

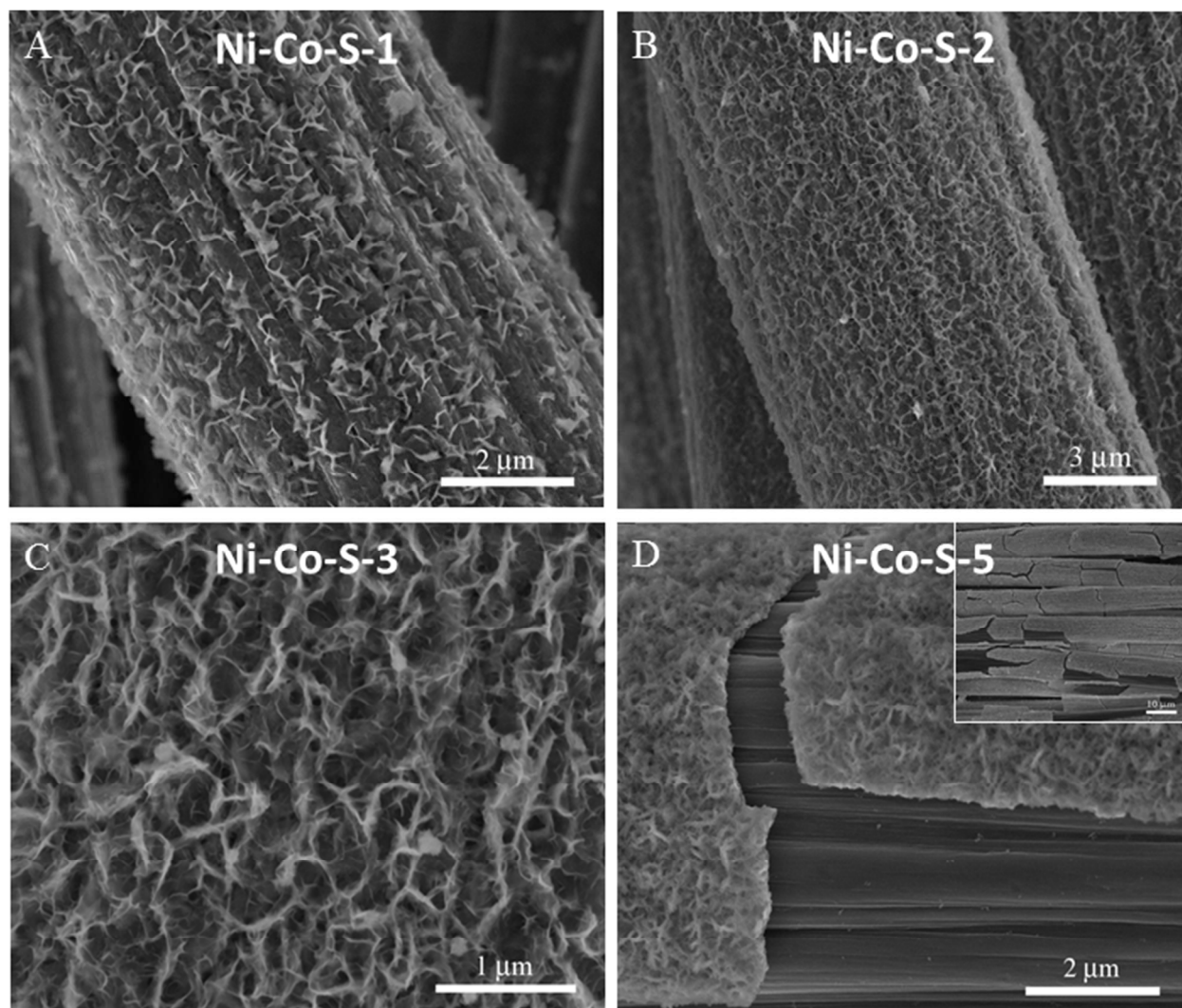
## Supporting Information

# **One-Step Electrodeposited Nickel Cobalt Sulfide Nanosheet Arrays for High-Performance Asymmetric Supercapacitors**

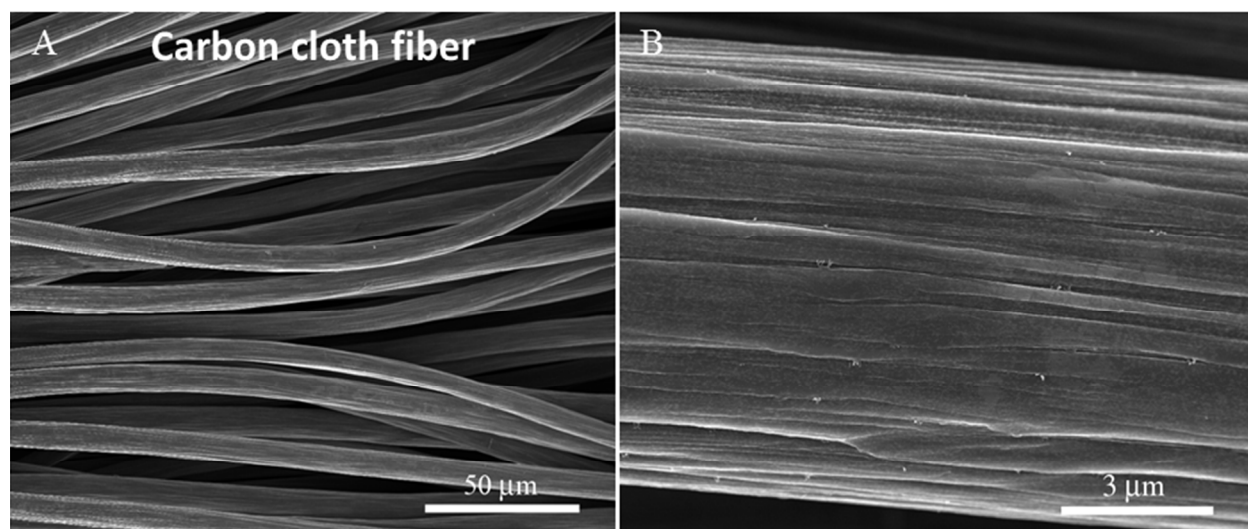
*Wei Chen, Chuan Xia, Husam N. Alshareef\**

