Supporting Information

Co_9S_8@Carbon Porous Nanocages Derived from a Metal-Organic Framework: A Highly Efficient Bifunctional Catalyst for Aprotic Li-O_2 Batteries

Yaying Dou,[ab] Ruqian Lian,[a] Yantao Zhang,[bc] Yingying Zhao,[a] Gang Chen,[a] Yingjin Wei*[a] and Zhangquan Peng*[b]

a. Key Laboratory of Physics and Technology for Advanced Batteries (Ministry of Education), College of Physics, Jilin University, Changchun, Jilin, 130012, China.*

E-mail: yjwei@jlu.edu.cn

b. State Key Laboratory of Electroanalytical Chemistry, Changchun Institute of Applied Chemistry, Chinese Academy of Science, Changchun, Jilin, 130022, China.*

E-mail: zqpeng@ciac.ac.cn

c. University of Chinese Academy of Sciences, Beijing, 100049, China.

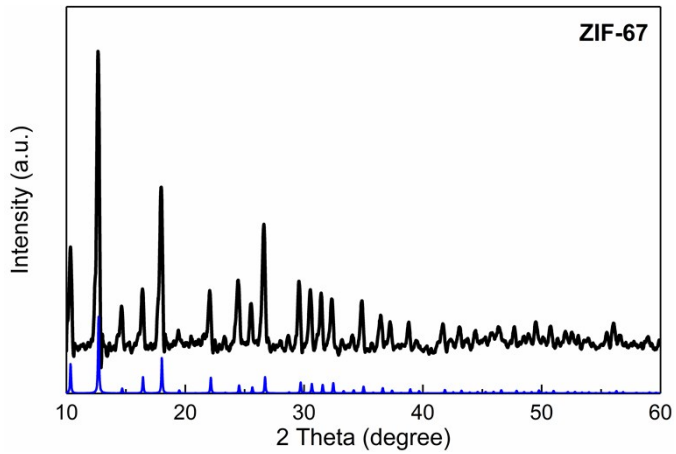

Figure S1. XRD pattern of ZIF-67 polyhedrons.

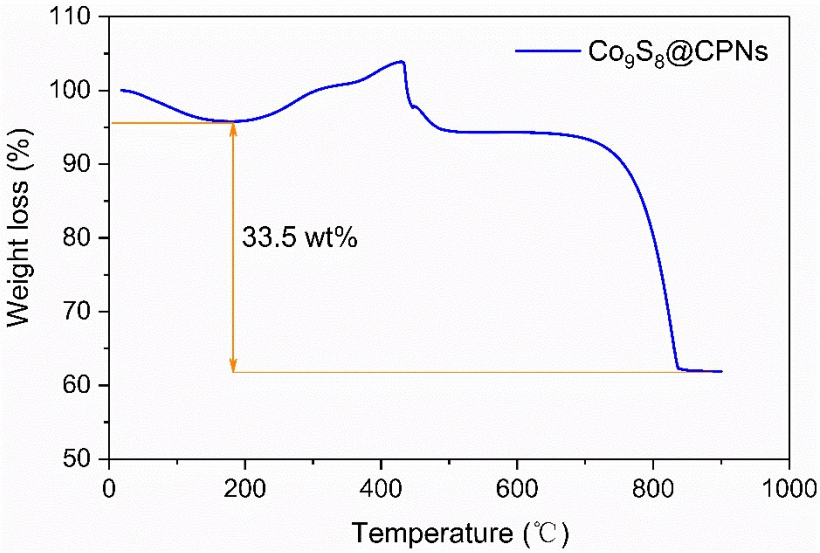

Figure S2. TGA curve of the synthesized Co_9S_8@CPNs under air flow with a temperature ramp of 10 ℃ min^{-1}. The content of carbon in Co_9S_8@CPN_S was determined by following equation:

30 - 150 ℃: $H_2O(ads) \rightarrow H_2O(g)$ (1)

