

Supporting Information

Deformable fibrous carbon supported ultrafine nano-SnO₂ as a high volumetric capacity and cyclic durable anode for Li storage

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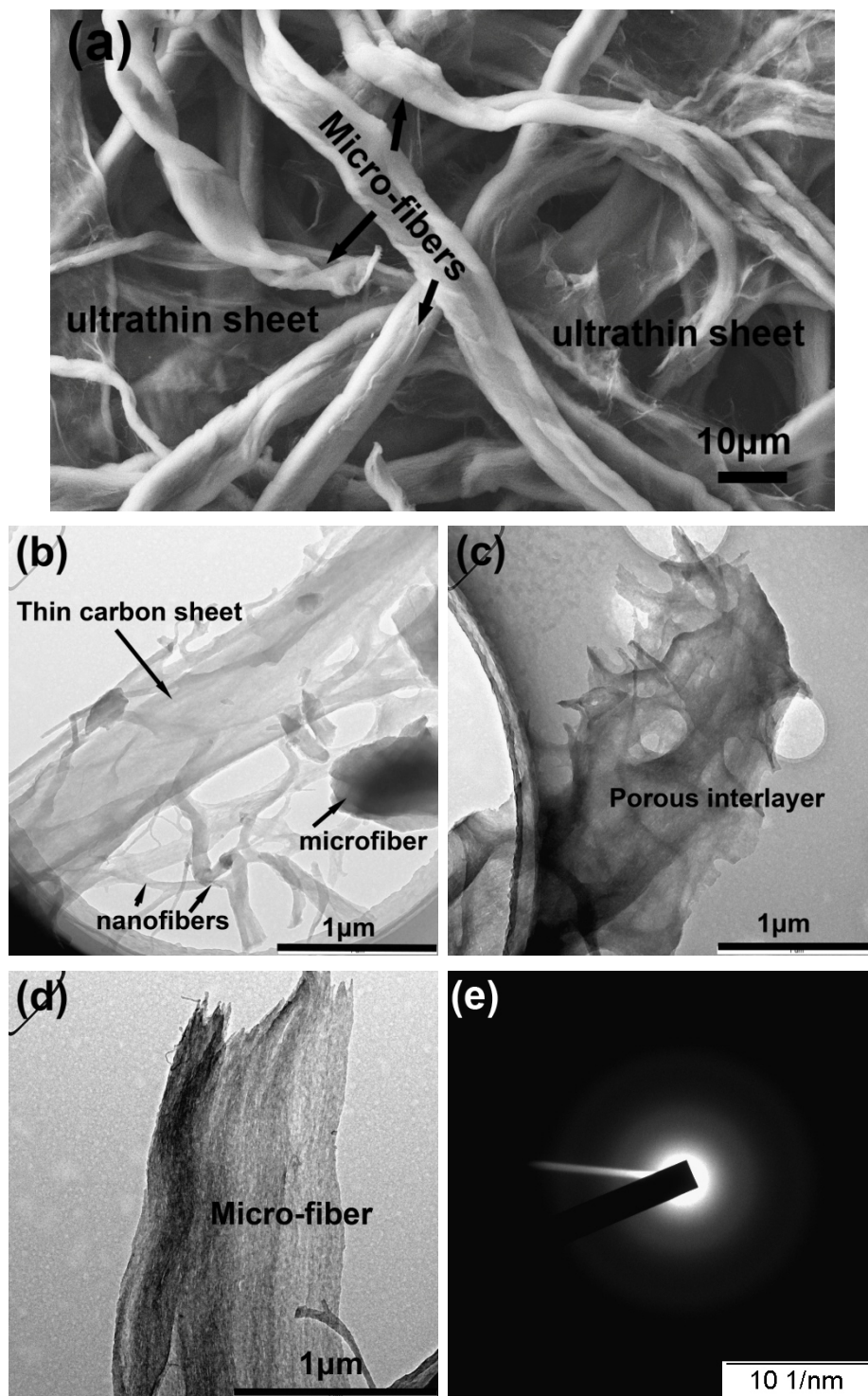


Figure S1.(a) SEM image for the as-obtained CFP, showing its interconnected 3D porous structure, there were many 2D ultrathin carbon sheets covered on the fibers; (b) TEM image for the 1D micro/nanofibers, and the thin carbon sheet of the CFP; (c) TEM image for the interconnected porous structure of the interlayer of the CFP; (d) TEM image of a microfiber, showing that it consisted of a large amount of nanofibers; (e) SAED of the CFP, confirmed its amorphous nature.

