

Supporting Information

Dense Cuprous Oxide Sheath Decorated Three-dimensional Copper Foam Enabling Stable Lithium Metal Anodes

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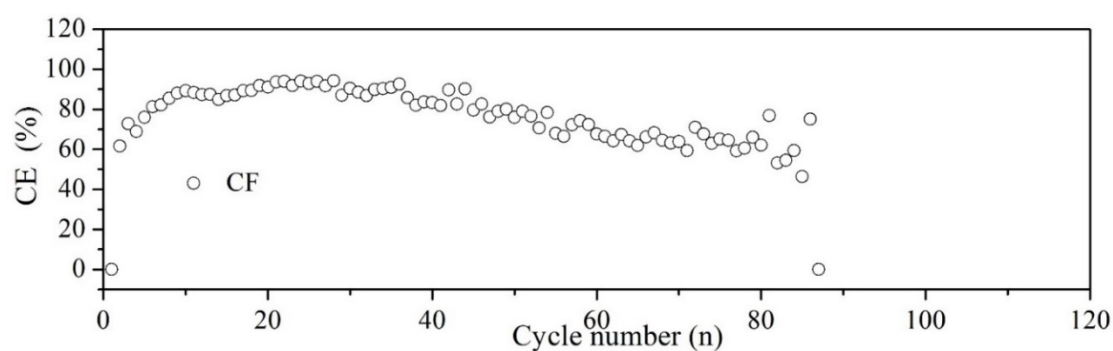


Figure S1. CE curves of the CF electrode at the current of 1 mA/cm² with the capacity of 1 mAh/cm².

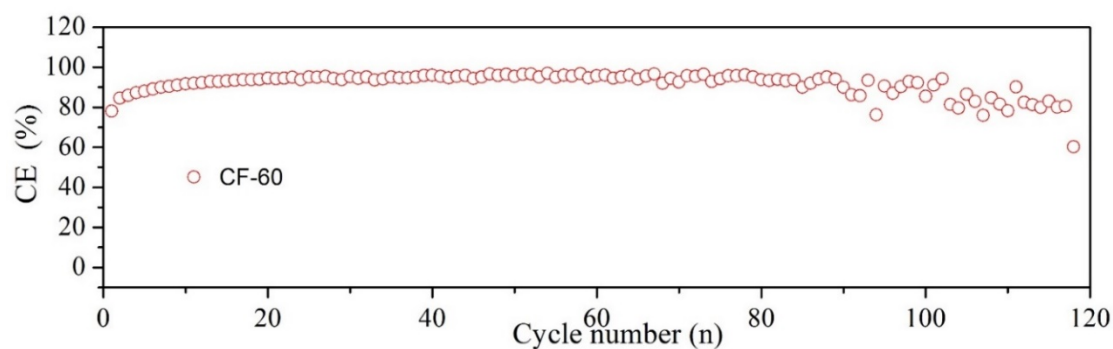


Figure S2. CE curves of the CF-60 electrode at the current of 1 mA/cm² with the capacity of 1 mAh/cm².

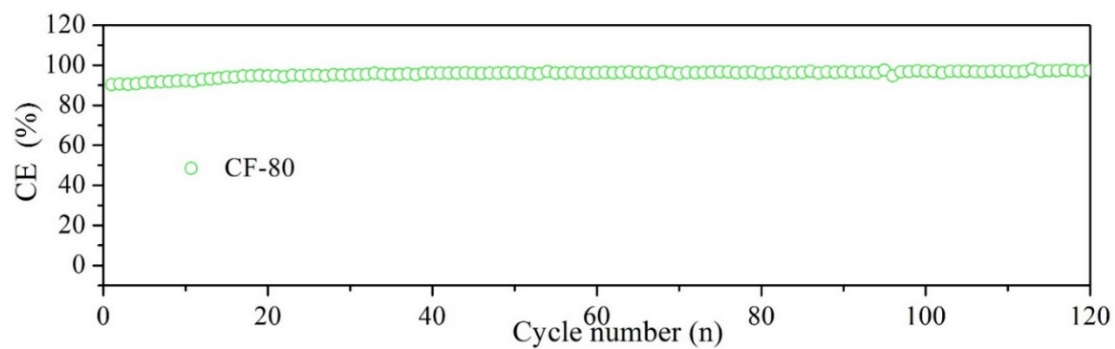


Figure S3. CE curves of the CF-80 electrode at the current of 1 mA/cm² with the capacity of 1 mAh/cm².

