Supporting Information

A Laser Etched Zinc Ion Microbattery with Excellent Flexibility and Self-Healability

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Calculation

The areal specific capacity of ZIMB is calculated based on the results of the GCD curves by the following formula (1):

$$C = \frac{I \cdot \Delta t}{S} \qquad (1)$$

Where C means the areal specific capacity, I means the charging or discharging current, Δt means the charging or discharging time, S means the total areal of cathode and anode.

The formulas for calculating the areal energy density and power density of ZIMB are expressed as following (2) and (3):

$$D_E = \int_0^{\Delta t} \frac{I \cdot V(t)}{S} dt = \int_0^{\Delta Q} \frac{V(q)}{S} dq \qquad (2)$$

$$D_P = \frac{D_E}{\Delta t} \qquad (3)$$

Where D_E and D_P respectively means the areal energy density and power density, Δt means the charging or discharging time, ΔQ means the charging or discharging capacity, I means the charging or discharging current, V means the working voltage, S means the total areal of cathode and anode.

The Coulombic efficiency (*CE*) and capacitance retention (*CR*) are respectively calculated from equations (4) and (5):

$$CE = \frac{\Delta t_d}{\Delta t_c} \qquad (4)$$

$$CR = \frac{\Delta t}{\Delta t_0} \qquad (5)$$

Where Δt_d is the discharge time and Δt_c is the charge time in same cycle, and Δt is the discharge time of different cycles and Δt_0 is the initial discharge time.

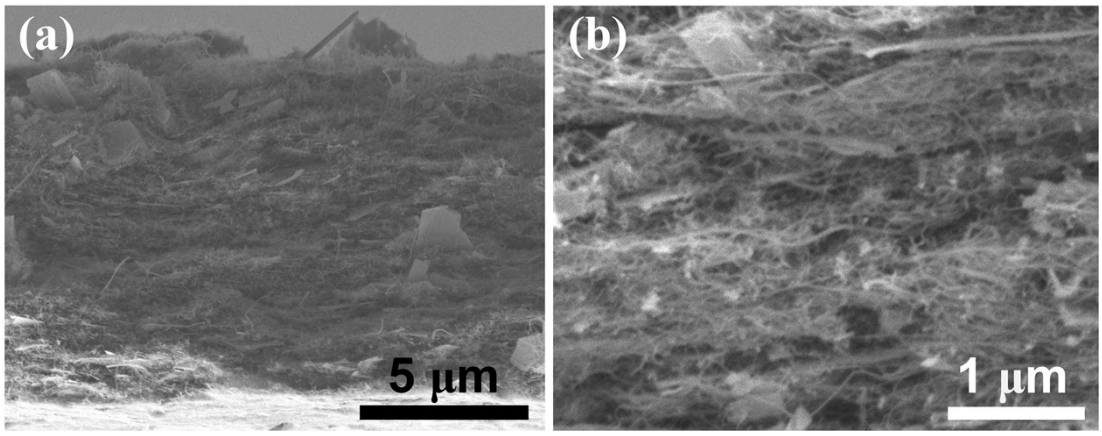

Figure S1. Cross-sectional SEM images of the MWCNTs-MnO_2 cathode at low and high magnifications. (a) Low and (b) high.

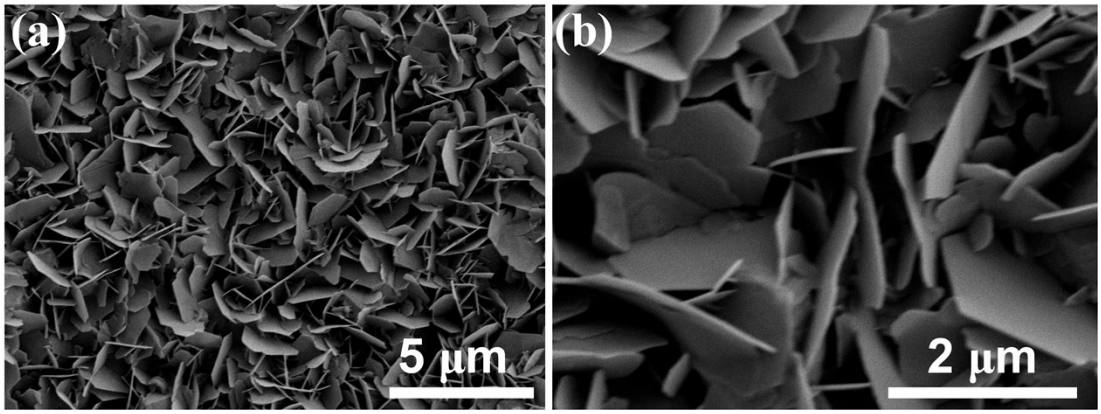

Figure S2. Surface SEM images of the MWCNTs-Zn anode at low and high magnifications. (a) Low and (b) high.

