

Supporting information

Palladium nanoparticles generated in situ used as catalysts in carbonylative cross-coupling in aqueous medium

P. Wójcik^a, M. Mart^b, S. Ulukanli^b, A.M. Trzeciak^{a*}

^a University of Wrocław, Faculty of Chemistry, 14 F. Joliot-Curie, 50-383 Wrocław, Poland

^b Department of Chemistry, Faculty of Science and Letters, Osmaniye Korkut Ata University, 80000 Osmaniye, Turkey

* corresponding author, e-mail: anna.trzeciak@chem.uni.wroc.pl

1. Synthesis of palladium complexes

Imidazole (2×10^{-3} mol) and CH_3CN (10 mL) were added to $\text{PdCl}_2(\text{cod})$ (1×10^{-3} mol), and the solution was heated for 2.5 h at 70 °C. After cooling down to ambient temperature, the solution was concentrated in *vacuo*. The product was filtered off, washed with CH_3CN , Et_2O , and dried in *vacuo*.

$\text{Pd}(\text{1-MI})_2\text{Cl}_2$ (Yield: 80%)

Anal. Calc. for $\text{C}_8\text{H}_{12}\text{N}_4\text{Cl}_2\text{Pd}$: C 28.13; H 3.54; N 16.40. Found: C 27.99; H 3.51; N 16.34.

^1H NMR (500 MHz, CDCl_3): δ (ppm): 3.66 (3H, s, NCH_3); 6.74 (1H d, $J_{\text{H-H}} = 1.7$ Hz, CH); 7.38 (1H d, $J_{\text{H-H}} = 1.7$ Hz, CH); 7.95 (1H, s, N_2CH). ^{13}C NMR (125 MHz, CDCl_3): δ (ppm): 34.6 (NCH_3); 119.6 (CH); 130.4 (CH), 139.4 (N_2C).

$\text{Pd}(\text{1-BI})_2\text{Cl}_2$ (Yield: 65%)

Anal. Calc. for $\text{C}_{14}\text{H}_{24}\text{N}_4\text{Cl}_2\text{Pd}$: C 39.50; H 5.68; N 13.16. Found: C 39.75; H 5.69; N 13.12.

^1H NMR (500 MHz, CDCl_3): δ (ppm): 0.92 ppm (3H, t, $J_{\text{H-H}} = 7.4$ Hz, CH_3); 1.30 ppm (2H, sx, $J_{\text{H-H}} = 7.4$ Hz, CH_2); 1.72 (2H, q, $J_{\text{H-H}} = 7.4$ Hz, CH_2), 3.87 (2H, t, $J_{\text{H-H}} = 7.4$ Hz, NCH_2); 6.75 (1H, s, CH); 7.38 (1H, s, CH); 7.97 (1H, s, CH). ^{13}C NMR (125 MHz, CDCl_3): δ (ppm): 13.4 (CH_3); 19.6 (CH_2); 32.5 (CH_2); 48.1 (N-CH_2); 118.3 (CH); 130.2 (CH); 138.6 (N_2C).

Table S1. Carbonylative Suzuki coupling of iodobenzene: testing solvent and base^a

Entry	Solvent	Base	Conv. ^b (%)	1 ^b (%)	2 ^b (%)	Selectivity to 1 (%)
1	IPA:water (1:1)	KOH	96	25	70	26
2	IPA:water (1:1)	K_2CO_3	85	60	20	71
3	IPA:water (1:1)	CsCO_3	68	22	46	32
4	IPA:water (1:1)	KH_2PO_4	2	1	1	50
5	IPA:water (1:1)	NEt_3	98	38	3	39
6	IPA:water (1:1)	$\text{NEt}(\text{i-Pr})_2$	100	51	27	51
7	Anisole	K_2CO_3	53	52	1	99
8	Ethylene glycol	K_2CO_3	87	1	86	1
9	THF	K_2CO_3	20	20	0	100

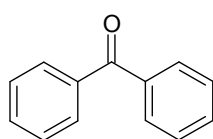
10	Dioxane	K ₂ CO ₃	44	44	0	100
11	Ethanol	K ₂ CO ₃	71	43	21	61
12	Water	NEt ₃	43	42	1	98
13	Water	K ₂ CO ₃	56	52	4	93
14	Water	Na ₂ CO ₃	68	65	3	96

^a Pd(1-MI)₂Cl₂ (1 mol %), base (3 mmol), solvent (5 mL), iodobenzene (1 mmol), phenyl boronic acid (1.2 mmol), CO (1atm), 60°C, 2h.

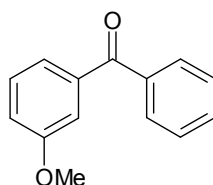
^b Conversions were determined by GC using mesitylene as internal standard.

IPA = 2-propanol

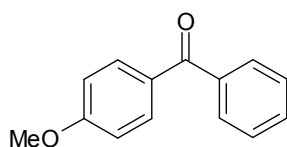
Structural data of diarylketones (references S1 – S19)



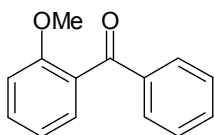
Benzophenone: ¹H NMR (500 MHz, CDCl₃): δ 7.80-7.77 (m, 4H), 7.58-7.55 (m, 2H), 7.48-7.44 (m, 4H). ¹³C NMR (125 MHz, CDCl₃): δ 196.9, 137.7, 132.6, 130.2, 128.4. GC-MS: m/z = 51 (11%), 77 (42%), 105 (100%), 182 ([M⁺] = 42%).



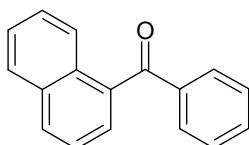
3-Methoxybenzophenone: ¹H NMR (500 MHz, CDCl₃): δ 7.79-7.78 (m, 2H), 7.58-7.55 (m, 1H), 7.47-7.44 (m, 2H), 7.37-7.31 (m, 3H), 7.11 (ddd, *J*_{H-H} = 7.8 Hz, 2.7 Hz, 1.5 Hz, 1H), 3.85 (s, 3H). ¹³C NMR (125 MHz, CDCl₃): δ 196.7, 159.8, 139.1, 137.8, 132.6, 130.2, 129.4, 128.5, 123.1, 119.1, 114.5, 55.7. GC-MS: m/z = 51 (36%), 64 (21%), 77 (82%), 105 (96%), 135 (100%), 181 (18%), 212 ([M⁺] = 82%).



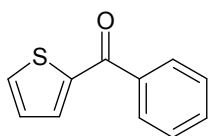
4-Methoxybenzophenone: ¹H NMR (500 MHz, CDCl₃): δ 7.81 (m, 2H), 7.74-7.72 (m, 2H), 7.54 (t, *J*_{H-H} = 7.4 Hz, 1H), 7.45 (t, *J*_{H-H} = 7.4 Hz, 2H), 6.96-6.93 (m, 2H), 3.87 (s, 3H). ¹³C NMR (125 MHz, CDCl₃): δ 195.7, 163.4, 138.5, 132.7, 132.1, 130.4, 129.9, 128.4, 113.7, 55.7. GC-MS: m/z = 51 (25%), 64 (18%), 77 (89%), 105 (36%), 135 (100%), 212 ([M⁺] = 82%).



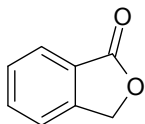
2-Methoxybenzophenone: ^1H NMR (500 MHz, CDCl_3): δ 7.80-7.78 (m, 2H), 7.54-7.51 (m, 1H), 7.47-7.39 (m, 3H), 7.34 (dd, $J_{\text{H-H}} = 7.4$ Hz, 1.7 Hz, 1H), 7.02 (td, $J_{\text{H-H}} = 7.5$ Hz, 0.9 Hz, 1H), 6.98 (d, $J_{\text{H-H}} = 8.4$ Hz, 1H). ^{13}C NMR (125 MHz, CDCl_3): δ 196.6, 157.5, 138.0, 133.1, 132.0, 130.0, 129.8, 129.1, 128.4, 120.7, 111.7, 55.8. GC-MS: $m/z = 51$ (36%), 64 (21%), 77 (82%), 105 (96%), 135 (100%), 181 (18%), 212 ($[\text{M}^+] = 82\%$).



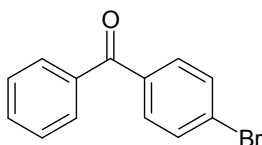
1-Naphthyl phenylketone: ^1H NMR (500 MHz, CDCl_3): δ 8.09 (d, $J_{\text{H-H}} = 8.2$ Hz, 1H), 7.99 (d, $J_{\text{H-H}} = 8.2$ Hz, 1H), 7.91 (d, $J_{\text{H-H}} = 8.2$ Hz, 1H), 7.86 (d, $J_{\text{H-H}} = 7.8$ Hz, 2H), 7.60-7.56 (m, 2H), 7.53-7.47 (m, 3H), 7.44 (t, $J_{\text{H-H}} = 7.8$ Hz, 2H). ^{13}C NMR (125 MHz, CDCl_3): δ 198.2, 138.5, 136.5, 133.9, 133.4, 131.4, 131.1, 130.6, 128.6, 127.9, 127.4, 126.6, 125.9, 124.5. GC-MS: $m/z = 51$ (25%), 77 (75%), 105 (71%), 127 (79%), 155 (100%), 232 ($[\text{M}^+] = 97\%$). Spectral data are consistent with data reported in the literature. [j, s, k]



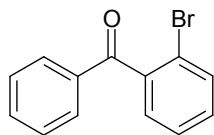
2-Benzoylthiophene: ^1H NMR (500 MHz, CDCl_3): δ 7.86-7.83 (m, 2H), 7.70 (dd, $J_{\text{H-H}} = 4.9$ Hz, 1.1 Hz, 1H), 7.63 (dd, $J_{\text{H-H}} = 3.8$ Hz, 1.1 Hz, 1H), 7.59-7.56 (m, 1H), 7.49-7.46 (m, 2H), 7.14 (dd, $J_{\text{H-H}} = 4.9$ Hz, 3.8 Hz, 1H). ^{13}C NMR (125 MHz, CDCl_3): δ 188.4, 143.9, 138.4, 135.0, 134.4, 132.5, 129.4, 128.6, 128.2. GC-MS: $m/z = 39$ (21%), 51 (21%), 77 (43%), 111 (100%), 188 ($[\text{M}^+] = 61\%$).



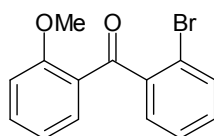
1-Phthalanone: ^1H NMR (500 MHz, CDCl_3): δ 7.91 (d, $J_{\text{H-H}} = 7.7$ Hz, 1H), 7.67 (dt, $J_{\text{H-H}} = 7.5$ Hz, 1.0 Hz, 1H), 7.51 (t, $J_{\text{H-H}} = 7.5$ Hz, 1H), 7.47 (dt, $J_{\text{H-H}} = 7.7$ Hz, 0.8 Hz, 1H), 5.31 (s, 2H). ^{13}C NMR (125 MHz, CDCl_3): δ 171.3, 146.7, 134.2, 129.2, 126.0, 125.9, 122.3, 69.8. GC-MS: $m/z = 51$ (19%), 77 (53%), 105 (100%), 134 ($[\text{M}^+] = 34\%$).



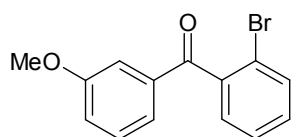
4-Bromobenzophenone: ^1H NMR (500 MHz, CDCl_3): δ 7.76-7.74 (m, 2H), 7.67-7.56 (m, 5H), 7.49-7.45 (m, 2H). ^{13}C NMR (125 MHz, CDCl_3): δ 195.8, 137.4, 136.5, 132.9, 131.8, 131.7, 130.1, 128.6, 127.7. GC-MS: m/z = 51 (21%), 77 (49%), 105 (100%), 155 (11%), 183 (32%), 260 and 262 ($[\text{M}^+] = 19\%$).



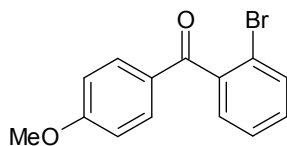
2-Bromobenzophenone: ^1H NMR (500 MHz, CDCl_3): δ 7.80-7.78 (m, 2H), 7.62 (d, $J_{\text{H-H}} = 8.0$ Hz, 1H), 7.58 (t, $J_{\text{H-H}} = 7.4$ Hz, 1H), 7.44 (t, $J_{\text{H-H}} = 7.8$ Hz, 2H), 7.41-7.38 (m, 1H), 7.35-7.32 (m, 2H). ^{13}C NMR (125 MHz, CDCl_3): δ 196.0, 140.9, 136.3, 133.9, 133.4, 131.3, 130.4, 129.2, 128.8, 127.4, 119.7. GC-MS: m/z = 51 (29%), 77 (75%), 105 (100%), 155 (11%), 183 (28%), 260 and 262 ($[\text{M}^+] = 28\%$).



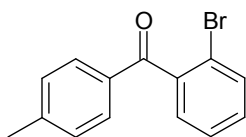
2-Bromo-2'-methoxybenzophenone: ^1H NMR (500 MHz, CDCl_3): δ 7.64 (dd, $J_{\text{H-H}} = 7.7$ Hz, 1.8 Hz, 1H), 7.56 (d, $J_{\text{H-H}} = 7.6$ Hz, 1H), 7.51-7.47 (m, 1H), 7.35-7.24 (m, 3H), 7.00 (t, $J_{\text{H-H}} = 7.5$ Hz, 1H), 6.91 (d, $J_{\text{H-H}} = 8.3$ Hz, 1H), 3.63 (s, 3H). ^{13}C NMR (125 MHz, CDCl_3): δ 195.4, 159.5, 142.9, 134.6, 133.2, 131.9, 131.1, 129.5, 127.4, 127.2, 120.9, 119.6, 112.2, 56.0. GC-MS: m/z = 50 (11%), 63 (7%), 77 (39%), 92 (14%), 121 (14%), 135 (100%), 155 (11%), 183 (14%), 211 (25%), 290 and 292 ($[\text{M}^+] = 11\%$).



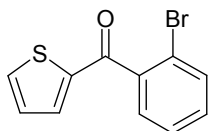
2-Bromo-3'-methoxybenzophenone: ^1H NMR (500 MHz, CDCl_3): δ 7.62 (d, $J_{\text{H-H}} = 8.0$ Hz, 1H), 7.43-7.37 (m, 2H), 7.33 (t, $J_{\text{H-H}} = 7.8$ Hz, 3H), 7.27-7.25 (m, 1H), 7.13 (dd, $J_{\text{H-H}} = 8.2$ Hz, 2.3 Hz, 1H). ^{13}C NMR (125 MHz, CDCl_3): δ 195.8, 160.1, 140.9, 137.7, 133.4, 131.3, 129.8, 129.1, 127.3, 123.7, 120.7, 119.7, 113.9, 22.7. GC-MS: m/z = 50 (8%), 64 (17%), 77 (35%), 92 (21%), 107 (33%), 135 (100%), 154 (19%), 183 (33%), 211 (96%), 290 and 292 ($[\text{M}^+] = 23\%$). Spectral data are consistent with data reported in the literature. [d]



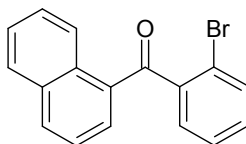
2-Bromo-4'-methoxybenzophenone: ^1H NMR (500 MHz, CDCl_3): δ 7.76 (d, $J_{\text{H-H}} = 9.0$ Hz, 2H), 7.62-7.60 (m, 1H), 7.40-7.36 (m, 1H), 7.33-7.29 (m, 2H), 6.91 (d, $J_{\text{H-H}} = 9.0$ Hz, 2H), 3.85 (s, 3H). ^{13}C NMR (125 MHz, CDCl_3): δ 194.6, 164.3, 141.3, 133.3, 132.8, 131.0, 129.3, 128.9, 127.4, 119.6, 114.1, 55.7. GC-MS: $m/z = 77$ (18%), 92 (11%), 135 (100%), 290 and 292 ($[\text{M}^+] = 18\%$).



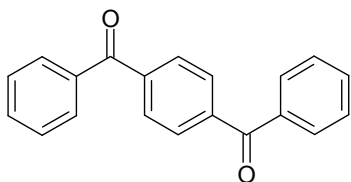
2-Bromo-4'-methylbenzophenone: ^1H NMR (500 MHz, CDCl_3): δ 7.69 (d, $J_{\text{H-H}} = 8.2$ Hz, 2H), 7.62-7.60 (m, 1H), 7.38 (dt, $J_{\text{H-H}} = 7.6$ Hz, 1.1 Hz, 1H), 7.33-7.29 (m, 2H), 7.25 (d, $J_{\text{H-H}} = 7.9$ Hz, 2H), 2.40 (s, 3H). ^{13}C NMR (125 MHz, CDCl_3): δ 195.7, 145.0, 141.1, 133.8, 133.3, 131.1, 130.5, 129.5, 129.0, 127.3, 119.6, 22.0. GC-MS: $m/z = 65$ (12%), 91 (36%), 119 (100%), 183 (6%), 274 and 276 ($[\text{M}^+] = 36\%$).



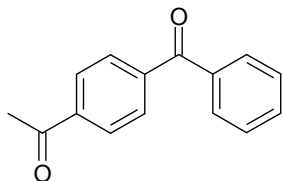
2-(2-Bromobenzoyl)thiophene: ^1H NMR (500 MHz, CDCl_3): δ 7.74 (dd, $J_{\text{H-H}} = 4.9$ Hz, 1.1 Hz, 1H), 7.63 (d, $J_{\text{H-H}} = 8.1$ Hz, 1H), 7.41-7.31 (m, 4H), 7.10 (dd, $J_{\text{H-H}} = 4.9$ Hz, 3.8 Hz, 1H). ^{13}C NMR (125 MHz, CDCl_3): δ 188.0, 143.6, 140.6, 136.2, 135.9, 133.6, 131.5, 128.9, 128.5, 127.3, 119.6. GC-MS: $m/z = 39$ (18%), 111 (100%), 154 (7%), 187 (11%), 266 and 268 ($[\text{M}^+] = 14\%$).



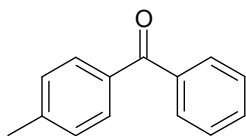
2-bromophenyl-1-naphthylketone: ^1H NMR (500 MHz, CDCl_3): δ 8.90 (d, $J_{\text{H-H}} = 8.6$ Hz, 1H), 8.02 (d, $J_{\text{H-H}} = 8.2$ Hz, 1H), 7.90 (d, $J_{\text{H-H}} = 8.2$ Hz, 1H), 7.67-7.62 (m, 2H), 7.58-7.55 (m, 2H), 7.46 (dd, $J_{\text{H-H}} = 7.5$ Hz, 1.7 Hz, 1H), 7.42-7.38 (m, 2H), 7.34 (dt, $J_{\text{H-H}} = 7.6$ Hz, 1.7 Hz, 1H). ^{13}C NMR (125 MHz, CDCl_3): δ 197.9, 142.2, 134.2, 134.1, 134.0, 133.6, 132.4, 131.7, 131.3, 130.2, 128.7, 128.6, 127.4, 126.9, 126.3, 124.5, 120.6. GC-MS: $m/z = 50$ (7%), 75 (18%), 101 (29%), 127 (78%), 155 (96%), 183 (14%), 202 (14%), 231 (100%), 310 and 312 ($[\text{M}^+] = 25\%$).



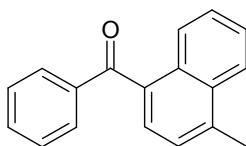
1,4-Phenylenebis(phenyl)methanone: ^1H NMR (500 MHz, CDCl_3): δ 7.87 (s, 4H), 7.84-7.82 (m, 4H), 7.63-7.59 (m, 2H), 7.50 (t, $J_{\text{H-H}} = 7.7$ Hz, 4H). ^{13}C NMR (125 MHz, CDCl_3): δ 196.2, 140.9, 137.2, 133.2, 130.3, 130.0, 128.7. GC-MS: $m/z = 77$ (48%), 105 (100%), 152 (8%), 181 (10%), 209 (48%) 286 ($[\text{M}^+] = 36\%$).



4-Acetylbenzophenone: ^1H NMR (500 MHz, CDCl_3): δ 8.04 (d, $J_{\text{H-H}} = 8.5$ Hz, 2H), 7.84 (d, $J_{\text{H-H}} = 8.5$ Hz, 2H), 7.79-7.77 (m, 2H), 7.60 (t, $J_{\text{H-H}} = 7.5$ Hz, 1H), 7.48 (t, $J_{\text{H-H}} = 7.8$ Hz, 2H), 2.65 (s, 3H). ^{13}C NMR (125 MHz, CDCl_3): δ 197.7, 196.1, 141.5, 139.8 137.1, 133.2, 130.3, 130.2, 128.7, 128.4, 27.1. GC-MS: $m/z = 43$ (28%), 51 (25%), 77 (75%), 105 (100%), 147 (36%), 209 (93%), 224 ($[\text{M}^+] = 54\%$).

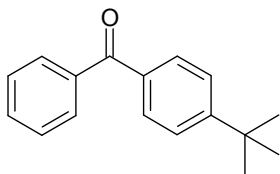


4-Methylbenzophenone: ^1H NMR (500 MHz, CDCl_3): δ 7.77-7.75 (m, 2H), 7.70 (d, $J_{\text{H-H}} = 8.2$ Hz, 2H), 7.57-7.54 (m, 1H), 7.47-7.44 (m, 2H), 7.26 (d, $J_{\text{H-H}} = 7.9$ Hz, 2H), 2.43 (s, 3H). ^{13}C NMR (125 MHz, CDCl_3): δ 196.7, 143.4, 138.2, 135.1, 132.4, 130.5, 130.1, 129.2, 128.4, 21.86. GC-MS: $m/z = 39$ (11%), 51 (21%), 77 (50%), 91 (54%), 105 (57%), 119 (100%), 181 (14%), 196 ($[\text{M}^+] = 64\%$).



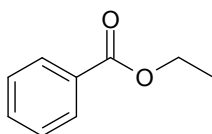
(4-methylnaphthalen-1-yl)(phenyl)methanone: ^1H NMR (500 MHz, CDCl_3): δ 8.15 (d, $J_{\text{H-H}} = 8.3$ Hz, 1H), 8.07 (d, $J_{\text{H-H}} = 8.3$ Hz, 1H), 7.85-7.83 (m, 2H), 7.58-7.54 (m, 2H), 7.51-7.42 (m, 4H), 7.34 (d, $J_{\text{H-H}} = 7.2$ Hz, 1H), 2.76 (s, 3H). ^{13}C NMR (125 MHz, CDCl_3): δ 198.3, 138.9, 138.5, 134.9, 133.2, 133.1, 131.3, 130.6, 128.6, 128.2, 127.1, 126.6, 126.5, 125.3, 124.6, 20.1. GC-

MS: $m/z = 51$ (12%), 77 (44%), 105 (25%), 115 (33%), 141 (37%), 169 (100%), 231 (23%), 246 ($[M^+] = 60\%$).

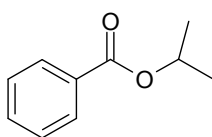


4-tert-Butylbenzophenone: $^1\text{H NMR}$ (500 MHz, CDCl_3): δ 7.79-7.73 (m, 4H), 7.57-7.54 (m, 1H), 7.49-7.44 (m, 4H), 1.35 (s, 9H). $^{13}\text{C NMR}$ (125 MHz, CDCl_3): δ 196.7, 156.4, 138.2, 135.0, 132.4, 130.3, 130.2, 128.4, 125.4, 35.3, 31.4. GC-MS: $m/z = 51$ (11%), 77 (46%), 105 (68%), 161 (14%), 223 (100%), 238 ($[M^+] = 39\%$).

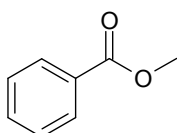
Structural data of benzoate esters (references S20 – S25)



Ethyl benzoate: $^1\text{H NMR}$ (500 MHz, CDCl_3): δ 8.04-8.02 (m, 2H), 7.55-7.51 (m, 1H), 7.43-7.40 (m, 2H), 4.36 (q, $J = 7.2$ Hz, 2H), 1.38 (t, $J = 7.1$ Hz, 3H). $^{13}\text{C NMR}$ (125 MHz, CDCl_3): δ 166.8, 133.0, 130.7, 129.7, 128.5, 61.1, 14.5. GC-MS: $m/z = 51$ (18%), 77 (49%), 105 (100%), 122 (33%), 150 ($[M^+] = 24\%$).



Propyl benzoate: $^1\text{H NMR}$ (500 MHz, CDCl_3): δ 8.01 (d, $J = 7.2$ Hz, 2H), 7.53-7.51 (m, 1H), 7.45-7.40 (m, 2H), 5.23 (sept, $J = 6.3$ Hz, 1H), 1.35 (d, $J = 6.3$ Hz, 6H). $^{13}\text{C NMR}$ (125 MHz, CDCl_3): δ 166.3, 132.9, 131.1, 129.7, 128.5, 68.5, 22.1. GC-MS: $m/z = 51$ (17%), 59 (20%), 77 (32%), 105 (100%), 123 (35%), 164 ($[M^+] = 14\%$).

