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SUPPORTING INFORMATION

Title: Synthesis of New Sterically Hindered Anilines
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Metalation reactions were carried out under an argon atmosphere using Schlenk techniques. A Parr Instrument stirred pressure reactor of 600 mL capacity was used for the reactions with ethylene. GC analyses were carried out using a Varian 3400 gas chromatograph with FID detection, and GC-MS analyses using a Varian Saturn 2000 instrument. NMR spectra were recorded as $CDCl_3$ solutions on a Bruker AC 300 instrument. Solutions of $LiK(OCH_2CH_2NMe_2)_2$ in MCH were prepared as described previously.[1] The anilines used as starting materials are all known compounds and were either commercially available and distilled before use (**1a-5a**, **11a**), or were prepared from the primary anilines by standard methylation procedures. Elemental analyses were performed at the National Hellenic Research Foundation on the corresponding HCl or HPF_6 salts.

2,6-Bis(1-ethylpropyl)aniline, **1b**. *n*-BuLi (63 ml, 120 mmol; 1.7 M in methylcyclohexane) was added slowly with stirring to 2,6-dimethylaniline (12.1 g, 100 mmol) in methylcyclohexane (80 ml) at 25 ºC. After the exothermic reaction mixture had cooled to room temperature, $LiK(OCH_2CH_2NMe_2)_2$ (20 mmol, 40 ml; 0.5 M in methylcyclohexane) was added and the resulting yellow mixture was stirred at r.t. for 30 min. before being transferred under a current of argon to a stirred pressure reactor containing $Mg(OCH_2CH_2OEt)_2$ (1 g, 5 mmol). After stirring for 30 min. At normal pressure and room temperature, the reactor was filled with ethylene to 10 atm. and stirred with heating at 80 °C. After 24 h,[2] the mixture was hydrolyzed with water and acidified with acetic acid, and the product was then extracted into hexane. The organic extract was dried over anhydrous Na_2SO_4. Subsequent filtration and removal of the solvent gave the crude product which was purified by fractional distillation to give a pale yellow liquid. Yield 15.5 g (67%). b.p. 78-79 °C/0.01 mbar. ^{1}H-NMR: δ = 0.88 (t, ^3J = 7.3 Hz, 12 H, CH_3), 1.7 (m, 8 H, CH_2), 2.55 (m, 2 H, CH), 3.7 (brs, 2 H, NH_2), 6.83 (dd, ^3J = 7.4 Hz, 1 H, ArH), 6.95 (d, ^3J = 7.4 Hz, 2 H, ArH); ^{13}C-NMR: δ = 12.0, 28.0, 42.3, 118.5, 123.9, 130.1, 142.4; MS (EI) *m/z* (relative intensity%): 233 (M^+, 23%), 204 (100), 176 (8), 160 (6), 146 (6), 134 (10); elemental analysis (HCl salt) $C_{16}H_{28}ClN$ (269.86): calcd. C 71.21, H 10.46, N 5.19; found C 71.28, H 10.73, N 5.19.

Compounds **2b** – **4b**, and **6b** - **10b** were prepared by a similar procedure and on the same scale.

2,6-Bis(1-ethylpropyl)-4-methylaniline (2b): Yield 19.0 g (77%), b.p. 80-82 °C/0.01 mbar. ^{1}H-NMR: δ = 0.87 (t, ^3J = 7.3 Hz, 12 H, $CH_2\underline{CH_3}$), 1.7 (m, 8 H, CH_2), 2.28 (s, 3 H, $ArCH_3$), 2.50 (m, 2 H, CH), 3.49 (s, 2 H, NH_2), 6.74 (s, 2 H, ArH); ^{13}C-NMR: δ = 12.0, 21.0, 28.1, 42.3, 124.4, 127.2, 130.2, 139.9; MS (EI) *m/z* (relative intensity%): 247 (M^+, 32%), 218 (100), 190 (4), 174 (5), 148 (9); elemental analysis (HCl salt) $C_{17}H_{30}ClN$ (283.88): calcd. C 71.93, H 10.65, N 4.93; found C 71.58, H 10.74, N 5.11.

