



<sup>1</sup>H NMR spectra (aromatic region) of styryl-15-crown-5 terthiophene **1** (top) and 15-crown-5 terthiophene dimer (**1**)<sub>2</sub> (bottom)

*5''-Bis-[2-(2'-[2''',2''']terthiophen-3''-yl-vinyl)-6,7,9,10,12,13,15,16,18,19-decahydro-5,8,11,14,17,20-hexaoxa-benzocyclooctadecene} (2)<sub>2</sub>*

Treatment of **2** with FeCl<sub>3</sub> yielded the title compound as a red solid, melting point = 208-210°C (55%).

Electronic spectrum (CH<sub>2</sub>Cl<sub>2</sub>) λ<sub>max</sub> nm/(log ε) 274.5 (4.50), 335.5 (4.83), 445.5 (4.56).

Electronic spectrum (thin film) λ<sub>max</sub> nm 346.0, 480.0.

<sup>1</sup>H NMR (400 MHz, CD<sub>2</sub>Cl<sub>2</sub>) δ 3.61-3.70 (m, 24H, OCH<sub>2</sub>9, 10, 12, 13, 15, 16); 3.85-3.87 (m, 8H, OCH<sub>2</sub>7, 18); 4.14-4.16 (m, 4H, OCH<sub>2</sub>19); 4.18-4.20 (m, 4H, OCH<sub>2</sub>6); 6.87 (d, 2H, <sup>3</sup>J = 8.3 Hz, ArH4); 7.04 (d, 2H, <sup>3</sup>J = 16.2 Hz, H<sub>vinyl</sub>1'); 7.08 (dd, 2H, <sup>3</sup>J = 5.1, <sup>4</sup>J = 3.5 Hz, ThH4'''); 7.08-7.10 (m, 4H, ArH1, 3); 7.17 (d, 2H, <sup>3</sup>J = 3.7, ThH3''); 7.26 (d, 2H, <sup>3</sup>J = 3.6, ThH4''); 7.27 (dd, 2H, <sup>3</sup>J = 3.4, 1.1 Hz, ThH3'''); 7.28 (d, 2H, <sup>3</sup>J = 16.2 Hz, H<sub>vinyl</sub>2'); 7.31 (dd, 2H, <sup>3</sup>J = 5.1, <sup>4</sup>J = 1.1 Hz, ThH5'''); 7.46 (s, 2H, ThH4''').

<sup>13</sup>C NMR (100.6 MHz, CD<sub>2</sub>Cl<sub>2</sub>) δ 68.0 OCH<sub>2</sub>; 68.1 OCH<sub>2</sub>; 68.9 OCH<sub>2</sub>; 68.9 OCH<sub>2</sub>; 69.9 OCH<sub>2</sub>; 70.0 OCH<sub>2</sub>; 70.0 OCH<sub>2</sub>; 70.1 OCH<sub>2</sub>; 70.1 OCH<sub>2</sub>; 111.2 ArC1; 113.2 ArC4; 119.2 C<sub>vinyl</sub>2'; 119.8 ArC3; 122.1 ThC4''; 123.9 ThC3''; 124.2 ThC4''; 124.7 ThC5''; 127.2 ThC3''; 127.7 ThC4''; 129.9 ArC2; 130.2 ThC2''; 130.5 C<sub>vinyl</sub>1'; 134.2 ThC2''; 135.7 ThC5''; 136.2 ThC2''; 136.6 ThC3''; 137.1 ThC5''; 148.9 ArC4; 149.0 ArC18.

HRMS (FAB) M<sup>+</sup> calc 1166.2566, found 1166.2626.

*4',3''-Bis-[2''''-(4''''-methoxy-3''''-[2''''''-(2''''''-methoxy-ethoxy)-ethoxy]-ethoxy)-phenyl]-vinyl]-[2,2';5',2'';5'',2'';5''',2'';5''',2''']sexithiophene (4)<sub>2</sub>*

Treatment of **4** with FeCl<sub>3</sub> yielded the title compound as a red solid, melting point = 158-160°C (69%).

Electronic spectrum (CH<sub>2</sub>Cl<sub>2</sub>) λ<sub>max</sub> nm/(log ε) 334.5 (4.81), 446.0 (4.57).

