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Supporting Information

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Synthesis of diarylamines catalyzed by iron salts

*Arkaitz Correa, Mónica Carril, and Carsten Bolm**

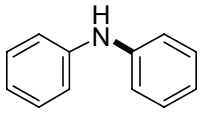
[*] Dr. A. Correa, Dr. M. Carril, Prof. Dr. C. Bolm, RWTH Aachen University, Landoltweg 1, D-52056 Aachen, Germany, carsten.bolm@oc.rwth-aachen.de, Fax: +49 (241) 8092391

Supporting Information Available. Experimental details for compounds **4a-q** and ^{1}H-NMR and ^{13}C-NMR spectra of all compounds are included.

General information: All reagents were purchased from commercial suppliers and used without further purification. $FeCl_3$ was purchased from Merck (98% purity). Acetanilides **1** were prepared following standard acetylation procedures from the corresponding commercially available anilines. All experiments were carried out under argon. Flash chromatography was carried out with Merck silica gel 60 (63-200 mesh). Analytical TLC was performed with Merck silica gel 60 F_{254} plates, and the products were visualized by UV detection. ^{1}H-NMR and ^{13}C-NMR spectra were recorded in $CDCl_3$. Chemical shifts (δ) are reported in ppm using TMS as internal standard, and spin-spin coupling constants (J) are given in Hz. Mass spectra were acquired on a Varian MAT 212 spectrometer (CI, 100 eV and EI, 70 eV). Microanalyses were obtained with a Vario EL element analyzer.

General procedure for the synthesis of diarylamines: A sealable tube equipped with a magnetic stir bar was charged with acetanilide **1** (1.0 equiv), aryl iodide **2** (1.5 equiv, if solid), Cs_2CO_3 (2.0 equiv) and $FeCl_3$ (0.15 equiv). The aperture of the tube was then covered with a rubber septum, and an argon atmosphere was established. Aryl halide **2** (1.5 equiv, if liquid), *N,N'*-dimethylethylendiamine (0.30 equiv) and toluene (1 mL/mmol of acetanilide) were added via syringe. The septum was then replaced by a teflon-coated screw cap, and the reaction vessel was placed in an oil bath kept at a 135 °C. After stirring at this temperature for 24 h, the heterogeneous mixture was cooled to room temperature and NaOMe (9.0 equiv) along with toluene (0.5 mL) was added. Stirring under reflux for 1.5 h was followed by cooling of the reaction mixture to room temperature and diluting with dichloromethane. The resulting solution was directly filtered through a pad of silica and concentrated to yield the diarylamine **4**, which was purified by silica gel chromatography. The identity and purity of the known products was confirmed by ^{1}H-and ^{13}C-NMR spectroscopic analysis, and the new products were fully characterized.

***N,N*-Diphenylamine (4a).**[1] Following the general procedure using acetanilide (100 mg, 0.74 mmol) and phenyl iodide (0.12 mL, 1.11 mmol) provided 114 mg (91% yield) of the coupling product as a brown solid after purification by flash chromatography (dichloromethane/pentane 2/8) of the crude oil.

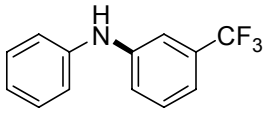


^{1}H-NMR (400 MHz, $CDCl_3$) δ 7.34 (dd, J = 8.5, 7.3 Hz, 4H), 7.13 (dd, J = 8.6, 1.1 Hz, 4H), 7.00 (t, J = 7.3 Hz, 2H), 5.72 (br s, 1H).

^{13}C-NMR (100 MHz, $CDCl_3$) δ 143.1 (C), 129.3 (CH), 120.9 (CH), 117.8 (CH).

All spectral data correspond to those given in the literature.

***N*-(3-Trifluoromethylphenyl)-*N*-phenylamine (4b).**[2] Following the general procedure using acetanilide (100 mg, 0.74 mmol) and 3-iodobenzotrifluoride (0.16 mL, 1.11 mmol) provided 115.6 mg (66% yield) of the coupling product as a brown oil after purification by flash chromatography (dichloromethane/pentane 2/8) of the crude oil.



^{1}H-NMR (400 MHz, $CDCl_3$) δ 7.38-7.29 (m, 4H), 7.22-7.12 (m, 4H), 7.08-7.04 (m, 1H), 5.82 (br s, 1H).

^{13}C-NMR (100 MHz, $CDCl_3$) δ 143.9 (C), 141.6 (C), 131.6 (q, J = 32.0 Hz, C), 129.7 (CH), 129.5 (CH), 125.6 (q, J = 201.0 Hz, C), 122.2 (CH), 119.6 (CH), 118.9 (CH), 116.8 (q, J = 3.8 Hz, CH), 113.1 (q, J = 3.85 Hz, CH).

All spectral data correspond to those given in the literature.

***N*-(4-Methoxyphenyl)-*N*-(3-methylphenyl)amine (4c).**[3] Following the general procedure using 4-methoxyacetanilide (100 mg, 0.61 mmol) and 3-iodotoluene (0.11 mL, 0.91 mmol) provided 114 mg (88% yield) of the coupling product as a white solid after purification by flash chromatography (dichloromethane/pentane 5/5) of the crude oil.

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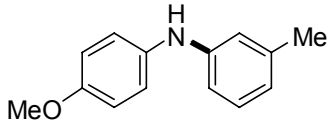
[1] A. S. Gajare, K. Toyota, M. Yoshifuji, F. Ozawa, *J. Org. Chem*. **2004**, *69*, 6504.
[2] X. Huang, K. W. Anderson, D. Zim, L. Jiang, A. Klapars, S. L. Buchwald, *J. Am. Chem. Soc*. **2003**, *125*, 6653.
[3] C. Desmarets, R. Schneider, Y. Fort, *J. Org. Chem*. **2002**, *67*, 3029.



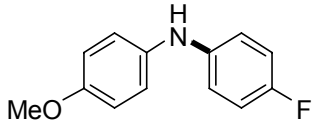
^{1}H-NMR (400 MHz, $CDCl_3$) δ 7.20-7.10 (m, 3H), 6.92 (d, J = 8.9 Hz, 2H), 6.79-6.72 (m, 3H), 5.50 (br s, 1H), 3.85 (s, 3H), 2.35 (s, 3H).

^{13}C-NMR (100 MHz, $CDCl_3$) δ 155.1 (C), 145.1 (C), 139.0 (C), 135.8 (C), 129.1 (CH), 122.1 (CH), 120.4 (CH), 116.3 (CH), 114.6 (CH), 112.7 (CH), 55.4 (CH_3), 21.5 (CH_3).

All spectral data correspond to those given in the literature.

***N*-(4-Fluorophenyl)-*N*-(4-methoxyphenyl)amine (4d).**[4] Following the general procedure using 4-methoxyacetanilide (100 mg, 0.61 mmol) and 1-fluoro-4-iodobenzene (0.10 mL, 0.91 mmol) provided 105 mg (80% yield) of the coupling product as a yellow solid after purification by flash chromatography (dichloro-methane/pentane 5/5) of the crude oil.

Alternatively, following the general procedure using 4-fluoroacetanilide (100 mg, 0.65 mmol) and 4-iodoanisole (234 mg, 0.98 mmol) provided 131 mg (92% yield) of the coupling product as a yellow solid after purification by flash chromatography (dichloromethane/pentane 5/5) of the crude oil.



^{1}H-NMR (400 MHz, $CDCl_3$) δ 7.01 (d, J = 8.9 Hz, 2H), 6.97-6.86 (m, 6H), 5.40 (br s, 1H), 3.81 (s, 3H).

^{13}C-NMR (100 MHz, $CDCl_3$) δ 156.9 (d, J = 237.7 Hz, C), 154.8 (C), 140.9 (d, J = 2.2 Hz, C), 136.4 (C), 121.0 (CH), 117.6 (d, J = 7.6 Hz, CH), 115.6 (d, J = 22.4 Hz, CH), 114.6 (CH), 55.5 (CH_3).

All spectral data correspond to those given in the literature.

***N*-(4-Methoxyphenyl)-*N*-(3-trifluoromethylphenyl)amine (4e).**[5] Following the general procedure using 4-methoxyacetanilide (100 mg, 0.61 mmol) and 3-iodobenzotrifluoride (0.13 mL, 0.91 mmol) provided 76 mg (47% yield) of the coupling

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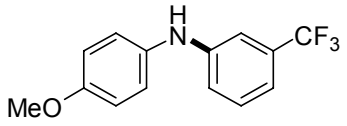
[4] R. A. Altman, K. W. Anderson, S. L. Buchwald, *J. Org. Chem.* **2008**, *73*, 5167.
[5] U. Nettekoven, F. Naud, A. Schnyder, H.-U. Blaser, *Synlett* **2004**, 2549.

product as a yellow solid after purification by flash chromatography (dichloromethane/pentane 5/5) of the crude oil.

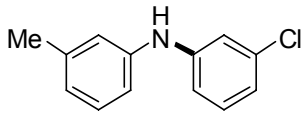


^{1}H-NMR (400 MHz, $CDCl_3$) δ 7.29 (t, J = 7.9 Hz, 1H), 7.12-7.08 (m, 3H), 7.05 (dd, J = 7.7, 0.6 Hz, 1H), 7.01 (dd, J = 8.2, 1.9 Hz, 1H), 6.91 (d, J = 8.9 Hz, 2H), 5.64 (br s, 1H), 3.83 (s, 3H)

^{13}C-NMR (100 MHz, $CDCl_3$) δ 155.9 (C), 145.9 (C), 134,2 (C), 131.5 (q, J = 31.8 Hz, C), 129.6 (CH), 124.5 (q, J = 184.1 Hz, C), 123.4 (CH), 117.7 (CH), 115.4 (q, J = 3.9 Hz, CH), 114.8 (CH), 111.1 (q, J = 3.9 Hz, CH), 55.5 (CH_3).

All spectral data correspond to those given in the literature.

***N*-(3-Chlorophenyl)-*N*-(3-methylphenyl)amine (4f).**[6] Following the general procedure using 3-methylacetanilide (100 mg, 0.67 mmol) and 1-chloro-3-iodobenzene (0.13 mL, 1.01 mmol) provided 120 mg (82% yield) of the coupling product as a brown oil after purification by flash chromatography (dichloromethane/pentane 1/9) of the crude oil.



^{1}H-NMR (400 MHz, $CDCl_3$) δ 7.26-7.16 (m, 2H), 7.05 (t, J = 2.1 Hz, 1H), 6.96-6.86 (m, 5H), 5.68 (br s, 1H), 2.37 (s, 3H).

^{13}C-NMR (100 MHz, $CDCl_3$) δ 144.8 (C), 141.7 (C), 139.2 (C), 134.8 (C), 130.1 (CH), 129.1 (CH), 122.8 (CH), 120.1 (CH), 119.6 (CH), 116.5 (CH), 115.9 (CH), 114.9 (CH), 21.5 (CH_3).

All spectral data correspond to those given in the literature.

***N*-(4-Fluorophenyl)-*N*-phenylamine (4g).**[7] Following the general procedure using 4-fluoroacetanilide (100 mg, 0.65 mmol) and phenyl iodide (0.11 mL, 0.98 mmol) provided 115.1 mg (94% yield) of the coupling product as a brown oil after purification by flash chromatography (dichloromethane/pentane 2/8) of the crude oil.

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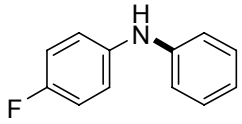
[6] R. B. Moffet, B. D. Aspergren, *J. Am. Chem. Soc*. **1959**, *82*, 1600.
[7] M. A. Carroll, R. A. Wood, *Tetrahedron* **2007**, *63*, 11349.

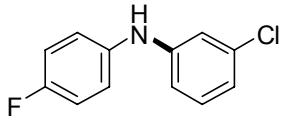


^{1}H-NMR (400 MHz, $CDCl_3$) δ 7.33-7.28 (m, 2H), 7.12-6.94 (m, 7H), 5.60 (br s, 1H).

^{13}C-NMR (100 MHz, $CDCl_3$) δ 158.0 (d, J = 240.1 Hz, C), 143. 9 (C), 138.9 (d, J = 2.4 Hz, C), 129.3 (CH), 120.6 (CH), 120.5 (d, J = 7.3 Hz, CH), 116.7 (CH), 115.9 (d, J = 22.5 Hz, CH).

All spectral data correspond to those given in the literature.

***N*-(3-Chlorophenyl)-*N*-(4-fluorophenyl)amine (4h).** Following the general procedure using 4-fluoroacetanilide (100 mg, 0.65 mmol) and 1-chloro-3-iodobenzene (0.15 mL, 0.98 mmol) provided 131.2 mg (91% yield) of the coupling product as a brown oil after purification by flash chromatography (dichloromethane/pentane 2/8) of the crude oil.



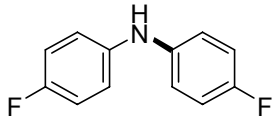
^{1}H-NMR (400 MHz, $CDCl_3$) δ 7.15 (t, J = 8.0 Hz, 1H), 7.10-6.99 (m, 4H), 6.93 (t, J = 2.1 Hz, 1H), 6.86 (ddd, J = 7.9, 1.9, 0.9 Hz, 1H), 6.80 (ddd, J = 8.2, 2.3, 0.9 Hz, 1H), 5.60 (br s, 1H).

