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Supplementary Information

Surface modification of electrospun TiO_2 nanofibers via layer-by-layer self-assembly for high-performance lithium-ion batteries

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Fig. S1 Digital photos for the powdered samples of the TiO_2 nanofibers (white) and the MoO_2-modified TiO_2 nanofibers (black).

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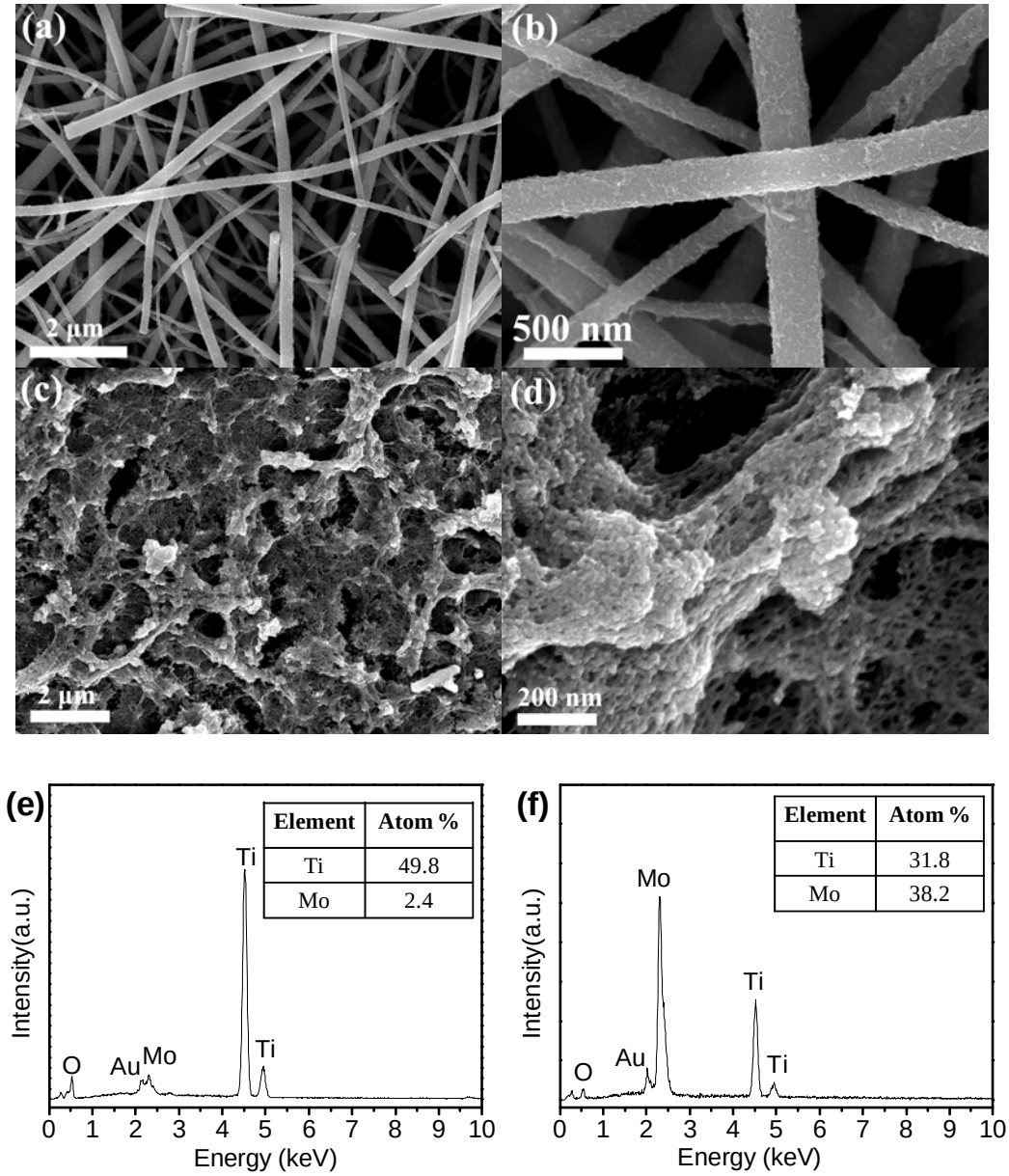

Fig. S2 FESEM images of sample A (a, b) and sample B (c,d). EDX spectrum of sample A (e) and sample B (f), the insets show the atomic percent of Ti and Mo.

