Supporting Information

Metal-Organic Frameworks Derived Leaf-like CoSNC Nanocomposites for Supercapacitor Electrodes

Yu Wang,[a] Qinjie Du,[a] Haimin Zhao,[b] Shanshan Hou,[a] Yu Shen,[a] Hongfeng Li,[a] Xueying Kong,[a] Wei Sun,[b] Bo Zhang,[a] Sheng Li,[a] Fengwei Huo[a] and Weina Zhang*[a]*

[a.]Key Laboratory of Flexible Electronics (KLOFE) & Institute of Advanced Materials (IAM), Nanjing Tech University (NanjingTech), 30 South Puzhu Road, Nanjing 211816, P.R. China. E-mail: iamwnzhang@njtech.edu.cn E-mail: iamfwhuo@njtech.edu.cn.

[b.]Zhejiang Tianneng Energy Technology Co., Ltd, 18 Baoqiao Road, Huaxi Industrial Function Zone, Huzhou 313100, P.R. China.

* Corresponding authors: iamfwhuo@njtech.edu.cn (F. Huo); iamwnzhang@njtech.edu.cn (W. Zhang)

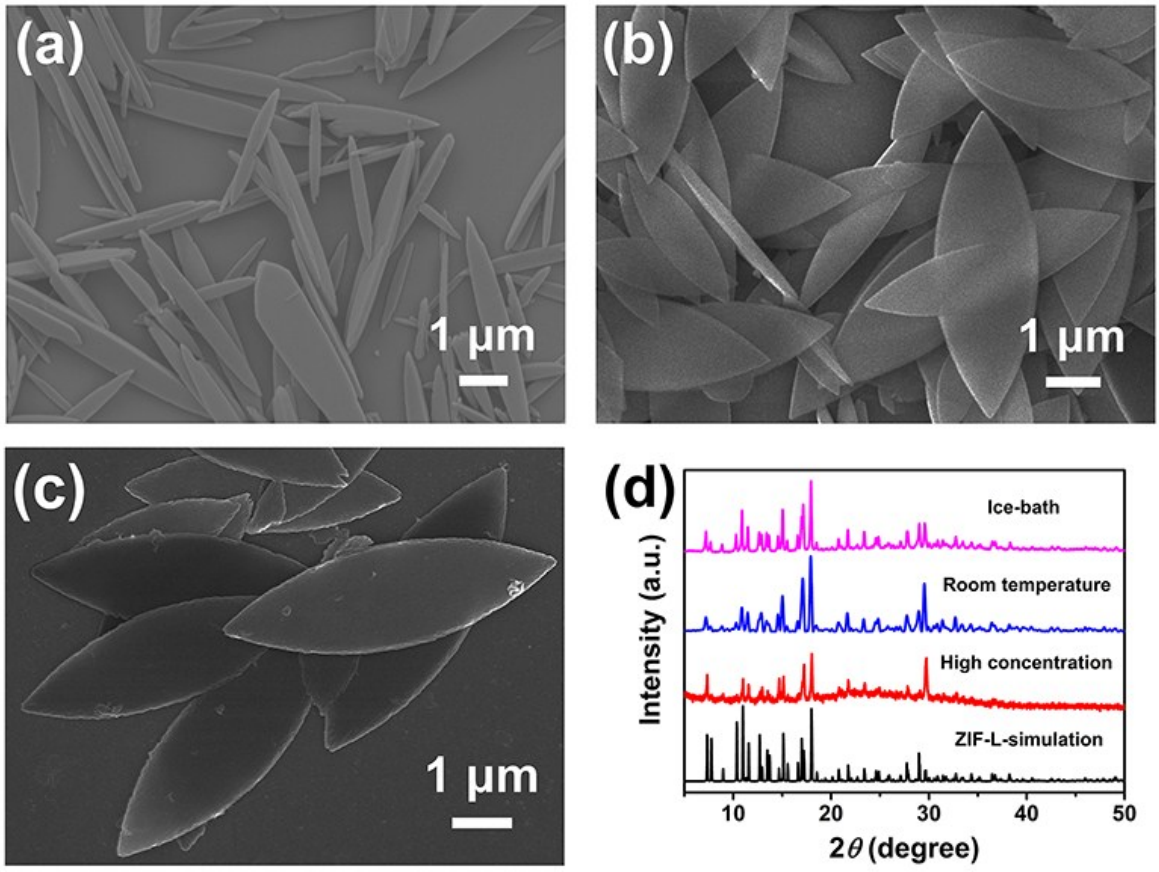

Fig. S1 SEM images of ZIF-L-Co with different morphologies: (a) High concentration. (b) Room temperature. (c) Ice-bath and (d) XRD patterns of ZIF-L-Co with different morphologies under various conditions.

