Electronic Supplementary Material (ESI) for Nanoscale.

Supplementary information

Battery-like bismuth oxide anode for soft-packed supercapacitors with high energy storage performance

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Supporting Figures:

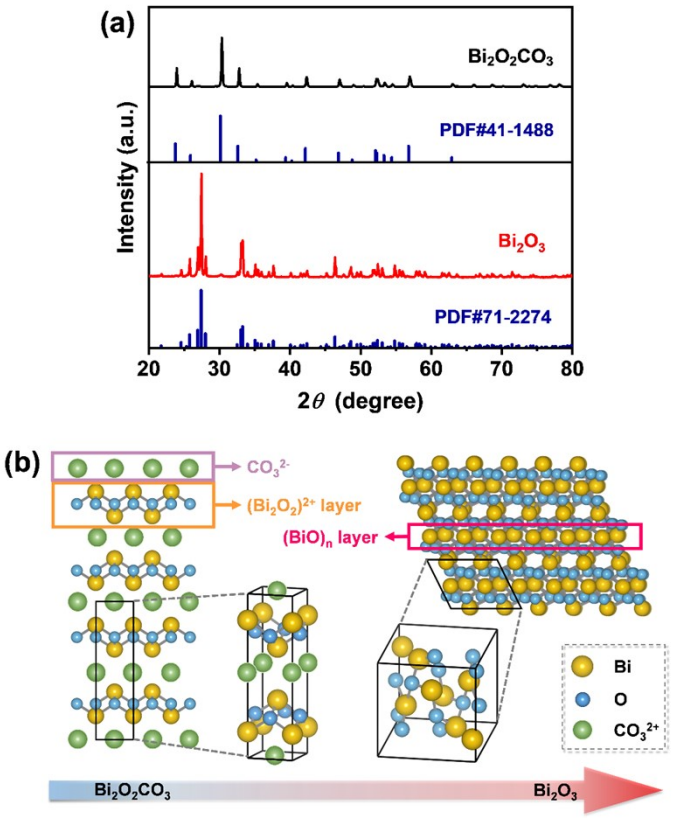

Fig. S1. (a) XRD patterns of $Bi_2O_2CO_3$ and Bi_2O_3, (b) Schematic diagram of the crystal structures of $Bi_2O_2CO_3$ and Bi_2O_3.

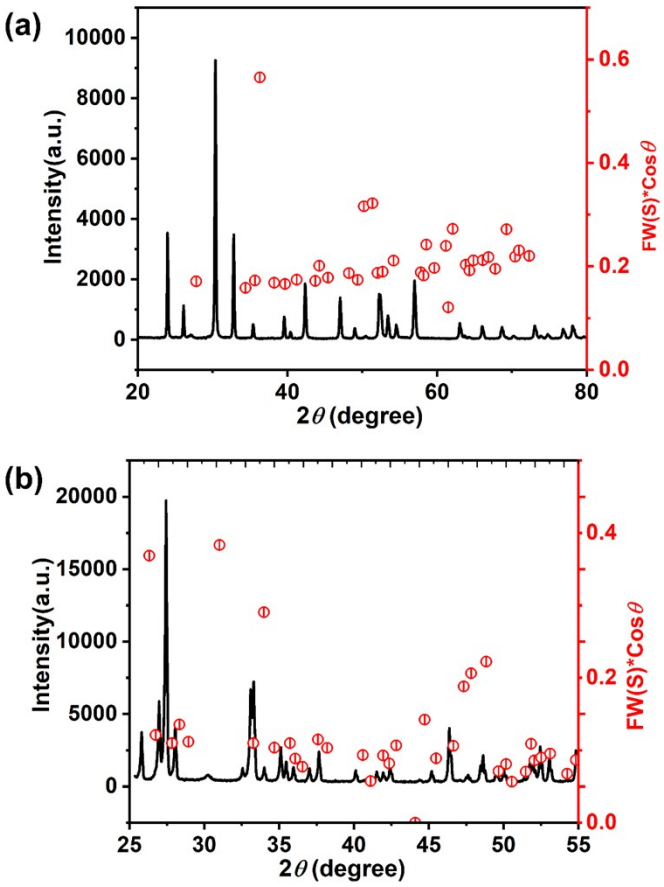

Fig. S2. XRD patterns and FW(S)*Cosθ-2θ diagrams of (a) $Bi_2O_2CO_3$ and (b) Bi_2O_3.

