Support information

Electrochemical tuning of Cu_3P/Ni_2P hybrid towards promoted hydrogen evolution reaction

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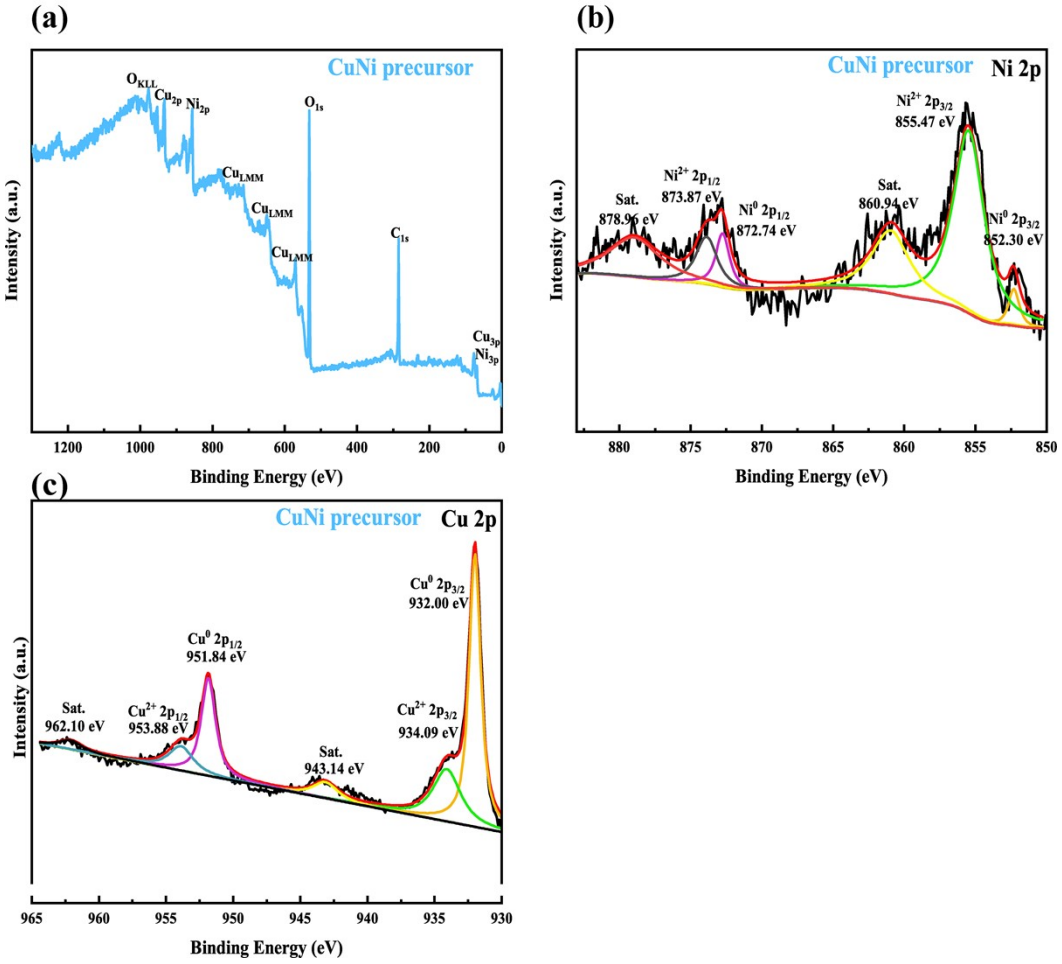

Figure S1. XPS spectra of NiCu precursor: (a) Survey spectrum, (b) Ni 2*p*, (c) Cu 2*p* and (d) P 2*p*.

