

Supplementary Information

Co/Li₂S of chemical confinement decorated electrochemically stable Co(OH)F nanoarrays enabling dendrite-free flexible 3D Li anodes

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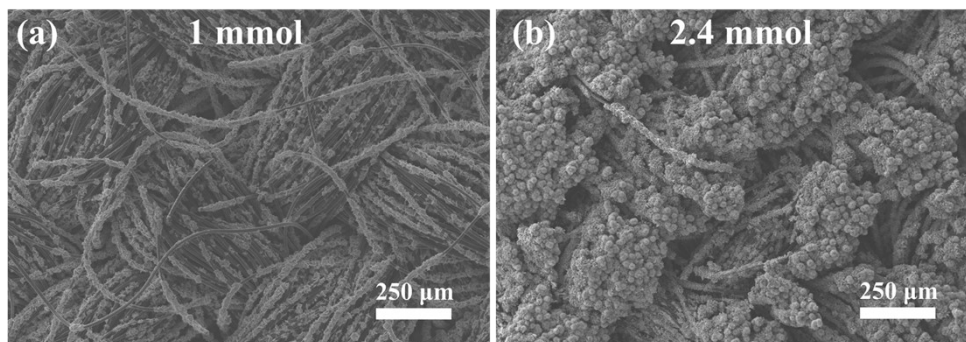


Fig. S1. SEM images of Co(OH)F precursor synthesized by (a) 1 mmol and (b) 2.4 mmol Co(NO₃)₂•6H₂O.

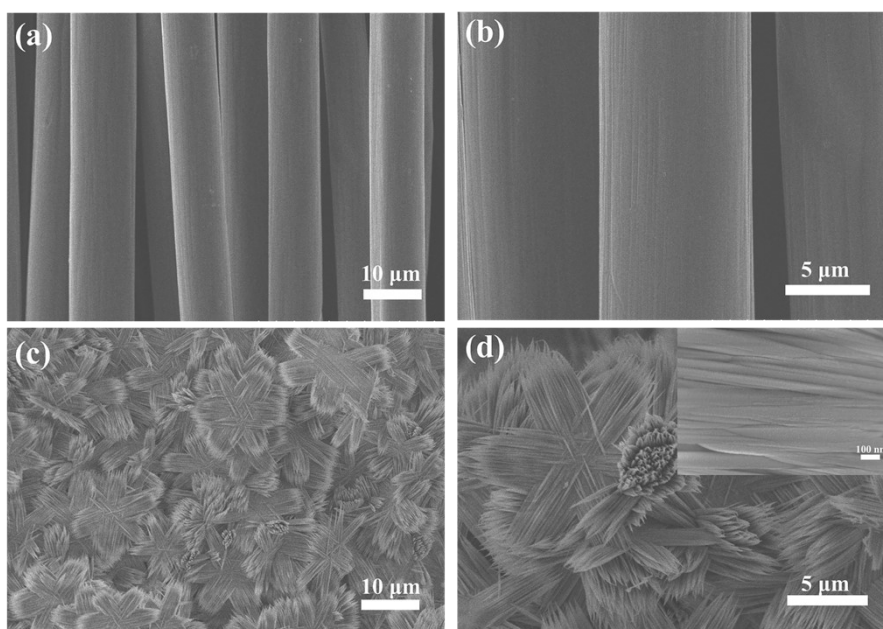


Fig. S2. SEM images of (a, b) pure CC and (c, d) Co(OH)F precursor at different magnifications.

