Electronic Supplementary Information

A flexible, electrochromic, rechargeable Zn//PPy battery with short circuit chromatic warning function

Jiaqi Wang,[ab] Jie Liu,[ab] Mengmeng Hu,[ab] Jie Zeng,[a] Yongbiao Mu,[a] Ya Guo,[a] Jie Yu,[a] Xing Ma,[a] Yejun Qiu,[a] Yan Huang,[abc*]

[a]*Centre of Flexible and Printable Electronics, Harbin Institute of Technology (Shenzhen), Shenzhen 518055, China.*
[b]*School of Materials Science and Engineering, Harbin Institute of Technology (Shenzhen), Shenzhen 518055, China.*
[c]*State Key Laboratory of Advanced Welding and Joining, Harbin Institute of Technology (Shenzhen), Shenzhen 518055, China. e-mail: yanhuanglib@hit.edu.cn.*

Figures

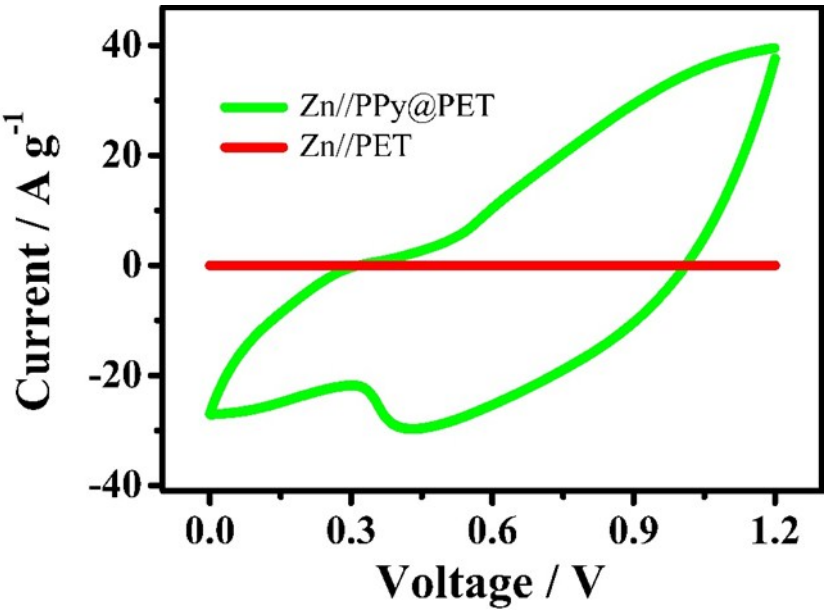

Fig. S1. The CV curves of the PET with and without deposited PPy at a scan rate of 100 mV s^{-1}.

The CV curve of PET without deposited PPy is a straight line. The conductive PET has no contribution to the capacity of Zn//PPy battery.

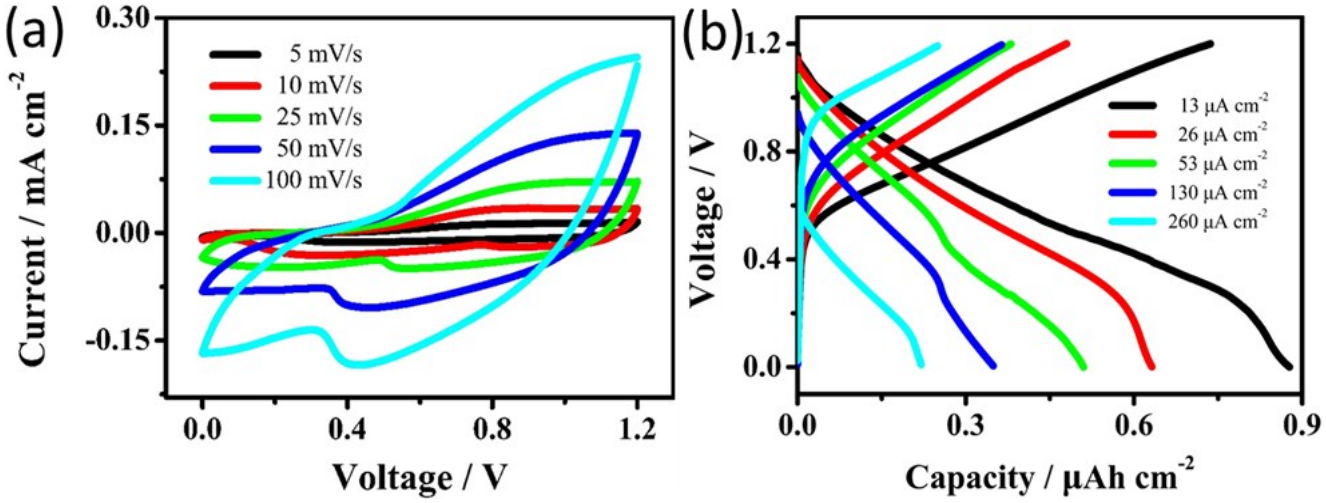

Fig. S2. Electrochemical performances of the rechargeable and flexible Zn// PPy battery in terms of areal capacity. (a) CV curves at various scan rates from 5 to 100 mV s^{-1}. (b) GCD curves at various charging/discharging currents from 13 to 260 μA cm^{-2}.

