Supporting Information for:

A phosphine-free, atom-efficient cross-coupling reaction of triorganoindiums with acyl chlorides catalyzed by immobilization of palladium(0) in MCM-41

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The Spectral Data of aryl ketones 3a-3z:

Benzophenone (3a).[1] White solid, Mp 47–48 °C. ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.81 (d, J = 7.2 Hz, 4H), 7.59 (t, J = 7.6 Hz, 2H), 7.49 (t, J = 7.6 Hz, 4H). ^{13}C NMR (100 MHz, $CDCl_3$): δ 196.8, 137.6, 132.4, 130.1, 128.3.

4-Methylbenzophenone (3b).[1] White solid, Mp 56–57 °C. ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.78 (d, J = 7.2 Hz, 2H), 7.72 (d, J = 6.8 Hz, 2H), 7.56 (t, J = 7.2 Hz, 1H), 7.47 (t, J = 7.2 Hz, 2H), 7.28 (d, J = 7.2 Hz, 2H), 2.44 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$): δ 196.5, 143.3, 138.0, 134.9, 132.2, 130.3, 130.0, 129.0, 128.2, 21.7.

4-Methoxybenzophenone (3c).[2] White solid, Mp 59–60 °C. ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.85-7.82 (m, 2H), 7.77-7.74 (m, 2H), 7.58-7.54 (m, 1H), 7.47 (t, J = 7.6 Hz, 2H), 6.96 (dd, J = 8.8, 2.0 Hz, 2H), 3.88 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$): δ 195.6, 163.2, 138.3, 132.6, 131.9, 130.1, 129.8, 128.2, 113.6, 55.5.

4-Chlorobenzophenone (3d).[1] White solid, Mp 75–76 °C. ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.79-7.74 (m, 4H), 7.60 (t, J = 7.4 Hz, 1H), 7.52-7.44 (m, 4H). ^{13}C NMR

(100 MHz, $CDCl_3$): δ 195.5, 138.9, 137.2, 135.9, 132.7, 131.5, 130.0, 128.7, 128.4.

4-Nitrobenzophenone (3e).[1] Yellow solid, Mp 136–137 °C. ^{1}H NMR (400 MHz, $CDCl_3$): δ 8.35 (d, J = 8.8 Hz, 2H), 7.95 (d, J = 8.4 Hz, 2H), 7.81 (d, J = 8.4 Hz, 2H), 7.66 (t, J = 7.2 Hz, 1H), 7.53 (t, J = 7.8 Hz, 2H). ^{13}C NMR (100 MHz, $CDCl_3$): δ 194.8, 149.8, 142.9, 136.3, 133.5, 130.7, 130.1, 128.7, 123.6.

4-Cyanobenzophenone (3f).[2] White solid, Mp 110–112 °C. ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.88 (d, J = 8.8 Hz, 2H), 7.81-7.77 (m, 4H), 7.65 (t, J = 7.6 Hz, 1H), 7.52 (t, J = 7.6 Hz, 2H). ^{13}C NMR (100 MHz, $CDCl_3$): δ 194.5, 140.7, 135.9, 132.8, 131.7, 129.7, 129.5, 128.1, 117.5, 115.2.

2-Methylbenzophenone (3g).[1] Colorless oil. ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.80 (d, J = 7.6 Hz, 2H), 7.57 (d, J = 7.6 Hz, 1H), 7.45 (t, J = 7.6 Hz, 2H), 7.39 (t, J = 7.6 Hz, 1H), 7.33-7.24 (m, 3H), 2.33 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$): δ 198.1, 138.2, 137.3, 136.2, 132.6, 130.5, 129.7, 129.6, 128.0, 127.9, 124.7, 19.5.

2-Methoxybenzophenone (3h).[2] Colorless oil. ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.81 (d, J = 7.6 Hz, 2H), 7.55 (t, J = 7.4 Hz, 1H), 7.49-7.34 (m, 4H), 7.04 (t, J = 7.4 Hz, 1H), 6.99 (d, J = 8.4 Hz, 1H), 3.72 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$): δ 196.5, 157.4, 137.8, 133.0, 131.9, 129.8, 129.6, 128.9, 128.2, 120.5, 111.5, 55.6.

1-Benzoylnaphthalene (3i).[1] Colorless oil. ^{1}H NMR (400 MHz, $CDCl_3$): δ 8.09 (d, J = 7.6 Hz, 1H), 7.95 (d, J = 8.4 Hz, 1H), 7.89–7.83 (m, 3H), 7.56–7.37 (m, 7H). ^{13}C NMR (100 MHz, $CDCl_3$): δ 198.0, 138.4, 136.5, 133.8, 133.3, 131.3, 131.1, 130.5, 128.5, 128.4, 127.8, 127.3, 126.5, 125.8, 124.4.

2-Benzoylnaphthalene (3j).[2] White solid, Mp 77–78 °C. ^{1}H NMR (400 MHz, $CDCl_3$): δ 8.24 (s, 1H), 7.95-7.82 (m, 6H), 7.61-7.45 (m, 5H). ^{13}C NMR (100 MHz, $CDCl_3$): δ 196.7, 138.0, 135.3, 134.9, 132.4, 132.3, 131.9, 130.1, 129.5, 128.4, 128.3, 127.9, 126.8, 125.8.

2-Benzoylthiophene (3k).[1] White solid, Mp 54–55 °C. ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.88-7.85 (m, 2H), 7.74–7.71 (m, 1H), 7.66–7.64 (m, 1H), 7.60 (t, J = 7.4 Hz, 1H), 7.50 (t, J = 7.6 Hz, 2H), 7.18–7.15 (m, 1H). ^{13}C NMR (100 MHz, $CDCl_3$): δ 188.2, 143.7, 138.2, 134.8, 134.2, 132.3, 129.2, 128.4, 128.0.

3-Benzoylpyridine (3l).[2] White solid, Mp 39–41 °C. ^{1}H NMR (400 MHz, $CDCl_3$): δ 9.02 (s, 1H), 8.83 (s, 1H), 8.13 (d, J = 8.0 Hz, 1H), 7.81 (d, J = 7.6 Hz, 2H), 7.64 (t, J = 7.4 Hz, 1H), 7.51 (t, J = 7.6 Hz, 2H), 7.48-7.44 (m, 1H). ^{13}C NMR (100 MHz, $CDCl_3$): δ 194.7, 152.5, 150.7, 137.3, 136.7, 133.2, 130.0, 128.6, 127.6, 123.5.

1,2-Diphenylethanone (3m).[3] White solid, Mp 52–53 °C. ^{1}H NMR (400 MHz, $CDCl_3$): δ 8.01 (d, J = 7.6 Hz, 2H), 7.55 (t, J = 7.4 Hz, 1H), 7.45 (t, J = 7.6 Hz, 2H), 7.35-7.22 (m, 5H), 4.29 (s, 2H). ^{13}C NMR (100 MHz, $CDCl_3$): δ 197.6, 136.7, 134.6, 133.2, 129.5, 128.7, 128.6, 126.9, 45.5.

4'-Methylacetophenone (3n).[4] Colorless oil. ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.85 (d, J = 8.0 Hz, 2H), 7.25 (d, J = 8.0 Hz, 2H), 2.57 (s, 3H), 2.41 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$): δ 197.7, 143.8, 134.7, 129.2, 128.4, 26.4, 21.6.

4'-Methoxyacetophenone (3o).[4] White solid, Mp 36–37 °C. ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.93 (d, J = 8.4 Hz, 2H), 6.93 (d, J = 8.8 Hz, 2H), 3.86 (s, 3H), 2.55 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$): δ 196.7, 163.5, 130.6, 130.4, 113.7, 55.5, 26.3.

4'-Chloroacetophenone (3p).[4] Colorless oil. ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.89 (d, J = 8.8 Hz, 2H), 7.43 (d, J = 8.4 Hz, 2H), 2.59 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$): δ 196.6, 139.4, 135.3, 129.7, 128.8, 26.4.

4'-Fluoroacetophenone (3q).[4] Colorless oil. ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.99 (dd, J = 8.8, 5.6 Hz, 2H), 7.13 (t, J = 8.6 Hz, 2H), 2.59 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$): δ 196.4, 165.7 (d, $^1J_{C\text{-}F}$ = 251.9 Hz), 133.6, 130.9 (d, $^3J_{C\text{-}F}$ = 9.3 Hz), 115.6 (d, $^2J_{C\text{-}F}$ = 21.8 Hz), 26.4.

2'-Methylacetophenone (3r).[4] Colorless oil. ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.68 (d, J = 8.4 Hz, 1H), 7.36 (t, J = 7.6 Hz, 1H), 7.27-7.21 (m, 2H), 2.56 (s, 3H), 2.52 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$): δ 201.7, 138.4, 137.7, 132.0, 131.5, 129.3, 125.7, 29.5, 21.5.

1-Acetylnaphthalene (3s).[4] Colorless oil. ^{1}H NMR (400 MHz, $CDCl_3$): δ 8.74 (d, J = 8.4 Hz, 1H), 7.97 (d, J = 8.0 Hz, 1H), 7.91 (d, J = 7.2 Hz, 1H), 7.85 (d, J = 8.0 Hz, 1H), 7.61-7.58 (m, 1H), 7.57-7.45 (m, 2H), 2.72 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$): δ 201.8, 135.5, 134.0, 133.0, 130.2, 128.7, 128.5, 128.1, 126.5, 126.1, 124.4, 30.0.

2-Acetylthiophene (3t).[4] Colorless oil. ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.70 (d, J = 4.0 Hz, 1H), 7.64 (d, J = 5.2 Hz, 1H), 7.13 (t, J = 4.4 Hz, 1H), 2.57 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$): δ 190.7, 144.5, 133.8, 132.5, 128.1, 26.8.

1-(*m*-Tolyl)pentan-1-one (**3u**). Pale yellow oil. ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.78-7.73 (m, 2H), 7.37-7.31 (m, 2H), 2.95 (t, J = 7.4 Hz, 2H), 2.41 (s, 3H), 1.76-1.66 (m, 2H), 1.46-1.35 (m, 2H), 0.95 (t, J = 7.4 Hz, 3H). ^{13}C NMR (100 MHz, $CDCl_3$): δ 200.9, 138.3, 137.2, 133.6, 128.6, 128.4, 125.3, 38.4, 26.6, 22.5, 21.4, 13.9. HRMS calcd for $C_{12}H_{16}O^+$ [M^+]: 176.1201, found 176.1206.

1-(4-Methoxyphenyl)pentan-1-one (3v).[5] Pale yellow oil. ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.94 (d, J = 8.4 Hz, 2H), 6.93 (d, J = 8.8 Hz, 2H), 3.87 (s, 3H), 2.91 (t, J = 7.4 Hz, 2H), 1.75-1.67 (m, 2H), 1.45-1.36 (m, 2H), 0.95 (t, J = 7.2 Hz, 3H). ^{13}C NMR (100 MHz, $CDCl_3$): δ 199.3, 163.3, 130.3, 130.2, 113.7, 55.4, 38.0, 26.8, 22.5, 13.9.

1-(4-Chlorophenyl)pentan-1-one (3w).[5] Pale yellow oil. ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.89 (d, J = 8.4 Hz, 2H), 7.42 (d, J = 8.4 Hz, 2H), 2.93 (t, J = 7.4 Hz, 2H), 1.74-1.66 (m, 2H), 1.45-1.35 (m, 2H), 0.95 (t, J = 7.4 Hz, 3H). ^{13}C NMR (100 MHz, $CDCl_3$): δ 199.2, 139.3, 135.4, 129.5, 128.8, 38.3, 26.4, 22.4, 13.9.

1-(4-Cyanophenyl)pentan-1-one (3x). Pale yellow oil. ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.97 (d, J = 8.4 Hz, 2H), 7.70 (d, J = 8.0 Hz, 2H), 2.92 (t, J = 7.4 Hz, 2H), 1.70-1.61

(m, 2H), 1.38-1.30 (m, 2H), 0.89 (t, J = 7.2 Hz, 3H). ^{13}C NMR (100 MHz, $CDCl_3$): δ 199.1, 140.0, 132.5, 128.5, 118.0, 116.2, 38.7, 26.1, 22.4, 13.9. HRMS calcd for $C_{12}H_{13}NO^+$ [M^+]: 187.0997, found 187.0995.

1-(Naphthalen-1-yl)pentan-1-one (3y). Pale yellow oil. ^{1}H NMR (400 MHz, $CDCl_3$): δ 8.54 (d, J = 8.0 Hz, 1H), 7.94 (d, J = 8.0 Hz, 1H), 7.86-7.80 (m, 2H), 7.58-7.44 (m, 3H), 3.03 (t, J = 7.4 Hz, 2H), 1.79-1.71 (m, 2H), 1.46-1.38 (m, 2H), 0.95 (t, J = 7.4 Hz, 3H). ^{13}C NMR (100 MHz, $CDCl_3$): δ 205.1, 136.5, 134.0, 132.3, 130.2, 128.4, 127.8, 127.1, 126.4, 125.8, 124.4, 42.1, 26.9, 22.5, 14.0. HRMS calcd for $C_{15}H_{16}O^+$ [M^+]: 212.1201, found 212.1207.

1-(Thiophen-2-yl)pentan-1-one (3z). Pale yellow oil. ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.73-7.69 (m, 1H), 7.62 (t, J = 4.8 Hz, 1H), 7.16-7.10 (m, 1H), 2.89 (t, J = 7.4 Hz, 2H), 1.79-1.70 (m, 2H), 1.47-1.36 (m, 2H), 0.96 (t, J = 6.4 Hz, 3H). ^{13}C NMR (100 MHz, $CDCl_3$): δ 193.5, 144.5, 133.3, 131.6, 128.0, 39.2, 26.9, 22.5, 13.9. HRMS calcd for $C_9H_{12}OS^+$ [M^+]: 168.0609, found 168.0612.

The Spectral Data of alkynyl ketones 4a-4x:

1,3-Diphenylpropynone (4a).[6] White solid, Mp 43–44 °C. ^{1}H NMR (400 MHz, $CDCl_3$): δ 8.23 (d, J = 7.6 Hz, 2H), 7.70 (d, J = 7.2 Hz, 2H), 7.64 (t, J = 7.2 Hz, 1H), 7.55-7.41 (m, 5H). ^{13}C NMR (100 MHz, $CDCl_3$): δ 178.1, 136.9, 134.2, 133.1, 130.9, 129.6, 128.7, 128.6, 120.1, 93.2, 86.9.

1-(4-Methylphenyl)-3-phenylpropynone (4b).[6] White solid, Mp 85–86 °C. ^{1}H NMR (400 MHz, $CDCl_3$): δ 8.12 (d, J = 8.0 Hz, 2H), 7.68 (d, J = 6.8 Hz, 2H), 7.48 (t, J = 6.8 Hz, 1H), 7.42 (t, J = 7.2 Hz, 2H), 7.31 (d, J = 8.0 Hz, 2H), 2.45 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$): δ 177.7, 145.2, 134.7, 133.0, 130.7, 129.7, 129.4, 128.7, 120.3, 92.6, 87.0, 21.8.

1-(3-Methylphenyl)-3-phenylpropynone (4c).[7] Colorless oil. ^{1}H NMR (400 MHz,

$CDCl_3$): δ 8.04 (d, J = 7.6 Hz, 1H), 8.02 (s, 1H), 7.69 (d, J = 7.6 Hz, 2H), 7.51-7.38 (m, 5H), 2.45 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$): δ 178.3, 138.5, 136.9, 135.0, 133.1, 130.8, 129.8, 128.7, 128.6, 127.2, 120.2, 92.9, 87.0, 21.4.

1-(4-Chlorophenyl)-3-phenylpropynone (4d).[6] White solid, Mp 85–86 °C. ^1H NMR (400 MHz, $CDCl_3$): δ 8.16-8.13 (m, 2H), 7.69-7.66 (m, 2H), 7.52-7.40 (m, 5H). ^{13}C NMR (100 MHz, $CDCl_3$): δ 176.7, 140.7, 135.4, 133.1, 131.0, 130.9, 129.0, 128.8, 119.9, 93.7, 86.6.

1-(Furan-2-yl)-3-phenylpropynone (4e).[6] Brown solid, Mp 49–50 °C. ^1H NMR (400 MHz, $CDCl_3$): δ 7.70-7.64 (m, 3H), 7.52-7.41 (m, 4H), 6.61 (t, J = 1.8 Hz, 1H). ^{13}C NMR (100 MHz, $CDCl_3$): δ 164.8, 153.3, 148.0, 133.1, 130.9, 128.7, 120.9, 120.0, 112.7, 91.9, 86.3.

3-Phenyl-1-(thiophen-2-yl)propynone (4f).[6] Brown solid, Mp 54–55 °C. ^1H NMR (400 MHz, $CDCl_3$): δ 8.01 (d, J = 1.2 Hz, 1H), 7.73 (dd, J = 4.8, 1.2 Hz, 1H), 7.68-7.64 (m, 2H), 7.51-7.39 (m, 3H), 7.19 (dd, J = 4.8, 4.0 Hz, 1H). ^{13}C NMR (100 MHz, $CDCl_3$): δ 169.8, 144.9, 135.3, 135.2, 133.0, 130.9, 128.7, 128.4, 119.9, 91.8, 86.4.

1,4-Diphenylbut-3-yn-2-one (4g).[8] Pale yellow oil. ^1H NMR (400 MHz, $CDCl_3$): δ 7.50-7.27 (m, 10H), 3.93 (s, 2H). ^{13}C NMR (100 MHz, $CDCl_3$): δ 185.2, 133.3, 133.1, 130.8, 129.9, 128.8, 128.6, 127.4, 119.9, 93.0, 87.8, 52.2.

1-Phenyl-3-(4-methylphenyl)propynone (4h).[9] White solid, Mp 66–67 °C. ^1H NMR (400 MHz, $CDCl_3$): δ 8.22 (d, J = 8.4 Hz, 2H), 7.63 (t, J = 7.6 Hz, 1H), 7.59 (d, J = 8.0 Hz, 2H), 7.52 (t, J = 7.6 Hz, 2H), 7.23 (d, J = 8.0 Hz, 2H), 2.41 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$): δ 178.1, 141.6, 137.0, 134.0, 133.1, 129.6, 129.5, 128.6, 117.0, 93.8, 86.8, 21.8.

1-(4-Methoxyphenyl)-3-(4-methylphenyl)propynone (4i).[10] White solid, Mp 107–108 °C. ^1H NMR (400 MHz, $CDCl_3$): δ 8.18 (d, J = 8.0 Hz, 2H), 7.56 (d, J = 8.0 Hz, 2H), 7.21 (d, J = 8.0 Hz, 2H), 6.97 (d, J = 8.0 Hz, 2H), 3.88 (s, 3H), 2.39 (s, 3H). ^{13}C

NMR (100 MHz, $CDCl_3$): δ 176.8, 164.4, 141.4, 133.0, 132.0, 130.4, 129.5, 117.2, 113.9, 93.0, 86.8, 55.6, 21.8.

1-(2-Methoxyphenyl)-3-(4-methylphenyl)propynone (4j).[10] Colorless oil. ^{1}H NMR (400 MHz, $CDCl_3$): δ 8.10 (d, J = 8.0 Hz, 1H), 7.57-7.51 (m, 3H), 7.20 (d, J = 8.0 Hz, 2H), 7.08-7.00 (m, 2H), 3.96 (s, 3H), 2.38 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$): δ 176.9, 159.8, 141.2, 135.0, 133.0, 132.7, 129.4, 126.8, 120.3, 117.6, 112.2, 92.3, 89.1, 55.9, 21.8.

1-Phenylhept-2-yn-1-one (4k). Pale yellow oil.[11] ^{1}H NMR (400 MHz, $CDCl_3$): δ 8.14 (d, J = 7.2 Hz, 2H), 7.59 (t, J = 7.2 Hz, 1H), 7.47 (t, J = 7.6 Hz, 2H), 2.52-2.47 (m, 2H), 1.69-1.61 (m, 2H), 1.54-1.46 (m, 2H), 0.98-0.94 (m, 3H). ^{13}C NMR (100 MHz, $CDCl_3$): δ 178.2, 136.9, 133.9, 129.5, 128.5, 96.8, 79.7, 29.8, 22.1, 18.9, 13.5.

1-(4-Nitrophenyl)hept-2-yn-1-one (4l).[11] Yellow oil. ^{1}H NMR (400 MHz, $CDCl_3$): δ 8.33 (d, J = 8.8 Hz, 2H), 8.29 (d, J = 8.8 Hz, 2H), 2.55 (t, J = 7.2 Hz, 2H), 1.72-1.66 (m, 2H), 1.55-1.48 (m, 2H), 0.98 (t, J = 7.2 Hz, 3H). ^{13}C NMR (100 MHz, $CDCl_3$): δ 176.1, 150.8, 141.1, 130.4, 123.8, 99.5, 79.4, 29.7, 22.1, 19.0, 13.5.

1-(2-Methoxyphenyl)hept-2-yn-1-one (4m).[10] Colorless oil. ^{1}H NMR (400 MHz, $CDCl_3$): δ 8.00 (dd, J = 7.8, 1.8 Hz, 1H), 7.53-7.48 (m, 1H), 7.03-6.96 (m, 2H), 3.91 (s, 3H), 2.46 (t, J = 7.0 Hz, 2H), 1.66-1.59 (m, 2H), 1.53-1.44 (m, 2H), 0.95 (t, J = 7.4 Hz, 3H). ^{13}C NMR (100 MHz, $CDCl_3$): δ 177.2, 159.6, 134.6, 132.9, 126.9, 120.2, 112.1, 95.3, 81.8, 55.8, 29.9, 22.0, 19.0, 13.5.

1-(Furan-2-yl)hept-2-yn-1-one (4n).[7] Pale yellow oil. ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.64 (d, J = 0.8 Hz, 1H), 7.31 (d, J = 3.2 Hz, 1H), 6.56 (dd, J = 3.6, 1.6 Hz, 1H), 2.47 (t, J = 7.0 Hz, 2H), 1.66-1.58 (m, 2H), 1.52-1.46 (m, 2H), 0.96 (t, J = 7.4 Hz, 3H). ^{13}C NMR (100 MHz, $CDCl_3$): δ 165.1, 153.3, 147.7, 120.5, 112.5, 95.6, 79.0, 29.7, 22.0, 18.8, 13.5.

1-(4-Methylphenyl)non-2-yn-1-one (4o).[6] Pale yellow oil. ^{1}H NMR (400 MHz,

$CDCl_3$): δ 8.03 (d, J = 8.0 Hz, 2H), 7.27 (d, J = 8.0 Hz, 2H), 2.49 (t, J = 7.2 Hz, 2H), 2.43 (s, 3H), 1.69-1.64 (m, 2H), 1.51-1.33 (m, 6H), 0.91 (t, J = 6.8 Hz, 3H). ^{13}C NMR (100 MHz, $CDCl_3$): δ 177.9, 144.8, 134.7, 129.7, 129.2, 96.3, 79.8, 31.2, 28.6, 27.8, 22.5, 21.7, 19.2, 14.0.

1-(3-Methylphenyl)non-2-yn-1-one (4p).[10] Colorless oil. ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.95 (d, J = 6.8 Hz, 1H), 7.94 (s, 1H), 7.42-7.33 (m, 2H), 2.50 (t, J = 7.0 Hz, 2H), 2.42 (s, 3H), 1.71-1.64 (m, 2H), 1.51-1.32 (m, 6H), 0.91 (t, J = 7.0 Hz, 3H). ^{13}C NMR (100 MHz, $CDCl_3$): δ 178.5, 138.3, 137.0, 134.7, 129.9, 128.4, 127.0, 96.7, 79.8, 31.3, 28.7, 27.8, 22.5, 21.3, 19.3, 14.0.

1-(4-Methoxyphenyl)non-2-yn-1-one (4q).[6] Pale yellow oil. ^{1}H NMR (400 MHz, $CDCl_3$): δ 8.11 (d, J = 8.8 Hz, 2H), 6.94 (d, J = 8.8 Hz, 2H), 3.89 (s, 3H), 2.48 (t, J = 7.2 Hz, 2H), 1.69-1.63 (m, 2H), 1.49-1.32 (m, 6H), 0.91 (t, J = 7.2 Hz, 3H). ^{13}C NMR (100 MHz, $CDCl_3$): δ 177.0, 164.3, 131.9, 130.4, 113.7, 96.0, 79.6, 55.6, 31.3, 28.7, 27.8, 22.5, 19.2, 14.1.

1-(Furan-2-yl)non-2-yn-1-one (4r).[6] Pale yellow oil. ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.64 (s, 1H), 7.31 (d, J = 3.6 Hz, 1H), 6.56 (dd, J = 3.2, 1.6 Hz, 1H), 2.46 (t, J = 7.0 Hz, 2H), 1.69-1.61 (m, 2H), 1.50-1.30 (m, 6H), 0.91 (t, J = 7.2 Hz, 3H). ^{13}C NMR (100 MHz, $CDCl_3$): δ 165.1, 153.3, 147.7, 120.5, 112.4, 95.6, 79.0, 31.2, 28.6, 27.7, 22.5, 19.1, 14.0.

1-(Thiophen-2-yl)non-2-yn-1-one (4s).[6] Pale yellow oil. ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.90-7.88 (m, 1H), 7.69-7.67 (m, 1H), 7.15 (dd, J = 4.8, 4.0 Hz, 1H), 2.48 (t, J = 7.0 Hz, 2H), 1.68-1.61 (m, 2H), 1.49-1.26 (m, 6H), 0.91 (t, J = 7.2 Hz, 3H). ^{13}C NMR (100 MHz, $CDCl_3$): δ 170.1, 145.1, 134.9, 134.8, 128.2, 95.5, 79.3, 31.2, 28.6, 27.7, 22.5, 19.1, 14.0.

4-Methoxy-1-phenylbut-2-yn-1-one (4t).[12] Pale yellow oil. ^{1}H NMR (400 MHz, $CDCl_3$): δ 8.15 (d, J = 7.6 Hz, 2H), 7.64 (t, J = 7.4 Hz, 1H), 7.51 (t, J = 7.6 Hz, 2H),

4.41 (s, 2H), 3.51 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$): δ 177.5, 136.3, 134.4, 129.6, 128.7, 90.0, 84.2, 59.8, 58.3.

4-Methoxy-1-(4-methylphenyl)but-2-yn-1-one (4u).[6] Pale yellow oil. ^{1}H NMR (400 MHz, $CDCl_3$): δ 8.04 (d, J = 8.4 Hz, 2H), 7.29 (d, J = 8.0 Hz, 2H), 4.39 (s, 2H), 3.50 (s, 3H), 2.44 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$): δ 177.2, 145.5, 134.1, 129.8, 129.4, 89.4, 84.4, 59.8, 58.2, 21.9.

1-Phenyl-3-(trimethylsilyl)propynone (4v).[13] Pale yellow oil. ^{1}H NMR (400 MHz, $CDCl_3$): δ 8.14 (d, J = 7.6 Hz, 2H), 7.61 (t, J = 7.6 Hz, 1H), 7.48 (t, J = 7.6 Hz, 2H), 0.32 (s, 9H). ^{13}C NMR (100 MHz, $CDCl_3$): δ 178.4, 137.2, 134.8, 130.3, 129.3, 101.6, 101.2, 0.0.

1-(4-Methylphenyl)-3-(trimethylsilyl)propynone (4w).[13] Pale yellow oil. ^{1}H NMR (400 MHz, $CDCl_3$): δ 8.03 (d, J = 8.4 Hz, 2H), 7.28 (d, J = 8.0 Hz, 2H), 2.43 (s, 3H), 0.32 (s, 9H). ^{13}C NMR (100 MHz, $CDCl_3$): δ 178.1, 146.0, 134.9, 130.5, 130.0, 101.6, 100.7, 22.5, 0.0.

1-(4-Chlorophenyl)-3-(trimethylsilyl)propynone (4x).[6] Pale yellow oil. ^{1}H NMR (400 MHz, $CDCl_3$): δ 8.08 (d, J = 8.4 Hz, 2H), 7.47 (d, J = 8.8 Hz, 2H), 0.32 (s, 9H). ^{13}C NMR (100 MHz, $CDCl_3$): δ 177.1, 141.5, 135.6, 131.7, 129.7, 102.0, 101.1, 0.0.

