Electronic Supplementary Information for

Bimetallic Ni-Mo nitride@N-doped C as highly active and stable bifunctional electrocatalysts for full water splitting

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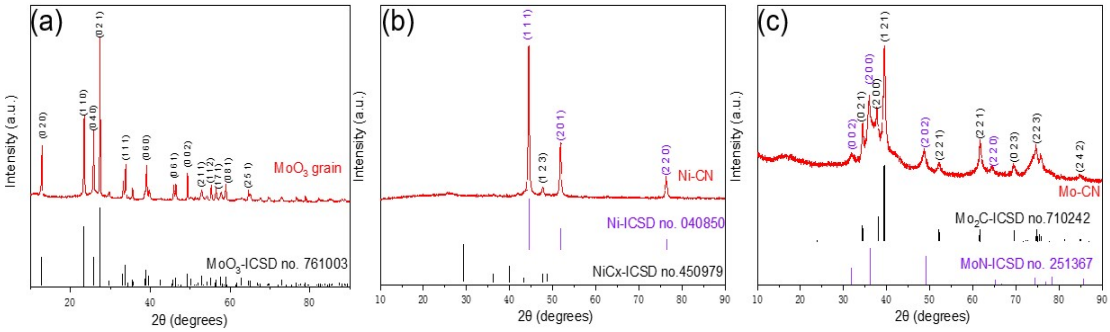

Figure S1 XRD pattern of (a) MoO_3 grain (b) Ni-CN (c) Mo-CN.

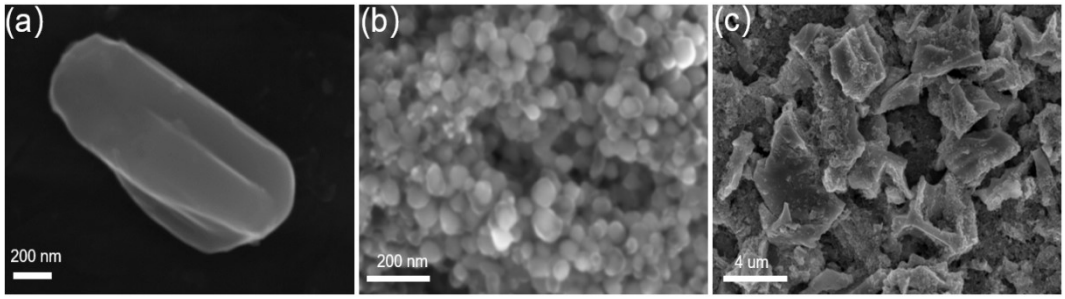

Figure S2 SEM images of (a) MoO_3 grain (b) Ni-CN (c) Mo-CN.

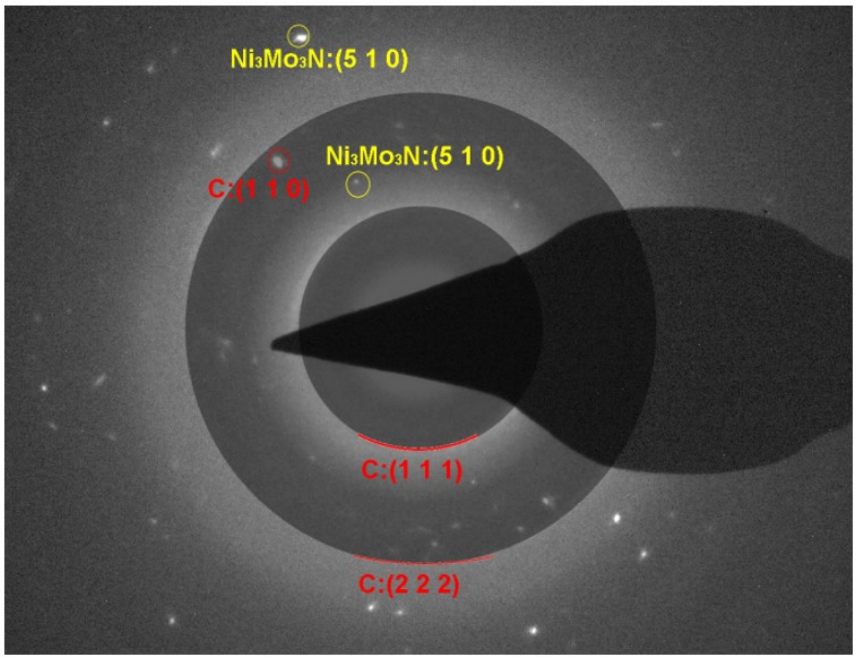

Figure S3 SAED pattern of NiMoN -2.

