Electronic Supplementary Material (ESI) for Inorganic Chemistry Frontiers.

UiO-66-NH_2 MOF derived N doped Porous Carbon and ZrO_2 Composite Cathode for Zinc-Ion Hybrid Supercapacitors

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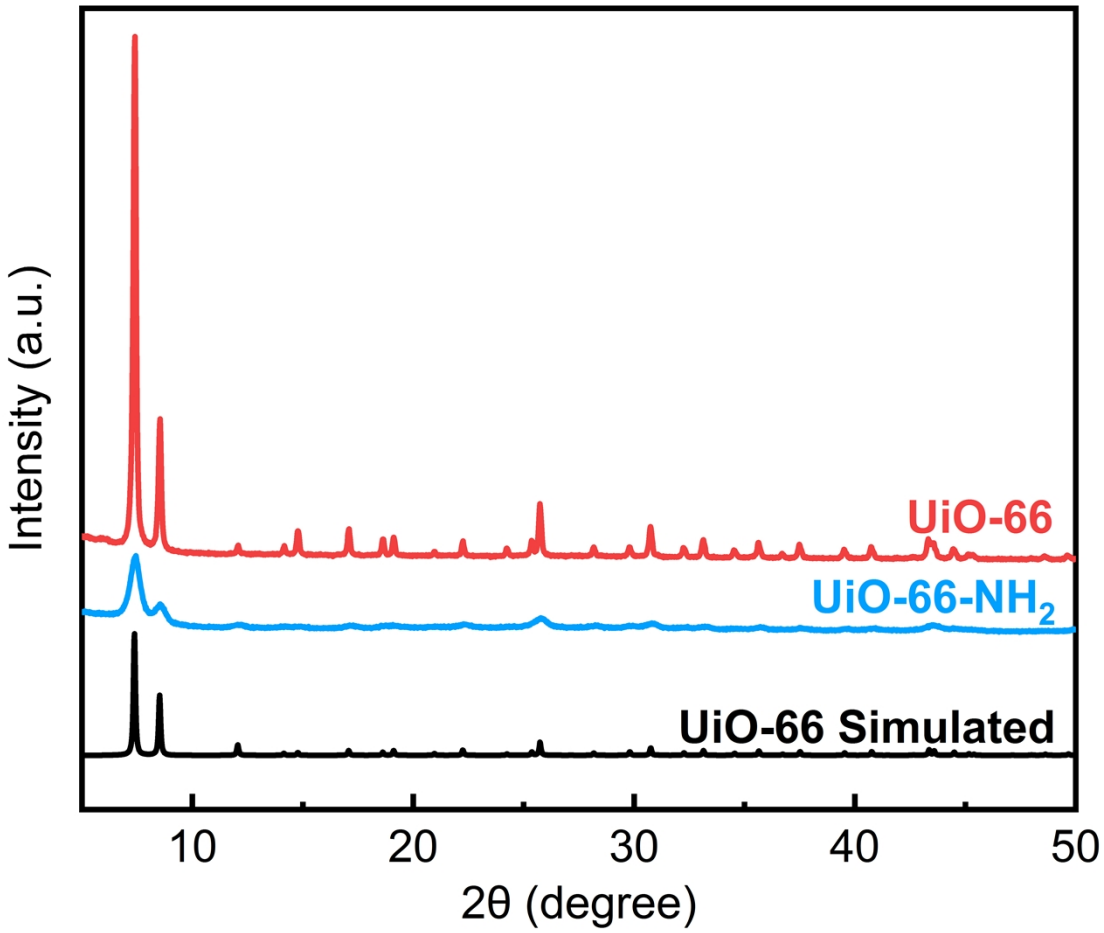

Fig. S1 XRD patterns of the as-synthesized UiO-66, UiO-66-NH_2 samples, and simulated XRD pattern of the UiO-66, respectively.

