Supplementary Information (SI)

Cubic-shaped WS_2 nanopetals on Prussian blue derived nitrogen-doped carbon nanoporous framework for high performance sodium-ion batteries

Yew Von Lim,[1] Ye Wang,[1] Dezhi Kong,[1] Lu Guo,[1] Jen It Wong,[2] L. K. Ang,[1] and Hui Ying Yang[1†]

[1.] Pillar of Engineering Product Development, Singapore University of Technology and Design, 8 Somapah Road, Singapore 487372, Singapore

[2.] JEOL Asia Pte. Ltd., 2 Corporation Road, #01-12, Singapore 618494, Singapore

[†]Corresponding author. Tel.: +65 6303 6663; Fax: +65 6779 5161. *E-mail address:* yanghuiying@sutd.edu.sg (H. Y. Yang)

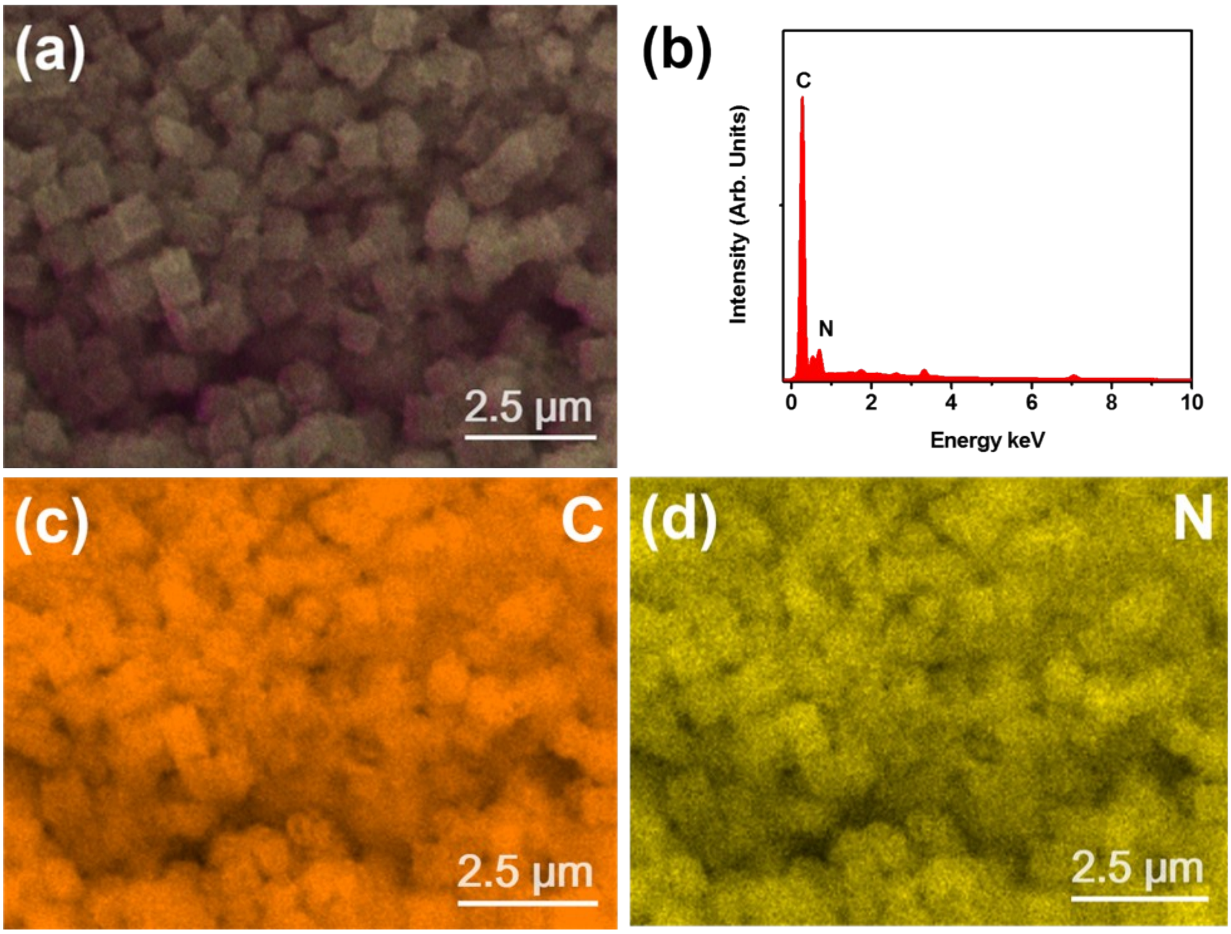

Figure S1. EDS results of the derived porous carbon nanocubes, (a) SEM and EDS images stack, (b) EDS spectra, and elemental mappings of (c) carbon, and (d) nitrogen.

