energies

Supplementary Materials: Electrospun Core-Shell Nanofiber as Separator for Lithium-Ion Batteries with High Performance and Improved Safety

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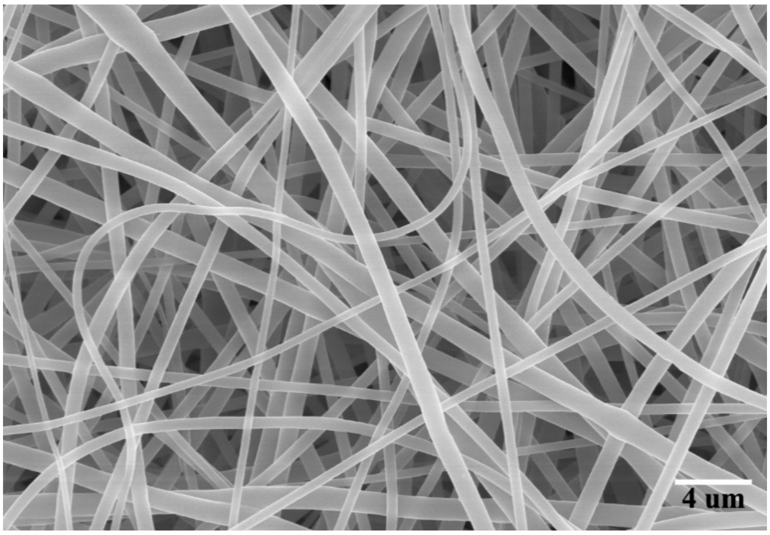

Figure S1. The SEM image of PAN@PVDF-HFP core-shell fiber network. All the nanofibers are smooth, and no obvious agglomeration is observed.

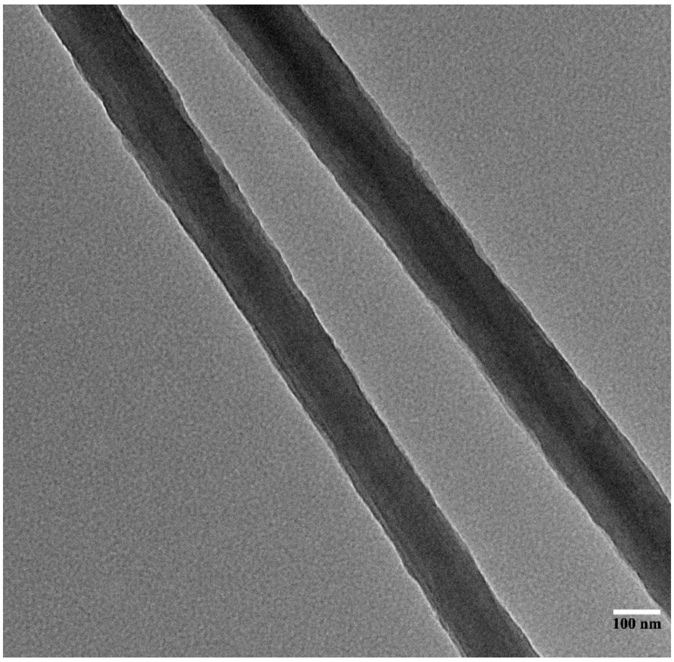

Figure S2. The TEM image of two PAN@PVDF-HFP fibers. A core-shell structure can be observed clearly.

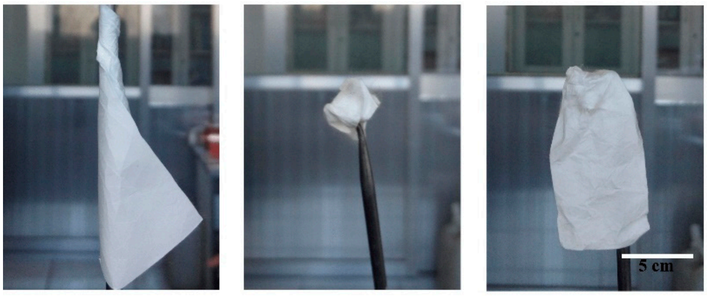

Figure S3. The flexibility test of PAN@PVDF-HFP separator. No cracks or pin-holes can be easily found after being rolled up or scrunched several times.

