Supporting Information

A Hierarchical Three-dimensional Porous Laser Scribed Graphene Film for Suppressing Polysulfide Shuttling in Lithium-Sulfur Batteries

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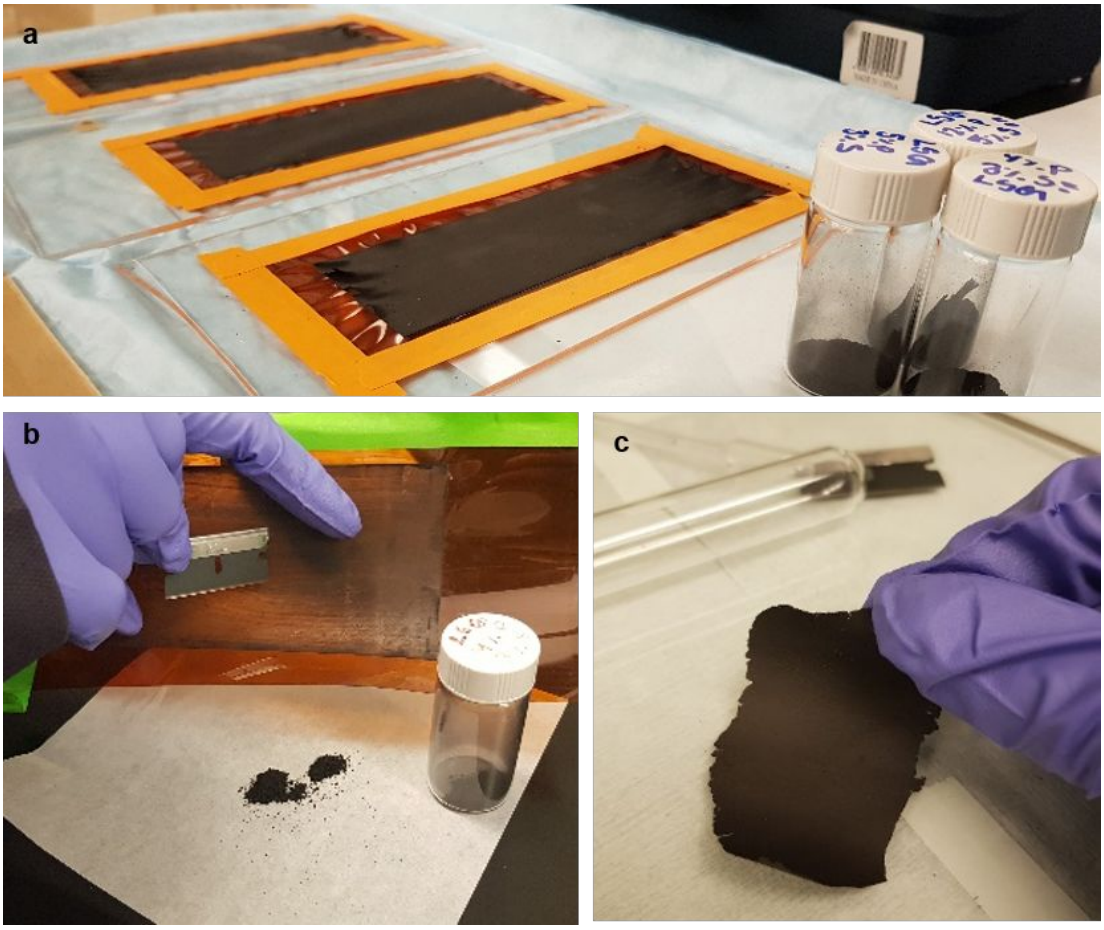

Figure S1. (a) parallel sheets of LSG from PI (b) LSG powder (c) a free standing LSG film after being rolled.

