Supporting Information

Molten salt-mediated synthesis of porous N-doped carbon as an efficient ORR electrocatalyst for zinc-air batteries

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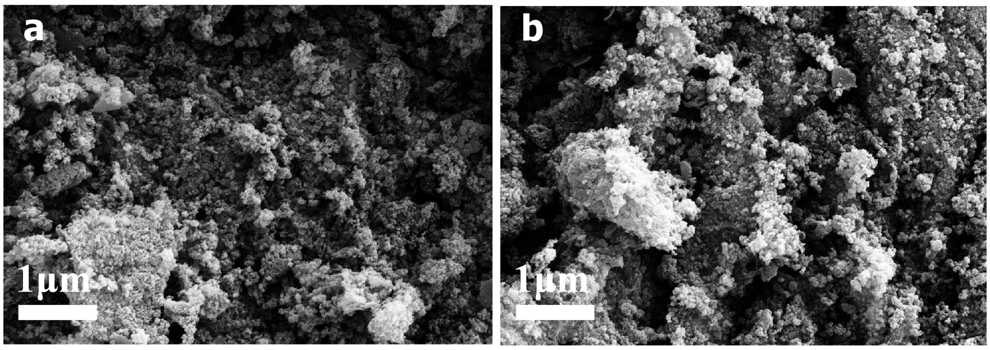

Fig. S1. (a) SEM images of SZ-NC-800; (b)SEM image of SZ-NC-1000

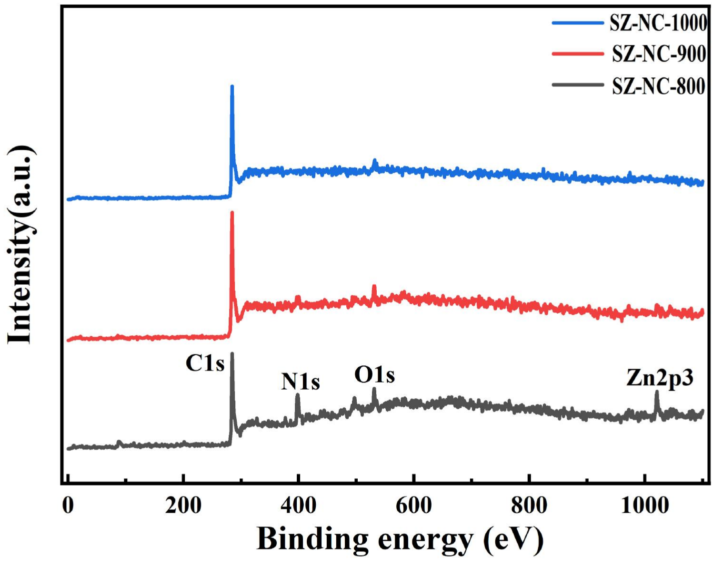

Fig. S2. XPS spectra of SZ-NC-800, SZ-NC-900 and SZ-NC-1000

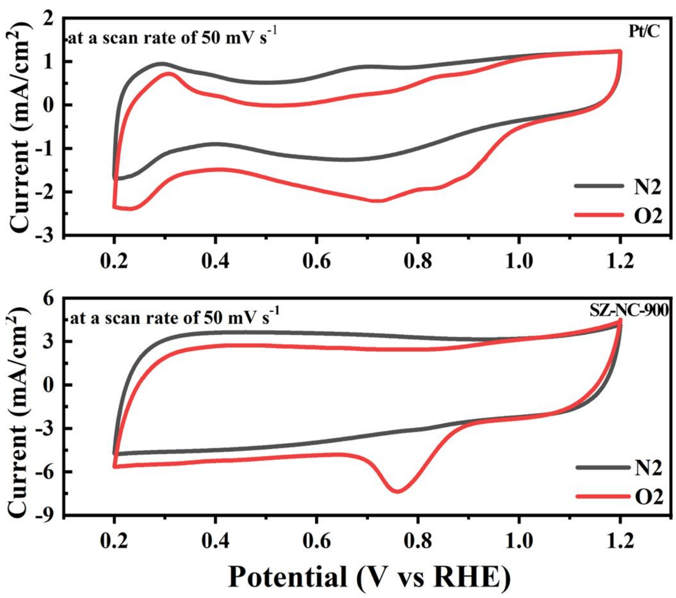

Fig. S3. CV curves of Pt/C and SZ-NC-900 in O_2-saturated and N_2-saturated solution, respectively.

