Electronic Supplementary Material (ESI) for Journal of Materials Chemistry A.

Table S1. Compositions of sandwich-like CoP/C, CoO/C and macroporous CoP materials, determined by ICP-AES.

Composites	Targeted element ratio	Experimental (ICP-AES) element ratio
Sandwich-like CoP/C	Co:P=1.00:1.00	Co:P=1.008:0.992
Sandwich-like CoO/C	Co:O=1.00:1.00	Co:O=1.003:0.997
Macroporous CoP	Co:P=1.00:1.00	Co:P=0.991:1.009

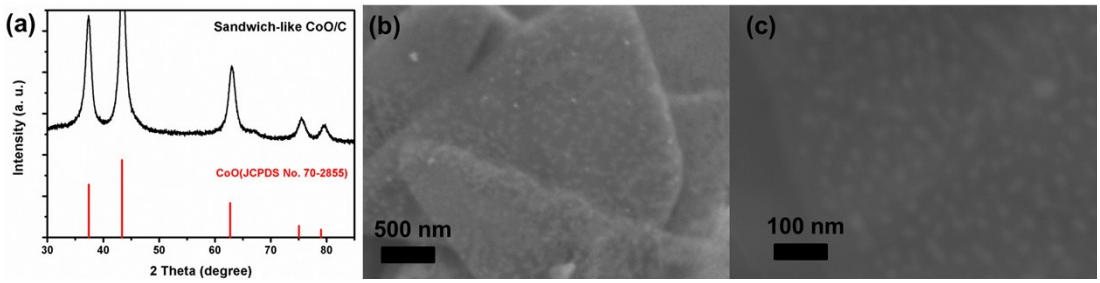

Figure S1.Sandwich-like CoO/C nanocomposites: (a) X-ray diffraction patterns; (b) and (c) SEM images.

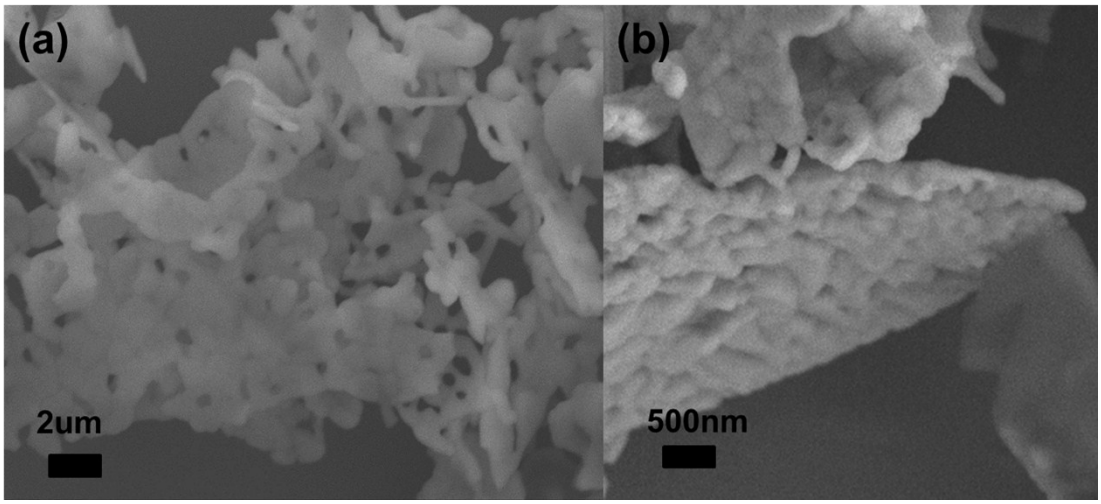

Figure S2. SEM images of macroporous CoP materials.

Table S2. Comparison of the OER activity for several recently reported highly active Co-based electrocatalysts in alkaline media.

