Electronic Supplementary Material (ESI) for Nanoscale.

Supporting Information

Coupling amorphous cobalt hydroxide nanoflakes on $Sr_2Fe_{1.5}Mo_{0.5}O_{5+\delta}$ perovskite nanofibers to induce bifunctionality for water splitting

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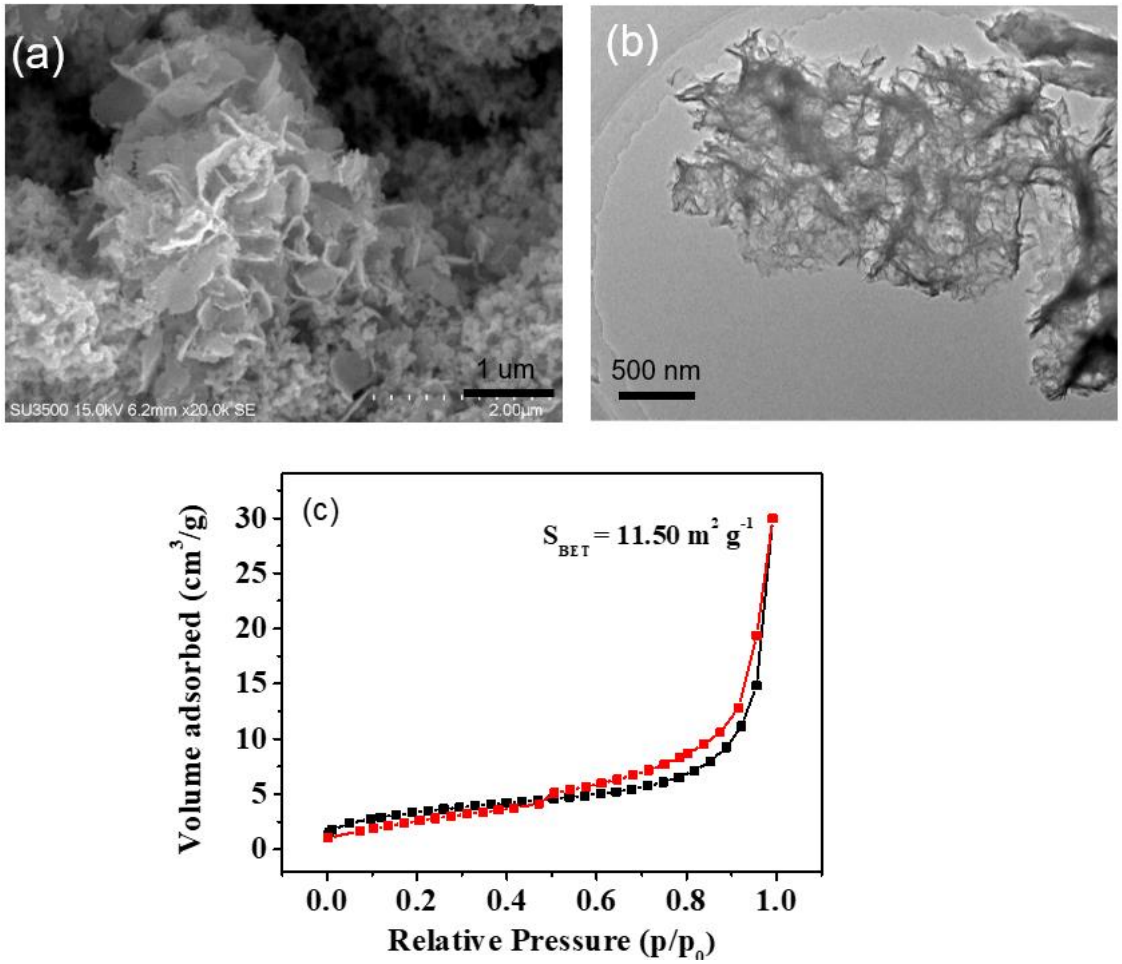

Figure S1. (a) SEM and (b) TEM images of $Co(OH)_2$, (c) N_2 adsorption-desorption isotherm of $Co(OH)_2$.

