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Supporting Information

Multi-interfacial FeOOH@$NiCo_2O_4$ heterojunction as a highly efficient bifunctional electrocatalyst for overall water splitting

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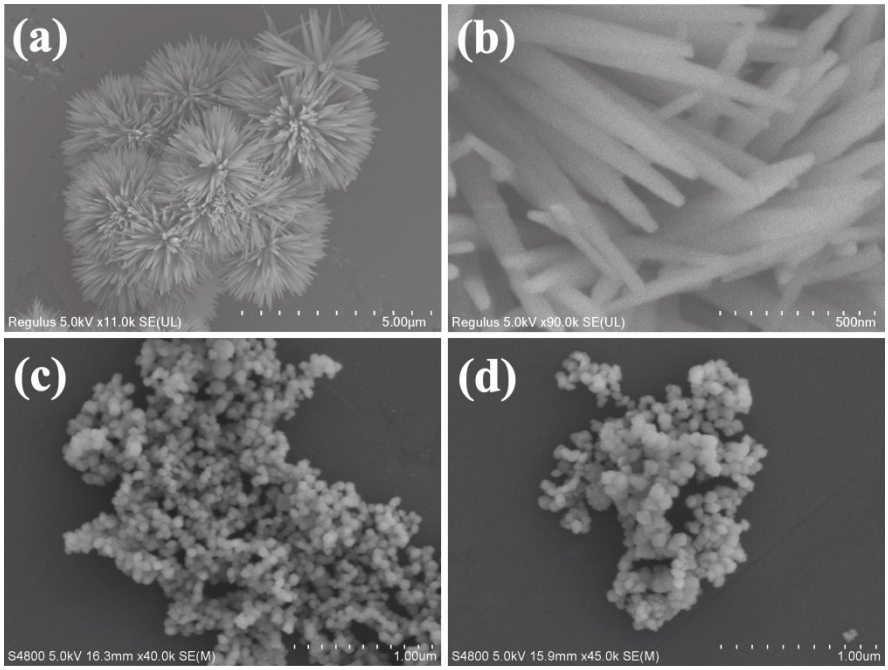

Fig. S1. (a, b) Low and high magnification SEM images of pure $NiCo_2O_4$. (c, d) Low and high magnification SEM images of pure FeOOH.

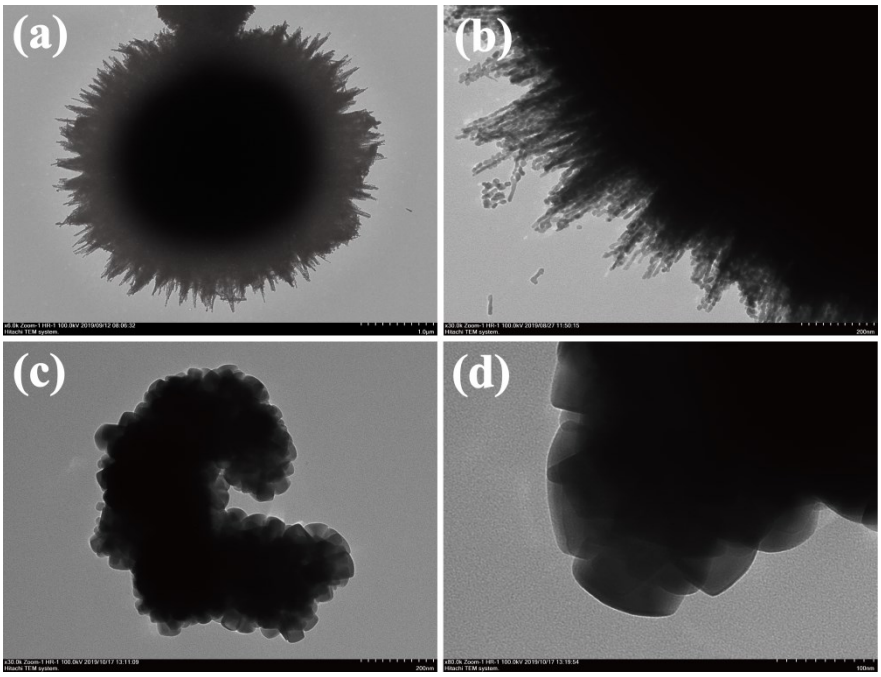

Fig. S2. (a, b) Low and high magnification TEM images of pure $NiCo_2O_4$. (c, d) Low and high magnification TEM images of pure FeOOH.