150 - 435 ℃: $Co_9S_8@CPNs + O_2(g) \rightarrow CoSO_4 + CO_2(g)$ (2)

435 - 850 ℃: $CoSO_4 + O_2(g) \rightarrow Co_3O_4 + SO_3(g)$ (3)

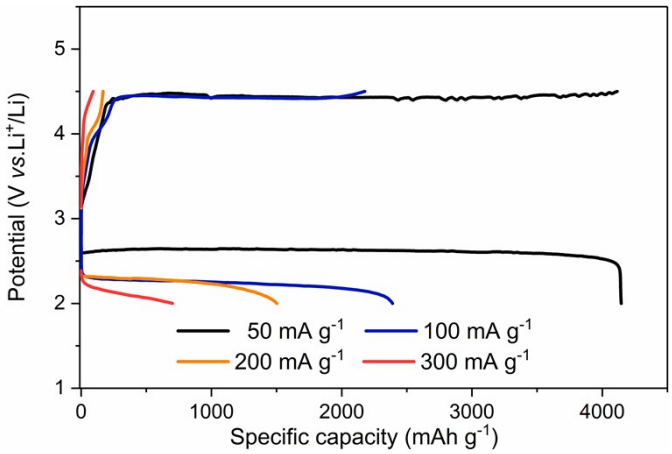

Figure S3. Rate capability of Super P cathode in the 1.0 M LiTFSI/TEGDME electrolyte at different current densities from 50 mA g^{-1} to 300 mA g^{-1}.

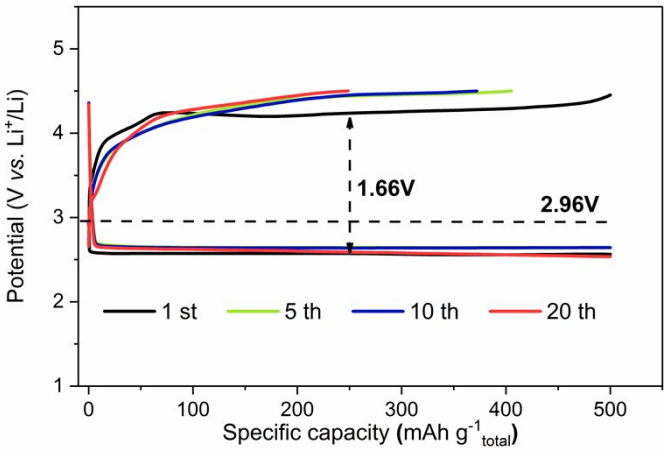

Figure S4. Cycling performance of Super P cathodes in the 1.0 M LiTFSI/TEGDME electrolyte at capacity limits of 500 mAh g^{-1} and the current density of 100 mA g^{-1}.

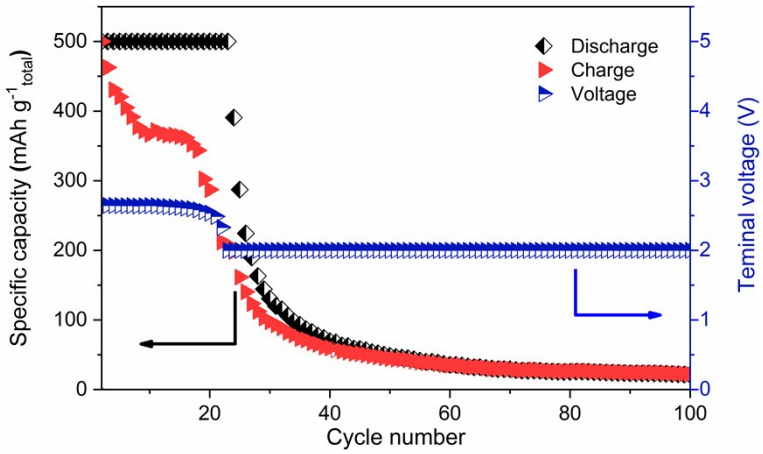

Figure S5. Voltage of the terminal discharge and variation in the discharge/charge capacity *vs*. the cycle number of Super P cathode at the current density of 100 mA g^{-1}.

