Electronic Supplementary Information

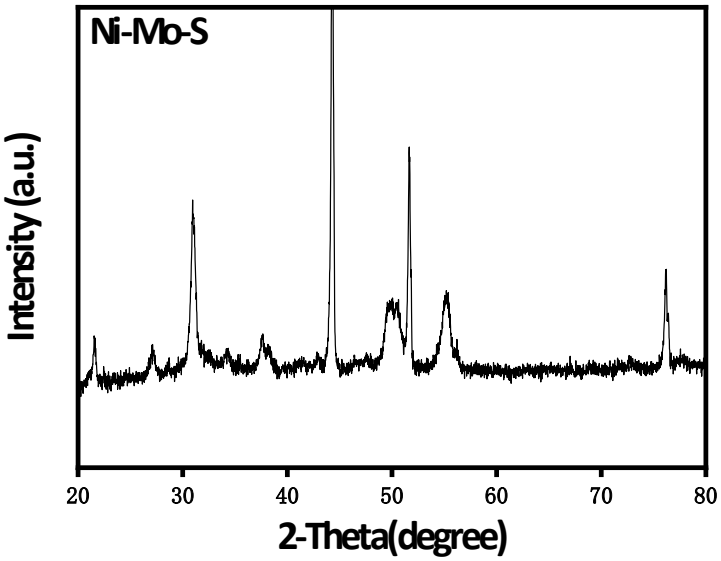

Fig. S1. XRD patterns of Ni-Mo-S/NF ;

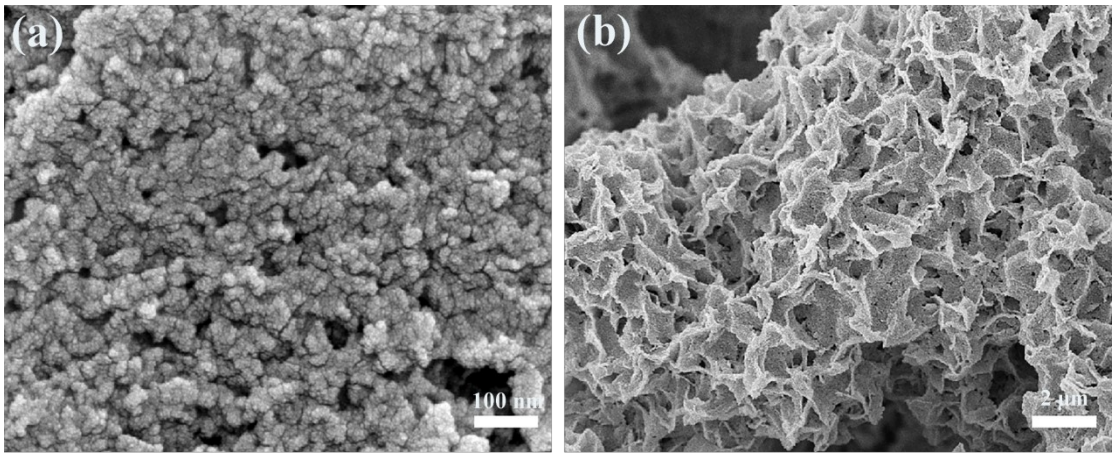

Fig. S2. (a-b) SEM images of Ni-Mo-S/NF;