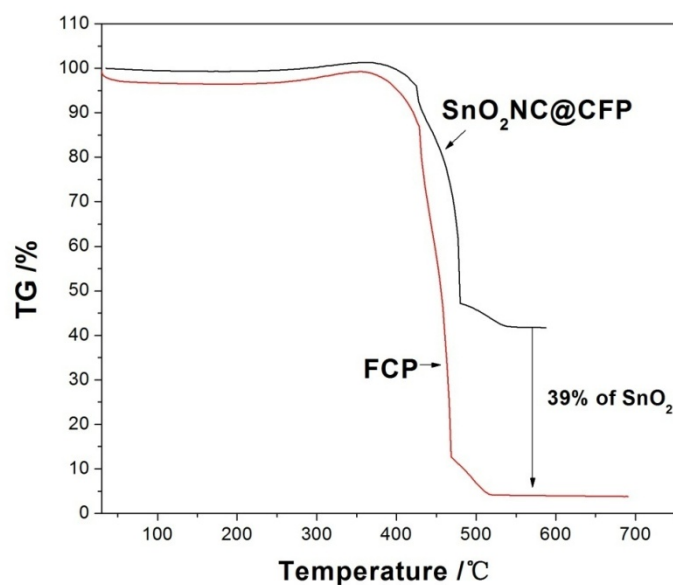


Figure S2. TG analysis curves of the CFP and SnO₂NC@CFP hybrid under O₂ atmosphere at a heating rate of 10°Cmin⁻¹

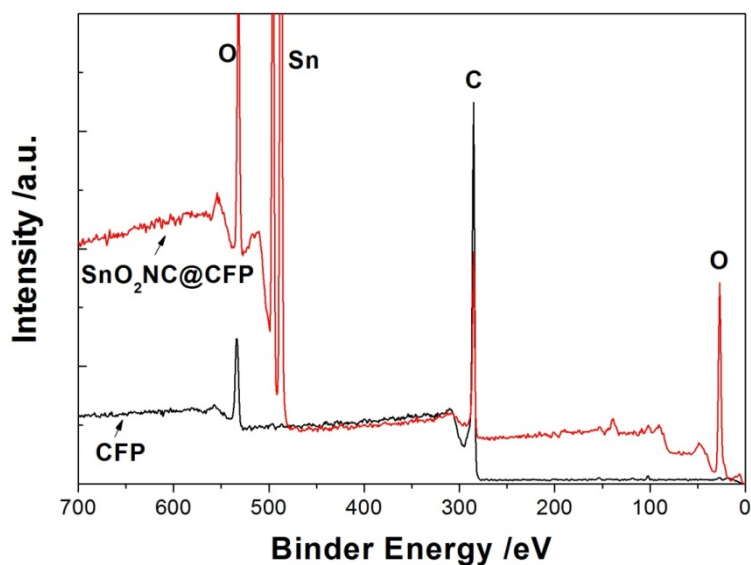


Figure S3. XPS survey scan of the CFP and SnO₂NC@CFP, showing the existence of Sn and increase of oxygen content in the SnO₂NC@CFP

Table S1. element content evaluation based on the XPS analysis in Figure S2

	C1s (at.%)	O1s(at.%)	Sn3d5(at.%)
CFP	86.08	13.92	—
SnO ₂ NC@CFP	44.86	39.11	16.03