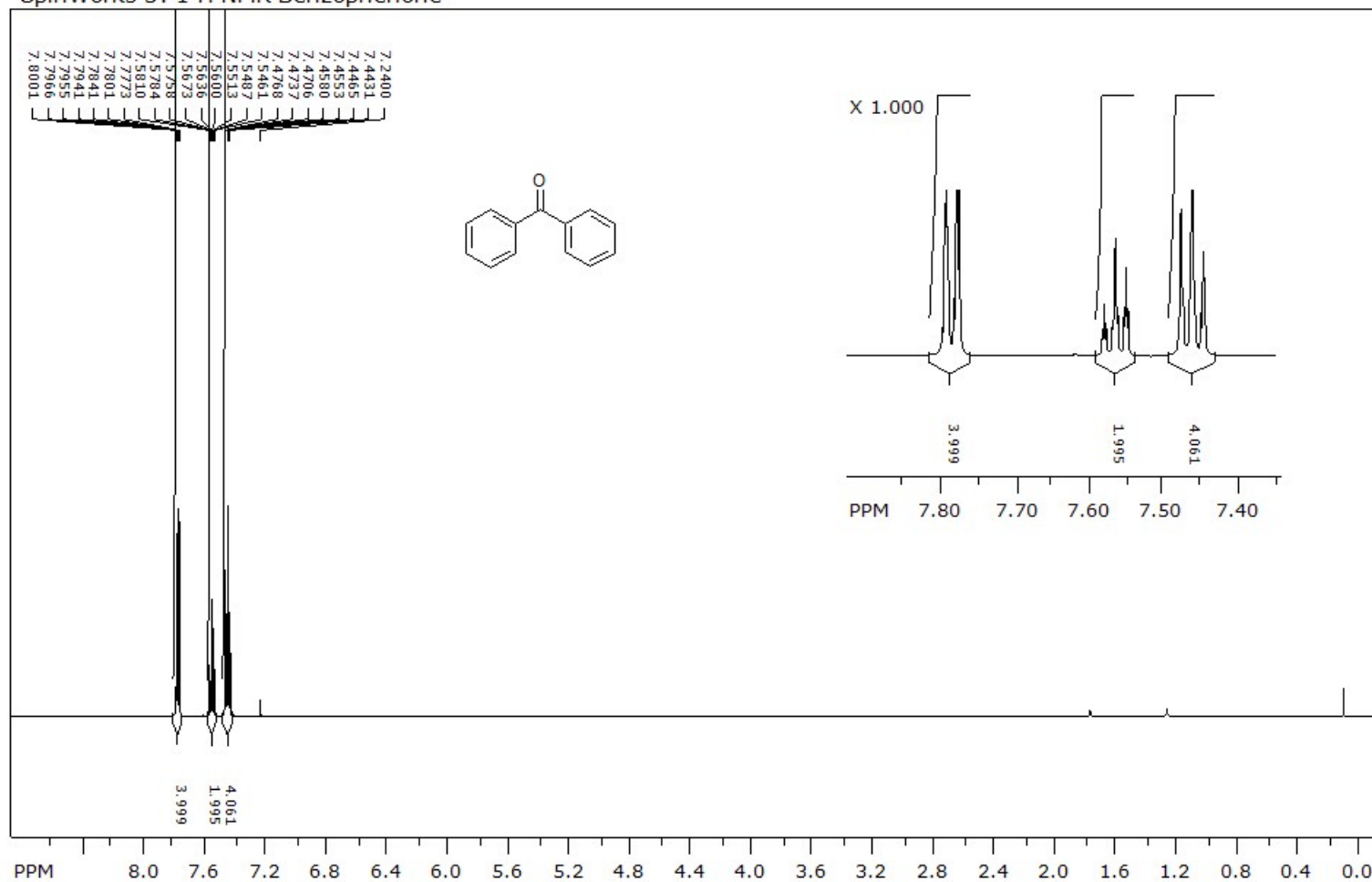


Methyl benzoate: ¹H NMR (500 MHz, CDCl₃): δ 8.03-8.01 (m, 2H), 7.55-7.51 (m, 1H), 7.43-7.40 (m, 2H), 3.90 (s, 3H). ¹³C NMR (125 MHz, CDCl₃): δ 167.3, 133.1, 130.4, 129.8, 128.5, 52.3. GC-MS: m/z = 51 (24%), 77 (63%), 105 (100%), 136 (30%).

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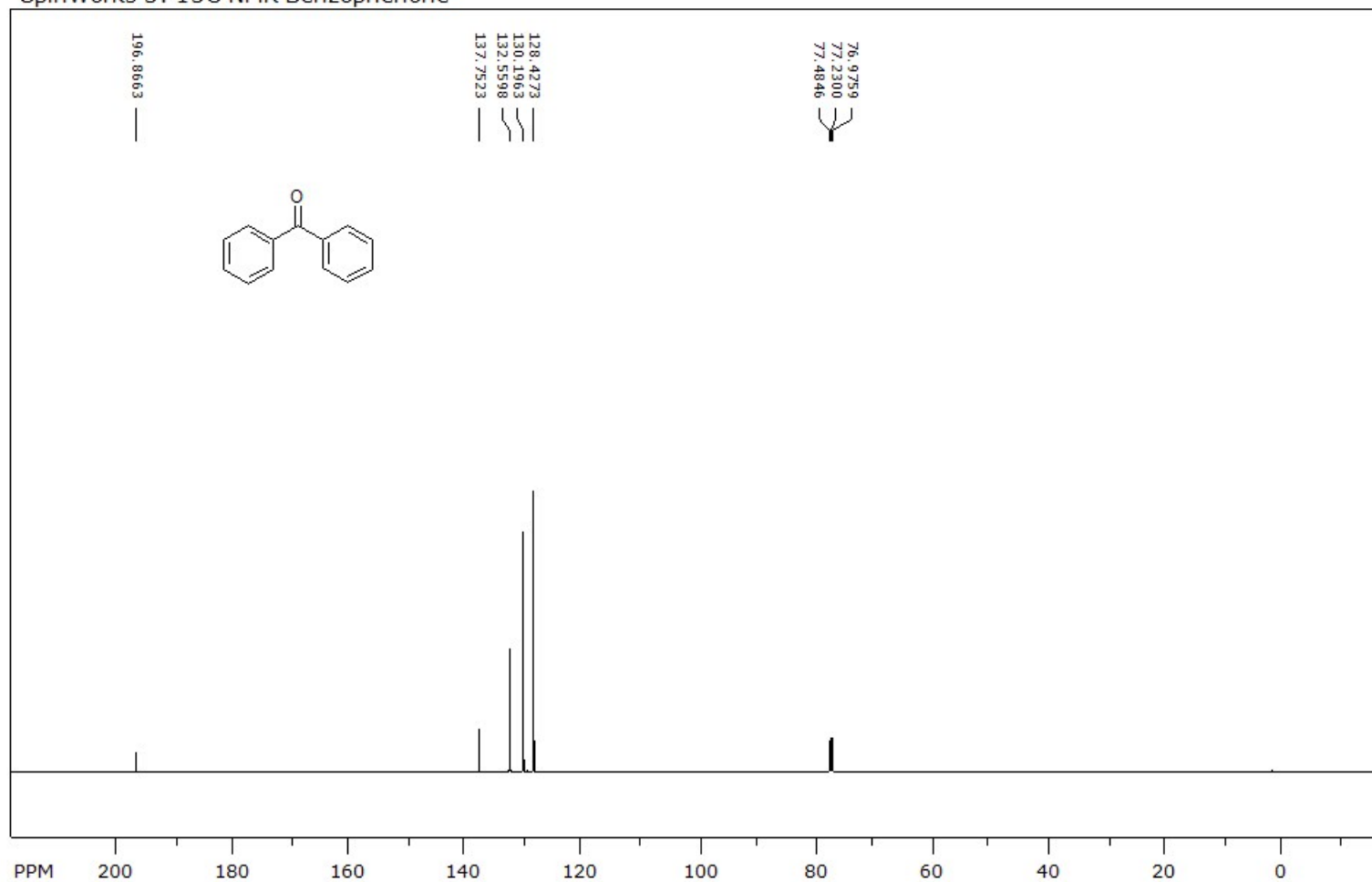
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 number of scans: 16

freq. of 0 ppm: 500.130023 MHz
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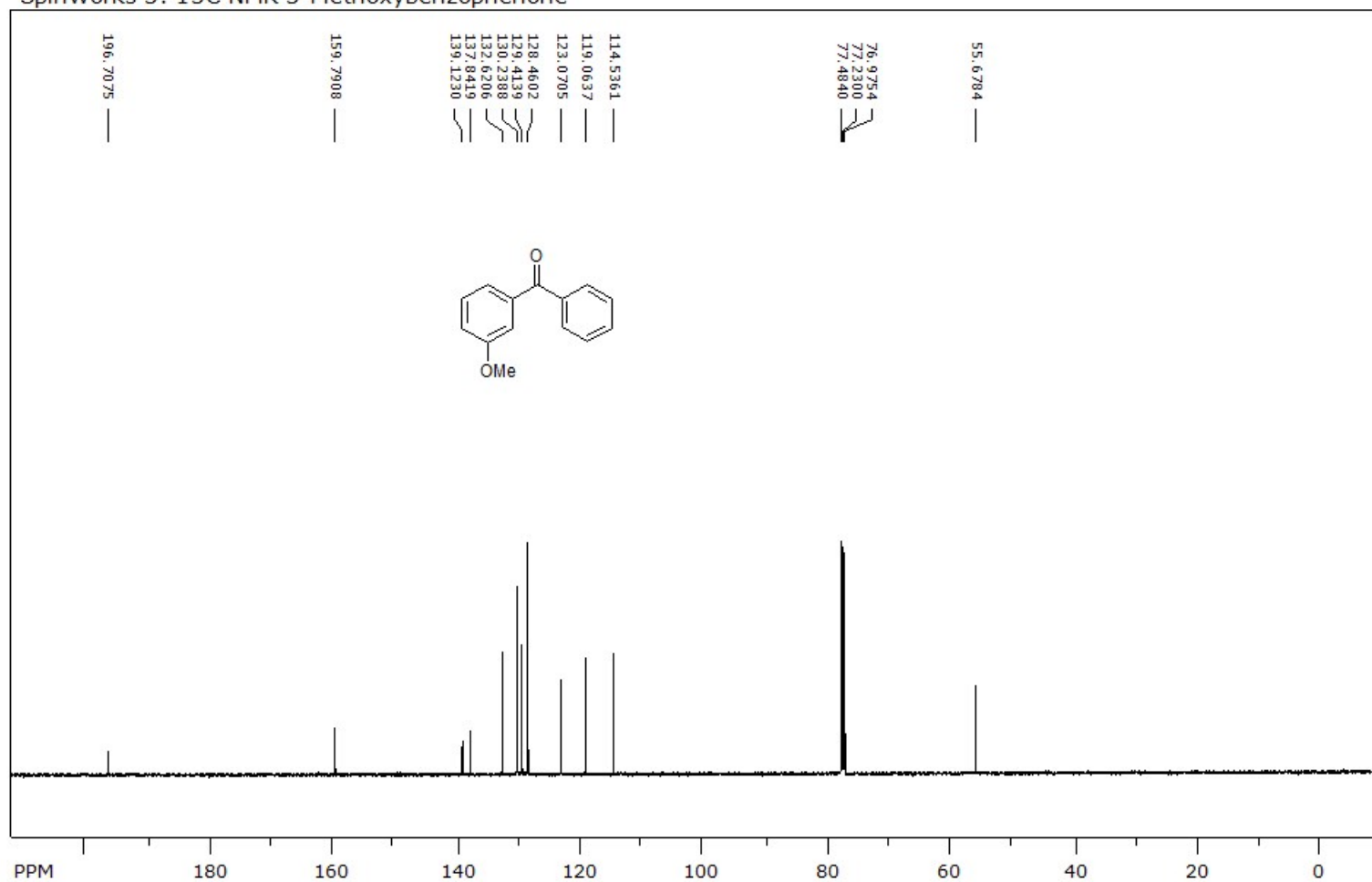
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number of scans: 4096

