Interface Engineering Triggered by Carbon Nanotubes-Supported Multiple Sulfides for Boosting Oxygen Evolution

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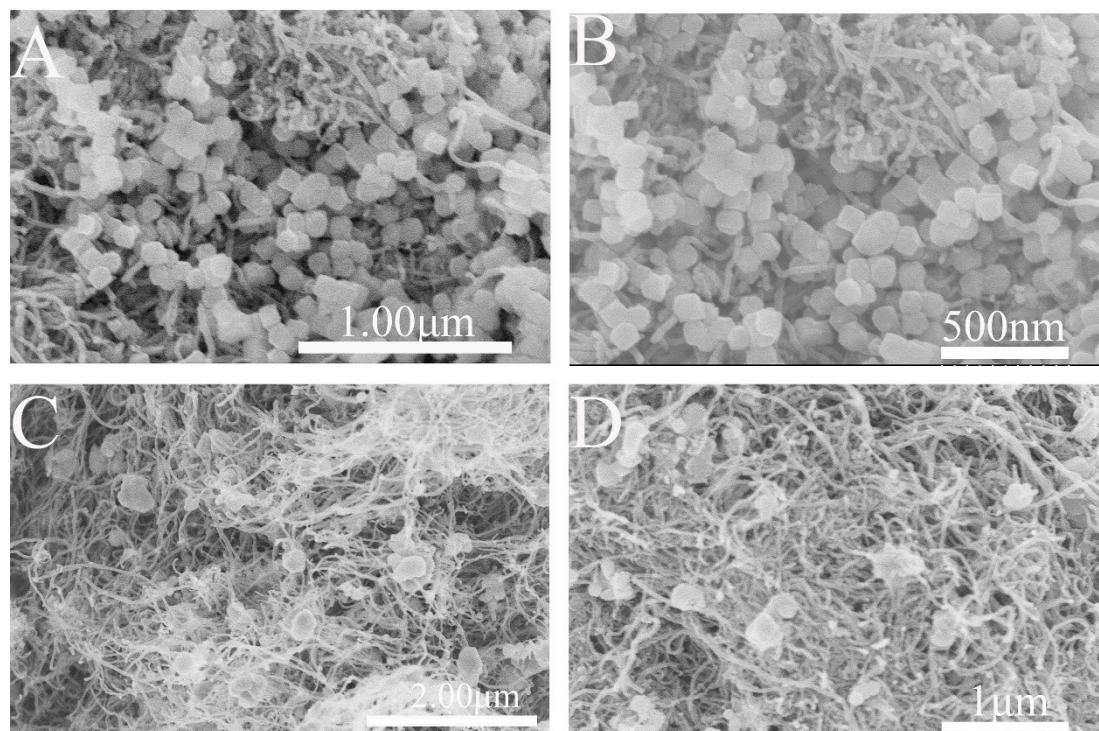Corresponding Autor, Jantai Ma*; E-mail address: majiantai@lzu.edu.cn (J. Ma)

