

## Supplementary information

### Hierarchical nanostructure-tuned super-high electrochemical stability of nickel cobalt sulfide

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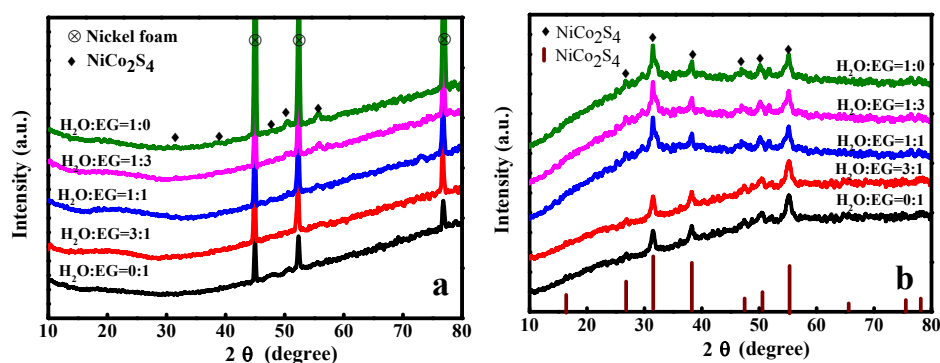


Fig. S1 XRD patterns of (a) NiCo<sub>2</sub>S<sub>4</sub> grown on nickel foam and (b) NiCo<sub>2</sub>S<sub>4</sub> powders prepared at different volume ratio of H<sub>2</sub>O to EG.

