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Supporting Information

MCM-41-immobilized 1,10-phenanthroline-copper(I) complex: A highly efficient and recyclable catalyst for the coupling of aryl iodides with aliphatic alcohols

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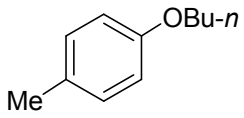
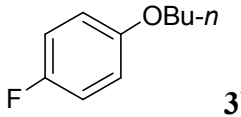
The spectral data of aryl alkyl ethers 3a-3f':



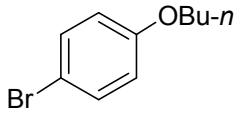
3a

4-Butoxytoluene.[1] Colorless oil. ^{1}H NMR (400 MHz, $CDCl_3$) δ = 7.07 (d, *J* = 8.4 Hz, 2H), 6.80 (d, *J* = 8.8 Hz, 2H), 3.93 (t, *J* = 6.6 Hz, 2H), 2.28 (s, 3H), 1.7-1.71 (m, 2H), 1.53-1.43 (m, 2H), 0.97 (t, *J* = 7.4 Hz, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ = 157.0, 129.9, 129.6, 114.4, 67.8, 31.4, 20.5, 19.3, 13.9.



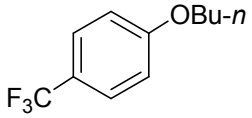
3b

1-Butoxy-4-fluorobenzene.[2] Colorless oil. ^{1}H NMR (400 MHz, $CDCl_3$) δ = 6.96 (t, *J* = 8.8 Hz, 2H), 6.84-6.80 (m, 2H), 3.91 (t, *J* = 6.6 Hz, 2H), 1.78-1.71 (m, 2H), 1.53-1.43 (m, 2H), 0.97 (t, *J* = 7.4 Hz, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ = 157.1 (d, *J* = 237.2 Hz), 155.3 (d, *J* = 2.0 Hz), 115.7 (d, *J* = 23.0 Hz), 115.4 (d, *J* = 7.9 Hz), 68.3, 31.4, 19.3, 13.9.



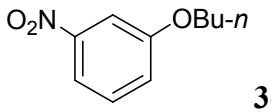
3c

1-Bromo-4-butoxybenzene.[3] Colorless oil. ^{1}H NMR (400 MHz, $CDCl_3$) δ = 7.26 (d, *J* = 9.2 Hz, 2H), 6.68 (d, *J* = 9.2 Hz, 2H), 3.82 (t, *J* = 6.4 Hz, 2H), 1.70-1.61 (m, 2H), 1.44-1.34 (m, 2H), 0.88 (t, *J* = 7.4 Hz, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ = 158.3, 132.2, 116.3, 112.6, 67.9, 31.3, 19.3, 13.9.



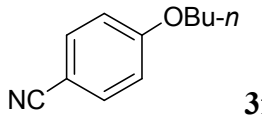
3d

1-Butoxy-4-(trifluoromethyl)benzene.[4] Colorless oil. ^{1}H NMR (400 MHz, $CDCl_3$) δ = 7.52 (d, *J* = 8.8 Hz, 2H), 6.93 (d, *J* = 8.4 Hz, 2H), 3.98 (t, *J* = 6.4 Hz, 2H), 1.81-1.74 (m, 2H), 1.54-1.44 (m, 2H), 0.98 (t, *J* = 7.4 Hz, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ = 161.7, 126.8 (q, ^3J = 3.7 Hz), 124.5 (q, ^1J = 269.3 Hz), 122.6 (q, ^2J = 32.4 Hz), 114.4, 67.9, 31.1, 19.2, 13.7.



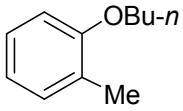
3e

1-Butoxy-3-nitrobenzene.[5] pale yellow liquid. ^{1}H NMR (400 MHz, $CDCl_3$) δ = 7.81-7.77 (m, 1H), 7.71 (t, *J* = 2.4 Hz, 1H), 7.41 (t, *J* = 8.2 Hz, 1H), 7.23-7.19 (m, 1H), 4.03 (t, *J* = 6.4 Hz, 2H), 1.84-1.77 (m, 2H), 1.57-1.46 (m, 2H), 0.99 (t, *J* = 7.4 Hz, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ = 159.7, 149.2, 129.9, 121.6, 115.5, 108.7, 68.4, 31.0, 19.2, 13.8.



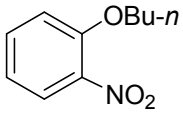
3f

4-Butoxybenzonitrile.[4] Colorless oil. ^{1}H NMR (400 MHz, $CDCl_3$) δ = 7.57 (d, *J* = 8.8 Hz, 2H), 6.93 (d, *J* = 8.8 Hz, 2H), 4.00 (t, *J* = 6.6 Hz, 2H), 1.83-1.74 (m, 2H), 1.55-1.44 (m, 2H), 0.98 (t, *J* = 7.4 Hz, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ = 162.5, 134.0, 119.4, 115.2, 103.6, 68.1, 31.0, 19.1, 13.8.



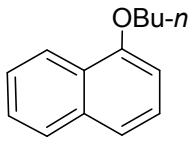
3g

2-Butoxytoluene.[6] Colorless oil. ^{1}H NMR (400 MHz, $CDCl_3$) δ = 7.09-7.03 (m, 2H), 6.78-6.71 (m, 2H), 3.88 (t, *J* = 6.4 Hz, 2H), 2.15 (s, 3H), 1.73-1.68 (m, 2H), 1.47-1.41 (m, 2H), 0.91 (t, *J* = 7.4 Hz, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ = 157.3, 130.6, 126.9, 126.7, 120.0, 110.9, 67.6, 31.5, 19.4, 16.2, 13.9.



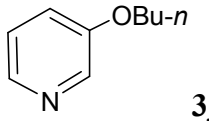
3h

1-Butoxy-2-nitrobenzene.[4] Yellow oil. ^{1}H NMR (400 MHz, $CDCl_3$) δ = 7.73 (dd, *J* = 8.2, 1.8 Hz, 1H), 7.45-7.40 (m, 1H), 7.00-6.90 (m, 2H), 4.03 (t, *J* = 6.2 Hz, 2H), 1.78-1.70 (m, 2H), 1.49-1.39 (m, 2H), 0.90 (t, *J* = 7.4 Hz, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ = 152.5, 140.0, 134.0, 125.5, 120.0, 114.4, 69.3, 31.0, 19.1, 13.7.



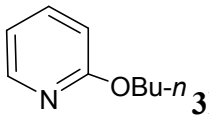
3i

1-Butoxynaphthalene.[5] Colorless oil. ^{1}H NMR (400 MHz, $CDCl_3$) δ = 8.30-8.27 (m, 1H), 7.76-7.74 (m, 1H), 7.46-7.32 (m, 4H), 6.74 (d, *J* = 7.6 Hz,1H), 4.07 (t, *J* = 6.4 Hz, 2H), 1.88-1.83 (m, 2H), 1.59-1.53 (m, 2H), 0.99 (t, *J* = 7.4 Hz, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ = 155.1, 134.7, 127.5, 126.4, 126.0, 125.9, 125.1, 122.2, 120.1, 104.7, 67.9, 31.5, 19.6, 14.0.



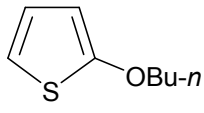
3j

3-Butoxypyridine.[7] Light yellow oil. ^{1}H NMR (400 MHz, $CDCl_3$) δ = 8.24 (s, 1H), 8.13 (s, 1H), 7.16-7.08 (m, 2H), 3.93 (t, *J* = 6.4 Hz, 2H), 1.75-1.67 (m, 2H), 1.46-1.37 (m, 2H), 0.91 (t, *J* = 7.4 Hz, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ = 155.3, 141.8, 138.0, 123.8, 121.1, 68.0, 31.2, 19.1, 13.8.



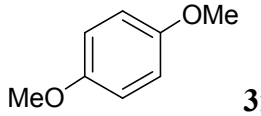
3k

2-Butoxypyridine.[1] Colorless oil. ^{1}H NMR (400 MHz, $CDCl_3$) δ = 8.08 (dd, *J* = 5.2, 1.2 Hz, 1H), 7.51-7.46 (m, 1H), 6.79-6.75 (m, 1H), 6.65 (d, *J* = 8.4 Hz, 1H), 4.21 (t, *J* = 6.8 Hz, 2H), 1.73-1.65 (m, 2H), 1.46-1.36 (m, 2H), 0.90 (t, *J* = 7.4 Hz, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ = 164.1, 146.9, 138.5, 116.5, 111.1, 65.7, 31.2, 19.3, 13.9.



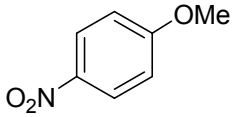
3l

2-Butoxythiophene.[1] Colorless oil. ^{1}H NMR (400 MHz, $CDCl_3$) δ = 6.65-6.62 (m, 1H), 6.46-6.44 (m, 1H), 6.13-6.11 (m, 1H), 3.95 (t, *J* = 6.4 Hz, 2H), 1.72-1.65 (m, 2H), 1.45-1.35 (m, 2H), 0.89 (t, *J* = 7.4 Hz, 3H). ^{13}C NMR (101 MHz, $CDCl_3$) δ = 165.9, 124.7, 111.7, 104.5, 73.7, 31.2, 19.1, 13.8.



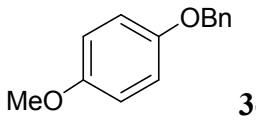
3m

1,4-Dimethoxybenzene.[8] White solid. Mp: 48-49 °C. ^{1}H NMR (400 MHz, $CDCl_3$) δ = 6.83 (s, 4H), 3.75 (s, 6H). ^{13}C NMR (100 MHz, $CDCl_3$) δ = 153.8, 114.7, 55.7.



3n

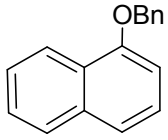
4-Nitroanisole.[9] Light yellow solid, Mp: 50.8 °C. ^{1}H NMR (400 MHz, $CDCl_3$) δ = 8.20 (d, *J* = 9.2 Hz, 2H), 6.96 (d, *J* = 9.2 Hz, 2H), 3.92 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ = 164.6, 141.5, 125.9, 114.0, 56.0.



3o

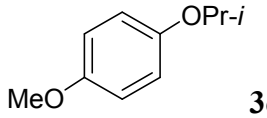
4-Benzyloxyanisole.[10] White solid. Mp: 63 °C. ^{1}H NMR (400 MHz, $CDCl_3$) δ= 7.43-

7.28 (m, 5H), 6.90 (d, J = 9.2 Hz, 2H), 6.82 (d, J = 8.8 Hz, 2H), 4.99 (s, 2H), 3.74 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ= 154.0, 153.0, 137.4, 128.6, 127.9, 127.5, 115.9, 114.7, 70.8, 55.7.



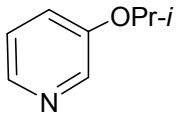
3p

1-Benzyloxynaphthalene.[11] Colorless oil. ^{1}H NMR (400 MHz, $CDCl_3$) δ = 8.36-8.33 (m, 1H), 7.76-7.73 (m, 1H), 7.49 (d, J = 7.2 Hz, 2H), 7.46-7.32 (m, 7H), 6.83 (d, J = 7.6 Hz, 1H), 5.19 (s, 2H). ^{13}C NMR (100 MHz, $CDCl_3$) δ = 154.6, 137.3, 134.7, 128.7, 128.0, 127.6, 127.5, 126.6, 126.0, 125.4, 122.3, 120.6, 105.3, 70.2.



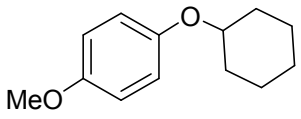
3q

4-*iso*-Propoxyanisole.[10] Colorless oil. ^{1}H NMR (400 MHz, $CDCl_3$) δ = 6.84 (d, J = 9.2 Hz, 2H), 6.81 (d, J = 9.2 Hz, 2H), 4.44-4.37 (m, 1H), 3.76 (s, 3H), 1.30 (d, J = 6.0 Hz, 6H). ^{13}C NMR (100 MHz, $CDCl_3$) δ = 153.9, 151.9, 117.5, 114.7, 71.0, 55.7, 22.1.



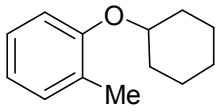
3r

3-*iso*-Propoxypyridine.[12] Colorless oil. ^{1}H NMR (400 MHz, $CDCl_3$) δ = 8.29 (s, 1H), 8.18 (s, 1H), 7.23-7.16 (m, 2H), 4.62-4.54 (m, 1H), 1.36 (d, J = 6.0 Hz, 6H). ^{13}C NMR (100 MHz, $CDCl_3$) δ = 154.1, 141.8, 139.3, 123.9, 122.5, 70.6, 21.9.



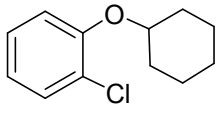
3s

(*p*-Methoxyphenoxy)cyclohexane.[13] Colorless oil. ^{1}H NMR (400 MHz, $CDCl_3$) δ = 6.86-6.79 (m, 4H), 4.12-4.05 (m, 1H), 3.75 (s, 3H), 1.96-1.92 (m, 2H), 1.79-1.74 (m, 2H), 1.53-1.42 (m, 3H), 1.36-1.27 (m, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ = 153.9, 151.8, 117.7, 114.6, 76.6, 55.7, 32.0, 25.7, 23.9.



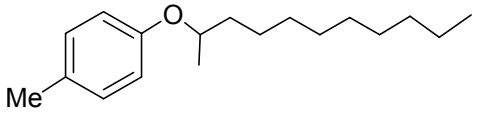
3t

1-Cyclohexyloxy-2-methylbenzene.[14] Colorless oil. ^{1}H NMR (400 MHz, $CDCl_3$) δ = 7.14-7.08 (m, 2H), 6.84-6.79 (m, 2H), 4.27-4.21 (m, 1H), 2.22 (s, 3H), 1.96-1.89 (m, 2H), 1.83-1.74 (m, 2H), 1.63-1.51 (m, 3H), 1.41-1.30 (m, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ = 156.0, 130.9, 128.0, 126.6, 120.2, 113.3, 75.3, 31.9, 25.8, 23.7, 16.5.



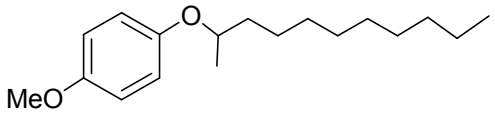
3u

1-Chloro-2-cyclohexyloxybenzene.[15] Colorless oil. ^{1}H NMR (400 MHz, $CDCl_3$) δ = 7.34 (dd, *J* = 8.0, 1.6, 1H), 7.18-7.13 (m, 1H), 6.94 (dd, *J* = 8.4, 1.2 Hz, 1H), 6.88-6.83 (m, 1H), 4.31-4.25 (m, 1H), 1.97-1.91 (m, 2H), 1.86-1.78 (m, 2H), 1.67-1.52 (m, 3H), 1.40-1.30 (m, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ = 153.5, 130.4, 127.5, 124.5, 121.4, 116.3, 77.1, 31.7, 25.6, 23.5.



3v

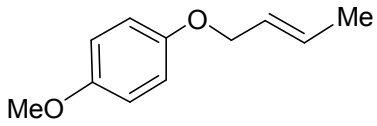
1-Methyl-4-(1-methyldecyloxy)benzene. Colorless oil. ^{1}H NMR (400 MHz, $CDCl_3$) δ = 7.06 (d, *J* = 8.4 Hz, 2H), 6.78 (d, *J* = 8.8 Hz, 2H), 4.32-4.24 (m, 1H), 2.27 (s, 3H), 1.76-1.67 (m, 1H), 1.58-1.49 (m, 1H), 1.42-1.24 (m, 17H), 0.88 (t, *J* = 6.8 Hz, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ = 156.1, 129.9, 129.7, 116.0, 74.1, 36.6, 31.9, 29.7, 29.6, 29.4, 25.6, 22.7, 20.5, 19.8, 14.1. Anal. Calcd. for $C_{18}H_{30}O$: C, 82.38; H, 11.52. Found: C, 82.14; H, 11.33.



3w

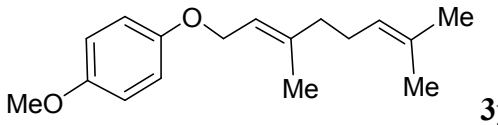
1-Methoxy-4-(1-methyldecyloxy)benzene. Colorless oil. ^{1}H NMR (400 MHz, $CDCl_3$) δ = 6.86- 6.79 (m, 4H), 4.23-4.18 (m, 1H), 3.76 (s, 3H), 1.74-1.67 (m, 1H), 1.55-1.48 (m, 1H), 1.43-1.23 (m, 17H), 0.88 (t, *J* = 6.8 Hz, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ = 153.8, 152.3, 117.5, 114.6, 75.1, 55.7, 36.6, 31.9, 29.7, 29.6, 29.3, 25.6, 22.7, 19.8,

14.1. Anal. Calcd. for $C_{18}H_{30}O_2$: C, 77.65; H, 10.86. Found: C, 77.39; H, 10.57.



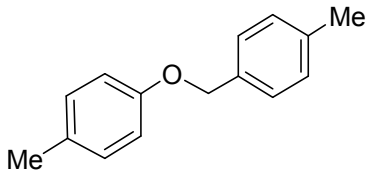
3x

1-(But-2-enyloxy)-4-methoxybenzene.[12] Light yellow oil. ^{1}H NMR (400 MHz, $CDCl_3$) δ = 6.86-6.80 (m, 4H), 5.84-5.79 (m, 1H), 5.76-5.71 (m, 1H), 4.39 (d, *J* = 6.0 Hz, 2H), 3.75 (s, 3H), 1.74 (dd, *J* = 6.0, 1.2 Hz, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ = 153.9, 152.9, 130.3, 126.4, 115.7, 114.6, 69.4, 55.7, 17.9.



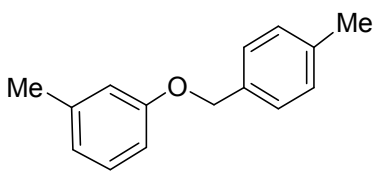
3y

1-(3,7-Dimethyl-octa-2,6-dienyloxy)-4-methoxybenzene.[16] Light yellow oil. ^{1}H NMR (400 MHz, $CDCl_3$) δ = 6.78-6.71 (m, 4H), 5.39 (t, *J* = 1.2 Hz, 1H), 5.01 (t, *J* = 1.2 Hz, 1H), 4.39 (d, *J* = 6.8 Hz, 2H), 3.66 (s, 3H), 2.07-1.95 (m, 4H), 1.63 (s, 3H), 1.59 (s, 3H), 1.52 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ = 153.8, 153.1, 140.8, 131.7, 123.9, 120.0, 115.7, 114.6, 65.5, 55.7, 39.6, 26.4, 25.7, 17.7, 16.6.



3z

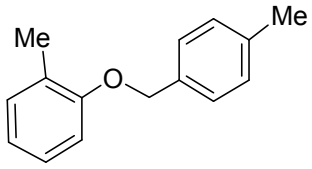
1-(4-Methylbenzyloxy)-4-methylbenzene.[17] White solid, Mp: 71 °C. ^{1}H NMR (400 MHz, $CDCl_3$) δ = 7.30 (d, *J* = 7.6 Hz, 2H), 7.17 (d, *J* = 7.6 Hz, 2H), 7.07 (d, *J* = 8.4 Hz, 2H), 6.86 (d, *J* = 8.4 Hz, 2H), 4.98 (s, 2H), 2.34 (s, 3H), 2.27 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ = 156.8, 137.7, 134.3, 130.1, 129.9, 129.3, 127.6, 114.8, 70.1, 21.3, 20.5.



3a'

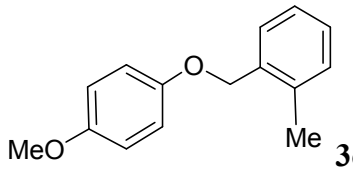
1-(4-Methylbenzyloxy)-3-methylbenzene. White solid, Mp: 38-39 °C. ^{1}H NMR (400

MHz, $CDCl_3$) δ = 7.20 (d, *J* = 7.6 Hz, 2H), 7.09-7.02 (m, 3H), 6.70-6.64 (m, 3H), 4.87 (s, 2H), 2.24 (s, 3H), 2.21 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ = 159.1, 139.6, 137.7, 134.3, 129.4, 129.3, 127.7, 121.8, 115.9, 111.8, 69.9, 21.7, 21.3. Anal. Calcd. for $C_{15}H_{16}O$: C, 84.87; H, 7.60. Found: C, 84.63; H, 7.46.



