Supplementary Materials

Pyridinic-nitrogen on ordered mesoporous carbon: A versatile NAD(P)H mimic for borrowing-hydrogen reactions[†]

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[†] *This paper is dedicated to the memory of our dear co-author Professor M. Sasidharan who passed away prematurely due to Covid-19 while this paper was being submitted/peer-reviewed.*

[‡] *These authors contributed equally to this work.*

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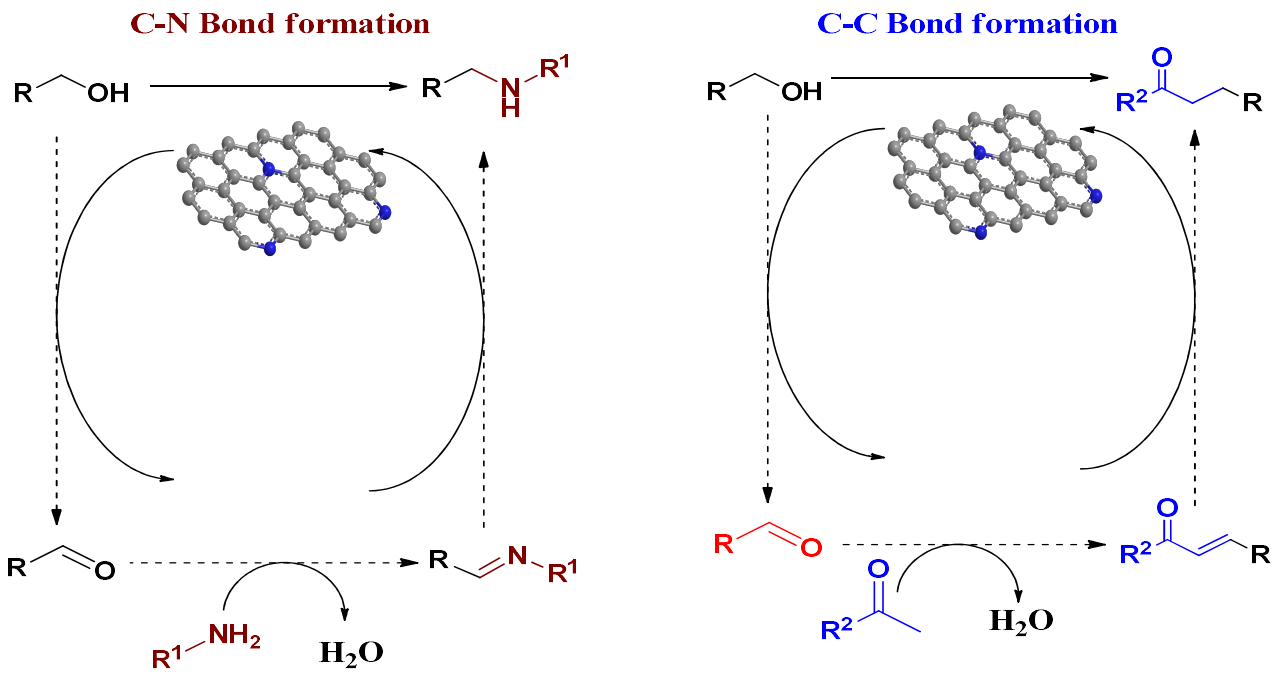
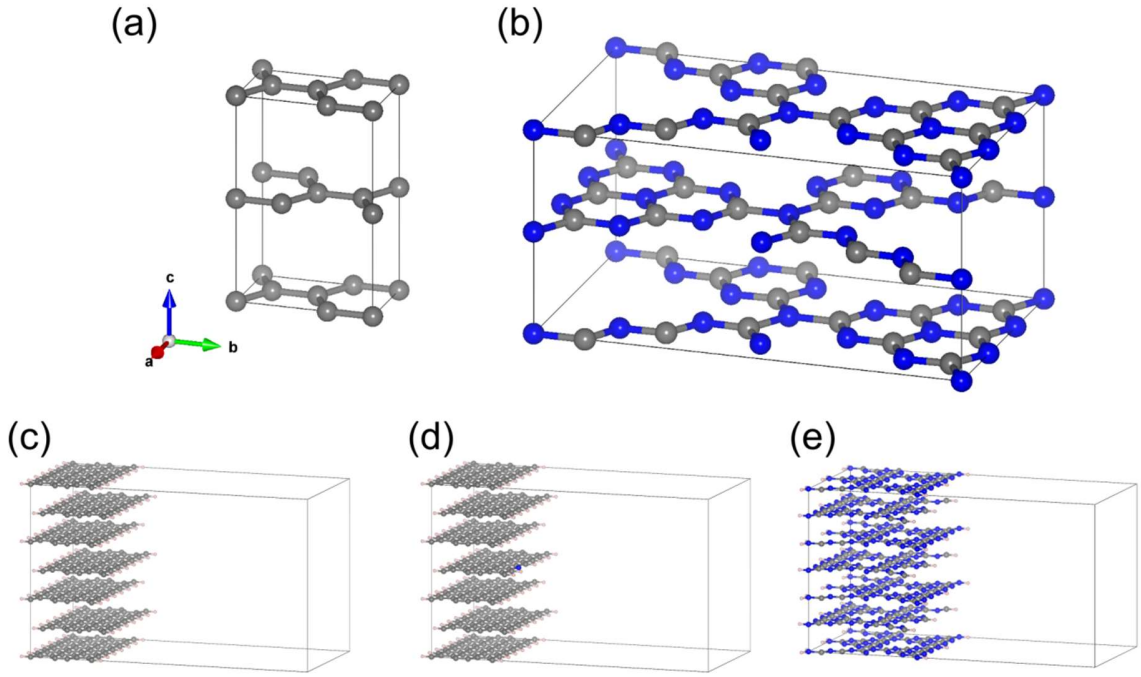
namithak@srmist.edu.in (KN) venu.iitkgp@gmail.com (VTB), selvam@iitm.ac.in (PS)

Content of Schemes, Figures and Tables



Scheme S1. The B–H reactions established for C–C and C–N bond formation over metal-free nitrogen-doped ordered mesoporous carbonaceous materials. Color code: H (white), C (gray) and N (blue).



Scheme S2. Graphitic *g*-C_3N_4 (delimited with black lines). (a) Orthorhombic unit cell of all-carbon graphite. (b) Orthorhombic unit cell of *g*-C_3N_4. (c) 6 × 2 × 3 expansion of the all-carbon graphite cell with the zig-zag edge exposed. (d) 6 × 2 × 3 expansion of the N−doped graphite cell with the zig-zag edge exposed. (e) 2 × 1 × 3 expansion of the graphitic *g*-C_3N_4 cell with the edge exposed. The edges are terminated with H atoms. Color code: H (white), C (gray) and N (blue).

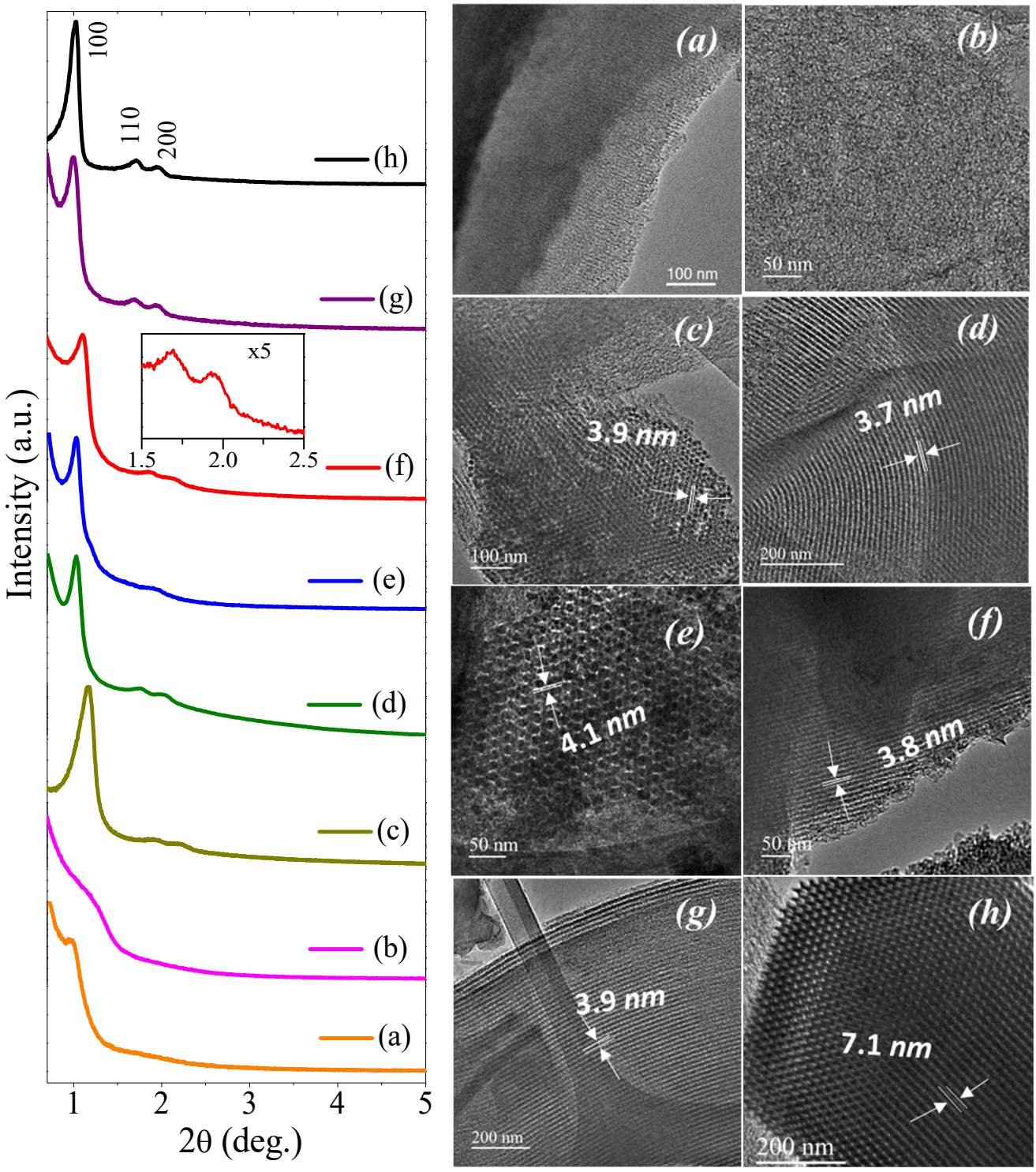


Figure S1. Low angle XRD (left) patterns and TEM images (right) of: (a) *g*-C_3N_4, (b) CSI-306 (NH_3), (c) CSI-306, (d) CMK-306, (e) MNC-316, (f) MNC-319, (g) MNC-326 and (h) SBA-15.

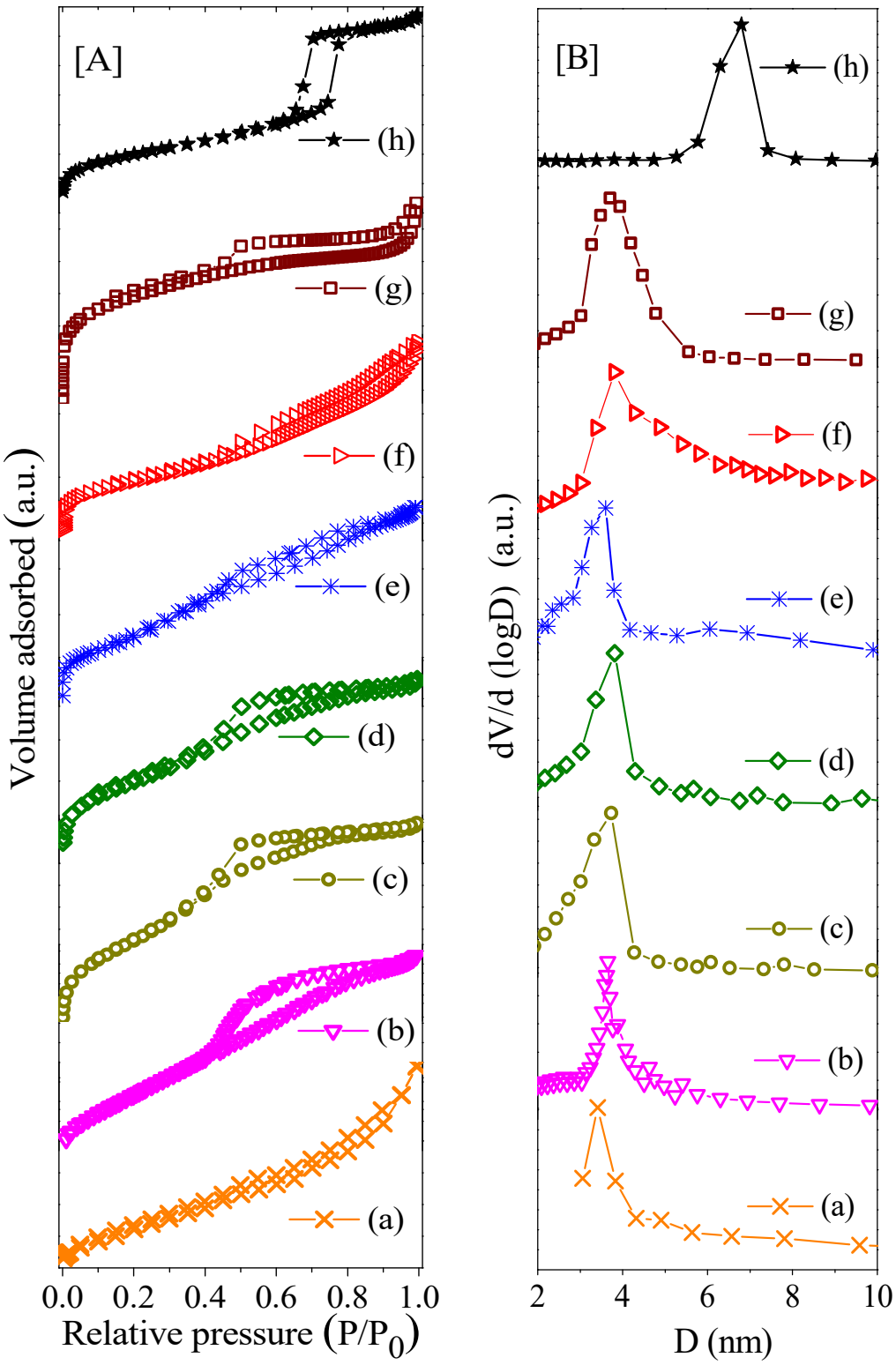
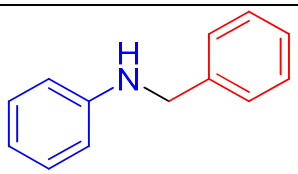
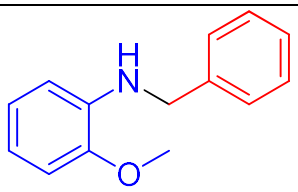
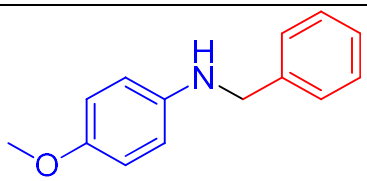
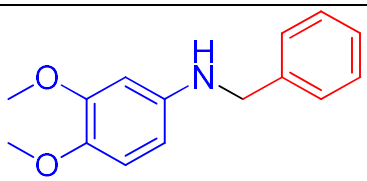
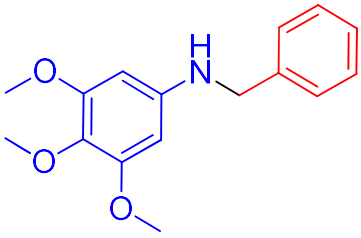
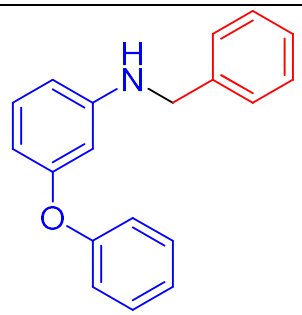
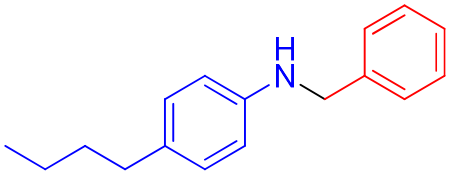
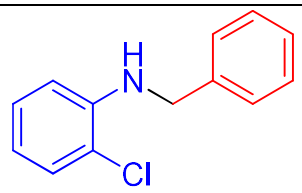
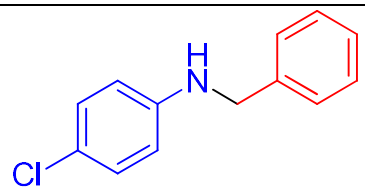
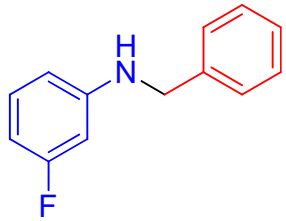
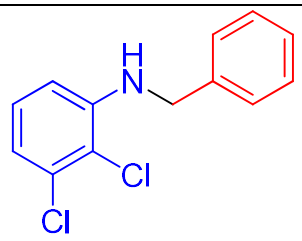
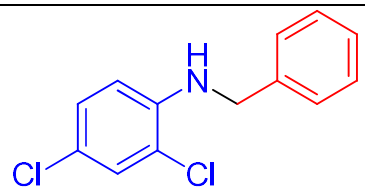
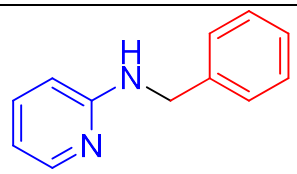
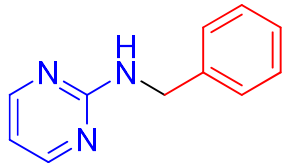
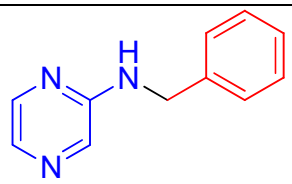
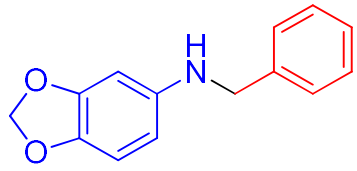


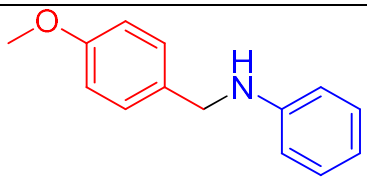
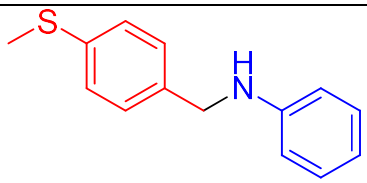
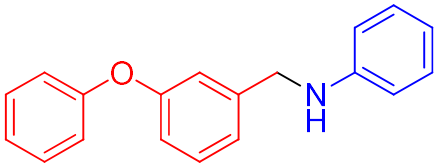
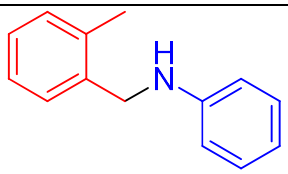
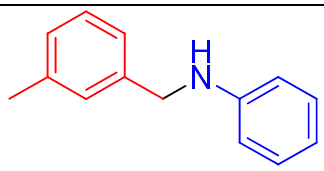
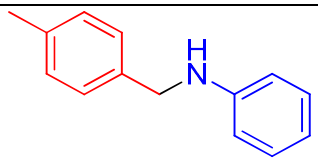
Figure S2. [A] N_2-sorption isotherms and [B] pore size distributions calculated using BJH method of: (a) *g*-C_3N_4, (b) CSI-306 (NH_3), (c) CSI-306, (d) CMK-306, (e) MNC-316, (f) MNC-319, (g) MNC-326 and (h) SBA-15.

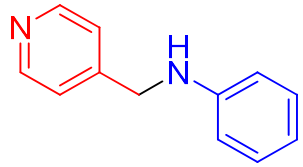
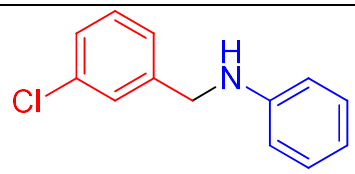
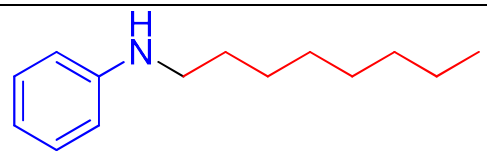
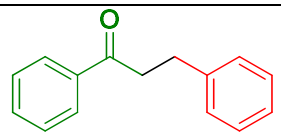
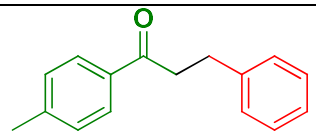
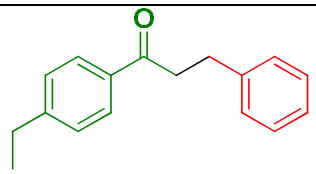
Table S1. ^{1}H-NMR and ^{13}C -NMR data.

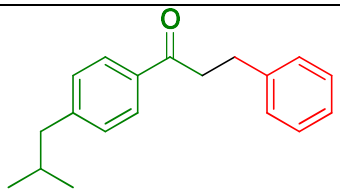
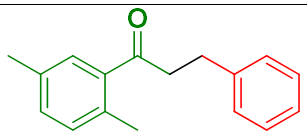
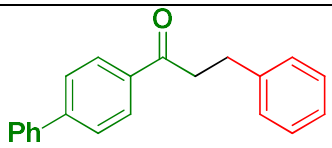
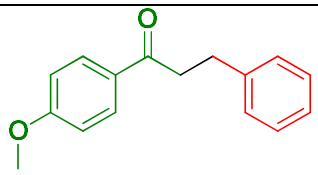
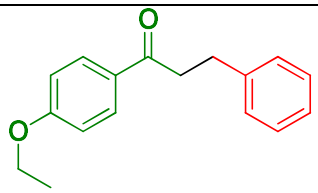
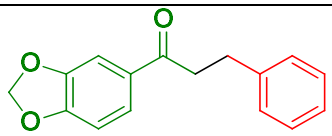
3aa		**N-benzylaniline (3aa):** color less oil (0.177g, 97% yield);**^{1}H NMR**: (500 MHz, $CDCl_3$, 25°C, TMS) δ 7.23 – 7.29 (m, 4H), 7.16 – 7.20 (m, 1H), 7.06 – 7.10 (m, 2H), 6.67 (t, *J* = 7.3 Hz, 1H), 6.54 (d, *J* = 8.6 Hz, 2H), 4.22 (s, 2H), 3.91 (br, 1H). ^{13}C NMR (126 MHz, $CDCl_3$, 25°C, TMS) δ = 148.0, 139.3, 129.1, 128.4, 127.3, 127.0, 117.3, 112.7, 48.0.
3ba		**N-benzyl-2-methoxyaniline (3ba):** Yellow oil (0.198g, 93% yield); **^{1}H-NMR**: (500 MHz, CDCl3, 25°C, TMS) δ 7.27-7.35 (m, 4H), 7.22 (t, J=7.5 Hz, 1H), 6.81 (dt, J=7.6Hz,1.5 Hz, 1H), 6.74 (dd, J=7.9Hz, 1.6Hz, 1H), 6.65 (td, J= 7.6 Hz, 1.5Hz, 1H), 6.56 (dd, J=7.8 Hz, 1.4Hz, 1H), 4.59 (br, 1H), 4.29 (s, 2H), 3.77 (s,3H). ^{13}C NMR (126 MHz, $CDCl_3$) δ 146.9, 139.8, 138.3, 128.7, 127.6, 127.2, 121.4, 116.8, 113.5, 110.2, 109.6, 55.5, 48.2.
3ca		**N-benzyl-4-methoxyaniline (3ca):** Brown solid (0.206g, 97% yield); **^{1}H-NMR**: (500 MHz, CDCl3, 25°C, TMS) δ 7.35-7.41 (m, 4H), 7.28-7.29 (m, 1H), 6.79-6.82 (m, 2H), 6.63-6.65 (m, 2H), 4.31 (s, 2H), 3.77 (s, 3H). ^{13}C NMR (126 MHz, $CDCl_3$) δ 152.2, 142.4, 139.6, 128.6, 127.6, 127.2, 114.9, 114.2, 55.8, 49.3.
3da		**N-benzyl-3,4-dimethoxyaniline (3da):** black solid (0.235g, 97% yield); **^{1}H-NMR**: (500 MHz, CDCl3, 25°C, TMS) δ 7.25-7.31 (m, 4H), 7.18-7.21 (m, 1H), 6.66 (d, J=8.6Hz, 1H), 6.20 (d, J=2.7Hz, 1H), 6.09 (dd, J=8.5Hz, 2.8 Hz, 1H), 4.21 (s, 2H), 3.73 (s, 3H), 3.72 (s, 3H). ^{13}C NMR (126 MHz, $CDCl_3$) δ 150.0, 143.1, 141.7, 139.6, 128.6, 127.6, 127.2, 113.3, 103.6, 99.0, 56.7, 55.7, 49.2.
3ea		**N-benzyl-3,4,5-trimethoxyaniline (3ea):** pale green crystals(0.215g, 79% yield); **^{1}H-NMR**: (500 MHz, CDCl3, 25°C, TMS) δ 7.18-7.31 (m, 5H), 5.81 (s, 2H), 4.22 (s, 2H), 3.71 (s, 6H), 3.68 (s, 3H). ^{13}C NMR (126 MHz, $CDCl_3$) δ 154.0, 145.0, 139.3, 130.2, 128.7, 127.6, 127.4, 90.5, 61.1, 55.9, 48.9.

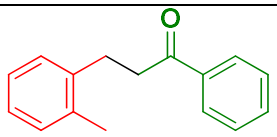
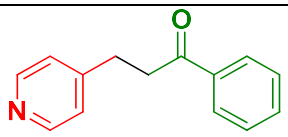
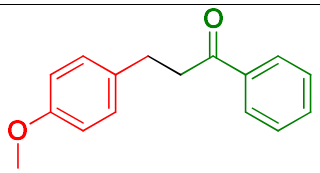
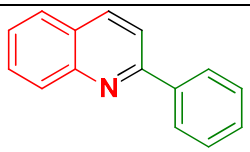
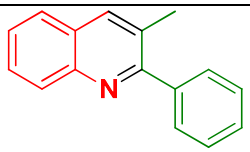
3fa		**N-benzyl-3-phenoxyaniline (3fa):** Yellow oil (0.261g, 97% yield); **^{1}H-NMR**: (500 MHz, CDCl3, 25°C, TMS) δ 7.24-7.30 (m, 7H), 7.03-7.07 (m, 2H), 6.33-6.98 (m, 2H), 6.31-6.33 (m, 2H), 6.25-6.26 (m, 1H), 4.21 (s, 2H), 3.99 (br, 1H). ^{13}C NMR (126 MHz, $CDCl_3$) δ 158.5, 157.3, 149.8, 139.2, 130.3, 129.7, 128.8, 127.6, 127.4, 123.1, 119.1, 108.1, 107.9, 103.4, 48.3.
3ga		**N-benzyl-4-butylaniline (3ga):** Orange liquid (0.219g, 92% yield); **^{1}H-NMR**: (500 MHz, CDCl3, 25°C, TMS) δ 7.31-7.37 (m,4H), 7.23-7.27 (m,1H), 6.98 (d, J=8.4 Hz, 2H), 6.56-6.58 (m, 2H), 4.29 (s,2H), 3.85 (br, 1H), 2.49 (t, J=7.7Hz, 2H), 1.50-1.56 (m, 2H), 1.32-1.36 (m, 2H), 0.91 (t, J=7.4 Hz, 3H). ^{13}C NMR (126 MHz, $CDCl_3$) δ 146.2, 139.7, 132.1, 129.2, 128.7, 127.6, 127.2, 113.0, 48.7, 34.8, 34.1, 22.4, 14.1.
3ha		**N-benzyl-2-chloroaniline (3ha):** Yellow oil (0.195g, 90% yield); **^{1}H-NMR**: (500 MHz, CDCl3, 25°C, TMS) δ 7.21-7.28 (m, 6H), 7.02 (t, J=7.5Hz, 1H), 6.55-6.59 (m, 2H), 4.68 (br, 1H), 4.29 (d, J=5.1, 2H). ^{13}C NMR (126 MHz, $CDCl_3$) δ 143.9, 138.8, 129.2, 128.8, 127.9, 127.4, 127.3, 119.2, 117.5, 111.6, 47.9.
3ia		**N-benzyl-4-chloroaniline (3ia):** Yellow oil (0.211g, 97% yield); **^{1}H-NMR**: (500 MHz, CDCl3, 25°C, TMS) δ 7.22-7.31 (m, 5H), 7.04-7.07 (m, 2H), 6.46-6.48 (m, 2H), 4.22 (s, 2H), 3.98(br, 1H). ^{13}C NMR (126 MHz, $CDCl_3$) δ 146.7, 138.9, 129.1, 128.7, 127.4, 127.4, 122.1, 113.9, 48.4.
3ja		**N-benzyl-3-fluoroaniline (3ja):** Yellow oil (0.195g, 97% yield); **^{1}H-NMR**: (400 MHz, CDCl3, 25°C, TMS) δ 7.25-7.33 (m,5H), 7.03-7.08 (m, 1H), 6.3-6.53 (m, 2H), 6.28 (d, J=8.5 Hz, 1H), 4.26 (s, 2H), 4.10 (br, 1H). 13C-NMR (100 MHz, CDCl3) δ 164.2 (d, J=200 Hz), 150.0 (d, J=10.5 Hz), 138.9, 130.3 (d, J=10.5 Hz),128.8, 127.6, 127.5, 108.8, 104.0 (d, J=20 Hz), 99.5 (d, J=10.6 Hz), 48.2.