^{13}C-NMR (100 MHz, $CDCl_3$) δ 158.6 (d, J = 241.6 Hz, C), 145.6 (C), 137.7 (d, J = 2.5 Hz, C), 135.0 (C), 130.3 (CH), 121.9 (d, J = 7.9 Hz, CH), 120.0 (CH), 116.2 (CH), 115.8 (d, J = 21.4 Hz, CH), 114.1 (CH).

MS (EI) *m/z* (%) 223 (M^++2, 40), 221 (M^+, 100), 185 (71), 93 (34).

Calcd. for $C_{12}H_9ClFN$: C, 65.02; H, 4.09; N, 6.32; found C, 65.29; H, 4.18; N, 6.05.

***N*,*N*-Bis(4-fluorophenyl)amine (4i).[8]** Following the general procedure using 4-fluoroacetanilide (100 mg, 0.65 mmol) and 1-fluoro-4-iodobenzene (0.11 mL, 0.98 mmol) provided 67 mg (50% yield) of the coupling product as a white solid after purification by flash chromatography (dichloromethane/pentane 3/7) of the crude oil.



[8] J. Cao, J. R. Lever, T. Kopajtic, J. L. Katz, A. T. Pham, M. L. Holmes, J. B. Justice, A. H. Newman, *J. Med. Chem.* **2004,** *47,* 6128.

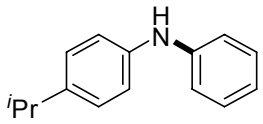
^{1}H-NMR (400 MHz, $CDCl_3$) δ 6.98-6.95 (m, 8H), 5.46 (br s, 1H).

^{13}C-NMR (100 MHz, $CDCl_3$) δ 157.7 (d, J = 239.6 Hz, C), 139.8 (d, J = 2.2 Hz, C), 119.4 (d, J = 7.7 Hz, CH), 115.9 (d, J = 22.5 Hz, CH).

MS (EI) *m/z* (%) 205 (M^+, 100), 83 (53).

Calcd. for $C_{12}H_9F_2N$: C, 70.24; H, 4.42; N, 6.38; found C, 70.22; H, 4.45; N, 6.65.

***N*-(4-Isopropylphenyl)-*N*-phenylamine (4j).**[9] Following the general procedure using 4-isopropylacetanilide (100 mg, 0.56 mmol) and phenyl iodide (0.09 mL, 0.84 mmol) provided 94 mg (80% yield) of the coupling product as a brown oil after purification by flash chromatography (dichloromethane/pentane 5/5) of the crude oil.

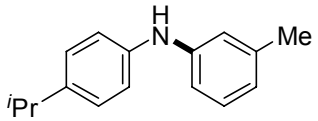


^{1}H-NMR (400 MHz, $CDCl_3$) δ 7.35 (dd, J = 8.5, 7.4 Hz, 2H), 7.25 (d, J = 8.5 Hz, 2H), 7.15-7.11 (m, 4H), 6.99 (t, J = 7.3 Hz, 1H), 5.69 (br s, 1H), 2.98 (sept, J = 7.0 Hz, 1H), 1.37 (d, J = 6.9 Hz, 6H).

^{13}C-NMR (100 MHz, $CDCl_3$) δ 143.8 (C), 141.9 (C), 140.6 (C), 129.2 (CH), 127.1 (CH), 120.2 (CH), 118.6 (CH), 116.9 (CH) 33.4 (CH), 24.1 (CH_3).

All spectral data correspond to those given in the literature.

***N*-(4-Isopropylphenyl)-*N*-(3-methylphenyl)amine (4k).** Following the general procedure using 4-isopropylacetanilide (100 mg, 0.56 mmol) and 3-iodotoluene (0.10 mL, 0.84 mmol) provided 105 mg (63% yield) of the coupling product as a brown oil after purification by flash chromatography (dichloromethane/pentane 5/5) of the crude oil.



^{1}H-NMR (400 MHz, $CDCl_3$) δ 7.22-7.18 (m, 3H), 7.09 (d, J = 8.5 Hz, 2H), 6.92-6.89 (m, 2H), 6.78 (d, J = 7.7 Hz, 1H), 5.62 (br s, 1H), 2.94 (sept, J = 6.9 Hz, 1H), 2.37 (s, 3H), 1.32 (d, J = 6.9 Hz, 6H).

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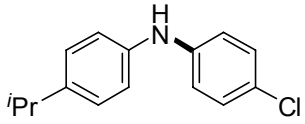
[9] K. Kunz, U. Scholz, O. Gaertzen, D. Ganzer, J. Wesener (Bayer Chemicals AG), EP 1437355, **2004** [*Chem*. *Abstr*. **2004**, *141*, 123760].

^{13}C-NMR (100 MHz, $CDCl_3$) δ 143.6 (C), 141.7 (C), 140.6 (C), 138.9 (C), 128.9 (CH), 127.0 (CH), 121.1 (CH), 118.5 (CH), 117.6 (CH), 114.0 (CH), 33.4 (CH), 24.2 (CH_3), 21.6 (CH_3).

MS (EI) *m/z* (%) 225 (M^+, 100), 211 (74), 194 (36), 180 (51).

Calcd. for $C_{16}H_{19}N$: C, 85.28; H, 8.50; N, 6.22; found C, 85.36; H, 8.45; N, 6.57.

***N*-(4-Chlorophenyl)-*N*-(4-isopropylphenyl)amine (4l).**[10] Following the general procedure using 4-isopropylacetanilide (100 mg, 0.56 mmol) and 1-chloro-4-iodobenzene (199.9 mg, 0.84 mmol) provided 87 mg (83% yield) of the coupling product as a white solid after purification by flash chromatography (dichloromethane/pentane 5/5) of the crude oil.

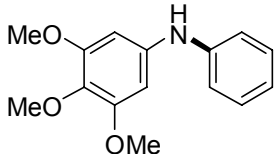


^{1}H-NMR (400 MHz, $CDCl_3$) δ 7.21-7.16 (m, 4H), 7.02 (d, J = 8.6 Hz, 2H), 6.95 (d, J = 8.9 Hz, 2H), 5.60 (br s, 1H), 2.90 (sept, J = 6.9 Hz, 1H), 1.27 (d, J = 6.9 Hz, 6H).

^{13}C-NMR (100 MHz, $CDCl_3$) δ 142.6 (C), 140.1 (C), 129.1 (CH), 127.3 (CH), 124.7 (C), 118.9 (CH), 117.9 (CH), 33.4 (CH), 24.1 (CH_3).

All spectral data correspond to those given in the literature.

***N*-(3,4,5-Trimethoxyphenyl)-*N*-phenylamine (4m).** Following the general procedure using 3,4,5-trimethoxyacetanilide (100 mg, 0.44 mmol) and phenyl iodide (0.08 mL, 0.66 mmol) provided 77.5 mg (68% yield) of the coupling product as a brown oil after purification by flash chromatography (ethyl acetate/pentane 3.5/6.5) of the crude oil.



^{1}H-NMR (400 MHz, $CDCl_3$) δ 7.26 (t, J = 7.9 Hz, 2H), 7.04 (d, J = 7.7 Hz, 2H), 6.91 (t, J = 7.3 Hz, 1H), 6.33 (s, 2H), 5.67 (br s, 1H), 3.82 (s, 3H), 3.80 (s, 6H).

^{13}C-NMR (100 MHz, $CDCl_3$) δ 153.6 (C), 143.4 (C), 139.1 (C), 132.6 (C), 129.2 (CH), 120.5 (CH), 117.3 (CH), 96.1 (CH), 60.9 (CH_3), 55.9 (CH_3).

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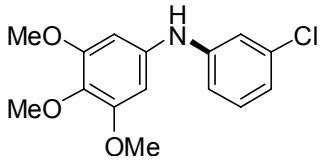
[10] T. Tamura, H. Kuriyama, M. Agoh, Y. Agoh, M. Soga, T. Mori (Maruishi Pharmaceutical Co. Ltd.), EP 1081138, **2001** [*Chem*. *Abstr*. **2001**, *134*, 207726].

MS (EI) *m/z* (%) 259 (M^+, 81), 244 (100), 216 (18), 77 (16).

Calcd. for $C_{15}H_{17}NO_3$: C, 69.48; H, 6.61; N, 5.40; found C, 69.12; H, 6.24; N, 5.41.

***N*-(3-Chlorophenyl)-*N*-(3,4,5-trimethoxyphenyl)amine (4n).** Following the general procedure using 3,4,5-trimethoxyacetanilide (100 mg, 0.44 mmol) and 1-chloro-3-iodobenzene (0.1 mL, 0.66 mmol) provided 73.7 mg (57% yield) of the coupling product as a yellow solid after purification by flash chromatography (ethyl acetate/pentane 3.5/6.5) of the crude oil.



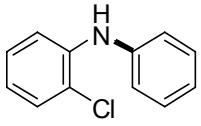
^{1}H-NMR (400 MHz, $CDCl_3$) δ 7.14 (t, J = 8.0 Hz, 1H), 6.99 (t, J = 2.1 Hz, 1H), 7.01-6.94 (m, 1H), 6.85 (dt, J = 8.1, 7.8, 2.1 Hz, 2H), 6.34 (s, 2H), 5.69 (br s, 1H), 3.83 (s, 3H), 3.81 (s, 6H).

^{13}C-NMR (100 MHz, $CDCl_3$) δ 153.7 (C), 145.2 (C), 137.8 (C), 134.9 (C), 133.4 (C), 130.2 (CH), 119.9 (CH), 116.2 (CH), 114.6 (CH), 97.5 (CH), 61.0 (CH_3), 56.1 (CH_3).

MS (EI) *m/z* (%) 295 (M^++2, 40), 293 (M^+, 83), 278 (100), 250 (25), 113 (18).

Calcd. for $C_{15}H_{16}ClNO_3$: C, 61.33; H, 5.49; N, 4.77; found C, 61.15; H, 5.38; N, 4.68.

***N*-(2-Chlorophenyl)-*N*-phenylamine (4o).[11]** Following the general procedure using 2-chloroacetanilide (100 mg, 0.59 mmol) and phenyl iodide (0.10 mL, 0.88 mmol) provided 51.5 mg (43% yield) of the coupling product as a yellow oil after purification by flash chromatography (dichloromethane/pentane 0.5/9.5) of the crude oil.



^{1}H-NMR (400 MHz, $CDCl_3$) δ 7.39-7.27 (m, 4H), 7.20-7.11 (m, 3H), 7.06 (t, J = 7.3 Hz, 1H), 6.82 (ddd, J = 7.9, 7.3, 1.5 Hz, 1H), 6.12 (br s,1H).

^{13}C-NMR (100 MHz, $CDCl_3$) δ 141.5 (C), 140.3 (C), 129.7 (CH), 129.4 (CH), 127.4 (CH), 122.6 (CH), 121.5 (C), 120.3 (CH), 120.2 (CH), 115.5 (CH).

All spectral data correspond to those given in the literature.

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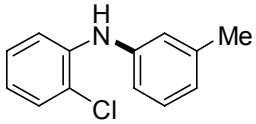
[11] R. E. Tundel, K. W. Anderson, S. L. Buchwald, *J. Org. Chem.* **2006**, *71*, 430.

***N*-(2-Chlorophenyl)-*N*-(3-methylphenyl)amine (4p).** Following the general procedure using 2-chloroacetanilide (100 mg, 0.59 mmol) and 3-iodotoluene (0.12 mL, 0.88 mmol) provided 48.5 mg (38% yield) of the coupling product as a yellow oil after purification by flash chromatography (dichloromethane/pentane 0.5/9.5) of the crude oil.



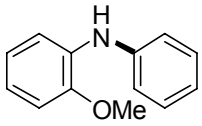
^{1}H-NMR (400 MHz, $CDCl_3$) δ 7.38 (dd, J = 7.9, 1.5 Hz, 1H), 7.32-7.21 (m, 2H), 7.18-7.13 (m, 1H), 7.02-7.00 (m, 2H), 6.90 (d, J = 7.5 Hz, 1H), 6.82 (dt, J = 7.7, 7.6, 1.5 Hz, 1H), 6.09 (br s, 1H), 2.37 (s, 3H).

^{13}C-NMR (100 MHz, $CDCl_3$) δ 141.4 (C), 140.4 (C), 139.3 (C), 129.7 (CH), 129.2 (CH), 127.4 (CH), 123.5 (CH), 121.4 (C), 120.9 (CH), 120.2 (CH), 117.2 (CH), 115.6 (CH), 21.5 (CH_3).

MS (EI) *m/z* (%) 219 (M^++2, 29) 217 (M^+, 100), 182 (70), 167 (97), 127 (15), 90 (22), 83 (57).

Calcd. for $C_{13}H_{12}ClN$: C, 71.72; H, 5.56; N, 6.43; found C, 71.54; H, 5.49; N, 6.81.

***N*-(2-Methoxyphenyl)-*N*-phenylamine (4q).[1]** Following the general procedure using 2-methoxyacetanilide (100 mg, 0.61 mmol) and phenyl iodide (0.10 mL, 0.92 mmol) provided 66.5 mg (55% yield) of the coupling product as a yellow oil after purification by flash chromatography (dichloromethane/pentane 3/7) of the crude oil.

