

Supplementary Material (ESI) for Journal of Materials Chemistry
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Nonvolatile Memory Devices Based on Polyimides Bearing Noncoplanar Twisted Biphenyl Units Containing Carbazole and Triphenylamine Side-chain Groups

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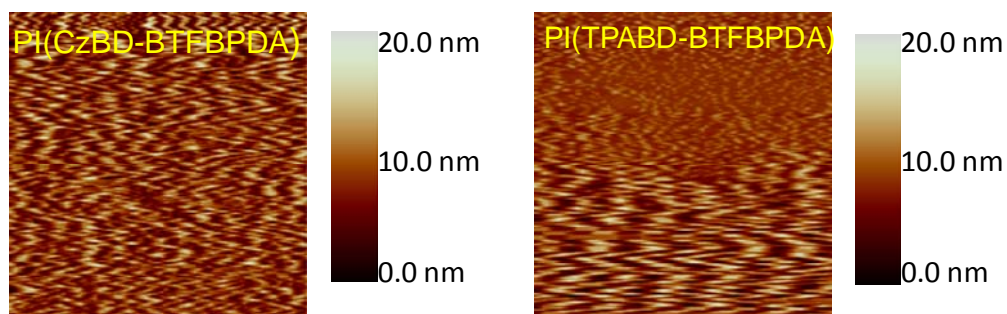


Figure S1. AFM images of polyimide films coated on ITO glass. The image size was of $1\ \mu\text{m} \times 1\ \mu\text{m}$. The Z-range for PI(CzBD-BTFBPDA) and PI(TPABD-BTFBPDA) are 10.7, 9.4 nm, respectively. Their corresponding roughnesses are determined to be 12.2 and 6.0 nm, respectively.

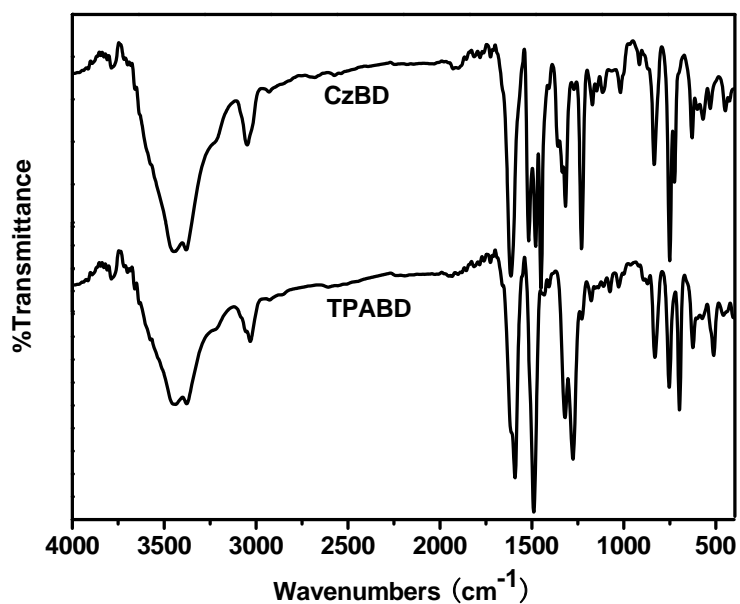


Figure S2. FT-IR spectra of CzBD and TPABD.