Catalysts	**Electrolyte**	**Mass loading (mg/cm^{-2})**	**$E_{J=10}$ (V vs. RHE)**	**Tafel slop ($mV\ dec^{-1}$)**	**Reference**
Sandwich-like CoP/C	**1.0 M KOH**	**0.36**	**1.56**	**53**	**This work**
Commercial IrO_2/C	1.0 M KOH	0.36	1.63	69	This work
CoP NR/C	1.0 M KOH	0.71	1.58	71	ACS Catal. **2015**, 5, 6874
CoP/C	0.1 M KOH	0.4	1.59	66	ACS Catal. **2015**, 5, 4066
Co-P film	1.0 M KOH	1.0	1.56	47	Angew. Chem. Int. Ed. **2015**, 54, 6251
CoP	0.1M NaOH	0.285	1.63	80	ACA Appl. Mater. Interfaces. **2015**, 7, 28412
Co_3O_4/N-rmGO	1.0 M KOH	1.0	1.54	67	Nature Materials. **2011**, 10, 780
CoO_x@CN	1.0 M KOH	1.0	1.5	N. A	J. Am. Chem. Soc. **2015**, 137, 2688
Co_xO_y/NC	0.1 M KOH	0.21	1.69	N. A	Angew. Chem. Int. Ed. **2014**,53,8508
Co_3O_4			1.68		
NCG-CoO	1.0 M KOH	NA	1.57	71	Energy Environ. Sci. **2014**, 7, 609
Co_3O_4C-NA	0.1 M KOH	0.2	1.52	70	J. Am. Chem. Soc. **2014**, 136, 13925
Co_3O_4-NA			1.63	123	
NiCo LDH	1.0 M KOH	0.17	1.6	40	Nano Lett. **2015**, 15, 1421.
CoCo LDH	1.0 M KOH	0.07	1.61	59	Nat. Commun. **2014**, 5, 4477
$CoSe_2$	0.1 M KOH	0.2	1.71	66	ACS Nano, **2014**, 4, 3970
$Zn_xCo_{3-x}O_4$ nanowire array (Ti foil substrate)	1.0 M KOH	~1.0	1.56	51	Chem. Mater.**2014**,26,1889
$Ni_xCo_{3-x}O_4$ nanowire array(Ti foil substrate)	1.0 M KOH	2.3~2.7	~1.6	59~64	Adv. Mater. **2010**, 22, 1926

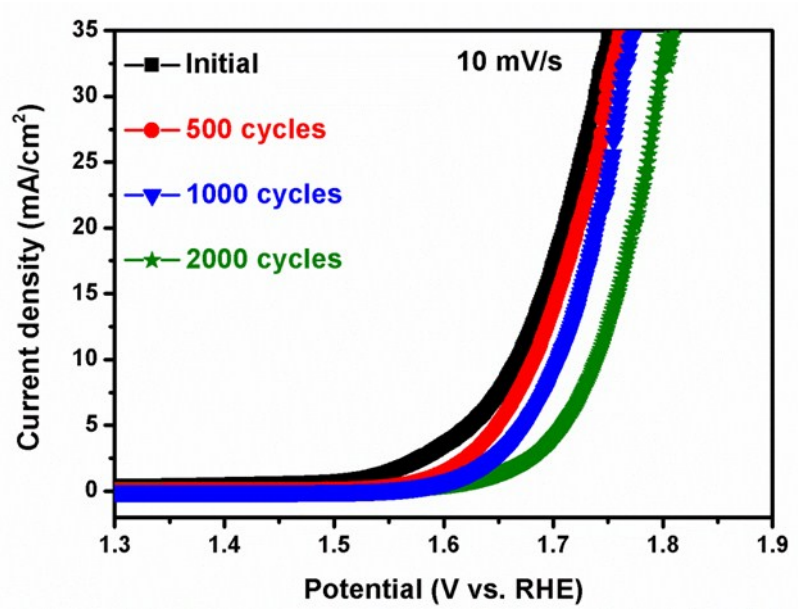

Figure S3. Polarization curves for sandwich-like CoO/C in KOH solution (1.0 M) at a scan rate of 10 mV/s.

