**Supplementary Material**

**Coupling Hierarchical Ultrathin Co Nanosheets with N-doped Carbon Plate as High-Efficiency Oxygen Evolution Electrocatalysts**

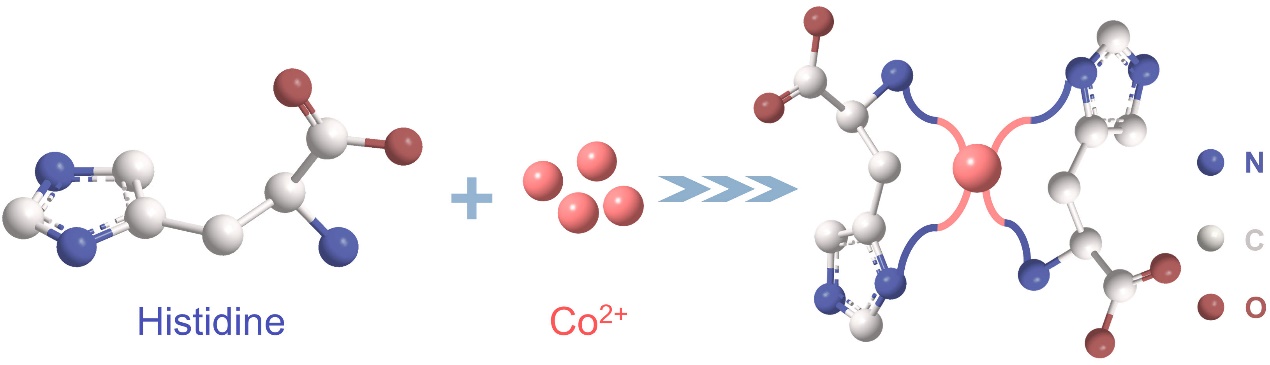
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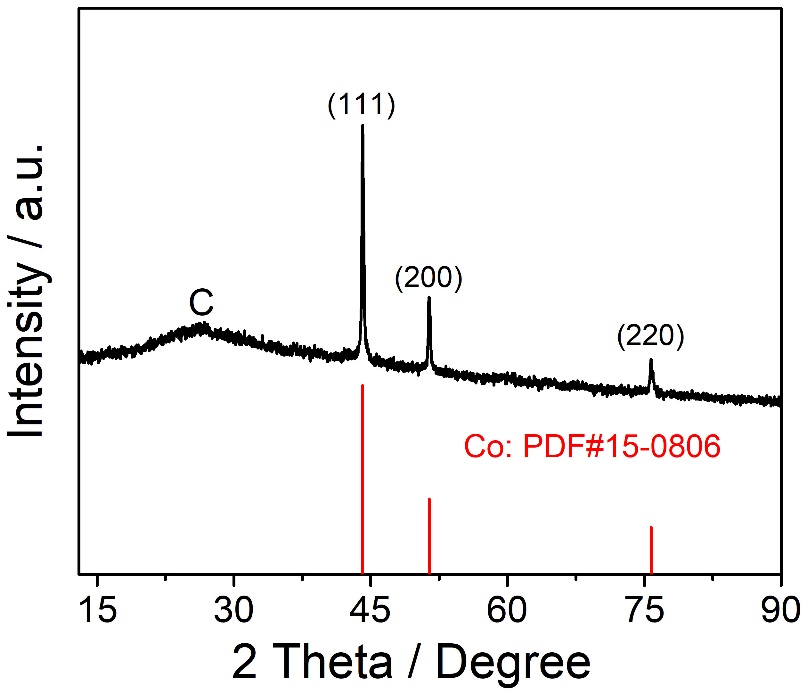
2School of Chemistry and Chemical Engineering, Southeast University, Nanjing 211189, PR China.