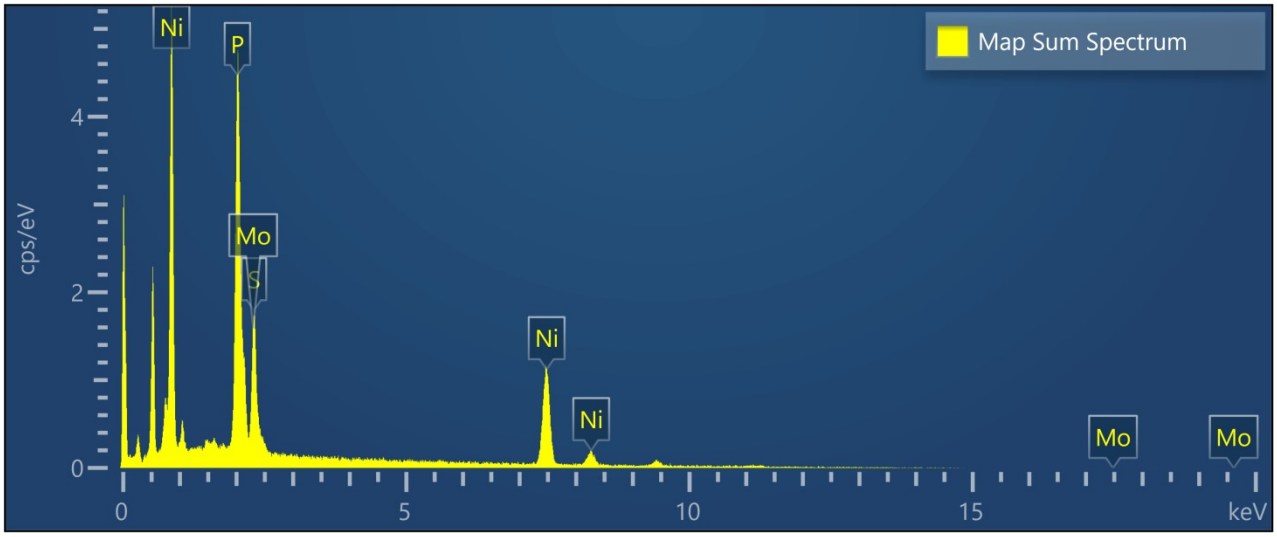

Fig. S3. EDS spectrum of Ni_3S_2@Ni_2P/MoS_2/NF.

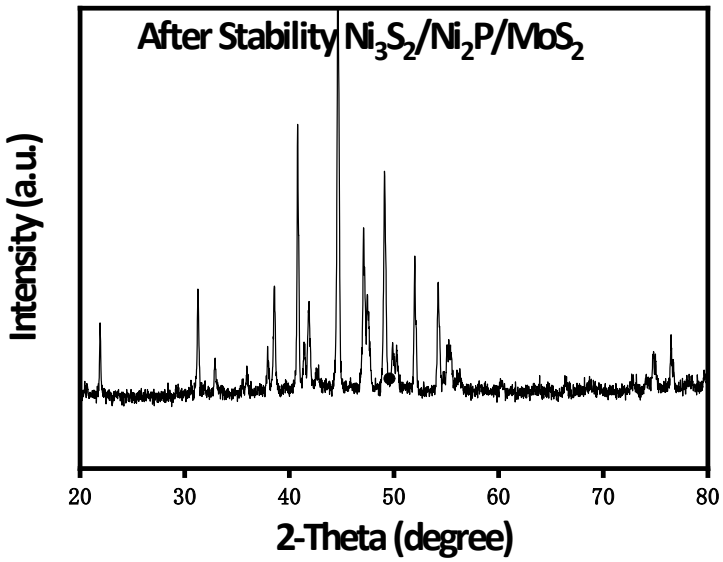

Fig. S4. XRD pattern of Ni_3S_2@Ni_2P/MoS_2/NF after stability measure.