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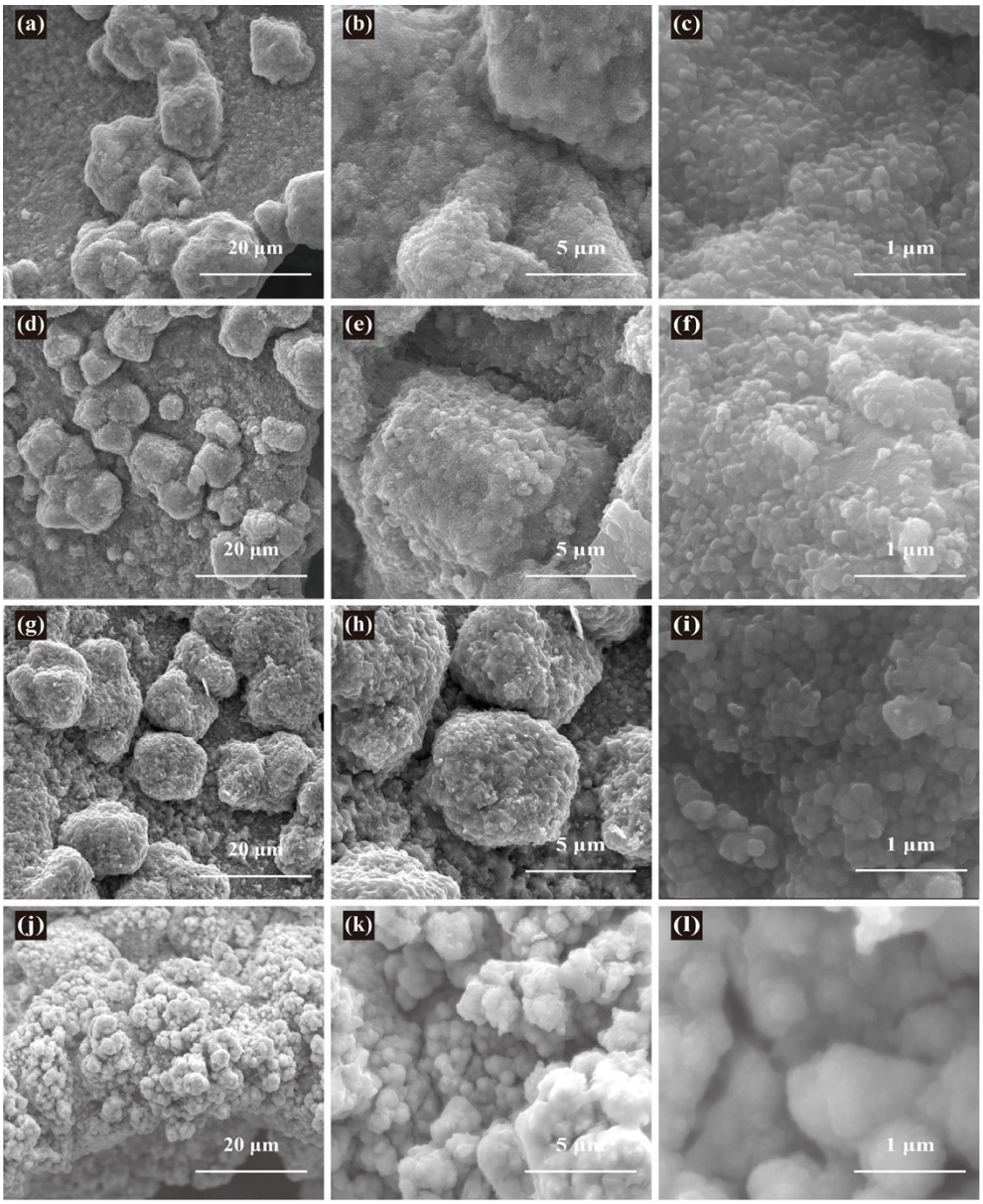

Figure S2. SEM images for Cu_3P/Ni_2P@NF modified by different CV scans in 0.5 M H_2SO_4: (a-c) Cu_3P/Ni_2P@NF-1c, (d-f) Cu_3P/Ni_2P@NF-2c, (g-i) Cu_3P/Ni_2P@NF-3c and (j-l) Cu_3P/Ni_2P@NF-5c.