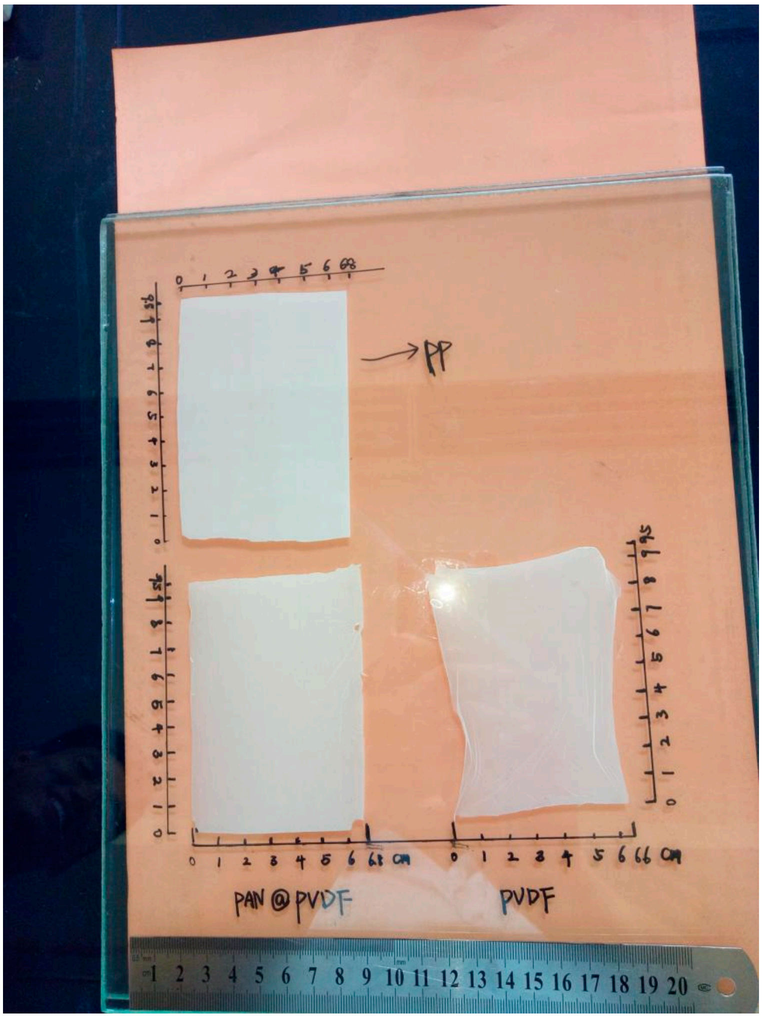

Figure S4. The thermal stability test of commercial separator, PVDF-HFP and PAN@PVDF-HFP fiber network. All the samples are clamped with two pieces of glass plates firstly, and then heated to elevated temperature for 10 minutes and pictured.

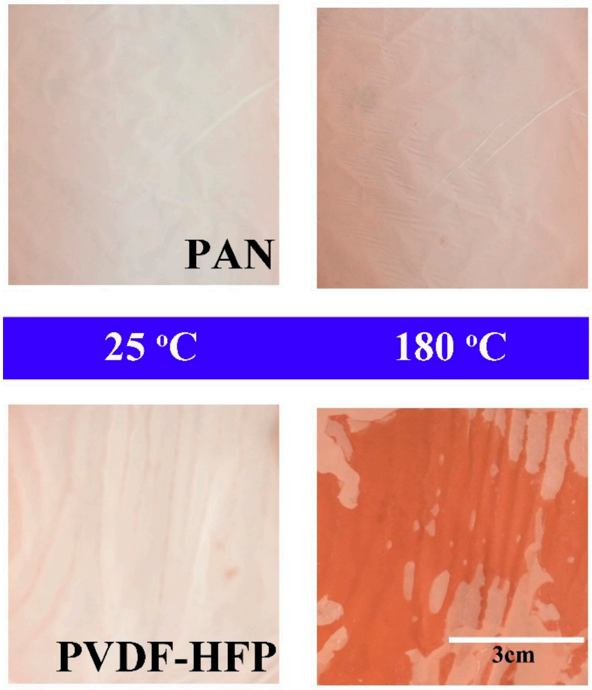

Figure S5. Thermal stability tests of PAN film and PVDF-HFP film at 180 °C. Porous PAN film exhibits almost no shrinkage at 180 °C. In sharp contrast, PVDF-HFP experiences severe melting and shrinking at 180 °C.

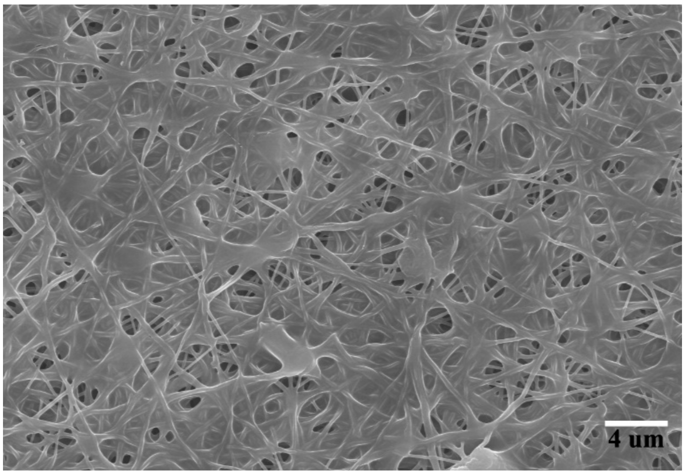

Figure S6. SEM image showing the structural intactness of PAN@PVDF-HFP fiber network at 250 °C.

