# Supporting Information

## *In-situ* carbon-coating and Ostwald ripening-based route for $Ni_3S_4$@C hollow spheres with superior Li-ion storage performances

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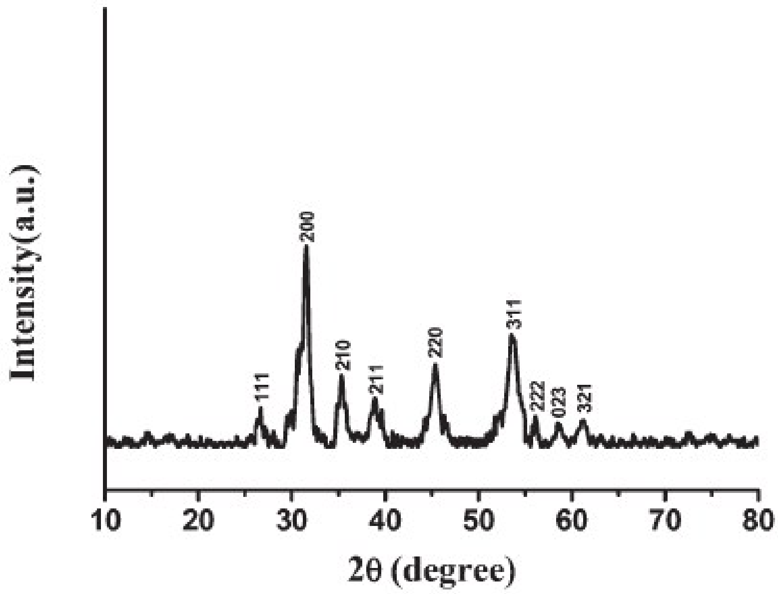


