

Ultra-low amount Pt-doped  $\text{Co}_2\text{P}/\text{Ni}_2\text{P}$  on nickel foam as an efficient electrocatalyst  
for hydrogen evolution reaction in alkaline electrolyte

Xin Xiao,<sup>a</sup> Dongping Sun,<sup>a</sup> Xiaoheng Liu,<sup>a</sup> Bo Qiu,<sup>a</sup> Xingyou Xu,<sup>\*,a,b,c</sup> Dongen

Zhang<sup>\*,b,c</sup> and Tao Yang<sup>\*,b,c</sup>

a. School of Chemical Engineering, Nanjing University of Science and Technology,  
Nanjing 210094, China.

E-mail: xuxingyou007@163.com

b. School of Environmental and Chemical Engineering, Jiangsu Ocean University,  
Lianyungang 222005, China.

E-mail: zdewxm@aliyun.com; yangtao\_hit@163.com

c. Jiangsu Institute of Marine Resources Development, Jiangsu Ocean University,  
Lianyungang 222005, China.

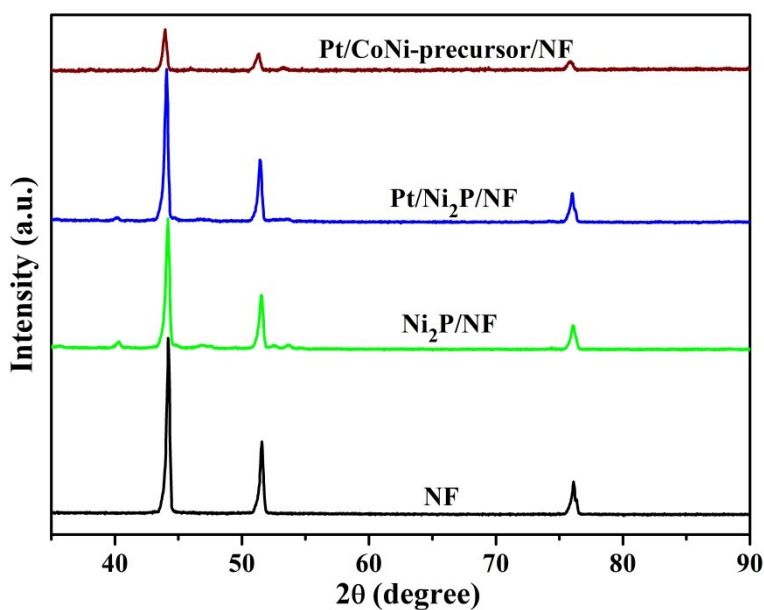


Fig. S1. XRD patterns of NF,  $\text{Ni}_2\text{P}/\text{NF}$ ,  $\text{Pt}/\text{Ni}_2\text{P}/\text{NF}$  and  $\text{Pt}/\text{CoNi-precursor}/\text{NF}$ .

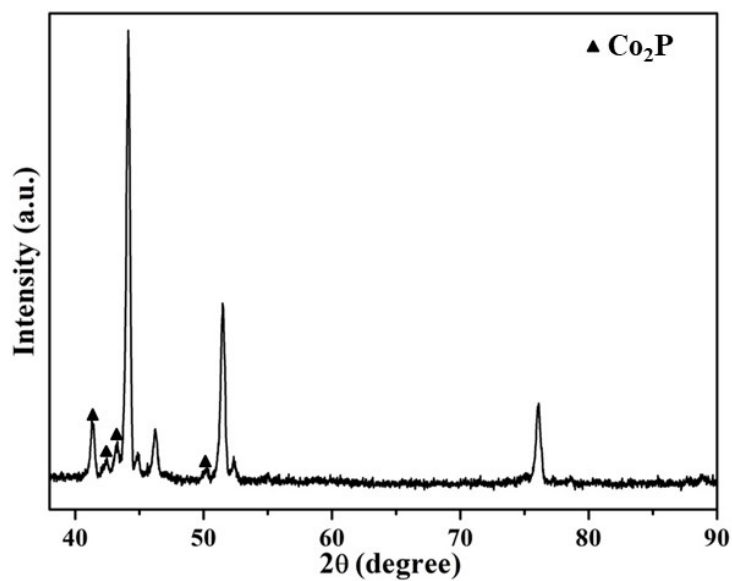


Fig. S2. XRD pattern of Pt/Co<sub>2</sub>P/Ni<sub>2</sub>P/NF after calcination at 600 °C for 3 h.

