Supporting Information

Reviving the bulky MoS_2 as advanced anode for lithium ion batteries

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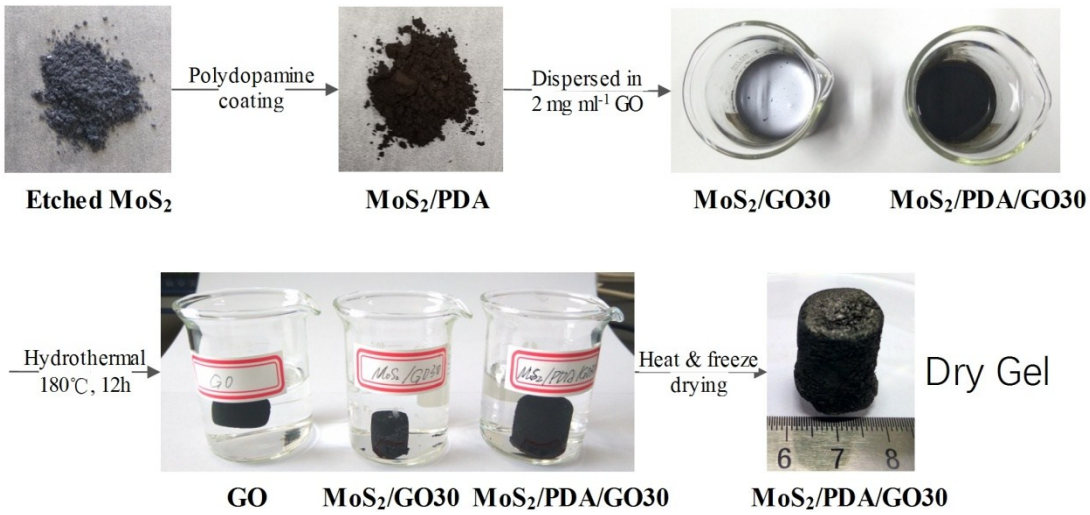

Figure S1. Schematic diagram of the detailed synthesis route of MoS_2-PDA-GO30.

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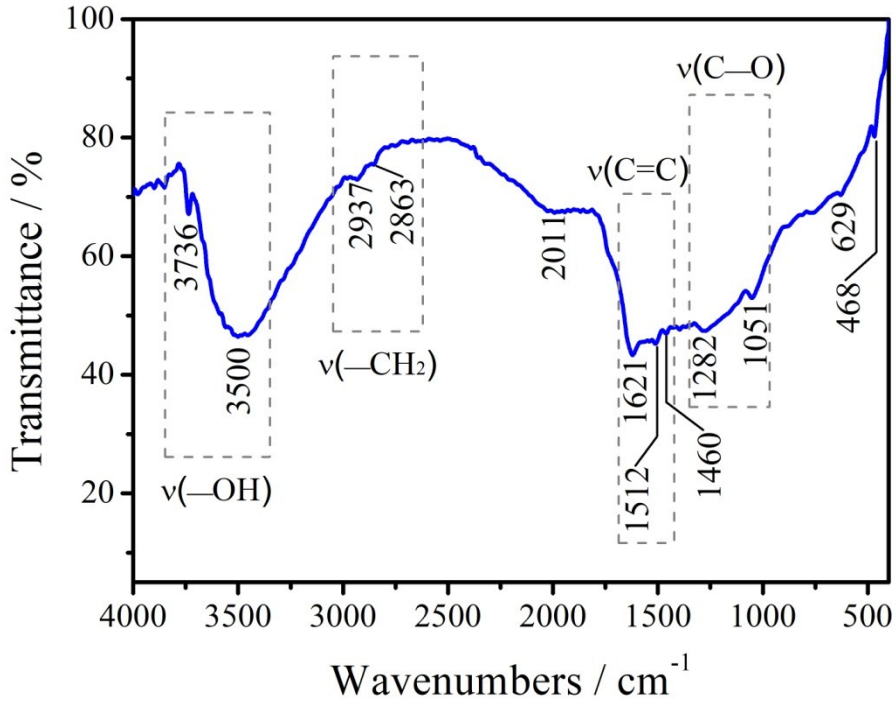

Figure S2. IR spectrum of the MoS_2-PDA intermediate.

