Electronic Supplementary Information


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Figure 1S. Diluted solutions ($1 \times 10^{-6}$ M in CH$_2$Cl$_2$) of compounds. UV light at 365 nm.

Figure 2S. Diluted solutions ($1 \times 10^{-3}$ M in CHCl$_3$) of compounds (left to right) T1N, T2N, BT1N, BT2N. Illumination under UV light at 254 nm (left) and UV light at 365 nm (right).
Experimental procedures
The sequence in which the detailed procedures are presented follows the synthetic routes present in Section Synthesis.

Synthesis of 3-octylthiophene (2).\(^1\)
3-bromothiophene (I) (2.81 mL, 30 mmol, d=1.74 g mL\(^{-1}\)) was slowly added to a solution of dichloro[1,3-bis(diphenylphosphino)propane] nickel (II) (Ni(dppp)Cl\(_2\)) (172 mg, 0.01 equiv) in 20 mL of freshly distilled ethyl ether in a 100 mL flask under nitrogen flux. To the reaction mixture was then dropwise added 15.00 mL of a 2 M octylmagnesium bromide ether solution (30 mmol), at a temperature maintained between 0 °C and 5 °C. After addition, the brown solution was stirred at reflux for 15 min, always under nitrogen. Upon cooling to room temperature, 20 mL of H\(_2\)O were carefully added to the reaction, and the resulting mixture was extracted three times with 20 mL of diethyl ether. The combined organic layer was washed with NaHCO\(_3\) s.s., water and brine, and the organic layer was dried over Na\(_2\)SO\(_4\). After filtration, the solvent was removed by rotary evaporation to afford a pale yellow oil, that, on further filtration on celite, gave 5.891 g of the pure title compound as a colourless oil, with a 98.2 % yield. \(^1\)H NMR (CDCl\(_3\)) \(\delta\) (ppm): 1.06 (3H, m), 1.44 (10H, m), 1.78 (2H, m), 2.77 (2H, t, \(J = 7.6\) Hz), 7.05 (1H, d, \(J = 3.0\) Hz), 7.06 (1H, s), 7.33 (1H, d, \(J = 3.0\) Hz). \(^1\)C NMR (CDCl\(_3\)) \(\delta\) (ppm): 14.25, 22.84, 29.45, 29.52, 29.62, 30.45, 30.74, 32.06, 119.86, 125.11, 128.35, 143.31.

Synthesis of 2-bromo-3-octylthiophene (3).\(^2\)
N-bromosuccinimide (NBS) (15.4 mmol, 2.741 g) was added portionwise to a solution of 3-octylthiophene (2) (14.0 mmol, 2.749 g) in 30 mL of a 1:1 (v/v) mixture of chloroform-acetic acid, at 0 °C, under nitrogen flux. The mixture was stirred at 0 °C for 30 min, then, after the solution has reached room temperature, 20 mL of H\(_2\)O were added, and the resulting mixture was extracted directly. The extract was successively washed with water, NaHCO\(_3\) 1 M and brine, and the organic layer was dried over Na\(_2\)SO\(_4\). After filtration, the solvent was removed by rotary evaporation to afford a yellow oil, that, after filtration on celite, gave 3.854 g of the pure title compound as a pale yellow oil, with a 97.9 % yield. \(^1\)H NMR (CDCl\(_3\)) \(\delta\) (ppm): 1.00 (3H, m), 1.40 (10H, m), 1.67 (2H, m), 2.66 (2H, t, \(J = 7.2\) Hz), 6.86 (1H, d, \(J = 5.6\) Hz), 7.22 (1H, d, \(J = 5.6\) Hz). \(^1\)C NMR (CDCl\(_3\)) \(\delta\) (ppm): 14.30, 22.87, 29.41, 29.44, 29.53, 29.58, 29.92, 32.06, 119.86, 125.15, 128.24, 141.94.

Synthesis of 2-(3-Octyliothienyl)magnesium bromide (4).
In an oven-dry 100 mL round-bottomed flask containing freshly distilled THF (10 mL), 0.292 g (12 mmol) of Mg turnings were placed, under nitrogen flux, and then gently crushed. To this suspension, a solution of freshly distilled THF (20 mL) containing 2-bromo-3-octylthiophene (3) (6.0 mmol, 1.652 g) and 1,2-dibromoethane (517 µL, 6.0 mmol, 1.127 g, d = 2.18 g mL\(^{-1}\)) was added dropwise, under nitrogen. Then, the reaction mixture was sonicated under N\(_2\) until complete disappearance of the magnesium. The resulting Grignard reagent was used immediately in subsequent coupling reactions.

Synthesis of 4,4''-dioctyl-2,2',5',2''-terthiophene (5).\(^3\)
In a 100 mL flask containing 20 mL of freshly distilled THF, under nitrogen flux, 2,5-dibromothiophene (0.303 mL, 2.7 mmol, 0.653 g, d = 2.150 g mL\(^{-1}\)) and 0.059 g (0.11 mmol) of dichloro[1,3-bis(diphenylphosphino)propane] nickel (II) (Ni(dppp)Cl\(_2\)), were placed. The mixture was cooled to 0 °C and then a THF solution of (3-octylthiophen-2-y) magnesium bromide (4), previously prepared from 2-bromo-3-octylthiophene (3) (6.0 mmol, 1.652 g) was added dropwise, keeping the temperature between 0 °C and 5 °C. At the end of the addition, the brown solution was allowed to reach room temperature, and then heated to 40 °C and stirred for additional 30 minutes, under nitrogen flux. Once the solution has reached room temperature, 15 mL of cold water were
carefully added, and the resulting mixture was extracted three times with diethyl ether (3x10 mL). The combined organic layers were washed with NaHCO₃ s.s., water and brine, and then dried over Na₂SO₄. After filtration, the solvent was removed by rotary evaporation, and, after celite filtration, 0.875 g of the pure title compound as a yellow oil were obtained, with a 68.5 % yield. ¹H NMR (CDCl₃) δ (ppm): 0.95 (6H, m), 1.34 (20H, m), 1.70 (4H, m), 2.85 (4H, t, J = 8 Hz), 6.99 (2H, d, J = 5.2 Hz), 7.12 (2H, s), 7.21 (2H, d, J = 5.2 Hz). ¹³C NMR (CDCl₃) δ (ppm): 14.26, 22.83, 29.44, 29.60, 29.72, 30.90, 32.04, 123.80, 126.12, 130.15, 130.53, 136.17, 139.75.

Synthesis of 3,3''-dioctyl-[2,2':5',2''-terthiophene]-5-carbaldehyde (6) and 3,3''-dioctyl-[2,2':5',2''-terthiophene]-5,5''-dicarbaldehyde (7).

