Supporting information

One-step Electrodeposition of the V-doped NiFe Nanosheets for Low-overpotential Alkaline Oxygen Evolution

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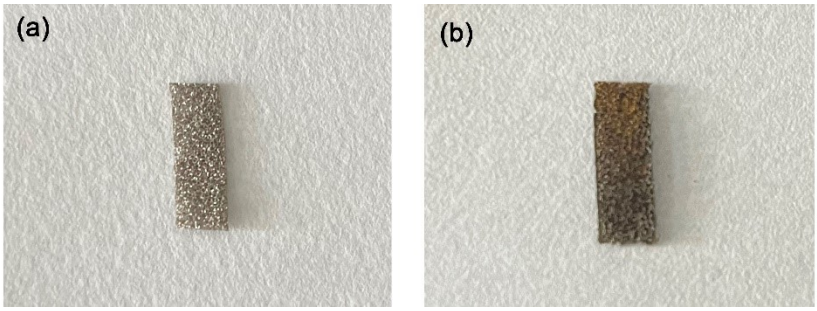

Fig. S1. Optical images of (a) NF array and (b) NiFeV/NF array. The NiFeV /NF array is darker than the NF array.

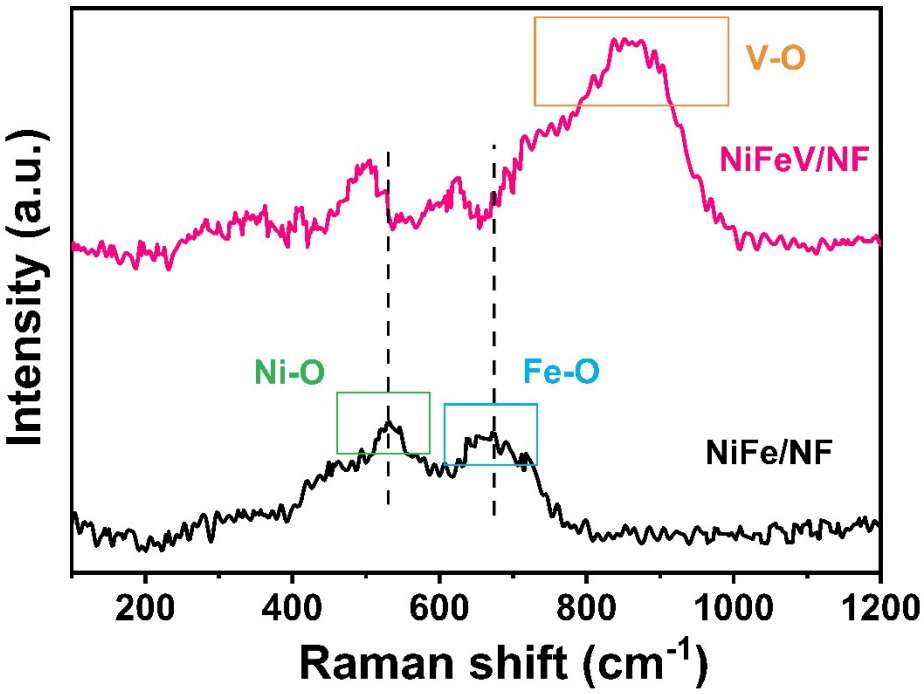

Fig. S2. Raman spectra of NiFeV/NF and NiFe/NF.

