

## Electronic Supplementary Information

### **Hierarchically-assembled Fe-MoS<sub>2</sub>/Ni<sub>3</sub>S<sub>2</sub>/NF (nickel foam) electrocatalyst for efficient water splitting**

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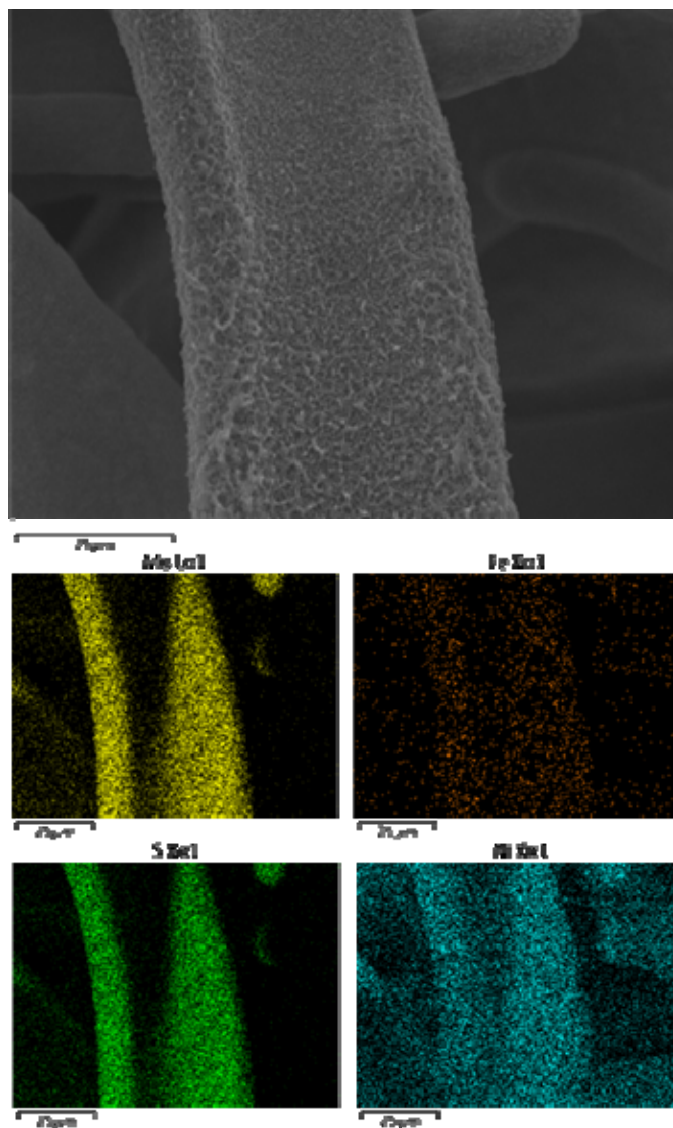
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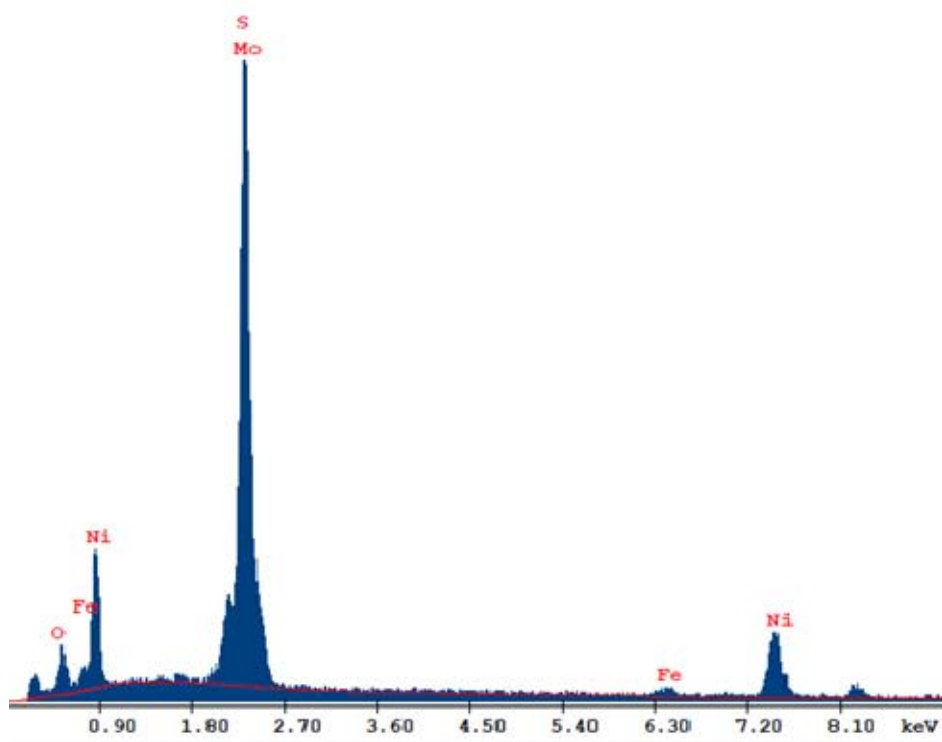
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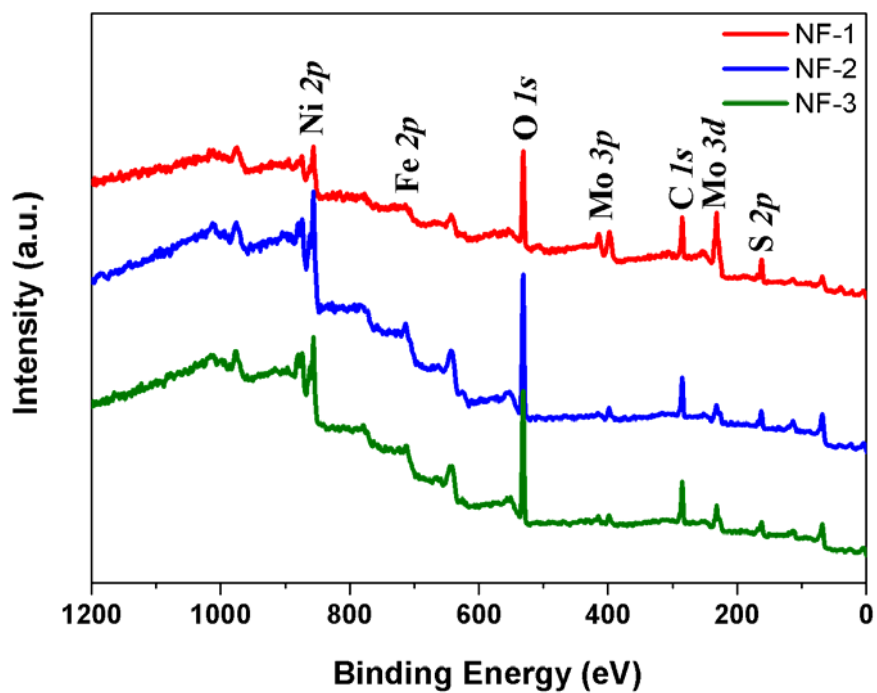


