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Supporting Information

Polypyrrole/TiO_2 nanotube arrays with coaxial heterogeneous structure as sulfur hosts for lithium-sulfur batteries

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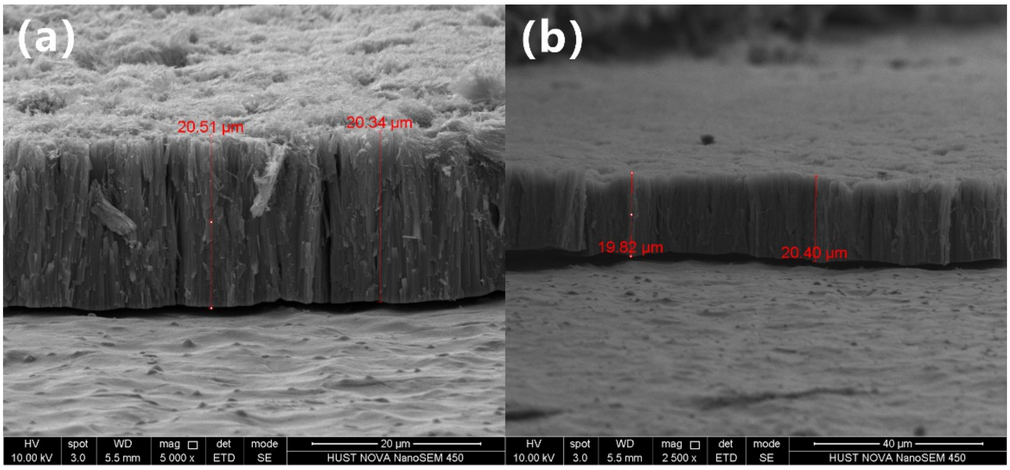

