

# Hexagonal Prism-like Hierarchical $\text{Co}_9\text{S}_8@\text{Ni}(\text{OH})_2$ Core-shell Nanotubes on Carbon Fibers for High-Performance Asymmetric Supercapacitors

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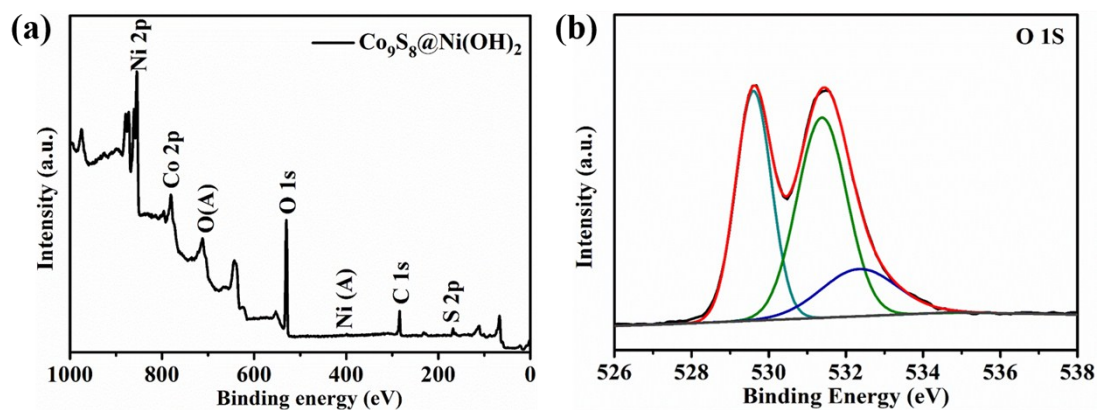
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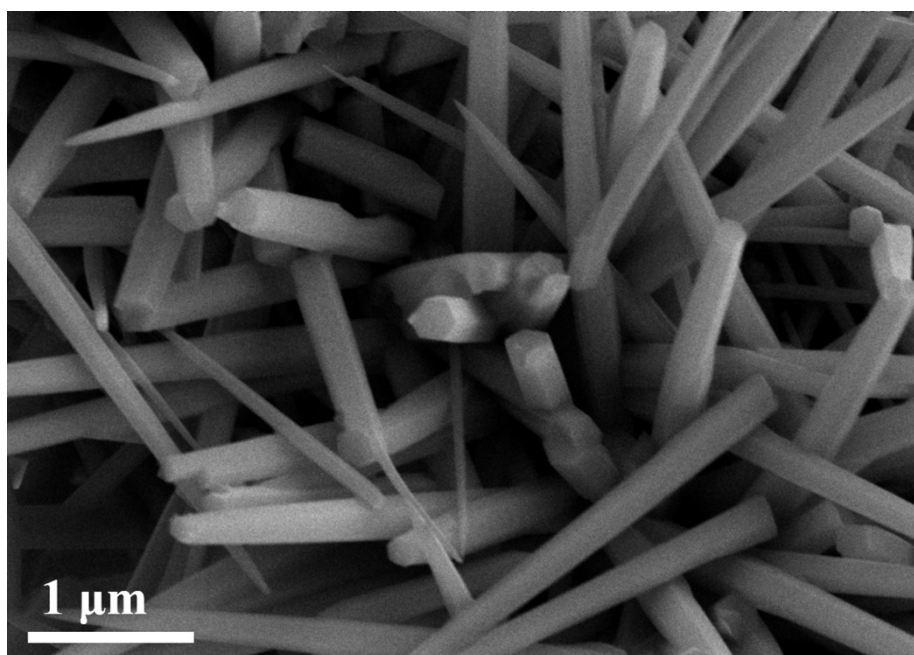
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**Fig. S1** (a) XPS survey spectrum of the  $\text{Co}_9\text{S}_8@\text{Ni}(\text{OH})_2$  core-shell nanotube arrays; (b) O 1s XPS spectrum of the  $\text{Co}_9\text{S}_8@\text{Ni}(\text{OH})_2$  electrode.



