

Supporting Information for

Constructing NiMoP nanorod arrays with highly active Ni₂P/NiMoP₂ interface for hydrogen evolution in 0.5 M H₂SO₄ and 1.0 M KOH media

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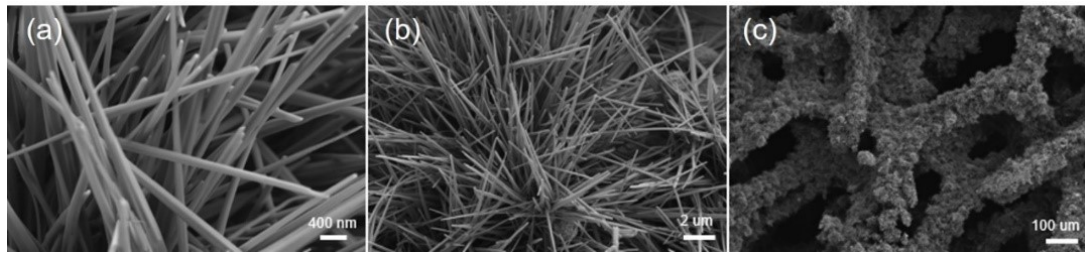


Fig. S1 SEM images of NiMoP at different magnifications.

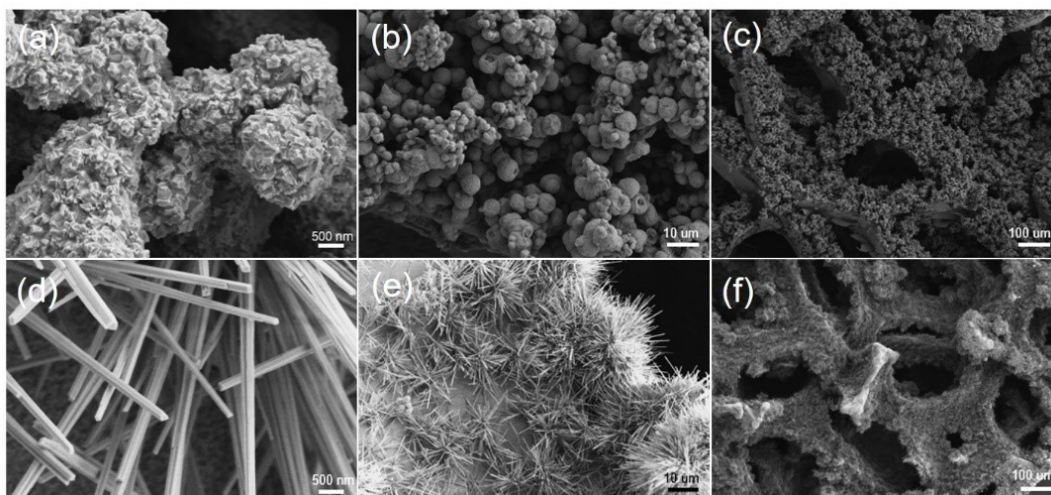


Fig. S2 SEM images of Ni_2P (a-c) and $\text{NiMoO}_4 \cdot x\text{H}_2\text{O}$ (d-f) at different magnifications.