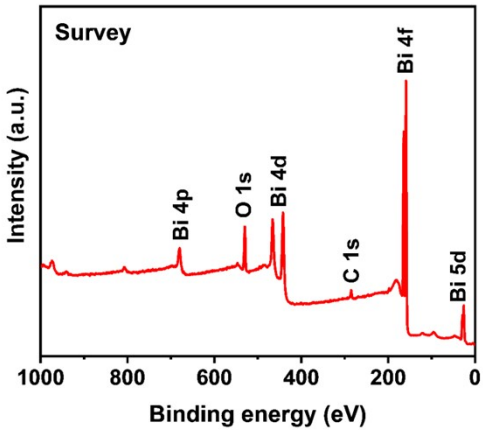

Fig. S3. XPS survey spectrum of Bi_2O_3.

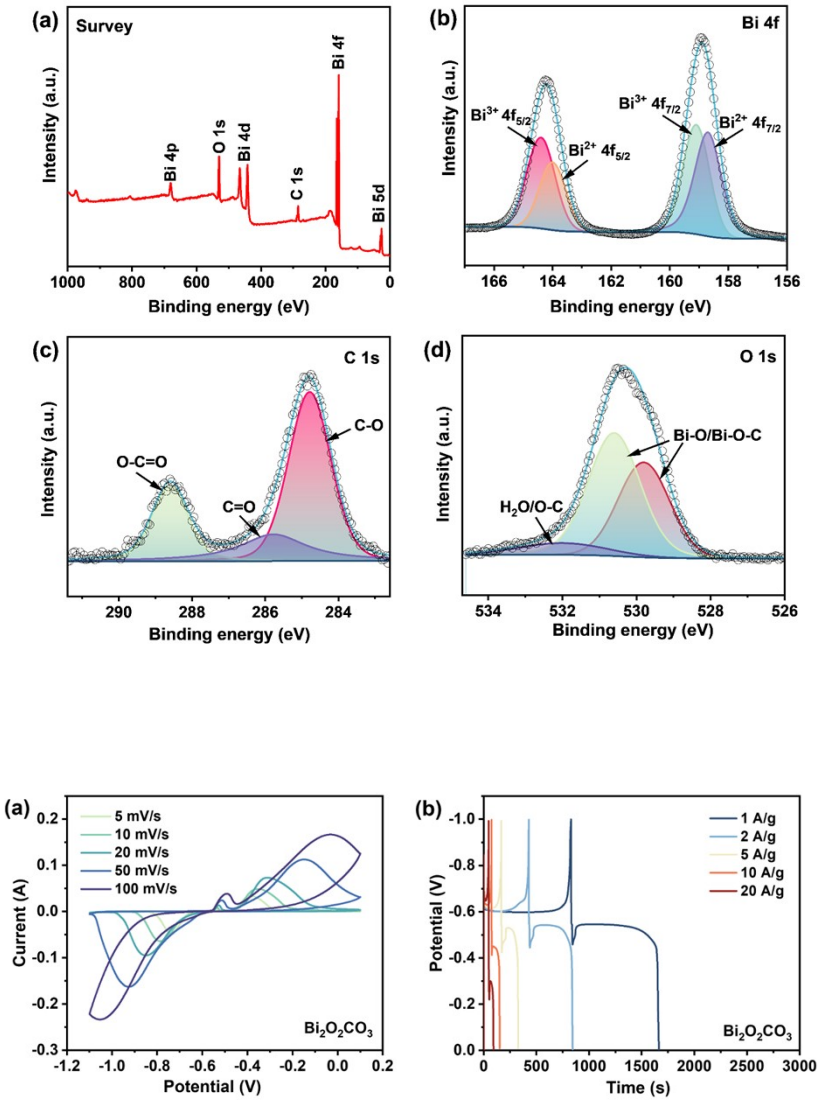

Fig. S4. XPS spectra of $Bi_2O_2CO_3$: (a) survey spectrum, (b) Bi 4f, (c) C 1s, (d) O 1s.

Fig. S5. (a) CV curves of $Bi_2O_2CO_3$ at 5~100 mV/s, (b) GCD curves of $Bi_2O_2CO_3$ at 1-20 A/g.