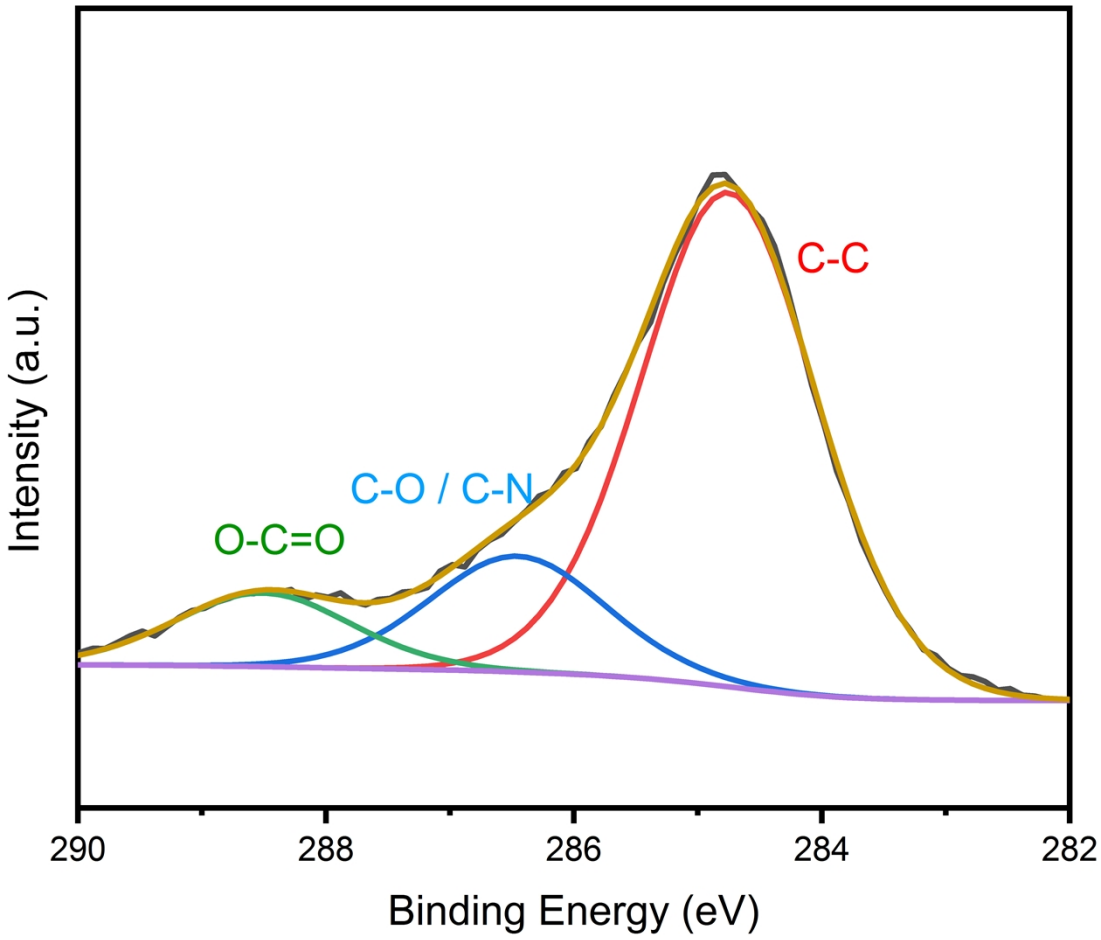

Fig. S2 High resolution XPS spectrum of C 1s for NC@ZrO_2 composite.