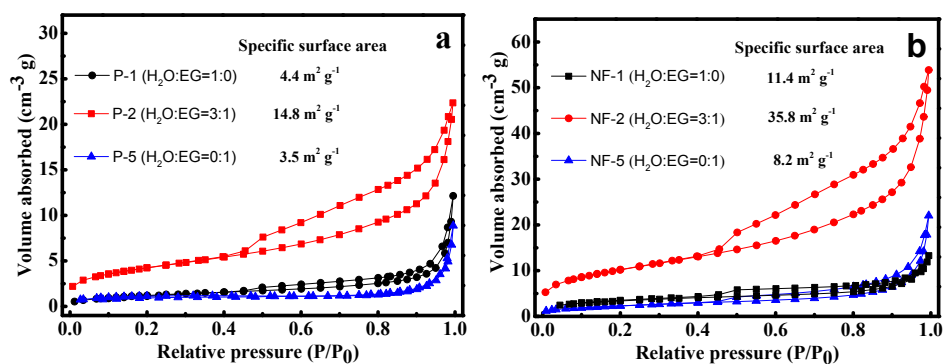
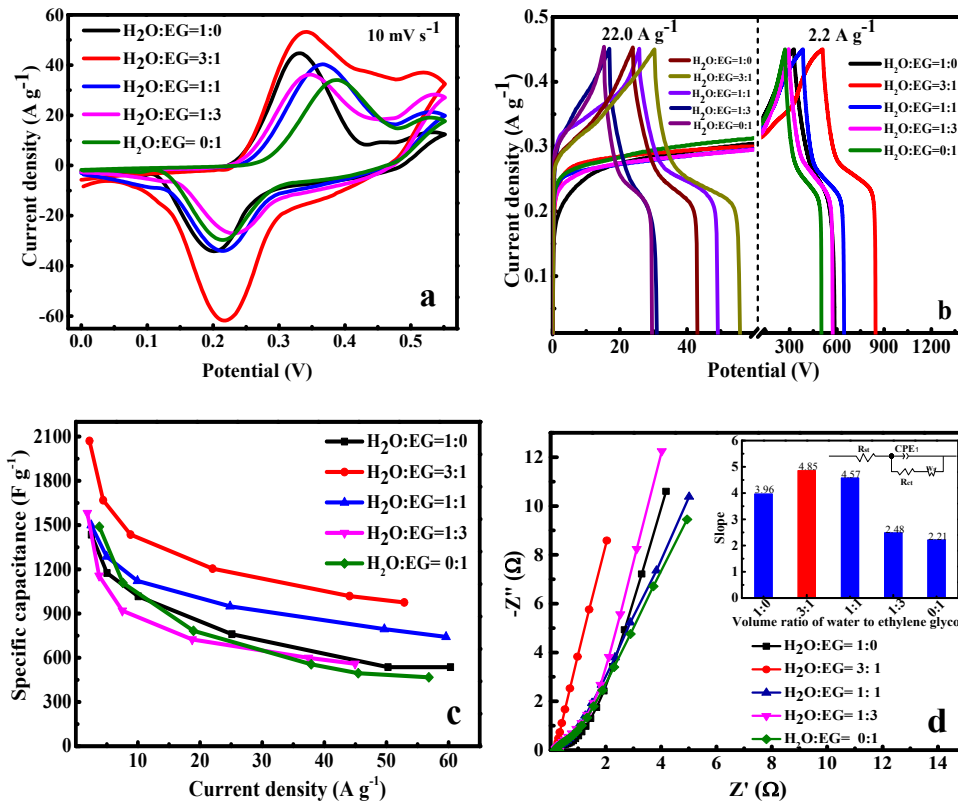
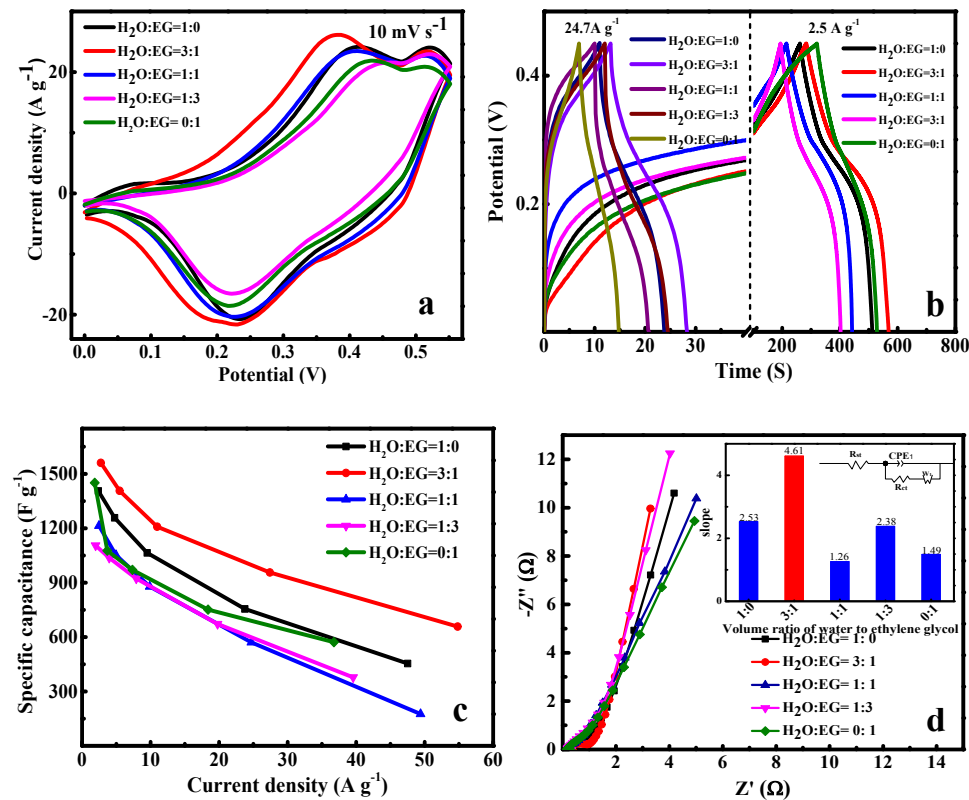