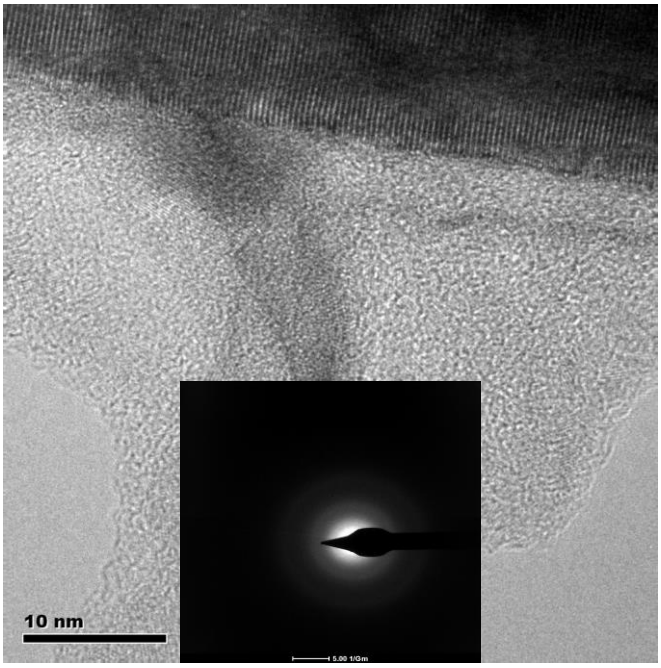

Figure S2. TEM images of $Co(OH)_2$/SFM-NF sample (inset showing the corresponding SAED pattern).

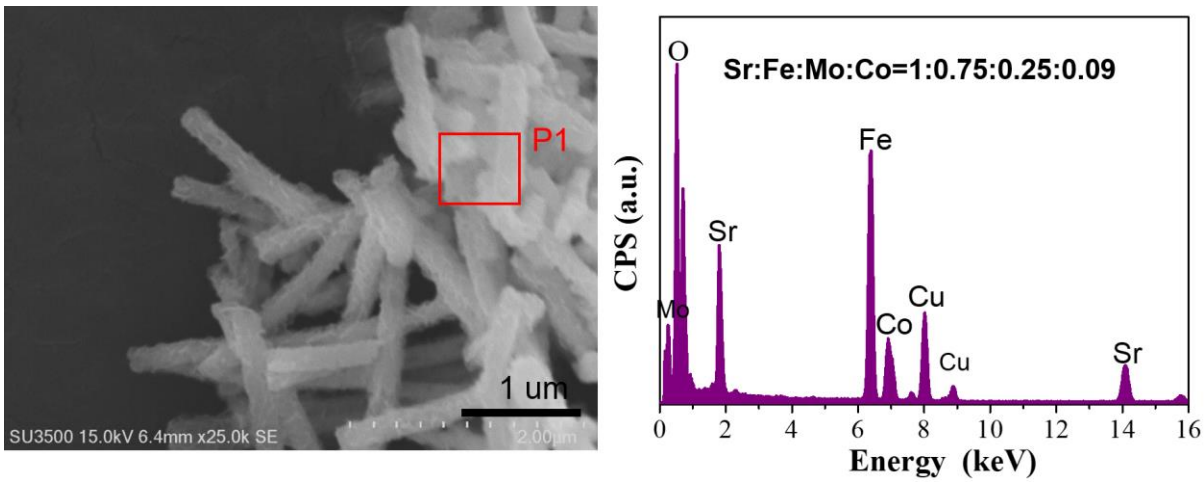

Figure S3. EDS spectrum of $Co(OH)_2$/SFM-NF sample measured at position P1.

