Supporting Information

Facile synthesis of morphology-controlled hybrid structure of $ZnCo_2O_4$ nanosheets and nanowires for high-performance asymmetric supercapacitors

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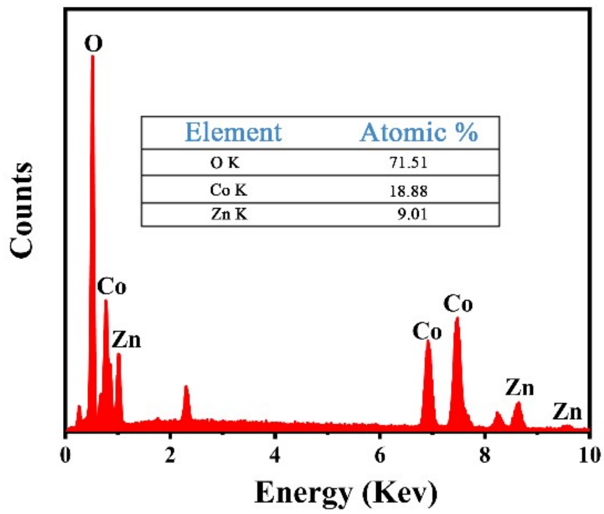

Fig. S1. EDS of the 3D hierarchical $ZnCo_2O_4$ nanosheets@nanowires films.

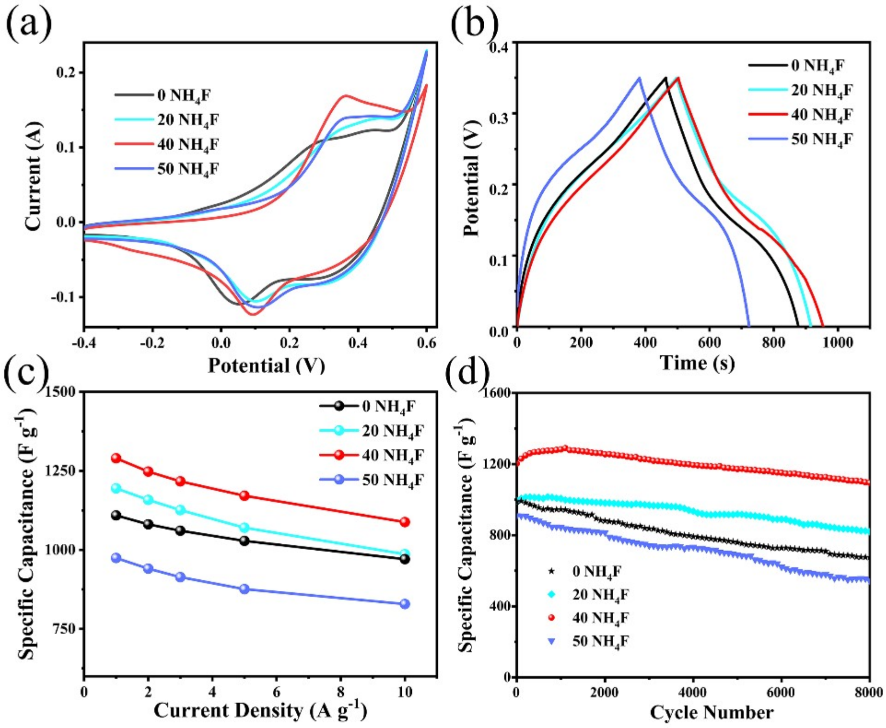

Fig. S2. Electrochemical properties of $ZnCo_2O_4$ films electrodes obtained at different concentration of NH_4F. (a) CV curves at the scan rate of 20 mV s^{-1}. (b) Galvanostatic charge-discharge curves at current density of 1 A g^{-1}. (c) Specific capacitances at different current densities. (d) Cycling stability at 1 A g^{-1}.

Table S1 Parameters obtained by fitting of Nyquist plots in Fig. 7f.

Sample	R_s (Ω)	R_{ct} (Ω)	Z_W (Ω)	CPE (μF cm^{-2})
Before 10,000 cycles	0.49	0.29	0.51	0.02
After 10,000 cycles	0.51	1.92	2.06	0.03

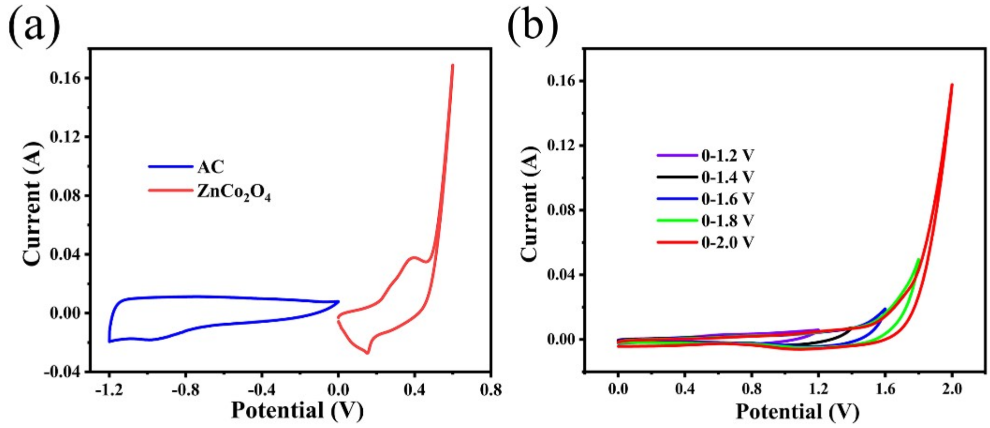

Fig. S3. (a) CV curves of the 3D hierarchical $ZnCo_2O_4$ nanosheets@nanowires films and AC electrodes at the scan rate of 20 mV s^{-1}. (b) CV curves of $ZnCo_2O_4$//AC ASC device in different potential ranges.