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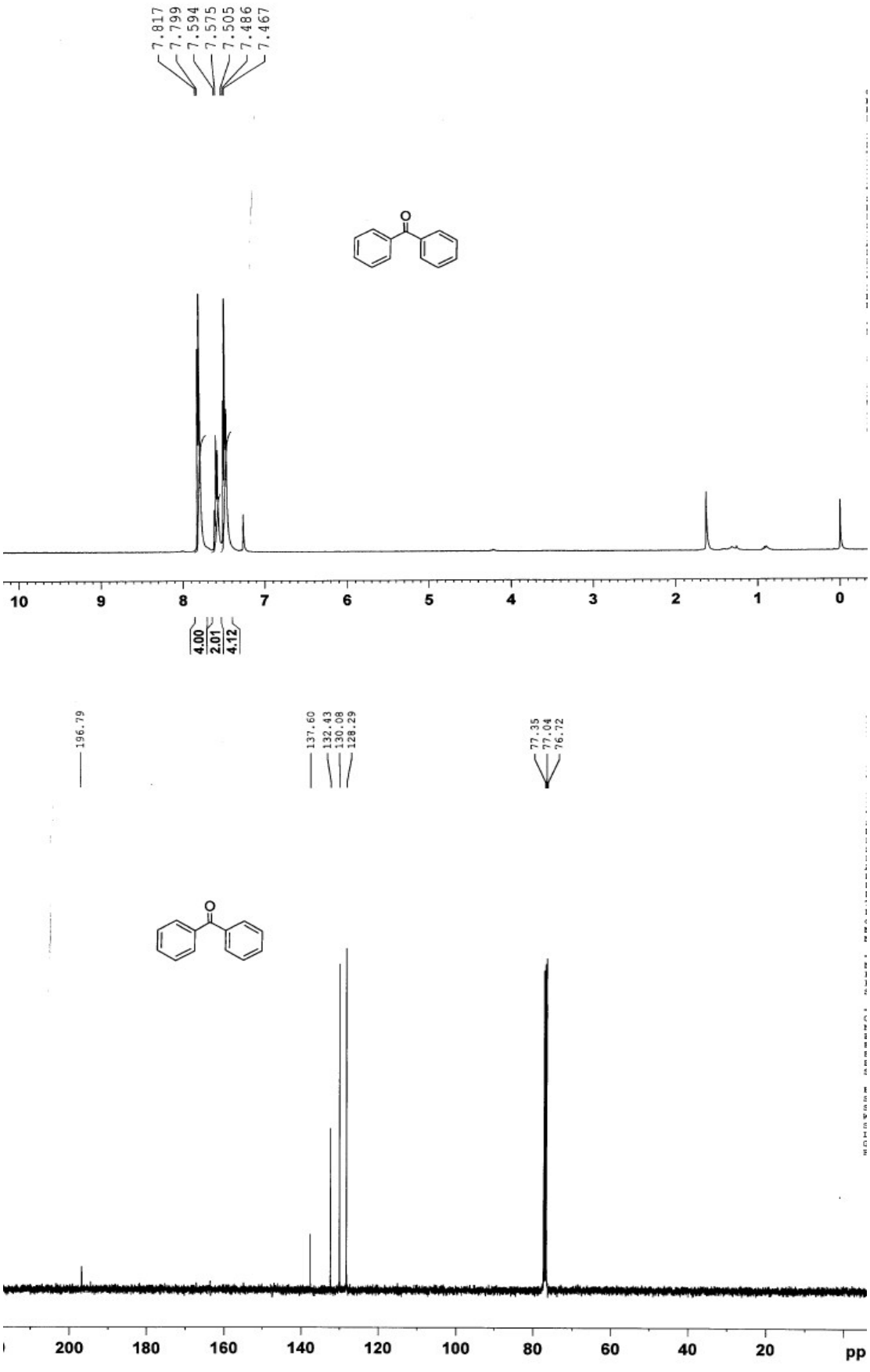
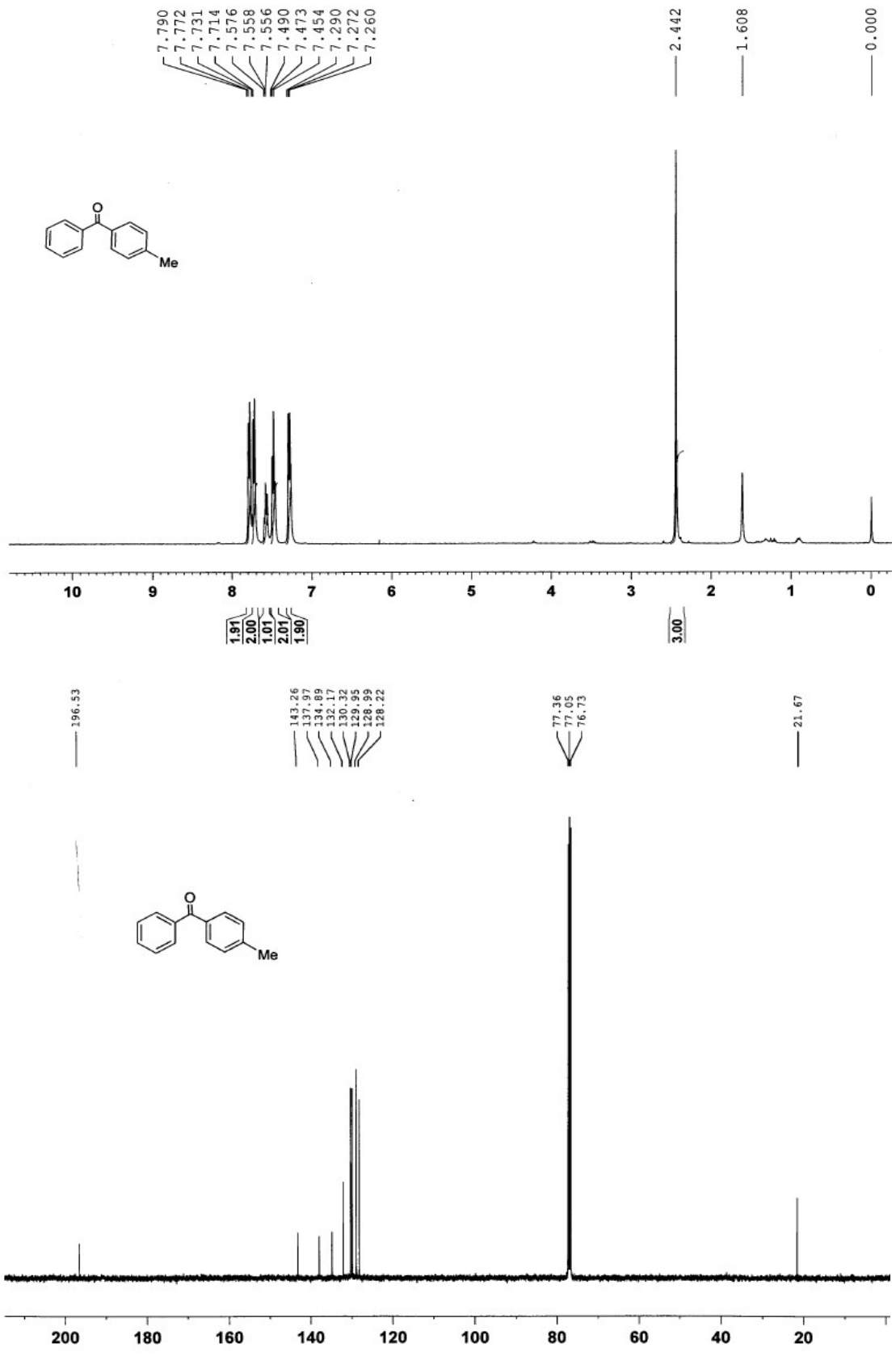
Copies of ^{1}H NMR and ^{13}C NMR Spectra of Compounds 3a-3z and 4a-4x



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



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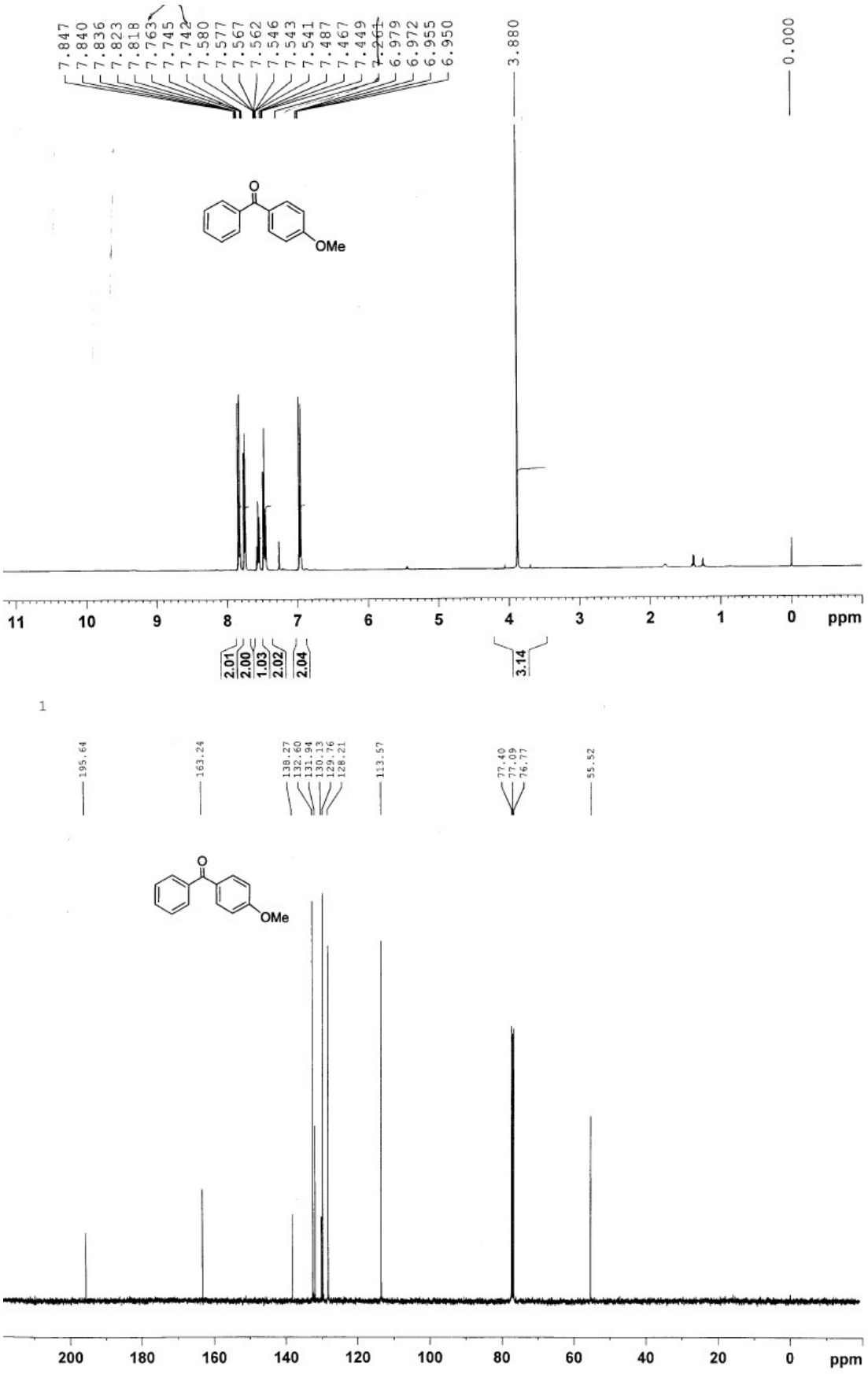
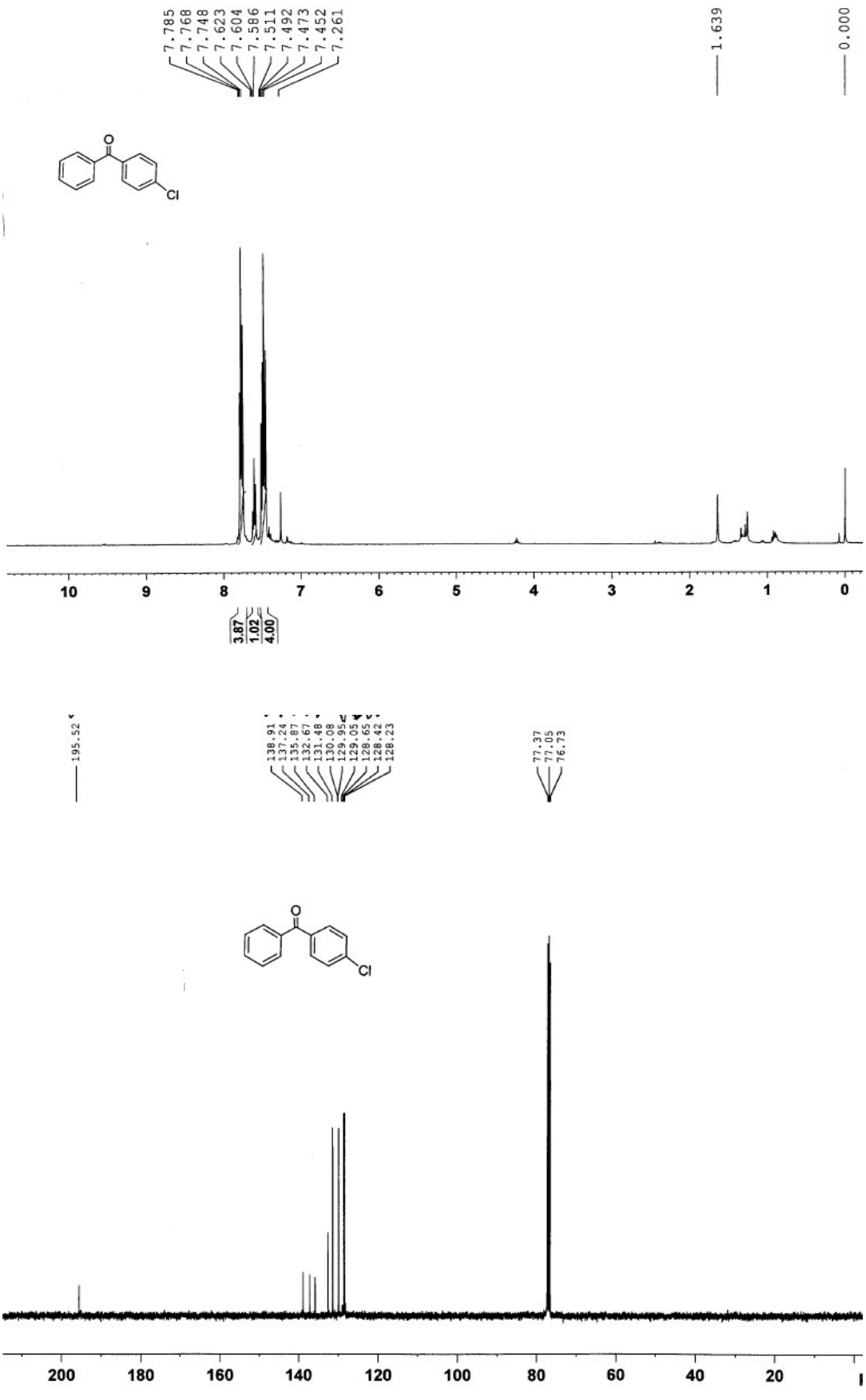
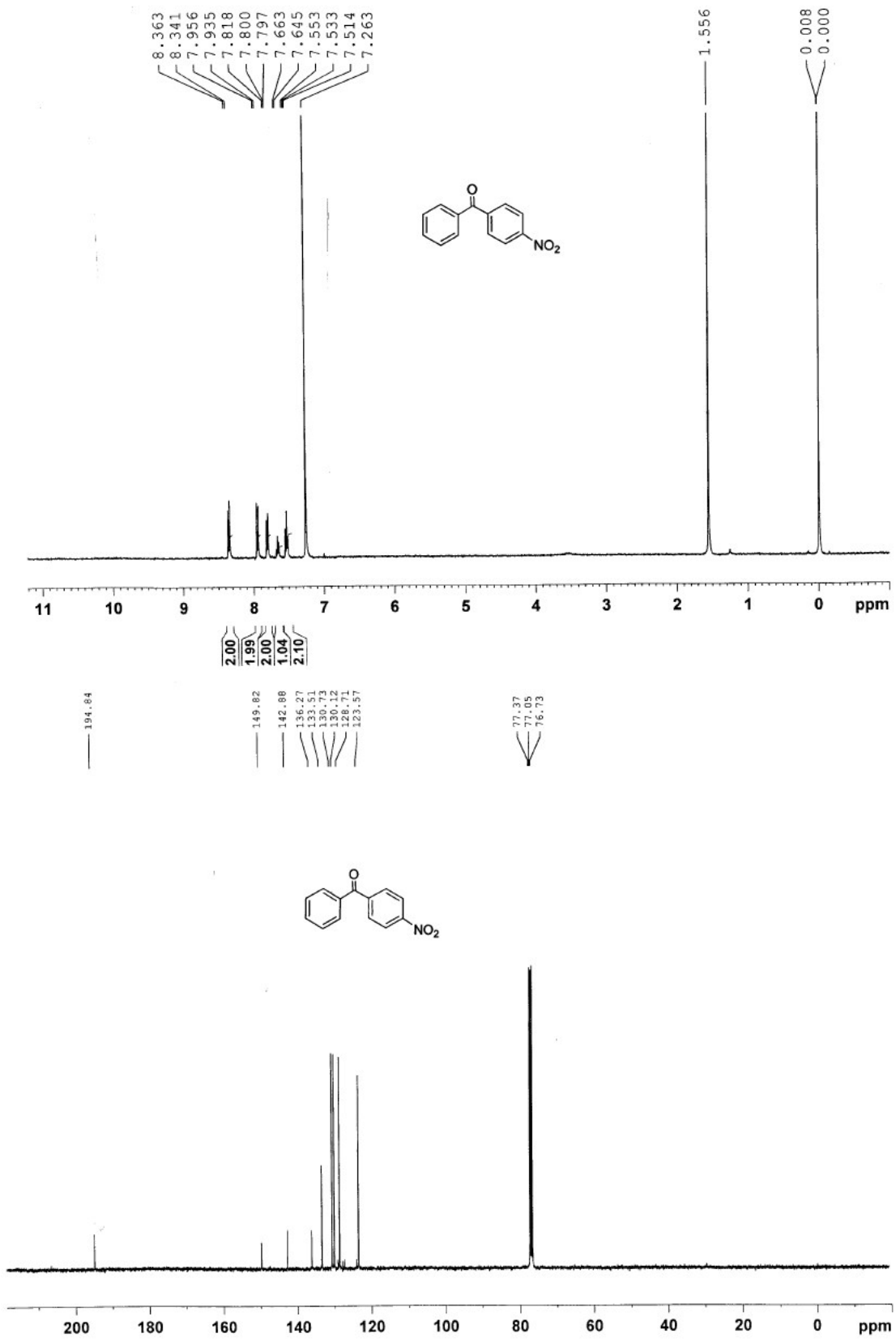


^{1}H NMR and ^{13}C NMR spectra of **3c**



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



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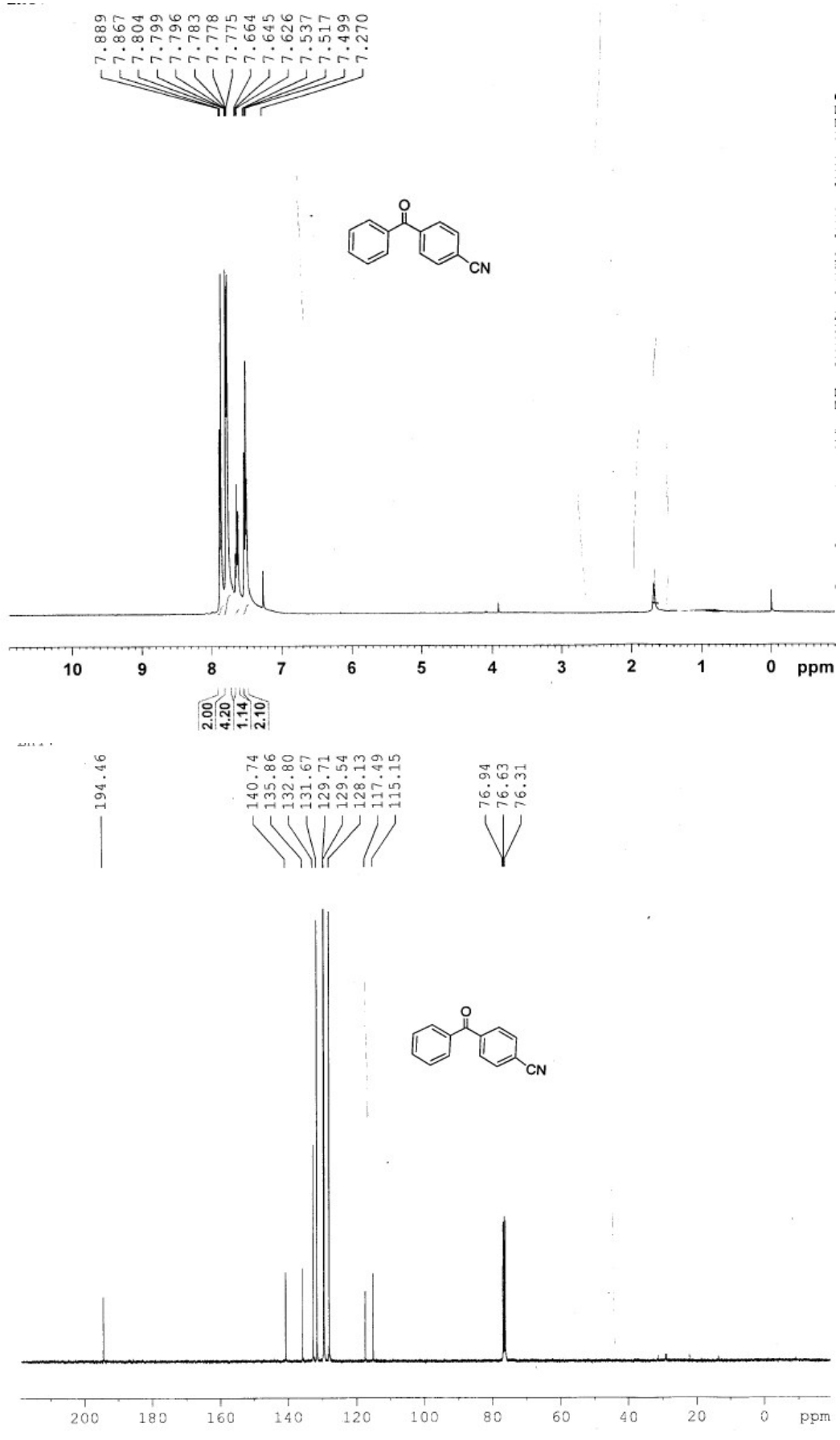
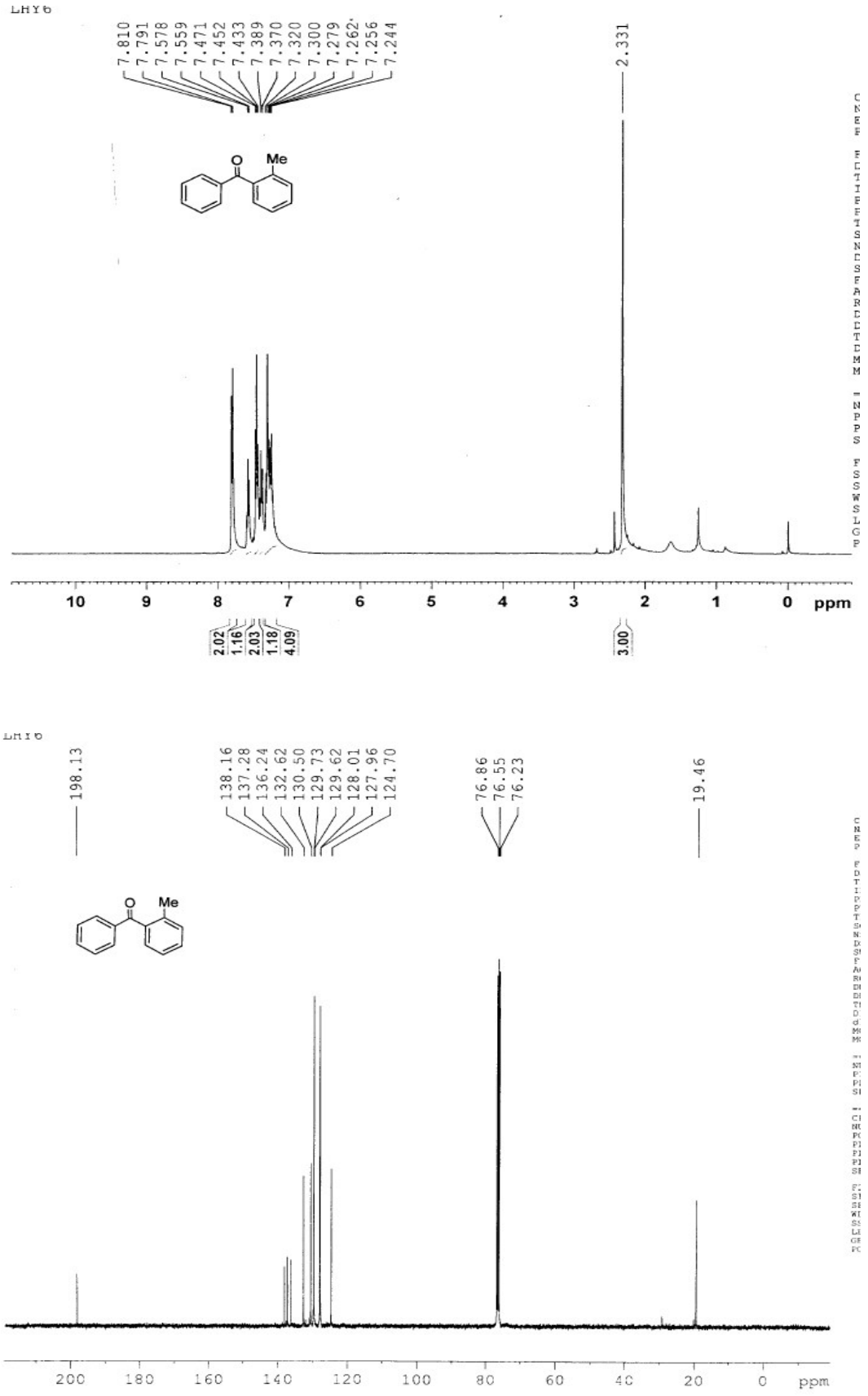
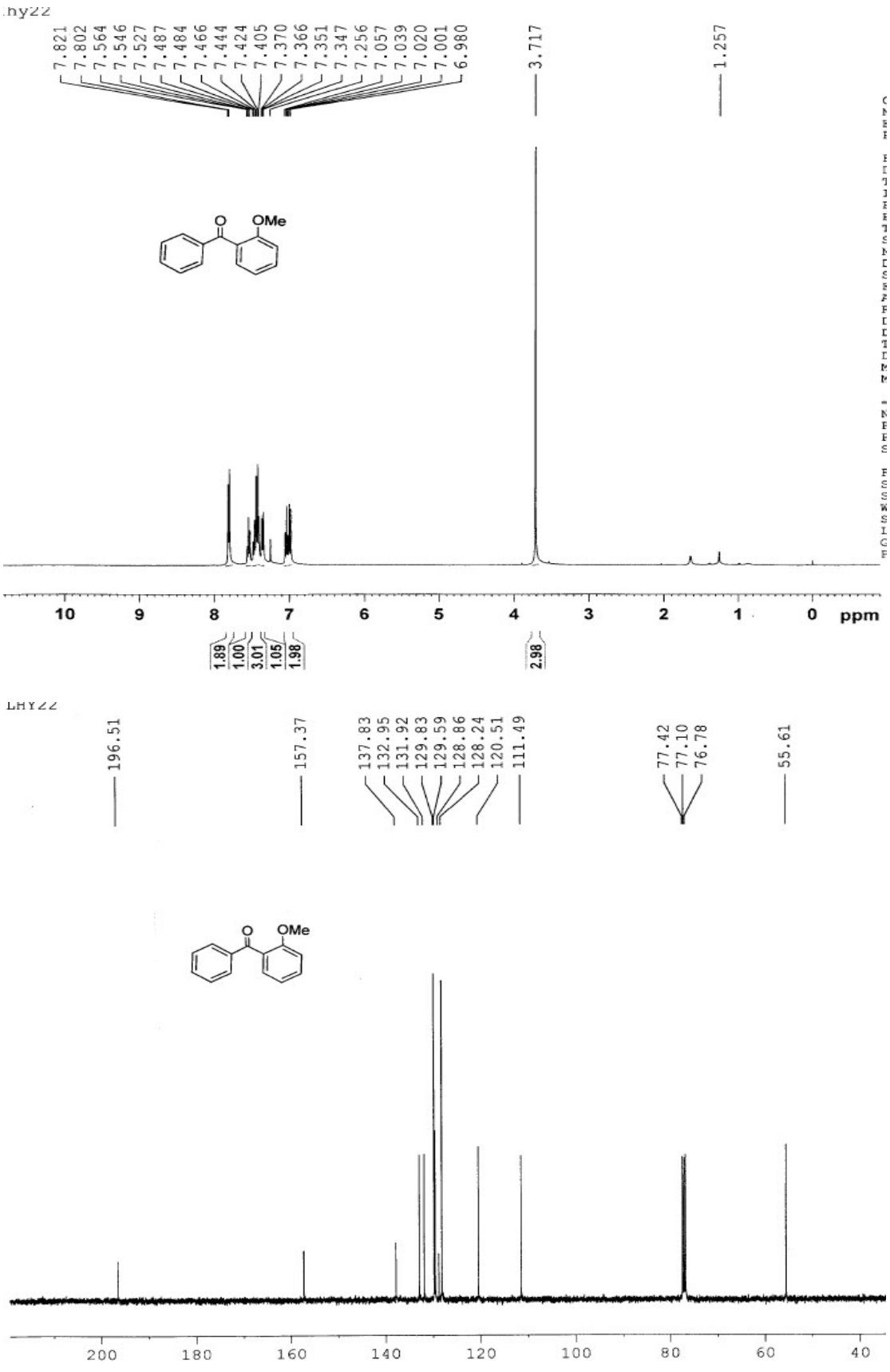


