Supplementary Information

Hydrochloric acid corrosion induced bifunctional free-standing NiFe hydroxide nanosheets towards high-performance alkaline seawater splitting

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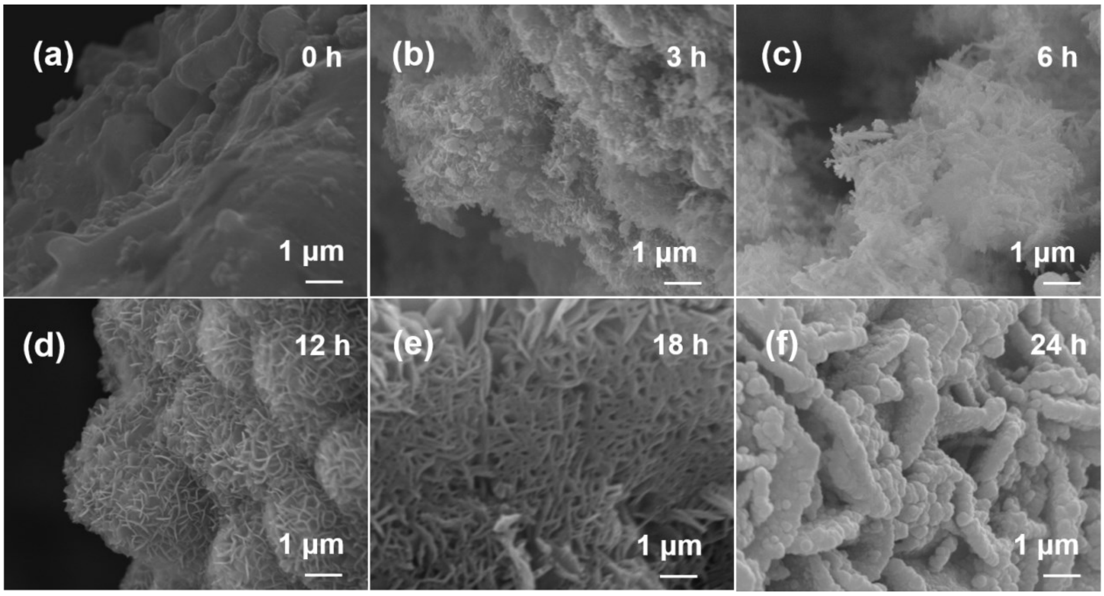

Fig. S1 SEM images of HCl-c-NiFe (a-f) with different corrosion time from 0 to 24 h.

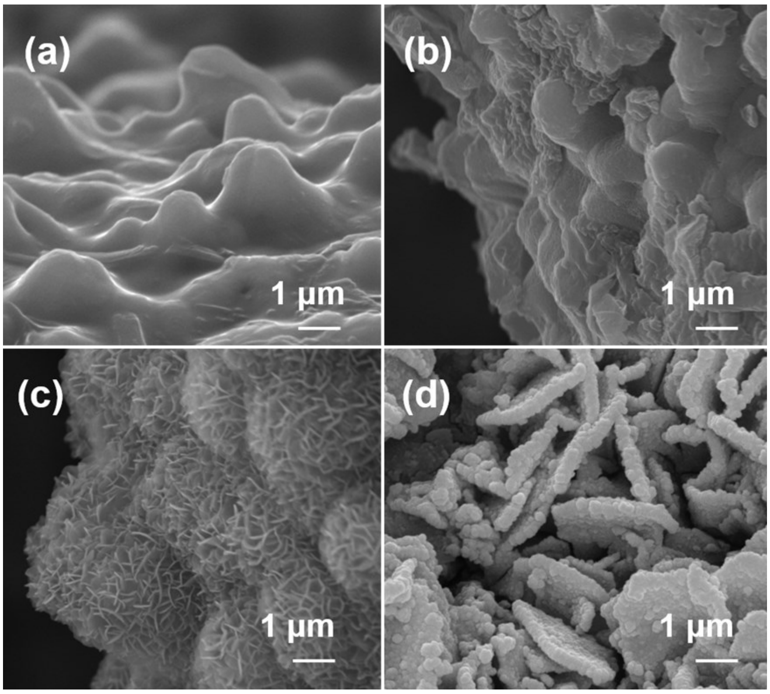

Fig. S2 SEM images of HCl-c-NiFe with different HCl concentrations at (a) 0, (b) 0.05 mM, (c) 0.1 mM and (d) 0.2 mM.

