Supplementary Information

Hollow cubic double layer structured Cu₇S₄/NiS nanocomposites for high-performance supercapacitors

Information of materials and reagents used in this paper

Copper sulfate (CuSO₄·5H₂O, 99.0%), sodium hydroxide (NaOH, 96.0%), polyvinyl pyrrolidone ((C₆H₉NO)_n, PVP, K30), ascorbic acid (C₆H₈O₆, AA, 99.7%), nickel chloride (NiCl₂·6H₂O, 96.0%), sodium sulfide (Na₂S·9H₂O, 98.0%), ethanol (C₂H₅OH, 99.7%), polyvinylidene fluoride (PVDF), carbon black. All chemicals were used as received without any further purification.



Fig. S1. XRD pattern of (a) C-150 (Cu₂O synthesized by 1.5 M NaOH); (b) CNOH-150 (Cu₂O/Ni(OH)₂ synthesized by C-150); (c) CS-150 (Cu₇S₄ synthesized by 1.5 M NaOH); (d) CNS-150 (Cu₇S₄/NiS synthesized by C-150).



Fig. S2. SEM image of the sample CNS-300 (Cu₇S₄/NiS synthesized by C-300)



Fig. S3. FESEM image of (a) C-150 (Cu₂O synthesized by 1.5 M NaOH); (b) CNOH-150 (Cu₂O/Ni(OH)₂ synthesized by C-150); (c) CS-150 (Cu₇S₄ synthesized by 1.5M NaOH); (d) CNS-150(Cu₇S₄/NiS synthesized by C-150).



Fig. S4 Sample CS-150 for (a) Cyclic Voltammograms (CV) curves from 0 to 0.5 V at the scan rate between 5 and 60 mV s⁻¹; (b) galvanostatic charge/discharge curves at different current densities ranged from 1 to 20 A g⁻¹; (c) average specific capacitance of the sample at various current rates; (d) cycling performance of the sample at a current rate of 4 A g^{-1} .



Fig. S5 (a) CV curves at scan rate 10 mV s⁻¹, and (b) Nyquist plots, of a CNS-025 electrode before and after 1000 charge/discharge cycles.