

Synthesis of Highly Substituted Phenols and Benzenes with Complete Regiochemical Control

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Supporting Information

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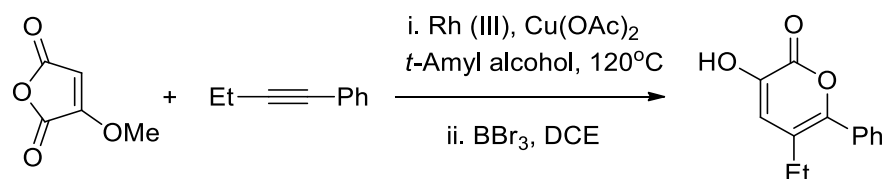
1. General Experimental Details:

All reactions were carried out under an inert Ar atmosphere in oven-dried glassware with magnetic stirring. Unless otherwise noted, reactions were heated using an oil bath, and reaction temperatures refer to external bath temperatures. Flash column chromatography (FCC) was carried out with SiliaFlash P60, 60 Å silica gel. Reactions and column chromatography were monitored with EMD silica gel 60 F254 plates and visualized with potassium permanganate stain.

Reagent grade 1,4-dioxane was dried over calcium hydride and distilled prior to use. 1,2-Dichlorobenzene was distilled under reduce pressure and degassed using three freeze-pump-thaw cycles. All other reagents and solvents were used without further purification from commercial sources. Unless otherwise noted, melting points were obtained from material that solidified after chromatography.

Instrumentation: FT-IR spectra were obtained on NaCl plates with a PerkinElmer Spectrum Vision spectrometer. Microwave reactions were performed with a Biotage® Initiator⁺ Microwave System. HRMS were recorded on a JEOL MS Route Magnetic Sector Instrument (EI) or a Waters Synapt HDMS TOF instrument (ESI). Unless otherwise noted, proton and carbon NMR spectra (¹H NMR and ¹³C NMR) were recorded in deuterated chloroform (CDCl₃) on a Bruker 700 MHz Avance III Spectrometer with a carbon-optimized cryoprobe or a Bruker 400 MHz DPX-400 spectrometer. Multiplicities are abbreviated as follows: s = singlet, d = doublet, t = triplet, q = quartet, pent = pentet, sext = sextet, sept = septet, br = broad, m = multiplet. Melting points were determined with a Cole-Parmer instrument and are uncorrected.

2. Preparation of Pyrone Coupling Partners



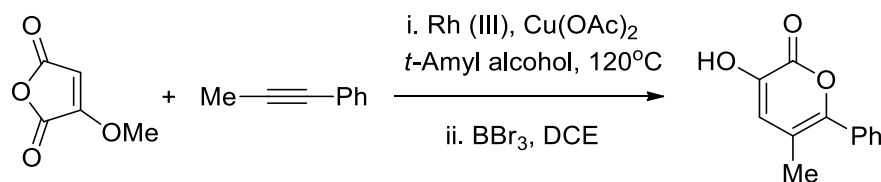
5-Ethyl-3-hydroxy-6-phenyl-2H-pyran-2-one (**22-S1**)

To a thick-walled reaction vessel were added a solution of 3-methoxyfuran-2,5-dione (1.98 g, 15.5 mmol, 1.5 eq) in *t*-amyl alcohol (100 mL), tris(acetonitrile)penta methylcyclopentadienylrhodium(III) hexafluoroantimonate (17 mg, 0.021 mmol, 0.002 eq), Cu(OAc)₂ (2.82 g, 15.5 mmol, 1.5 eq) and 1-phenyl-butyne (1.34 g, 10.3 mmol, 1 eq). The headspace of the vessel was evacuated by brief exposure to vacuum, and the vessel was back-filled with Ar. The vessel was evacuated and back-filled with Ar two additional times. The tube was quickly sealed and heated to 120 °C for 16 h. The reaction mixture was cooled to rt and filtered through Celite with EtOAc to remove solids. The filtrate was concentrated. The residue was purified by FCC (5:1 hexanes:EtOAc) to yield 5-ethyl-3-methoxy-6-phenyl-2H-pyran-2-one as a white solid (1.76 g, 74%).

Data for 5-ethyl-3-methoxy-6-phenyl-2H-pyran-2-one: R_f: 0.37 (3:2 hexanes:EtOAc); mp: 111 – 115 °C; IR (thin film) 1726, 1639 cm⁻¹; ¹H NMR (700 MHz, CDCl₃) δ 7.43 (t, *J* = 7.0 Hz, 2H), 7.38 (t, *J* = 7.7 Hz, 1H), 7.27 – 7.26 (m, 2H), 6.47 (s, 1H), 3.80 (s, 3H), 2.47 (q, *J* = 7.7 Hz, 2H), 1.20 (t, *J* = 7.0 Hz, 3H); ¹³C NMR (176 MHz, CDCl₃) δ 154.3, 143.5, 136.5, 128.9, 128.8, 127.9, 117.3, 116.5, 56.1, 28.7, 24.1, 12.5; HRMS (ESI) *m/z*: [M + H]⁺ Calcd for C₁₄H₁₅O₃ 231.1021; Found 231.1015.

To a solution of 5-ethyl-3-methoxy-6-phenyl-2H-pyran-2-one (1.67 g, 7.26 mmol, 1 eq) in 1,2-dichloroethane (73 mL, 0.1 M) was added BBr₃ (1 M in heptane, 11 mL, 11.0 mmol, 1.5 eq) dropwise. The mixture was stirred at rt for 20 min. The reaction was quenched by addition of sat'd aqueous NaHCO₃ (100 mL) and extracted with CH₂Cl₂ (4 x 30 mL). The combined organic layers were dried over Na₂SO₄, filtered, and concentrated. The residue was purified by FCC (5:1 hexanes:EtOAc) to yield **22-S1** as a light yellow solid.

Data for **22-S1**: R_f: 0.43 (2:1 hexanes:EtOAc); mp: 113 – 115 °C; IR (thin film) 3309, 1683, 1651 cm⁻¹; ¹H NMR (700 MHz, CDCl₃) δ 7.48 – 7.40 (m, 5H), 6.76 (s, 1H), 6.24 (s, 1H), 2.46 (q, *J* = 7.7 Hz, 2H), 1.19 (t, *J* = 7.7 Hz, 3H); ¹³C NMR (176 MHz, CDCl₃) δ 161.3, 148.7, 140.8, 132.2, 129.3, 128.6, 128.4, 118.8, 118.5, 23.4, 14.5; HRMS (ESI) *m/z*: [M + H]⁺ Calcd for C₁₃H₁₃O₃ 217.0865; Found 217.0868.

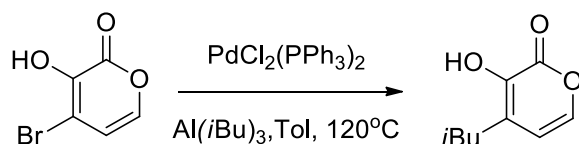


3-Hydroxy-5-methyl-6-phenyl-2H-pyran-2-one (22-S2)

To a thick-walled reaction vessel were added a solution of 3-methoxyfuran-2,5-dione (3.84 g, 30.0 mmol, 1.5 eq) in *t*-amyl alcohol (200 mL), tris(acetonitrile)penta methylcyclopentadienylrhodium(III) hexafluoroantimonate (33 mg, 0.04 mmol, 0.004 eq), Cu(OAc)₂ (5.46 g, 30.0 mmol, 1.5 eq) and 1-phenyl-propyne (2.32 g, 20.0 mmol, 1 eq). The headspace of the vessel was evacuated by brief exposure to vacuum, and the vessel was back-filled with Ar. The vessel was evacuated and back-filled with Ar two additional times. The tube was quickly sealed and heated to 120 °C for 16 h. The reaction mixture was cooled to rt and filtered through Celite with EtOAc to remove solids. The filtrate was dried over Na₂SO₄, filtered, and concentrated. The residue was purified by FCC (3:1 hexanes:EtOAc) to yield 3-methoxy-5-methyl-6-phenyl-2H-pyran-2-one as a white solid (1.56 g, 36%). Spectroscopic data for 3-methoxy-5-methyl-6-phenyl-2H-pyran-2-one matched those previously reported.¹

To a solution of 3-methoxy-5-methyl-6-phenyl-2H-pyran-2-one (1.55 g, 5.5 mmol, 1 eq) in 1,2-dichloroethane (72 mL, 0.1 M) was added BBr₃ (1 M in heptane, 8.6 mL, 8.6 mmol, 1.5 eq) dropwise. The mixture was stirred at rt for 20 min. The reaction was quenched by addition of sat'd aqueous NaHCO₃ (100 mL) and extracted with CH₂Cl₂ (4 x 30 mL). The combined organic layers were dried over Na₂SO₄, filtered, and concentrated. The residue was purified by FCC (3:1 hexanes:EtOAc) to yield **22-S2** as a white solid (1.37 g, 97%).

Data for **22-S2**: R_f: 0.54 (pure Et₂O); mp: 134 – 138 °C; IR (thin film) 3326, 1684, 1649, 1422, 1362 cm⁻¹; ¹H NMR (700 MHz, CDCl₃) δ 7.52 (d, *J* = 7.7 Hz, 2H), 7.44 (t, *J* = 7.7 Hz, 2H), 7.41 (t, *J* = 7.7 Hz, 1H), 6.69 (s, 1H), 5.98 (s, 1H), 2.18 (s, 3H); ¹³C NMR (176 MHz, CDCl₃) δ 161.4, 148.6, 140.3, 132.3, 129.2, 128.6, 128.4, 120.1, 112.7, 17.4; HRMS (ESI) *m/z*: [M + H]⁺ Calcd for C₁₂H₁₁O₃ 203.0708; Found 203.0709.

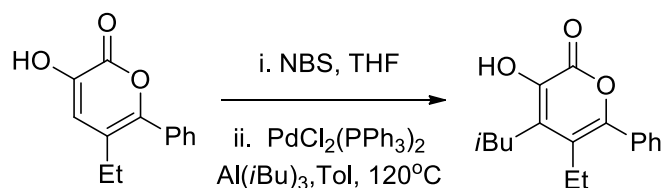


3-Hydroxy-4-isobutyl-2H-pyran-2-one (22-S3)

To a thick-walled reaction vessel were added a solution of 4-bromo-3-hydroxy-2H-pyran-2-one (1.20 g, 6.3 mmol, 1 eq) in toluene (13 mL, 0.5M) and PdCl₂(PPh₃)₂ (22 mg, 0.0315 mmol, 0.005 eq). The mixture was stirred for 1 min, and triisobutyl aluminum (1.1 M in toluene, 6.8 mL, 7.5 mmol, 1.2 eq) was added dropwise. The tube was quickly sealed and heated to 100 °C for 4 h. The reaction was cooled to rt,

quenched with 5% citric acid (30 mL), and extracted with EtOAc (5 x 30 mL). The combined organic layers were dried over Na₂SO₄, filtered, and concentrated. The residue was purified by FCC (5:1 hexanes:EtOAc) to yield **22-S3** as a yellow solid (538.1 mg, 51 %).

Data for **22-S3**: R_f: 0.54 (5:3 hexanes:EtOAc); mp: 39 – 41 °C; IR (thin film) 3356, 2960, 1756, 1695, 1674 cm⁻¹; ¹H NMR (700 MHz, CDCl₃) δ 7.09 (d, *J* = 4.9 Hz, 1H), 6.32 (s, 1H), 6.09 (d, *J* = 4.9 Hz, 1H), 2.36 (d, *J* = 7.0 Hz, 2H), 1.93 (sept, *J* = 7.0 Hz, 1H), 0.94 (d, *J* = 7.0 Hz, 6H); ¹³C NMR (176 MHz, CDCl₃) δ 161.6, 140.7, 139.1, 130.1, 110.5, 37.6, 27.9, 22.4; HRMS (ESI) *m/z*: [M + H]⁺ Calcd for C₉H₁₃O₃ 169.0865; Found 169.0863.



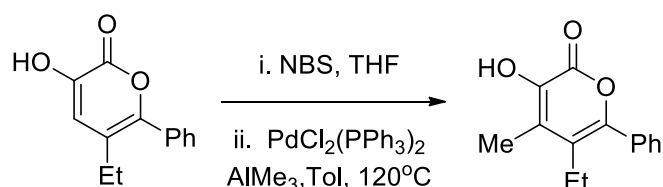
5-Ethyl-3-hydroxy-4-isobutyl-6-phenyl-2H-pyran-2-one (**22-S4**)

To a solution of 5-ethyl-3-hydroxy-6-phenyl-2H-pyran-2-one (864 mg, 4.0 mmol, 1 eq) in dimethylformamide (2 mL) was added the solution of *N*-bromosuccinimide (783 mg, 4.4 mmol, 1.1 eq) in dimethylformamide (2 mL) dropwise. The mixture was stirred at rt for 20 min. The reaction was quenched with brine (10 mL), and extracted with EtOAc (5 x 20 mL). The combined organic layers were washed with brine (5 x 10 mL), dried over Na₂SO₄, filtered, and concentrated. The residue was purified by FCC (5:1 hexanes:EtOAc) to yield 4-bromo-5-ethyl-3-hydroxy-6-phenyl-2H-pyran-2-one as a yellow solid (1.03 g, 87%).

Data for 4-bromo-5-ethyl-3-hydroxy-6-phenyl-2H-pyran-2-one: R_f: 0.46 (2:1 hexanes:EtOAc); mp: 150 – 153 °C; IR (thin film) 3295, 1682, 1371 cm⁻¹; ¹H NMR (700 MHz, CDCl₃) δ 7.47 – 7.45 (m, 5H), 6.65 (s, 1H), 2.59 (q, *J* = 7.0 Hz, 2H), 1.22 (t, *J* = 7.0 Hz, 3H); ¹³C NMR (176 MHz, CDCl₃) δ 158.6, 148.4, 139.7, 132.2, 129.8, 128.8, 128.5, 119.4, 118.2, 24.0, 14.5; HRMS (ESI) *m/z*: [M + H]⁺ Calcd for C₁₃H₁₂O₃Br 294.9970; Found 294.9966.

To a thick-walled reaction vessel were added a solution of 4-bromo-5-ethyl-3-hydroxy-6-phenyl-2H-pyran-2-one (456 mg, 1.55 mmol, 1 eq) in toluene (3.1 mL, 0.5M) and PdCl₂(PPh₃)₂ (11 mg, 0.015 mmol, 0.01 eq). The mixture was stirred for 1 min, and triisobutyl aluminum (1.1 M in toluene, 1.7 mL, 1.85 mmol, 1.2 eq) was added dropwise. The tube was quickly sealed and heated to 100 °C for 16 h. The reaction was cooled to rt, quenched with 5% citric acid (20 mL), and extracted with EtOAc (5 x 20 mL). The combined organic layers were dried over Na₂SO₄, filtered, and concentrated. The residue was purified by FCC (5:1 hexanes:EtOAc) to yield **22-S4** as a yellow solid (177 mg, 42 %).

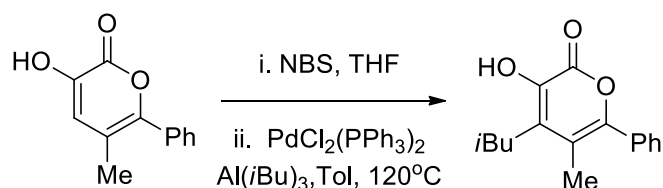
Data for **22-S4**: R_f: 0.40 (4:1 hexanes:EtOAc); mp: 74 - 78 °C; IR (thin film) 3336, 2959, 1760, 1451 cm⁻¹; ¹H NMR (700 MHz, CDCl₃) δ 7.48 – 7.46 (m, 2H), 7.44 – 7.42 (m, 3H), 6.05 (s, 1H), 2.49 (d, *J* = 7.0 Hz, 2H), 2.46 (q, *J* = 7.7 Hz, 2H), 2.02 (sept, *J* = 7.0 Hz, 1H), 1.07 (t, *J* = 7.7 Hz, 3H), 1.0 (d, *J* = 7.0 Hz, 6H); ¹³C NMR (176 MHz, CDCl₃) δ 160.9, 148.5, 138.3, 133.1, 131.9, 129.2, 129.0, 128.4, 120.2, 34.7, 28.5, 22.7, 20.6, 15.4; HRMS (ESI) *m/z*: [M + H]⁺ Calcd for C₁₇H₂₁O₃ 273.1491; Found 273.1502.



5-Ethyl-3-hydroxy-4-methyl-6-phenyl-2H-pyran-2-one (22-S5)

To a thick-walled reaction vessel were added a solution of 4-bromo-5-ethyl-3-hydroxy-6-phenyl-2H-pyran-2-one (537 mg, 1.82 mmol, 1 eq) in toluene (3.64 mL, 0.5M) and PdCl₂(PPh₃)₂ (6.4 mg, 0.009 mmol, 0.005 eq). The mixture was stirred for 1 min, and trimethyl aluminum (25 % w/w, 576 mg, 2.0 mmol, 1.1 eq) was added dropwise. The tube was quickly sealed and heated to 100 °C for 3 days. The reaction was cooled to rt, quenched with 5% citric acid (50 mL), and extracted with EtOAc (5 x 30 mL). The combined organic layers were dried over Na₂SO₄, filtered, and concentrated. The residue was purified by FCC (10:1 hexanes:EtOAc) to yield **22-S5** as a white solid (285 mg, 68 %).

Data for **22-S5**: R_f: 0.57 (3:1 hexanes:EtOAc); mp: 144 – 146 °C; IR (thin film) 3327, 1680, 1643 cm⁻¹; ¹H NMR (700 MHz, CDCl₃) δ 7.47 – 7.42 (m, 5H), 6.11 (s, 1H), 2.46 (q, *J* = 7.0 Hz, 2H), 2.21 (s, 3H), 1.15 (t, *J* = 7.0 Hz, 3H); ¹³C NMR (176 MHz, CDCl₃) δ 160.5, 148.4, 138.1, 133.0, 129.3, 128.9, 128.5, 128.4, 120.0, 21.1, 14.9, 11.7; HRMS (ESI) *m/z*: [M + H]⁺ Calcd for C₁₄H₁₅O₃ 231.1021; Found 231.1017.



3-Hydroxy-4-isobutyl-5-methyl-6-phenyl-2H-pyran-2-one (22-S6)

To a solution of 3-hydroxy-5-methyl-6-phenyl-2H-pyran-2-one (1.36 g, 6.73 mmol, 1 eq) in dimethylformamide (3.5 mL) was added a solution of *N*-bromosuccinimide (1.32 g, 7.4 mmol, 1.1 eq) in dimethylformamide (3.5 mL) dropwise. The mixture was stirred at rt for 20 min. The reaction was quenched with brine (10 mL), and extracted with EtOAc (5 x 20 mL). The combined organic layers were washed with brine (4 x 10 mL), dried over Na₂SO₄, filtered, and concentrated. The residue was purified by FCC (5:1 hexanes:EtOAc) to yield 4-bromo-3-hydroxy-5-methyl-6-phenyl-2H-pyran-

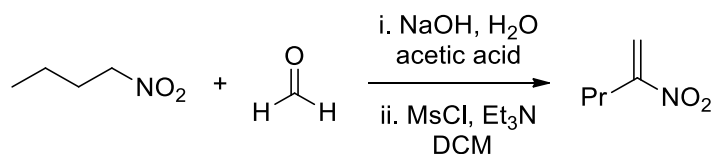
2-one as a white solid (1.66 g, 88%).

Data for 4-bromo-3-hydroxy-5-methyl-6-phenyl-2H-pyran-2-one: R_f: 0.29 (4:1 hexanes:EtOAc); mp: 190 – 193 °C; IR (thin film) 3272, 3223, 1682, 1370 cm⁻¹; ¹H NMR (700 MHz, DMSO-d₆) δ 10.92 (s, 1H), 7.55 – 7.49 (m, 5H), 2.15 (s, 1H); ¹³C NMR (176 MHz, DMSO-d₆) δ 157.8, 147.0, 140.6, 132.8, 130.0, 129.4, 129.0, 119.9, 113.3, 18.2; HRMS (ESI) m/z: [M + H]⁺ Calcd for C₁₂H₁₀O₃Br 280.9813; Found 280.9812.

To a thick-walled reaction vessel were added a solution of 4-bromo-3-hydroxy-5-methyl-6-phenyl-2H-pyran-2-one (170 mg, 0.6 mmol, 1 eq) in toluene (1.2 mL, 0.5M) and PdCl₂(PPh₃)₂ (4.3 mg, 0.006 mmol, 0.01 eq). The mixture was stirred for 1 min, and triisobutyl aluminum (1.1 M in toluene, 0.66 mL, 0.73 mmol, 1.2 eq) was added dropwise. The tube was quickly sealed and heated to 100 °C for 4 h. The reaction was cooled to rt, quenched with 5% citric acid (20 mL), and extracted with EtOAc (5 x 20 mL). The combined organic layers were dried over Na₂SO₄, filtered, and concentrated. The residue was purified by FCC (5:1 hexanes:EtOAc) to yield **22-S6** as a white solid (83.5 mg, 54 %).

Data for **22-S6**: R_f: 0.49 (3:1 hexanes:EtOAc); mp: 142 – 144 °C; IR (thin film) 3318, 2959, 1683, 1640 cm⁻¹; ¹H NMR (700 MHz, CDCl₃) δ 7.49 – 7.48 (m, 2H), 7.45 – 7.39 (m, 3H), 6.03 (s, 1H), 2.50 (d, *J* = 7.0 Hz, 2H), 2.11 (s, 3H), 1.99 (sept, *J* = 7.0 Hz, 1H), 1.01 (d, *J* = 7.0 Hz, 6H); ¹³C NMR (176 MHz, CDCl₃) δ 161.0, 148.1, 137.9, 133.0, 132.5, 129.2, 128.1, 128.3, 113.8, 35.2, 28.2, 22.7, 14.5; HRMS (ESI) m/z: [M + H]⁺ Calcd for C₁₆H₁₉O₃ 259.1334; Found 259.1335.

3. Preparation of Nitroalkene Coupling Partners

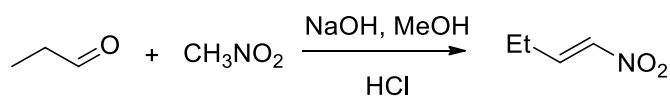


2-Nitropent-1-ene (**23-S1**)

To a solution of NaOH (210 mg, 5.25 mmol, 1.05 eq) in water (2 mL) at 0 °C was added 1-nitrobutane (515 mg, 5.00 mmol, 1 eq) dropwise. The mixture was stirred at 0 °C for 10 min, followed by rt for 1 h. The flask was cooled to 0 °C, and formalin (37% w/w, 426 mg, 5.25 mmol, 1.05 eq) was added dropwise. The mixture was stirred at 0 °C for 2 h, followed by an additional 16 h at rt. The mixture was cooled to 0 °C, and acetic acid (315 mg, 5.5 mmol, 1.1 eq) was added dropwise. The mixture was warmed to rt, and extracted with Et₂O (5 x 20 mL). The combined organic layers were washed with brine, dried over Na₂SO₄, filtered, and concentrated.

To a solution of the crude material (545 mg, 4.1 mmol, 1 eq) from above in CH₂Cl₂ (4.1 mL, 1 M) at 0 °C was added MsCl (559 mg, 4.9 mmol, 1.5 eq). The mixture was stirred at 0 °C for 10 min, upon which time Et₃N (1.66 g, 16.4 mmol, 4 eq) was added dropwise. The mixture was stirred at 0 °C for 1 h, and then warmed to rt for 1 h. The mixture was quenched with 1 N HCl (30 mL), and extracted with EtOAc (3 x 30 mL). The combined organic layers were dried over Na₂SO₄, filtered, and concentrated. The residue was purified by FCC (10:1 hexanes:EtOAc) to yield **23-S1** as a yellow oil (113 mg, 24%).

Data for **23-S1**: R_f: 0.54 (5:1 hexanes:EtOAc); IR (thin film) 2966, 2931, 2878, 1722, 1564, 1528, 1345 cm⁻¹; ¹H NMR (700 MHz, CDCl₃) δ 6.42 (d, *J* = 2.1 Hz, 1H), 5.53 (s, 1H), 2.57 (dt, *J* = 7.7, 0.7 Hz, 2H), 1.57 (sext, *J* = 7.7 Hz, 2H), 0.98 (t, *J* = 7.7 Hz, 3H); ¹³C NMR (176 MHz, CDCl₃) δ 158.1, 117.0, 32.0, 20.4, 13.4; HRMS (ESI) *m/z*: [M + H]⁺ Calcd for C₅H₁₀NO₂ 116.0712; Found 116.0706.

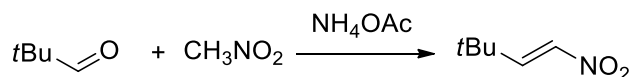


(E)-1-Nitrobut-1-ene (**23-S2**)

To a solution of propionaldehyde (5.80 g, 100.0 mmol, 1 eq) in MeOH (50 mL) and nitro methane (24.4 g, 400.0 mmol, 4 eq) at 0 °C was added a solution of 1 N NaOH (250 mL) dropwise. The mixture was stirred at 0 °C for 2 h. The mixture was then added to a solution of 6 N HCl (60 mL) and stirred at 0 °C for 15 min. The mixture was warmed to rt, and extracted with EtOAc (4 x 60 mL). The combined organic layers were dried over Na₂SO₄, filtered and concentrated. The residue was purified by FCC (10:1 hexanes:EtOAc) to yield **23-S2** as an oil (4.36 g, 43%).

Data for **23-S2**: R_f: 0.6 (4:1 hexanes:EtOAc); IR (thin film) 2979, 2942, 2881, 1650,

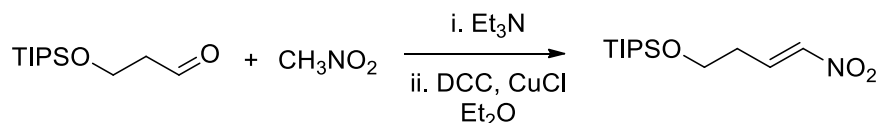
1528, 1356 cm^{-1} ; ^1H NMR (700 MHz, CDCl_3) δ 7.33 (pent, $J = 7.0$ Hz, 1H), 6.98 (d, $J = 13.3$ Hz, 1H), 2.32 (dpent, $J = 7.0, 1.4$ Hz, 2H), 1.14 (t, $J = 7.0$ Hz, 3H); ^{13}C NMR (176 MHz, CDCl_3) δ 144.1, 139.2, 21.9, 11.9; HRMS (ESI) m/z : $[\text{M} + \text{H}]^+$ Calcd for $\text{C}_4\text{H}_8\text{NO}_2$ 102.0555; Found 102.0558.



3,3-Dimethyl-1-nitrobut-1-ene (23-S3)

To a solution of pivaldehyde (2.15 g, 25.0 mmol, 1 eq) in nitro methane (25 mL) was added ammonium acetate (962.5 mg, 12.5 mmol, 0.5 eq). The mixture was heated to reflux for 4.5 h. The mixture was cooled to rt, quenched with brine (100 mL), and extracted with EtOAc (4 x 30 mL). The combined organic layers were dried over Na_2SO_4 , filtered and concentrated. The residue was purified by FCC (25:1 hexanes:EtOAc) to yield **23-S3** as an oil (1.84 g, 57%).

Data for **23-S3**: R_f: 0.43 (25:1 hexanes:EtOAc); IR (thin film) 2968, 1644, 1530, 1351 cm^{-1} ; ^1H NMR (700 MHz, CDCl_3) δ 7.25 (td, $J = 14.0, 1.4$ Hz, 1H), 6.89 (dd, $J = 14.0, 1.4$ Hz, 1H), 1.15 – 1.14 (m, 9H); ^{13}C NMR (176 MHz, CDCl_3) δ 152.1, 137.2, 32.7, 28.5; HRMS (ESI) m/z : $[\text{M} + \text{H}]^+$ Calcd for $\text{C}_6\text{H}_{12}\text{NO}_2$ 130.0868; Found 130.0869.



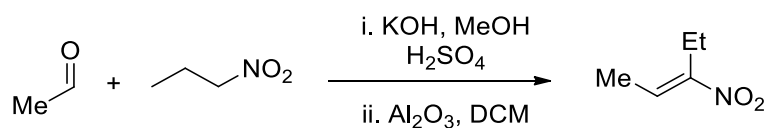
(E)-Triisopropyl((4-nitrobut-3-en-1-yl)oxy)silane (23-S4)

To a solution of 3-((triisopropylsilyl)oxy)propanal (4.6 g, 20.0 mmol, 1 eq) in 1-nitromethane (6.1 g, 100.0 mmol, 5 eq) was added Et₃N (202 mg, 2.0 mmol, 0.1 eq) dropwise. The mixture was stirred at rt for 20 h. The reaction was quenched with 1 N HCl (20 mL), and extracted with EtOAc (4 x 30 mL). The combined organic layers were dried over Na_2SO_4 , filtered and concentrated.

To a solution of the crude material (1.4 g, 4.8 mmol, 1 eq) from above in Et₂O (16 mL, 0.3 M) was added *N,N'*-dicyclohexylcarbodiimide (1.09 g 5.28 mmol, 1.1 eq) and CuCl (143 mg, 1.44 mmol, 0.3 eq). The mixture was heated to reflux for 17 h. The reaction mixture was cooled to rt, and filtered through Celite with EtOAc. The filtrate was washed with 1 N HCl (2 x 30 mL), washed with brine (2 x 30 mL), dried over Na_2SO_4 , filtered and concentrated. The residue was purified by FCC (40:1 hexanes:EtOAc) to yield **23-S4** as an oil (484 mg, 37%, 3:1 E/Z mixture).

Data for **23-S4**: R_f: 0.54 (5:1 hexanes:EtOAc); IR (thin film) 2944, 2892, 2867, 1528, 1463, 1352 cm^{-1} ; ^1H NMR (700 MHz, CDCl_3) δ 7.34 (pent, $J = 7.0$ Hz, 1H) (E), 7.07 (d, $J = 13.3$ Hz, 1H) (E), 6.99 (d, $J = 8.4$ Hz, 0.35H) (Z), 6.38 (q, $J = 7.0$ Hz, 0.35 H) (Z), 3.88 – 3.85 (m, 2.7 H) (E/Z), 2.98 (q, $J = 6.3$ Hz, 0.7H) (Z), 2.49 (q, $J = 6.3$ Hz, 2H) (E), 1.14 – 1.08 (m, 4H) (E/Z), 1.05 (d, $J = 7.0$ Hz, 24 H) (E/Z); ^{13}C NMR (176

MHz, CDCl₃) (E) δ 140.7, 139.9, 61.1, 32.0, 18.0, 11.9; (Z) δ 139.9, 138.8, 61.3, 31.6, 18.0, 11.9; HRMS (ESI) *m/z*: [M + Na]⁺ Calcd for C₁₃H₂₇NO₃NaSi 296.1658; Found 296.1667.

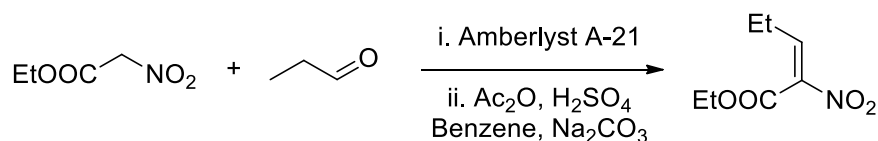


(E)-3-Nitropent-2-ene (23-S5)

To a solution of acetaldehyde (2.64 g, 60.0 mmol, 1 eq) in 1-nitropropane (9.35 g, 105.0 mmol, 1.75 eq) at 0 °C was added 1N KOH in MeOH (6 mL) dropwise. The mixture was stirred at 0 °C for 2.5 h, upon which time a solution of 0.9 N H₂SO₄ in MeOH (4 mL) was added. The mixture was stirred at 0 °C for 10 min, and the solvent was removed under reduced pressure. The residue was dissolved in EtOAc (100 mL), washed sequentially with sat'd aqueous NaHCO₃ (30 mL), water (30 mL), and brine (30 mL). The organic layer was dried over Na₂SO₄, filtered and concentrated.

To a solution of the crude material (3.3 g, 24.8 mmol, 1 eq) from above in CH₂Cl₂ (31 mL) was added Al₂O₃ (5.06 g, 49.6 mmol, 2 eq). The mixture was heated to 40 °C for 20 h. The reaction mixture was cooled to rt, and filtered through Celite with CH₂Cl₂ to remove solids. The filtrate was concentrated, and distilled (bp 50 – 60 °C, 7 torr) to yield **23-S5** as an oil (420 mg, 15 %).

Data for **23-S5**: R_f: 0.57 (4:1 hexanes:EtOAc); IR (thin film) 3527, 2980, 1551, 1520, 1335 cm⁻¹; ¹H NMR (700 MHz, CDCl₃) δ 7.12 (q, *J* = 7.7 Hz, 1H), 2.60 (q, *J* = 7.7 Hz, 2H), 1.87 (d, *J* = 7.7 Hz, 3H), 1.09 (t, *J* = 7.7 Hz, 3H); ¹³C NMR (176 MHz, CDCl₃) δ 153.9, 131.0, 19.6, 13.3, 12.3; HRMS (ESI) *m/z*: [M + H]⁺ Calcd for C₅H₁₀NO₂ 116.0712; Found 116.0712.



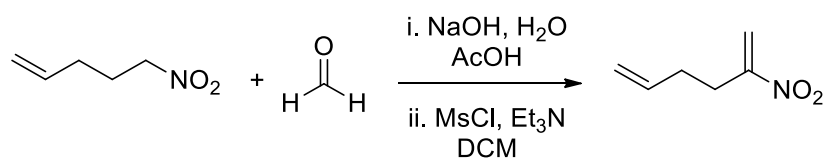
(E)-Ethyl 2-nitropent-2-enoate (23-S6)

To propinaldehyde (870 mg, 15.0 mmol, 3 eq) at 0 °C was added amberlyst A-21 (250 mg). The mixture was stirred at 0 °C for 5 min, upon which time ethyl nitroacetate (665 mg, 5.0 mmol, 1 eq) was added dropwise. The mixture was stirred at 0 °C for 2 h and then warmed to rt for 16h. The mixture was filtered through Celite with EtOAc to remove solids. The filtrate was concentrated, and the residue was purified by FCC (5:1 hexanes:EtOAc) to yield an alcohol product as oil (845 mg, 88%).

To a solution of the crude alcohol above (611 mg, 3.2 mmol, 1 eq) in acetic anhydride (490 mg, 4.8 mmol, 1.2 eq) was added concentrated H₂SO₄ (0.003 mL). The reaction mixture was heated to 60 °C for 40 min. The mixture was diluted with benzene (3.2

mL), and Na₂CO₃ (339 mg, 3.2 mmol, 1 eq) was added. The mixture was maintained at 60 °C until the evolution of CO₂ gas ceased. The mixture was cooled to rt, and the solvent was removed under reduced pressure. The residue was purified by FCC (20:1 hexanes:EtOAc) to yield **23-S6** as an oil (204 mg, 37%).

Data for **23-S6**: R_f: 0.57 (5:1 hexanes:EtOAc); IR (thin film) 2982, 2942, 1736, 1540 cm⁻¹; ¹H NMR (700 MHz, CDCl₃) δ 7.21 (t, *J* = 7.7 Hz, 0.35H) (Z), 6.84 (t, *J* = 7.7 Hz, 1H) (E), 4.34 (q, *J* = 7.0 Hz, 0.7H) (Z), 4.29 (q, *J* = 7.0 Hz, 2H) (E), 2.43 (pent, *J* = 7.7 Hz, 0.7H) (Z), 2.27 (pent, *J* = 7.7 Hz, 2H) (E), 1.33 (t, *J* = 7.0 Hz, 1.05H) (Z), 1.30 (t, *J* = 7.0 Hz, 3H) (E), 1.14 (t, *J* = 7.7 Hz, 1.05H) (Z), 1.69 (t, *J* = 7.7 Hz, 3H) (E); ¹³C NMR (176 MHz, CDCl₃) (E) δ 158.7, 144.5, 141.2, 62.7, 21.6, 14.0, 12.3; (Z) δ 159.8, 144.3, 144.1, 62.6, 21.4, 13.9, 12.5; HRMS (ESI) *m/z*: [M + H]⁺ Calcd for C₇H₁₂NO₄ 174.0766; Found 174.0760.



2-Nitrohexa-1,5-diene (23-S7)

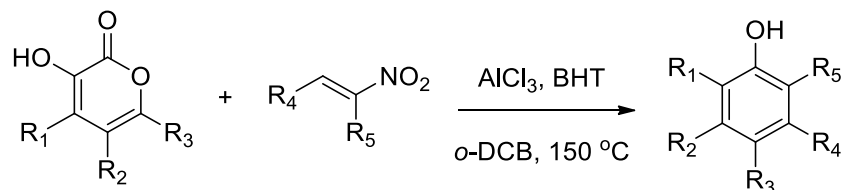
To a solution of NaOH (210 mg, 5.25 mmol, 1.05 eq) in water (2 mL) at 0 °C was added 5-nitropent-1-ene (575 mg, 5.00 mmol, 1 eq) dropwise. The mixture was stirred at 0 °C for 10 min, followed by rt for 1 hour. The mixture was cooled to 0 °C, and formaline (37% w/w, 426 mg, 5.25 mmol, 1.05 eq) was added. The mixture was stirred at 0 °C for 2 h, followed by an additional 16 h at rt. The mixture was cooled to 0 °C, and acetic acid (330 mg, 5.50 mmol, 1.1 eq) was added dropwise. The mixture was warmed to rt, and extracted with Et₂O (4 x 30 mL). The combined organic layers were washed with brine, dried over Na₂SO₄, filtered and concentrated.

To a solution of the crude material (290 mg, 2.0 mmol, 1 eq) from above in CH₂Cl₂ (10 mL) at 0 °C was added MsCl (342 mg, 3.0 mmol, 1.5 eq). The mixture was stirred at 0 °C for 10 min, and upon which time Et₃N (808 mg, 8.0 mmol, 4 eq) was added dropwise. The mixture was stirred at 0 °C for 1 hour, and rt for 1 hour. The mixture was warmed to rt, quenched with 1 N HCl (20 mL), and extracted with EtOAc (4 x 30 mL). The combined organic layers were dried over Na₂SO₄, filtered and concentrated. The residue was purified by FCC (20:1 hexanes:EtOAc) to yield **23-S7** as an oil (128 mg, 51%).

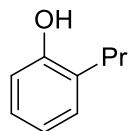
Data for **23-S7**: R_f: 0.69 (5:1 hexanes:EtOAc); IR (thin film) 2929, 1714, 1641, 1555, 1526 cm⁻¹; ¹H NMR (700 MHz, CDCl₃) δ 6.46 (s, 1H), 5.79 (dddd, *J* = 16.8, 11.3, 7.0 Hz, 1H), 5.56 (s, 1H), 5.09 – 5.05 (m, 2H), 2.71 (t, *J* = 7.7 Hz, 2H), 2.32 (q, *J* = 7.0 Hz, 2H); ¹³C NMR (176 MHz, CDCl₃) δ 157.3, 135.9, 117.7, 116.5, 32.1, 29.5; HRMS (ESI) *m/z*: [M + H]⁺ Calcd for C₆H₁₀NO₂ 128.0712; Found 128.0713.

4. Syntheses of Substituted Phenols

General Procedure for Phenol Syntheses:

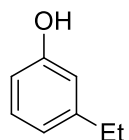


To a thick-walled reaction vessel was added the pyrone, alkene, BHT (0.1 eq) and AlCl₃ (0.1 eq). The vessel was flushed with Ar gas for 5 min. 1,2-Dichlorobenzene (0.5 M) was added, and tube was quickly sealed. The reaction mixture was heated to 150 °C for 16 h unless otherwise noted. The reaction mixture was cooled to rt, and the mixture was directly purified by FCC without aqueous work up.



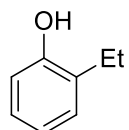
2-Propylphenol (25)

3-Hydroxy-2H-pyran-2-one (89.6 mg, 0.8 mmol, 4 eq) and 2-nitropent-1-ene (23 mg, 0.2 mmol, 1 eq) were subjected to the general procedure for 1 h. Purification by FCC (20:1 hexanes:EtOAc) yielded **25** as a yellow oil (22 mg, 81%). Spectroscopic data for **25** matched those previously reported.²



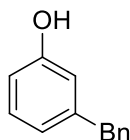
3-Ethylphenol (26)

3-Hydroxy-2H-pyran-2-one (89.6 mg, 0.8 mmol, 4 eq) and 1-nitrobut-1-ene (20.2 mg, 0.2 mmol, 1 eq) were subjected to the general procedure. Purification by FCC (10:1 hexanes:EtOAc) yielded **26** as a colorless oil (19.8 mg, 81%). Spectroscopic data for **26** matched those previously reported.³



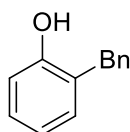
2-Ethylphenol (27)

3-Hydroxy-2H-pyran-2-one (89.6 mg, 0.8 mmol, 4 eq) and 2-nitrobut-1-ene (20.2 mg, 0.2 mmol, 1 eq) were subjected to the general procedure for 3 h. Purification by FCC (15:1 hexanes:EtOAc) yielded **27** as a yellow oil (17.9 mg, 73%). Spectroscopic data for **27** matched those previously reported.⁴



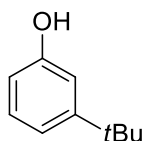
3-Benzylphenol (28)

3-Hydroxy-2H-pyran-2-one (89.6 mg, 0.8 mmol, 4 eq) and (3-nitroallyl)benzene (32.6 mg, 0.2 mmol, 1 eq) were subjected to the general procedure. Purification by FCC (10:1 hexanes:EtOAc) yielded **28** as a colorless oil (23.2 mg, 63%). Spectroscopic data for **28** matched those previously reported.⁵



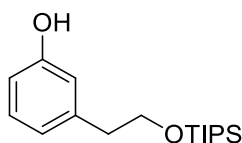
2-Benzylphenol (29)

3-Hydroxy-2H-pyran-2-one (89.6 mg, 0.8 mmol, 4 eq) and (2-nitroallyl)benzene (32.6 mg, 0.2 mmol, 1 eq) were subjected to the general procedure for 2 h. Purification by FCC (10:1 hexanes:EtOAc) yielded **29** as a yellow solid (27.5 mg, 74%). Spectroscopic data for **29** matched those previously reported.⁶



3-(Tert-butyl)phenol (30)

3-Hydroxy-2H-pyran-2-one (89.6 mg, 0.8 mmol, 4 eq) and 3,3-dimethyl-1-nitrobut-1-ene (25.8 mg, 0.2 mmol, 1 eq) were subjected to the general procedure at 180 °C. Purification by FCC (10:1 hexanes:EtOAc) yielded **30** as a colorless oil (25.5 mg, 85%). Spectroscopic data for **30** matched those previously reported.⁷

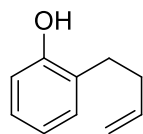


3-(2-((Triisopropylsilyl)oxy)ethyl)phenol (31).

3-Hydroxy-2H-pyran-2-one (67.2 mg, 0.6 mmol, 3 eq) and triisopropyl((4-nitrobut-3-en-1-yl)oxy)silane (54.6 mg, 0.2 mmol, 1 eq) were subjected to the general procedure. Purification by FCC (20:1 hexanes:EtOAc) yielded **31** as a yellow oil (32.5 mg, 55%).

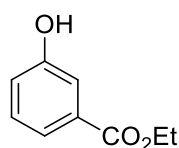
Data for **31**: R_f: 0.49 (5:1 hexanes:EtOAc); IR (thin film) 3344, 2943, 2892, 2866, 1589, 1458 cm⁻¹; ¹H NMR (700 MHz, CDCl₃) δ 7.15 (t, *J* = 7.7 Hz, 1 H), 6.80 (d, *J* = 7.7 Hz, 1 H), 6.71 (s, 1 H), 6.80 (d, *J* = 7.7 Hz, 1 H), 4.89 (s, 1 H), 3.87 (t, *J* = 7.7 Hz, 2 H), 2.82 (t, *J* = 7.7 Hz, 2 H), 1.11 – 1.07 (m, 3 H), 1.05 (d, *J* = 7.0 Hz, 18 H); ¹³C NMR (176 MHz, CDCl₃) δ 155.4, 141.1, 129.4, 121.7, 116.1, 113.0, 64.8, 39.6, 18.0,

12.0; HRMS (ESI) m/z : $[M + Na]^+$ Calcd for $C_{17}H_{30}O_2SiNa$ 317.1913; Found 317.1909.



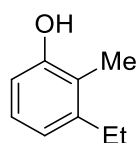
2-(But-3-en-1-yl)phenol (**32**)

3-Hydroxy-2H-pyran-2-one (67.2 mg, 0.6 mmol, 3 eq) and 2-nitrohexa-1,5-diene (25.4 mg, 0.2 mmol, 1 eq) were subjected to the general procedure for 1 h. Purification by FCC (40:1 hexanes:EtOAc) yielded **32** as a colorless oil (18 mg, 61%). Spectroscopic data for **32** matched those previously reported.⁸



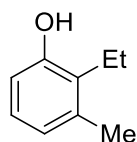
Ethyl 3-hydroxybenzoate (**33**)

3-Hydroxy-2H-pyran-2-one (89.6 mg, 0.8 mmol, 4 eq) and ethyl 3-nitroacrylate (29.0 mg, 0.2 mmol, 1 eq) were subjected to the general procedure for 10 min. Purification by FCC (20:1 hexanes:EtOAc) yielded **33** as a white solid (14.6 mg of **33**, 7.1 mg of the corresponding regioisomer, $rr = 2:1$, 65% yield). Spectroscopic data for **33** matched those previously reported.⁹



3-Ethyl-2-methylphenol (**34**)

3-Hydroxy-2H-pyran-2-one (89.6 mg, 0.8 mmol, 4 eq) and ethyl 3-nitroacrylate (23.0 mg, 0.2 mmol, 1 eq) were subjected to the general procedure. Purification by FCC (10:1 hexanes:EtOAc) yielded **34** as a yellow solid (19.0 mg, 70%). Spectroscopic data for **34** matched those previously reported.¹⁰

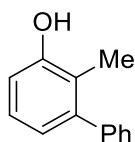


2-Ethyl-3-methylphenol (**35**).

3-Hydroxy-2H-pyran-2-one (89.6 mg, 0.8 mmol, 4 eq) and 3-nitropent-2-ene (23 mg, 0.2 mmol, 1 eq) were subjected to the general procedure. Purification by FCC (20:1 hexanes:EtOAc) yielded **35** as a yellow oil (30.2 mg, 55%).

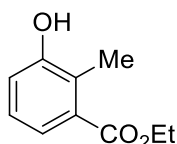
Data for **35**: R_f : 0.48 (5:1 hexanes:EtOAc); IR (thin film) 3387, 2967, 1584, 1465

cm⁻¹; ¹H NMR (700 MHz, CDCl₃) δ 6.96 (t, *J* = 7.7 Hz, 1 H), 6.75 (d, *J* = 7.7 Hz, 1 H), 6.62 (d, *J* = 7.7 Hz, 1 H), 4.61 (s, 1 H), 2.66 (q, *J* = 7.7 Hz, 2 H), 2.31 (s, 3 H), 1.15 (t, *J* = 7.7 Hz, 3 H); ¹³C NMR (176 MHz, CDCl₃) δ 153.3, 137.6, 128.7, 126.2, 122.8, 112.9, 19.5, 19.3, 13.4; HRMS (ESI) *m/z*: [M + H]⁺ Calcd for C₉H₁₃O 137.0966; Found 137.0972.



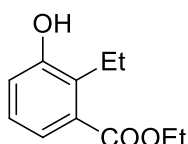
2-Methyl-[1,1'-biphenyl]-3-ol (36)

3-Hydroxy-2H-pyran-2-one (112 mg, 1 mmol, 5 eq) and (2-nitroprop-1-en-1-yl) benzene (32.6 mg, 0.2 mmol, 1 eq) were subjected to the general procedure at 160 °C for 2 days. Purification by FCC (10:1 hexanes:EtOAc) yielded **36** as a yellow oil (26.8 mg, 73%). Spectroscopic data for **36** matched those previously reported.¹¹



Ethyl 3-hydroxy-2-methylbenzoate (37)

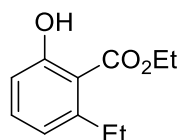
3-Hydroxy-2H-pyran-2-one (89.6 mg, 0.8 mmol, 4 eq) and ethyl 3-nitrobut-2-enoate (31.8 mg, 0.2 mmol, 1 eq) were subjected to the general procedure at 160 °C. Purification by FCC (10:1 hexanes:EtOAc) yielded **37** as a yellow solid (20.9 mg, 58%). Spectroscopic data for **37** matched those previously reported.¹²



Ethyl 2-ethyl-3-hydroxybenzoate (38).

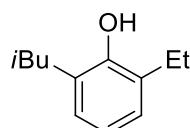
3-Hydroxy-2H-pyran-2-one (67.2 mg, 0.6 mmol, 3 eq) and ethyl 3-nitropent-2-enoate (34.6 mg, 0.2 mmol, 1 eq) were subjected to the general procedure. Purification by FCC (20:1 hexanes:EtOAc) yielded **38** as a yellow solid (15.7 mg of **38**, 8.4 mg of **39** *rr* = 2:1, 63% yield).

Data for **38**: *R*_f: 0.27 (5:1 hexanes:EtOAc); mp: 67 – 69 °C. IR (thin film) 3406, 2978, 2936, 1693, 1585, 1463, 1287 cm⁻¹; ¹H NMR (700 MHz, CDCl₃) δ 7.37 (d, *J* = 7.7 Hz, 1 H), 7.10 (t, *J* = 7.7 Hz, 1 H), 6.92 (d, *J* = 7.7 Hz, 1 H), 5.26 (s, 1 H), 4.36 (q, *J* = 7.0 Hz, 2 H), 2.92 (q, *J* = 7.7 Hz, 2 H), 1.39 (t, *J* = 7.0 Hz, 3 H), 1.23 (t, *J* = 7.7 Hz, 3 H); ¹³C NMR (176 MHz, CDCl₃) δ 168.3, 154.0, 132.0, 131.2, 126.4, 122.5, 118.5, 61.1, 20.3, 14.3, 14.3; HRMS (EI) *m/z*: [M]⁺ Calcd for C₁₁H₁₄O₃ 194.0943; Found 194.0938.



Ethyl 2-ethyl-6-hydroxybenzoate (**39**)

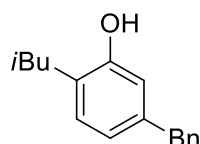
3-Hydroxy-2H-pyran-2-one (89.6 mg, 0.8 mmol, 4 eq) and ethyl 3-nitrobut-2-enoate (34.6 mg, 0.2 mmol, 1 eq) were subjected to the general procedure. Purification by FCC (100:1 hexanes:EtOAc) yielded **39** as a colorless oil (6.3 mg, 16%). Spectroscopic data for **39** matched those previously reported.¹³



2-Ethyl-6-isobutylphenol (**40**).

3-Hydroxy-4-isobutyl-2H-pyran-2-one (67.2 mg, 0.4 mmol, 2 eq) and 2-nitrobut-1-ene (20.2 mg, 0.2 mmol, 1 eq) were subjected to the general procedure for 15 min. Purification by FCC (40:1 hexanes:EtOAc) yielded **40** as a yellow oil (23.6 mg, 66%).

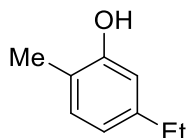
Data for **40**: R_f: 0.57 (7:1 hexanes:EtOAc); IR (thin film) 3580, 2958, 2931, 2869, 1457, 1188 cm⁻¹; ¹H NMR (700 MHz, CDCl₃) δ 7.01 (dd, *J* = 7.0, 1.4 Hz, 1 H), 6.95 (dd, *J* = 7.0, 1.4 Hz, 1 H), 6.82 (t, *J* = 7.0 Hz, 1 H), 4.63 (s, 1 H), 2.64 (q, *J* = 7.7 Hz, 2 H), 2.48 (d, *J* = 7.7 Hz, 2 H), 1.93 (sept, *J* = 7.0 Hz, 1 H), 1.25 (t, *J* = 7.7 Hz, 3 H), 0.95 (d, *J* = 7.0 Hz, 6 H); ¹³C NMR (176 MHz, CDCl₃) δ 151.5, 129.3, 128.8, 126.8, 126.7, 120.2, 39.5, 28.9, 23.1, 22.7, 14.0; HRMS (EI) *m/z*: [M]⁺ Calcd for C₁₂H₁₈O 178.1358; Found 178.1353.



5-Benzyl-2-isobutylphenol (**41**).

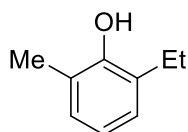
3-Hydroxy-4-isobutyl-2H-pyran-2-one (67.2 mg, 0.4 mmol, 2 eq) and (3-nitroallyl) benzene (27.2 mg, 0.2 mmol, 1 eq) were subjected to the general procedure for 4 h. Purification by FCC (40:1 hexanes:EtOAc) yielded **41** as a yellow oil (24.4 mg, 51%).

Data for **41**: R_f: 0.15 (5:1 hexanes: CH₂Cl₂); IR (thin film) 3534, 3431, 3027, 2954, 2925, 2867, 1425 cm⁻¹; ¹H NMR (700 MHz, CDCl₃) δ 7.30 (t, *J* = 7.7 Hz, 2 H), 7.23 - 7.20 (m, 3 H), 7.00 (d, *J* = 7.7 Hz, 1 H), 6.73 (dd, *J* = 7.7, 1.4 Hz, 1 H), 6.57 (d, *J* = 1.4 Hz, 1 H), 4.58 (s, 1 H), 3.92 (s, 2 H), 2.45 (d, *J* = 7.0 Hz, 2 H), 1.92 (sept, *J* = 7.0 Hz, 1 H), 0.94 (d, *J* = 7.0 Hz, 6 H); ¹³C NMR (176 MHz, CDCl₃) δ 153.6, 141.1, 140.4, 131.2, 129.0, 128.5, 126.1, 125.1, 121.1, 115.8, 41.5, 39.0, 28.9, 22.6; HRMS (EI) *m/z*: [M]⁺ Calcd for C₁₇H₂₀O 240.1514; Found 240.1513.



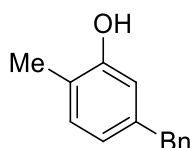
2-Methyl-5-ethylphenol (42)

3-Hydroxy-4-methyl-2H-pyran-2-one (75.6 mg, 0.6 mmol, 3 eq) and 1-nitrobut-1-ene (20.2 mg, 0.2 mmol, 1 eq) were subjected to the general procedure for 3 h. Purification by FCC (15:1 hexanes:EtOAc) yielded **42** as a yellow oil (22.3 mg, 82%). Spectroscopic data for **42** matched those previously reported.¹⁴



2-Ethyl-6-methylphenol (43)

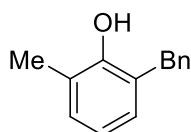
3-Hydroxy-4-methyl-2H-pyran-2-one (50.4 mg, 0.4 mmol, 2 eq) and 2-nitrobut-1-ene (20.2 mg, 0.2 mmol, 1 eq) were subjected to the general procedure for 15 min. Purification by FCC (30:1 hexanes:EtOAc) yielded **43** as a yellow oil (19.3 mg, 71%). Spectroscopic data for **43** matched those previously reported.¹⁵



5-Benzyl-2-methylphenol (44).

3-Hydroxy-4-methyl-2H-pyran-2-one (50.4 mg, 0.4 mmol, 2 eq) and (3-nitroallyl) benzene (32.6 mg, 0.2 mmol, 1 eq) were subjected to the general procedure. Purification by FCC (40:1 hexanes:EtOAc) yielded **44** as a yellow solid (26.6 mg, 67%).

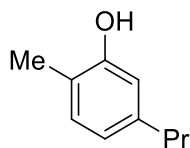
Data for **44**: R_f: 0.48 (7:1 hexanes: EtOAc); mp: 34 – 35 °C; IR (thin film) 3565, 3027, 2957, 2922, 1594, 1470, 1199 cm⁻¹; ¹H NMR (700 MHz, CDCl₃) δ 7.31 (t, *J* = 7.7 Hz, 2 H), 7.23 – 7.20 (m, 3 H), 7.06 (d, *J* = 7.7 Hz, 1 H), 6.73 (d, *J* = 7.7 Hz, 1 H), 6.58 (s, 1 H), 4.65 (d, *J* = 2.8 Hz, 1 H), 3.92 (s, 2 H), 2.23 (s, 3 H); ¹³C NMR (176 MHz, CDCl₃) δ 153.8, 141.1, 140.5, 131.0, 129.0, 128.5, 126.1, 121.4, 121.3, 115.5, 41.5, 15.4; HRMS (ESI) *m/z*: [M + H]⁺ Calcd for C₁₄H₁₅O 199.1123; Found 199.1116.



2-Benzyl-6-methylphenol (45)

3-Hydroxy-4-methyl-2H-pyran-2-one (50.4 mg, 0.4 mmol, 2 eq) and (2-nitroallyl) benzene (32.6 mg, 0.2 mmol, 1 eq) were subjected to the general procedure for 45

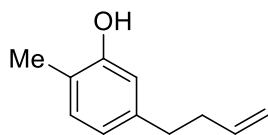
min. Purification by FCC (20:1 hexanes:EtOAc) yielded **45** as a white solid (31.7 mg, 80%). Spectroscopic data for **45** matched those previously reported.¹⁶



2-Methyl-5-propylphenol (**46**).

3-Hydroxy-4-methyl-2H-pyran-2-one (50.4 mg, 0.4 mmol, 2 eq) and 1-nitropent-1-ene (23 mg, 0.2 mmol, 1 eq) were subjected to the general procedure at 180 °C for 1 hour. Purification by FCC (20:1 hexanes:EtOAc) yielded **46** as a yellow oil (23.2 mg, 77%).

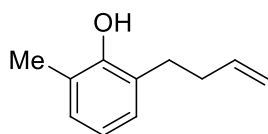
Data for **46**: R_f: 0.45 (5:1 hexanes: EtOAc); IR (thin film) 3392, 2959, 2929, 2871, 1587, 1456, 1420, 1244 cm⁻¹; ¹H NMR (700 MHz, CDCl₃) δ 7.03 (d, *J* = 7.7 Hz, 1 H), 6.69 (dd, *J* = 7.7, 1.4 Hz, 1 H), 6.62 (d, *J* = 1.4 Hz, 1 H), 4.69 (s, 1 H), 2.52 (t, *J* = 7.7 Hz, 2 H), 2.23 (s, 3 H), 1.63 (sext, *J* = 7.7 Hz, 2 H), 0.95 (t, *J* = 7.7 Hz, 3 H); ¹³C NMR (176 MHz, CDCl₃) δ 153.6, 142.1, 130.8, 120.9, 120.7, 115.0, 37.6, 24.5, 15.4, 13.9; HRMS (EI) *m/z*: [M]⁺ Calcd for C₁₀H₁₄O 150.1045; Found 150.1051.



5-(But-3-en-1-yl)-2-methylphenol (**47**).

3-Hydroxy-4-methyl-2H-pyran-2-one (50.4 mg, 0.4 mmol, 2 eq) and 1-nitrohexa-1,5-diene (25.4 mg, 0.2 mmol, 1 eq) were subjected to the general procedure for 6 h. Purification by FCC (20:1 hexanes:EtOAc) yielded **47** as a yellow oil (19.8 mg, 61%).

Data for **47**: R_f: 0.43 (5:1 hexanes:EtOAc); IR (thin film) 3400, 2977, 2925, 2856, 1640, 1587, 1419 cm⁻¹; ¹H NMR (700 MHz, CDCl₃) δ 7.03 (d, *J* = 7.0 Hz, 1 H), 6.69 (d, *J* = 7.0 Hz, 1 H), 6.63 (s, 1 H), 5.86 (ddt, *J* = 16.8, 10.5, 6.3 Hz, 1 H), 5.47 (d, *J* = 17.5 Hz, 1 H), 4.98 (d, *J* = 10.5 Hz, 1 H), 4.66 (s, 1 H), 2.64 (t, *J* = 7.7 Hz, 2 H), 2.35 (q, *J* = 7.7 Hz, 2 H), 2.22 (s, 3 H); ¹³C NMR (176 MHz, CDCl₃) δ 153.6, 141.2, 138.1, 130.8, 120.9, 120.8, 115.0, 114.9, 35.5, 34.9, 15.4; HRMS (EI) *m/z*: [M]⁺ Calcd for C₁₁H₁₄O 162.1045; Found 162.1042.

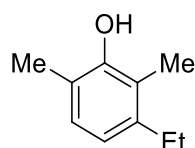


2-(But-3-en-1-yl)-6-methylphenol (**48**).

3-Hydroxy-4-methyl-2H-pyran-2-one (50.4 mg, 0.4 mmol, 2 eq) and 2-nitrohexa-1,5-diene (25.4 mg, 0.2 mmol, 1 eq) were subjected to the general procedure for 15 min.

Purification by FCC (50:1 hexanes:EtOAc) yielded **48** as a colorless oil (17.1 mg, 53%).

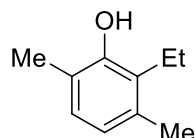
Data for **48**: R_f: 0.57 (5:1 hexanes:EtOAc); IR (thin film) 3568, 2923, 2854, 1640, 1594, 1468 cm⁻¹; ¹H NMR (700 MHz, CDCl₃) δ 6.99 (d, *J* = 7.7 Hz, 2 H), 6.79 (t, *J* = 7.7 Hz, 1 H), 5.91 (ddt, *J* = 16.8, 13.3, 7.0 Hz, 1 H), 5.09 (dd, *J* = 17.5, 1.4 Hz, 1 H), 5.05 (d, *J* = 10.5 Hz, 1 H), 4.63 (s, 1 H), 2.71 (t, *J* = 7.7 Hz, 2 H), 2.38 (q, *J* = 7.7 Hz, 2 H), 2.26 (s, 3 H); ¹³C NMR (176 MHz, CDCl₃) δ 151.8, 138.3, 128.7, 127.9, 127.2, 123.0, 120.3, 115.2, 33.9, 29.8, 15.9; HRMS (EI) m/z: [M]⁺ Calcd for C₁₁H₁₄O 162.1045; Found 162.1044.



3-Ethyl-2,6-dimethylphenol (**49**).

3-Hydroxy-4-methyl-2H-pyran-2-one (100 mg, 0.8 mmol, 2 eq) and 2-nitropent-2-ene (23 mg, 0.2 mmol, 1 eq) were subjected to the general procedure. Purification by FCC (10:1 hexanes:EtOAc) yielded **49** as a yellow oil (24.2 mg, 81%).

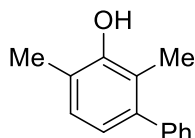
Data for **49**: R_f: 0.54 (5:1 hexanes: EtOAc); IR (thin film) 3427, 2960, 2927, 2869, 1493 cm⁻¹; ¹H NMR (700 MHz, CDCl₃) δ 6.92 (d, *J* = 7.7 Hz, 1 H), 6.70 (d, *J* = 7.7 Hz, 1 H), 4.62 (s, 1 H), 2.62 (q, *J* = 7.7 Hz, 2 H), 2.23 (s, 3 H), 2.21 (s, 3 H), 1.19 (t, *J* = 7.7 Hz, 3 H); ¹³C NMR (176 MHz, CDCl₃) δ 152.1, 141.7, 127.7, 121.1, 120.2, 120.2, 26.6, 15.9, 15.0, 11.2; HRMS (EI) m/z: [M]⁺ Calcd for C₁₀H₁₄O 150.1045; Found 150.1049.



2-Ethyl-3,6-dimethylphenol (**50**).

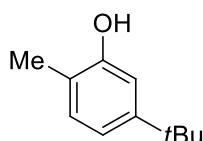
3-Hydroxy-4-methyl-2H-pyran-2-one (100 mg, 0.8 mmol, 2 eq) and 3-nitropent-2-ene (23 mg, 0.2 mmol, 1 eq) were subjected to the general procedure. Purification by FCC (15:1 hexanes:EtOAc) yielded **50** as a yellow oil (22.5 mg, 75%).

Data for **50**: R_f: 0.48 (7:1 hexanes: EtOAc); IR (thin film) 3571, 2966, 2933, 2872, 1464 cm⁻¹; ¹H NMR (700 MHz, CDCl₃) δ 6.87 (d, *J* = 7.7 Hz, 1 H), 6.67 (d, *J* = 7.7 Hz, 1 H), 4.59 (s, 1 H), 2.66 (q, *J* = 7.7 Hz, 2 H), 2.28 (s, 3 H), 2.22 (s, 3 H), 1.15 (t, *J* = 7.7 Hz, 3 H); ¹³C NMR (176 MHz, CDCl₃) δ 151.7, 134.9, 128.0, 127.6, 122.1, 120.4, 19.7, 19.2, 15.8, 13.4; HRMS (EI) m/z: [M]⁺ Calcd for C₁₀H₁₄O 150.1045; Found 150.1049.



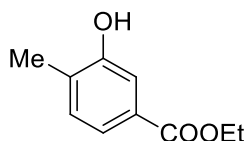
2,4-Dimethyl-[1,1'-biphenyl]-3-ol (**51**)

3-Hydroxy-4-methyl-2H-pyran-2-one (75.6 mg, 0.6 mmol, 2 eq) and (2-nitroprop-1-en-1-yl)benzene (32.6 mg, 0.2 mmol, 1 eq) were subjected to the general procedure. Purification by FCC (15:1 hexanes:EtOAc) yielded **51** as a solid (26.5 mg, 67%). Spectroscopic data for **51** matched those previously reported.¹¹



5-(*Tert*-butyl)-2-methylphenol (**52**)

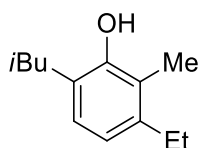
3-Hydroxy-4-methyl-2H-pyran-2-one (50.4 mg, 0.4 mmol, 2 eq) and 3,3-dimethyl-1-nitrobut-1-ene (25.8 mg, 0.2 mmol, 1 eq) were subjected to the general procedure. Purification by FCC (10:1 hexanes:EtOAc) yielded **52** as yellow solid (25.0 mg, 76%). Spectroscopic data for **52** matched those previously reported.¹⁷



Ethyl 3-hydroxy-4-methylbenzoate (**53**).

3-Hydroxy-4-methyl-2H-pyran-2-one (50.4 mg, 0.4 mmol, 2 eq) and ethyl 3-nitroacrylate (29 mg, 0.2 mmol, 1 eq) were subjected to the general procedure for 10 min. Purification by FCC (20:1 hexanes:EtOAc) yielded **53** as a yellow solid (22.9 mg, 7.5 mg of the corresponding regioisomer, rr = 3:1, 84% yield).

Data for **53**: R_f: 0.33 (5:1 hexanes: EtOAc); mp: 79 – 80 °C; IR (thin film) 3431, 2983, 1698 cm⁻¹; ¹H NMR (700 MHz, CDCl₃) δ 7.63 (d, *J* = 1.4 Hz, 1 H), 7.52 (dd, *J* = 7.7, 1.4 Hz, 1 H), 7.17 (d, *J* = 7.7 Hz, 1 H), 6.12 (brs, 1 H), 4.37 (q, *J* = 7.0 Hz, 2 H), 2.31 (s, 3 H), 1.39 (t, *J* = 7.0 Hz, 3 H); ¹³C NMR (176 MHz, CDCl₃) δ 167.2, 154.2, 130.9, 130.3, 129.1, 121.7, 115.8, 61.2, 16.2, 14.3; HRMS (ESI) *m/z*: [M + H]⁺ Calcd for C₁₀H₁₃O₃ 181.0865; Found 181.0870.

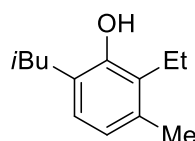


3-Ethyl-6-isobutyl-2-methylphenol (**54**).

3-Hydroxy-4-isobutyl-2H-pyran-2-one (50.4 mg, 0.3 mmol, 3 eq) and 2-nitropent-2-ene (11.5 mg, 0.1 mmol, 1 eq) were subjected to the general procedure. Purification

by FCC (15:1 hexanes:EtOAc) yielded **54** as a yellow oil (13.4 mg, 70%)

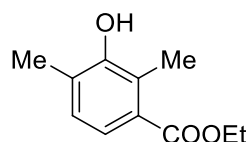
Data for **54**: R_f: 0.48 (7:1 hexanes:EtOAc); IR (thin film) 3575, 2959, 2931, 2869, 1428 cm⁻¹; ¹H NMR (700 MHz, CDCl₃) δ 6.87 (d, *J* = 7.7 Hz, 1 H), 6.71 (d, *J* = 7.7 Hz, 1 H), 4.63 (s, 1 H), 2.62 (q, *J* = 7.0 Hz, 2 H), 2.44 (d, *J* = 7.0 Hz, 2 H), 2.20 (s, 3 H), 1.90 (sept, *J* = 7.0 Hz, 1 H), 1.19 (t, *J* = 7.0 Hz, 3 H), 0.95 (d, *J* = 7.0 Hz, 6 H); ¹³C NMR (176 MHz, CDCl₃) δ 151.8, 141.5, 128.0, 123.9, 121.2, 120.0, 39.6, 28.9, 26.7, 22.7, 14.8, 11.3; HRMS (EI) *m/z*: [M]⁺ Calcd for C₁₃H₂₀O 192.1514; Found 192.1523.



2-Ethyl-6-isobutyl-3-methylphenol (**55**).

3-Hydroxy-4-isobutyl-2H-pyran-2-one (50.4 mg, 0.3 mmol, 3 eq) and 3-nitropent-2-ene (11.5 mg, 0.1 mmol, 1 eq) were subjected to the general procedure. Purification by FCC (50:1 hexanes:EtOAc) yielded **55** as a yellow oil (13.5 mg, 70%).

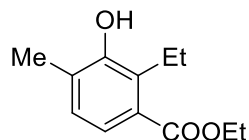
Data for **55**: R_f: 0.52 (10:1 hexanes:EtOAc); IR (thin film) 3623, 3583, 2957, 2931, 2867, 1460 cm⁻¹; ¹H NMR (700 MHz, CDCl₃) δ 6.82 (d, *J* = 7.0 Hz, 1 H), 6.69 (d, *J* = 7.0 Hz, 1 H), 4.63 (s, 1 H), 2.66 (q, *J* = 7.0 Hz, 2 H), 2.43 (d, *J* = 7.0 Hz, 2 H), 2.29 (s, 3 H), 1.90 (sept, *J* = 7.0 Hz, 1 H), 1.15 (t, *J* = 7.0 Hz, 3 H), 0.95 (d, *J* = 7.0 Hz, 6 H); ¹³C NMR (176 MHz, CDCl₃) δ 151.5, 134.9, 128.2, 127.9, 124.2, 121.9, 39.6, 29.0, 22.7, 19.8, 19.3, 13.5; HRMS (EI) *m/z*: [M]⁺ Calcd for C₁₃H₂₀O 192.1514; Found 192.1522.



Ethyl 3-hydroxy-2,4-dimethylbenzoate (**56**).

3-Hydroxy-4-methyl-2H-pyran-2-one (189 mg, 1.5 mmol, 1.5 eq) and ethyl 3-nitrobut-2-enoate (159 mg, 1 mmol, 1 eq) were subjected to the general procedure. Purification by FCC (20:1 hexanes:EtOAc) yielded **56** as a yellow solid (128.2 mg of **56**, 45.2 mg of the corresponding regioisomer, *rr* = 2.8:1, 89% yield).

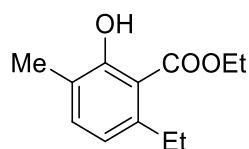
Data for **56**: R_f: 0.42 (5:1 hexanes:EtOAc); mp: 35 – 37 °C; IR (thin film) 3473, 2980, 2926, 1697 cm⁻¹; ¹H NMR (700 MHz, CDCl₃) δ 7.36 (d, *J* = 7.7 Hz, 1 H), 6.99 (d, *J* = 7.7 Hz, 1 H), 5.26 (s, 1 H), 4.34 (q, *J* = 7.0 Hz, 2 H), 2.47 (s, 3 H), 2.27 (s, 3 H), 1.38 (t, *J* = 7.0 Hz, 3 H); ¹³C NMR (176 MHz, CDCl₃) δ 168.3, 152.7, 129.5, 127.7, 127.6, 124.8, 122.3, 60.9, 16.5, 14.3, 12.7; HRMS (ESI) *m/z*: [M + H]⁺ Calcd for C₁₁H₁₅O₃ 195.1021; Found 195.1018.



Ethyl 2-ethyl-3-hydroxy-4-methylbenzoate (57).

3-Hydroxy-4-methyl-2H-pyran-2-one (50.4 mg, 0.4 mmol, 2 eq) and ethyl 3-nitropent-2-enoate (34.6 mg, 0.2 mmol, 1 eq) were subjected to the general procedure. Purification by FCC (20:1 hexanes:EtOAc) yielded **57** as a yellow solid (28.5 mg of **57**, 9.6 mg of **58**, rr = 3:1, yield: 91%).

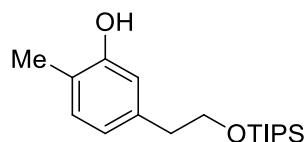
Data for **57**: R_f: 0.30 (5:1 hexanes:EtOAc); mp: 38 – 40 °C; IR (thin film) 3486, 2978, 2936, 2875, 1699, 1271 cm⁻¹; ¹H NMR (700 MHz, CDCl₃) δ 7.34 (d, *J* = 7.7 Hz, 1 H), 7.01 (d, *J* = 7.7 Hz, 1 H), 5.02 (s, 1 H), 4.34 (q, *J* = 7.0 Hz, 2 H), 2.95 (q, *J* = 7.0 Hz, 2 H), 2.28 (s, 3 H), 1.38 (t, *J* = 7.0 Hz, 3 H), 1.23 (t, *J* = 7.0 Hz, 3 H); ¹³C NMR (176 MHz, CDCl₃) δ 168.1, 152.3, 130.6, 129.3, 127.8, 127.5, 122.4, 60.8, 20.4, 16.4, 14.3; HRMS (ESI) *m/z*: [M + H]⁺ Calcd for C₁₂H₁₇O₃ 209.1178; Found 209.1178.



Ethyl 6-ethyl-2-hydroxy-3-methylbenzoate (58).

3-Hydroxy-4-methyl-2H-pyran-2-one (50.4 mg, 0.4 mmol, 2 eq) and ethyl 2-nitropent-2-enoate (34.6 mg, 0.2 mmol, 1 eq) were subjected to the general procedure for 7 h. Purification by FCC (20:1 hexanes:EtOAc) yielded **58** as a yellow oil (15 mg, 36%),

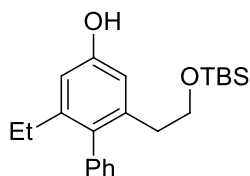
Data for **58**: R_f: 0.75 (5:1 hexanes:EtOAc); IR (thin film) 2978, 2932, 1655, 1248 cm⁻¹; ¹H NMR (700 MHz, CDCl₃) δ 11.51 (d, *J* = 0.7 Hz, 1 H), 7.18 (d, *J* = 7.7 Hz, 1 H), 6.65 (d, *J* = 7.7 Hz, 1 H), 4.44 (q, *J* = 7.0 Hz, 2 H), 2.91 (q, *J* = 7.0 Hz, 2 H), 2.22 (s, 3 H), 1.44 (t, *J* = 7.0 Hz, 3 H), 1.20 (t, *J* = 7.0 Hz, 3 H); ¹³C NMR (176 MHz, CDCl₃) δ 172.0, 160.9, 144.8, 135.1, 124.2, 120.9, 111.2, 61.6, 29.6, 16.4, 15.9, 14.0; HRMS (ESI) *m/z*: [M + H]⁺ Calcd for C₁₂H₁₇O₃ 209.1178; Found 209.1182.



2-Methyl-5-(2-((triisopropylsilyl)oxy)ethyl)phenol (59).

