Supporting Information

Ni-Fe phosphate/Ni foam electrode: Facile hydrothermal synthesis and ultralong OER durability

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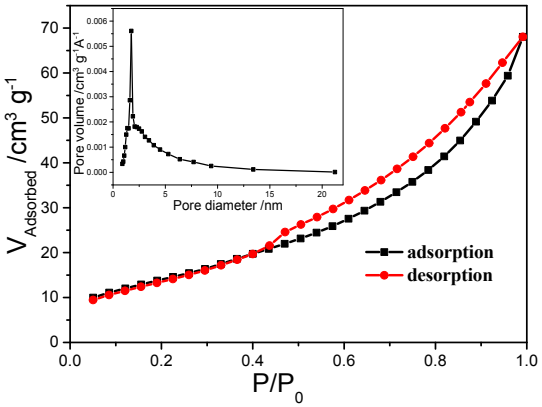
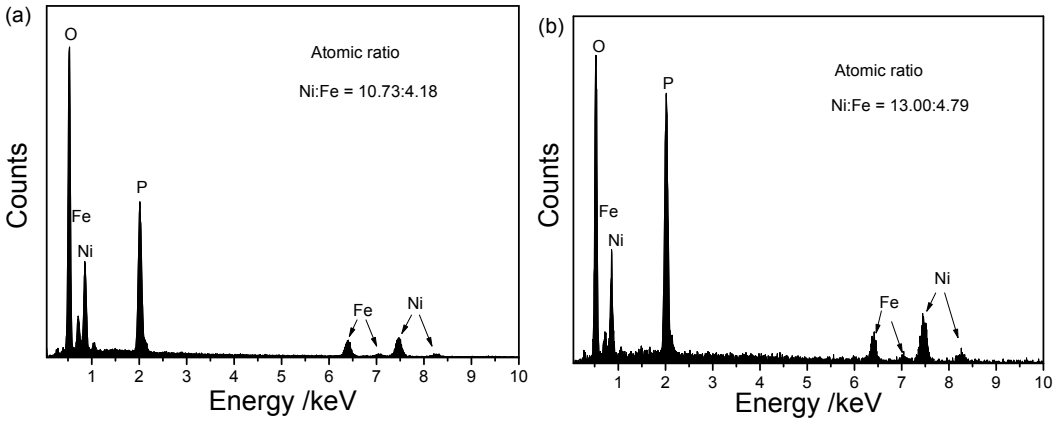


Figure S1 N_2 adsorption-desorption curve and the BJH pore size distribution of the NiFe-Pi catalyst obtained from the system with 150 mg urea and 0.55 mL HCl (37 wt%) at 150 °C for 90 min.



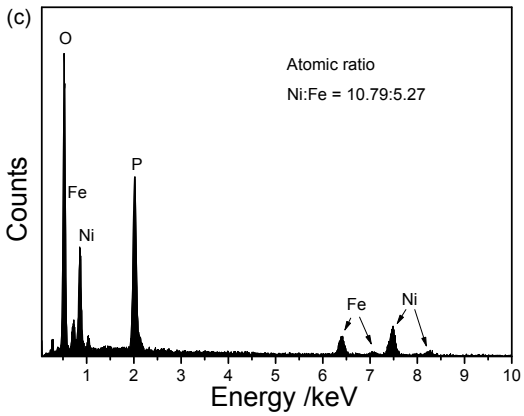


Figure S2. EDS analyses of the NiFe-Pi catalysts obtained under the same conditions from the systems with different amounts of urea: (a) 150, (b) 50 and (c) 400 mg.