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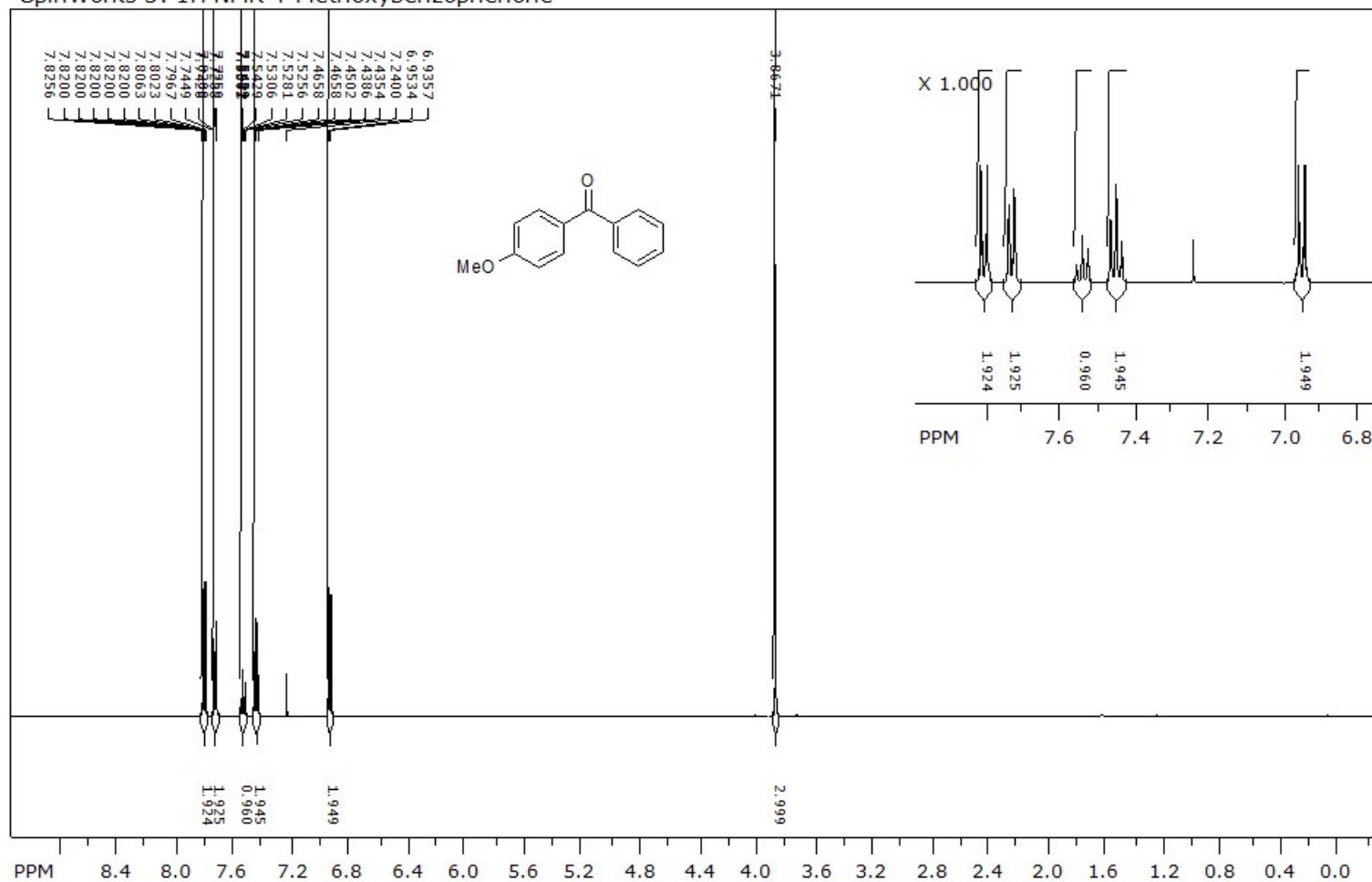
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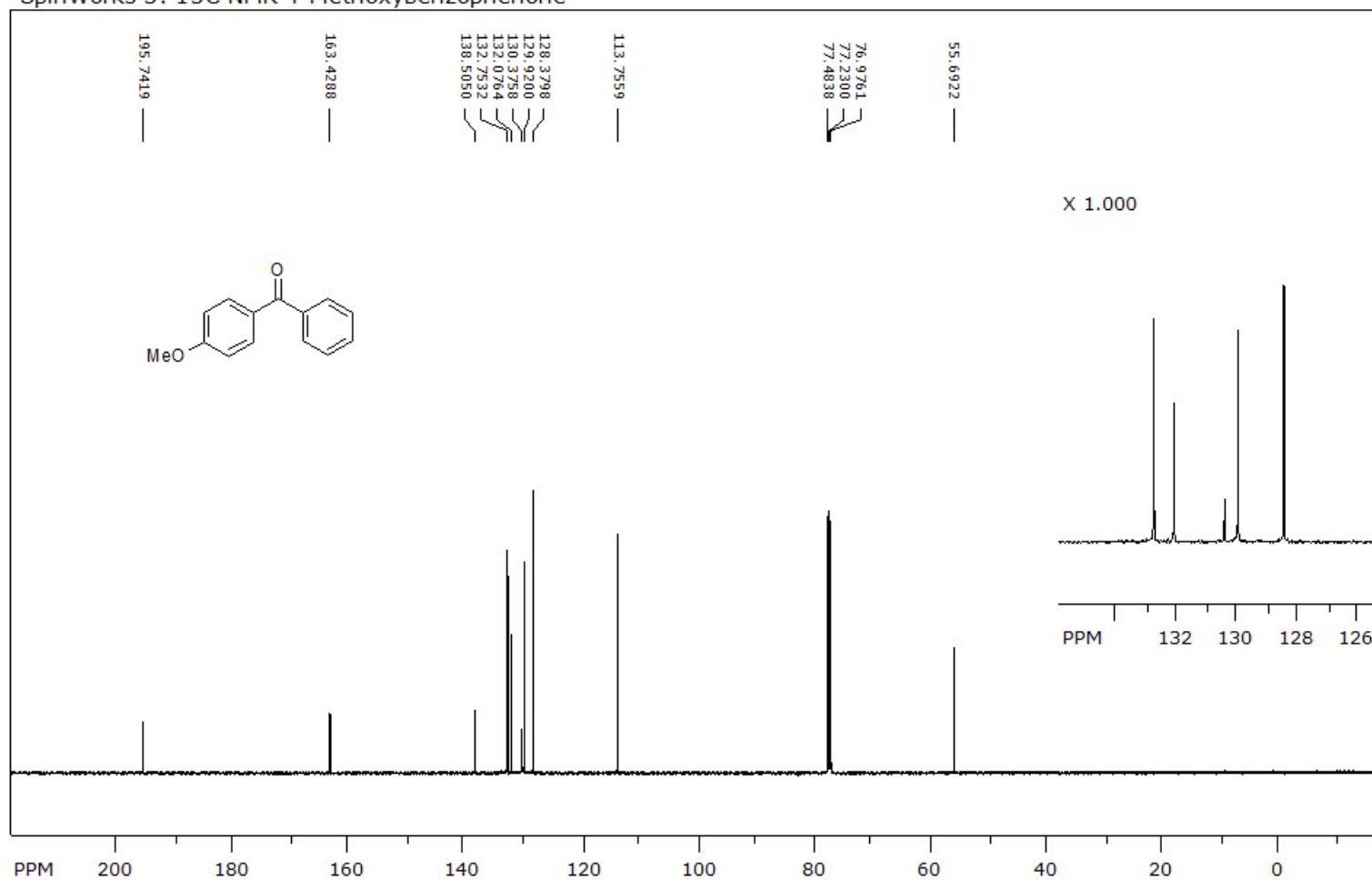
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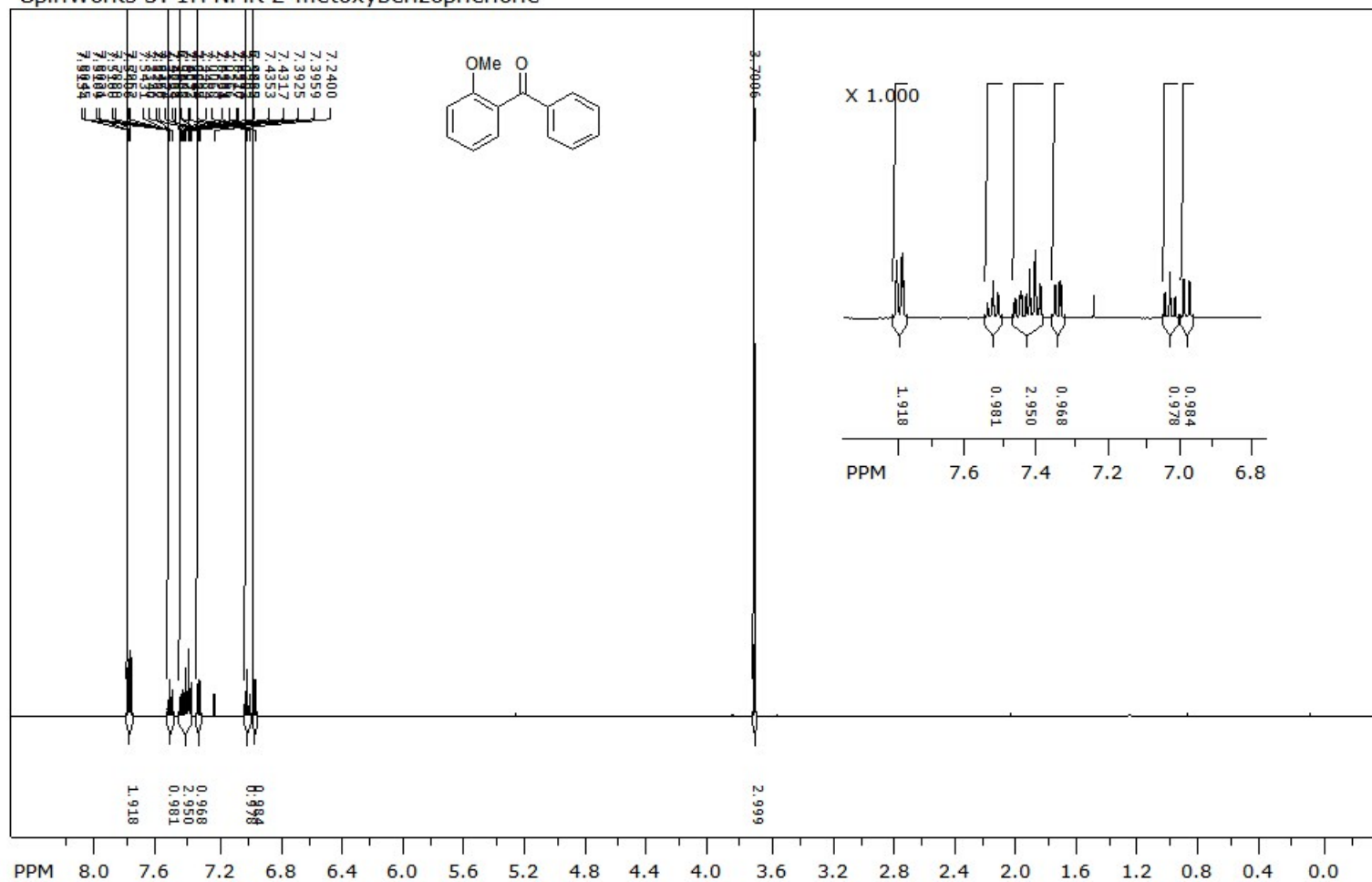
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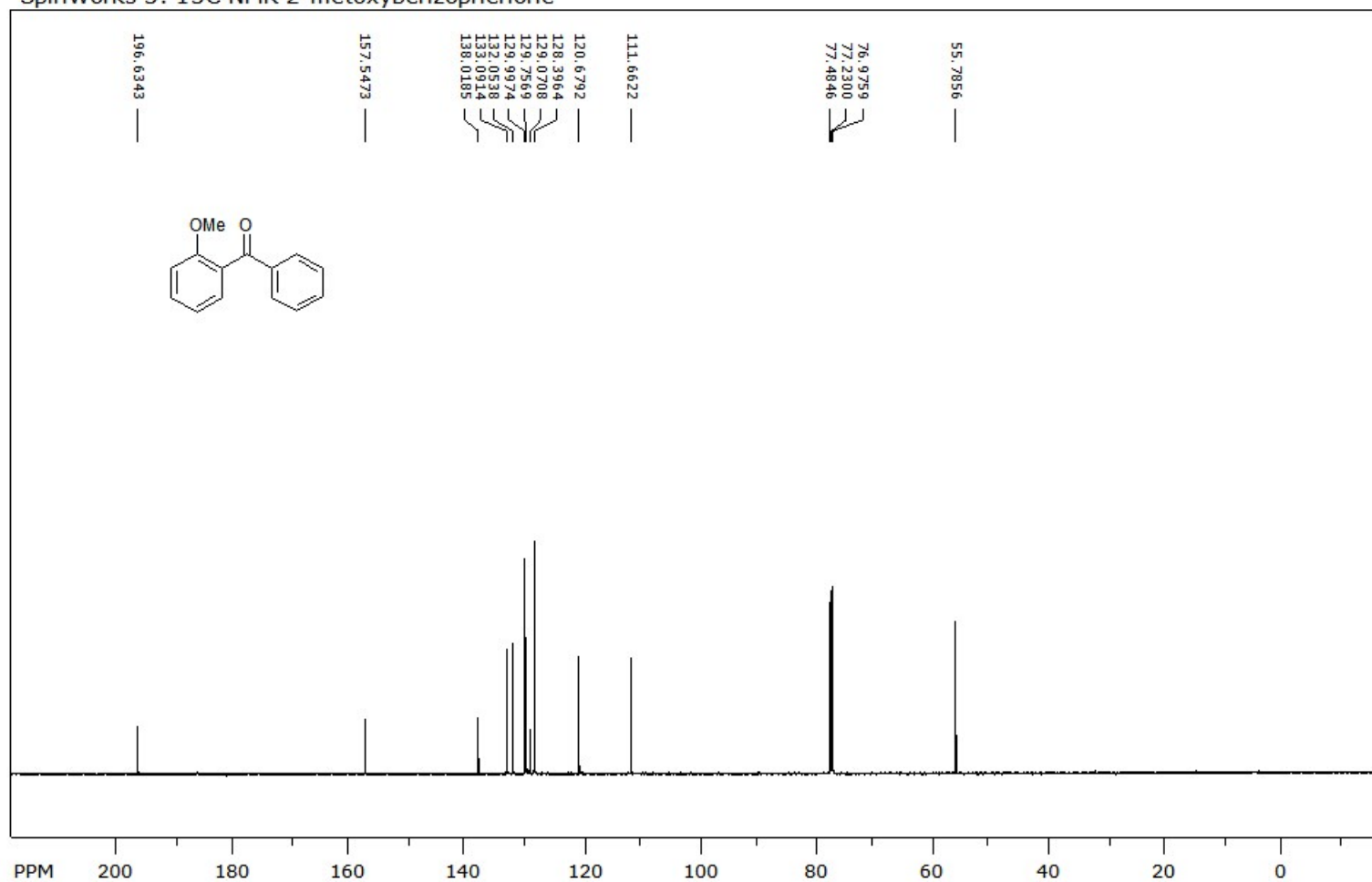
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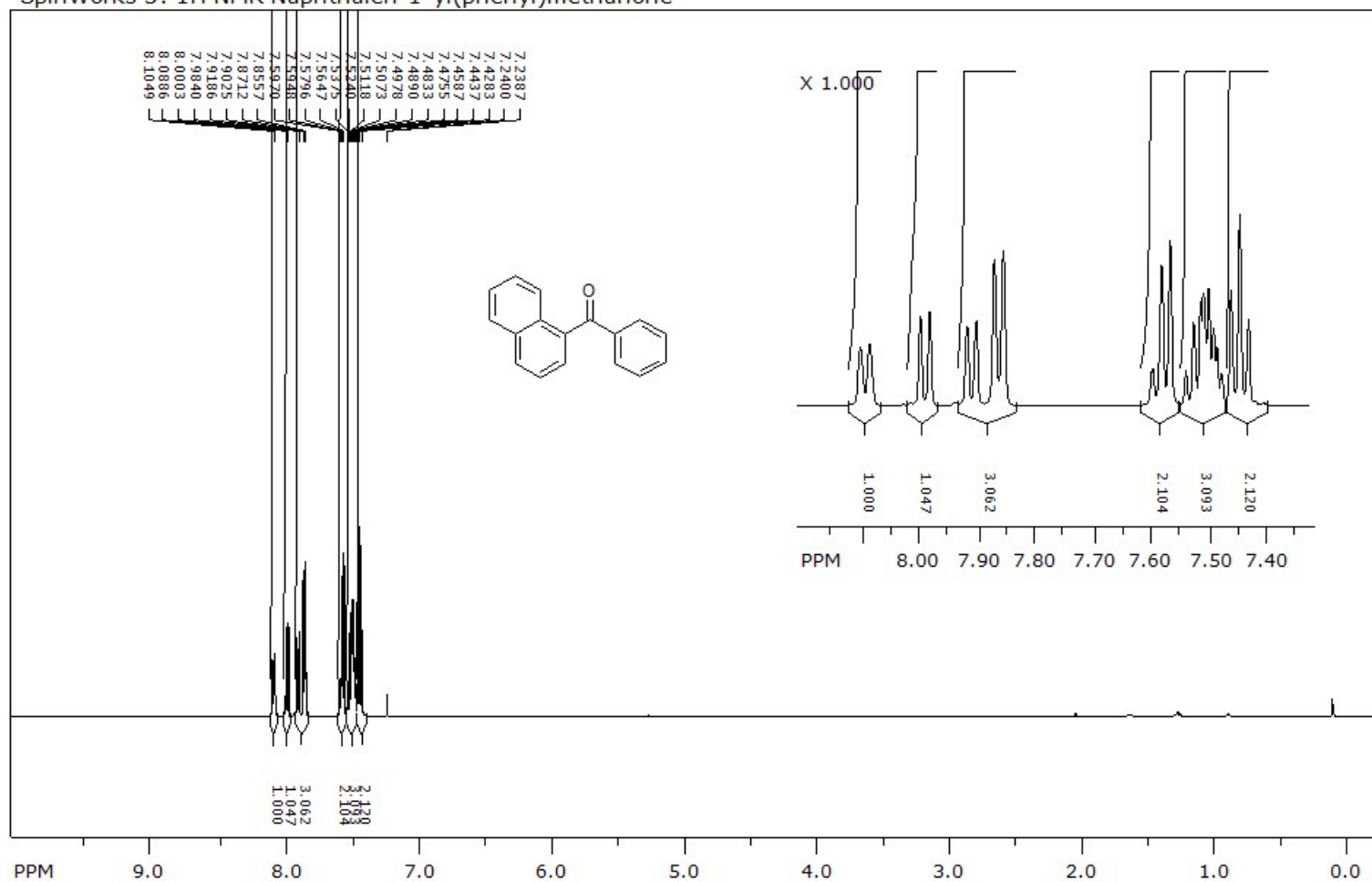
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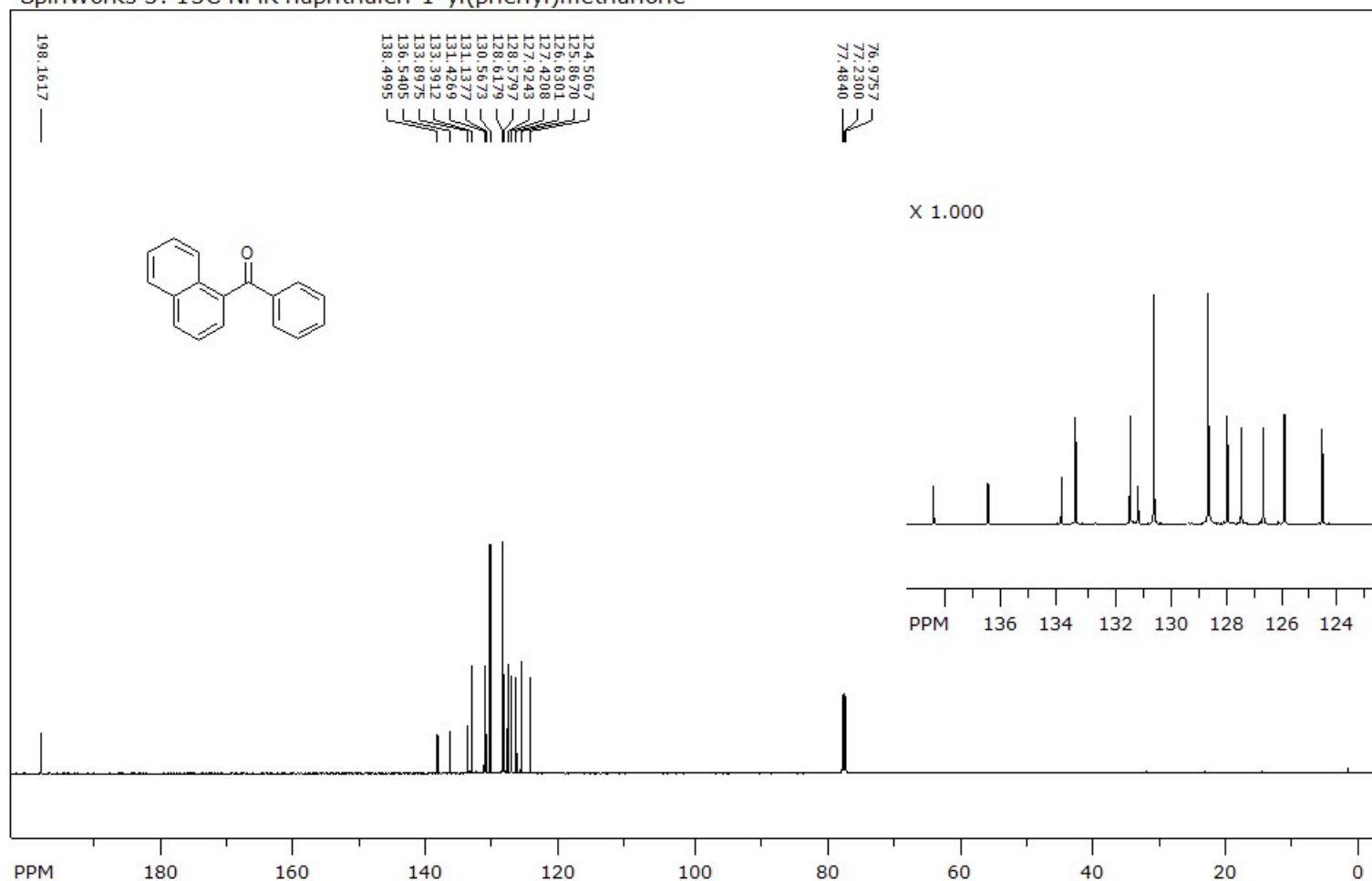
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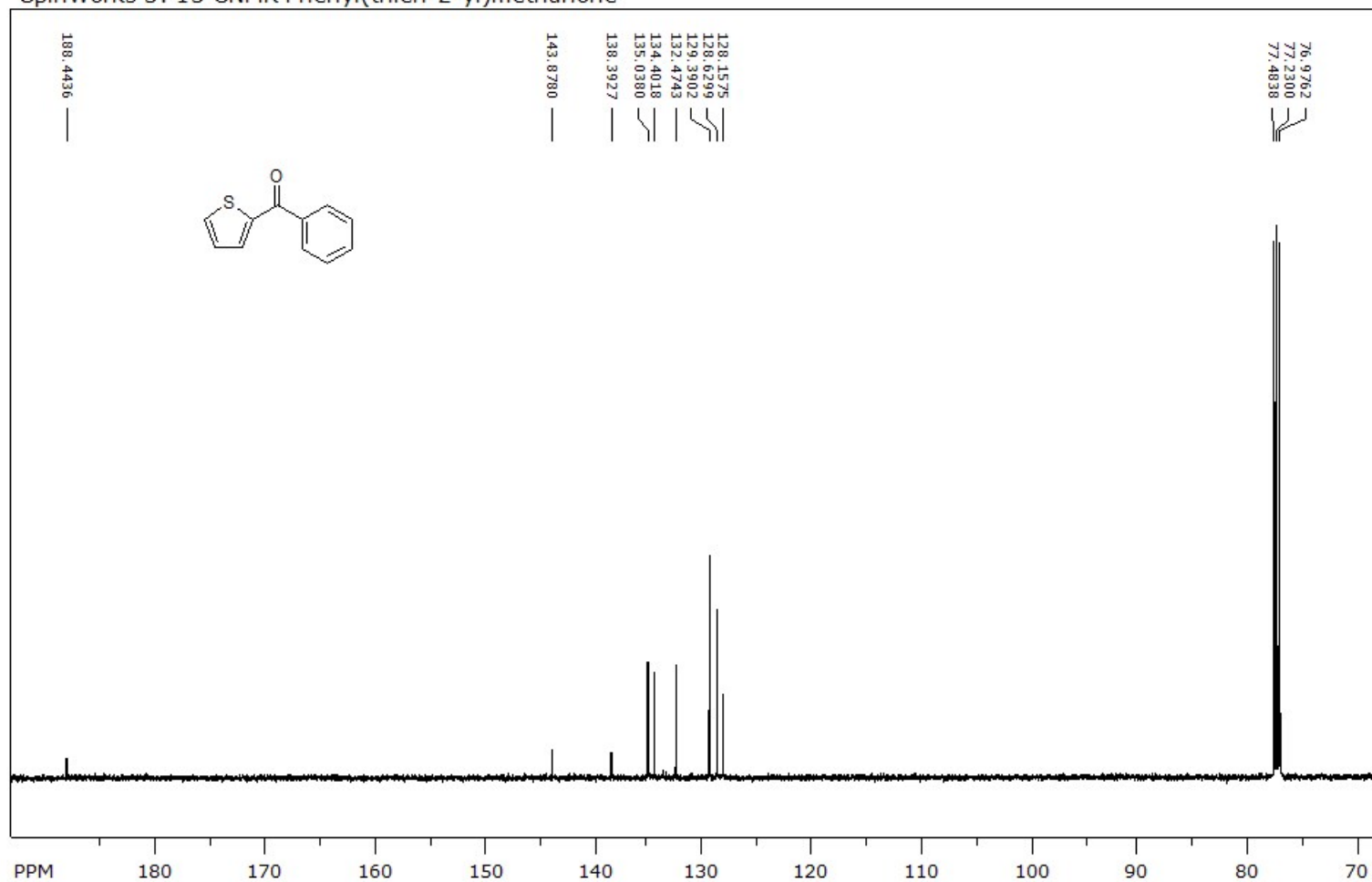
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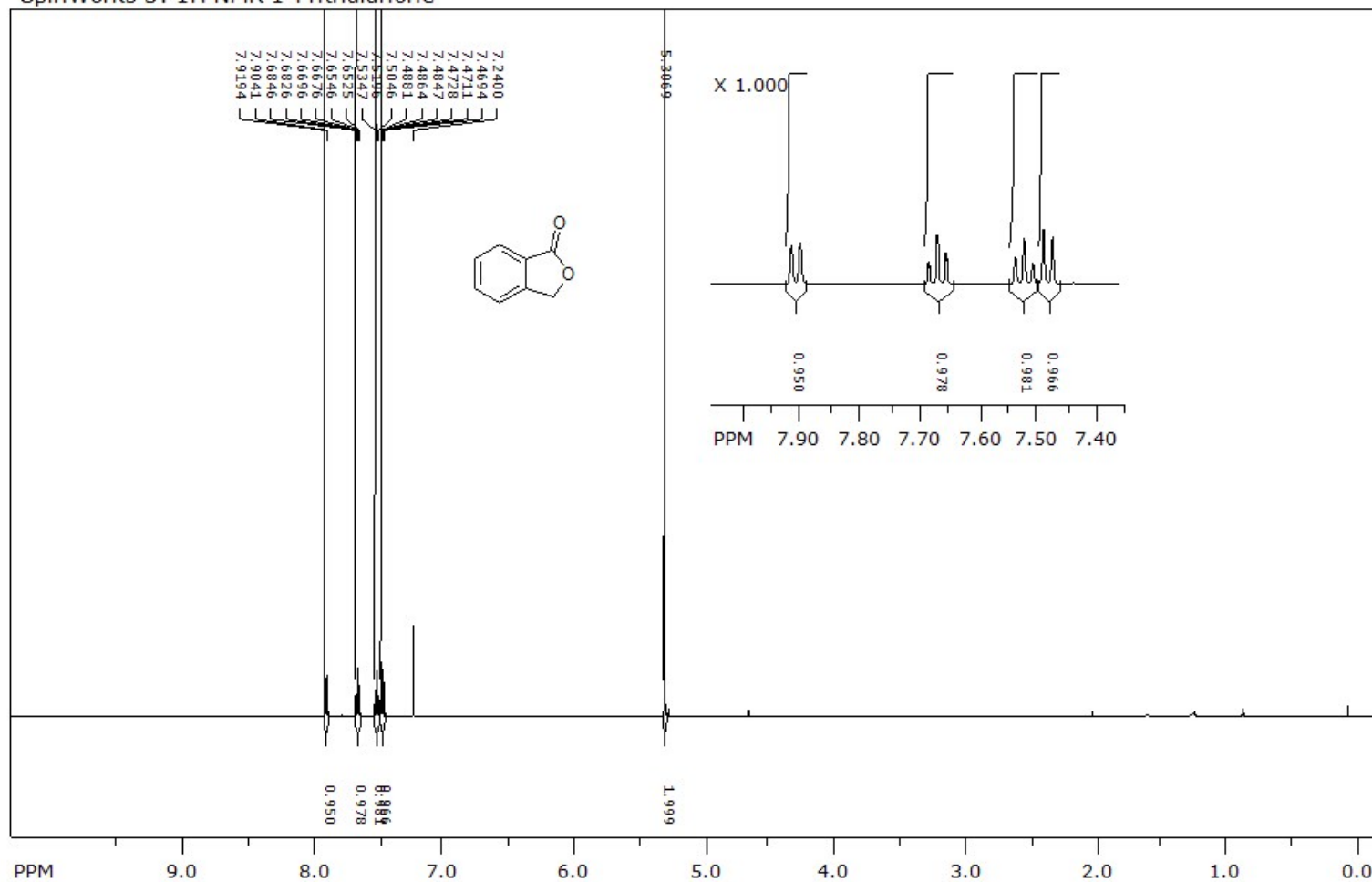
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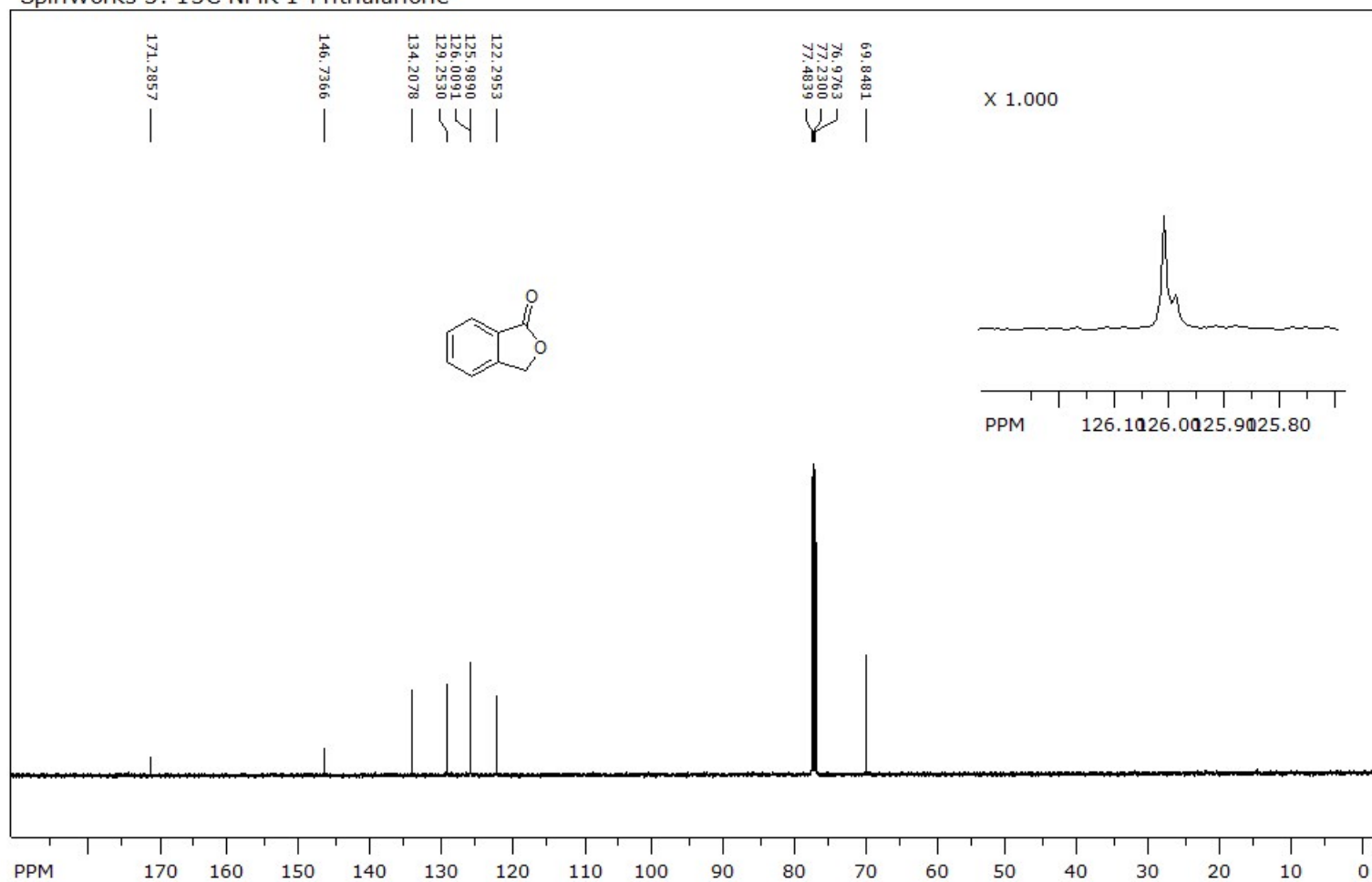
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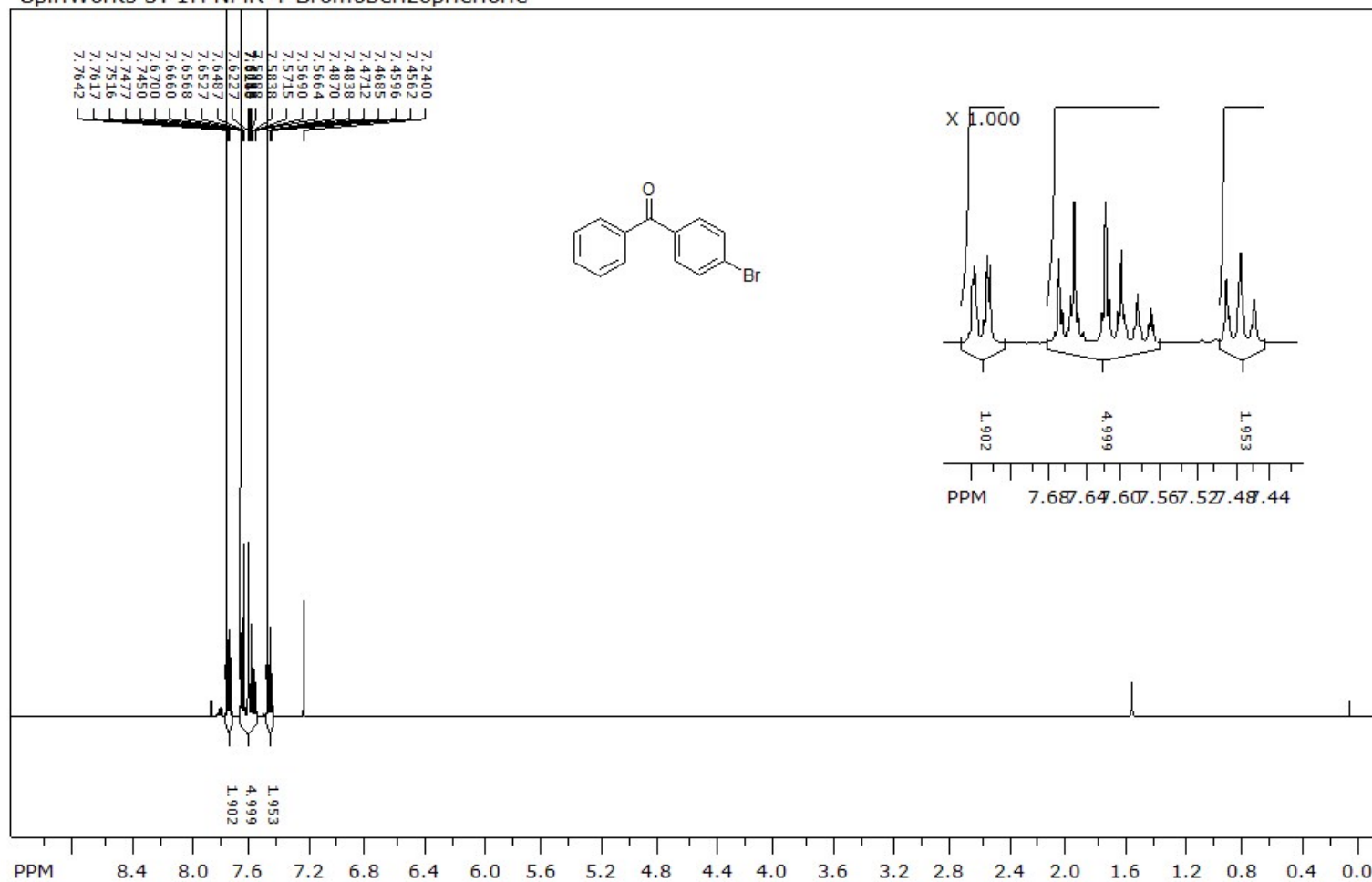
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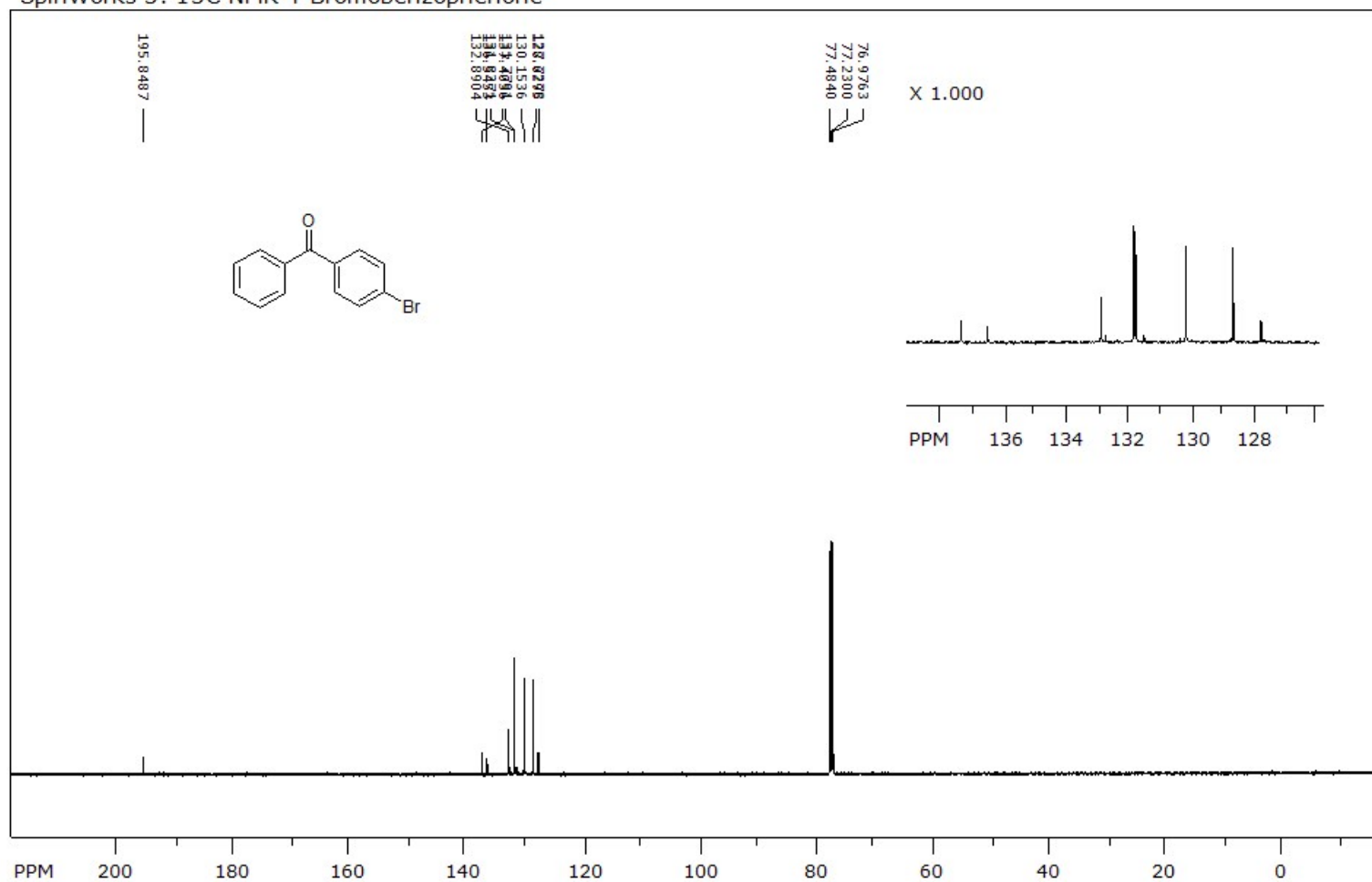
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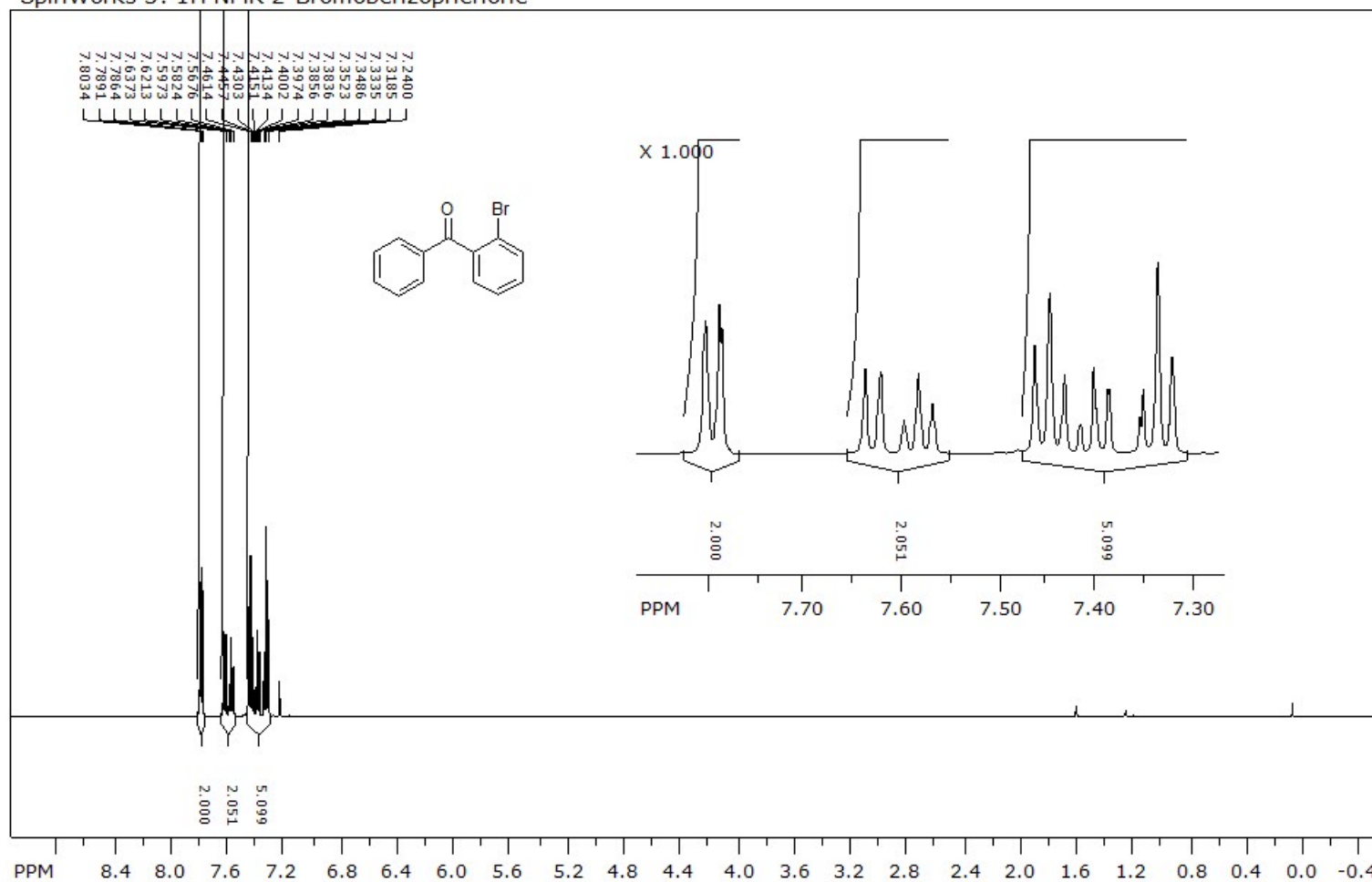
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 processed size: 32768 complex points
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 Hz/cm: 1190.476 ppm/cm: 9.46547

