

## Supporting Information

### Solution-grown GeO<sub>2</sub> nanoparticles with a nearly 100% yield as lithium-ion battery anodes

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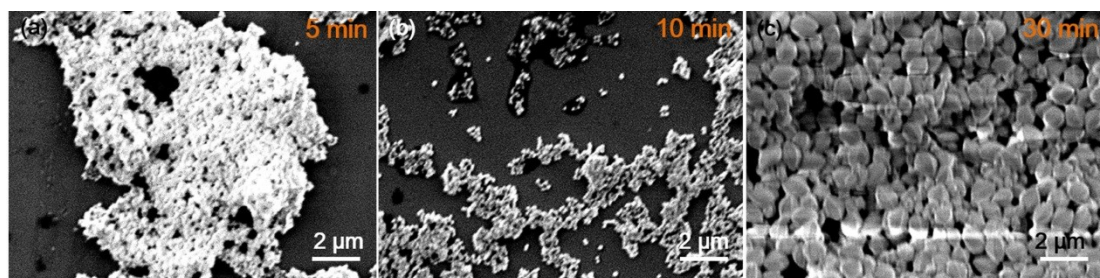


Figure S1. SEM images for different reaction time to discuss the growth mechanism of GeO<sub>2</sub> nanoparticles. (a) 5 min (b) 10 min, and (c) 30 min.

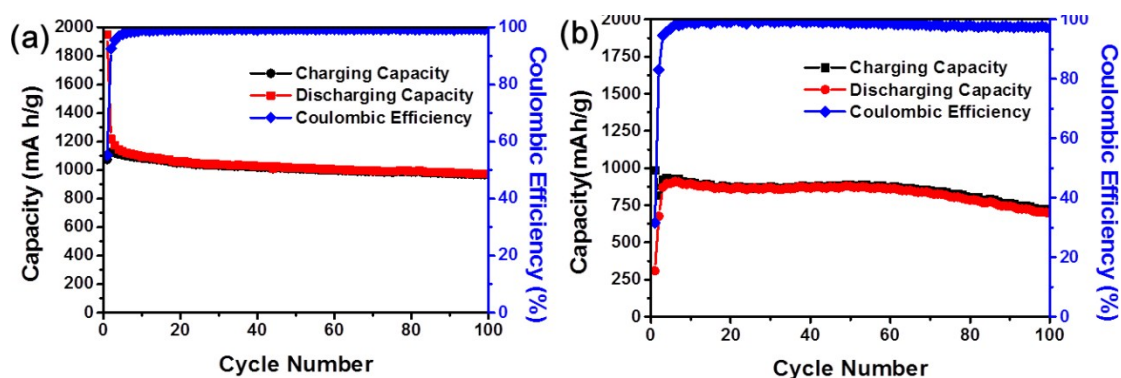


Figure S2. galvanostatic charging/discharging curve of GeO<sub>2</sub> nanoparticles obtained in the cyclohexane system for oil phase at

different current rate between the voltage 0.01 V to 1.5 V at room temperature (electrolyte :FEC/DMC). (a) 0.1 C (b) 1C

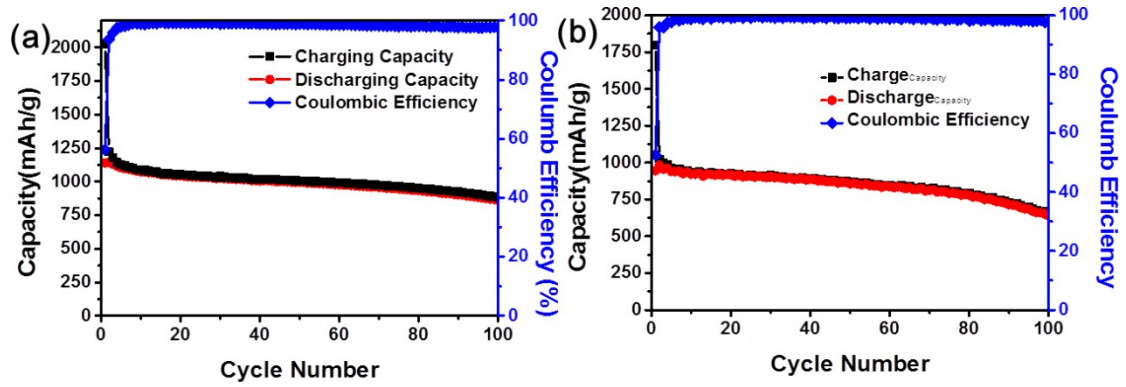


Figure S3. galvanostatic charging/discharging curve of GeO<sub>2</sub> nanoparticles obtained in the hexane system for oil phase at

different current rate between the voltage 0.01 V to 1.5 V at room temperature with electrolyte EC/DMC. (a) 0.1 C (b) 1C