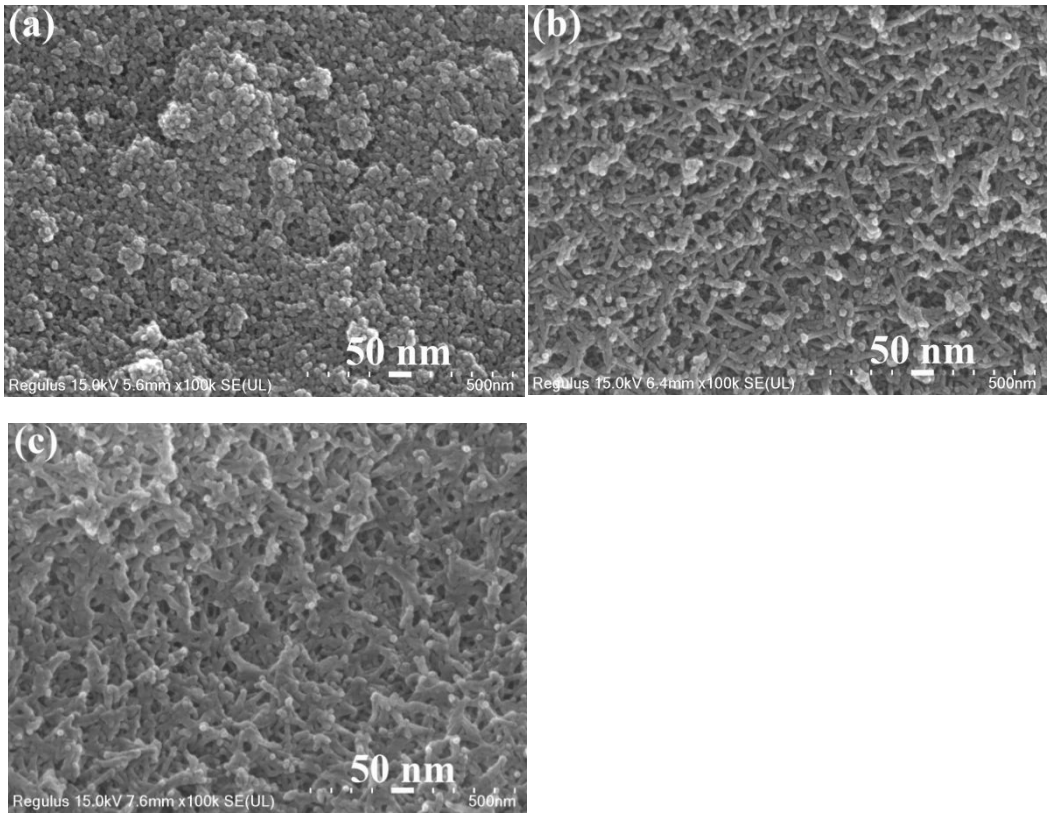
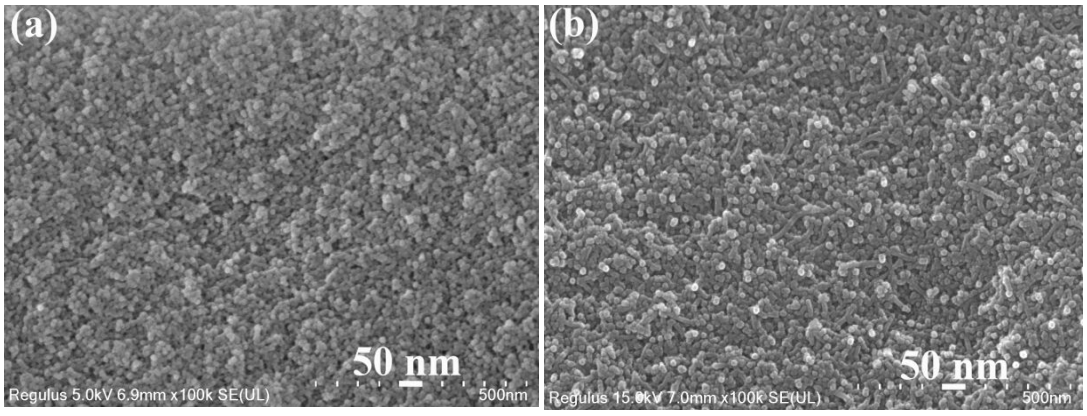


Figure S3. FESEM images of NiFe-Pi/NF catalysts obtained under the same conditions for various reaction durations: (a) 30 min, (b) 60 min and (c) 120 min.