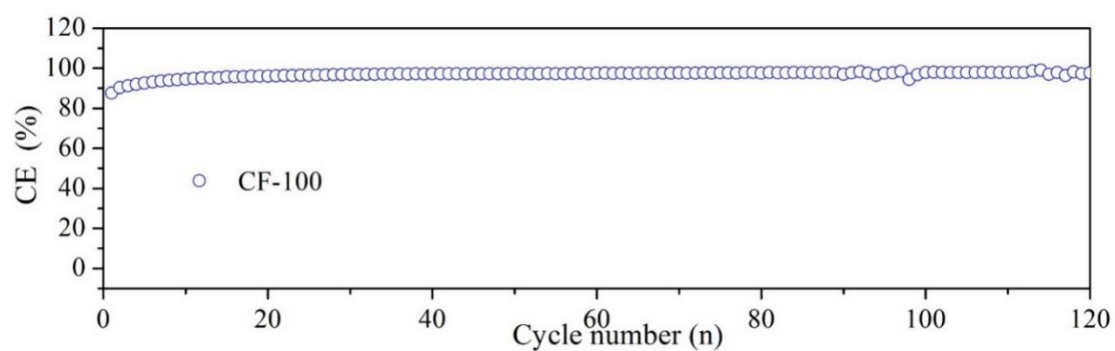


Figure S4. CE curves of the CF-100 electrode at the current of 1 mA/cm² with the capacity of 1 mAh/cm².

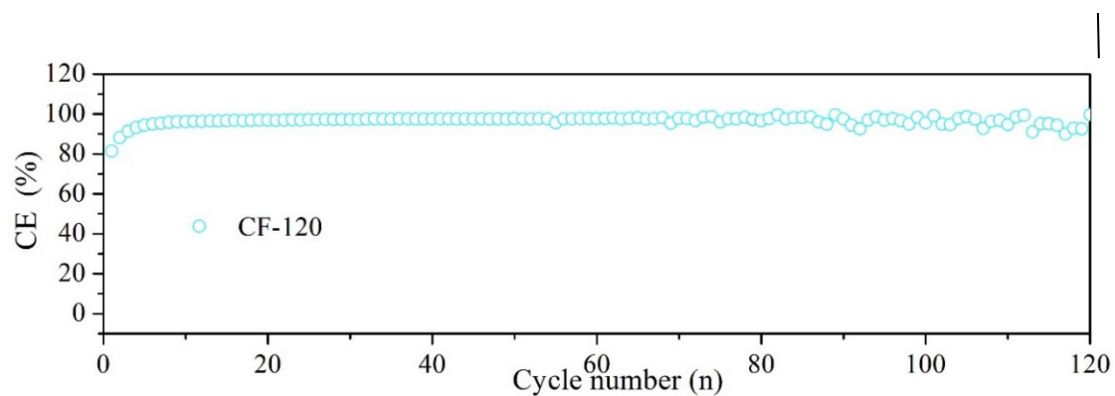


Figure S5. CE curves of the CF-120 electrode at the current of 1 mA/cm² with the capacity of 1 mAh/cm².