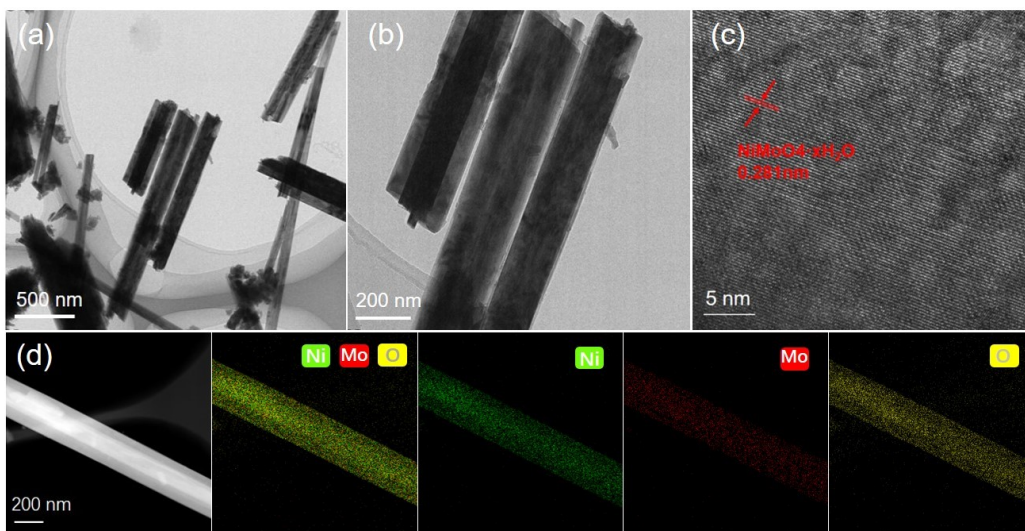


Fig. S3 (a-b) TEM images of $\text{NiMoO}_4 \cdot x\text{H}_2\text{O}$. (c) HRTEM image of $\text{NiMoO}_4 \cdot x\text{H}_2\text{O}$. (d) Elemental mapping images of $\text{NiMoO}_4 \cdot x\text{H}_2\text{O}$.

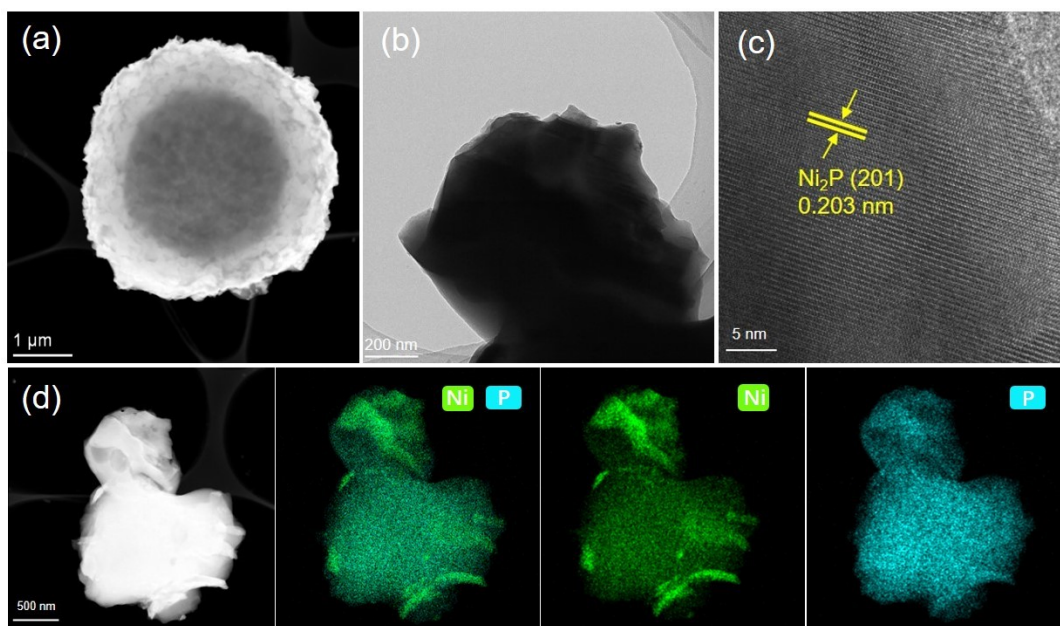


Fig. S4 (a-c) STEM, TEM and HRTEM images of Ni₂P. (d) Elemental mapping images of Ni₂P.

