# SUPPORTING INFORMATION

# Synthesis of Crescent Aromatic Oligoamides

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**General Methods.** Chemicals were purchased from commercial sources and used as received unless otherwise noted. Unless otherwise specified, all solvents were removed with a rotary evaporator. Analytical thin layer chromatography (TLC) was conducted on Analtech Uniplate silica gel plates with detection by UV light.

$^{1}H$ and $^{13}C$ NMR analyses were carried out using Tetramethylsilane (TMS) as the internal standard. Chemical shifts are reported in ppm values downfield from tetramethylsilane and *J* values are reported in Hz. For electrospray mass spectrum (ES-MS), the concentration of the samples was about 1.0 mmol/mL. The diluted solution was electrosprayed at a flow rate of 5_10$^{-6}$ L/min with a needle voltage of 4.5 kV. The mobile phase was an aqueous solution of methanol (*V/V*, 1:1). MALDI experiments were performed using a matrix of 9-nitroanthracene or dithranol. Mass spectra were acquired in positive reflector mode and using an acceleration voltage of 19 kV. External mass calibration was performed using a standard PEG-2000 mixture. Spectra were obtained by setting the laser power close to the threshold of ionization and generally 300 pulses were acquired and averaged.

**2,4-dihydroxy-5-nitrobenzoic acid (5).**[1] Acetic acid (300 mL) and nitric acid (280 mL) were mixed and cooled to 0ºC in an ice bath, to which 2,4-dihydroxybenzoic acid (77.0 g, 50.0 mmol) was added portionwise. The reaction was warmed to room temperature and stirred for 12 h. The precipitate was collected by filtration and washed with a minimum amount of water to afford a pink solid. (73.6 g, yield 74.0%); m.p. 213.8 $^{0}$C. $^{1}H$ NMR (500 MHz, DMSO-$d_6$) δ 8.43 (s, 1H), 6.57 (s, 1H); $^{13}C$ NMR (127.5 MHz, $CDCl_3$) δ 170.1, 165.7, 158.4, 129.4, 129.3, 105.6, 104.5. Anal. Calcd. for $C_7H_5NO_6$: C, 42.22; H, 2.53; N, 7.03. Found: C, 42.03; H 2.46; N, 6.98.

**Purification of 2,4-dihydroxy-5-nitro-benzoic acid (5).** The crude compound **1-I** (15.0 g, 75.3 mmol) in pink, prepared from nitration with nitric acid (69.4%) and 2,4-dihydroxy-benzoic acid in acetic acid, was mixed with concentrated sulfuric acid (6 mL) in methanol (80mL) and the mixture was refluxed 36 h. After cooling to room temperature, the white precipitate (10.8g) (**6**) was collected and washed with methanol. The mother solution was concentrated and allowed to stand overnight. The precipitate coming out (3.1 g) and the above white solid (10.8 g) were combined and dissolved in THF and refluxed overnight in the presence of KOH (6.3 g, 113.0 mmol) in water (4 mL). Water (100 mL) was added and the mixture was acidified with conc.HCl followed by evaporating most of the THF. Filtration and washing with water afforded a faint yellow solid (12.6 g, 84.0 %).

**2,4-Dihydroxy-5-nitro-benzoic acid methyl ester (6)**. Following the above procedure refluxing of the mixture of compound **5** (50.0 g, 0.25 mol), concentrated sulfuric acid (36 mL) and methanol (220mL) for 2 days provided a white solid (43.4 g, yield 81.1%); m.p. 168.5$^{0}$C. $^{1}H$ NMR (400MHz, DMSO-$d_6$) δ11.74 (s, 1H), 11.20 (s, 1H), 8.39 (s, 1H), 6.58 (s, 1H), 3.89 (s, 1H). $^{13}C$ NMR (125.7 MHz, DMSO-$d_6$) δ53.1, 105.9, 107.0, 127.6, 129.9, 160.6, 168.1, 169.2. Anal. Calcd. For $C_8H_7NO_6$: C, 45.08; 3.31; 6.57. Found C, 44.51; H 3.33; N, 6.53.

**2,4-Dimethoxy-5-nitro-benzoic acid methyl ester (7a)**. Following the general procedure **(1)**, reaction of compound **6** (20.0 g, 93.8 mmol) with $CH_3I$ (40.0 g, 0.28 mmol) in the presence of $K_2CO_3$ (38.9 g, 0.28 mol) in DMF (200 mL) for 28 h followed by adding water (2 L), filtering and washing with water, provided the product as an off-white solid (21.2 g, 93.8%). m.p.146.5$^{0}$C. $^{1}H$ NMR (400 MHz, $CDCl_3$) δ8.64 (s, 1H), 6.53 (s, 1H), 4.05 (s, 3H), 4.02 (s, 3H),

3.89 (s, 3H). $^{13}$C NMR (100.6 MHz, DMSO-$d_6$) δ164.6, 164.4, 158.4, 131.8, 130.5, 111.9, 99.20, 58.0, 57.8, 52.7; MS (ESI) m/z, Calcd for $C_{10}H_{11}NO_6$ 241.06 ($M^+$), found 242.0 ($M+H^+$). Anal. Calcd. for $C_{10}H_{11}NO_6$: C, 49.80; H, 4.60; N, 5.81. Found: C, 49.61; H 4.40; N, 5.33.

**5-Nitro-2, 4-bis-octyloxy-benzoic acid methyl ester (7b).** Following the general procedure **(1)**, reaction of compound **6** (21.0 g, 98.5 mmol) with 1-bromooctane (41.9 g, 217 mmol) in the presence of $K_2CO_3$ (40.8 g, 296 mmol) and KI (0.42g, 2.52 mmol) in DMF (250 mL) provided the product as a faint-yellow solid (44.6 g, 85%); m. p. 66.8$^0$C. $^1$H NMR (400 MHz, DMSO-$d_6$) δ8.34 (s, 1H), 6.83 (s, 1H), 4.24-4.18 (m, 4H), 3.76 (s, 3H), 1.73 (m, 4H), 1.42 (m, 4H), 1.24 (m, 16H), 0.84 (m, 6H). $^{13}$C NMR (100.6 MHz, DMSO-$d_6$) δ164.5, 164.0, 157.8, 131.8, 130.5, 111.8, 100.2, 70.5, 70.1, 52.6, 31.9, 31.8, 29.3, 29.3, 29.2, 29.2, 28.9, 28.9, 26.0, 25.9, 22.7, 14.6; MS (ESI) m/z, Calcd for $C_{24}H_{39}NO_6$ 437.28 ($M^+$), found 438.3 ($M+H^+$). Anal. Calcd. for $C_{24}H_{39}NO_6$: C, 65.88; H, 8.98; N, 3.20. Found: C, 66.10; H 9.01; N, 3.20.

**2,4-Bis-dodecyloxy-5-nitro-benzoic acid methyl ester (7c).** Following the general procedure **(1)**, reaction of compound **6** (10.0 g, 46.9 mmol) with 1-bromo-dodecane (25.7 g, 103.1 mmol) in the presence of $K_2CO_3$ (16.2 g, 117.4 mmol) and KI (0.26 g, 1.57 mmol) in DMF (150 mL) provided the product as a yellow solid (24.3g, 94.2%); m.p. 58.5$^0$C. $^1$H NMR (500 MHz, $CDC1_3$) δ8.60 (s, 1H**),** 6.47 (s, 1H), 4.13, 4.09(t, t, 4H), 3.87 (s, 3H), 1.88 (m, 4H), 1.51 (m, 4H), 1.26 (m, 32H), 0.88 (t, 6H); $^{13}$C NMR (125.7 MHz, $CDCl_3$) δ164.4, 164.1, 157.9, 131.5, 111.6, 97.9, 70.1, 69.8, 52.2, 32.1, 29.8, 29.8, 29.8, 29.7, 29.7, 29.7, 29.6, 29.5, 29.4, 29.4, 29.0, 29.0, 26.0, 22.8, 14.3; MS (ESI) m/z, ($M^+$) Calcd for $C_{32}H_{55}O_6$ 549.40 ($M^+$), found 550.3 ($M+H^+$). Anal. Calcd. for $C_{32}H_{55}NO_6$: C, 69.91; H, 10.08; N, 2.55. Found: C, 70.13; H 10.11; N, 2.64.

**2,4-Diisobutoxy-5-nitro-benzoic acid methyl ester (7d).** Following the general procedure **(1)**, reaction of compound **6** (21.3 g, 100 mmol) with 2-bromobutane (48.0 g, 350 mmol) in DMF (300 mL) in the presence of $K_2CO_3$ (82.9 g, 600 mmol) and KI (0.48 g, 2.89 mmol) provided the product as a white solid (28.7 g, 88.0%); m.p. 106.2$^0$C. $^1$H NMR (500 MHz, DMSO-$d_6$) δ8.61 (s, 1H), 6.45 (s, 1H), 3.89 (t, 2H, J = 6.0), 3.88 (s, 3H), 3.86 (t, 2H, J = 7.0), 2.21 (m, 4H), 1.10 (t, 12H, J = 6.5). $^{13}$C NMR (125.7 MHz, DMSO-$d_6$) δ164.3, 164.0, 157.8, 131.4, 111.3, 97.5, 97.5, 75.9, 75.7, 52.0, 28.3, 28.2, 19.1, 19.0; MS (ESI) m/z, Calcd for $C_{16}H_{23}NO_6$ 325.15 ($M^+$), found 326.1 ($M+H^+$). Anal. Calcd. for $C_{16}H_{23}NO_6$, C, 59.06; H, 7.13; N, 4.31; Found: C, 58.88; H 7.13; N, 4.51.

**2,4-Bis-{2-[2-(2-methoxy-ethoxy)-ethoxy]-ethoxy}-5-nitro-benzoic acid methyl ester (7e).** Toluene-4-sulfonic acid 2-[2-(2-methoxy-ethoxy)-ethoxy]-ethyl ester (44.8 g, 140.7 mmol) was added in two batches at 100$^0$C to a mixture of compound **6** (10.0 g, 46.9 mmol) and potassium carbonate (20.0 g, 144.7 mmol) in DMF (200 mL), which was preheated at 60 $^0$C under stirring for 1 h. The reaction was allowed to proceed at 100$^0$C for 24 h upon addition of the first batch (35.0 g) and then the 2$^{nd}$ batch (9.8 g) was added followed by continuous heating for another 24 h. After filtration the brown solution was evaporated in vacuo to afford a red oil, which was absorbed in ethyl acetate (100 mL) and the solid left from filtration was mixed with water (150 mL) and then extracted with ethyl acetate (2 × 100 mL). The organic layer was pooled, washed once with water, dried over anhydrous sodium sulfate and evaporated to provide the product as

yellow oil (21.9 g, 92.4%): $^1$H NMR (500 MHz, $CDC1_3$) δ8.58 (s, 1H), 6.70 (s, 1H), 4.31 (t, J = 4.5 Hz, 2H), 4.28 (t, J = 4.5 Hz, 2), 3.95 (t, J=4.5 Hz, 4H), 3.87 (s, 3H), 3.77 (t, J = 5.0 Hz, 4H), 3.68~3.63 (m, 8H), 3.54 (t, J= 4.5 Hz, 4H), 3.37 (s, 6H); $^{13}$C NMR (125.7 MHz, $CDCl_3$) δ163.5, 163.2, 157.0, 131.5, 130.5, 111.5, 99.0, 71.4, 70.6, 70.6, 70.1, 70.1, 70.1, 70.0, 69.98, 69.96, 69.6, 69.3, 68.9, 68.8, 58.4, 51.6; MS (ESI) m/z, Calcd for $C_{22}H_{35}NO_{12}$ 505.22 ($M^+$), found 528.3 ($M+Na^+$). Anal. Calcd. for $C_{22}H_{35}NO_{12}$, C, 52.27; H, 6.98; N, 2.77; Found: C, 52.10; H 6.53; N, 2.52.

**2,4-Bis-(3-tert-butoxycarbonyl-propoxy)-5-nitro-benzoic acid methyl ester (7f).** Following the general procedure **(1)**, reaction of compound **6** (9.1 g, 42.7 mmol) with 4-bromo-butyric acid tert-butyl ester (20.0g, 89.6 mmol) in the presence of potassium carbonate (17.7 g, 128.3 mmol) provided the crude product in brown oil (21.0g). Purification by dissolving the oil in chloroform-n-hexane (20:1, v/v) and filtering through a pad of silica gel gave a faint yellow oil which solidified upon standing (19.6g, 92.3%); m.p. 64.5$^0$C. $^1$H NMR (500 MHz, $CDC1_3$) δ8.61 (s, 1)**,** 6.65 (s, 1), 4.23 (t, 2), 4.19 (t, 2), 3.88 (s, 3), 2.52, 2.50 (t, t, 4), 2.14 (m, 4), 1.57 (s, 9), 1.45 (s, 9); $^{13}$C NMR (125.7 MHz, $CDCl_3$) δ172.5, 172.4, 164.2, 163.8, 157.6, 131.8, 131.4, 111.6, 98.2, 80.7, 80.6, 68.8, 68.5, 52.1, 31.2, 31.2, 28.1, 24.2, 24.1; MS (ESI) m/z, Calcd for $C_{24}H_{35}NO_{10}$ ($M^+$) 497.23, Found 520.1 ($M+Na^+$). $C_{24}H_{35}NO_{10}$: C, 57.94; H, 7.09; N, 2.82. Found: C, 57.98; H 7.09; N, 2.95.

**2,4-Dimethoxy-5-nitro-benzoic acid (1a).**[1-3] Following the general procedure (**3A**), hydrolysis of the ester **7a** (3.62 g, 15.0 mmol) in MeOH (40 mL) with 1N NaOH (30 mL, 30 mmol) for 30-40 minutes provided the product as a white solid (3.23 g, 95%); m.p. 215.2$^0$C. $^1$H NMR (400 MHz, DMSO-$d_6$) δ12.85 (s, 1H), 8.35 (s, 1H), 6.85 (s, 1H), 4.03 (s, 3H), 3.97 (s, 3H). $^{13}$C NMR (100.6 MHz, DMSO-$d_6$) δ165.5, 164.7, 158.3, 131.5, 130.8, 112.8, 99.0, 57.9, 57.6. Anal. Calcd. for $C_9H_9NO_6$: C, 47.58; H, 3.99; N, 6.17. Found C, 47.41; H, 4.02; N, 6.09.

**5-Nitro-2,4-bis-octyloxy-benzoic acid (1b).** Following the general procedure (**3A**), hydrolysis of the ester **7b** (20.0 g, 45.7 mmol) in MeOH (200 mL) with NaOH (3.66 g, 91.4 mmol) in water (10 mL) for 2 h provided the product as a white solid (17.7 g, 91.4%). m.p. 70.8$^0$C. $^1$H NMR (400 MHz, DMSO-$d_6$) δ12.72 (s, 1H), 8.32 (s, 1H), 6.81 (s, 1H), 4.23 (t, 2H, J = 6.0), 4.16 (t, 2H, J = 6.0), 1.74-1.70 (m, 4H), 1.42 (m, 16H), 1.24 (m, 16H), 0.84 (m, 6H). $^{13}$C NMR (100.6 MHz, DMSO-$d_6$) δ165.6, 164.1, 157.6, 131.5, 130.7, 112.9, 99.9, 70.4, 69.9, 31.9, 29.4, 29.3, 29.3, 29.2, 29.0, 28.9, 26.0, 22.8, 14.6; Anal. Calcd. for $C_{23}H_{37}NO_6$: C, 65.22; H, 8.81; N, 3.31. Found C, 64.95; H, 8.63; N, 3.27.

**2,4-Bis-dodecyloxy-5-nitro-benzoic acid (1c).** Following the general procedure (**3B**), hydrolysis of the ester **7c** (23.1 g, 42.0 mmol) in THF (150 mL) with potassium hydroxide (5.9 g, 105.0 mmol) dissolved in water (10 mL) overnight provided the product as yellow solid in quantitative yield; m.p. 56.8$^0$C. $^1$H NMR (500 MHz, $CDCl_3$) δ 8.83 (s, 1H), 6.62 (s, 1H), 4.34 (t, 2H), 4.22 (t, 2H), 2.02 (m, 2H), 1.96 (m, 2H), 1.58 (m, 4H), 1.34 (m, 32H), 0.95 (t, 6H); $^{13}$C NMR (125.7 MHz, $CDCl_3$) δ165.3, 162.7, 158.2, 133.1, 132.2, 110.0, 97.9, 70.9, 70.4, 63.1, 32.8, 32.99, 31.98, 29.8, 29.7, 29.7, 29.70, 29.69, 29.66, 29.62, 29.57, 29.52, 29.4, 29.31, 29.27, 28.9, 25.81, 25.82, 22.76, 14.1; MS (ESI) m/z, Calcd for $C_{31}H_{53}NO_6$ ($M^+$) 535.39, found 558.3

($M+Na^+$). Anal. Calcd. for $C_{31}H_{53}NO_6$: C, 69.50; H, 9.97; N, 2.61. Found C, 70.09; H, 10.36; N, 2.54.

**2,4-Diisobutoxy-5-nitro-benzoic acid (1d).** Following the general procedure (**3A**), hydrolysis of the ester **7d** (16.3 g, 50.1 mmol) in MeOH (80 mL) with 2N NaOH (50 mL, 50 mmol) under reflux for 2h provided the product as a white solid (15.0 g, 96%); m.p. 178.8$^0$C. $^1$H NMR (500 MHz, $CDCl_3$) δ8.77 (s, 1H), 6.53 (s, 1H), 4.02 (d, 2H, J = 6.5 Hz ), 3.92 (t, 2H, J = 6.5 Hz), 2.27 (m, 1H), 2.21 (m, 1H), 1.12 (d, 6H, J = 7.0 Hz), 1.09 (d, 6H, J = 6.5 Hz). $^{13}$C NMR (125.7 MHz, $CDCl_3$) δ 65.0, 162.5, 158.2, 133.2, 132.3, 109.7, 97.6, 76.8, 76.3, 28.2, 28.2, 19.1, 19.0. Anal. Calcd. for $C_{15}H_{21}NO_6$: C, 57.87; H, 6.80; N, 4.50. Found C, 57.62; H, 6.67; N, 4.42.

**2,4-Bis-{2-[2-(2-methoxy-ethoxy)-ethoxy]-ethoxy}-5-nitro-benzoic acid (1e).** A solution of compound **7e** (10.1g, 20.0mmol) and potassium hydroxide (2.0g, 35.7 mmol) in water (50mL) was heated at 70$^0$C for 4h. After cooling down to room temperature, the mixture was extracted once with diethyl ether (20mL) and the aqueous solution was acidified with 10% HCl and then extracted with ethyl acetate (3×50 mL). The extract was dried over anhydrous sodium sulfate and evaporated to give a yellow oil (9.5g, 96.6%): $^1$H NMR (500 MHz, $CDC1_3$) δ 8.72 (s, 1), 6.75 (s, 1), 4.40 (t, 2), 4.34 (t, 2), 3.94 (q, 4), 3.76 (q, 4), 3.69~3.63 (m, 8), 3.57~3.53 (m, 4), 3.39(s, 3), 3.37 (s, 3); $^{13}$C NMR (125.7 MHz, $CDCl_3$) δ 164.5, 162.2, 157.7, 133.6, 132.0, 111.6, 99.6, 71.9, 71.9, 71.1, 70.8, 70.6, 70.44, 70.41, 70.3, 69.8, 69.3, 68.6, 59.0, 59.0; MS (ESI) m/z, Calcd for $C_{21}H_{33}NO_{12}$ ($M^+$) 491.20, found 514.3 ($M+Na^+$). Anal. Calcd. for $C_{21}H_{33}NO_{12}$: C, 51.32; H, 6.77; N, 2.85. Found C, 50.91; H, 6.89; N, 3.22.

**2,4-Bis-(3-tert-butoxycarbonyl-propoxy)-5-nitro-benzoic acid (1f).** A solution of compound **7g** (3.0g, 6.0 mmol) and lithidium hydroxide monohydrate (0.89g, 21.2 mmol) in methanol (80mL) was stirred at room temperature for ca.16 h. The progress of the reaction was monitored by TLC plate (EtAc/n-hexane, 3:1, v/v). The mixture was acidified with acetic acid (ca.1eq. based on LiOH) at 0$^0$C till pH reached ca.4 and at this moment the solution turned from yellow to clear. The residue after removal of most of the solvent was diluted with water and extracted with ethyl acetate (2 × 50 mL). The extract was dried over anhydrous sodium sulfate and evaporated to afford the product as a yellow oil which solidified upon standing (2.31g, 79.0%). $^1$H NMR (500 MHz, $CDC1_3$) δ 8.72 (s, 1), 6.81 (s, 1), 4.34 (t, 2), 4.28 (t, 2), 2.52, 2.50 (t, t, 4), 2.20~2.12 (m, 4), 1.46 (d, 18); $^{13}$C NMR (125.7 MHz, $CDCl_3$) δ 172.5, 172.3, 166.3, 163.0, 158.0, 132.8, 132.3, 110.2, 98.4, 98.4, 81.1, 80.8, 69.4, 69.1, 31.1, 31.0, 28.2, 28.1, 24.0, 23.9; MS (ESI) m/z, ($M^+$) Calcd for $C_{23}H_{33}NO_{10}$ 483.21 ($M^+$), found 506.2 ($M+Na^+$). Anal. Calcd. for $C_{23}H_{33}NO_{10}$: C, 57.13; H, 6.88; N, 2.90. Found: C, 57.08; H 6.79; N, 2.81.

**2,4-Dihydroxy-5-nitro-benzoic acid tert-butyl ester ( 8 ).** DCC (5.18 g, 25.0 mmol) and DMAP (92 mg, 0.75 mmol) in THF (20 mL) were added to a mixture of 2,4-dihydroxy-5-nitro-benzoic acid **5** (2.00 g, 10.0 mmol) and tert-butanol (18.8 g, 0.20 mol). The mixture was stirred at room temperature for ca.15 h and then heated at 55$^0$C for another 12h. After cooling down to room temperature, the precipitate was removed by filtration and the yellow solution was brought to dryness. The residue was extracted with EtAc (3 × 40 mL) under stirring and the solvent of the organic layer was evaporated. Repeated recrystallizations from EtAc/Acetone (2:1) provided the

product as a yellow solid (1.02 g, 40.0%); m.p. 209.8$^0$C. $^1$H NMR (500 MHz, $CDCl_3$) δ 11.83 (s, 1H), 11.00 (s, 1H), 8.64 (s, 1H), 6.59 (s, 1H), 1.64 (s, 9H); $^{13}$C NMR (75.5 MHz, $CDCl_3$) 168.5, 168.4, 160.2, 129.8, 105.7, 84.9, 28.3; MS (ESI) m/z, Calcd for $C_{11}H_{13}NO_6$ 255.07 ($M^+$), Found 256.1 ($M+H^+$). Anal. Calcd. for $C_{11}H_{13}NO_6$: C, 51.77; H, 5.13; N, 5.49. Found: C, 51.95; H 5.10; N, 5.41.

**2,4-Bis-(3-ethoxycarbonyl-propoxy)-5-nitro-benzoic acid tert-butyl ester ( 9 ).** Following the general procedure **(1)**, reaction of compound **8** (2.34 g, 9.17 mmol) with ethyl 4-bromobutylate (5.95 g, 30.5 mmol) in the presence of anhydrous $K_2CO_3$ (4.22 g, 30.5 mmol) and KI (60 mg, 0.36 mmol) in DMF (120 mL) for 18 h provided the product as a faint-yellow solid (4.05 g, 91.3%); m.p. 50.8$^0$C. $^1$H NMR (500 MHz, $CDCl_3$) δ 8.48 (s, 1H), 6.56 (s, 1H), 4.22 (t, J = 6.5 Hz, 2H), 4.18~4.13 (m, 6H), 2.59 (q, 4H), 2.20 (m, 4H), 1.57 (m, 9H), 1.26 (t, J= 7.5 Hz, 6H). $^{13}$C NMR (125.7 MHz, $CDCl_3$) δ 173.2, 173.2, 163.4, 163.4, 157.1, 131.9, 131.1, 114.3, 98.3, 98.2, 81.9, 68.8, 68.5, 68.5, 68.4, 60.8, 60.75, 60.71, 30.3, 30.3, 30.25, 30.20, 30.1, 28.4, 24.4, 24.3, 24.24, 24.18, 14.41, 14.40, 14.39, 14.38; MS (ESI) m/z, Calcd for $C_{23}H_{33}NO_{10}$ 483.21 ($M^+$), Found 484.2 ($M+H^+$). Anal. Calcd. for $C_{23}H_{33}NO_{10}$: C, 57.13; H, 6.88; N, 2.90. Found: C, 57.14; H 6.93; N, 2.85.