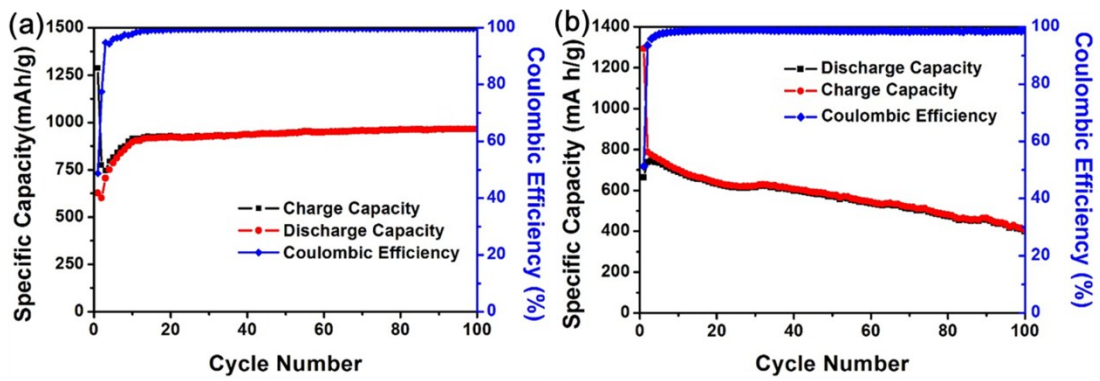
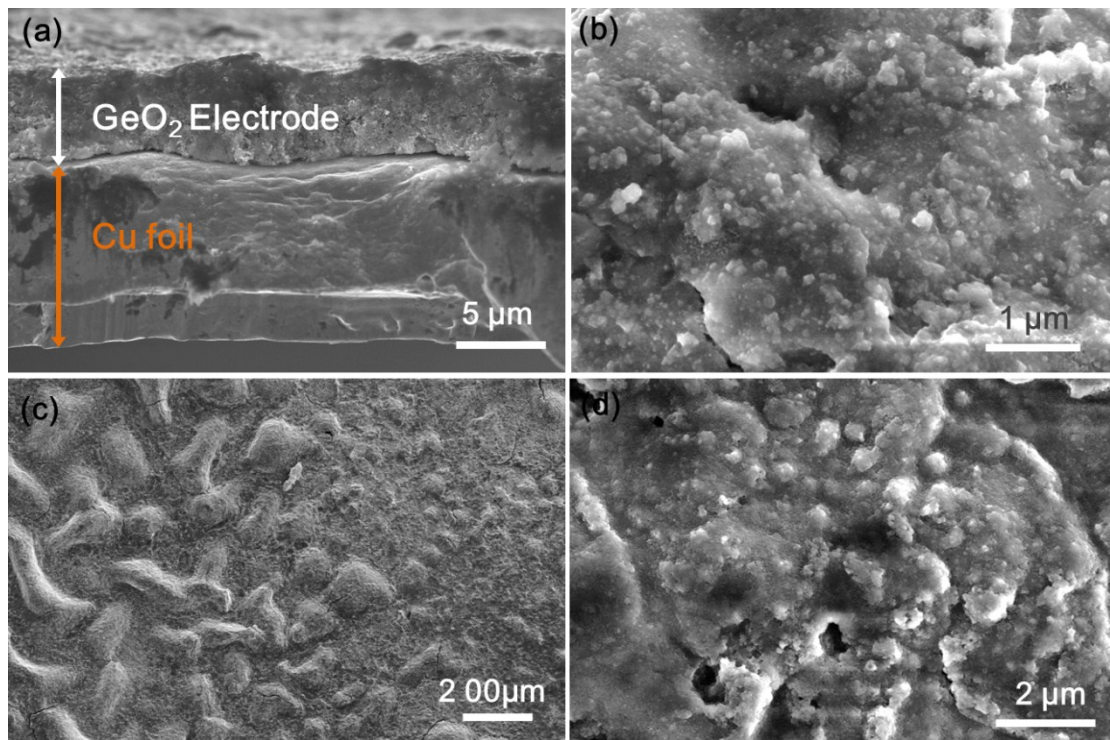