**Fig. S2** SEM image of the precursor  $\text{Co}(\text{CO}_3)_{0.35}\text{Cl}_{0.20}(\text{OH})_{1.10}\cdot 1.74\text{H}_2\text{O}$  solid nanoneedles on CFs.

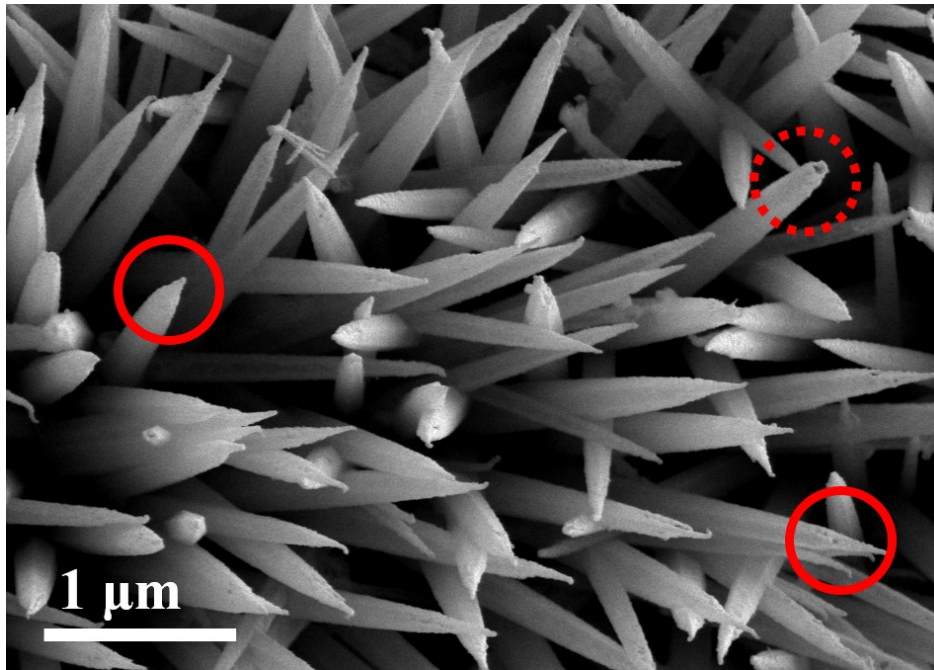


Fig. S3 SEM image of as-prepared hollow Co<sub>9</sub>S<sub>8</sub> nanoneedles.

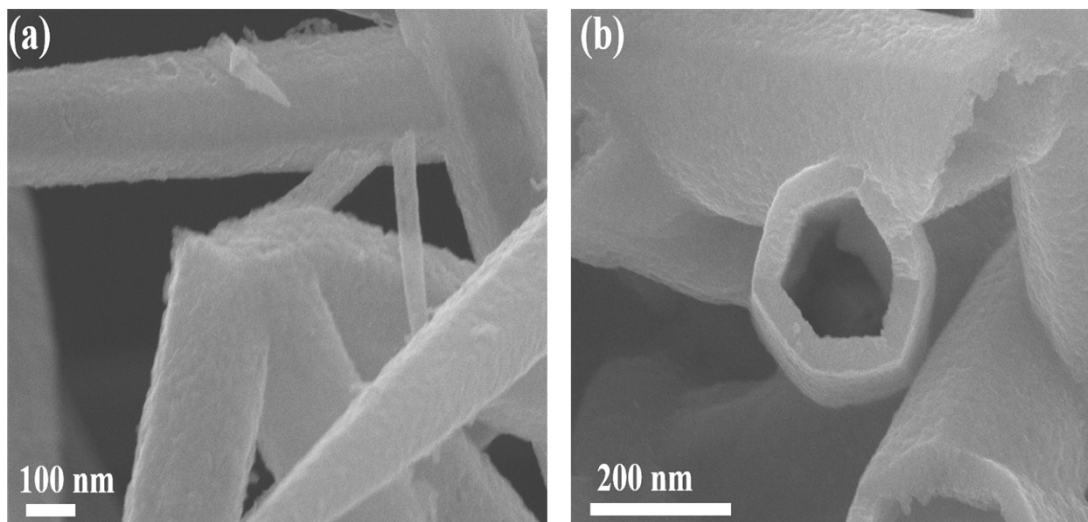


Fig. S4 SEM images of the Co<sub>9</sub>S<sub>8</sub> nanotubes synthesized at 150 °C for 10h.