**2,4-Bis-(3-ethoxycarbonyl-propoxy)-5-nitro-benzoic acid (1g).** A mixture of compound **9** (3.60 g, 7.44 mmol) and $CF_3COOH$ (4.24 g, 37.2 mmol) in $CH_2Cl_2$ (120 mL) was stirred overnight at room temperature. The reaction mixture was washed with water and dried over anhydrous $Na_2SO_4$. Removal of $CH_2Cl_2$ gave the product as a faint-yellow oil (3.06 g, 96.2%); m.p. 91.2$^0$C. $^1$H NMR (500 MHz, $CDCl_3$) δ 8.71 (s, 1H), 6.72 (s, 1H), 4.32 (t, 2H), 4.28 (t, 2H), 4.16 (m, 4H), 2.60 (t, 4H), 2.23 (m, 4H), 1.27 (m, 6H). $^{13}$C NMR (125.7 MHz, $CDCl_3$) δ 173.2, 173.0, 166.4, 163.1, 158.0, 132.7, 132.4, 110.3, 98.3, 69.3, 69.0, 60.9, 60.8, 30.0, 23.93, 23.91, 14.26; MS (ESI) m/z, Calcd for $C_{19}H_{25}NO_{10}$ 427.15 ($M^+$), Found 428.2 ($M+H^+$). Anal. Calcd. for $C_{19}H_{25}NO_{10}$: C, 53.39; H, 5.90; N, 3.28. Found: C, 53.66; H, 5.89; N, 3.43.

**Methyl 2-hydroxy-4-octyloxy benzoate (10a).** Compound **6** (5.00g, 29.7mmol), 1-octyl bromide (6.31g, 32.7 mmol), potassium iodide (63 mg, 11.0mmol) and tetrabutyl ammonium bromide (25mg) were added to dry acetone (75 mL). To the solution was added anhydrous potassium carbonate (4.1g, 29.7 mmol). The mixture was heated to reflux for 4 h while stirring. The solution was filtered and the mother liquor was evaporated. The residue was dissolved in ethyl acetate and washed with water (3_10mL) and dried over magnesium sulfate. The ethyl acetate was removed and the product was recrystallized in cold methanol to afford the product as a light pink solid (5.44g, 65.3% yield). m.p.39.1-39.6–C. $^1$H NMR (400 MHz, $CDCl_3$) δ 10.91 (s, 1H), 7.69 (d, 1H, J=6.8), 6.39 (m, 2H), 3.93 (t, 2H, 6.8) 3.87 (s, 3H), 1.74 (m, 2H), 1.40-0.84 (m, 13H); $^{13}$C NMR (75.4 MHz, $CDCl_3$) δ 167.0, 164.5, 159.1, 131.7, 109.3, 106.7, 101.3, 72.3, 50.0, 32.5, 30.6, 30.3, 30.0, 26.6, 23.1, 14.0; MS (ESI) m/z; Calcd for $C_{16}H_{24}O_4$ ($M^+$) 280.4, found 281.4 $(M+H)^+$, 303.4 $(M+Na)^+$. Anal. Calcd. For $C_{16}H_{24}O_4$ C, 68.54; H, 8.63 found C, 68.37; H, 8.66.

**Methyl 2-hydroxy-4-dodecyloxy benzoate (10b).** Prepared analogously as described above for compound **10a**. White solid; Yield 89.0%. m.p. 57.4-58.0–C. $^1$H NMR (400 MHz, $CDCl_3$) δ 10.88 (s, 1H), 7.63 (d, 1H, J = 9.2 Hz), 6.27-6.15 (m, 2H), 3.92 (t, 2H, J = 6.8 Hz) 3.85 (s, 3H), 1.77 (m, 2H), 1.40-0.84 (m, 18H), 0.88 (m, 3H); $^{13}$C NMR (75.4 MHz, $CDCl_3$) δ 167.0, 164.5,

159.1, 131.7, 109.3, 106.7, 101.3, 72.3, 50.0, 32.5, 30.6, 30.3, 30.0, 26.6, 23.1, 14.0; MS (ESI) m/z, Calcd for $C_{20}H_{32}O_4$ ($M^+$) 336.23, found 337.2 $(M+H)^+$, 359.1 $(M+Na)^+$. Anal. Calcd. for $C_{20}H_{32}O_4$ C, 71.39; H, 9.59 found C, 71.41; H, 9.58.

**Methyl 2-methoxy-4-octyloxybenzoate (11a).** Compound **10a** (1.00g, 3.57 mmol) and anhydrous $K_2CO_3$ (2.00g, 12mmol) were added to dry acetone (60 mL). To the solution was added dimethyl sulfate (0.675 g, 5.35mmol) dropwise over 15 min under stirring. The mixture was refluxed for 3 days and then filtered. The acetone was evaporated and the residue was dissolved in ethyl acetate followed by washing with 1M NaOH (3_10mL), water (3_10mL) and brine (3_10mL) and drying over magnesium sulfate and concentrated in vacuo to afford a crude product. Crystallization in cold methanol provided the product as white needles (1.03g, 98.0%). m.p. 39.0-39.9–C. $^1$H NMR (500 MHz, $CDCl_3$) δ 7.85 (d, 1H, J = 9.0 Hz), 6.49 (m, 2H), 4.00 (t, 2H, J = 6.5 Hz), 3.90 (s, 3H), 3.87 (s, 3H), 1.80 (m, 2H), 1.47 (m, 2H), 1.34-1.30 (m, 8H), 0.90 (t, 3H, J = 6.0 Hz); $^{13}$C NMR (75.4 MHz, $CDCl_3$) δ 170.40\, 165.2, 163.7, 131.1, 107.9, 105.2, 101.1, 77.4, 77.0 , 76.6, 68.3, 51.9, 31.8, 29.3, 29.2, 29.0, 25.9, 22.6, 14.0; MS (ESI) m/z, Calcd for $C_{17}H_{26}O_4$ ($M^+$) 294.2, found 295.2 $(M+H)^+$. Anal. Calcd. for $C_{17}H_{26}O_4$ C, 69.36; H, 8.98; Found: C, 69.07; H 8.98.

**Methyl 2-methoxy-4-dodecyloxybenzoate (11b).**[4] Prepared analogously as described above for compound **10b**. White solid; Yield 97%. m.p. 58.1-59.4–C $^1$H NMR (500 MHz, $CDCl_3$) δ 7.84 (d, 1H, J = 8.9 Hz), 6.46 (m, 2H), 4.00 (t, 2H, J = 6.8 Hz), 3.88 (s, 3H), 3.85 (s, 3H), 1.79 (m, 2H), 1.46 (m, 2H), 1.34-1.26 (m, 18H), 0.88 (t, 3H, J = 7.2 Hz); $^{13}$C NMR (75.4 MHz, $CDCl_3$) δ170.1, 165.5, 163.8, 131.3, 107.7, 106.4, 99.7, 72.3, 56.0, 52.0, 32.1, 30.1, 30.0, 29.9, 26.4, 23.1, 14.1; MS (ESI) m/z, Calcd for $C_{21}H_{34}O_4$ ($M^+$) 350.3, found 351.3 $(M+H)^+$. Anal. Calcd. for $C_{21}H_{34}O_4$ C, 71.96; H, 9.78; Found: C, 71.85; H 9.88.

**2-Methoxy-4-octyloxybenzoic acid (12a).** Following the general procedure (**3A**), hydrolysis of the ester **11a** (1.03g, 3.50 mmol) in methanol (25mL) with 1M NaOH (15mL, 15mmol) overnight afforded the product as a white solid (962 mg, 98.0% yield). m.p. 72.1-73.9–C. $^1$H NMR (400 MHz, $CDCl_3$) δ10.18 (s, 1H), 7.91 (d, 1H, J = 6.3 Hz), 6.50 (m, 2H), 4.02 (t, 2H, J = 6.4 Hz), 3.89 (s, 3H), 1.81 (m, 2H), 1.49 (m, 2H), 1.21-1.15 (m, 8H), 0.91 (t, 3H, J = 6.1 Hz); $^{13}$C NMR (75.4 MHz, $CDCl_3$) δ 172.0, 165.0, 164.2, 131.7, 107.8, 106.4, 99.7, 72.3, 56.0, 32.5, 30.6, 30.3, 30.0, 26.6, 23.1, 14.0; MS (ESI) m/z, Calcd for $C_{16}H_{24}O_4$ ($M^+$) 280.2, found 281.2 $(M+H)^+$, 303.2 $(M+Na)^+$. Anal. Calcd. for $C_{16}H_{24}O_4$ C, 68.54; H, 8.63; Found: C, 68.50; H 8.60.

**2-Methoxy-4-dodecyloxybenzoic acid (12b).** Prepared analogously as described above for compound **11b**. White solid, Yield 96.4%. m.p. 86.5-87.4–C. $^1$H NMR (400 MHz, $CDCl_3$) δ 10.50 (s, 1H), 8.12 (d, 1H, J = 8.5 Hz), 6.64 (m, 2H), 6.53 (s, 2H), 4.04 (s, 3H), 1.80 (m, 2H), 1.45 (m, 2H), 1.35-1.27 (m, 8H), 0.90 (m, 3H); $^{13}$C NMR (75.4 MHz, $CDCl_3$) δ 172.0, 165.0, 164.2, 131.7, 107.8, 106.4, 99.7, 72.3, 56.0, 32.5, 30.6, 30.3, 30.0, 26.6, 23.1, 14.0; MS (ESI) m/z, Calcd for $C_{20}H_{32}O_4$ ($M^+$) 336.2, found 337.3 $(M+H)^+$, 359.3 $(M+Na)^+$. Anal. Calcd. for $C_{20}H_{32}O_4$ C, 71.39; H, 9.59; Found: C, 71.35; H 9.60.

**2-Methoxy-5-nitro-4-octyloxybenzoic acid (13a).** Compound **12a** (2.47g, 8.81 mmol) was dissolved in concentrated sulfuric acid (20 mL) and cooled to 0°C in an ice bath. Ammonium

nitrate (0.776g, 9.690mmol) was added portionwise over 20 min to the mixture while stirring. The mixture was allowed to warm to room temperature and stirred for another 20 min. Water (30mL) was added and the precipitate was filtered and washed with cold methanol to afford the product as a light pink solid (2.82g, 98.3% yield). m.p. 151-152–C. $^1$H NMR (400 MHz, $CDCl_3$) δ 8.36 (s, 1H), 6.86 (s, 1H), 4.28 (t, 2H, J = 6.0 Hz), 3.97 (s, 3H), 1.77 (m, 2H), 1.45-1.27 (m, 10H), 0.86 (m, 3H); $^{13}$C NMR (75.4 MHz, $CDCl_3$) δ 172.0, 170.3, 160.1, 126.8, 126.3, 108.7, 126.3, 108.7, 100.6, 71.3, 56.0, 30.3, 30.0, 26.6, 23.1, 14.0; MS (ESI) m/z, Calcd for $C_{16}H_{23}NO_6$ ($M^+$) 325.2, found 326.2 $(M+H)^+$, 348.2 $(M+Na)^+$. Anal. Calcd. for $C_{16}H_{23}NO_6$ C, 59.06; H, 7.13; N, 4.31 found C, 58.97; H, 7.00; N, 4.36.

**2-Methoxy-5-nitro-4-dodecyloxybenzoic acid (13b).** Prepared analogously as described above for compound **13a**. White solid, yield 98.1%. m.p. 159.7-161.4–C. $^1$H NMR (400 MHz, $CDCl_3$) δ 8.78 (s, 1H), 6.58 (s, 1H), 4.18 (t, 2H, J = 6.0 Hz), 4.14 (s, 3H), 1.90 (m, 2H), 1.50 (t, 2H), 1.37-1.27 (m, 17H), 0.88 (t, 3H); $^{13}$C NMR (75.4 MHz, $CDCl_3$) δ172.0, 170.3, 160.1, 126.8, 126.3, 108.7, 126.3, 108.7, 100.6, 71.3, 56.0, 30.6, 30.3, 30.0, 26.6, 23.1, 14.0; MS (ESI) m/z, Calcd for $C_{20}H_{31}NO_6$ ($M^+$) 381.2, found 382.3 $(M+H)^+$, 404.2 $(M+Na)^+$. Anal. Calcd. for $C_{20}H_{31}NO_6$ C, 62.97; H, 8.19; N, 3.67, found C, 62.86; H, 8.15; N, 3.60.

**4,6-Dimethoxy-isophthalic acid dimethyl ester (16a).**[5] A mixture of compound **15** (22.6 g, 100 mmol), dimethyl sulfate (56.5 mL, 600 mmol) and anhydrous $K_2CO_3$ (82.8 g, 600 mmol) in acetone (400 mL) was refluxed for 3 days. After cooling down to room temperature $CH_2Cl_2$ (100 mL) was added and the mixture was stirred for 20 min and then filtered off. The organic layer was washed once with water. After evaporating the solvent, the residue was triturated with $H_2O$ (200 mL) and the solid was collected by filtration and dried in the air to give the product as a white solid (23.6 g, 93%); m.p. 149.8$^0$C. $^1$H NMR (500 MHz, $CDCl_3$) δ 8.43 (s, 1H), 6.45 (s, 1H), 3.94 (s, 6H), 3.83 (s, 6H). $^{13}$C NMR (125.7 MHz, $CDCl_3$) δ 165.0, 164.0, 136.9, 111.3, 95.5, 56.0, 51.7; MS (ESI) m/z, calcd for $C_{12}H_{14}O_6$ ($M^+$) 254.08, found 255.1 $(M+H)^+$, 277.1 $(M+Na)^+$.

**4,6-Bis-octyloxy-isophthalic acid dimethyl ester (16b).** Following the general procedure **(1)**, reaction of compound **15** (15.0 g, 66.3 mmol) with 1-bromooctane (28.2 g, 146 mmol) in the presence of $K_2CO_3$ (27.4 g, 198 mmol) in DMF (200 mL) provided the product as a white solid (11.9 g, 88.0%); m.p. 33.2$^0$C. $^1$H NMR (500 MHz, $CDCl_3$) δ 8.46 (s, 1H), 6.42 (s, H), 4.06 (t, 4H, *J* = 6.4 Hz), 3.85 (s, 6H), 1.87 (m, 2H), 1.51 (m, 4H), 1.35-1.28 (m, 16H), 0.88 (t, 3H, *J* = 6.8 Hz); $^{13}$C NMR (125.7 MHz, $CDCl_3$) δ 165.4, 163.6, 137.0, 112.0, 97.7, 69.3, 51.6, 31.8, 29.3, 29.2, 29.1, 25.5, 22.6, 14.0. Anal. Calcd for $C_{26}H_{42}O_6$: C, 69.30; H, 9.40. Found: C, 69.46; H, 9.68.

**4,6-Bis-{2-[2-(2-methoxy-ethoxy)-ethoxy]-ethoxy}-isophthalic acid dimethyl ester (16c).** Following the procedure for compound **7e**, reaction of tosylate of triethylene glycol monomethyl ester (63.3 g, 198.9 mmol) with compound **15** (15.0 g, 66.3 mmol) in the presence of $K_2CO_3$ (28.0 g, 202.9 mmol) in DMF (280 mL) provided the product as yellow oil (29.4 g, 85.4%). $^1$H NMR (500 MHz, $CDC1_3$) δ 8.45 (s, 1H), 6.57 (s, 1H), 4.24 (t, 4H, J = 5.0 Hz), 3.94 (t, 4H, J = 5.0 Hz), 3.85 (s, 6H), 3.79 (t, 4H, J = 5.5 Hz), 3.68~3.62 (m, 8H), 3.56 (m, 4H), 3.37 (s, 6H); $^{13}$C NMR (125.7 MHz, $CDCl_3$) δ 163.5, 163.2, 157.0, 131.5, 130.5, 111.5, 99.0, 71.4,

70.6, 70.6, 70.2, 70.1, 70.1, 70.02, 69.98, 69.96, 69.6, 69.3, 68.9, 68.8, 58.4, 51.6; MS (ESI) m/z, Calcd for $C_{24}H_{38}O_{12}$ 518.24 ($M^+$), Found 541.2 ($M+Na^+$). HRMS *m/z* calcd. for $C_{24}H_{38}NaO_{12}$ ($M+Na^+$): 541.22610. Found: 541.22637. $^1H$ NMR and $^{13}C$ NMR spectra, see **Fig.S1 and S2**.

**4,6-Bis-[2-(3-methyl-butoxy)-propoxy]-isophthalic acid dimethyl ester (16d).** Following the procedure for compound **7e**, reaction of toluene-4-sulfonic acid 2-(3-methyl-butoxy)-propyl ester (31.5 g, 106.0 mmol) with compound **15** (10.0 g, 44.2 mmol) in the presence of $K_2CO_3$ (20.0 g, 145 mmol) in DMF (200 mL) provided the product as yellow oil (11.6 g, 54.5%). $^1H$ NMR (500MHz, CDC1$_3$) δ 8.46 (s, 1H), 6.49 (s, 1H), 4.10 (m, 2H), 3.89 (m, 4H), 3.85 (s, 6H), 3.62 (m, 4H), 1.70 (m, 2H), 1.48(m, 4H), 1.32 (d, J=6 Hz, 6H), 0.91(d, J=2.5 Hz, 6H), 0.89(d, J=2.5 Hz, 6H). $^{13}C$ NMR (125.7 MHz, $CDCl_3$) δ 165.3, 163.4, 137.2, 112.0, 97.8, 73.7, 72.9, 68.2, 51.8, 39.0, 25.1, 22.7, 22.7, 17.6; MS (ESI) m/z, Calcd for $C_{26}H_{42}O_8$ 482.29 ($M^+$), Found 483.1 ($M+H^+$). Anal. Calcd for $C_{26}H_{42}O_8$: C, 64.71; H, 8.77. Found: C, 64.03; H, 8.73.

**4,6-Bis-(3-tert-butoxycarbonylamino-propoxy)-isophthalic acid dimethyl ester (16e).** Following the general procedure (**1**), reaction of **15** (3.00 g, 13.3 mmol) with (3-bromo-propyl)-carbamic acid tert-butyl ester (6.98 g, 29.3 mmol) in the presence of $K_2CO_3$ (5.62 g, 40.7 mmol) and KI (95 mg, 0.57 mmol) in DMF (50 mL) at 90 °C for 36 h afforded the product as a white solid (6.23 g, 86.6%); m.p. 121.8 $^0$C. $^1H$ NMR (500 MHz, $CDCl_3$) δ 8.57 (s, 1H), 6.45 (s, 1H), 6.02 (s, 4H), 4.16 (t, J = 5.5 Hz, 4H), 3.89 (s, 6H), 3.43 (s, 4H), 2.08 (d, J = 5.0 Hz, 4H), 1.45 (s, 18H). $^{13}C$ NMR (125.7 MHz, $CDCl_3$) δ 164.8, 163.5, 156.3, 137.3, 111.1, 96.7, 78.7, 68.5, 51.9, 38.8, 28.9, 28.3; MS (ESI) m/z, Calcd for $C_{26}H_{40}N_2O_{10}$ 540.27 ($M^+$), Found 563.3 ($M+Na^+$). Anal. Calcd for $C_{26}H_{40}N_2O_{10}$: C, 57.76; H, 7.46; N, 5.18. Found: C, 57.95; H, 7.45; N, 5.23.

**4,6-Diisobutoxy-isophthalic acid dimethyl ester (16f).** Prepared analogously as described above for compound **16b**. White solid: Yield 85.0%; m.p. 88.5$^0$C. $^1H$ NMR (500 MHz, $CDCl_3$) δ 8.48 (s, 1H), 6.39 (s, H), 3.86 (s, 6H), 3.84 (d, 4H, *J* = 6.3 Hz), 2.20 (m, 2H), 1.09 (d, 12H, *J* = 6.9 Hz); $^{13}C$ NMR (75.4 MHz, $CDCl_3$) δ 165.6, 163.9, 137.3, 111.6, 97.1, 75.4, 51.8, 28.5, 19.3; MS (ESI) m/z, Calcd for $C_{18}H_{26}O_6$ ($M^+$) 338.17, Found 339.1 ($M+H^+$), 361.2 ($M+Na^+$). Anal. Calcd for $C_{18}H_{26}O_6$: C, 63.89; H, 7.74. Found: C, 64.11; H, 7.80.

**4,6-Bis-(3-tert-butoxycarbonyl-propoxy)-isophthalic acid dimethyl ester (16g).** Following the general procedure (**1**), reaction of **15** (2.00 g, 8.84 mmol) with 4-bromo-butyric acid tert-butyl ester (4.33 g, 19.4 mmol) in the presence of $K_2CO_3$ (3.66 g, 26.5 mmol) and KI (43 mg, 0.26 mmol) in DMF (100 mL) provided a crude product as brown oil (4.17g). Chromatography ($CHCl_3$/EtAc, 25:1, v/v) gave the product as a white solid (3.84 g, 85.1%); m.p. 86.5$^0$C.$^1H$ NMR (500 MHz, $CDCl_3$) δ 8.46 (s, 1H), 6.52 (s, 1H), 4.16 (t, J = 7.5 Hz, 4H), 3.86 (s, 6H), 2.51 (t, J = 9.0 Hz, 4H), 2.13 (m, 4H), 1.44 (s, 18H); $^{13}C$ NMR (125.7 MHz, $CDCl_3$) δ 172.6, 165.4, 163.6, 137.3, 111.8, 97.6, 80.6, 68.0, 51.8, 31.5, 28.2, 24.4; MS (ESI) m/z, Calcd for $C_{26}H_{38}O_{10}$ 510.25 ($M^+$), Found 511.3 ($M+H^+$). Anal. Calcd for $C_{26}H_{38}O_{10}$: C, 61.16; H, 7.50. Found: C, 60.97; H, 7.44.

**4,6-Dimethoxy-isophthalic acid (3a).** Following the general procedure (**3A**), hydrolysis of compound **16a** (20.0 g, 78.7 mmol) in MeOH (60 mL) with NaOH (7.87 g, 197 mmol) in $H_2O$

(20 mL) for 4 h afforded the product as a white solid (16.4 g, 92.1%); m.p. 276.5 $^0$C. $^1$H NMR (500 MHz, DMSO-$d_6$) δ 12.4 (br, 2H), 8.2 (s, 1H), 6.7 (s, 1H), 3.9 (s, 6H); $^{13}$C NMR (125.7 MHz, DMSO-$d_6$) δ 165.80, 163.48, 136.13, 111.65, 96.92, 56.19; Anal. Calcd. for $C_{10}H_{10}O_6$: C, 53.10; H, 4.46. Found C, 53.28; H, 4.46.

**4,6-Bis-octyloxy-isophthalic acid (3b).** Following the general procedure (**3A**), hydrolysis of compound **16b** (1.0 g, 2.22 mmol) in THF (30 mL), in the presencee of KOH (0.40 g, 7.14 mmol) in $H_2O$ (2 mL) for 2 h provided the product as a white solid (0.90 g, 96.0%); m.p. 125.8$^0$C. $^1$H NMR (500 MHz, $CDCl_3$) δ 10.05 (br, 2H), 8.99 (s, 1H), 6.56 (s, 1H), 4.27 (t, 4H, J = 6.5 Hz), 1.96 (m, 4H), 1.50 (m, 4H), 1.37 (m, 4H), 1.26 (s, 52H), 0.88 (t, 6H, J = 6.0 Hz); $^{13}$C NMR (125.7 MHz, $CDCl_3$) δ 164.3, 162.5, 140.2, 111.7, 96.7, 70.8, 31.9, 29.7, 29.6, 29.6, 29.5, 29.4, 29.4, 29.3, 28.7, 25.8, 22.7, 14.1; MS (ESI) m/z, Calcd for $C_{24}H_{38}O_6$ ($M^+$) 422.27, Found 423.1 ($M+H^+$), 445.3 ($M+Na^+$). Anal. Calcd. for $C_{24}H_{38}O_6$: C, 68.22; H, 9.06. Found C, 68.35; H, 9.02.