**Fig. S1** SEM image (above) and elemental mapping (down) of Fe-MoS<sub>2</sub>/Ni<sub>3</sub>S<sub>2</sub>/NF-2.

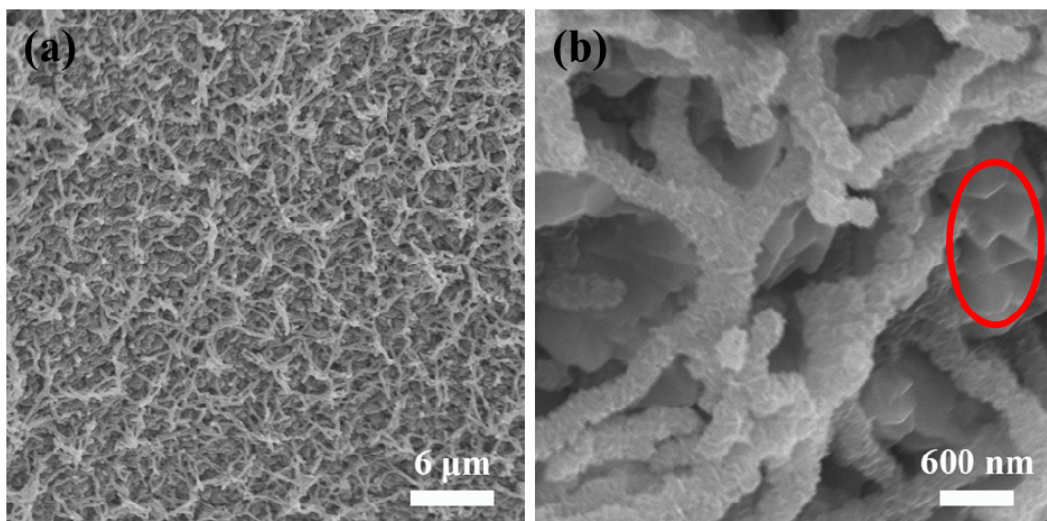


| Element | Wt %   | At %   |
|---------|--------|--------|
| O K     | 6.74   | 19.72  |
| MoL     | 30.31  | 14.79  |
| S K     | 22.90  | 33.43  |
| FeK     | 2.99   | 2.51   |
| NiK     | 37.06  | 29.55  |
| Total   | 100.00 | 100.00 |

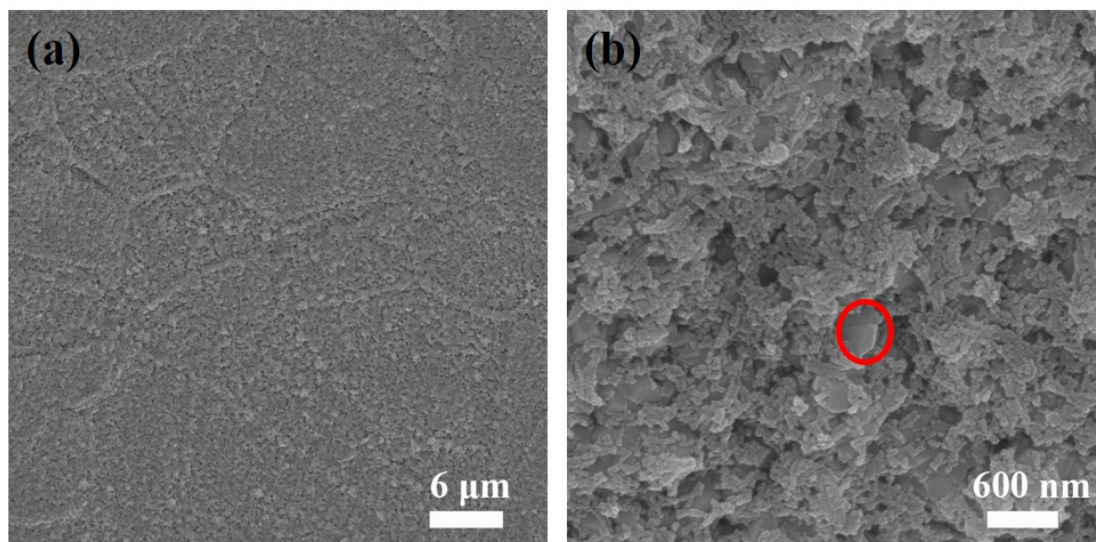
**Fig. S2** EDS spectrum of Fe-MoS<sub>2</sub>/Ni<sub>3</sub>S<sub>2</sub>/NF-2.