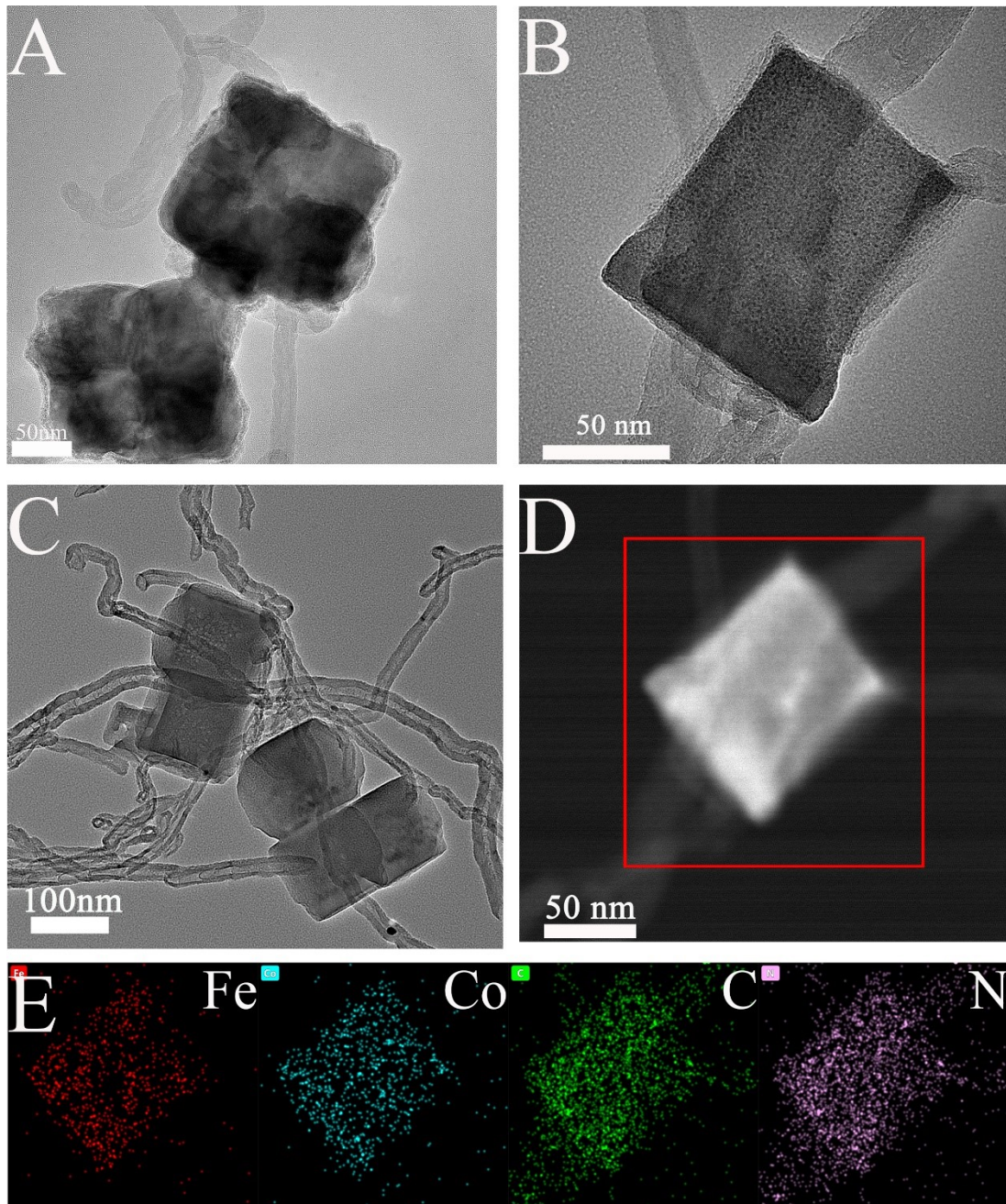**Figure S1   SEM image of CoFe PBA/CNTs (A, B) and S-CoFe/CNTs (C, D)**