Electronic spectrum (thin film) λ<sub>max</sub> nm 278.5, 348.0, 499.5.

<sup>1</sup>H NMR (400.1 MHz, CD<sub>2</sub>Cl<sub>2</sub>) δ 3.30 (s, 6H, 2''''''OCH<sub>3</sub>); 3.46-3.49 (m, 4H, OCH<sub>2</sub>2'''''''); 3.56-3.58 (m, 4H, OCH<sub>2</sub>1'''''''); 3.58-3.61 (m, 4H, OCH<sub>2</sub>2'''''''); 3.65-3.67 (m, 4H, OCH<sub>2</sub>1'''''''); 3.82-3.85 (m, 4H, OCH<sub>2</sub>2'''''''); 3.87 (s, 6H, ArOCH<sub>3</sub>); 4.17-4.19 (m, 4H, OCH<sub>2</sub>1'''''''); 6.90 (d, 2H, <sup>3</sup>J = 8.3 Hz, ArH5'''''); 7.04 (d, 2H, <sup>3</sup>J = 16.1 Hz, H<sub>vinyl</sub>2'''''); 7.08 (dd, 2H, <sup>3</sup>J = 5.1 Hz, <sup>4</sup>J = 3.6 Hz, ThH4, 4'''''); 7.09 (d, 2H, <sup>4</sup>J = 2.0 Hz, ArH2'''''); 7.12 (dd, 2H, <sup>3</sup>J = 8.3 Hz, <sup>4</sup>J = 2.0 Hz, ArH6'''''); 7.17 (d, 2H, <sup>3</sup>J = 3.8 Hz, ThH3'', 4'''); 7.26 (d, 2H, <sup>3</sup>J = 3.8 Hz, ThH4'', 3'''); 7.27 (dd, 2H, <sup>3</sup>J = 3.6 Hz, <sup>4</sup>J = 1.2 Hz, ThH3, 3'''); 7.28 (d, 2H, <sup>3</sup>J = 16.2 Hz, H<sub>vinyl</sub>1'''''); 7.31 (dd, 2H, <sup>3</sup>J = 5.2 Hz, <sup>4</sup>J = 1.1 Hz, ThH5, 5'''''); 7.46 (s, 2H, ThH3', 4''').

<sup>13</sup>C NMR (100.6 MHz, CD<sub>2</sub>Cl<sub>2</sub>) δ 55.5 ArOCH<sub>3</sub>; 58.3 2''''''OCH<sub>3</sub>; 68.1 OCH<sub>2</sub>1'''''''; 69.3 OCH<sub>2</sub>2'''''''; 70.1 OCH<sub>2</sub>1'''''''; 70.2 OCH<sub>2</sub>2'''''''; 70.4 OCH<sub>2</sub>1'''''''; 71.6 OCH<sub>2</sub>2'''''''; 111.1 ArC2'''''; 111.6 ArC5'''''; 119.2 C<sub>vinyl</sub>1'''''; 119.8 ArC6'''''; 122.2 ThC3', 4'''; 124.0 ThC3, 3''''; 124.3 ThC4'', 3''; 124.8 ThC5, 5''''; 127.3 Th3'',

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$^4\text{C}$ : 127.7 ThC4,  $^4\text{C}$ ''''; 129.9 ArC1''''''; 129.9 ThC5', 2''''; 130.5 C<sub>vinyl</sub>2''''''; 134.3 ThC2'', 5''''; 135.7 ThC2', 5''''; 136.3 ThC2, 2''''; 136.7 ThC4', 3''''; 137.1 ThC5'', 2''''; 148.2 ArC3''''''; 149.5 ArC4''''''.

HRMS (FAB) M<sup>+</sup> calc 1082.2354, found 1082.2381.

### *4',3''''-Bis-[2''''''-[4''''''-methoxy-3''''''-(2''''''-[2''''''''-[2''''''''-(2''''''''-methoxy-ethoxy)-ethoxy]-ethoxy]-ethoxy)-phenyl]-vinyl]-[2,2';5',2'';5'',2'''';5''',2'''';5'''';2'''''';5''''',2'''''']sexithiophene (5)<sub>2</sub>*

Treatment of **5** with FeCl<sub>3</sub> yielded the title compound as a red solid, melting point = 160-163°C (59%).

