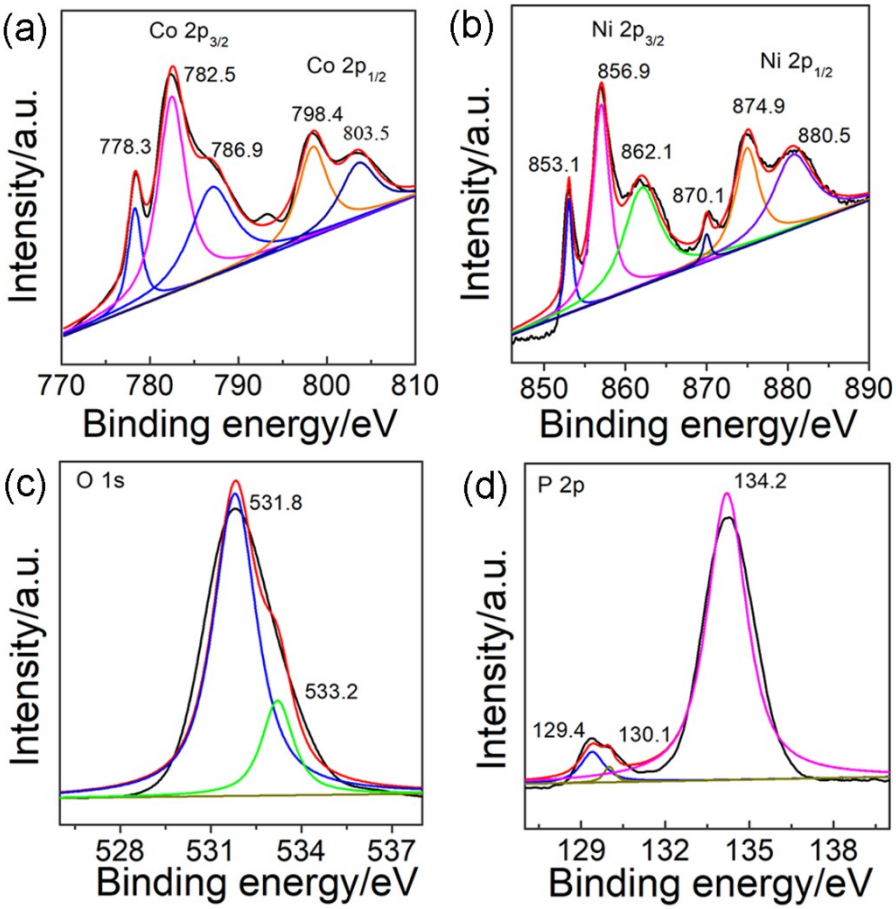

Fig. S6 Co 2p (a), Ni 2p (b), P 2p (c) and O 1s (d) XPS spectra of $CoNi_{1.5}P$.

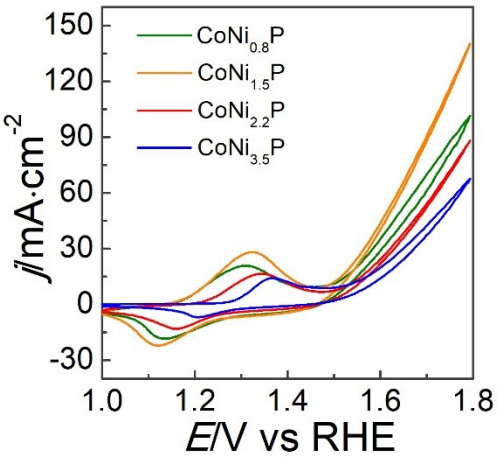

Fig. S7 CV curves of $CoNi_{0.8}P$, $CoNi_{1.5}P$, $CoNi_{2.2}P$ and $CoNi_{3.5}P$ in O_2-saturated 1.0 mol·L^{-1} KOH aqueous solution at a scan rate of 50 mV s^{-1}.