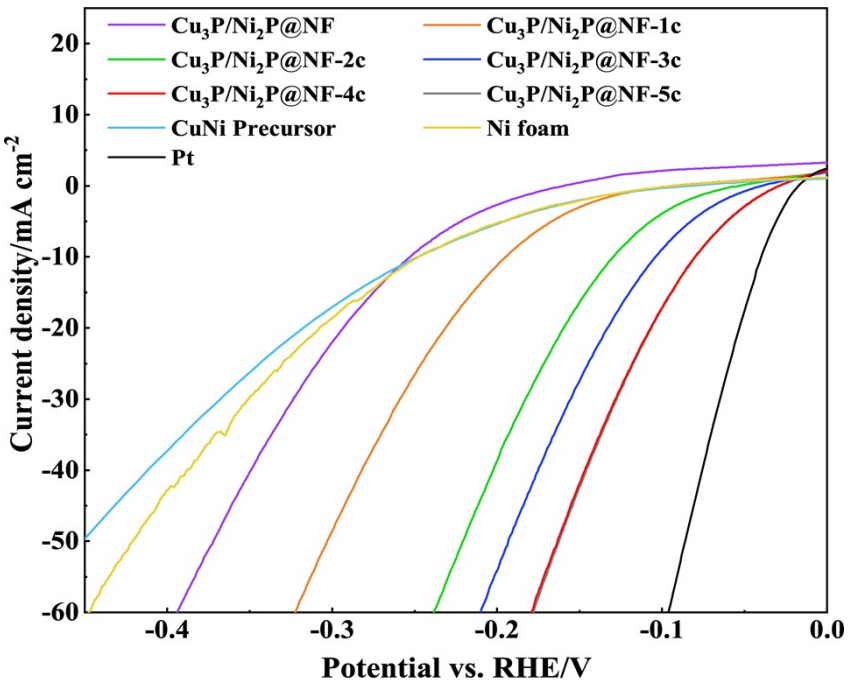

Figure S3. (a) Polarization curves without *iR* correction of NiCu precursor, Cu_3P/Ni_2P@NF, electrochemically modified Cu_3P/Ni_2P@NF, Pt and Ni foam in 0.5 M H_2SO_4 (scan rate: 5 mV s^{-1});