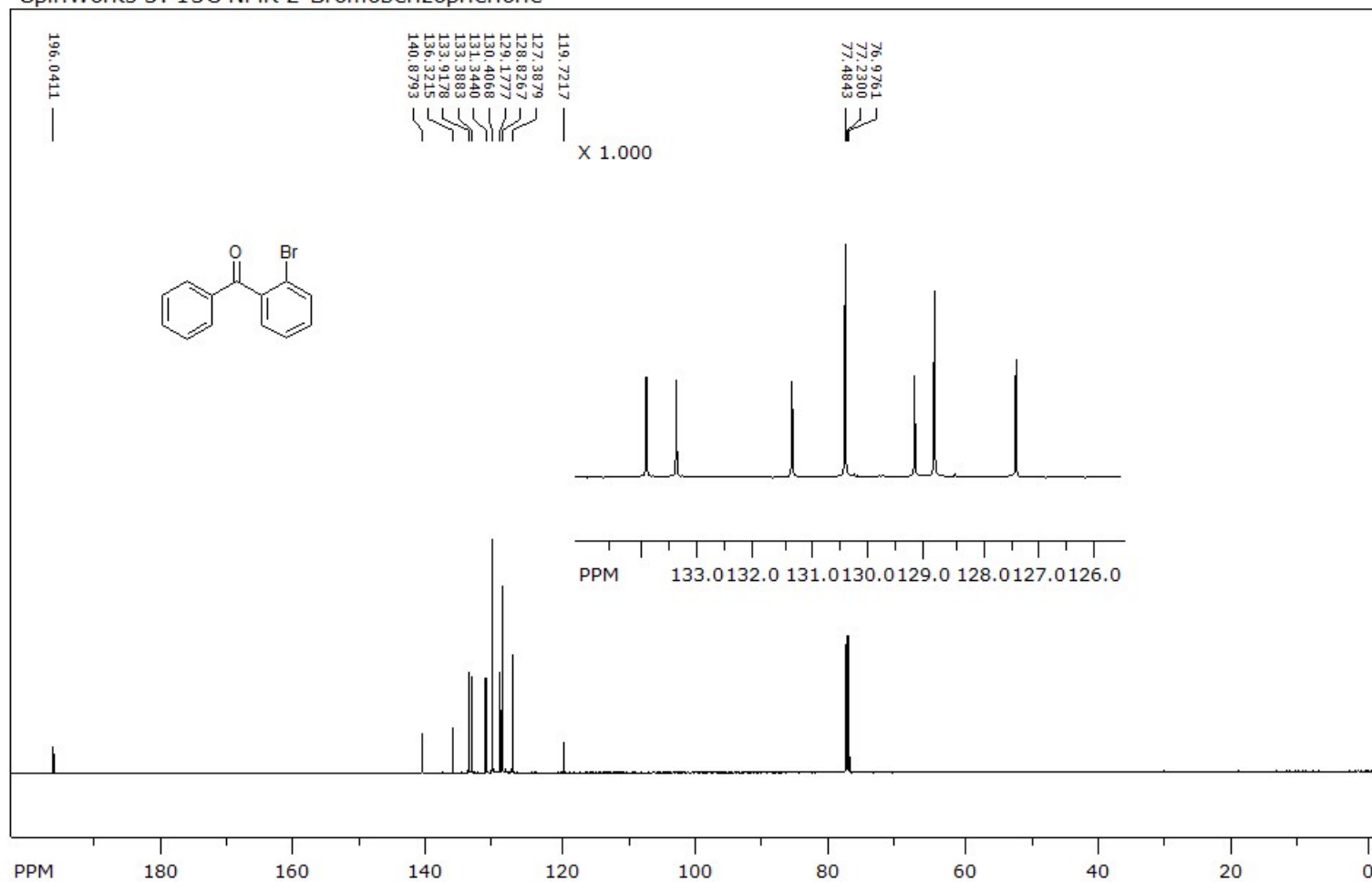
SpinWorks 3: 1H NMR 2-Bromobenzophenone



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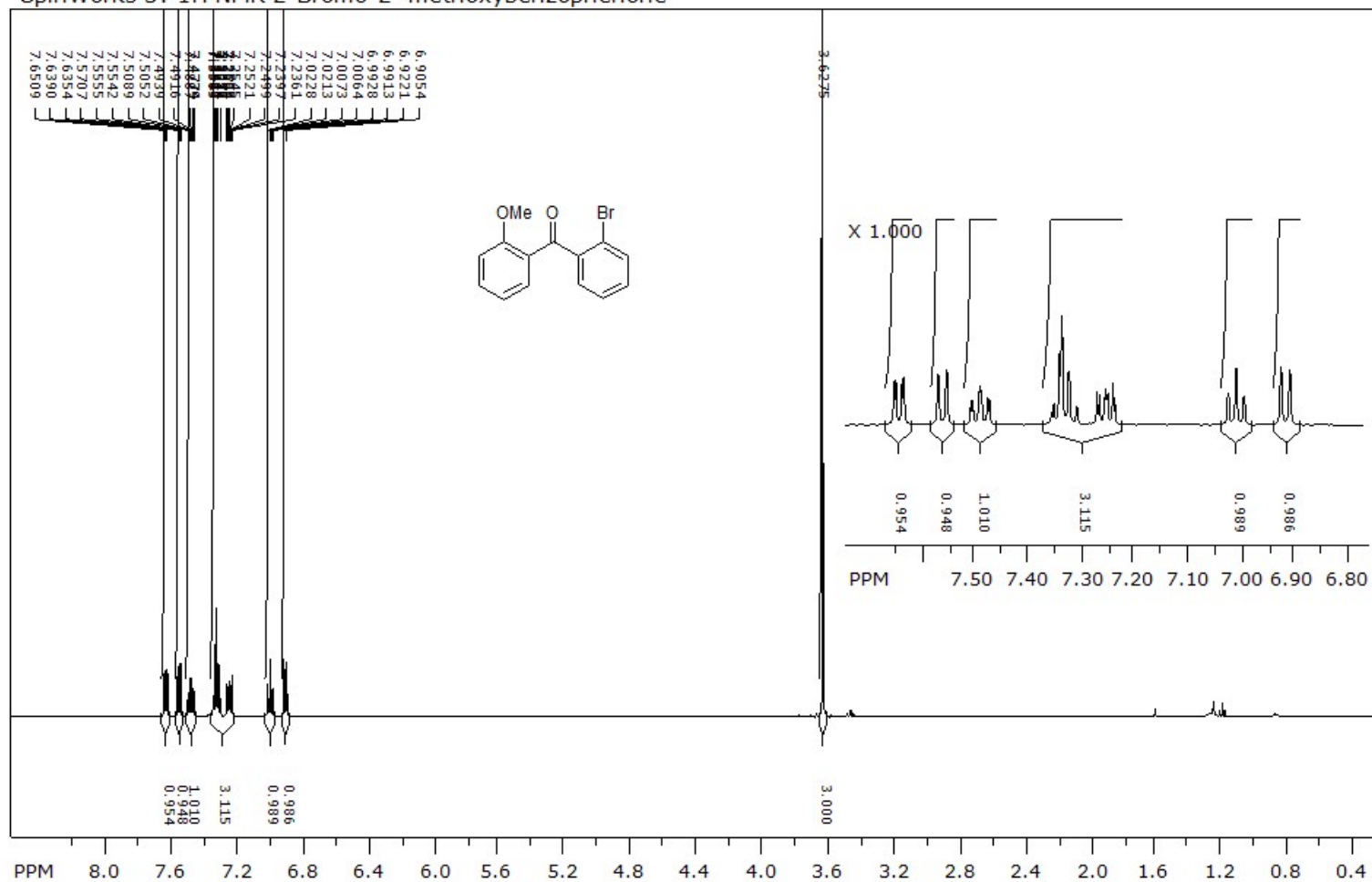
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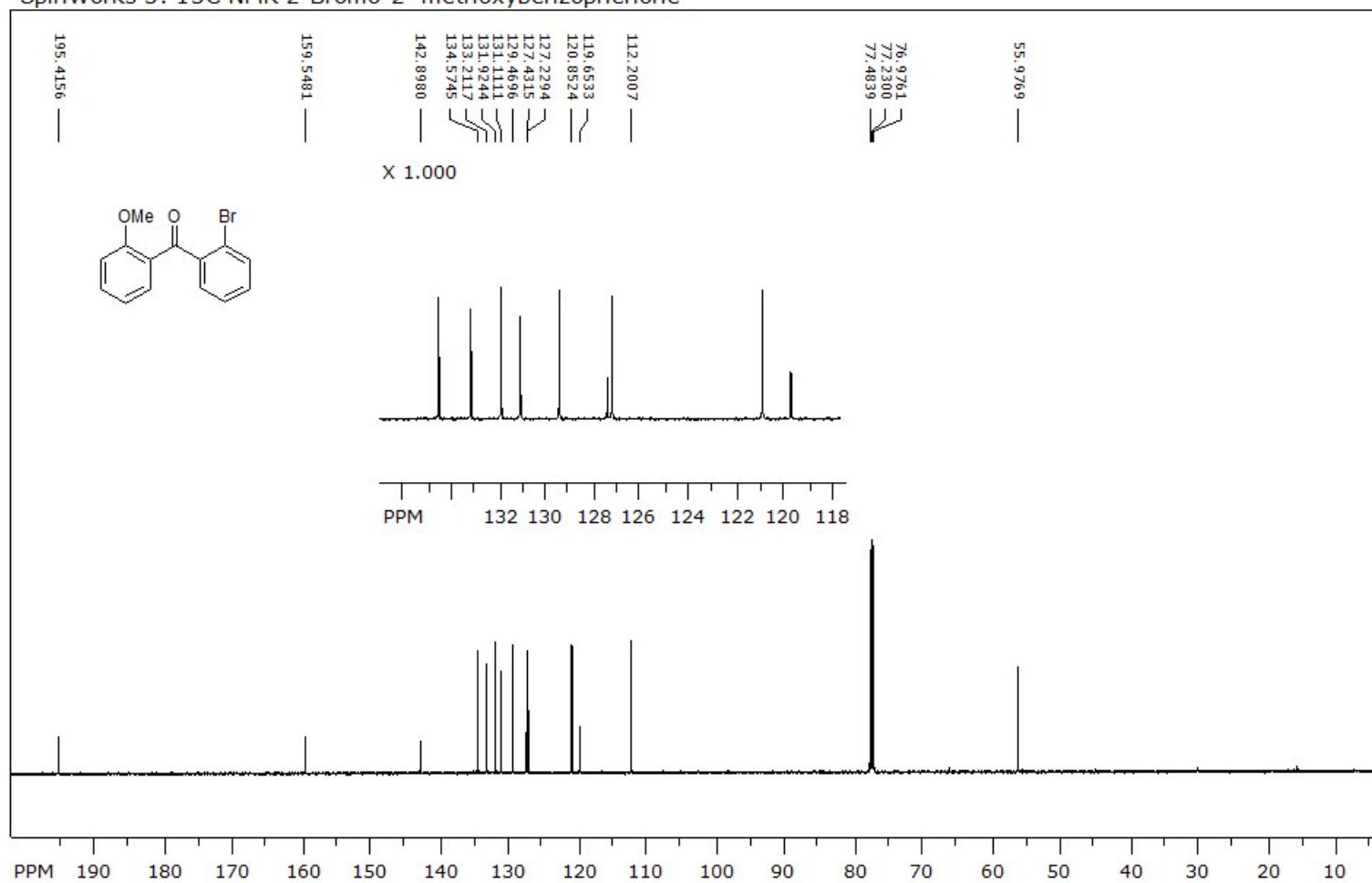
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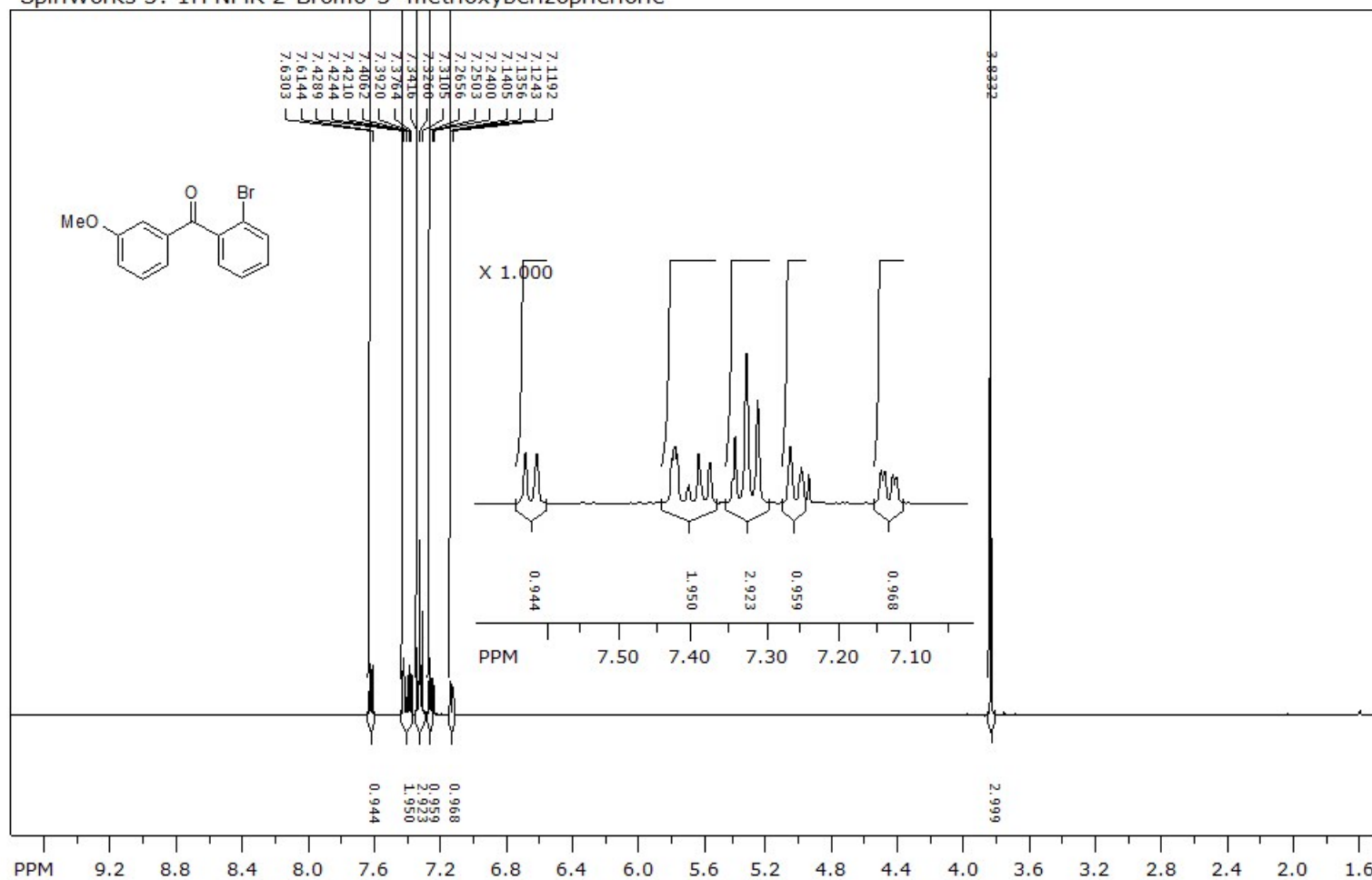
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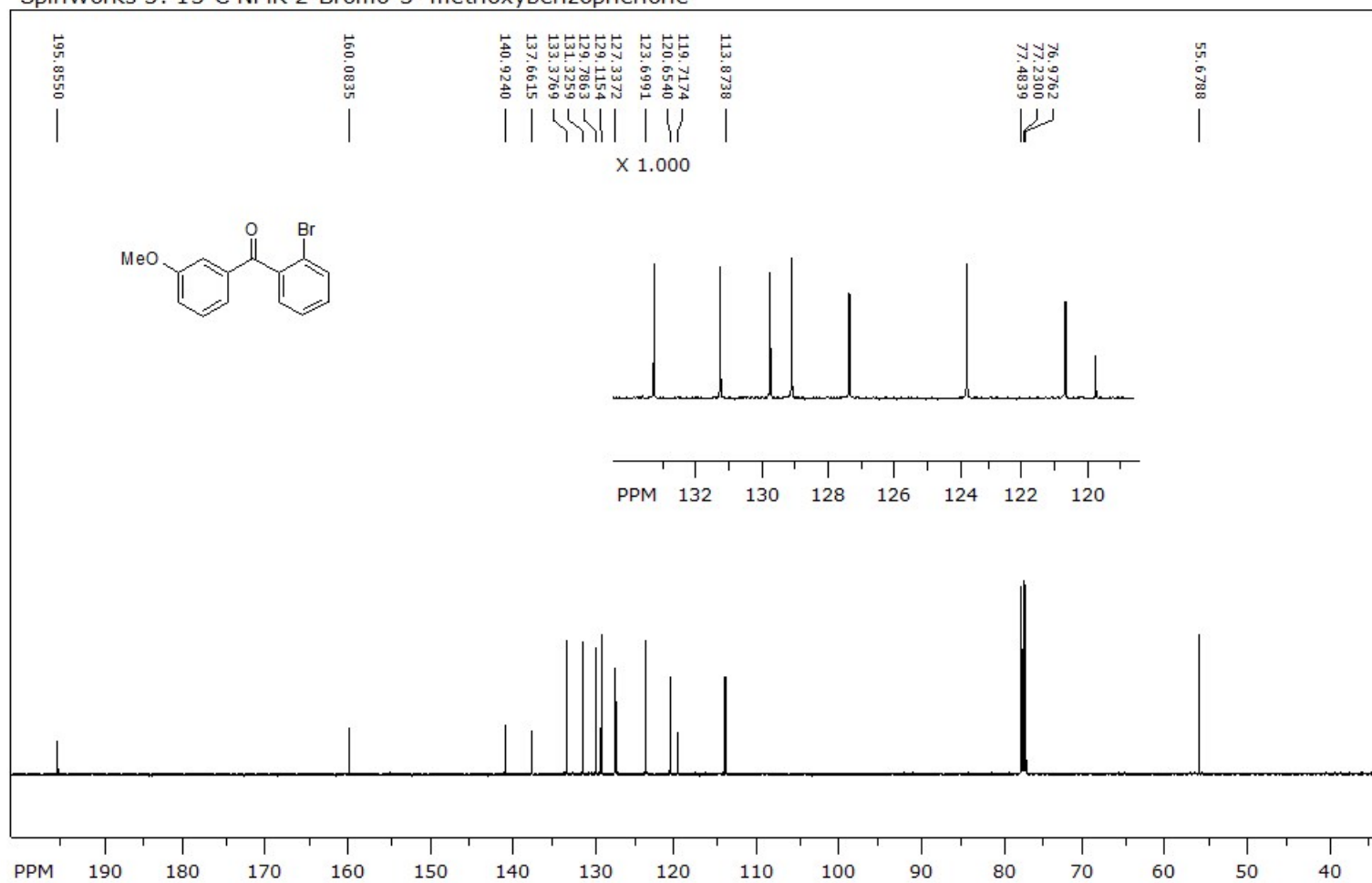
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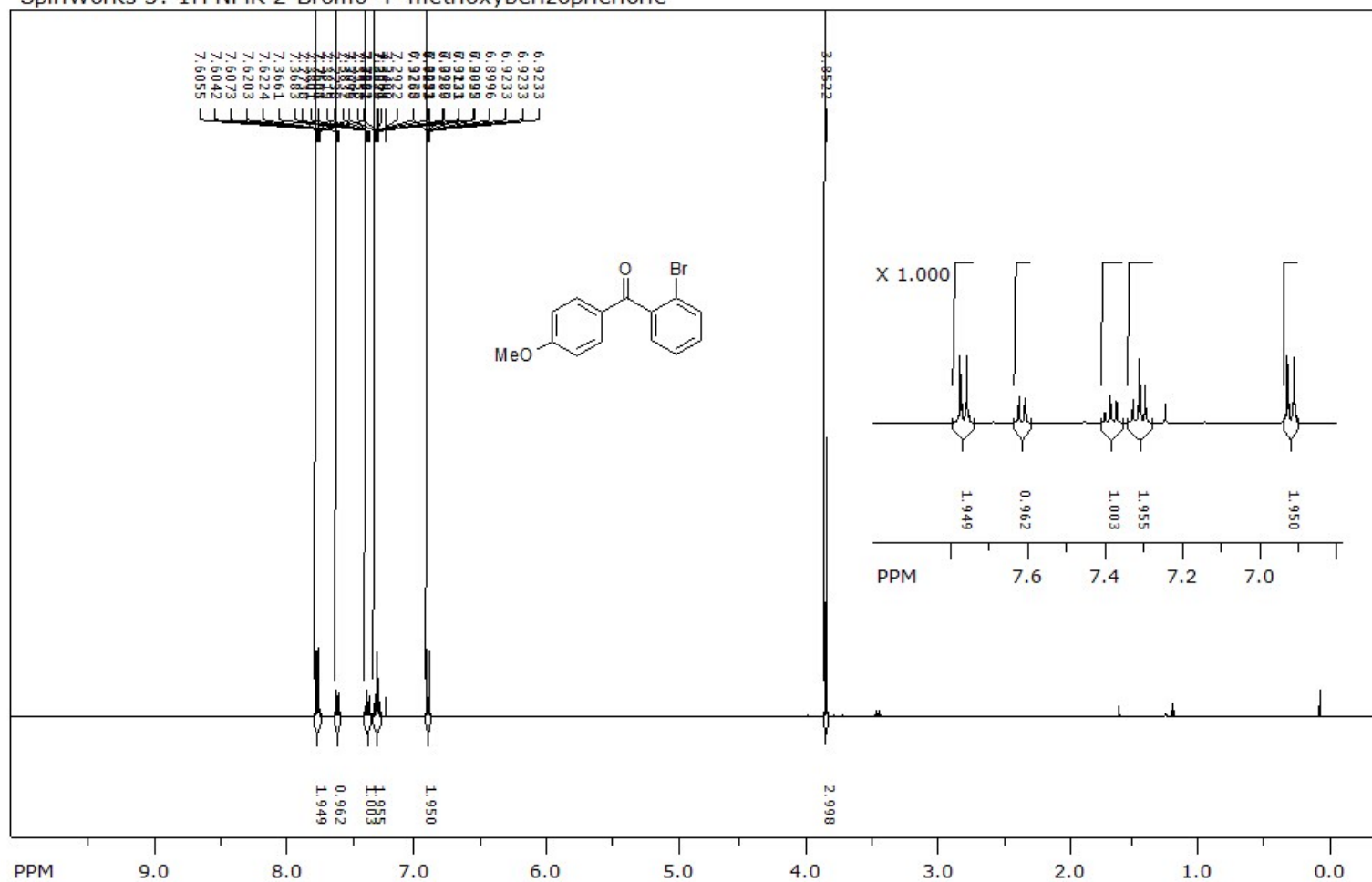
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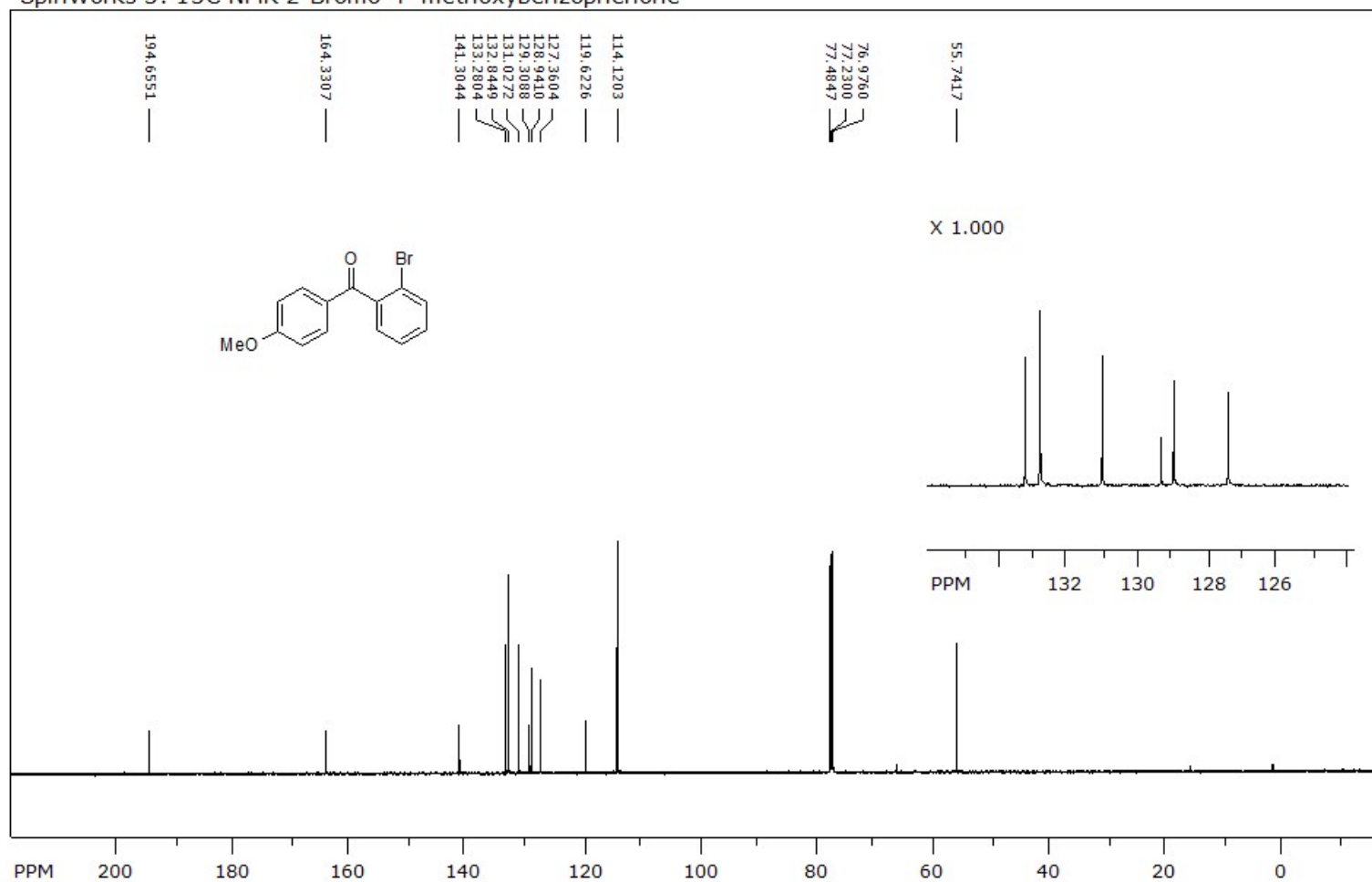