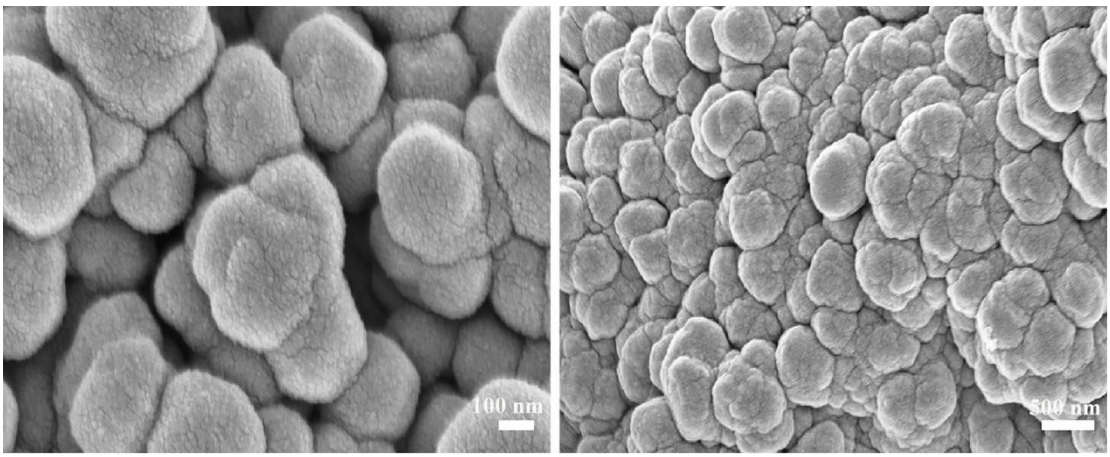

Fig. S5. SEM images of Ni_3S_2@Ni_2P/MoS_2/NF after 40h stability test.

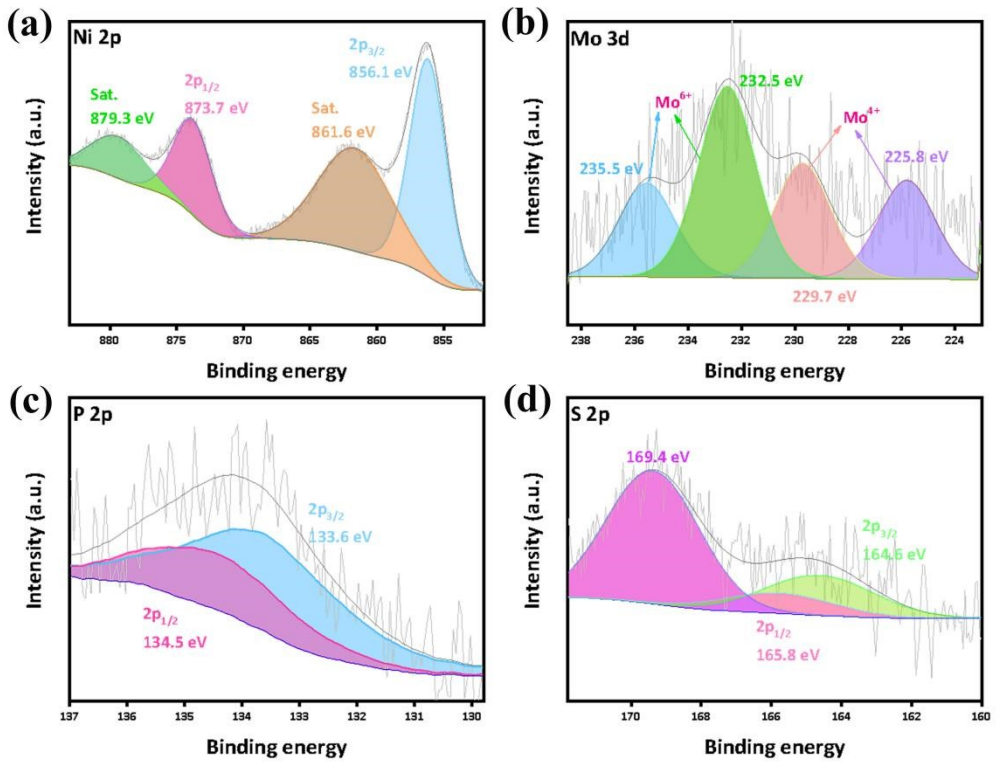

Fig. S6. XPS survey spectra of Ni_3S_2@Ni_2P/MoS_2/NF in (a) Ni 2p region (b) Mo 3d region (c) P 2p region and (d) S 2p region after OER stability test.