**4,6-Bis-{2-[2-(2-methoxy-ethoxy)-ethoxy]-ethoxy}-isophthalic acid (3c).** Following the general procedure **(3B)**, hydrolysis of the ester **16c** (10.0 g, 19.3 mmol) with KOH (5.41 g, 96.5 mmol) in $H_2O$ (200 mL) at 80$^0$C for 3 h. The resulting yellow oil after acidification was dissolved in methylene chloride and filtered to remove the salt. Removal of the solvent and drying in vacuum at 60$^0$C afforded the product as yellow oil (8.62 g, 91.0%). $^1$H NMR (500 MHz, $CDCl_3$) δ 8.82 (s, 1H), 6.62 (s, 1H), 4.39 (t, *J* = 4.5 Hz, 4H), 3.95 (t, *J* = 4.5 Hz, 4H), 3.76 (q, 4H, *J* = 4.5, 6.0 Hz), 3.68 (q, 4H, *J* = 2.5, 5.5 Hz), 3.64 (q, 4H, *J* = 4.0, 6.5 Hz), 3.55 (q, 4H, *J* = 2.5, 5.5 Hz), 3.38 (s, 6H). $^{13}$C NMR (125.7 MHz, $CDCl_3$) δ 165.1, 162.3, 139.1, 111.9, 98.4, 71.9, 70.8, 70.6, 70.5, 69.6, 68.7, 59.0; MS (ESI) m/z, Calcd for $C_{22}H_{34}O_{12}$ 490.21 ($M^+$), Found 513.1 ($M+Na^+$). Anal. Calcd. for $C_{22}H_{34}O_{12}$: C, 53.87; H, 6.99. Found C, 53.24; H, 6.95.

**4,6-Bis-[2-(3-methyl-butoxy)-propoxy]-isophthalic acid (3d).** Following the general procedure (**3B**), hydrolysis of the ester **16d** (5.80g, 12.02 mmol) in methanol (60mL) with potassium hydroxide (2.36g, 42.07 mmol) in water (2 mL) overnight afforded the product as a white solid (4.6g, 83.3%); m.p. 98.5$^0$C. $^1$H NMR (500MHz, $CDC1_3$) δ 8.81 (s, 1H), 6.60 (s, 1H), 4.23 (m, 2H), 4.12 (m, 2H), 3.94(m, 2H), 3.65(m, 2H), 3.48(m, 2H), 1.68(m, 2H), 1.49 (m, 4H), 1.31(d, J=6.5 Hz, 6H), 0.89(d, J=7 Hz, 12H); $^{13}$C NMR (125.7MHz, $CDCl_3$) δ 165.3, 162.6, 139.6, 112.3, 98.2, 73.6, 72.8, 67.7, 38.6, 25.0, 22.7, 22.5, 16.3; MS (ESI) m/z, Calcd for $C_{24}H_{38}O_8$ 454.26 ($M^+$), Found 477.1 ($M+Na^+$). Anal. Calcd. for $C_{24}H_{38}O_8$: C, 63.42; H, 8.43. Found C, 63.47; H, 8.42.

**4,6-Bis-(3-tert-butoxycarbonylamino-propoxy)-isophthalic acid (3e).** Following the general procedure **(3A)**, the ester **16e** (2.00 g, 3.70 mmol) in THF/MeOH (1:1, 60 mL) and NaOH (0.37 g, 9.25 mmol) in $H_2O$ (2 mL) was hydrolyzed for 1 h. The solution was then cooled down to 0$^0$C and acidified with 10% HCl until pH reached 3. The mixture was diluted with water (80mL) and the precipitate was collected and washed with water, which afforded the product as a white solid (1.78 g, 93.9%); m. p. 176.2$^0$C. $^1$H NMR (500 MHz, DMSO-$d_6$) δ 12.37 (s, 2H), 8.21 (s, 1H), 6.87 (s, 2H), 6.66 (s, 1H), 4.13 (t, J = 5.5Hz, 4H), 3.12 (t, J = 6.0 Hz, 4H), 1.85 (t, J = 6.0 Hz, 4H), 1.35 (s, 18H); $^{13}$C NMR (125.7 MHz, DMSO-$d_6$) δ 165.8, 162.7, 155.6, 136.1, 111.9, 98.4, 77.5, 66.6, 36.9, 28.9, 28.2; MS (ESI) m/z, Calcd for $C_{24}H_{36}N_2O_{10}$ 512.24 ($M^+$), Found

513.3 ($M+H^+$), 535.4 ($M+Na^+$). Anal. Calcd. for $C_{24}H_{36}N_2O_{10}\cdot 1/2H_2O$: C, 55.27; H, 7.09, N, 5.37. Found C, 55.46; H, 7.00, N, 5.20.

**4,6-Diisobutoxy-isophthalic acid (3f).** Prepared analogously as described above for compound **3d**. White solid, 91.0%; m.p.198.5 $^0$C. $^1$H NMR (500 MHz, DMSO-$d_6$) δ 12.36 (s, 1H), 8.22 (s, H), 6.64 (s, 1H), 3.91 (d, 4H, J = 6.5 Hz), 2.06 (m, 2H), 1.02 (d, 12H, J = 7.0 Hz); $^{13}$C NMR (125.7 MHz, DMSO-$d_6$) δ 165.8, 162.7, 135.9, 111.4, 97.7, 74.3, 27.6, 18.8; MS (ESI) m/z, Calcd for $C_{16}H_{22}O_6$ ($M^+$) 310.14, Found 311.0 ($M+H^+$). Anal. Calcd. for $C_{16}H_{22}O_6$ Found C, 61.92; H, 7.15. Found C, 61.58; H, 7.08.

**4,6-Bis-(3-tert-butoxycarbonyl-propoxy)-isophthalic acid (3g).** A mixture of compound **16g** (2.00 g, 3.92 mmol) in MeOH (100 mL) and $LiOH\cdot H_2O$ (0.98 g, 23.4 mmol) in $H_2O$ (5 mL) was stirred at room temperature for ca.15 h. The mixture was diluted with water (30 mL) and acidified with acetic acid at 0 $^0$C. After removing most of the methanol the mixture was extracted with EtAc. Removal of the solvent gave the crude comprising the diaicd, the monoester acid and unreacted starting **16f**. Purification of the desired diacid product was achieved by chromatography ($CHCl_3$/EtAc, 1:1,v/v). Trituration with ethyl acetate/n-hexane afforded the product as a white solid (0.28 g, 15.0%); m.p. 138.5 $^0$C. $^1$H NMR (500 MHz, $CDCl_3$) δ 12.4 (s, 2H), 8.22 (s, 1H), 6.73 (s, 1H), 4.21 (t, *J* = 6.0 Hz, 4H), 2.53 (m, 4H), 1.97 (t, 4H, *J* = 7.0 Hz, 4H), 1.46 (s, 18H); MS (ESI) m/e, Calcd for $C_{24}H_{34}O_{10}$ ($M^+$) 482.22, Found 505.2 ($M+Na^+$). Anal. Calcd. for $C_{24}H_{34}O_{10}$: C, 59.74; H, 7.10. Found C, 59.44; H, 7.08.

**4,6-Diisobutoxy-isophthalic acid monomethyl ester ( 17a).** Following the general procedure **(3B)** using only 1.7 eq. of base, dimethyl ester **16f** (1.00 g, 2.96 mmol) in THF (50 mL) and NaOH (0.20 g, 5.00 mmol) dissolved in a minimum amount of water was hydrolyzed at room temperature for ca.12 h. The residue was subjected to flash chromatography ($CHCl_3$/MeOH 10:0.2) to afford the product as a white solid (0.60 g, 62.6%); m.p. 134.2$^0$C. $^1$H NMR (500 MHz, $CDCl_3$) δ 10.76 (s, 1H), 8.68 (s, 1H), 6.47 (s, 1H), 4.03 (d, 2H, *J* = 6.5 Hz), 3.87 (s, 3H), 4.85 (d, 2H, *J* = 7.5 Hz), 2.23 (m, 2H), 1.11 (m, 12H). $^{13}$C NMR (125.7 MHz, $CDCl_3$) δ 164.9, 164.5, 162.0, 138.5, 113.9, 109.4, 96.8, 76.6, 75.6, 51.9, 28.4, 28.2, 19.3, 19.2; MS (ESI) m/z, Calcd for $C_{17}H_{24}O_6$ 324.16 ($M^+$), Found 347.2 ($M+Na^+$). Anal. Calcd. for $C_{17}H_{24}O_6$: C, 62.95; H, 7.46. Found C, 62.96; H, 7.45.

**4,6-Bis-{2-[2-(2-methoxy-ethoxy)-ethoxy]-ethoxy}-isophthalic acid monomethyl ester (17b).** Prepared analogously as described above for compound **17a**, hydrolysis of the dimethyl ester **16c** (5.70 g, 11.0 mmol) and NaOH (1.10 g, 27.5 mmol) in the mixed solvent of methanol and water (300 mL, 2:1, v/v) provided an oily residue. Purification by flash chromatography on silica gel ($CHCl_3$/EtAc/MeOH 10:1:0.5) afforded the desired monoester as yellow oil (68.9%). $^1$H NMR (500 MHz, $CDCl_3$) δ 8.62 (s, 1H), 6.66 (s, 1H), 4.39 (t, 4H, *J* = 4.5 Hz), 4.28 (t, 4H, *J* = 5.0 Hz), 3.94 (m, 4H), 3.85 (s, 3H), 3.79~3.73 (m, 4H), 3.69~3.61 (m, 8H), 3.57~3.53 (m, 4H), 3.37 (t, 6H). $^{13}$C NMR (125.7 MHz, $CDCl_3$) δ 165.4, 164.9, 164.1, 161.9, 138.2, 114.4, 111.0, 98.65, 72.64, 72.0, 72.0, 71.2, 70.9, 70.8, 70.7, 70.6, 70.6, 70.4, 69.56, 69.55, 69.5, 68.8, 61.8, 59.1, 59.1, 52.0, 20.9; MS (ESI) m/z, Calcd for $C_{23}H_{36}O_{12}$ ($M^+$) 504.22, Found 527.2 ($M+Na^+$). Anal. Calcd. for $C_{23}H_{36}O_{12}$: C, 54.75; H, 7.19. Found C, 54.53; H, 7.49.

**4,6-Bis-[2-(3-methyl-butoxy)-propoxy]-isophthalic acid monomethyl ester (monomethyl ester) (17c).** A mixture of dimethyl ester **16d** (5.40g, 11.2 mmol) in methanol (60 mL) and KOH (0.88 g, 15.7 mmol) dissolved in water (3 mL) was stirred under reflux for ca.3 h. The reaction was traced by TLC plate ($CH_2Cl_2$/EtAc 10:1). The solution was diluted by water (50mL) and acidified with 10% hydrochloric acid. After removing ca. half of the solvent the resulting mixture was extracted with ethyl acetate, and washed with water twice, dried over $Na_2SO_4$. Flash chromatography (n-hexane/ethyl acetate 3:1) provided the monoester as yellow oil (4.61g, 68.6%). $^1$H NMR (500 MHz, $CDCl_3$) δ 10.55 (s, 1H), 8.69 (s, 1H), 6.56 (s, 1H), 4.25, 4.24 (d, d, 1H), 4.14~4.07 (m, 3H), 3.94~3.88 (m, 3H), 3.85 (s, 3H), 3.67~3.62 (m, 2H), 3.59~3.54 (m, 1H), 3.47~3.42 (m, 1H), 1.68(m, 2H), 1.54~1.42 (m, 4H), 1.32 (t, J=7.5 Hz,6H), 0.89 (d, J=7 Hz, 6H); $^{13}$C NMR (125.7 MHz, $CDCl_3$) δ 164.9, 164.7, 163.9, 161.6, 138.3, 114.4, 110.4, 97.9, 73.6, 73.4, 73.1, 72.7, 68.2, 67.6, 51.9, 38.9, 38.5, 25.00, 24.98, 22.7, 22.6, 22.6, 22.4, 17.3, 16.1; MS (ESI) m/z, Calcd for $C_{25}H_{40}O_8$ 468.27 ($M^+$), Found 469.3 ($M+H^+$), 491.2 ($M+Na^+$). Anal. Calcd. for $C_{25}H_{40}O_8$: C, 64.08; H, 8.60. Found: C, 63.62; H, 8.67.

**4,6-Dihydroxy-isophthalic acid di-*tert*-butyl ester (18).** A mixture of DCC (26.7 g, 29.5 mmol), tert-butanol (96.0g, 1.30 mol, ca.123 ml) and 4,6-dihydroxy isophthalic acid (10.0g, 51.8 mmol) in THF (HPLC, 200 ml) were treated with DMAP and stirred at room temperature for 24 h. A large amount of solid formed (DCU) in the course of reaction was filtered off and washed with THF. The filtrate was evaporated to dryness and EtAc/n-Hexane (1:6, 400 ml) was added and the mixture was stirred at room temperature for 30 min. Filtration provided an almost colorless solution. After removing the solvent, n-hexane was added to the wet residue, which was triturated for a while and filtered to afford the product as a pink solid (8.90 g, 55.4%); m.p. 155.2 $^0$C. $^1$H NMR ($CDCl_3$, 400MHz) δ 11.69 (s, 2H), 8.47 (s, 1H), 6.63 (s, 1H), 1.81 (s, 18H); MS (ESI) m/z, Calcd for $C_{16}H_{22}O_6$ 310.14 ($M^+$), Found 310.7 ($M+H^+$). Anal. Calcd. for $C_{16}H_{22}O_6$: C, 61.92; H, 7.15. Found: C, 62.22; H, 7.19.

**4,6-Bis-(3-ethoxycarbonyl-propoxy)-isophthalic acid di-tert-butyl ester (19).** Following the general procedure (**1**) using acetonitrile as solvent, reaction of compound **18** (0.50 g, 1.61 mmol) with ethyl 4-bromobutanoate (0.94 g, 4.83 mmol) in acetonitrile (50 mL) in the presence of anhydrous $K_2CO_3$ (6.66 g, 4.83 mmol) and KI (26.0 mg, 0.16 mmol) for 18 h provided the product as a white solid (0.73g, 84%); m.p. 64.2$^0$C. $^1$H NMR (400 MHz, $CDCl_3$) δ 8.20 (s, 1), 6.37 (s, 1), 4.10~4.01 (m, 8), 2.50 (t, 4), 2.09 (quint, 4), 1.49 (s, 18), 1.18 (t, 6). $^{13}$C NMR (125.7 MHz, $CDCl_3$) δ 1732.2, 164.6, 162.4, 136.6, 114.0, 97.6, 97.5, 80.9, 67.8, 60.5, 30.5, 28.4, 24.4, 14.3; MS (ESI) m/z, Calcd for $C_{28}H_{42}O_{10}$ ($M^+$) 538.28, Found 538.8 ($M+H^+$), 561.1 ($M+Na^+$). Anal. Calcd. for $C_{28}H_{42}O_{10}$: C, 62.44; H, 7.86. Found C, 62.61; H, 7.83.

**4,6-Bis-(3-ethoxycarbonyl-propoxy)-isophthalic acid (3h).** A mixture of compound **19** (5.00 g, 9.28 mmol) and $CF_3COOH$ (10.58 g, 92.8 mmol) in $CH_2Cl_2$ (20 mL) was stirred at room temperature for 24 h. After removing all solvent and the catalyst the residue was triturated with diethyl ether to provide the product as a white solid (3.80g, 96.0%); m.p. 141.5$^0$C. $^1$H-NMR (500 MHz, $CDCl_3$) δ8.84 (s, 1H), 6.75 (s, 1H), 4.35 (t, 4H, J = 6.4 Hz), 4.16 (q, 4H), 2.57 (t, 4H, J = 6.8 Hz), 2.24 (m, 4H), 1.27 (t, 6H, J = 8.5 Hz). $^{13}$C NMR (125.7 MHz, $CDCl_3$) δ 172.5, 165.7, 162.5, 111.9, 98.2, 67.4, 59.8, 29.7, 23.9, 14.0; MS (ESI) m/z, Calcd for $C_{20}H_{26}O_{10}$ 426.15 ($M^+$), Found 426.9 ($M+H^+$), 449.2 ($M+Na^+$). Anal. Calcd. for $C_{20}H_{26}O_{10}$: C, 56.33; H, 6.15. Found C,

56.10; H, 6.17.

**4,6-Dimethoxy-1,3-dinitrobenzene (4a).** This compound is known and was prepared according to the reported procedure.[6] To a mixture of absolute MeOH (4.93 g, 154 mmol) and freshly distilled dry TEA (16.0 g, 158 mmol) pre-cooled to ~0 $^0$C was added portionwise 1,3-difluoro-4,6-dinitrobenzene (15.0 g, 73.5 mmol). The mixture was then stirred at room temperature for 1.5 h. The slurry was dissolved in $CH_2Cl_2$ (200 mL), washed with diluted HCl and water. Removal of the solvent afforded the product as a yellow solid, which is pure enough for use (15.3 g, 91.2%). m.p. 154.8 $^0$C. $^1$H NMR (500 MHz, $CDCl_3$) δ 8.77 (s, 1H), 6.62 (s, 1H), 4.10 (s, 6H); MS (ESI) m/z calcd for $C_8H_8N_2O_6$ 228.04 ($M^+$), Found 229.0 ($M+H^+$).

**1,5-Dinitro-2,4-bis-octyloxy-benzene (4b).** A mixture of 1-octanol (10.50g, 80.4 mmol), triethyl amine (8.25 g, 81.5 mmol) and 1,5-difluoro-2,4-dinitro-benzene (8.00, 39.2 mmol) was stirred at room temperature for 2h. The mixture was dissolved in ethyl acetate and washed with water, dried over $Na_2SO_4$. Removal of the solvent gave the product as an oil (16.30g, 98.0%). $^1$H NMR (500 MHz, $CDCl_3$) δ 8.74 (s, 1H), 6.56 (s, 1H), 4.17 (t, J = 6.3 Hz, 4H), 1.90 (m, 4H), 1.52 (m, 4H), 1.42~1.20 (m, 16H), 0.89 (m, 6H). $^{13}$C NMR (125.7 MHz, $CDCl_3$) δ 158.1, 125.8, 98.8, 70.8, 31.9, 29.3, 29.2, 28.8, 25.9, 22.8, 14.2; MS (ESI) m/z, Calcd for $C_{22}H_{36}N_2O_6$ ($M^+$) 424.26, Found 425.4 ($M+H^+$). Anal. Calcd. for $C_{22}H_{36}N_2O_6$: C, 62.24; H, 8.55; N, 6.60. Found C, 62.21; H, 8.49, N, 6.79.

**{3-[5-(3-tert-Butoxycarbonylamino-propoxy)-2,4-dinitro-phenoxy]-propyl}-carbamic acid tert-butyl ester (4c).** Prepared analogously as described above for compound **4b**, reaction of 1,3-difluoro-4,6-dinitrobenzene (8.00 g, 39.2 mmol) with (3-hydroxy-propyl)-carbamic acid tert-butyl ester (14.1g, 80.4 mmol) followed by purification via flash chromatography ($CHCl_3$/Et) provided the product as yellow solid (17.0 g, 84.3%). m.p.134.5$^0$C.$^1$H NMR (500 MHz, $CDCl_3$) δ 8.57 (s, 1H), 6.59 (s, 1H), 5.28 (s, 2H), 4.19 (t, J = 6.0 Hz, 4H), 3.25 (q, 4H), 1.99 (t, J = 5.5 Hz, 4H),1.36 (s, 18H); $^{13}$C NMR (125.7 MHz, $CDCl_3$) δ 157.8, 156.2, 130.5, 125.6, 79.0, 68.8, 60.2, 37.4, 32.6, 29.0, 28.2, 20.8, 14.0; MS (ESI) m/z, Calcd for $C_{22}H_{34}N_4O_{10}$ ($M^+$) 514.23, found 515.3 ($M+H^+$). Anal. Calcd. for $C_{22}H_{34}N_4O_{10}$: C, 51.36; H, 6.66; N, 10.89. Found C, 51.12; H, 6.54, N, 10.80.

**2,4-Dimethoxy-5-nitro-phenylamine (4''a)**. This is a known compund and was prepared based on method similar to that reported.[7] The polysulfide solution was prepared by heating a mixture of sodium hydrosulfide hydrate (11.1 g, $NaSH \cdot xH_2O$), sulfur (1.80 g, 56.2 mmol) and sodium hydroxide (3.3 g, 83.3 mmol) in 140 mL of water first at 80 $^0$C for 10 min and then being allowed to cool down to room temperature. The resulting clear, faint-orange solution was added dropwise in two batches (90 mL in 2.5h and 50 mL in the next 4 h) at 90 $^0$C to a flask containing 1, 5-dimethoxy-2, 4-dinitro-benzene (10.0 g, 43.8 mmol). The reaction mixture was allowed to cool down to room temperature and to stand overnight. Filtration and washing with water provided a yellow crystal (7.20 g, 82.8 %), which contained the mono-reduced nitro compound as the only product; m.p. 125.6 $^0$C. $^1$H NMR (500 MHz, $CDCl_3$) δ 7.41 (s, 1H), 6.49 (s, 1H), 3.96 (s, 3H), 3.94 (s, 3H), 3.73 (s, 2H); MS (ESI) m/z, Calcd for $C_8H_{10}N_2O_4$ ($M^+$) 198.06, Found 199.0 ($M+H^+$).

**{3-[4-Amino-5-(3-tert-butoxycarbonylamino-propoxy)-2-nitro-phenoxy]-propyl}-carbamic acid tert-butyl ester (4''b).** Prepared analogously as described above for compound **4''a**. Yellow solid, 78.5%. m.p. 108.8$^0$C. $^1$H NMR (500 MHz, $CDCl_3$) δ 7.47 (s, 1H), 6.46 (s, 1H), 5.21 (s, 1H), 4.72 (s, 1H), 4.11 (m, 4H), 3.36 (m, 4H), 2.05 (m, 4H), 1.44 (s, 18H); $^{13}$C NMR (75.4 MHz, $CDCl_3$) δ 156.4, 156.2, 151.8, 147.5, 139.1, 130.4, 111.4, 66.8, 38.3, 29.7, 29.6, 28.5, 28.5; MS (ESI) m/z, Calcd for $C_{22}H_{36}N_4O_8$ ($M^+$) 484.25, found 485.2 ($M+H^+$). HRMS *m/z* calcd. for $C_{22}H_{36}N_4NaO_8$ ($M+Na^+$): 507.24308. Found: 507.24495. Anal. Calcd. for $C_{22}H_{36}N_4O_8$: C, 54.53; H, 7.49; N, 11.56. Found C, 54.12; H, 7.54, N, 11.47.

**4-Methyl-2-nitro-1-octyloxy-benzene (20a).** Following the general procedure **(1)**, a mixture of 4-methyl-2-nitrophenol (20g, 0.13 mol), 1-bromooctane (30.3g, 0.16 mol) and anhydrous potassium carbonate (90.2g, 0.65 mol) in DMF (150mL) and dry acetone (10mL) was heated at 90°C for 3 days. Workup as usual provided the product as brown oil (31.4g, 91.0%) $^1$H NMR (400MHz, $CDCl_3$) δ 7.63 (s, 1H), 7.29 (d, 1H, J = 8.4), 6.95 (d,1H, J = 8.8), 4.06 (t, 2H, J=6.4), 2.33 (s, 3H), 1.79-1.85 (m, 2H), 1.28-1.48 (m, 10H), 0.87 (t, 3H, J = 6.8). $^{13}$C NMR (125.7 MHz, $CDCl_3$) δ 150.6, 139.8, 134.8, 130.1, 152.8, 114.7, 69.9, 32.0, 29.5, 29.4, 29.2, 26.1, 22.9, 20.3, 14.3; MS (ESI) m/z, Calcd for $C_{15}H_{23}NO_3$ ($M^+$) 265.2, found 266.3 $(M+H)^+$. Anal. Calcd. for $C_{15}H_{23}NO_3$: C, 67.90; H, 8.74; N, 5.28; Found C, 67.87; H, 8.79, N, 5.27.

**1-{2-[2-(2-Methoxy-ethoxy)-ethoxy]-ethoxy}-4-methyl-2-nitro-benzene (20b).** A mixture of 4-methyl-2-nitro-phenol (5.0 g, 32.6 mmol), tosylate of triethylene glycol monomethyl ether (13.5 g, 42.4 mmol) and anhydrous $K_2CO_3$ (8.1 g, 58.7 mmol) in DMF was heated at 85$^0$C overnight. After filtration and removing the solvent water was added and the residual mixture was extracted with EtAc twice, washed with water once, dried over $MgSO_4$ and filtered. The product was obtained as yellow oil after removing the solvent (8.3g, 85.1%). $^1$H NMR (500 MHz, $CDCl_3$) δ 7.62 (s,1H), 7.30 (d, J = 10.5 Hz, 1H), 6.99 (d, J = 10.5 Hz, 1H), 4.22 (t, J =12 Hz, 2H), 3.89 (t, J = 12 Hz, 2H), 3,68~3.54 (m, 8H), 3.37 (s, 3H), 2.34 (s, 3H); $^{13}$C NMR (125.7 MHz, $CDCl_3$) δ 150.4, 134.9, 130.8, 125.9, 115.4, 72.1, 71.3, 70.9, 70.7, 70.0, 69.6, 59.2, 20.4; MS (ESI) m/z, Calcd for $C_{14}H_{21}NO_6$ ($M^+$) 299.14, found 300.0 $(M+H)^+$, 322.0 $(M+Na)^+$. Anal. Calcd. for $C_{14}H_{21}NO_6$: C, 56.18; H, 7.07; N, 4.68. Found C, 56.08; H, 7.16, N, 4.79.

