Supporting Information

Spinel oxide $CoFe_2O_4$ grown on Ni foam as efficient electrocatalyst for oxygen evolution reaction

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S1. Electrochemical Measurements.

The potential was calibrated with respect to reversible hydrogen electrode (RHE). $E_{RHE}=E_{Hg/HgO}$ + 0.923 V in 1 M KOH. All the potentials mentioned in our paper are against RHE unless otherwise specified. The overpotential (η) was calculated according to the following formula: $\eta(V)=E_{RHE}-1.23V$.

S2. Estimation of Effective Electrochemical Active Surface Area (ESCA).

Electrochemical capacitance is determined using cyclic voltammetry (CV) measurements. The potential range is typically a 0.1V window taken from open-circuit potential (OCP) of the system. CV measurements are conducted by sweeping the potential across the non-Faradaic region with different scan rates: from 2 mV s^{-1} to 10 mV s^{-1}. All measured current in this non-Faradaic potential region is assumed to be ascribed to the double-layer charging, by plotting the current density against the scan rate, a linear trend was observed. The linear slope, equivalent to twice of the double-layer capacitance C_{dl}, was used to represent the ECSA. As given by eq (1).

$$ECSA=C_{dl}/C_s, \quad (1)$$

Cs is the specific capacitance of catalyst or the capacitance of an atomically smooth planar surface of the materialper unit area under identical electrolyte conditions.

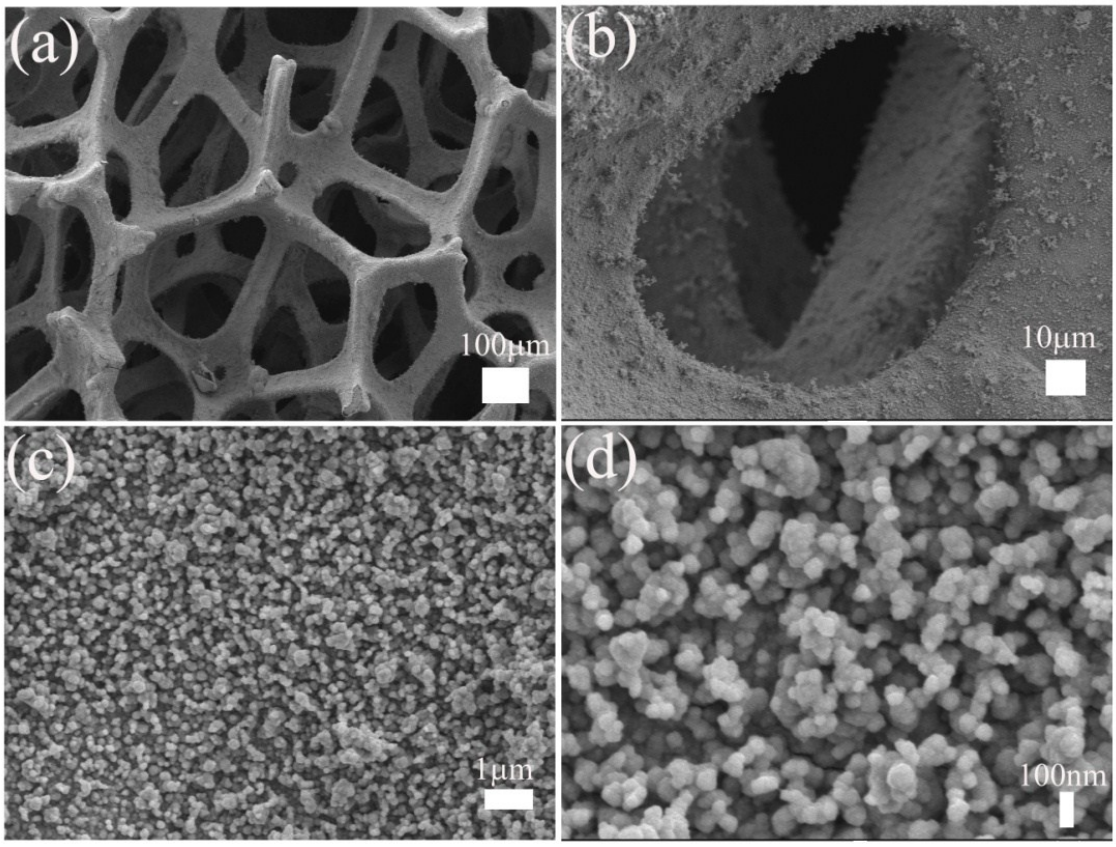

Fig.S1. (a - d) FESEM images of $CoFe_2O_4$/NF precursors with different magnifications.

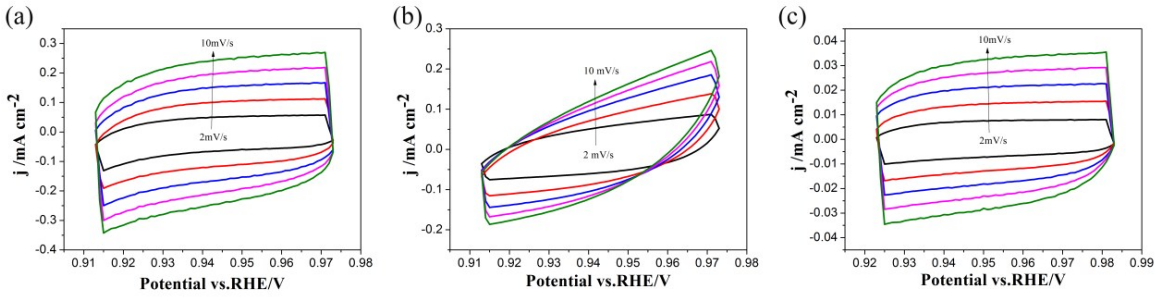

Fig.S2. (a-c) Cyclic voltammograms of the (a) $CoFe_2O_4$/NF; (b) CoO_x/NF; and (c) FeO_x/NF measured at different scan rates from 2 to 10 mV s^{-1} in 1.0 M KOH.

Table S1. OER properties of $CoFe_2O_4$/NF, CoO_x/NF and FeO_x/NF.

Catalyst	η/V (j=10 mA·cm^{-2})	η/V (j=50 mA·cm^{-2})	η/V (j=100 mA·cm^{-2})	Rs /Ω	R_{ct} /Ω
$CoFe_2O_4$/NF	273	341	400	0.83	2.08
CoO_x/NF	317	413	478	0.63	4.49
FeO_x/NF	360	449	529	0.73	7.24

Table S2. Comparision of OER electrocatalytic activity of reported $CoFe_2O_4$ Catalysts in 1.0 M KOH (overpotentialsη calculated by using the formula $\eta = E_{RHE} - 1.23$ V).

Catalyst	η/mV (j=10mA·cm^{-2})	mass loading/mg cm^{-2}	Ref.
$CoFe_2O_4$/NF	273	0.46	This work
CoO_x/NF	317	0.40	This work
FeO_x/NF	360	0.38	This work
$CoFe_2O_4$	340	0.32	1
$CoFe_2O_4$/biomass carbon hybrid	300 (1.0 M NaOH)	0.34	2
$CoFe_2O_4$/SWNTs	310	0.50	3
$Co_{1-y}Fe_yO_x$/CNTs	280	0.52	4
$CoFe_2O_4$ Nanoplates	410	1.06	5
Co/$CoFe_2O_4$@N-graphene	350	~	6
Au-$CoFe_2O_4$	312	~	7

Reference

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