Supporting Information

Poly(3,4-dioxythiophene) Soft Nano-Network with Compatible Ion Transporting Channel for Improved Electrochromic Performance

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1. AFM of PEDOT film

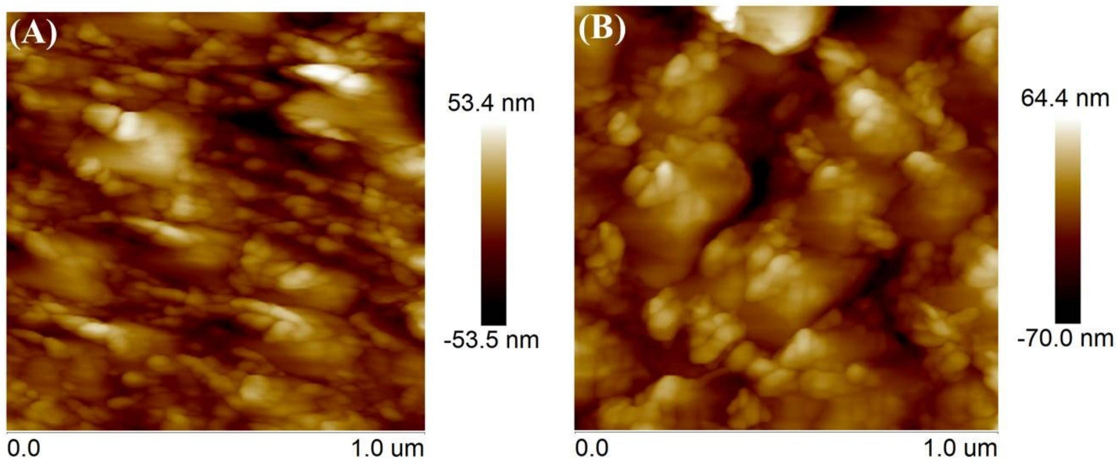


Figure S1. The AFM images of the ED film on ITO, (A) doped and (B) dedoped PEDOT, scan area: 1×1 μm^2.

2. Impedance spectroscopy of the PM-BTE and PEDOT films

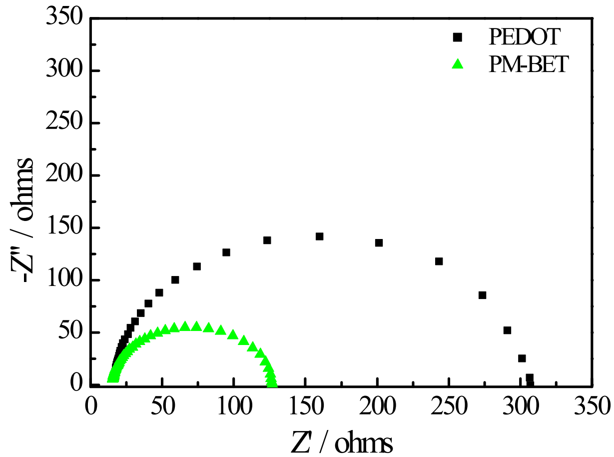
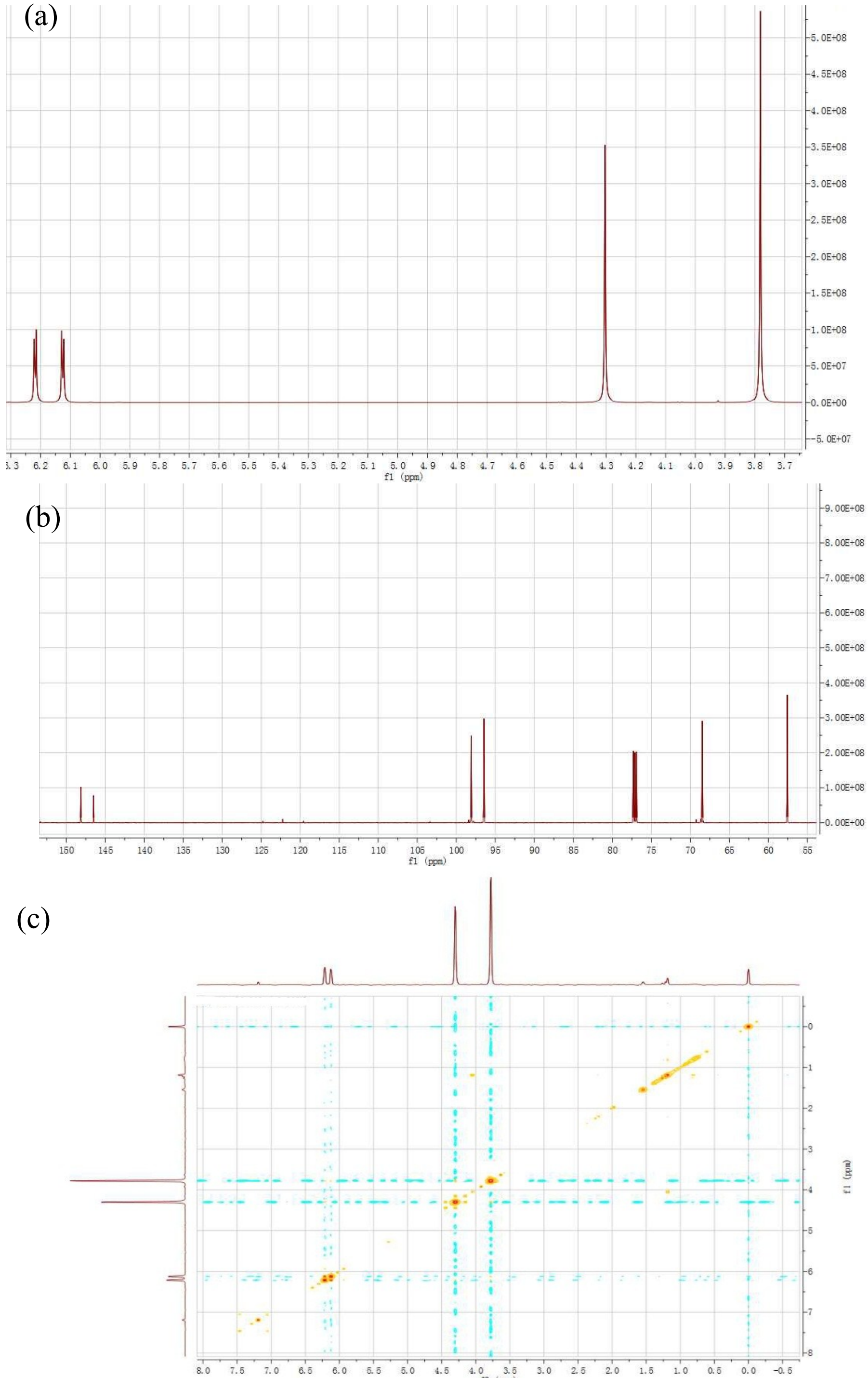