Materials Science and Engineering, King Abdullah University of Science and Technology  
(KAUST), Thuwal 23955-6900, Saudi Arabia

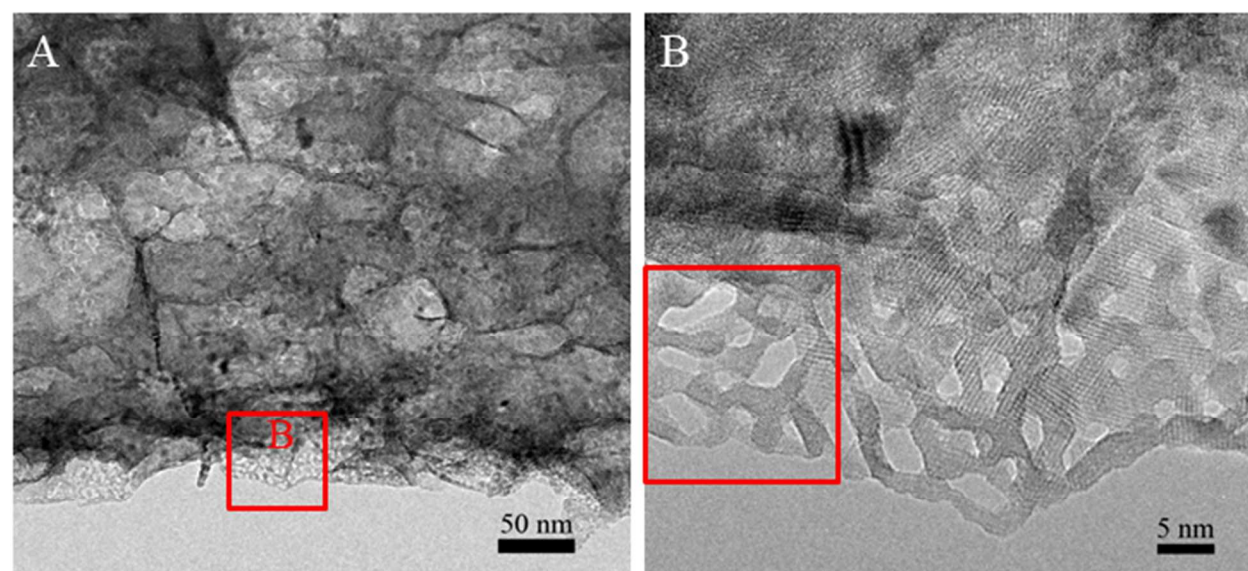
\*Corresponding Author: [husam.alshareef@kaust.edu.sa](mailto:husam.alshareef@kaust.edu.sa)