3-Hydroxy-4-methyl-2H-pyran-2-one (50.4 mg, 0.4 mmol, 2 eq) and triisopropyl((4-nitrobut-3-en-1-yl)oxy)silane (54.6 mg, 0.2 mmol, 1 eq) were subjected to the general procedure. Purification by FCC (20:1 hexanes:EtOAc) yielded **59** as a yellow oil (48.2 mg, 78%).

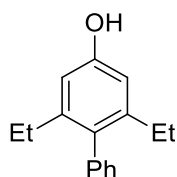
Data for **59**: R_f: 0.56 (5:1 hexanes:EtOAc); IR (thin film) 3384, 2953, 2892, 2866, 1462 cm⁻¹; ¹H NMR (700 MHz, CDCl₃) δ 7.03 (d, *J* = 7.7 Hz, 1 H), 6.71 (d, *J* = 7.7 Hz, 1 H), 6.65 (s, 1 H), 4.76 (s, 1 H), 3.85 (t, *J* = 7.7 Hz, 2 H), 2.80 (t, *J* = 7.7 Hz, 2 H), 2.22 (s, 3 H), 1.13 – 1.07 (m, 3 H), 1.06 (d, *J* = 6.3 Hz, 18 H); ¹³C NMR (176 MHz, CDCl₃) δ 153.6, 138.3, 130.8, 121.4, 121.3, 115.7, 65.0, 39.3, 18.0, 15.4, 12.0; HRMS (ESI) m/z: [M + Na]⁺ Calcd for C₁₈H₃₂O₂SiNa 331.2069; Found 331.2066.



2-(2-((Tert-butyldimethylsilyloxy)ethyl)-6-ethyl-[1,1'-biphenyl]-4-ol (**60**).

5-Ethyl-3-hydroxy-6-phenyl-2H-pyran-2-one (21.6 mg, 0.1 mmol, 1 eq) and tert-butyldimethyl ((4-nitrobut-3-en-1-yl)oxy)silane (46.2 mg, 0.2 mmol, 2 eq) were subjected to the general procedure. Purification by FCC (20:1 hexanes:EtOAc) yielded **60** as a yellow solid (13.2 mg, 37%).

Data for **60**: R_f: 0.42 (5:1 hexanes:EtOAc); mp: 74 – 78 °C; IR (thin film) 3339, 2957, 2929, 2857, 1609, 1456 cm⁻¹; ¹H NMR (700 MHz, CDCl₃) δ 7.39 (t, *J* = 7.0 Hz, 2 H), 7.33 (t, *J* = 7.0 Hz, 1 H), 7.14 (d, *J* = 7.0 Hz, 2 H), 6.64 (d, *J* = 2.8 Hz, 2 H), 4.76 (s, 1 H), 3.56 (t, *J* = 7.7 Hz, 2 H), 2.53 (t, *J* = 7.7 Hz, 2 H), 2.27 (q, *J* = 7.7 Hz, 2 H), 1.00 (t, *J* = 7.7 Hz, 3 H), 0.81 (s, 9 H), -0.13 (s, 6 H); ¹³C NMR (176 MHz, CDCl₃) δ 154.5, 144.3, 139.9, 138.3, 134.3, 130.1, 128.2, 126.7, 114.0, 112.9, 64.1, 37.4, 26.9, 26.0, 18.3, 15.4, -5.4; HRMS (ESI) m/z: [M + Na]⁺ Calcd for C₂₂H₃₂O₂SiNa 379.2069; Found 379.2063.

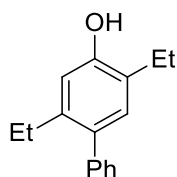


2,6-Diethyl-[1,1'-biphenyl]-4-ol (**61**).

5-Ethyl-3-hydroxy-6-phenyl-2H-pyran-2-one (21.6 mg, 0.1 mmol, 1 eq) and 1-nitrobut-1-ene (80.8 mg, 0.8 mmol, 8 eq) were subjected to the general procedure with hydroquinone (1.1 mg, 0.01 mmol, 0.1eq) added as an additional radical inhibitor. Purification by FCC (20:1 hexanes:EtOAc) yielded **61** as a yellow solid (11.2 mg, 50%).

Data for **61**: R_f: 0.36 (5:1 hexanes:EtOAc); mp: 99 – 101 °C; IR (thin film) 3357, 2965, 2933, 2871, 1609, 1454 cm⁻¹; ¹H NMR (700 MHz, CDCl₃) δ 7.40 (dt, *J* = 7.7, 1.4 Hz, 2 H), 7.34 (tt, *J* = 7.7, 1.4 Hz, 1 H), 7.16 (dd, *J* = 7.7, 1.4 Hz, 2 H), 6.64 (s, 2 H), 4.78 (s, 2 H), 2.29 (q, *J* = 7.7 Hz, 4 H), 1.02 (t, *J* = 7.7 Hz, 6 H); ¹³C NMR (176 MHz, CDCl₃) δ 154.7, 144.1, 140.2, 133.7, 130.1, 128.0, 126.6, 112.3, 26.9, 15.4;

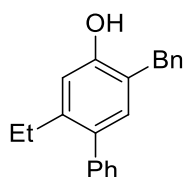
HRMS (EI) m/z : $[M]^+$ Calcd for $C_{16}H_{18}O$ 226.1358; Found 226.1365.



2,5-Diethyl-[1,1'-biphenyl]-4-ol (62).

5-Ethyl-3-hydroxy-6-phenyl-2H-pyran-2-one (43.2 mg, 0.2 mmol, 1 eq) and 2-nitrobut-1-ene (60.6 mg, 0.6 mmol, 3 eq) were subjected to the general procedure at 180 °C for 7 h. Purification by FCC (20:1 hexanes:EtOAc) yielded **62** as a yellow solid (22.5 mg, 50%).

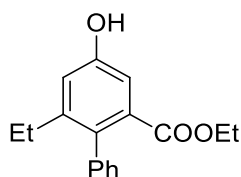
Data for **62**: R_f : 0.39 (5:1 hexanes:EtOAc); mp: 65 – 67 °C; IR (thin film) 3400, 2965, 2930, 2872, 1615, 1488 cm^{-1} ; 1H NMR (700 MHz, $CDCl_3$) δ 7.40 (t, $J = 7.0$ Hz, 2 H), 7.34 – 7.31 (m, 3 H), 7.01 (s, 1 H), 6.74 (s, 1 H), 4.74 (s, 1 H), 2.66 (q, $J = 7.7$ Hz, 2 H), 2.55 (q, $J = 7.7$ Hz, 2 H), 1.27 (t, $J = 7.7$ Hz, 3 H), 1.10 (t, $J = 7.7$ Hz, 3 H); ^{13}C NMR (176 MHz, $CDCl_3$) δ 152.7, 141.9, 140.5, 134.4, 130.9, 129.5, 128.0, 126.9, 126.5, 115.0, 25.8, 22.6, 15.6, 14.1; HRMS (EI) m/z : $[M]^+$ Calcd for $C_{16}H_{18}O$ 226.1358; Found 226.1369.



5-Benzyl-2-ethyl-[1,1'-biphenyl]-4-ol (63).

5-Ethyl-3-hydroxy-6-phenyl-2H-pyran-2-one (86.4 mg, 0.4 mmol, 2 eq) and (2-nitroallyl) benzene (32.6 mg, 0.2 mmol, 1 eq) were subjected to the general procedure for 6 h. Purification by FCC (10:1 hexanes:EtOAc) yielded **63** as a yellow solid (38.2 mg, 66%).

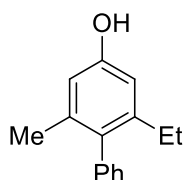
Data for **63**: R_f : 0.39 (5:1 hexanes:EtOAc); mp: 93 – 97 °C; IR (thin film) 3534, 3027, 2966, 2930, 1614, 1488 cm^{-1} ; 1H NMR (700 MHz, $CDCl_3$) δ 7.40 (dt, $J = 7.0, 1.4$ Hz, 2 H), 7.34 (tt, $J = 7.0, 1.4$ Hz, 1 H), 7.32 – 7.29 (m, 6 H), 7.23 (tt, $J = 7.7, 1.4$ Hz, 1 H), 7.03 (s, 1 H), 6.76 (s, 1 H), 4.73 (s, 1 H), 4.02 (s, 2 H), 2.57 (q, $J = 7.7$ Hz, 2 H), 1.12 (t, $J = 7.7$ Hz, 3 H); ^{13}C NMR (176 MHz, $CDCl_3$) δ 153.1, 141.7, 141.4, 140.0, 134.5, 132.6, 129.6, 128.7, 128.7, 128.0, 126.5, 126.4, 124.1, 115.7, 36.2, 25.9, 15.6; HRMS (EI) m/z : $[M]^+$ Calcd for $C_{21}H_{20}O$ 288.1514; Found 288.1526.



Ethyl 6-ethyl-4-hydroxy-[1,1'-biphenyl]-2-carboxylate (**64**).

5-Ethyl-3-hydroxy-6-phenyl-2H-pyran-2-one (43.2 mg, 0.2 mmol, 1 eq) and 1-nitropent-1-ene (58 mg, 0.4 mmol, 2 eq) were subjected to the general procedure. Purification by FCC (20:1 hexanes:EtOAc) yielded **64** as a yellow solid (14.1 mg of **64**, 10.5 mg of the corresponding regioisomer, rr = 1.4:1, 46% yield).

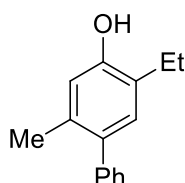
Data for **64**: R_f: 0.33 (5:1 hexanes:EtOAc); mp: 101 – 103 °C; IR (thin film) 3386, 2970, 2933, 1703, 1609 cm⁻¹; ¹H NMR (700 MHz, CDCl₃) δ 7.35 (tt, *J* = 7.0, 1.4 Hz, 2 H), 7.32 (tt, *J* = 7.0, 1.4 Hz, 1 H), 7.17 (d, *J* = 2.7 Hz, 1 H), 7.16 (td, *J* = 7.0, 1.4 Hz, 2 H), 6.93 (d, *J* = 2.8 Hz, 1 H), 5.32 (brs, 1 H), 3.95 (q, *J* = 7.0 Hz, 2 H), 2.38 (q, *J* = 7.7 Hz, 2 H), 1.02 (t, *J* = 7.0 Hz, 3 H), 0.88 (t, *J* = 7.7 Hz, 3 H); ¹³C NMR (176 MHz, CDCl₃) δ 168.7, 154.6, 145.2, 139.8, 133.8, 133.3, 129.5, 127.7, 126.7, 118.3, 113.6, 60.9, 26.5, 15.3, 13.5; HRMS (ESI) *m/z*: [M + H]⁺ Calcd for C₁₇H₁₉O₃ 271.1334; Found 271.1322.



2-Ethyl-6-methyl-[1,1'-biphenyl]-4-ol (**65**).

3-Hydroxy-5-methyl-6-phenyl-2H-pyran-2-one (20.2 mg, 0.1 mmol, 1 eq) and 1-nitrobut-1-ene (50.5 mg, 0.5 mmol, 5 eq) were subjected to the general procedure, except 2,6-di-tertbutyl phenol (10.3 mg, 0.05 mmol, 0.5 eq) was used as a radical inhibitor instead of BHT. Purification by FCC (20:1 hexanes:EtOAc) yielded **65** as a yellow solid (10.4 mg, 49%).

Data for **65**: R_f: 0.45 (5:1 hexanes:EtOAc); mp: 89 – 93 °C; IR (thin film) 3306, 2968, 2926, 1593, 1460, 1299 cm⁻¹; ¹H NMR (700 MHz, CDCl₃) δ 7.40 (t, *J* = 7.7 Hz, 2 H), 7.33 (t, *J* = 7.7 Hz, 1 H), 7.14 (d, *J* = 7.7 Hz, 2 H), 6.63 (d, *J* = 2.1 Hz, 1 H), 6.60 (d, *J* = 2.1 Hz, 1 H), 4.65 (s, 1 H), 2.30 (q, *J* = 7.7 Hz, 2 H), 1.97 (s, 3 H), 1.02 (t, *J* = 7.7 Hz, 3 H); ¹³C NMR (176 MHz, CDCl₃) δ 154.4, 144.0, 140.5, 137.9, 134.2, 129.9, 128.3, 126.5, 113.9, 112.2, 26.8, 21.0, 15.4; HRMS (ESI) *m/z*: [M + H]⁺ Calcd for C₁₅H₁₇O 213.1279; Found 213.1274.

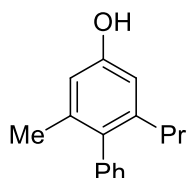


5-Ethyl-2-methyl-[1,1'-biphenyl]-4-ol (**66**).

3-Hydroxy-5-methyl-6-phenyl-2H-pyran-2-one (20.2 mg, 0.1 mmol, 1 eq) and 2-nitrobut-1-ene (50.5 mg, 0.5 mmol, 5 eq) were subjected to the general procedure, except 2,6-di-tertbutyl phenol (10.3 mg, 0.05 mmol, 0.5 eq) was used as a radical

inhibitor instead of BHT. Purification by FCC (20:1 hexanes:EtOAc) yielded **66** as a yellow solid (9.5 mg, 45%).

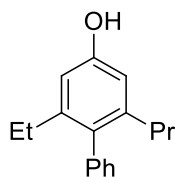
Data for **66**: R_f: 0.40 (5:1 hexanes:EtOAc); mp: 56 – 56 °C; IR (thin film) 3406, 2965, 2929, 1615 cm⁻¹; ¹H NMR (700 MHz, CDCl₃) δ 7.40 (t, *J* = 7.7 Hz, 2 H), 7.33 – 7.31 (m, 3 H), 7.03 (s, 1 H), 6.70 (s, 1 H), 4.69 (s, 1 H), 2.65 (q, *J* = 7.7 Hz, 2 H), 2.22 (s, 3 H), 1.26 (t, *J* = 7.7 Hz, 3 H); ¹³C NMR (176 MHz, CDCl₃) δ 152.4, 141.8, 134.7, 134.1, 130.9, 129.5, 128.0, 127.1, 126.4, 116.8, 22.6, 20.1, 14.2; HRMS (ESI) *m/z*: [M + H]⁺ Calcd for C₁₅H₁₇O 213.1255; Found 213.1260.



2-Methyl-6-propyl-[1,1'-biphenyl]-4-ol (**67**).

3-Hydroxy-5-methyl-6-phenyl-2H-pyran-2-one (20.2 mg, 0.1 mmol, 1 eq) and 1-nitropent-1-ene (58 mg, 0.5 mmol, 5 eq) were subjected to the general procedure, except 2,6-di-tertbutyl phenol (10.3 mg, 0.05 mmol 0.5 eq) was used as a radical inhibitor instead of BHT. Purification by FCC (20:1 hexanes:EtOAc) yielded **67** as a yellow solid (11.7 mg, 55%).

Data for **67**: R_f: 0.39 (5:1 hexanes:EtOAc); mp: 51 – 54 °C; IR (thin film) 3338, 2959, 2929, 2870, 1608, 1592, 1455, 1307, 1151 cm⁻¹; ¹H NMR (700 MHz, CDCl₃) δ 7.40 (t, *J* = 7.7 Hz, 2 H), 7.33 (tt, *J* = 7.7, 1.4 Hz, 1 H), 7.13 (dd, *J* = 1.4, 7.7 Hz, 2 H), 6.62 (d, *J* = 2.8 Hz, 1 H), 6.61 (d, *J* = 2.1 Hz, 1 H), 4.77 (s, 1 H), 2.26 (t, *J* = 7.7 Hz, 2 H), 1.97 (s, 3 H), 1.43 (sext, *J* = 7.7 Hz, 2 H), 0.77 (t, *J* = 7.7 Hz, 3 H); ¹³C NMR (176 MHz, CDCl₃) δ 154.2, 142.4, 140.6, 137.9, 134.5, 129.9, 128.2, 126.5, 114.0, 112.9, 35.7, 24.2, 21.1, 14.1; HRMS (EI) *m/z*: [M]⁺ Calcd for C₁₆H₁₈O 226.1358; Found 226.1354.

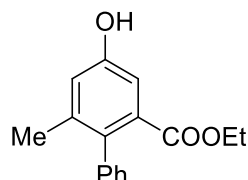


2-Ethyl-6-propyl-[1,1'-biphenyl]-4-ol (**68**).

5-Ethyl-3-hydroxy-6-phenyl-2H-pyran-2-one (21.6 mg, 0.1 mmol, 1 eq) and 1-nitropent-1-ene (58 mg, 0.5 mmol, 5 eq) were subjected to the general procedure. Purification by FCC (20:1 hexanes:EtOAc) yielded **68** as a yellow solid (13.2 mg, 55%).

Data for **68**: R_f: 0.45 (5:1 hexanes:EtOAc); mp: 73 – 75 °C; IR (thin film) 3306, 2960, 2929, 2869, 1593, 1455 cm⁻¹; ¹H NMR (400 MHz, CDCl₃) δ 7.41 – 7.37 (m, 2 H),

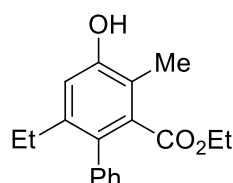
7.33 (tt, $J = 6.4, 1.6$ Hz, 1 H), 7.14 (tt, $J = 6.4, 1.6$ Hz, 2 H), 6.63 (d, $J = 2.8$ Hz, 1 H), 6.61 (d, $J = 2.8$ Hz, 1 H), 4.68 (s, 1 H), 2.31 – 2.21 (m, 4 H), 1.42 (sext, $J = 7.2$ Hz, 2 H), 1.01 (t, $J = 7.6$ Hz, 3 H), 0.76 (t, $J = 7.2$ Hz, 3 H); ^{13}C NMR (100 MHz, CDCl_3) δ 154.5, 144.1, 142.5, 140.2, 134.0, 130.2, 128.0, 126.5, 112.9, 112.3, 35.8, 26.9, 24.2, 15.3, 14.0; HRMS (ESI) m/z : $[\text{M} + \text{H}]^+$ Calcd for $\text{C}_{17}\text{H}_{21}\text{O}$ 241.1592; Found 241.1599.



Ethyl 4-hydroxy-6-methyl-[1,1'-biphenyl]-2-carboxylate (69).

3-Hydroxy-5-methyl-6-phenyl-2H-pyran-2-one (40.4 mg, 0.2 mmol, 1 eq) and ethyl 3-nitroacrylate (58 mg, 0.4 mmol, 2 eq) were subjected to the general procedure. Purification by FCC (20:1 hexanes:EtOAc) yielded **69** as a yellow solid (12 mg of **69**, 10 mg of the corresponding regioisomer, $rr = 1.2:1$, 43% yield).

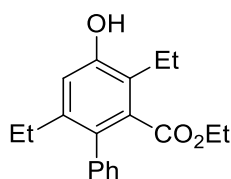
Data for **69**: R_f : 0.24 (5:1 hexanes:EtOAc); mp: 117 – 121 °C; IR (thin film) 3386, 2981, 2925, 1705, 1611, 1452, 1317 cm^{-1} ; ^1H NMR (700 MHz, CDCl_3) δ 7.36 (t, $J = 7.7$ Hz, 2 H), 7.31 (tt, $J = 7.7, 1.4$ Hz, 1 H), 7.19 (d, $J = 2.8$ Hz, 1 H), 7.15 – 7.13 (m, 2 H), 6.90 (d, $J = 2.8$ Hz, 1 H), 3.95 (q, $J = 7.0$ Hz, 2 H), 2.06 (s, 3 H), 0.88 (t, $J = 7.0$ Hz, 3 H); ^{13}C NMR (176 MHz, CDCl_3) δ 168.7, 154.4, 140.2, 139.1, 134.4, 133.0, 129.2, 127.9, 126.7, 120.0, 113.7, 60.9, 20.9, 13.5; HRMS (ESI) m/z : $[\text{M} + \text{Na}]^+$ Calcd for $\text{C}_{16}\text{H}_{16}\text{O}_3\text{Na}$ 279.0997; Found 279.0992.



Ethyl 6-ethyl-4-hydroxy-3-methyl-[1,1'-biphenyl]-2-carboxylate (70).

5-Ethyl-3-hydroxy-6-phenyl-2H-pyran-2-one (86.4 mg, 0.4 mmol, 2 eq) and ethyl 3-nitrobut-2-enoate (31.8 mg, 0.2 mmol, 1 eq) were subjected to the general procedure for 5 days. Purification by FCC (10:1 hexanes:EtOAc) yielded **70** as a yellow solid (21.6 mg, 38%).

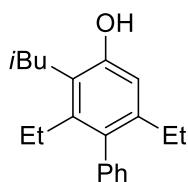
Data for **70**: R_f : 0.42 (5:1 hexanes:EtOAc); mp: 91 – 95 °C; IR (thin film) 3396, 2968, 1699, 1600, 1463, 1309 cm^{-1} ; ^1H NMR (700 MHz, CDCl_3) δ 7.35 (t, $J = 7.7$ Hz, 2 H), 7.30 (tt, $J = 7.7, 1.4$ Hz, 1 H), 7.21 (dd, $J = 7.7, 1.4$ Hz, 2 H), 6.75 (s, 1 H), 5.29 (s, 1 H), 3.93 (q, $J = 7.0$ Hz, 2 H), 2.34 (q, $J = 7.7$ Hz, 2 H), 2.20 (s, 3 H), 0.99 (t, $J = 7.7$ Hz, 3 H), 0.90 (t, $J = 7.0$ Hz, 3 H); ^{13}C NMR (176 MHz, CDCl_3) δ 169.7, 153.1, 141.5, 138.9, 136.1, 131.2, 130.1, 127.8, 127.0, 117.9, 115.7, 61.0, 26.1, 15.4, 13.7, 12.5; HRMS (EI) m/z : $[\text{M}]^+$ Calcd for $\text{C}_{18}\text{H}_{20}\text{O}_3$ 284.1413; Found 284.1399.



Ethyl 3,6-diethyl-4-hydroxy-[1,1'-biphenyl]-2-carboxylate (71).

5-Ethyl-3-hydroxy-6-phenyl-2H-pyran-2-one (43.2 mg, 0.2 mmol, 1 eq) and ethyl 3-nitropent-2-enoate (69.2 mg, 0.4 mmol, 2 eq) were subjected to the general procedure for 3 h. Purification by FCC (15:1 hexanes:EtOAc) yielded **71** as a yellow solid (26.3 mg, 44%).

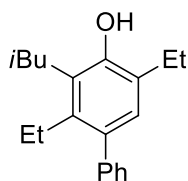
Data for **71**: R_f: 0.33 (5:1 hexanes:EtOAc); mp: 94 – 97 °C; IR (thin film) 3399, 2969, 2935, 2873, 1700, 1598, 1443, 1309 cm⁻¹; ¹H NMR (700 MHz, CDCl₃) δ 7.33 (t, *J* = 7.0 Hz, 2 H), 7.31 – 7.30 (m, 1 H), 7.23 – 7.21 (m, 2 H), 6.75 (s, 1 H), 5.08 (s, 1 H), 3.92 (q, *J* = 7.0 Hz, 2 H), 2.61 (q, *J* = 7.7 Hz, 2 H), 2.35 (q, *J* = 7.7 Hz, 2 H), 1.22 (t, *J* = 7.7 Hz, 3 H), 1.00 (t, *J* = 7.0 Hz, 3 H), 0.91 (t, *J* = 7.7 Hz, 3 H); ¹³C NMR (176 MHz, CDCl₃) δ 169.6, 152.8, 141.5, 138.9, 135.9, 131.2, 130.1, 127.7, 127.0, 124.2, 116.0, 60.8, 26.1, 21.1, 15.3, 14.5, 13.7; HRMS (EI) *m/z*: [M]⁺ Calcd for C₁₉H₂₂O₃ 298.1569; Found 298.1583.



2,6-Diethyl-3-isobutyl-[1,1'-biphenyl]-4-ol (72).

5-Ethyl-3-hydroxy-4-isobutyl-6-phenyl-2H-pyran- 2-one (27.2 mg, 0.1 mmol, 1 eq) and 1-nitrobut-1-ene (30.3 mg, 0.3 mmol, 3 eq) were subjected to the general procedure at 130 °C for 24 h. Purification by FCC (50:1 hexanes:EtOAc) yielded **72** as a yellow solid (13.3 mg, 47%).

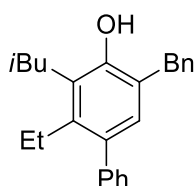
Data for **72**: R_f: 0.48 (5:1 hexanes:EtOAc); mp: 55- 58 °C; IR (thin film) 3424, 2960, 2931, 2869, 1600, 1463 cm⁻¹; ¹H NMR (700 MHz, CDCl₃) δ 7.39 (t, *J* = 7.7 Hz, 2 H), 7.33 (t, *J* = 7.7 Hz, 1 H), 7.17 (dd, *J* = 7.7, 1.4Hz, 2 H), 6.59 (s, 1 H), 4.61 (s, 1 H), 2.56 (d, *J* = 7.0 Hz, 2 H), 2.37 (q, *J* = 7.7 Hz, 2 H), 2.20 (q, *J* = 7.7 Hz, 2 H), 1.97 (sept, *J* = 7.0 Hz, 1 H), 1.01 – 0.99 (m, 9 H), 0.87 (t, *J* = 7.7 Hz, 3 H); ¹³C NMR (176 MHz, CDCl₃) δ 153.2, 142.4, 141.2, 141.1, 134.3, 130.3, 127.9, 126.4, 122.9, 112.4, 34.9, 29.5, 26.7, 23.6, 22.8, 15.3, 15.2; HRMS (EI) *m/z*: [M]⁺ Calcd for C₂₀H₂₆O 282.1984; Found 282.1990.



2,5-Diethyl-3-isobutyl-[1,1'-biphenyl]-4-ol (73).

5-Ethyl-3-hydroxy-4-isobutyl-6-phenyl-2H-pyran-2-one (27.2 mg, 0.1 mmol, 1 eq) and 2-nitrobut-1-ene (30.3 mg, 0.3 mmol, 3 eq) were subjected to the general procedure at 130 °C. Purification by FCC (50:1 hexanes:EtOAc) yielded **73** as a yellow oil (18.4 mg, 65%).

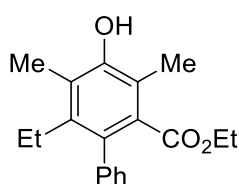
Data for **73**: R_f: 0.72 (5:1 hexanes:EtOAc); IR (thin film) 3594, 2961, 2932, 2869, 1458, 1196 cm⁻¹; ¹H NMR (700 MHz, CDCl₃) δ 7.38 (t, *J* = 7.0 Hz, 2 H), 7.32 (tt, *J* = 7.0, 1.4 Hz, 1 H), 7.30 (dd, *J* = 7.0, 1.4 Hz, 2 H), 6.84 (s, 1 H), 4.67 (s, 1 H), 2.64 – 2.56 (m, 6 H), 1.97 (sept, *J* = 7.0 Hz, 1 H), 1.26 (t, *J* = 7.7 Hz, 3 H), 1.02 (d, *J* = 7.0 Hz, 6 H), 0.91 (t, *J* = 7.7 Hz, 3 H); ¹³C NMR (176 MHz, CDCl₃) δ 151.2, 143.2, 139.3, 134.8, 129.7, 128.2, 127.8, 126.3, 125.8, 125.2, 35.3, 29.5, 22.9, 22.9, 15.5, 13.7; HRMS (EI) *m/z*: [M]⁺ Calcd for C₂₀H₂₆O 282.1984; Found 282.1974.



5-Benzyl-2-ethyl-3-isobutyl-[1,1'-biphenyl]-4-ol (74).

5-Ethyl-3-hydroxy-4-isobutyl-6-phenyl-2H-pyran-2-one (27.2 mg, 0.1 mmol, 1 eq) and (3-nitroallyl)benzene (21.9 mg, 0.3 mmol, 3 eq) were subjected to the general procedure. Purification by FCC (50:1 hexanes:EtOAc) yielded **74** as a yellow oil (21.9 mg, 64%).

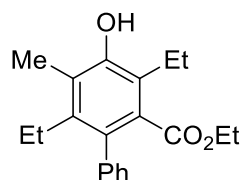
Data for **74**: R_f: 0.75 (6:1 hexanes:EtOAc); IR (thin film) 3548, 2957, 2929, 2868, 1602, 1461 cm⁻¹; ¹H NMR (700 MHz, CDCl₃) δ 7.28 (t, *J* = 7.0 Hz, 2 H), 7.33 – 7.30 (m, 5 H), 7.26 (d, *J* = 7.0 Hz, 2 H), 7.22 (t, *J* = 7.0 Hz, 1 H), 6.86 (s, 1 H), 4.62 (s, 1 H), 3.99 (s, 2 H), 2.61 – 2.57 (m, 4 H), 1.95 (sept, *J* = 7.0 Hz, 1 H), 0.98 (d, *J* = 7.0 Hz, 6 H), 0.92 (t, *J* = 7.0 Hz, 3 H); ¹³C NMR (176 MHz, CDCl₃) δ 151.7, 143.0, 140.2, 139.7, 135.0, 130.2, 129.7, 128.8, 128.7, 127.8, 126.5, 126.3, 126.1, 123.3, 37.0, 35.2, 29.5, 22.9, 22.8, 15.5; HRMS (EI) *m/z*: [M]⁺ Calcd for C₂₅H₂₈O 344.2140; Found 344.2149.



Ethyl 6-ethyl-4-hydroxy-3,5-dimethyl-[1,1'-biphenyl]-2-carboxylate (75).

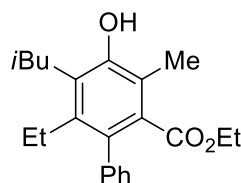
5-Ethyl-3-hydroxy-4-methyl-6-phenyl-2H-pyran- 2-one (46 mg, 0.2 mmol, 2 eq) and ethyl 3-nitrobut-2-enoate (15.9 mg, 0.1 mmol, 1 eq) were subjected to the general procedure for 3 days. Purification by FCC (10:1 hexanes:EtOAc) yielded **75** as a yellow oil (15.8 mg, 53%).

Data for **75**: R_f: 0.36 (7:1 hexanes:EtOAc); IR (thin film) 3455, 2971, 2932, 1703, 1443, 1289, 1202 cm⁻¹; ¹H NMR (700 MHz, CDCl₃) δ 7.33 (tt, *J* = 6.3, 1.4 Hz, 2 H), 7.30 (tt, *J* = 6.3, 1.4 Hz, 1 H), 7.21 (dt, *J* = 6.3, 1.4 Hz, 2 H), 4.81 (s, 1 H), 3.88 (q, *J* = 7.0 Hz, 2 H), 2.43 (q, *J* = 7.7 Hz, 2 H), 2.27 (s, 3 H), 2.21 (s, 3 H), 0.93 (t, *J* = 7.7 Hz, 3 H), 0.89 (t, *J* = 7.0 Hz, 3 H); ¹³C NMR (176 MHz, CDCl₃) δ 169.5, 151.5, 139.8, 139.8, 133.6, 131.4, 130.2, 127.6, 126.9, 122.7, 116.8, 60.7, 23.6, 14.6, 13.7, 13.0, 12.0; HRMS (EI) *m/z*: [M]⁺ Calcd for C₁₉H₂₂O₃ 298.1569; Found 298.1574.

**Ethyl 3,6-diethyl-4-hydroxy-5-methyl-[1,1'-biphenyl]-2-carboxylate (76).**

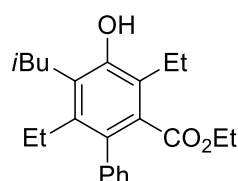
5-Ethyl-3-hydroxy-4-methyl-6-phenyl-2H-pyran- 2-one (23 mg, 0.1 mmol, 1 eq) and ethyl 3-nitropent-2-enoate (86.5 mg, 0.5 mmol, 5 eq) were subjected to the general procedure for 2 days. Purification by FCC (20:1 hexanes:EtOAc) yielded **76** as a yellow oil (20.6 mg, 66%).

Data for **76**: R_f: 0.45 (5:1 hexanes:EtOAc); IR (thin film) 3480, 2970, 2934, 1705, 1285, 1202 cm⁻¹; ¹H NMR (700 MHz, CDCl₃) δ 7.35 (t, *J* = 7.0 Hz, 2 H), 7.30 (t, *J* = 7.0 Hz, 1 H), 7.24 (d, *J* = 7.0 Hz, 2 H), 5.07 (s, 1 H), 3.89 (q, *J* = 7.0 Hz, 2 H), 2.61 (q, *J* = 7.0 Hz, 2 H), 2.43 (q, *J* = 7.0 Hz, 2 H), 2.28 (s, 3 H), 1.23 (t, *J* = 7.0 Hz, 3 H), 0.95 (t, *J* = 7.0 Hz, 3 H), 0.91 (t, *J* = 7.0 Hz, 3 H); ¹³C NMR (176 MHz, CDCl₃) δ 169.7, 151.2, 139.8, 133.2, 131.4, 130.3, 127.6, 126.9, 123.3, 123.0, 60.7, 23.7, 21.6, 14.6, 14.5, 13.7, 12.0; HRMS (ESI) *m/z*: [M + H]⁺ Calcd for C₂₀H₂₅O₃ 313.1804; Found 313.1802.

**Ethyl 6-ethyl-4-hydroxy-5-isobutyl-3-methyl-[1,1'-biphenyl]-2-carboxylate (77).**

5-Ethyl-3-hydroxy-4-isobutyl-6-phenyl-2H-pyran- 2-one (54.4 mg, 0.2 mmol, 1 eq) and ethyl 3-nitrobut-2-enoate (63.4 mg, 0.4 mmol, 2 eq) were subjected to the general procedure for 4 days. Purification by FCC (7:1 hexanes:EtOAc) yielded **77** as a yellow oil (48.1 mg, 71%).

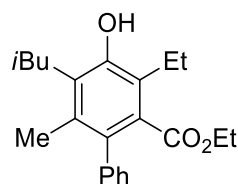
Data for **77**: R_f: 0.27 (7:1 hexanes:EtOAc); IR (thin film) 3478, 2958, 2932, 2869, 1706, 1430, 1296, 1202 cm⁻¹; ¹H NMR (700 MHz, CDCl₃) δ 7.33 (t, *J* = 7.0 Hz, 2 H), 7.30 (t, *J* = 7.0 Hz, 1 H), 7.23 (d, *J* = 7.0 Hz, 2 H), 4.82 (s, 1 H), 3.89 (q, *J* = 7.0 Hz, 2 H), 2.58 (d, *J* = 7.7 Hz, 2 H), 2.45 (q, *J* = 7.7 Hz, 2 H), 2.20 (s, 3 H), 1.95 (sept, *J* = 7.0 Hz, 1 H), 0.99 (d, *J* = 7.0 Hz, 6 H), 0.89 (t, *J* = 7.0 Hz, 3 H), 0.86 (t, *J* = 7.7 Hz, 3 H); ¹³C NMR (176 MHz, CDCl₃) δ 167.7, 151.6, 140.2, 139.8, 133.9, 131.5, 130.3, 127.6, 126.9, 126.6, 116.9, 60.8, 35.3, 29.4, 23.1, 22.8, 15.3, 13.7, 13.0; HRMS (ESI) *m/z*: [M + H]⁺ Calcd for C₂₂H₂₉O₃ 341.2117; Found 341.2127.



Ethyl 3,6-diethyl-4-hydroxy-5-isobutyl-[1,1'-biphenyl]-2-carboxylate (78).

5-Ethyl-3-hydroxy-4-isobutyl-6-phenyl-2H-pyran- 2-one (27.2 mg, 0.1 mmol, 1 eq) and ethyl 3-nitropent-2-enoate (34.6 mg, 0.2 mmol, 2 eq) were subjected to the general procedure at 180 °C for 3 days. Purification by FCC (15:1 hexanes:EtOAc) yielded **78** as a yellow oil (11.3 mg, 32%).

Data for **78**: R_f: 0.45 (5:1 hexanes:EtOAc); IR (thin film) 3494, 2962, 2871, 1707, 1465 cm⁻¹; ¹H NMR (700 MHz, CDCl₃) δ 7.33 (t, *J* = 7.0 Hz, 2 H), 7.29 (t, *J* = 7.0 Hz, 1 H), 7.24 (d, *J* = 7.0 Hz, 2 H), 4.79 (s, 1 H), 3.87 (q, *J* = 7.0 Hz, 2 H), 2.61 – 2.57 (m, 4 H), 2.45 (q, *J* = 7.7 Hz, 2 H), 1.95 (sept, *J* = 7.0 Hz, 1 H), 1.22 (t, *J* = 7.7 Hz, 3 H), 1.00 (d, *J* = 7.0 Hz, 6 H), 0.90 (t, *J* = 7.0 Hz, 3 H), 0.86 (t, *J* = 7.7 Hz, 3 H); ¹³C NMR (176 MHz, CDCl₃) δ 169.6, 151.2, 140.2, 139.8, 133.6, 131.5, 130.4, 127.5, 126.8, 126.6, 123.1, 60.6, 35.4, 29.5, 23.1, 22.8, 21.6, 15.2, 14.4, 13.7; HRMS (EI) *m/z*: [M]⁺ Calcd for C₂₃H₃₀O₃ 354.2195; Found 354.2180.



Ethyl 3-ethyl-4-hydroxy-5-isobutyl-6-methyl-[1,1'-biphenyl]-2-carboxylate (79).

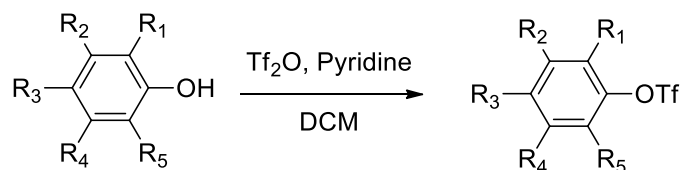
3-Hydroxy-4-isobutyl-5-methyl-6-phenyl-2H-pyran- 2-one (258 mg, 0.1 mmol, 1 eq) and ethyl 3-nitropent-2-enoate (346 mg, 0.2 mmol, 2 eq) were subjected to the general procedure at 180 °C. Purification by FCC (20:1 hexanes:EtOAc) yielded **79** as a yellow oil (249.3 mg, 70%).

Data for **79**: R_f: 0.48 (5:1 hexanes:EtOAc); mp: 84 – 89 °C; IR (thin film) 3494, 2956, 2926, 2869, 1707, 1464, 1295, 1198 cm⁻¹; ¹H NMR (700 MHz, CDCl₃) δ 7.35 (t, *J* = 7.0 Hz, 2 H), 7.30 (t, *J* = 7.0 Hz, 1 H), 7.22 (d, *J* = 7.0 Hz, 2 H), 5.03 (s, 1 H), 3.92 (q,

$J = 7.0$ Hz, 2 H), 2.63 (q, $J = 7.0$ Hz, 2 H), 2.60 (d, $J = 7.7$ Hz, 2 H), 2.03 (s, 3 H), 1.94 (sept, $J = 7.0$ Hz, 1 H), 1.24 (t, $J = 7.0$ Hz, 3 H), 1.01 (d, $J = 7.0$ Hz, 6 H), 0.91 (t, $J = 7.0$ Hz, 3 H); ^{13}C NMR (176 MHz, CDCl_3) δ 169.8, 151.0, 140.4, 133.9, 133.2, 131.9, 130.1, 127.8, 127.6, 126.8, 123.4, 60.7, 36.0, 28.9, 22.8, 21.6, 17.4, 14.5, 13.7; HRMS (ESI) m/z : $[\text{M} + \text{H}]^+$ Calcd for $\text{C}_{22}\text{H}_{29}\text{O}_3$ 341.2117; Found 341.2121.

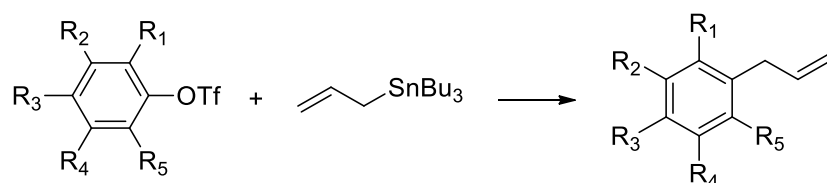
5. Syntheses of Substituted Benzenes

General Procedure for Triflate Formation



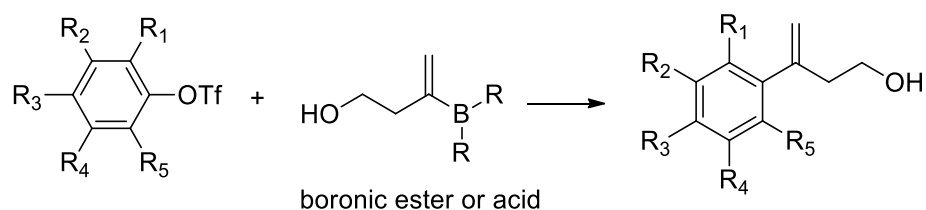
To a solution of phenol (1 eq) in DCM (0.2 M) was added pyridine (1.5 eq) at 0 °C. After stirring for 5 mins, triflic anhydride (1.3 eq) was added dropwise. The mixture was stirred at 0 °C for 30 mins, then rt for 2 h. The mixture was quenched with 2N HCl and extracted with DCM (3 X). The combined organic layers were dried over Na₂SO₄, filtered and concentrated. The residue was purified by FCC.

General Procedure for Stille Couplings:

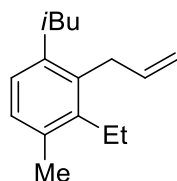


To a thick-walled reaction vessel were added the triflate (1 eq), Pd(PPh₃)₄ (10 mol%), and DMF (0.1 M) under Ar. The stannane (1.3 eq) was added dropwise, and the tube was sealed and heated to 90 °C for 16 h unless otherwise noted. The reaction mixture was cooled to rt, EtOAc was added and the organic layer was washed with brine. The organic layer was dried over Na₂SO₄, filtered and concentrated. The residue was purified by FCC.

General Procedure for Suzuki Couplings:



To a thick-walled reaction vessel were added the triflate (1 eq), boronic ester or acid (1.5 eq), Pd(PPh₃)₄ (10 mol%), K₂CO₃ (3 eq) and 1, 4-dioxane/ water mixture (4:1, 0.1 M). The headspace of the vessel was evacuated by brief exposure to vacuum, and the vessel was back-filled with Ar. The vessel was evacuated and back-filled with Ar two additional times. The tube was sealed and heated to 110 °C for 16 h unless otherwise noted. The reaction was cooled to rt, and solvent was removed under vacuum. The crude reaction mixture was dissolved in EtOAc, filtered through celite, dried over Na₂SO₄, filtered, and concentrated. The residue was purified by FCC.

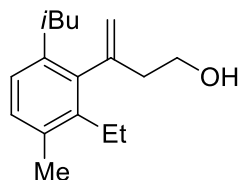


2-Allyl-3-ethyl-1-isobutyl-4-methylbenzene (80).

2-Ethyl-6-isobutyl-3-methylphenol (**55**) (80 mg, 0.417 mmol, 1 eq) was subjected to the general triflate formation procedure. Purification by FCC (100% Hexane) yielded 2-Ethyl-6-isobutyl-3-methylphenyl trifluoromethanesulfonate (103.5 mg, 77%).

2-Ethyl-6-isobutyl-3-methylphenyl trifluoromethanesulfonate (21 mg, 0.07 mmol, 1 eq) and allyl tributylstannane (28 mg, 0.085 mmol, 1.2 eq) were subjected to the general Stille coupling procedure with a reaction time of 6 days. Purification by FCC (100% hexanes) yielded **80** as a colorless oil (8.8 mg, 63%).

Data for **80**: R_f: 0.59 (Pure hexanes); IR (thin film) 3079, 2956, 2928, 2868, 1636, 1461 cm⁻¹; ¹H NMR (700 MHz, CDCl₃) δ 6.96 (d, *J* = 7.7 Hz, 1 H), 6.89 (d, *J* = 7.7 Hz, 1 H), 5.95 (ddt, *J* = 16.8, 10.5, 5.6 Hz, 1 H), 4.99 (dd, *J* = 9.8, 1.4 Hz, 1 H), 4.82 (dd, *J* = 16.8, 1.4 Hz, 1 H), 3.43 (dt, *J* = 5.6, 2.1 Hz, 2 H), 2.64 (q, *J* = 7.7 Hz, 2 H), 2.43 (d, *J* = 7.7 Hz, 2 H), 2.31 (s, 3 H), 1.85 (sept, *J* = 7.0 Hz, 1 H), 1.12 (t, *J* = 7.7 Hz, 3 H), 1.92 (d, *J* = 7.0 Hz, 6 H); ¹³C NMR (176 MHz, CDCl₃) δ 141.3, 138.1, 137.6, 135.1, 133.6, 128.1, 127.8, 114.9, 42.6, 32.7, 29.5, 22.7, 22.7, 19.7, 14.3; HRMS (EI) m/z: [M]⁺ Calcd for C₁₆H₂₄ 216.1878; Found 216.1884.

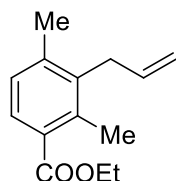


3-(2-Ethyl-6-isobutyl-3-methylphenyl)but-3-en-1-ol (81).

2-Ethyl-6-isobutyl-3-methylphenyl trifluoromethanesulfonate (21 mg, 0.07 mmol, 1 eq) and 3-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)but-3-en-1-ol (18.3 mg, 0.09 mmol, 1.3 eq) were subjected to the general Suzuki coupling procedure with a reaction time of 4 days. Purification by FCC (5:1 hexanes:EtOAc) yielded **81** as a colorless oil (8.6 mg, 54%).

Data for **81**: R_f: 0.38 (5:1 hexanes:EtOAc); IR (thin film) 3337, 2955, 2932, 2869, 1637, 1466 cm⁻¹; ¹H NMR (700 MHz, CDCl₃) δ 7.02 (d, *J* = 7.7 Hz, 1 H), 6.95 (d, *J* = 7.7 Hz, 1 H), 5.35 (dd, *J* = 2.8, 1.4 Hz, 1 H), 4.94 (d, *J* = 1.4 Hz, 1 H), 3.86 (app q, *J* = 6.3 Hz, 2 H), 2.68 – 2.62 (m, 1 H), 2.52 – 2.49 (m, 3 H), 2.43 (dd, *J* = 14.0, 7.0 Hz, 1 H), 2.33 (dd, *J* = 14.0, 7.0 Hz, 1 H), 2.32 (s, 3 H), 1.88 (sept, *J* = 7.0 Hz, 1 H), 1.41 (s, 1 H), 1.10 (t, *J* = 7.0 Hz, 3 H), 0.92 (d, *J* = 7.0 Hz, 3 H), 0.87 (d, *J* = 7.0 Hz, 3 H); ¹³C NMR (176 MHz, CDCl₃) δ 145.1, 142.0, 139.4, 136.2, 133.5, 128.8, 126.8, 115.0, 60.5, 42.1, 41.3, 29.8, 23.8, 22.7, 22.6, 19.4, 15.1; HRMS (ESI) m/z: [M + Na]⁺ Calcd

for C₁₇H₂₆ONa 269.1881; Found 269.1875.

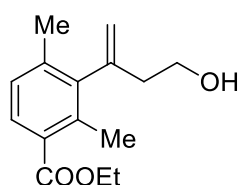


Ethyl 3-allyl-2,4-dimethylbenzoate (82).

Ethyl 3-hydroxy-2,4-dimethylbenzoate (**56**) (100 mg, 0.515 mmol, 1 eq) was subjected to the general triflate formation procedure. Purification by FCC (50:1 to 10:1 hexanes:EtOAc) yielded Ethyl 2,4-dimethyl-3-(((trifluoromethyl)sulfonyl)oxy)benzoate (113.4 mg, 67%).

Ethyl 2,4-dimethyl-3-(((trifluoromethyl)sulfonyl)oxy)benzoate (32.6 mg, 0.1 mmol, 1 eq) and allyl tributylstannane (40 mg, 0.12 mmol, 1.2 eq) were subjected to the general Stille coupling procedure. Purification by FCC (50:1 hexanes:EtOAc) yielded **82** as a yellow oil (19.2 mg, 88%).

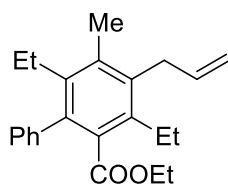
Data for **82**: R_f: 0.74 (10:1 hexanes:EtOAc); IR (thin film) 3082, 2979, 2933, 1717, 1264 cm⁻¹; ¹H NMR (700 MHz, CDCl₃) δ 7.57 (d, *J* = 7.7 Hz, 1 H), 7.05 (d, *J* = 7.7 Hz, 1 H), 5.91 (ddt, *J* = 16.8, 9.8, 4.9 Hz, 1 H), 5.01 (dq, *J* = 10.5, 2.1 Hz, 1 H), 4.82 (dq, *J* = 17.5, 2.1 Hz, 1 H), 4.35 (q, *J* = 7.0 Hz, 2 H), 3.45 (dt, *J* = 5.6, 2.1 Hz, 2 H), 2.48 (s, 3 H), 2.33 (s, 3 H), 1.38 (t, *J* = 7.7 Hz, 3 H); ¹³C NMR (176 MHz, CDCl₃) δ 168.9, 140.8, 137.6, 137.4, 134.8, 129.7, 127.8, 127.5, 115.2, 60.7, 33.5, 20.5, 16.5, 14.4; HRMS (ESI) *m/z*: [M + H]⁺ Calcd for C₁₄H₁₉O₂ 219.1385; Found 219.1384.



Ethyl 3-(4-hydroxybut-1-en-2-yl)-2,4-dimethylbenzoate (83).

Ethyl 2,4-dimethyl-3-(((trifluoromethyl)sulfonyl)oxy)benzoate (32.6 mg, 0.1 mmol, 1 eq) and 3-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)but-3-en-1-ol (26 mg, 0.13 mmol, 1.3 eq) were subjected to the general Suzuki coupling procedure. Purification by FCC (5:1 hexanes:EtOAc) yielded **83** as a yellow oil (20 mg, 81%)

Data for **83**: R_f: 0.34 (3:1 hexanes:EtOAc); IR (thin film) 3419, 2980, 2931, 1716, 1591 cm⁻¹; ¹H NMR (700 MHz, CDCl₃) δ 7.64 (d, *J* = 7.7 Hz, 1 H), 7.08 (d, *J* = 7.7 Hz, 1 H), 5.41 (q, *J* = 1.4 Hz, 1 H), 4.94 (d, *J* = 1.4 Hz, 1 H), 4.34 (q, *J* = 7.0 Hz, 2 H), 3.82 – 3.76 (m, 2 H), 2.51 – 2.49 (m, 2 H), 2.47 (s, 3 H), 2.29 (s, 1 H), 1.57 (brs, 1 H), 1.38 (t, *J* = 7.0 Hz, 3 H); ¹³C NMR (176 MHz, CDCl₃) δ 168.4, 144.9, 143.5, 139.3, 136.3, 128.8, 128.6, 127.3, 116.0, 60.7, 60.4, 40.3, 20.7, 17.9, 14.4; HRMS (ESI) *m/z*: [M + H]⁺ Calcd for C₁₅H₂₁O₃ 249.1491; Found 249.1497.

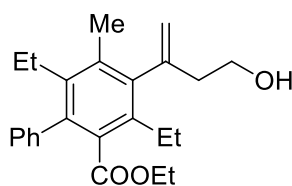


Ethyl 4-allyl-3,6-diethyl-5-methyl-[1,1'-biphenyl]-2-carboxylate (84).

Ethyl 3,6-diethyl-4-hydroxy-5-methyl-[1,1'-biphenyl]-2-carboxylate (**76**) (127 mg, 0.407 mmol, 1 eq) was subjected to the general triflate formation procedure. Purification by FCC (20:1 hexanes:EtOAc) yielded Ethyl 3,6-diethyl-5-methyl-4-(((trifluoromethyl)sulfonyl)oxy)-[1,1'-biphenyl]-2-carboxylate (173 mg, 96%).

Ethyl 3,6-diethyl-5-methyl-4-(((trifluoromethyl)sulfonyl)oxy)-[1,1'-biphenyl]-2-carboxylate (44.4 mg, 0.1 mmol, 1 eq) and allyl tributylstannane (43 mg, 0.13 mmol, 1.3 eq) were subjected to the general Stille couplings procedure. Purification by FCC (40:1 hexanes:Aceton) yielded **84** as a colorless oil (32 mg, 95%).

Data for **84**: R_f: 0.57 (10:1 hexanes:Aceton); IR (thin film) 3082, 2974, 2934, 2875, 1726, 1274 cm⁻¹; ¹H NMR (700 MHz, CDCl₃) δ 7.34 (t, *J* = 7.0 Hz, 2 H), 7.30 (t, *J* = 7.0 Hz, 1 H), 7.25 (d, *J* = 7.0 Hz, 2 H), 5.97 (ddt, *J* = 15.4, 9.8, 4.9 Hz, 1 H), 5.07 (d, *J* = 10.5 Hz, 1 H), 4.94 (d, *J* = 17.5 Hz, 1 H), 3.86 (q, *J* = 7.0 Hz, 2 H), 3.51 (d, *J* = 3.5 Hz, 2 H), 2.61 (q, *J* = 7.0 Hz, 2 H), 2.44 (q, *J* = 7.0 Hz, 2 H), 2.31 (s, 3 H), 1.20 (t, *J* = 7.0 Hz, 3 H), 0.94 (t, *J* = 7.0 Hz, 3 H), 0.90 (t, *J* = 7.0 Hz, 3 H); ¹³C NMR (176 MHz, CDCl₃) δ 170.3, 139.9, 138.7, 137.1, 136.7, 136.1, 135.7, 135.6, 133.4, 129.9, 127.5, 126.9, 115.5, 60.5, 33.5, 24.4, 23.8, 15.8, 15.7, 14.6, 13.7; HRMS (ESI) *m/z*: [M + H]⁺ Calcd for C₂₃H₂₉O₂ 337.2168; Found 337.2164.



Ethyl 3,6-diethyl-4-(4-hydroxybut-1-en-2-yl)-5-methyl-[1,1'-biphenyl]-2-carboxylate (85).

Ethyl 3,6-diethyl-5-methyl-4-(((trifluoromethyl)sulfonyl)oxy)-[1,1'-biphenyl]-2-carboxylate (23 mg, 0.052 mmol, 1 eq) and (4-hydroxybut-1-en-2-yl)boronic acid (12 mg, 0.104 mmol, 2 eq) were subjected to the general Suzuki coupling procedure with microwave heating (110 °C) and reaction time of 20 h. Purification by FCC (5:1 hexanes:EtOAc) yielded **85** as a yellow oil (11.9 mg, 63%).

Data for **85**: R_f: 0.12 (5:1 hexanes:EtOAc); IR (thin film) 3441, 2970, 2934, 2876, 1723 cm⁻¹; ¹H NMR (700 MHz, CDCl₃) δ 7.35 (t, *J* = 7.0 Hz, 2 H), 7.31 (tt, *J* = 7.0, 1.4 Hz, 1 H), 7.27 – 7.26 (m, 2 H), 7.23 (dd, *J* = 7.7, 2.1 Hz, 1 H), 5.42 (d, *J* = 1.4 Hz,

1 H), 5.05 (d, $J = 1.4$ Hz, 1 H), 3.89 – 3.88 (m, 2 H), 3.87 – 3.82 (m, 2 H), 2.65 – 2.60 (m, 1 H), 2.58 – 2.51 (m, 3 H), 2.43 (q, $J = 7.7$ Hz, 2 H), 2.29 (s, 3 H), 1.49 (brs, 1 H), 1.13 (t, $J = 7.0$ Hz, 3 H), 0.93 (t, $J = 7.0$ Hz, 3 H), 0.89 (t, $J = 7.0$ Hz, 3 H); ^{13}C NMR (176 MHz, CDCl_3) δ 170.1, 145.2, 142.0, 139.7, 138.7, 137.9, 134.6, 134.5, 133.0, 129.9, 129.8, 127.6, 127.6, 127.0, 115.5, 60.5, 60.5, 40.8, 24.5, 23.7, 16.7, 16.6, 14.3, 13.7; HRMS (ESI) m/z : $[\text{M} + \text{H}]^+$ Calcd for $\text{C}_{24}\text{H}_{31}\text{O}_3$ 367.2273; Found 367.2267.

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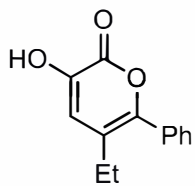
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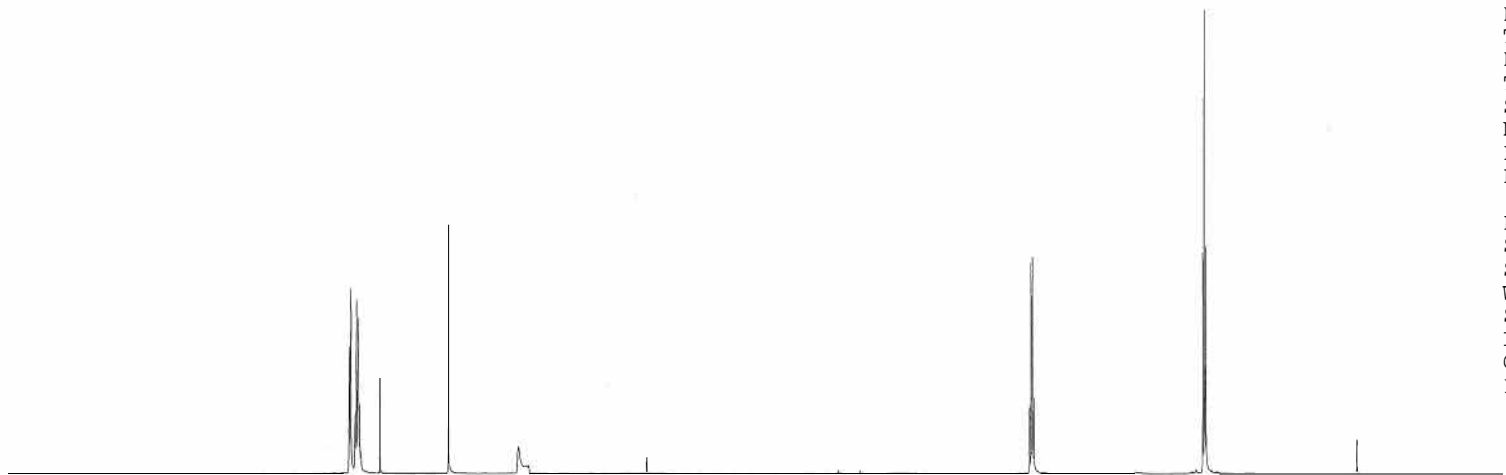


22 - S1

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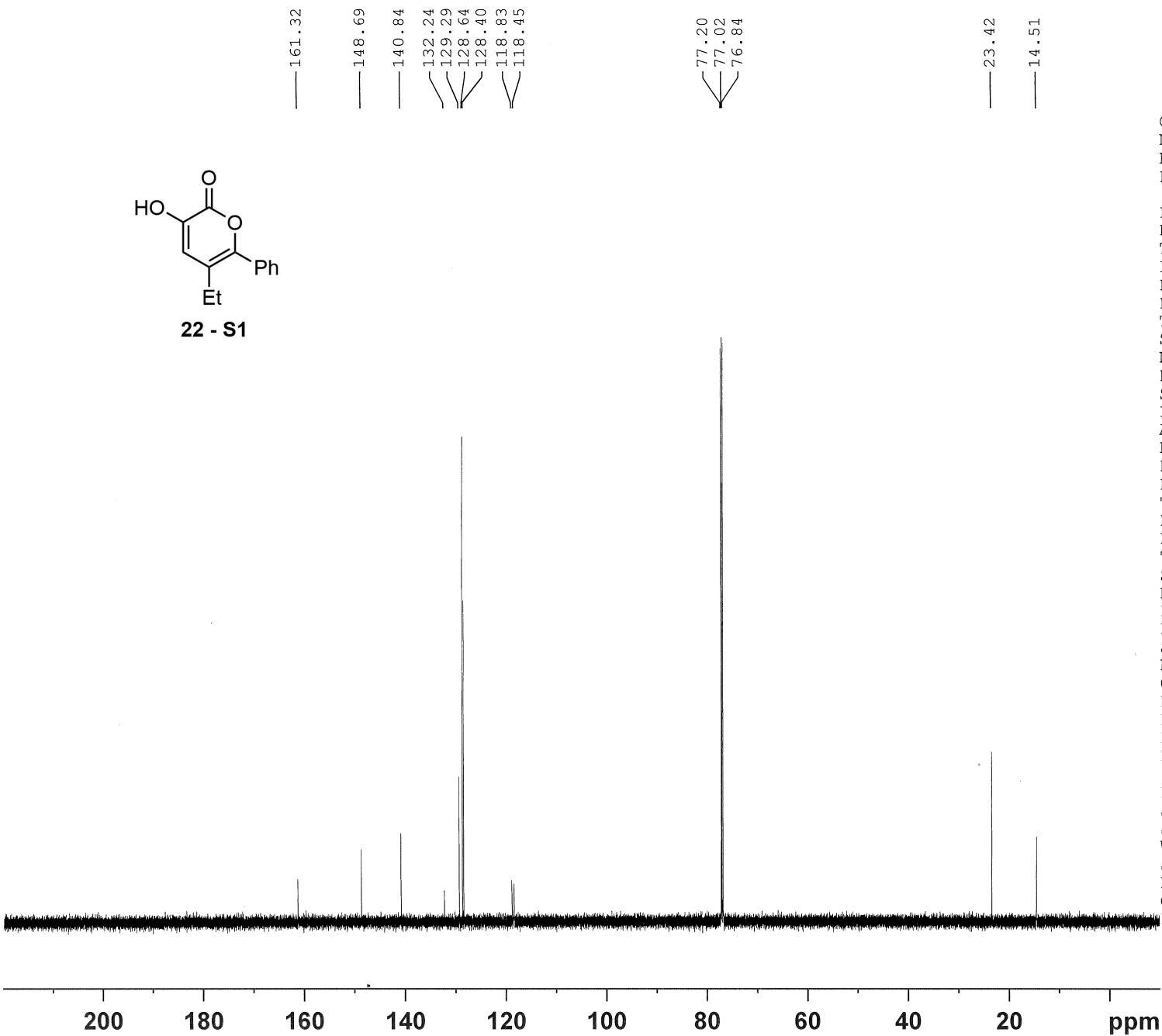
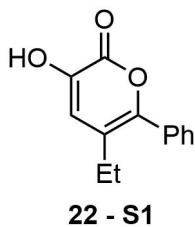
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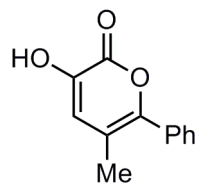


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 FIDRES 1.300465 Hz
 AQ 0.7689557 sec
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 D1 2.0000000 sec
 D11 0.0300000 sec
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22 - S2

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PROCNO 1

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RG 6.35
DW 47.600 usec
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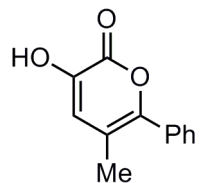
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1.10

2.85



22 - S2

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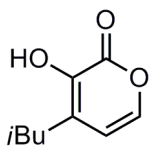
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PLW13 0.13982999 W

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22 - S3

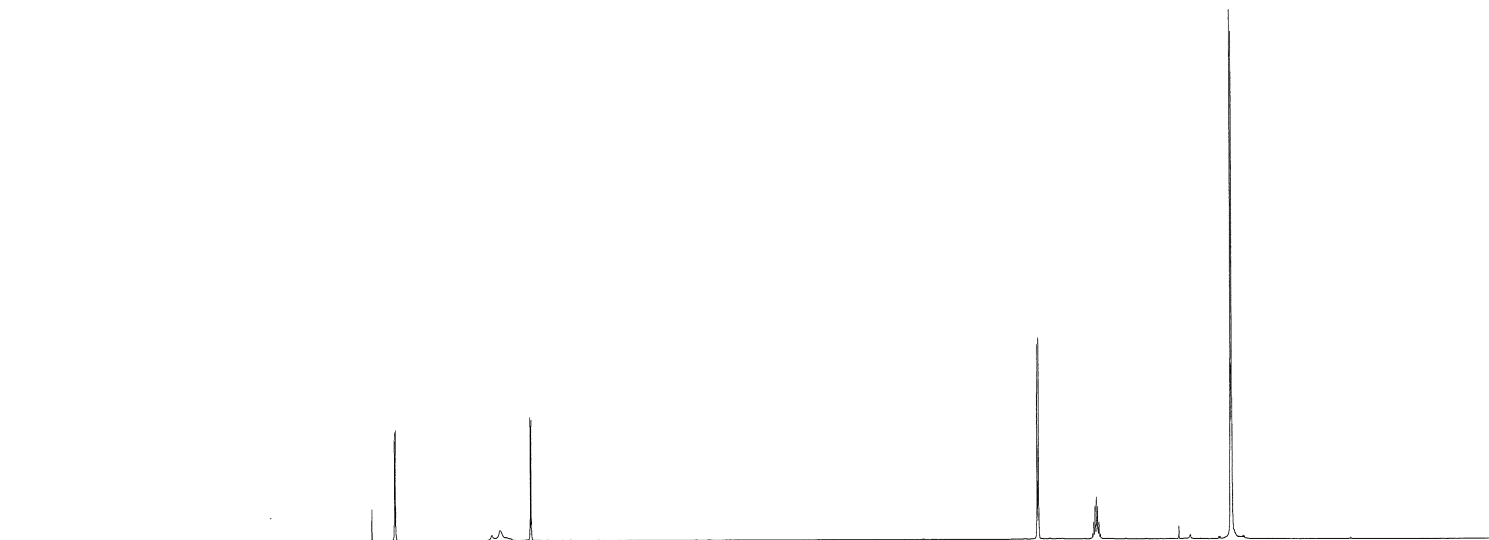
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Current Data Parameters
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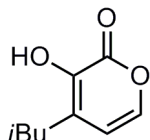
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P1 9.50 usec
PLW1 13.00000000 W

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WDW no
SSB 0
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GB 0
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6.35



22 - S3

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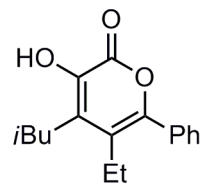
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22 - S4

Current Data Parameters

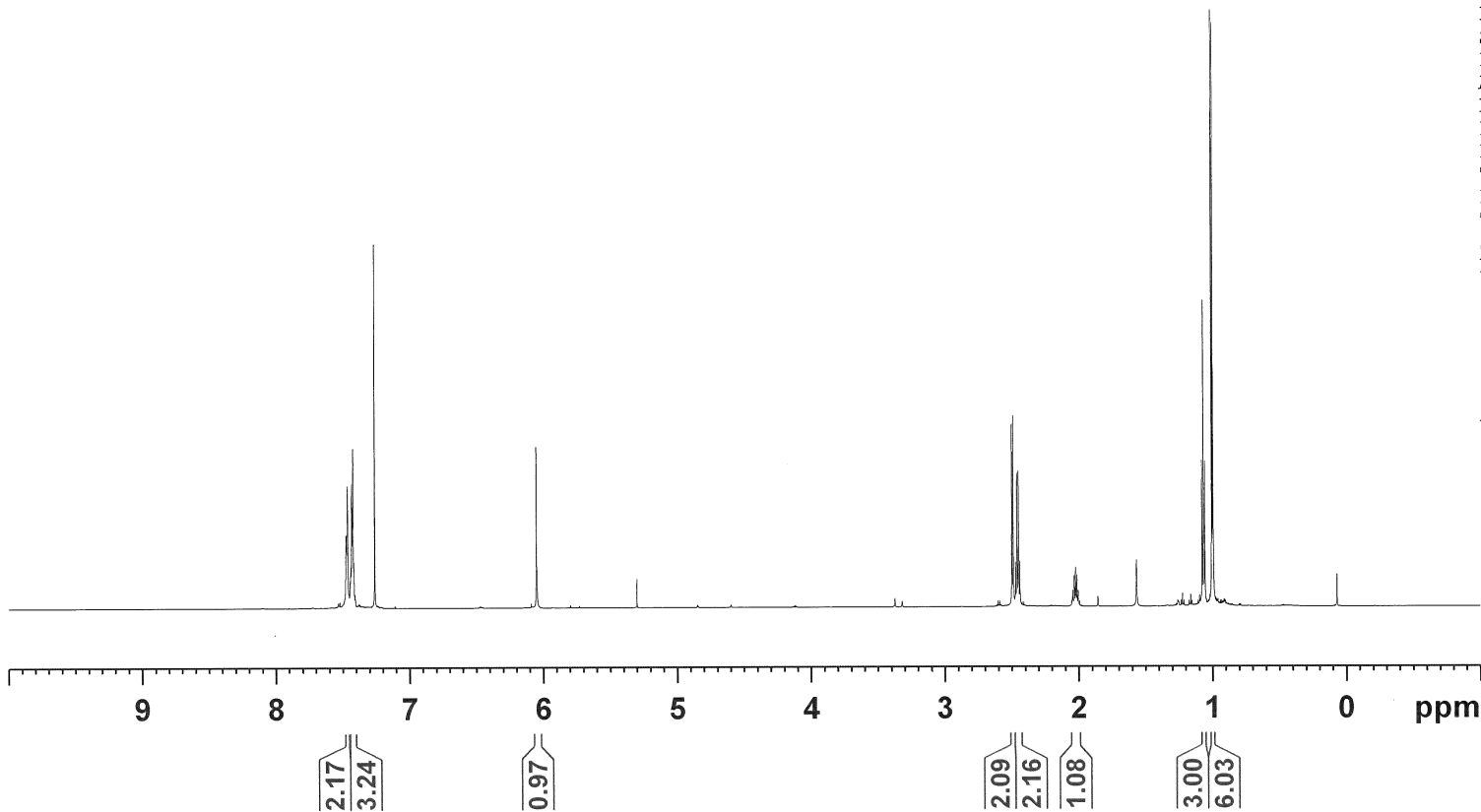
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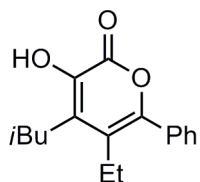
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RG 6.35
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DE 10.00 usec
TE 303.2 K
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SFO1 700.0115500 MHz
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22 - S4

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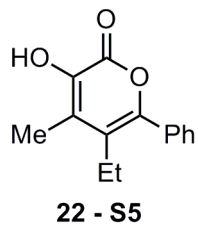
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DE 18.00 usec
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D11 0.0300000 sec
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NUC2 1H
CPDPRG[2] waltz16
PCPD2 65.00 usec
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PLW13 0.13982999 W

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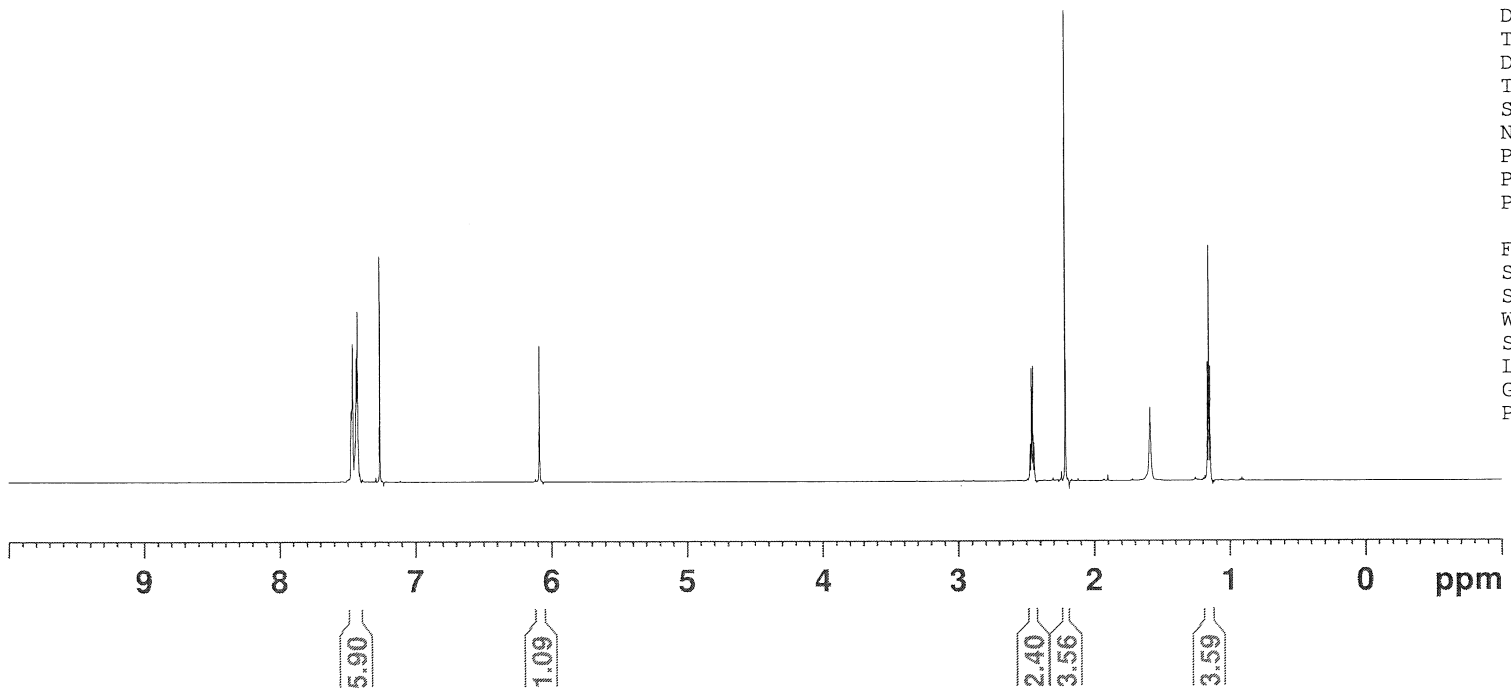
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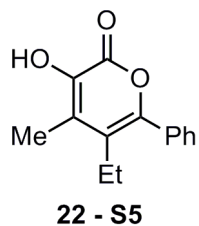
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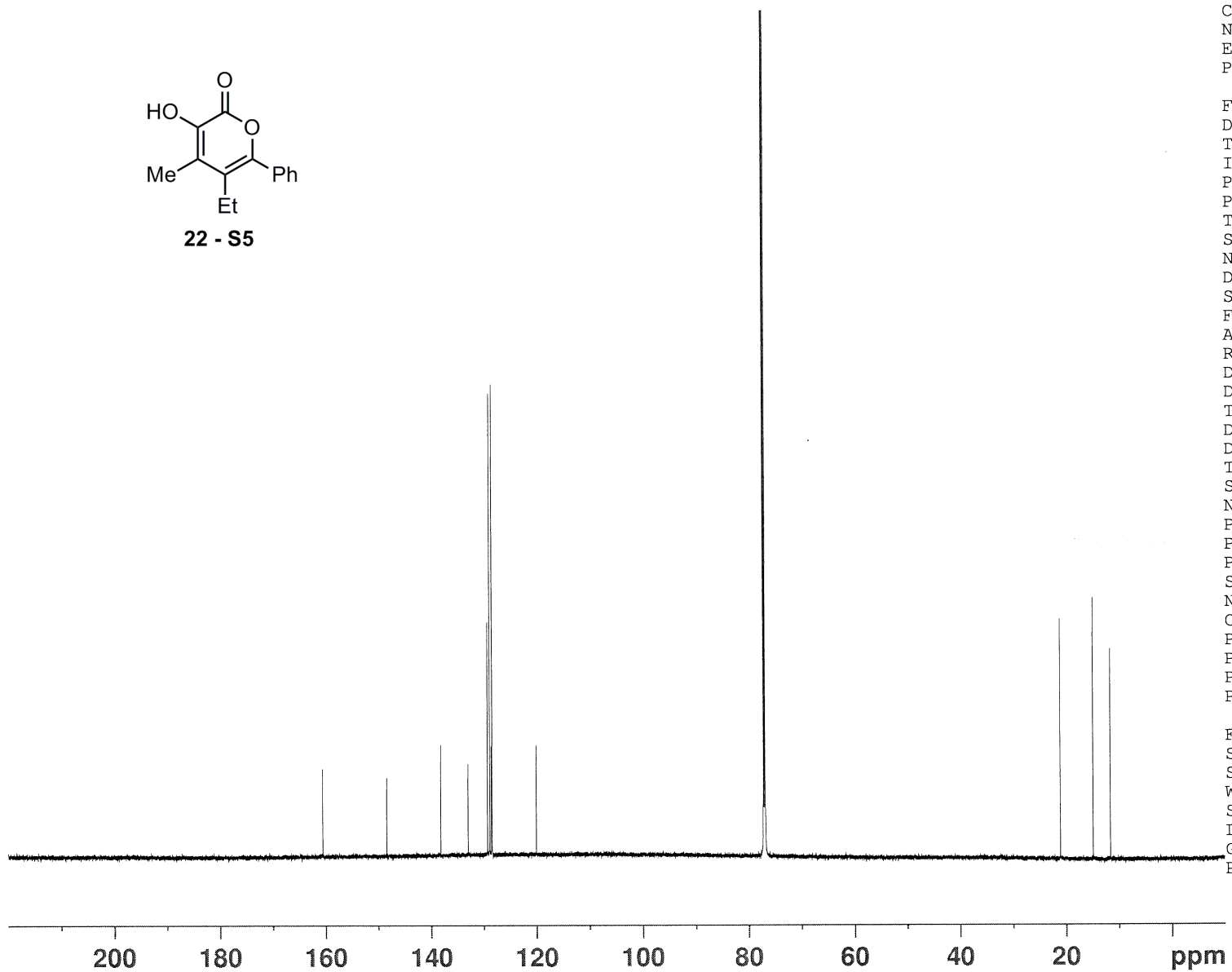
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 77.03
 76.85
 21.10
 14.91
 11.65