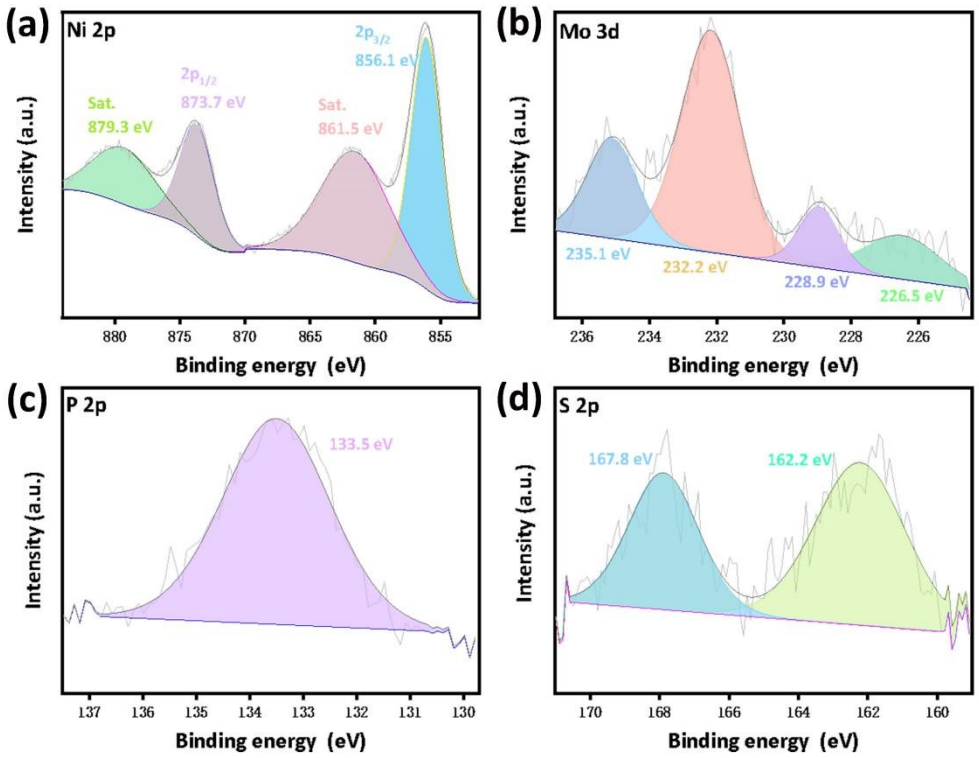

Fig. S7. XPS survey spectra of Ni_3S_2@Ni_2P/MoS_2/NF in (a) Ni 2p region (b) Mo 3d region (c) P 2p region and (d) S 2p region after HER stability test.

