# Facile and fast fabrication of iron-phosphate supported on nickel foam as a highly efficient and stable oxygen evolution catalyst

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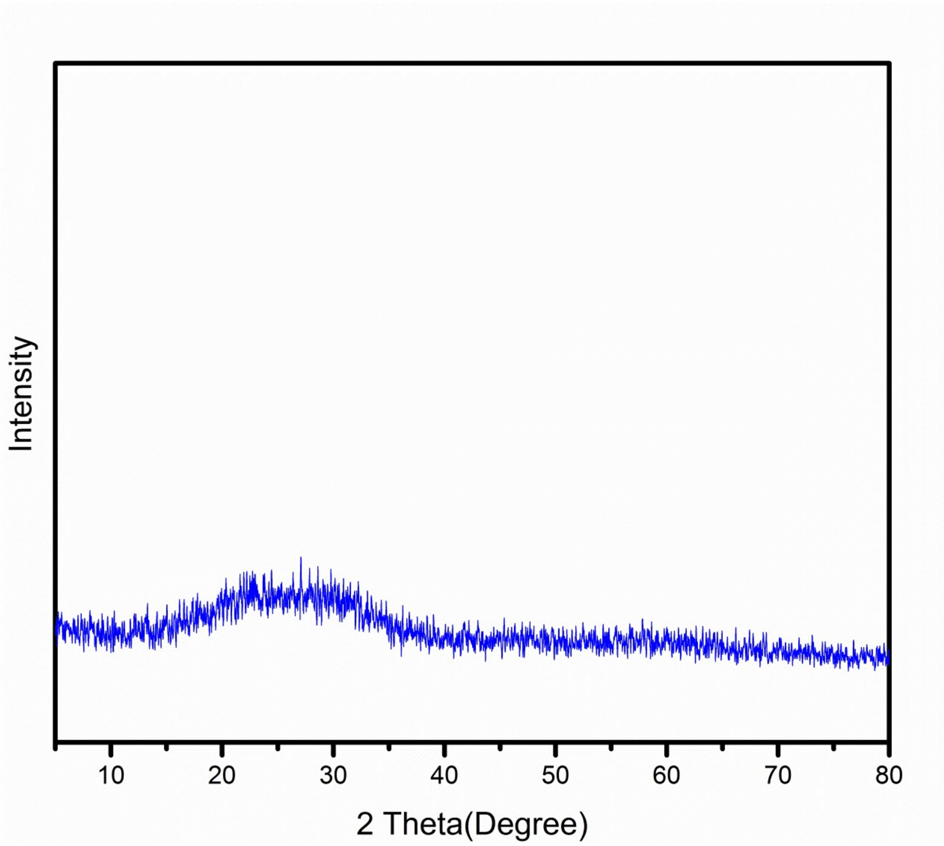