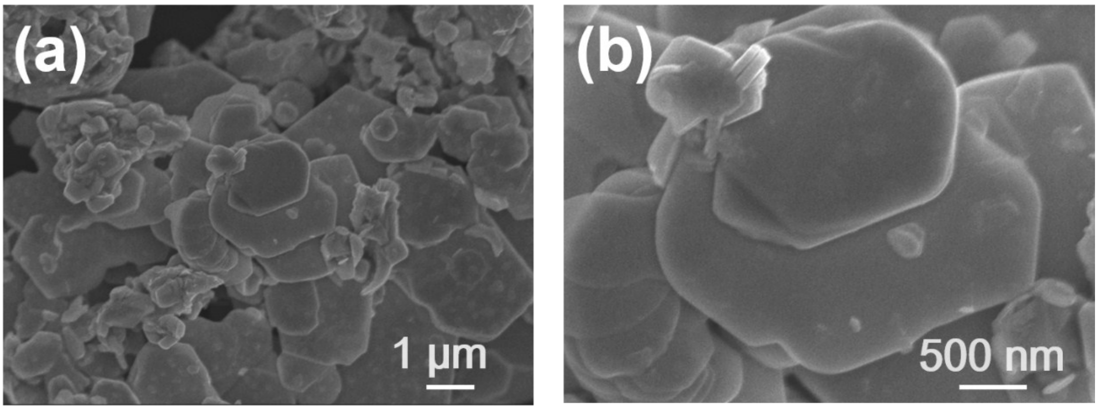

Figure S2. SEM images of the pure WS_2 at various magnifications.

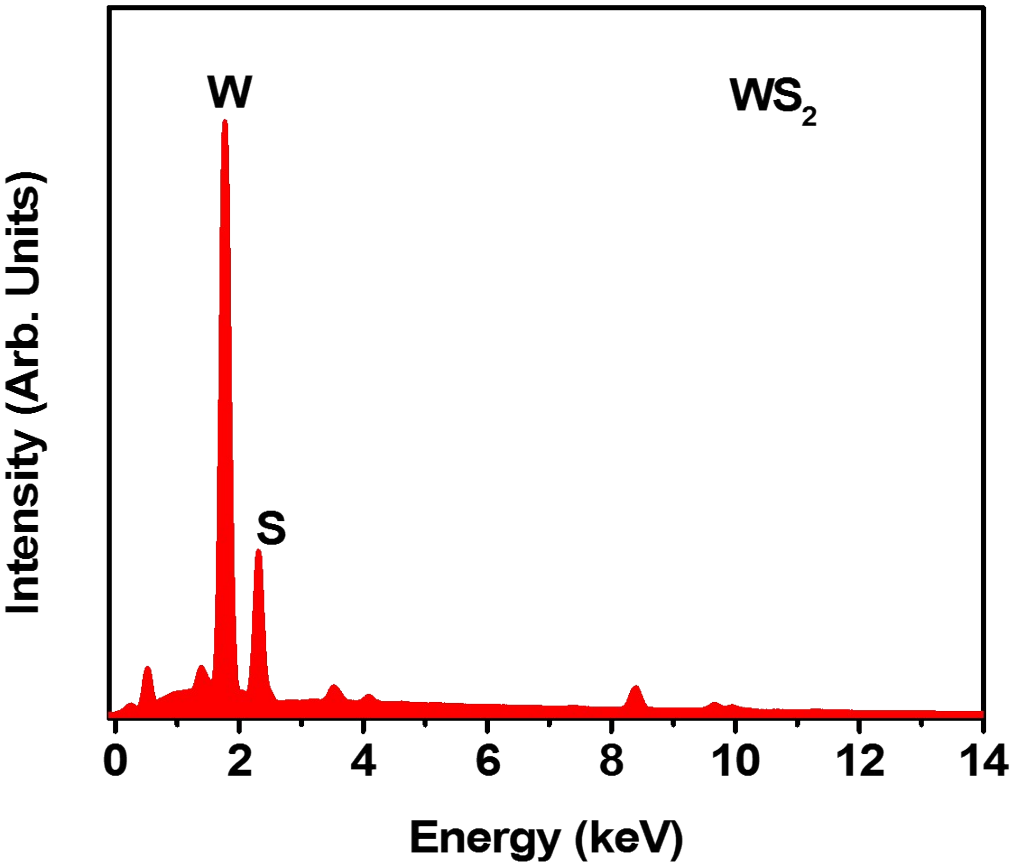

Figure S3. EDS spectra of the pure WS_2.