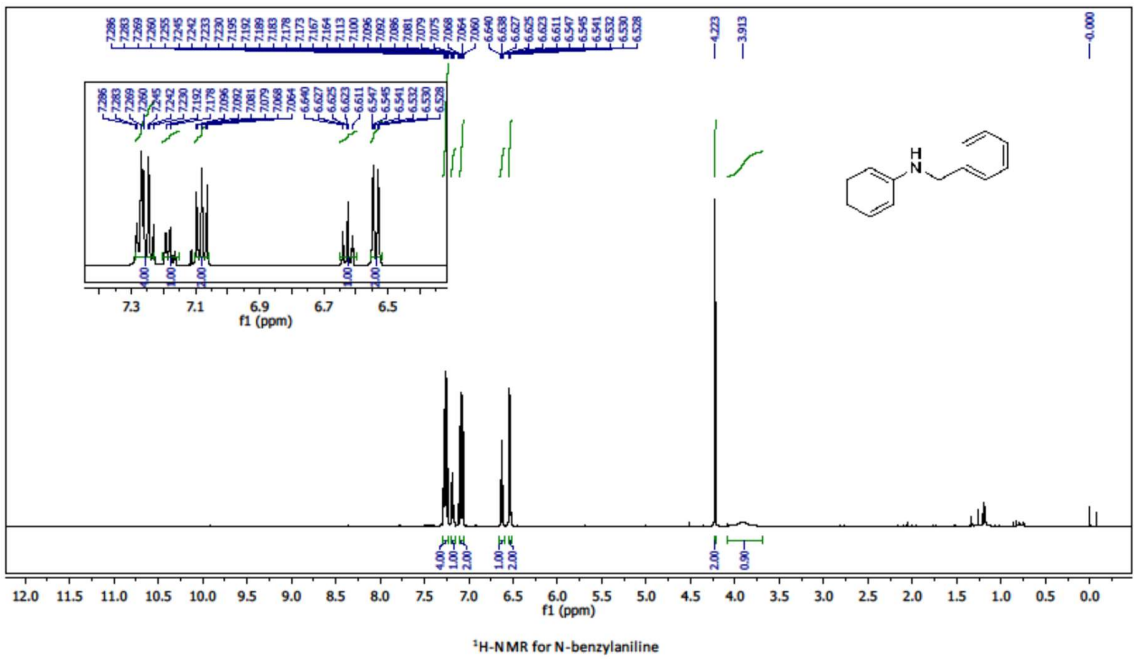
3ka		**N-benzyl-2,3-dichloroaniline (3ka):** Yellow oil (O.242g, 97% yield); **^{1}H-NMR**: (500 MHz, CDCl3, 25°C, TMS) δ 7.28-7.36 (m, 5H), 6.79 (t, J=7.5 Hz, 1H), 6.51 (d, J=1.5 Hz, 1H), 6.49 (d, J=1.5 Hz, 1H), 4.89 (br, 1H), 4.38 (d, J=5.5 Hz, 2H). ^{13}C NMR (126 MHz, $CDCl_3$) δ 145.3, 138.3, 132.9, 128.9, 127.8, 127.6, 127.3, 118.2, 117.2, 109.4, 48.0.
3la		**N-benzyl-2,4-dichloroaniline (3la):** Yellow oil (0.227g, 91% yield); **^{1}H-NMR**: (500 MHz, CDCl3, 25°C, TMS) δ 7.25-7.37 (m, 6H), 7.02-7.04 (m, 1H), 6.51 (d, J=9 Hz, 1H), 4.72 (br,1H), 4.37 (s, 1H). ^{13}C NMR (126 MHz, $CDCl_3$) δ 142.6, 138.3, 128.8, 128.7, 127.8, 127.5, 127.2, 121.4, 119.4, 112.1, 47.9.
3ma		**N-benzylpyridin-2-amine (3ma):**Colour less crystal (0.178g, 97% yield); **^{1}H-NMR**: (500 MHz, CDCl3, 25°C, TMS) δ 8.10-8.11 (m, 1H), 7.32-7.40 (m, 5H), 7.21-7.39 (m, 1H), 6.58-6.60 (m, 1H), 6.37(d, J=7.3Hz, 1H), 4.84 (br, 1H), 4.50 (d, J=6.1 Hz, 2H). ^{13}C NMR (126 MHz, $CDCl_3$) δ 158.6, 148.2, 139.2, 137.5, 128.6, 127.4, 127.3, 113.2, 106.8, 46.3.
3na		**N-benzylpyrimidin-2-amine (3na):**Colour less crystal (0.179g, 97% yield); **^{1}H-NMR**: (500 MHz, CDCl3, 25°C, TMS) δ 8.25 (d, J=3.5 Hz, 2H), 7.25-7.36 (m, 5H), 6.53 (t, J=7.0 Hz, 1H), 5.68 (br, 1H), 4.64 (d, J=6.0Hz, 2H). ^{13}C NMR (126 MHz, $CDCl_3$) δ 162.3, 158.1, 139.1, 128.6, 127.5, 127.2, 110.8, 45.4.
3oa		**N-benzylpyrazin-2-amine (3oa):**Colour less crystal (0.178g, 96% yield); **^{1}H-NMR**: (500 MHz, CDCl3, 25°C, TMS) δ 7.97-7.98 (m, 1H), 7.80 (d, J=1.5 Hz, 1H), 7.85 (d, J=2.5 Hz, 1H), 7.29-7.34 (m, 4H), 7.25-7.28 (m, 1H), 5.06 (br, 1H), 4.55 (d, J=6.1 Hz, 2H). ^{13}C NMR (126 MHz, $CDCl_3$) δ 154.5, 142.0, 138.5, 133.1, 132.1, 128.8, 127.6, 127.6, 45.6.
3pa		**N-benzylbenzo[d][1,3]dioxol-5-amine (3pa):** Black solid (0.195g, 86% yield); **^{1}H-NMR**: (500 MHz, CDCl3, 25°C, TMS) δ 7.14-7.25 (m, 5H), 6.53 (d, J=8.3Hz, 1H), 6.14 (d, J=2.3Hz, 1H), 5.93-5..96 (m, 1H), 5.70 (s, 2H), 4.13 (s, 2H), 3.70 (br, 1H). ^{13}C NMR (126 MHz, $CDCl_3$) δ 148.3, 143.9, 139.7, 139.4, 128.6, 127.5, 127.3, 108.6, 104.4, 100.6, 96.0, 49.3.

3ab		**N-(4-methoxybenzyl)aniline (3ac):** Brown oil (0.200g, 94% yield); **^{1}H-NMR**: (500 MHz, CDCl3, 25°C, TMS) δ 7.20-7.22 (m, 2H), 7.08-7.11 (m, 2H), 6.79-6.65 (m, 2H), 6.62 -6.65 (m, 1H), 6.52-6.57 (m, 2H) 4.18 (s, 2H) 3.73 (s, 3H). ^{13}C NMR (126 MHz, $CDCl_3$) δ 158.9, 148.2, 131.4, 129.3, 128.8, 117.5, 114.0, 112.9, 55.3, 47.8.
3ac		**N-(4-(methylthio)benzyl)aniline (3ad):** Yellow oil (0.219g, 95% yield); **^{1}H-NMR**: (500 MHz, CDCl3, 25°C, TMS) δ 7.03-7.16 (m, 6H), 6.60 (t, J=7.5 Hz, 1H), 6.48 (d, J=8.2Hz, 2H), 4.13 (s, 2H), 3.80 (br, 1H), 2.33 (s, 3H). ^{13}C NMR (126 MHz, $CDCl_3$) δ 148.1, 137.2, 136.5, 129.4, 128.1, 127.0, 117.7, 113.0, 47.9, 16.1.
3ad		**N-(3-phenoxybenzyl)aniline (3ae):** White crystals (0.231g, 84% yield); **^{1}H-NMR**: (500 MHz, CDCl3, 25°C, TMS) δ 7.24 – 7.31 (m, 3H), 7.12 – 7.15 (m, 2H), 7.05 – 7.08 (m, 2H), 6.96 – 6.98 (m, 3H), 6.87 – 6.89 (m, 1H), 6.69 (tt, *J* = 7.4, 1.0 Hz, 1H), 6.56 – 6.68 (m, 2H), 4.26 (s, 2H), 4.00 (br, 1 H). ^{13}C NMR (126 MHz, $CDCl_3$) δ 157.5, 157.0, 147.8, 141.6, 129.9, 129.7, 129.2, 123.2, 122.1, 118.9, 117.7, 117.6, 117.4, 112.8, 47.9.
3ae		**N-(2-methylbenzyl)aniline (3af):** Yellow oil (0.189g, 96% yield); **^{1}H-NMR**: (500 MHz, CDCl3, 25°C, TMS) δ 7.26 (d, J=7.3 Hz, 1H), 7.10-7.13 (m, 5H), 6.65 (t, J=7.5 Hz, 1H), 6.57 (d, J=7.8 Hz, 2H), 4.19 (s, 2H), 2.29 (s, 3H). ^{13}C NMR (126 MHz, $CDCl_3$) δ 148.2, 136.9, 136.4, 130.4, 129.3, 128.3, 127.5, 126.2, 117.6, 112.8, 46.5, 19.0.
3af		**N-(3-methylbenzyl)aniline (3ag):** Yellow oil (0.189g, 96% yield); **^{1}H-NMR**: (500 MHz, CDCl3, 25°C, TMS) δ 7.21-7.24 (m, 1H), 7.20 – 7.13 (m, 4H), 7.09 (d, *J* = 7.4 Hz, 1H), 6.71 (t, *J* = 7.3 Hz, 1H), 6.64 (d, *J* = 7.8 Hz, 2H), 4.28 (s, 2H), 4.05 (br, 1H), 2.35 (s, 3H). ^{13}C NMR (126 MHz, $CDCl_3$) δ 148.2, 139.4, 138.3, 129.3, 128.6, 128.3, 128.0, 124.6, 117.6, 112.9, 48.4, 21.5.
3ag		**N-(4-methylbenzyl)aniline (3ah):** Yellow oil (0.191g, 97% yield); **^{1}H-NMR**: (500 MHz, CDCl3, 25°C, TMS) δ 7.18 (d, J=8.1Hz, 2H), 7.06-7.11 (m, 4H), 6.63 (t, J=7.3 Hz, 1H), 6.56 (d, J=8.3Hz, 2H), 4.20 (s, 2H), 2.26 (S, 3H).

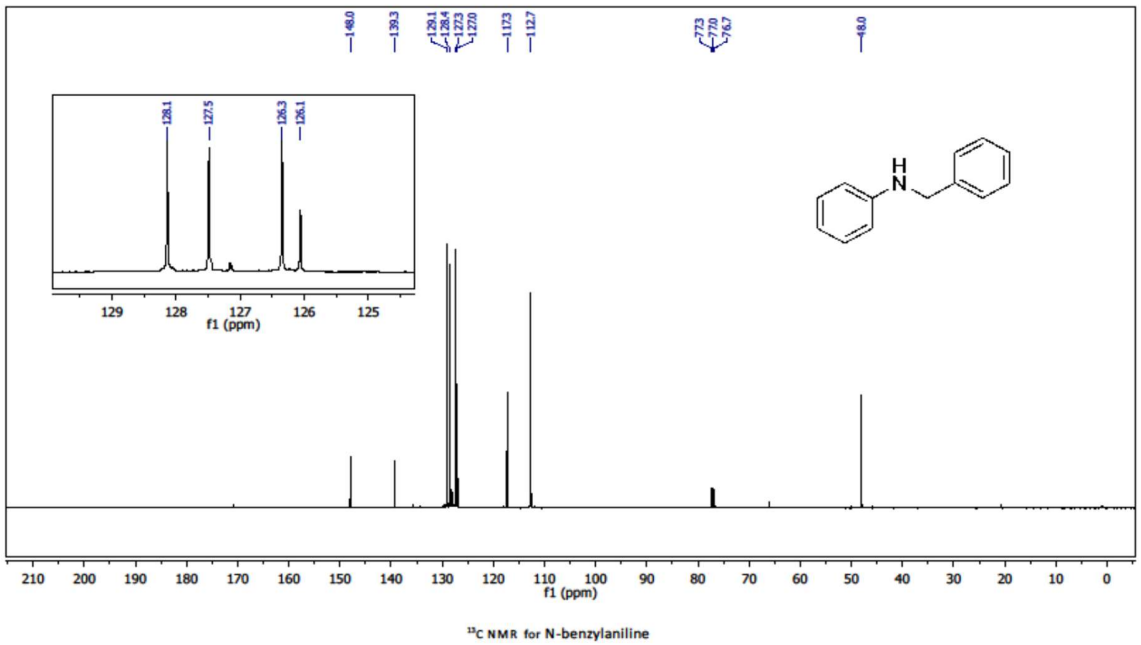
		^{13}C NMR (126 MHz, $CDCl_3$) δ 148.2, 136.9, 136.3, 129.3, 129.3, 127.5, 117.6, 112.9, 48.1, 21.1.
3ah		**N-(pyridin-4-ylmethyl)aniline (3ai):**Colour less crystal (0.178g, 97% yield); **^{1}H-NMR**: (500 MHz, CDCl3, 25°C, TMS) δ 8.49 (d, J=4.9Hz, 2H), 7.22 (d, J=4.9 Hz, 2H), 7.06-7.11 (m, 2H), 6.66 (t, J=7.3Hz, 1H), 6.50 (d, J=8.4Hz, 2H), 4.29 (s, 2H), 4.16 (br, 1H). ^{13}C NMR (126 MHz, $CDCl_3$) δ 149.9, 149.1, 147.4, 129.4, 122.2, 118.1, 112.9, 47.1.
3ai		**N-(3-chlorobenzyl)aniline (3aj):** Brown oil (0.201g, 93% yield); **^{1}H-NMR**: (500 MHz, CDCl3, 25°C, TMS) δ 7.26 (s, 1H), 7.08-7.14 (m, 3H), 7.05-7.07 (m, 2H), 6.63 (t, J=7.5 Hz, 1H), 6.50 (d, J=8.0 Hz, 2H), 4.19 (s, 2H), 3.95 (br, 1H). ^{13}C NMR (126 MHz, $CDCl_3$) δ 147.8, 141.8, 134.6, 130.0, 129.4, 127.5, 127.4, 125.5, 117.9, 113.0, 47.8.
3aj		**N-octylaniline(3ak):**Color less oil(0.071g, 86% yield); **^{1}H-NMR**: (500 MHz, CDCl3, 25°C, TMS) δ 7.05-7-09 (m, 2H), 6.49-6.60 (m, 3H), 3.45 (br, 1H), 2.99 (t, J=7.5 Hz, 2H), 1.48-1.54 (m, 2H), 1.18-1.24 (m, 10H), 0.81 (t, J=7.7 Hz, 3H). ^{13}C NMR (126 MHz, $CDCl_3$) δ 148.5, 129.1, 117.0, 112.6, 43.9, 31.8, 29.5, 29.4, 29.2, 27.1, 22.6, 14.0.
6aa		**1,3-diphenylpropan-1-one (6aa):** Colorless oil (0.203 g, 97% yield); ^{1}H NMR (500 MHz, $CDCl_3$, 25 °C, TMS) δ 7.93 (d, *J* = 7.2 Hz, 1H), 7.51 (t, *J* = 7.4 Hz, 1H), 7.41 (t, *J* = 7.7 Hz, 1H), 7.31 – 7.16 (m, 3H), 3.26 (t, *J* = 7.7 Hz, 1H), 3.05 (t, *J* = 7.7 Hz, 1H). ^{13}C NMR (126 MHz, $CDCl_3$) δ 199.42, 141.49, 137.07, 133.24, 128.79, 128.72, 128.62, 128.23, 126.32, 40.64, 30.33.
6ba		**3-phenyl-1-(p-tolyl)propan-1-one (6ba):** Yellow oil (0.204 g, 91% yield); ^{1}H NMR (500 MHz, $CDCl_3$, 25 °C, TMS) δ 7.86 (d, *J* = 8.2 Hz, 2H), 7.35 – 7.13 (m, 7H), 3.24 (t, J= 7.7Hz, 2H), 3.05 (t, J= 7.8Hz, 2H), 2.40 (s, 3H). ^{13}C NMR (126 MHz, $CDCl_3$) δ 199.09, 144.01, 141.56, 134.53, 129.44, 128.67, 128.59, 128.33, 126.26, 40.51, 30.37, 21.80.
6ca		**1-(4-ethylphenyl)-3-phenylpropan-1-one (6ca):** Yellow oil (0.207 g, 87% yield); ^{1}H NMR (500 MHz, $CDCl_3$, 25 °C, TMS) δ 7.81 (dd, *J* = 8.1, 1.3 Hz, 2H), 7.25 – 7.16 (m, 6H), 7.16 – 7.09 (m, 1H), 3.20 (t, J= 7.6Hz, 2H), 2.98 (t, *J* = 7.7 Hz, 2H), 2.62 (q, *J* = 7.6 Hz, 2H), 1.18 (t, *J* = 7.6 Hz, 3H). ^{13}C NMR (126 MHz, $CDCl_3$) δ 198.95,

		150.04, 141.43, 134.62, 128.53, 128.44, 128.29, 128.12, 126.11, 40.38, 30.23, 28.94, 15.21.
6da		**1-(4-isobutylphenyl)-3-phenylpropan-1-one (6da):** Yellow oil (0.240 g, 90% yield); ^{1}H-NMR (500 MHz, $CDCl_3$, 25°C, TMS) δ 7.86-7.88 (m, 2H), 7.18-7.30 (m, 7H), 3.27 (t, J= 7.8Hz, 2H), 3.05 (t, J= 7.6Hz, 2H), 2.52 (d, J= 7.2Hz, 2H), 1.85-1.93 (m, 1H), 0.91 (s, 3H), 0.89 (s, 3H). ^{13}C NMR (126 MHz, $CDCl_3$) δ 199.14, 147.74, 141.61, 134.84, 129.50, 128.69, 128.62, 128.22, 126.27, 45.56, 40.54, 30.40, 30.29, 22.51. HRMS for $C_{19}H_{22}O$ [M+H] Calculated: 267.1750, Found: 267.1745.
6ea		**1-(2,5-dimethyl phenyl)-3-phenylpropan-1-one (6ea):** Yellow oil (0.197 g, 83% yield); ^{1}H NMR (500 MHz, $CDCl_3$, 25°C, TMS) δ 7.29 (s, 1H), 7.00-7.20 (m, 7H), 3.11 (t, J=7.5Hz, 2H), 2.94 (t, J= 7.6Hz, 2H), 2.32 (s, 3H), 2.22 (s, 3H).^{13}C NMR (126 MHz, $CDCl_3$) δ 203.66, 141.45, 137.98, 135.30, 135.05, 132.11, 132.01, 129.14, 128.66, 128.60, 126.26, 43.40, 30.50, 21.05, 20.92.
6fa		**1-([1,1'-biphenyl]-4-yl)-3-phenylpropan-1-one (6fa):** White solid (0.160g, 56% yield); ^{1}H NMR: (500 MHz, $CDCl_3$, 25°C, TMS) δ 8.01 (d, J=8.5 Hz, 2H), 7.59-7.66 (m, 4H), 7.37- 7.46 (m, 3H), 7.25-7.29 (m, 5H), 3.31 (t, J= 7.8Hz, 2H), 3.08 (t, J= 7.6Hz, 2H). ^{13}C NMR (126 MHz, $CDCl_3$) δ 198.87, 145.78, 141.32, 139.88, 138.70, 135.53, 128.96, 128.66, 128.56, 128.45, 128.24, 127.27, 126.16, 77.28, 77.02, 76.77, 40.52, 30.20.
6ga		**1-(4-methoxyphenyl)-3-phenylpropan-1-one (6ga):** White solid (0.205 g, 86% yield); ^{1}H NMR (500 MHz, $CDCl_3$, 25 °C, TMS) δ 7.92-7.94 (m, 2H), 7.17-7.30 (m, 5H), 6.90-6.92 (m, 2H), 3.83 (s, 3H), 3.23 (t, J=7.7Hz, 2H), 3.04 (t, J=7.8Hz, 2H).^{13}C NMR (126 MHz, $CDCl_3$) δ 198.03, 163.64, 141.67, 130.50, 128.70, 128.62, 126.27, 113.92, 55.65, 40.31, 30.53.
6ha		**1-(4-ethoxyphenyl)-3-phenylpropan-1-one (6ha):** Yellow solid (0.236 g, 93% yield); ^{1}H NMR (500 MHz, $CDCl_3$, 25 °C, TMS) δ 7.89-7.92 (m, 2H), 7.22-7.27 (m, 5H), 6.87-6.89 (m, 2H), 4.04(q, J= 7.5 Hz, 2H), 3.21 (t, J=7.5Hz, 2H), 3.03 (t, J= 7.6 Hz, 2H), 1.41 (t, J= 7.7Hz, 3H).^{13}C NMR (126 MHz, $CDCl_3$) δ 198.02, 163.05, 141.66, 130.48, 129.94, 128.67, 128.60, 126.24, 114.32, 63.91, 40.27, 30.51, 14.84.
6ia		**1-(benzo[d][1,3]dioxol-5-yl)-3-phenyl propan-1-one (6ia):** Yellow oil (0.195 g, 77% yield); ^{1}H NMR (500 MHz, $CDCl_3$, 25 °C, TMS) δ 7.52 (d, J= 7.8Hz, 1H), 7.42 (s, 1H), 7.17-7.29 (m, 5H), 6.8 (d, J= 8.6Hz, 1H), 5.98 (s, 2H), 3.19 (t, J=7.5Hz, 2H), 3.03 (t, J=7.6Hz, 2H). ^{13}C NMR (126 MHz, $CDCl_3$) δ 197.32, 151.73, 148.20,

		141.34, 131.77, 128.53, 128.43, 126.13, 124.26, 107.90, 107.87, 101.84, 40.23, 30.36.
6ab		**1-phenyl-3-(o-tolyl)propan-1-one (6ab):** Yellow oil (0.204 g, 92% yield); ^{1}H NMR (500 MHz, $CDCl_3$, 25 °C, TMS) δ 7.95-7.97 (m, 2H), 7.53-7.57 (m, 1H), 7.43-7.46 (m, 2H), 7.12-7.20 (m, 4H), 3.25 (t, J=7.6Hz, 2H), 3.06 (t, J= 7.5Hz, 2H), 2.35 (s, 3H).^{13}C NMR (126 MHz, $CDCl_3$) δ 199.56, 139.57, 137.04, 136.18, 133.27, 130.53, 128.92, 128.81, 128.23, 126.51, 126.36, 39.30, 27.70, 19.53.
6ac		**1-phenyl-3-(pyridin-4-yl)propan-1-one (6ac):** Brown solid (0.200g, 95% yield); ^{1}H NMR: (500 MHz, $CDCl_3$, 25°C, TMS) δ 8.49 (dd, J=4.4HZ, 1.8Hz, 2H), 7.93-7.95 (m, 2H), 7.53-7.57 (m, 1H), 7.43-7.46 (m, 2H), 7.16-7.18 (m, 2H), 3.31 (t, J=7.4 Hz, 2H), 3.05 (t, 7.5 Hz, 2H). ^{13}C NMR (126 MHz, $CDCl_3$) δ 198.23, 150.42, 149.75, 136.57, 133.35, 128.72, 128.00, 123.94, 77.28, 77.02, 76.77, 38.85, 29.18.
6ad		**3-(4-methoxyphenyl)-1-phenylpropan-1-one (6ad):** Yellow solid (0.232 g, 97% yield); ^{1}H-NMR (500 MHz, $CDCl_3$, 25 °C, TMS) δ 7.92-7.94 (m, 2H), 7.50-7.53 (m, 1H), 7.40-7.43 (m, 2H), 7.13-7.16 (m, 2H), 6.81-6.84 (m, 2H), 3.75 (s, 3H), 3.23 (t, J=7.5Hz, 2H), 2.99 (t, J=7.4Hz, 2H). ^{13}C NMR (126 MHz, $CDCl_3$) δ 199.59, 158.17, 137.08, 133.49, 133.21, 129.53, 128.77, 128.22, 114.12, 55.45, 40.88, 29.46.
9aa		**2-phenylquinoline (9aa):** White solid (0.195 g, 97% yield); ^{1}H-NMR (500 MHz, $CDCl_3$, 25 °C, TMS) δ 8.18 – 8.06 (m, 4H), 7.81 (d, J = 8.6 Hz, 1H), 7.76 (d, J = 8.1 Hz, 1H), 7.67-7.63 (m, 1H), 7.50 – 7.43 (m, 3H), 7.40-7.37 (m, 1H). ^{13}C NMR (126 MHz, $CDCl_3$) δ 157.58, 148.47, 139.88, 136.98, 129.92, 129.85, 129.51, 129.03, 127.77, 127.65, 127.38, 126.48, 119.22.
9ab		**3-methyl-2-phenylquinoline (9ab):** White solid (0.213 g, 97% yield); ^{1}H-NMR (500 MHz, $CDCl_3$, 25 °C, TMS) δ 8.01 (d, J = 8.5 Hz, 1H), 7.81 (s, 1H), 7.59 (d, J = 8.1 Hz, 1H), 7.52-7.48 (m, 1H), 7.46-7.44 (m, 2H), 7.35-7.32 (m, 3H), 7.31 – 7.25 (m, 1H), 2.28 (s, 3H). ^{13}C NMR (126 MHz, $CDCl_3$) δ 160.52, 146.68, 140.92, 136.74, 129.30, 129.16, 128.90, 128.75, 128.32, 128.20, 127.61, 126.74, 126.41, 20.63.

