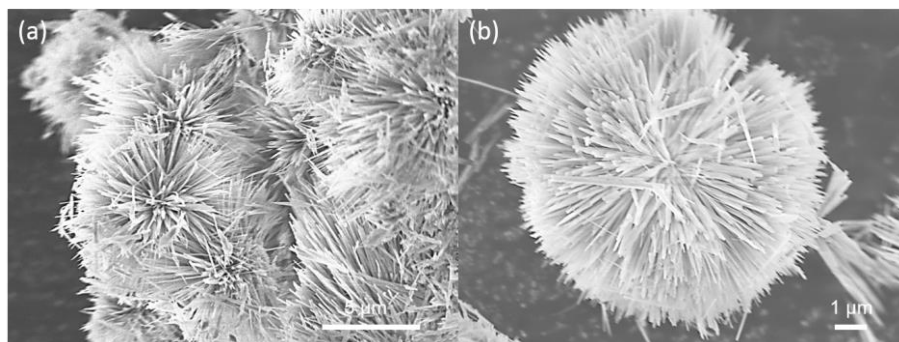


## Electronic Supplementary Information

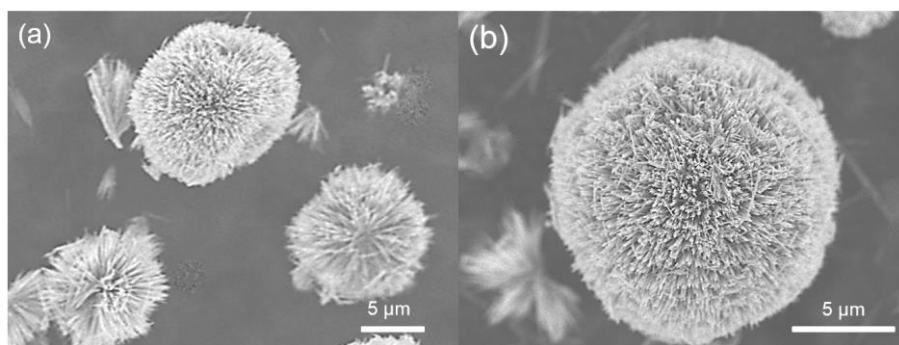
### **Urchin-like CoO-C Micro/Nano Hierarchical Structures as High Performance Anode Materials for Li-Ion Batteries**

*Lili Liu, Lihui Mou, Jia Yu, Shimou Chen\**

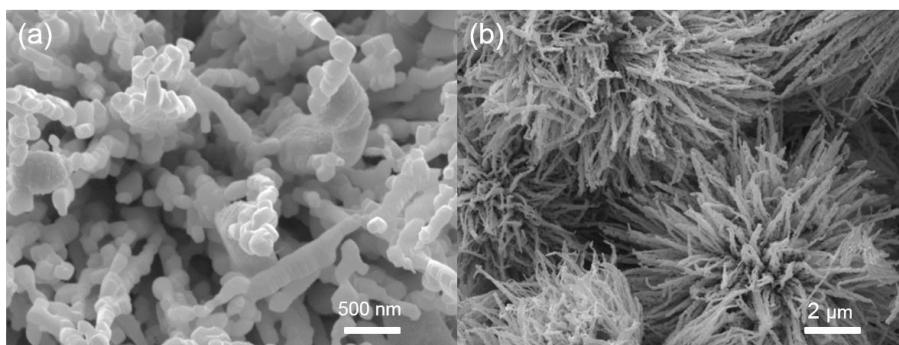
## Supplementary Figures



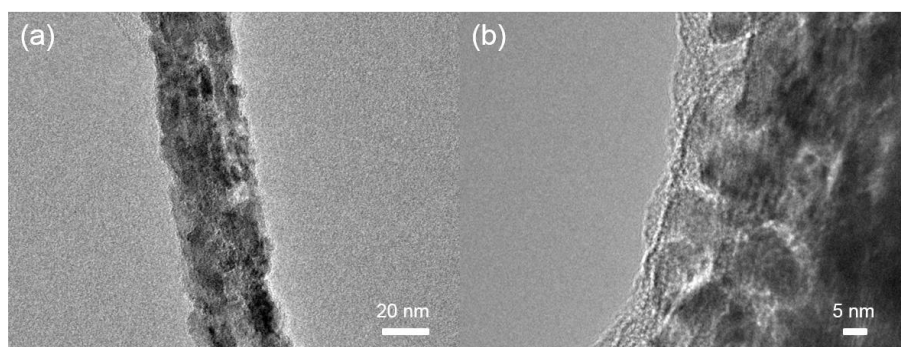
**Fig. S1** Morphologies of urchin-like cobalt carbonate hydroxide precursor microspheres.



