Supporting Information

Controllable Selective and Per-Functionalization of Dendritic Oligoamines

Fritz Vögtle,* Hassan Fakhrnabavi and Oleg Lukin

Kekulé-Institut für Organische Chemie und Biochemie der Universität Bonn, Gerhard-Domagk-Str. 1, 53121 Bonn, Germany. E-mail: voegtle@uni-bonn.de. Fax: +49 228 735662

General procedure for the synthesis of sulfonamides 2a, 2c and 2d:
Tris(2-aminoethyl)amine **1** (2.05 mmol) and Et_3N (12.35 mmol) were dissolved in chloroform (100 ml). A chloroform solution of a sulfonyl chloride (12.35 mmol) was added with intensive stirring under argon atmosphere. The reaction mixture was then allowed to stir at room temperature for 24 hrs. The solvent was removed under reduced pressure and the solid residue was chromatographed on silica gel.
Tris(2-(4-nitrobenzenesulfonamidoethyl))amine (2a): Crystallized from chloroform-methanol; yield 80%; m.p. 140°C; ^{1}H NMR (300 MHz, [D$_6$]DMSO): δ, ppm = 2.35 (t, 6 H, ^3J(H,H) = 6.4 Hz, CH_2), 2.76 (t, 6 H, ^3J(H,H) = 6.4 Hz, CH_2), 7.78 (s, 3 H, NH), 8.02 (d, 6 H, ^3J(H,H) = 8.8 Hz, ArH), 8.40 (d, 6 H, ^3J(H,H) = 8.8 Hz, ArH); ^{13}C NMR (100.62 MHz, [D$_6$]DMSO): δ, ppm = 40.86, 53.37, 125.00, 128.36, 146.56, 149.94; FAB MS: 702.0 (M^+), $C_{24}H_{27}N_7O_{12}S_3$ requires M^+ = 701.7.
Tris(2-(2-naphthalenesulfonamidoethyl))amine (2c): R_f = 0.70 (dichloromethane/ ethylacetate = 5/3); yield 33%; m.p. 156°C; ^{1}H NMR (300 MHz, [D$_6$]DMSO): δ, ppm = 2.26 (t, 6 H, ^3J(H,H) = 6.1 Hz, CH_2), 2.72 (m, 6 H, CH_2), 7.54 (t, 3 H, ^3J(H,H) = 5.7 Hz, ArH), 7.66 (m, 6 H, ArH), 7.78 (dd, 3 H, ^3J(H,H) = 8.5 Hz, ^4J(H,H) = 1.7 Hz, ArH), 7.98 (t, 6 H, ^3J(H,H) = 7.5 Hz, ArH), 8.12 (d, 3 H, ^3J(H,H) = 7.5 Hz, ArH), 8.41 (s, 3 H, NH); ^{13}C NMR (75.47 MHz, DMSO): δ, ppm = 40.77, 53.60, 122.54, 127.66, 127.98, 128.19, 129.10, 129.55, 129.80, 132.15, 134.50, 137.98; FAB MS: 717.3 (M^+), $C_{36}H_{36}N_4O_6S_3$ requires M^+ = 716.9.
Tris(2-(4-cyanobenzenesulfonamidoethyl))amine (2d): R_f = 0.18 (dichloromethane/ ethylacetate = 5/2); yield 27%; m.p. 169°C; ^{1}H NMR (400 MHz, $CDCl_3$): δ, ppm = 2.33 (t, 6 H, ^3J(H,H) = 6.5 Hz, CH_2), 2.72 (m, 6 H, CH_2), 7.70 (t, 3 H, ^3J(H,H) = 5.4 Hz, NH), 7.93 (d, 6 H, ^3J(H,H) = 8.5 Hz, ArH), 8.06 (d, 6 H, ^3J(H,H) = 8.5 Hz, ArH); ^{13}C NMR (100.62 MHz, $CDCl_3$): δ, ppm = 40.84, 53.42, 115.33, 118.13, 127.57, 133.87, 145.13; Elemental analysis: Calcd. for $C_{27}H_{27}N_7O_6S_3$, %: C, 50.53; H, 4.24; N, 15.28; S, 14.99. Found, %: C, 50.37; H, 4.18; N, 15.09; S, 14.85.

