



Supporting Information

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Superlithiophilic Amorphous SiO₂–TiO₂ Distributed into Porous Carbon Skeleton Enabling Uniform Lithium Deposition for Stable Lithium Metal Batteries

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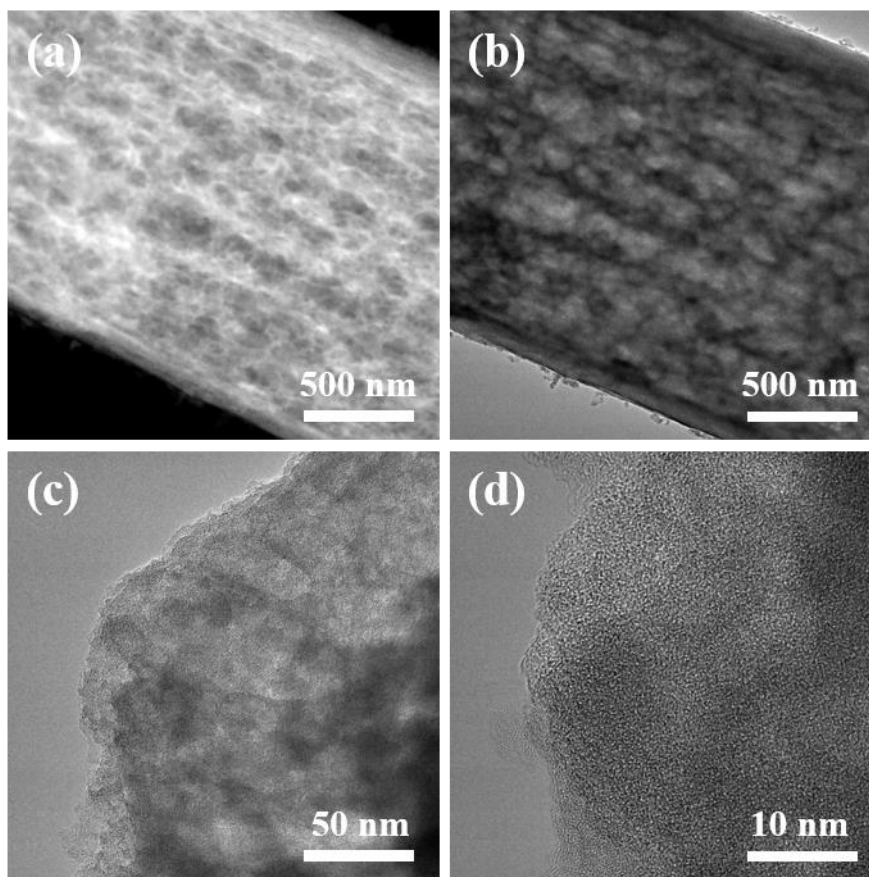


Figure S1. TEM (a,b) and HRTEM (c,d) images of the PCSF.

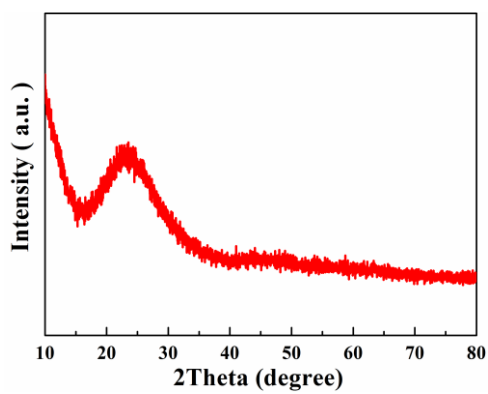


Figure S2. XRD patterns of the PCSF heat-treated at 700 °C.