Fig. S1 FESEM images of side view of pure TiO_2 nanotube arrays

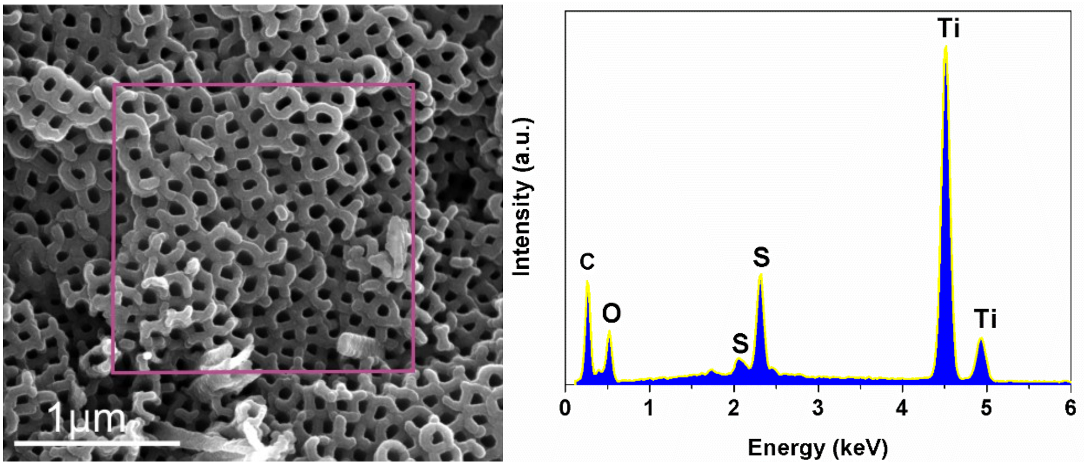

Fig. S2 EDS patterns of S/PPy/TiO_2 NTs-300 on FESEM gird

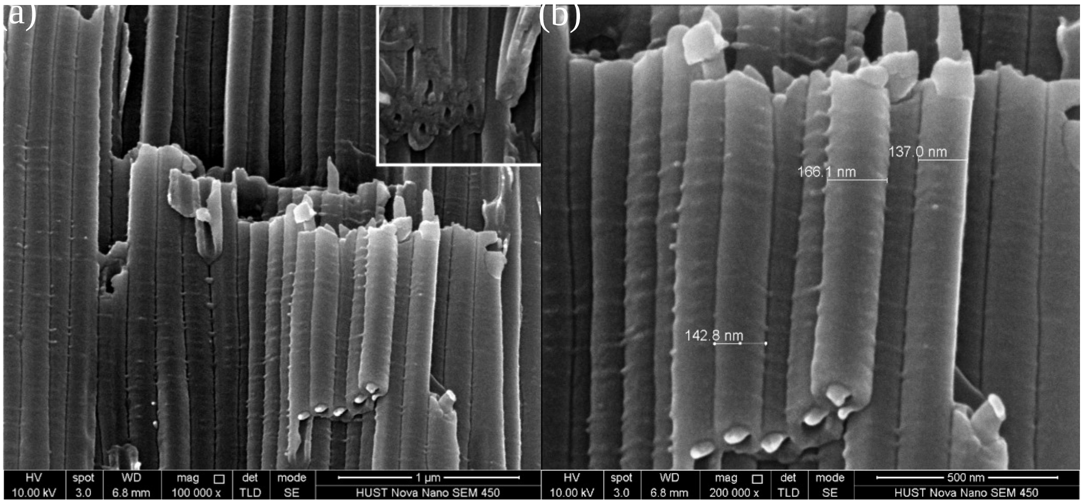

Fig. S3 FESEM images of side view of S/PPy/TiO_2 NTs-300 near the bottom of tubes

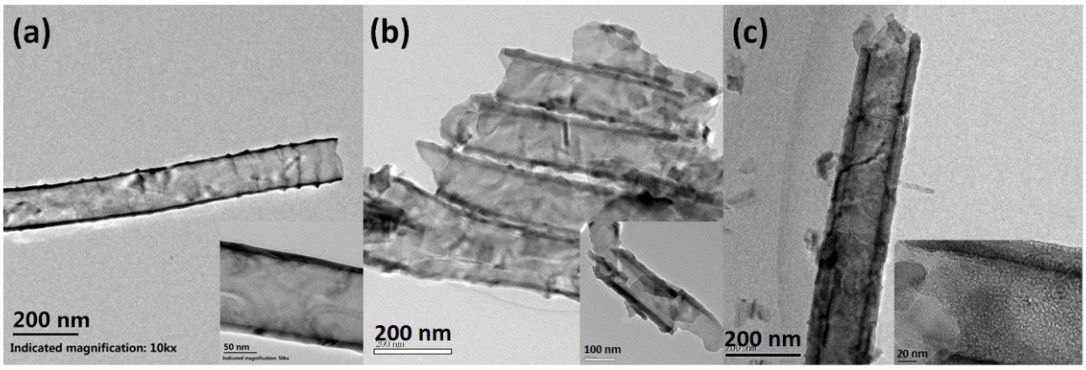

Fig. S4. TEM image of pure TiO_2 NTs (a), PPy/TiO_2 NTs (b), S/PPy/TiO_2 NTs-160 (c).