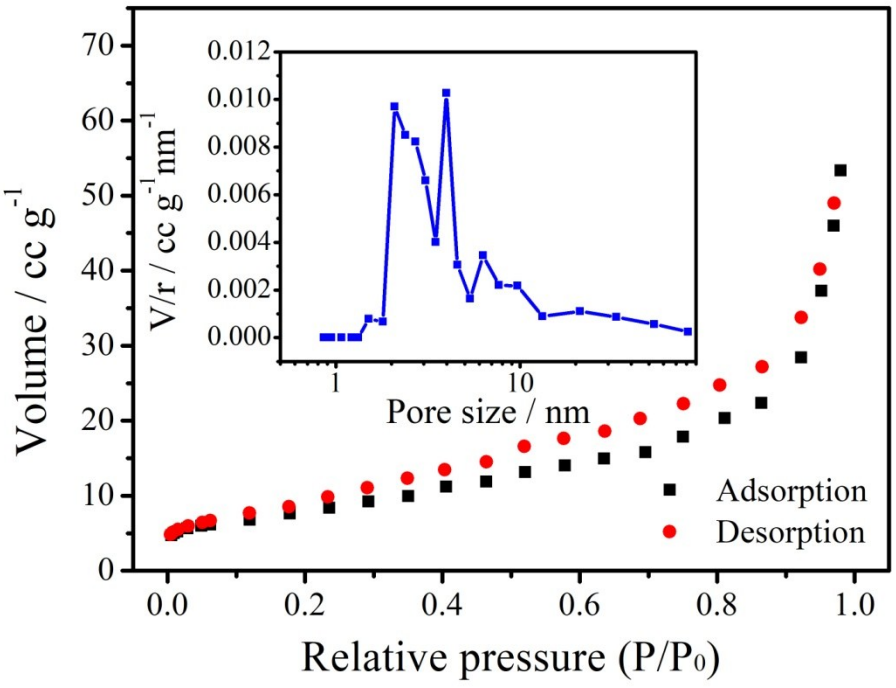

Figure S3. N_2 adsorption isotherm and pore size distribution curve (insert) of MoS_2-GO30.

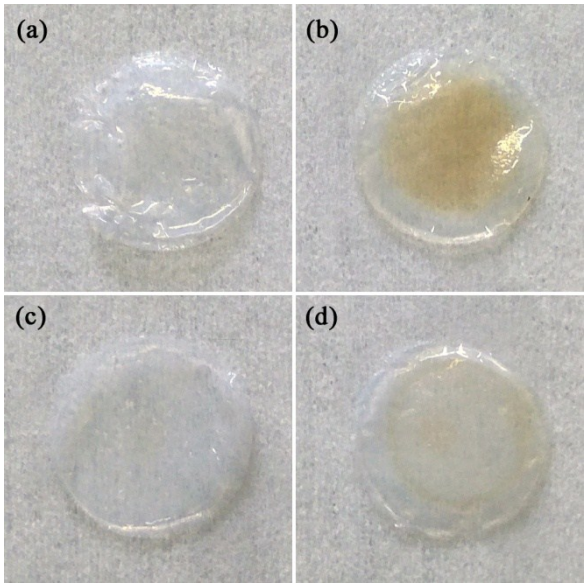

Figure S4. Polysulfide outflow investigation in different Li cycles. Separators of MoS_2-GO30//Li cells after 2 (a) and 50 (b) cycles, separators of MoS_2-PDA-GO30//Li cells after 2 (c) and 50 (d) cycles.