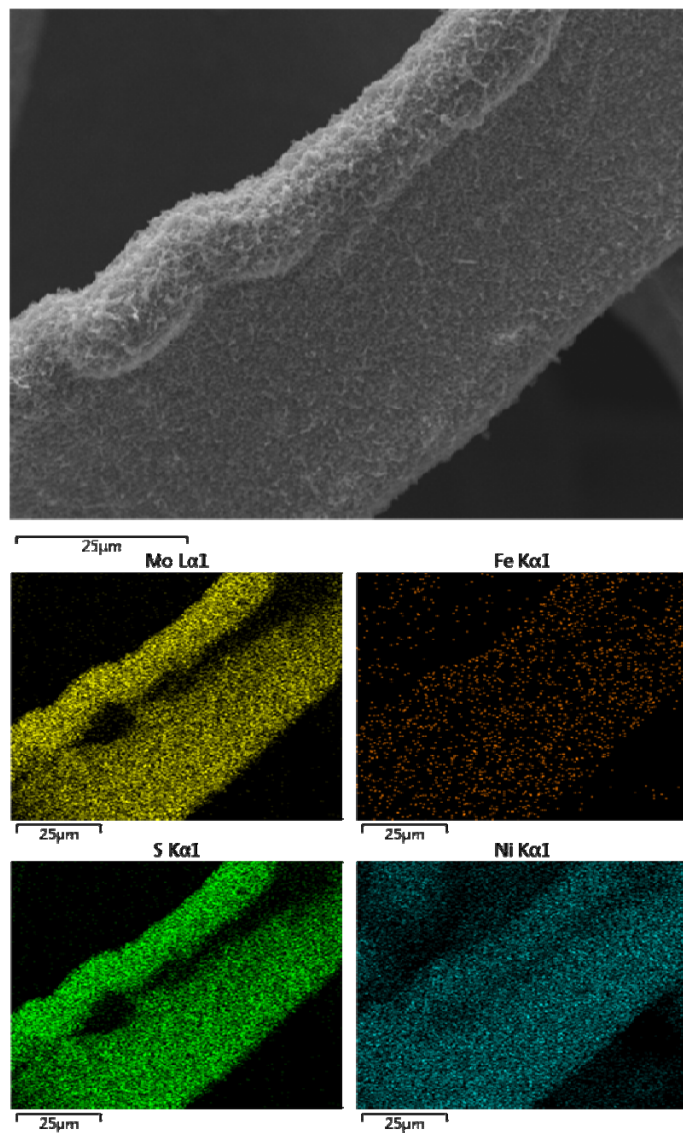
**Fig. S3** Full XPS spectra of Fe-MoS<sub>2</sub>/Ni<sub>3</sub>S<sub>2</sub>/NF-1, 2 and 3.



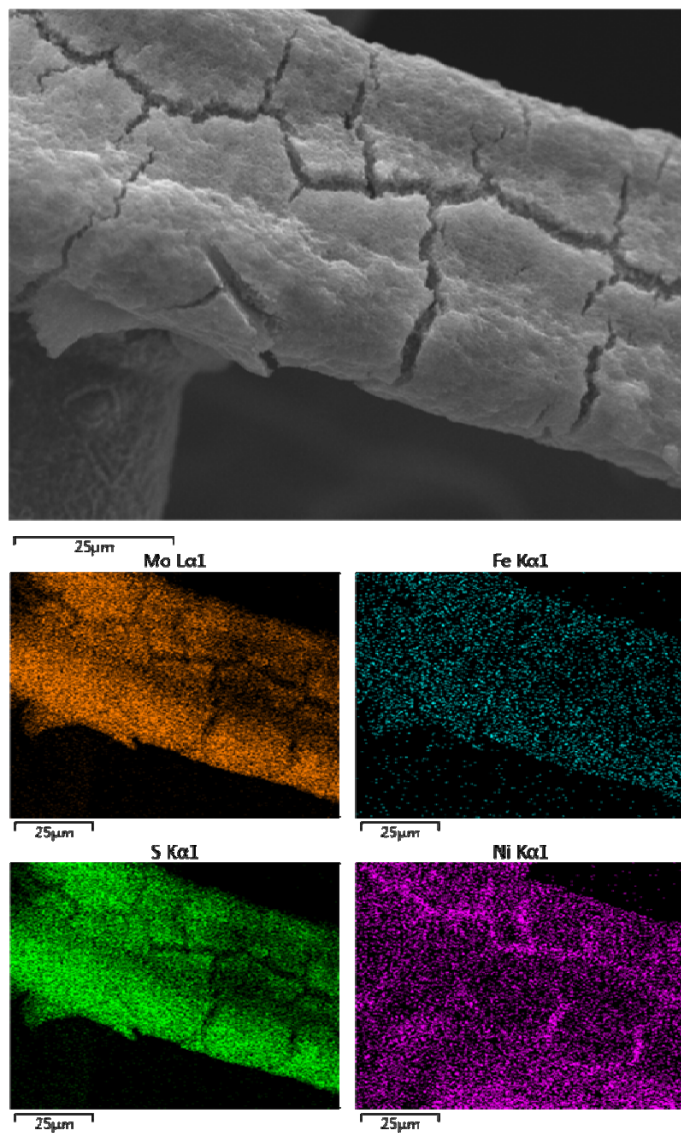
**Fig. S4** SEM images of Fe-MoS<sub>2</sub>/Ni<sub>3</sub>S<sub>2</sub>/NF-1, which showed the Ni<sub>3</sub>S<sub>2</sub> nanoplates circled in red.