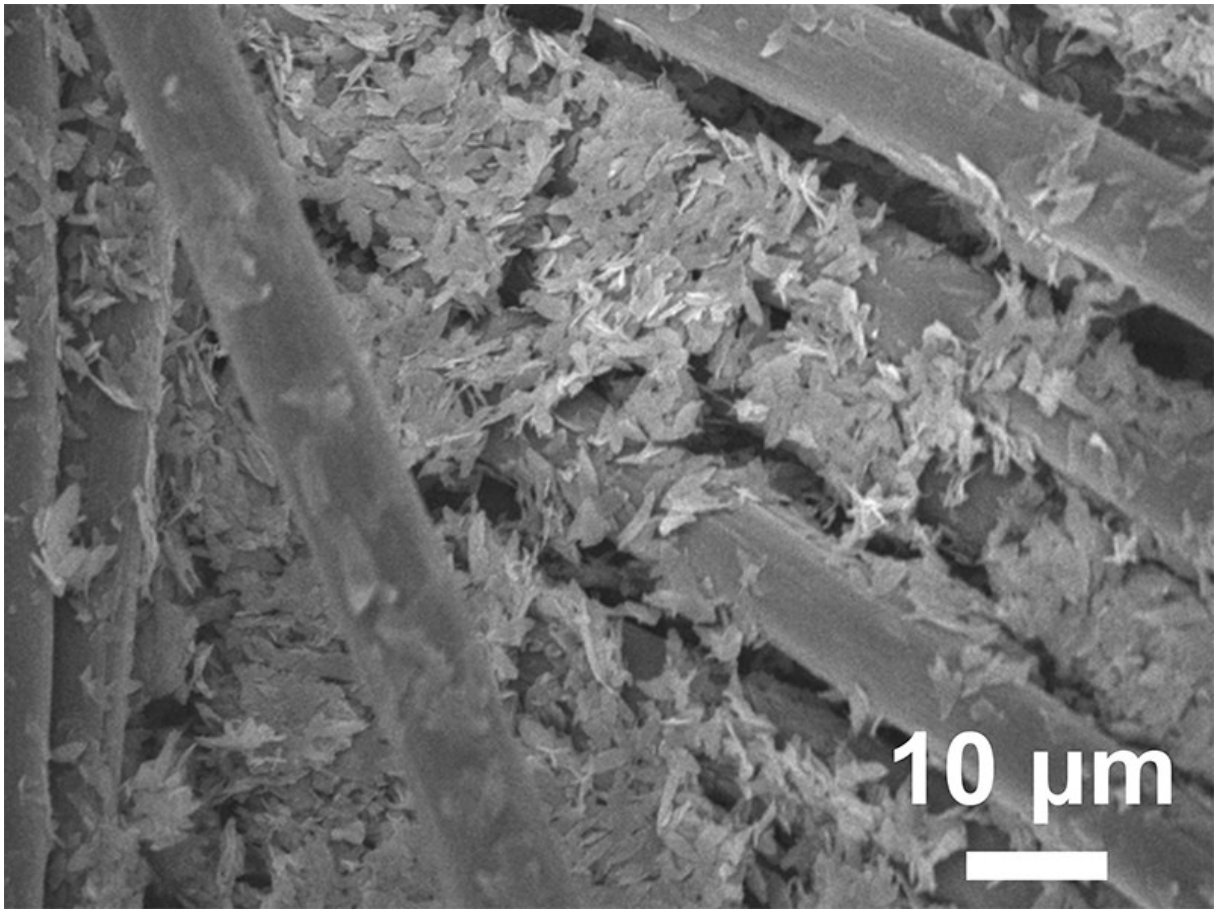

Fig. S2 SEM image of the leaf-like CoSNC nanocomposites on carbon cloth.