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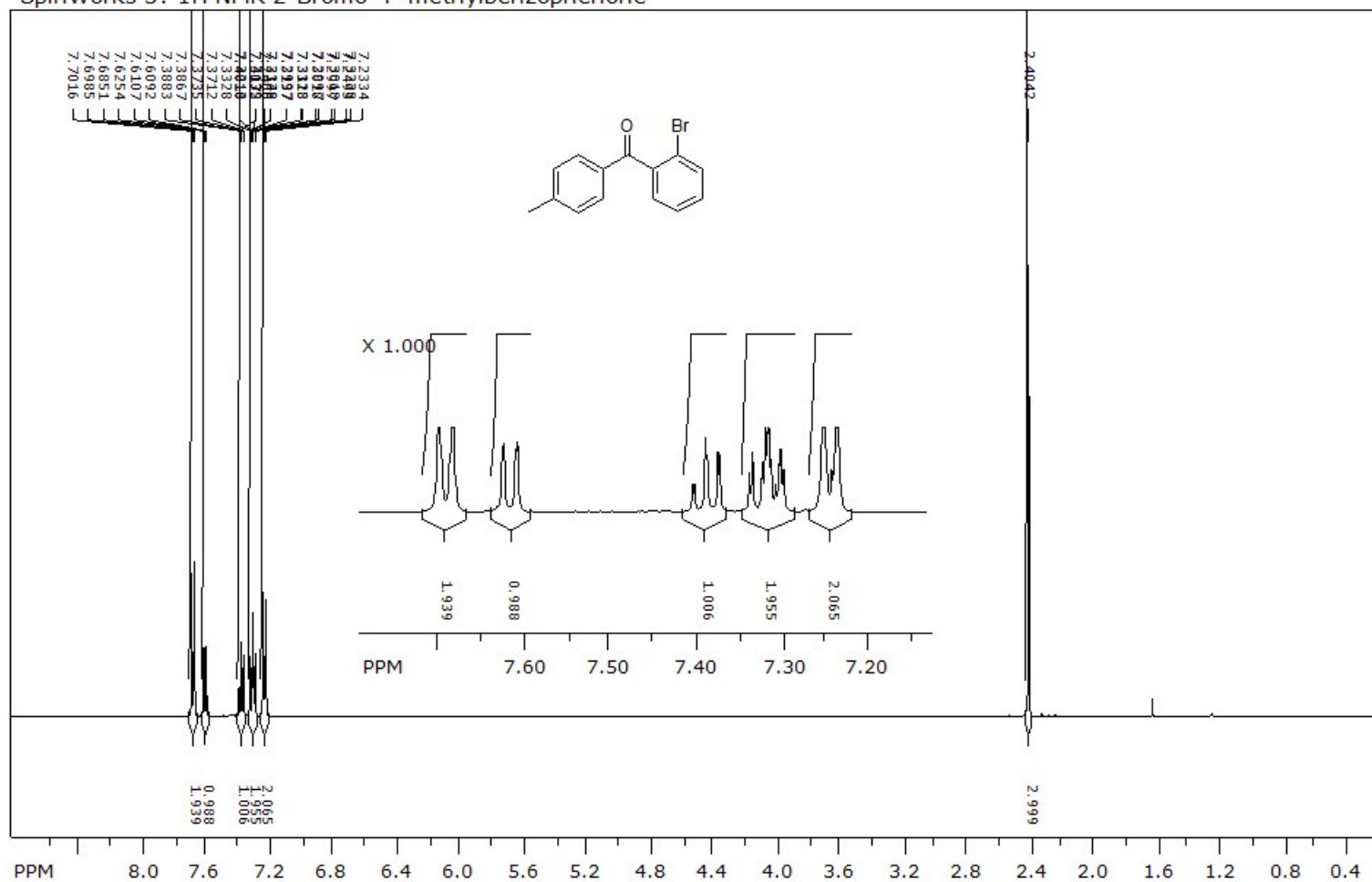
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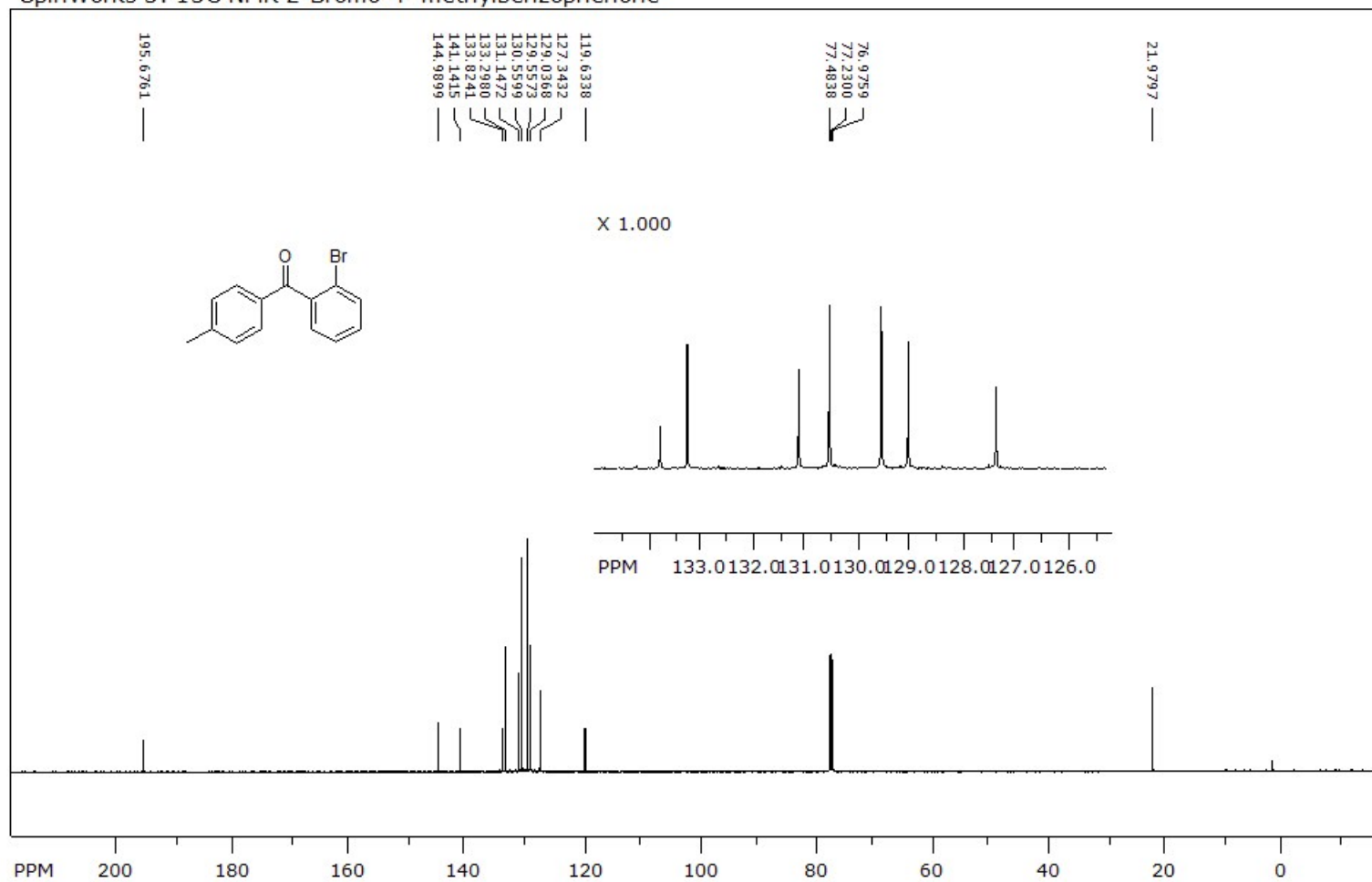
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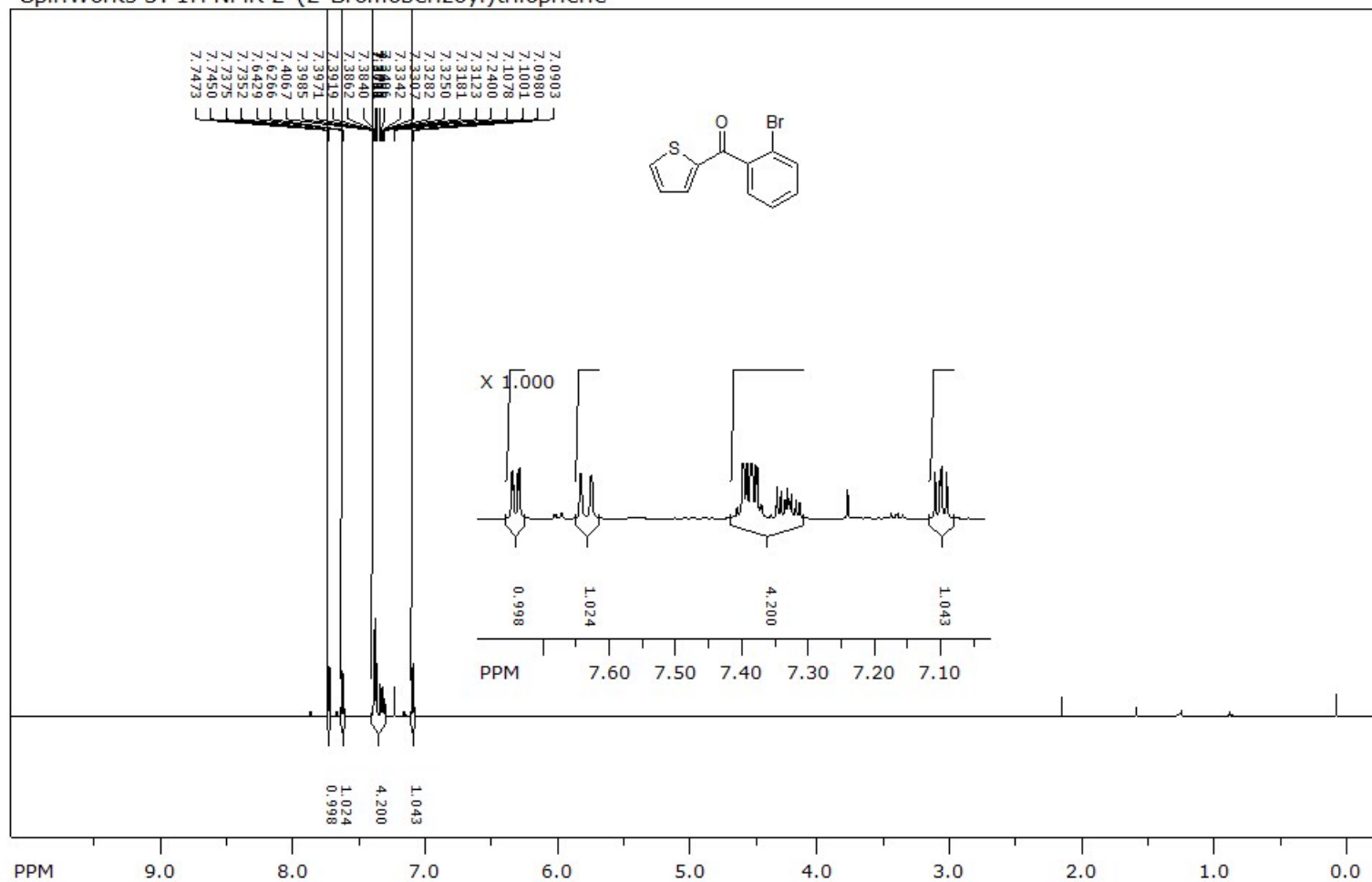
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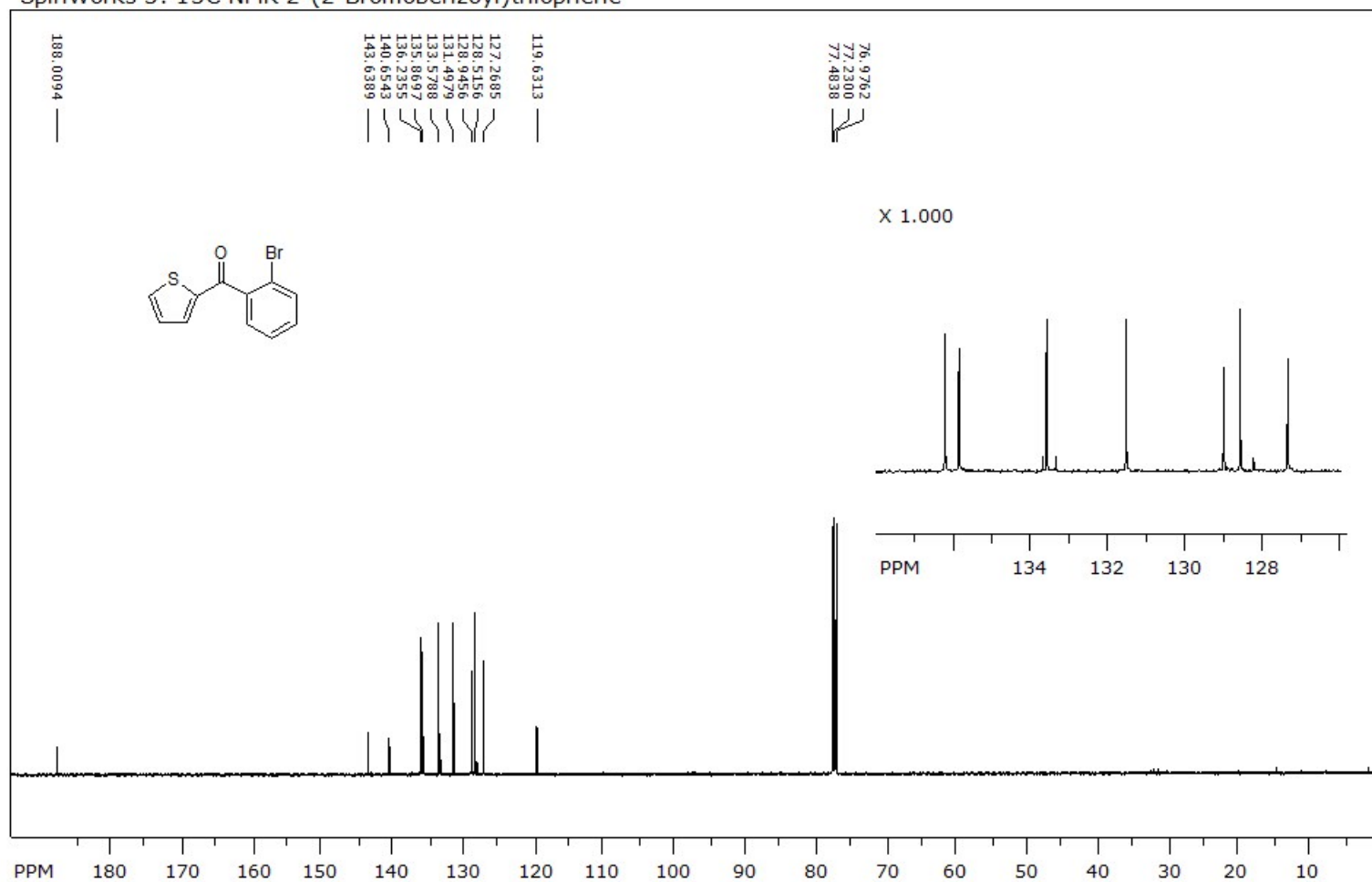
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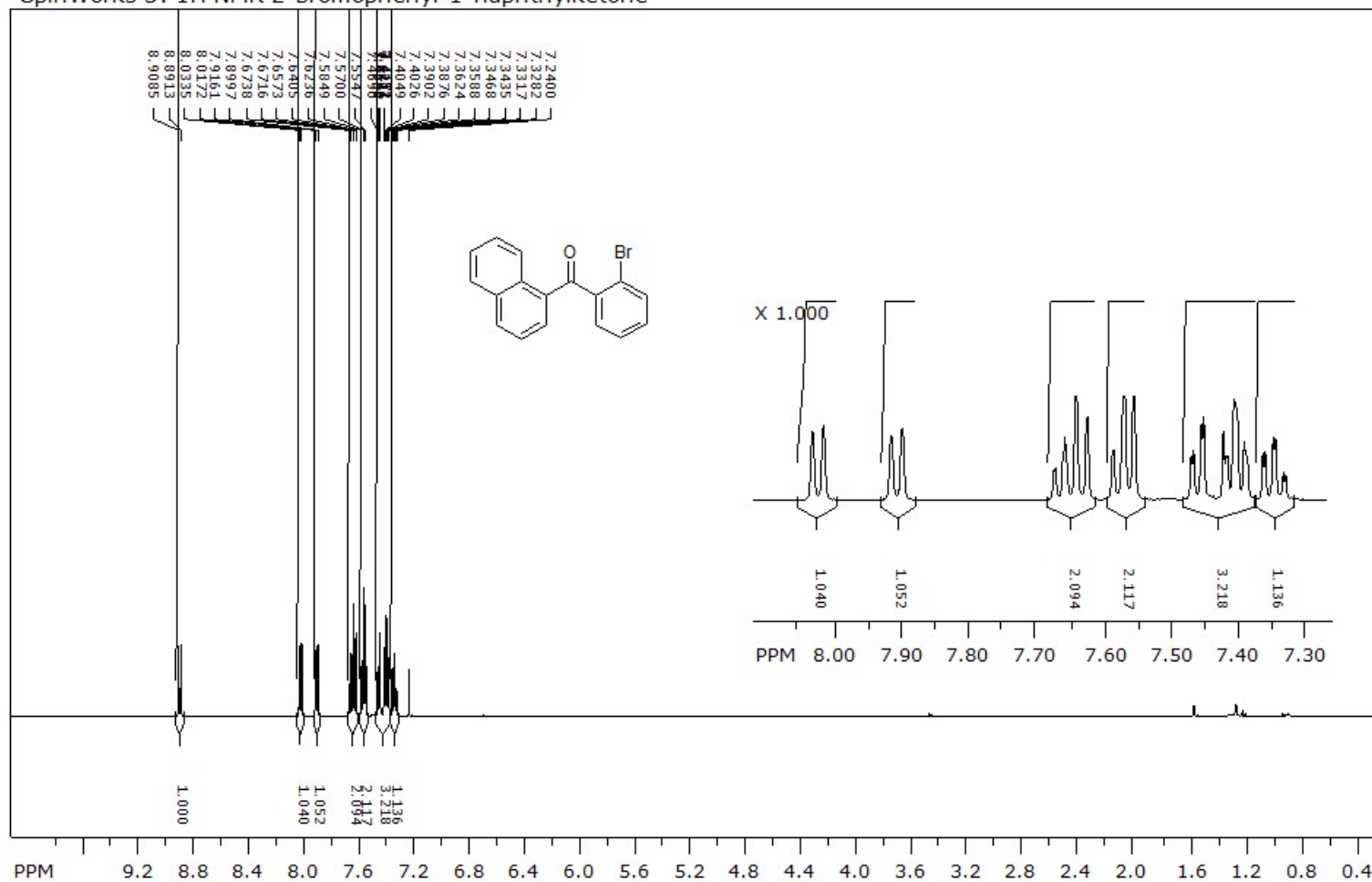
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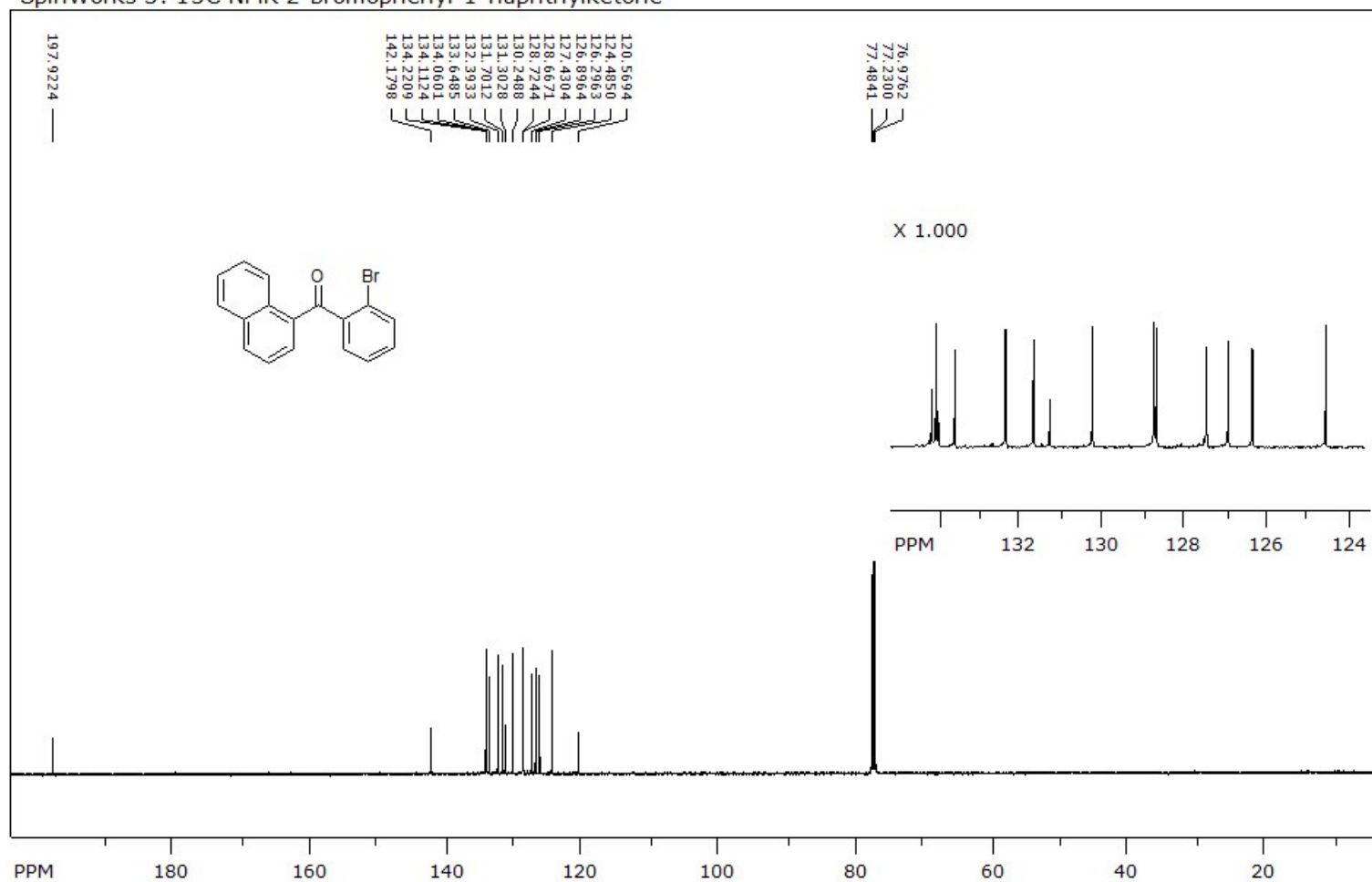
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 LB: 0.300 GF: 0.0000
 Hz/cm: 199.149 ppm/cm: 0.39819