**Fig. S5** SEM images of Fe-MoS<sub>2</sub>/Ni<sub>3</sub>S<sub>2</sub>/NF-3, which showed the Ni<sub>3</sub>S<sub>2</sub> nanoplates circled in red.

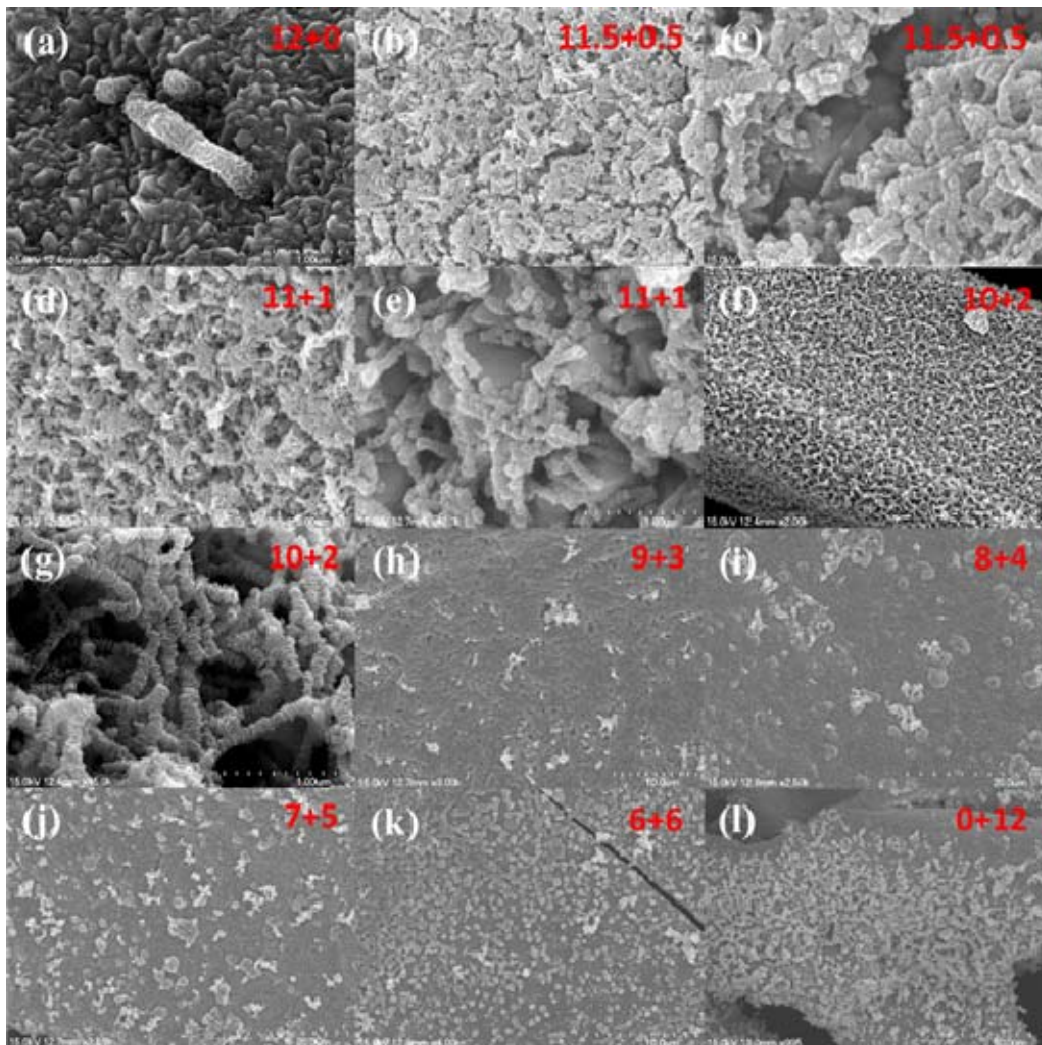


**Fig. S6** SEM image (above) and elemental mapping (down) of Fe-MoS<sub>2</sub>/Ni<sub>3</sub>S<sub>2</sub>/NF-1.



**Fig. S7** SEM image (above) and elemental mapping (down) of Fe-MoS<sub>2</sub>/Ni<sub>3</sub>S<sub>2</sub>/NF-3.





**Fig. S8** SEM images of the products under solutions with different volume ratios of DMF (mL) and H<sub>2</sub>O (mL).

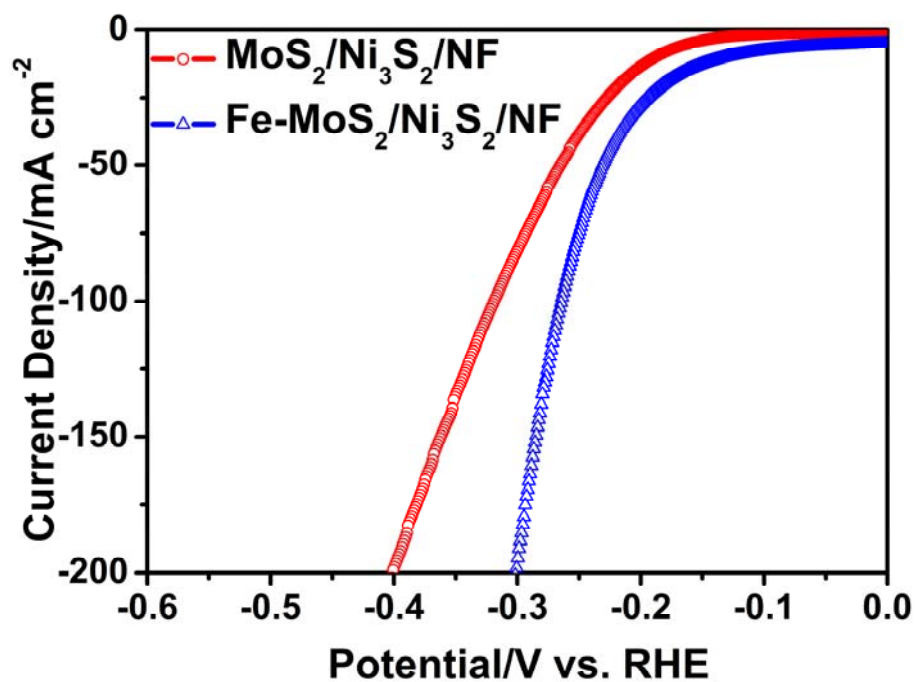


Fig. S9 HER Polarization curves of Fe-MoS<sub>2</sub>/Ni<sub>3</sub>S<sub>2</sub>/NF-2 and MoS<sub>2</sub>/Ni<sub>3</sub>S<sub>2</sub>/NF.