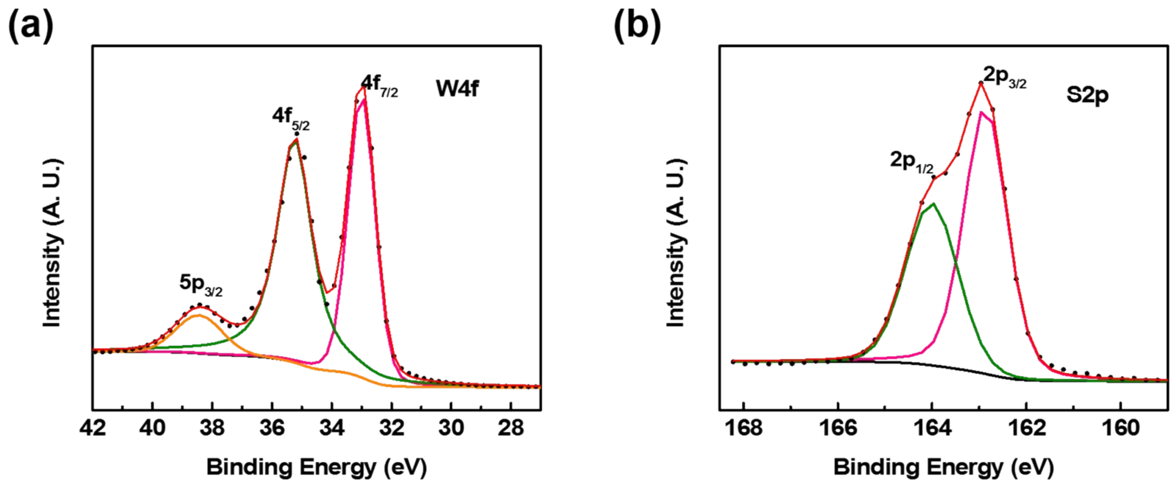

Figure S4. XPS spectra of, (a) W 4f, and (b) S 2p of the pristine WS_2 samples.

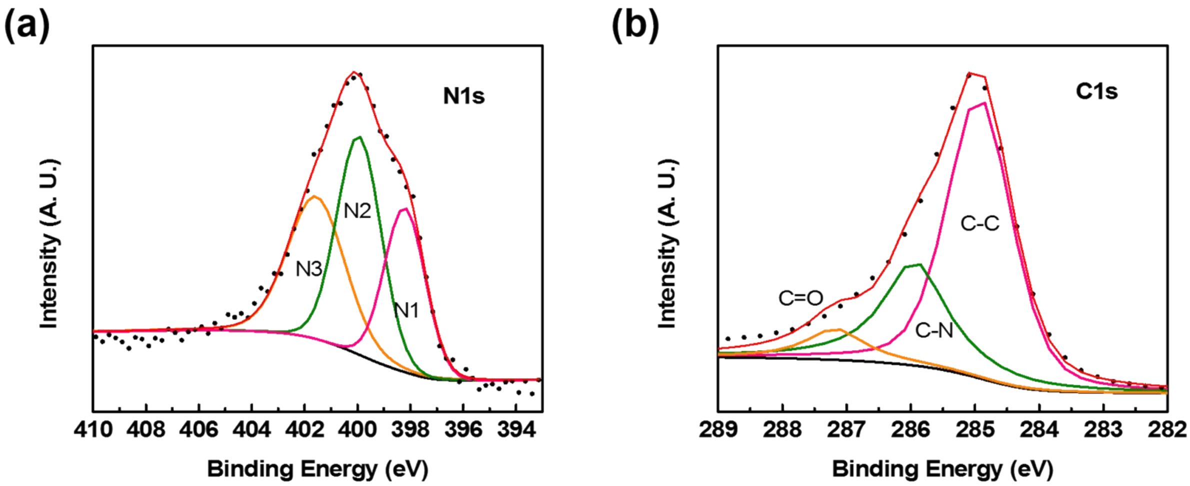

Figure S5. XPS spectra of, (a) N 1s with N1 (pyridinic-N), N2 (pyrrolic-N), and N3 (graphitic-N), and (b) C 1s of the pristine nitrogen-doped carbon nanocubes.

