Electronic Supplementary Information

Template-directed synthesis of sulphur doped NiCoFe layered double hydroxide porous nanosheets with enhanced electrocatalytic activity for oxygen evolution reaction

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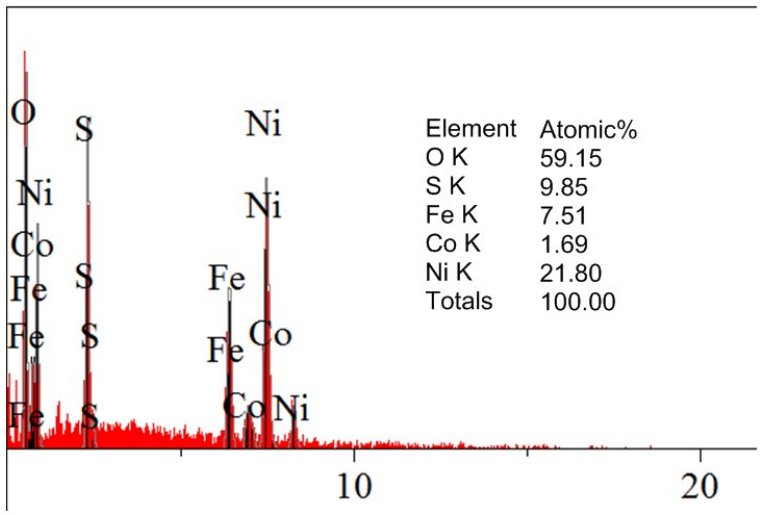

Fig. S1 EDX analyses for S-NiCoFe LDH.

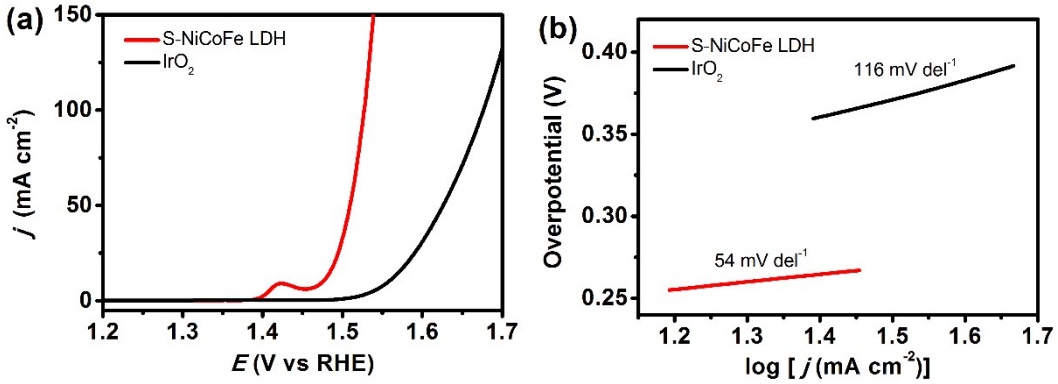

Fig. S2 (a) LSV curves and (b) Tafel plots of S-NiCoFe LDH powder/CC, and IrO_2/CC, recorded at a scan rate of 1 mV s^{-1} in 1.0 M KOH.

