Supporting Information (SI):

# Fe doped NiS nanosheet arrays grown on carbon fiber paper for highly efficient electrocatalytic oxygen evolution reaction

Wenrui Li[⑤], Haofei Zhao[⑤], Hao Li, Rongming Wang*

*a Beijing Advanced Innovation Center for Materials Genome Engineering, Beijing Key Laboratory for Magneto-Photoelectrical Composite and Interface Science, School of Mathematics and Physics, University of Science and Technology Beijing, Beijing 100083, China.*
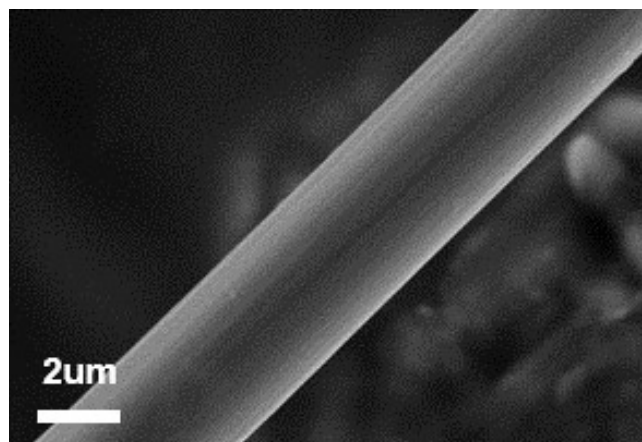
**E-mail:** rmwang@ustb.edu.cn

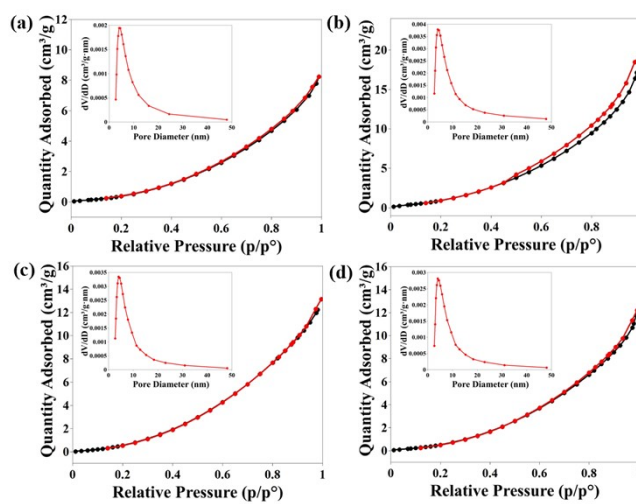**Fig. S1** SEM image of a single carbon fiber with clean surface in CFP before the synthesis.



**Fig. S2** N$_2$ Adsorption-desorption isotherm for (a) Fe-NiS@CFP, (b) NiFe LDH@CFP, (c) NiS@CFP and (d) Ni LDH@CFP. Inset: corresponding to BJH pore-size distribution curves.
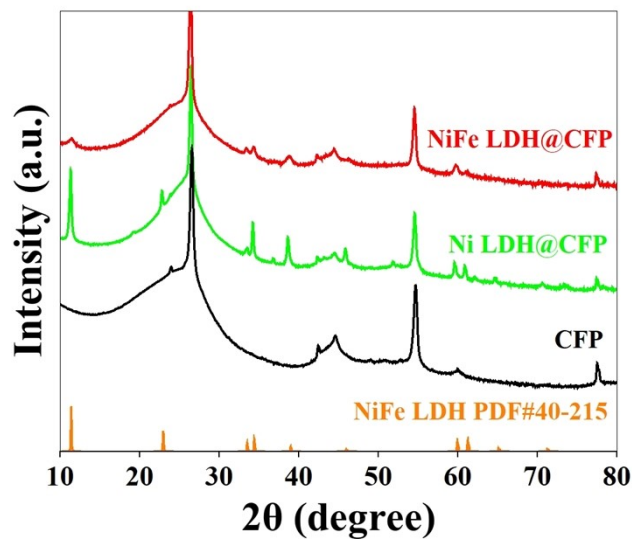
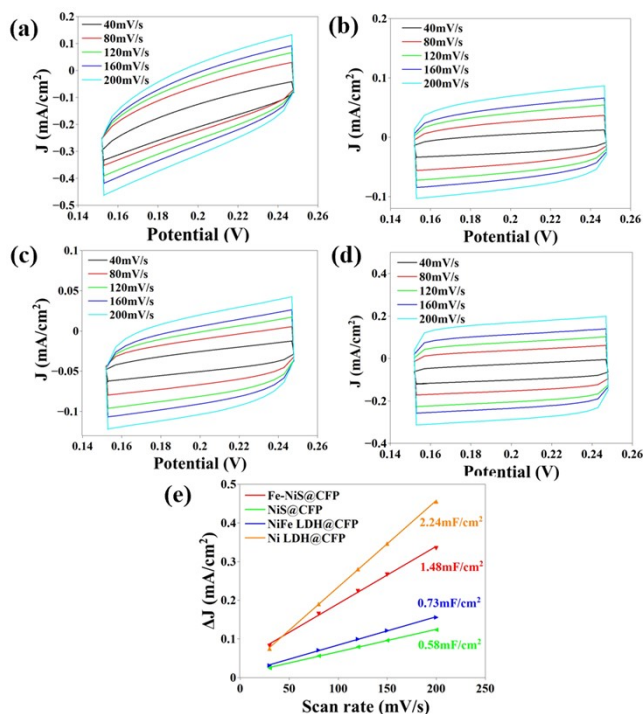**Fig. S3** XRD spectra of the NiFe LDH@CFP, Ni LDH@CFP and CFP.



