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Supporting Information

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Wearable Textile-Based Co-Zn Alkaline Microbattery with High Energy Density and Excellent Reliability

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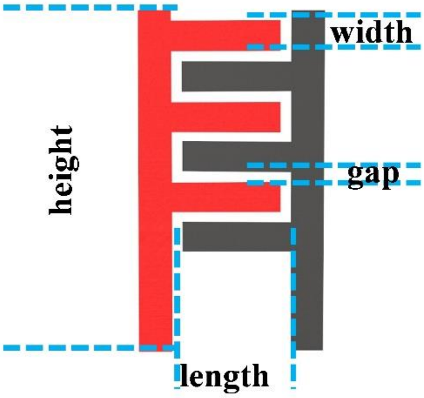
Figure S1. Digital photograph of a piece of conducive NT showing a low resistance.



width	1.5 mm
gap	0.5 mm
length	5 mm
height	17 mm
area	0.96 cm^2

Figure S2. Patterns and dimensions of Co-Zn microbattery.

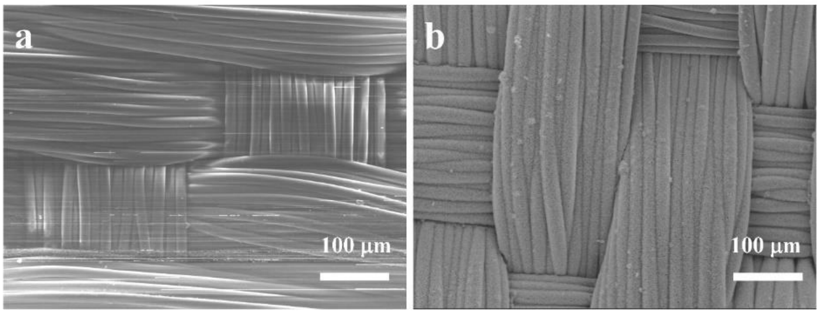


Figure S3. SEM images of a) pristine textiles and b) NC-LDH@NT.

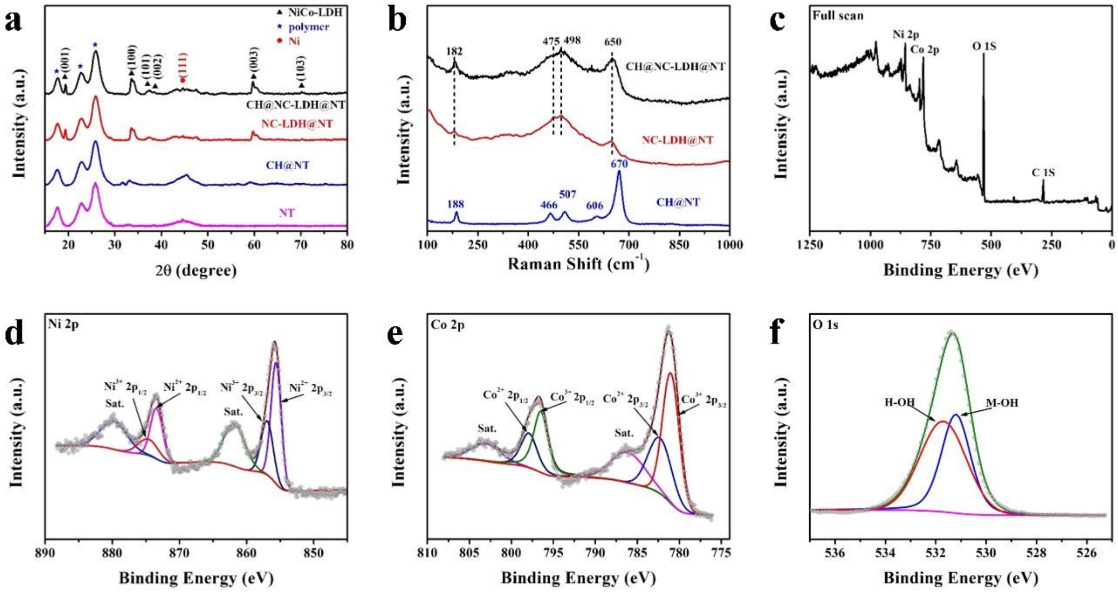


Figure S4. a) XRD patterns of NT, CH@NT, NC-LDH@NT, and CH@NC-LDH@NT. b) Raman spectra of CH@NT, NC-LDH@NT, and CH@NC-LDH@NT. c) XPS survey scan spectra, d) high-resolution Ni 2p spectra, e) high-resolution Co 2p spectra, and f) high-resolution O 1s spectra of CH@NC-LDH@NT.

