

**1 Co/N-doped hierarchical porous carbon as efficient oxygen electrocatalysis**  
**2 for rechargeable Zn-air battery**

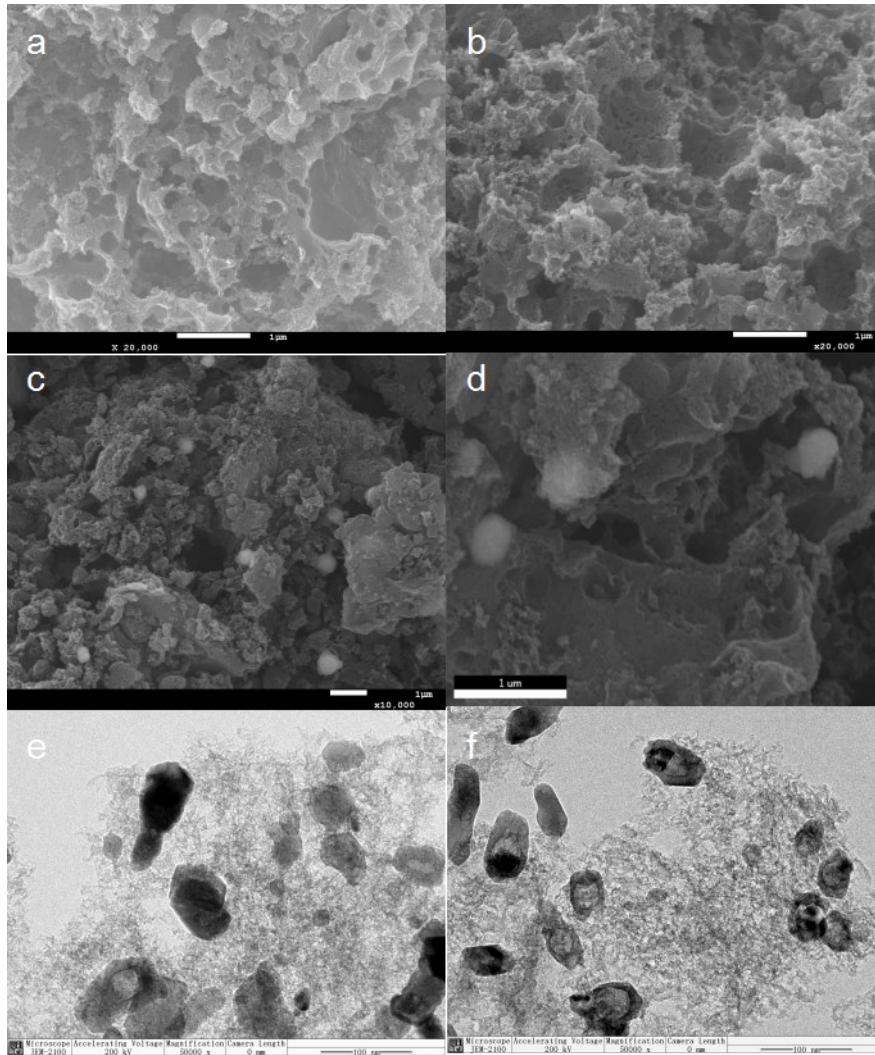
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12 **Figure S1.** (a-d) SEM images of HPC, NHPC, Co/NHPC-700 and Co/NHPC-900, (e-f) TEM images of

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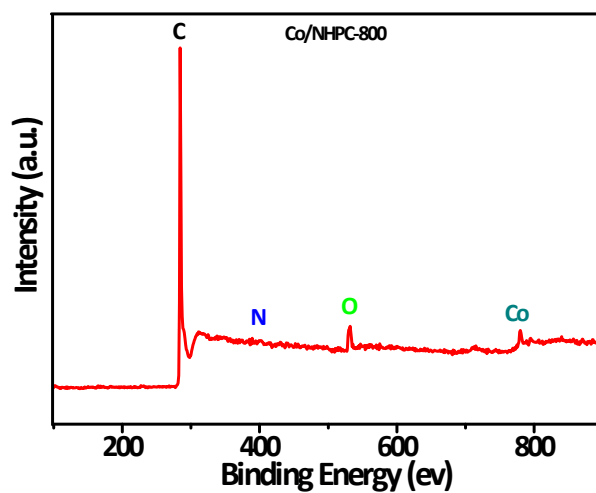
Co/NHPC-700 and Co/NHPC-900.

