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Electronic Supplementary Information

A High-capacity Dual Core-shell Structured MWCNTs@S@PPy Nanocomposite Anode for Advanced Aqueous Rechargeable Lithium Battery

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1. CV curves of carbon felt (CF)

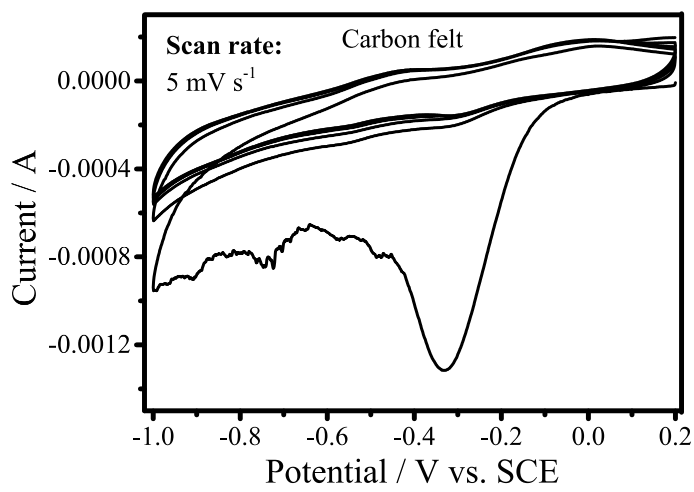

Fig. S1 CV curves of carbon felt at scan rate of 5 mV s^{-1}.

2. Electrochemical performance of MWCNTs@S and PPy in aqueous saturated LiAc solution using carbon felt (CF) as the current collector