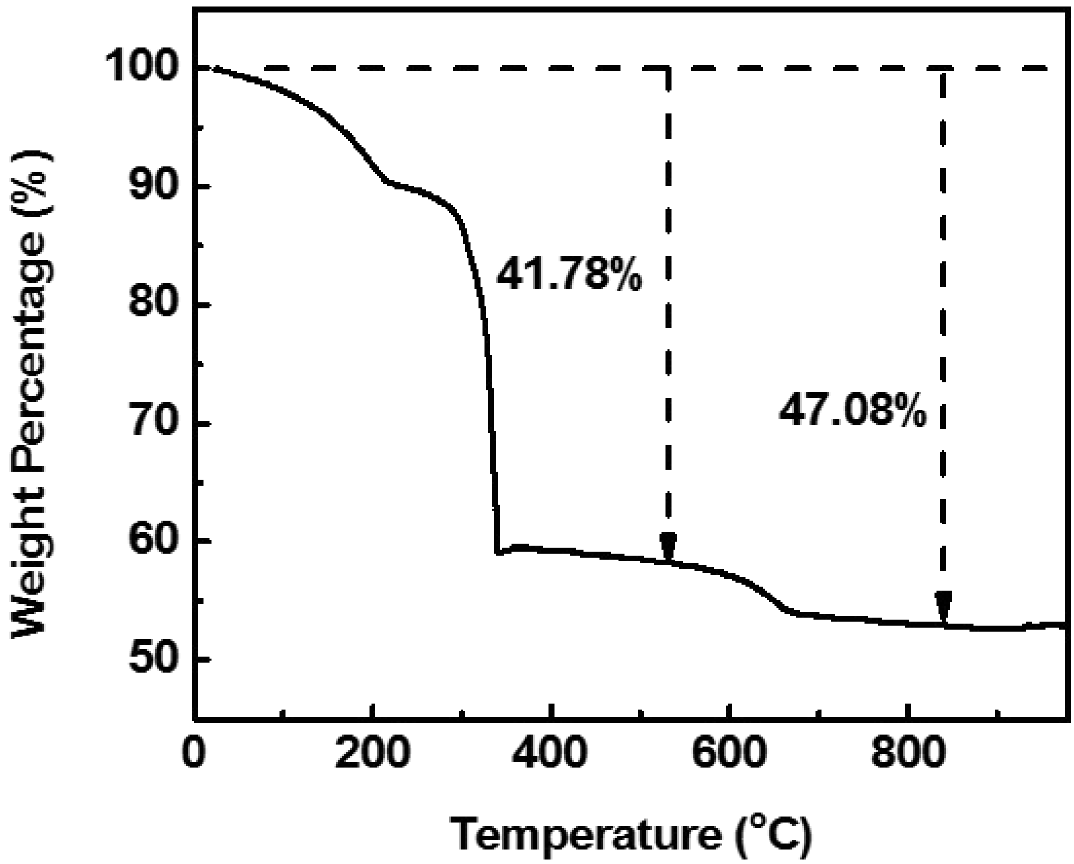

Figure S6. TGA of the as-prepared PB nanocubes measured in air

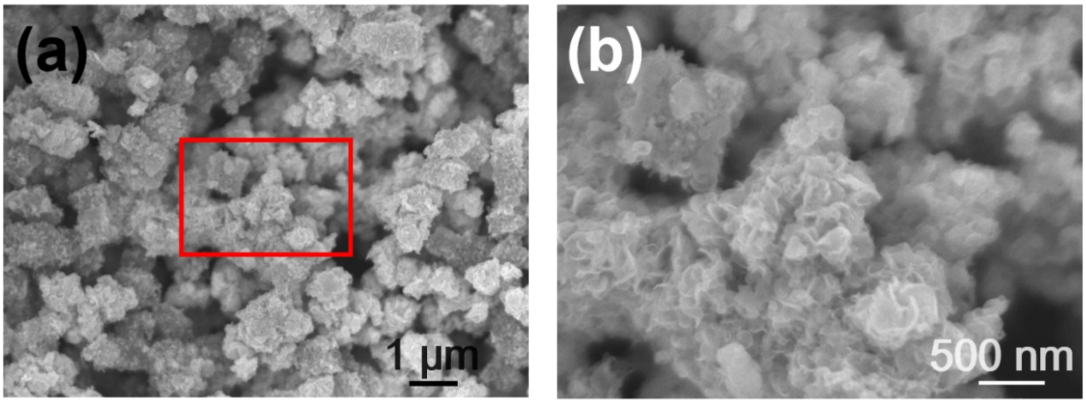

Figure S7. SEM image of the WS_2@NC electrode materials after 200th cycle lifetime at different magnifications.

