

Supplementary Material

Facile synthesis of mono-, bis- and tris-aryl-substituted aniline derivatives in aqueous DMF

Chun Liu,* Xiaoxiao Song, Qijian Ni, and Jieshan Qiu

State Key Lab of Fine Chemicals, Dalian University of Technology, Dalian 116024, P R China

E-mail: chunliu70@yahoo.com

Contents

Materials and methods and experimental procedure	S1-S2
Characterization data	S2-S7
References	S7
NMR for cross-coupling products	S8-S30

Materials and methods

Unless otherwise noted, all the reactions were carried out under air. All aryl halides and arylboronic acids were purchased from Alfa Aesar, Avocado and used without purification. ^1H NMR spectra were recorded on a Varian Inova 400 spectrometer. Chemical shifts are reported in ppm relative to TMS. Mass spectroscopy data of the products were collected on a MS-EI instrument. HPLC yields were recorded on a Waters Alliance 2695-2996-2475 High Performance Liquid Chromatography. Other products were isolated by chromatography on a short silica gel (200-300 mesh) column using petroleum ether (60-90°C), unless otherwise noted. Compounds described in the literature were characterised by comparison of their ^1H NMR spectra with reported data.

The HPLC measurement was carried out using an XBridge C18 (2.1×150mm, 5 μm) column. Mobile phase consisted of H₂O (including 0.3% HOAc and 0.3% N(CH₂CH₃)₃) and MeOH, the gradient elution was adopted, the volume ratio of H₂O to MeOH was 30:70 at the beginning to 0:100 at the end, the flow rate was 0.3 mL/min. A variable wavelength UV detector at 246 nm was used. The value of time of retention was 14.2 min.

General procedure for the Suzuki reaction of aryl bromides with arylboronic acids. A mixture of 2,4,6-tribromoaniline (0.25 mmol), aryl boronic acid (1.125 mmol), $K_3PO_4 \cdot 7H_2O$ (1.25 mmol), $Pd(OAc)_2$ (1.0 mol%), DMF (2.7 mL) and distilled water (1.3 mL) was stirred at 80°C under air for the indicated time. The mixture was added to brine (15 mL) and extracted three times with ethyl acetate (3×15 mL). The solvent was concentrated under vacuum and the product was isolated by chromatography on a short silica gel (200-300 mesh) column.

A mixture of 2,6-dibromo-4-nitroaniline (0.25 mmol), aryl boronic acid (0.75 mmol), $K_3PO_4 \cdot 7H_2O$ (0.75 mmol), $Pd(OAc)_2$ (0.5 mol%), DMF (2.7 mL) and distilled water (1.3 mL) was stirred at 80°C under air for the indicated time. The mixture was added to brine (15 mL) and extracted three times with ethyl acetate (3×15 mL). The solvent was concentrated under vacuum and the product was isolated by chromatography on a short silica gel (200-300 mesh) column.

A mixture of 2,6-dibromoaniline (0.5 mmol), aryl boronic acid (1.5 mmol), $K_3PO_4 \cdot 7H_2O$ (1.5 mmol), $Pd(OAc)_2$ (0.5 mol%), DMF (2.7 mL) and distilled water (1.3 mL) was stirred at 80°C under air for the indicated time. The mixture was added to brine (15 mL) and extracted three times with ethyl acetate (3×15 mL). The solvent was concentrated under vacuum and the product was isolated by chromatography on a short silica gel (200-300 mesh) column.

A mixture of 4-bromoaniline (0.5 mmol), aryl boronic acid (0.75 mmol), $K_3PO_4 \cdot 7H_2O$ (1.0 mmol), $Pd(OAc)_2$ (0.5 mol%), DMF (2.7 mL) and distilled water (1.3 mL) was stirred at 80°C under air for the indicated time. The mixture was added to brine (15 mL) and extracted three times with ethyl acetate (3×15 mL). The solvent was concentrated under vacuum and the product was isolated by chromatography on a short silica gel (200-300 mesh) column.

Characterization data

2,4,6-Triphenylaniline (Table 3, entry 1). 1H NMR (400 MHz, $CDCl_3$): δ 7.60-7.56 (m, 6H, Ph), 7.48 (t, J 7.6 Hz, 4H, Ph), 7.41-7.37 (m, 6H, Ph), 7.26 (t, J 7.2 Hz, 1H, Ph), 3.91 (s, 2H, NH_2), ppm.

2,4,6-Tris(4-methylphenyl)aniline (Table 3, entry 2). 1H NMR (400 MHz, $CDCl_3$, TMS): δ 7.49-7.46 (m, 6H, Ph), 7.38 (s, 2H, Ph), 7.29 (d, J 8.0 Hz, 4H, Ph), 7.20 (d, J 8.0 Hz, 2H, Ph), 2.41 (s, 6H, 2× CH_3), 2.37 (s, 3H, CH_3), ppm; ^{13}C NMR (100 MHz, $CDCl_3$, TMS): δ 140.07 (Ph), 138.16 (Ph), 137.13 (2×Ph), 136.81 (2×Ph), 136.01 (Ph), 131.22 (Ph), 129.65 (4×Ph), 129.47 (2×Ph), 129.30 (4×Ph), 128.40 (2×Ph), 128.13 (2×Ph), 126.34 (2×Ph), 21.19 (2× CH_3), 21.11 (CH_3); MS (EI) m/z : calculated value: 363.1987, found value: 363.1990 (M^+); Mp 113.1-114.0°C.

2,4,6-Tris(3-methylphenyl)aniline (Table 3, entry 3). 1H NMR (400 MHz, $CDCl_3$, TMS): δ 7.41-7.35 (m, 10H, Ph), 7.27 (t, J 7.4 Hz, 1H, Ph), 7.21-7.17 (m, 2H, Ph), 7.07 (d, J 7.2 Hz, 1H, Ph), 3.91 (s, 2H, NH_2), 2.41 (s, 6H, 2× CH_3), 2.37 (s, 3H, CH_3), ppm; ^{13}C NMR (100 MHz, $CDCl_3$, TMS): δ 140.99 (Ph), 140.07 (Ph), 139.77 (2×Ph), 138.70 (2×Ph), 138.31 (Ph), 131.39

(Ph), 130.22 (2×Ph), 128.94 (2×Ph), 128.75 (Ph), 128.66 (Ph), 128.39 (2×Ph), 128.29 (2×Ph), 127.36 (Ph), 127.26 (Ph), 126.48 (2×Ph), 123.67 (2×Ph), 21.70 (CH₃), 21.65 (2×CH₃) ppm; MS (EI) *m/z*: calculated value: 363.1987, found value: 363.1990 (M⁺); mp 96.8-97.4°C.

2,4,6-Tris(4-methoxyphenyl)aniline (Table 3, entry 4). ¹H NMR (400 MHz, CDCl₃, TMS): δ 7.52-7.47 (m, 6H, Ph), 7.31 (s, 2H, Ph), 7.01 (d, *J* 8.8 Hz, 4H, Ph), 6.93 (d, *J* 8.8 Hz, 2H, Ph), 3.87 (s, 6H, 2×OCH₃), 3.85 (s, 2H, NH₂), 3.83 (s, 3H, OCH₃), ppm; ¹³C NMR (100 MHz, CDCl₃, TMS): δ 158.92 (2×Ph), 158.47 (Ph), 140.19 (Ph), 133.68 (Ph), 132.02 (2×Ph), 130.81 (Ph), 130.49 (4×Ph), 128.00 (2×Ph), 127.80 (2×Ph), 127.45 (2×Ph), 114.30 (4×Ph), 114.14 (2×Ph), 55.36 (3×OCH₃) ppm; MS (EI) *m/z*: calculated value: 411.1834, found value: 411.1844 (M⁺); mp 154.0-154.8°C.

2,4,6-Tris(4-fluorophenyl)aniline (Table 3, entry 5). ¹H NMR (400 MHz, CDCl₃, TMS): δ 7.53-7.49 (m, 6H, Ph), 7.30 (s, 2H, Ph), 7.17 (t, *J* 8.8 Hz, 4H, Ph), 7.08 (t, *J* 8.8 Hz, 2H, Ph), 3.81 (s, 2H, NH₂), ppm; ¹³C NMR (100 MHz, CDCl₃, TMS): δ 162.40 (d, *J*_{CF} 245 Hz, 2×Ph), 162.15 (d, *J*_{CF} 244 Hz, Ph), 140.52 (Ph), 136.92 (d, *J*_{CCCCF} 3 Hz, Ph), 135.40 (d, *J*_{CCCCF} 2 Hz, 2×Ph), 131.15 (d, *J*_{CCCF} 8 Hz, 4×Ph), 130.44 (Ph), 128.52 (2×Ph), 128.03 (d, *J*_{CCCF} 8 Hz, 2×Ph), 127.57 (2×Ph), 116.08 (d, *J*_{CCF} 21 Hz, 4×Ph), 115.71 (d, *J*_{CCF} 21 Hz, 2×Ph), ppm; MS (EI) *m/z*: calculated value: 375.1235, found value: 375.1241 (M⁺); mp 127.6-129.4°C.

2,4,6-Tris(3,4-difluorophenyl)aniline (Table 3, entry 6). ¹H NMR (400 MHz, CDCl₃, TMS): δ 7.38-7.16 (m, 11H, Ph), 3.87 (s, 2H, NH₂), ppm; ¹³C NMR (100 MHz, CDCl₃, TMS): δ 150.55 (dd, *J* 248, 12 Hz, 3×Ph), 149.96 (dd, *J* 248, 12 Hz, 2×Ph), 149.50 (dd, *J* 247, 12 Hz, Ph), 140.57 (Ph), 137.48 (dd, *J* 6, 4 Hz, Ph), 135.84 (dd, *J* 6, 5 Hz, Ph), 129.33 (Ph), 128.55 (2×Ph), 126.50 (2×Ph), 125.49 (dd, *J* 6, 4 Hz, 2×Ph), 122.14 (dd, *J* 6, 4 Hz, 2×Ph), 118.41 (d, *J* 17 Hz, 2×Ph), 117.98 (d, *J* 17 Hz, 2×Ph), 117.53 (d, *J* 17 Hz, Ph), 115.16 (d, *J* 18 Hz, Ph), ppm; MS (EI) *m/z*: calculated value: 429.0952, found value: 429.0955 (M⁺); mp 194.0-194.4°C.

2,4,6-Tris(4-chlorophenyl)aniline (Table 3, entry 7). ¹H NMR (400 MHz, CDCl₃, TMS): δ 7.50-7.44 (m, 10H, Ph), 7.35 (d, *J* 8.4 Hz, 2H, Ph), 7.31 (s, 2H, Ph), 3.86 (s, 2H, NH₂), ppm; ¹³C NMR (100 MHz, CDCl₃, TMS): δ 140.47 (Ph), 138.97 (Ph), 137.65 (2×Ph), 133.65 (2×Ph), 132.55 (Ph), 130.69 (4×Ph), 130.06 (Ph), 129.25 (4×Ph), 128.90 (2×Ph), 128.36 (2×Ph), 127.58 (2×Ph), 127.27 (2×Ph), ppm; MS (EI) *m/z*: calculated value: 423.0348, found value: 423.0343 (M⁺); mp 152.0-153.1°C.

2,6-Bis(4-methylphenyl)-4-nitroaniline (Table 4, entry 3). ¹H NMR (400 MHz, CDCl₃, TMS): δ 8.02 (s, 2H, Ph), 7.36 (d, *J* 7.6 Hz, 4H, Ph), 7.30 (d, *J* 8.0 Hz, 4H, Ph), 4.58 (s, 2H, NH₂), 2.42 (s, 6H, 2×CH₃), ppm; ¹³C NMR (100 MHz, CDCl₃, TMS): δ 147.68 (Ph), 138.65 (Ph), 138.23 (2×Ph), 134.39 (2×Ph), 130.03 (4×Ph), 128.91 (4×Ph), 126.73 (2×Ph), 125.61 (2×Ph), 21.25 (2×CH₃), ppm; MS (EI) *m/z*: calculated value: 318.1368, found value: 318.1371 (M⁺); mp

180.2-182.1°C.

4-Nitro-2,6-diphenylaniline (Table 4, entry 4).² ¹H NMR (400 MHz, CDCl₃, TMS): δ 8.06 (s, 2H, Ph), 7.53-7.47 (m, 8H, Ph), 7.45-7.42 (m, 2H, Ph), 4.58 (s, 2H, NH₂), ppm.

2,6-Bis(4-formylphenyl)-4-nitroaniline (Table 4, entry 5). ¹H NMR (400 MHz, CDCl₃, TMS): δ 10.10 (s, 2H, 2×CHO), 8.11 (s, 2H, Ph), 8.05 (d, *J* 8.4 Hz, 4H, Ph), 7.70 (d, *J* 8.0 Hz, 4H, Ph), 4.57 (s, 2H, NH₂), ppm; ¹³C NMR (100 MHz, DMSO-*d*₆, TMS): δ 193.29 (2×CHO), 149.42 (Ph), 143.75 (2×Ph), 137.14 (Ph), 136.08 (2×Ph), 130.80 (4×Ph), 130.40 (4×Ph), 126.49 (2×Ph), 125.60 (2×Ph), ppm; MS (EI) *m/z*: calculated value: 346.0954, found value: 346.0959 (M⁺); mp 226.9-228.3°C.

2,6-Bis(4-fluorophenyl)-4-nitroaniline (Table 4, entry 6). ¹H NMR (400 MHz, CDCl₃, TMS): δ 8.03 (s, 2H, Ph), 7.47-7.44 (m, 4H, Ph), 7.21 (t, *J* 8.6 Hz, 4H, Ph), 4.47 (s, 2H, NH₂), ppm; ¹³C NMR (100 MHz, CDCl₃, TMS): δ 162.68 (d, *J*_{CF} 247 Hz, 2×Ph), 147.47 (Ph), 138.72 (Ph), 133.06 (d, *J*_{CCCCF} 3 Hz, 2×Ph), 130.93 (d, *J*_{CCCF} 9 Hz, 4×Ph), 125.93 (2×Ph), 125.87 (2×Ph), 116.47 (d, *J*_{CCF} 21 Hz, 4×Ph), ppm; MS (EI) *m/z*: calculated value: 326.0867, found value: 326.0875 (M⁺); mp 215.9-216.5°C.

2,6-Bis(3,4-difluorophenyl)-4-nitroaniline (Table 4, entry 7). ¹H NMR (400 MHz, CDCl₃, TMS): δ 8.03 (s, 2H, Ph), 7.36-7.30 (m, 4H, Ph), 7.23-7.20 (m, 2H, Ph), 4.49 (s, 2H, NH₂), ppm; ¹³C NMR (100 MHz, CDCl₃, TMS): δ 150.76 (dd, *J* 250, 13 Hz, 2×Ph), 150.45 (dd, *J* 250, 13 Hz, 2×Ph), 146.96 (Ph), 138.84 (Ph), 133.72 (dd, *J* 7, 5 Hz, 2×Ph), 126.16 (2×Ph), 125.49 (dd, *J* 8, 3 Hz, 2×Ph), 124.95 (2×Ph), 118.45 (2×Ph), 118.45 (d, *J* 34 Hz, 2×Ph), ppm; MS (EI) *m/z*: calculated value: 326.0678, found value: 326.0676 (M⁺); mp 221.6-222.3°C.

2,6-Bis(3,4,5-trifluorophenyl)-4-nitroaniline (Table 4, entry 8). ¹H NMR (400 MHz, CDCl₃, TMS): δ 8.03 (s, 2H, Ph), 7.17-7.09 (m, 4H, Ph), 4.51 (s, 2H, NH₂), ppm; ¹³C NMR (100 MHz, CDCl₃, TMS): δ 151.83 (ddd, *J* 252, 10, 4 Hz, 4×Ph), 146.56 (Ph), 139.96 (dt, *J* 253, 15 Hz, 2×Ph), 138.88 (Ph), 132.64-132.44 (m, 2×Ph), 126.34 (2×Ph), 124.20 (2×Ph), 113.65 (dd, *J* 9, 6 Hz, 4×Ph), ppm; MS (EI) *m/z*: calculated value: 398.0490, found value: 398.0490 (M⁺); mp 209.2-210.2°C.

2,6-Diphenylaniline (Table 5, entry 1).³ ¹H NMR (400 MHz, CDCl₃, TMS): δ 7.52-7.50 (m, 4H, Ph), 7.47-7.43 (m, 4H, Ph), 7.37-7.33 (m, 2H, Ph), 7.12 (d, *J* 7.6 Hz, 2H, Ph), 6.88 (t, *J* 7.4 Hz, 1H, Ph), 3.85 (s, 2H, NH₂), ppm.

2,6-Bis(4-methylphenyl)aniline (Table 5, entry 2). ¹H NMR (400 MHz, CDCl₃, TMS): δ 7.33 (dd, *J* 48.4, 8.0 Hz, 8H, Ph), 7.10 (d, *J* 7.6 Hz, 2H, Ph), 6.86 (t, *J* 7.6 Hz, 1H, Ph), 3.85 (s, 2H, NH₂), 2.40 (s, 6H, 2×CH₃), ppm; ¹³C NMR (100 MHz, CDCl₃, TMS): δ 141.01 (Ph), 136.95

(2×Ph), 136.92 (2×Ph), 129.68 (2×Ph), 129.60 (4×Ph), 129.28 (4×Ph), 127.95 (Ph), 118.18 (2×Ph), 21.29 (2×CH₃), ppm; MS (EI) *m/z*: calculated value: 273.1517, found value: 273.1510 (M⁺); mp 118.2-119.1 °C.

2,6-Bis(4-methoxyphenyl)aniline (Table 5, entry 3).⁴¹H NMR (400 MHz, CDCl₃, TMS): δ 7.45-7.42 (m, 4H, Ph), 7.08 (d, *J* 7.6 Hz, 2H, Ph), 7.01-6.97 (m, 4H, Ph), 6.85 (t, *J* 7.4 Hz, 1H, Ph), 3.85 (s, 6H, 2×OCH₃), 3.82 (s, 2H, NH₂), ppm.

2,6-Bis(2-methylphenyl)aniline (Table 5, entry 4).⁴ ¹H NMR (400 MHz, CDCl₃, TMS): δ 7.29-7.25 (m, 8H, Ph), 7.02-6.99 (m, 2H, Ph), 6.85-6.80 (m, 1H, Ph), 3.28 (s, 2H, NH₂), 2.20 (d, *J* 4.0 Hz, 6H, 2×CH₃), ppm.