General procedure for the synthesis of sulfonimides 3a-e and 9: Tris(2-aminoethyl)amine **1** (2.05 mmol) and a sulfonyl chloride (18.44 mmol) were dissolved in dry acetonitrile (100 ml). Dry Cs_2CO_3 (18.44 mmol) was added to the acetonitrile solution and the resulting suspension was allowed to stir at room temperature for two days. Then an excess of Cs_2CO_3 was filtered and the solvent was removed under reduced pressure. The solid residue was dissolved in 100 ml of dry dichloromethane and the precipitated CsCl was filtered and the solvent was washed with water (2x150 ml), dried over Na_2SO_4 and then evaporated in vacuum. The crude product was purified on silica gel.
Tris(2-(4-methylbenzenesulfonimidoethyl))amine (3a): R_f = 0.40 (dichloromethane); yield 45%; m.p. 85°C; ^{1}H NMR (300 MHz, $CDCl_3$): δ, ppm = 2.44 (s, 18 H, CH_3), 2.80 (t, 6 H, ^3J(H,H) = 7.8 Hz, CH_2), 3.62 (t, 6 H, ^3J(H,H) = 7.8 Hz, CH_2), 7.33 (d, 12 H, ^3J(H,H) = 8.5 Hz, ArH), 7.94 (d, 12 H, ^3J(H,H) = 8.5 Hz, ArH); ^{13}C NMR (75.48 MHz, $CDCl_3$): δ, ppm = 21.64, 46.38, 53.78, 128.39, 129.76, 136.75, 145.01; FAB MS: 1071.2 (M^+), $C_{48}H_{54}N_4O_{12}S_6$ requires M^+ = 1071.4; Elemental analysis: Calcd., %: C, 53.81; H, 5.08; N, 5.23; S, 17.96. Found, %: C, 53.30; H, 4.96; N, 5.25; S, 16.95.

Tris(2-(2-naphthalenesulfonimidoethyl))amine (3b): R_f = 0.48 (dichloromethane/ ethylacetate = 100/1); yield 70%; m.p. 107°C; ^{1}H NMR (400 MHz, $CDCl_3$): δ, ppm = 3.02 (t, 6 H, ^3J(H,H) = 7.5 Hz, CH_2), 3.81 (t, 6 H, ^3J(H,H) = 7.5 Hz, CH_2), 7.52 (m, 6 H, ArH), 7.63 (m, 6 H, ArH), 7.86-7.93 (m, 18 H, ArH), 8.05 (dd, 6 H, ^3J(H,H) = 8.5 Hz, ^4J(H,H) = 1.8 Hz, ArH), 8.63 (d, 6 H, ^4J(H,H) = 1.8 Hz, ArH);.^{13}C NMR (100.62 MHz, $CDCl_3$): δ, ppm = 46.74, 54.19, 122.89, 127.64, 127.83, 129.47, 129.49, 129.79, 130.40, 131.98, 135.35, 136.17; FAB MS: 1287.2 (M^+), $C_{66}H_{54}N_4O_{12}S_6$ requires M^+ = 1287.6; Elemental analysis: Calcd., %: C, 61.57; H, 4.23; N, 4.35; S, 14.94. Found, %: C, 60.96; H, 4.20; N, 4.43; S, 14.73.

Tris(2-(4-methoxybenzenesulfonimidoethyl))amine (3c): R_f = 0.61 (dichloromethane/ ethylacetate = 20/1); yield 13%; m.p. 90°C; ^{1}H NMR (300 MHz, $CDCl_3$): δ, ppm = 2.81 (t, 6 H, ^3J(H,H) = 8 Hz, CH_2), 3.62 (t, 6 H, ^3J(H,H) = 8 Hz, CH_2), 3.87 (s, 18 H, CH_3), 7.00 (d, 12 H, ^3J(H,H) = 9.0 Hz, ArH), 7.99 (d, 12 H, ^3J(H,H) = 9.0 Hz, ArH); ^{13}C NMR (75.47 MHz, $CDCl_3$): δ, ppm = 53.80, 55.71, 55.74, 114.30, 130.70, 131.12; 163.86; FAB MS: 1167.2 (M^+), $C_{48}H_{54}N_4O_{18}S_6$ requires M^+ = 1167.4; Elemental analysis: Calcd., %: C, 49.39; H, 4.66; N, 4.80; S, 16.48. Found, %: C, 49.28; H, 4.57; N, 4.80; S, 16.57.