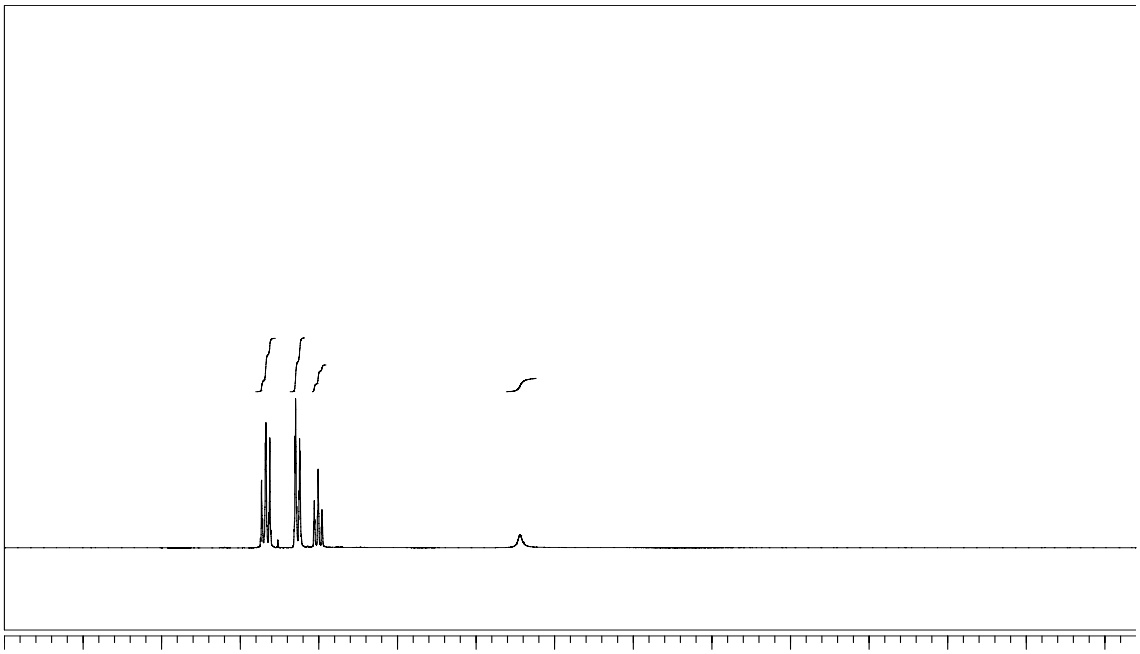


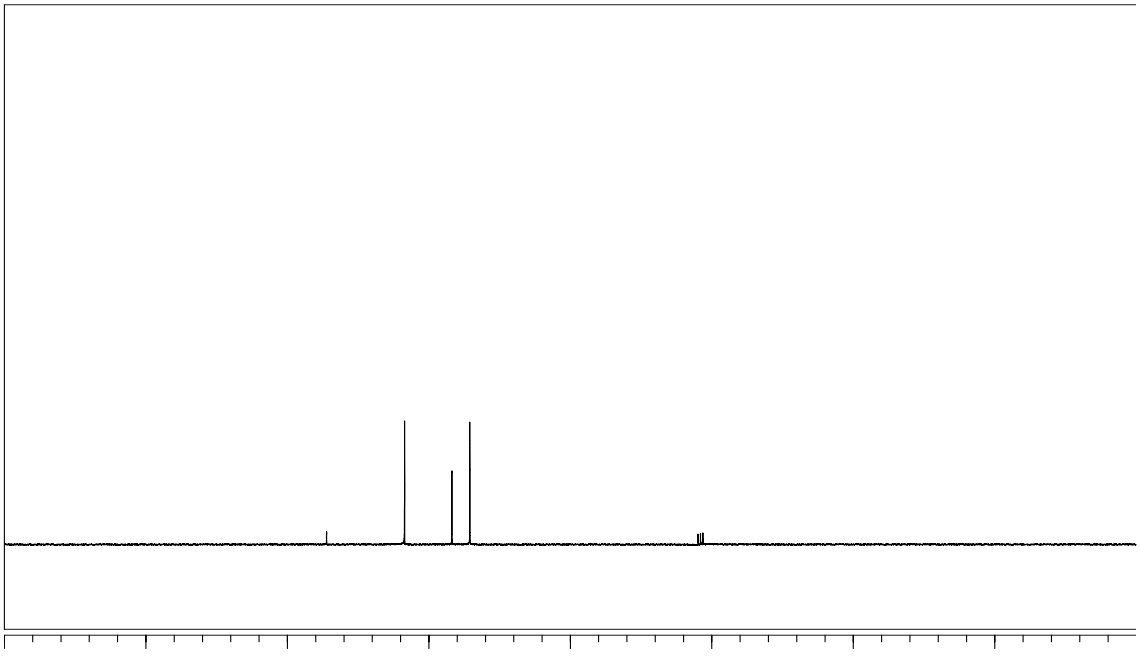
^{1}H-NMR (400 MHz, $CDCl_3$) δ 7.36-7.28 (m, 3H), 7.20-7.17 (m, 2H), 7.00-6.88 (m, 4H), 6.18 (br s, 1H), 3.92 (s, 3H).

^{13}C-NMR (100 MHz, $CDCl_3$) δ 148.2 (C), 142.7 (C), 132.9 (C), 129.2 (CH), 121.1 (CH), 120.8 (CH), 119.8 (CH), 118.5 (CH), 114.6 (CH), 110.5 (CH), 55.6 (CH_3).

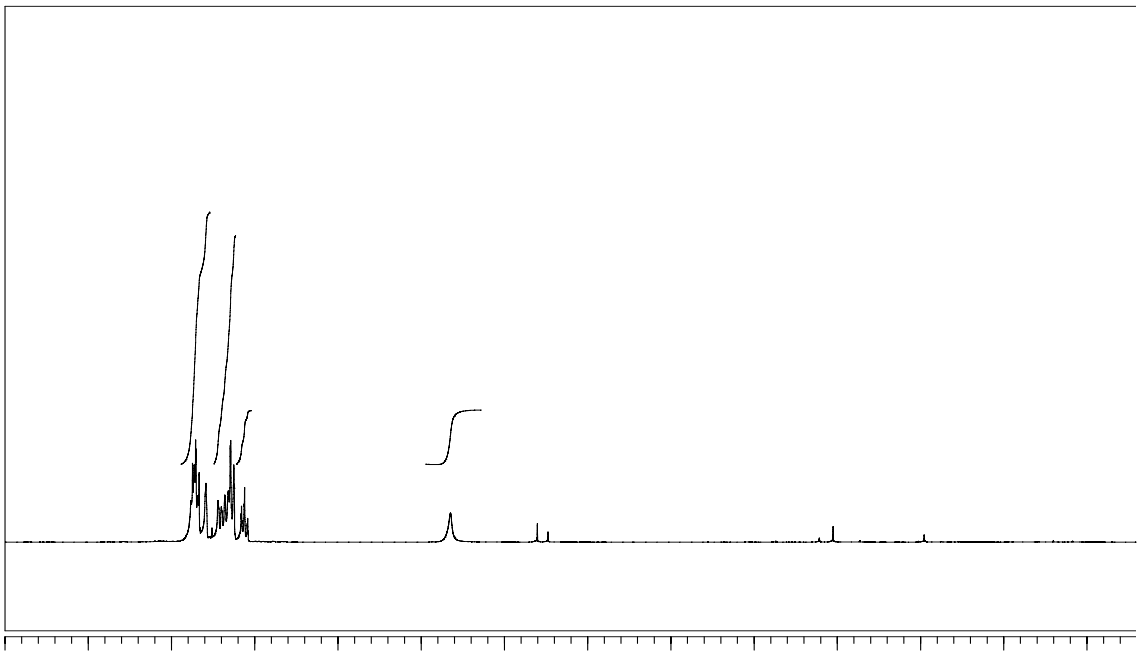
All spectral data correspond to those given in the literature.