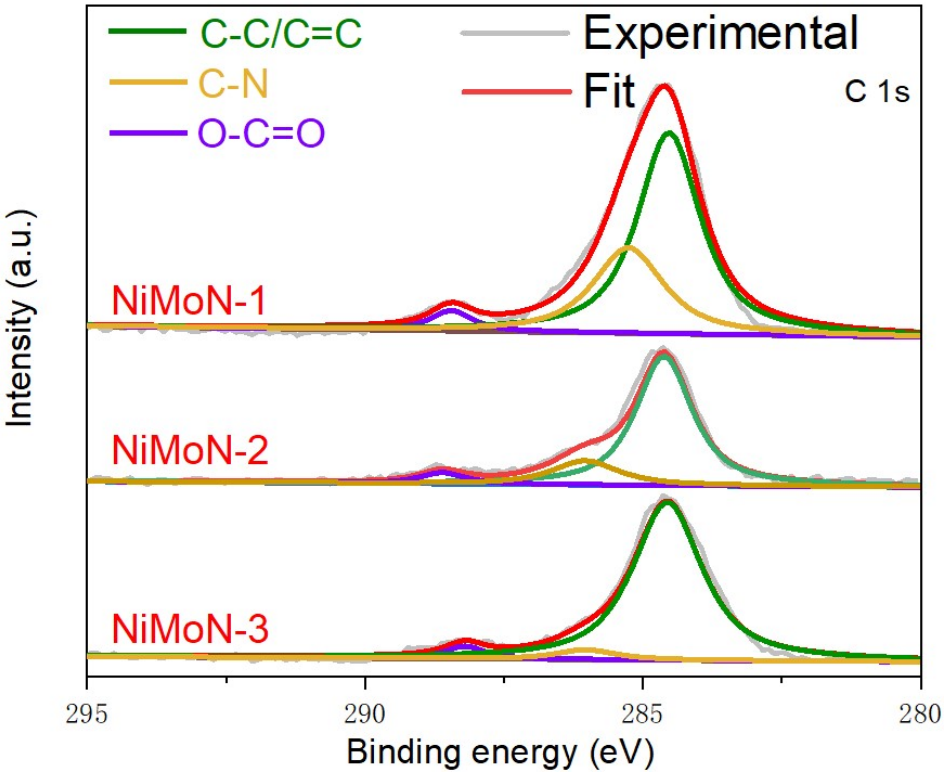

Figure S4 High-resolution XPS spectra of C 1s.

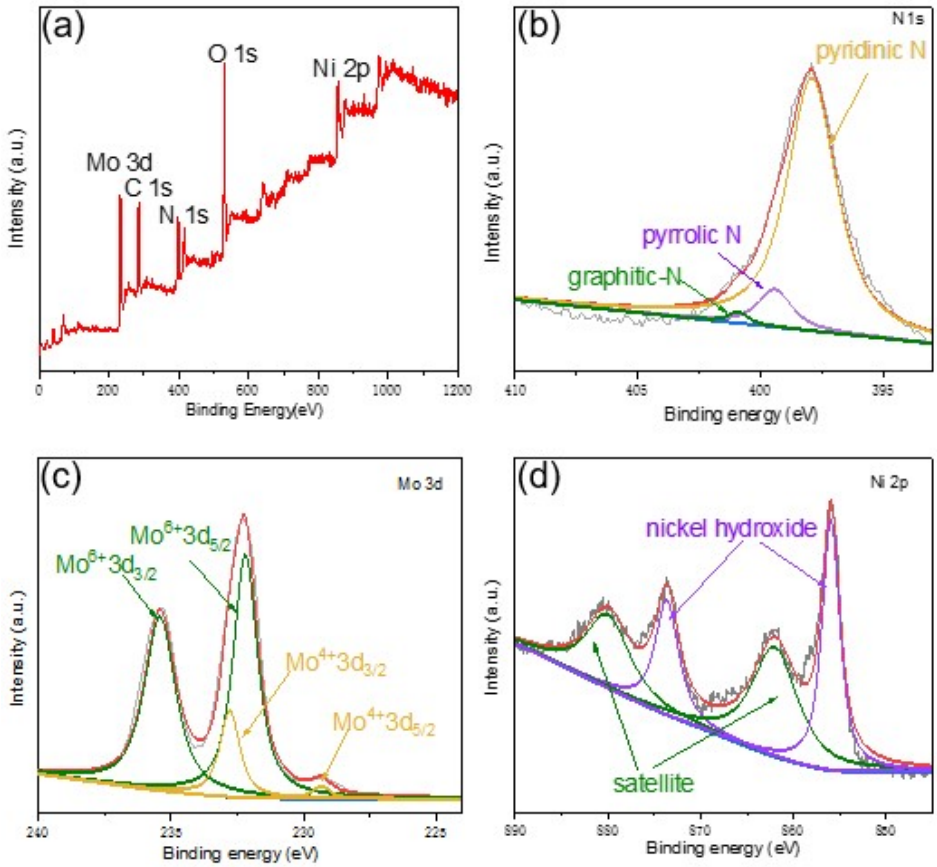

Figure S5 XPS spectra of the bimetallic NiMoN-1 catalysts :
(a) survey spectrum, (b) N 1s (c) Mo 3d, and (d) Ni 2p .