Electronic spectrum (CH<sub>2</sub>Cl<sub>2</sub>) λ<sub>max</sub> nm/(log ε) 335.5 (4.80), 450.5 (4.61).

Electronic spectrum (thin film) λ<sub>max</sub> nm 281.5, 342.5, 485.0.

$^1\text{H}$  NMR (400.1 MHz, CD<sub>2</sub>Cl<sub>2</sub>) δ 3.30 (s, 6H, 2''''''''OCH<sub>3</sub>); 3.46-3.48 (m, 4H, OCH<sub>2</sub>2'''''''''); 3.53-3.55 (m, 4H, OCH<sub>2</sub>1'''''''''); 3.56-3.57 (m, 8H, OCH<sub>2</sub>1''''''''', 2'''''''''); 3.60-3.62 (m, 4H, OCH<sub>2</sub>2'''''''''); 3.66-3.68 (m, 4H, OCH<sub>2</sub>1'''''''''); 3.83-3.85 (m, 4H, OCH<sub>2</sub>2'''''''''); 3.87 (s, 6H, ArOCH<sub>3</sub>); 4.17-4.20 (m, 4H, OCH<sub>2</sub>1'''''''''); 6.90 (d, 2H,  $^3J$  = 8.4 Hz, ArH5'''''''); 7.04 (d, 2H,  $^3J$  = 16.2 Hz, H<sub>vinyl</sub>2'''''''''); 7.08 (dd, 2H,  $^3J$  = 5.1 Hz,  $^4J$  = 3.6 Hz, ThH4, 4'''''''); 7.09 (d, 2H,  $^4J$  = 2.5 Hz, ArH2'''''''''); 7.13 (dd, 2H,  $^3J$  = 8.6 Hz,  $^4J$  = 2.0 Hz, ArH6'''''''''); 7.17 (d, 2H,  $^3J$  = 3.8 Hz, ThH3'', 4'''''); 7.26 (d, 2H,  $^3J$  = 3.8 Hz, ThH4'', 3'''''); 7.27 (dd, 2H,  $^3J$  = 3.6 Hz,  $^4J$  = 1.3 Hz, ThH3, 3'''''); 7.28 (d, 2H,  $^3J$  = 16.1 Hz, H<sub>vinyl</sub>1'''''''''); 7.31 (dd, 2H,  $^3J$  = 5.1 Hz,  $^4J$  = 1.1 Hz, ThH5, 5'''''''); 7.46 (s, 2H, ThH3', 4''''''').

$^{13}\text{C}$  NMR (100.6 MHz, CD<sub>2</sub>Cl<sub>2</sub>) δ 55.5 ArOCH<sub>3</sub>; 58.3 2''''''''OCH<sub>3</sub>; 68.1 OCH<sub>2</sub>1'''''''''; 69.3 OCH<sub>2</sub>2'''''''''; 70.0 OCH<sub>2</sub>1'''''''''; 70.1 OCH<sub>2</sub>1'''''''''; 70.2 OCH<sub>2</sub>2'''''''''; 70.2 OCH<sub>2</sub>2'''''''''; 70.4 OCH<sub>2</sub>1'''''''''; 71.5 OCH<sub>2</sub>2'''''''''; 111.2 ArC2'''''''''; 111.6 ArC5'''''''''; 119.2 C<sub>vinyl</sub>1'''''''''; 119.8 ArC6'''''''''; 122.2 ThC3', 4''''''; 124.0 ThC3, 3''''''; 124.3 ThC4'', 3''''; 124.8 ThC5, 5''''''; 127.2 ThC3'', 4''''; 127.7 ThC4, 4''''''; 129.8 ArC1''''''''; 129.9 ThC5', 2''''; 130.5 C<sub>vinyl</sub>2''''''''; 134.3 ThC2'', 5''''; 135.7 ThC2', 5''''; 136.3 ThC2, 2''''; 136.7 ThC4', 3''''; 137.1 ThC5'', 2''''; 148.2 ArC3''''''''; 149.5 ArC4''''''''.

HRMS (FAB) M<sup>+</sup> calc 1170.2879, found 1170.2919.