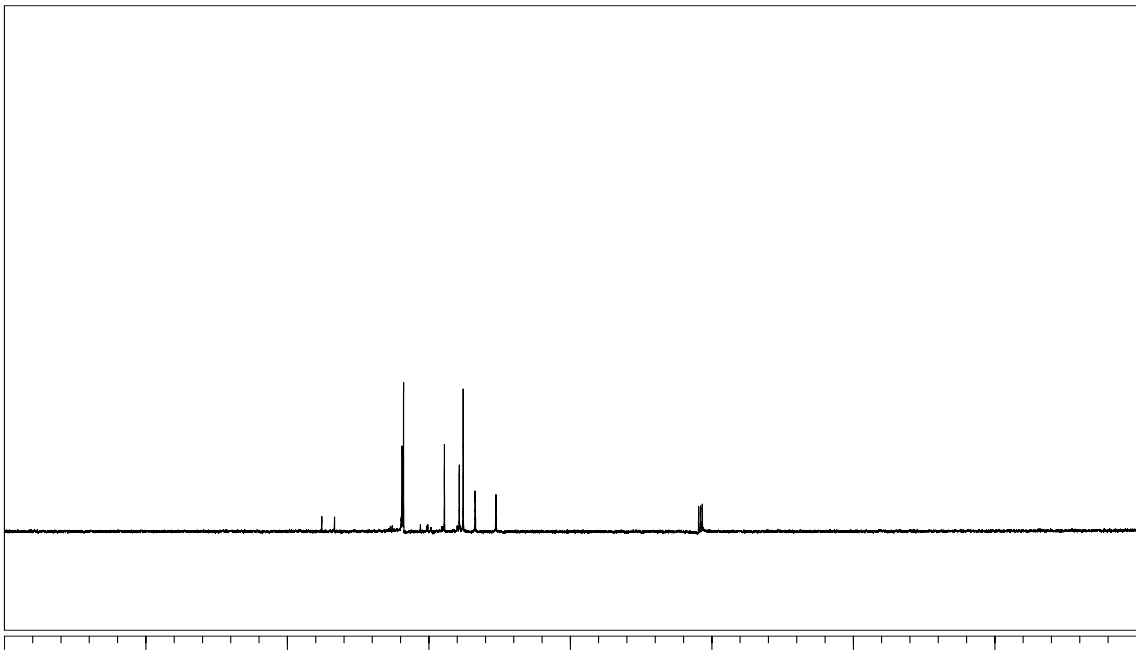
***N*,*N*-Diphenylamine (4a)**



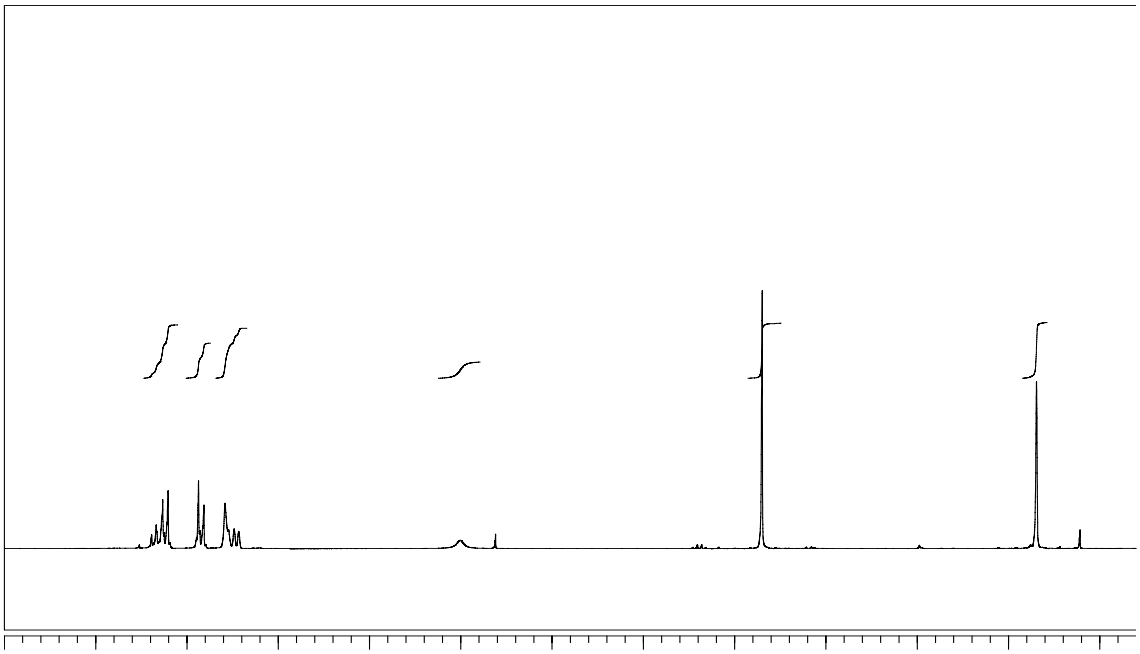


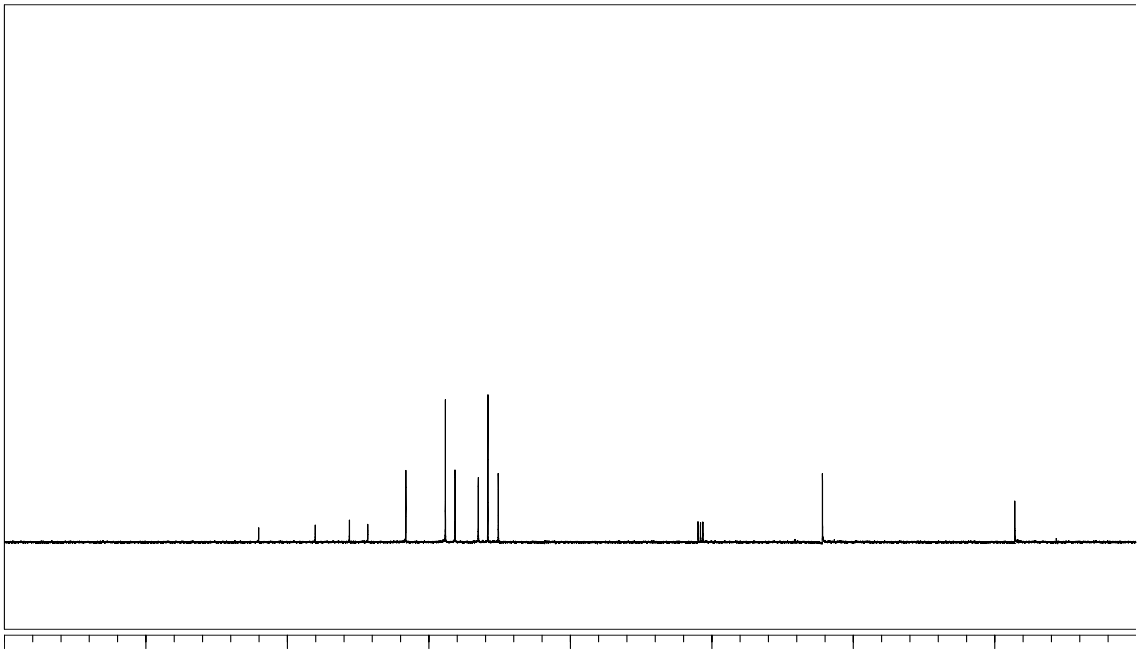
***N*-(3-Trifluoromethylphenyl)-*N*-phenylamine (4b)**



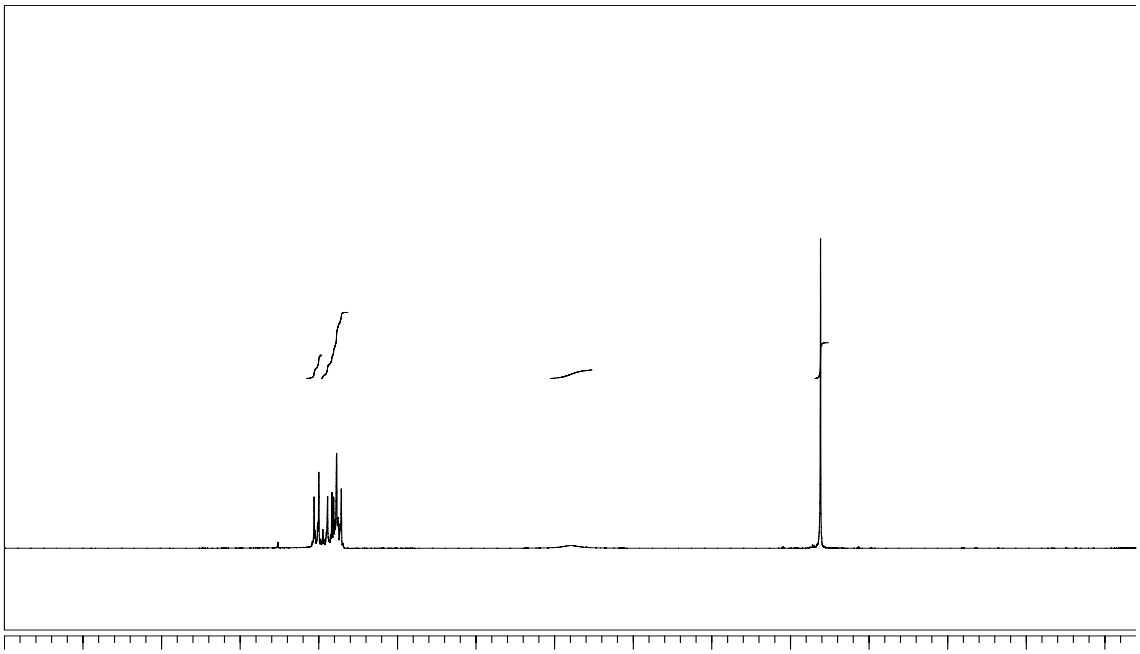


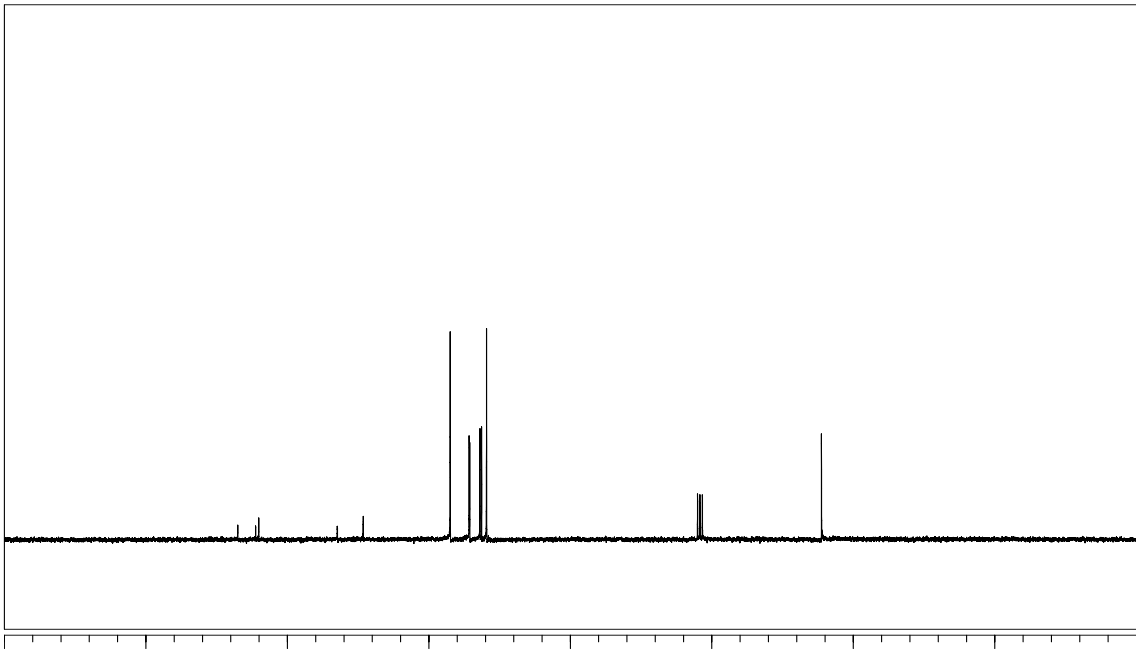
***N*-(4-Methoxyphenyl)-*N*-(3-methylphenyl)amine (4c)**



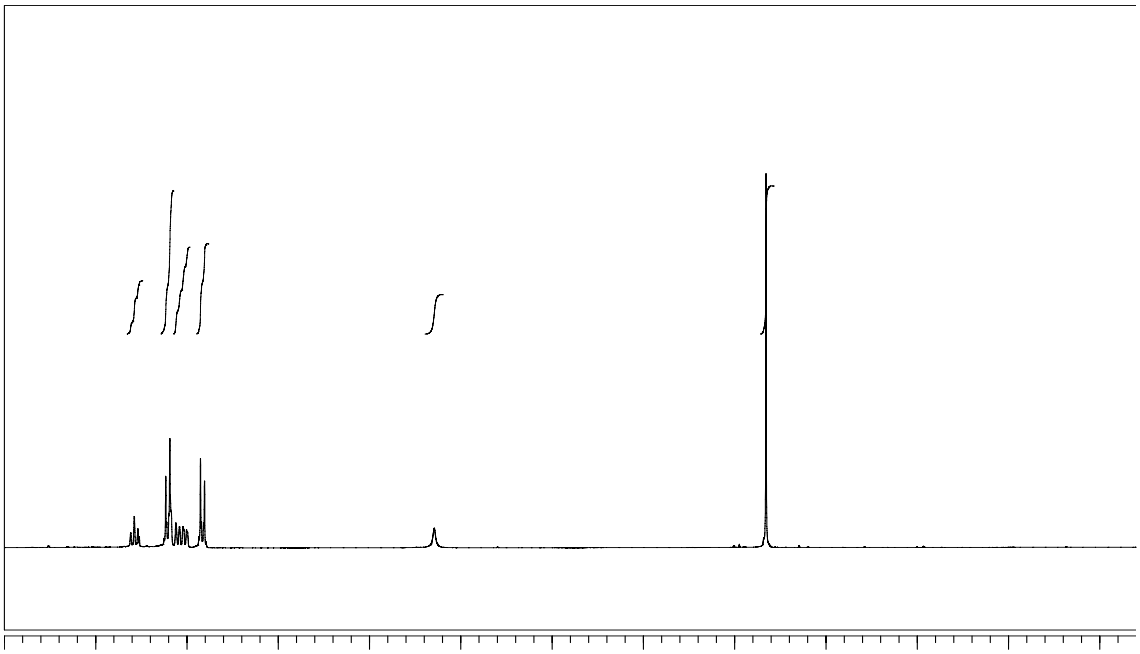


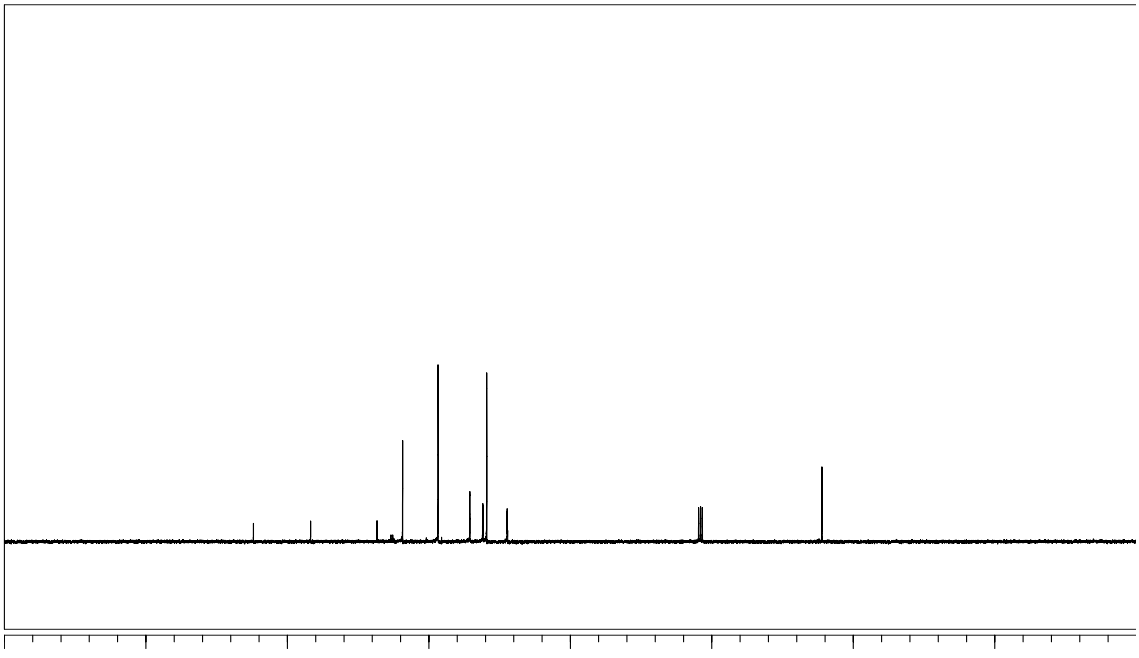
***N*-(4-Fluorophenyl)-*N*-(4-methoxyphenyl)amine (4d)**



