

Supplementary Information for :

**The surface-sulphurated Co₃O₄ nanowire array electrocatalyst for oxygen evolution
reaction and water-splitting applications**

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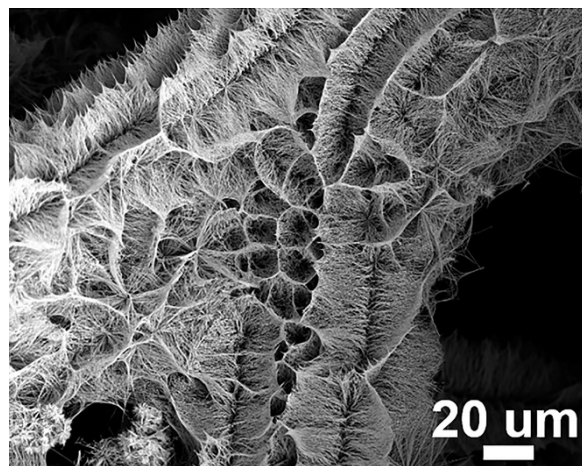


Fig. S1. SEM images of $\text{Co}_3\text{O}_4/\text{NF}$.

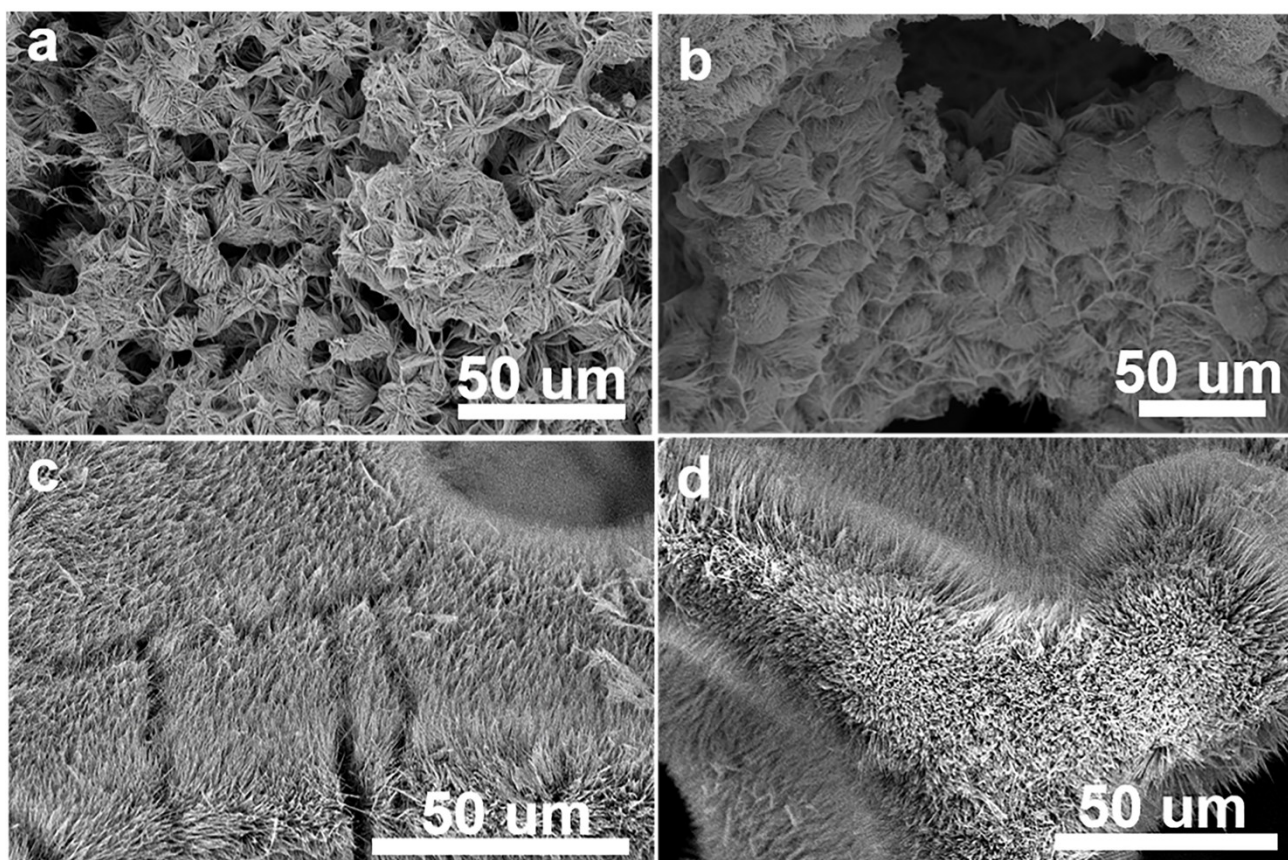


Fig. S2. SEM images of $\text{Co}_3\text{O}_4\text{-S/NF}$ when cobalt nitrate hexahydrate: urea = 1:0.2 (a), 1:0.5 (b), 1:1 (c), 1:2 (d).

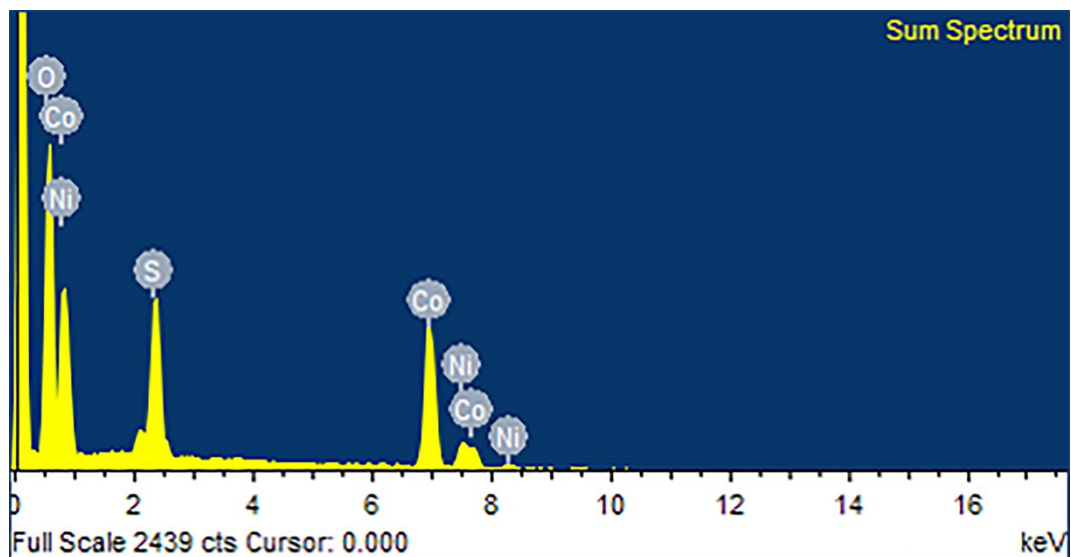


Fig. S3. EDS elemental mapping of $\text{Co}_3\text{O}_4\text{-S/NF}$.