In a 100 mL round-bottomed flask, under N₂, at 0 °C, phosphorus oxychloride (0.798 mL, 8.56 mmol, d=1.645 g mL⁻¹, 8 equiv) was added to dry and previously degassed solution of N,N-dimethylformamide (DMF) (stored on alumina) (1.657 mL, 21.40 mmol, d=0.944 g mL⁻¹, 20 equiv) in 20 mL of dry 1,2-dichloroethane (DCE) (stored over molecular sieves). This mixture was stirred for 15 minutes and allowed to reach room temperature, and then added dropwise, under nitrogen flux, to a 100 mL round-bottomed flask containing a cold (and previously degassed) solution of 4,4''-dioctyl-2,2':5',2''-terthiophene (5) (0.506 g, 1.07 mmol) in 10 mL of dry 1,2-dichloroethane (DCE). After being stirred at 60 °C for 4 hours, the mixture was poured into ice-cold water (30 mL), and then extracted three times with dichloromethane. The combined organic layers were washed with water and brine and dried over Na₂SO₄. After filtration and upon removal of the solvent, 523 mg of a dark orange liquid was obtained. The crude product was purified with flash chromatography on silica gel using a mixture of ethyl acetate/hexane (5:95) as eluant, giving 327 mg of 3,3''-dioctyl-[2,2':5',2''-terthiophene]-5-carbaldehyde (6) (57.8 % yield) and 175 mg of 3,3''-dioctyl-[2,2':5',2''-terthiophene]-5,5''-dicarbaldehyde (7) (30.9 % yield).

3,3''-dioctyl-[2,2':5',2''-terthiophene]-5-carbaldehyde (6): ¹H NMR (CDCl₃) δ (ppm): 0.89 (6H, m), 1.29 (20H, m), 1.68 (4H, m), 2.80 (4H, m), 6.94 (1H, d, J = 5.2 Hz), 7.08 (1H, d, J = 3.8 Hz), 7.18 (1H, d, J = 5.2 Hz), 7.22 (1H, d, J = 3.8 Hz), 7.57 (1H, s), 8.91 (1H, s). ¹³C NMR (CDCl₃) δ (ppm): 14.14, 22.70, 29.29, 29.32, 29.40, 29.43, 29.48, 29.54, 29.61, 30.29, 30.30, 30.69, 31.89, 31.91, 124.29, 126.12, 127.64, 129.76, 130.22, 134.38, 138.44, 139.03, 140.12, 140.21, 141.00, 182.33.

3,3''-dioctyl-[2,2':5',2''-terthiophene]-5,5''-dicarbaldehyde (7): ¹H NMR (CDCl₃) δ (ppm): 0.84 (6H, m), 1.25 (20H, m), 1.66 (4H, m), 2.78 (4H, t, J = 7.4 Hz), 7.22 (2H, s), 7.58 (2H, s), 9.80 (2H, s). ¹³C NMR (CDCl₃) δ (ppm): 14.11, 22.66, 29.24, 29.39, 29.50, 30.25, 31.84, 127.85, 136.62, 139.00, 139.99, 140.68, 140.88, 182.16.

Synthesis of T1N (ethyl 2-cyano-3-(3,3''-dioctyl-[2,2':5',2''-terthiophen]e)-5-yl)acrylate).

To a solution of 0.322 g (0.642 mmol) 3,3''-dioctyl-[2,2':5',2''-terthiophene]-5-carbaldehyde (6) in 20 mL of dry dichloromethane (DCM) were added three drops of triethylamine. Then 0.273 mL (2.568 mmol, d=1.063 g mL⁻¹, 4 equiv) of ethyl cyanoacetate were added. The resulting solution was stirred overnight under nitrogen, at room temperature. The reaction mixture was then extracted with dichloromethane (DCM) (2x10 mL), washed with water, then brine and dried over Na₂SO₄. After removal of solvent, the mixture was purified by chromatography on silica gel using ethyl acetate/hexane (1:9) as eluant to afford the title compound as a deep orange solid (0.242 mg, 63.1 % yield), m.p.: 90-92 °C ¹H NMR (CDCl₃) δ (ppm): 0.86 (6H, m), 1.26 (23H, m), 1.64 (4H, m), 2.76 (4H, m), 4.32 (2H, q, J = 7.2 Hz), 6.91 (1H, d, J = 5.2 Hz), 7.06 (1H, d, J = 4.0 Hz), 7.18 (1H, d, J = 5.2 Hz), 7.24 (1H, d, J = 4.0 Hz), 7.53 (1H, s), 8.16 (1H, s). ¹³C NMR (CDCl₃) δ (ppm): 14.11, 14.20, 22.67, 29.29, 29.39, 29.45, 29.56, 29.58, 30.13, 30.59, 31.84, 31.87, 62.29, 97.36, 115.96, 124.37, 126.05, 127.99, 129.71, 130.24, 132.67, 133.88, 138.90, 140.18, 140.23, 140.84, 141.74, 145.82, 162.87. MS (APCI) m/z: C₃₆H₄₅NO₂S₃ calcd 595.92; found 596.38.
Synthesis of T2N (2,2'-diethyl 3,3''-(3,3''-dioctyl-[2,2':5',2''-terthiophene]-5,5''-diyli)bis(2-cyanoacrylate).\(^6\)

To a solution of 0.171 g (0.324 mmol) 3,3''-dioctyl-[2,2':5',2''-terthiophene]-5,5''-dicarbaldehyde (7) in 20 mL of dry dichloromethane (DCM) were added three drops of triethylamine. Then 0.276 mL (2.592 mmol, d = 1.063 g mL\(^{-1}\), 8 equiv) of ethyl cyanoacetate were added. The resulting solution was stirred overnight under nitrogen, at room temperature. The reaction mixture was then extracted with dichloromethane (DCM) (2x10 mL), washed with water, then brine and dried over Na\(_2\)SO\(_4\). After removal of solvent, the mixture was purified by chromatography on silica gel using ethyl acetate/hexane (1:9) as eluent to afford the title compound as a deep brown solid (0.150 g, 64.4 % yield). m.p.: 154-157 °C. \(^1\)H NMR (CDCl\(_3\)) \(\delta\) (ppm): 0.86 (6H, m), 1.34 (20H, m), 1.39 (6H, m), 1.68 (4H, m), 2.82 (4H, m), 3.45 (4H, q, \(J = 7.0\) Hz), 7.31 (2H, s), 7.59 (2H, s), 8.21 (2H, s). \(^13\)C NMR (CDCl\(_3\)) \(\delta\) (ppm): 14.19, 14.30, 22.74, 29.41, 29.55, 29.66, 30.73, 32.02, 123.76, 135.38, 136.78, 139.70.