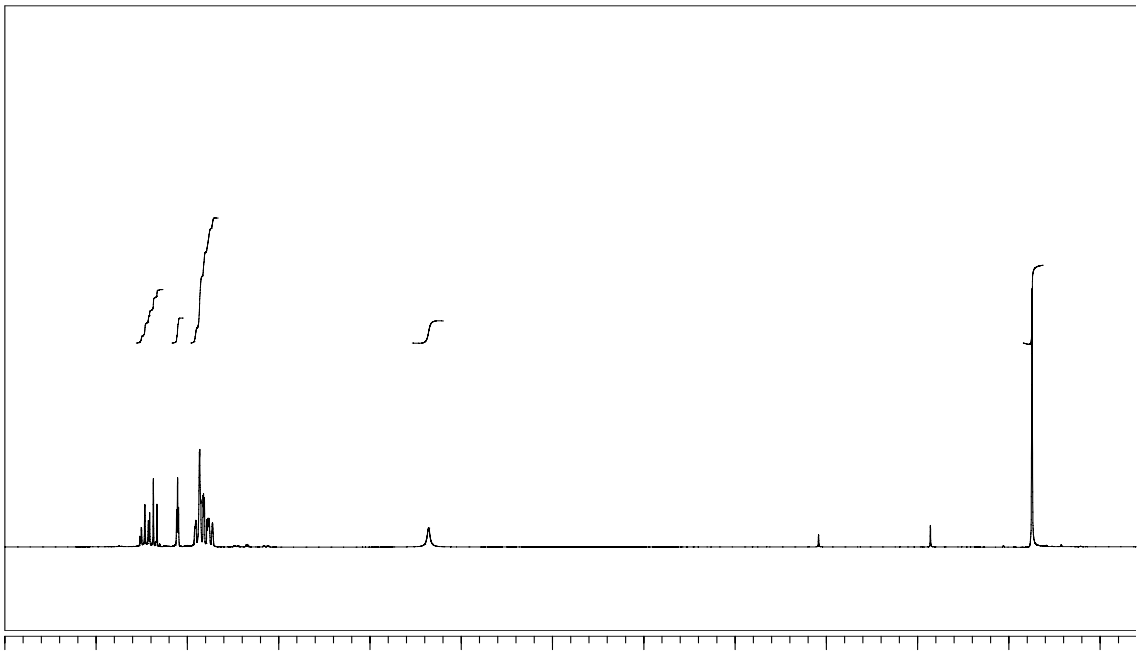


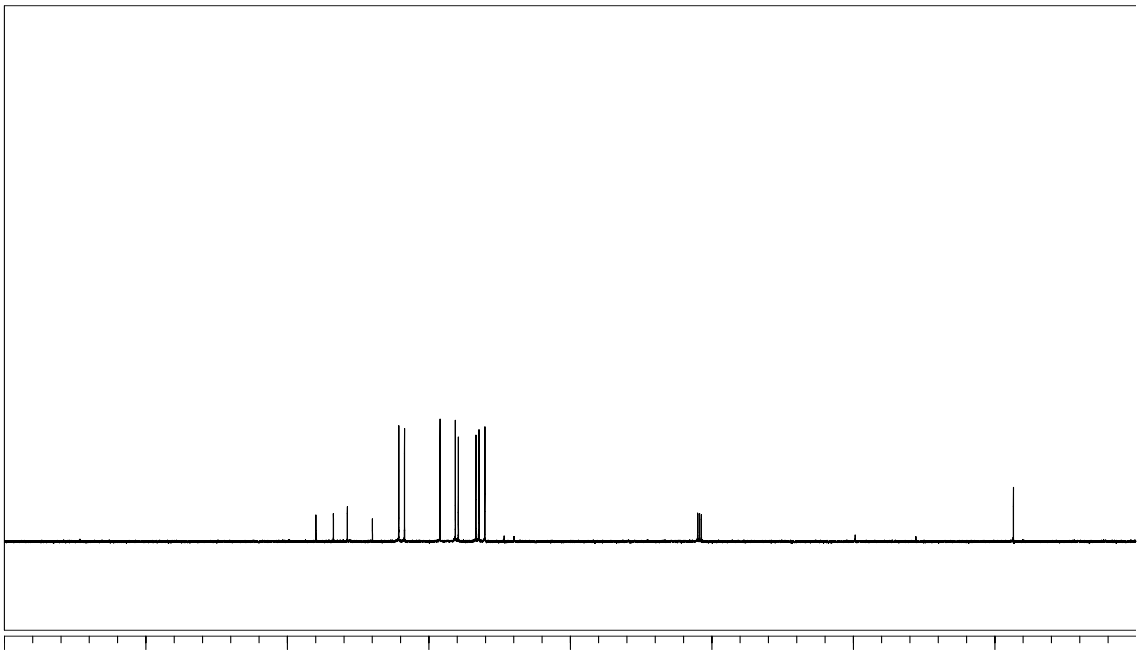
***N*-(4-Methoxyphenyl)-*N*-(3-trifluoromethylphenyl)amine (4e)**



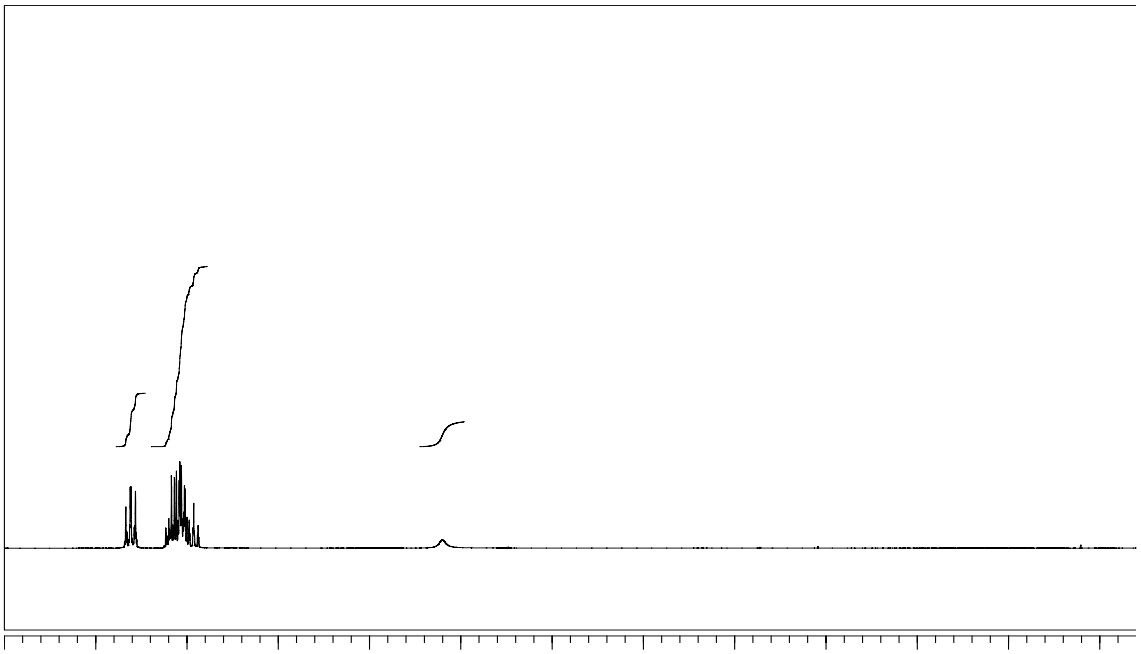


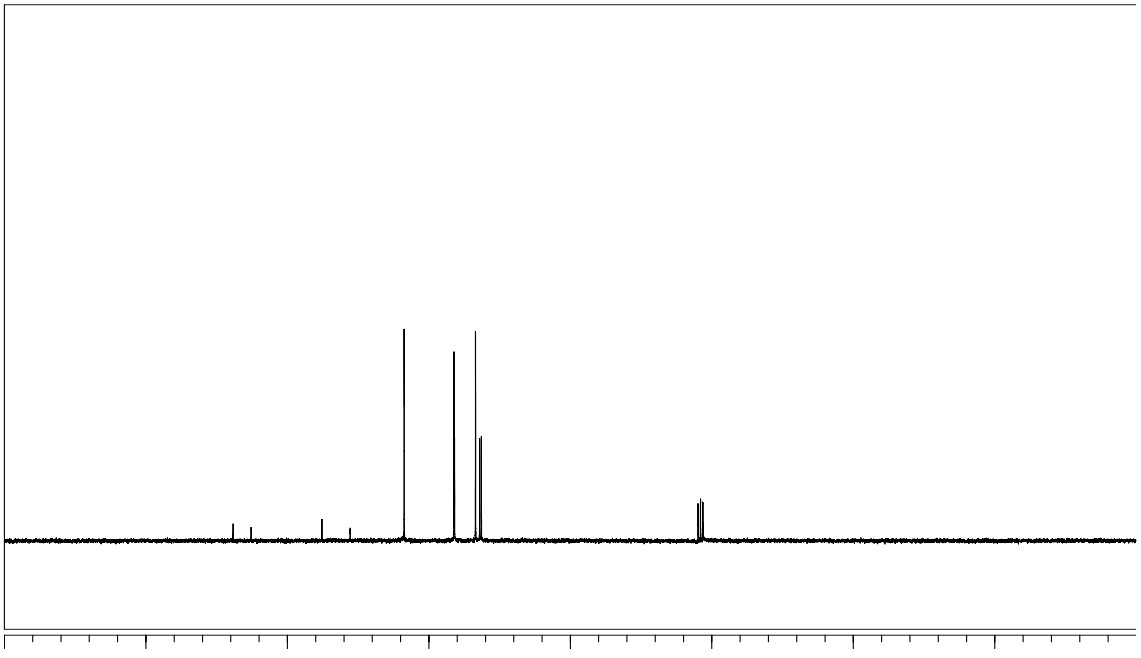
***N*-(3-Chlorophenyl)-*N*-(3-methylphenyl)amine (4f)**



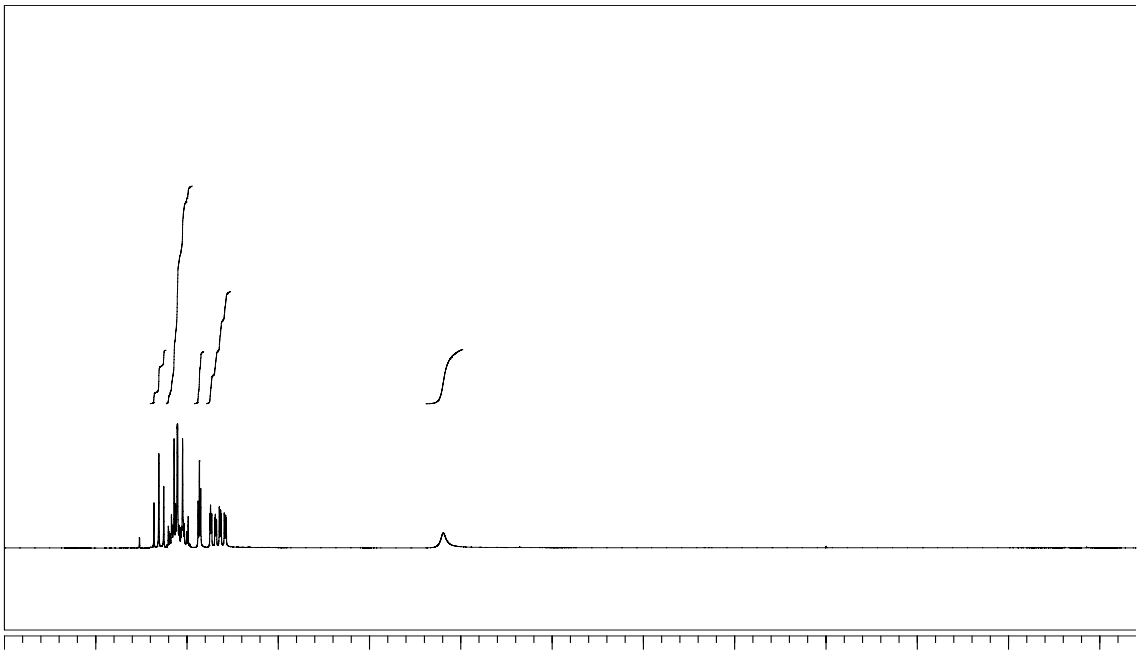


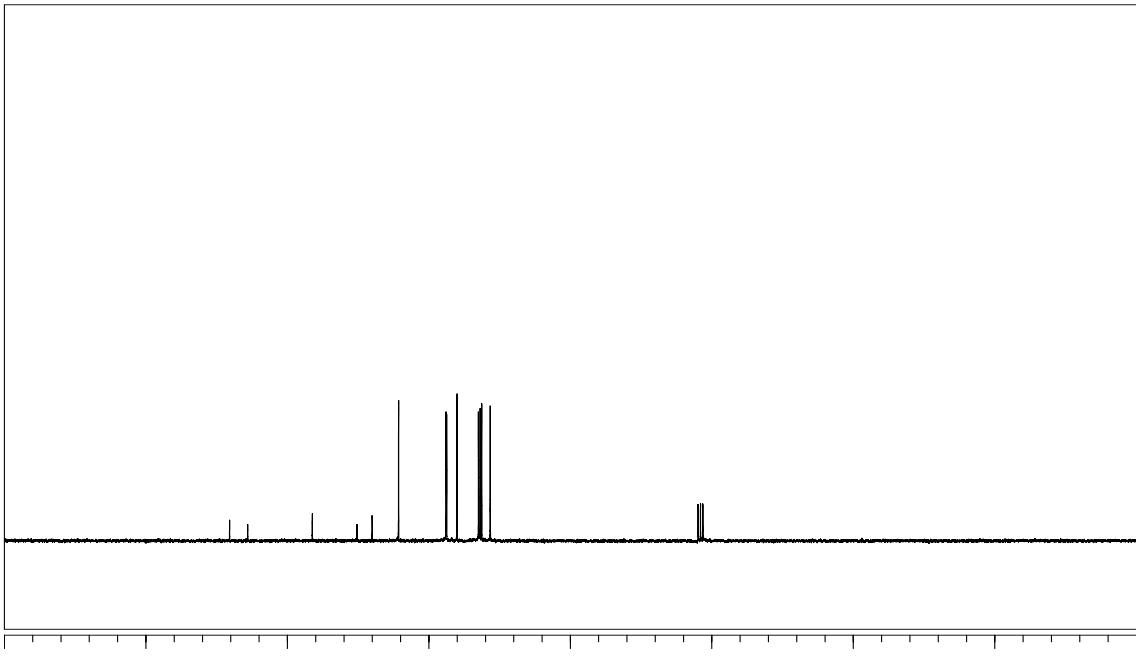
***N*-(4-Fluorophenyl)-*N*-phenylamine (4g)**