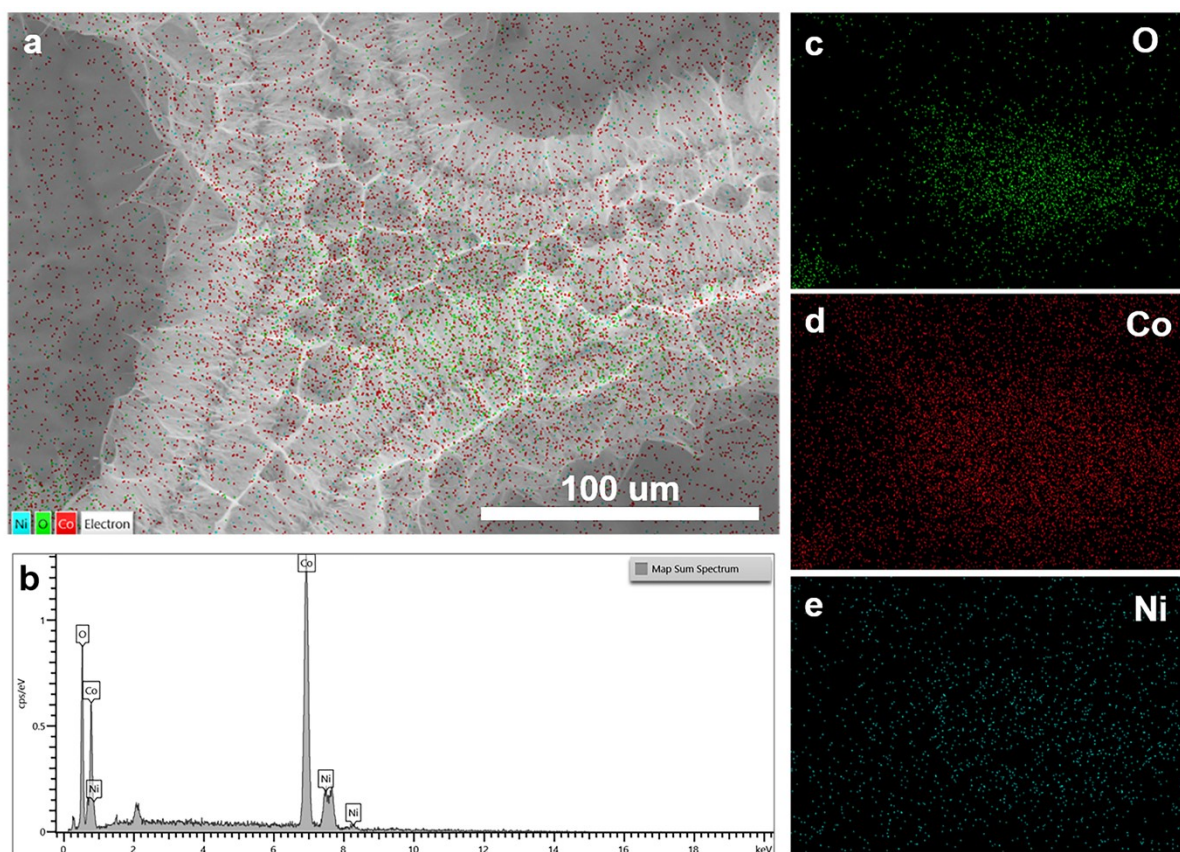


Fig. S4. (a) SEM image of elemental mapping ($\text{Co}_3\text{O}_4\text{/NF}$); (b-e) EDS elemental mapping images of (c) O, (d) Co, (e) Ni.

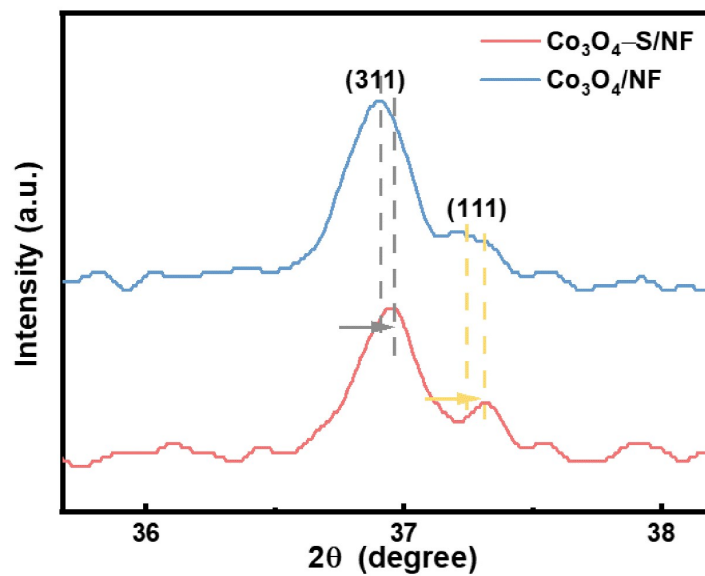


Fig. S5. Enlarge XRD pattern at 36°–38°.

