



## Supporting Information

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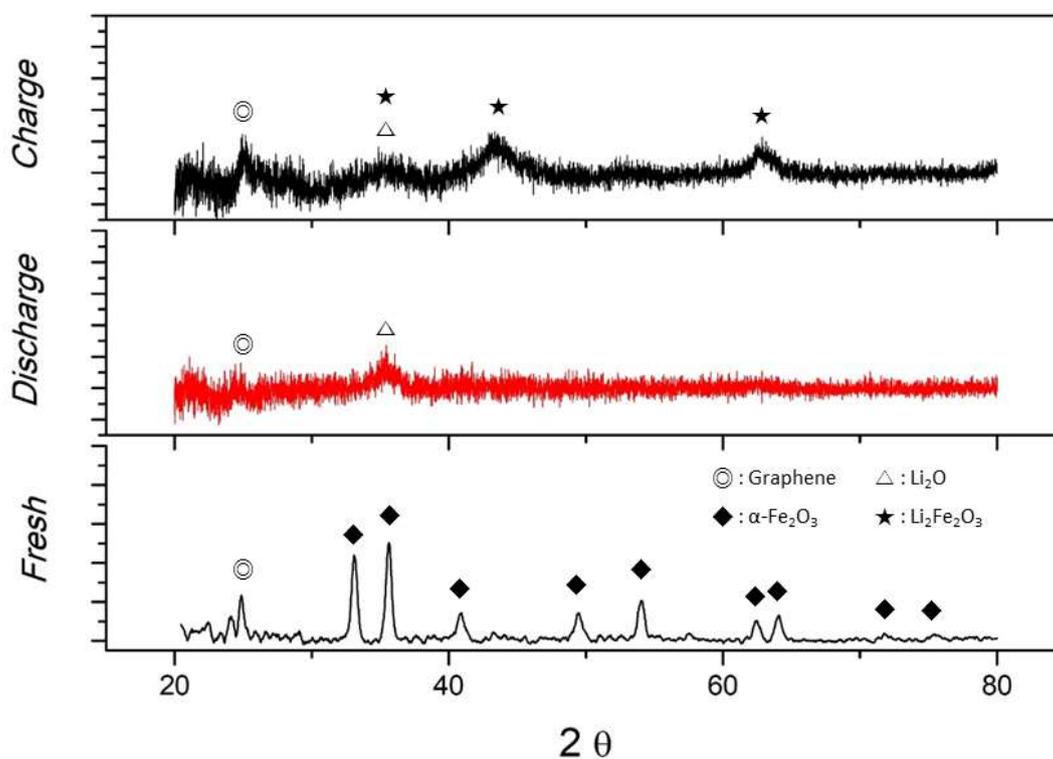
Etching-Assisted Crumpled Graphene Wrapped Spiky  
Iron Oxide Particles for High-Performance Li-Ion Hybrid  
Supercapacitor

*Eunji Kim, Hyeri Kim, Byung-Jun Park, Young-Hee Han, Jong  
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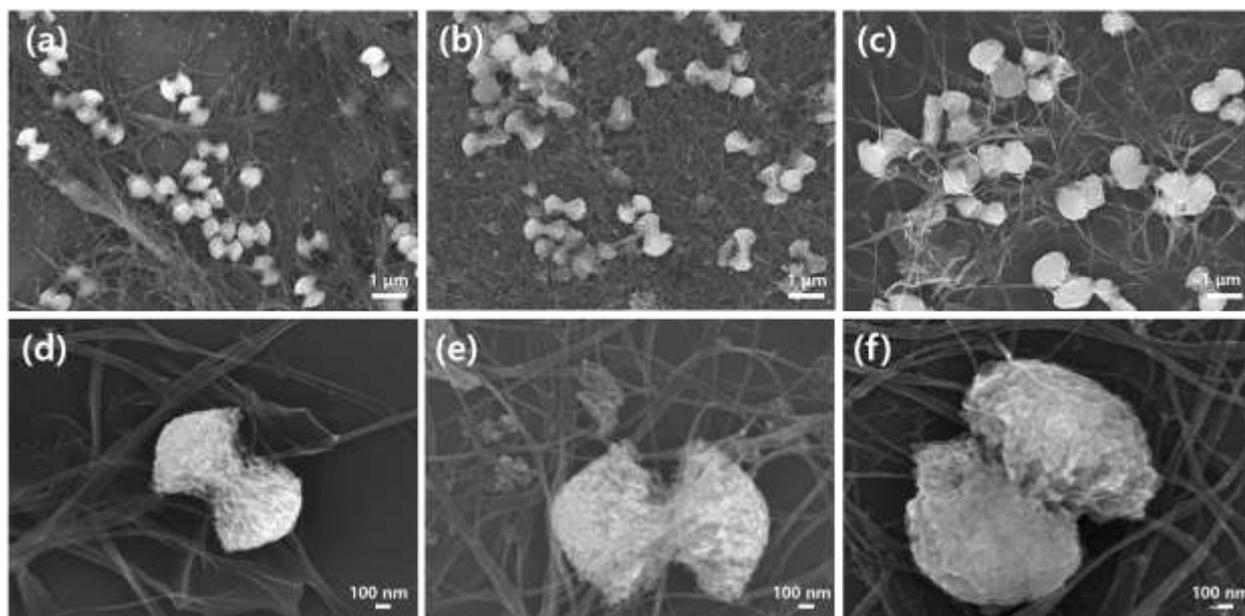
## Supporting Information

