# *Supporting Information for*

# *Ni-P Amorphous Alloy Efficient Electrocatalyst with Hierarchical Structure toward Borohydride Oxidation*

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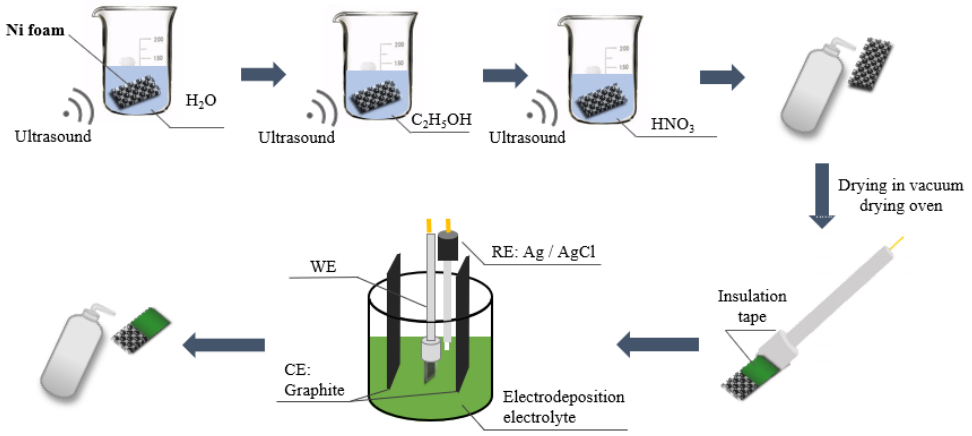