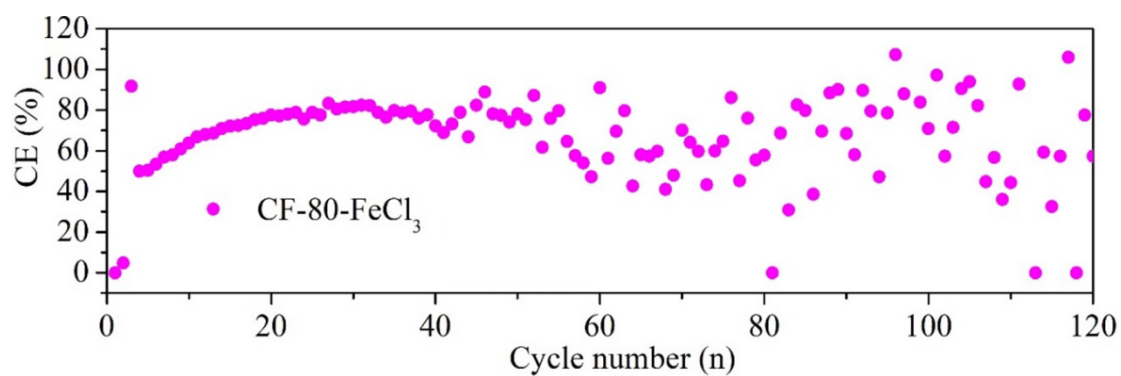


Figure S6. CE curves of the CF-80-FeCl₃ electrode at the current of 1 mA/cm² with the capacity of 1 mAh/cm².

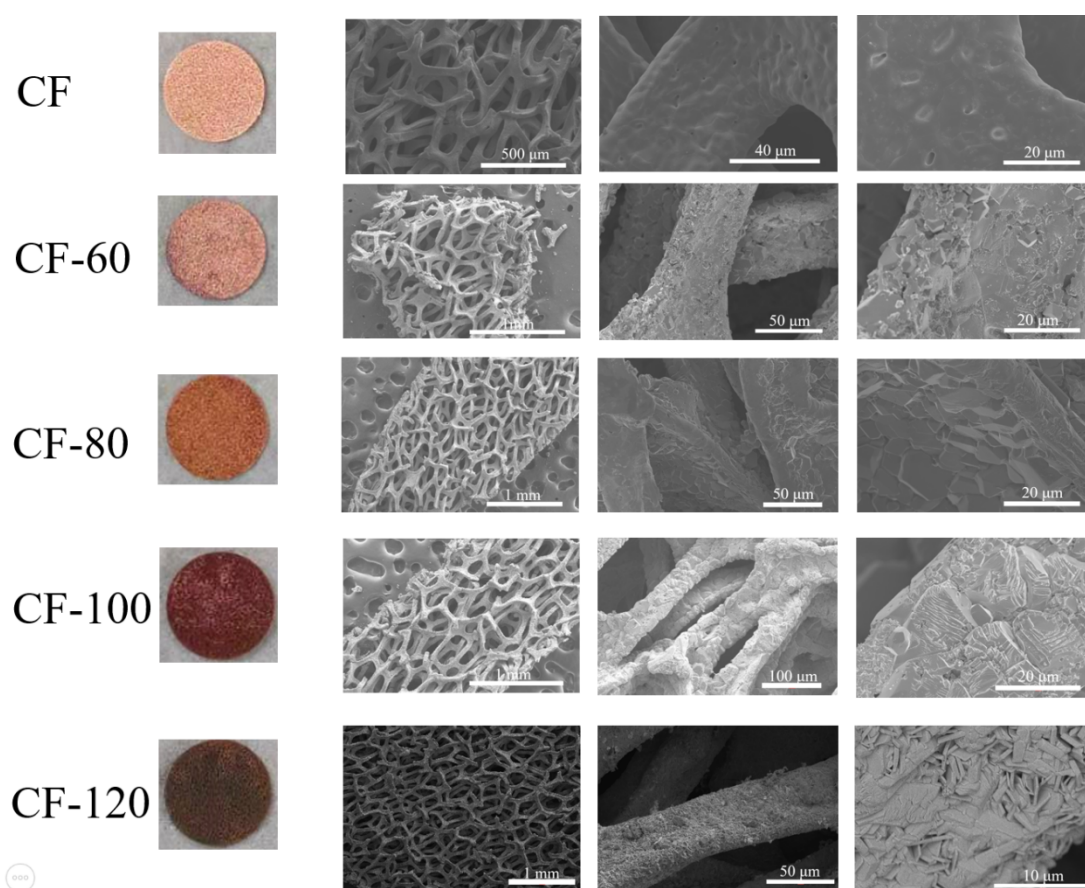


Figure S7. Optical photos and the corresponding SEM images of CF, CF-60, CF-80, CF-100 and CF-120.