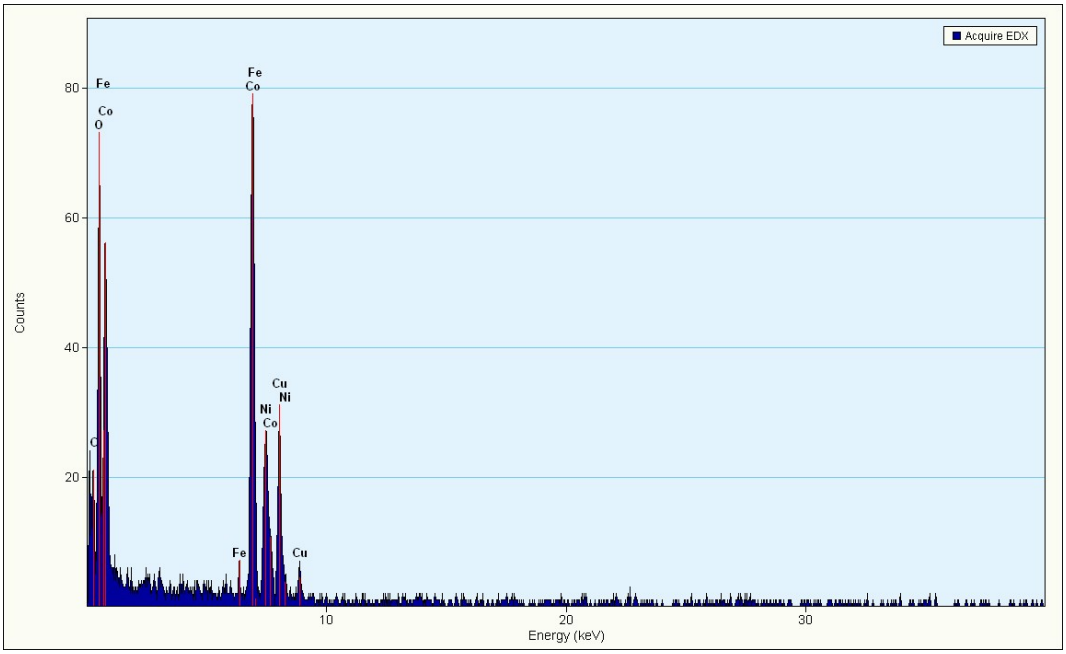

Fig. S3. EDX spectrum of FeOOH@$NiCo_2O_4$.

