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Electronic Supplementary Information for

Poly-(styrene-acrylonitrile) copolymer-derived hierarchical architecture in electrode materials for lithium ion batteries

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(1) Characterization of the composition in TiO_2/C materials

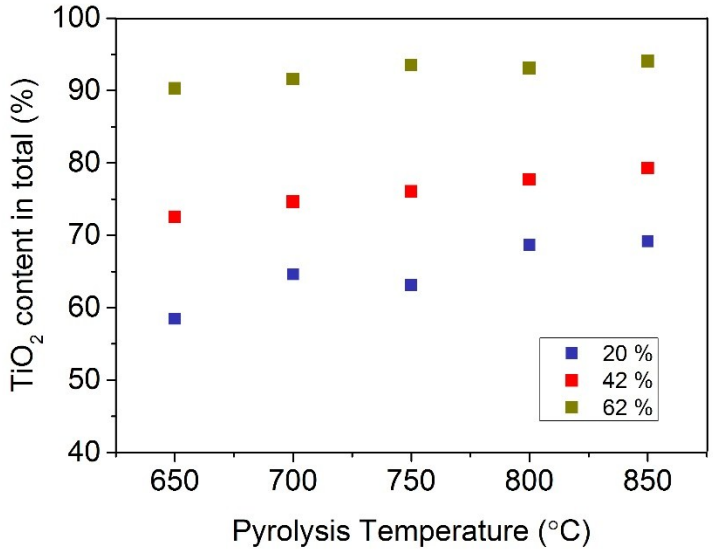

Fig. S1 TiO_2 weight fraction from TGA measurements for samples, 20TP, 42TP and 62TP, pyrolyzed at different temperatures.

Table S1 TiO_2 weight fraction from TGA measurements for samples, 20TP, 42TP and 62TP, pyrolyzed at different temperatures.

T, °C	In 62TP, %	In TP, %	In 20TP, %
650	90.3	72.5	58.5
700	91.6	74.6	64.6
750	93.5	76.0	63.1
800	93.1	77.7	68.7
850	94.0	79.3	69.2

Table S2 Intensity peak fractions of D1, D3 and G bands in Figure 3c.

T, °C	D1, %	D3, %	G, %
650	54	21	26
700	47	13	40
750	47	13	40
800	49	10	40
850	50	11	39

(2) Electrochemical performance tests of poly-(styrene-acrylonitrile) derived carbon electrode in the absence of TiO_2

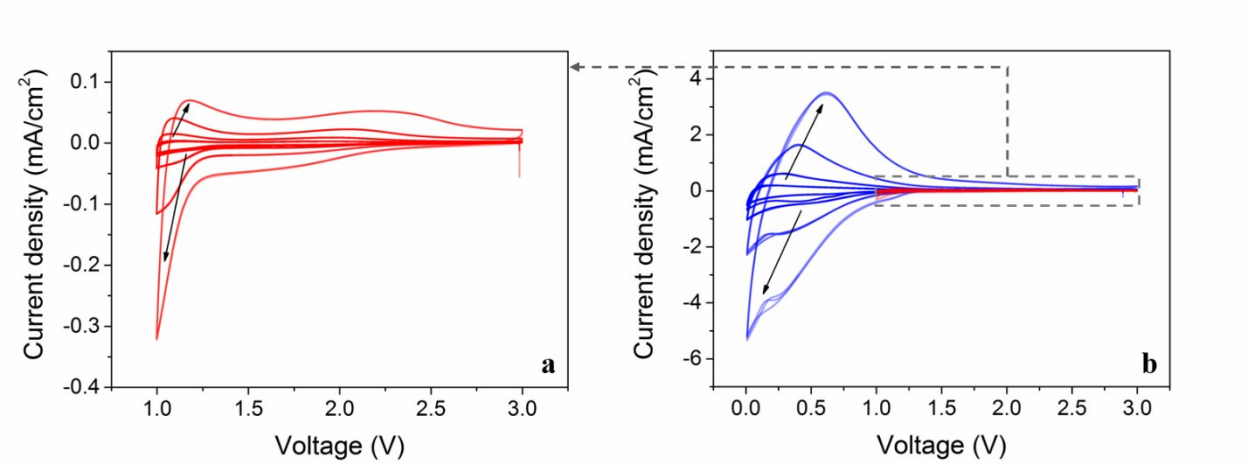

Fig. S2 CV curves of the cells prepared using poly-(styrene-acrylonitrile) derived carbon network as the anode in the absence of TiO_2, in voltage range of (a) 1.0-3.0 V and (b) 0-3.0 V at scan rates of 0.1, 0.33, 0.5 and 1.0 mV/s. It is seen from Fig S2a that in 1.0-3.0 V, the current density is very small, indicating that the intercalation of lithium into the carbon structure within this potential window is rather limited. In Fig. S2b, a broad rectangular shape of redox voltage profile can be seen in 0-1.0 V, while in 1.0-3.0 V, the curves are relatively flat without distinguished redox peaks. Therefore, the capacitive phenomenon enhancing capacity mainly occurs in 0-1.0 V. During the Li intercalation process, an evident peak is detected around 0.25-0.5 V, which is attributed to the formation of the SEI film on the surface of carbon, resulting in the irreversible consumption of Li ions in electrolyte.

