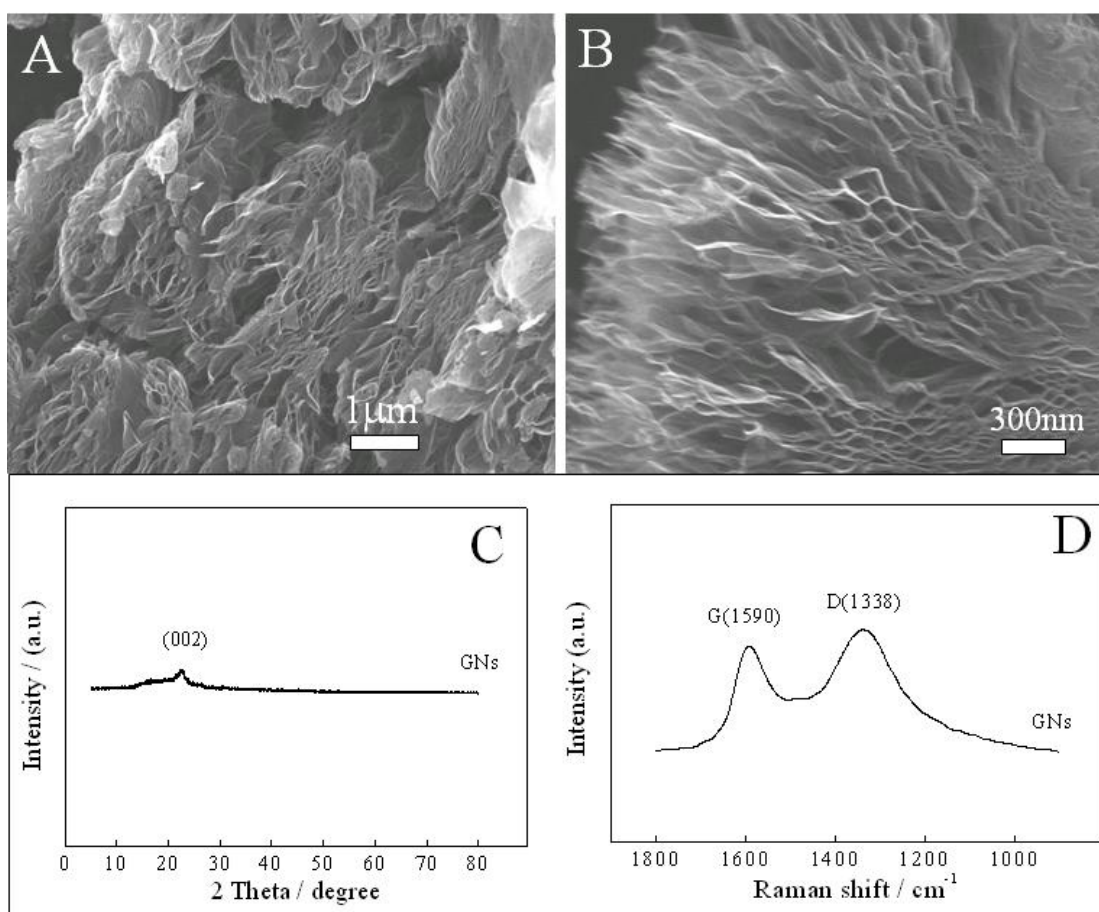


Supporting information for

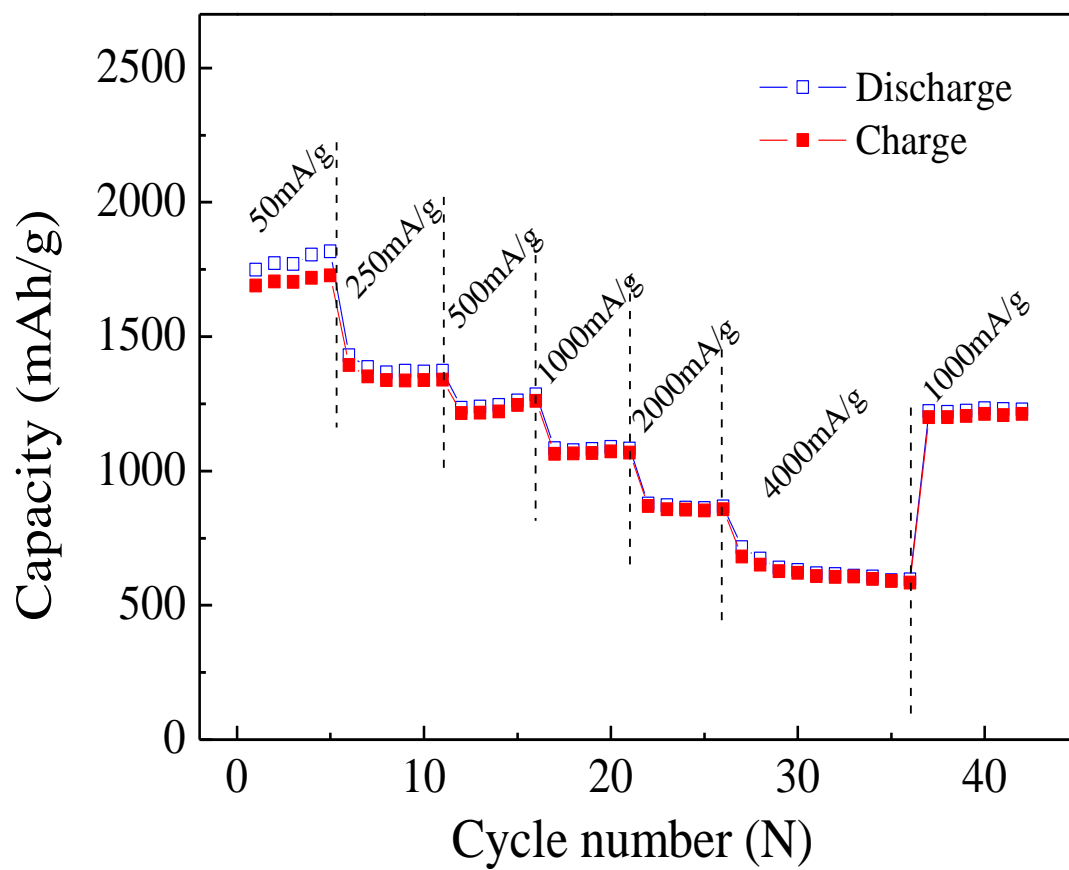
Facile ultrasonic synthesis of CoO quantum dot/Graphene nanosheet composites with high lithium storage capacity