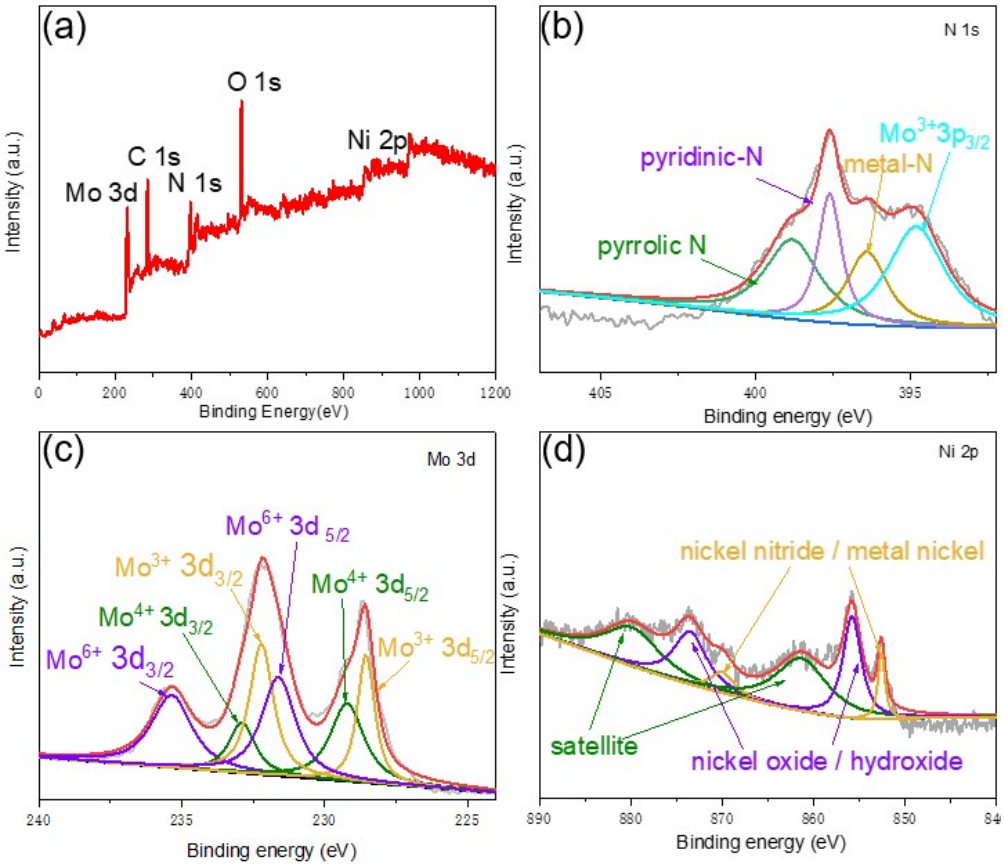

Figure S6 XPS spectra of the bimetallic NiMoN-3 catalysts :
(a) survey spectrum, (b) N 1s (c) Mo 3d, and (d) Ni 2p .

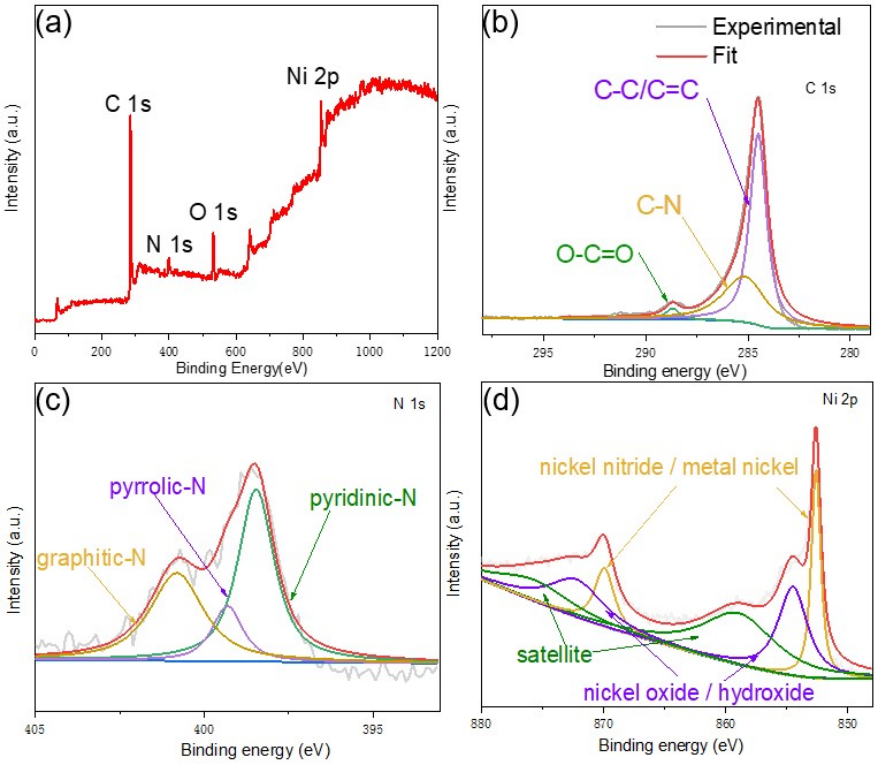

Figure S7 XPS spectra of the bimetallic Ni-CN catalysts :
(a) survey spectrum, (b) C 1s (c) N 1s, and (d) Ni 2p.