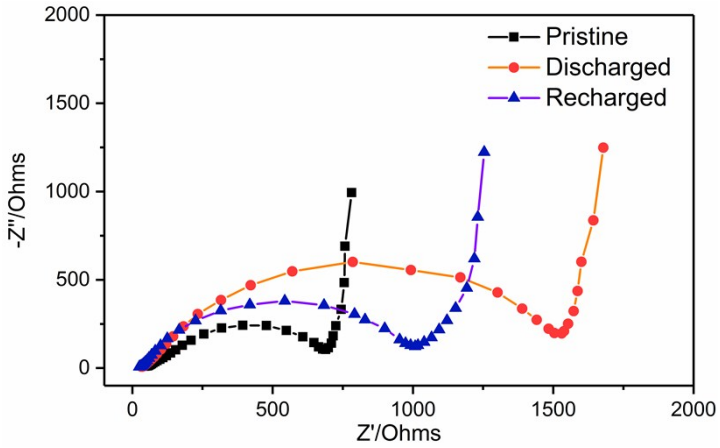

Figure S6. Nyquist plots at different discharge/charge status of Super P cathode in the frequency range of 10^5 to 0.1 Hz.

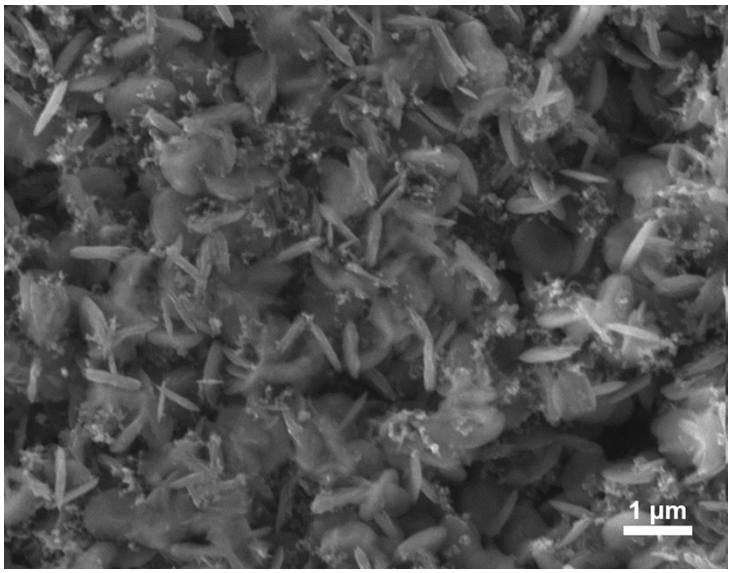

Figure S7. SEM image of the discharged Super P cathode with a current density of 100 mA g^{-1}.

Catalyst	Cycling performance	Measurement conditions	Reference
Flowerlike NiS	30 cycles	900 mAh/g at 75 mA/g	[1]
N、S co-doped FeS	100 cycles	500 mAh/g at 0.3 mA/cm^2	[2]
MoS_2	30 cycles	500 mAh/g at 0.1 mA/cm^2	[3]
CoS_2 nanoparticals@graphene	20 cycles	500 mAh/g at 200 mA/g	[4]
Co_3S_4	25 cycles	500 mAh/g at 100 mA/g	[5]
MoS_2@gold nanoparticals	50 cycles	1000 mAh/g at 300 mA/g	[6]
MoSSe	30 cycles	730 mAh/g at 50 mA/g	[7]
Co_9S_8@CPNs	110 cycles	500 mAh/g at 100 mA/g	This work

Table S1. Comparison of the cycling performances of various sulfide-based catalysts used in aprotic Li-O2 batteries.

References

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