Supporting information for

Br-Doped Nickel-Cobalt Phosphide Nanoarrays on Engineered Porous NF for High-Efficiency Water Oxidation

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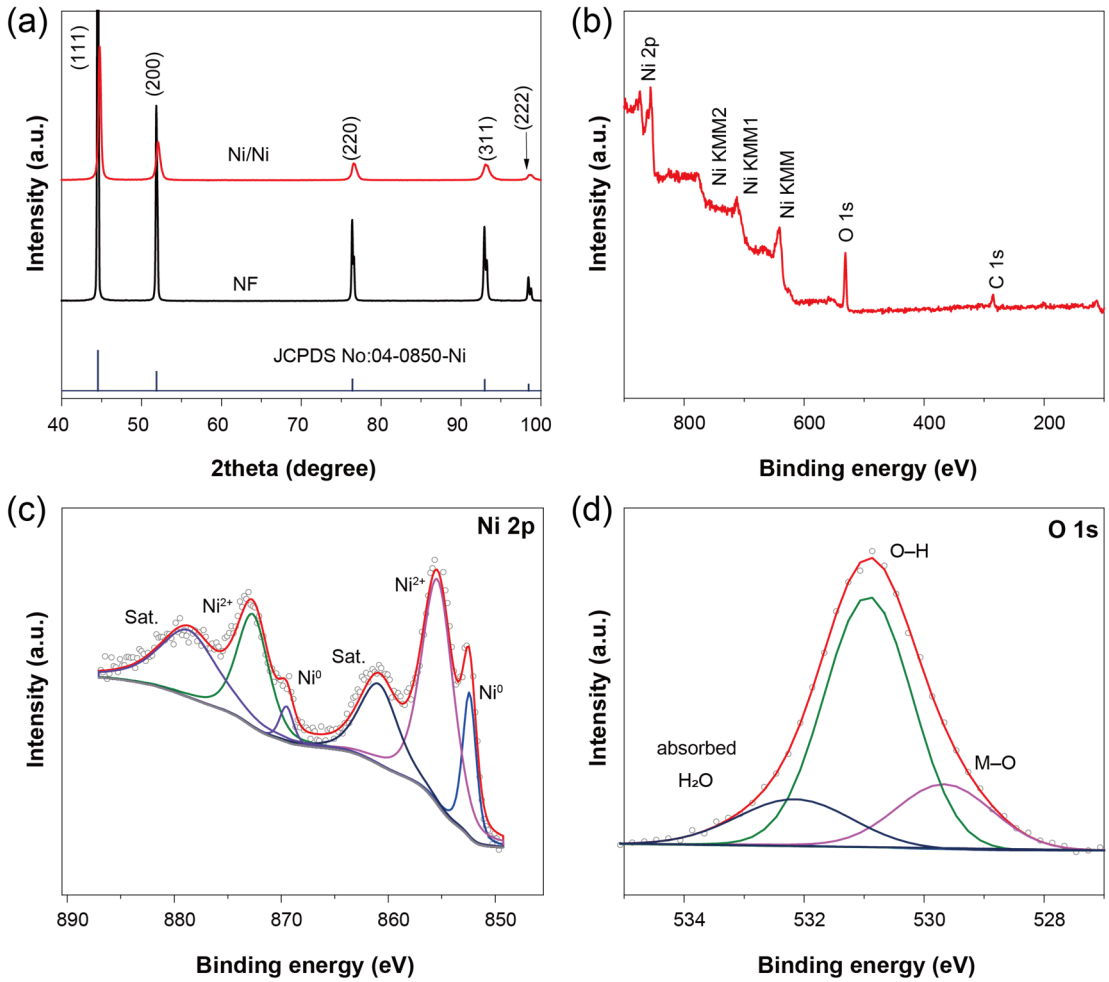

Figure S1. The physical characterization of NF/Ni. (**a**) XRD patterns, XPS of NF/Ni (**b**) survey spectrum and high resolution XPS of (**c**) Ni 2p and (**d**) O 1s.

