Supplementary Materials

Glu-Co-Assisted Iron-Based Metal–Organic Framework-Derived FeCo/N Co-Doped Carbon Material as Efficient Bifunctional Oxygen Electrocatalysts for Zn–Air Batteries

Pengfei Sha [1], Xiao Yong [1], Di Chen [2], Xing Chen [1], Fengying Yan [1], Beili Pang [1], Hongzhou Dong [1], Jianhua Yu [1], Liyan Yu [1] and Lifeng Dong [1,3,*]

[1] College of Materials Science and Engineering, Qingdao University of Science and Technology, Qingdao 266042, China
[2] Shandong Engineering Research Center of Green and High-Value Marine Fine Chemical, Weifang University of Science and Technology, Shouguang 262700, China
[3] Department of Physics, Hamline University, St. Paul, MN 55104, USA
* Correspondence: ldong03@hamline.edu

Figures

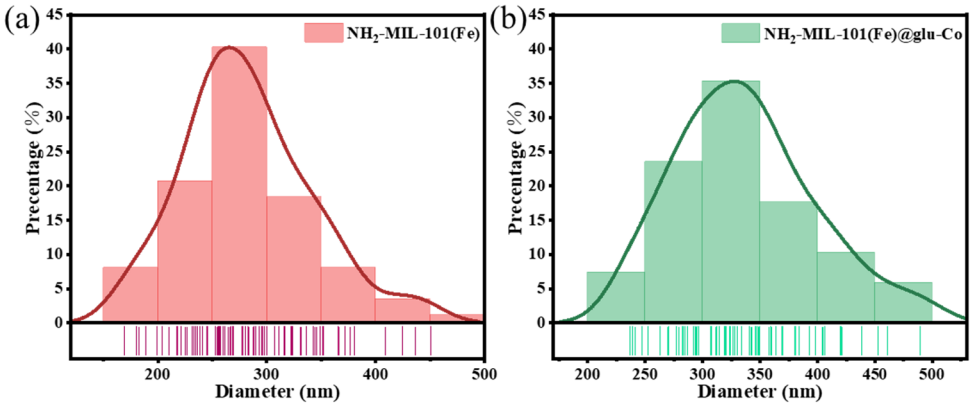

Figure S1. Particle size distribution plots showing the average size (based on measurements of over 50 particles) of (a) NH_2-MIL-101(Fe) and (b) NH_2-MIL-101(Fe)@glu-Co.