2,6-Bis(4-fluorophenyl)aniline (Table 5, entry 5). ¹H NMR (400 MHz, CDCl₃, TMS): δ 7.48-7.45 (m, 4H, Ph), 7.17-7.12 (m, 4H, Ph), 7.09 (d, *J* 7.6 Hz, 2H, Ph), 6.87 (t, *J* 7.6 Hz, 1H, Ph), 3.75 (s, 2H, NH₂), ppm, ¹³C NMR (100 MHz, CDCl₃, TMS): δ 162.16 (d, *J*_{CF} 245 Hz, 2×Ph), 140.93 (Ph), 135.50 (d, *J*_{CCCCF} 3 Hz, 2×Ph), 131.01 (d, *J*_{CCCF} 8 Hz, 4×Ph), 129.95 (2×Ph), 127.03 (Ph), 118.30 (2×Ph), 115.84 (d, *J*_{CCF} 21 Hz, 4×Ph), ppm; MS (EI) *m/z*: calculated value: 281.1016, found value: 281.1018 (M⁺); mp 146.0-147.6 °C.

2,6-Bis(3,4-difluorophenyl)aniline (Table 5, entry 6). ¹H NMR (400 MHz, CDCl₃, TMS): δ 7.33-7.29 (m, 2H, Ph), 7.27-7.19 (m, 4H, Ph), 7.08 (d, *J* 7.6 Hz, 2H, Ph), 6.87 (t, *J* 7.6 Hz, 1H, Ph), 3.77 (s, 2H, NH₂), ppm, ¹³C NMR (100 MHz, CDCl₃, TMS): δ 150.46 (dd, *J* 248, 12 Hz, 2×Ph), 149.77 (dd, *J* 248, 12 Hz, 2×Ph), 140.64 (Ph), 136.28 (dd, *J* 6, 4 Hz, 2×Ph), 130.19 (2×Ph), 126.06 (Ph), 125.47 (dd, *J* 6, 4 Hz, 2×Ph), 118.45 (2×Ph), 118.37 (d, *J* 17 Hz, 2×Ph), 117.78 (d, *J* 17 Hz, 2×Ph), ppm; MS (EI) *m/z*: calculated value: 317.0828, found value: 317.0818 (M⁺); mp 88.2-89.0 °C.

2,6-Bis(3,4,5-trifluorophenyl)aniline (Table 5, entry 7). ¹H NMR (400 MHz, CDCl₃, TMS): δ 7.16-7.07 (m, 6H, Ph), 6.87 (t, *J* 7.6 Hz, 1H, Ph), 3.78 (s, 2H, NH₂), ppm, ¹³C NMR (100 MHz, CDCl₃, TMS): δ 151.46 (ddd, *J* 250, 10, 4 Hz, 4×Ph), 140.37 (Ph), 139.21 (dt, *J* 251, 5 Hz, 2×Ph), 135.25-135.04 (m, 2×Ph), 130.42 (2×Ph), 125.25 (Ph), 118.67 (2×Ph), 113.52 (dd, *J* 16, 6 Hz, 4×Ph), ppm; MS (EI) *m/z*: calculated value: 353.0639, found value: 353.0637 (M⁺); mp 92.5-93.1 °C.

4-Phenylaniline (Table 6, entry 1).⁵ ¹H NMR (400 MHz, CDCl₃, TMS): δ 7.55-7.52 (m, 2H, Ph), 7.43-7.37 (m, 4H, Ph), 7.29-7.25 (m, 1H, Ph), 6.77-6.74 (m, 2H, Ph), 3.71 (s, 2H, NH₂), ppm.

4-(4-Methylphenyl)aniline (Table 6, entry 2).⁶ ¹H NMR (400 MHz, CDCl₃, TMS): δ 7.44-7.38 (m, 4H, Ph), 7.20 (d, *J* 8.0 Hz, 2H, Ph), 6.76-6.73 (m, 2H, Ph), 3.69 (s, 2H, NH₂), 2.37 (s, 3H,

CH_3), ppm.

4-(2-Methylphenyl)aniline (Table 6, entry 3).⁷ 1H NMR (400 MHz, $CDCl_3$, TMS): δ 7.24-7.20 (m, 4H, Ph), 7.12 (d, J 8.8 Hz, 2H, Ph), 6.72-6.69 (m, 2H, Ph), 3.66 (s, 2H, NH_2), 2.28 (s, 3H, CH_3), ppm.

4-(2-Methoxyphenyl)aniline (Table 6, entry 4).¹ 1H NMR (400 MHz, $CDCl_3$, TMS): δ 7.34 (d, J 8.4 Hz, 2H, Ph), 7.29-7.21 (m, 2H, Ph), 6.99 (t, J 7.4 Hz, 1H, Ph), 6.94 (d, J 8.0 Hz, 1H, Ph), 6.70 (d, J 8.4 Hz, 2H, Ph), 3.79 (s, 3H, CH_3), 3.66 (s, 2H, NH_2), ppm.

4-(4-Cyanophenyl)aniline (Table 6, entry 5).⁸ 1H NMR (400 MHz, $CDCl_3$, TMS): δ 7.80 (s, 1H, Ph), 7.76-7.73 (m, 1H, Ph), 7.55-7.52 (m, 1H, Ph), 7.48 (t, J 8.0 Hz, 1H, Ph), 7.40-7.37 (m, 2H, Ph), 6.79-6.75 (m, 2H, Ph), 3.82 (s, 2H, NH_2), ppm.

4-(4-Fluorophenyl)aniline (Table 6, entry 6). 1H NMR (400 MHz, $CDCl_3$, TMS): δ 7.49-7.44 (m, 2H, Ph), 7.37-7.33 (m, 2H, Ph), 7.10-7.05 (m, 2H, Ph), 6.77-6.73 (m, 2H, Ph), 3.72 (s, 2H, NH_2), ppm; ^{13}C NMR (100 MHz, $CDCl_3$, TMS): δ 161.88 (d, J_{CF} 244 Hz, Ph), 145.85 (Ph), 137.35 (d, J_{CCCCF} 3 Hz, Ph), 130.64 (Ph), 127.90 (2 \times Ph), 127.82 (2 \times Ph), 115.46 (d, J_{CCF} 21 Hz, 2 \times Ph), 115.42 (2 \times Ph), ppm; MS (EI) m/z : calculated value: 187.0797, found value: 187.0795 (M^+); mp 120.2-121.1 $^{\circ}C$.

4-(3,4-Difluorophenyl)aniline (Table 6, entry 7). 1H NMR (400 MHz, $CDCl_3$, TMS): δ 7.32-7.28 (m, 3H, Ph), 7.23-7.13 (m, 2H, Ph), 6.76-6.73 (m, 2H, Ph), 3.76 (s, 2H, NH_2), ppm; ^{13}C NMR (100 MHz, $CDCl_3$, TMS): δ 150.48 (dd, J 245, 13 Hz, Ph), 149.23 (dd, J 245, 13 Hz, Ph), 146.37 (Ph), 138.39 (dd, J 6, 4 Hz, Ph), 129.36 (Ph), 127.87 (2 \times Ph), 122.07 (dd, J 6, 4 Hz, Ph), 117.34 (d, J 17 Hz, Ph), 115.40 (2 \times Ph), 115.07 (d, J 17 Hz, Ph), ppm; MS (EI) m/z : calculated value: 205.0703, found value: 205.0694 (M^+); mp 88.3-89.2 $^{\circ}C$.

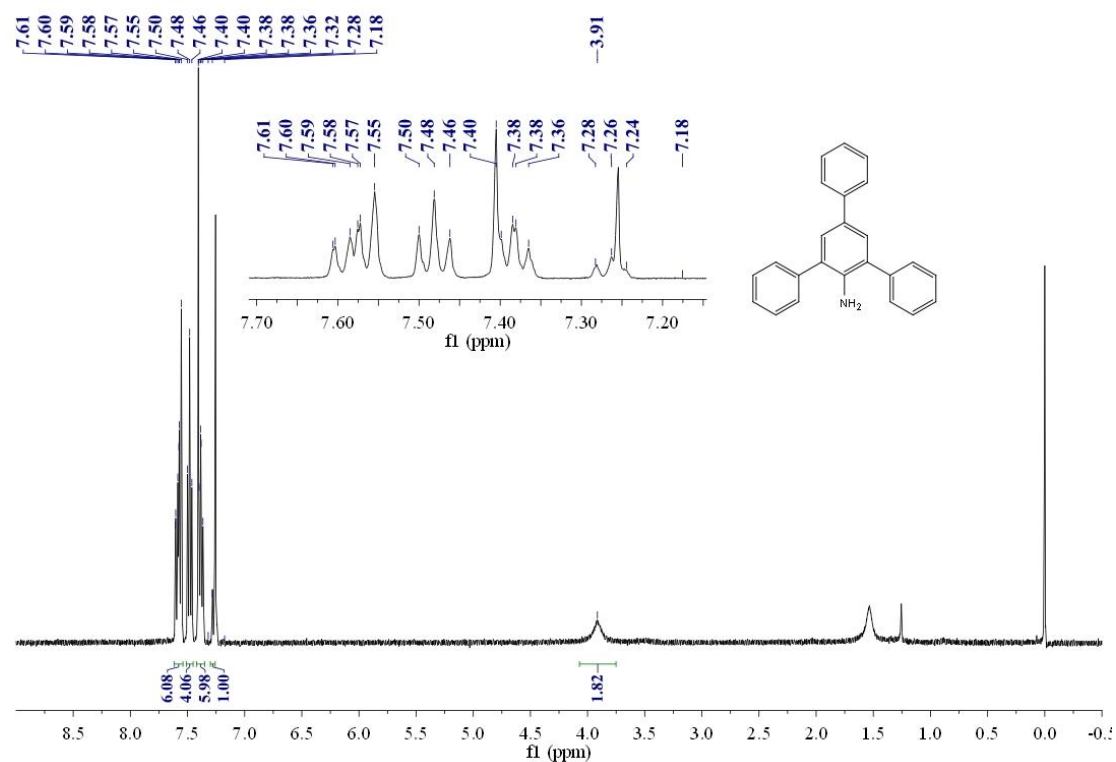
4-(3,4,5-Trifluorophenyl)aniline (Table 6, entry 8). 1H NMR (400 MHz, $CDCl_3$, TMS): δ 7.32-7.29 (m, 2H, Ph), 7.13-7.07 (m, 2H, Ph), 6.75-6.72 (m, 2H, Ph), 3.80 (s, 2H, NH_2), ppm; ^{13}C NMR (100 MHz, $CDCl_3$, TMS): δ 151.38 (ddd, J 247, 10, 5 Hz, 2 \times Ph), 146.84 (Ph), 139.85-137.06 (m, 2 \times Ph), 128.25 (Ph), 127.78 (2 \times Ph), 115.35 (2 \times Ph), 109.95 (dd, J 16, 6 Hz, 2 \times Ph), ppm; MS (EI) m/z : calculated value: 223.0609, found value: 223.0599 (M^+); mp 83.6-84.1 $^{\circ}C$.

References

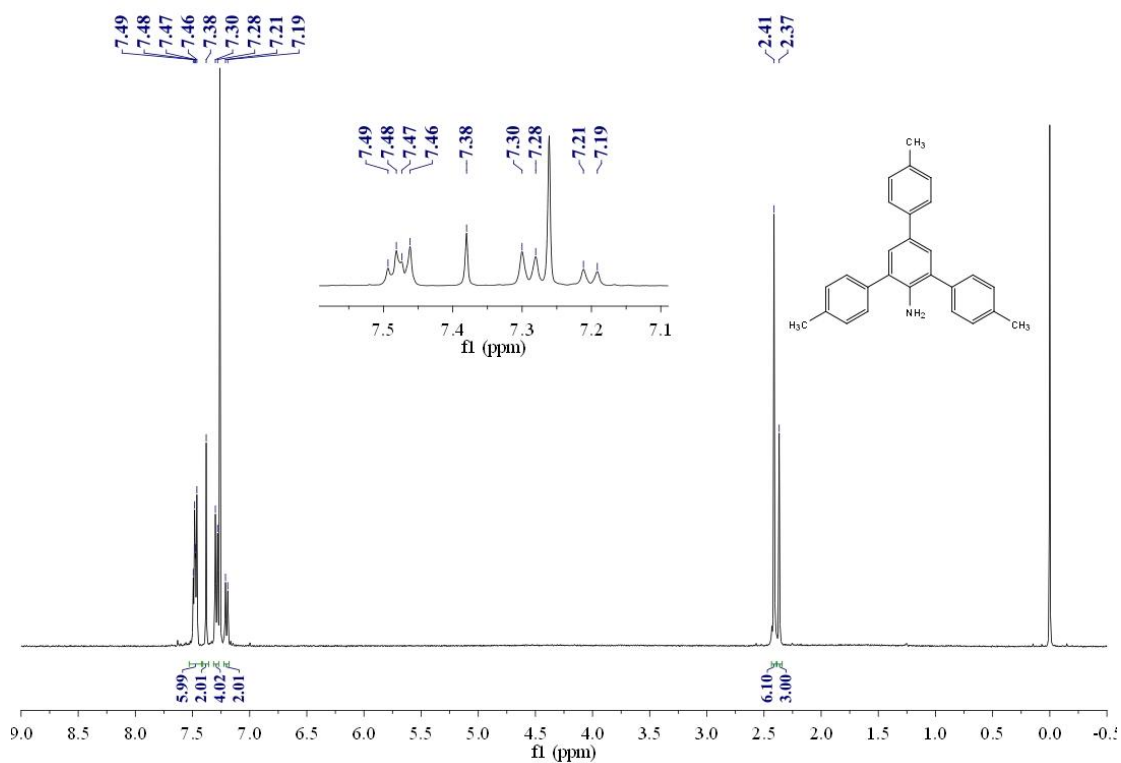
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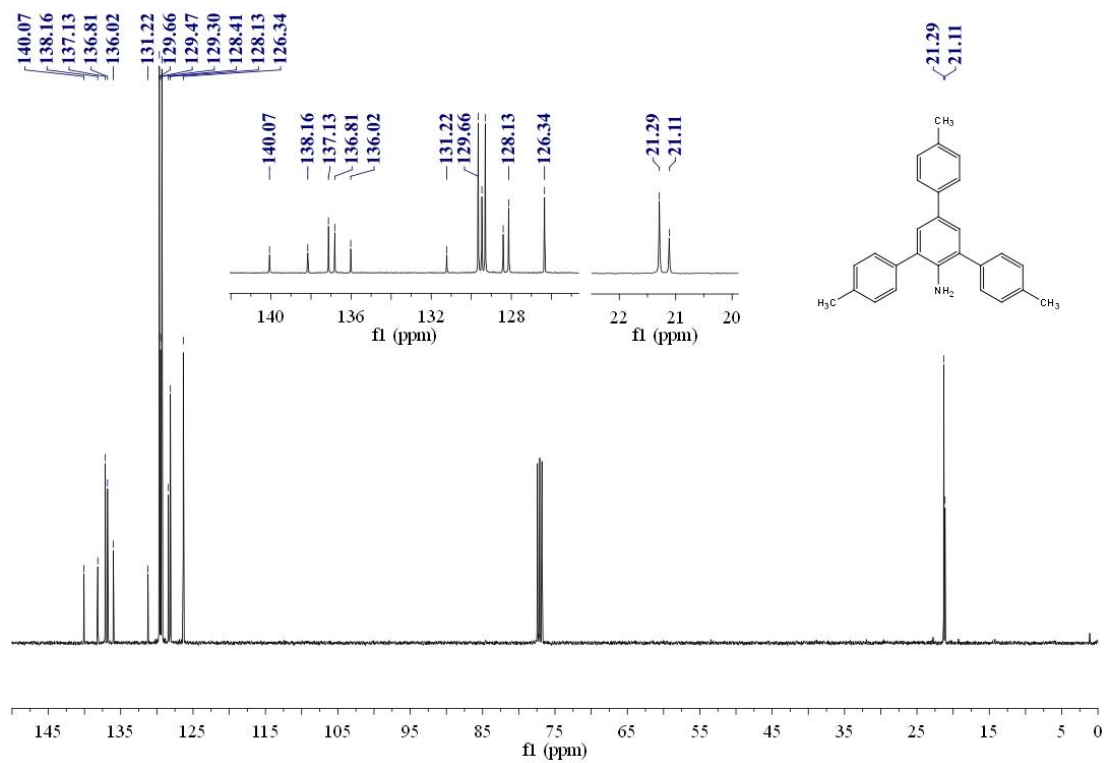
NMR Spectra for all Cross-Coupling Products