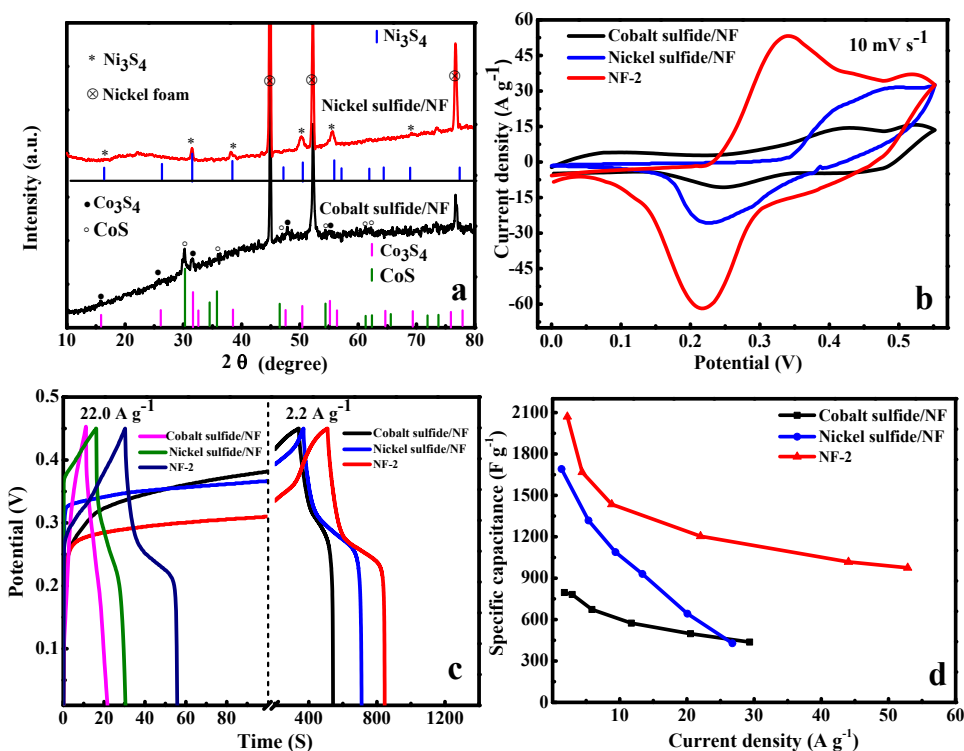
Fig. S2 N<sub>2</sub> adsorption and desorption isotherms and specific surface area of (a) NiCo<sub>2</sub>S<sub>4</sub> grown on nickel foam and (b) NiCo<sub>2</sub>S<sub>4</sub> powders prepared at different volume ratio of H<sub>2</sub>O to EG.



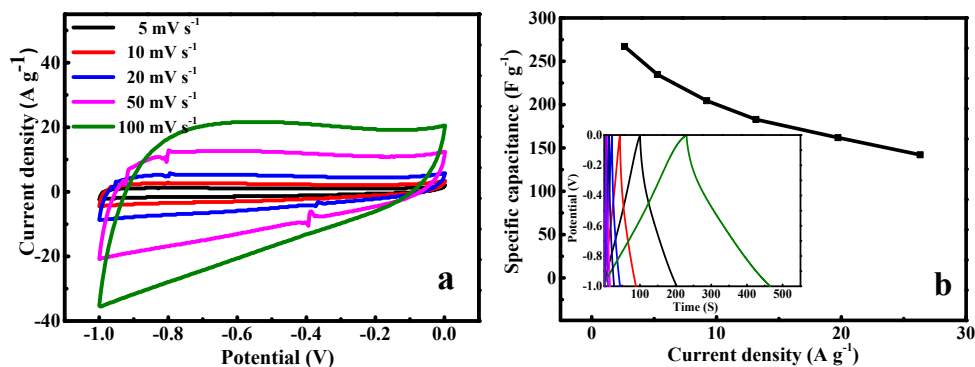
**Fig. S3** (a) CV curves at scan rate of 10 mV s<sup>-1</sup> and (b) GCD curves of NiCo<sub>2</sub>S<sub>4</sub> grown on nickel; (c) specific capacitance vs. current density for NiCo<sub>2</sub>S<sub>4</sub> grown on nickel foam; (d) Nyquist plots for NiCo<sub>2</sub>S<sub>4</sub> grown on nickel foam.