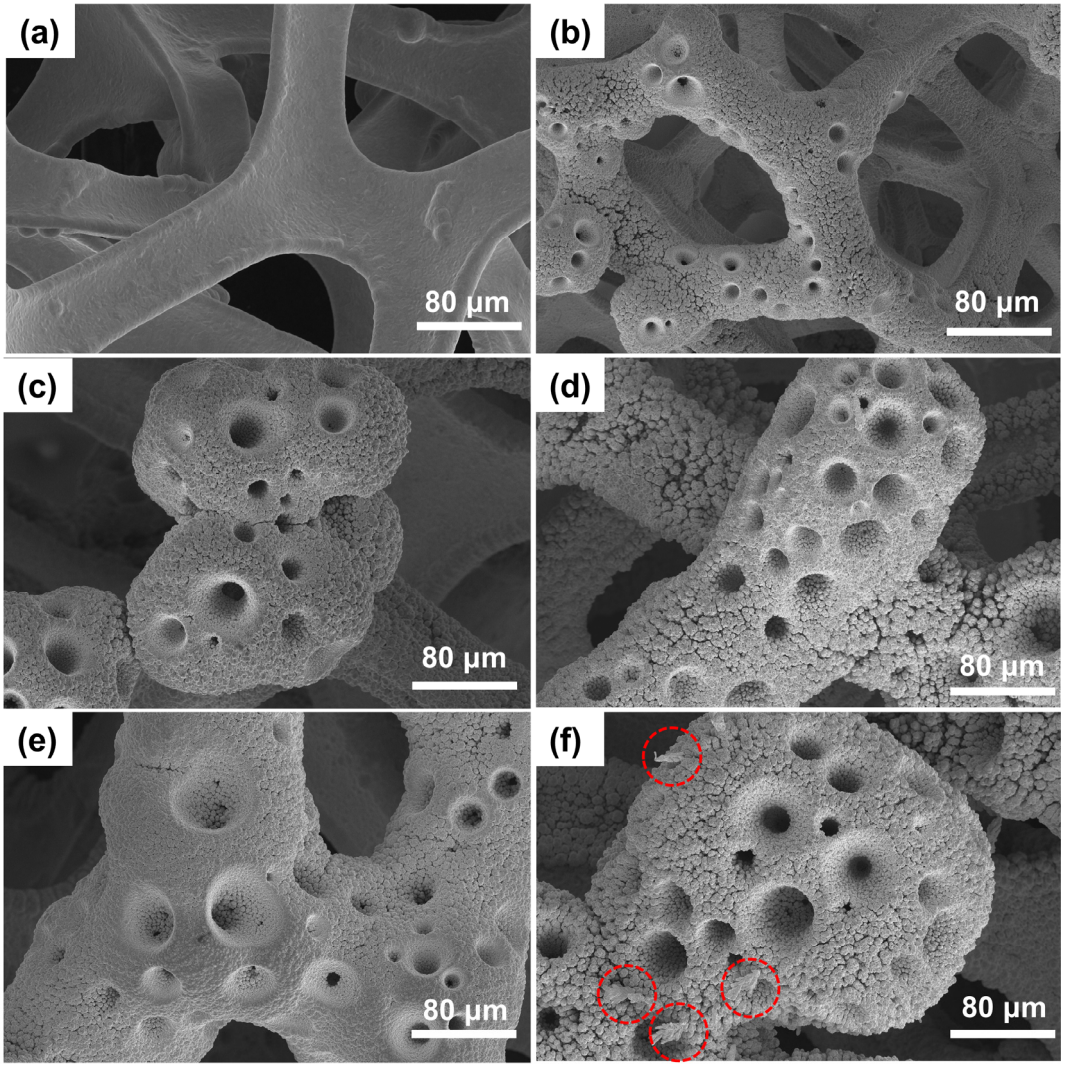

Figure S2. SEM images of pristine (**a**) NF and NF-Ni deposited for (**b**) 100 s, (**c**) 200 s, (**d**) 300 s, (**e**) 400 s and (**f**) 500 s.

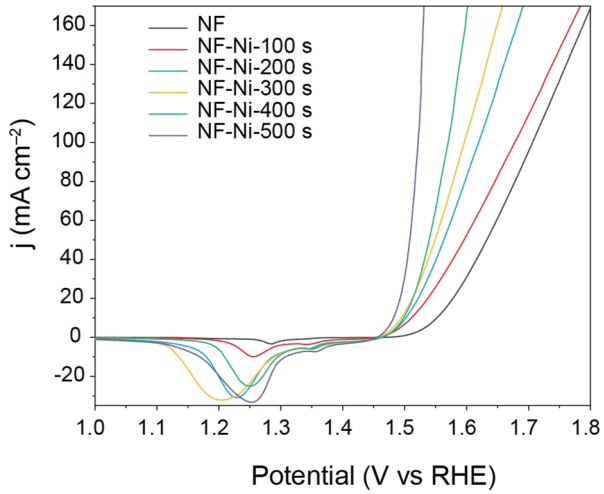

Figure S3. Polarization curves for OER of NF and NF-Ni with different deposition time (100 s, 200 s, 300 s, 400 s and 500 s).

