Electronic Supplementary Material (ESI) for Journal of Materials Chemistry A.

Supporting Information

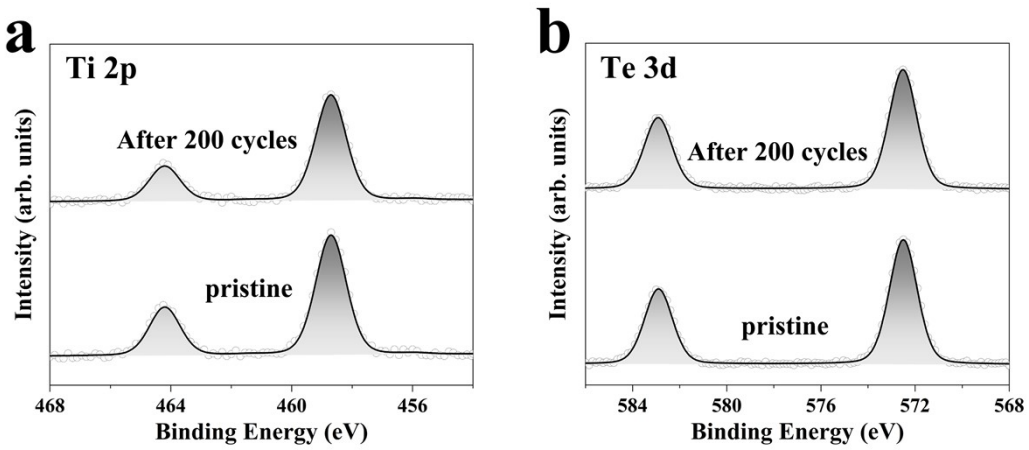

Fig. S1. The XPS spectra of (**a**) Ti 2*p* and (**b**) Te 3*d* for $TiTe_2$ electrode at diverse states.

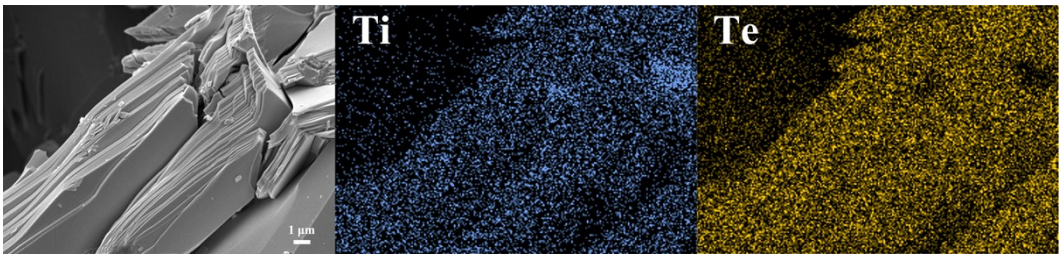

Fig. S2. The SEM image with corresponding EDS mapping for $TiTe_2$.