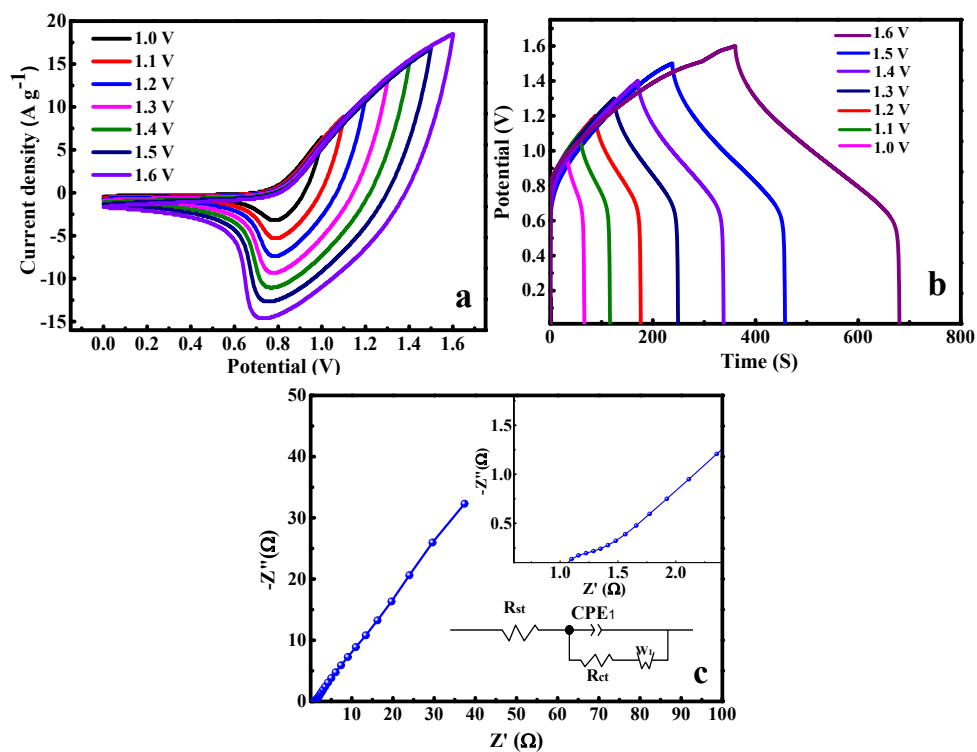
**Fig. S4** (a) CV curves at scan rate of 10 mV s<sup>-1</sup> and (b) GCD curves of NiCo<sub>2</sub>S<sub>4</sub> powders; (c) specific capacitance vs. current density for NiCo<sub>2</sub>S<sub>4</sub> powders; (d) Nyquist plots of NiCo<sub>2</sub>S<sub>4</sub> powders.



**Fig. S5** (a) XRD patterns of cobalt sulfide and nickel sulfide respectively grown on nickel foams; (b) CV curves at scan rate of  $10 \text{ mV s}^{-1}$  and (c) GCD curves of cobalt sulfide and nickel sulfide respectively grown on nickel foams, and NF-2; (d) specific capacitance vs. current density for cobalt sulfide and nickel sulfide respectively grown on nickel foams, and NF-2. The cobalt sulfide and nickel sulfide grown on nickel foams were synthesized at the same reaction conditions to NF-2.



**Fig. S6** (a) CV curves of AC; (b) specific capacitance vs. current density for AC; (inset) GCD curves of AC.



**Fig. S7** (a) CV curves of NF-2//AC ASCs at different potential windows; (b) GCD curves of NF-2//AC ASCs at different cell voltages; (c) Nyquist plots of NF-2//AC ASCs.