Current Data Parameters
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 EXPNO 2
 PROCNO 1

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 TE 303.2 K
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 PLW2 13.00000000 W
 PLW12 0.27768999 W
 PLW13 0.13982999 W

 F2 - Processing parameters
 SI 131072
 SF 176.0169002 MHz
 WDW EM
 SSB 0
 LB 1.00 Hz
 GB 0
 PC 1.40

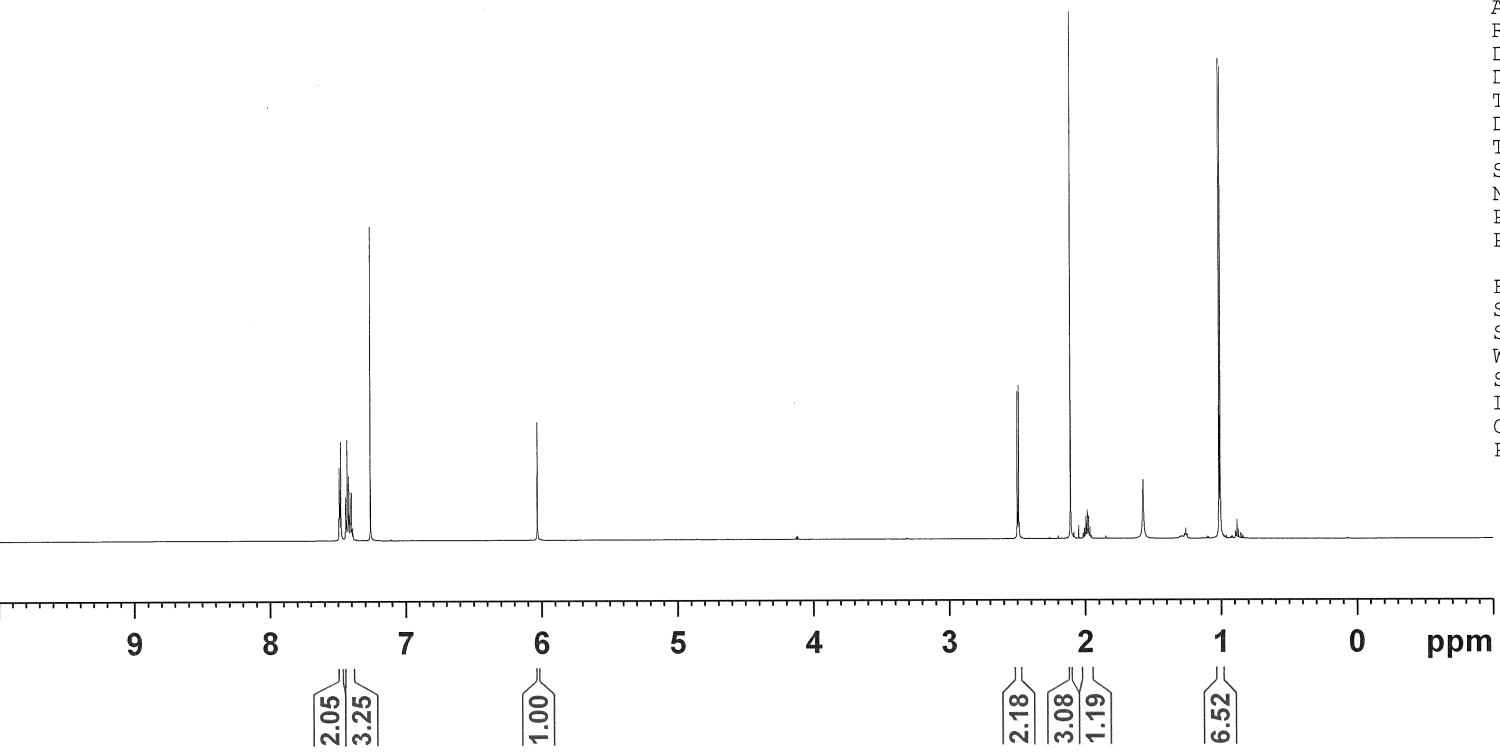
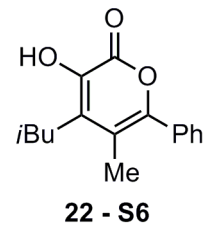
7.491
7.488
7.481
7.479
7.476
7.446
7.443
7.441
7.433
7.431
7.423
7.414
7.412
7.410
7.406
7.402
7.398
7.394
7.392
7.262
6.032

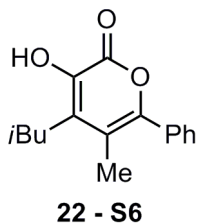
2.501
2.490
2.109
2.015
2.005
1.995
1.985
1.976
1.966
1.956
1.016
1.006

Current Data Parameters
NAME XZ-3-242
EXPNO 1
PROCNO 1

F2 - Acquisition Parameters
Date_ 20190714
Time_ 16.54 h
INSTRUM spect
PROBHD z151340_0001 (
PULPROG zg30
TD 65536
SOLVENT CDC13
NS 16
DS 2
SWH 10504.202 Hz
FIDRES 0.320563 Hz
AQ 3.1195135 sec
RG 36
DW 47.600 usec
DE 20.00 usec
TE 303.4 K
D1 1.00000000 sec
TD0 1
SFO1 700.0115500 MHz
NUC1 1H
P1 9.50 usec
PLW1 13.00000000 W

F2 - Processing parameters
SI 131072
SF 700.0070167 MHz
WDW no
SSB 0
LB 0 Hz
GB 0
PC 1.00





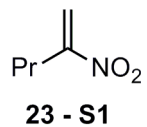
— 160.97
 — 148.13
 — 137.94
 — 132.95
 — 132.47
 — 129.23
 — 129.12
 — 128.27
 — 113.84
 — 77.22
 — 77.03
 — 76.85
 — 35.22
 — 28.18
 — 22.70
 — 14.54

Current Data Parameters
 NAME XZ-3-242
 EXPNO 2
 PROCNO 1

F2 - Acquisition Parameters
 Date_ 20190714
 Time_ 17.01 h
 INSTRUM spect
 PROBHD z151340_0001 (
 PULPROG zgpg30
 TD 65536
 SOLVENT CDCl3
 NS 62
 DS 4
 SWH 42613.637 Hz
 FIDRES 1.300465 Hz
 AQ 0.7689557 sec
 RG 203
 DW 11.733 usec
 DE 18.00 usec
 TE 303.2 K
 D1 2.0000000 sec
 D11 0.0300000 sec
 TD0 1
 SFO1 176.0362620 MHz
 NUC1 13C
 P1 11.25 usec
 PLW1 29.0000000 W
 SFO2 700.0098000 MHz
 NUC2 1H
 CPDPRG[2] waltz16
 PCPD2 65.00 usec
 PLW2 13.0000000 W
 PLW12 0.27768999 W
 PLW13 0.13982999 W

F2 - Processing parameters
 SI 131072
 SF 176.0169002 MHz
 WDW EM
 SSB 0
 LB 1.00 Hz
 GB 0
 PC 1.40

200 180 160 140 120 100 80 60 40 20 ppm



— 7.262

< 6.417
6.414

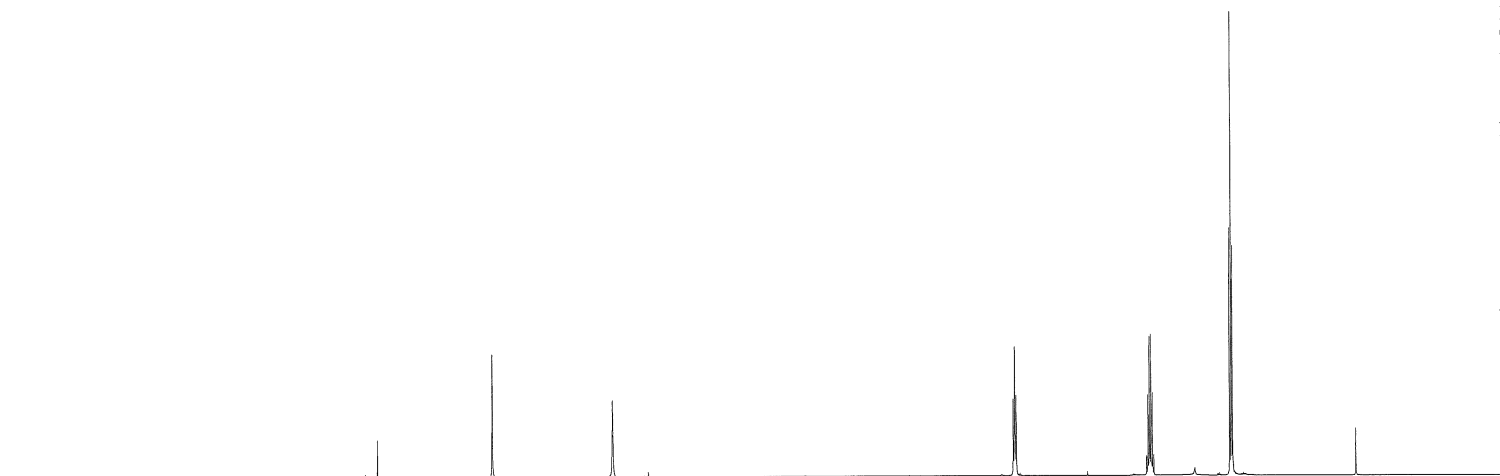
— 5.530

2.582
2.581
2.570
2.560
2.559
1.600
1.589
1.579
1.568
1.557
1.547
0.988
0.978
0.967

Current Data Parameters
 NAME XZ-3-279
 EXPNO 1
 PROCNO 1

F2 - Acquisition Parameters
 Date_ 20191130
 Time_ 12.41 h
 INSTRUM spect
 PROBHD z151340_0001 (
 PULPROG zg30
 TD 65536
 SOLVENT CDC13
 NS 16
 DS 2
 SWH 10504.202 Hz
 FIDRES 0.320563 Hz
 AQ 3.1195135 sec
 RG 18
 DW 47.600 usec
 DE 20.00 usec
 TE 303.2 K
 D1 1.00000000 sec
 TD0 1
 SFO1 700.0115500 MHz
 NUC1 1H
 P0 3.17 usec
 P1 9.50 usec
 PLW1 13.00000000 W

F2 - Processing parameters
 SI 131072
 SF 700.0070163 MHz
 WDW EM
 SSB 0
 LB 0.30 Hz
 GB 0
 PC 1.00



9 8 7 6 5 4 3 2 1 0 ppm

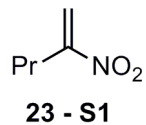
1.00

1.03

2.06

2.13

3.11



— 158.06

— 117.01

77.23
 77.05
 76.87

— 32.03

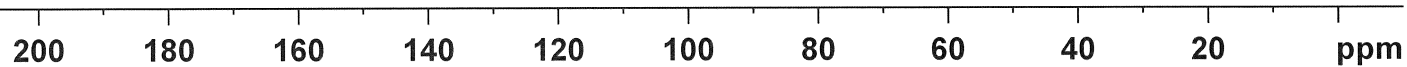
— 20.43

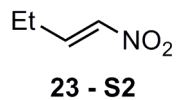
— 13.37

Current Data Parameters
 NAME XZ-3-279
 EXPNO 2
 PROCNO 1

F2 - Acquisition Parameters
 Date_ 20191130
 Time_ 12.46 h
 INSTRUM spect
 PROBHD Z151340_0001 (
 PULPROG zgpg30
 TD 65536
 SOLVENT CDC13
 NS 30
 DS 4
 SWH 42613.637 Hz
 FIDRES 1.300465 Hz
 AQ 0.7689557 sec
 RG 203
 DW 11.733 usec
 DE 18.00 usec
 TE 303.2 K
 D1 2.0000000 sec
 D11 0.0300000 sec
 TD0 1
 SFO1 176.0362620 MHz
 NUC1 13C
 P0 3.75 usec
 P1 11.25 usec
 PLW1 29.0000000 W
 SFO2 700.0098000 MHz
 NUC2 1H
 CPDPRG[2] waltz16
 PCPD2 65.00 usec
 PLW2 13.0000000 W
 PLW12 0.27768999 W
 PLW13 0.13982999 W

F2 - Processing parameters
 SI 131072
 SF 176.0169002 MHz
 WDW EM
 SSB 0
 LB 1.00 Hz
 GB 0
 PC 1.40





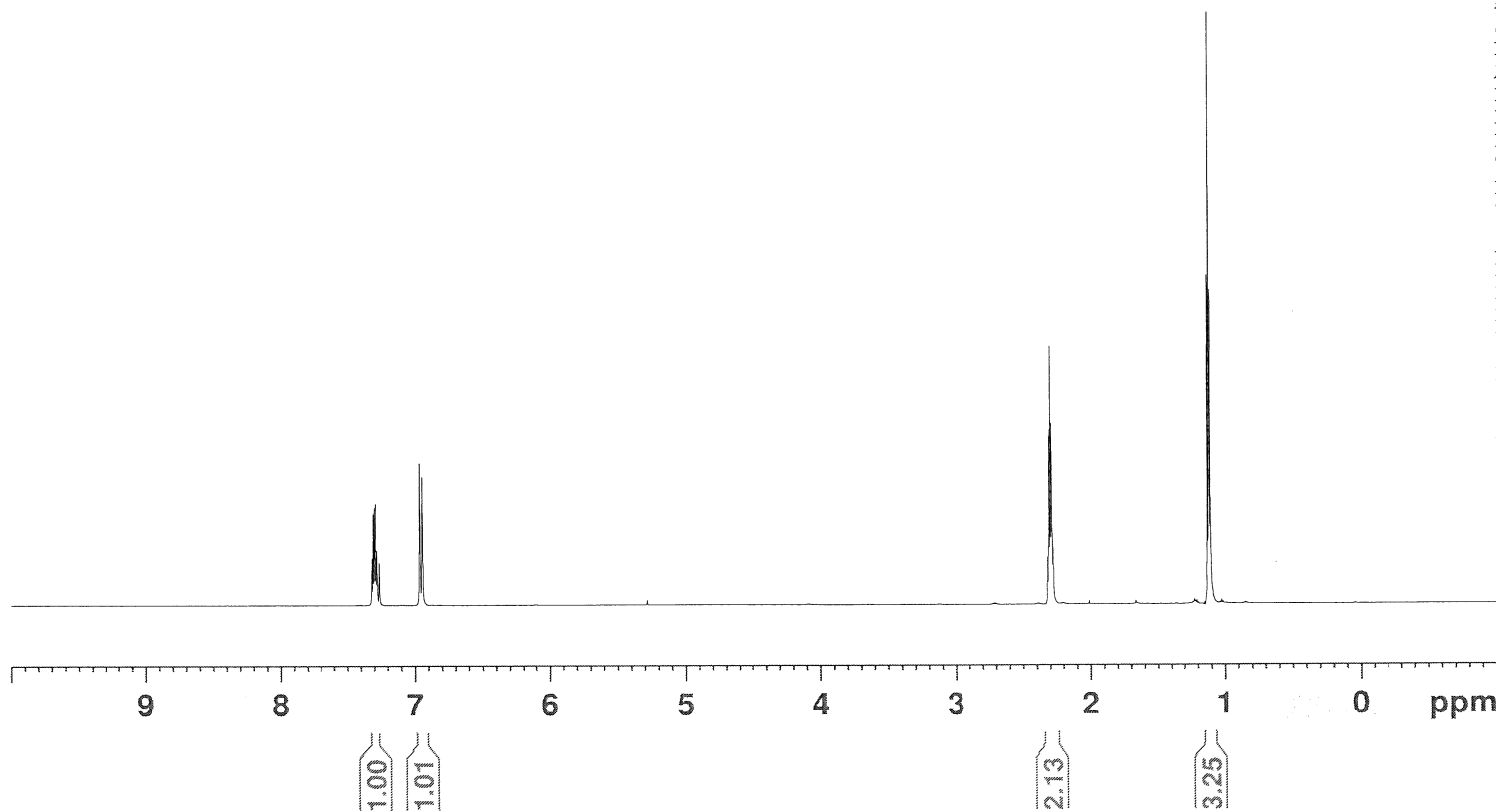
7.318
 7.308
 7.298
 7.289
 7.279
 7.262
 6.963
 6.944

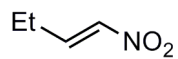
2.317
 2.307
 2.296
 2.286
 2.276
 1.126
 1.116
 1.105

Current Data Parameters
 NAME XZ-4-249
 EXPNO 1
 PROCNO 1

F2 - Acquisition Parameters
 Date_ 20200620
 Time 14.16 h
 INSTRUM spect
 PROBHD Z151340_0001 (
 PULPROG zg30
 TD 65536
 SOLVENT CDCl3
 NS 16
 DS 2
 SWH 10504.202 Hz
 FIDRES 0.320563 Hz
 AQ 3.1195135 sec
 RG 9
 DW 47.600 usec
 DE 20.00 usec
 TE 303.2 K
 D1 1.00000000 sec
 TD0 1
 SFO1 700.0115500 MHz
 NUC1 1H
 P0 3.17 usec
 P1 9.50 usec
 PLW1 13.00000000 W

F2 - Processing parameters
 SI 131072
 SF 700.0070158 MHz
 WDW EM
 SSB 0
 LB 0.30 Hz
 GB 0
 PC 1.00





23 - S2

144.12
139.17

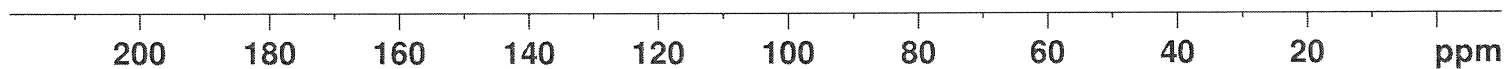
77.29
77.11
76.93

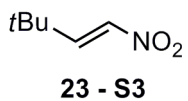
21.93
11.87

Current Data Parameters
NAME XZ-4-249
EXPNO 2
PROCNO 1

F2 - Acquisition Parameters
Date_ 20200620
Time 14.20 h
INSTRUM spect
PROBHD Z151340_0001 (
PULPROG zgpg30
ID 65536
SOLVENT CDCl3
NS 20
DS 4
SWH 42613.637 Hz
FIDRES 1.300465 Hz
AQ 0.7689557 sec
RG 203
DW 11.733 usec
DE 18.00 usec
TE 303.2 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1
SFO1 176.0362620 MHz
NUC1 13C
P0 3.75 usec
P1 11.25 usec
PLW1 29.00000000 W
SFO2 700.0098000 MHz
NUC2 1H
CPDPRG[2] waltz16
PCPD2 65.00 usec
PLW2 13.00000000 W
PLW12 0.27768999 W
PLW13 0.13982999 W

F2 - Processing parameters
SI 131072
SF 176.0169002 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40





7.262
 7.261
 7.258
 7.256
 7.241
 7.239
 7.236
 6.897
 6.895
 6.877
 6.875

1.149
 1.147
 1.145
 1.144
 1.144

Current Data Parameters
 NAME XZ-2-244
 EXPNO 1
 PROCNO 1

F2 - Acquisition Parameters
 Date_ 20191130
 Time_ 13.17 h
 INSTRUM spect
 PROBHD Z151340_0001 (
 PULPROG zg30
 TD 65536
 SOLVENT CDCl3
 NS 16
 DS 2
 SWH 10504.202 Hz
 FIDRES 0.320563 Hz
 AQ 3.1195135 sec
 RG 9
 DW 47.600 usec
 DE 20.00 usec
 TE 303.2 K
 D1 1.00000000 sec
 TD0 1
 SFO1 700.0115500 MHz
 NUC1 1H
 P0 3.17 usec
 P1 9.50 usec
 PLW1 13.00000000 W

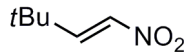
F2 - Processing parameters
 SI 131072
 SF 700.0070158 MHz
 WDW no
 SSB 0
 LB 0 Hz
 GB 0
 PC 1.00



9 8 7 6 5 4 3 2 1 0 ppm

1.05
1.00

9.16



23 - S3

152.05

137.18

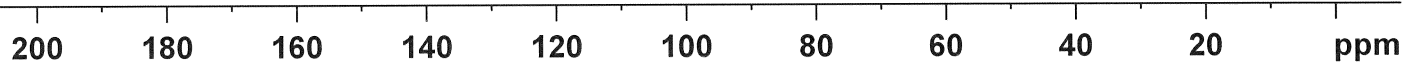
77.25
77.07
76.89

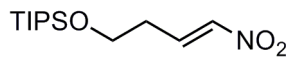
32.73
28.46

Current Data Parameters
NAME XZ-2-244
EXPNO 2
PROCNO 1

F2 - Acquisition Parameters
Date_ 20191130
Time_ 13.20 h
INSTRUM spect
PROBHD Z151340_0001 (
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 20
DS 4
SWH 42613.637 Hz
FIDRES 1.300465 Hz
AQ 0.7689557 sec
RG 203
DW 11.733 usec
DE 18.00 usec
TE 303.2 K
D1 2.0000000 sec
D11 0.03000000 sec
TD0 1
SFO1 176.0362620 MHz
NUC1 13C
P0 3.75 usec
P1 11.25 usec
PLW1 29.00000000 W
SFO2 700.0098000 MHz
NUC2 1H
CPDPRG[2] waltz16
PCPD2 65.00 usec
PLW2 13.00000000 W
PLW12 0.27768999 W
PLW13 0.13982999 W

F2 - Processing parameters
SI 131072
SF 176.0169002 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40





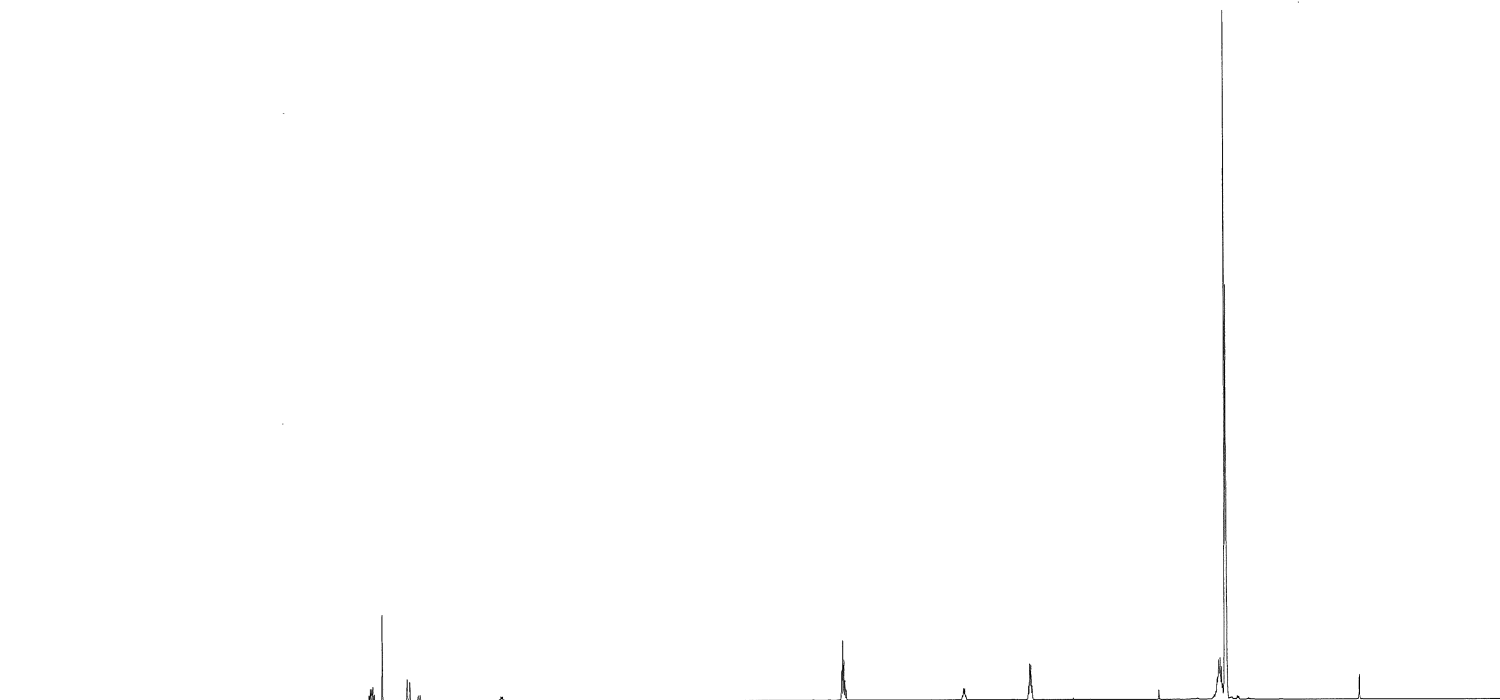
23 - S4

7.385
7.374
7.365
7.355
7.344
7.286
7.103
7.084
7.019
7.007
6.421
6.411
6.400
6.389
3.904
3.896
3.887
3.879
3.870
3.016
3.007
2.998
2.989
2.529
2.520
2.510
2.501
1.137
1.127
1.121
1.116
1.107
1.099
1.082
1.072

Current Data Parameters
NAME XZ-4-27
EXPNO 1
PROCNO 1

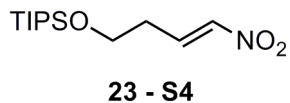
F2 - Acquisition Parameters
Date_ 20191004
Time_ 12.04 h
INSTRUM spect
PROBHD z151340_0001 (
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 10504.202 Hz
FIDRES 0.320563 Hz
AQ 3.1195135 sec
RG 28.5
DW 47.600 usec
DE 20.00 usec
TE 303.2 K
D1 1.00000000 sec
TD0 1
SFO1 700.0115500 MHz
NUC1 1H
P0 3.17 usec
P1 9.50 usec
PLW1 13.00000000 W

F2 - Processing parameters
SI 131072
SF 700.0070000 MHz
WDW no
SSB 0
LB 0 Hz
GB 0
PC 1.00



9 8 7 6 5 4 3 2 1 0 ppm

1.01
1.00
0.35
0.36
2.90
0.74
2.20
31.08



140.65
 139.93
 139.17
 138.76

77.21
 77.03
 76.85

61.33
 61.08

32.01
 31.56

17.98
 17.96
 11.90
 11.88

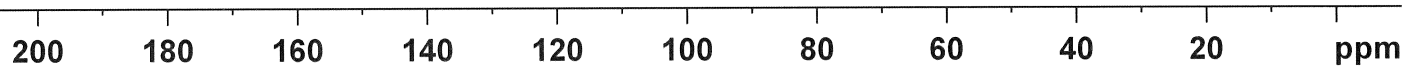
Current Data Parameters
 NAME XZ-4-27
 EXPNO 2
 PROCNO 1

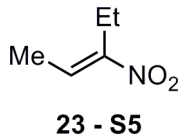
F2 - Acquisition Parameters

Date_ 20191004
 Time_ 12.12 h
 INSTRUM spect
 PROBHD Z151340_0001 (
 PULPROG zgpg30
 TD 65536
 SOLVENT CDCl3
 NS 59
 DS 4
 SWH 42613.637 Hz
 FIDRES 1.300465 Hz
 AQ 0.7689557 sec
 RG 203
 DW 11.733 usec
 DE 18.00 usec
 TE 303.2 K
 D1 2.0000000 sec
 D11 0.0300000 sec
 TD0 1
 SFO1 176.0362620 MHz
 NUC1 13C
 P0 3.75 usec
 P1 11.25 usec
 PLW1 29.0000000 W
 SFO2 700.0098000 MHz
 NUC2 1H
 CPDPRG[2] waltz16
 PCPD2 65.00 usec
 PLW2 13.0000000 W
 PLW12 0.27768999 W
 PLW13 0.13982999 W

F2 - Processing parameters

SI 131072
 SF 176.0169002 MHz
 WDW EM
 SSB 0
 LB 1.00 Hz
 GB 0
 PC 1.40





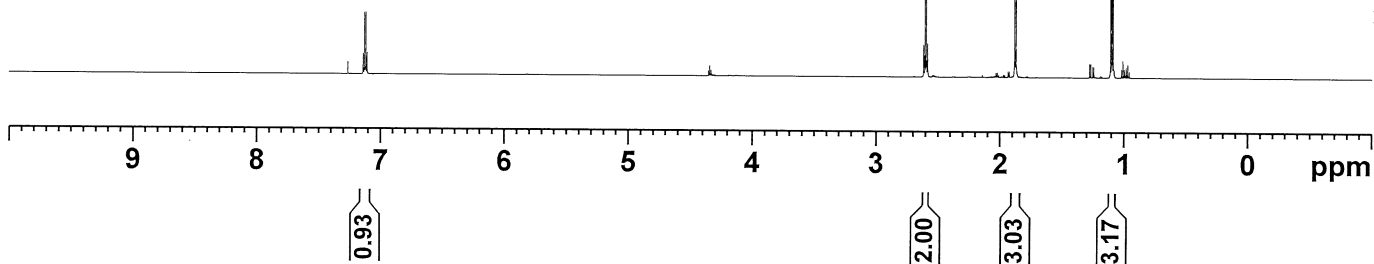
7.262
7.138
7.128
7.117
7.107

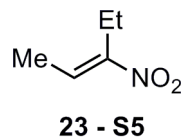
2.615
2.604
2.593
2.583
1.880
1.869
1.105
1.095
1.084

Current Data Parameters
 NAME XZ-2-128
 EXPNO 1
 PROCNO 1

F2 - Acquisition Parameters
 Date_ 20191130
 Time_ 12.18 h
 INSTRUM spect
 PROBHD Z151340_0001 (
 PULPROG zg30
 TD 65536
 SOLVENT CDCl3
 NS 16
 DS 2
 SWH 10504.202 Hz
 FIDRES 0.320563 Hz
 AQ 3.1195135 sec
 RG 9
 DW 47.600 usec
 DE 20.00 usec
 TE 303.2 K
 D1 1.00000000 sec
 TD0 1
 SFO1 700.0115500 MHz
 NUC1 1H
 P0 3.17 usec
 P1 9.50 usec
 PLW1 13.00000000 W

F2 - Processing parameters
 SI 131072
 SF 700.0070160 MHz
 WDW no
 SSB 0
 LB 0 Hz
 GB 0
 PC 1.00





153.90

130.99

77.26
77.08
76.89

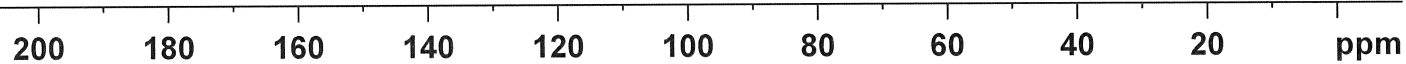
19.58
13.25
12.29

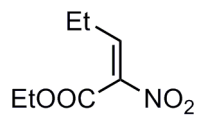
Current Data Parameters
 NAME XZ-2-128
 EXPNO 4
 PROCNO 1

F2 - Acquisition Parameters

Date_ 20191130
 Time_ 12.34 h
 INSTRUM spect
 PROBHD z151340_0001 (
 PULPROG zgpg30
 TD 65536
 SOLVENT CDC13
 NS 8
 DS 4
 SWH 42613.637 Hz
 FIDRES 1.300465 Hz
 AQ 0.7689557 sec
 RG 203
 DW 11.733 usec
 DE 18.00 usec
 TE 303.2 K
 D1 2.0000000 sec
 D11 0.0300000 sec
 TD0 1
 SFO1 176.0362620 MHz
 NUC1 13C
 P0 3.75 usec
 P1 11.25 usec
 PLW1 29.0000000 W
 SFO2 700.0098000 MHz
 NUC2 1H
 CPDPRG[2] waltz16
 PCPD2 65.00 usec
 PLW2 13.0000000 W
 PLW12 0.27768999 W
 PLW13 0.13982999 W

F2 - Processing parameters
 SI 131072
 SF 176.0169002 MHz
 WDW EM
 SSB 0
 LB 1.00 Hz
 GB 0
 PC 1.40





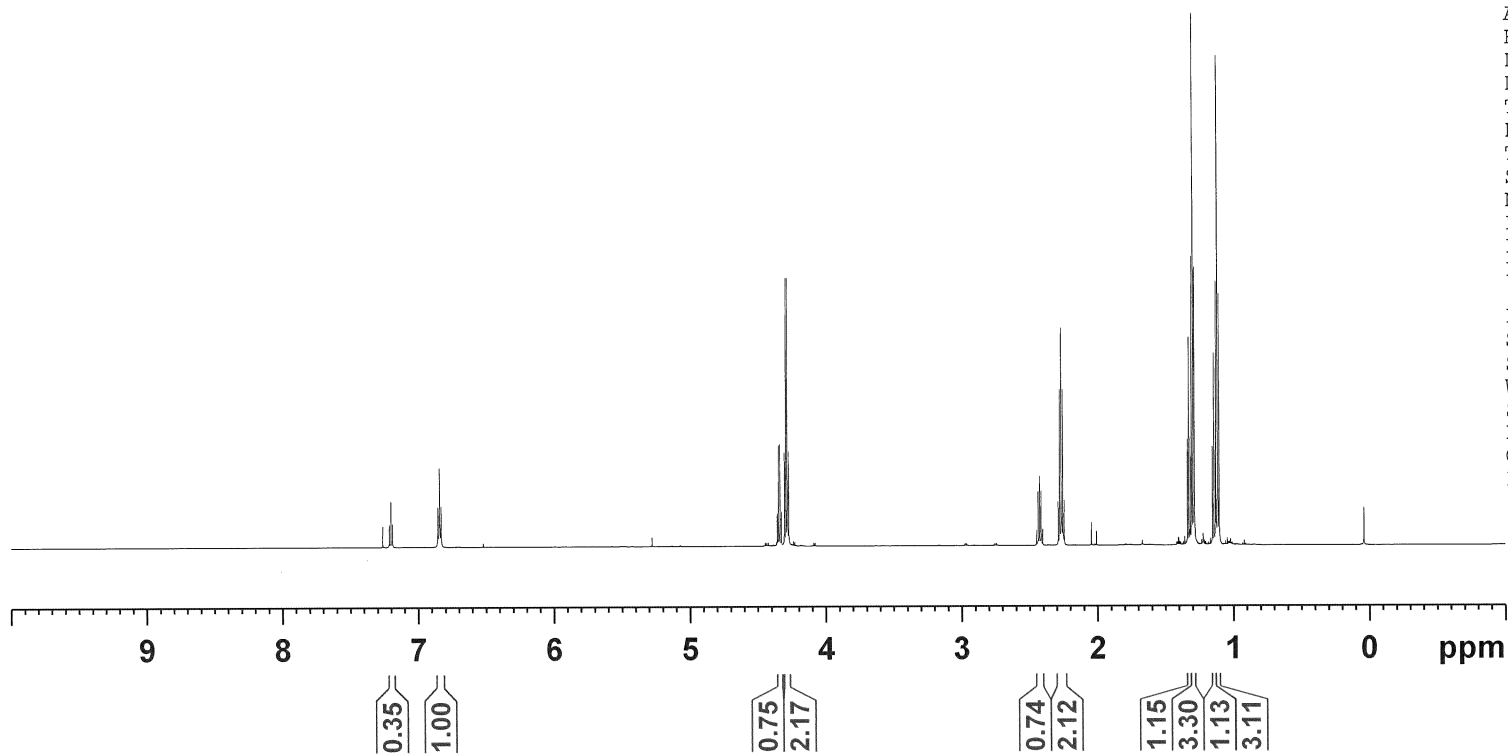
23 - S6

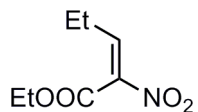
7.262
7.213
7.202
7.190
6.855
6.844
6.832
4.358
4.348
4.338
4.328
4.304
4.294
4.284
4.274
2.449
2.438
2.427
2.415
2.405
2.290
2.279
2.268
2.257
2.246
1.338
1.328
1.317
1.307
1.297
1.286
1.154
1.143
1.133
1.127

Current Data Parameters
NAME XZ-3-157
EXPNO 1
PROCNO 1

F2 - Acquisition Parameters
Date_ 20191130
Time_ 13.26 h
INSTRUM spect
PROBHD z151340_0001 (
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 10504.202 Hz
FIDRES 0.320563 Hz
AQ 3.1195135 sec
RG 9
DW 47.600 usec
DE 20.00 usec
TE 303.2 K
D1 1.00000000 sec
TD0 1
SFO1 700.011550 MHz
NUC1 1H
P0 3.17 usec
P1 9.50 usec
PLW1 13.00000000 W

F2 - Processing parameters
SI 131072
SF 700.0070159 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00





23 - S6

159.82
158.69
144.54
144.27
144.09
141.24

77.27
77.09
76.91
62.72
62.59

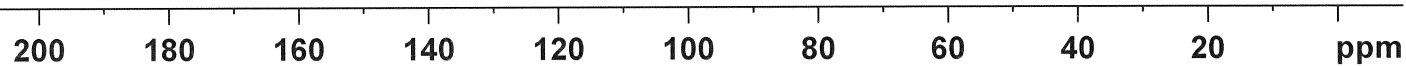
21.55
21.40
13.95
13.90
12.49
12.28

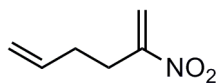
NAME XZ-3-157
EXPNO 5
PROCNO 1

F2 - Acquisition Parameters

Date_ 20191130
Time 13.54 h
INSTRUM spect
PROBHD Z151340_0001 (
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 93
DS 4
SWH 42613.637 Hz
FIDRES 1.300465 Hz
AQ 0.7689557 sec
RG 203
DW 11.733 usec
DE 18.00 usec
TE 303.2 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1
SFO1 176.0362620 MHz
NUC1 13C
P0 3.75 usec
P1 11.25 usec
PLW1 29.00000000 W
SFO2 700.0098000 MHz
NUC2 1H
CPDPRG[2] waltz16
PCPD2 65.00 usec
PLW2 13.00000000 W
PLW12 0.27768999 W
PLW13 0.13982999 W

F2 - Processing parameters
SI 131072
SF 176.0169002 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40





23 - S7

7.262
6.461
5.817
5.807
5.802
5.798
5.793
5.783
5.777
5.773
5.768
5.759
5.559
5.094
5.068
5.053

2.723
2.712
2.701
2.339
2.329
2.319
2.309

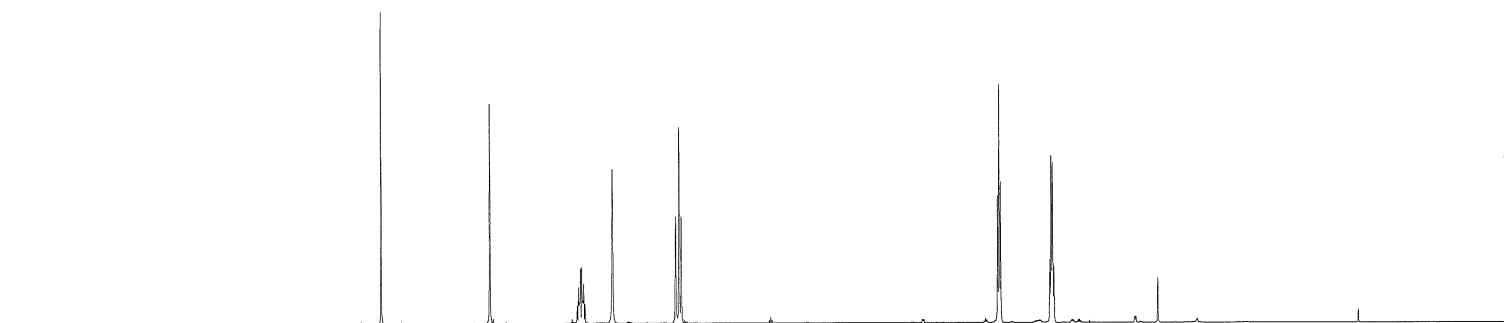
Current Data Parameters
NAME XZ-4-42
EXPNO 1
PROCNO 1

F2 - Acquisition Parameters

Date_ 20191016
Time_ 17.27 h
INSTRUM spect
PROBHD Z151340_0001 (
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 10504.202 Hz
FIDRES 0.320563 Hz
AQ 3.1195135 sec
RG 36
DW 47.600 usec
DE 20.00 usec
TE 303.2 K
D1 1.00000000 sec
TDO 1
SFO1 700.0115500 MHz
NUC1 1H
PO 3.17 usec
P1 9.50 usec
PLW1 13.00000000 W

F2 - Processing parameters

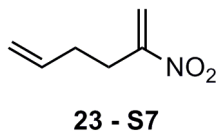
SI 131072
SF 700.0070144 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00



9 8 7 6 5 4 3 2 1 0 ppm

1.02
1.00
1.04
2.06

2.07
2.06



157.32

135.94

117.65
116.51

77.21
77.03
76.85

31.14
29.48

Current Data Parameters
 NAME XZ-4-42
 EXPNO 2
 PROCNO 1

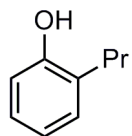
F2 - Acquisition Parameters

Date_ 20191016
 Time_ 17.34 h
 INSTRUM spect
 PROBHD z151340_0001 (
 PULPROG zgpg30
 TD 65536
 SOLVENT CDCl3
 NS 76
 DS 4
 SWH 42613.637 Hz
 FIDRES 1.300465 Hz
 AQ 0.7689557 sec
 RG 203
 DW 11.733 usec
 DE 18.00 usec
 TE 303.2 K
 D1 2.00000000 sec
 D11 0.03000000 sec
 TD0 1
 SFO1 176.0362620 MHz
 NUC1 13C
 P0 3.75 usec
 P1 11.25 usec
 PLW1 29.00000000 W
 SFO2 700.0098000 MHz
 NUC2 1H
 CPDPRG[2] waltz16
 PCPD2 65.00 usec
 PLW2 13.00000000 W
 PLW12 0.27768999 W
 PLW13 0.13982999 W

F2 - Processing parameters

SI 131072
 SF 176.0169002 MHz
 WDW no
 SSB 0
 LB 0 Hz
 GB 0
 PC 1.40

200 180 160 140 120 100 80 60 40 20 ppm

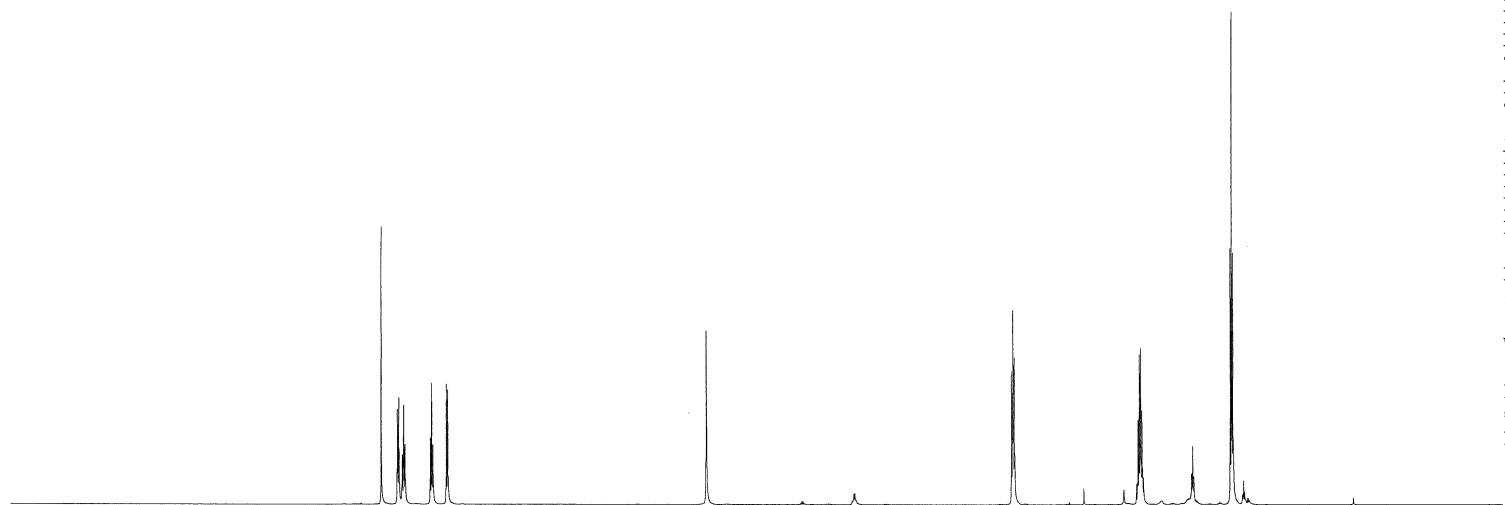


25

7.262
7.141
7.131
7.108
7.106
7.095
7.086
7.084
6.899
6.889
6.878
6.780
6.769

— 4.867

2.616
2.605
2.594
1.696
1.685
1.674
1.663
1.653
1.642
1.006
0.996



1.00
1.05
1.02
1.02

1.02

2.14

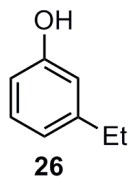
2.16

3.32

Current Data Parameters
NAME XZ-3-280
EXPNO 2
PROCNO 1

F2 - Acquisition Parameters
Date_ 20200618
Time 13.21 h
INSTRUM spect
PROBHD Z151340_0001 (
PULPROG zg30
TD 65536
SOLVENT CDC13
NS 16
DS 2
SWH 10504.202 Hz
FIDRES 0.320563 Hz
AQ 3.1195135 sec
RG 16
DW 47.600 usec
DE 20.00 usec
TE 303.2 K
D1 1.00000000 sec
TD0 1
SF01 700.0115500 MHz
NUC1 1H
P0 3.17 usec
P1 9.50 usec
PLW1 13.00000000 W

F2 - Processing parameters
SI 131072
SF 700.0070168 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00



7.262
7.167
7.156
7.145
6.791
6.790
6.780
6.779
6.694
6.691
6.689
6.664
6.661
6.653
6.649
4.891

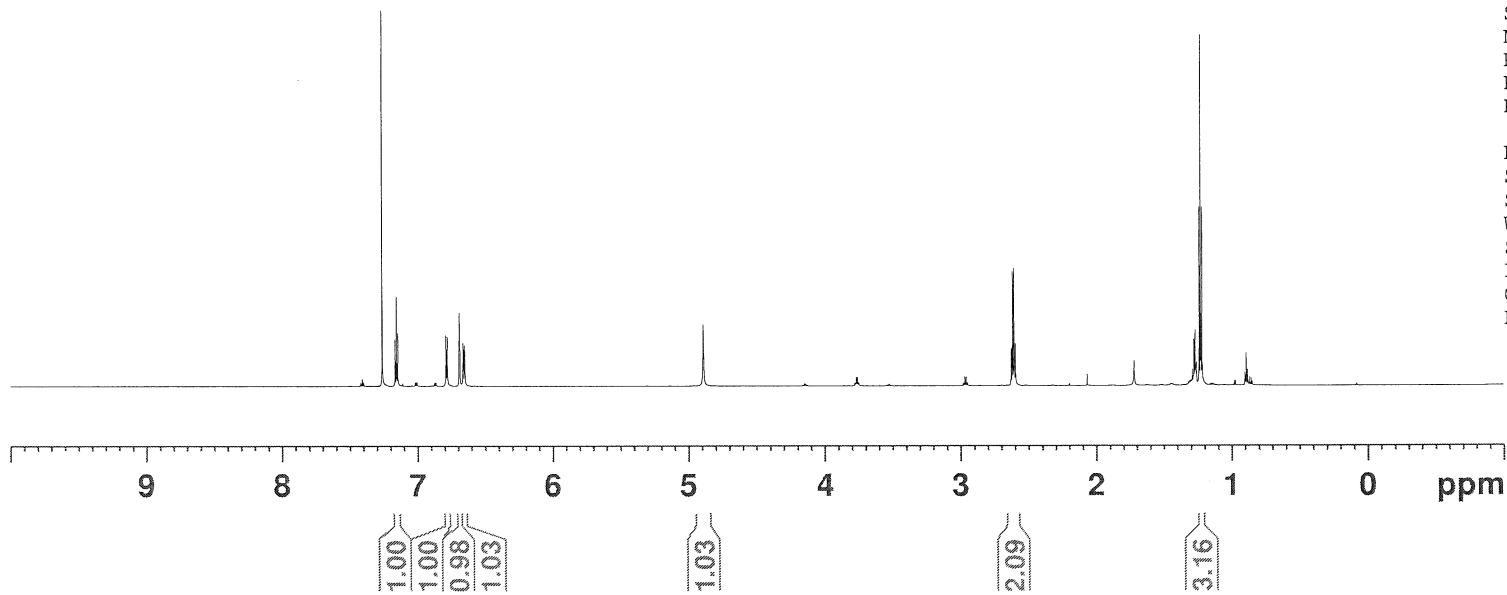
2.628
2.618
2.607
2.596

1.240
1.229
1.218

Current Data Parameters
NAME XZ-3-20
EXPNO 1
PROCNO 1

F2 - Acquisition Parameters
Date_ 20200618
Time 13.05 h
INSTRUM spect
PROBHD Z151340_0001 (
PULPROG zg30
TD 65536
SOLVENT CDC13
NS 16
DS 2
SWH 10504.202 Hz
FIDRES 0.320563 Hz
AQ 3.1195135 sec
RG 25.4
DW 47.600 usec
DE 20.00 usec
TE 303.2 K
D1 1.00000000 sec
TD0 1
SF01 700.0115500 MHz
NUC1 1H
P0 3.17 usec
P1 9.50 usec
PLW1 13.00000000 W

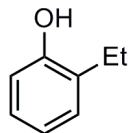
F2 - Processing parameters
SI 131072
SF 700.0070167 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00



7.262
7.161
7.159
7.150
7.149
7.106
7.103
7.095
7.092
7.084
7.081
6.909
6.908
6.899
6.897
6.888
6.887
6.777
6.775
6.765
6.764
4.804

2.671
2.660
2.649
2.638

1.264
1.253
1.242

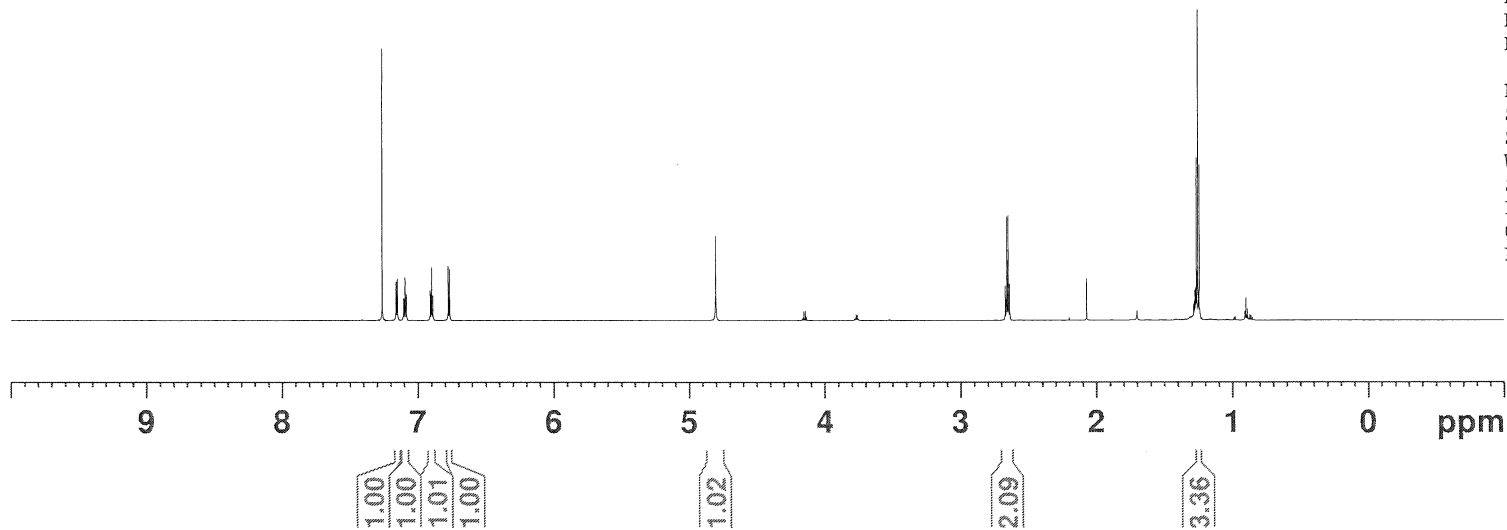


27

Current Data Parameters
NAME XZ-3-21
EXPNO 1
PROCNO 1

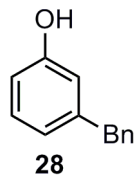
F2 - Acquisition Parameters
Date_ 20200618
Time 13.13 h
INSTRUM spect
PROBHD z151340_0001 (
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 10504.202 Hz
FIDRES 0.320563 Hz
AQ 3.1195135 sec
RG 22.6
DW 47.600 usec
DE 20.00 usec
TE 303.2 K
D1 1.00000000 sec
TD0 1
SF01 700.0115500 MHz
NUC1 1H
P0 3.17 usec
P1 9.50 usec
PLW1 13.00000000 W

F2 - Processing parameters
SI 131072
SF 700.0070166 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00



7.345
7.334
7.324
7.264
7.262
7.255
7.239
7.228
7.203
7.192
7.180
6.835
6.825
6.707
6.696
6.675
5.264

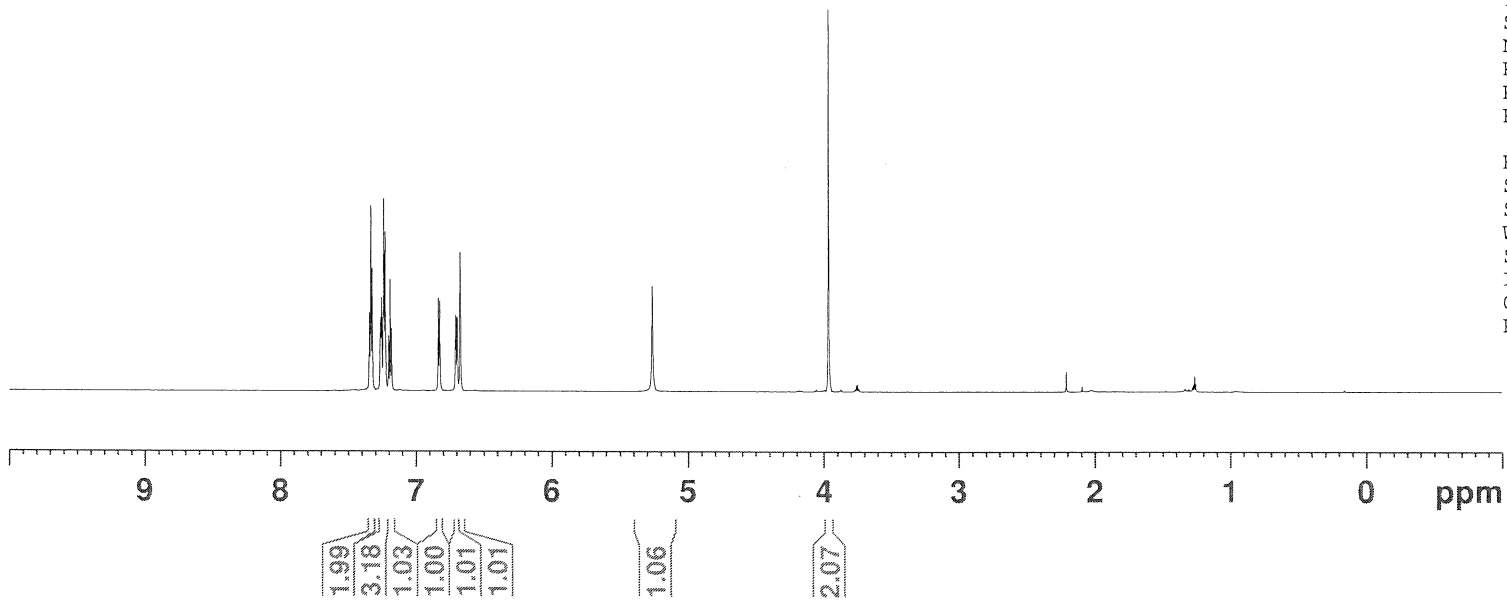
3.965



Current Data Parameters
NAME XZ-2-95
EXPNO 3
PROCNO 1

F2 - Acquisition Parameters
Date_ 20200622
Time 15.57 h
INSTRUM spect
PROBHD Z151340_0001 (zg30)
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 10504.202 Hz
FIDRES 0.320563 Hz
AQ 3.1195135 sec
RG 9
DW 47.600 usec
DE 20.00 usec
TE 303.2 K
D1 1.0000000 sec
TD0 1
SF01 700.0115500 MHz
NUC1 1H
P0 3.17 usec
P1 9.50 usec
PLW1 13.0000000 W

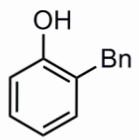
F2 - Processing parameters
SI 131072
SF 700.0070157 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00



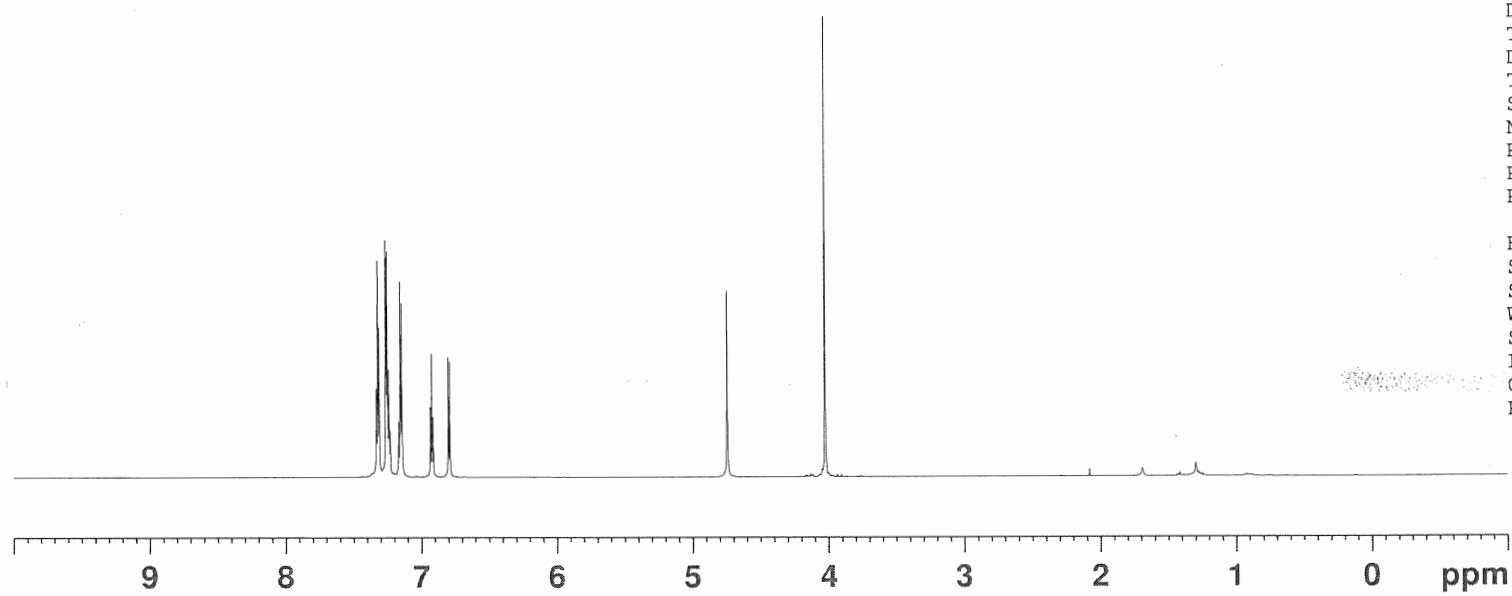
7.331
7.320
7.310
7.262
7.251
7.239
7.229
7.166
7.154
7.143
6.933
6.922
6.912
6.800
6.789

— 4.744

— 4.026



29



2.06
3.27
2.02
1.00
0.99

1.05

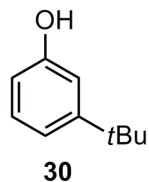
2.18

```

Current Data Parameters
NAME           XZ-2-296
EXPNO          3
PROCNO         1

F2 - Acquisition Parameters
Date_          20200622
Time           15.48 h
INSTRUM        spect
PROBHD         Z151340_0001 (
PULPROG        zg30
TD             65536
SOLVENT        CDCl3
NS             16
DS             2
SWH            10504.202 Hz
FIDRES         0.320563 Hz
AQ             3.1195135 sec
RG             20.2
DW             47.600 usec
DE             20.00 usec
TE             303.2 K
D1             1.00000000 sec
TD0            1
SFO1           700.0115500 MHz
NUC1           1H
P0             3.17 usec
P1             9.50 usec
PLW1           13.00000000 W

F2 - Processing parameters
SI             131072
SF             700.0070181 MHz
WDW            EM
SSB            0
LB             0.30 Hz
GB             0
PC             1.00
  
```



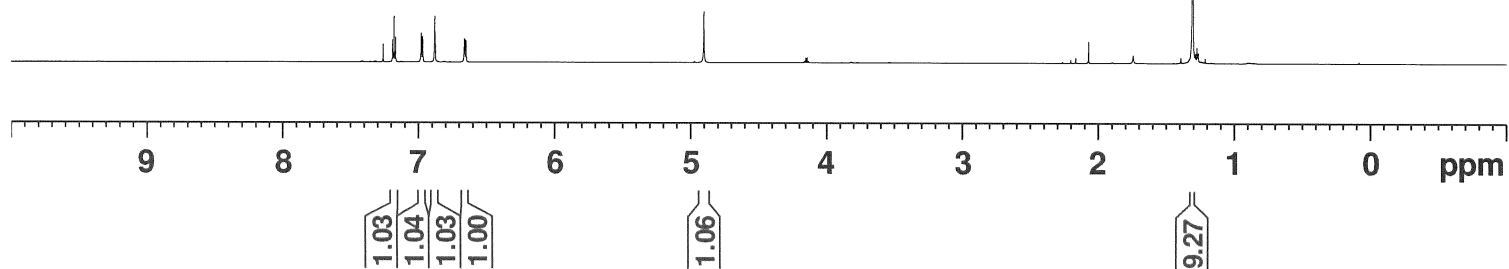
7.260
 7.191
 7.180
 7.168
 6.980
 6.969
 6.882
 6.880
 6.877
 6.664
 6.661
 6.653
 6.649
 — 4.902

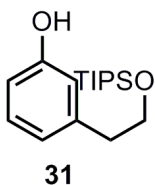
— 1.305

Current Data Parameters
 NAME XZ-2-248-2
 EXPNO 1
 PROCNO 1

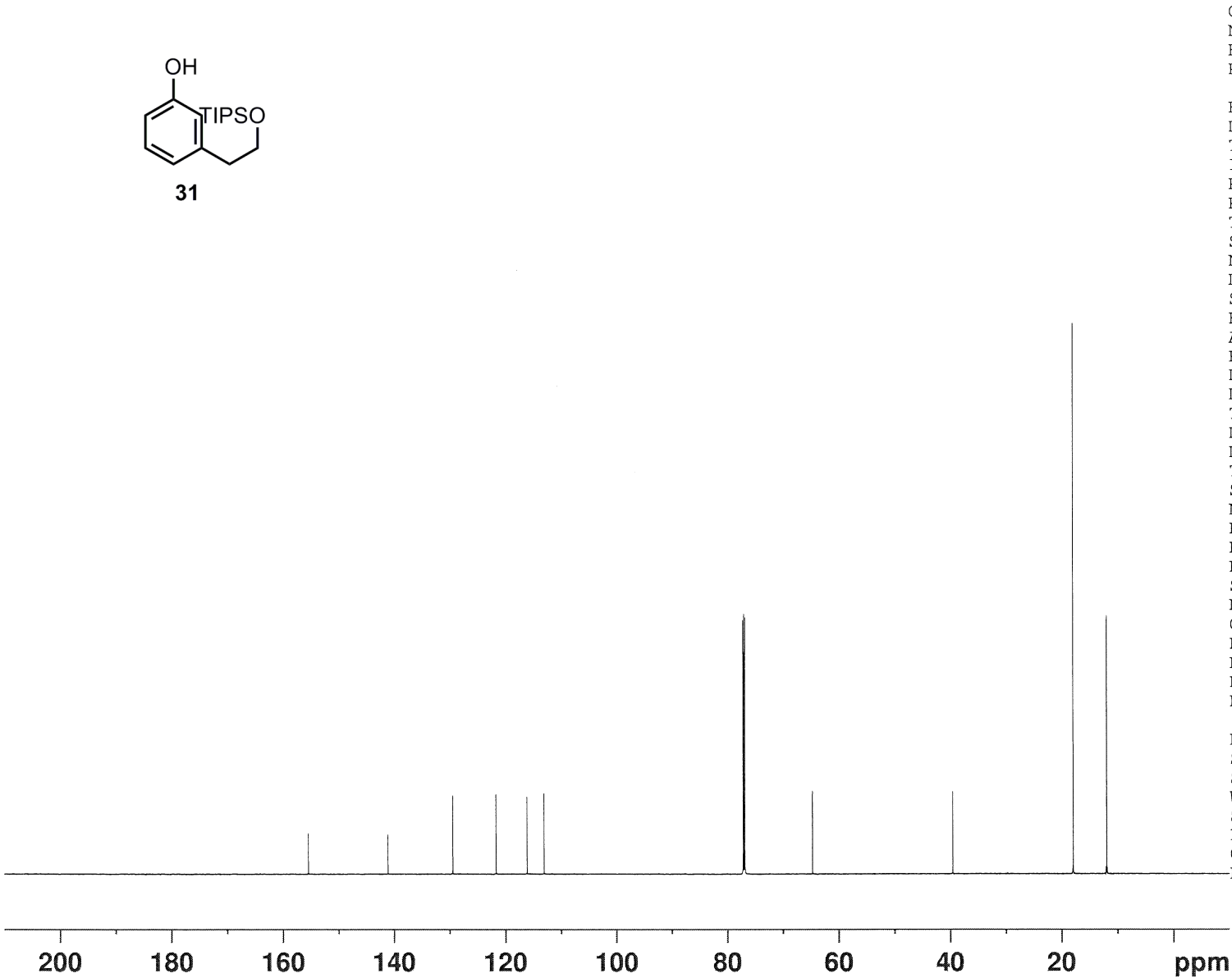
F2 - Acquisition Parameter
 Date_ 20181001
 Time 21.55 h
 INSTRUM spect
 PROBHD Z151340_0001 (
 PULPROG zg30
 TD 65536
 SOLVENT CDC13
 NS 16
 DS 2
 SWH 10504.202 Hz
 FIDRES 0.320563 Hz
 AQ 3.1195135 sec
 RG 5
 DW 47.600 usec
 DE 10.00 usec
 TE 303.2 K
 D1 1.00000000 sec
 TD0 1
 SFO1 700.0115500 MHz
 NUC1 1H
 P1 11.00 usec
 PLW1 13.00000000 W

F2 - Processing parameters
 SI 131072
 SF 700.0070180 MHz
 WDW no
 SSB 0
 LB 0 Hz
 GB 0
 PC 1.00





— 155.41
 — 141.07
 — 129.42
 — 121.67
 — 116.11
 — 113.03
 — 77.23
 — 77.05
 — 76.86
 — 64.75
 — 39.62
 — 18.00
 — 11.99

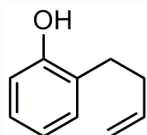


Current Data Parameters
 NAME XZ-4-28
 EXPNO 2
 PROCNO 1

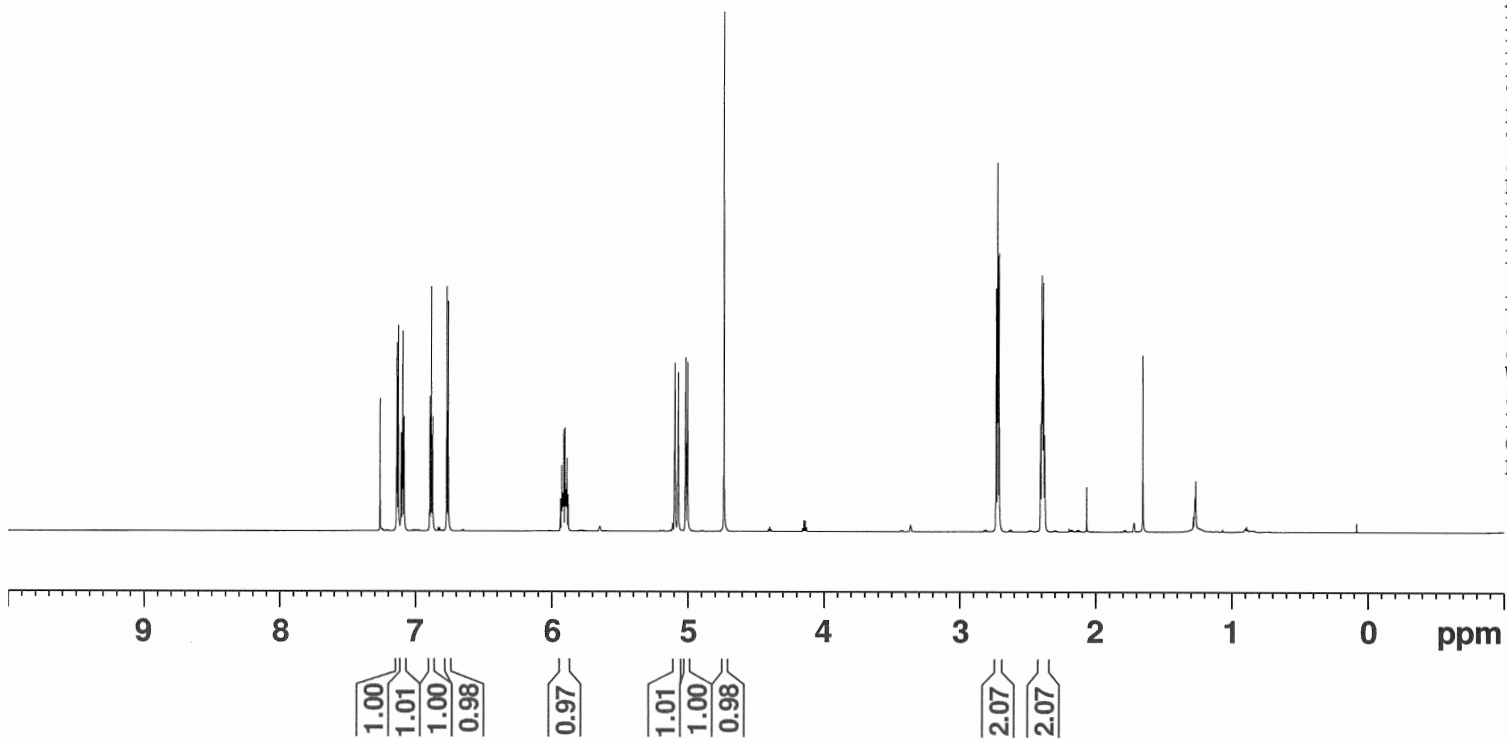
 F2 - Acquisition Parameters
 Date_ 20191007
 Time 13.37 h
 INSTRUM spect
 PROBHD z151340_0001 (
 PULPROG zgpg30
 TD 65536
 SOLVENT CDCl3
 NS 8
 DS 4
 SWH 42613.637 Hz
 FIDRES 1.300465 Hz
 AQ 0.7689557 sec
 RG 203
 DW 11.733 usec
 DE 18.00 usec
 TE 303.2 K
 D1 2.00000000 sec
 D11 0.03000000 sec
 TD0 1
 SFO1 176.0362620 MHz
 NUC1 13C
 P0 3.75 usec
 P1 11.25 usec
 PLW1 29.00000000 W
 SFO2 700.0098000 MHz
 NUC2 1H
 CPDPRG[2] waltz16
 PCPD2 65.00 usec
 PLW2 13.00000000 W
 PLW12 0.27768999 W
 PLW13 0.13982999 W

 F2 - Processing parameters
 SI 131072
 SF 176.0169002 MHz
 WDW EM
 SSB 0
 LB 1.00 Hz
 GB 0
 PC 1.40

7.262
7.139
7.128
7.107
7.096
7.085
6.896
6.885
6.875
6.772
6.760
5.936
5.927
5.922
5.917
5.912
5.902
5.897
5.893
5.888
5.878
5.095
5.071
5.016
5.002
4.734
2.732
2.721
2.710
2.405
2.396
2.385
2.374