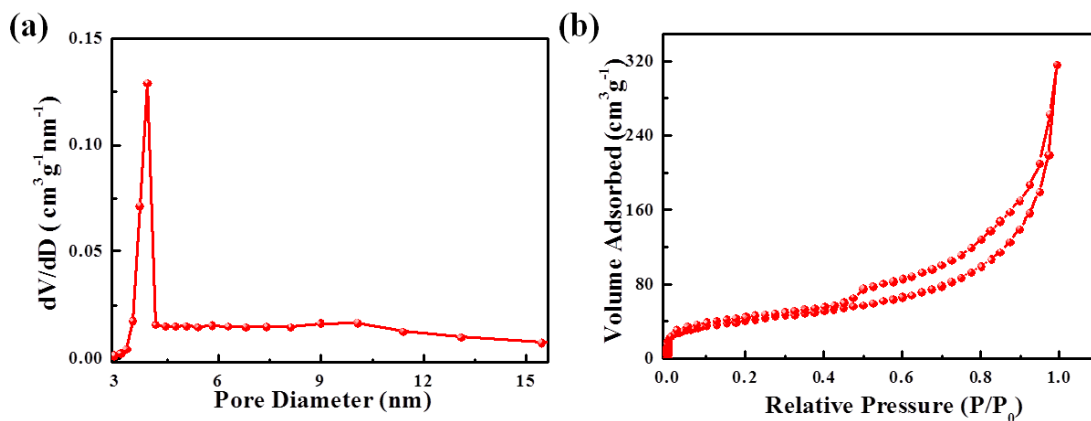


Figure S3. (a) Pore size distribution curves and (b) nitrogen adsorption-desorption isotherms of the PCSF.

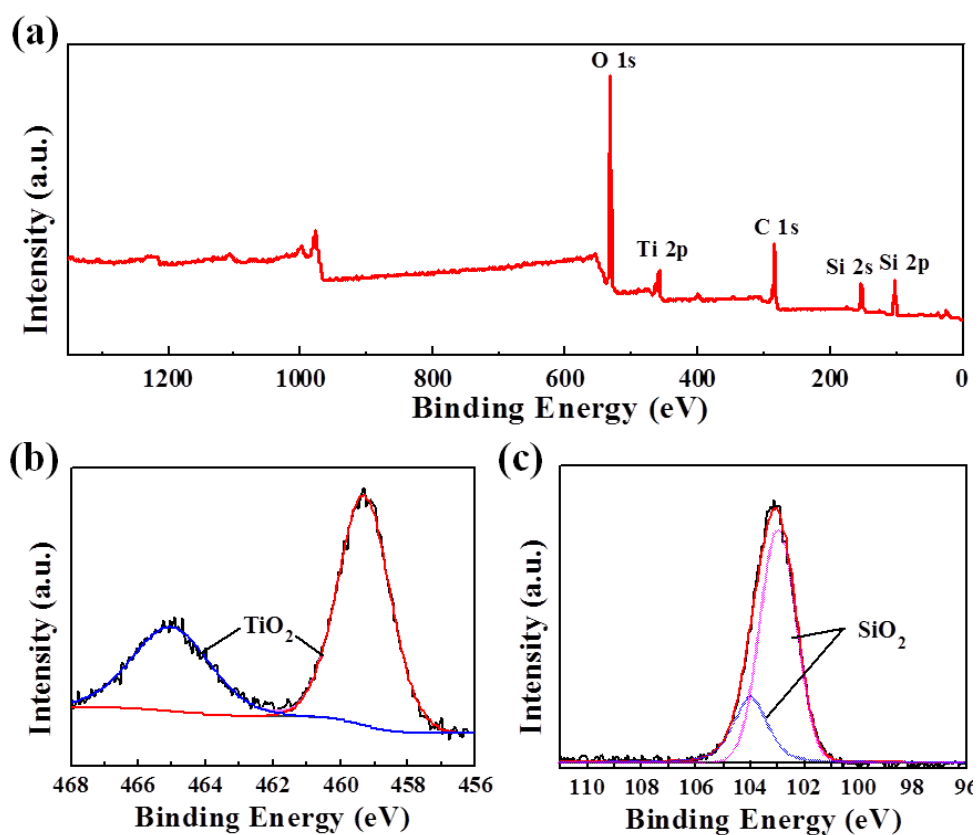


Figure S4. (a) XPS characterization of the PCSF composite, (b) core-level spectra of Ti 2p peaks, (c) core-level spectra of Si 2p peaks.

