

## Supporting Information

### Biomass-mediated synthesis of carbon-supported nanostructured metal sulfides for ultra-high performance Lithium-ion batteries

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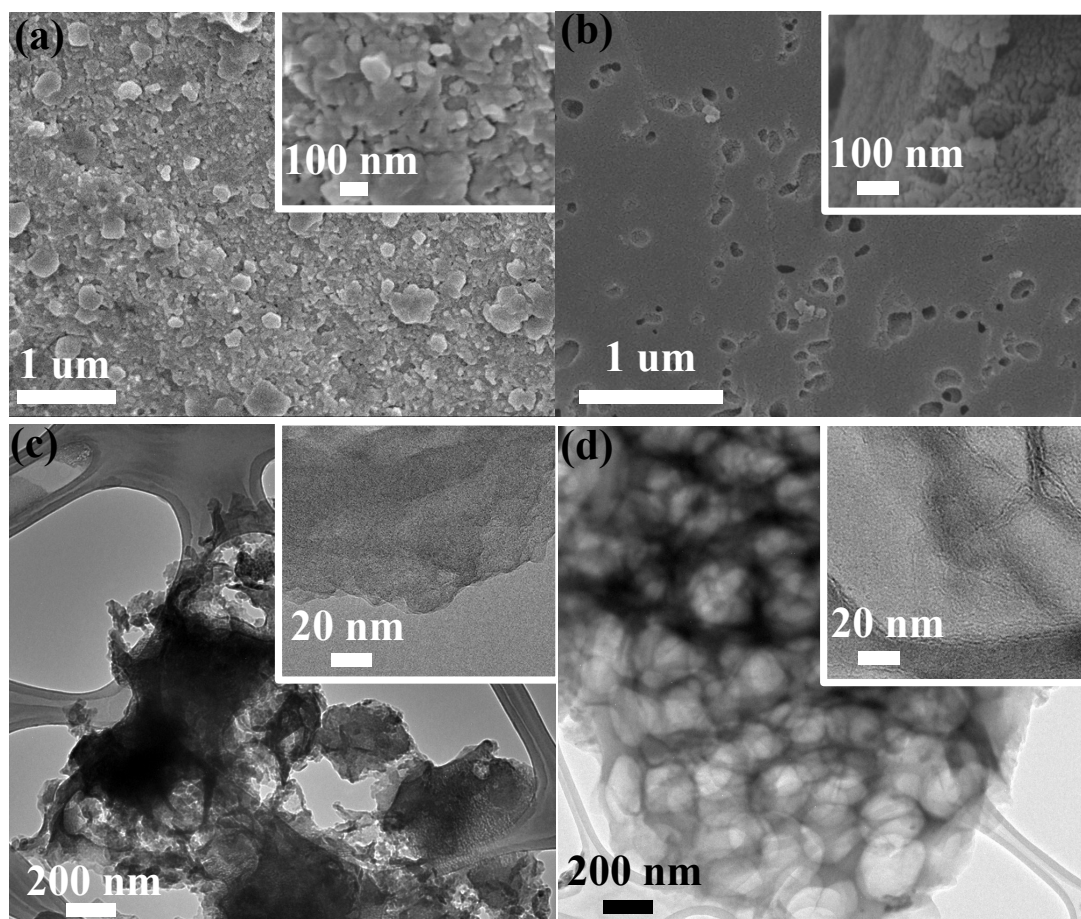


Fig. S1. SEM image of alginate after annealing (a) and alginate containing L-cysteine after annealing (b); (c – d) TEM image of sample in (a) and (b) respectively.