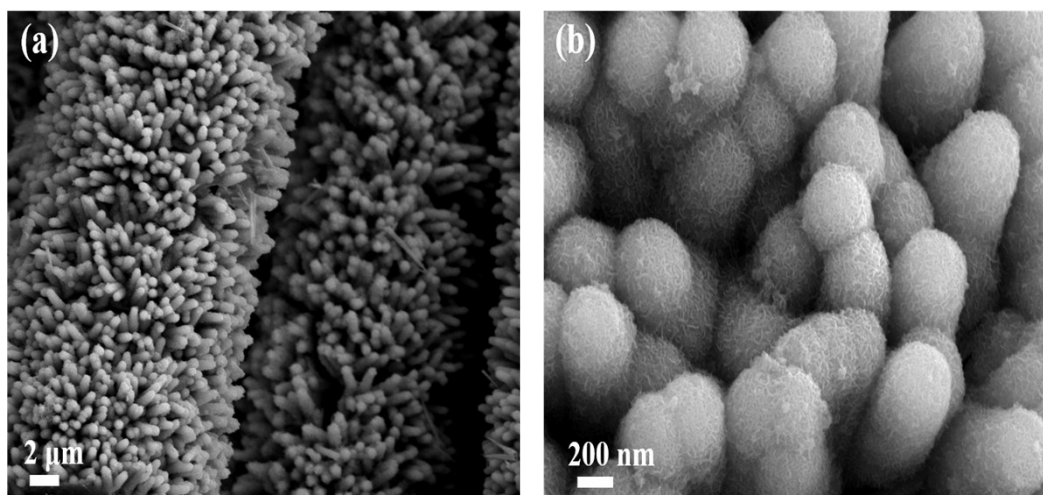


Fig. S5 SEM images of the as-prepared  $\text{Co}_9\text{S}_8@\text{Ni}(\text{OH})_2$  core-shell nanotube arrays at different magnification.

