

Electronic Supplementary Information

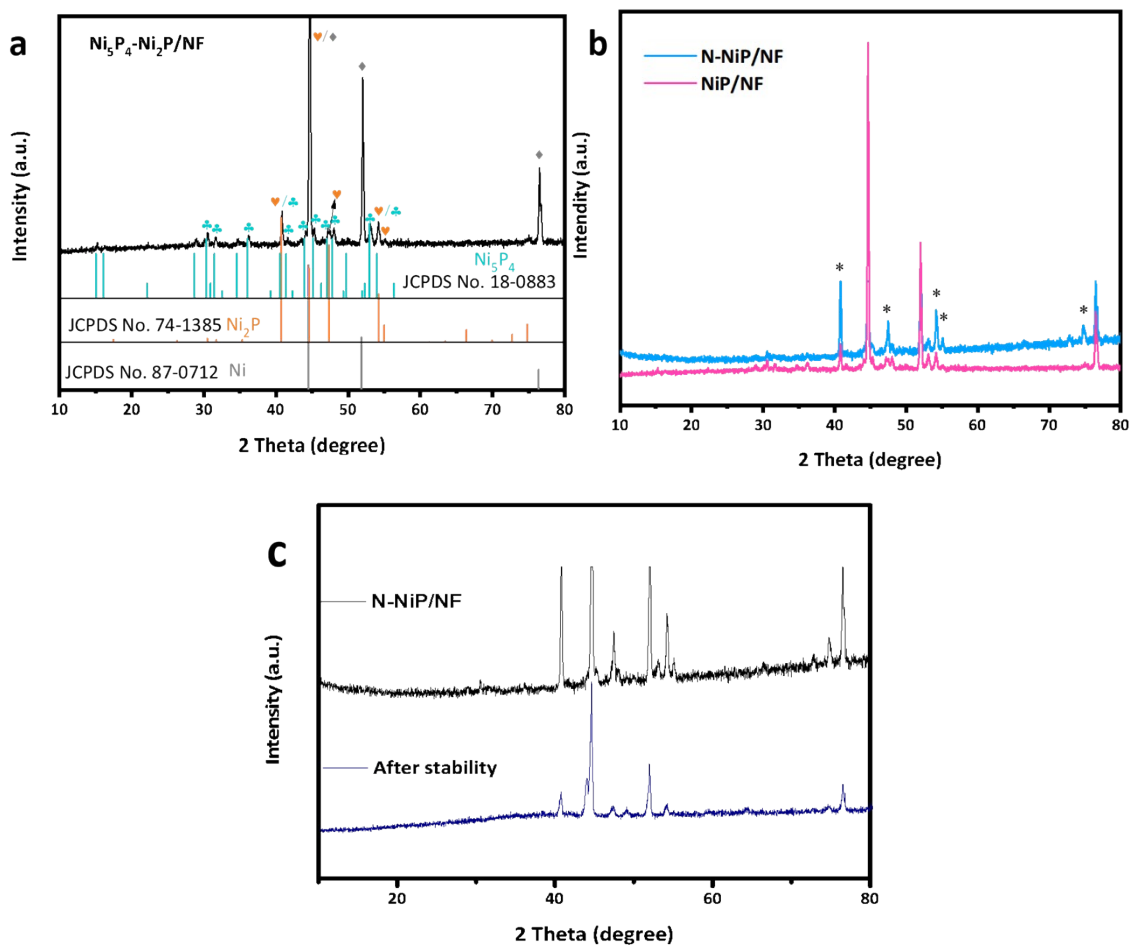


Fig. S1. XRD patterns of (a) NiP/NF; (b) XRD comparison of NiP /NF and N-NiP/NF. (c) XRD patterns of N-NiP/NF before and after stability.

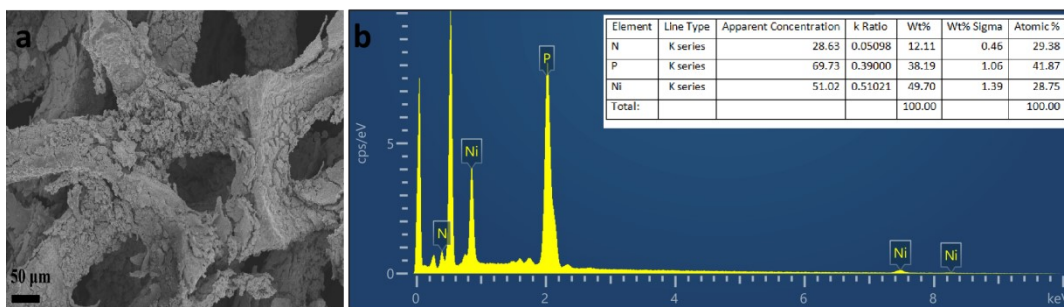


Fig. S2. The SEM image at low magnification of N-NiP/NF for a; and EDS spectrum of

N-NiP/NF for b.