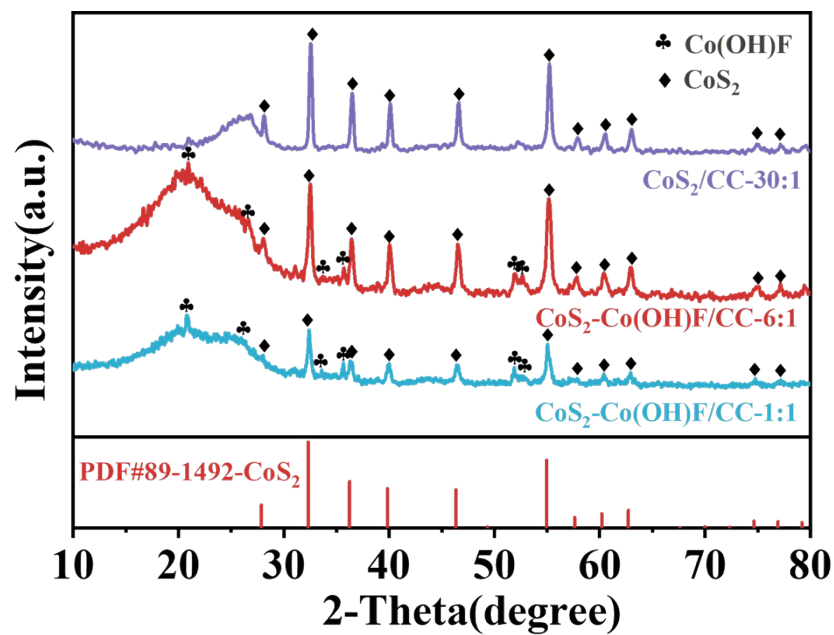


Fig. S3. XRD pattern of the $\text{CoS}_2\text{-Co(OH)F-1:1}$, $\text{CoS}_2\text{-Co(OH)F-6:1}$ and $\text{CoS}_2\text{/CC-30:1}$.

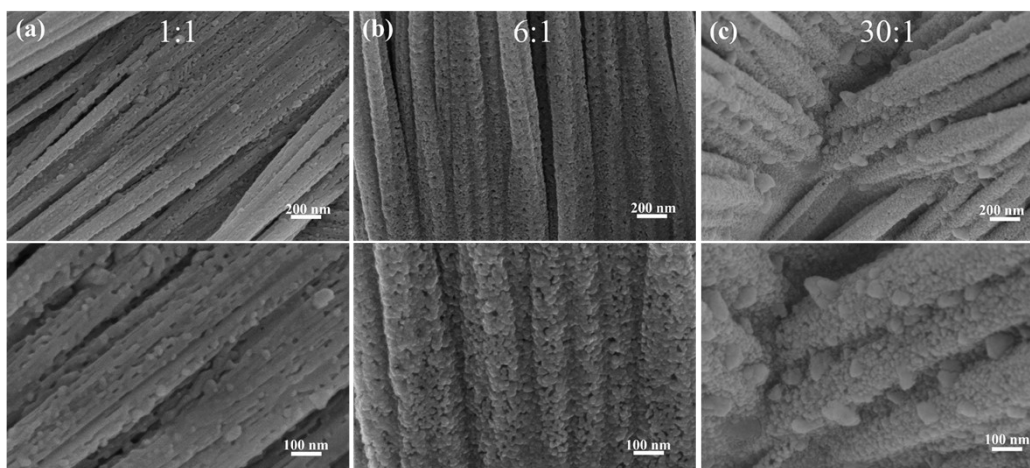


Fig. S4. SEM images of (a) $\text{CoS}_2\text{-Co(OH)F/CC-1:1}$, (b) $\text{CoS}_2\text{-Co(OH)F/CC-6:1}$ and (c) $\text{CoS}_2\text{/CC-30:1}$ at different magnifications.