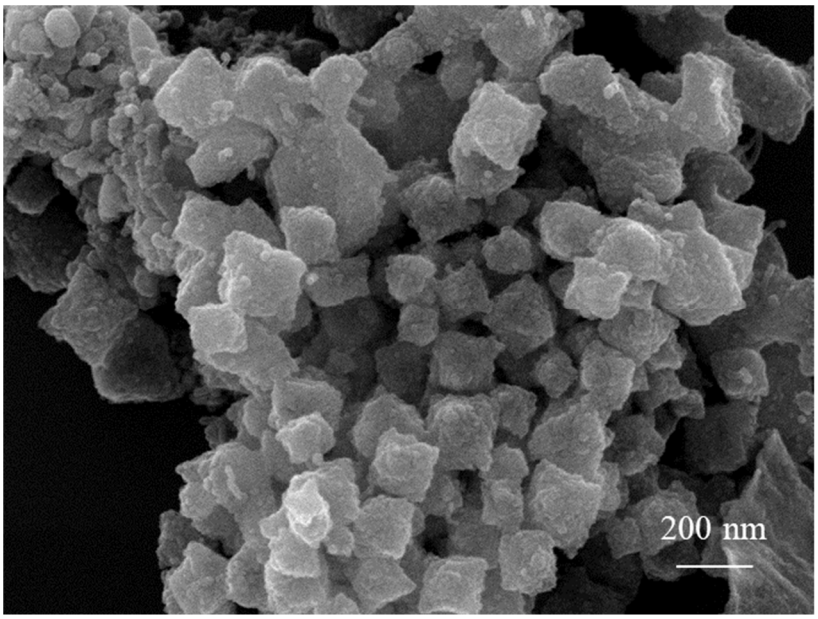

Figure S2. *SEM image of Fe-C.*

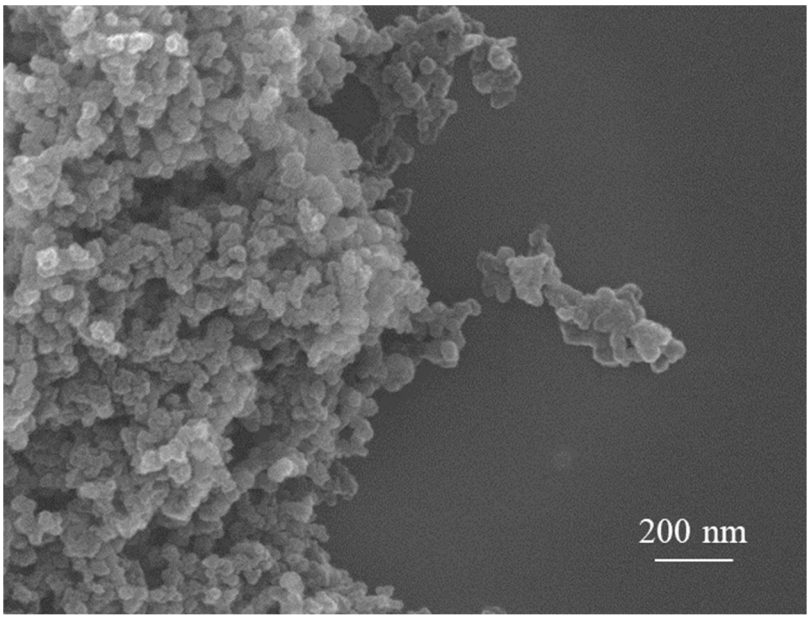

Figure S3. SEM image of KB.

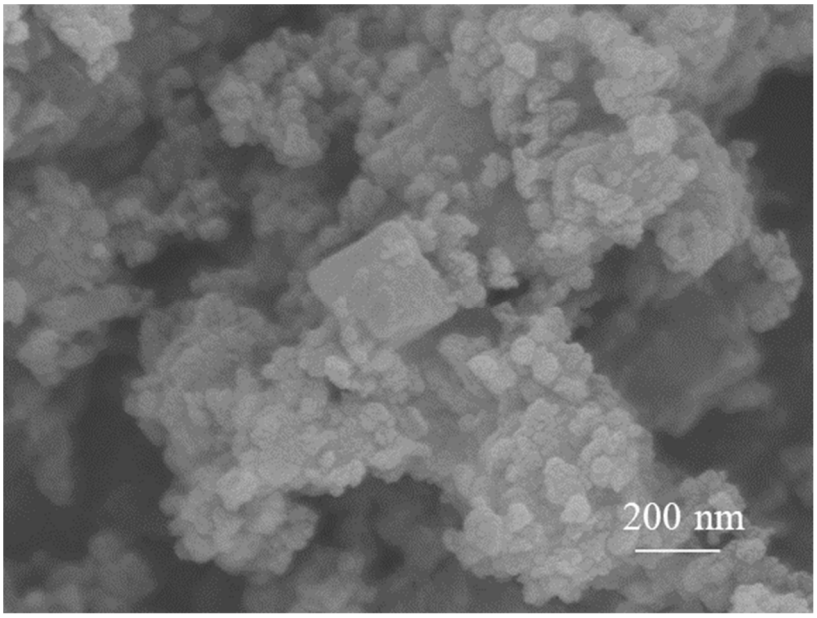

Figure S4. SEM image of NH_2-MIL-101(Fe)@glu-Co/KB.