**2,4-Dimethoxy-N-(5-methyl-2-octyloxy-phenyl)-5-nitro-benzamide (21a).** Following general procedure (4), compound **20a** (3.00 g, 11.3 mmol) was reduced by catalytic hydrogenation in methanol (50 mL) at room temperature for 8 h. The resulting amine was dissolved in $CH_2Cl_2$ (30 mL) and triethylamine (8 mL) was added followed by the addition of acid chloride, prepared from 2,4-dimethoxy-5-nitro-benzoic acid (3.34 g, 14.7 mmol) based on the general procedure **(2)**. The solution was stirred overnight at room temperature and then washed with 10% HCl and water, dried over anhydrous $Na_2SO_4$. After the removal of the solvent, the residue was triturated with ethyl acetate to afford the dimer as a white solid (3.60 g, 71.7%). m.p.141.3~143.2 $^0$C $^1$H NMR (400 MHz, $CDCl_3$) δ 0.04 (s, 1H), 8.98 (s, 1H), 8.46 (s, 1H), 6.85 (d, 1H, *J* = 8.0), 6.79 (d, 1H, *J* = 8.4), 6.58 (s, 1H), 4.14 (t, 2H, *J* = 4.4), 4.04-4.09 (m, 5H), 2.33 (s, 3H), 1.86 (m, 20H) 0.91(m 10H); $^{13}$C NMR (125.7 MHz, $CDCl_3$) δ 161.5, 160.7, 157.3, 145.8, 133.6, 131.8, 130.7, 128.0, 124.3, 121.4, 115.2, 110.9, 96.4, 69.0, 57.0, 32.0, 29.8, 29.6, 29.5, 26.2, 22.9, 21.3, 14.3, 8.4; MS (ESI) m/z, calcd for $C_{24}H_{33}N_2O_6$ ($M^+$) 445.53, found 446.2 $(M+H)^+$. Anal Calc'd for $C_{24}H_{32}N_2O_6$ C, 64.85; H, 7.26; N, 6.30; found C, 65.06; H, 7.34; N, 6.30.

**2,4-Dimethoxy-N-(2-{2-[2-(2-methoxy-ethoxy)-ethoxy]-ethoxy}-5-methyl-phenyl)-5-nitro-benzamide (21b).** Following the general procedure **(4)**, dimer **20b** (5.0 g, 16.7 mmol) was reduced in ethanol (70 mL) at 1 Pa for 2 h. Dry $CH_2Cl_2$ (80 mL) and $Et_3N$ (4.45g, 44.0 mmol) were added to the residue and the chloride of 2,4-dimethoxy-5-nitro-benzoic acid (4.0g, 17.6 mmol), prepared according to the general procedure **(2)**, was added dropwise in 30 min. The mixture was stirred at room temperature overnight. After filtration the brown solution was concentrated and the residue was triturated with ethanol to afford a faint-yellow solid (6.1g, 76.3%); m.p. 116.8~117.5$^0$C. $^1$H NMR (400MHz, $CDCl_3$) δ 10.20 (s, 1H), 8.96 (s, 1H), 8.45 (s, 1H), 6.81 (q, 2H), 6.60 (s, 1H), 4.24 (t, 2H), 4.19 (s, 3H), 4.04 (s, 3H), 3.88 (t, 2H), 3.66 (t, 2H), 3.61 (t, 2H), 3.58 (t, 2H), 3.49 (t, 2H), 3.34 (s, 3H), 2.33 (s, 3H); $^{13}$C NMR (125.7 MHz, $CDCl_3$) δ 161.1, 160.4, 156.8, 146.1, 133.2, 131.0, 130.5, 127.7, 123.9, 120.6, 114.1, 109.7, 96.7, 96.7, 70.1, 56.7, 56.7, 56.0, 55.9, 31.9, 29.7, 29.6, 29.6, 29.5, 29.4, 29.3, 28.8, 25.8, 22.7, 21.1, 21.1, 14.1; MS (ESI) m/z, calcd for $C_{23}H_{30}N_2O_9$ ($M^+$) 478.2, found 479 $(M+H)^+$, 501 $(M+Na)^+$. Anal. Calcd. for $C_{23}H_{30}N_2O_9$: C, 57.73; H, 6.32; N, 5.85. Found C, 57.09; H, 6.20, N, 5.87.

**Trimer (22a)**. To a solution of the amine prepared from the corresponding dimer **21a** (1.23g, 2.77mmol) according to the general procedure **(4)**, and triethyl amine (2.5mL) in $CH_2Cl_2$ (20mL) was added the acid chloride prepared from **1c** (1.41g, 3.32mmol) according to the general procedure **(2)**. The solution was stirred at room temperature for 18 h. The solvent was evaporated and the crude trimer triturated with acetone to afford the product as a light yellow solid (1.61g, 71.2% yield). m.p.157.5~159.0 $^0$C $^1$H NMR (400MHz, $CDCl_3$) δ 10.18 (s, 1H), 9.63 (s, 1H), 9.23 (s, 1H), 8.86 (s, 1H), 8.60 (s, 1H), 6.83-6.75 (m, 2H), 6.39 (s, 1H), 6.33 (s, 1H), 4.22 (t, 2H, J=9.0), 4.04-3.93 (m, 12H), 2.35 (s, 3H), 2.04 (m, 2H), 1.85 (m, 2H), 1.74 (m, 2H), 1.60-1.26 (m, 44H), 0.88 (m, 9H); MS (ESI) m/z, calcd for $C_{55}H_{85}N_3O_9$ ($M^+$) 931.6, found 932.4 $(M+H)^+$, 954.4 $(M+Na)^+$. Anal. Calc'd for $C_{55}H_{85}N_3O_9$ C, 70.86; H, 9.19; N, 4.51; found C, 70.29; H, 9.11; N, 4.56.

**Trimer (22b).** Dimer **21b** (2.50 g, 5.22 mmol) was hydrogenated in chloroform/ethanol (60mL, 2:1) (40$^0$C, 4 Pa, 5 h). The resulting solid was dried in vacuum at ca.45$^0$C for 2 h. Dry $CH_2Cl_2$ (60 mL) and $Et_3N$ (1.32 g, 13.05 mmol) were added. The acid chloride prepared from the acid **1e** (2.63g, 5.35 mmol) in methylene chloride (10 mL) according to the general procedure **(2)**, was added dropwise in 30 min and then the mixture was stirred at room temperature overnight. After removing the solvent the brown residue was triturated with ethanol and then with ethyl acetate to afford a yellow solid (3.46 g, 72.0%); m.p. 132.5~133.5$^0$C. $^1$H NMR (500MHz, DMSO-$d_6$) δ 10.46 (s, 1H), 9.99 (s, 1H), 9.02 (s, 1H), 8.65 (s, 1H), 8.40 (s, 1H), 7.10 (s, 1H), 6.99 (d, J=8.5Hz, 1H), 6.94 (s, 1H), 6.86 (d, J=8.5Hz, 1H), 4.61 (t, 2H), 4.46 (t, 2H), 4.23 (t, J=9Hz, 2H), 4.14 (s, 3H), 4.06 (s, 3H), 3.94 (t, J=8.5Hz, 2H), 3.83 (m, 4H), 3.63 (t, J=9 Hz, 2H), 3.59 (q, 4H), 3.54~3.50 (m, 6H), 3.47 (s, J=9.5Hz, 2H), 3.44~3.41 (m, 4H), 3.39~3.34 (m, 4H), 3.28 (t, 2H), 3.22 (s, 3H), 3.19 (s, 3H), 3.15 (s, 3H); $^{13}$C NMR (125.7 MHz, $CDCl_3$) δ 162.7, 160.8, 160.0, 156.2, 154.5, 152.6, 145.2, 132.8, 130.9, 129.0, 124.4, 123.3, 121.6, 121.0, 114.7, 113.9, 111.3, 98.8, 94.6, 71.9, 71.9, 71.8, 71.1, 70.7, 70.6, 70.6, 70.5, 70.5, 69.8, 69.6, 69.0, 68.2, 59.0, 59.0, 56.3, 56.0, 21.2; MS (ESI) m/z, Calcd for $C_{44}H_{63}N_3O_{18}$ ($M^+$) 921.41, found 922 $(M+H)^+$, 944 $(M+Na)^+$. Anal. Calcd. for $C_{44}H_{63}N_3O_{18}$: C, 57.32; H, 6.89; N, 4.56. Found C, 57.04; H, 6.89, N, 4.50.

**Tetramer (23).** Prepared analogously as described above for compound **22b.** To a solution of amino trimer prepared from the corresponding trimer **22b** (2.0 g, 2.17 mmol) according to the general procedure **(4)** (50$^{o}$C, 4 Pa, 5 h). Dry $CH_2Cl_2$ (60 mL) and $Et_3N$ (2.63 g, 2.60 mmol), was added the acid chloride prepared from the corresponding acid **1a** (0.49g, 2.16 mmol) in methylene chloride (10 mL) according to the general procedure **(2)**. Similar workup as for trimer provided the product as a yellow solid (1.83 g, 77.0%); m.p.160.5$^{0}$C. $^{1}$H NMR (500 MHz, $CDCl_3$) δ 10.37 (s, 1H), 9.71 (s, 1H), 9.14 (s, 1H), 8.92 (s, 1H), 8.61 (s, 1H), 6.88 (s, 2H), 6.71 (s, 1H), 6.56 (s, 1H), 4.52 (t, 2H), 4.31 (m, 4H), 4.13 (s, 3H), 4.11 (t, 2H), 4.06 (s, 3H), 3.96 (m, 4H), 3.82~3.52 (m, 24H), 3.44 (s, 3H), 3.42 (s, 3H), 3.39 (s, 3H), 2.41 (s, 3H); $^{13}$C NMR (125.7 MHz, $CDCl_3$) δ 162.8, 162.1, 161.9, 159.8, 157.0, 154.6, 153.1, 132.0, 130.8, 129.0, 123.3, 122.1, 121.1, 114.1, 113.9, 113.8, 111.2, 96.4, 96.3, 95.1, 71.9, 71.8, 70.6, 70.54, 70.50, 70.47, 70.41, 69.6, 69.3, 69.2, 68.7, 68.3, 68.1, 59.0, 58.9, 57.4, 56.6, 56.5, 56.2, 21.2; MS (ESI) m/z, calcd. for $C_{53}H_{72}N_4O_{21}$ ($M^+$) 1100.47, found 1101 $(M+H)^+$,1123 $(M+Na)^+$. HRMS *m/z* calcd. for $C_{53}H_{72}N_4NaO_{21}$ ($M+Na^+$): 1123.4587. Found: 1123.4592. For NOESY spectra, see Fig.S5~S7.

**Pentamer (24).** Prepared analogously as described above for compound **23.** Hydrogenatation (53$^{o}$C, 4 Pa, 4 h) of tramer **23** (1.40 g, 1.27 mmol) followed by coupling the diacid chloride, prepared from **1e** (0.72g, 1.47 mmol) in $CH_2Cl_2$ (30 mL) in the presence of $Et_3N$ (0.37 g, 3.65 mmol) provided the crude product in brown oil. Chromatography ($CHCl_3$/EtAc/MeOH=10:1:1) afforded a yellow solid (1.71g, 87.3%). m.p.141.2$^{0}$C. $^{1}$H NMR (500MHz, $CDCl_3$) δ 10.32 (s, 1H), 9.97 (s, 1H), 9.79 (s, 1H), 9.96 (s, 1H), 9.22 (s, 1H), 9.14 (s, 1H), 8.93 (s, 1H), 8.80 (s, 1H), 8.57 (s, 1H), 6.80 (s, 2H), 6.61 (s, 1H), 6.54 (s, 1H), 6.53 (s, 1H), 6.36 (s, 1H), 4.51 (t, 2H), 4.28, 4.27 (t, t, 4H), 4.23 (t, 2H), 4.18 (t, 2H), 4.11 (t, 2H), 4.07 (s, 3H), 4.02 (s, 3H), 3.98 (s, 3H), 3.97 (s, 3H), 3.95~3.93 (m, 4H), 3.90 (t, 2H), 3.80 (t, 2H), 3.77(t, 2H), 3.73 (m, 4H), 3.69 (m, 4H), 3.66~3.48 (m, 26H), 3.45 (m, 4H), 3.36 (s, 3H), 3.35 (s, 3H), 3.32 (s, 3H), 3.31 (s, 3H), 3.29 (s, 3H), 2.35 (s, 3H); $^{13}$C NMR (125.7 MHz, $CDCl_3$) δ 162.8, 162.2, 162.0, 161.2, 159.9, 156.2, 154.4, 154.3, 153.0, 152.8, 152.6, 151.2, 145.3, 132.5, 130.7, 129.1, 124.3, 124.1, 123.5, 123.1, 122.8, 122.4, 121.3, 120.9, 114.5, 114.3, 113.8, 113.2, 111.2, 98.9, 97.1, 94.8, 94.2, 71.9, 71.8, 71.8, 71.8, 71.8, 71.0, 70.7, 70.6, 70.6, 70.5, 70.45, 70.42, 70.40, 70.3, 69.9, 69.8, 69.6, 69.4, 69.1, 69.0, 68.9, 68.5, 68.1, 58.97, 58.89, 58.88, 56.4, 56.1, 56.1, 56.1, 21.2; MS (ESI) m/z, Calcd for $C_{74}H_{105}N_5O_{30}$ ($M^+$) 1543.68, found 1544.66 ($M+H^+$). HRMS *m/z* calcd. for $C_{74}H_{105}N_5NaO_{30}$ ($M+Na^+$) 1566.67421; Found: 1566.6759 ($M+Na^+$). For NOESY spectra, see Fig.S8~10.

**Hexamer (25)**.[10] This compound was prepared similarly as described above for compound **24** in a yield of 83%. m.p.131.8~132.5 $^{0}$C. $^{1}$H NMR (500MHz, 273K, 20%DMSO-$d_6$-80%$CDCl_3$) δ 10.49 (s, 1H), 10.42 (s, 1H), 10.31 (s, 1H), 10.08 (s, 1H), 10.06 (s, 1H), 9.35 (s, 1H), 9.34 (s, 1H), 9.19 (s, 1H), 9.16 (s, 1H), 8.54 (s, 1H), 8.30 (d, 1H), 7.54 (t, J = 8.5 Hz, 1H), 7.14 (t, J = 8.0 Hz, 1H), 7.11 (d, J = 8.0 Hz, 1H), 6.84 (m, 2H), 6.75 (s, 1H), 6.71 (s, 1H), 6.66 (s, 1H), 4.41~4.36 (m, 8H), 4.26 (t, 2H), 4.14 (s, s, 6), 4.12 (s, 3H), 4.07 (s, 3H), 4.04 (s, 3H), 4.00~3.98 (m, 8H), 3.94 (t, 2H), 3.77~3.44 (m), 2.35 (s, 3H); MS (ESI) m/z, Calcd for $C_{83}H_{114}N_6NaO_{33}$ 1745.73246 ($M^+$), found 1745.73392 ($M+H^+$). For NOESY spectra, see Fig.S8~10.

**Dimer (26a)**. The acid chloride of **1 b** was prepared from **1 b** (3.81g, 10.0mmol) in accordance with general procedure **2.** The acid chloride was dropped slowly into a stirred

solution of 2-methoxy-5-methylaniline (1.24g, 9.0mmol) and triethylamine (1.88mL, 13.5 mmol) in $CH_2Cl_2$ (50mL) at 0°C under argon over 20 minutes. The solution was warmed to room temperature and stirred for 18 h. The reaction was quenched with water and the solution washed with alternate washings of 10% HCl solution, saturated sodium bicarbonate solution and water. The organic layer was dried over sodium sulfate, evaporated. Recrystallization from chloroform/ethyl acetate provided the dimer as an off-white solid (3.47g, 77.1%). m.p. 148-149 $^oC$ $^1H$ NMR (400 MHz, $CDCl_3$) δ 10.19 (s, 1H), 8.93 (s, 1H), 8.42 (s, 1H), 6.85 (d, 1H, J=10), 6.78 (d, 1H, J=10), 6.53 (s, 1H), 4.13 (s, 3H), 3.91 (s, 2H), 2.34 (s, 3H), 1.87 (s, 2H), 1.55 (s, 2H), 1.50 (s, 2H), 1.27 (s br, 12H), 0.88 (s, 3H). $^{13}C$ NMR (125.7 MHz, $CHCl_3$) δ 161.1, 160.4, 156.8, 146.1, 133.2, 131.0, 130.5, 127.7, 123.9, 120.6, 114.1, 109.7, 96.7, 96.7, 77.3, 77.0, 76.8, 70.1, 56.7, 56.7, 56.0, 55.9, 31.9, 29.7, 29.65, 29.60, 29.5, 29.4, 29.3, 28.8, 25.8, 22.7, 21.07, 21.06, 14.1; MS (ESI) m/z, Calcd for $C_{28}H_{40}N_2O_6$ ($M^+$) 500.3, found 501.1 $(M+H)^+$, 523.1 $(M+Na)^+$.Anal Calc'd $C_{28}H_{40}N_2O_6$ C, 67.18; H, 8.05; N, 5.60; found C, 67.01; H, 8.07; N, 5.61.

**Trimer (26b)**. Prepared analogously as described above for dimer **26a**. Off-white solid; Yield 77.9%. m.p.163.5-165.0 $^oC$ $^1H$ NMR (400 MHz, $CDCl_3$) δ10.37 (s, 1H), 9.69 (s, 1H), 9.25 (s, 1H), 8.79 (s, 1H), 8.52 (s, 1H), 6.80 (m, 3H), 6.25 (s, 1H), 6.21(s, 1H), 4.12 (s, 3H), 3.99 (s, 2H), 3.90 (s, 2H), 2.35 (s, 3H), 1.93 (s, 2H), 1.72 (s, 2H), 1.58 (s, 2H), 1.50 (s, 2H), 1.41 (s, 2H), 1.26 (br, 24H), 0.89 (s, 3H), 0.88 (s, 3H); $^{13}C$ NMR (125.7 MHz, $CHCl_3$) δ 162.8, 161.5, 159.8, 156.5, 153.8, 151.3, 146.2, 132.2, 130.7, 128.7, 123.4, 122.8, 122.1, 120.7, 113.8, 113.1, 109.7, 96.7, 94.6, 77.6, 77.3, 77.0, 70.1, 69.3, 57.4, 56.2, 56.1, 46.0, 32.2, 29.9, 29.9, 29.89, 29.87, 29.85, 29.76, 29.69, 29.6, 29.1, 26.0, 25.8, 22.9, 21.4, 14.4, 8.8; MS (ESI) m/z, Calcd for $C_{48}H_{71}N_3O_9$ ($M^+$) 833.5, found 834.4 $(M+H)^+$, 856.4 $(M+Na)^+$. Anal Calc'd $C_{48}H_{71}N_3O_9$ C, 69.12; H, 8.58; N, 5.04; found C, 68.91; H, 8.64; N, 4.82.

**Tetramer (26c)**. Off-white solid, Yield 73.0%. m.p. 186.0-186.4 $^oC$ $^1H$ NMR (500 MHz, $CDCl_3$) δ 10.39 (s, 1H), 9.88 (s, 1H), 9.74 (s, 1H), 9.41 (s, 1H), 9.18 (s, 1H), 8.82 (s, 1H), 8.58 (s, 1H), 6.83 (s, 1H), 6.80 (s, 1H), 6.49 (s, 1H), 6.35 (s, 1H), 6.28 (s, 1H), 6.25 (s, 2H), 4.22 (s, 2H), 4.08 (s, 2H), 4.03 (m, 2H), 3.97 (m, 6H), 3.92 (s, 6H), 2.36 (s, 3H), 1.92 (s, 6H), 1.69 (s, 6H), 1.57-1.24 (m, 48H), 0.88 (m, 9H); MS (MALDI-TOF) m/z, Calcd for $C_{68}H_{102}N_4O_{12}$ ($M^+$) 1166.8, found 1166.7 $(M+H)^+$,1189.7 $(M+Na)^+$. Anal Calc'd for $C_{68}H_{102}N_4O_{12}$ C, 69.95; H, 8.81; N, 4.80; found C, 70.34; H, 8.71; N, 4.71.

**Pentamer (26d)**. Light yellow solid, Yield 68.3%. m.p. 169.7-171.0 $^oC$ $^1H$ NMR (500 MHz, $CDCl_3$) δ 10.39 (s, 1H), 9.95 (s, 1H), 9.86 (s, 1H), 9.81 (s, 1H), 9.44 (s, 1H), 9.36 (s, 1H), 9.19 (s, 1H), 8.80 (s, 1H), 6.80 (m, 4H), 6.37 (s, 2H), 6.17 (s, 1H), 4.30 (s, 2H), 4.10-3.89 (m, 21H), 2.38 (s, 3H), 1.92-1.84 (m, 8H), 1.67 (s, 2H), 1.58 (m, 2H), 1.42-1.21 (br m, 23H), 0.86 (m, 12H); MS (MALDI-TOF) m/z, Calcd for $C_{88}H_{133}N_5O_{15}$ ($M^+$) 1500.0, found 1501.1 $(M+H)^+$, 1522.9 $(M+Na)^+$. Anal Calc'd for $C_{88}H_{133}N_5O_{15}$ C, 70.41; H, 8.93; N, 4.67; found C, 70.15; H, 8.87; N, 4.41.

**Hexamer (26e)**. Off-white solid, Yield 65.4%. m.p.136.9-138.1 $^oC$ $^1H$ NMR (500 MHz, $CDCl_3$) δ 10.36 (s, 1H), 9.904 (s, 1H), 9.88 (s, 1H), 9.83 (s, 1H), 9.78 (s, 1H), 9.38 (s, 1H), 9.30 (s, 1H), 9.16 (s, 1H), 8.80 (s, 1H), 8.57 (s, 1H), 6.78 (s, 1H), 6.75 (s, 1H), 6.43 (s, 1H), 6.40 (s, 2H), 6.42 (s, 1H), 4.28 (s, 1H), 4.02 (s, 6H), 3.94 (s, 6H), 3.88 (s, 6H), 2.33 (s, 3H), 1.88 (s, 2H), 3.97 (s, 3H), 1.63 (s, H), 1.43 (m, 2H), 1.31-0.88 (m, 10H), 0.84 (m, 3H); MS (MALDI-TOF)

m/z, Calcd for $C_{108}H_{164}N_6O_{18}$ ($M^+$) 1833.2, found 1834.2 $(M+H)^+$, 1856.1 $(M+Na)^+$. Anal Calc'd for $C_{108}H_{164}N_6O_{18}$ C, 70.71; H, 9.01; N, 4.58; found C, 70.61; H, 8.89; N, 4.45

**Heptamer (26f)**. The product was purified by column chromatography ($CHCl_3$/EtOAc/ MeOH, 10:1:1) to afford **13f** as a yellow solid (1.54g, 60.1%). m.p. 132-134 $^oC$ $^1H$ NMR (500 MHz, $CDCl_3$) δ10.33 (s, 1H), 9.85 (s, 2H), 9.72 (s, 1H), 9.68 (s, 1H), 9.35 (s, 2H), 9.23 (s, 1H), 9.11 (s, 1H), 8.74 (s, 1H), 8.50 (s, 1H), 6.63 (s, 1H), 6.47 (s, 2H), 6.38 (s, 2H), 6.29 (s, 2H), 6.18 (s, 2H), 6.09 (s, 1H), 4.25 (s, 2H), 4.04-3.95 (m, 6H), 3.78 (s, 6H), 3.71 (s, 6H), 3.63 (s, 6H), 2.24 (s, 3H), 1.87 (br s, 14H), 1.74 (s, 14H), 1.43 (m, 14H), 1.25-0.88 (m, 70H), 0.87-0.79 (m, 21H); MS (MALDI-TOF) m/z, Calcd for $C_{128}H_{195}N_7O_{21}$ ($M^+$) 2166.4, found 2167.1 $(M+H)^+$, 2189.2 $(M+Na)^+$. Anal. Calcd for $C_{128}H_{195}N_7O_{21}$ C, 70.91; H, 9.07; N, 4.52; found C, 70.55; H, 9.02; N, 4.51

**Octamer (26g)**. The product was purified by column chromatography ($CHCl_3$/EtOAc/ MeOH, 10:1:1) to afford as a yellow powder (1.03g, 58%). m.p.130.2-131.2 $^oC$ $^1H$ NMR (500 MHz, $CDCl_3$) δ 10.30 (s, 1H), 9.95 (s, 1H), 9.83 (s, 2H), 9.62 (s, 3H), 9.29 (s br, 4H), 9.11 (s, 1H), 8.76 (s, 1H), 8.60 (s, 1H), 8.49 (s, 1H), 6.67 (s, 1H), 6.54-6.39 (br, 8H), 4.11-3.64 (br, 26H), 3.50 (s, 18H), 1.92-1.20 (br, 140H), 0.95-0.84 (br, 21H); MS (ESI) m/z, Calcd for $C_{149}H_{229}N_8O_{24}$ ($M^+$) 2514.7, found 2515.5 $(M+H)^+$, 2537.9 $(M+Na)^+$. Anal. Calcd for $C_{149}H_{229}N_8O_{24}$ C, 71.06; H, 9.11; N, 4.48 found C, 68.57; H, 8.95; N, 4.39.