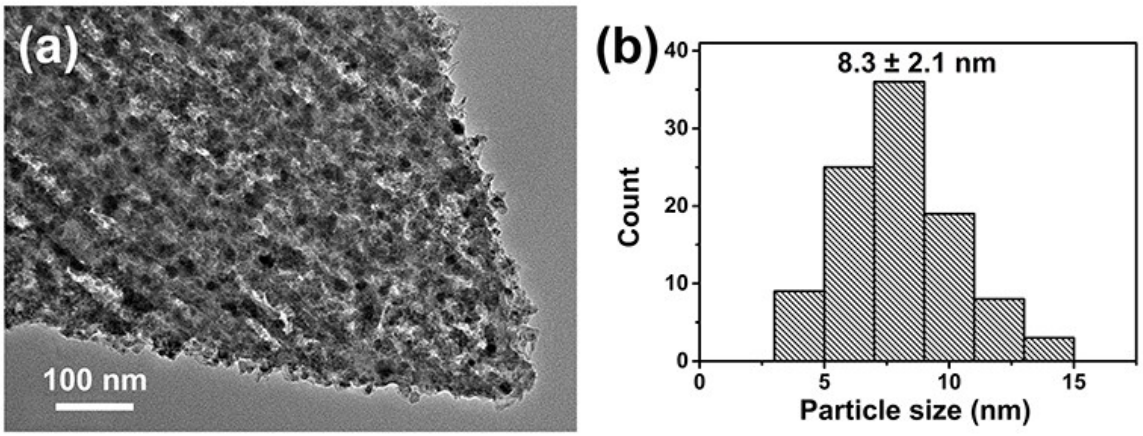

Fig. S3 (a) TEM image of leaf-like CoSNC nanocomposites. (b) Size distribution histogram of CoS_2 nanoparticles in leaf-like CoSNC nanocomposites.

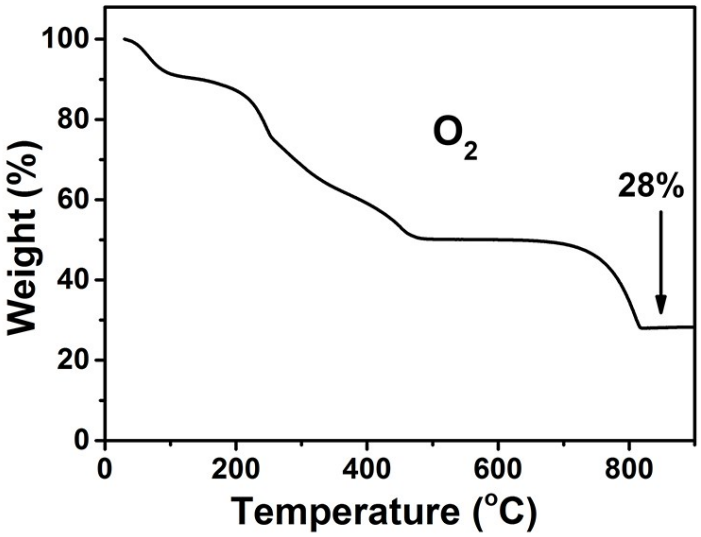

Fig. S4 TGA curve of the leaf-like CoSNC nanocomposites measured in O_2.

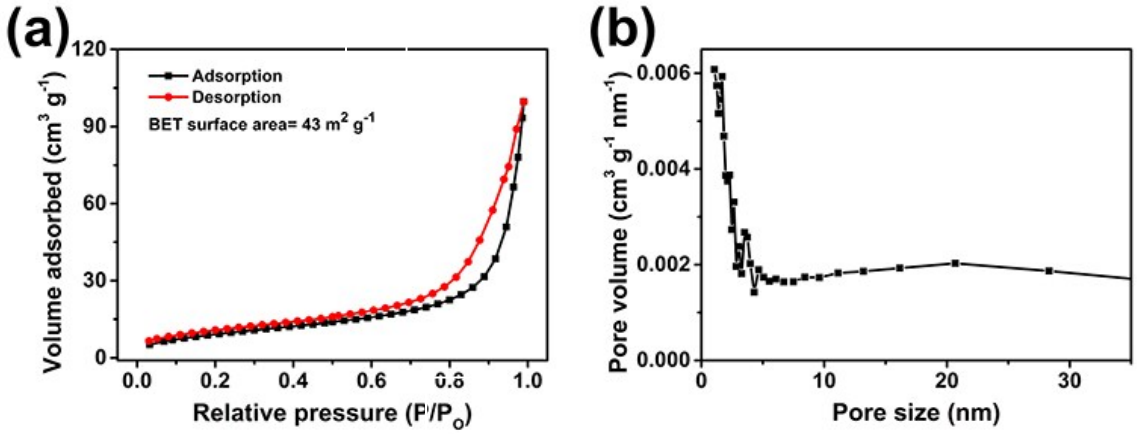

Fig. S5 (a) N_2 sorption isotherms and (b) Pore-size distribution of the leaf-like CoSNC nanocomposites.