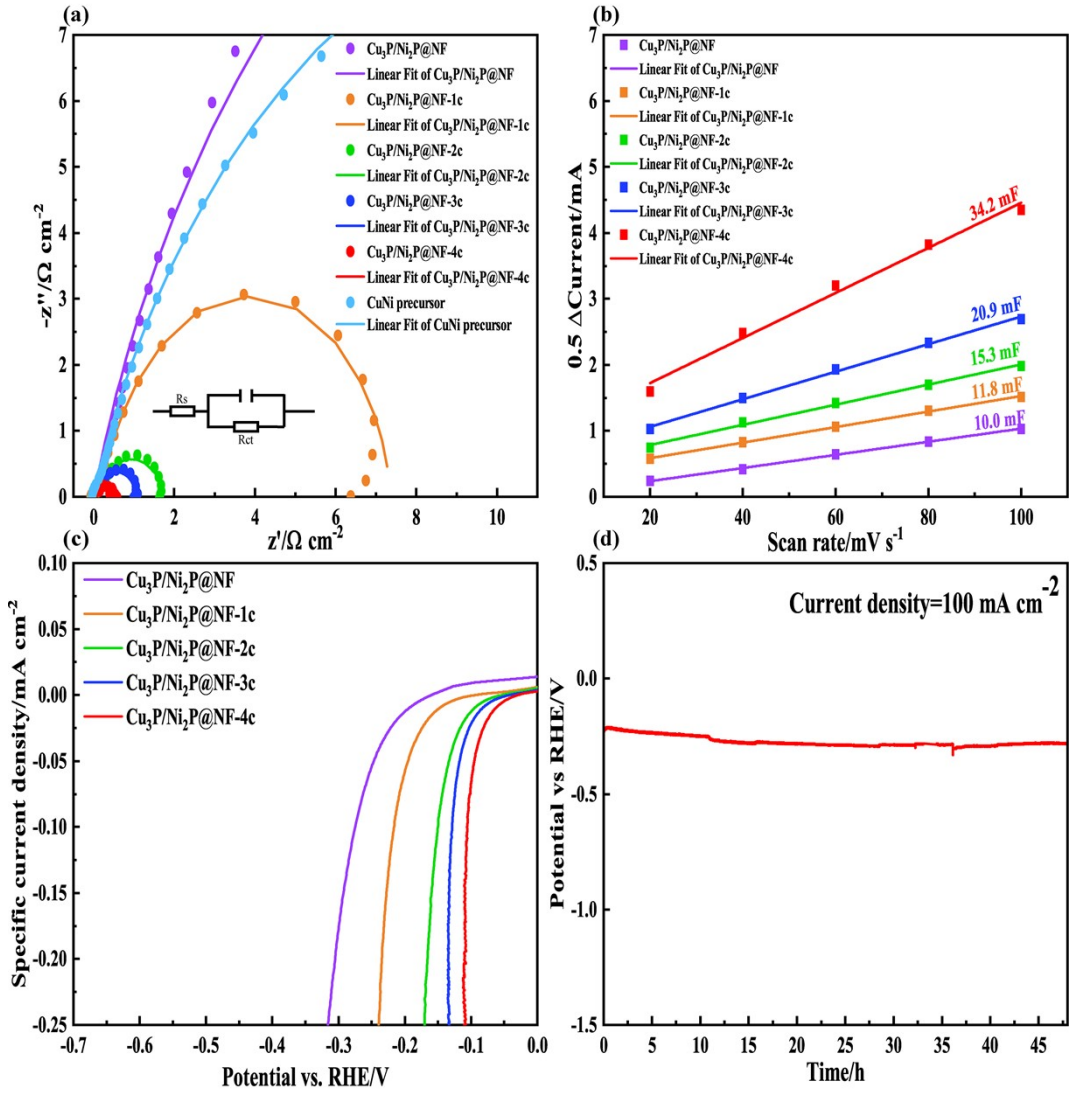

Figure S4. (a) Nyquist plots; (b) C_{dl}; (c) Polarization curves related to specific current density of Cu_3P/Ni_2P@NF and Cu_3P/Ni_2P@NF modified by CV scans in 0.5 M H_2SO_4; (d) chronopotentiometric curve for Cu_3P/Ni_2P@NF-4c at 100 mA·cm^{-2} for 48 h in 0.5 M H_2SO_4 without *iR* correction.

