

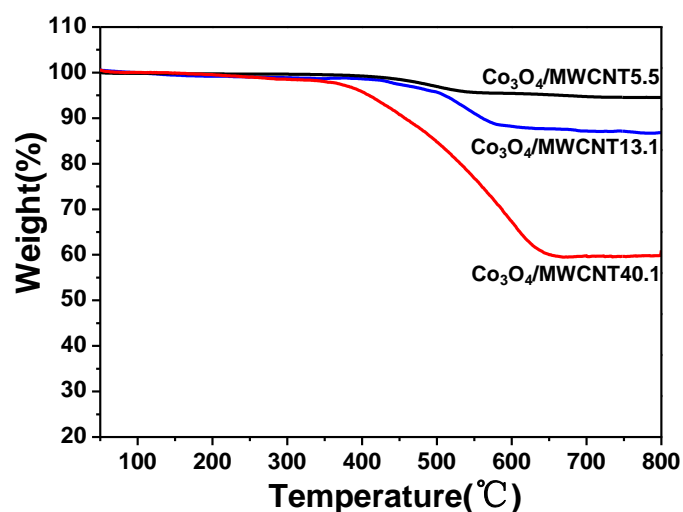
## Supporting information

### Octahedral $\text{Co}_3\text{O}_4$ particles threaded by carbon nanotube arrays as intergrated structure anodes for lithium ion batteries

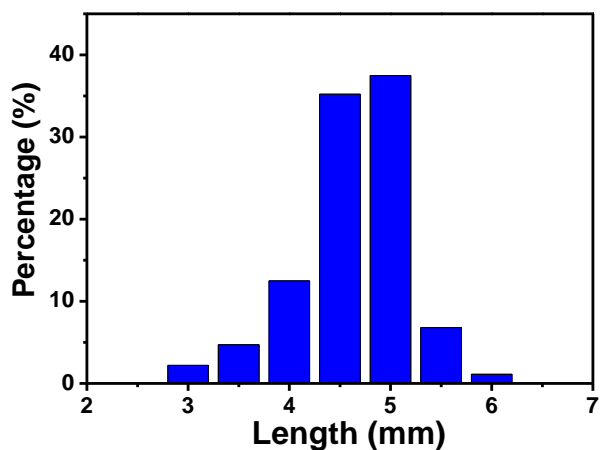
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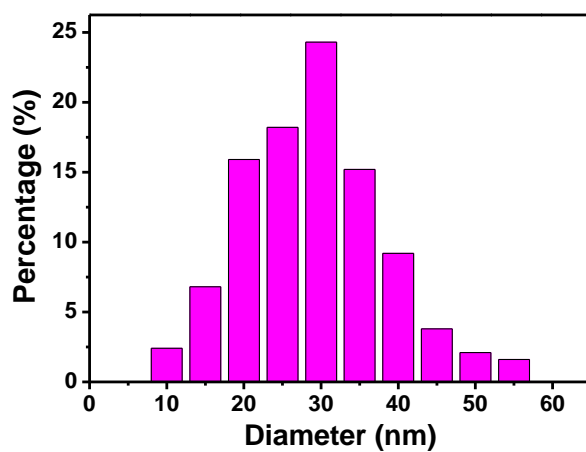
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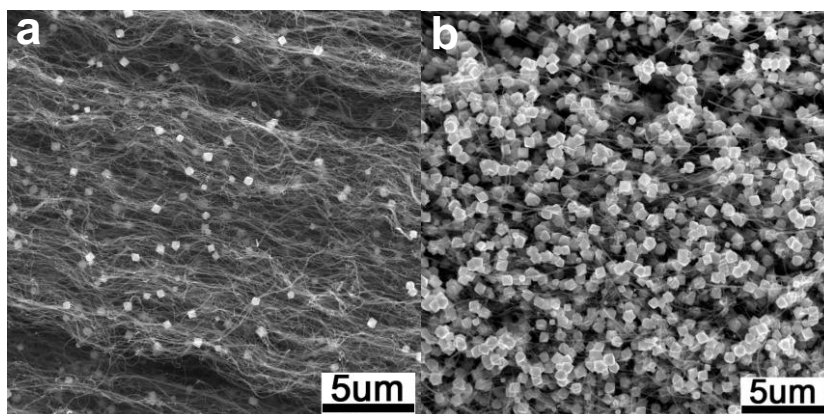
**Fig. S1** Thermogravimetric curves of the  $\text{Co}_3\text{O}_4/\text{MWCNT}$  arrays in air with a heating rate of  $10\text{ }^\circ\text{C min}^{-1}$ , indicating the  $\text{Co}_3\text{O}_4$  content of 59.9, 86.9 and 94.5 wt%.