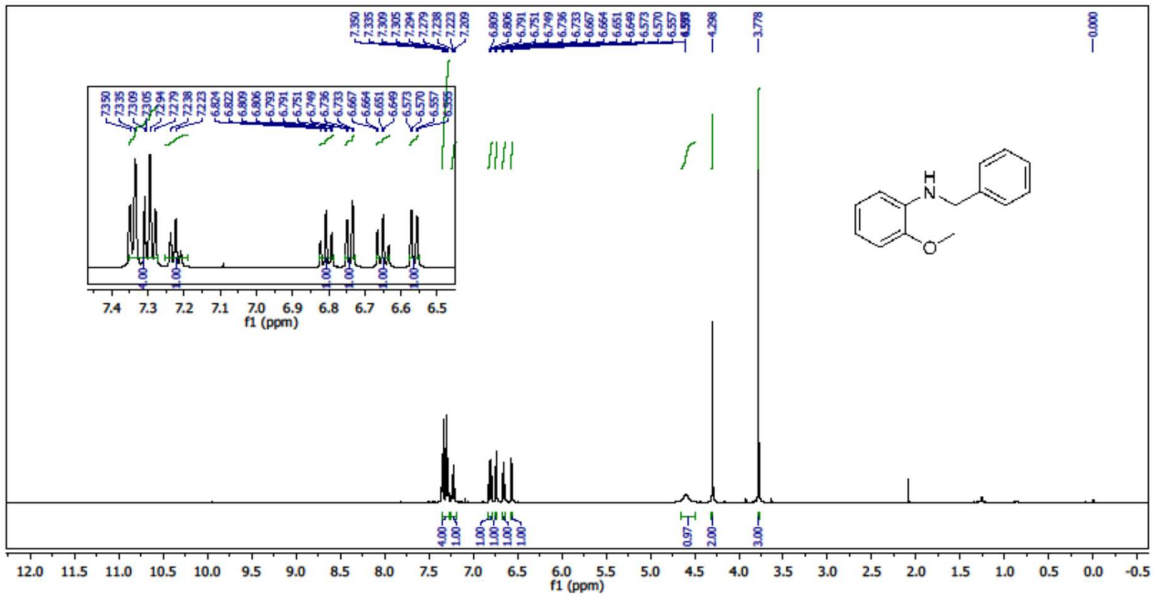


^{1}H-NMR for N-benzylaniline

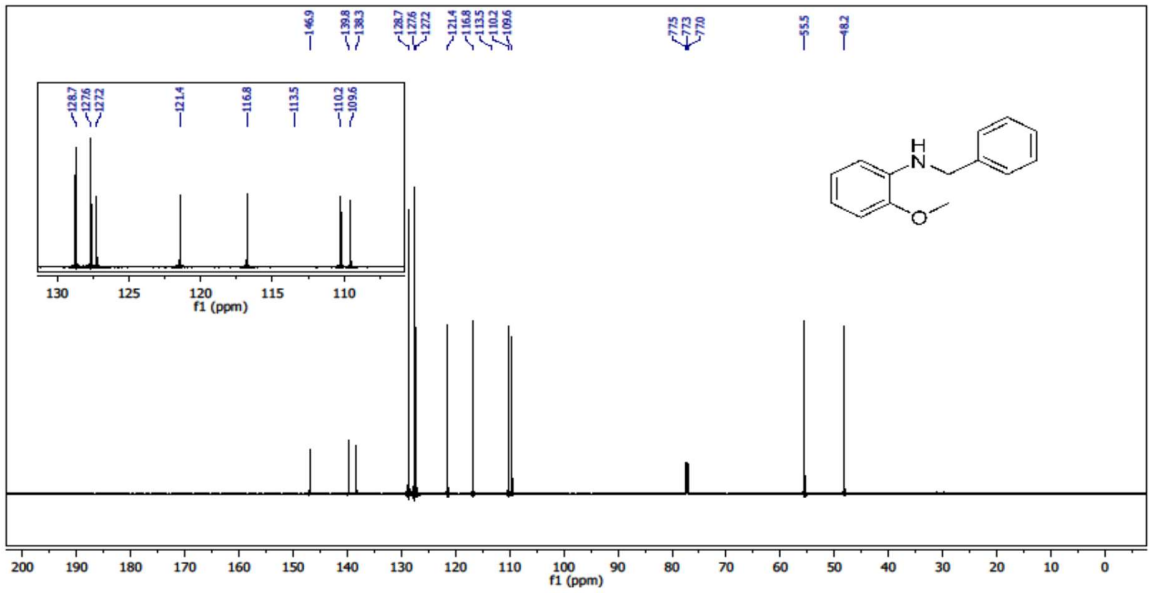


^{13}C NMR for N-benzylaniline

3aa

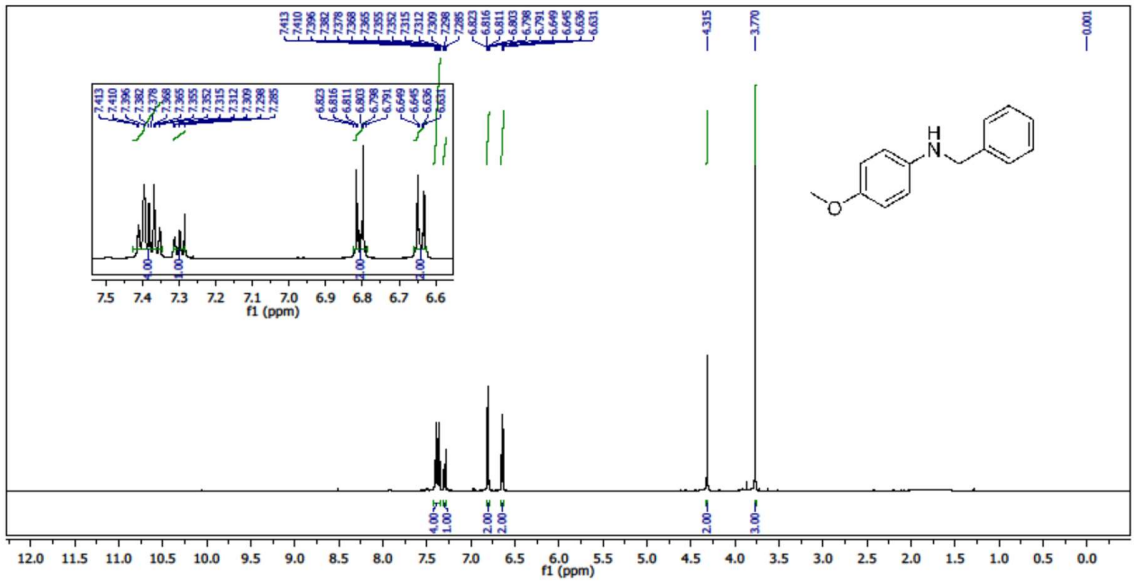


^{1}H-NMR for N-benzyl-2-methoxyaniline

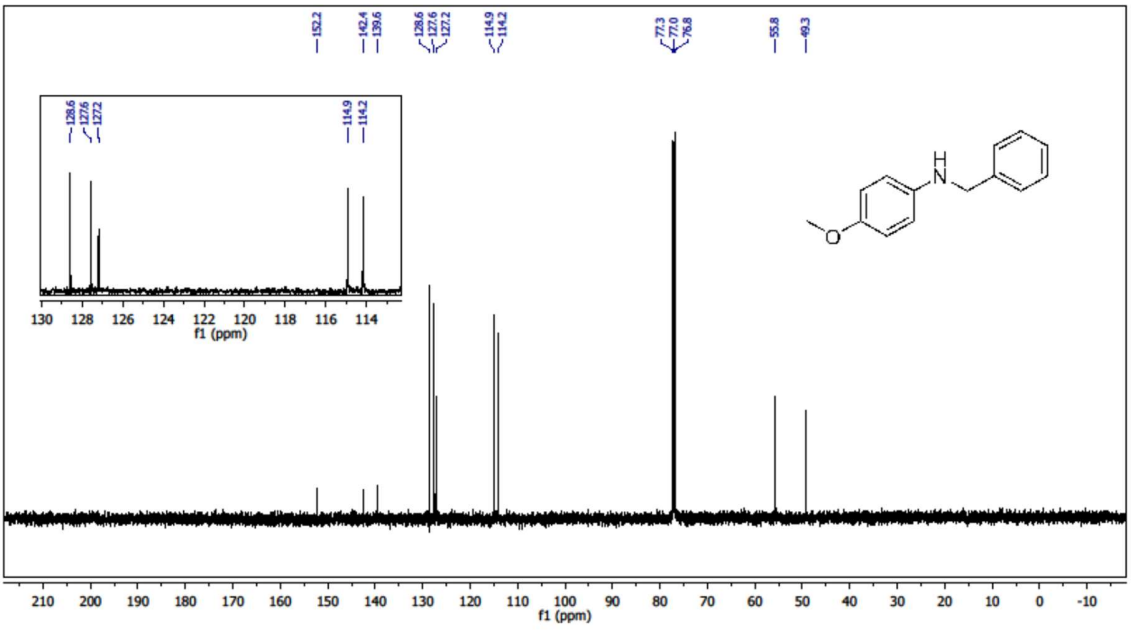


^{13}C NMR for N-benzyl-2-methoxyaniline

3ba



^{1}H-NMR for N-benzyl-4-methoxyaniline



^{13}C NMR for N-benzyl-4-methoxyaniline

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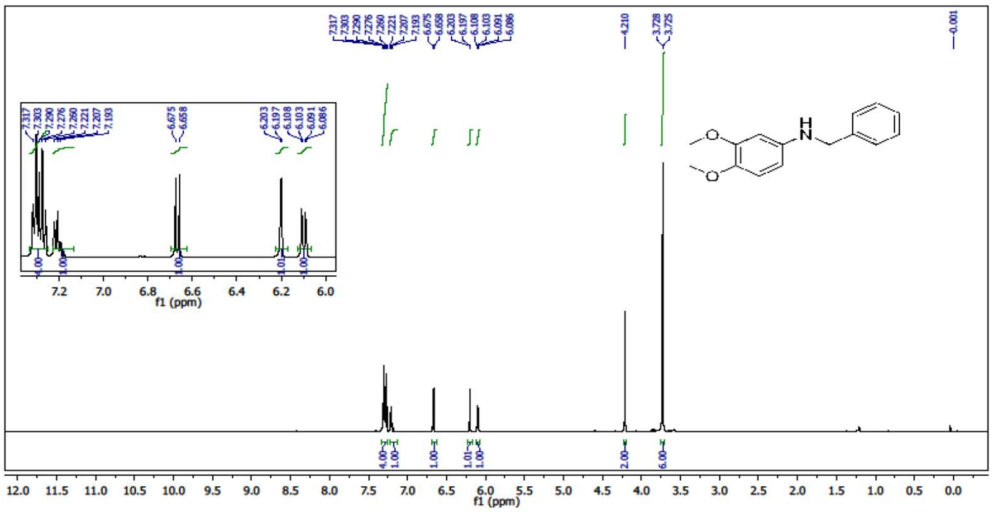
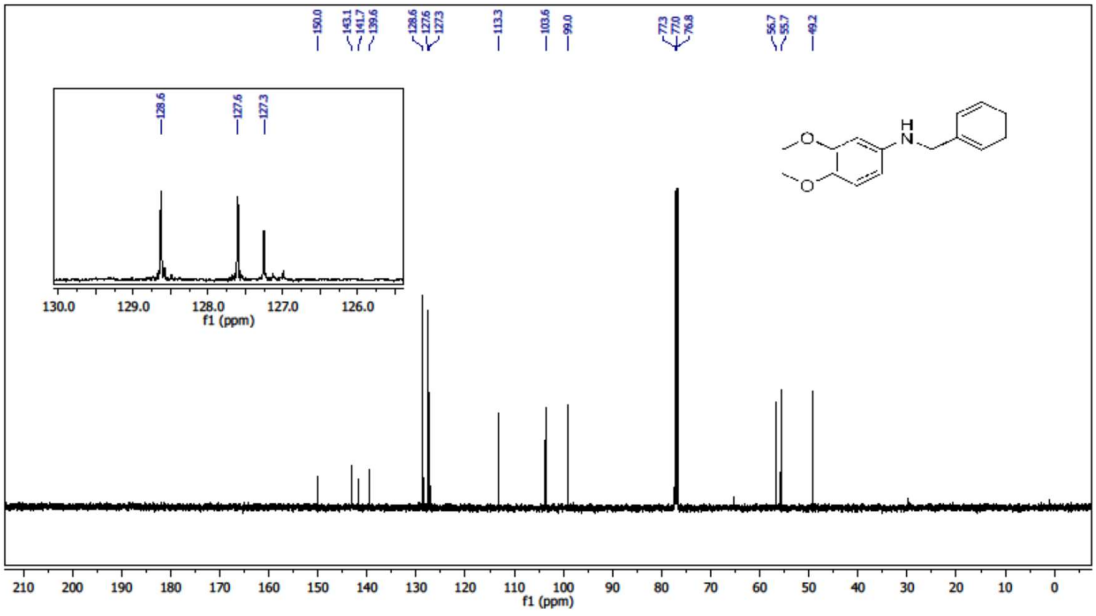


^{1}H-NMR for N-benzyl-3,4-dimethoxyaniline



^{13}C NMR for N-benzyl-3,4-dimethoxyaniline

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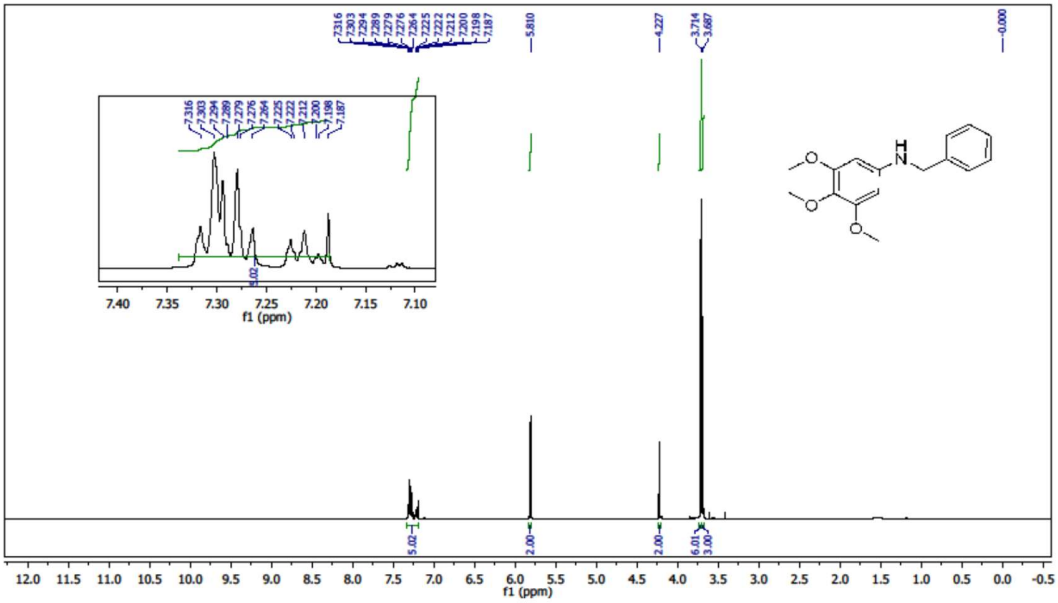
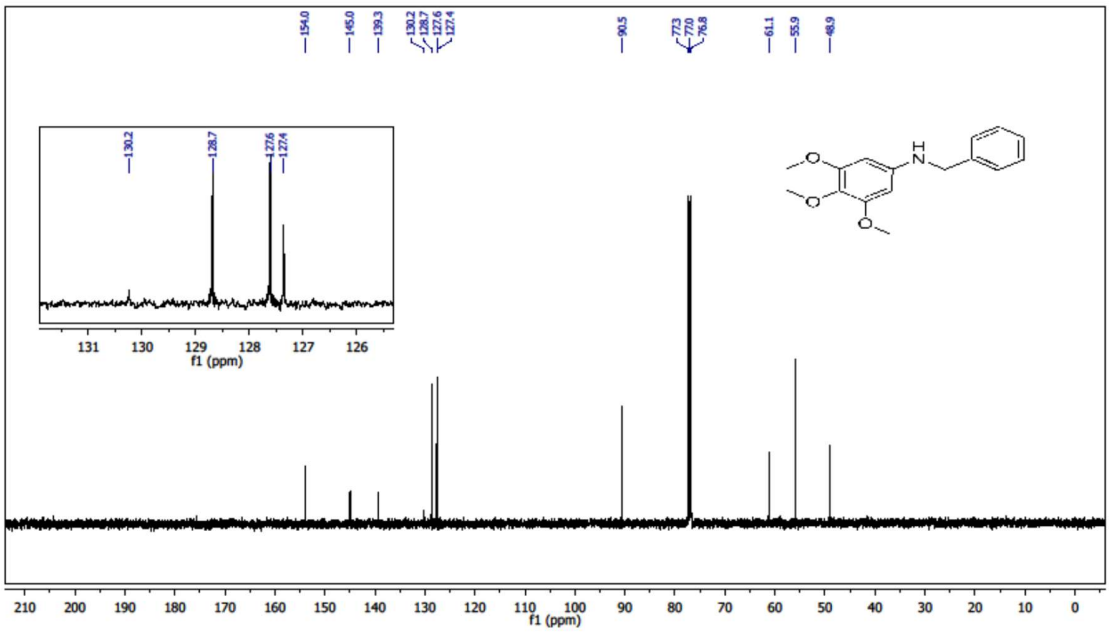
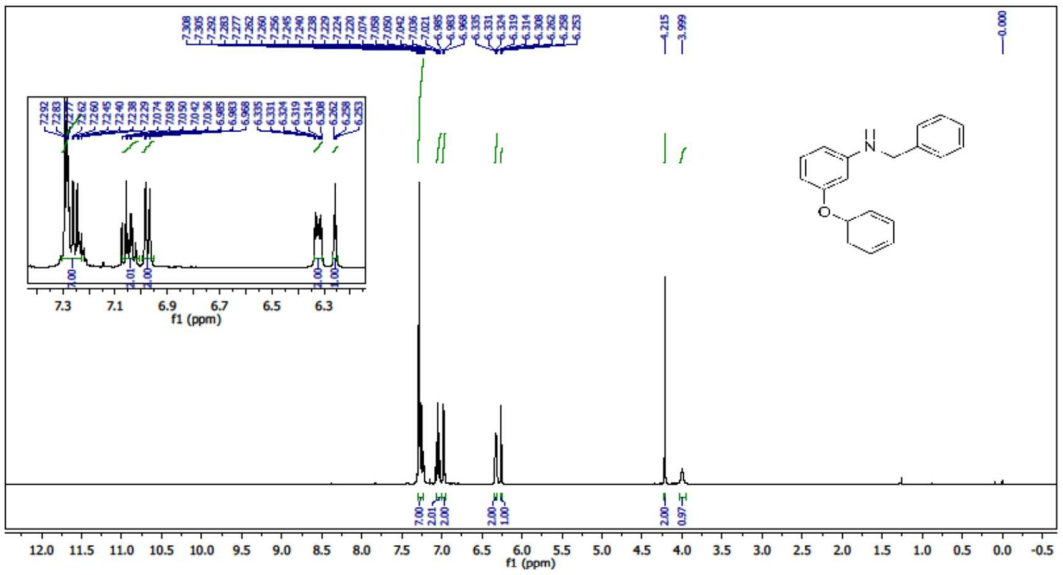


^{1}H-NMR for N-benzyl-3,4,5-trimethoxyaniline

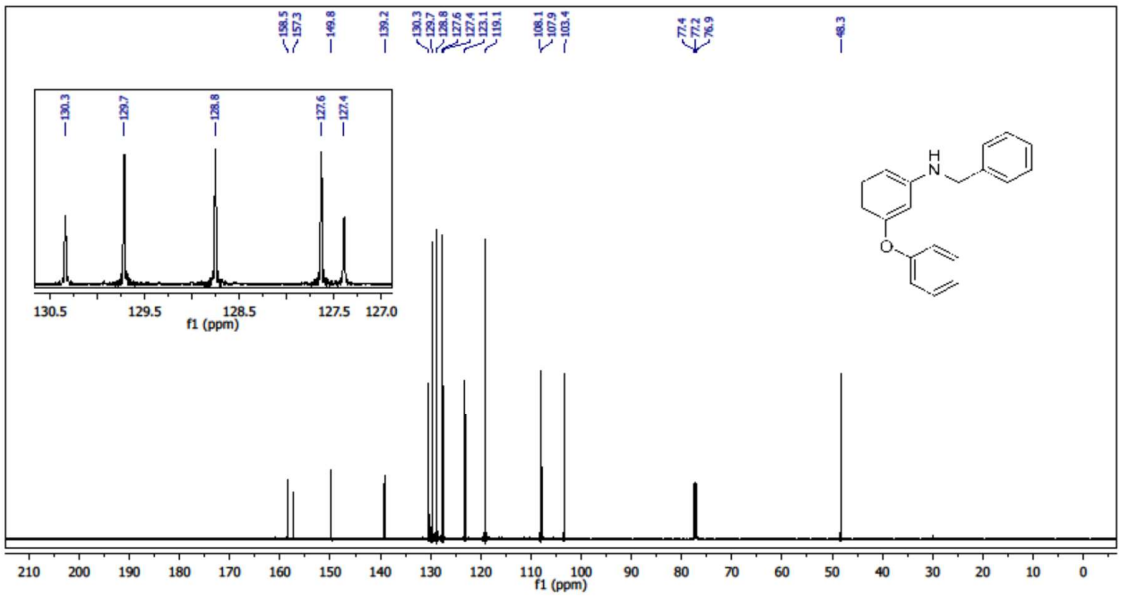


^{13}C NMR for N-benzyl-3,4,5-trimethoxyaniline

3ea



^{1}H-NMR for N-benzyl-3-phenoxyaniline



^{13}C NMR for N-benzyl-3-phenoxyaniline

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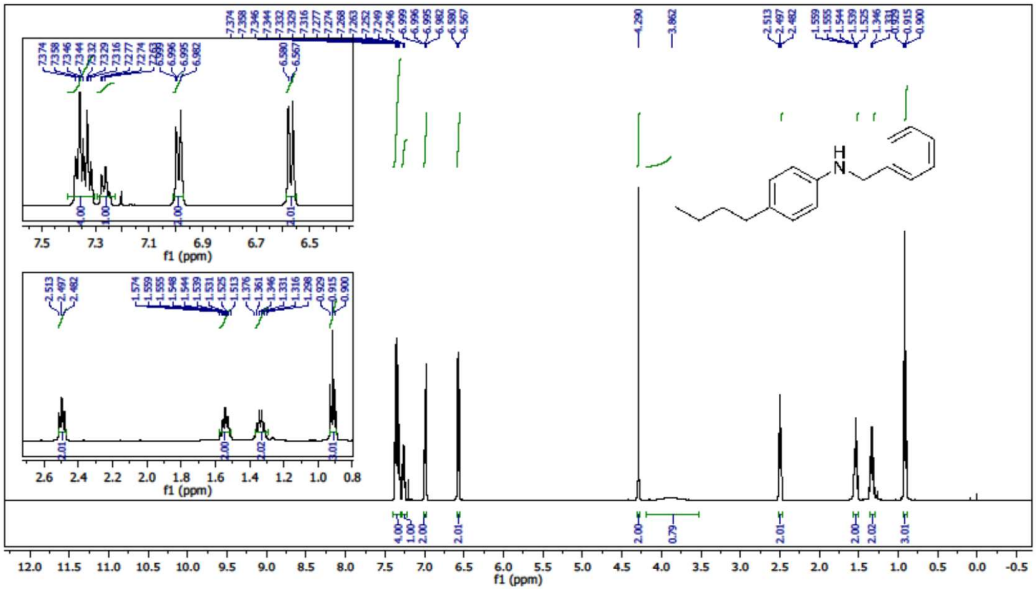
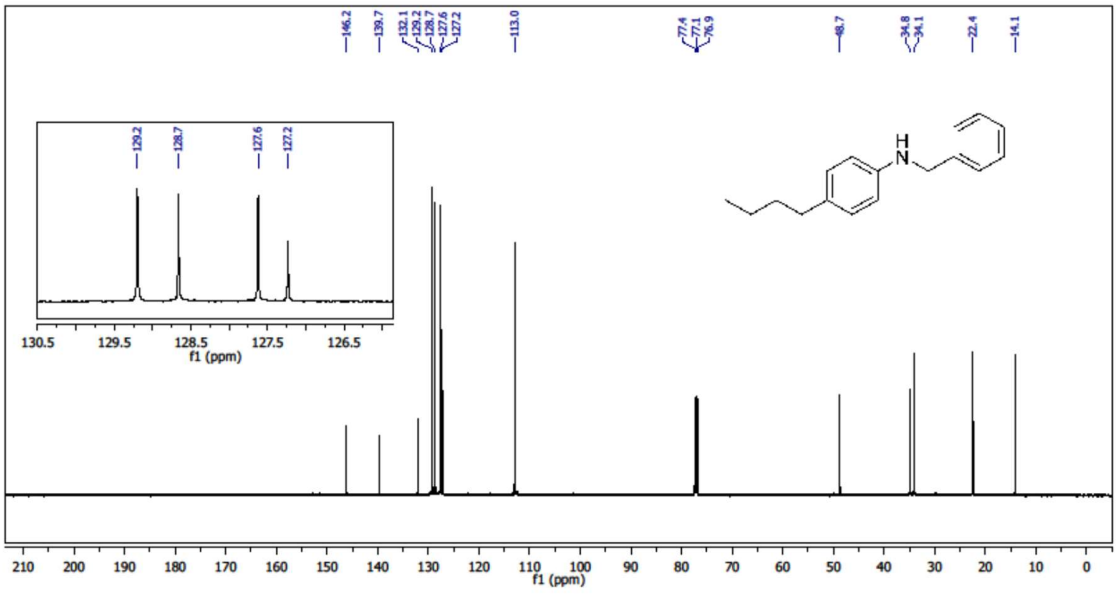
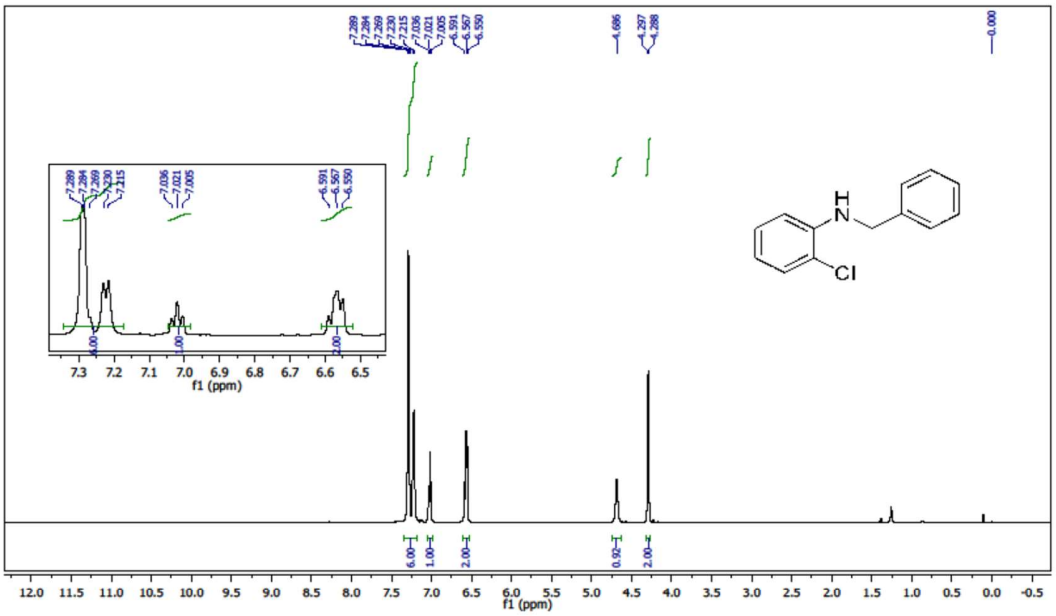


^{1}H-NMR for N-benzyl-4-butylaniline

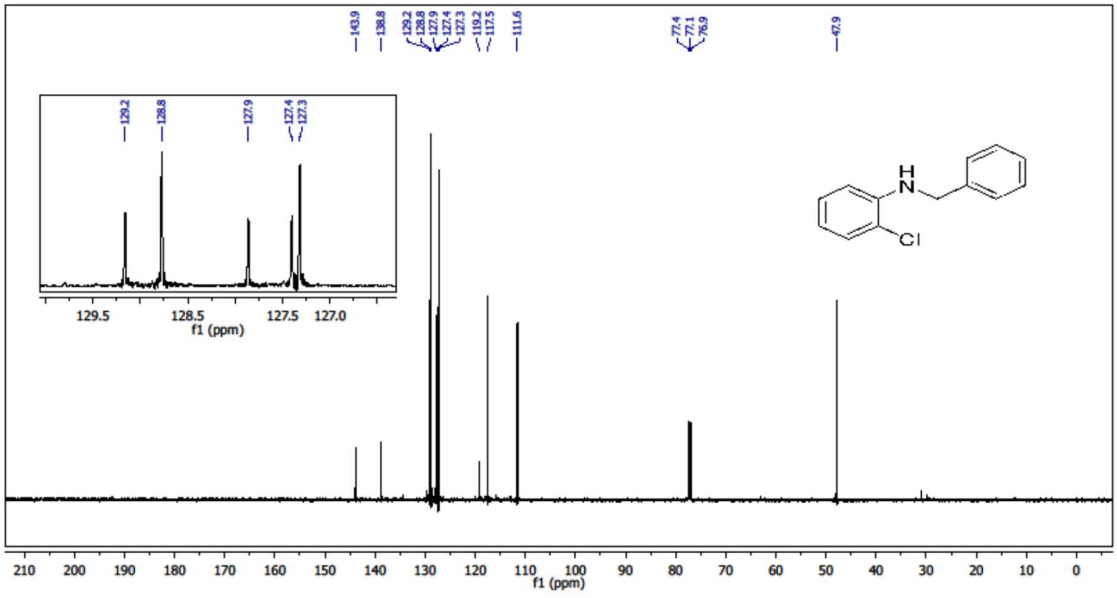


^{1}H-NMR for N-benzyl-4-butylaniline

3ga



^{1}H-NMR for N-benzyl-2-chloroaniline



^{13}C NMR for N-benzyl-2-chloroaniline

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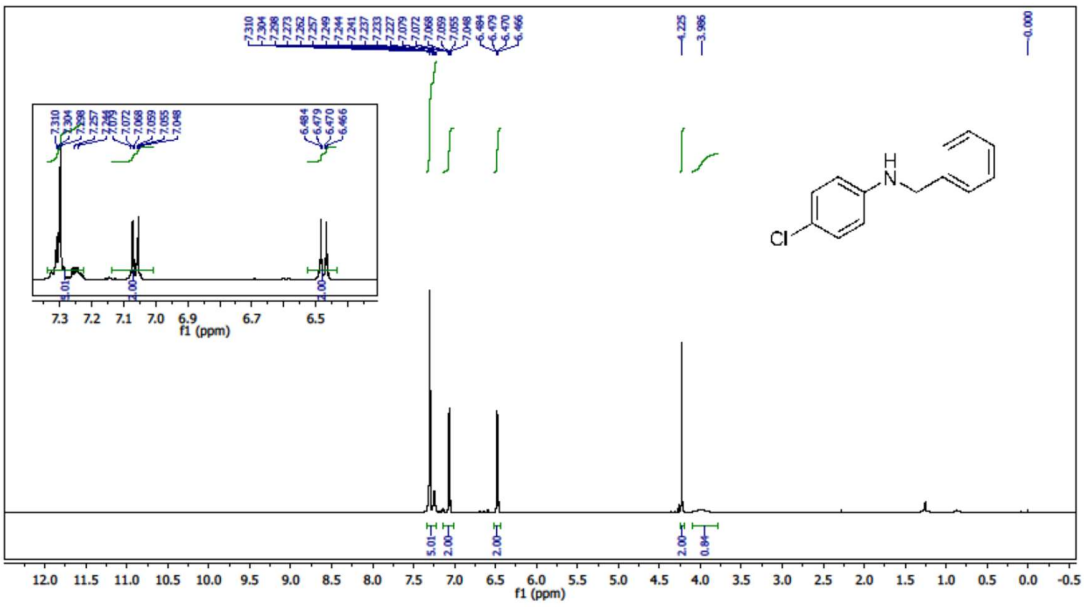
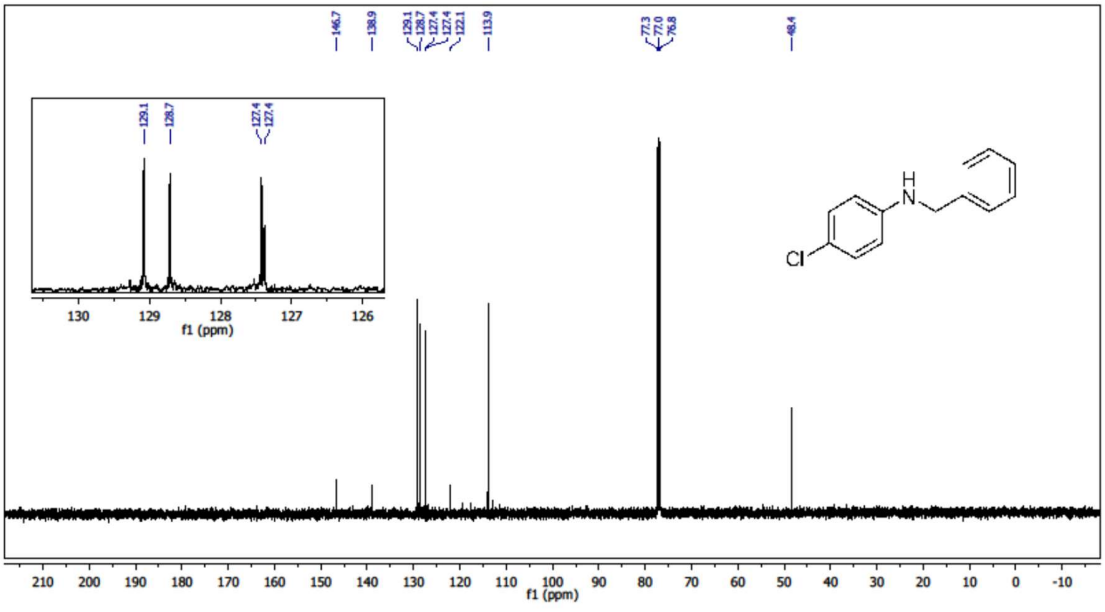