Figure S2   TEM images (A) of multi-individual S-CoFe/CNTs , (B) one individual CoFe PBA/CNTs , (C)   multi-individual CoFe PBA/CNTs (D) Dark field TEM of CoFe PBA/CNTs, (E) EDS elemental mapping of the CoFe PBA/CNTs refers to the signals of Co, Fe, C and N respectively as marked in (C).
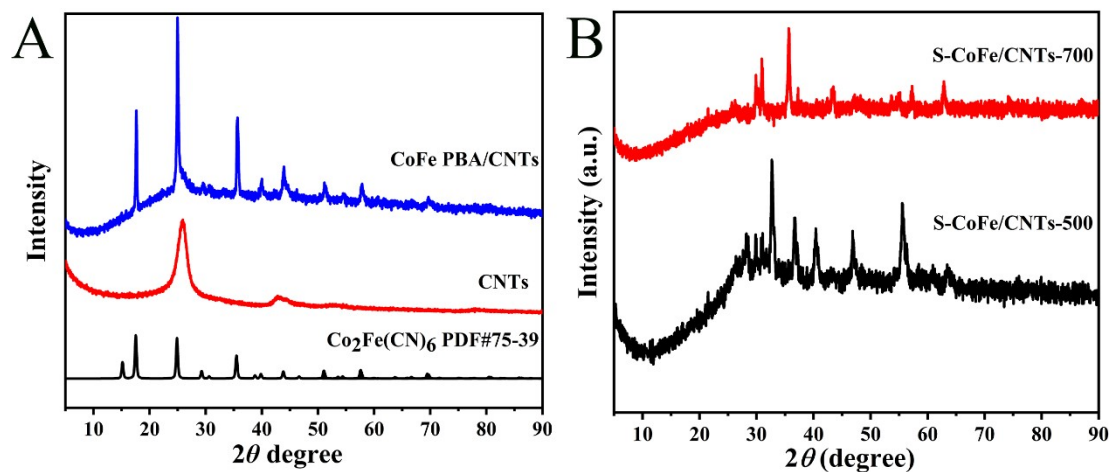
Figure S3　(A) XRD patterns of CoFe PBA/CNTs samples; (B) XRD diffractograms of S-CoFe/CNTs-700 and S-CoFe/CNTs-500
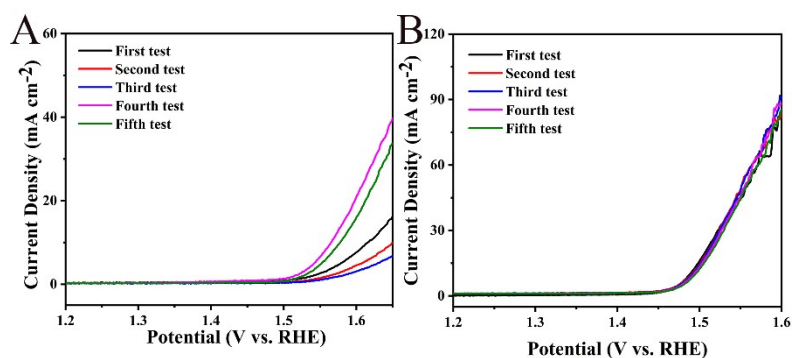