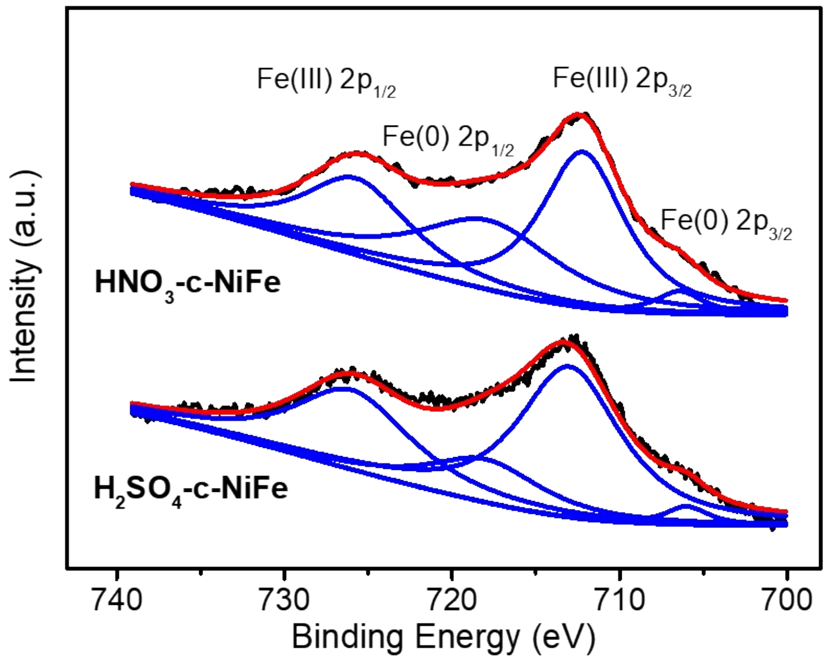

Fig. S3 High-revolution Fe 2p XPS spectra for HNO_3-c-NiFe and H_2SO_4-c-NiFe.

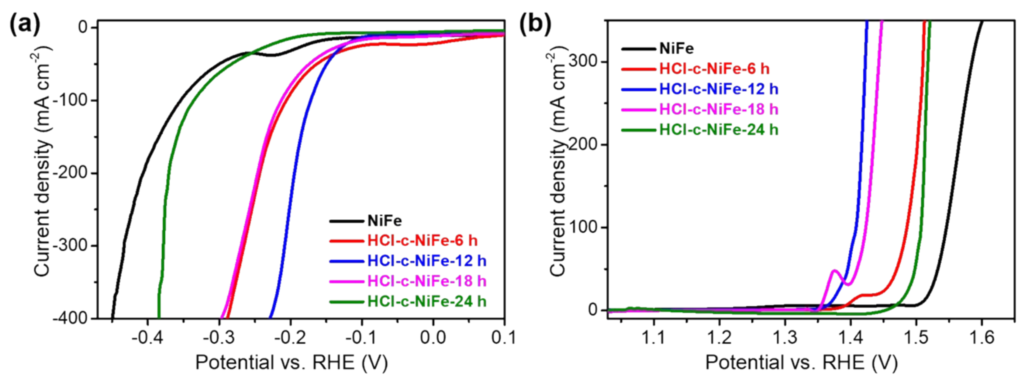

Fig. S4 (a) HER and (b) OER polarization curves of HCl-c-NiFe with different corrosion time in 1.0 M KOH.

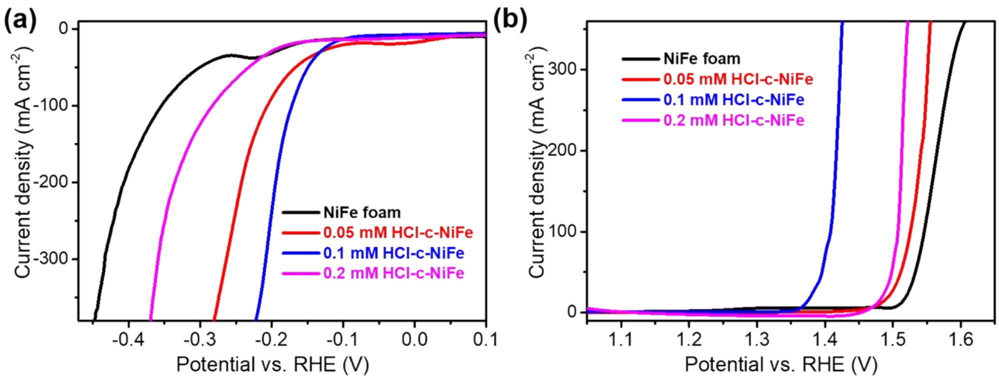

Fig. S5 (a) HER and (b) OER polarization curves of HCl-c-NiFe with different HCl concentrations in 1.0 M KOH electrolyte.