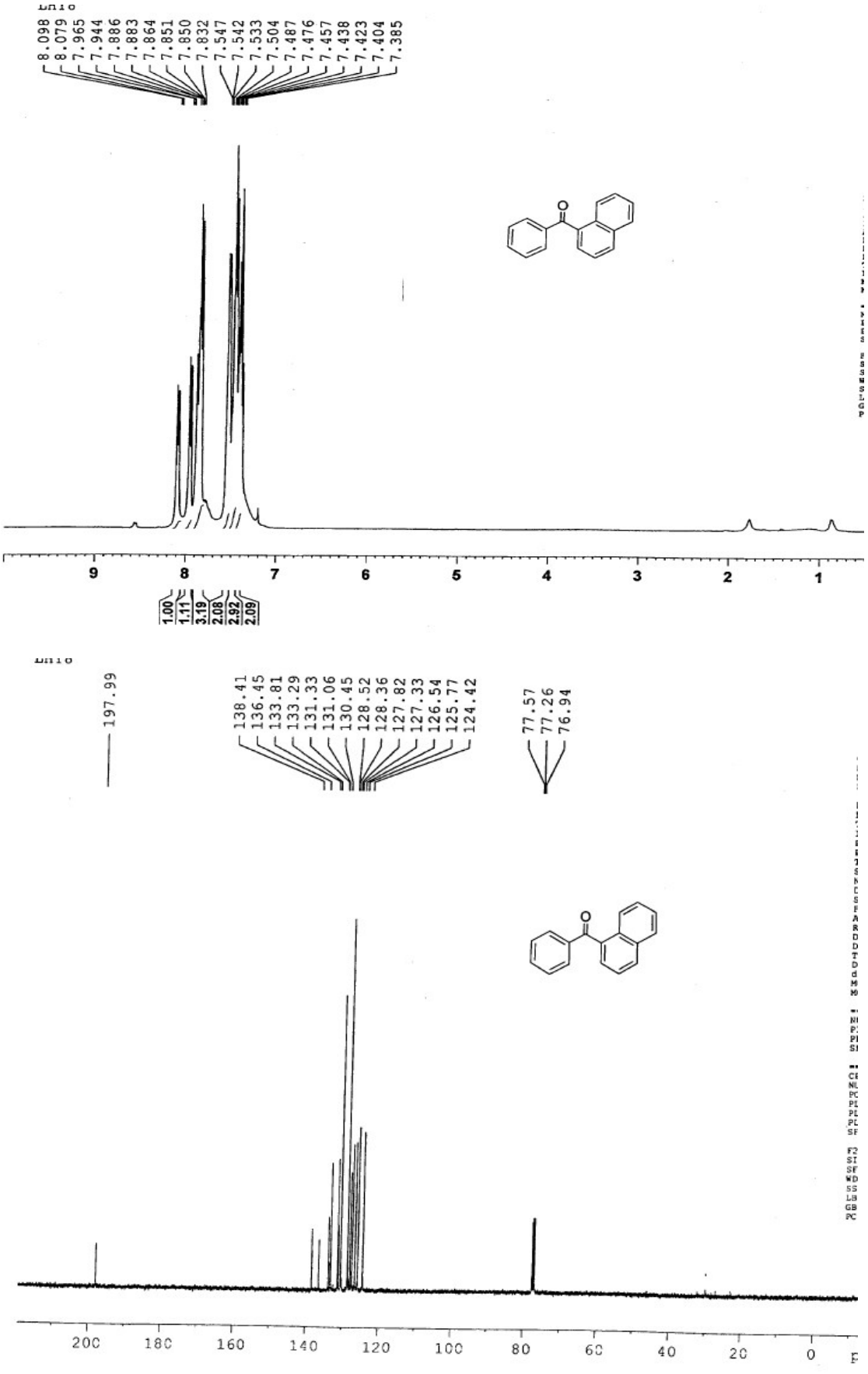
^{1}H NMR and ^{13}C NMR spectra of **3f**



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



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



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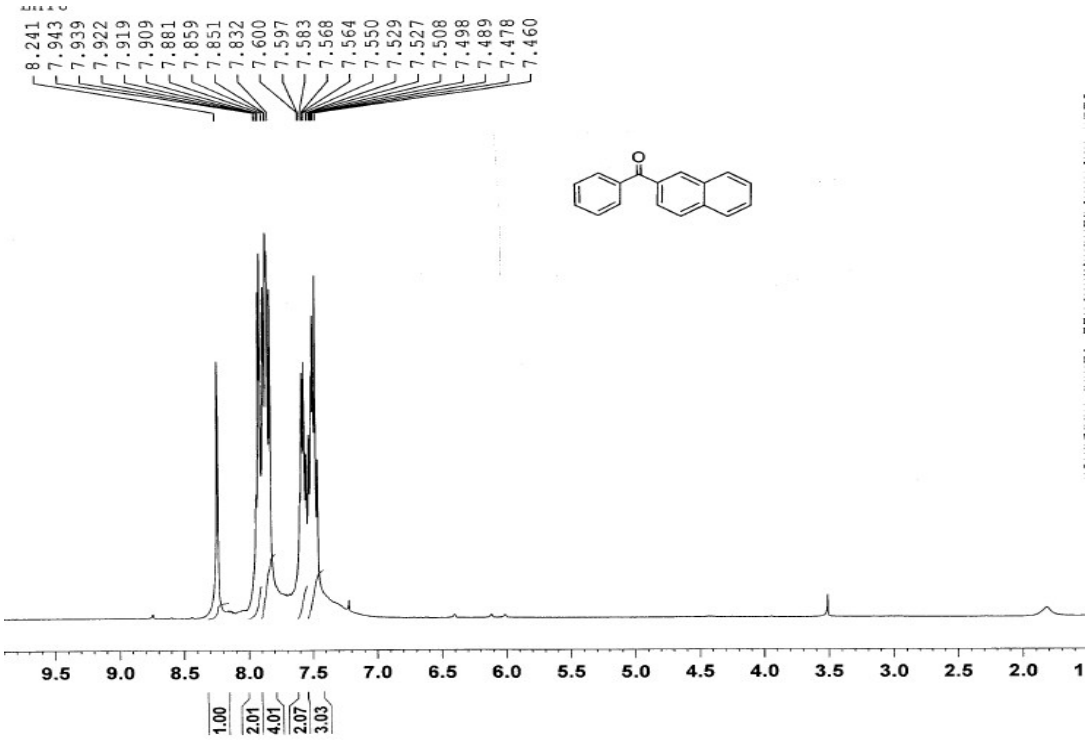

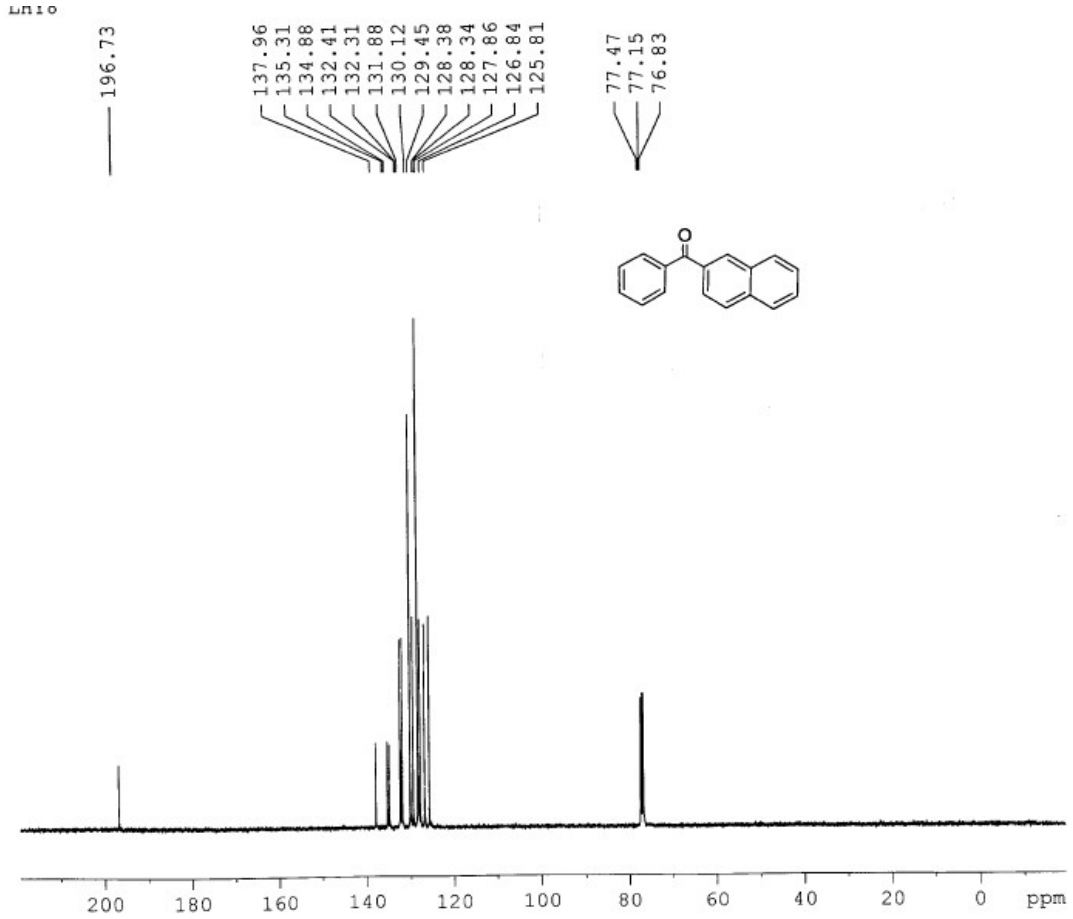

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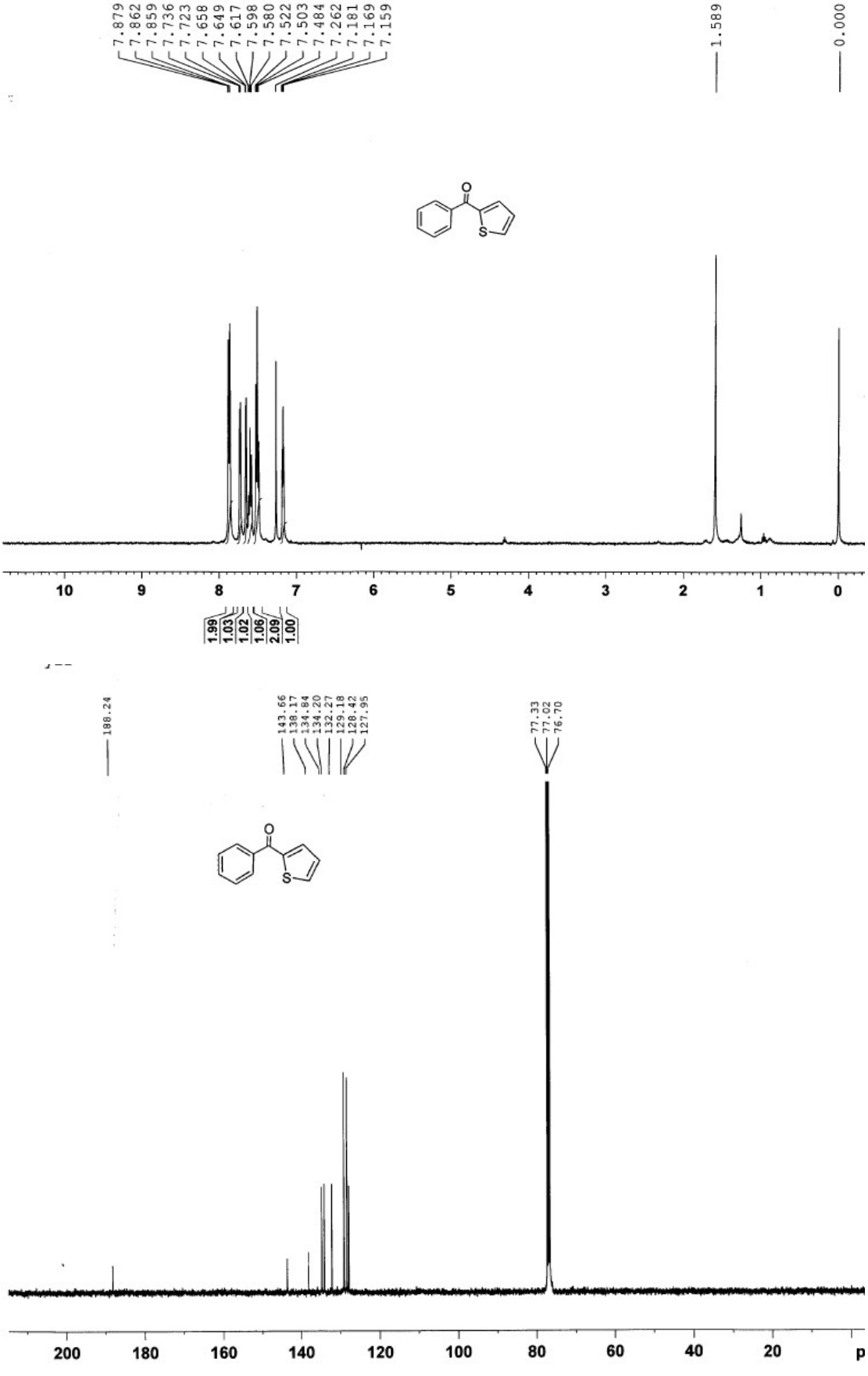

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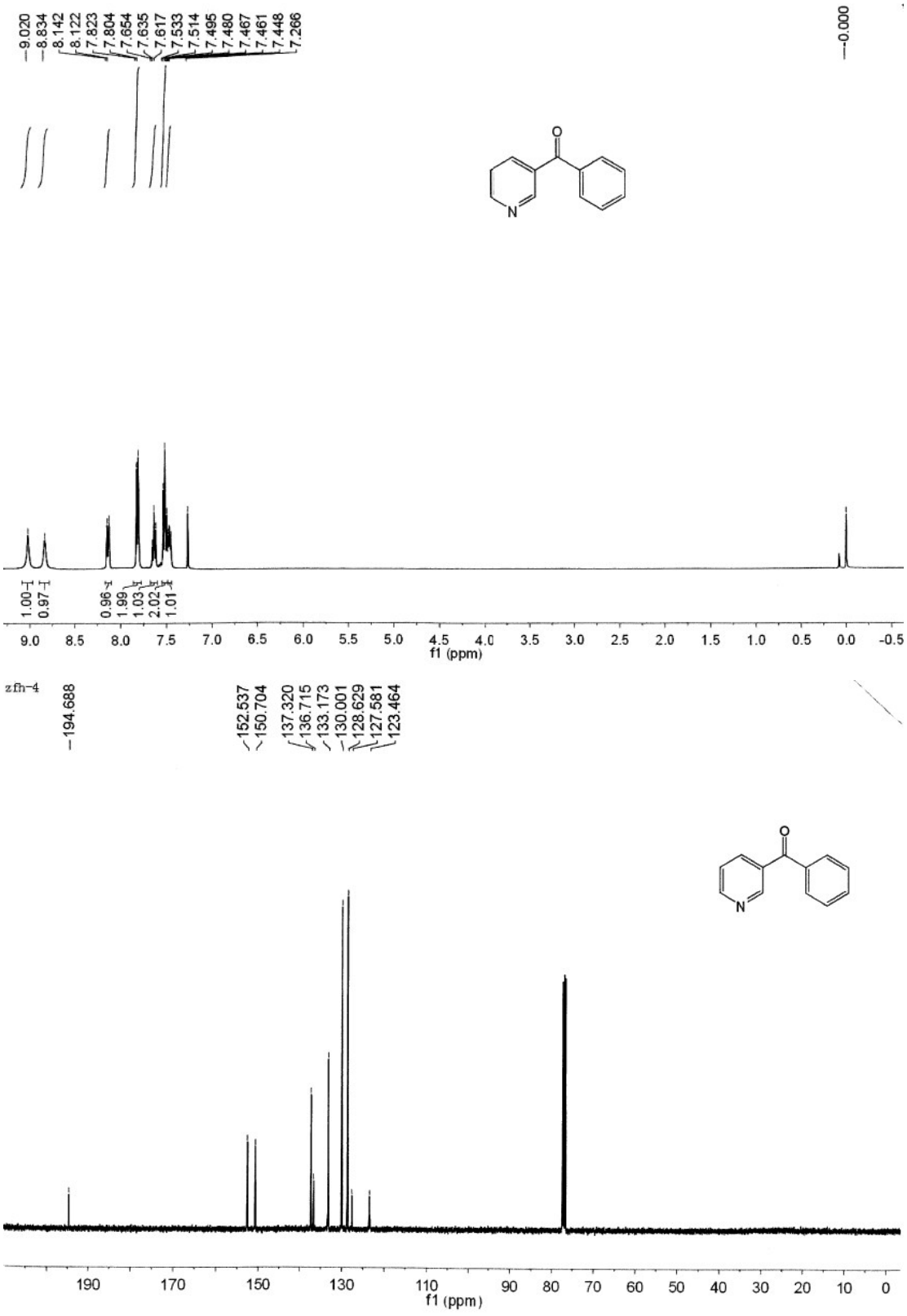

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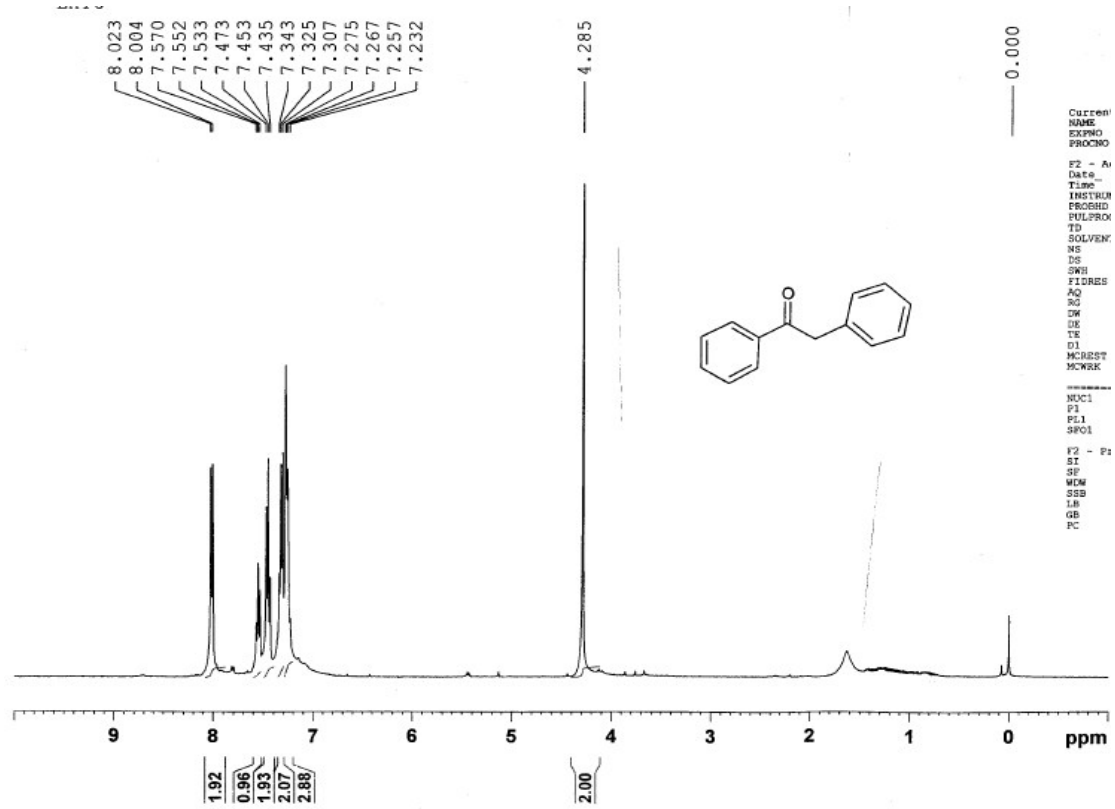
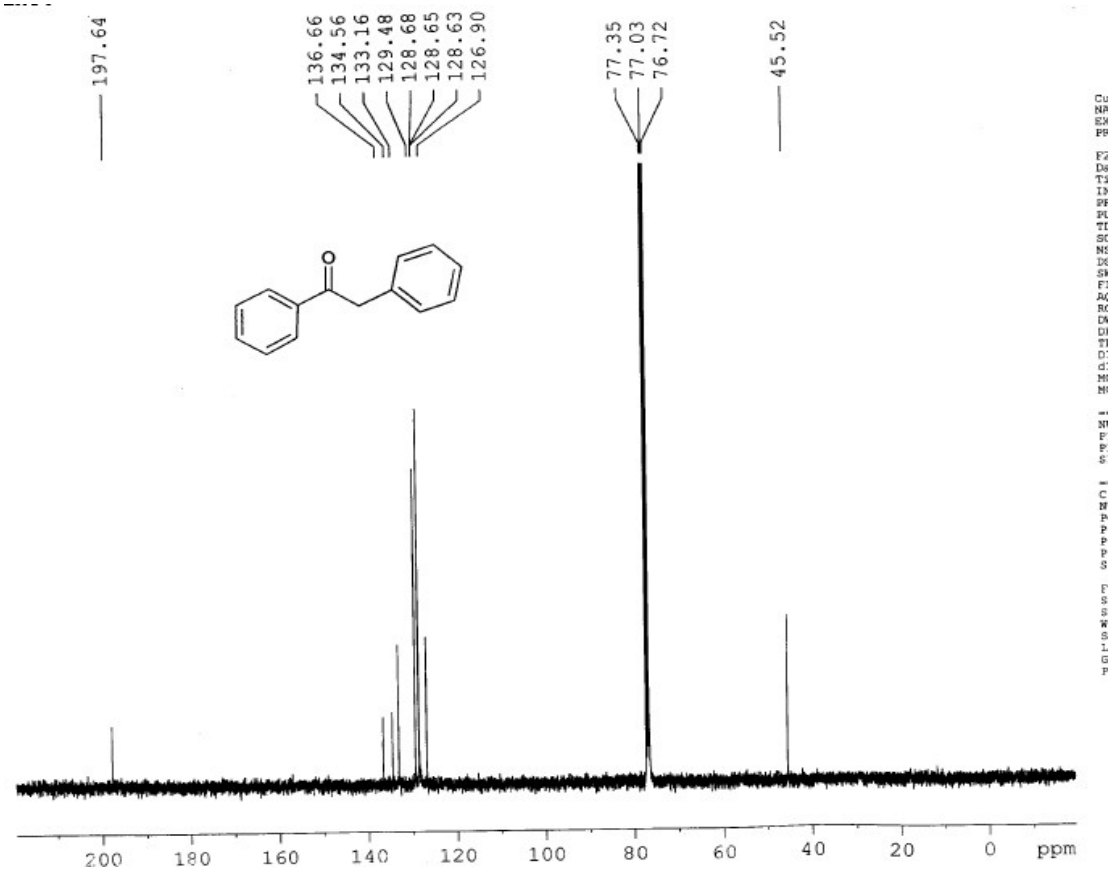
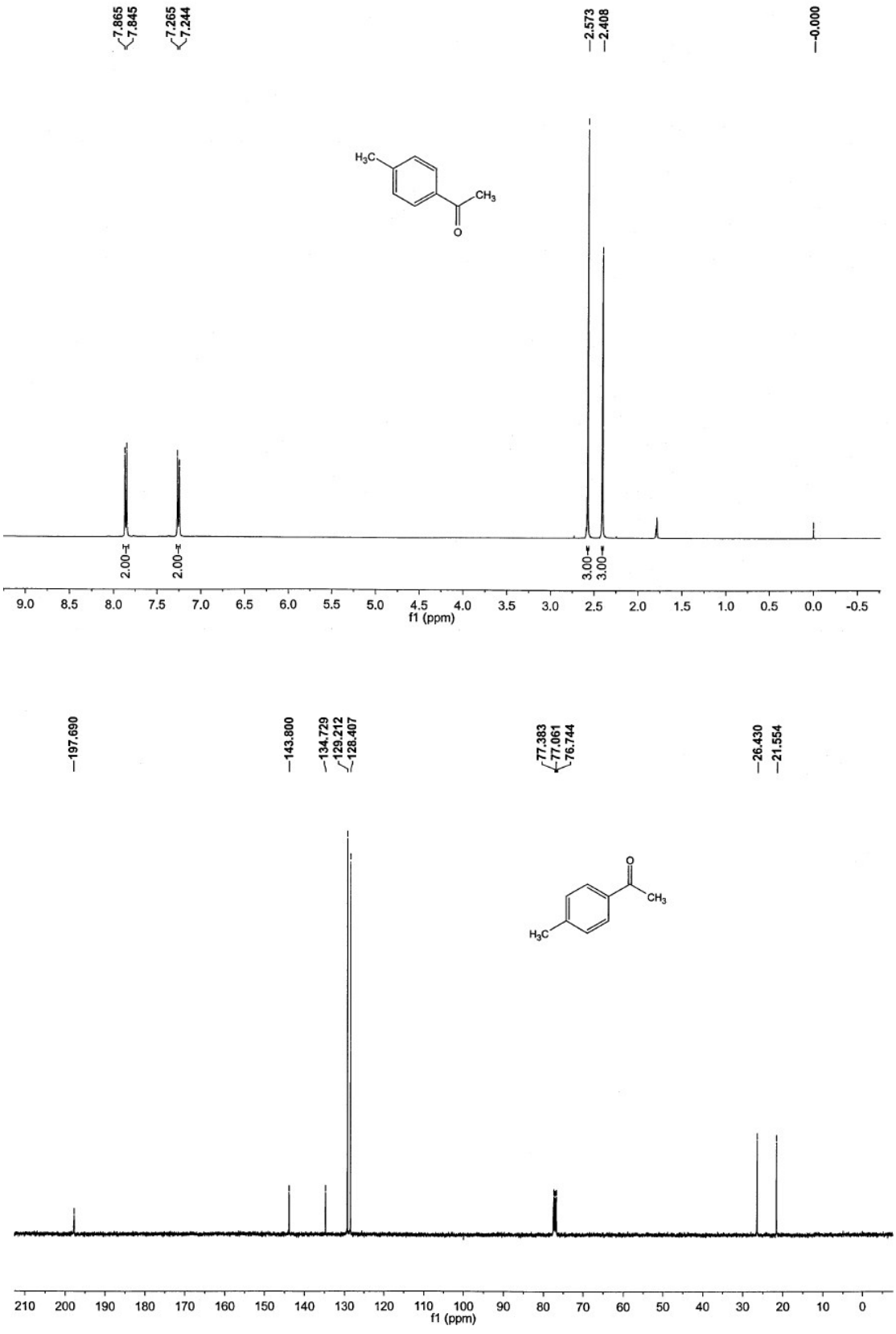
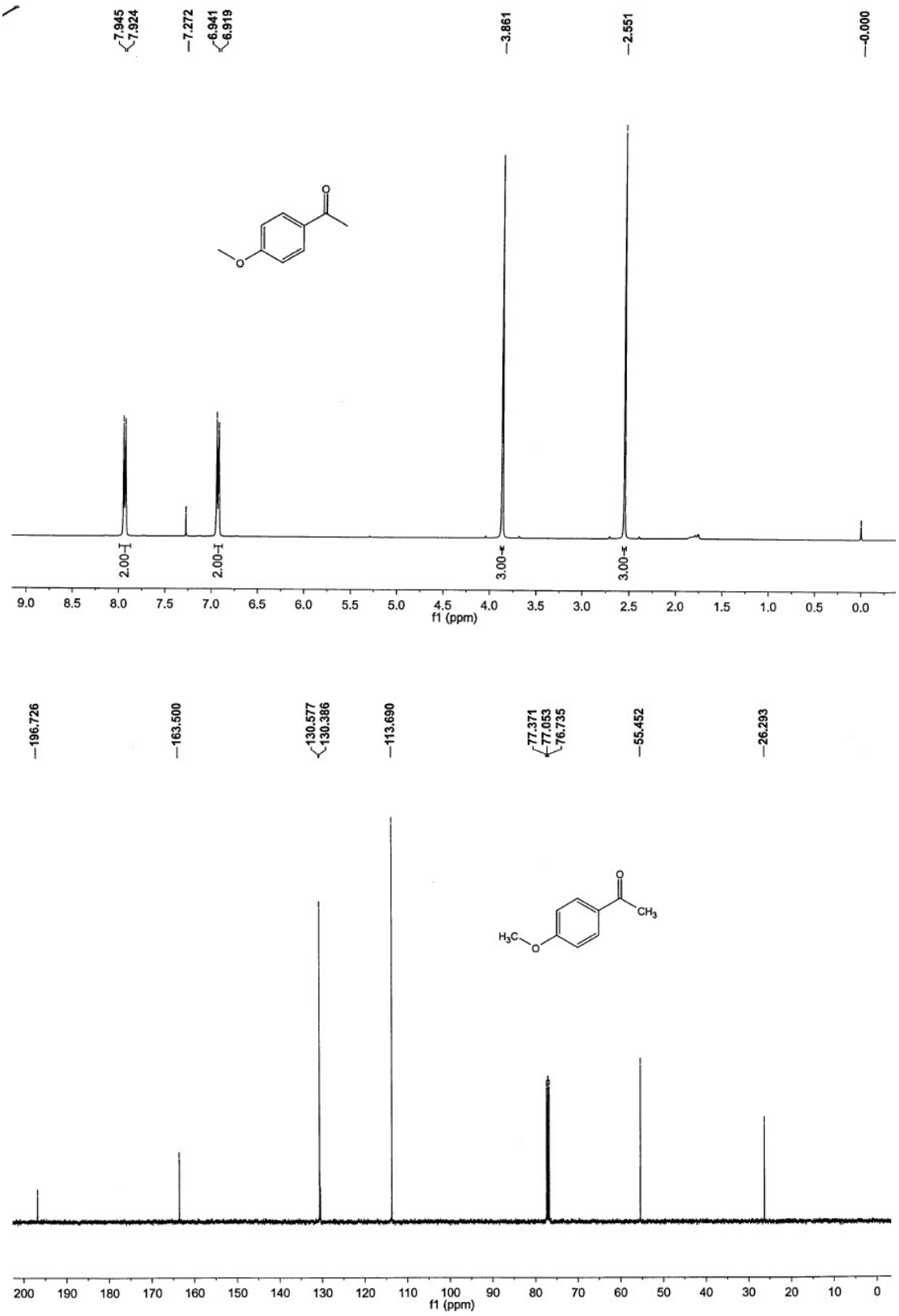