2,4,6-triphenylaniline

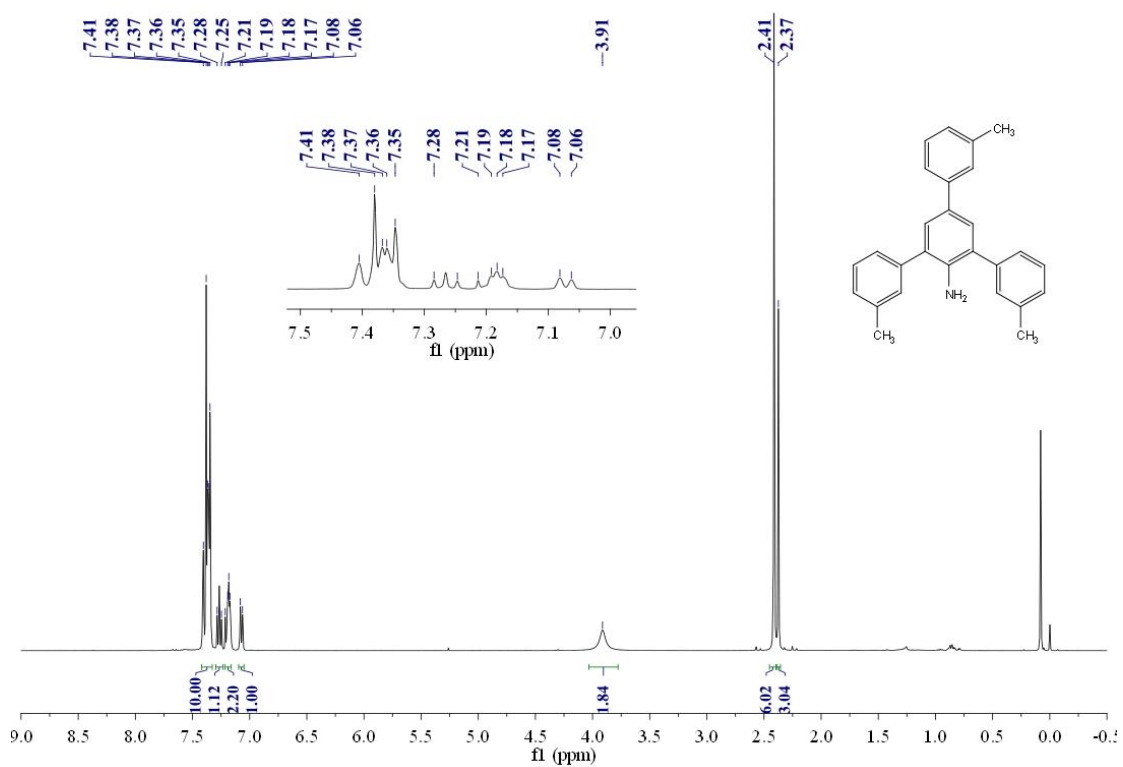


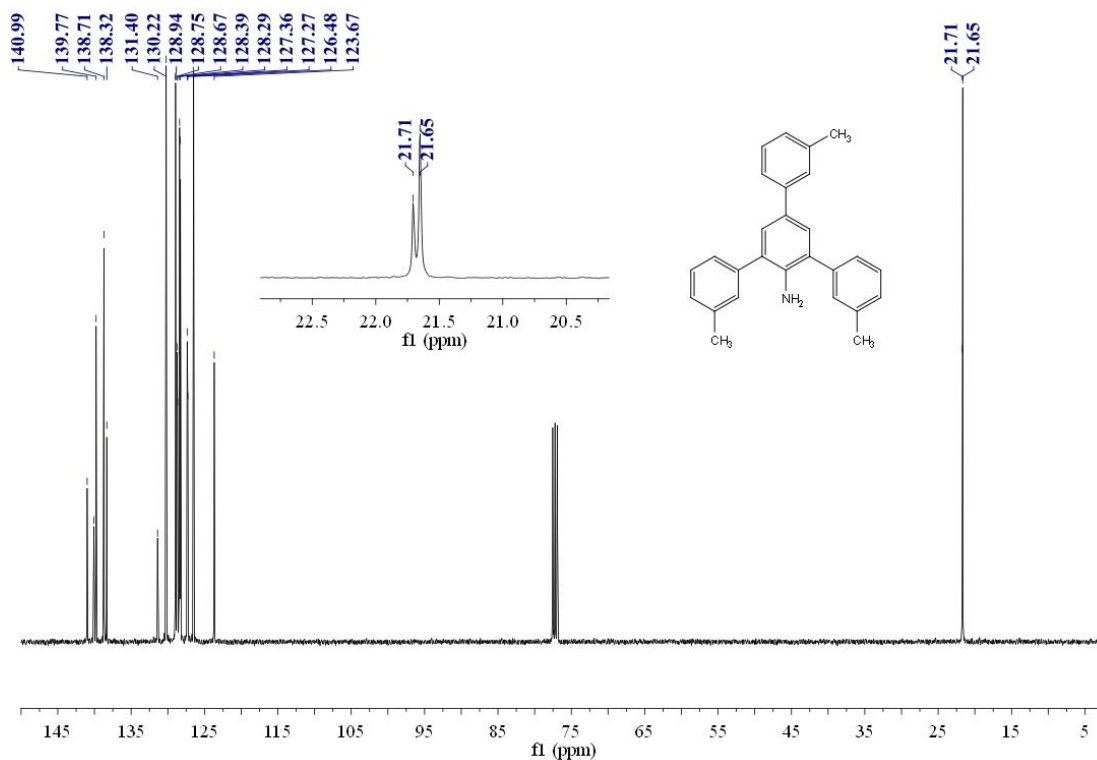
2,4,6-tris(4-methylphenyl)aniline



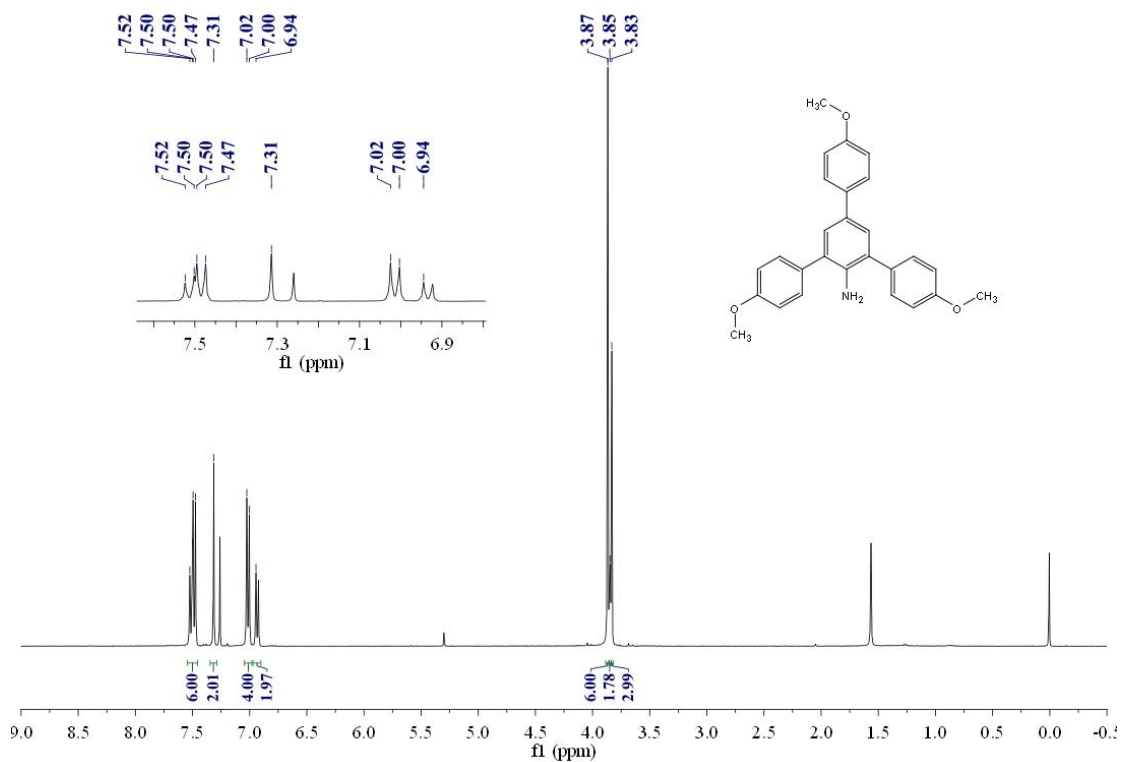


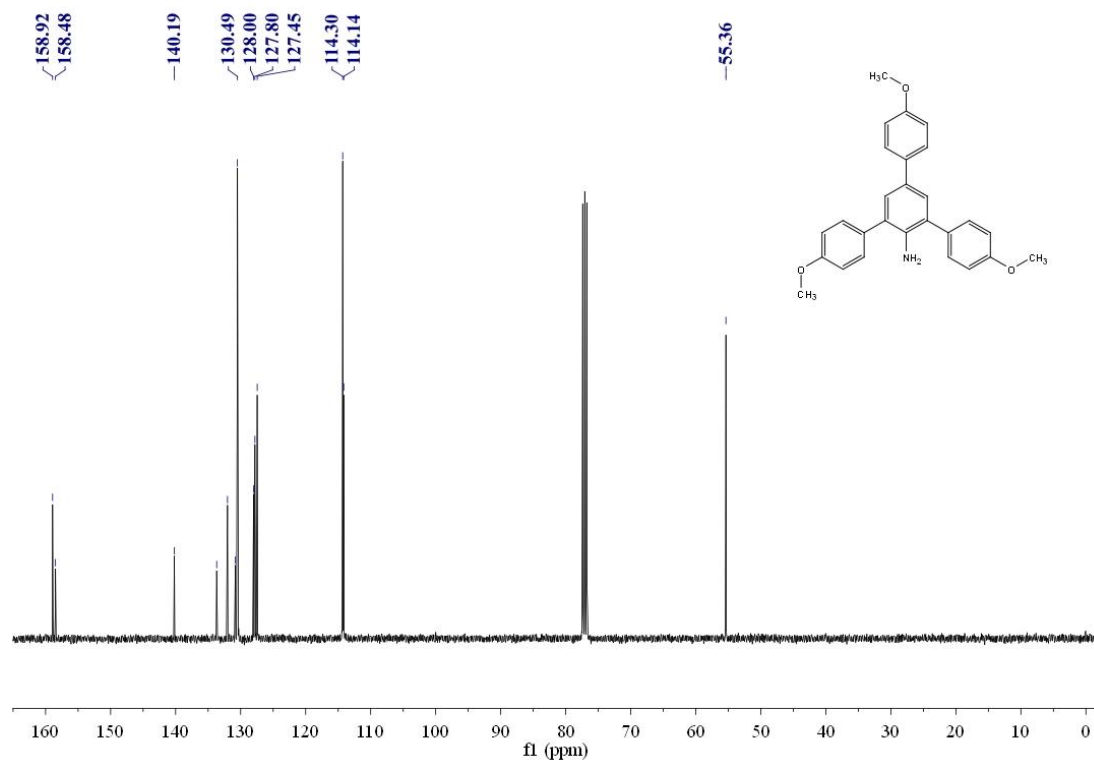
2,4,6-tris(3-methylphenyl)aniline



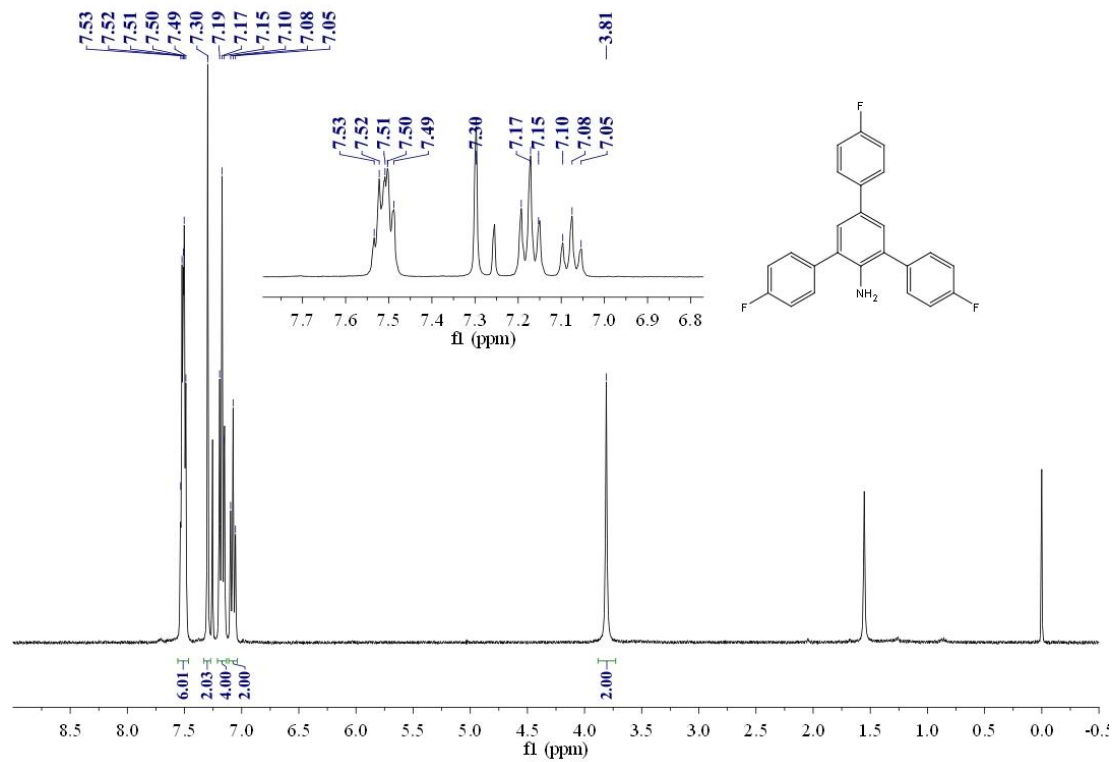


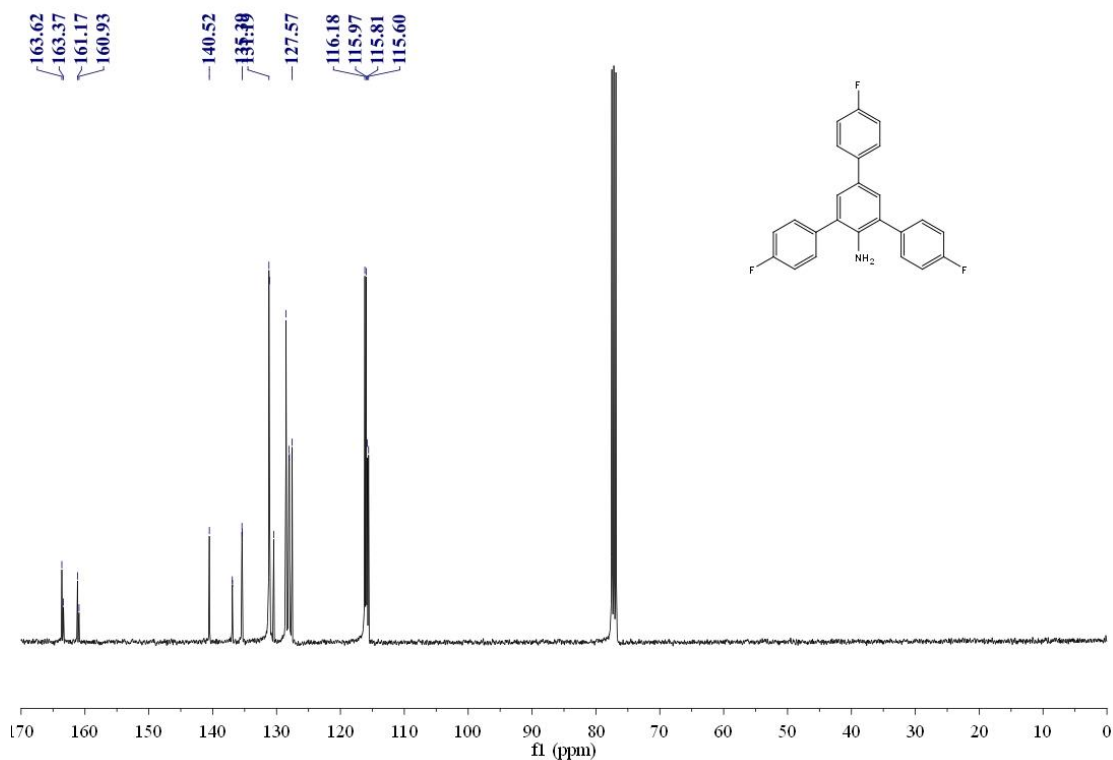
2,4,6-tris(4-methoxyphenyl)aniline



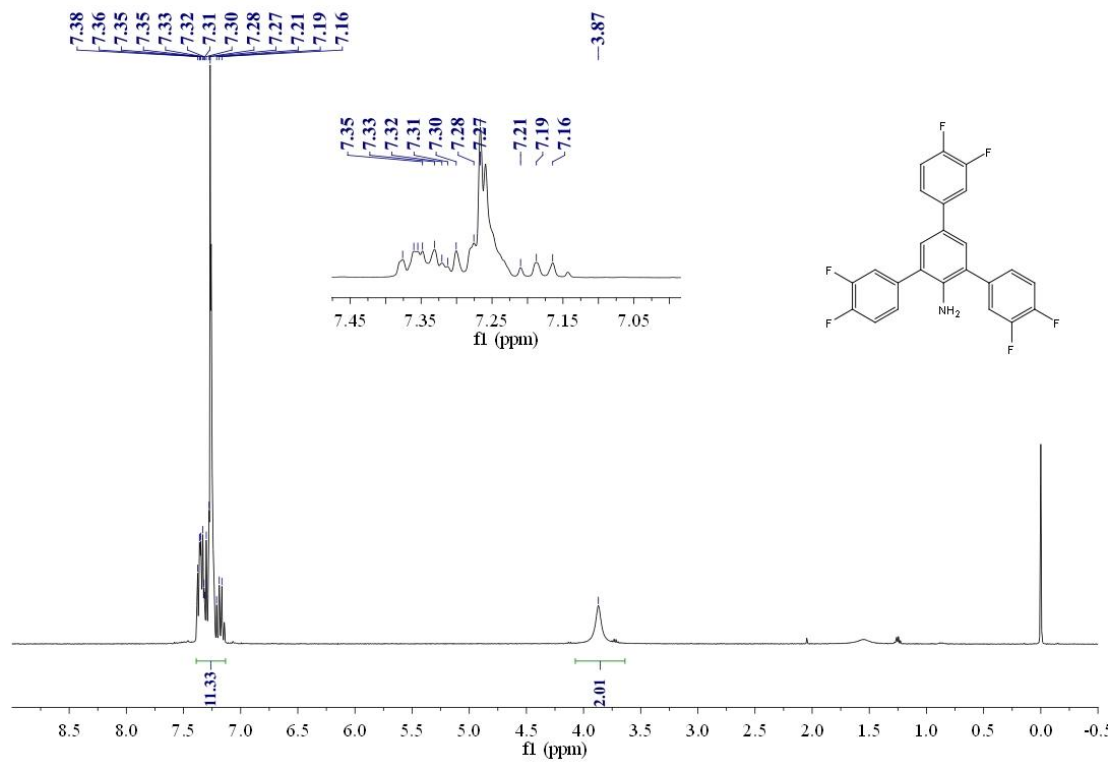