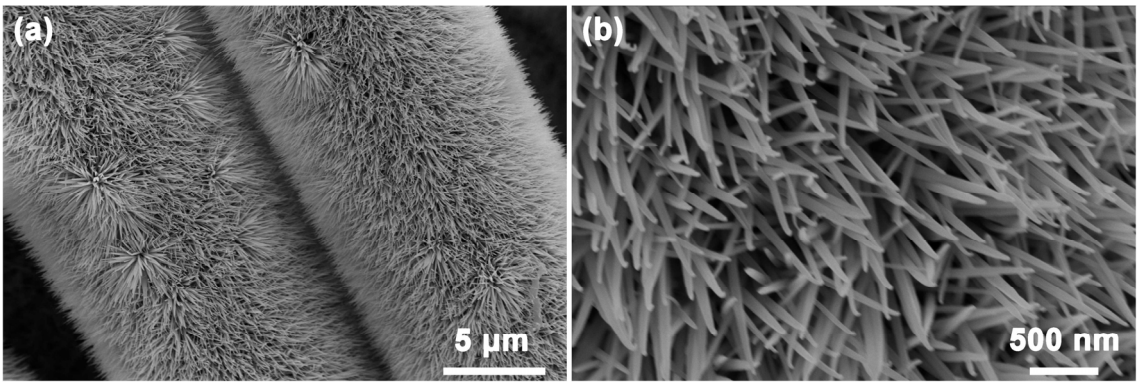

Figure S4. The SEM images of NF/NiCo LDH in (**a**) low magnification and (**b**) high magnification.

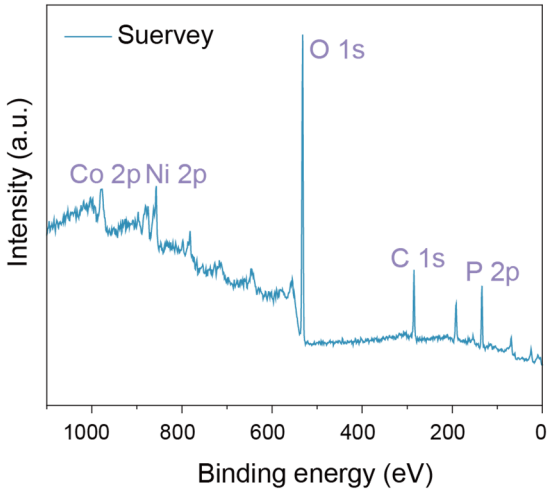

Figure S5. The survey XPS spectrum for NF/Ni@Br-NiCoP.

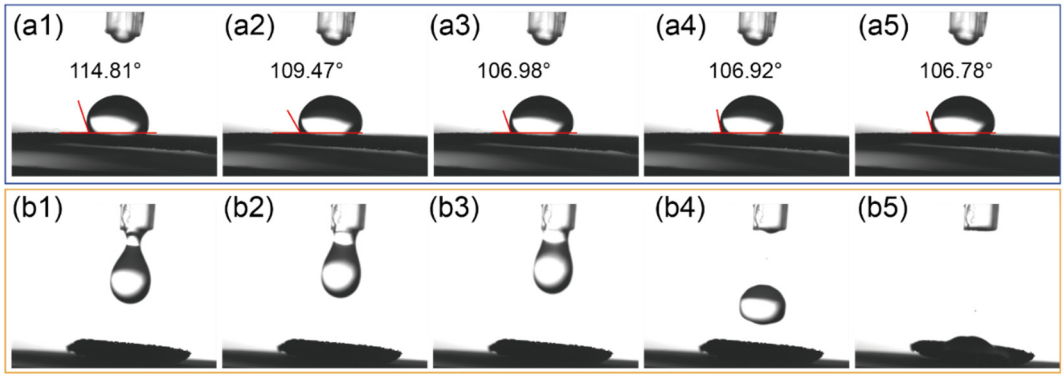

Figure S6. The wettability measurements for (**a**) NF and (**b**) NF/Ni@Br-NiCoP.