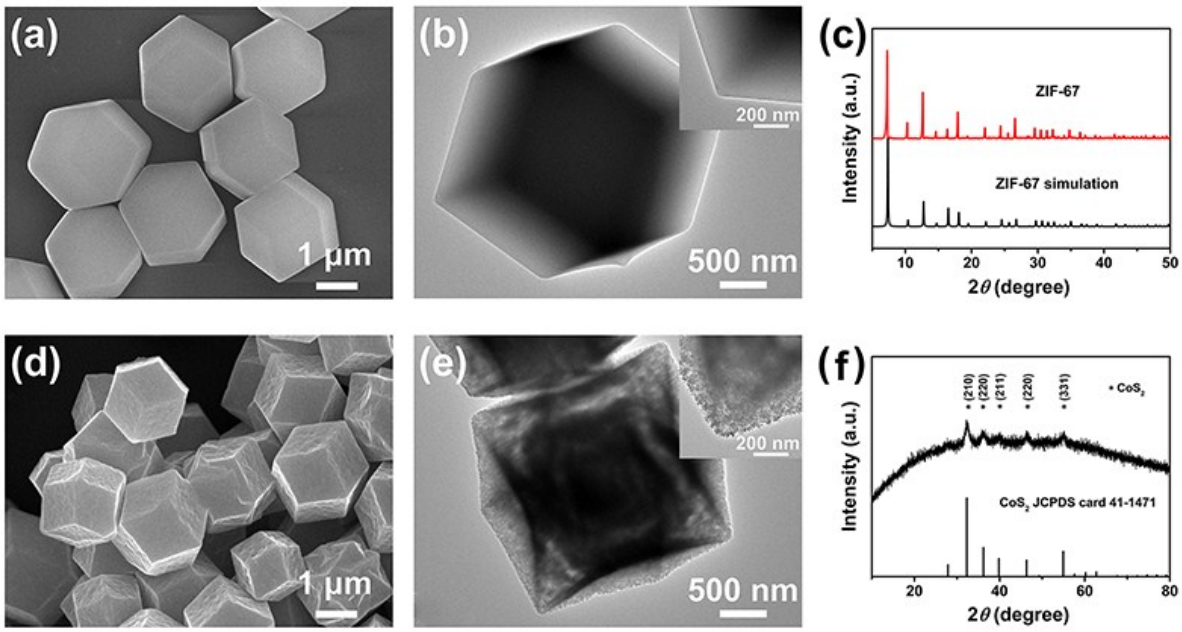

Fig. S6 (a) SEM image of ZIF-67. (b) TEM image of ZIF-67. Top inset: enlarged image of the edge. (c) XRD pattern of ZIF-67. (d) SEM image of dodecahedral-like CoSNC nanocomposites. (e) TEM image of dodecahedral-like CoSNC nanocomposites. Top inset: enlarged image of the edge. (f) XRD pattern of dodecahedral-like CoSNC nanocomposites.

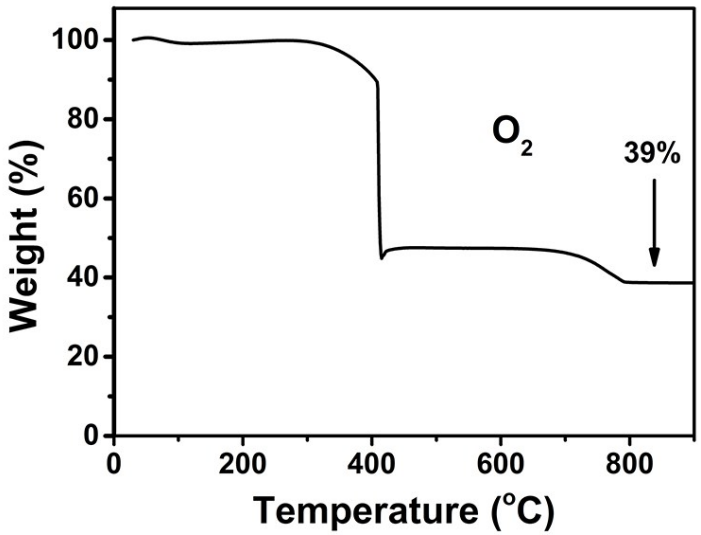

Fig. S7 TGA curve of dodecahedral-like CoSNC nanocomposites measured in O_2.