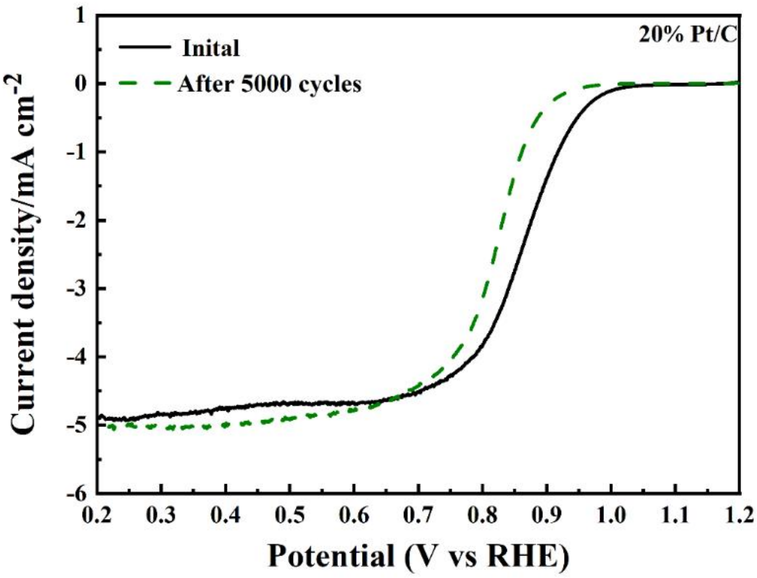

Fig. S4. LSV curves of Pt/C before and after 5000 cycles in O_2-saturated solution.

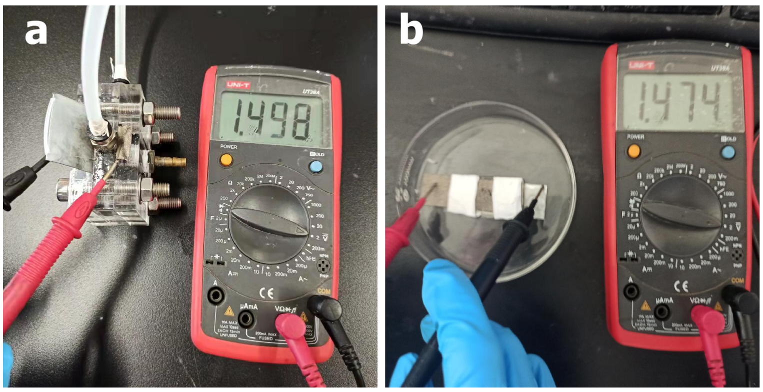

Fig. S5. (a) Photograph of the liquid ZAB measured by the voltmeter. (b) Photograph of the solid ZAB measured by the voltmeter.