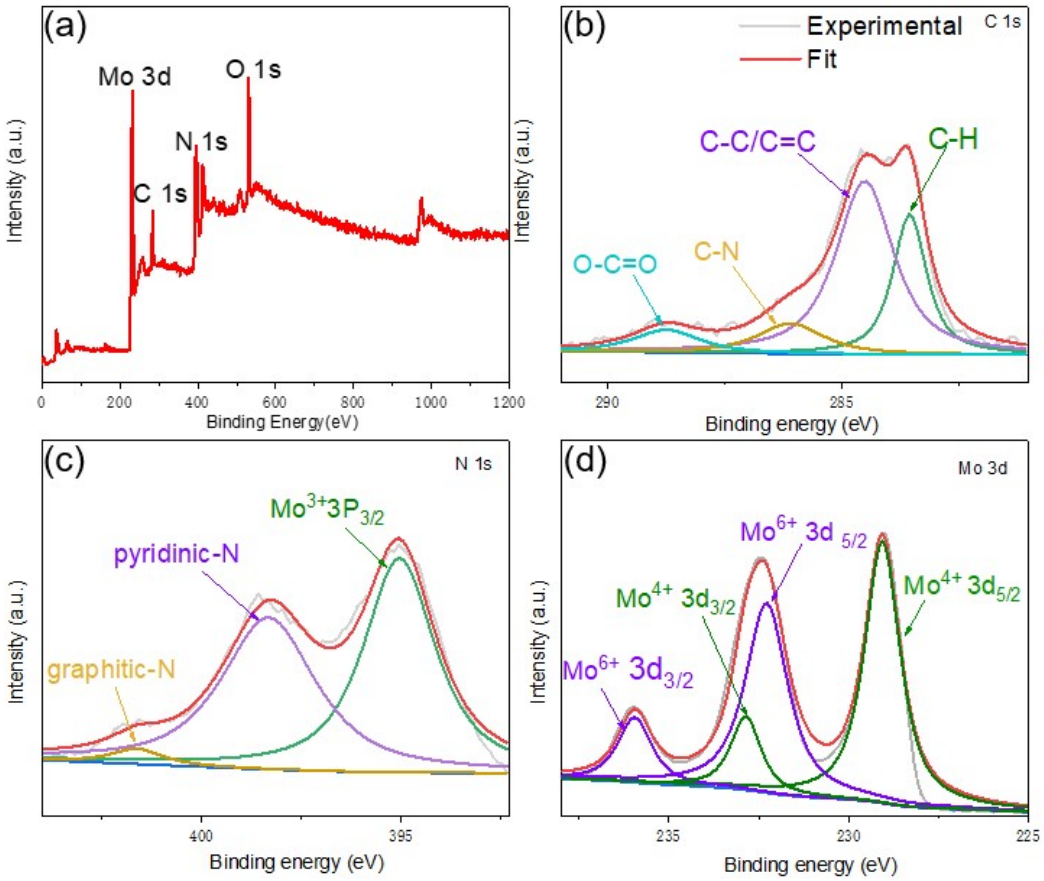

Figure S8 XPS spectra of the bimetallic Mo-CN catalysts :
(a) survey spectrum, (b) C 1s (c) N 1s, and (d) Mo 3d.

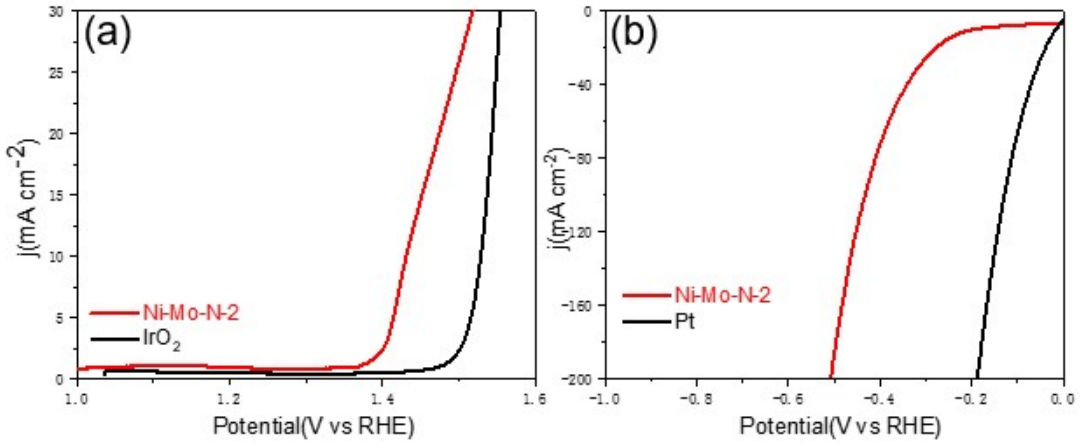

Figure S9 Electrocatalytic activity in 1 M KOH (a) The polarization curves of OER,
(a) The polarization curves of HER

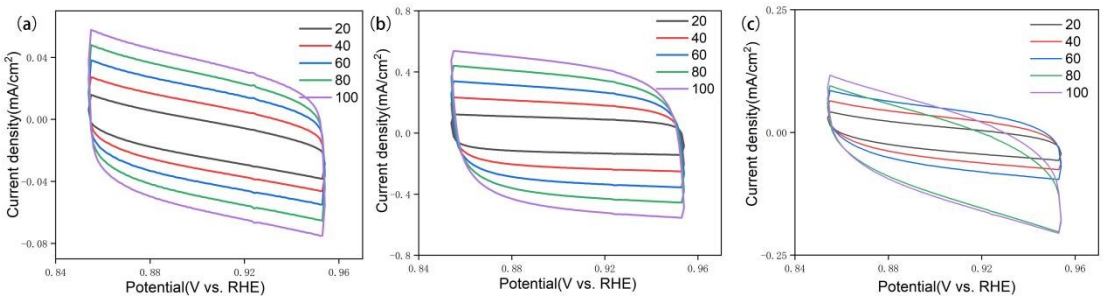

Figure S10 Cyclic voltammographs with the scan rate from20 to 100mV/s for NiMoN-1,NiMoN-2,NiMoN-3 in 1 M KOH on electrocatalytic OER activity