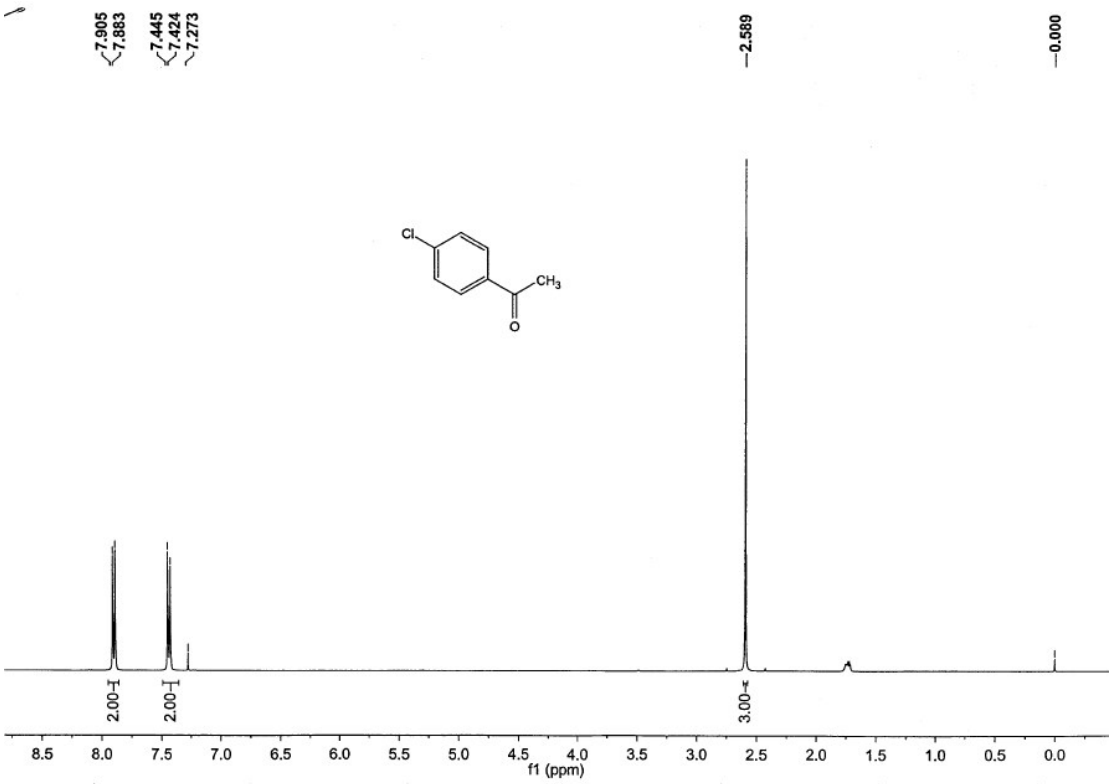
^{1}H NMR and ^{13}C NMR spectra of **3m**

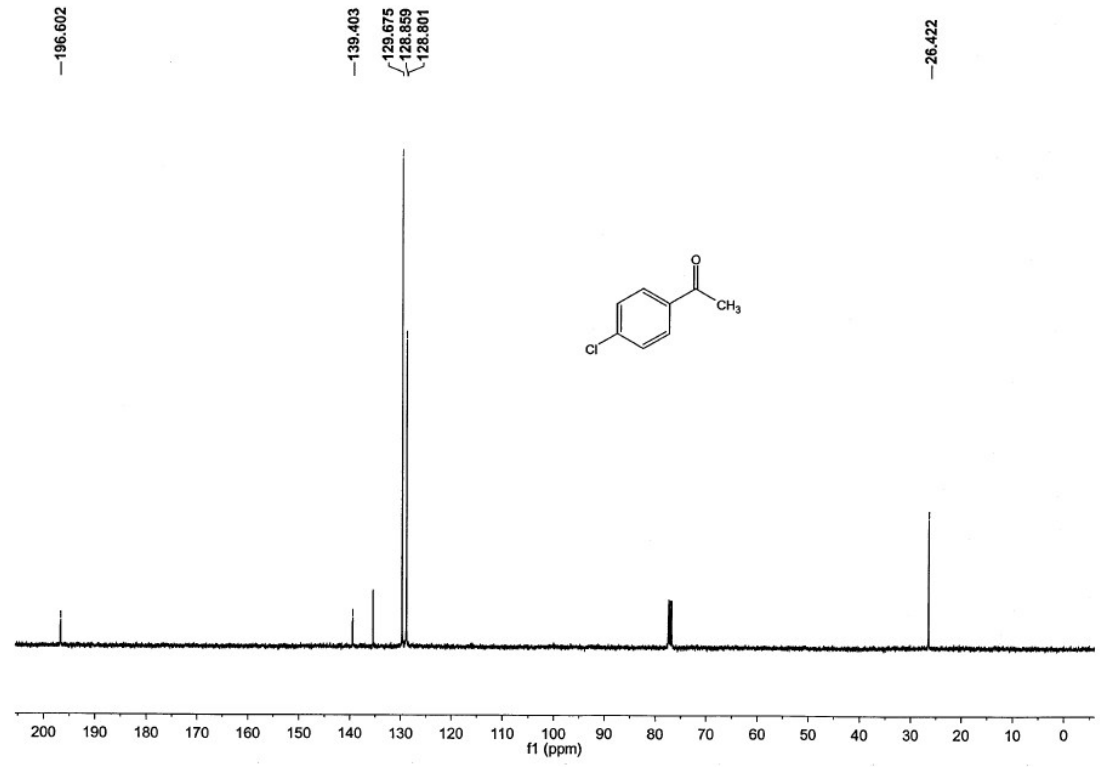


^{1}H NMR and ^{13}C NMR spectra of **3n**

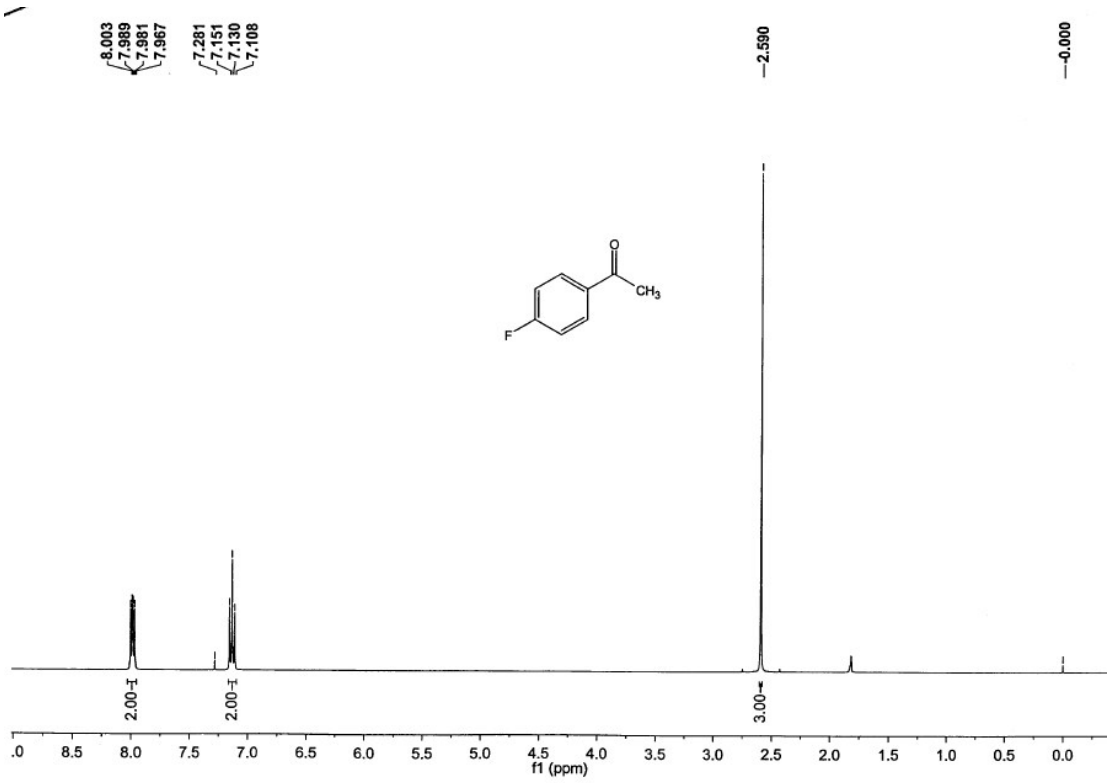


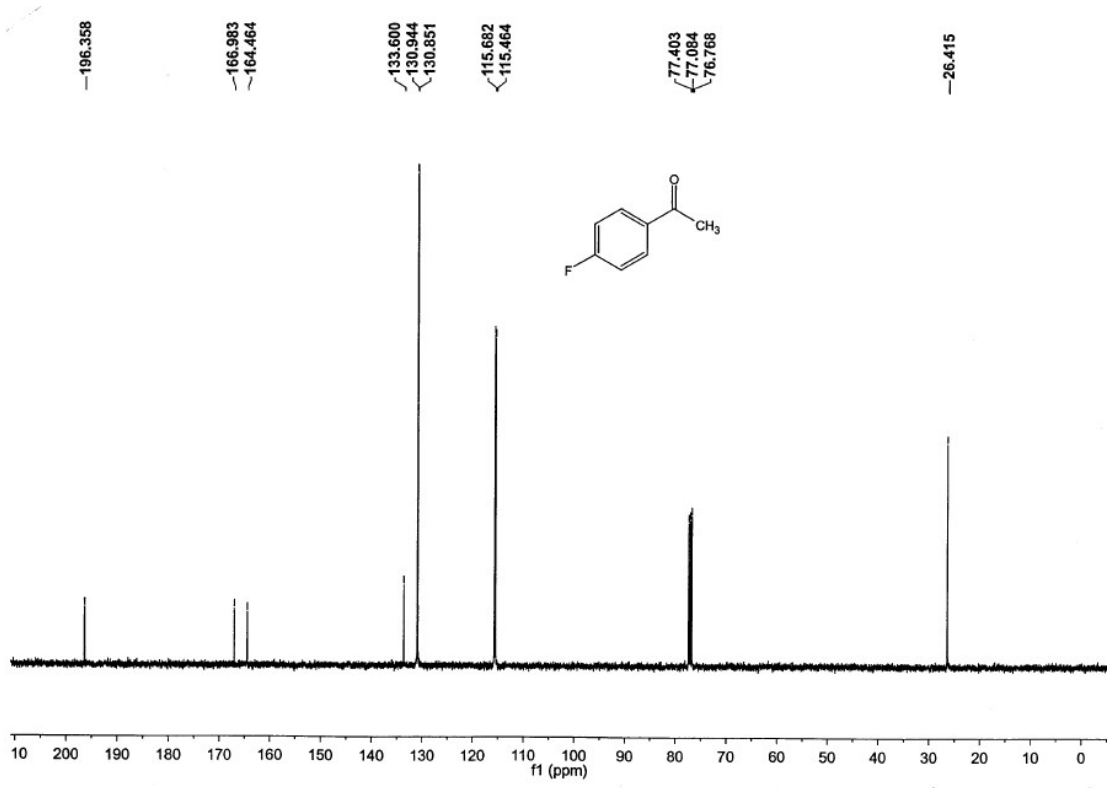
^{1}H NMR and ^{13}C NMR spectra of **3o**



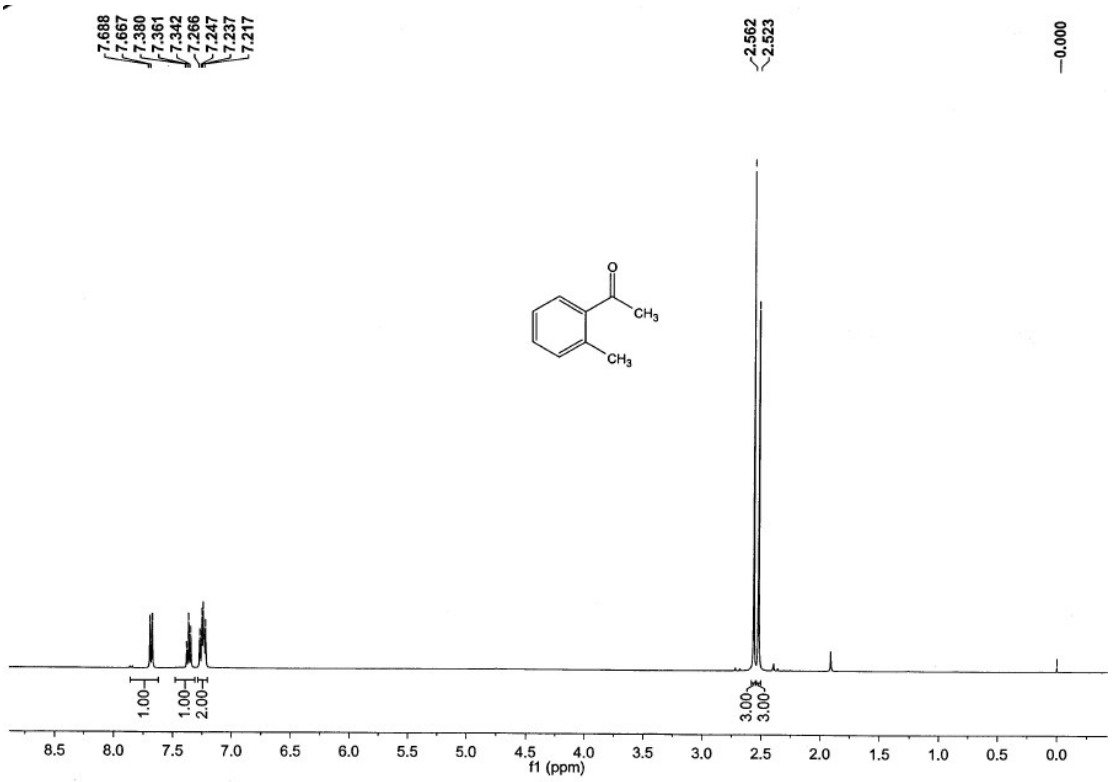


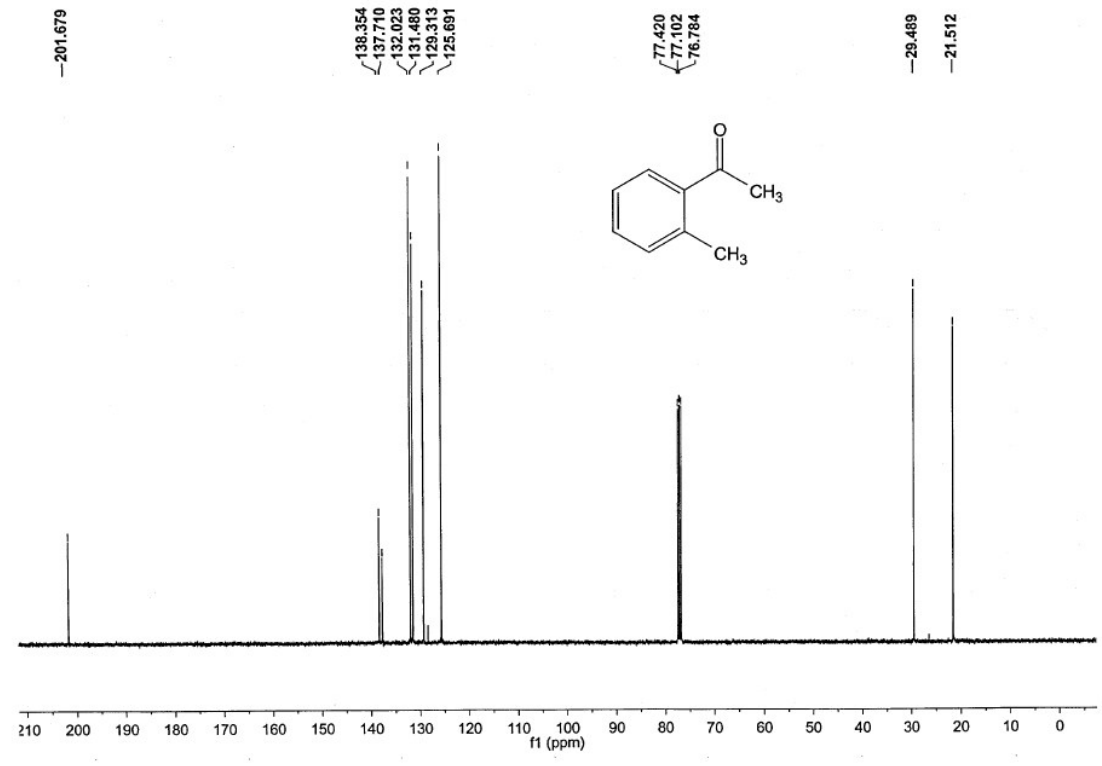
^{1}H NMR and ^{13}C NMR spectra of **3p**



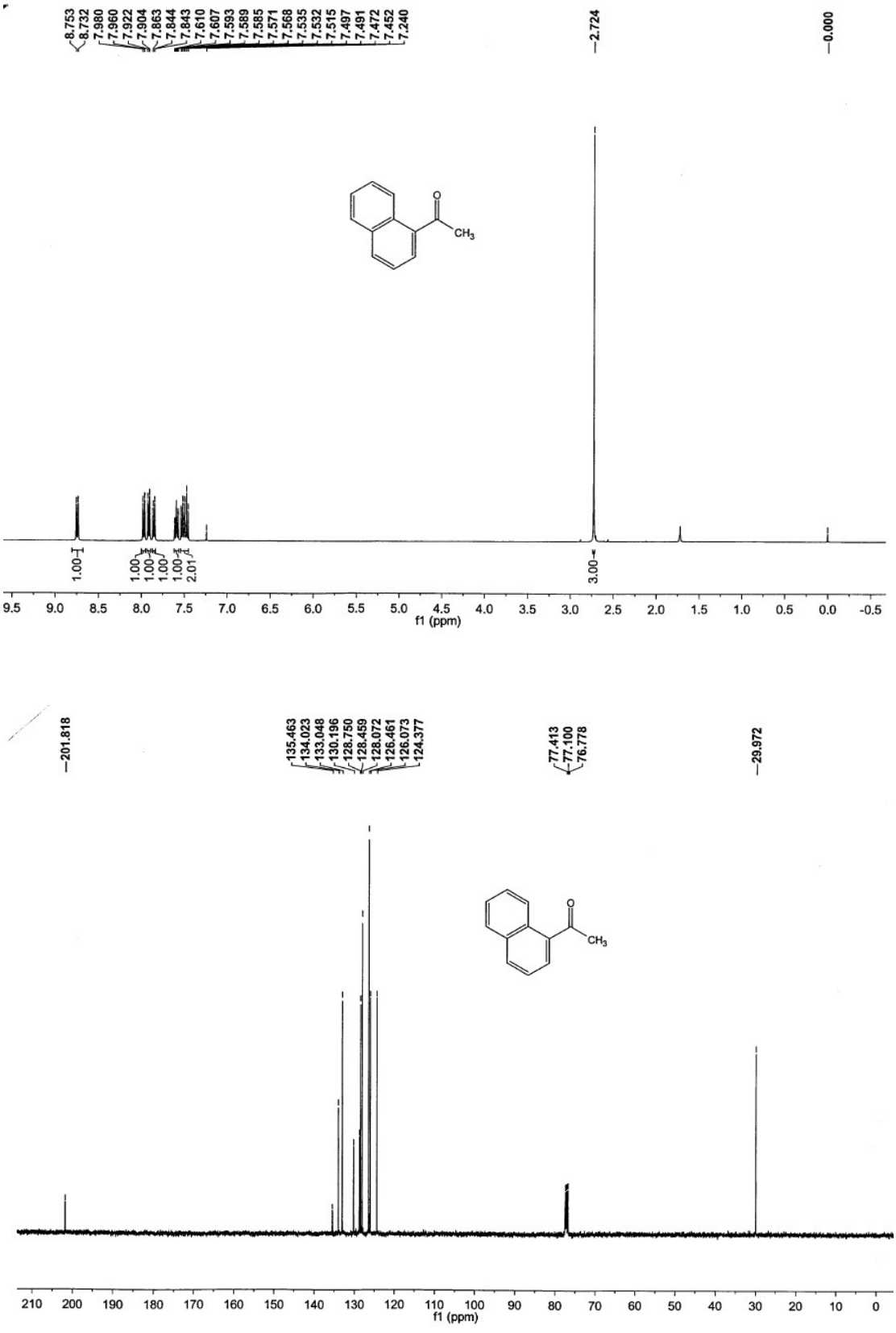


^{1}H NMR and ^{13}C NMR spectra of **3q**

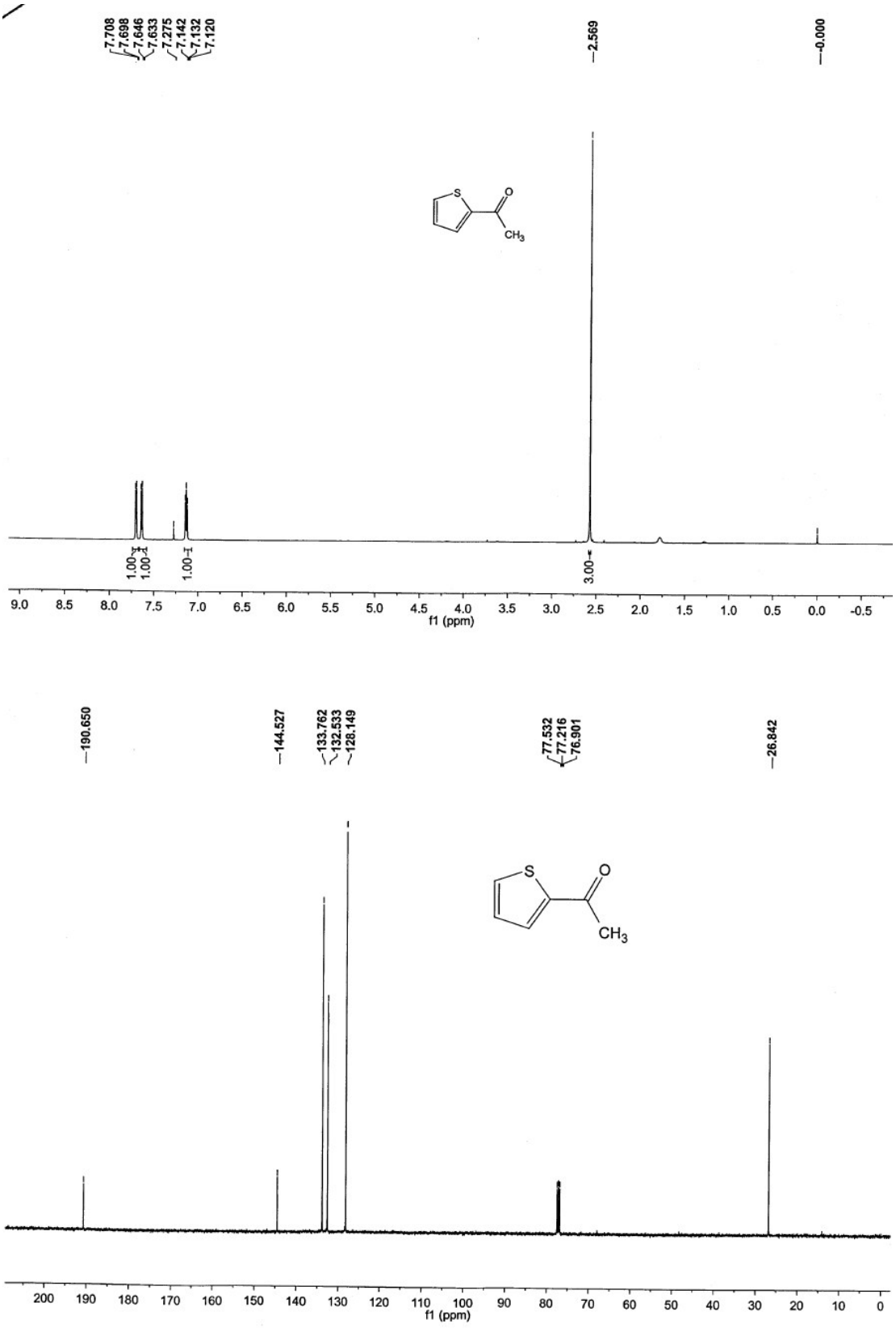




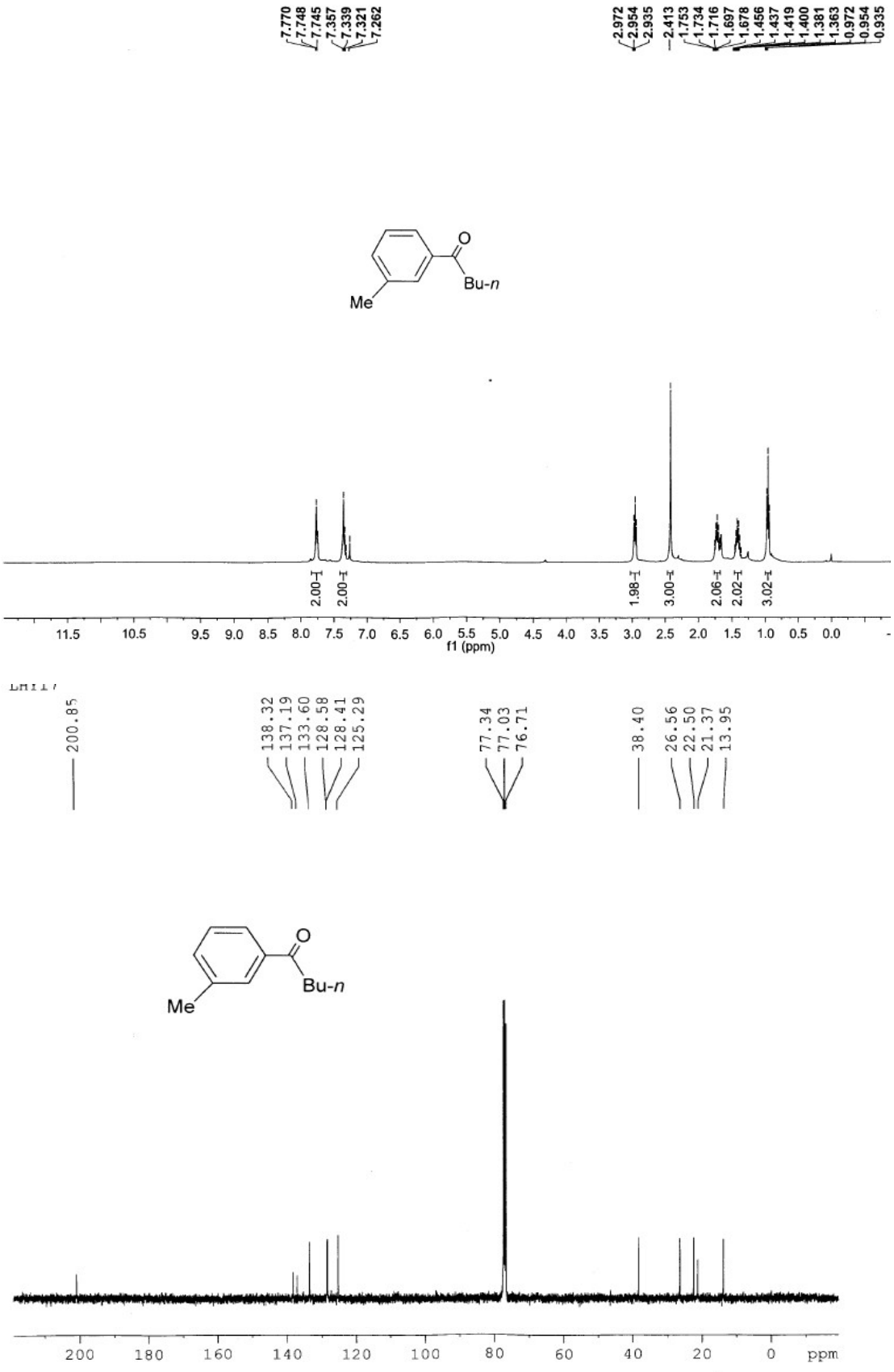
^{1}H NMR and ^{13}C NMR spectra of **3r**