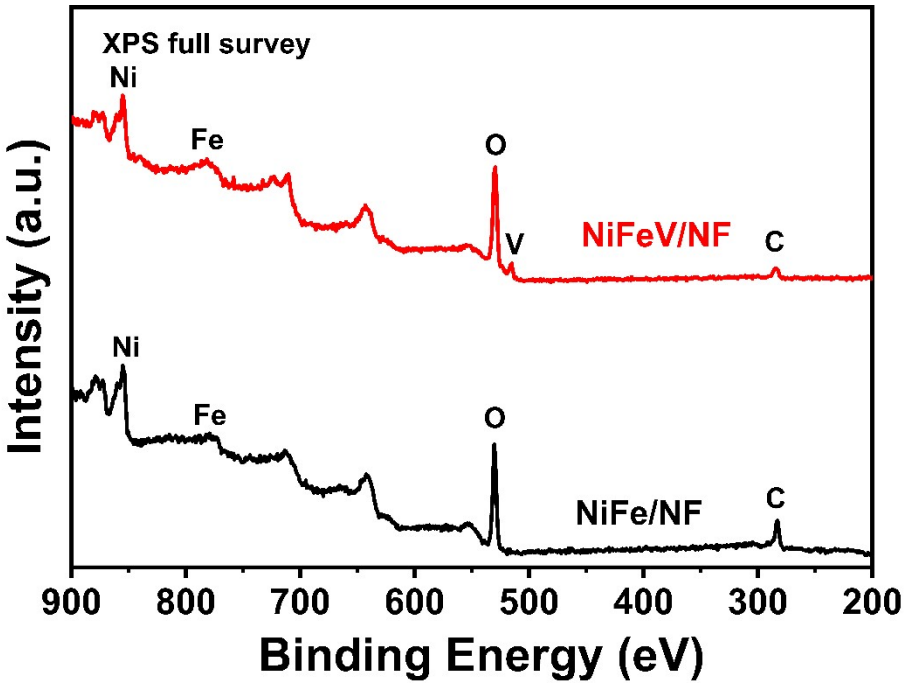

Fig. S3. XPS spectra of NiFeV/NF and NiFe/NF.

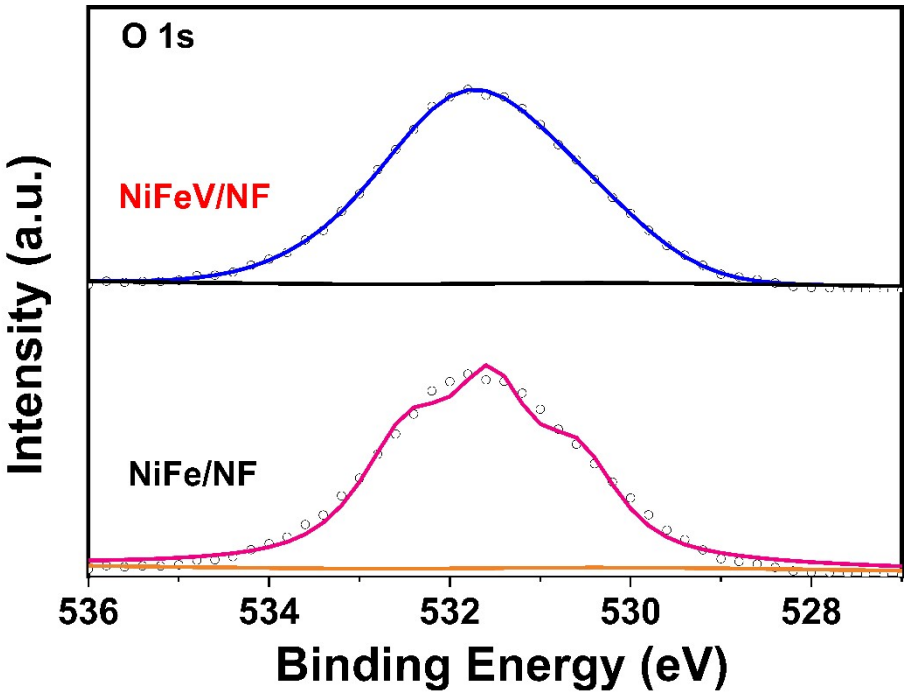

Fig. S4. High-resolution XPS spectra of O1s in the prepared samples..

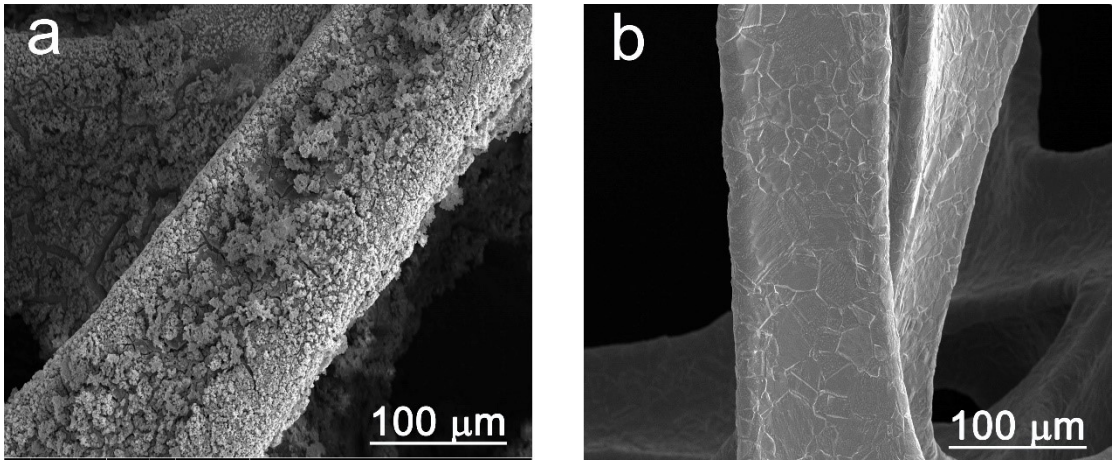

Fig. S5. SEM images of bare NiFeV/NF (a) and NF (b).