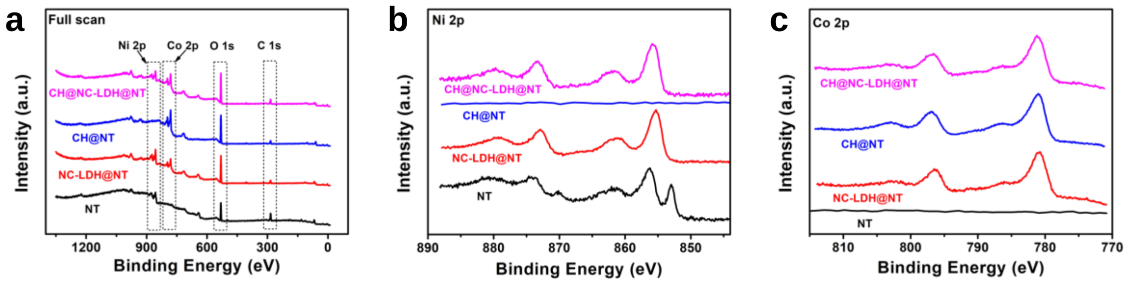


Figure S5. a) XPS survey scan spectra, b) high-resolution Ni 2p spectra, and c) high-resolution Co 2p spectra of NT, CH@NT, NC-LDH@NT and CH@NC-LDH@NT.

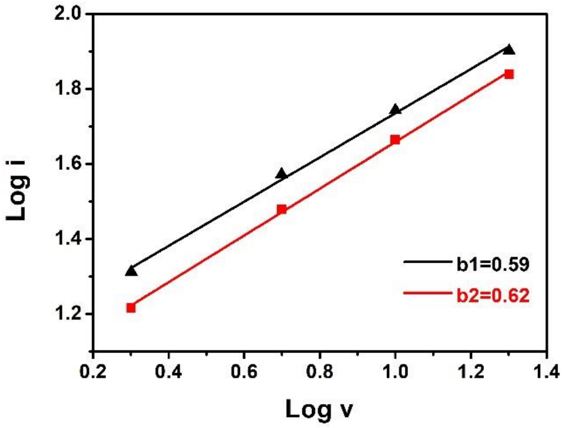


Figure S6. The linear fitting chart of log(v) and log(i) of anodic peak and cathodic peak.

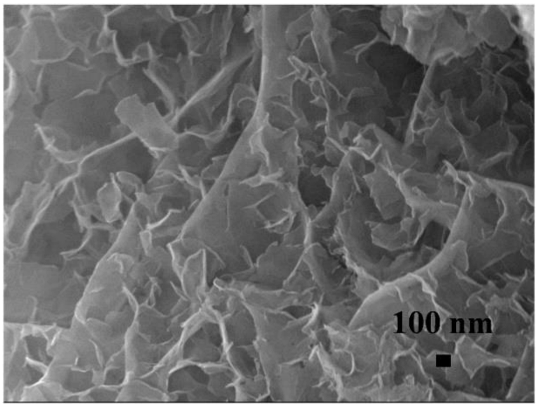


Figure S7. SEM images of CH@NC-LDH@NT after 2000 cycles.