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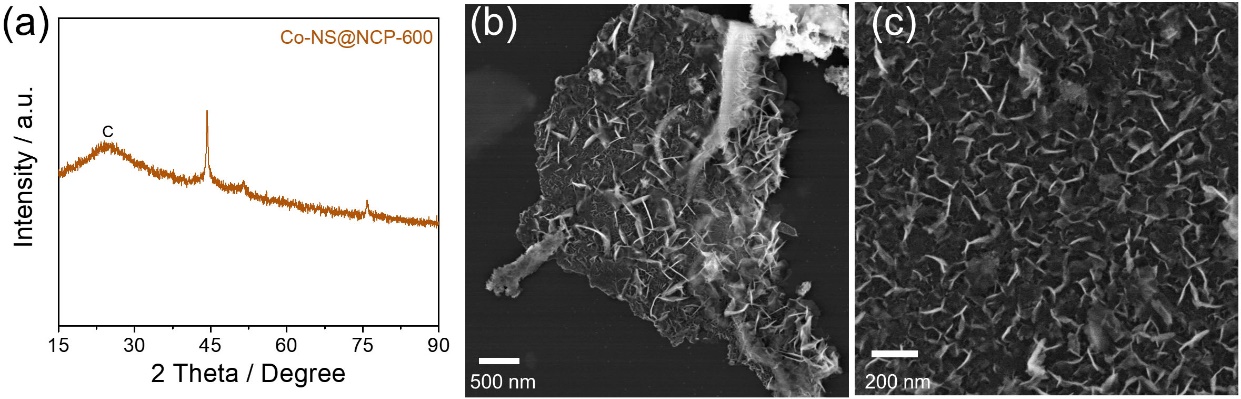
**Part I: Figures**



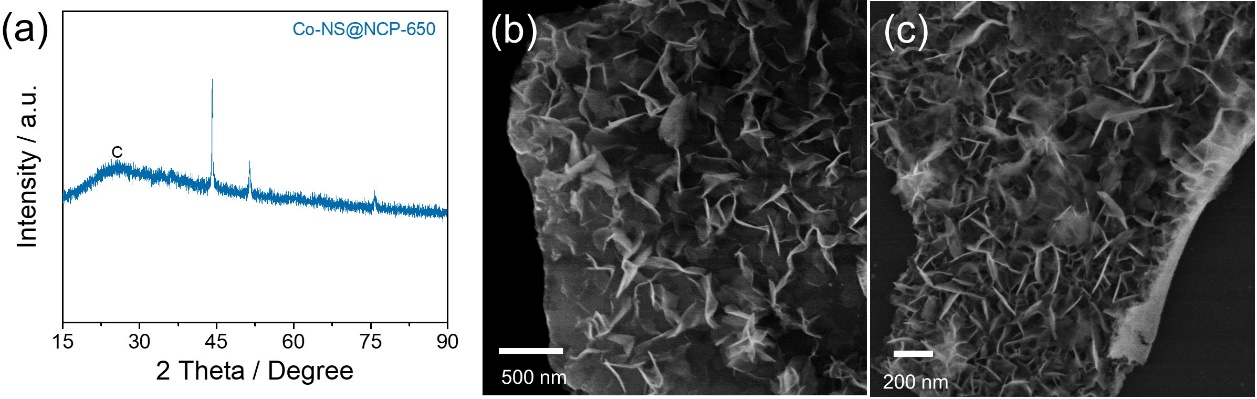
**Supplementary Figure 1.** Schematic interaction between histidine and Cobalt ion.