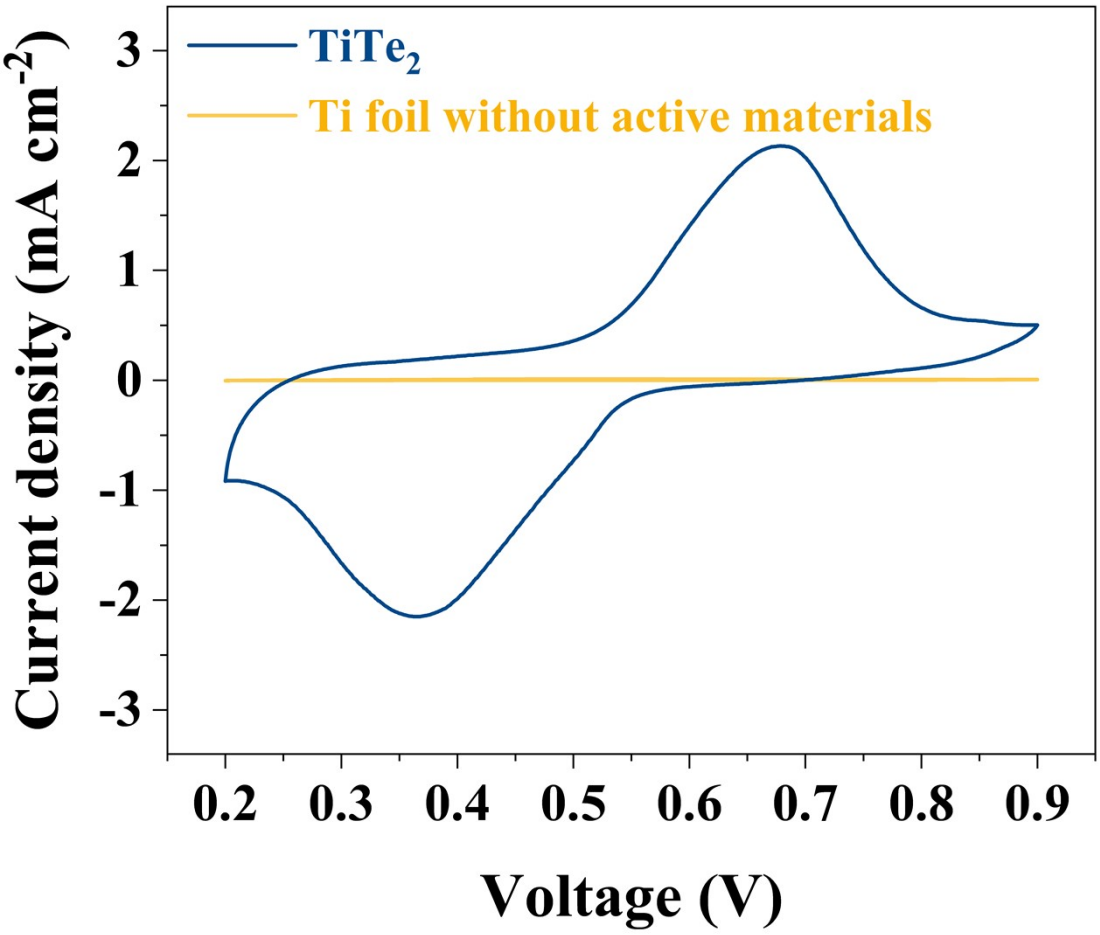

Fig. S3. The CV curves for the Ti foil electrode without active materials and $TiTe_2$ electrode in 3 M $ZnSO_4$ electrolyte at 0.6 mV s^{-1}.

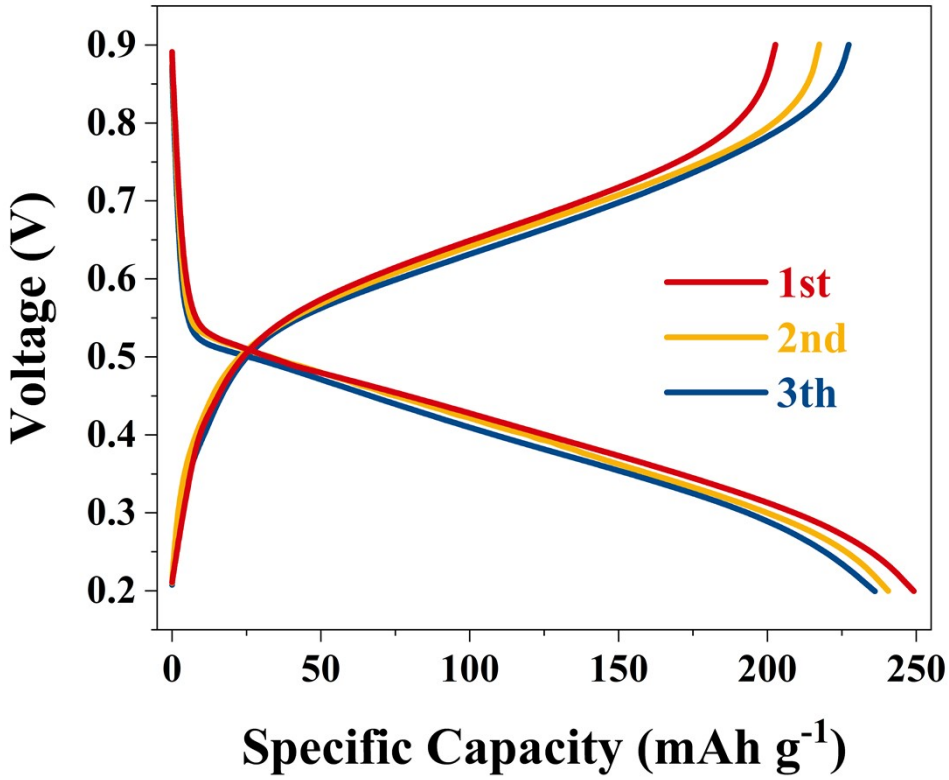

Fig. S4. The charge/discharge curves of the non-activated $TiTe_2$ electrode for the first three cycles at a current rate of 0.05 A g^{-1}.