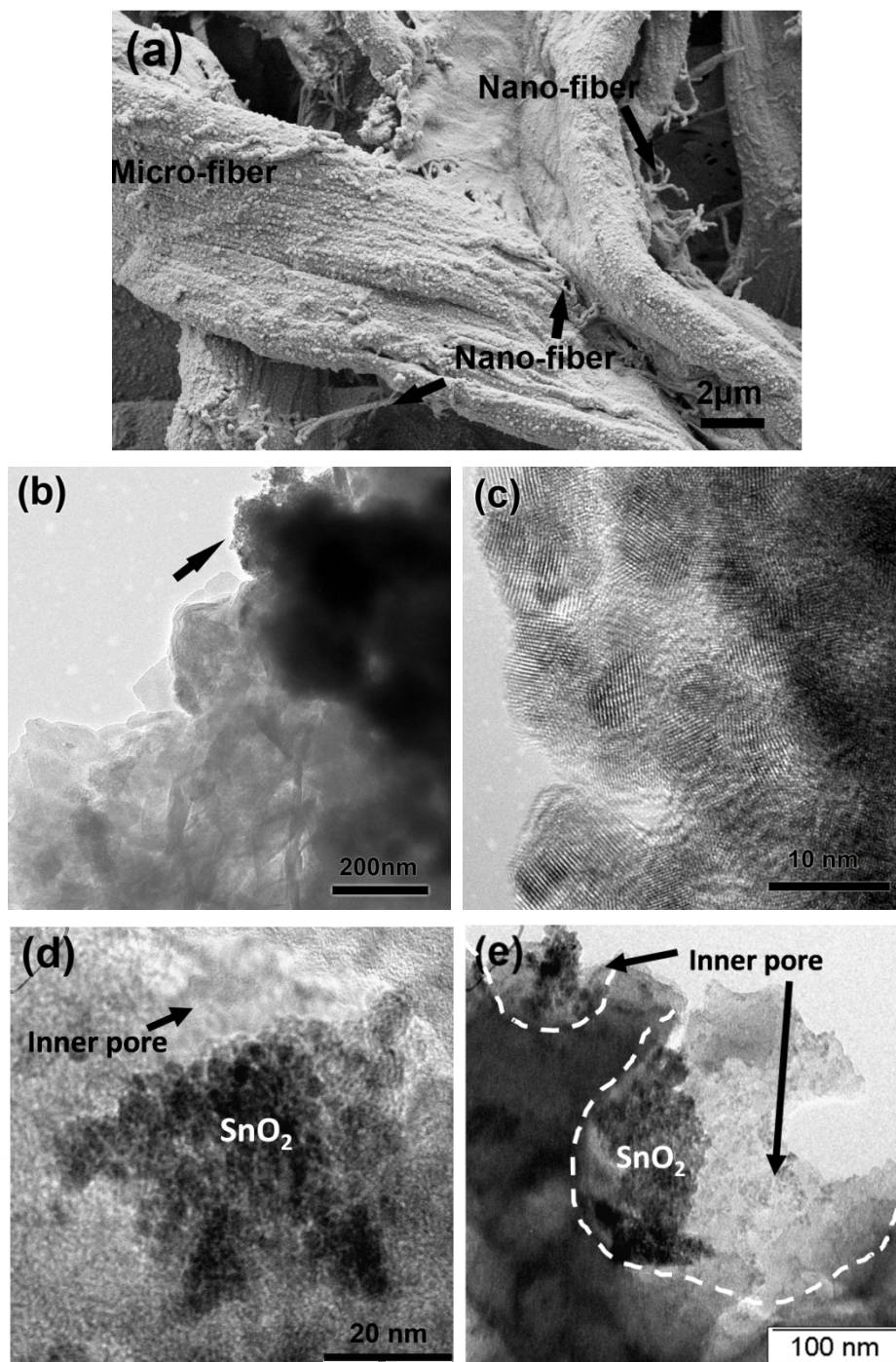


Figure S4. (a) SEM image for the as-obtained SnO₂NC@CFP hybrid, it was found that micro-sized fiber bundles tended to divide to nano-fibers; (b) TEM and (c) HRTEM image for a part of the hybrid, showing ultrafine SnO₂ nanocrystals bonded on the surfaces of the micro/nanosized carbon fibers; (d) and (e) TEM images for the inner pores of the hybrid, showing the aggregations of SnO₂ nanocrystals **in** the pores, with free-space to accommodate the volume change of these nanosized SnO₂ aggregates.