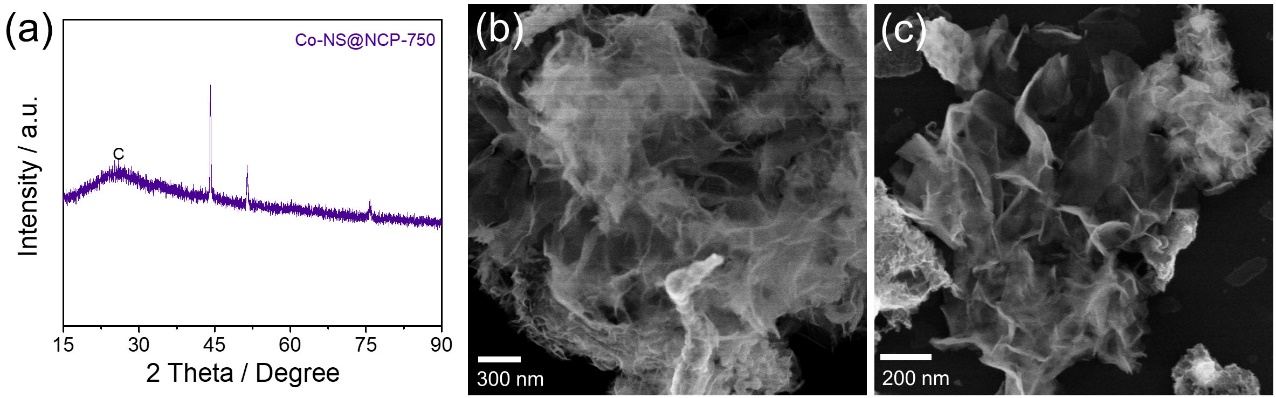
**Supplementary Figure 2.** XRD pattern of Co-NS@NCP-700 catalyst.



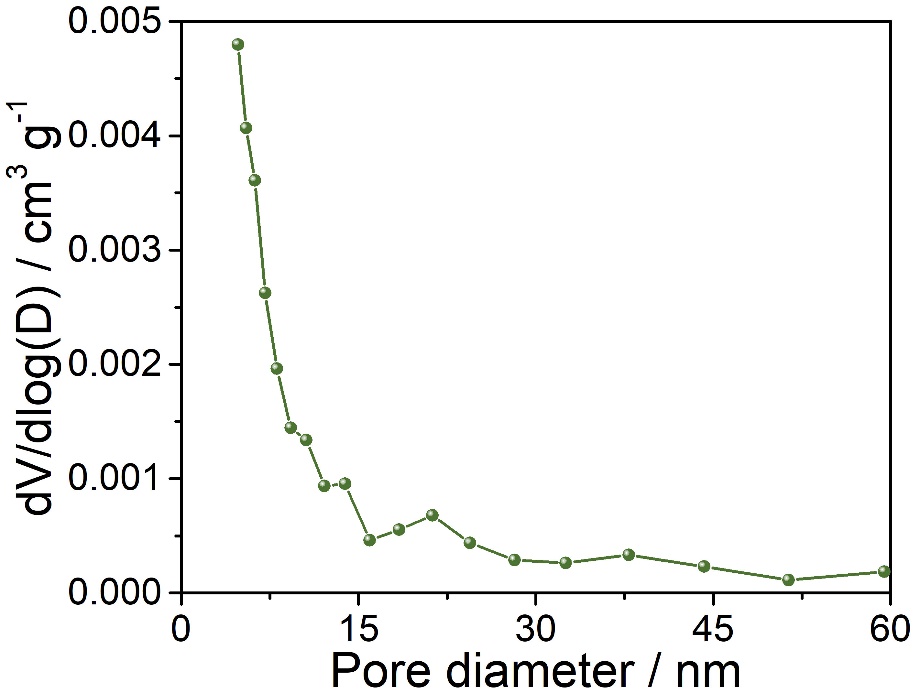
**Supplementary Figure 3.** (a) XRD pattern; and (b) SEM images of Co-NS@NCP-600 catalyst.