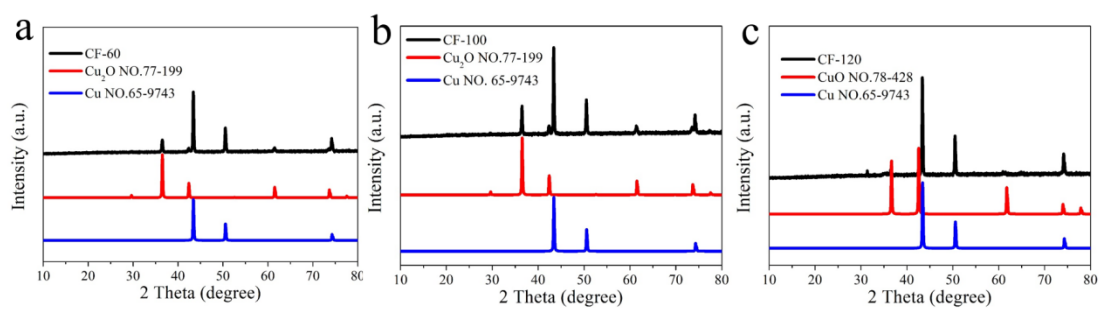


Figure S8. The PXRD patterns of **a)** CF-60, **b)** CF-100 and **c)** CF-120.

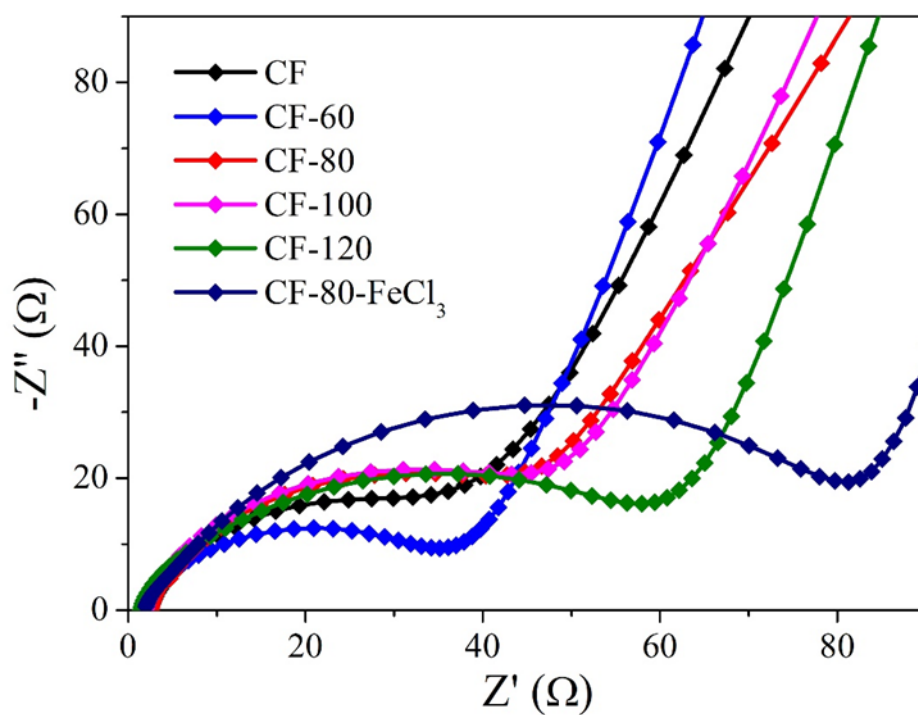


Figure S9. EIS of CF, CF-60, CF-80, CF-100, CF-120 and CF-80-FeCl₃ electrodes before cycling.