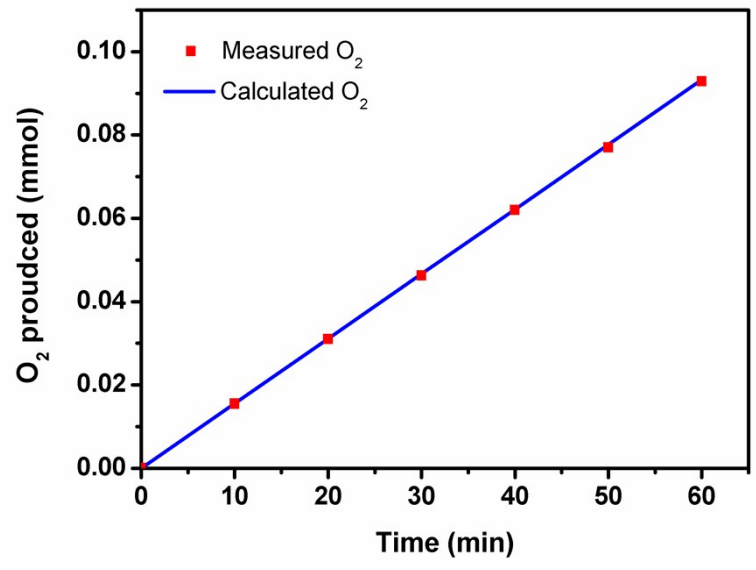

Fig. S3 The measured and theoretical yields of O_2 over time during electrolysis of S-NiCoFe LDH at the current density of 10 mA cm^{-2}.

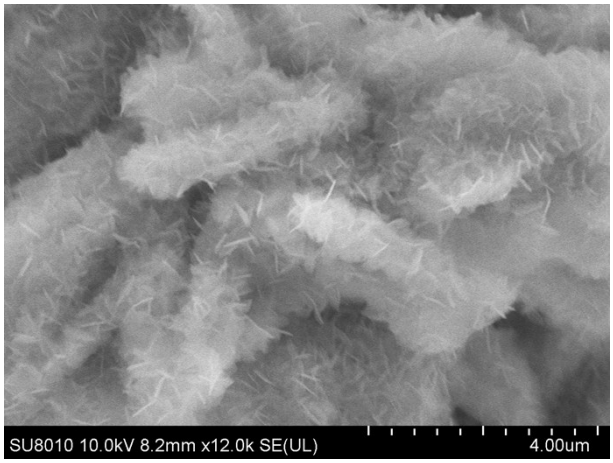

Fig. S4 SEM image of S-NiCoFe LDH after OER.

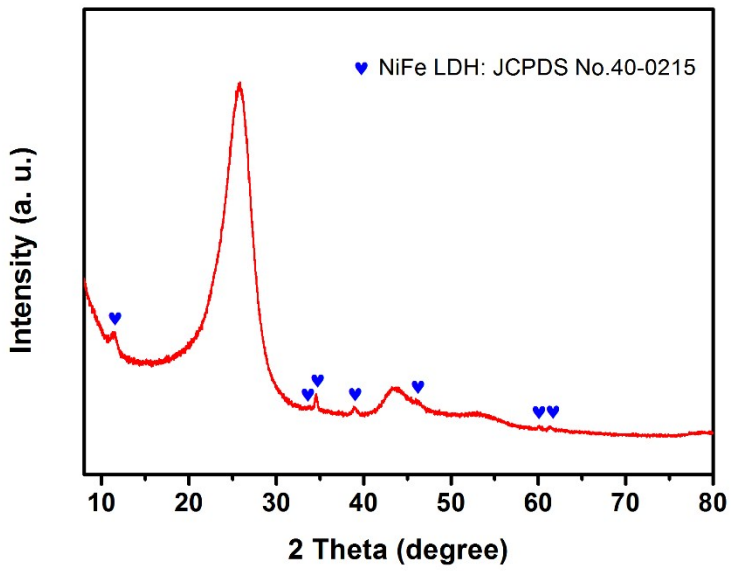

Fig. S5 XRD patterns of S-NiCoFe LDH after OER.

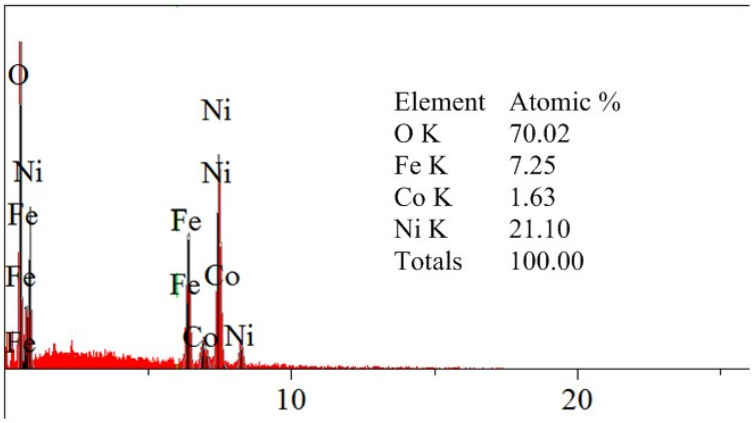

Fig. S6 EDX analyses for S-NiCoFe LDH after OER.