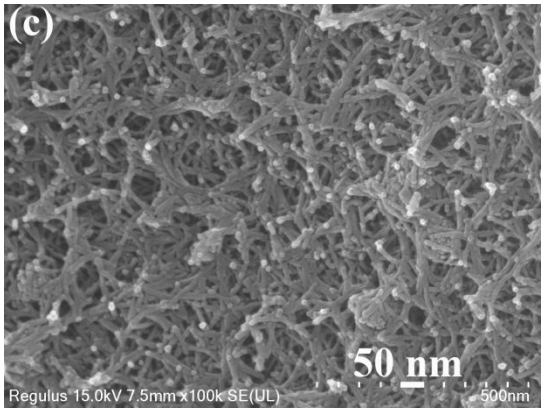


Figure S4. FESEM images of NiFe-Pi/NF obtained under the same conditions at various reaction temperatures: (a) 90 °C, (b) 120 °C and (c) 180 °C.

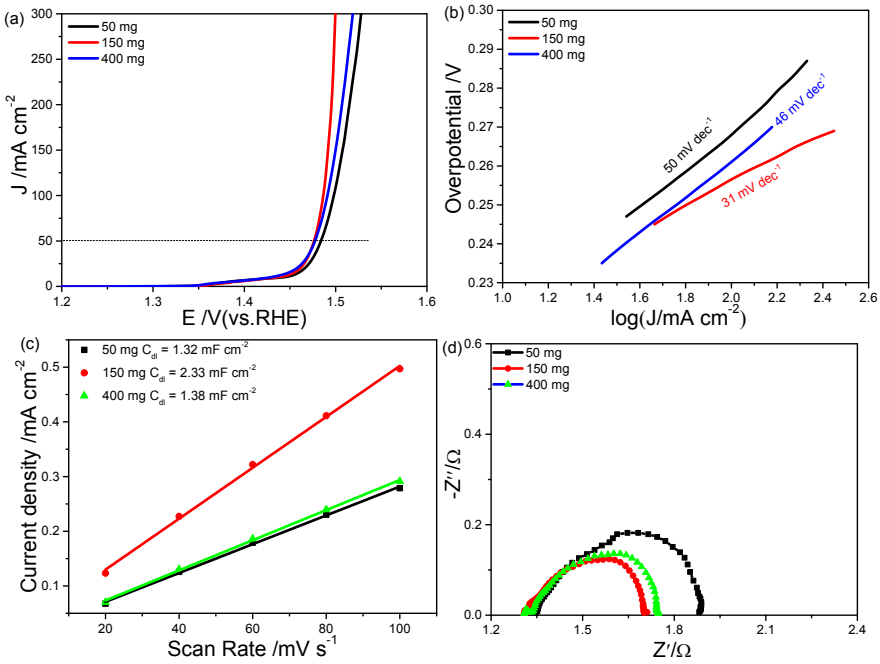
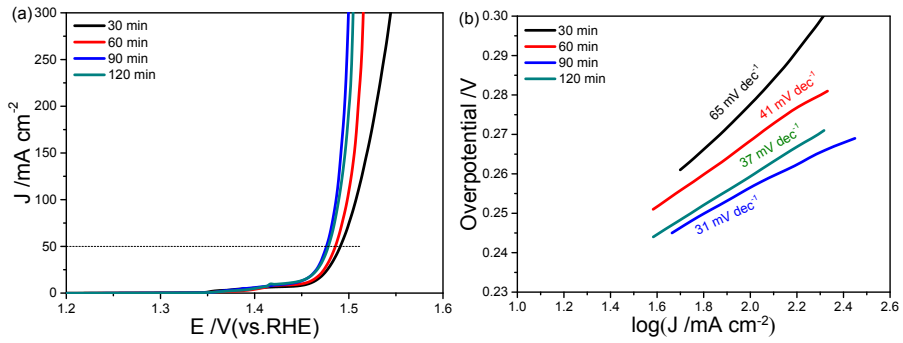