**Fig. S4** Cyclic voltammograms of (a) Fe-NiS@CFP, (b) NiFe LDH@CFP, (c) NiS@CFP and (d) Ni LDH@CFP with various scan rates (40–200 mV/s) in the region of 0.15–0.25 V. (e) The capacitive current density at 0.20 V as a function of scan rate for samples.
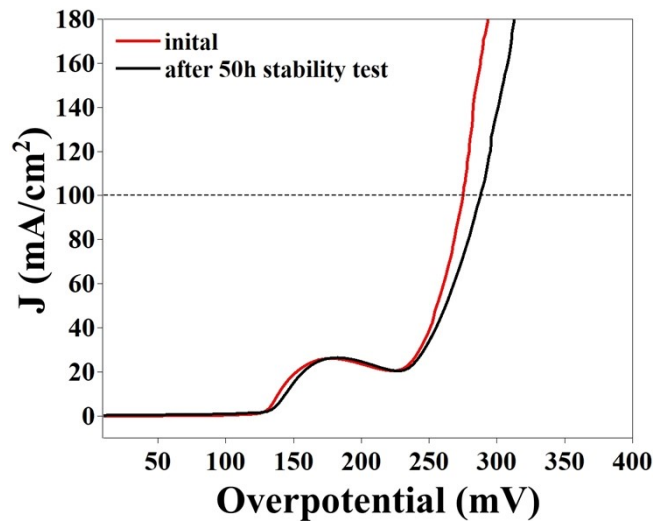
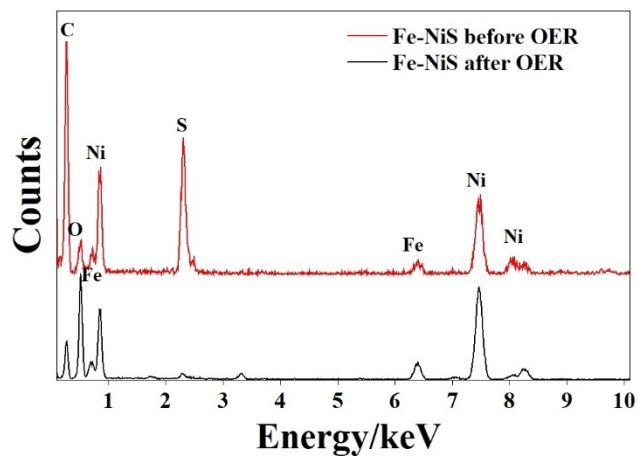**Fig. S5** LSV curve for Fe-NiS@CFP before and after the stability test (~ 100 mA/cm$^2$, 50 h).



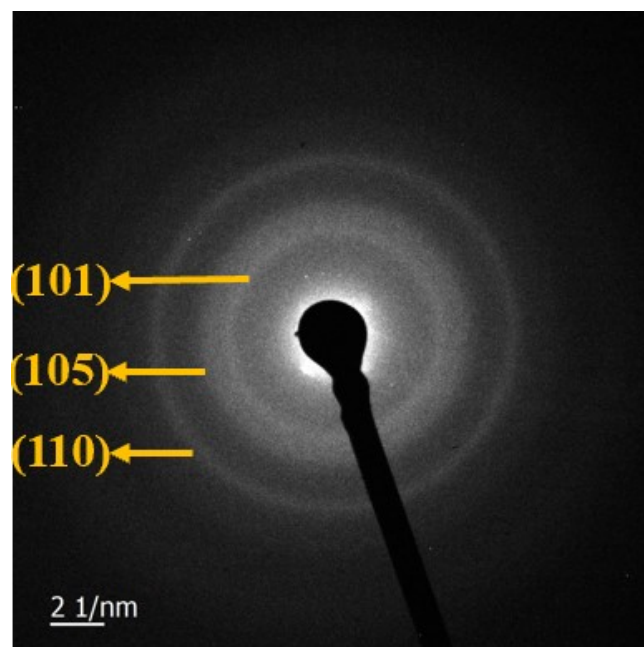**Fig. S6** EDX spectra of Fe-NiS@CFP before and after the stability test (~ 100 mA/cm$^2$, 50 h).

**Fig. S7** SAED pattern of Fe-NiS@CFP after the stability test (~ 100 mA/cm$^2$, 50 h).

**Table S1.** The fitting parameters of the electrochemical impedance spectra of as prepared catalysts.

| Catalysts | Rs (Ω) | $Rct_1$ (Ω) | $CPE_1$ | $Rct_2$ (Ω) | $CPE_2$ |
|---|---|---|---|---|---|
| Ni LDH@CFP | 1.48 | 0.33 | 0.81 | 4.21 | 0.67 |
| NiS@CFP | 1.36 | 0.28 | 0.83 | 3.47 | 0.61 |
| NiFe LDH@CFP | 1.70 | 0.25 | 0.77 | 2.56 | 0.74 |
| Fe-NiS@CFP | 1.60 | 0.38 | 0.76 | 2.14 | 0.72 |