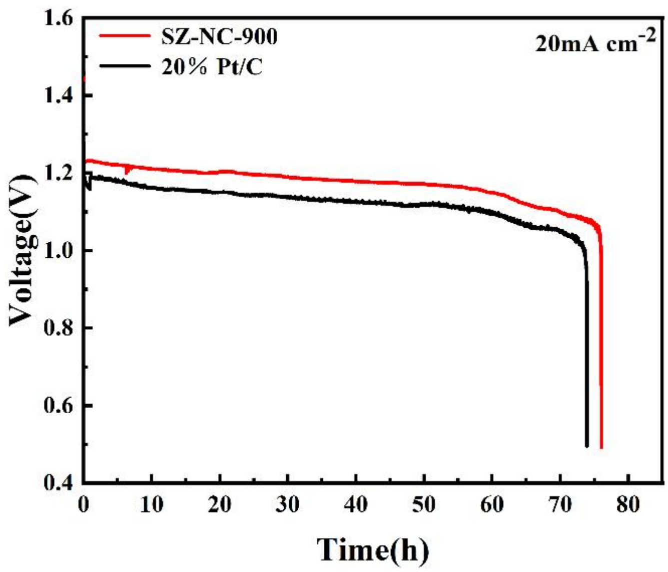

Fig.S6. Discharging performance of liquid ZAB

Table S1. Pore structure parameters of SZ-NC-800, SZ-NC-900 and SZ-NC-1000

Sample	S_{BET} (m^2g^{-1})	V_T (cm^3g^{-1})	D
SZ-NC-800	1993.38	2.45	4.92
SZ-NC-900	2710.58	3.35	4.95
SZ-NC-1000	2352.14	3.56	6.05

Table S2. C, N and O contents (at.%) in SZ-NC-800 , SZ-NC-900 and SZ-NC-1000

Sample	Atomic Surface Composition (at.%) by XPS			
	C	N	O	Zn
SZ-NC-800	75.64	13.66	6.99	1.71
SZ-NC-900	85.77	8.93	5.29	---
SZ-NC-1000	91.67	4.91	3.41	---

Table S3. Types of N doping species and atomic percentages for various carbon materials analyzed from N1s spectra

Prepared catalysts	N-doping (%)			
	Pyridinic-N (398.3eV)	Graphitic-N (401eV)	Pyrrolic-N (399.6eV)	Oxidized-N (402.2eV)
SZ-NC-800	62.48	8.59	23.73	5.2
SZ-NC-900	46.40	23.04	18.09	12.47
SZ-NC-1000	35.86	36.12	10.46	17.56

Table S4. Activity comparison of non-noble metal electrocatalysts toward ORR

No	Catalysts	$E_{1/2}$(V vs.RHE)	Electrolyte	Ref.
1	N, S-carbon nanosheets	0.77	0.1 M KOH	1
2	N-carbon nanosheets	0.77	0.1 M KOH	2
3	Co/MoC@NC	0.824	0.1 M KOH	3
4	N, P-GC-1000	0.85	0.1 M KOH	4
5	NSMC-0.6	0.68	0.1 M KOH	5
6	BCN/rGO-Co	0.85	0.1 M KOH	6
7	Co-N-C	0.84	0.1 M KOH	7
8	Mn-CoNx/N-PC	0.85	0.1 M KOH	8
9	CoO/N-rGO	0.79	0.1 M KOH	9
10	FeNCF	0.84	0.1 M KOH	10
11	C/CoFe- 30–650	0.81	0.1 M KOH	11
12	**SZ-NC-900**	**0.856**	**0.1 M KOH**	**This work**

Table S5. Performance comparison of non-noble metal electrocatalysts in Zn-air batteries

No.	Catalysts	Power Density (mW/cm^2)	Specific capacity ($mAh\ g^{-1}$)	Electrolyte	Ref.
1	N,S-CC	47	715	6 M KOH + 0.2 M $Zn(Ac)_2$	12
2	PANI/ZIF-67	70	____	6 M KOH	13
3	Fe_3N@N-C	87.5	717.5	6 M KOH and 0.2 M $ZnCl_2$	14
4	EA-Co-900	73	____	6 M KOH + 0.2 M $Zn(Ac)_2$	15

5	Co-N/S/rGO	66.6	——	6 M KOH + 0.2 M $Zn(CH_3COO)_2$	16
6	FP 0.6@CNP1000	80	——	6 M KOH + 0.2 M $Zn(CH_3COO)_2$	17
7	Fe/Ni@NiCo-CNT	51.6	796.5	6 M KOH + 0.2 M $Zn(CH_3COO)_2$	18
8	BNF-LCF	99.4	791.5	6 M KOH + 0.2 M $Zn(CH_3COO)_2$	19
9	CoSe 2 /Co@NCNF-3	79.13	——	6 M KOH + 0.2 M $Zn(CH_3COO)_2$	20
10	Co@NCs-900	57.63	——	6 M KOH + 0.2 M $Zn(CH_3COO)_2$	21
11	Fe-Nx-C	96	641	6 M KOH+0.2 M $Zn(AC)_2$	22
12	**SZ-NC-900**	**93**	**760**	**6M KOH**	**This work**

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