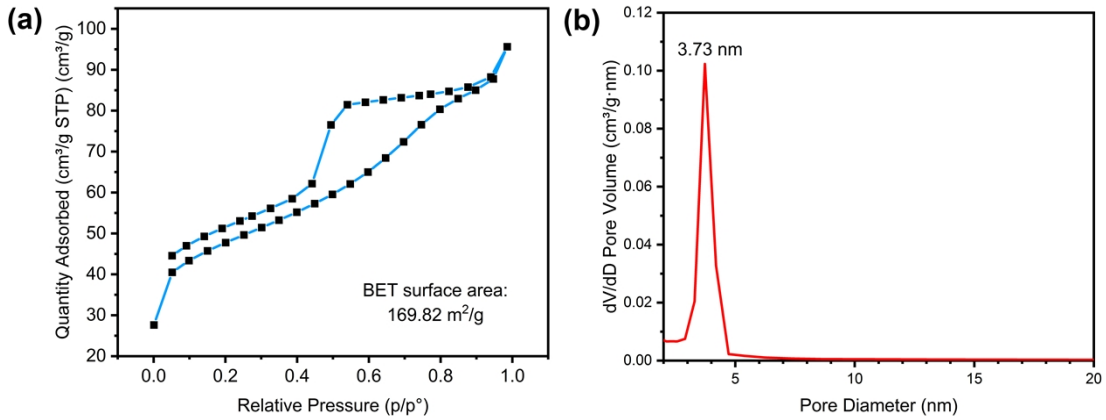

Fig. S3 (a) N_2 adsorption and desorption curves of C@ZrO_2 composite, (b) pore size distribution curve.

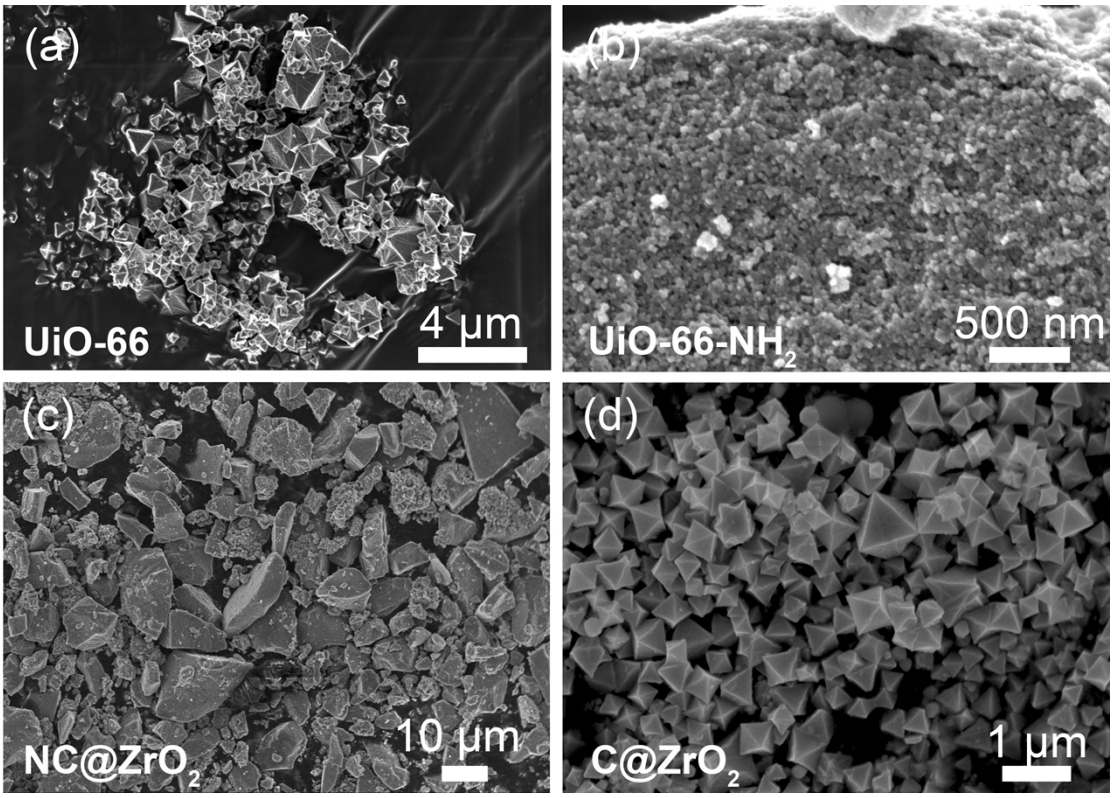

Fig. S4 SEM images of UiO-66, UiO-66-NH_2 and the derived composites. (a) UiO-66. (b) UiO-66-NH_2. (c) NC@ZrO_2 composite (d) C@ZrO_2 composite..