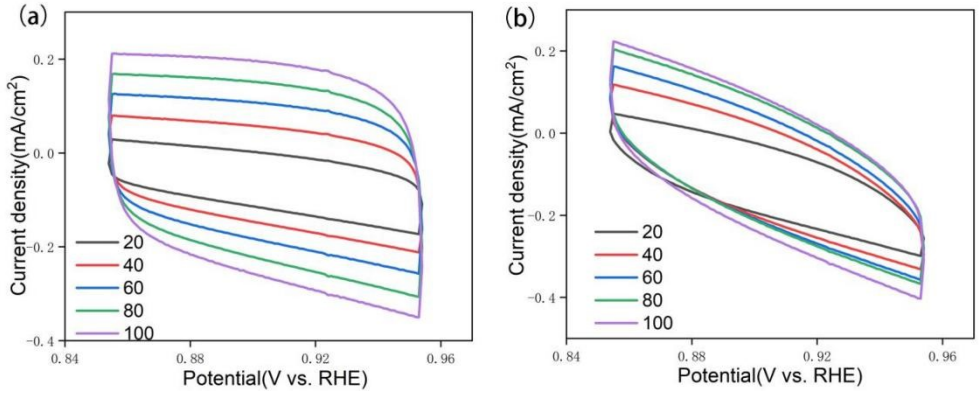

Figure S11 Cyclic voltammographs with the scan rate from20 to 100mV/s for Ni-CN， Mo-CN in 1 M KOH on electrocatalytic OER activity

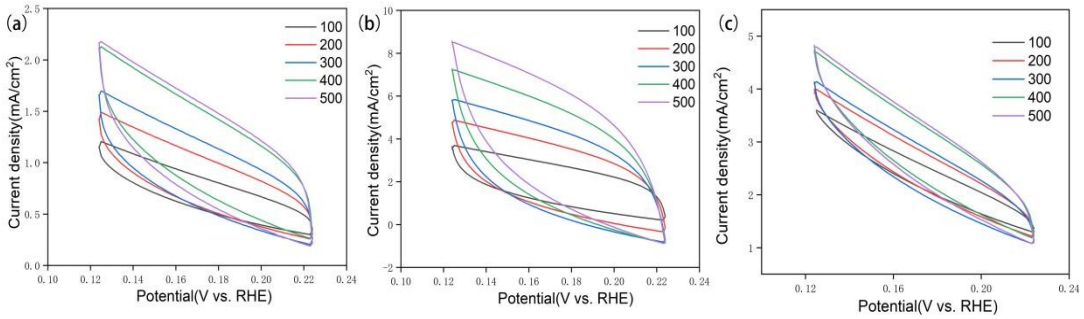

Figure S12 Cyclic voltammographs with the scan rate from20 to 100mV/s for NiMoN-1,NiMoN-2,NiMoN-3 in 1 M KOH on electrocatalytic HER activity.

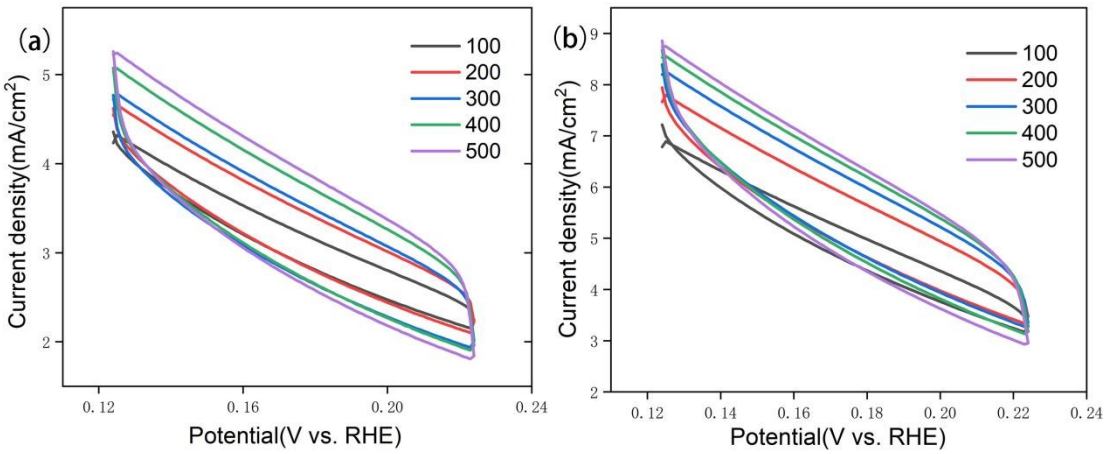

Figure S13 Cyclic voltammographs with the scan rate from20 to 100mV/s for Ni-CN， Mo-CN in 1 M KOH on electrocatalytic HER activity.

