

**Self-supported hierarchical core-shell $\text{Co}_9\text{S}_8@\text{NiCo}_2\text{O}_4$ hollow
nanoneedle arrays for asymmetric supercapacitors**

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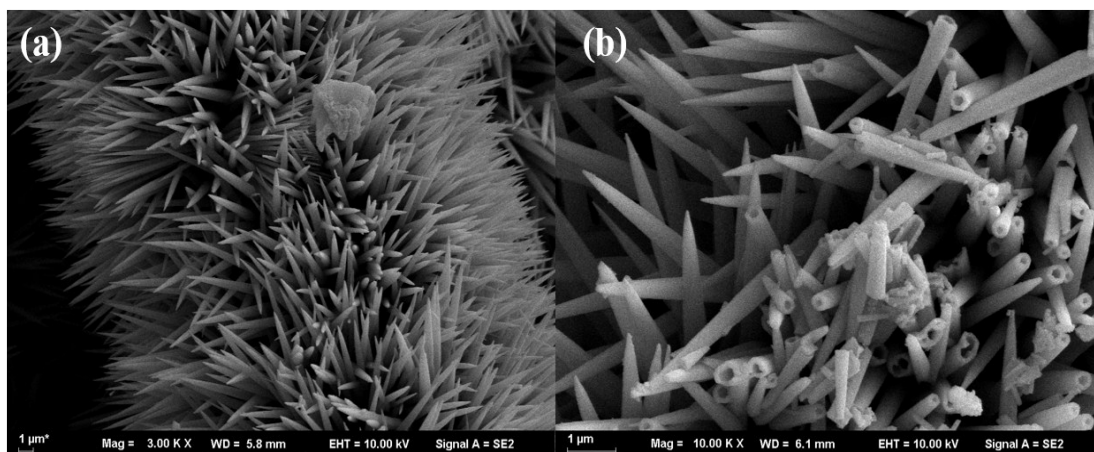


Fig. S1 SEM images of pure Co_9S_8 hollow nonneedles.

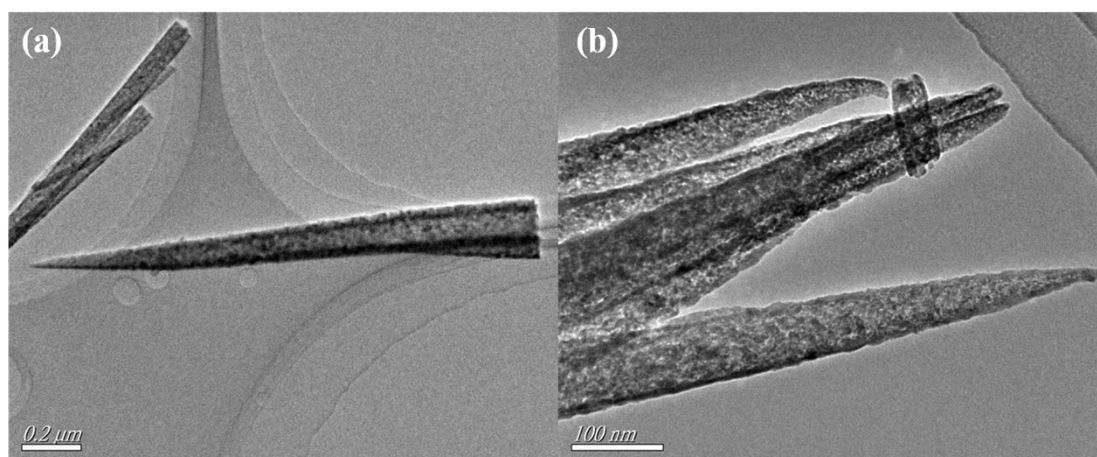


Fig. S2 TEM images of pure Co_9S_8 hollow nonneedles

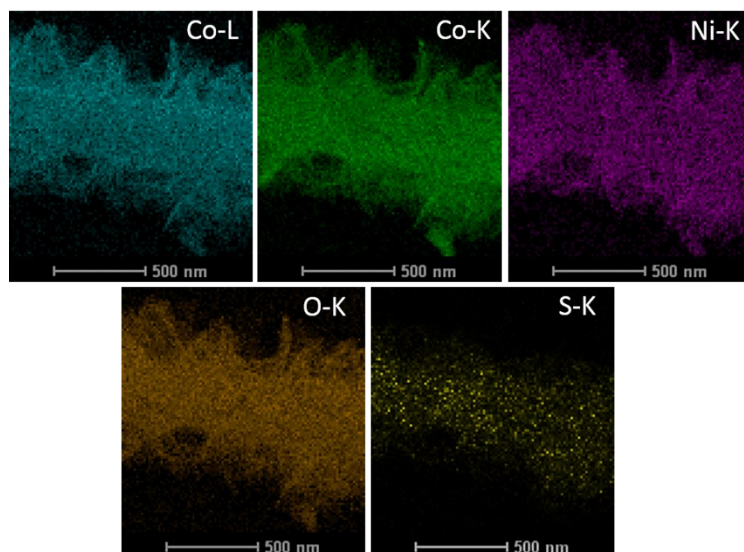


Fig. S3 Elemental mapping images of Co-L(blue), Co-K(green), Ni(purple), O(orange), S(yellow) in $\text{Co}_9\text{S}_8@\text{NiCo}_2\text{O}_4$ core-shell nanoneedles.