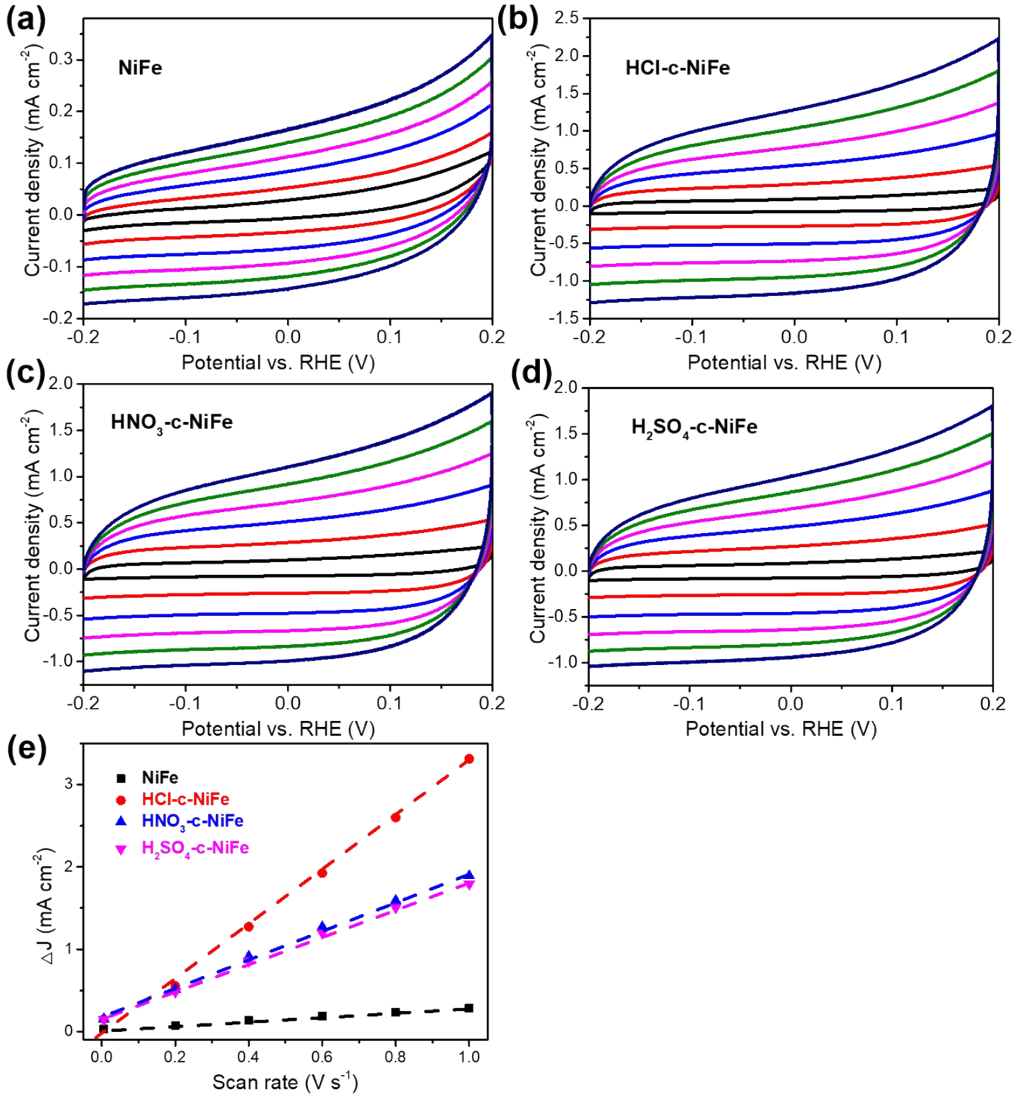

Fig. S6 CV curves of (a) NiFe, (b) HCl-c-NiFe, (c) HNO_3-c-NiFe, (d) H_2SO_4-c-NiFe with different scan rates. (e) Relationship between scan rate and *ΔJ* of the studied catalysts.