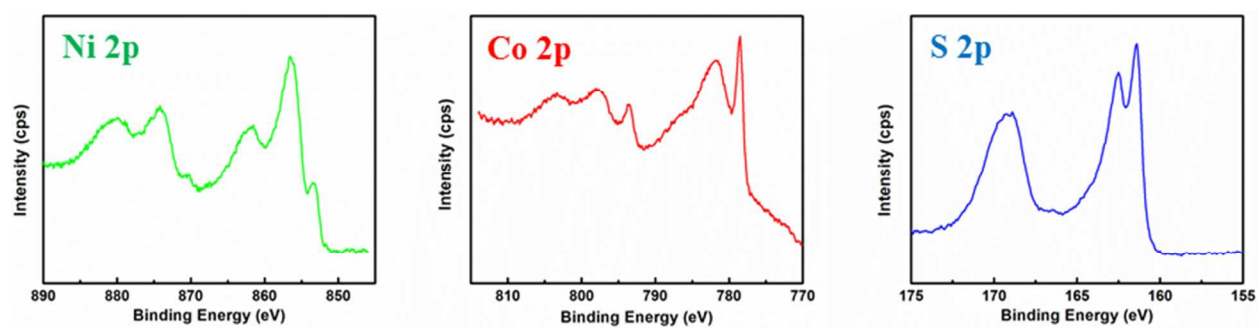
**Figure S1.** SEM images of the electrodeposited Ni-Co-S electrodes with different concentrations of deposition solutions. (A) Ni-Co-S-1; (B) Ni-Co-S-2; (C) Ni-Co-S-3; (D) Ni-Co-S-5.



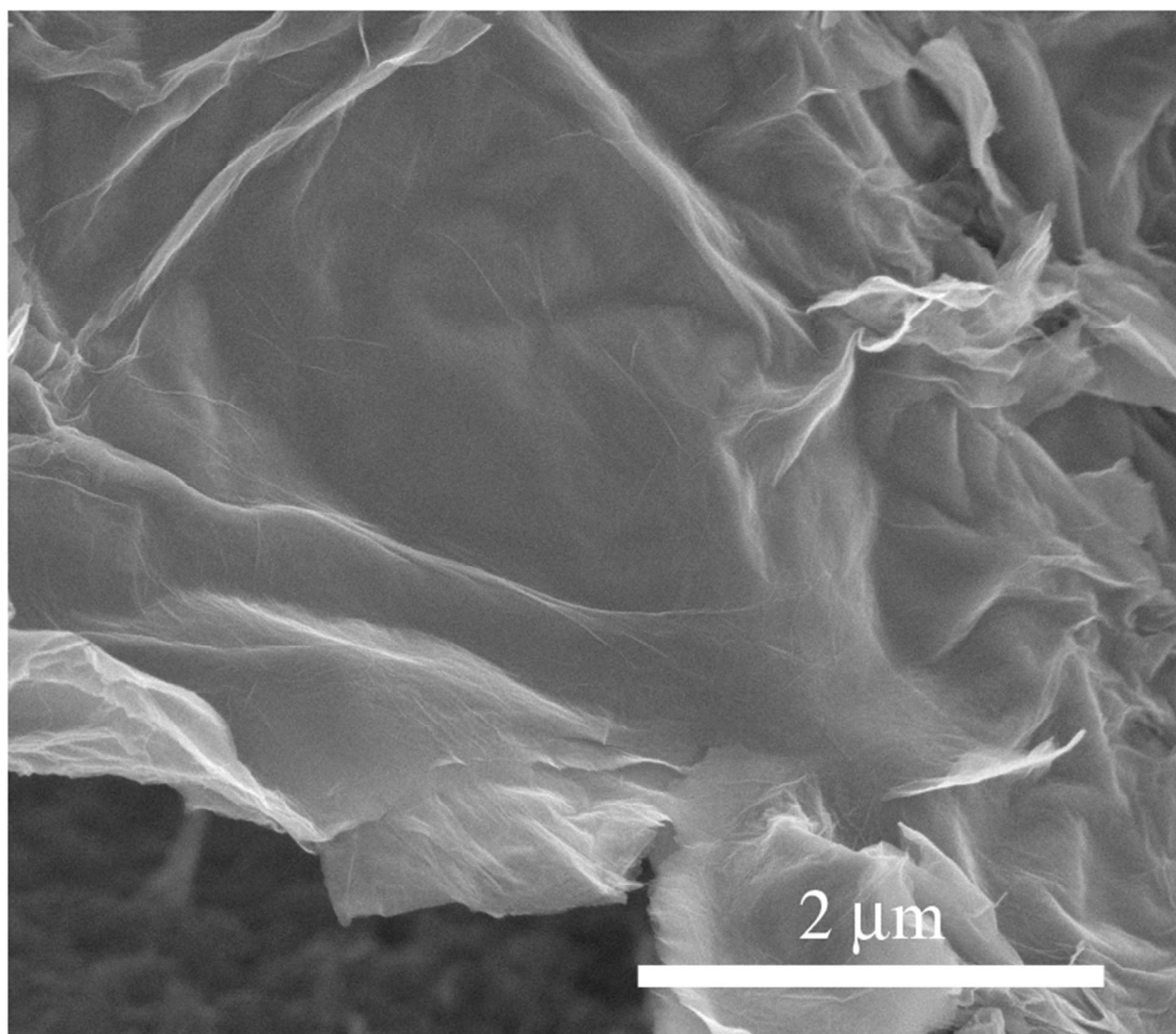
**Figure S2.** Morphology of the pristine carbon cloth used as a current collector in this study.