2-(1-Ethylpropyl)-6-(1-methylethyl)aniline (3b): Yield 13.1 g (60%), b.p. 78-80 °C/0.01 mbar. ^{1}H-NMR: δ = 0.90 (t, ^3J = 7.3 Hz, 3 H, $CH_2\underline{CH_3}$), 0.91 (t, ^3J = 7.3 Hz, 3 H, $CH_2\underline{CH_3}$), 0.98 (t, ^3J = 7.6 Hz, 3 H, $CH_2\underline{CH_3}$), 1.31 (d, ^3J = 7.0 Hz, 3 H, $CH\text{-}\underline{CH_3}$), 1.7 (m, 6 H, CH_2), 2.55 (m, 1 H, CH), 2.73 (m, 1 H, CH), 3.70 (s, 2 H, NH_2), 6.84 (t, ^3J = 7.3 Hz, 1 H, ArH), 6.98 (d, ^3J = 7.3 Hz, 1 H, ArH), 7.03 (d, ^3J = 7.3 Hz, 1 H, ArH); ^{13}C-NMR (DEPT assignments in parentheses): δ = 12.0 (CH_3), 12.2 (CH_3), 20.0 (CH_3), 27.6 (CH_2), 29.7 (CH_2), 34.9 (CH), 42.1 (CH), 118.4 (CH), 123.0 (CH), 124.0 (CH), 129.9 (quat), 131.7 (quat), 141.5 (quat); MS (EI) m/z (relative intensity%): 219 (M+, 31%), 190 (100), 162 (6), 146 (6), 134 (7); elemental analysis (HCl salt) $C_{15}H_{26}ClN$ (255.83): calcd. C 70.42, H 10.24, N 5.47; found C 71.58, H 10.48, N 5.29.

2,6-Bis(1-methylpropyl)aniline (4b): Yield 15.5 g (76%), b.p. 68-70 °C/0.01 mbar. ^{1}H-NMR: δ = 0.96 (t, ^3J = 7.3 Hz, 3 H, $CH_2\underline{CH_3}$), 0.97 (t, ^3J = 7.3 Hz, 3 H, $CH_2\underline{CH_3}$), 1.29 (d, ^3J = 6.9, 6 H, $CH\underline{CH_3}$), 1.6-1.7 (m, 4 H, CH_2), 2.7 (m, 2 H, CH), 3.7 (brs, 2 H, NH_2), 6.82 (dd, ^3J = 7.5 Hz, 1H, ArH), 7.02 (d, ^3J = 7.6 Hz, 2H, ArH); ^{13}C-NMR (DEPT assignments in parentheses): δ = 12.3 (CH_3), 20.1 (CH_3), 29.5(8) (CH_2), 29.6(4) (CH_2), 34.9 (CH), 118.5 (CH), 123.2 (CH), 131.7 (quat), 140.6 (quat); MS (EI) *m/z* (relative intensity%): 205 (M^+, 25%), 190 (6), 176 (100), 146 (5), 132 (8), 120 (9); elemental analysis (HCl salt) $C_{14}H_{24}ClN$ (241.80): calcd. C 69.54, H 10.00, N 5.79; found C 70.21, H 10.18, N 5.67.