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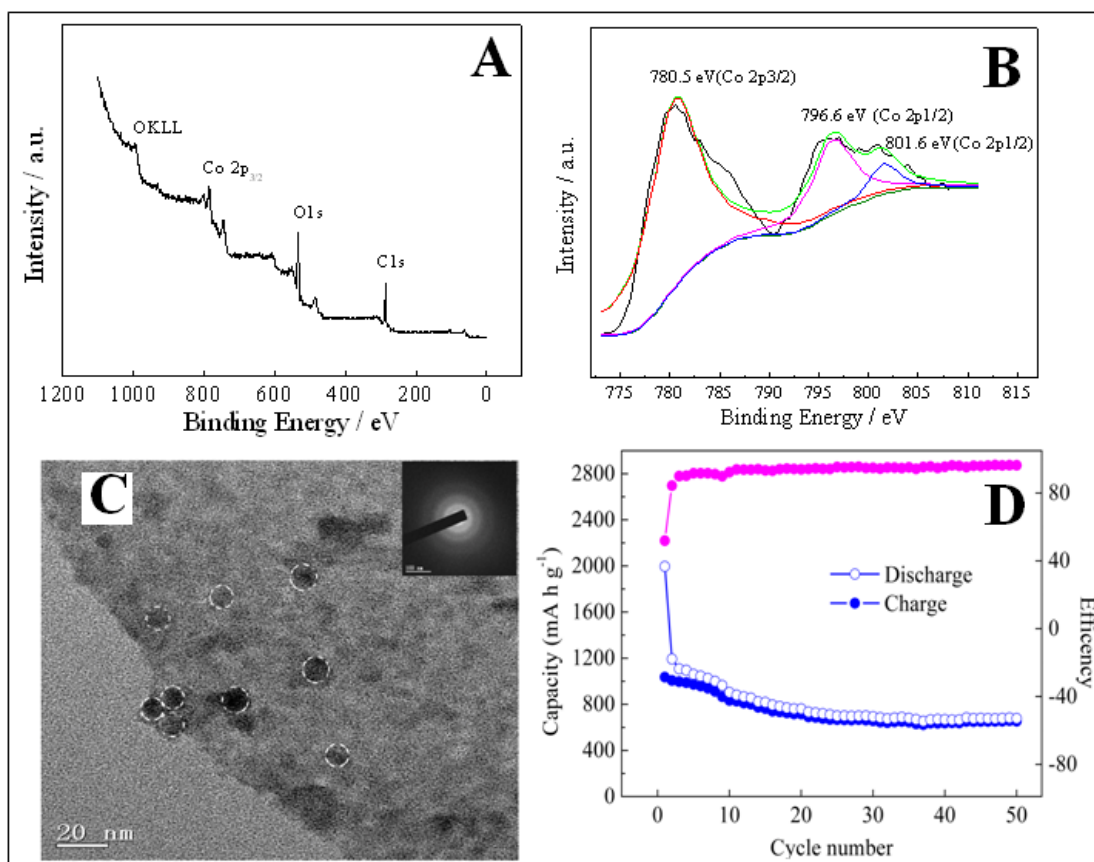
Siyang Liu,[†] and Jinhu Yang^{†,*}



