

Supporting Information

Formation of Graphene-encapsulated CoS₂ Hybrid Composite with Hierarchical Structure for High-Performance Lithium-ion Batteries

Shi Tao^{a,*}, *Weifeng Huang*^c, *Hui Xie*^b, *Jing Zhang*^a, *Zhicheng Wang*^a, *Wangsheng Chu*^b, *Bin Qian*^{a,*}, *Li Song*^b

^a *Department of Physics and Electronic Engineering, Jiangsu Laboratory of Advanced Functional Materials, Changshu Institute of Technology, Changshu 215500, China*

^b *National Synchrotron Radiation Laboratory, University of Science and Technology of China, Hefei, 230026, China*

^c *College of Engineering, Peking University, Beijing 100871, China*

^{*} *Corresponding author. Tel: 0086+512 52251553. Fax: 0086+512 52251882.*

E-mail: taoshi@cslg.edu.cn(S.Tao), njqb@cslg.edu.cn(B.Qian)

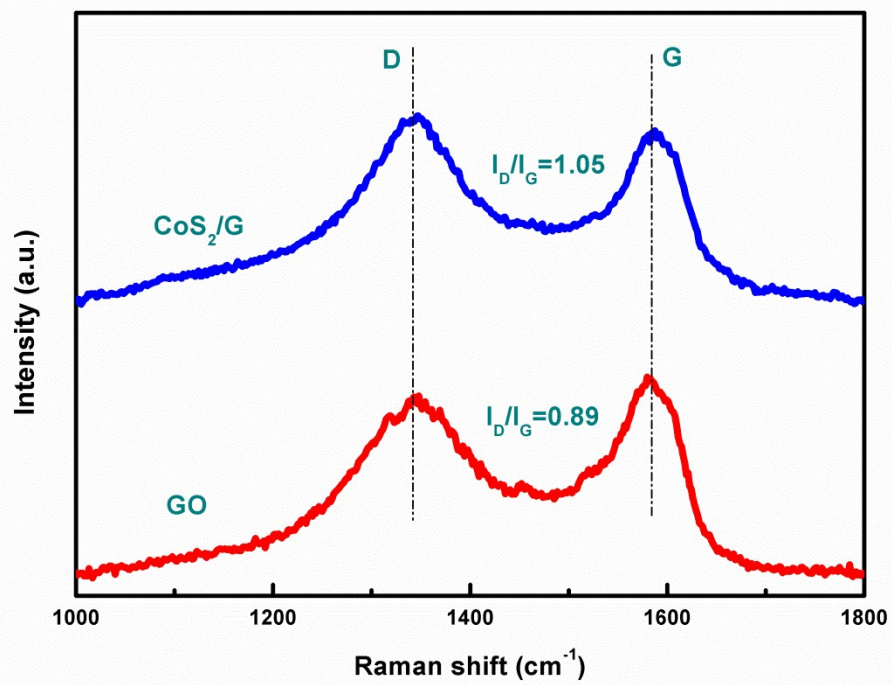


Figure S1. Raman spectrum of GO and CoS_2/G .

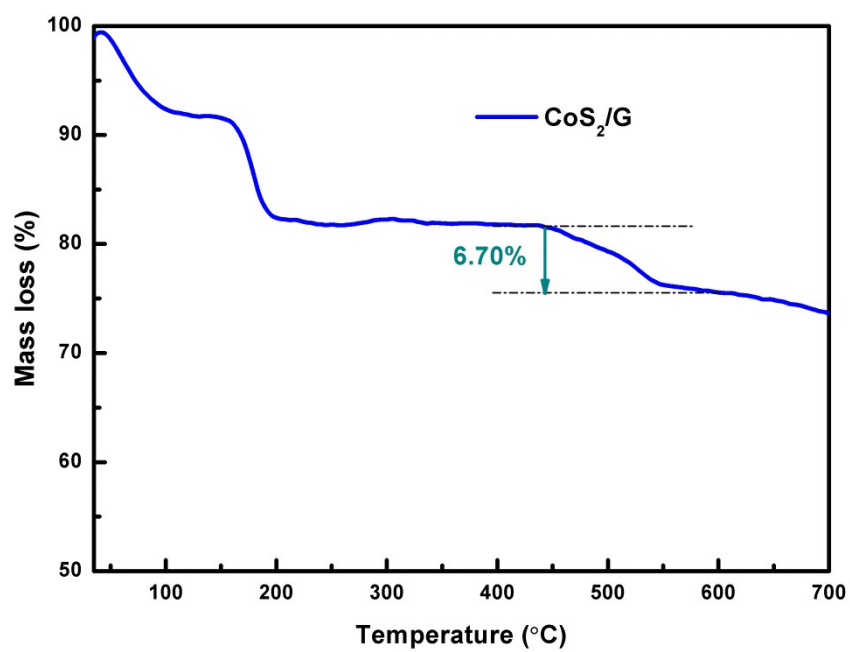


Figure S1. TGA curve of CoS_2/G sample.