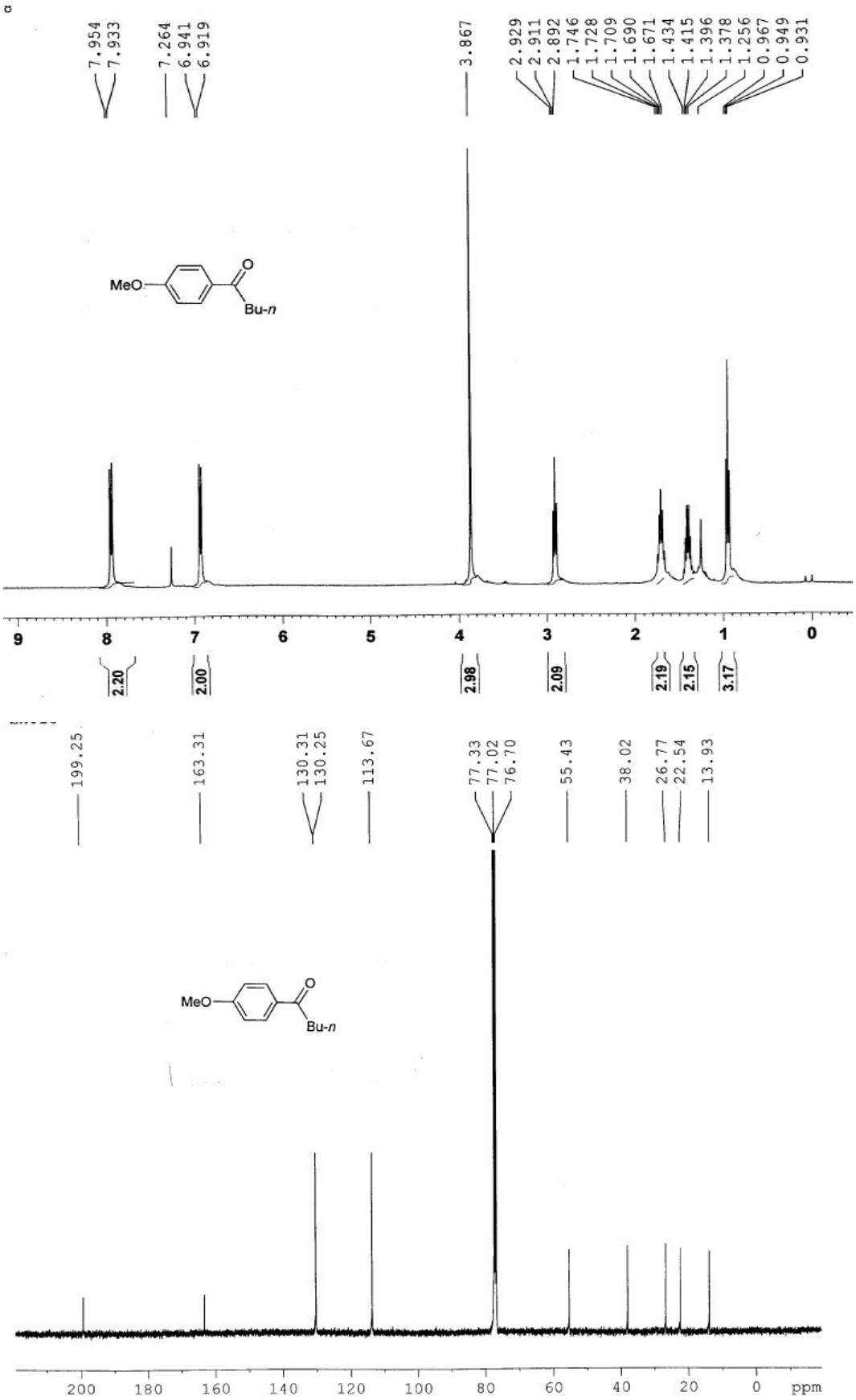
^{1}H NMR and ^{13}C NMR spectra of **3s**



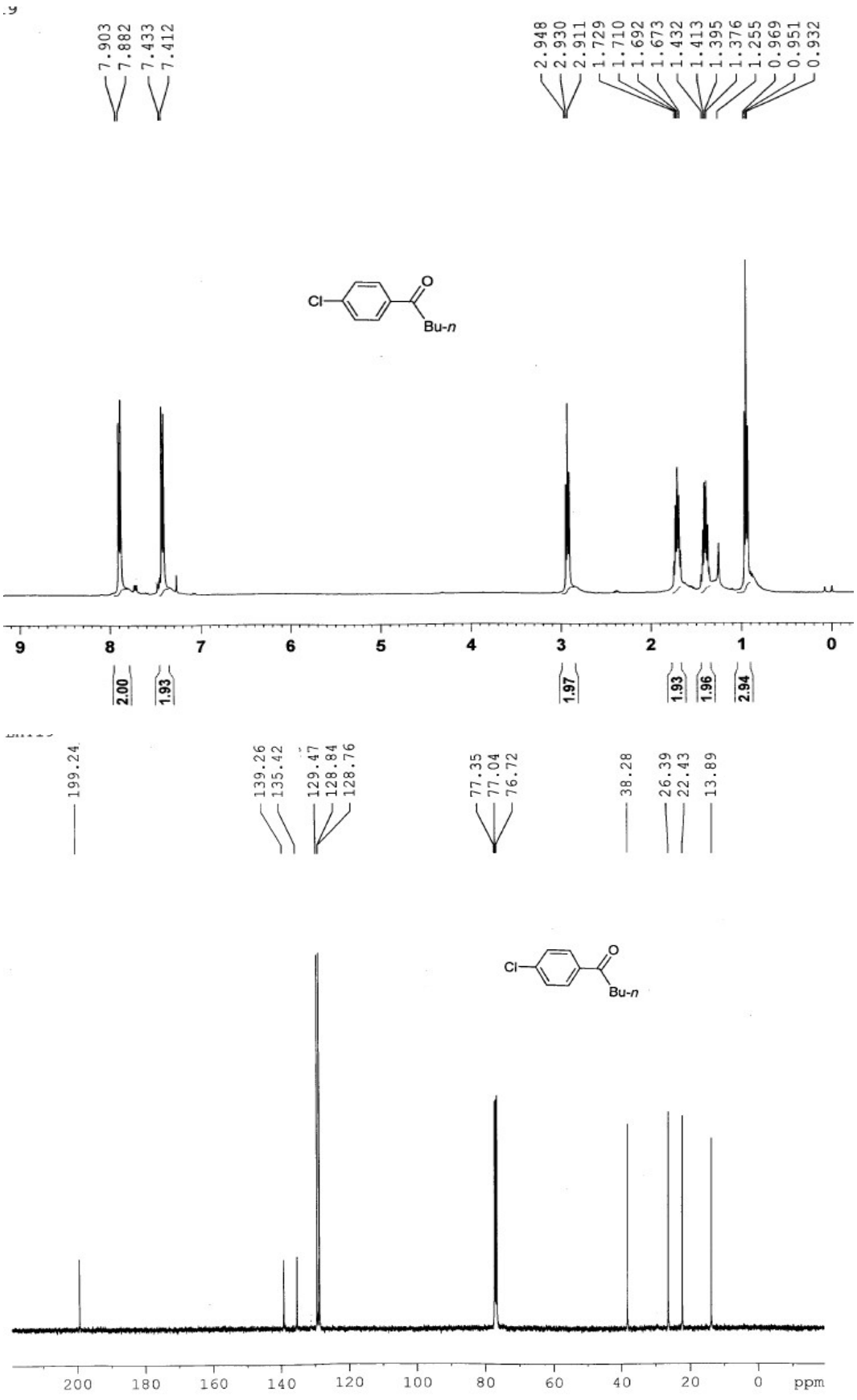
^{1}H NMR and ^{13}C NMR spectra of **3t**



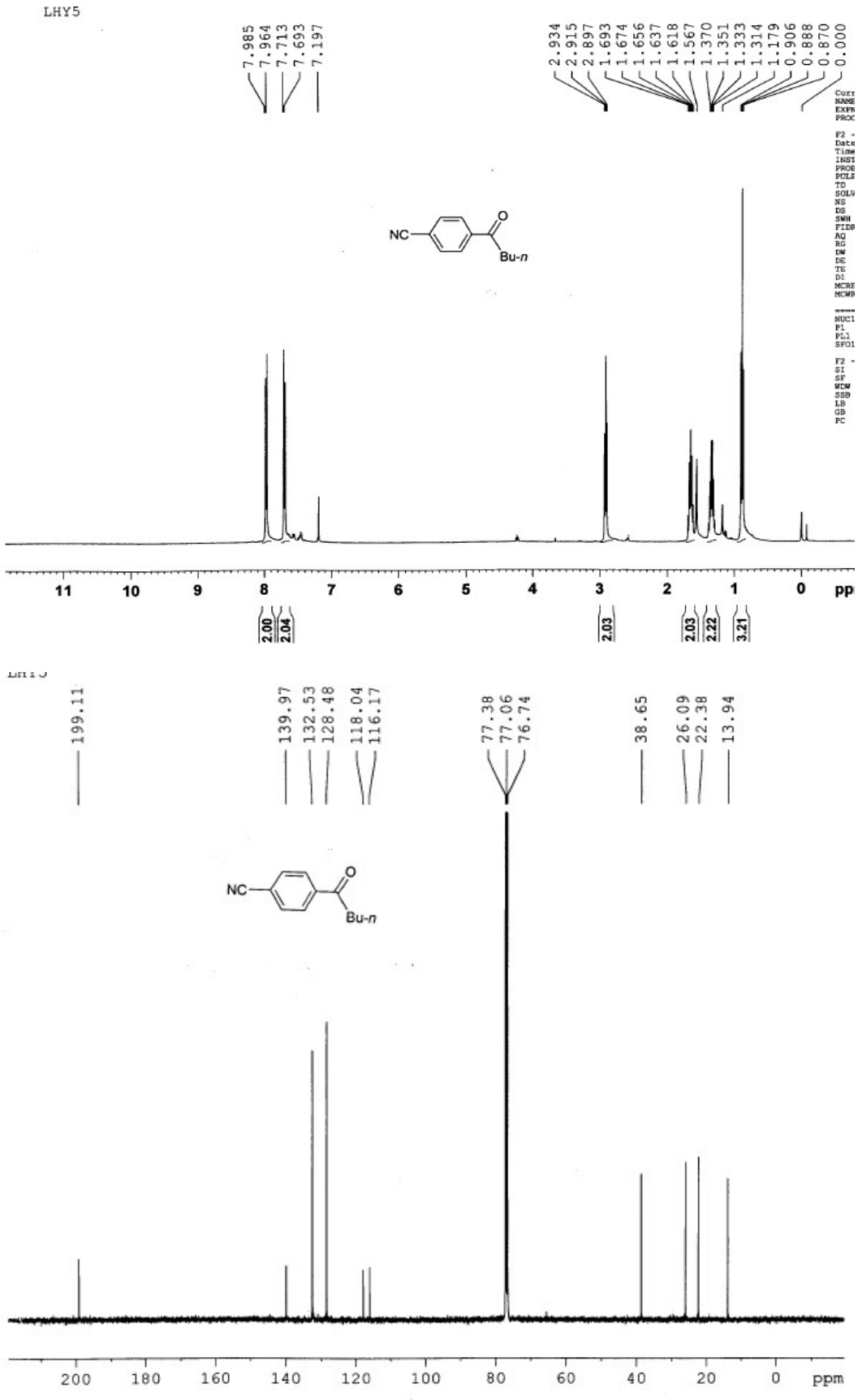
^{1}H NMR and ^{13}C NMR spectra of **3u**



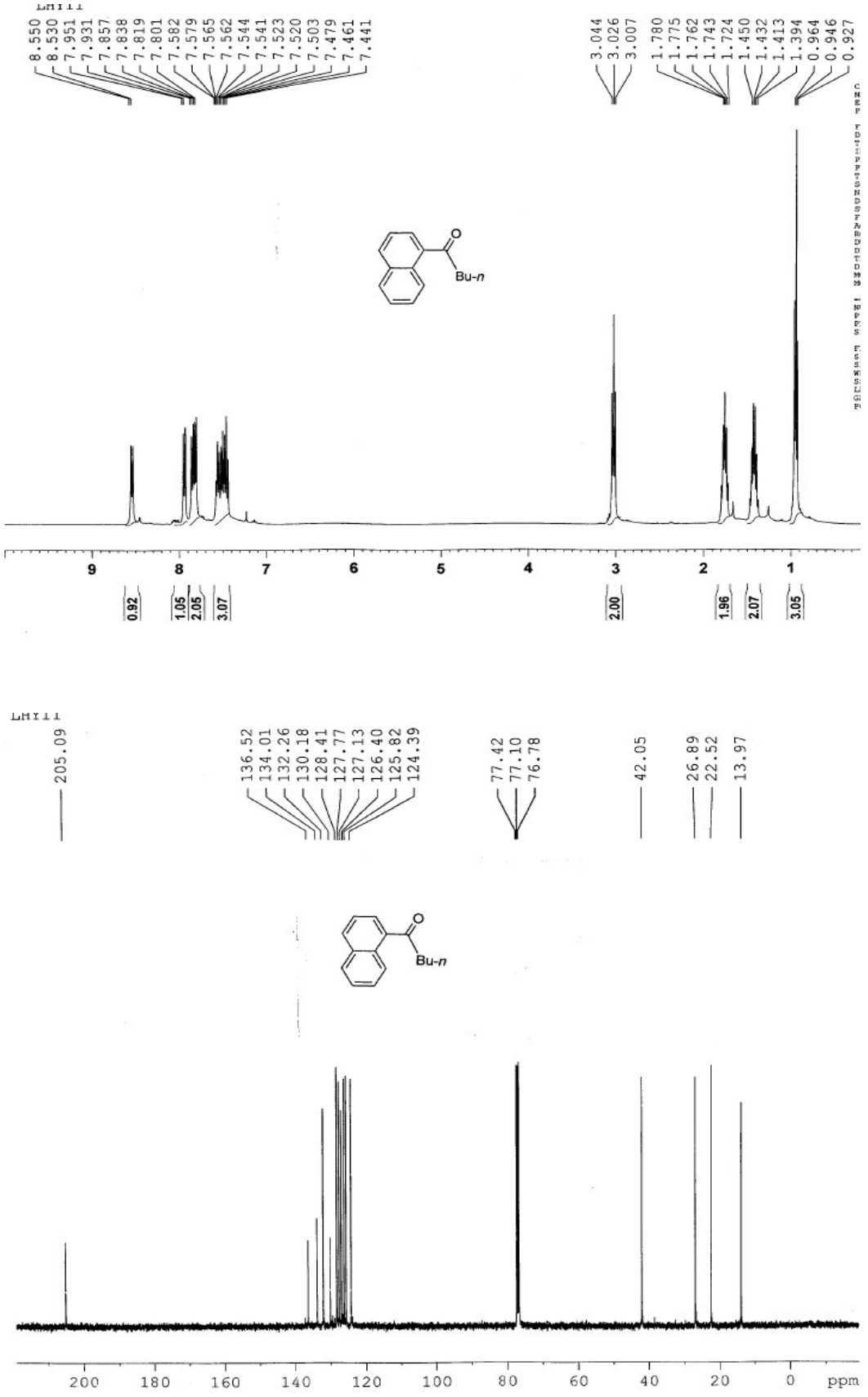
^{1}H NMR and ^{13}C NMR spectra of **3v**



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



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



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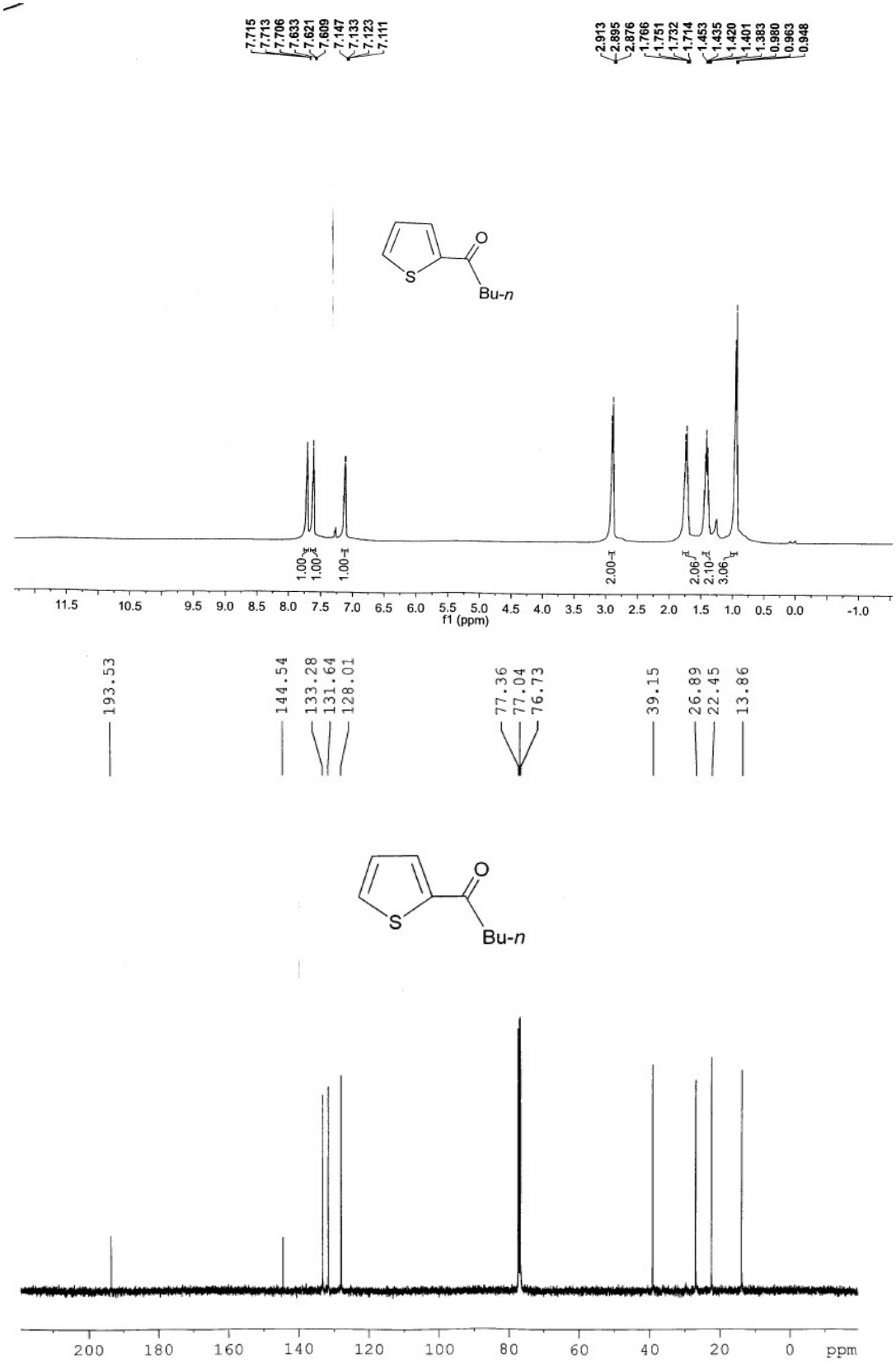

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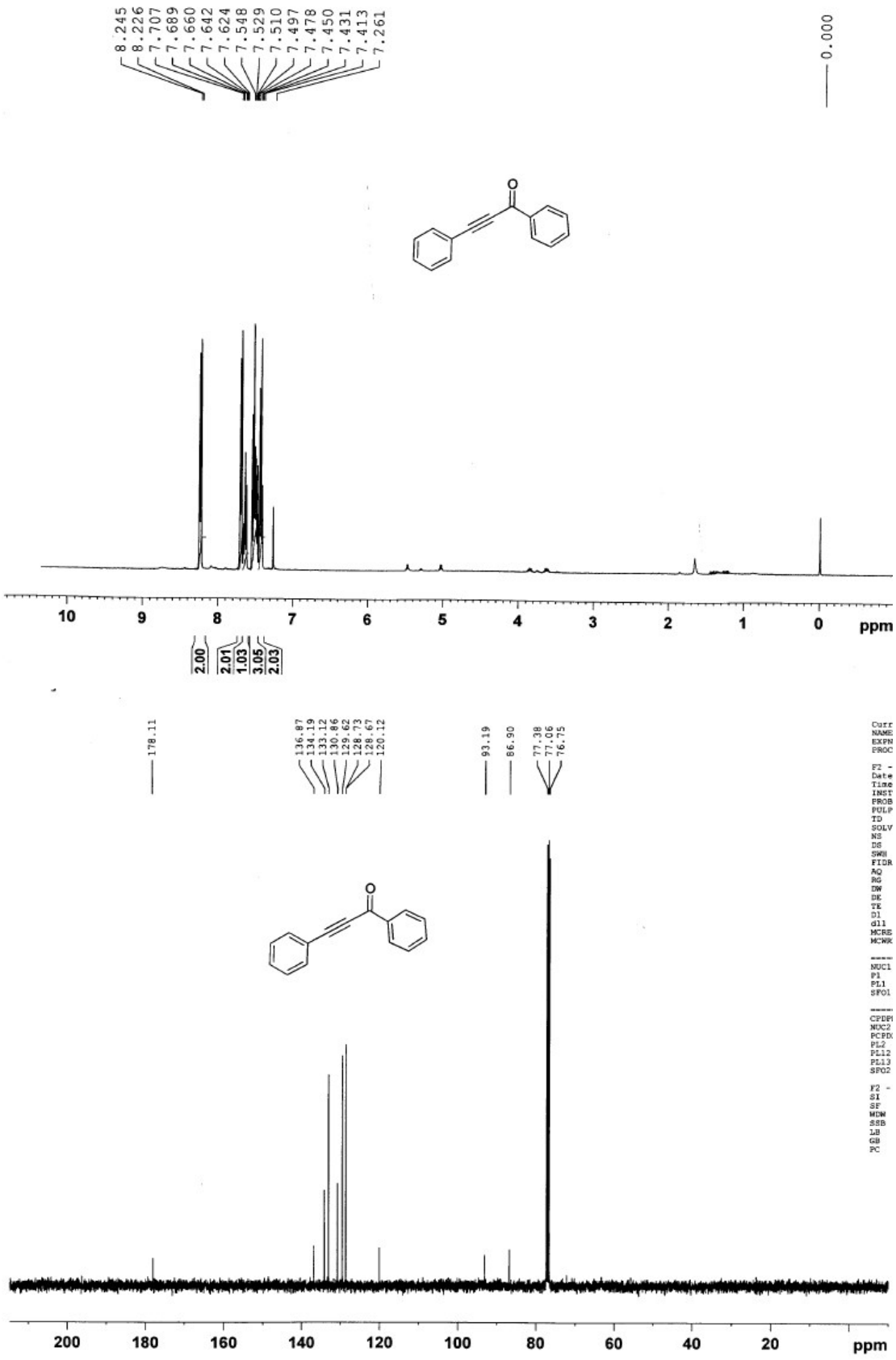
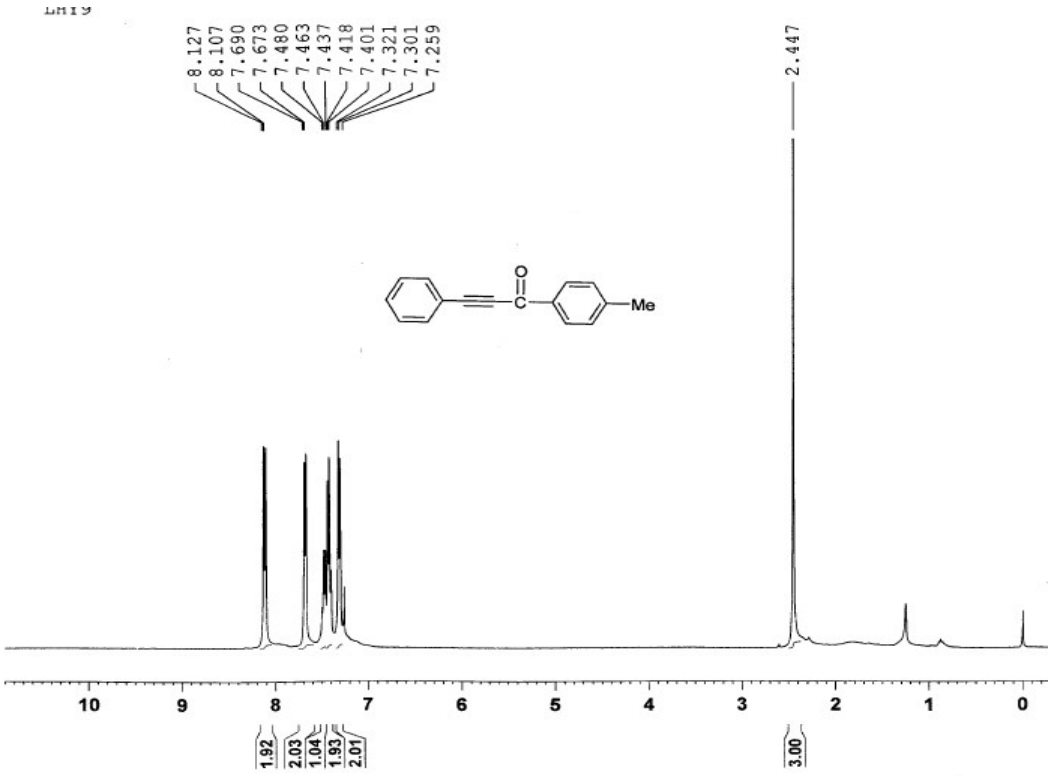
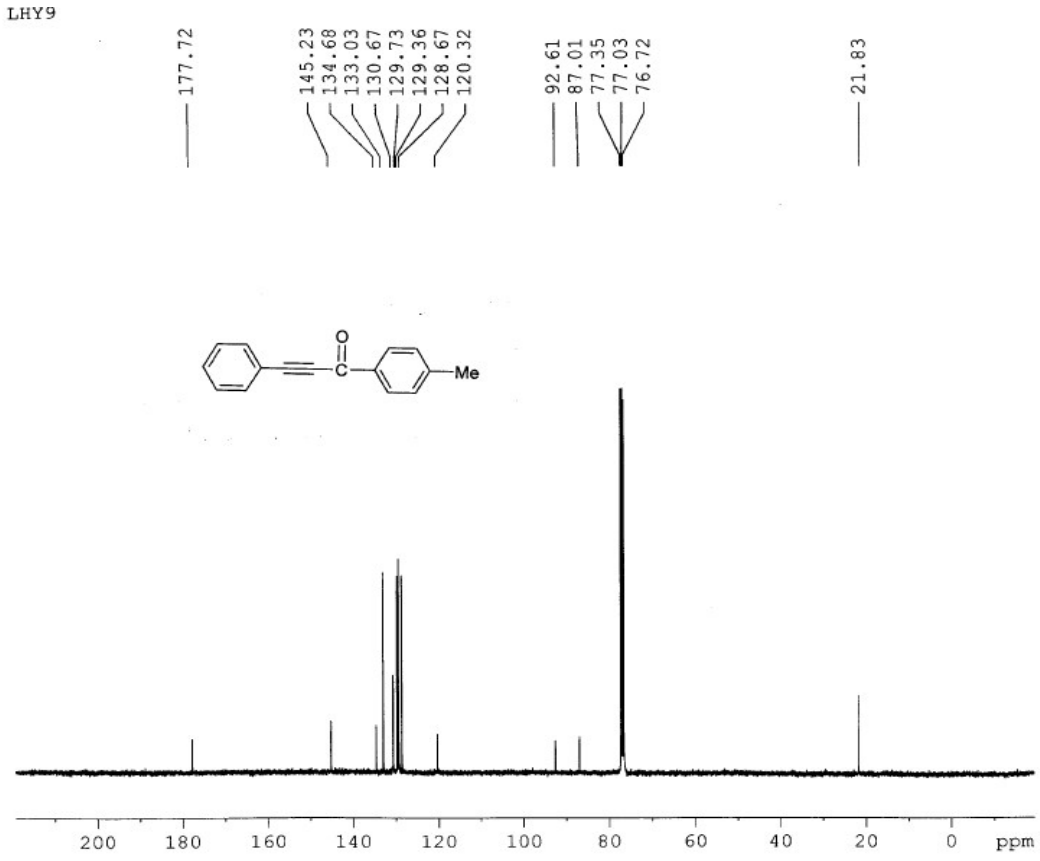
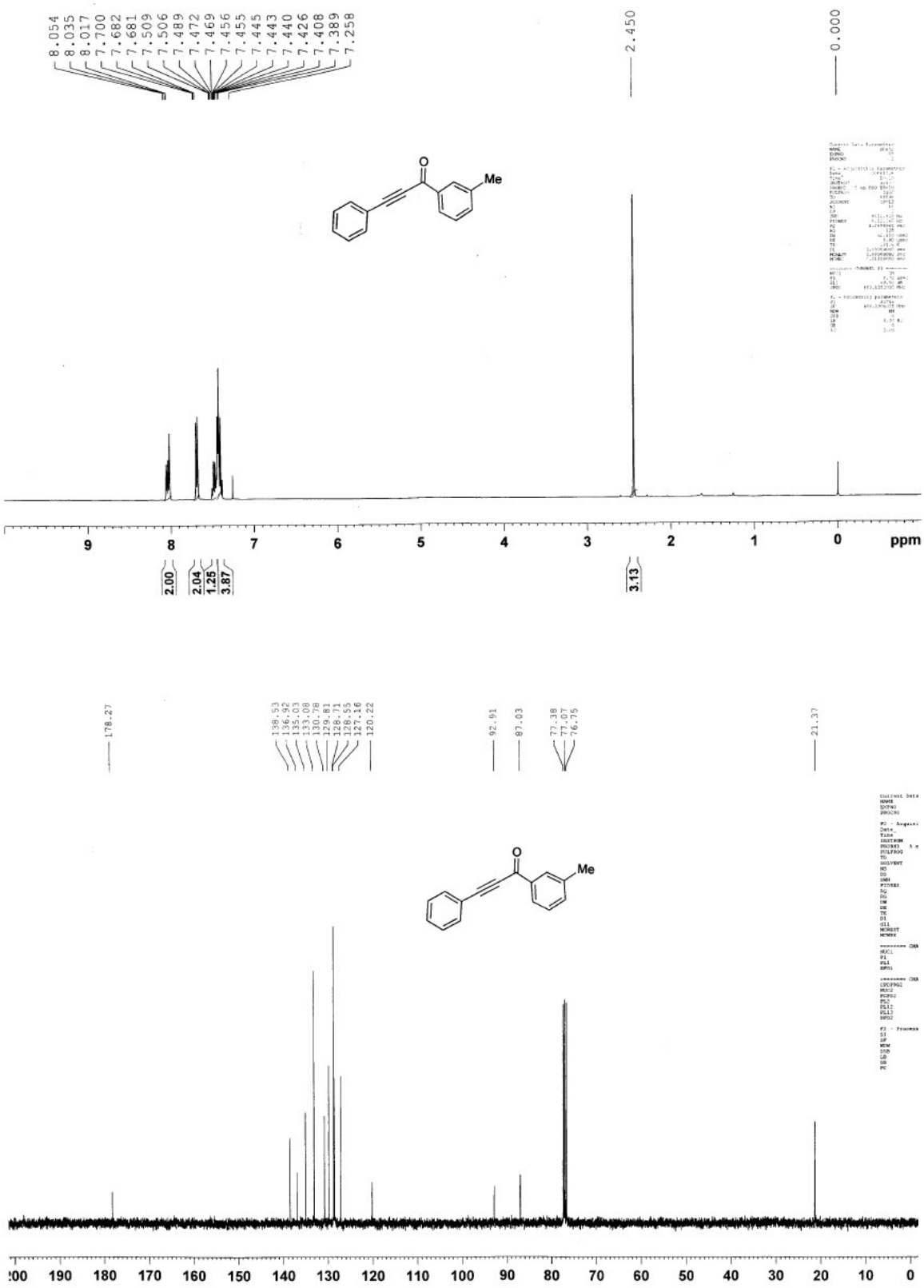