Tris(2-(4-cyanobenzenesulfonimidoethyl))amine (3d): R_f = 0.75 (dichloromethane/ ethylacetate = 10/1); yield 12%; m.p. 128°C; ^{1}H NMR (400 MHz, $CDCl_3$): δ, ppm = 2.90 (t, 6 H, ^3J(H,H) = 8 Hz, CH_2), 3.74 (t, 6 H, ^3J(H,H) = 8 Hz, CH_2), 7.90 (d, 12 H, ^3J(H,H) = 8.6 Hz, ArH), 8.19 (d, 12 H, ^3J(H,H) = 8.6 Hz, ArH); ^{13}C NMR (100.62 MHz, $CDCl_3$): δ, ppm = 46.47, 53.74, 116.79, 118.34, 129.14, 133.21, 142.63; Elemental analysis: Calcd. For $C_{48}H_{36}N_{10}O_{12}S_6$, %: C, 50.69; H, 3.19; N, 12.32; S, 16.92. Found, %: C, 50.45; H, 3.21; N, 12.22; S, 16.43.

Tris(2-(5-dimethylaminonaphthalene-1-sulfonimidoethyl))amine (3e): R_f = 0.33 (dichloromethane/ethylacetate = 10/1); yield 80%; m.p. 140°C; ^{1}H NMR (400 MHz, $CDCl_3$): δ, ppm = 2.68 (t, 6 H, ^3J(H,H) = 7.5 Hz, CH_2), 2.84 (s, 36 H, $N(CH_3)_2$), 3.83 (t, 6 H, ^3J(H,H) = 7.5 Hz, CH_2), 7.02 (d, 6 H, ^3J(H,H) = 7.5 Hz, ArH), 7.13 (t, 6 H, ^3J(H,H) = 8.4 Hz, ArH), 7.43 (t, ^3J(H,H) = 8.4 Hz, ArH), 7.87 (d, 6 H, ^3J(H,H) = 8.4 Hz, ArH), 8.27 (d, 6 H, ^3J(H,H) = 7.5 Hz, ArH), 8.49 (d, 6 H, ^3J(H,H) = 8.4 Hz, ArH); ^{13}C NMR (100.62 MHz, $CDCl_3$): δ, ppm = 45.43, 53.31, 115.33, 118.80, 123.17, 128.45, 129.60, 129.73, 131.78, 132.27, 133.56, 151.60; FAB MS: 1545.4 (M^+), $C_{78}H_{84}N_{10}O_{12}S_6$ requires M^+ = 1545.9; Elemental analysis: Calcd., %: C, 60.60; H, 5.48; N, 9.06; S, 12.45. Found, %: C, 59.82; H, 5.51; N, 9.12; S, 12.40.

General procedure for the synthesis of sulfonimides 4a-d and 10, 11: To a stirred solution of **2b** (**2c**, **2d**) (0.33 mmol) in 100 ml of dry acetonitrile a sulfonyl chloride (1.96 mmol) and Cs_2CO_3 (1.96 mmol) were added. The reaction mixture was allowed to stir for two days at room temperature. Then an excess of Cs_2CO_3 was filtered and the solvent was removed under reduced pressure. The solid residue was dissolved in 100 ml of dry dichloromethane and the precipitated CsCl was filtered and the solvent was washed with water (2x150 ml), dried over Na_2SO_4 and then evaporated in vacuum. The crude product was purified on silica gel

