Supporting Information

Superior performance of $ZnCo_2O_4$/ZnO@multiwall carbon nanotubes with laminated shape assembled as high practical all-solid-state asymmetric supercapacitors

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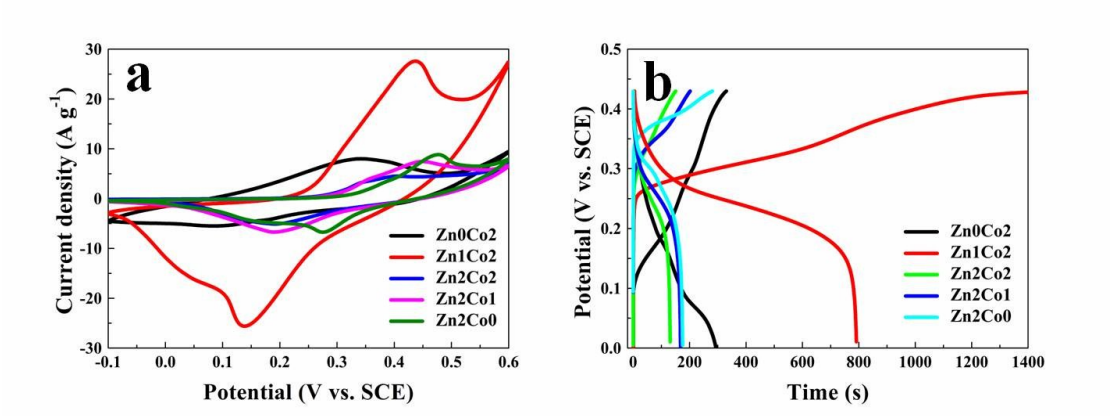

Fig. S1 (a) The CV curves of control groups; (b) GCD test of reference groups at 1 A g^{-1}.