**4-(4-Methyl-2-nitro-phenoxy)-butyric acid ethyl ester (27a).** Following the general procedure (**1**), reaction of 4-methyl-2-nitro-phenol (10.0 g, 65.3 mmol) with 4-bromo-butyric acid ethyl ester (15.3 g, 78.4 mmol) in the presence of $K_2CO_3$ (13.5 g, 98.0 mol) in DMF (160 mL) for 24 h followed by filtering, removing DMF, extracting with ethyl acetate, provided the product as an brown oil (16.1 g, 92.3%). $^1H$ NMR (400 MHz, $CDCl_3$) δ7.64 (s, 1H), 7.31 (d, 1H, J=14.0 H), 6.96 (d, 1H, J=14.0 Hz), 4.18 ~ 4.11 (m, 4H), 2.56 (t, 2H), 2.14 (m, 2H), 1.26 (t, 3H). $^{13}C$ NMR (75.5 MHz, $CDCl_3$) δ173.11, 150.12, 139.55, 134.72, 130.30, 125.66, 114.59, 68.42, 60.46, 30.35, 24.34, 20.14, 14.20; MS (ESI) m/z, Calcd for $C_{13}H_{17}NO_5$ ($M^+$) 267.11, found 268.1 $(M+H)^+$. Anal. Calcd. for $C_{13}H_{17}NO_5$: C, 58.42; H, 6.41; N, 5.24. Found C, 58.30; H, 6.23, N, 5.12.

**Dimer (27b).** Compound **27a** (0.34 g, 1.27 mmol) was reduced in ethanol (Pd-C 50 mg, 2 h, $30^0C$, 4Pa) and worked up according to the general procedure (**4**) to afford an oil (0.30 g). A mixture of the reduced amine, 2,4-dimethoxy-5-nitro-benzoic acid (0.30 g, 1.32 mmol) and $Ph_3PCl_2$ (1.51 g, 4.54 mmol) in methylene chloride (20 mL) was refluxed 4 h. The solution was washed with 10% HCl, saturated $NaHCO_3$, water and dried over $Na_2SO_4$. Trituration with ethanol provided the product as a white solid (0.48g, 85.3%); m.p. 181.2~182.2 $^0C$. $^1H$ NMR (500MHz, $CDCl_3$) δ 9.94 (s, 1H), 8.93 (s, 1H), 8.43 (s, 1H), 6.83 (d, J = 7.5 Hz, 1H), 6.75 (d, J = 7.5 Hz, 1H), 6.52 (s, 1H), 4.14 (s, 3H), 4.06 (t, J = 5.5 Hz, 2H), 4.00 (s, 3H), 2.51 (t, J = 7.0 Hz, 2H), 2.33 (s, 3H), 2.18 (t, J = 6.5 Hz, 2H), 1.25 (t, J = 7Hz, 6H); $^{13}C$ NMR (125.7 MHz, $CDCl_3$) δ 173.07, 161.60, 160.74, 157.40, 145.49, 133.40, 131.71, 130.93, 127.92, 124.35, 121.46, 115.03, 110.97, 96.47, 67.86, 60.86, 57.21, 57.03, 30.99, 25.16, 21.27, 14.44; MS (ESI) m/z, Calcd for C, 59.19; H, 5.87; N, 6.27. Found C, 59.16; H, 5.80, N, 6.25.

**Trimer (27c).** Dimer **27b** (1.00 g, 2.23 mmol) was reduced in $CH_2Cl_2$/DMF (Pd-C 0.20 g, 4 h, 50$^0$C, 4Pa) and worked up according to the general procedure (**4**) to afford the free amine as an off-white solid (0.93 g, 2.23 mmol). A mixture of the reduced amine, diester acid **1h** (1.00 g, 2.34 mmol) and $Ph_3PCl_2$ (2.67 g, 8.03 mmol) in dry methylene chloride (100 mL) was refluxed 12 h. The workup following that for dimer **27b** provided the product as an off-white solid (1.35g, 73.3%); m.p. 150.0~151.2$^0$C. $^1$H NMR (500 MHz, $CDCl_3$) δ 10.14 (s, 1H), 9.60 (s, 1H), 9.21 (s, 1H), 8.80 (s, 1H), 8.57 (d, J = 1.5 Hz, 1H), 6.82 (d, J = 8.0 Hz, 1H), 6.77 (s, J = 8.5 Hz, 1H), 6.43 (s, 1H), 6.36 (s, 1H), 4.32 (t, J = 7.5 Hz, 2H), 4.19~4.07 (m, 8H), 4.01 (t, J = 6.5 Hz, 2H), 3.99 (s, 3H), 3.96 (s, 3H), 2.64 (t, J = 7.5 Hz, 2H), 2.52 (t, J = 7.5 Hz, 2H), 2.45 (t, J = 7.0 Hz, 2H), 2.37 (m, 2H), 2.36 (s, 3H), 2.19 (m, 2H), 2.03 (m, 2H), 1.26 (m, 9H); $^{13}$C NMR (125.7 MHz, $CDCl_3$) δ 173.2, 173.1, 173.1, 162.8, 161.0, 160.0, 156.3, 154.1, 152.1, 145.3, 132.3, 131.1, 130.8, 128.8, 123.5, 123.5, 122.0, 121.1, 114.1, 113.5, 110.8, 97.9, 94.3, 70.0, 68.8, 67.8, 60.9, 60.8, 60.7, 56.4, 56.1, 30.8, 30.3, 30.1, 25.1, 24.2, 24.0, 21.4, 14.45, 14.43, 14.41; MS (ESI) m/z, Calcd for $C_{41}H_{51}N_3O_{15}$ ($M^+$) 825.33, found 826.4 $(M+H)^+$. Anal. Calcd. for $C_{41}H_{51}N_3O_{15}$: C, 59.63; H, 6.22; N, 5.09. Found C, 59.54; H, 6.23, N, 5.12.

**Tetramer (27d).** Trimer **27c** (0.43 g, 0.52 mmol) was reduced in $CH_2Cl_2$/DMF (Pd-C 0.20 g, 4 h, 50$^0$C, 4Pa) and worked up according to the general procedure (**4**) to afford the free amine as a yellow crystal (0.41 g, 0.52 mmol). A mixture of the reduced amine, 2,4-dimethoxy-5-nitro-benzoic acid (0.13 g, 0.57 mmol) and $Ph_3PCl_2$ (0.62 g, 1.87 mmol) in dry methylene chloride (60 mL) was refluxed 2 days. The workup following that for dimer **14b** and recrystallized from $CH_2Cl_2$/MeOH provided the product as a white solid (0.44 g, 84.2%); m.p.223.2~224.5 $^0$C. $^1$H NMR (500MHz, $CDCl_3$) δ 10.16 (s, 1H), 9.72 (s, 1H), 9.66 (s, 1H), 9.35 (s, 1H), 9.09 (s, 1H), 8.83 (s, 1H), 8.57 (s, 1H), 6.82 (d, J = 8.5 Hz, 1H), 6.78 (d, J = 8.0 Hz, 1H), 6.56 (s, 1H), 6.42 (s, 1H), 6.40 (s, 1H), 4.23 (s, 3H), 4.19~4.08 (m, 6H), 4.05 (s, 3H), 4.01 (s, 3H), 3.89 (s, 3H), 3.73 (m, 4H), 2.63 (t, J=7.0 Hz, 2H), 2.54 (t, J = 7.5 Hz, 2H), 2.35 (s, 3H), 2.26 (m, 2H), 2.20 (m, 2H), 1.25 (m, 9H); MS (ESI) m/z, Calcd for $C_{50}H_{60}N_4O_{18}$ ($M^+$) 1004.39, found 1005.6 $(M+H)^+$. Anal. Calcd. for $C_{50}H_{60}N_4O_{18}\cdot H_2O$: C, 58.70; H, 6.11; N, 5.48. Found C, 58.12; H, 6.02, N, 5.41.

**Pentamer (27e).** Tetramer **27d** (150 mg, 0.15 mmol) was reduced in $CH_2Cl_2$/DMF (40mL/40mL, Pd-C 30 mg, 4 h, 50$^0$C, 4Pa) and worked up according to the general procedure (**4**). A mixture of the reduced amine, diester acid **1g** (70 mg, 0.16 mmol) and $Ph_3PCl_2$ (0.62 g, 1.87 mmol) in dry chloroform (70 mL) was refluxed 2 days. Filtration provided the product as a yellow solid (0.44 g, 84.2%) m.p.195.2~196.5$^0$C. $^1$H NMR (500 MHz, $CDCl_3$) δ 10.15 (s, 1H), 9.78 (s, 1H), 9.76 (s, 1H), 9.63 (s, 1H), 9.32 (s, 1H), 9.22 (s, 1H), 9.10 (s, 1H), 8.81 (s, 1H), 8.58 (s, 1H), 6.81 (d, J = 7.5 Hz, 1H), 6.77 (d, J = 8.5 Hz, 1H), 6.53 (s, 1H), 6.52 (s, 1H), 6.50 (s, 1H), 6.35 (s, 1H), 4.38 (t, J = 7.5 Hz, 2H), 4.16~4.07 (m, 20H), 2.68 (t, J = 7.0 Hz, 2H), 2.56~2.47 (m, 6H), 2.39 (m, 2H), 2.35 (s, 3H), 2.25~2.18 (m, 6H), 2.03 (m, 2H), 1.24 (m, 15H); MS (ESI) m/z, Calcd for $C_{69}H_{85}N_5O_{25}$ ($M^+$) 1383.55, found 1384.8 $(M+H^+)$. Anal. Calcd. for $C_{69}H_{85}N_5O_{25}\cdot H_2O$: C, 59.09; H, 6.25; N, 4.99. Found C, 58.88; H, 6.21; N, 5.17.

**Trimer (28a).** Dimer **21b** (543 mg, 1.13 mmol) was reduced in chloroform/ethanol (25 mL, 1:2, 50 $^0$C, 4 Pa) for 5 h and worked up according to the general procedure (**4A**). The resulting brown solid was used for the next coupling step. A mixture of the acid **1g** (500mg, 1.03 mmol) in methylene chloride (10 mL), EDC (494 mg, 2.58 mmol) and HOBt (351 mg, 2.60 mmol) was

stirred at room temperature for 50 min and then the reduced dimer was added with several drops of $Et_3N$. The mixture was stirred at room temperature overnight. After washing with water, the residue was subjected to chromatography ($CHCl_3$/MeOH, 50:1). The major band was collected to afford the product as an off-white solid (537 mg, 52.1%); m.p.147.2~148.5$^0$C. $^1$H NMR (500 MHz, $CDCl_3$) δ 10.29 (s, 1H), 9.63 (s, 1H), 9.21 (s, 1H), 8.87 (s, 1H), 8.55 (s, 1H), 6.80 (s, 2H), 6.59 (s, 1H), 6.47 (s, 1H), 4.32 (t, J = 9.0 Hz, 2H), 4.23 (t, J = 6.5 Hz, 2H), 4.13 (t, J = 7.5 Hz, 2H), 4.04 (s, 3H), 3.99 (s, 3H), 3.89 (t, J = 8.0 Hz, 2H), 3.68 (q, 4H), 3.63~3.58 (m, 4H), 3.49 (q, 2H), 3.34 (s, 3H), 2.51 (t, J = 9.5Hz, 2H), 2.44 (t, J = 8.5Hz, 2H), 2.34 (s, 3H), 2.30 (t, J = 8.5 Hz, 2H), 2.07 (t, J = 8.0 Hz, 2H), 1.45 (s, 9H), 1.44 (s, 9H). $^{13}$C NMR (125.7 MHz, $CDCl_3$) δ 172.4, 172.2, 162.7, 160.9, 159.9, 156.2, 154.1, 152.0, 145.2, 132.2, 130.9, 130.8, 129.0, 123.5, 123.2, 121.8, 120.9, 114.0, 113.4, 111.2, 97.7, 94.2, 80.7, 80.4, 71.9, 70.59, 70.57, 69.8, 69.6, 68.7, 68.1, 59.0, 56.1, 55.9, 31.3, 31.1, 28.2, 28.1, 24.2, 24.0, 21.2; MS (ESI) m/z, Calcd for $C_{46}H_{63}N_3O_{16}$ 913.42 ($M^+$), Found 914.4 $(M+H)^+$, 936.3 $(M+Na)^+$. Anal. Calcd. for $C_{46}H_{63}N_3O_{16}$: C, 60.45; H, 6.95; N, 4.60. Found C, 56.08; H, 7.16, N, 4.79. HRMS *m/z* calcd. for $C_{46}H_{63}N_3NaO_{16}$ ($M+Na^+$): 936.4106. Found: 936.4117. For $^1$H NMR and $^{13}$C NMR spectra, see Fig.S3 and S4.

**Tetramer (28b).** A mixture of trimer **28a** (200 mg, 0.22 mmol), 15% Pd/C (30 mg) and 4-amniopyridine (618 mg, 6.60 mmol) in a mixed solvent of chloroform and ethanol (30mL, 2:1) was shaken under $H_2$ (50$^o$C, 4 Pa) for 4 h. The mixture was filtered and the green residue was dissolved in a mixed solvent of $CHCl_3$/EtAc/MeOH (10:1:0.5) and filtered through a pad of silica gel. The filtrate was brought to dryness and washed with 10% $NaHCO_3$, water twice and dried over $Na_2SO_4$. The resulting solid after removing the solvent was used for the next coupling step. A mixture of 2,4-dimethoxy-5-nitro-benzoic acid (74.6 mg, 0.33 mmol) in methylene chloride (15 mL), EDC (158 mg, 0.82 mmol) and HOBt (113 mg, 0.84 mmol) was stirred at room temperature for 50 min and then the reduced trimer was added with several drops of $Et_3N$. The mixture was stirred at room temperature for 24 h. After removing all solvent the residue was subjected to chromatography ($CHCl_3$/EtAc/MeOH, 10:1:0.5, v/v). The major band was collected and concentrated. Trituration with EtAc provided a yellow solid (167 mg, 69.5%). m.p.200.5~201.2$^0$C. $^1$H NMR (500 MHz, $CDCl_3$) δ 10.31 (s, 1H), 9.75 (s, 1H), 9.71 (s, 1H), 9.37 (s, 1H), 9.14 (s, 1H), 8.80 (s, 1H), 8.60 (s, 1H), 6.80 (s, 1H), 6.79 (s, 1H), 6.54 (s, 1H), 6.34 (s, 1H), 6.33 (s, 1H), 4.24 (s, 3H), 4.21 (t, J = 5.0 Hz, 2H), 4.10 (t, J = 7.0 Hz, 2H), 4.06 (s, 3H), 4.02 (s, 3H), 3.89 (q, 2H), 3.81 (s, 3H), 3.69 (q, 2H), 3.63~3.59 (m, 4H), 3.50 (q, 2H), 3.35 (s, 3H), 2.53 (t, J = 7.0 Hz, 2H), 2.46 (t, J = 7.0 Hz, 2H), 2.36 (s, 3H), 2.23 (m, 4H), 1.48 (s, 9H), 1.45 (s, 9H); MS (ESI) m/z, Calcd for $C_{55}H_{72}N_4O_{19}$ ($M^+$) 1092.48, found 1093.5 $(M+H)^+$, 1115.5 $(M+Na)^+$. Anal. Calcd. for $C_{55}H_{72}N_4O_{19}$: C, 60.43; H, 6.64; N, 5.13. Found C, 60.71; H, 6.55, N, 5.06.

**Trimer (29a).** 1,5-Dinitro-2,4-bis-octyloxy-benzene (1.00 g, 2.36 mmol) was hydrogenated in the presence of 10%Pd carbon (0.10g) at 2Pa for 3h at room temperature. The solution was filtered in darkness as fast as possible followed by immediate removal of the solvent. The reduced diamine was used for the immediate coupling reaction. The acid chloride, prepared from 2,3-dimethoxy-4-nitro-benzoic acid (1.18 g, 5.18 mmol) and the above diamine were stirred at room temperature under argon in the presence of triethyl amine (0.57g, 5.70 mmol) overnight. After removing solvent, the residue was purified by chromatography ($CHCl_3$/EtAc, 50:1) to afford the product as the orange solid (1.35g, 73.4%); m.p.144.5~145.5$^0$C. $^1$H NMR (500 MHz,

$CDCl_3$) δ 10.33 (s, 2), 9.75 (s, 1), 8.17 (d, 2, J = 9Hz), 7.63 (d, 2, J = 9Hz), 6.59 (s, 1), 4.11, 4.09, 4.06 (t, s, s, 16), 1.91 (m, 4), 1.55 (m, 4), 1.45~1.40 (m, 16), 0.88 (t, 6); $^{13}$C NMR (125.7 MHz, $CDCl_3$) δ160.0, 152.8, 147.0, 146.6, 145.3, 131.5, 126.7, 120.6, 119.7, 114.3, 96.7, 69.2, 62.3, 62.2, 31.8, 29.5, 29.3, 26.0, 22.7, 14.1; MS (ESI) m/z, Calcd for $C_{40}H_{54}N_4O_{12}$ 782.37 ($M^+$), Found 783.3 ($M+H^+$). Anal. Calcd. for $C_{40}H_{54}N_4O_{12}$: C, 61.37; H, 6.95; N, 7.16. Found C, 61.37; H, 7.00, N, 7.13.

**Pentamer (29b).** Following the similar procedure for trimer **16**, the diamine from hydrogenation of dinitrotrimer (0.50g, 0.64 mmol) (4Pa, 48°C, 4h) was coupled with acid chloride, prepared from 5-nitro-2,4-bis-octyloxy-benzoic acid **1b** (0.60 g, 1.40 mmol) in the presence of triethyl amine (0.17g, 1.69 mmol). Recrystallization from methylene chloride/ethyl acetate provided the product as a yellow solid (0.98g, 95.0%); m.p.199.2~200.5$^0$C. $^1$H NMR (500 MHz, $CDCl_3$) δ 10.20 (s, 2H), 10.15 (s, 2H), 9.60 (s, 1H), 8.95 (s, 2H), 8.45 (d, 2, J = 9.0 Hz), 8.10 (d, 2H, J = 9.0 Hz), 6.58 (s, 2H), 6.56 (s, 1H), 4.34 (t, 4H), 4.15 (t, 4H), 4.06 (t, 4H), 4.03 (s, 6H), 3.96 (s, 6H), 3.20~3.00 (m, 12H), 2.07 (m, 4H), 1.89 (m, 4H), 1.80~1.20 (m, 58H), 0.88 (m, 12H); MS (ESI) m/z, Calcd for $C_{86}H_{128}N_6O_{18}$ 1532.93 ($M^+$), Found 1534.1 ($M+H^+$). Anal. Calcd. for $C_{86}H_{128}N_6O_{18}\cdot H_2O$: C, 66.55; H, 8.44; N, 5.42. Found C, 66.78; H, 8.45; N, 5.48.

**Trimer dimethyl ester (30a).** Following the hydrogenation and workup procedure for compound **29a**, the resulting diamine from 1,3-dinitrobenze (500 mg, 2.19mmol) was immediately used for the next coupling. A mixture of monomethyl ester acid **17c** (4.42 mmol), dry methylene chloride (25mL), oxalyl chloride (6.63 mmol) and 2 drops DMF was stirred under reflux for 1h. The solution turned red upon the end of the reaction. The resulting acid chloride dissolved in methylene chloride (15mL) was added dropwise to a solution of the above diamine and triethyl amine (0.55g, 5.44 mmol) in darkness in 30 min. The mixture was stirred at room temperature for ca.6 h and washed with saturated sodium bicarbonate, water and dried over $Na_2SO_4$. The crude product after removing solvent was triturated with ethyl acetate/methanol (3:1) to afford the product as an off-white solid (2.18 g, 93.2%). $^1$H NMR (500 MHz, $CDCl_3$) δ 9.66 (s, 2, NH), 9.32 (s, 1, Ar), 8.88 (s, 2, Ar), 6.58 (s, 2), 6.56 (s, 1), 4.25 (q, 4), 4.150 ~ 4.09 (m, 6), 3.97~ 3.90 (m), 3.90 (s, 6), 3.84 (s, 6), 3.67~ 3.57 (m, 8), 3.50 ~ 3.46 (m, 4), 1.73~1.58 (m), 1.48 (q, 6), 1.43 ~1.38 (m), 1.35 ~1.32 (m, 12), 0.91, 0.90 (d, d, 12, Me), 0.83, 0.81 (d, d, 12, Me). $^{13}$C NMR (125.7 MHz, $CDCl_3$) δ 165.1, 162.4, 161.7, 160.5, 146.3, 137.4, 120.6, 117.3, 114.9, 113.2, 97.6, 95.1, 73.6, 73.2, 73.1, 72.9, 68.1, 67.7, 55.9, 51.5, 38.8, 38.7, 24.9, 24.8, 22.6, 22.5, 22.5, 22.4, 17.4, 17.2; MS (ESI) m/z, Calcd for $C_{58}H_{88}N_2O_{16}$: 1068.61 ($M^+$), Found, 1091.1 ($M+Na^+$). Anal. Calcd. for $C_{58}H_{88}N_2O_{16}$: C, 65.15; H, 8.29; N, 2.62; Found C, 65.10; H, 8.11, N, 2.33.

**Trimer diacid (30b).** Following the general procedure **(3A)**, hydrolysis of dimethyl ester **18a** (0.25 g, 0.23 mmol) with KOH (0.26 g, 4.68 mmol) in water (1.0mL) under reflux for ca.3 h followed by trituration with ethyl acetate afforded the product as a white solid (0.21g, 86.2%); m.p.192.2~193.2$^0$C. $^1$H NMR (500 MHz, $CDCl_3$) δ 10.54 (s, 2), 9.47 (s, 2, NH), 9.03 (s, 2, Ar), 8.99 (s, 1), 6.66 (s, 2), 6.44 (s, 1), 4.30~4.24 (m, 4), 4.20~4.17 (m, 2), 4.07 (t, 2), 3.96~3,88 (m, 8), 3.86 (s, 6), 3.63 (q, 2), 3.58 (q, 2), 3.45 (q, 4), 1.71~1.46 (m), 1.37~1.25 (m), 0.89 (d, 12, Me), 0.78 (d, 12, Me); $^{13}$C NMR (125.7 MHz, DMSO-$d_6$) δ 165.9, 162.0, 161.0, 160.3, 146.1, 135.8, 119.5, 113.5, 113.4, 98.8, 73.0, 73.0, 72.7, 72.3, 67.0, 66.5, 56.0, 38.5, 38.3, 24.4, 24.3,

22.45, 22.43, 22.25, 22.22, 17.1, 16.5; MS (ESI) m/z, Calcd for $C_{56}H_{84}N_2O_{16}$ ($M^+$) 1058.59, Found 1081.3 ($M+Na^+$). Anal. Calcd. for $C_{56}H_{84}N_2O_{16}\cdot H_2O$: C, 63.50; H, 8.18; N, 2.64. Found C, 63.78; H, 8.19; N, 2.66.