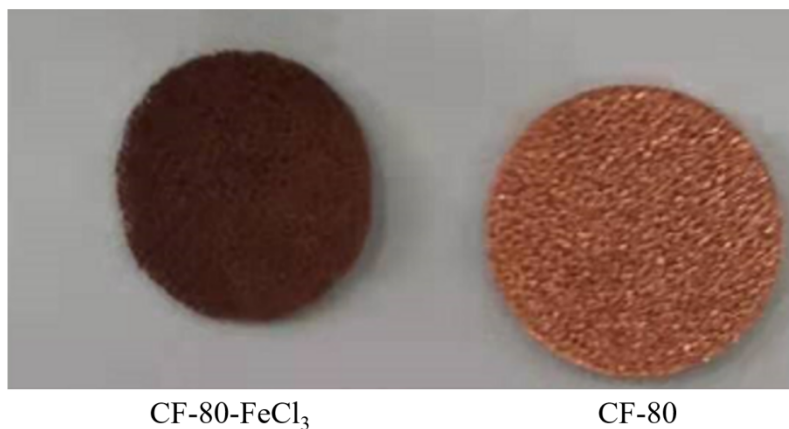


Figure S10. Optical photos of CF-80-FeCl₃ and CF-80 electrodes.

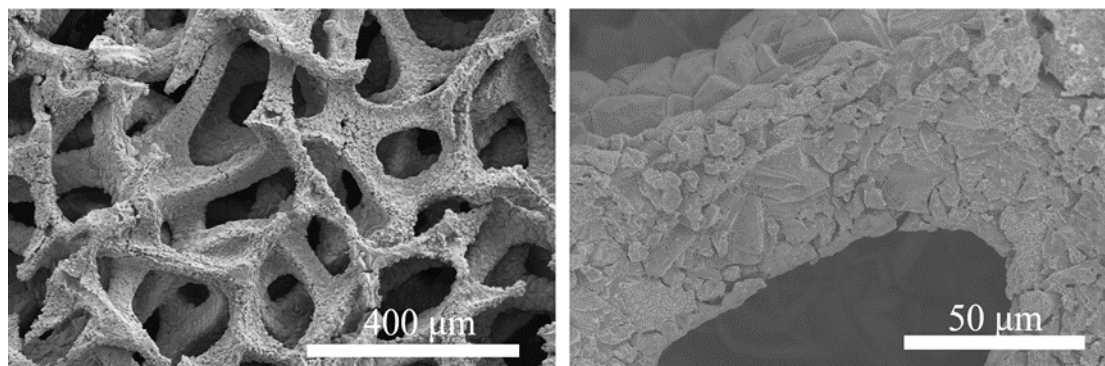


Figure S11. SEM images of CF-80-FeCl₃ electrodes with different resolutions.

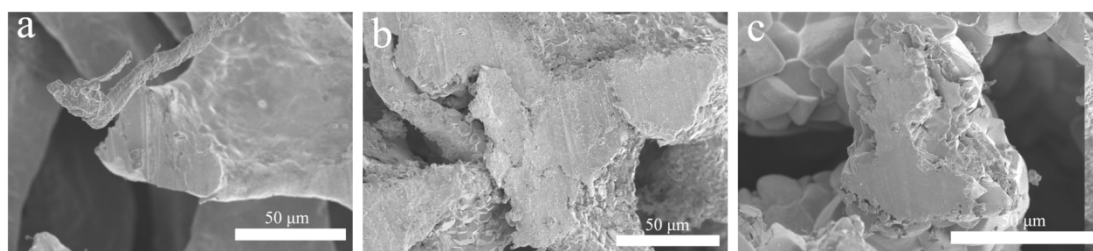


Figure S12. Cross section SEM images of **a)** CF, **b)** CF-80 and **c)** CF-80-FeCl₃ electrodes.