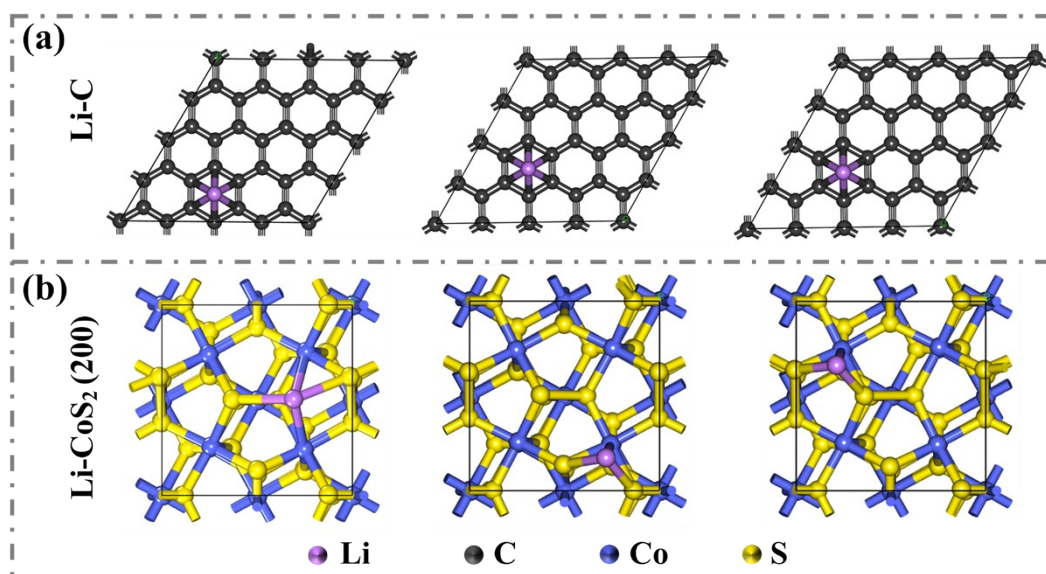


Fig. S5. The top views of three Li adsorption sites on (a) C layer and (b) CoS₂(200).

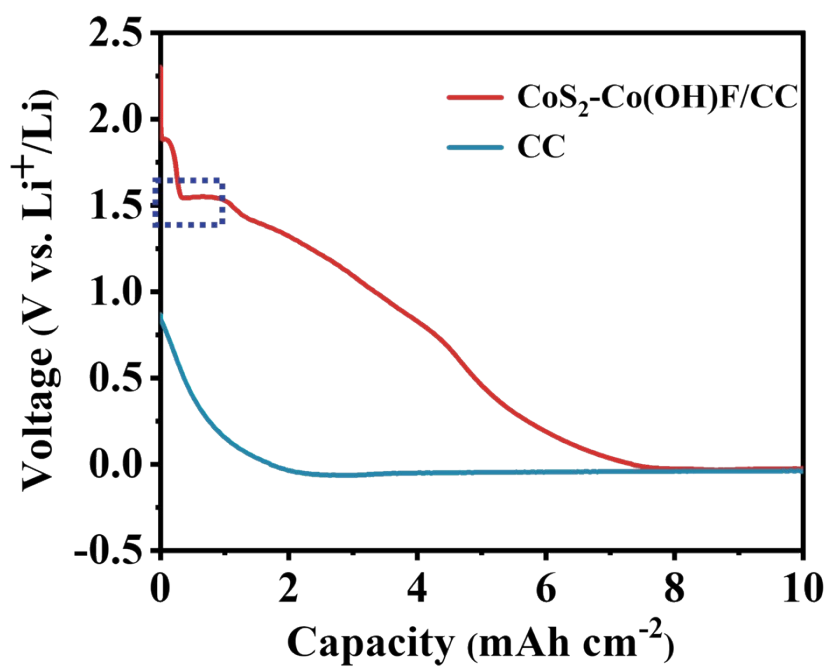


Fig. S6. Initial discharge profiles of CoS₂-Co(OH)F/CC and CC.