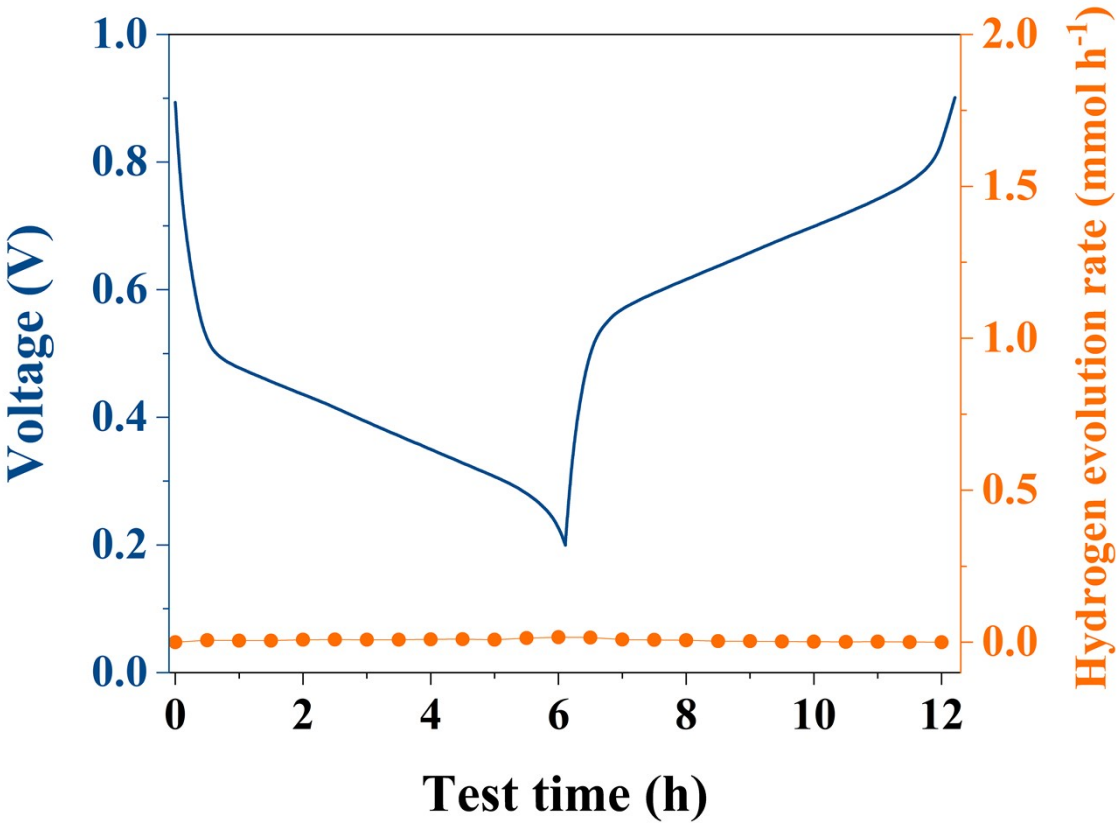

Fig. S5. The hydrogen evolution flux upon in situ DEMS test of the $TiTe_2$ electrode.