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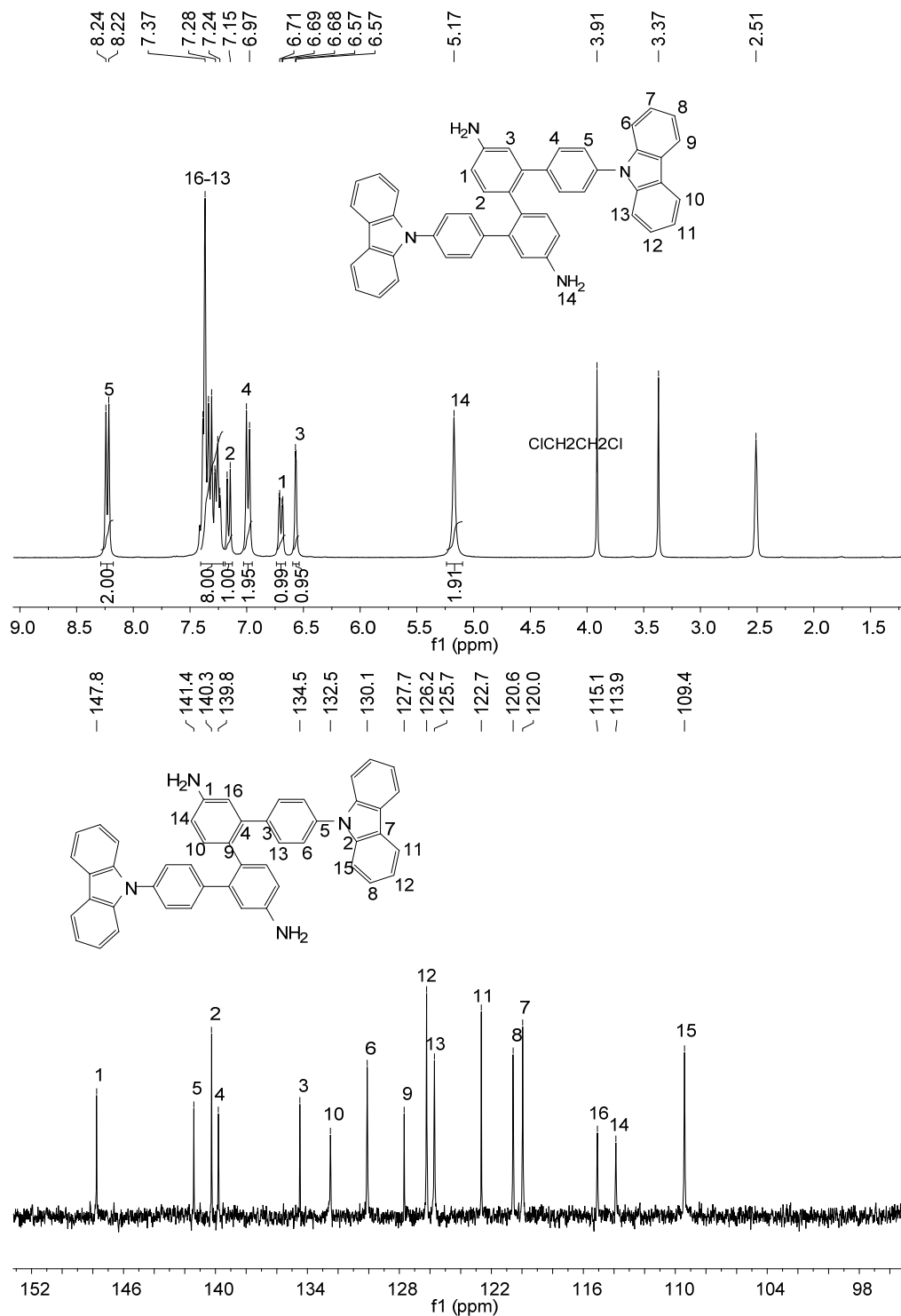


Figure S3. ^1H NMR and ^{13}C NMR spectra of CzBD.