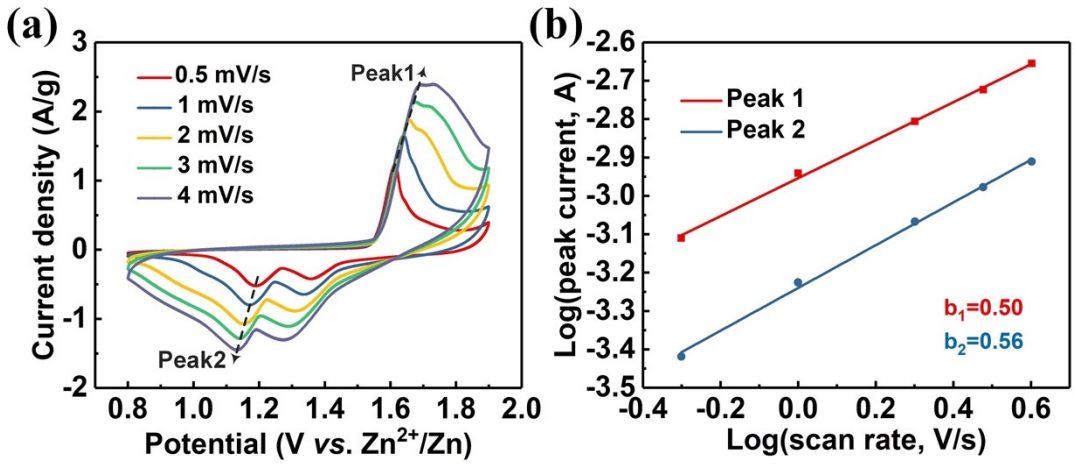

Figure S3. The CV curves and corresponding b values of the MWCNTs-MnO_2 electrodes with weight ratios of 3:2. (a) The CV curves and (b) the corresponding b values.

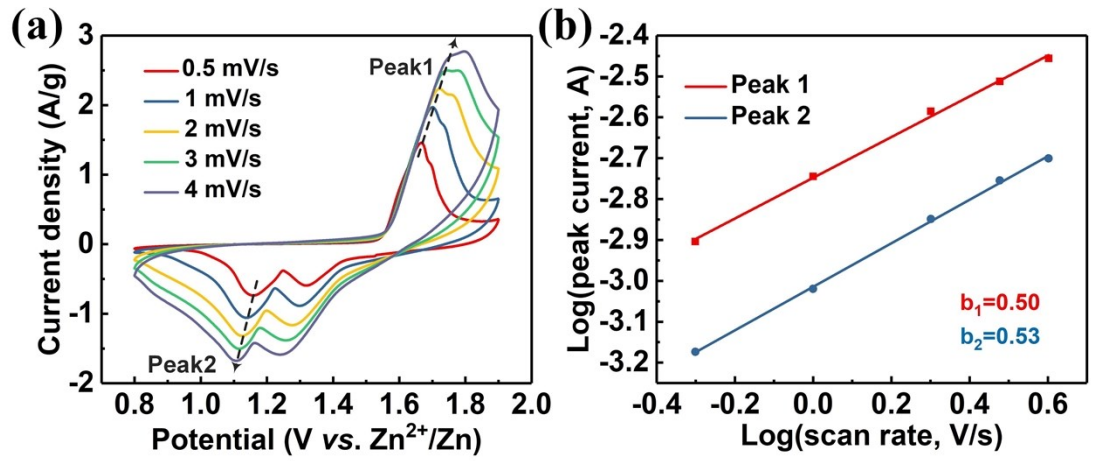

Figure S4. The CV curves and corresponding b values of the MWCNTs-MnO_2 electrodes with weight ratios of 3:4. (a) The CV curves and (b) the corresponding b values.