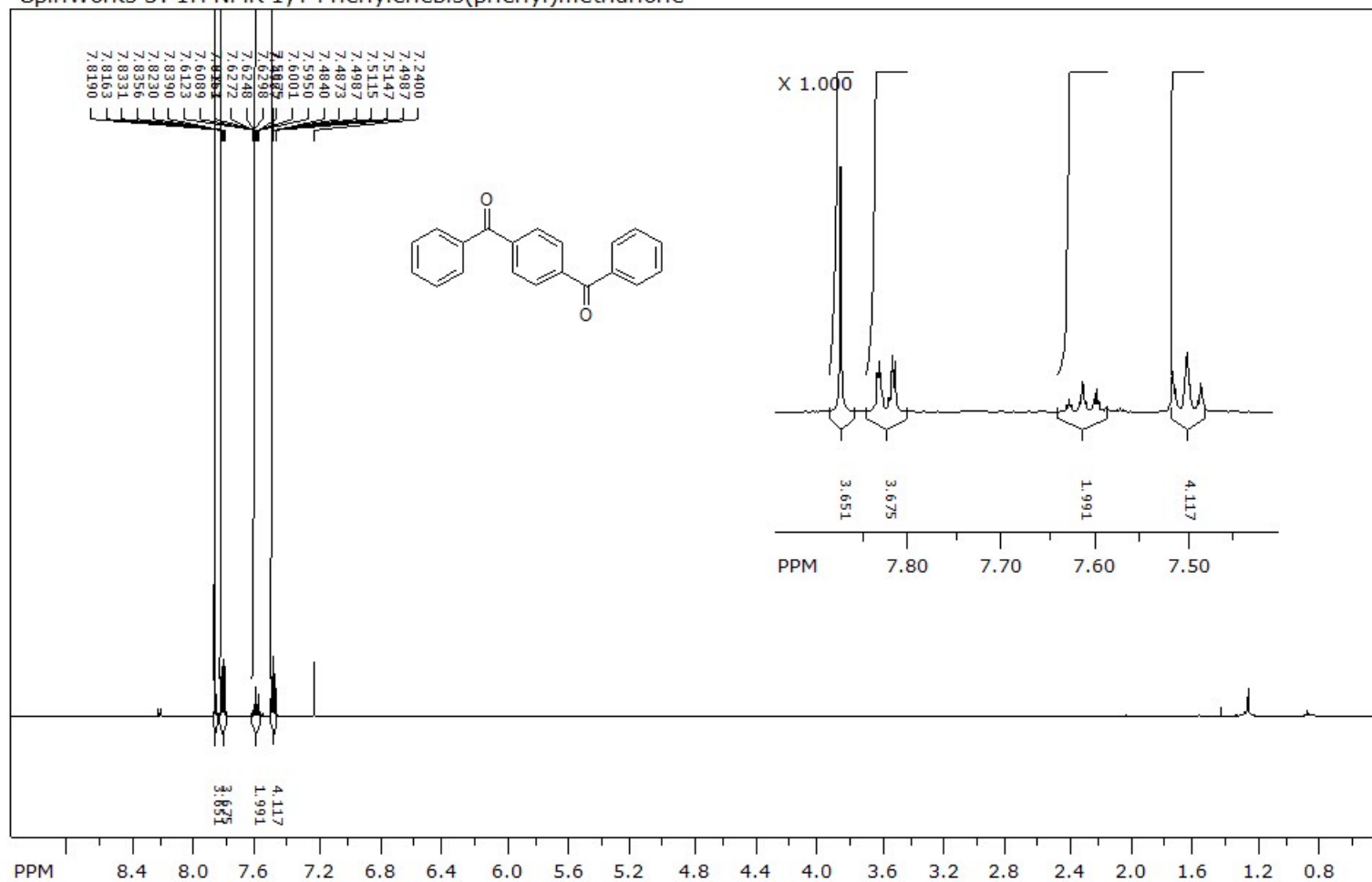
SpinWorks 3: ¹³C NMR 2-bromophenyl-1-naphthylketone



file: ...Users\Przemek\Desktop\MM66-1\2\fid exp: <zggp30>
 transmitter freq.: 125.770364 MHz
 time domain size: 65536 points
 width: 29761.90 Hz = 236.6369 ppm = 0.454131 Hz/pt
 number of scans: 1024

freq. of 0 ppm: 125.757765 MHz
 processed size: 32768 complex points
 LB: 1.000 GF: 0.0000
 Hz/cm: 1016.211 ppm/cm: 8.07989

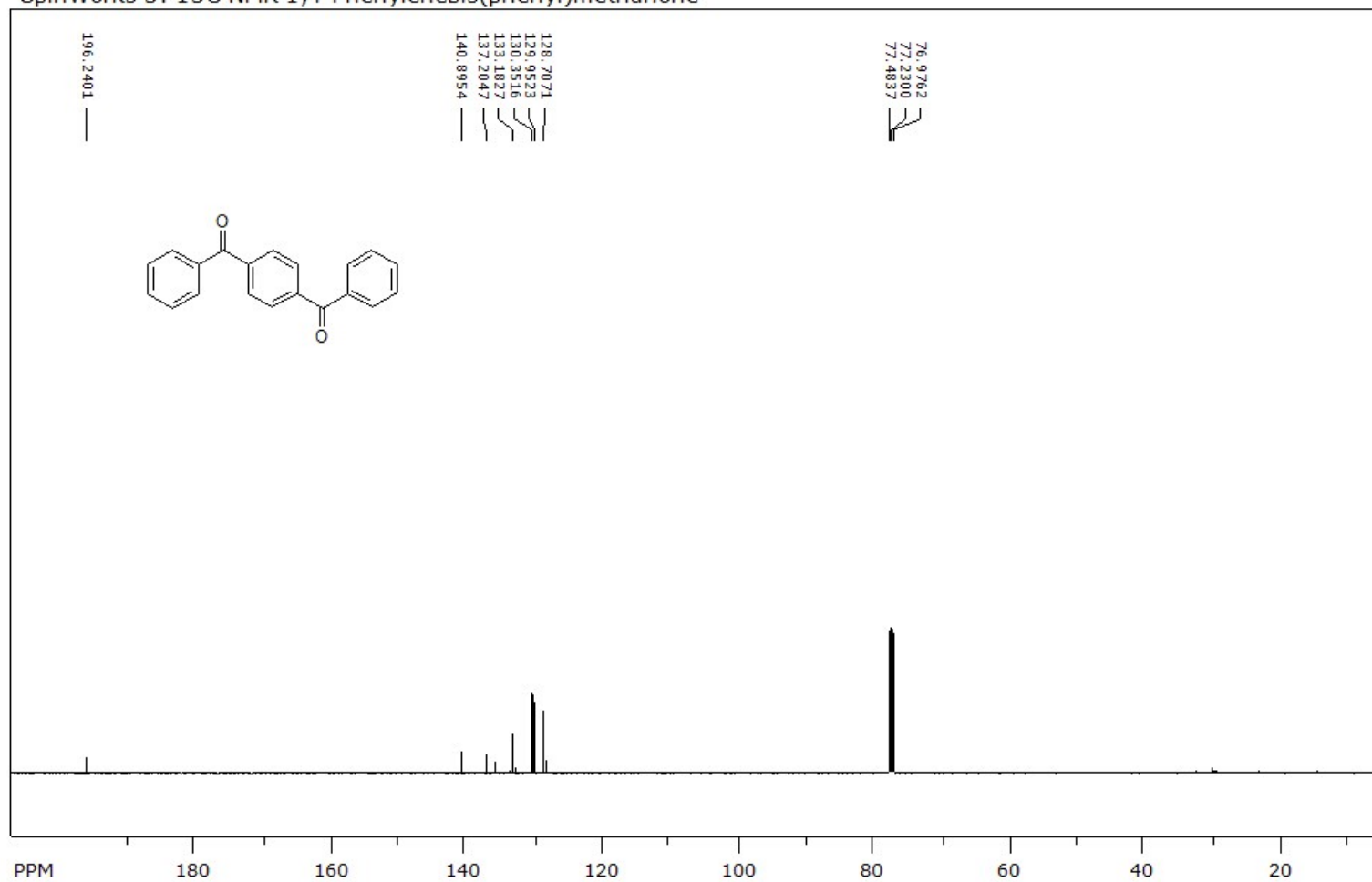
SpinWorks 3: 1H NMR 1,4-Phenylenebis(phenyl)methanone



file: ...tów\Diarylowe ketony\PW8R728\1\fid exp: <zg30>
 transmitter freq.: 500.133751 MHz
 time domain size: 65536 points
 width: 12500.00 Hz = 24.9933 ppm = 0.190735 Hz/pt
 number of scans: 16

freq. of 0 ppm: 500.130024 MHz
 processed size: 65536 complex points
 LB: 0.300 GF: 0.0000
 Hz/cm: 176.596 ppm/cm: 0.35310

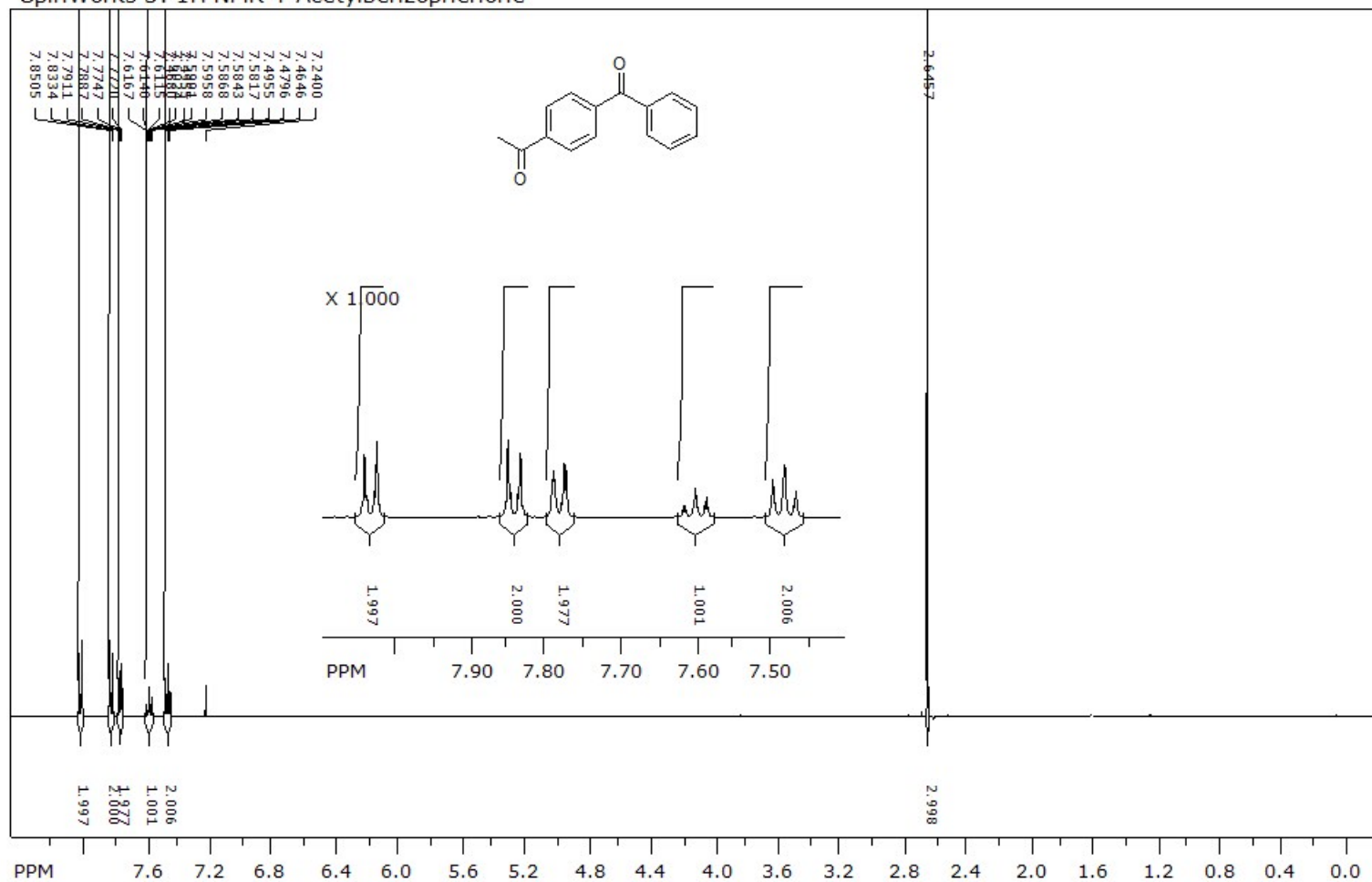
SpinWorks 3: ¹³C NMR 1,4-Phenylenebis(phenyl)methanone



file: ...henylenebis(phenylmethanone)\2\fid exp: <zggg30>
 transmitter freq.: 125.770364 MHz
 time domain size: 65536 points
 width: 29761.90 Hz = 236.6369 ppm = 0.454131 Hz/pt
 number of scans: 2560

freq. of 0 ppm: 125.757762 MHz
 processed size: 32768 complex points
 LB: 1.000 GF: 0.0000
 Hz/cm: 1022.290 ppm/cm: 8.12822

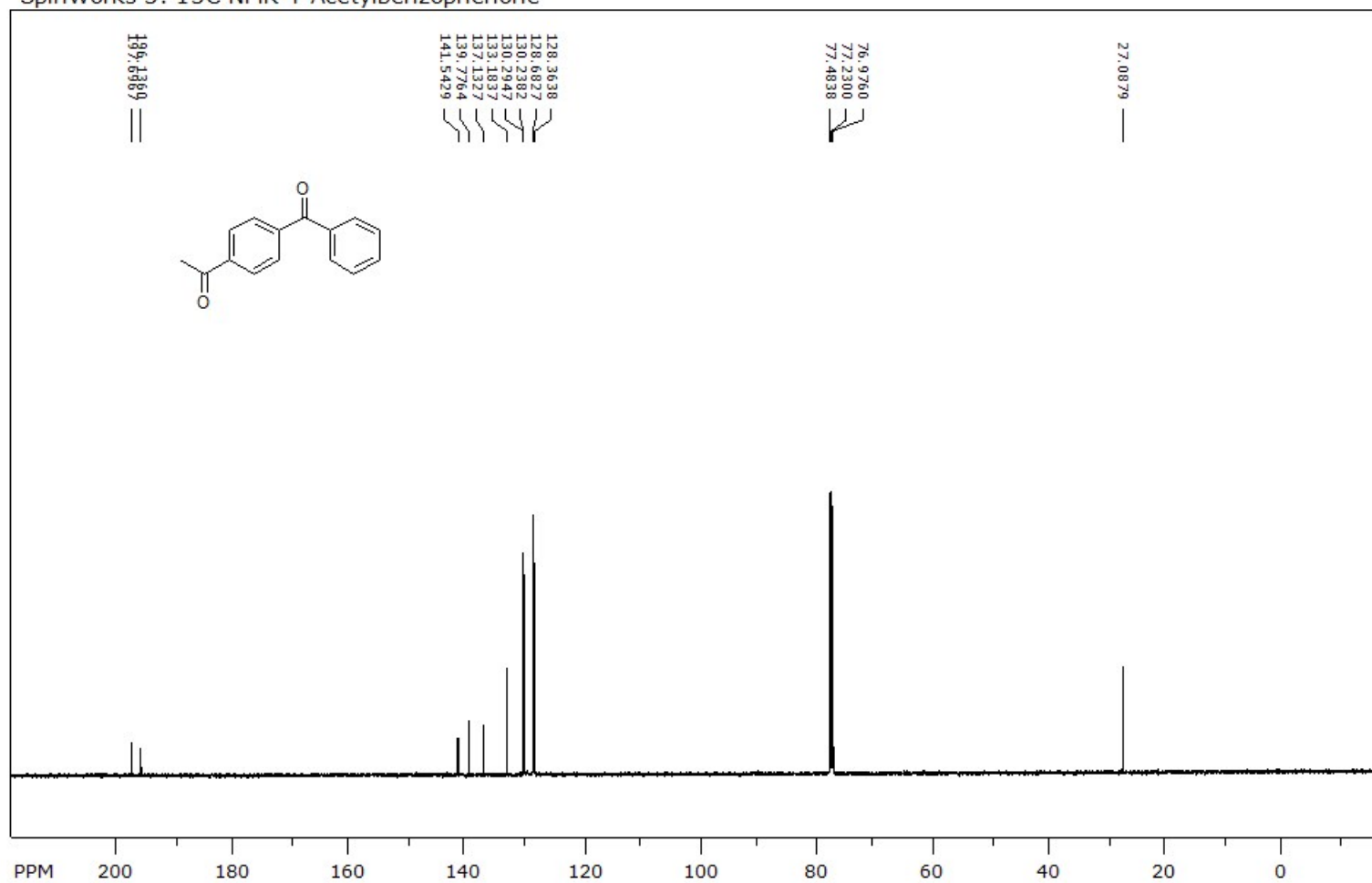
SpinWorks 3: 1H NMR 4-Acetylbenzophenone



file: ...sers\Przemek\Desktop\PW6049B\1\fid exp: <zg30>
 transmitter freq.: 500.133751 MHz
 time domain size: 65536 points
 width: 12500.00 Hz = 24.9933 ppm = 0.190735 Hz/pt
 number of scans: 16

freq. of 0 ppm: 500.130024 MHz
 processed size: 65536 complex points
 LB: 0.300 GF: 0.0000
 Hz/cm: 174.898 ppm/cm: 0.34970