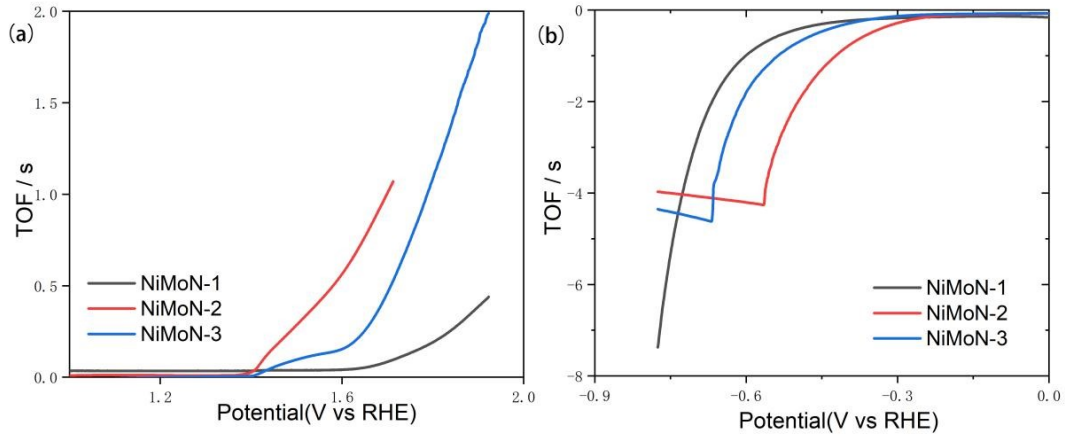

Figure S14 (a)The OER-TOFs of the NiMoN-1,NiMoN-2,NiMoN-3 (b)The HER-TOFs of the NiMoN-1,NiMoN-2,NiMoN-3.

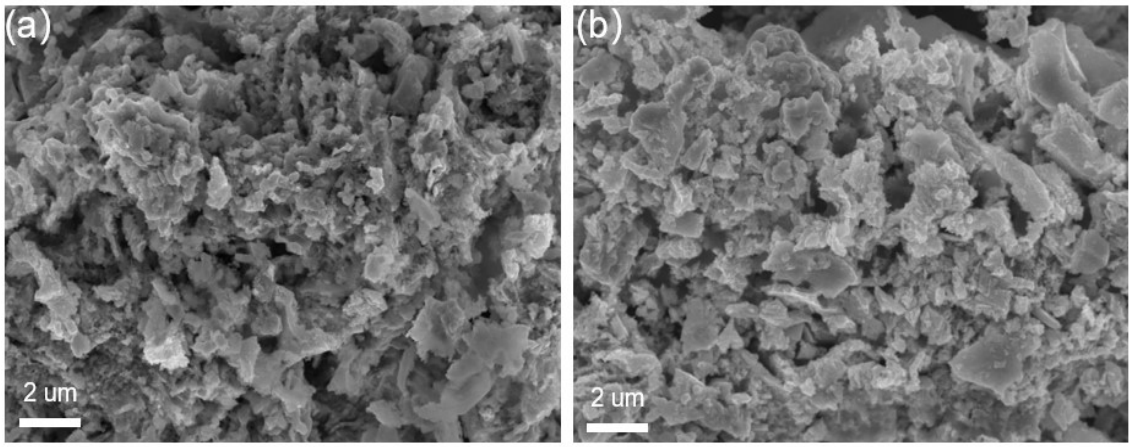

Figure S15 SEM images of NiMoN-2 catalysts after (a) OER and (b) HER.

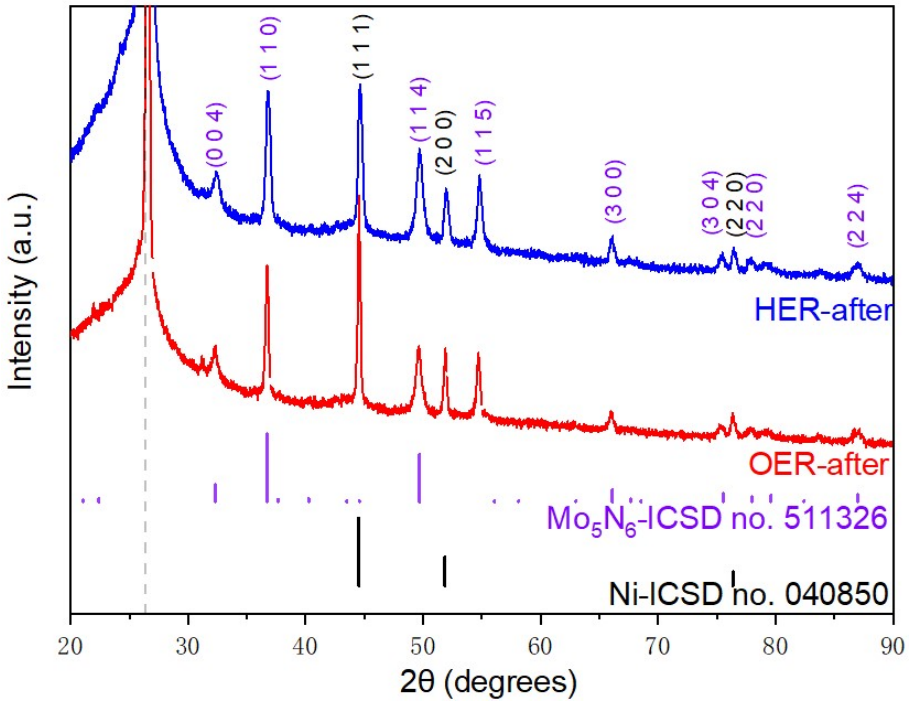

Figure S16 XRD pattern of NiMoN-2 after OER and HER.