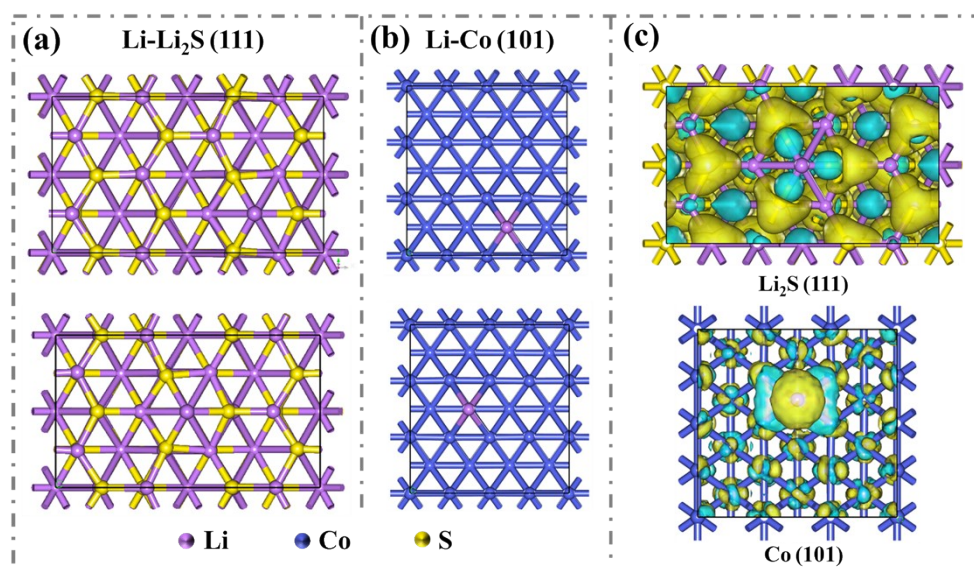


Fig. S7. The top views of Li adsorption sites on (a) Li_2S (111) and (b) Co (101). (c) The top views of charge density differences for Li on the surfaces of Li_2S (111) and Co (101).

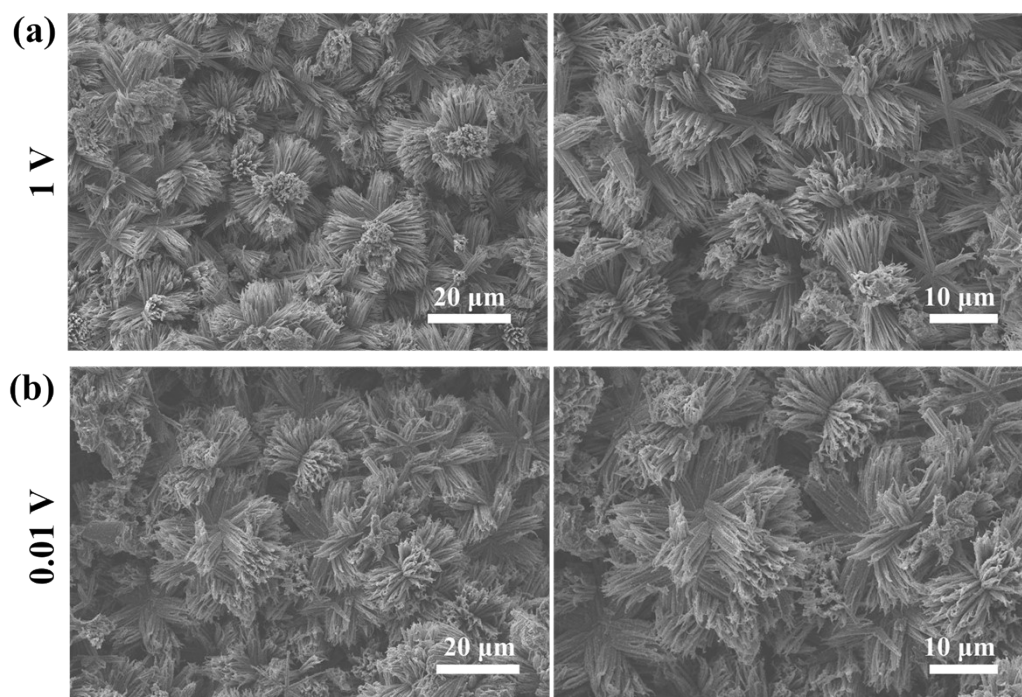


Fig. S8. SEM images of $\text{CoS}_2\text{-Co(OH)F/CC}$ galvanostatic discharge to (a) 1 V and (b) 0.01 V.