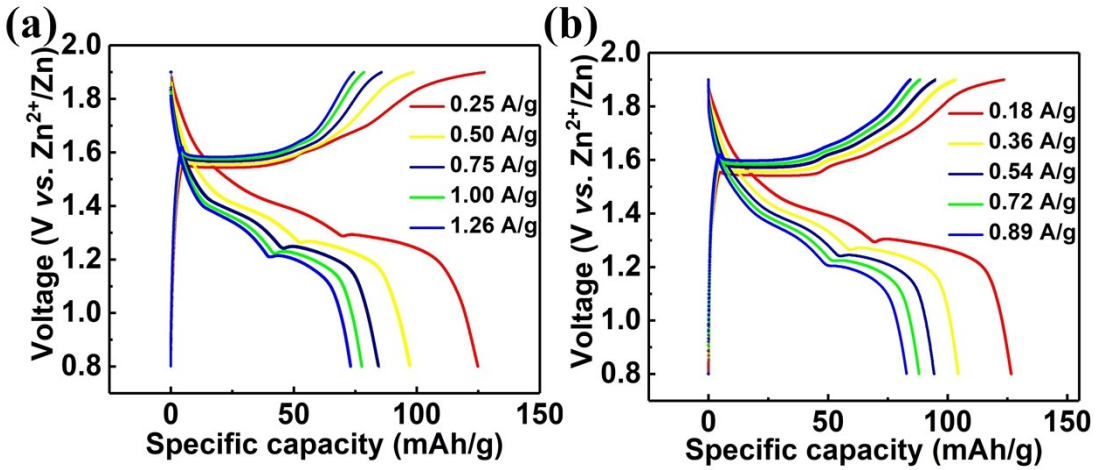

Figure S5. The GCD curves with various current densities of the MWCNTs-MnO_2 electrodes with various weight ratios of MWCNTs to MnO_2. (a) 3:2 and (b) 3:4.

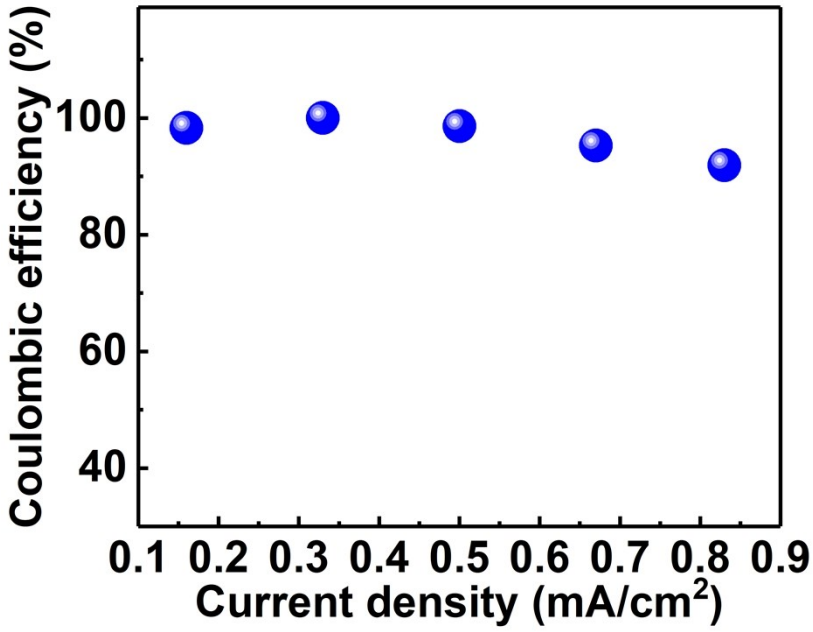

Figure S6. Coulombic efficiencies of the ZIMB under different current densities.

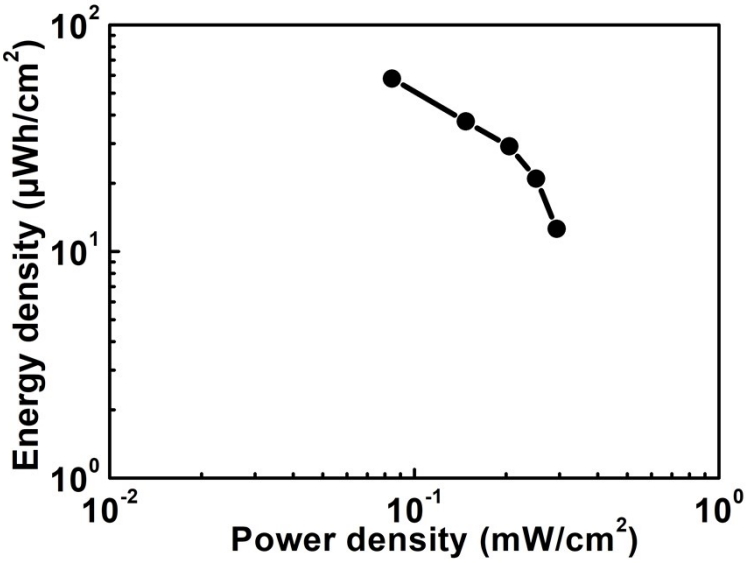

Figure S7. Energy and power density plot of the ZIMB.