^{1}H-NMR for N-benzyl-4-chloroaniline



^{13}C NMR for N-benzyl-4-chloroaniline

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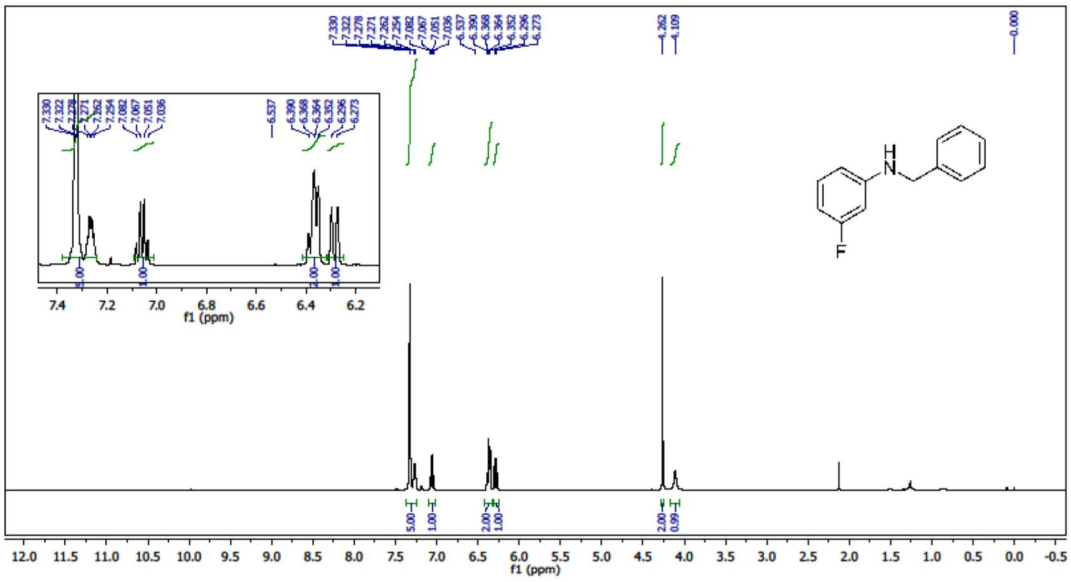
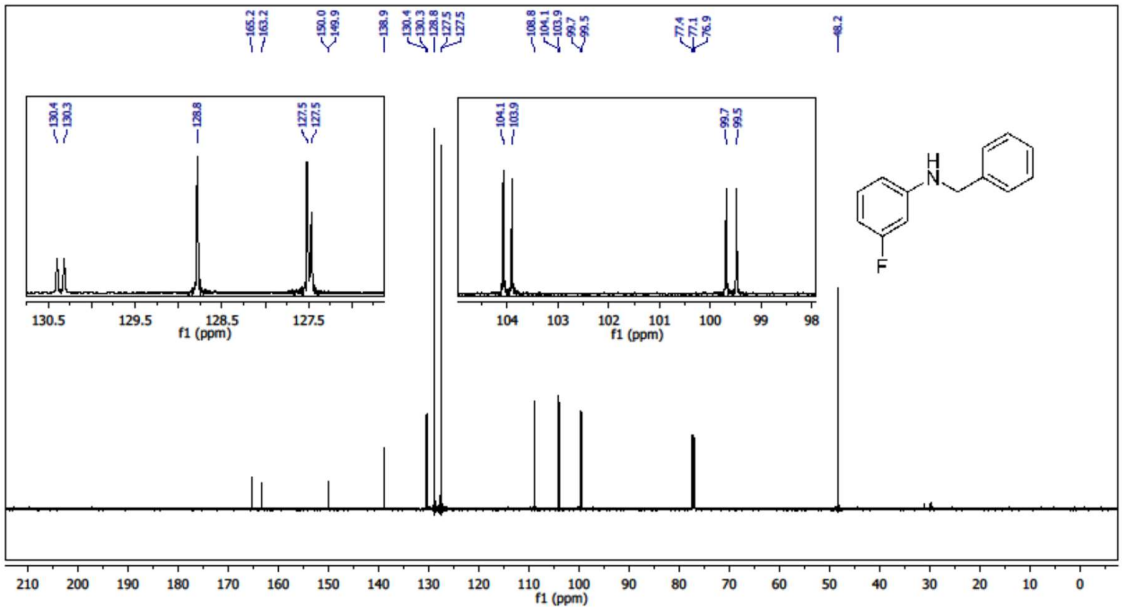


^{1}H-NMR for N-benzyl-3-fluoroaniline



^{13}C NMR for N-benzyl-3-fluoroaniline

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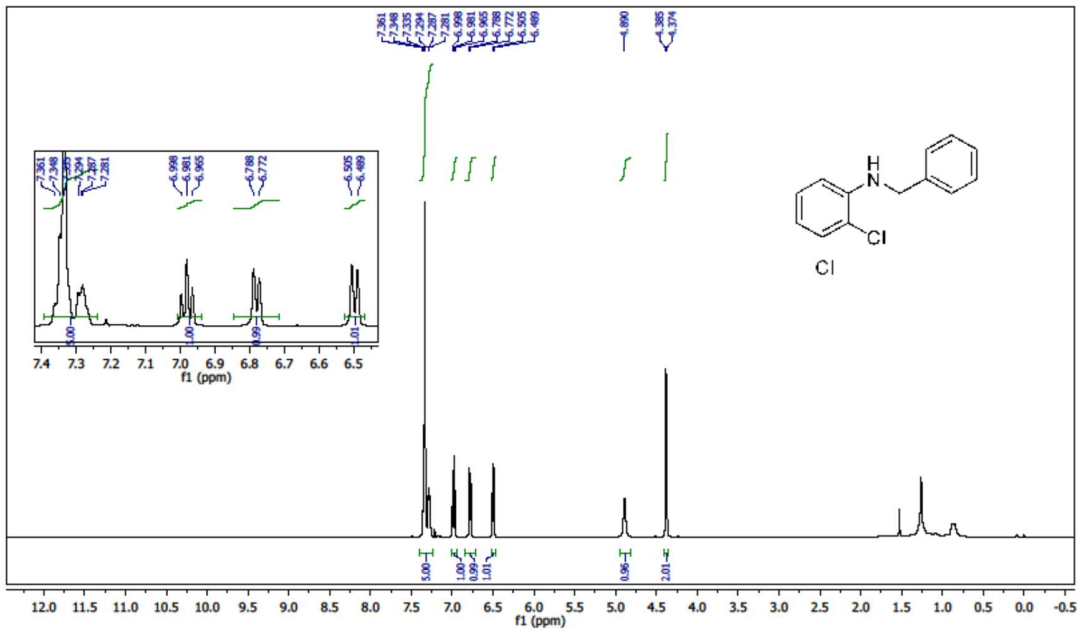
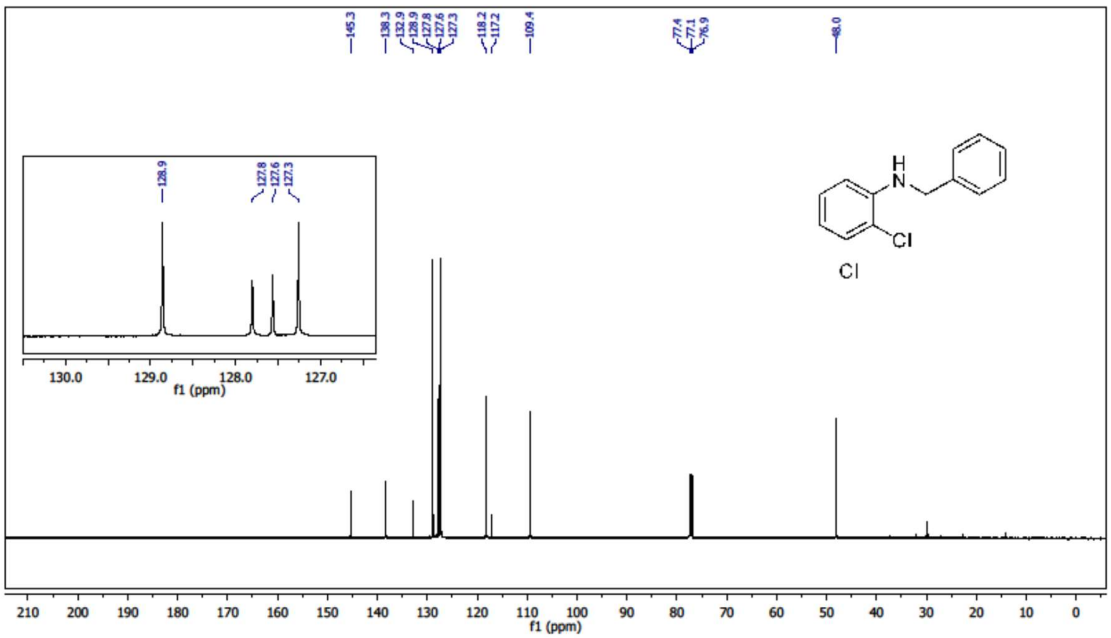


^{1}H-NMR for N-benzyl-2,3-dichloroaniline



^{1}H-NMR for N-benzyl-2,3-dichloroaniline

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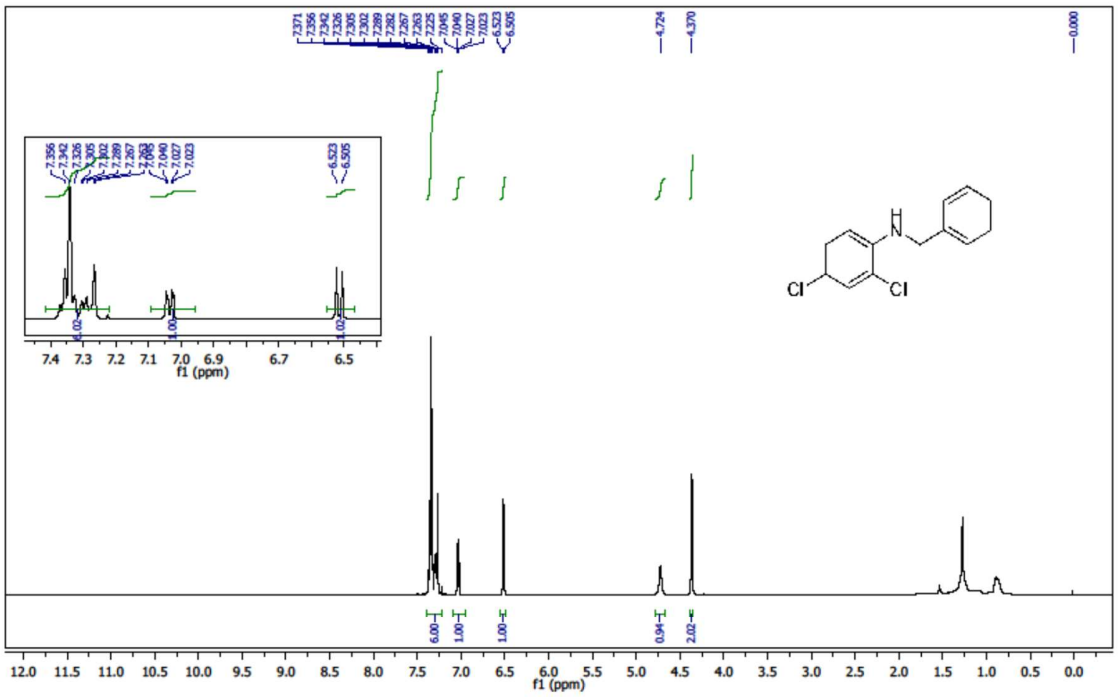
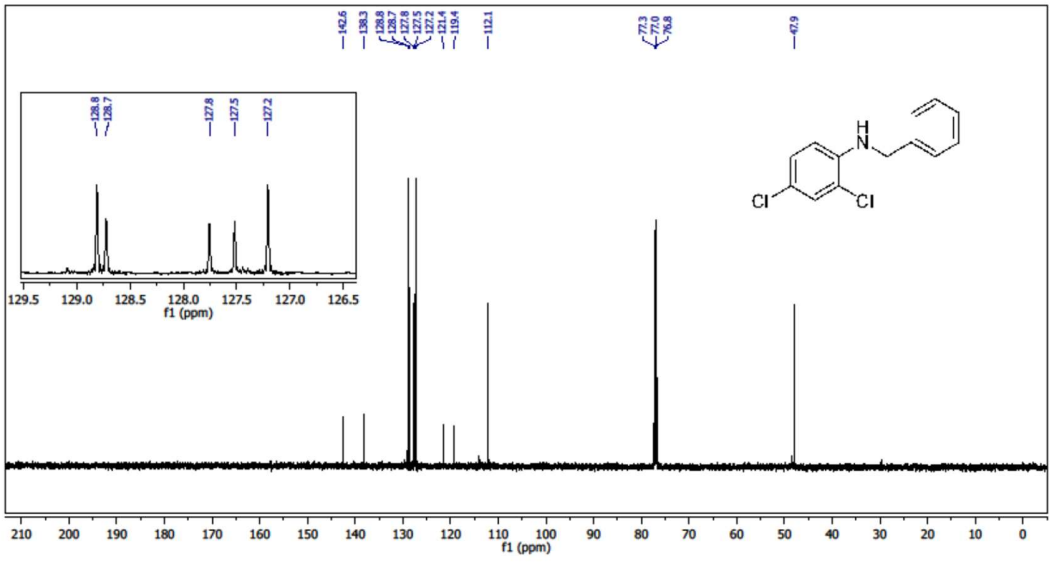
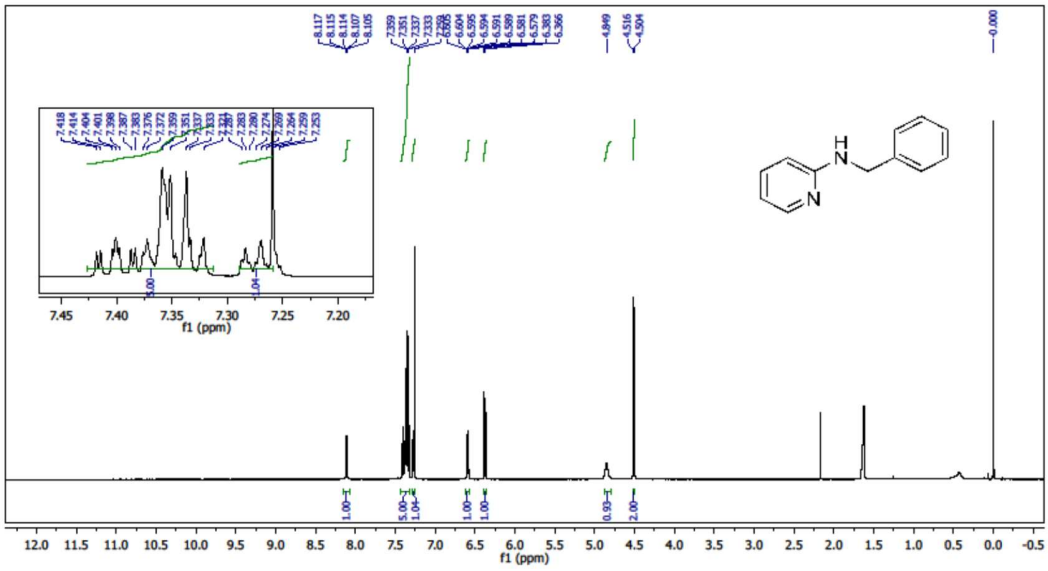


^{1}H-NMR for N-benzyl-2,4-dichloroaniline

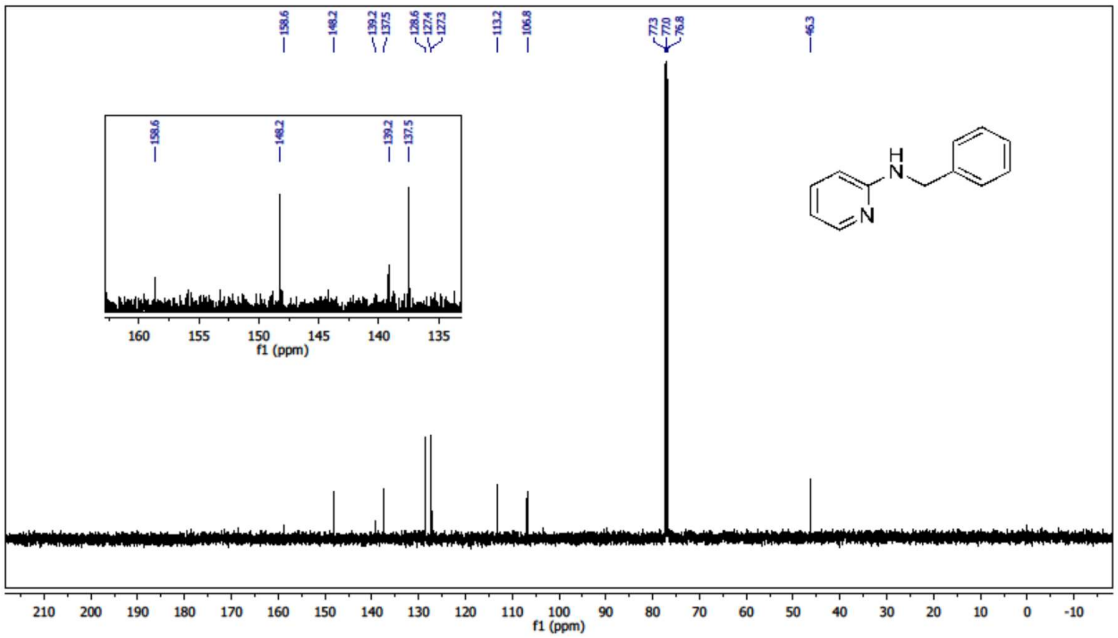


^{13}C NMR for N-benzyl-2,4-dichloroaniline

3la

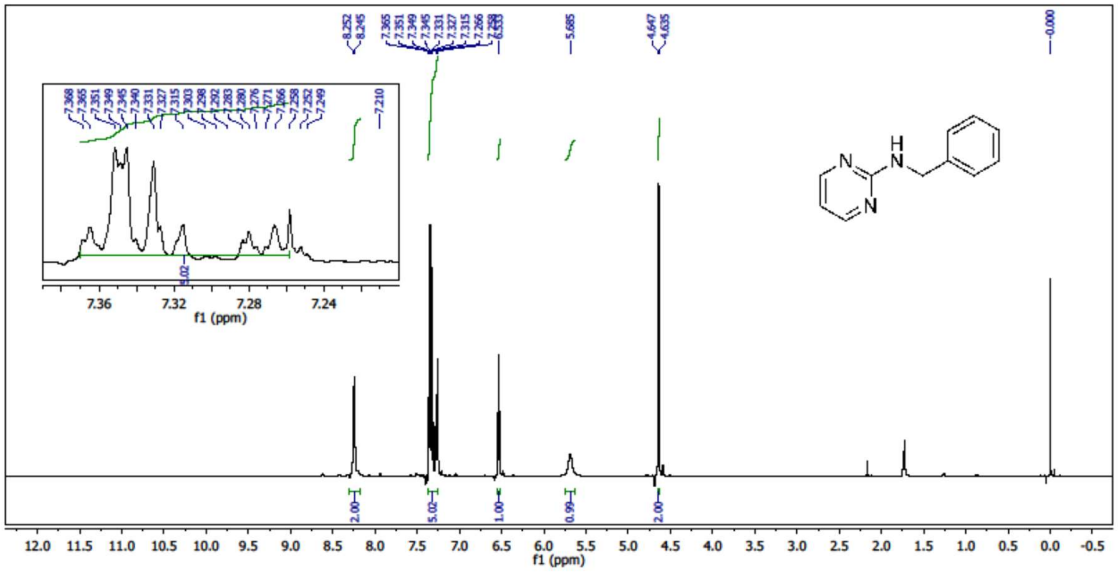


^{1}H-NMR for N-benzylpyridin-2-amine

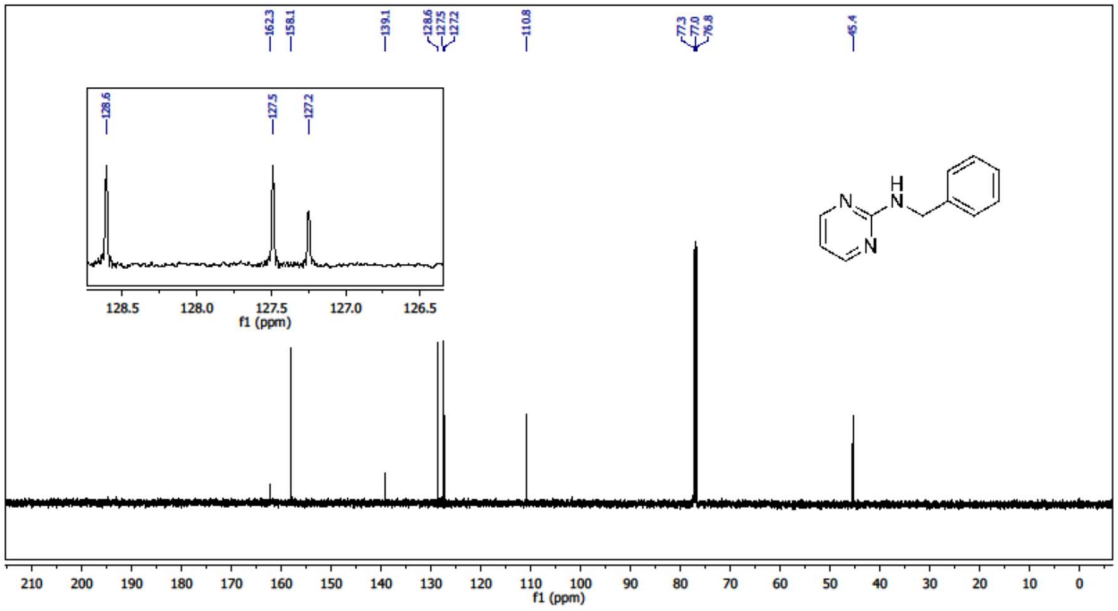


^{13}C NMR for N-benzylpyridin-2-amine

3ma



^{1}H-NMR for N-benzylpyrimidin-2-amine



^{13}C NMR for N-benzylpyrimidin-2-amine

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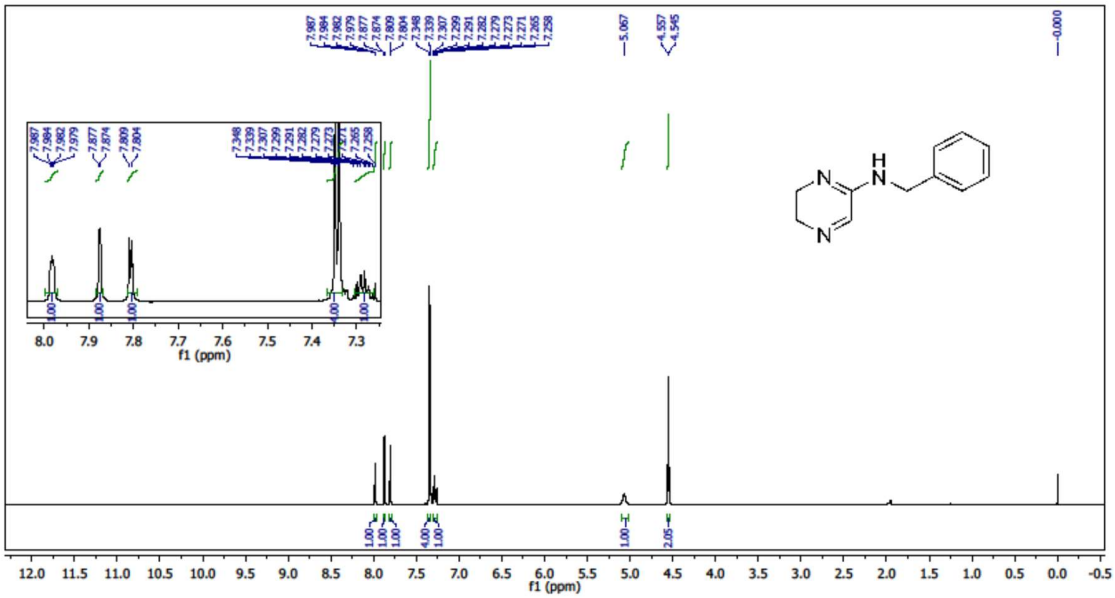
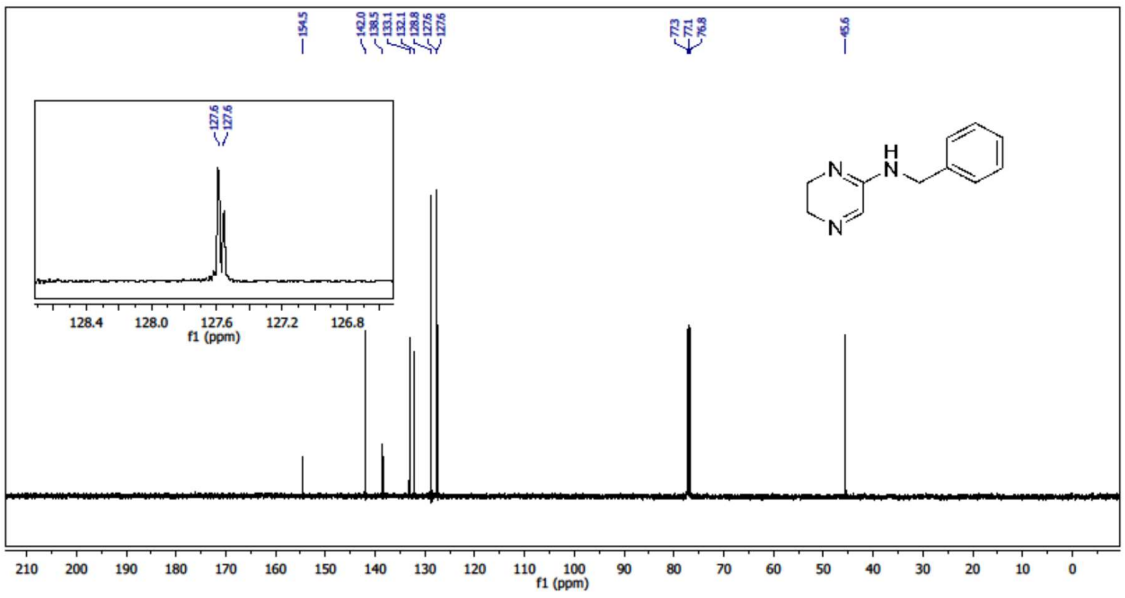