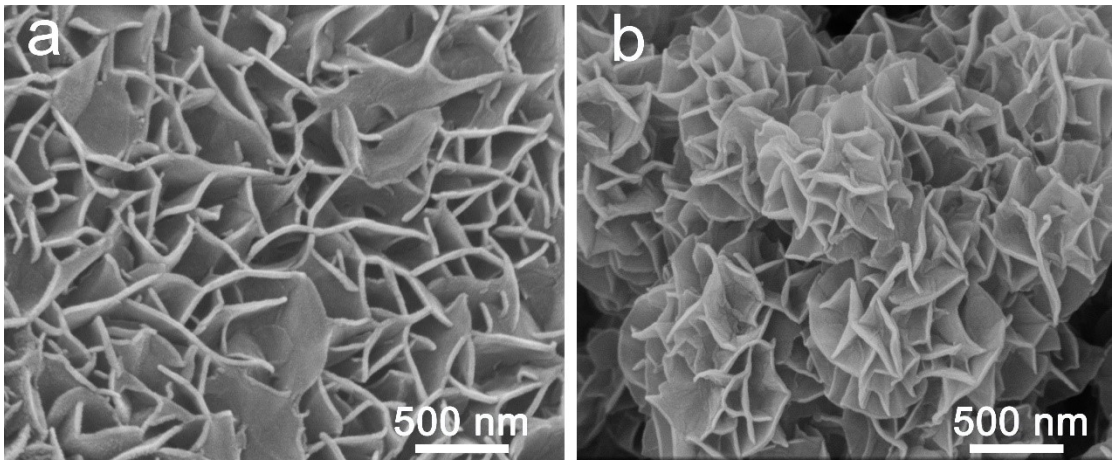

Fig. S6. SEM images of NiFe/NF (a) and NiFe/NF (b).

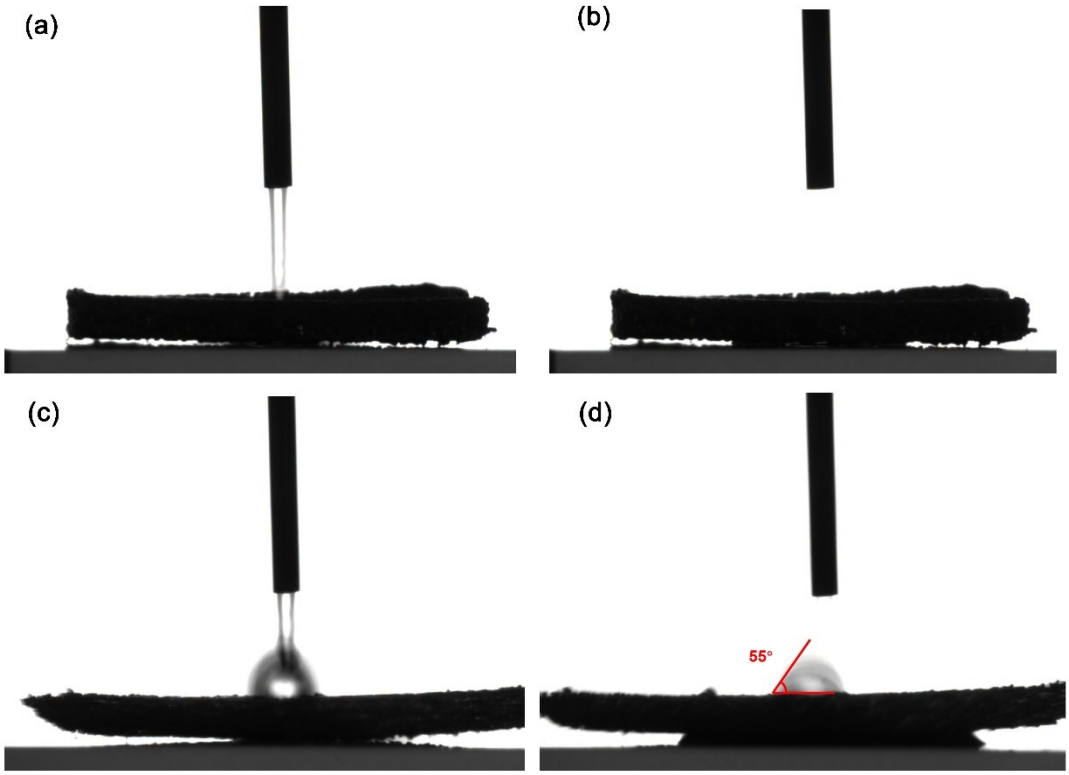

Fig. S7. Surface wettability of the NiFeV/NF (a,b) and the NiFe/NF (c,d).