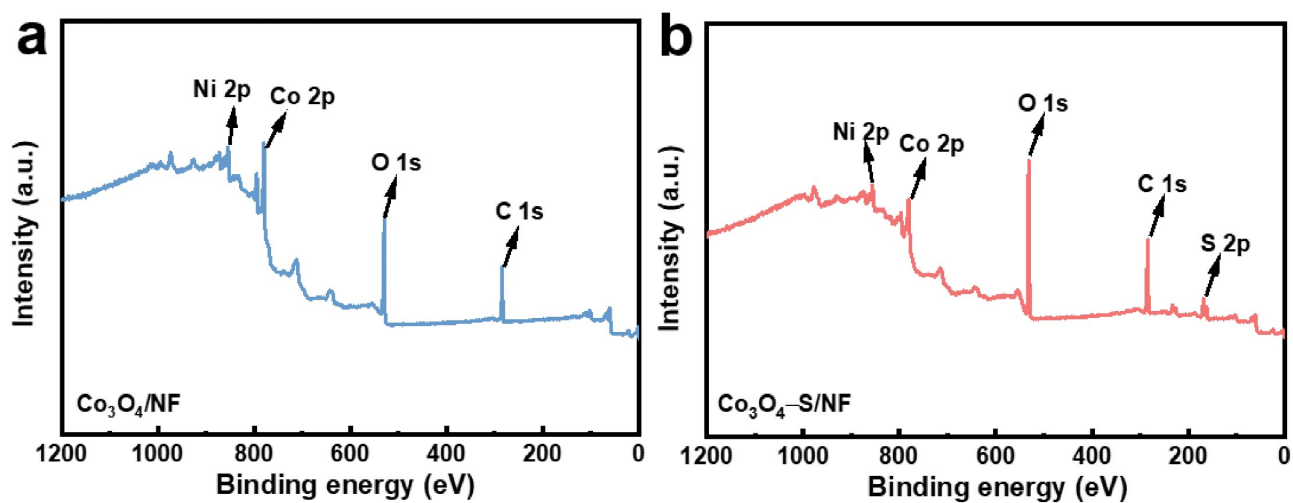


Fig. S6. The XPS spectrum of (a) $\text{Co}_3\text{O}_4/\text{NF}$ and (b) $\text{Co}_3\text{O}_4\text{-S}/\text{NF}$.