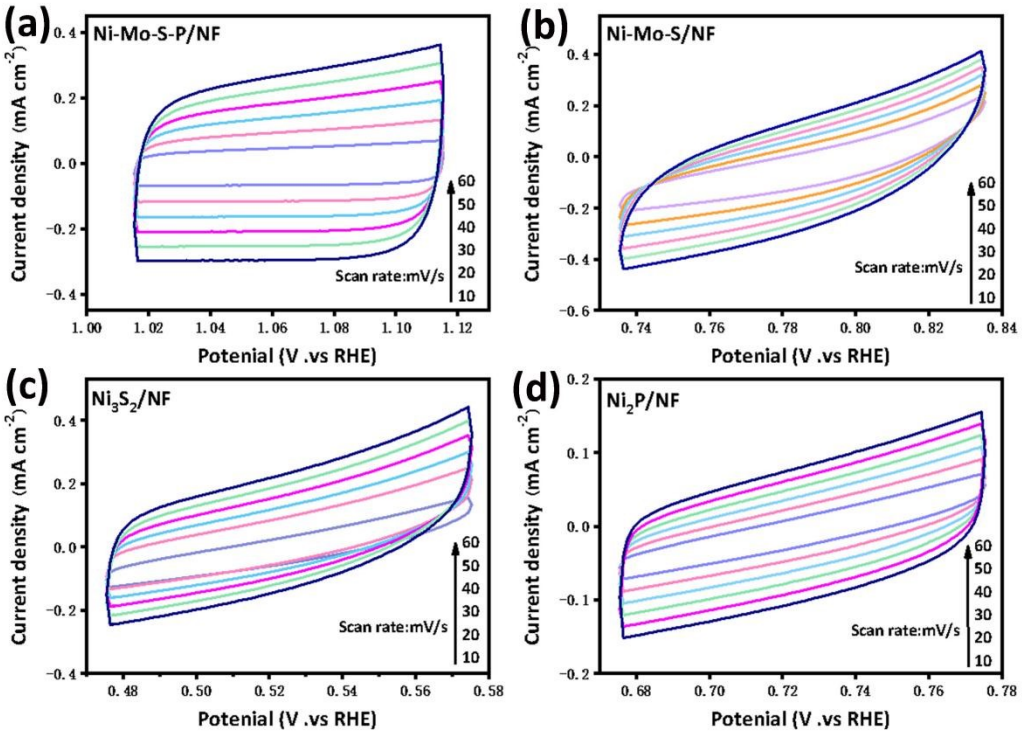

Fig. S8. CV images within scan rate of 10~60 mV/s of Ni_3S_2@Ni_2P/MoS_2/NF, Ni-Mo-P/NF, Ni_3S_2/NF and Ni_2P/NF electrocatalysts.

Calculation of ECSA for each catalyst:

ECSA = C_{dl}/C_s

ECSA $_{Ni_3S_2@Ni_2P/MoS_2}$ = 4.5 mF cm^{-2}/40 μF cm^{-2} = 112.5 cm^{-2}_{ECSA}

ECSA $_{Ni\text{-}Mo\text{-}S}$ = 3 mF cm^{-2}/40 μF cm^{-2} = 75 cm^{-2}_{ECSA}

ECSA $_{Ni_3S_2}$ = 2.8 mF cm^{-2}/40 μF cm^{-2} = 70 cm^{-2}_{ECSA}

ECSA $_{Ni_2P}$ = 1.8 mF cm^{-2}/40 μF cm^{-2} = 45 cm^{-2}_{ECSA}

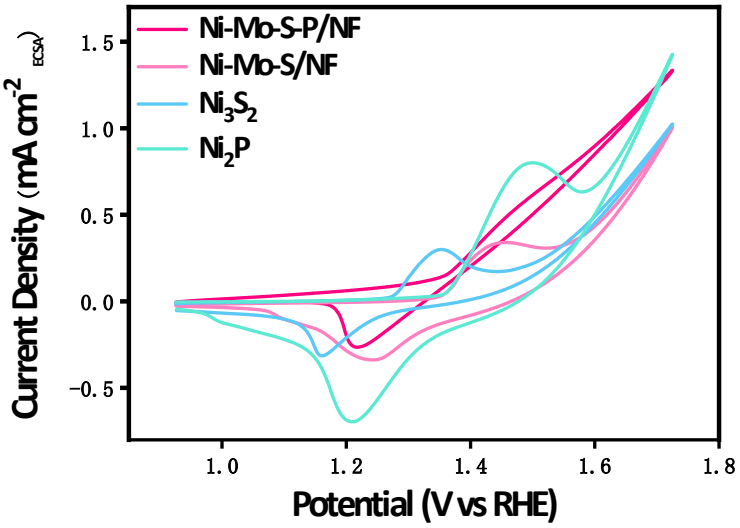

Fig. S9. OER polarization curves normalized for the ECSA of the studied catalysts in 1 M KOH.