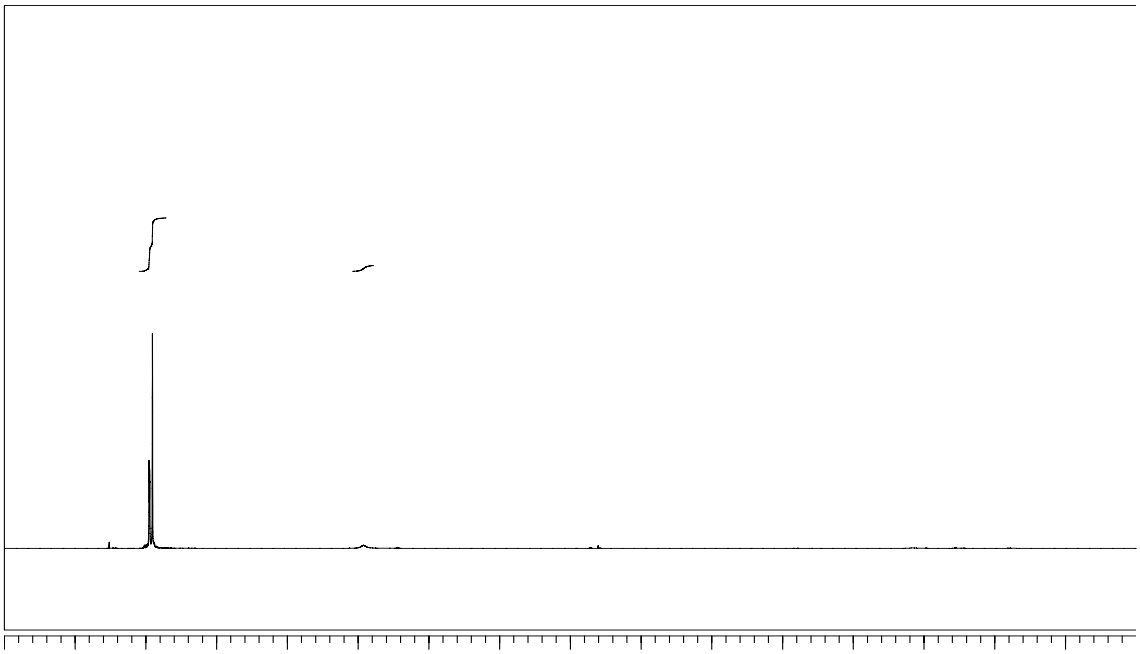


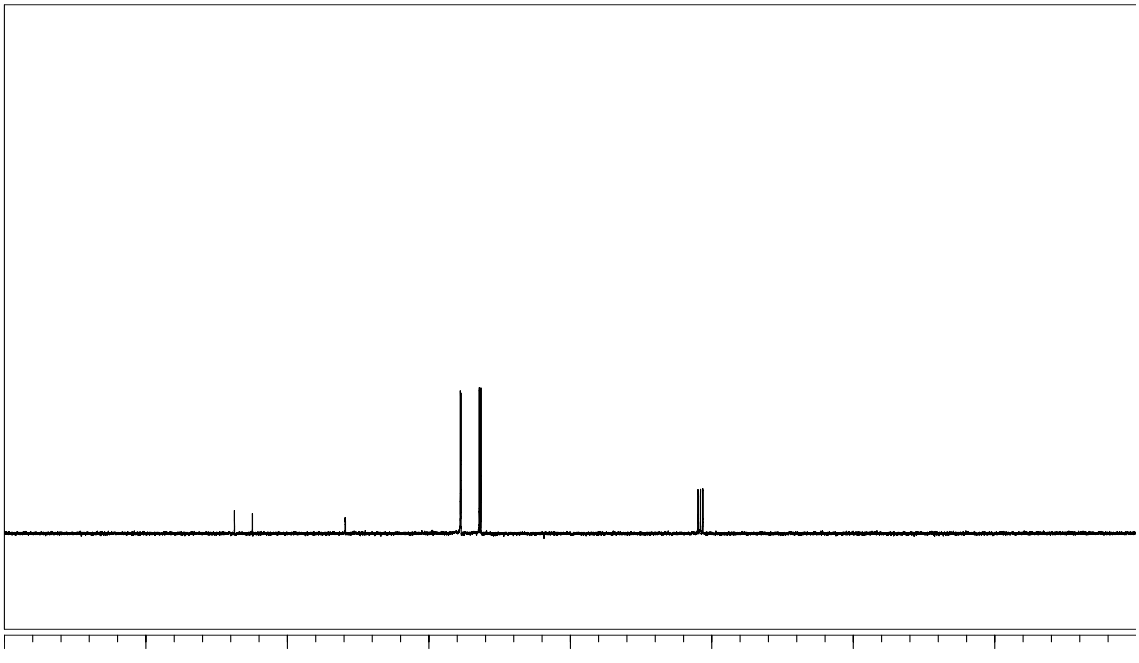
***N*-(3-Chlorophenyl)-*N*-(4-fluorophenyl)amine (4h)**



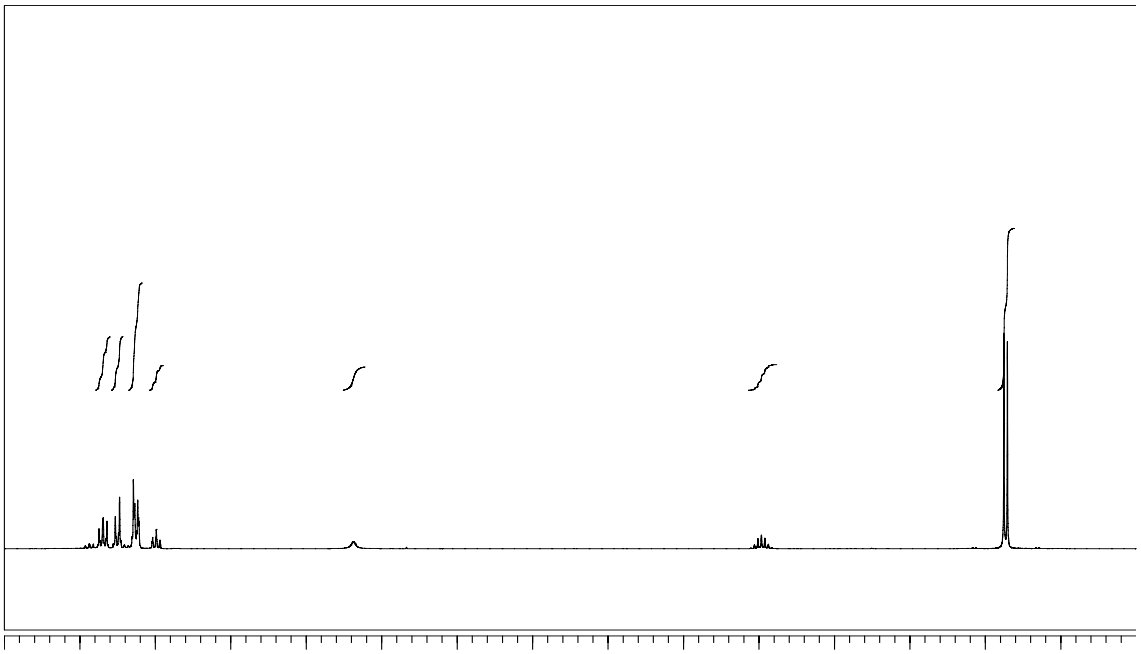


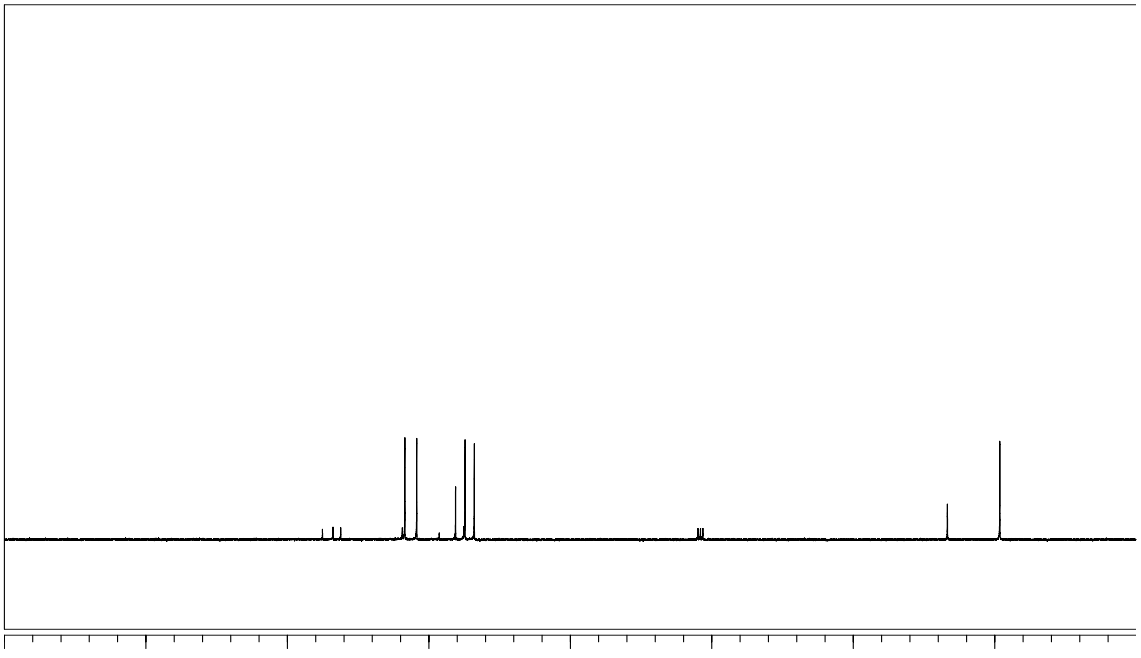
***N,N*-Bis(4-fluorophenyl)amine (4i)**



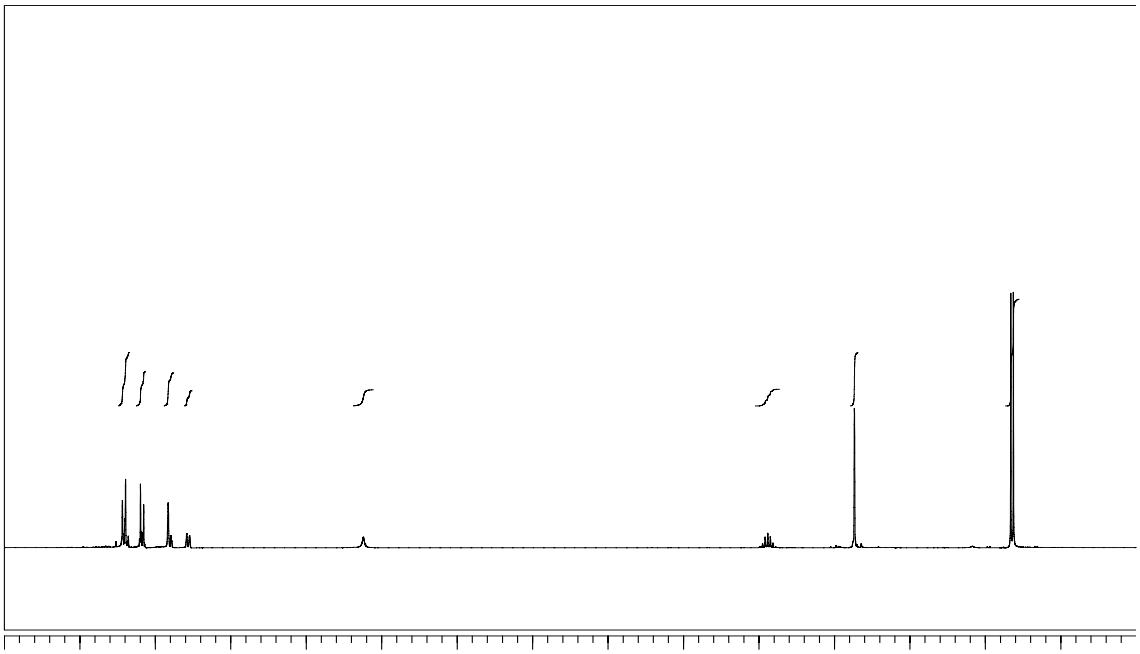


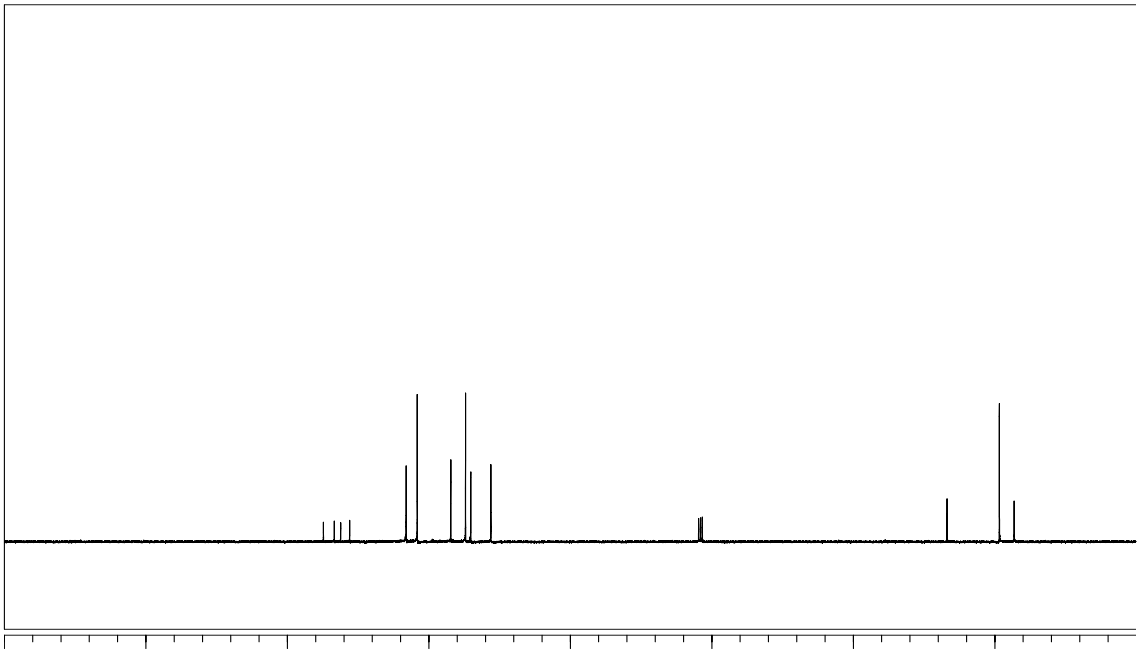
***N*-(4-Isopropylphenyl)-*N*-phenylamine (4j)**