Synthesis of 5,5'-dibromo-2,2'-bithiophene (9).\(^7\)

N-bromosuccinimide (NBS) (12.8 mmol, 2.280 g) was added portionwise to a solution of 2,2'-bithiophene (8) (6.51 mmol, 1.014 g) in 30 mL of a 1:1 (v/v) mixture of chloroform/dichloroacetic acid, at 0 °C, under nitrogen flux. The mixture was stirred at 0 °C for 30 min, then, the solution has reached room temperature, 20 mL of \(\text{H}_2\text{O}\) were added, and the resulting mixture was extracted directly. The extract was successively washed with water, NaHCO\(_3\) 1 M and brine, and the organic layer was dried over Na\(_2\)SO\(_4\). After filtration, the solvent was removed by rotary evaporation to afford a yellow oil, that, after filtration on celite, gave 1.974 g of the pure title compound as a white grey solid, with a 99.8 % yield. m.p.: 145-146 °C. \(^1\)H NMR (CDCl\(_3\)) \(\delta\) (ppm): 6.85 (2H, d, \(J = 3.8\) Hz), 6.97 (2H, d, \(J = 3.8\) Hz). \(^13\)C NMR (CDCl\(_3\)) \(\delta\) (ppm): 111.65, 124.27, 130.79, 137.90.

Synthesis of 3,3''''-dioctyl-2,2':5',2''''-quaterthiophene (10).\(^8\) Kumada coupling reaction.

In a 100 mL flask containing 20 mL of freshly distilled THF, under nitrogen flux, 5,5''-dibromo-2,2'-bithiophene (2.7 mmol, 0.875 g) and 0.059 g (0.11 mmol) of dichloro[1,3-bis(diphenylphosphino)propane] nickel (II) (Ni(dppp)Cl\(_2\), were placed. The mixture was cooled to 0 °C and then a THF solution of 3-octythiophene-2-yl)magnesium bromide (4), previously prepared from 2-bromo-3-octythiophene (3) (6.0 mmol, 1.652 g) was added dropwise, keeping the temperature between 0 °C and 5 °C. At the end of the addition, the brown solution was allowed to reach room temperature, and then heated to 40 °C and stirred for additional 30 minutes, under nitrogen flux. Once the solution has reached room temperature, 15 mL of cold water were carefully added, and the resulting mixture was extracted with diethyl ether (3x10 mL). The combined organic layers were washed with NaHCO\(_3\) s.s., water and brine, and then dried over Na\(_2\)SO\(_4\). After filtration, the solvent was removed by rotary evaporation, and, after celite filtration, 0.984 g of the pure title compound as a yellow oil were obtained, with a 65.7% yield. \(^1\)H NMR (CDCl\(_3\)) \(\delta\) (ppm): 1.06 (6H, m), 1.46 (20H, m), 1.82 (4H, m), 2.94 (4H, m), 7.05 (2H, d, \(J = 5.2\) Hz), 7.15 (2H, d, \(J = 5.2\) Hz), 7.24 (4H, m). \(^13\)C NMR (CDCl\(_3\)) \(\delta\) (ppm): 14.24, 22.82, 29.41, 29.55, 29.66, 30.73, 32.02, 123.76, 126.40, 130.05, 130.44, 135.38, 136.78, 139.70.

Synthesis of 3,3''''-dioctyl-[2,2':5',2''''-quaterthiophene]-5-carbaldehyde (11) and 3,3''''-dioctyl-[2,2':5',2''''-quaterthiophene]-5,5''''-dicarbaldehyde (12).\(^8\)

In a 100 mL round-bottomed flask, under N\(_2\), at 0 °C, phosphorus oxychloride (0.447 mL, 4.8 mmol, d=1.645 g mL\(^{-1}\), 8 equiv) was added to dry and previously degassed solution of N,N-dimethylformamide (DMF) (stored on alumina) (0.929 mL, 12.0 mmol, d=0.944 g mL\(^{-1}\), 20 equiv) in 20 mL of dry 1,2-dichloroethane (DCE) (stored over molecular sieves). This mixture was stirred for 15 minutes and allowed to reach room temperature, and then added dropwise, under nitrogen...
flux, to a 100 mL round-bottomed flask containing a cold (and previously degassed) solution of 3,3''-dioctyl-2,2':5',2':5'',2'''-quaterthiophene (10) (0.333 g, 0.6 mmol) in 10 mL of dry 1,2-dichloroethane (DCE). After being stirred at 60 °C for 4 hours, the mixture was poured into ice-cold water (30 mL), and then extracted three times with dichloromethane. The combined organic layers were washed with water and brine and dried over Na₂SO₄. After filtration and upon removal of the solvent, 523 mg of a dark red liquid was obtained. The crude product was purified by flash chromatography on silica gel using ethyl acetate/hexane (1:9) as eluant to afford the title compound (0.333 g, 79.4 % yield) and 130 mg of 3,3''-dioctyl-2,2':5',2':5'',2'''-quaterthiophene-5,5'''-dicarbaldehyde (12) (35.4 % yield).

### Synthesis of BT1N (ethyl 2-cyano-3-(3,3'''-dioctyl-[2,2':5',2':5'',2'''-quaterthiophene]-5-carbaldehyde)

In a 100 mL round-bottomed flask, under N₂, at 0 °C, phosphorus oxychloride (1.342 mL, 14.40 mmol, d = 1.645 g mL⁻¹, 30 equiv) was added to dry and previously degassed solution of N,N-dimethylformamide (DMF) (stored on alumina) (1.115 mL, 14.40 mmol, d = 0.944 g mL⁻¹, 30 equiv) in 20 mL of dry 1,2-dichloroethane (DCE) (stored over molecular sieves). This mixture was stirred for 15 minutes and allowed to reach room temperature, and then added dropwise, under nitrogen flux, to a 100 mL round-bottomed flask containing a (previously degassed) solution of 3,3''-dioctyl-2,2':5',2':5'',2'''-quaterthiophene (10) (0.266 g, 0.48 mmol) in 20 mL of dry 1,2-dichloroethane (DCE). After being stirred at reflux for 4 hours, the reaction mixture was allowed to reach room temperature and quenched via the addition of 20 mL of a 2M NaOH aqueous solution and allowed to stir for additional 30 minutes. The product was then extracted with dichloromethane (2 × 25 mL), and the combined organic layers were washed with water and brine and dried over Na₂SO₄. After filtration and upon removal of the solvent, 0.291 g of the pure title compound (99.3 % yield) as an orange-red solid. ¹H NMR (CDCl₃) δ (ppm): 0.88 (6H, m), 1.29 (20H, m), 1.70 (4H, m), 2.82 (4H, m), 7.20 (4H, m), 7.59 (2H, s), 9.83 (2H, s). ¹³C NMR (CDCl₃) δ (ppm): 14.20, 22.77, 29.33, 29.47, 29.51, 29.56, 29.62, 30.28, 30.70, 31.95, 31.97, 124.04, 124.09, 124.57, 126.53, 128.24, 130.15, 130.20, 133.68, 135.97, 136.30, 138.99, 139.11, 140.08, 140.27, 140.38, 140.95, 182.39.