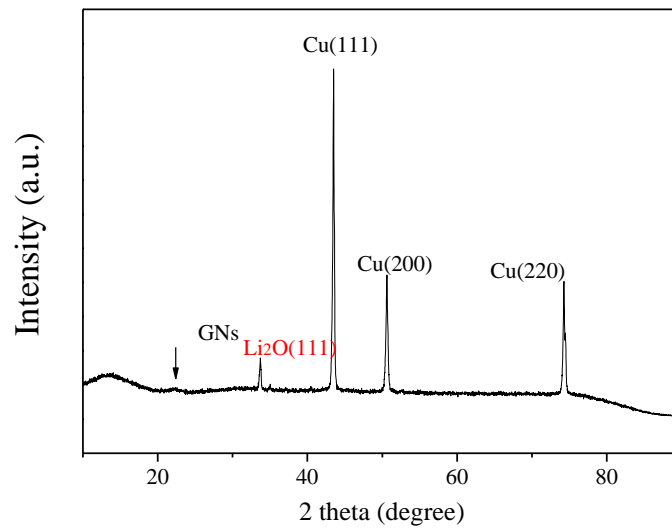
FS1. (A, B) SEM images, (C) XRD pattern and (D) Raman spectrum of GNs. The corresponding XRD and Raman characterizations both show graphene characteristics of the nanosheets, confirming the formation of GNs.



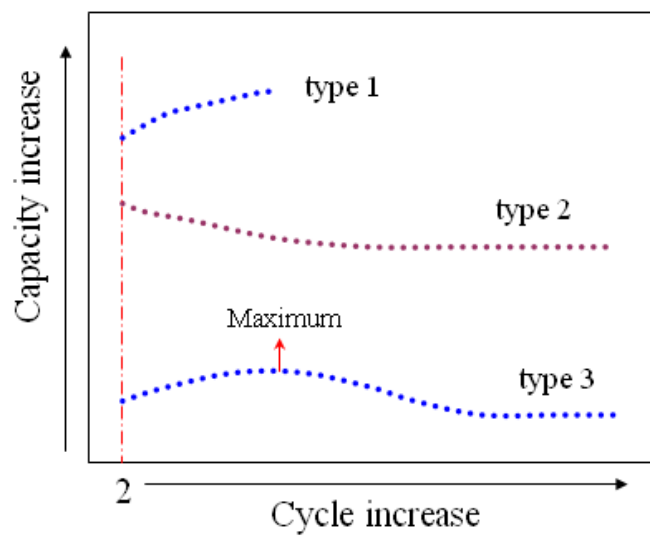
FS 2. Rate capability of the CQD/GN composites at the current densities between 50 and 4000 mA g⁻¹.



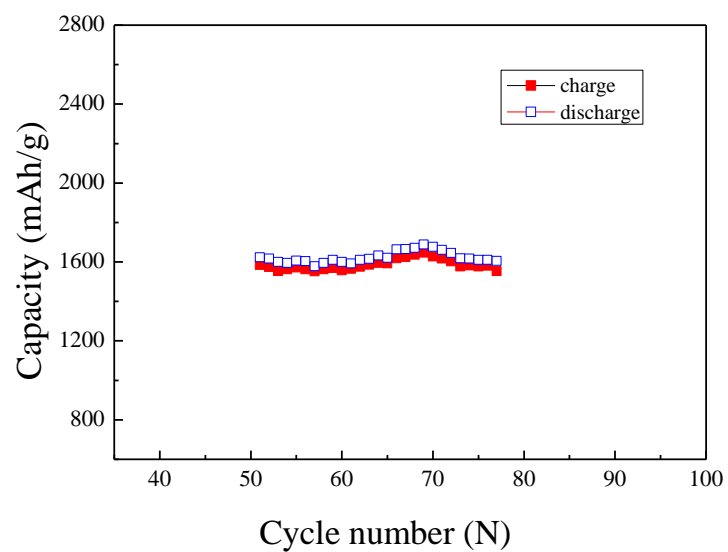
FS3. (A) XPS full and (B) Co2p spectrum, (C) TEM image and (D) capacity-cycle number curves and coulombic efficiency during cycling at current rate of 50mA g⁻¹ of the amorphous CoO nanograin/GN composites. Full XPS spectrum in A indicates only Co, O and C elements exist. The peaks at 780.5 eV and 796.6 eV in B corresponding to the binding energy of Co 2p 3/2 and 2p 1/2 of CoO, respectively, while the weak peaks at 801.6 eV should be the satellite of Co 2p 1/2, this result reveals the valence of Co in cobalt oxide is +2. On the other hand, TEM with ED pattern (inset in C) analysis corresponding to circled CoO grains in C demonstrates the CoO here is definitely amorphous.



FS 4. XRD pattern of the CQD/GN composites on Cu substrate after cycling processes. From the peaks in the XRD pattern, it is clear that no signal of CoO existence. This evidences that the CoO QDs decrystallized gradually and became amorphous during the cycling.



FS 5. Schematic diagram shows the different three types of the capacity behaviors with cycles.



FS 6. Additional cycling performance of the CQD/GN composites at the current density of 50 mA g^{-1} from 51 to 77 cycles. The maximum lithium storage capacity of about $1646.7 \text{ mAh g}^{-1}$ is obtained at the 69th cycle.