

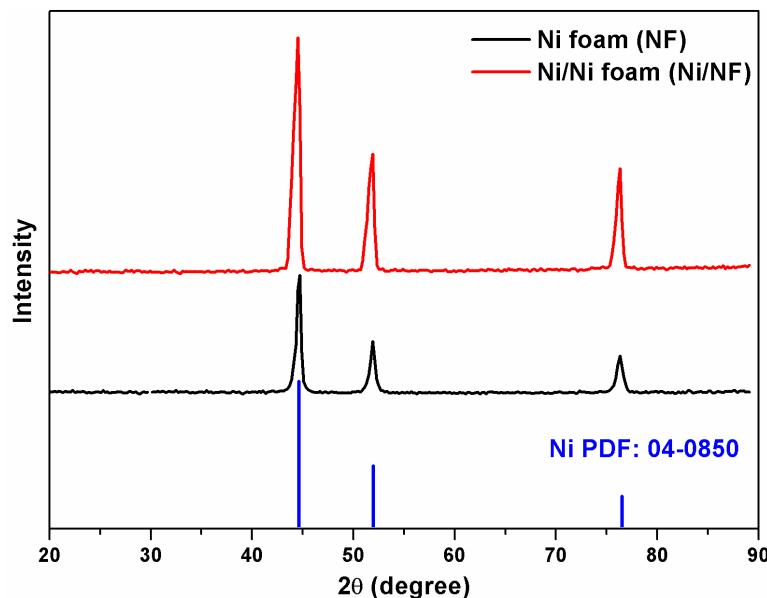
# Supporting Information

## Hierarchically Porous Urchin-Like Ni<sub>2</sub>P Superstructures Supported on Nickel Foam as Efficient Bifunctional Electrocatalysts for Overall Water Splitting