Figure S5. (a) LSV curves and (b) Tafel plots of the catalysts prepared from the systems with various amounts of urea at 150 °C for 90 min; (c) Linear relationship between the scan rate and the J_{anodic}-$J_{cathodic}$ value at 1.08 V (vs. RHE) obtained from a single CV cycle at every scan rate. (d) Nyquist plots of various catalysts at an overpotential of 300 mV in 1.0 M KOH.



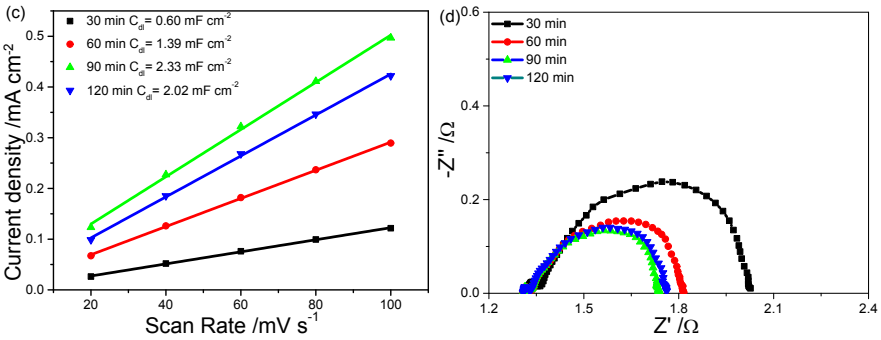


Figure S6. (a) LSV curves and (b) Tafel plots of the catalysts prepared from the systems with 150 mg urea at 150 °C for different durations; (c) Linear relationship between the scan rate and the J_{anodic}-$J_{cathodic}$ value at 1.08 V (vs. RHE) obtained from a single CV cycle at every scan rate. (d) Nyquist plots of various catalysts at an overpotential of 300 mV in 1.0 M KOH.