Figure S2. The impedance spectroscopy of the PM-BTE and PEDOT films.

Ionic conductivities were measured by the complex impedance analysis using impedance analyzer AUTOLAB PGSTAT302N. PM-BTE and PEDOT films were pressed between the stainless steel electrodes and were put in glove boxes with pressure contact. The runs were performed in inert atmosphere (N_2), by varying the frequency from 10^{-2} to 10^{6} Hz. The impendence spectrum of the PM-BTE and PEDOT are shown in the Figure below. In the Nyquist plot, we can see that the semicircle of the PM-BTE significantly smaller than the PEDOT. This observation indicates that the ion conductivity of PM-BTE is much higher and the redox system is kinetically fast than the PEDOT. This is due to the fact that diameter of the semicircle observed in the Nyquist plot yields magnitude of the charge transfer resistance (R_{CT}). This shows that the cross-linked nano-channel network of PM-BTE film, decreases the conventional kinetic limitations, and promotes the transfer and diffusion of ions.

3. NMR spectra of M-BTE



(d)

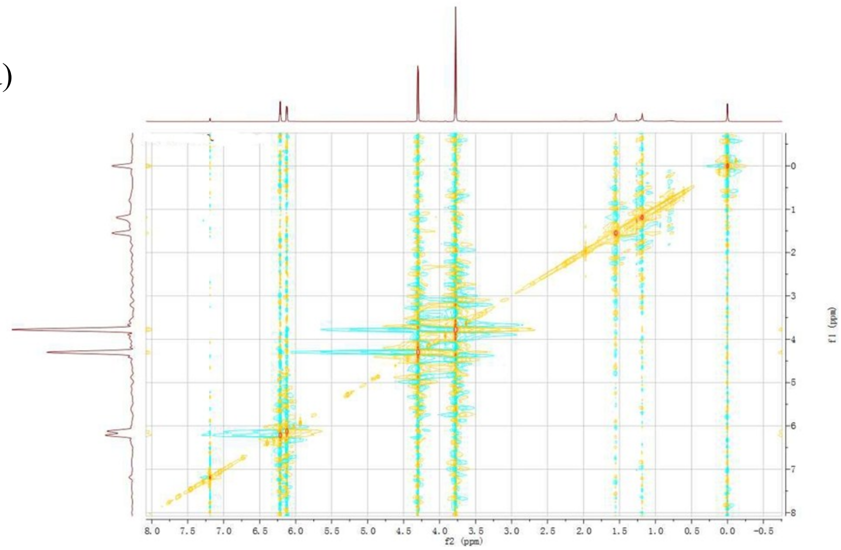


Figure S3. 1D NMR spectra (^1H (a) and ^{13}C (b)) and 2D NMR (H-H COSY (c) and C-H NOSEY (d)) of the monomer M-BTE in $CDCl_3$.