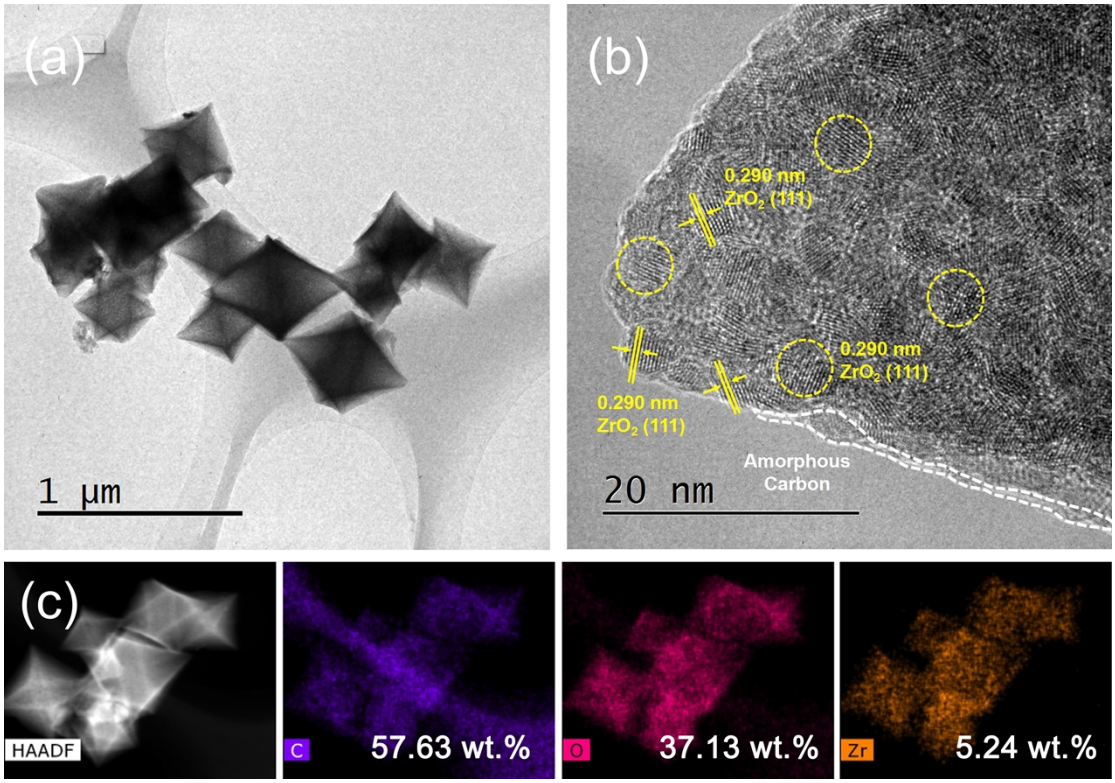

Fig. S5 TEM characterizations of C@ZrO_2 composite. (a) TEM image. (b) HRTEM image. (c) TEM-EDS elemental mapping of the C@ZrO_2 composite, and the mass ratio of C, O, and Zr.