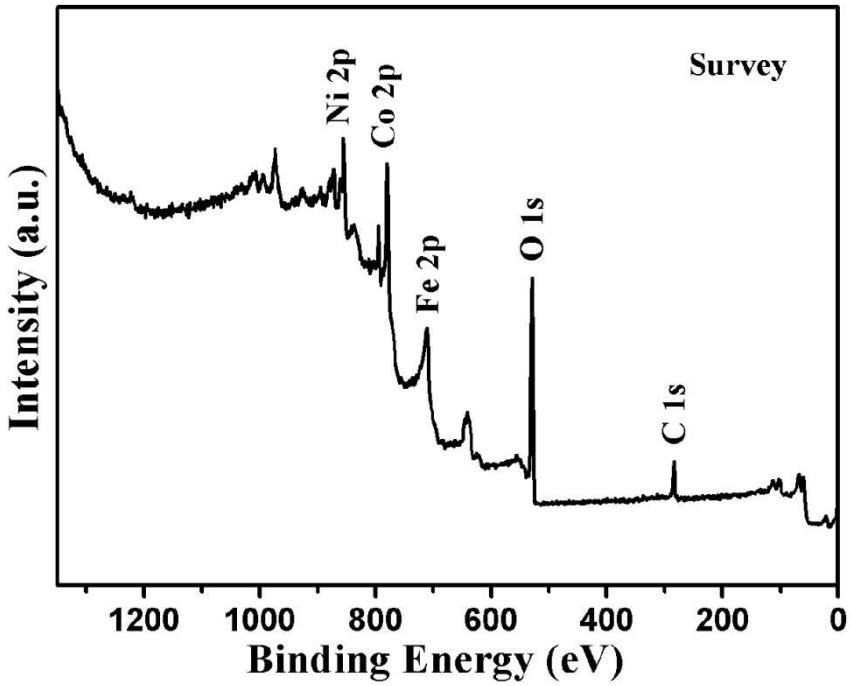

Fig. S4. Elements XPS survey.

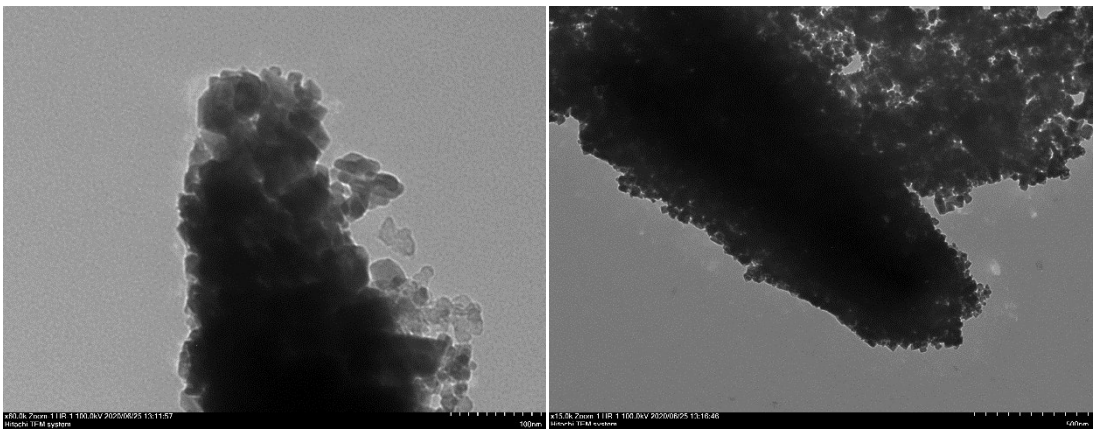

Fig. S5. TEM images of $FeOOH@NiCo_2O_4$ after test.