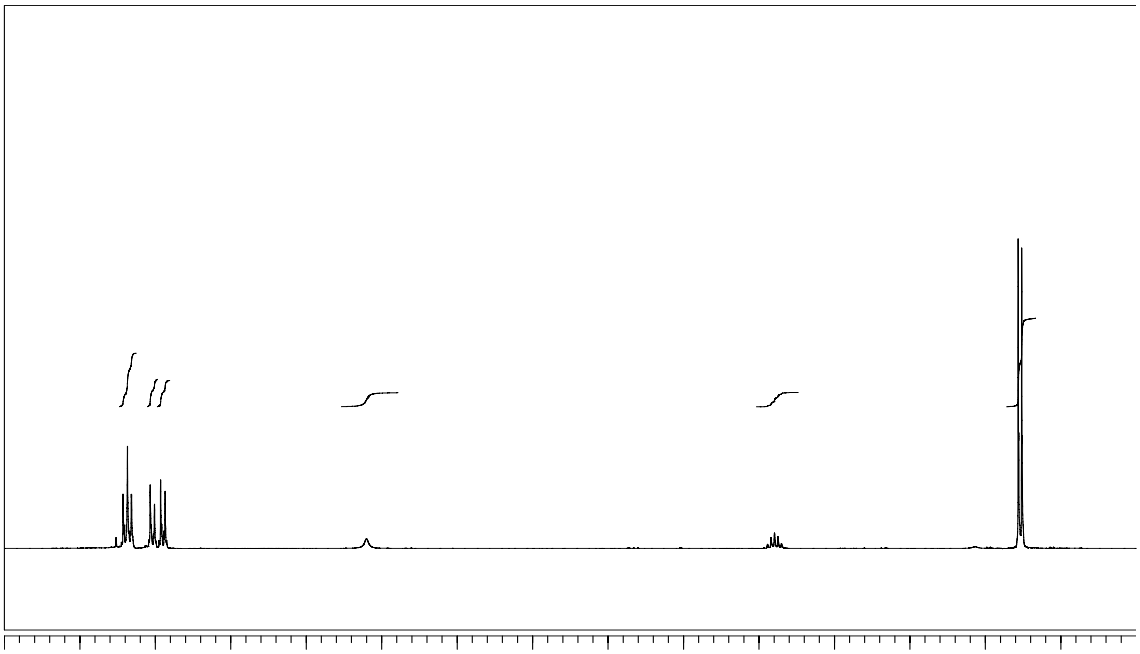


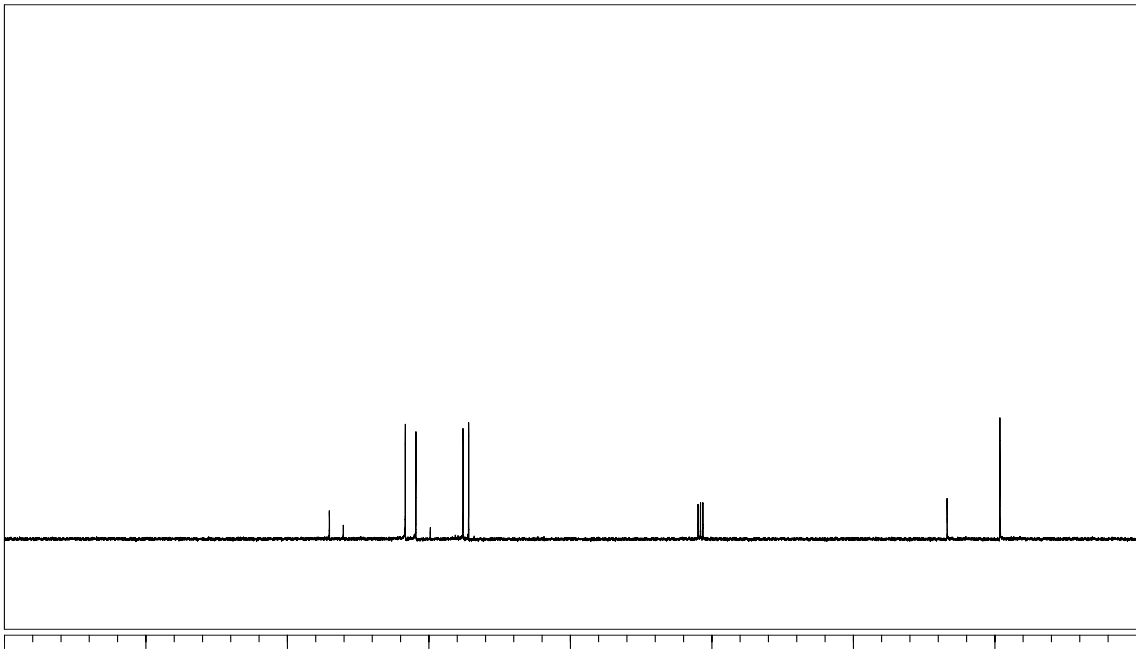
***N*-(4-Isopropylphenyl)-*N*-(3-methylphenyl)amine (4k)**



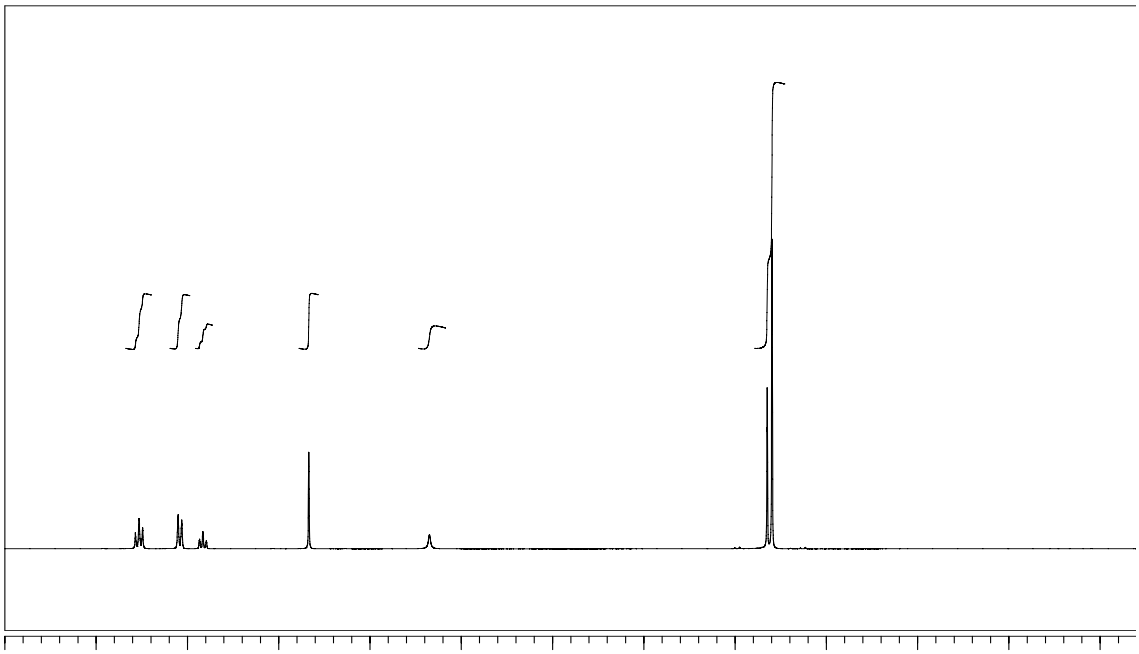


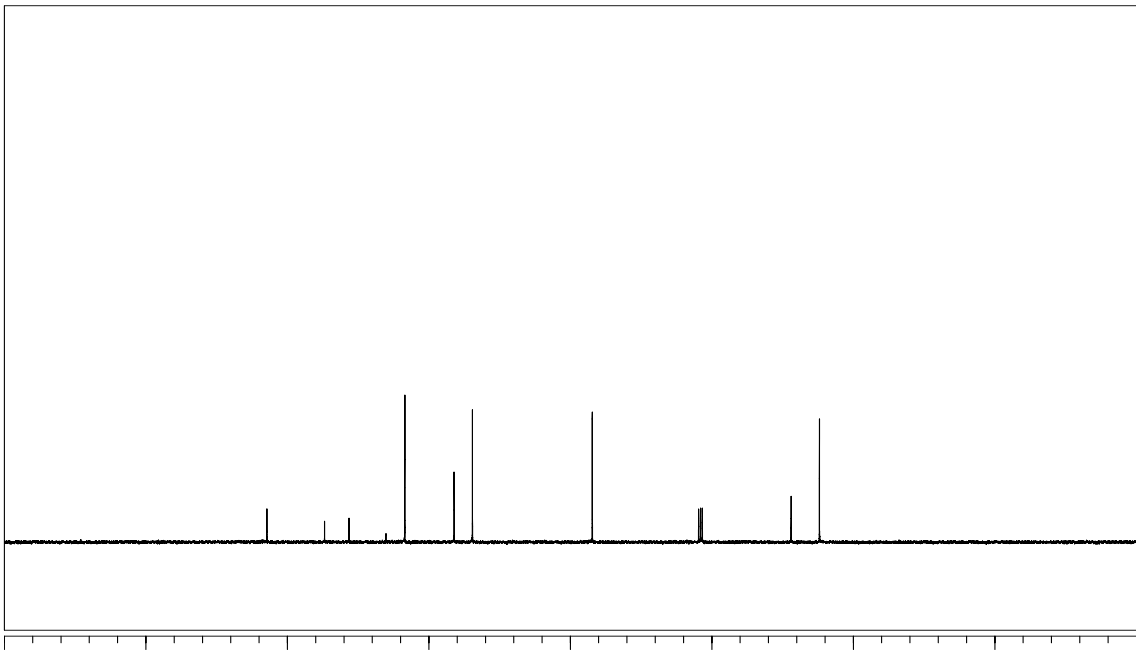
_N_-(4-Chlorophenyl)-_N_-(4-isopropylphenyl)amine (4l)