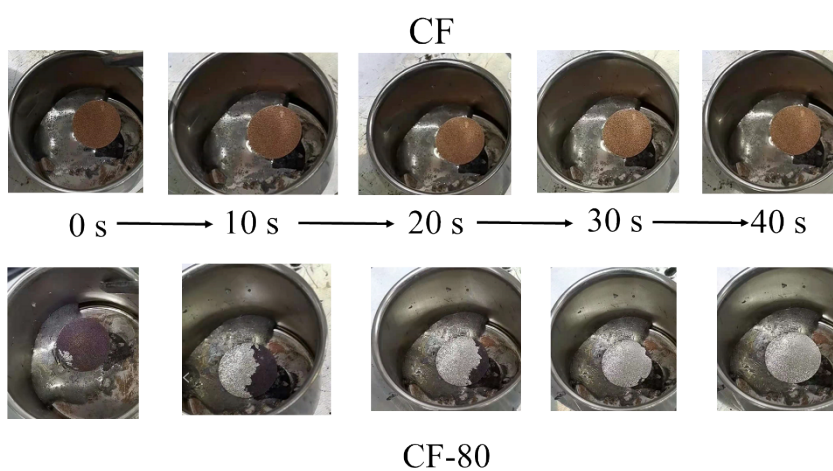


Figure S13. Comparison of the wettability of CF and CF-80 to molten lithium.

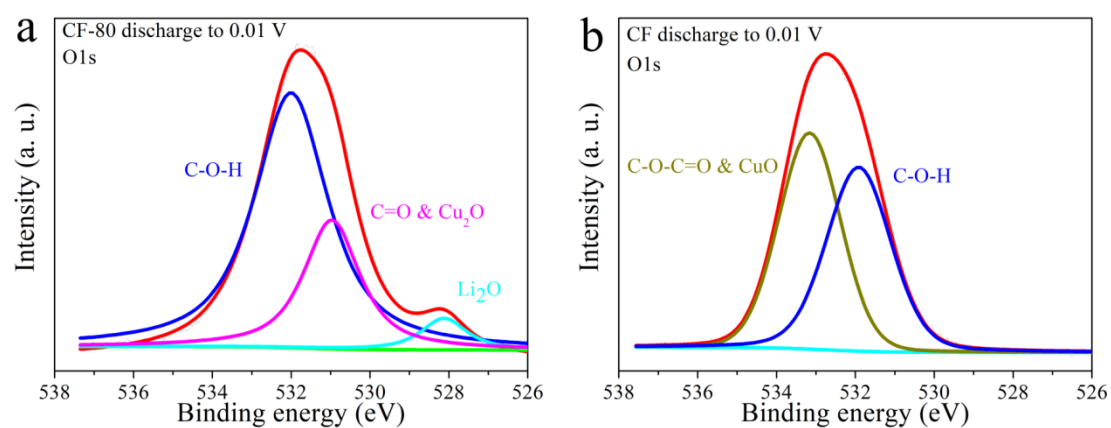


Figure S14. XPS spectra of O1s spectra when the **a)** CF-80 electrodes and **b)** CF electrodes were discharged to 0.01 V.

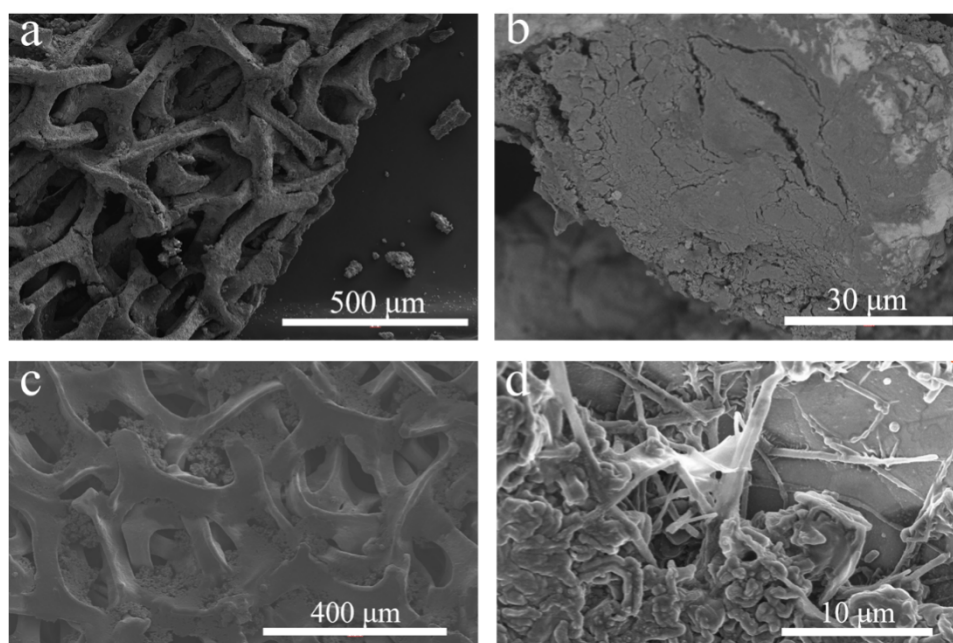


Figure S15. SEM images of **a, b)** CF-80 and **c, d)** CF electrodes after plated with the capacity of 1 mAh/cm² at 1 mA/cm².