32



Current Data Parameters
NAME XZ-4-44
EXPNO 1
PROCNO 1

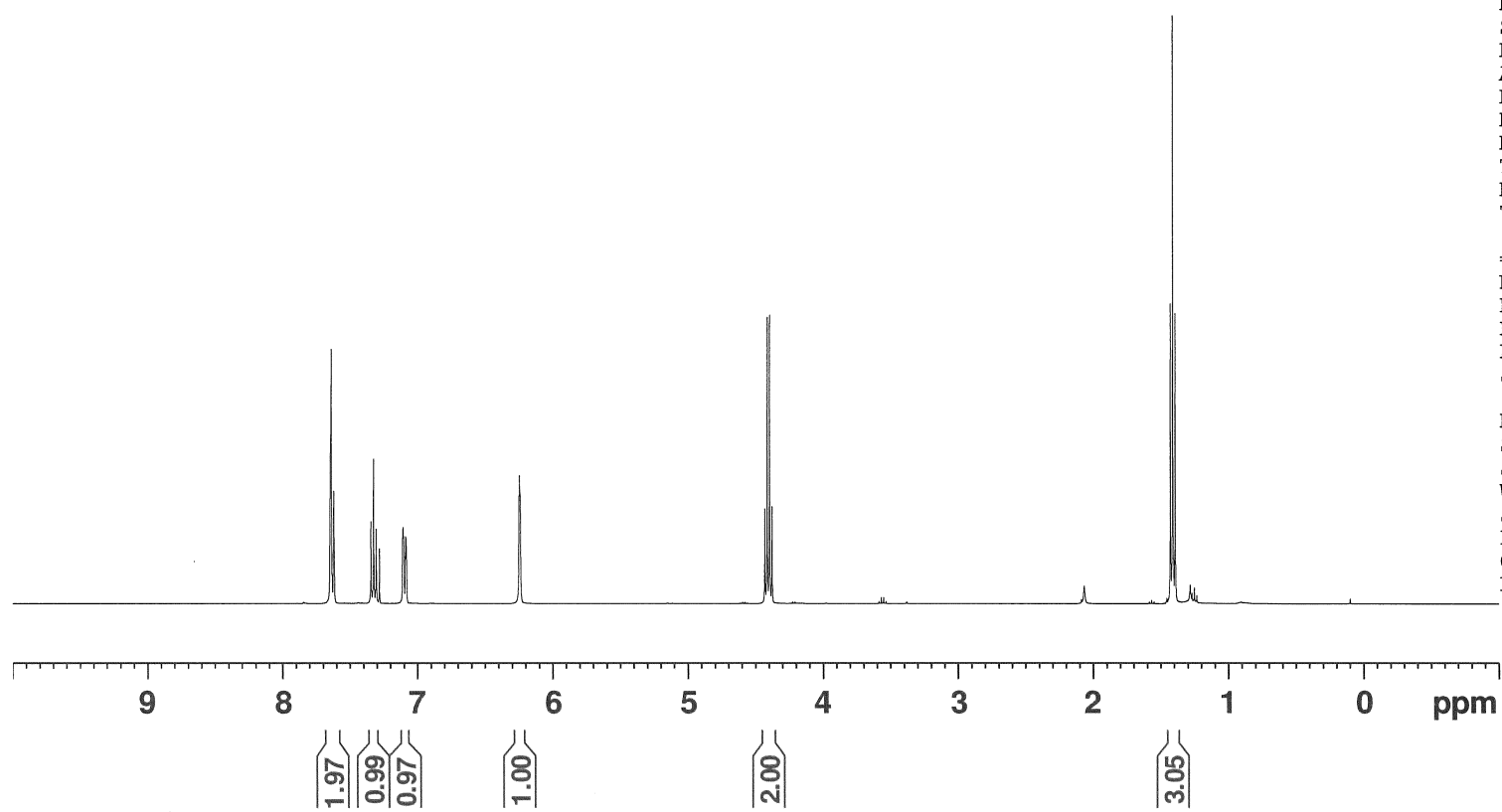
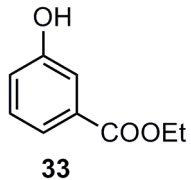
F2 - Acquisition Parameter
Date_ 20191018
Time 10.17 h
INSTRUM spect
PROBHD Z151340_0001 (
PULPROG zg30
TD 65536
SOLVENT CDC13
NS 16
DS 2
SWH 10504.202 Hz
FIDRES 0.320563 Hz
AQ 3.1195135 sec
RG 25.4
DW 47.600 usec
DE 20.00 usec
TE 303.2 K
D1 1.00000000 sec
TD0 1
SFO1 700.0115500 MHz
NUC1 1H
P0 3.17 usec
P1 9.50 usec
PLW1 13.00000000 W

F2 - Processing parameters
SI 131072
SF 700.0070167 MHz
WDW no
SSB 0
LB 0 Hz
GB 0
PC 1.00

7.638
7.619
7.345
7.325
7.305
7.282
7.109
7.106
7.103
7.101
7.089
7.087
7.082
6.246

4.430
4.413
4.395
4.377

1.428
1.410
1.392

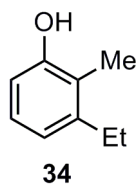


Current Data Parameters
 NAME ZX-2-149-2
 EXPNO 1
 PROCNO 1

F2 - Acquisition Parameter
 Date_ 20180527
 Time 13.18
 INSTRUM spect
 PROBHD 5 mm PABBO BB-
 PULPROG zg30
 TD 65536
 SOLVENT CDCl3
 NS 32
 DS 2
 SWH 8278.146 Hz
 FIDRES 0.126314 Hz
 AQ 3.9583745 sec
 RG 90.5
 DW 60.400 usec
 DE 6.50 usec
 TE 303.1 K
 D1 1.00000000 sec
 TD0 1

===== CHANNEL f1 =====
 NUC1 1H
 P1 14.00 usec
 PL1 0 dB
 PL1W 10.27361584 W
 SFO1 400.1424710 MHz

F2 - Processing parameters
 SI 131072
 SF 400.1400000 MHz
 WDW no
 SSB 0
 LB 0 Hz
 GB 0
 PC 1.00



7.262
7.030
7.019
7.008
6.790
6.779
6.650
6.639

— 4.757

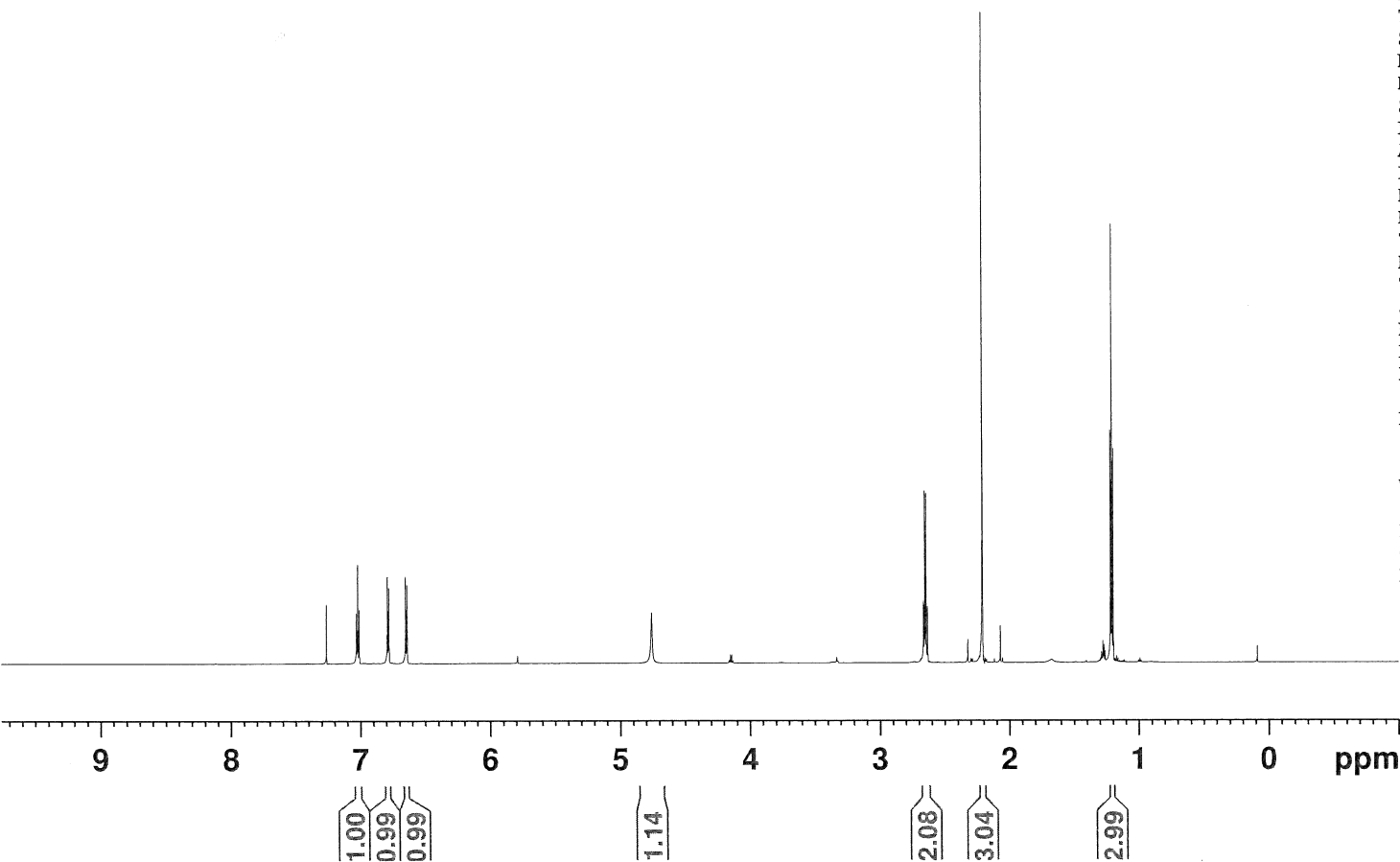
2.663
2.652
2.641
2.630
2.207

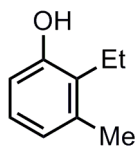
1.216
1.205
1.194

Current Data Parameters
NAME XZ-2-287
EXPNO 1
PROCNO 1

F2 - Acquisition Parameters
Date_ 20181105
Time 15.35 h
INSTRUM spect
PROBHD Z151340_0001 (
PULPROG zg30
TD 65536
SOLVENT CDC13
NS 16
DS 2
SWH 10504.202 Hz
FIDRES 0.320563 Hz
AQ 3.1195135 sec
RG 6.35
DW 47.600 usec
DE 10.00 usec
TE 303.2 K
D1 1.00000000 sec
TD0 1
SF01 700.0115500 MHz
NUC1 1H
P1 9.50 usec
PLW1 13.00000000 W

F2 - Processing parameters
SI 131072
SF 700.0070150 MHz
WDW no
SSB 0
LB 0 Hz
GB 0
PC 1.00





35

7.262
6.970
6.959
6.947
6.754
6.744
6.626
6.615

— 4.610

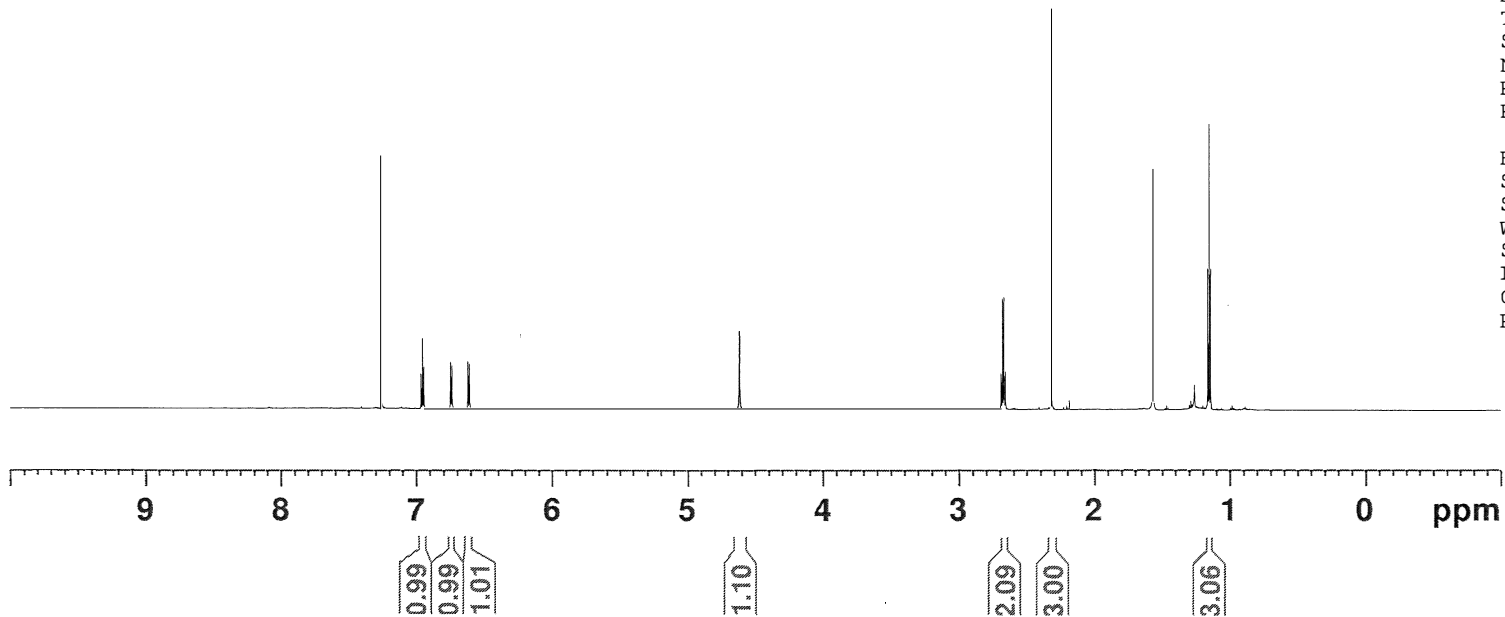
2.680
2.669
2.658
2.647
2.311

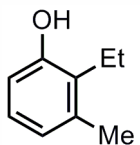
1.562
1.159
1.148
1.137

Current Data Parameters
NAME XZ-3-258
EXPNO 1
PROCNO 1

F2 - Acquisition Parameters
Date_ 20190729
Time 17.07 h
INSTRUM spect
PROBHD Z151340_0001 (
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 10504.202 Hz
FIDRES 0.320563 Hz
AQ 3.1195135 sec
RG 36
DW 47.600 usec
DE 20.00 usec
TE 303.4 K
D1 1.00000000 sec
TD0 1
SF01 700.0115500 MHz
NUC1 1H
P1 9.50 usec
PLW1 13.00000000 W

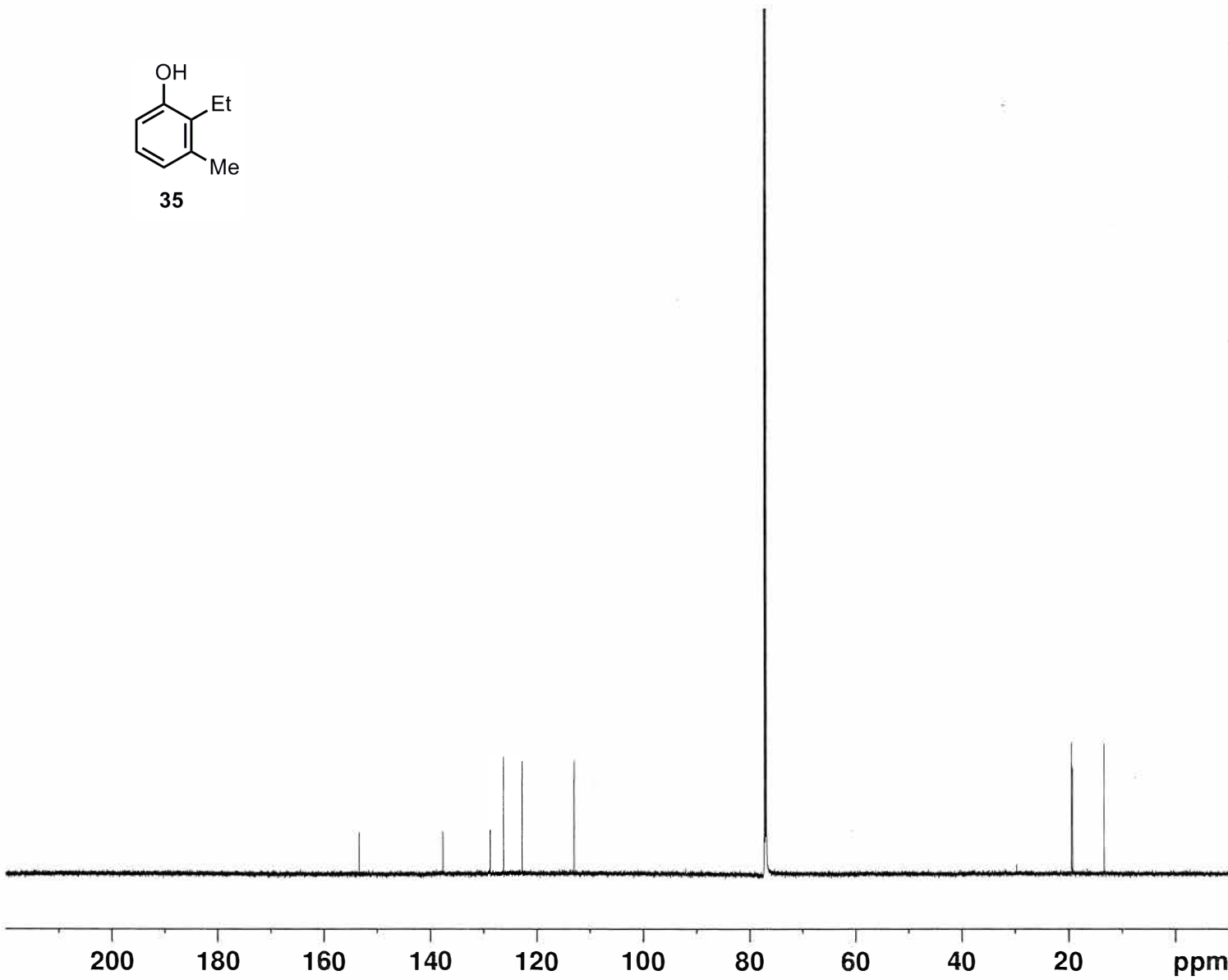
F2 - Processing parameters
SI 131072
SF 700.0070172 MHz
WDW no
SSB 0
LB 0 Hz
GB 0
PC 1.00





35

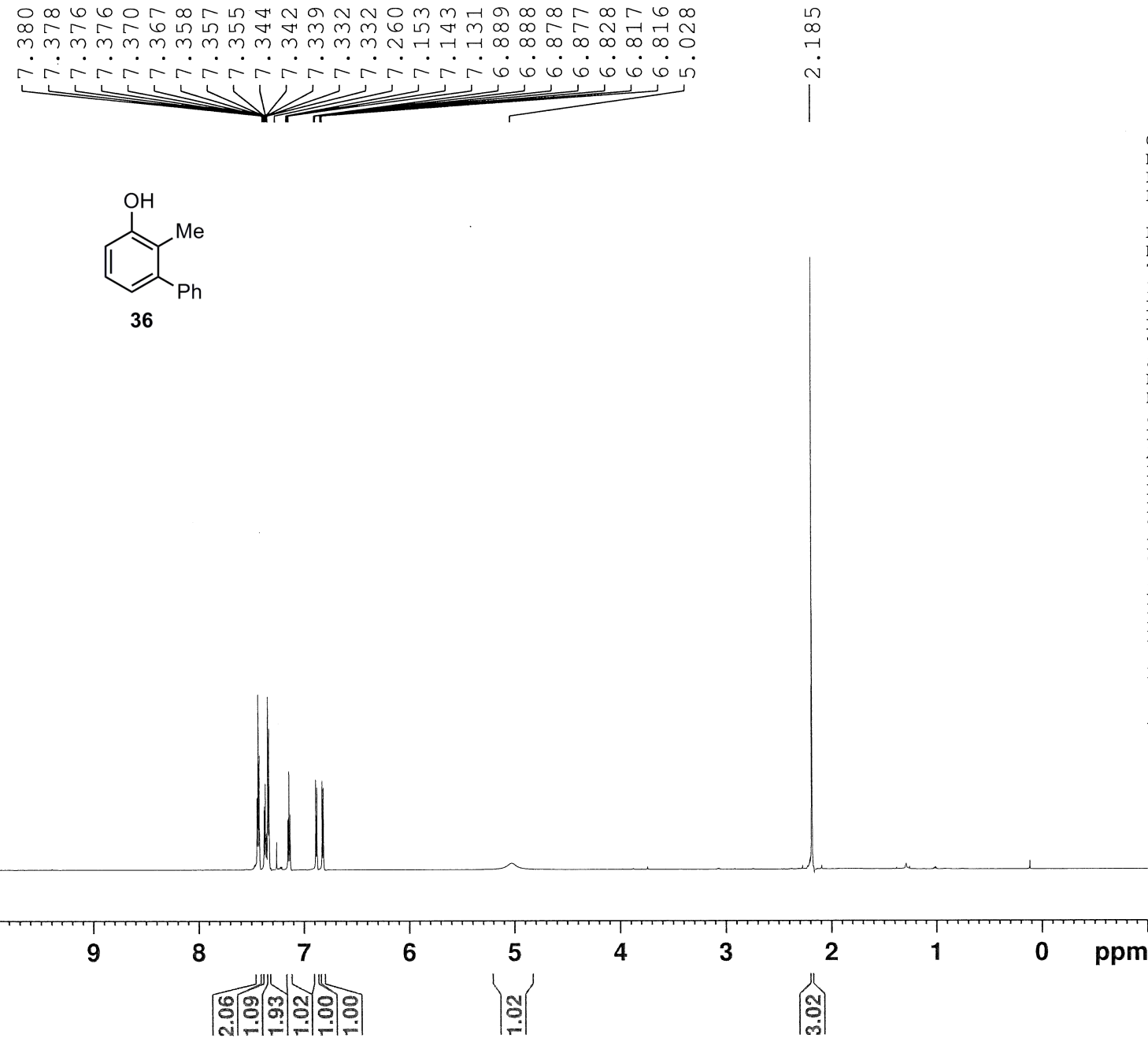
153.31
 137.57
 128.68
 126.23
 122.78
 112.91
 77.21
 77.03
 76.85
 19.47
 19.27
 13.39



Current Data Parameters
 NAME XZ-3-258
 EXPNO 3
 PROCNO 1

F2 - Acquisition Parameters
 Date_ 20190729
 Time 17.23 h
 INSTRUM spect
 PROBHD z151340_0001 (
 PULPROG zgpg30
 TD 65536
 SOLVENT CDC13
 NS 68
 DS 4
 SWH 42613.637 Hz
 FIDRES 1.300465 Hz
 AQ 0.7689557 sec
 RG 203
 DW 11.733 usec
 DE 18.00 usec
 TE 303.2 K
 D1 2.00000000 sec
 D11 0.03000000 sec
 TD0 1
 SFO1 176.0362620 MHz
 NUC1 13C
 P1 11.25 usec
 PLW1 29.00000000 W
 SFO2 700.0098000 MHz
 NUC2 1H
 CPDPRG[2] waltz16
 PCPD2 65.00 usec
 PLW2 13.00000000 W
 PLW12 0.27768999 W
 PLW13 0.13982999 W

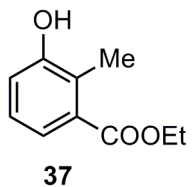
F2 - Processing parameters
 SI 131072
 SF 176.0169002 MHz
 WDW EM
 SSB 0
 LB 1.00 Hz
 GB 0
 PC 1.40



Current Data Parameters
 NAME XZ-2-238
 EXPNO 1
 PROCNO 1

F2 - Acquisition Parameters
 Date_ 20181006
 Time 15.19 h
 INSTRUM spect
 PROBHD Z151340_0001 (
 PULPROG zg30
 TD 65536
 SOLVENT CDCl3
 NS 16
 DS 2
 SWH 10504.202 Hz
 FIDRES 0.320563 Hz
 AQ 3.1195135 sec
 RG 5
 DW 47.600 usec
 DE 10.00 usec
 TE 303.2 K
 D1 1.00000000 sec
 TD0 1
 SFO1 700.0115500 MHz
 NUC1 1H
 P1 11.00 usec
 PLW1 13.00000000 W

F2 - Processing parameters
 SI 131072
 SF 700.0070177 MHz
 WDW no
 SSB 0
 LB 0 Hz
 GB 0
 PC 1.00



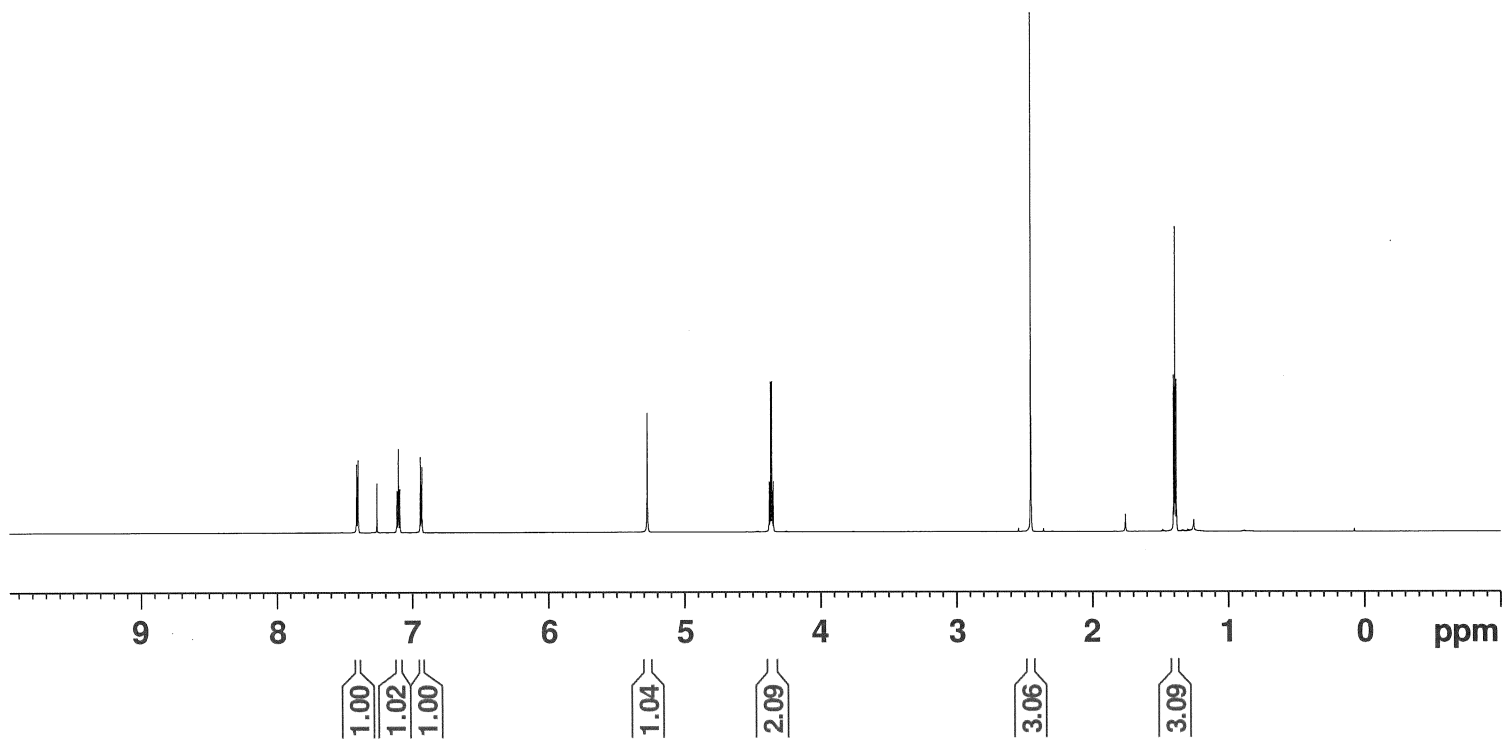
7.411
7.400
7.262
7.115
7.104
7.092
6.942
6.930

5.274

4.377
4.367
4.357
4.347

2.453

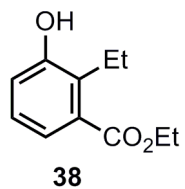
1.402
1.392
1.382



Current Data Parameters
NAME XZ-3-37-2
EXPNO 1
PROCNO 1

F2 - Acquisition Parameter
Date_ 20181214
Time 14.30 h
INSTRUM spect
PROBHD Z151340_0001 (
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 10504.202 Hz
FIDRES 0.320563 Hz
AQ 3.1195135 sec
RG 6.35
DW 47.600 usec
DE 10.00 usec
TE 300.0 K
D1 1.00000000 sec
TD0 1
SFO1 700.0115500 MHz
NUC1 1H
P1 9.50 usec
PLW1 13.00000000 W

F2 - Processing parameters
SI 131072
SF 700.0070159 MHz
WDW no
SSB 0
LB 0 Hz
GB 0
PC 1.00



7.373
 7.362
 7.262
 7.113
 7.102
 7.091
 6.928
 6.918

— 5.255

4.379
 4.369
 4.359
 4.348

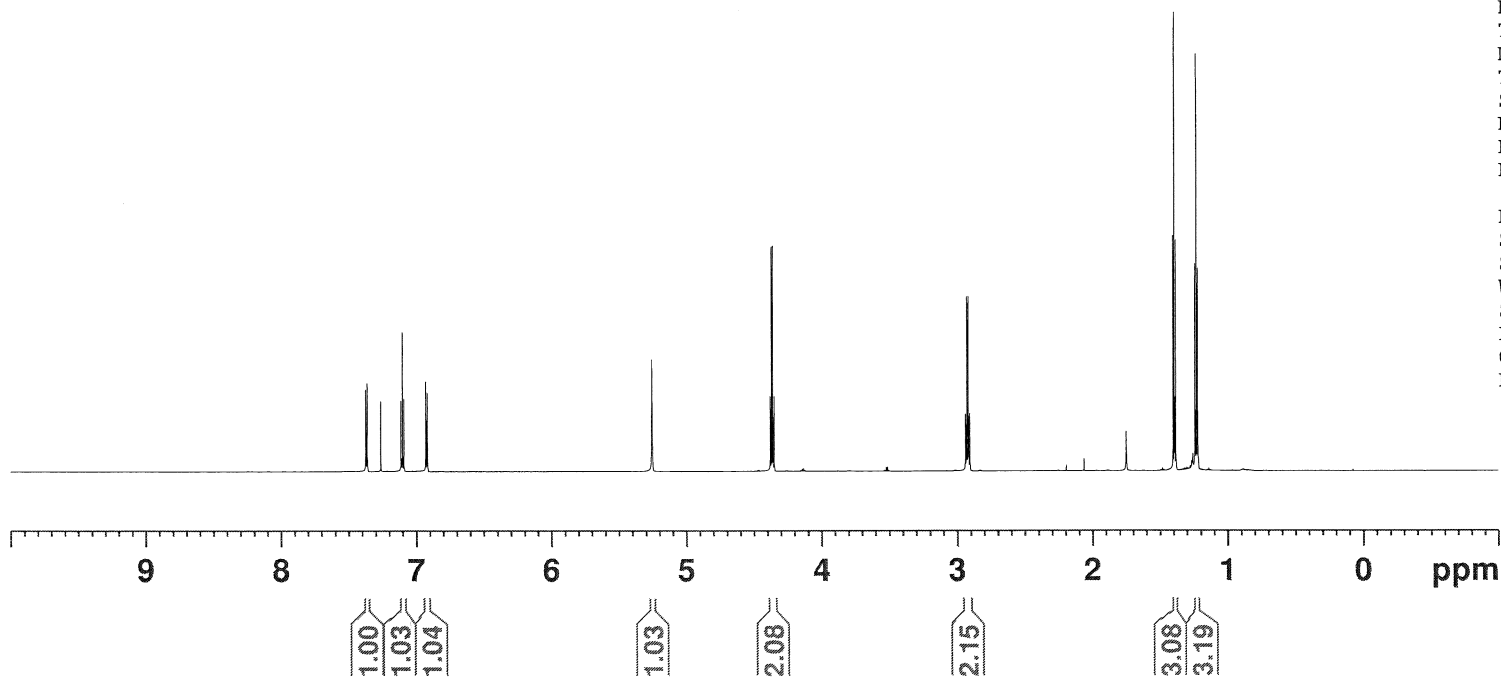
2.937
 2.926
 2.916
 2.905

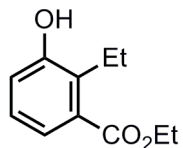
1.402
 1.392
 1.382
 1.241
 1.230
 1.219

Current Data Parameters
 NAME XZ-3-127-2
 EXPNO 1
 PROCNO 1

F2 - Acquisition Parameters
 Date_ 20190408
 Time 16.47 h
 INSTRUM spect
 PROBHD Z151340_0001 (
 PULPROG zg30
 TD 65536
 SOLVENT CDCl3
 NS 16
 DS 2
 SWH 10504.202 Hz
 FIDRES 0.320563 Hz
 AQ 3.1195135 sec
 RG 6.35
 DW 47.600 usec
 DE 10.00 usec
 TE 303.2 K
 D1 1.00000000 sec
 TD0 1
 SFO1 700.0115500 MHz
 NUC1 1H
 P1 9.50 usec
 PLW1 13.00000000 W

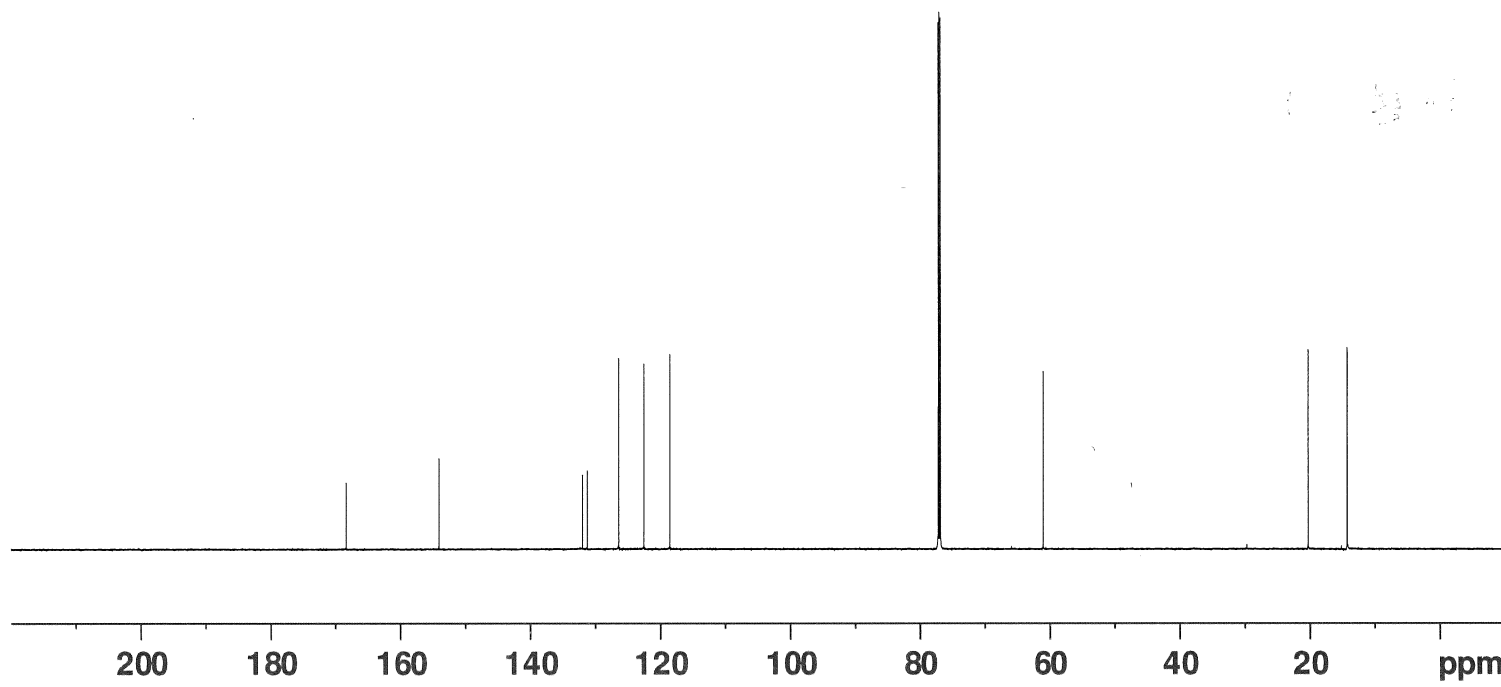
F2 - Processing parameters
 SI 131072
 SF 700.0070166 MHz
 WDW no
 SSB 0
 LB 0 Hz
 GB 0
 PC 1.00





38

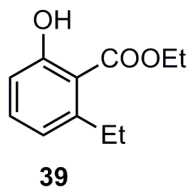
168.34
 154.04
 131.98
 131.23
 126.40
 122.53
 118.53
 77.23
 77.05
 76.87
 61.08
 20.32
 14.34
 14.27



Current Data Parameters
 NAME XZ-3-127-2
 EXPNO 2
 PROCNO 1

F2 - Acquisition Parameter
 Date_ 20190408
 Time 16.51 h
 INSTRUM spect
 PROBHD Z151340_0001 (
 PULPROG zgpg30
 TD 65536
 SOLVENT CDCl3
 NS 18
 DS 4
 SWH 42613.637 Hz
 FIDRES 1.300465 Hz
 AQ 0.7689557 sec
 RG 203
 DW 11.733 usec
 DE 18.00 usec
 TE 303.2 K
 D1 2.00000000 sec
 D11 0.03000000 sec
 TD0 1
 SFO1 176.0362620 MHz
 NUC1 13C
 P1 11.25 usec
 PLW1 29.00000000 W
 SFO2 700.0098000 MHz
 NUC2 1H
 CPDPRG[2] waltz16
 PCPD2 65.00 usec
 PLW2 13.00000000 W
 PLW12 0.27768999 W
 PLW13 0.13982999 W

F2 - Processing parameters
 SI 131072
 SF 176.0169002 MHz
 WDW EM
 SSB 0
 LB 1.00 Hz
 GB 0
 PC 1.40



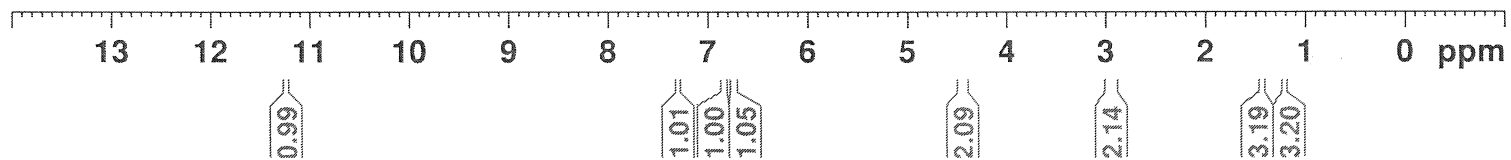
— 11.242

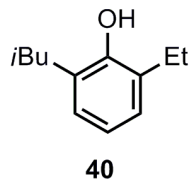
7.316
7.305
7.294
7.262
6.848
6.836
6.748
6.737
4.463
4.452
4.442
4.432
2.967
2.956
2.946
2.935
1.452
1.442
1.431
1.224
1.213
1.203

Current Data Parameters
 NAME XZ-4-247-1
 EXPNO 2
 PROCNO 1

F2 - Acquisition Parameters
 Date_ 20200620
 Time 10.53 h
 INSTRUM spect
 PROBHD z151340_0001 (
 PULPROG zg30
 TD 65536
 SOLVENT CDC13
 NS 16
 DS 2
 SWH 10504.202 Hz
 FIDRES 0.320563 Hz
 AQ 3.1195135 sec
 RG 32
 DW 47.600 usec
 DE 20.00 usec
 TE 303.2 K
 D1 1.00000000 sec
 TD0 1
 SFO1 700.0115500 MHz
 NUC1 1H
 P0 3.17 usec
 P1 9.50 usec
 PLW1 13.00000000 W

F2 - Processing parameters
 SI 131072
 SF 700.0070158 MHz
 WDW EM
 SSB 0
 LB 0.30 Hz
 GB 0
 PC 1.00





7.262
 7.015
 7.013
 7.005
 7.003
 6.952
 6.950
 6.941
 6.939
 6.831
 6.820
 6.810

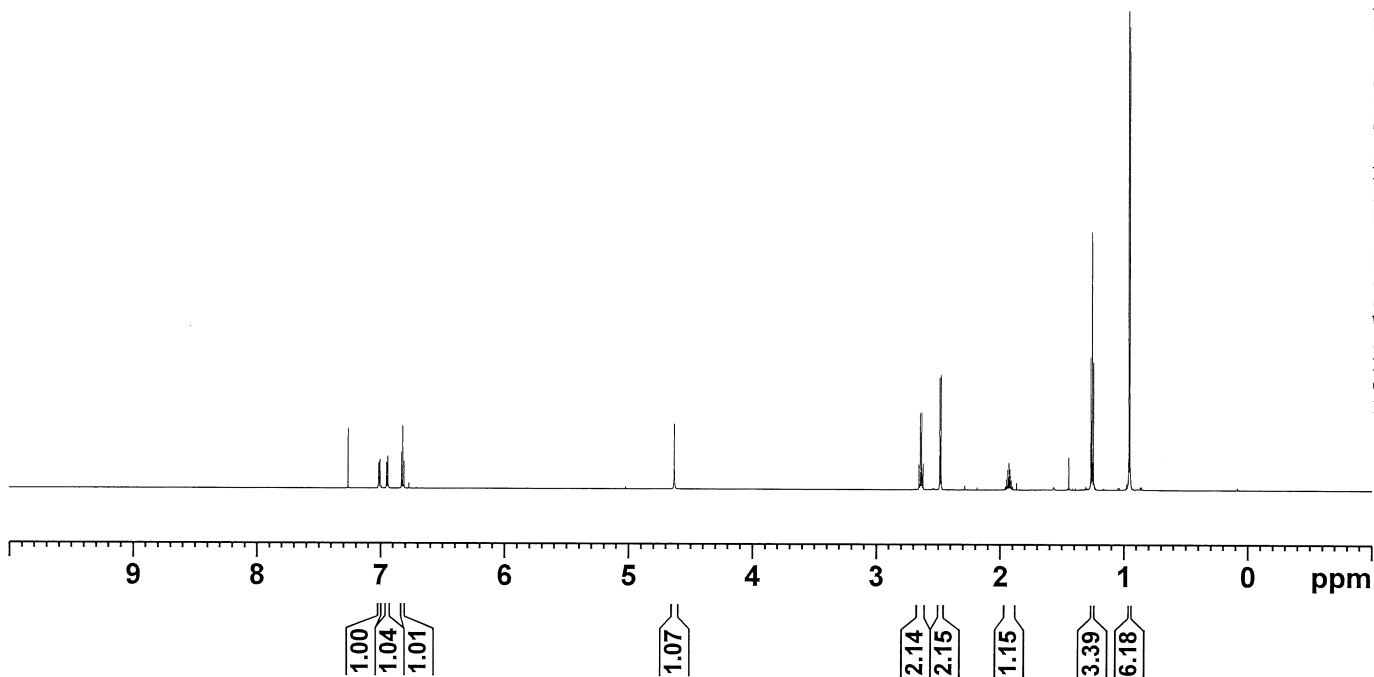
4.629

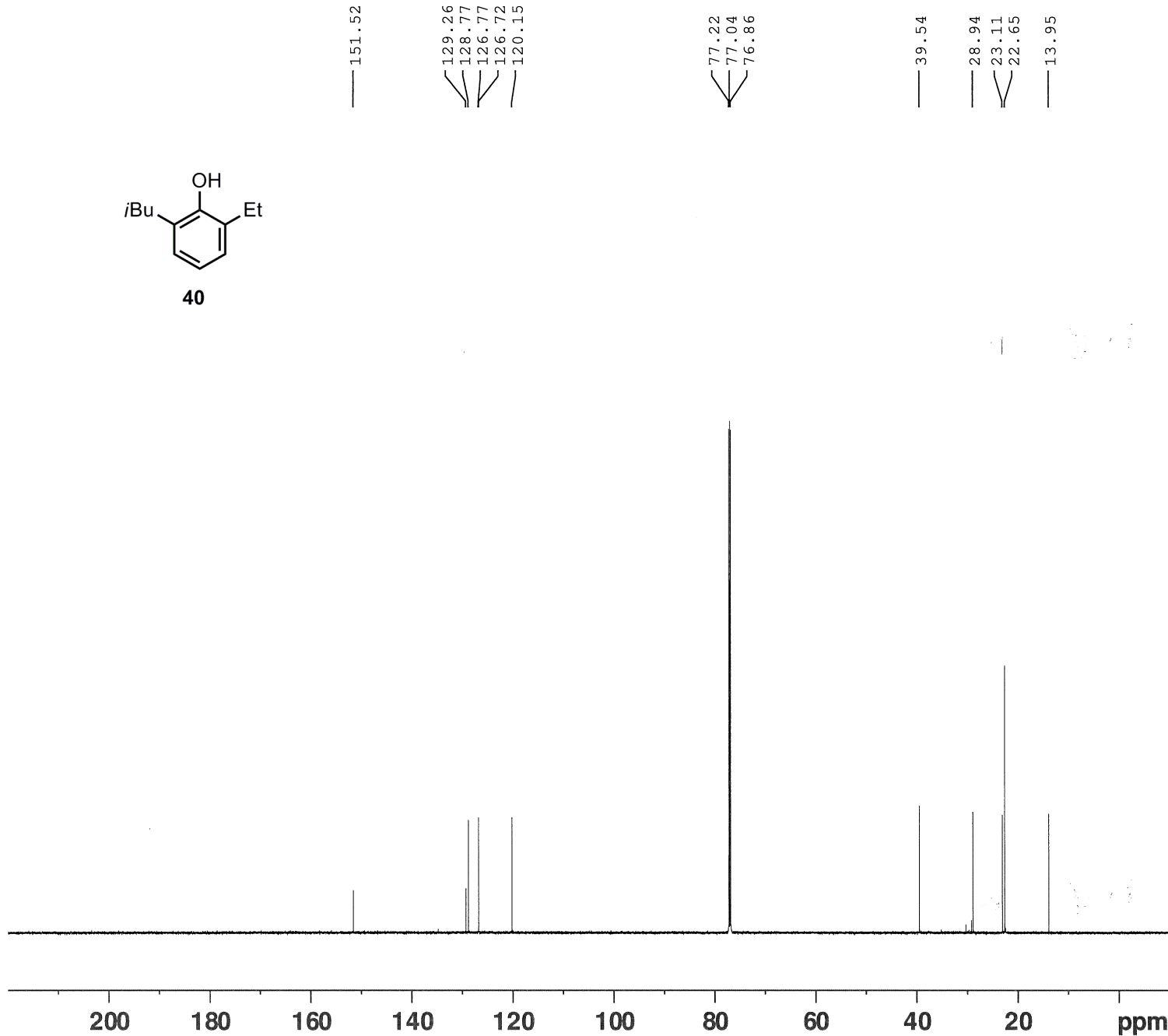
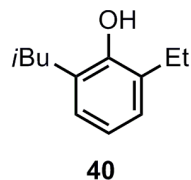
2.653
 2.642
 2.631
 2.620
 2.486
 2.475
 1.956
 1.946
 1.936
 1.926
 1.917
 1.907
 1.897
 1.265
 1.254
 1.243
 0.958
 0.949

Current Data Parameters
 NAME XZ-3-100
 EXPNO 2
 PROCNO 1

F2 - Acquisition Parameters
 Date_ 20190312
 Time 9.57 h
 INSTRUM spect
 PROBHD Z151340_0001 (
 PULPROG zg30
 TD 65536
 SOLVENT CDC13
 NS 16
 DS 2
 SWH 10504.202 Hz
 FIDRES 0.320563 Hz
 AQ 3.1195135 sec
 RG 5.6
 DW 47.600 usec
 DE 10.00 usec
 TE 303.2 K
 D1 1.00000000 sec
 TD0 1
 SFO1 700.0115500 MHz
 NUC1 1H
 P1 9.50 usec
 PLW1 13.00000000 W

F2 - Processing parameters
 SI 131072
 SF 700.0070167 MHz
 WDW no
 SSB 0
 LB 0 Hz
 GB 0
 PC 1.00





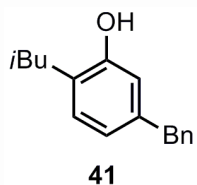
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Current Data Parameters
NAME      XZ-3-100
EXPNO     3
PROCNO    1

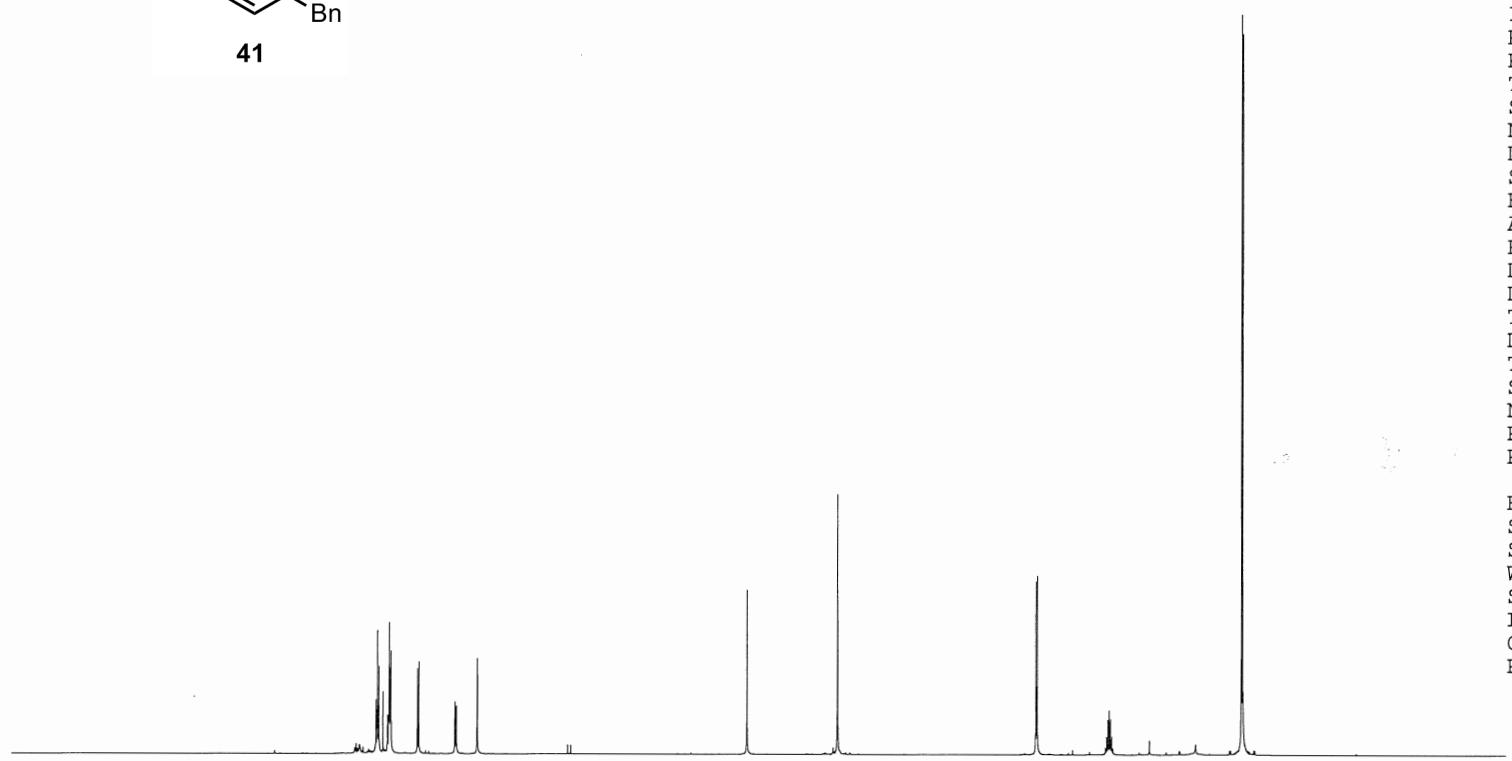
F2 - Acquisition Parameter
Date_     20190312
Time      10.01 h
INSTRUM   spect
PROBHD    Z151340_0001 (
PULPROG   zgpg30
TD         65536
SOLVENT   CDCl3
NS         5
DS         4
SWH       42613.637 Hz
FIDRES    1.300465 Hz
AQ         0.7689557 sec
RG         203
DW         11.733 usec
DE         18.00 usec
TE         303.2 K
D1         2.00000000 sec
D11        0.03000000 sec
TD0        1
SFO1       176.0362620 MHz
NUC1       13C
P1         11.25 usec
PLW1       29.00000000 W
SFO2       700.0098000 MHz
NUC2       1H
CPDPRG[2]  waltz16
PCPD2      65.00 usec
PLW2       13.00000000 W
PLW12      0.27768999 W
PLW13      0.13982999 W

F2 - Processing parameters
SI         131072
SF         176.0169002 MHz
WDW        EM
SSB        0
LB         1.00 Hz
GB         0
PC         1.40

```

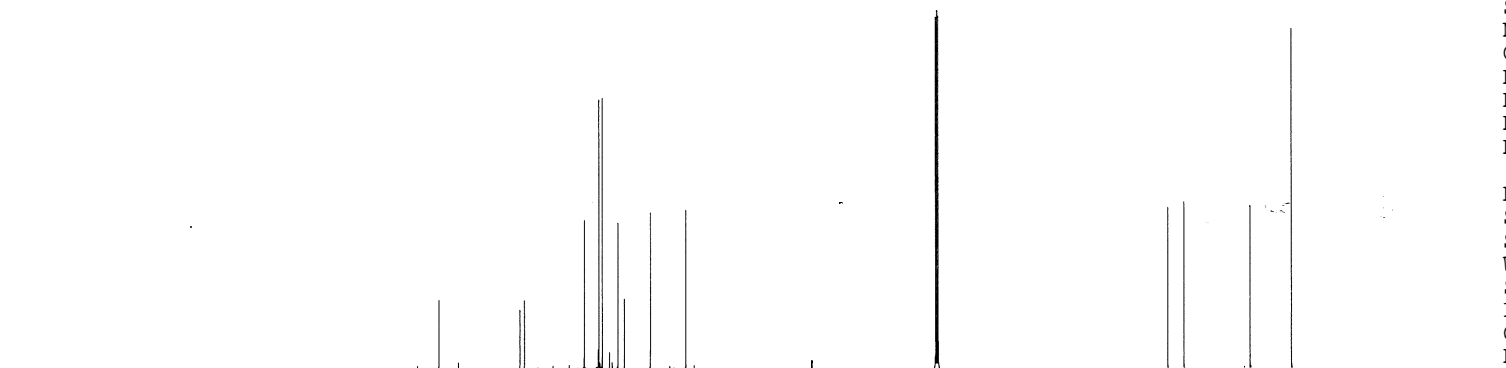
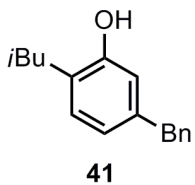


7.314
 7.303
 7.292
 7.262
 7.229
 7.216
 7.204
 7.008
 6.997
 6.733
 6.731
 6.722
 6.720
 6.569
 6.567
 — 4.584
 — 3.918
 2.457
 2.447
 1.946
 1.936
 1.926
 1.917
 1.907
 1.897
 1.888
 0.945
 0.935



2.02
 2.96
 0.99
 0.99
 0.95
 1.00
 2.06
 2.13
 1.08
 6.00

Current Data Parameters
 NAME XZ-3-105
 EXPNO 1
 PROCNO 1
 F2 - Acquisition Parameter
 Date_ 20190326
 Time 13.27 h
 INSTRUM spect
 PROBHD Z151340_0001 (
 PULPROG zg30
 TD 65536
 SOLVENT CDC13
 NS 16
 DS 2
 SWH 10504.202 Hz
 FIDRES 0.320563 Hz
 AQ 3.1195135 sec
 RG 6.35
 DW 47.600 usec
 DE 10.00 usec
 TE 303.2 K
 D1 1.00000000 sec
 TD0 1
 SFO1 700.0115500 MHz
 NUC1 1H
 P1 9.50 usec
 PLW1 13.00000000 W
 F2 - Processing parameters
 SI 131072
 SF 700.0070163 MHz
 WDW EM
 SSB 0
 LB 0.30 Hz
 GB 0
 PC 1.00

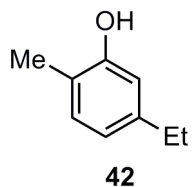


200 180 160 140 120 100 80 60 40 20 ppm

Current Data Parameters
 NAME XZ-3-105
 EXPNO 2
 PROCNO 1

F2 - Acquisition Parameter
 Date_ 20190326
 Time 13.33 h
 INSTRUM spect
 PROBHD Z151340_0001 (
 PULPROG zgpg30
 TD 65536
 SOLVENT CDC13
 NS 26
 DS 4
 SWH 42613.637 Hz
 FIDRES 1.300465 Hz
 AQ 0.7689557 sec
 RG 203
 DW 11.733 usec
 DE 18.00 usec
 TE 303.2 K
 D1 2.00000000 sec
 D11 0.03000000 sec
 TD0 1
 SFO1 176.0362620 MHz
 NUC1 13C
 P1 11.25 usec
 PLW1 29.00000000 W
 SFO2 700.0098000 MHz
 NUC2 1H
 CPDPRG[2] waltz16
 PCPD2 65.00 usec
 PLW2 13.00000000 W
 PLW12 0.27768999 W
 PLW13 0.13982999 W

F2 - Processing parameters
 SI 131072
 SF 176.0169002 MHz
 WDW EM
 SSB 0
 LB 1.00 Hz
 GB 0
 PC 1.40

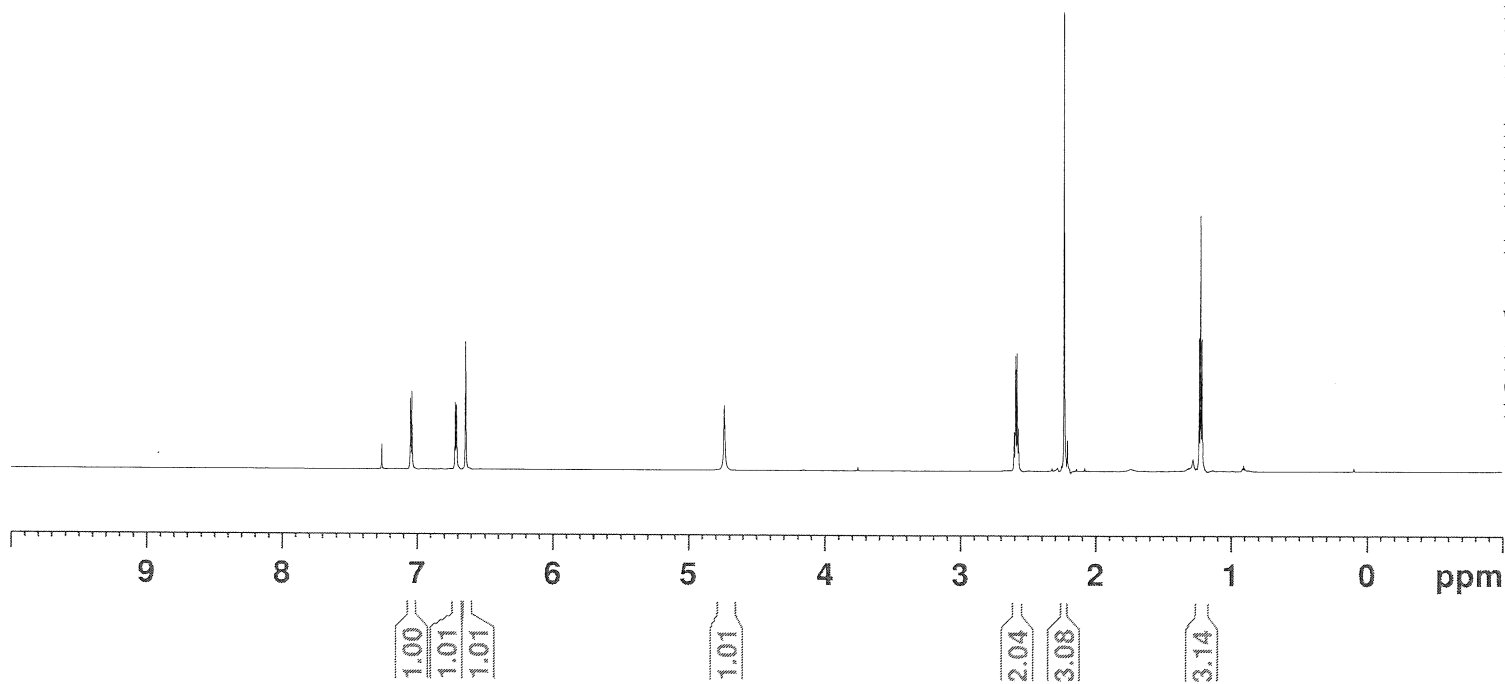


7.262
7.050
7.039
6.719
6.708
6.642

— 4.737

2.603
2.592
2.581
2.571
2.233

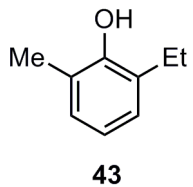
1.234
1.223
1.212



Current Data Parameters
 NAME XZ-3-98
 EXPNO 4
 PROCNO 1

F2 - Acquisition Parameters
 Date_ 20200622
 Time 16.05 h
 INSTRUM spect
 PROBHD Z151340_0001 (
 PULPROG zg30
 TD 65536
 SOLVENT CDCl3
 NS 16
 DS 2
 SWH 10504.202 Hz
 FIDRES 0.320563 Hz
 AQ 3.1195135 sec
 RG 20.2
 DW 47.600 usec
 DE 20.00 usec
 TE 303.2 K
 D1 1.0000000 sec
 TD0 1
 SF01 700.0115500 MHz
 NUC1 1H
 P0 3.17 usec
 P1 9.50 usec
 PLW1 13.00000000 W

F2 - Processing parameters
 SI 131072
 SF 700.0070154 MHz
 WDW EM
 SSB 0
 LB 0.30 Hz
 GB 0
 PC 1.00



7.262
 7.012
 7.002
 6.994
 6.984
 6.817
 6.806
 6.796

— 4.595

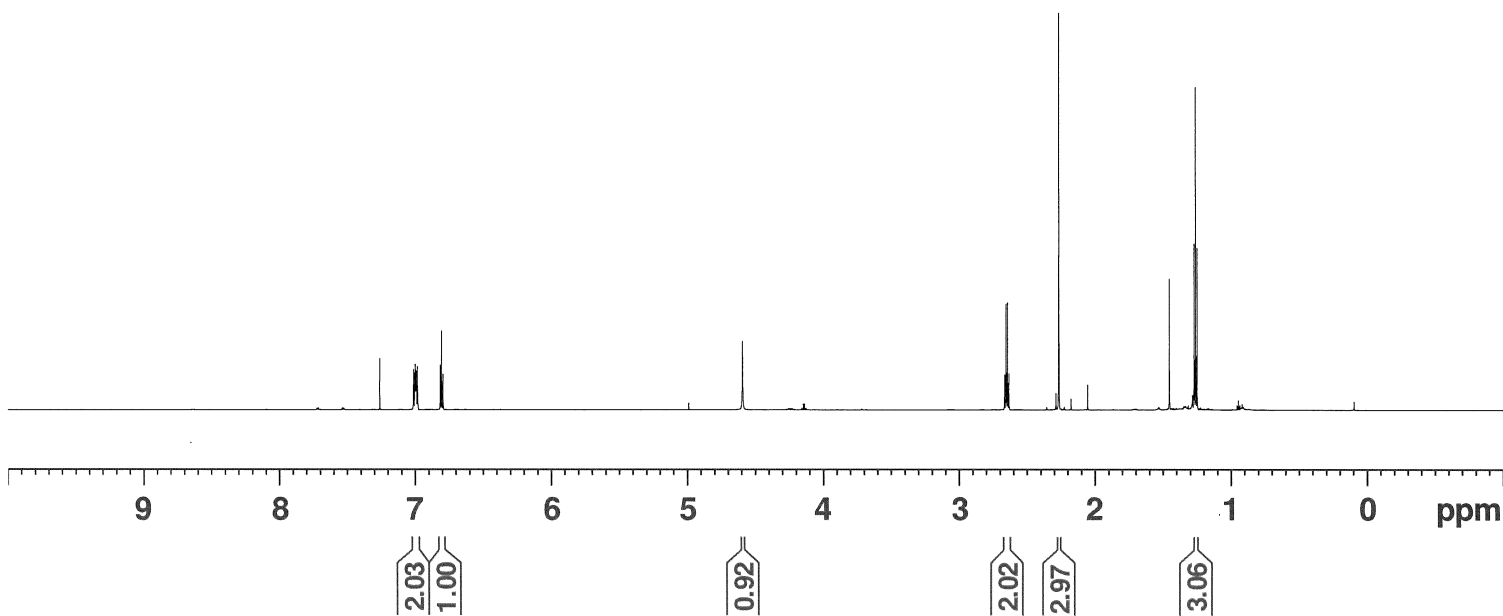
2.666
 2.655
 2.644
 2.634
 2.267

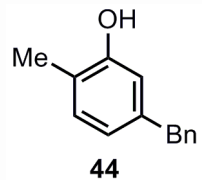
1.272
 1.261
 1.250

Current Data Parameters
 NAME XZ-3-99
 EXPNO 1
 PROCNO 1

F2 - Acquisition Parameter
 Date_ 20190311
 Time 16.21 h
 INSTRUM spect
 PROBHD Z151340_0001 (
 PULPROG zg30
 TD 131072
 SOLVENT CDC13
 NS 16
 DS 2
 SWH 10504.202 Hz
 FIDRES 0.160281 Hz
 AQ 6.2390270 sec
 RG 5.6
 DW 47.600 usec
 DE 10.00 usec
 TE 323.2 K
 D1 1.00000000 sec
 TD0 1
 SFO1 700.0115500 MHz
 NUC1 1H
 P1 9.50 usec
 PLW1 13.00000000 W

F2 - Processing parameters
 SI 131072
 SF 700.0070156 MHz
 WDW no
 SSB 0
 LB 0 Hz
 GB 0
 PC 1.00



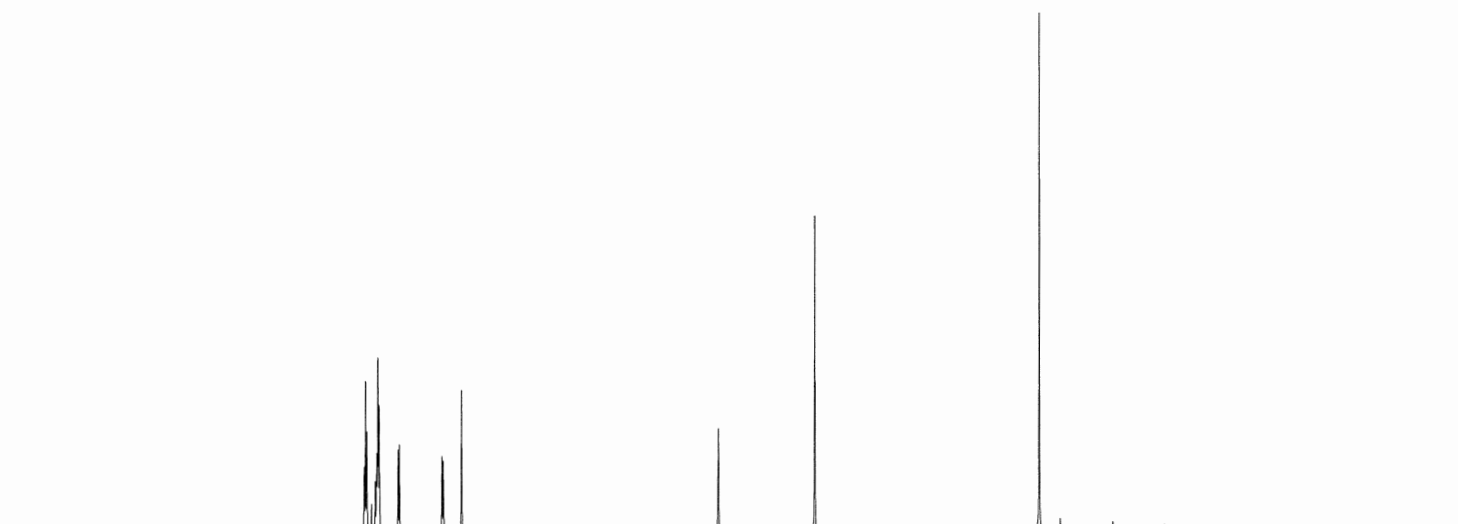


7.317
7.306
7.296
7.262
7.233
7.222
7.214
7.203
7.061
7.051
6.731
6.720
6.583

< 4.651
4.647

— 3.921

— 2.228



2.00
2.92
1.00
0.99
0.96

1.02

2.08

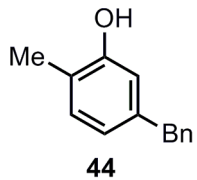
3.03

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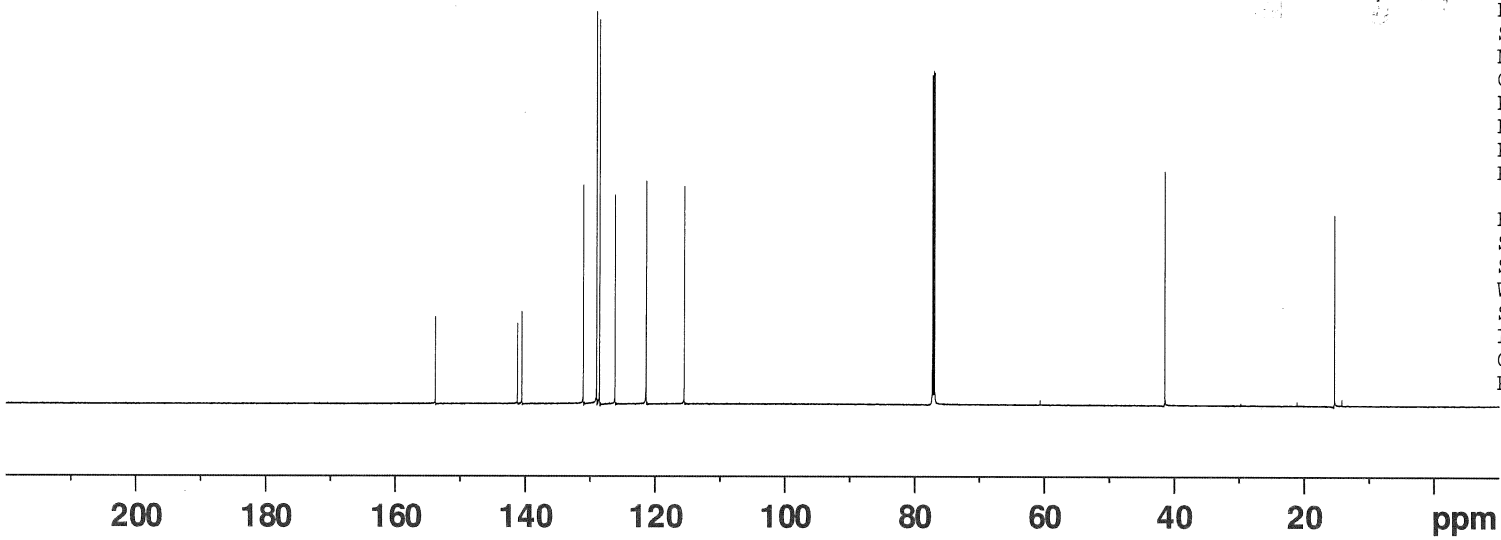
Current Data Parameters
NAME           XZ-3-104
EXPNO          1
PROCNO         1

F2 - Acquisition Parameters
Date_          20190326
Time           13.14 h
INSTRUM        spect
PROBHD         Z151340_0001 (
PULPROG        zg30
TD             65536
SOLVENT        CDC13
NS             16
DS             2
SWH            10504.202 Hz
FIDRES         0.320563 Hz
AQ             3.1195135 sec
RG             6.35
DW             47.600 usec
DE             10.00 usec
TE             303.2 K
D1             1.00000000 sec
TD0            1
SFO1           700.0115500 MHz
NUC1           1H
P1             9.50 usec
PLW1           13.00000000 W

F2 - Processing parameters
SI             131072
SF             700.0070160 MHz
WDW            no
SSB            0
LB             0 Hz
GB             0
PC             1.00
  
```



153.75
 141.13
 140.47
 131.01
 128.96
 128.51
 126.12
 121.39
 121.32
 115.47
 77.27
 77.08
 76.90
 41.47
 15.40



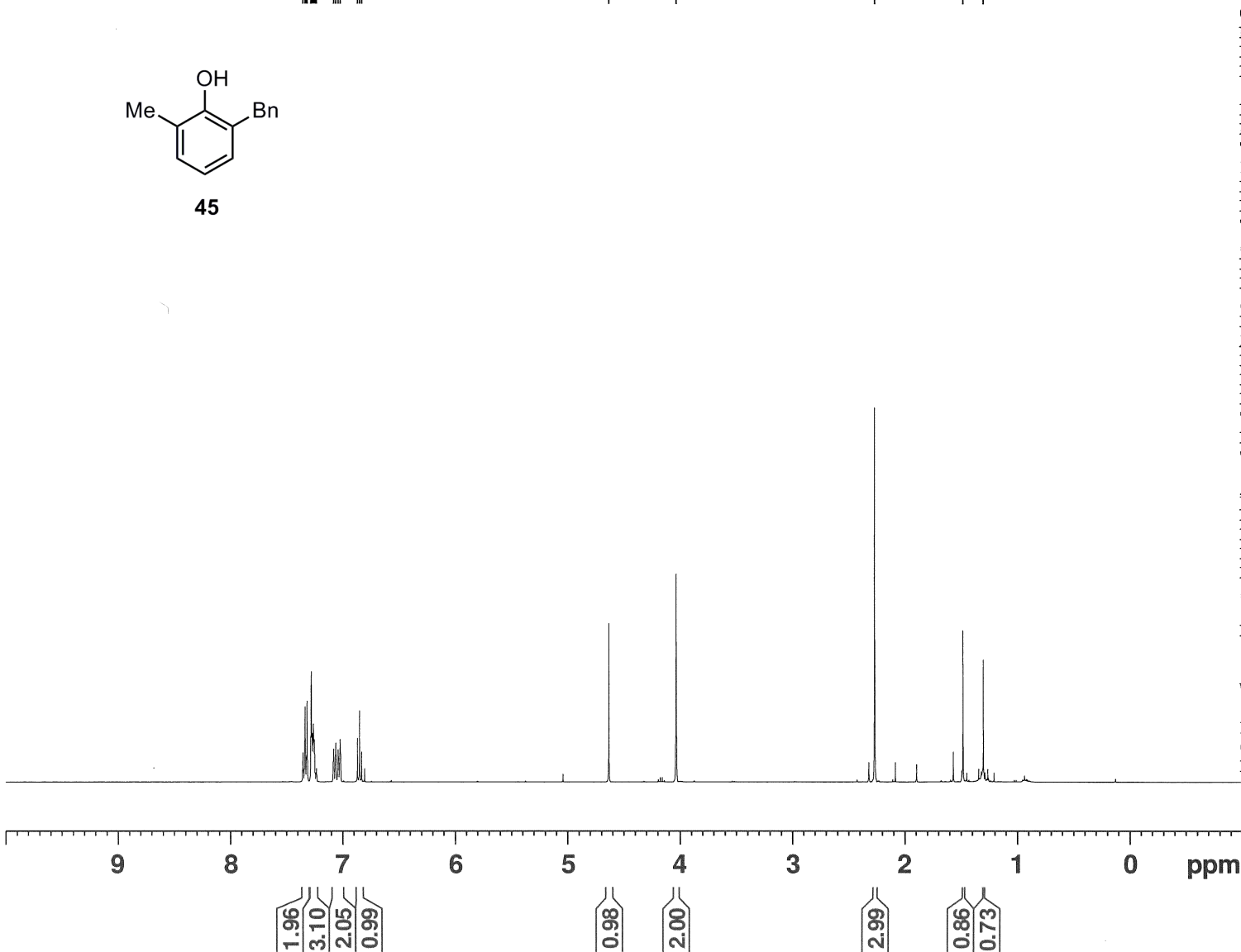
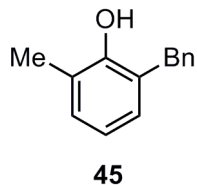
Current Data Parameters
 NAME XZ-3-104
 EXPNO 2
 PROCNO 1

F2 - Acquisition Parameter
 Date_ 20190326
 Time 13.19 h
 INSTRUM spect
 PROBHD Z151340_0001 (
 PULPROG zgpg30
 TD 65536
 SOLVENT CDC13
 NS 30
 DS 4
 SWH 42613.637 Hz
 FIDRES 1.300465 Hz
 AQ 0.7689557 sec
 RG 203
 DW 11.733 usec
 DE 18.00 usec
 TE 303.2 K
 D1 2.00000000 sec
 D11 0.03000000 sec
 TD0 1
 SFO1 176.0362620 MHz
 NUC1 13C
 P1 11.25 usec
 PLW1 29.00000000 W
 SFO2 700.0098000 MHz
 NUC2 1H
 CPDPRG[2] waltz16
 PCPD2 65.00 usec
 PLW2 13.00000000 W
 PLW12 0.27768999 W
 PLW13 0.13982999 W

F2 - Processing parameters
 SI 131072
 SF 176.0169002 MHz
 WDW EM
 SSB 0
 LB 1.00 Hz
 GB 0
 PC 1.40

7.353
7.335
7.322
7.316
7.282
7.278
7.271
7.261
7.259
7.250
7.244
7.233
7.079
7.060
7.040
7.022
6.868
6.849
6.830
— 4.632
— 4.034

— 2.267
— 1.481
— 1.301

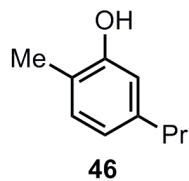


Current Data Parameters
NAME ZX-2-152
EXPNO 1
PROCNO 1

F2 - Acquisition Parameter
Date_ 20180528
Time 16.27
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 32
DS 2
SWH 8278.146 Hz
FIDRES 0.126314 Hz
AQ 3.9583745 sec
RG 90.5
DW 60.400 usec
DE 6.50 usec
TE 303.5 K
D1 1.00000000 sec
TD0 1