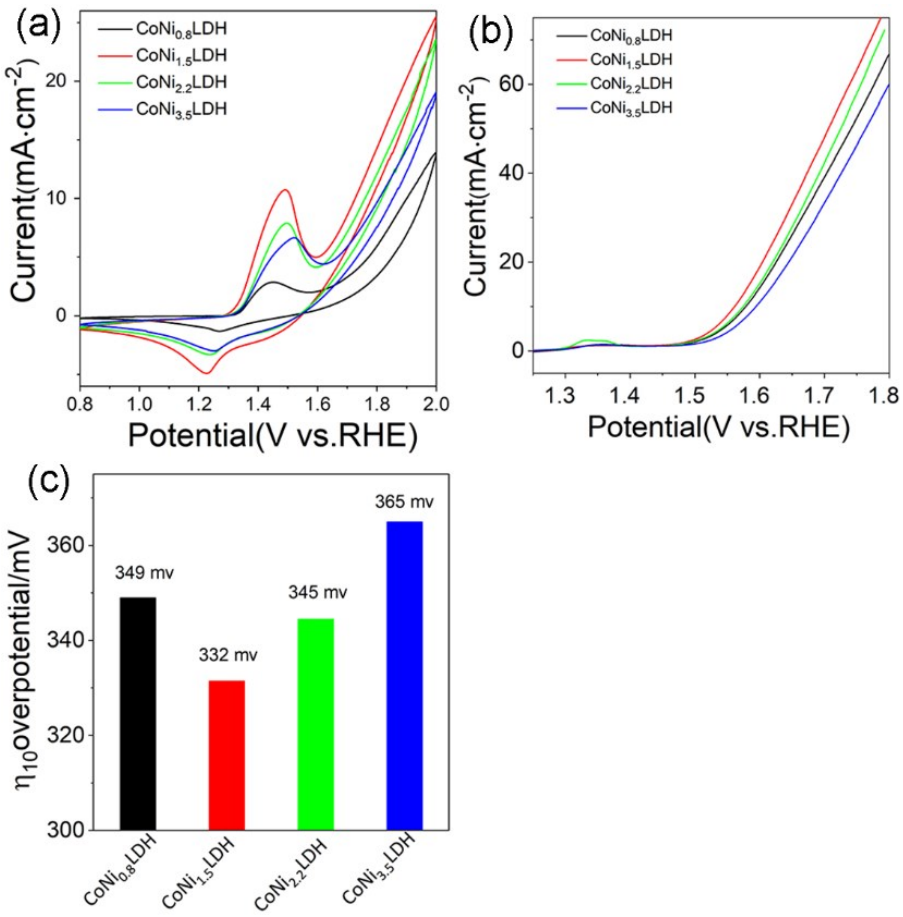

Fig. S8 CV and LSV curves of $CoNi_{0.8}$-LDH, $CoNi_{1.5}$-LDH, $CoNi_{2.2}$-LDH and $CoNi_{3.5}$-LDH in O_2-saturated 1.0 mol·L^{-1} KOH aqueous solution at a scan rate of 50 mV s^{-1}.

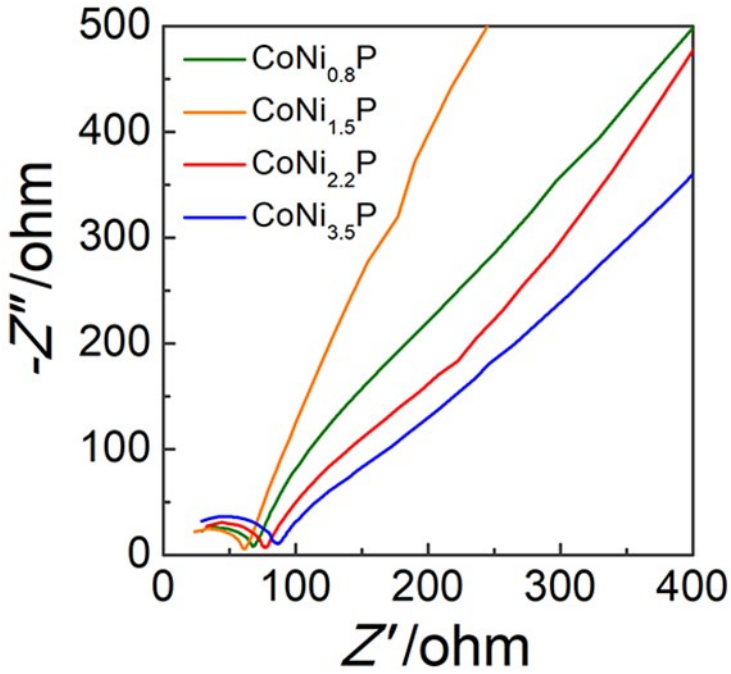

Fig. S9 Nyquist diagram of $CoNi_{0.8}P$, $CoNi_{1.5}P$, $CoNi_{2.2}P$ and $CoNi_{3.5}P$ at open potentials in 1.0 mol·L^{-1} KOH.

