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

Conjugated Microporous Polymers with Excellent Electrochemical Performance for Lithium and Sodium Storage

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Results and discussion

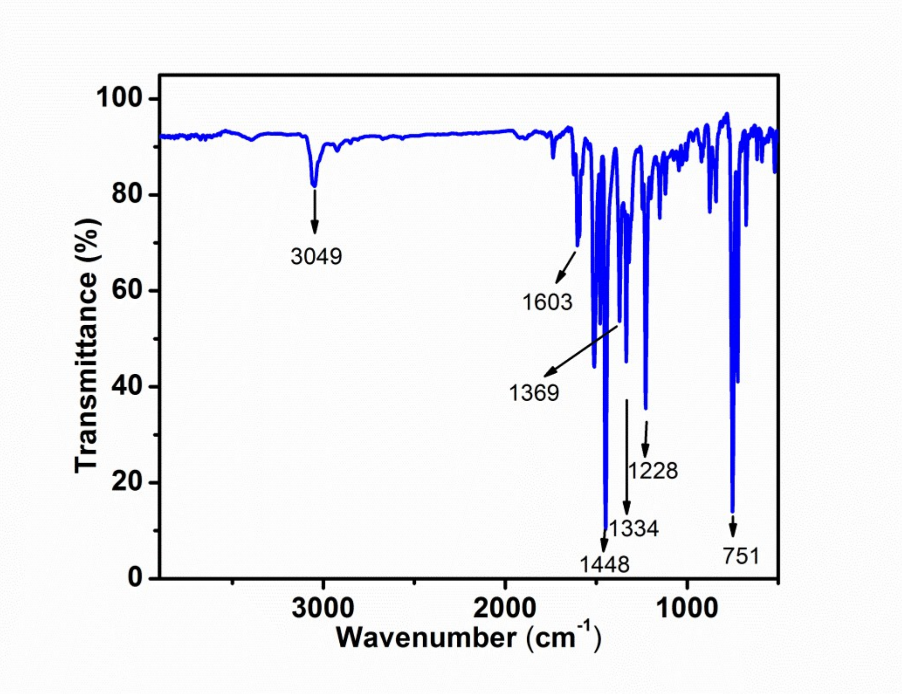

Fig. S1 FT-IR spectrum of DCzBT.

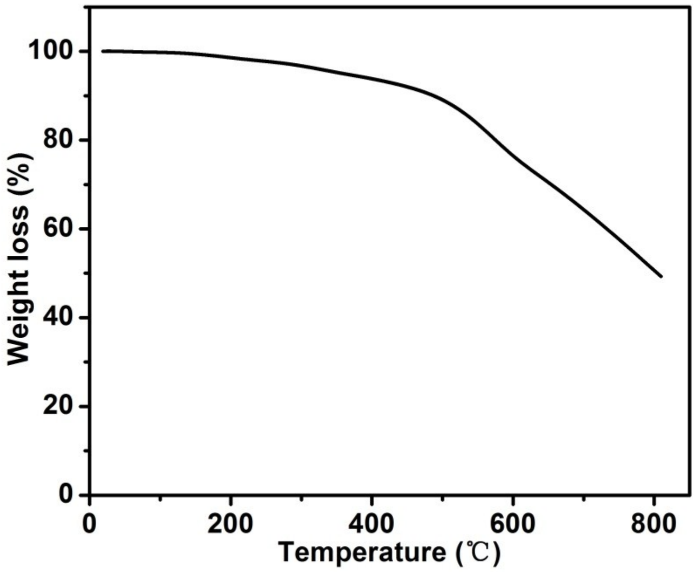

Fig. S2 Thermo gravimetric analysis of PDCzBT.

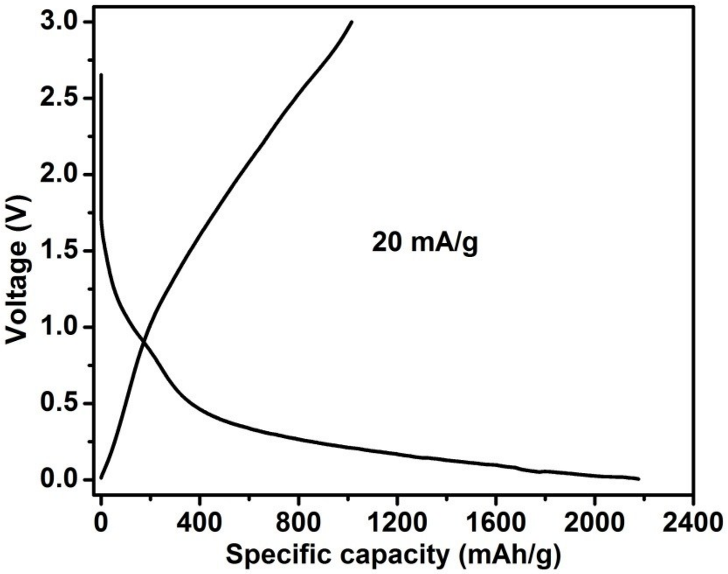

Fig. S3 The initial charge/discharge profile of PDCzBT-based LIBs under 20 mA/g.