===== CHANNEL f1 =====
NUC1 1H
P1 14.00 usec
PL1 0 dB
PL1W 10.27361584 W
SFO1 400.1424710 MHz

F2 - Processing parameters
SI 131072
SF 400.1400000 MHz
WDW no
SSB 0
LB 0 Hz
GB 0
PC 1.00



7.262
 7.039
 7.028
 6.696
 6.694
 6.685
 6.683
 6.619
 6.617

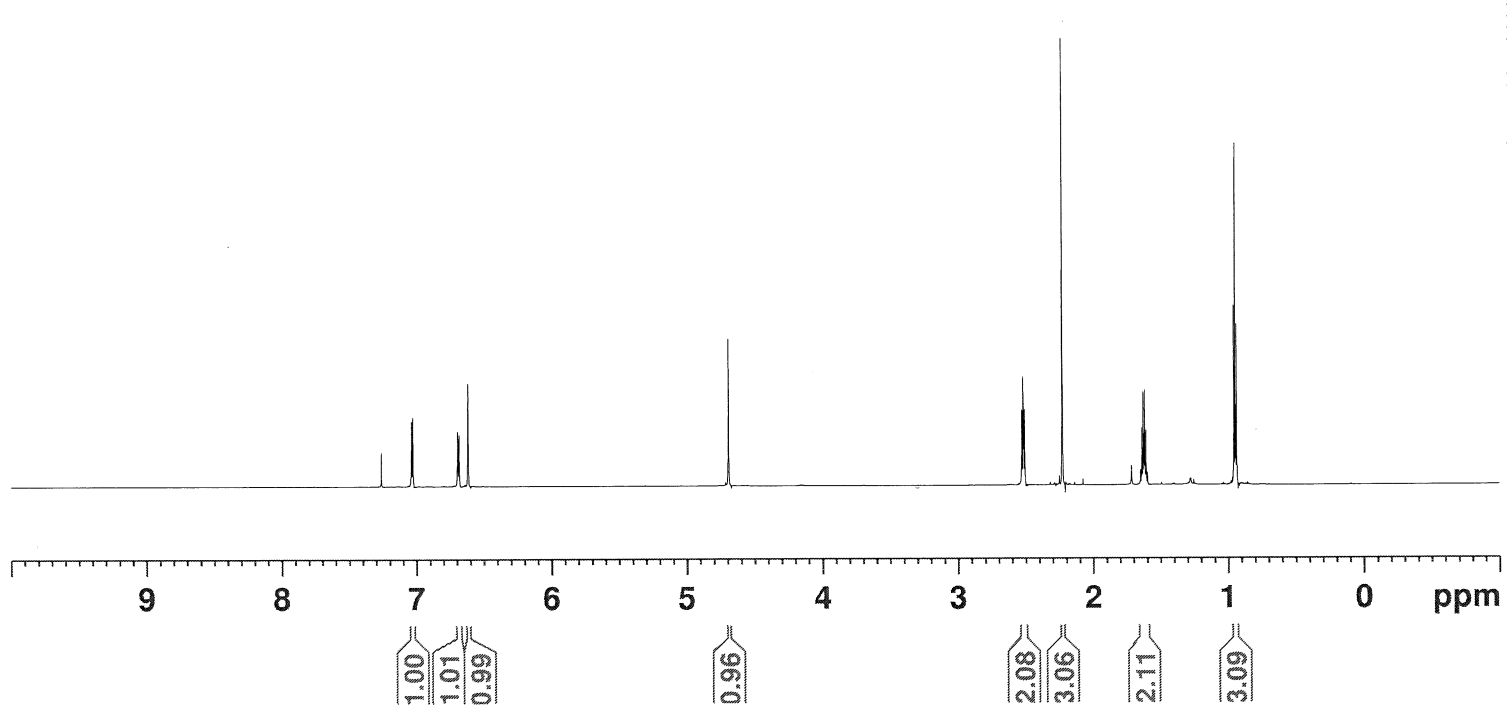
— 4.693

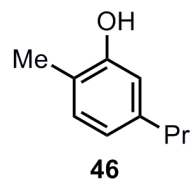
2.529
 2.518
 2.507
 2.230
 1.650
 1.639
 1.629
 1.618
 1.607
 1.596
 0.956
 0.946
 0.935

Current Data Parameters
 NAME XZ-3-143
 EXPNO 1
 PROCNO 1

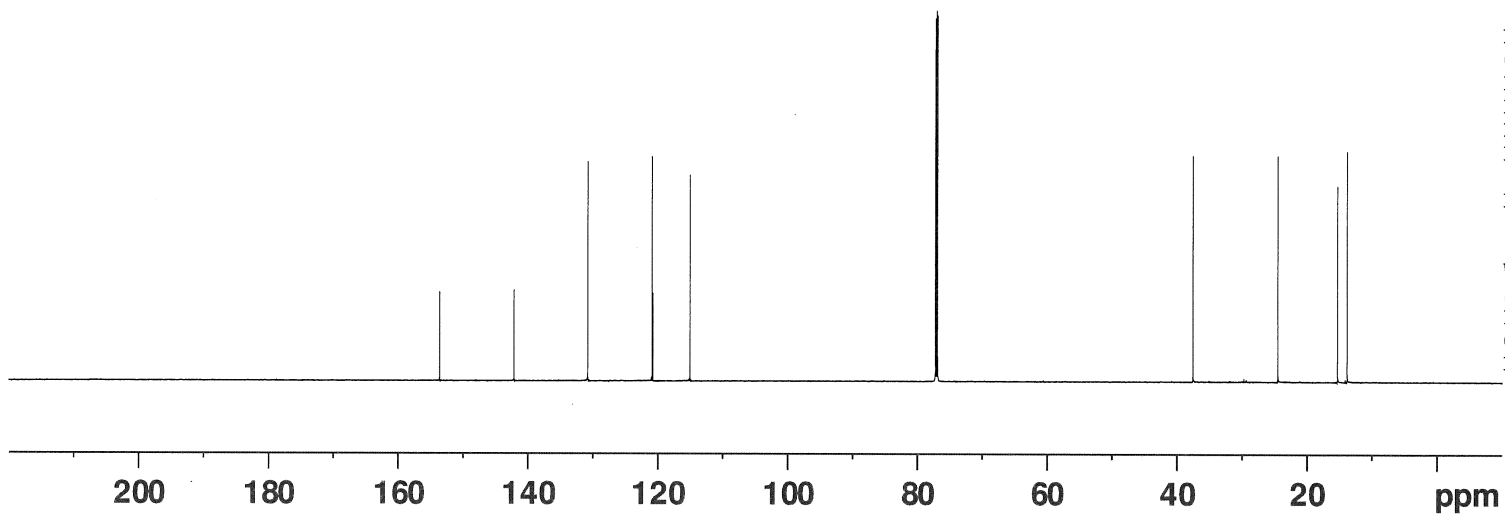
F2 - Acquisition Parameters
 Date_ 20190422
 Time 15.46 h
 INSTRUM spect
 PROBHD z151340_0001 (
 PULPROG zg30
 TD 65536
 SOLVENT CDC13
 NS 16
 DS 2
 SWH 10504.202 Hz
 FIDRES 0.320563 Hz
 AQ 3.1195135 sec
 RG 5.6
 DW 47.600 usec
 DE 10.00 usec
 TE 303.2 K
 D1 1.00000000 sec
 TD0 1
 SFO1 700.0115500 MHz
 NUC1 1H
 P1 9.50 usec
 PLW1 13.00000000 W

F2 - Processing parameters
 SI 131072
 SF 700.0070147 MHz
 WDW no
 SSB 0
 LB 0 Hz
 GB 0
 PC 1.00





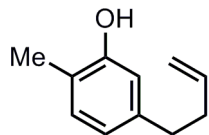
153.55
 142.10
 130.76
 120.87
 120.71
 115.03
 77.24
 77.06
 76.88
 37.60
 24.53
 15.35
 13.87



Current Data Parameters
 NAME XZ-3-143
 EXPNO 2
 PROCNO 1

F2 - Acquisition Parameter
 Date_ 20190422
 Time 15.51 h
 INSTRUM spect
 PROBHD Z151340_0001 (
 PULPROG zgpg30
 TD 65536
 SOLVENT CDCl3
 NS 29
 DS 4
 SWH 42613.637 Hz
 FIDRES 1.300465 Hz
 AQ 0.7689557 sec
 RG 203
 DW 11.733 usec
 DE 18.00 usec
 TE 303.2 K
 D1 2.00000000 sec
 D11 0.03000000 sec
 TD0 1
 SFO1 176.0362620 MHz
 NUC1 13C
 P1 11.25 usec
 PLW1 29.00000000 W
 SFO2 700.0098000 MHz
 NUC2 1H
 CPDPRG[2] waltz16
 PCPD2 65.00 usec
 PLW2 13.00000000 W
 PLW12 0.27768999 W
 PLW13 0.13982999 W

F2 - Processing parameters
 SI 131072
 SF 176.0169002 MHz
 WDW EM
 SSB 0
 LB 1.00 Hz
 GB 0
 PC 1.40



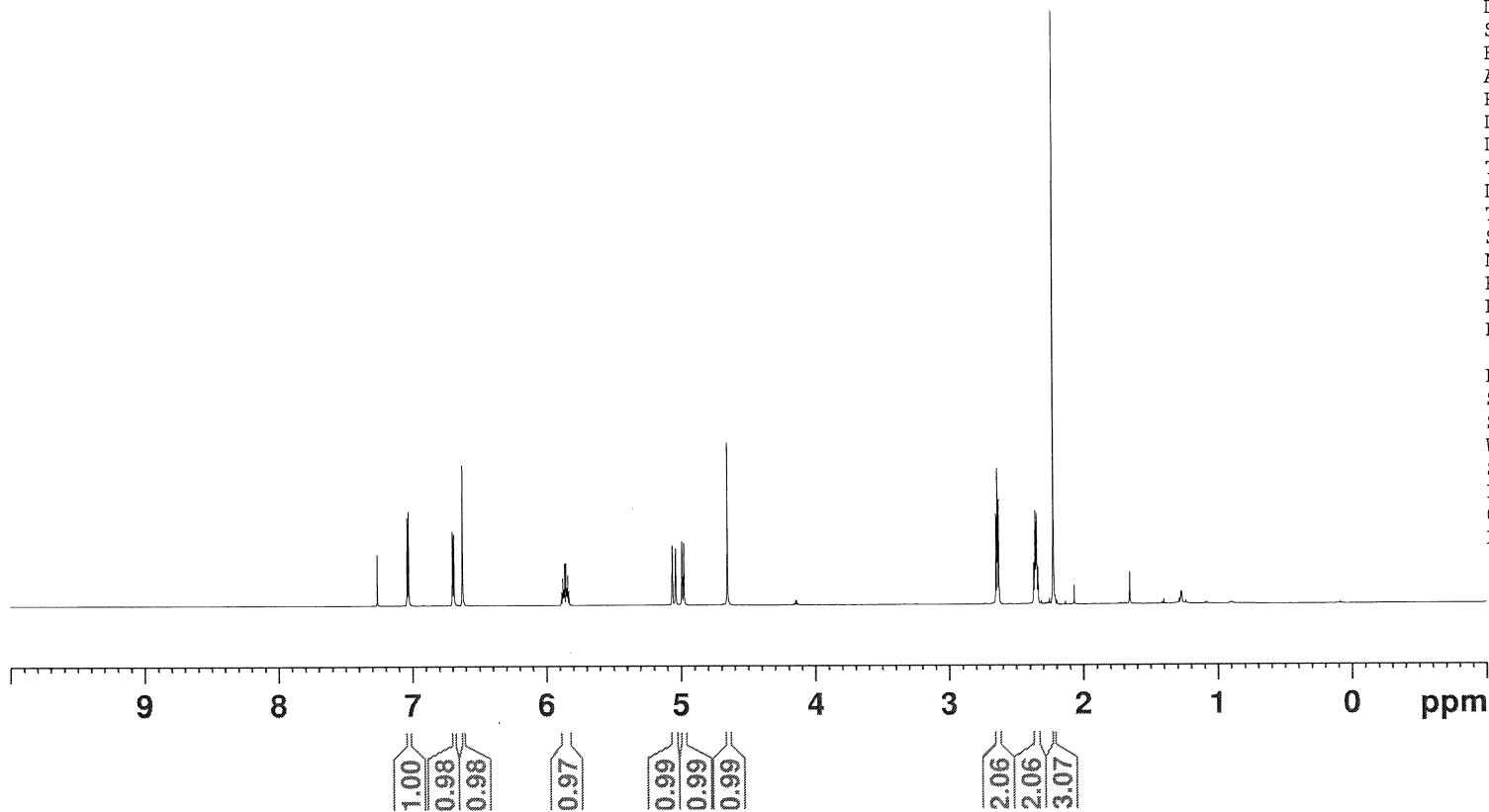
47

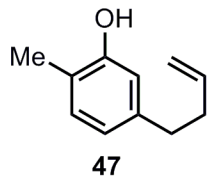
7.262
7.039
7.029
6.700
6.689
6.627
5.888
5.879
5.873
5.869
5.864
5.854
5.849
5.845
5.840
5.830
5.063
5.038
4.992
4.977
4.656
2.651
2.640
2.628
2.368
2.358
2.347
2.337
2.224

Current Data Parameters
NAME XZ-4-37
EXPNO 1
PROCNO 1

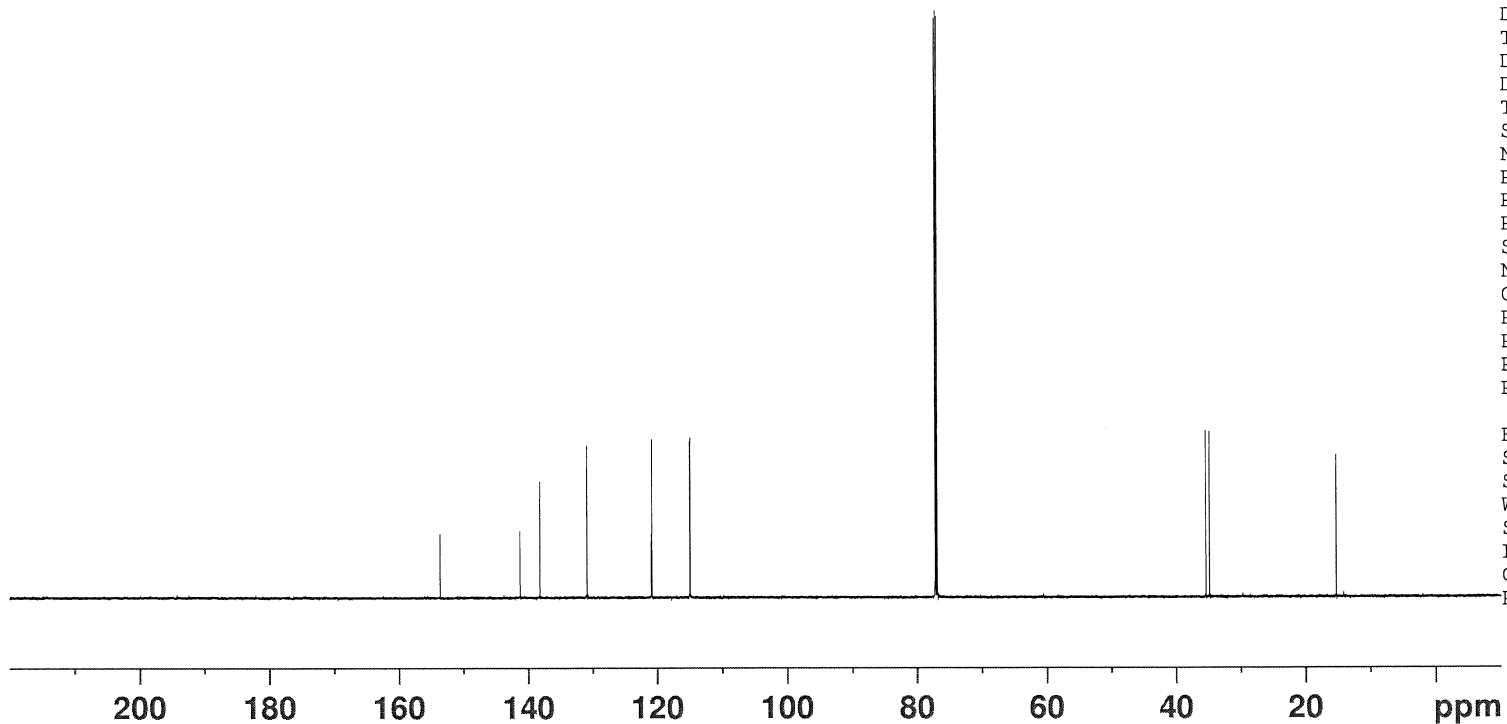
F2 - Acquisition Parameters
Date_ 20191013
Time 18.13 h
INSTRUM spect
PROBHD z151340_0001 (
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 10504.202 Hz
FIDRES 0.320563 Hz
AQ 3.1195135 sec
RG 25.4
DW 47.600 usec
DE 20.00 usec
TE 303.3 K
D1 1.00000000 sec
TD0 1
SFO1 700.0115500 MHz
NUC1 1H
P0 3.17 usec
P1 9.50 usec
PLW1 13.00000000 W

F2 - Processing parameters
SI 131072
SF 700.0070113 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00





153.59
141.24
138.14
130.84
120.93
120.80
114.98
114.91
77.23
77.04
76.86
35.45
34.89
15.35

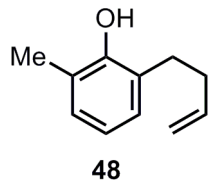


Current Data Parameters
NAME XZ-4-37
EXPNO 2
PROCNO 1

F2 - Acquisition Parameters
Date_ 20191013
Time 18.16 h
INSTRUM spect
PROBHD z151340_0001 (
PULPROG zgpg30
TD 65536
SOLVENT CDC13
NS 4
DS 4
SWH 42613.637 Hz
FIDRES 1.300465 Hz
AQ 0.7689557 sec
RG 203
DW 11.733 usec
DE 18.00 usec
TE 303.2 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1
SFO1 176.0362620 MHz
NUC1 13C
P0 3.75 usec
P1 11.25 usec
PLW1 29.00000000 W
SFO2 700.0098000 MHz
NUC2 1H
CPDPRG[2] waltz16
PCPD2 65.00 usec
PLW2 13.00000000 W
PLW12 0.27768999 W
PLW13 0.13982999 W

F2 - Processing parameters
SI 131072
SF 176.0169002 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

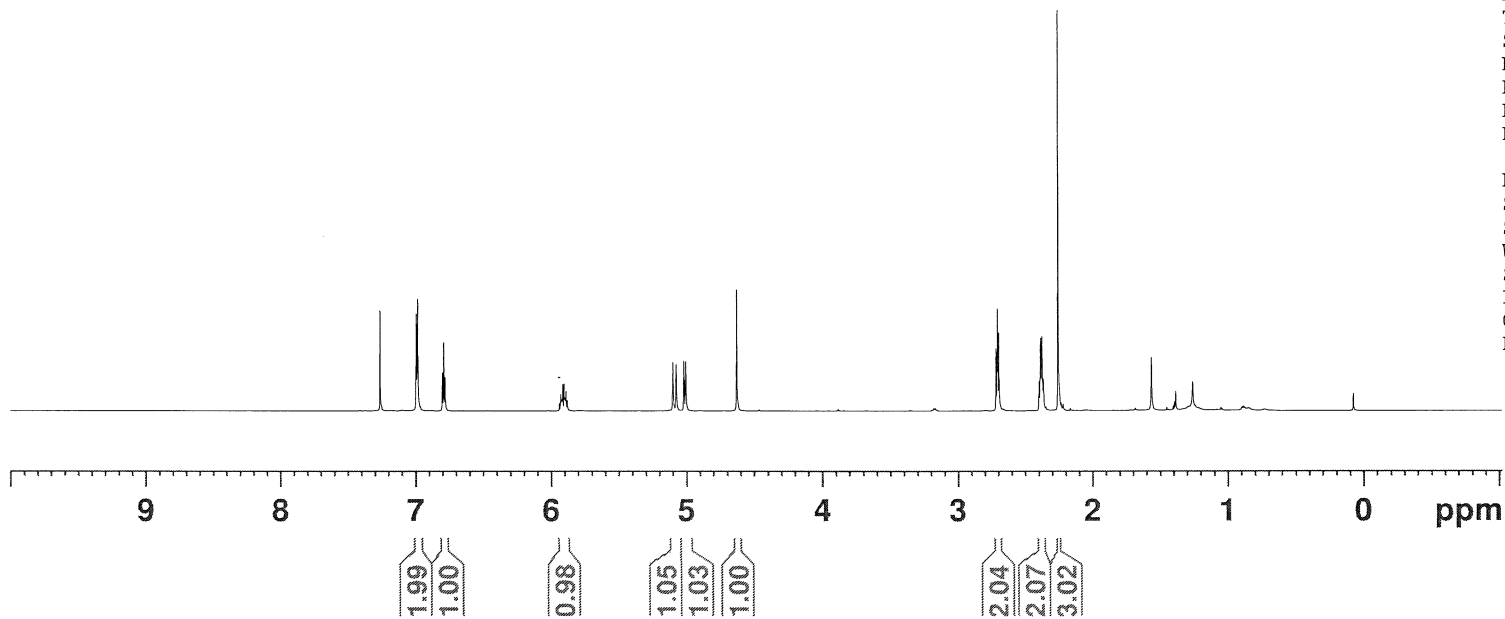
7.263
6.995
6.984
6.802
6.791
6.781
5.938
5.928
5.923
5.919
5.914
5.904
5.899
5.895
5.889
5.880
5.101
5.099
5.076
5.074
5.020
5.005
4.629
2.718
2.707
2.696
2.397
2.387
2.376
2.366
2.258

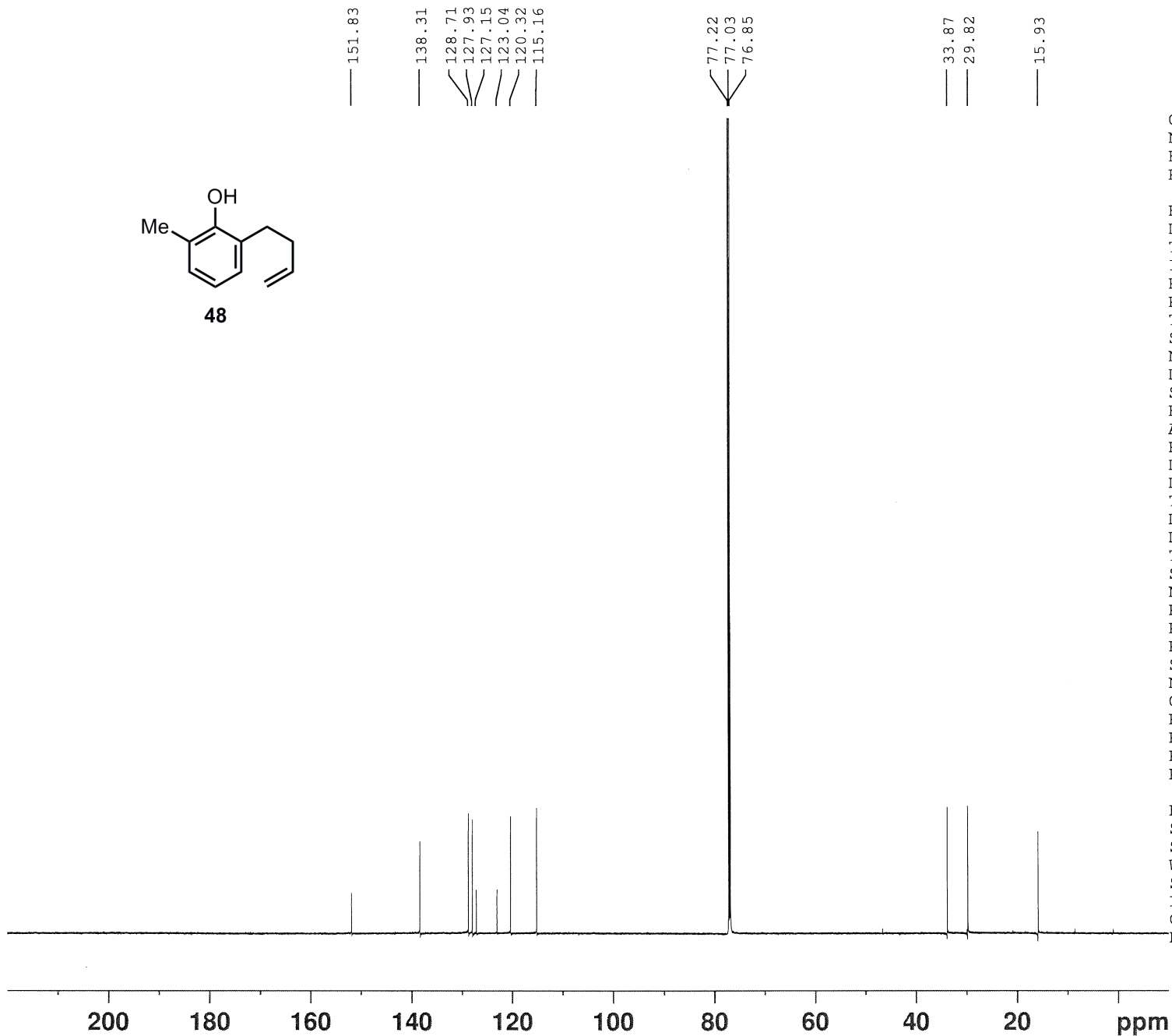
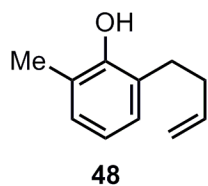


Current Data Parameters
NAME XZ-4-46
EXPNO 3
PROCNO 1

F2 - Acquisition Parameters
Date_ 20191021
Time 13.29 h
INSTRUM spect
PROBHD Z151340_0001 (
PULPROG zg30
TD 65536
SOLVENT CDC13
NS 16
DS 2
SWH 10504.202 Hz
FIDRES 0.320563 Hz
AQ 3.1195135 sec
RG 32
DW 47.600 usec
DE 20.00 usec
TE 303.2 K
D1 1.00000000 sec
TD0 1
SFO1 700.0115500 MHz
NUC1 1H
P0 3.17 usec
P1 9.50 usec
PLW1 13.00000000 W

F2 - Processing parameters
SI 131072
SF 700.0070149 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

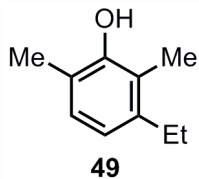




Current Data Parameters
 NAME XZ-4-46
 EXPNO 4
 PROCNO 1

F2 - Acquisition Parameters
 Date_ 20191021
 Time 13.37 h
 INSTRUM spect
 PROBHD Z151340_0001 (
 PULPROG zgpg30
 TD 65536
 SOLVENT CDC13
 NS 78
 DS 4
 SWH 42613.637 Hz
 FIDRES 1.300465 Hz
 AQ 0.7689557 sec
 RG 203
 DW 11.733 usec
 DE 18.00 usec
 TE 303.2 K
 D1 2.00000000 sec
 D11 0.03000000 sec
 TD0 1
 SFO1 176.0362620 MHz
 NUC1 13C
 P0 3.75 usec
 P1 11.25 usec
 PLW1 29.00000000 W
 SFO2 700.0098000 MHz
 NUC2 1H
 CPDPRG[2] waltz16
 PCPD2 65.00 usec
 PLW2 13.00000000 W
 PLW12 0.27768999 W
 PLW13 0.13982999 W

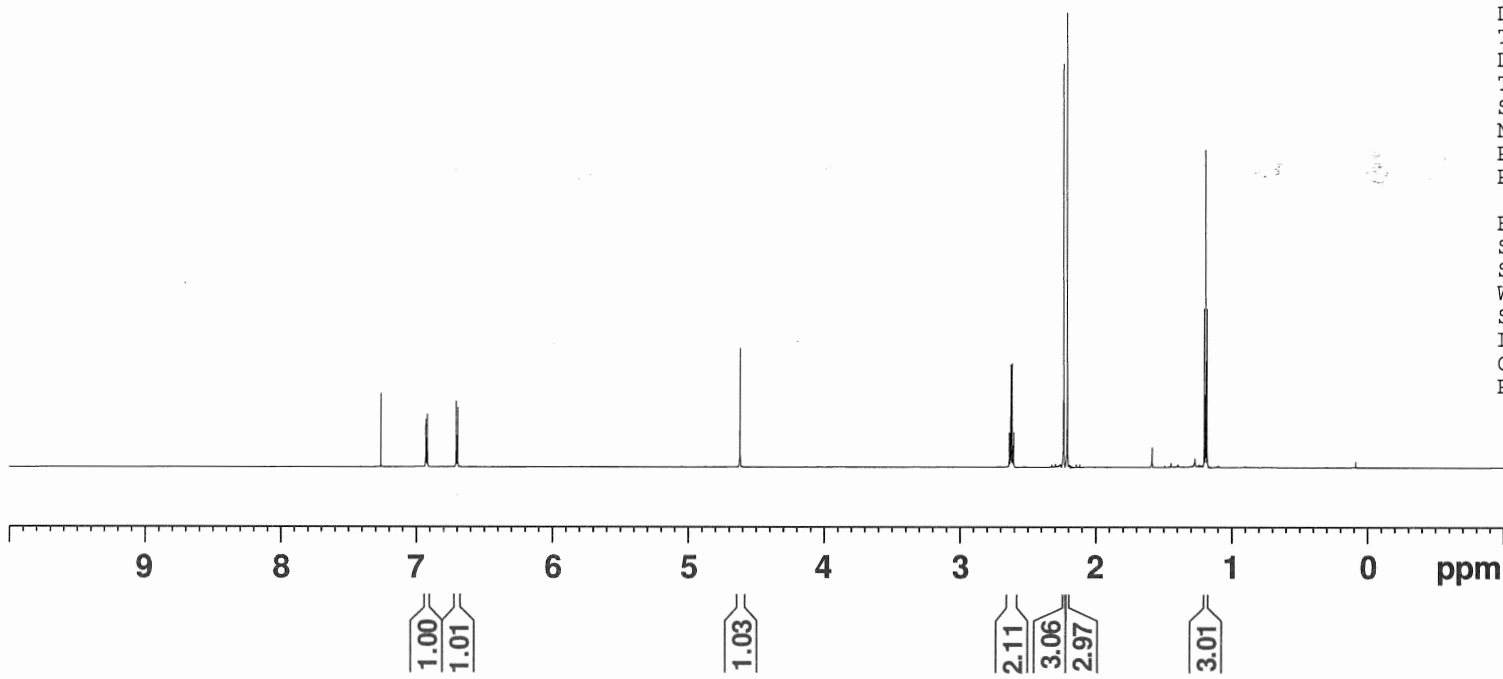
F2 - Processing parameters
 SI 131072
 SF 176.0169002 MHz
 WDW EM
 SSB 0
 LB 1.00 Hz
 GB 0
 PC 1.40



7.260
 6.929
 6.918
 6.706
 6.695

— 4.616

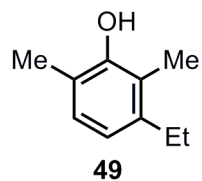
2.634
 2.624
 2.613
 2.602
 2.233
 2.207
 1.200
 1.189
 1.178



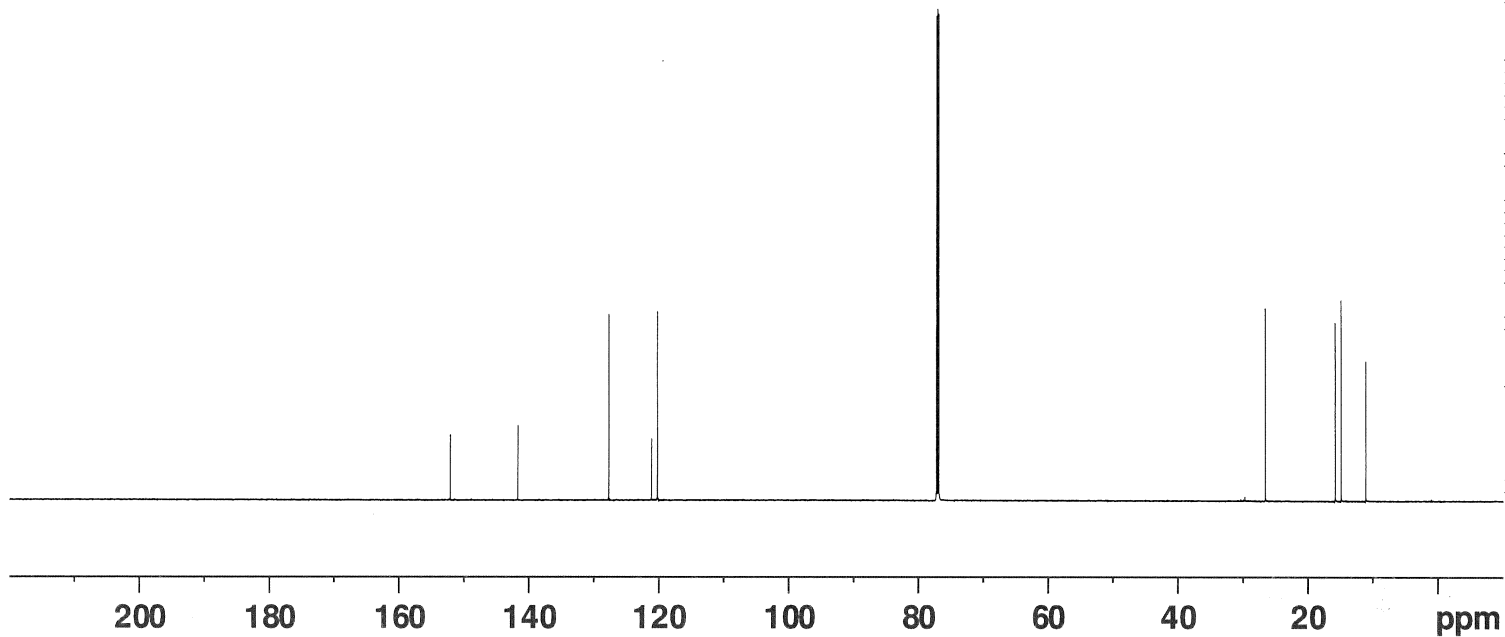
Current Data Parameters
 NAME XZ-2-291
 EXPNO 1
 PROCNO 1

F2 - Acquisition Parameter
 Date_ 20181119
 Time 16.01 h
 INSTRUM spect
 PROBHD Z151340_0001 (
 PULPROG zg30
 TD 65536
 SOLVENT CDCl3
 NS 16
 DS 2
 SWH 10504.202 Hz
 FIDRES 0.320563 Hz
 AQ 3.1195135 sec
 RG 6.35
 DW 47.600 usec
 DE 10.00 usec
 TE 303.2 K
 D1 1.00000000 sec
 TD0 1
 SFO1 700.0115500 MHz
 NUC1 1H
 P1 9.50 usec
 PLW1 13.00000000 W

F2 - Processing parameters
 SI 131072
 SF 700.0070176 MHz
 WDW no
 SSB 0
 LB 0 Hz
 GB 0
 PC 1.00



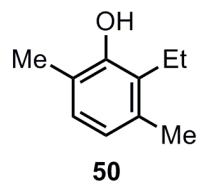
— 152.05
 — 141.67
 — 127.69
 — 121.10
 — 120.21
 — 120.15
 — 77.23
 — 77.05
 — 76.87
 — 26.63
 — 15.88
 — 14.95
 — 11.16



Current Data Parameters
 NAME XZ-2-291
 EXPNO 2
 PROCNO 1

F2 - Acquisition Parameter
 Date_ 20181119
 Time 16.05 h
 INSTRUM spect
 PROBHD Z151340_0001 (
 PULPROG zgpg30
 TD 65536
 SOLVENT CDC13
 NS 34
 DS 4
 SWH 42613.637 Hz
 FIDRES 1.300465 Hz
 AQ 0.7689557 sec
 RG 203
 DW 11.733 usec
 DE 18.00 usec
 TE 303.2 K
 D1 2.00000000 sec
 D11 0.03000000 sec
 TD0 1
 SFO1 176.0362620 MHz
 NUC1 13C
 P1 11.25 usec
 PLW1 29.00000000 W
 SFO2 700.0098000 MHz
 NUC2 1H
 CPDPRG[2] waltz16
 PCPD2 65.00 usec
 PLW2 13.00000000 W
 PLW12 0.27768999 W
 PLW13 0.13982999 W

F2 - Processing parameters
 SI 131072
 SF 176.0169002 MHz
 WDW EM
 SSB 0
 LB 1.00 Hz
 GB 0
 PC 1.40

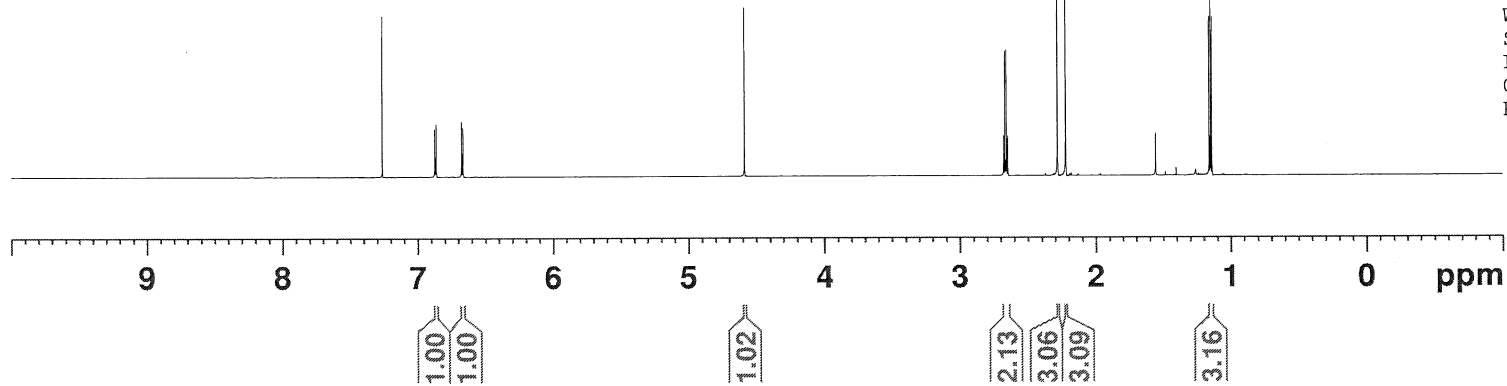


7.262
6.873
6.862
6.675
6.664

4.588

2.679
2.669
2.658
2.647
2.283
2.223

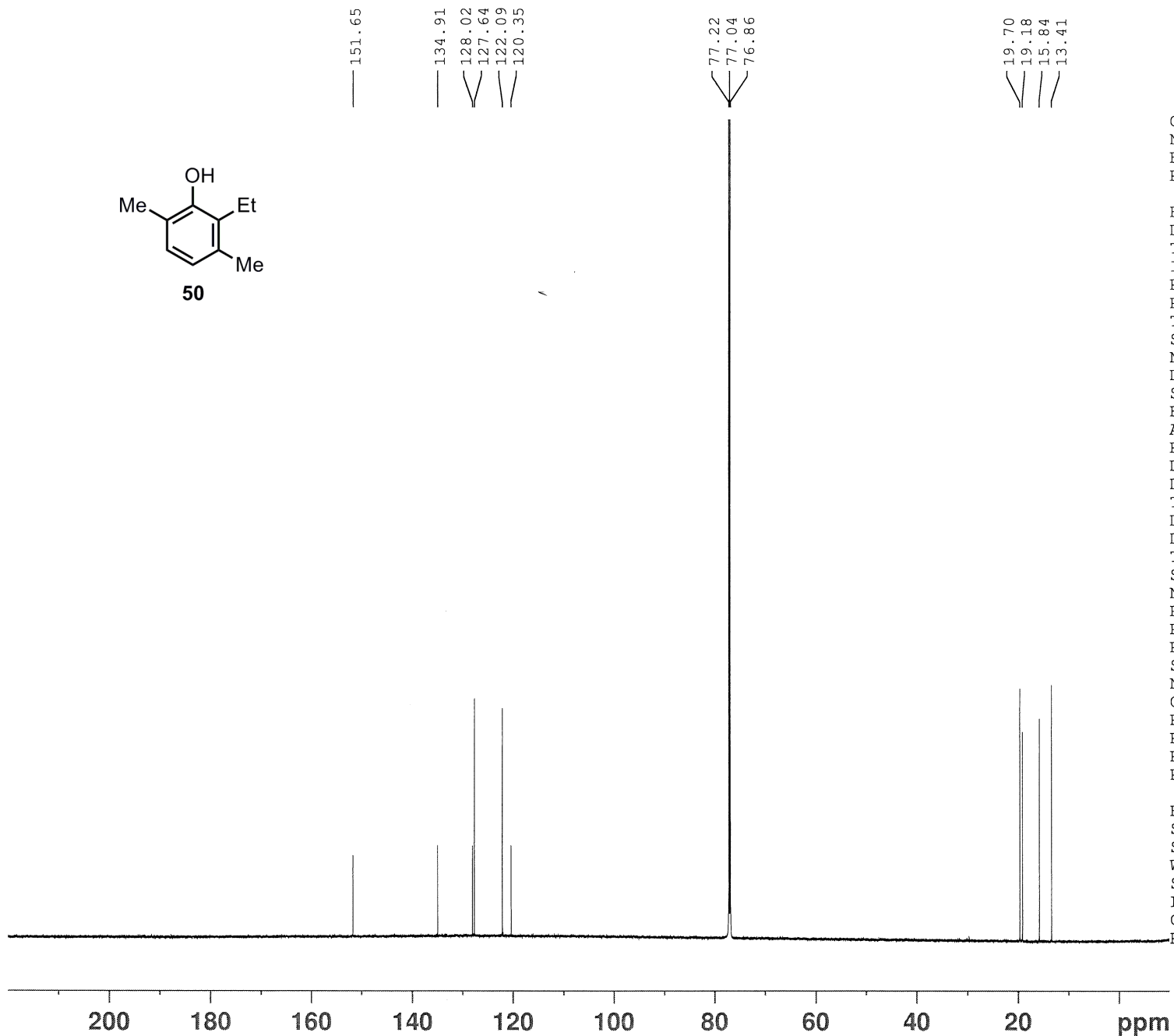
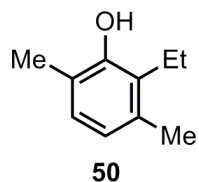
1.161
1.150
1.139



Current Data Parameters
NAME XZ-3-23
EXPNO 1
PROCNO 1

F2 - Acquisition Parameters
Date_ 20190919
Time 10.03 h
INSTRUM spect
PROBHD z151340_0001 {
PULPROG zg30
TD 65536
SOLVENT CDC13
NS 16
DS 2
SWH 10504.202 Hz
FIDRES 0.320563 Hz
AQ 3.1195135 sec
RG 32
DW 47.600 usec
DE 20.00 usec
TE 303.2 K
D1 1.00000000 sec
TD0 1
SFO1 700.0115500 MHz
NUC1 1H
P0 3.17 usec
P1 9.50 usec
PLW1 13.00000000 W

F2 - Processing parameters
SI 131072
SF 700.0070168 MHz
WDW no
SSB 0
LB 0 Hz
GB 0
PC 1.00



```

Current Data Parameters
NAME             XZ-3-23
EXPNO            2
PROCNO           1

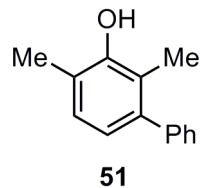
F2 - Acquisition Parameters
Date_            20190919
Time             10.10 h
INSTRUM          spect
PROBHD           Z151340_0001 (
PULPROG          zgpg30
TD               65536
SOLVENT          CDC13
NS               77
DS               4
SWH              42613.637 Hz
FIDRES           1.300465 Hz
AQ               0.7689557 sec
RG               203
DW               11.733 usec
DE               18.00 usec
TE               303.2 K
D1               2.00000000 sec
D11              0.03000000 sec
TD0              1
SFO1             176.0362620 MHz
NUC1             13C
P0               3.75 usec
P1               11.25 usec
PLW1             29.00000000 W
SFO2             700.0098000 MHz
NUC2             1H
CPDPRG[2]       waltz16
PCPD2            65.00 usec
PLW2             13.00000000 W
PLW12            0.27768999 W
PLW13            0.13982999 W

F2 - Processing parameters
SI               131072
SF               176.0169002 MHz
WDW              EM
SSB              0
LB               1.00 Hz
GB               0
PC               1.40

```

7.451
7.448
7.434
7.431
7.415
7.382
7.378
7.375
7.366
7.360
7.354
7.342
7.338
7.333
7.325
7.321
7.319
7.282
7.071
7.052
6.824
6.805
4.751

2.336
2.198

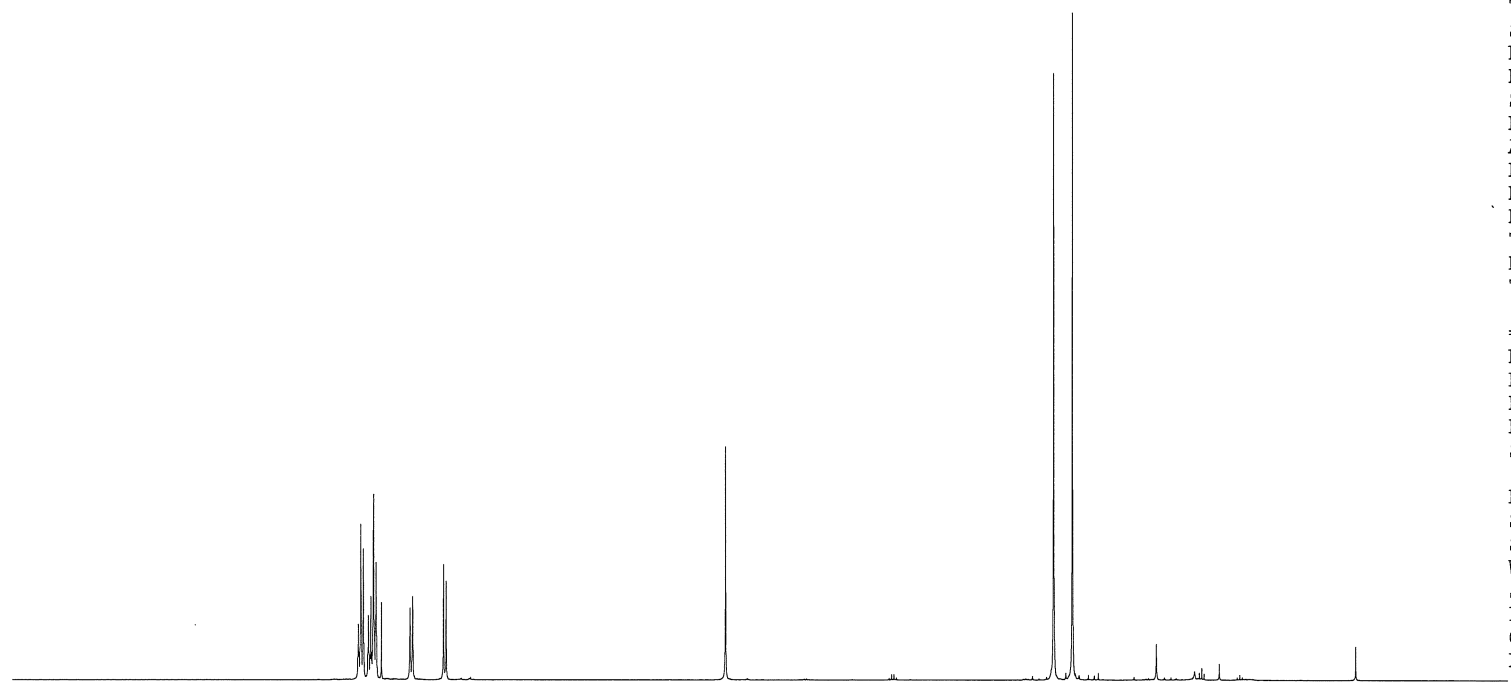


Current Data Parameters
NAME ZX-2-121
EXPNO 1
PROCNO 1

F2 - Acquisition Parameter
Date_ 20180430
Time 20.31
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zg30
TD 65536
SOLVENT CDC13
NS 32
DS 2
SWH 8278.146 Hz
FIDRES 0.126314 Hz
AQ 3.9583745 sec
RG 128
DW 60.400 usec
DE 6.50 usec
TE 303.4 K
D1 1.00000000 sec
TD0 1

===== CHANNEL f1 =====
NUC1 1H
P1 14.00 usec
PL1 0 dB
PL1W 10.27361584 W
SFO1 400.1424710 MHz

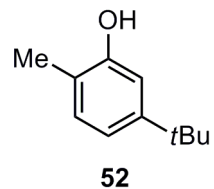
F2 - Processing parameters
SI 131072
SF 400.1400000 MHz
WDW no
SSB 0
LB 0 Hz
GB 0
PC 1.00



2.03
2.98
1.00
0.99

1.02

3.09
3.09



7.262
7.077
7.066
6.908
6.906
6.897
6.894
6.837
6.834

4.711

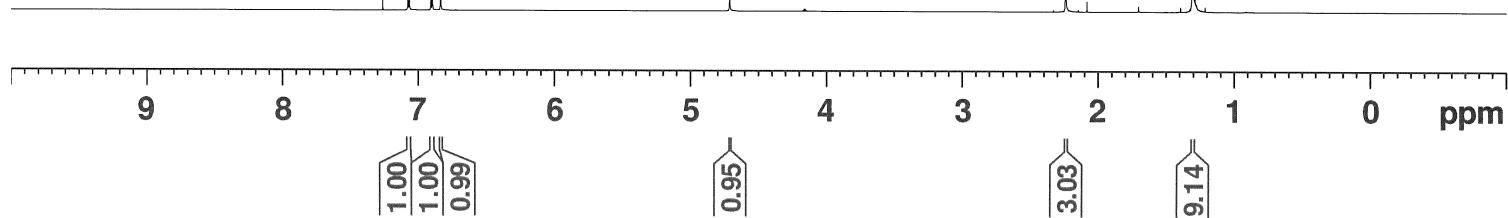
2.239

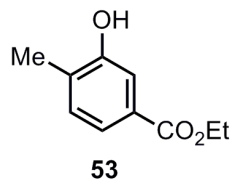
1.305

Current Data Parameters
NAME XZ-3-106
EXPNO 1
PROCNO 1

F2 - Acquisition Parameter
Date_ 20190326
Time 12.59 h
INSTRUM spect
PROBHD Z151340_0001 (
PULPROG zg30
TD 65536
SOLVENT CDC13
NS 16
DS 2
SWH 10504.202 Hz
FIDRES 0.320563 Hz
AQ 3.1195135 sec
RG 5.6
DW 47.600 usec
DE 10.00 usec
TE 303.2 K
D1 1.00000000 sec
TD0 1
SF01 700.0115500 MHz
NUC1 1H
P1 9.50 usec
PLW1 13.00000000 W

F2 - Processing parameters
SI 131072
SF 700.0070157 MHz
WDW no
SSB 0
LB 0 Hz
GB 0
PC 1.00





7.632
7.630
7.526
7.524
7.515
7.513
7.262
7.177
7.166
— 6.116

4.386
4.376
4.366
4.356

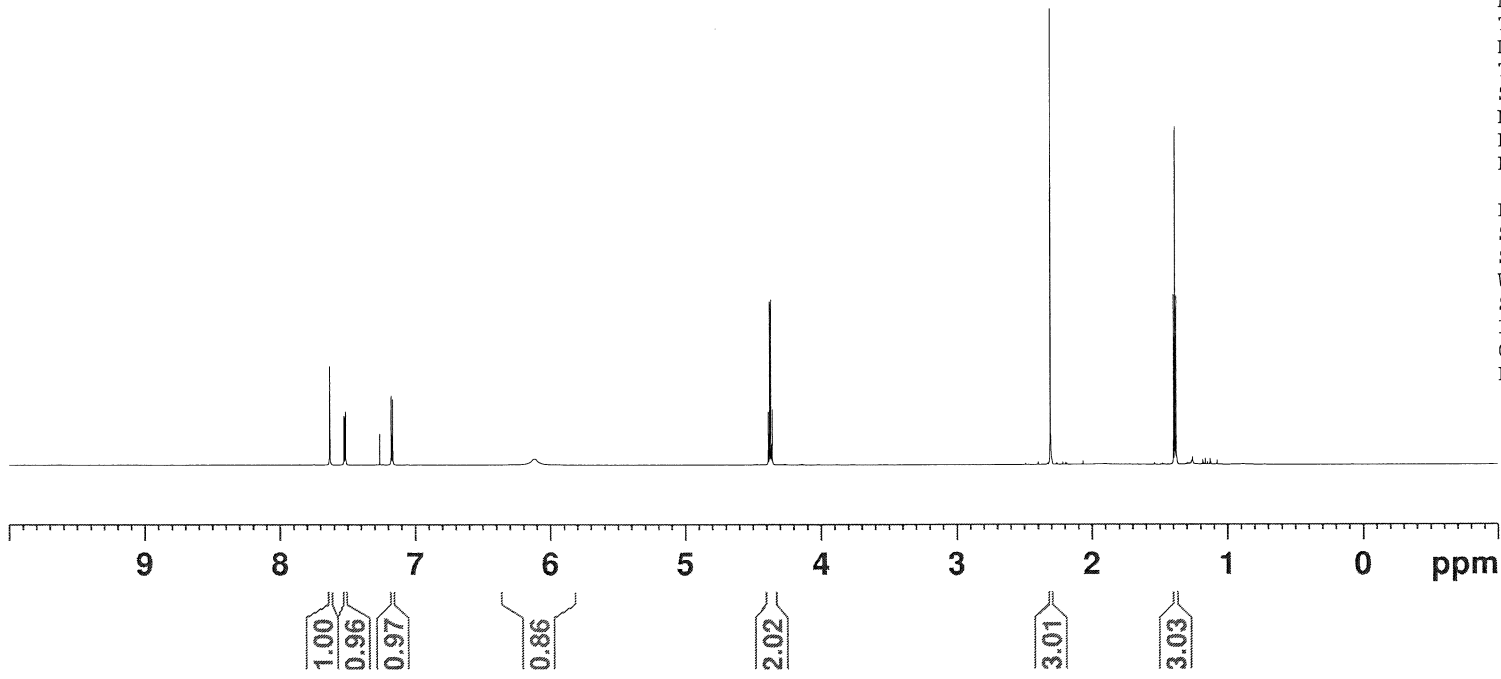
— 2.306

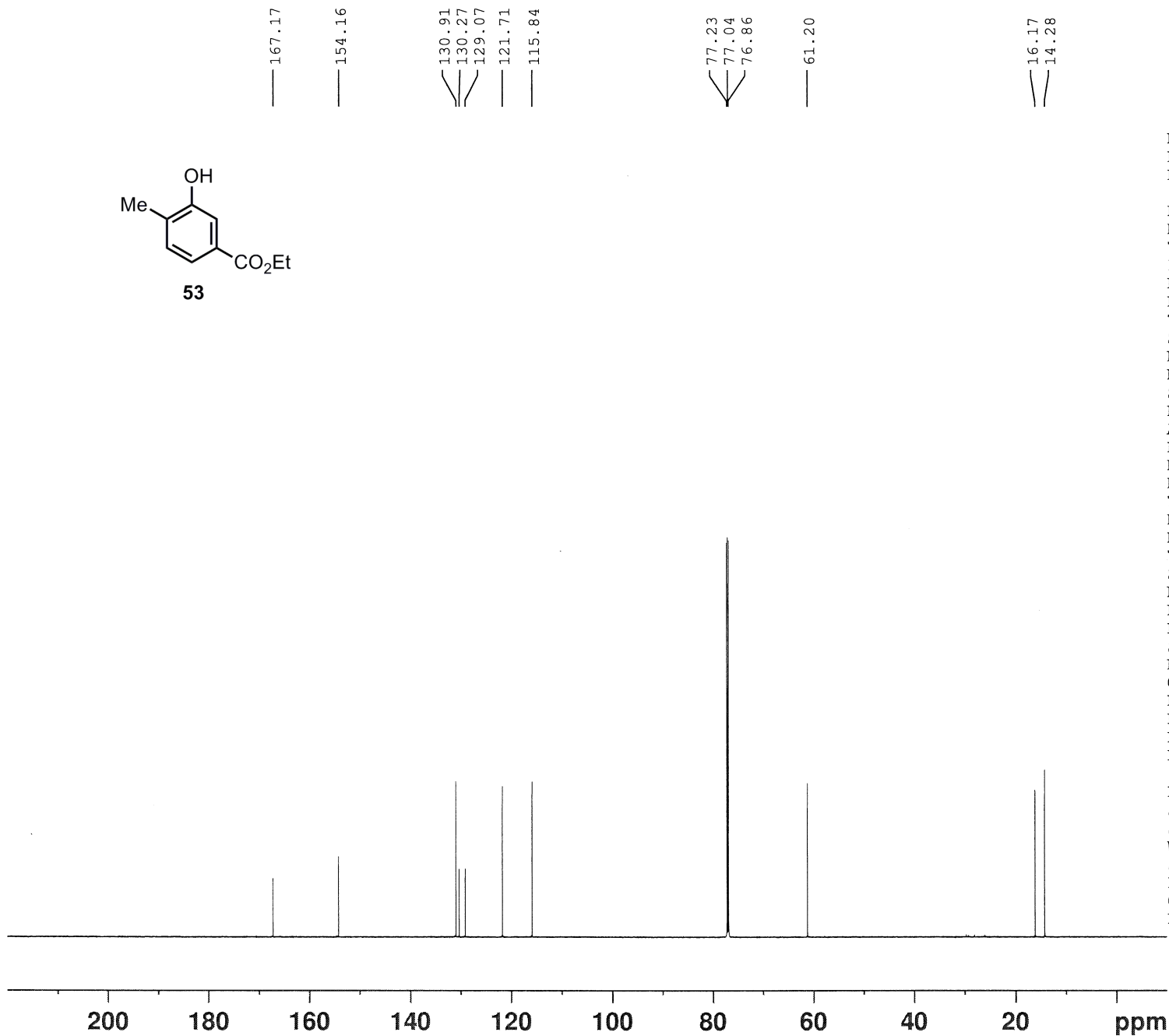
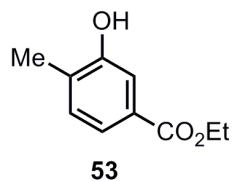
1.396
1.385
1.375

Current Data Parameters
NAME XZ-3-152-2
EXPNO 3
PROCNO 1

F2 - Acquisition Parameters
Date_ 20190819
Time 17.20 h
INSTRUM spect
PROBHD z151340_0001 (
PULPROG zg30
TD 65536
SOLVENT CDC13
NS 16
DS 2
SWH 10504.202 Hz
FIDRES 0.320563 Hz
AQ 3.1195135 sec
RG 25.4
DW 47.600 usec
DE 20.00 usec
TE 303.3 K
D1 1.00000000 sec
TD0 1
SFO1 700.0115500 MHz
NUC1 1H
P1 9.50 usec
PLW1 13.00000000 W

F2 - Processing parameters
SI 131072
SF 700.0070151 MHz
WDW no
SSB 0
LB 0 Hz
GB 0
PC 1.00





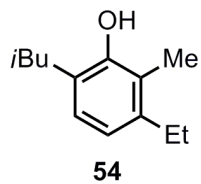
```

NAME          XZ-3-152-2
EXPNO         4
PROCNO        1

F2 - Acquisition Parameters
Date_         20190819
Time          17.24 h
INSTRUM       spect
PROBHD        Z151340_0001 (
PULPROG       zgpg30
TD            65536
SOLVENT       CDC13
NS            15
DS            4
SWH           42613.637 Hz
FIDRES        1.300465 Hz
AQ            0.7689557 sec
RG            203
DW            11.733 usec
DE            18.00 usec
TE            303.2 K
D1            2.00000000 sec
D11           0.03000000 sec
TD0           1
SFO1          176.0362620 MHz
NUC1          13C
P1            11.25 usec
PLW1          29.00000000 W
SFO2          700.0098000 MHz
NUC2          1H
CPDPRG[2]    waltz16
PCPD2         65.00 usec
PLW2          13.00000000 W
PLW12         0.27768999 W
PLW13         0.13982999 W

F2 - Processing parameters
SI            131072
SF            176.0169002 MHz
WDW           EM
SSB           0
LB            1.00 Hz
GB            0
PC            1.40

```



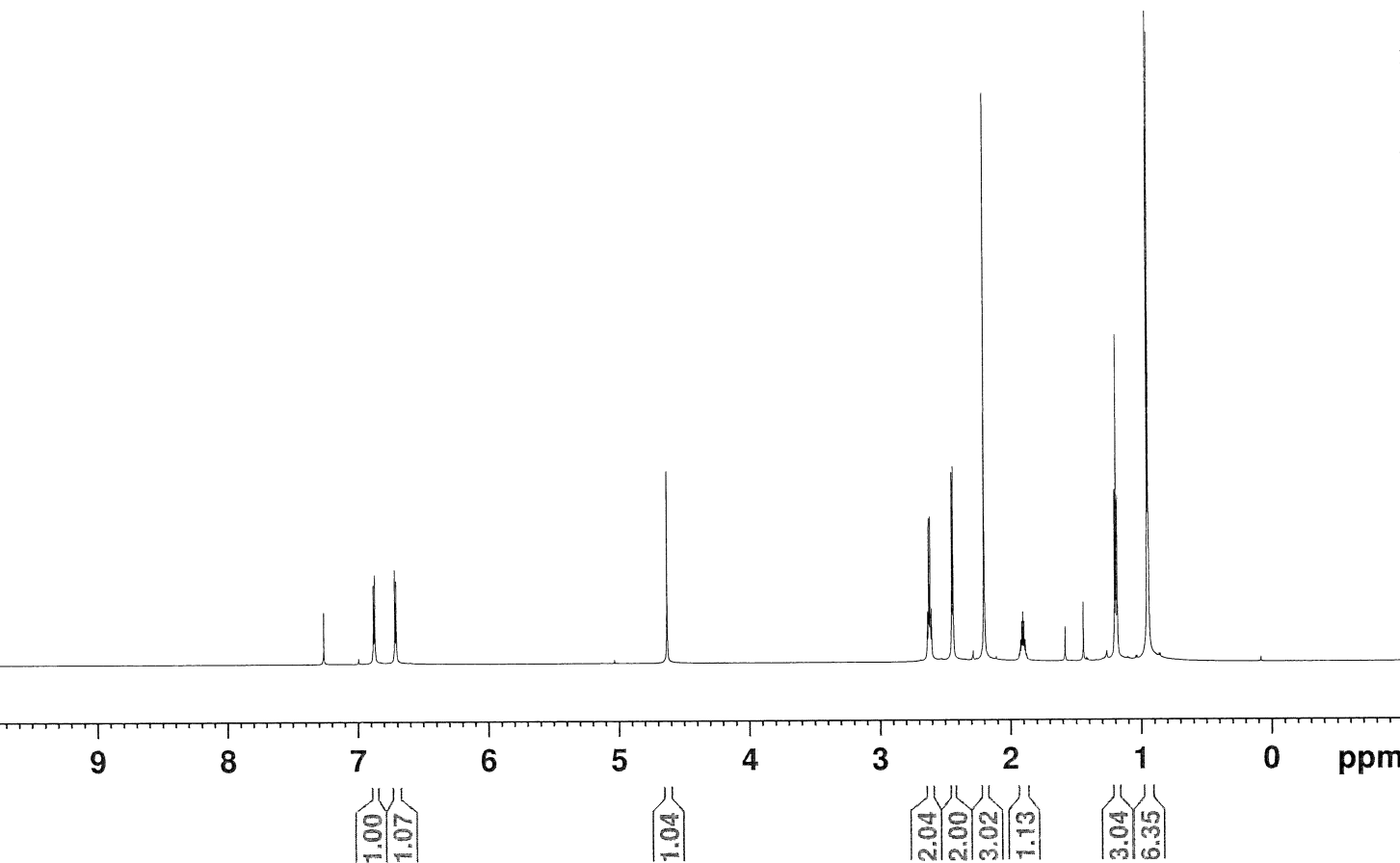
7.260
6.880
6.869
6.716
6.705

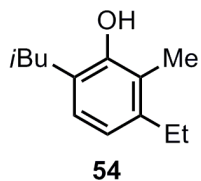
4.629
2.633
2.623
2.612
2.601
2.446
2.436
2.199
1.932
1.922
1.912
1.903
1.893
1.884
1.874
1.201
1.191
1.180
0.952
0.943

Current Data Parameters
NAME XZ-3-31
EXPNO 1
PROCNO 1

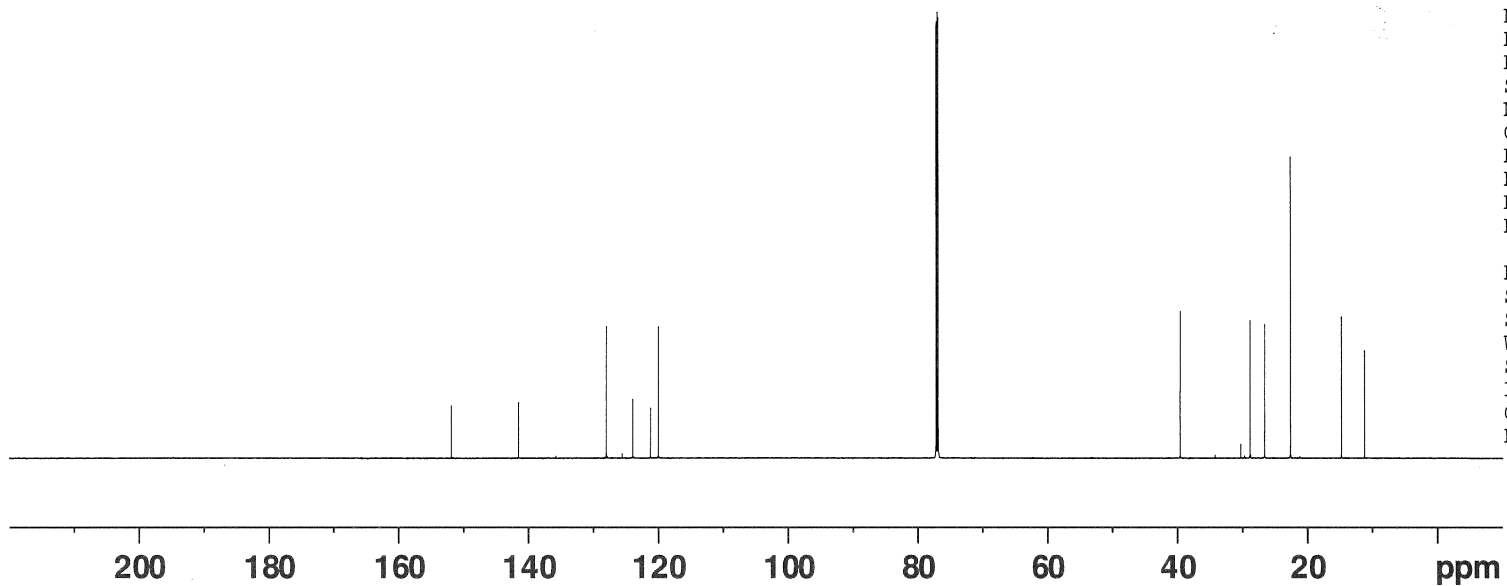
F2 - Acquisition Parameters
Date_ 20181210
Time 13.40 h
INSTRUM spect
PROBHD Z151340_0001 (
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 10504.202 Hz
FIDRES 0.320563 Hz
AQ 3.1195135 sec
RG 5.6
DW 47.600 usec
DE 10.00 usec
TE 298.2 K
D1 1.00000000 sec
TD0 1
SFO1 700.0115500 MHz
NUC1 1H
P1 9.50 usec
PLW1 13.00000000 W

F2 - Processing parameters
SI 131072
SF 700.0070166 MHz
WDW no
SSB 0
LB 0 Hz
GB 0
PC 1.00





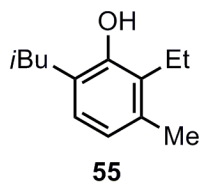
151.83
 141.50
 128.00
 123.94
 121.20
 119.99
 77.24
 77.06
 76.88
 39.64
 28.90
 26.65
 22.69
 14.84
 11.28



Current Data Parameters
 NAME XZ-3-31
 EXPNO 2
 PROCNO 1

F2 - Acquisition Parameter
 Date_ 20181210
 Time 13.49 h
 INSTRUM spect
 PROBHD Z151340_0001 (
 PULPROG zgpg30
 TD 65536
 SOLVENT CDC13
 NS 50
 DS 4
 SWH 42613.637 Hz
 FIDRES 1.300465 Hz
 AQ 0.7689557 sec
 RG 203
 DW 11.733 usec
 DE 18.00 usec
 TE 298.2 K
 D1 2.00000000 sec
 D11 0.03000000 sec
 TD0 1
 SFO1 176.0362620 MHz
 NUC1 13C
 P1 11.25 usec
 PLW1 29.00000000 W
 SFO2 700.0098000 MHz
 NUC2 1H
 CPDPRG[2] waltz16
 PCPD2 65.00 usec
 PLW2 13.00000000 W
 PLW12 0.27768999 W
 PLW13 0.13982999 W

F2 - Processing parameters
 SI 131072
 SF 176.0169002 MHz
 WDW EM
 SSB 0
 LB 1.00 Hz
 GB 0
 PC 1.40



7.260
6.830
6.819
6.690
6.680

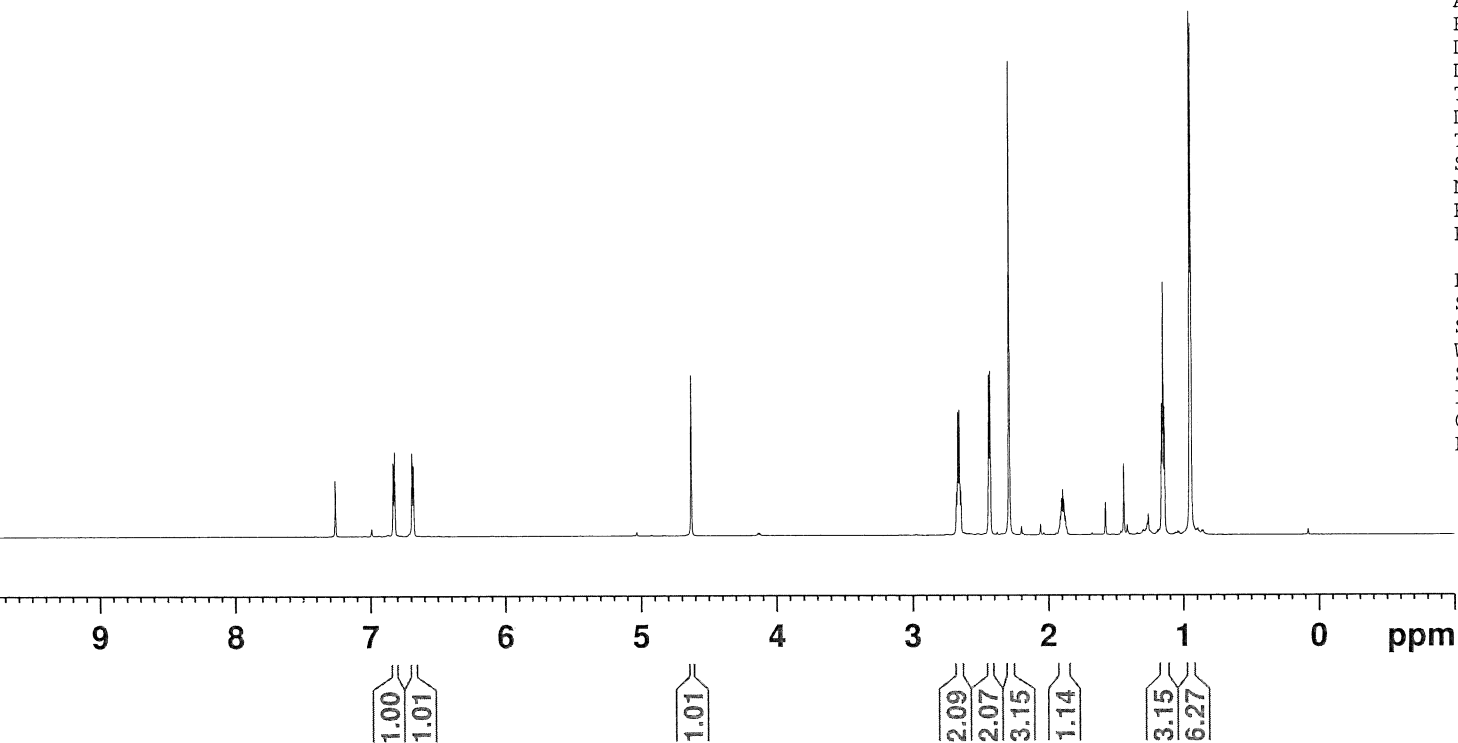
4.629

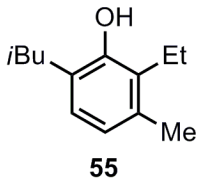
2.675
2.665
2.654
2.643
2.437
2.427
2.288
1.910
1.901
1.891
1.882
1.872
1.863
1.159
1.148
1.138
0.951
0.941

Current Data Parameters
NAME XZ-3-32
EXPNO 1
PROCNO 1

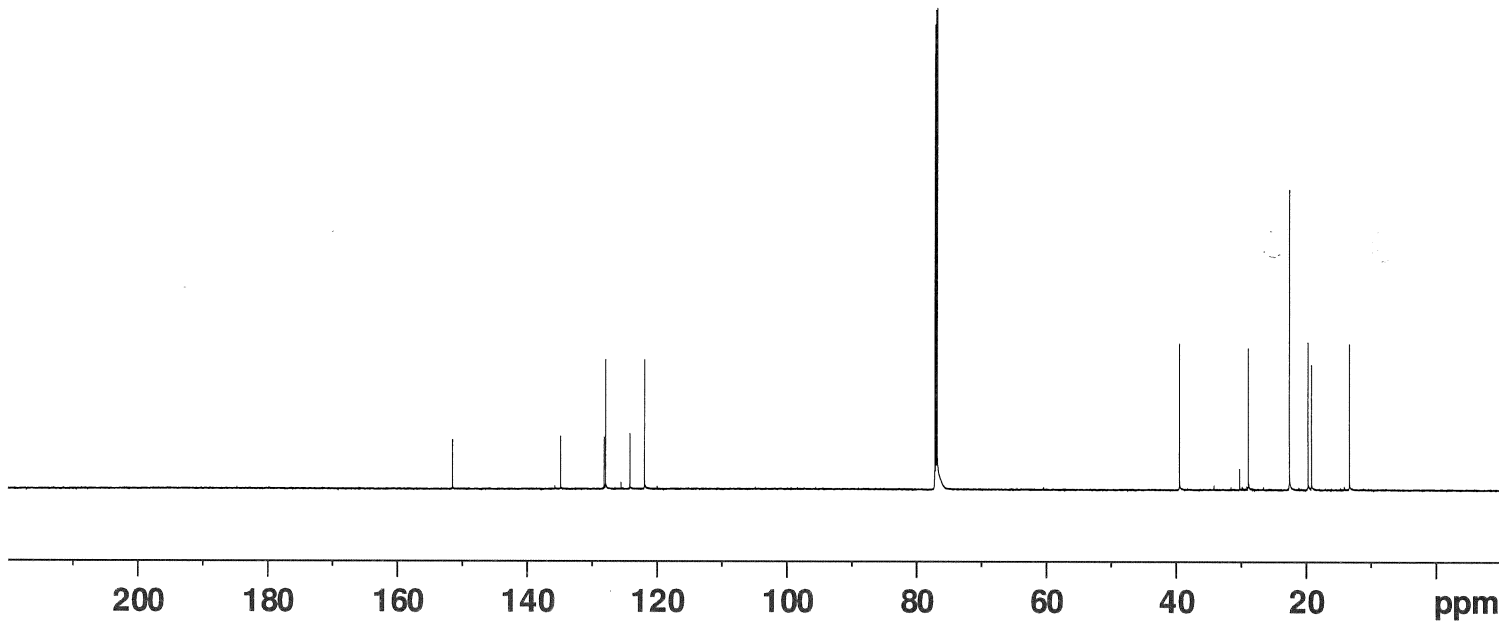
F2 - Acquisition Parameters
Date_ 20181210
Time 20.09 h
INSTRUM spect
PROBHD Z151340_0001 (
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 10504.202 Hz
FIDRES 0.320563 Hz
AQ 3.1195135 sec
RG 5.6
DW 47.600 usec
DE 10.00 usec
TE 298.2 K
D1 1.00000000 sec
TD0 1
SFO1 700.0115500 MHz
NUC1 1H
P1 9.50 usec
PLW1 13.00000000 W