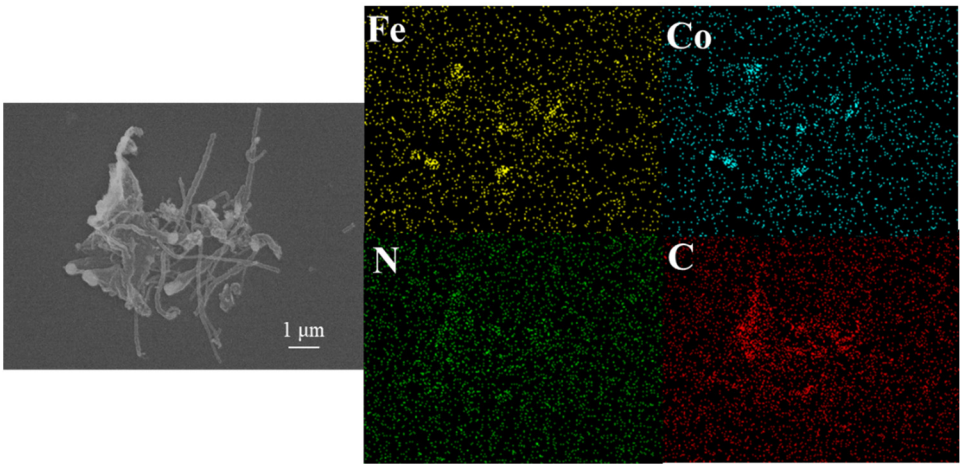

Figure S5. EDS elemental mapping images of Fe, Co, N and C of FeCo-CNTs.

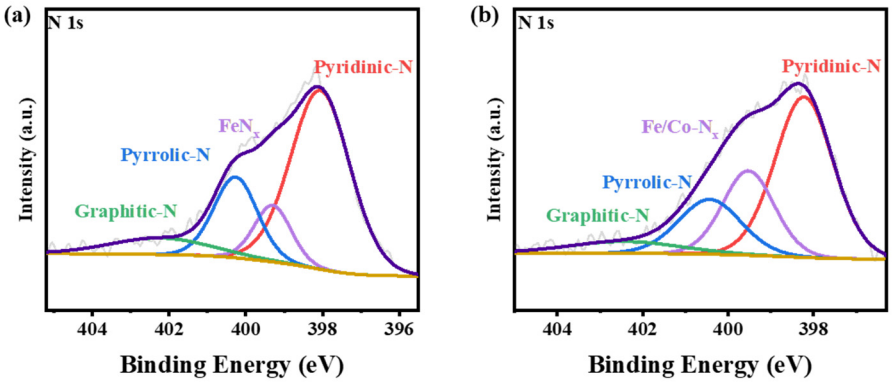

Figure S6. N 1s spectra of (a) Fe-C and (b) FeCo-CNTs.

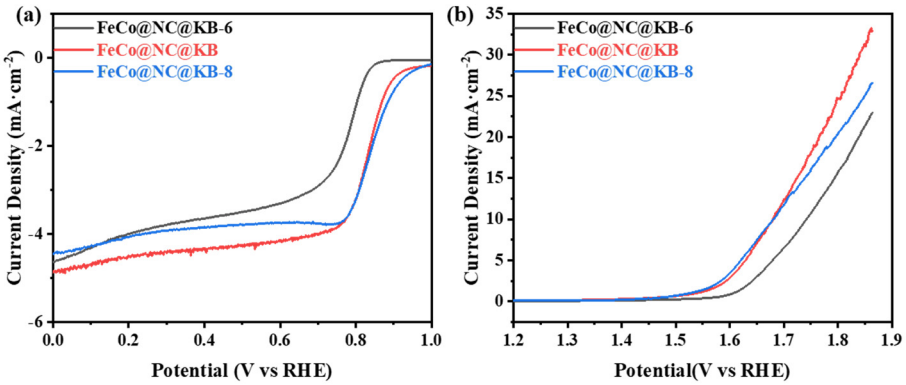

Figure S7. (a) ORR and (b) OER LSV curves of FeCo-CNTs/KB at different temperatures.