**Fig. S1** Schematic diagram of catalyst electrode preparation.

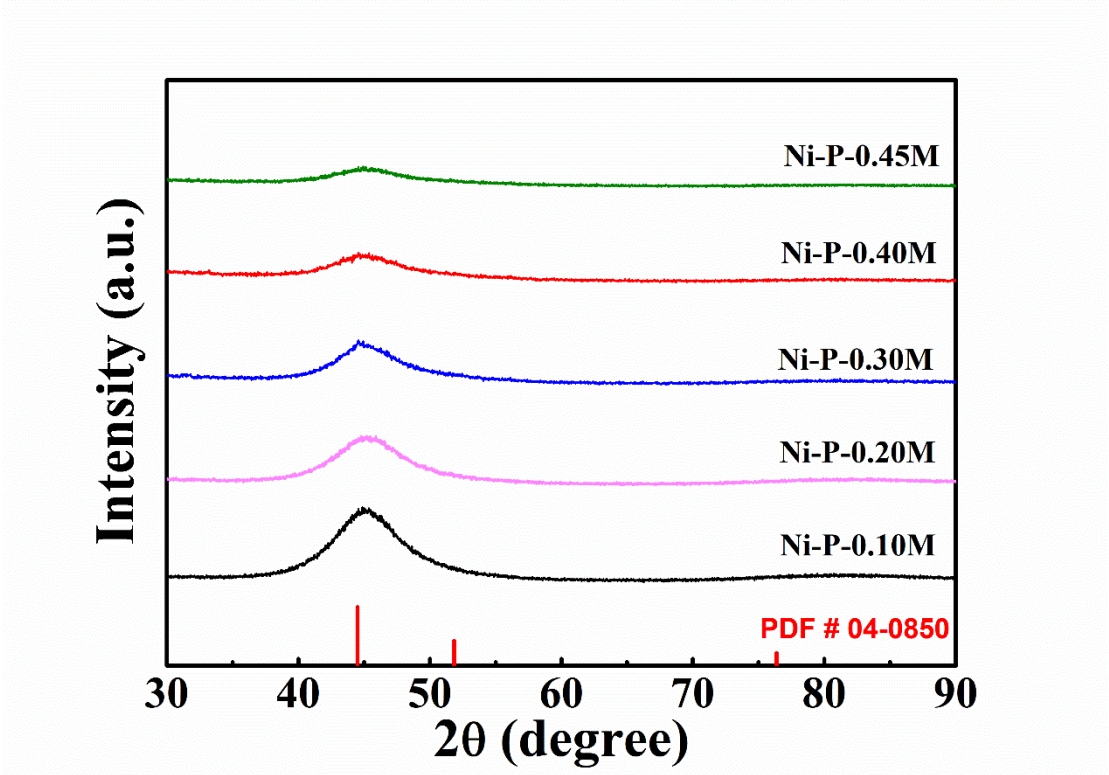


**Fig. S2** XRD patterns of Ni-P@NF catalysts with different P.

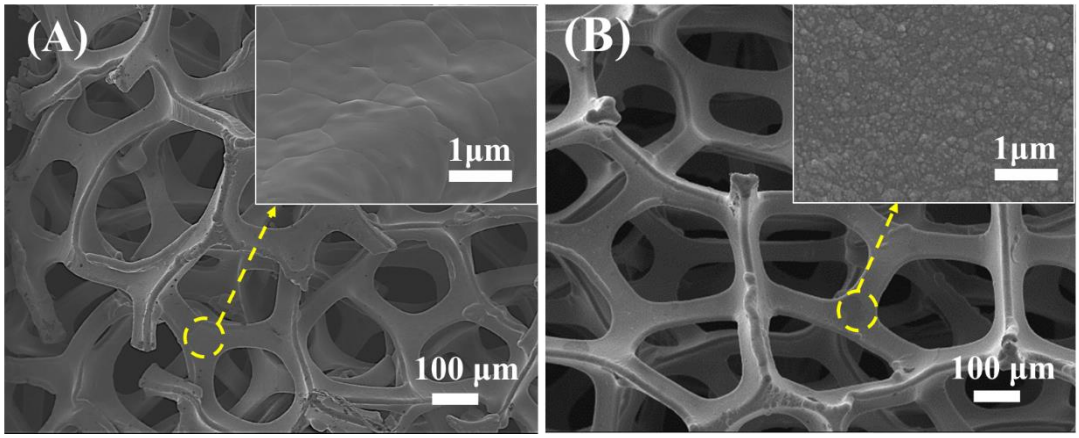


**Fig. S3** SEM images of (A) Ni foam, (B)Ni@NF.

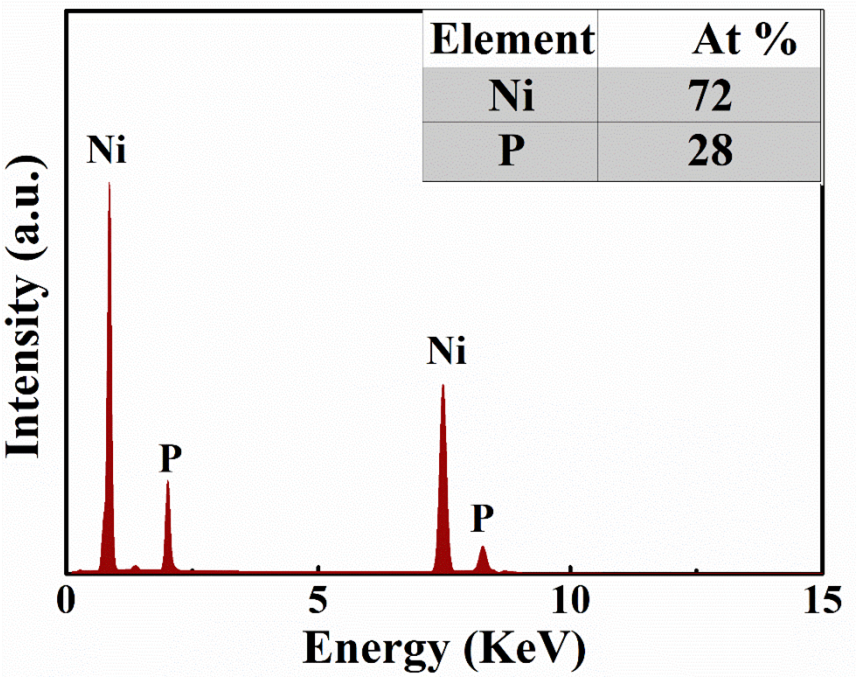


**Fig. S4** The EDS element distribution of Ni-P@NF was obtained from TEM.

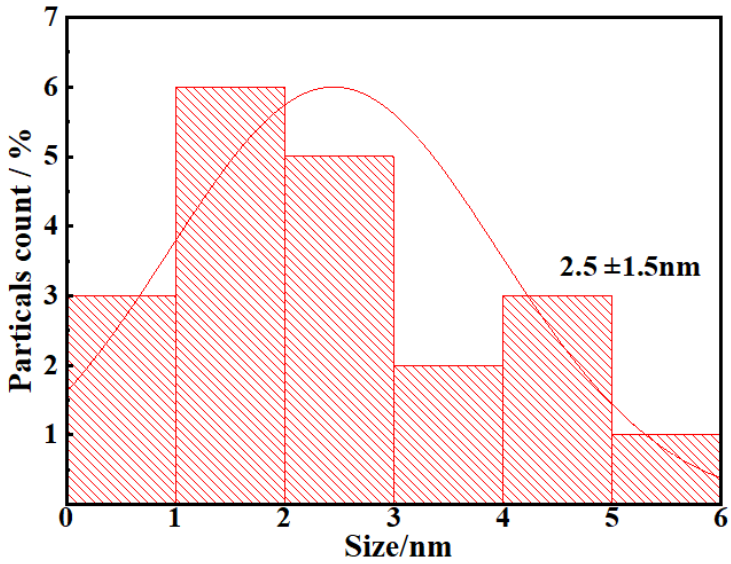