^{1}H-NMR for N-benzylpyrazin-2-amine



^{13}C NMR for N-benzylpyrazin-2-amine

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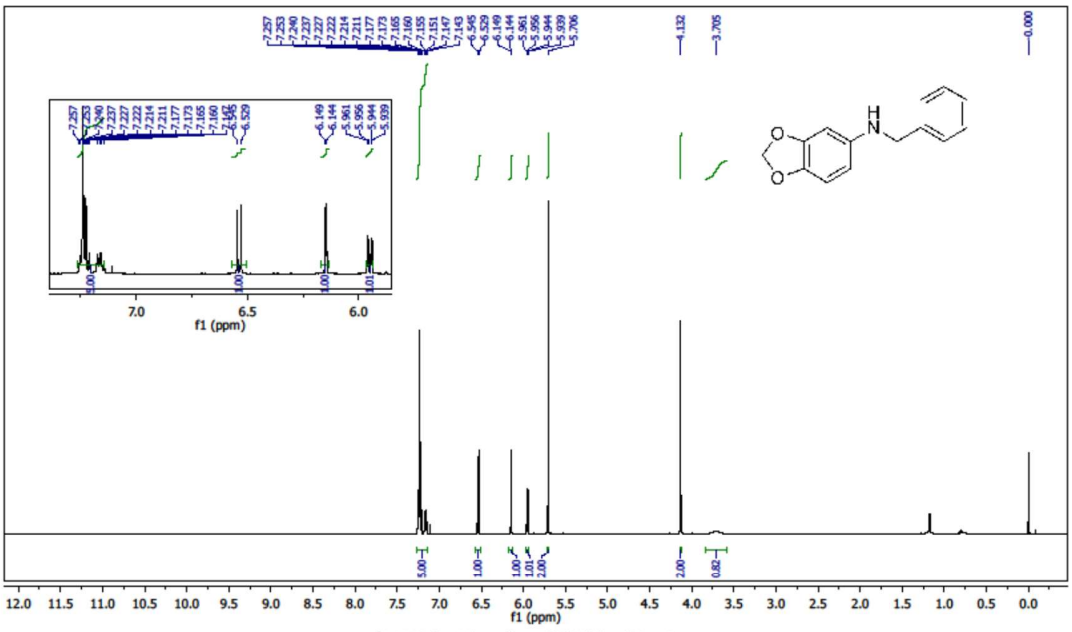
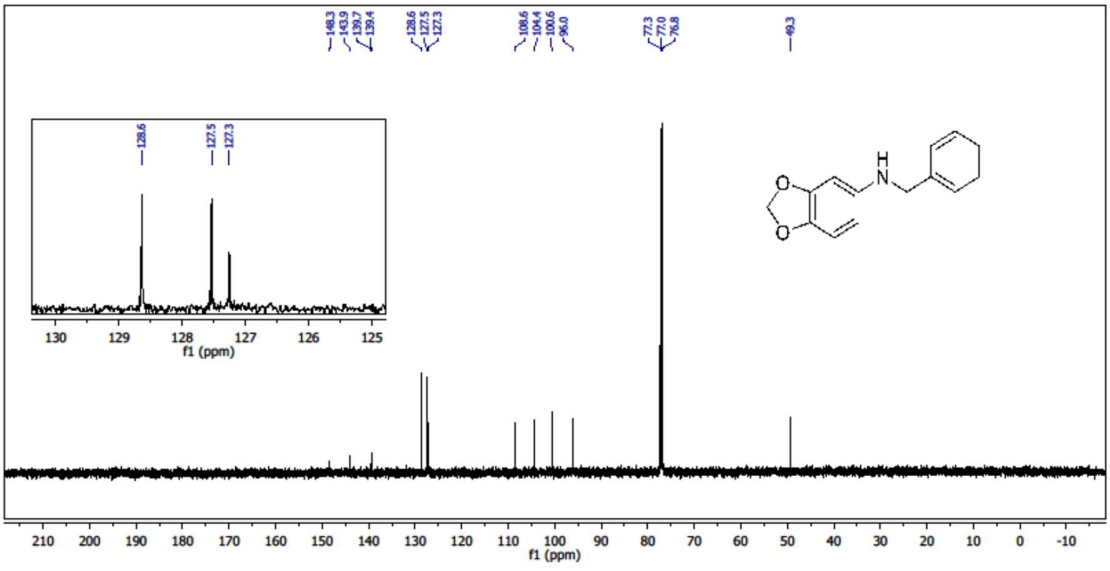
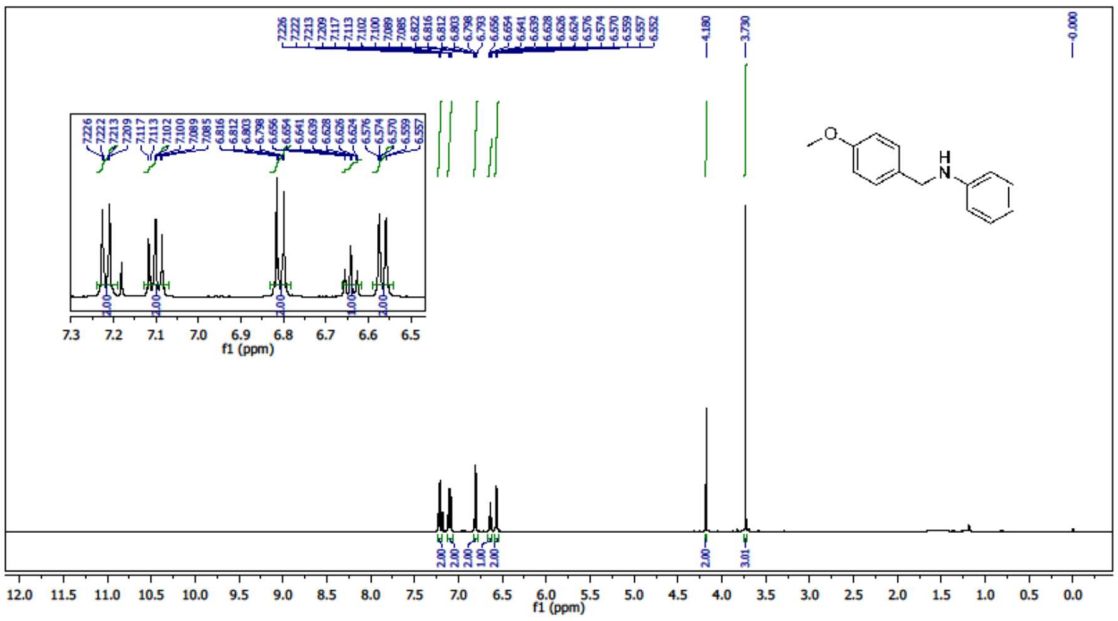


^{1}H-NMR for N-benzylbenzo[d][1,3]dioxol-5-amine

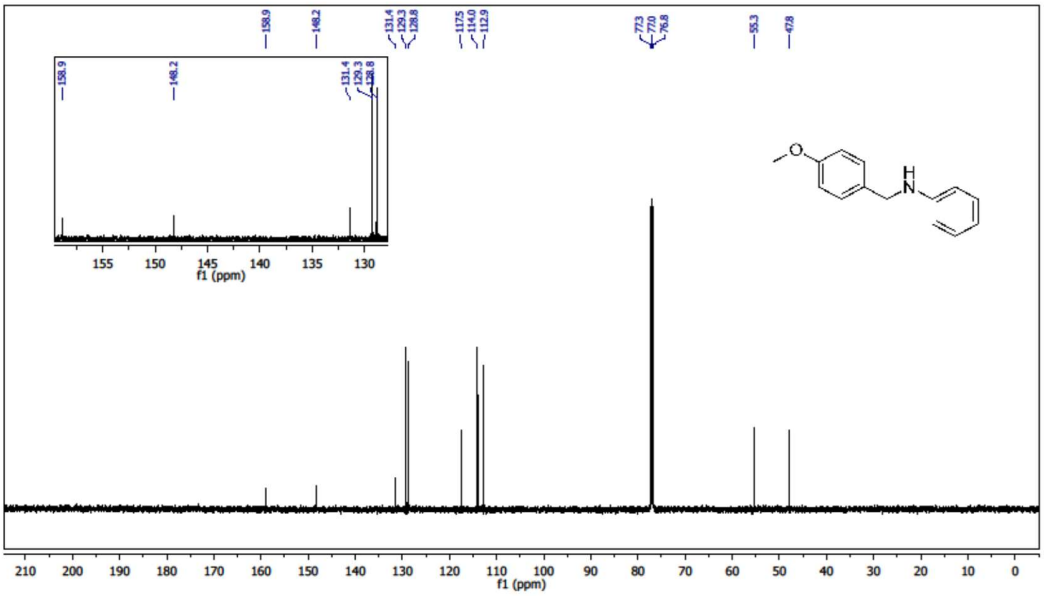


^{13}C NMR for N-benzylbenzo[d][1,3]dioxol-5-amine

3pa

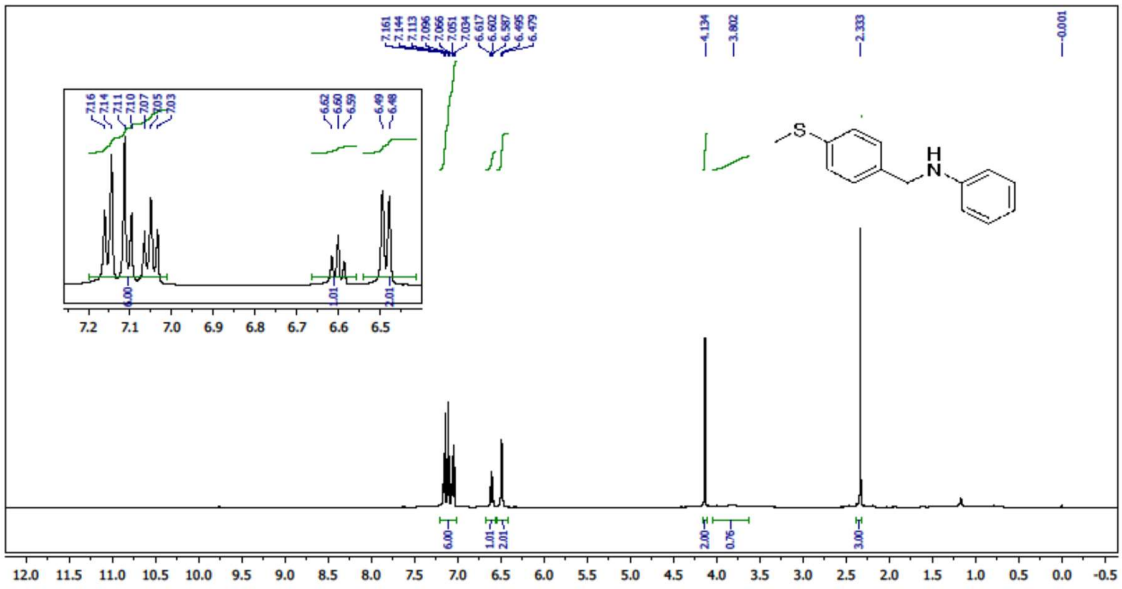


^{1}H-NMR for N-(4-methoxybenzyl)aniline

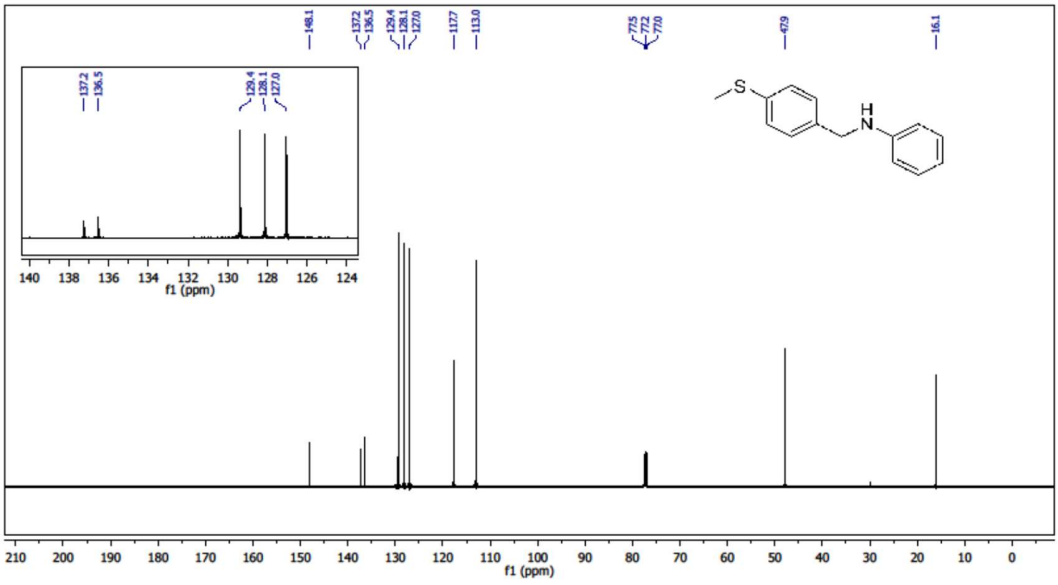


^{13}C NMR for N-(4-methoxybenzyl)aniline

3ab



^{1}H-NMR for N-(4-(methylthio)benzyl)aniline



^{1}H-NMR for N-(4-(methylthio)benzyl)aniline

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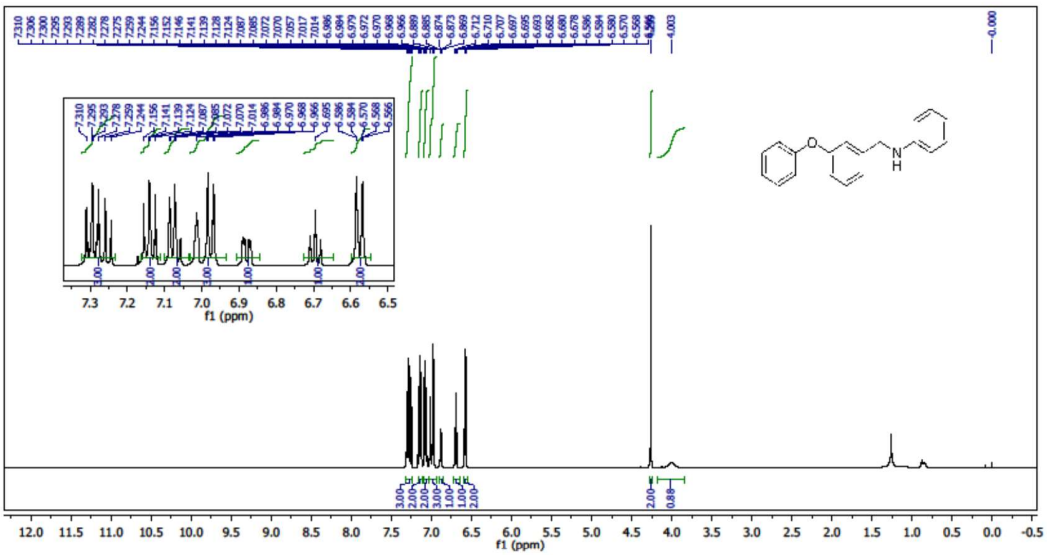
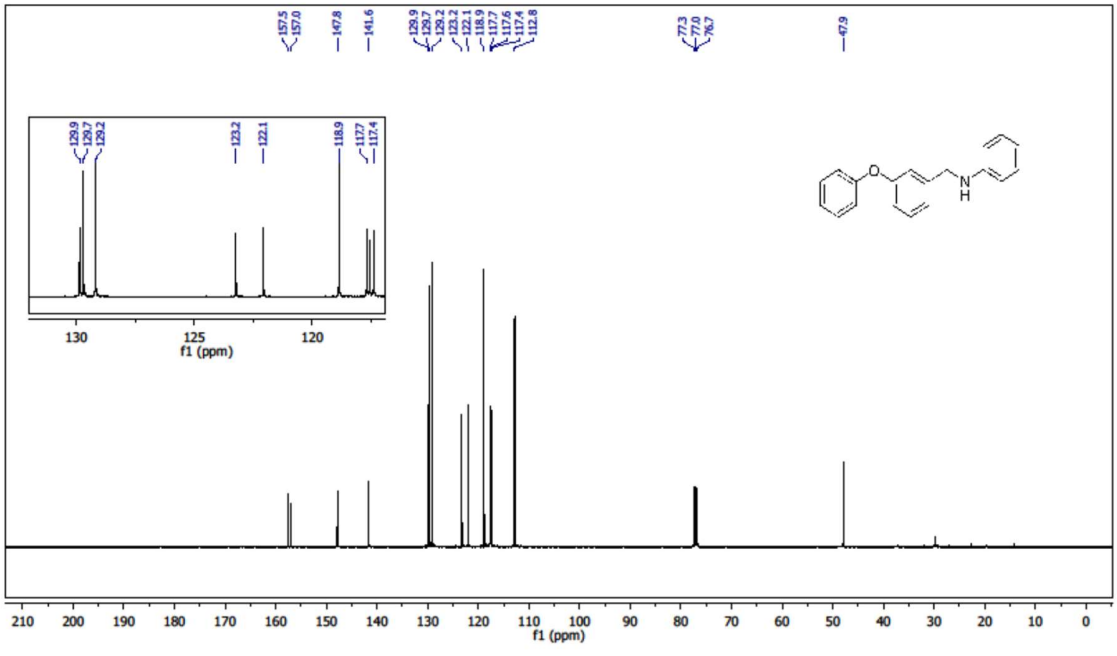


^{1}H NMR for N-(3-phenoxybenzyl)aniline



^{13}C NMR for N-(3-phenoxybenzyl)aniline

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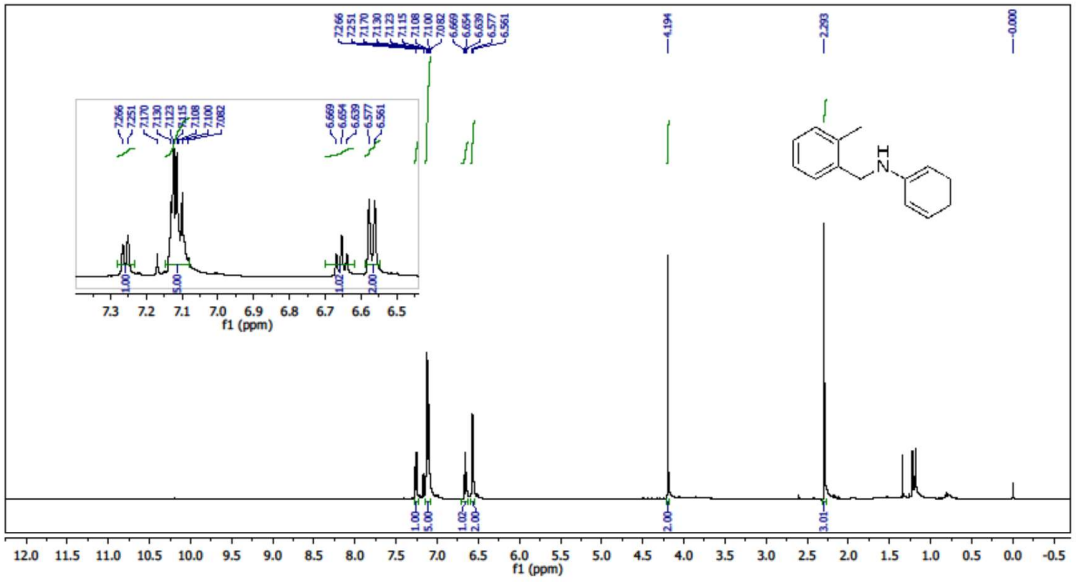
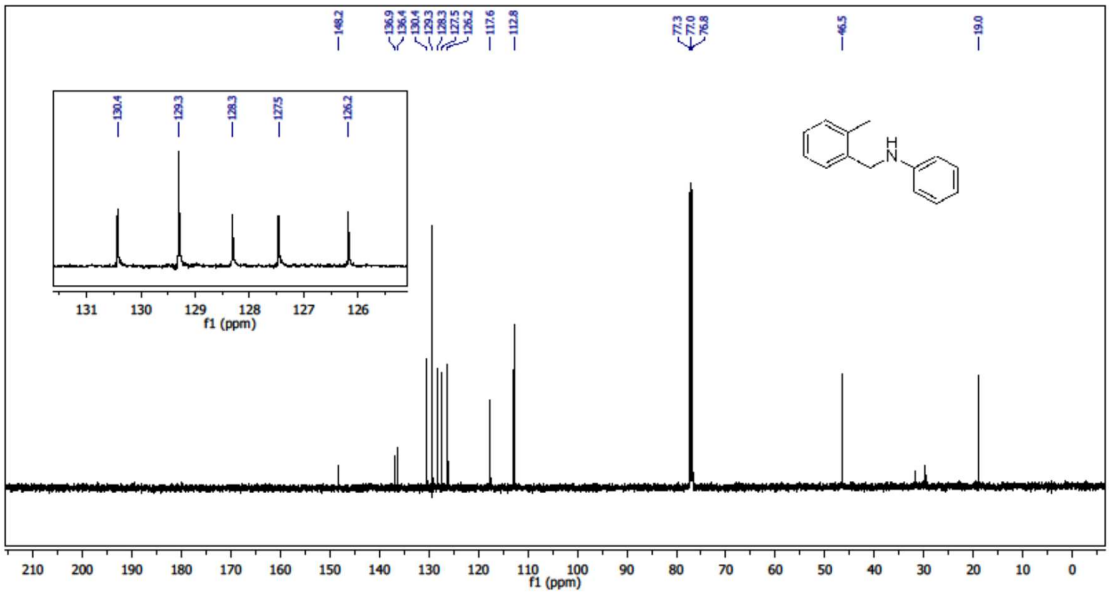


^{1}H-NMR for N-(2-methylbenzyl)aniline



^{13}C NMR for N-(2-methylbenzyl)aniline

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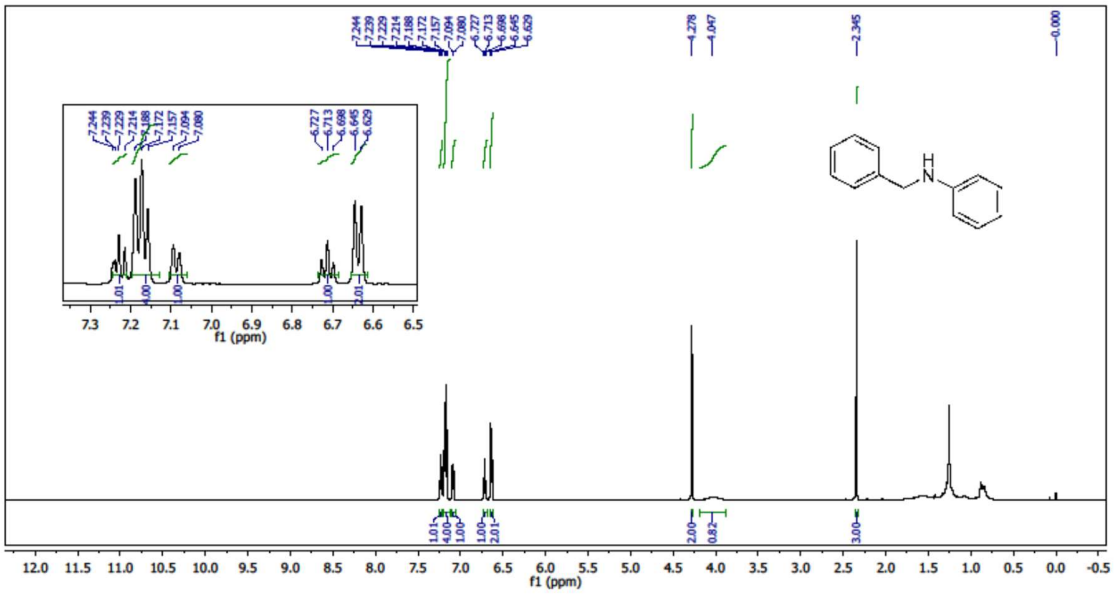
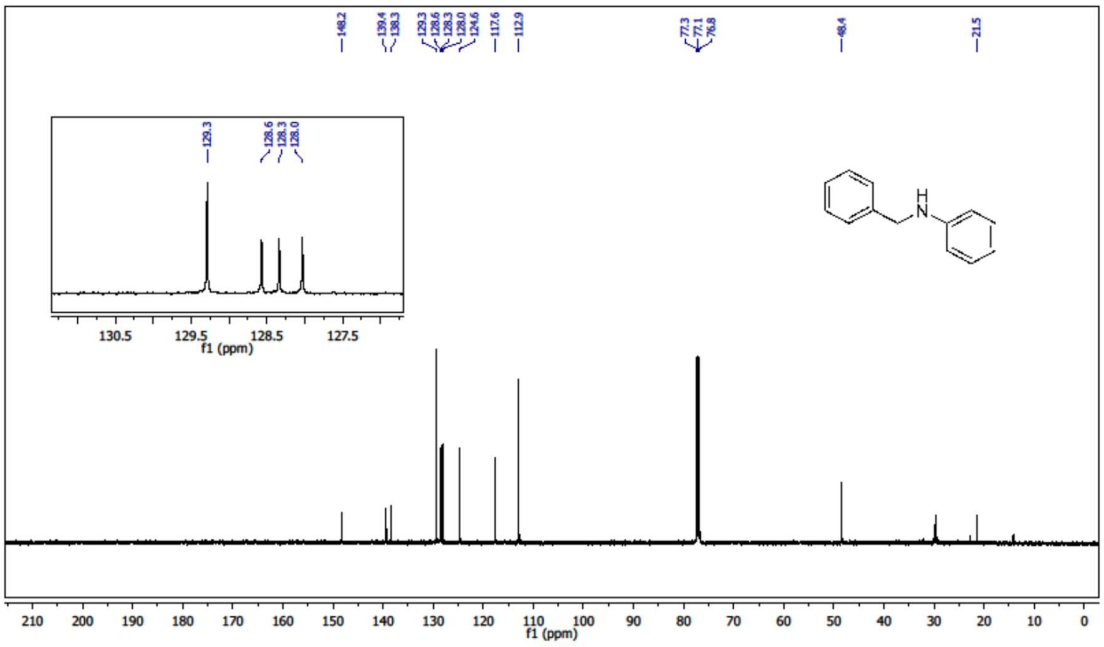


^{1}H-NMR for N-(3-methylbenzyl)aniline



^{1}H-NMR for N-(3-methylbenzyl)aniline

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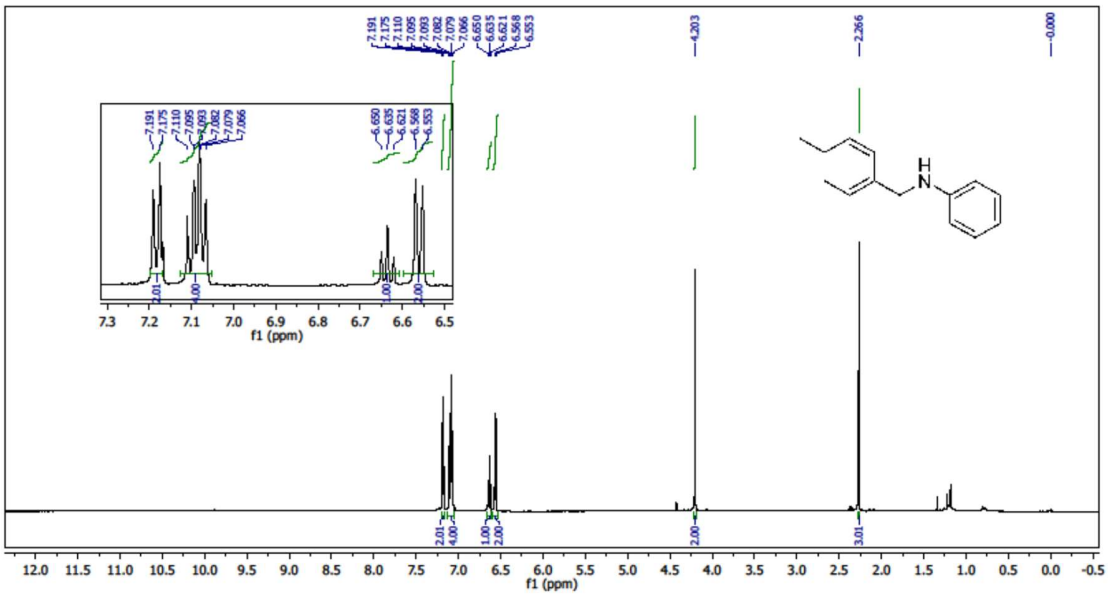
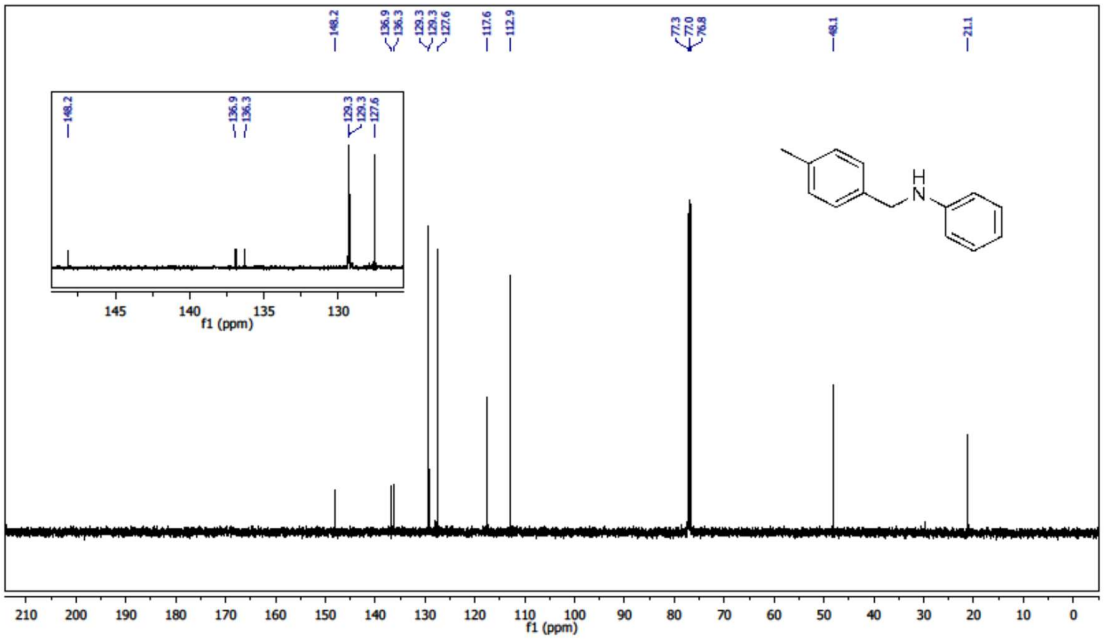