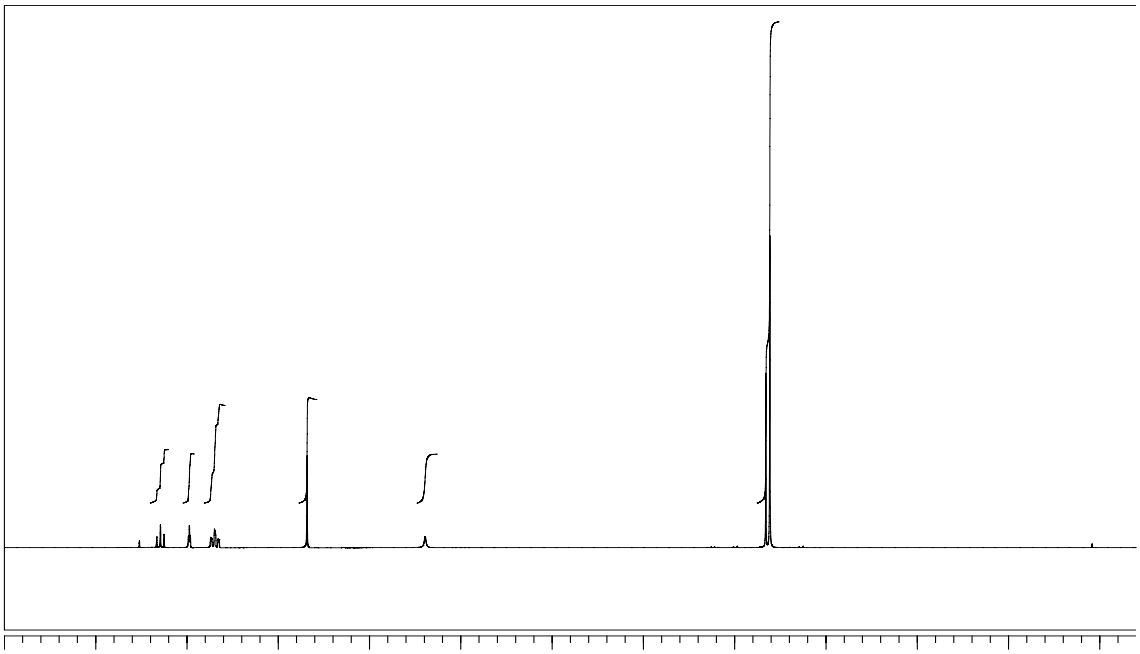


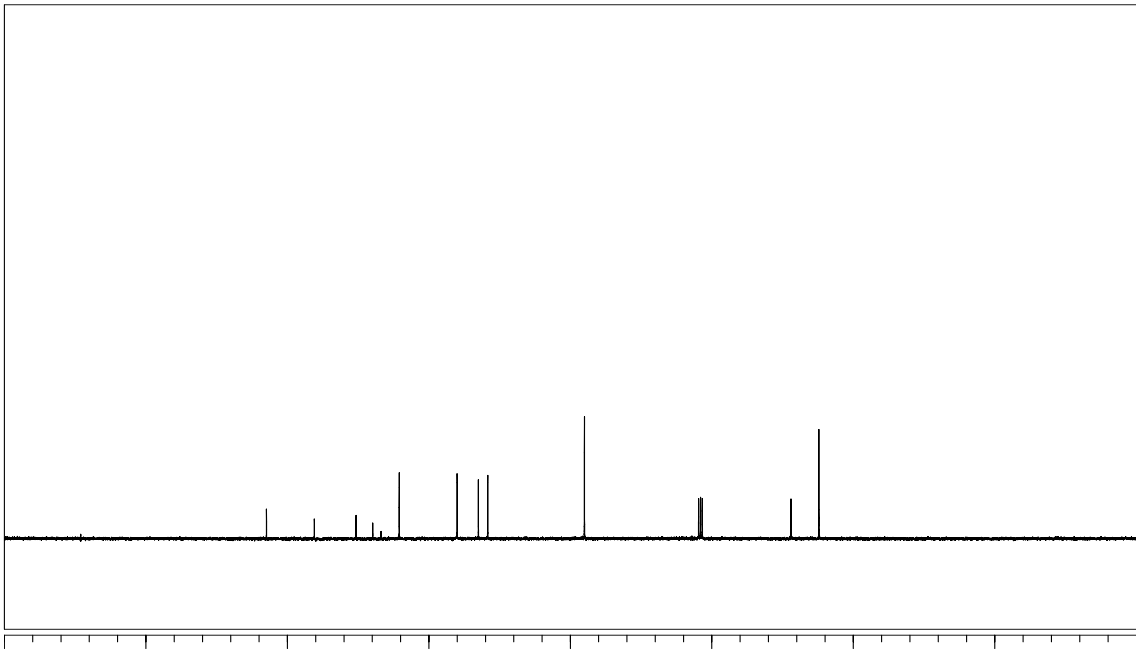
***N*-(3,4,5-Trimethoxyphenyl)-*N*-phenylamine (4m)**



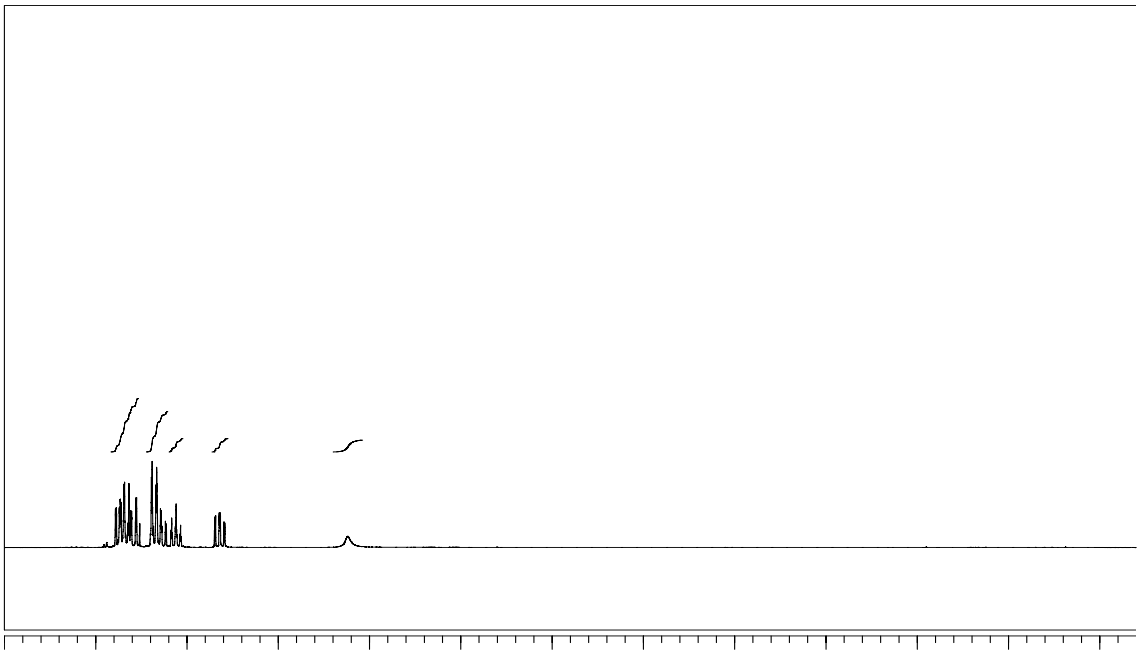


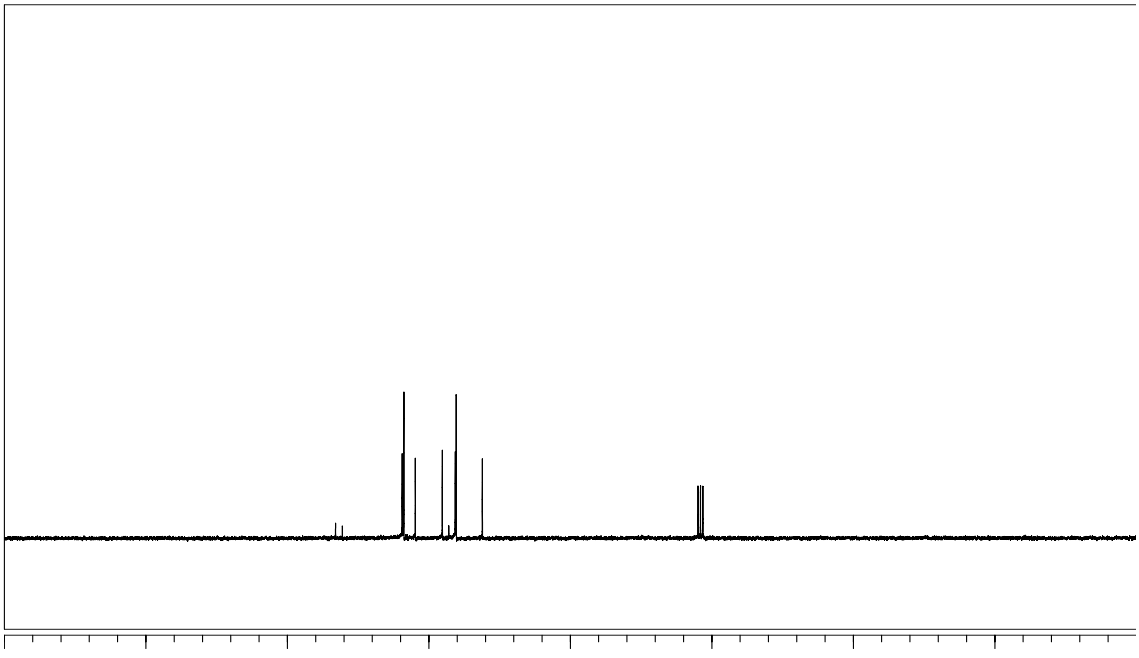
***N*-(3-Chlorophenyl)-*N*-(3,4,5-trimethoxyphenyl)amine (4n)**



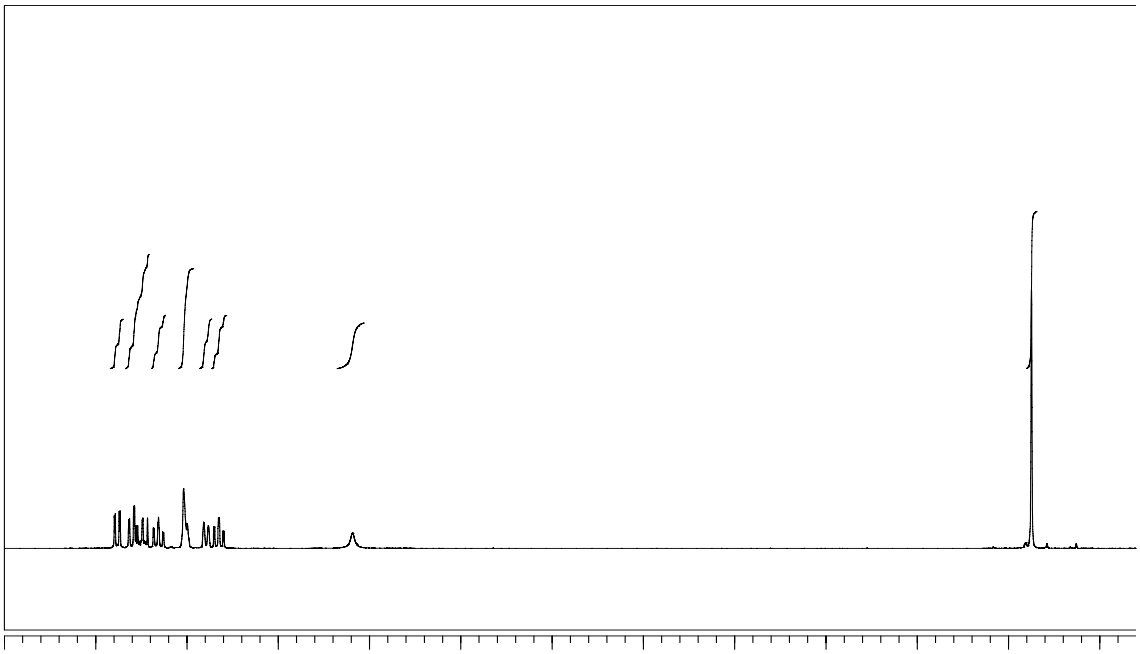


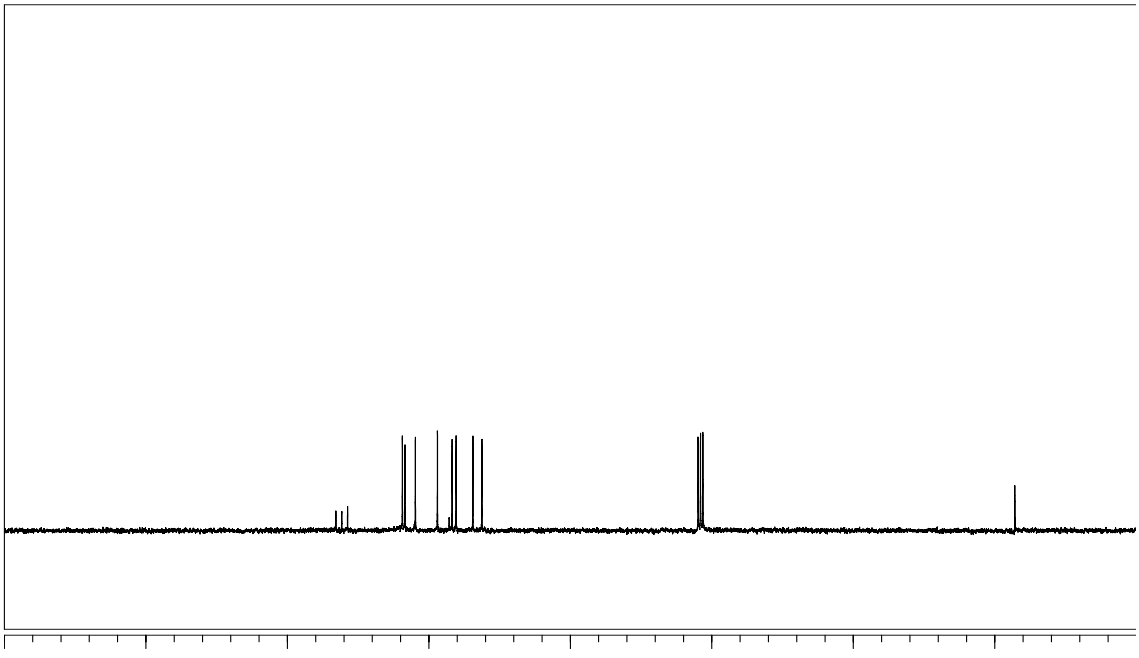
***N*-(2-Chlorophenyl)-*N*-phenylamine (4o)**





***N*-(2-Chlorophenyl)-*N*-(3-methylphenyl)amine (4p)**





***N*-(2-Methoxyphenyl)-*N*-phenylamine (4q)**