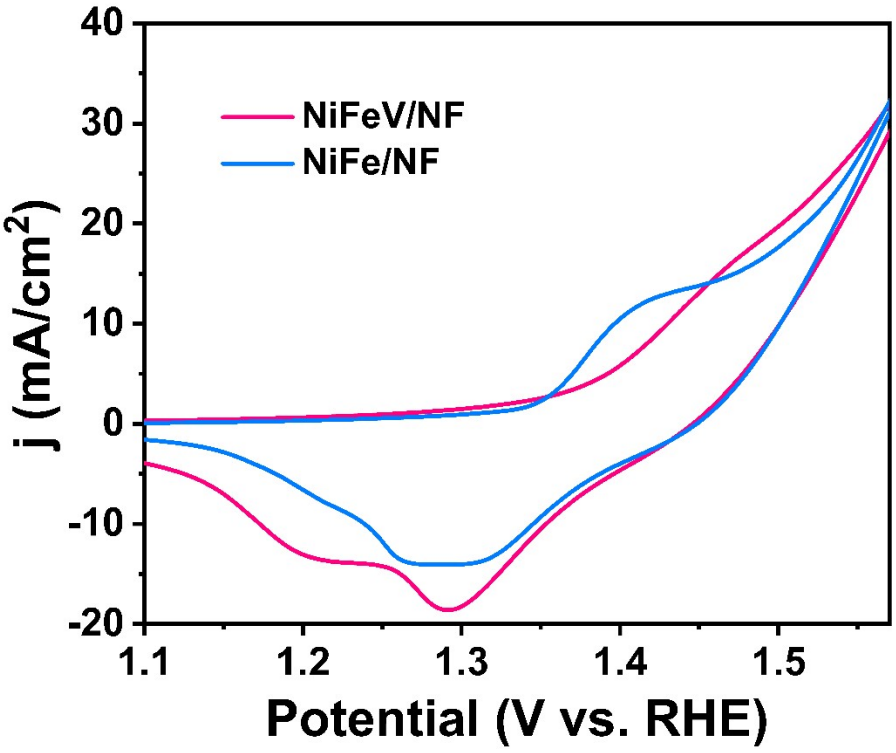

Fig. S8. CV curves of NiFeV/NF and NiFe/NF.

