Electronic Supplementary Material (ESI) for Nanoscale.

Supplementary Information for

A unique hollow Li_3VO_4/carbon nanotubes composite anode for high-rate long-life lithium-ion batteries†

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§ These authors contributed equally to this work. All authors discussed the results and commented on the manuscript. The authors declare no competing financial interest.

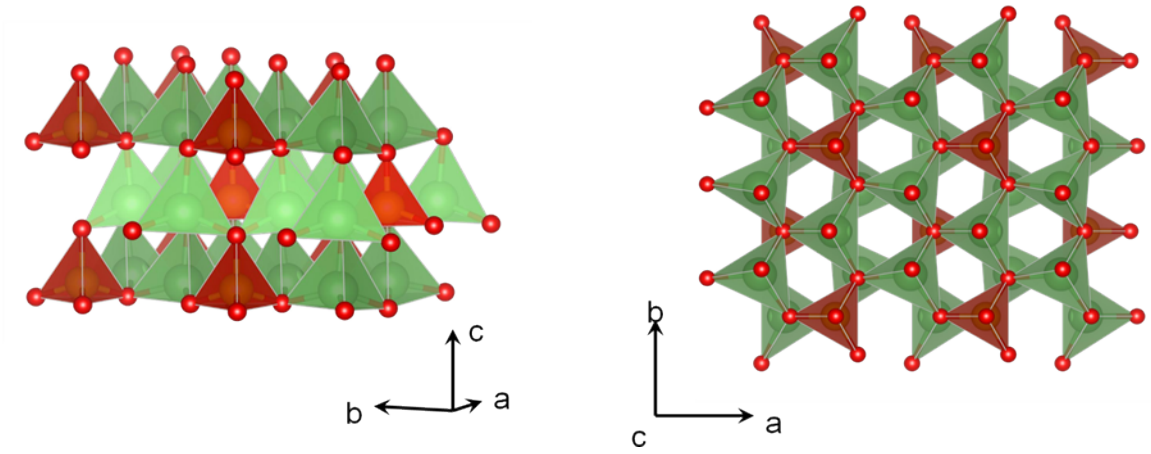

Figure S1. The crystal structure of Li_3VO_4.

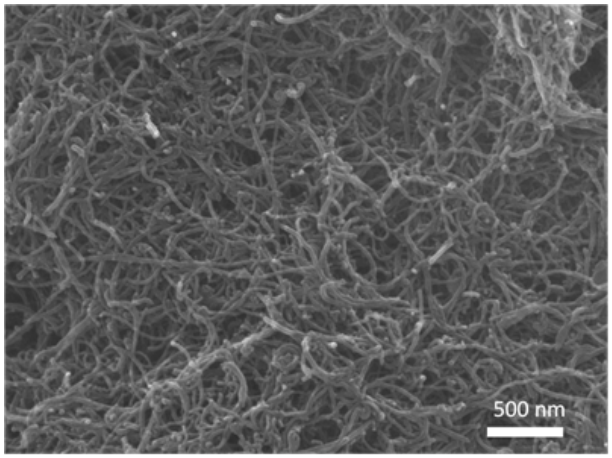

Figure S2. SEM image of hydroxylated CNTs.

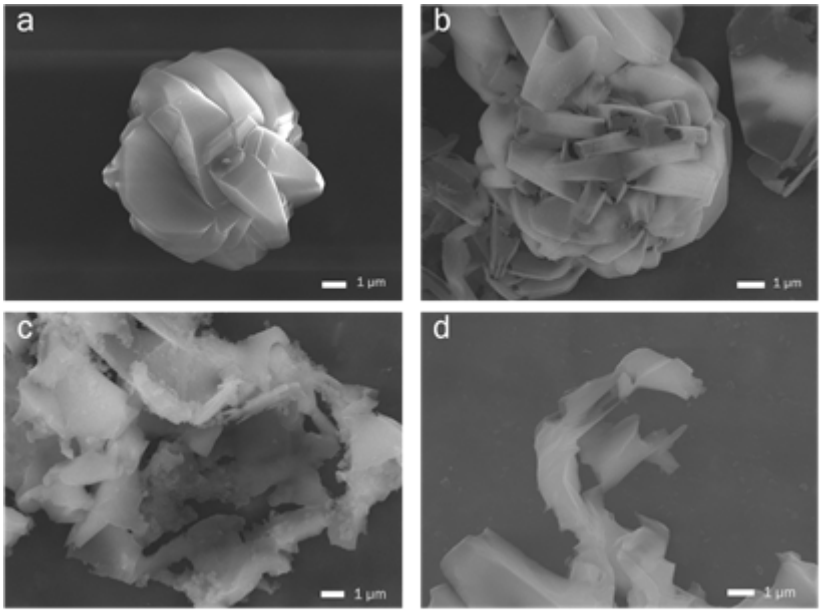

Figure S3. Li_3VO_4 was etched by different dosage water. (a) Without water treatment. (b) Washing the Li_3VO_4 two times. (c) Washing the Li_3VO_4 three times. (d) Washing the Li_3VO_4 four times.