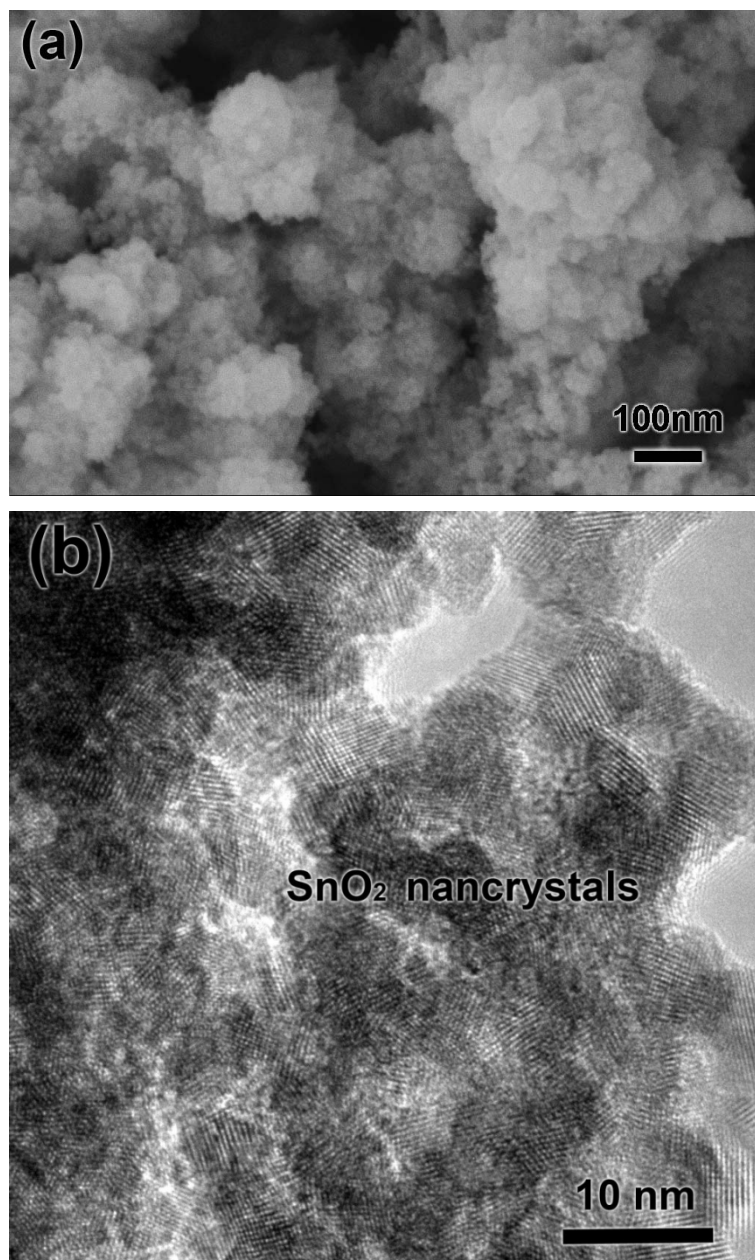


Figure S5. (a) SEM image and (b) HTEM image for the Pure SnO₂NC powders formed during the deposition, which was collected from the solution near under the CFP working electrodes, indicating that the SnO₂ were ultrafine nanocrystals however they were aggregated together.