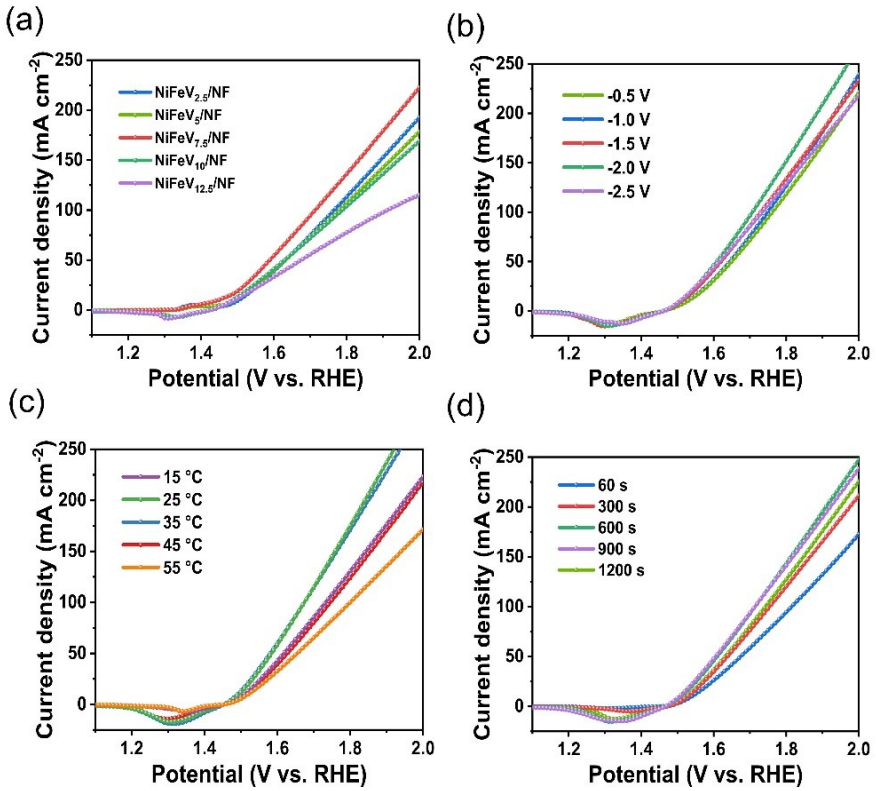

Fig. S9. The OER LSV curves of NiFeV/NF in different (a) Concentration of V (mM) (b) electrodeposition voltages, (c) electrodeposition temperature, and (d) electrodeposition temperature time.

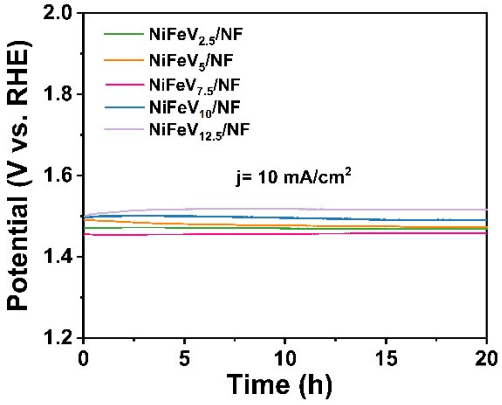

Fig. S10. The potential stability test of NiFeV/NF with different V concentrations at a current density of 10 mA/cm^2 at 1 M KOH

Table S1. The OER electrochemical impedance parameters obtained by simulating the Nyquist plots in Figure 3e with an appropriate equivalent circuit model.

Electrocatalysts	R_s ($\Omega \cdot cm^2$)	CPE_1-T (F)	CPE_1-P (F)	R_1 ($\Omega \cdot cm^2$)	CPE_2-T (F)	CPE_2-P (F)	R_{ct} ($\Omega \cdot cm^2$)
NiFe/NF	1.535	0.1022	0.69979	0.18817	0.080326	0.95788	0.85983
NiFeV/NF	1.512	0.10828	1.79049	0.12038	0.19539	0.93286	0.38797