^{1}H NMR and ^{13}C NMR spectra of **4a**

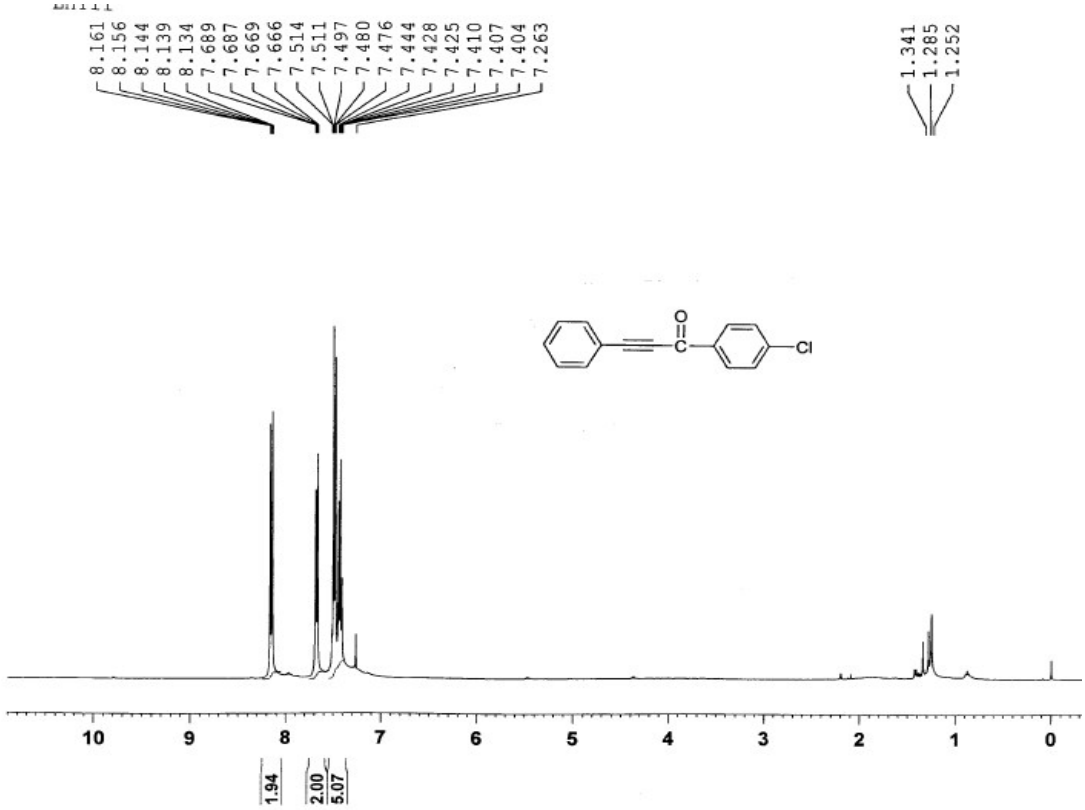


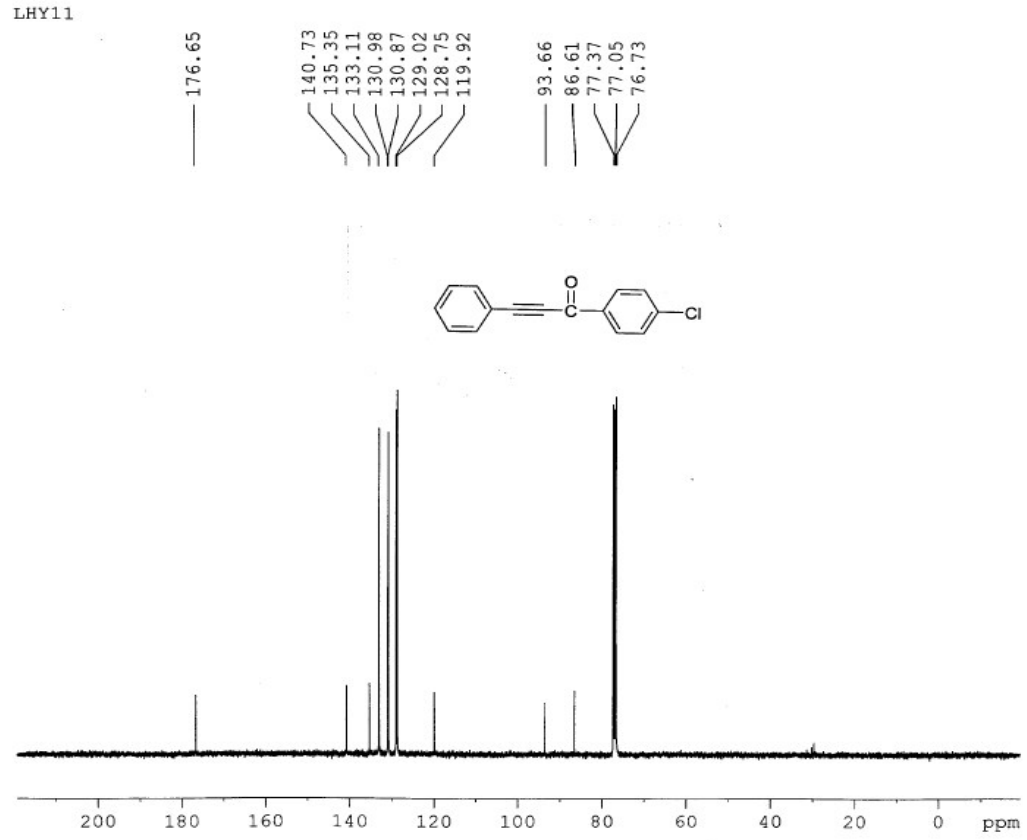


^{1}H NMR and ^{13}C NMR spectra of **4b**

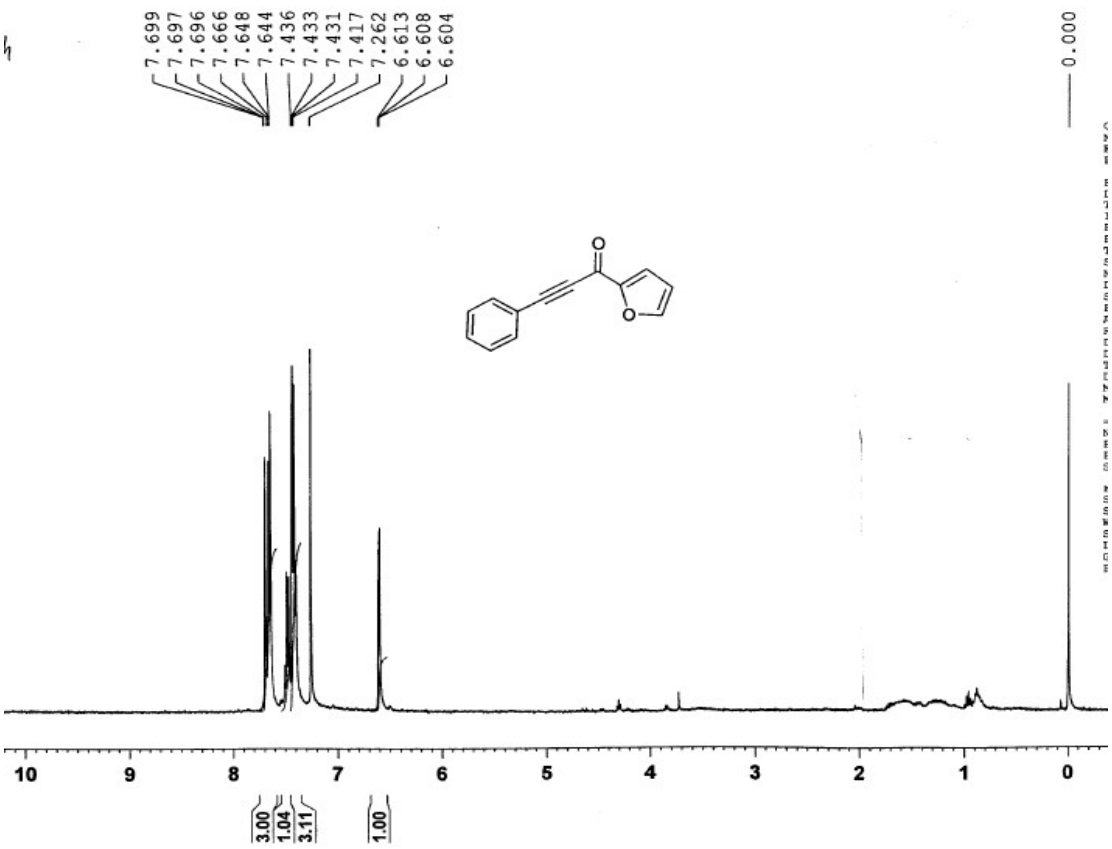


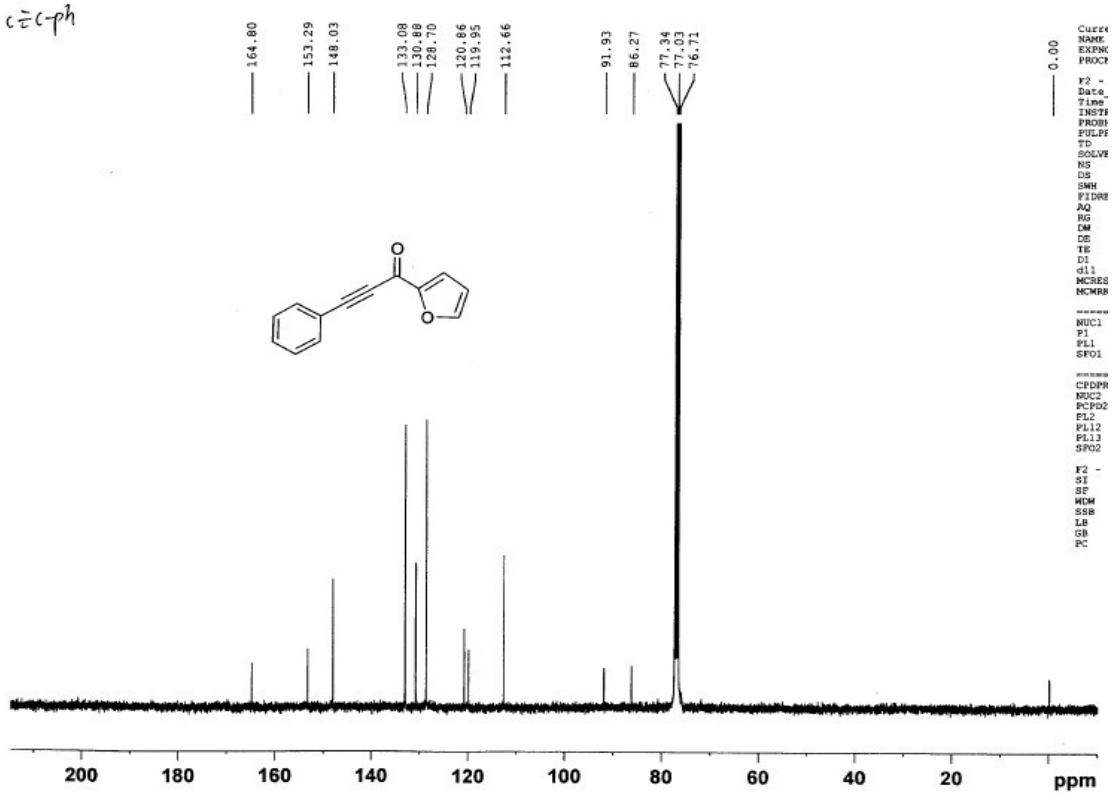
^{1}H NMR and ^{13}C NMR spectra of **4c**



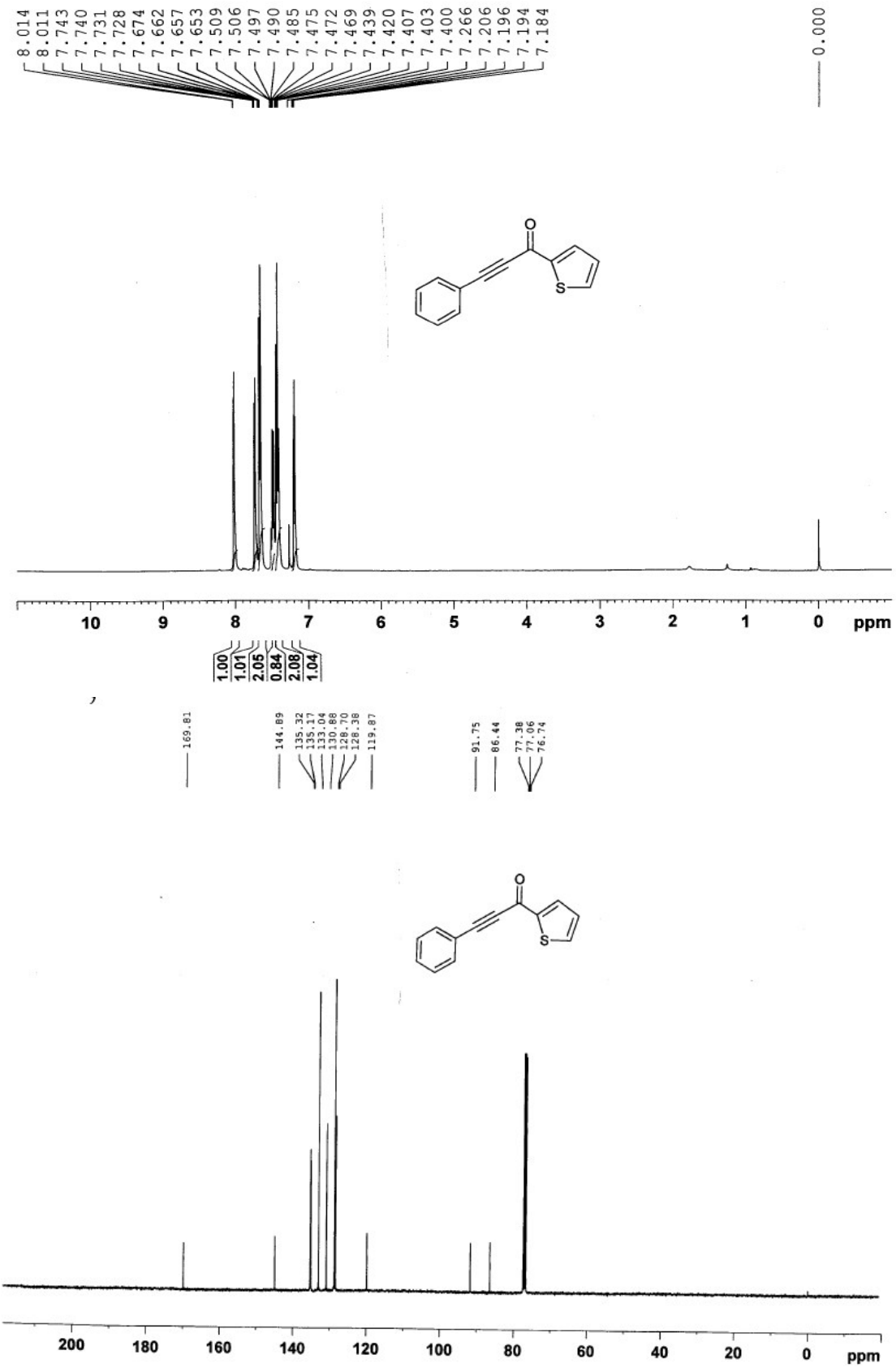


^{1}H NMR and ^{13}C NMR spectra of **4d**

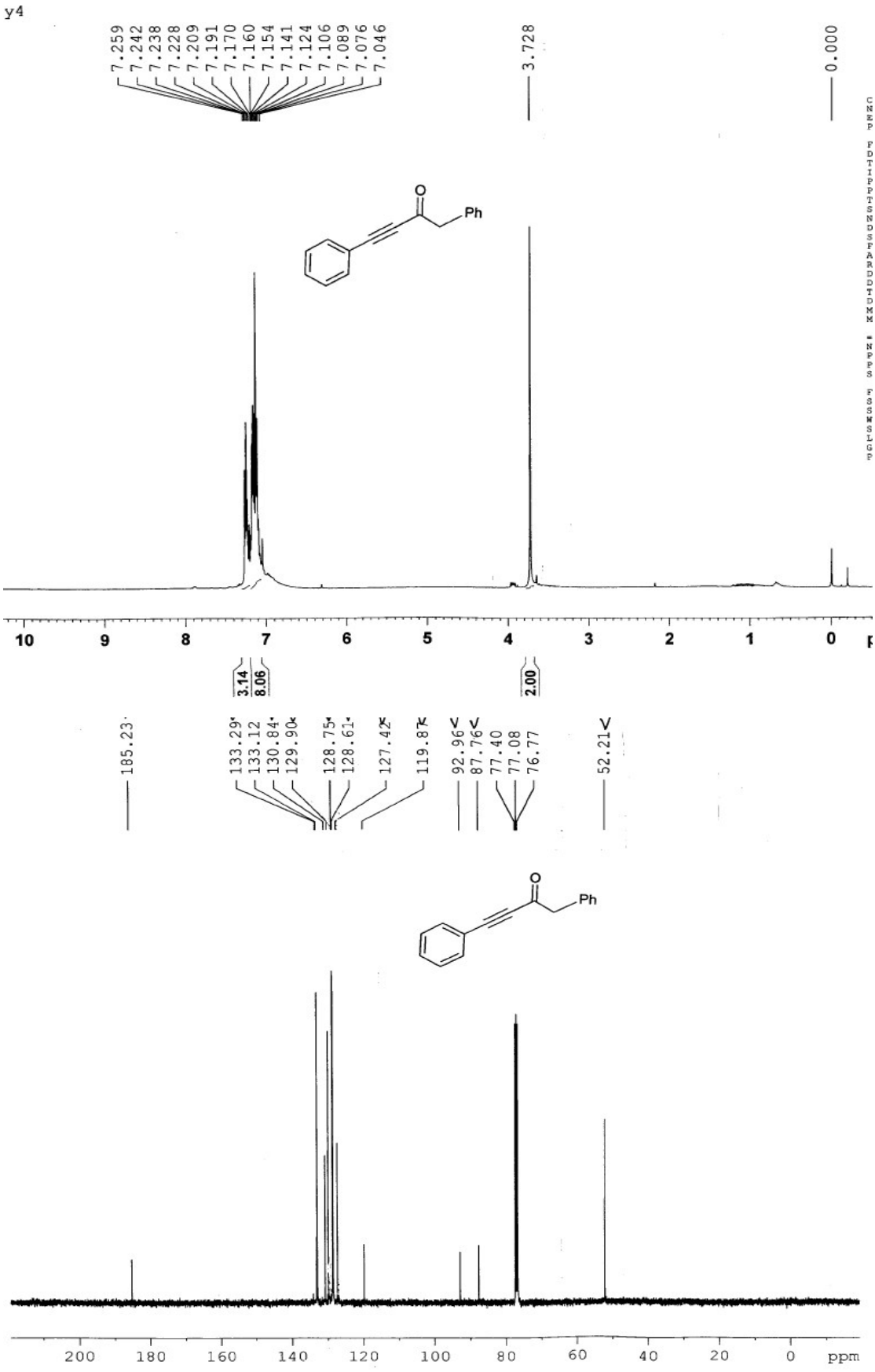




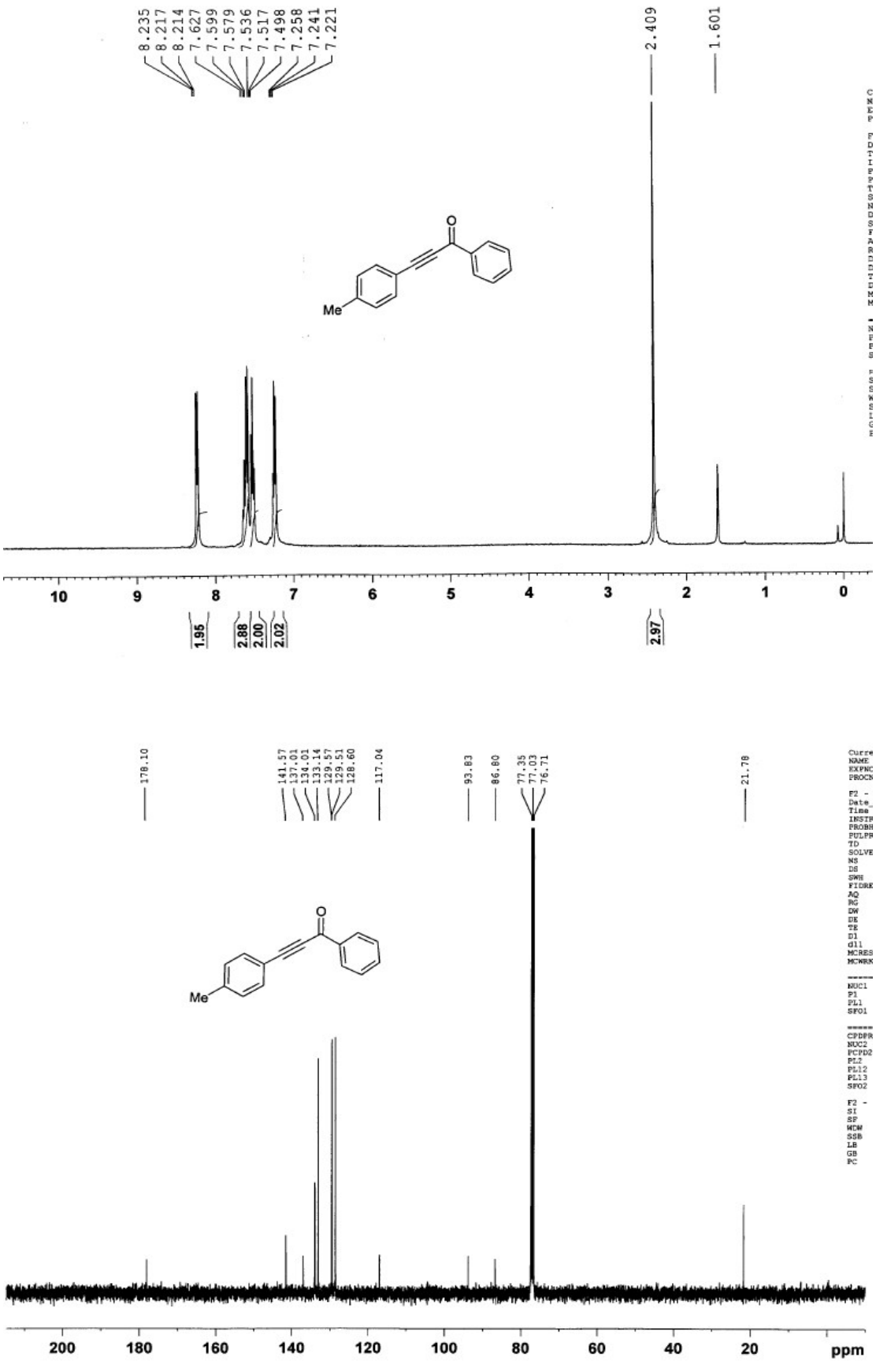
^{1}H NMR and ^{13}C NMR spectra of **4e**



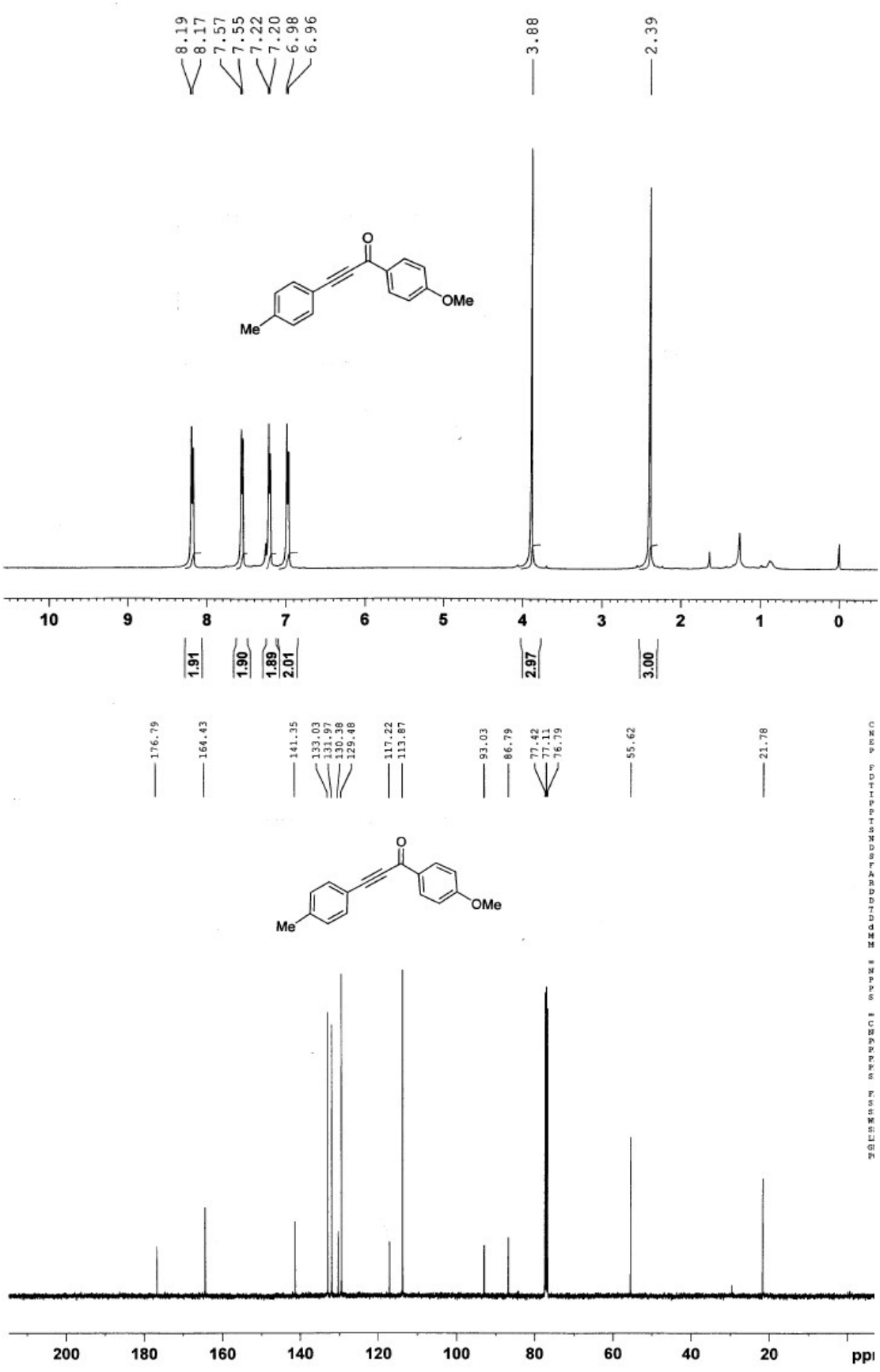
^{1}H NMR and ^{13}C NMR spectra of **4f**



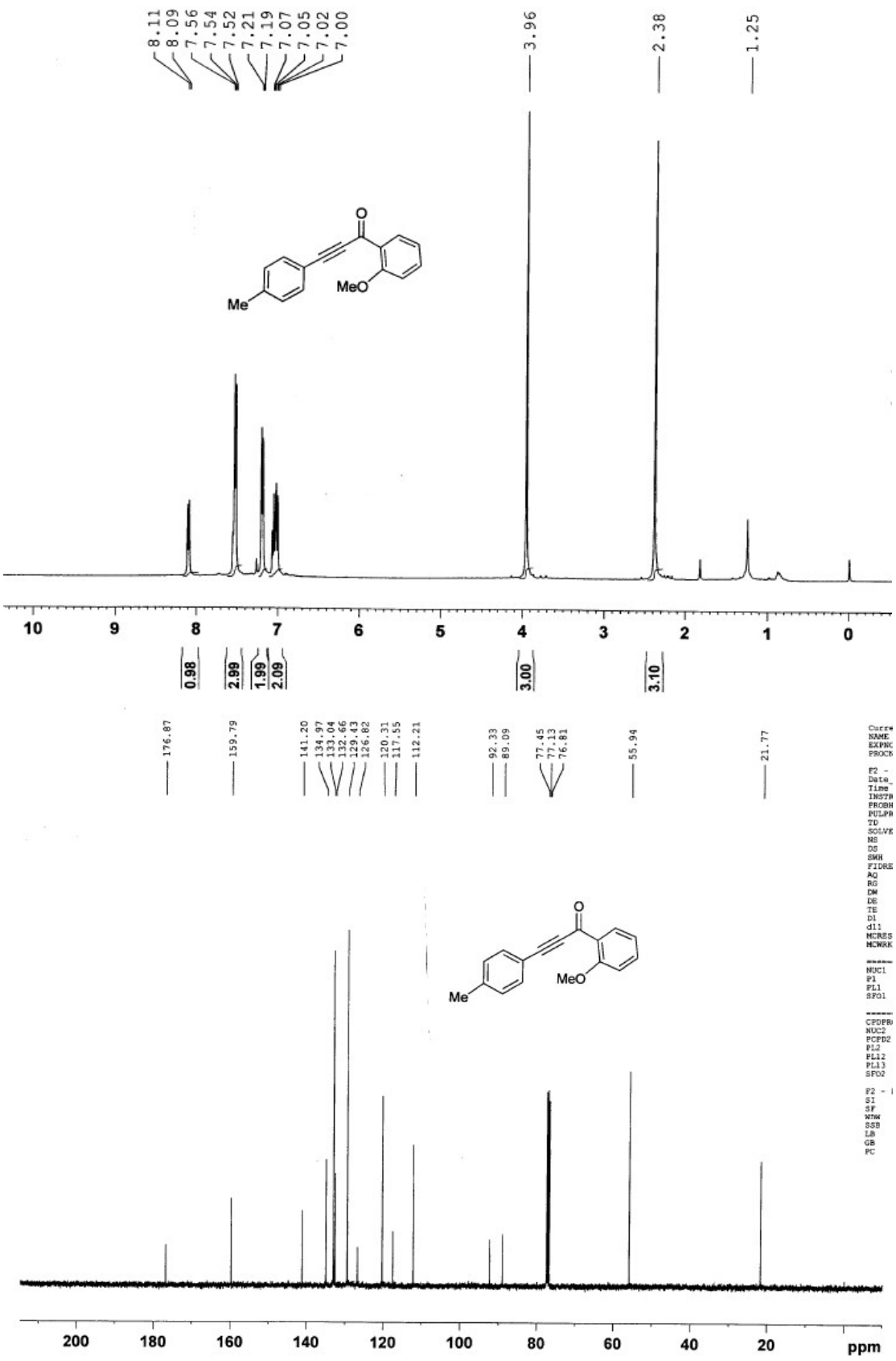
^{1}H NMR and ^{13}C NMR spectra of **4g**