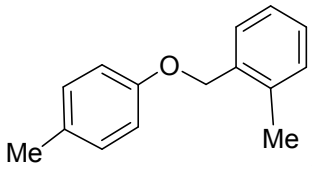
3b'

1-(4-Methylbenzyloxy)-2-methylbenzene.[18] White solid, Mp: 62 °C. ^1H NMR (400 MHz, $CDCl_3$) δ = 7.24 (d, *J* = 6.8 Hz, 2H), 7.12-7.02 (m, 4H), 6.78 (d, *J* = 7.6 Hz, 2H), 4.93 (s, 2H), 2.27 (s, 3H), 2.19 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ = 157.1, 137.5, 134.6, 130. 8, 129.3, 127.3, 127.2, 126.8, 120.6, 111.5, 69.8, 21.3, 16.5.



3c'

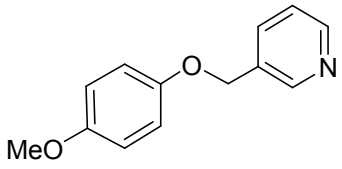
1-(2-Methylbenzyloxy)-4-methoxybenzene. White solid, Mp: 53-54 °C. ^1H NMR (400 MHz, $CDCl_3$) δ = 7.38 (d, *J* = 7.2 Hz, 1H), 7.25-7.16 (m, 3H), 6.91 (d, *J* = 9.2 Hz, 2H), 6.82 (d, *J* = 9.2 Hz, 2H), 4.95 (s, 2H), 3.73 (s, 3H), 2.35 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ = 154.1, 153.2, 136.7, 135.2, 130.5, 128.7, 128.3, 126.1, 115.9, 114.8, 69.4, 55.8, 19.0. Anal. Calcd. for $C_{15}H_{16}O_2$: C, 78.92; H, 7.06. Found: C, 78.64; H, 6.87.



3d'

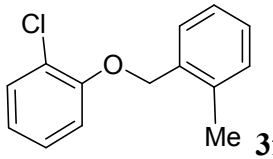
1-(2-Methylbenzyloxy)-4-methylbenzene. White solid, Mp: 42-43 °C. ^1H NMR (400 MHz, $CDCl_3$) δ = 7.40 (d, *J* = 6.8 Hz, 1H), 7.27-7.20 (m, 3H), 7.10 (d, *J* = 8.4 Hz, 2H), 6.89 (d, *J* = 8.4 Hz, 2H), 5.00 (s, 2H), 2.37 (s, 3H), 2.29 (s, 3H). ^{13}C NMR (100

MHz, $CDCl_3$) δ = 156.9, 136.7, 135.1, 130.4, 130.2, 129.9, 128.6, 128.2, 126.0, 114.7, 68.7, 20.5, 18.9. Anal. Calcd. for $C_{15}H_{16}O$: C, 84.87; H, 7.60. Found: C, 84.66; H, 7.43.



3e'

3-[(4-methoxyphenoxy)methyl]pyridine. Light yellow solid. Mp: 35 °C. ^{1}H NMR (400 MHz, $CDCl_3$) δ = 8.66 (s, 1H), 8.57 (d, *J* = 4.8 Hz, 1H), 7.76 (d, *J* = 8.0 Hz, 1H), 7.33-7.28 (m, 1H), 6.90 (d, *J* = 9.2 Hz, 2H), 6.84 (d, *J* = 8.8 Hz, 2H), 5.02 (s, 2H), 3.76 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ = 154.3, 152.5, 149.3, 149.0, 135.3, 132.8, 123.5, 115.9, 114.8, 68.3, 55.7. Anal. Calcd. for $C_{13}H_{13}NO_2$: C, 72.54; H, 6.09; N, 6.51. Found: C, 72.28; H, 6.23; N, 6.31.



3f'

1-(2-Methylbenzyloxy)-2-chlorobenzene. Colorless oil. ^{1}H NMR (400 MHz, $CDCl_3$) δ = 7.38 (d, *J* = 6.8 Hz, 1H), 7.29 (dd, *J* = 8.0, 1.6 Hz, 1H), 7.17-7.09 (m, 4H), 6.91 (d, *J* = 8.4 Hz, 1H), 6.82 (t, *J* = 7.6 Hz, 1H), 5.02 (s, 2H), 2.31 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ = 154.3, 136.5, 134.4, 130.4, 128.3, 127.7, 126.1, 123.4, 121.7, 114.0, 69.5, 19.0. Anal. Calcd. for $C_{14}H_{13}ClO$: C, 72.26; H, 5.63. Found: C, 72.38; H, 5.39.

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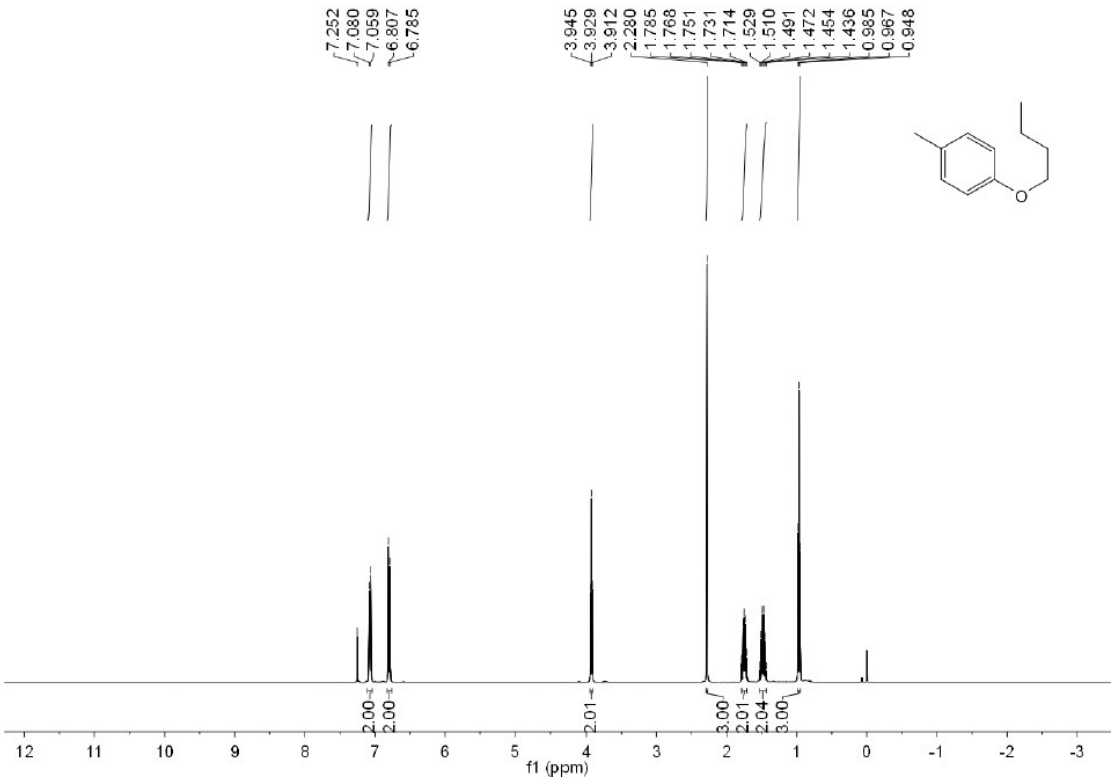
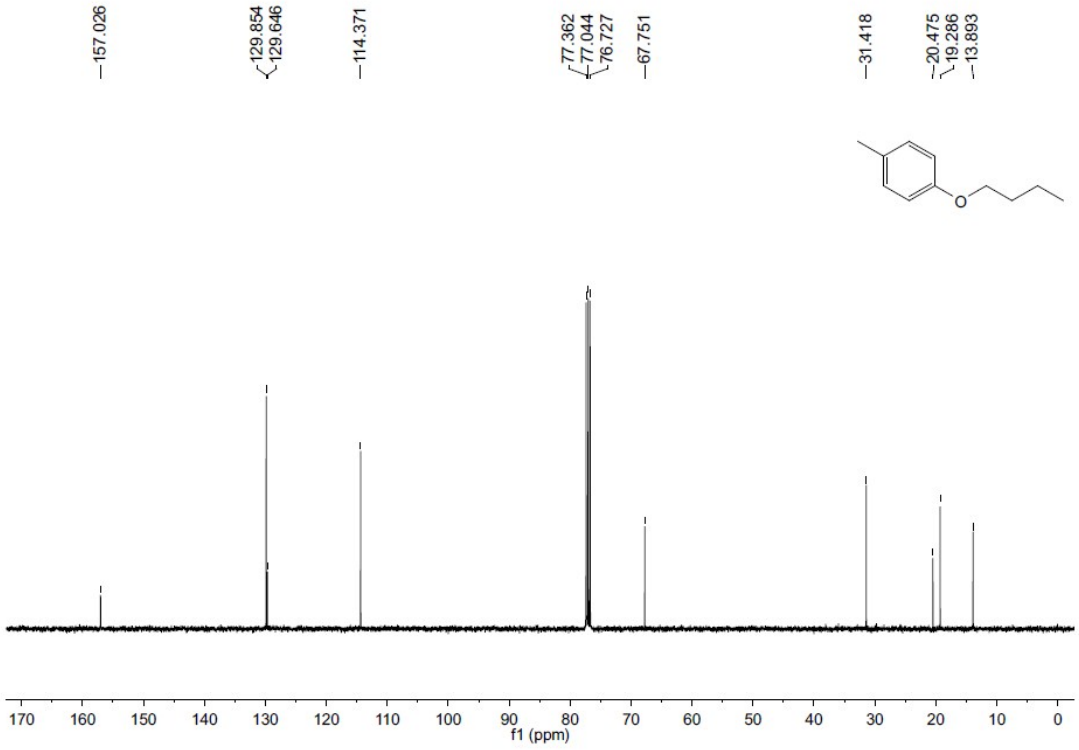
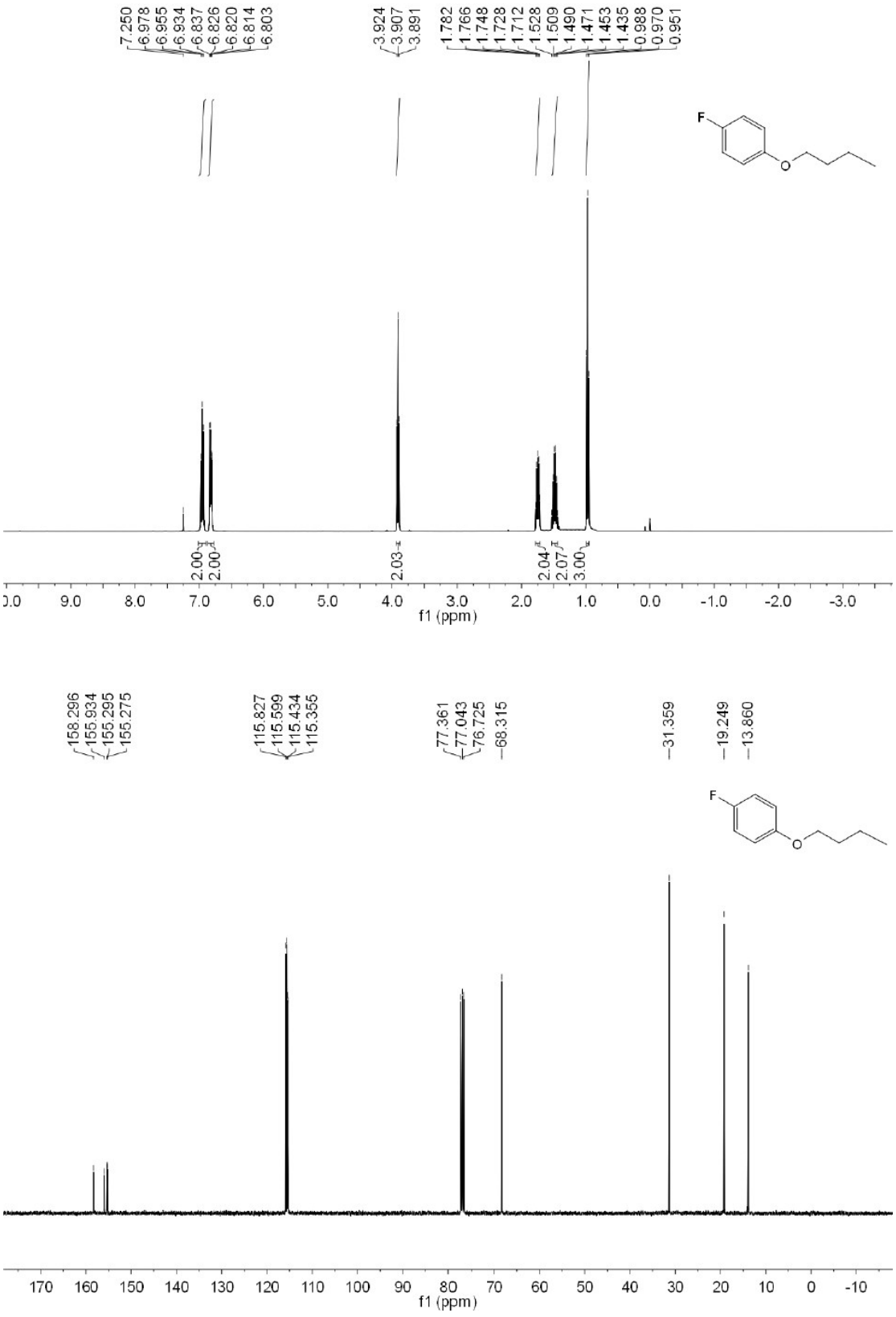
^{1}H NMR and ^{13}C NMR spectra of compounds 3a-3f'





^{1}H NMR and ^{13}C NMR spectra of compound **3a**



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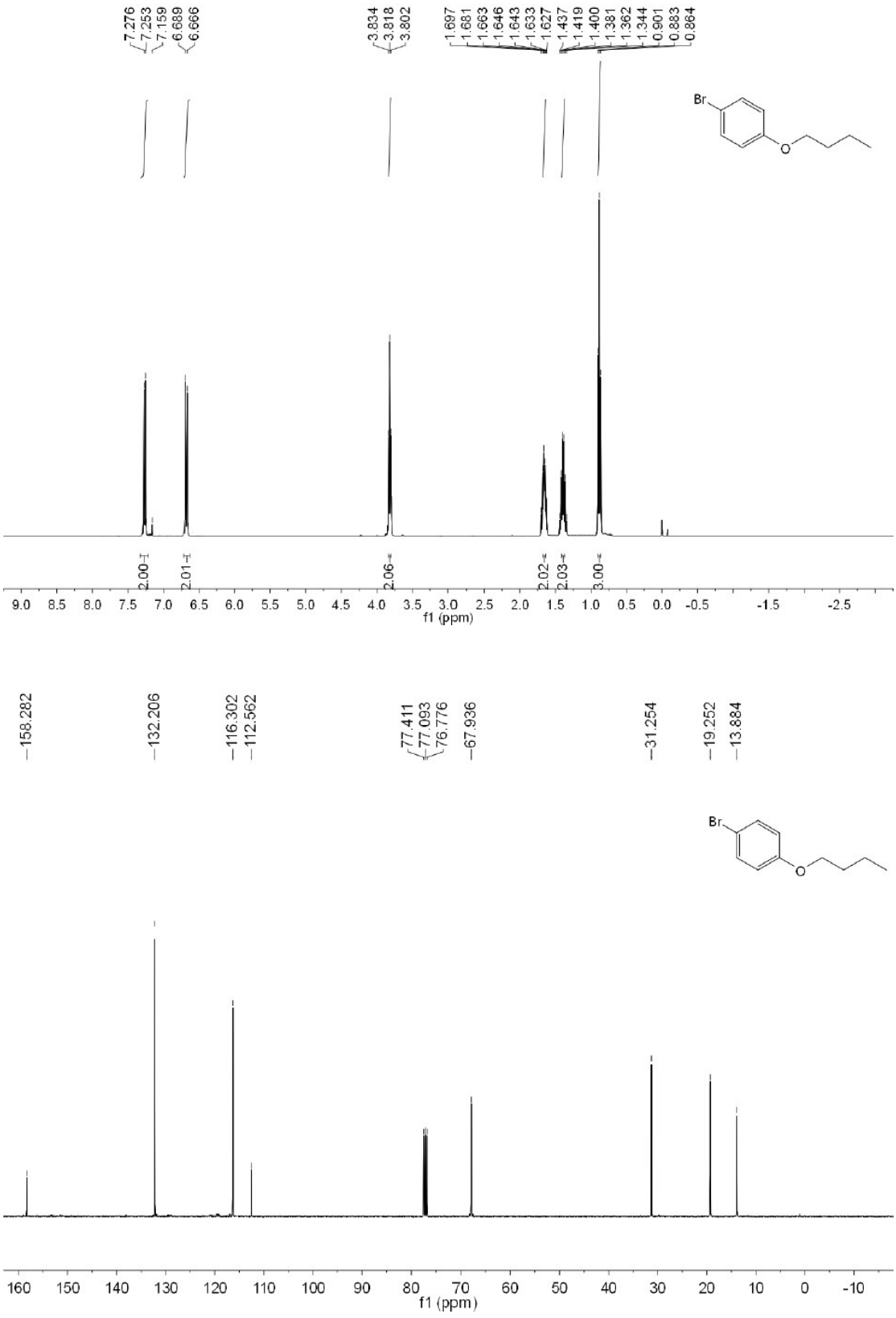

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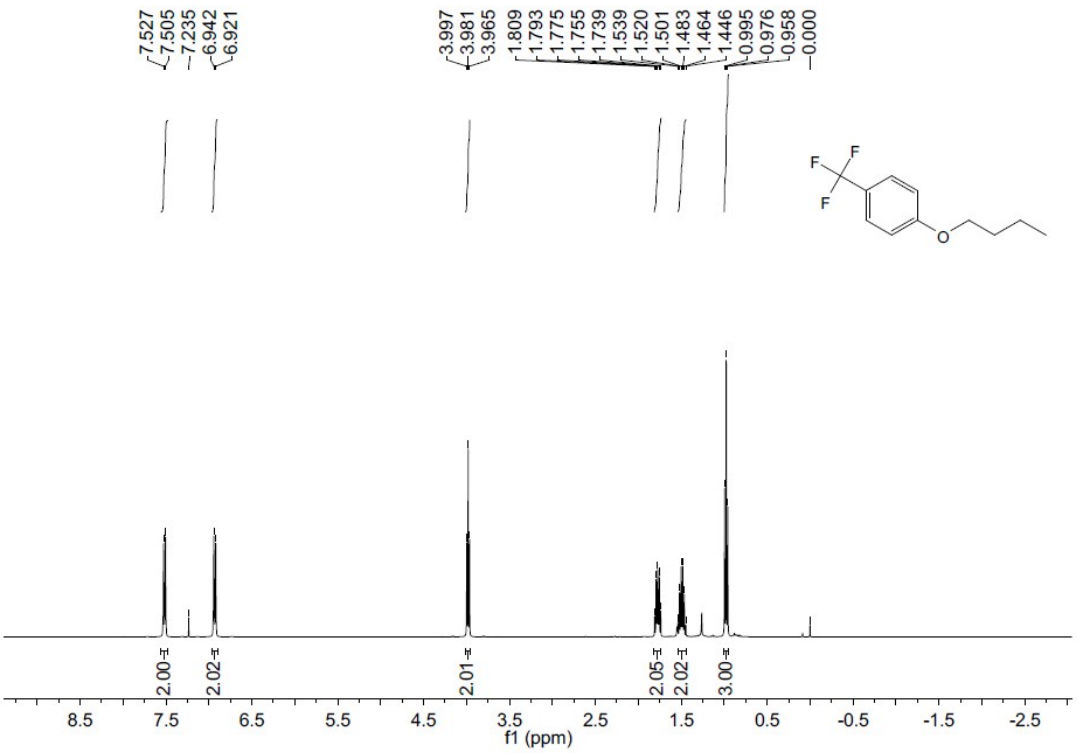