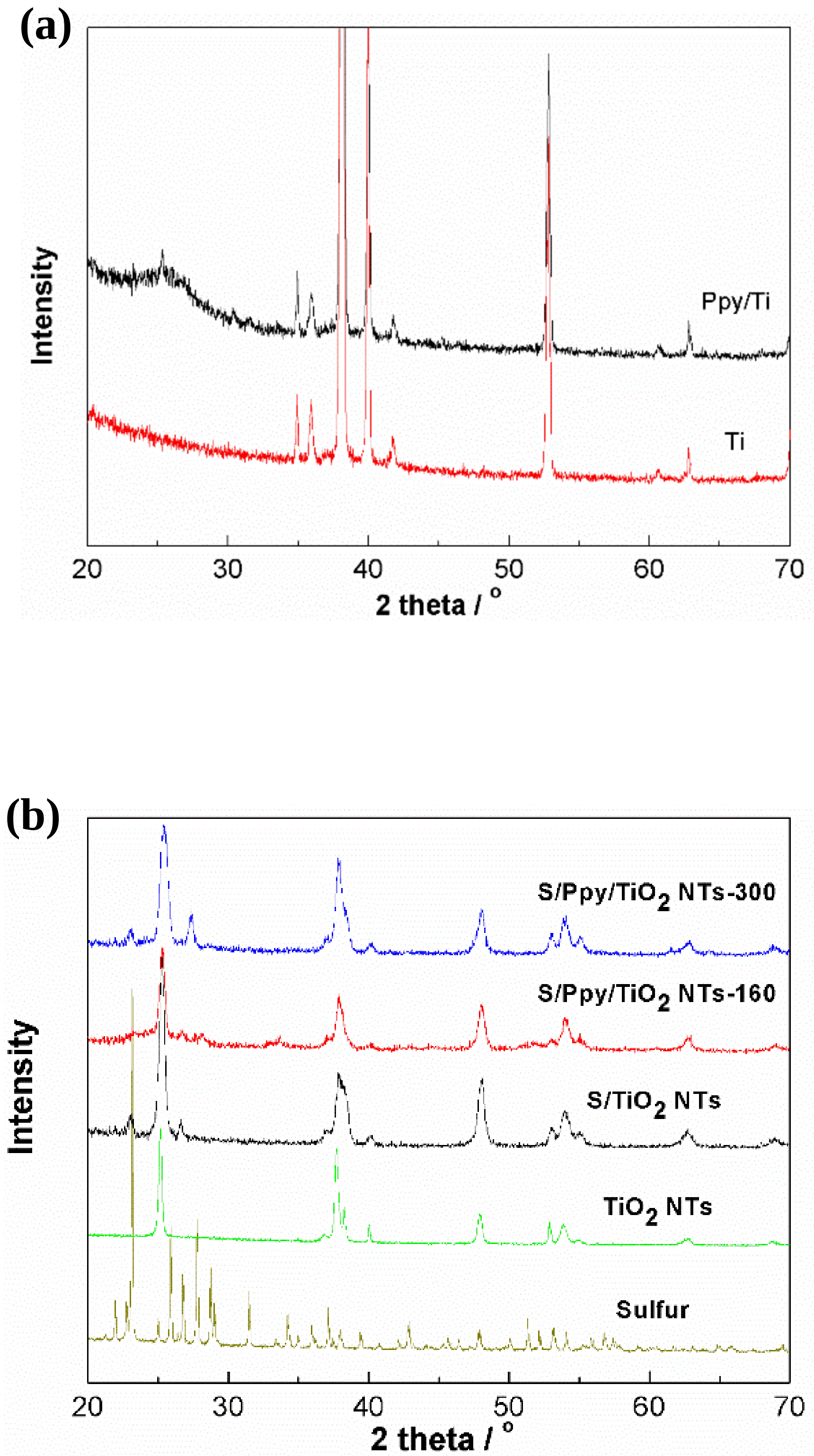

Fig. S5 (a) XRD patterns of titanium(Ti) plate and PPy/Ti plate. PPy was prepared by electrochemical deposition on Ti plate with a constant current density of 1.0 mA/cm^2. (b) XRD patterns of element sulfur, pure TiO_2 NTs, S/TiO_2 NTs, S/PPy/TiO_2 NTs-160 and S/PPy/TiO_2 NTs-

300.