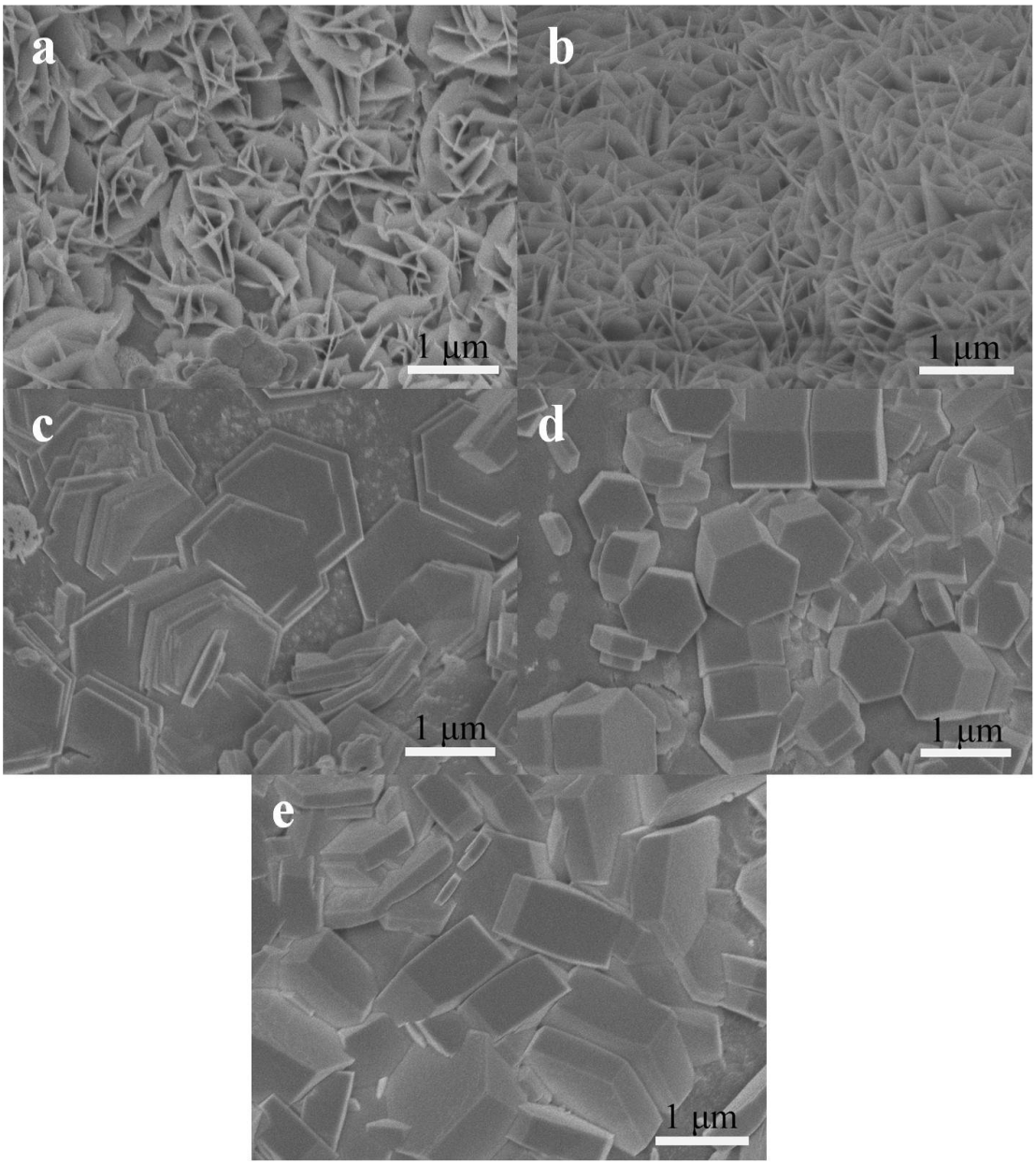

Fig. S2 SEM image of (a) Zn0Co2, (b) Zn1Co2, (c) Zn2Co2, (d) Zn2Co1, and (e) Zn2Co0.

Fig. S2 reveals the morphology and structure of the Zn0Co2, Zn1Co2, Zn2Co2, Zn2Co1, and Zn2Co0, respectively. As we can see from the pictures, with the reduction of cobalt and increase of zinc, the morphologies of the samples changed from lamellar structure to hexagonal structure. Meanwhile, the crystallinity of the samples increased with the increasing zinc content. This phenomenon reveals that the presence of zinc can inhibit the formation of lamellar structure and improve the

crystallinity.

Table S1 Atomic ratio and specific capacitance of control groups

	Mass proportion of Zn : Co	Recharge time (s)	Specific capacitance (F g^{-1})
Zn0Co2	0:2	293.1	681.6
Zn1Co2	1:2	791.3	1840.2
Zn2Co2	2:2	130.9	304.4
Zn2Co0	2:1	167.8	390.2
Zn2Co1	2:0	174.7	406.3

By comparisons of the capacitance performances for five control groups, Zn1Co2 is selected as the objective, and then a deep investigation was carried out on it. Fig. S2a show the CV curves of control groups. Fig. S2b shows GCD test of control groups at 1 A g^{-1}. The loop of Zn1Co2 is the largest and the recharging time is the longest, meaning that Zn1Co2 has the highest specific capacitance. The corresponding specific capacitances are listed in Table S1.