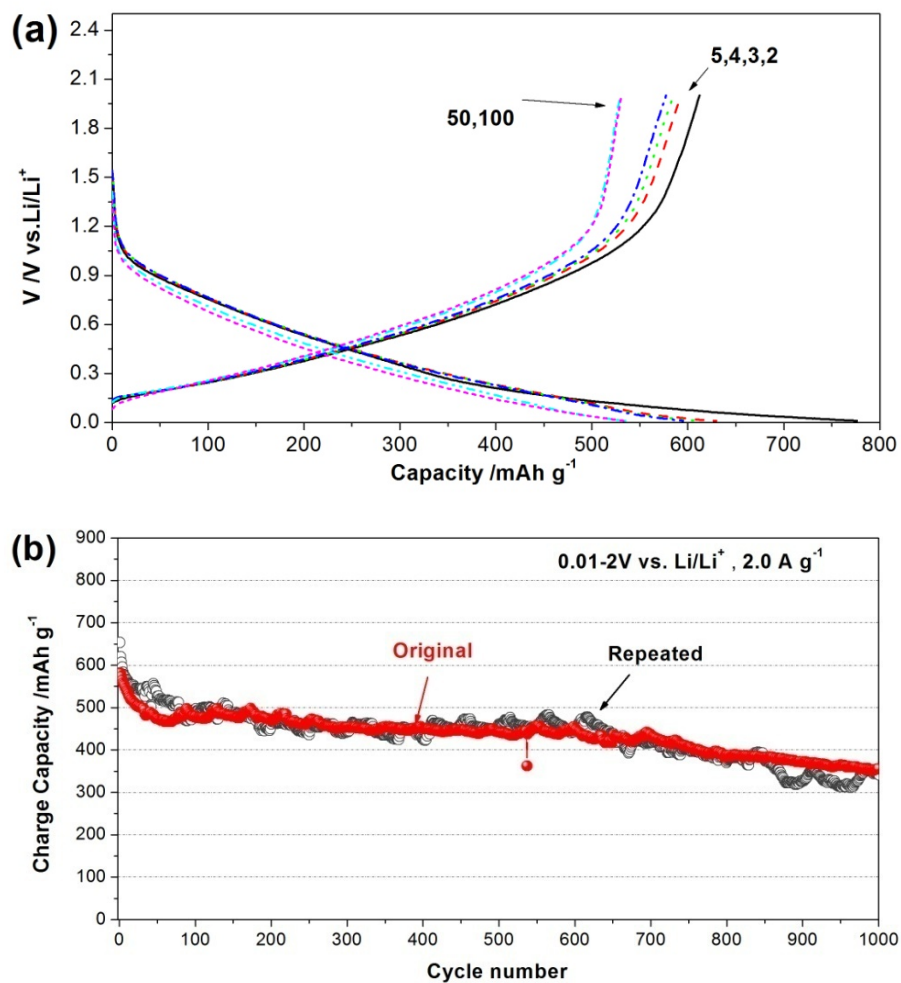


Figure S6 (a) Discharge-charge curves at representative cycles of the slurry-coating $\text{SnO}_2\text{NC@CFP}$ electrode; (b) Long term cycle performance of the slurry-coating $\text{SnO}_2\text{NC@CFP}$ hybrid at current rate of 2.0 A g^{-1} between 0.01 and 2V vs. Li/Li^+ .

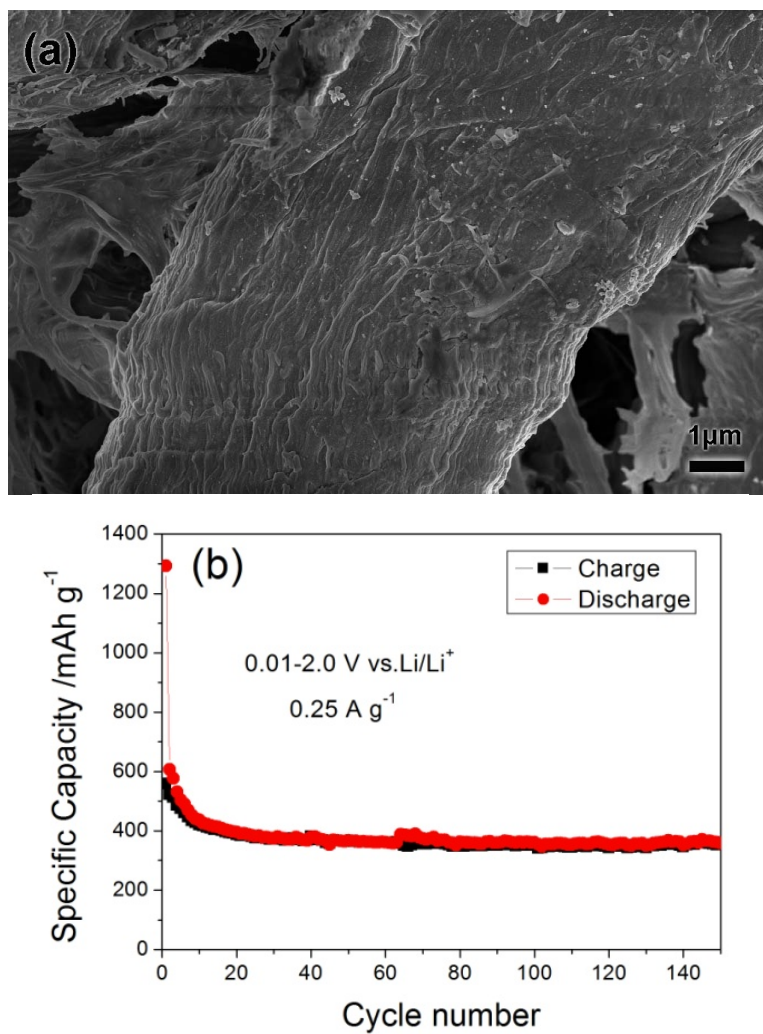


Figure S7 (a) SEM image, and (b) cycle performance of a binder-free $\text{SnO}_2@\text{CFP}$ sample with a lower SnO_2 content of 23wt%.