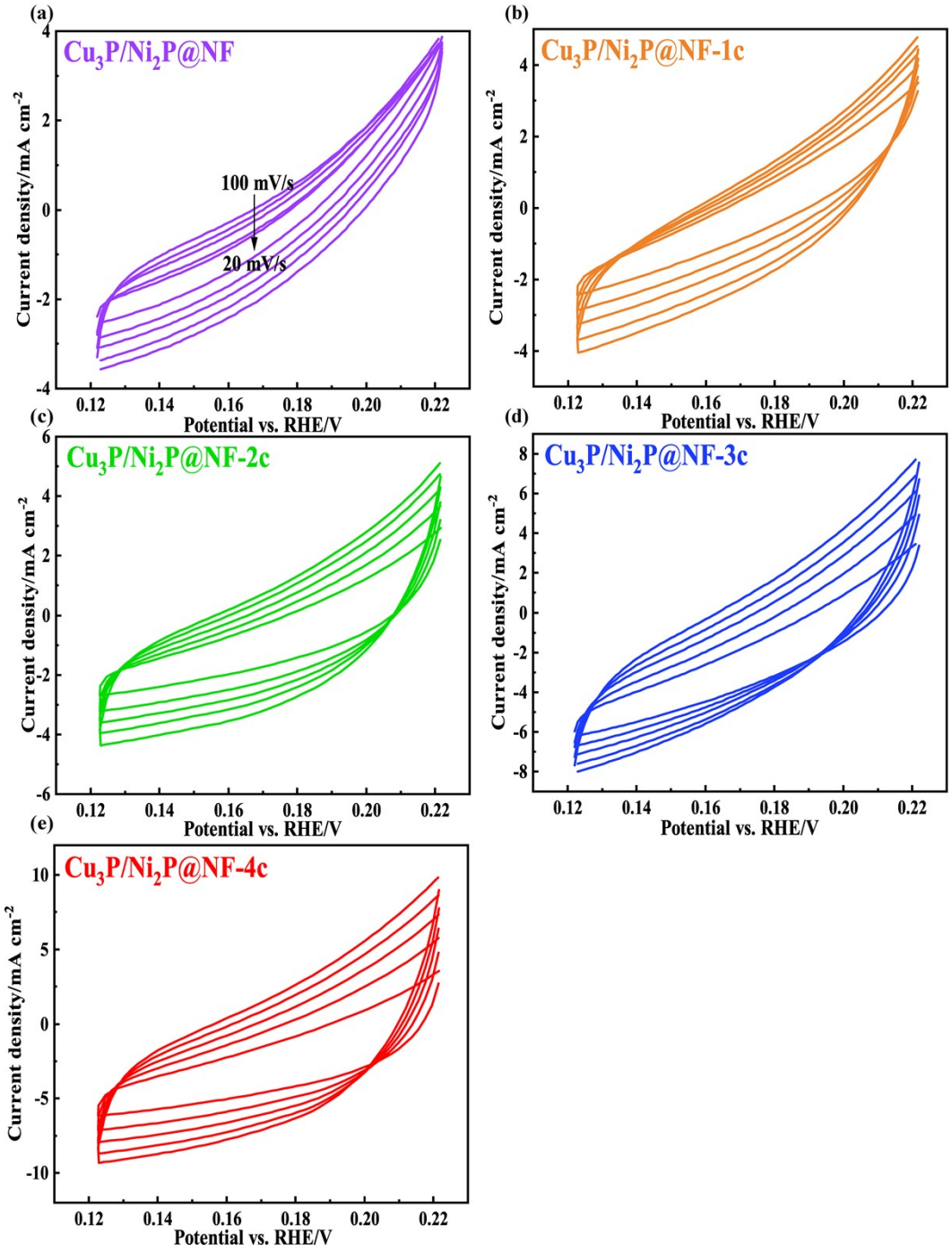

Figure S5. CV curves: Cu_3P/Ni_2P@NF (a), Cu_3P/Ni_2P@NF-1c (b), Cu_3P/Ni_2P@NF-2c (c), Cu_3P/Ni_2P@NF-3c (d) and Cu_3P/Ni_2P@NF-4c (e).

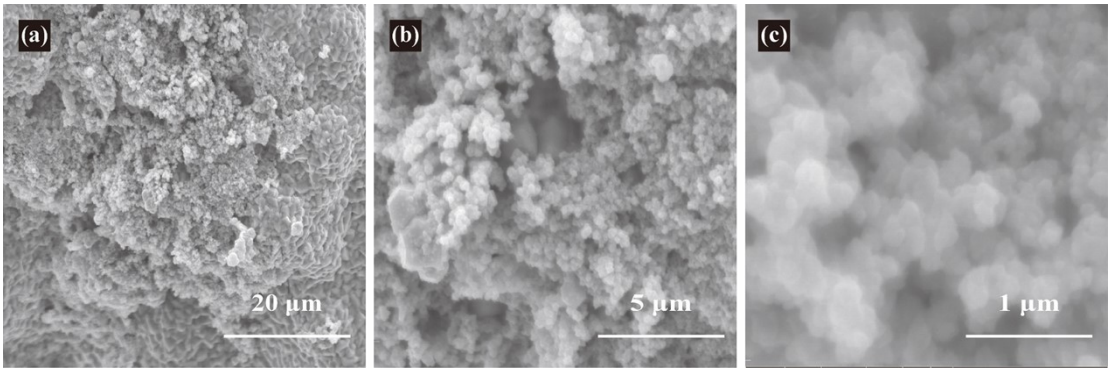

Figure S6. SEM images for post-HER Cu_3P/Ni_2P@NF-4c with different magnifications.