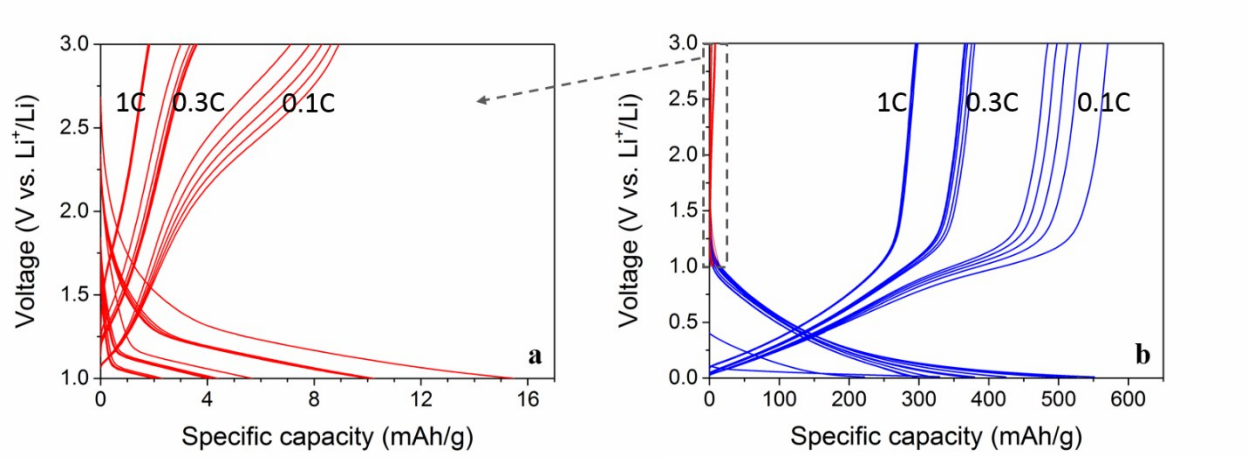

Fig. S3 Charge/discharge specific capacity of the cells prepared using poly-(styrene-acrylonitrile) derived carbon network as the anode in the absence of TiO_2, in the voltage range of (a) 1.0-3.0 V and (b) 0-3.0 V at different C rates. (1C=165 mAh/g). From Fig. S3a, the specific capacity is only around 2 mAh/g at 1C. In Fig. S3b, considerable capacity (~300 mAh/g at 1C current density) is obtained in the voltage range, 0-1.0 V. Still, the capacity contribution in 1.0-3.0 V is negligible, which is in coherence with the results in Fig. S2 and in the literature.

(3) Repetition tests of long-term cycling performance of various composite samples.

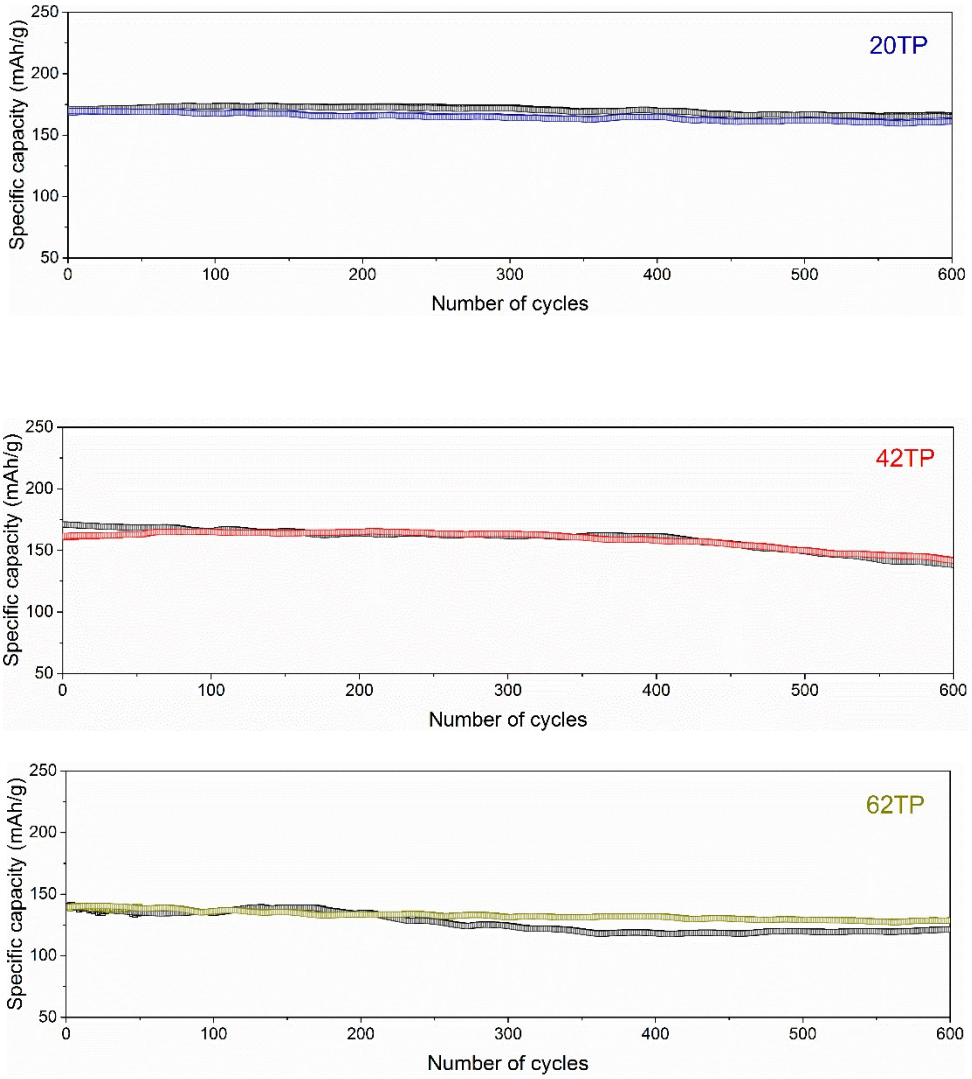

Fig. S4 Repeated tests of long-term cycling performance of various composite samples (black curves stand for another running).