Tris(2-(4-methylbenzenesulfonyl-2-naphthalenesulfonyl)-imidoethyl)amine (4a): R_f = 0.28 (dichloromethane); yield 93%; m.p. 105°C; ^{1}H NMR (400 MHz, $CDCl_3$): δ, ppm = 2.41 (s, 9 H, CH_3), 2.92 (t, 6 H, ^3J(H,H) = 7.6 Hz, CH_2), 3.72 (t, 6 H, ^3J(H,H) = 7.6 Hz, CH_2), 7.30 (d, 6 H, ^3J(H,H) = 8.5 Hz, ArH), 7.56 (m, 3 H, ArH); 7.64 (m, 3 H, ArH), 7.89 (d, 3 H, ^3J(H,H) = 8.2 Hz, ArH), 7.95-7.98 (m, 12 H, ArH), 8.04 (dd, 3 H, ^3J(H,H) = 8.2 Hz; ^4J(H,H) = 1.8 Hz, ArH), 8.62 (br. s, 3 H, ArH); ^{13}C NMR (100.62 MHz, $CDCl_3$): δ, ppm = 21.64, 46.53, 54.00, 122.90, 127.61, 127.84, 128.45, 129.44, 129.47, 129.81, 130.32, 132.00, 135.34, 136.27, 136.65, 145.13; FAB MS: 1179.3 (M^+), $C_{57}H_{54}N_4O_{12}S_6$ requires M^+ = 1179.5; Elemental analysis: Calcd., %: C, 58.04; H, 4.61; N, 4.75; S, 16.31. Found, %: C, 57.71; H, 4.62; N, 5.03; S, 15.96.

Tris(2-(4-methylbenzenesulfonyl-5-dimethylaminonaphthalene-1-sulfonyl)-imidoethyl)amine (4b): R_f = 0.50 (dichloromethane/ethylacetate = 20/1); yield 72%; m.p. 120°C; ^{1}H NMR (400 MHz, $CDCl_3$): δ, ppm = 2.34 (s, 9 H, CH_3), 2.66 (t, 6 H, ^3J(H,H) = 7.5 Hz, CH_2), 2.88 (s, 18 H, $N(CH_3)_2$), 3.73 (t, 6 H, ^3J(H,H) = 7.5 Hz, CH_2), 7.11-7.14 (m, 9 H, ArH), 7.45 (t, 3 H, ^3J(H,H) = 8.3 Hz, ArH), 7.58 (t, 3 H, ^3J(H,H) = 7.9 Hz, ArH), 7.62 (d, 6 H, ^3J(H,H) = 8.4 Hz, ArH); 8.08 (d, 3 H, ^3J(H,H) = 8.6 Hz, ArH), 8.40 (dd, 3 H, ^3J(H,H) = 7.2 Hz; ^4J(H,H) = 1.0 Hz, ArH), 8.62 (d, 3 H, ^3J(H,H) = 8.5 Hz; ArH); ^{13}C NMR (100.62 MHz, $CDCl_3$): δ, ppm = 21.57, 45.46, 46.85, 53.58, 115.34, 118.67, 123.32, 128.20, 128.82, 129.53, 129.78, 129.83, 131.84, 134.27, 135.86, 144.85, 151.84; FAB MS: 1308.2 (M^+), $C_{63}H_{69}N_7O_{12}S_6$ requires M^+ = 1308.7; Elemental analysis: Calcd., %: C, 57.82; H, 5.31; N, 7.49; S, 14.70. Found, %: C, 57.41; H, 5.26; N, 7.47; S, 14.14.

Tris(2-(2-naphthalenesulfonyl-5-dimethylaminonaphthalene-1-sulfonyl)imidoethyl) amine (4c): R_f = 0.48 (dichloromethane/ethylacetate = 25/1); yield 89%; m.p. 130°C; ^{1}H NMR (300 MHz, $CDCl_3$): δ, ppm = 2.81 (s, 24 H, CH_3, CH_2), 3.88 (t, 6 H, ^3J(H,H) = 7.5 Hz, CH_2), 6.96 (d, 3 H, ^3J(H,H) = 7.7 Hz, ArH), 7.27 (d, 3 H, ^3J(H,H) = 8.8 Hz, ArH), 7.44-7.79 (m, 21 H, ArH), 7.99 (d, 3 H, ^3J(H,H) = 8.6 Hz, ArH), 8.20 (s, 3 H, ArH), 8.48 (d, 3 H, ^3J(H,H) = 7.3 Hz, ArH), 8.60 (d, 3 H, ^3J(H,H) = 8.3 Hz, ArH);.^{13}C NMR (75.47 MHz, $CDCl_3$): δ, ppm = 45.37, 53.92, 115.24, 118.40, 122.64, 123.30, 127.35, 127.65, 128.80, 129.06, 129.19, 129.65, 129.74, 129.84, 129.99, 131.71, 132.02, 132.30, 133.86, 135.13, 135.41, 151.70; FAB MS: 1416.2 (M^+), $C_{72}H_{69}N_7O_{12}S_6$ requires M^+ = 1416.75; Elemental analysis: Calcd., %: C, 61.04; H, 4.91; N, 6.92; S, 13.58. Found, %: C, 60.44; H, 4.87; N, 6.97; S, 13.44.