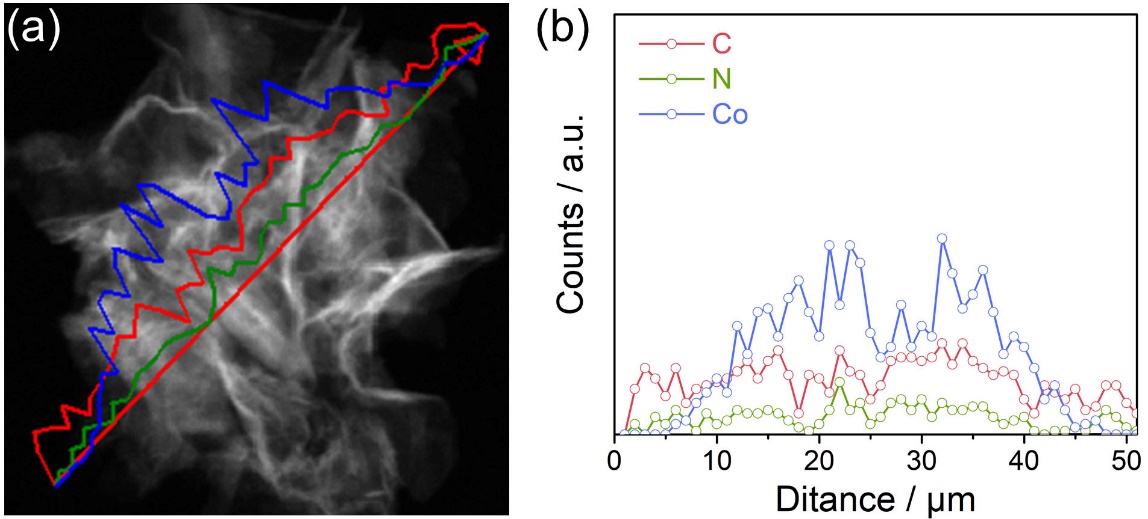
**Supplementary Figure 4.** (a) XRD pattern; and (b) SEM images of Co-NS@NCP-650 catalyst.



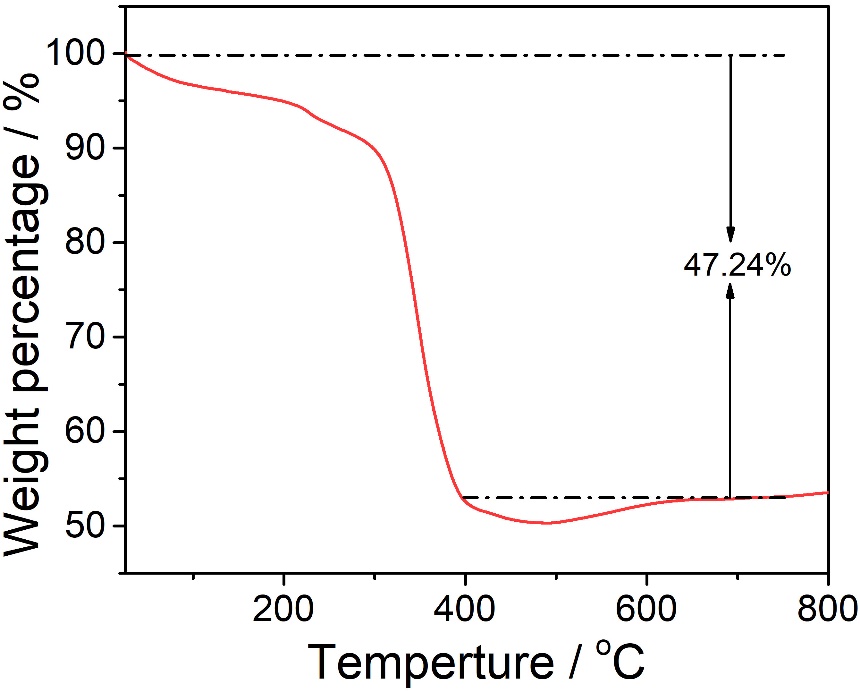
**Supplementary Figure 5.** (a) XRD pattern; and (b) SEM images of Co-NS@NCP-750 catalyst.