### Synthesis of BT1N (ethyl 2-cyano-3-(3,3'''-dioctyl-[2,2':5',2':5'',2'''-quaterthiophene]-5-carbaldehyde (11)) in 20 mL of dry dichloromethane (DCM)

To a solution of 0.146 g (0.25 mmol) 3,3''-dioctyl-2,2':5',2':5'',2'''-quaterthiophene-5-carbaldehyde (11) in 20 mL of dry dichloromethane (DCM) were added three drops of triethylamine. Then 0.133 mL (1.25 mmol, d = 1.063 g mL⁻¹, 5 equiv) of ethyl cyanoacetate were added. The resulting solution was stirred overnight under nitrogen, at room temperature. The reaction mixture was then extracted with dichloromethane (DCM) (2x10 mL), washed with water, then brine and dried over Na₂SO₄. After removal of solvent, the mixture was purified by chromatography on silica gel using ethyl acetate/hexane (1:9) as eluant to afford the title compound as a black solid (0.135 g, 79.4 % yield). m.p.: 66-69 °C. ¹H NMR (CDCl₃) δ (ppm): 0.89 (6H, m), 1.30 (23H, m), 1.68 (4H, m), 2.79 (4H, m), 4.36 (2H, m), 6.94 (1H, m), 7.02 (1H, m), 7.16 (4H, m), 7.54 (1H, s), 8.16 (1H, s). ¹³C NMR (CDCl₃) δ (ppm): 14.18, 14.28, 22.74, 29.33, 29.42, 29.48, 29.59, 30.12, 30.65, 31.94, 62.42, 97.66, 116.05, 124.11, 124.65, 126.52, 128.56, 130.14, 130.20,
132.89, 133.30, 135.86, 136.45, 139.52, 140.07, 140.46, 140.82, 141.67, 141.69, 145.86, 162.99. MS (APCI) m/z: C₃₈H₄₇NO₃S₄ calc 678.04; found 678.48.

**Synthesis of BT1C (5-((3,3'''-dioctyl-[2,2':5',2'':5'',2''']-quaterthiophen)-5-yl)methylene)-3-ethyl-2-thioxothiazolidin-4-one).**

To a solution of 0.181 g (0.310 mmol) 3,3'''-dioctyl-[2,2':5',2'':5'',2''']-quaterthiophene-5-carbaldehyde (11) in 20 mL of dry dichloromethane (DCM) were added three drops of piperidine. Then 0.197 mL (1.850 mmol, d = 1.063 g mL⁻¹, 10 equiv) of ethyl cyanoacetate were added three drops of (3,3'''-dioctyl-[2,2':5',2'':5'',2''']-quaterthiophene). Then 0.172 mL (1.440 mmol, d = 1.303 g mL⁻¹, 5.0 equiv) of 3-ethylrhodanine were added. The reaction mixture was then extracted with dichloromethane (DCM) (2x10 mL), washed with water, then brine and dried over Na₂SO₄. After removal of solvent, the mixture was purified by chromatography on silica gel using ethyl acetate/hexane (1:9) as eluant to afford the title compound as a dark metallic green solid (0.190 g, 72.9 % yield). m.p.: 175-177 °C. ¹H NMR (CDCl₃) δ (ppm): 1.18 (6H, m), 1.29 (26H, m), 1.66 (4H, m), 2.76 (4H, m), 4.01 (4H, q, J = 7.2 Hz), 7.20 (4H, m), 7.57 (2H, s), 7.71 (2H, s). ¹³C NMR (CDCl₃) δ (ppm): 12.43, 14.26, 22.82, 29.40, 29.44, 29.53, 29.56, 29.66, 29.67, 30.36, 30.78, 32.03, 40.58, 120.77, 124.23, 124.58, 126.73, 127.81, 130.26, 133.86, 135.36, 136.21, 136.33, 137.38, 138.87, 139.57, 140.22, 141.28, 167.42, 192.15. MS (APCI) m/z: C₄₈H₅₂N₂O₄S₄ calc 897.37; found 897.39.

**Synthesis of BT2N (2,2')-diethyl 3,3''-((3,3'''-dioctyl-[2,2':5',2'':5'',2''']-quaterthiophene)-5,5''''-diyl)bis(2-cyanoacrylate).**

To a solution of 0.113 g (0.185 mmol) 3,3'''-dioctyl-[2,2':5',2'':5'',2''']-quaterthiophene-5,5''''-dicarbaldehyde (12) in 20 mL of dry dichloromethane (DCM) were added three drops of triethylamine. Then 0.178 mL (1.440 mmol, d = 1.303 g mL⁻¹, 5.0 equiv) of 3-ethylrhodanine were added. The reaction mixture was then extracted with dichloromethane (DCM) (2x10 mL), washed with water, then brine and dried over Na₂SO₄. After removal of solvent, the mixture was purified by chromatography on silica gel using ethyl acetate/hexane (1:9) as eluant to afford the title compound as a black solid (0.190 g, 78.9 % yield). m.p.: 87-89 °C. ¹H NMR (CDCl₃) δ (ppm): 0.89 (6H, m), 1.30 (23H, m), 1.62 (4H, m), 2.80 (4H, m), 4.18 (2H, q, J = 7.2 Hz), 6.91 (1H, d, J = 5.2 Hz), 7.04 (1H, d, J = 3.8 Hz), 7.20 (4H, m), 7.22 (1H, s), 7.77 (1H, s). ¹³C NMR (CDCl₃) δ (ppm): 12.43, 14.26, 22.82, 29.40, 29.44, 29.53, 29.56, 29.66, 29.67, 30.36, 30.78, 32.03, 40.58, 120.77, 124.23, 124.58, 126.73, 127.81, 130.26, 133.86, 135.36, 136.21, 136.33, 137.38, 138.87, 139.57, 140.22, 141.28, 167.42, 192.15. MS (APCI) m/z: C₃₈H₄₇NO₃S₄ calc 726.16; found 726.28.