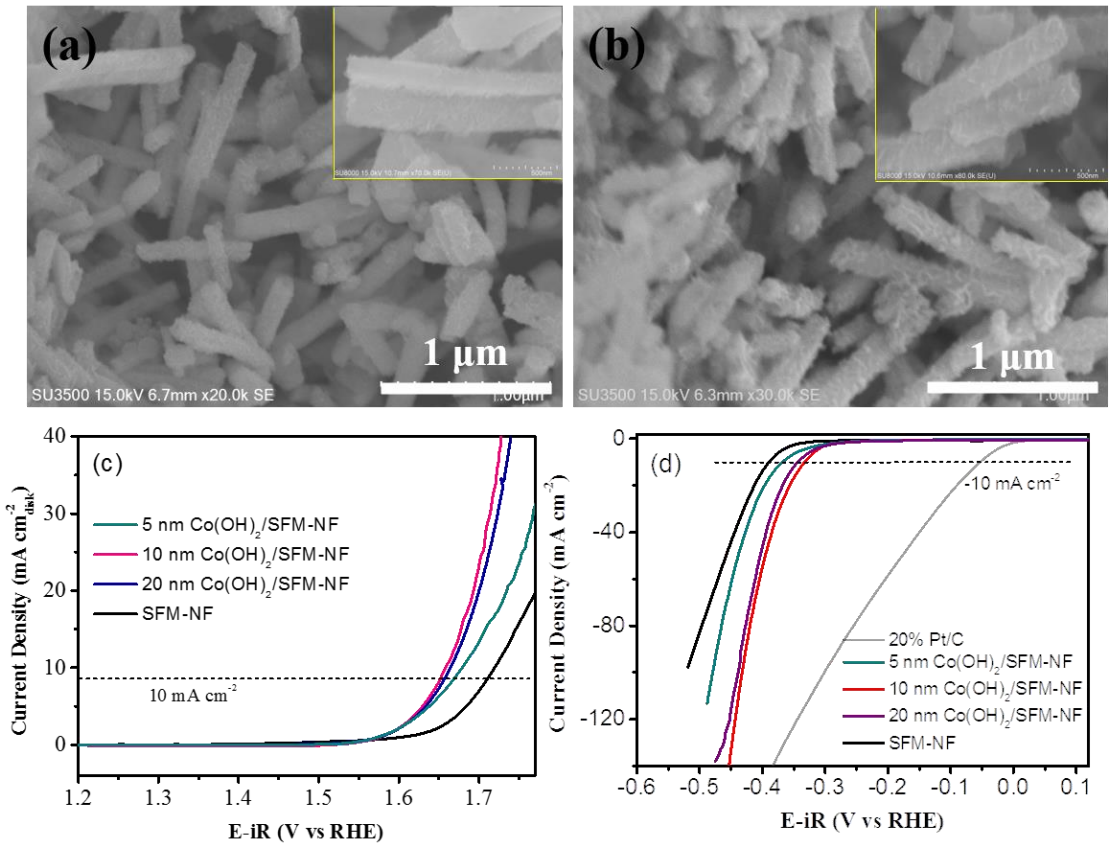

Figure S4. SEM images of (a) 5 nm $Co(OH)_2$/SFM-NF and (b) 20 nm $Co(OH)_2$/SFM-NF; LSV curves of as-prepared samples for (c) OER and (d) HER .