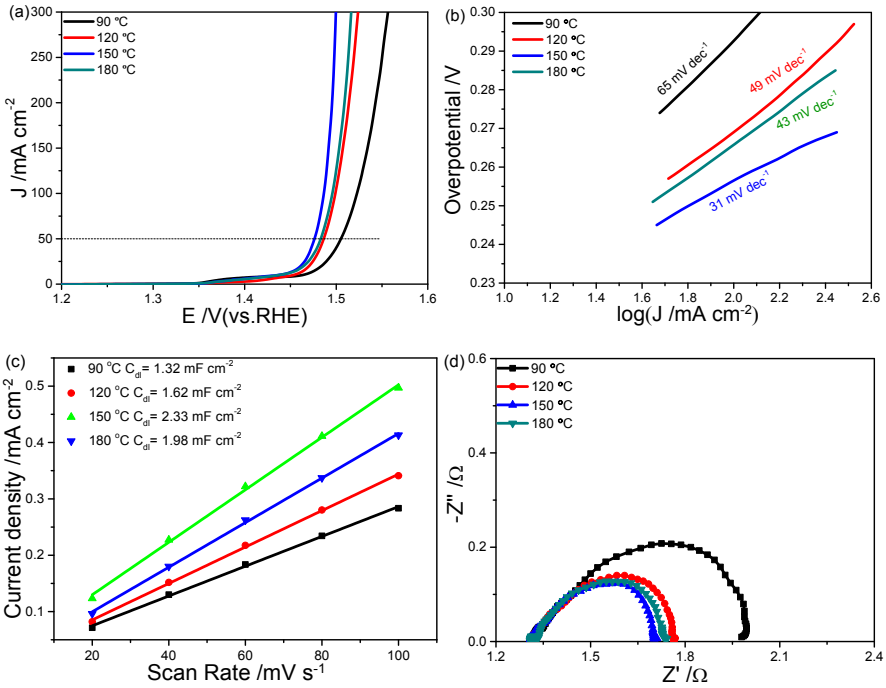


Figure S7. (a) LSV curves and (b) Tafel plots of the catalysts prepared from the systems with 150 mg urea at various temperatures for 90 min; (c) Linear relationship between the scan rate and the J_{anodic}-$J_{cathodic}$ value at 1.08 V (vs. RHE) obtained from a single CV cycle at every scan rate. (d) Nyquist plots of various catalysts at an overpotential of 300 mV in 1.0 M KOH.

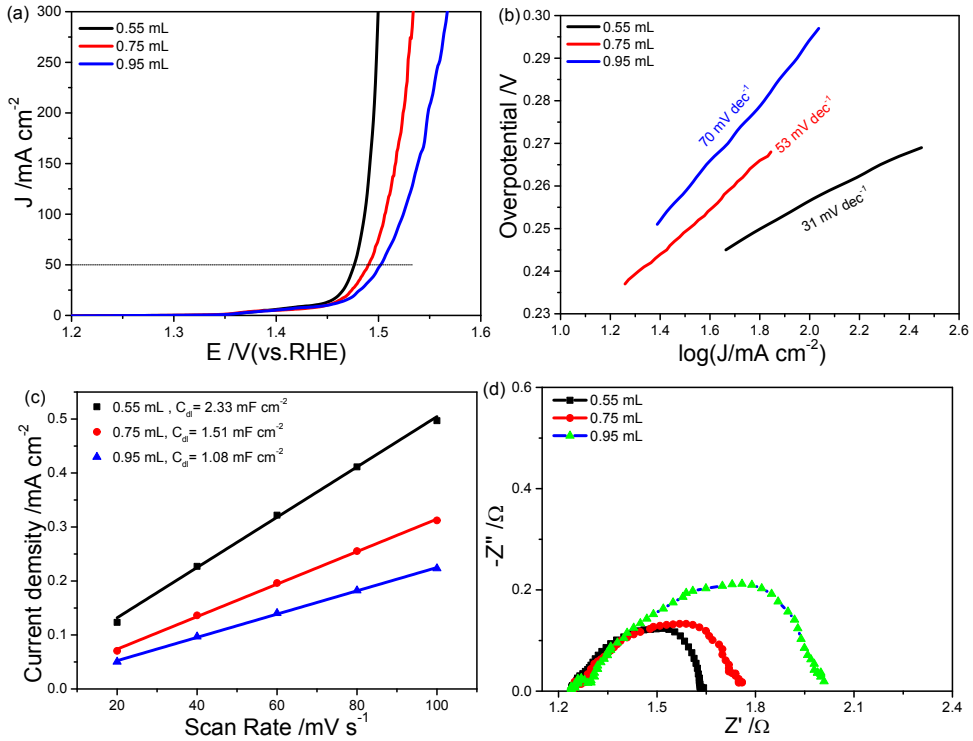


Figure S8. (a) LSV curves and (b) Tafel plots of the catalysts prepared from the systems with various volumes of HCl (37 wt%); (c) Linear relationship between the scan rate and the J_{anodic}-$J_{cathodic}$ value at 1.08 V (vs. RHE) obtained from a single CV cycle at every scan rate. (d) Nyquist plots of various catalysts at an overpotential of 300 mV in 1.0 M KOH.

