

Supporting Information for

A Planar Fully Stretchable Lithium Ion Batteries Based on Lamellar Conductive Elastomer

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1. The surface morphology of stretchable PVDF/TPU-Cu@Ag conductive substrate assisted with SEM.

The surface morphology of PVDF/TPU-Cu@Ag conductive substrate is analysed before electrode preparation. The results are shown in Figure S1.

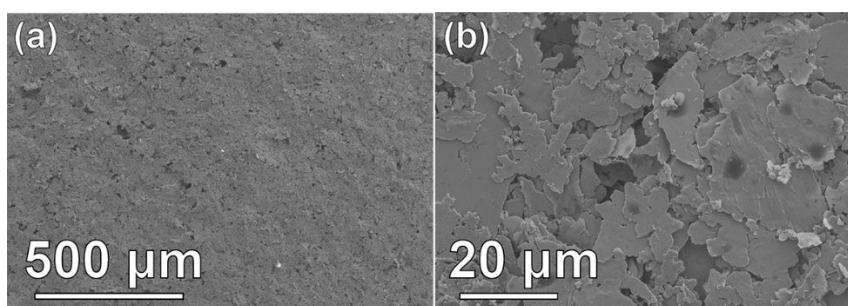


Figure S1 (a,b) SEM images of the TPU-Cu@Ag conductive substrate at different magnification.

2. The conductivity of TPU-Cu@Ag conductive substrate.

The conductivity of TPU-Cu@Ag conductive substrate was measured at both released and stretched state. The dates were obtained by M-3 type four-probe tester which is shown in Figure

S2

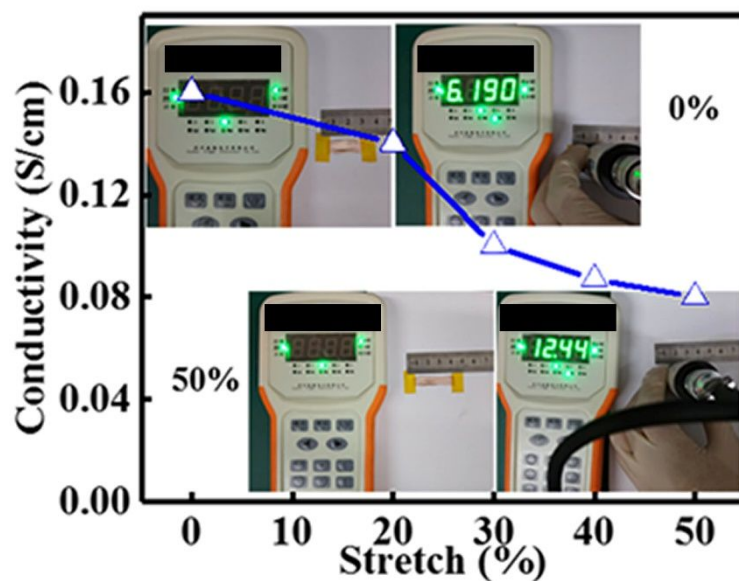


Figure S2 The relationship between conductivity and stretch ratio of TPU-Cu@Ag conductive substrate.

3. Comparison of conductivity of different conductive substrates.

Three kinds of conductive substrates including TPU-Cu, TPU-Al and TPU-Cu@Ag were prepared to compare their conductivity. Only the TPU-Cu@Ag conductive substrate possesses excellent electrical conductivity due to the sheet structure of Cu@Ag powders.