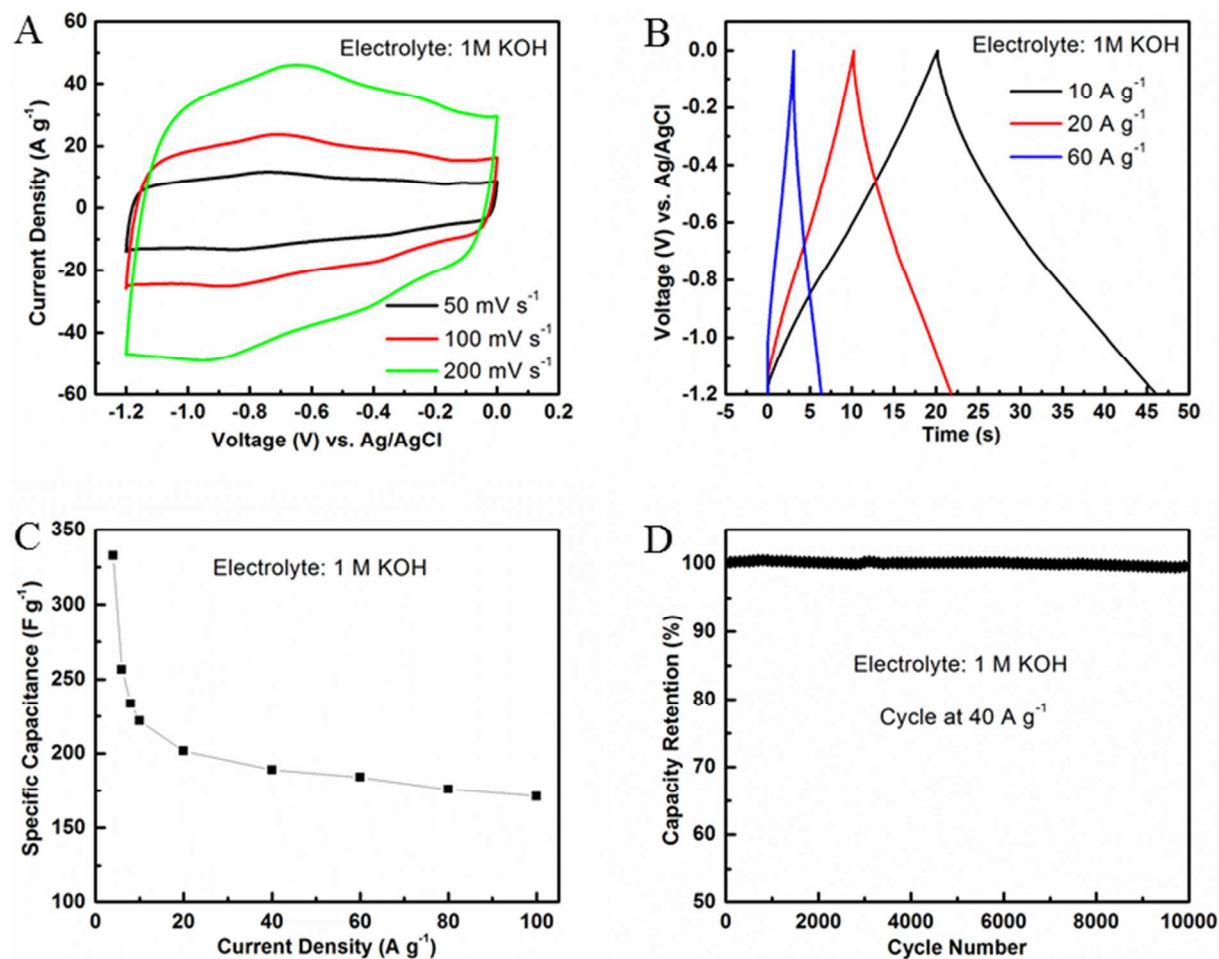
**Figure S3.** TEM images of the Ni-Co-S-4 nanosheets with different magnifications.