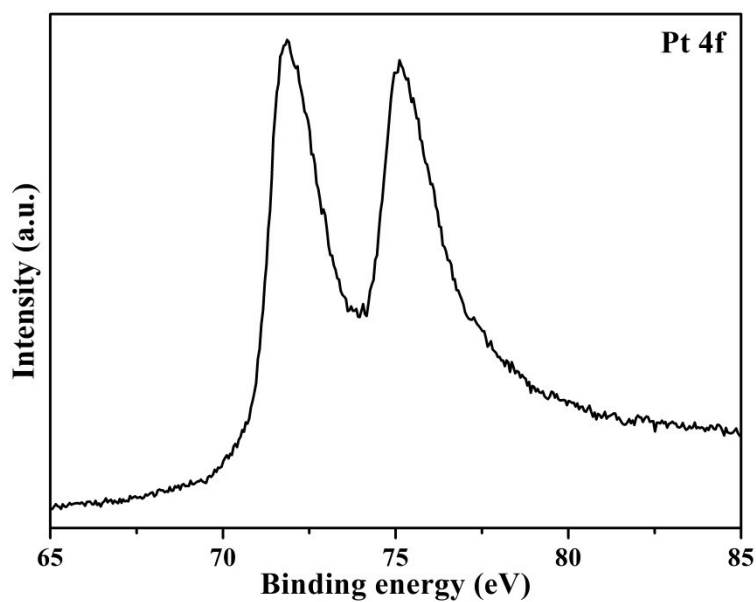


Fig. S3. High-resolution XPS spectrum of Pt 4f of commercial 20 wt.% Pt/C.