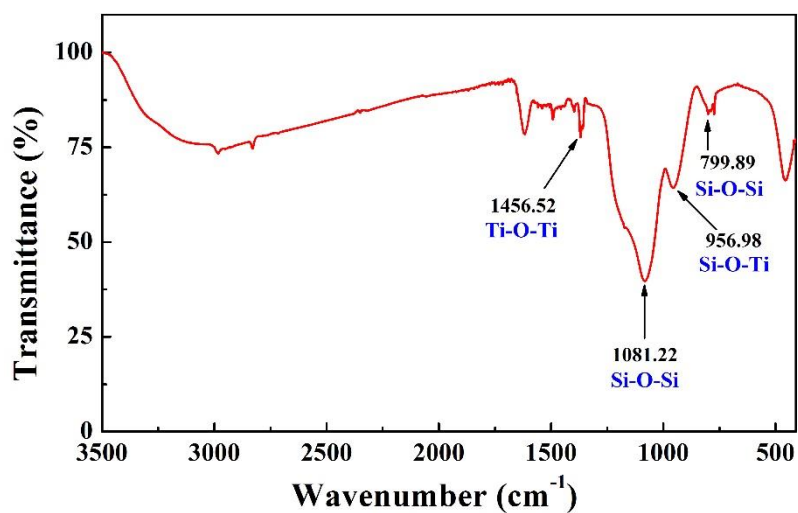


Figure S5. FTIR spectrum of PCSF composite.

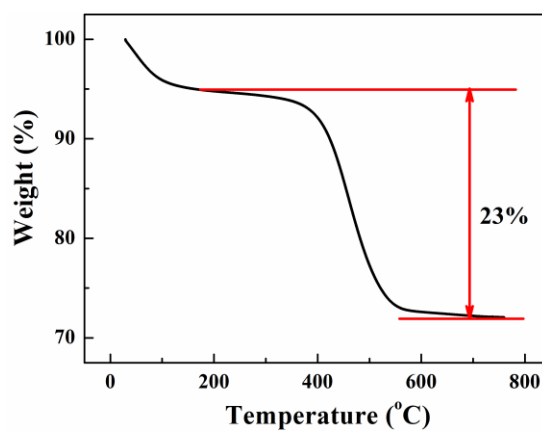


Figure S6. Thermogravimetric analysis (TGA) of the PCSF from room temperature to 750 $^{\circ}\text{C}$ at a heating rate of 10 $^{\circ}\text{C min}^{-1}$ under air atmosphere.

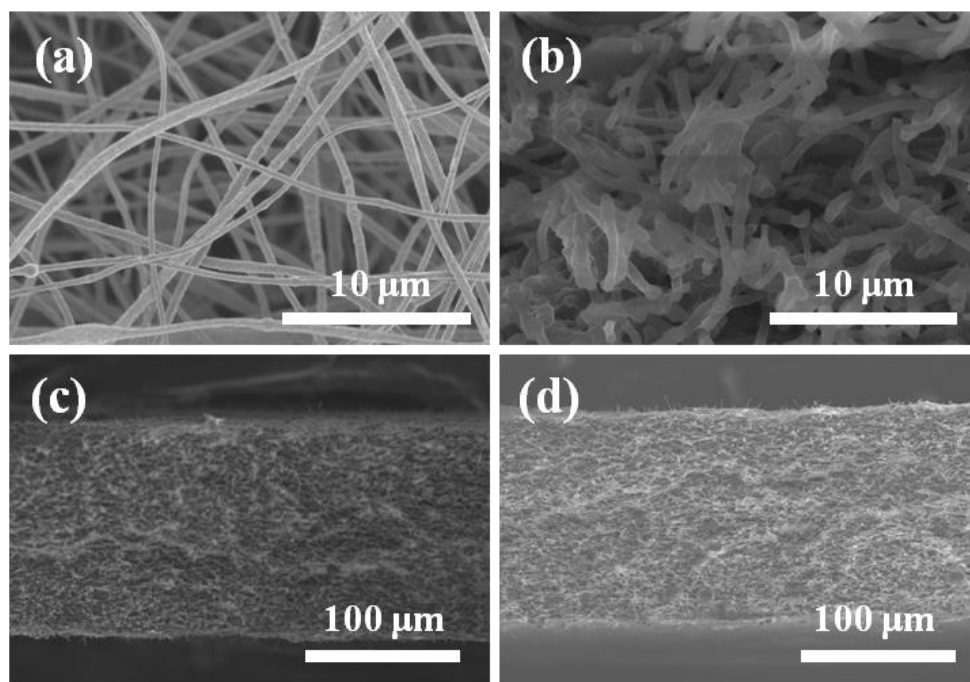


Figure S7. The SEM images of the CF (a, c) before depositing lithium metal and (b, d) after electrodeposition with high area capacity of 8 mAh cm^{-2} lithium metal.