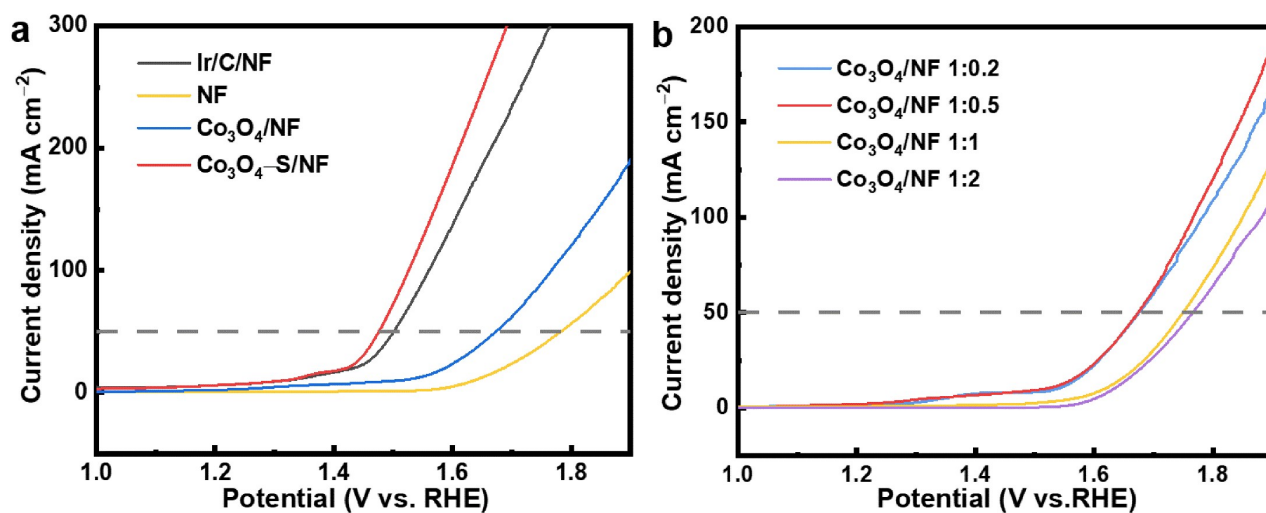


Fig. S7. (a) OER polarization curves of the catalysts; (b) OER polarization curves of the Co₃O₄/NF synthesized with different reactant ratios in 1.0 M KOH (cobalt nitrate hexahydrate: urea = 1:0.2,1:0.5,1:1,1:2).

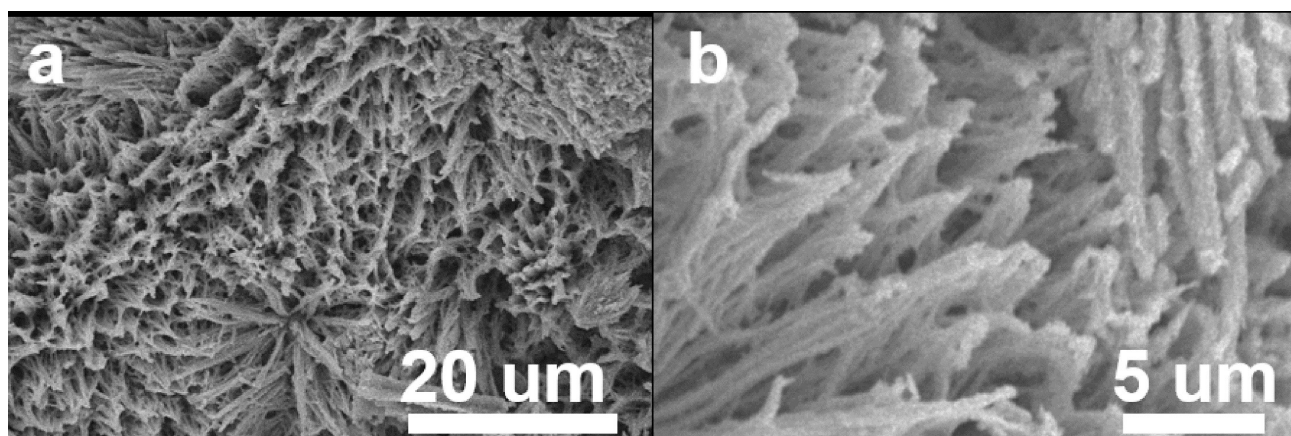


Fig. S8. (a-b) SEM images of Co₃O₄-S/NF after 12 h stability test (Cobalt nitrate hexahydrate: urea= 1:0.5).