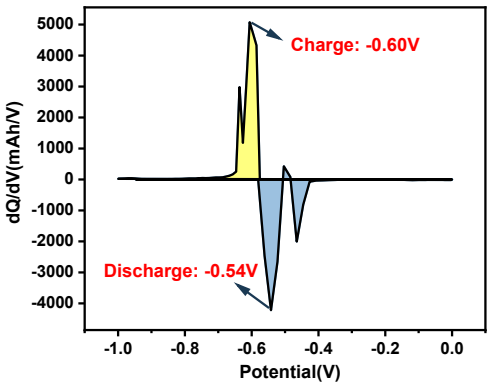

Fig. S6. Differential capacitance curve of Bi_2O_3 at 1 A/g.

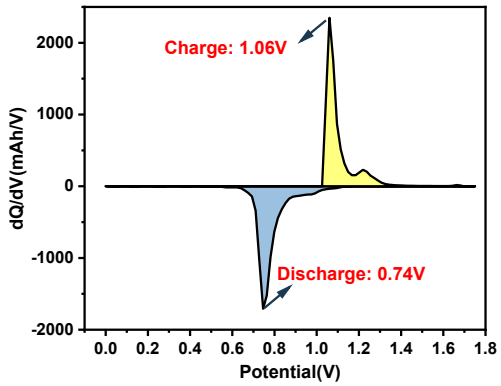

Fig. S7. Differential capacitance curve of supercapacitor at 1 A/g.

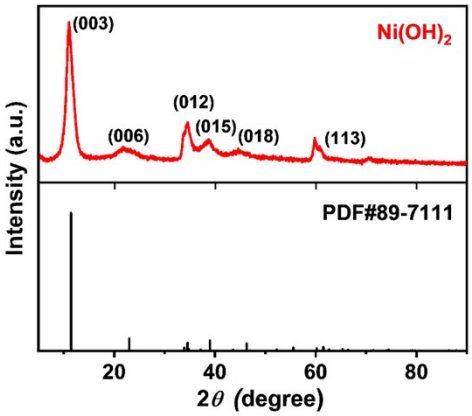

Fig. S8. XRD patterns of $Ni(OH)_2$ and PDF#89-7111.

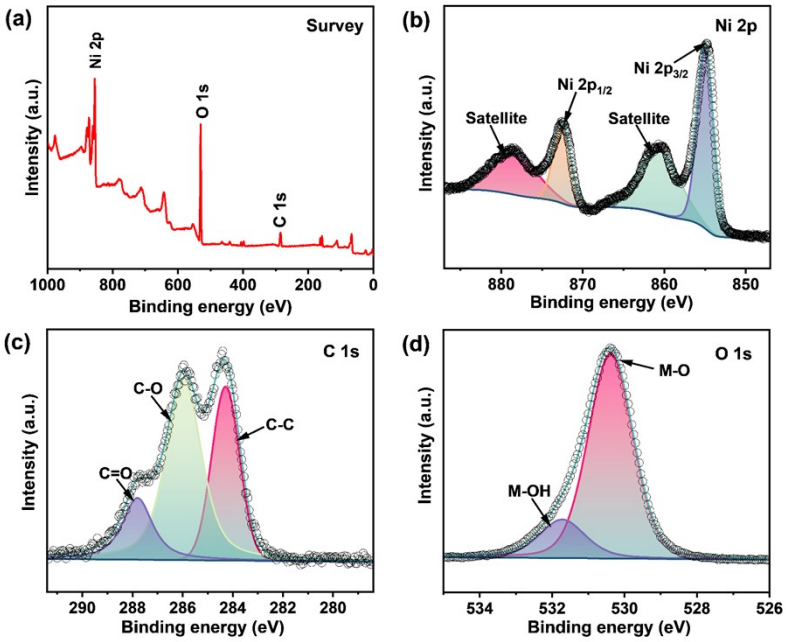

Fig. S9. XPS spectra of $Ni(OH)_2$: (a) survey spectrum, (b) Ni 2p, (c) C 1s; (d) O 1s.