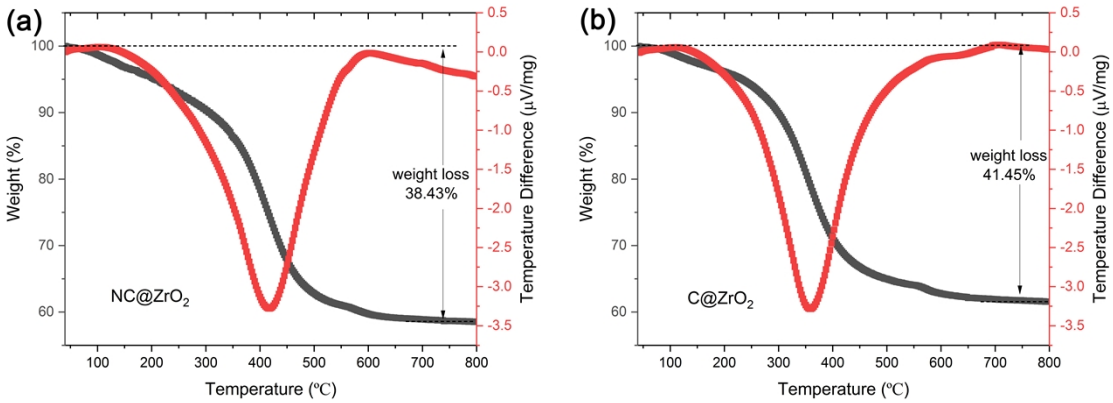

Fig. S6 TG-DTA analysis of $NC@ZrO_2$ and $C@ZrO_2$ composites. (a) $NC@ZrO_2$. (b) $C@ZrO_2$.