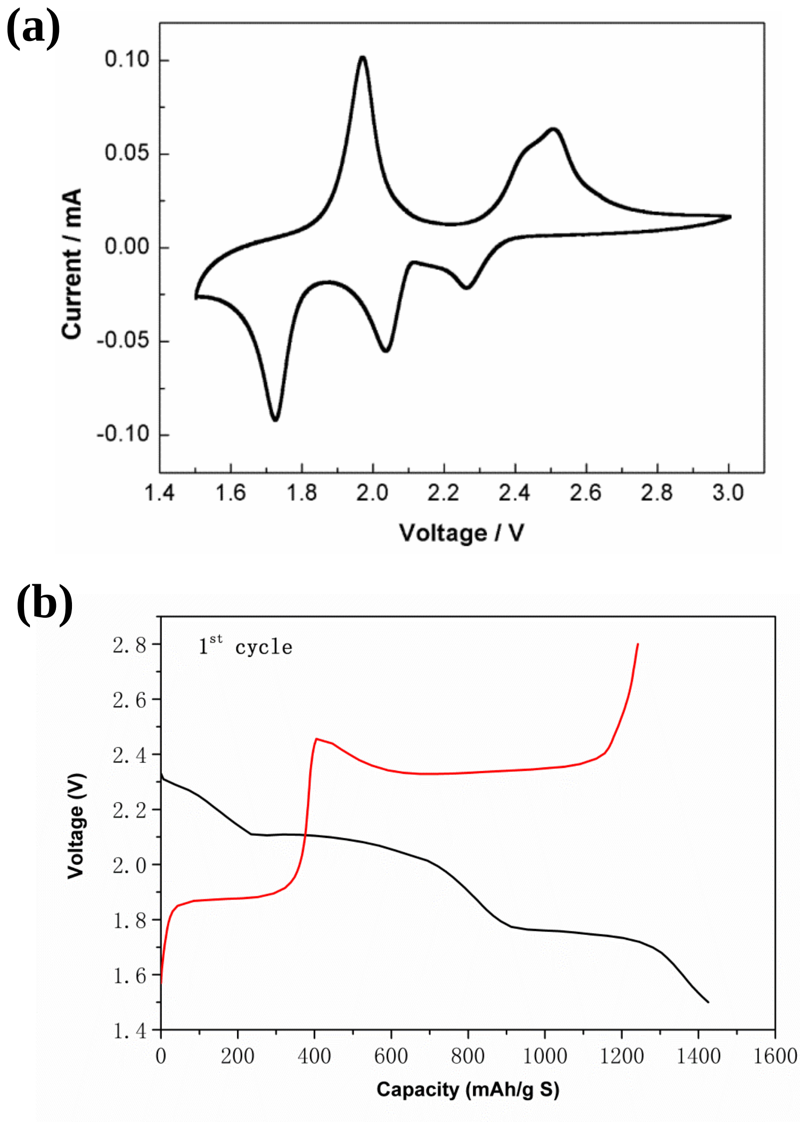

Fig. S6 (a) Cyclic voltammograms of S/TiO_2 NTs with the test range from 1.5 V to 3.0 V. (b) Discharge/charge curves of S/TiO_2 NTs at 0.05 C.