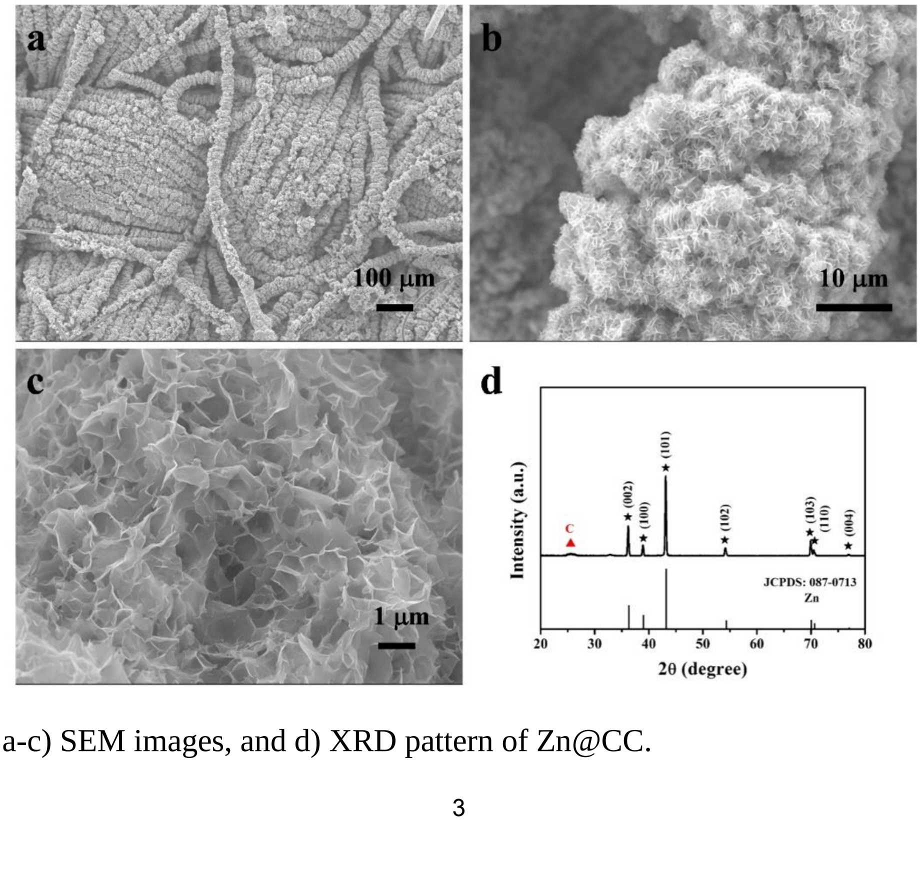


Figure S8. a-c) SEM images, and d) XRD pattern of Zn@CC.

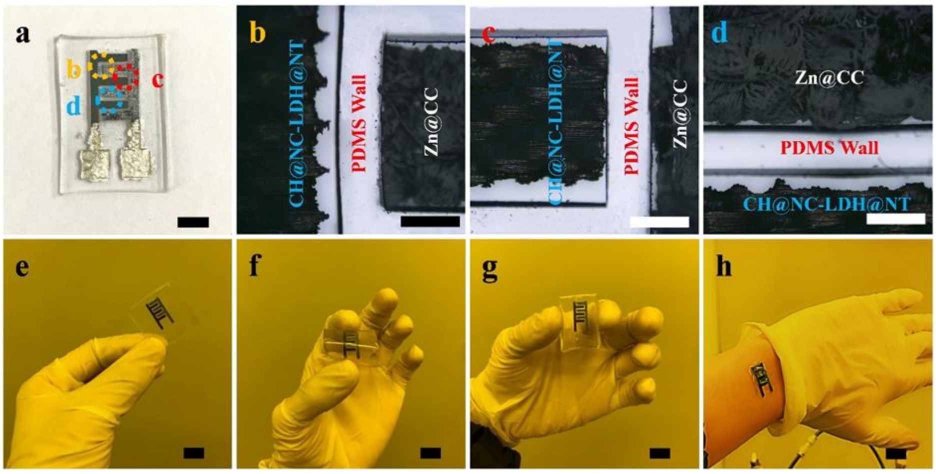


Figure S9. Structure and mechanical performance of the Co-Zn alkaline microbattery. a) Optical photograph of the assembled microbattery. Scale bar: 5 mm. b-d) Optical micrographs of internal structure of the microbattery. Scale bar: 0.5 mm. Optical photographs of a microbattery with e) original, f) lateral bending, g) vertical bending, and h) attached on skin. Scale bar: 1 cm.