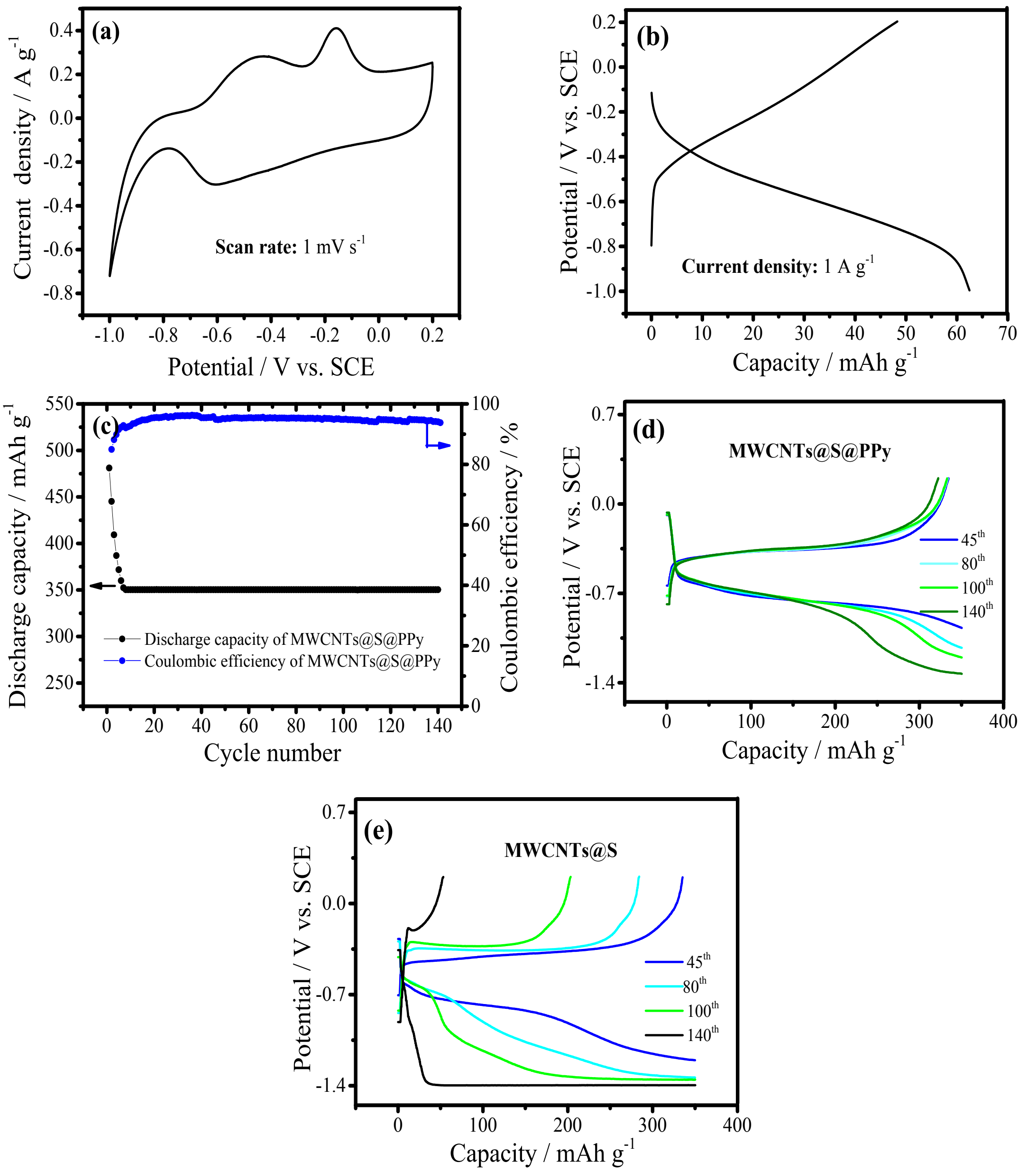

Fig. S2 (a) CV curve and (b) charge-discharge curve of PPy and (c) cycling performance of the MWCNTs@S@PPy and MWCNTs@S in LiAc aqueous solution with a restriction of the discharge capacity of 350 mAh g^{-1} and a 0.2 V potential cut-off during the charging process at a current density of 1 A g^{-1} and (c, d) charge-discharge curves of the MWCNTs@S@PPy, MWCNTs@S during cycling.

3. Color change of the MWCNTs@S and MWCNTs@S@PPy nanocomposite before and after cycling in aqueous saturated LiAc solution

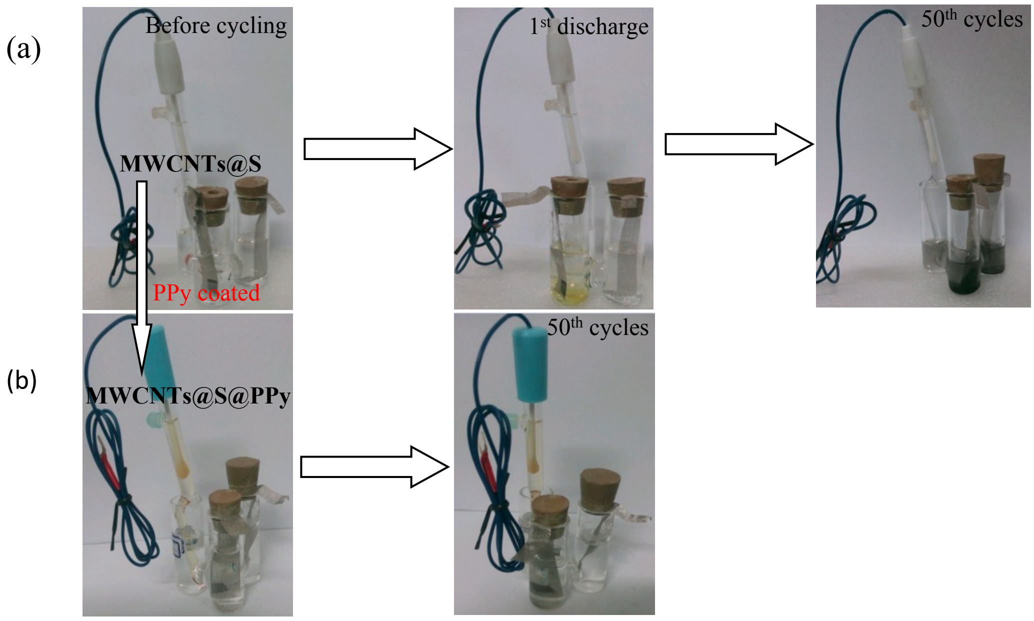

Fig. S3 Color change of the (a) MWCNTs@S and (b) MWCNTs@S@PPy nanocomposites before and after cycling in aqueous saturated LiAc solution.