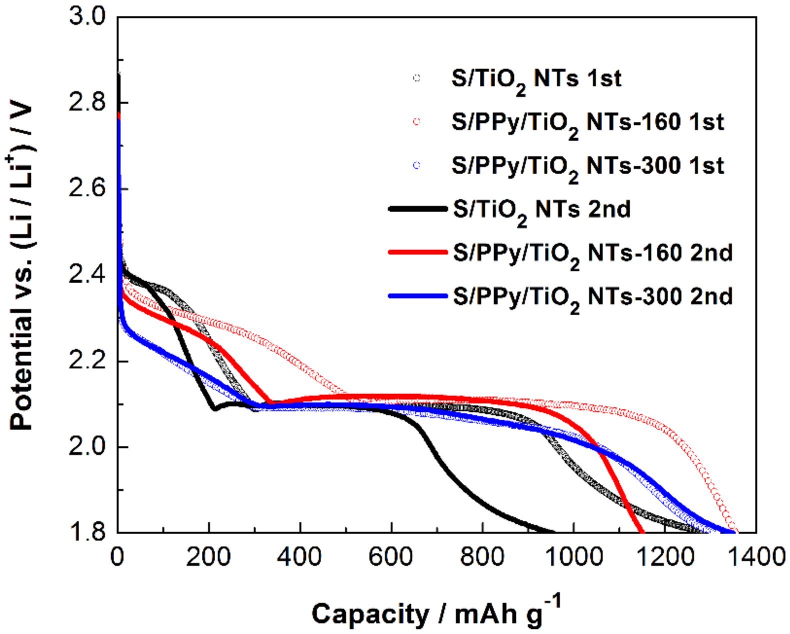

Fig. S7 The discharge curves of the first cycle for S/TiO_2 NTs, S/PPy/TiO_2 NTs-160 and S/PPy/TiO_2 NTs-300 compared with the performance of second cycle at 0.05 C.