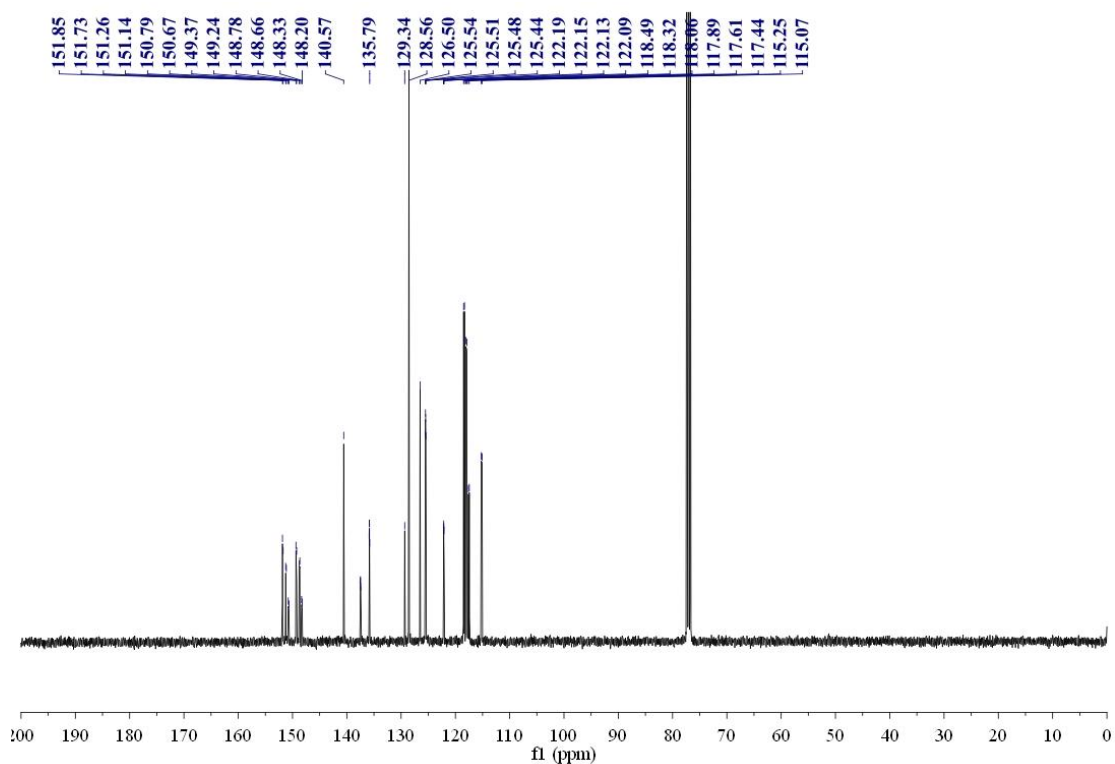
2,4,6-tris(4-fluorophenyl)aniline



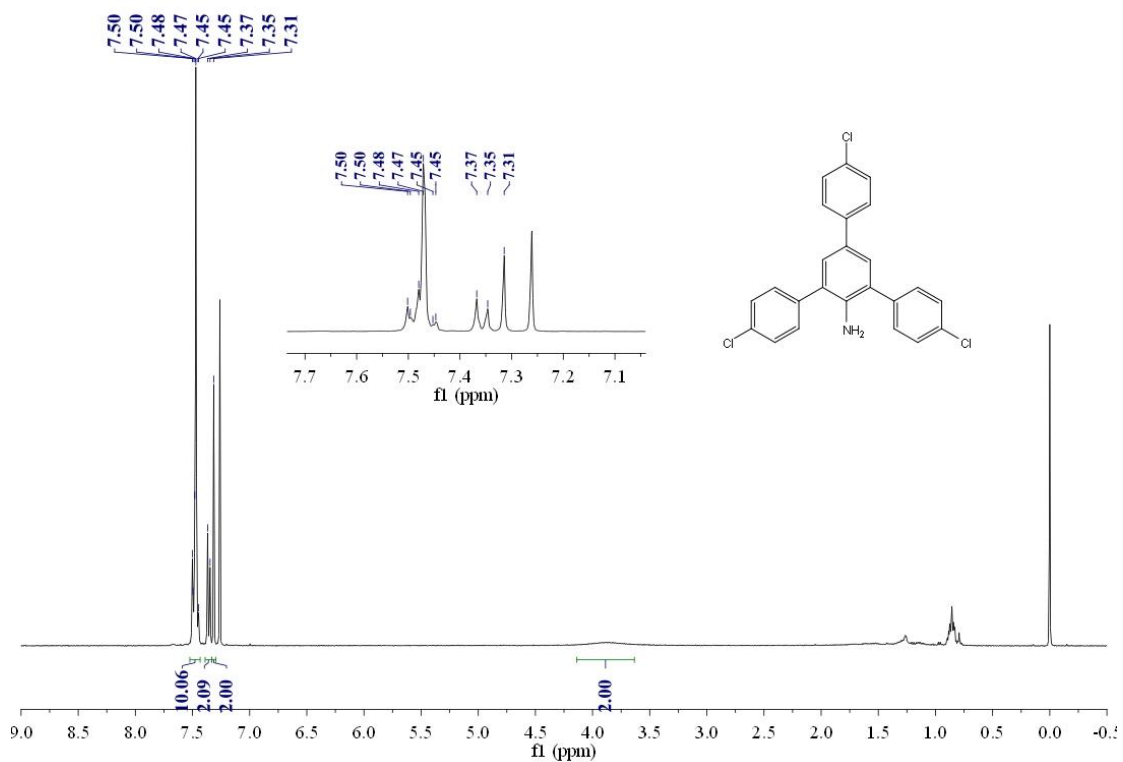


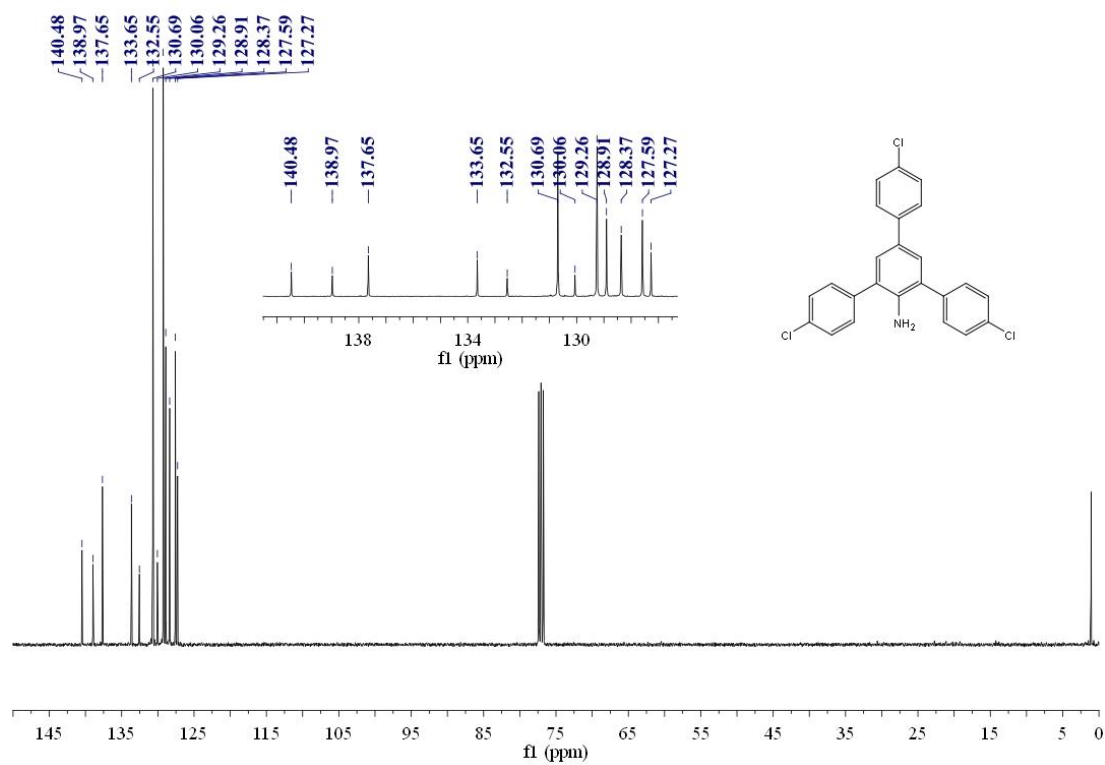
2,4,6-tris(3,4-difluorophenyl)aniline



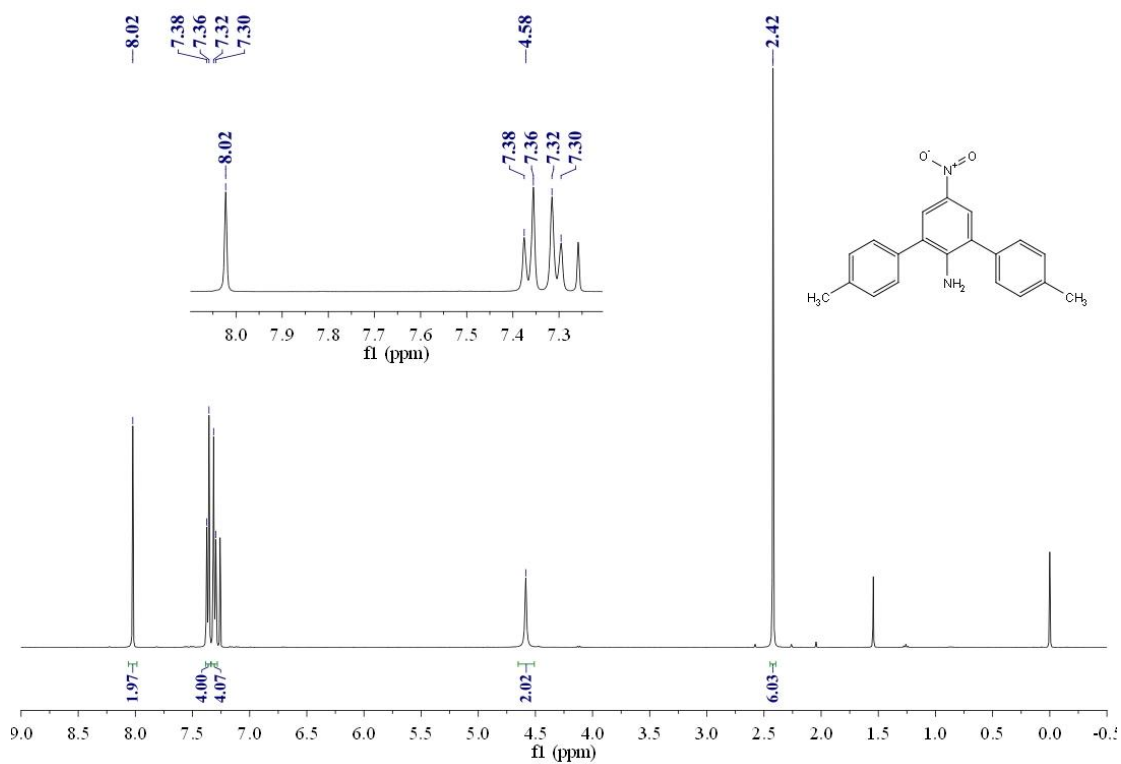


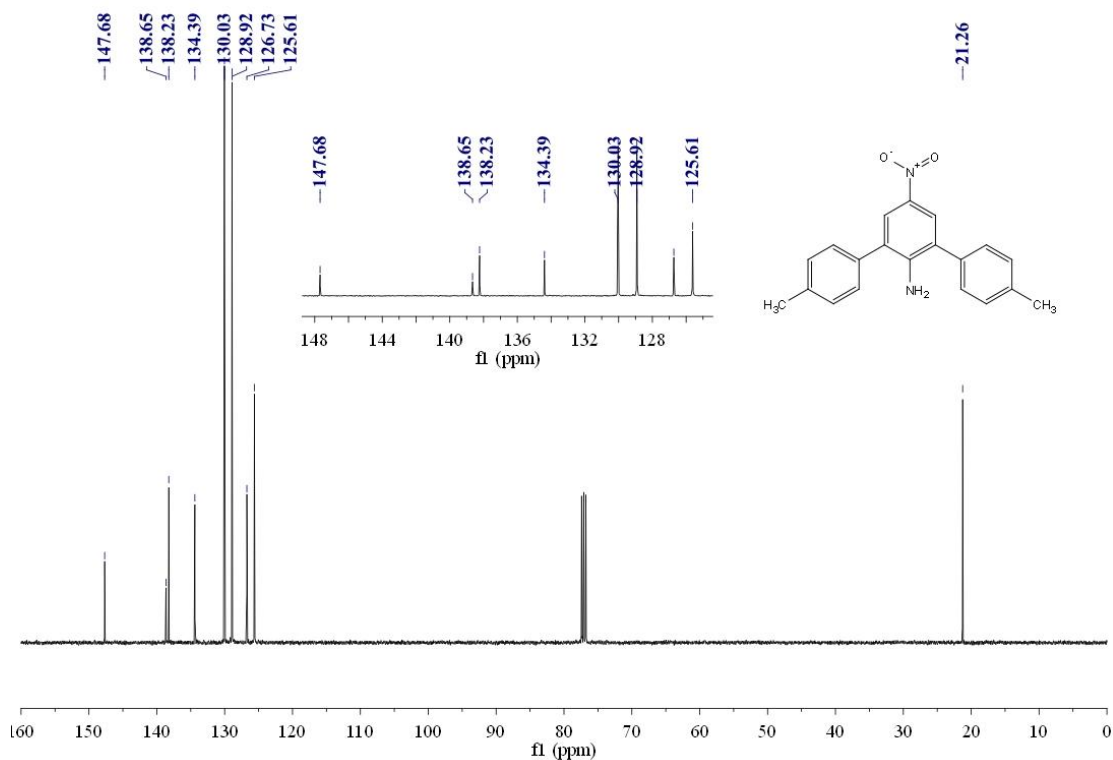
2,4,6-tris(4-chlorophenyl)aniline



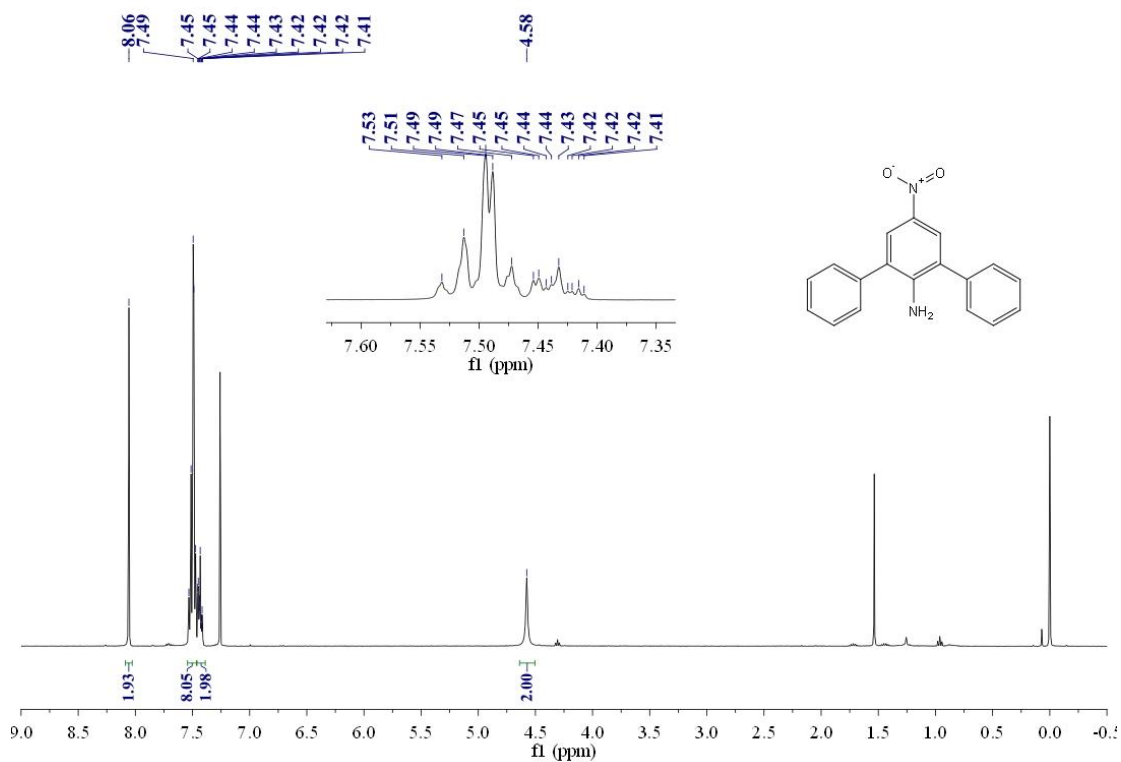


2,6-bis(4-methylphenyl)-4-nitroaniline

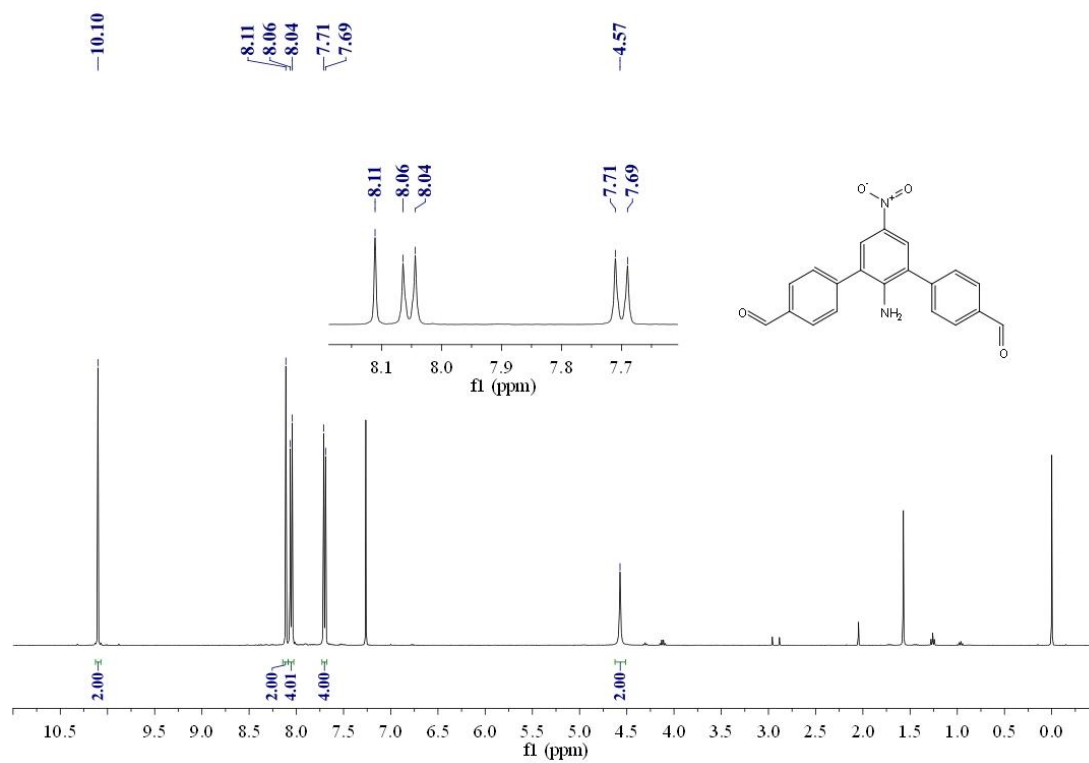