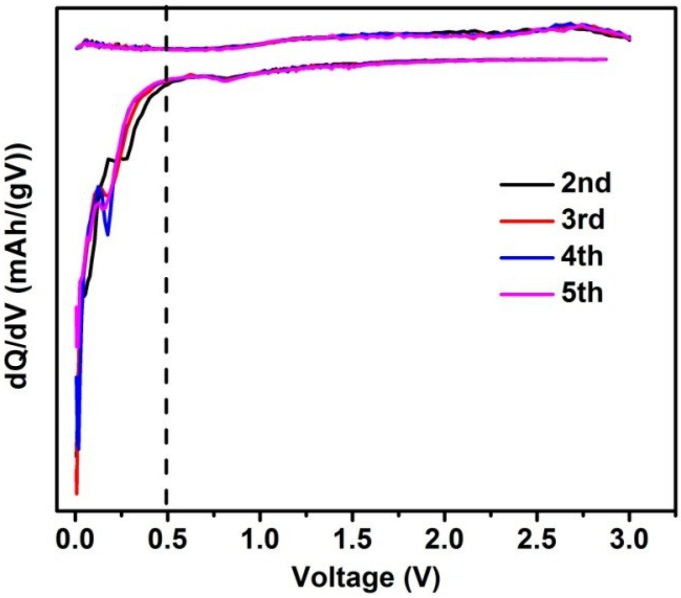

Fig. S4 Differential curves of charge/discharge profiles of PDCzBT-based LIBs under 20 mA/g.

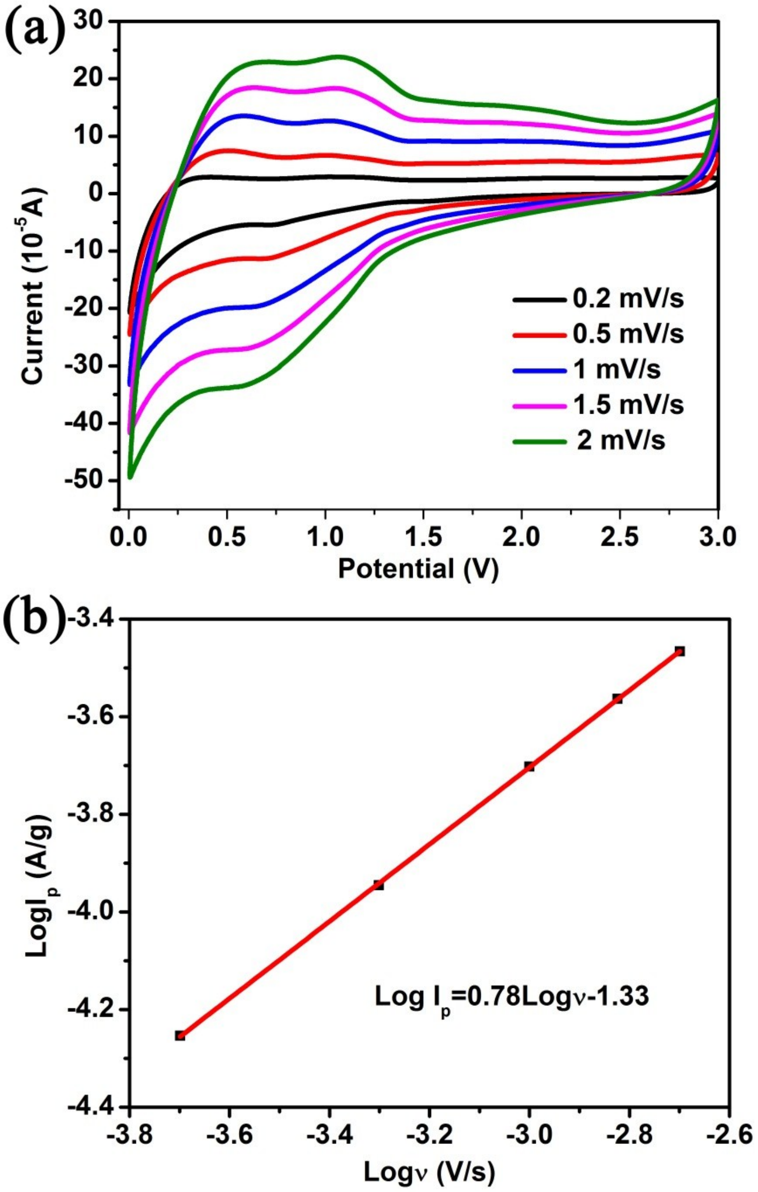

Fig. S5 (a) Cyclic voltammogram (CV) profiles of PDCzBT-based LIBs at different scan rates. (b) Log I_P-Log υ curve.