^{1}H-NMR for N-(4-methylbenzyl)aniline



^{13}C for N-(4-methylbenzyl)aniline

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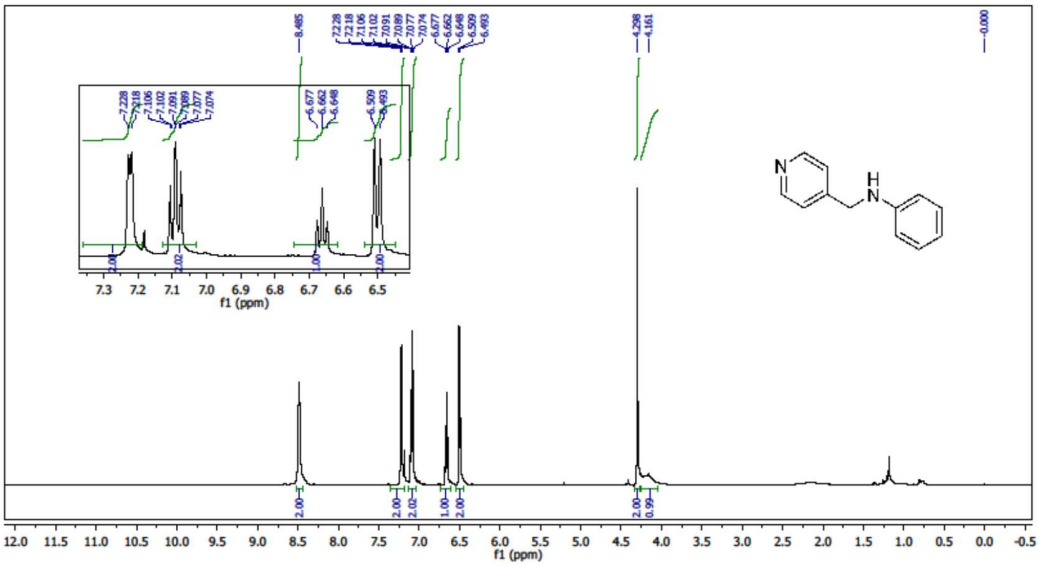
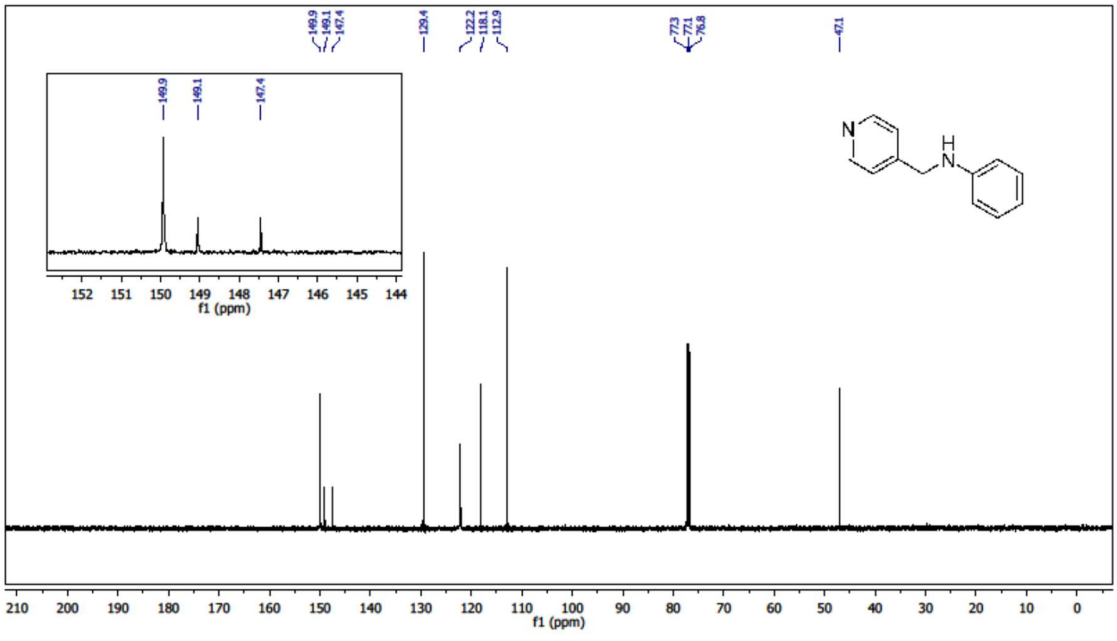


^{1}H-NMR for N-(pyridin-4-ylmethyl)aniline



^{13}C NM for RN-(pyridin-4-ylmethyl)aniline

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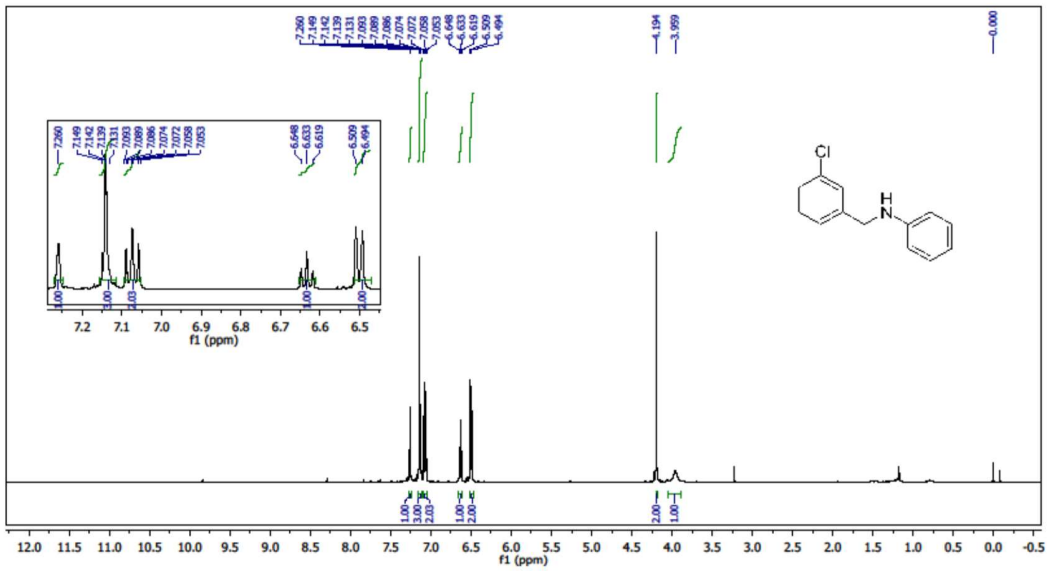
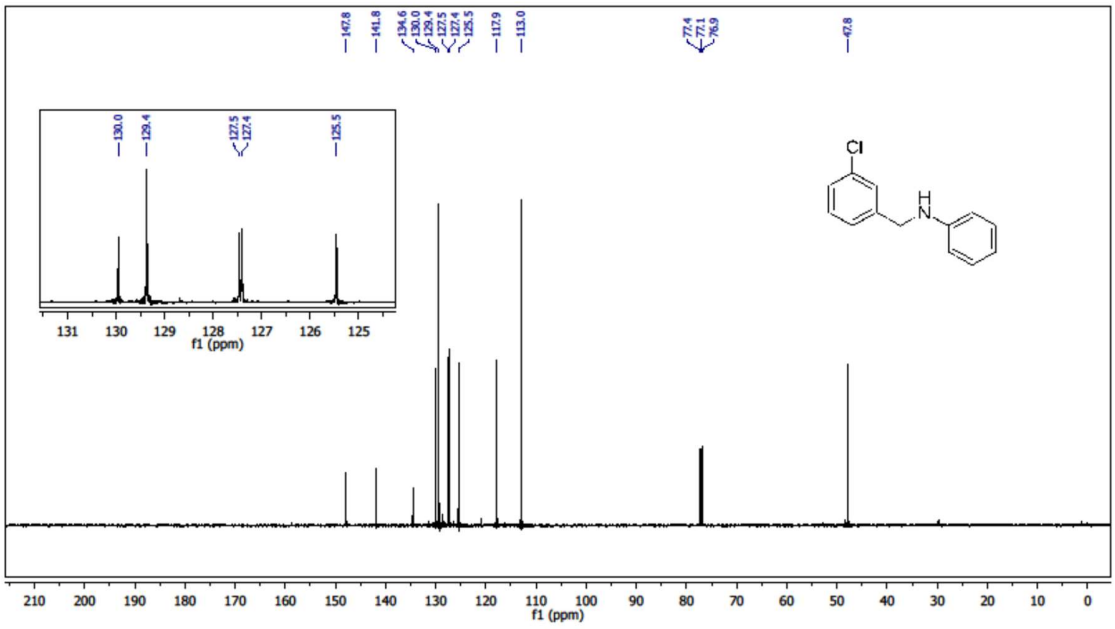


^{1}H-NMR for N-(3-chlorobenzyl)aniline



^{13}C NMR for N-(3-chlorobenzyl)aniline

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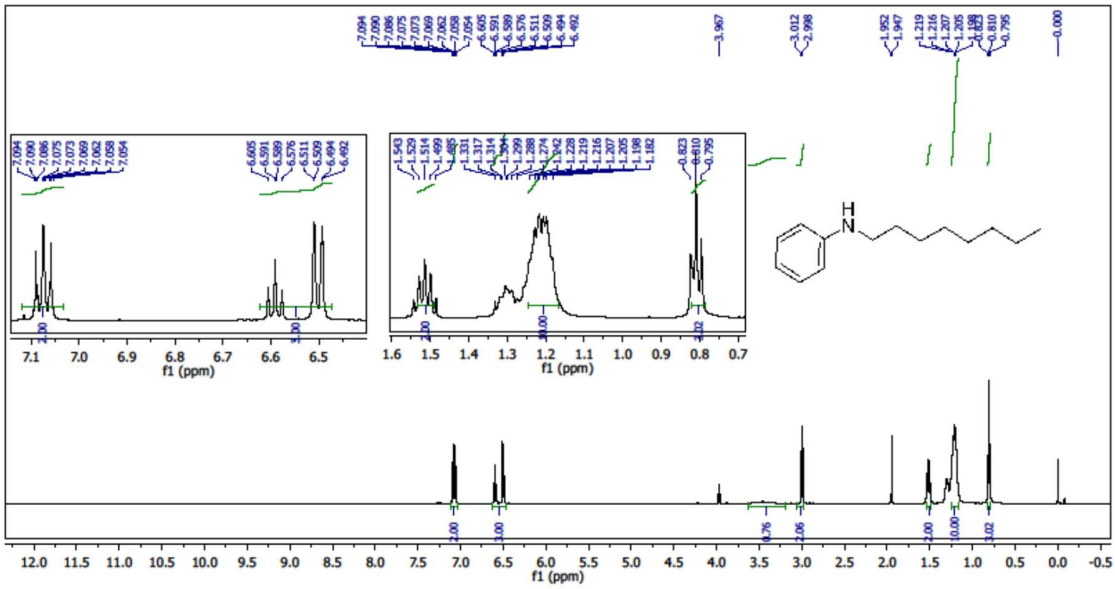
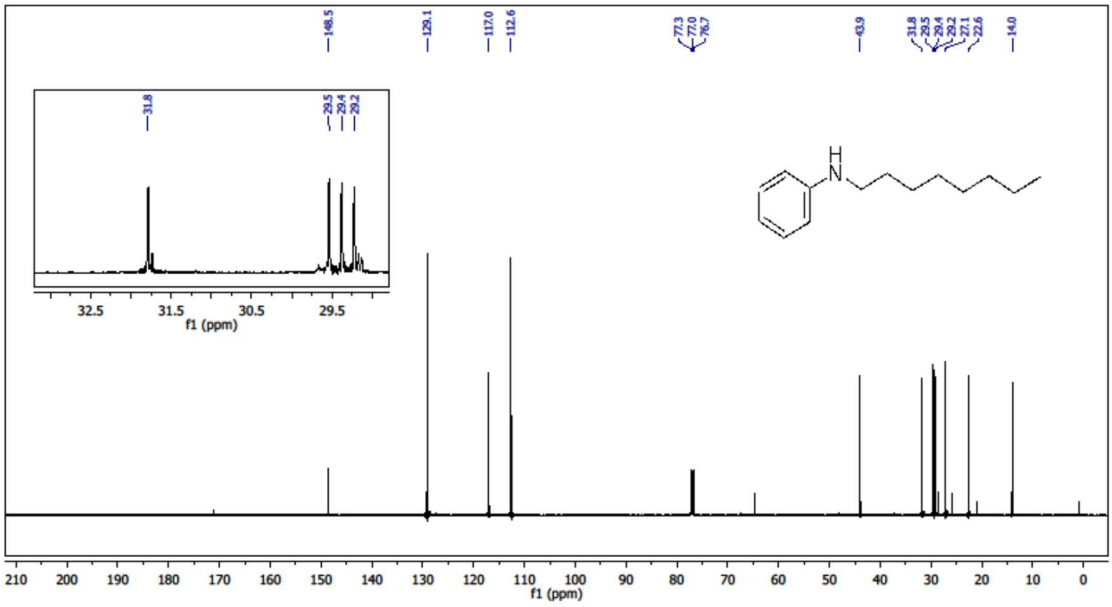


^{1}H-NMR for N-octylaniline



^{13}C NMR for N-octylaniline

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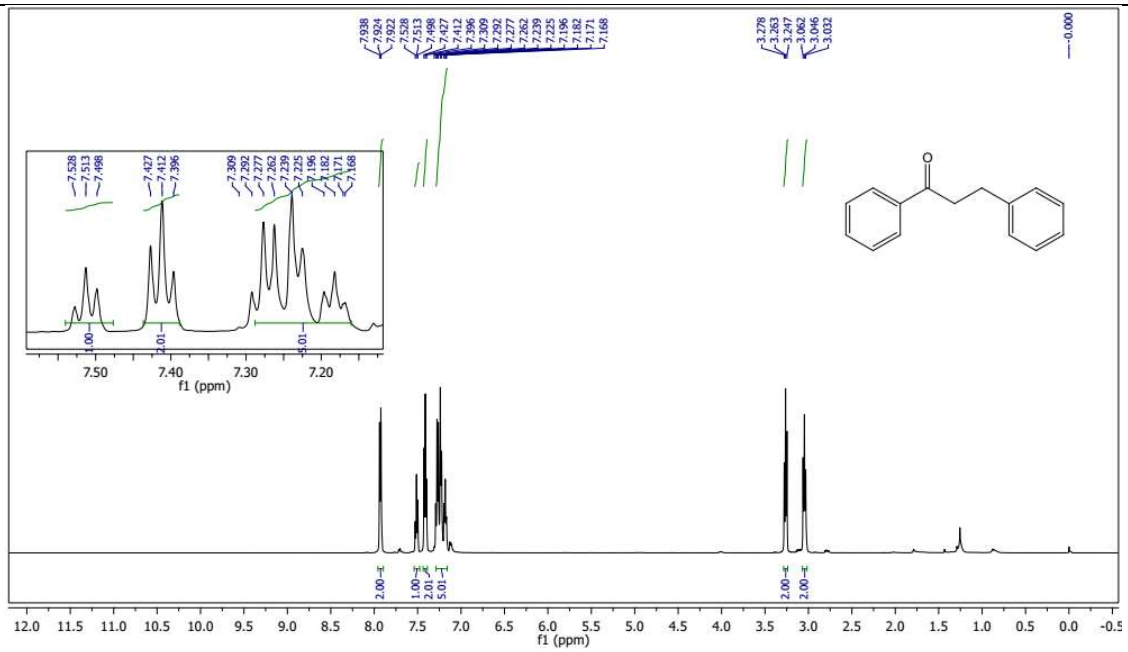
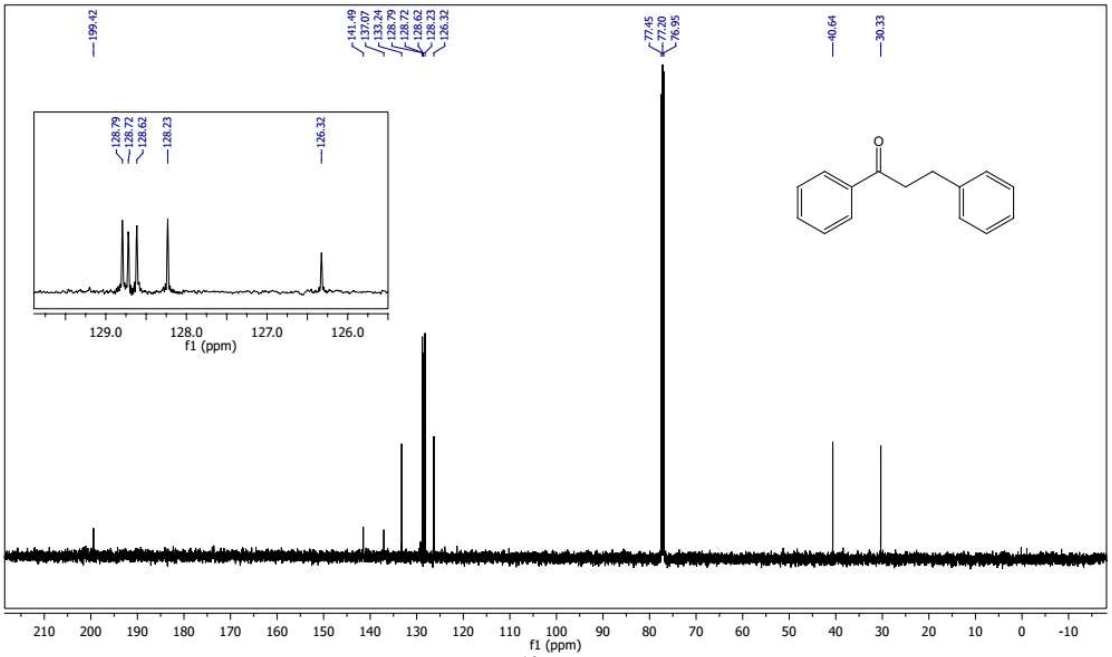


6aa ^{1}H-NMR



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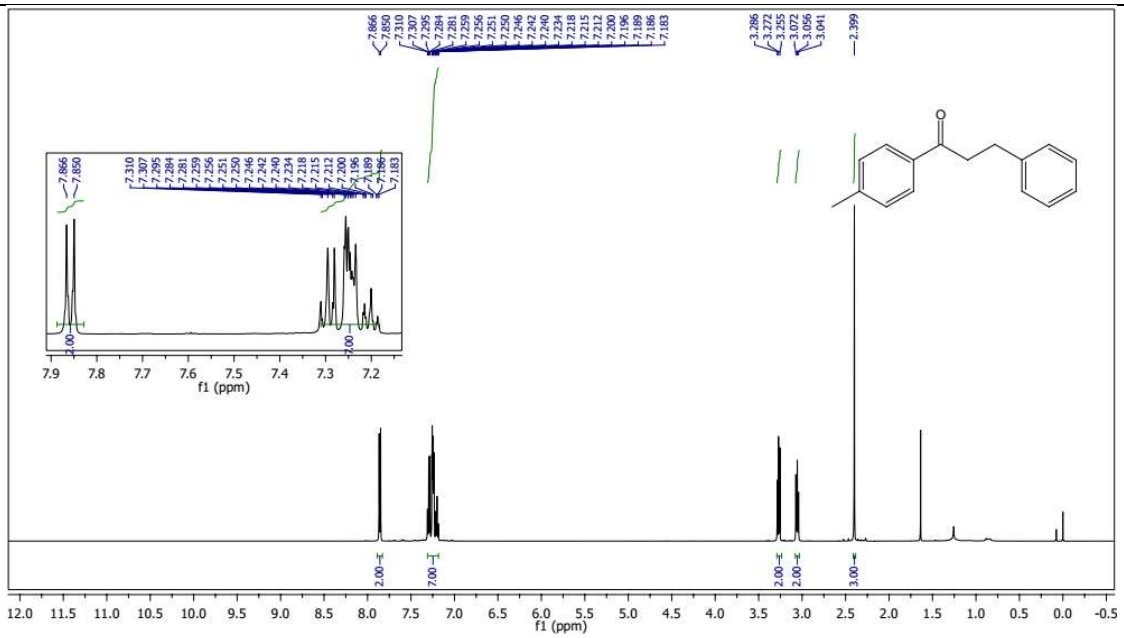

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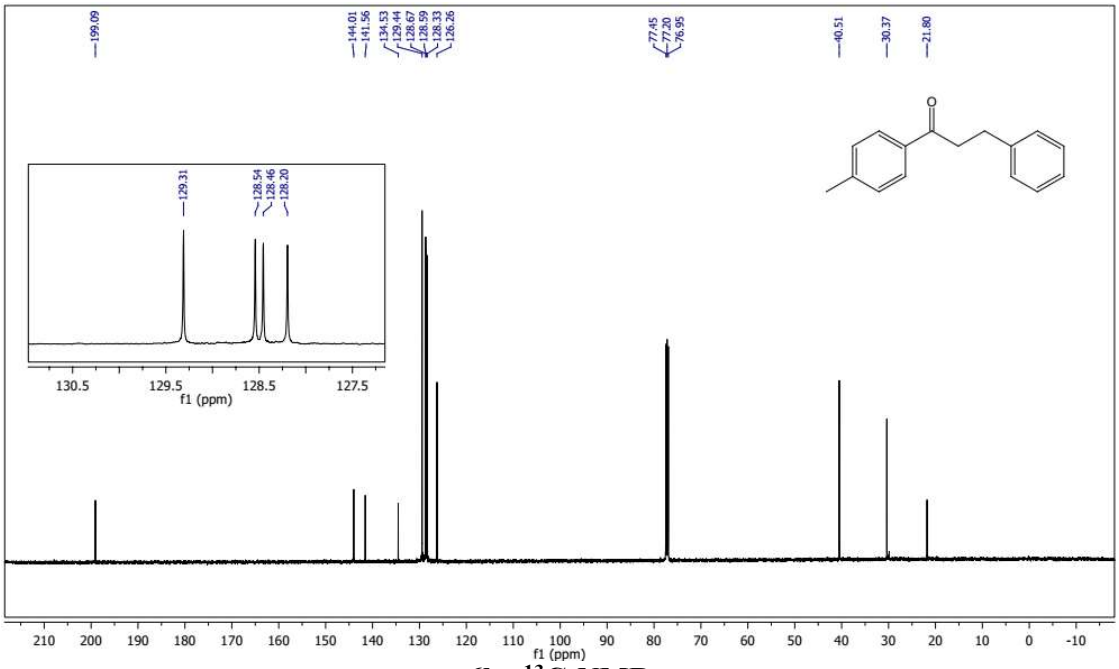

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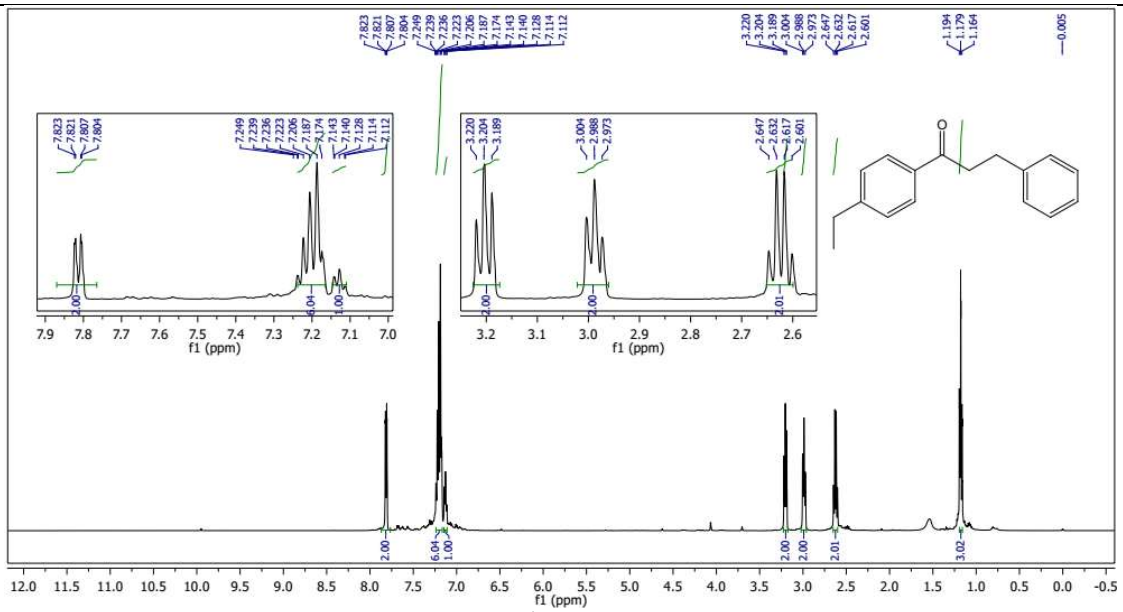

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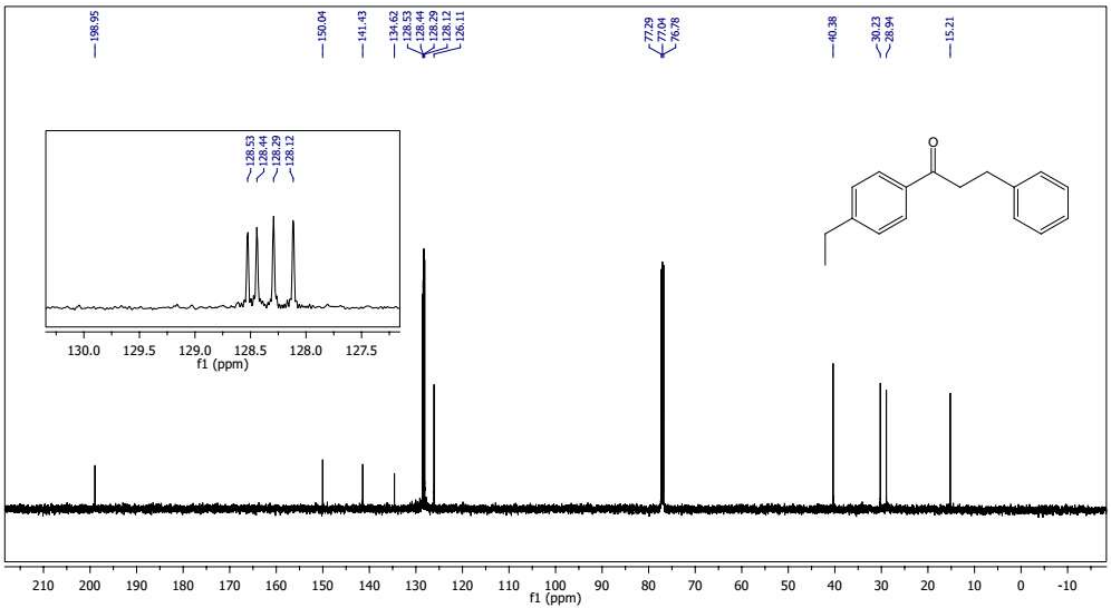