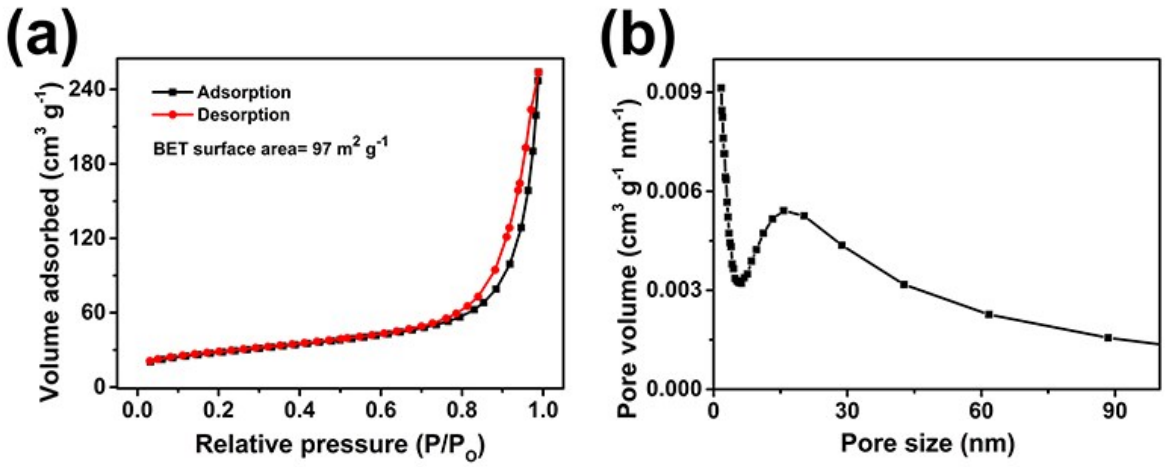

Fig. S8 (a) N_2 sorption isotherms and (b) Pore-size distribution of dodecahedral-like CoSNC nanocomposites.

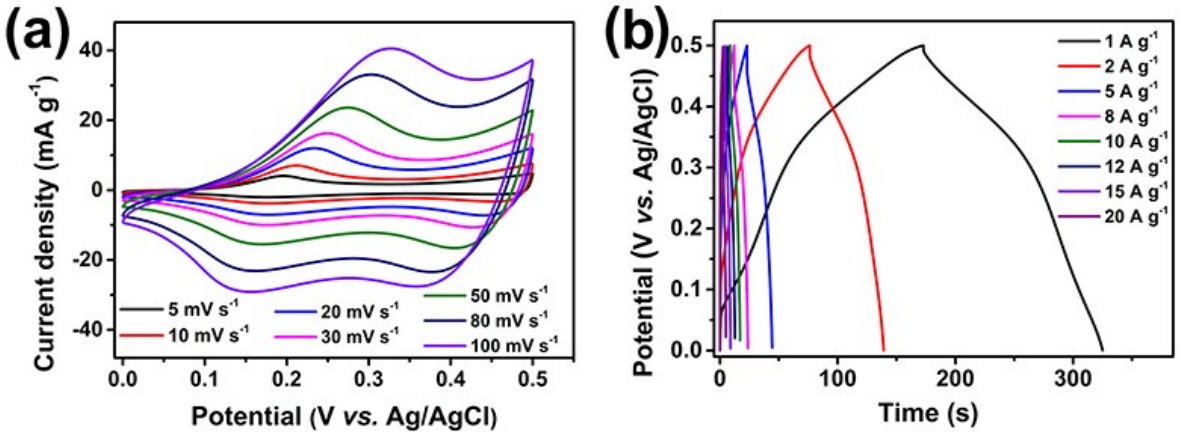

Fig. S9 (a) CV curves at different scan rates from 5 to 100 mV s^{-1} and (b) Charge/discharge curves at various current densities from 1 to 20 A g^{-1} of dodecahedral-like CoSNC nanocomposites electrode.