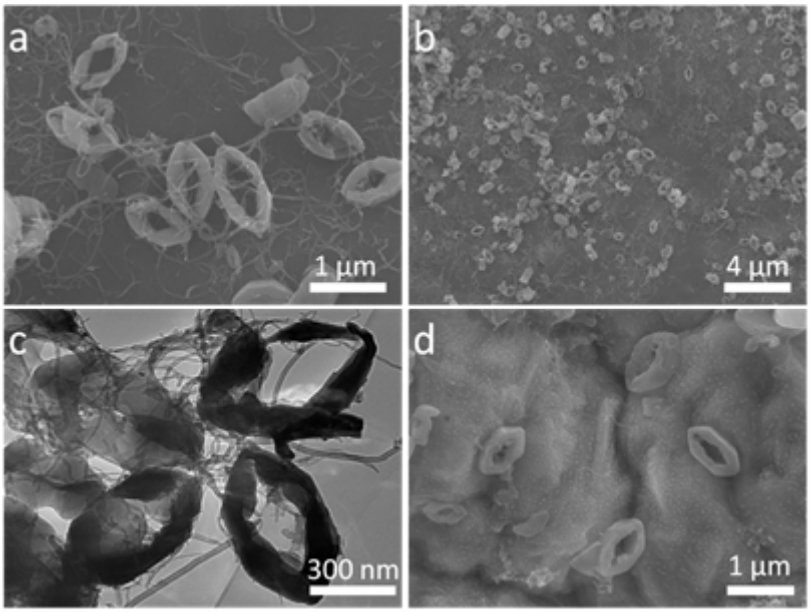

Figure S4. (a) and (b) SEM images of the hollow Li_3VO_4/CNT composite. (c) Low magnification TEM image of the hollow Li_3VO_4/CNT composite. (d) SEM image of the hollow Li_3VO_4/CNT composite electrode.

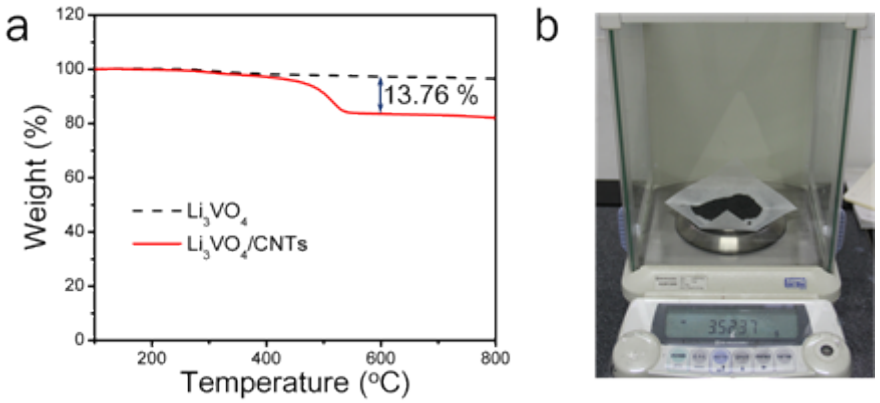

Figure S5. (a) TGA curves of Li_3VO_4 and the hollow Li_3VO_4/CNT composite. (b) The production in one pot (360 mL) was weighed to be 3.5237 g.

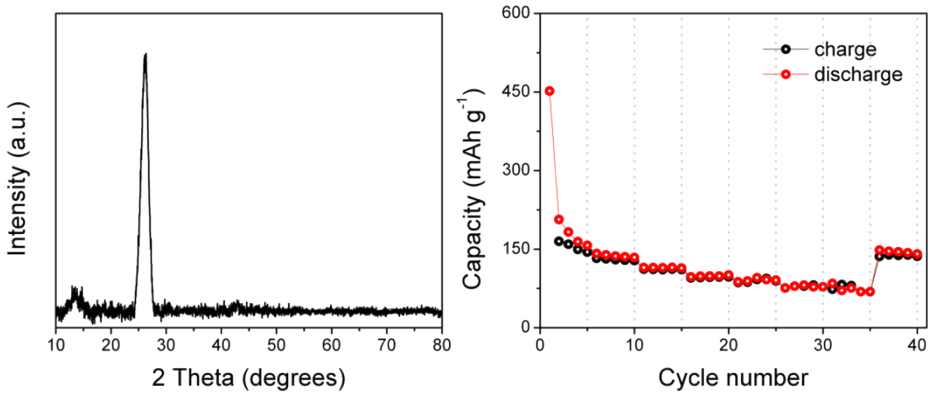

Figure S6. XRD pattern and rate performance of CNTs.

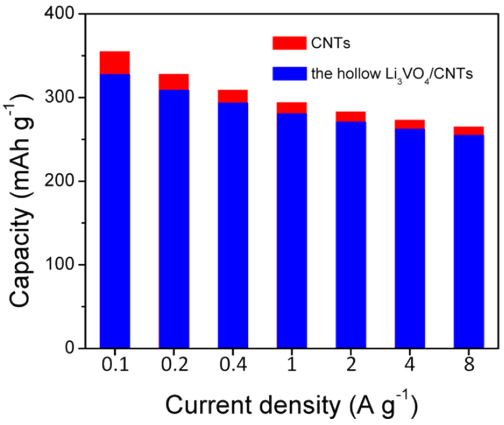

Figure S7. The capacity contribution ratio of CNTs and the hollow Li_3VO_4.