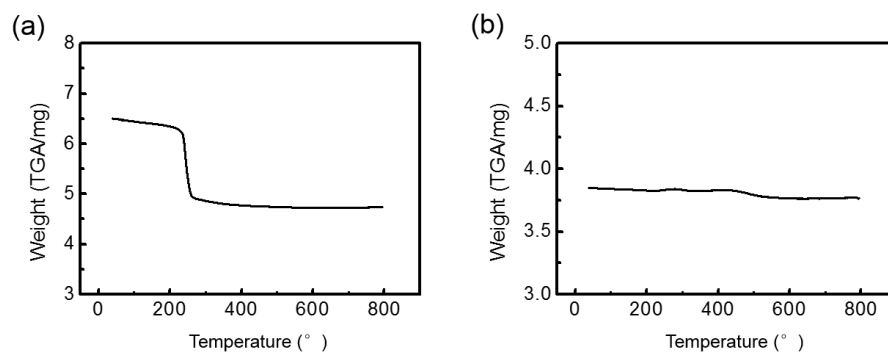
**Fig. S2** Morphologies of final CoO-C microspheres.



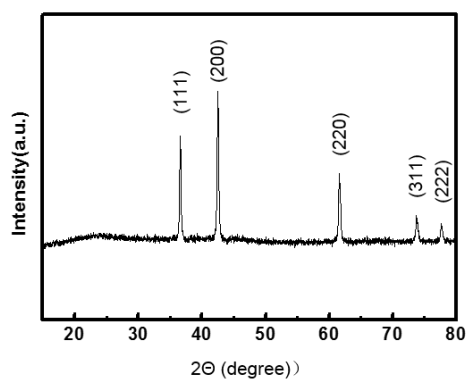
**Fig. S3** Morphologies of CoO-C microspheres with higher carbon coating amount.



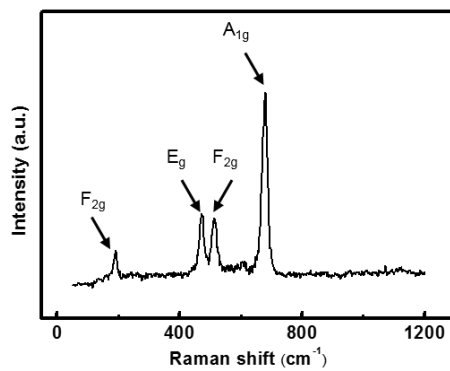
**Fig. S4** TEM image of the individual nanowire, exhibiting the porous structure of inner CoO and the thin carbon coating layer.



**Fig. S5** TG analysis curve of the (a) cobalt carbonate hydroxide precursor and (b) CoO-C final product.

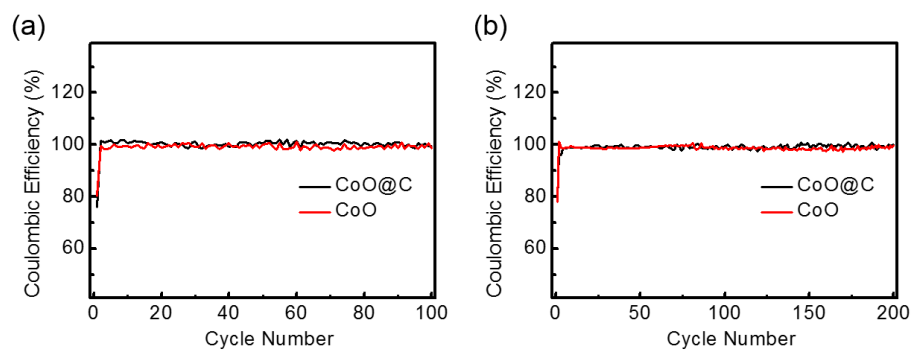


**Fig. S6** XRD pattern of the single CoO material without carbon coating layer.



**Fig. S7** Raman spectrum, exhibiting the F<sub>2g</sub>, A<sub>1g</sub> and E<sub>g</sub> peaks of CoO.





**Fig. S8** Coulombic efficiencies of the CoO-C and CoO during cycles with current densities of (a)  $100 \text{ mA g}^{-1}$  and (b)  $500 \text{ mA g}^{-1}$ .

**Table S1** Performance comparison with other LIB anodes based on cobalt-oxide based multiple or single component nanostructures.

Electrode material	Cycle Numbers	Discharge Capacity/mAhg <sup>-1</sup>	Current density/mAg <sup>-1</sup>	Ref
Urchin-like CoO@C Microspheres	100	755	100	Our Work
Mesoporous Co <sub>3</sub> O <sub>4</sub> Nanowire Arrays	20	700	111	<i>Nano Lett.</i> , 2008, <b>8</b> , 265
Co <sub>3</sub> O <sub>4</sub> Nanobelt Array	25	770	177	<i>ACS Nano</i> , 2010, <b>4</b> , 1425
Single-, Double-, Triple-Shelled Co <sub>3</sub> O <sub>4</sub> hollow spheres	50	680, 866, 611	178	<i>Adv. Funct. Mater.</i> , 2010, <b>20</b> , 1680
Mesoporous Co <sub>3</sub> O <sub>4</sub> Nanowire Arrays	70	550	100	<i>Adv. Funct. Mater.</i> , 2012, <b>22</b> , 861
Porous ZnCo <sub>2</sub> O <sub>4</sub> Nanoflakes	25	750	80	<i>J. Mater. Chem.</i> , 2010, <b>20</b> , 4439
CoO@N-Doped Carbon Nanocube	50	598.3	100	<i>ACS Appl. Mater. Interfaces</i> , 2014, <b>6</b> , 10602
CoO@C wall arrays	60	804	500	<i>J. Mater. Chem. A</i> , 2014, <b>2</b> , 11597