**Fig. S1**. XRD pattern of powder- Fe-P*i*.

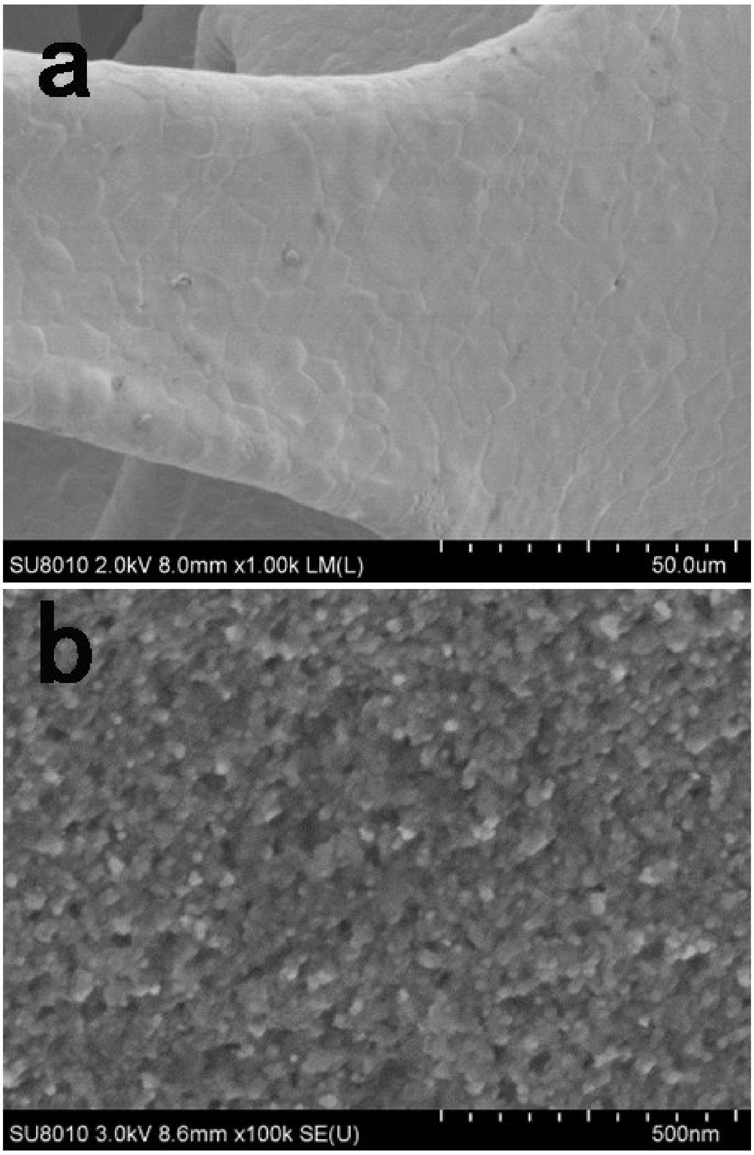


**Fig. S2**. SEM images of a) the NF substrate and b) an $Fe(OH)_3$/NF electrode.

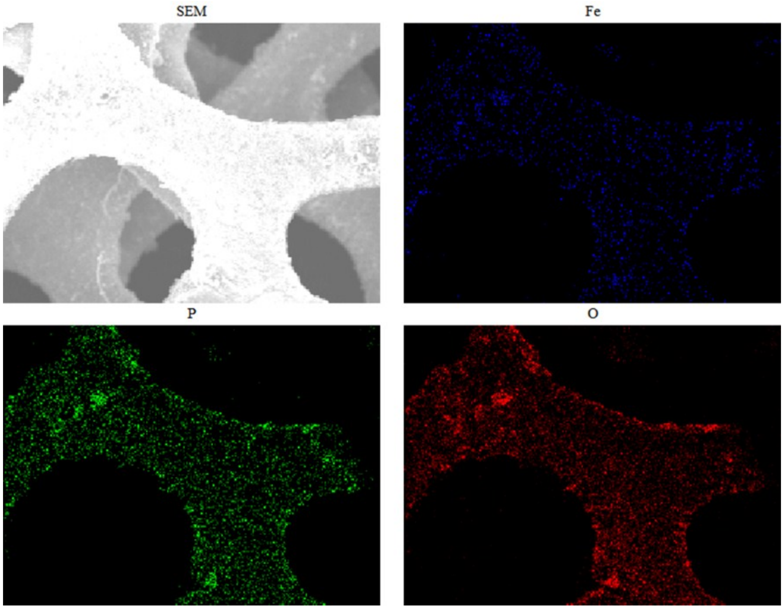