### *4',3''''-Bis-[2''''''-(3''''''-methoxy-4''''''-[2''''''''-[2''''''''-(2''''''''-methoxy-ethoxy)-ethoxy]-ethoxy)-phenyl]-vinyl]-[2,2';5',2'';5'',2'''';5''',2'''';5'''';2'''''';5''''',2'''''']sexithiophene (7)<sub>2</sub>*

Treatment of **7** with FeCl<sub>3</sub> yielded the title compound as a red solid, melting point = 124-126°C (63%).

Electronic spectrum (CH<sub>2</sub>Cl<sub>2</sub>) λ<sub>max</sub> nm/(log ε) 335.5 (4.82), 448.0 (4.60).

Electronic spectrum (thin film) λ<sub>max</sub> nm 279.5, 348.5, 489.0.

$^1\text{H}$  NMR (400.1 MHz, CD<sub>2</sub>Cl<sub>2</sub>) δ 3.33 (s, 6H, 2''''''''OCH<sub>3</sub>); 3.49-3.52 (m, 4H, OCH<sub>2</sub>2'''''''''); 3.58-3.61 (m, 4H, OCH<sub>2</sub>1'''''''''); 3.62-3.64 (m, 4H, OCH<sub>2</sub>2'''''''''); 3.67-3.69 (m, 4H, OCH<sub>2</sub>1'''''''''); 3.82-3.85 (m, 4H, OCH<sub>2</sub>2'''''''''); 3.90 (s, 6H, ArOCH<sub>3</sub>); 4.14-4.16 (m, 4H, OCH<sub>2</sub>1'''''''''); 6.90 (d, 2H,  $^3J$  = 8.8 Hz, ArH5'''''''); 7.05 (d, 2H,  $^3J$  = 15.6 Hz, H<sub>vinyl</sub>2'''''''''); 7.08 (dd, 2H,  $^3J$  = 5.1 Hz,  $^4J$  = 3.6 Hz, ThH4, 4'''''''); 7.07-7.09 (m, 4H, ArH2''''''''', 6'''''''''); 7.17 (d, 2H,  $^3J$  = 3.8 Hz, ThH3'', 4'''''); 7.25 (d, 2H,  $^3J$  = 3.8 Hz, ThH4'', 3'''''); 7.27 (dd, 2H,  $^3J$  = 3.6 Hz,  $^4J$  = 1.2 Hz, ThH3, 3'''''); 7.30 (d, 2H,  $^3J$  = 15.4 Hz, H<sub>vinyl</sub>1'''''''''); 7.31 (dd, 2H,  $^3J$  = 5.1 Hz,  $^4J$  = 1.1 Hz, ThH5, 5'''''''); 7.46 (s, 2H, ThH3', 4''''''').

$^{13}\text{C}$  NMR (100.6 MHz, CD<sub>2</sub>Cl<sub>2</sub>) δ 55.5 ArOCH<sub>3</sub>; 58.3 2''''''''OCH<sub>3</sub>; 68.0 OCH<sub>2</sub>1'''''''''; 69.2 OCH<sub>2</sub>2'''''''''; 70.1 OCH<sub>2</sub>1'''''''''; 70.2 OCH<sub>2</sub>2'''''''''; 70.4 OCH<sub>2</sub>1'''''''''; 71.5 OCH<sub>2</sub>2'''''''''; 109.3 ArC2'''''''''; 112.9 ArC5'''''''''; 119.2 C<sub>vinyl</sub>1'''''''''; 119.3 ArC6'''''''''; 122.1 ThC3', 4''''''; 123.9 ThC3, 3''''''; 124.2 ThC4'', 3''''; 124.7 ThC5, 5''''''; 127.2 ThC3'', 4''''; 127.7 ThC4, 4''''''; 129.9 ThC5', 2''''; 130.2 ArC1''''''''; 130.5 C<sub>vinyl</sub>2''''''''; 134.2 ThC2'', 5''''; 135.7 ThC2', 5''''; 136.3 ThC2, 2''''; 136.6 ThC4', 3''''; 137.1 ThC5'', 2''''; 148.2 ArC4''''''''; 149.3 ArC3''''''''.

HRMS (FAB) M<sup>+</sup> calc 1082.2354, found 1082.2351.