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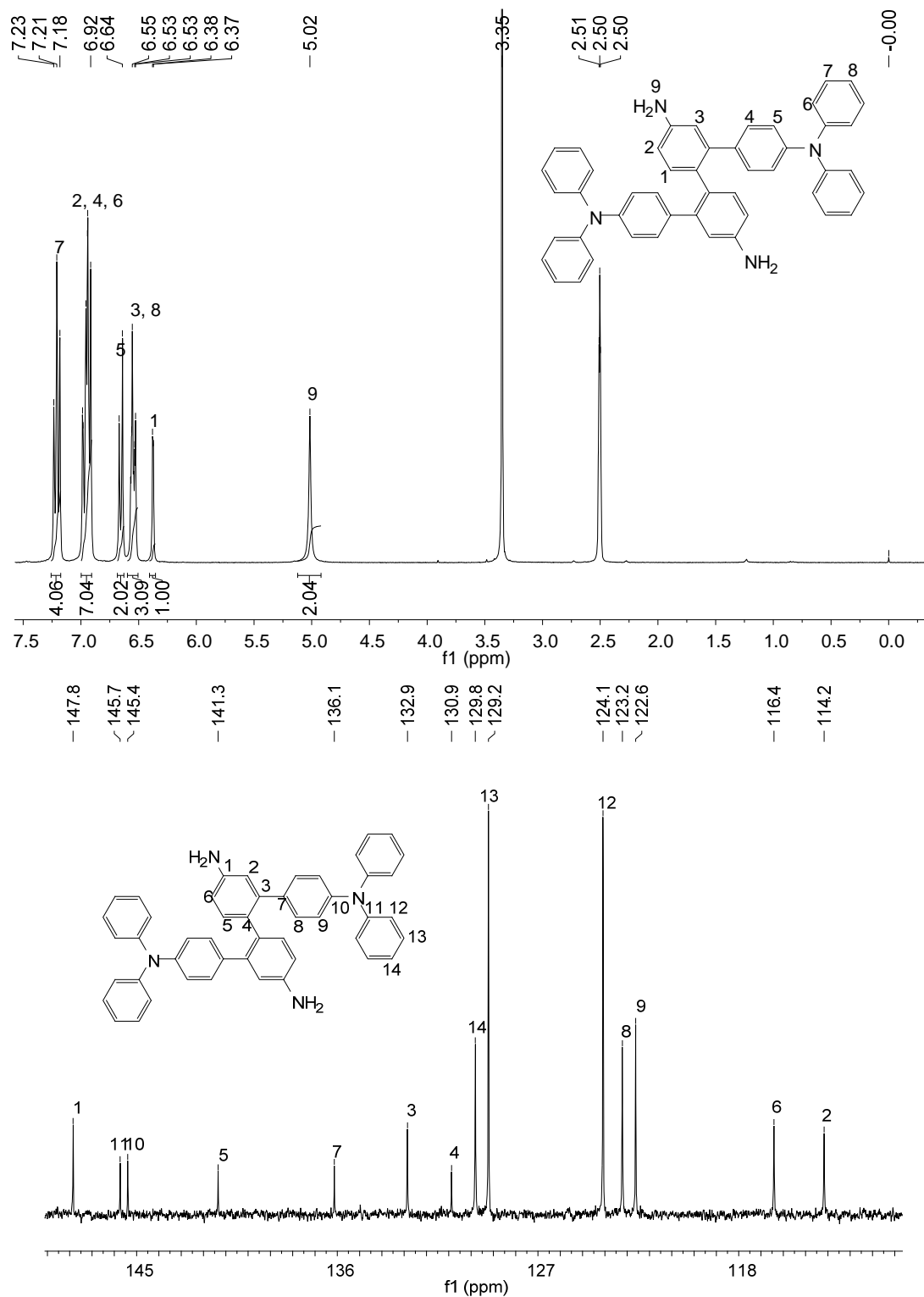


Figure S4. ^1H NMR and ^{13}C NMR spectra of TPABD.

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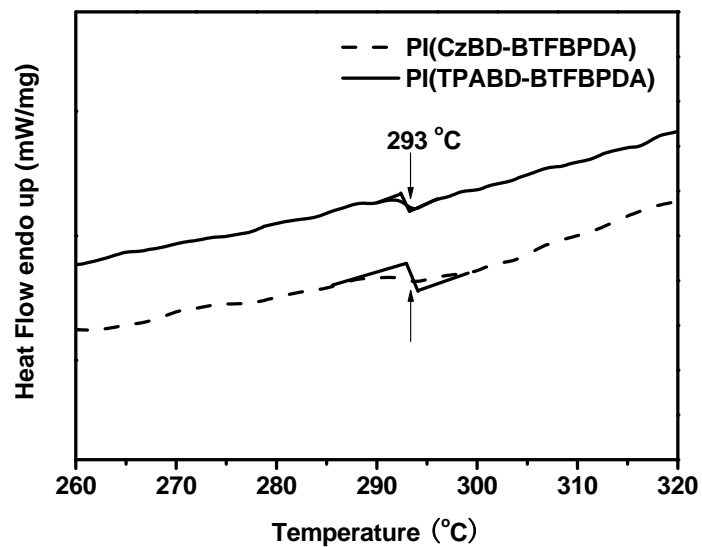


Figure S5. DSC curves of PI(CzBD-BTFBPDA) and PI(TPABD-BTFBPDA).