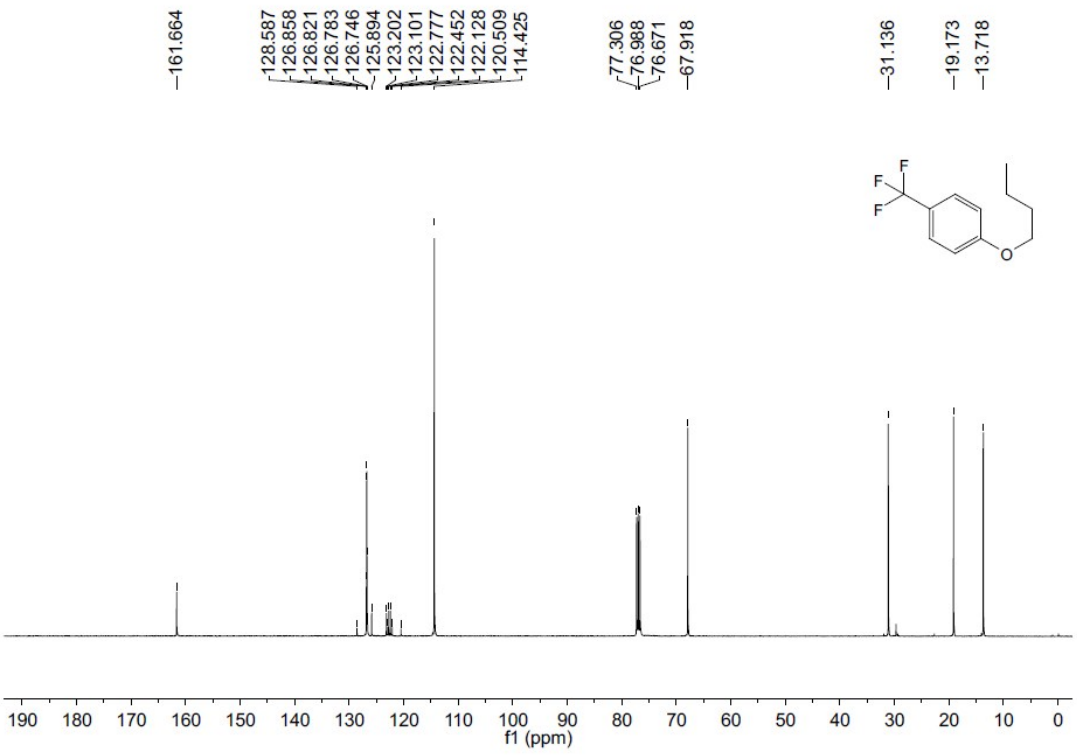

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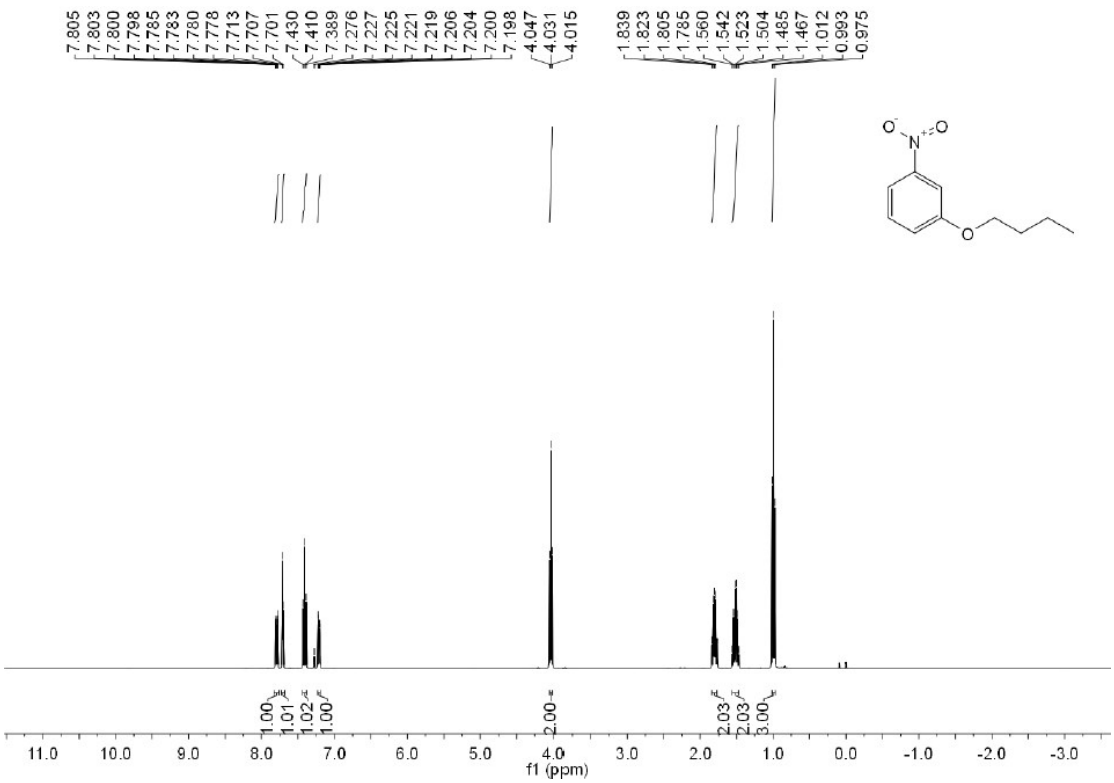
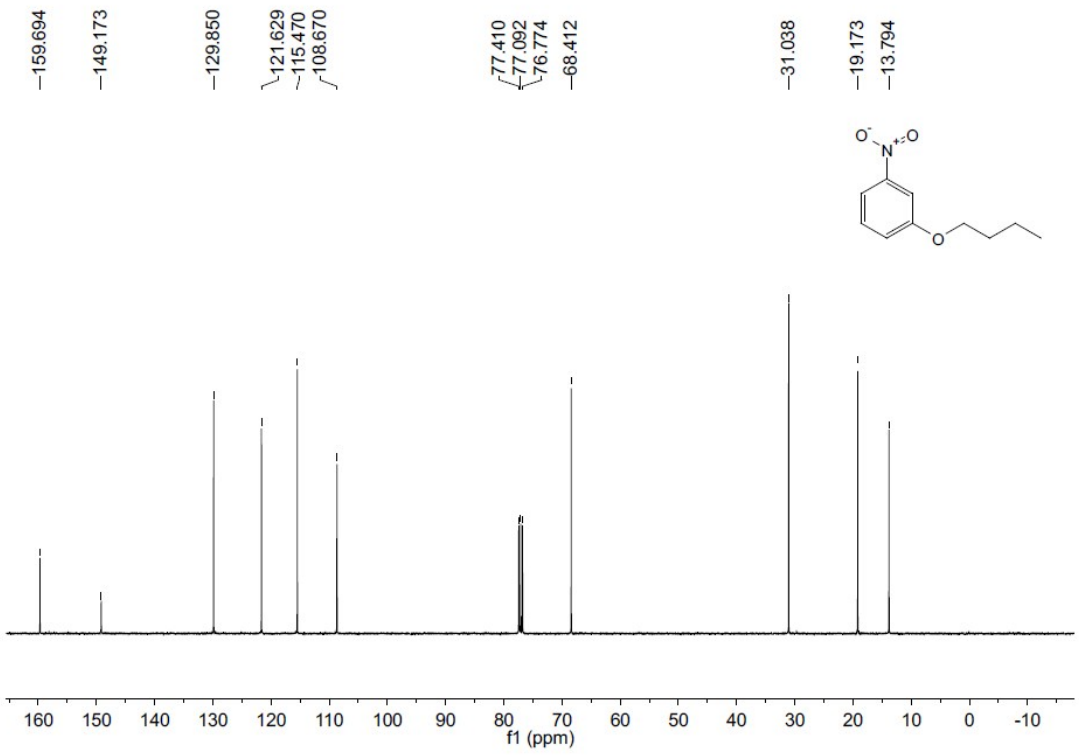
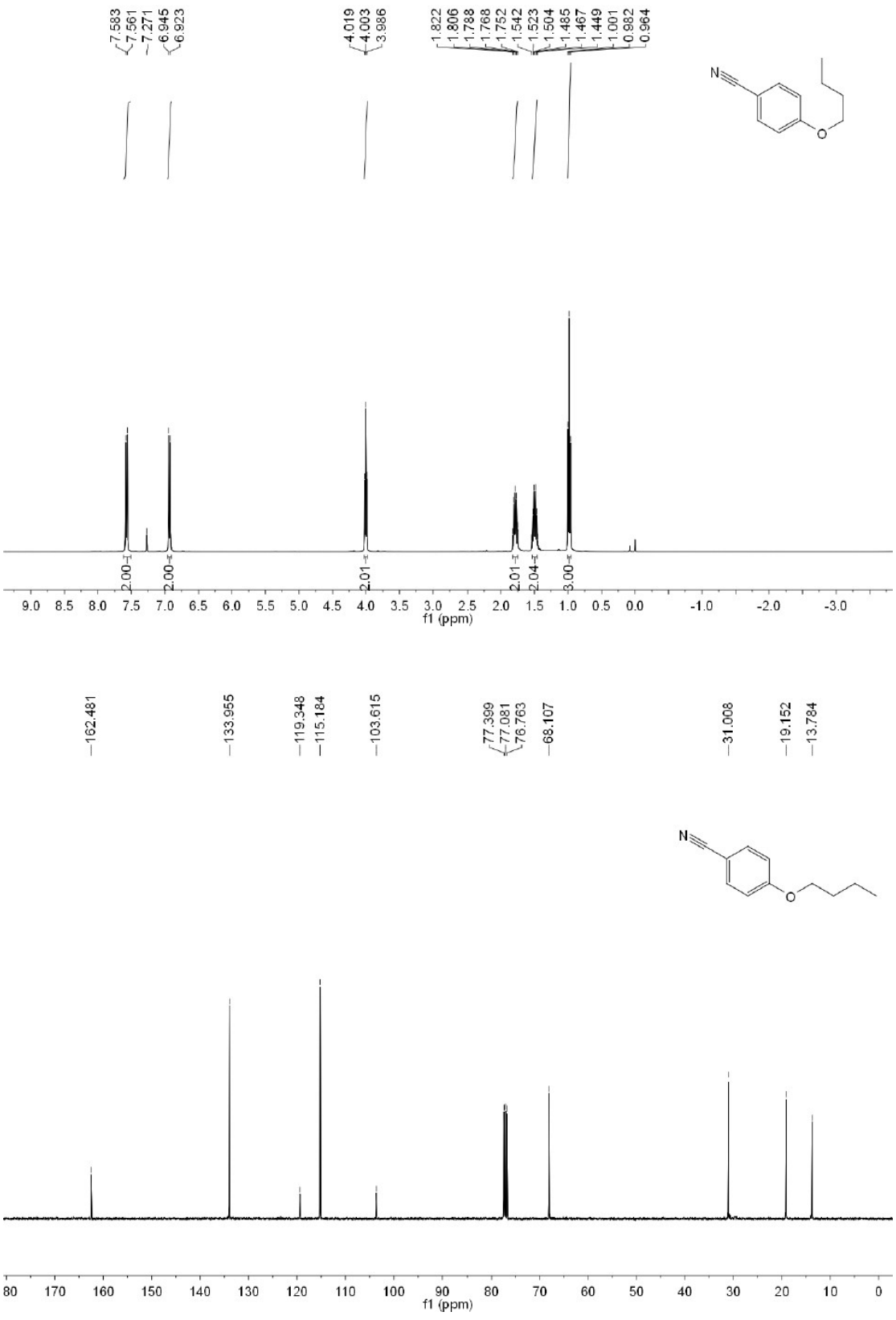
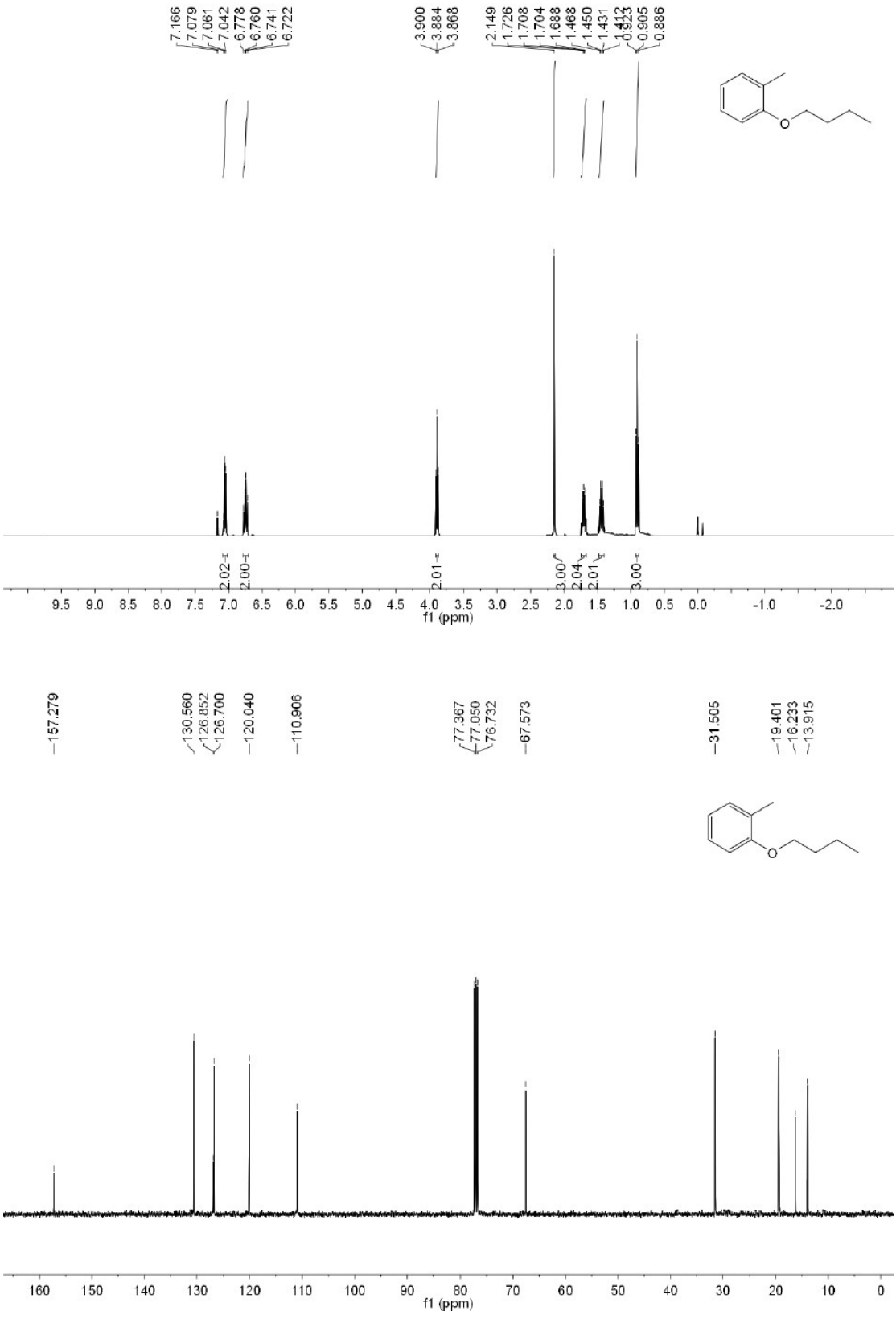




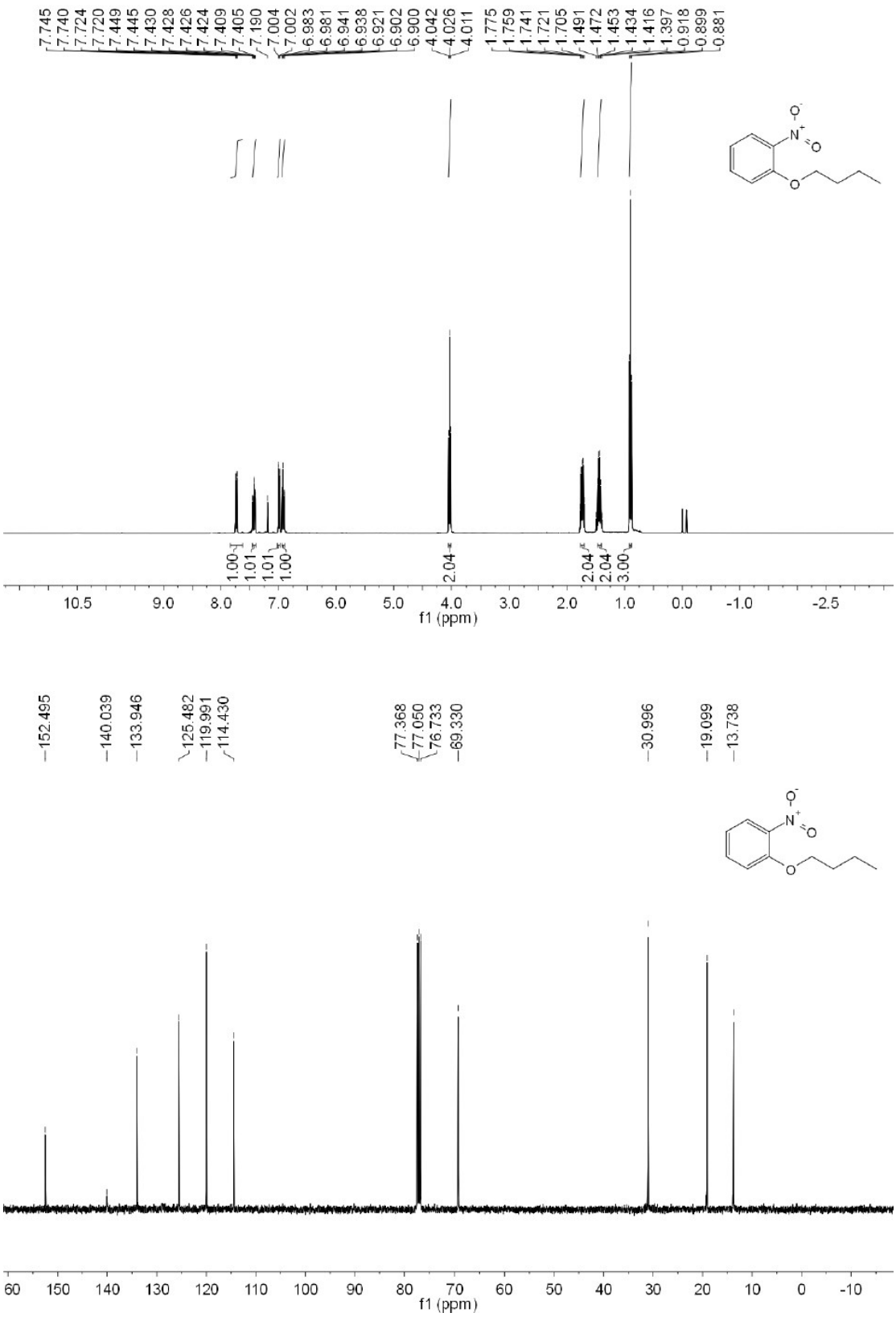
^{1}H NMR and ^{13}C NMR spectra of compound **3e**



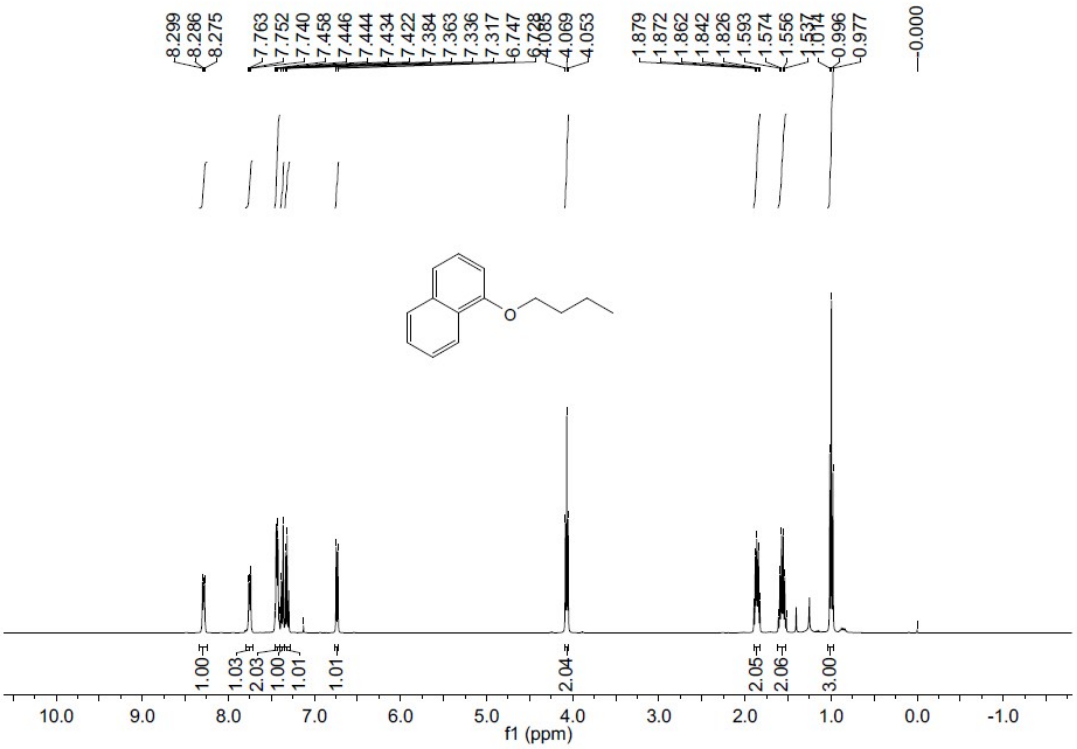
^{1}H NMR and ^{13}C NMR spectra of compound **3f**