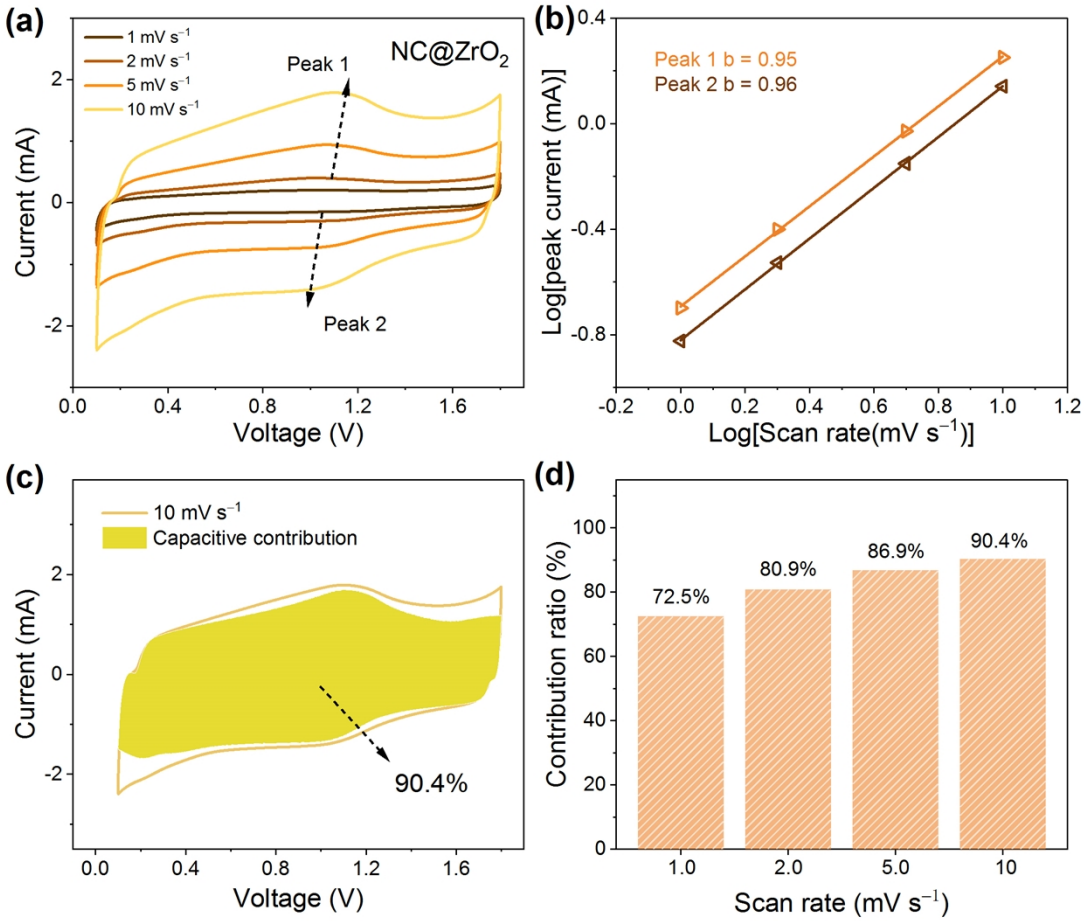

Fig. S7 Anlalysis of the redox pseudocapacitance-like contribution of NC@ZrO_2. (a) CV profiles of ZHC at different scan rates with NC@ZrO_2. (b) The plots of log(i) vs log(υ) (peak current: i, scan rate: υ), calculated from CV curves. (c) The shaded region shows the CV profile with the capacitive contribution at a scan rate of 10.0 mV s^{-1}. (d) Contribution ratio of capacitive at different scan rates.

