

Synergistically enhanced alkaline hydrogen evolution reaction by coupling CoFe layered double hydroxide with NiMoO₄ prepared by two-step electrodeposition

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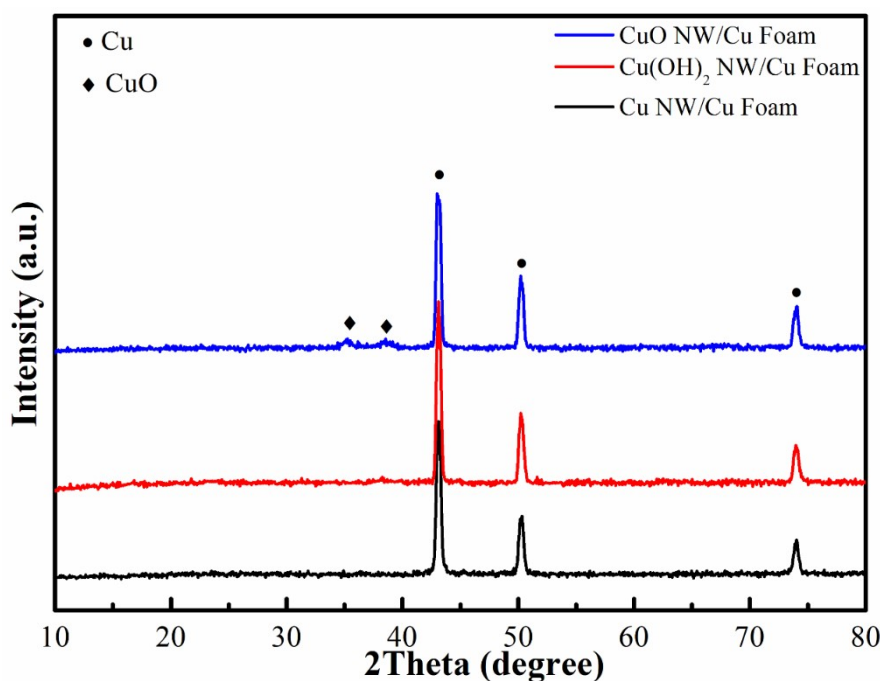


Fig. S1 XRD patterns of as-synthesized Cu(OH)₂ NW/Cu Foam, CuO NW/Cu Foam and Cu NW/Cu Foam