Prior to cycling, the aqueous electrolytes are transparent. However, the electrolyte for the MWCNTs@S became yellowish after the 1st discharge and became turbid after 50 cycles. These results show the active substance drop off from the current collector, which mainly due to the dissolution of the polysulfide (PS) anions and the huge volume change during cycling. In contrast, before and after 50 cycles the electrolyte for the MWCNTs@S@PPy is still transparent, which indicates that the PPy coating can not only prevent or inhibit the dissolution of polysulfide (PS) anions but also buffer the volume changes during the cycling process.

4. CV curves of $LiMn_2O_4$ nanorod in saturated LiAc

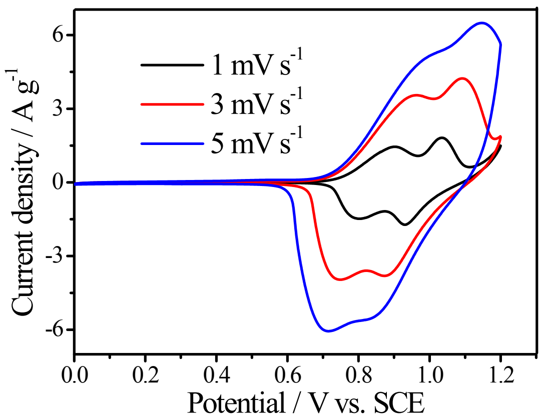

Fig. S4 CV curves of $LiMn_2O_4$ nanorod in saturated LiAc aqueous electrolyte.

5. SEM, TEM micrographs and XRD pattern of $LiMn_2O_4$ nanorod

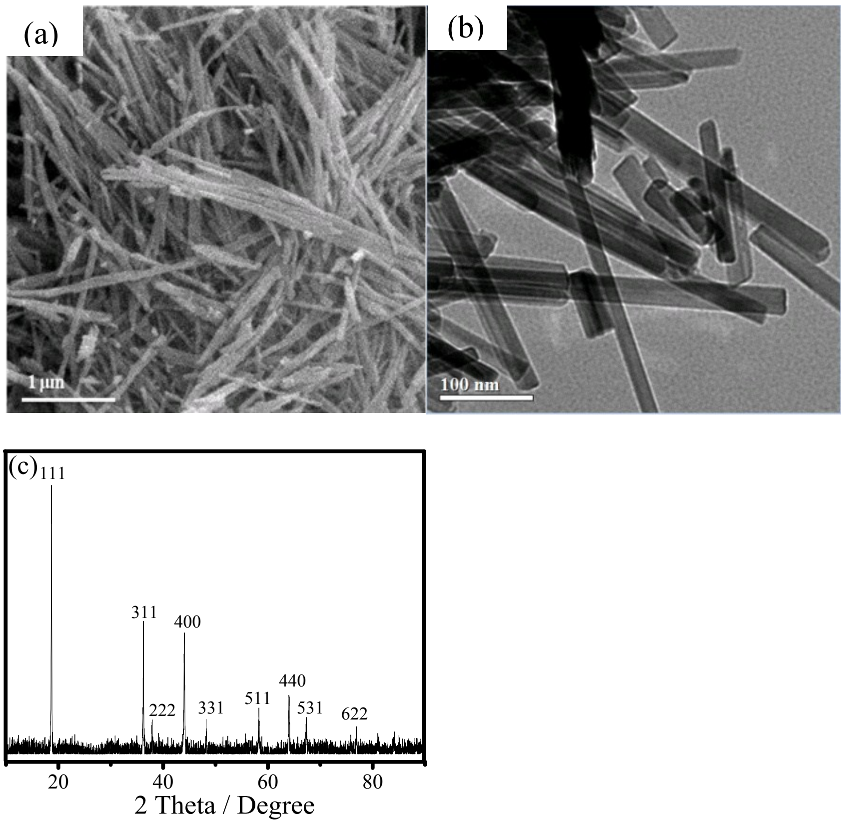

Fig. S5 SEM (a) and TEM (b) micrographs and (c) XRD of $LiMn_2O_4$ nanorod.