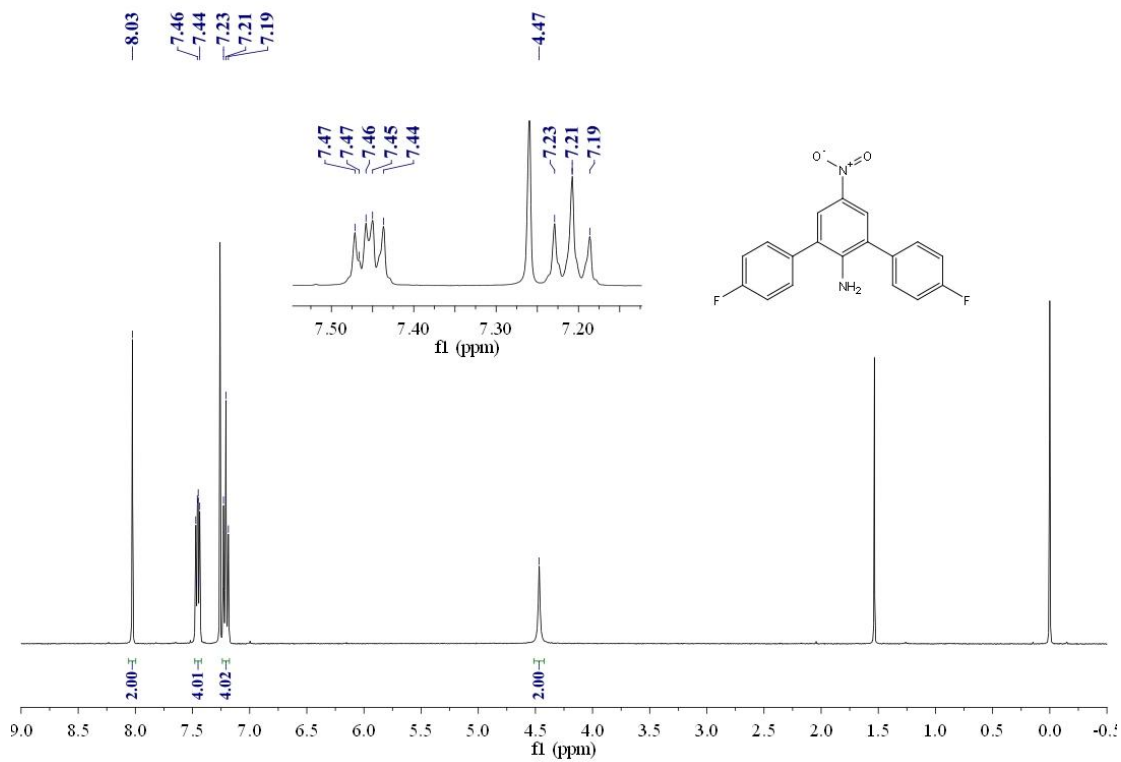
4-nitro-2,6-diphenylaniline

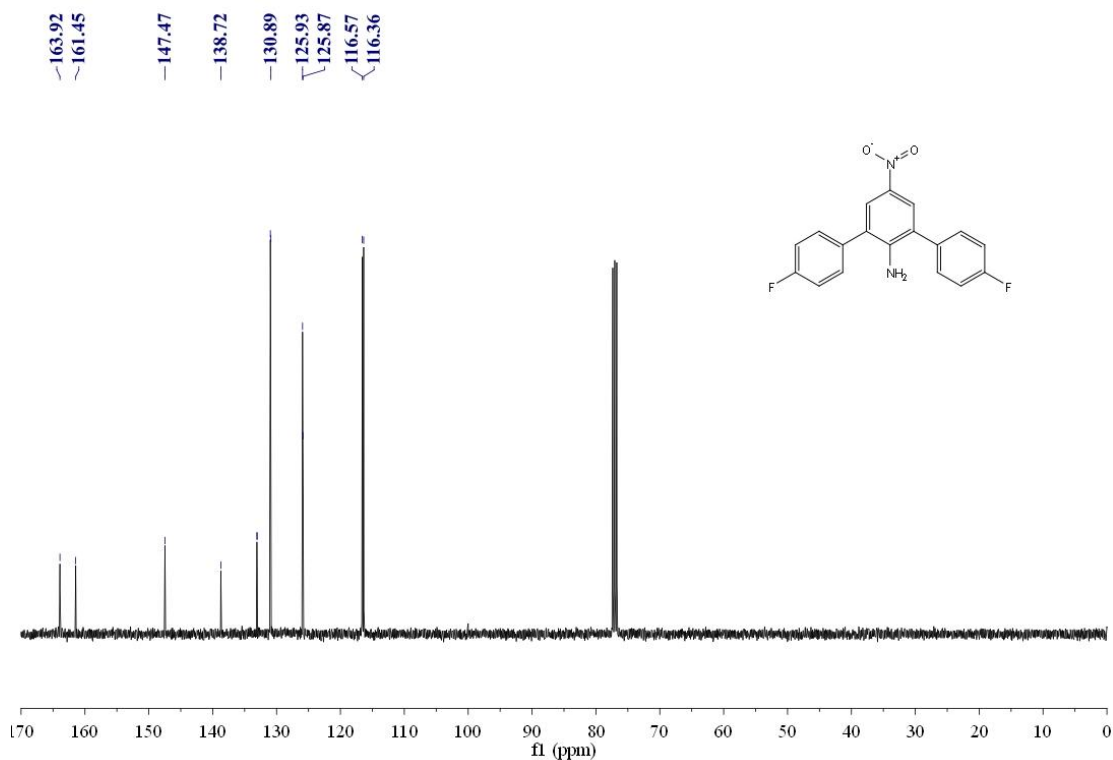


2,6-bis(4-formylphenyl)-4-nitroaniline

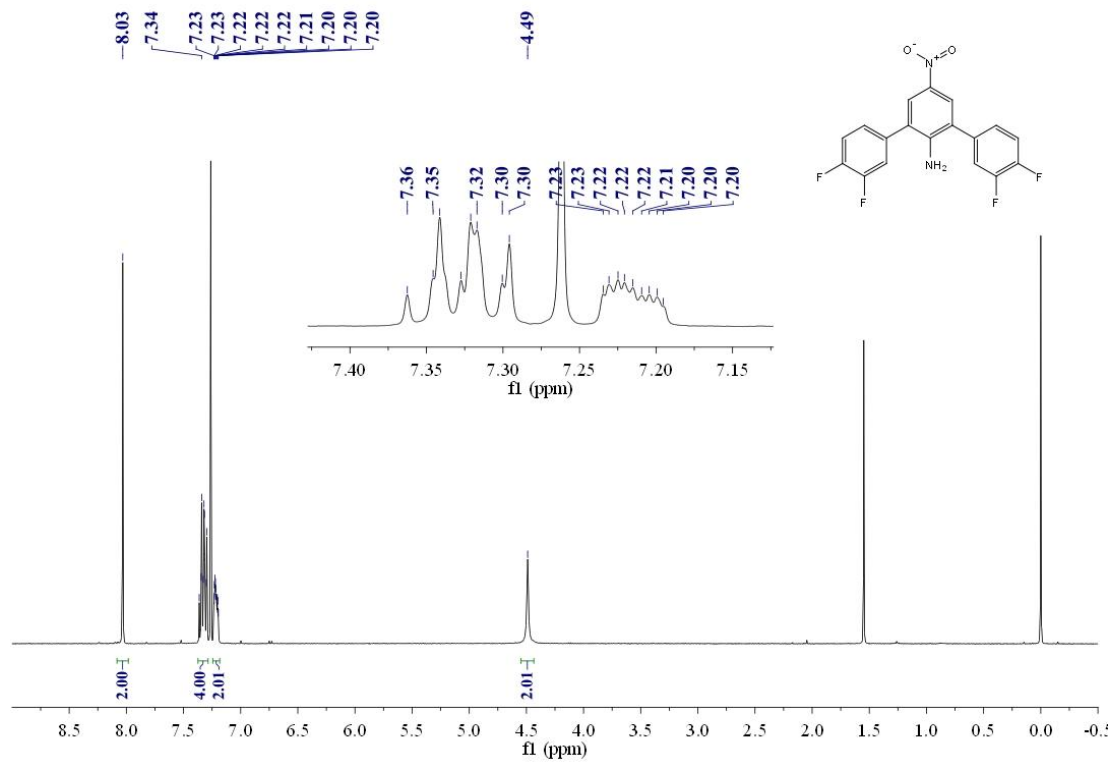


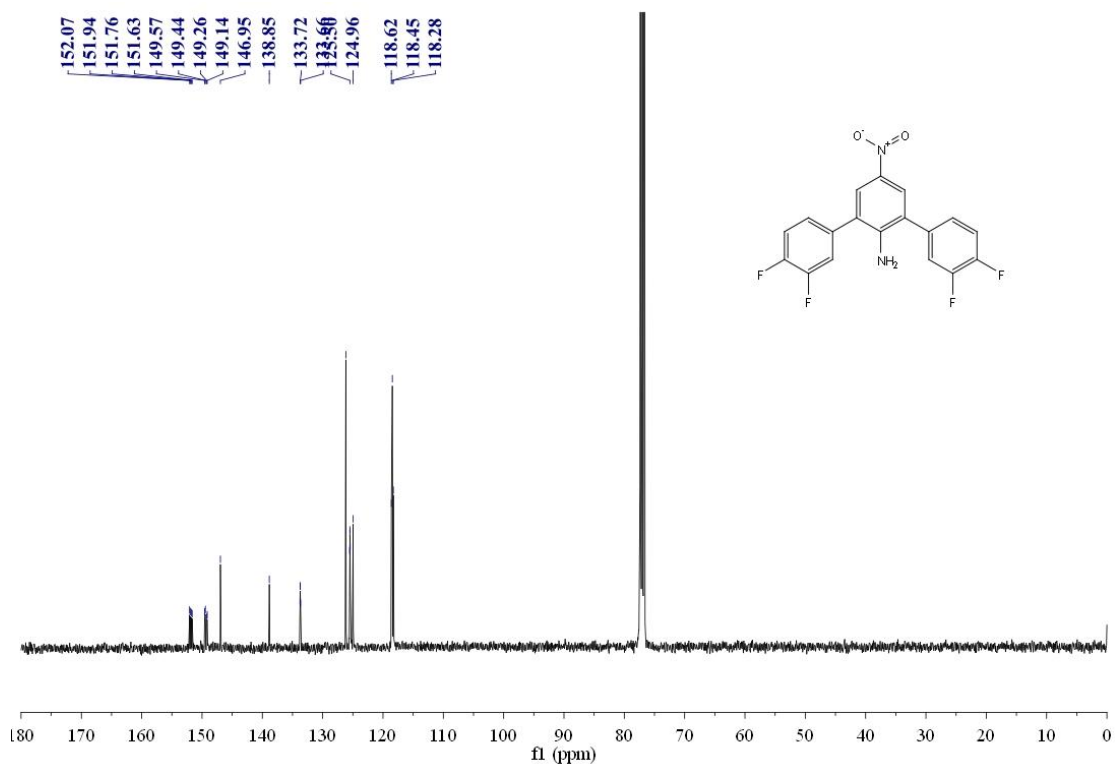
2,6-bis(4-fluorophenyl)-4-nitroaniline



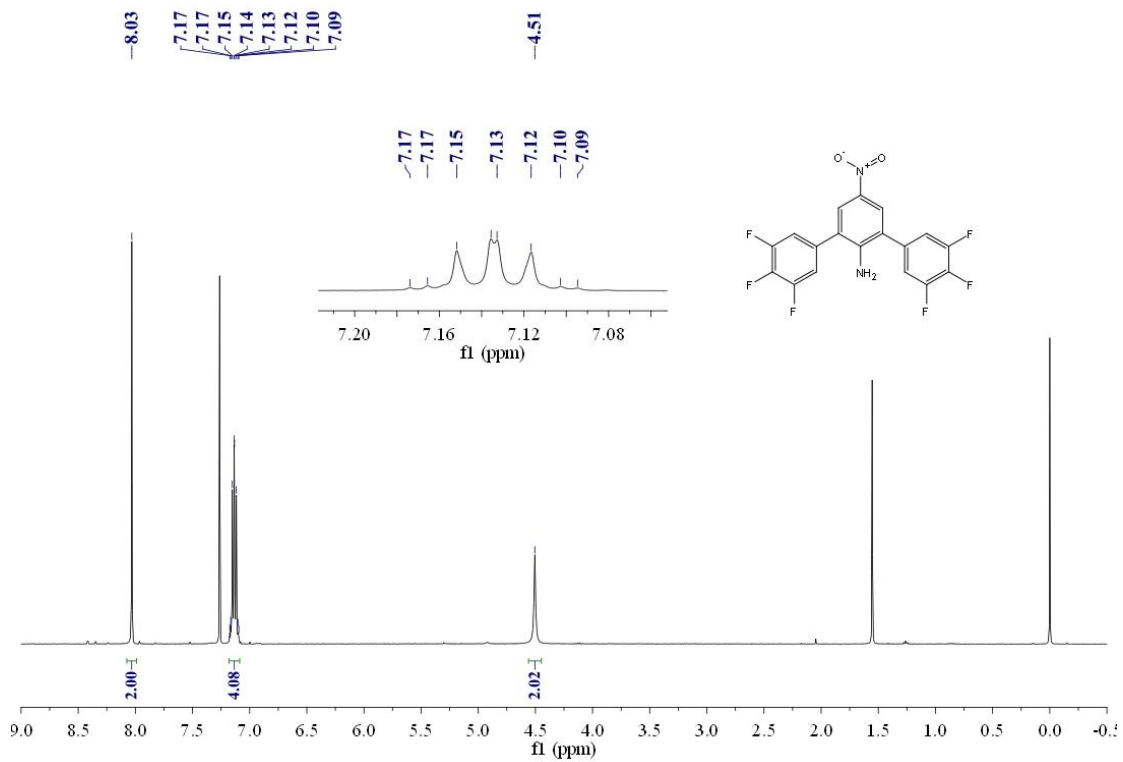


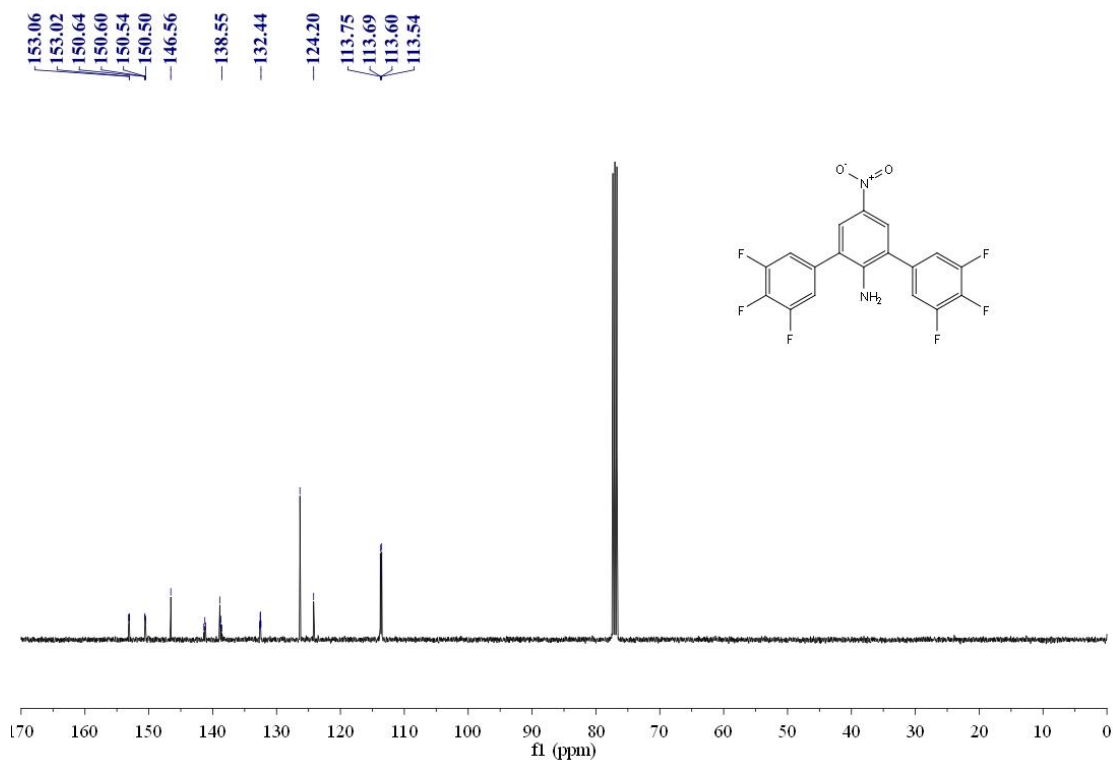
2,6-bis(3,4-difluorophenyl)-4-nitroaniline