**Fig. S5** Pore size distribution map obtained by TEM.

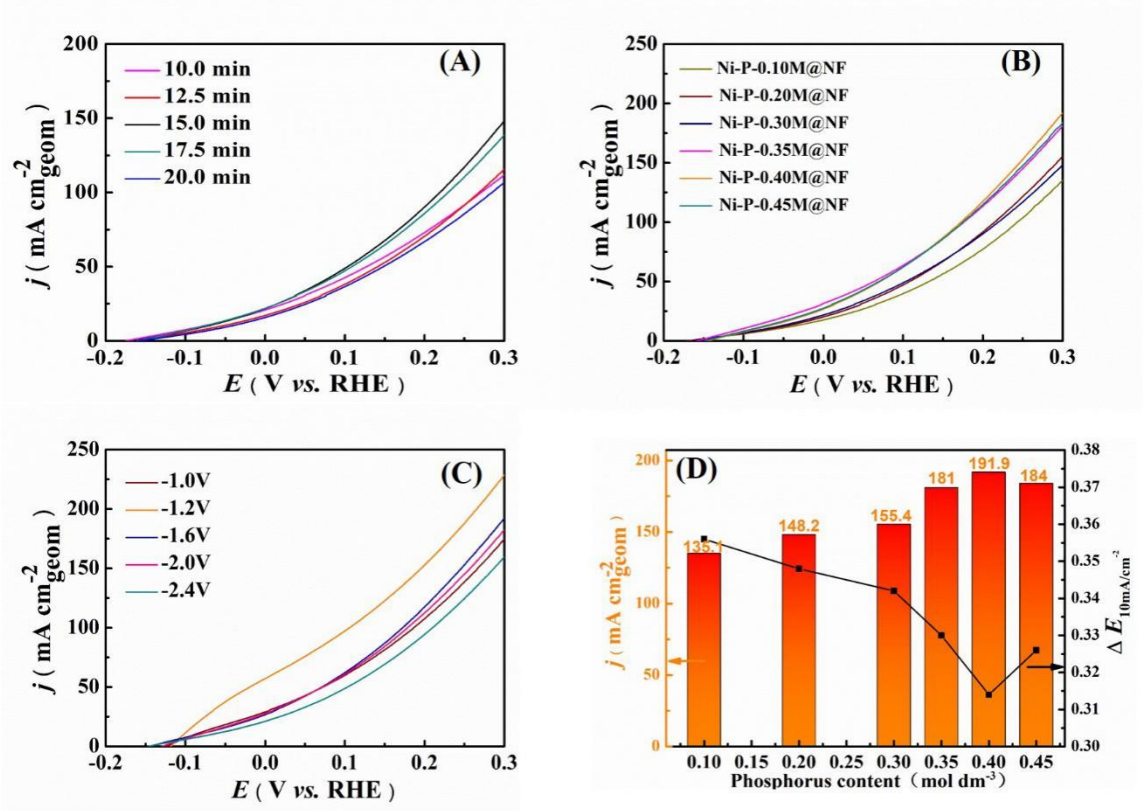


**Fig. S6** (A)-(C) LSVs of BOR on the Ni-P@NF prepared by different deposition times, different phosphorus concentrations, different deposition potentials in 0.27 mol $dm^{-3}$ $NaBH_4$ and 2 mol $dm^{-3}$ NaOH solution with scan rate of 5 mV $s^{-1}$ at 298 K, (D) The current density of BOR and the overpotential at current density of 10mA/$cm^{-2}$ on the Ni-P@NF prepared by different phosphorus concentrations.