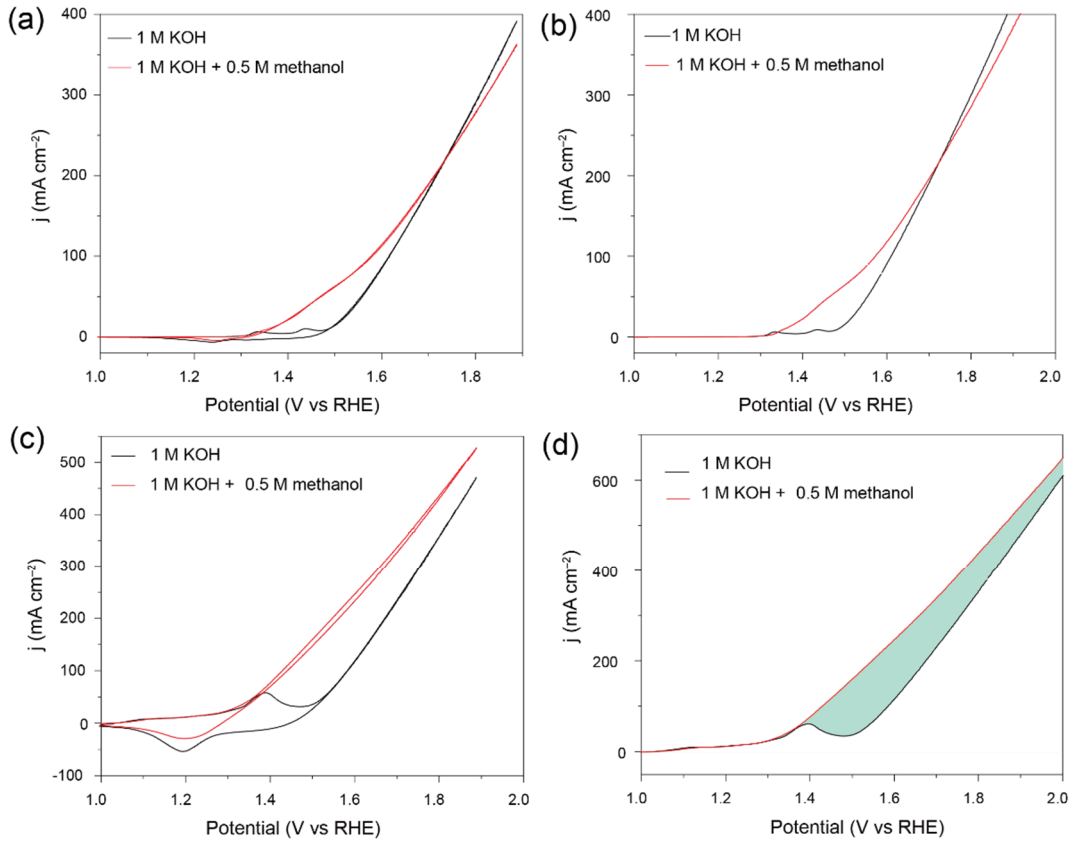

Figure S7. The CV and LSV curves of (**a**,**b**) NF/Ni@NiCoP NNS and (**c**,**d**) NF/Ni@Br-NiCoP.