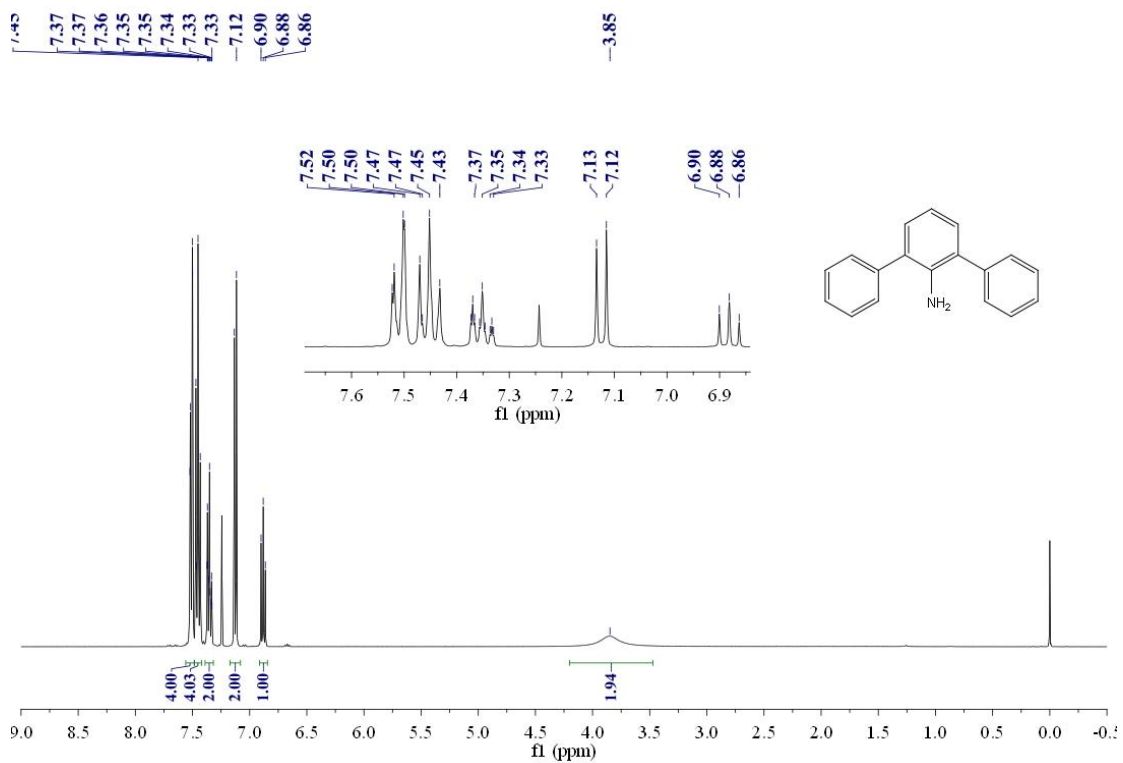


2,6-bis(3,4,5-trifluorophenyl)-4-nitroaniline

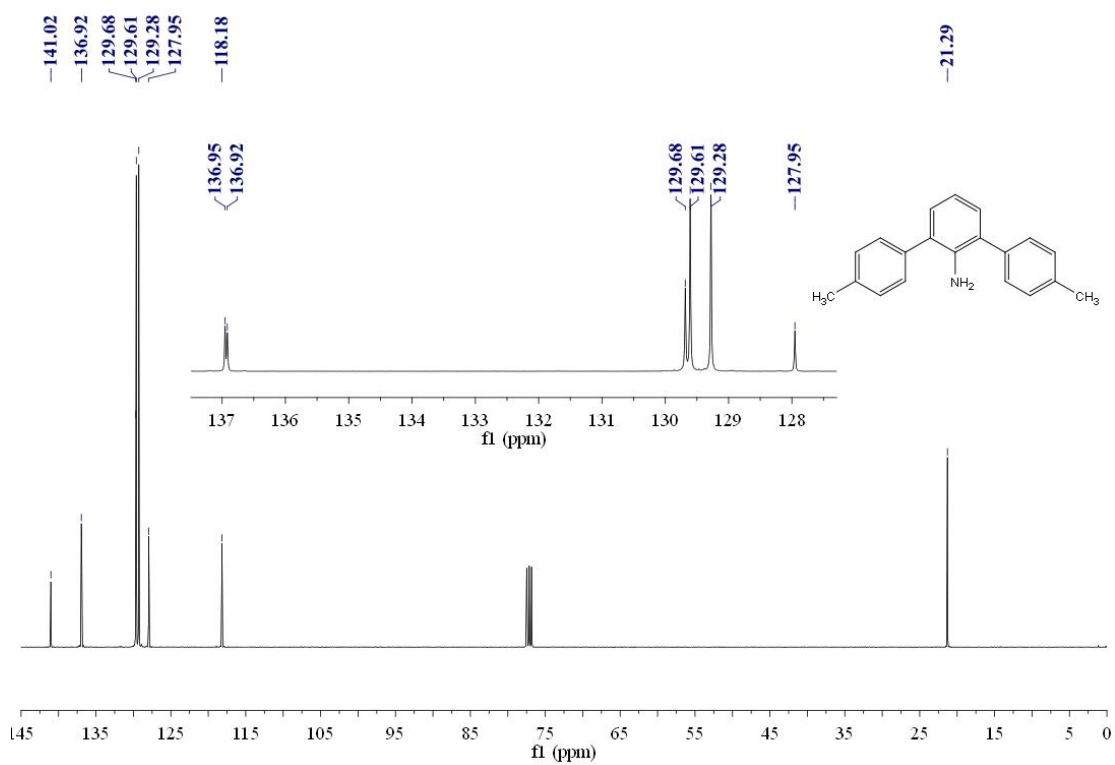
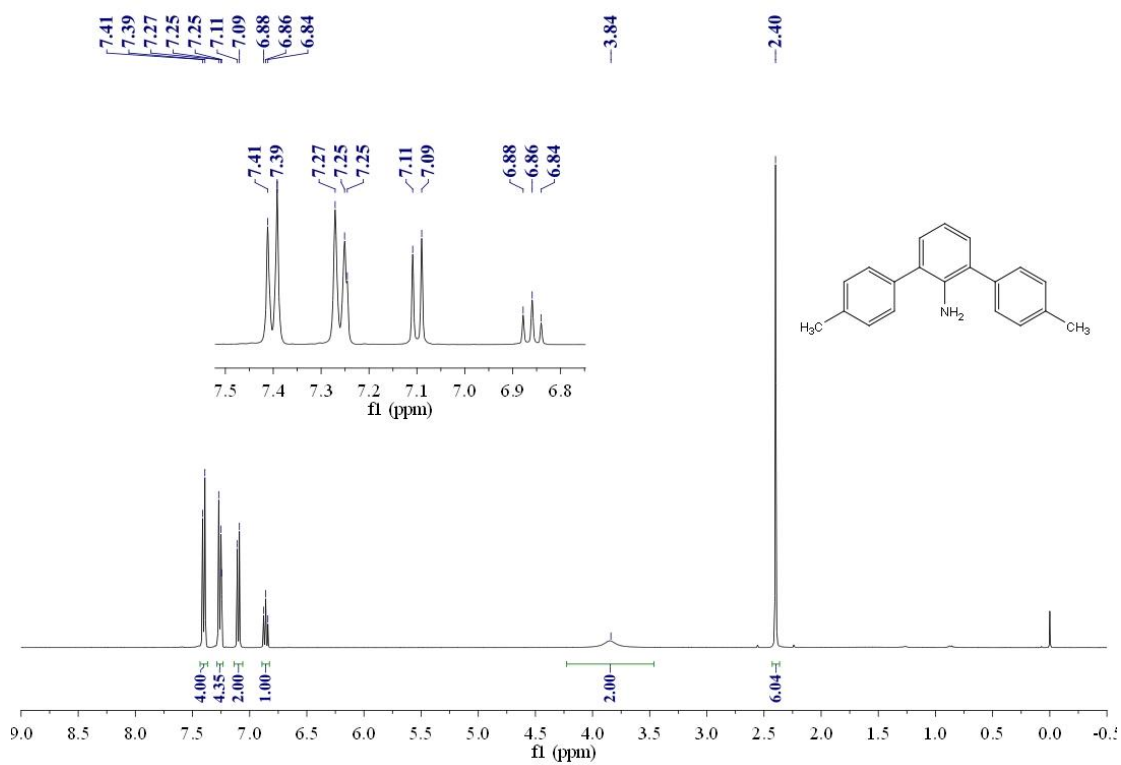




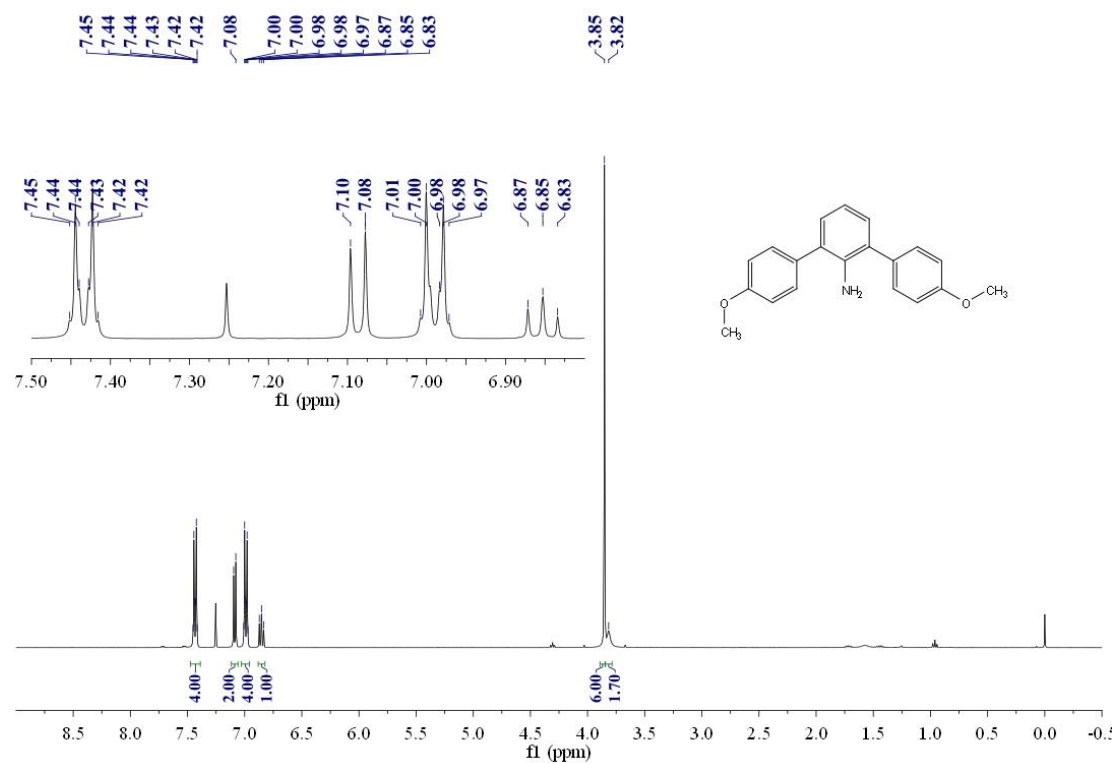
2,6-diphenylaniline



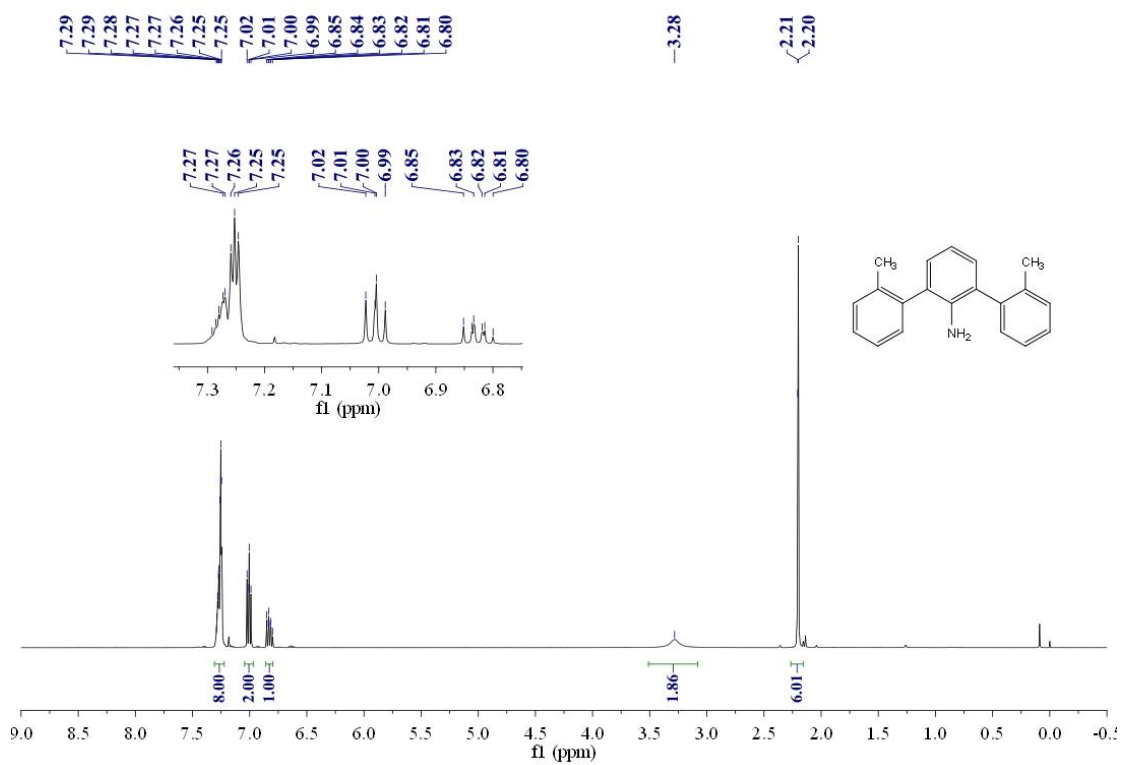
2,6-bis(4-methylphenyl)aniline



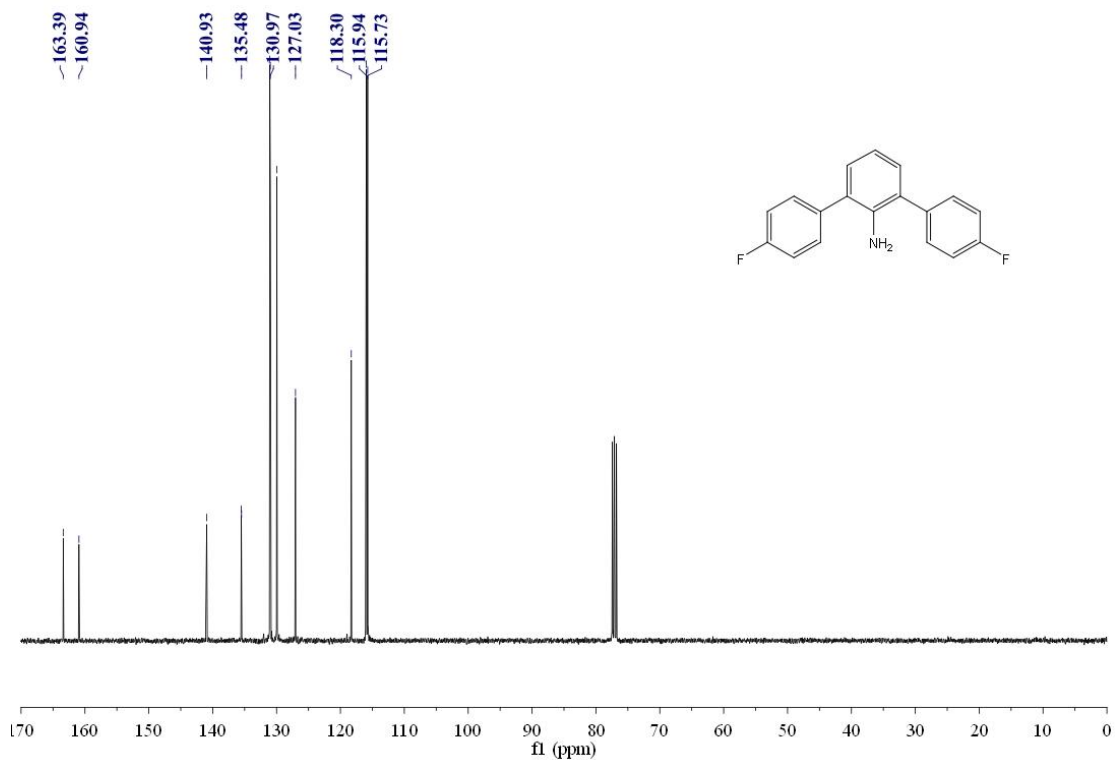
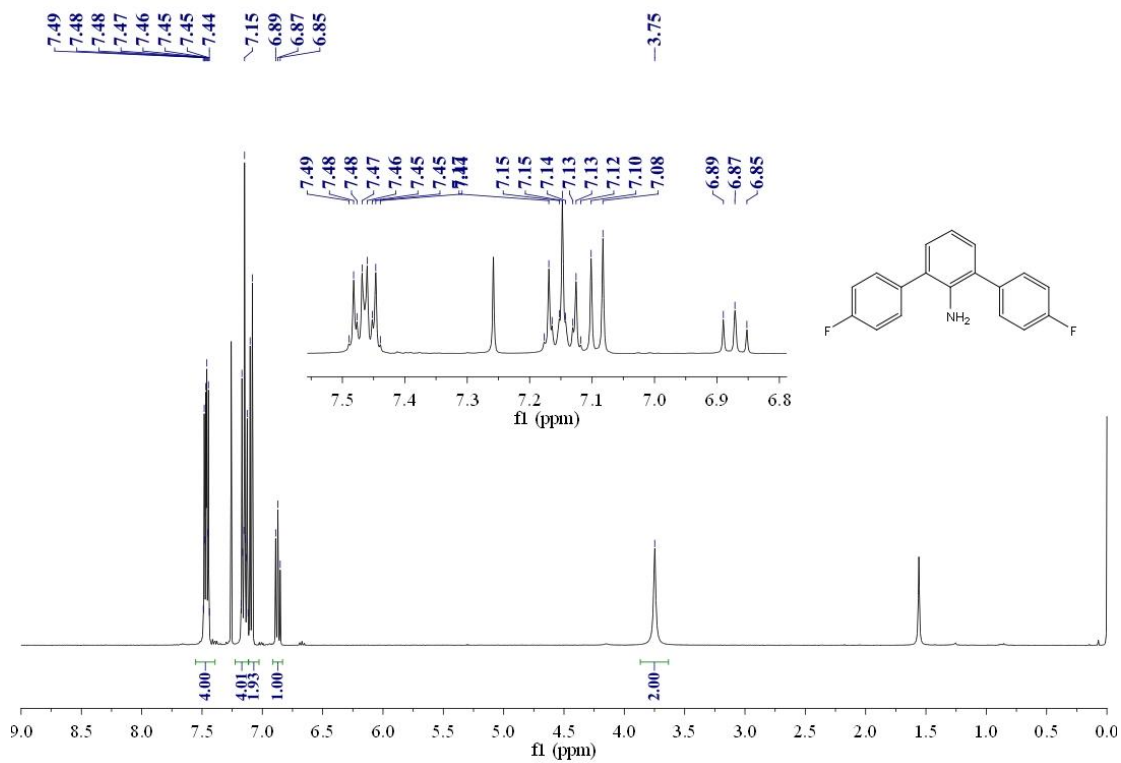
2,6-bis(4-methoxyphenyl)aniline