**Fig. S3**. SEM-EDX mappings of Fe-P*i*/NF.

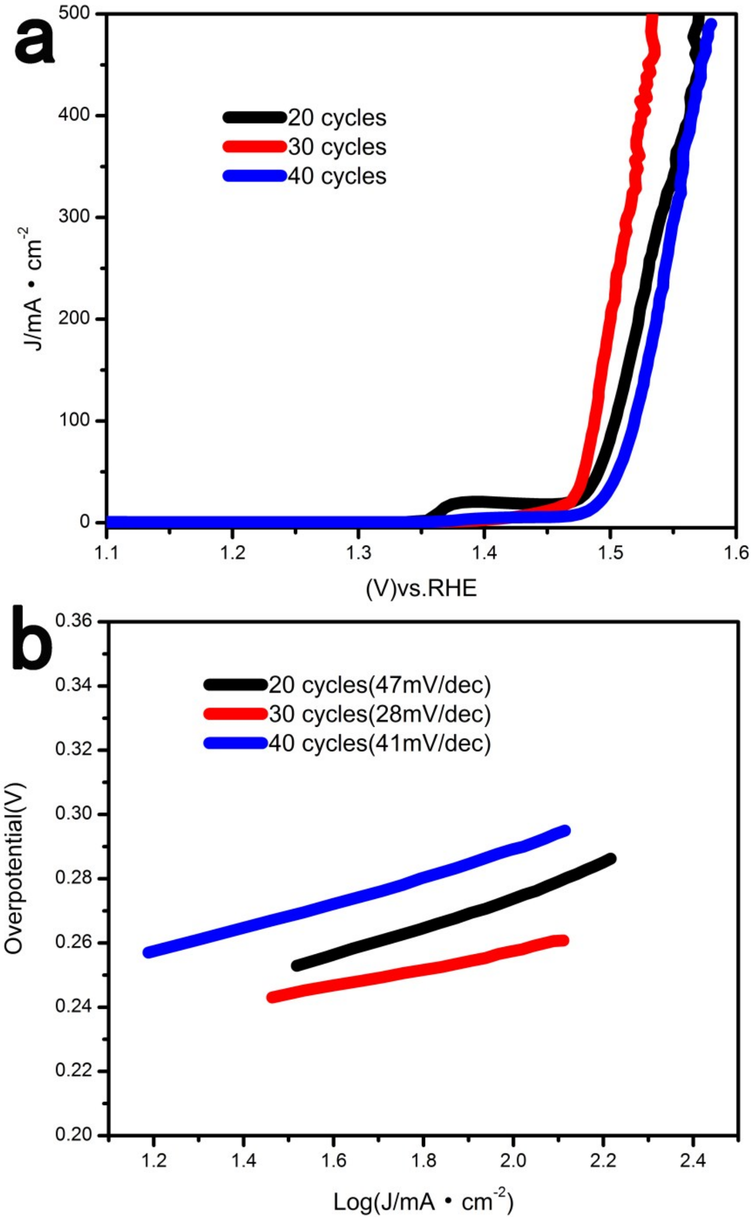


**Fig. S4**. a) Polarization curves for Fe-P*i*/NF prepared with different numbers of cycles. b) The corresponding Tafel plots.