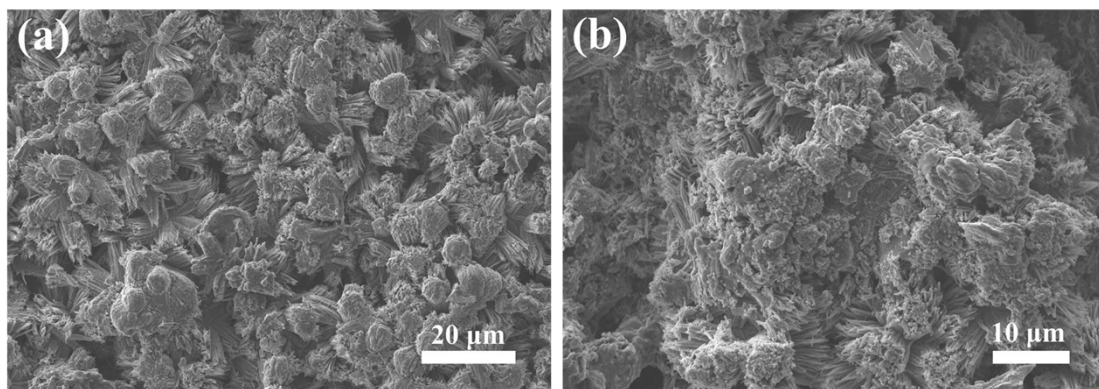


Fig. S9. SEM images of CoS₂/CC-30:1 galvanostatic discharge to 0.01 V.

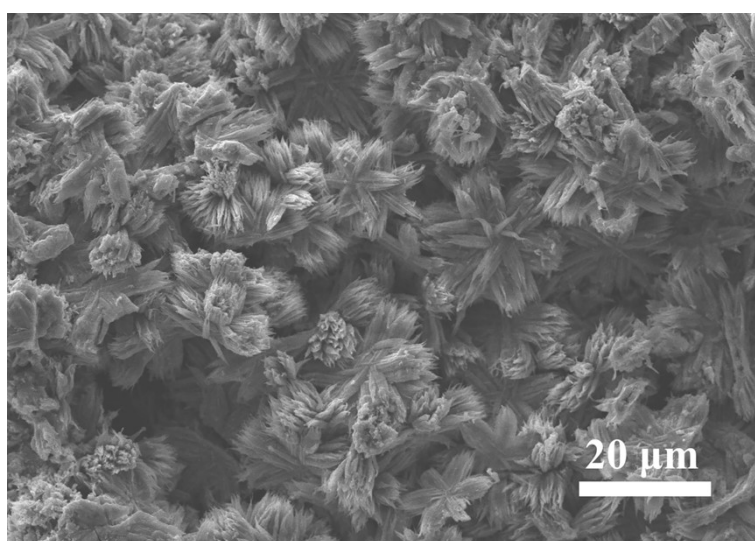


Fig. S10. SEM image of CoS₂-Co(OH)F/CC framework for 2 mAh cm⁻².