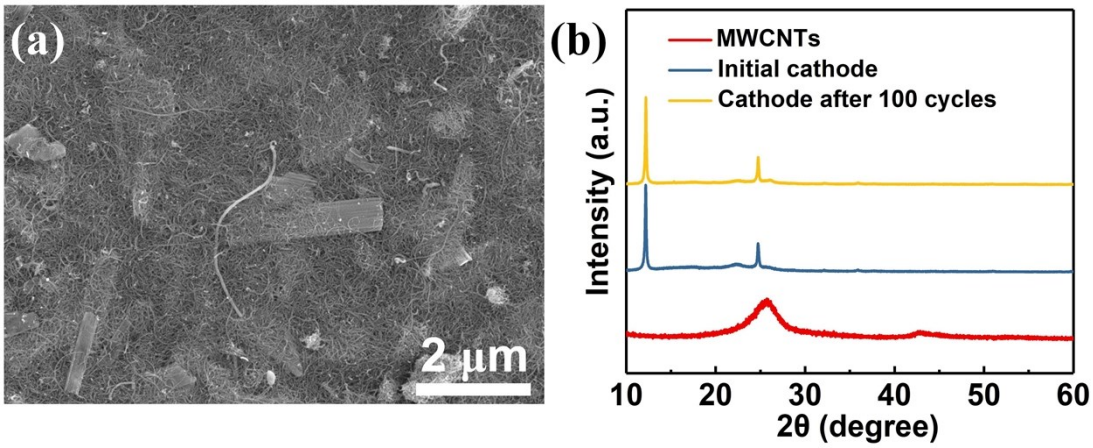

Figure S8. The characterization of MWCNTs-MnO_2 cathode after 100 GCD cycles. (a) SEM image of the cathode after 100 GCD cycles. (b) Normalized XRD patterns of the cathode before and after 100 GCD cycles.

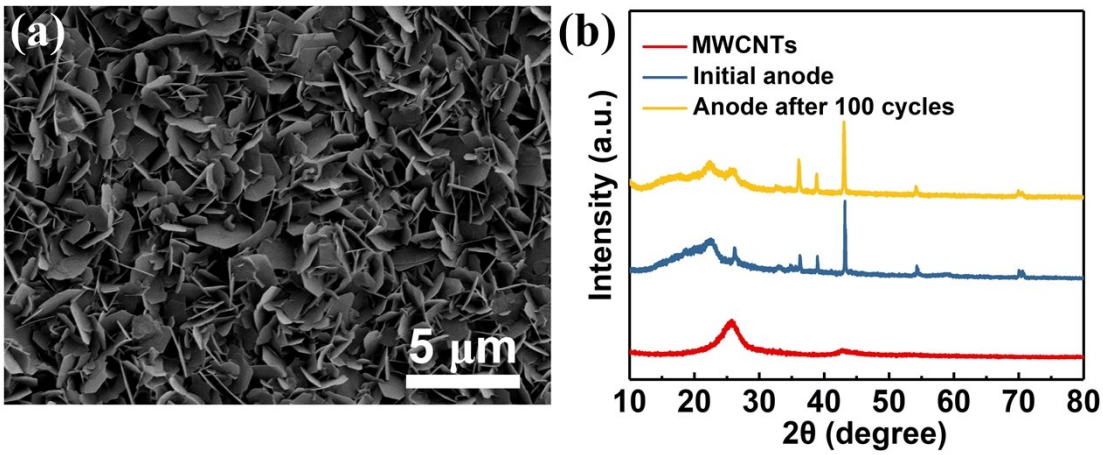

Figure S9. The characterization of MWCNTs-Zn anode after 100 GCD cycles. (a) SEM image of the anode after 100 GCD cycles. (b) Normalized XRD patterns of the anode before and after 100 GCD cycles.