F2 - Processing parameters
SI 131072
SF 700.0070183 MHz
WDW no
SSB 0
LB 0 Hz
GB 0
PC 1.00





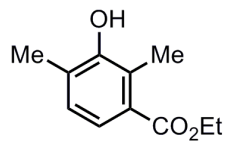
151.47
 134.85
 128.16
 127.94
 124.21
 121.94
 77.24
 77.06
 76.88
 39.58
 29.00
 22.67
 19.81
 19.27
 13.45



Current Data Parameters
 NAME XZ-3-32
 EXPNO 2
 PROCNO 1

F2 - Acquisition Parameter
 Date_ 20181210
 Time 20.15 h
 INSTRUM spect
 PROBHD Z151340_0001 (
 PULPROG zgpg30
 TD 65536
 SOLVENT CDC13
 NS 62
 DS 4
 SWH 42613.637 Hz
 FIDRES 1.300465 Hz
 AQ 0.7689557 sec
 RG 203
 DW 11.733 usec
 DE 18.00 usec
 TE 298.2 K
 D1 2.00000000 sec
 D11 0.03000000 sec
 TD0 1
 SFO1 176.0362620 MHz
 NUC1 13C
 P1 11.25 usec
 PLW1 29.00000000 W
 SFO2 700.0098000 MHz
 NUC2 1H
 CPDPRG[2] waltz16
 PCPD2 65.00 usec
 PLW2 13.00000000 W
 PLW12 0.27768999 W
 PLW13 0.13982999 W

F2 - Processing parameters
 SI 131072
 SF 176.0169002 MHz
 WDW no
 SSB 0
 LB 0 Hz
 GB 0
 PC 1.40



56

7.368
7.357
7.262
6.998
6.986

5.260

4.357
4.347
4.337
4.326

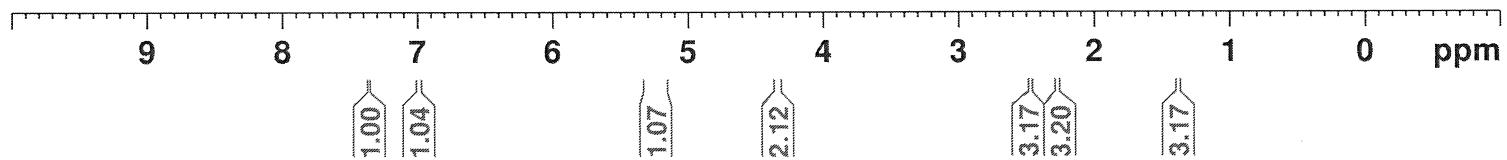
2.469
2.271

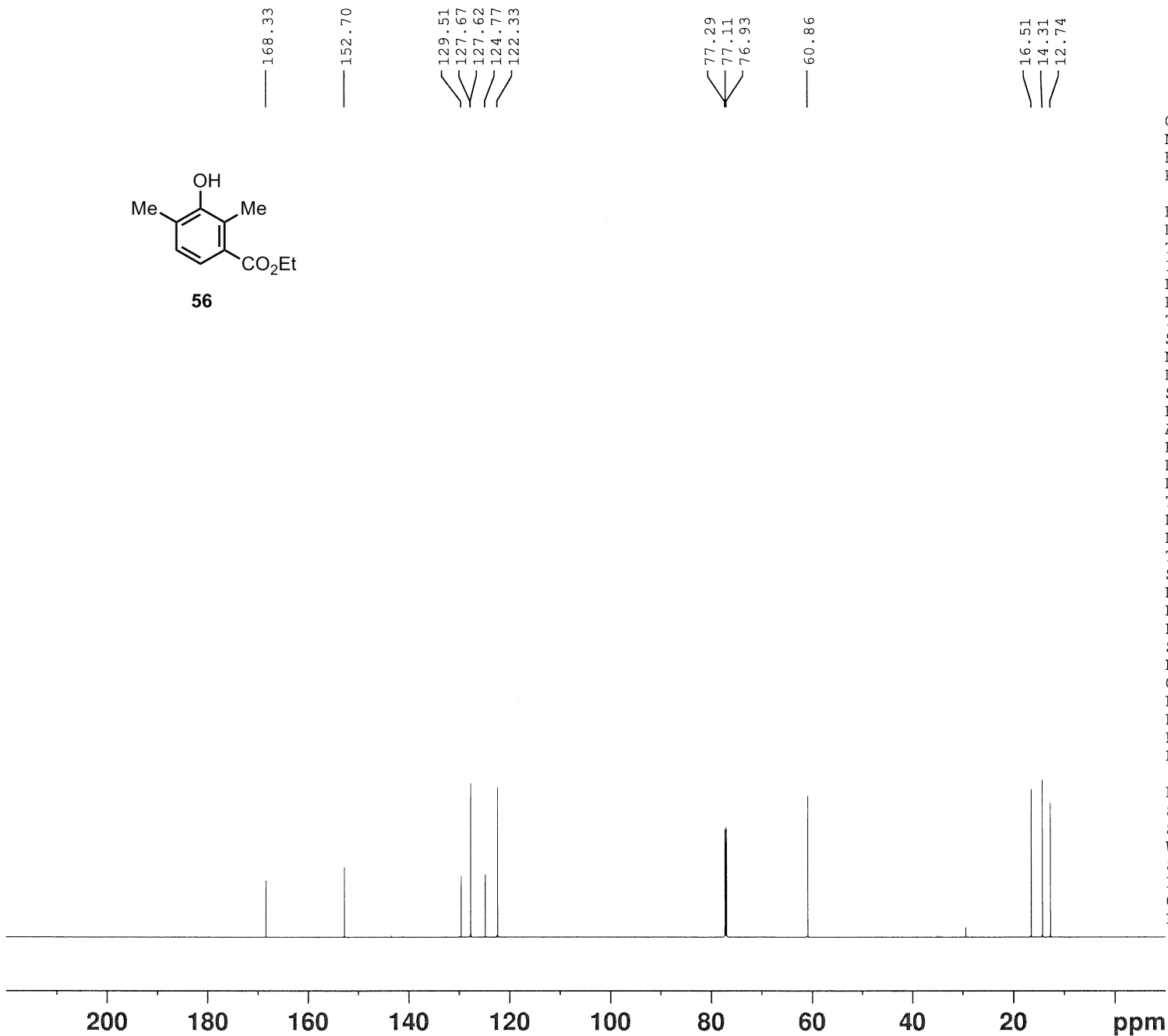
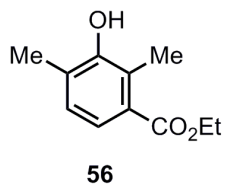
1.391
1.380
1.370

Current Data Parameters
NAME XZ-3-183-2
EXPNO 1
PROCNO 1

F2 - Acquisition Parameters
Date_ 20190526
Time 18.06 h
INSTRUM spect
PROBHD z151340_0001 (
PULPROG zg30
TD 65536
SOLVENT CDC13
NS 16
DS 2
SWH 10504.202 Hz
FIDRES 0.320563 Hz
AQ 3.1195135 sec
RG 5
DW 47.600 usec
DE 10.00 usec
TE 303.2 K
D1 1.00000000 sec
TD0 1
SFO1 700.0115500 MHz
NUC1 1H
P1 9.50 usec
PLW1 13.00000000 W

F2 - Processing parameters
SI 131072
SF 700.0070163 MHz
WDW no
SSB 0
LB 0 Hz
GB 0
PC 1.00





Current Data Parameters

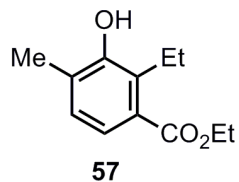
NAME XZ-3-183-2
 EXPNO 3
 PROCNO 1

F2 - Acquisition Parameters

Date_ 20190526
 Time 18.20 h
 INSTRUM spect
 PROBHD z151340_0001 (
 PULPROG zgpg30
 TD 65536
 SOLVENT CDC13
 NS 11
 DS 4
 SWH 42613.637 Hz
 FIDRES 1.300465 Hz
 AQ 0.7689557 sec
 RG 203
 DW 11.733 usec
 DE 18.00 usec
 TE 303.2 K
 D1 2.00000000 sec
 D11 0.03000000 sec
 TD0 1
 SFO1 176.0362620 MHz
 NUC1 13C
 P1 11.25 usec
 PLW1 29.00000000 W
 SFO2 700.0098000 MHz
 NUC2 1H
 CPDPRG[2] waltz16
 PCPD2 65.00 usec
 PLW2 13.00000000 W
 PLW12 0.27768999 W
 PLW13 0.13982999 W

F2 - Processing parameters

SI 131072
 SF 176.0169002 MHz
 WDW EM
 SSB 0
 LB 1.00 Hz
 GB 0
 PC 1.40



7.350
7.339
7.262
7.013
7.001

5.021
4.359
4.349
4.339
4.328

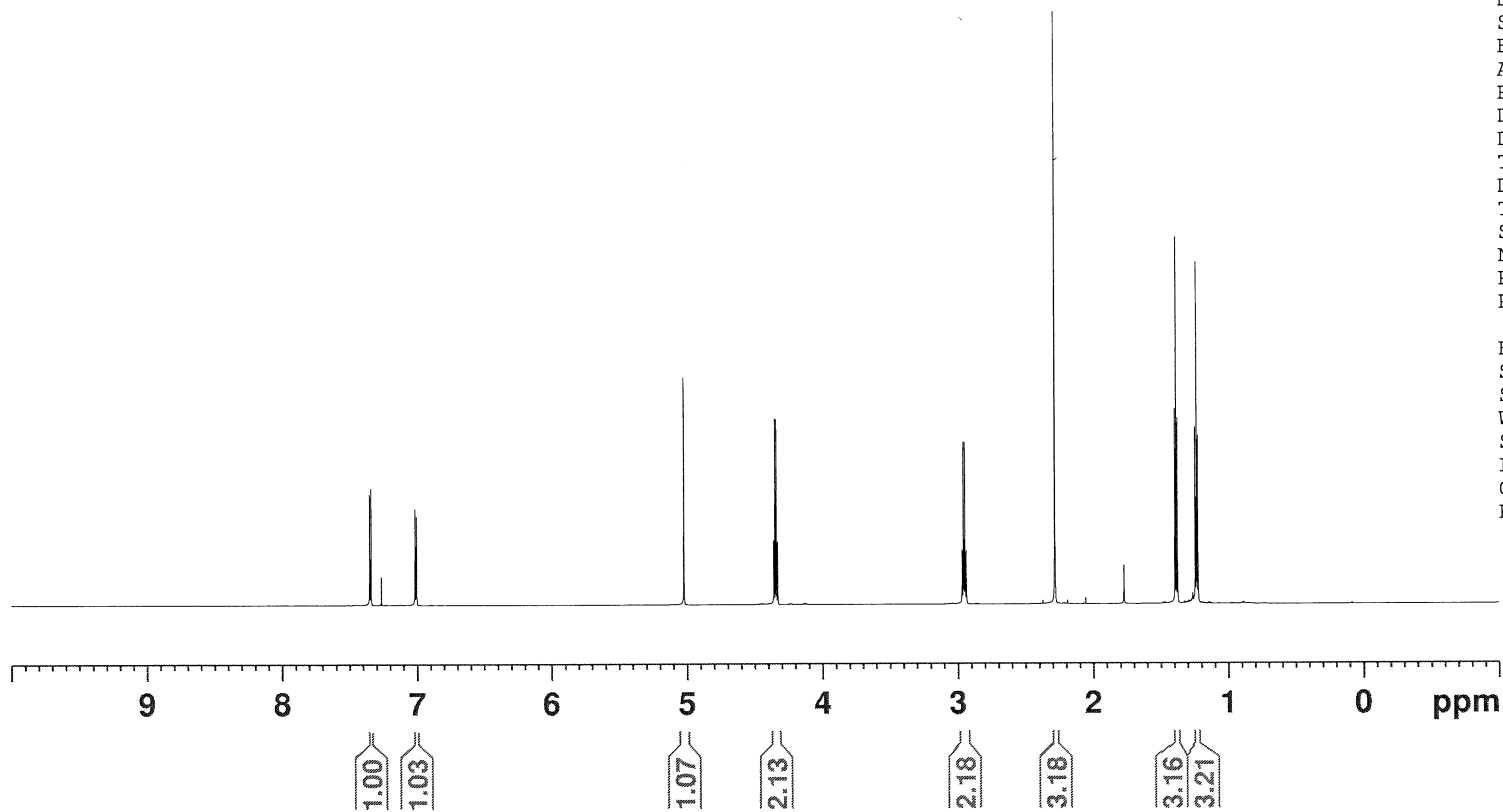
2.966
2.956
2.945
2.934
2.282

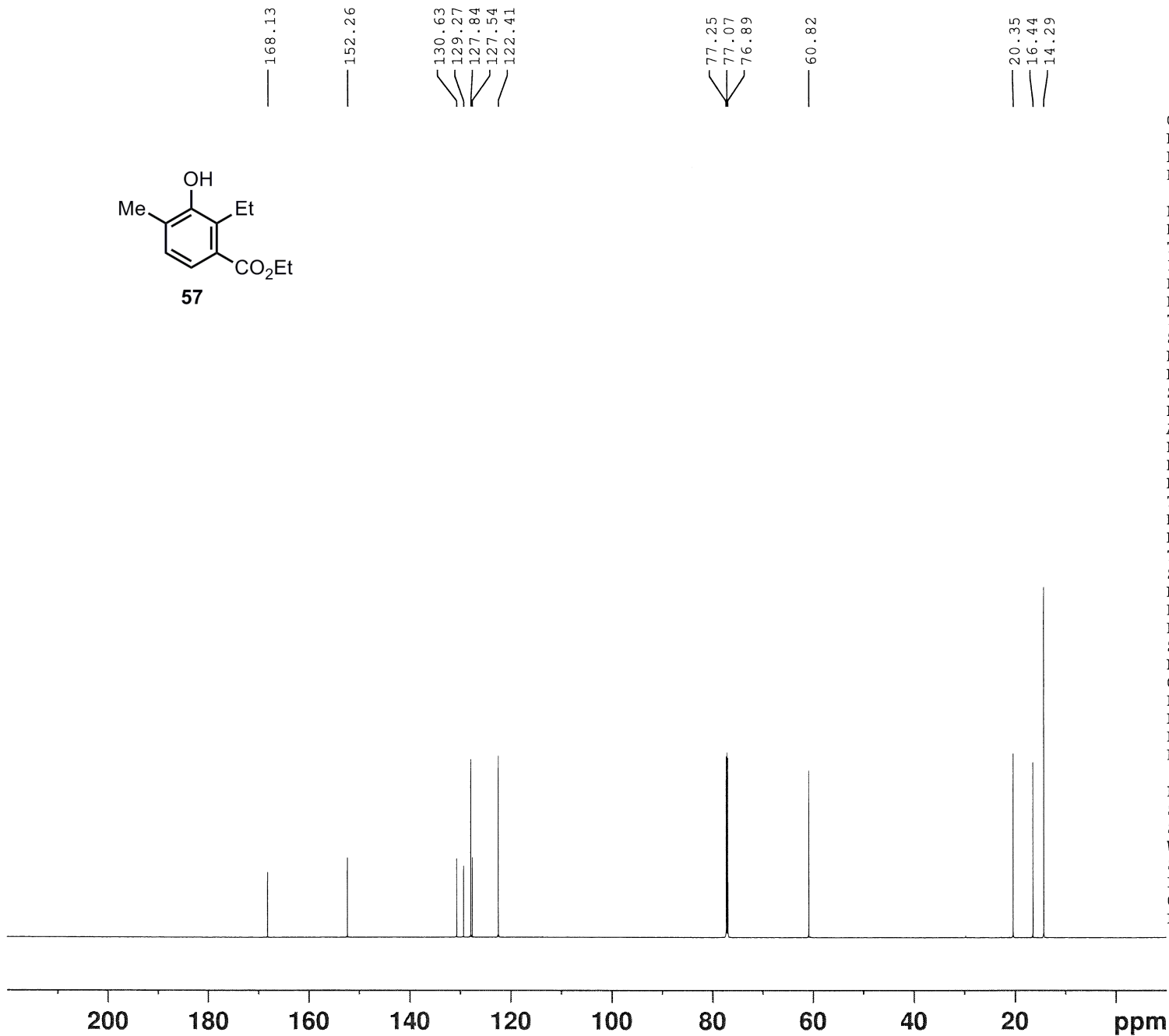
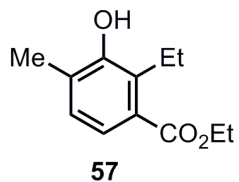
1.394
1.383
1.373
1.243
1.233
1.222

Current Data Parameters
NAME XZ-3-128-2
EXPNO 1
PROCNO 1

F2 - Acquisition Parameters
Date_ 20190408
Time 16.59 h
INSTRUM spect
PROBHD Z151340_0001 (
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 10504.202 Hz
FIDRES 0.320563 Hz
AQ 3.1195135 sec
RG 5.6
DW 47.600 usec
DE 10.00 usec
TE 303.2 K
D1 1.00000000 sec
TD0 1
SFO1 700.0115500 MHz
NUC1 1H
P1 9.50 usec
PLW1 13.00000000 W

F2 - Processing parameters
SI 131072
SF 700.0070162 MHz
WDW no
SSB 0
LB 0 Hz
GB 0
PC 1.00



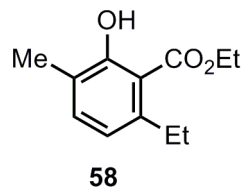


Current Data Parameters
 NAME XZ-3-128-2
 EXPNO 2
 PROCNO 1

F2 - Acquisition Parameters
 Date_ 20190408
 Time 17.03 h
 INSTRUM spect
 PROBHD z151340_0001 (
 PULPROG zgpg30
 TD 65536
 SOLVENT CDC13
 NS 35
 DS 4
 SWH 42613.637 Hz
 FIDRES 1.300465 Hz
 AQ 0.7689557 sec
 RG 203
 DW 11.733 usec
 DE 18.00 usec
 TE 303.2 K
 D1 2.00000000 sec
 D11 0.03000000 sec
 TD0 1
 SFO1 176.0362620 MHz
 NUC1 13C
 P1 11.25 usec
 PLW1 29.00000000 W
 SFO2 700.0098000 MHz
 NUC2 1H
 CPDPRG[2] waltz16
 PCPD2 65.00 usec
 PLW2 13.00000000 W
 PLW12 0.27768999 W
 PLW13 0.13982999 W

F2 - Processing parameters
 SI 131072
 SF 176.0169002 MHz
 WDW EM
 SSB 0
 LB 1.00 Hz
 GB 0
 PC 1.40

11.510
11.509



7.262
7.187
7.176
6.654
6.643

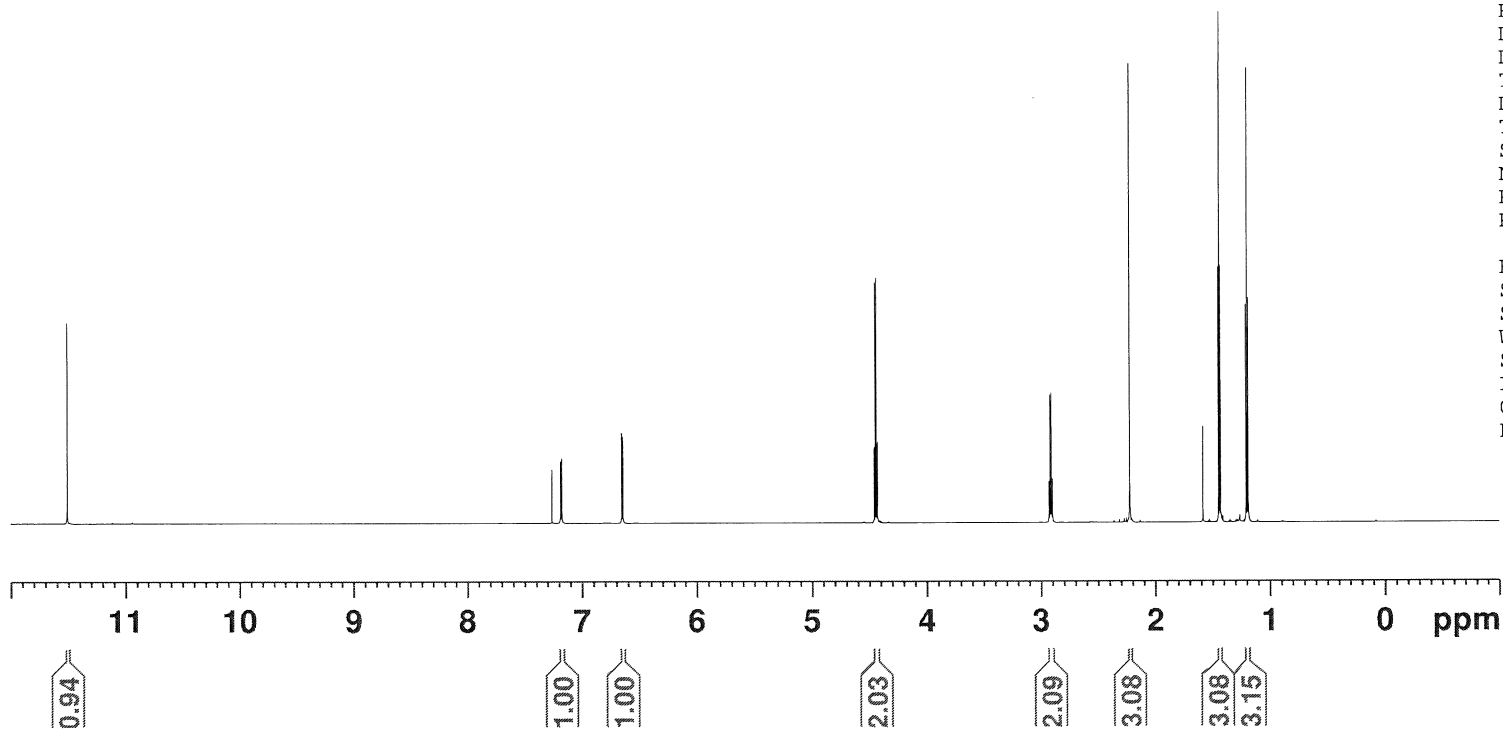
4.457
4.447
4.437
4.426

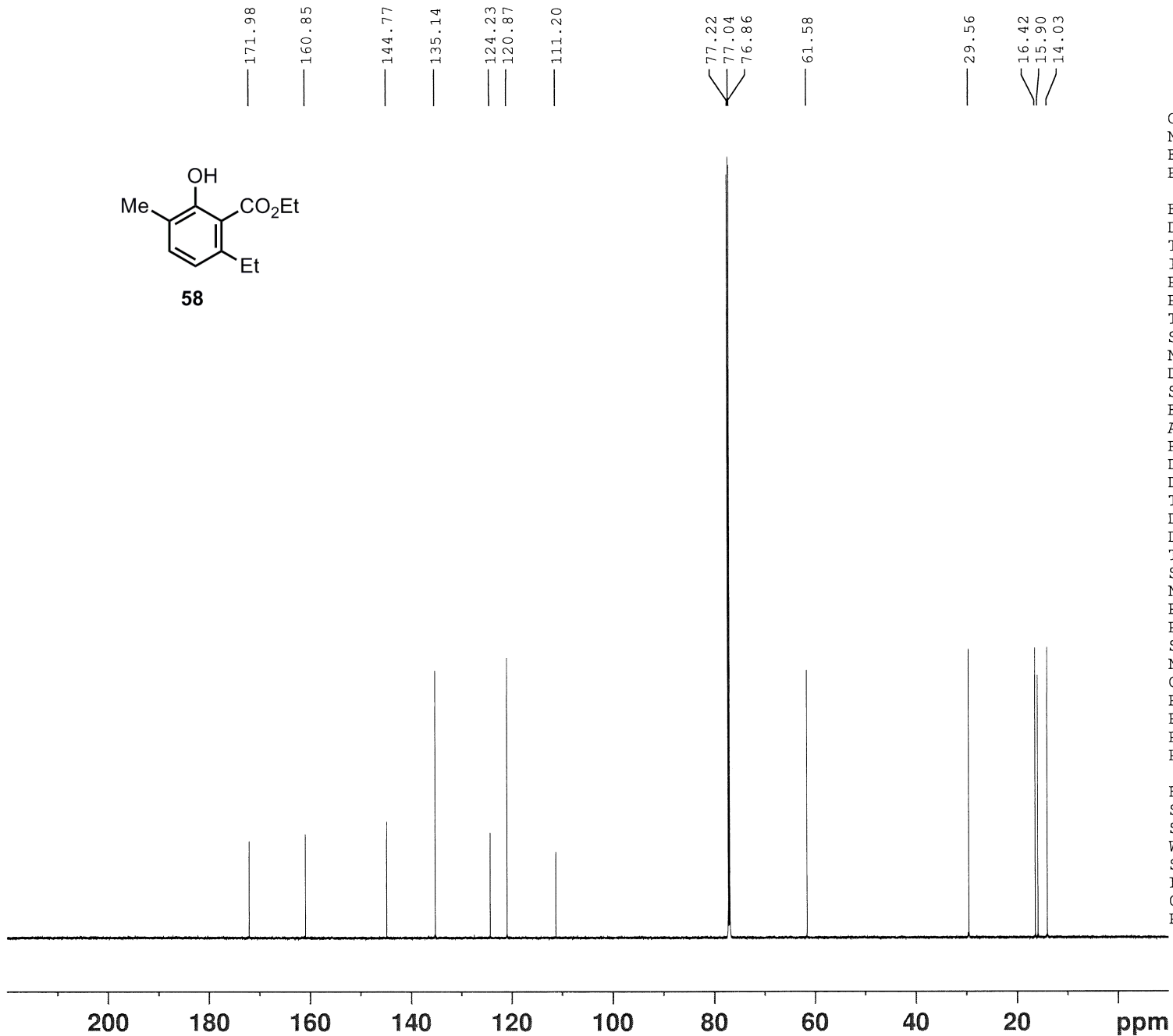
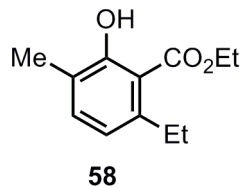
2.930
2.920
2.909
2.898
2.224
1.447
1.436
1.426
1.206
1.195
1.185

Current Data Parameters
NAME XZ-3-161
EXPNO 1
PROCNO 1

F2 - Acquisition Parameters
Date_ 20190821
Time 16.16 h
INSTRUM spect
PROBHD Z151340_0001 (
PULPROG zg30
TD 65536
SOLVENT CDC13
NS 16
DS 2
SWH 10504.202 Hz
FIDRES 0.320563 Hz
AQ 3.1195135 sec
RG 25.4
DW 47.600 usec
DE 20.00 usec
TE 303.3 K
D1 1.00000000 sec
TD0 1
SFO1 700.011500 MHz
NUC1 1H
P1 9.50 usec
PLW1 13.00000000 W

F2 - Processing parameters
SI 131072
SF 700.0070166 MHz
WDW no
SSB 0
LB 0 Hz
GB 0
PC 1.00





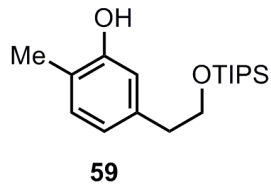
```

Current Data Parameters
NAME           XZ-3-161
EXPNO          2
PROCNO         1

F2 - Acquisition Parameters
Date_          20190821
Time           16.20 h
INSTRUM        spect
PROBHD         Z151340_0001 (
PULPROG        zgpg30
TD             65536
SOLVENT        CDCl3
NS             17
DS             4
SWH            42613.637 Hz
FIDRES         1.300465 Hz
AQ            0.7689557 sec
RG            203
DW            11.733 usec
DE            18.00 usec
TE            303.2 K
D1            2.0000000 sec
D11           0.0300000 sec
TD0           1
SFO1          176.0362620 MHz
NUC1           13C
P1            11.25 usec
PLW1          29.0000000 W
SFO2          700.0098000 MHz
NUC2           1H
CPDPRG[2]     waltz16
PCPD2         65.00 usec
PLW2          13.0000000 W
PLW12         0.27768999 W
PLW13         0.13982999 W

F2 - Processing parameters
SI            131072
SF            176.0169002 MHz
WDW           EM
SSB           0
LB            1.00 Hz
GB           0
PC            1.40

```



7.262
7.035
7.024
6.719
6.708
6.652

4.758

3.863
3.852
3.841

2.809
2.798
2.787

2.223

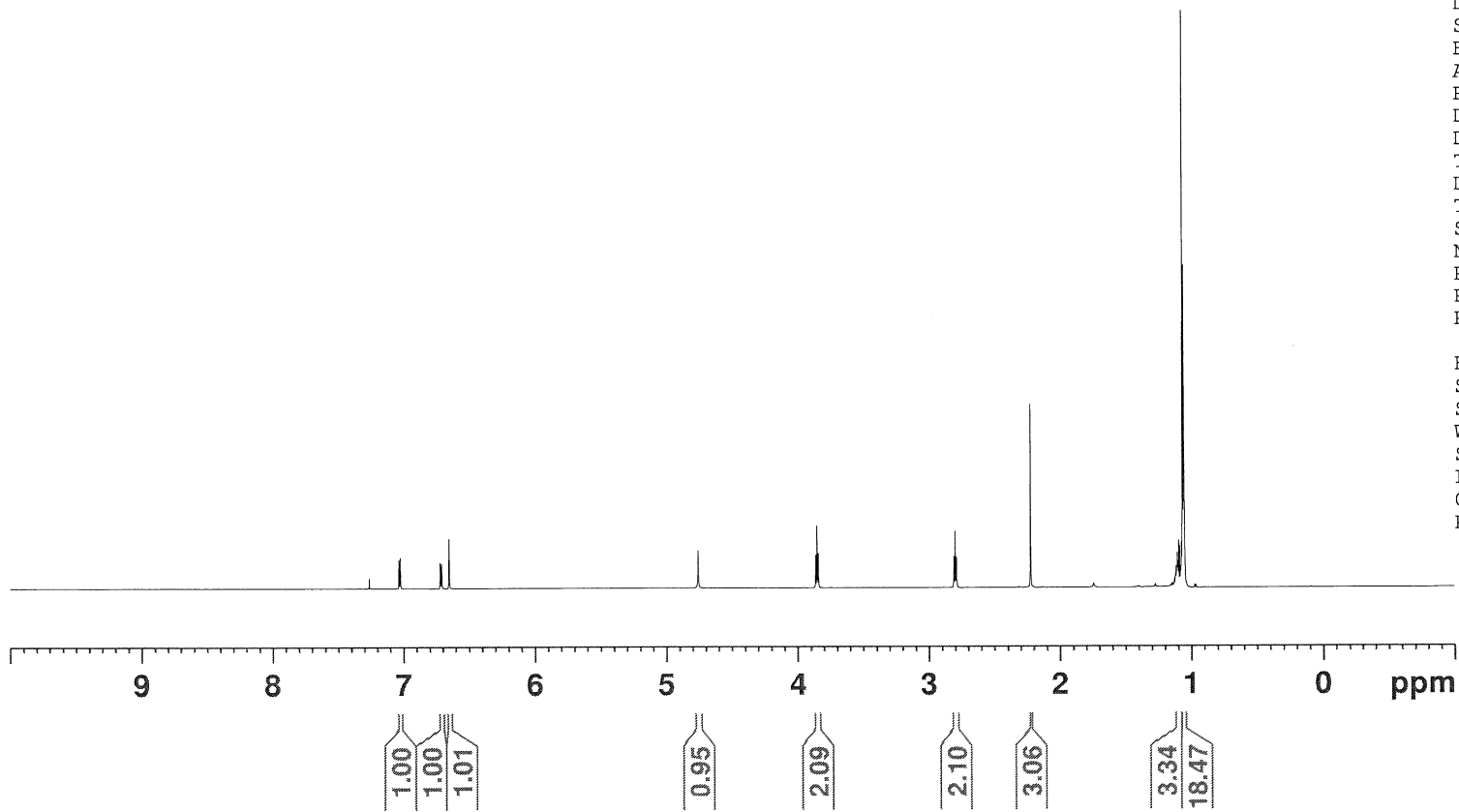
1.128
1.117
1.111
1.106

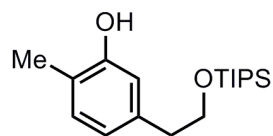
1.095
1.087
1.079
1.073
1.064
1.055

Current Data Parameters
NAME XZ-4-29
EXPNO 1
PROCNO 1

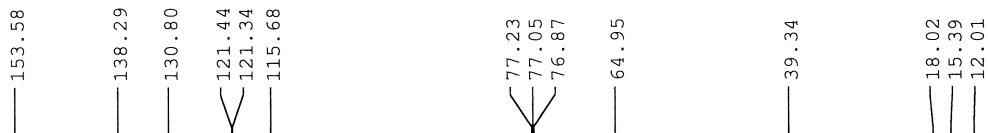
F2 - Acquisition Parameters
Date_ 20191007
Time 13.44 h
INSTRUM spect
PROBHD z151340_0001 (
PULPROG zg30
TD 65536
SOLVENT CDC13
NS 16
DS 2
SWH 10504.202 Hz
FIDRES 0.320563 Hz
AQ 3.1195135 sec
RG 9
DW 47.600 usec
DE 20.00 usec
TE 303.2 K
D1 1.00000000 sec
TD0 1
SFO1 700.0115500 MHz
NUC1 1H
P0 3.17 usec
P1 9.50 usec
PLW1 13.00000000 W

F2 - Processing parameters
SI 131072
SF 700.0070151 MHz
WDW no
SSB 0
LB 0 Hz
GB 0
PC 1.00





59



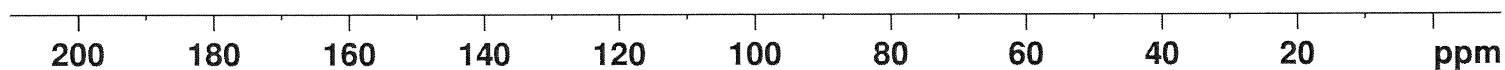
Current Data Parameters
 NAME XZ-4-29
 EXPNO 2
 PROCNO 1

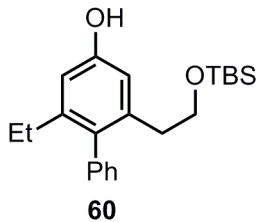
F2 - Acquisition Parameters

Date_ 20191007
 Time 13.49 h
 INSTRUM spect
 PROBHD Z151340_0001 (
 PULPROG zgpg30
 TD 65536
 SOLVENT CDCl3
 NS 9
 DS 4
 SWH 42613.637 Hz
 FIDRES 1.300465 Hz
 AQ 0.7689557 sec
 RG 203
 DW 11.733 usec
 DE 18.00 usec
 TE 303.2 K
 D1 2.00000000 sec
 D11 0.03000000 sec
 TD0 1
 SFO1 176.0362620 MHz
 NUC1 13C
 P0 3.75 usec
 P1 11.25 usec
 PLW1 29.00000000 W
 SFO2 700.0098000 MHz
 NUC2 1H
 CPDPRG[2] waltz16
 PCPD2 65.00 usec
 PLW2 13.00000000 W
 PLW12 0.27768999 W
 PLW13 0.13982999 W

F2 - Processing parameters

SI 131072
 SF 176.0169002 MHz
 WDW EM
 SSB 0
 LB 1.00 Hz
 GB 0
 PC 1.40





7.399
7.388
7.378
7.336
7.326
7.315
7.262
7.147
7.137
6.643
6.639

— 4.759

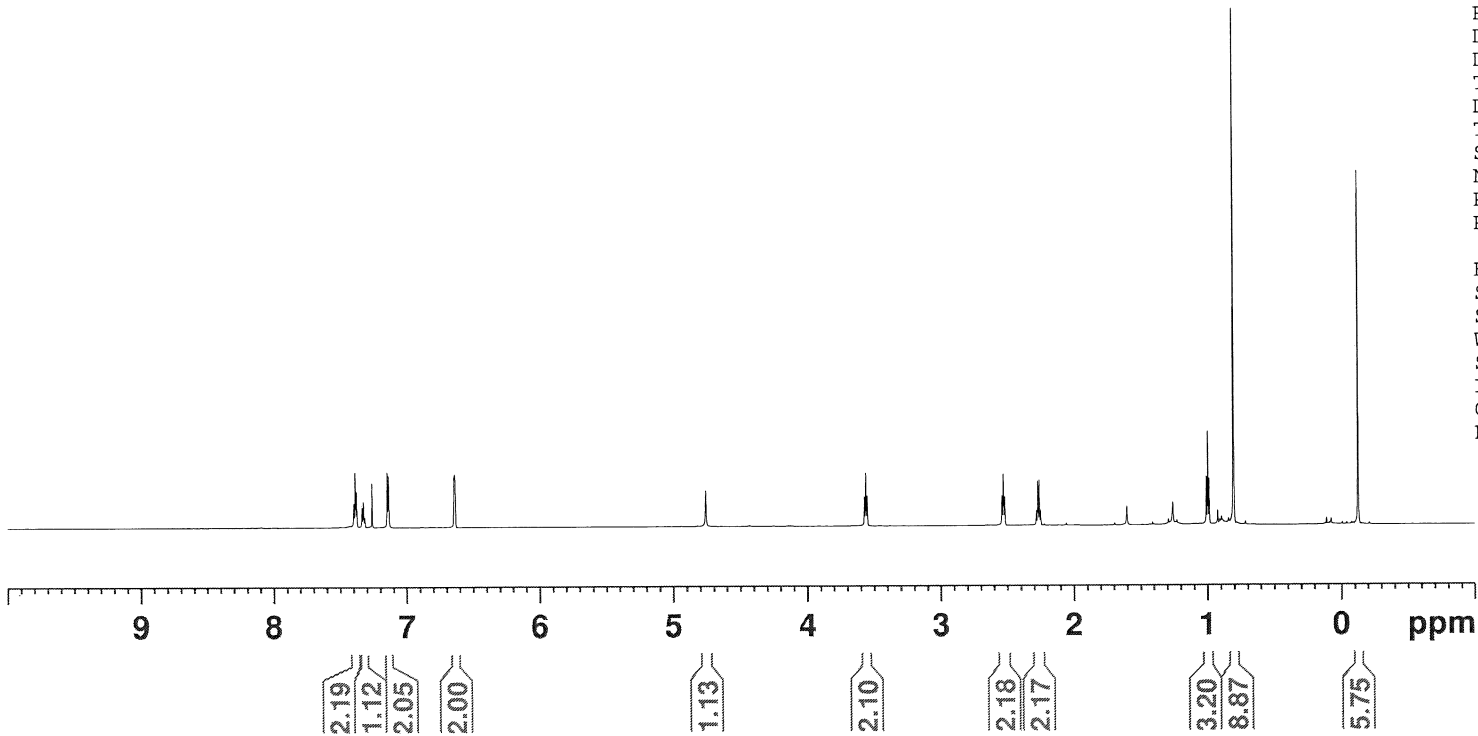
3.573
3.562
3.551
2.541
2.530
2.519
2.282
2.271
2.261
2.250
1.008
0.997
0.986
0.806

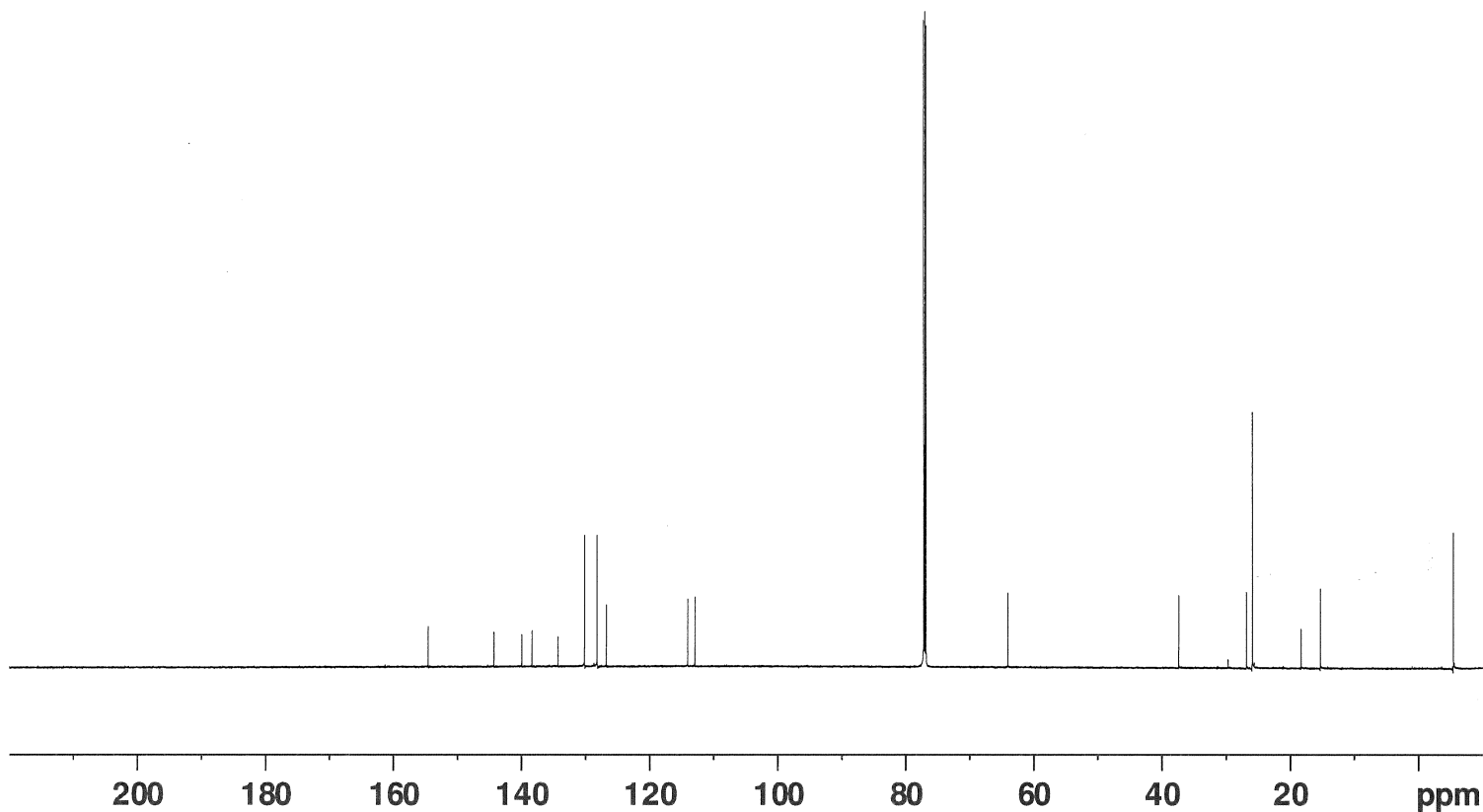
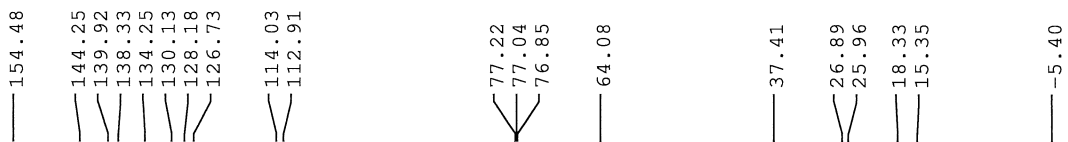
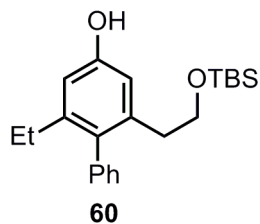
— -0.125

Current Data Parameters
NAME XZ-3-108
EXPNO 1
PROCNO 1

F2 - Acquisition Parameters
Date_ 20190326
Time 13.46 h
INSTRUM spect
PROBHD z151340_0001 (
PULPROG zg30
TD 65536
SOLVENT CDC13
NS 16
DS 2
SWH 10504.202 Hz
FIDRES 0.320563 Hz
AQ 3.1195135 sec
RG 6.35
DW 47.600 usec
DE 10.00 usec
TE 303.2 K
D1 1.00000000 sec
TD0 1
SFO1 700.0115500 MHz
NUC1 1H
P1 9.50 usec
PLW1 13.00000000 W

F2 - Processing parameters
SI 131072
SF 700.0070161 MHz
WDW no
SSB 0
LB 0 Hz
GB 0
PC 1.00





Current Data Parameters
 NAME XZ-3-108
 EXPNO 2
 PROCNO 1

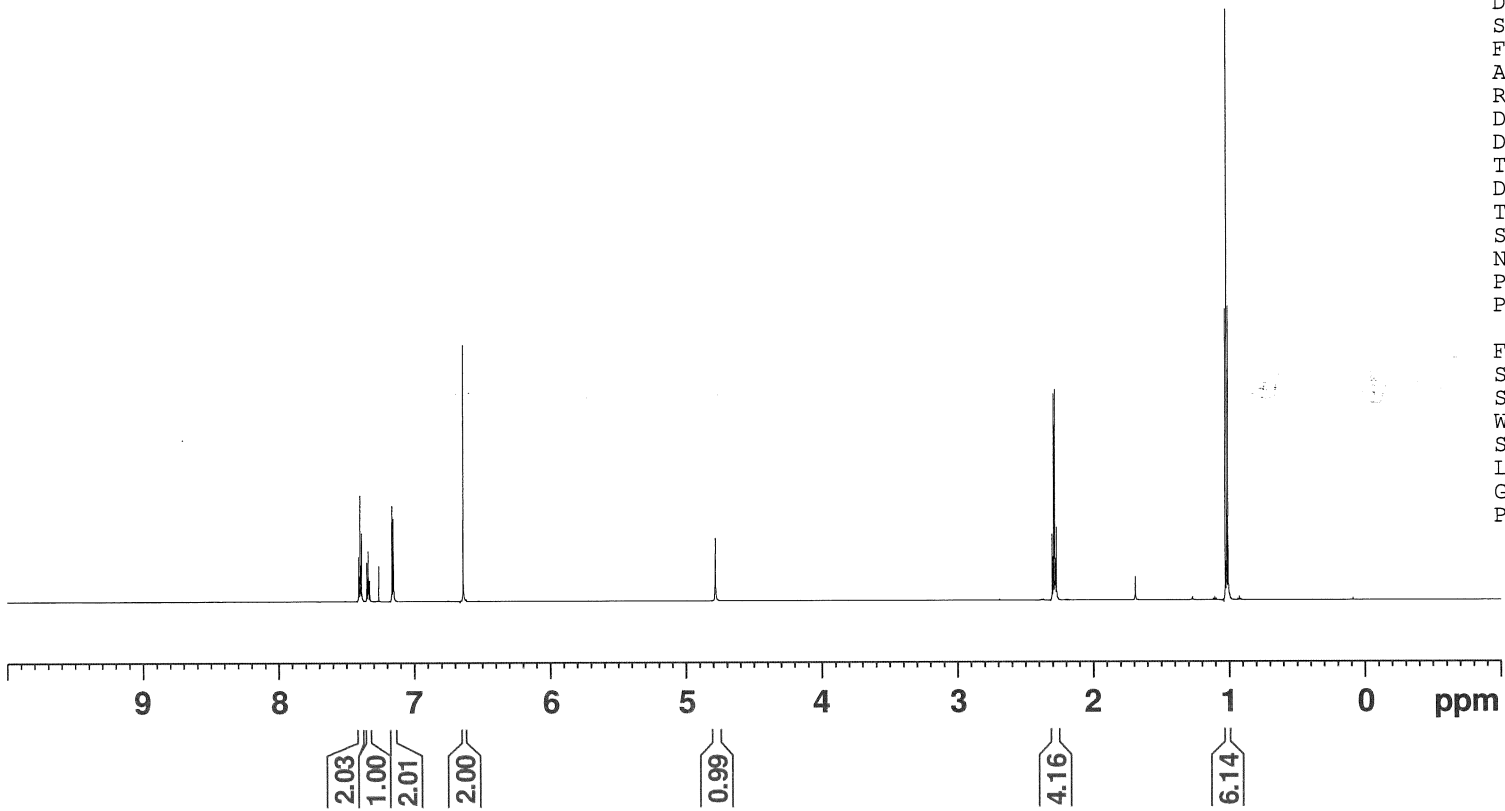
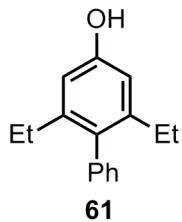
F2 - Acquisition Parameter
 Date_ 20190326
 Time 13.53 h
 INSTRUM spect
 PROBHD z151340_0001 (
 PULPROG zgpg30
 TD 65536
 SOLVENT CDC13
 NS 36
 DS 4
 SWH 42613.637 Hz
 FIDRES 1.300465 Hz
 AQ 0.7689557 sec
 RG 203
 DW 11.733 usec
 DE 18.00 usec
 TE 303.2 K
 D1 2.00000000 sec
 D11 0.03000000 sec
 TD0 1
 SFO1 176.0362620 MHz
 NUC1 13C
 P1 11.25 usec
 PLW1 29.00000000 W
 SFO2 700.0098000 MHz
 NUC2 1H
 CPDPRG[2] waltz16
 PCPD2 65.00 usec
 PLW2 13.00000000 W
 PLW12 0.27768999 W
 PLW13 0.13982999 W

F2 - Processing parameters
 SI 131072
 SF 176.0169002 MHz
 WDW EM
 SSB 0
 LB 1.00 Hz
 GB 0
 PC 1.40

7.411
7.410
7.402
7.400
7.391
7.389
7.352
7.350
7.348
7.342
7.339
7.336
7.331
7.329
7.327
7.262
7.166
7.164
7.154
7.152
6.640
4.783

2.302
2.291
2.280
2.269

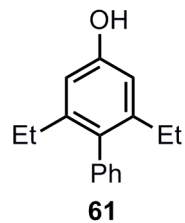
1.027
1.016
1.005



Current Data Parameters
NAME XZ-3-218
EXPNO 1
PROCNO 1

F2 - Acquisition Parameter
Date_ 20190725
Time 11.07 h
INSTRUM spect
PROBHD Z151340_0001 (
PULPROG zg30
TD 65536
SOLVENT CDC13
NS 16
DS 2
SWH 10504.202 Hz
FIDRES 0.320563 Hz
AQ 3.1195135 sec
RG 22.6
DW 47.600 usec
DE 20.00 usec
TE 303.4 K
D1 1.00000000 sec
TD0 1
SFO1 700.0115500 MHz
NUC1 1H
P1 9.50 usec
PLW1 13.00000000 W

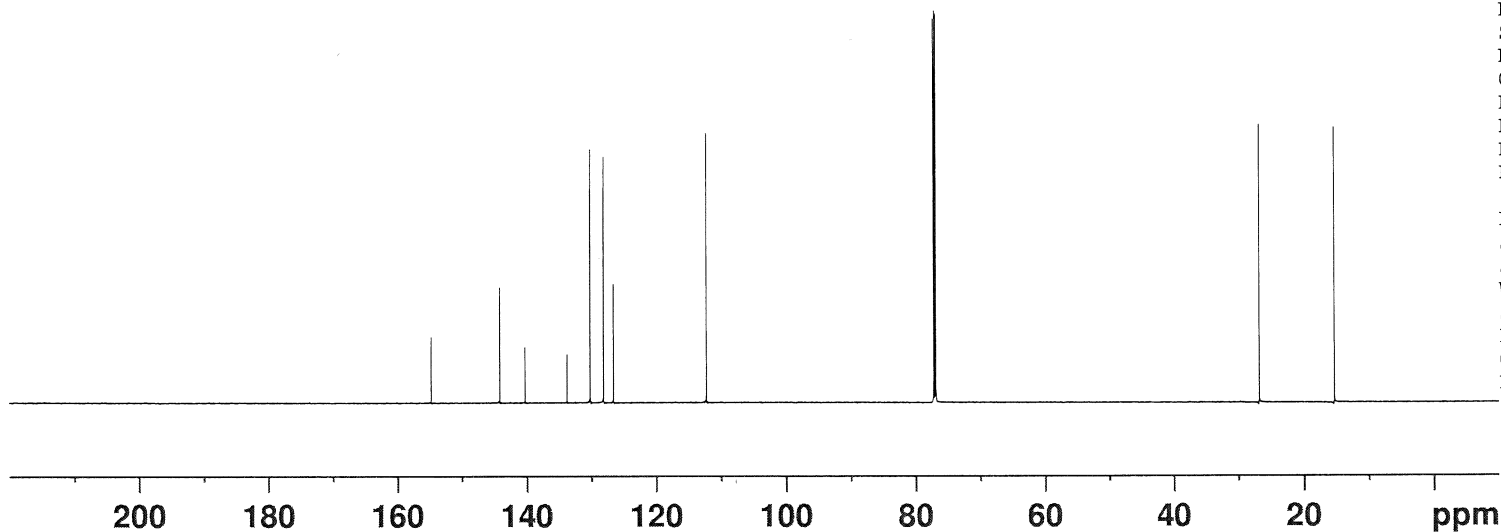
F2 - Processing parameters
SI 131072
SF 700.0070168 MHz
WDW no
SSB 0
LB 0 Hz
GB 0
PC 1.00



154.69
 144.09
 140.21
 133.69
 130.14
 128.08
 126.56
 112.25

77.24
 77.05
 76.87

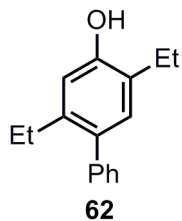
26.86
 15.35



Current Data Parameters
 NAME XZ-3-218
 EXPNO 2
 PROCNO 1

F2 - Acquisition Parameters
 Date_ 20190725
 Time 11.11 h
 INSTRUM spect
 PROBHD z151340_0001 (
 PULPROG zgpg30
 TD 65536
 SOLVENT CDC13
 NS 17
 DS 4
 SWH 42613.637 Hz
 FIDRES 1.300465 Hz
 AQ 0.7689557 sec
 RG 203
 DW 11.733 usec
 DE 18.00 usec
 TE 303.2 K
 D1 2.00000000 sec
 D11 0.03000000 sec
 TD0 1
 SFO1 176.0362620 MHz
 NUC1 13C
 P1 11.25 usec
 PLW1 29.00000000 W
 SFO2 700.0098000 MHz
 NUC2 1H
 CPDPRG[2] waltz16
 PCPD2 65.00 usec
 PLW2 13.00000000 W
 PLW12 0.27768999 W
 PLW13 0.13982999 W

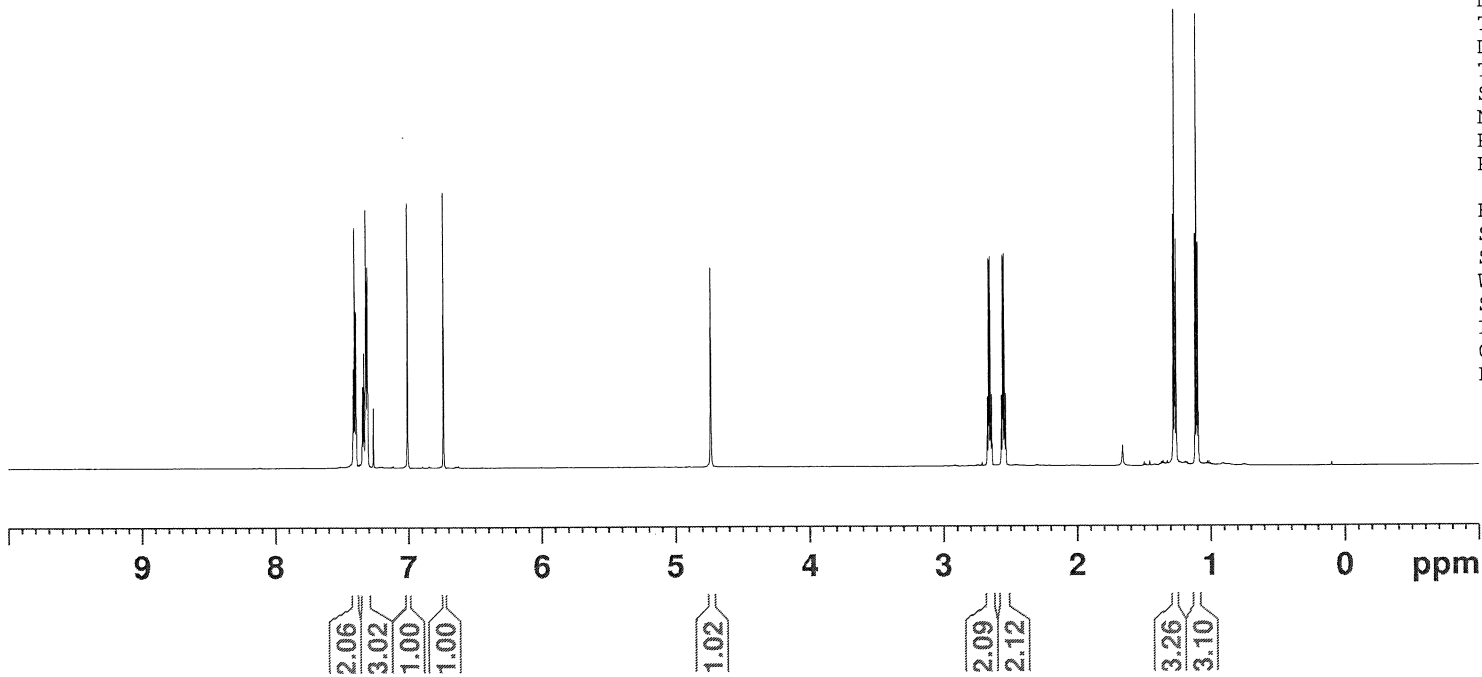
F2 - Processing parameters
 SI 131072
 SF 176.0169002 MHz
 WDW EM
 SSB 0
 LB 1.00 Hz
 GB 0
 PC 1.40



7.413
7.403
7.392
7.344
7.333
7.317
7.306
7.262
7.006
6.736

4.738

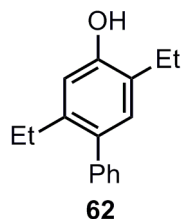
2.671
2.660
2.650
2.639
2.566
2.555
2.545
2.534
1.277
1.266
1.255
1.113
1.102
1.092



Current Data Parameters
NAME ZX-3-134
EXPNO 3
PROCNO 1

F2 - Acquisition Parameters
Date_ 20190415
Time 14.49 h
INSTRUM spect
PROBHD Z151340_0001 (
PULPROG zg30
TD 65536
SOLVENT CDC13
NS 16
DS 2
SWH 10504.202 Hz
FIDRES 0.320563 Hz
AQ 3.1195135 sec
RG 6.35
DW 47.600 usec
DE 10.00 usec
TE 303.2 K
D1 1.00000000 sec
TD0 1
SFO1 700.0115500 MHz
NUC1 1H
P1 9.50 usec
PLW1 13.00000000 W

F2 - Processing parameters
SI 131072
SF 700.0070141 MHz
WDW no
SSB 0
LB 0 Hz
GB 0
PC 1.00



152.66
 141.86
 140.52
 134.44
 130.94
 129.53
 128.00
 126.92
 126.46
 115.03

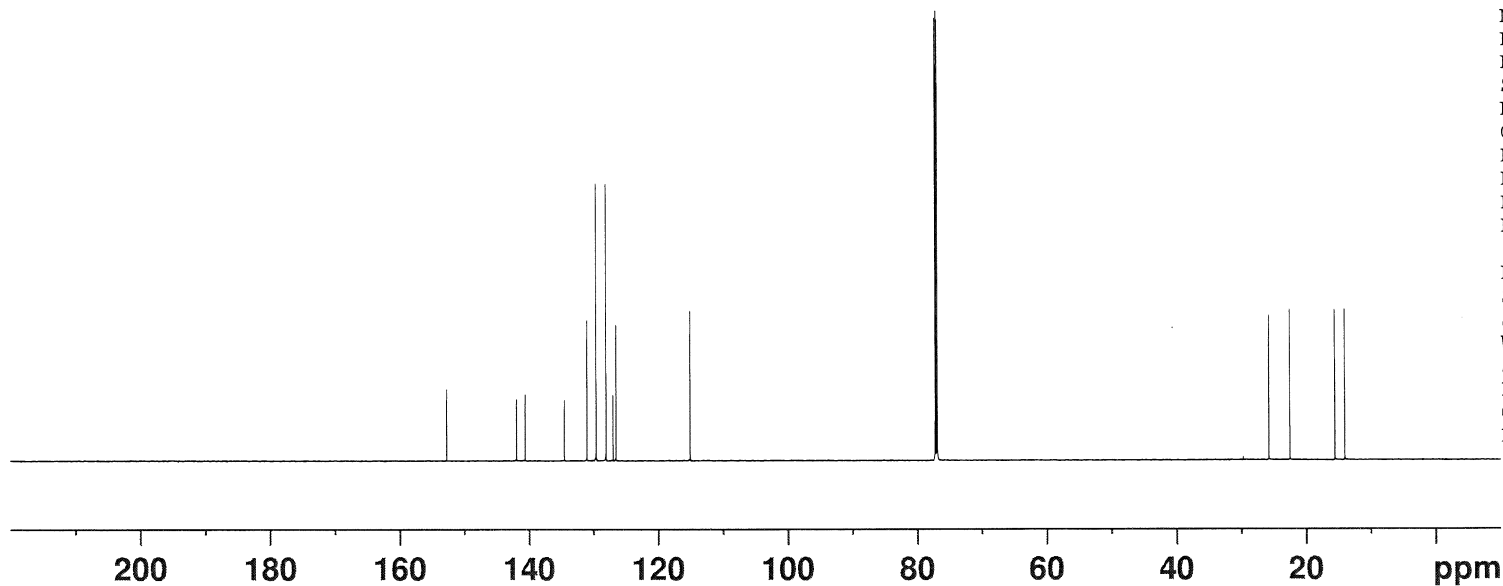
77.24
 77.06
 76.88

25.79
 22.56
 15.59
 14.06

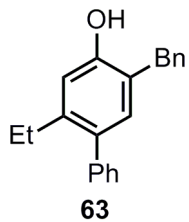
Current Data Parameters
 NAME XZ-3-134
 EXPNO 4
 PROCNO 1

F2 - Acquisition Parameters
 Date_ 20190415
 Time 14.53 h
 INSTRUM spect
 PROBHD z151340_0001 (
 PULPROG zgpg30
 TD 65536
 SOLVENT CDC13
 NS 21
 DS 4
 SWH 42613.637 Hz
 FIDRES 1.300465 Hz
 AQ 0.7689557 sec
 RG 203
 DW 11.733 usec
 DE 18.00 usec
 TE 303.2 K
 D1 2.00000000 sec
 D11 0.03000000 sec
 TD0 1
 SFO1 176.0362620 MHz
 NUC1 13C
 P1 11.25 usec
 PLW1 29.00000000 W
 SFO2 700.0098000 MHz
 NUC2 1H
 CPDPRG[2] waltz16
 PCPD2 65.00 usec
 PLW2 13.00000000 W
 PLW12 0.27768999 W
 PLW13 0.13982999 W

F2 - Processing parameters
 SI 131072
 SF 176.0169002 MHz
 WDW EM
 SSB 0
 LB 1.00 Hz
 GB 0
 PC 1.40



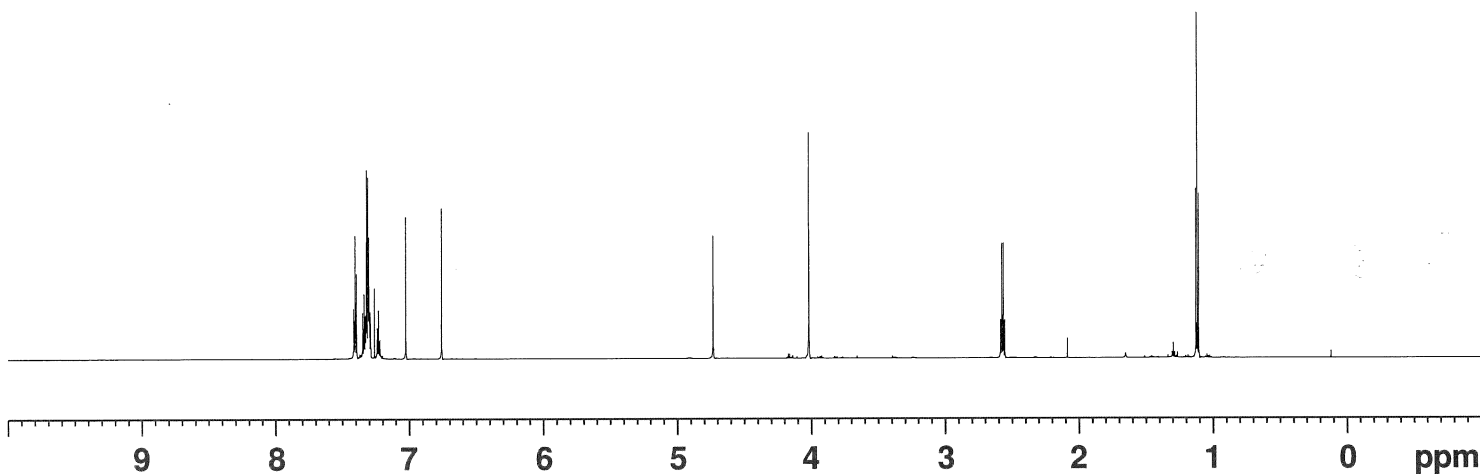
7.416
7.415
7.407
7.404
7.396
7.394
7.350
7.348
7.346
7.340
7.338
7.335
7.329
7.327
7.325
7.319
7.318
7.314
7.311
7.309
7.308
7.302
7.300
7.290
7.260
7.242
7.239
7.237
7.231
7.229
7.226
7.219
7.026
6.758
4.732
4.017
2.586
2.575
2.564
2.553
1.126
1.116
1.105



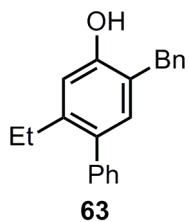
Current Data Parameters
NAME XZ-2-303
EXPNO 1
PROCNO 1

F2 - Acquisition Parameter
Date_ 20181120
Time 10.08 h
INSTRUM spect
PROBHD Z151340_0001 (
PULPROG zg30
TD 65536
SOLVENT CDC13
NS 16
DS 2
SWH 10504.202 Hz
FIDRES 0.320563 Hz
AQ 3.1195135 sec
RG 5.6
DW 47.600 usec
DE 10.00 usec
TE 303.2 K
D1 1.00000000 sec
TD0 1
SFO1 700.0115500 MHz
NUC1 1H
P1 9.50 usec
PLW1 13.00000000 W

F2 - Processing parameters
SI 131072
SF 700.0070173 MHz
WDW no
SSB 0
LB 0 Hz
GB 0
PC 1.00



2.06
1.47
5.66
1.02
1.00
1.01
1.05
2.13
2.14
3.17



153.06
141.65
141.44
140.03
134.54
132.57
129.56
128.73
128.71
128.03
126.53
126.40
124.14
115.69

77.27
77.09
76.91

36.19

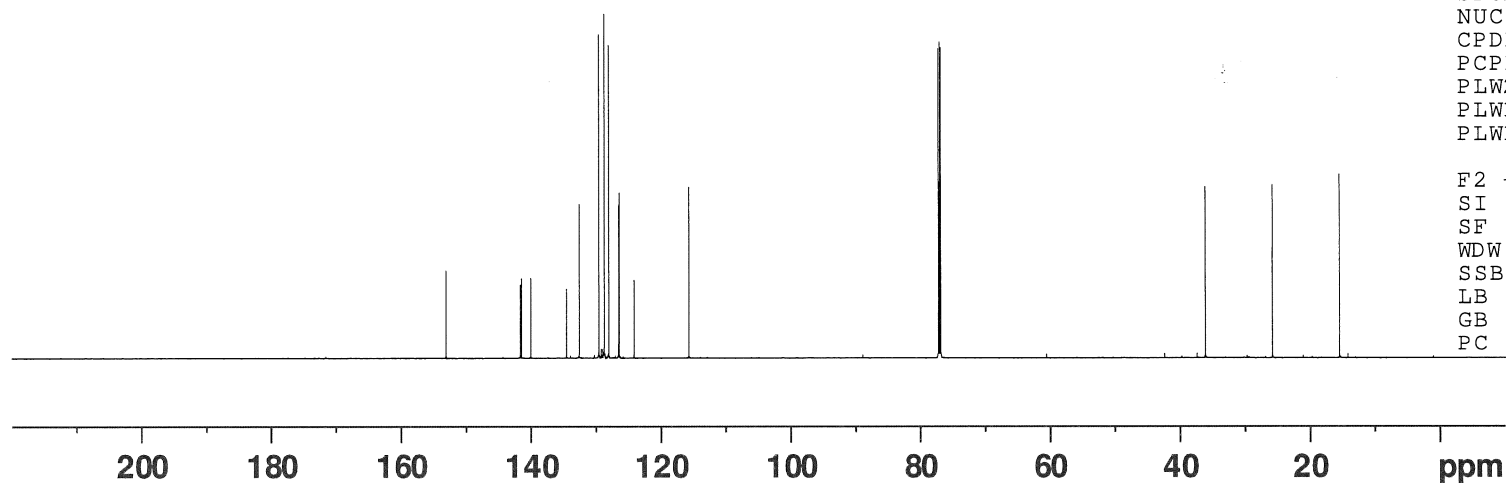
25.87

15.55

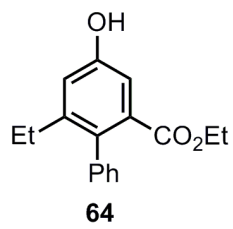
Current Data Parameters
NAME XZ-2-303
EXPNO 2
PROCNO 1

F2 - Acquisition Parameter
Date_ 20181120
Time 10.13 h
INSTRUM spect
PROBHD Z151340_0001 (
PULPROG zgpg30
TD 65536
SOLVENT CDC13
NS 40
DS 4
SWH 42613.637 Hz
FIDRES 1.300465 Hz
AQ 0.7689557 sec
RG 203
DW 11.733 usec
DE 18.00 usec
TE 303.2 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1
SFO1 176.0362620 MHz
NUC1 13C
P1 11.25 usec
PLW1 29.00000000 W
SFO2 700.0098000 MHz
NUC2 1H
CPDPRG[2] waltz16
PCPD2 65.00 usec
PLW2 13.00000000 W
PLW12 0.27768999 W
PLW13 0.13982999 W

F2 - Processing parameters
SI 131072
SF 176.0169002 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40



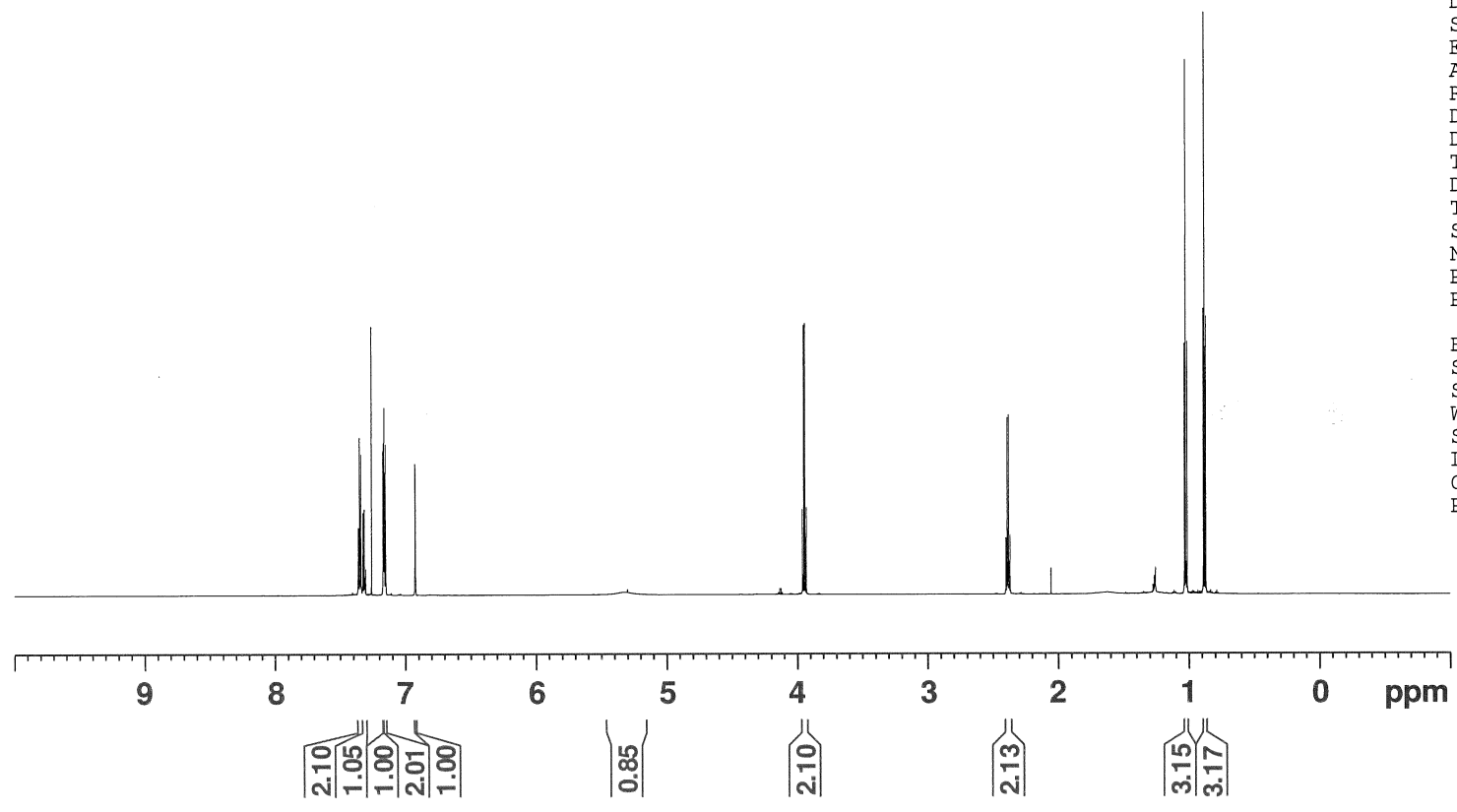
7.365
7.363
7.361
7.356
7.353
7.351
7.345
7.343
7.340
7.330
7.327
7.325
7.321
7.317
7.313
7.309
7.307
7.305
7.262
7.174
7.171
7.167
7.164
7.161
7.157
7.155
7.153
6.929
6.925
3.961
3.951
3.940
3.930
2.401
2.390
2.379
2.368
1.033
1.023
1.012
0.889
0.878
0.868