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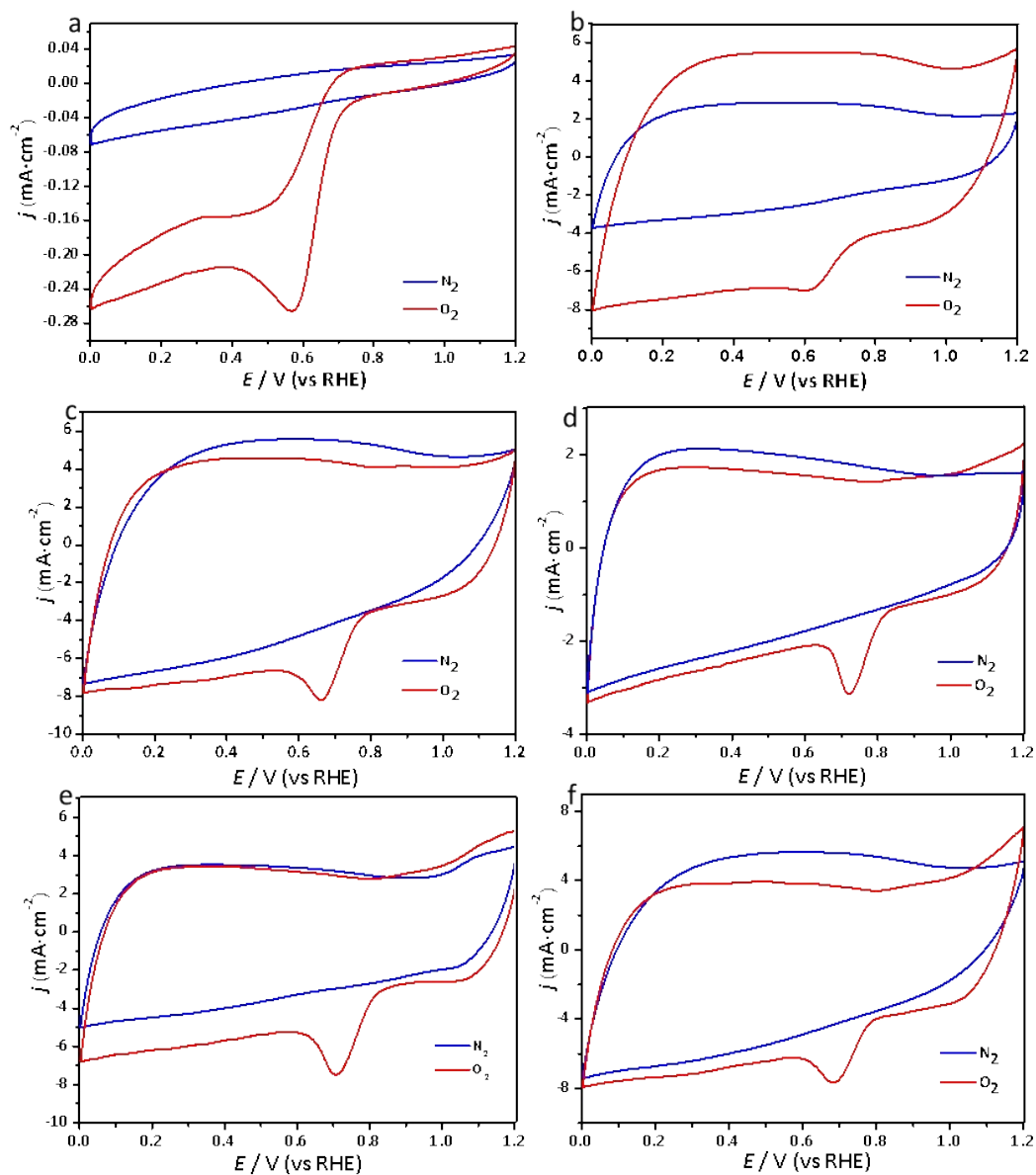
**Figure S2.** Survey spectrum of Co/NHPC-800