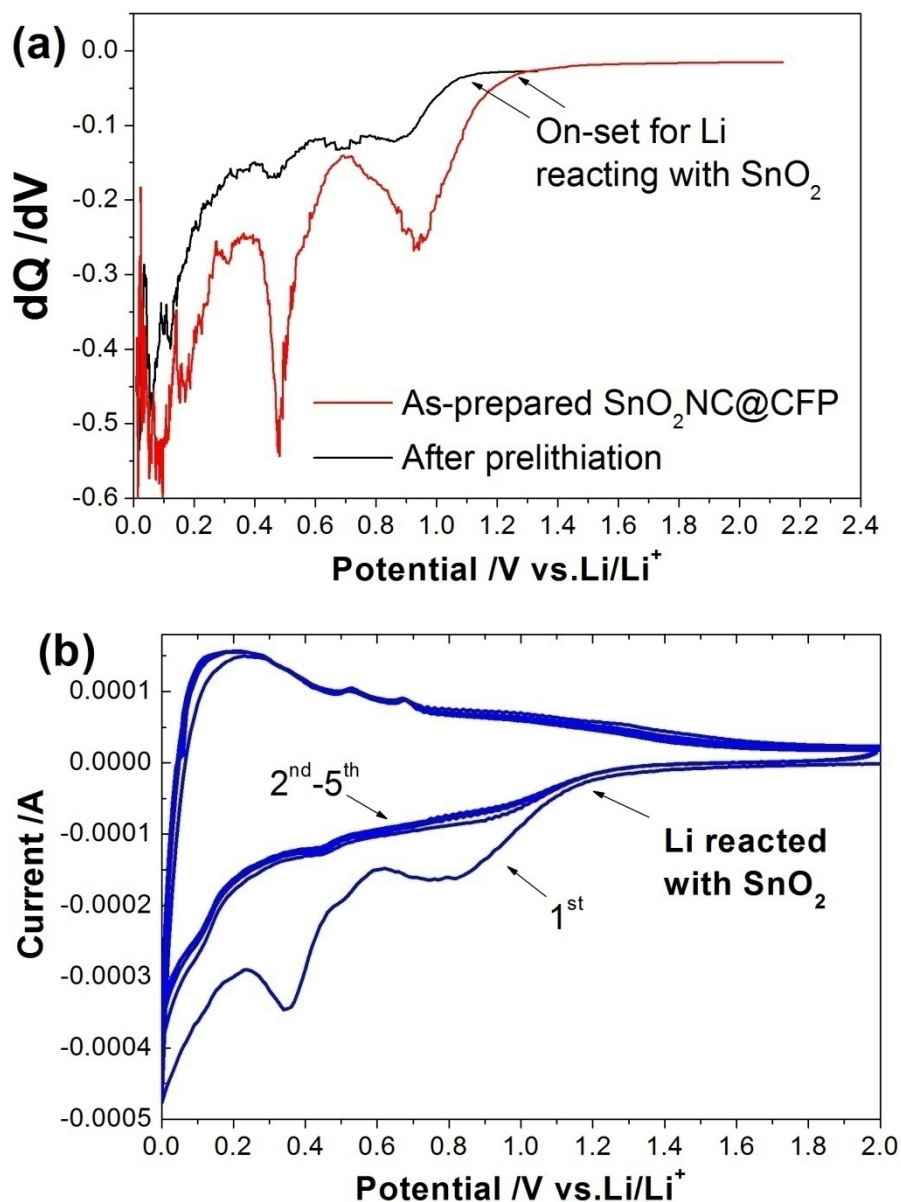


Figure S8 (a) Comparison for the differential initial discharge curves of the as-prepared and prelithiation hybrids, revealing that less SnO_2 reacted with Li during initial discharging of the prelithiation electrode; (b) cyclic voltammogram curves for the as-prepared $\text{SnO}_2\text{NC@CFP}$ anode, showing that there are SnO_2 reacting with Li at the second and the following cycles.