**Dinitro pentamer (31).** To a solution of **4''a** in methylene chloride (30 mL) and triethyl amine (0.40g, 3.95 mmol) was added the acid chloride in methylene chloride (25mL) prepared from diacid trimer (1.18g, 1.13 mmol) and oxalyl chloride (0.57 g, 4.52 mmol) according to the general procedure **(2)**. The mixture was stirred at room temperature overnight and washed with 10%HCl and water to afford a brown-yellow solid. The crude was subjected to chromatography ($CHCl_3$/EtAc/MeOH, 10:1:0.5) to provided the product as a yellow solid (0.20 g, 12.6%); m.p.197.5~198.8$^0$C. $^1$H NMR (500 MHz, 60%$CDCl_3$-40%DMSO-$d_6$) δ 9.97 (s, 2, NH), 9.81 (s, 2, NH), 9.24 (s, 1, Ar), 9.12 (s, 2, Ar), 8.94 (s, 2, Ar), 6.86 (s, 2, Ar), 6.74 (s, 2, Ar), 6.71 (s, 1, Ar), 4.34~4.28 (m), 4.10 (s, 3, Me), 3.95 (s, 12, Me), 3.59 (m, 4), 3.44 (m, 4), 3.32 (s, 3, Me), 1.57 (m, 2), 1.33 (t, 12, Me), 0.76 (t, 24, Me). $^{13}$C NMR (125.7 MHz, 60% $CDCl_3$-40% DMSO-$d_6$) δ 161.6, 161.2, 160.1, 159.9, 153.8, 151.1, 146.2, 136.6, 130.7, 120.7, 120.0, 117.7, 117.6, 115.3, 114.4, 98.4, 96.5, 95.3, 73.3, 73.1, 72.9, 72.9, 67.0, 66.9, 56.7, 56.6, 55.9, 38.5, 38.5, 24.6, 24.5, 22.42, 22.35, 22.31, 16.8, 16.7; MS (MALDI-TOF), Calcd. for $C_{72}H_{100}N_6O_{22}$ ($M^+$) 1400.69, Found, 1423.7 ($M+Na^+$). Anal. Calcd. for $C_{72}H_{100}N_6O_{22}$: C, 61.70; H, 7.19; N, 6.00. Found C, 61.25; H, 7.23; N, 5.96.

**Dinitro trimer (32).** Prepared analogously as described above for compound **31.** Yellow solid, Yield 91.0%; m.p.223.2~224.2$^0$C. $^1$H NMR (500 MHz, $CDCl_3$) δ9.73 (s, 2H), 9.14 (s, 2H), 8.86 (s, 1H), 6.60 (s, 1H), 6.46 (s, 2H), 4.27 (q, 2H), 4.17 (q, 2H), 4.04 (s, 6H), 3.95 (q, 2H), 3.90 (s, 6H), 3.60 (m, 2H), 3.46 (m, 2H), 1.60 (m, 2H), 1.38 (m, 2H), 1.37 (d, 6H), 0.81, 0.80 (d, d, 12H); $^{13}$C NMR (125.7 MHz, 50%$CDCl_3$-50%DMSO-$d_6$) δ 147.5, 146.2, 139.9, 137.3, 116.6, 106.4, 100.5, 83.0, 59.2, 58.7, 52.6, 45.7, 42.8, 42.8, 24.4, 10.4, 8.24, 8.22, 2.5. MS (ESI) m/z, Calcd for $C_{40}H_{54}N_4O_{14}$ ($M^+$) 814.36, Found 815.4 ($M+H^+$). Anal. Calcd. for $C_{40}H_{54}N_4O_{14}$: C, 58.96; H, 6.68; N, 6.88. Found C, 59.02; H, 6.70; N, 6.80.

**Pentamer dimethyl ester (33).** Following the hydrogenation and workup procedure for compound **29b**, reduction of the dinitro trimer **32** (1.40 g, 1.72 mmol) in $CHCl_3$/EtOH (80mL, 4:1) afforded a yellow solid for the next coupling. Monomethyl ester acid chloride was prepared as in compound **30a** from **17c** (1.72g, 3.68 mmol) and oxalyl chloride (0.93 g, 7.36 mmol) in dry methylene chloride (30 mL). The resulting acid chloride was dissolved in methylene chloride (25mL) and added dropwise to a solution of the above diamine in methylene chloride (30 mL) and triethyl amine (1.49g, 14.7 mmol). The mixture was stirred at room temperature overnight and the solvent was removed. The crude was dissolved in ethyl acetate and washed with 10% NaOH, 10% HCl and water. Chromatography ($CHCl_3$/MeOH, 10:0.1) provided the desired pentamer as a yellow crystal (2.50 g, 87.8%); m.p.137.2~138.2 $^0$C. $^1$H NMR (500 MHz, $CDCl_3$) δ 9.56 (s, 2H), 9.48 (s, 2H), 9.11 (s, 1H), 9.10 (s, 2H), 8.85 (s, 2H), 6.65 (s, 1H), 6.57 (s, 2H), 6.54 (s, 2H), 4.25 (q, 2H), 4.11 (m, 4H), 3.95 (m, 4H), 3.89 (s, 6H), 3.84 (s, 6H), 3.62 (m, 4H), 3.50 (m, 2H), 1.73 (m, 2H), 1.60 (m, 2H), 1.48 (q, 4H), 1.38 (m, 4H), 1.35 (m, 3H), 0.91, 0.90 (d, d, 12H), 0.87, 0.82 (d, d, 24H); MS (MALDI-TOF), Calcd for $C_{90}H_{134}N_4O_{24}$ 1654.94 ($M^+$), Found 1656.1 ($M+H^+$). Anal. Calcd. for $C_{90}H_{134}N_4O_{24}$: C, 65.27; H, 8.16; N, 3.38. Found C, 65.10; H, 8.20; N, 3.21.

**Pentamer diacid (34).** Following the general procedure **(3B)**, hydrolysis of pentamer dimethyl ester **33** (0.66 g, 0.40 mmol) in methanol (40 mL) with KOH (0.67 g, 12.0 mmol) in water (1.0mL) under reflux for ca.3 h followed by trituration with ethyl acetate provided the desired product as a white solid (0.49g, 74.9%); m.p.175.2~176.5$^0$C. $^1$H NMR (500 MHz, $CDCl_3$) δ 10.55 (s, 2H), 9.47 (s, 4H), 9.11 (s, 1H), 9.03 (s, 2H), 8.98 (s, 2H), 6.66, 6l.65 (s, s, 3H), 6.50 (s, 2H), 4.26~4.22 (m, 4H), 4.18~4.06 (m, 6H), 4.00~3.80 (m, 2H), 3.89, 3.87 (s, s, 12H), 3.60~3.57 (s, 6H), 3.50~3.40 (m, 4H), 1.69~1.48 (m), 1.40~1.28 (m, 18H), 0.90, 0.88 (s, s, 12H), 0.81, 0.77 (d, d, 12H). $^{13}$C NMR (125.7 MHz, DMSO-$d_6$) δ 165.8, 161.9, 161.0, 161.0, 160.3, 159.8, 146.2, 135.8, 119.54, 119.50, 115.9, 114.8, 113.5, 113.4, 98.8, 95.9, 67.0, 66.50, 66.46, 56.0, 38.5, 38.3, 24.4, 24.3, 22.4, 22.24, 22.21, 17.1, 16.5, 16.5; MS (MALDI-TOF), Calcd for $C_{88}H_{130}N_4O_{24}$ 1626.91 ($M^+$), Found 1650.1 ($M+Na^+$). Anal. Calcd. for $C_{88}H_{130}N_4O_{24}$: C, 64.92; H, 8.05; N, 3.44. Found C, 65.10; H, 8.01; N, 3.30.

**Triskaidecamer (35).** Hexamer **25** (230 mg, 0.133 mmol) was reduced in the presence of 10% Pd/C (40mg) in a mixed solvent of chloroform and ethanol (45mL, **2:1**) under $H_2$ (55$^o$C, 4 Pa) for 4 h and worked up according to the general procedure **(4)**. After drying in vacuum at 50$^0$C (2h) the resulting yellow solid (220mg) was coupled with the diacid chloride, prepared from 4,6-bis-[2-(2-ethoxy-ethoxy)-ethoxymethoxy]-isophthalic acid **3c** (31mg, 0.064mmol) in the presence of $Et_3N$ (19.3 mg, 0.191 mmol) to provide a crude product (210 mg). Repeated recrystallizations from $CH_2Cl_2$/EtAc provided the product as a faint-yellow crystal (180 mg, 36.9%). m.p.125.2 ~126.0$^0$C. $^1$H NMR (500 MHz, DMF-$d_7$, 0 $^0$C): δ10.42 (s, 2H), 10.32 (s, 2H), 10.30 (s, 2H), 10.11 (s, 2H), 10.07 (s, 2H), 9.38 (s, 2H), 9.33 (s, 2H), 9.24 (s, 2H), 9.12 (s, 2H), 9.03 (s, 2H), 8.94 (s, 1H), 8.42 (s, 2H), 7.03 (s, 1H), 6.94 (s, 2H), 6.95~6.79 (m, 9H), 4.51 (s, 2H), 4.36 (m, 6H), 4.10~3.86 (m), 3.90~3.80 (m), 3.76 (s, 4H), 3.56~3.21 (m), 3.11~3.07 (m, 36H), 2.06 (s, 6H); MS (MALDI-TOF), Calcd for $C_{188}H_{262}N_{12}O_{72}$ 3839.72 ($M^+$), Found 3862.8 ($M+Na^+$). For NOESY spectra, see Fig.S13~15.

**2,4-Dimethoxy-5-nitro-benzoic acid *tert*-butyl ester (36).** To a solution of the acid chloride in dry $CH_2Cl_2$ (100 mL) prepared from **1a** (5.06 g, 22.3 mmol) and oxalyl chloride (2.87 mL) according to the general procedure **(2)**, was added dropwise potassium tert-butoxide (2.75 g, 23.3 mmol) in warm THF (40 mL) within 30 minutes in an ice-water bath. The whole mixture was stirred at room temperature overnight and filtered off. Removal of the solvent provided the crude product, which is purified by crystallization from $CH_2Cl_2$ /n-hexane to afford the product as a while solid (3.40 g, 54.0%). m.p.101.6~102.7 $^0$C $^1$H-NMR (500 MHz, $CDCl_3$) δ8.52 (s, 1H), 6.53 (s, 1H), 4.04 (s, 3H), 4.01 (s, 3H), 1.59 (s, 9H). $^{13}$C NMR (75.5 MHz, $CDCl_3$) δ164.5, 162.6, 157.7, 131.1, 113.5, 96.4, 81.8, 56.7, 56.6, 28.2. Anal. Calcd. for $C_{13}H_{17}NO_6$: C, 55.12; H, 6.05; N, 4.94. Found: C, 55.32; H, 6.15; N, 4.77.

**2,4-Diisobutoxy-5-(2,2,2-trifluoro-acetylamino)-benzoic acid (37).** To a flask with 2,4-diisobutoxy-5-nitro-benzoic acid **1d** (1 g, 3.24 mmol) in $CH_2Cl_2$ (30 mL) was added 10% Pd/C (100 mg) and triethyl amine (1 mL, 7.12 mmol), the mixture was shaken under hydrogen for 8 hours. The solid was filtered off and trifluoroacetic anhydride (0.45 mL, 3.24 mmol) in $CH_2Cl_2$ (20 mL) was added the to the solution in ice-water bath. The mixture was stirred at room temperature overnight and washed with 10% hydrochloric acid and brine. After removal of the solvent, the residue was treated with hot methanol to afford the product as a white solid (1.08 g, 89.0%). m.p. 140.0-141.2 ˚C. $^1$H NMR (500 MHz, $CDCl_3$) δ9.6 (b, 1H), 8.84 (s, 1H), 8.30 (s,

1H), 6.53 (s, 1H), 3.92 (d, 4H), 2.21 (m, 2H), 1.04(d, 6H). $^{13}$C NMR (75.5 MHz, $CDCl_3$) δ164.5, 156.6, 153.5, 125.5, 119.3, 109.9, 96.4, 75.62 28.17, 28.16, 19.2, 19.0; MS (ESI) m/z, calcd for $C_{17}H_{23}F_3NO_5Na^+$ 378.0, 266.1. Anal. Calc'd. for $C_{17}H_{23}F_3NO_5$ C, 54.11; H, 5.88; N, 3.71; found C, 54.09; H, 5.81; N, 3.74;

**5-[2,4-Diisobutoxy-5-(2,2,2-trifluoro-acetylamino)-benzoylamino]-2,4-dimethoxy-benzoic acid tert-butyl ester (40).** To the amine **38** hydrogenated from **36** (200 mg, 1.00 mmol) and triethylamine (0.21 mL, 1.5 equiv.) in $CH_2Cl_2$ (20 mL) was added the acid chloride in $CH_2Cl_2$ (10 mL) prepared from acid **37** (293 mg, 0.78 mmol) in $CH_2Cl_2$ (10 mL) and oxalyl chloride (180 μL, 2.12 mmol) according to the general procedure **(2)**. The mixture was stirred at room temperature overnight and then was washed with brine, dried over anhydrous $Na_2SO_4$. After the removal of the solvent, the residue was triturated with $CH_2Cl_2$/n-hexane to provide the tetramer as a white solid (329 mg, yield 76%). m.p. 221.2-222.3˚C. $^1$H-NMR (500 MHz, $CDCl_3$) δ 9.78 (s, 1H), 9.03 (s, 1H), 8.97 (s, 1H), 8.23 (s, 1H), 6.50 (s, 2H), 3.93 (d, 2H), 3.92 (s, 6H), 3.86 (d, 2H), 2.27 (m, 1H), 2.19 (m, 1H), 1.60 (s, 9H), 1.08 (m, 12H); $^{13}$C NMR (75.5 MHz, $CDCl_3$) δ 164.7, 162.1, 157.1, 155.6, 152.4, 152.2, 125.2, 124.5, 120.9, 118.3, 114.8, 113.4, 96.5, 95.6, 80.6, 76.4, 75.3, 56.5, 55.5, 28.3, 28.2, 19.3, 19.1; MS (ESI) m/z, calcd for $C_{30}H_{39}F_3N_2O_8Na^+$ 635.1, 612.9, 557.1. Anal. Calcd. for $C_{30}H_{39}F_3N_2O_8$ C, 58.82; H, 6.42; N, 4.57; found C, 58.59; H, 6.40; N, 4.59.

**5-[2,4-Diisobutoxy-5-(2,2,2-trifluoro-acetylamino)-benzoylamino]-2,4-dimethoxy-benzoic acid (41).** To a flask with dimer **40** (210 mg, 0.34 mmol) in $CH_2Cl_2$ (20 mL) was added TFA (1 mL) and the mixture was stirred at room temperature for 1 h. After removal of the solvent, the residue was treated with methanol to afford the dimer acid **41** (174 mg, 91.0%). Acid **41** was used without further purification in the synthesis of **43**.

**5-(5-Amino-2,4-diisobutoxy-benzoylamino)-2,4-dimethoxy-benzoic acid tert-butyl ester (42).** To a solution of dimmer **40** (1.00 g, 1.63 mmol) in methanol (20 mL) was added 2N aq. NaOH (20 mL) and the mixture was stirred at room temperature overnight. The solution was extracted with methylene chloride (30 mL), washed with brine and dried with anhydrous $Na_2SO_4$. After the removal of the solvent, the residue was triturated with $CH_2Cl_2$/n-hexane to provide the dimer amine **42** (520 mg, 62%). Amine **42** was used without further purification in the synthesis of **43**.

**Tetramer (43).** To the amine **42** (516 mg, 1 mmol) and triethylamine (169 μL, 1.2 mmol) in $CH_2Cl_2$ (10 mL) was added the acid chloride in $CH_2Cl_2$ (10 mL) prepared from acid **41** (556 mg, 1 mmol) in $CH_2Cl_2$ (10 mL) and oxalyl chloride (94 μL, 1.1 mmol) according to the general procedure **(2)**. The mixture was stirred at room temperature overnight. The similar workup as in **42** provided the tetramer **43** (801 mg, yield 76.0%). m.p. 164.6-165.8˚C. $^1$H NMR (500 MHz, $CDCl_3$) δ10.03 (s, 1H), 9.99 (s, 1H), 9.83 (s, 1H), 9.44 (s, 1H), 9.32 (s, 1H), 9.28 (s, 1H), 9.06 (s, 1H), 8.44 (s, 1H), 6.65 (s, 1H), 6.62 (s, 1H), 6.59 (s, 1H), 6.53 (s, 1H), 4.08 (m, 20H), 2.38 (m, 4H), 1.84 (s, 9H), 1.24 (m, 24H). $^{13}$C NMR (75.5 MHz, $CDCl_3$) δ165.1, 163.2, 162.7, 157.1, 156.7, 155.2, 154.8, 153.9, 152.7, 152.2, 127.6, 124.5, 121.5, 120.9, 120.5, 113.5, 112.4, 96.7, 96.2, 95.3, 94.8, 80.7, 74.1, 75.0, 56.1, 55.9, 55.5, 55.4, 49.1, 48.9, 48.8, 48.6, 48.4, 48.2, 48.1, 28.1, 28.0, 27.94, 27.86, 19.02 19.0, 18.9, 18.6; MS (MALDI-TOF) for $C_{54}H_{69}F_3N_4O_{14}Na^+$

Calcd. 1077.5, Found 1077.3. Anal. Calcd. for $C_{54}H_{69}F_3N_4O_{14}$ C, 61.47; H, 6.59; N, 5.31; found C, 61.40; H, 6.55; N, 5.22.

**Octamer (44).** To the tetramer amine (40 mg, 0.042 mmol) and DIEA (9 μL, 1.2 mmol) in $CH_2Cl_2$ (10 mL) was added the acid chloride in $CH_2Cl_2$ (10 mL) prepared from the tetramer acid (50 mg, 0.05 mmol) in $CH_2Cl_2$ (10 mL) and oxalyl chloride (10 μL) according to the general procedure **(2)**. The reaction was stirred at room temperature overnight. The residue was washed with brine and dried with anhydrous $Na_2SO_4$. Removal of the solvent gives the octamer **44** (6 mg). m.p. 157.4-159.0˚C. $^1$H-NMR (500 MHz, $CDCl_3$) δ9.82 (m, 4H), 9.12 (m, 4H), 9.83 (s, 1H), 8.35 (b, 8H), 6.40 (m, 8H), 3.96 (m, 16H), 3.86 (m, 24H), 2.16 (m, 8H), 1.62 (s, 9H), 1.04 (s, 48H). $^{13}$C NMR (75.5 MHz, $CDCl_3$) δ164.8, 162.8, 162.4, 156.7, 154.3, 153.4, 152.3, 151.8, 124.7, 121.5, 117.7, 114.5, 113.9, 96.7, 94.8, 75.2, 56.3, 55.7, 55.5, 29.6, 28.2, 19.2, 19.2, 19.0. MS (MALDI-TOF) for $C_{102}H_{129}F_3N_8O_{26}Na^+$ Calcd. 1961.9; Found 1961.8. Anal Calcd for $C_{102}H_{129}F_3N_8O_{26}$ C, 63.14; H, 6.70; N, 5.78; found C, 63.00; H, 6.59; N, 5.72.


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**Figure S1.** $^{1}H$ NMR spectrum of compound **16c** in $CDCl_3$