**Synthesis of BT2C (5,5'-(5,5''-((3,3'''-dioctyl-[2,2':5',2'':5'',2''']-quaterthiophene)-5,5''''-diyl)bis(methanlylidene))bis(3-ethyl-2-thioxothiazolidin-4-one).**

To a solution of 0.293 g (0.480 mmol) 3,3'''-dioctyl-[2,2':5',2'':5'',2''']-quaterthiophene-5,5''''-dicarbaldehyde (12) in 20 mL of dry dichloromethane (DCM) were added three drops of piperidine. Then 0.178 mL (1.440 mmol, d = 1.303 g mL⁻¹, 5.0 equiv) of 3-ethylrhodanine were added. The reaction mixture was then extracted with dichloromethane (DCM) (2x10 mL), washed with water, then brine and dried over Na₂SO₄. After removal of solvent, the mixture was purified by chromatography on silica gel using ethyl acetate/hexane (1:9) as eluant to afford the title compound as a dark metallic green solid (0.340 g, 78.9 % yield). m.p.: 210-212 °C. ¹H NMR (CDCl₃) δ (ppm): 0.86 (6H, m), 1.23 (26H, m), 1.66 (4H, m), 2.76 (4H, m), 4.01 (4H, q, J = 7.2 Hz), 7.20 (4H, m), 7.57 (2H, s), 7.71 (2H, s). ¹³C NMR (CDCl₃) δ (ppm): 12.30, 14.14, 22.68, 29.26, 29.39, 29.48, 29.53, 29.70, 30.17, 30.21, 31.87, 39.85, 120.83, 124.63, 124.81, 127.65, 128.32, 134.40, 134.62, 135.41, 137.25, 137.27, 137.77, 138.32, 139.00, 140.39, 140.57, 140.60, 167.15, 191.83. MS (APCI) m/z: C₄₄H₅₂N₂O₂S₈ calc 897.37; found 897.37.
Synthesis of tributyl(4-octylthiophen-2-yl)stannane (13).
To a solution of 295 mg of 3-octylthiophene (2) (1.50 mmol) in 25 mL of freshly distilled THF at a temperature of -78 °C were added 0.75 mL of n-BuLi (1.50 mmol, 2 M in hexane). The solution was allowed to stand at -40 to -50 °C for 1 hour and then cooled to -78 °C again. Then were added 0.45 mL of tributyltin chloride (96 mg, d = 1.2 g mL\(^{-1}\), 1.65 mmol). The reaction mixture was stirred for 1 hour and then allowed to reach room temperature and stirred overnight. Then, the reaction mixture was quenched with water and extracted with hexane. The organic layer was dried with sodium sulphate and filtered. Hexane was removed under vacuum, affording crude title product (650 mg, 89.2 % yield), which was used directly for the next synthetic step without further purification.

Synthesis of 5-bromo-4-octylthiophene-2-carbaldehyde (14).\(^9\)
In a 100 mL round-bottomed flask, under N\(_2\), at 0 °C, phosphorus oxychloride (6.524 mL, 70 mmol, d=1.645 g mL\(^{-1}\), 10 equiv) was added to a dry and previously degassed solution of N,N-dimethylformamide (DMF) (stored on alumina) (5.421 mL, 70 mmol, d=0.944 g mL\(^{-1}\), 10 equiv) in 20 mL of dry dichloroethane (DCE) (stored over molecular sieves). This mixture was stirred for 15 minutes and allowed to reach room temperature, and then added dropwise, under nitrogen flux, to a 100 mL round-bottomed flask containing a (previously degassed) solution of (3) (1.927 g, 7 mmol) in 20 mL of dry 1,2-dichloroethane (DCE). After being stirred at reflux for 4 hours, the reaction mixture was allowed to reach room temperature and quenched via the addition of 20 mL of a 2M NaOH aqueous solution and allowed to stir for additional 30 minutes. Then, the reaction mixture was quenched with water and extracted with hexane. The organic layer was dried over sodium sulphate and filtered. Hexane was removed under vacuum, affording crude title product (650 mg, 89.2 % yield), which was used directly for the next synthetic step without further purification.

Synthesis of 3,4'-dioctyl-[2,2'-bithiophene]-5-carbaldehyde (15).\(^10\)
Pd(PPh\(_3\))\(_4\) (2 mol %) was added to a solution of 5-bromo-4-octylthiophene-2-carbaldehyde (14) (352 mg, 1.16 mmol) and tributyl(4-octylthiophen-2-yl)stannane (13) (563 mg, 1.16 mmol) in 50 mL of dry toluene under nitrogen and then the reaction mixture was heated at reflux overnight. After pouring the mixture into 100 mL of water, the organic phase was extracted with dichloromethane (3x20 mL); the combined extracts were washed three times with distilled water, dried with Na\(_2\)SO\(_4\), and concentrated. The residue was purified through column chromatography (SiO\(_2\); hexanes/DCM, 6:1) to provide a yellow oil (316 mg, 65.0 % yield). \(^1\)H NMR (CDCl\(_3\)) \(\delta\) (ppm): 0.89 (3H, m), 1.28 (10H, m), 1.60 (2H, m), 2.57 (2H, m), 2.79 (2H, t, \(J = 8.0\) Hz), 7.47 (1H, s), 9.77 (1H, s). \(^{13}\)C NMR (CDCl\(_3\)) \(\delta\) (ppm): 14.22, 22.77, 29.26, 29.32, 29.44, 29.50, 29.59, 31.96, 122.24, 136.90, 137.02, 144.11, 182.02.

Synthesis of 5'-bromo-3,4'-dioctyl-[2,2'-bithiophene]-5-carbaldehyde (16).\(^10\)
N-bromosuccinimide (NBS) (0.74 mmol, 0.132 g) was added portionwise to 3,4'-dioctyl-[2,2'-bithiophene]-5-carbaldehyde (15) (0.74 mmol, 0.310 g) in 30 mL of a 1:1 (v/v) mixture of chloroform-acetic acid, at 0 °C, under nitrogen flux. The mixture was stirred at 0 °C for 30 min, then, after the solution has reached room temperature, 20 mL of H\(_2\)O were added, and the resulting mixture was extracted directly. The extract was successively washed with water, NaHCO\(_3\) 1 M and brine, and the organic layer was dried over Na\(_2\)SO\(_4\). After filtration, the solvent was removed by
rotary evaporation to afford a yellow oil, that, after filtration on celite, gave 0.241 g of the pure title compound as a pale yellow oil, with a 65.6 % yield. $^1$H NMR (CDCl$_3$) $\delta$ (ppm): 0.86 (6H, m), 1.25 (20H, m), 1.60 (4H, m), 2.53 (2H, t, $J = 7.9$ Hz), 2.70 (2H, t, $J = 8.1$ Hz), 6.93 (1H, s), 7.53 (1H, s), 9.77 (1H, s). $^{13}$C NMR (CDCl$_3$) $\delta$ (ppm): 14.14, 14.18, 22.70, 29.39, 29.44, 29.49, 29.66, 30.30, 31.90, 111.19, 128.19, 136.16, 143.17.

