Electronic Supplementary Material (ESI) for Physical Chemistry Chemical Physics.

Surpporting Information

The preparation of Co-precursor. In detail, 66.7mM of $Co(NO_3)_2 \cdot 6H_2O$ solution was prepared as the electrolyte, the pre-treated NF was served as the cathode, and a saturated calomel electrode (SCE) and platinum were used as reference electrode and counter electrode, respectively. The electrodeposit process was proceeded for 800s under a constant potential of -0.8 V. Further, the $Co(OH)_2$/NF was rinsed with deionized water and ethanol and then vacuumed for 10h. The as-prepared $Co(OH)_2$/NF was heated for 2h at 400℃ with a heating rate of 5℃/min and cooled down to room temperature. Finally, a certain mass of Mo-$Co(OH)_2$ nanoplates were deposited on the Co_3O_4/NF via a similar electrodeposition process.

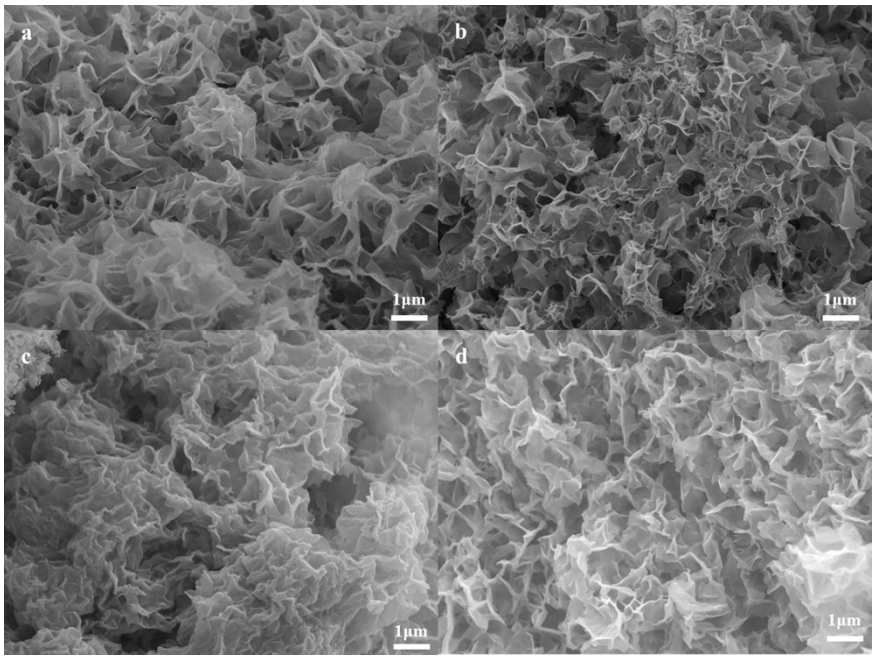

Fig. S1 SEM images of (a) Mo-CoP/Co_2P/NF-300, (b) Mo-CoP/Co_2P/NF-200, (c) Mo-CoP/Co_2P/NF-500 and (d) Mo-CoP/Co_2P/NF-800.

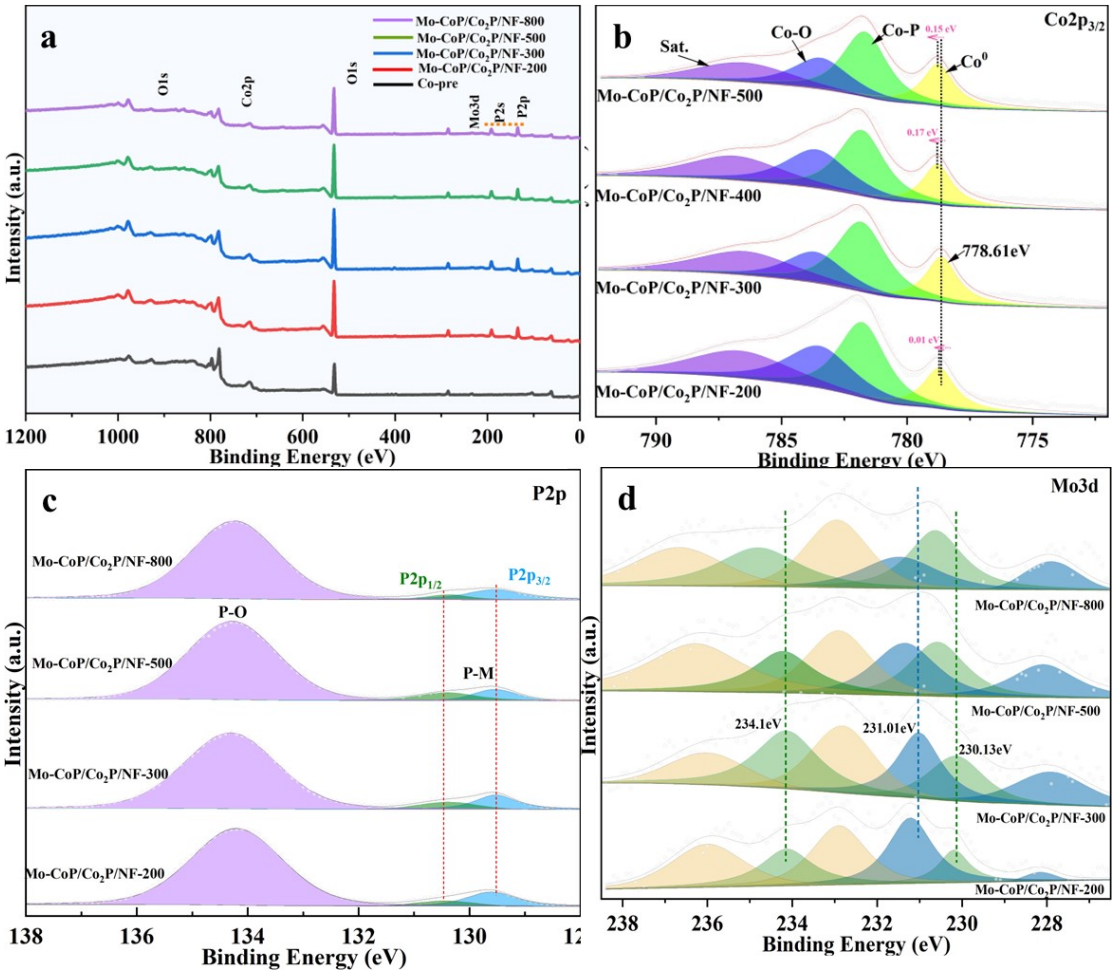

Fig. S2 (a) Survey X-ray photoelectron spectroscopy (XPS) of Mo-CoP/Co_2P/NF-300, Mo-CoP/Co_2P/NF-200, Mo-CoP/Co_2P/NF-500 and Mo-CoP/Co_2P/NF-800. (b-d) XPS spectra of Co2p, P2p and Mo3d for Mo-CoP/Co_2P/NF-300, Mo-CoP/Co_2P/NF-200, Mo-CoP/Co_2P/NF-500 and Mo-CoP/Co_2P/NF-800.

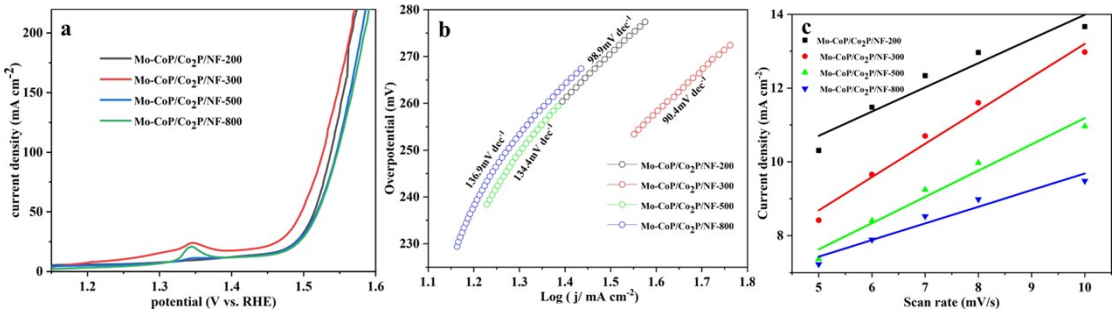

Fig. S3 (a) LSV curves, (b) Tafel slopes and (c) the double-layer capacitance (Cdl) of CoP/Co_2P/NF-200, CoP/Co_2P/NF-300, Mo-CoP/Co_2P/NF-500 and Mo-CoP/Co_2P/NF-800 for HER

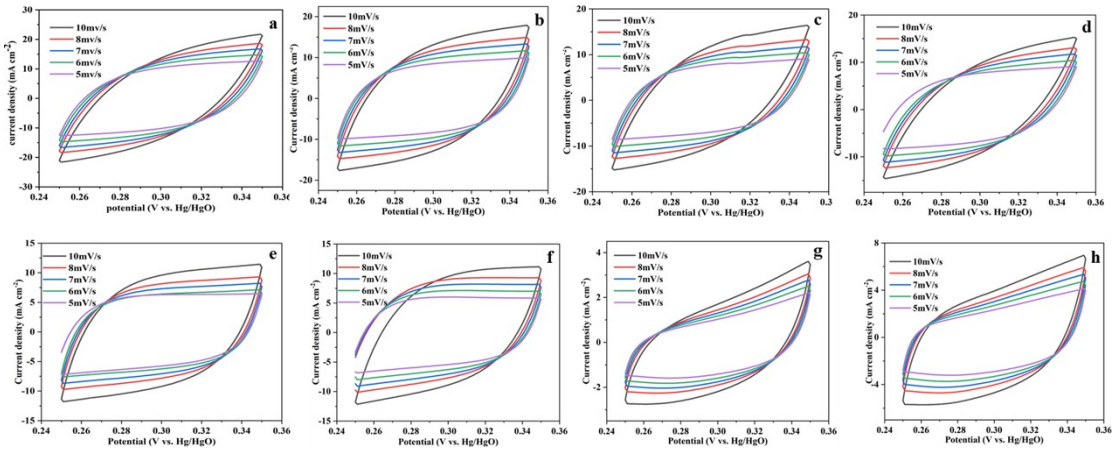

Fig. S4 CV curves of the CoP/Co_2P/NF-200, CoP/Co_2P/NF-300, Mo-CoP/Co_2P/NF-500, Mo-CoP/Co_2P/NF-800, Co-pre, CoP, Co_2P, CoP/Co_2P at the different scan rates ranging from 5 to 10 mV s^{-1} for OER.

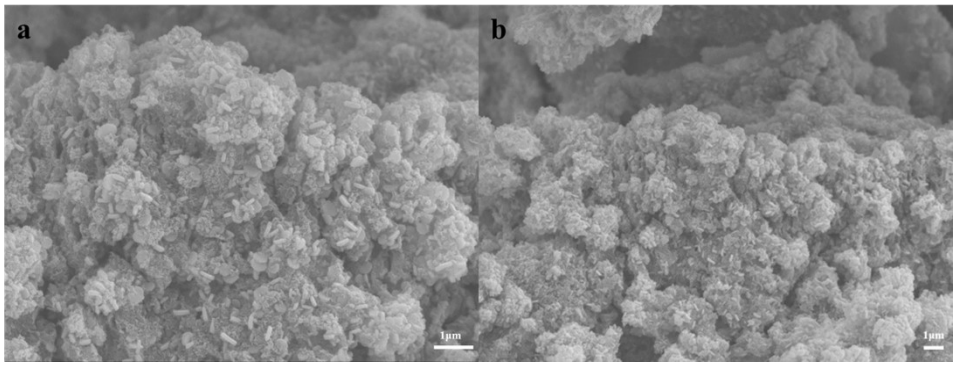

Fig. S5 SEM images of CoP/Co_2P/NF-300 after OER

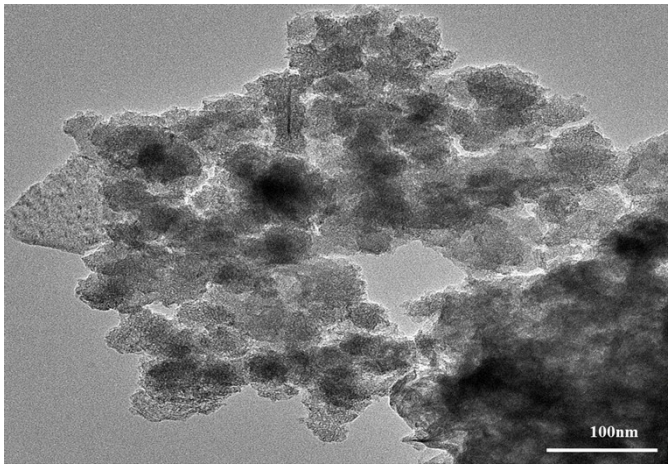

Fig. S6 TEM images of CoP/Co_2P/NF-300 after OER

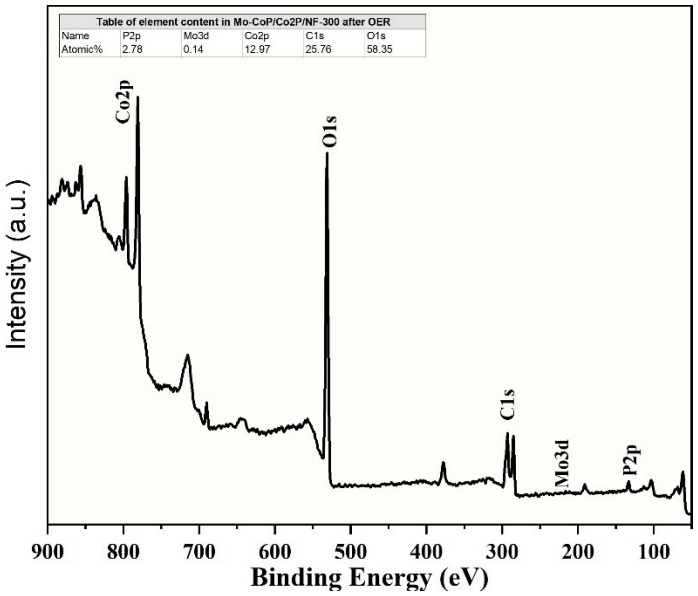

Fig. S7 Survey spectra of CoP/Co_2P/NF-300 after OER

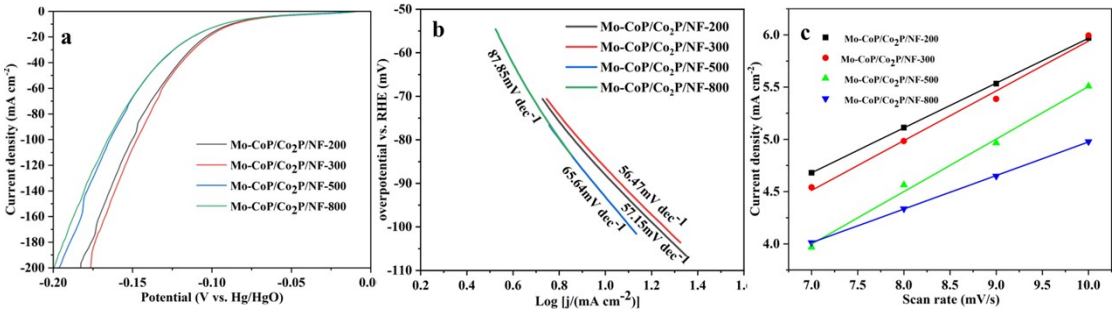

Fig. S8 (a) LSV curves, (b) Tafel slopes and (c) the double-layer capacitance (Cdl) of CoP/Co_2P/NF-200, CoP/Co_2P/NF-300, Mo-CoP/Co_2P/NF-500 and Mo-CoP/Co_2P/NF-800 for OER