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**Table S1.** The *t*-Plot report of HPC, NHPC, Co/NHPC-700, Co/NHPC-800 and Co/NHPC-900.

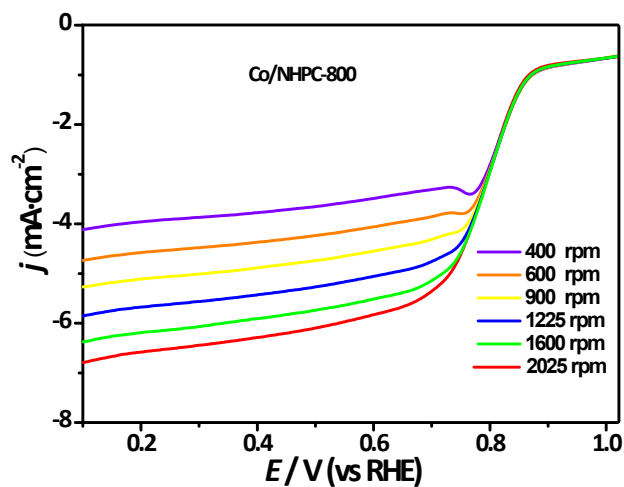
<i>t</i> -Plot report	$S_{\text{micro}}$	$S_{\text{external}}$	$V_{\text{micro}}$	$V_{\text{total}}$
	$\text{m}^2 \cdot \text{g}^{-1}$		$\text{cm}^3 \cdot \text{g}^{-1}$	
HPC	259	628	0.13	0.59
NHPC	349	622	0.17	0.43
Co/NHPC-700	341	646	0.16	0.50
Co/NHPC-800	367	701	0.18	0.57
Co/NHPC-900	355	706	0.17	0.64

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**Figure S3.** (a-f) CV curves of WC, HPC, NHPC, Co/NHPC-700, Co/NHPC-800 and Co/NHPC-900, respectively.