### *4',3''''-Bis-[2''''''-[3''''''-methoxy-4''''''-(2''''''-[2''''''''-[2''''''''-(2''''''''-methoxy-ethoxy)-ethoxy]-ethoxy)-ethoxy]-ethoxy)-phenyl]-vinyl]-[2,2';5',2'';5'',2'''';5''',2'''';5'''';2'''''';5''''',2'''''']sexithiophene (8)<sub>2</sub>*

Treatment of **8** with FeCl<sub>3</sub> yielded the title compound as a red solid, melting point = 99-101°C (84%).

Electronic spectrum (CH<sub>2</sub>Cl<sub>2</sub>) λ<sub>max</sub> nm/(log ε) 336.5 (4.81), 454.0 (4.63).

Electronic spectrum (thin film) λ<sub>max</sub> nm 285.0, 344.5, 478.0.

$^1\text{H}$  NMR (400.1 MHz, CD<sub>2</sub>Cl<sub>2</sub>) δ 3.32 (s, 6H, 2''''''''OCH<sub>3</sub>); 3.48-3.50 (m, 4H, OCH<sub>2</sub>2'''''''''); 3.56-3.58 (m, 4H, OCH<sub>2</sub>1'''''''''); 3.59-3.60 (m, 8H, OCH<sub>2</sub>1''''''''', 2'''''''''); 3.63-3.65 (m, 4H, OCH<sub>2</sub>2'''''''''); 3.68-3.69 (m, 4H, OCH<sub>2</sub>1'''''''''); 3.83-3.85 (m, 4H, OCH<sub>2</sub>2'''''''''); 3.90 (s, 6H, ArOCH<sub>3</sub>); 4.14-4.16 (m, 4H, OCH<sub>2</sub>1'''''''''); 6.90 (d, 2H,  $^3J$  = 8.9 Hz, ArH5'''''''); 7.06 (d, 2H,  $^3J$  = 16.4 Hz, H<sub>vinyl</sub>2'''''''''); 7.07-7.09 (m, 4H, ArH2''''''''', 6'''''''''); 7.08 (dd, 2H,  $^3J$  = 5.1 Hz,  $^4J$  = 3.6 Hz, H4, 4'''''''); 7.17 (d, 2H,  $^3J$  = 3.8 Hz, H3'', 4'''''); 7.25 (d, 2H,  $^3J$  = 3.8 Hz, H4'', 3'''''); 7.27 (dd, 2H,  $^3J$  = 3.6 Hz,  $^4J$  = 1.2 Hz, H3, 3'''''); 7.30 (d, 2H,  $^3J$  = 16.7 Hz, H<sub>vinyl</sub>1'''''''''); 7.31 (dd, 2H,  $^3J$  = 5.1 Hz,  $^4J$  = 1.1 Hz, H5, 5'''''''); 7.46 (s, 2H, H3', 4''''''').

$^{13}\text{C}$  NMR (100.6 MHz, CD<sub>2</sub>Cl<sub>2</sub>) δ 55.4 ArOCH<sub>3</sub>; 58.2 2''''''''OCH<sub>3</sub>; 67.9 OCH<sub>2</sub>1'''''''''; 69.2 OCH<sub>2</sub>2'''''''''; 70.0 OCH<sub>2</sub>1'''''''''; 70.1 OCH<sub>2</sub>1'''''''''; 70.2 OCH<sub>2</sub>2'''''''''; 70.3 OCH<sub>2</sub>1'''''''''; 71.5 OCH<sub>2</sub>2'''''''''; 109.2 ArC2'''''''''; 112.8 ArC5'''''''''; 119.2 C<sub>vinyl</sub>1'''''''''; 119.3 ArC6'''''''''; 122.1 C3', 4''''; 123.9 C3, 3''''''; 124.1 C4'', 3''''; 124.7 C5, 5''''''; 127.1 C3'', 4''''; 127.7 C4, 4''''''; 129.9 C5', 2''''; 130.2 ArC1''''''''; 130.5 C<sub>vinyl</sub>2''''''''; 134.2 C2'', 5''''; 135.6 C2', 5''''; 136.2 C2, 2''''; 136.5 C4', 3''''; 137.0 C5'', 2''''; 148.1 ArC4''''''''; 149.2 ArC3''''''''.

HRMS (FAB) M<sup>+</sup> calc 1170.2879, found 1170.2900.