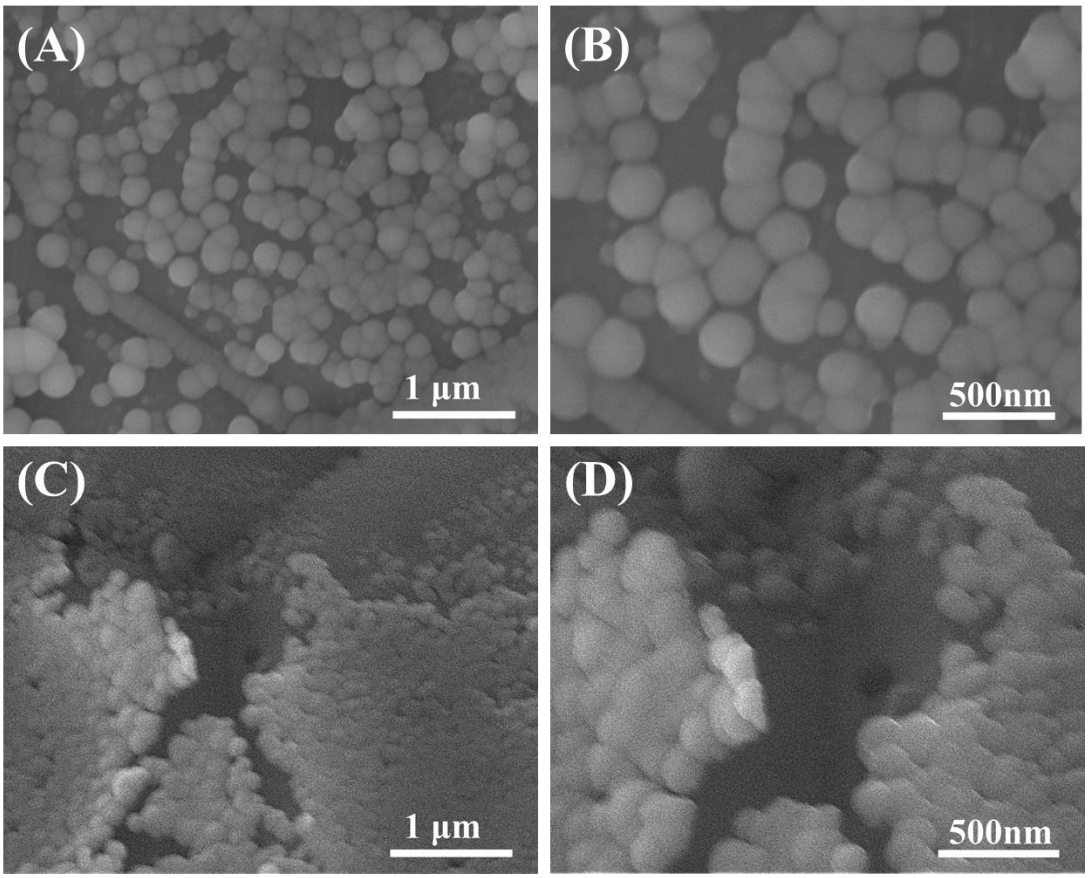


**Fig. S7** SEM image of Ni-P@NF (A-B) deposit for 15min, (C-D) deposit for 20min.

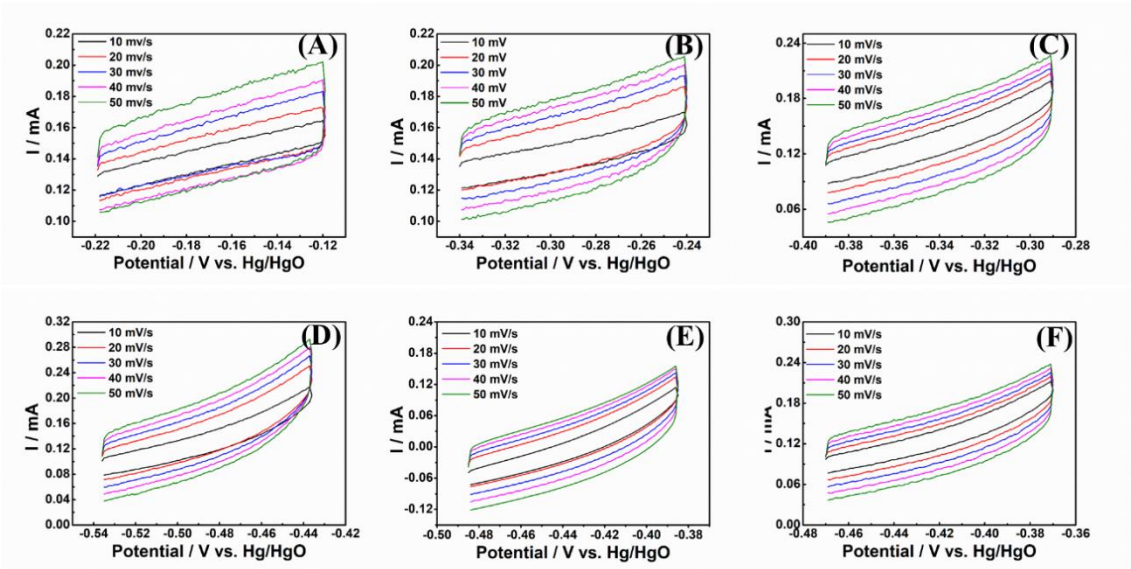


**Fig. S8** Cyclic voltammograms for (A) Ni@NF; (B) Ni-P-0.1@NF; (C)Ni-P-0.2@NF; (D) Ni-P-0.3@NF; (E) Ni-P-0.4@NF; and (F) Ni-P-0.45@NF in the 0.1 V potential window in 1 mol $dm^{-3}$ NaOH solution at scan rates of 10, 20, 30, 40, and 50 mV $s^{-1}$.

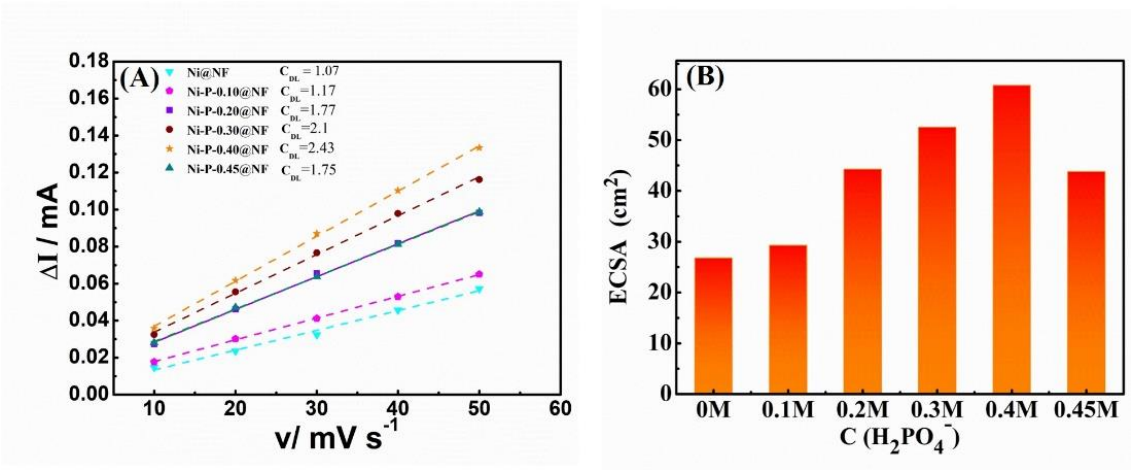


**Fig. S9** (A) Plots of the average anodic current density at the specific potential *vs.* Hg/HgO as a function of scan rate (10, 20, 30, 40, and 50 mV $s^{-1}$), (B) the relationship between active area and phosphorus concentration.