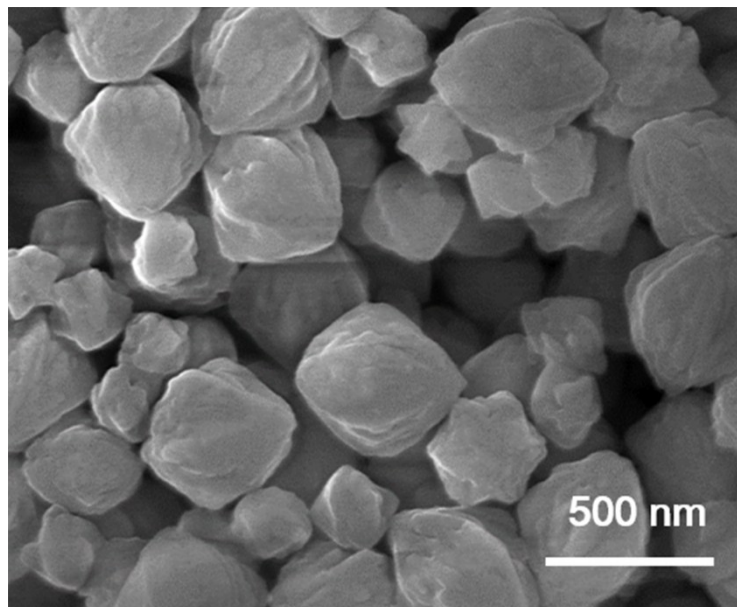
Figure S4. galvanostatic charging/discharging curve of GeO<sub>2</sub> nanoparticles with different carbon conductor (active

material/super-p/binder is 80:10:10) between the voltage 0.01 V to 1.5 V at room temperature (electrolyte :FEC/DMC). (a) 0.1

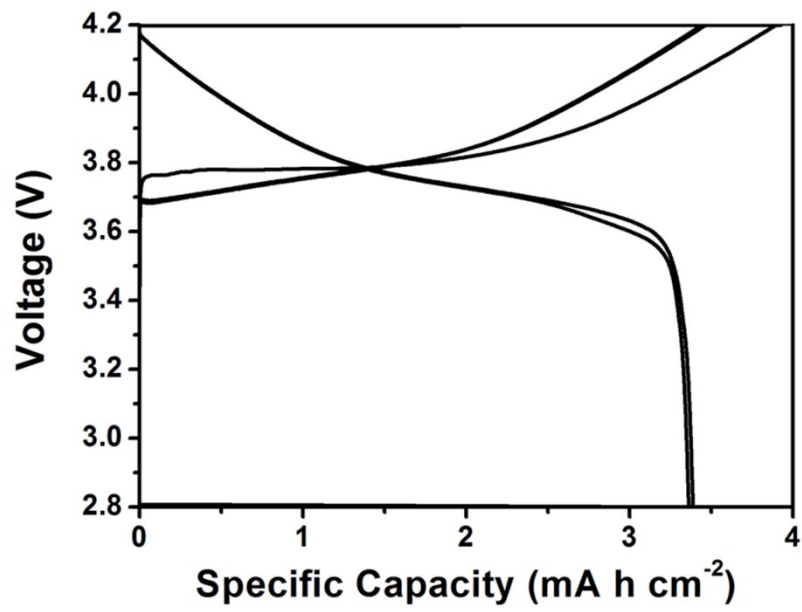
C (b) 1C



**Figure S5.** SEM images of  $\text{GeO}_2$  nanoparticles for anode electrode (a) cross section of anode electrode for fresh cell (b) top view of anode electrode after 10 cycle at the current rate of 0.1 C ( $1\text{C}=1.1\text{ A/g}$ ) (c, d) top view of anode electrode after 100 cycle at the current rate of 0.1 C.



**Figure S6.** SEM images of  $\text{GeO}_2$  nanoparticles with high resolution for morphological and surficial observation.



**Figure S7.** galvanostatic charging/discharging curve of  $\text{Li}(\text{NiCoMn})\text{O}_2$  cathode electrode at the current density of 0.1C (1C=160 mA h/g).