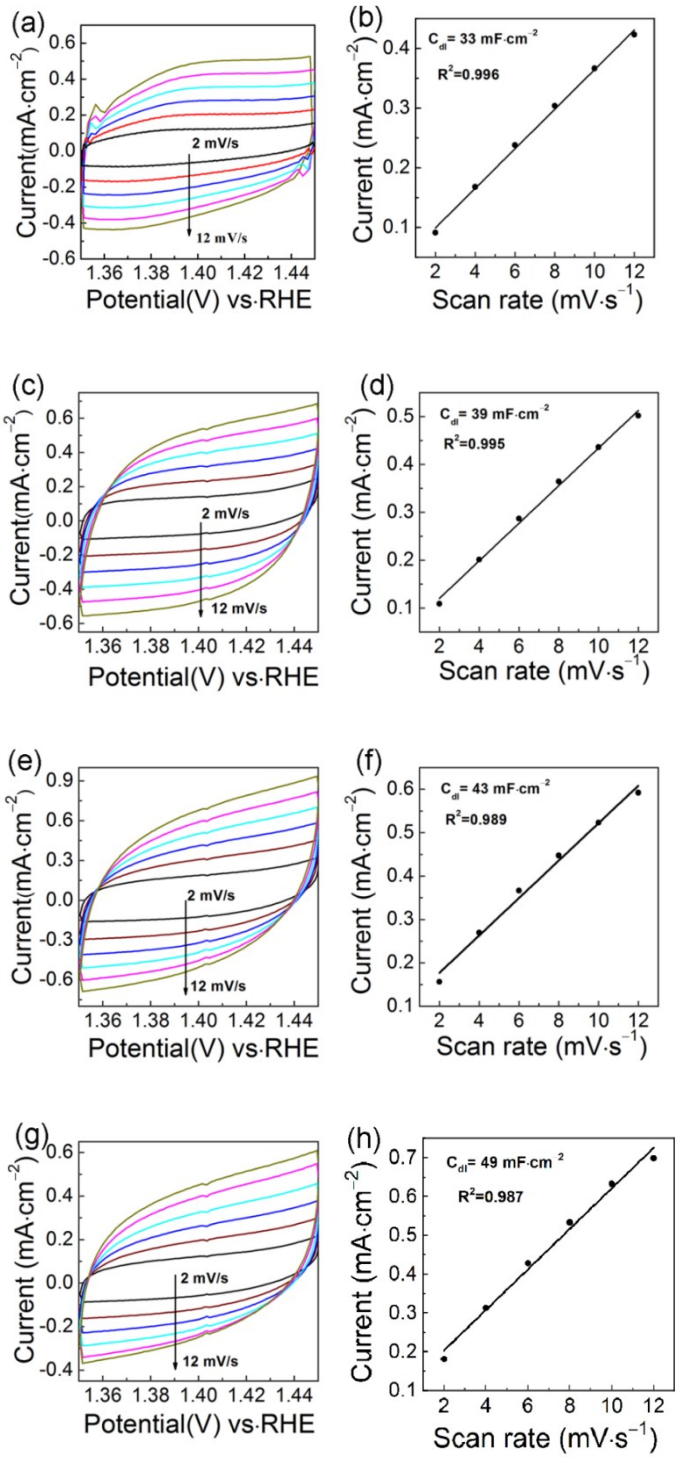

Fig. S10 Cyclic voltammogram (CV) curves and current density as a function of scan rate derived from CV curves of $CoNi_{0.8}P$ (a-b), $CoNi_{1.5}P$ (c-d), $CoNi_{2.2}P$ and $CoNi_{3.5}P$ (e-f) at scan rates of 2, 4, 6, 8, 10 and 12 mV·s^{-1} in 1.0 mol·L^{-1} KOH.