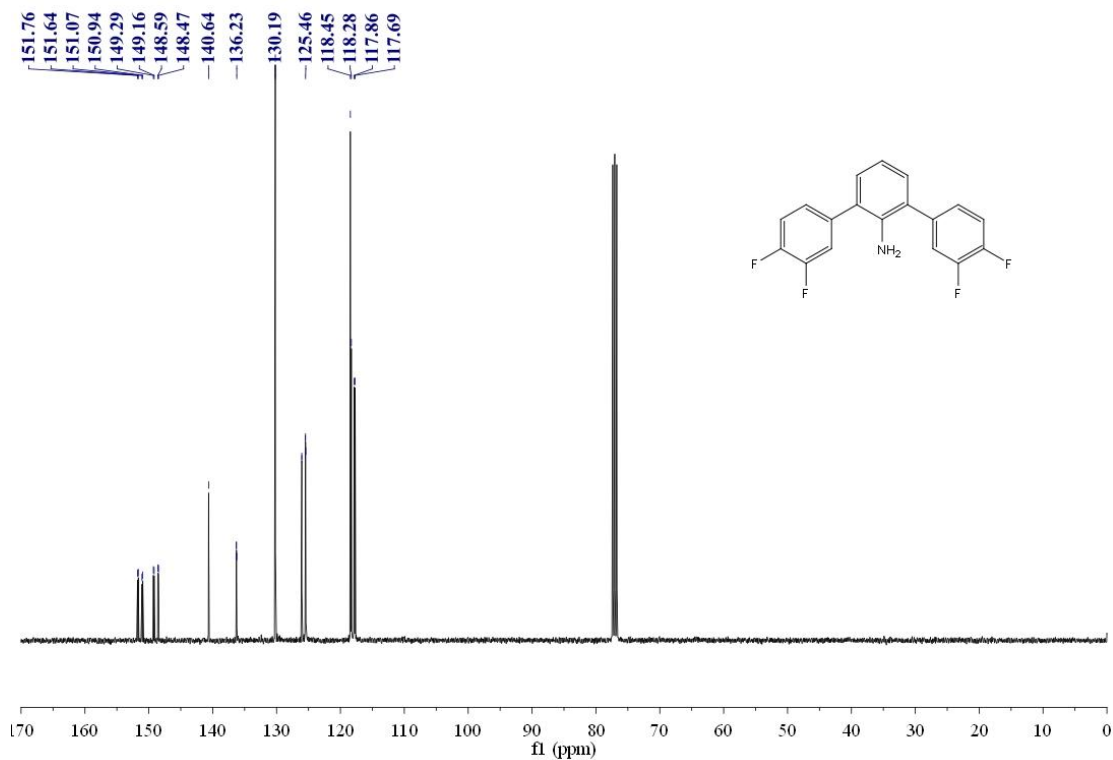
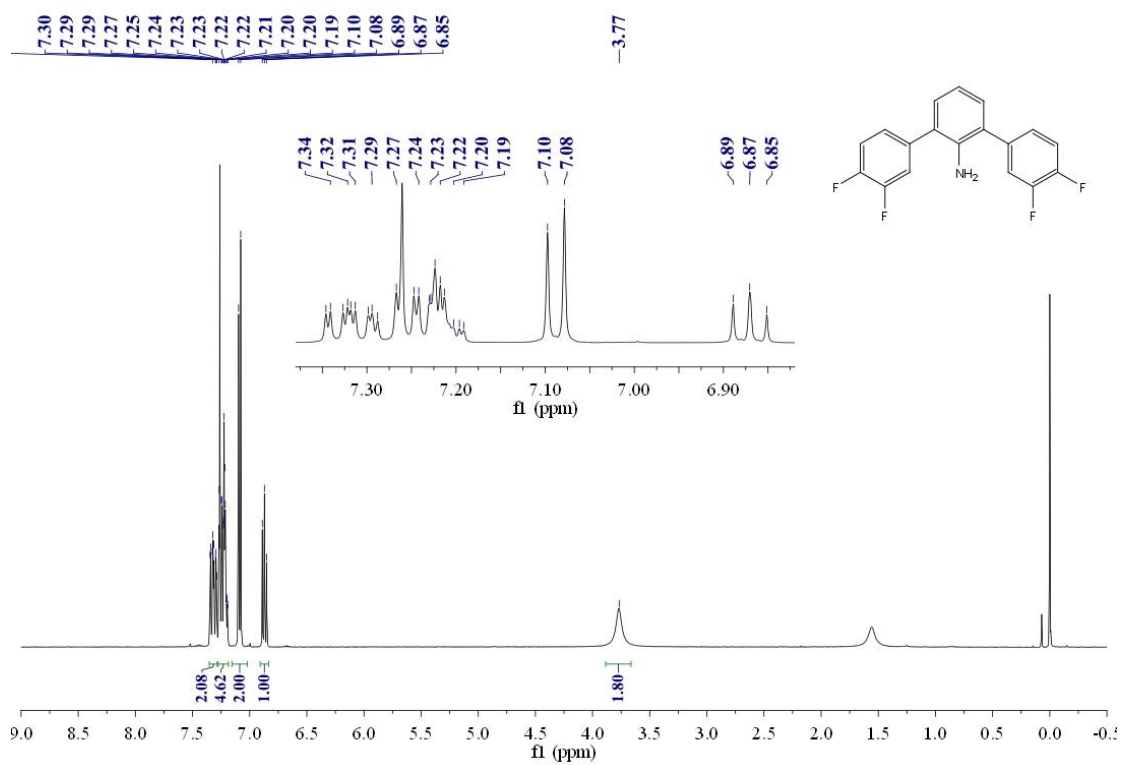
2,6-bis(2-methylphenyl)aniline



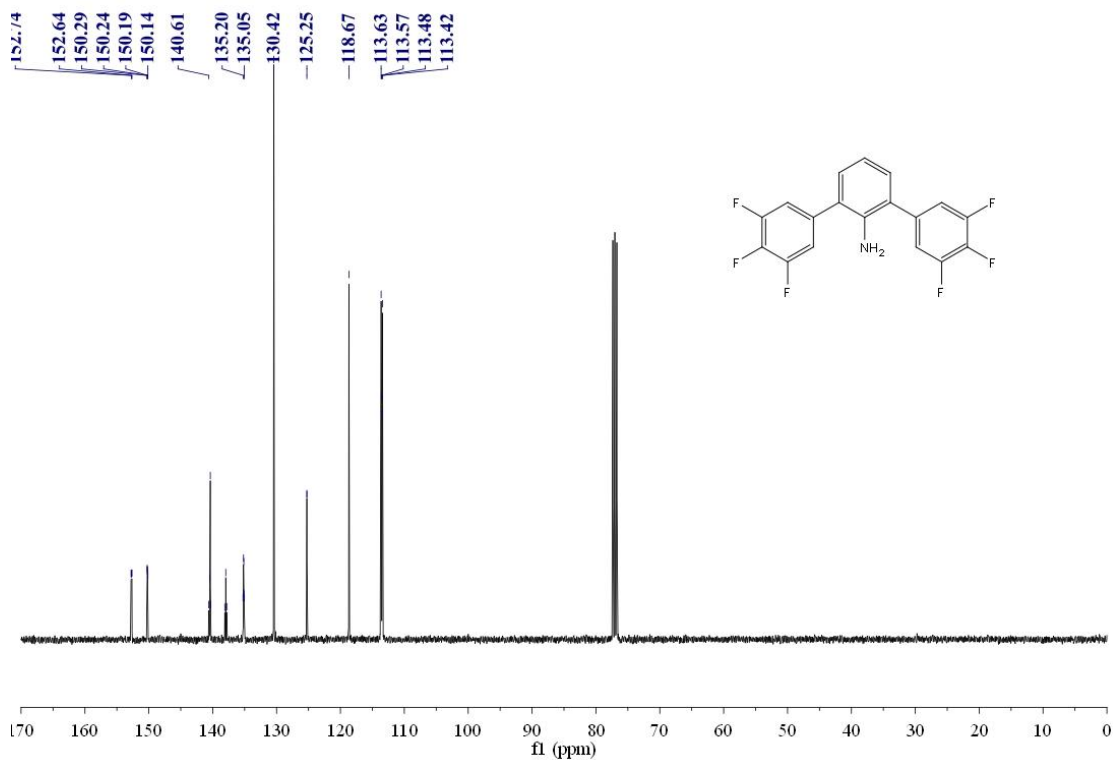
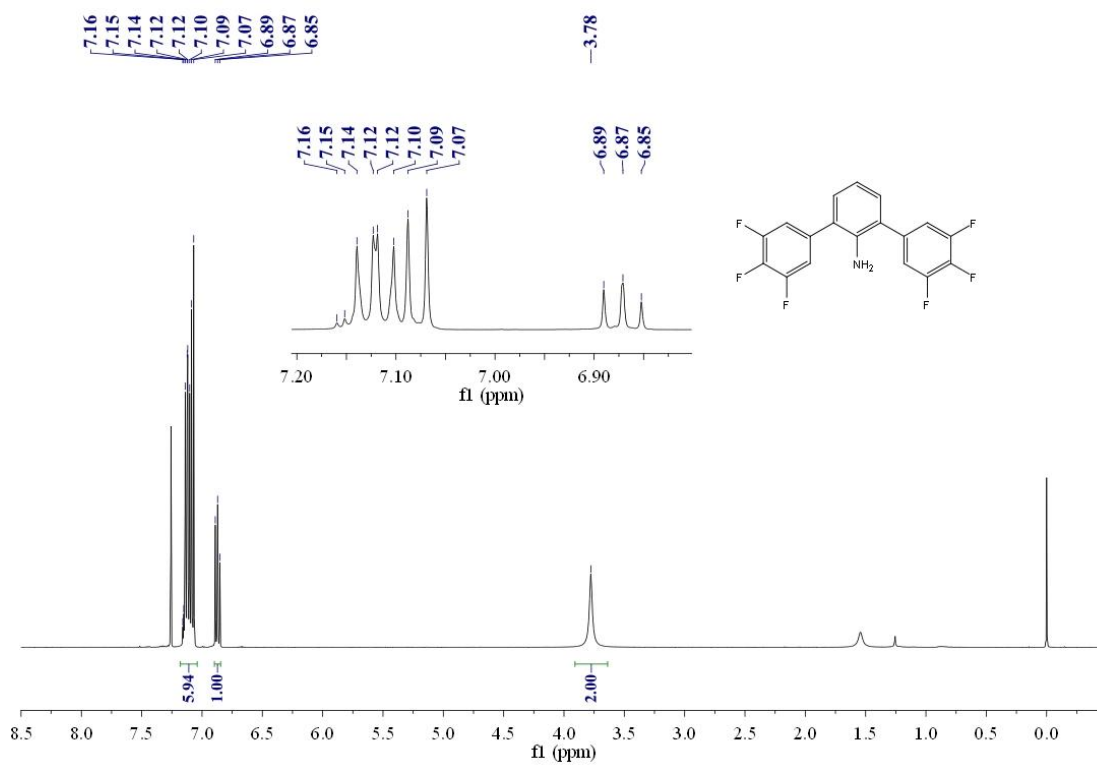
2,6-bis(4-fluorophenyl)aniline