Tris(2-(4-methoxybenzenesulfonyl-4-cyanobenzenesulfonyl)imidoethyl)amine (4d): R_f = 0.72 (dichloromethane/ethylacetate = 20/1); yield 98%; m.p. 96°C; ^{1}H NMR (300 MHz, $CDCl_3$): δ, ppm = 2.87 (t, 6 H, ^3J(H,H) = 7.5 Hz, CH_2), 3.70 (t, 6 H, ^3J(H,H) = 7.5 Hz, CH_2), 3.90 (s, 9 H, CH_3), 7.02 (d, 6 H, ^3J(H,H) = 9.0 Hz, ArH), 7.84 (d, 6 H, ^3J(H,H) = 8.7 Hz, ArH), 7.97 (d, 6 H, ^3J(H,H) = 9.0 Hz, ArH), 8.17 (d, 6 H, ^3J(H,H) = 8.7 Hz, ArH); ^{13}C NMR (75.47 MHz, $CDCl_3$): δ, ppm = 46.19, 53.78, 55.84, 114.57, 117.02, 117.63, 129.00, 129.98, 130.90, 132.93, 143.55, 164.42; FAB MS: 1152.1 (M^+), $C_{48}H_{45}N_7O_{15}S_6$ requires M^+ = 1152.3; Elemental analysis: Calcd., %: C, 50.03; H, 3.94; N, 8.51; S, 16.70. Found, %: C, 49.39; H, 3.93; N, 8.36; S, 15.83.

Tris(4-nitro-*N*-(4-nitrobenzyl)-benzenesulfonamidoethyl)amine (5): To a stirred solution of 4-nitrobenzyl bromide (42.75 mmol) in 200 ml of dry acetonitrile sulfonamide **2a** (7.12 mmol) and Cs_2CO_3 (30.70 mmol) were added. The reaction mixture was allowed to stir for two days at room temperature. Then an excess of Cs_2CO_3 was filtered and the solvent was removed under reduced pressure. The solid residue was dissolved in 100 ml of dry dichloromethane and the precipitated CsCl was filtered and the solvent was washed with water (2x250 ml), dried over Na_2SO_4 and then evaporated in vacuum. The crude product was purified on silica gel. R_f = 0.50 (dichloromethane/ethylacetate = 20/1); yield 70%; m.p. 95°C; ^{1}H NMR (300 MHz, $CDCl_3$): δ, ppm = 2.23 (t, 6 H, ^3J(H,H) = 7.2 Hz, CH_2), 3.00 (t, 6 H, ^3J(H,H) = 7.2 Hz, CH_2), 4.30 (s, 6 H, CH_2), 7.35 (d, 6 H, ^3J(H,H) = 8.6 Hz, ArH), 7.94 (d, 6 H, ^3J(H,H) = 8.9 Hz, ArH), 8.08 (d, 6 H, ^3J(H,H) = 8.6 Hz, ArH), 8.34 (d, 6 H, ^3J(H,H) = 8.9 Hz, ArH); ^{13}C NMR (75.47 MHz, $CDCl_3$): δ, ppm = 47.23, 52.60, 53.00, 123.80, 124.61, 128.24, 128.93, 143.11, 144.30, 147.73, 150.26; FAB MS: 1107.1 (M^+), $C_{45}H_{42}N_{10}O_{18}S_3$ requires M^+ = 1107.1; Elemental analysis: Calcd., %: C, 48.82; H, 3.82; N, 12.65; S, 8.69. Found, %: C, 48.46; H, 3.70; N, 12.63; S, 8.37.

Tris(4-amino-N-(4-aminobenzyl)benzenesulfonamidoethyl)amine (6): $SnCl_2.2H_2O$ (248.20 mmol) dissolved in 5 ml of absolute ethanol was added to a stirred solution of hexanitro compound **5** (8.37 mmol) in 100 ml of absolute ethanol. Then 5 ml of 37% HCl was added. The reaction mixture was stirred at reflux for 5 hrs. The mixture was poured onto 200 ml of ice water. 2M NaOH solution was added to adjust pH of the resulting mixture to 10.