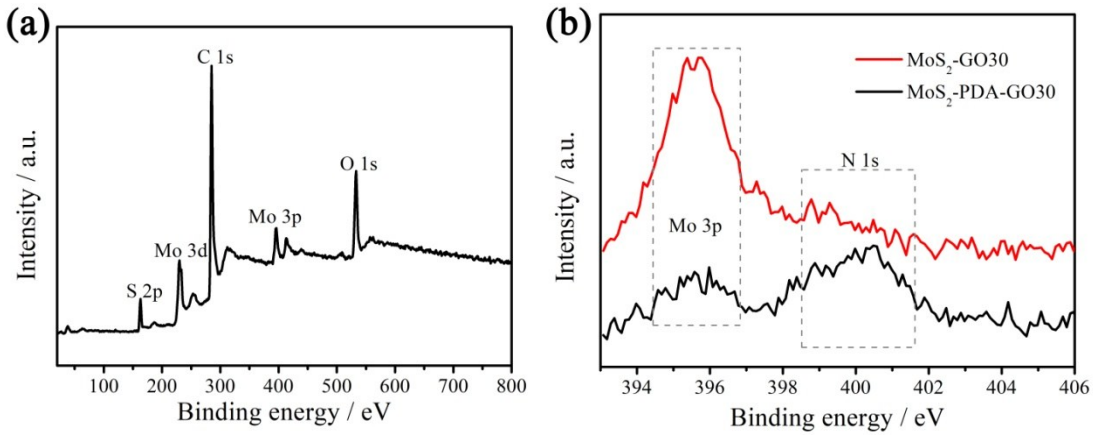

Figure S5. (a) XPS survey spectrum of MoS_2-GO30, (b) high resolution N 1s spectra contrast of MoS_2-PDA-GO30 and MoS_2-GO30.

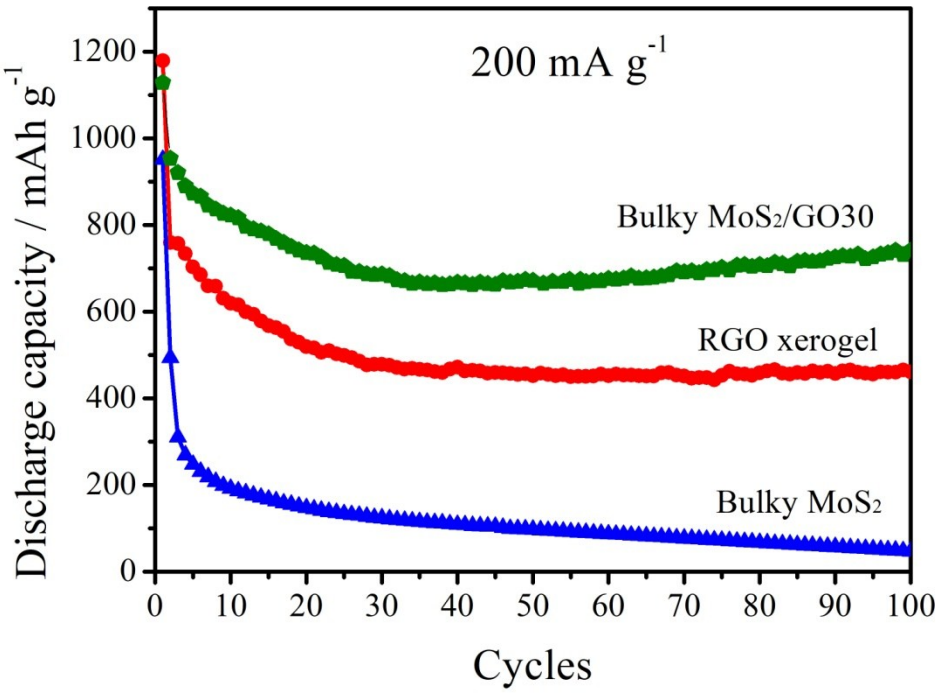

Figure S6. Cycling performance of bulky MoS_2, RGO xerogel and MoS_2-GO30 control samples at 200 mA g^{-1}.