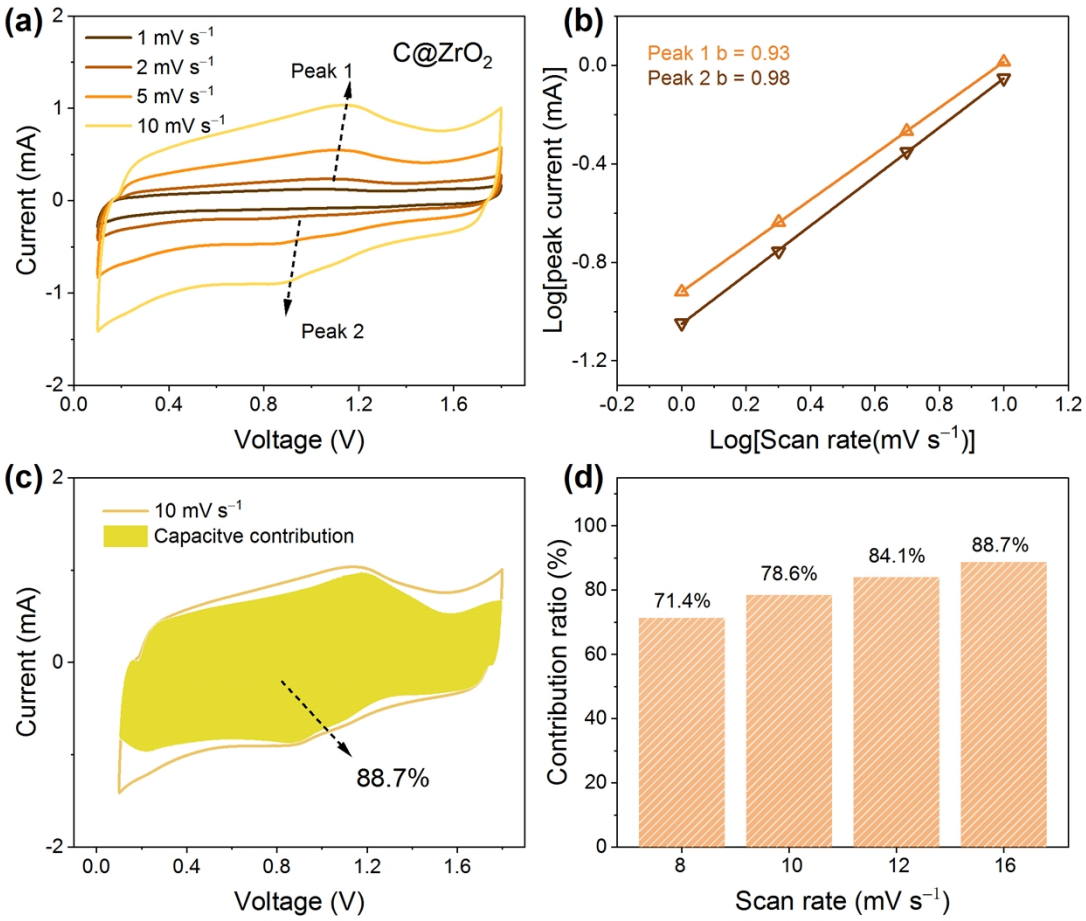

Fig. S8 Anlalysis of the redox pseudocapacitance-like contribution of C@ZrO_2. (a) CV profiles of ZHC at different scan rates with C@ZrO_2. (b) The plots of log(*i*) vs log(*υ*) (peak current: *i*, scan rate: *υ*), calculated from CV curves. (c) The shaded region shows the CV profile with the capacitive contribution at a scan rate of 10.0 mV s^{-1}. (d) Contribution ratio of capacitive at different scan rates.

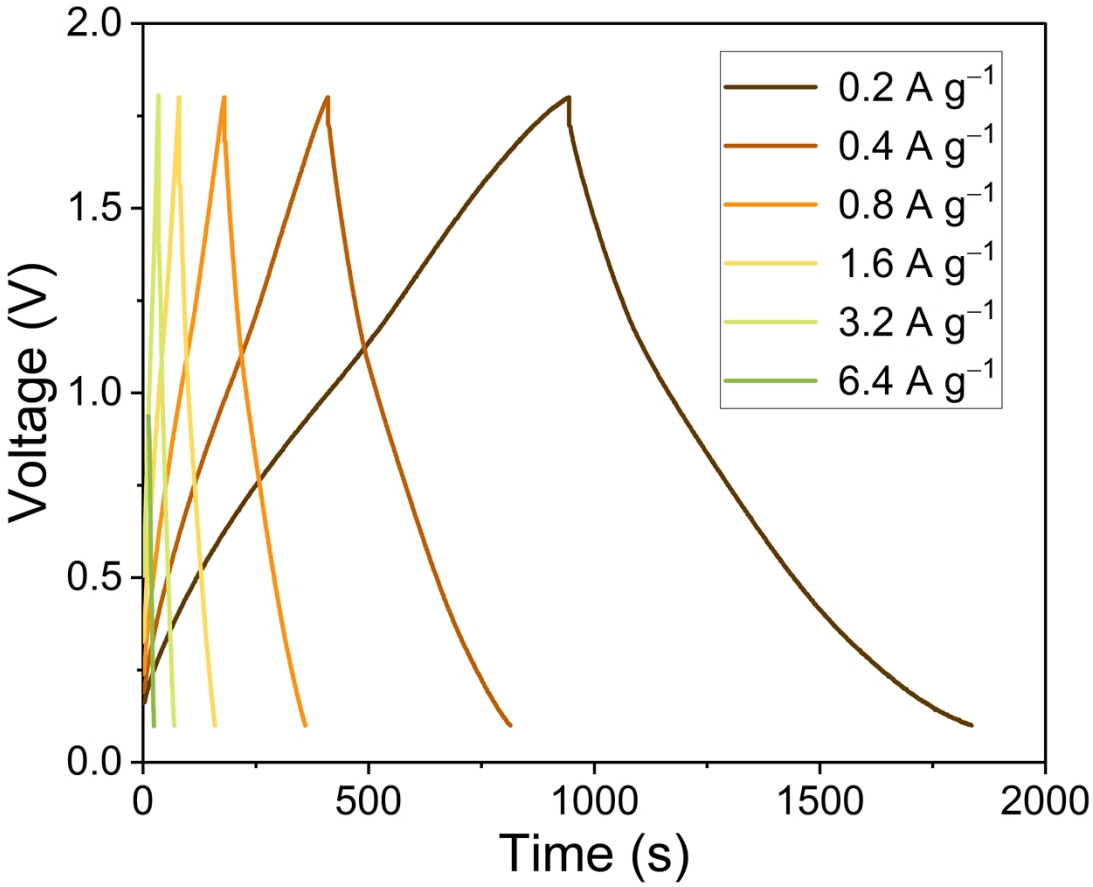

Fig. S9 GCD curves of C@ZrO_2 based ZHSs at current ranging from 0.2 to 6.4 A g^{-1}.