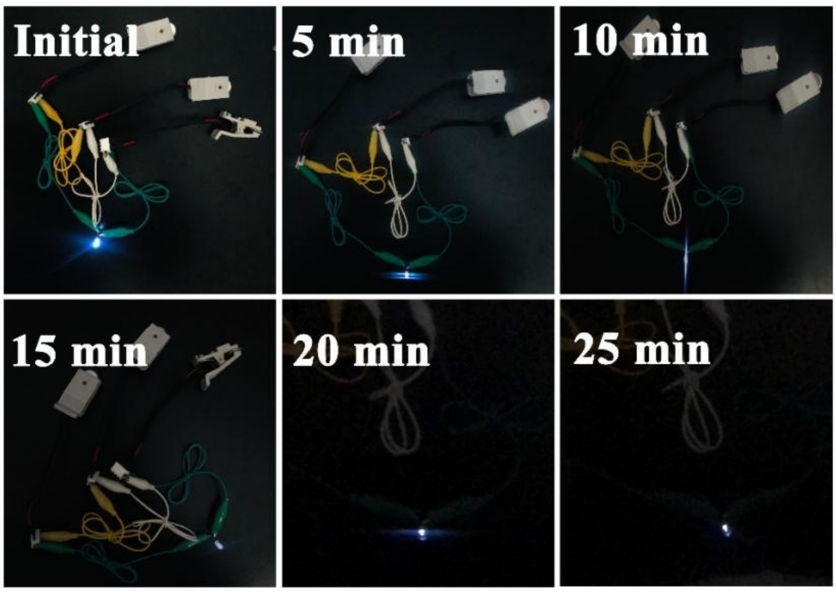

Fig. S4. Optical images of a blue LED powered by three ASC devices connected in series and the lightened blue LED at different stages.

Table S2 Comparison of the electrochemical properties between the as-prepared 3D hierarchical $ZnCo_2O_4$ nanosheets@nanowires films and recent results reported in literature.

Materials	Electrolyte	Voltage window	Specific Capacity	Cycling Stability	Ref.
$ZnCo_2O_4$ nanoparticles	1 M KOH	0-0.45 V	843 F g^{-1} at 1 A g^{-1}	91.5% after 2,000 cycles at 1 A g^{-1}	[1]
3D hierarchical $ZnCo_2O_4$	6 M KOH	0-0.4 V	421.05 F g^{-1} at 1 A g^{-1}	88% after 5000 cycles at 5 A g^{-1}	[2]
$ZnCo_2O_4$ nanobelts	2 M KOH	0-0.45 V	776.2 F g^{-1} at 1 A g^{-1}	84.3% after 1,500 cycles at 3 A g^{-1}	[3]
$ZnCo_2O_4$ nanowires	2 M KOH	0-0.4 V	1099 F g^{-1} at 1 A g^{-1}	84.8% after 5,000 cycles at 40 A g^{-1}	[4]
$ZnCo_2O_4$ microspheres	1 M KOH	0-0.425 V	344.44 F g^{-1} at 1 mA cm^{-2}	85% after 500 cycles at 100 mV s^{-1}	[5]
peony-like $ZnCo_2O_4$	3 M KOH	0-0.55 V	440 F g^{-1} at 1 A g^{-1}	98% after 5,000 cycles at 2 A g^{-1}	[6]
$ZnCo_2O_4$ with Zn/Co vacancies	6 M KOH	0-0.4 V	1608.95 F g^{-1} at 0.35 A g^{-1}	89% after 3,500 cycles at 5 A g^{-1}	[7]
flower-like $ZnCo_2O_4$	KOH	0-0.4 V	680 F g^{-1} at 1 A g^{-1}	90% after 2,000 cycles at 5 A g^{-1}	[8]
Porous $ZnCo_2O_4$ quasi-cubes	2 M KOH	0-0.45 V	804 F g^{-1} at 1 A g^{-1}	79.2% after 3,000 cycles at 5 A g^{-1}	[9]
$ZnCo_2O_4$ nanocubes with 3D porous structure	6 M KOH	0-0.5 V	542.6 F g^{-1} at 1 A g^{-1}	87% after 8,000 cycles at 15 A g^{-1}	[10]

N-rGO/$ZnCo_2O_4$	1 M KOH	0-0.6 V	950 F g^{-1} at 1 A g^{-1}	89.6% after 5,000 cycles at 1 A g^{-1}	[11]
flower-like $ZnCo_2O_4$/ZnO	6 M KOH	0-0.5 V	803 F g^{-1} at 1 A g^{-1}	91.04% after 10,000 cycles at 10 A g^{-1}	[12]
3D hierarchical $ZnCo_2O_4$ nanosheets@nanowires	6 M KOH	0-0.35 V	1289.6 F g^{-1} at 1 A g^{-1}	86.8% after 10,000 cycles at 1 A g^{-1}	(This work)

References

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