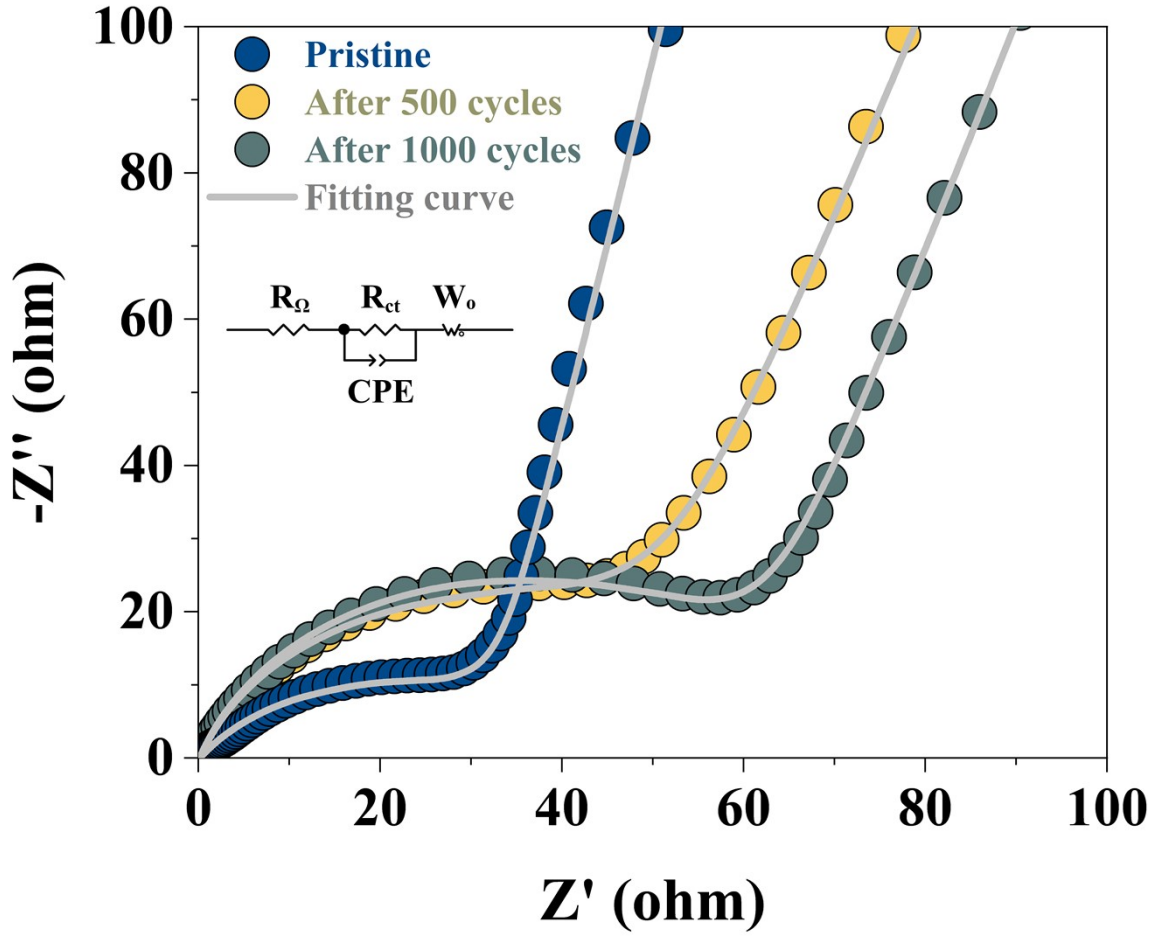

Fig. S6. Nyquist plots with the corresponding equivalent circuit for $TiTe_2$ electrode at the pristine state, after 500 cycles, and after 1000 cycles.

