Supporting Information

Solution-processable Low-bandgap 3-Fluorothieno[3,4-b]thiophene-2-carboxylate-based Conjugated Polymers for Electrochromic Applications

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NMR of Monomers and Polymers

2-butyloctyl 4, 6-dibromo-3-fluorothieno[3, 4-b]thiophene-2-carboxylate (2)

Figure S1 $^1$H NMR spectrum of 2
2-butyloctyl 3-fluoro-4, 6-di(thiophen-2-yl)thieno[3, 4-b]thiophene-2-carboxylate (3)

Figure S2 $^1$H NMR spectrum of 3
2-butyloctyl 4, 6-bis(5-bromothiophen-2-yl)-3-fluorothieno[3, 4-b]thiophene-2-carboxylate (4)

Monomers 5, 6 and 7 were prepared according to literature reported method.\textsuperscript{1,2}

Monomer 5. $^1$H NMR (400 MHz, CDCl$_3$) δ (ppm) 4.15 (s, 4H), 0.89 (s, 18H).

Monomer 6. $^1$H NMR (400 MHz, CDCl$_3$) δ (ppm) 3.92 (t, $J = 8.0$ Hz, 4H), 1.72 (q, $J = 7.2$ Hz, 4H), 1.44-1.29 (m, 36H), 0.90 (t, $J = 6.8$ Hz, 6H), 0.34 (s, 18H).

Monomer 7. $^1$H NMR (400 MHz, CDCl$_3$) δ (ppm) 3.74 (s, 4H), 1.28 (m, 40H), 0.90 (t, $J = 6.8$ Hz, 6H), 0.32 (s, 18H).

**Figure S3** $^1$H NMR spectrum of 4
Figure S4 $^1$H NMR spectrum of P1

Figure S5 $^1$H NMR spectrum of P2
Figure S6 $^1$H NMR spectrum of P3
GPC and TGA Plots of Polymers

Figure S7 GPC chromatogram of P1.

Figure S8 GPC chromatogram of P2.
Figure S9 GPC chromatogram of P3.

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Figure S10 Thermograms of P1-P3.

Reference:
