Supporting Information

Effects of Fluorination on the Electrochromic Performance of Benzothiadiazole-Based Donor-Acceptor Copolymers

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1 NMR of Monomers and Polymers
2 GPC, TGA and DSC Plots of Polymers
3 Degradation Profile of Electrochromic Devices
4 TD-DFT Calculations
Figure S1 $^1$H NMR spectrum of compound 2 (CD$_2$Cl$_2$, room temperature).
Figure S2 $^1$H NMR spectrum of compound 4b (CD$_2$Cl$_2$, room temperature).

Figure S3 $^1$H NMR spectrum of compound 4c (CD$_2$Cl$_2$, room temperature).
Figure S4 $^1$H NMR spectrum of PDAT-DTBT ($C_2D_2Cl_4$, 120 °C).

Figure S5 $^1$H NMR spectrum of PDAT-DTBT-F ($C_2D_2Cl_4$, 120 °C).
Figure S6 $^1$H NMR spectrum of PDAT-DTBT-2F (C$_2$D$_2$Cl$_4$, 120 °C).

2 GPC, TGA and DSC Plots of Polymers

Figure S7 GPC chromatogram of PDAT-DTBT.
Figure S8 GPC chromatogram of PDAT-DTBT-F.

Figure S9 GPC chromatogram of PDAT-DTBT-2F.
Figure S10 Thermograms of PDAT-DTBT, PDAT-DTBT-F and PDAT-DTBT-2F.

Figure S11 DSC plot of PDAT-DTBT.
Figure S12 DSC plot of PDAT-DTBT-F.

Figure S13 DSC plot of PDAT-DTBT-2F.
3 Degradation Profile of Electrochromic Devices

Figure S14 Degradation profiles of PDAT-DTBT, PDAT-DTBT-F and PDAT-DTBT-2F devices during the ‘burn-in’ period. The devices were switched at 15 s cycles between +1.6 and -1.6 V at 1500 nm. Data was obtained based on 3 repeated trials.

4 TD-DFT Calculations

Table S1. DFT calculations of PDAT-DTBT, PDAT-DTBT-F and PDAT-DTBT-2F dimer.

<table>
<thead>
<tr>
<th>Model</th>
<th>HOMO (eV)</th>
<th>LUMO (eV)</th>
<th>LH gap (eV)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PDAT-DTBT</td>
<td>-4.668</td>
<td>-2.705</td>
<td>1.963</td>
</tr>
<tr>
<td>PDAT-DTBT-F</td>
<td>-4.694</td>
<td>-2.780</td>
<td>1.914</td>
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<tr>
<td>PDAT-DTBT-2F</td>
<td>-4.754</td>
<td>-2.782</td>
<td>1.972</td>
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