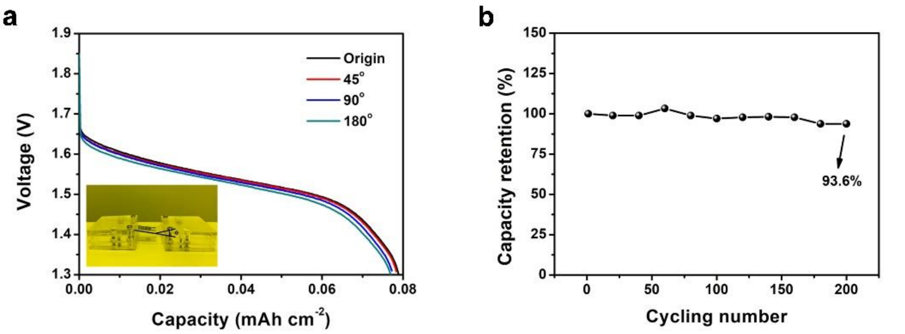


Figure S10. a) GCD curves of Co-Zn microbattery under different bending angles. Bending angle θ = 0-180°, bending radius R = 10 mm, device length L = 30 mm. b) Capacity retention of Co-Zn microbattery after 200 times of bending tests. Bending angle θ = 90°.

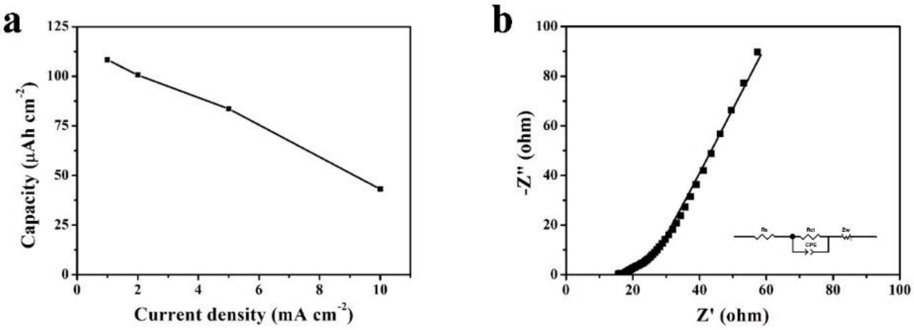


Figure S11. a) Rate performance and b) Nyquist plot of Co-Zn microbattery.

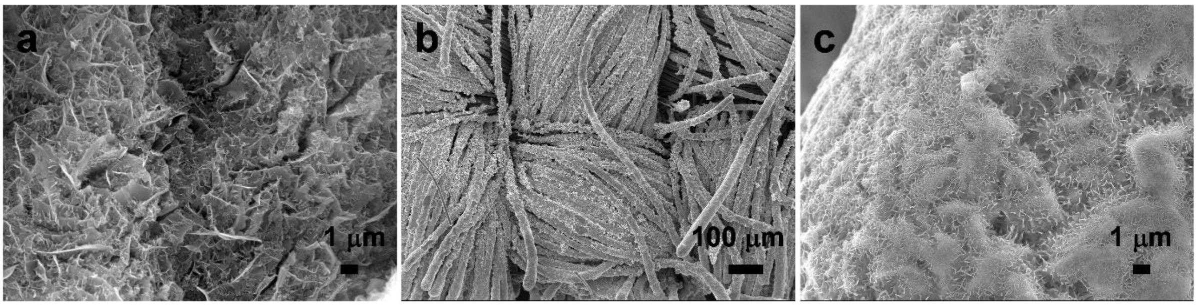


Figure S12. SEM images of a) CH@NC-LDH@NT, and b,c) Zn@CC after cycling.

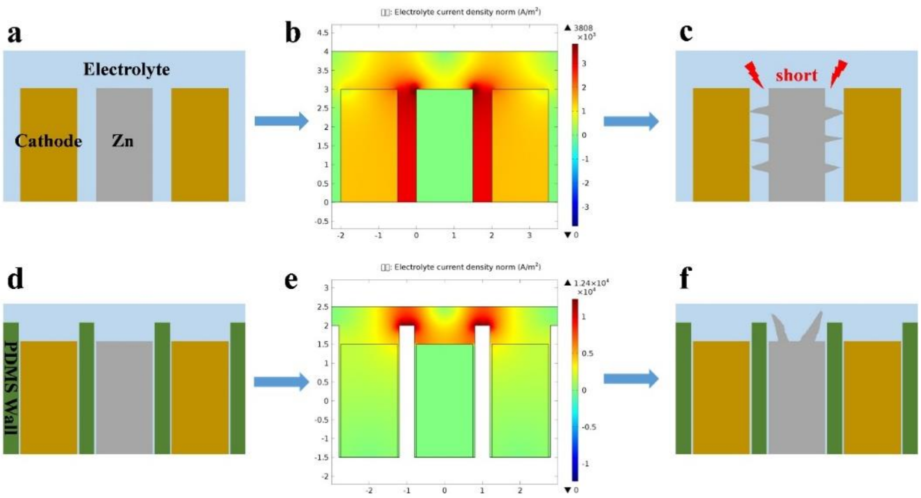


Figure S13. Scheme of trench-type configuration for avoiding dendrite-induced short circuit. a) Schematic illustration before cycling, b) current density profile, c) schematic illustration after cycling of conventional configuration. d) Schematic illustration before cycling, b) current density profile, c) schematic illustration after cycling of trench-type configuration.