**Figure S1**. XRD pattern of the pure-phase of $NiS_2$ precursor.

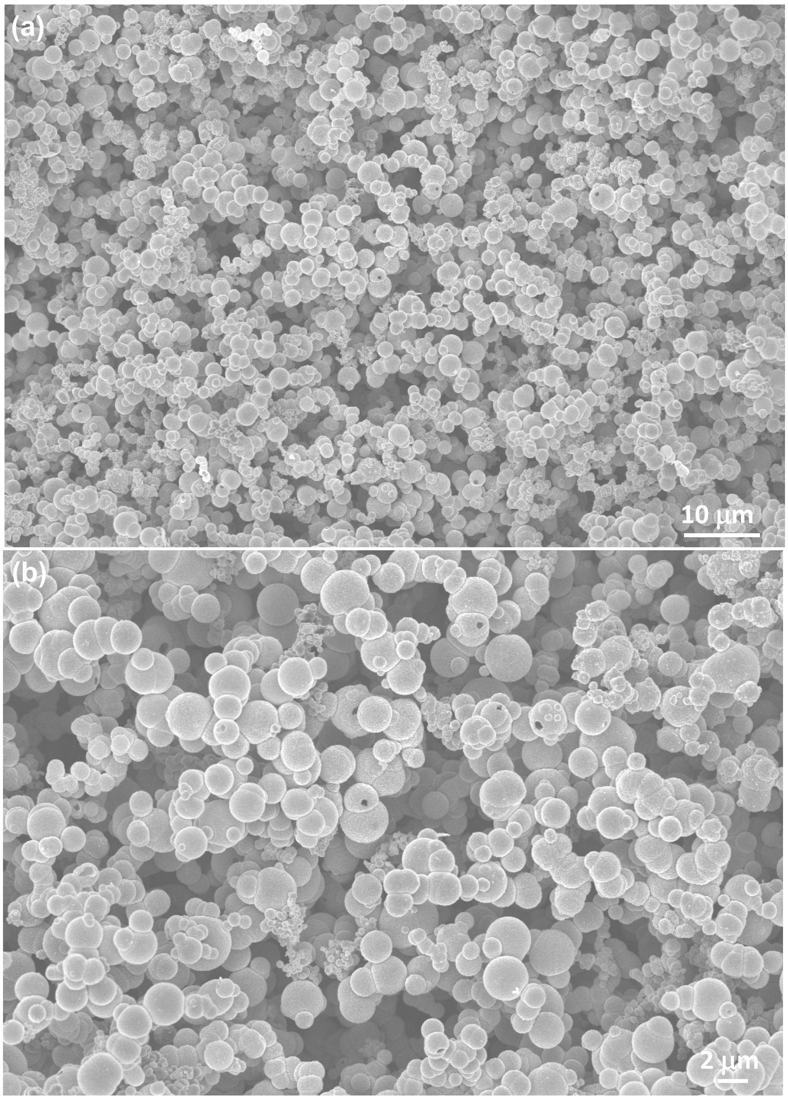


**Figure S2**. SEM images of the nickel sulfide hollow micropheres without carbon-coating.

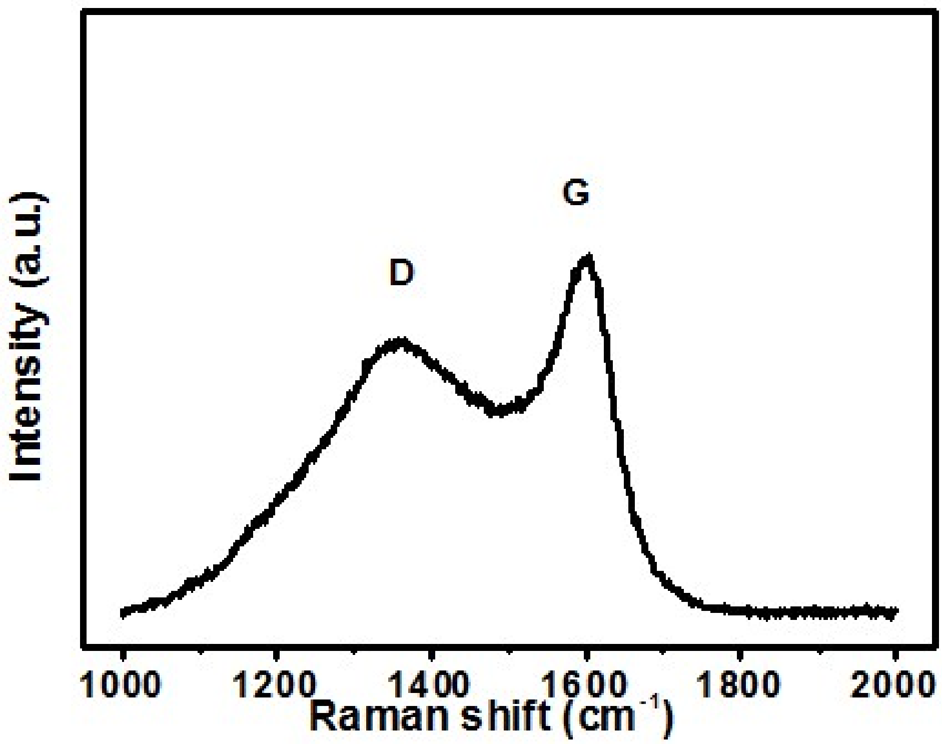


**Figure S3**. Raman spectrum of $Ni_3S_4$@C hollow microspheres. As shown in this image, the two major Raman bands are located at 1350 and 1600 cm$^{-1}$. The band located at 1600 cm$^{-1}$corresponds to the G peak from the breathing motion of sp$^3$ rings, while the one located at 1350 cm$^{-1}$ is in good agreement with the D band, which is generally associated with a double-resonance effect. The value $I_D/I_G$ can be used to evaluate the degree of disorder for pyrolytic carbon, and the measured $I_D/I_G$ intensity ratio is approximate 2.3, indicating the amorphous phase is a major component of the carbon layer.