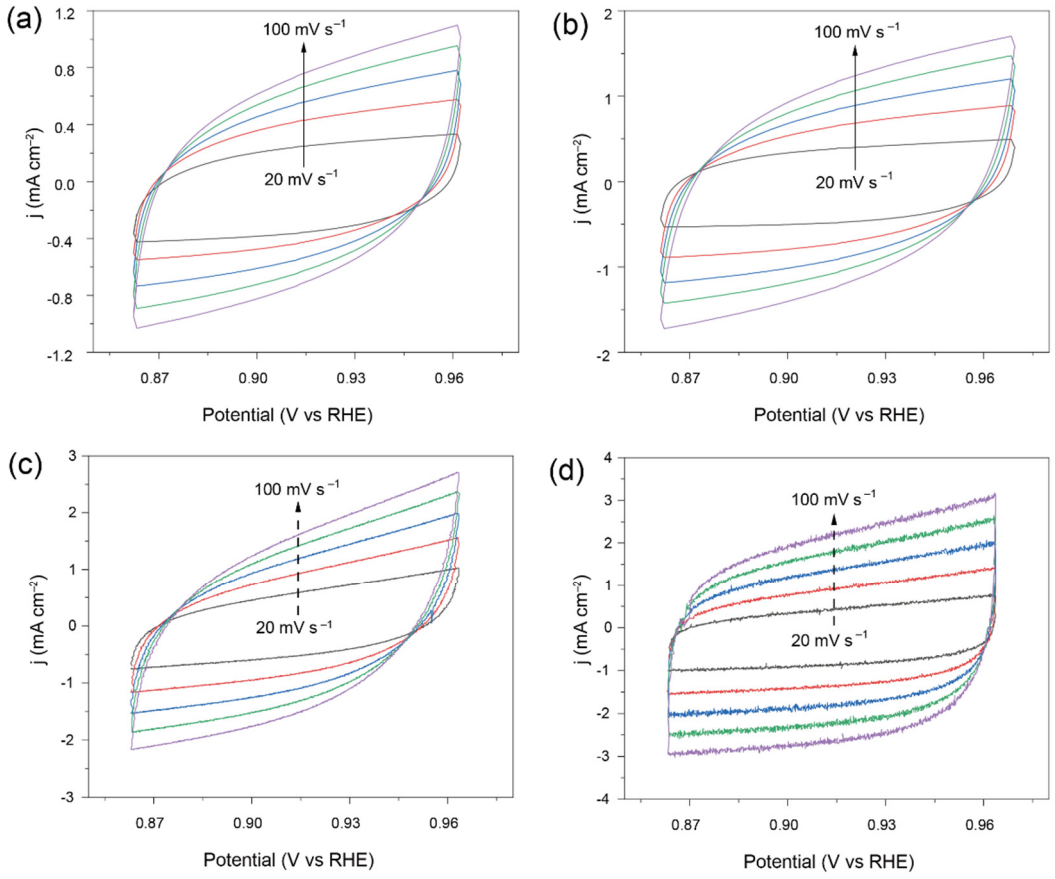

Figure S8. The CV curves in non-faradic region for (**a**) NF, (**b**) NF/Ni, (**c**) NF/Ni@NiCoP and (**d**) NF/Ni@Br-NiCoP.

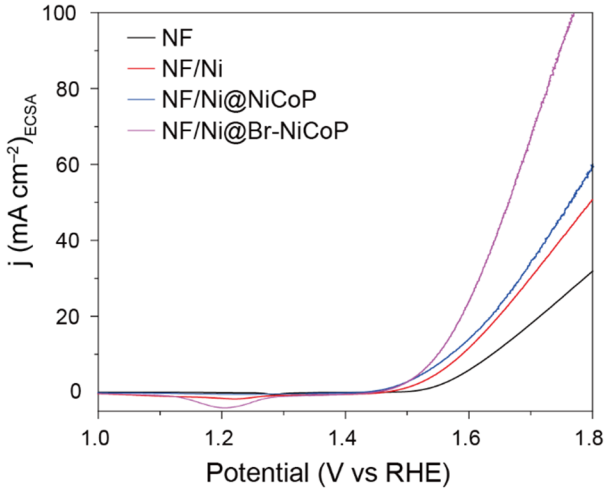

Figure S9. The ECSA normalized LSV curves.

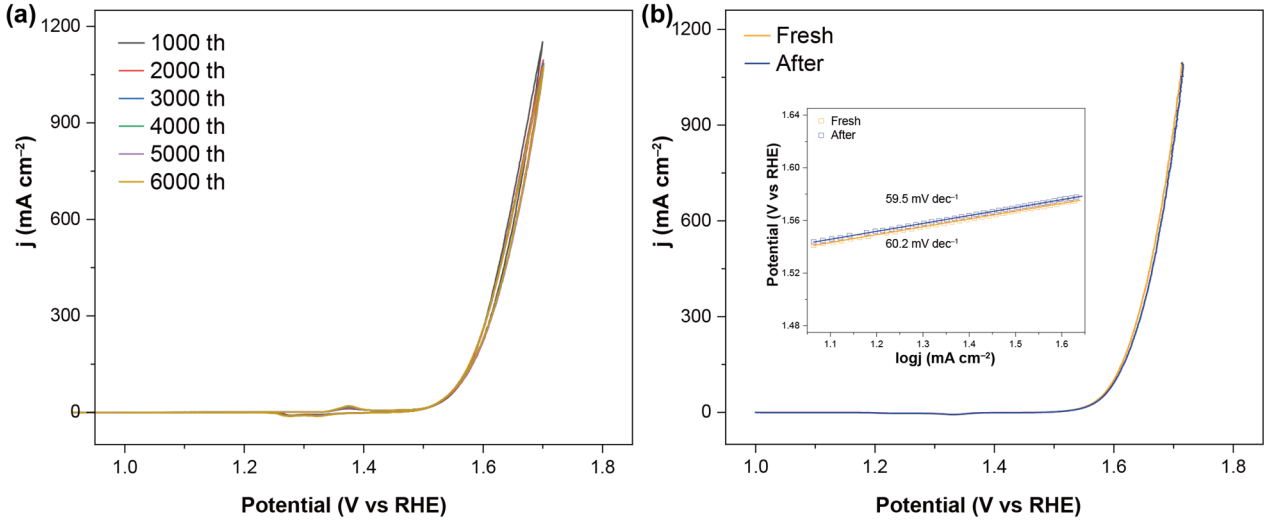

Figure S10. The (**a**) CV curves and (**b**) LSV curves for NF/Ni@Br-NiCoP after different CV cycles.