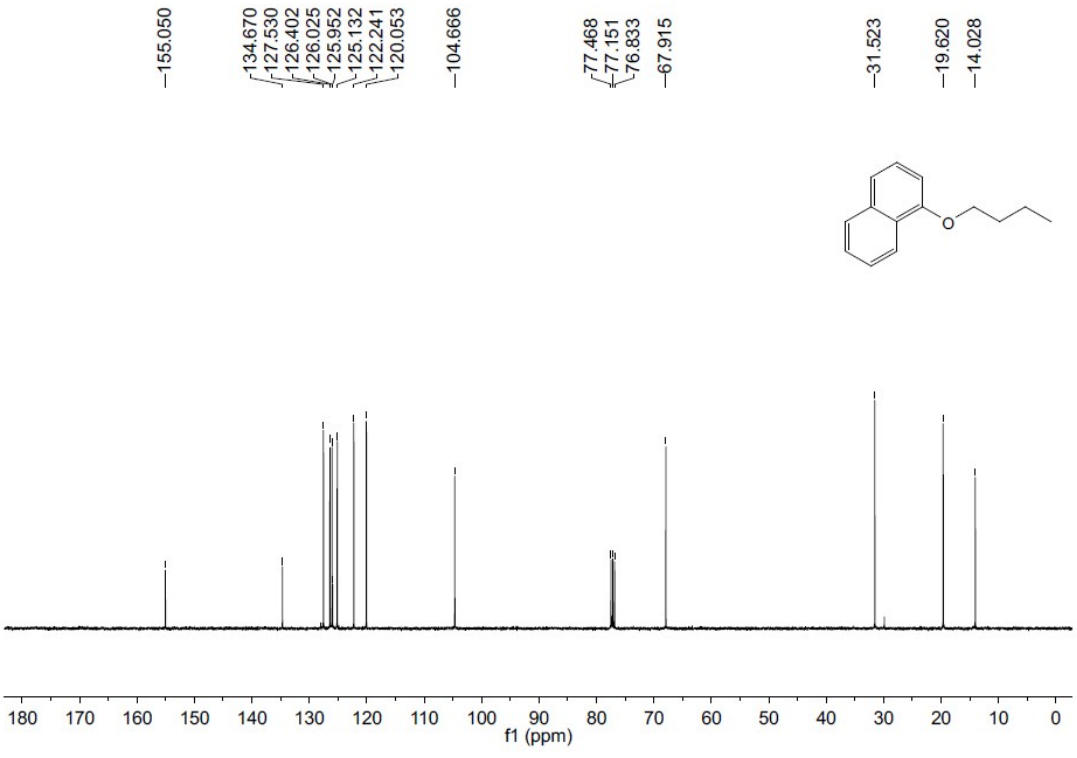


^{1}H NMR and ^{13}C NMR spectra of compound **3g**

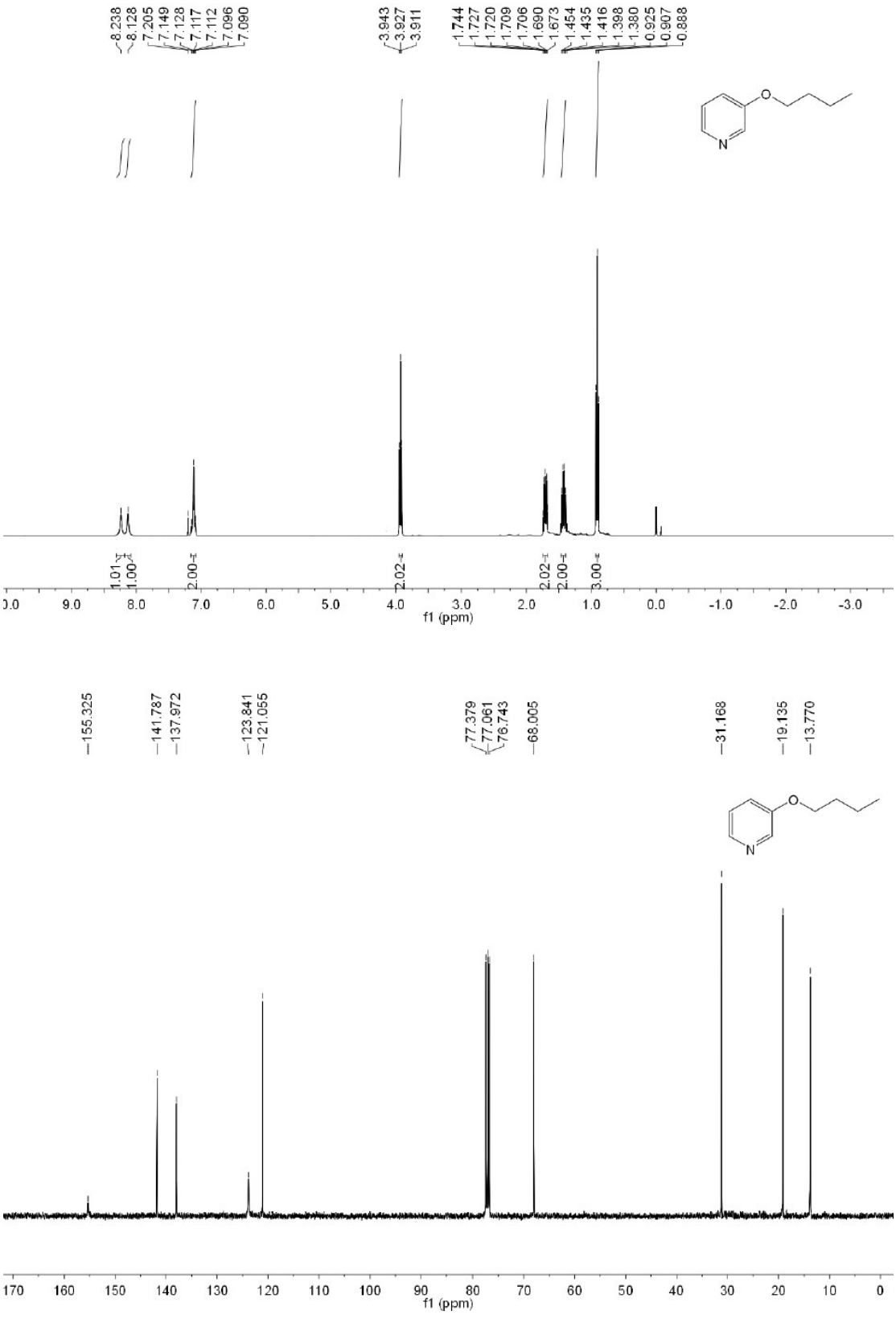


^{1}H NMR and ^{13}C NMR spectra of compound **3h**





^{1}H NMR and ^{13}C NMR spectra of compound **3i**



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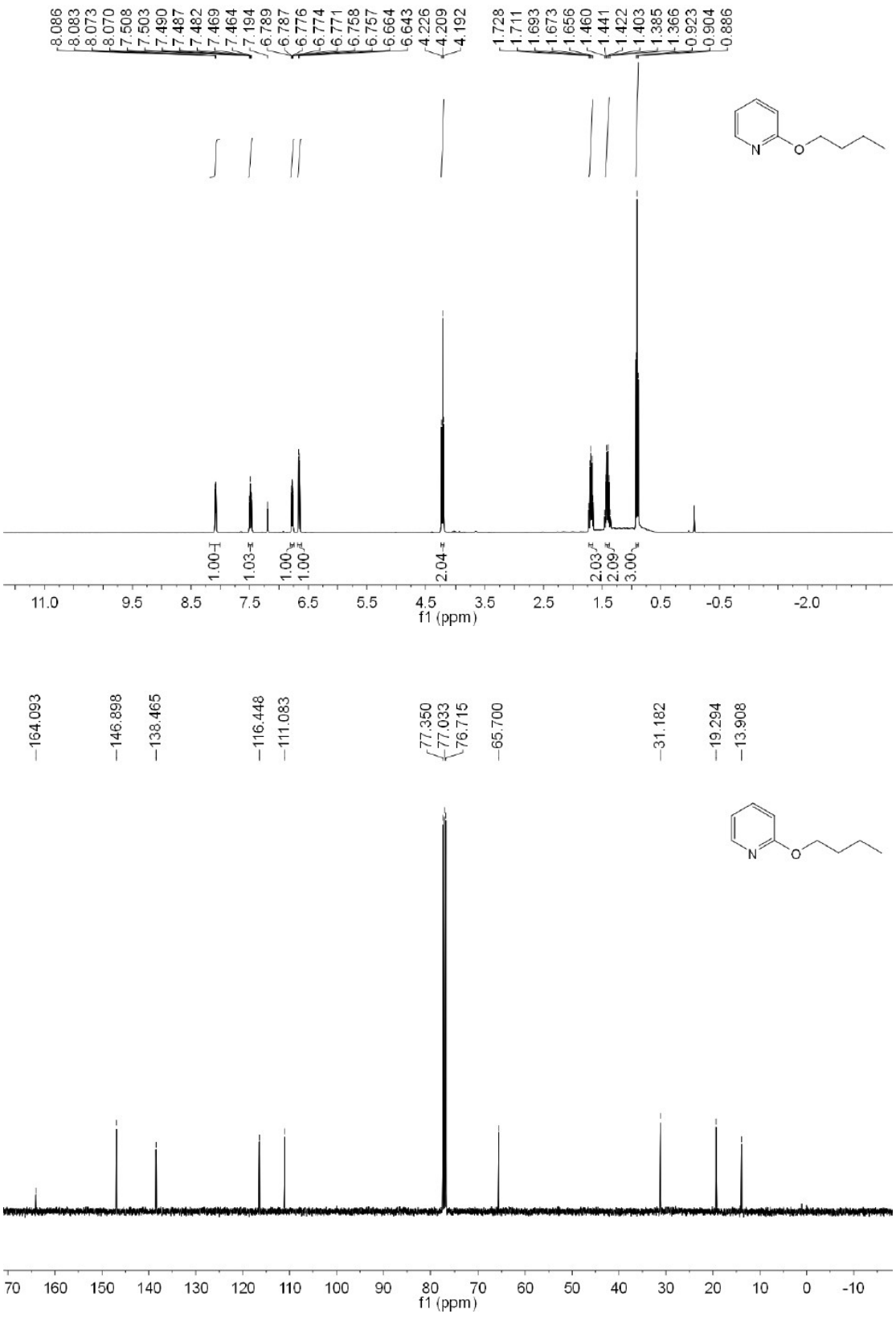

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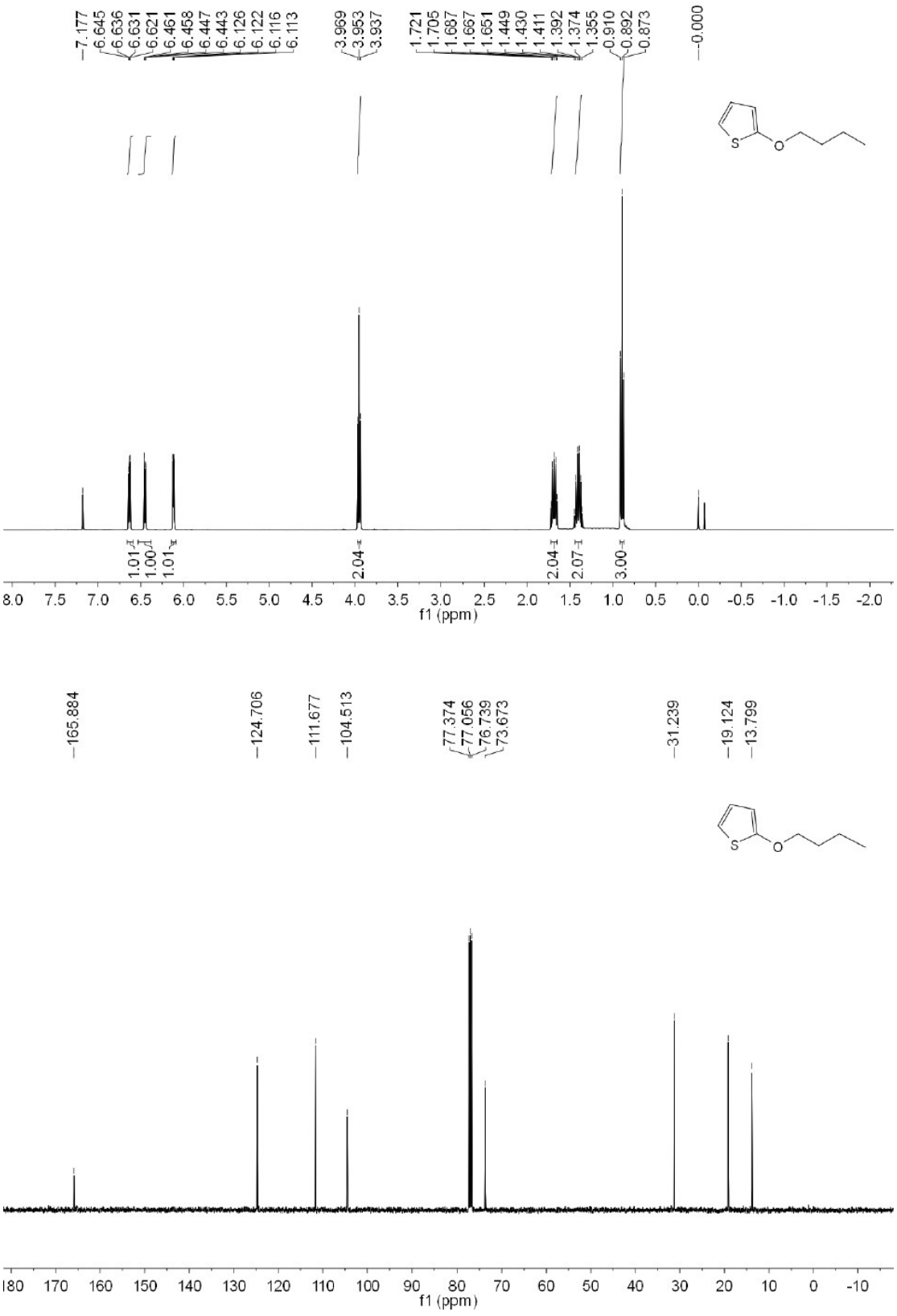
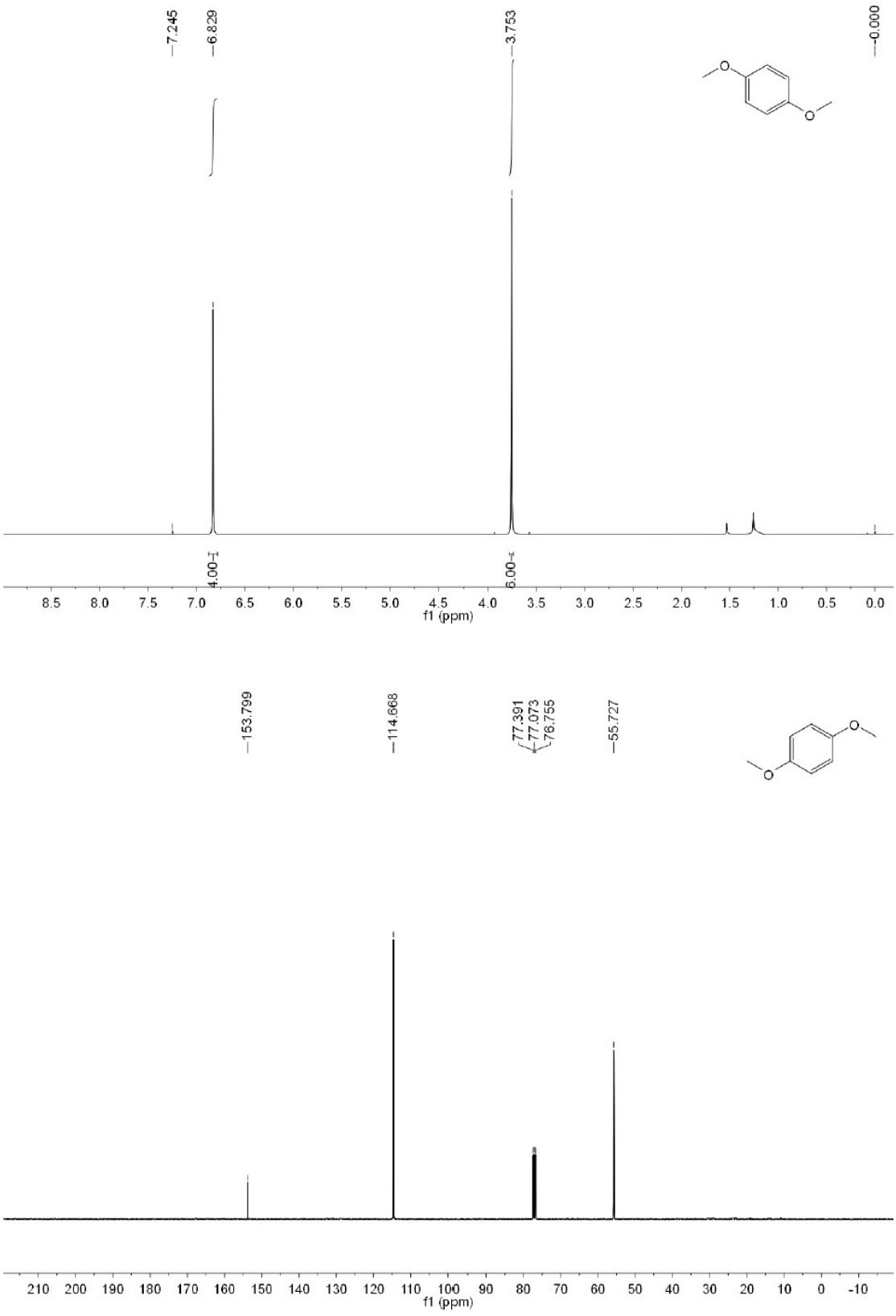
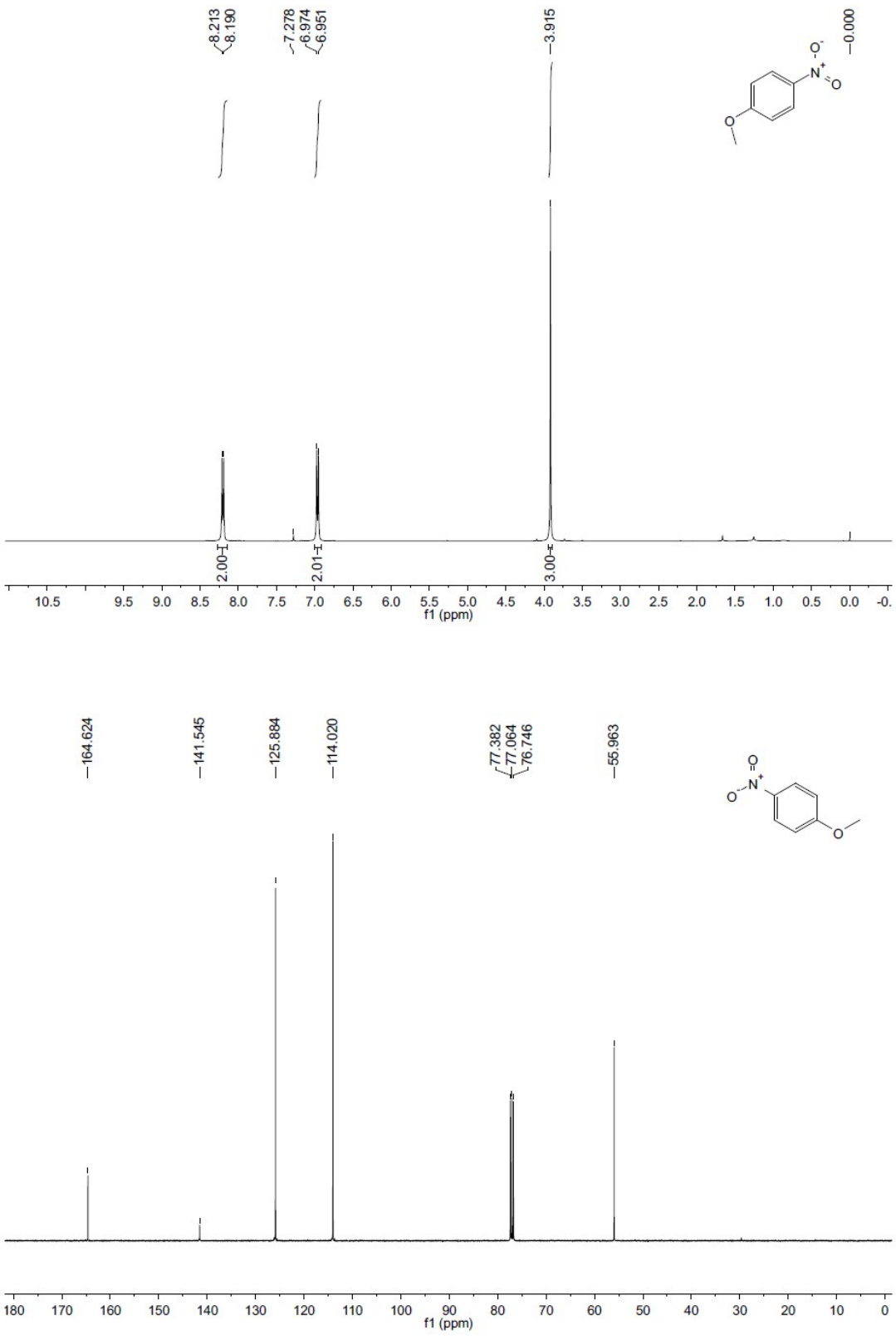