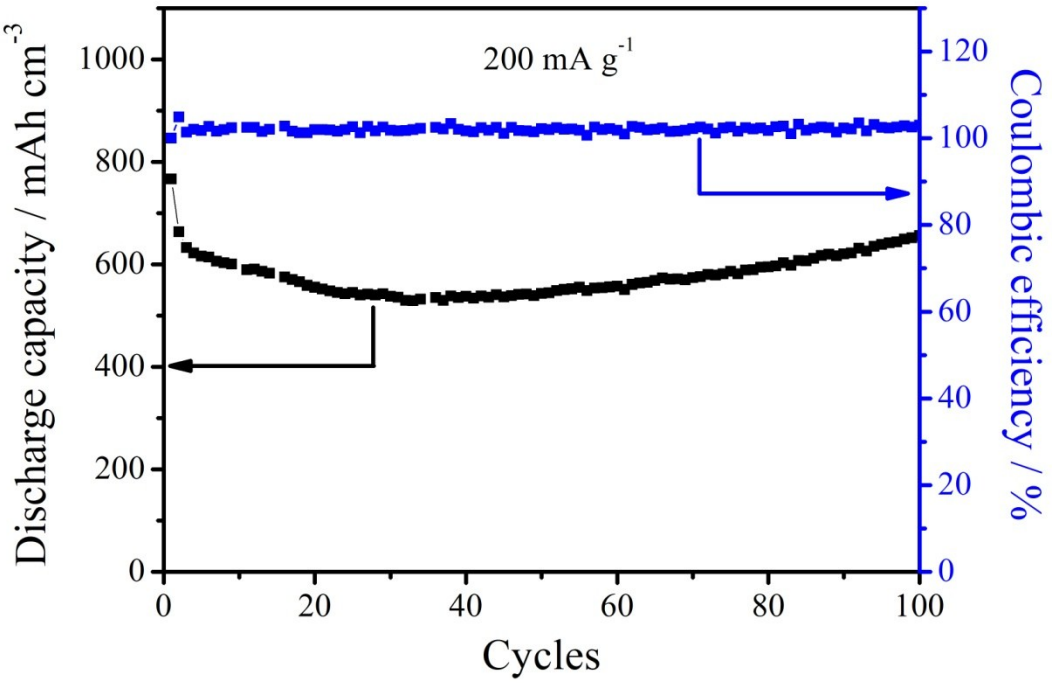

Figure S7. Cycling performance of MoS_2-PDA-GO30 in a volumetric style at 200 mA g^{-1} in Li half cells. The specific capacity is normalized based on the volume of the active loading on electrodes.