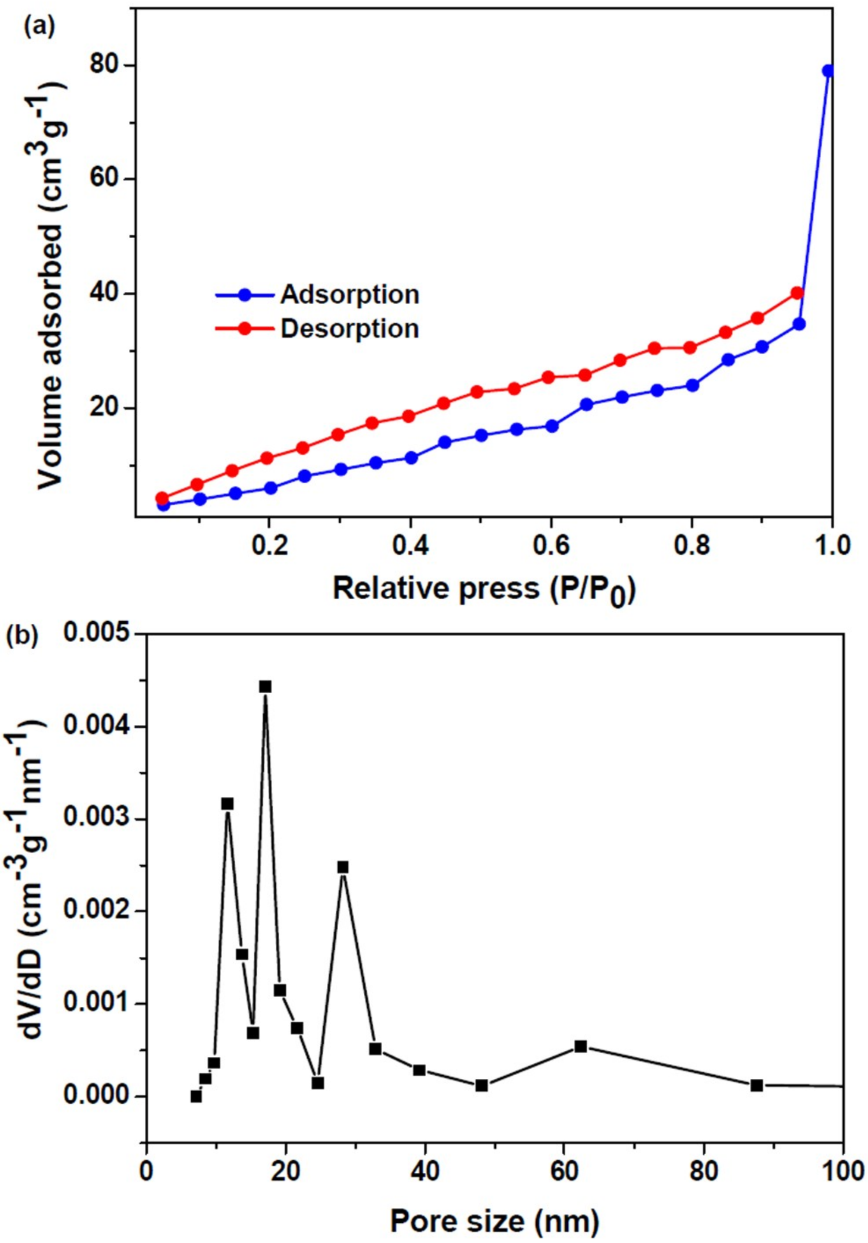


**Figure S4**. $N_2$ adsorption/desorption isotherms (a) and the corresponding pore size distribution (b) of the $Ni_3S_4$@C hollow microspheres.