I_p is the peak discharge current density; υ is the scan rate. For lithium storage, the best fit of the data to an apparent power-law dependence yields $I_p \propto \upsilon^{0.78}$.The apparent exponent value is mainly depending on the lithium storage mechanism. For bulk lithium insertion dominated processes, the apparent exponent value is close to 0.5 ($I_p \propto \upsilon^{0.5}$); while the apparent exponent value is close to 1 ($I_p \propto \upsilon$) in surface pseudocapacitive lithium storage. Therefore, the apparent exponent value of 0.78 could presumably be attributed to a mixed process involving both Li^+ doping into the polymer chains and absorbing on the surfaces/interfaces.

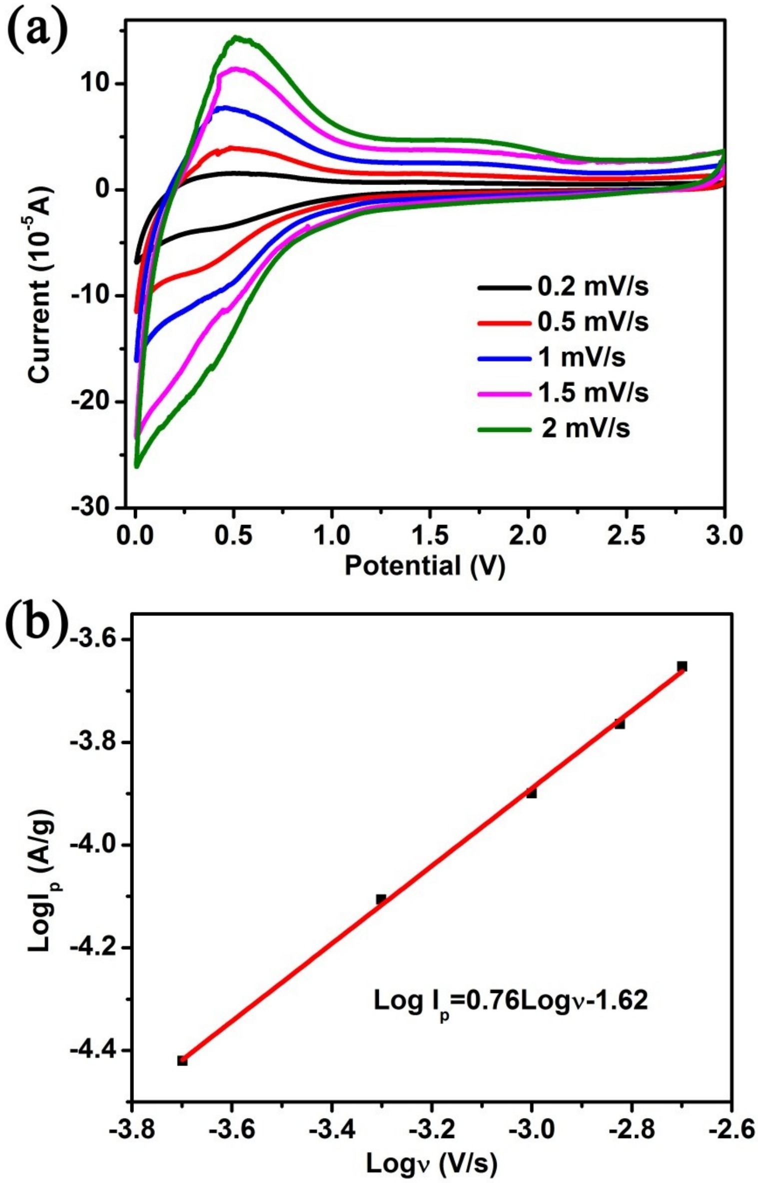

Fig. S6 (a) Cyclic voltammogram (CV) profiles of PDCzBT-based SIBs at different scan rates. (b) Log I_P-Log υ curve.