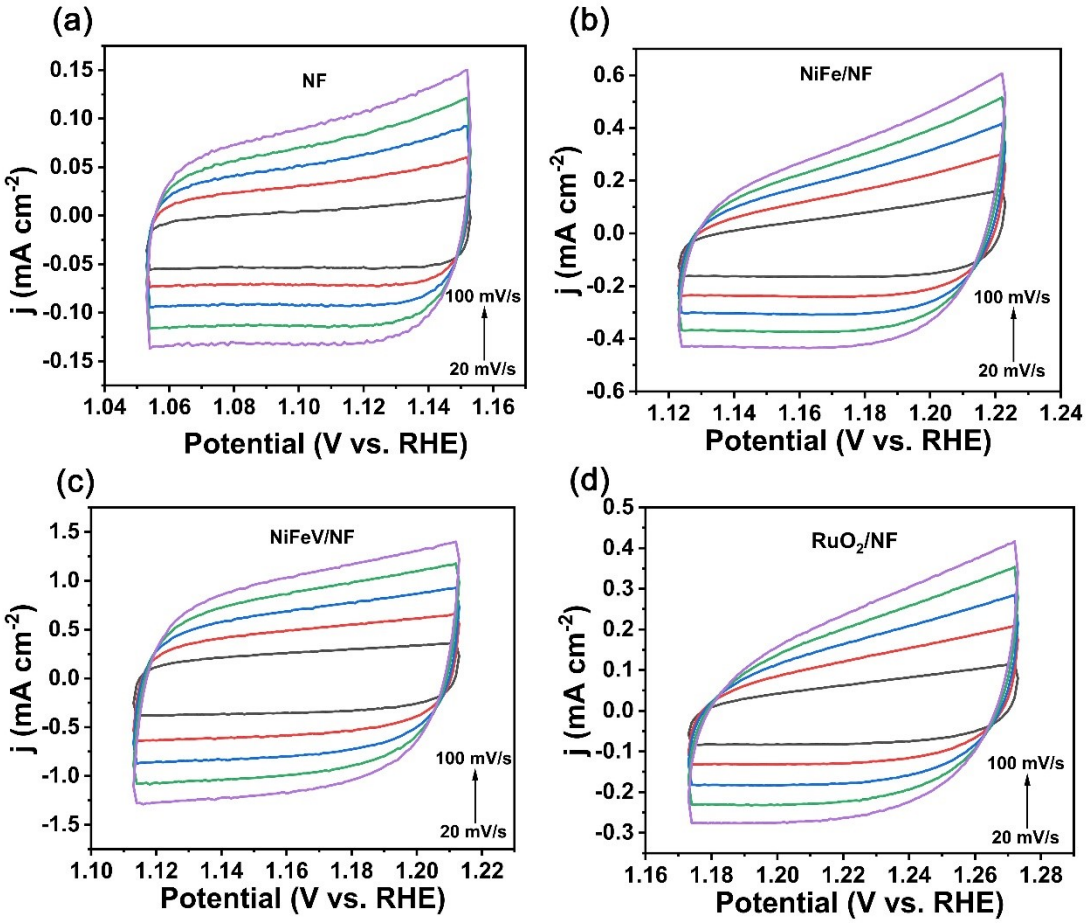

Fig. S11. Cyclic voltammograms (CVs) at different scan rates of the prepared samples. a NF, b NiFe/NF, c NiFeV/NF, d RuO_2/NF.

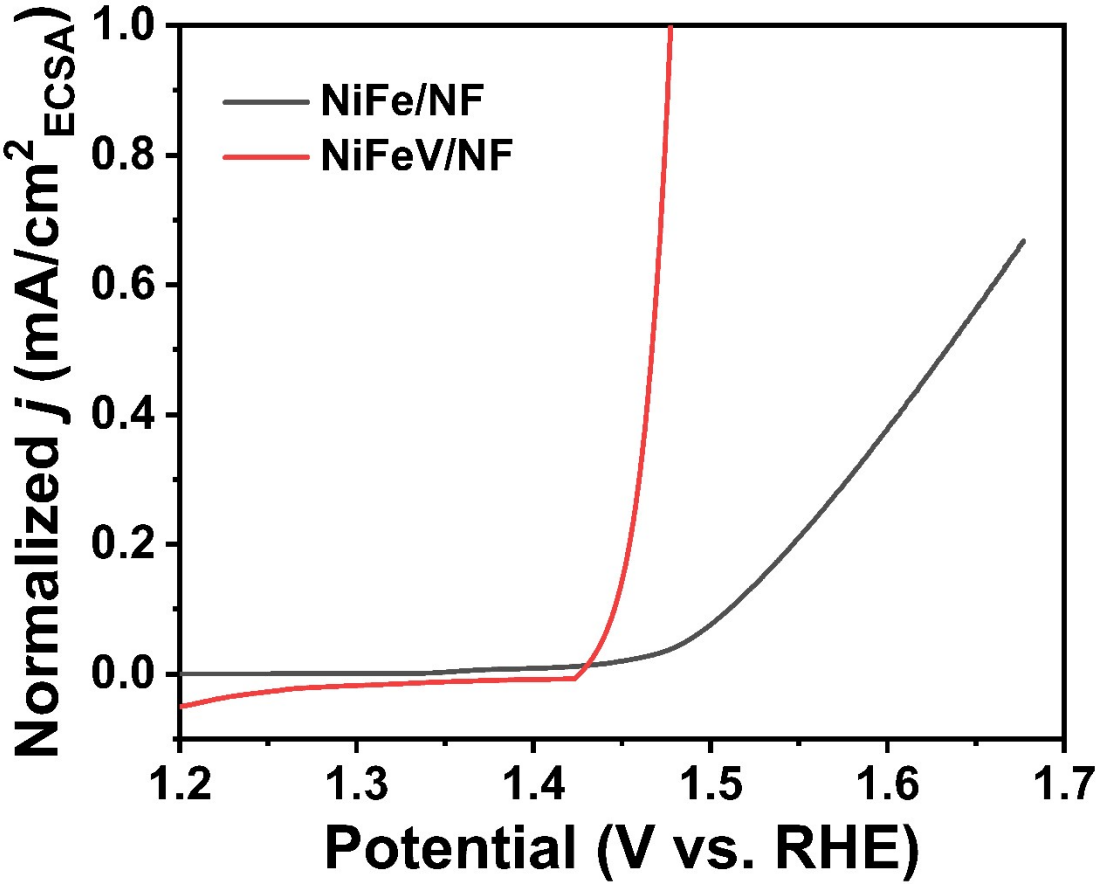

Fig. S12. OER polarization curves for NiFeV/NF and NiFe/NF, normalized by electrical surface area (ECSA).