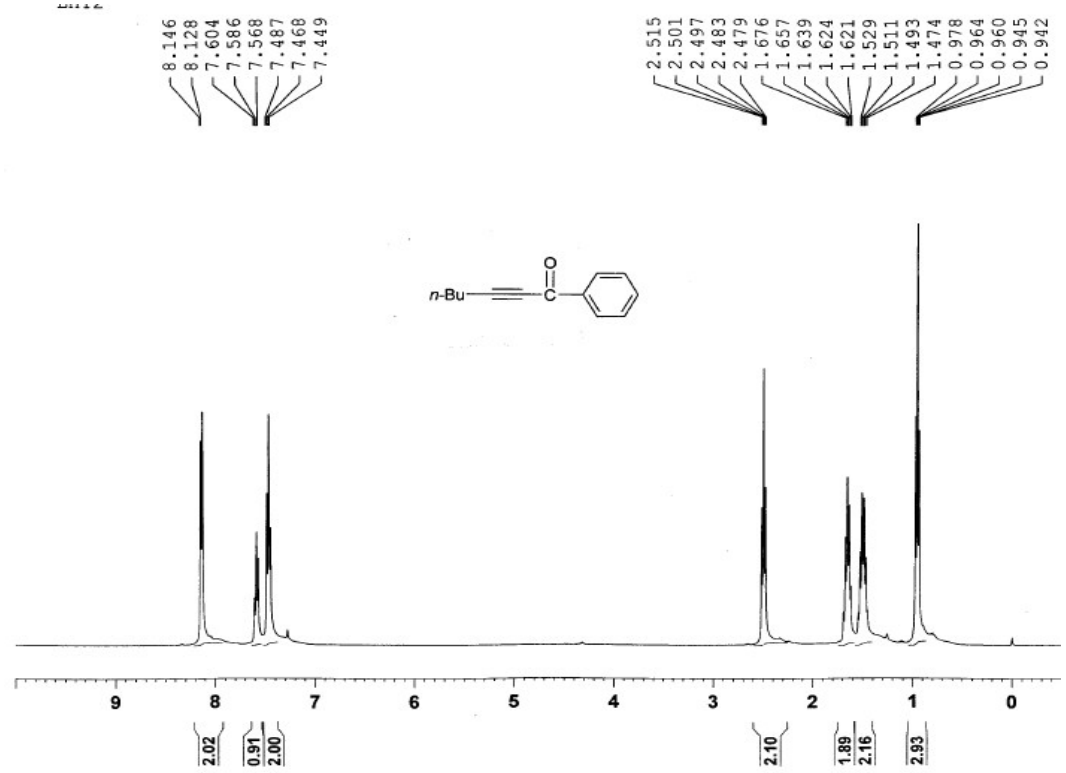
^{1}H NMR and ^{13}C NMR spectra of **4h**

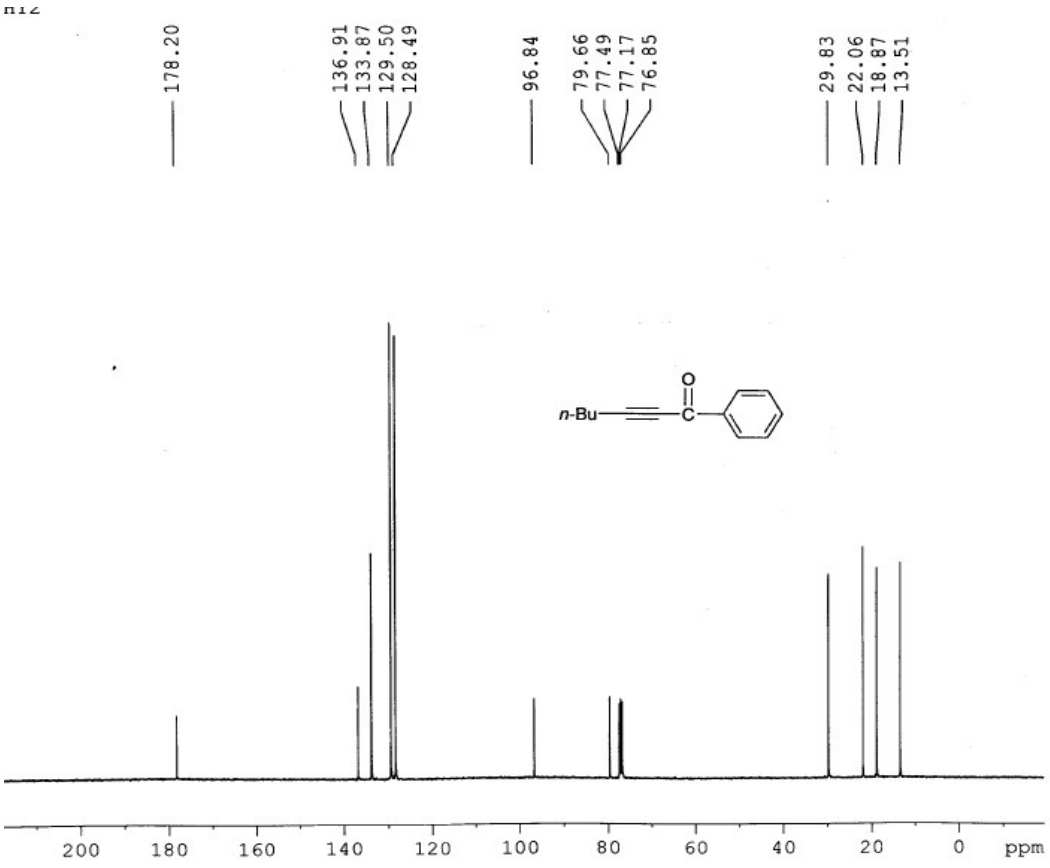


^{1}H NMR and ^{13}C NMR spectra of **4i**

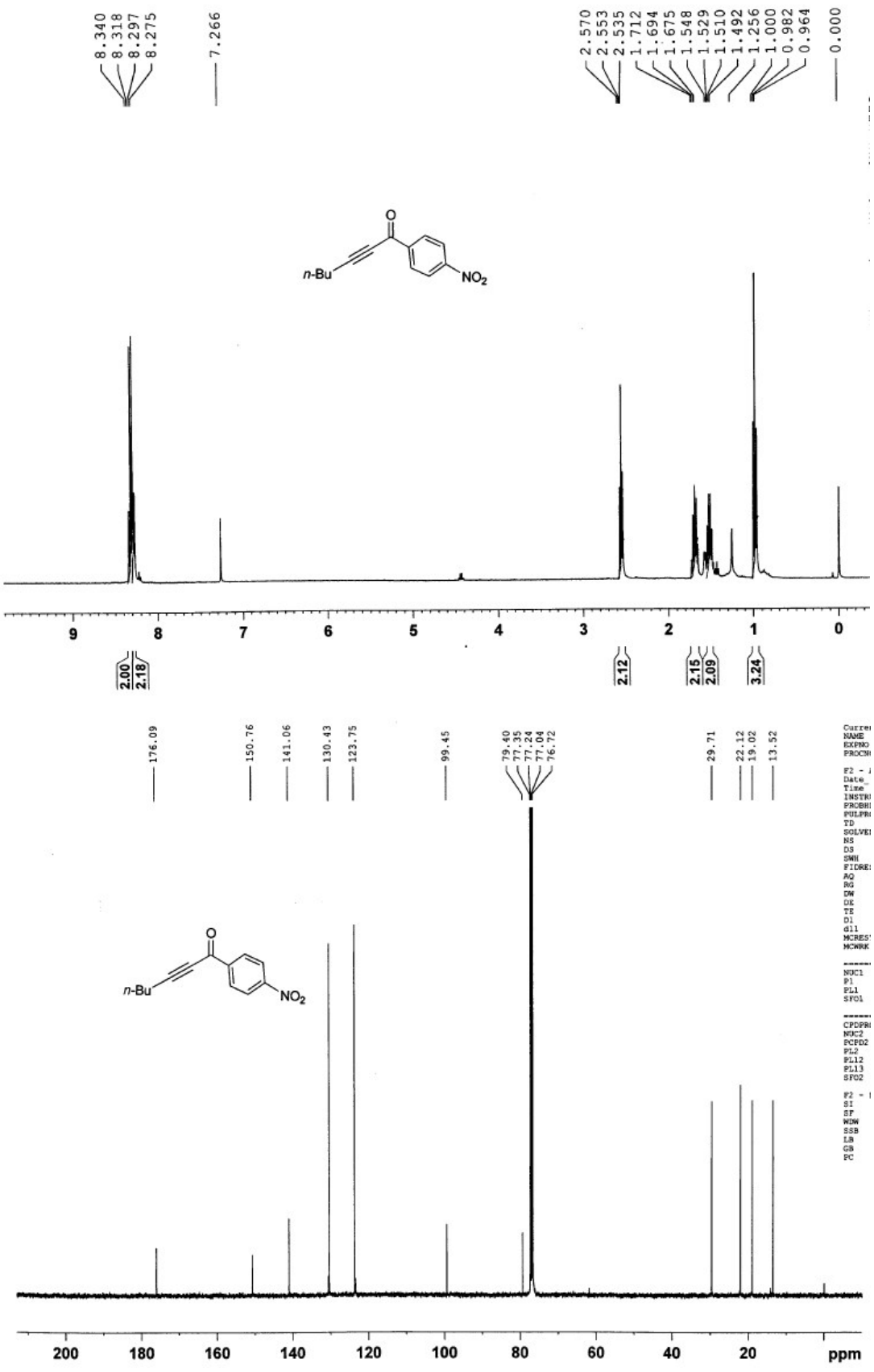


^{1}H NMR and ^{13}C NMR spectra of **4j**

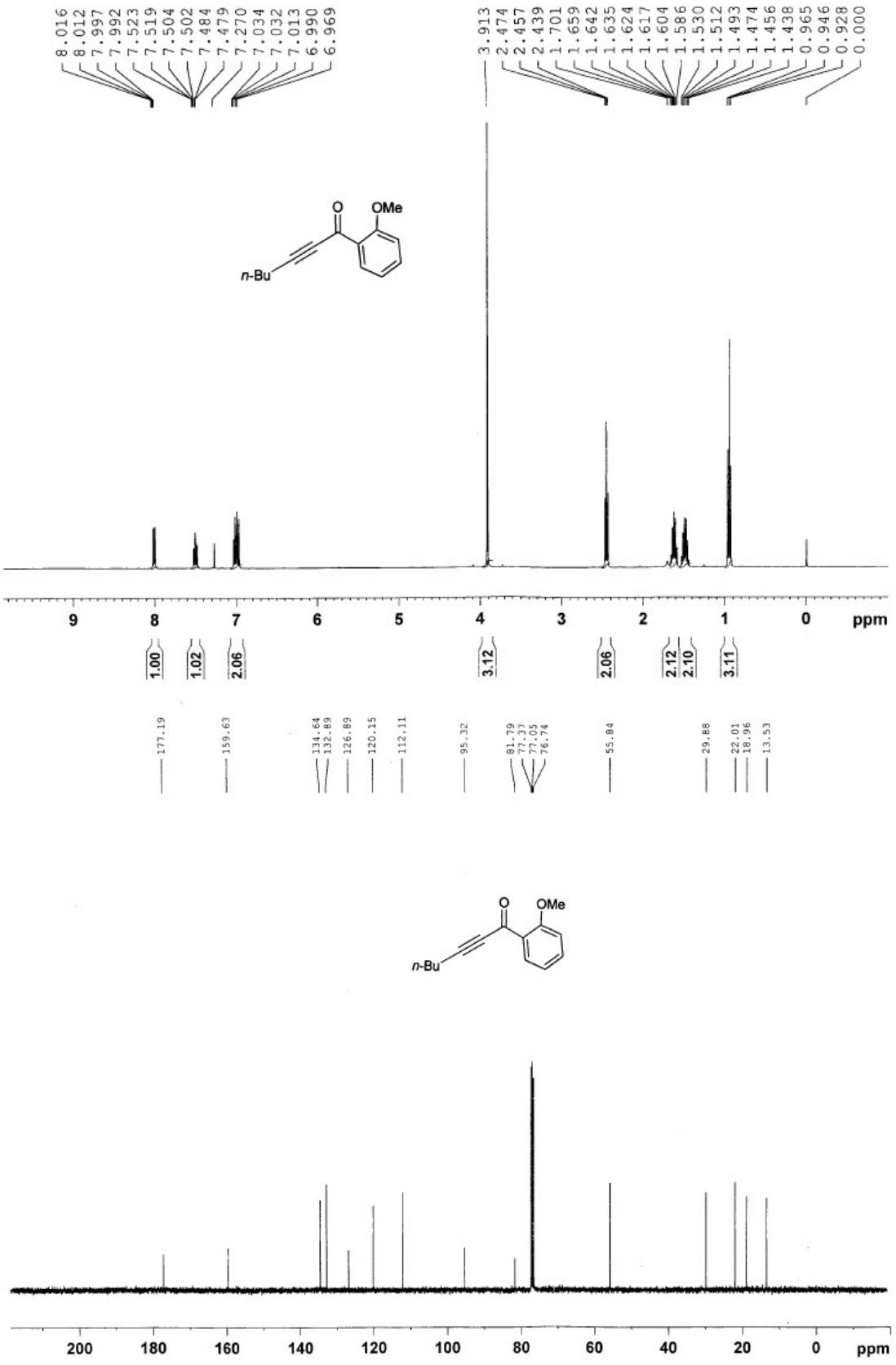




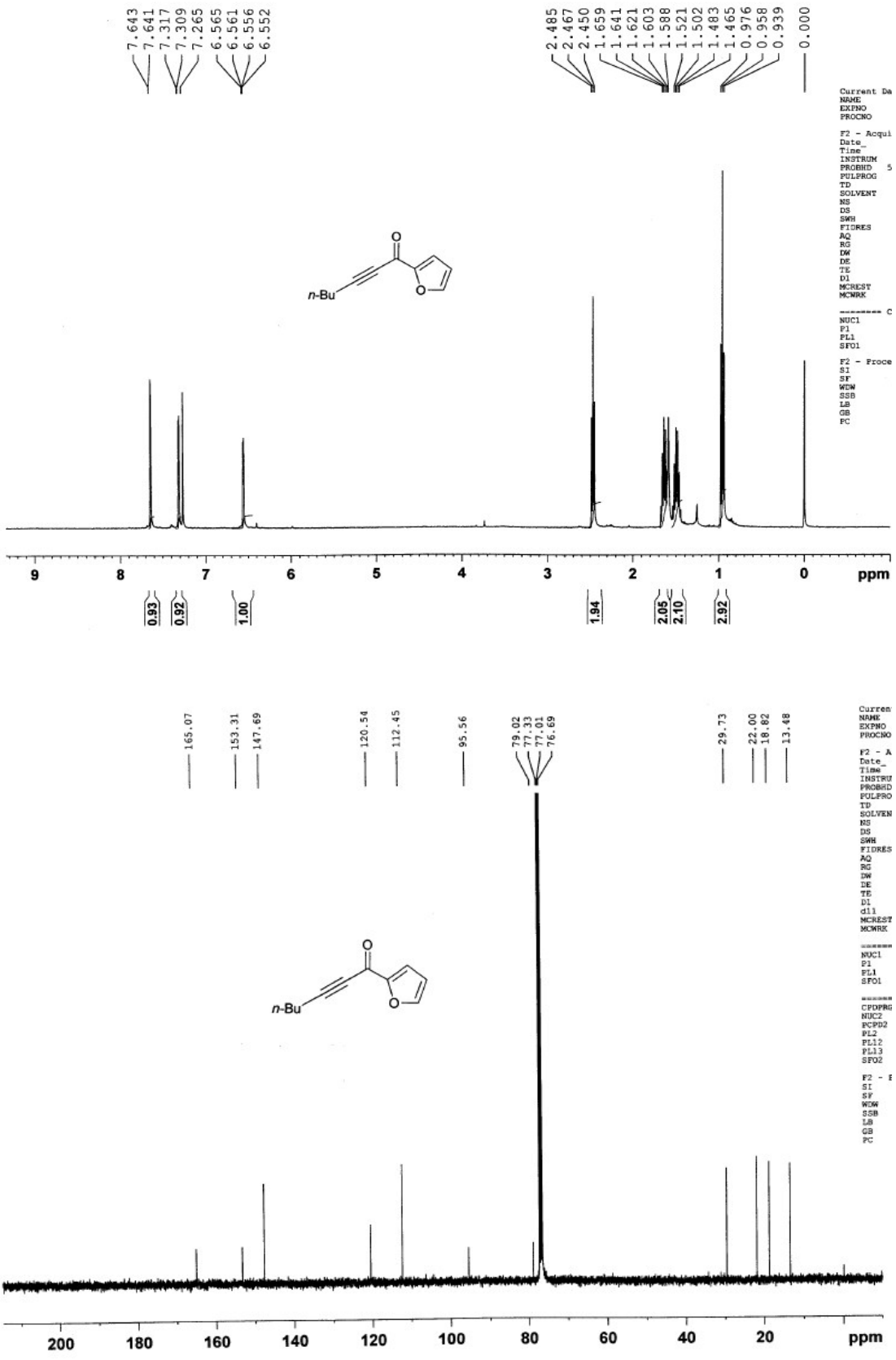
^{1}H NMR and ^{13}C NMR spectra of **4k**



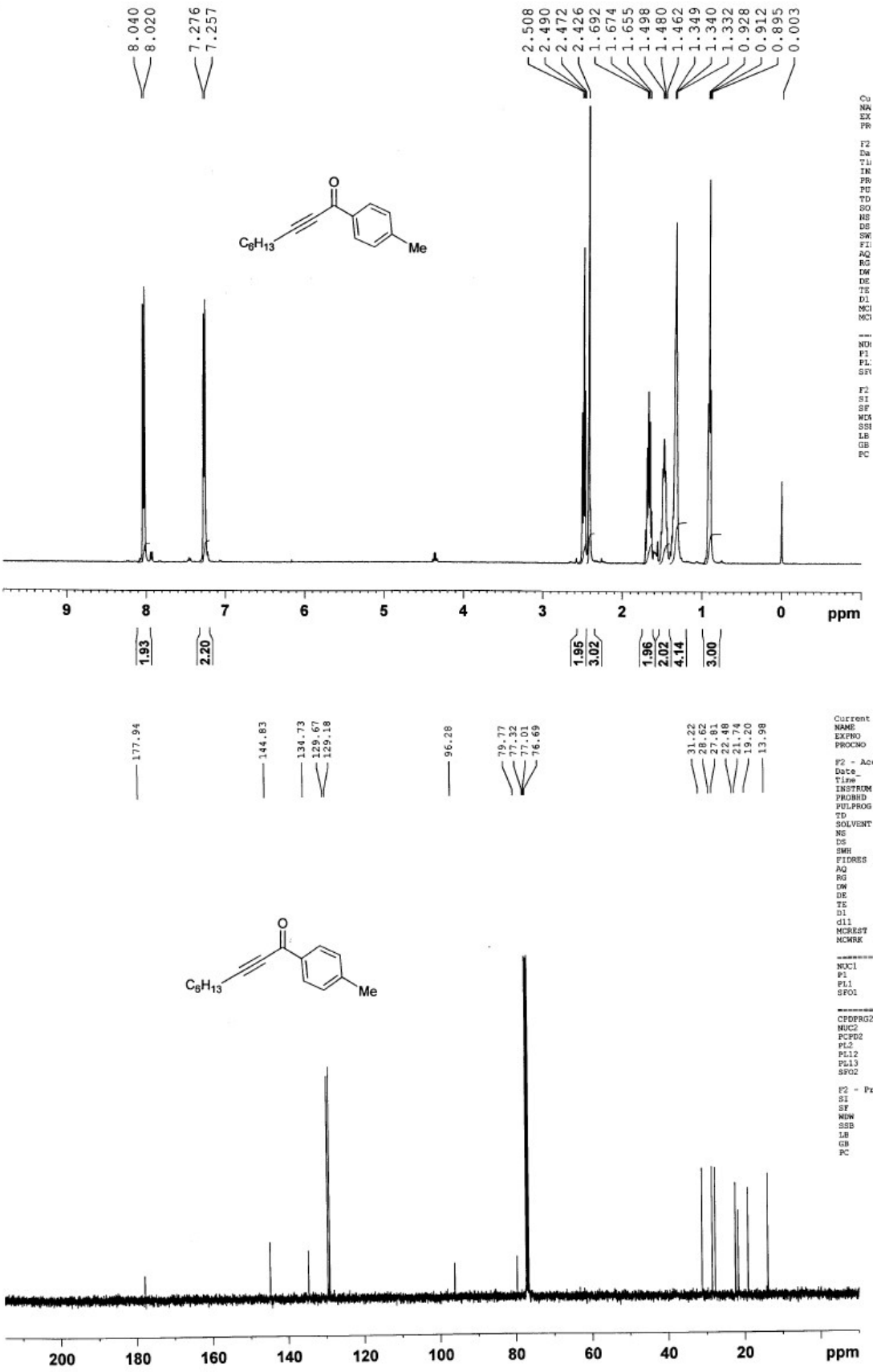
^{1}H NMR and ^{13}C NMR spectra of **4l**



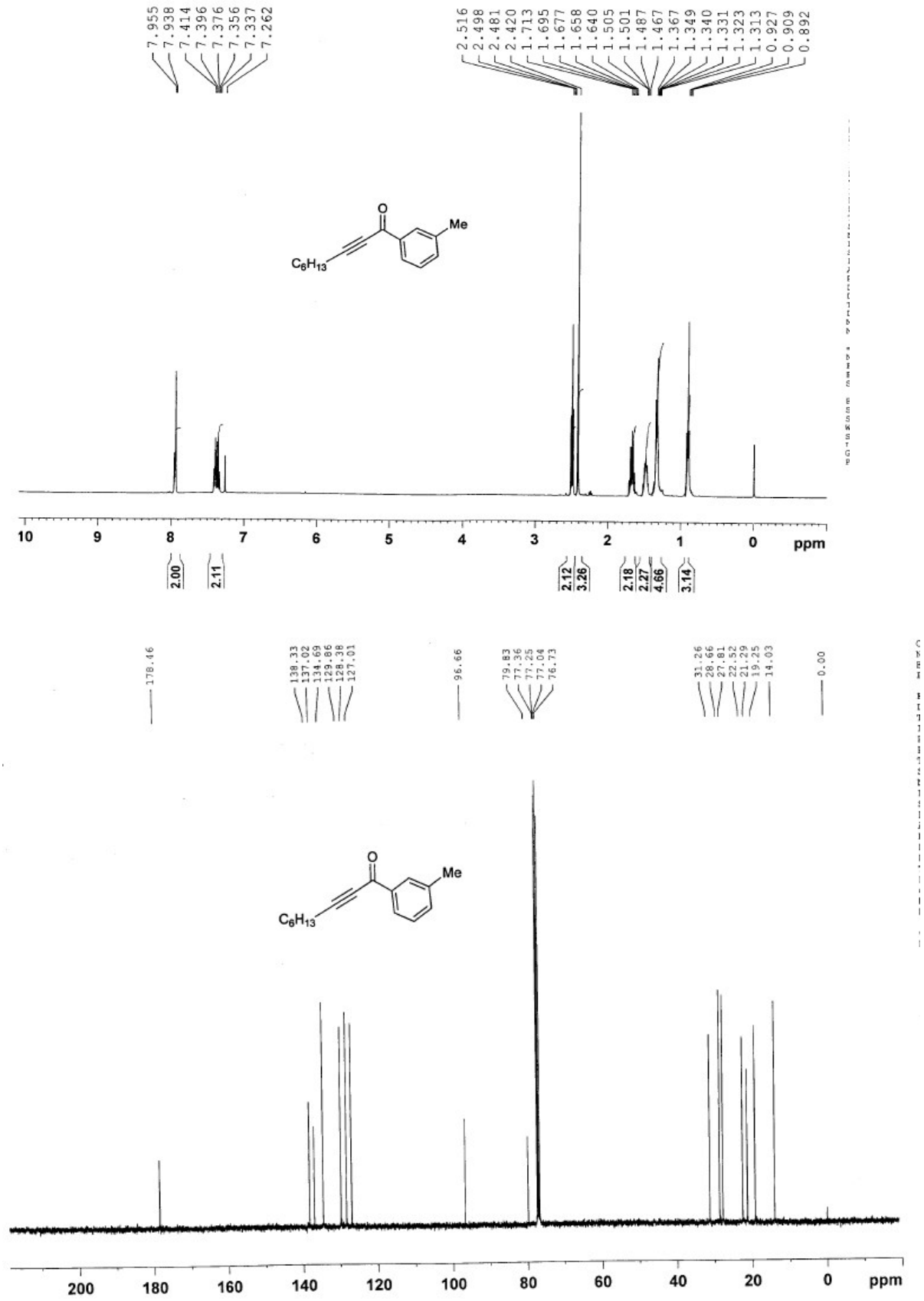
^{1}H NMR and ^{13}C NMR spectra of **4m**



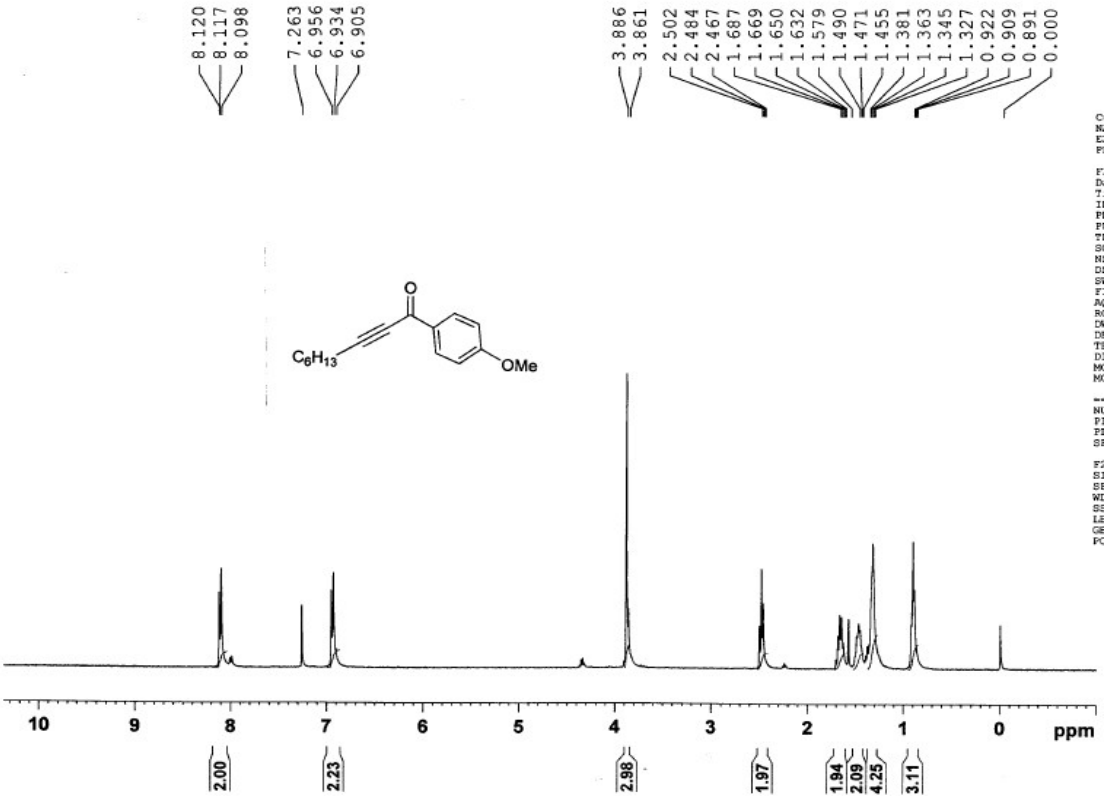
^{1}H NMR and ^{13}C NMR spectra of **4n**