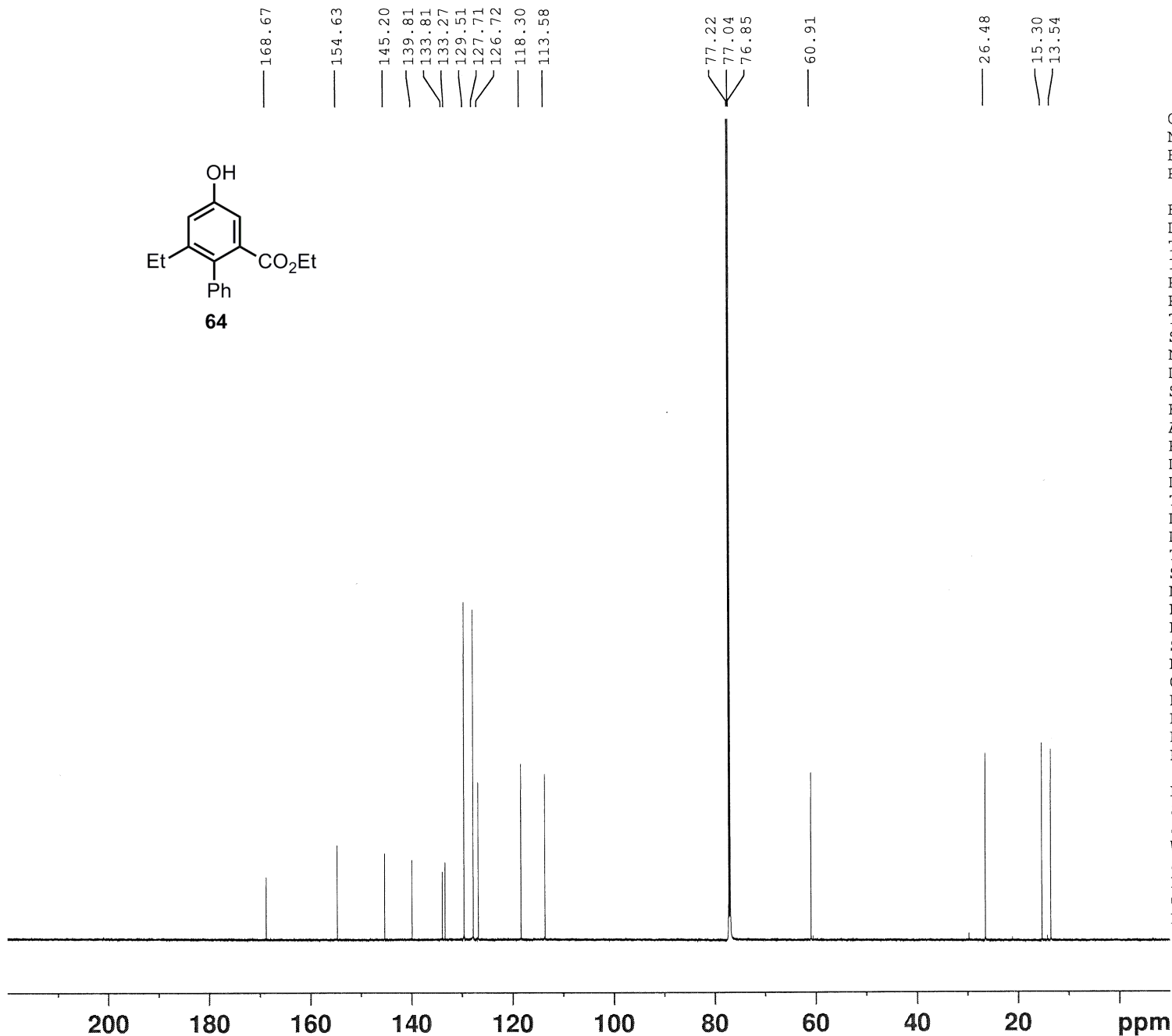
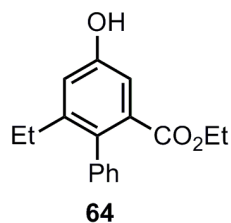


Current Data Parameters
NAME XZ-3-155-2
EXPNO 1
PROCNO 1

F2 - Acquisition Parameter
Date_ 20190822
Time 13.39 h
INSTRUM spect
PROBHD Z151340_0001 (
PULPROG zg30
TD 65536
SOLVENT CDC13
NS 16
DS 2
SWH 10504.202 Hz
FIDRES 0.320563 Hz
AQ 3.1195135 sec
RG 32
DW 47.600 usec
DE 20.00 usec
TE 303.4 K
D1 1.00000000 sec
TD0 1
SF01 700.0115500 MHz
NUC1 1H
P1 9.50 usec
PLW1 13.00000000 W

F2 - Processing parameters
SI 131072
SF 700.0070164 MHz
WDW no
SSB 0
LB 0 Hz
GB 0
PC 1.00





Current Data Parameters

NAME XZ-3-155-2
 EXPNO 2
 PROCNO 1

F2 - Acquisition Parameters

Date_ 20190822
 Time 13.50 h
 INSTRUM spect
 PROBHD Z151340_0001 (
 PULPROG zgpg30
 TD 65536
 SOLVENT CDC13
 NS 121
 DS 4
 SWH 42613.637 Hz
 FIDRES 1.300465 Hz
 AQ 0.7689557 sec
 RG 203
 DW 11.733 usec
 DE 18.00 usec
 TE 303.2 K
 D1 2.00000000 sec
 D11 0.03000000 sec
 TD0 1
 SFO1 176.0362620 MHz
 NUC1 13C
 P1 11.25 usec
 PLW1 29.00000000 W
 SFO2 700.0098000 MHz
 NUC2 1H
 CPDPRG[2] waltz16
 PCPD2 65.00 usec
 PLW2 13.00000000 W
 PLW12 0.27768999 W
 PLW13 0.13982999 W

F2 - Processing parameters

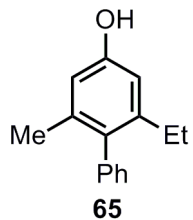
SI 131072
 SF 176.0169002 MHz
 WDW EM
 SSB 0
 LB 1.00 Hz
 GB 0
 PC 1.40

7.412
7.401
7.390
7.340
7.339
7.329
7.319
7.262
7.144
7.134
7.132
6.633
6.630
6.604
6.601

— 4.651

2.321
2.310
2.299
2.288
1.966

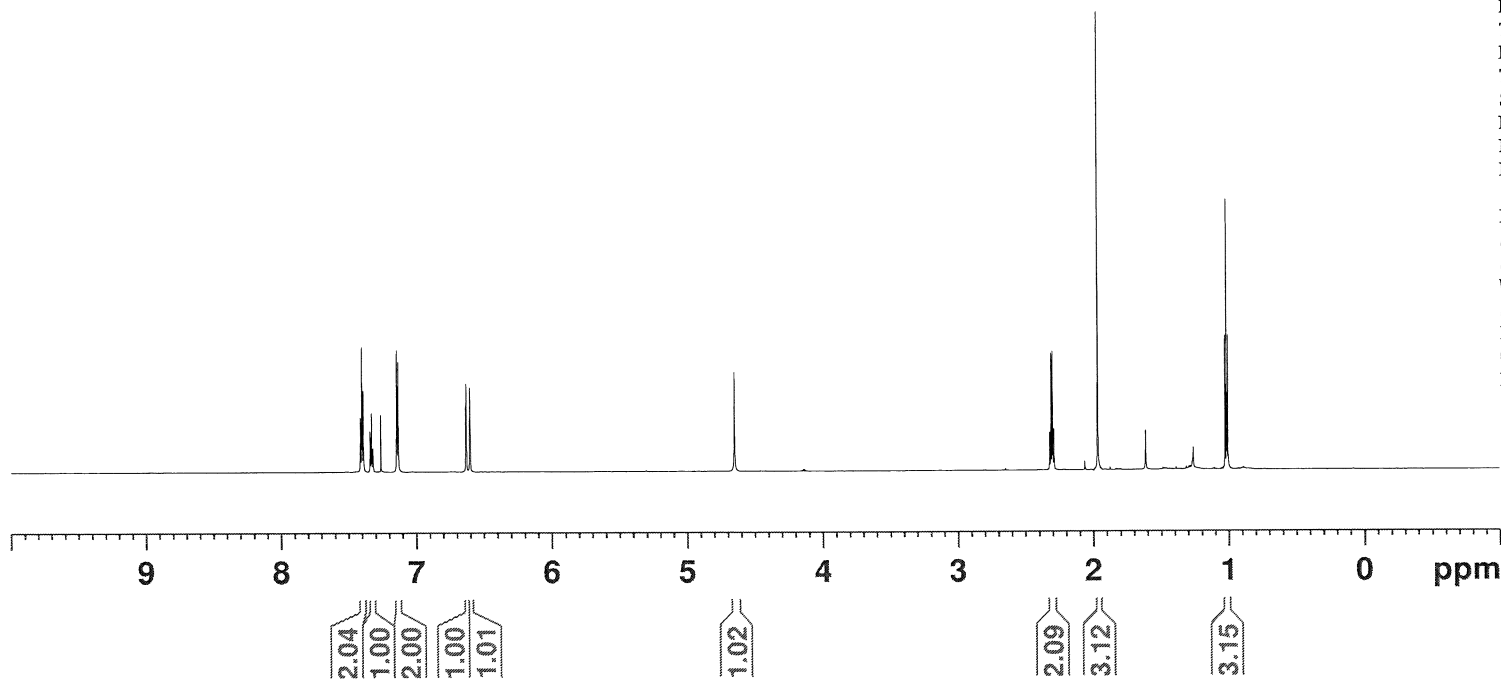
1.026
1.015
1.005

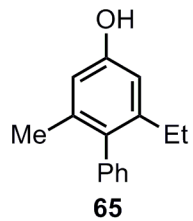


Current Data Parameters
NAME XZ-3-267
EXPNO 1
PROCNO 1

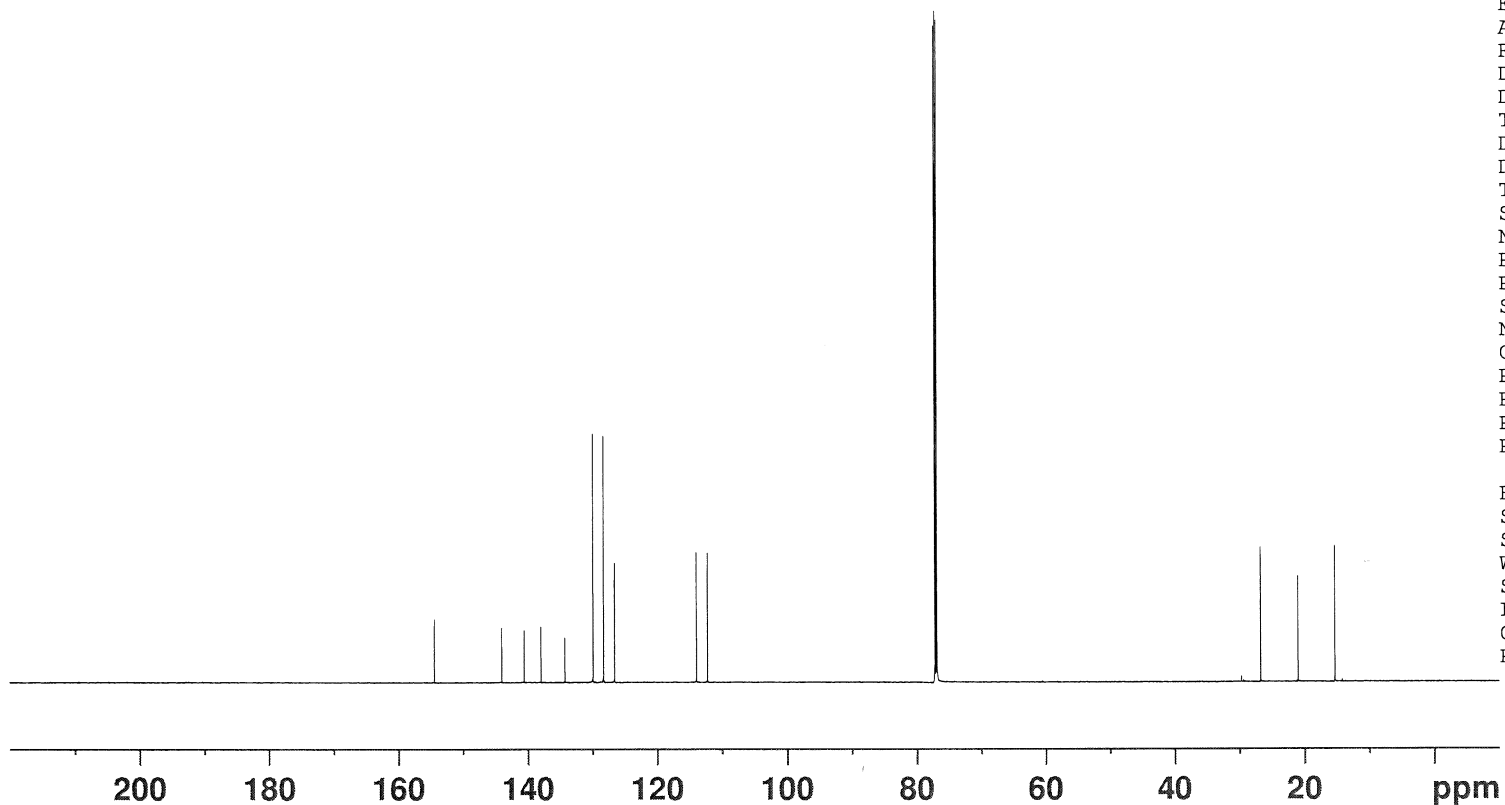
F2 - Acquisition Parameters
Date_ 20190805
Time 17.31 h
INSTRUM spect
PROBHD Z151340_0001 (
PULPROG zg30
TD 65536
SOLVENT CDC13
NS 16
DS 2
SWH 10504.202 Hz
FIDRES 0.320563 Hz
AQ 3.1195135 sec
RG 28.5
DW 47.600 usec
DE 20.00 usec
TE 303.4 K
D1 1.00000000 sec
TD0 1
SFO1 700.0115500 MHz
NUC1 1H
P1 9.50 usec
PLW1 13.00000000 W

F2 - Processing parameters
SI 131072
SF 700.0070173 MHz
WDW no
SSB 0
LB 0 Hz
GB 0
PC 1.00





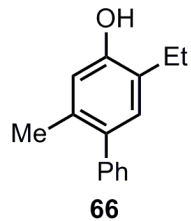
154.41
 143.99
 140.51
 137.92
 134.23
 129.87
 128.25
 126.54
 113.92
 112.23
 77.22
 77.04
 76.86
 26.79
 21.04
 15.37



Current Data Parameters
 NAME XZ-3-267
 EXPNO 2
 PROCNO 1

F2 - Acquisition Parameters
 Date_ 20190805
 Time 17.39 h
 INSTRUM spect
 PROBHD z151340_0001 (
 PULPROG zgpg30
 TD 65536
 SOLVENT CDC13
 NS 100
 DS 4
 SWH 42613.637 Hz
 FIDRES 1.300465 Hz
 AQ 0.7689557 sec
 RG 203
 DW 11.733 usec
 DE 18.00 usec
 TE 303.2 K
 D1 2.00000000 sec
 D11 0.03000000 sec
 TD0 1
 SFO1 176.0362620 MHz
 NUC1 13C
 P1 11.25 usec
 PLW1 29.00000000 W
 SFO2 700.0098000 MHz
 NUC2 1H
 CPDPRG[2] waltz16
 PCPD2 65.00 usec
 PLW2 13.00000000 W
 PLW12 0.27768999 W
 PLW13 0.13982999 W

F2 - Processing parameters
 SI 131072
 SF 176.0169002 MHz
 WDW EM
 SSB 0
 LB 1.00 Hz
 GB 0
 PC 1.40



7.411
 7.399
 7.389
 7.329
 7.321
 7.320
 7.318
 7.309
 7.262
 7.026
 6.695

— 4.687

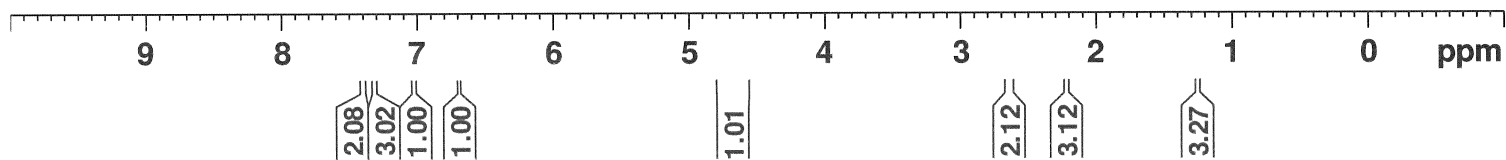
2.662
 2.652
 2.641
 2.630
 2.218

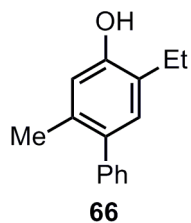
1.267
 1.256
 1.245

Current Data Parameters
 NAME XZ-3-112
 EXPNO 7
 PROCNO 1

F2 - Acquisition Parameter
 Date_ 20190822
 Time 17.19 h
 INSTRUM spect
 PROBHD Z151340_0001 (
 PULPROG zg30
 TD 65536
 SOLVENT CDC13
 NS 16
 DS 2
 SWH 10504.202 Hz
 FIDRES 0.320563 Hz
 AQ 3.1195135 sec
 RG 28.5
 DW 47.600 usec
 DE 20.00 usec
 TE 303.3 K
 D1 1.00000000 sec
 TD0 1
 SFO1 700.0115500 MHz
 NUC1 1H
 P1 9.50 usec
 PLW1 13.00000000 W

F2 - Processing parameters
 SI 131072
 SF 700.0070145 MHz
 WDW no
 SSB 0
 LB 0 Hz
 GB 0
 PC 1.00

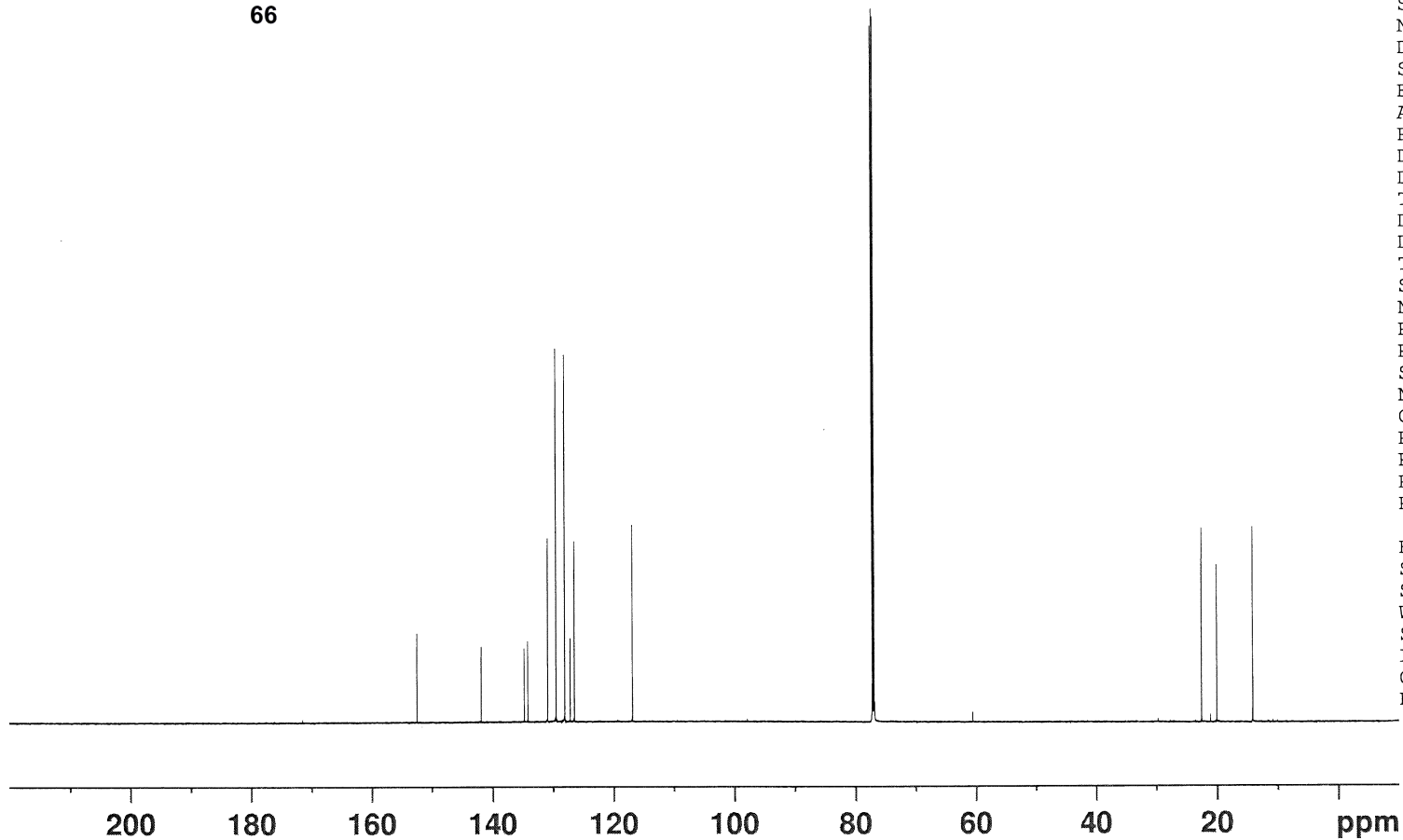




152.42
141.81
134.72
134.13
130.85
129.45
128.03
127.13
126.44
116.84

77.23
77.05
76.87

22.58
20.08
14.16



```

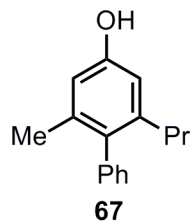
Current Data Parameters
NAME             XZ-3-112
EXPNO            2
PROCNO           1

F2 - Acquisition Parameters
Date_            20190325
Time             13.09 h
INSTRUM          spect
PROBHD           Z151340_0001 (
PULPROG          zgpg30
TD               65536
SOLVENT          CDC13
NS               35
DS               4
SWH              42613.637 Hz
FIDRES           1.300465 Hz
AQ               0.7689557 sec
RG               203
DW               11.733 usec
DE               18.00 usec
TE               303.2 K
D1               2.00000000 sec
D11              0.03000000 sec
TD0              1
SFO1             176.0362620 MHz
NUC1             13C
P1               11.25 usec
PLW1             29.00000000 W
SFO2             700.0098000 MHz
NUC2             1H
CPDPRG[2]       waltz16
PCPD2            65.00 usec
PLW2             13.00000000 W
PLW12            0.27768999 W
PLW13            0.13982999 W

F2 - Processing parameters
SI               131072
SF               176.0169002 MHz
WDW              EM
SSB              0
LB               1.00 Hz
GB               0
PC               1.40
  
```

7.408
7.398
7.387
7.339
7.338
7.336
7.330
7.327
7.324
7.318
7.316
7.314
7.262
7.136
7.134
7.125
7.123
6.621
6.617
6.608
6.605
4.771

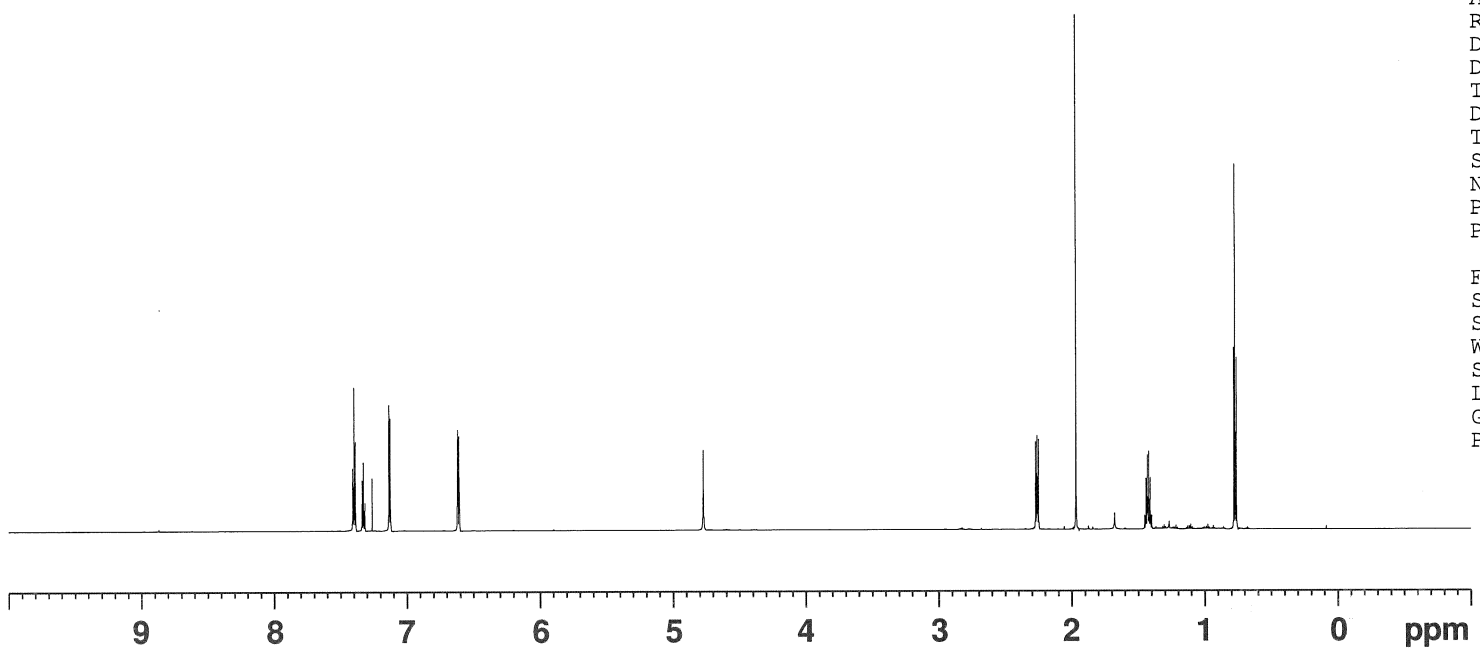
2.270
2.259
2.248
1.966
1.451
1.440
1.429
1.418
1.407
1.397
0.780
0.770
0.759



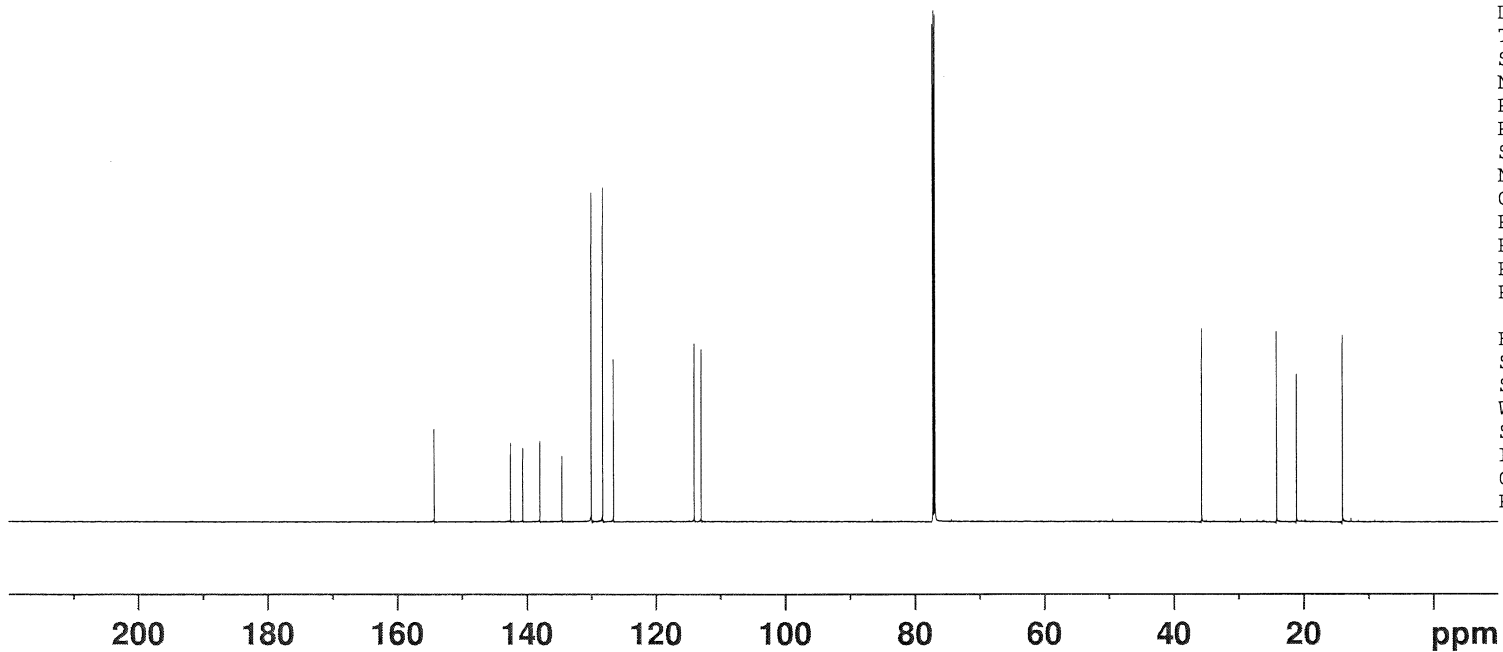
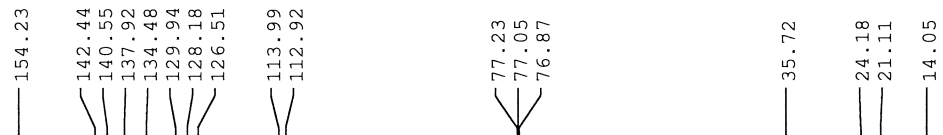
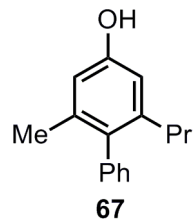
Current Data Parameters
NAME XZ-3-233
EXPNO 1
PROCNO 1

F2 - Acquisition Parameter
Date_ 20190725
Time 11.17 h
INSTRUM spect
PROBHD Z151340_0001 (
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 10504.202 Hz
FIDRES 0.320563 Hz
AQ 3.1195135 sec
RG 25.4
DW 47.600 usec
DE 20.00 usec
TE 303.3 K
D1 1.00000000 sec
TD0 1
SF01 700.0115500 MHz
NUC1 1H
P1 9.50 usec
PLW1 13.00000000 W

F2 - Processing parameters
SI 131072
SF 700.0070167 MHz
WDW no
SSB 0
LB 0 Hz
GB 0
PC 1.00



2.11
1.03
2.06
1.03
1.00
1.00
2.19
3.17
2.15
3.19

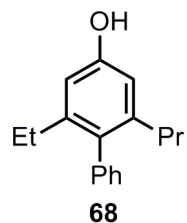


Current Data Parameters
 NAME XZ-3-233
 EXPNO 2
 PROCNO 1

F2 - Acquisition Parameters
 Date_ 20190725
 Time 11.24 h
 INSTRUM spect
 PROBHD z151340_0001 (
 PULPROG zgpg30
 TD 65536
 SOLVENT CDCl3
 NS 47
 DS 4
 SWH 42613.637 Hz
 FIDRES 1.300465 Hz
 AQ 0.7689557 sec
 RG 203
 DW 11.733 usec
 DE 18.00 usec
 TE 303.2 K
 D1 2.0000000 sec
 D11 0.0300000 sec
 TD0 1
 SFO1 176.0362620 MHz
 NUC1 13C
 P1 11.25 usec
 PLW1 29.0000000 W
 SFO2 700.0098000 MHz
 NUC2 1H
 CPDPRG[2] waltz16
 PCPD2 65.00 usec
 PLW2 13.0000000 W
 PLW12 0.27768999 W
 PLW13 0.13982999 W

F2 - Processing parameters
 SI 131072
 SF 176.0169002 MHz
 WDW EM
 SSB 0
 LB 1.00 Hz
 GB 0
 PC 1.40

7.409
7.405
7.401
7.388
7.384
7.369
7.348
7.344
7.340
7.332
7.326
7.308
7.262
7.152
7.148
7.143
7.135
7.131
7.128
6.632
6.625
6.614
6.607
4.675
2.306
2.288
2.269
2.251
2.232
2.227
2.212
1.447
1.428
1.414
1.409
1.396
1.390
1.371
1.027
1.008
0.990
0.782
0.764
0.745

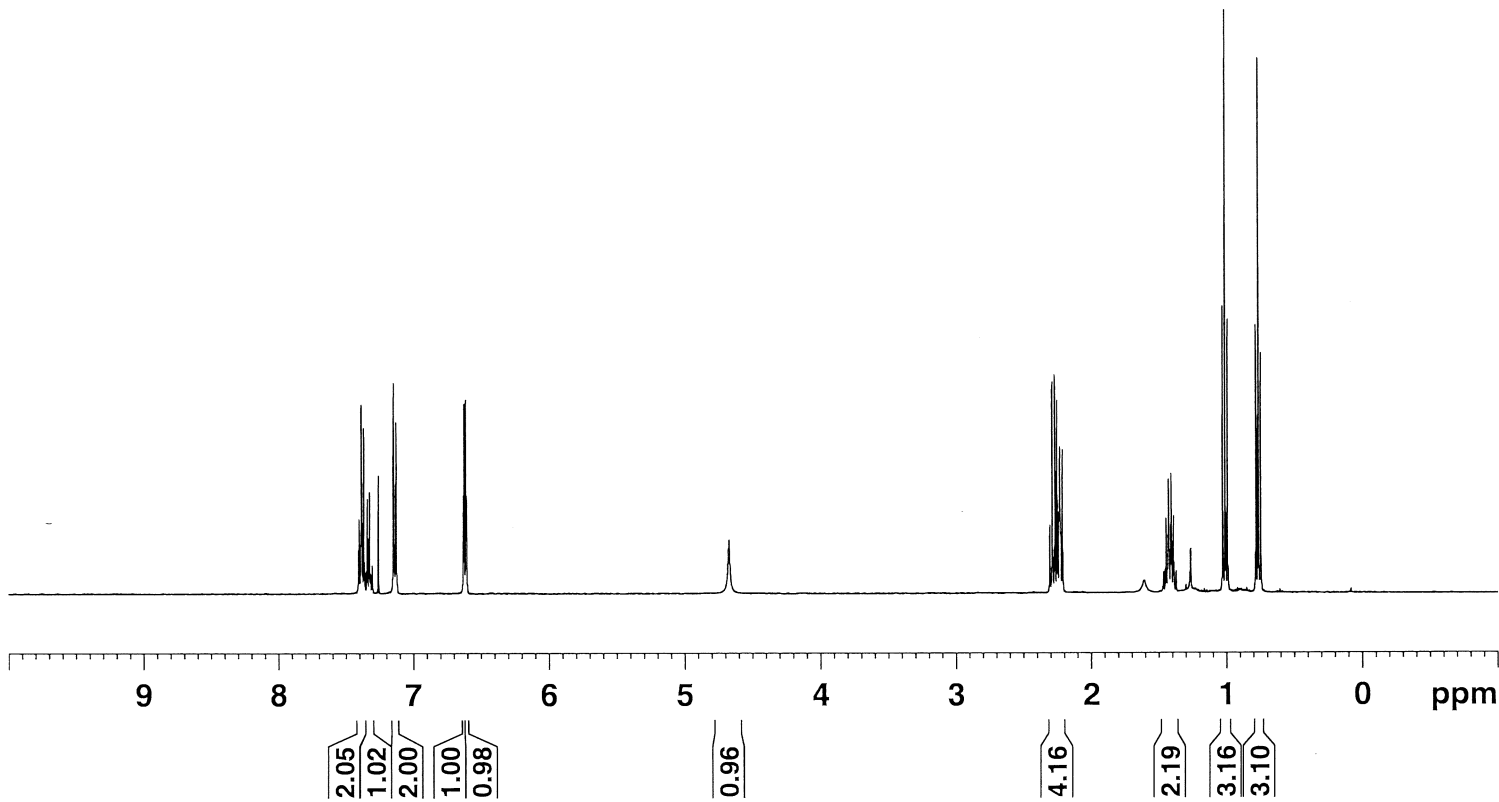


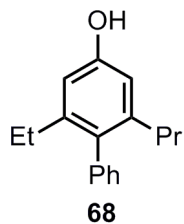
```

NAME          XZ-3-284
EXPNO         1
PROCNO       1
Date_        20190906
Time         11.56
INSTRUM      spect
PROBHD       5 mm BBO BB-1H
PULPROG      zg30
TD           65536
SOLVENT      CDC13
NS           32
DS           2
SWH          8278.146 Hz
FIDRES       0.126314 Hz
AQ           3.9584243 se
RG           322.5
DW           60.400 us
DE           6.50 us
TE           298.2 K
D1           1.00000000 se
TD0          1
  
```

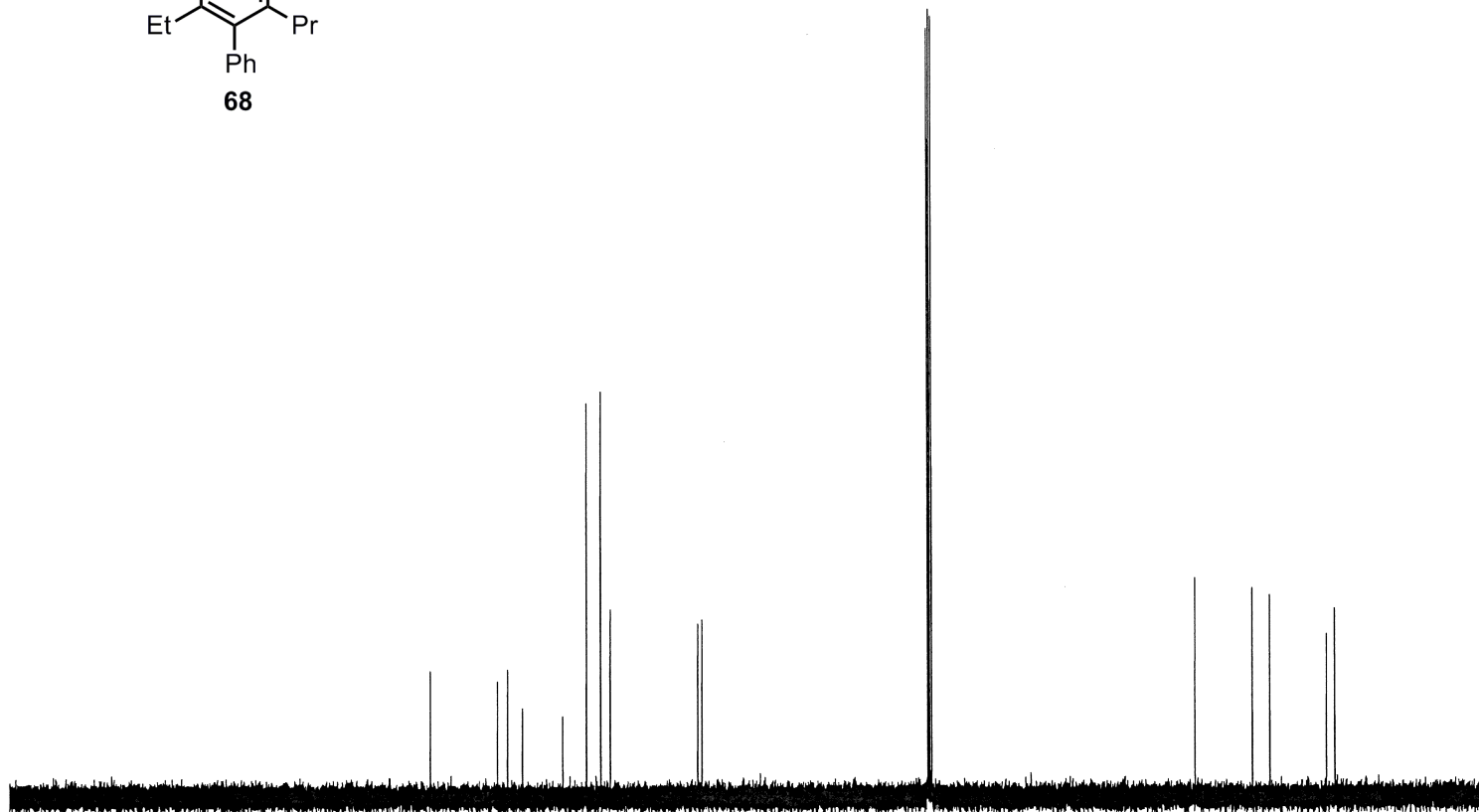
```

===== CHANNEL f1 =====
NUC1          1H
P1            9.50 us
PL1          -6.00 dB
PL1W         40.90000153 W
SFO1         400.1424710 MH:
SI            131072
SF           400.1400081 MH:
WDW           no
SSB           0
LB            0.00 Hz
GB            0
PC            1.00
  
```





154.50
 144.06
 142.53
 140.23
 133.95
 130.20
 127.98
 126.50
 112.90
 112.27
 77.34
 77.02
 76.71
 35.79
 26.88
 24.16
 15.29
 14.04



```

NAME          XZ-3-284
EXPNO         2
PROCNO       1
Date_        20190906
Time         12.14
INSTRUM      spect
PROBHD       5 mm BBO BB-1H
PULPROG      zgpg30
TD           65536
SOLVENT      CDC13
NS           232
DS           4
SWH          24154.590 Hz
FIDRES       0.368570 Hz
AQ           1.3566452 sec
RG           18390.4
DW           20.700 use
DE           6.50 use
TE           298.2 K
D1           2.70000005 sec
D11          0.03000000 sec
TDO         1
  
```

```

===== CHANNEL f1 =====
NUC1          13C
P1            12.00 use
PL1           0.00 dB
PL1W          29.59002304 W
SFO1          100.6263507 MHz
  
```

```

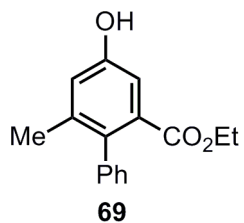
===== CHANNEL f2 =====
CPDPRG2      waltz16
NUC2          1H
PCPD2        65.00 use
PL2          -6.00 dB
PL12         10.46 dB
PL13         12.50 dB
PL2W         40.90000153 W
PL12W        0.92410922 W
PL13W        0.5772785 W
SFO2         400.1416006 MHz
SI           131072
SF           100.6152830 MHz
WDW          no
SSB          0
LB           0.00 Hz
GB           0
PC           1.40
  
```

200 180 160 140 120 100 80 60 40 20 ppm

7.371
7.368
7.360
7.349
7.324
7.322
7.321
7.315
7.312
7.309
7.303
7.301
7.300
7.262
7.189
7.185
7.147
7.145
7.142
7.135
6.902
6.898
3.969
3.959
3.949
3.939

2.060

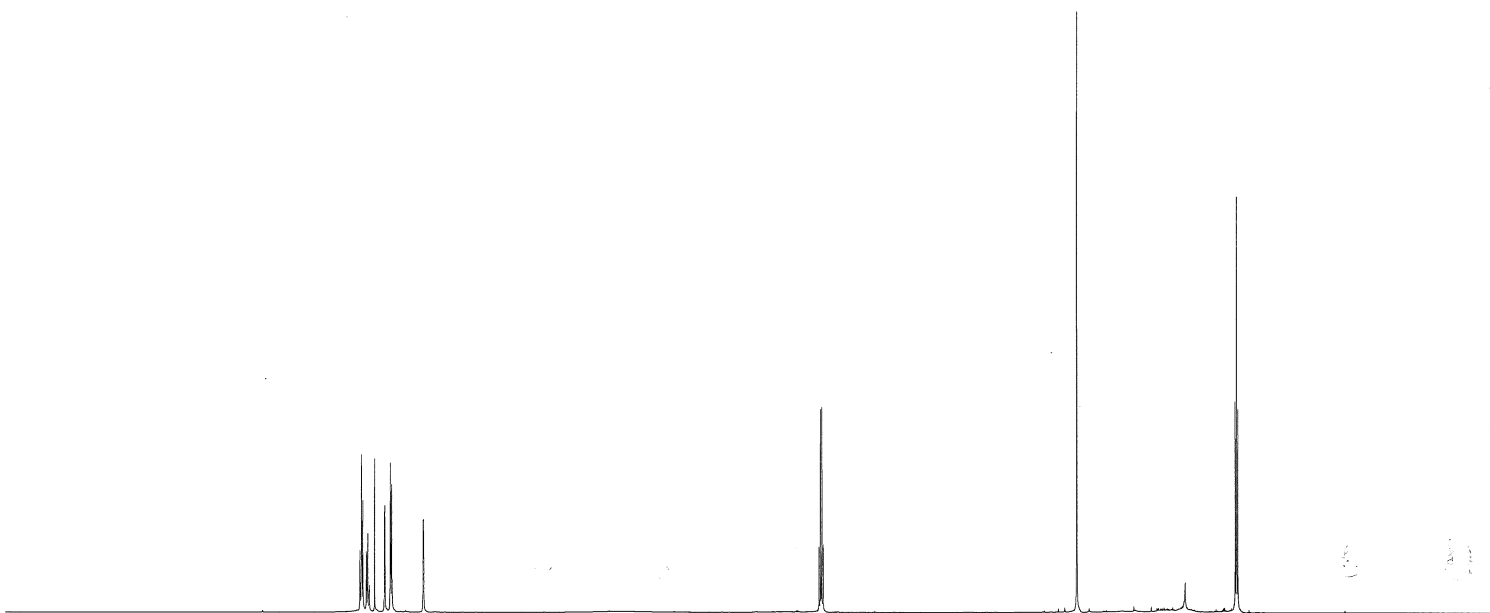
0.886
0.876
0.866



Current Data Parameters
NAME XZ-3-277
EXPNO 1
PROCNO 1

F2 - Acquisition Parameters
Date_ 20190821
Time_ 15.54 h
INSTRUM spect
PROBHD Z151340_0001 (
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 10504.202 Hz
FIDRES 0.320563 Hz
AQ 3.1195135 sec
RG 32
DW 47.600 usec
DE 20.00 usec
TE 303.3 K
D1 1.00000000 sec
TD0 1
SFO1 700.0115500 MHz
NUC1 1H
P1 9.50 usec
PLW1 13.00000000 W

F2 - Processing parameters
SI 131072
SF 700.0070167 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00



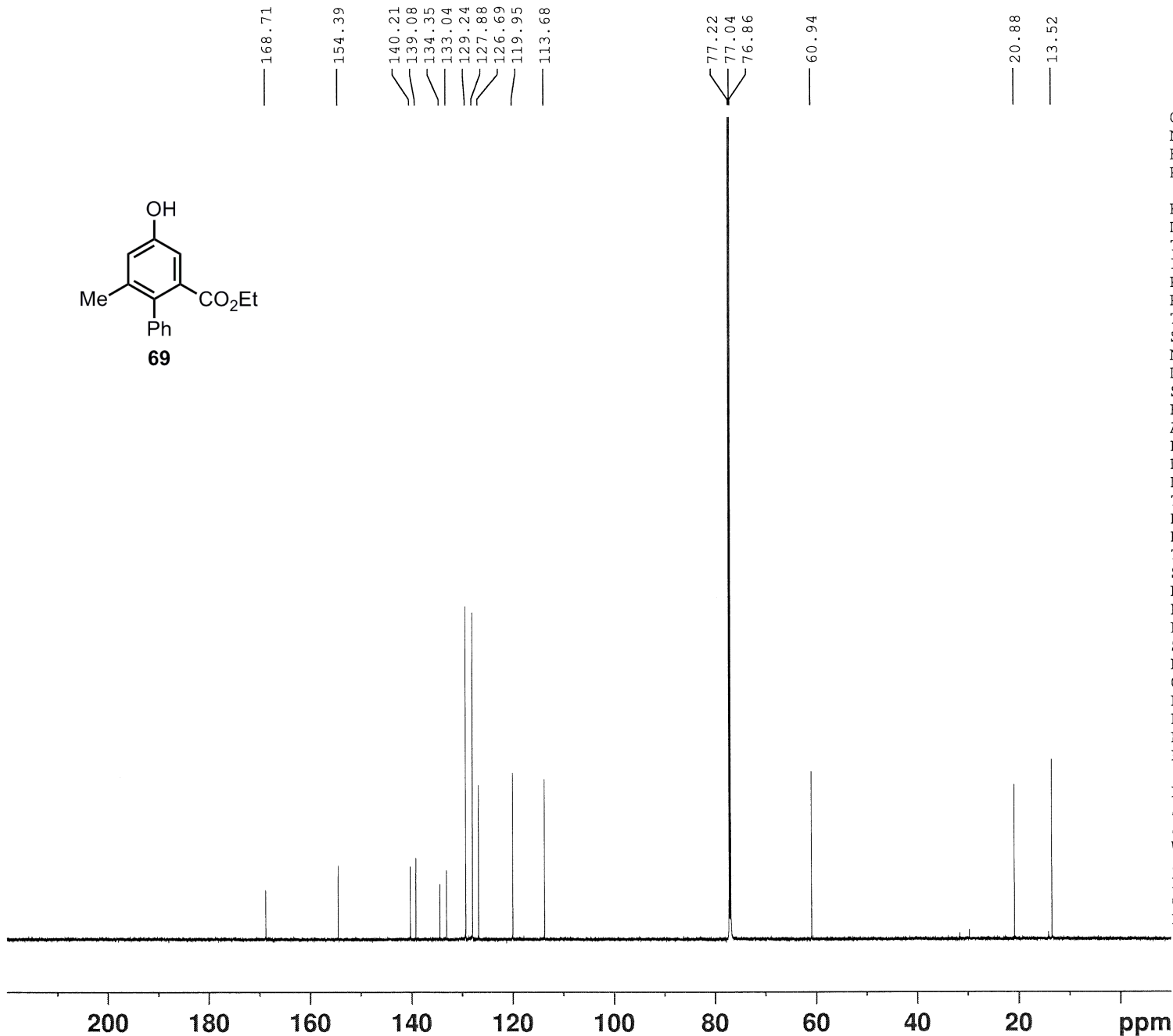
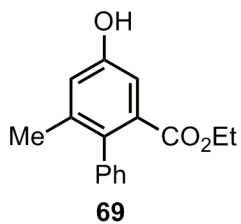
9 8 7 6 5 4 3 2 1 0 ppm

2.08
1.08
1.00
2.02
1.00

2.07

3.11

3.23



Current Data Parameters
 NAME XZ-3-277
 EXPNO 3
 PROCNO 1

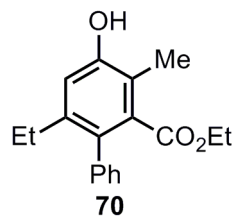
F2 - Acquisition Parameters
 Date_ 20190821
 Time 16.09 h
 INSTRUM spect
 PROBHD Z151340_0001 (
 PULPROG zgpg30
 TD 65536
 SOLVENT CDCl3
 NS 48
 DS 4
 SWH 42613.637 Hz
 FIDRES 1.300465 Hz
 AQ 0.7689557 sec
 RG 203
 DW 11.733 usec
 DE 18.00 usec
 TE 303.2 K
 D1 2.00000000 sec
 D11 0.03000000 sec
 TD0 1
 SFO1 176.0362620 MHz
 NUC1 13C
 P1 11.25 usec
 PLW1 29.00000000 W
 SFO2 700.0098000 MHz
 NUC2 1H
 CPDPRG[2] waltz16
 PCPD2 65.00 usec
 PLW2 13.00000000 W
 PLW12 0.27768999 W
 PLW13 0.13982999 W

F2 - Processing parameters
 SI 131072
 SF 176.0169002 MHz
 WDW EM
 SSB 0
 LB 1.00 Hz
 GB 0
 PC 1.40

7.350
7.340
7.329
7.314
7.312
7.310
7.305
7.301
7.298
7.293
7.291
7.289
7.262
7.218
7.216
7.206
7.205
6.745
5.289

3.945
3.935
3.925
3.915

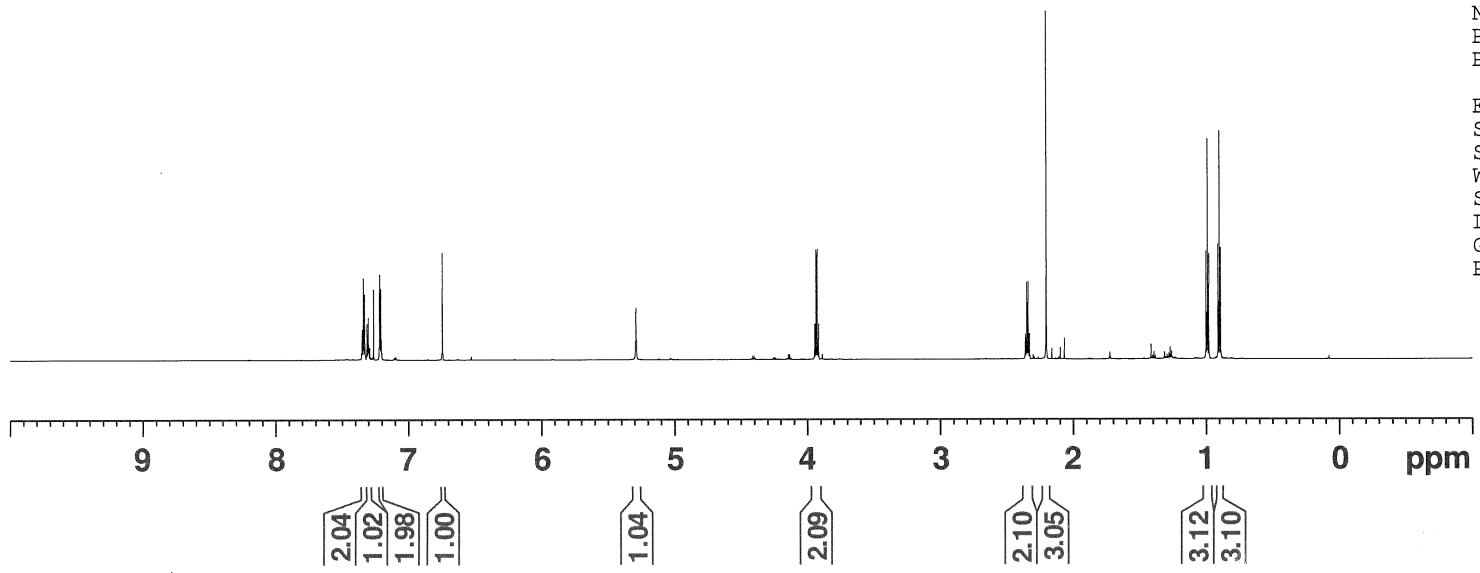
2.360
2.349
2.338
2.327
2.202
1.000
0.989
0.979
0.911
0.901
0.890

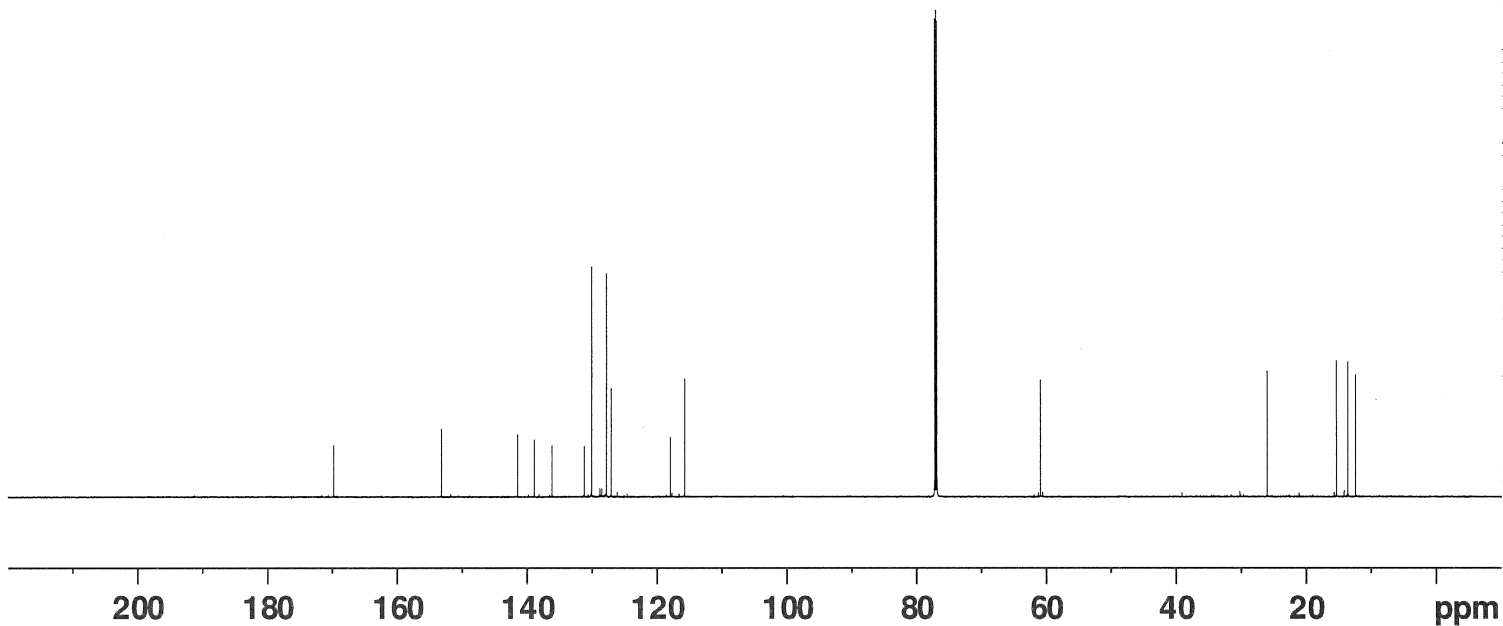
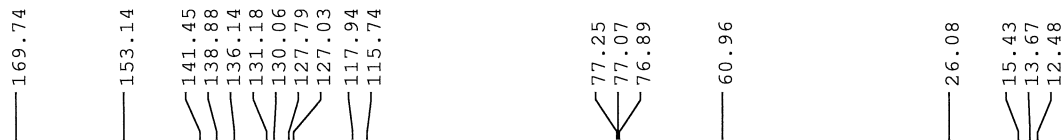
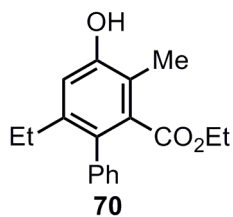


Current Data Parameters
NAME XZ-3-18
EXPNO 1
PROCNO 1

F2 - Acquisition Parameter
Date_ 20181203
Time 17.40 h
INSTRUM spect
PROBHD Z151340_0001 (
PULPROG zg30
TD 65536
SOLVENT CDC13
NS 16
DS 2
SWH 10504.202 Hz
FIDRES 0.320563 Hz
AQ 3.1195135 sec
RG 5.6
DW 47.600 usec
DE 10.00 usec
TE 298.2 K
D1 1.00000000 sec
TD0 1
SF01 700.0115500 MHz
NUC1 1H
P1 9.50 usec
PLW1 13.00000000 W

F2 - Processing parameters
SI 131072
SF 700.0070154 MHz
WDW no
SSB 0
LB 0 Hz
GB 0
PC 1.00

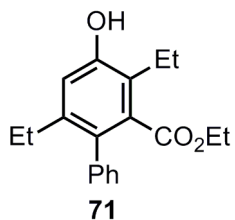




Current Data Parameters
NAME XZ-3-18
EXPNO 2
PROCNO 1

F2 - Acquisition Parameter
Date_ 20181203
Time 17.46 h
INSTRUM spect
PROBHD Z151340_0001 ()
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 25
DS 4
SWH 42613.637 Hz
FIDRES 1.300465 Hz
AQ 0.7689557 sec
RG 203
DW 11.733 usec
DE 18.00 usec
TE 298.2 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1
SFO1 176.0362620 MHz
NUC1 13C
P1 11.25 usec
PLW1 29.00000000 W
SFO2 700.0098000 MHz
NUC2 1H
CPDPRG[2] waltz16
PCPD2 65.00 usec
PLW2 13.00000000 W
PLW12 0.27768999 W
PLW13 0.13982999 W

F2 - Processing parameters
SI 131072
SF 176.0169002 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40



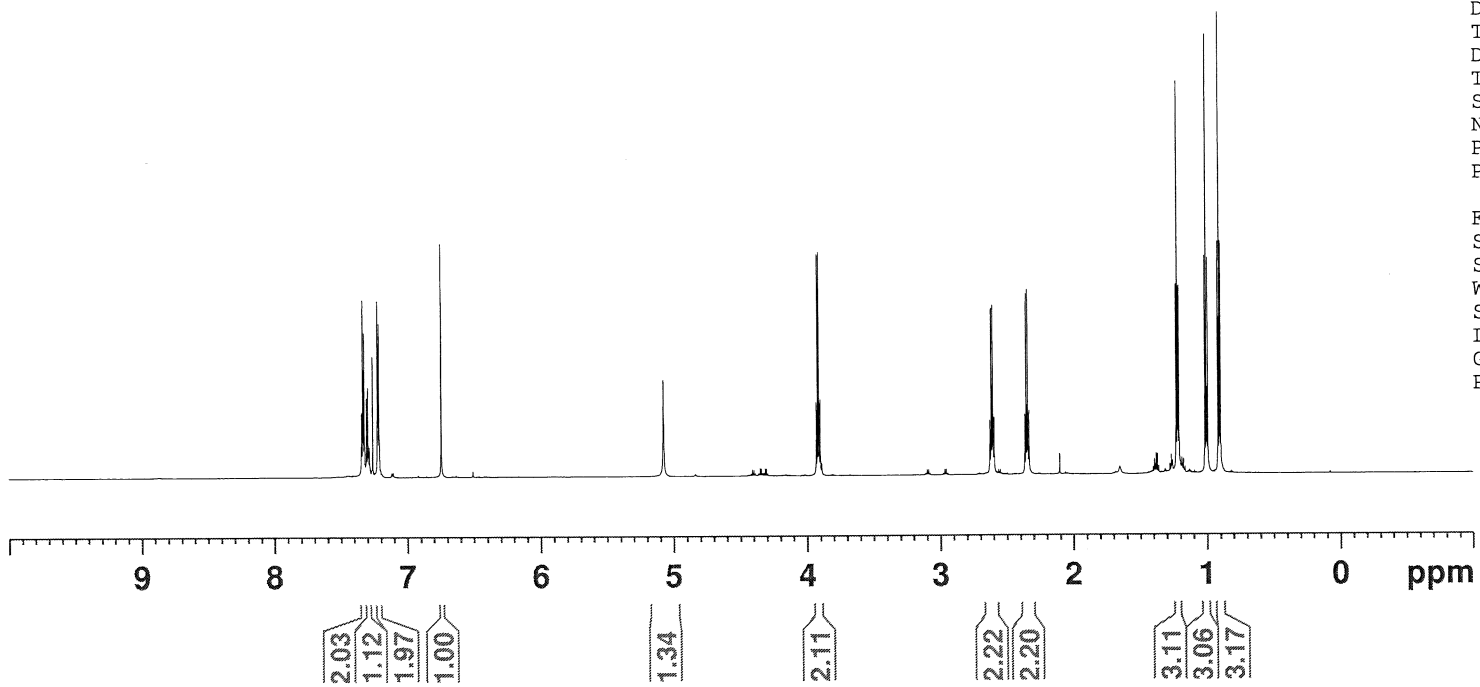
7.345
 7.335
 7.324
 7.307
 7.300
 7.297
 7.262
 7.226
 7.224
 7.214
 6.746

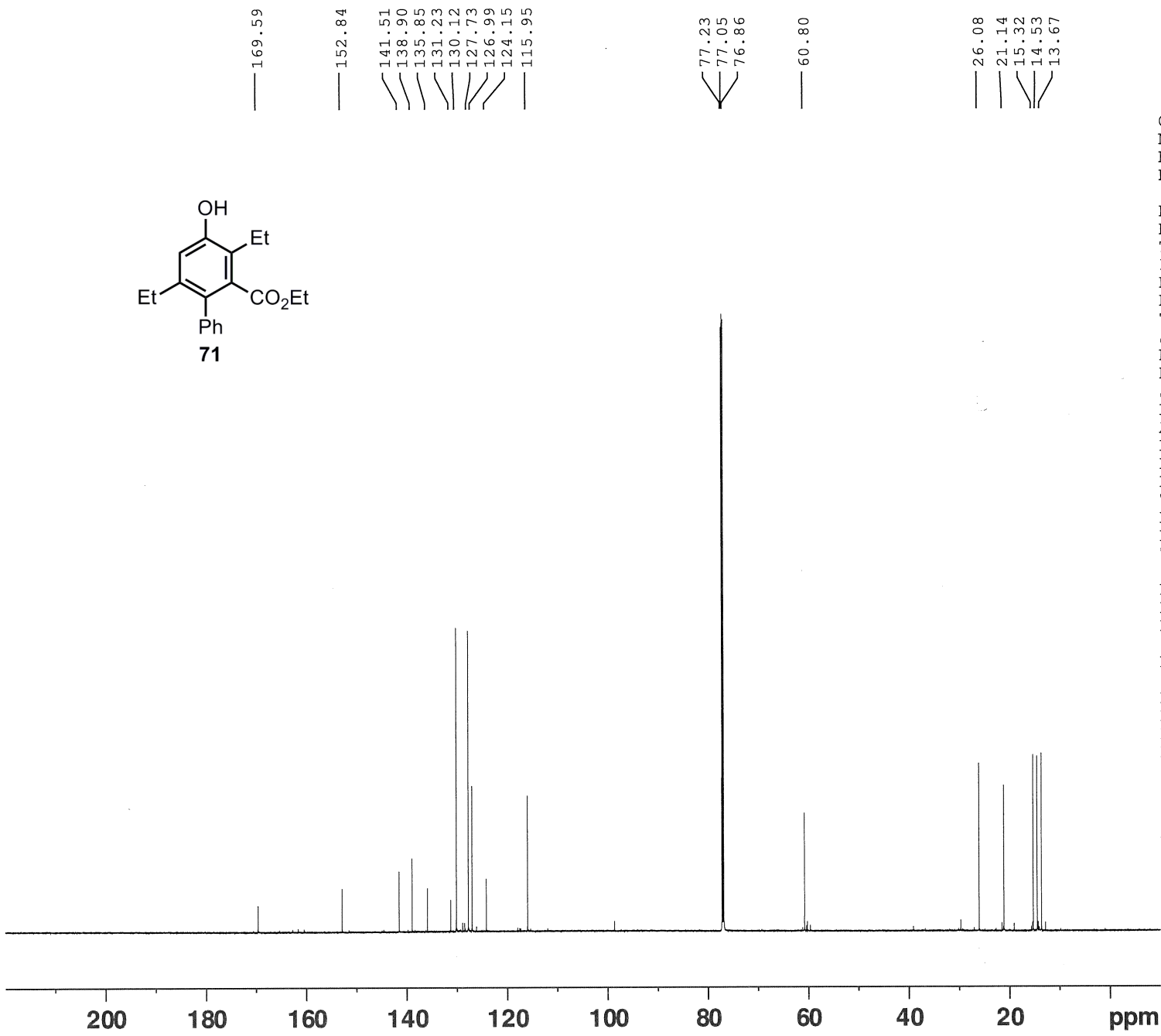
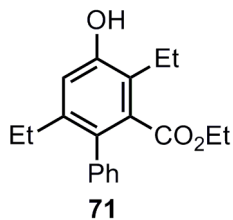
— 5.078
 3.931
 3.921
 3.911
 3.900
 2.627
 2.617
 2.606
 2.595
 2.365
 2.355
 2.344
 2.333
 1.230
 1.219
 1.208
 1.014
 1.004
 0.993
 0.917
 0.906
 0.896

Current Data Parameters
 NAME XZ-3-137
 EXPNO 3
 PROCNO 1

F2 - Acquisition Parameters
 Date_ 20190430
 Time 10.16 h
 INSTRUM spect
 PROBHD Z151340_0001 (
 PULPROG zg30
 TD 65536
 SOLVENT CDC13
 NS 16
 DS 2
 SWH 10504.202 Hz
 FIDRES 0.320563 Hz
 AQ 3.1195135 sec
 RG 5.6
 DW 47.600 usec
 DE 10.00 usec
 TE 303.2 K
 D1 1.00000000 sec
 TD0 1
 SFO1 700.0115500 MHz
 NUC1 1H
 P1 9.50 usec
 PLW1 13.00000000 W

F2 - Processing parameters
 SI 131072
 SF 700.0070166 MHz
 WDW no
 SSB 0
 LB 0 Hz
 GB 0
 PC 1.00





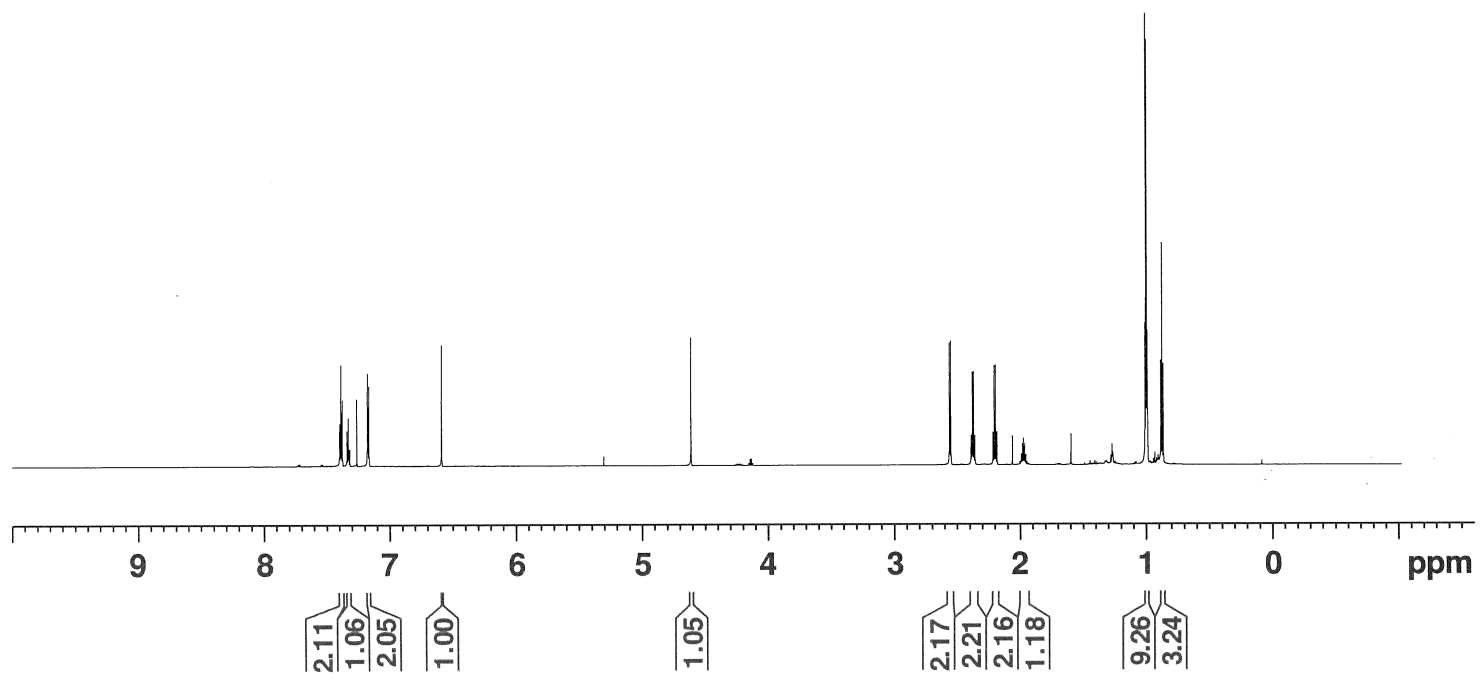
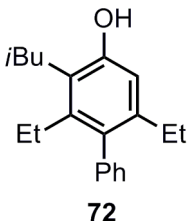
Current Data Parameters
 NAME XZ-3-137
 EXPNO 2
 PROCNO 1

F2 - Acquisition Parameter
 Date_ 20190422
 Time 15.22 h
 INSTRUM spect
 PROBHD Z151340_0001 (
 PULPROG zgpg30
 TD 65536
 SOLVENT CDC13
 NS 51
 DS 4
 SWH 42613.637 Hz
 FIDRES 1.300465 Hz
 AQ 0.7689557 sec
 RG 203
 DW 11.733 usec
 DE 18.00 usec
 TE 303.2 K
 D1 2.00000000 sec
 D11 0.03000000 sec
 TD0 1
 SFO1 176.0362620 MHz
 NUC1 13C
 P1 11.25 usec
 PLW1 29.00000000 W
 SFO2 700.0098000 MHz
 NUC2 1H
 CPDPRG[2] waltz16
 PCPD2 65.00 usec
 PLW2 13.00000000 W
 PLW12 0.27768999 W
 PLW13 0.13982999 W

F2 - Processing parameters
 SI 131072
 SF 176.0169002 MHz
 WDW EM
 SSB 0
 LB 1.00 Hz
 GB 0
 PC 1.40

7.398
7.388
7.377
7.340
7.329
7.319
7.262
7.178
7.176
7.167
7.165
6.589

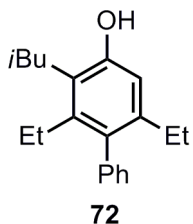
4.612
2.560
2.550
2.390
2.379
2.368
2.358
2.215
2.205
2.194
2.183
2.002
1.992
1.982
1.973
1.963
1.953
1.943
1.008
1.001
0.998
0.992
0.987
0.884
0.874
0.863



Current Data Parameters
 NAME XZ-3-174
 EXPNO 1
 PROCNO 1

F2 - Acquisition Parameter
 Date_ 20190519
 Time 15.51 h
 INSTRUM spect
 PROBHD Z151340_0001 (
 PULPROG zg30
 TD 65536
 SOLVENT CDC13
 NS 16
 DS 2
 SWH 10504.202 Hz
 FIDRES 0.320563 Hz
 AQ 3.1195135 sec
 RG 5.6
 DW 47.600 usec
 DE 10.00 usec
 TE 303.2 K
 D1 1.00000000 sec
 TD0 1
 SFO1 700.0115500 MHz
 NUC1 1H
 P1 9.50 usec
 PLW1 13.00000000 W

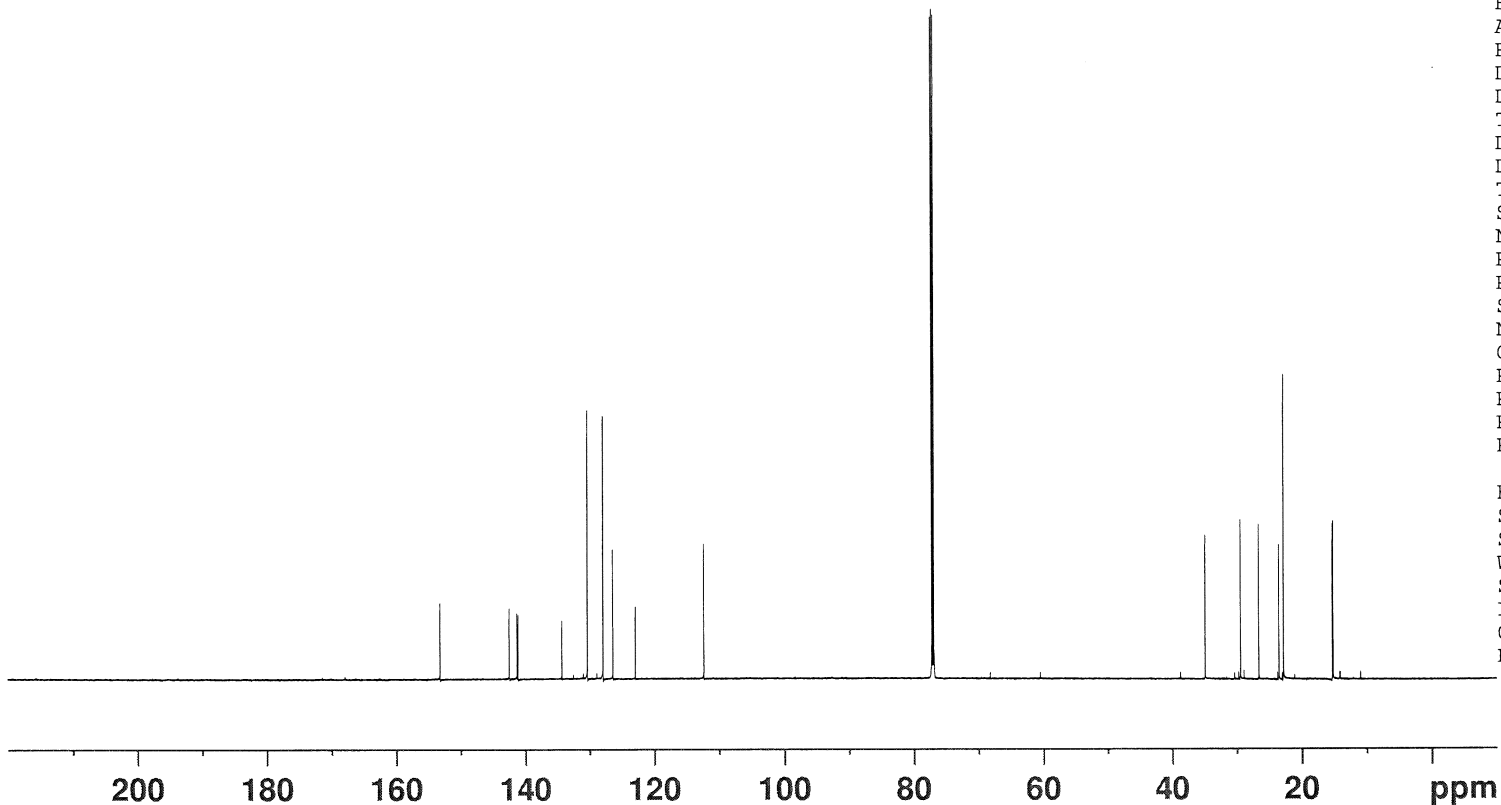
F2 - Processing parameters
 SI 131072
 SF 700.0070146 MHz
 WDW no
 SSB 0
 LB 0 Hz
 GB 0
 PC 1.00