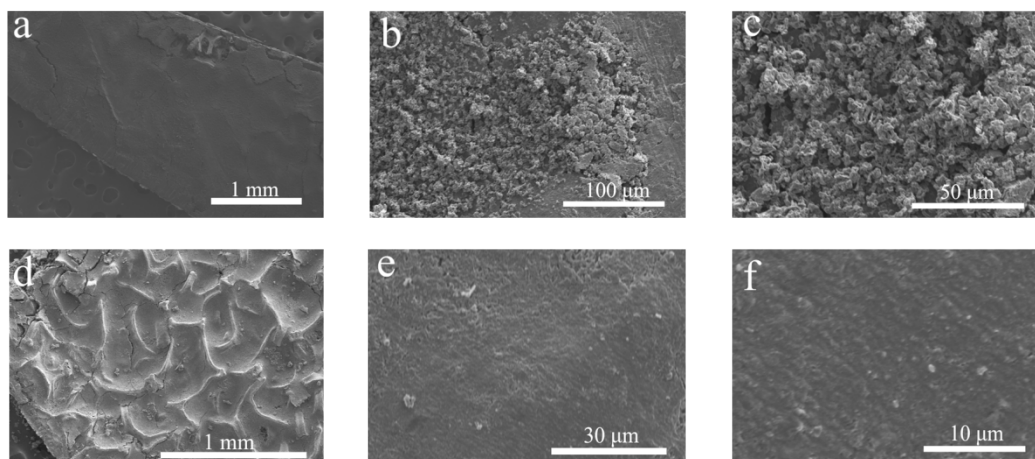


Figure S16. SEM images of **a-c)** CF electrodes, and **d-f)** CF-80 electrodes after 20 cycles at $1\text{mA}/\text{cm}^2$ with a deposition capacity of $4\text{mAh}/\text{cm}^2$.

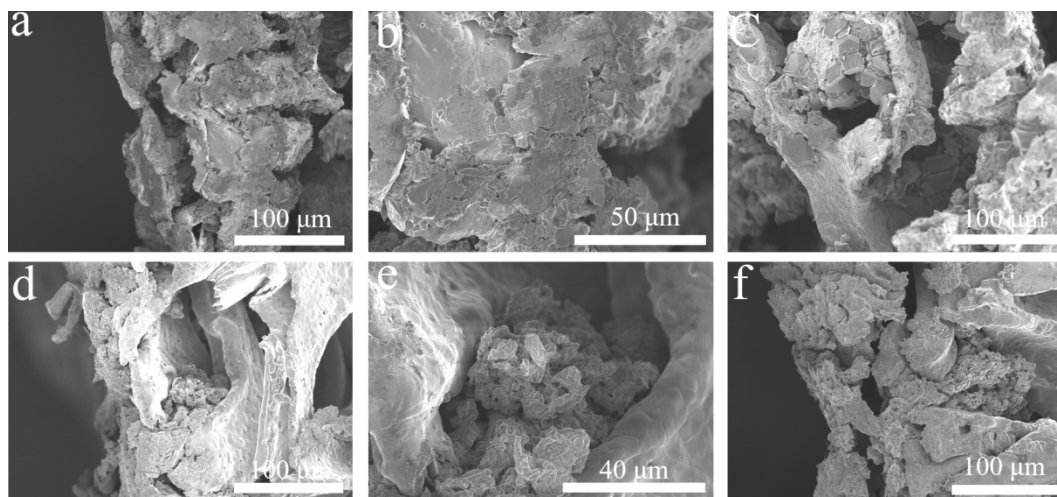


Figure S17. The SEM images of cross section views for CF-80 electrodes **a,b)** at $1\text{mA}/\text{cm}^2$ with a deposition capacity of $4\text{mAh}/\text{cm}^2$; **c)** lithium metal completely stripped of CF-80; **d)** and **e)** cross section view SEM images of CF at $1\text{mA}/\text{cm}^2$ with a deposition capacity of $4\text{mAh}/\text{cm}^2$; **f)** lithium metal completely stripped of CF.