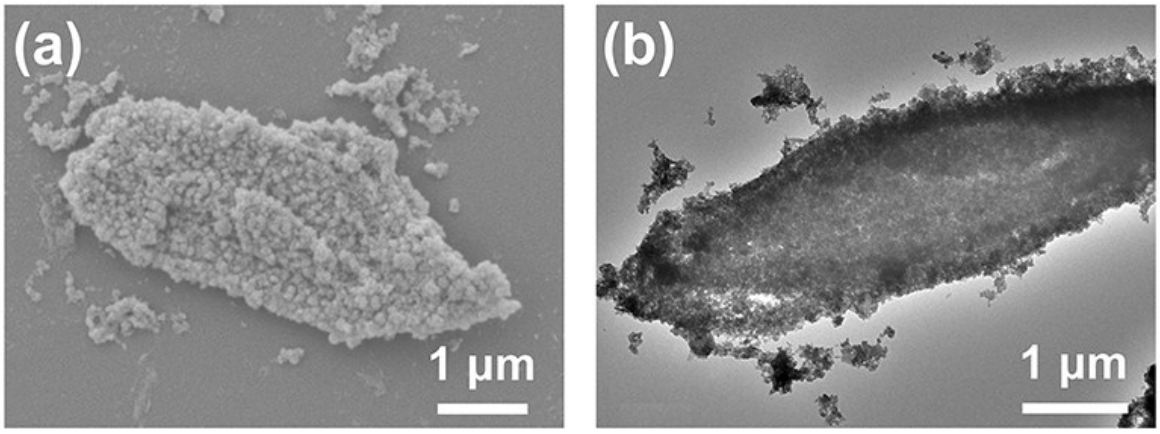

Fig. S10 (a) SEM image and (b) TEM image of the leaf-like CoSNC nanocomposites after 10,000 cycles at a current density of 10 A g^{-1}.

Table S1. Comparsion of supercapacitor performances of MOF-derived carbon, MOF-derived carbon/metal sulfide and cobalt-based materials.

Electrode materials	Electrolytes	Maximum C_S	Rate performances	Cycling performances	References
1) Leaf-like CoSNC nanocomposites derived from ZIF-L-Co (48.2 wt.% of CoS_2)	2 M KOH	383 F g^{-1} at 1.0 A g^{-1}	C_S retention of 72.3% at 10 A g^{-1} C_S retention of 59% at 20 A g^{-1}	C_S retention of 91% at 10 A g^{-1} after 10,000 cycles	This work
2) 3D interconnected porous carbons derived from MOF-5	6 M KOH	212 F g^{-1} at 0.05 A g^{-1}	C_S retention of 82.5% at 20 A g^{-1}	C_S retention of 95.9% after 1,000 cycles	Ref. S1
3) Hierarchically flower-like N‑doped porous carbon derived from Cu-MOF	6 M KOH	149 F g^{-1} at 0.5 A g^{-1}	C_S retention of 70.5% at 10 A g^{-1}	C_S retention of 86.8% at 1.0 A g^{-1} after 2,000 cycles	Ref. S2
4) 2D CoSNC nanocomposites derived from PPF-3 nanosheets (21 wt.% of $CoS_{1.097}$)	2M KOH	360 F g^{-1} at 1.5 A g^{-1}	C_S retention of 56.8% at 30 A g^{-1}	C_S retention of 90% at 12 A g^{-1} after 2,000 cycles	Ref. S3
5) $Cu_{1.96}S$-C polyhedra derived from HKUST-1 (74 wt.% of Cu1.96S)	2M KOH	200 F g^{-1} at 0.5 A g^{-1}	C_S retention of 60% at 2.0 A g^{-1}	C_S retention of 80% at 50 mV s^{-1} after 3,000 cycles	Ref. S4
6) CoS polyhedral nanocages derived from ZIF-67	1M KOH	1476 F g^{-1} at 1.0 A g^{-1}	C_S retention of 63% at 10 A g^{-1}	C_S retention of 88.2% at 10 A g^{-1} after 2,000 cycles	Ref. S5
7) 2D CoS sheets	2M KOH	1314 F g^{-1} at 1.0 A g^{-1}	C_S retention of 54.4% at 20 A g^{-1}	C_S retention of 91.7% at 3.0 A g^{-1} after 500 cycles	Ref.S6
8) 3D flower-like	6M KOH	522 F g^{-1} at	C_S retention of	C_S retention of 97.7% at 1.0 A	Ref. S7

Co_9S_8		0.5 A g^{-1}	76% at 2.0 A g^{-1}	g^{-1} after 1,000 cycles	
9) 3D flower-like CoS	6M KOH	586 F g^{-1} at 1.0 A g^{-1}	C_S retention of 89% at 10 A g^{-1}	C_S retention of 91% at 1.0 A g^{-1} after 1,000 cycles	Ref. S8

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