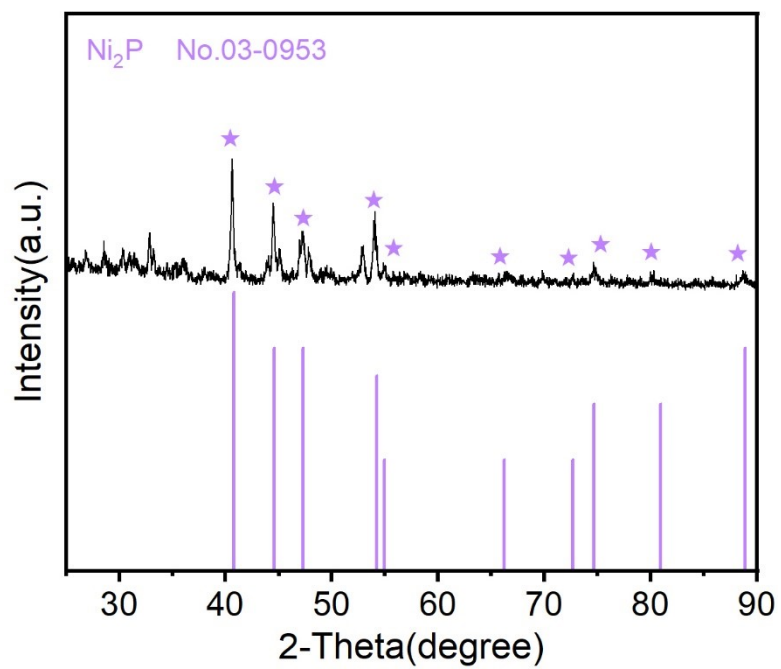


Fig. S5 XRD pattern of the Ni_2P .

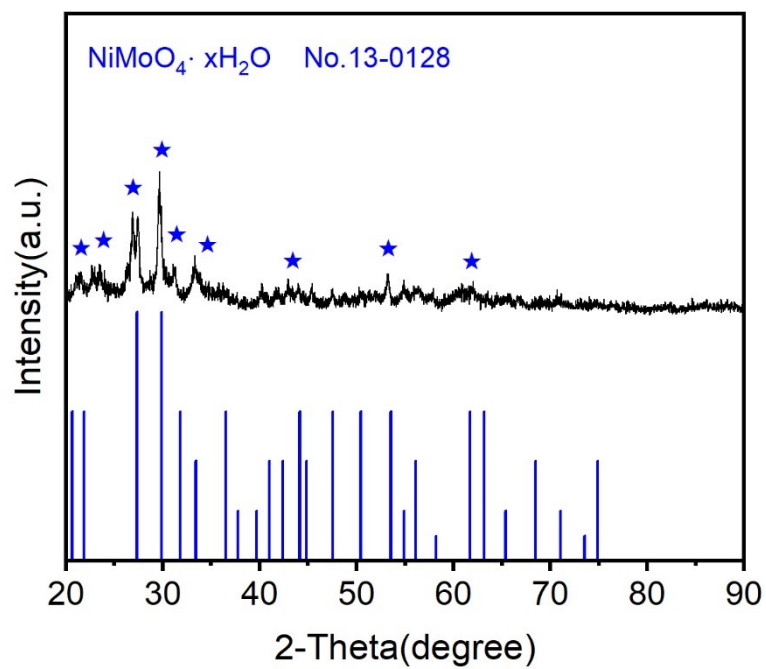


Fig. S6 XRD pattern of the $\text{NiMoO}_4 \cdot x\text{H}_2\text{O}$.