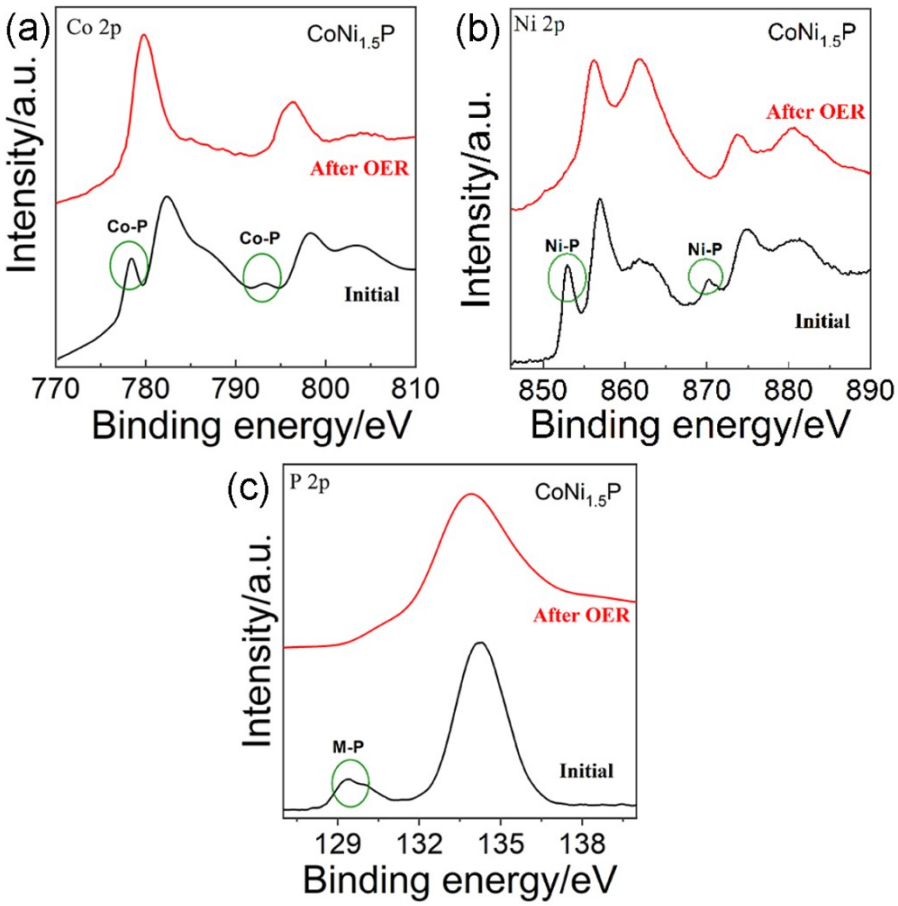

Fig. S11 Co 2p (a), Ni 2p (b) and P 2p (c) XPS spectra of $CoNi_{1.5}P$ after 10 h OER test in O_2-saturated 1.0 mol·L^{-1} KOH aqueous solution.

Table S1. Comparison of OER activity of various reported catalysts in 1.0 $mol \cdot L^{-1}$ KOH aqueous solution.

Catalyst	η_{10} /mV	Reference
$CoNi_{1.5}P$	**278**	**This work**
NiCoP/rGO	270	*10.1002/adfm.201601420*
Co-Mn-P	330	*J. Am.Chem. Soc. 2016, 138, 4006*
Co-P film	345	*Angew.Chem.Int.Ed.* 2015, *54*, 6251
Ni_5P_4 films	290	*Angew. Chem.* 2015, *127*, 12538
Ni_2P	290	*Energy Environ. Sci.* 2015, *8*, 2347
NiP/Ni	270	*Adv. Funct. Mater.* 2016, *26*, 3314
Ni-P	300	*Energy Environ. Sci.* 2016, *9*, 1246
CoP MNA	290	*Adv. Funct. Mater.* 2015, *25*, 7337
$Ni_{0.51}Co_{0.49}P$	239	*10.1002/adfm.201603727*
NiCoP	310	*Adv. Mater. Interfaces* 2016, *3*, 1500454
$(Co_{0.52}Fe_{0.48})_2P$	270	*Energy Environ. Sci.* 2016, *9*, 2257
CoP/rGO-400	340	*Chem. Sci.* 2016, *7*, 1690
NiCoP/CC	242	ACS Catal. 2017, 7, 4131-4137
NiCoP/CNF	268	*Adv. Energy Mater.* 2018, 1800555
NiFe LDH@NiCoP/NF	220	*Adv. Funct. Mater.* 2018, *28*, 1706847
$Ni_{0.6}Co_{1.4}P$	300	*Adv. Funct. Mater.* 2018, 1706008
h-CoNiP/rGO	370	*Electrochemistry Communications 83 (2017) 85–89*
NiCoP/NC PHCs	297	*J. Mater. Chem. A, 2017, 5, 18839–18844*
NiCoP@Cu_3P/CF	309	*J. Mater. Chem. A, 2018, 6, 2100–2106*
Ni_2P-CoP	320	*ACS Appl. Mater. Interfaces 2017, 9, 23222-23229*
CoP/NCNHP	310	*J. Am. Chem. Soc. 2018, 140, 2610-2618*