Figure S4　(A) The polarization curve of S-CoFe /CNTs prepared at 400℃ for five tests ; (B) The polarization curve of S-CoFe /CNTs prepared at 500℃ for five tests
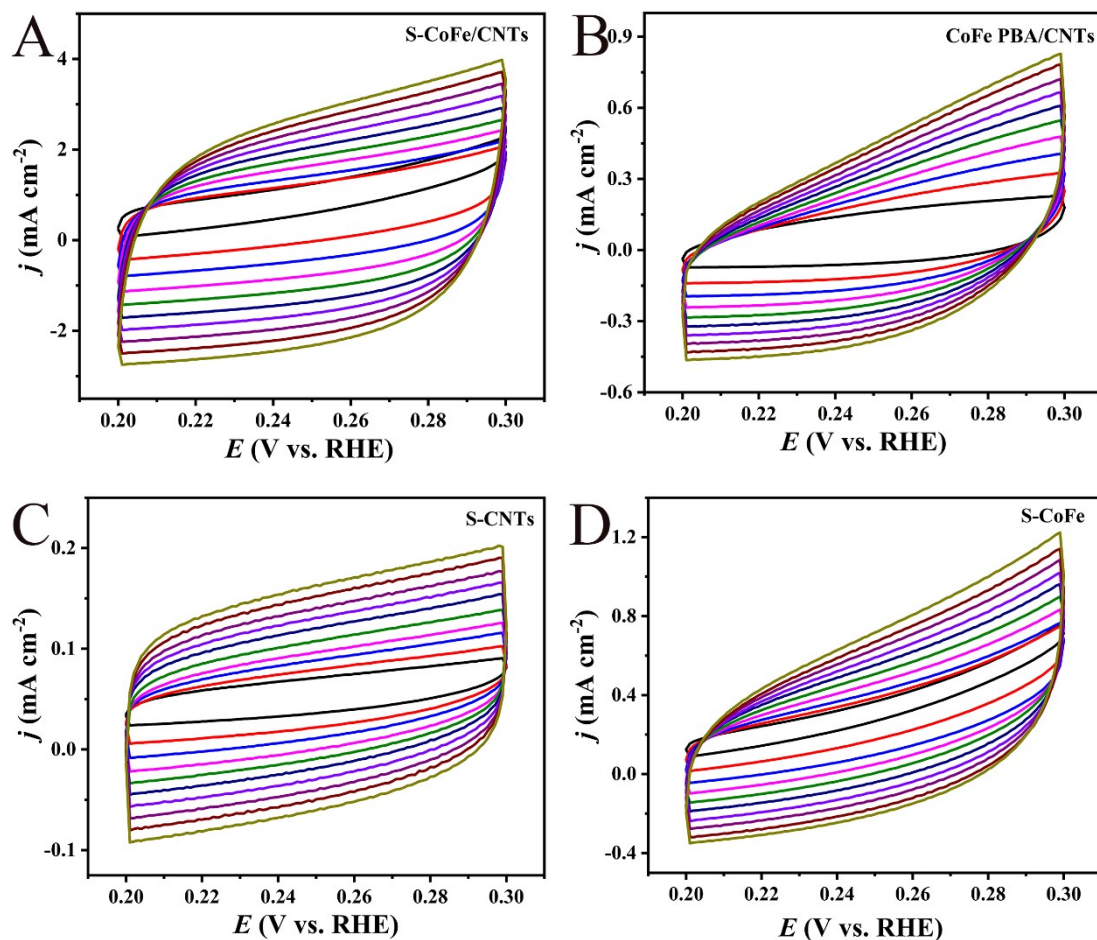
Figure S5 CV curves of the (A) S-CoFe/CNTs, (B) CoFe PBA/CNTs, (C) S-CNTs and (D) S-CoFe at different scan rates from 10 to 100mV s^{-1}.
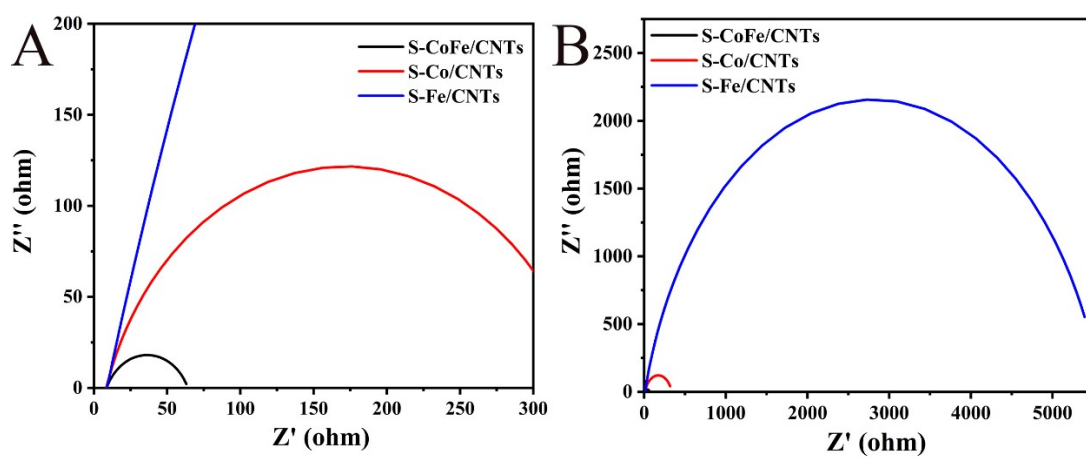