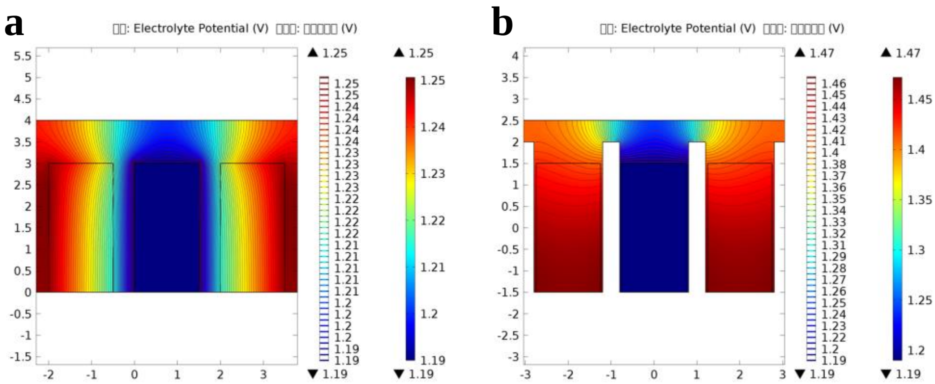


Figure S14. Calculated electric field distribution of a) conventional configuration and b) trench-type configuration.

Figure S15. Photograph of three Co-Zn microbatteries connected in series for lighting an LED scroller of "WUT" log.

Table S1. Comparison of areal energy/power densities of our Co-Zn alkaline microbattery with most reported energy storage devices.

Energy storage devices	Power density ($mW\ cm^{-2}$)	Energy density ($mWh\ cm^{-2}$)	Reference
CH@NC-LDH @NT//Zn@CC	**14.4**	**0.1736**	**This work**
rGO//rGO	**2.51**	**0.00051**	**Ref. S1**
rGO-Ni//rGO-Ni	**1.86**	**0.00158**	**Ref. S2**
CNT//Zn	**7.8**	**0.028**	**Ref. S3**
Ni-NiO//Zn	**20.2**	**0.0066**	**Ref. S4**
PEDOT:PSS//PEDOT:PSS	**3.52**	**0.041**	**Ref. S5**
MnO_2/CNT//MnO_2/CNT	**0.51**	**0.02107**	**Ref. S6**
AC//Zn	**3.9**	**0.1154**	**Ref. S7**
MnO_2/CNT//V_2O_5/CNT	**0.63**	**0.00088**	**Ref. S8**
$Cu(OH)_2$@FeOOH/Cu	**0.73**	**0.01807**	**Ref. S9**

Table S2. Comparison of volume energy/power densities of our Co-Zn alkaline microbattery with most reported energy storage devices.

Energy storage devices	Power density (mW cm^{-3})	Energy density (mWh cm^{-3})	Reference
CH@NC-LDH@NT//Zn@CC	**599.9**	**7.23**	**This work**
Ni-NiO//Zn	**220**	**0.67**	**Ref. S4**
Graphene//graphene	**297**	**1.81**	**Ref. S10**
$CoMoO_4$//C-ZnO	**420**	**4.6**	**Ref. S11**
NiO//C-ZnO	**210**	**7.76**	**Ref. S12**
$Ni(OH)_2$@Ni//Zn@Ni	**425**	**4.05**	**Ref. S13**
4V/500 μAh Li thin-film battery	**5.4**	**7.4**	**Ref. S14**
PEDOT//PEDOT	**1000**	**1**	**Ref. S15**
NiO//Fe_3O_4	**640**	**5.2**	**Ref. S16**
$NiMoO_4$//Fe_2O_3	**330.62**	**0.68**	**Ref. S17**

Supporting Information Reference

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