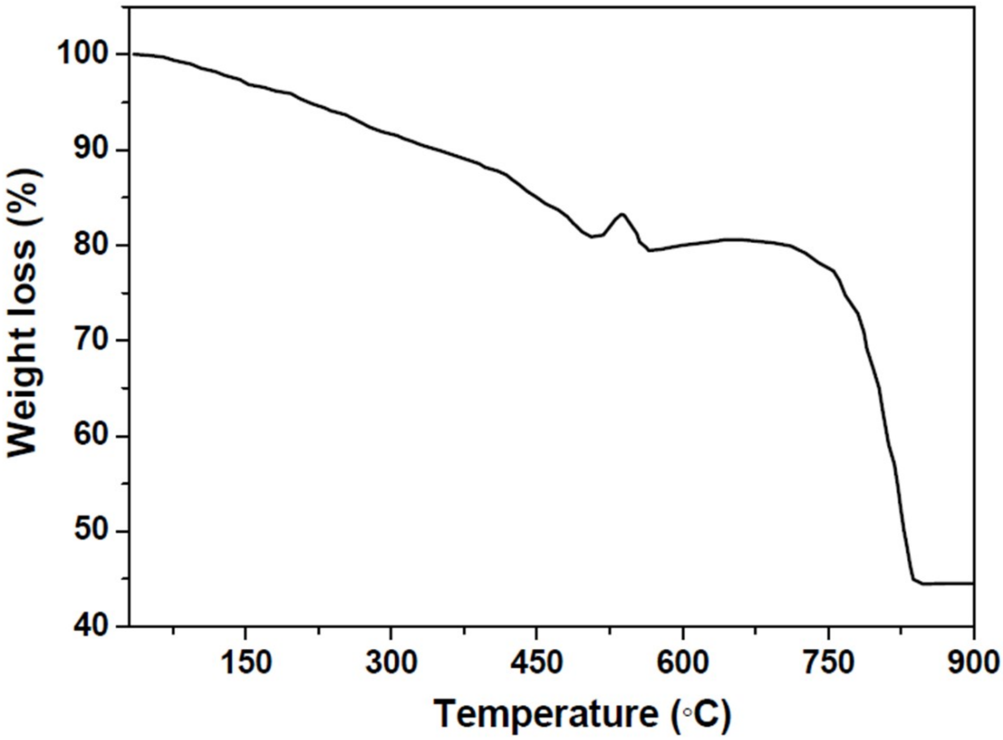


**Figure S5**. TGA curve of $Ni_3S_4$@C hollow microspheres under $O_2$ atmosphere from the room temperature to 900 °C.

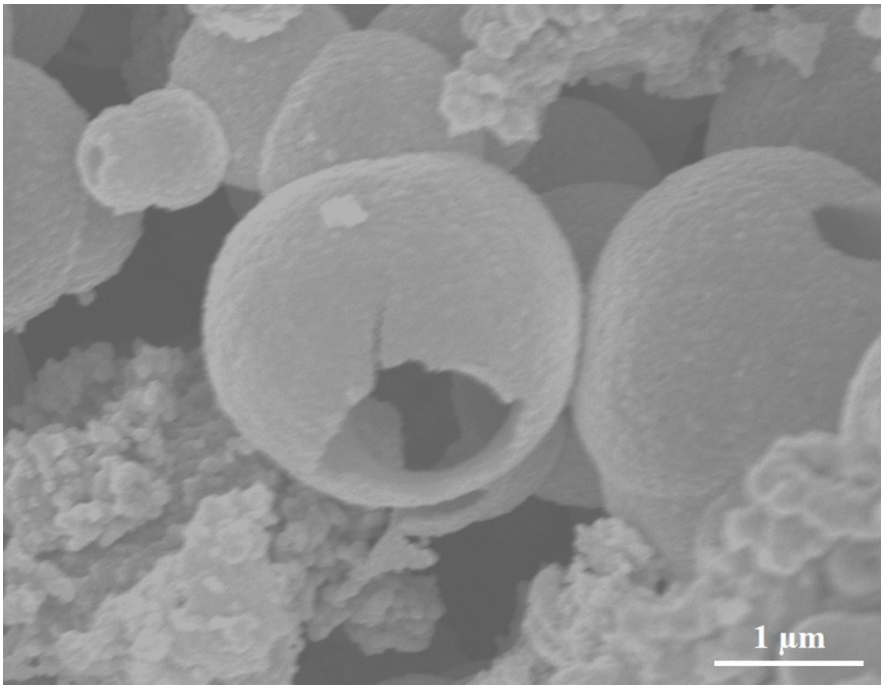


**Figure S6**. SEM image of $Ni_3S_4$@C hollow microspheres after 100 cycles at a current density of 0.1C.

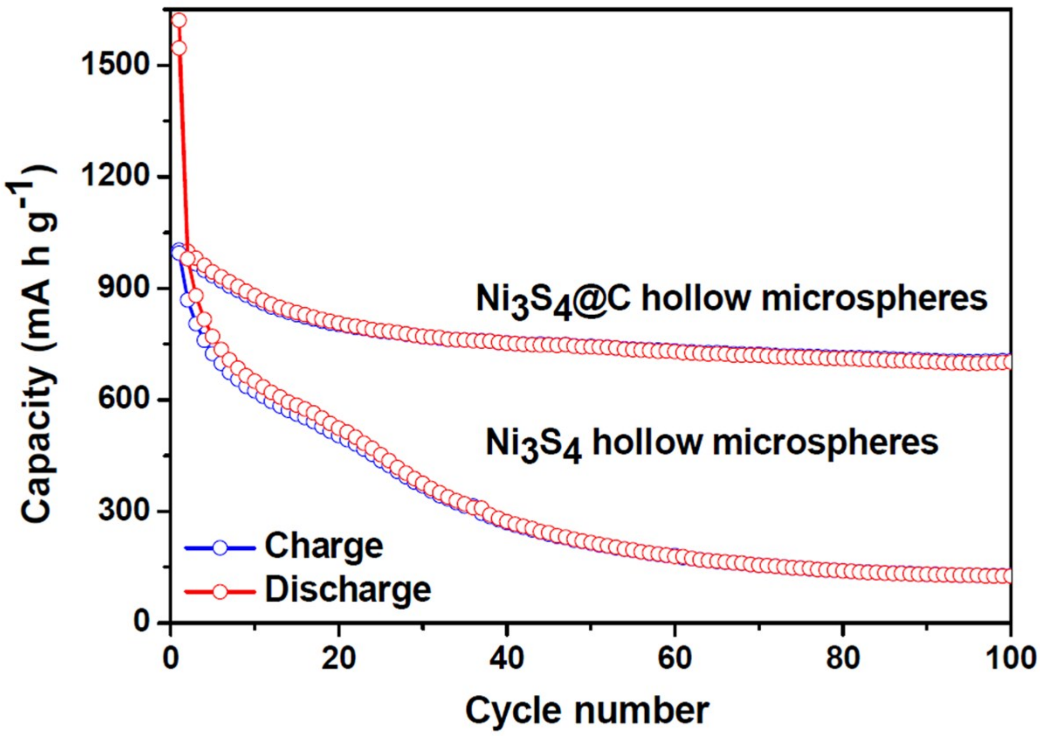