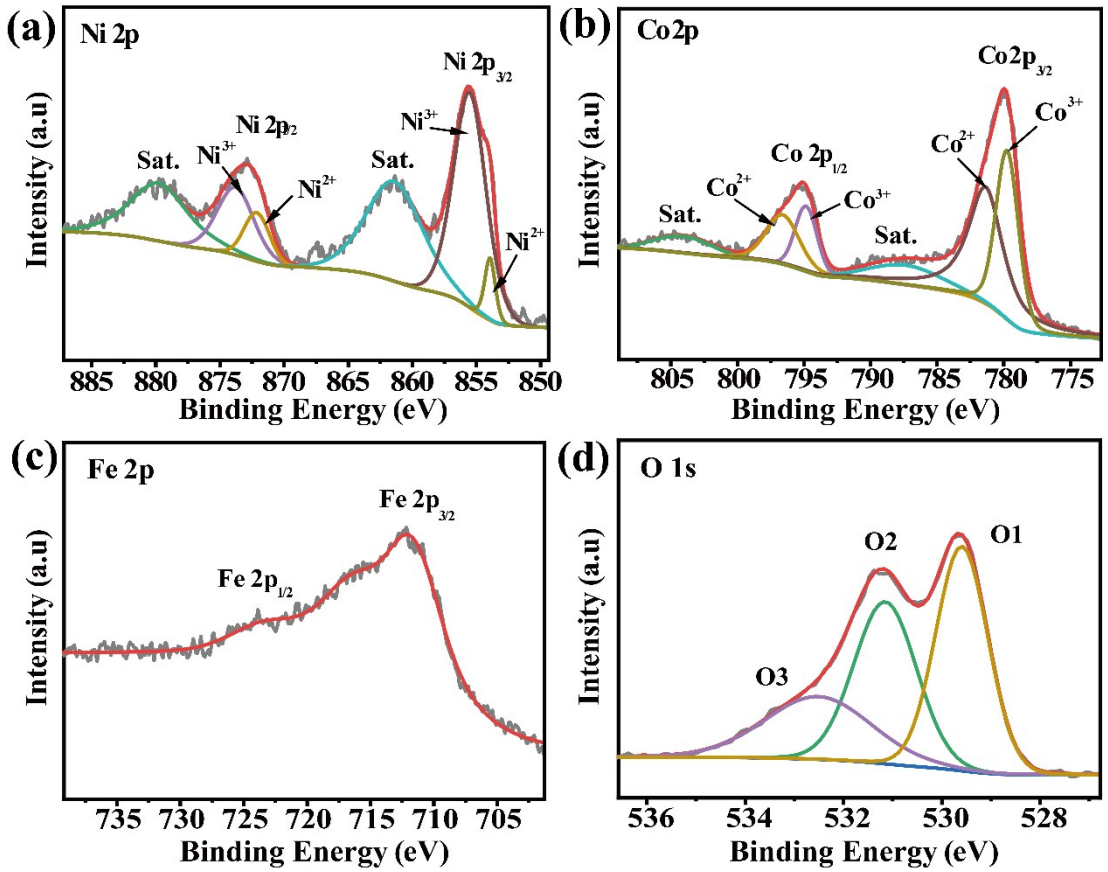

Fig. S6. The XPS spectra of FeOOH/$NiCo_2O_4$ after the test: (a) Ni 2p, (b) Co 2p, (c) Fe 2p and (d) O 1s.

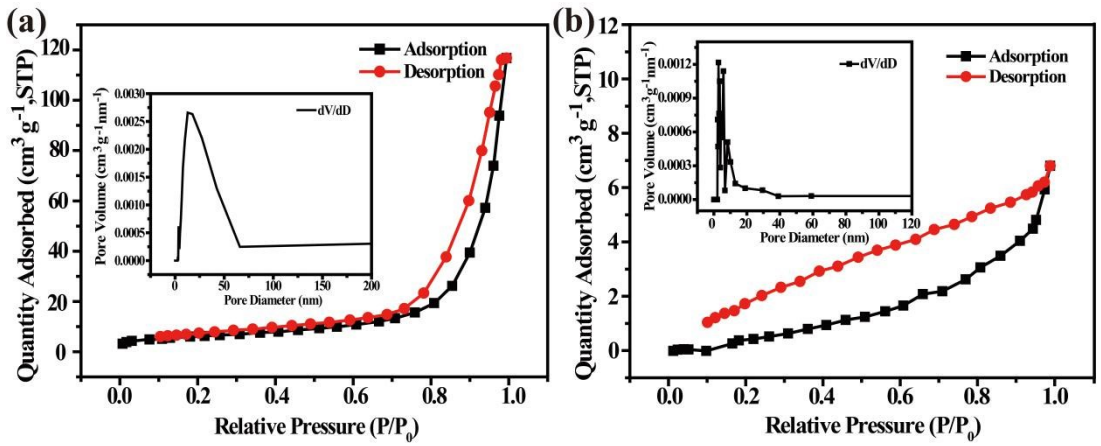

Fig. S7. The $NiCo_2O_4$ (a) and FeOOH (b) N_2 adsorption-desorption isotherms and pore size distribution curves.