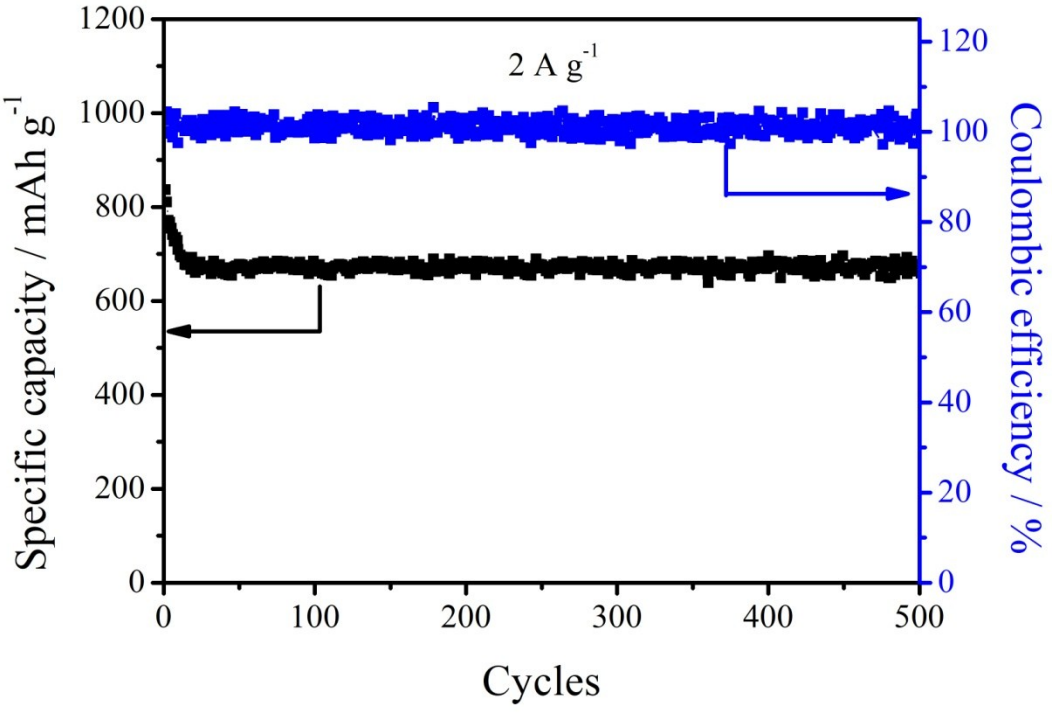

Figure S8. Cycling performance of MoS_2-PDA-GO30 sample at 2 A g^{-1} with an areal mass loading of approximately 2.5 mg cm^{-2} in Li half cells.

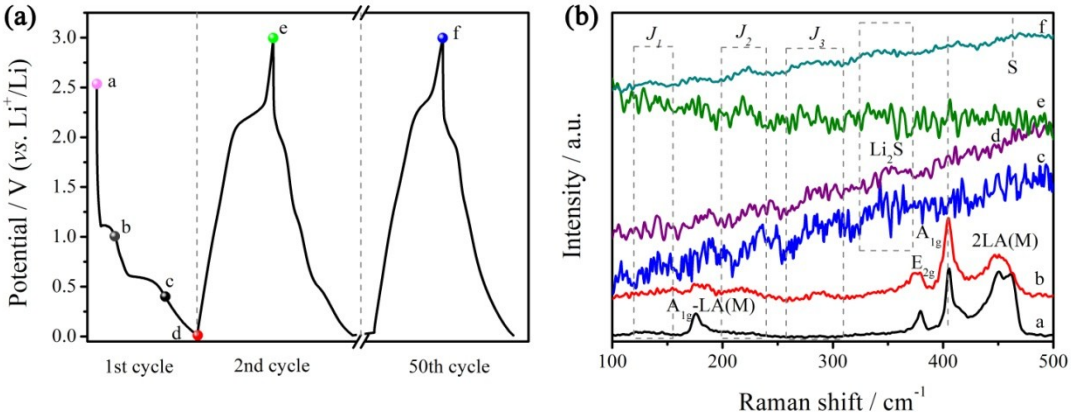

Figure S9. Ex-situ Raman investigation of MoS_2-PDA-GO30 electrode. (a) charge-discharge plots at 200 mA g^{-1} and (b) corresponding Raman spectra of MoS_2-PDA-GO30 electrode at 2.5 V, 1.0 V, 0.4 V, 0.01 V, 3.0 V in 2nd cycle and 3.0 V in 50th cycle. The electrodes for tests were obtained by dissembling corresponding Li half cells, rinsed the electrodes by DEC and sealed by slide glasses after natural drying in the glove box.