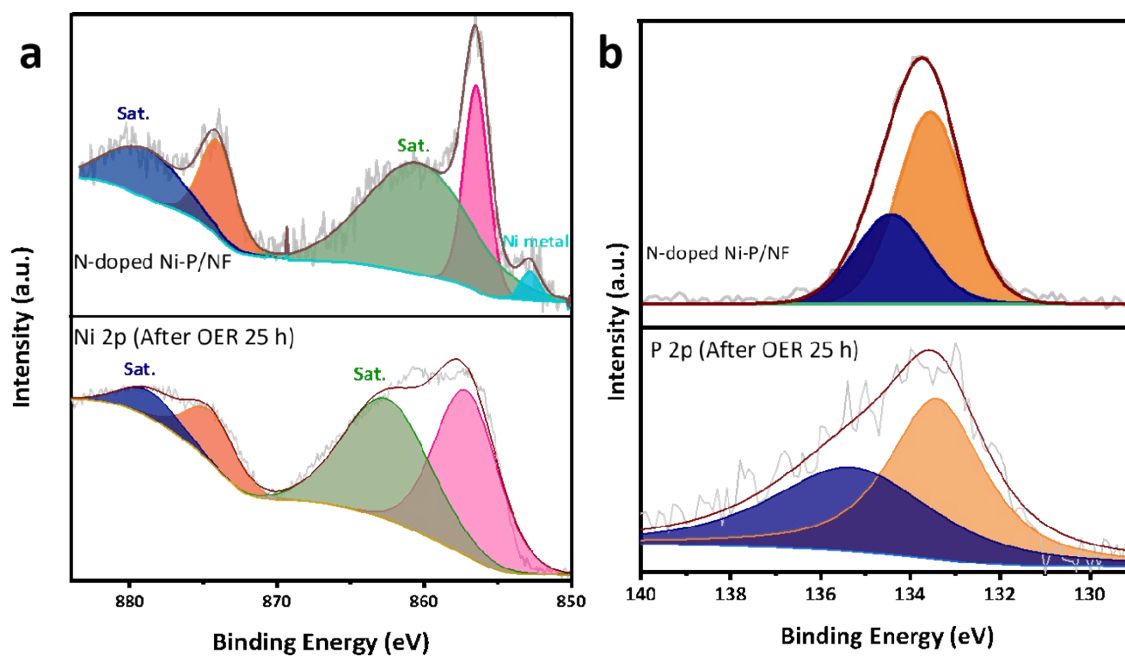


Fig. S3. XPS survey spectra of N-NiP/NF in (a) Ni 2p region (b) P 2p region after long-term OER test.