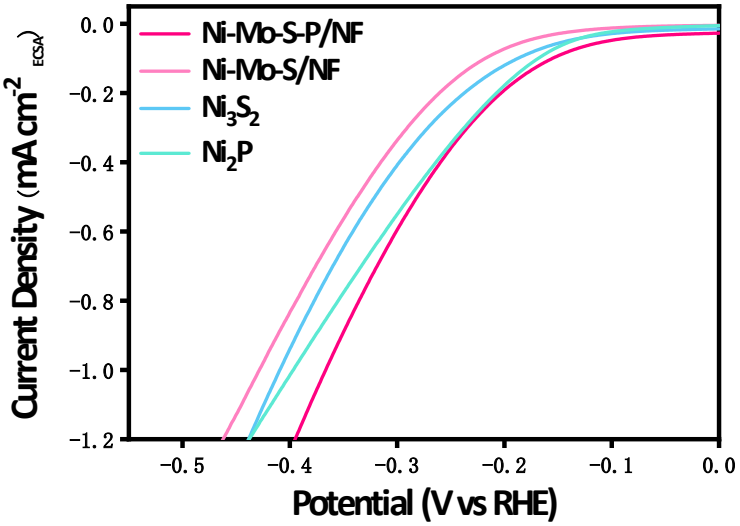

Fig. S10. HER polarization curves normalized for the ECSA of the studied catalysts in 1 M KOH.

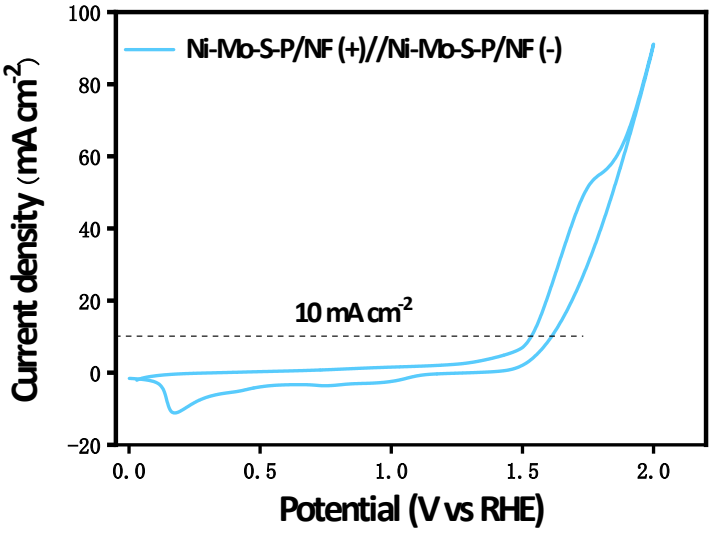

Fig. S11. Polarization curves of Ni-Mo-P-S/NF in 1.0 M KOH for overall water splitting.

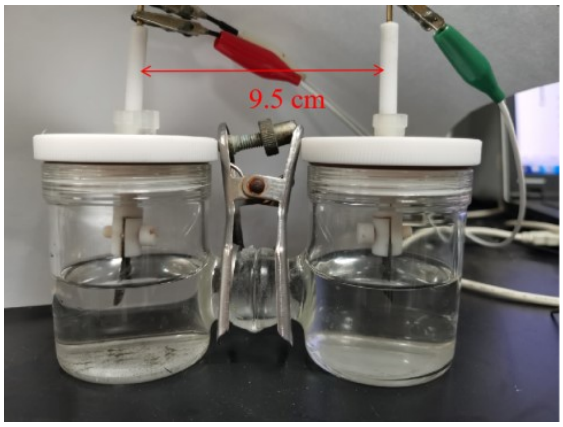

Fig. S12. Picture of Ni-Mo-P-S/NF as cathode and anode for overall water splitting.