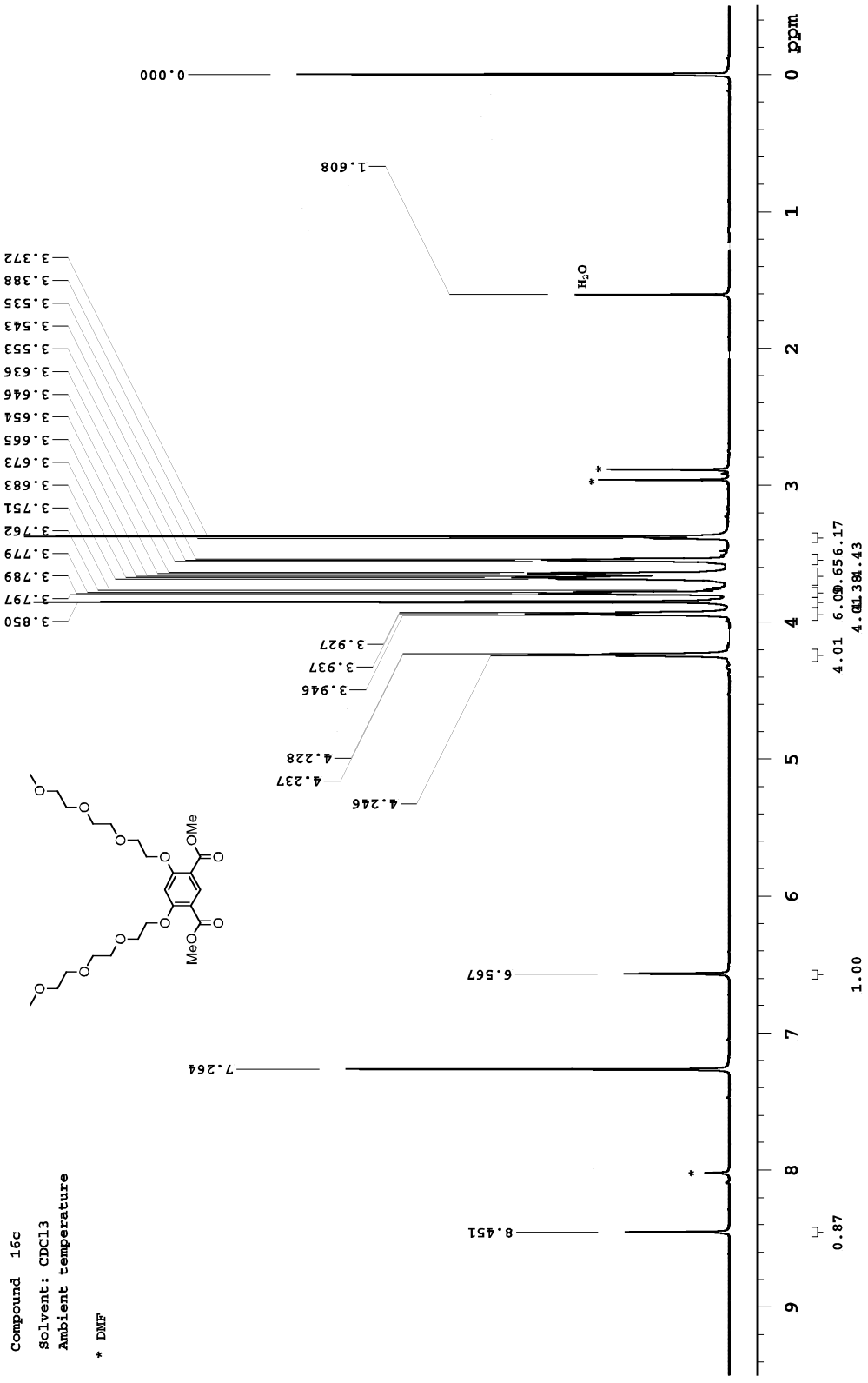



**Figure S2.** $^{13}C$ NMR spectrum of compound **16c** in $CDCl_3$

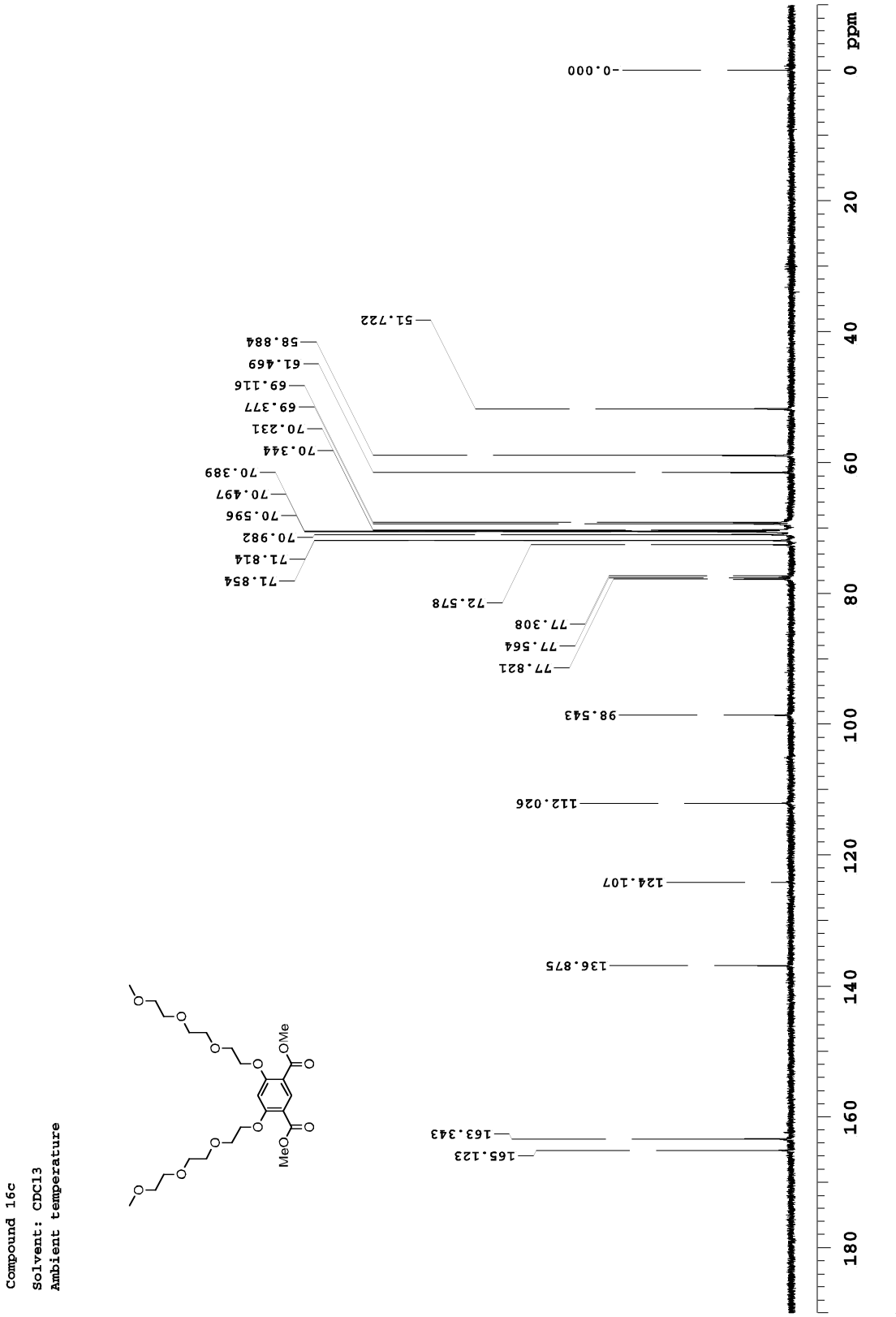



**Figure S3.** $^{1}$H NMR spectrum of compound **28a** in $CDCl_3$

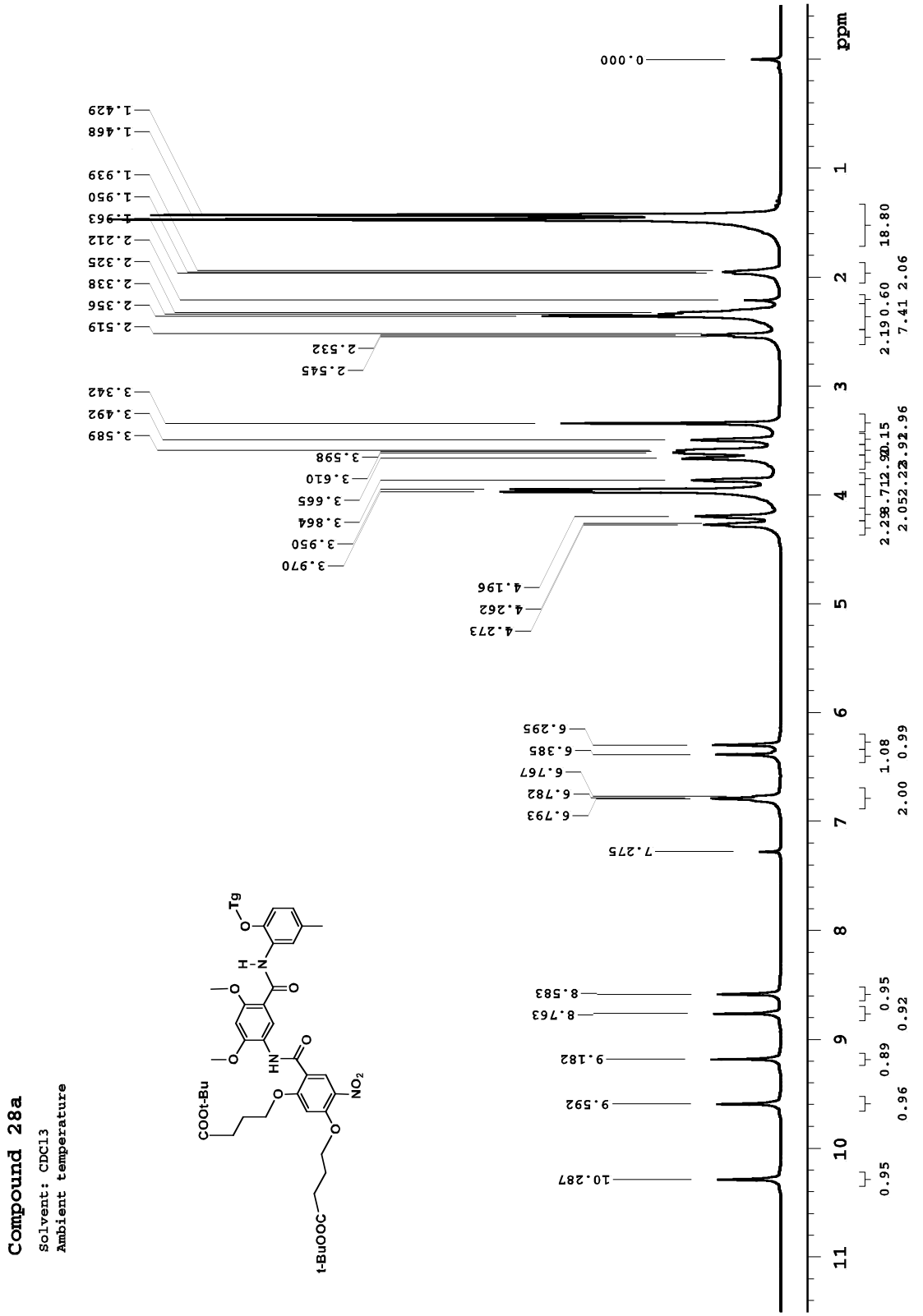



**Figure S4.** $^{13}C$ NMR spectrum of compound **28a** in $CDCl_3$

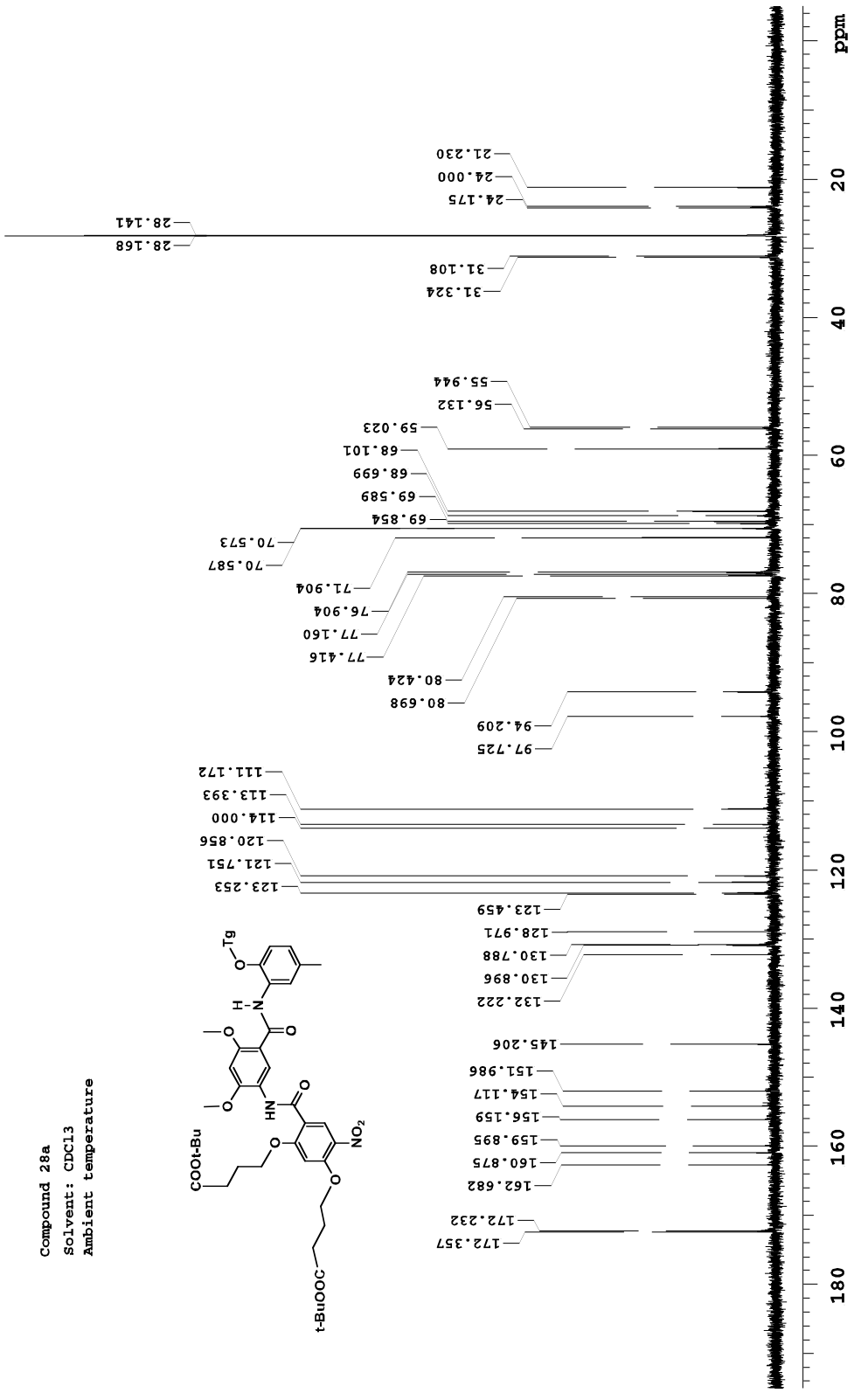



**Figure S5.** $^{1}H$ NMR spectrum of compound **23** in $CDCl_3$

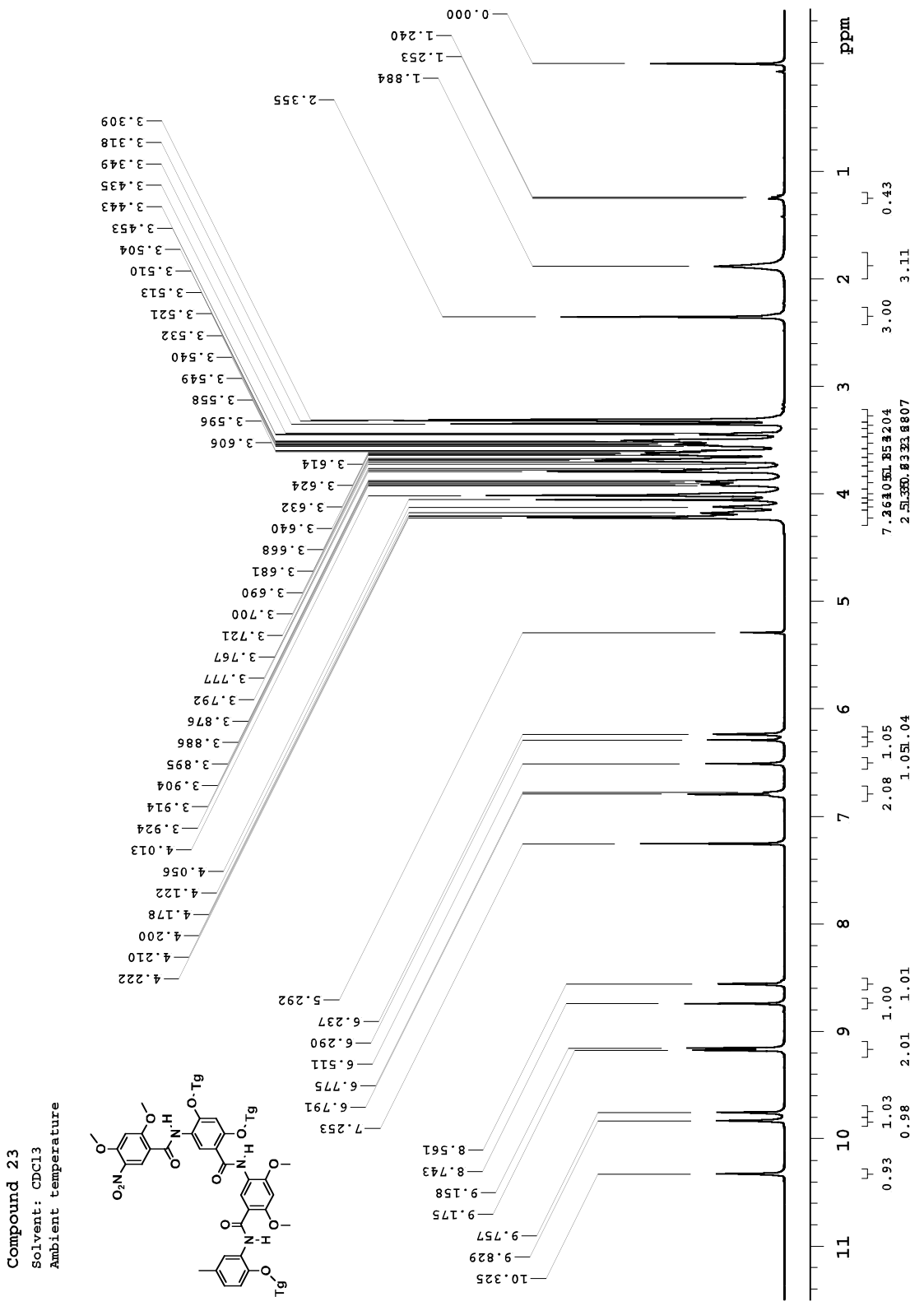
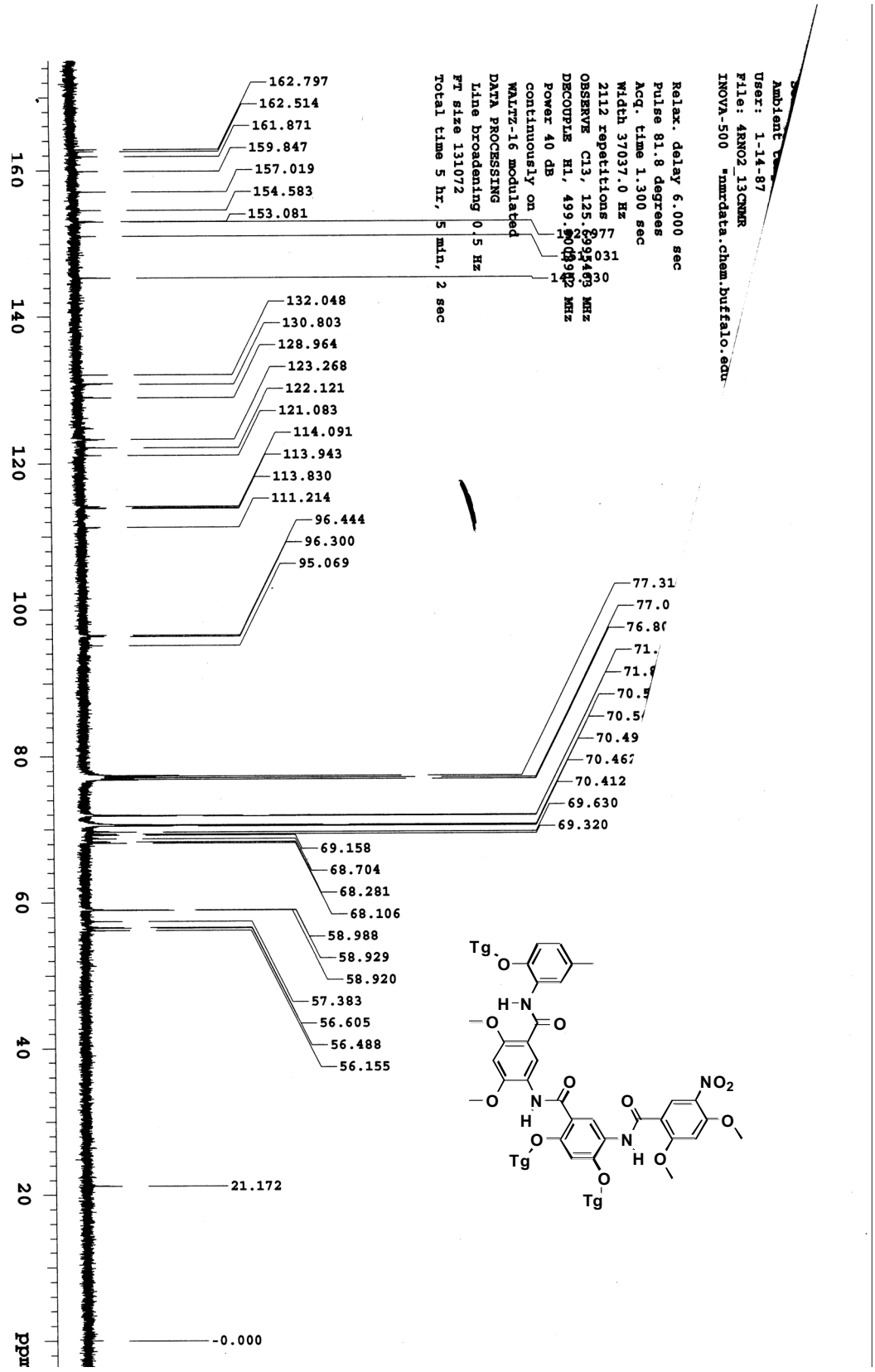



**Figure S6.** $^{13}C$ NMR spectrum of compound **23** in $CDCl_3$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95.069
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77.0
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71.
71.
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70.5
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68.106
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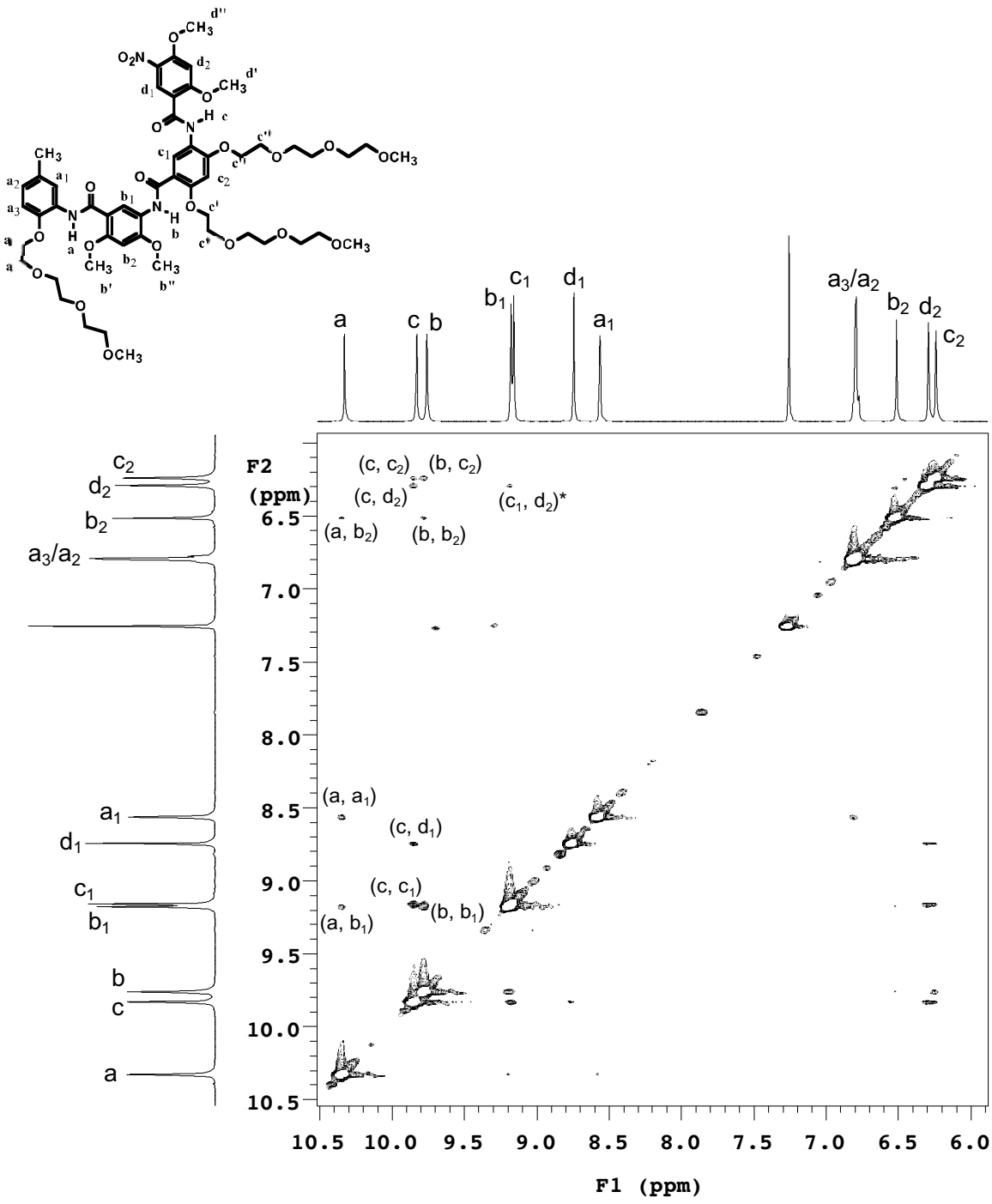
58.929
58.920
57.383
56.605
56.488
56.155
21.172
-0.000
ppm
Tg
NO2

**Fig**

**ure S7.** Partial 2D NOE spectrum of compound **23b** in $CDCl_3$ (2mM, 297 K, mixing time 0.5 s)




* Intermolecular contact

**Figure S8.** $^{1}H$ NMR spectrum of compound **24** in $CDCl_3$

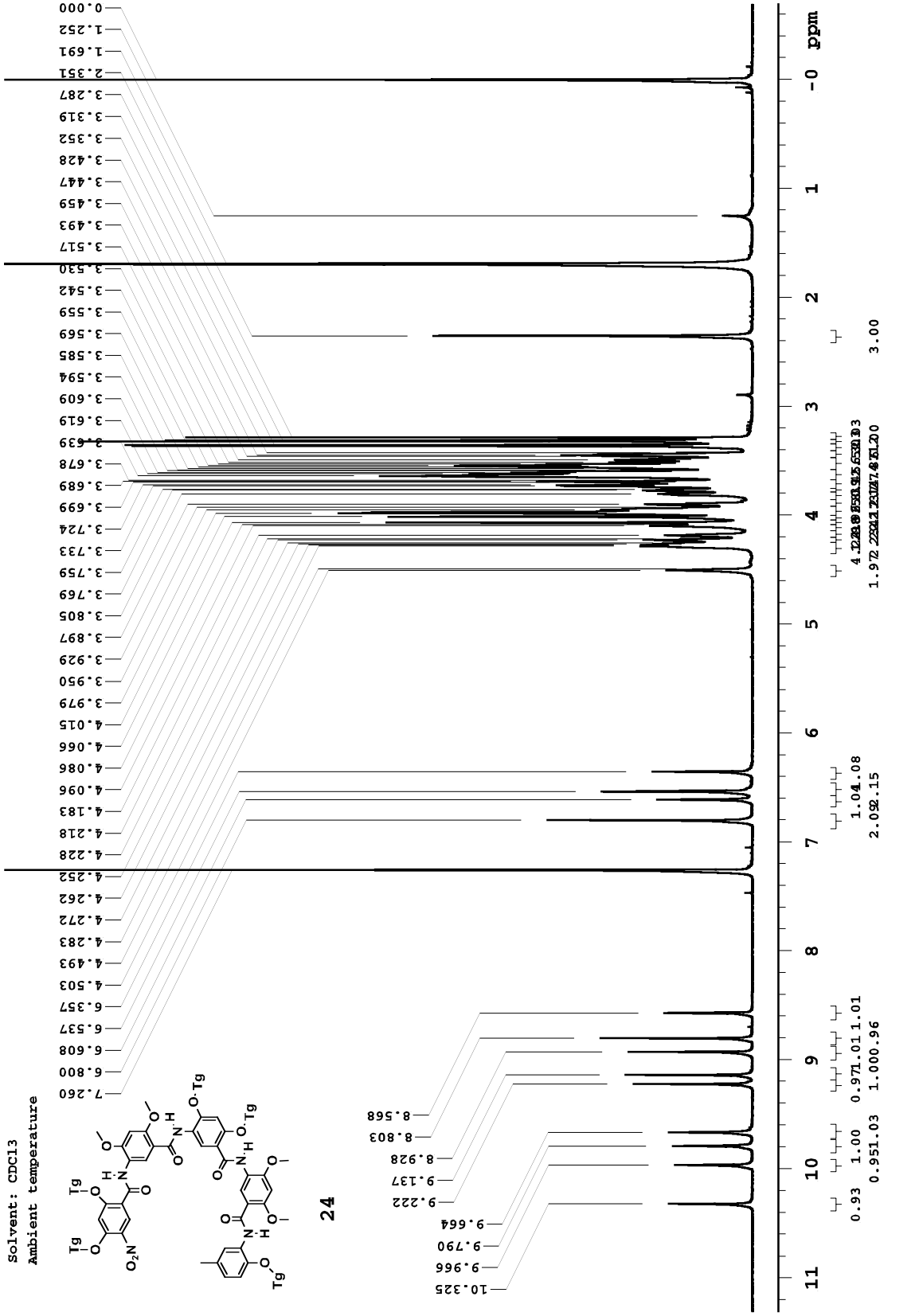


**Figure S9.** Partial 2D NOE spectrum (a) of compound **24** in $CDCl_3$ showing the contacts from the amide and aromatic protons (2mM, 297 K, mixing time 0.4 s)