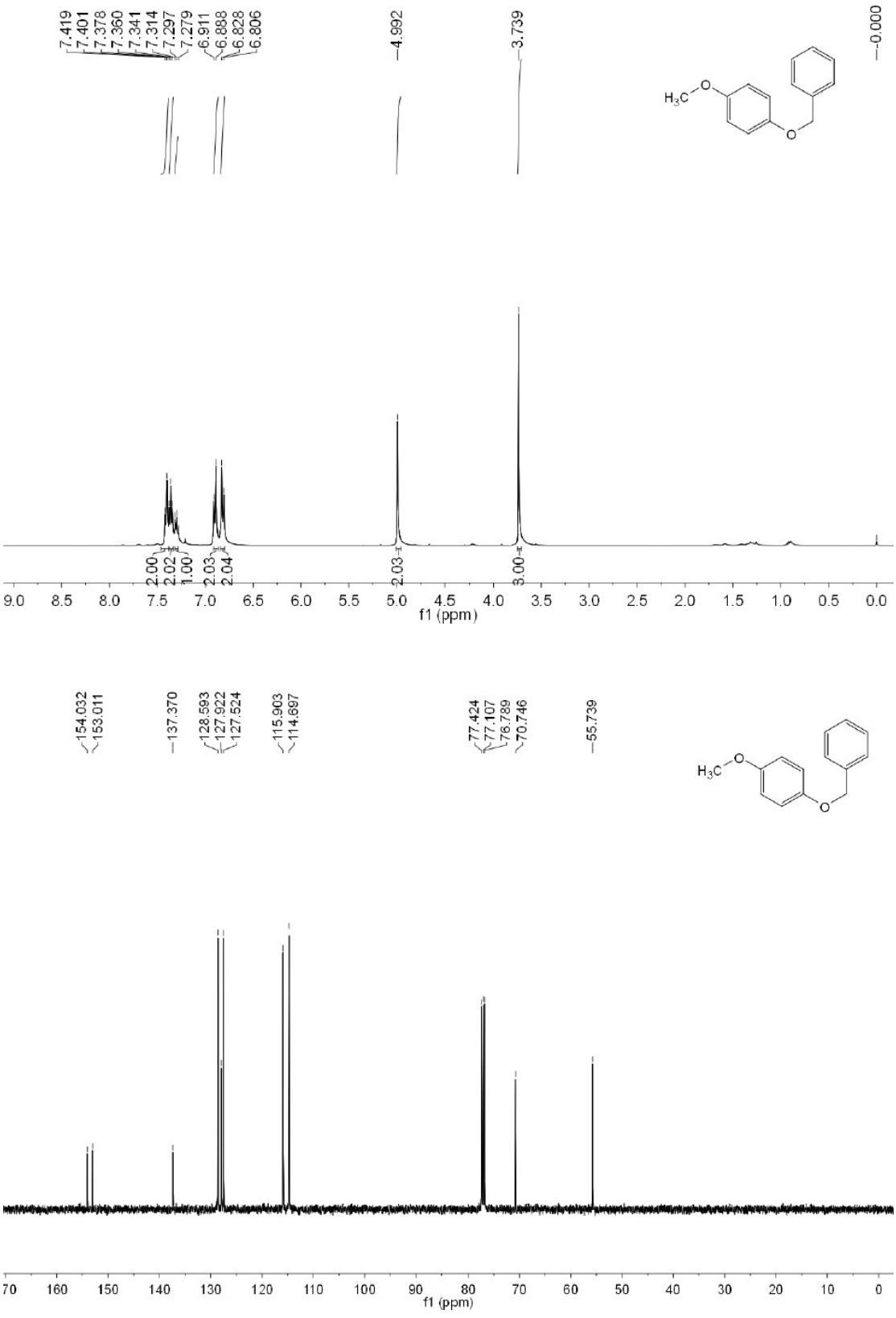
^{1}H NMR and ^{13}C NMR spectra of compound **3l**



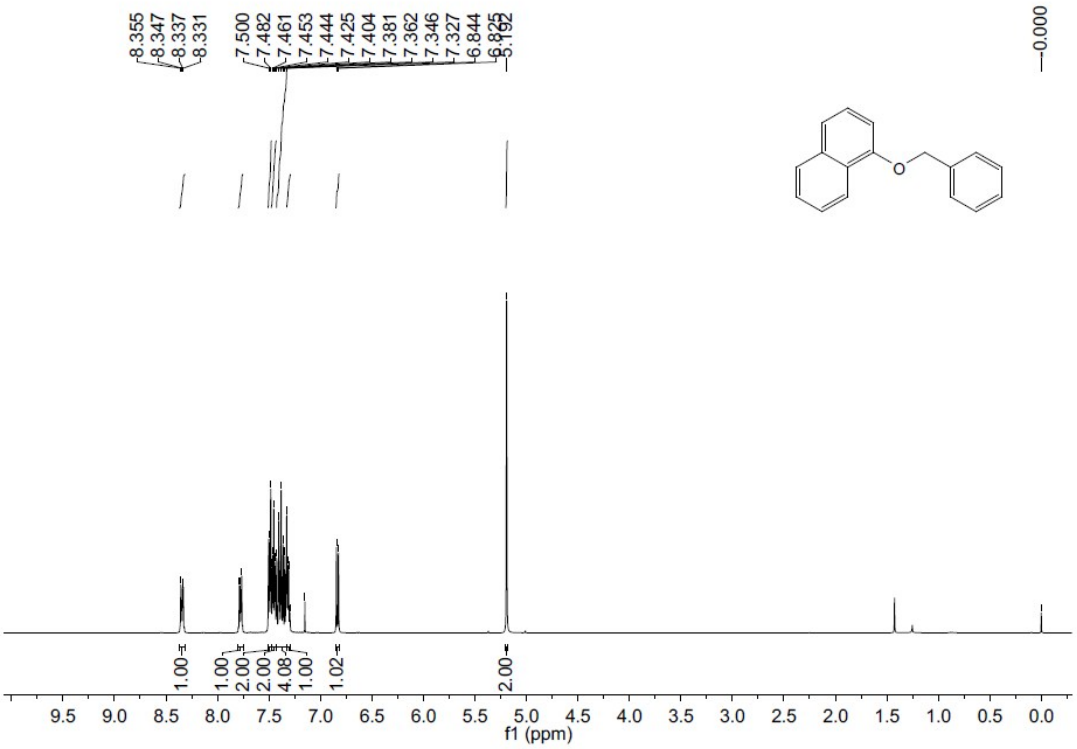
^{1}H NMR and ^{13}C NMR spectra of compound **3m**

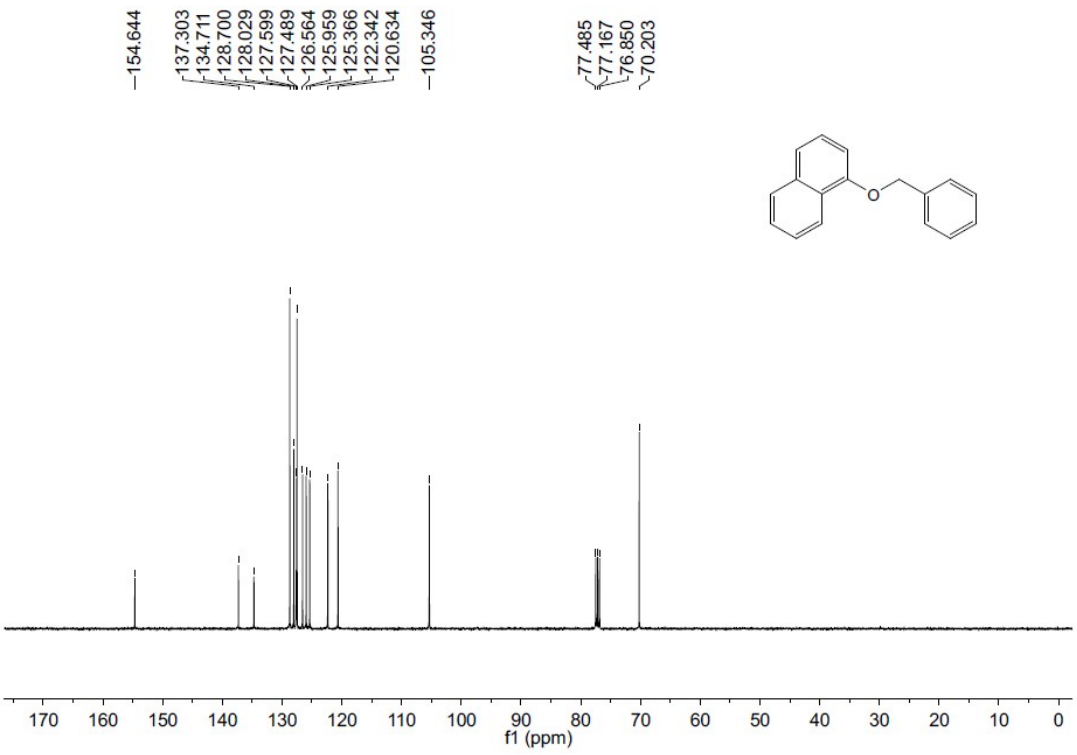


^{1}H NMR and ^{13}C NMR spectra of compound **3n**

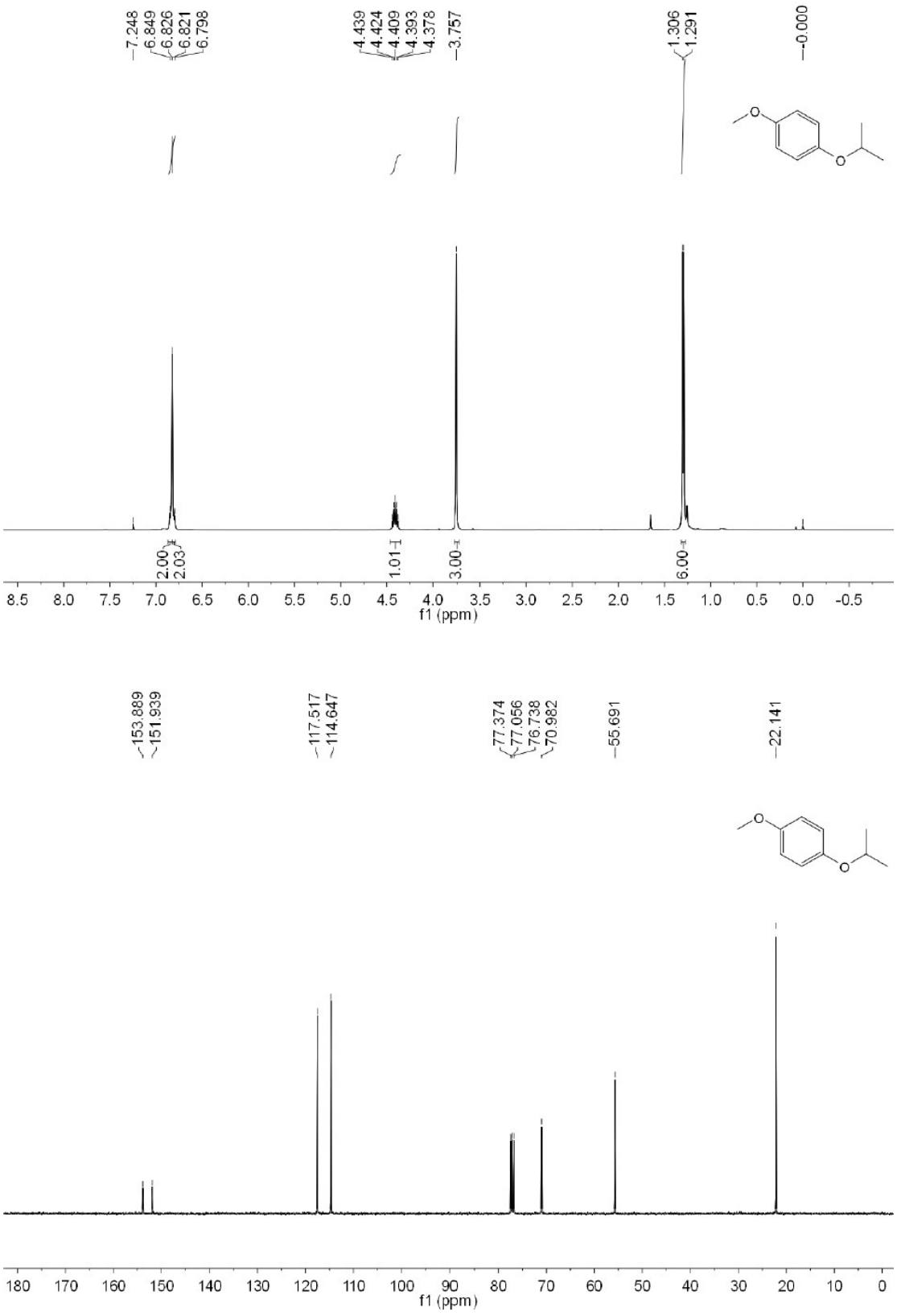


^{1}H NMR and ^{13}C NMR spectra of compound **3o**

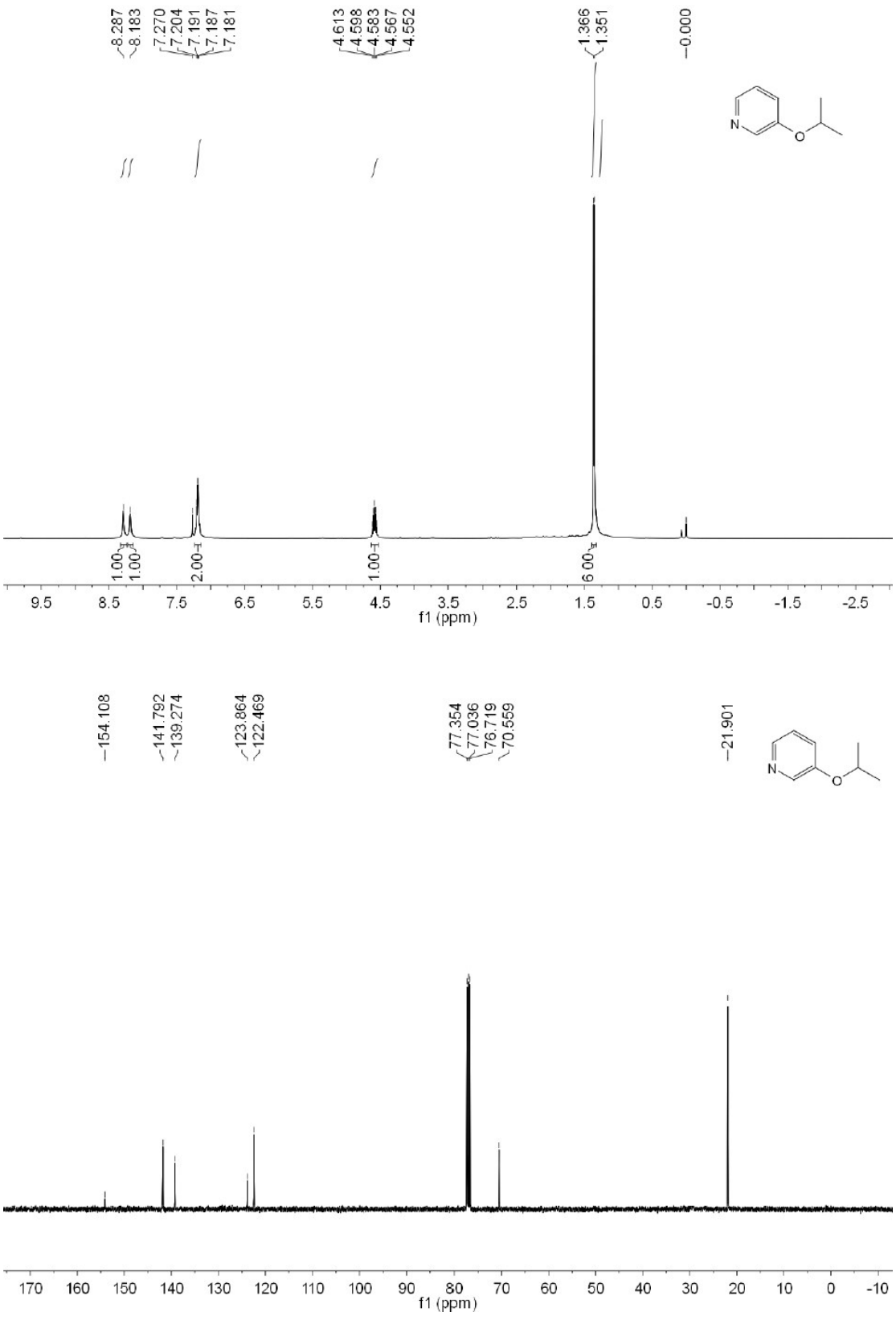




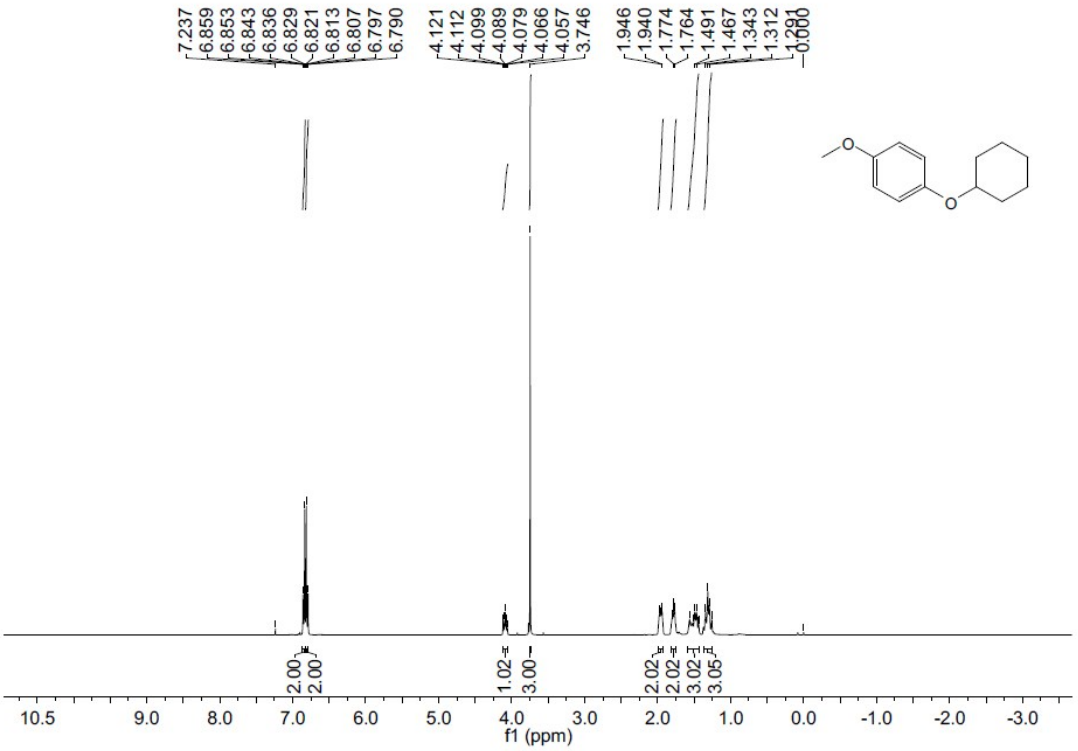
^{1}H NMR and ^{13}C NMR spectra of compound **3p**