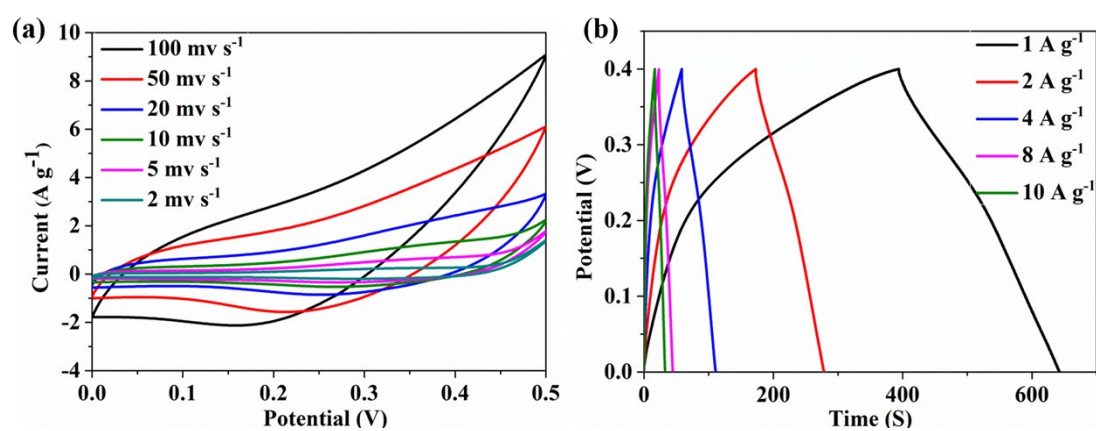
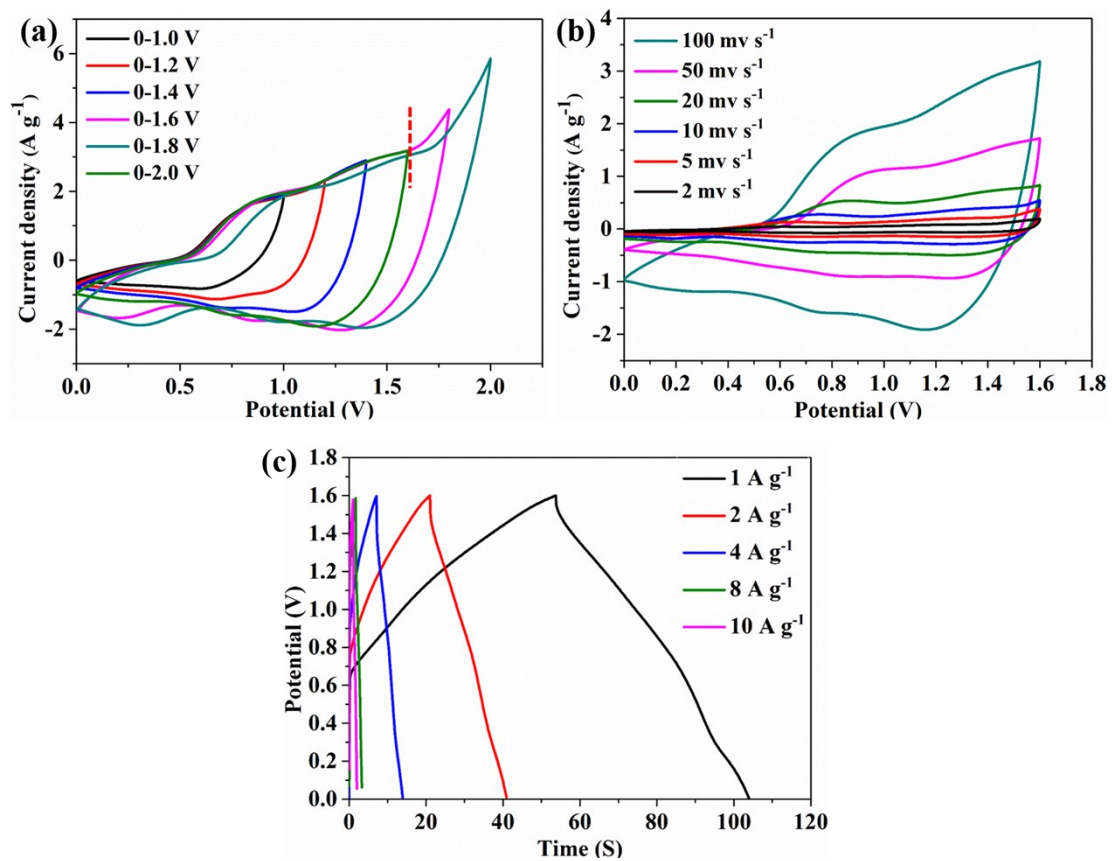
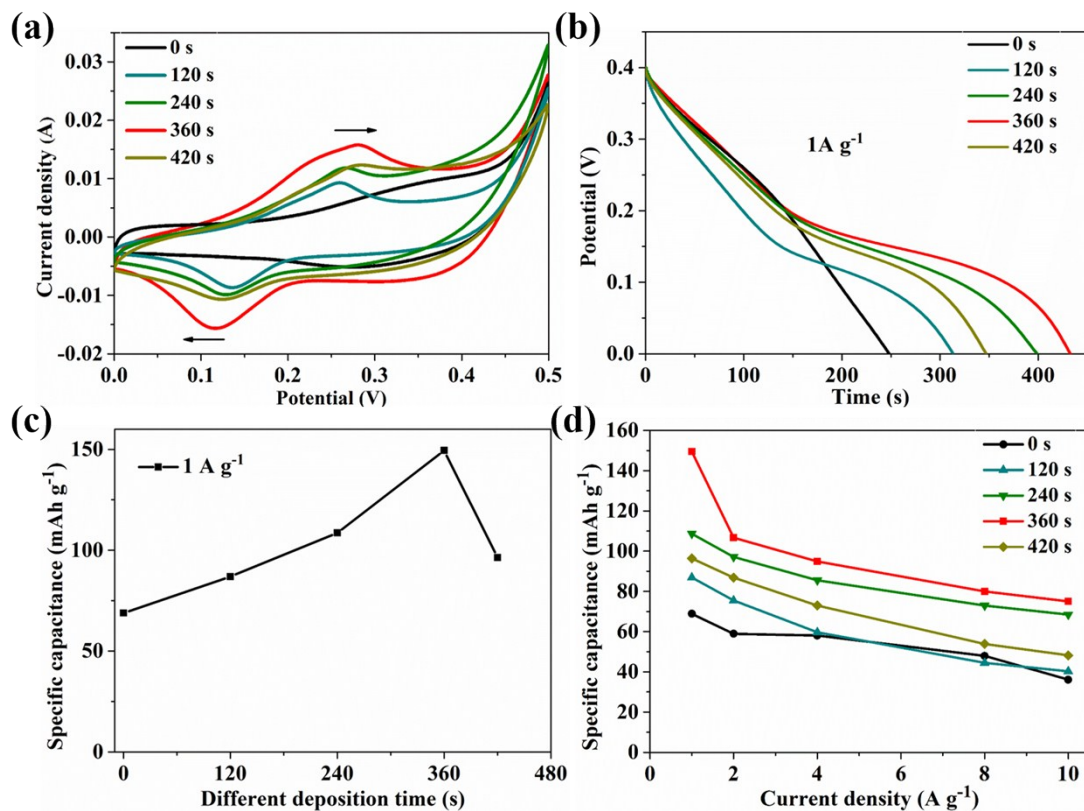


