Supporting Information

Nonvolatile Transistor Memory Devices using

High Dielectric Constant Polyimides Electrets

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+equal contribution to this work.
Table S1. Inherent Viscosity\(^a\) and Solubility Behavior of Polyimides

<table>
<thead>
<tr>
<th>Code</th>
<th>(\eta_{\text{inh}}) (dL/g)</th>
<th>Solubility in various Solvent(^b)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>NMP</td>
</tr>
<tr>
<td>PI(BTDA-TPA-CN)</td>
<td>0.97</td>
<td>++</td>
</tr>
<tr>
<td>PI(DSDA-TPA-CN)</td>
<td>0.42</td>
<td>++</td>
</tr>
<tr>
<td>PI(6FDA-TPA-CN)</td>
<td>0.94</td>
<td>++</td>
</tr>
</tbody>
</table>

\(^a\) Measured at a polymer concentration of 0.5 g/dL in DMAc at 30 °C.

\(^b\) The solubility was determined with a 10 mg sample in 1 mL of a solvent. ++, soluble at room temperature; +, soluble on heating; +−, partially soluble or swelling.
Table S2. Thermal Properties of Polyimides$^a$

<table>
<thead>
<tr>
<th>Polymer code</th>
<th>$T_d^5$ ($^\circ$C)$^b$</th>
<th>$T_d^{10}$ ($^\circ$C)$^b$</th>
<th>$R_{800}$ (%)$^c$</th>
</tr>
</thead>
<tbody>
<tr>
<td>PI(BTDA-TPA-CN)</td>
<td>620, 650</td>
<td>645</td>
<td>70</td>
</tr>
<tr>
<td>PI(DSDA-TPA-CN)</td>
<td>535, 575</td>
<td>595</td>
<td>62</td>
</tr>
<tr>
<td>PI(6FDA-TPA-CN)</td>
<td>590, 620</td>
<td>605</td>
<td>65</td>
</tr>
</tbody>
</table>

$^a$ The polymer film samples were heated at 300 $^\circ$C for 1 h prior to all the thermal analyses.

$^b$ Temperature at which 5 % and 10% weight loss occurred, respectively, recorded by TGA at a heating rate of 20 $^\circ$C/min and a gas flow rate of 20 cm$^3$/min.

$^c$ Residual weight percentages at 800 $^\circ$C under nitrogen flow.
Figure S1. Contact angles of various polymer electrets: (a) PI(BTDA-TPA-CN), (b) PI(DSDA-TPA-CN) and (c) PI(6FDA-TPA-CN).
**Figure S2.** Atomic force microscopy (AFM) topographies of (a) PI(BTDA-TPA-CN), (b) PI(DSDA-TPA-CN) and (c) PI(6FDA-TPA-CN) spin-coated on bare SiO$_2$ substrates on 1 μm x 1 μm areas.
Figure S3. Transfer characteristics of the pentacene with PI(6FDA-TPA-CN) as electret. The $V_g$ sweeps ranged from 20 to 100 V.
Figure S4. Molecular orbitals of PI(DSDA-TPA-CN).
Figure S5. Molecular orbitals of PI(BTDA-TPA-CN).
Figure S6. The on-current of OFET device decay through $10^4$ s storage with (a) PI(BTDA-TPA-CN), (b) PI(DSDA-TPA-CN) and (c) PI(6FDA-TPA-CN) as electrets.