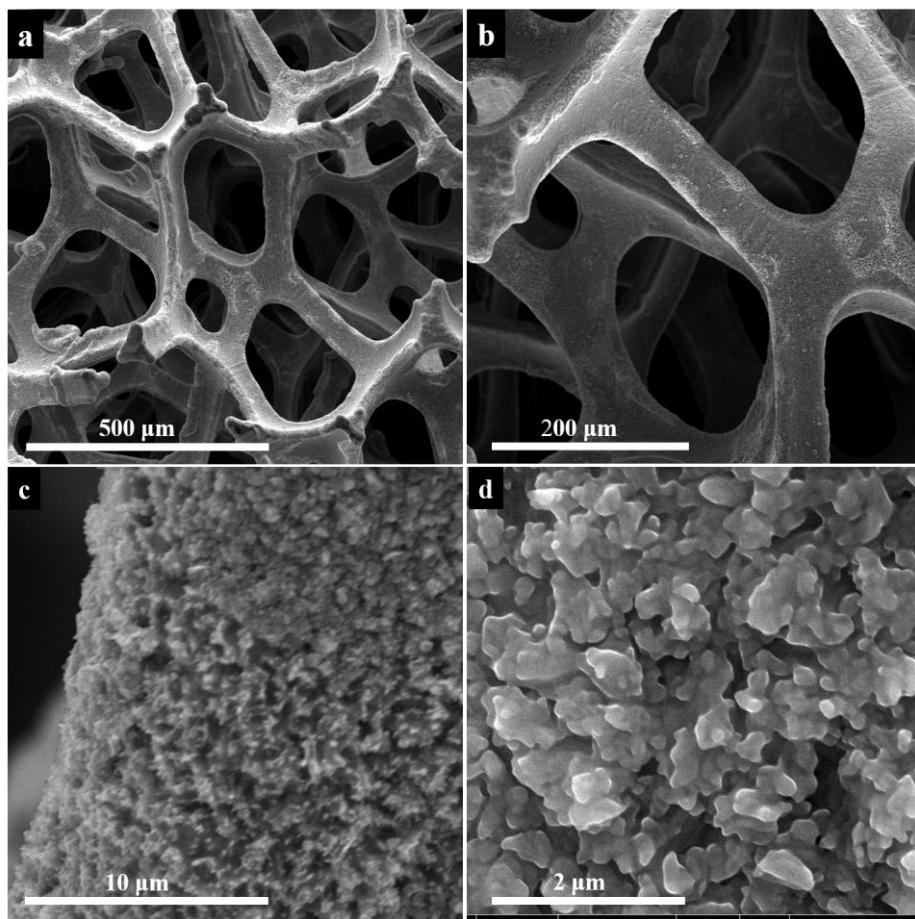
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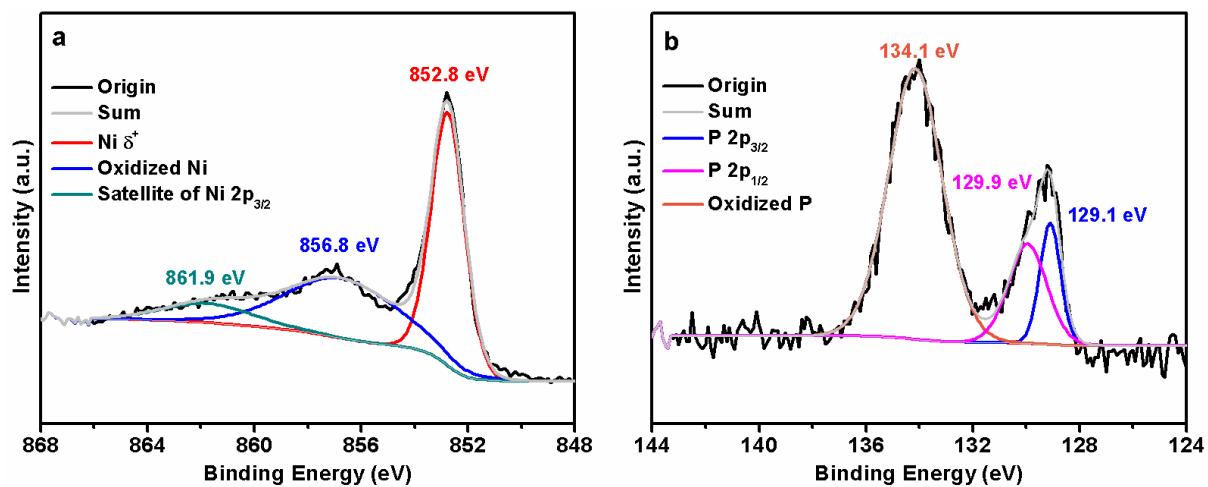
### 1. Supporting data