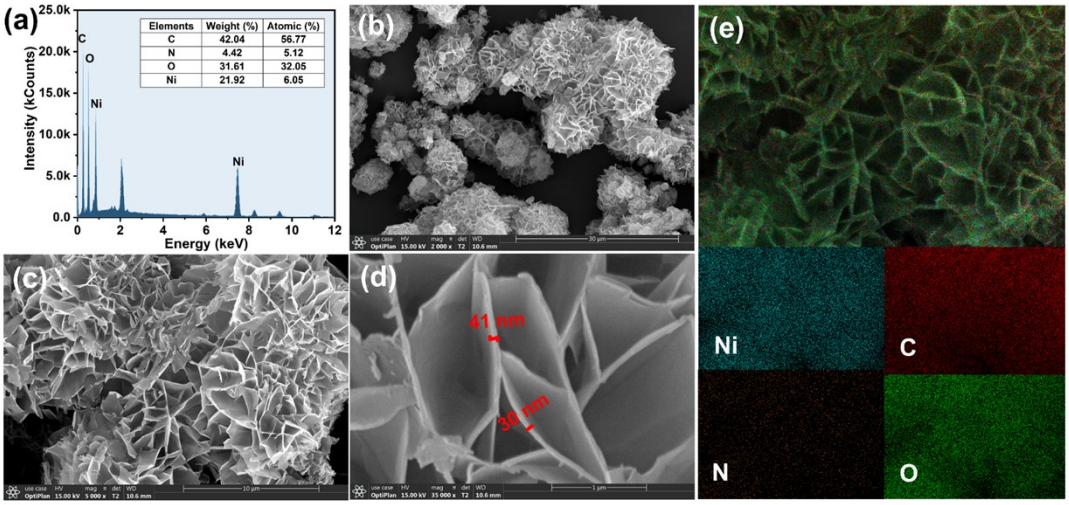

Fig. S10. (a) EDS spectra of $Ni(OH)_2$, (b, c, d) SEM images of $Ni(OH)_2$, (e) Elemental mapping images of Ni, C, N and O of $Ni(OH)_2$.

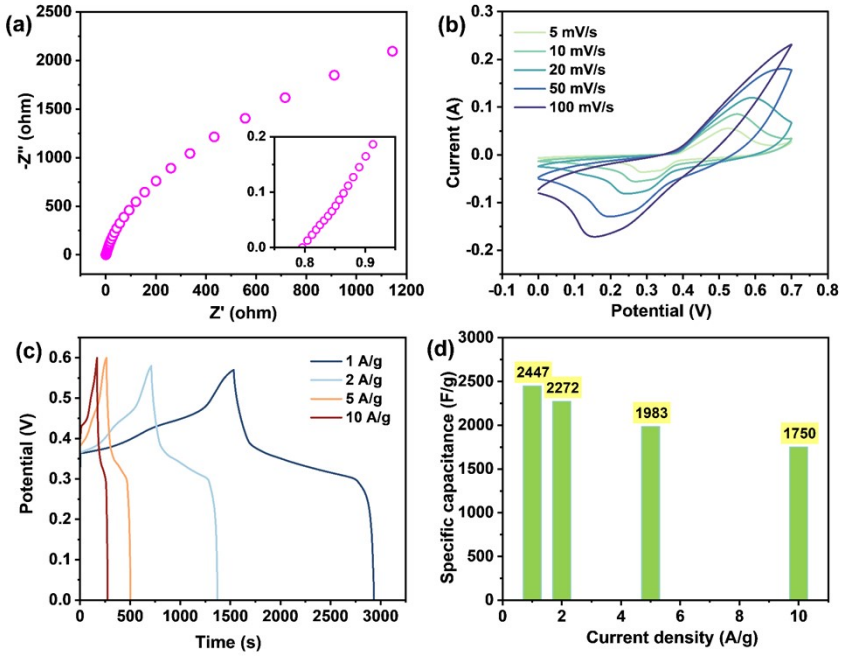

Fig. S11. (a) EIS curve of $Ni(OH)_2$, (b) CV curves of $Ni(OH)_2$ at 5~100 mV/s, (c) GCD curves of $Ni(OH)_2$ at 1-10 A/g, (d) Comparisons of specific capacitances of $Ni(OH)_2$ at 1-10 A/g.