Synthesis of 5,5'-bis(tributylstannyl)-2,2'-bithiophene (17).$^{11}$
To a solution of 0.078 g (0.078 mmol) diethyl 3,3'-dicarbalddehyde (18) in 20 mL of dry dichloromethane (DCM) were added 5.28 mL of n-BuLi (13.2 mmol, 2 M in hexane). After a white precipitate formed, the mixture was allowed to reach room temperature and stirred for 1 hour and then tributyltin chloride (5.28 g, 36.0 % yield). $^1$H NMR (CDCl$_3$) $\delta$ (ppm): 0.96-1.66 (54H, m), 1.66 (54H, m), 2.81 (4H, m), 2.70 (2H, t, $J = 8.1$ Hz), 7.11 (6H, m), 7.58 (2H, s), 9.80 (2H, s). $^{13}$C NMR (CDCl$_3$) $\delta$ (ppm): 0.86 (6H, m), 1.25 (6H, m), 1.29 (40H, m), 1.65 (4H, m), 2.81 (4H, m), 7.12 (6H, m), 7.58 (2H, s), 9.80 (2H, s). $^{13}$C NMR (CDCl$_3$) $\delta$ (ppm): 13.69, 14.20, 17.58, 17.63, 20.88, 22.77, 23.93, 26.93, 27.94, 29.36, 29.50, 29.58, 29.80, 30.34, 30.54, 31.98, 124.25, 126.96, 130.50, 132.67, 132.91, 134.60, 137.25, 139.19, 140.16, 140.53, 140.49, 141.18, 182.59.

Synthesis of 3,3''',3''''',4'-tetraoctyl-[2,2':5',2':5',2'''':5'''':2''''''':5''''''':4'''']'-sexithiophene]-5,5'''''''-dicarbadlehyde (18).$^8$
Pd(PPh$_3$)$_4$ (2 mol % respect to 5'-bromo-3,4'-dioctyl-[2,2'-bithiophene]-5-carbaldehyde (16)) was added to a solution of 5'-bromo-3,4'-dioctyl-[2,2'-bithiophene]-5-carbaldehyde (16) (0.248 g, 0.5 mmol) and 5,5'-bis(tributylstannyl)-2,2'-bithiophene (17) (0.223 g, 0.30 mmol) in 15 mL of dry toluene under N$_2$, and the mixture was heated to gentle reflux for 24 h. After pouring the mixture into 20 mL of water, the organic phase was extracted with dichloromethane (DCM). The extract was successively washed with water, dried over Na$_2$SO$_4$ and evaporated in vacuo. The crude product was then purified with column chromatography (SiO$_2$: CHCl$_3$/hexane 1:9) to give a dark red oil (3.005 g, 67.3 % yield). $^1$H NMR (CDCl$_3$) $\delta$ (ppm): 0.96-1.66 (54H, m), 7.11-7.35 (4H, m). $^{13}$C NMR (CDCl$_3$) $\delta$ (ppm): 11.00, 13.79, 27.39, 29.10, 124.80, 136.16, 143.17.

Synthesis of BT4N (2,2')-diethyl 3,3'-(3,3''',3''''',4'-tetraoctyl-[2,2':5',2':5',2'''':5'''':2''''''':5''''''':4'''']'-sexithiophene]-5,5'''''''-diyl)bis(2-cyanoacrylate).
To a solution of 0.078 g (0.078 mmol) 3,3''',3''''',4'-tetraoctyl-[2,2':5',2':5',2'''':5'''':2''''''':5''''''':4''''''']'-sexithiophene]-5,5'''''''-dicarbadlehyde (18) in 20 mL of dry dichloromethane (DCM) were added three drops of triethylamine. Then 0.083 mL (0.780 mmol, d = 1.063 g mL$^{-1}$, 10 equiv) of ethyl cyanoacetate were added. The resulting solution was stirred overnight under nitrogen, at room temperature. The reaction mixture was then extracted with dichloromethane (DCM) (2x10 mL), washed with water, then brine and dried over Na$_2$SO$_4$. After removal of solvent, the mixture was purified by chromatography on silica gel using ethyl acetate/hexane (1:9) as eluant to afford the title compound as a black solid (0.068 g, 73.1 % yield). $^1$H NMR (CDCl$_3$) $\delta$ (ppm): 0.88 (12H, m), 1.29 (40H, m), 1.39 (6H, m), 1.70 (8H, m), 2.82 (8H, m), 4.35 (4H, q, $J = 7.0$ Hz), 7.16 (6H, m), 7.56 (2H, s), 8.21 (2H, s). $^{13}$C NMR (CDCl$_3$) $\delta$ (ppm): 14.25, 22.81, 29.38, 29.41, 29.50, 29.53, 29.63, 29.73, 30.27, 32.01, 62.53, 97.65, 116.20, 124.37, 127.07, 130.96, 132.58, 132.91, 133.22, 134.63, 137.37, 140.55, 140.72, 141.16, 141.92, 146.16, 163.17.
Synthesis of 3,3''-dioctyl-2,2':5',2''':5'',2'''':5'''''-quaterthiophene (10).\textsuperscript{8} Stille coupling reaction.
Pd(PPh\textsubscript{3})\textsubscript{4} (2 mol %) was added to a solution of 2-bromo-3-octythiophene (3) (826 mg, 3.0 mmol) and (5,5'''-bis(tributylstannyl)-2,2'-bithiophene) (17) (1.117 g, 1.5 mmol) in 50 mL of dry toluene under nitrogen and then the reaction mixture was heated at reflux overnight. After pouring the mixture into 100 mL of water, the organic phase was extracted with dichloromethane (3x20 mL); the combined extracts were washed three times with distilled water, dried with Na\textsubscript{2}SO\textsubscript{4}, and concentrated. The residue was purified through column chromatography (SiO\textsubscript{2}; hexanes/DCM, 6:1) to provide the title compound as a yellow oil (650 mg, 78.1 % yield). \textsuperscript{1}H NMR (CDCl\textsubscript{3}) \(\delta\) (ppm): 0.93 (18H, m), 1.30 (60H, m), 1.64 (12H, m), 2.82 (12H, m), 7.02 (4H, m), 7.13 (4H, m), 7.59 (2H, s), 9.83 (2H, s). \textsuperscript{13}C NMR (CDCl\textsubscript{3}) \(\delta\) (ppm): 14.24, 22.81, 26.97, 27.97, 29.13, 29.45, 29.61, 29.78, 30.89, 32.07, 123.76, 125.33, 135.86, 136.74, 138.23, 140.18.