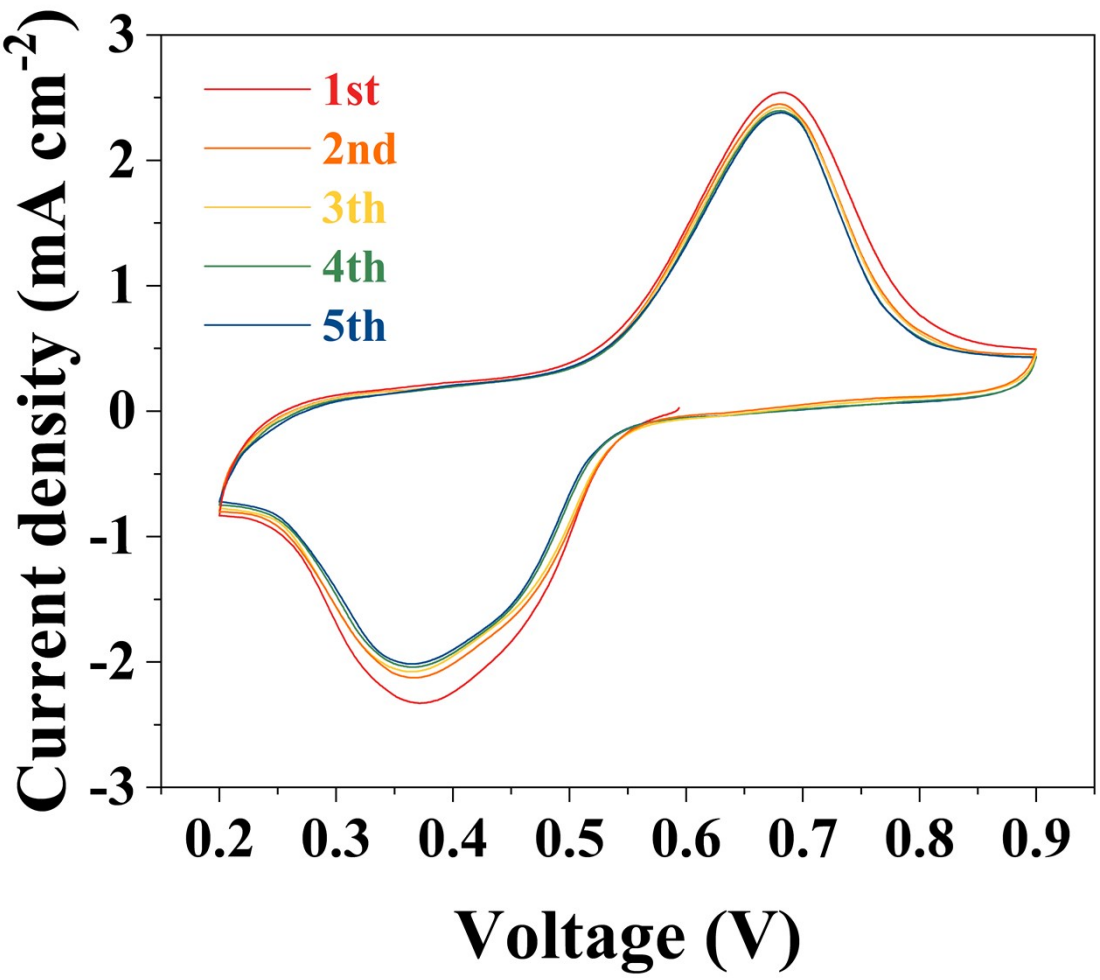

Fig. S7. The CV curves of the non-activated $TiTe_2$ electrode for the first five cycles at 0.6 mV s^{-1}.