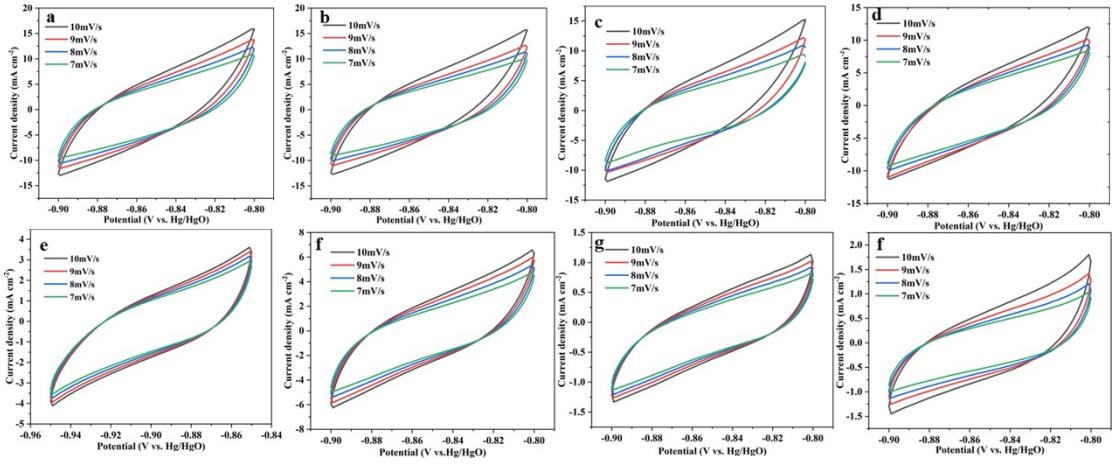

Fig. S9 CV curves of the CoP/Co_2P/NF-200, CoP/Co_2P/NF-300, Mo-CoP/Co_2P/NF-500, Mo-CoP/Co_2P/NF-800, Co-pre, CoP, Co_2P, CoP/Co_2P at the different scan rates ranging from 5 to 10 mV s^{-1} for HER.