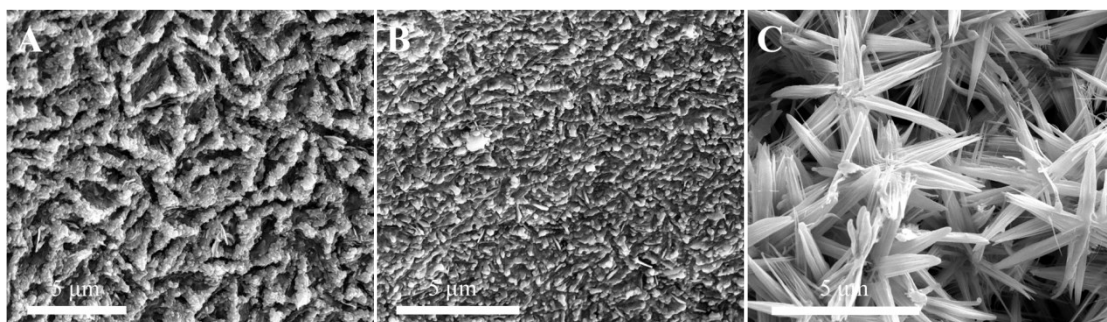
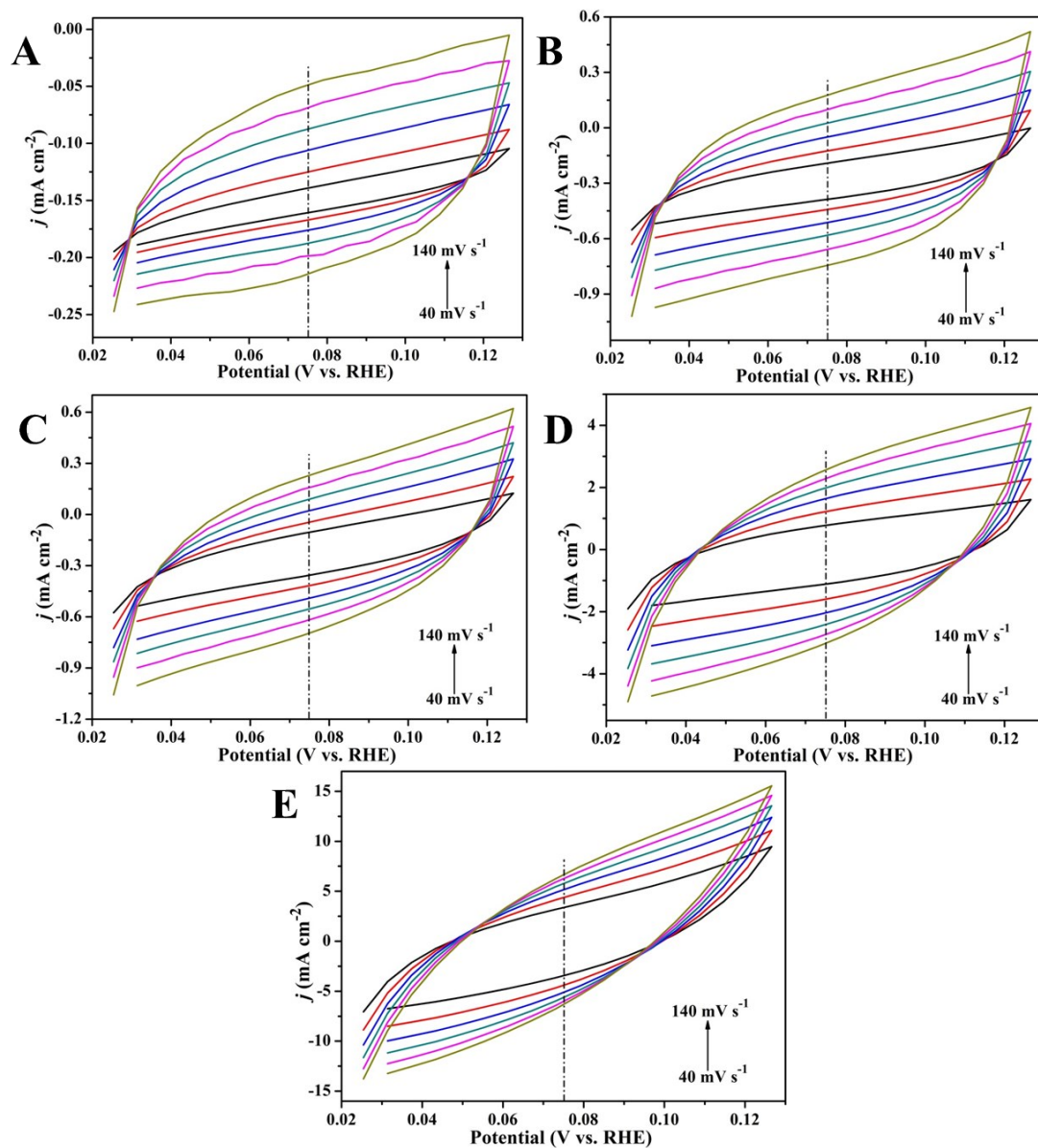


Fig. S4. SEM images of (A) Ni<sub>2</sub>P/NF, (B) Pt/ Ni<sub>2</sub>P/NF and (C) Co<sub>2</sub>P/Ni<sub>2</sub>P/NF.



**Fig. S5.** CV curves of (A) NF, (B) Ni<sub>2</sub>P/NF, (C) Pt/Ni<sub>2</sub>P/NF, (D) Co<sub>2</sub>P/Ni<sub>2</sub>P/NF and (E) Pt/Co<sub>2</sub>P/Ni<sub>2</sub>P/NF with various scan rates (40-140 mV s<sup>-1</sup>) in the region of 0.0254 to 0.1254 V.