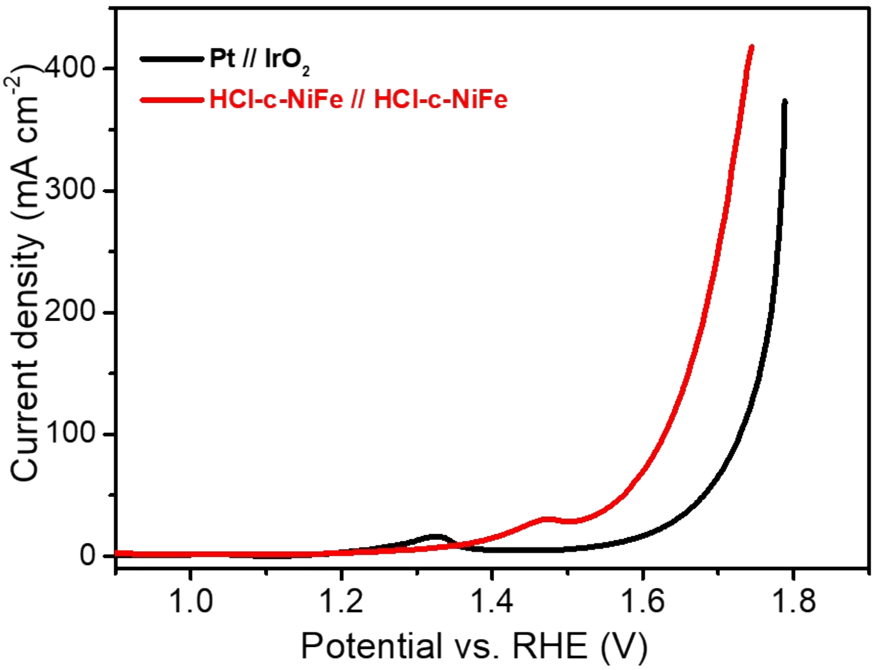

Fig. S7 The overall water splitting curves for HCl-c-NiFe and Pt//IrO_2 in 1.0 M KOH electrolyte.

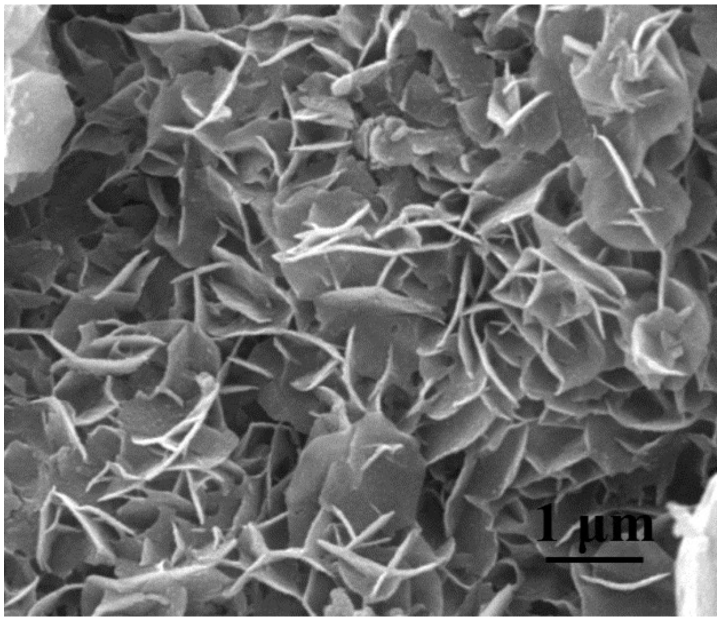

Fig. S8 SEM image of HCl-c-NiFe after 1000 h long-term measurement in 1.0 M KOH electrolyte.

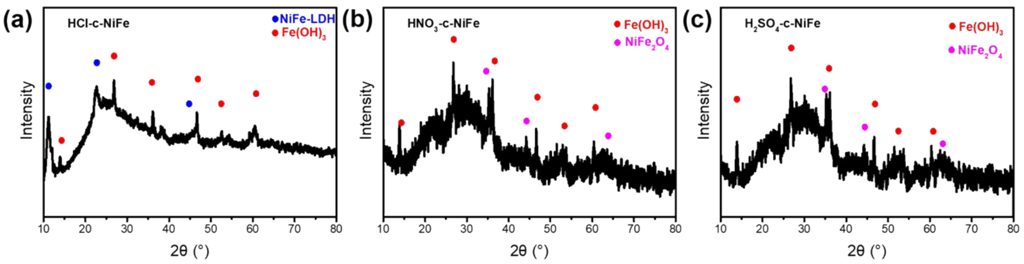

Fig. S9 XRD patterns of (a) HCl-c-NiFe, (b) HNO_3-c-NiFe and (c) H_2SO_4-c-NiFe after 1000 h long-term stability test in 1.0 M KOH electrolyte.