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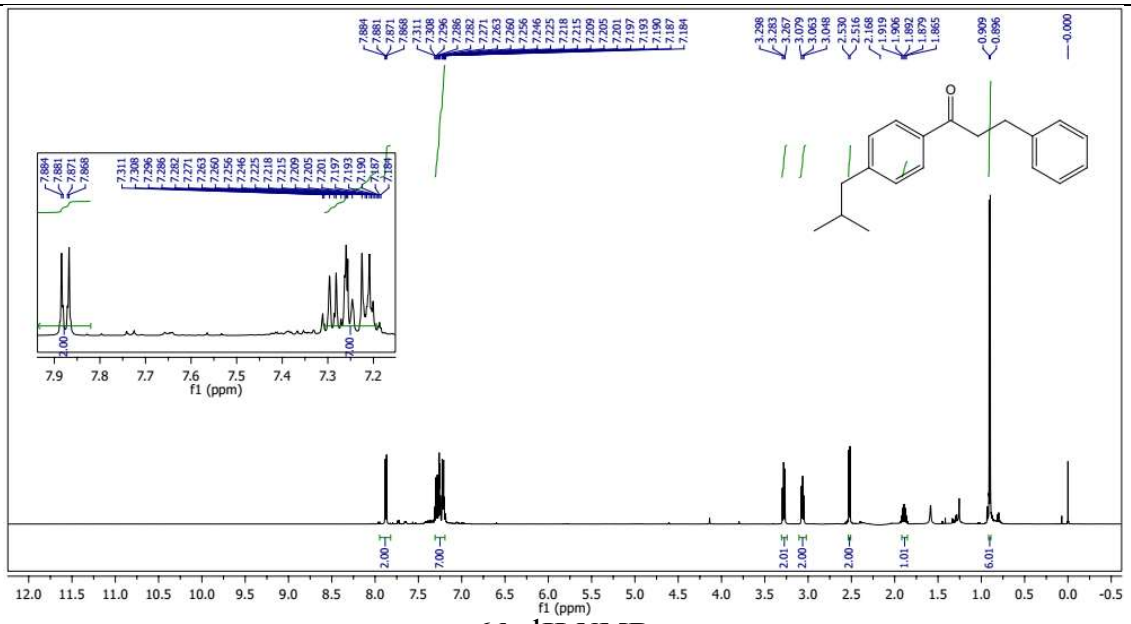

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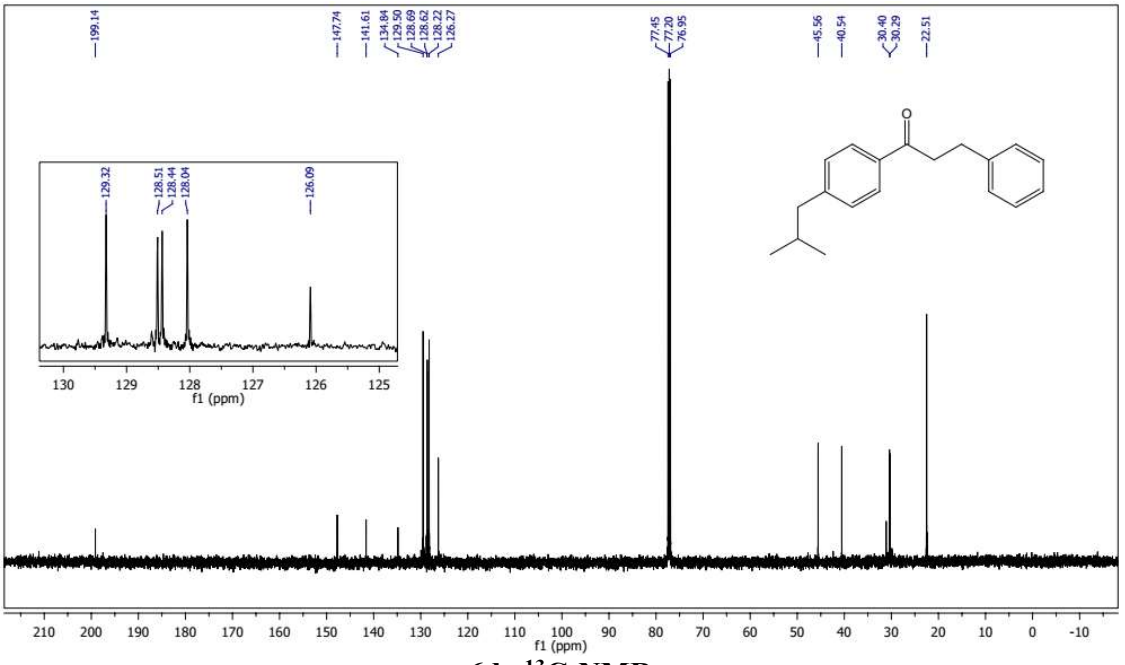

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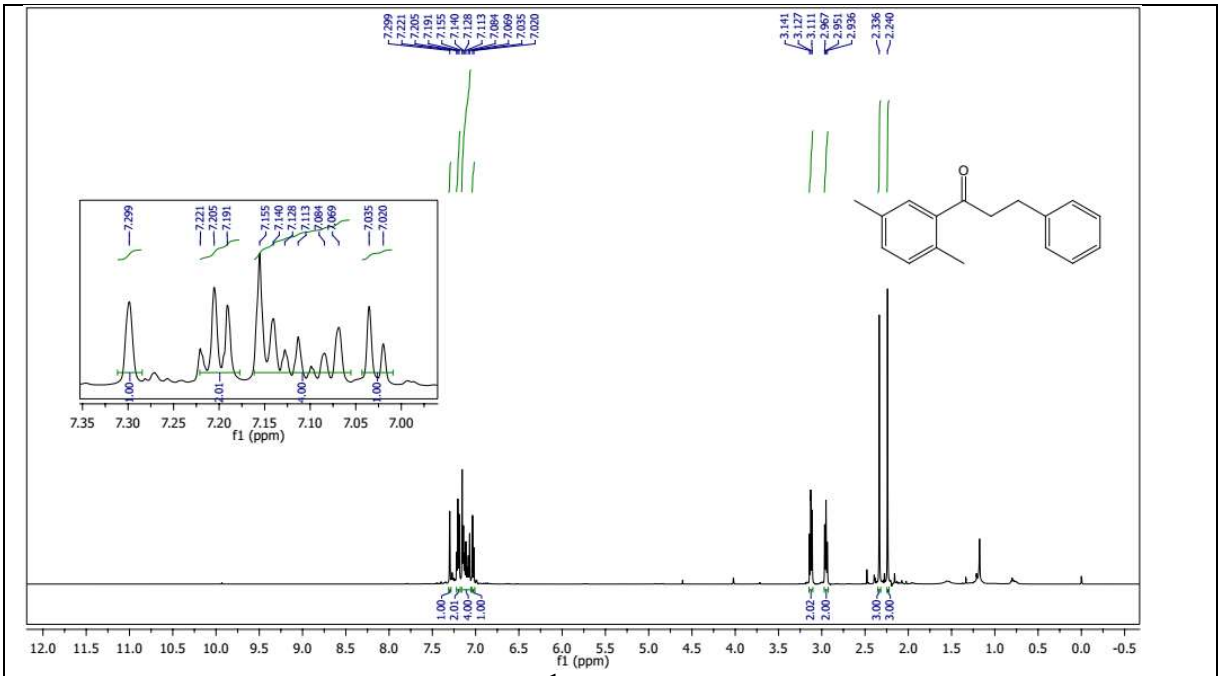
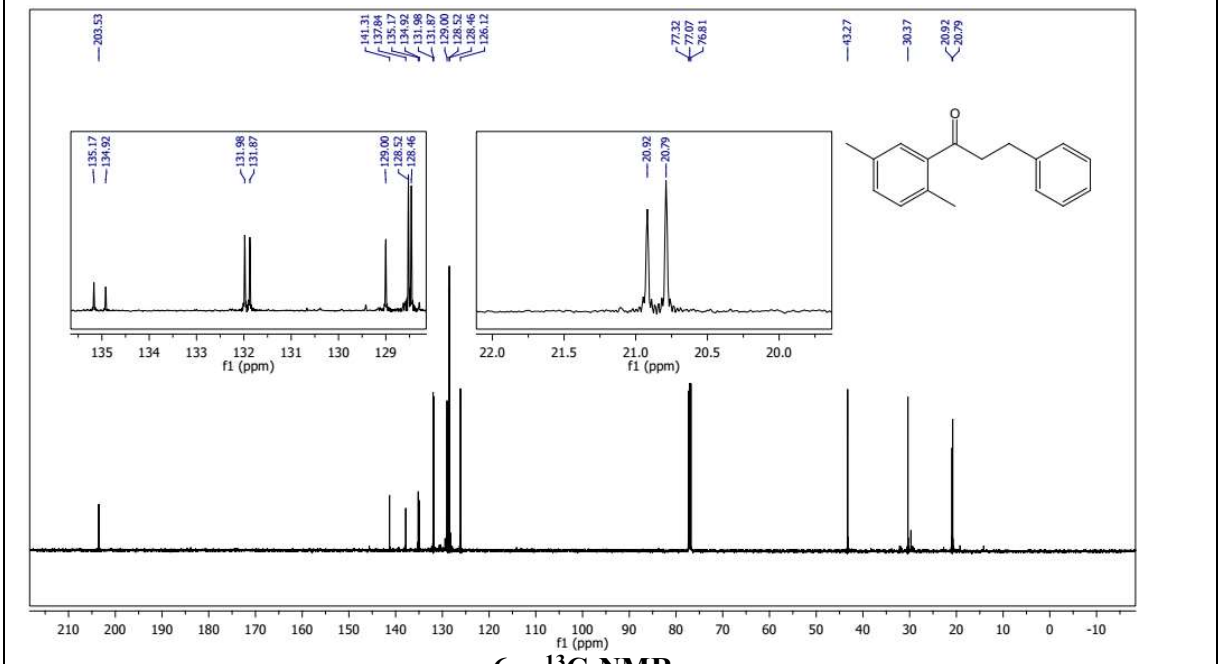
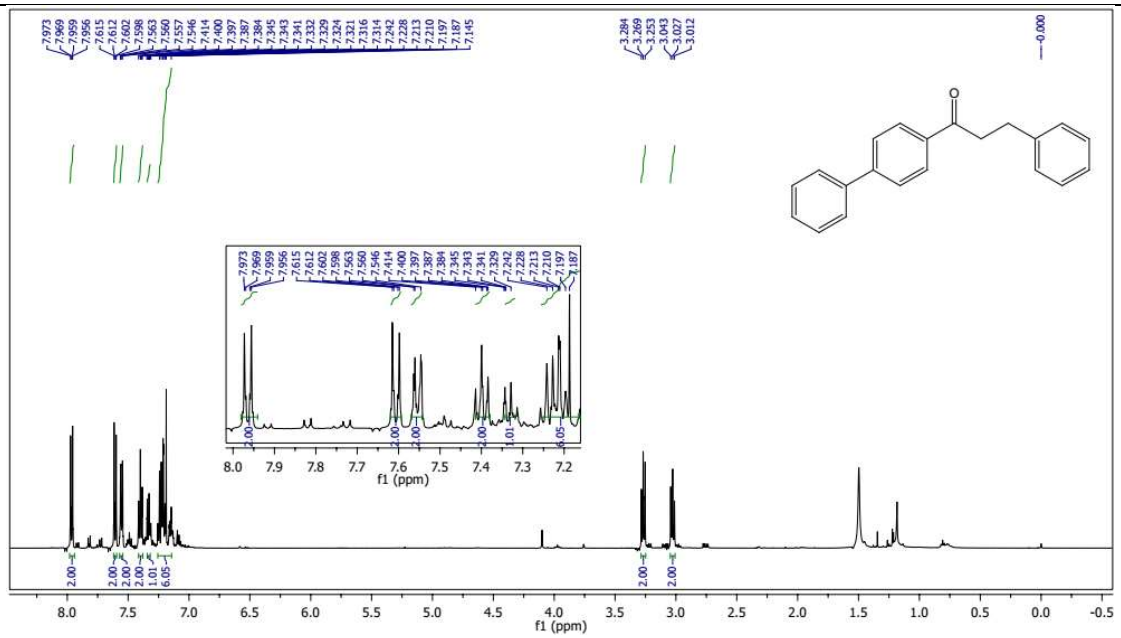


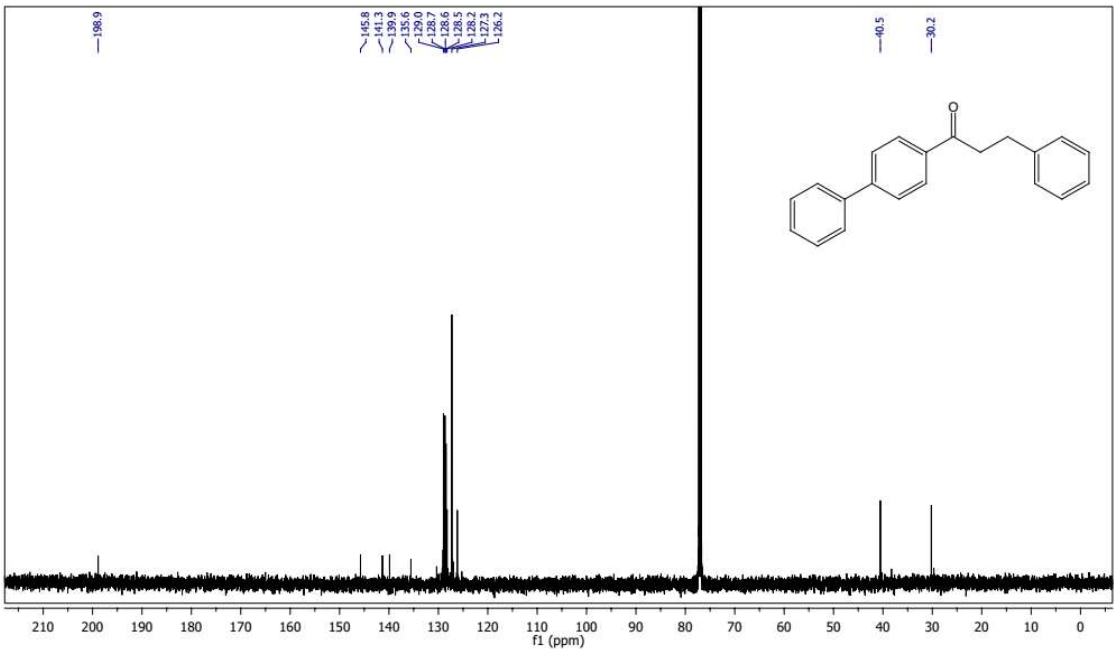
6ea ^{1}H-NMR



6ea ^{13}C-NMR



6fa ^{1}H-NMR



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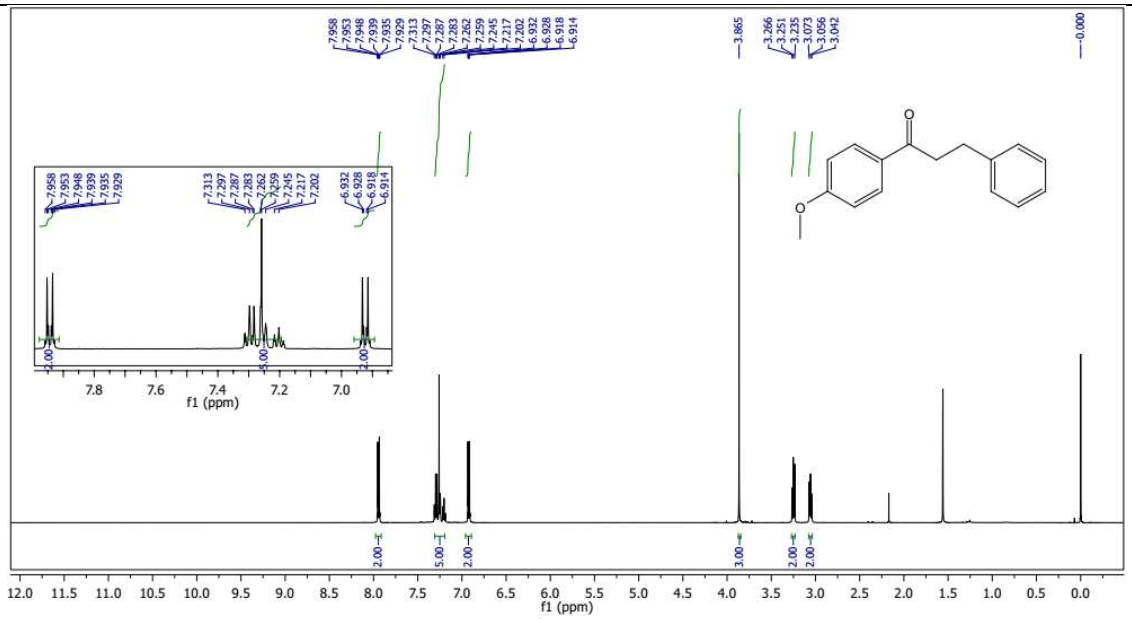
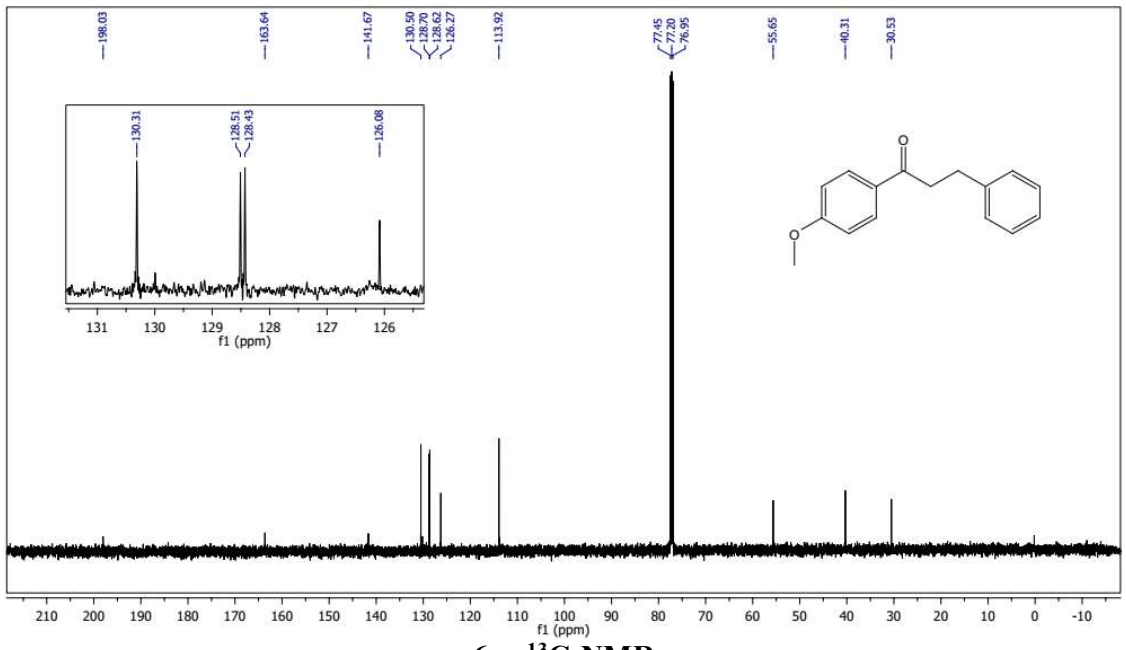


6ga ^{1}H-NMR



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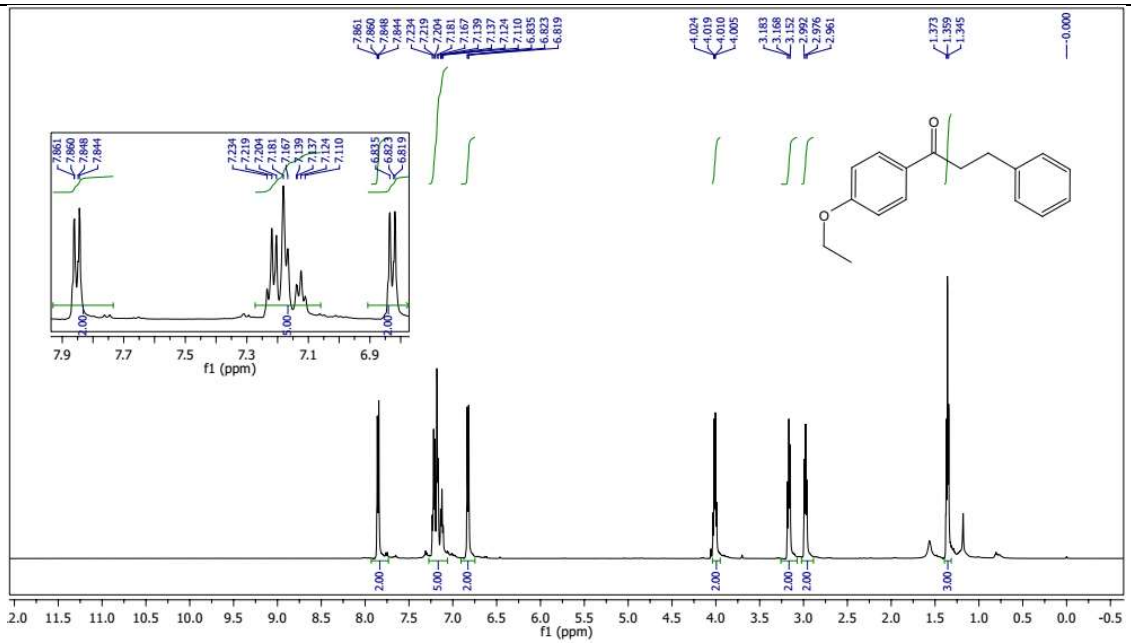
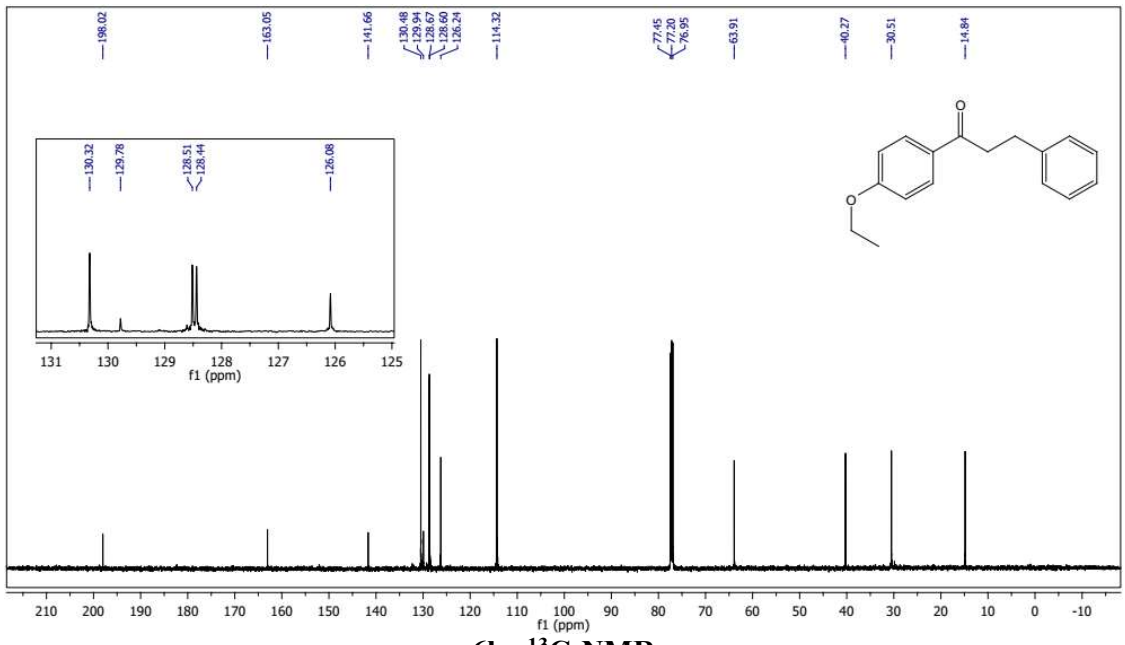
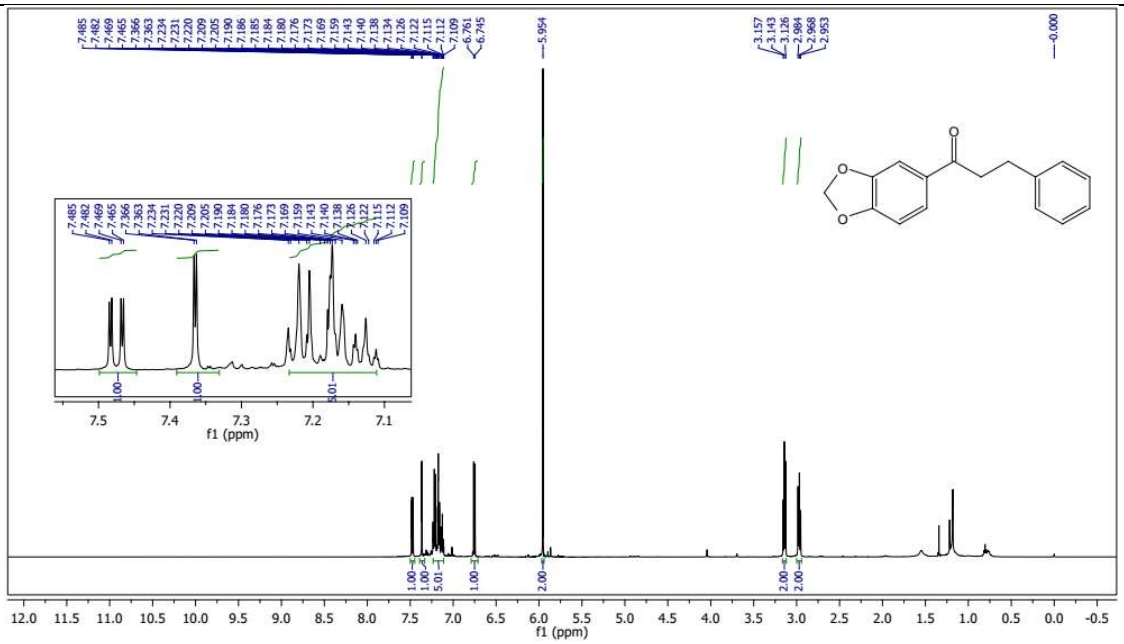