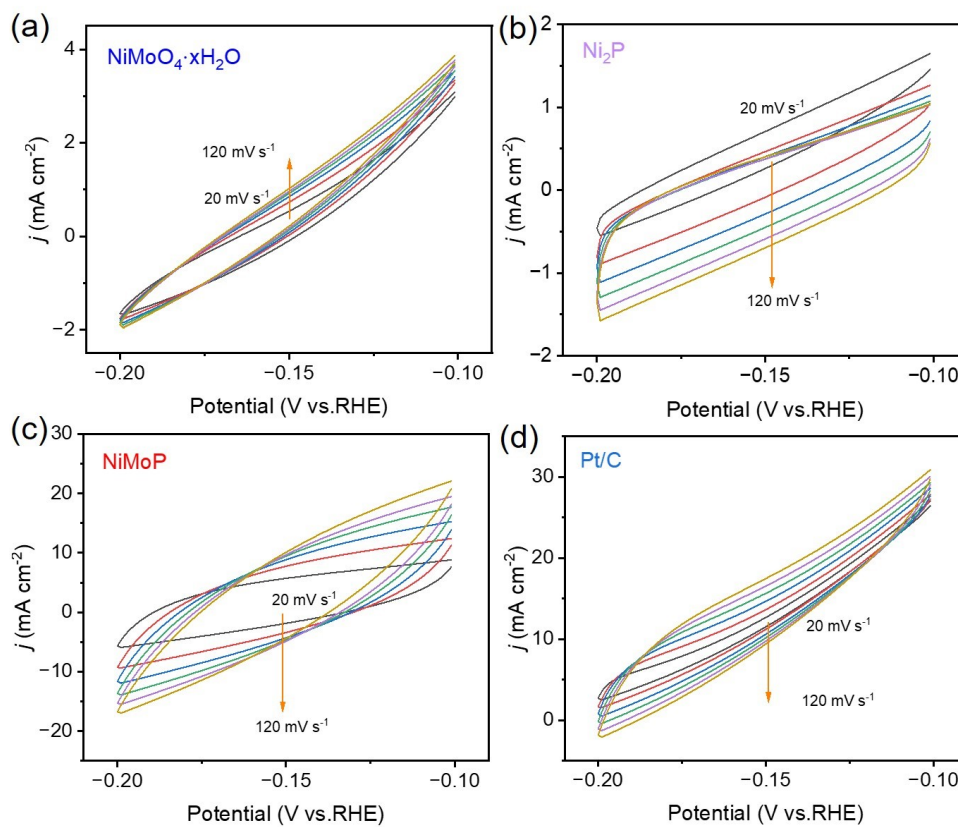


Fig. S7 Double layer capacitance measurements for HER in 0.5 M H₂SO₄ with scan rates from 20 to 120 mV s⁻¹ for (a) NiMoO₄·xH₂O, (b) Ni₂P, (c) NiMoP, (d) Pt/C.

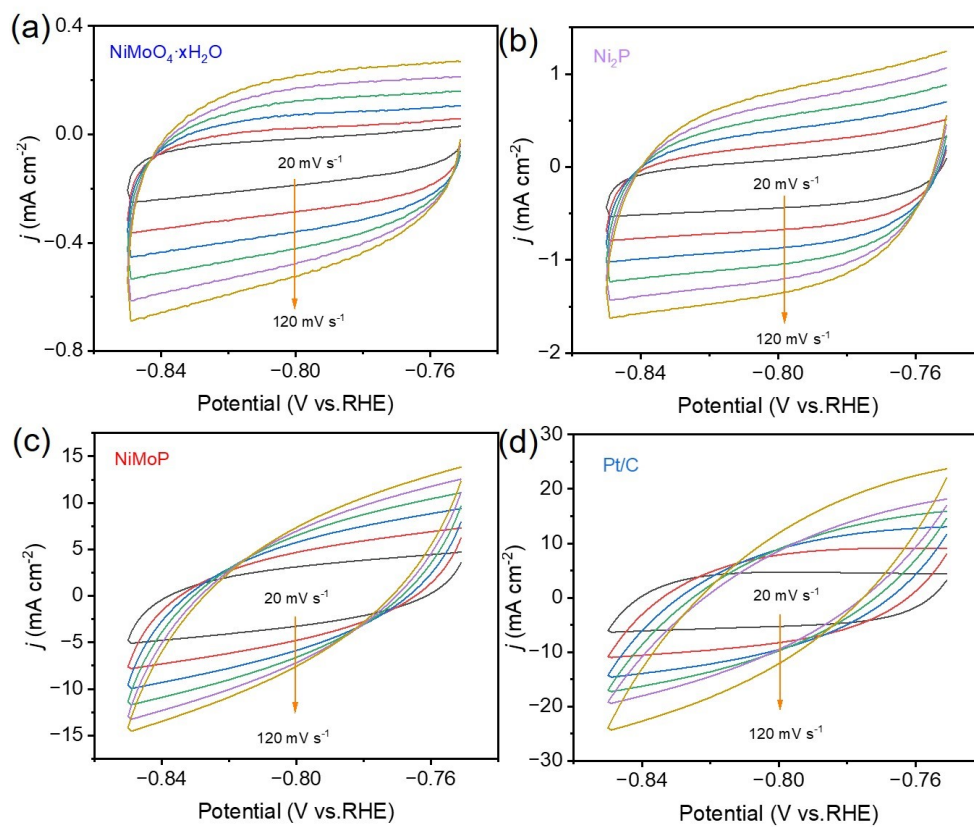


Fig. S8 Double layer capacitance measurements for HER in 1.0 M KOH with scan rates from 20 to 120 mV s^{-1} for (a) $\text{NiMoO}_4 \cdot x\text{H}_2\text{O}$, (b) Ni_2P , (c) NiMoP , (d) Pt/C .