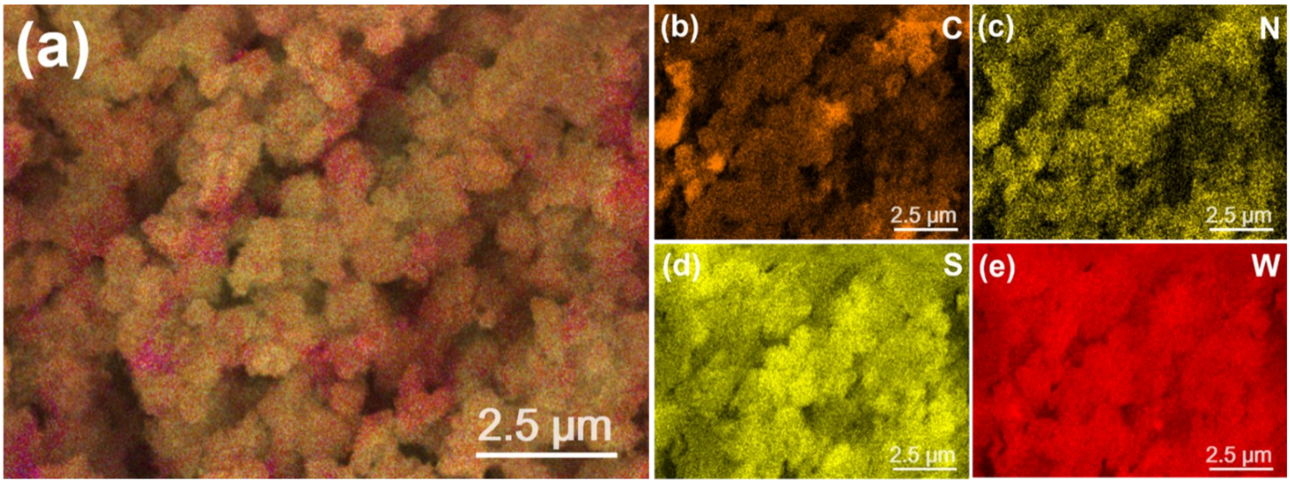

Figure S8. EDS mapping results of the WS_2@NC after the 200th cycle lifetime, of (a) SEM and EDS image stack, and elemental mapping results of (b) carbon, (c) nitrogen, (d) sulfur and (e) tungsten.

Table S1. The result of this work and in comparison of the state-of-art synthesis methods of improving performance of TMDs based SIBs electrode materials and their electrochemical performance.

Examples	**Synthesis Methods**	**Electrochemical Properties (mAh g^{-1}/cycles/mA g^{-1})**	**Ref.**
This work	Solvothermal methods	320/200/200 384/100	
WS_2/CNT-rGO Hierarchical framework	Solvothermal methods + freeze drying	252.9/100/200	[1]
WS_2 nanosheets/ N-doped carbon	Precipitation methods	360/100/100 200/100/200	[2]
WS_2/RGO microspheres	Spray pyrolysis	334/200/200	[3]
WS_2/graphene	Hydrothermal methods	329/500/20 218/500/80 170/500/160	[4]
WS_2/carbon	Electrostatic spray Deposition	219/200/500	[5]
WS_x/WO_3 Thornbush nanofibers	Electrospinning and Calcination	600/100/100	[6]
MoS_2/graphene paper	Filtration and calcination	218/20/25	[7]
MoS_2 nanosheets	Liquid phase exfoliation	161/20/100	[8]
MoS_2-PEO	Exfoliation restacking	148/70/50	[9]
MoS_2 in Carbon nanofibers	Electrospinning	300/100/1000	[10]
MoS_2/carbon composites	Hydrothermal methods	400/300/670	[11]
MoS_2 vine-like Nanofibers	Electrospinning	470/30/100	[12]
MoS_2/graphene composites	Hydrothermal methods	312.7/200/100	[13]
MoS_2 nanosheets (ultrathin)	Ultrasonic exfoliation Methods	251/100/320	[14]
MoS_2 nanoflowers	Hydrothermal methods	320/600/320	[15]
WS_2/carbon	Ball milling and sulfidation	270/100/100	[16]

References

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