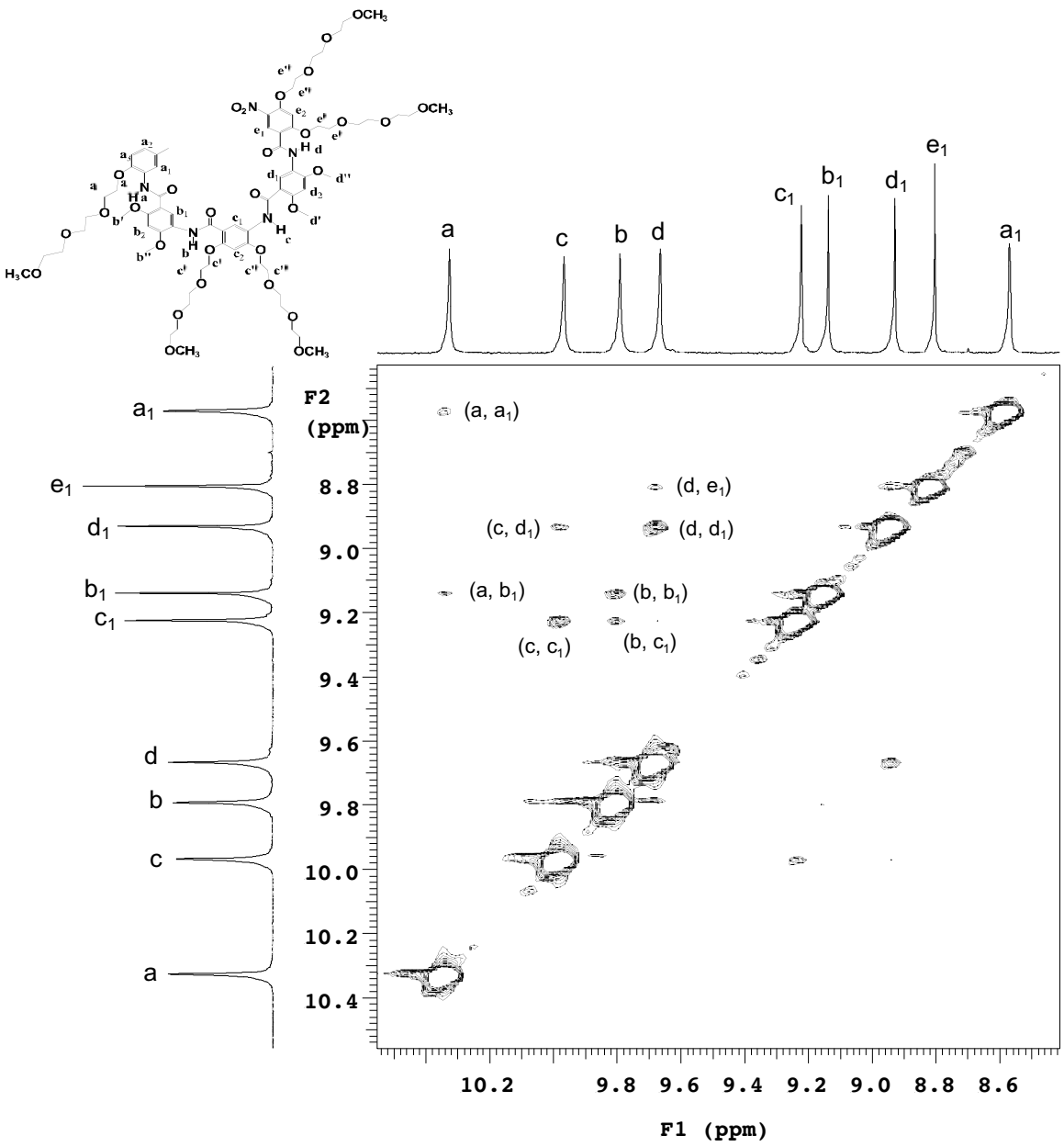


**Figure S10.** Partial 2D NOE spectrum (b) of compound **24** in $CDCl_3$ showing the contacts from the amide and side chain protons (2mM, 297 K, mixing time 0.4 s)

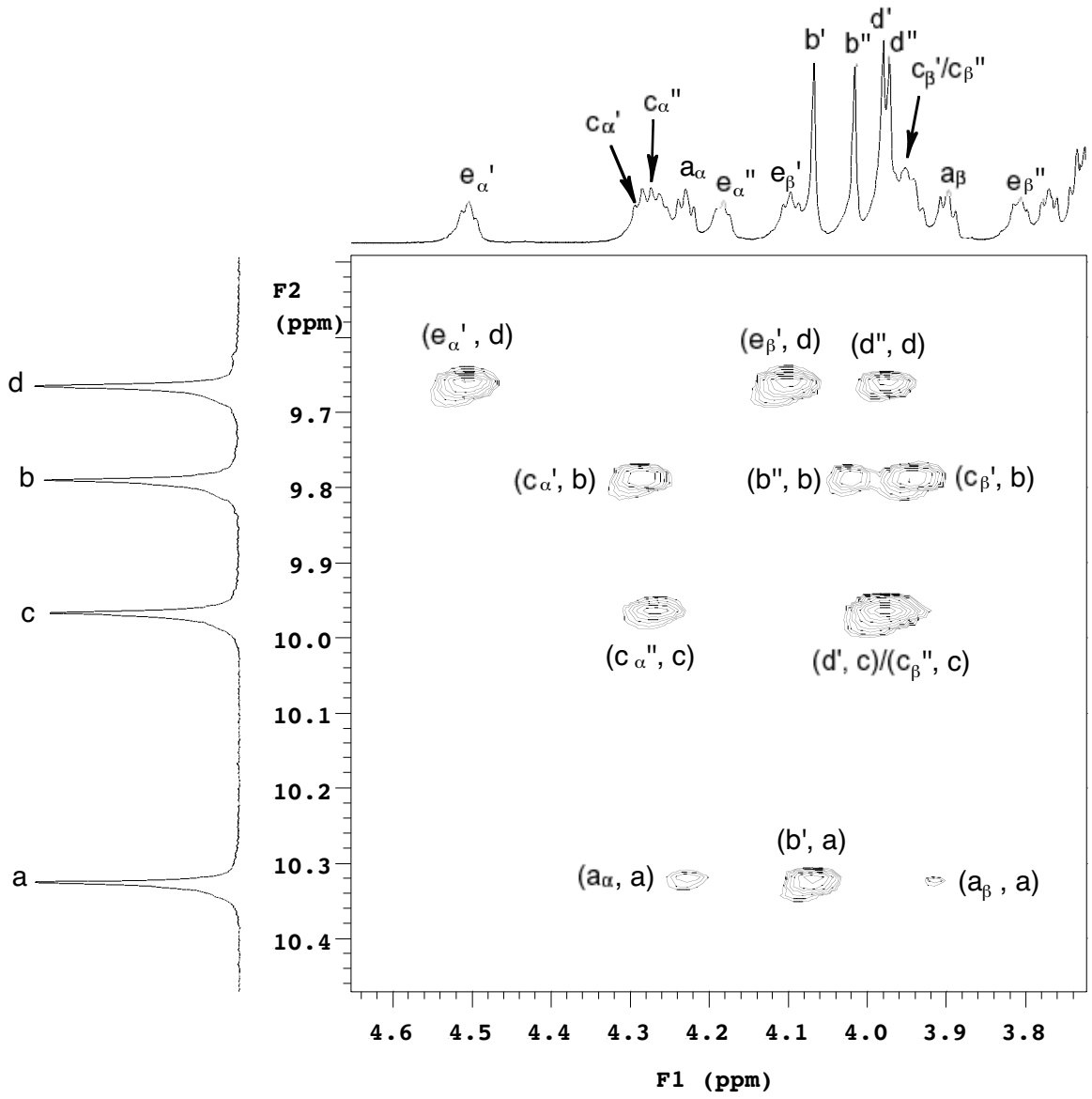


**Figure S11.** $^{1}H$ NMR spectrum of compound **25** in $CDCl_3$

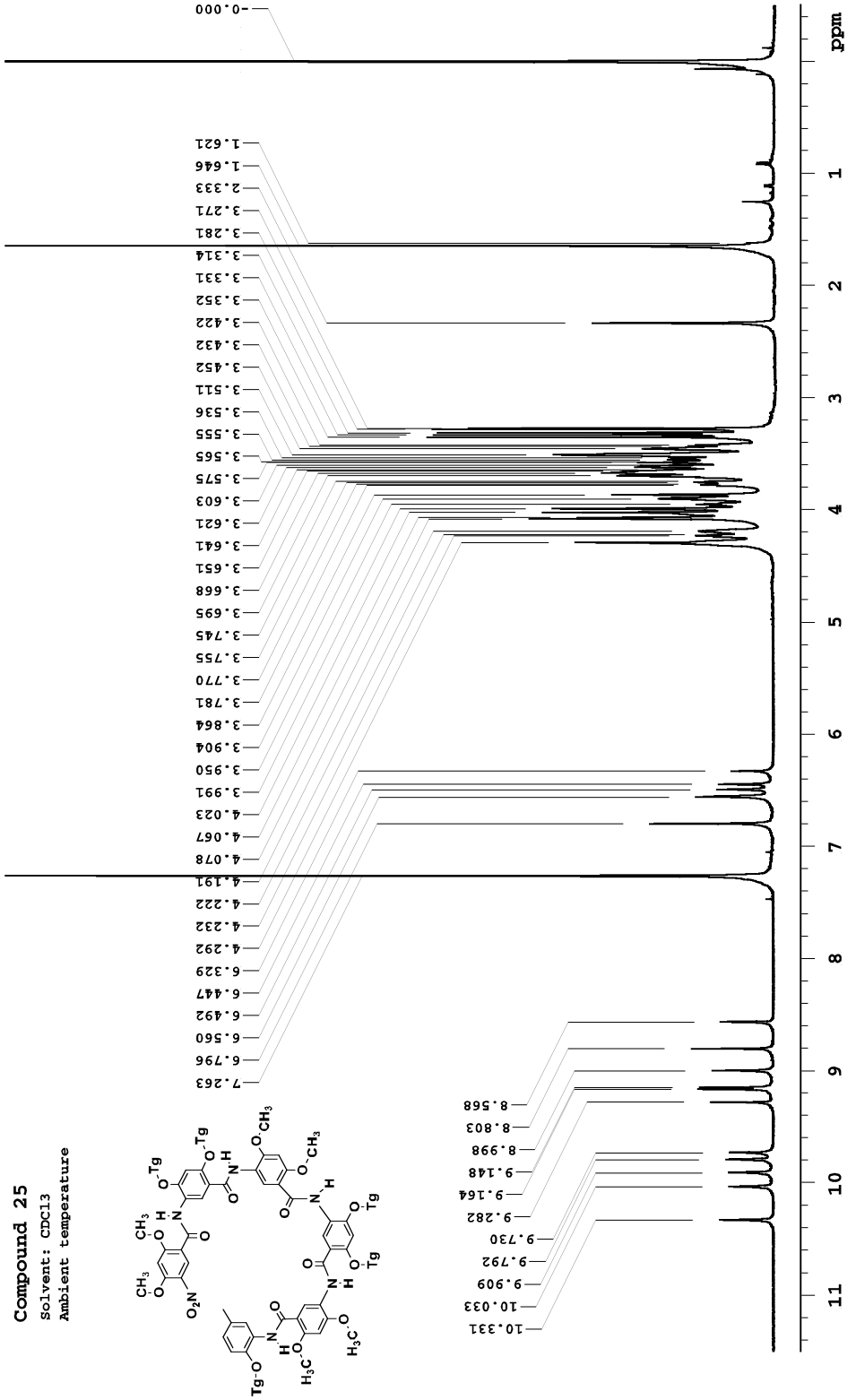
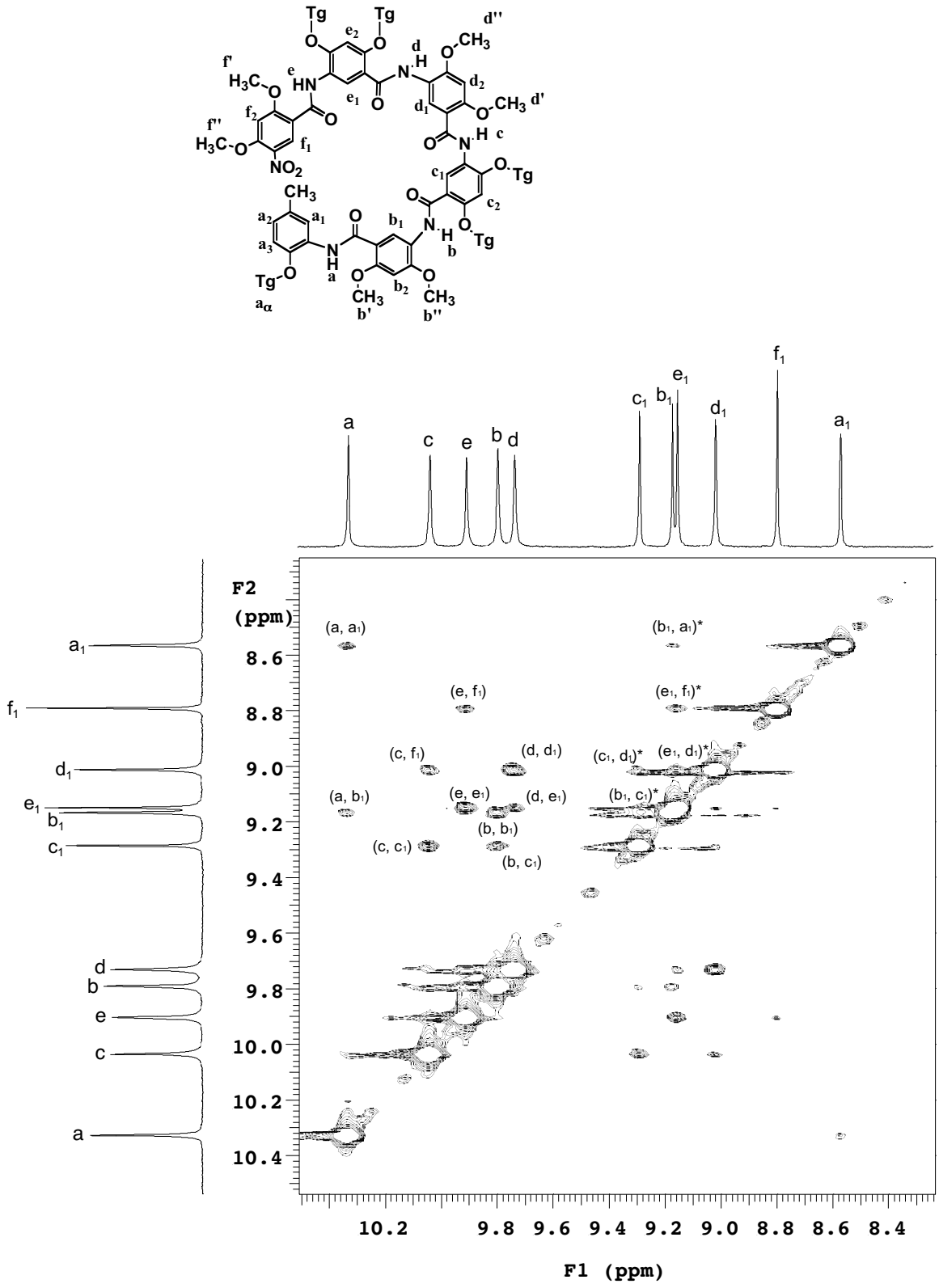


**Figure S12.** Partial 2D NOE spectrum of compound **25** in $CDCl_3$ (2mM, 297 K, mixing time 0.35 s)




* from spin diffusion

**Figure S13.** $^{1}H$ NMR spectrum of compound **35** in DMF-$d_7$

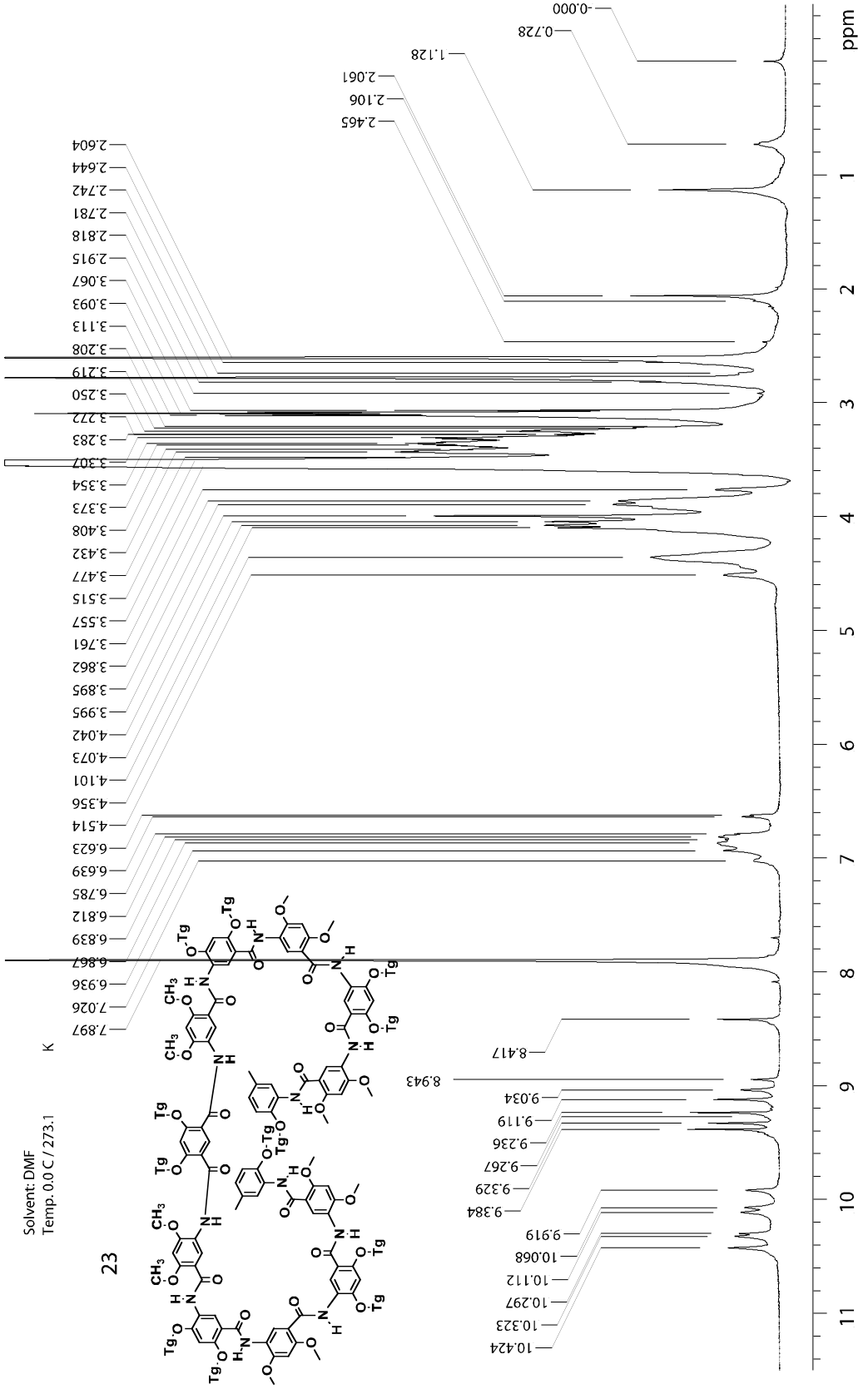
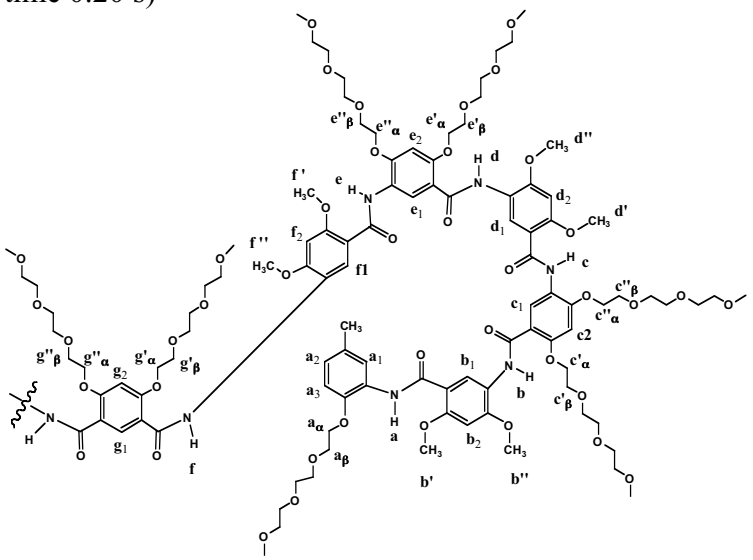


**Figure S14.** Partial 2D NOE spectrum of compound **35** in DMF-$d_7$ (2mM, 273 K, mixing time 0.20 s)



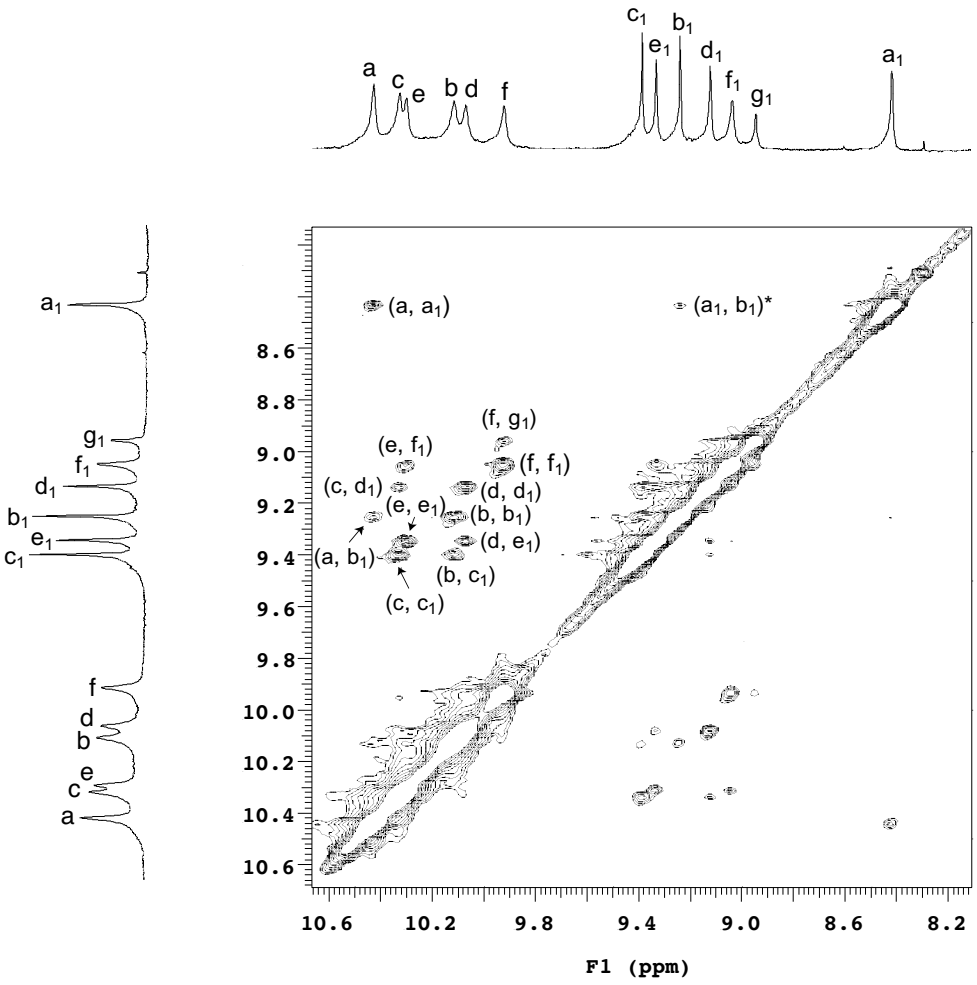


**Figure S15.** Partial 2D NOE spectrum of compound **35** in DMF-$d_7$ (2mM, 273 K, mixing time 0.20 s)