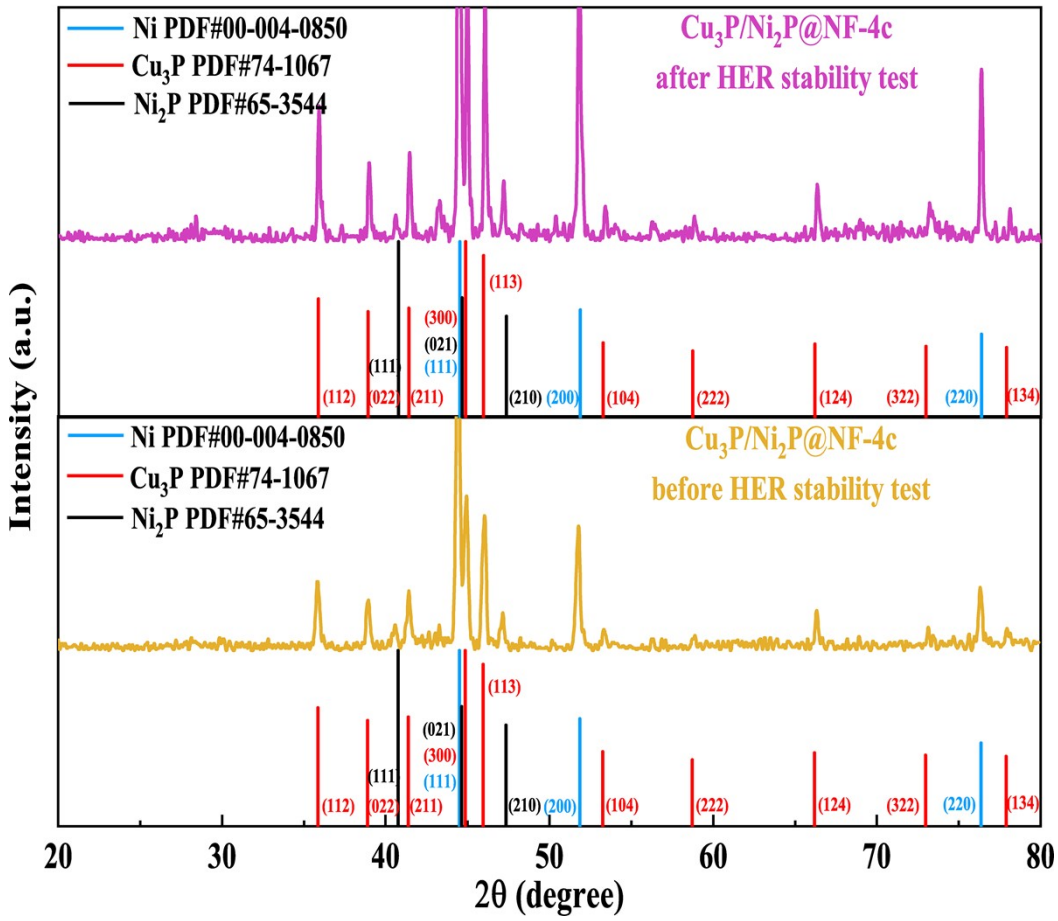

Figure S7. XRD patterns for Cu_3P/Ni_2P@NF-4c and post-HER Cu_3P/Ni_2P@NF-4c.

Table S1. Comparison of the HER performance of Cu_3P/Ni_2P@NF and electrochemically

modified Cu_3P/Ni_2P@NF in 0.5 M H_2SO_4.

Materials	Media	η_{10} (mV)	Tafel slopes (mV·dec^{-1})	Exchange current density (mA·cm^{-2})	*Rct* (Ω)	C_{dl} (mF)	ECSA (cm^2)	*RF*
Cu_3P/Ni_2P@NF	0.5 M H_2SO_4	240	86.7	0.02	33.54	10.0	250	250
Cu_3P/Ni_2P@NF-1c	0.5 M H_2SO_4	182	74.9	0.04	7.54	11.8	295	295
Cu_3P/Ni_2P@NF-2c	0.5 M H_2SO_4	117	54.8	0.07	1.76	15.3	383	383
Cu_3P/Ni_2P@NF-3c	0.5 M H_2SO_4	91	50.9	0.16	1.10	20.9	523	523
Cu_3P/Ni_2P@NF-4c	0.5 M H_2SO_4	67	43.9	0.28	0.49	34.2	855	855

Table S2. Comparison of the HER performance of Cu_3P/Ni_2P@NF-4c and other HER electrocatalysts.

Materials	Media	η_{10} / mV	Tafel slopes (mV·dec^{-1})	Reference
Ni_2P-WO_3	0.5 M H_2SO_4	107	55.9	[1]
Cu_3P@NPC-CF	0.5 M H_2SO_4	81.94	81.25	[2]
Cu_2S-Cu_3P@C	0.5 M H_2SO_4	85	34	[3]
Ni_2P/Ni_5P_4@3DNG	0.5 M H_2SO_4	139	59	[4]
$Ni_{12}P_5$-Ni_2P	0.5 M H_2SO_4	166	60	[5]
Ni_2P /NF	0.5 M H_2SO_4	78	33	[6]
N-C@CoP/Ni_2P	0.5 M H_2SO_4	153	53.01	[7]
Co_2P/Ni_2P/CNT-3	0.5 M H_2SO_4	151	41.64	[8]
Ni_2P/CC	0.5 M H_2SO_4	119	50	[9]
Ni_2P/NF-PECVD	0.5 M H_2SO_4	97	79	[10]
Ni_2P/CoP@ NPC	0.5 M H_2SO_4	160	57	[11]

$Cu_xNi_{1-x}P$@PC	0.5 M H_2SO_4	102	85.8	[12]
Cu_3P/Ni_2P@NF 4000c	0.5 M H_2SO_4	67	43.9	This work

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