Figure S6 (A) local enlarged images of image (B); (B) Nyquist diagrams of EIS for S-CoFe/CNTs, S-Co/CNTs and S-Fe/CNTs;
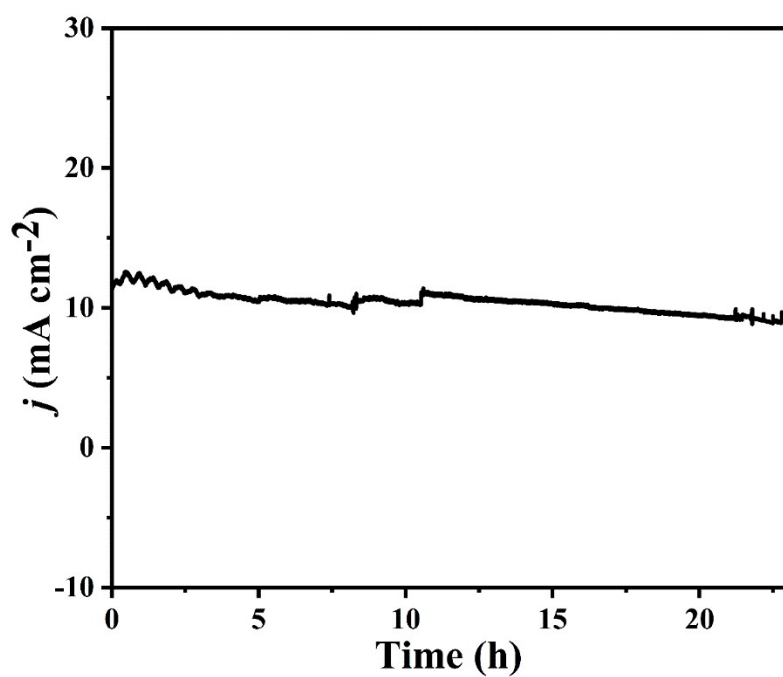
Figure S7   Amperometric i-t curve of S-CoFe/CNTs
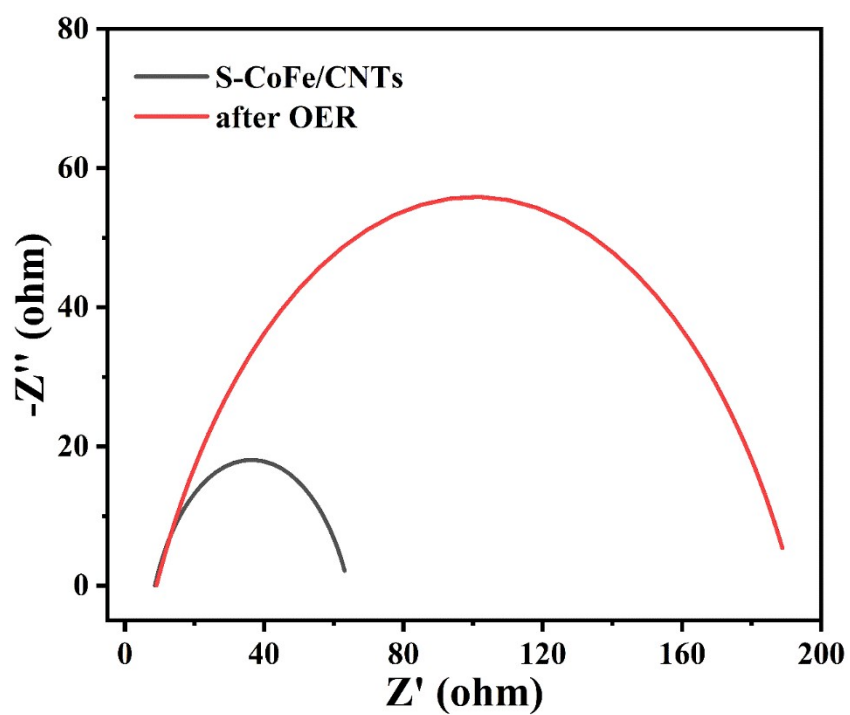

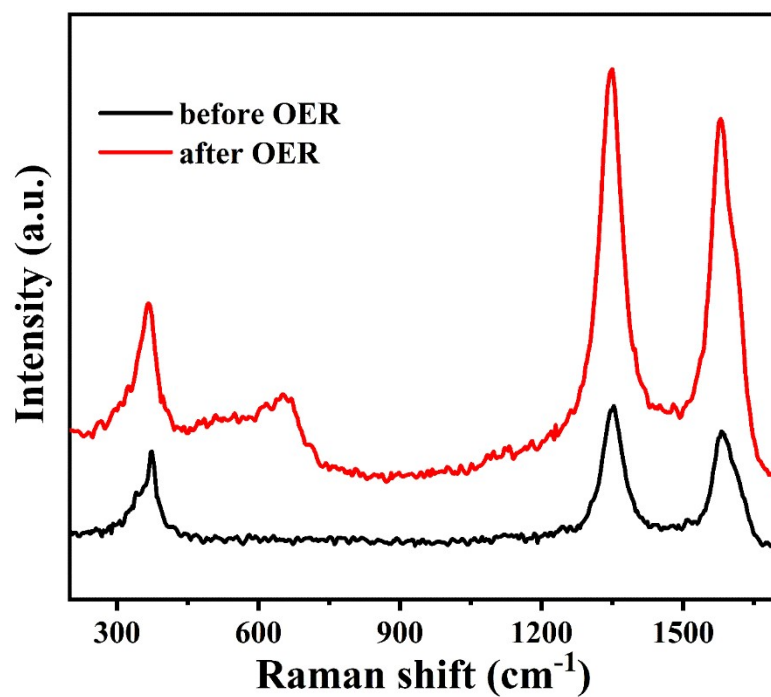**Figure S8   Nyquist diagrams of EIS for S-CoFe/CNTs before and after the OER test**