2-(1-Ethylpropyl)-*N*-methylaniline (6b): Yield 11.7 g (66%), b.p. 103-105 °C/5 mbar. ^{1}H-NMR: δ = 0.92 (t, ^3J = 7.3 Hz, 6 H, $CH_2\underline{CH_3}$), 1.7 (m, 4 H, CH_2), 2.5 (m, 1 H, CH), 2.94 (s, 3 H, NCH_3), 3.75 (br.s., 1 H, NH), 6.75 (d, ^3J = 8.5 Hz, 1H, ArH), 6.83 (t, ^3J = 7.5 Hz, 1 H, ArH), 7.13 (dd, ^3J = 7.6 Hz, ^3J = 1.5 Hz, 1 H, ArH), 7.22 (m, 1H, ArH); ^{13}C-NMR: δ = 11.8 (CH_3), 27.4 (CH_2), 31.1 (CH_3), 41.2 (CH), 110.0 (CH), 117.1 (CH), 126.2 (CH), 126.4 (CH), 129.3 (quat), 147.0 (quat); MS (EI) *m/z* (relative intensity%): 177 (M^+, 53%), 148 (100), 133 (41), 132 (15), 118 (27); elemental analysis (HCl salt) $C_{12}H_{20}ClN$ (213.75): calcd. C 67.43, H 9.43, N 6.55; found C 67.66, H 9.78, N 6.37.

2-(1-Ethylpropyl)-*N*,4-dimethylaniline (7b): Yield 13.4 g (70%), b.p. 66-68 °C/0.1 mbar. ^{1}H-NMR: δ = 0.89 (t, ^3J = 7.3 Hz, 6 H, $CH_2\underline{CH_3}$), 1.7 (m, 4 H, CH_2), 2.32 (s, 3 H, $ArCH_3$), 2.47 (m, 1 H, CH), 2.90 (s, 3 H, NCH_3), 3.70 (br.s., 1 H, NH), 6.65 (d, ^3J = 7.9 Hz, 1H, ArH), 6.91 (s, 1 H, ArH), 7.00 (d, ^3J = 7.9 Hz, 1 H, ArH); ^{13}C-

NMR: δ = 12.1 ($CH_2\underline{C}H_3$), 20.7 ($ArCH_3$), 27.7 (CH_2), 31.6 (NCH_3), 41.4 (CH), 110.7 (CH), 126.4 (quat), 127.0 (CH), 127.2 (CH), 129.9 (quat), 144.9 (quat); MS (EI) *m/z* (relative intensity%): 191 (M^+, 79%), 162 (100), 147 (54), 132 (27), 117 (6); elemental analysis (HCl salt) $C_{13}H_{22}ClN$ (227.78): calcd. C 68.55, H 9.74, N 6.15; found C 68.28, H 9.81, N 6.27.

2-(1-Ethylpropyl)-*N*,5-dimethylaniline (8b): Yield 66 % (estimated by GC analysis of the distillate (total weight 14.3 g) which also contained 8% 2-[1-ethylpropyl]- 3-propyl-*N*-methylaniline, **8c**) b.p. 60-61 °C/0.01 mbar. ^{1}H-NMR: δ = 0.99 (t, ^3J = 7.3 Hz, 6 H, $CH_2\underline{CH_3}$), 1.8 (m, 4 H, CH_2), 2.48 (s, 3 H, $ArCH_3$), 2.5 (m, 1 H, CH), 3.00 (s, 3 H, NCH_3), 3.82 (br.s., 1 H, NH), 6.64 (s, 1 H, ArH), 6.73 (d, ^3J = 7.3 Hz, 1 H, ArH), 7.08 (d, ^3J = 7.3 Hz, 1 H, ArH); ^{13}C-NMR: δ = 11.8 (CH_3), 21.4 (CH_3), 27.4 (CH_2), 31.1 (CH_3), 41.0 (CH), 110.9 (CH), 117.8 (CH), 126.1 (CH), 126.4 (quat), 135.9 (quat), 146.9 (quat); MS (EI) *m/z* (relative intensity%): 191 (M^+, 47%), 162 (100), 147 (38), 132 (24), 117 (5); since the product was obtained as a mixture with **8c**, a satisfactory elemental analysis was not obtained.