Table S2. Comparison of the potentials at 10 mA cm^{-2} with recently reported OER catalysts

Catalyst	Electrolyte	Overpotential (mV) at 10 mA cm-2	Tafel slope (mV dec−1)	Reference
NiFeV/NF	1.0 M KOH	218	33	This work
NiCoP/CC		242	64.2	1
NiFe LDH/NF		256	50	2
Co-Fe-P-Se/NC		270	42	3
Ni_3FeN/r-GO		270	54	4
N-$NiMoO_4$/NiS_2@CFC		283	44.3	5
FeCoNi		288	60	6
NiFeMn LDH		289	47	7
$NaNi_{0.9}Fe_{0.1}O_2$		290	44	8
NiFe@NC		300	56	9
HCM@Ni-N		304	76	10

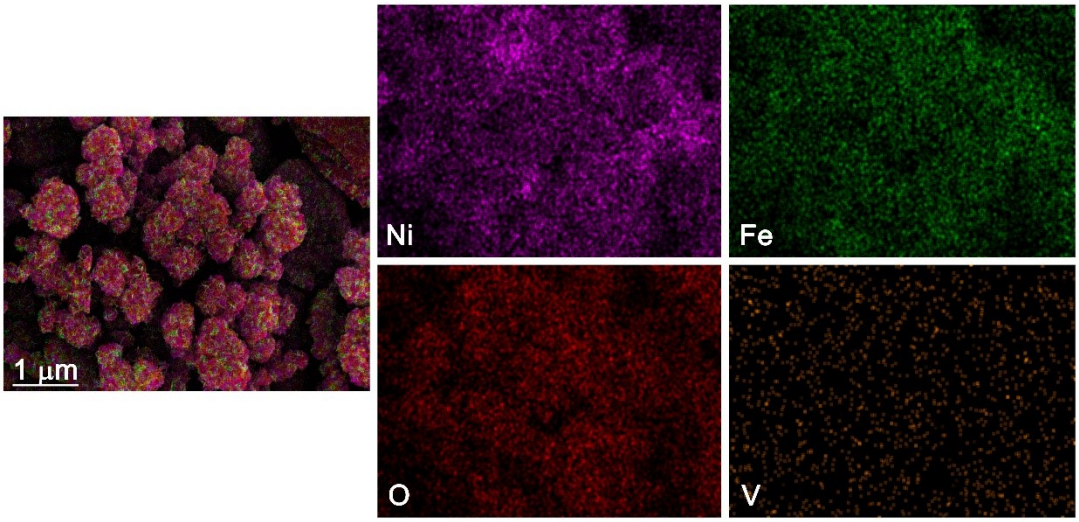

Fig. S13. SEM image and corresponding EDX mapping images of the NiFeV/NF after the OER stability test for 20 h.