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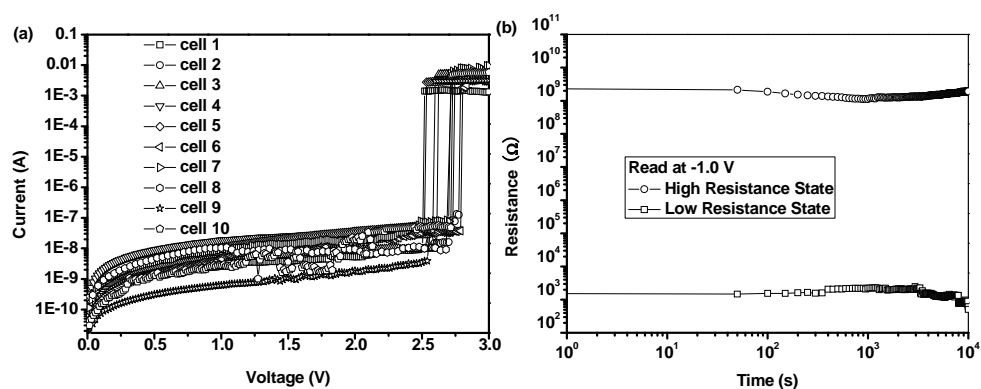


Figure S6. (a) *I-V* curves of ten Al/PI(CzBD-BTFBPDA)/ITO cells at the SET operation. (b) The resistance distribution of the high and low conductivity state.

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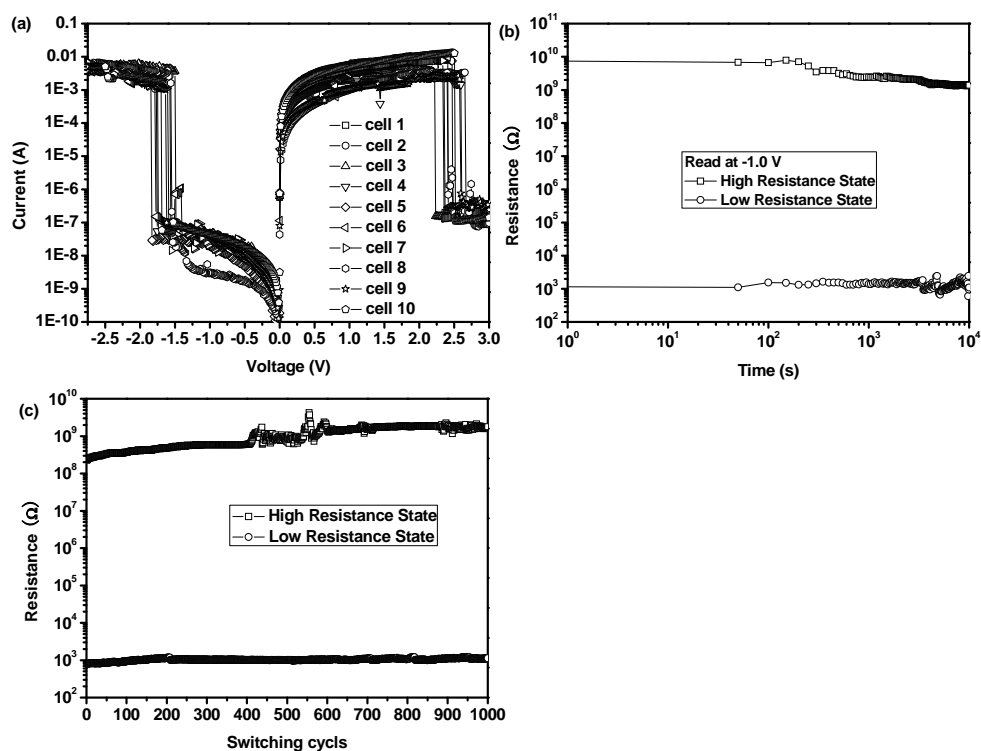


Figure S7. (a) *I-V* curves of ten Al/PI(TPABD-BTFBPDA)/ITO cells at the SET and RESET operation. (b) The resistance distribution of the high and low conductivity state. (c) Endurance characteristic of the Al/PI(TPABD-BTFBPDA)/ITO cell. The resistance ratios of high resistance state to low resistance state are more than 10^5 during the 1000 cycles of fatigued test.