2,6-(1-Ethylpropyl)-*N*-methylaniline (**9b):** Yield 17.0 g (69%), b.p. 81-82 °C/0.01 mbar. ^{1}H-NMR: δ = 0.84 (t, ^3J = 7.3 Hz, 12 H, $CH_2\underline{CH_3}$), 1.57 (m, 4 H, CH_2), 1.75 (m, 4 H, CH_2), 2.68 (s, 3 H, NCH_3), 2.86 (m, 1 H, CH), 3.06 (br.s., 1 H, NH), 7.0-7.1 (m, 3 H, ArH); ^{13}C-NMR: δ = 12.2 (CH_3), 29.6 (CH_2), 38.1 (CH_3), 41.9 (CH), 123.7 (CH), 123.9 (CH), 139.8 (quat), 147.8 (quat); MS (EI) *m/z* (relative intensity%): 247 (M^+, 37%), 232 (9), 218 (100), 203 (11), 188 (9), 174 (16); elemental analysis (HCl salt) $C_{17}H_{30}ClN$ (283.88): calcd. C 71.93, H 10.65, N 4.93; found C 71.76, H 10.84, N 4.82.

2-Propyl-*N*,3-dimethylaniline (10b): Yield 50% (estimated by GC analysis of the distillate (total weight 10.1 g) which also contained 10% 2,3-dipropyl-*N*-methylaniline, **10c**) b.p. 88-92 °C/0.5 mbar. ^{1}H-NMR: δ = 1.17 (t, ^3J = 7.3 Hz, 3 H, $CH_2\underline{CH_3}$), 1.7 (m, 2 H, CH_2), 2.43 (s, 3 H, $ArCH_3$), 2.62 (dd, ^3J = 7.3 Hz, 2 H, CH_2), 2.99 (s, 3 H, NCH_3), 3.85 (br.s., 1 H, NH), 6.67 (d, ^3J = 7.9 Hz, 1 H, ArH), 6.74 (d, ^3J = 6.7 Hz, 1 H, ArH), 7.2 (m, 1 H, ArH); ^{13}C-NMR: δ = 14.5 (CH_3), 19.7 (CH_3), 21.2 (CH_2), 29.2 (CH_2), 31.1 (NCH_3), 107.9 (CH), 119.5 (CH), 125.0 (quat), 126.4 (CH), 136.1 (quat), 146.8 (quat); MS (EI) *m/z* (relative intensity%): 164 (M+1, 45%), 163 (72%), 134 (100), 117 (5), 105 (8) ; since the product was obtained as a mixture with **10c**, a satisfactory elemental analysis was not obtained.

2-(1-Ethylpropyl)-*N*,*N*-dimethylaniline (11b): A 600 mL stirred pressure reactor was charged with *N*,*N*-dimethyltoluidine (27 g, 200 mmol), methylcyclohexane (60 mL), $Mg(OCH_2CH_2OEt)_2$ (1.0 g, 5 mmol), $LiK(OCH_2CH_2NMe_2)_2$ (20 mmol, 40 ml; 0.5 M in methylcyclohexane), and *n*-BuLi (12 ml, 20 mmol; 1.7 M in methylcyclohexane). After stirring in for 10 min was pressurised with ethylene to 10 atm and heated with stirring to 80°C. After 24 h,[2] the mixture was hydrolyzed with water and acidified with acetic acid, and the product was then extracted into hexane. The organic extract was dried over anhydrous Na_2SO_4. Subsequent filtration and removal of the solvent gave the crude product which was purified by fractional distillation to give a pale yellow liquid. Yield 26.0 g (68%). b.p. 55 °C/0.02 mbar. ^{1}H-NMR: δ = 0.91 (t, ^3J = 7.3 Hz, 6 H, $CH_2\underline{CH_3}$), 1.6 (m, 2 H, CH_2), 1.8 (m, 2 H, CH_2), 2.74 (s, 6 H, NCH_3), 3.3 (m, 1 H, CH), 7.15-7.30 (m, 4 H, ArH); ^{13}C-NMR: δ = 12.2 (CH_3), 29.2 (CH_2), 40.4 (CH), 45.8 (CH_3), 120.1 (CH), 124.2 (CH), 126.0 (CH), 126.6 (CH), 142.0 (quat), 153.7 (quat); MS (EI) *m/z* (relative intensity%): 191 (M^+, 77%), 176 (39), 162 (100), 147 (51), 146 (29), 132 (51), 118 (22); elemental analysis (HCl salt) $C_{13}H_{22}ClN$ (227.78): calcd. C 68.55, H 9.74, N 6.15; found C 68.66, H 9.50, N 6.20.