For sodium storage, the best fit of the data to an apparent power-law dependence yields $I_p \propto \upsilon^{0.76}$. The apparent exponent value of 0.76 demonstrate that the sodium storage mechanism of PDCzBT is also a mixed process involving both Na^+ doping into the polymer chains and absorbing on the surfaces/interfaces.

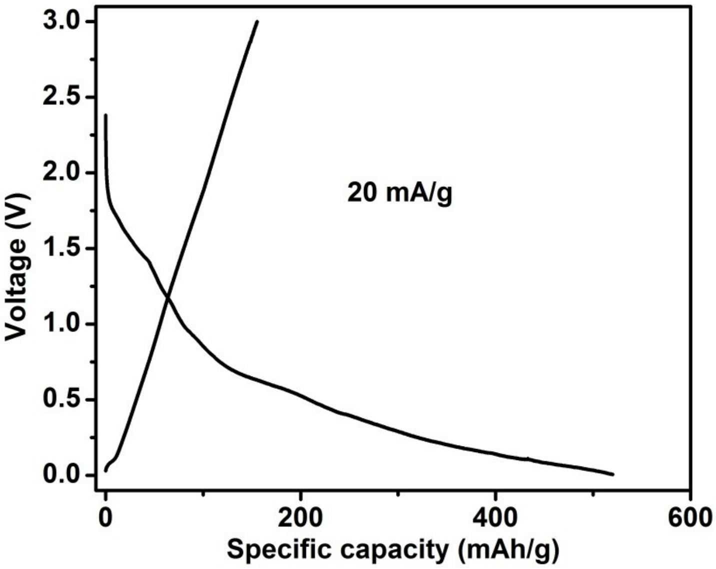

Fig. S7 The initial charge/discharge profile of PDCzBT-based SIBs under 20 mA/g.

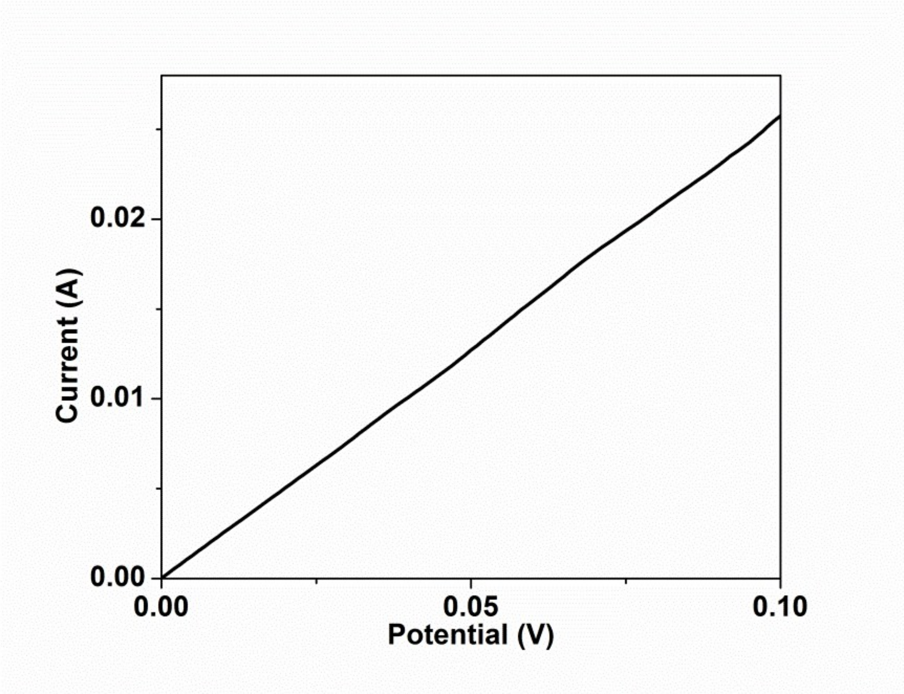

Fig. S8 I-V curve of the PDCzBT.

The electronic conductivity of PDCzBT was carried out by linear voltage scanning method. The detailed measuring method is shown below.

Pellets used for electronic conductivity measurements with a size around 12 mm diameter and 0.3 mm thick were prepared by die-pressing PDCzBT powder samples under a pressure of 15MPa without any conductive carbon black and binder. Silver paste was coated on both sides of the pellet to form the electrodes and the electronic conductivities of the PDCzBT pellets were tested at 20 °C by a linear voltage scanning method at a scanning rate of 0.5 mV/s from 0 to 0.1 V using an electrochemical workstation (Chenhua CHI). The electronic conductivity is calculated as the equation:

$$R = U/I = \rho L/s$$

$$\kappa = 1/\rho = L/(sR)$$

κ is electronic conductivity, ρ is resistivity, L is length, s is the area, R is resistance.