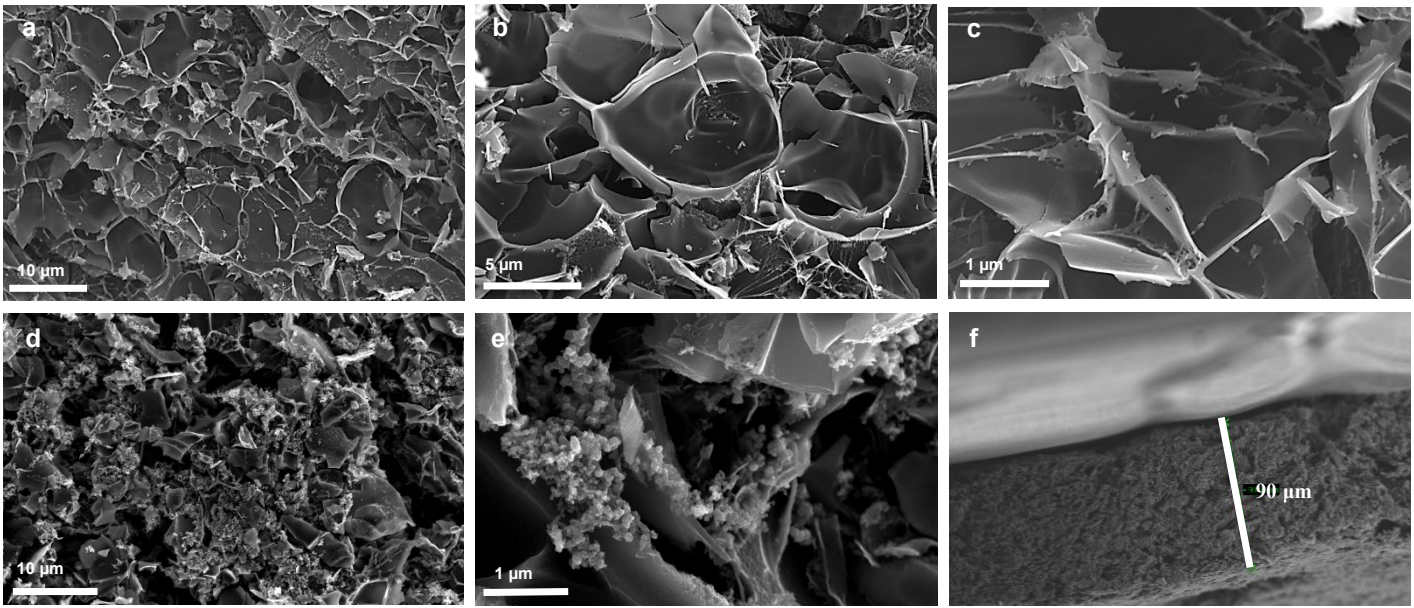

Figure S2. SEM images of (a),(b) and (c) LSG powder at different scales and of (d) and (e) of the free standing LSG interlayer; (f) Cross-sectional SEM image of the free standing LSG interlayer.

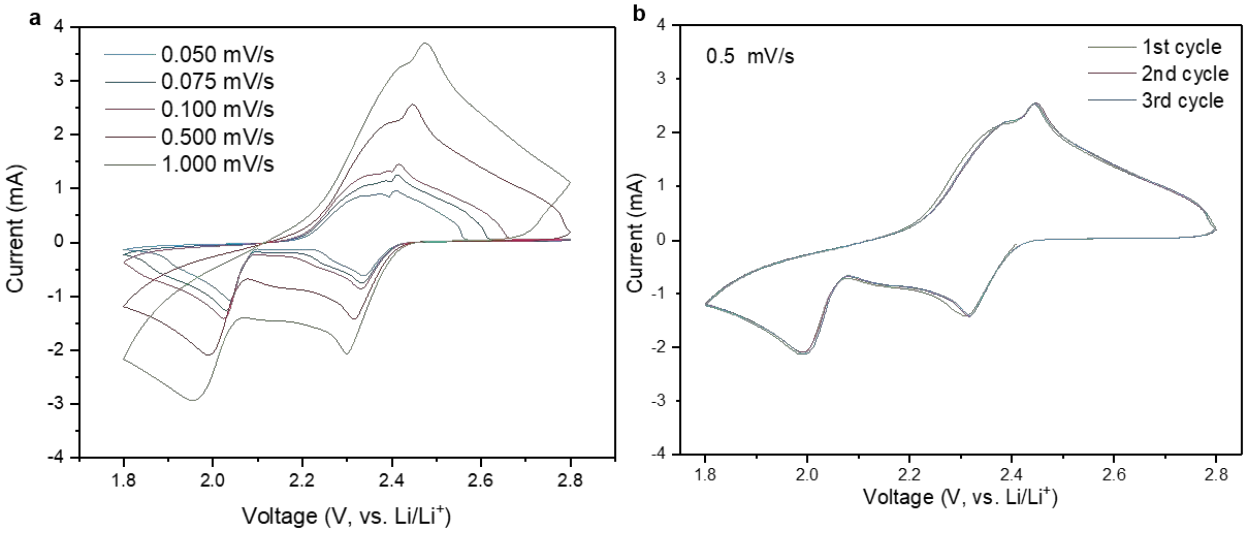

Figure S3. CV curves of pirstine Li-S battery at (a) different scan rates and (b) different cycles.