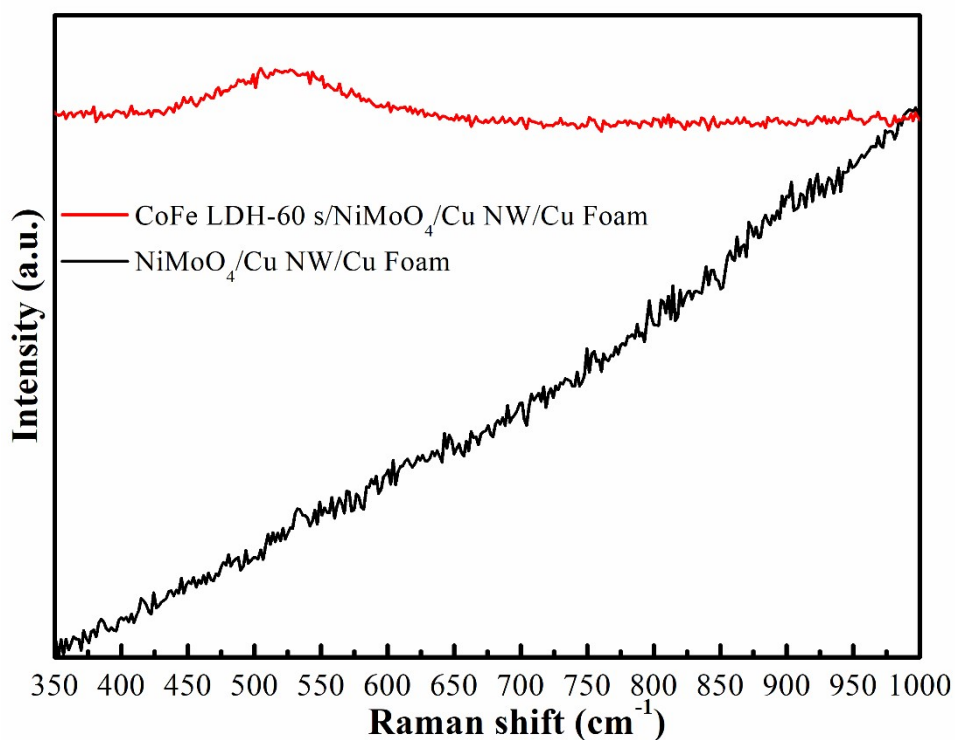


Fig. S2 Raman spectra of CoFe LDH-60 s/NiMoO₄/Cu NW/Cu Foam and NiMoO₄/Cu NW/Cu Foam