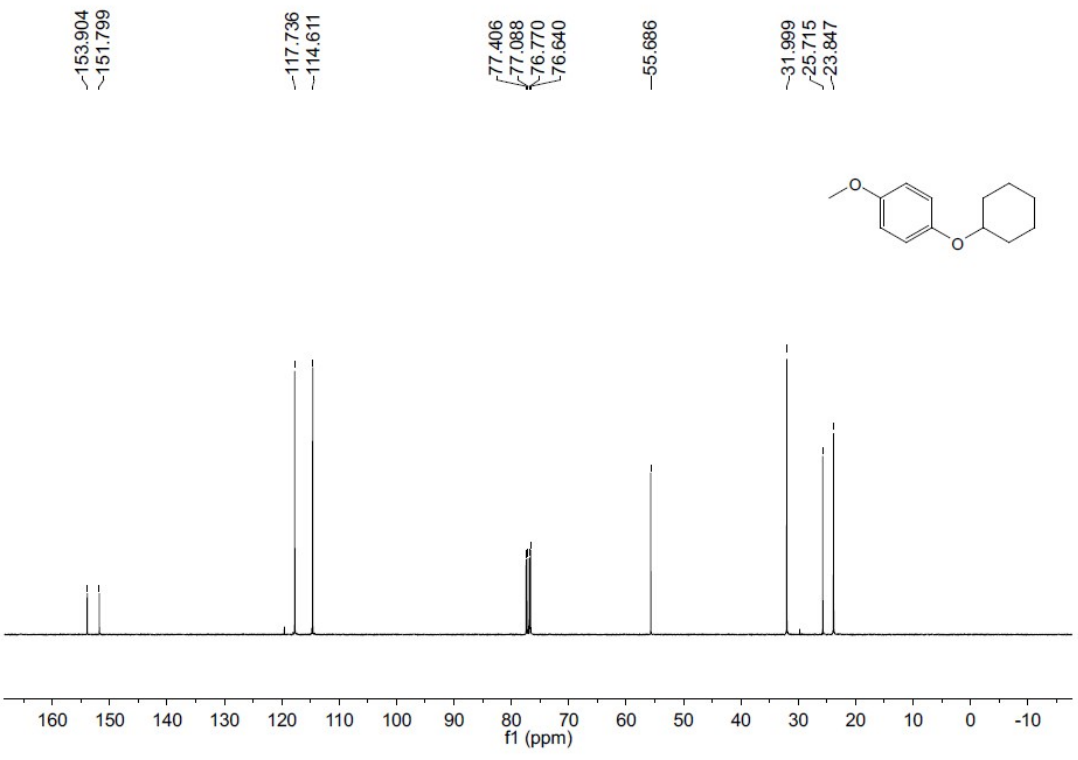


^{1}H NMR and ^{13}C NMR spectra of compound **3q**

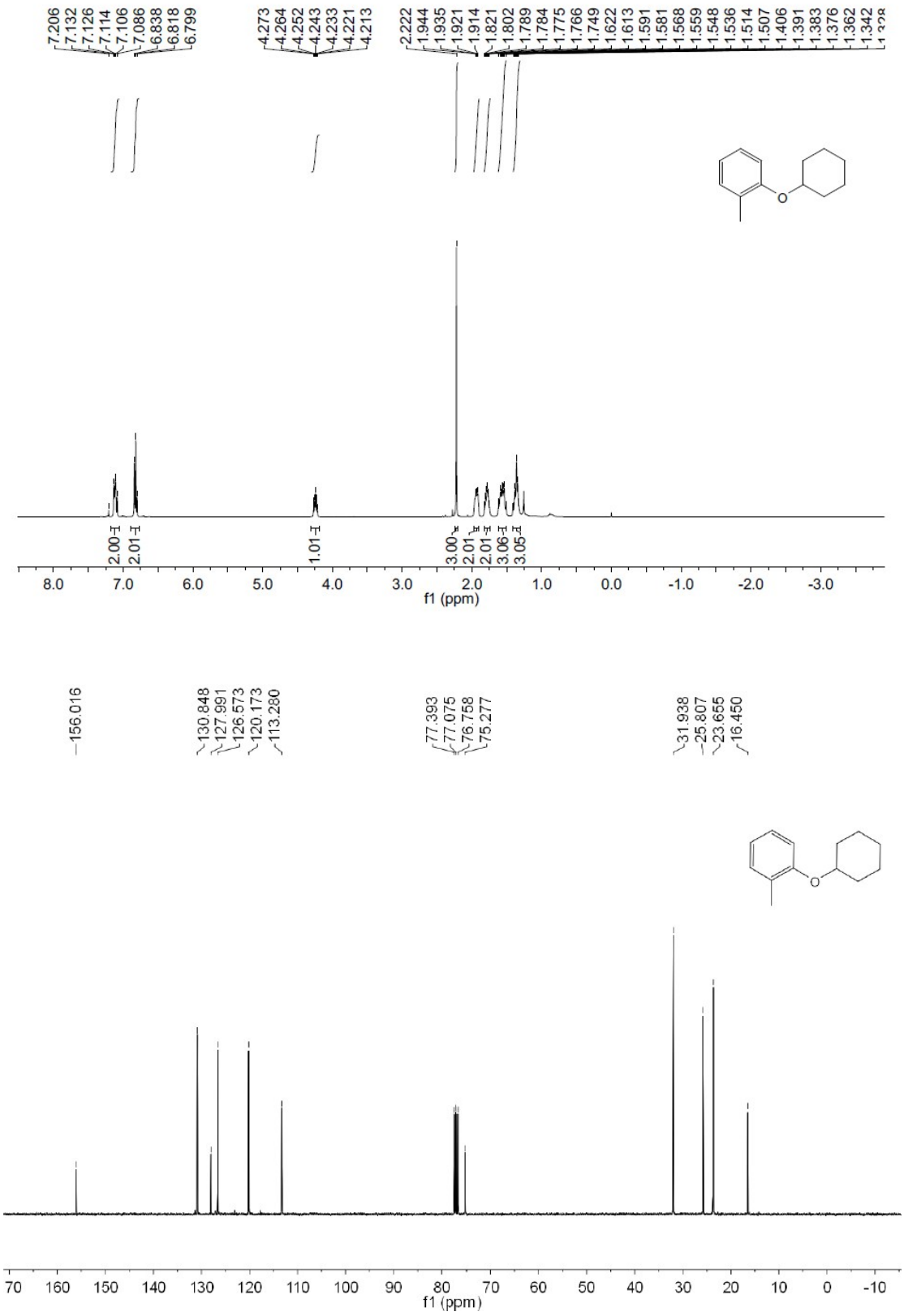


^{1}H NMR and ^{13}C NMR spectra of compound **3r**

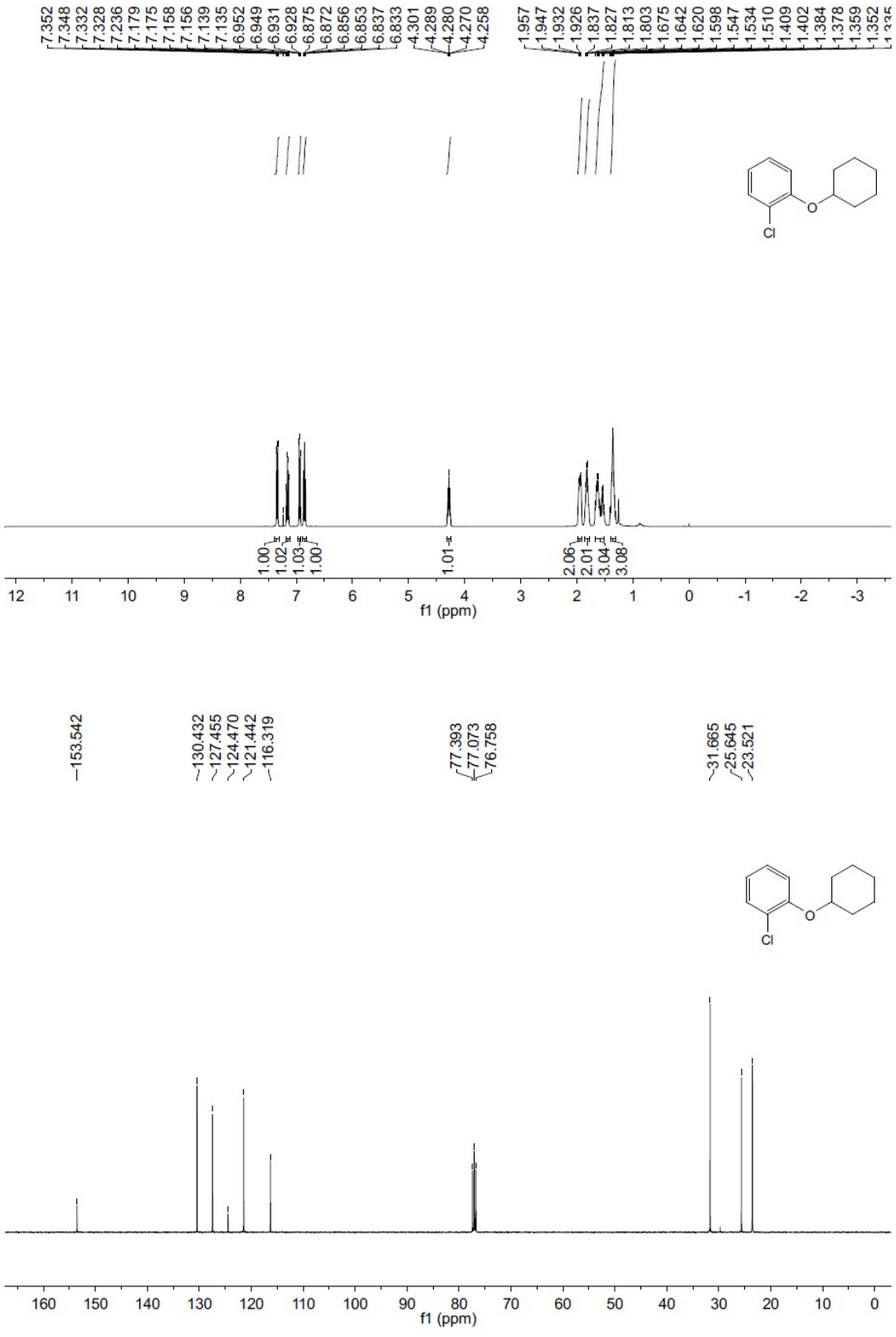




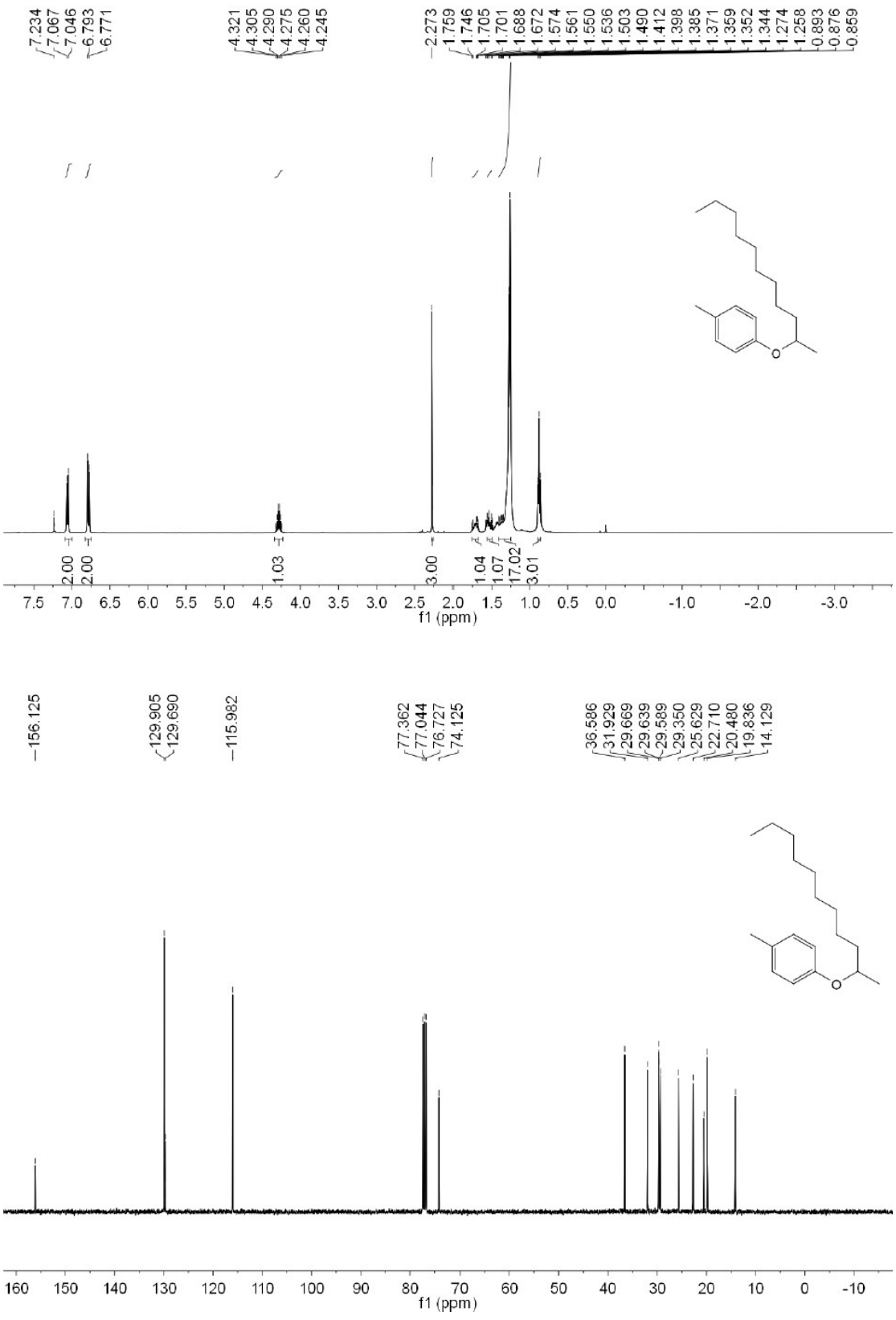
^{1}H NMR and ^{13}C NMR spectra of compound **3s**



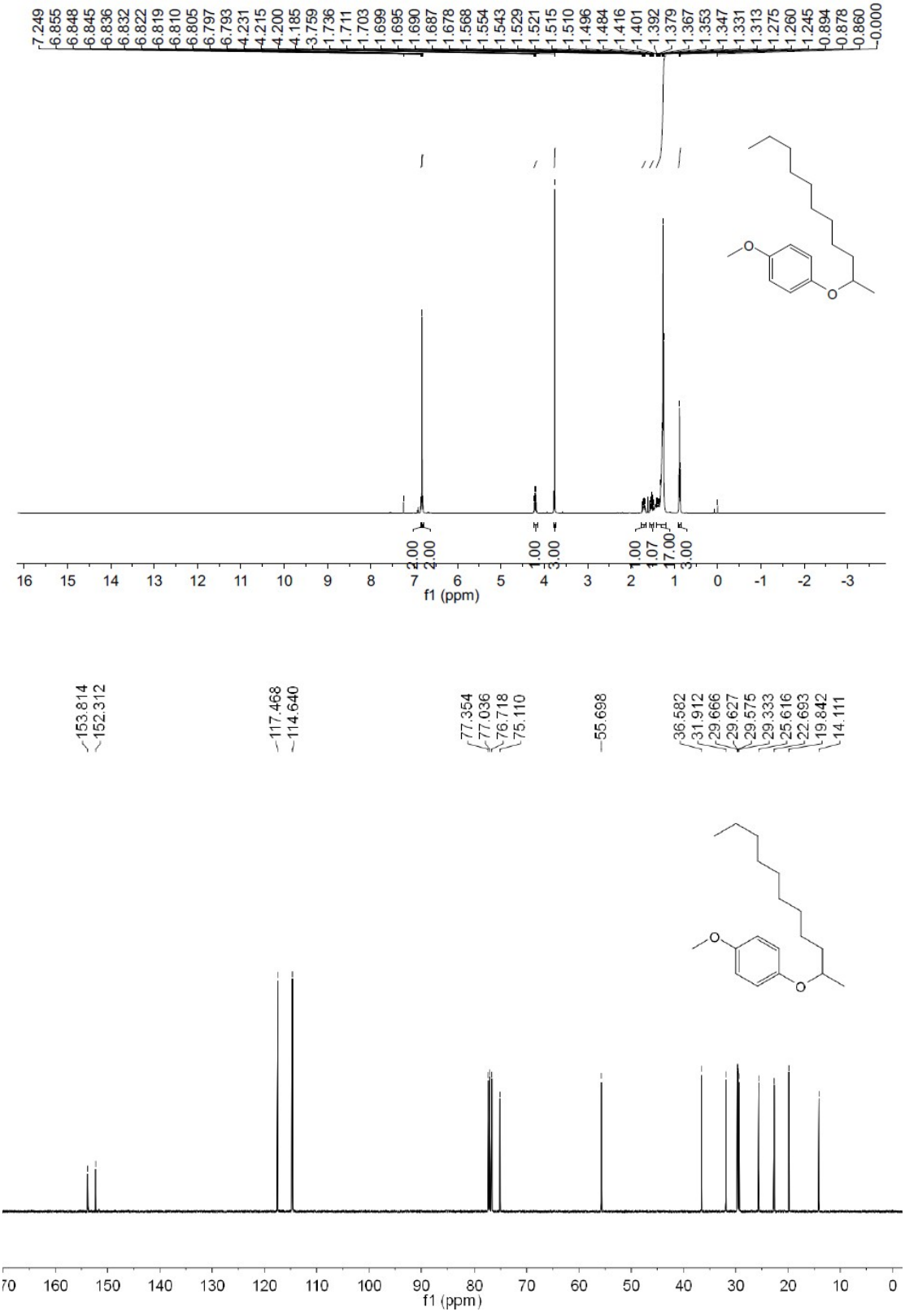
^{1}H NMR and ^{13}C NMR spectra of compound **3t**