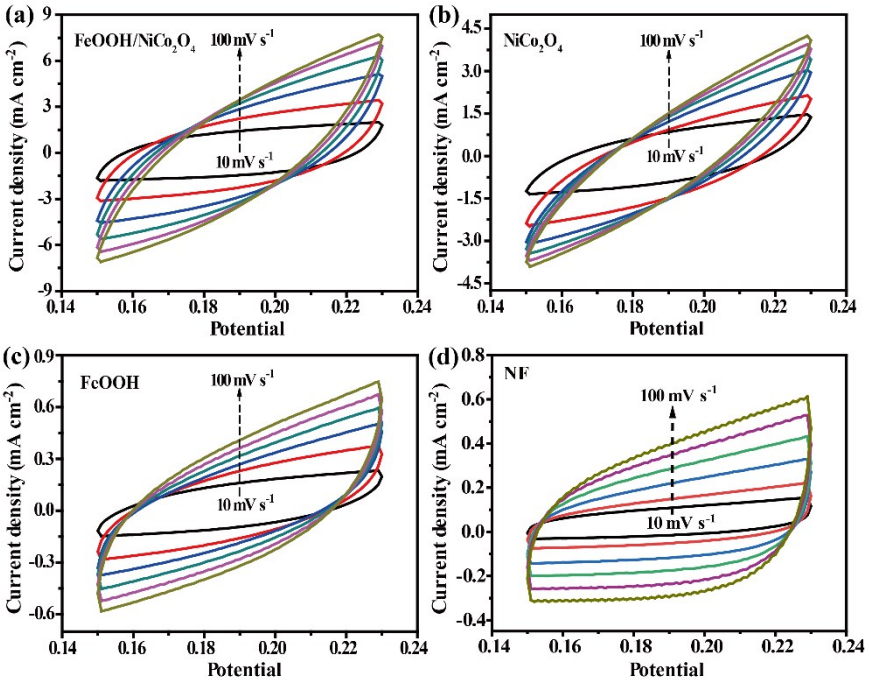

Fig. S8. CV curves for OER in 1.0 M KOH at scan rate of 10 mV/s, 20 mV/s, 40 mV/s, 60 mV/s, 80 mV/s and 100 mV/s. (a) FeOOH@$NiCo_2O_4$, (b) $NiCo_2O_4$, (c) FeOOH and (d) NF.