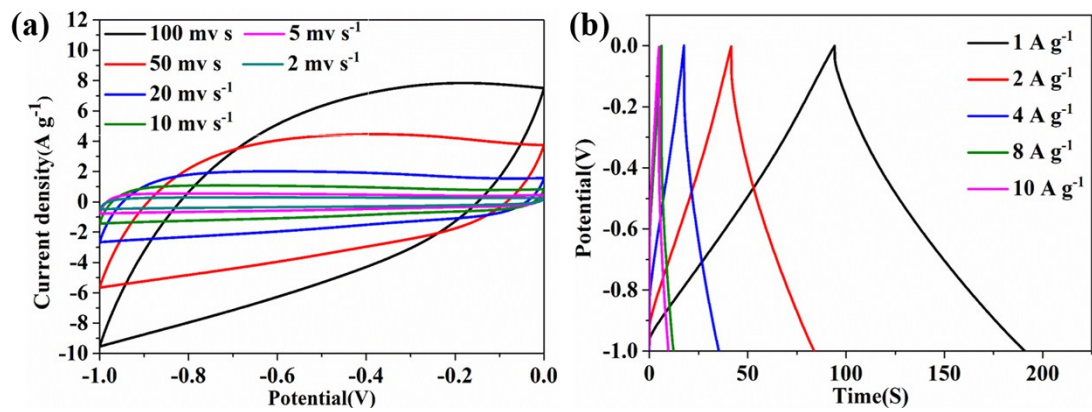
Fig. S6 (a) CV curves of bare  $\text{Co}_9\text{S}_8$  electrode at different scan rates; (b) GCD curves of  $\text{Co}_9\text{S}_8$  electrode at different current densities.



**Fig. S7** (a) CV curves of the  $\text{Co}_9\text{S}_8//\text{AC}$  device collected in different voltage window; (b) CV curves of the  $\text{Co}_9\text{S}_8//\text{AC}$  device at different scan rates in the operation window of 1.6 V; (c) GCD curves of the ASC device measured at different current densities.



**Fig. S8** (a) CV curves of  $\text{Co}_9\text{S}_8@\text{Ni}(\text{OH})_2$  core-shell nanotubes obtained for different exposition time: 0 s, 120 s, 240 s, 360 s, 420 s. (b) Discharge curves of the  $\text{Co}_9\text{S}_8@\text{Ni}(\text{OH})_2$  core-shell electrodes with different electrodeposition times. (c) The plot of specific capacitance versus different deposition times for  $\text{Co}_9\text{S}_8@\text{Ni}(\text{OH})_2$  electrodes at a current density of  $1 \text{ A g}^{-1}$ . (d) The specific capacity of the electrodes with different exposition time at different current densities.



**Fig. S9** (a) CV curves of the AC electrode at different scan rates; (b) Galvanostatic charge-discharge curves at different current densities.