The mixture was then taken up with chloroform (3x200 ml). The collected chloroform layers were washed with water (2x200 ml) and dried over Na_2SO_4. The solvent was removed under reduced pressure and the crude product was chromatographed on silica gel. R_f = 0.55 (dichloromethane/methanol = 5/1); yield 79%; m.p. 125°C; ^{1}H NMR (300 MHz, $CDCl_3$): δ, ppm = 2.20 (br. s, 6 H, CH_2), 2.84 (br. s, 6 H, CH_2), 3.92 (br. s, 18 H, CH_2, NH_2), 6.55 (d, 6 H, ^3J(H,H) = 8.0 Hz, ArH), 6.60 (d, 6 H, ^3J(H,H) = 8.4 Hz, ArH), 6.88 (d, 6 H, ^3J(H,H) = 8.0 Hz, ArH), 7.42 (d, 6 H, ^3J(H,H) = 8.4 Hz, ArH); ^{13}C NMR (100.62 MHz, $CDCl_3$): δ, ppm = 45.13, 52.09, 52.64, 113.43, 115.06, 128.73, 128.80, 129.35, 129.43, 146.05, 151.53; FAB MS: 927.3 (M^+), $C_{45}H_{54}N_{10}O_6S_3$ requires M^+ = 927.2; Elemental analysis: Calcd., %: C, 58.29; H, 5.87; N, 15.11; S, 10.38. Found, %: C, 57.46; H, 5.71; N, 14.82; S, 9.77.

General procedure for the synthesis of hexasulfonimide dendrimers 6 and 7.
Hexaamine **6** (0.32 mmol) and Et_3N (29.20 mmol) were dissolved in chloroform (100 ml). A chloroform solution of a sulfonyl chloride (29.20 mmol) was added with intensive stirring under argon atmosphere. The reaction mixture was stirred at reflux for two days. The solvent was removed under reduced pressure and the crude product was chromatographed on silica gel.

Hexakis(4-methylbenzenesulfonimide) dendrimer (7): R_f = 0.40 (dichloromethane/ethylacetate = 50/1); yield 33%; m.p. 155°C; ^{1}H NMR (300 MHz, $CDCl_3$): δ, ppm = 2.27 (t, 6 H, ^3J(H,H) = 6.5 Hz, CH_2), 2.40 (s, 18 H, CH_3), 2.44 (s, 18 H, CH_3), 3.06 (t, 6 H, ^3J(H,H) = 6.5 Hz, CH_2), 4.33 (s, 6 H, CH_2), 6.94 (d, 6 H, ^3J(H,H) = 8.3 Hz, ArH), 7.07 (d, 6 H, ^3J(H,H) = 8.3 Hz, ArH), 7.16 (d, 6 H, ^3J(H,H) = 8.5 Hz, ArH), 7.25 (d, 12 H, ^3J(H,H) = 8.3 Hz, ArH), 7.31 (d, 12 H, ^3J(H,H) = 8.3 Hz, ArH), 7.12-7.78 (m, 30 H, ArH); ^{13}C NMR (75.47 MHz, $CDCl_3$): δ, ppm = 21.63, 21.70, 46.47, 52.35, 53.43, 127.97, 128.48, 128.56, 129.18, 129.66, 129.83, 131.77, 132.55, 134.27, 136.17, 136.46, 138.40, 141.25, 142.94, 145.17, 145.51; FAB MS: 2777.2 (M^+), $C_{129}H_{126}N_{10}O_{30}S_{15}$ requires M^+ = 2777.4; Elemental analysis: Calcd., %: C, 55.78; H, 4.57; N, 5.04; S, 17.32. Found, %: C, 54.75; H, 4.48; N, 5.04; S, 16.75.