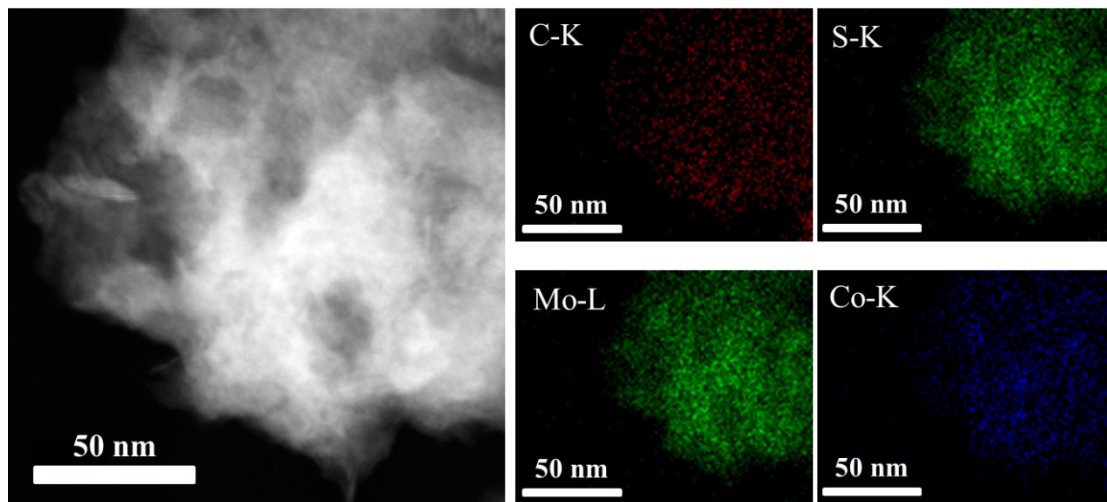


Fig. S2. TEM element mapping of annealed  $\text{CoMoS}_{3.13}\text{@ADC}$ .

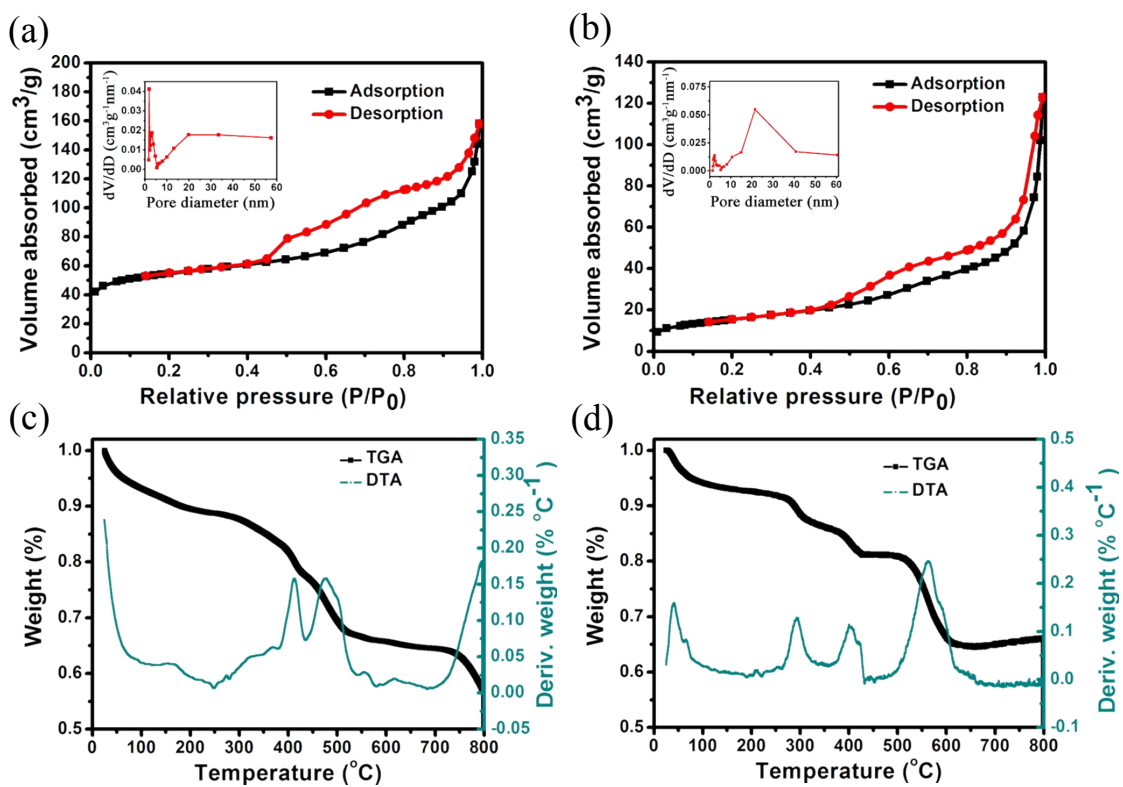


Fig. S3. nitrogen isothermal curve (a), pore size distribution curve (inset of a) and TGA/DTA curve (c) of  $\text{MoS}_2@ADC$ ; nitrogen isothermal curve (b), pore size distribution curve (inset of b) and TGA/DTA curve (d) of  $\text{CoMoS}_{3.13}@ADC$ .