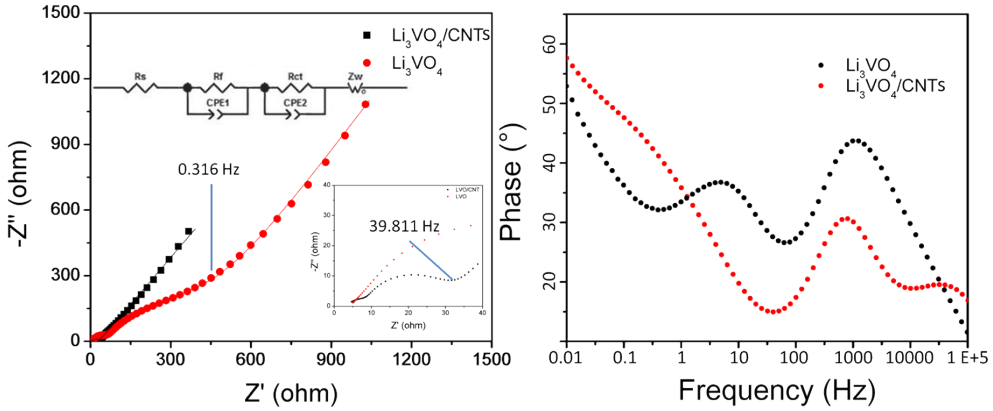

Figure S8. EIS and phase diagram of Li_3VO_4 and Li_3VO_4/CNT anodes after 30 cycles.

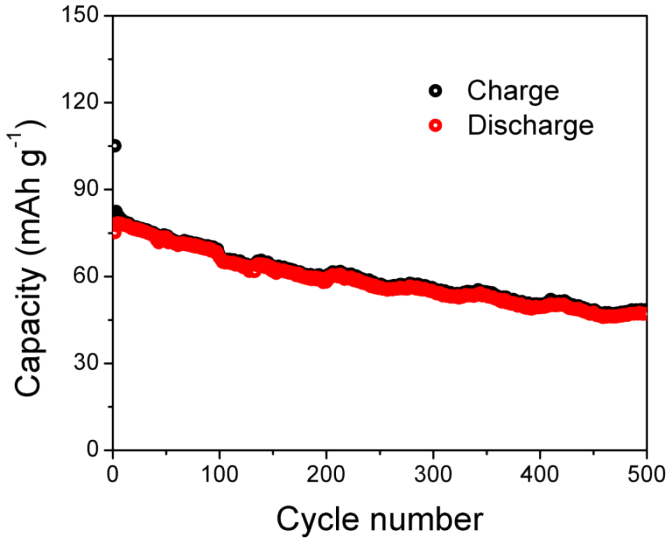

Figure S9. Cyclic performance of $LiFePO_4$ at 320 mA g^{-1}.

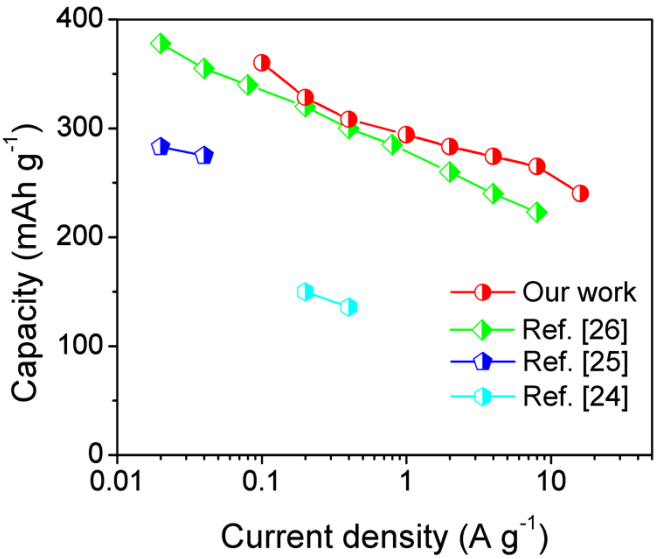

Figure S10. Electrochemical performance of the hollow Li_3VO_4/CNT anode material compared with other previous works.

Table S1. Electrochemical performance of Li_3VO_4 anode material compared with other previous works.

	Synthetic method	Time (h)	morphology	Current density (A g^{-1})	Electrochemical performance (mAh g^{-1})	References
Li_3VO_4	solid-state method	6	microparticle	0.2	154	24
				0.4	136	
Li_3VO_4	solid-state method	8	microparticle	0.02	283	25
				0.04	265	
Li_3VO_4/GO	hydrothermal	40	microbox	0.2	320	26
				0.4	300	
				8	223	
Our composite	hydrothermal	2	hollow nanoparticle	0.2	328	
				0.4	308	
				8	265	
				16	240	

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