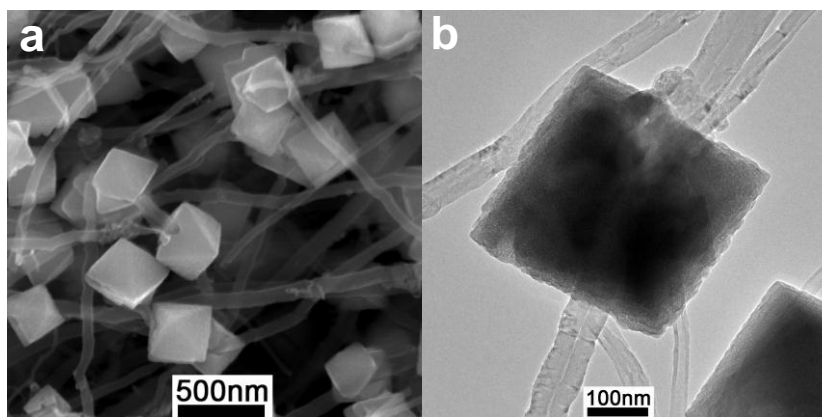
**Fig. S2** Length distribution of the the ultra-long MWCNT arrays.



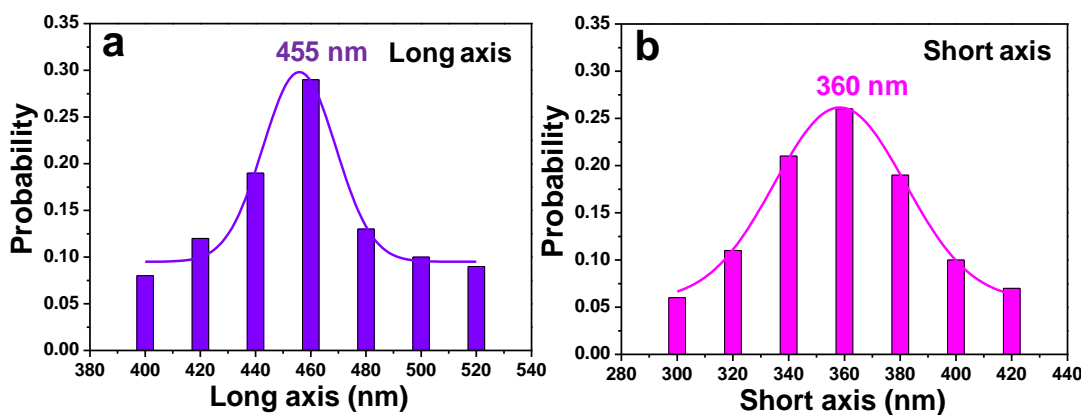
**Fig. S3** Diameter distribution of the the ultra-long MWCNT arrays.



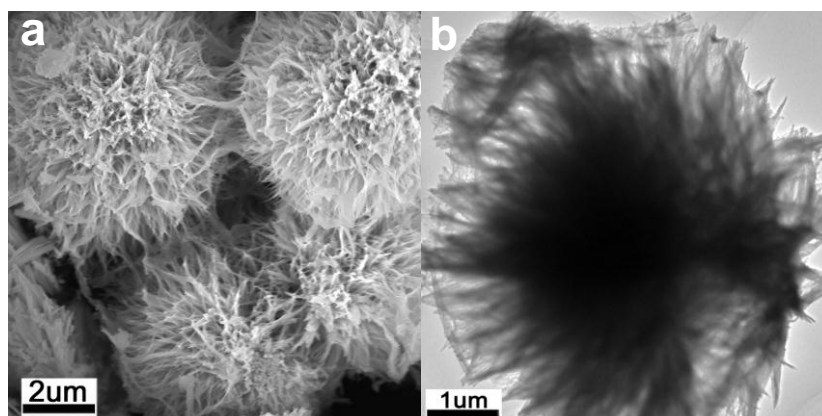
**Fig. S4** SEM images of the (a)  $\text{Co}_3\text{O}_4/\text{MWCNT40.1}$  and (b)  $\text{Co}_3\text{O}_4/\text{MWCNT5.5}$  composites.



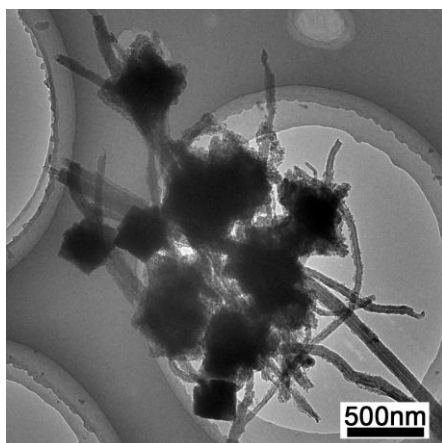
**Fig. S5** (a) SEM and (b) TEM images of the  $\text{Co}_3\text{O}_4/\text{MWCNT13.1}$  composite showing the threaded structure.



**Fig. S6** (a, b) Size distributions of the octahedral  $\text{Co}_3\text{O}_4$  particles.



**Fig. S7** (a) SEM and (b) TEM images of the urchin-like  $\text{Co}_3\text{O}_4$ .



**Fig. S8** TEM image of the Co<sub>3</sub>O<sub>4</sub>/MWCNT13.1 composite after 100 discharge/charge cycles.