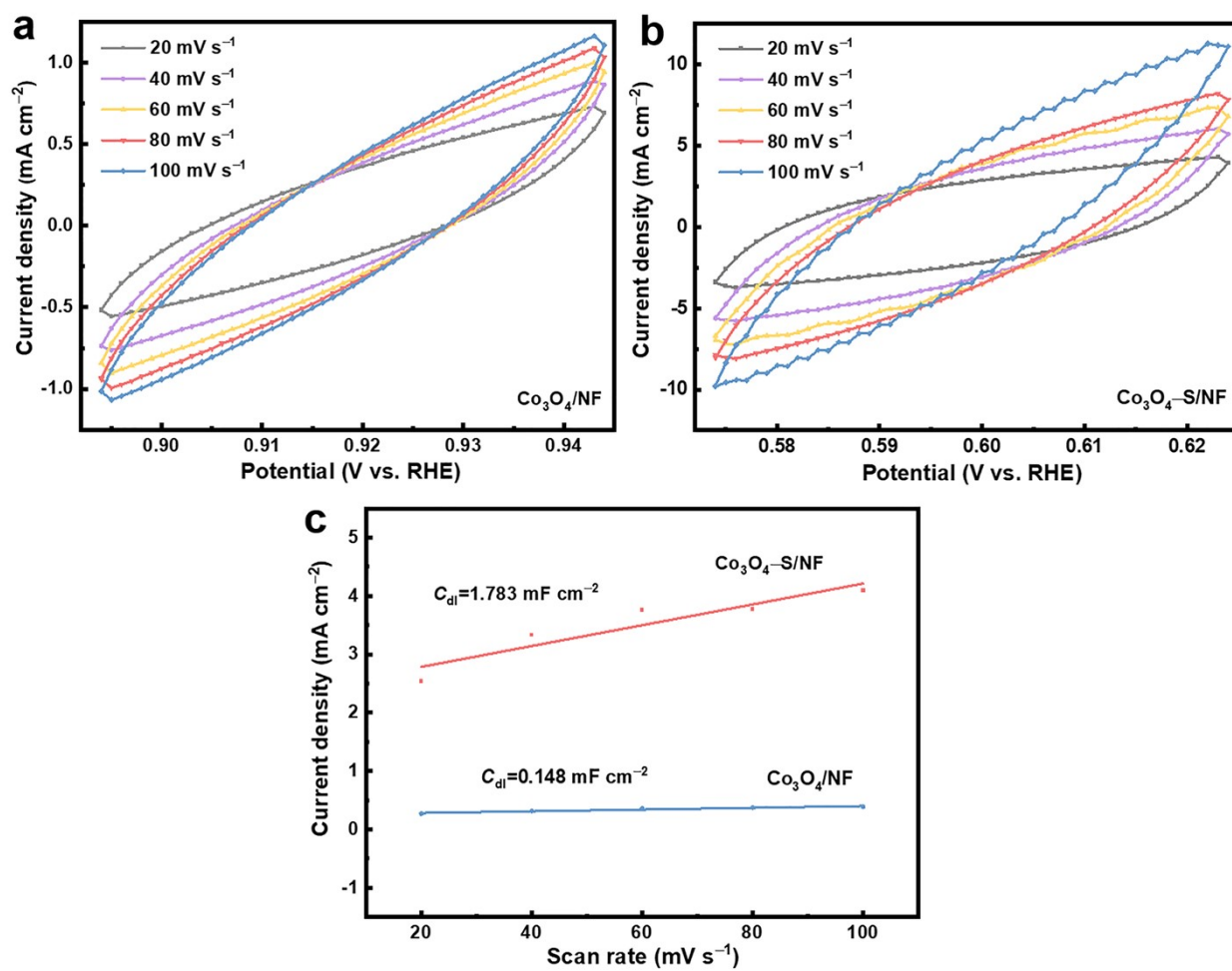


Fig. S9. CV curves of (a) $\text{Co}_3\text{O}_4/\text{NF}$ and (b) $\text{Co}_3\text{O}_4\text{-S}/\text{NF}$ at different sweep speeds; (c) Electrochemical double-layer capacitance (C_{dl});

Table S1 The fitting results of Nyquist plots of different electrocatalysts.

Catalyst	R_s (Ω)	R_{ct} (Ω)	CPE (F)
NF	7.196	65.67	0.735
Ir/C/NF	6.564	54.06	0.618
Co ₃ O ₄ /NF	6.974	55.81	0.723
Co ₃ O ₄ -S/NF	6.567	40.46	0.732