Compounds **12b** – **15b** were prepared by a similar procedure on the same scale.

3-(1-Ethylpropyl)-*N*,*N*-dimethyl-2-propylaniline (**12b):** Yield 20.0 g (86%), b.p. 73 °C/0.02 mbar. ^{1}H-NMR: δ = 0.89 (t, ^3J = 7.3 Hz, 6 H, $CHCH_2\underline{CH_3}$), 1.08 (t, ^3J = 7.3 Hz, 3 H, $CH_2CH_2\underline{CH_3}$), 1.6 (m, 4 H, $ArCH\underline{CH_2}$), 1.75 (m, 2 H, $ArCH_2\underline{CH_2}$), 2.71 (s, 6 H, NCH_3), 2.6 (m, 1 H, CH), 7.00 (d, ^3J = 7.9 Hz, 1 H, ArH), 7.08 (d, ^3J = 7.9 Hz, 1 H, ArH), 7.20 (m, 1 H, ArH); ^{13}C-NMR: δ = 12.2 (CH_3), 14.8 (CH_3), 24.6 (CH_2), 29.0 (CH_2), 29.4 (CH_2), 43.1 (CH), 46.1 (CH_3), 117.6 (CH), 121.8 (CH), 126.0 (CH), 137.5 (quat), 145.5 (quat), 153.1 (quat); MS (EI) *m/z* (relative intensity%): 233 (M^+, 73%), 218 (52), 204 (100), 191 (22), 190 (21), 174 (20), 162 (15), 160 (15), 148 (15); elemental analysis (HCl salt) $C_{16}H_{28}ClN$ (269.86): calcd. C 71.21, H 10.46, N 5.19; found C 71.38, H 10.41, N 5.11.

2,4-Bis(1-ethylpropyl)-*N*,*N*-dimethylaniline (13b): Yield 20.9 g (80%), b.p. 92 °C/0.05 mbar. ^{1}H-NMR: δ = 0.79 (t, ^3J = 7.3 Hz, 6 H, $CH_2\underline{CH_3}$), 0.80 (t, ^3J = 7.3 Hz, 6H, $CH_2\underline{CH_3}$), 1.5 (m, 4 H, CH_2), 1.7 (m, 4 H, CH_2), 2.3 (m, 1 H, CH), 2.65 (s, 6 H, NCH_3), 3.2 (m, 1 H, CH), 6.90 (m, 1 H, ArH), 6.92 (d, ^3J = 7.9 Hz, 1 H, ArH), 7.12 (d, ^3J = 7.9, 1 H, ArH); ^{13}C-NMR: δ = 12.1, 12.2, 29.3, 40.3, 46.0, 49.3, 119.8, 124.9, 126.1, 141.1, 141.2, 151.3;

MS (EI) *m/z* (relative intensity%): 261 (M^+, 39%), 246 (23), 232 (100), 217 (16), 202 (12), 188 (9); elemental analysis (HPF_6 salt) $C_{18}H_{32}F_6NP$ (407.42): calcd. C 53.06, H 7.92, N 3.44; found C 52.77, H 8.10, N 3.20.