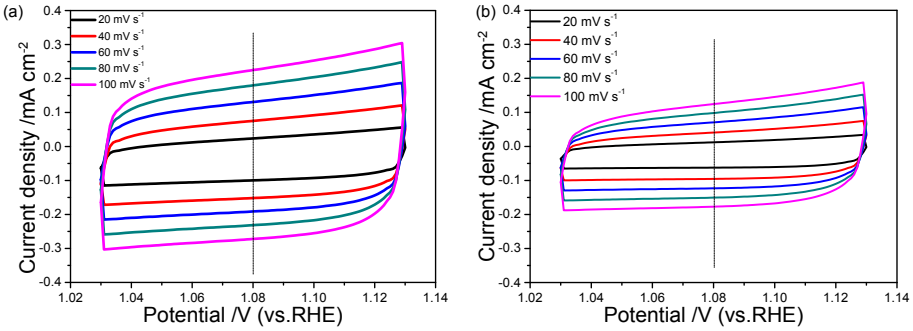


Figure S9. CV curves of NiFe-Pi/NF (a) and NiFe-OH/NF (b).

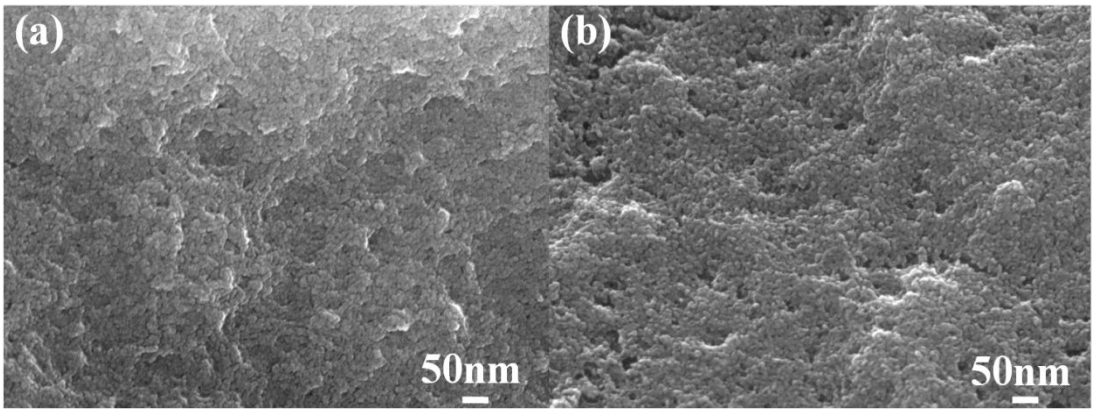


Figure S10. FESEM images of the NiFe-Pi catalyst before (a) and after (b) continuously

catalyzing for 300 h at the current density of 20 mA cm^{-2}.

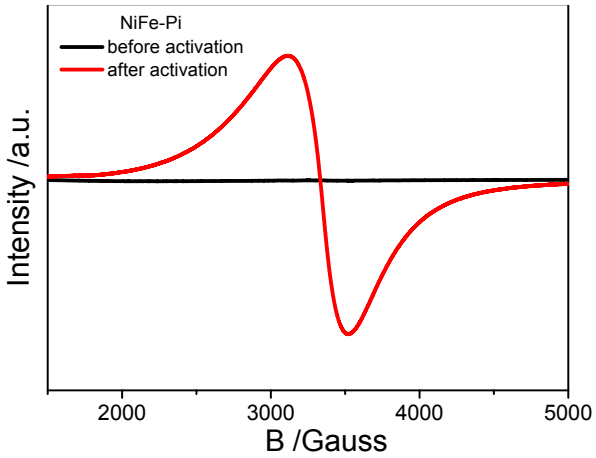


Figure S11. EPR spectra of the NiFe-Pi catalyst before and after activating for 150 CV cycles.