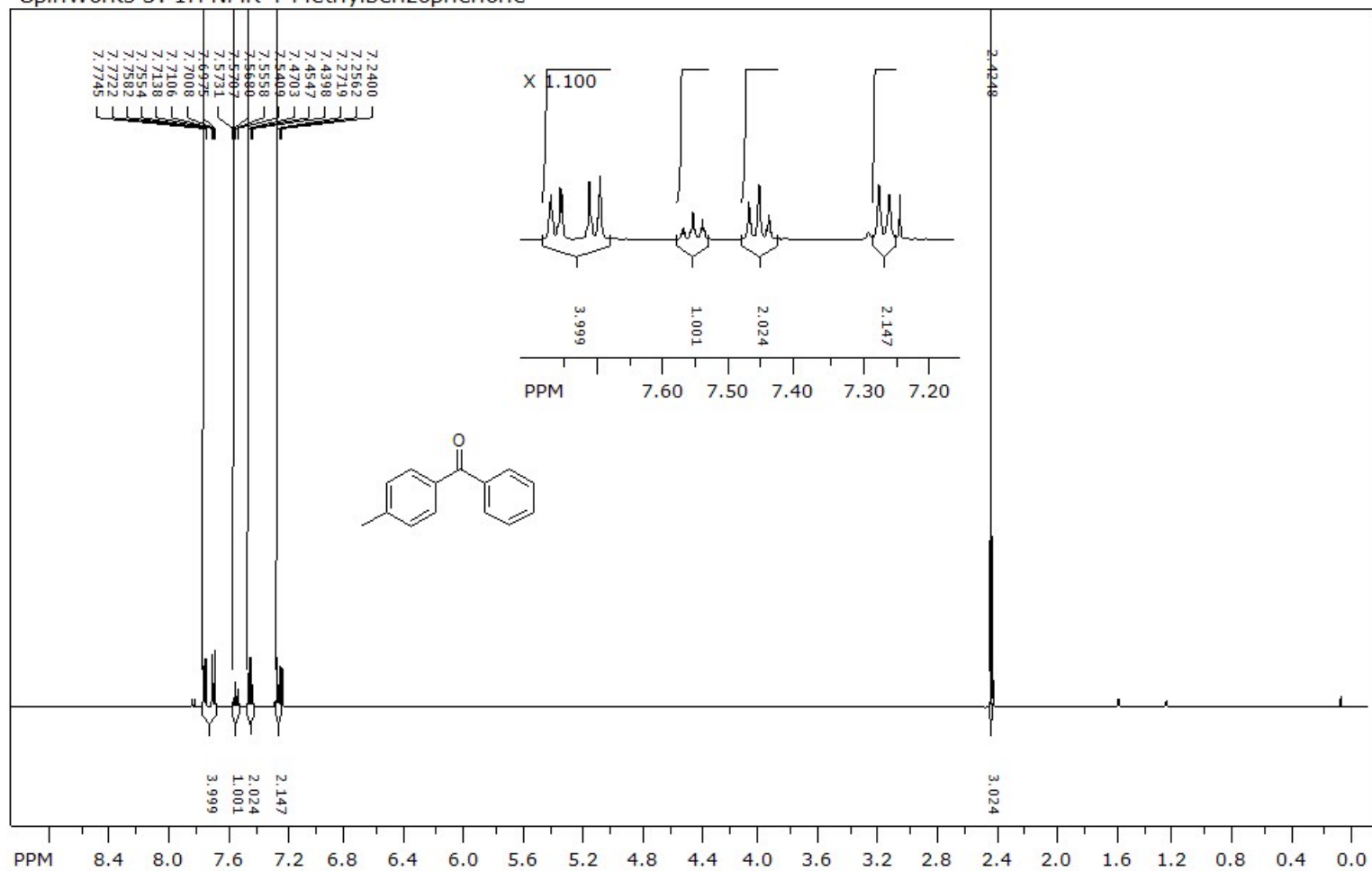
SpinWorks 3: ¹³C NMR 4-Acetylbenzophenone



file: ...sers\Przemek\Desktop\PW6049B\2\fid exp: <zggp30>
 transmitter freq.: 125.770364 MHz
 time domain size: 65536 points
 width: 29761.90 Hz = 236.6369 ppm = 0.454131 Hz/pt
 number of scans: 1024

freq. of 0 ppm: 125.757763 MHz
 processed size: 32768 complex points
 LB: 1.000 GF: 0.0000
 Hz/cm: 1190.476 ppm/cm: 9.46547

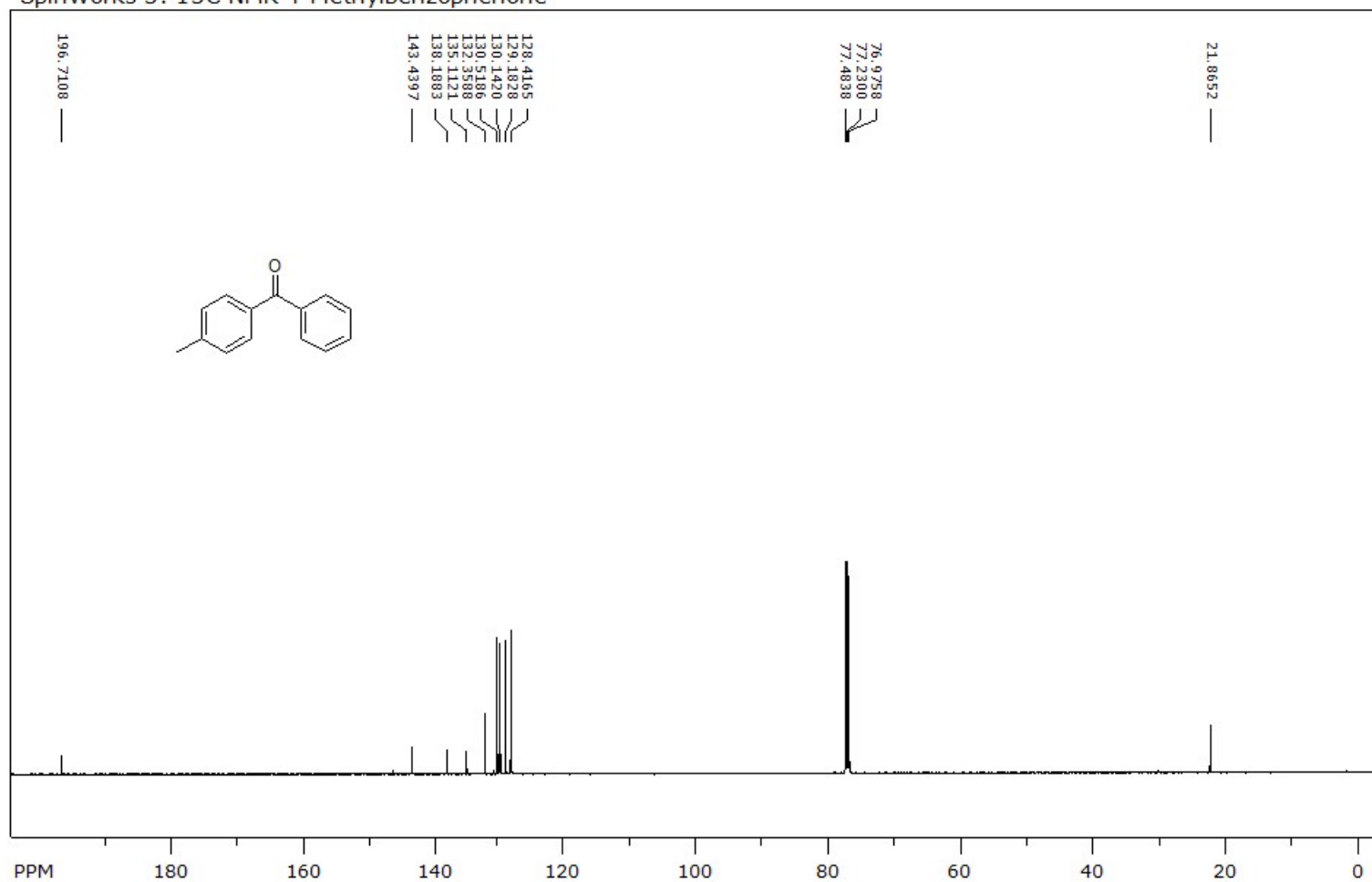
SpinWorks 3: 1H NMR 4-Methylbenzophenone



file: ...Users\Przemek\Desktop\PW6051\1\fid exp: <zg30>
 transmitter freq.: 500.133751 MHz
 time domain size: 65536 points
 width: 12500.00 Hz = 24.9933 ppm = 0.190735 Hz/pt
 number of scans: 16

freq. of 0 ppm: 500.130024 MHz
 processed size: 65536 complex points
 LB: 0.300 GF: 0.0000
 Hz/cm: 184.255 ppm/cm: 0.36841

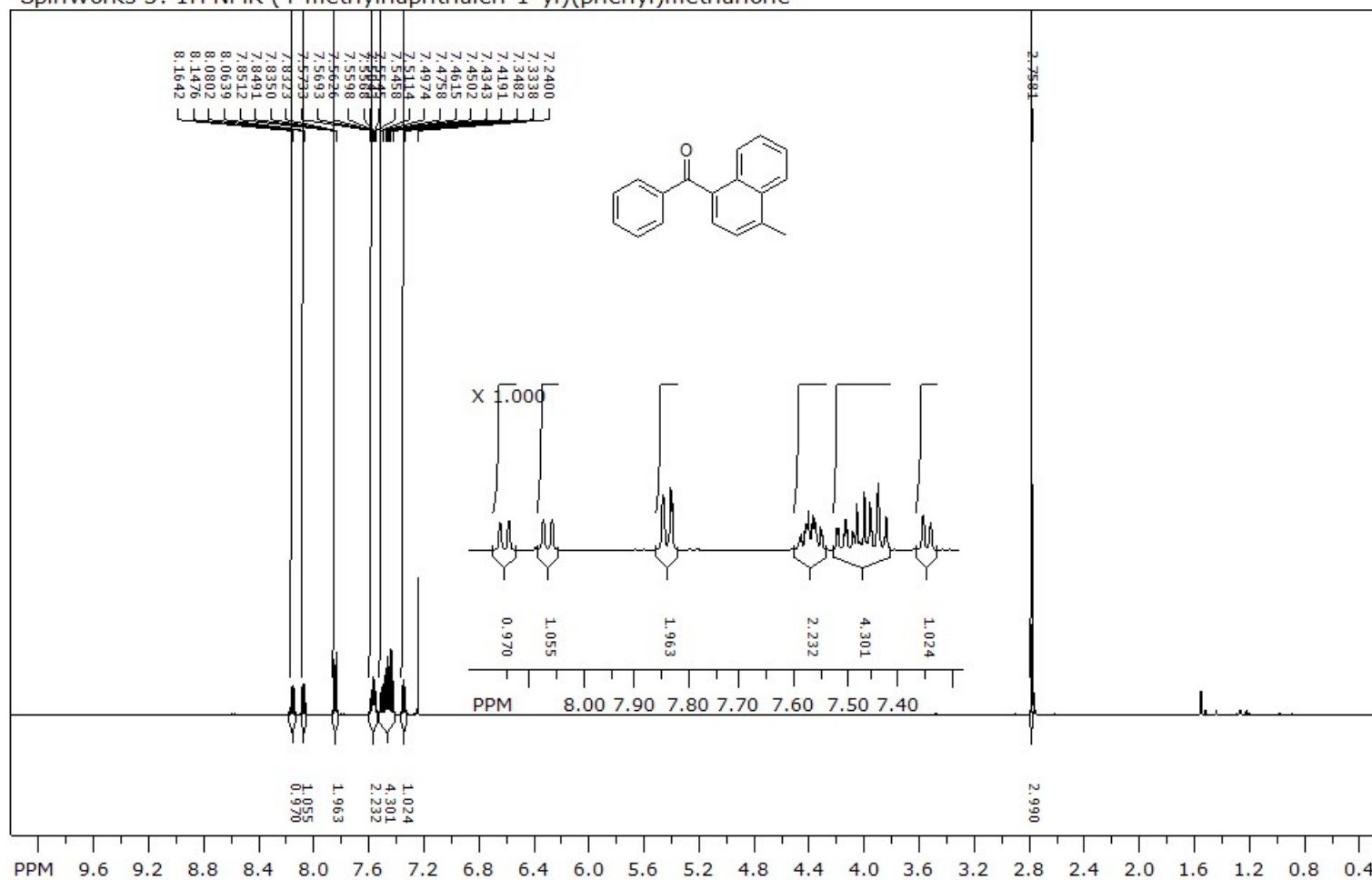
SpinWorks 3: 13C NMR 4-Methylbenzophenone



file: ...Users\Przemek\Desktop\PW6051\2\fid expt: <zggg30>
 transmitter freq.: 125.770364 MHz
 time domain size: 65536 points
 width: 29761.90 Hz = 236.6369 ppm = 0.454131 Hz/pt
 number of scans: 4096

freq. of 0 ppm: 125.757762 MHz
 processed size: 32768 complex points
 LB: 1.000 GF: 0.0000
 Hz/cm: 1051.672 ppm/cm: 8.36184

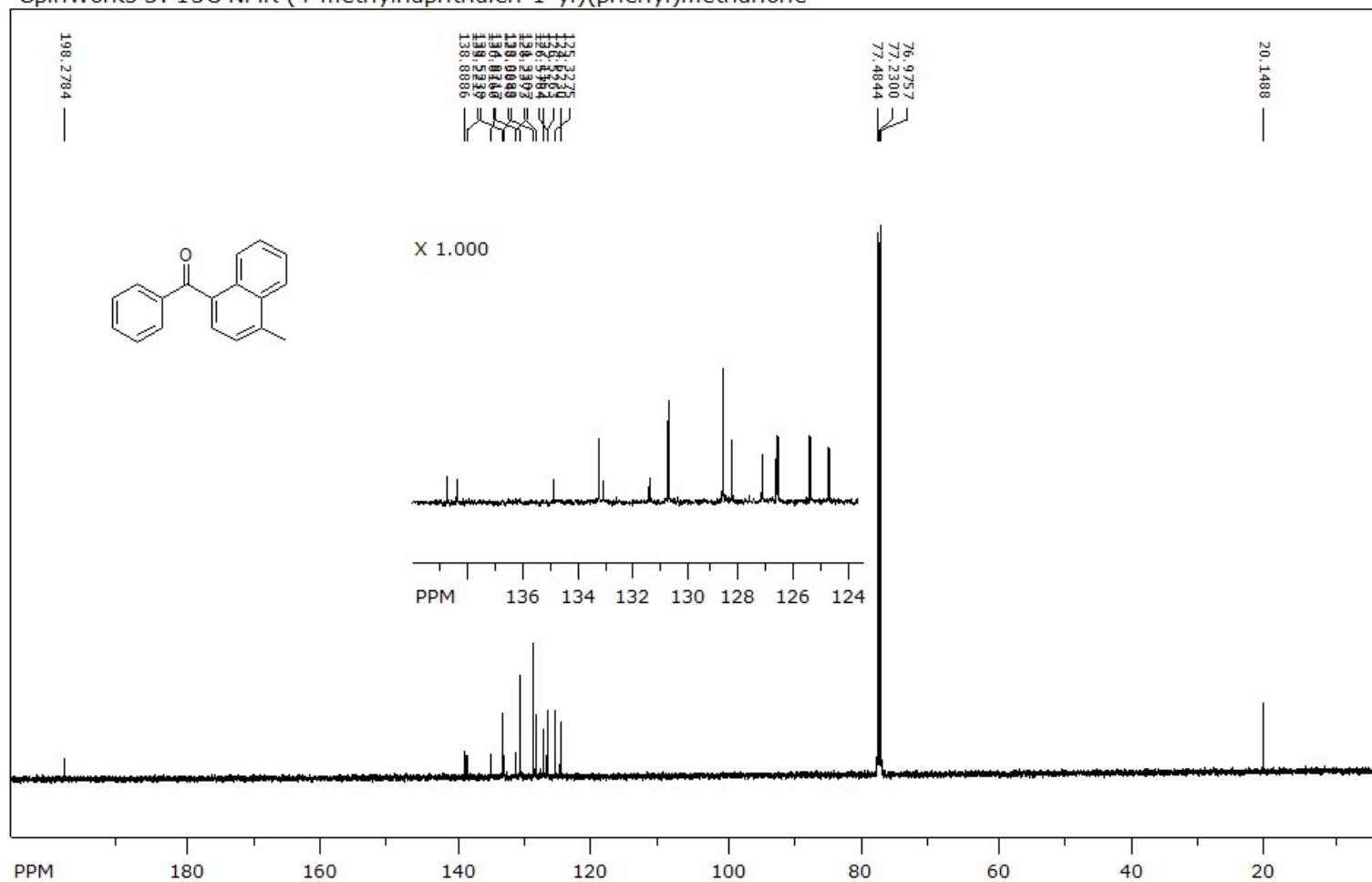
SpinWorks 3: 1H NMR (4-methylnaphthalen-1-yl)(phenyl)methanone



file: ...Users\Przemek\Desktop\MM55-1\1\fid expt: <zg30>
 transmitter freq.: 500.133751 MHz
 time domain size: 65536 points
 width: 12500.00 Hz = 24.9933 ppm = 0.190735 Hz/pt
 number of scans: 16

freq. of 0 ppm: 500.130024 MHz
 processed size: 65536 complex points
 LB: 0.300 GF: 0.0000
 Hz/cm: 200.000 ppm/cm: 0.39989

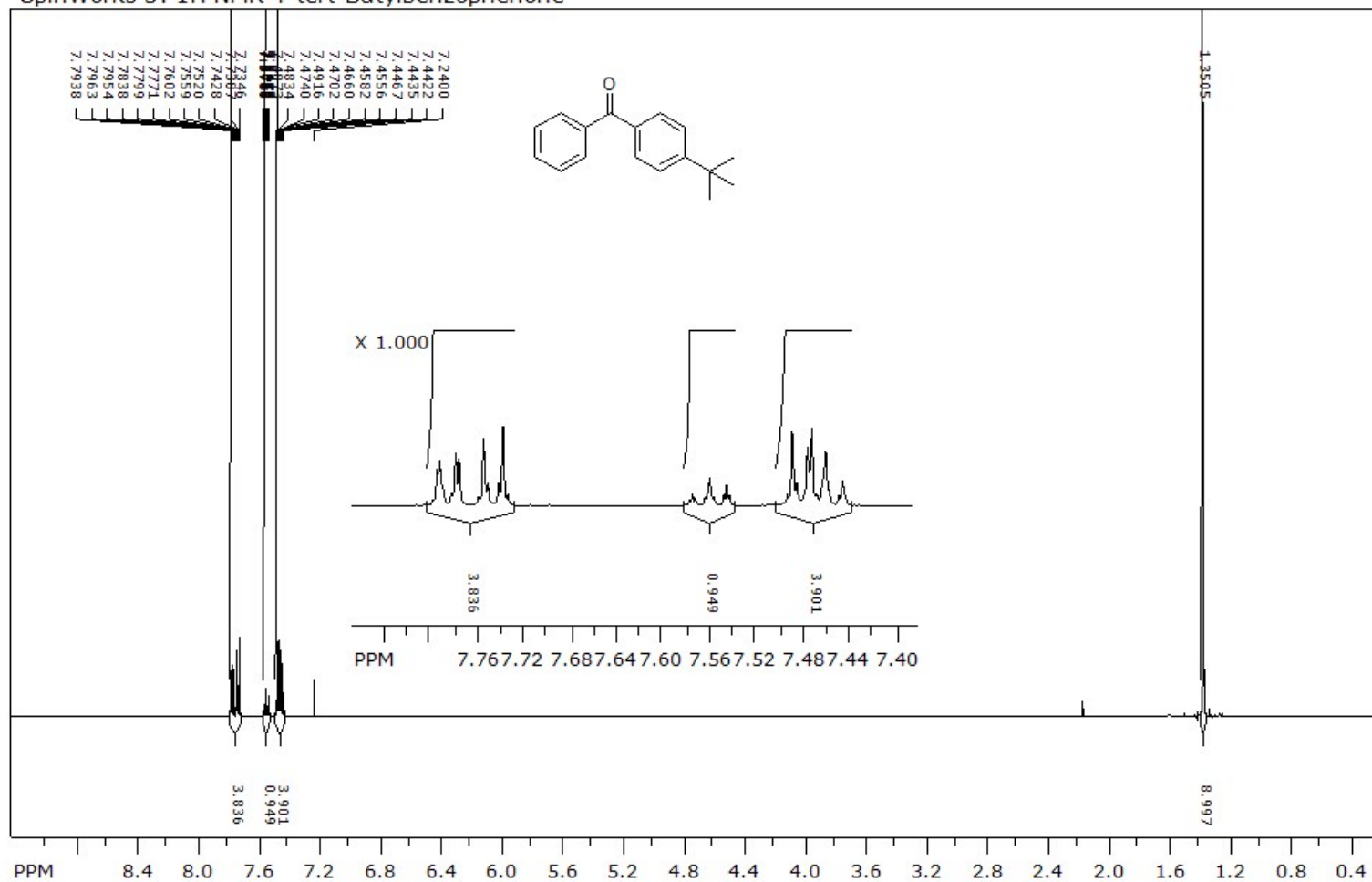
SpinWorks 3: ¹³C NMR (4-methylnaphthalen-1-yl)(phenyl)methanone



file: ...Users\Przemek\Desktop\MM55-1\2\fid exp: <zggp30>
 transmitter freq.: 125.770364 MHz
 time domain size: 65536 points
 width: 29761.90 Hz = 236.6369 ppm = 0.454131 Hz/pt
 number of scans: 1024

freq. of 0 ppm: 125.757761 MHz
 processed size: 32768 complex points
 LB: 1.000 GF: 0.0000
 Hz/cm: 1027.356 ppm/cm: 8.16850

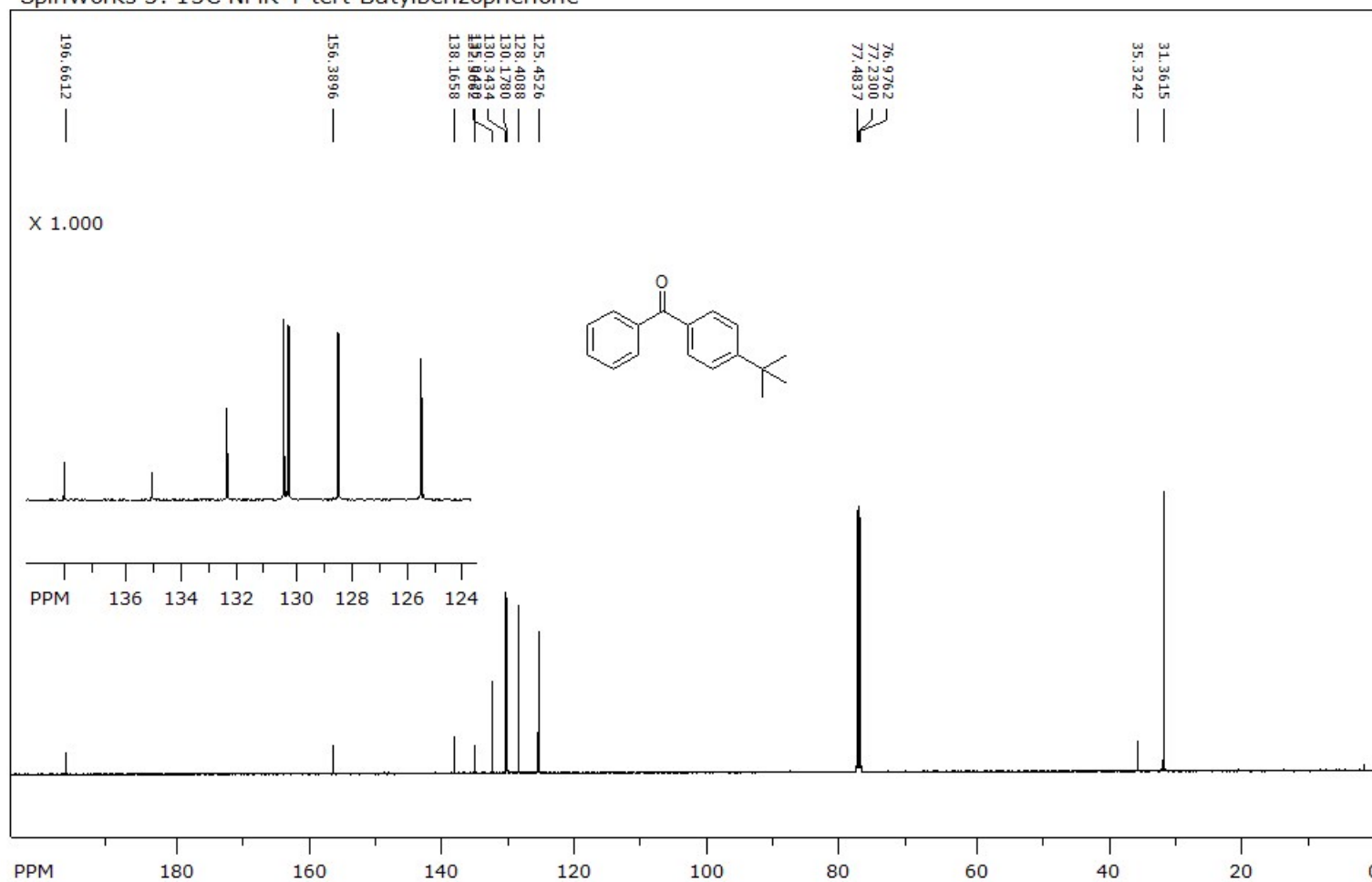
SpinWorks 3: 1H NMR 4-tert-Butylbenzophenone



file: ...:\Users\Przemek\Desktop\MM62\1\fid exp: <zg30>
 transmitter freq.: 500.133751 MHz
 time domain size: 65536 points
 width: 12500.00 Hz = 24.9933 ppm = 0.190735 Hz/pt
 number of scans: 16

freq. of 0 ppm: 500.130024 MHz
 processed size: 65536 complex points
 LB: 0.300 GF: 0.0000
 Hz/cm: 182.128 ppm/cm: 0.36416