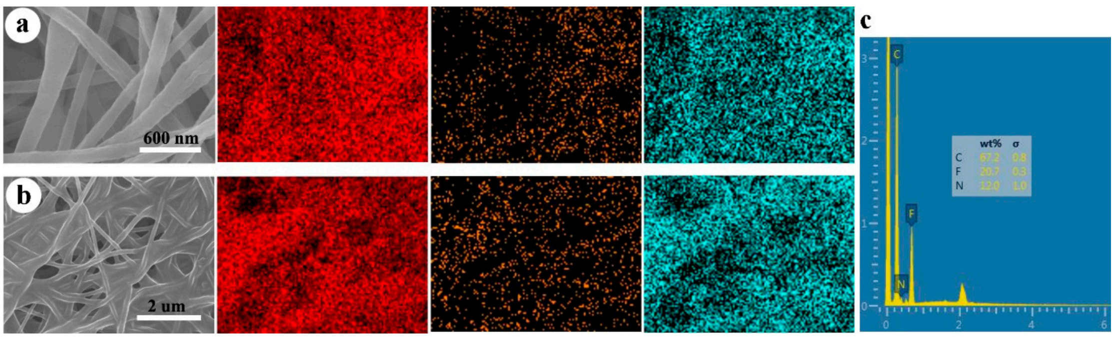

Figure S7. Elemental mapping of selected area of PAN@PVDF-HFP fiber network: (a) Elemental mapping at room temperature and (b) at 180 °C; (c) EDS results.

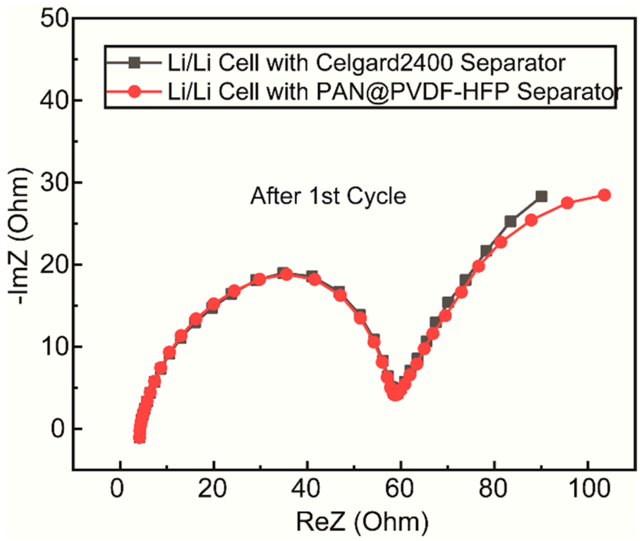

Figure S8. Impedance spectroscopies (after first cycle) of cell using Celgard2400 separator and cell using PAN@PVDF-HFP separator with the same configuration.

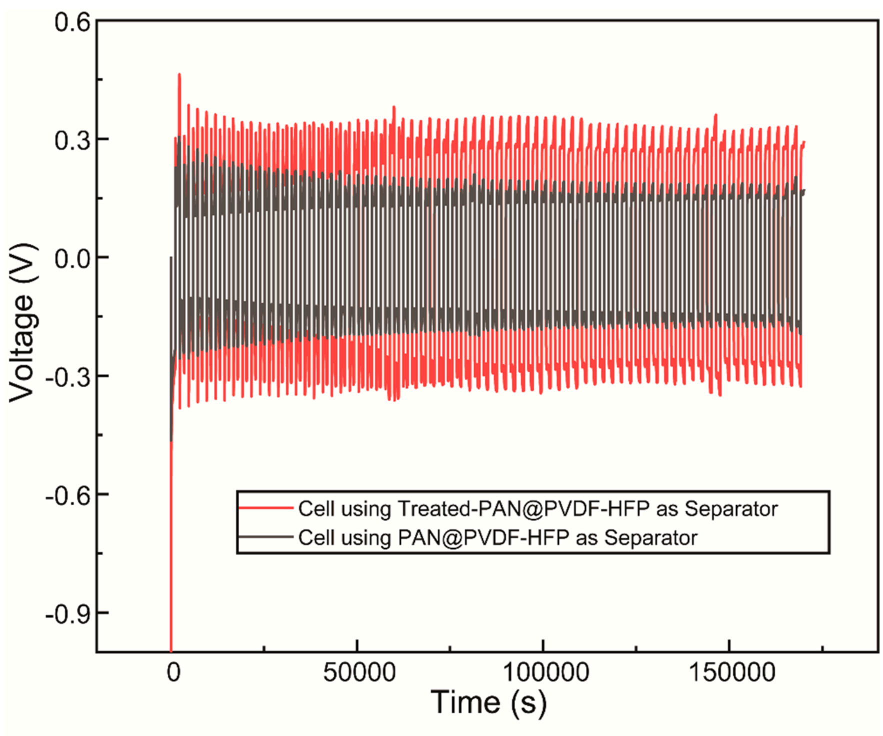

Figure S9. Symmetric cycling of cell using PAN@PVDF-HFP fiber network as separator (black) and cell using heat-treated PAN@PVDF-HFP fiber network as separator (red). The Li/Li symmetric cell is able to cycle with the heat-treated PAN@PVDF-HFP fiber network as the separator, although its overpotential is noticeably larger than that of cell using untreated samples. .