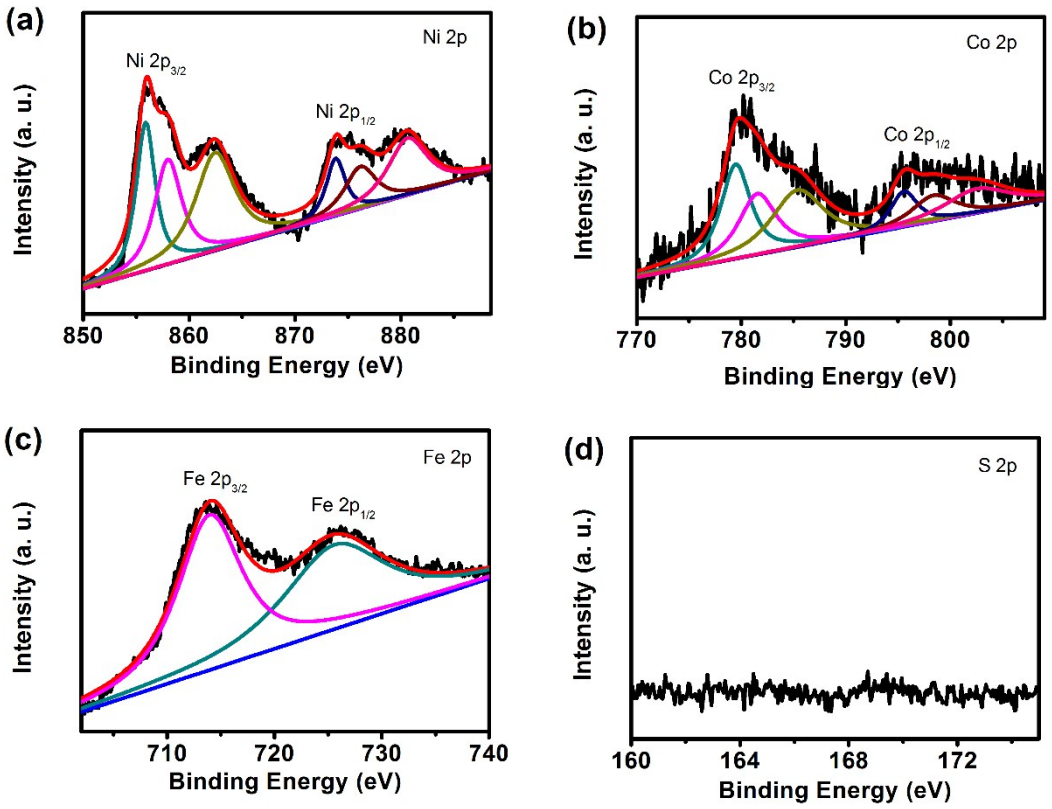

Fig. S7 High resolution XPS spectra of (a) Ni 2p, (b) Co 2p, (c) Fe 2p, and (d) S 2p for S-NiCoFe LDH after OER.