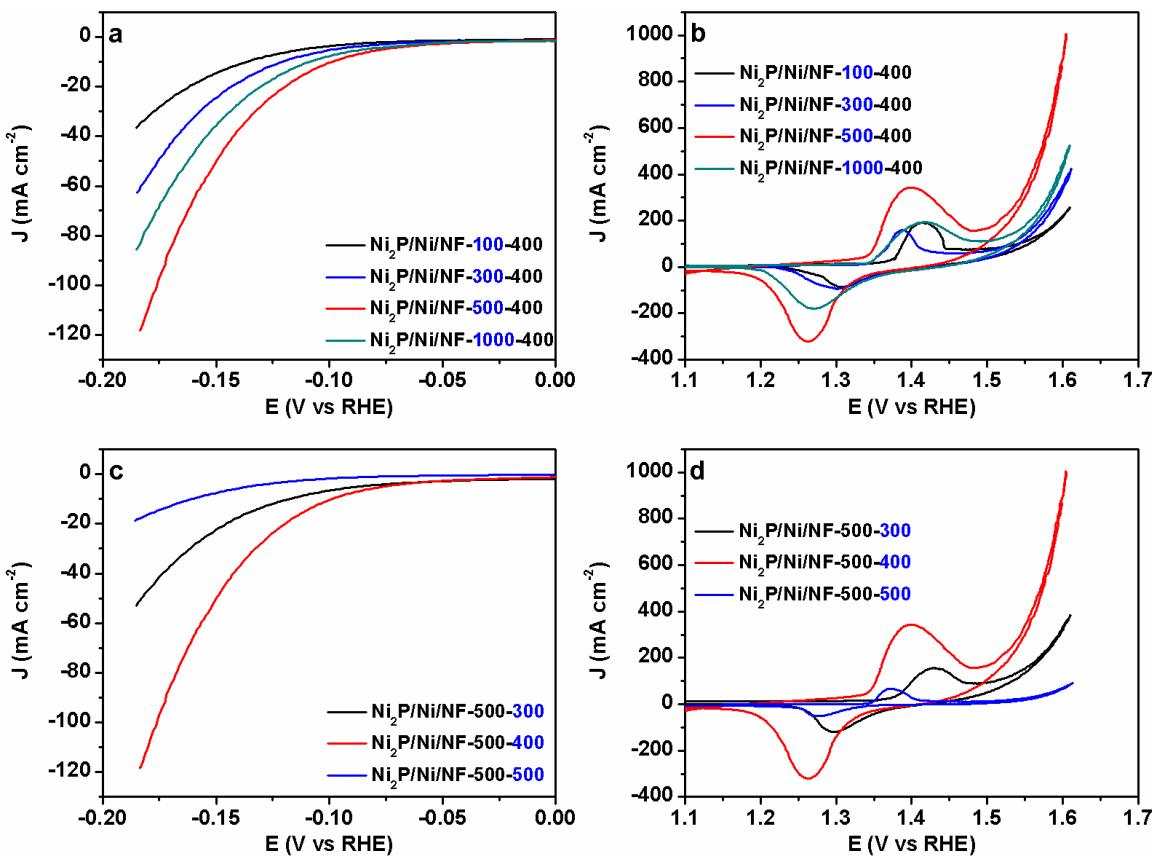
**Figure S1** XRD patterns of nickel foam (black) and Ni/NF (red) samples.



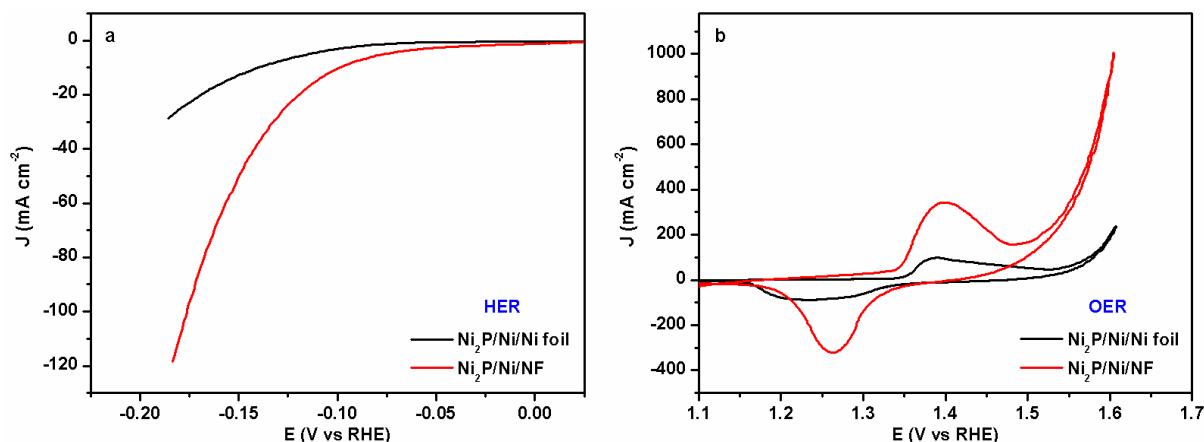
**Figure S2** (a-d) SEM images of  $\text{Ni}_2\text{P}/\text{NF}$  at different magnifications.