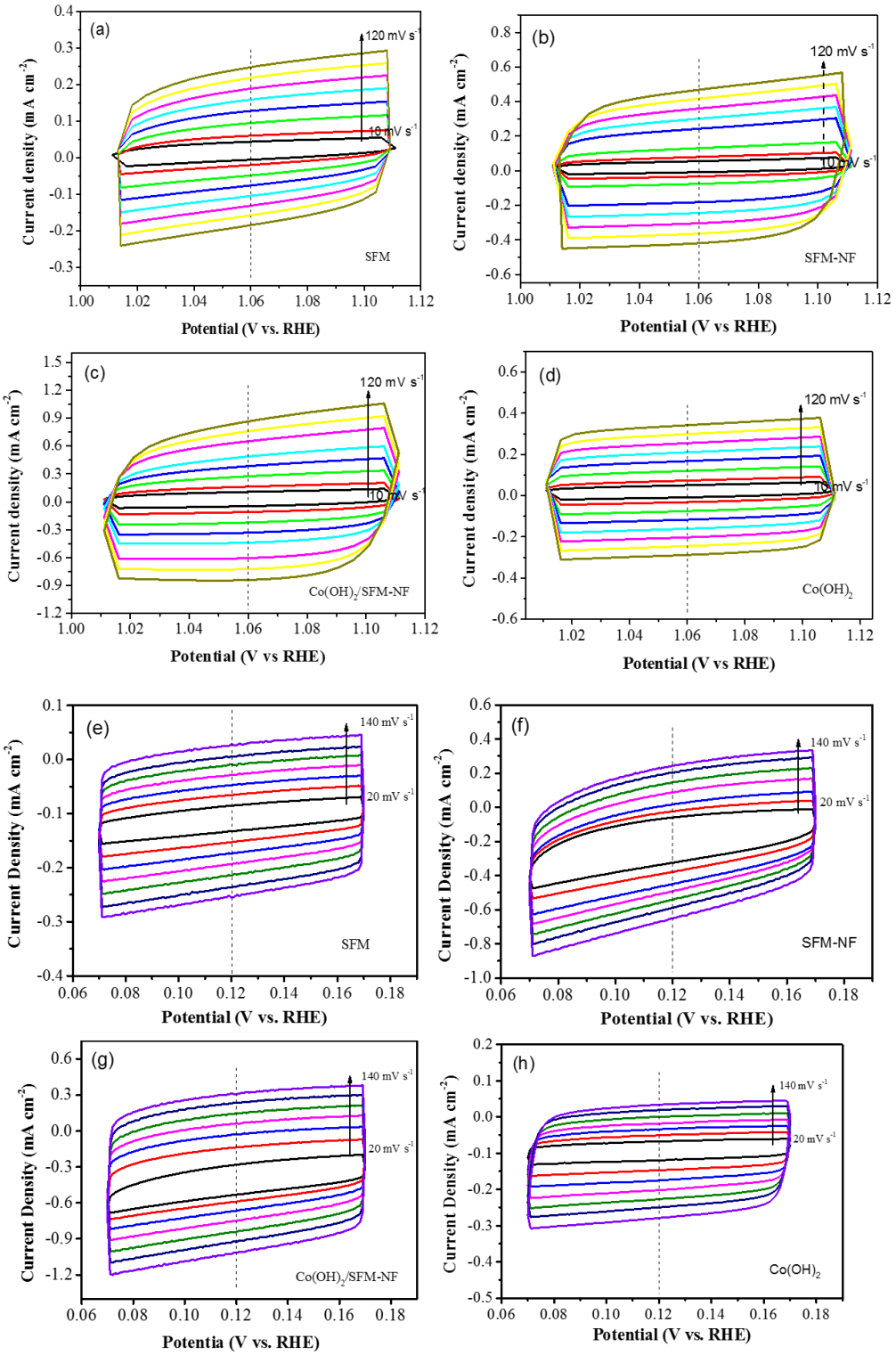

Figure S5. CV curves of (a) SFM, (b) SFM-NF, (c) $Co(OH)_2$/SFM-NF, (d) $Co(OH)_2$ measured with different scan rates of 10, 20, 40, 60, 80, 100, 120, and 140 mV s^{-1} with a potential of 1.01-1.11 V vs. RHE; CV curves of (e) SFM, (f) SFM-NF, (g) $Co(OH)_2$/SFM-NF and (h) $Co(OH)_2$ measured with a potential of 0.07-0.17 V. vs. RHE.

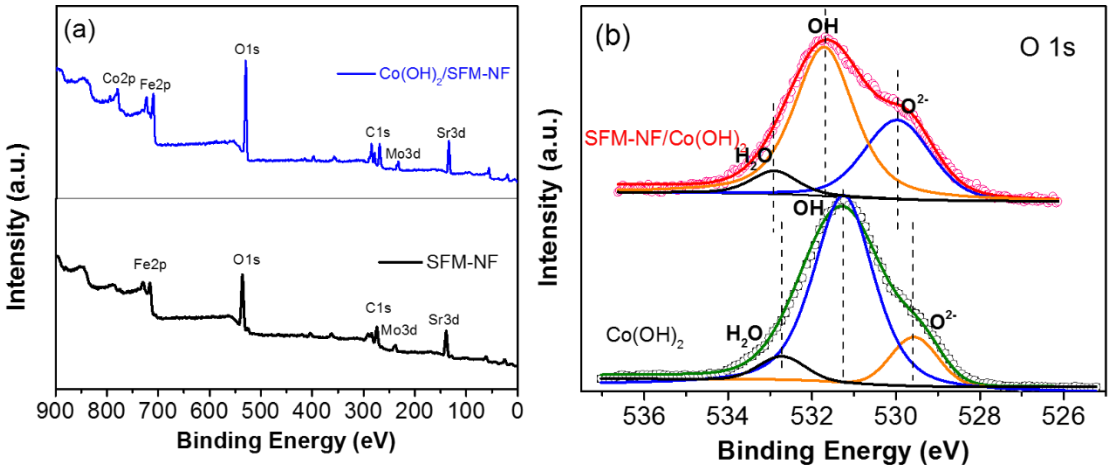

Figure S6. (a) Full XPS spectrum of SFM-NF and $Co(OH)_2$/SFM-NF samples, (b) High resolution XPS spectra of O 1s of $Co(OH)_2$ and $Co(OH)_2$/SFM-NF samples.