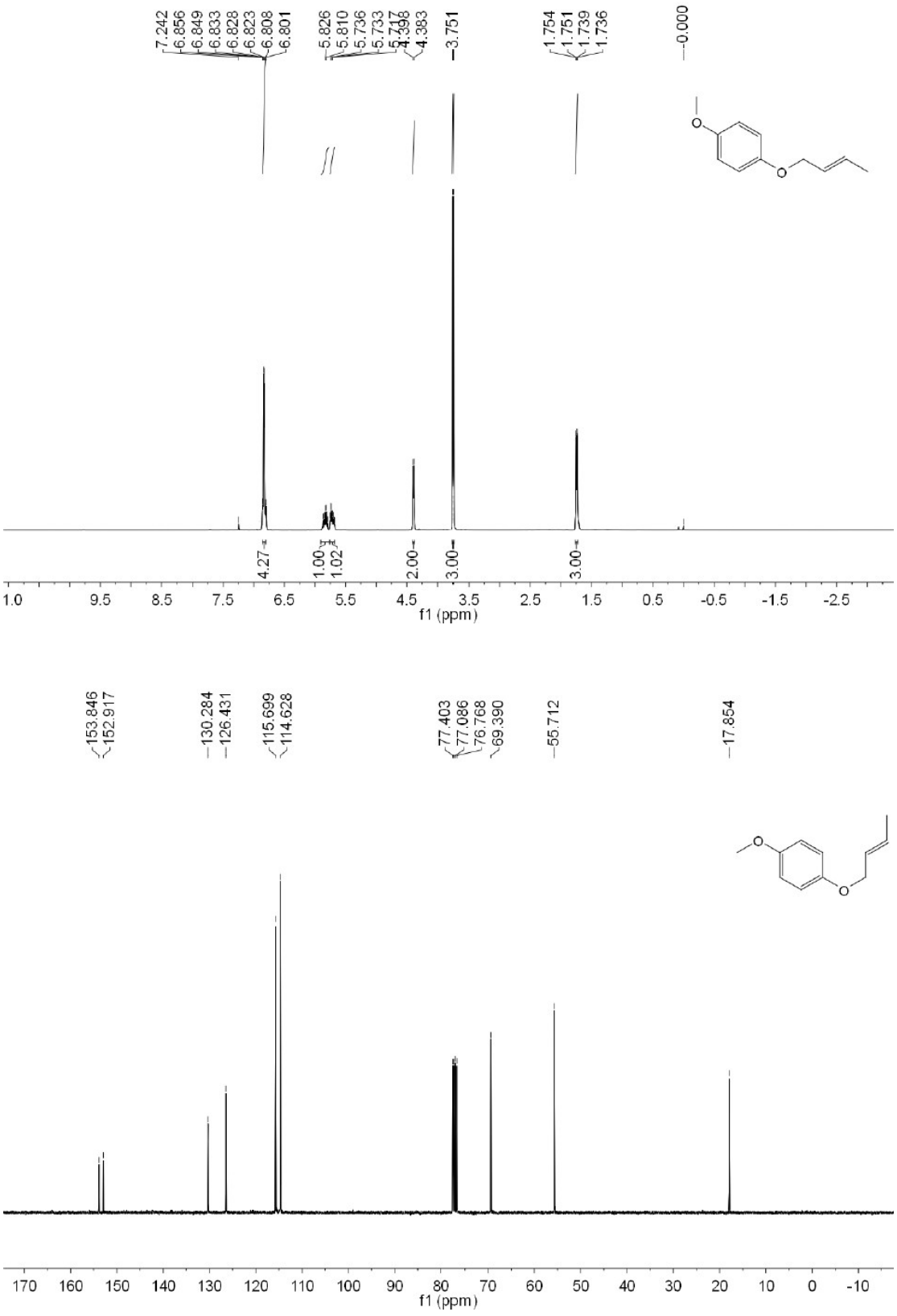
^{1}H NMR and ^{13}C NMR spectra of compound **3u**



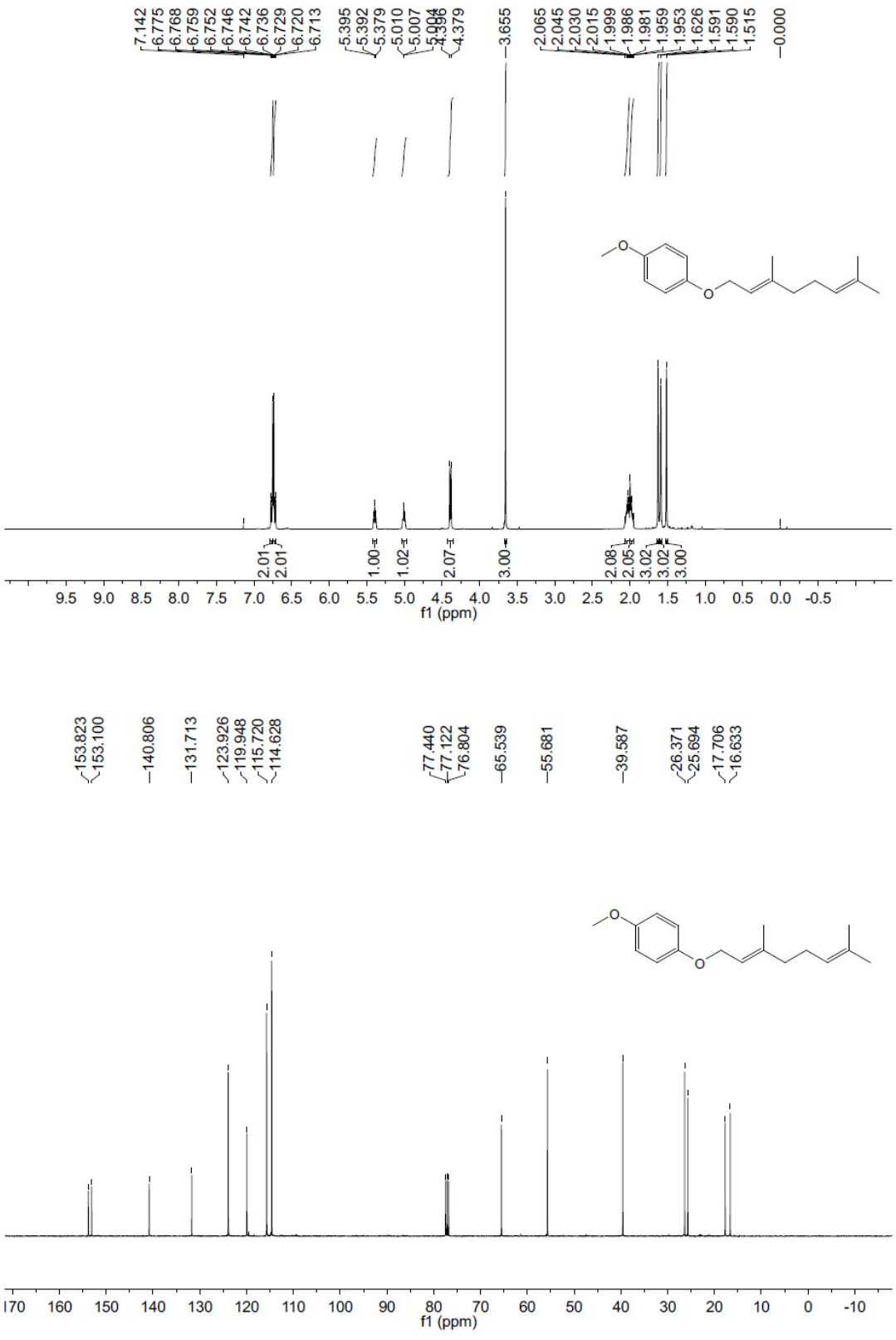
^{1}H NMR and ^{13}C NMR spectra of compound **3v**



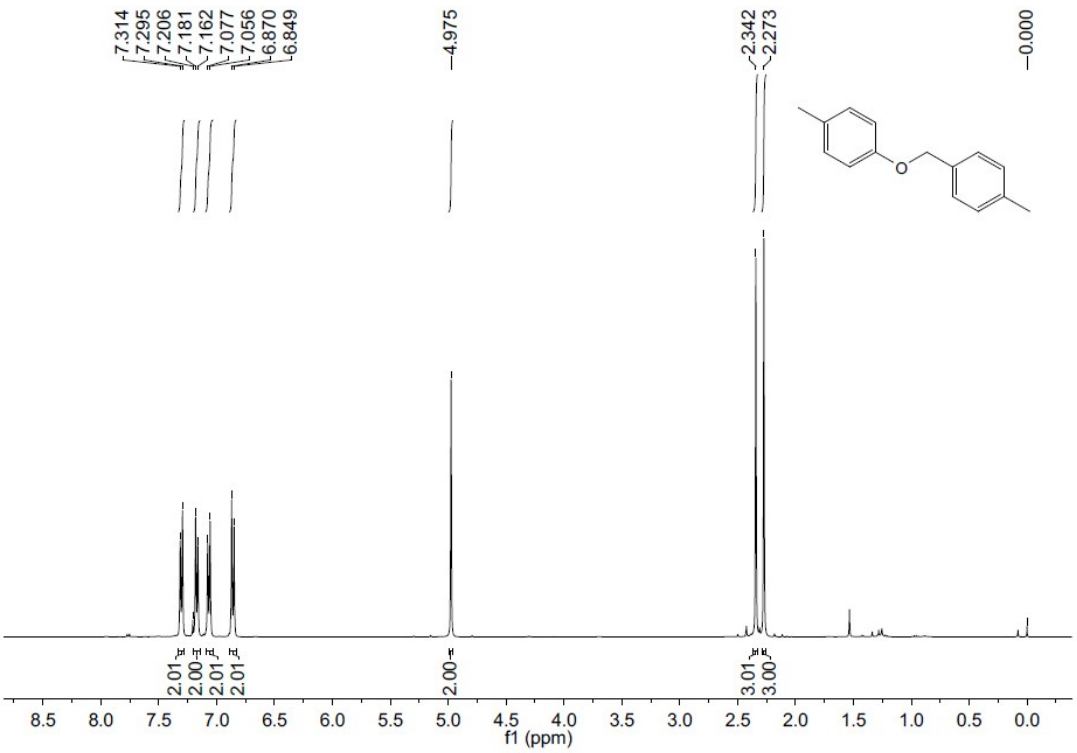
^{1}H NMR and ^{13}C NMR spectra of compound **3w**

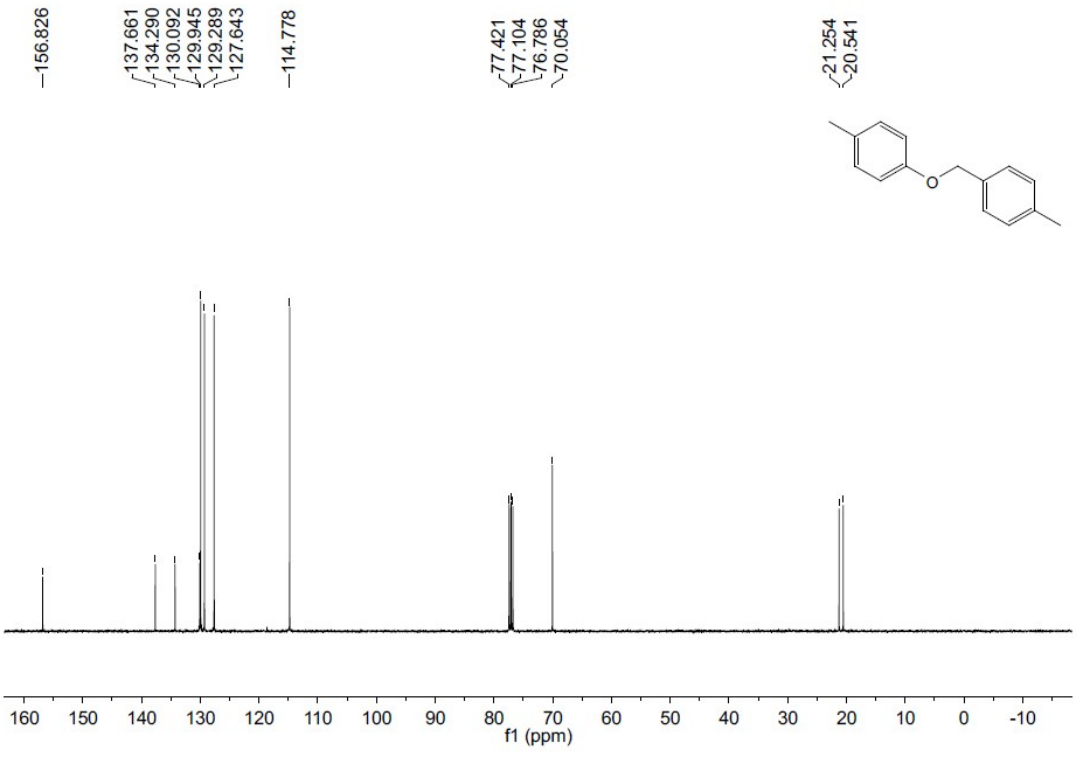


^{1}H NMR and ^{13}C NMR spectra of compound **3x**

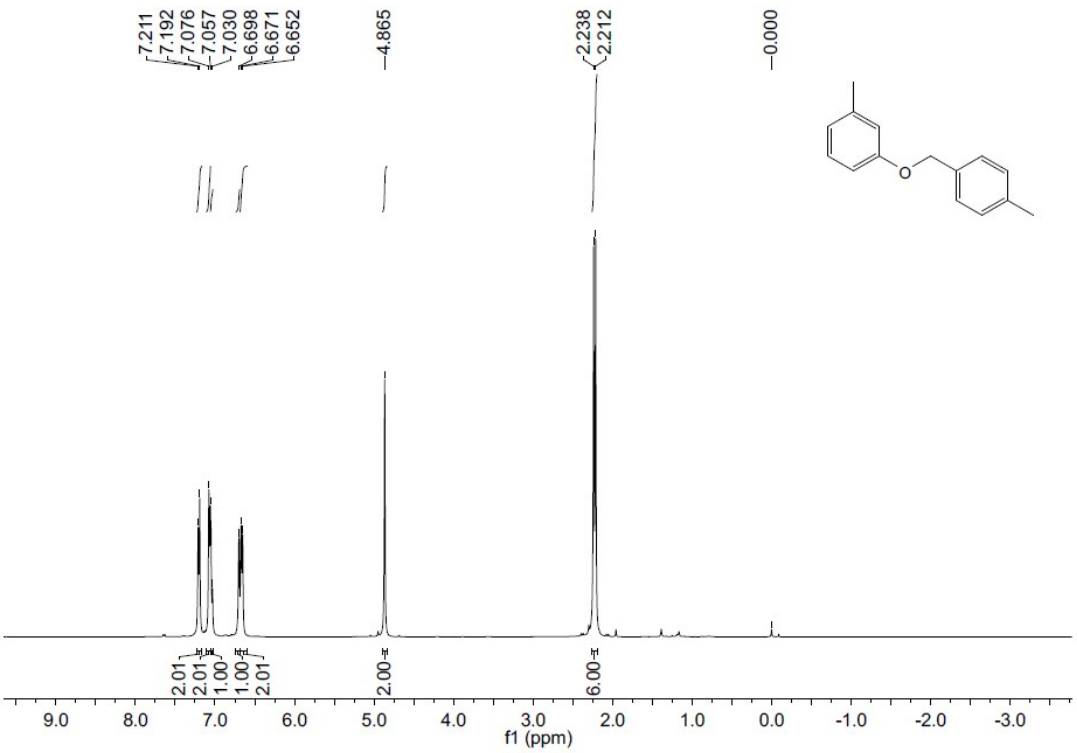


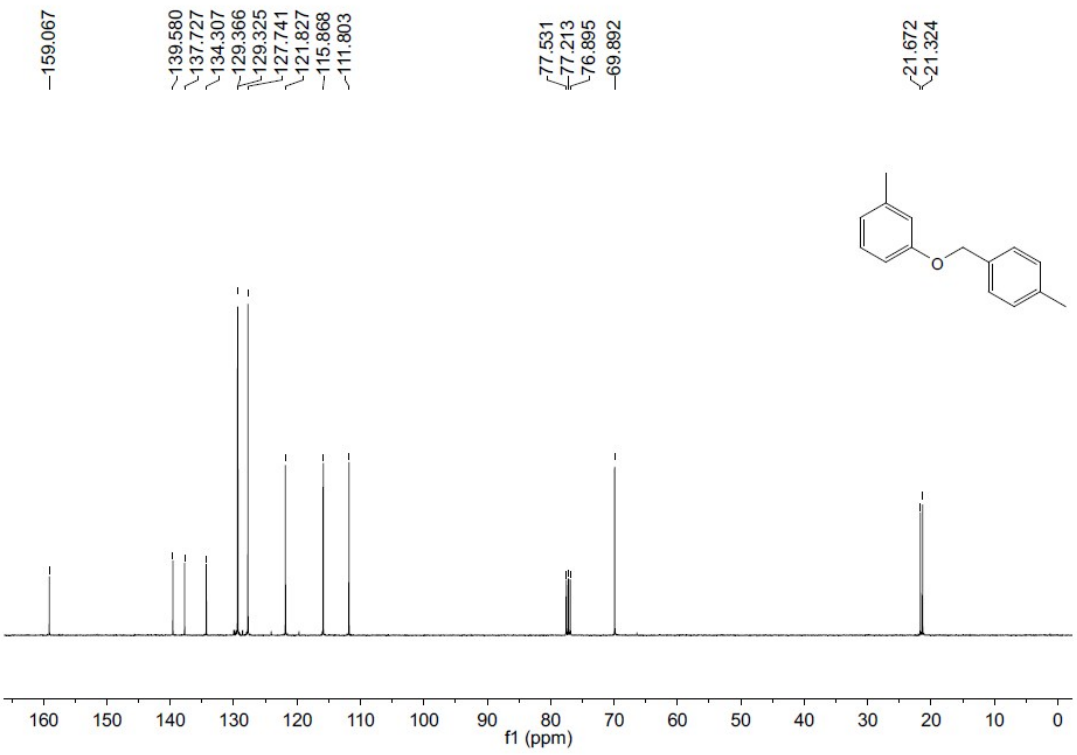
^{1}H NMR and ^{13}C NMR spectra of compound **3y**



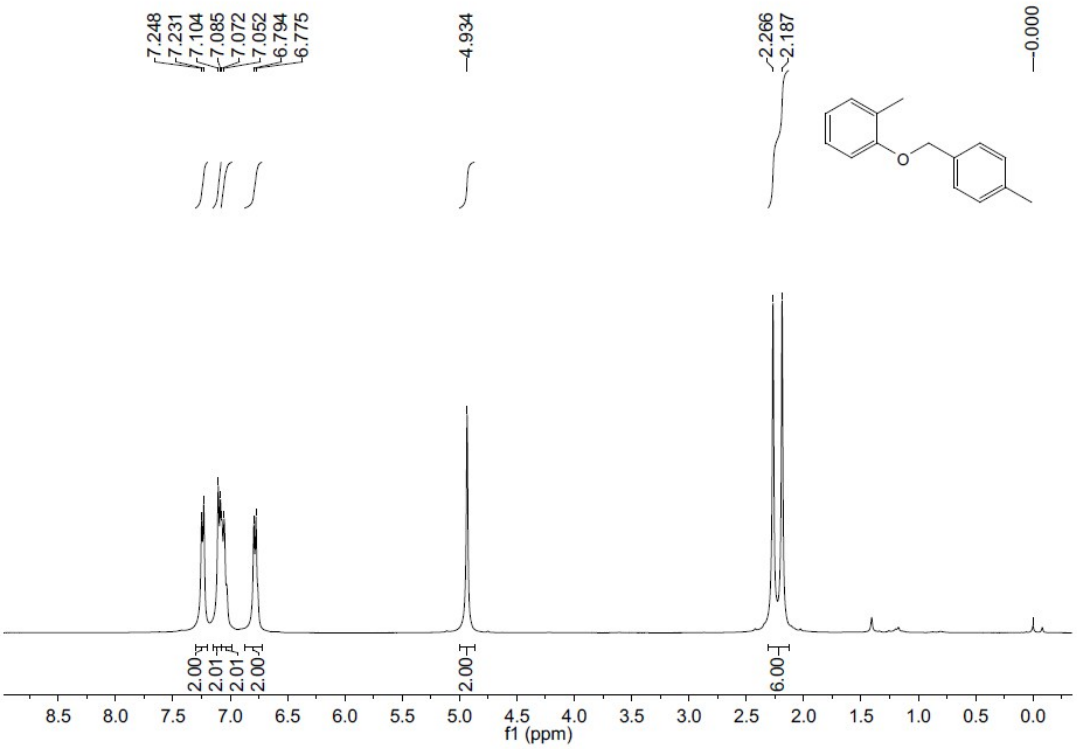


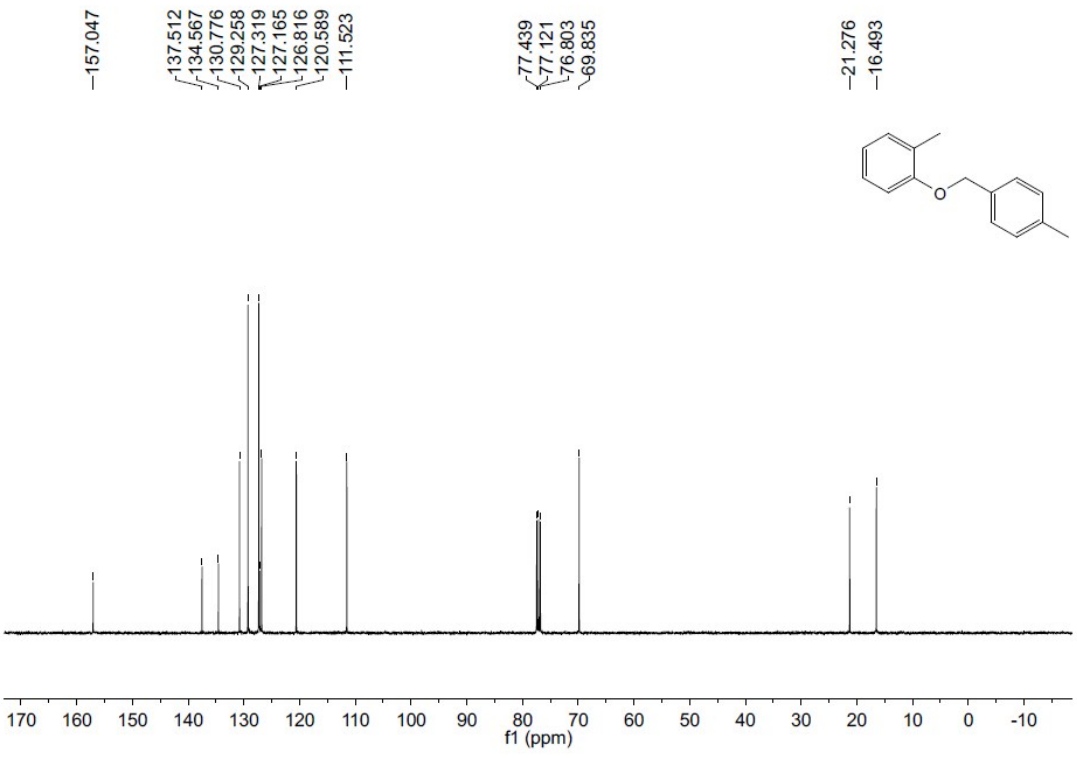
^{1}H NMR and ^{13}C NMR spectra of compound **3z**