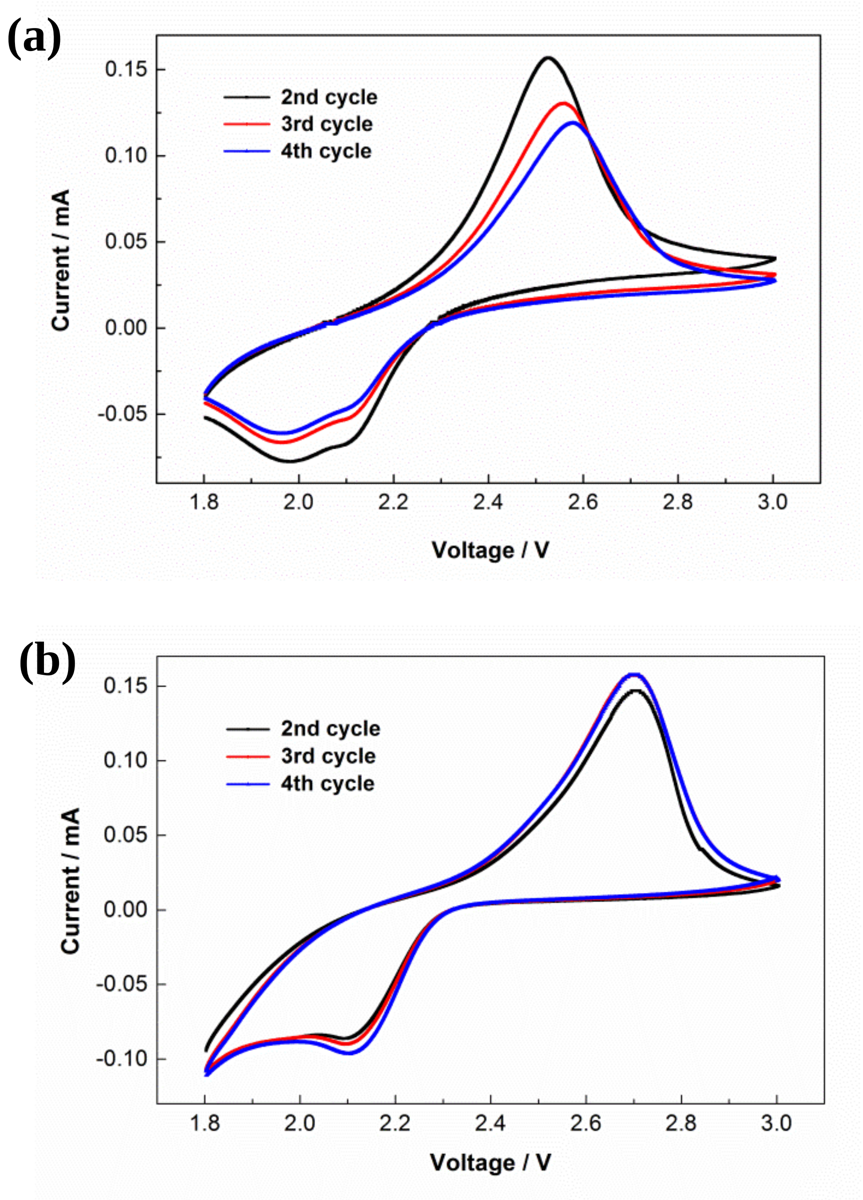

Fig. S8 Cyclic voltammograms of S/PPy/TiO_2 NTs-160 electrode (a), and S/PPy/TiO_2 NTs-300 electrode (b) with the test range from 1.8 V to 3.0 V.

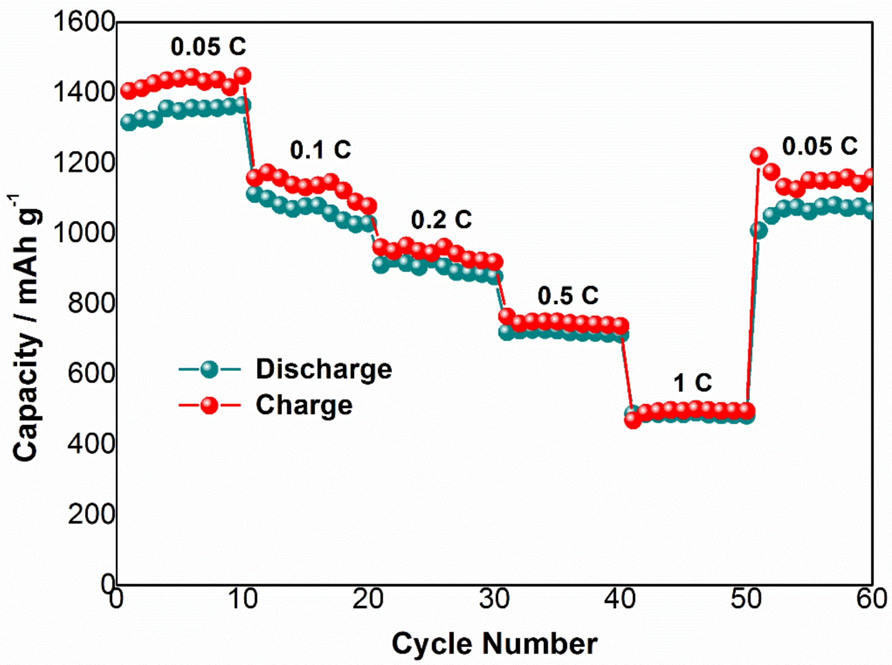

Fig.S9. Discharge/charge capacity of S/PPy/TiO_2 NTs-300 cycled at various C-rates from 0.05 C to 1 C.

Table S1 Summary of the performance of the recently reported corresponding materials compared with our work[1-10]

Approach	First discharge capacity (mAh g^{-1})	Reversible discharge capacity (mAh g^{-1})	Current rate	Total cycle number	Sulphur loading in electrode
S-TiO_2 yolk-shell	1030	690	0.5 C	100	53 wt.%
OSAC@TiO_2-S	995	700	1/16 C	100	47 wt%
S+H-TiO_2	1301.9	928.1	0.1 C	50	41.3 wt%
NG/S-20 TiO_2	1102	905	1	500	73.8 wt%
TiO_{2-x}/S	1100	890	0.2	200	45 wt%
S-TiO_2	900	530	335 mA g^{-1}	50	57.5 wt%
S@PPy/GS	908.7	537.8	0.2	200	49 wt%
S-PPy	1043	500	100 mA g^{-1}	30	65 wt%
PPy@S@PPy	801	554	50 mA g^{-1}	50	65.6 wt%
PPy-AB/S	847	630	0.5 C	200	40.5 wt%
S/PPy/TiO_2 NTs	997.1	1150.6	0.1	100	64.68 wt%

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