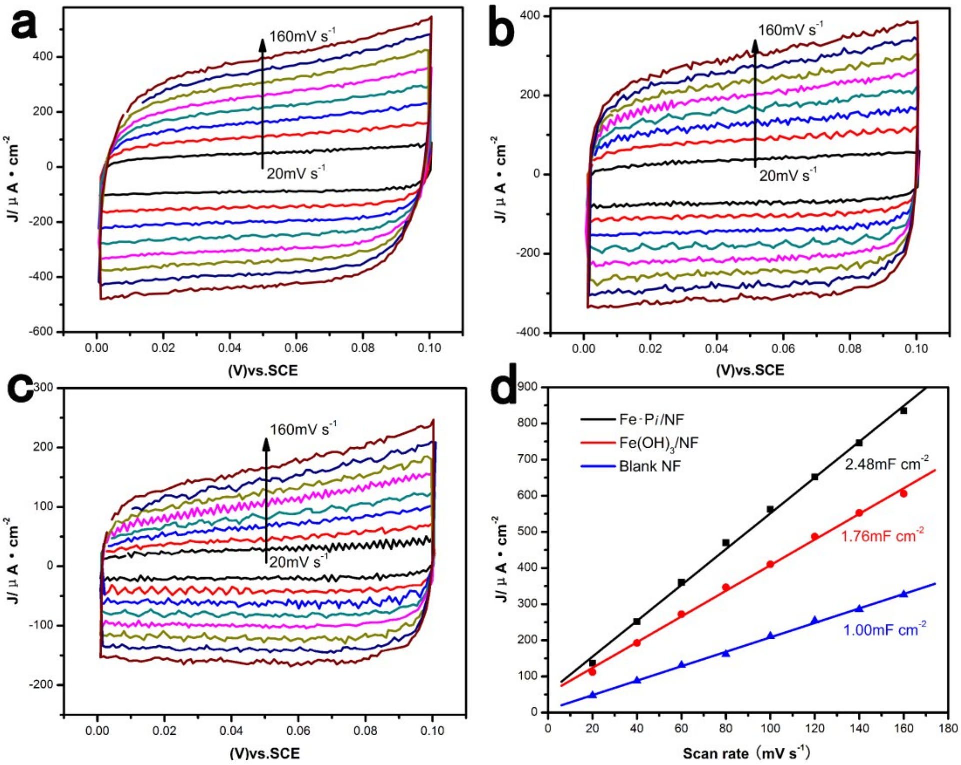


**Fig. S5**. Double-layer capacitance measurements of: a) Fe-P*i*/NF, b) $Fe(OH)_3$/NF, and c) Blank NF. d) Charging current density differences plotted against scan rates. The linear slope, equivalent to twice the double-layer capacitance, Cdl, was used to represent the ECSA.