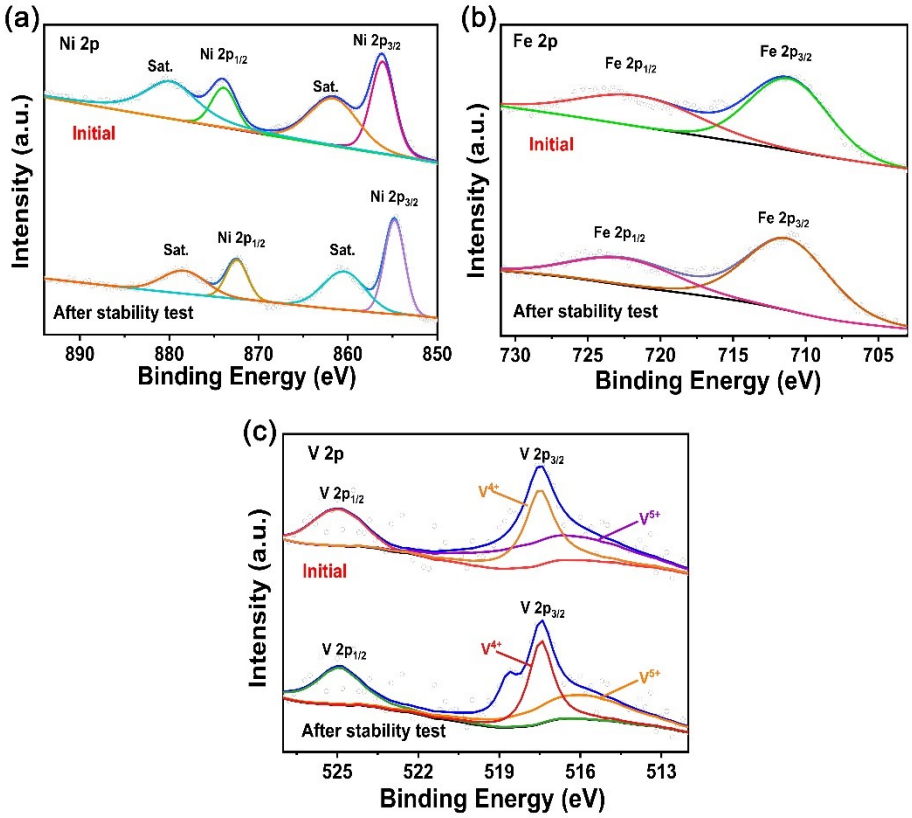

Fig. S14. XPS spectra comparison of fresh NiFeV/NF electrocatalyst and NiFeV/NF electrocatalysts after the OER stability tests. (a) Ni 2p, (b)Fe 2p, and (c)V 2p.

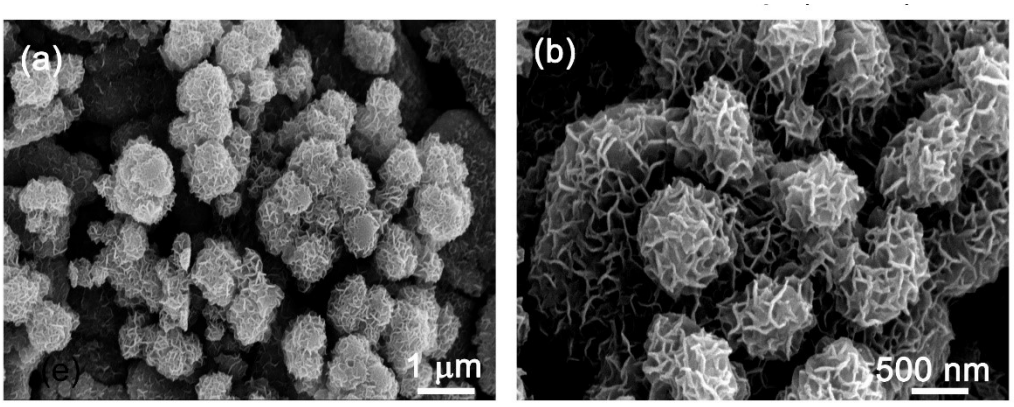

Fig. S15. SEM images of NiFeV/NF after 20 h stability test.

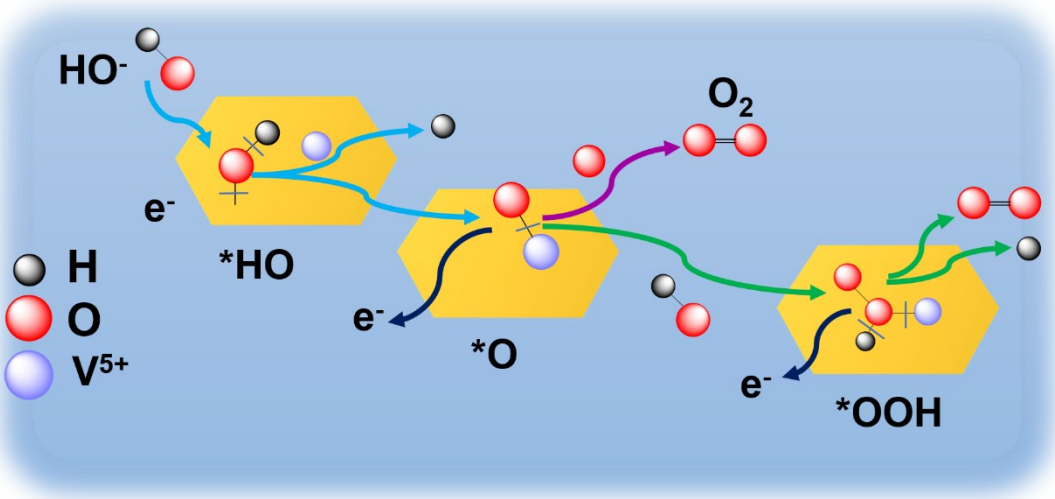

Fig. S16. Schematic illustration of the OER processes on the NiFeV/NF nanosheets, where * represents the reaction sites of the electrocatalysts.

Reference

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