Synthesis of 3,3''-dialkoxy-[2,2':5',2''':5'',2'''':5''''',2'''''':5'''''',2''''''':5''''''',2'''''''':5'''''''',2''''''''':5''''''''']quaterthiophene]-5,5'''''''-dicarbaldehyde (20).\textsuperscript{8}
Pd(PPh\textsubscript{3})\textsubscript{4} (2 mol % respect to 5''-bromo-3,4'-dioctyl-[2,2'-bithiophene]-5-carbaldehyde (16)) was added to a solution of 5''-bromo-3,4'-dioctyl-[2,2'-bithiophene]-5-carbaldehyde (16) (0.224 g, 0.45 mmol) and (3,3''-dioctyl-[2,2':5',2''':5'',2'''':5''''',2'''''':5'''''',2''''''':5''''''',2''''''''':5''''''''']quaterthiophene]-5,5'''''''-dicarbaldehyde (20) (0.255 g, 0.23 mmol) in 15 mL of dry toluene under N\textsubscript{2}, and the mixture was heated to gentle reflux for 24 h. After pouring the mixture into 20 mL of water, the organic phase was extracted with dichloromethane (DCM). The crude product was then purified with column chromatography (SiO\textsubscript{2}; hexane) to give a brown oil product (0.371 g, 99.2 % yield). \textsuperscript{1}H NMR (CDCl\textsubscript{3}) \(\delta\) (ppm): 0.98-1.67 (118H, m), 2.88 (4H, t), 7.03-7.16 (6H, m). \textsuperscript{13}C NMR (CDCl\textsubscript{3}) \(\delta\) (ppm): 8.89, 10.99, 13.82, 14.27, 22.86, 27.43, 29.13, 29.45, 29.61, 29.78, 30.89, 32.07, 123.76, 125.93, 135.84, 135.87, 136.14, 136.67, 138.82, 140.81.

Synthesis of BT6N (2,2')-diethyl 3,3''-(3,3'''-3,3'''''-3,3'''''-4'''-hexaoctyl-[2,2':5',2''':5'',2'''':5''''',2'''''':5'''''',2''''''':5''''''',2''''''''':5''''''''']octithiophene]-5,5'''''''-dicarbaldehyde (20).\textsuperscript{8}
To a solution of 0.183 g of 3,3'''-dioctyl-2,2':5',2''':5'',2'''':5''''',2'''''':5'''''',2''''''':5''''''',2''''''''':5''''''''']octithiophene (11) (19).\textsuperscript{8}
To a solution of 0.305 g (0.220 mmol) 3,3'''''-3,3'''''''-4'''-hexaoctyl-[2,2':5',2''':5'',2'''':5''''',2'''''':5'''''',2''''''':5''''''',2''''''''':5''''''''']octithiophene]-5,5'''''''-dicarbaldehyde (20) in 20 mL of dry dichloromethane (DCM) were added three drops of triethylamine. Then 0.234 mL (2.220 mmol, d = 1.063 g mL\textsuperscript{-1}, 10 equiv) of ethyl cyanoacetate were added. The resulting solution was stirred overnight under nitrogen, at room temperature. The reaction mixture was then extracted with dichloromethane (DCM) (2x10 mL), washed with water, then brine and dried over Na\textsubscript{2}SO\textsubscript{4}. After removal of solvent, the mixture was purified by chromatography on silica gel using ethyl...
acetate/hexane (1:9) as eluant to afford the title compound as a dark violet solid (0.260 g, 73.6 % yield). m.p.: 141-144 °C. \(^1\)H NMR (CDCl\(_3\)) \(\delta\) (ppm): 0.89 (18H, m), 1.31 (66H, m), 1.71 (12H, m), 2.81 (12H, m), 4.36 (4H, q, \(J = 7.2\) Hz), 7.03 (6H, m), 7.19 (2H, s), 7.56 (2H, s), 8.22 (2H, s). \(^{13}\)C NMR (CDCl\(_3\)) \(\delta\) (ppm): 13.76, 14.25, 14.37, 17.09, 17.66, 22.81, 27.15, 27.87, 29.43, 29.57, 29.73, 30.25, 30.66, 32.03, 62.53, 97.52, 116.21, 124.14, 126.65, 129.27, 130.99, 131.20, 132.34, 132.84, 133.37, 133.47, 134.95, 137.02, 140.38, 140.48, 140.54, 140.64, 140.69, 141.21, 142.12, 146.20, 163.23.

References
Normalized absorption UV-Vis spectra of compounds.

**Figure 3S.** Normalized absorption of T1N and T2N.

**Figure 4S.** Normalized absorption of BT1N and BT2N.
Figure 5S. Normalized absorption of T1N and BT1N.

Figure 6S. Normalized absorption of T2N and BT2N.
Figure 7S. Normalized absorption of BT1C and BT2C.

Figure 8S. Normalized absorption of BT1N and BT1C.
**Figure 9S.** Normalized absorption of BT2N and BT2C.

**Figure 10S.** Normalized absorption of BT4N and BT6N.
$^1$H-NMR and $^{13}$C-NMR spectra of compounds
$^1$H NMR spectrum of 3-octylthiophene (2)
$^{13}$C NMR spectrum of 3-octylthiophene (2)
$^1$H NMR spectrum of 2-bromo-3-octylthiophene (3)
$^{13}$C NMR spectrum of 2-bromo-3-octylthiophene (3)