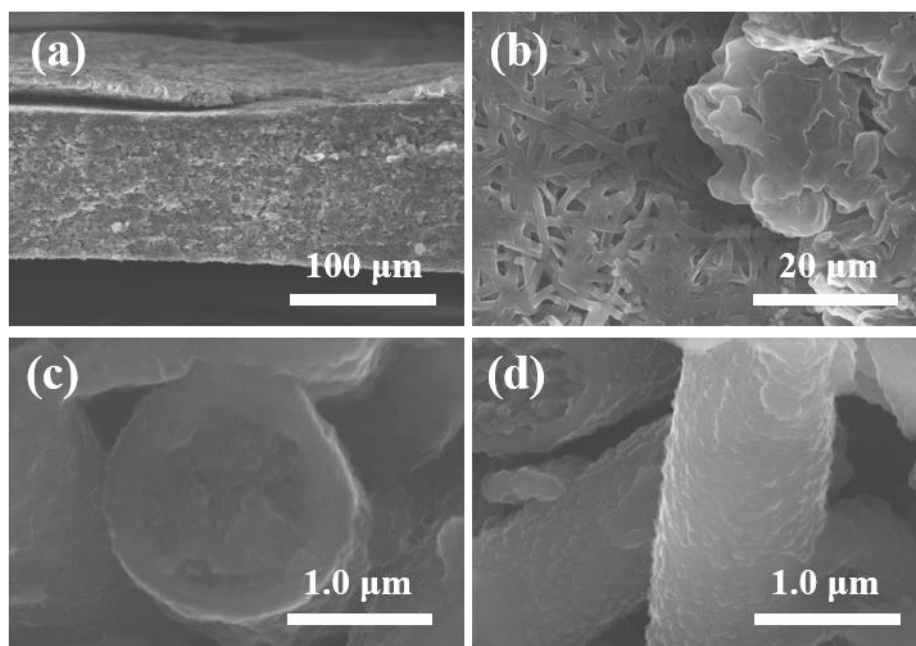


Figure S8. (a, c, d) Cross-sectional SEM images of PCSF host after Li plating of 9 mAh cm^{-2} , (b) Top-view SEM images of PCSF after Li plating of 9 mAh cm^{-2} .

