Facile Synthesis of MOFs-derived Co-N-C nanostructure as Bi-functional Oxygen Electrocatalysts for Rechargeable Zn-air Batteries

Xinlei Luo[a,1], Ziheng Zheng[a,1], Bingxue Hou[b], Xianpan Xie[a], Cheng Cheng Wang[a,*]

[a]*School of Entrepreneurship and Innovation, Shen Zhen Polytechnic, Shenzhen, 518055, China*

[b]*Aviation Engineering Institute, Civil Aviation Flight University of China, GuangHan,618037, China*

[1]*The authors are making the same contribution to this paper.*

[*] Corresponding Author:

xxp@szpt.edu.cn(X.P.Xie)

wangchengcheng@szpt.edu.cn (Dr.C.C. Wang)

Figure S1 N_2 adsorption isotherms of Co-N-C-900°C catalyst.

Figure S2 TEM images, EDS mapping as well as EDS spectra of selected Co-N-C-900 °C-acid catalysts.

Figure S3. Corresponding Koutecky-Levich (K-L) plots derived from LSV results on catalysts of Pt/C(a), Co-N-C-800°C(b), Co-N-C-900°C(c) and Co-N-C-900°C-acid(d) catalysts.

Figure S4. Half-wave potential for Pt/C, Co-N-C-800 °C, Co-N-C-900 °C and Co-N-C-900 °C-acid catalysts (a); Exchange current density obtained at 0.75 V of Pt/C, Co-N-C-800°C, Co-N-C-900°C and Co-N-C-900°C-acid catalysts (b) of these catalysts under O_2 0.1 M KOH with 1600 rpm rotation rate with 10 mV/s scan rate.

Figure S5.Chronopotentiometry results of Co-N-C-900°C measured at 10 mA/cm^2 in 0.1 M KOH at 1600 rpm rotation rate.

Figure S6. Surface morphology of Co-N-C-900°C coated on the carbon foam assembled Zn-air battery after long term stability test.(Big round partiles referred to Zn)

Real-time video was attached in the file.

Fig.S1

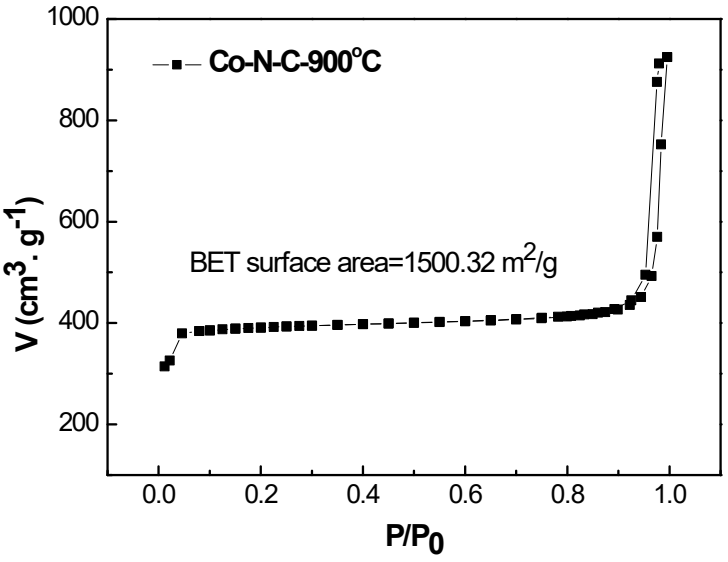
Co-N-C-900°C
BET surface area=1500.32 m2/g
V (cm3 . g-1)
P/P0
1000
800
600
400
200
0.0
0.2
0.4
0.6
0.8
1.0

Figure S2.

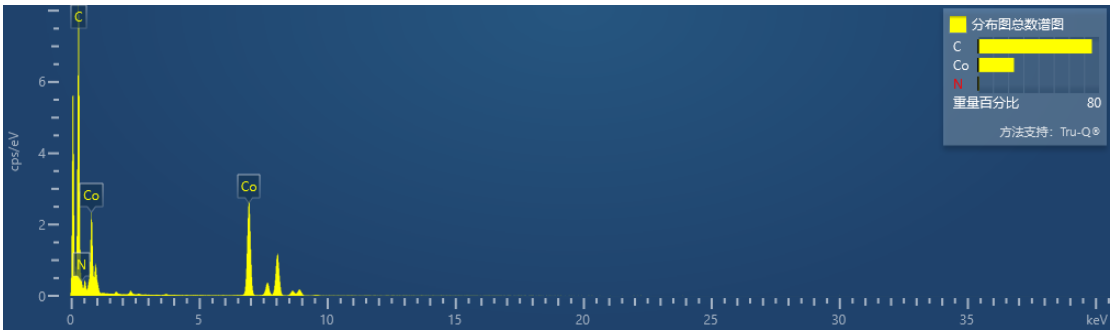
C
Co
Co
N
cps/eV
0
2
4
6
0
5
10
15
20
25
30
35
keV
分布图总数谱图
C
Co
N
重量百分比
80
方法支持：Tru-Q®

Figure S3.

Figure S4.

Figure S5.

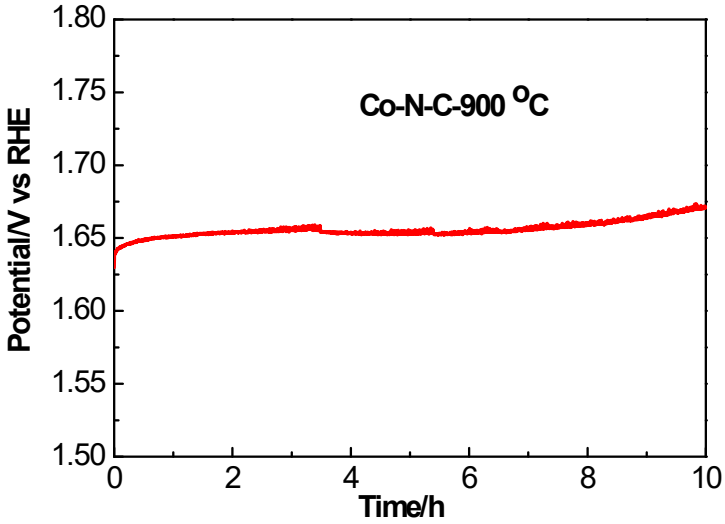

Figure S6.