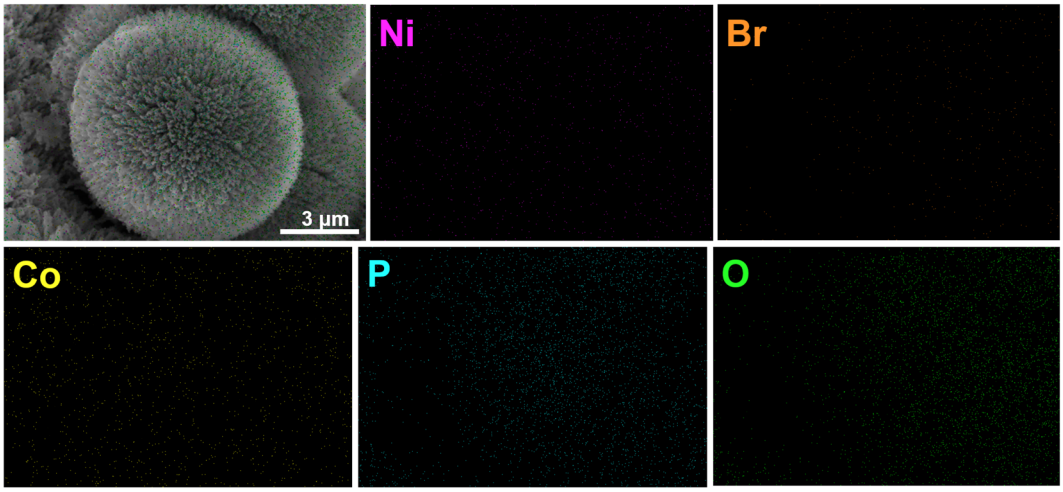

Figure S11. The SEM-EDS characterization for NF/Ni@Br-NiCoP post OER test.

