

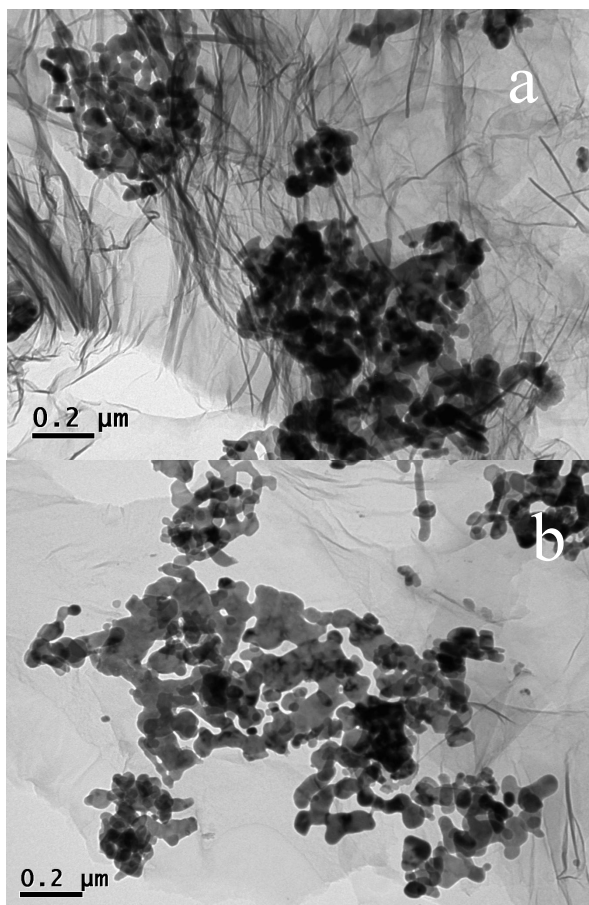
## **Supporting Information**

### **Microwave-assisted synthesis of $\text{Co}_3\text{O}_4$ - graphene sheet-on-sheet nanocomposite as a superior anode material for Li-ion Batteries**

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#### **Supporting Information 1**

TEM images of  $\text{Co}_3\text{O}_4$ -GNS sheet-on-sheet nanocomposite.

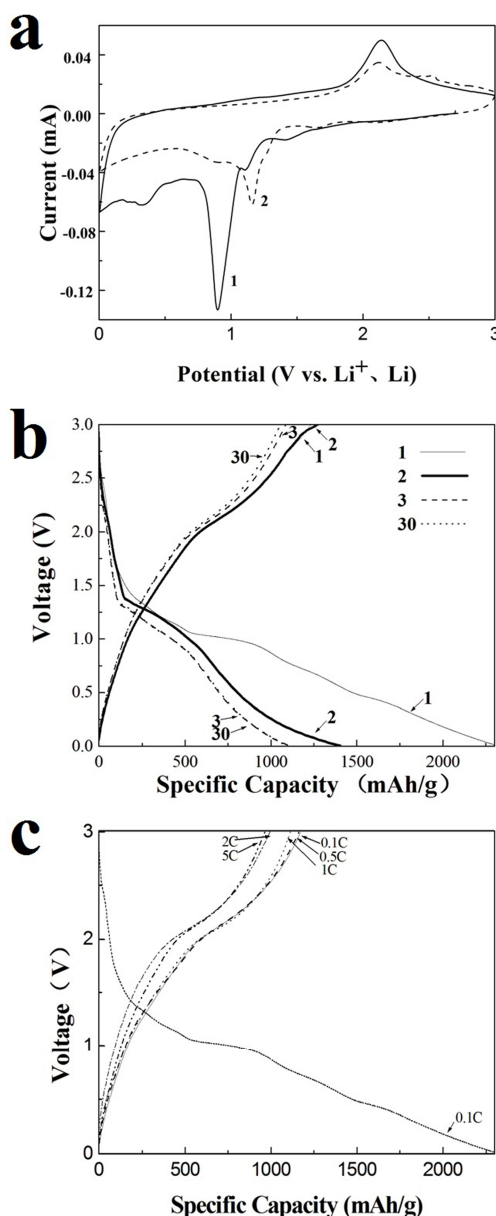


## Supporting Information 2

(a) Cyclic voltammetry of Co<sub>3</sub>O<sub>4</sub>-GNS composite anode. A few cathodic peaks (~1.4V, 1.1V, 0.9 V, 0.3V) are observed in the first cycle, corresponding to multi-step lithium insertions in the anode and solid electrolyte interface (SEI) film formation. An anodic peak at ~2.1V is attributed to the oxidation reaction of Co. In the 2<sup>nd</sup> cycle, a large cathodic peak at ~1.2V is attributed the reduction reaction of Co<sub>3</sub>O<sub>4</sub> and the anodic peak (~2.1V) is still observed. The lithium storage mechanism of Co<sub>3</sub>O<sub>4</sub> is indicated by the following equation:



(b) the 1<sup>st</sup>, 2<sup>nd</sup>, 3<sup>rd</sup>, and 30<sup>th</sup> cycles of discharge and charge curves of Co<sub>3</sub>O<sub>4</sub>-GNS composite at 0.1C. (c) the first cycle discharge and charge curve of Co<sub>3</sub>O<sub>4</sub>-GNS composite anode at different rates of 0.1C, 0.5C, 1C, 2C, and 5C (1C=890 mA.g<sup>-1</sup>). For each current rate, the first cycle discharging was kept at 0.1C.



### Supporting Information 3

TEM image of the  $\text{Co}_3\text{O}_4$ -GNS electrodes after cycling, showing that porous structure could be still retained after repetitive lithium insertion and extraction. Because electrolytes and carbon black particles were also present, GNS was hard to be viewed in this image.