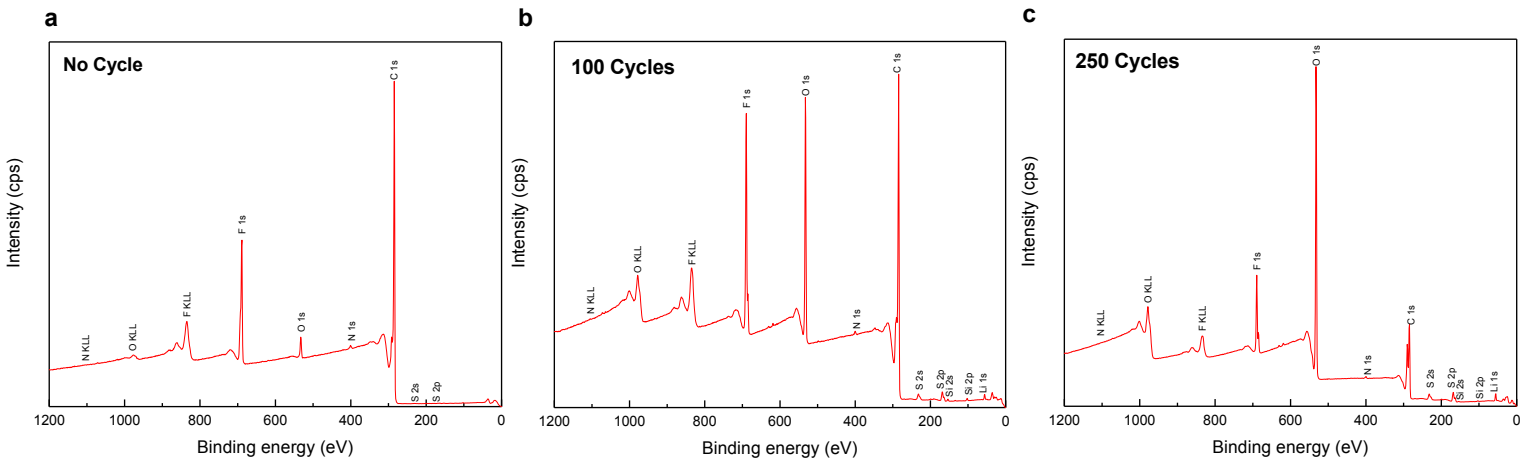

Figure S4. XPS mapping of LSG interlayer before cycling, after 100 cycles and after 250 cycles.

Table S1. Summary of carbon-based interlayers used in Li-S batteries

Interlayer	Initial Capacity, mAh g^{-1} (Current density, A g^{-1})	Capacity retention	Cycle number	References
Laser Scribed Graphene with CCB	1165(0.25) →938	80.4%	*100*	*This work*
Fe_3O_4-Decorated Porous Graphene	975 (0.3) →631	64.7%	*97*	1
Carbonized PAN–Nafion nanofibers	1549 (0.2) → 1057	83.1%	*100*	2
1GO/5CNT	1600 (0.2)→ 670	41.9%	*100*	3
Functionalized Boron Nitride Nanosheets/Graphene	1100(3)→700	63.6%	*Stable from 100 to 1000*	4
GO/M@CNT	813 (0.5) electrode, after activation	80.4%	*200*	5
sulfur–nitrogen dual-doped graphene	1460 (0.25C) 770 → 612(2C)	79.5%	*250*	6
porous nitrogen and phosphorous dual doped graphene	1158.3 (1C) → ~900	77.7%	*100*	7
Graphene-embedded carbon fiber	1250 (1C)	72%	*100*	8
rGO-CB composite	1260 remains 895	71.1%	*100*	9
conductive multiwalled carbon nanotube	1446 → 855 (0.5C)	59.1%	*100*	10
freestanding hollow carbon nanofiber/reduced graphene oxide	1318.4(0.2C)	60.1%	*100*	11

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