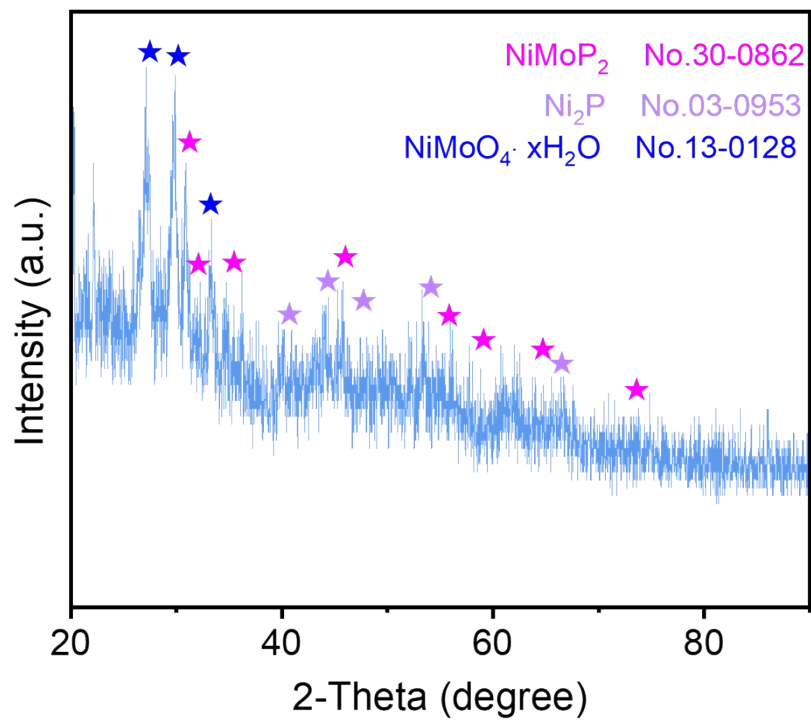


Fig. S9 XRD pattern of NiMoP after 1000 cycles test in 0.5 M H₂SO₄.

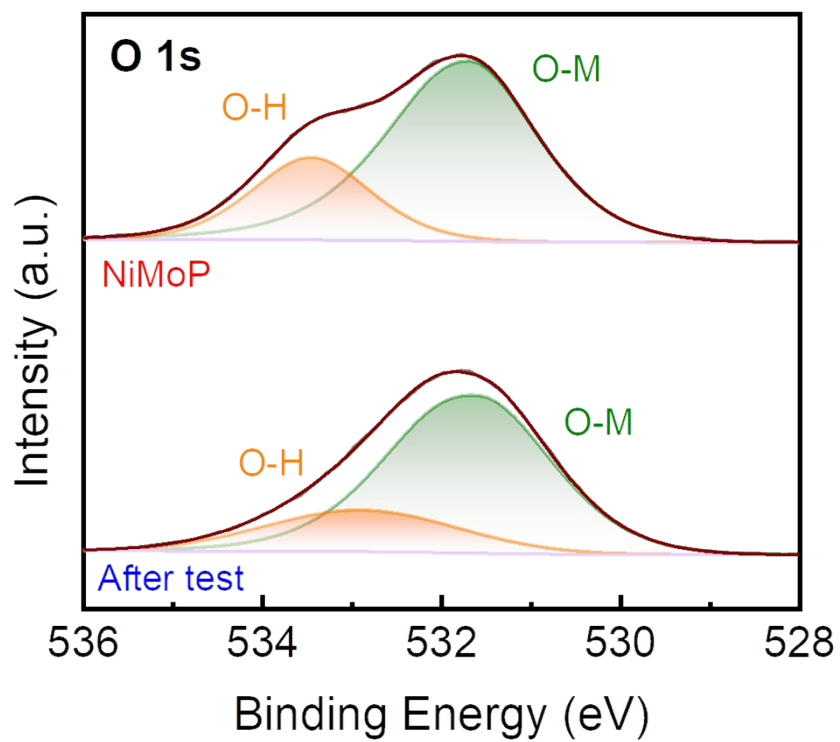


Fig. S10 High-resolution XPS spectra of O 1s for NiMoP after 1000 cycles test in 0.5 M H₂SO₄.