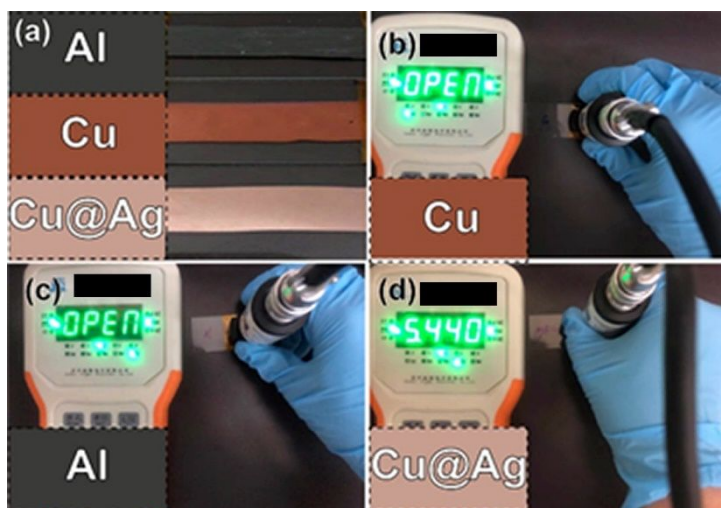


Figure S3 The conductivity comparison of TPU-Cu, TPU-Al and TPU-Cu@Ag substrate. (a) The digital photos of TPU-Cu, TPU-Al and TPU-Cu@Ag substrate. (b) The “OPEN” resistance value of TPU-Cu and (c) TPU-Al substrate displayed on resistance testing equipment. (d) The 5.4 Ω resistance value of TPU-Cu@Ag substrate.

4. Stretchability of TPU/PVDF separator.

The prepared TPU/PVDF separator can be stretched to 125% of initial length, the results are displayed in Figure S4.

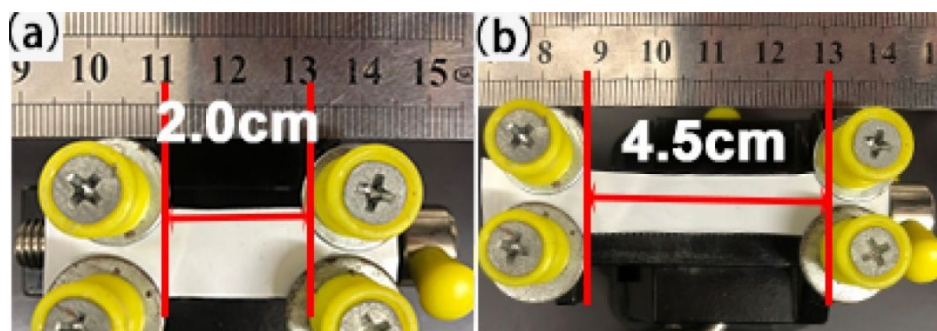


Figure S4 (a) The pristine state and (b) the 125 % stretchable state of TPU/PVDF separator.

5. Measuring the precursor surface topography of Si@C HFs.

From the Figure S5a, b, the independent organic fibers are observed clearly and the Si nanoparticles cluster can be found through the transparent organic fibers.

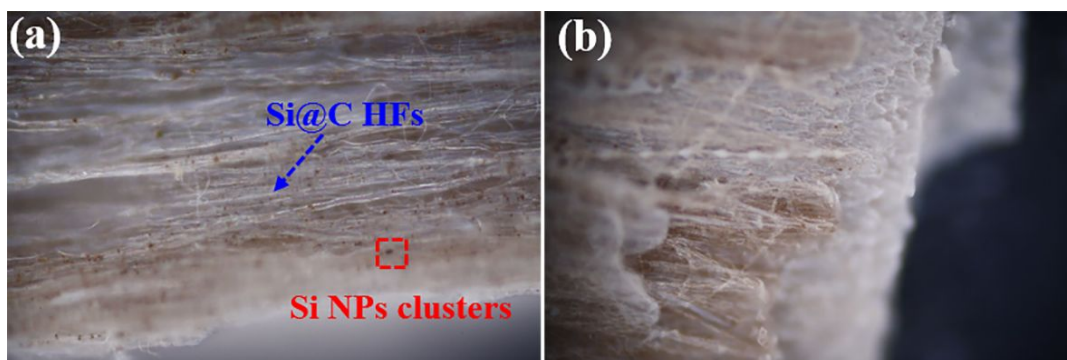


Figure S5 (a) The precursor optical microscope image and (b) the section image of core-shell Si@C HFs.

Table S1 Comparison of Different Stretchable Batteries

Fabricated Batteries By	Stretchability (%)	Cycle numbers	Capacity (mAh/cm ²)
Peng's group	400	200	0.12
Cui's group	50	100	3.6
Rogers' group	300	20	1.1
Our work	150	100	6