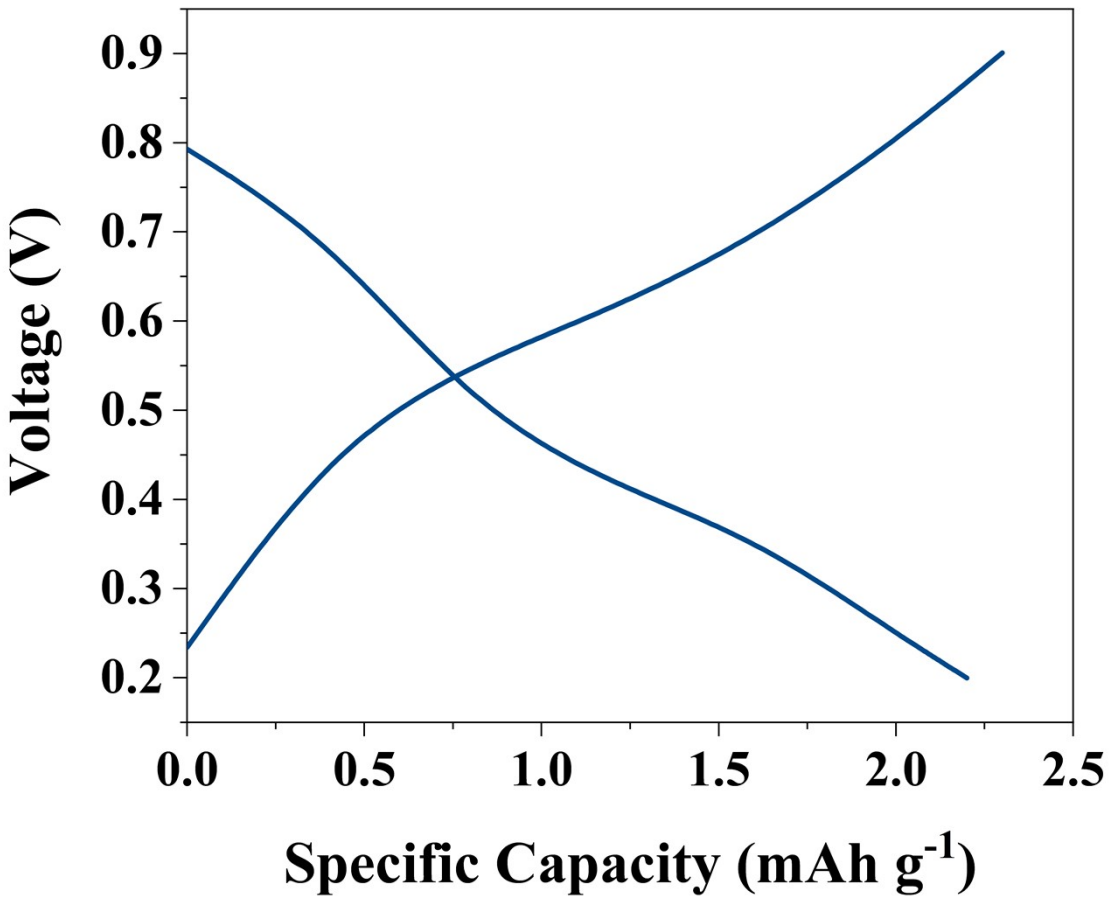

Fig. S8. The charge and discharge curves for the $TiTe_2$ electrode in the 3 M H_2SO_4 electrolyte.

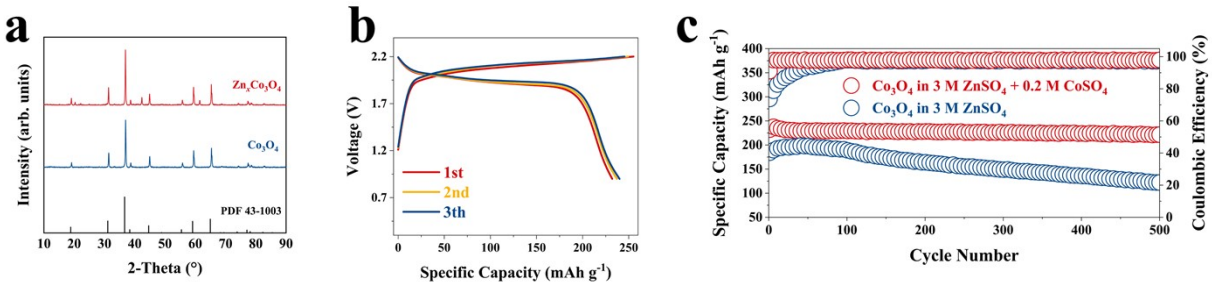

Fig. S9. (**a**) The XRD patterns of $Zn_xCo_3O_4$ and Co_3O_4. (**b**) The charge/discharge curves for the $Zn_xCo_3O_4$ electrode in the 3 M $ZnSO_4$ + 0.2 M $CoSO_4$ electrolyte. (**c**) The cycling performances for $Zn_xCo_3O_4$ electrodes in the 3 M $ZnSO_4$ + 0.2 M $CoSO_4$ and 3 M $ZnSO_4$ electrolyte at 0.1 A g^{-1}.

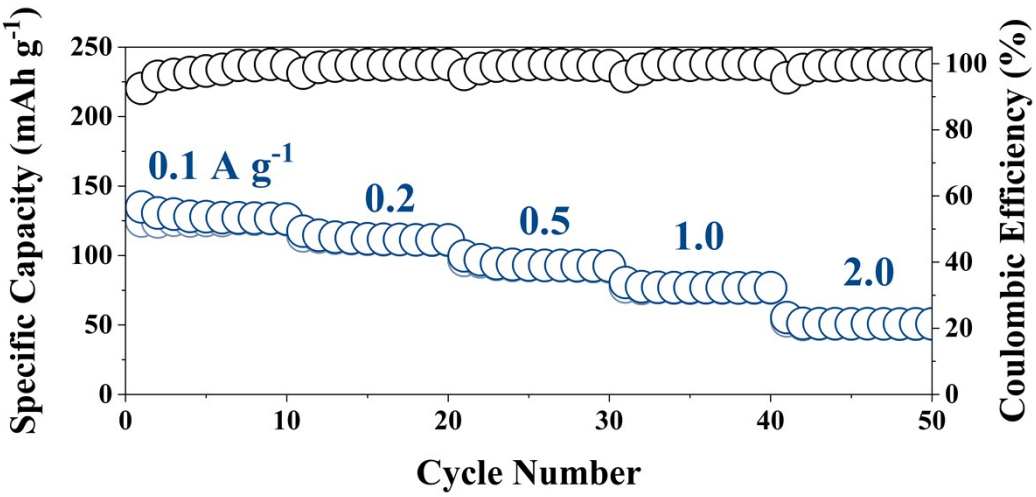

Fig. S10. The rate capability of the $TiTe_2$‖$Zn_xCo_3O_4$ pouch cell from 0.1 to 2.0 A g^{-1}.