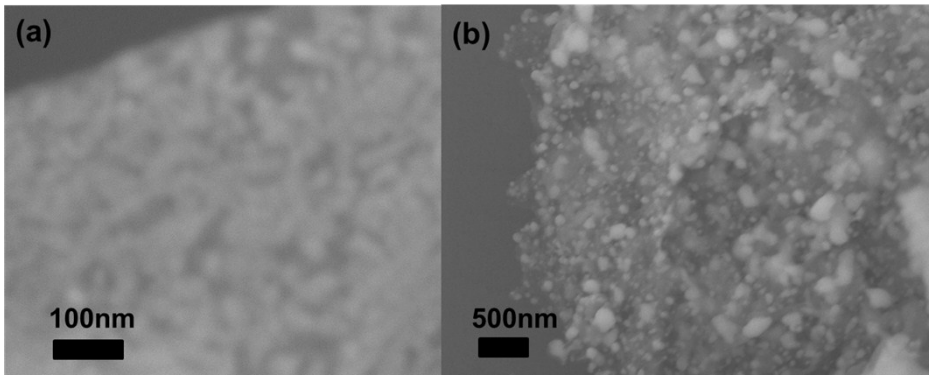

Figure S4. SEM images of CoP/C (a) and CoO/C (b) after 2000 cycling tests.

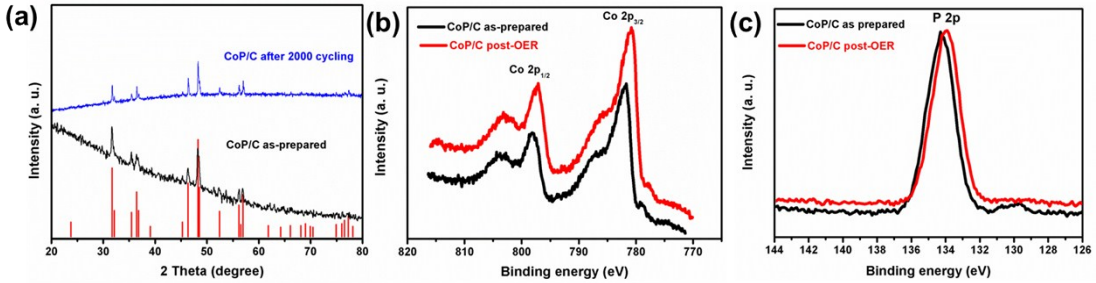

Figure S5. a) XRD data and b-c) XPS spectrum of sandwich-like CoP/C after 2000 cycling tests.

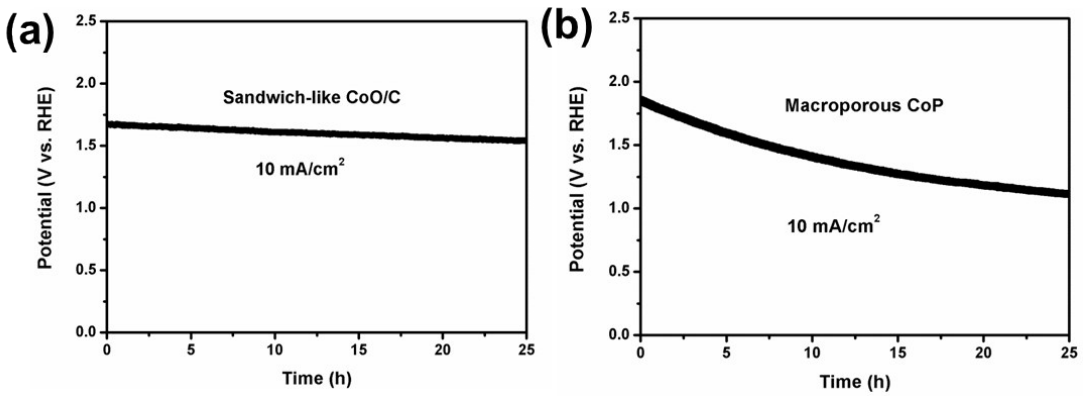

Figure S6. Chronoamperometric technology at a constant current density of 10 mA/cm^2 of (a) sandwich-like CoO/C and (b) macroporous CoP

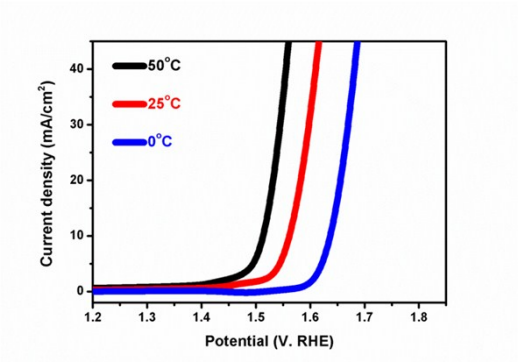

Figure S7. Polarization curves of sandwich-like CoP/C at different temperature.