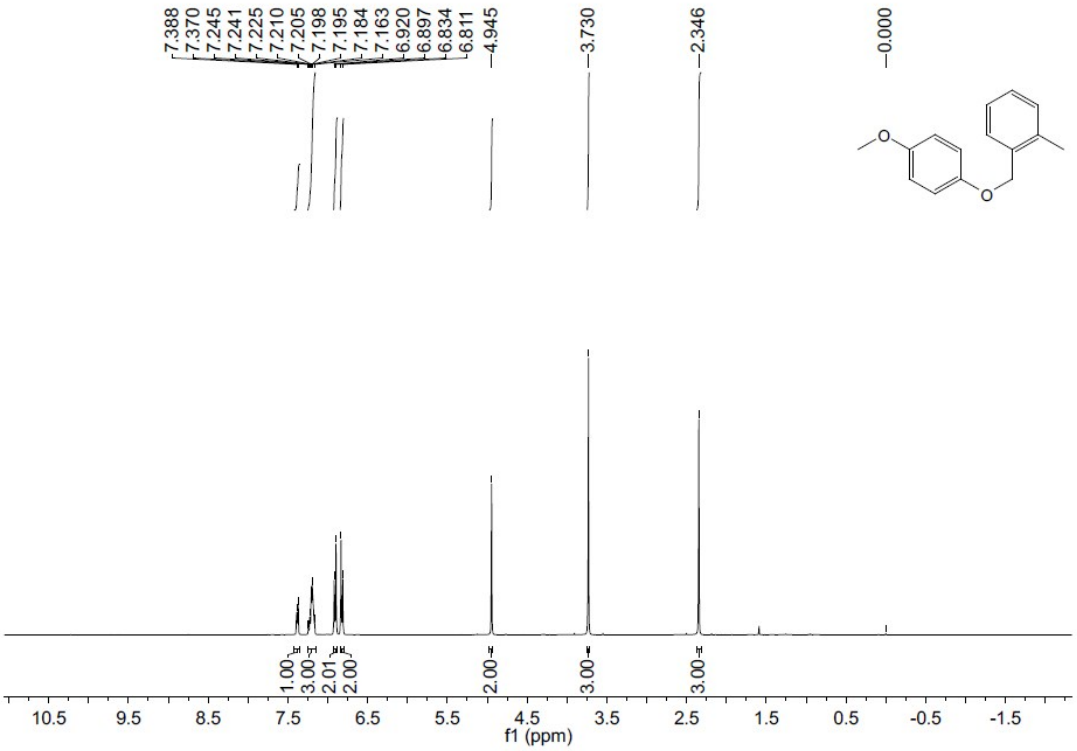


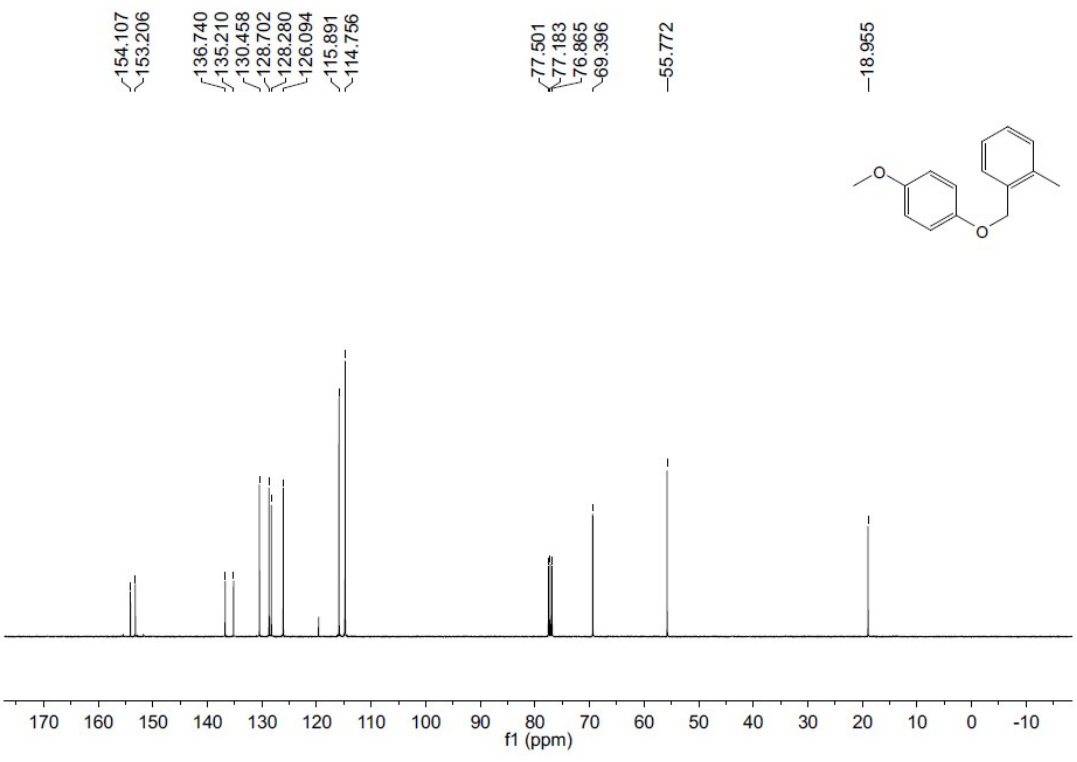
^{1}H NMR and ^{13}C NMR spectra of compound **3a'**



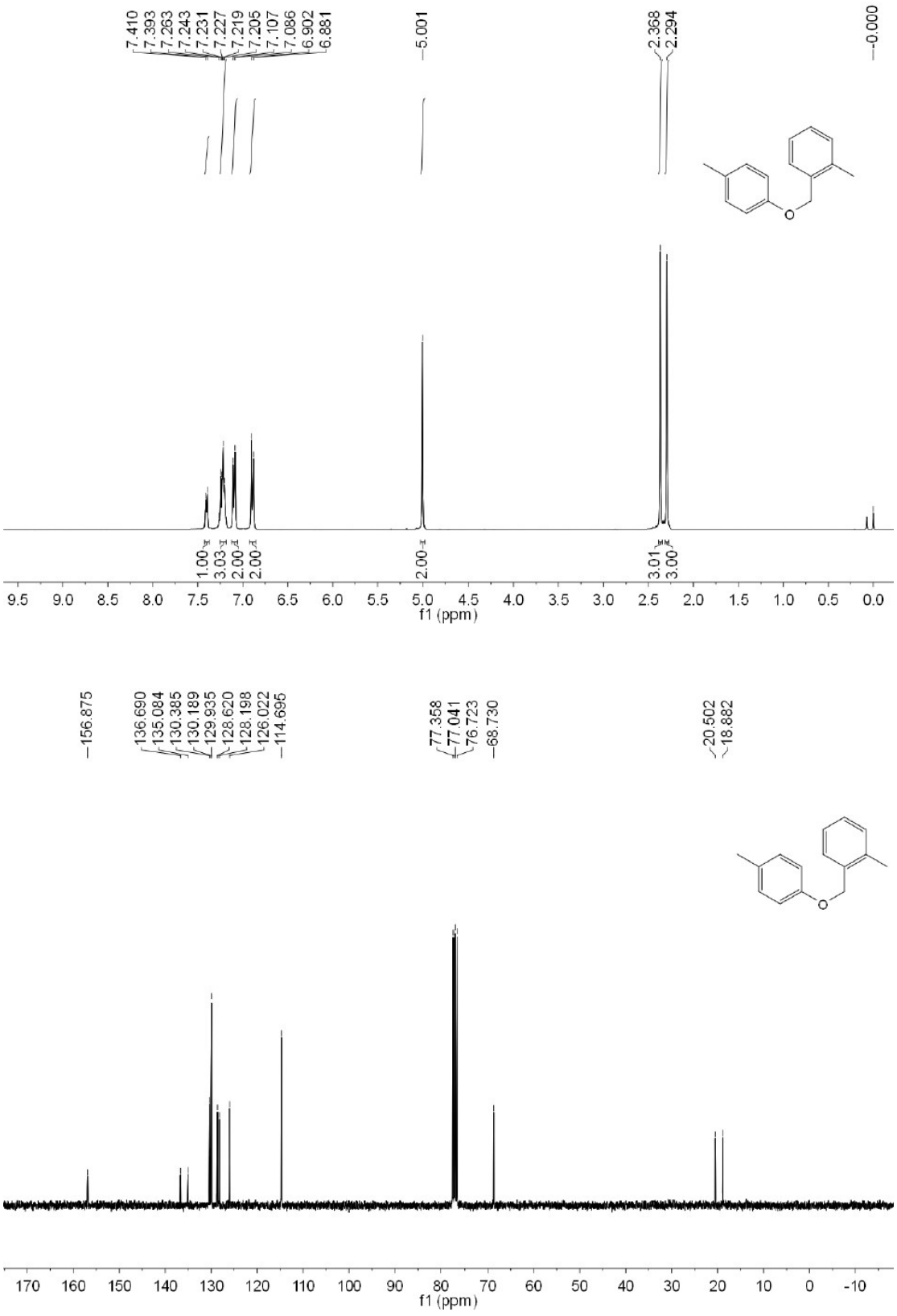


^{1}H NMR and ^{13}C NMR spectra of compound **3b'**

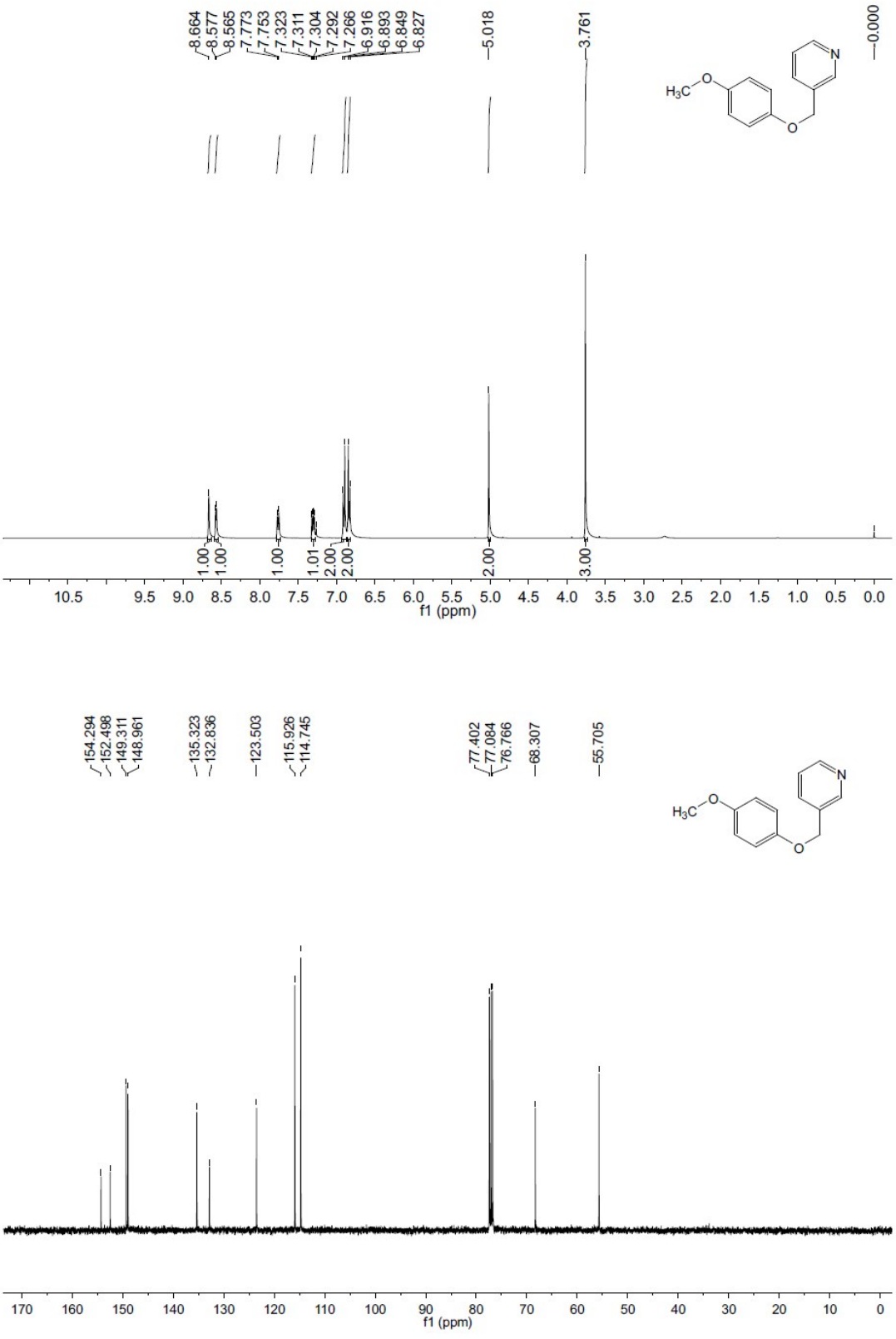




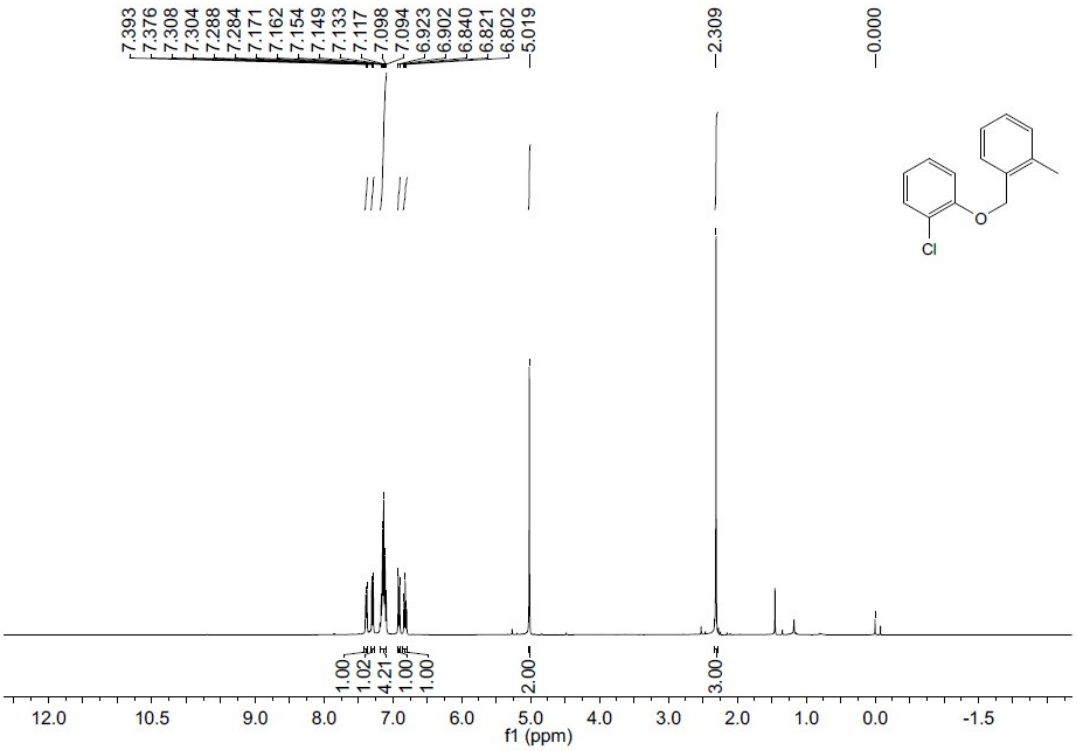
^{1}H NMR and ^{13}C NMR spectra of compound **3c'**

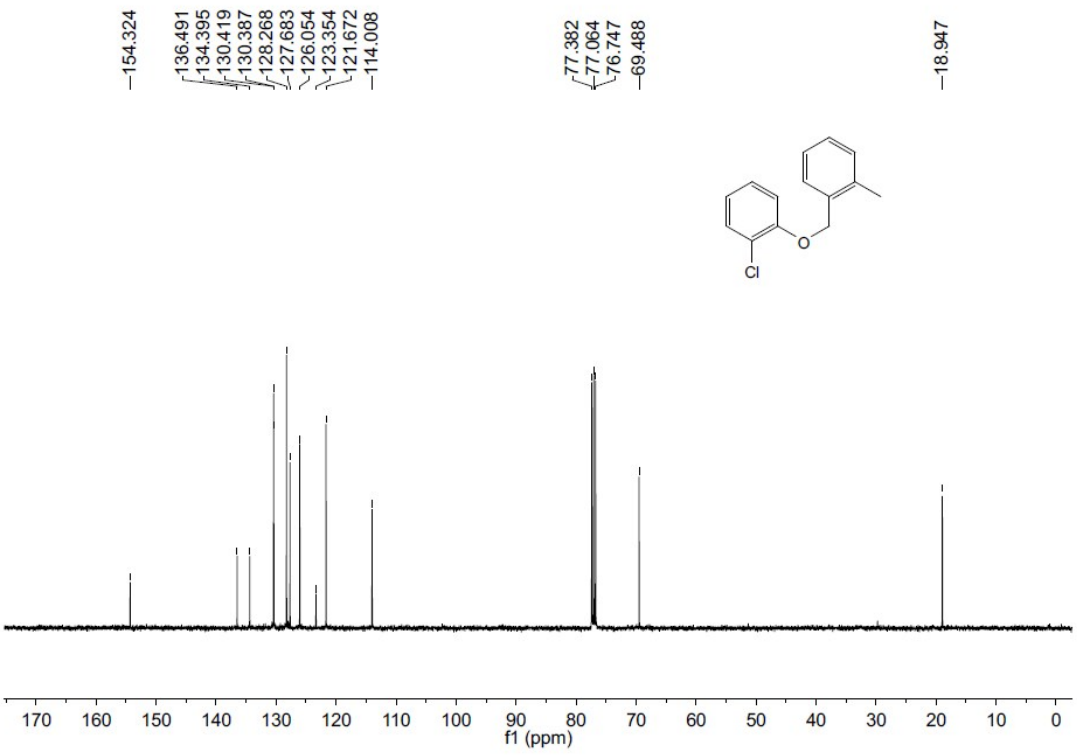


^{1}H NMR and ^{13}C NMR spectra of compound **3d'**



^{1}H NMR and ^{13}C NMR spectra of compound **3e'**





^{1}H NMR and ^{13}C NMR spectra of compound **3f'**