Supplementary Information

3D bead-like Cu₂S/NC nanofibers fabric as interlayer enabling dendrite-free lithium metal anodes

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Fig. S1 (a) XPS Survey spectrum and (b) C 1s high-resolution XPS spectrum of

Cu₂S/NC nanofibers fabric.



Fig. S2 SEM images of lithium anode after 20 cycles for Li||Cu cells with (a) pristine separator, (b) PAN interlayer, (c) Cu₂O/PAN interlayer and (d) Cu₂S/NC interlayer.



Fig. S3 Histograms of overpotential at various current densities.



Fig. S4 The S 2p high-resolution XPS spectrum of Cu_2S/NC interlayer after cycling.



Fig. S5 SEM image during the Li stripping/plating process of Cu_2S/NC interlayer.



Fig. S6 Equivalent circuits of Li||Li symmetric cells with PAN, Cu_2O/PAN and Cu_2S/NC interlayers before and after cycling.



Fig. S7 Enlarged voltage profiles of Li||Li symmetric cells with PAN, Cu₂O/PAN and

Cu₂S/NC interlayers at 0.5 mA cm⁻² and 0.5 mAh cm⁻².



Fig. S8 Enlarged voltage profiles of Li||Li symmetric cells with PAN, Cu₂O/PAN and

Cu₂S/NC interlayers at 1.0 mA cm⁻² and 1.0 mAh cm⁻².



Fig. S9 Equivalent circuits of Li||LFP full cells with PAN, Cu₂O/PAN and Cu₂S/NC interlayers after 100 cycles.



Fig. S10 Charge/discharge curves of $Li \| LFP$ full cells with (a) PAN and (b)

Cu₂O/PAN interlayers at different rates.



Fig. S11 Charge/discharge curves of Li||LFP full cells with (a) PAN, (b) Cu₂O/PAN

and (c) Cu_2S/NC interlayers at 1.0 C for different cycles.

Interlayers $R_e(\Omega, before) R_{ct}(\Omega, before) R_e(\Omega, after) R_{ct}(\Omega, after)$ 60.9 PAN 287.4 52.6 288.4 Cu₂O/PAN 54.8 208.0 42.1 183.8 Cu₂S/NC 35.1 136.3 34.7 133.2

Table S1 R_e and R_{ct} variation of Li||Li symmetric cells with PAN, Cu₂O/PAN and Cu₂S/NC interlayers before and after cycling.

 R_0 represents the internal ohmic impedance, R_e is electron transfer impedance, R_{ct} denotes the interface charge transfer impedance, CPE1 and CPE2 are the constant phase element. Z_w is the Warburg impedance.

Table S2 R_e and R_{ct} variation of Li||LFP full cells with PAN, Cu₂O/PAN and Cu₂S/NC interlayers after 100 cycles.

Interlayers	$R_e(\Omega)$	$R_{ct}(\Omega)$
PAN	39.2	213.6
Cu ₂ O/PAN	34.7	133.2
Cu ₂ S/NC	12.1	37.8