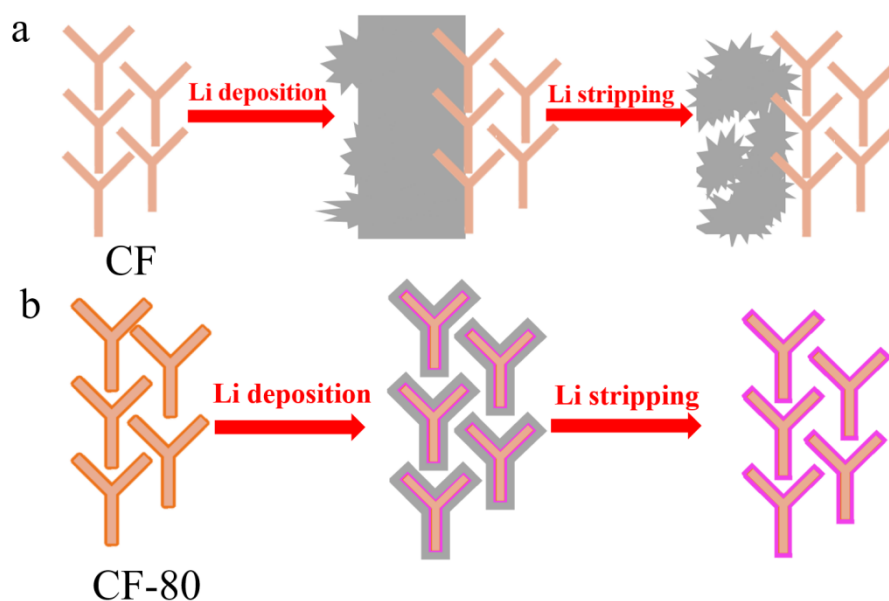


Figure S18. Schematic diagram of lithium deposition and stripping across CF and CF-80 electrode sections.

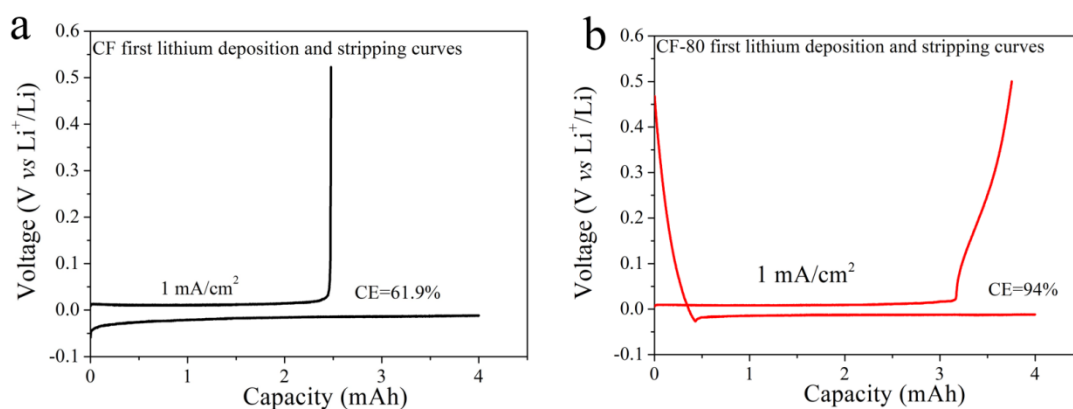


Figure S19. a) The first cycle lithium deposition and stripping curves of CF electrode at 1 mA/cm² for 4 mAh/cm²; **b)** the first cycle lithium deposition and stripping curves of CF-80 electrode at 1 mA/cm² for 4 mAh/cm².