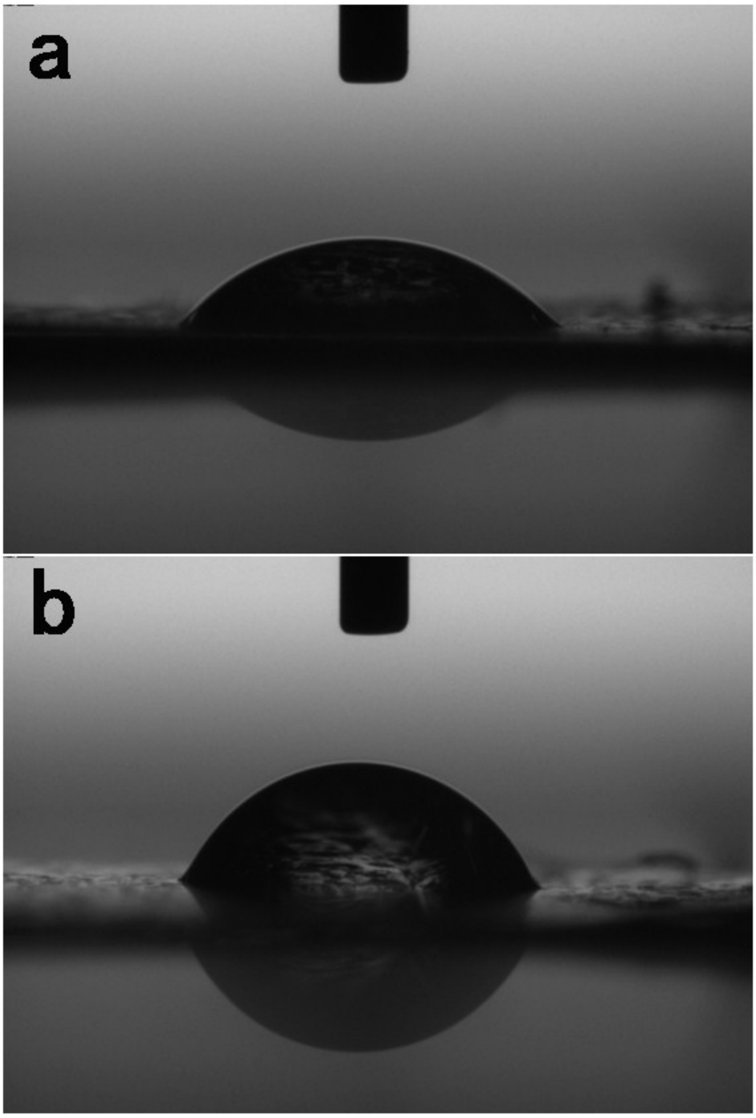


**Fig. S6**. Water contact-angle images of: a) Fe-P*i*/NF and b) $Fe(OH)_3$/NF.

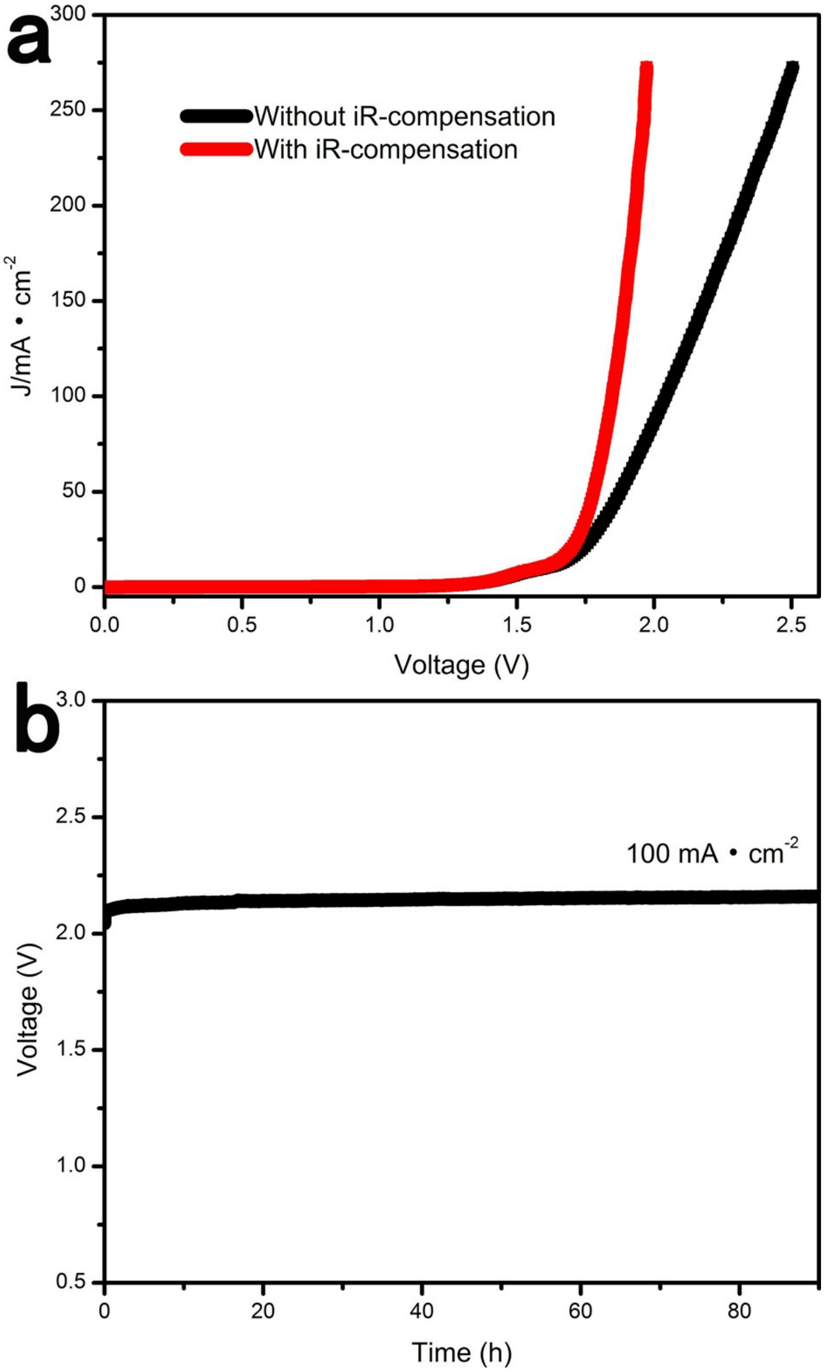


**Fig. S7**. a) LSV curves for overall water splitting in a two-electrode system. b) Chronopotentiometric curve for the two-electrode system at a constant current density of 100 mA $cm^{-2}$ without *iR* compensation. Fe-P*i*/NF as anode and blank NF as cathode in the two-electrode system. All experiments were carried out in 1.0 M KOH.