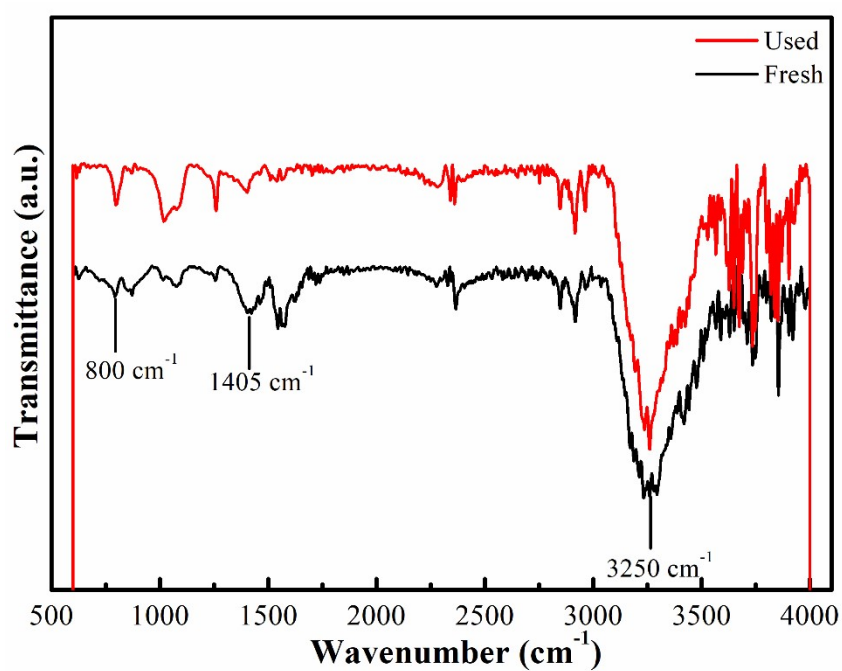


Fig. S3 ATR-FTIR of the fresh and used CoFe LDH-60 s/NiMoO₄/Cu NW/Cu Foam

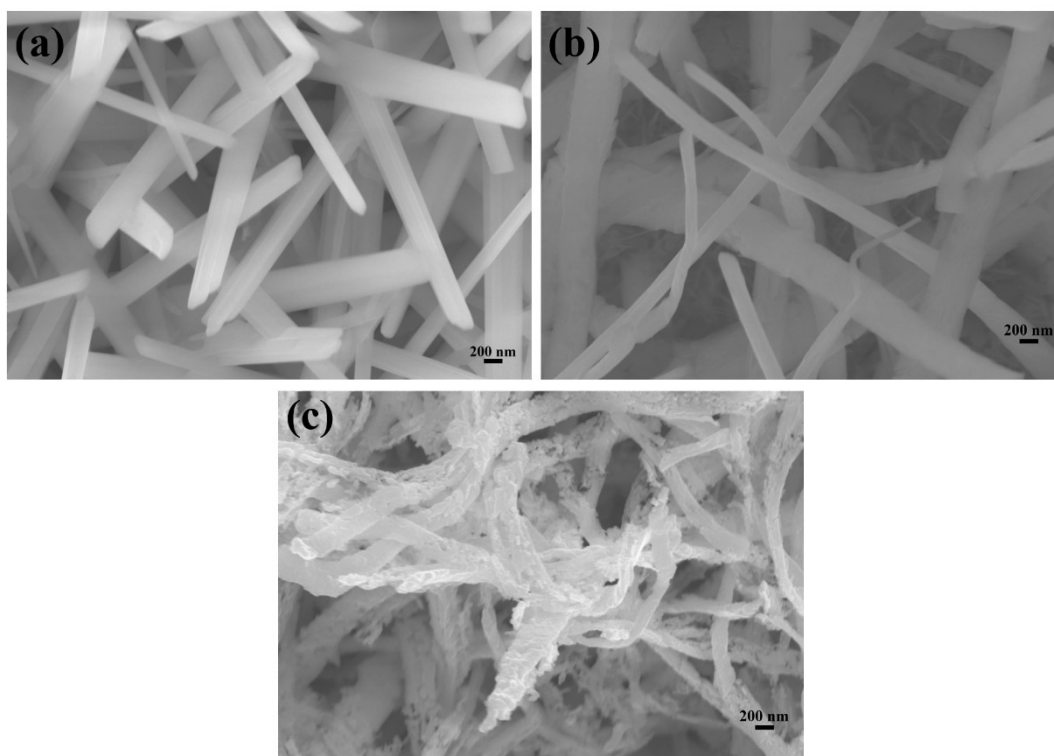


Fig. S4 SEM images of as-synthesized $\text{Cu}(\text{OH})_2$ NW/Cu Foam (a), CuO NW/Cu Foam (b) and Cu NW/Cu Foam (c)