**Table S1.** The $C_{DL}$ and ECSA of Ni-P electrodes.

| Catalysts | $C_{DL}$ (mF $cm^{-2}$) | *ECSA* ($cm^2$) |
|---|---|---|
| Ni @NF | 1.07 | 26.75 |
| Ni-P-0.10@NF | 1.17 | 29.25 |
| Ni-P-0.20@NF | 1.77 | 44.25 |
| Ni-P-0.30@NF | 2.10 | 52.5 |
| Ni-P-0.40@NF | 2.43 | 60.75 |
| Ni-P-0.45@NF | 1.75 | 43.75 |

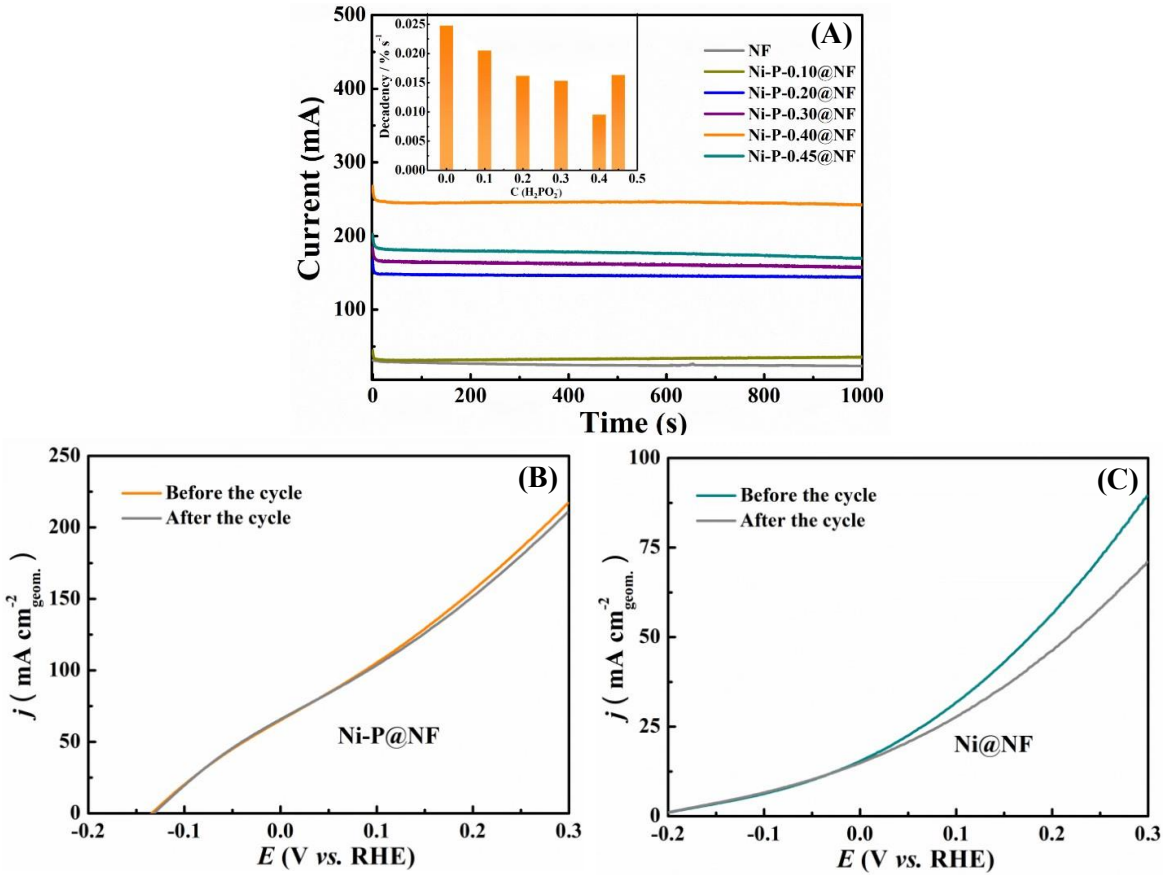


**Fig. S10** (A) Chronoamperometry curves of BOR on different catalysts in 0.27mol $dm^{-3}$ $NaBH_4$ and 2 mol $dm^{-3}$ NaOH at 298 K, (B-C) The accelerated lifetime test the Ni-P@NF, Ni @NF in 0.27mol $dm^{-3}$ $NaBH_4$ and 2 mol $dm^{-3}$ NaOH solution with scan rate of 5 mV $s^{-1}$ at 298 K.

**Table S2.** EIS data of BOR on different catalyst electrodes

| Anode catalyst | $R_L$(Ω) | $R_{ct}$(Ω) | $C_d$（mF） |
|---|---|---|---|
| NF | 1.715 | 421.2 | 0.1824 |
| Ni @NF | 1.952 | 13.8 | 0.5054 |
| Ni-P@NF | 1.658 | 1.23 | 0.902 |