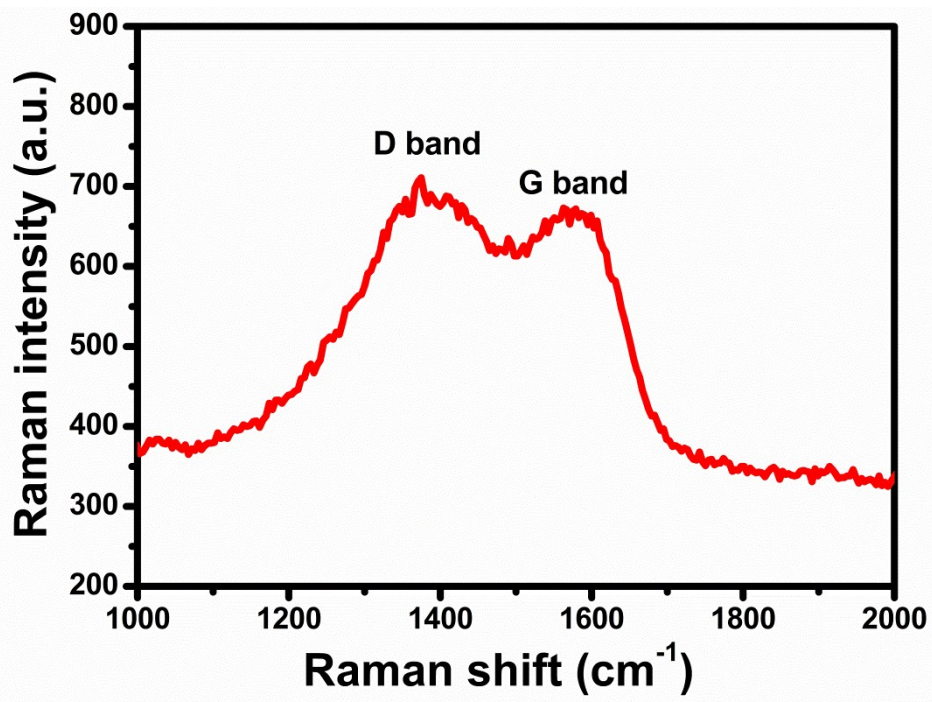


Fig. S4 Raman spectrum of CoMoS<sub>3.13</sub>@ADC in 1000~2000 cm<sup>-1</sup>

Table S1. Electrochemical performance of CoMoS<sub>3.13</sub>@ADC electrode with previously reported MoS<sub>2</sub>/carbon composite anodes

Ref	Electrode	Initial discharge capacity (100 mA g <sup>-1</sup> )	Initial charge capacity (100 mA g <sup>-1</sup> )	Residual capacity (100 mA g <sup>-1</sup> )	Rate capacity (1A g <sup>-1</sup> )	Rate capacity (2A g <sup>-1</sup> )
<b>Our material</b>	<b>CoMoS<sub>3.13</sub>@ADC</b>	<b>1439</b>	<b>1121</b>	<b>1125</b>	<b>800</b>	<b>755</b>
1	MoS <sub>2</sub> /a-C-1.0	2100	926	961		
2	MoS <sub>2</sub> /G (1:2)	1571	1031	1100	900	
3	MoS <sub>2</sub> /N-G	1300	1021.2	1285.3	850	

## References

1. K. Chang, W. Chen, L. Ma, H. Li, H. Li, F. Huang, Z. Xu, Q. Zhang and J.-Y. Lee, *Journal of Materials Chemistry*, 2011, **21**, 6251-6257.
2. K. Chang and W. Chen, *ACS nano*, 2011, **5**, 4720-4728.
3. K. Chang, D. Geng, X. Li, J. Yang, Y. Tang, M. Cai, R. Li and X. Sun, *Advanced Energy Materials*, 2013, **3**, 839-844.