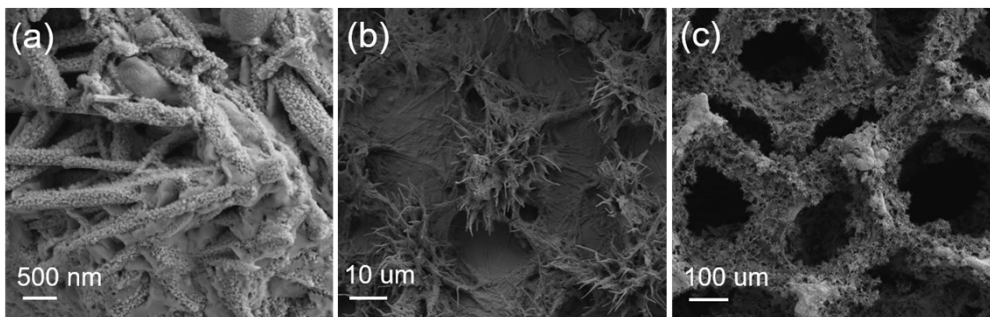


Fig. S11 SEM images of NiMoP after 1000 cycles test at different magnifications in 1.0 M KOH.

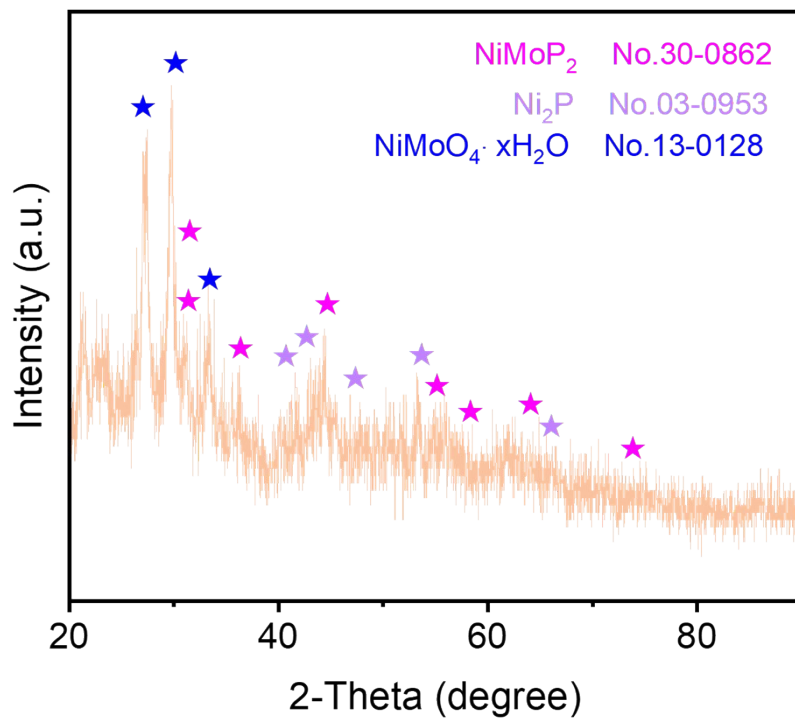


Fig. S12 XRD pattern of NiMoP after 1000 cycles test in 1.0 M KOH.