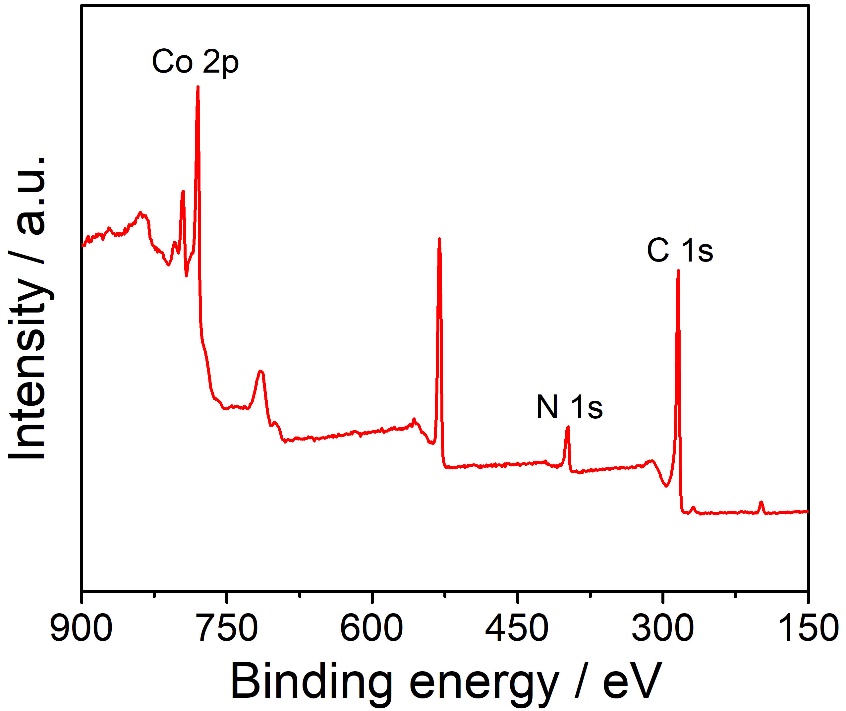
**Supplementary Figure 6.** pore-size distribution curve of Co-NS@NCP-700 catalyst.



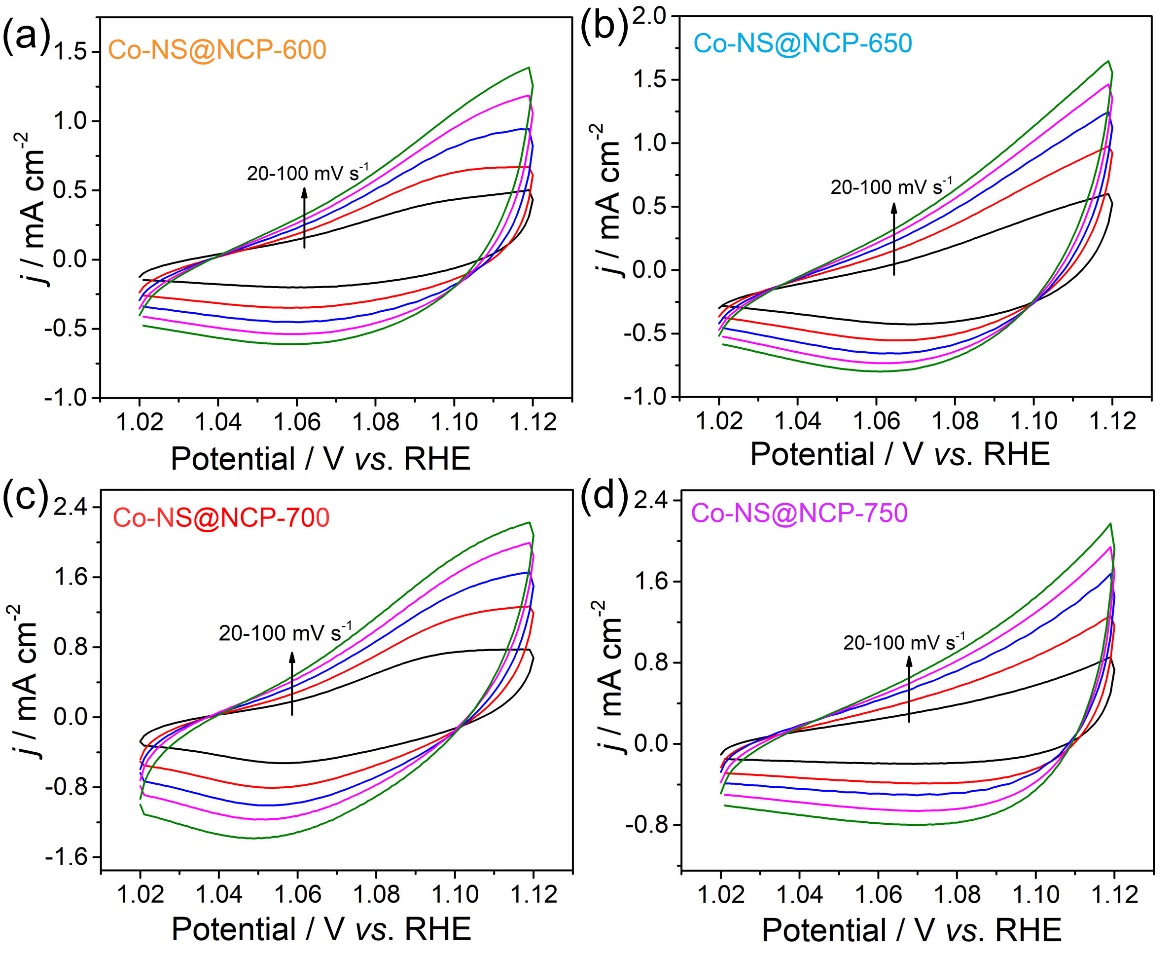
**Supplementary Figure 7.** (a)HAADF-STEM image; and (b) EDX line-scan profiles of Co-NS@NCP-700 catalyst.



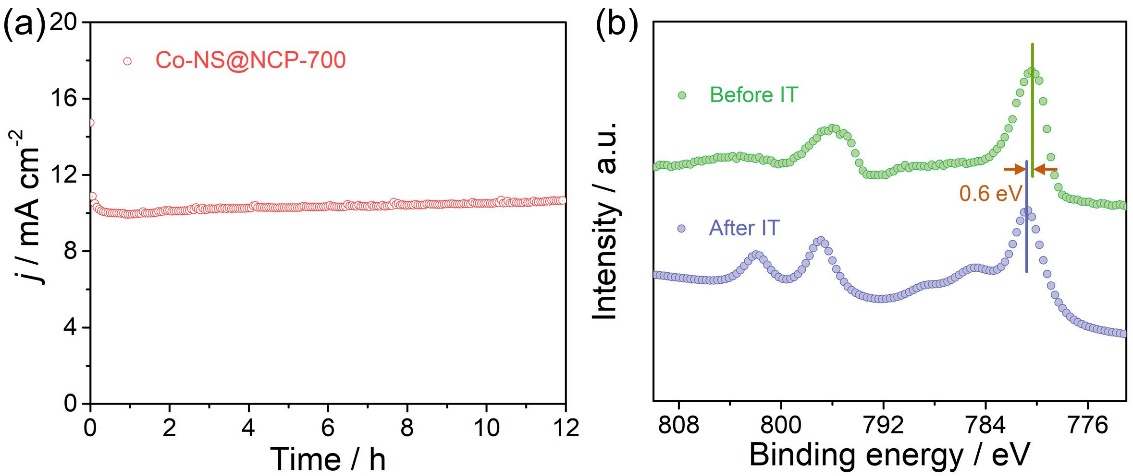
**Supplementary Figure 8.** TGA curve of Co-NS@NCP-700 catalyst.



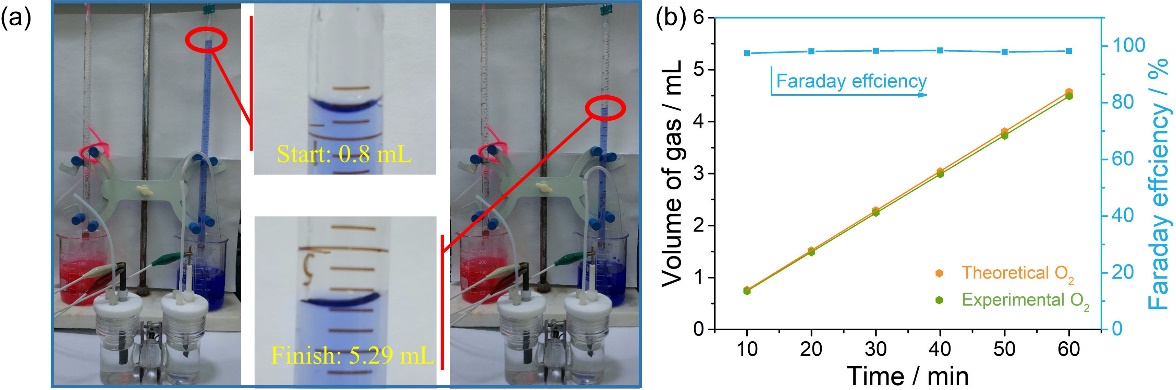
**Supplementary Figure 9.** The XPS survey scan spectrum of Co-NS@NCP-700 catalyst.