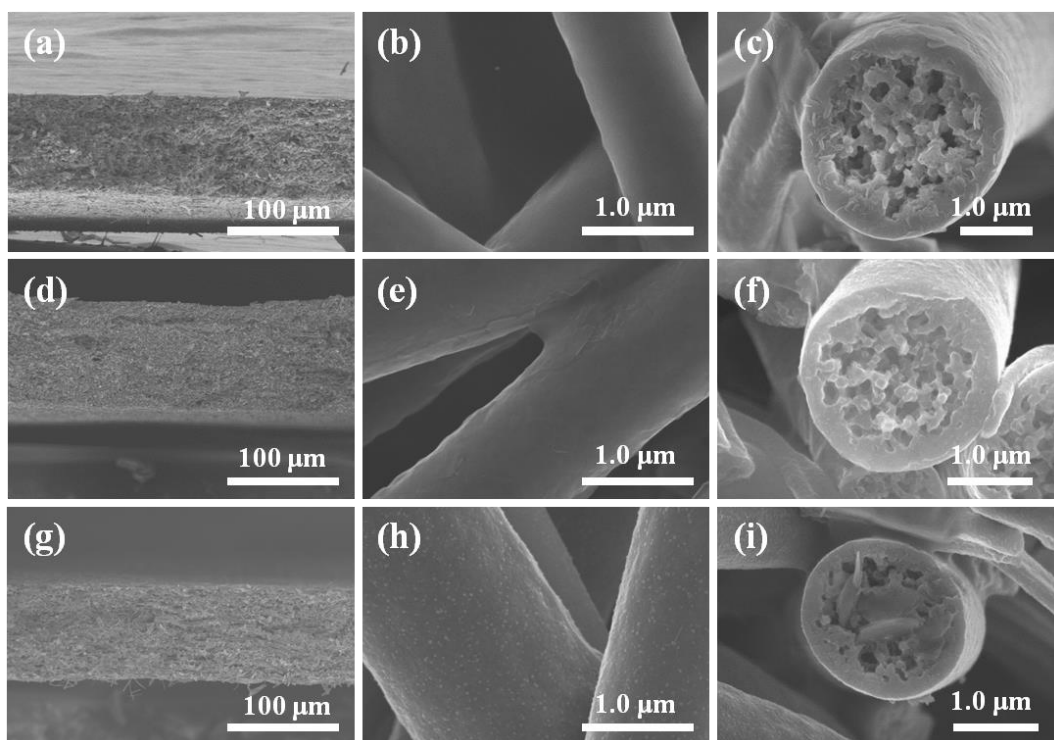


Figure S9. Cross-sectional SEM images of the PCSF host after plating 3 mAh cm^{-2} under the different current densities (a-c) 2 mA cm^{-2} , (d-f) 5 mA cm^{-2} , (g-i) 10 mA cm^{-2} .

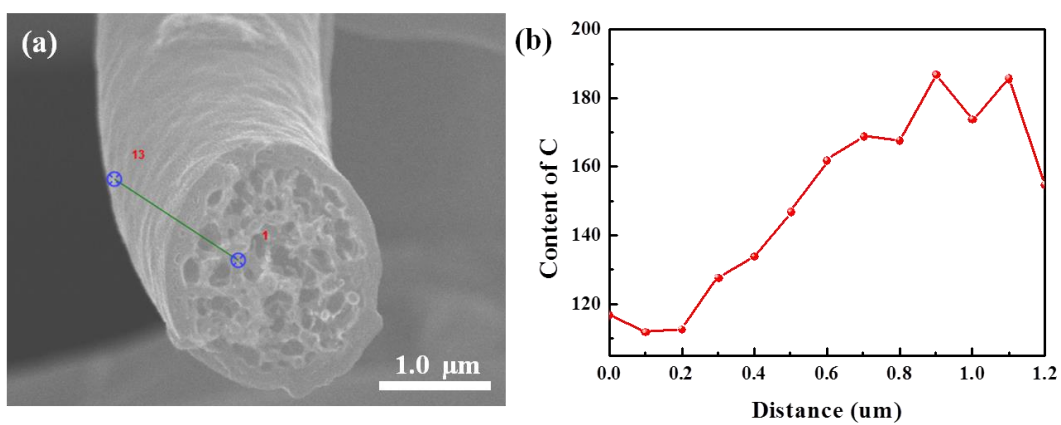


Figure S10 EDX spectrum profile scanning data for the carbon atom of the PCSF.

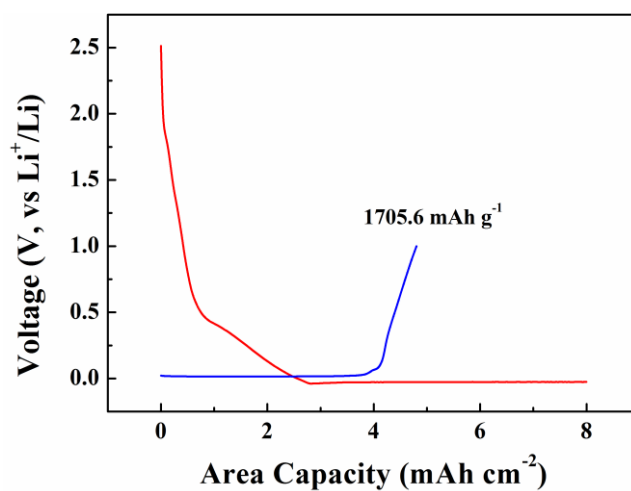


Figure S11. Voltage profile of initial plating 8 mAh cm⁻² and then stripping Li from the Li@PCSF to 1.0 V (vs. Li⁺/Li).