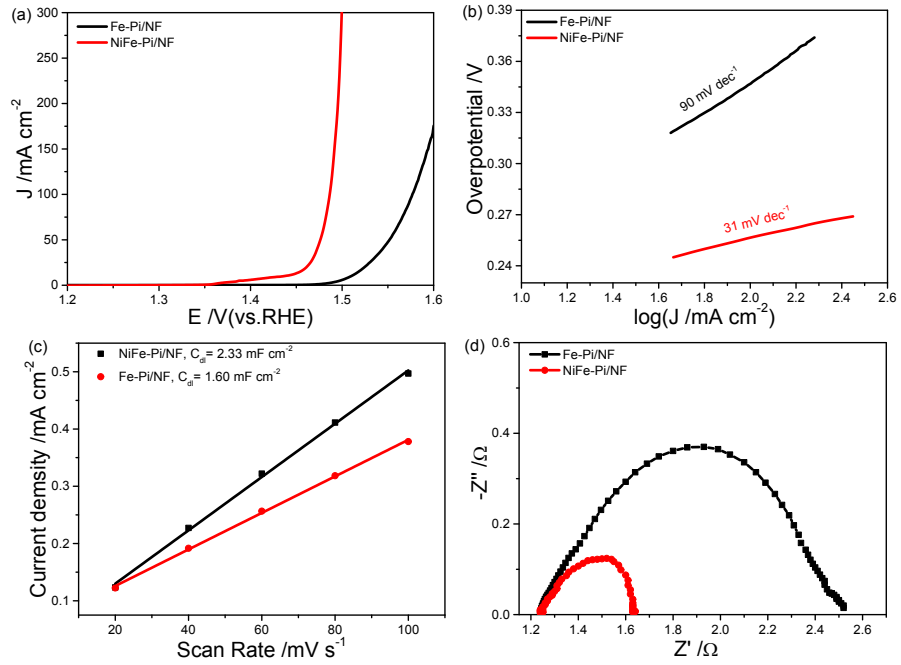


Figure S12. The comparison for OER catalytic performances between Fe-Pi and NiFe-Pi prepared under the same experimental conditions from the systems without and with NF, respectively.

Table S1. Comparison of OER performances for the present catalyst with some catalysts reported in the literature at 1 M KOH electrolyte.

Catalyst	Overpotential@10 mA cm^{-2}	Tafel slope (mV dec^{-1})	Substrate	Durability	Refs.
NiFe-Pi/NF	206 mV	31	NF	300 h	This work
Amorphous $FePO_4$	218 mV	43	NF	15 h	1
NiCoFe-Pi/NF	240 mV	58	NF	24 h	2
Fe-Pi/NF	215 mV	28	NF	90 h	3
Ni:Pi-Fe/NF	220 mV	37	NF	10 h	4
FePi/NF	230 mV	70	NF	24 h	5
NiFePi/P	230 mV	57	NiFe foam	24 h	6

1. L. Yang, Z. Guo, J. Huang, Y. Xi, R. Gao, G. Su, W. Wang, L. Cao, B. Dong. Vertical growth of 2D amorphous $FePO_4$ nanosheet on Ni foam: Outer and inner structural design for superior water splitting. Adv. Mater. 2017, 1704574. https://doi.org/10.1002/adma.201704574.
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3. D. Zhong, L. Liu, D. Li, C. Wei, Q. Wang, G. Hao, Q. Zhao, J. Li. Facile and fast fabrication of iron-phosphate supported on nickel foam as a highly efficient and stable oxygen evolution catalyst. J. Mater. Chem. A. 2017, **5**(35), 18627-18633. https://doi.org/10.1039/c7ta05580c.
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5. P. T. Babar, A. C. Lokhande, H. J. Shim, M. G. Gang, B. S. Pawar, S. M. Pawar, J. H. Kim. SILAR deposited iron phosphate as a bifunctional electrocatalyst for efficient water splitting. J. Colloid. Interface Sci. 2019, **534**, 350-356. https://doi.org/10.1016/j.jcis.2018.09.015.
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