**Etching-assisted crumpled graphene wrapped spiky iron oxide particles for high performance Li-ion hybrid supercapacitor**

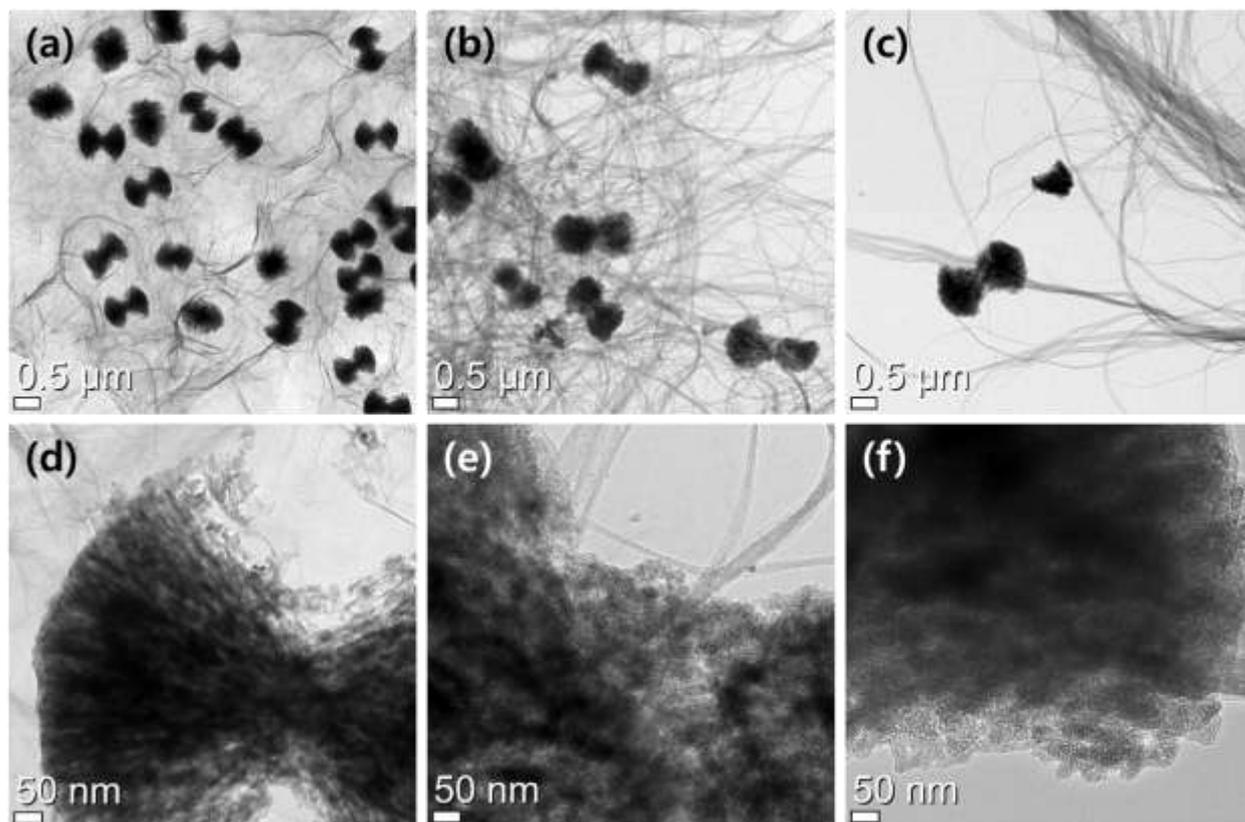
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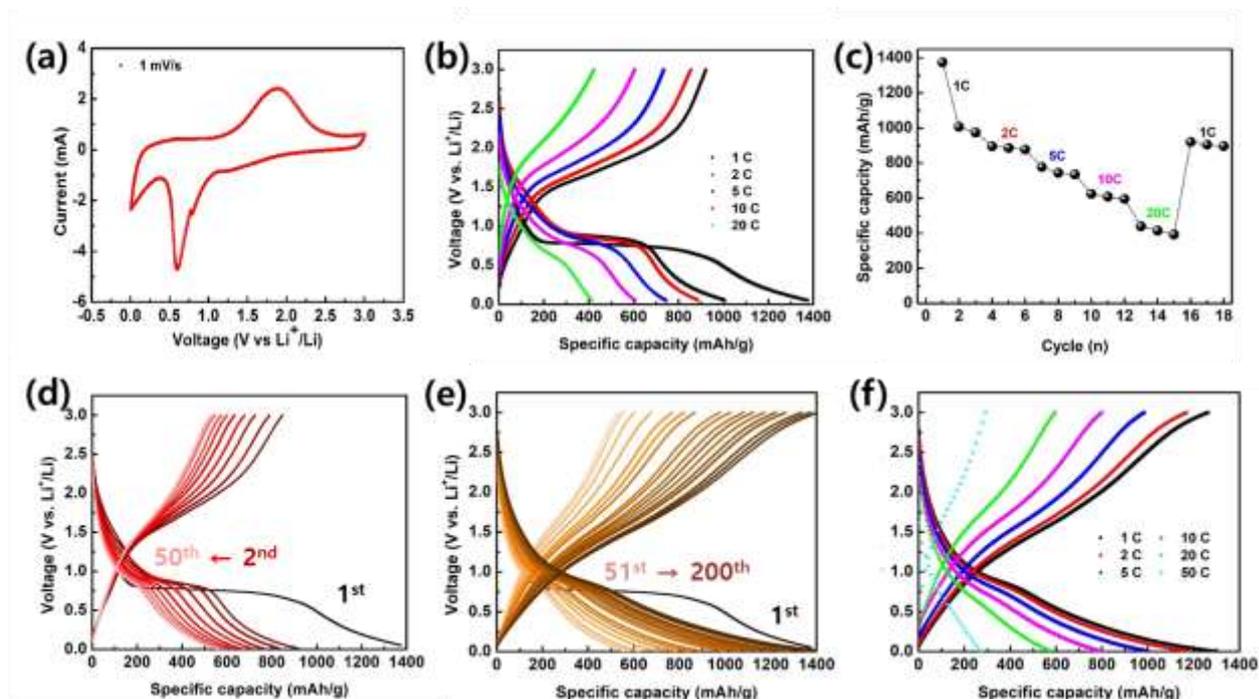
**Figure S1.** XRD patterns of pristine CG@SF electrodes, and charged/discharged states of CG@SF electrodes after 2 cycles.