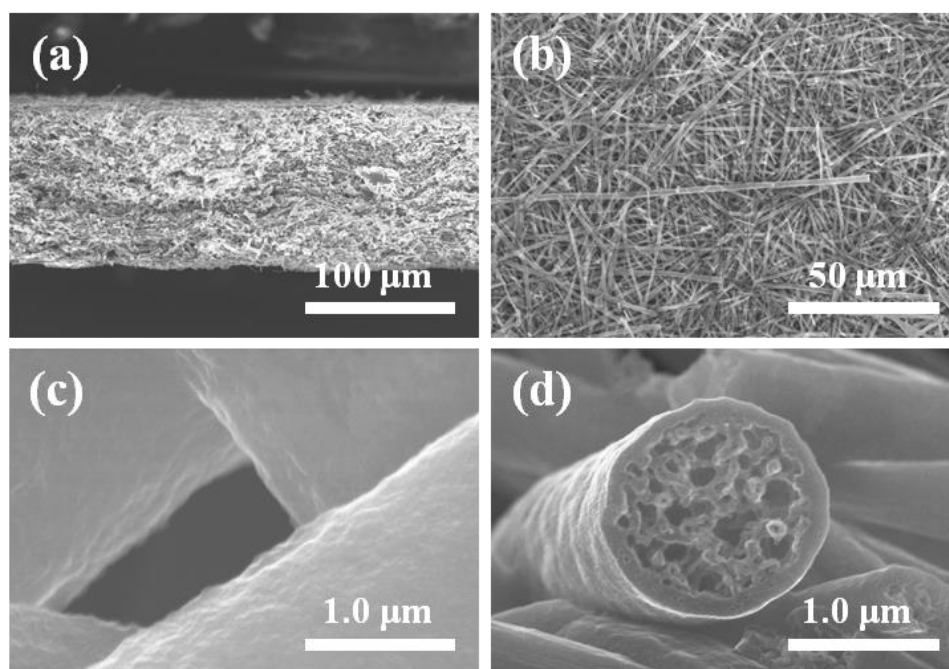
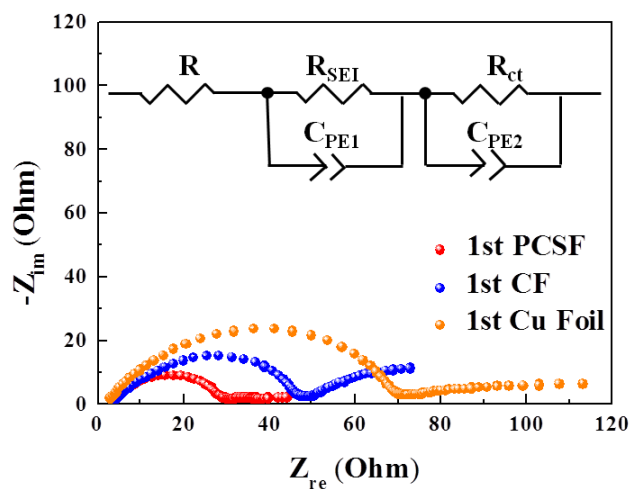


Figure S12. (a, c, d) Cross-sectional SEM images and (b) Top-view SEM images for the surface morphology of PCSF after plating at 0.5 mA cm⁻² and then stripping at the current density of 0.2 mA cm⁻².



Fitting results

		PCSF	CF	Cu Foil
1st cycle	R_{SEI} (ohm)	26.14	46.01	70.04
	R_{ct} (ohm)	13.89	40.10	25.20

Figure S13. Impedance performance of Li@PCSF, Li@Cu and Li@CF composite anodes after 1 cycle of Li plating/stripping at 1 mAh cm^{-2} at the current density of 2 mA cm^{-2} .

Table S1 Quantitative analysis of elements C, O, Si and Ti in PCSF composite fiber.

Element	Mass%	Atom%
C	26.6	39.11
O	35.2	38.74
Si	31.2	19.56
Ti	7.0	2.58