Hexakis(4-*t*-buthylbenzenesulfonimide) dendrimer (8): R_f = 0.42 (dichloromethane/ethylacetate = 50/1); Yield 18%; m.p. 160-165°C; ^{1}H NMR (400 MHz, $CDCl_3$): δ, ppm = 1.30 (s, 54 H, CH_3), 1.34 (s, 54 H, CH_3), 2.38 (t, 6 H, ^3J(H,H) = 6.9 Hz, CH_2), 3.15 (t, 6 H, ^3J(H,H) = 6.8 Hz, CH_2), 4.38 (s, 6 H, CH_2), 7.00 (d, 6 H, ^3J(H,H) = 8.3 Hz, ArH), 7.10 (d, 6 H, ^3J(H,H) = 8.3 Hz, ArH), 7.22 (d, 6 H, ^3J(H,H) = 8.6 Hz, ArH), 7.47 (d, 12 H, ^3J(H,H) = 8.7 Hz, ArH), 7.54 (d, 12 H, ^3J(H,H) = 8.7 Hz, ArH), 7.77-7.82 (m, 30 H, ArH); ^{13}C NMR (100.62 MHz, $CDCl_3$): δ, ppm = 31.03, 35.26, 35.35, 46.43, 52.22, 126.04, 126.23, 127.98, 128.38, 128.45, 129.17, 131.77, 132.57, 134.45, 136.16, 136.46, 138.37, 138.55, 141.40, 157.93, 158.32; FAB MS: 3281.8 (M^+), $C_{165}H_{198}N_{10}O_{30}S_{15}$ requires M^+ = 3282.4; Elemental analysis: Calcd., %: C, 60.38; H, 6.08; N, 4.27; S, 14.65. Found, %: C, 59.19; H, 5.92; N, 4.26; S, 14.43.

Bis(2-(4-methoxybenzenesulfonimidoethyl))-(4-methoxybenzenesulfonamidoethyl) amine (9): R_f = 0.28 (dichloromethane/ethylacetate = 20/1); yield 18%; m.p. 72°C; ^{1}H NMR (300 MHz, $CDCl_3$): δ, ppm = 2.63 (br. s, 2 H, CH_2), 2.75 (br. s, 4 H, CH_2), 2.96 (br. s, 2 H, CH_2), 3.62 (br. s, 4 H, CH_2), 3.81 (s, 3 H, CH_3), 3.88 (s, 12 H, CH_3), 6.93-6.99 (m, 10 H, ArH), 7.80 (d, 2 H, ^3J(H,H) = 9.0 Hz, ArH), 7.89 (d, 8 H, ^3J(H,H) = 9.0 Hz, ArH); ^{13}C NMR (75.47 MHz, $CDCl_3$): δ, ppm = 53.70, 55.55, 55.75, 114.15, 114.33, 114.38, 129.20, 130.60, 130.66, 162.87, 163.93; FAB MS: 997.2 (M^+), $C_{41}H_{48}N_4O_{15}S_5$ requires M^+ = 997.2; Elemental analysis: Calcd., %: C, 49.38; H, 4.85; N, 5.62; S, 16.08. Found, %: C, 49.33; H, 4.82; N, 5.90; S, 15.48.

Bis(2-(4-cyanobenzenesulfonyl-2-naphthalenesulfonyl)-imidoethyl)-(2-naphthalene-sulfonamidoethyl)amine (10): R_f = 0.33 (dichloromethane/ethylacetate = 50/1); yield 21%; m.p. 105°C; ^{1}H NMR (300 MHz, $CDCl_3$): δ, ppm = 2.74-3.05 (m, 8 H, CH_2), 3.83 (br. s, 4 H, CH_2), 5.36 (s, 1 H, NH), 7.56-7.75 (m, 10 H, ArH), 7.85-8.00 (m, 12 H, ArH), 8.09 (d, 4 H,

^3J(H,H) = 8.3 Hz, ArH), 8.47 (s, 1 H, ArH), 8.56 (s, 2 H, ArH); ^{13}C NMR (75.47 MHz, $CDCl_3$): δ, ppm = 40.78, 46.76, 54.01, 54.74, 116.94, 117.64, 122.28, 122.52, 127.57, 127.93, 128.04, 128.45, 128.81, 128.96, 129.26, 129.69, 129.73, 129.98, 130.66, 131.87, 132.16, 132.87, 134.86, 135.20, 135.47, 136.57, 143.17; FAB MS: 1047.3 (M^+), $C_{50}H_{42}N_6O_{10}S_5$ requires M^+ = 1047.2; Elemental analysis: Calcd., %: C, 57.34; H, 4.04; N, 8.02; S, 15.31. Found, %: C, 56.87; H, 4.06; N, 8.03; S, 15.56.