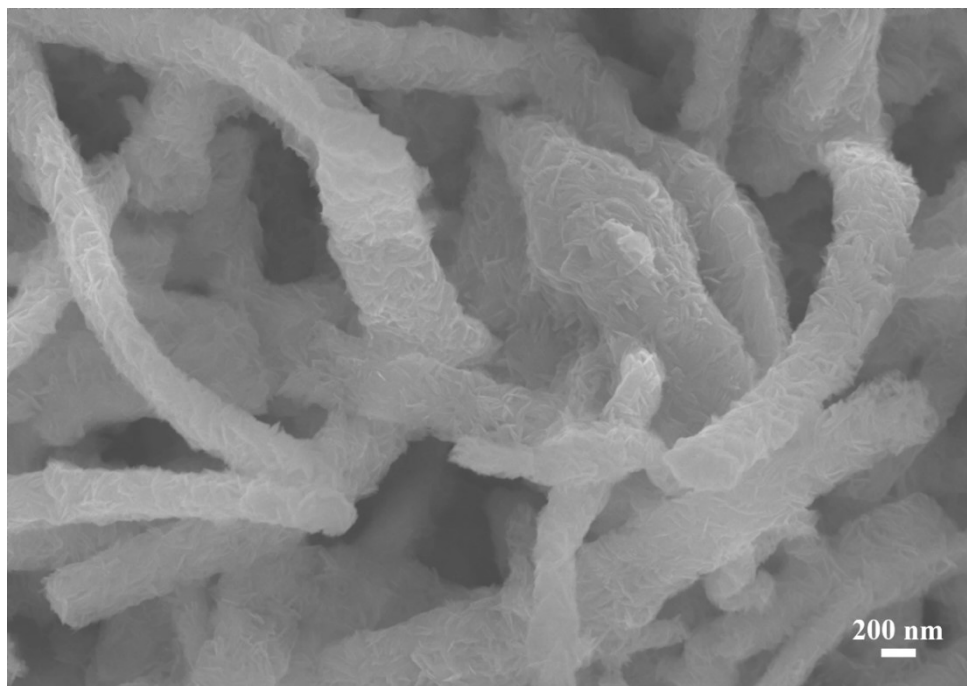


Fig. S5 SEM images of as-synthesized CoFe LDH-60 s/Cu NW/Cu Foam

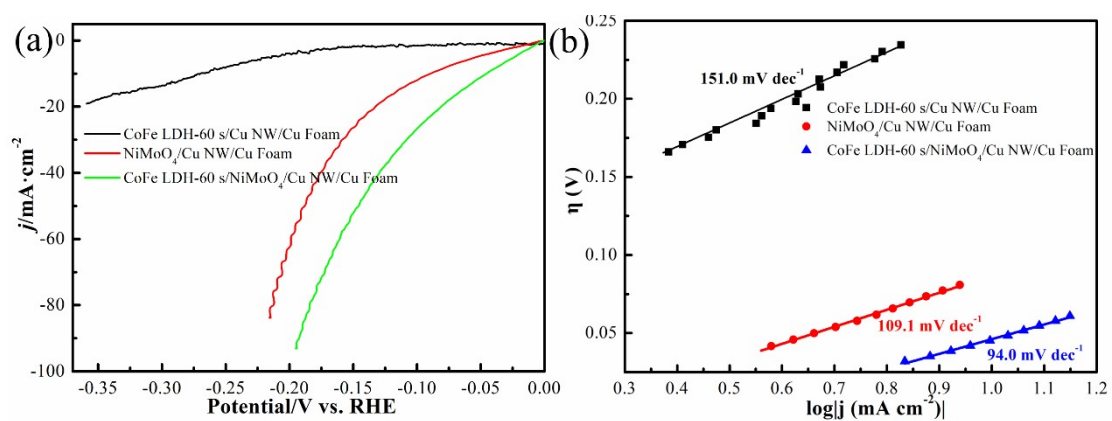


Fig. S6 Alkaline HER performance of CoFe LDH-60 s/Cu NW/Cu Foam, NiMoO₄/Cu NW/Cu Foam and CoFe LDH-60 s/NiMoO₄/Cu NW/Cu Foam. (a) LSV curves, (b) Tafel plots

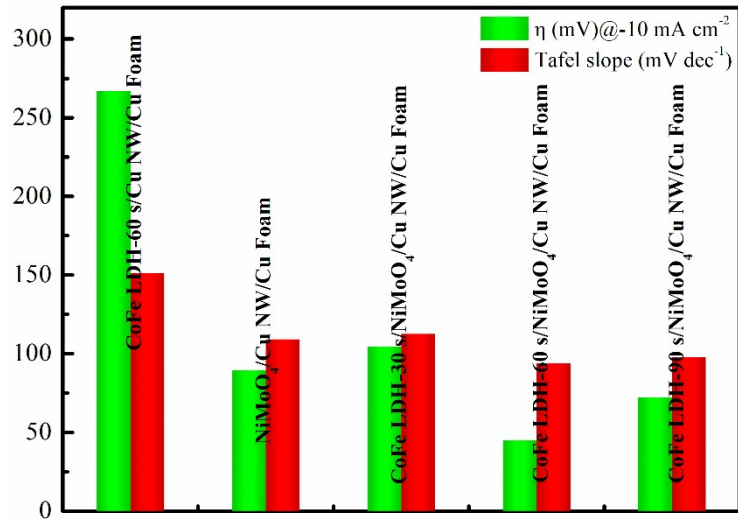


Fig. S7 Overpotential (η) and Tafel slope comparison for the as-synthesized HER electrocatalysts