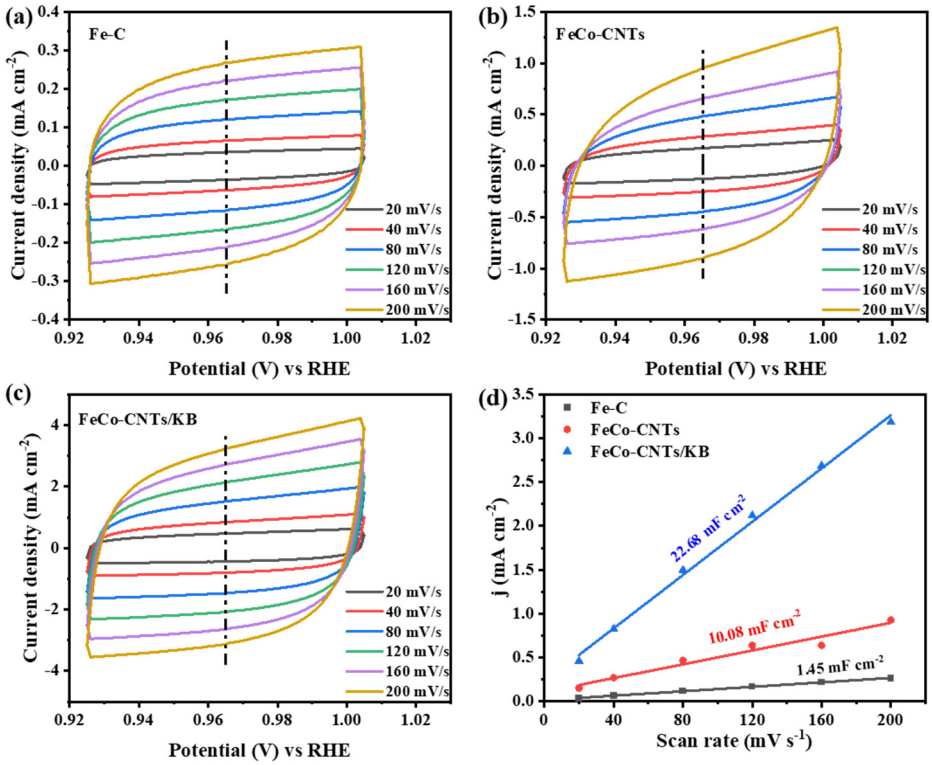

Figure S8. CVs measured at scan rates from 20 to 200 mV s^{-1} for (a) Fe-C, (b) FeCo-CNTs and (c) FeCo-CNTs/KB in 1M KOH. (d) Current density (at 0.965 V) as a function of scan rate derived from (a) to (c).

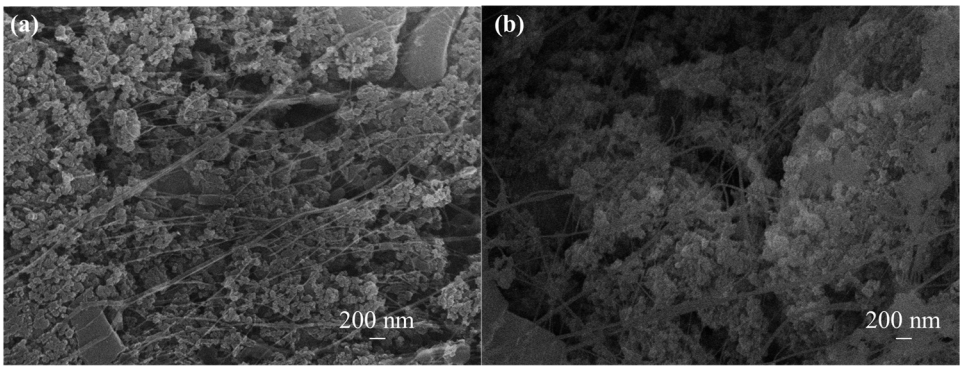

Figure S9. SEM images of cathode catalyst (a) before and (b) after cycling test.

Tables

Table S1. Elemental compositions of FeCo-CNTs/KB from EDS analysis.

Element	Weight%	Atomic%
C	**70.13**	**80.41**
N	**16.72**	**16.44**
Fe	**5.80**	**1.43**
Co	**7.35**	**1.72**

Table S2. Elemental compositions (atomic%) in Fe-C, FeCo-CNTs and FeCo-CNTs/KB.

	C	N	Fe	Co	O
Fe-C	**71.98 %**	**8.51 %**	**13.91 %**		**5.59 %**
FeCo-CNTs	**86.98 %**	**5.46 %**	**1.92 %**	**1.08 %**	**4.57 %**
FeCo-CNTs/KB	**81.47 %**	**11.35 %**	**2.31 %**	**1.88 %**	**3.00 %**

Table S3. N-type contents in Fe-C, FeCo-CNTs and FeCo-CNTs/KB.

	Graphitic-N	Pyrrolic-N	M-N	Pyridinic-N
Fe-C	**5.35 %**	**20.90 %**	**6.94 %**	**66.82 %**
FeCo-CNTs	**7.25 %**	**18.57 %**	**23.62 %**	**50.56 %**
FeCo-CNTs/KB	**5.80 %**	**26.48 %**	**43.93 %**	**23.78 %**