**Figure S7**. Li-ion storage performance of $Ni_3S_4$@C hollow microspheres and bare $Ni_3S_4$ hollow microspheres at a current density of 0.1C (about 100 mA $g^{-1}$). The bare $Ni_3S_4$ hollow microspheres were synthesized via the similar hydrothermal crystallization route, while no using of glucose as the carbon source.

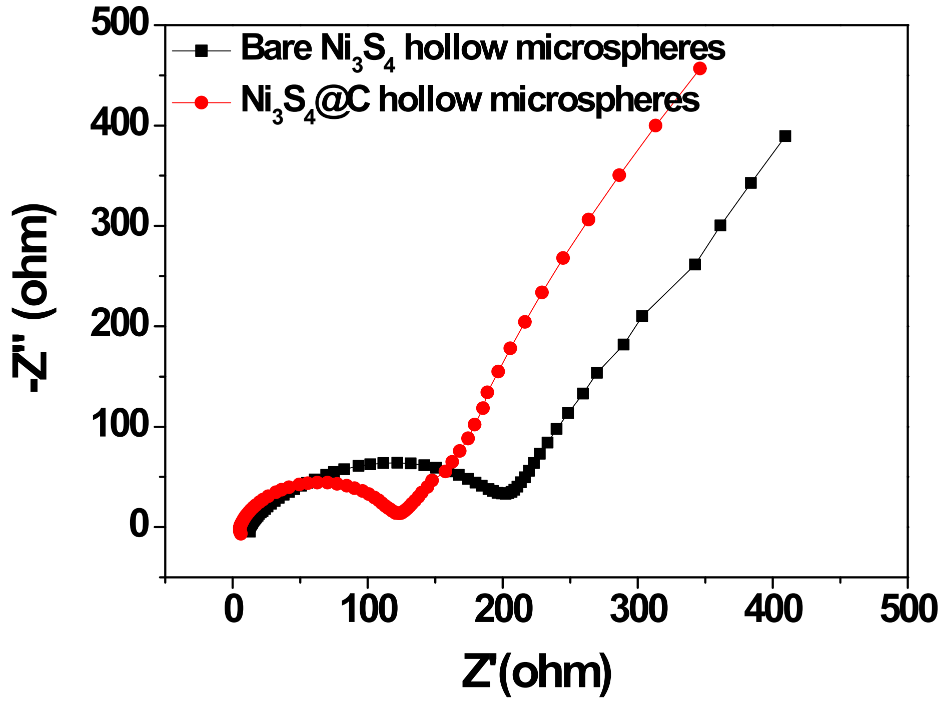


**Figure S8**. EIS spectra of $Ni_3S_4$@C hollow microspheres and bare $Ni_3S_4$ hollow microspheres.