**Figure S3** High-resolution XPS spectra of (a)  $\text{Ni } 2\text{p}_{3/2}$  and (b)  $\text{P } 2\text{p}$  for fresh  $\text{Ni}_2\text{P}/\text{Ni}/\text{NF}$ .



**Figure S4** Polarization curves (a, c for HER and b, d for OER) measured with  $\text{Ni}_2\text{P}/\text{Ni}/\text{NF}$ -x-y samples in 1.0 M KOH electrolyte at  $2 \text{ mV s}^{-1}$  as a function of (a, b) the electrodeposition time and (c, d) the phosphidation temperature, wherein the “x” represents the electrodeposition time and “y” represents the phosphidation temperature. It concludes that the  $\text{Ni}_2\text{P}/\text{Ni}/\text{NF}$ -500-400 sample (*denote as  $\text{Ni}_2\text{P}/\text{Ni}/\text{NF}$  for brevity in the main text*) exhibited the best HER and OER activities.



**Figure S5** (a) HER polarization curves and (b) OER CV curves of  $\text{Ni}_2\text{P}/\text{Ni}/\text{NF}$  and  $\text{Ni}_2\text{P}/\text{Ni}/\text{Ni}$  foil.

**Table S1** Comparison of electrocatalytic **HER** activity of various nonprecious catalysts in 1.0 M KOH electrolyte.

Catalysts	J (mA cm <sup>-2</sup> )	η (mV)	Tafel slop (mV dec <sup>-1</sup> )	Reference
Ni <sub>2</sub> P/Ni/NF	10 20	-98 -120	72	This work
NiFe LDH/NF	10 20	>-200 ~-250	-	S1
MoC <sub>x</sub> /C	10 20	-151 ->175	59	S2
H <sub>2</sub> -CoCat	10	>-385	140	S3
CoO <sub>x</sub> @CN	10	-232	N/A	S4
MoS <sub>2+x</sub> /FTO	10	-310	N/A	S5
CoP/CC	10 100	-209 ->500	129	S6
Co-S/FTO	1	-480	N/A	S7
Co-NRCNTs	10 20	-370 ->450	N/A	S8.
Ni <sub>2</sub> P	20	-205	N/A	S9
MoB	10	>-225	N/A	S10
Ni/Ni(OH) <sub>2</sub>	10	>-300	N/A	S11
MoS <sub>x</sub>	10	>-540	N/A	S12
FeP NAs/CC	10	-218	146	S13
N, P-G	10	>700	145	S14
Ni <sub>2</sub> P	20	250	N/A	S15

**Table S2** Comparison of electrocatalytic **OER** activity of various nonprecious catalysts in 1.0 M KOH electrolyte.

Catalysts	$\eta$ (mV) at 10 mA cm <sup>-2</sup>	Reference
<b>Ni<sub>2</sub>P/Ni/NF</b>	<b>200</b>	<b>This work</b>
CoCo LDH	393	S16
NiCo-(b)	420	
Co/P-(a)	380	
Co/B	>400	S17
Ni/B	>400	
CoO <sub>x</sub> @CN	260	S4
Co <sub>3</sub> O <sub>4</sub> /Co <sub>3</sub> O <sub>4</sub> DSNCs	340	S18
Co/P films	345	S19
MnCo <sub>2</sub> O <sub>x</sub>	>410	S20
CoFeO <sub>x</sub> film	~360	S21
CoO <sub>x</sub> film	403	S22
NiFeO <sub>x</sub> film	>350	S21
MnO <sub>x</sub> film	563	S22
Co <sub>3</sub> O <sub>4</sub> /N-rmGO	310	S23
NiCoO <sub>x</sub>	>420	S21
NiCo LDH	>420	S24
N-G-CoO	340	S25
Ni <sub>x</sub> Co <sub>3-x</sub> O <sub>4</sub>	~370	S26

## 2. References

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