**Table S1**. Comparison of OER performance for Fe-P*i*/NF with those of state-of-the-art electrocatalysts under alkaline conditions.

| Material | Electrolyte (KOH) | η @10 mA $cm^{-2}$ (mV) | Tafel slope (mV $dec^{-1}$) | Reference |
|---|---|---|---|---|
| Fe-P*i*/NF | 1M | 215 | 28 | This work. |
| a-FeNiOx | 0.1 M | 210±10 @1 mA $cm^{-2}$ | 24±4 | S[1] |
| NiSe/NF | 1 M | 270 @20 mA $cm^{-2}$ | 64 | S[2] |
| NiFe-LDH/CNT | 1 M | 240 | 31 | S[3] |
| Ni-P | 1 M | 300 | 64 | S[4] |
| α-$Ni(OH)_2$ | 0.1 M | 331 | 42 | S[5] |
| NiFe LDH/NF | 1 M | 240 | | S[6] |
| CoO/hi-$Mn_3O_4$ | 1 M | 378 | 61 | S[7] |
| $W_{0.5}Co_{0.4}Fe_{0.1}$/NF | 1 M | 250 | 32 | S[8] |
| NiFe LDH-NS@DG10 | 1 M | 210 | 52 | S[9] |
| NiFeOx/IF | 1 M | 220 | 34 | S[10] |
| Ni-Fe-OH@$Ni_3S_2$/NF | 1 M | 165 | 93 | S[11] |
| CoMnP nanoparticles | 1 M | 330 | 61 | S[12] |
| Ni:Pi-Fe/NF | 1 M | 220 | | S[13] |

**Table S2**. Comparison of the TOF value for Fe-P*i*/NF with those of state-of-the-art electrocatalysts under alkaline conditions.

| Material | Electrolyte (KOH) | TOF ($s^{-1}$) | Reference |
|---|---|---|---|
| Fe-P*i*/NF | 1 M | 0.381 @**η**=270 mV | This work. |
| Fe-P*i*/NF | 1 M | 0.838 @**η**=300 mV | This work. |
| NiFe-LDH/CNT | 1 M | 0.56 @**η**=300 mV | S[3] |
| NiFeMn-LDH | 1 M | 0.038 @**η**=300 mV | S[14] |
| α-$Ni(OH)_2$ | 0.1 M | 0.0361 @**η**=350 mV | S[5] |
| Gelled FeCoW | 1 M | 0.46 @**η**=300 mV | S[15] |
| $Ni_2P$/Ni/NF | 1 M | 0.015 @**η**=350 mV | S[16] |
| $Ni_{45}Fe_{55}$ | 0.1 M | 0.14 @**η**=300 mV | S[17] |
| Ni/birnessite | 1 M | 0.061 @**η**=400 mV | S[18] |
| NiCeOx-Au | 1 M NaOH | 0.08 @**η**=280 mV | S[19] |
| CCS Ni-Co Nanowire | 1 M | 0.0086 @**η**=300 mV | S[20] |
| FeNiOx film | 1 M | 0.68 @**η**=310 mV | S[21] |
| $Ni_{0.75}V_{0.25}$-LDH | 1 M | 0.054 @**η**=350 mV | S[22] |
| NiFe-DAT film | 1M NaOH | 0.42 @**η**=300 mV | S[23] |

**Table S3**. The Rs and Rct values of the catalysts from EIS spectra (Fig. 4a) simulated using the corresponding equivalent circuit.

| Sample | Rs(Ω) | $R_1$(Ω) | Rct(Ω) |
|---|---|---|---|
| Fe-P*i*/NF | 1.35 | 1.89 | 0.19 |
| $Fe(OH)_3$/NF | 0.98 | 0.37 | 0.52 |
| $RuO_2$/NF | 1.15 | 1.34 | 4.91 |

**Notes and references**

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