The two-dimentional battery delivers areal capacity of 0.9 μAh cm^{-2} at the current density of 13 μA cm^{-2}.

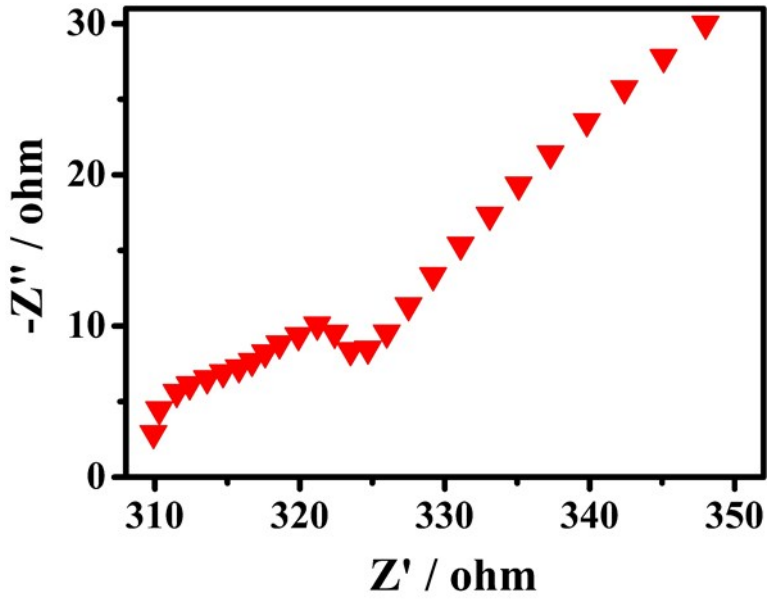

Fig. S3. The Nyquist plot of the flexible electrochromic Zn//PPy battery.

The battery has a systematic resistance about 310 Ω, and a small charge transfer resistance around 15 Ω.

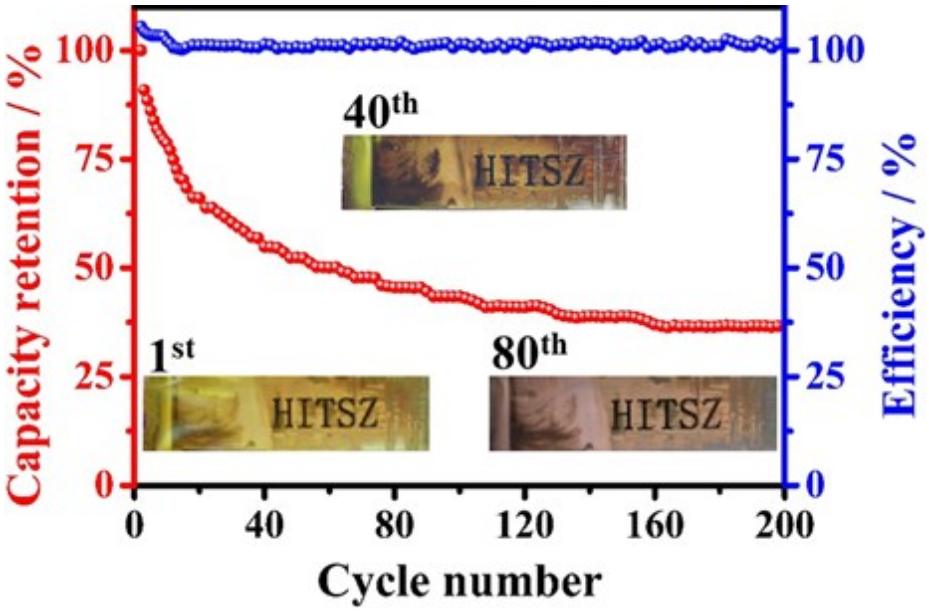

Fig. S4. Capacity retention as a function of cycle number at specific current of 4.4 A g^{-1} and the electrochromic effect in different cycle number at a voltage of 0 V.

The battery retains 41% and 38% of initial capacity after 100 and 200 cycles, respectively. The columbic efficiency of the battery almost retains 100%, demonstrating good performance. Besides, the battery is bright yellow in the first cycle. At the 40th cycle, the color turned weak. With the cycle further to 80th, the electrochromic process almost disappear. After that, the color keeps black.