**Figure S4.** XPS spectra of the Ni-Co-S-4 nanosheets. (A) Ni 2p; (B) Co 2p; (C) S 2p.

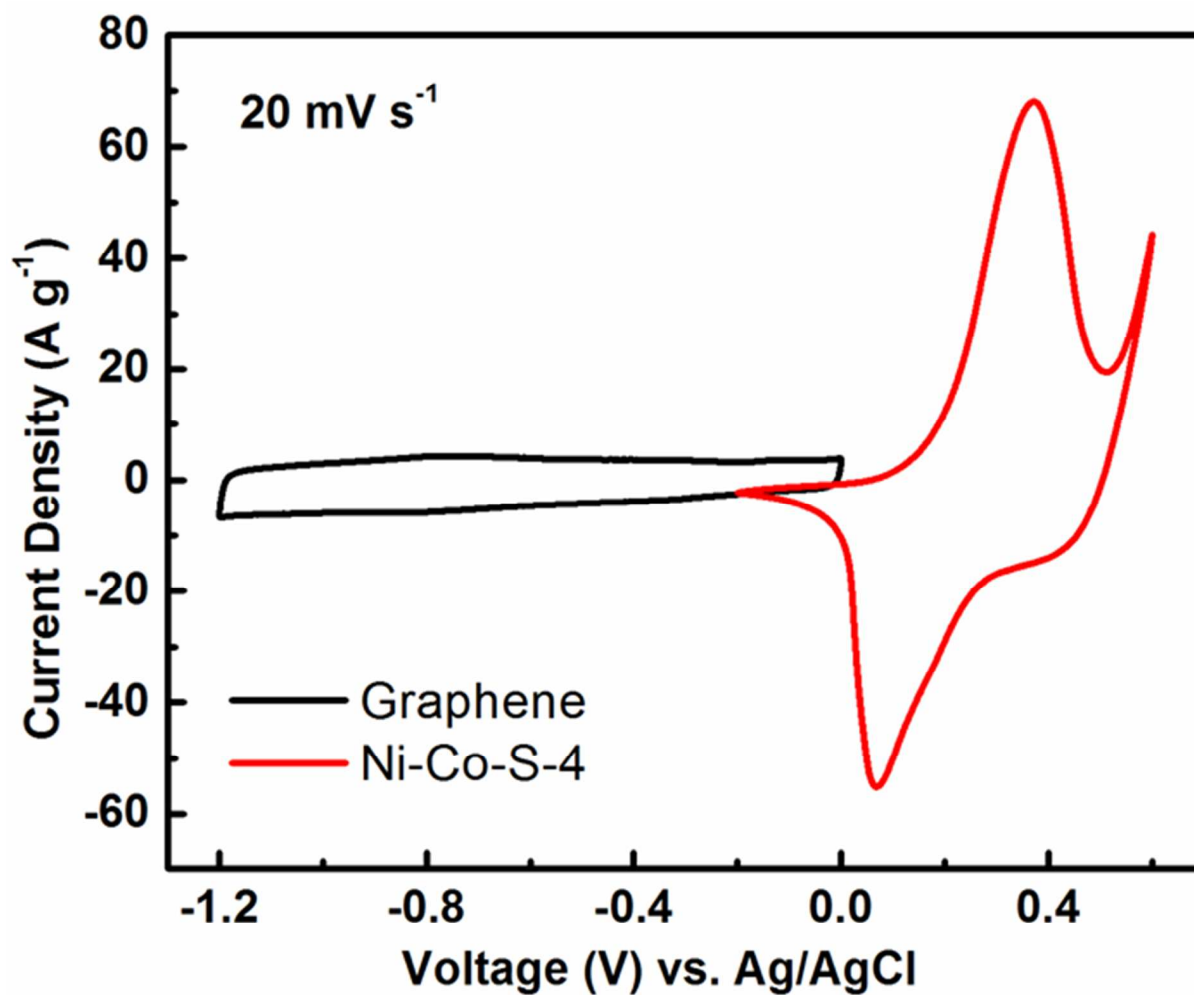


**Figure S5.** SEM image of the graphene as negative electrode material in this study.

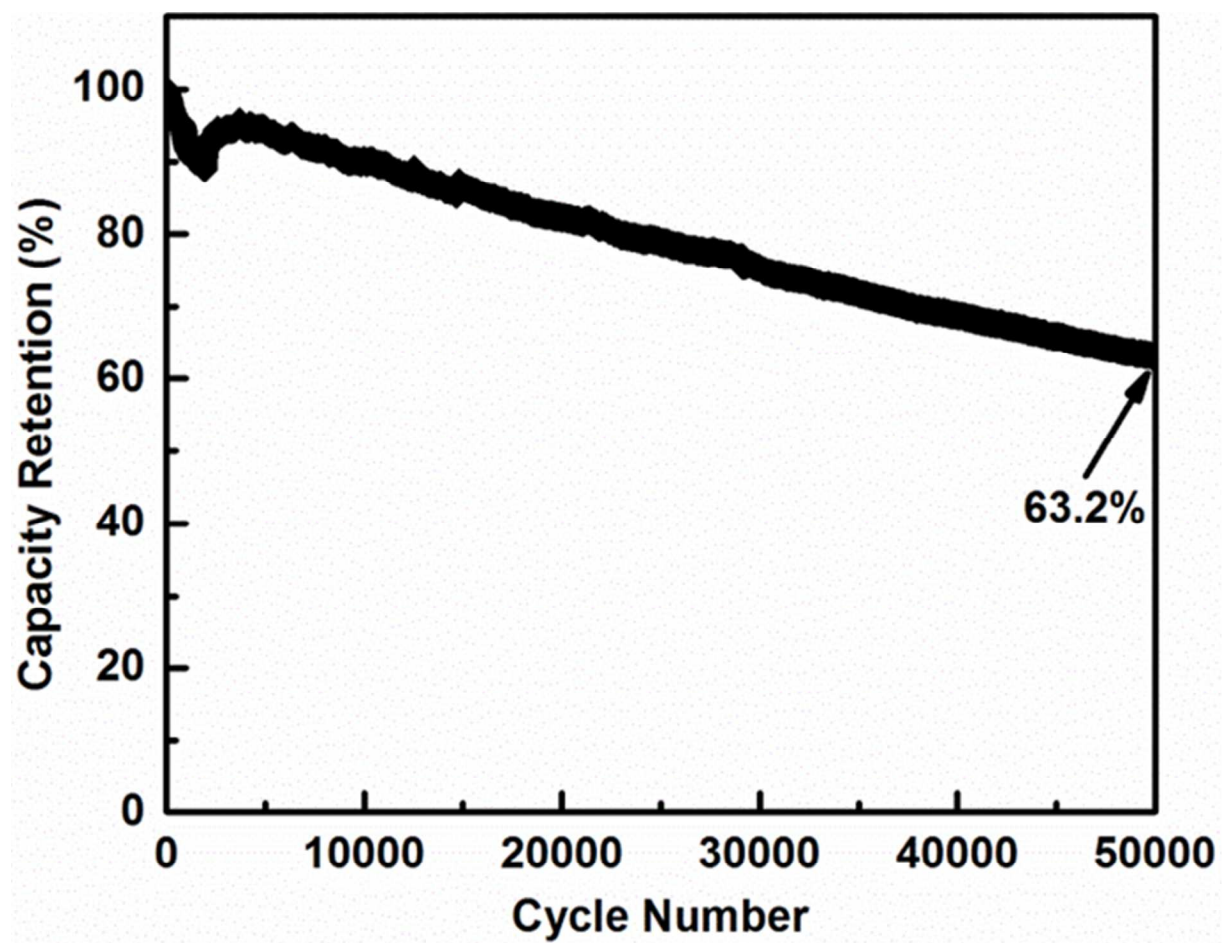


**Figure S6.** The electrochemical performance of the graphene negative electrode in 1M KOH electrolyte. (A) cyclic voltammetry; (B) galvanostatic charge-discharge; (C) specific capacitance vs. current density; (D) cycling stability.





**Figure S7.** The cyclic voltammetry profiles of the Ni-Co-S-4 as positive electrode and graphene as negative electrode at the same scan rate of  $20 \text{ mV s}^{-1}$  in the 1M KOH electrolyte.



**Figure S8.** Long-term cycling stability of the asymmetric Ni-Co-S//graphene supercapacitors.