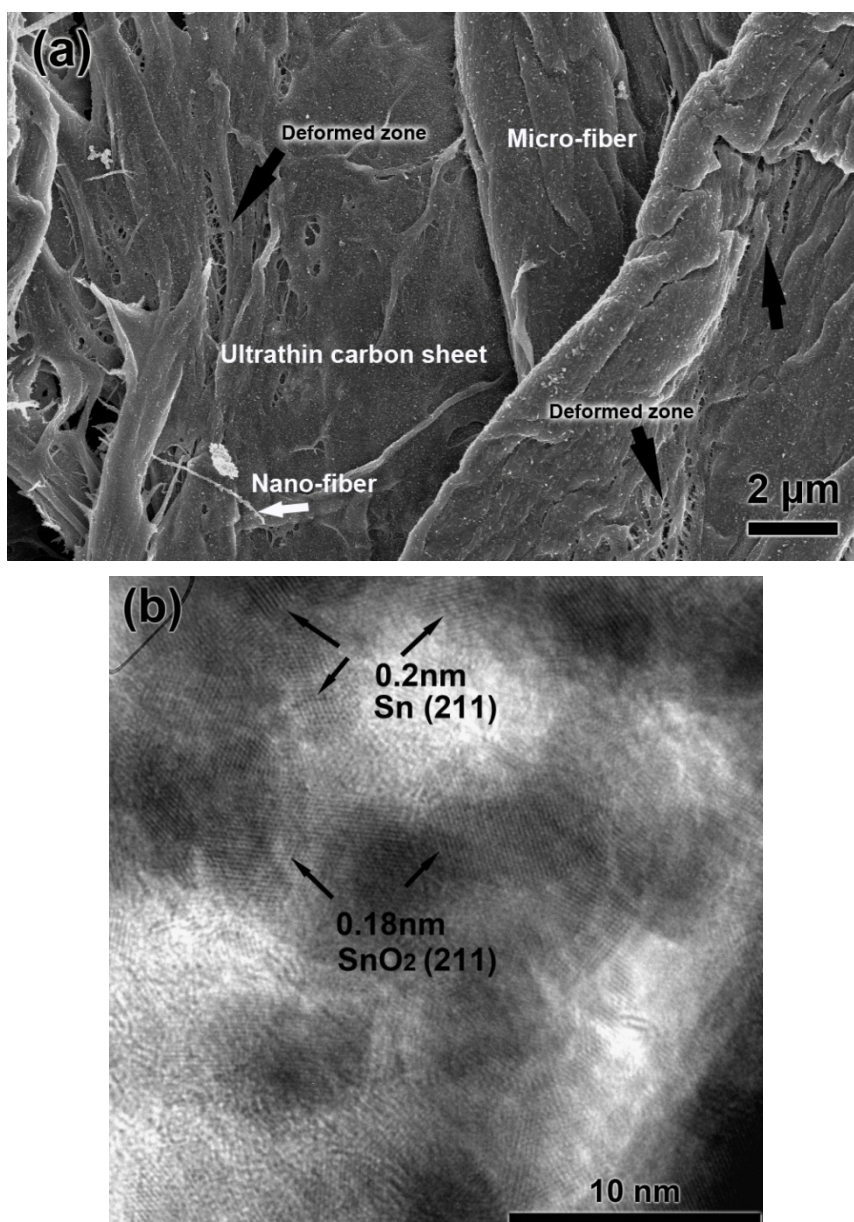


Figure S9. (a) SEM image, (b) HRTEM image of the binder-free $\text{SnO}_2\text{NC@CFP}$ after cycling 150 cycles at 0.25 Ag^{-1} . It had been found that the interconnected 3D porous structure was maintained in the hybrid sheets after 150 discharge-charge cycles. However, there were obvious deformation zones inside the 1D and 2D fibrous carbon scaffolds, where a part of the carbon had been divided to form many nanosized fibers. The HRTEM image revealed the existence of SnO_2 /Sn nanocrystals in carbon matrix.