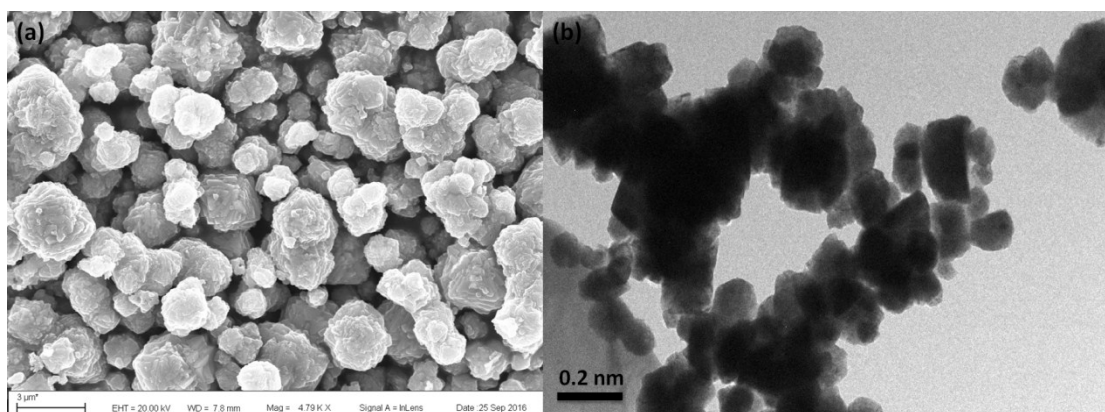


Figure S3 (a) SEM image, and (b) TEM image of of bare CoS₂ sample.

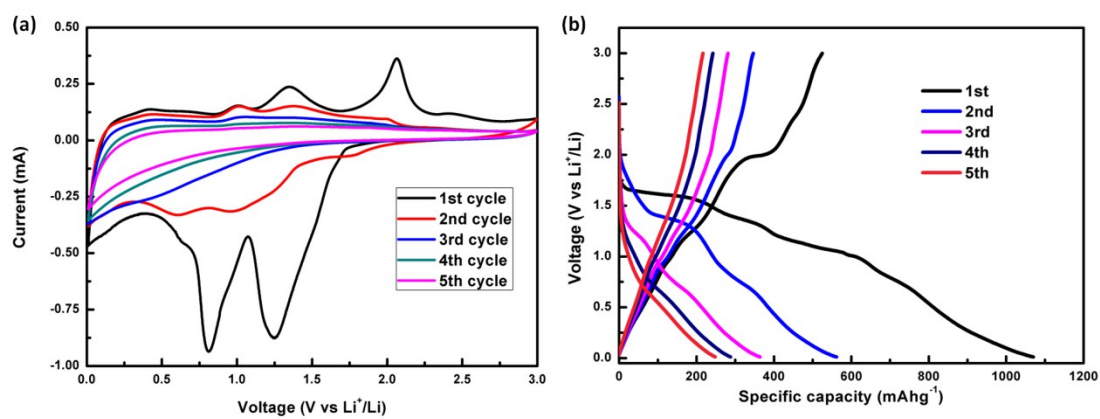


Figure S4. (a) CV curves, and (b) charge-discharge curves of bare CoS₂ sample.

Table S1 Comparison of the electrochemical performance for CoS₂ based anodes in the previous literature with our sample

Electrode materials	1 st discharge/charge capacity (mAh g ⁻¹)	Cycling performance	Ref
CoS ₂	1280/900	350 mAh g ⁻¹ at 50 mA g ⁻¹ after 20 cycles	16
CoS ₂ /GNS	1825/1018	950 mAh g ⁻¹ at 100 mA g ⁻¹ after 50 cycles	17
CoS ₂ /graphene	1150/770	360 mAh g ⁻¹ at 800 mA g ⁻¹ after 250 cycles	18
CoS ₂ polydedral	929.1/716.2	702.4 mAh/g at 100 mA g ⁻¹ after 10 cycles	19
CoS ₂ /RGO	1154/778	644 mAh/g at 50 mA g ⁻¹ after 30 cycles	20
CoS ₂ spheres	1210/900	320 mAh g ⁻¹ at 50 mA/g after 40 cycles	21
CoS ₂ @C	1080/1060	440 mAh g ⁻¹ at 0.2 mA cm ⁻² after 50 cycles	22
CoS ₂ -quantum dots/graphene	1504/1185	1129.6 mAh g ⁻¹ at 100 mA g ⁻¹ after 50 cycles	33
CoS ₂ nanocages/graphene	1169/893	697 mAh g ⁻¹ at 500 mA g ⁻¹ after 300 cycles	34
CoS ₂ /fCNT	1282.5/768.4	337.8 mAh g ⁻¹ at 1000 mA g ⁻¹ after 1000 cycles	23
CoS ₂ @C	1082/788	730 mAh g ⁻¹ at 500 mA g ⁻¹ after 200 cycles	24
CoS ₂ /N-doped C	1100/750	560 mAh g ⁻¹ at 100 mA g ⁻¹ after 50 cycles	25
CoS ₂ /G	1110/810	400 mAh g ⁻¹ at 500 mA g ⁻¹ after 1000 cycles	This work