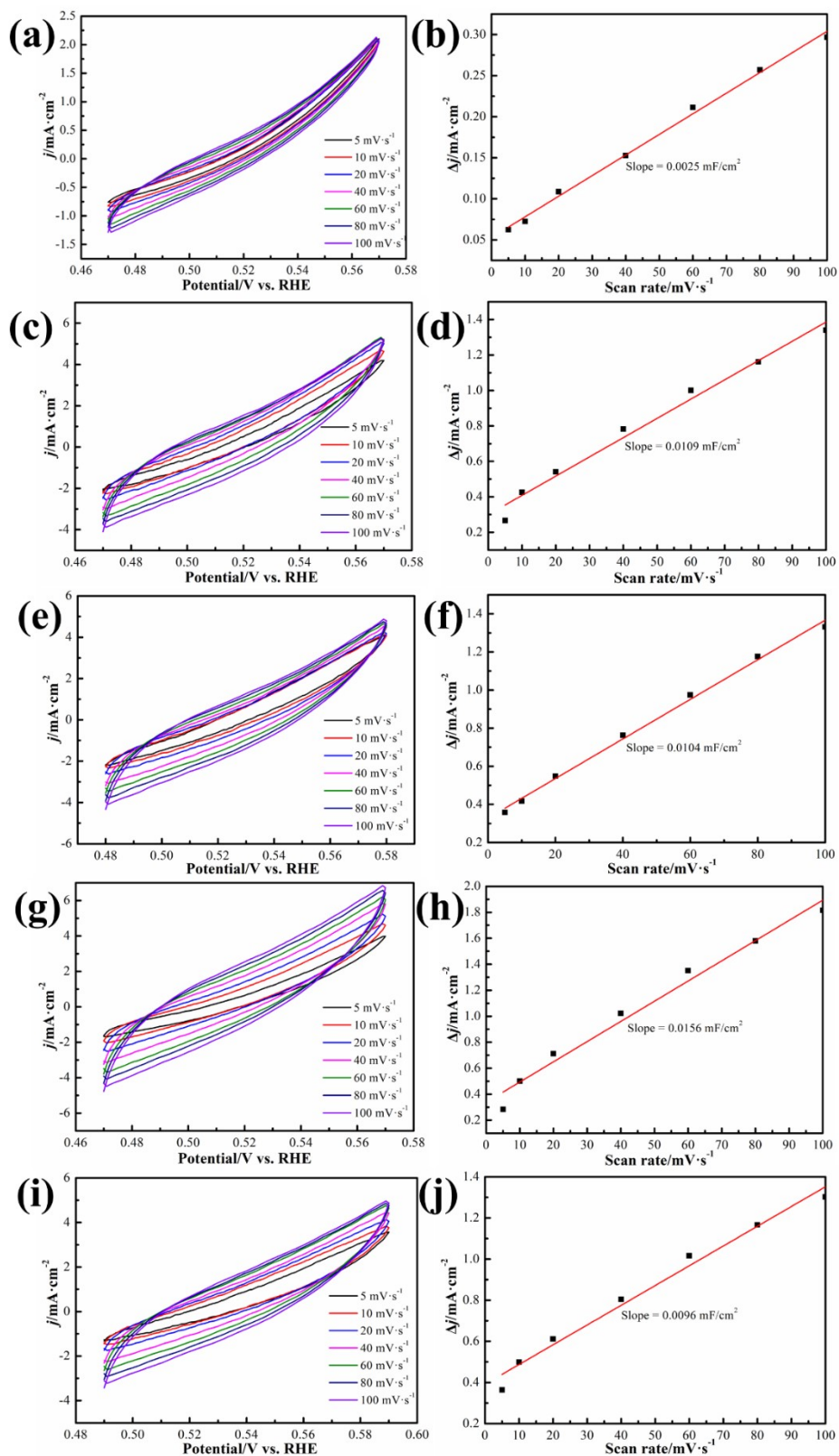


Fig. S8 CV curves obtained at different scan rates and the corresponding anodic and cathodic current density difference (Δj) against scan rate plots for NiMoO₄/Cu Foam (a, b), NiMoO₄/Cu NW/Cu Foam (c, d), CoFe LDH-30 s/NiMoO₄/Cu NW/Cu Foam (e, f), CoFe LDH-60 s/NiMoO₄/Cu NW/Cu Foam (g, h) and CoFe LDH-90 s/NiMoO₄/Cu NW/Cu Foam (i, j)