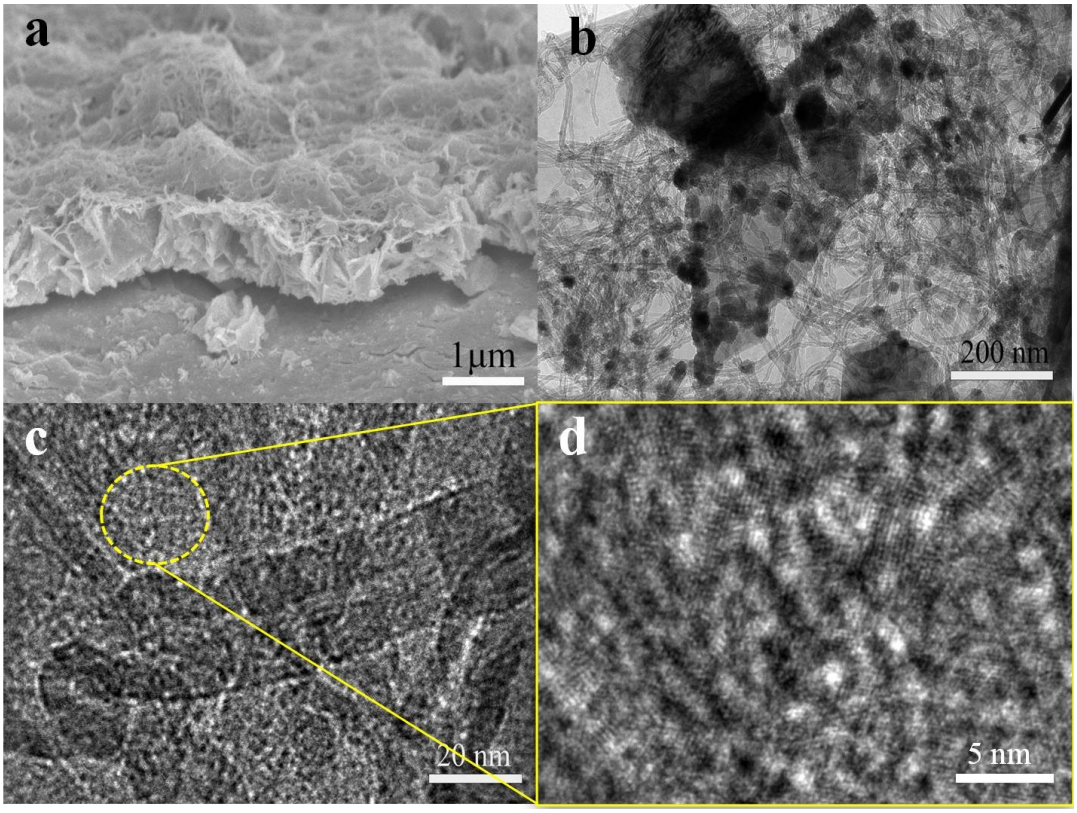

Fig. S3 (a) Cross-section SEM image, (b) TEM image, (c) HRTEM pattern of Zn1Co2@MWCNTs and (d) clear lattice fringe of dissolved matter.

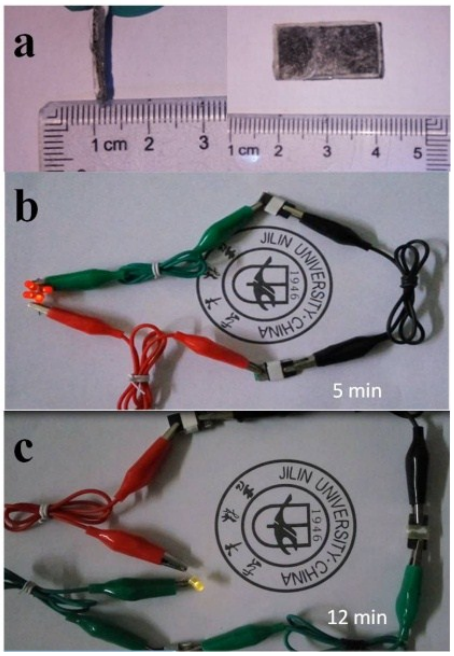

Fig. S4 (a) Size of Zn1Co2@MWCNTs//AC solid-state asymmetric supercapacitor; brightness of (b) four red LEDs in 5 minutes and (c) one yellow LED in 12 minutes.

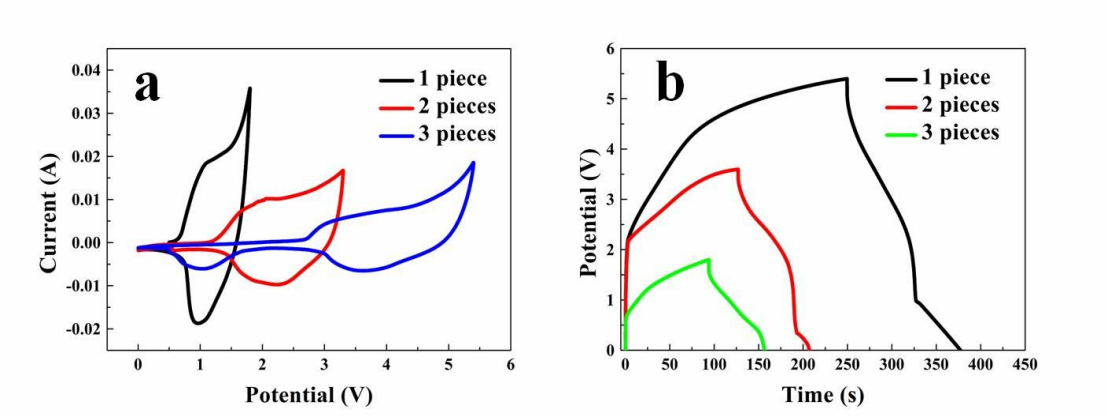

Fig. S5 (a) CV curves of Zn1Co2@MWCNTs//AC solid-state asymmetric supercapacitor with different numbers in series; (b) GCD curves in the same current.