Electronic Supplementary Information

One-step hydrothermal fabrication of strongly coupled Co$_3$O$_4$ nanosheets-reduced graphene oxide towards electrochemical capacitors

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Fig. S1 (a) CV curve (10 mV s$^{-1}$) and (b) charge-discharge plots of the r-GO electrode at various current densities as indicated.

As seen in the Fig. S1a, the small areas integrated below the zero-current line at a scan rate of 10 mV s$^{-1}$, suggesting the low SC of the as-fabricated rGO electrode. Of particularly note, a serious polarization phenomenon above ~0.35 V is presented, which is related to the oxygen evolution in such electrochemical window. Fig S1b demonstrates the typical charge-discharge plots of the rGO electrode at various current densities as indicated. The obvious linear charge-discharge curves indicate the typical electrical double-layer capacitance for the rGO electrode. And the SCs of 11, 8 and 6 F g$^{-1}$ can be calculated for rGO electrode at current densities of 2, 3 and 5 A g$^{-1}$. Furthermore, the low coulombic efficiency of ~64% was observed at 2 A g$^{-1}$ for the rGO electrode, owing to the existence of obvious polarization.
As demonstrated in Fig. S2a, near rectangular shape of the CV are observed, indicating its typical double-layer electric capacitance. In addition, the SC of the AC electrode is calculated as \(~118 \text{ F g}^{-1}\) at a current density of 0.5 A g\(^{-1}\), as shown in Fig. S2b.
Fig. S3 Calculated SCs as a function of the current density for the AC/Co$_3$O$_4$ NSs-rGO asymmetric EC