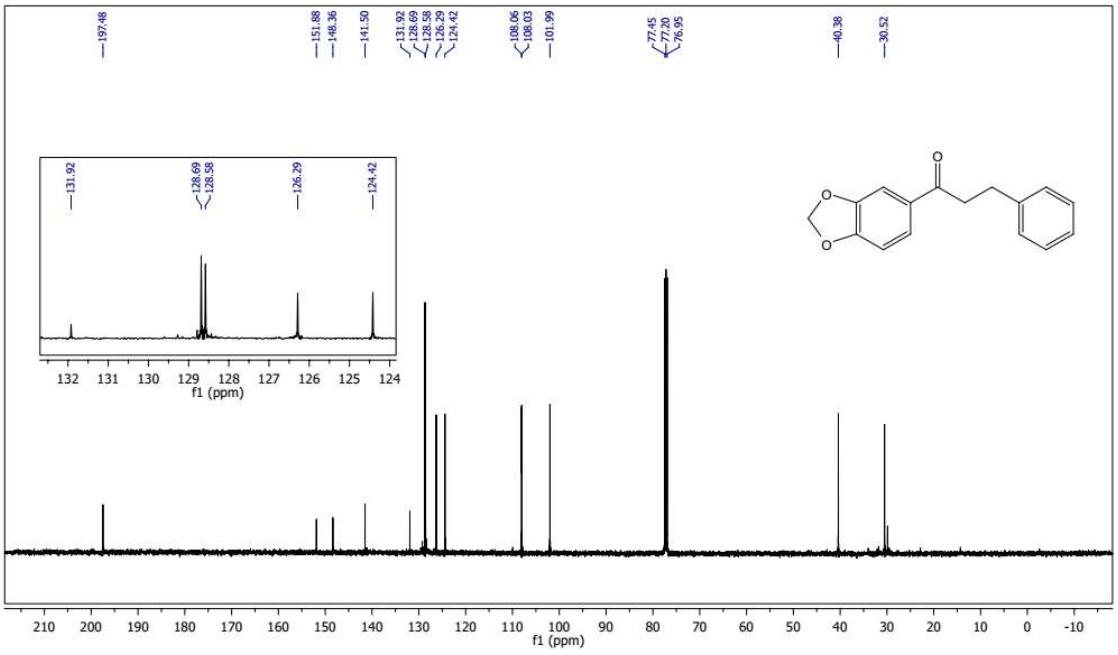
6ha ^{1}H-NMR



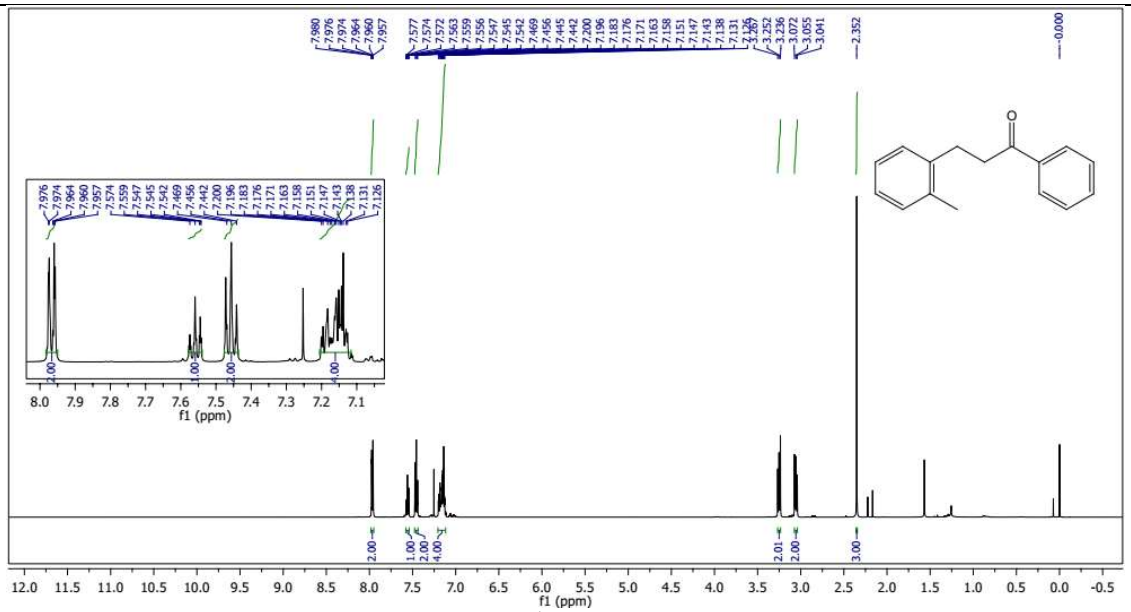
6ha ^{13}C-NMR



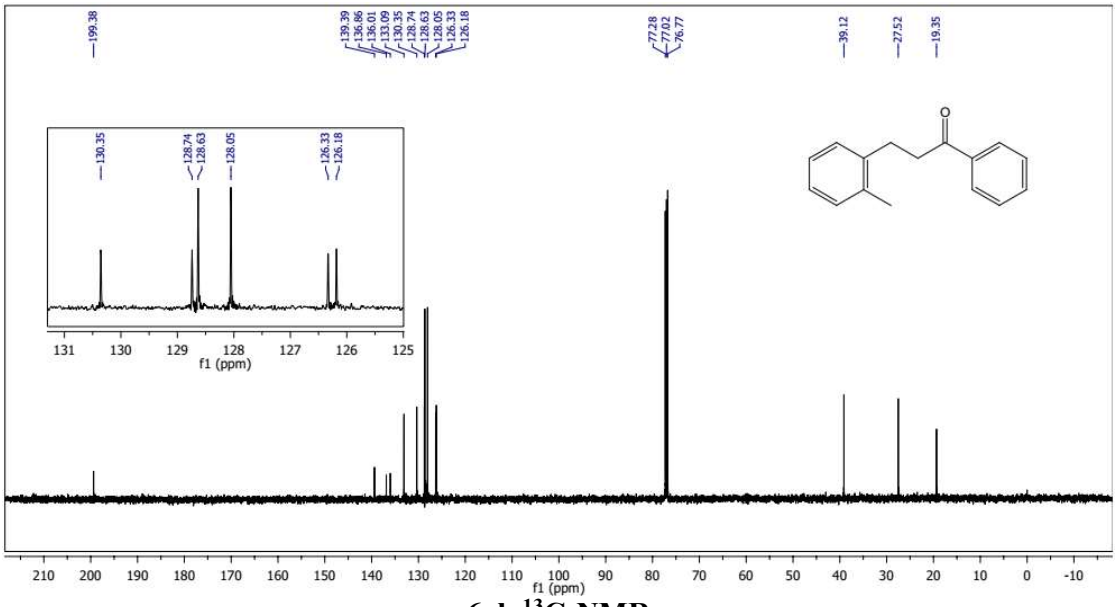
6ia ^{1}H-NMR



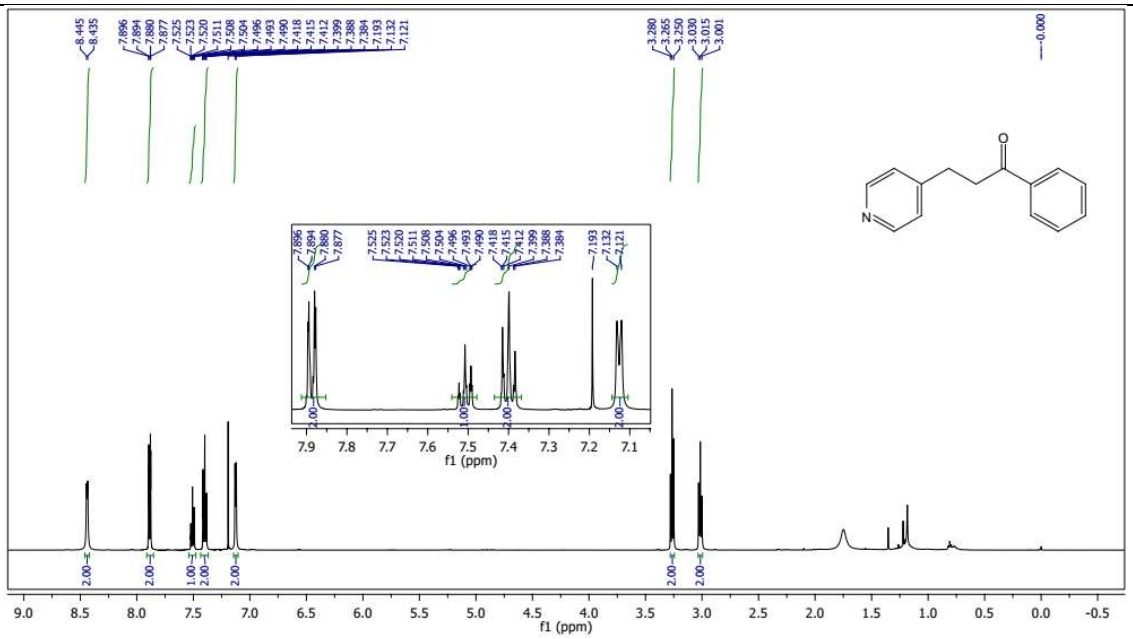
6ia ^{13}C-NMR



6ab ^{1}H-NMR



6ab ^{13}C-NMR



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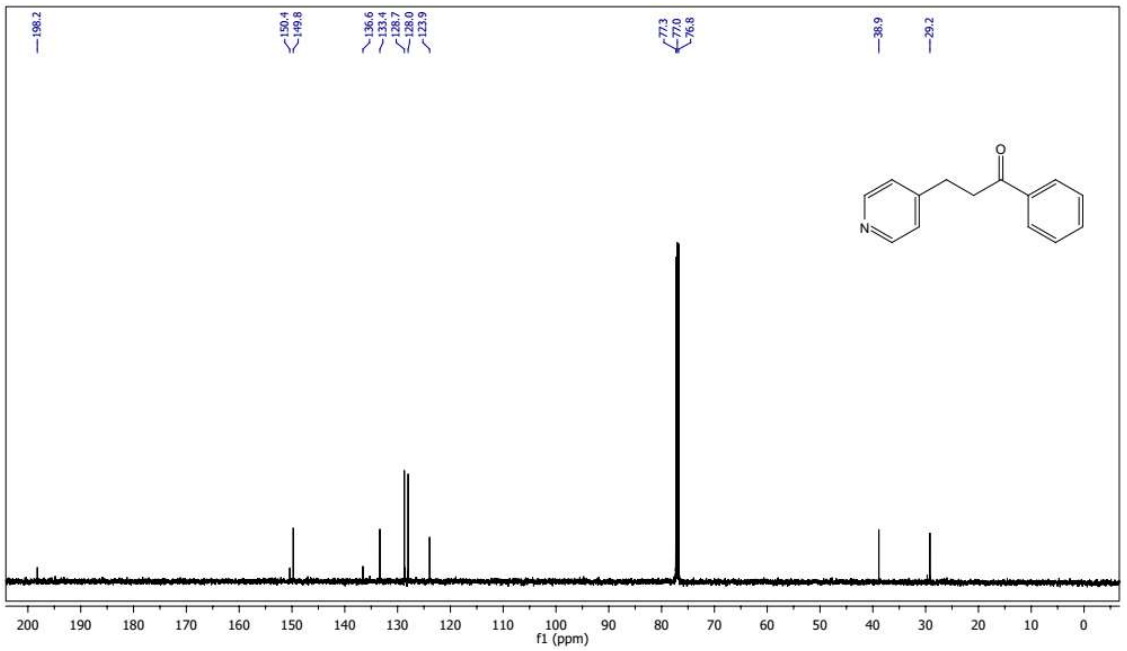
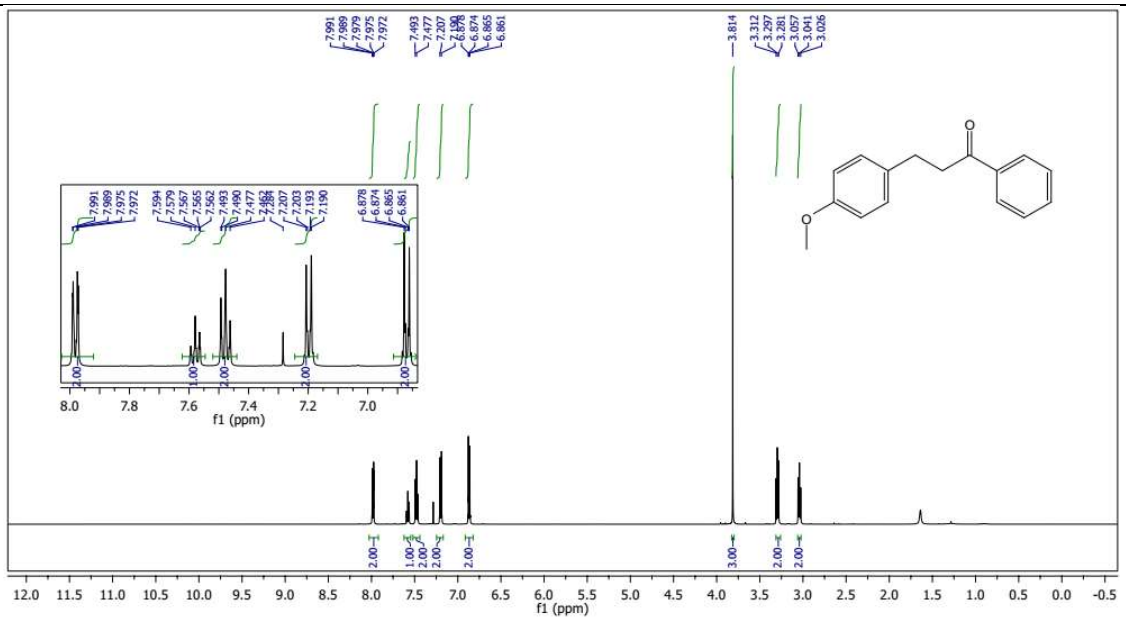
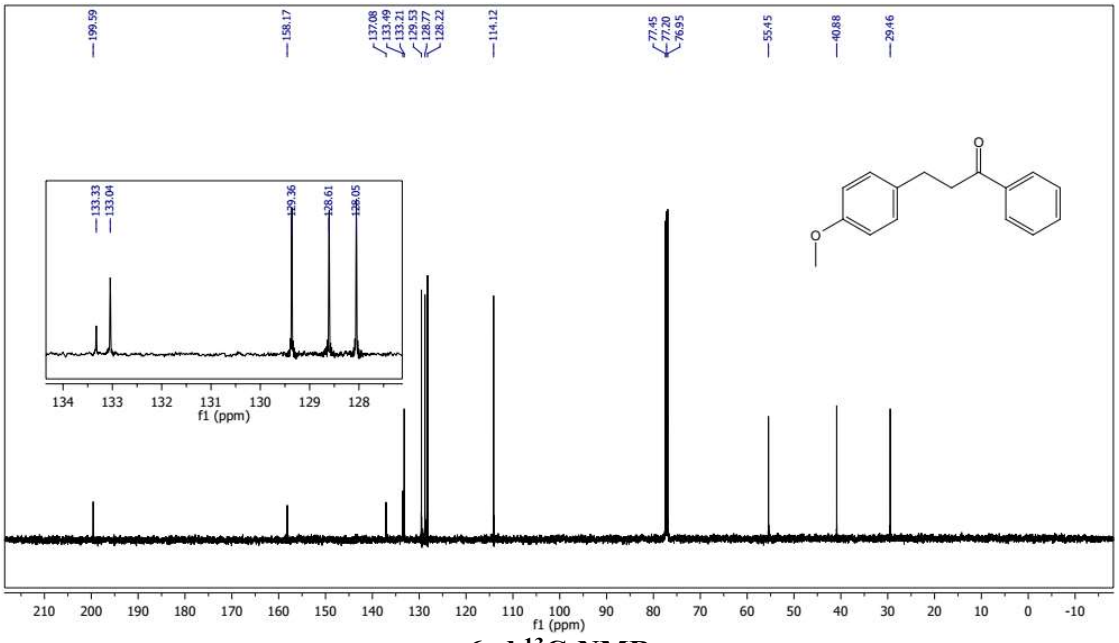


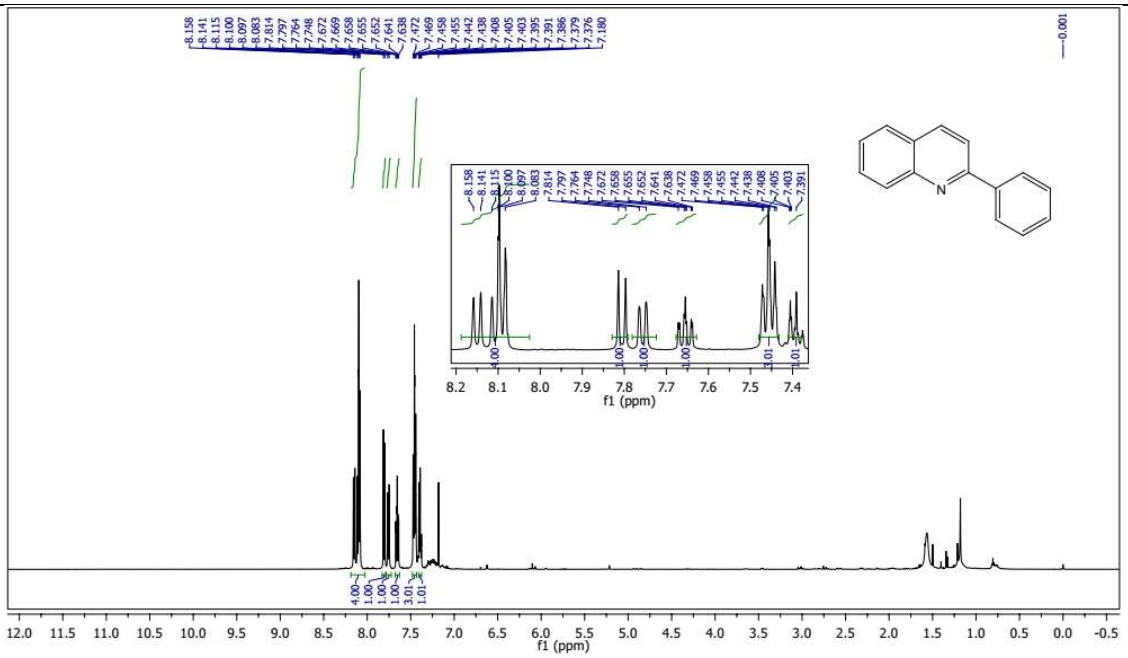
6ac ^{13}C-NMR



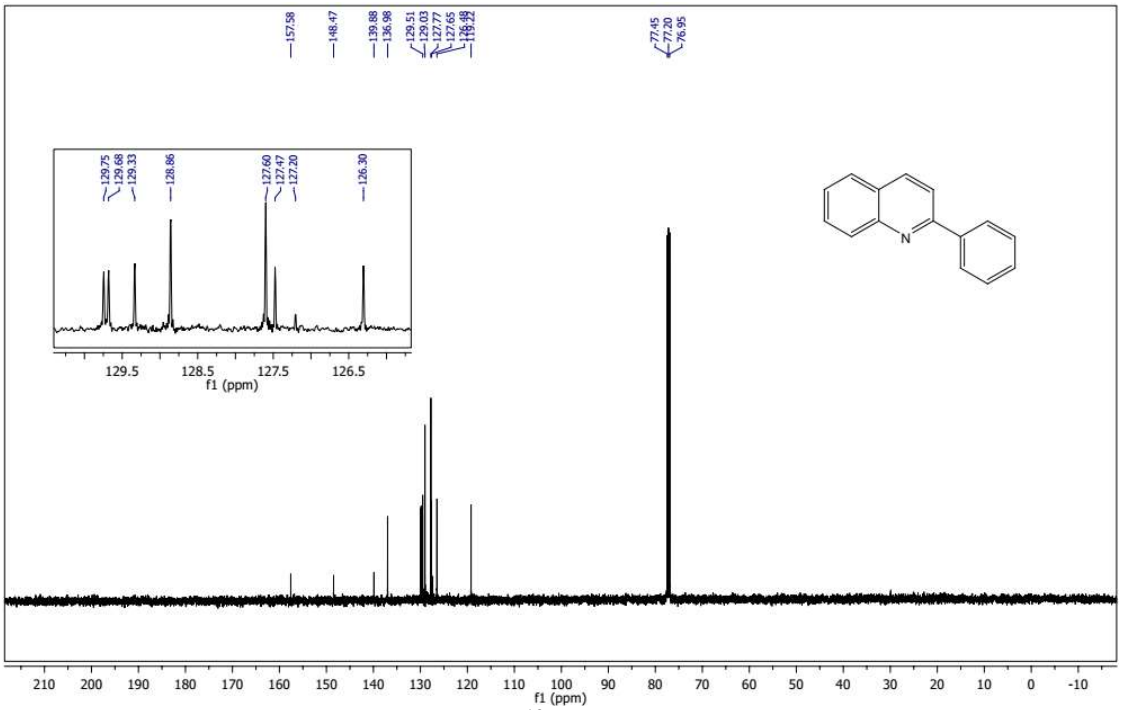
6ad ^{1}H-NMR



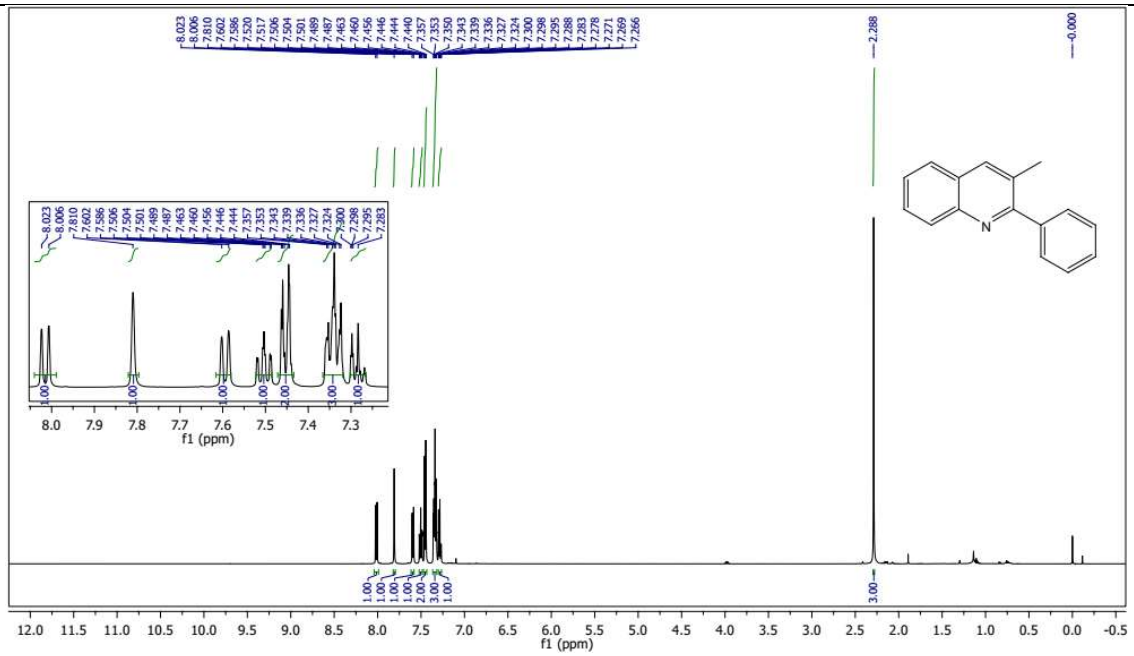
6ad ^{13}C-NMR



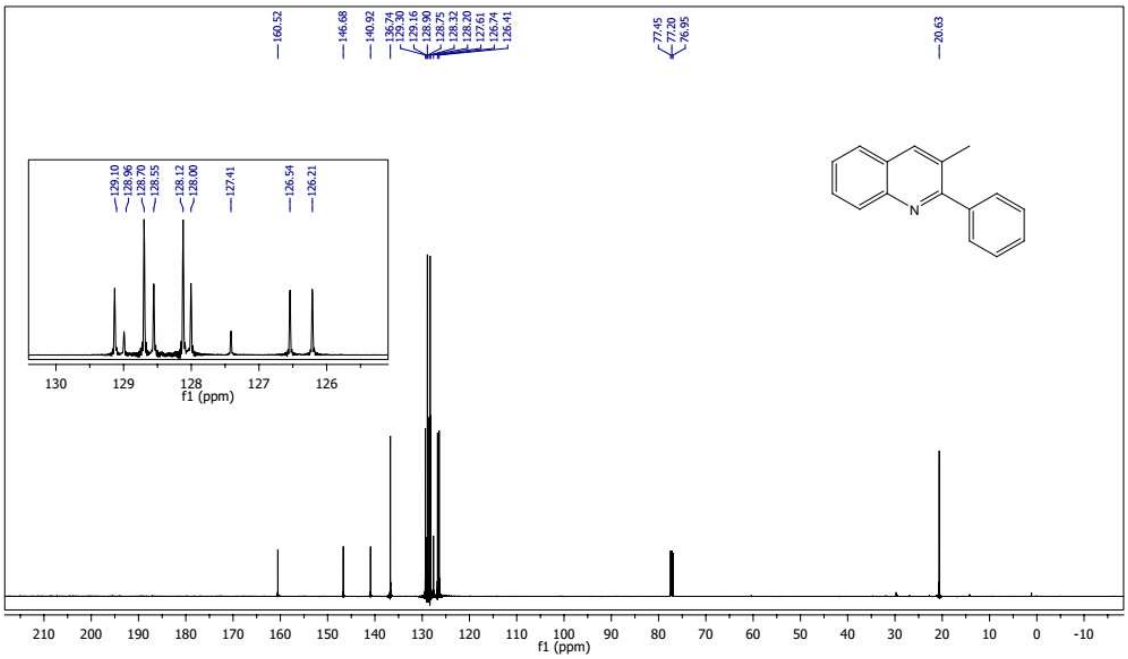
9aa ^{1}H-NMR



9aa ^{13}C-NMR

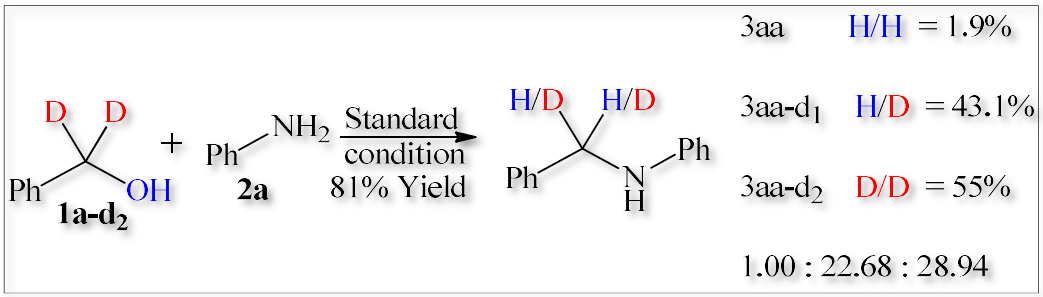


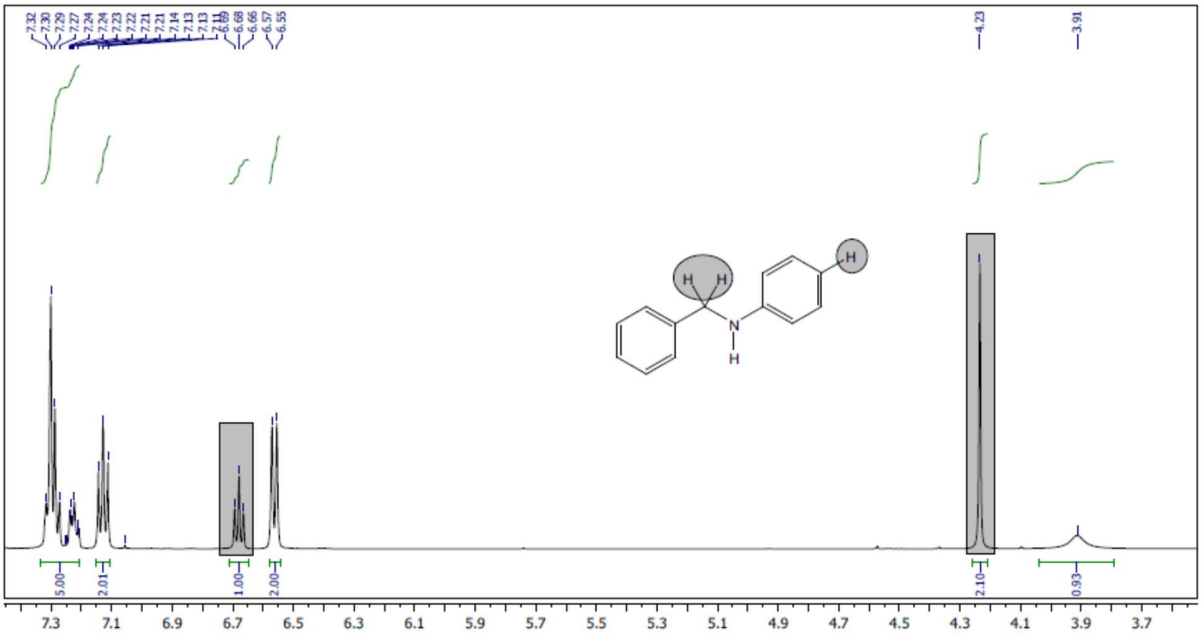
9ab ^{1}H-NMR



9ab ^{13}C-NMR

Table S2. Deuterium labeling study; ^{1}H NMR data.





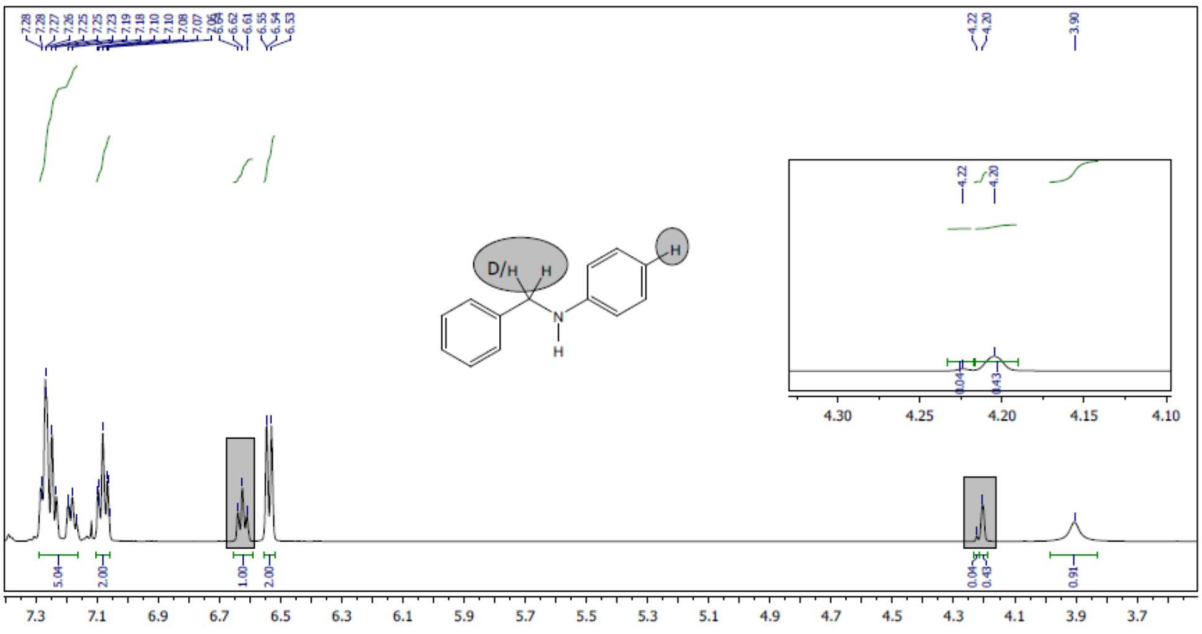


Table S3. Kinetic isotopic study; ^{1}H NMR data.