Bis(2-naphthalenesulfonamidoethyl)-(2-(4-cyanobenzene-sulfonyl-2-naphthalene-sulfonyl)imidoethyl)amine (11): R_f = 0.47 (dichloromethane/ethylacetate = 10/1); yield 41%; m.p. 83°C; ^{1}H NMR (300 MHz, $CDCl_3$): δ, ppm = 2.63-2.77 (m, 6 H, CH_2), 3.03 (s, 4 H, CH_2), 3.88 (s, 2 H, CH_2), 5.91 (s, 2 H, NH), 7.53-7.70 (m, 8 H, ArH), 7.81-8.02 (m, 14 H, ArH), 8.48 (s, 2 H, ArH), 8.52 (s, 1 H, ArH); ^{13}C NMR (75.47 MHz, $CDCl_3$): δ, ppm = 40.92, 47.11, 53.96, 54.75, 117.02, 117.40, 122.35, 122.53, 127.48, 127.90, 127.95, 128.43, 128.74, 128.85, 129.31, 129.65, 129.70, 129.73, 129.85, 130.57, 131.85, 132.15, 132.80, 134.83, 135.36, 135.40, 136.57, 143.14; FAB MS: 882.3 (M^+), $C_{43}H_{39}N_5O_8S_4$ requires M^+ = 882.1; Elemental analysis: Calcd., %: C, 58.55; H, 4.46; N, 7.94; S, 14.54. Found, %: C, 58.13; H, 4.46; N, 7.93; S, 14.32.

Bis(2-(4-methoxybenzenesulfonimidoethyl))-2-(*N*-(10-iodo-decyl)-4-methoxybenzene-sulfonamidoethyl)amine (12): R_f = 0.78 (dichloromethane/ethylacetate = 20/1); yield 20%; m.p. 88°C; ^{1}H NMR (400 MHz, $CDCl_3$): δ, ppm = 1.24-1.37 (m, 18 H, CH_2), 2.74-2.83 (m, 6 H, CH_2), 3.05-3.08 (m, 4 H, CH_2), 3.64 (t, 4 H, ^3J(H,H) = 7.1 Hz, CH_2), 3.84 (s, 3 H, CH_3), 3.87 (s, 12 H, CH_3), 6.96 (d, 2 H, ^3J(H,H) = 9.0 Hz, ArH), 7.00 (d, 8 H, ^3J(H,H) = 9.0 Hz, ArH), 7.78 (d, 2 H, ^3J(H,H) = 9.0 Hz, ArH), 7.97 (d, 8 H, ^3J(H,H) = 9.0 Hz, ArH); ^{13}C NMR (100.62 MHz, $CDCl_3$): δ, ppm = 7.23, 26.62, 26.81, 28.42, 28.75, 29.10, 29.25, 29.38, 30.43, 32.59, 33.51, 45.12, 46.34, 49.60, 53.95, 54.26, 55.55, 55.70, 114.25, 129.27, 130.66, 131.11, 162.70, 163.83; FAB MS: 1263.2 (M^+), $C_{51}H_{67}IN_4O_{15}S_5$ requires M^+ = 1263.3.

Biphenyl-4,4'-disulfonic acid bis(2-(4-methoxybenzene-sulfonimidoethyl))-(4-methoxy-benzenesulfonyl)imide (13): The preparation procedure is similar to that for compounds **4a-d** with an exception for the twice as less molar amount of the disulfonyl chloride (0.98 mmol). R_f = 0.85 (dichloromethane/ethylacetate = 10/1); Yield 13%; m.p. 120°C; ^{1}H NMR (300 MHz, $CDCl_3$): δ, ppm = 2.87 (br. s, 12 H, CH_2), 3.67 (br. s, 12 H, CH_2), 3.86 (m, 30 H, CH_3), 6.98 (d, 20 H, ^3J(H,H) = 8.9 Hz, ArH), 7.73-7.84 (m, 4 H, ArH), 7.98 (d, 20 H, ^3J(H,H) = 8.9 Hz, ArH), 8.12-8.24 (m, 4 H, ArH); ^{13}C NMR (75.47 MHz, $CDCl_3$): δ, ppm = 46.15, 53.83, 55.73, 114.31, 127.71, 128.14, 128.65, 129.09, 130.70, 131.05, 163.89; FAB MS: 2273.3 (M^+), $C_{94}H_{102}N_8O_{34}S_{12}$ requires M^+ = 2272.6.