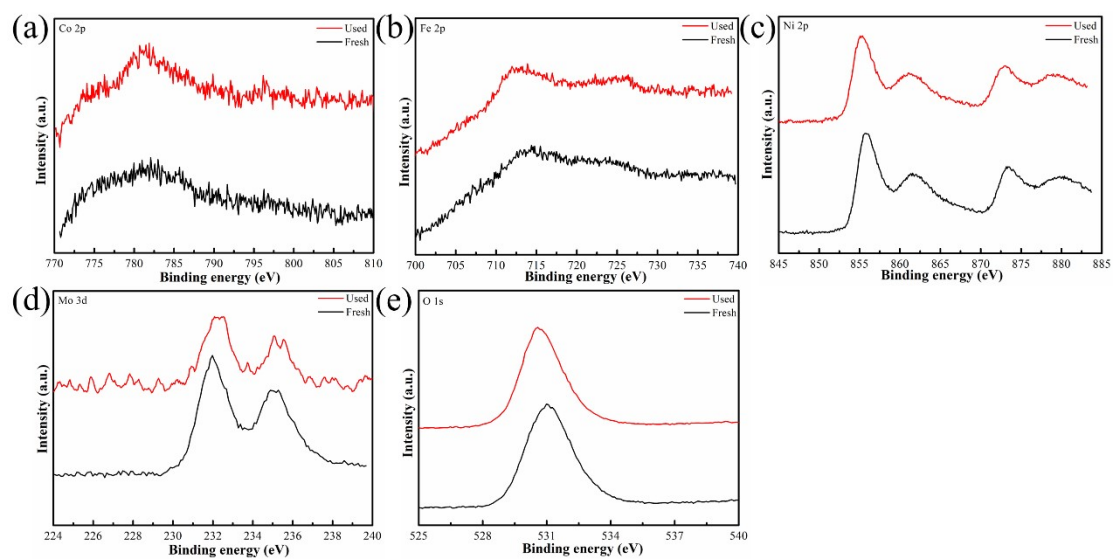


Fig. S9 High-resolution Co 2p (a), Fe 2p (b), Ni 2p (c), Mo 3d (d) and O 1s (e) XPS spectra of CoFe LDH-60 s/NiMoO₄/Cu NW/Cu Foam before (Fresh) and after (Used) HER stability test

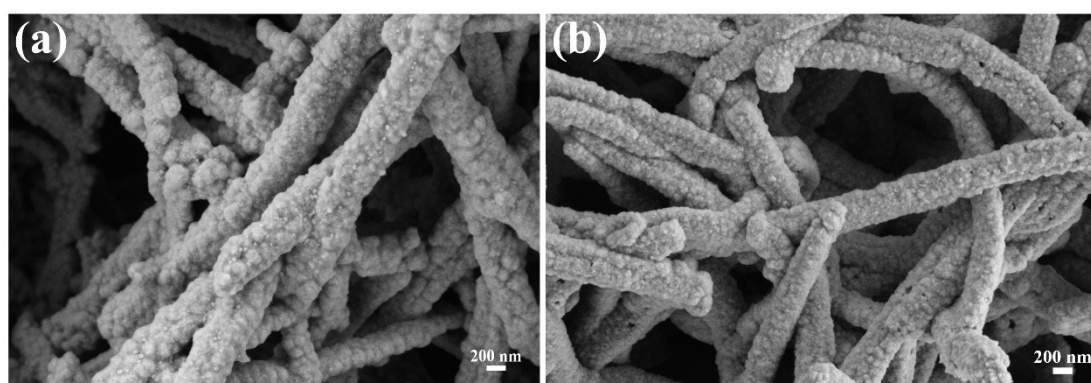


Fig. S10 SEM images of the fresh (a) and the used (b) CoFe LDH-60 s/NiMoO₄/Cu NW/Cu Foam