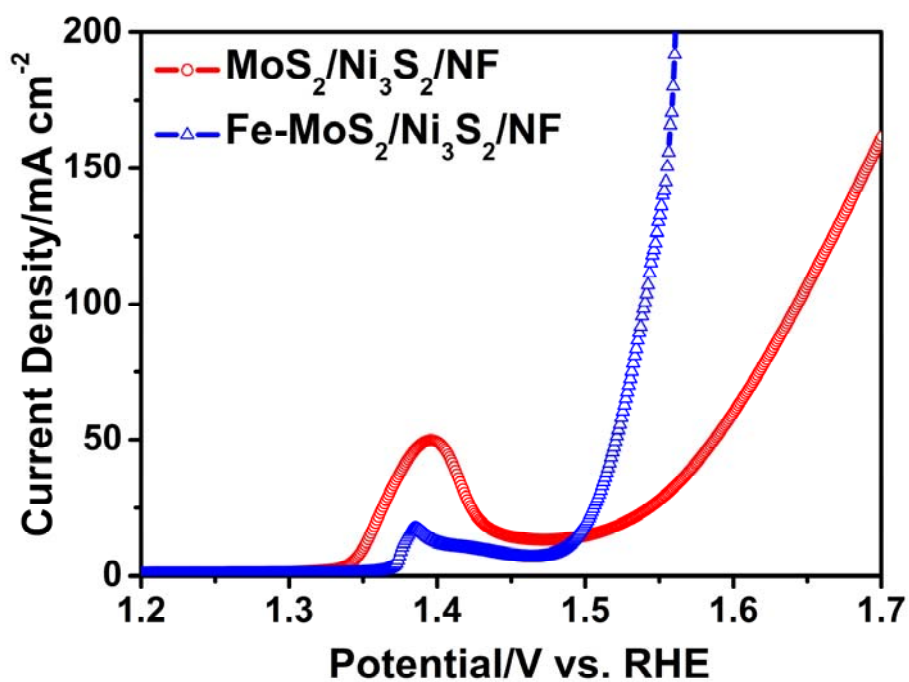
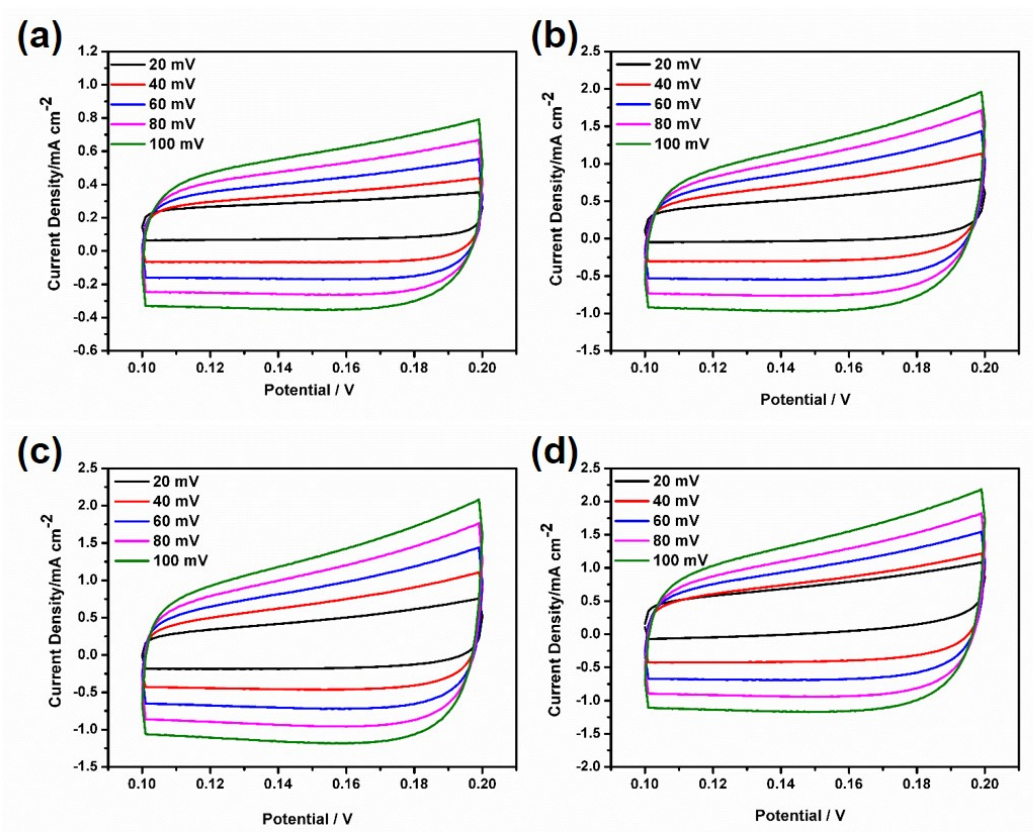


Fig. S10 OER Polarization curves of Fe-MoS<sub>2</sub>/Ni<sub>3</sub>S<sub>2</sub>/NF-2 and MoS<sub>2</sub>/Ni<sub>3</sub>S<sub>2</sub>/NF.



**Fig. S11** Cyclic voltammograms curves of various samples at scan rates ranging from 20 to 100  $\text{mV}\cdot\text{s}^{-1}$  with an interval point of 20  $\text{mV}\cdot\text{s}^{-1}$  in 1.0 M KOH for the determination of the double layer capacitance: (a) bare NF, (b) Fe-MoS<sub>2</sub>/Ni<sub>3</sub>S<sub>2</sub>/NF-1, (c) Fe-MoS<sub>2</sub>/Ni<sub>3</sub>S<sub>2</sub>/NF-2 and (d) Fe-MoS<sub>2</sub>/Ni<sub>3</sub>S<sub>2</sub>/NF-3.