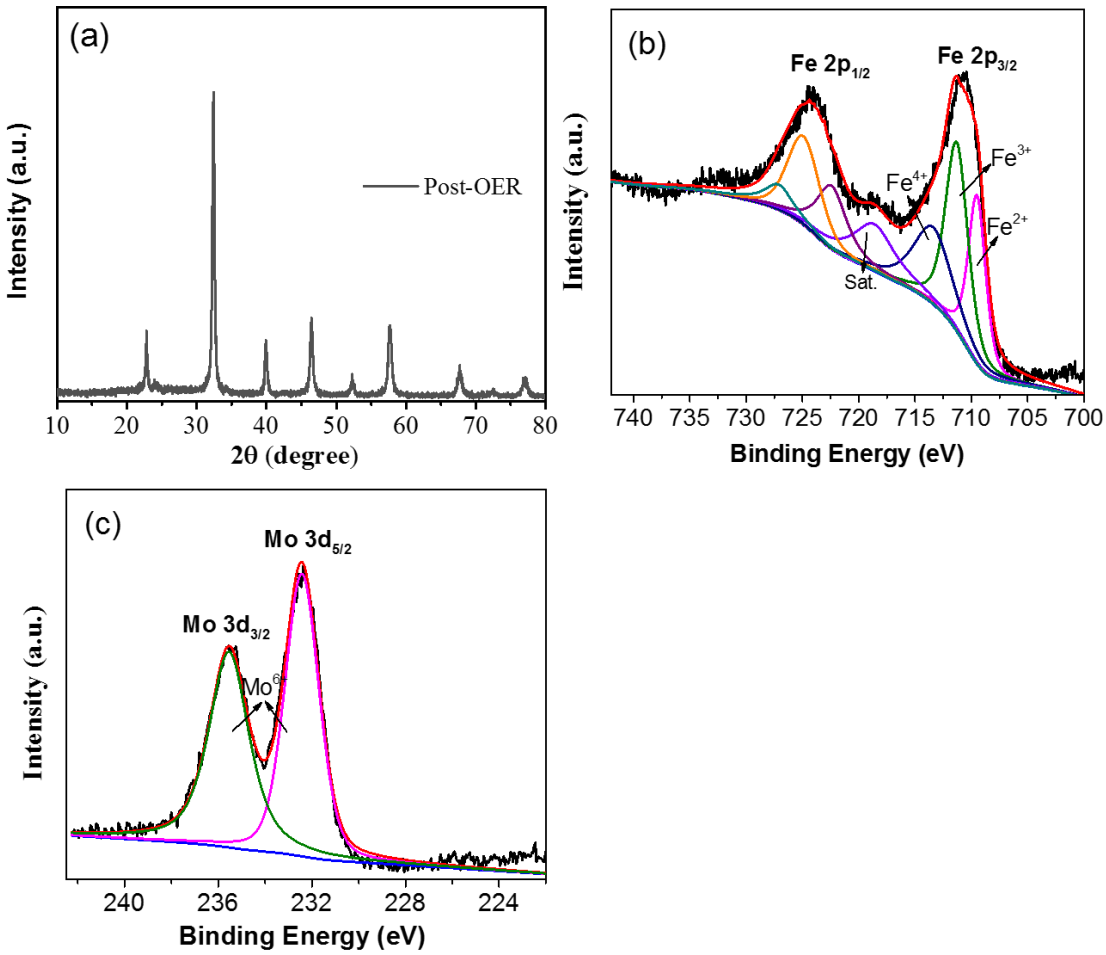

Figure S7. (a) XRD pattern of $Co(OH)_2$/SFM-NF electrode after OER durability test; XPS spectra of (b) Fe 2p and (c) Mo 3d for $Co(OH)_2$/SFM-NF after OER test.