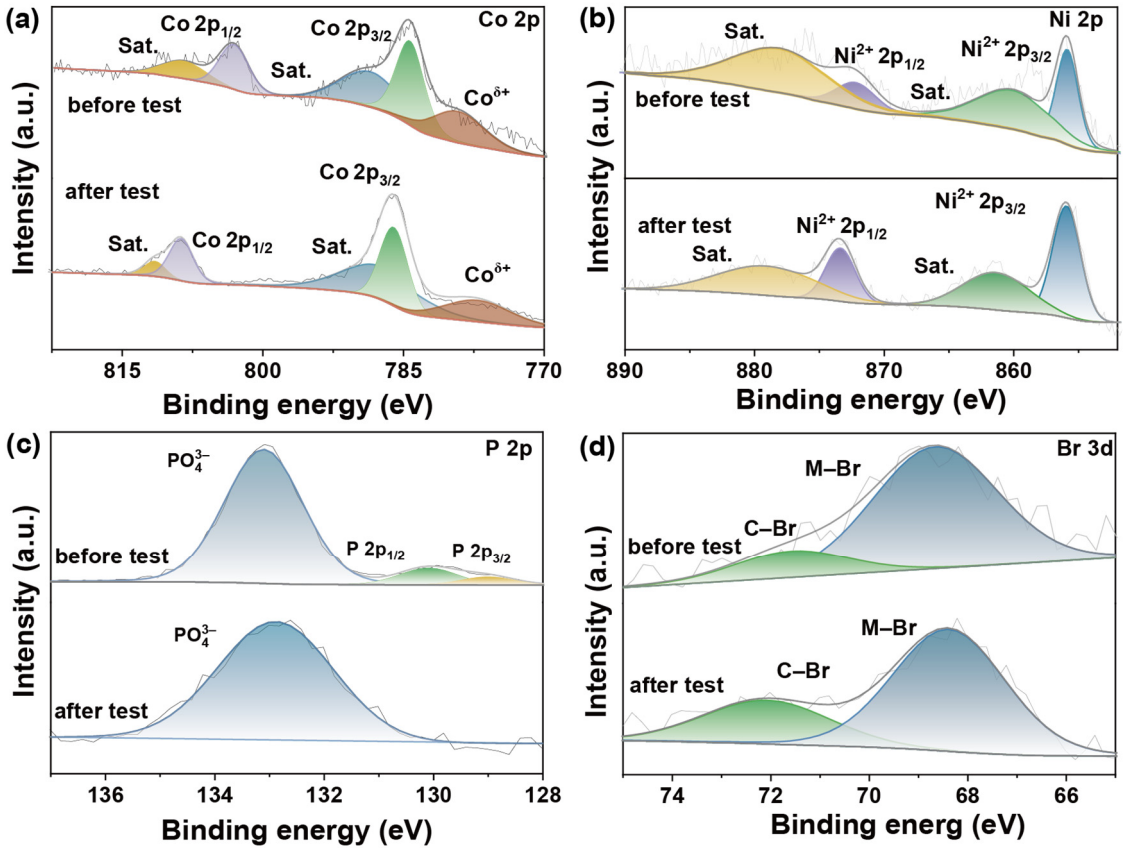

Figure S12. The XPS characterization for NF/Ni@Br-NiCoP at initial state and post OER test. High resolution XPS spectra for (**a**) Co 2p, (**b**) Ni 2p, (**c**) P 2p and (**d**) Br 3d.

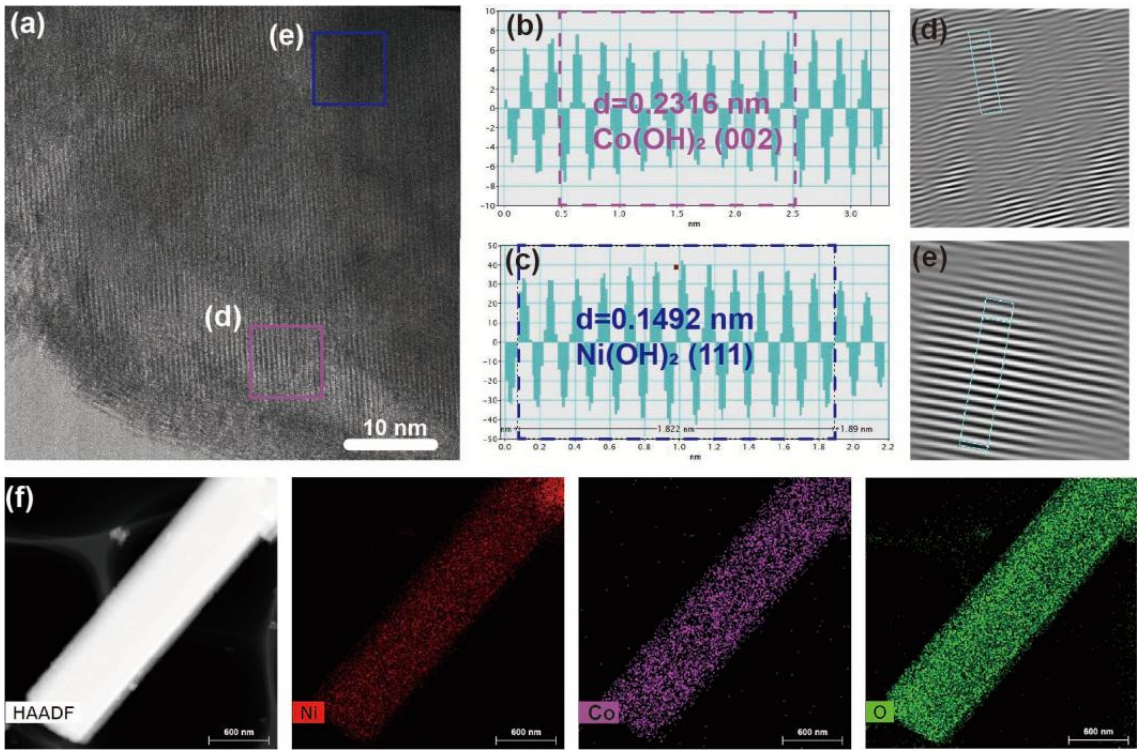

Figure S13. The dynamics reconstruction characterization of NF/Ni@Br-NiCoP under OER process. (**a–e**) TEM and (HR)TEM and (**f**) EDS spectra.