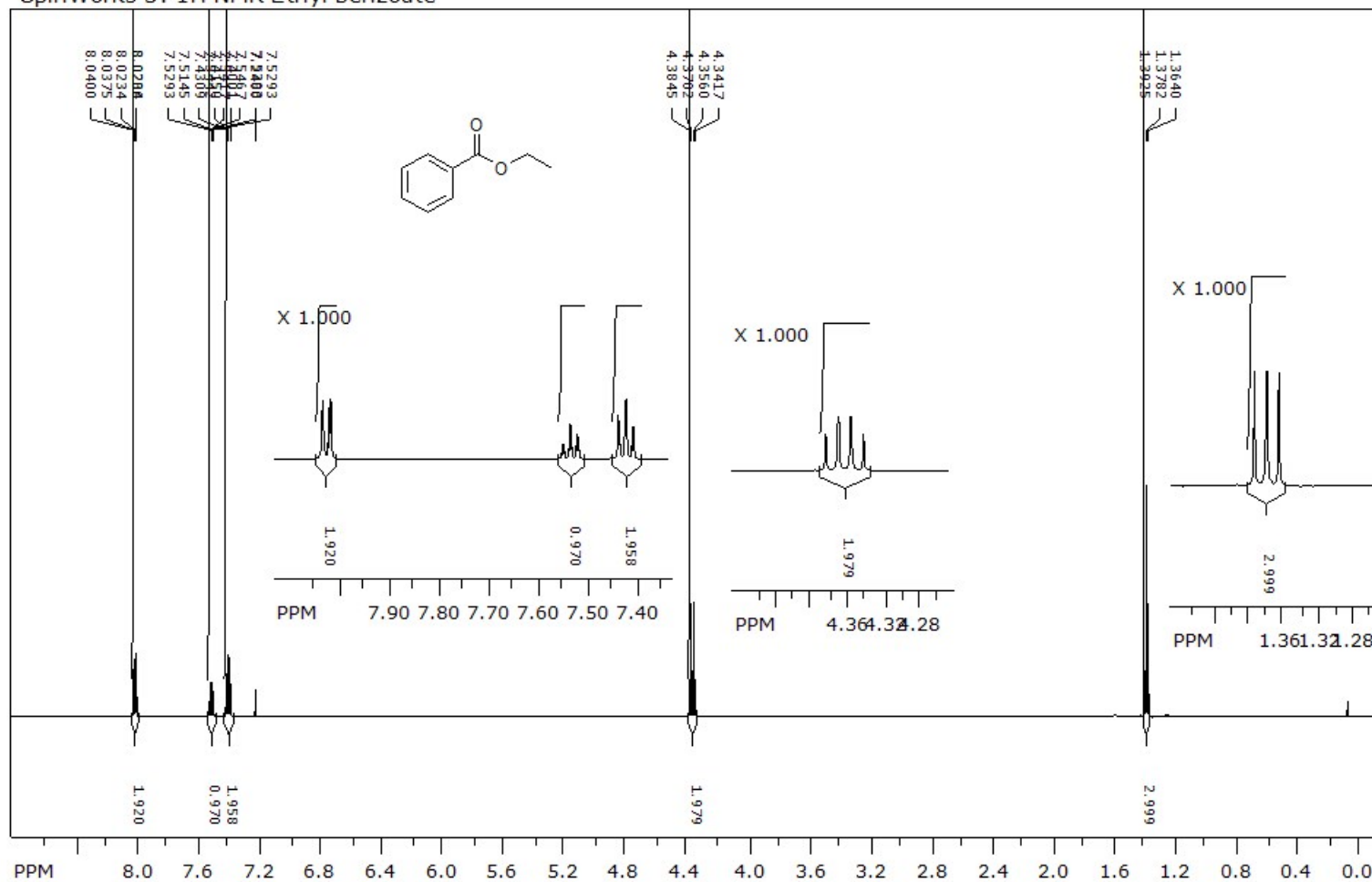
SpinWorks 3: 13C NMR 4-tert-Butylbenzophenone



file: ...:\Users\Przemek\Desktop\MM62\2\fid expt: <zpgg30>
 transmitter freq.: 125.770364 MHz
 time domain size: 65536 points
 width: 29761.90 Hz = 236.6369 ppm = 0.454131 Hz/pt
 number of scans: 4096

freq. of 0 ppm: 125.757763 MHz
 processed size: 32768 complex points
 LB: 1.000 GF: 0.0000
 Hz/cm: 1040.527 ppm/cm: 8.27323

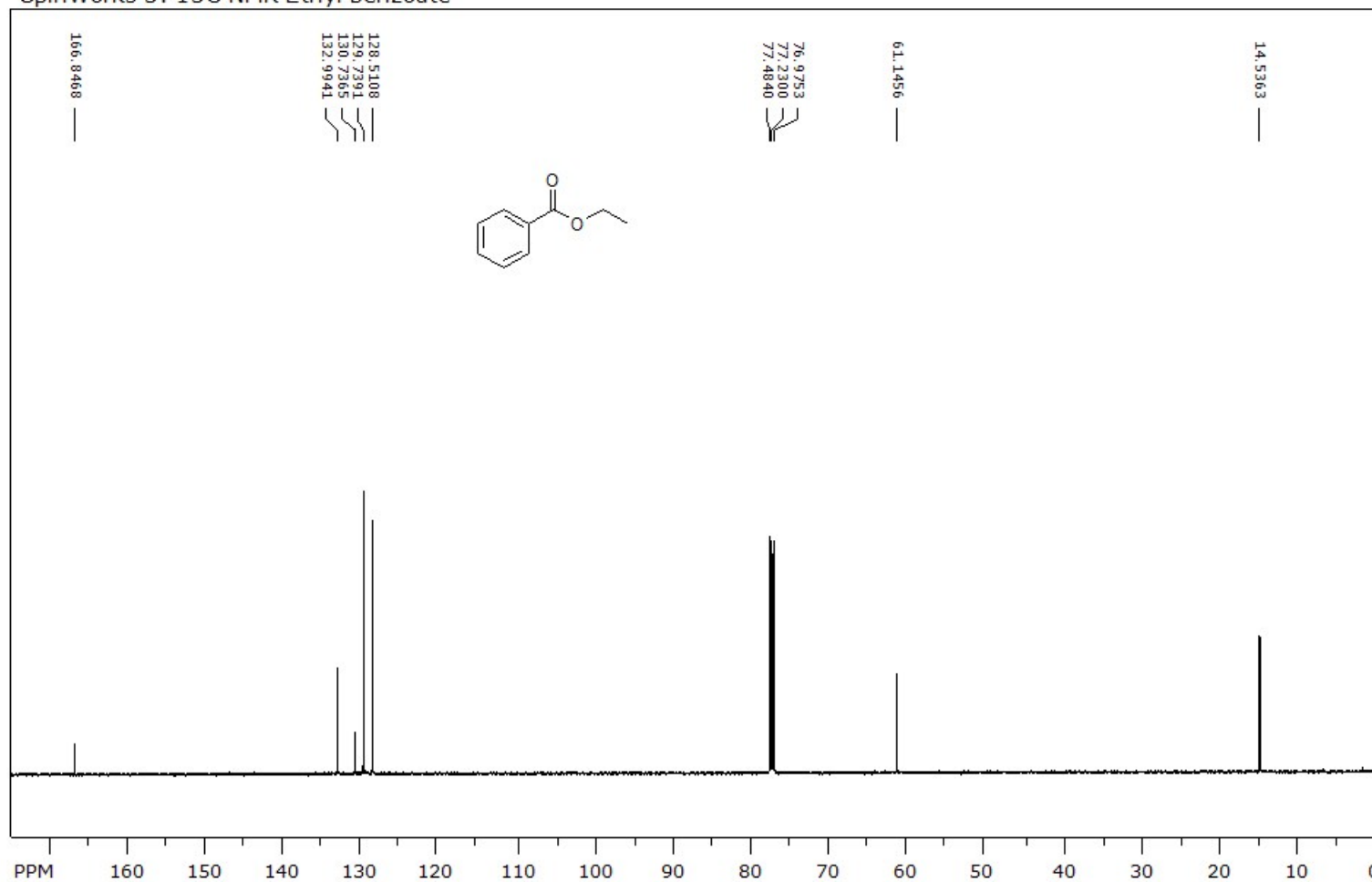
SpinWorks 3: 1H NMR Ethyl benzoate



file: ...:\Users\Przemek\Desktop\MM58\1\fid exp: <zg30>
 transmitter freq.: 500.133751 MHz
 time domain size: 65536 points
 width: 12500.00 Hz = 24.9933 ppm = 0.190735 Hz/pt
 number of scans: 16

freq. of 0 ppm: 500.130024 MHz
 processed size: 65536 complex points
 LB: 0.300 GF: 0.0000
 Hz/cm: 180.851 ppm/cm: 0.36161

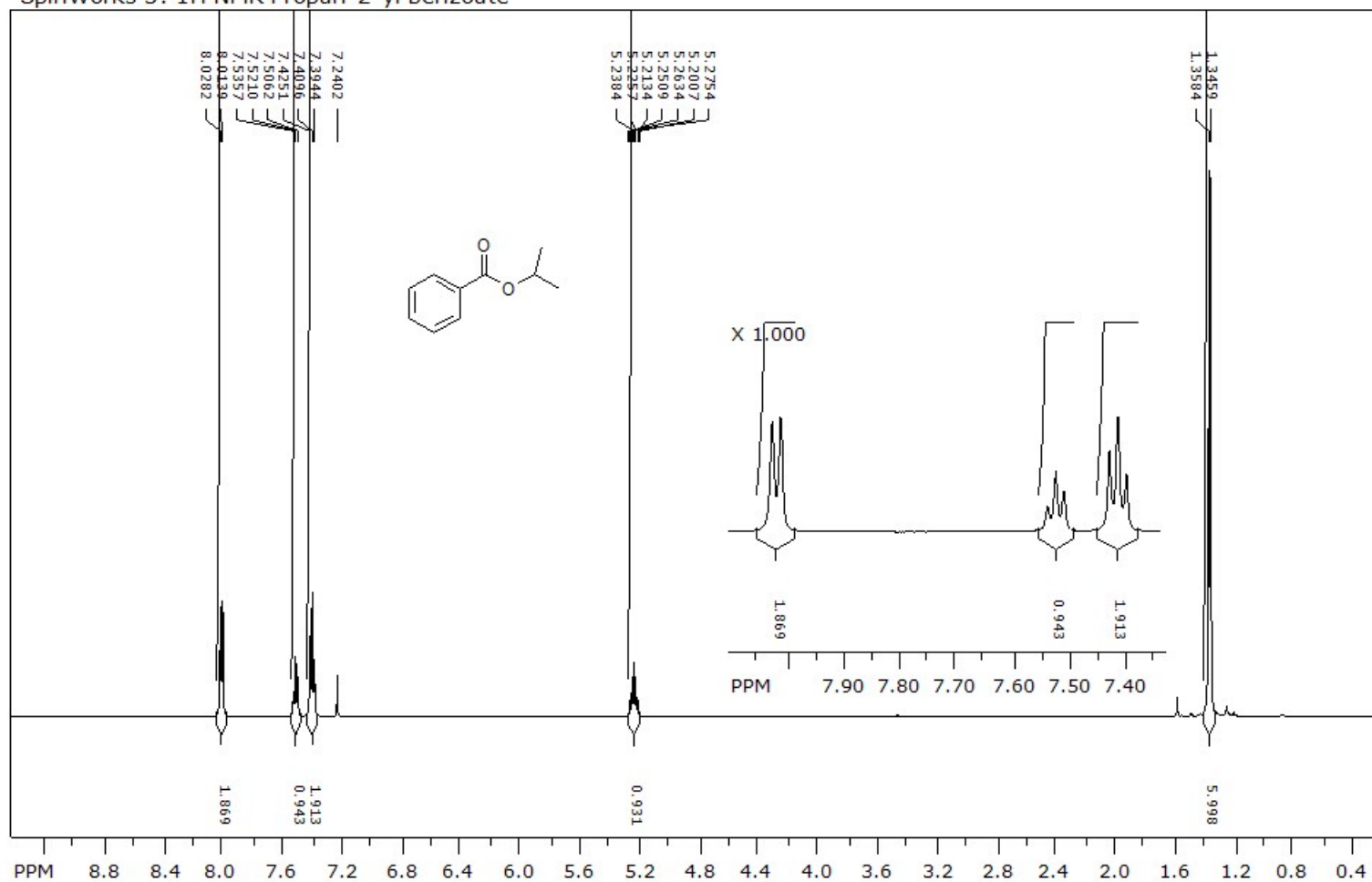
SpinWorks 3: ¹³C NMR Ethyl benzoate



file: ...:\Users\Przemek\Desktop\MM58\2\fid exp: <zpgg30>
transmitter freq.: 125.770364 MHz
time domain size: 65536 points
width: 29761.90 Hz = 236.6369 ppm = 0.454131 Hz/pt
number of scans: 1024

freq. of 0 ppm: 125.757762 MHz
processed size: 32768 complex points
LB: 1.000 GF: 0.0000
Hz/cm: 888.551 ppm/cm: 7.06487

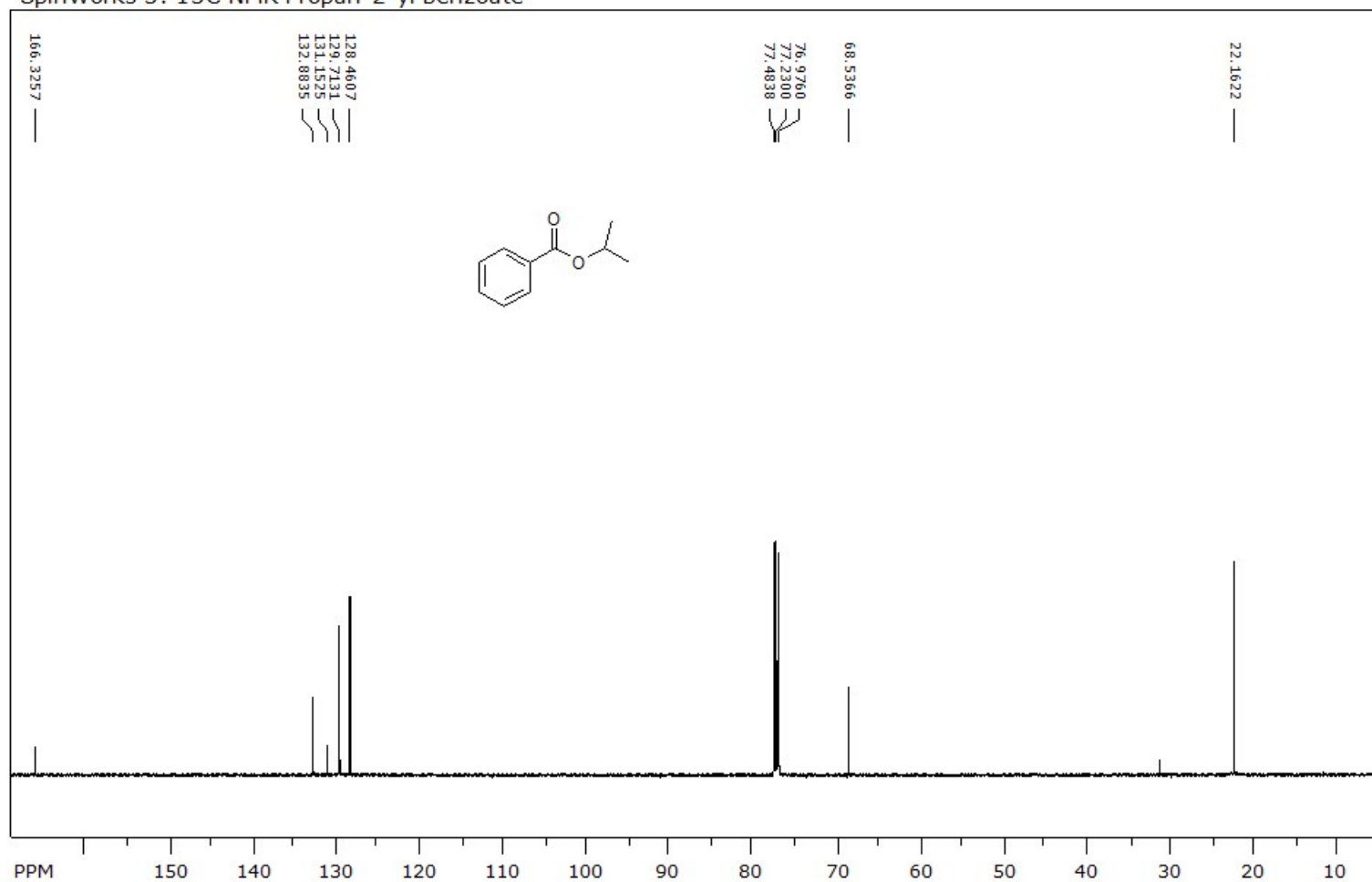
SpinWorks 3: 1H NMR Propan-2-yl benzoate



file: ...Users\Przemek\Desktop\MM57-2\1\fid exp: <zg30>
 transmitter freq.: 500.133751 MHz
 time domain size: 65536 points
 width: 12500.00 Hz = 24.9933 ppm = 0.190735 Hz/pt
 number of scans: 16

freq. of 0 ppm: 500.130023 MHz
 processed size: 65536 complex points
 LB: 0.300 GF: 0.0000
 Hz/cm: 185.532 ppm/cm: 0.37096

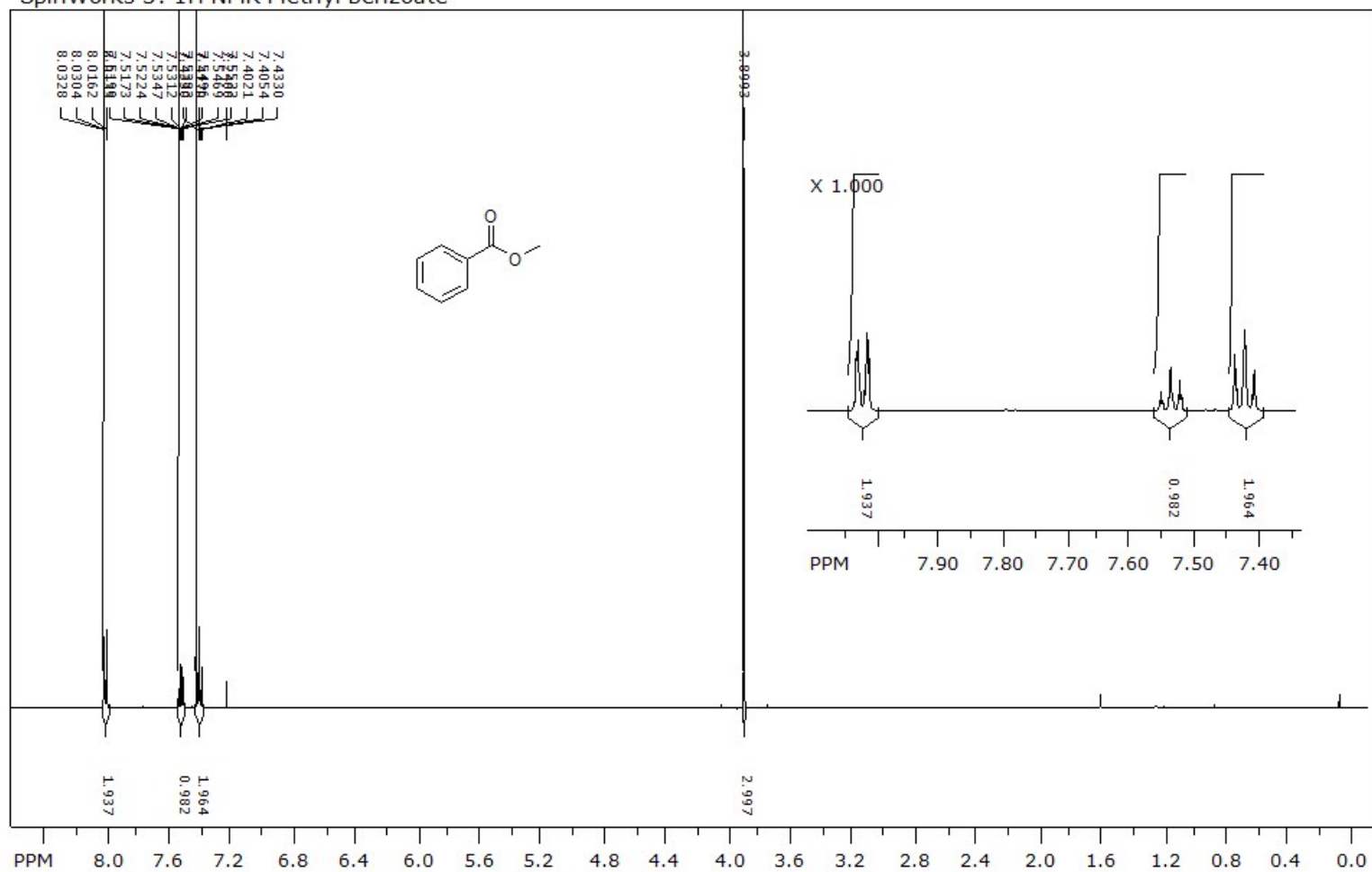
SpinWorks 3: ¹³C NMR Propan-2-yl benzoate



file: ...Users\Przemek\Desktop\MM57-2\2\fid expt: <zggp30>
transmitter freq.: 125.770364 MHz
time domain size: 65536 points
width: 29761.90 Hz = 236.6369 ppm = 0.454131 Hz/pt
number of scans: 1024

freq. of 0 ppm: 125.757762 MHz
processed size: 32768 complex points
LB: 1.000 GF: 0.0000
Hz/cm: 830.800 ppm/cm: 6.60569

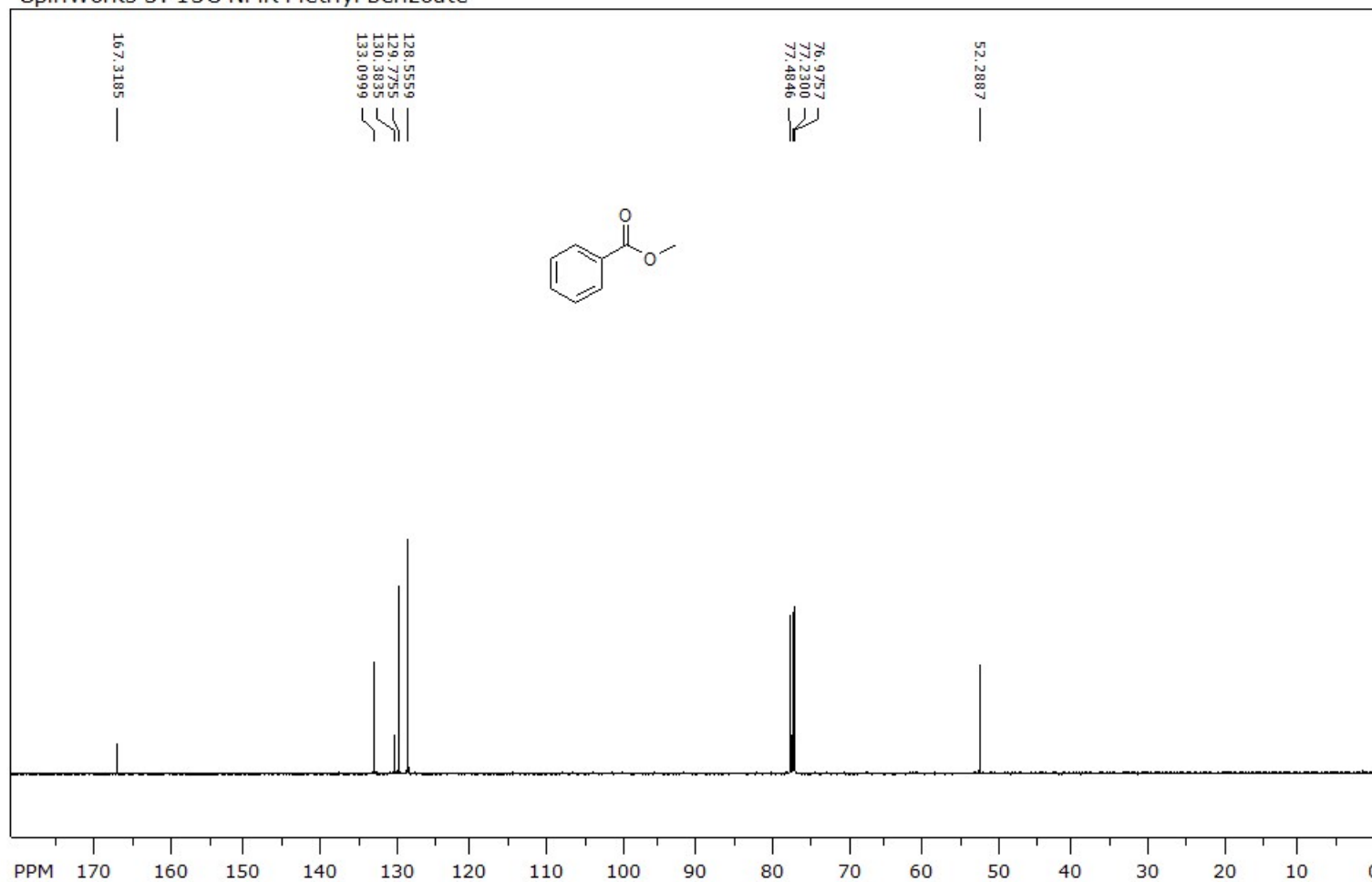
SpinWorks 3: 1H NMR Methyl benzoate



file: ...:\Users\Przemek\Desktop\MM67\1\fid expt: <zg30>
 transmitter freq.: 500.133751 MHz
 time domain size: 65536 points
 width: 12500.00 Hz = 24.9933 ppm = 0.190735 Hz/pt
 number of scans: 16

freq. of 0 ppm: 500.130024 MHz
 processed size: 65536 complex points
 LB: 0.300 GF: 0.0000
 Hz/cm: 175.319 ppm/cm: 0.35054

SpinWorks 3: ¹³C NMR Methyl benzoate



file: ...:\Users\Przemek\Desktop\MM67\2\fid exp: <zggg30>
transmitter freq.: 125.770364 MHz
time domain size: 65536 points
width: 29761.90 Hz = 236.6369 ppm = 0.454131 Hz/pt
number of scans: 1024

freq. of 0 ppm: 125.757763 MHz
processed size: 32768 complex points
LB: 1.000 GF: 0.0000
Hz/cm: 921.986 ppm/cm: 7.33071