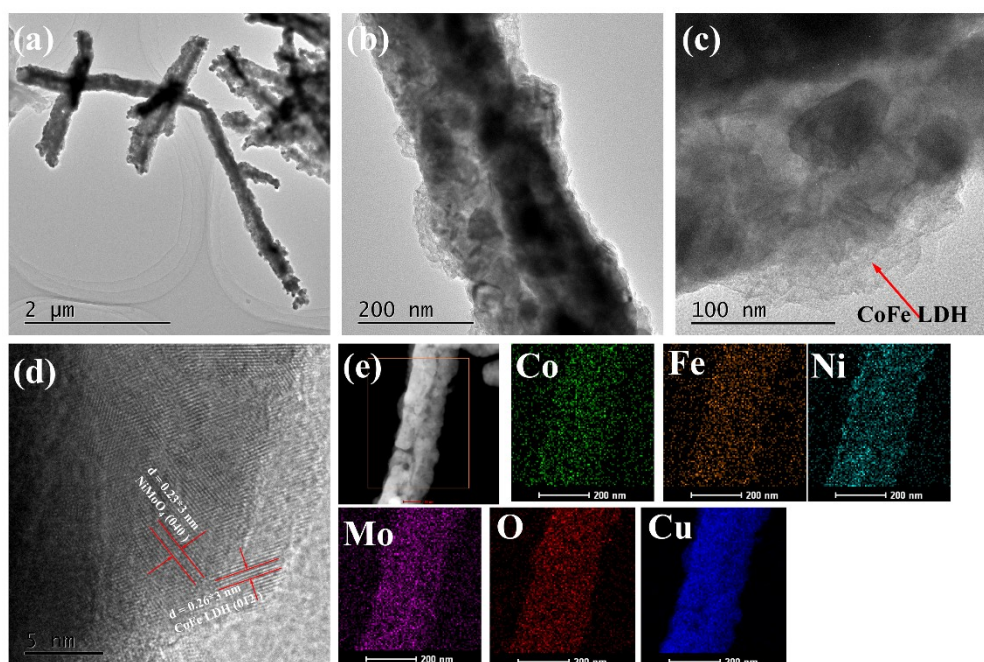


Fig. S11 TEM images (a, b and c), HRTEM image (d) and corresponding EDS mapping images (e) of the used CoFe LDH-60 s/NiMoO₄/Cu NW/Cu Foam

Table S1 alkaline HER performance comparison of CoFe LDH-60 s/ NiMoO₄/Cu NW/Cu Foam with the recently reported literatures

Catalysts	Electrolyte	Overpotential (mV) @ -10 mA/cm ²	Tafel slope (mV/dec)	Ref.
CoFe LDH-60 s/NiMoO ₄ /Cu NW/Cu Foam	1.0 M KOH	45	94.0	This work
NiMo MT/NF	1.0 M KOH	119	119	Int. J. Hydrogen Energ., 2019, 44: 24712-24718
NiMoS ₄ /Ti	0.1 M KOH	194	97	J. Mater. Chem. A, 2017, 5, 16585
CoFe LDH@NiFe LDH	1.0 M KOH	240	88.88	Appl. Catal. B- Environ., 2019, 253: 131-139
NCNT-NP@NF	1.0 M KOH	96.1	84.8	Chem. Eng. J., 2021, 413: 127531
Ni _{2(1-x)} Mo _{2x} P	1.0 M KOH	72	46.4	Nano Energy, 2018, 53: 492-500
MoS ₂ @Mo ₂ C	1.0 M KOH	129	78	J. Mater. Sci., 2020, 55: 16197-16210