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 μm × 1 μm. 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.
Figure S3. $^1$H NMR and $^{13}$C NMR spectra of CzBD.
Figure S4. $^1$H NMR and $^{13}$C NMR spectra of TPABD.
Figure S5. DSC curves of PI(CzBD-BTFBPDA) and PI(TPABD-BTFBPDA).
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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.