Compared to the MoO_2-modified TiO_2 nanofibers discussed in the paper, other MoO_2-modified TiO_2 nanofibers samples were prepared by different concentration of PDDA and PMA solutions or by different cycle times. For sample A, the concentration of PDDA solution is 0.1 wt % and PMA solution is 2.5 mg/ml, and cycle time is 10 cycles. For sample B, the concentration of PDDA solution is 0.4 wt % and PMA solution is 10 mg/ml, and cycle time is 30 cycles. Fig. S2a and S2b show the FESEM images of sample A. Fig. S2c and S2d are the FESEM images of sample B. Fig. S2e and S2f

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are the EDX spectra of sample A and B, the insets show the atomic percent of Ti and Mo. With the concentration decreased, the thickness of MoO_2 shell and the content of Mo were reduced. Moreover, the result of sample B clearly display that the thickness of MoO_2 shell and the content of element Mo increase largely by increasing the cycle times, where the fibrous structure was destroyed. All the results present that the thickness of the MoO_2 shell can be tuned by changing the concentration of PDDA and PMA solution or the cycle time.

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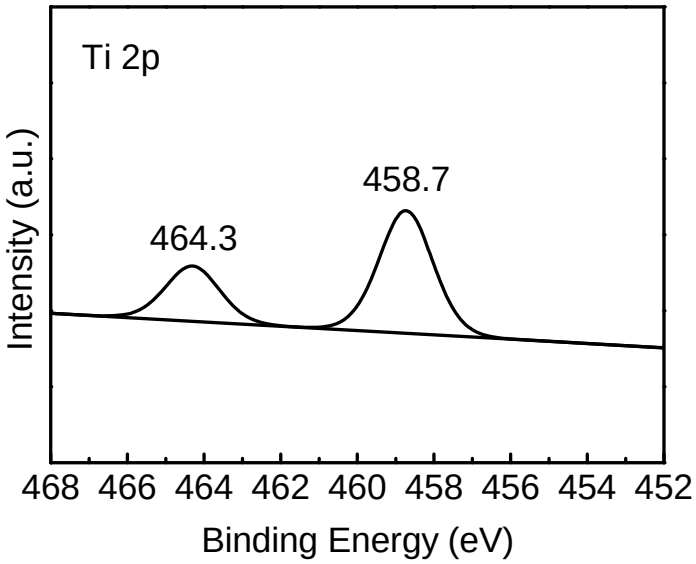

Fig. S3 High-resolution XPS spectrum of Ti 2p for the MoO_2-modified TiO_2 nanofibers.

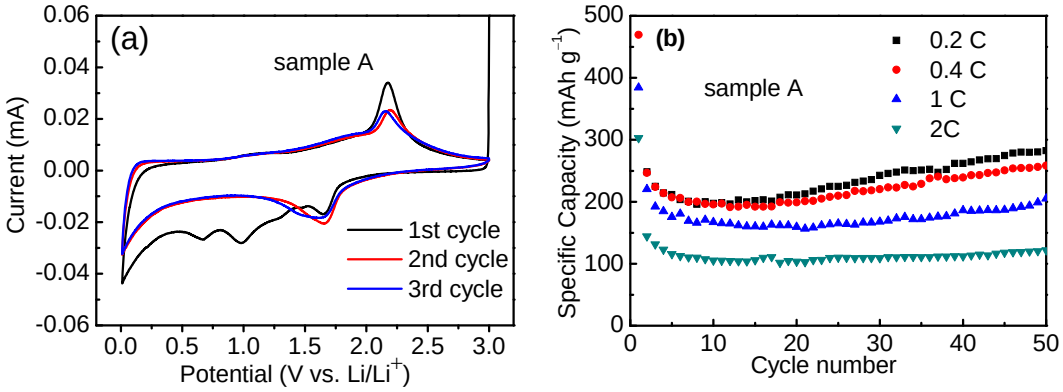

Fig. S4 The first three CV curves (a) and the cycle and rate behavior of the sample A (b).

In order to further investigate the effect of MoO_2 shell for electrochemical properties of the MoO_2-modified TiO_2 nanofibers, CV and galvanostatic cycling studies were also explored for sample A. The first three CV curves of the electrodes made from sample A at a scan rate of 0.1 mV s^{-1} are similar as the result of the MoO_2-modified TiO_2 nanofibers discussed in the paper. Fig. S4b shows the discharge capacity versus cycle number for sample A at different rates. The discharge capacities are better than the TiO_2 nanofibers, but worse than the TiO_2@MoO_2 nanofibers. The result can reflect that the MoO_2 shell plays positive impacts on the electrochemical properties for the TiO_2 nanofibers and thicker MoO_2 shell can bring higher capacity.