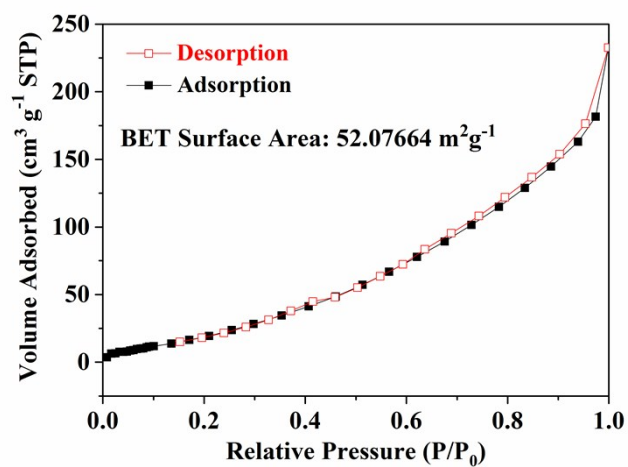


Fig. S4 N_2 adsorption-desorption isotherms for the hybrid $\text{Co}_9\text{S}_8@\text{NiCo}_2\text{O}_4$ core-shell nanoneedles.

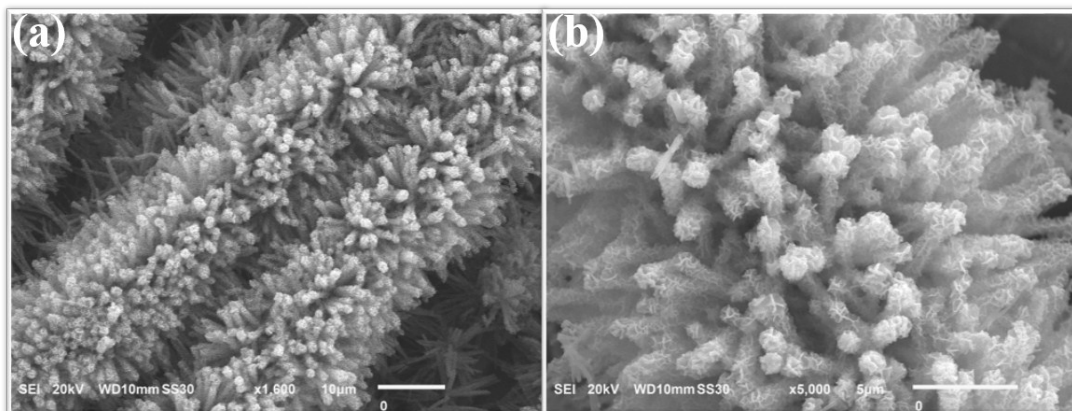


Fig. S5 SEM image of the $\text{Co}_9\text{S}_8@\text{NiCo}_2\text{O}_4$ core-shell nanoneedles after charging and discharging for 6000 cycles.

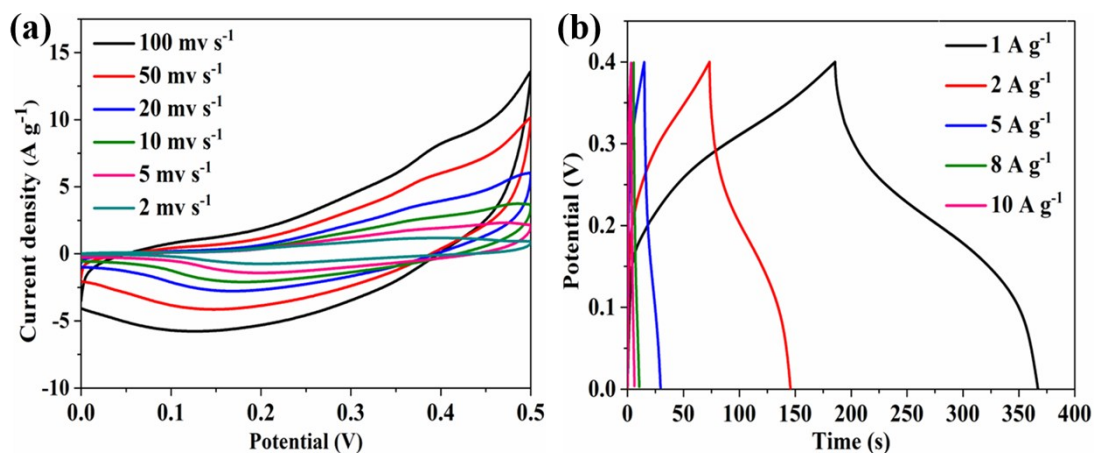


Fig. S6 (a) CV curves of pure NiCo_2O_4 electrode at various scan rate; (b) GCD curves of pure NiCo_2O_4 electrode at different current densities.

