Supporting Information

Self-supporting S@GO-FWCNTs composite films as positive electrode for high-performance Lithium-sulfur battery

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Materials	methods	Sulfur	Current	Capacity	Cycle
		content	rate	(mAh	number
		(wt%)		$g_{electrode}^{-1}$)	
This work	vacuum-filtrated	66.1	3C	482.1/385.7	500
Flexible Carbon	vacuum-filtrated	53	1C	483/325	100
Nanotubes-					
Graphene/Sulfur					
Composite Film ^[1]					
Graphene-sulfur	vacuum	67	0.1C	700/600	100
paper ^[2]	infiltration				
Fibrous graphene-	freeze-drying	63	0.5C	700/541	100
sulfur (G-S)					
hybrid ^[3]					
Graphene/carbon	freeze-drying	70.3	1C	776/657	450
nanotube/Sulfur					
hybrid ^[4]					

Table S1 Sulfur content and electrochemical properties of flexible sulfur-based cathode in this work and literatures.

REFERENCES

- Y. Chen, S.T. Lu, X.H. Wu and J. Liu, Flexible Carbon Nanotube-Graphene/Sulfur Composite Film: Free-Standing Cathode for High-Performance Lithium/Sulfur Batteries, Journal of Physical Chemistry C, 2015, 119, 10288.
- 2. J. Jin, Z.Y. Wen, G.Q. Ma, Y. Lu, Y.M. Cui, M.F. Wu, X. Liang and X.W. Wu, Flexible selfsupporting graphene–sulfur paper for lithium sulfur batteries, Rsc Advances, 2013, **3**, 2558.
- G.M. Zhou, L.C. Ying, D.W. Wang, L. LI, S.F. Pei, L.R. Gentle, F. Li and H.M. Cheng, Fibrous Hybrid of Graphene and Sulfur Nanocrystals for High-Performance Lithium-Sulfur Batteries, Acs Nano, 2013, 7, 5367.
- 4. S.Z. Niu, W. Lv, C. Zhang, Y.T. Shi, J.F. Zhao, B.H. Li, Q.H. Yang and F.Y. Kang, One-pot self-assembly of graphene/carbon nanotube/sulfur hybrid with three dimensionally interconnected structure for lithium–sulfur batteries, Journal of Power Sources, 2015, **295**, 182.