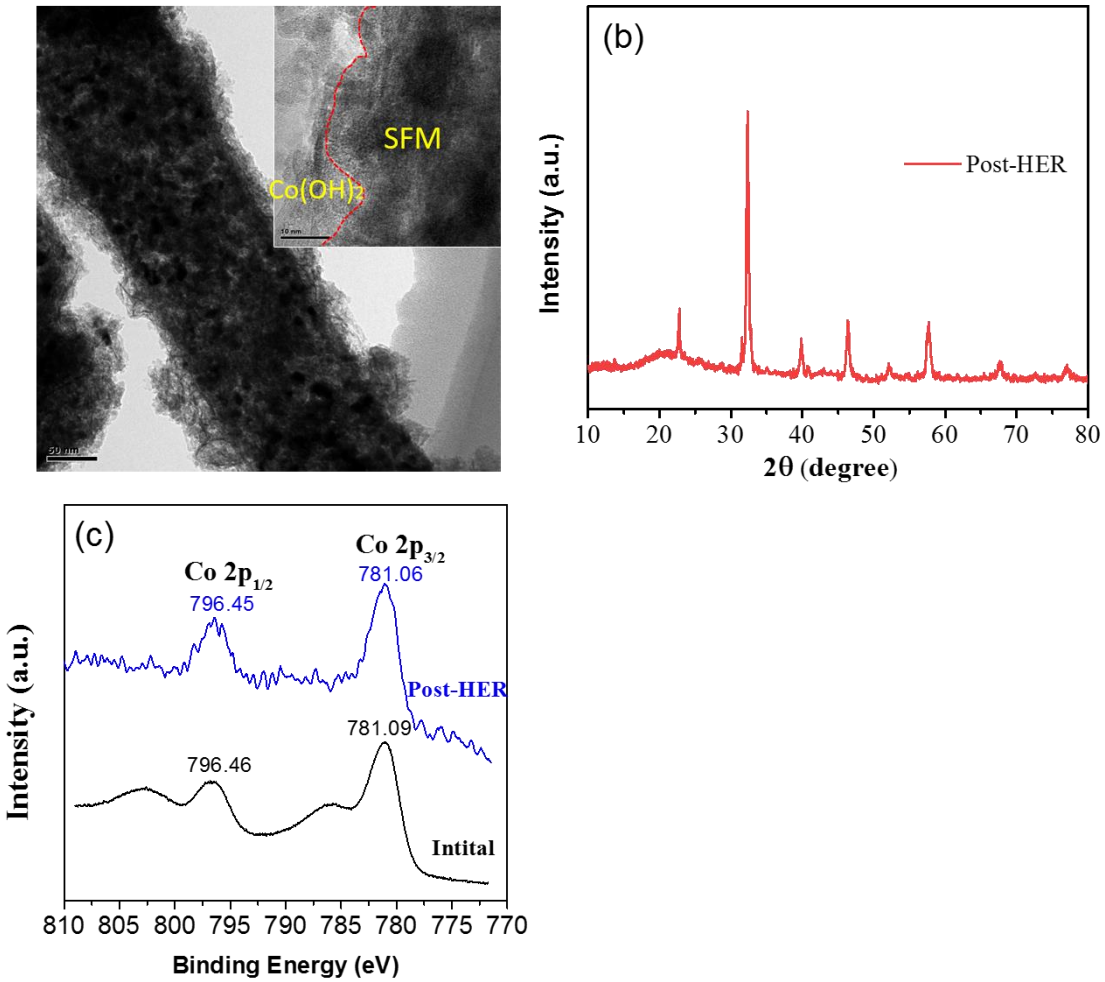

Figure S8. (a) TEM images of $Co(OH)_2$/SFM-NF electrode after HER durability test, (b) XRD pattern of $Co(OH)_2$/SFM-NF electrode after HER durability test, (c) XPS spectra of Co 2p for $Co(OH)_2$/SFM-NF before and after HER test.

Table S1. Survey of overall water splitting stability with current density and cell voltage of representative bifunctional electrocatalysts in 1 M KOH electrolytes.

Catalyst	Current density ($10\ mA\ cm^{-2}$)	Cell voltage (V)	Stability (h)	Reference
Pt(-)/IrO_2(+)	10	1.58	30	This work
$Co(OH)_2$/SFM-NF	10	1.60	68	This work
A-PBSCF-H	10	1.62	12	[1]
$SrNb_{0.1}Co_{0.7}Fe_{0.2}O_{3-\delta}$-NR	10	1.68	30	[2]
NiFe LDHs	10	1.70	10	[3]
$NiCo_2O_4$	10	1.65	20	[4]
NiFe/$NiCo_2O_4$	10	1.67	10	[5]
$NiCo_2S_4$	10	1.63	50	[6]
$NdBaMnO_{5+\delta}$	10	1.67	30	[7]
3DOM-LFC	10	1.75	12	[8]
$La_{0.5}Ba_{0.25}Sr_{0.25}CoO_{2.9-\delta}F_{0.1}$	10	1.66	13.3	[9]
$CoNi(OH)_x$	10	1.67	10	[10]
CoMoV LDH	10	1.61	20	[11]
$Co(OH)_2$ -NA	10	1.64	20	[12]
$Co_{0.75}Ni_{0.25}(OH)_2$ nanosheet	10	1.57	15	[13]
$Co_{0.9}Fe_{0.1}(OH)_x$-NF	10	1.62	30	[14]
$Na_{0.08}Ni_{0.9}Fe_{0.1}O_2$	16	1.60	12	[15]
$Co(OH)_2$@Ni	10	1.64	20	[16]
$Co(OH)_2$/Ag/FeP	10	1.56	50	[17]

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