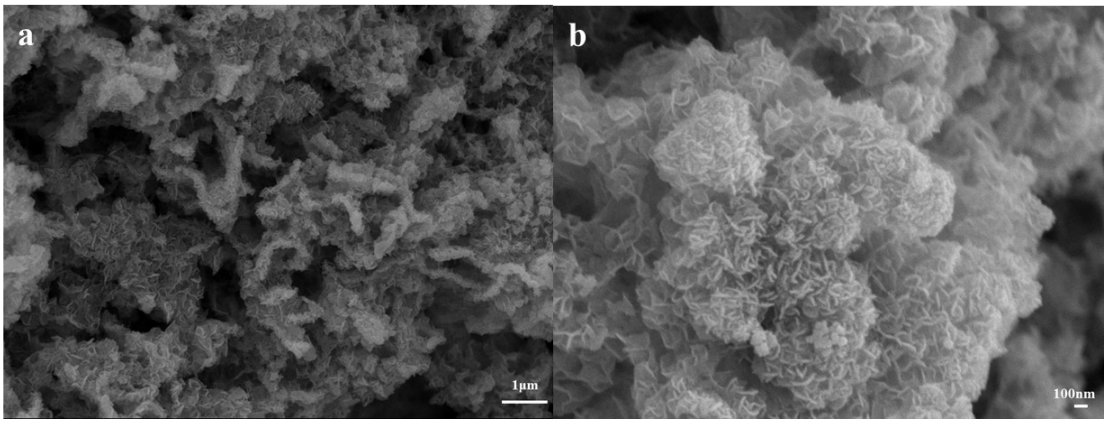

Fig. S10 SEM images of CoP/Co_2P/NF-300 after HER

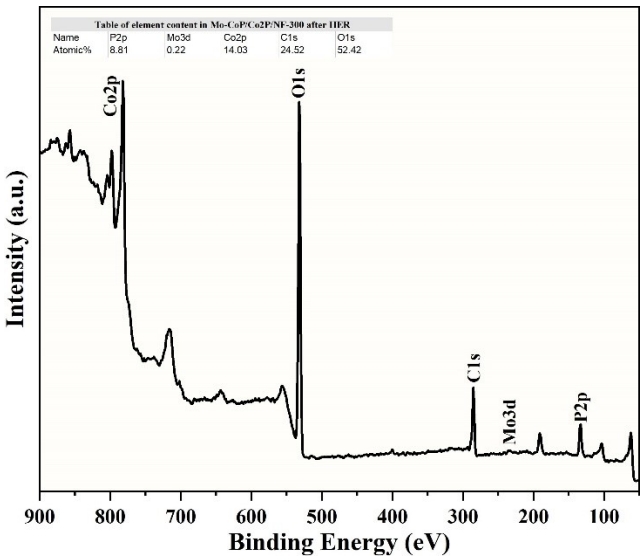

Fig. S11 Survey spectra of CoP/Co_2P/NF-300 after HER

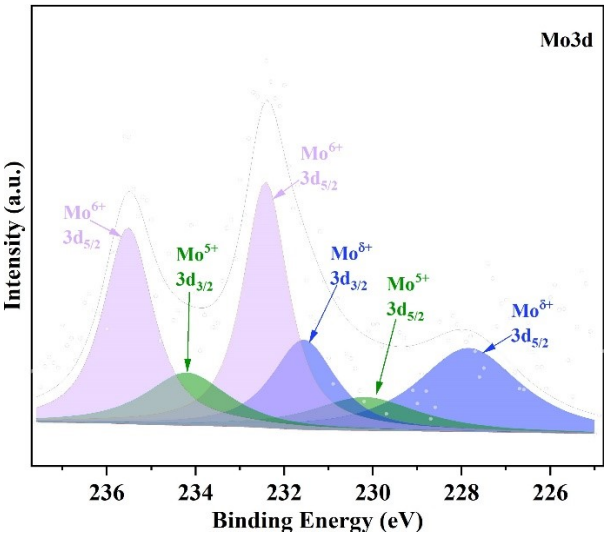

Fig. S12 High-resolution XPS spectra of Mo3d in Mo-CoP/Co_2P/NF-300 after HER

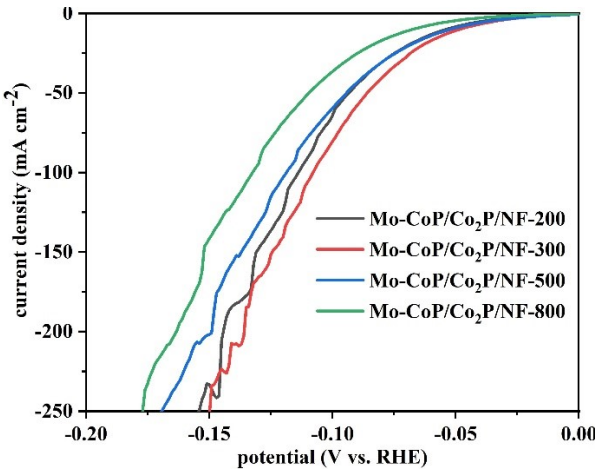

Fig. S13 LSV curves for HER in 0.5M H_2SO_4 of Mo-CoP/Co_2P/NF-200, Mo-CoP/Co_2P/NF-300, Mo-CoP/Co_2P/NF-500 and Mo-CoP/Co_2P/NF-800

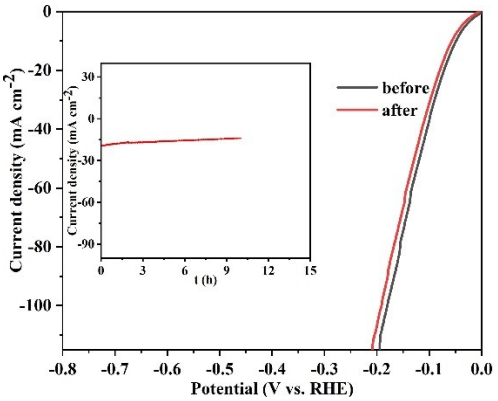

Fig. S14 Mo-CoP/Co_2P/NF-300 polarization curves of before and after 10h for HER in H_2SO_4. The inset gives the chronoamperometric curve of the HER for 10h.