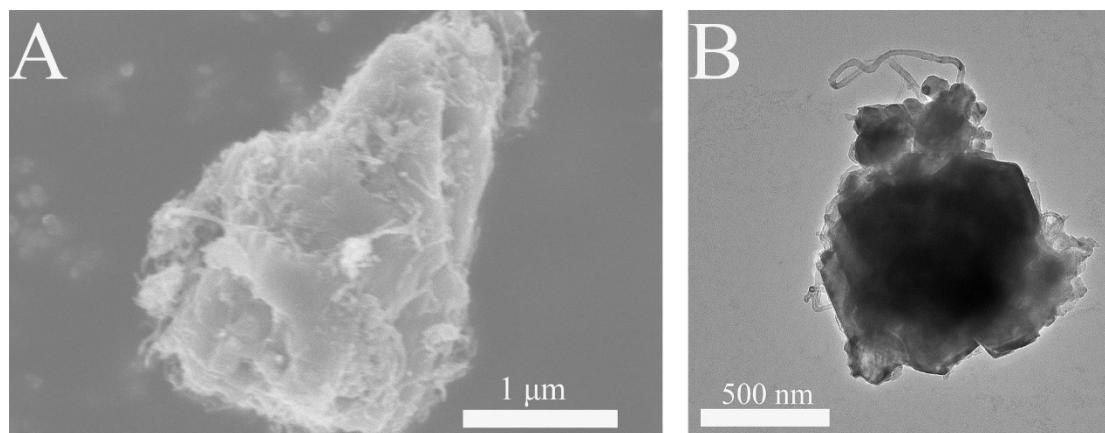**Figure S9   Raman spectra of S-CoFe/CNTs before after OER test**

Figure S10   (A) SEM image and (B) TEM image of S-CoFe/CNTs after OER test

Table S1　The comparison of other OER catalysts derived from Prussian blue analogue in alkaline medium.

Materials	Overpotential (mV) @10mA cm^{-2}	Reference
S-CoFe/CNTs	253	This work
CoFe@NC-NCNT-H	380	[1]
$CoSe_2$ NBs	335	[2]
PBA@POM	440	[3]
$NiCoO_x$-400	280	[4]
$Ni_xCo_{3-x}O_4$ /NF	287	[5]
Ni_2Fe-O	370	[6]
CoFe PBA/CoS_2 -12	301	[7]
FeCoP-400	261	[8]
$Fe_{0.5}Co_{0.5}MoO_4$-xSx	263	[9]
CoP-NPC	308	[10]
PB@Met-700	330	[11]

Table S2　The comparison of OER performance of other TMSs catalysts in alkaline medium.

Materials	Overpotential (mV) @10 mA cm^{-2}	Reference
S-CoFe/CNTs	253	This work
Cu_9S_5/NF	298	[12]
$Co_{0.25}Fe_{0.75}S_2$	270	[13]
Ni-Fe-OH/Ni_3S_2/NF	268	[14]
CNTs/N-Cu_2S-5cyc	280	[15]
Ni_3S_4/N,P-HPC	370	[16]
CuS_2 nanorods	270	[17]
CoS_2 @MXene	270	[18]
Fe/C-doped-MoS_2/Ni_3S_2-450	270	[19]

Table S3　The Integral table of Co and Fe peak area in XPS data of catalyst before and after OER test

	Before OER test		After OER test	
	2p1/2	2p3/2	2p1/2	2p3/2
Co^{2+}/Co^{3+}	4.172	4.176	0.475	0.477
Fe^{2+}/Fe^{3+}	2.705	2.701	0.538	0.531

Reference

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