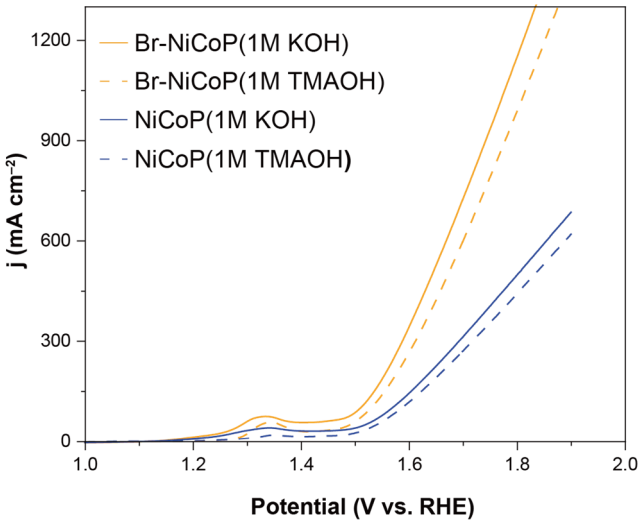

Figure S14. The LSV curves for NF/Ni@NiCoP and NF/Ni@Br-NiCoP in KOH and TMAOH.

Table S1. The concentration of Co, Ni, P and Br in the NF/Ni@Br-NiCoP.

Element	**Co**	**Ni**	**P**	**Br**
Content (at. %)	28.959	57.176	12.732	1.133

Table S2. The OER overpotential of catalysts reported recently.

Catalyst	**Overpotential@10 mA^{-2}**	**References**
Ni-CoOOH	320 mV	*Chem. Eng. J.* 2022, 443, 136432
$Co_3(PO_4)_2$	301 mV	*Small* 2022, 18, 2204309
Cr doped Co_xP	325 mV	*Adv. Funct. Mater.* 2023, 2214081
Co-Mo-0.125–6N	413	*Appl. Catal. B* 2023, 328, 122474
$Fe_xNi_{2-x}P_4O_{12}$/RGO	277	*Appl. Catal. B* 2023, 334, 122834
Mo-CoP	330	*Ionics* 2021, 27, 7, 3109–3118
MnCo/NiSe/NF	320	*Appl. Catal. B* 2023, 325, 122355
Fe_2P/Co_2N porous heterostructure	285	*Adv. Funct. Mater.* 2023, 33, 2209465
Ru/NiFeOOH/NFF	266	*Chem. Eng. J.* 2023, 458, 141457
P-Mo-Co_3O_4@CC	309	*Carbon Energy* 2023, 5, e279
NiFe LDH	302	*Adv. Mater.* 2023, 35, 2203420
RuO_2	310	This work
NF/Ni@Br-NiCoP	**220**	**This Work**

Bold text indications the performance data of the samples

Table S3. Comparison of OER stability performance of Br-NiCoP with recently reported catalysts.

No.	Catalyst	Electrolyte	Stability Duration (CP)	Cycles (CV/LSV)	References
1	**Br-NiCoP**	**1.0 M KOH**	**>140 h@10 mA cm^{-2}**	**6000 cycles**	**This Work**
2	Br-CoP	1.0 M KOH	100 h@10 mA cm^{-2}	2000 cycles	*Energy Environ. Mater.* **2025**, *8*, 4, e70013.
3	Ce-NiCoP/LDH	1.0 M KOH	50 h@10 mA cm^{-2}	–	*J. Colloid Interface Sci.* **2025**, *700*, 3, 138590.
4	NiCo-LDH/NiCoP	1.0 M KOH	24 h@10 mA cm^{-2}	–	*Chem. Eng. J.* **2024**, *494*, 1, 153212.
5	Ru-NiCoP	1.0 M KOH	48 h@50 mA cm^{-2}	1000 cycles	*Chem. Eng. J.* **2024**, *480*, 2, 148560.
6	NiCoP/rGO	1.0 M KOH	20 h@10 mA cm^{-2}	–	*Energy Adv.* **2023**, *2*, 10, 1560–1568.
7	NiCoAl-LDH@NiP	1.0 M KOH	30 h@100 mA cm^{-2}	–	*Nanoscale* **2025**, *17*, 35,
8	Fe-Co-P	1.0 M KOH	40 h@10 mA cm^{-2}	3000 cycles	*ACS Nano* **2024**, *18*, 12, 8956–8965.
9	Ni_2P/CC	1.0 M KOH	70 h@10 mA cm^{-2}	–	*Mater. Chem. Front.* **2024**, *8*, 4, 888–905.
10	CoS@NiS	1.0 M KOH	100 h@10 mA cm^{-2}	–	*Catalysts* **2025**, *15*, 2, 124.
11	M-NSSe	1.0 M KOH	24 h@10 mA cm^{-2}	–	*Small* **2024**, *20*, 15, 2408887.