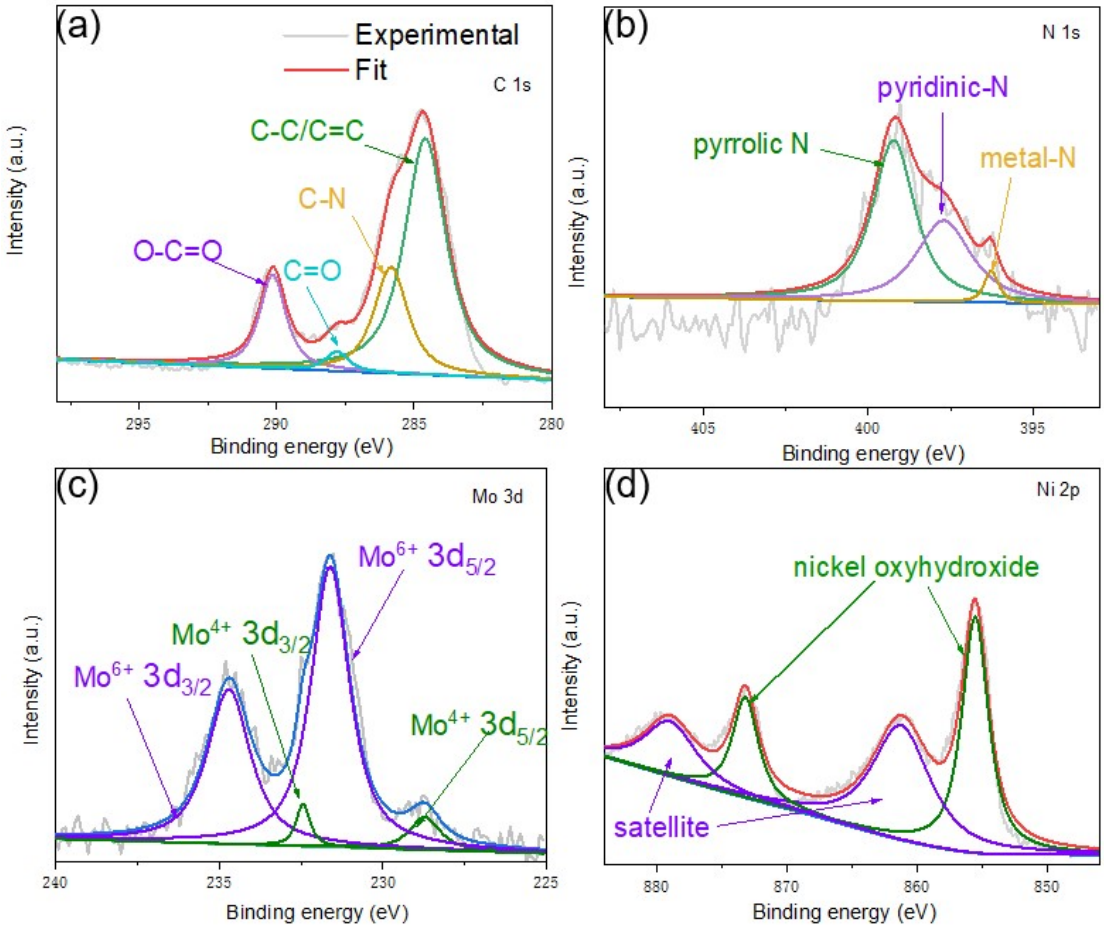

Figure S17 XPS spectra of NiMoN-2 after OER.