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\begin{align*}
\text{ppm} & \quad 200 & \quad 150 & \quad 100 & \quad 50 & \quad 0 \\
\end{align*}
\]
$^1$H NMR spectrum of 4,4''-dioctyl-2,2':5',2''-terthiophene (5)
$^{13}$C NMR spectrum of 4,4''-dioctyl-2,2':5',2''-terthiophene (5)
$^1$H NMR spectrum of 3,3''-dioctyl-[2,2':5',2''-terthiophene]-5-carbaldehyde (6)
$^{13}$C NMR spectrum of 3,3''-dioctyl-[2,2':5',2''-terthiophene]-5-carbaldehyde (6)
$^1$H NMR spectrum of 3,3''-dioctyl-[2,2':5',2''-terthiophene]-5,5''-dicarbaldehyde (7)
$^{13}$C NMR spectrum of 3,3''-dioctyl-[2,2':5',2'-terthiophene]-5,5''-dicarbaldehyde (7)
$^1$H NMR spectrum of T1N (ethyl 2-cyano-3-(3,3''-dioctyl-[2,2':5',2''-terthiophen]-5-yl)acrylate)
$^{13}$C NMR spectrum of **T1N** (ethyl 2-cyano-3-(3,3''-dioctyl-[2,2':5',2''-terthiophen]-5-yl)acrylate)
¹H NMR spectrum of T2N (2,2'-diethyl 3,3'-(3,3''-dioctyl-[2,2':5',2''-terthiophene]-5,5''-diyl)bis(2-cyanoacrylate)
$^{13}$C NMR spectrum of T2N (2,2'-diethyl 3,3'-(3,3''-dioctyl-[2,2':5',2''-terthiophene]-5,5''-diyl)bis(2-cyanoacrylate)
$^1$H NMR spectrum of 5,5'-dibromo-2,2'-bithiophene (9)
$^{13}$C NMR spectrum of 5,5'-dibromo-2,2'-bithiophene (9)
\(^1\)H NMR spectrum of 3,3''-dioctyl-2,2':5',2''-5'',2''-quaterthiophene (10)
$^{13}$C NMR spectrum of 3,3'''-dioctyl-2,2':5',2'':5'',2'''-quaterthiophene (10)
$^1$H NMR spectrum of 3,3'''-dioctyl-[2,2':5',2''':5'',2'''-quaterthiophene]-5-carbaldehyde (11)
$^{13}$C NMR spectrum of 3,3'''-dioctyl-[2,2':5',2''':5'',2'''-quaterthiophene]-5-carbaldehyde (11)
\(^1\)H NMR spectrum of 3,3''-dioctyl-[2,2':5',2''-quaterthiophene]-5,5''-dicarbaldehyde (12)
$^{13}$C NMR spectrum of 3,3'''-dioctyl-[2,2':5',2'':5'',2'''-quaterthiophene]-5,5'''-dicarbaldehyde (12)
$^1$H NMR spectrum of **BT1N** (ethyl 2-cyano-3-(3,3''-dioctyl-[2,2':5',2'':5'',2'''-quaterthiophen]-5-yl)acrylate)
$^{13}$C NMR spectrum of BT1N (ethyl 2-cyano-3-(3,3'''-dioctyl-[2,2':5',2'':5'',2'''-quaterthiophen]-5-yl)acrylate)
$^1$H NMR spectrum of BT1C (5-((3$_3''$)-dioctyl-[2,2':5',2''-quaterthiophen]-5-yl)methylene)-3-ethyl-2-thiothiazolidin-4-one)
$^{13}$C NMR spectrum of **BT1C** (5-((3,3'''-dioctyl-[2,2':5',2'':5'',2'''-quaterthiophen]-5-yl)methylene)-3-ethyl-2-thioxothiazolidin-4-one)
$^1$H NMR spectrum of \textbf{BT2N} (2,2')-diethyl 3,3'-(3,3''-dioctyl-[2,2':5',2'':5'',2''':5'',5''''-quaterthiophene]-5,5'''-diyl)bis(2-cyanoacrylate)
$^{13}$C NMR spectrum of **BT2N** (2,2')-diethyl 3,3'-(3,3'''-dioctyl-[2,2':5',2'':5'',2'''-quaterthiophene]-5,5'''-diyl)bis(2-cyanoacrylate)
$^1$H NMR spectrum of **BT2C (5,5')-5,5'-(3,3''-dioctyl-[2,2':5',2'':5'',2'''-quaterthiophene]-5,5'''-diyl)bis(methanylylidene))bis(3-ethyl-2-thioxothiazolidin-4-one)**
$^{13}$C NMR spectrum of BT2C (5,5')-5,5'-(3,3'''-dioctyl-[2,2':5',2'':5'',2'''-quaterthiophene]-5,5'''-diyl)bis(methanylylidene))bis(3-ethyl-2-thioxothiazolidin-4-one)
$^1$H NMR spectrum of 5-bromo-4-octylthiophene-2-carbaldehyde (14)
$^{13}$C NMR spectrum of 5-bromo-4-octylthiophene-2-carbaldehyde (14)
$^1$H NMR spectrum of 3,4'-dioctyl-[2,2'-bithiophene]-5-carbaldehyde (15)
$^{13}$C NMR spectrum of 3,4'-dioctyl-[2,2'-bithiophene]-5-carbaldehyde (15)
$^1$H NMR spectrum of 5'-bromo-3,4'-dioctyl-[2,2'-bithiophene]-5-carbaldehyde (16)
$^{13}$C NMR spectrum of 5'-bromo-3,4'-dioctyl-[2,2'-bithiophene]-5-carbaldehyde (16)
$^1$H NMR spectrum of 5,5'-bis(tributylstannyl)-2,2'-bithiophene (17)
$^{13}$C NMR spectrum of 5,5'-bis(tributylstannyl)-2,2'-bithiophene (17)
$^1$H NMR spectrum of 3,3\textsuperscript{''''},3\textsuperscript{''''''},4\textsuperscript{-}tetraoctyl-[2,2\textsuperscript{''},2\textsuperscript{''''},2\textsuperscript{'''''},2\textsuperscript{''''''},2\textsuperscript{'''''''}-sexithiophene]-5,5\textsuperscript{'''''}-dicarbaldehyde (18)
$^{13}$C NMR spectrum of 3,3',3'',3''',4'-tetraoctyl-[2,2':5',2''':5'',2''':5''',2'''''':5''''',2'''''':5'''''':5'''''']-sexithiophene-5,5'''''-dicarbaldehyde (18)
$^1$H NMR spectrum of **BT4N** (2,2')-diethyl 3,3'-((3,3'',3''',4''')-tetraoctyl-[2,2':5',2'':5'',2'''':5''',2''''':5''''',2'''''':5'''':5''':5''':5'':5''':5''':5''':5''':sexithiophene]-5,5'''''-diyl)bis(2-cyanoacrylate)
$^{13}$C NMR spectrum of BT4N (2,2')-diethyl 3,3'-(3,3'''',3''''',4'-tetraoctyl-[2,2':5',2'':5'',2''':5''',2''''':5'''''',2'''''':5''''''',sexithiophene]-5,5'''''''-diyl)bis(2-cyanoacrylate)
$^1$H NMR spectrum of (3,3''-dioctyl-[2,2':5',2''-5'',2'''-quaterthiophene]-5,5''-diyl)bis(tributylstannane) (19)
$^{13}$C NMR spectrum of (3,3''-dioctyl-[2,2':5',2''-5'',2'''-quaterthiophene]-5,5'''-diyl)bis(tributylstannane) (19)
\(^1\)H NMR spectrum of 3,3''',3''''',3''''''',4',4''-hexaoyl-[2,2':5',2'':5'',2''':5''',2''''':5''''',2'''''':5'''''',2''''''':5''''''']-octithiophene]-5,5'''''''-dicarbaldehyde (20)
$^{13}$C NMR spectrum of 3,3'''',3''''',3''''''',4',4'''-hexaoctyl-[2,2':5',2':2',5',2':5',2':5',2':5',2':5',2':5',2':5',2':5',2':5',2':5',octithiophene]-5,5'''''''dicarbaldehyde (20)
$^1$H NMR spectrum of **BT6N** (2,2')-diethyl 3,3'-(3,3'''',3''''',3''''''',4',4'''-hexa-2,2':5',2''':5'',2''''':5''''',2'''''':5'''''',2'''''''':5'''''''',2''''''''':5''''''''''-octithiophene-5,5'''''''-diyl)bis(2-cyanoacylate)
$^{13}$C NMR spectrum of BT6N (2,2')-diethyl 3,3',3''',3'''''-hexa[n-alkyl]-[2,2':5',2''':5'''',2'''''':5'''''',2''''''':5'''''''',2''''''''':5'''''''''',2''''''''''':5'''''''''',2'''''''''''':5'''''''''''-octithiophene]-5,5'''''''''''-diyl]bis(2-cyanoacrylate)