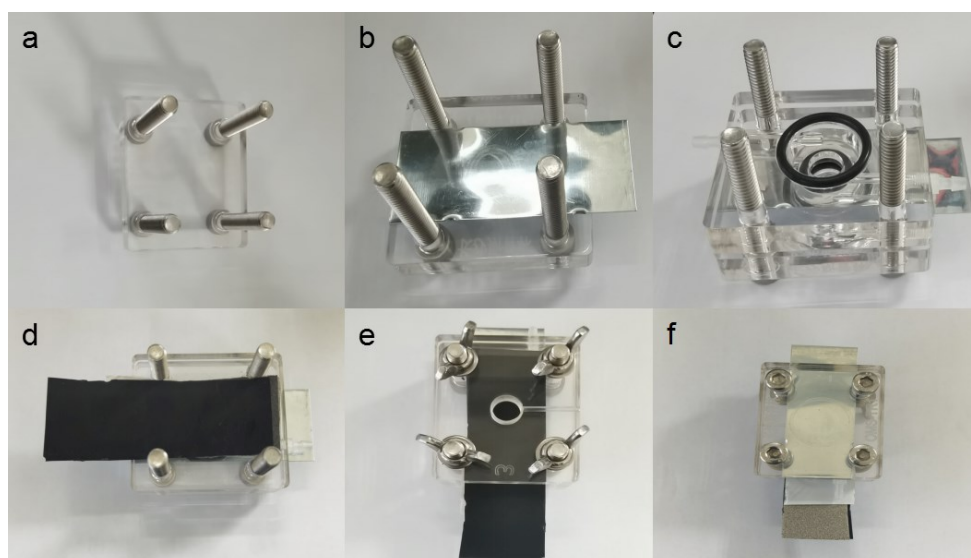


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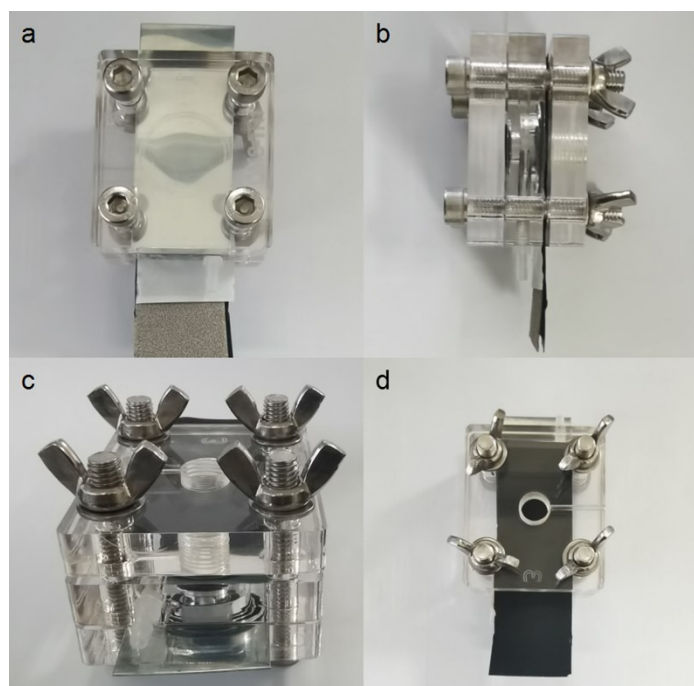
**Figure S4.** LSV curves of Co/NHPC-800 with different rotate speed in O<sub>2</sub>-saturated 0.1 M KOH

27 **Table S3** . The comparison of ORR, OER and dual catalytic performances in this work to some  
 28 results from literatures.

Sample	$E_{ORR}$ <i>onset</i> [V]	$E_{ORR1/2}$ [V]	Transferre d electrons ( <i>n</i> )	$E_{OER}$ [V] ( <i>j</i> =10 mA cm <sup>-2</sup> )	$\Delta E$ ( $E_{j=10}$ - $E_{1/2}$ )(V)	RZABs cycle Duration [h]	Ref.
Co, N-doped CNTs	0.89	0.79	~4	1.61	0.82	12	S1
Co@Co <sub>3</sub> O <sub>4</sub> /NC-1	0.90	0.80	3.78	1.65	0.85	NA	S2
NiCo <sub>2</sub> O <sub>4</sub> @N- graphene	0.87	0.75	3.9	1.63	0.88	13	S3
NMC/Co@CNTs	0.90	0.79	3.76-3.98	1.73	0.94	11	S4
Fe/N-CNT	0.96	0.81	3.85-3.90	1.75	0.94	NA	S5
Co/N-C-800	0.88	0.74	3.95	1.60	0.86	76	S6
Co <sub>3</sub> O <sub>4</sub> /N-rGO	0.92	0.79	3.90	1.72	0.93	25	S7
Co <sub>3</sub> O <sub>4</sub> /Co <sub>2</sub> MnO <sub>4</sub> nanocomposite	0.90	0.68	3.51–3.82	1.77	1.09	-	S8
NiCoMnO <sub>4</sub> /N-rGO	0.92	0.72	3.92	1.77	1.05	-	S9
Co/NHPC-800	0.92	0.82	3.8-4.0	1.71	0.89	364	<b>This work</b>



29 **Figure S5.** (a-f) Photographs of the assembly process for the fabrication of a rechargeable  
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**Figure S6.** (a-d) Photographs of the rechargeable Zn-air battery recorded from different

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directions.

### 35 **References.**

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