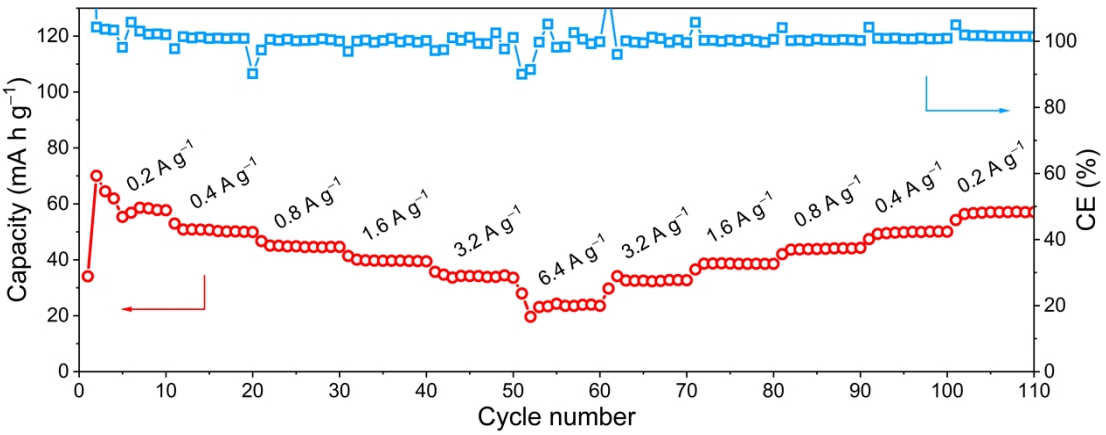

Fig. S10 Rate performance of the C@ZrO_2 cathode.

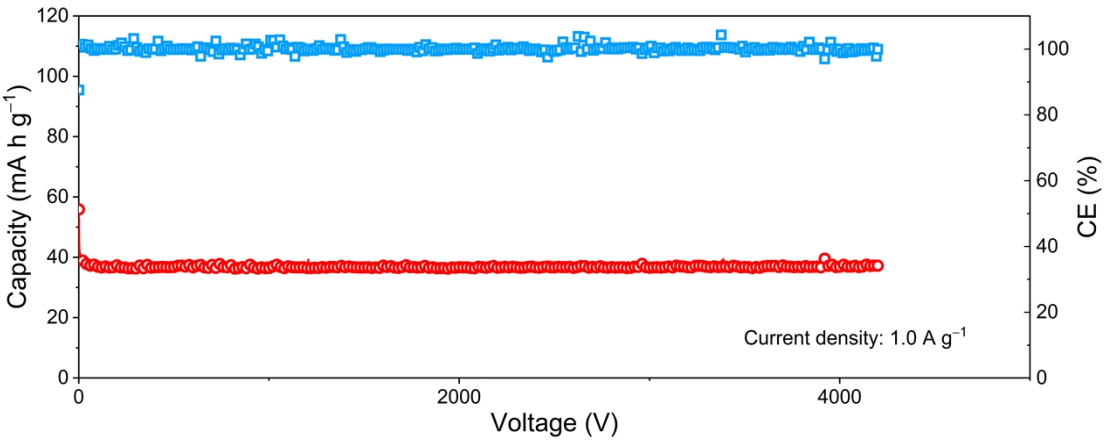

Fig. S11 Long-cycling performance of C@ZrO_2-based ZHS.