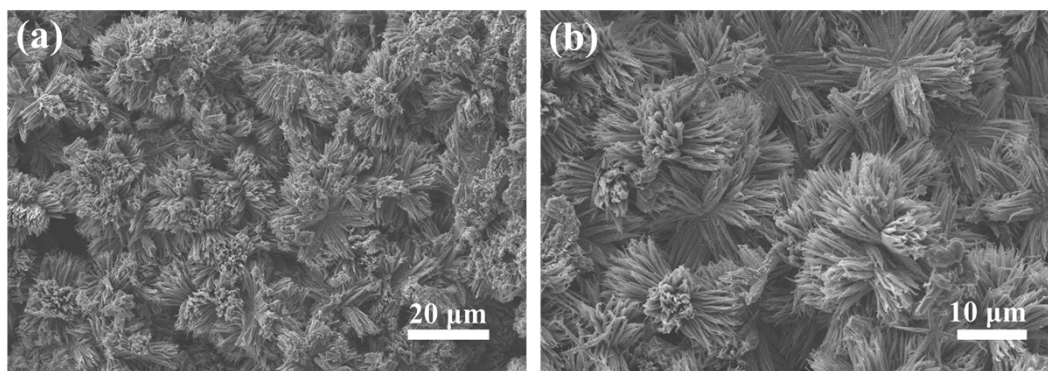


Fig. S11. (a,b) SEM images after $\text{CoS}_2\text{-Co(OH)F/CC}$ framework plating/stripping 50 cycles at different magnification.

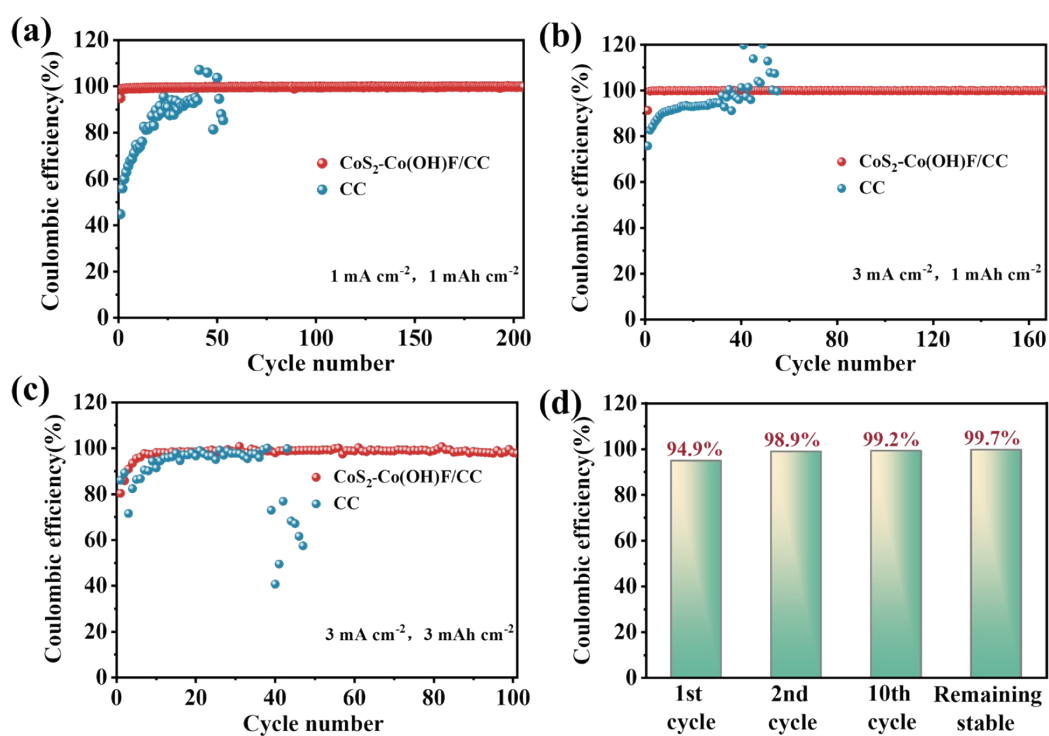


Fig. S12. CEs of Li plating on CC and $\text{CoS}_2\text{-Co(OH)F/CC}$: (a) 1 mA cm^{-2} with a capacity of 1 mAh cm^{-2} (b) 3 mA cm^{-2} with a capacity of 1 mAh cm^{-2} and (c) 3 mA cm^{-2} with a capacity of 3 mAh cm^{-2} . (d) CE values of $\text{CoS}_2\text{-Co(OH)F/CC}$ for different cycles (1 mA cm^{-2} , 1 mAh cm^{-2}).