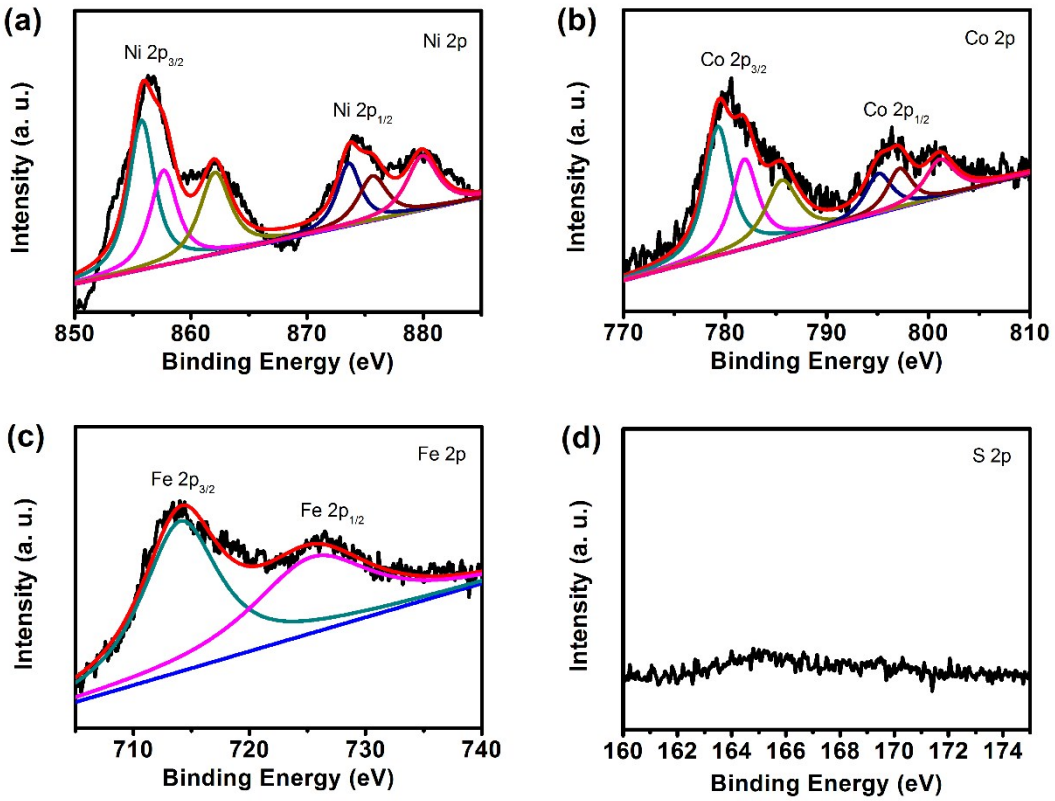

Fig. S8 High resolution XPS spectra of (a) Ni 2p, (b) Co 2p, (c) Fe 2p, and (d) S 2p for S-NiCoFe LDH after 500 CV cycles.

Table S1. OER activity of some reported electrocatalysts.[a]

Catalyst	η at 10 mA cm^{-2} (mV)	η at 100 mA cm^{-2} (mV)	Tafel slope (mV del^{-1})	Mass loading (mg cm^{-2})	TOF_{300} (s^{-1})[b]	Substrate[c]	Reference
S-NiCoFe LDH	206	258	46	1.05	0.102	CC	This work
NiFeSe	N.A.	270	47.2	1.5	N.A.	NF	1
$NiFeO_x$	230	260	31.5	1.6	N.A.	CFP	2
$Fe(PO_3)_2/Ni_2P$	177	221	51.9	8.0	0.12	NF	3
Fe-doped Ni_3S_2	N.A.	253	65.5	12.7	N.A.	NF	4
Gelled FeCoW	190	250	N.A.	0.21	0.46	Au@NF	5
MoS_2/Ni_3S_2	218	290	88	9.7	N.A.	NF	6
$CoFe_2O_4$/C NRAs	240	290	45	0.424	N.A.	NF	7
Co-Fe-P	244	N.A.	58	1.03	0.0915	NF	8
NiCoP	242	330	64.2	2.0	N.A.	CC	9
$Ni_{1.5}Fe_{0.5}P$	264	293	55	1.38	N.A.	CFP	10

(a) The electrolyte is 1.0 M KOH unless otherwise stated. η is overpotential. (b) TOF_{S300} for the turnover frequencies at overpotential = 300 mV. (c) NF = nickel foam; CFP = carbon fiber paper; CC = carbon cloth.

References

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