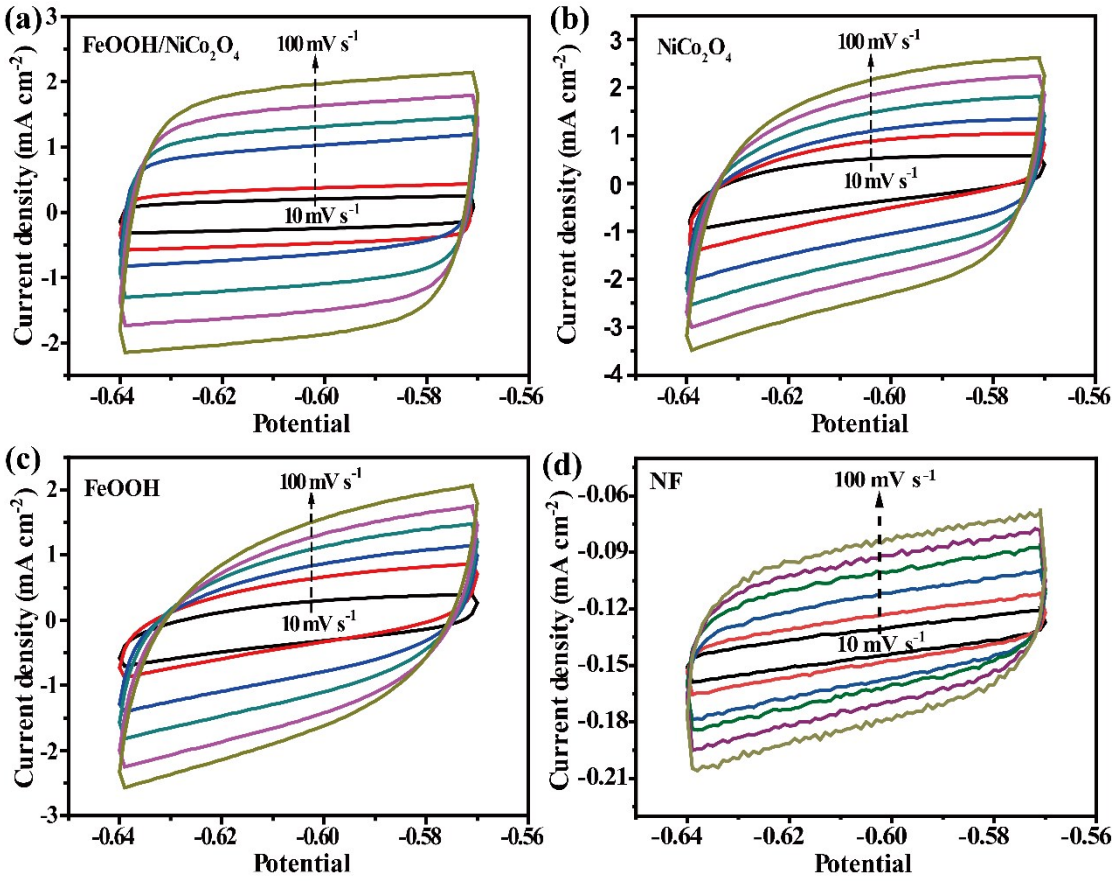

Fig. S9. CV curves for HER in 1.0 M KOH at scan rate of 10 mV/s, 20 mV/s, 40 mV/s, 60 mV/s, 80 mV/s and 100 mV/s. (a) FeOOH@$NiCo_2O_4$, (b) $NiCo_2O_4$, (c) FeOOH and (d) NF.

Table S1. Comparison of the overpotential of FeOOH/$NiCo_2O_4$ in 1.0 M KOH with other iron-, cobalt- and nickel-based bifunctional catalysts.

Catalysts	**Electrolyte**	**Overpotential at j=10mA cm^{-2} (mV)**		**Tafel (mV dec^{-1})**		**Overall Water Splitting (V)**	**Ref.**
		OER	**HER**	**OER**	**HER**		
FeOOH/$NiCo_2O_4$	1.0 M KOH	203	146	21.9	41.3	1.58	This Work

$Ni_{0.9}Fe_{0.1}$/NC	1.0 M KOH	330	231	45	111	1.58	1
FeOOH/NiFe LDHs-NF	1.0 M KOH	208	\	42	\	\	2
Fe-Ni_3S_2/NF	1.0 M KOH	214	47	42	95	1.54	3
$Co(OH)_2/Co_3O_4$	1.0 M KOH	281	\	52.7	\	\	4
CoFe LDH-F	1.0 M KOH	300	255	40	95	1.63	5
NiFe/$NiCo_2O_4$/NF	1.0 M KOH	260	110	38.8	88	1.67	6
CoS-$Co(OH)_2$@aMoS_{2+x}/NF	1.0 M KOH	380	143	68	68	1.58	7
Ni-Fe-P/NF_{30}	1.0 M KOH	229	72	\	74.5	1.58	8
NiCoFe-LDH/CFC	1.0 M KOH	210	133	59	89	1.59	9
$NiCo_2S_4$ NW	1.0 M KOH	260	210	40.1	58.9	1.63	10
Ni–Co–P	1.0 M KOH	255	107	29.1	86	1.62	11
Co-Fe oxyphosphide	1.0 M KOH	280	180	53	62	1.69	12
NiFe HNSs	1.0 M KOH	220	189	40.7	87.2	1.67	13

Reference

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