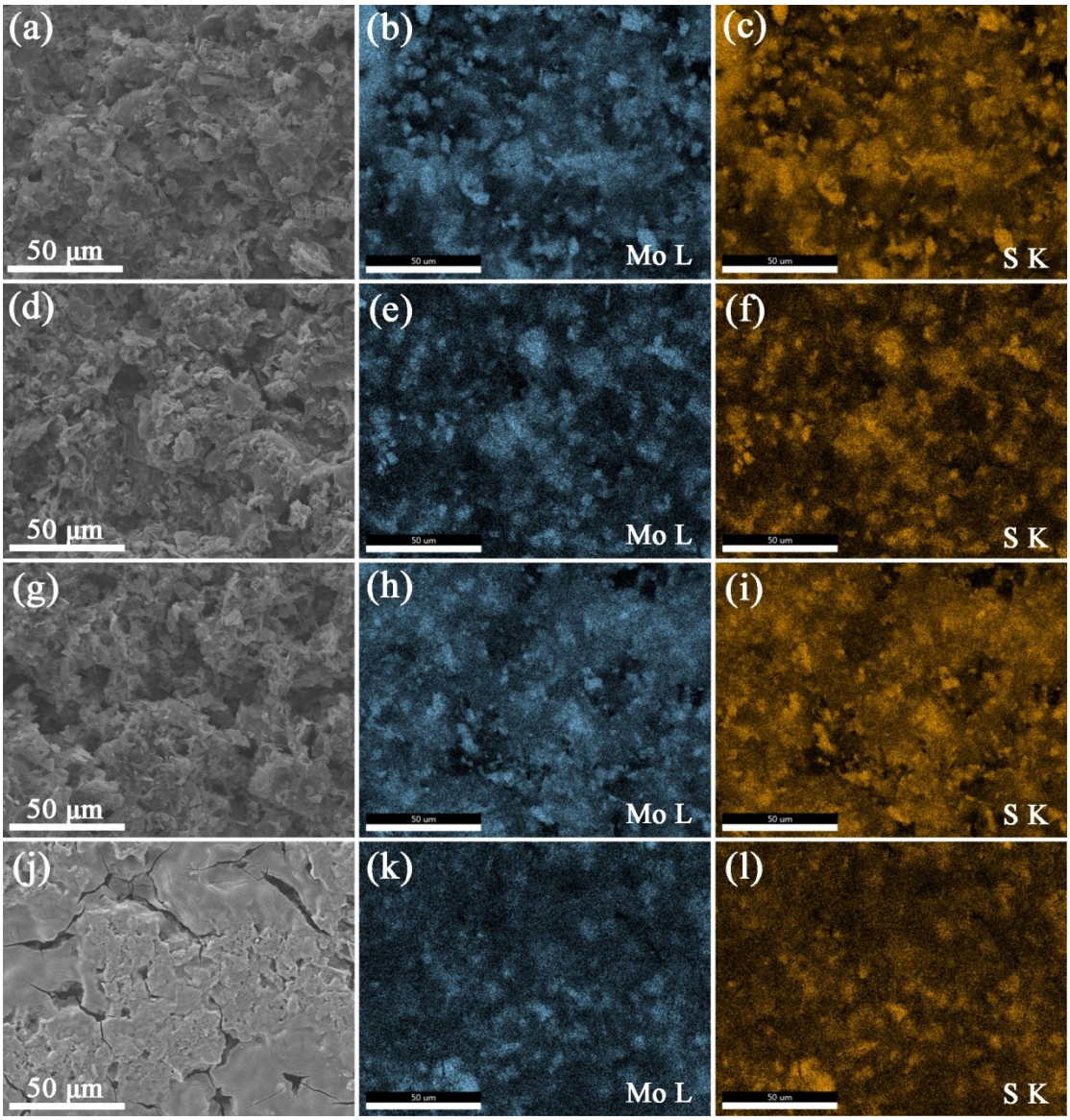

Figure S10. Ex-situ EDS mapping investigation of MoS_2-GO30 and MoS_2-PDA-GO30 electrodes before and after Li cycling. SEM image and corresponding Mo, S element distribution of (a)-(c) MoS_2-GO30 electrode before cycling, (d)-(f) MoS_2-GO30 electrode after 50 cycles, (g)-(i) MoS_2-PDA-GO30 electrode before cycling, (j)-(l) MoS_2-PDA-GO30 electrode after 50 cycles. The cycled electrodes were obtained by dissembling corresponding Li-half cells cycled at 200 mA g^{-1} in 3.0 V and rinsed by DEC solvent.