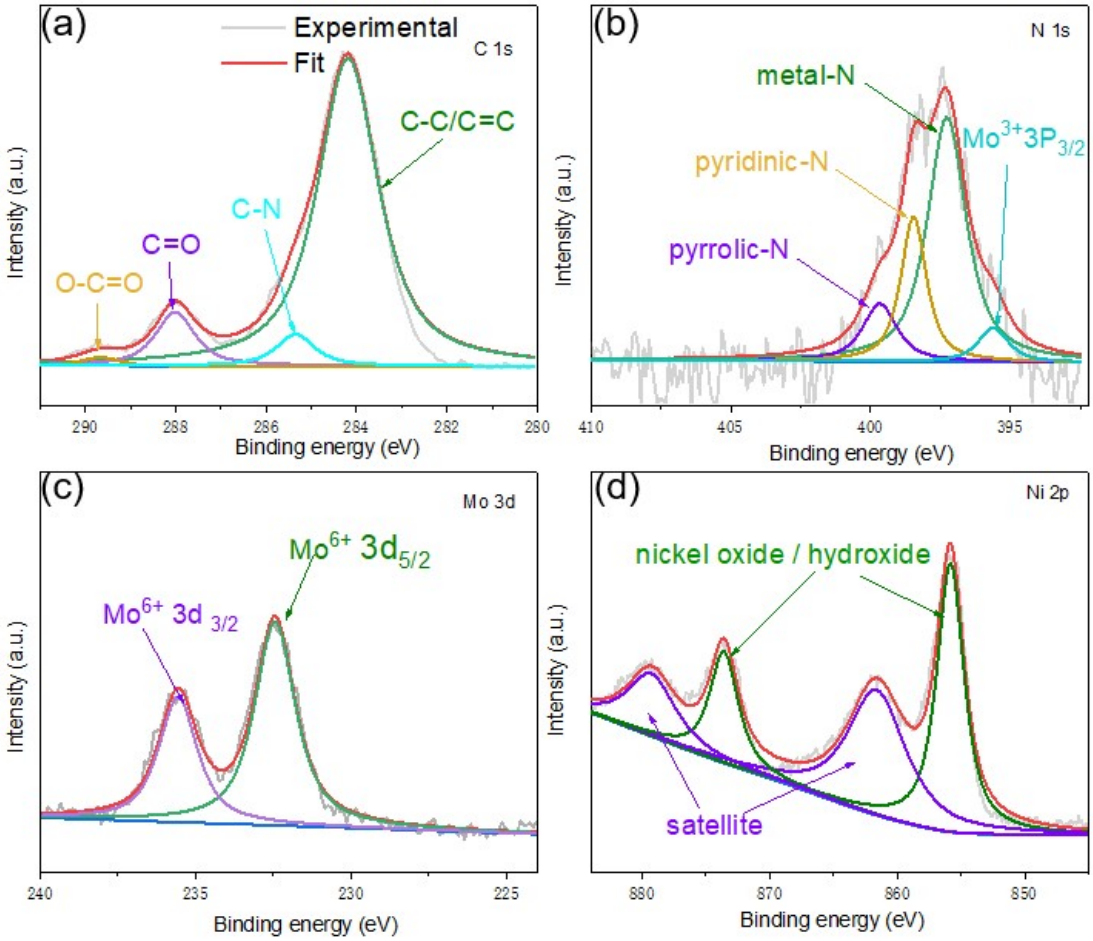

Figure S18 XPS spectra of NiMoN-2 after HER.

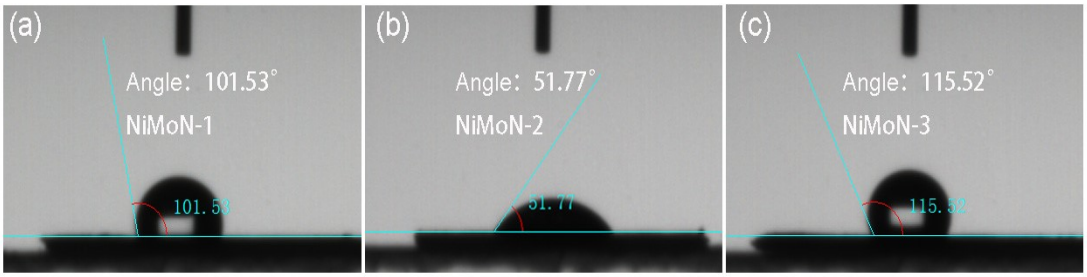

Figure S19 Contact angles of (a) NiMoN-1, (b) NiMoN-2, and (c) NiMoN-3.

Table S1.Comparison of the R_{CT} values of the prepared materials .

Sample	R_{CT} (Ohm)-OER	R_{CT} (Ohm)-HER
NiMoN-1	1.74	1.57
NiMoN-2	1.51	1.42
NiMoN-3	1.86	1.63
Ni-CN	2.42	1.97
Mo-CN	3.37	2.85

Table S2. Comparison of the catalytic activities of OER on NiMoN-2 with recently reported catalysts in the 1.0 mol·L^{-1} KOH medium (pH = 14)

Catalyst	η /mV vs. RHE	Ref.
NiMoN-2	202	This work
Co-NiMoN-400	294	[6]
$Ni_{0.69}Co_{0.31}P$	266	[17]
Ni-Fe-MoN NTs	228	[18]
Ni_3FeS	223	[19]
NiMoN-550	295	[20]
NiMoC/NC-100	328	[25]
CoNiMo-O/H_2-450	279	[27]
NiMoNS	260	[32]
Ni-NiO/HGF-1.5h	308	[36]
Ni_3FeN-NPs	280	[43]
$Fe^{3+}NiCo_2O_4$	210	[44]
Ni-BDC@NiFe-LDH-2	272	[46]
Ni_3N/NiMoN-5	277	[47]

Note: η is the overpotential measured at 10 mA·cm^{-2}.

Table S3. Bifunctional electrocatalyst for overall water splitting in 1.0 M KOH solution.

Catalyst	*Voltage* / V	Ref.
NiMoN-2	1.58	This work
b-$NiMoO_4$/NF	1.55	[2]
Co-NiMoN-400	1.57	[6]
$Ni_{0.69}Co_{0.31}P$	1.59	[17]
Ni-Fe-MoN NTs	1.513	[18]
NiMoN-550	1.596	[20]
Ni_3FeS	1.57	[19]
NiMoC/NC-100	1.72	[25]
CoNiMo-O/H_2-450	1.59	[27]