2,5-Bis(1-ethylpropyl)-*N*,*N*-dimethylaniline (14b): Yield 19.3 g (74%), b.p. 116-117 °C/2 mbar. ^{1}H-NMR: δ = 0.80 (t, ^3J = 7.3 Hz, 12 H, $CH_2\underline{CH_3}$), 1.5 (m, 4 H, CH_2), 1.7 (m, 4 H, CH_2), 2.3 (m, 1 H, CH), 2.65 (s, 6 H, NCH_3), 3.15 (m, 1 H, CH), 6.87 (d, ^3J = 8.0 Hz, 1 H, ArH), 6.92 (s, 1 H, ArH), 7.06 (d, ^3J = 8.0 Hz, 1H, ArH); ^{13}C-NMR: δ = 12.3 (CH_3), 29.3 (CH_2), 40.2 (CH), 45.9 (CH_3), 49.4 (CH), 119.4 (CH), 123.3 (CH), 126.1 (CH), 138.9 (quat), 143.4 (quat), 153.4 (quat); MS (EI) *m/z* (relative intensity%): 261 (M^+, 31%), 246 (12), 232 (100), 216 (4), 204 (6), 202 (5), 188 (15); elemental analysis (HPF_6 salt) $C_{18}H_{32}F_6NP$ (407.42): calcd. C 53.06, H 7.92, N 3.44; found C 52.69, H 8.12, N 3.26.

2,6-Bis(1-ethylpropyl)-*N*,*N*-dimethylaniline (15b): Yield 19.1 g (73%), b.p. 80-1 °C/0.01 mbar. ^{1}H-NMR: δ = 0.83 (t, ^3J = 7.3 Hz, 12 H, $CH_2\underline{CH_3}$), 1.5 (m, 4 H, CH_2), 1.7 (m, 4 H, CH_2), 2.84 (s, 6 H, NCH_3), 2.9 (m, 1 H, CH), 6.99 (d, ^3J = 7.7 Hz, 2 H, ArH), 7.13 (t, ^3J = 7.7 Hz, 1 H, ArH); ^{13}C-NMR: δ = 12.7 (CH_3), 29.6 (CH_2), 42.4 (CH), 44.5 (CH_3), 123.9 (CH), 125.8 (CH), 146.6 (quat), 150.4 (quat); MS (EI) *m/z* (relative intensity%): 261 (M^+, 50%), 246 (100), 232 (79), 216 (13), 202 (22), 188 (13); elemental analysis (HPF_6 salt) $C_{18}H_{32}F_6NP$ (407.42): calcd. C 53.06, H 7.92, N 3.44; found C 53.24, H 7.77, N 3.51.

Metalation of benzene and derivatisation by carboxylation:[3] To a solution of $LiK(OCH_2CH_2NMe_2)_2$ (20 mmol, 32 mL; 0.63 M in methylcyclohexane) and an excess of benzene (5.4 mL; 60 mmol) was added *n*-BuLi (20 mmol; 12 mL; 1.7 M in methylcyclohexane) at room temperature. An exothermic reaction occurred with the immediate formation of a brown-grey suspension. After stirring for 3 minutes, the reaction mixture was poured under a current of argon onto a slurry of solid carbon dioxide in diethyl ether. When the mixture had reached room temperature, water (200 mL) was added and the solution was extracted with toluene (2 x 50 mL) and hexane (1 x 50 mL). The aqueous layer was reduced to about 50 mL using a rotary evaporator and acidified with hydrochloric acid. The voluminous white precipitate was extracted into dichloromethane, the solution dried over anhydrous Na_2SO_4 and subsequently evaporated to give an off-white solid. Yield 1.7 g (70 %), m.p. (after recrystallisation from water) 120-122 °C (Lit.[4] for benzoic acid: 122 °C)

Extending the reaction time to 60 minutes increased the yield to 2.0 g (82 %)

[1] C. G. Screttas, B. R. Steele, *J. Organomet. Chem.* **1993**, *453*, 163-170.

[2] For best results, the optimum reaction time was determined by sampling the reaction mixture. A small amount was taken and extracted into hexane using the work up procedure described above, and then analysed by GC and GC-MS. If intermediate products were still present the reaction was continued until completion.

[3] *cf*. M. Schlosser, *J. Organomet. Chem.* **1967**, *8*, 9-16.

[4] CRC Handbook of Chemistry and Physics, 82nd edition.