Supporting Information

Microwave-assisted rapid preparation of hollow carbon nanospheres@TiN nanoparticles for Lithium-Sulfur batteries

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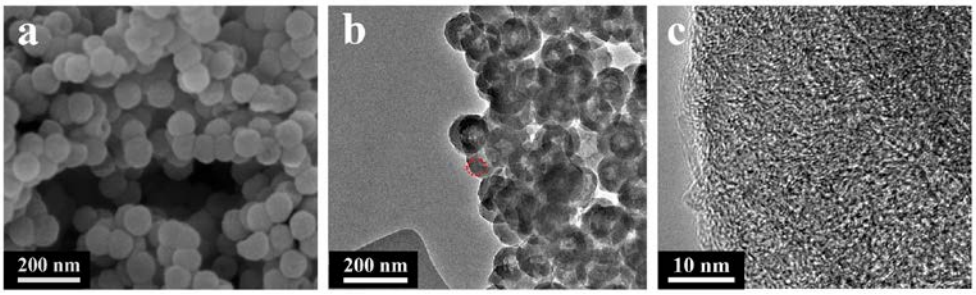

Fig. S1 (a) SEM image and (b, c) TEM images of HCNs.

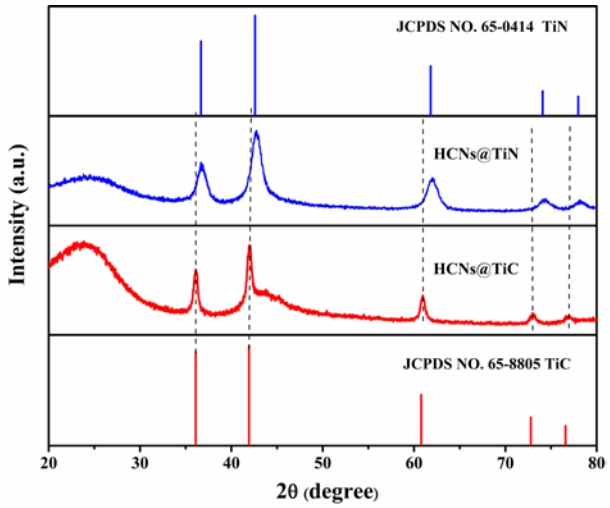

Fig. S2 XRD pattern of HCNs@TiN and HCNs@TiC

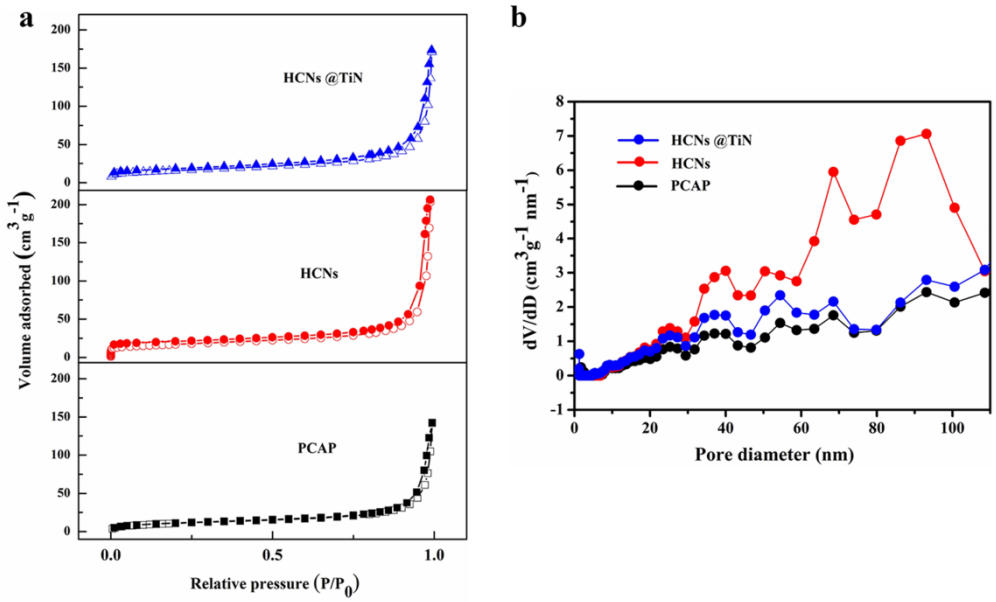

Fig. S3 (a) N_2 adsorption/desorption isotherms and (b) corresponding pore size distributions of PCAP, HCNs and HCNs@TiN.

Table S1

Surface area and pore volume of PCAP, HCNs and HCNs@TiN.

Specimen	S_{BET} (m^2 g^{-1})	V_{total} (cm^3 g^{-1})
PACP	39.4	0.16
HCNs	58.6	0.26
HCNs@TiN	54.9	0.20

Table S2.

Electrochemical performance of sulfur cathodes based on HCNs@TiN compared with other representative sulfur cathode based on porous carbon materials in the literatures.[15, 32, 44-46]

Sulfur hosts (morphology)	**Sulfur content (mg cm^{-2})**	**Current rate (C)**	**Cycle number**	**Initial Capacity (mAh g^{-1})**	**Capacity retention (%)**	**Ref.**
Hollow carbon nanospheres@TiN	1.2	0.1	200	1098	74	This work
Hollow carbon nanosphere	1.5-2.0	0.2	200	1401	44.7	15
Hollow carbon nanosphere/polymer	1.0	0.1	500	1430	31	32
Graphene/hollow carbon sphere	1.3-1.7	1	200	832	69.1	44
TiO/hollow carbon sphere	1.5	0.5	500	1066	59.1	45
$Ti_3C_2T_x$@Meso carbon	2	0.5	300	1255.8	56.1	46