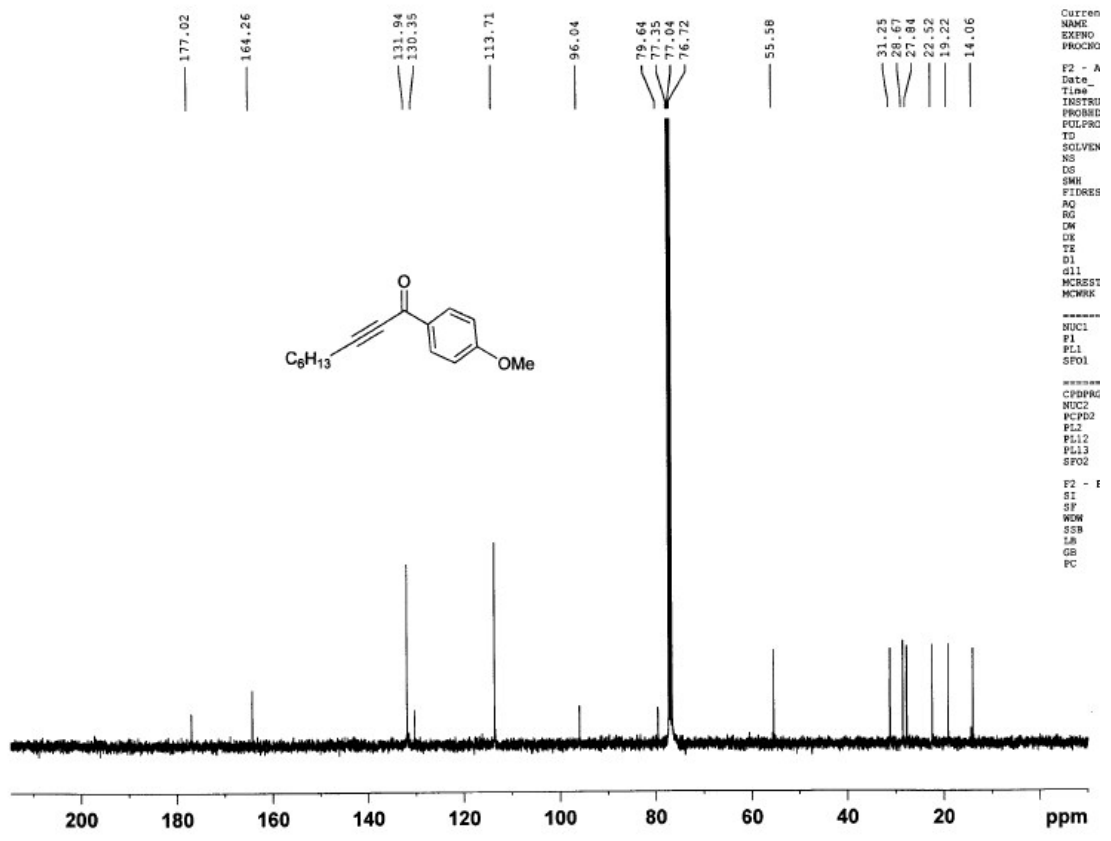


^{1}H NMR and ^{13}C NMR spectra of **4o**

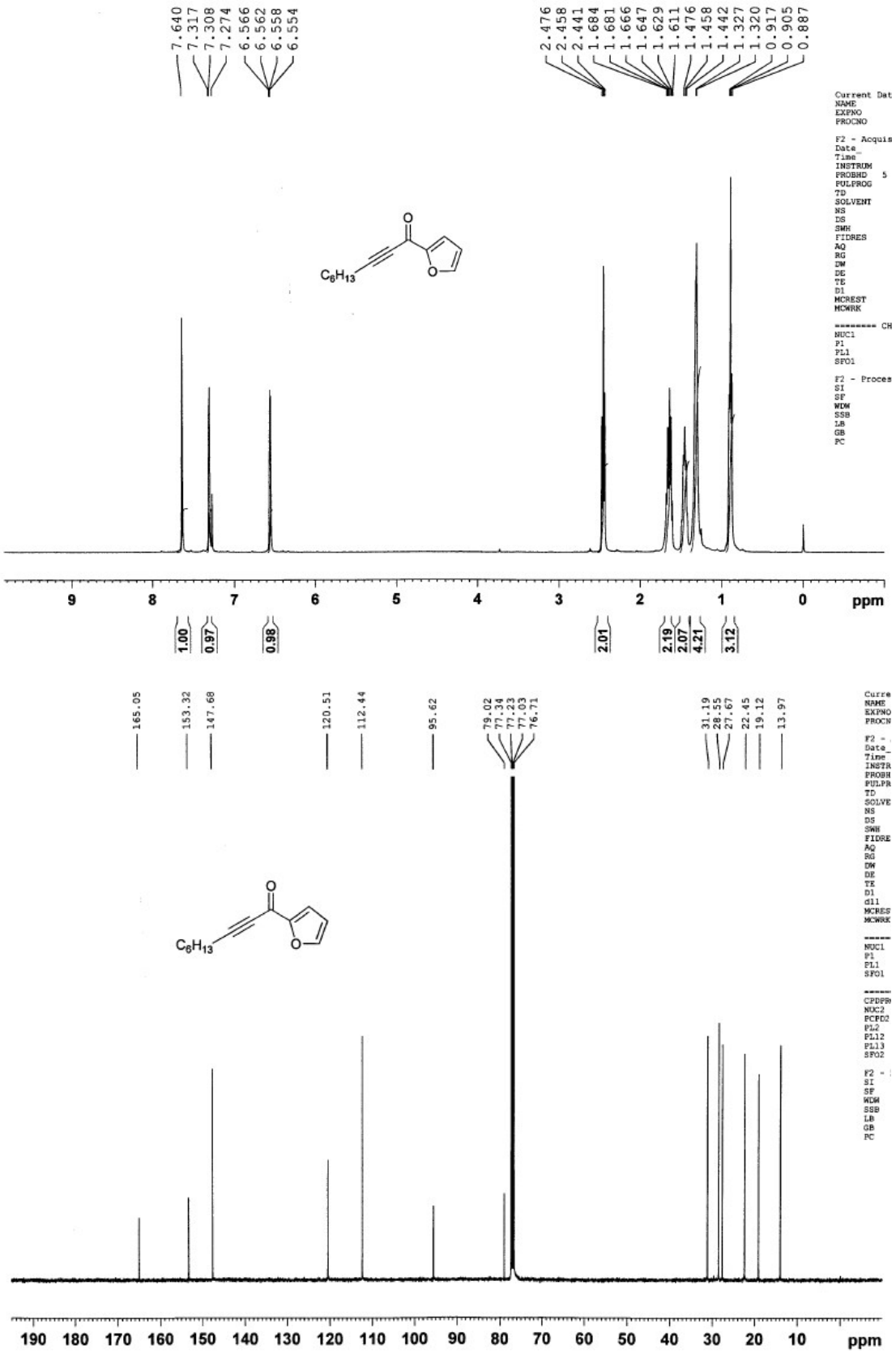


^{1}H NMR and ^{13}C NMR spectra of **4p**

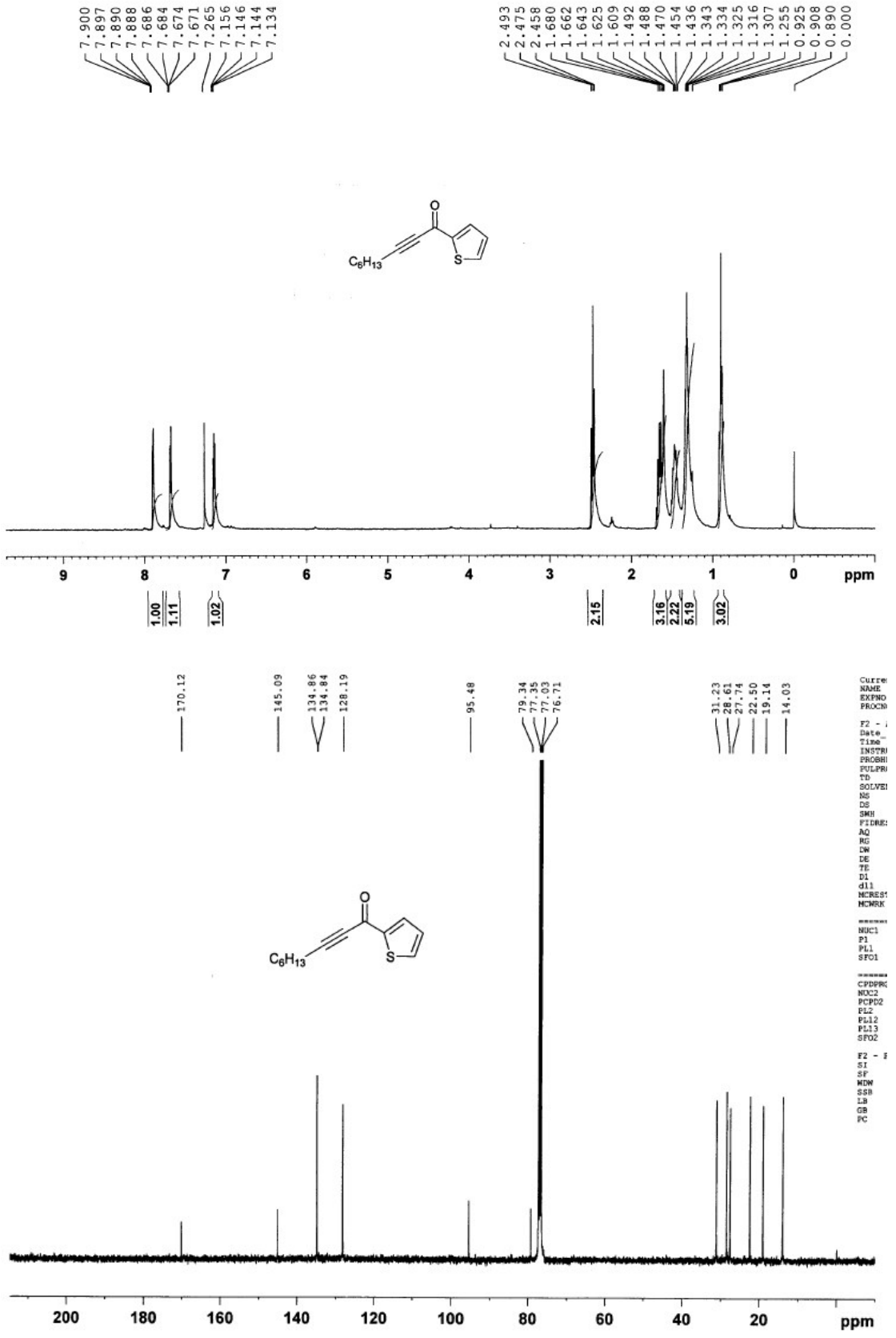




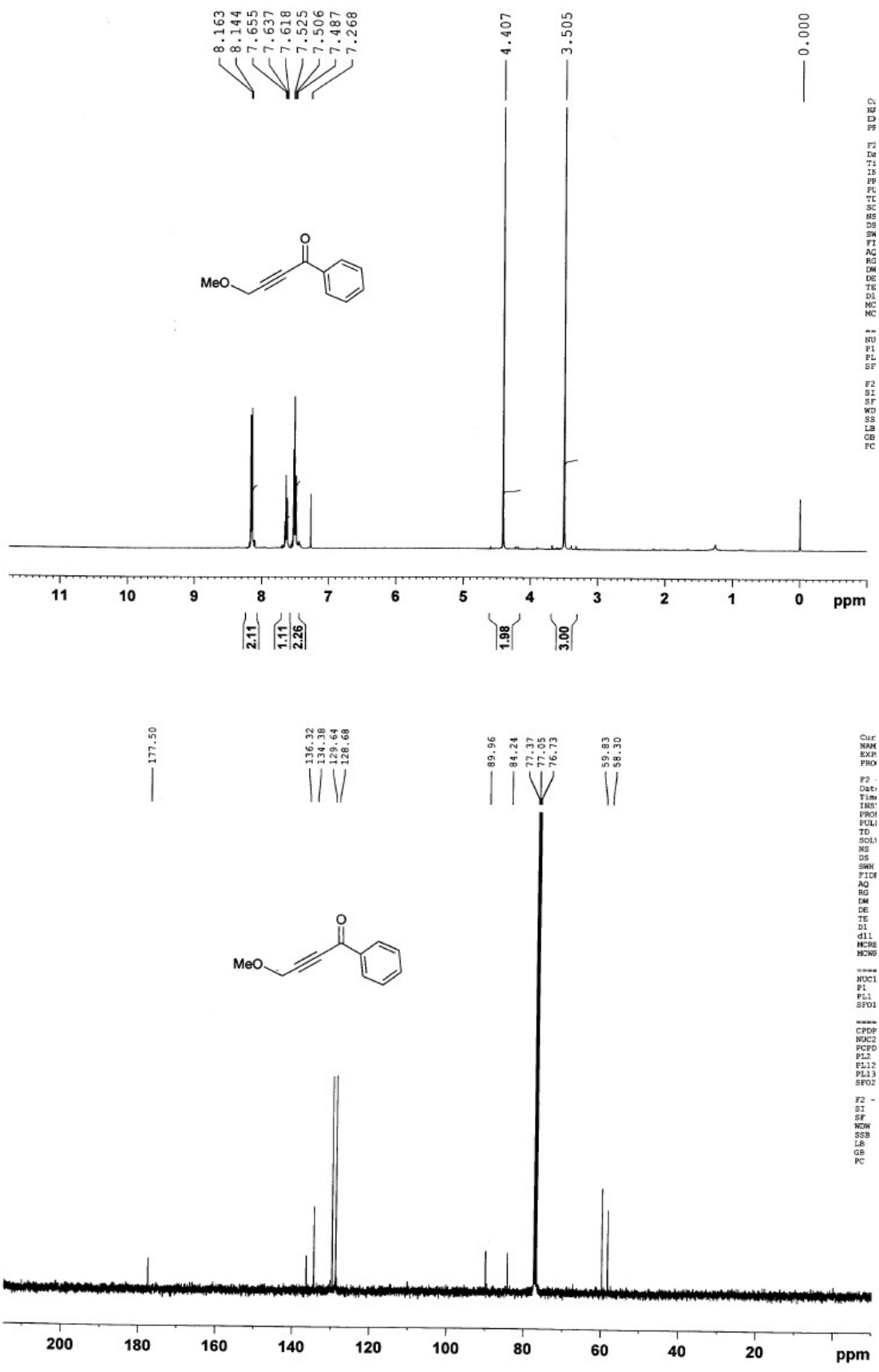
^{1}H NMR and ^{13}C NMR spectra of **4q**



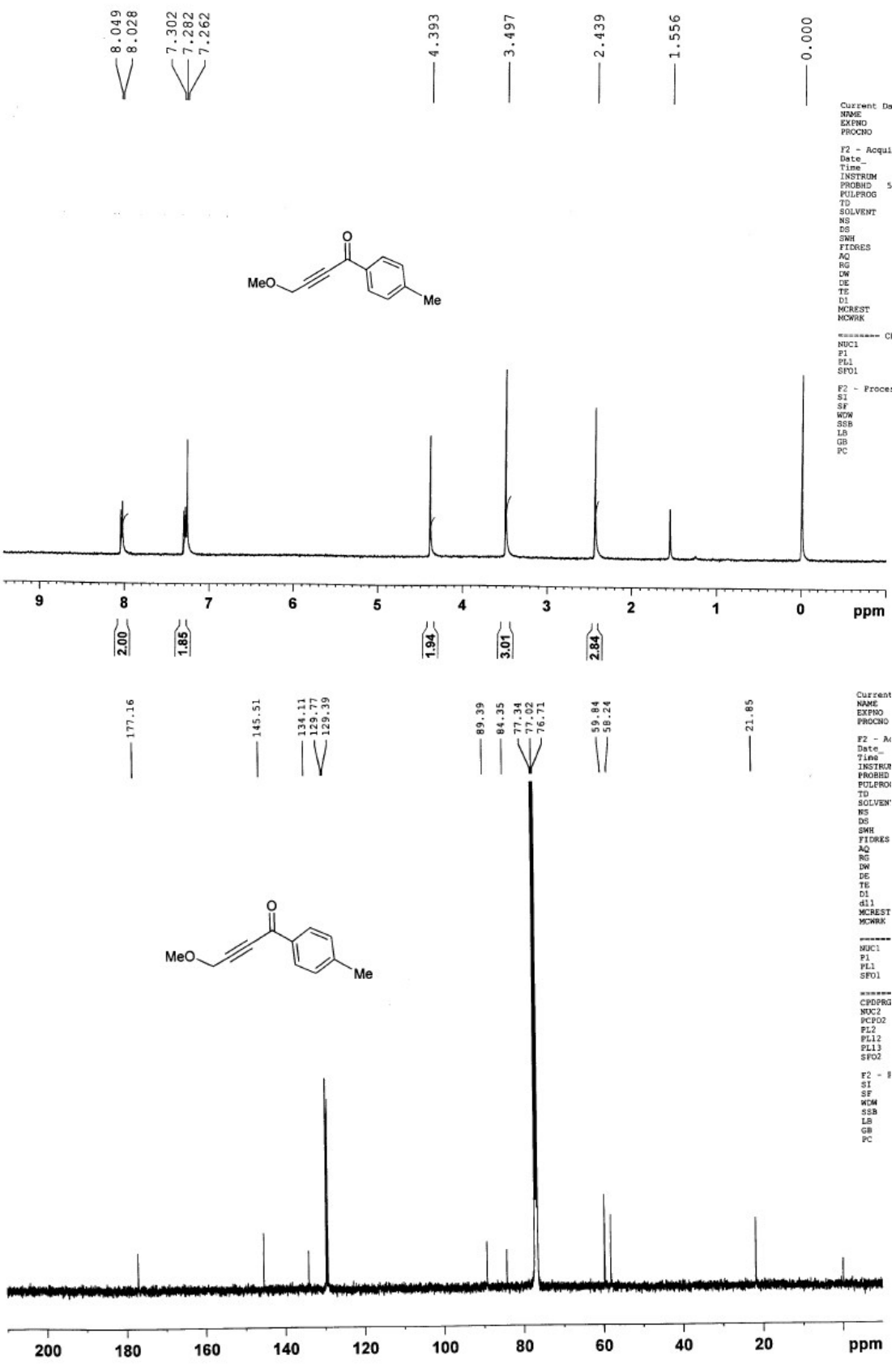
^{1}H NMR and ^{13}C NMR spectra of **4r**



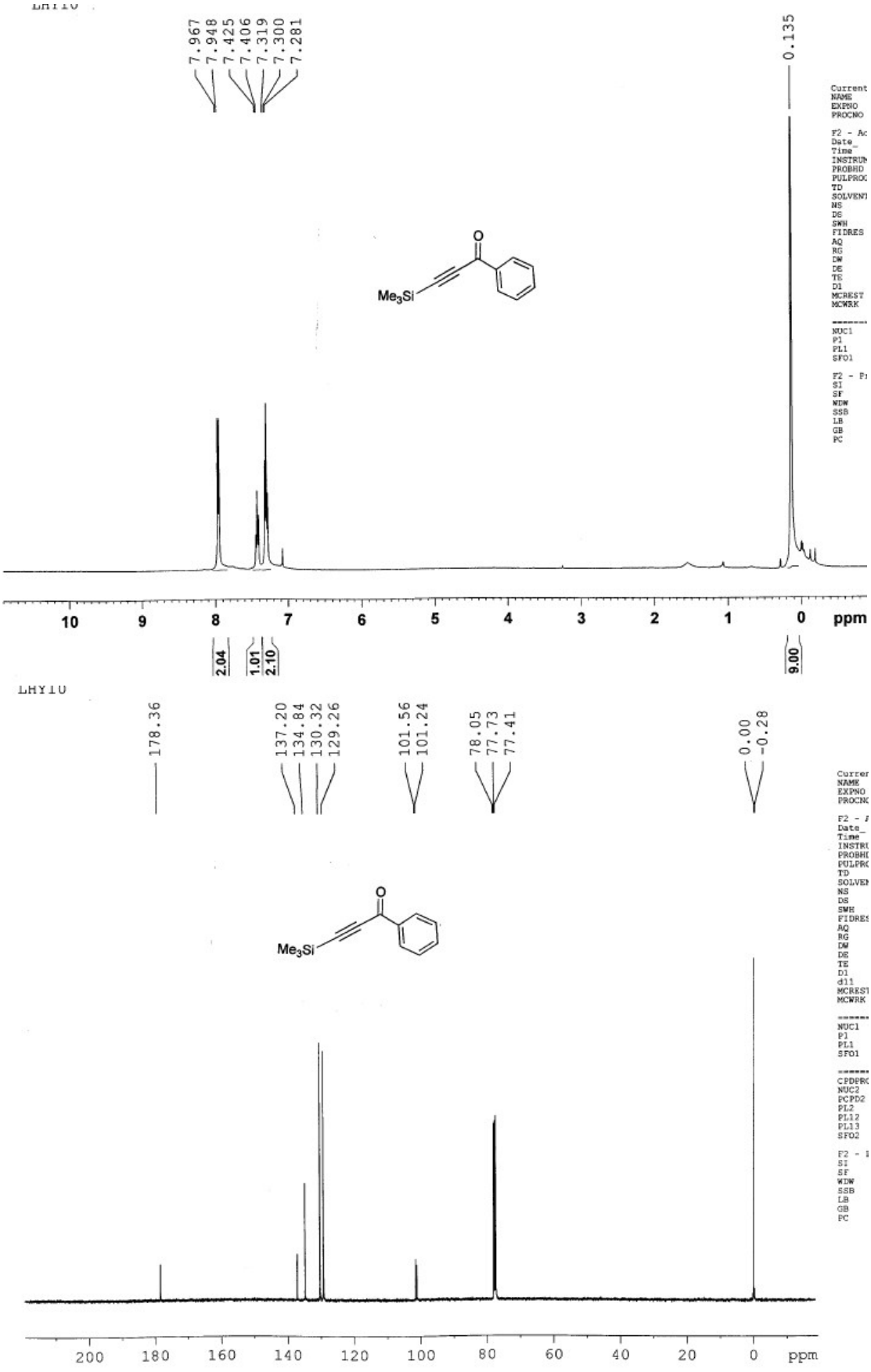
^{1}H NMR and ^{13}C NMR spectra of **4s**



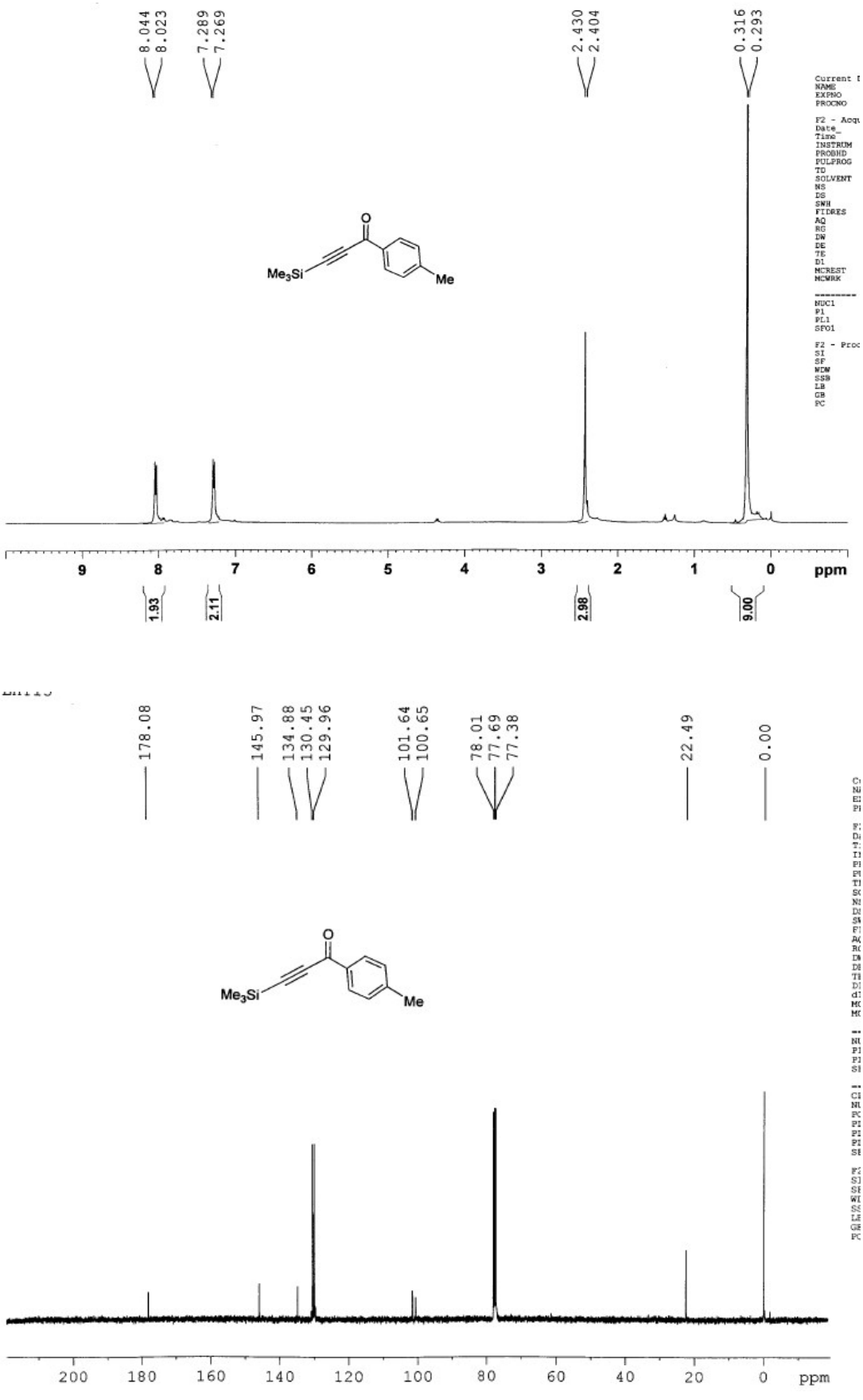
^{1}H NMR and ^{13}C NMR spectra of **4t**



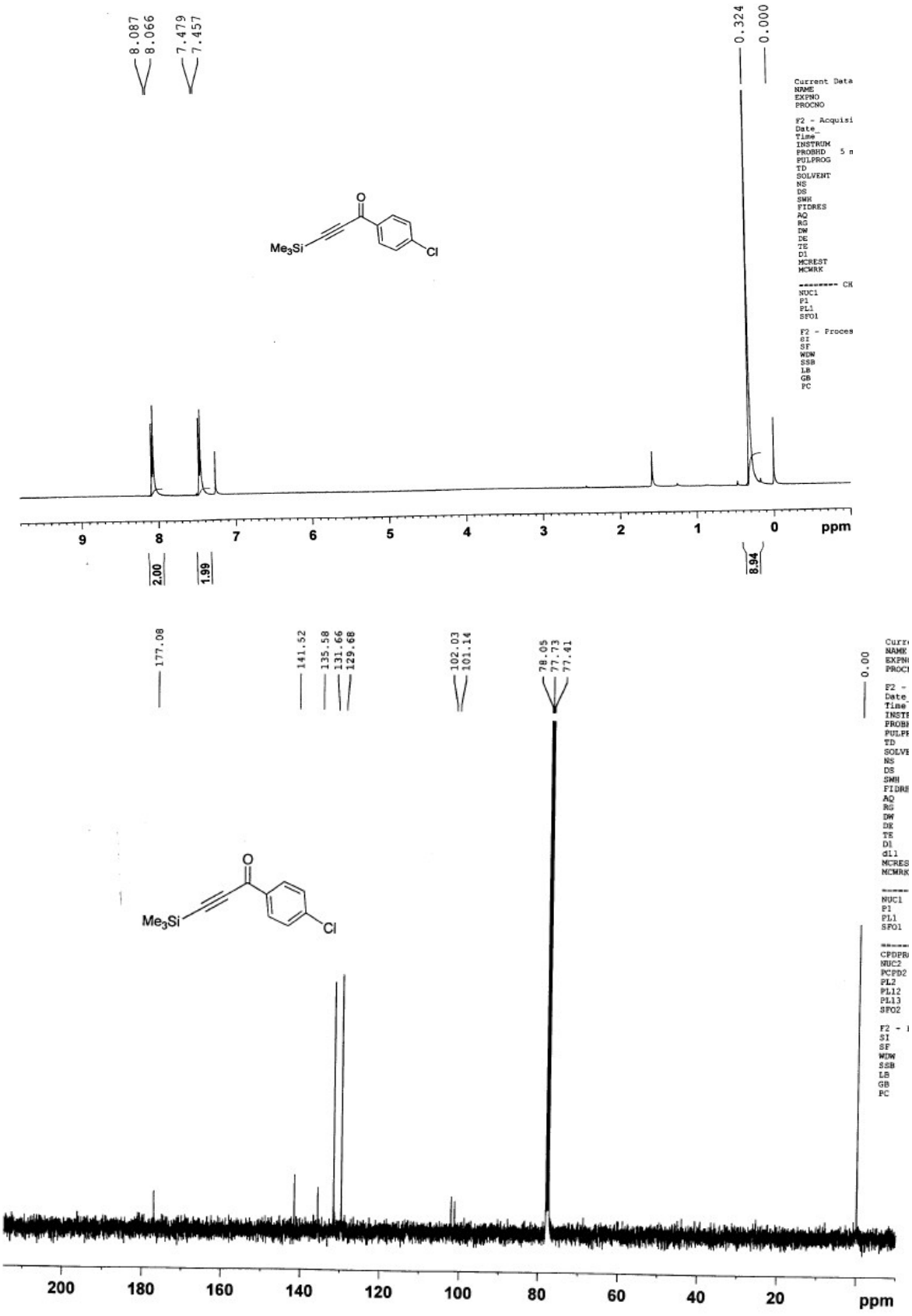
^{1}H NMR and ^{13}C NMR spectra of **4u**



^{1}H NMR and ^{13}C NMR spectra of **4v**



^{1}H NMR and ^{13}C NMR spectra of **4w**



^{1}H NMR and ^{13}C NMR spectra of **4x**