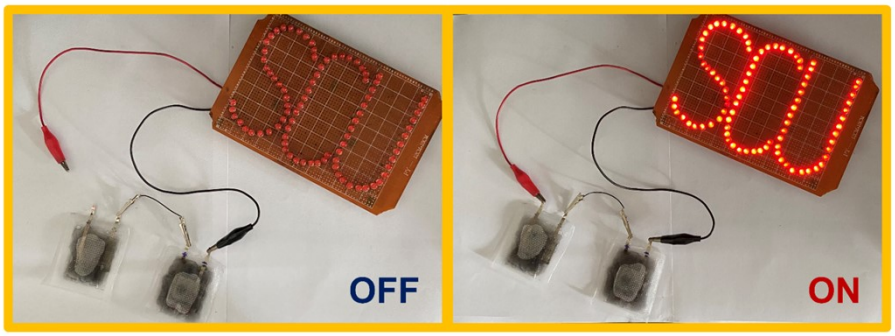

Fig. S12. The pictures of the "SCU" sign in "ON" and "OFF" states.

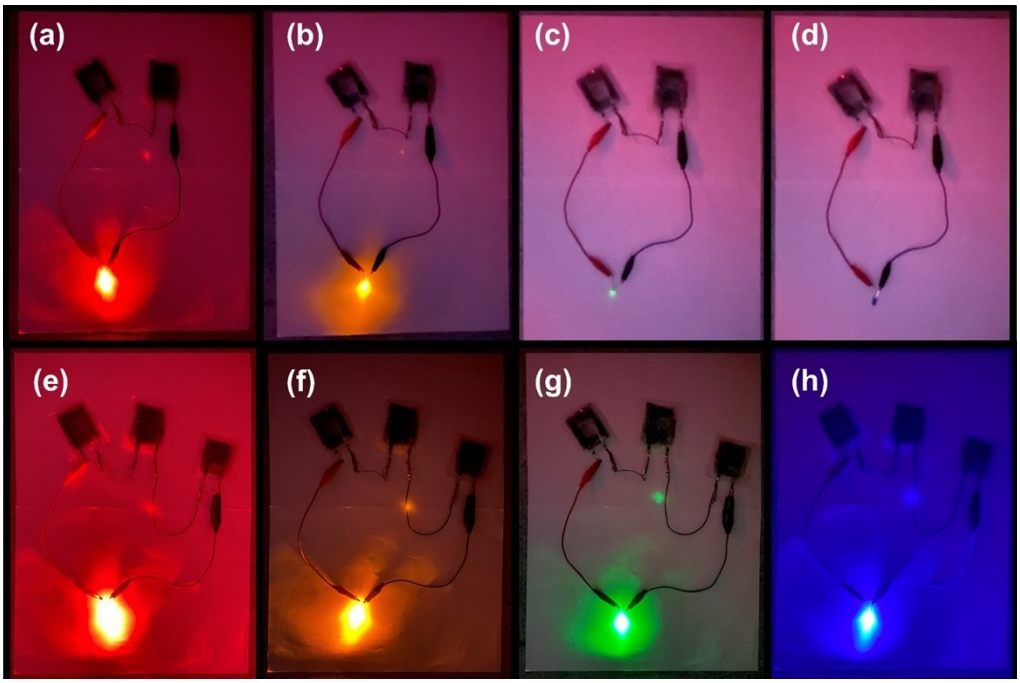

Fig. S13. Lighting pictures of one LED of different colors powered with (a-d) two series-connected ASCs and (e-h) three series-connected ASCs.

Supporting Table

Table S1 Comparsion studies for Bi-based materials.

Materials	Specific capacitance	Current density	Rate capability: retention	Current density interval	References
r-Bi_2O_3/GN	681 F g^{-1}	1 mA cm^{-2}	56.2%	1~50 mA cm^{-2}	[16]
Bi-Bi_2O_3/CNT	850 F g^{-1}	1 A g^{-1}	84.0%	1~30 A g^{-1}	[22]
$Bi_2O_2CO_3$	1045.3 F g^{-1}	1 A g^{-1}	68.3%	1~20 A g^{-1}	[23]
$Bi_2O_2CO_3$/rGO	667 F g^{-1}	1 A g^{-1}	75.0%	1~20 A g^{-1}	[28]
Bi_2O_3@C	1095 C g^{-1}	1 A g^{-1}	52.5%	1~5 A g^{-1}	[31]
$Bi_2O_2CO_3$-RGO	860 F g^{-1}	5 mVs^{-1}	96.0%	5~20 mV s^{-1}	[33]
Bi_2O_3–AC	466 F g^{-1}	1 A g^{-1}	71.9%	1~5 A g^{-1}	[38]
Bi_2O_3	1178 F g^{-1}	1 A g^{-1}	94.9%	1~20 A g^{-1}	★This work