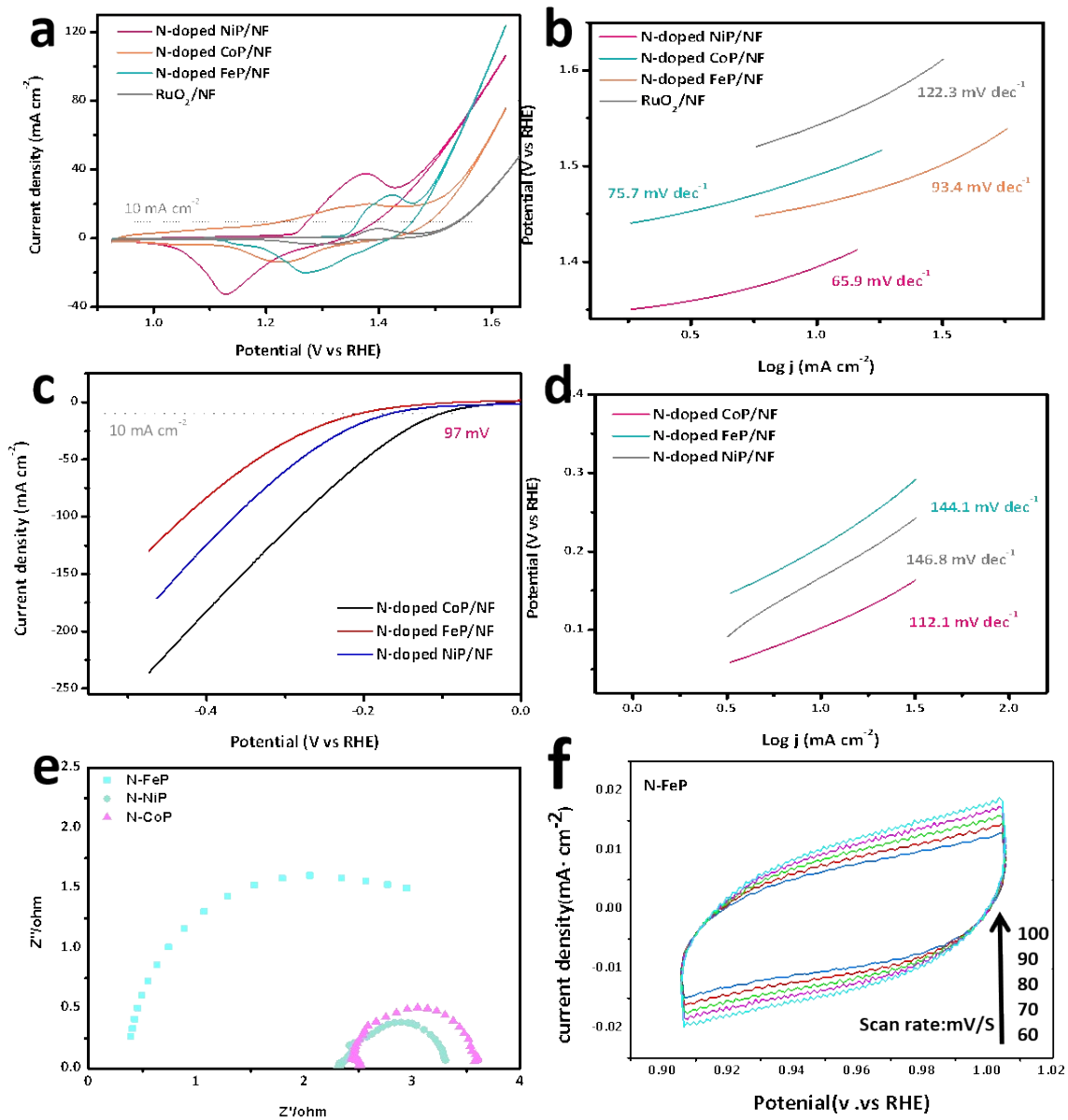


Fig. S4. (a) OER polarization curves of N-NiP/NF, N-CoP/NF, N-FeP/NF, RuO₂/NF. (b) The tafel slope of OER corresponding to different catalysts. (c) HER polarization curves of N-NiP/NF, N-CoP/NF, N-FeP/NF, Pt/NF. (d) The tafel slope of HER corresponding to different catalysts. Nyquist diagram of N-NiP/NF, N-CoP/NF, N-FeP/NF for (e). CV images of N-FeP in the sweep speed range of 60, 70, 80, 90 and 100mV/s for (f).

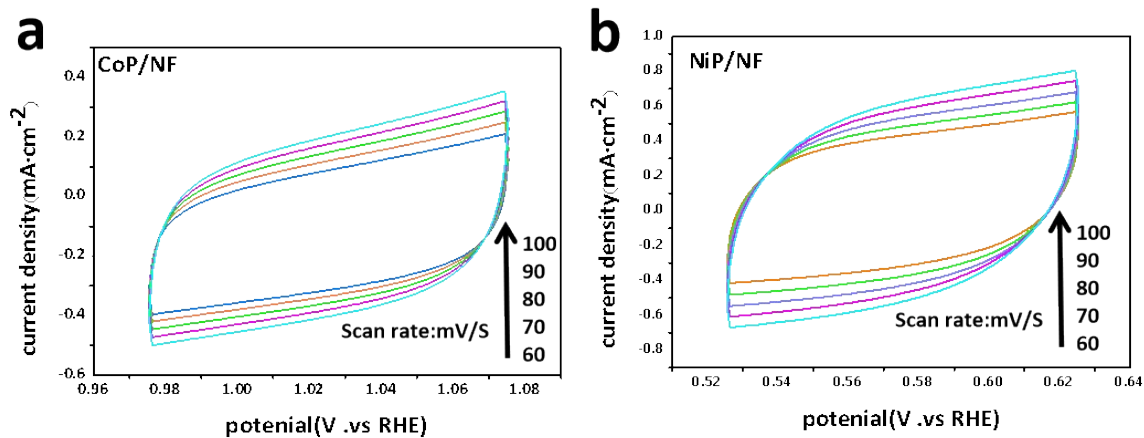


Fig. S5. CV images of NiP/NF, CoP/NF in the sweep speed range of 60, 70, 80, 90 and 100mV/s for (a), (b).

Table S1. Comparison of the OER performance for N-NiP/NF catalyst with other reported electrocatalysts.

Catalysts	η_{10} (mV)	Reference
N - NiP/NF	160 mV	This work
V - CoMx (M = P, S, O)	290 mV	1
Fe - NiP ₂ /Ni ₂ P	254 mV	2
NiFeP@NiP@NF	227 mV	3
Np - NiFeCoP	244 mV	4
NiFe LDH/NF-IH	246 mV	5
Fe- (Ni,Mn)Co ₂ O ₄	242 mV	6
Co ₃ O ₄ /CoFe ₂ O ₄ /NF	215 mV	7
Ni ₃ S ₂ @Ni ₂ P/MoS ₂ /NF	175 mV	8
Ni _{0.65} Ga _{0.30} Fe _{0.05}	200 mV	9
Ni ₃ S ₂ - CoMoS _x /NF	234 mV	10
Fe ₃ O ₄ - NiFe LDH NF	216 mV	11
VFe-MOF@NF	246 mV	12
N- CoS ₂	240 mV	13
triflPt and NiFe-LDH	261 mV	14
P, B - NiFePB	197 mV	15
CoSe@NiFe-LDH	201 mV	16

References

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