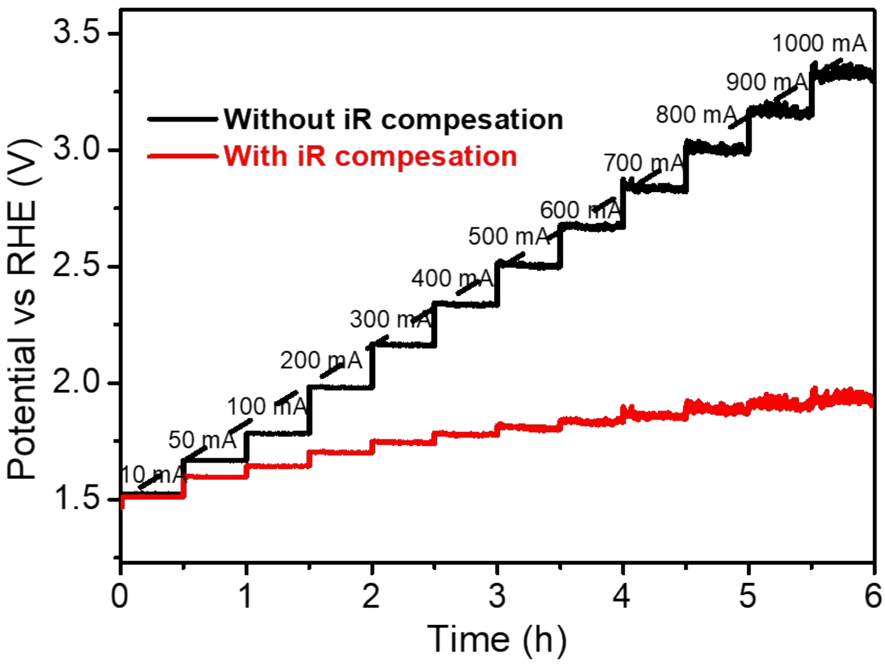

Fig. S10 The chronopotentiometry curve under different current density from 10-1000 mA cm^{-2}.

Table S1. Elemental contents of the studied NiFe foams before and after 1000 h long-term stability tests in 1.0 M KOH electrolyte.

	Ni(At%)	Fe(At%)	Ni/Fe ratio
NiFe foam	7.14	1.94	3.68
HCl-c-NiFe	3.03	5.63	0.538
HNO_3-c-NiFe	0.53	9.67	0.055
H_2SO_4-c-NiFe	0.19	7.67	0.025
NiFe foam after test	6.99	1.03	7.20
HCl-c-NiFe after test	2.86	5.31	0.539
HNO_3-c-NiFe after test	0.67	8.54	0.079
H_2SO_4-c-NiFe after test	0.18	5.97	0.030

Table S2 Electrocatalytical performance comparison of the reported bifunctional catalysts in 1.0 M KOH electrolyte.

Electrode materials	OER overpotential (mV at 100 mA/cm^2)	HER overpotential (mV at 100 mA/cm^2)	Reference
NiCo-LDH@Ni foam	390	355	[1]
Cu-NiFe LDH@Cu foam	281	143	[2]
$NiCo_2S_4$@NiFe LDH@Ni foam	220	140	[3]
CoFe-NiFe LDH@Ni foam	240	350	[4]
Cu3P-NiFe LDH@Cu mesh	280	370	[5]
NiFe LDH-Ni_3S_2@Ni foam	240	300	[6]
HCl-c-NiFe foam	175	175	This work

Table S3 Stability comparison of the reported seawater electrolysis catalysts towards seawater splitting.

Electrode materials	Electrolyte	Stable operation time (h)	Reference
NiMoN@NiFeN	1.0 M KOH + 0.5 M NaCl	100	[7]
NiFe-NiS/Ni foam	1.0 M KOH + seawater	1000	[8]
NiCoP nanoarray	0.1 M KOH + 0.5 M NaCl	20	[9]
Porous Carbon	N_2-saturated seawater	50	[10]
PtM	seawater	12	[11]
NiFe LDH	0.3 M borate buffer + 0.5 M NaCl	1	[12]
HCl-c-NiFe	1.0 M KOH + 0.5 M NaCl	300	This work

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