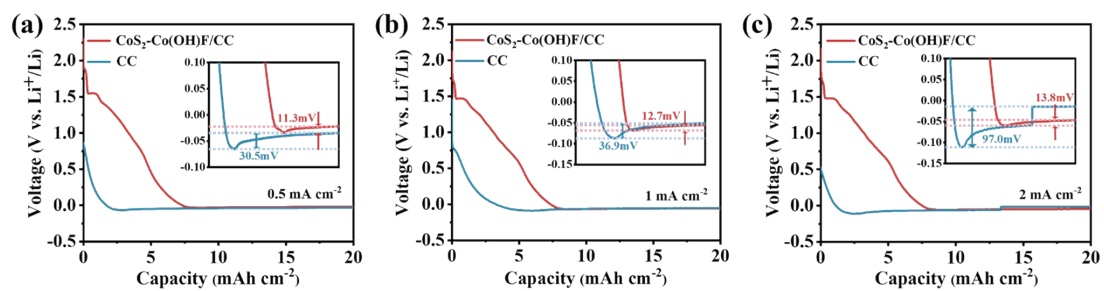


Fig. S13. Voltage profiles for Li nucleation on the CC and $\text{CoS}_2\text{-Co(OH)F/CC}$ electrodes at current densities of (a) 0.5 mA cm^{-2} , (b) 1 mA cm^{-2} and (c) 2 mA cm^{-2} .



Fig. S14. Digital image of $\text{CoS}_2\text{-Co(OH)F/CC}$ framework for 10 mAh cm^{-2} of Li.

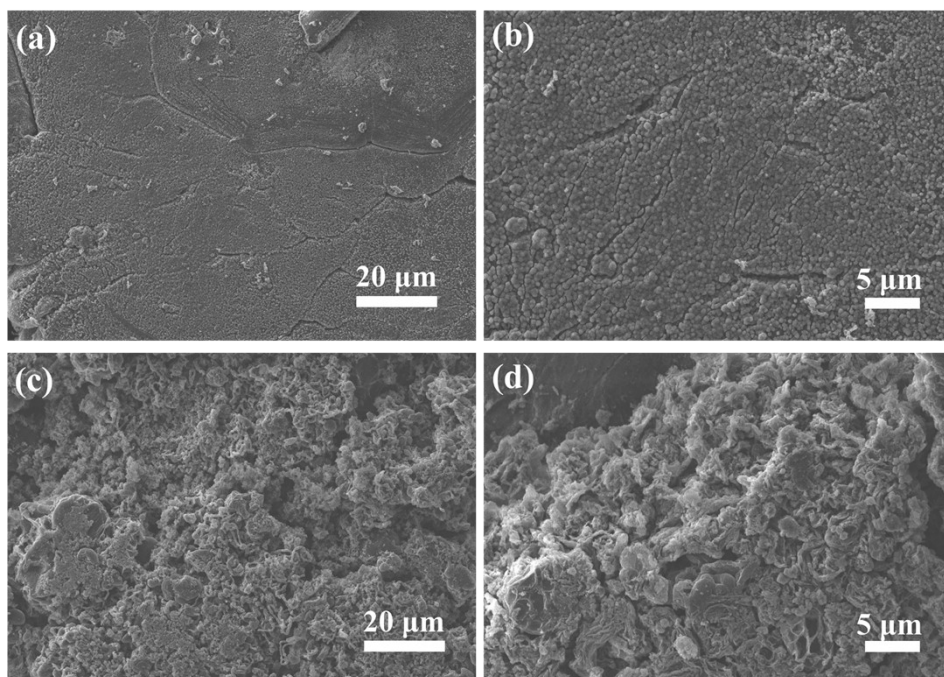


Fig. S15. The SEM images of the the corresponding anode for (a, b) LFP//Li@CoS₂-Co(OH)F/CC and (c, d) LFP//Li full cells after 300 cycles at 1C.