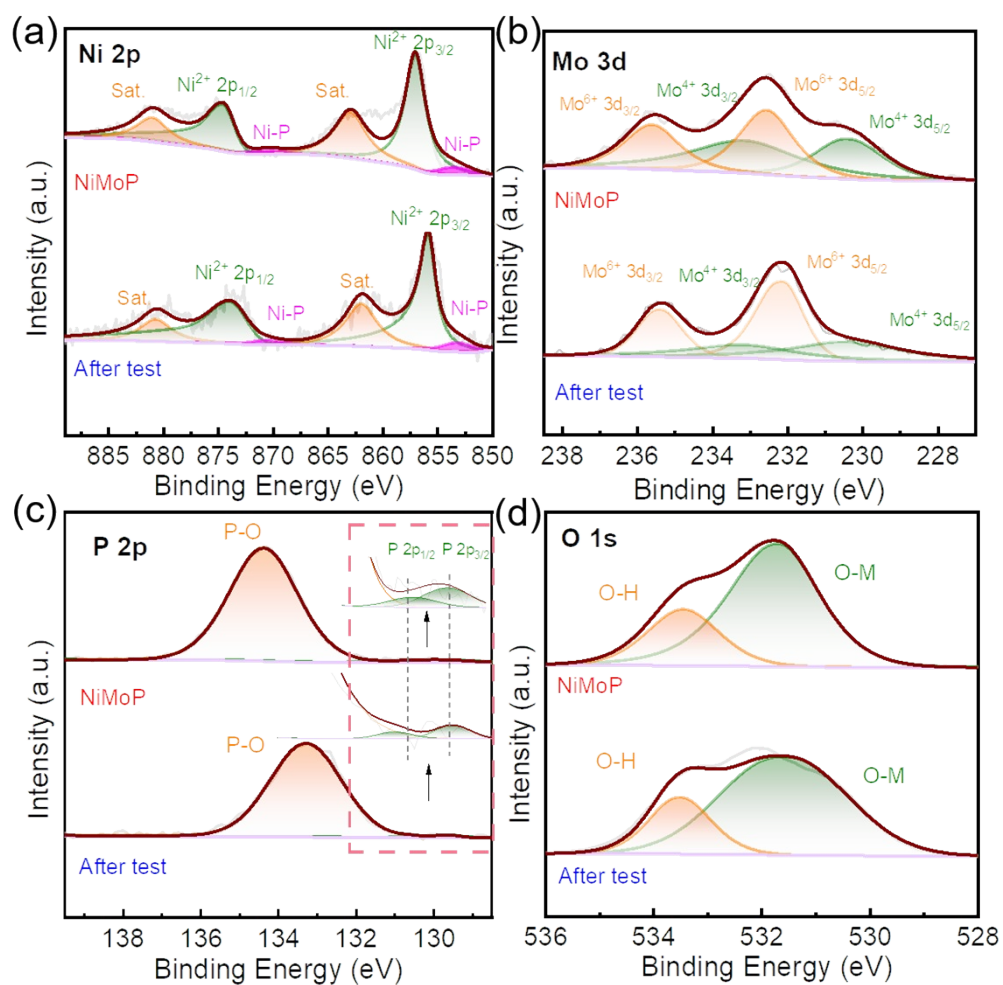


Fig. S13 High-resolution XPS spectra of (a) Ni 2p, (b) Mo 3d, (c) P 2p, (d) O 1s for NiMoP after 1000 cycles test in 1.0 M KOH.

Table S1. Comparison of overpotentials at 10 mA cm⁻² between NiMoP and the reported transition metal phosphide based HER electrocatalysts in 0.5 M H₂SO₄.

Catalysts	Overpotential (mV)	Tafel slopes	Refs.
NiMoP	44	48.78	This Work
Cu ₃ P-CoP/CC	59	58	1
CoNiP-NF/rGO	82	37	2
FeCoP/C	97.5	43.8	3
Ni ₂ P-CoP	105	64	4
V/CoP/Ni ₂ P/NF	79	58.3	5
MnCoP/Ti	49	55	6
Ni ₂ MnP/NF	80	64	7
NiCoP/CC	44	39	8
NiFeP ₂ /CP	56	49.5	9
Mn-NiP ₂ NSs/CC	66	42	10
Co@CoFe-P	46	66.27	11
FeP NFSLs	71	61	12
MoP/S	64	50	13
Cu ₃ P NW/CF	143	67	14
WP ₂ NSs/W	140	67.98	15
MoP/CNT	114	51.5	16
MoP NW/CC	113	53.3	17

Table S2. Comparison of overpotentials at 10 mA cm⁻² between NiMoP and the reported transition metal phosphide based HER electrocatalysts in 1.0 M KOH.

Catalysts	Overpotential (mV)	Tafel slopes	Refs.
NiMoP	88	70	This Work
Ni/NiCoP	90	95	18
Mn-CoP	95	53	19
W-CoP NAs/CC	94	63	20
Co(OH) _x /CoP	100	76	21
NiCoP/CNF	130	83	22
FeCoNiP@NCNTs	233.5	79	23
A-Co _{0.9} V _{0.1} P/TF	107	72	24
sc-Ni ₂ P ^{δ-} /NiHO	60	75	25
FeP NPs@NPC	214	82	26
Co-Fe-P/CeO ₂ HHRs	69.7	90.1	27
Ni-Mn-FeP	103	71.6	28
Ni _{5%} CoP	84	67	29
MoP-QDs@PC	98.8	66	30
N/C/MoP	169	51.3	31
MoP/MoO ₂	80	41	32

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