**Supplementary Figure 10.** CV curves of the synthesized Co-NS@NCP catalysts in the non-Faradaic region (-1 - 1.1 V) were obtained at different scanning rates. (a) Co-NS@NCP-600; (b) Co-NS@NCP-650; (c) Co-NS@NCP-700; and (d) Co-NS@NCP-750.



**Supplementary Figure 11.** (a) The chronopotentiometry curve at overpotential of 300 mV; and (b) High-resolution Co 2p XPS spectra of Co-NS@NCP-700 catalyst before and after *i*-*t* test.



**Supplementary Figure 12.** Faraday efficiency of Co-NS@NCP-700 catalyst: (a) test process diagram; and (b) curves.

**Part II. Tables**

**Supplementary Table 1**. Comparison of OER performance of Co-NS@NCP-700 catalyst with some previously reported Co-based catalysts in 1.0 M KOH solution.

|  |  |  |  |
| --- | --- | --- | --- |
| Number | Catalyst | η *j* = 10 mA cm-2  / mV | Reference |
| 1 | Co-NS@NCP-700 | 278 | This work |
| 2 | NC-Co SA | 360 | *ACS Catal.* **2018**, 8, 8961−8969 |
| 3 | Co BTC-5wt% rGO | 290 | *Renewable Energy* **2020**, 156, 1040 |
| 4 | rGO@CoFe2O4 | 300 | *ACS Catal*. **2019**, 9, 3878−3887 |
| 5 | Co3O4/HNCP-40 | 333 | *ACS Catal.* **2018**, 8, 7879−7888 |
| 6 | CoNC-NB2 | 350 | *Small* **2020**, 16, 2001171 |
| 7 | Co NPS@CNT | 380 | *Applied Surface Science* **2020**, 507, 145155 |
| 8 | Co-UNMS | 400 | *ACS Catal*. **2018**, 8, 1913−1920 |
| 9 | Co/CoO | 350 | *ACS Energy Lett*. **2017**, 2, 1208−1213 |
| 10 | Co-NTMCs@NSC | 284 | *Nanoscale*, **2019**, 11, 21302 |
| 11 | Co3N@NA-CNCs | 280 | *Nano Res*. **2019**, 12, 1605–1611 |
| 12 | Co/CoP-5 | 340 | *Adv. Energy Mater*. **2017**, 7, 1602355 |
| 13 | FeCo/Co2P@NPCF | 330 | *Adv. Energy Mater*. **2020**, 10, 1903854. |
| 14 | CoOx-4h | 306 | *Nano Energy*, **2018**, 43, 110-116 |
| 15 | Co2P@NC-Fe2P-2 | 290 | *ACS Appl. Mater. Interfaces*, **2020**, 12, 25884 | |
| 16 | 3D CoS0.46P0.54 | 302 | *Small Methods*, **2020**, 2000043 |
| 17 | Co0.30CuOx | 290 | *ACS Catal.*, **2018**, 8, 12030-12040 |
| 18 | CoP-2 | 310 | *Adv. Funct. Mater.*,**2019**, 1905252 |
| 19 | CoP/NCNHP | 310 | *J. Am. Chem. Soc.*, **2018**, 140, 2610 |
| 20 | Ni-CoP@C | 279 | *Nano Energy,***2019**, 62, 136-143 |