**Figure S2.** SEM images of (a and d) pristine partially-etched spiky  $\alpha$ - $\text{Fe}_2\text{O}_3$  particles, discharged state of CG@SF electrodes after (b and e) 50 cycles and (c and f) 200 cycles.



**Figure S3.** TEM images of (a and d) pristine partially-etched spiky  $\alpha$ - $\text{Fe}_2\text{O}_3$  particles, (b and e) charged state and (c and f) discharged state of CG@SF electrodes after 200 cycles.



**Figure S4.** Electrochemical performances of the crumpled graphene wrapped spiky iron oxide (CG@SF) electrode with a potential range of 0.05 – 3.0 V in 1 M LiPF<sub>6</sub> electrolyte. (a) CV curve of half-cell CG@SF//Li at a scan rate of 1 mV s<sup>-1</sup> with the 1<sup>st</sup> cycle in the voltage range of 0.05 – 3.0 V vs Li/Li<sup>+</sup>. (b) Galvanostatic charge-discharge profiles and (c) specific capacity of the CG@SF electrode at the different current density from 1 C to 20 C from the 1<sup>st</sup> cycle. (d and e) Galvanostatic charge-discharge profiles of the CG@SF electrode at the current density at 1 C (d) from the 1<sup>st</sup> to 50<sup>th</sup> cycles and (e) from the 51<sup>st</sup> to 200<sup>th</sup> cycles. (f) Galvanostatic charge-discharge profiles of the CG@SF electrode at the different current density from 1 C to 20 C after the 200<sup>th</sup> cycles.