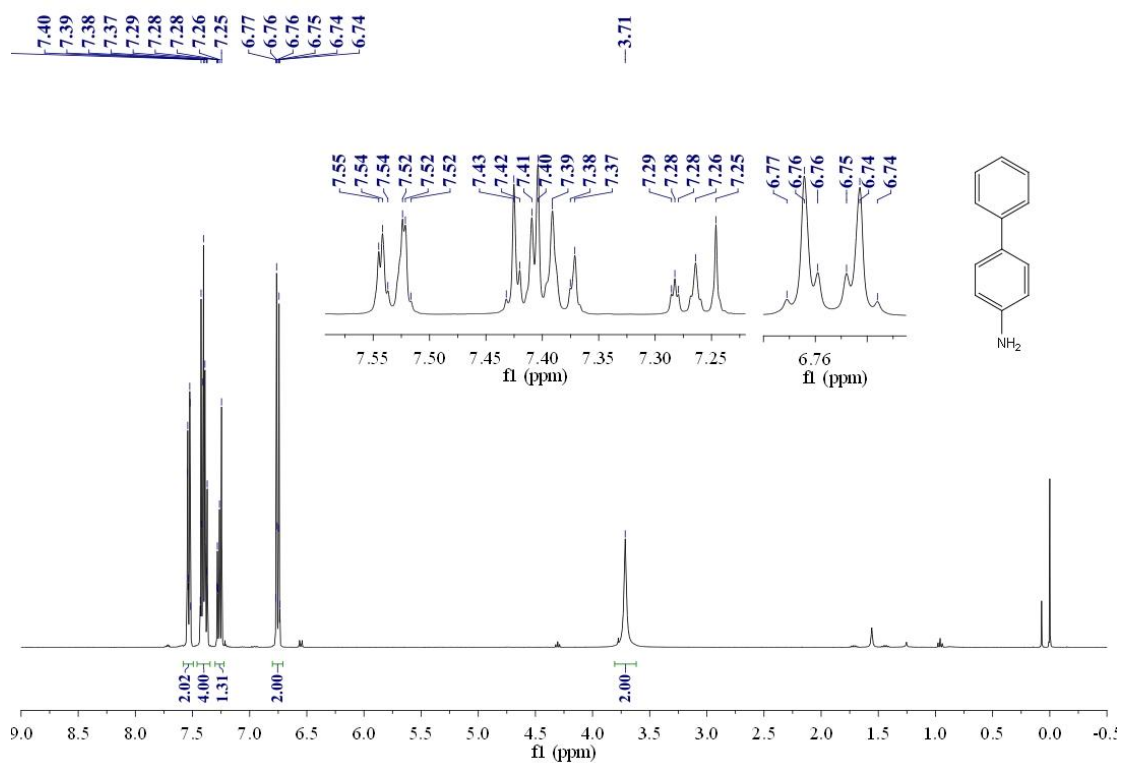
2,6-bis(3,4-difluorophenyl)aniline



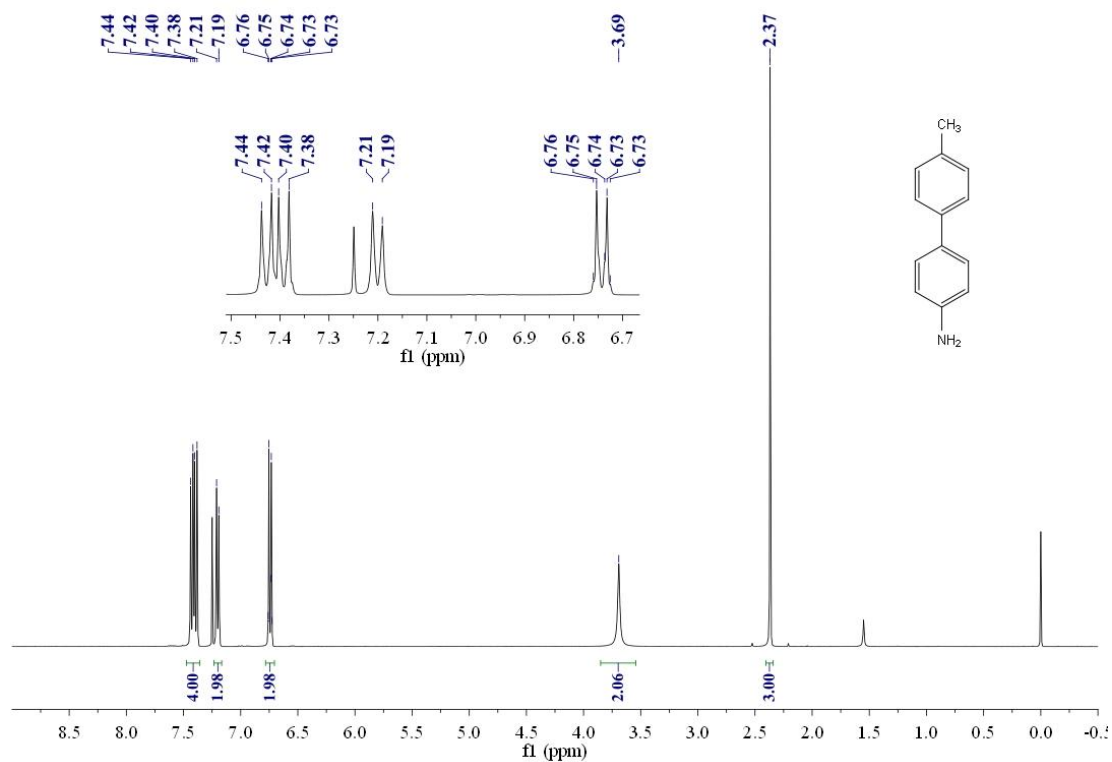
2,6-bis(3,4,5-trifluorophenyl)aniline



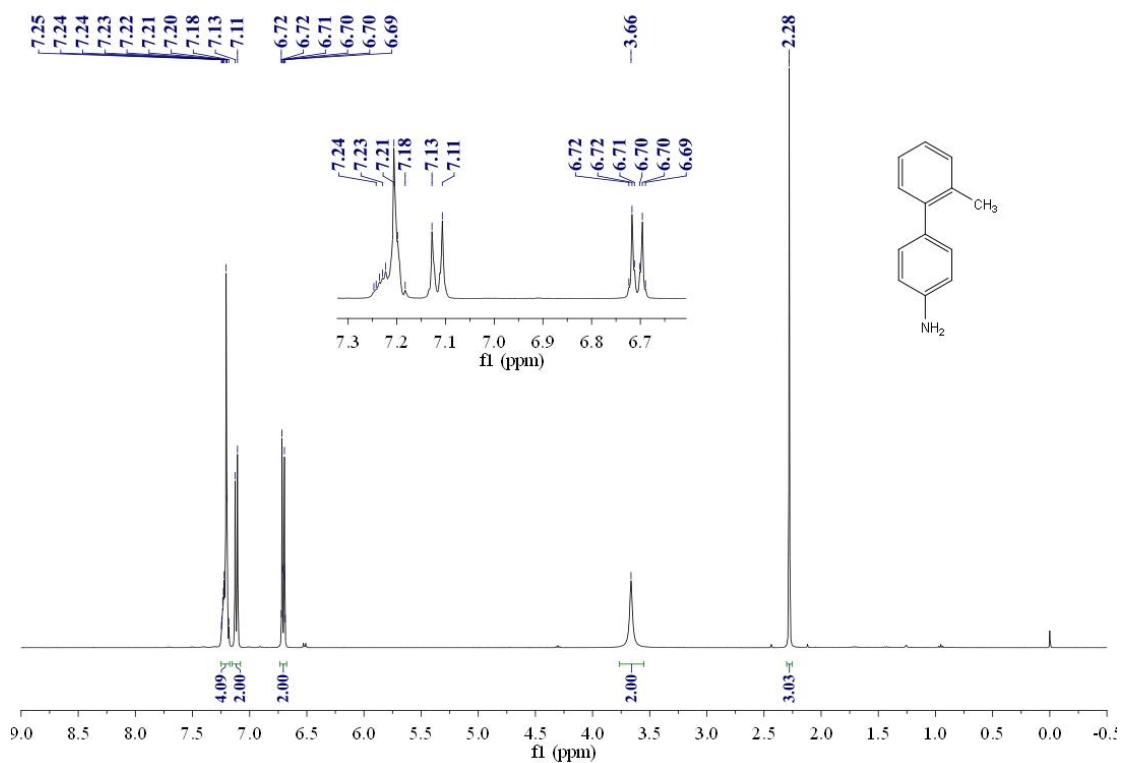
4-phenylaniline



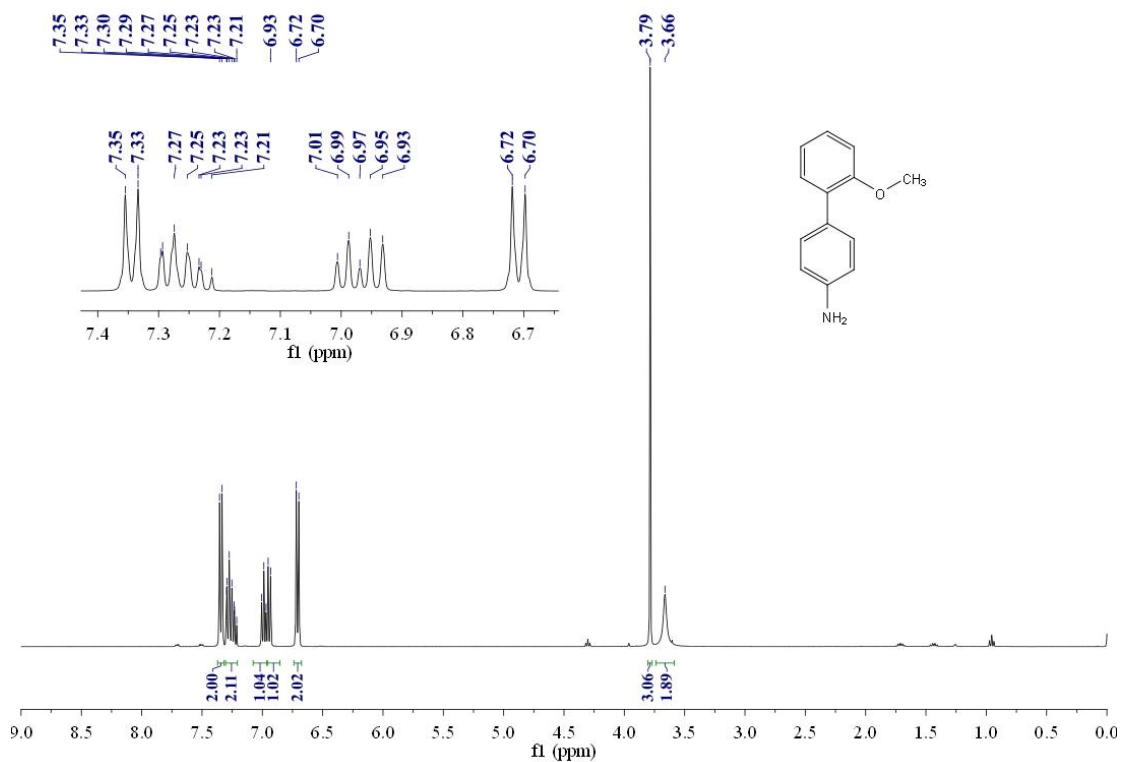
4-(4-methylphenyl)aniline



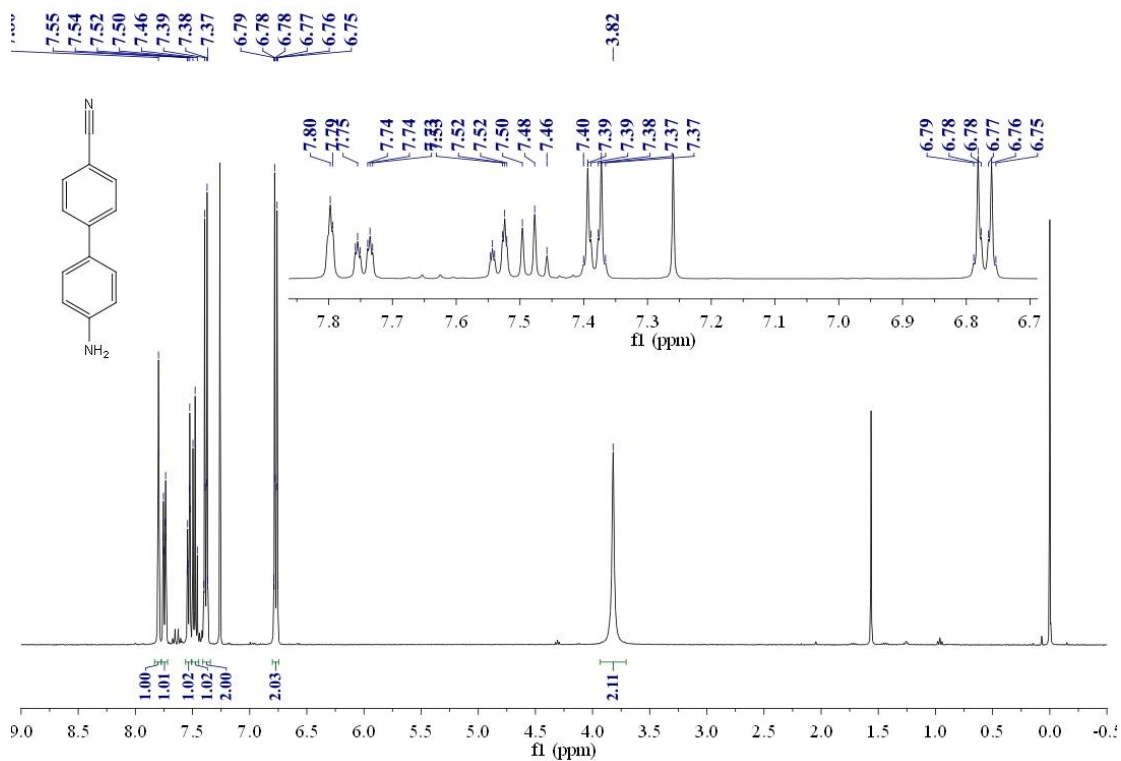
4-(2-methylphenyl)aniline



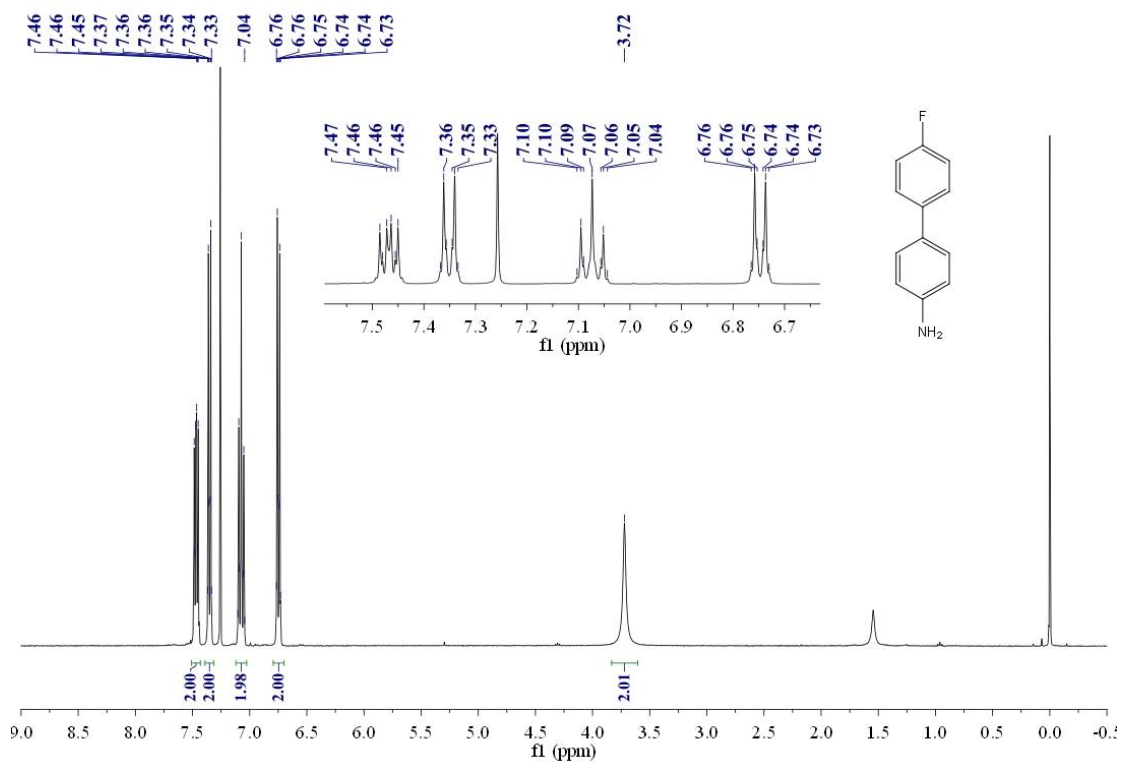
4-(2-methoxyphenyl)aniline

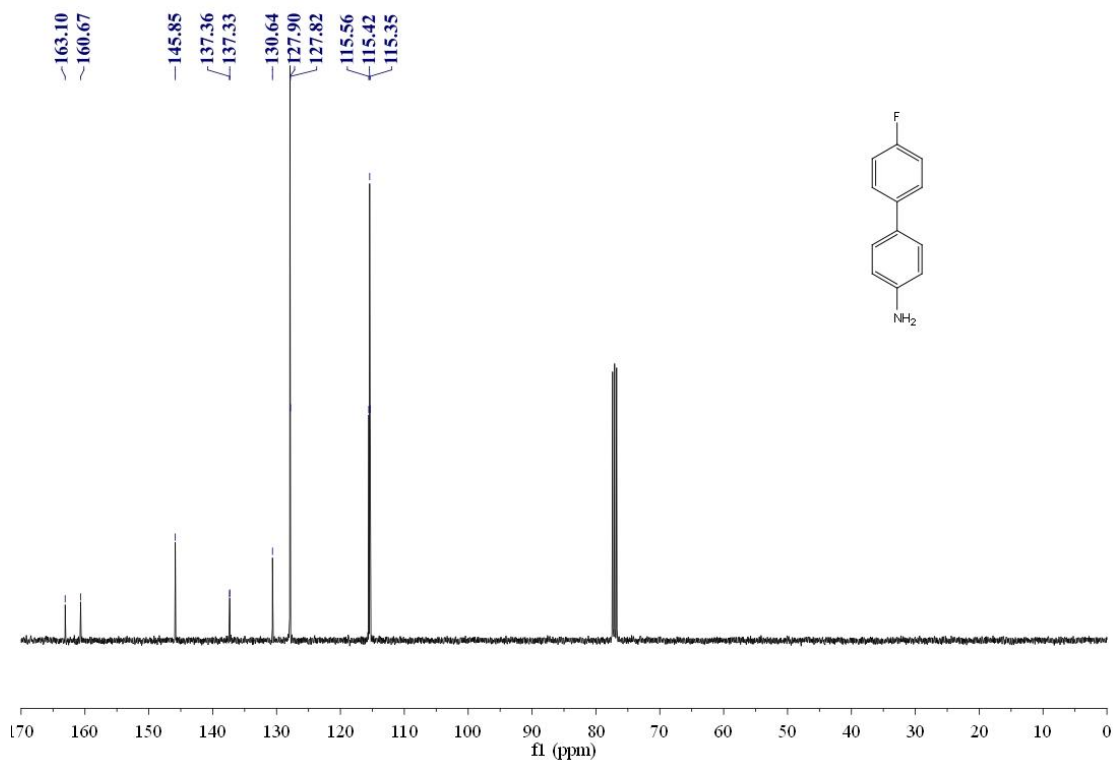


4-(4-cyanophenyl)aniline

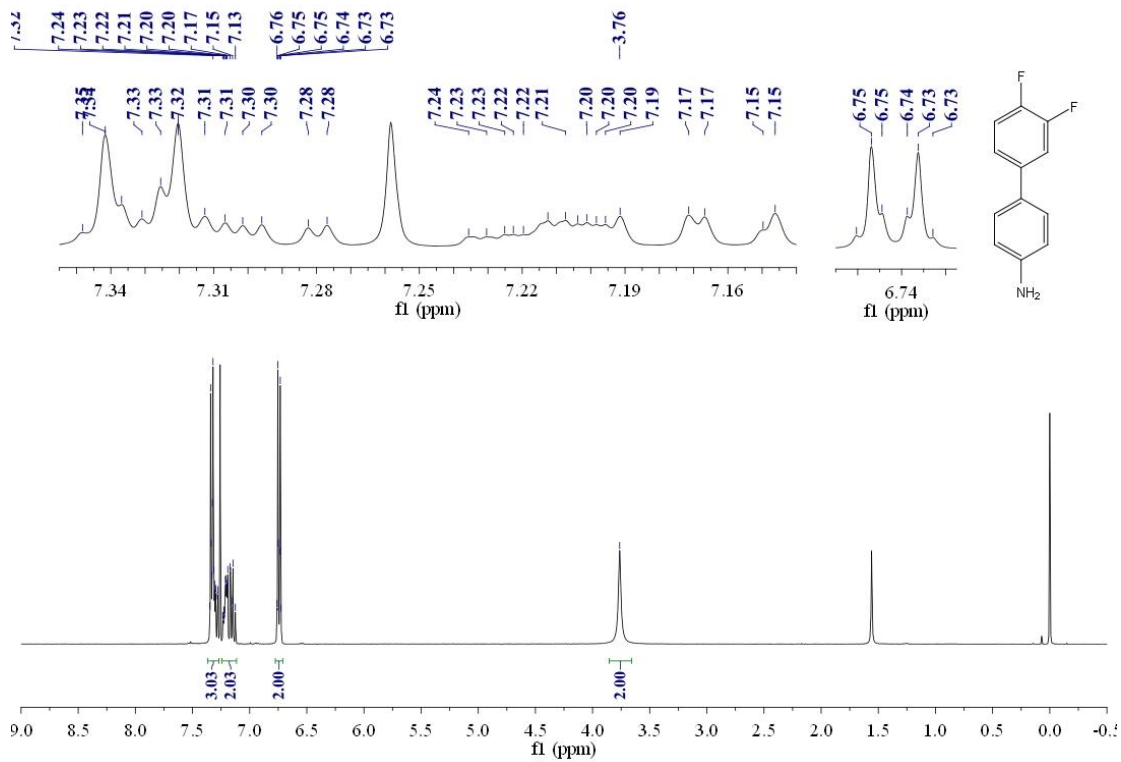


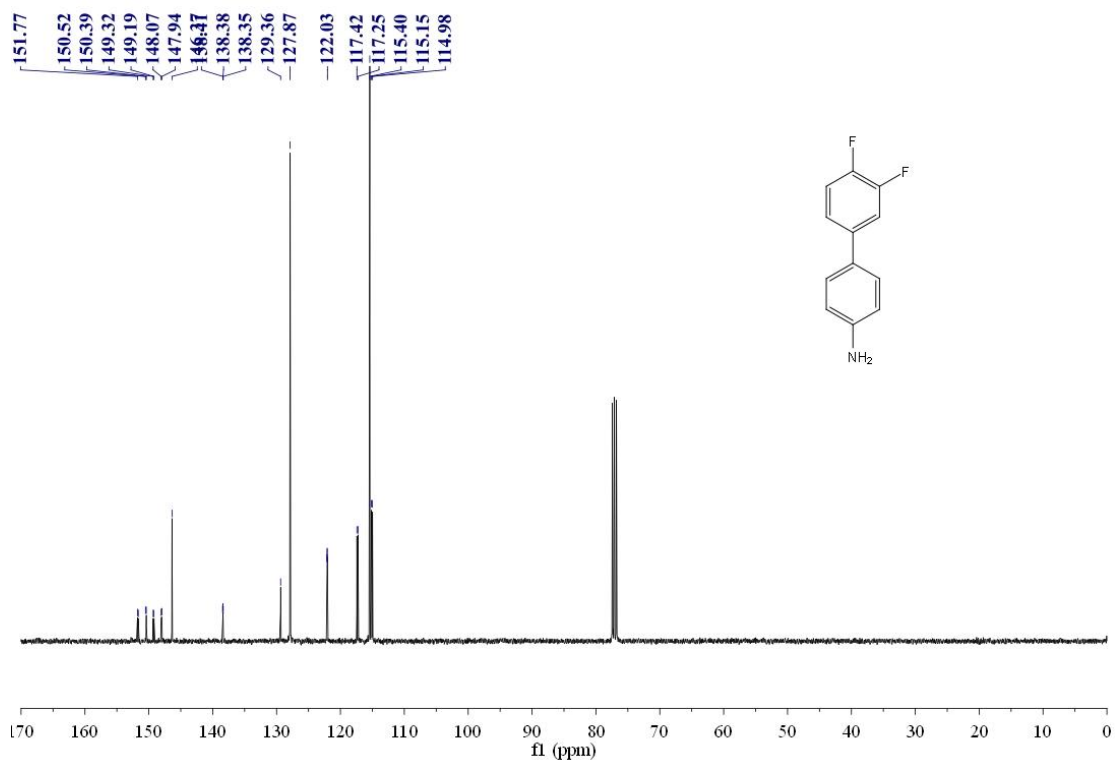
4-(4-fluorophenyl)aniline





4-(3,4-difluorophenyl)aniline





4-(3,4,5-trifluorophenyl)aniline