153.17
 142.43
 141.24
 141.07
 134.25
 130.31
 127.89
 126.36
 122.89
 112.35

77.22
 77.04
 76.86

34.94
 29.49
 26.67
 23.55
 22.84
 15.33
 15.20

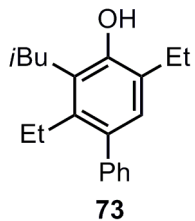


Current Data Parameters
 NAME XZ-3-174
 EXPNO 3
 PROCNO 1

F2 - Acquisition Parameters
 Date_ 20190519
 Time 16.04 h
 INSTRUM spect
 PROBHD Z151340_0001 (
 PULPROG zgpg30
 TD 65536
 SOLVENT CDCl3
 NS 23
 DS 4
 SWH 42613.637 Hz
 FIDRES 1.300465 Hz
 AQ 0.7689557 sec
 RG 203
 DW 11.733 usec
 DE 18.00 usec
 TE 303.2 K
 D1 2.0000000 sec
 D11 0.0300000 sec
 TD0 1
 SFO1 176.0362620 MHz
 NUC1 13C
 P1 11.25 usec
 PLW1 29.0000000 W
 SFO2 700.0098000 MHz
 NUC2 1H
 CPDPRG[2] waltz16
 PCPD2 65.00 usec
 PLW2 13.0000000 W
 PLW12 0.27768999 W
 PLW13 0.13982999 W

F2 - Processing parameters
 SI 131072
 SF 176.0169002 MHz
 WDW EM
 SSB 0
 LB 1.00 Hz
 GB 0
 PC 1.40

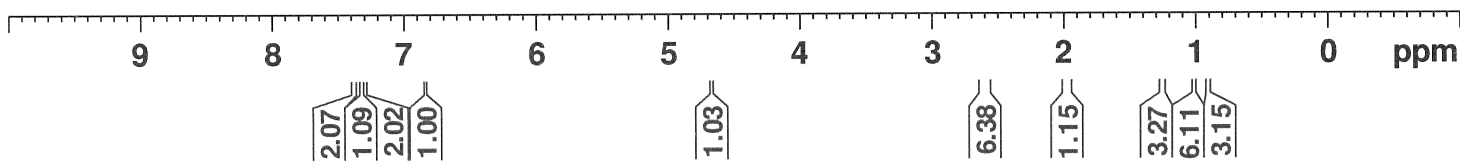
7.393
7.383
7.372
7.334
7.332
7.331
7.325
7.322
7.319
7.313
7.311
7.309
7.303
7.301
7.291
7.290
7.262
6.841
4.673
2.637
2.626
2.615
2.609
2.605
2.599
2.586
2.575
2.564
1.998
1.988
1.978
1.968
1.959
1.949
1.267
1.256
1.245
1.020
1.011
0.920
0.910
0.899

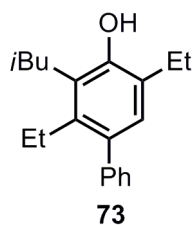


Current Data Parameters
NAME XZ-3-173
EXPNO 4
PROCNO 1

F2 - Acquisition Parameter
Date_ 20190521
Time 10.39 h
INSTRUM spect
PROBHD Z151340_0001 (
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 10504.202 Hz
FIDRES 0.320563 Hz
AQ 3.1195135 sec
RG 6.35
DW 47.600 usec
DE 10.00 usec
TE 303.2 K
D1 1.00000000 sec
TD0 1
SFO1 700.0115500 MHz
NUC1 1H
P1 9.50 usec
PLW1 13.00000000 W

F2 - Processing parameters
SI 131072
SF 700.0070164 MHz
WDW no
SSB 0
LB 0 Hz
GB 0
PC 1.00

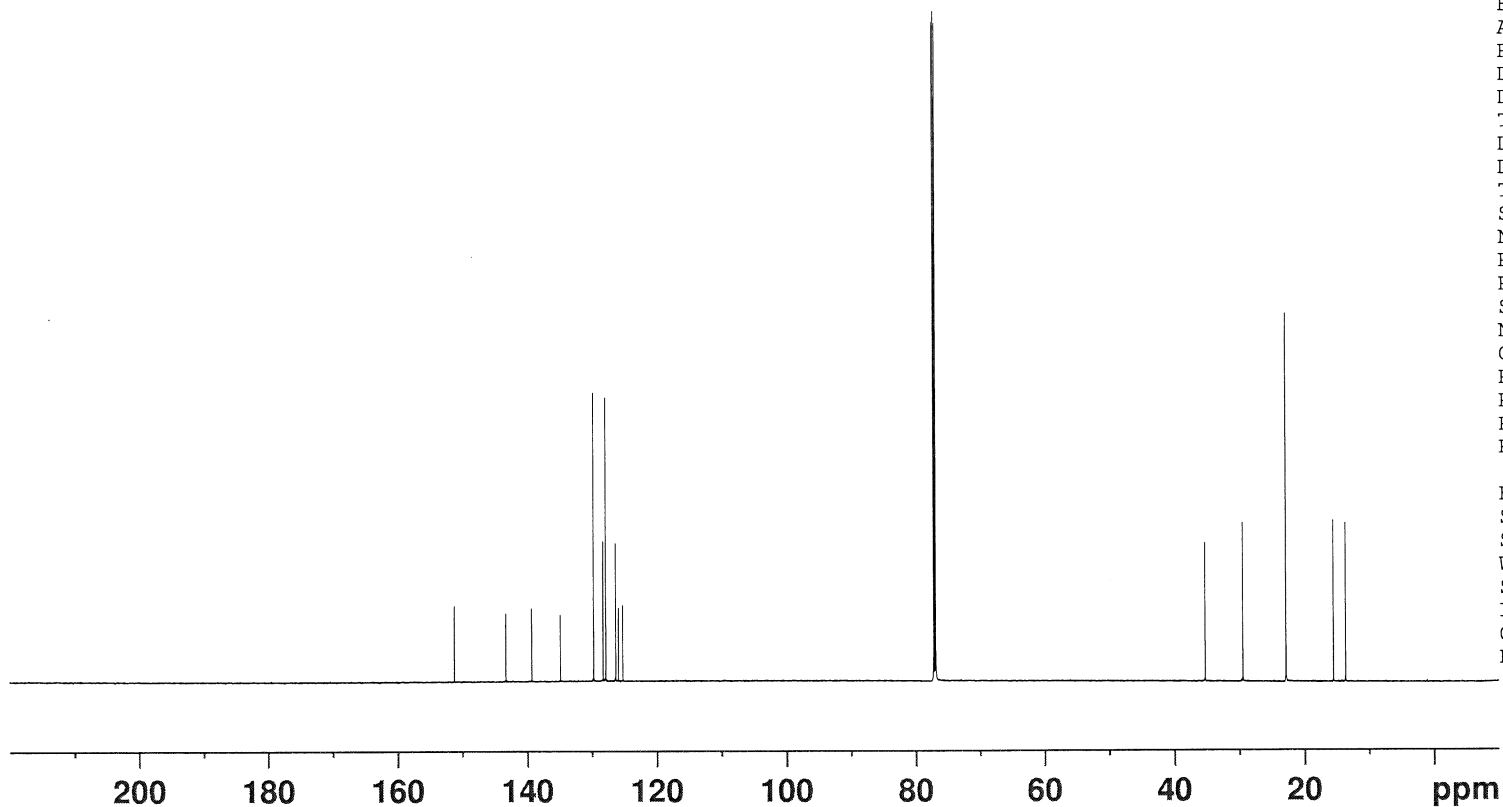




151.19
143.23
139.25
134.83
129.69
128.22
127.82
126.28
125.84
125.19

77.22
77.04
76.86

35.30
29.53
22.89
22.85
15.54
13.68

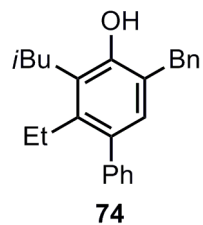


Current Data Parameters
NAME XZ-3-173
EXPNO 6
PROCNO 1

F2 - Acquisition Parameters
Date_ 20190521
Time 10.53 h
INSTRUM spect
PROBHD Z151340_0001 (
PULPROG zgpg30
TD 65536
SOLVENT CDC13
NS 47
DS 4
SWH 42613.637 Hz
FIDRES 1.300465 Hz
AQ 0.7689557 sec
RG 203
DW 11.733 usec
DE 18.00 usec
TE 303.2 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1
SFO1 176.0362620 MHz
NUC1 13C
P1 11.25 usec
PLW1 29.00000000 W
SFO2 700.0098000 MHz
NUC2 1H
CPDPRG[2] waltz16
PCPD2 65.00 usec
PLW2 13.00000000 W
PLW12 0.27768999 W
PLW13 0.13982999 W

F2 - Processing parameters
SI 131072
SF 176.0169002 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

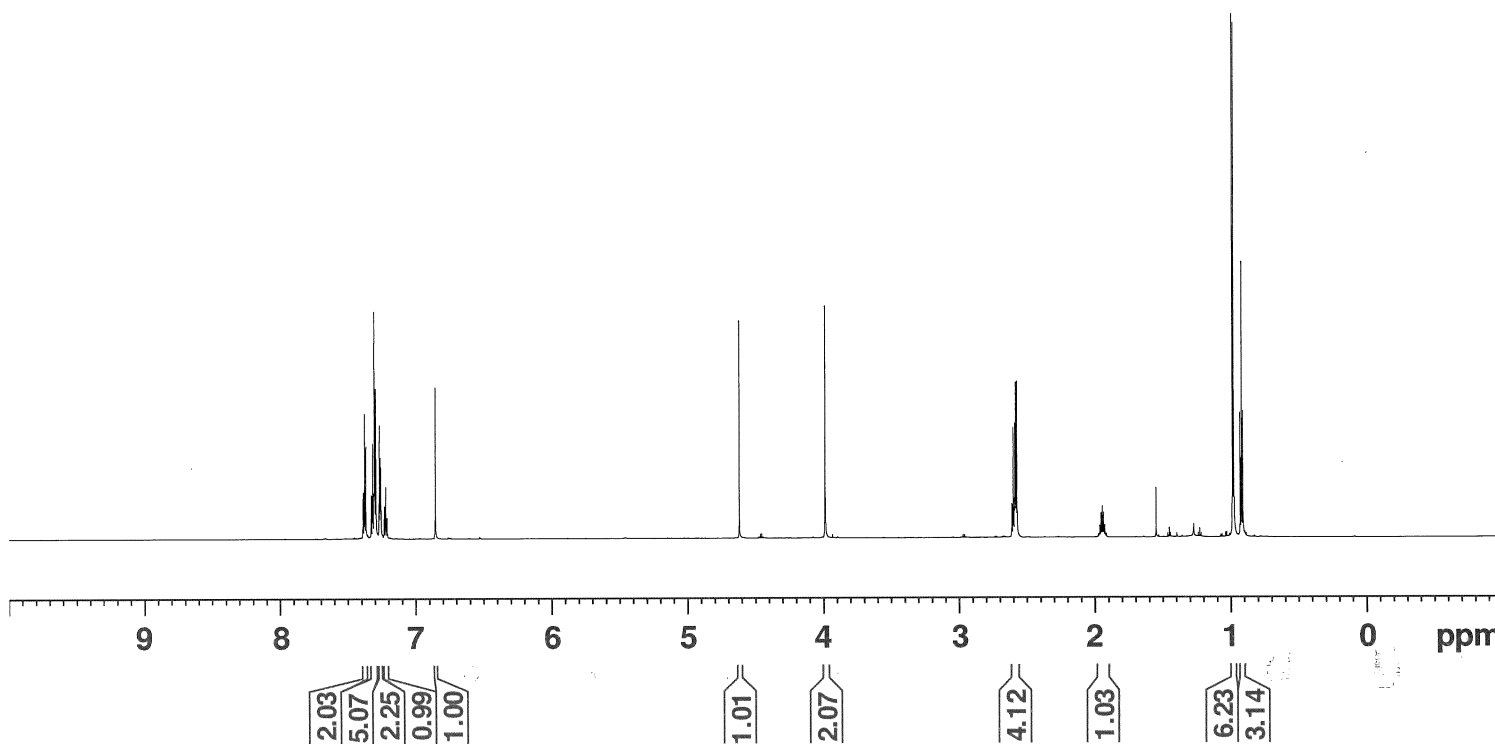
7.390
7.379
7.369
7.331
7.329
7.328
7.319
7.316
7.307
7.305
7.302
7.296
7.269
7.262
7.259
7.232
7.222
7.211
6.857
— 4.619
3.987
2.611
2.601
2.590
2.584
2.579
2.573
1.974
1.964
1.955
1.945
1.935
1.926
1.916
0.986
0.977
0.930
0.920
0.909

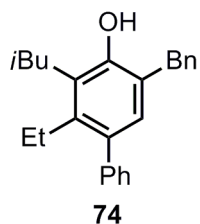


Current Data Parameters
NAME XZ-3-256
EXPNO 1
PROCNO 1

F2 - Acquisition Parameter
Date_ 20190729
Time 12.15 h
INSTRUM spect
PROBHD Z151340_0001 (
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 10504.202 Hz
FIDRES 0.320563 Hz
AQ 3.1195135 sec
RG 22.6
DW 47.600 usec
DE 20.00 usec
TE 303.4 K
D1 1.00000000 sec
TD0 1
SFO1 700.0115500 MHz
NUC1 1H
P1 9.50 usec
PLW1 13.00000000 W

F2 - Processing parameters
SI 131072
SF 700.0070166 MHz
WDW no
SSB 0
LB 0 Hz
GB 0
PC 1.00

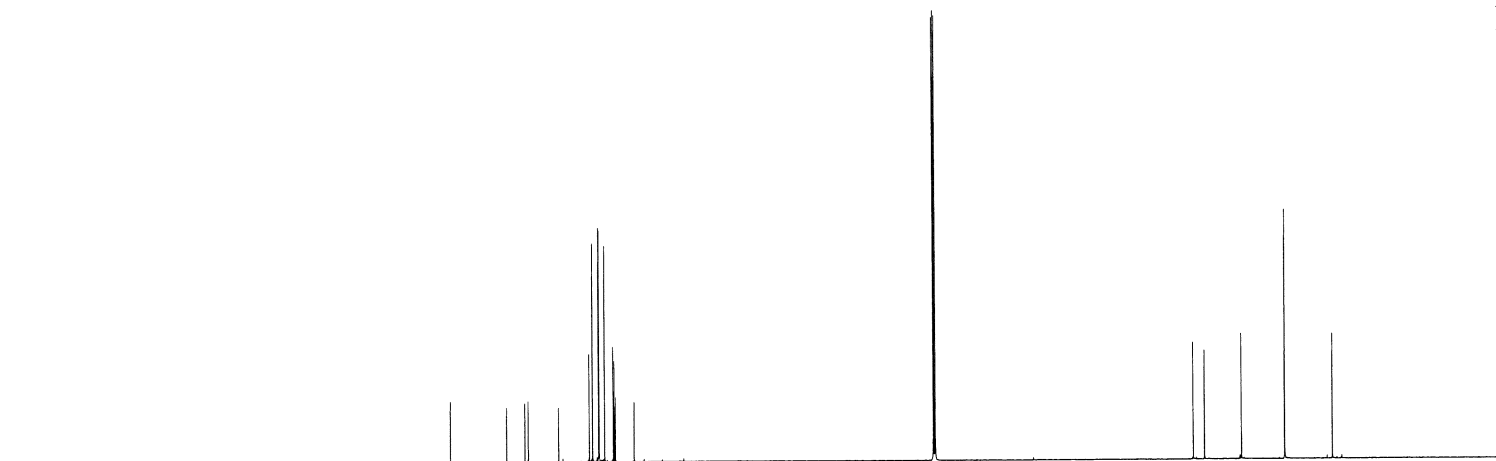




151.69
142.99
140.19
139.67
134.96
130.23
129.71
128.77
128.65
127.83
126.51
126.33
126.14
123.29

77.23
77.05
76.87

36.98
35.22
29.53
22.90
22.84
15.52



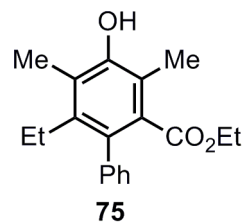
Current Data Parameters
NAME XZ-3-256
EXPNO 3
PROCNO 1

F2 - Acquisition Parameters
Date_ 20190729
Time 12.27 h
INSTRUM spect
PROBHD Z151340_0001 (
PULPROG zgpg30
TD 65536
SOLVENT CDC13
NS 102
DS 4
SWH 42613.637 Hz
FIDRES 1.300465 Hz
AQ 0.7689557 sec
RG 203
DW 11.733 usec
DE 18.00 usec
TE 303.2 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1
SFO1 176.0362620 MHz
NUC1 13C
P1 11.25 usec
PLW1 29.00000000 W
SFO2 700.0098000 MHz
NUC2 1H
CPDPRG[2] waltz16
PCPD2 65.00 usec
PLW2 13.00000000 W
PLW12 0.27768999 W
PLW13 0.13982999 W

F2 - Processing parameters
SI 131072
SF 176.0169002 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

200 180 160 140 120 100 80 60 40 20 ppm

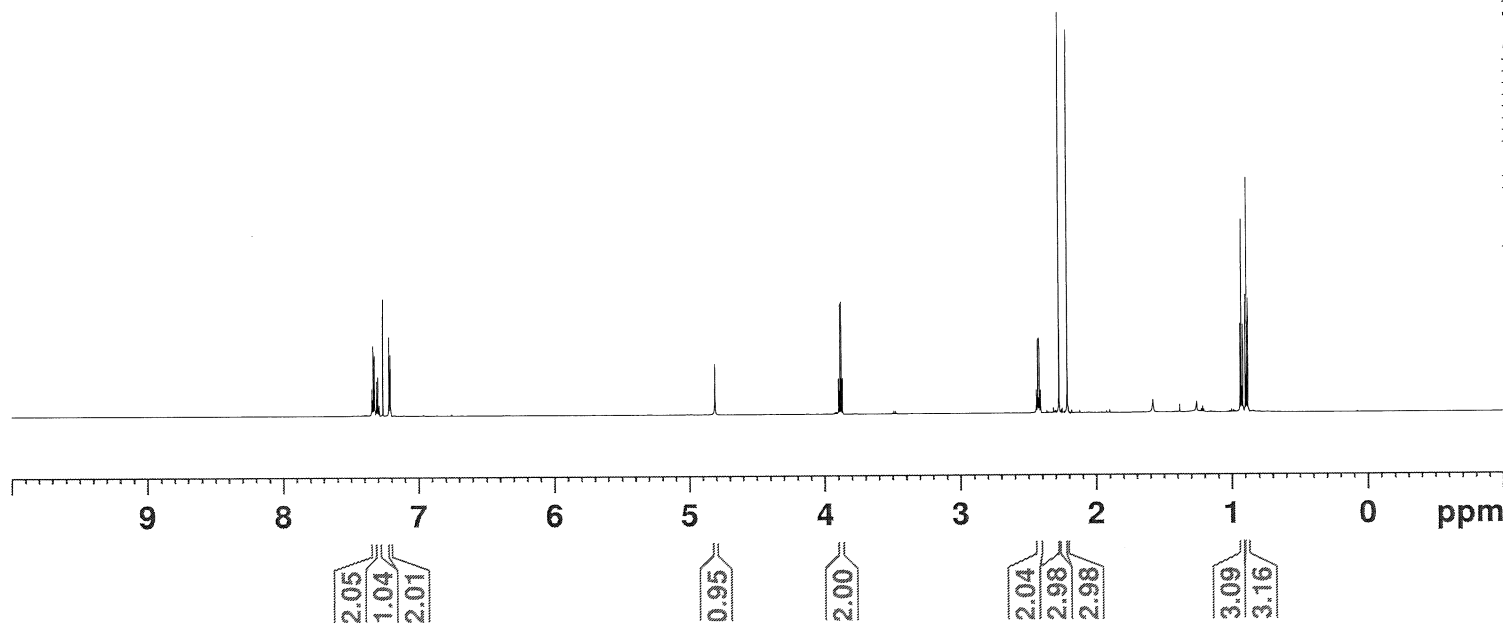
7.342
7.337
7.334
7.332
7.326
7.324
7.321
7.311
7.309
7.307
7.302
7.299
7.295
7.290
7.288
7.286
7.219
7.217
7.214
7.209
7.207
7.205
4.810
3.898
3.888
3.878
3.867
2.441
2.430
2.419
2.409
2.274
2.213
0.938
0.927
0.916
0.899
0.889
0.878

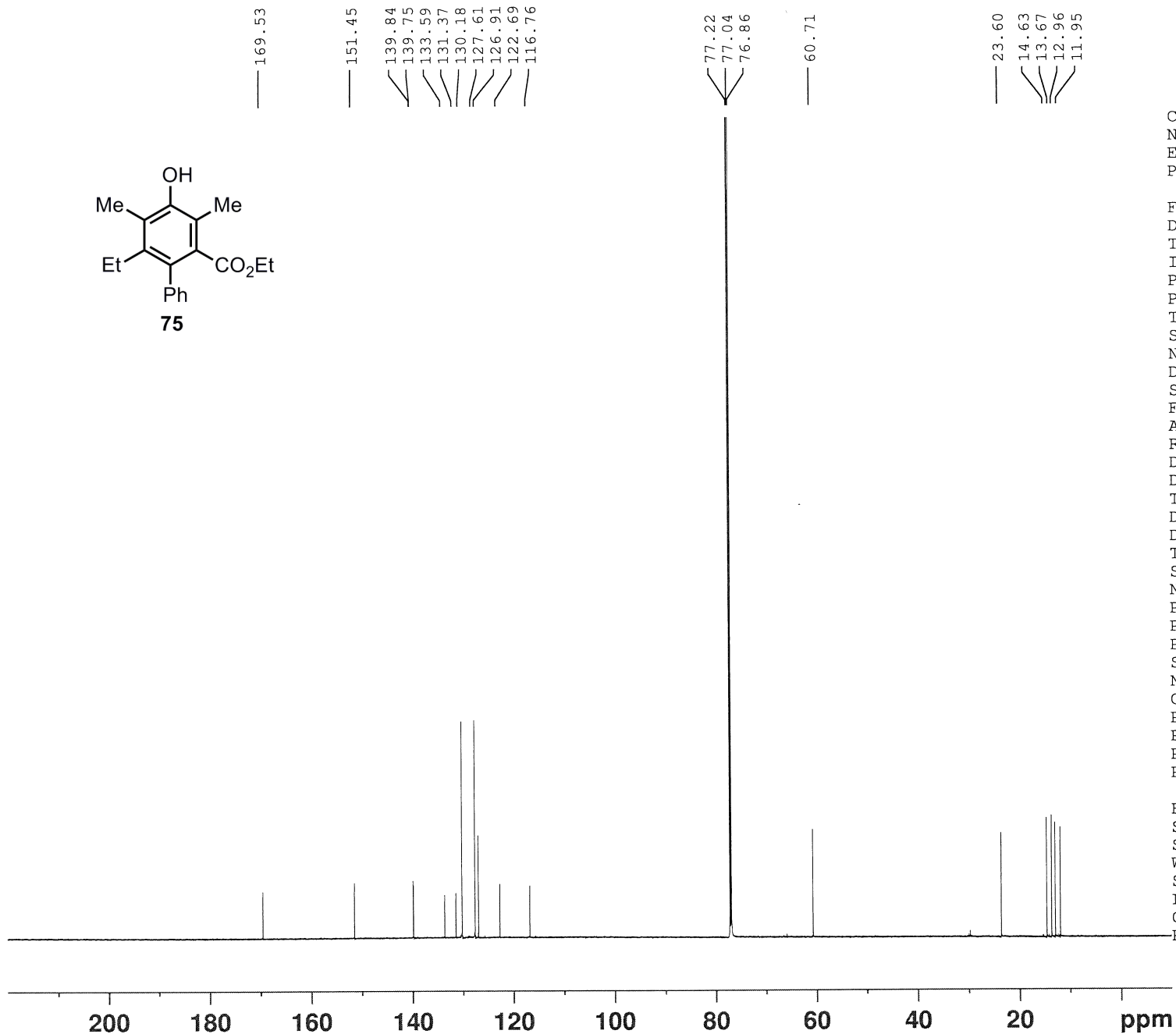
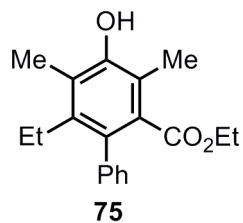


Current Data Parameters
NAME XZ-3-19
EXPNO 3
PROCNO 1

F2 - Acquisition Parameters
Date_ 20190919
Time 10.17 h
INSTRUM spect
PROBHD Z151340_0001 (
PULPROG zg30
TD 65536
SOLVENT CDC13
NS 16
DS 2
SWH 10504.202 Hz
FIDRES 0.320563 Hz
AQ 3.1195135 sec
RG 32
DW 47.600 usec
DE 20.00 usec
TE 303.2 K
D1 1.00000000 sec
TD0 1
SF01 700.0115500 MHz
NUC1 1H
P0 3.17 usec
P1 9.50 usec
PLW1 13.00000000 W

F2 - Processing parameters
SI 131072
SF 700.0070168 MHz
WDW no
SSB 0
LB 0 Hz
GB 0
PC 1.00

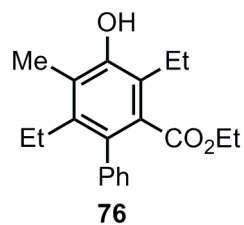




Current Data Parameters
 NAME XZ-3-19
 EXPNO 4
 PROCNO 1

F2 - Acquisition Parameters
 Date_ 20190919
 Time 10.26 h
 INSTRUM spect
 PROBHD z151340_0001 (
 PULPROG zgpg30
 TD 65536
 SOLVENT CDCl3
 NS 77
 DS 4
 SWH 42613.637 Hz
 FIDRES 1.300465 Hz
 AQ 0.7689557 sec
 RG 203
 DW 11.733 usec
 DE 18.00 usec
 TE 303.2 K
 D1 2.0000000 sec
 D11 0.0300000 sec
 TD0 1
 SFO1 176.0362620 MHz
 NUC1 13C
 P0 3.75 usec
 P1 11.25 usec
 PLW1 29.0000000 W
 SFO2 700.0098000 MHz
 NUC2 1H
 CPDPRG[2] waltz16
 PCPD2 65.00 usec
 PLW2 13.0000000 W
 PLW12 0.27768999 W
 PLW13 0.13982999 W

F2 - Processing parameters
 SI 131072
 SF 176.0169002 MHz
 WDW EM
 SSB 0
 LB 1.00 Hz
 GB 0
 PC 1.40



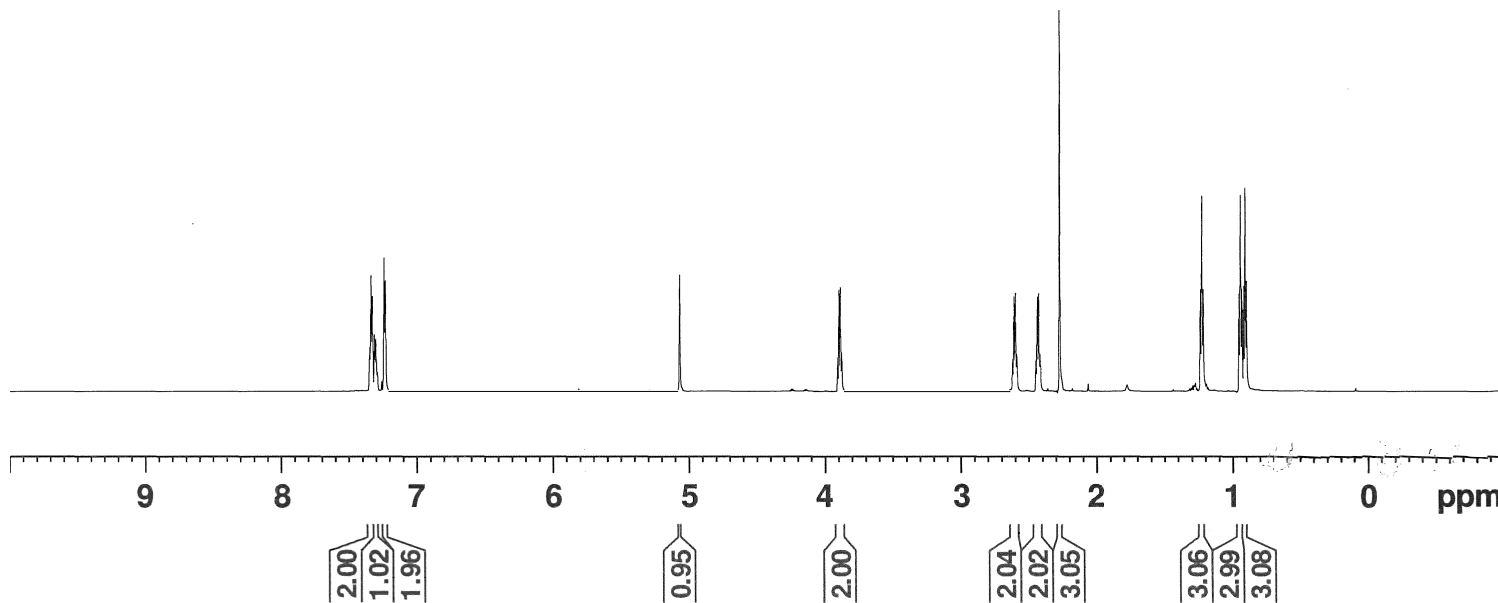
7.350
7.340
7.330
7.314
7.304
7.294
7.262
7.244
7.234

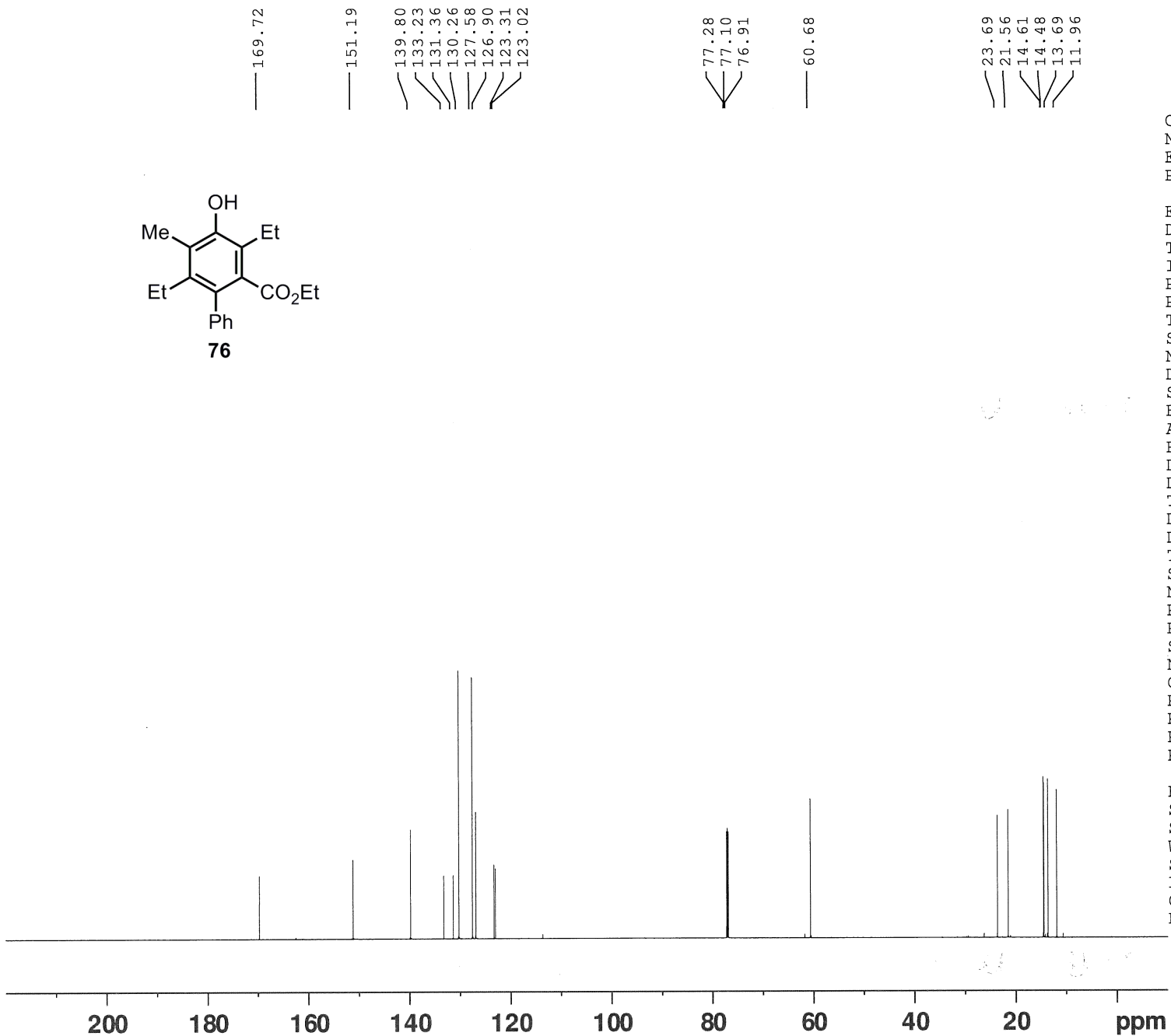
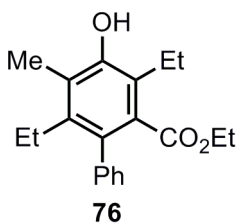
5.070
3.909
3.899
3.889
3.879
2.621
2.611
2.600
2.589
2.449
2.439
2.429
2.418
2.276
1.240
1.229
1.219
0.956
0.946
0.935
0.921
0.911
0.901

Current Data Parameters
 NAME XZ-3-222
 EXPNO 1
 PROCNO 1

F2 - Acquisition Parameter
 Date_ 20190630
 Time 16.05 h
 INSTRUM spect
 PROBHD Z151340_0001 (
 PULPROG zg30
 TD 65536
 SOLVENT CDC13
 NS 16
 DS 2
 SWH 10504.202 Hz
 FIDRES 0.320563 Hz
 AQ 3.1195135 sec
 RG 9
 DW 47.600 usec
 DE 20.00 usec
 TE 303.2 K
 D1 1.00000000 sec
 TD0 1
 SFO1 700.0115500 MHz
 NUC1 1H
 P1 9.50 usec
 PLW1 13.00000000 W

F2 - Processing parameters
 SI 131072
 SF 700.0070151 MHz
 WDW no
 SSB 0
 LB 0 Hz
 GB 0
 PC 1.00

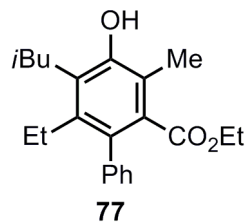




Current Data Parameters
 NAME XZ-3-222
 EXPNO 3
 PROCNO 1

F2 - Acquisition Parameter
 Date_ 20190630
 Time 16.22 h
 INSTRUM spect
 PROBHD Z151340_0001 (
 PULPROG zgpg30
 TD 65536
 SOLVENT CDC13
 NS 92
 DS 4
 SWH 42613.637 Hz
 FIDRES 1.300465 Hz
 AQ 0.7689557 sec
 RG 203
 DW 11.733 usec
 DE 18.00 usec
 TE 303.2 K
 D1 2.00000000 sec
 D11 0.03000000 sec
 TD0 1
 SFO1 176.0362620 MHz
 NUC1 13C
 P1 11.25 usec
 PLW1 29.00000000 W
 SFO2 700.0098000 MHz
 NUC2 1H
 CPDPRG[2] waltz16
 PCPD2 65.00 usec
 PLW2 13.00000000 W
 PLW12 0.27768999 W
 PLW13 0.13982999 W

F2 - Processing parameters
 SI 131072
 SF 176.0169002 MHz
 WDW no
 SSB 0
 LB 0 Hz
 GB 0
 PC 1.40



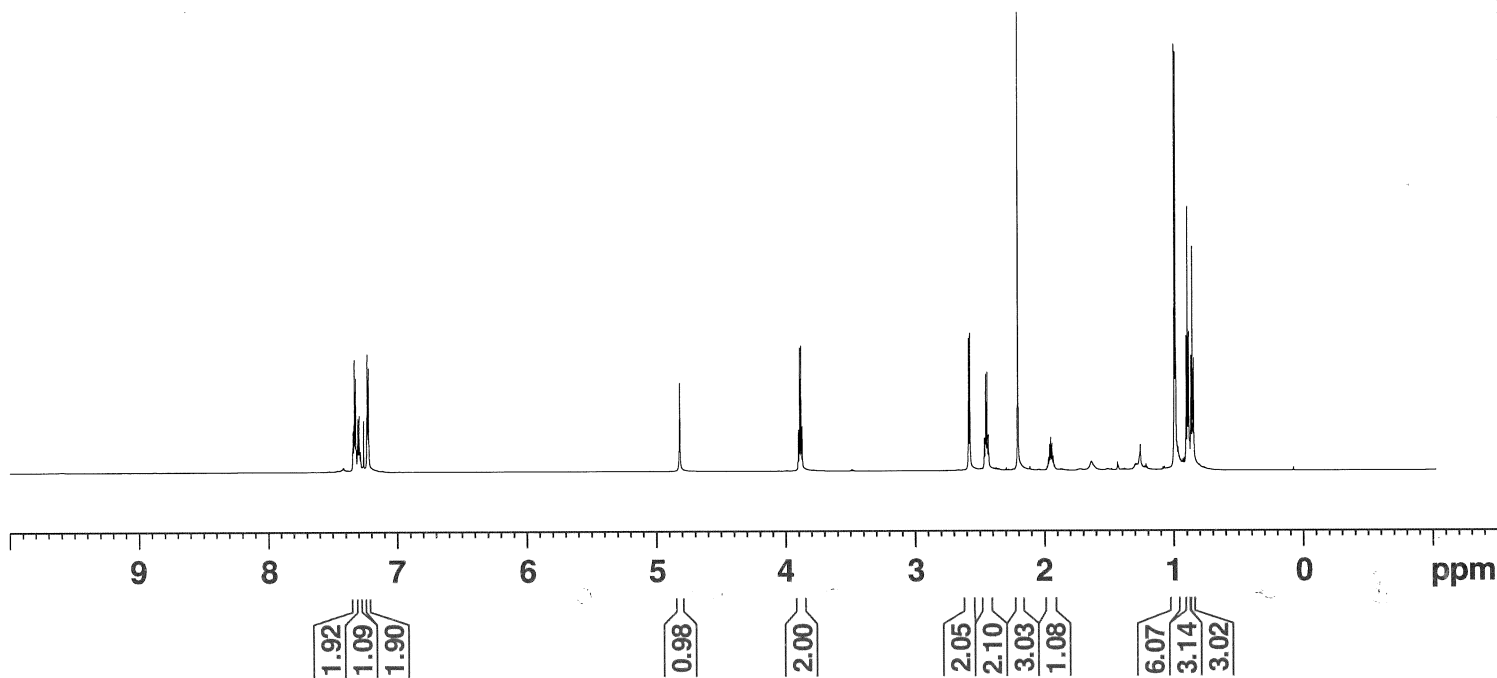
7.344
7.334
7.323
7.306
7.296
7.286
7.262
7.234
7.224

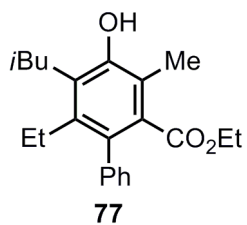
4.819
3.902
3.892
3.882
3.871
2.585
2.574
2.463
2.452
2.441
2.431
2.204
1.978
1.969
1.959
1.949
1.940
1.930
1.920
0.994
0.984
0.902
0.892
0.882
0.866
0.855
0.844

Current Data Parameters
 NAME XZ-3-35-3
 EXPNO 1
 PROCNO 1

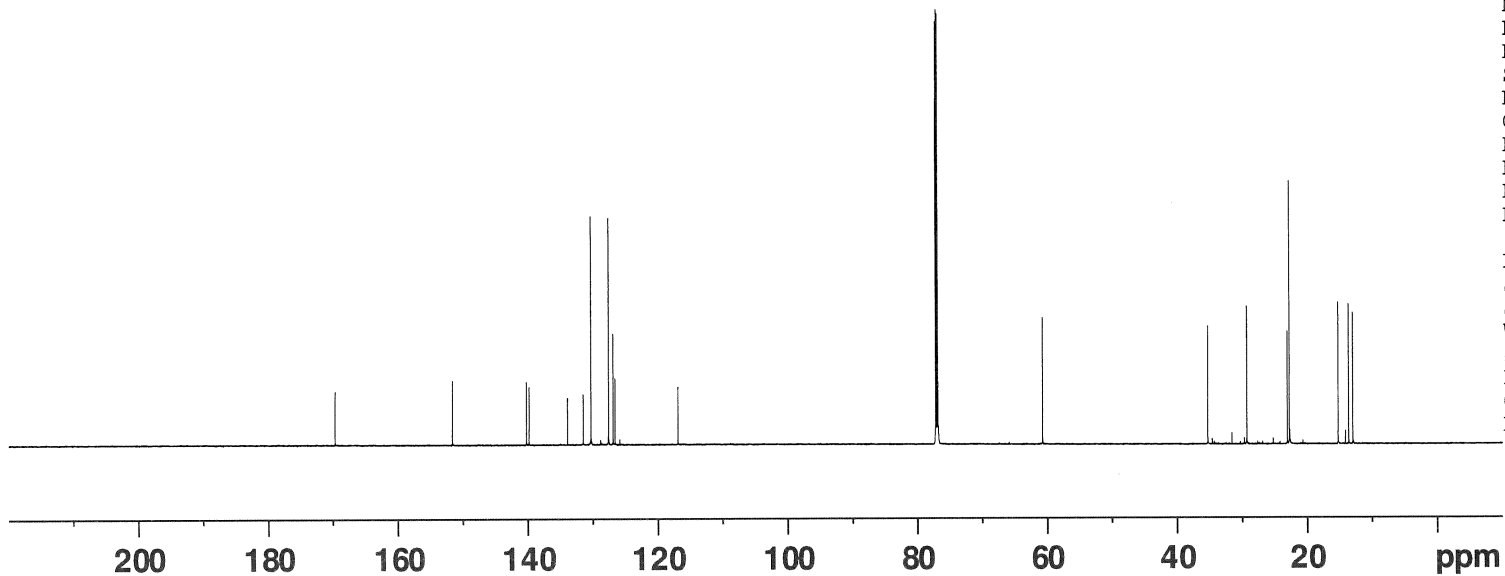
F2 - Acquisition Parameter
 Date_ 20181217
 Time 12.16 h
 INSTRUM spect
 PROBHD Z151340_0001 (
 PULPROG zg30
 TD 65536
 SOLVENT CDCl3
 NS 16
 DS 2
 SWH 10504.202 Hz
 FIDRES 0.320563 Hz
 AQ 3.1195135 sec
 RG 6.35
 DW 47.600 usec
 DE 10.00 usec
 TE 300.1 K
 D1 1.00000000 sec
 TD0 1
 SFO1 700.0115500 MHz
 NUC1 1H
 P1 9.50 usec
 PLW1 13.00000000 W

F2 - Processing parameters
 SI 131072
 SF 700.0070158 MHz
 WDW no
 SSB 0
 LB 0 Hz
 GB 0
 PC 1.00





— 169.67
 — 151.60
 140.23
 139.81
 133.89
 131.49
 130.31
 127.60
 126.88
 126.59
 116.90
 77.24
 77.06
 76.88
 — 60.77
 — 35.34
 — 29.36
 23.12
 22.81
 15.30
 13.69
 13.04

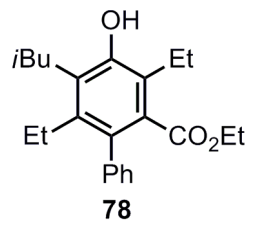


Current Data Parameters
 NAME XZ-3-35-3
 EXPNO 2
 PROCNO 1

F2 - Acquisition Parameter
 Date_ 20181217
 Time 12.26 h
 INSTRUM spect
 PROBHD Z151340_0001 (
 PULPROG zgpg30
 TD 65536
 SOLVENT CDCl3
 NS 39
 DS 4
 SWH 42613.637 Hz
 FIDRES 1.300465 Hz
 AQ 0.7689557 sec
 RG 203
 DW 11.733 usec
 DE 18.00 usec
 TE 300.0 K
 D1 2.00000000 sec
 D11 0.03000000 sec
 TD0 1
 SFO1 176.0362620 MHz
 NUC1 13C
 P1 11.25 usec
 PLW1 29.00000000 W
 SFO2 700.0098000 MHz
 NUC2 1H
 CPDPRG[2] waltz16
 PCPD2 65.00 usec
 PLW2 13.00000000 W
 PLW12 0.27768999 W
 PLW13 0.13982999 W

F2 - Processing parameters
 SI 131072
 SF 176.0169002 MHz
 WDW EM
 SSB 0
 LB 1.00 Hz
 GB 0
 PC 1.40

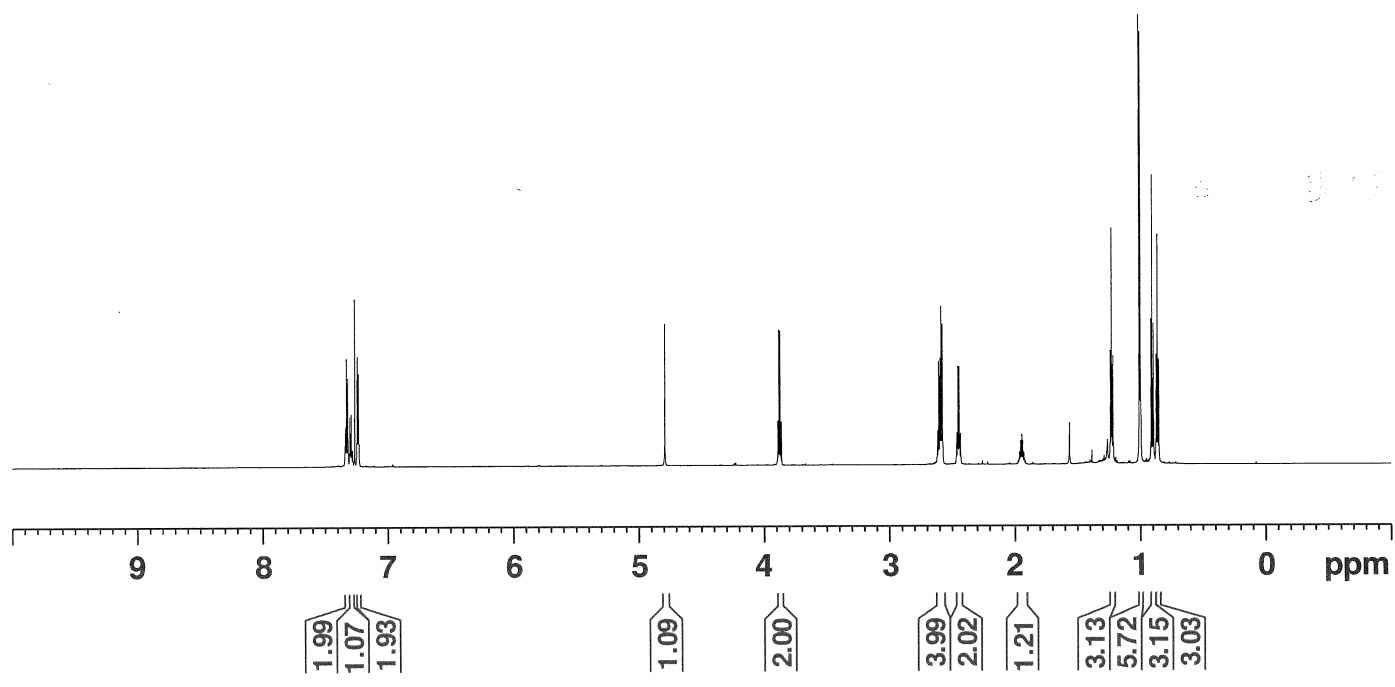
7.328
7.317
7.301
7.291
7.280
7.262
7.241
7.231
4.790
3.889
3.879
3.869
3.858
2.614
2.603
2.592
2.583
2.572
2.461
2.450
2.439
2.429
1.971
1.961
1.951
1.942
1.932
1.922
1.233
1.222
1.211
1.001
0.992
0.909
0.899
0.888
0.868
0.857
0.847

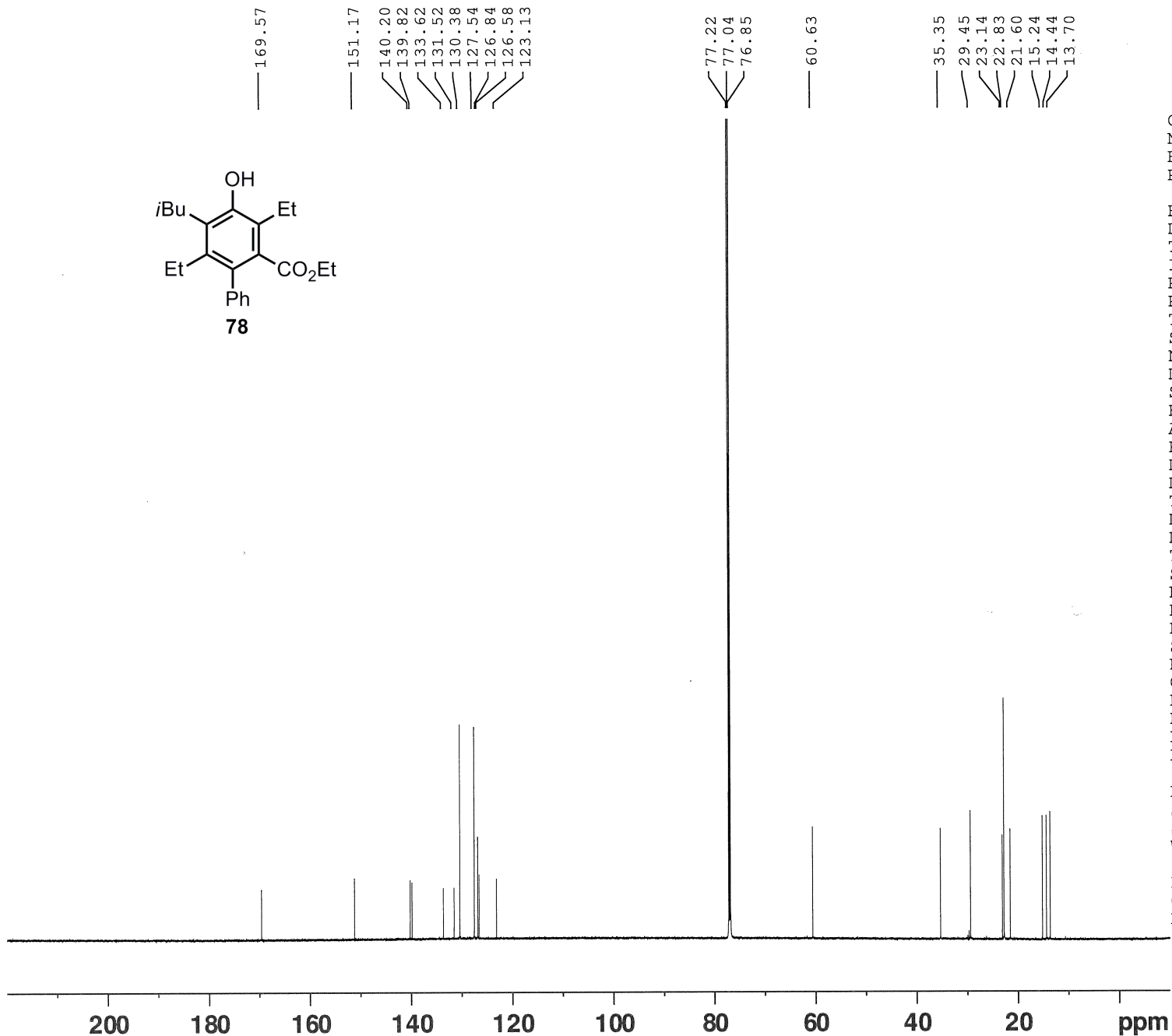
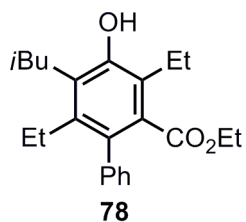


Current Data Parameters
 NAME XZ-3-142
 EXPNO 3
 PROCNO 1

F2 - Acquisition Parameter
 Date_ 20190430
 Time 10.26 h
 INSTRUM spect
 PROBHD Z151340_0001 (
 PULPROG zg30
 TD 65536
 SOLVENT CDCl3
 NS 16
 DS 2
 SWH 10504.202 Hz
 FIDRES 0.320563 Hz
 AQ 3.1195135 sec
 RG 9
 DW 47.600 usec
 DE 10.00 usec
 TE 303.2 K
 D1 1.00000000 sec
 TD0 1
 SFO1 700.0115500 MHz
 NUC1 1H
 P1 9.50 usec
 PLW1 13.00000000 W

F2 - Processing parameters
 SI 131072
 SF 700.0070161 MHz
 WDW no
 SSB 0
 LB 0 Hz
 GB 0
 PC 1.00

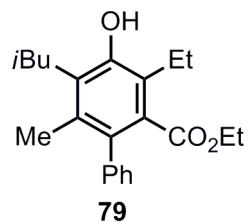




Current Data Parameters
 NAME XZ-3-142
 EXPNO 4
 PROCNO 1

F2 - Acquisition Parameter
 Date_ 20190430
 Time 10.33 h
 INSTRUM spect
 PROBHD Z151340_0001 (
 PULPROG zgpg30
 TD 65536
 SOLVENT CDCl3
 NS 77
 DS 4
 SWH 42613.637 Hz
 FIDRES 1.300465 Hz
 AQ 0.7689557 sec
 RG 203
 DW 11.733 usec
 DE 18.00 usec
 TE 303.2 K
 D1 2.00000000 sec
 D11 0.03000000 sec
 TD0 1
 SFO1 176.0362620 MHz
 NUC1 13C
 P1 11.25 usec
 PLW1 29.00000000 W
 SFO2 700.0098000 MHz
 NUC2 1H
 CPDPRG[2] waltz16
 PCPD2 65.00 usec
 PLW2 13.00000000 W
 PLW12 0.27768999 W
 PLW13 0.13982999 W

F2 - Processing parameters
 SI 131072
 SF 176.0169002 MHz
 WDW EM
 SSB 0
 LB 1.00 Hz
 GB 0
 PC 1.40



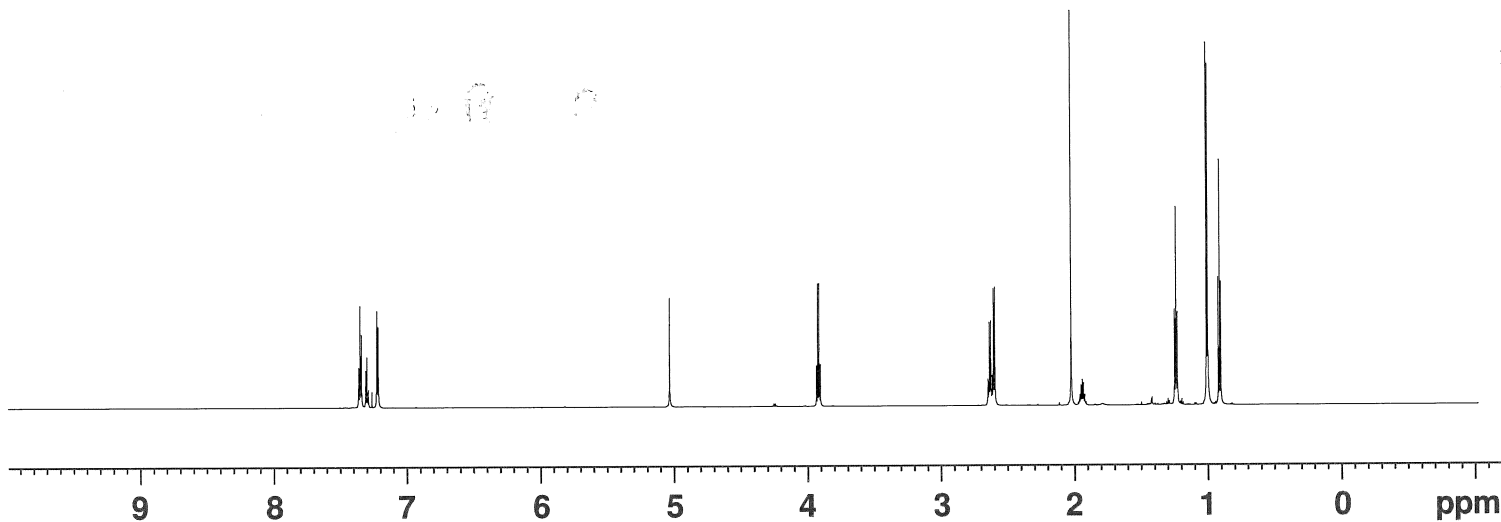
7.361
7.351
7.340
7.309
7.299
7.288
7.262
7.225
7.215

5.033
3.934
3.924
3.914
3.904
2.648
2.638
2.627
2.616
2.607
2.596
2.025
1.971
1.961
1.952
1.942
1.932
1.922
1.913
1.249
1.239
1.228
1.010
1.001
0.922
0.912
0.902

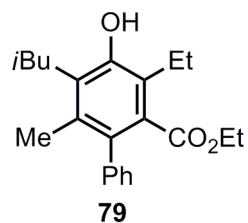
Current Data Parameters
NAME XZ-3-246
EXPNO 1
PROCNO 1

F2 - Acquisition Parameter
Date_ 20190721
Time 15.15 h
INSTRUM spect
PROBHD Z151340_0001 (
PULPROG zg30
TD 65536
SOLVENT CDC13
NS 16
DS 2
SWH 10504.202 Hz
FIDRES 0.320563 Hz
AQ 3.1195135 sec
RG 9
DW 47.600 usec
DE 20.00 usec
TE 303.4 K
D1 1.00000000 sec
TD0 1
SFO1 700.0115500 MHz
NUC1 1H
P1 9.50 usec
PLW1 13.000000000 W

F2 - Processing parameters
SI 131072
SF 700.0070151 MHz
WDW no
SSB 0
LB 0 Hz
GB 0
PC 1.00



2.04
0.99
2.00
0.99
2.02
2.10
2.00
3.01
1.01
3.15
6.15
3.11



169.75

151.02

140.36

133.88

133.16

131.94

130.12

127.81

127.62

126.84

123.41

77.30

77.12

76.93

60.71

35.99

28.89

22.81

21.59

17.40

14.54

13.69

Current Data Parameters

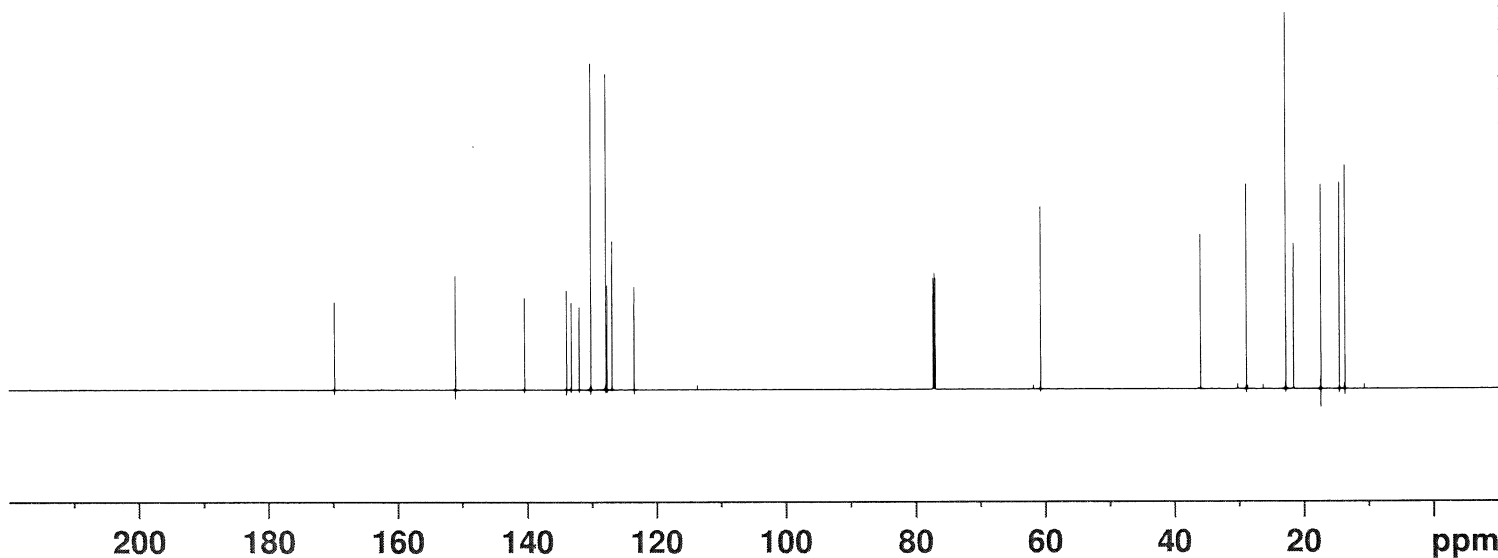
NAME XZ-3-246
EXPNO 4
PROCNO 1

F2 - Acquisition Parameters

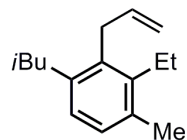
Date_ 20190721
Time 15.35 h
INSTRUM spect
PROBHD z151340_0001 (
PULPROG zgpg30
TD 65536
SOLVENT CDC13
NS 12
DS 4
SWH 42613.637 Hz
FIDRES 1.300465 Hz
AQ 0.7689557 sec
RG 203
DW 11.733 usec
DE 18.00 usec
TE 303.2 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1
SFO1 176.0362620 MHz
NUC1 13C
P1 11.25 usec
PLW1 29.00000000 W
SFO2 700.0098000 MHz
NUC2 1H
CPDPRG[2] waltz16
PCPD2 65.00 usec
PLW2 13.00000000 W
PLW12 0.27768999 W
PLW13 0.13982999 W

F2 - Processing parameters

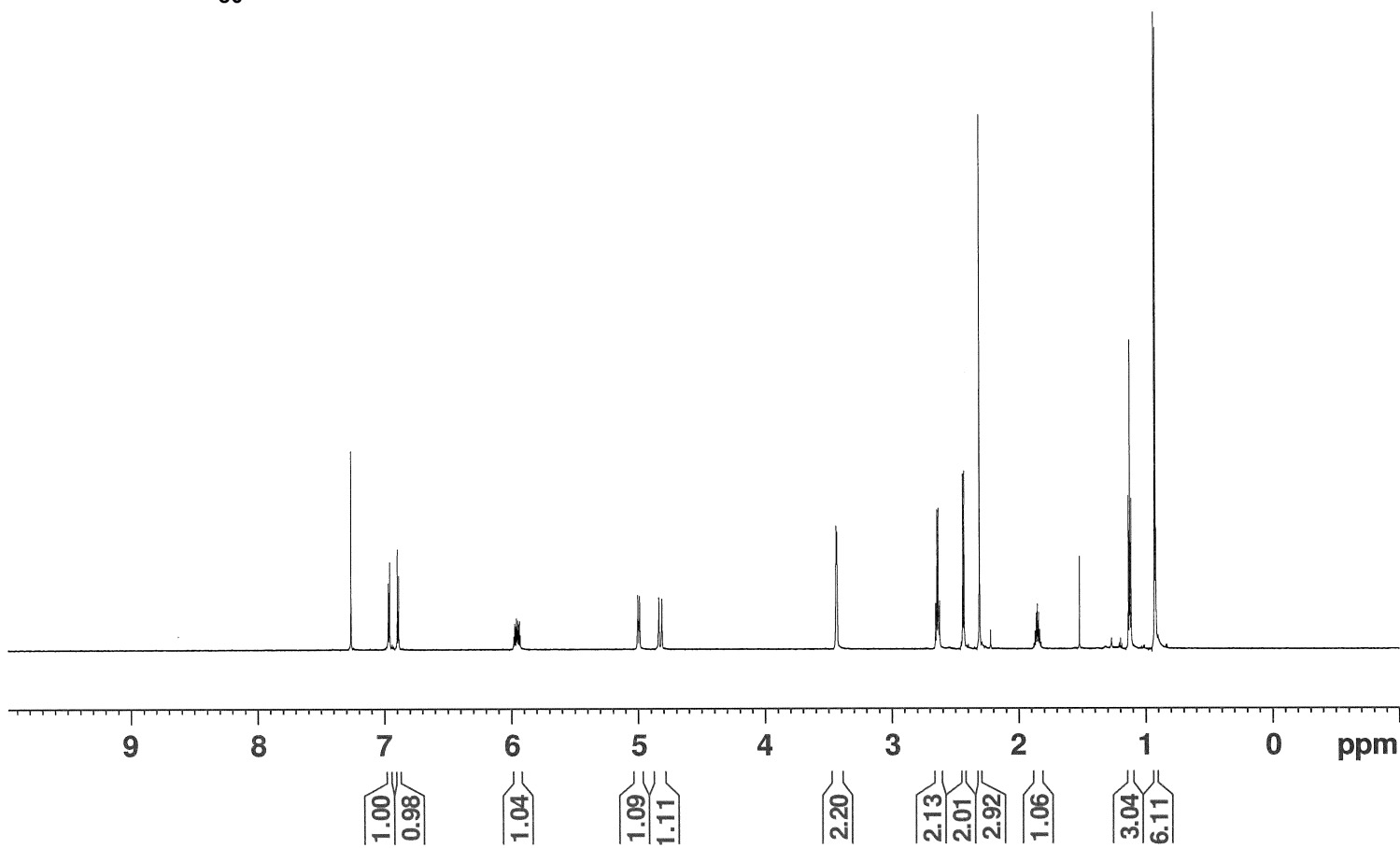
SI 131072
SF 176.0169002 MHz
WDW no
SSB 0
LB 0 Hz
GB 0
PC 1.40



7.262
6.968
6.957
6.896
6.885
5.981
5.973
5.966
5.959
5.949
5.942
5.934
5.926
5.002
5.000
4.988
4.985
4.837
4.835
4.813
4.810
3.437
3.435
3.432
3.430
2.653
2.642
2.632
2.621
2.439
2.428
2.307
1.879
1.869
1.860
1.850
1.841
1.831
1.821
1.133
1.122



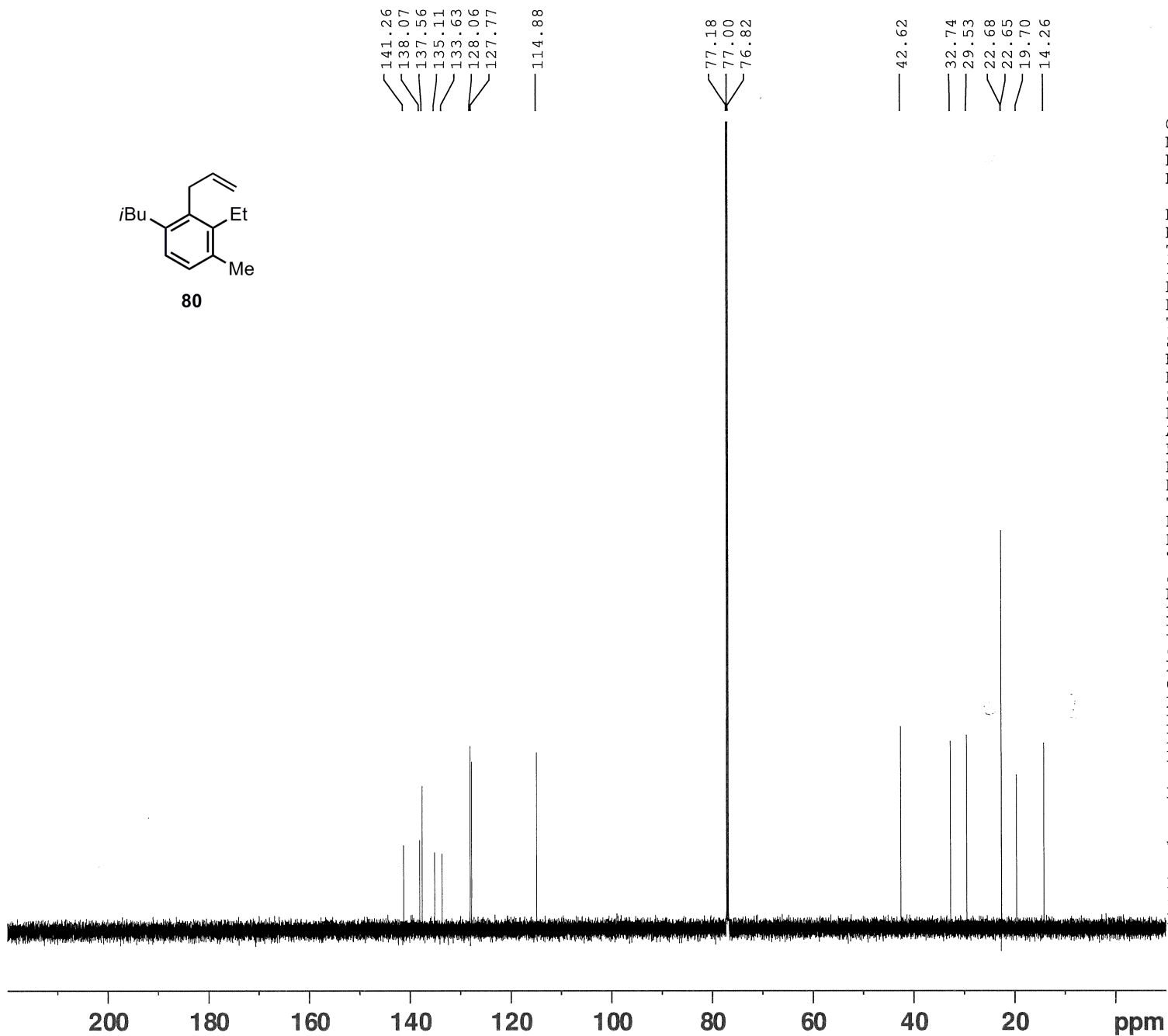
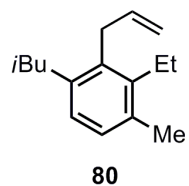
80



Current Data Parameters
NAME XZ-3-194-2
EXPNO 1
PROCNO 1

F2 - Acquisition Parameter
Date_ 20190606
Time 14.21 h
INSTRUM spect
PROBHD Z566801_0015 (
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 10504.202 Hz
FIDRES 0.320563 Hz
AQ 3.1195135 sec
RG 203
DW 47.600 usec
DE 6.50 usec
TE 303.2 K
D1 1.00000000 sec
TD0 1
SFO1 700.0115500 MHz
NUC1 1H
P1 12.88 usec
PLW1 40.00000000 W

F2 - Processing parameters
SI 131072
SF 700.0070166 MHz
WDW no
SSB 0
LB 0 Hz
GB 0
PC 1.00



Current Data Parameters

NAME XZ-3-194-2
 EXPNO 2
 PROCNO 1

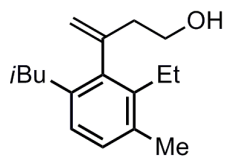
F2 - Acquisition Parameter

Date_ 20190606
 Time 14.38 h
 INSTRUM spect
 PROBHD Z566801_0015 (
 PULPROG zgpg30
 TD 65536
 SOLVENT CDCl3
 NS 256
 DS 4
 SWH 42613.637 Hz
 FIDRES 1.300465 Hz
 AQ 0.7689557 sec
 RG 203
 DW 11.733 usec
 DE 6.50 usec
 TE 303.0 K
 D1 2.00000000 sec
 D11 0.03000000 sec
 TD0 1
 SFO1 176.0362620 MHz
 NUC1 13C
 P1 8.95 usec
 PLW1 100.00000000 W
 SFO2 700.0098000 MHz
 NUC2 1H
 CPDPRG[2] waltz16
 PCPD2 65.00 usec
 PLW2 40.00000000 W
 PLW12 1.57060003 W
 PLW13 0.79086000 W

F2 - Processing parameters

SI 131072
 SF 176.0169002 MHz
 WDW no
 SSB 0
 LB 0 Hz
 GB 0
 PC 1.40

7.262
7.021
7.010
6.952
6.941
5.352
5.350
5.348
5.345
4.938
4.936
4.935
3.875
3.866
3.859
3.850
2.668
2.657
2.648
2.638
2.524
2.513
2.504
2.502
2.494
2.444
2.434
2.424
2.414
2.342
2.331
2.318
2.312
1.893
1.883
1.874
1.407
1.104
1.094
1.083
0.921
0.912
0.877
0.867

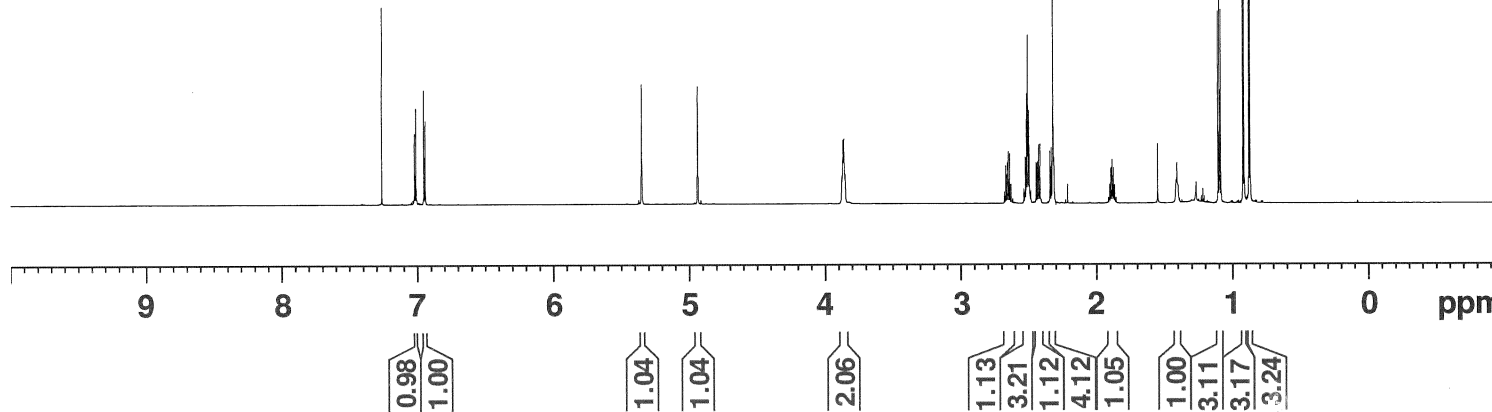


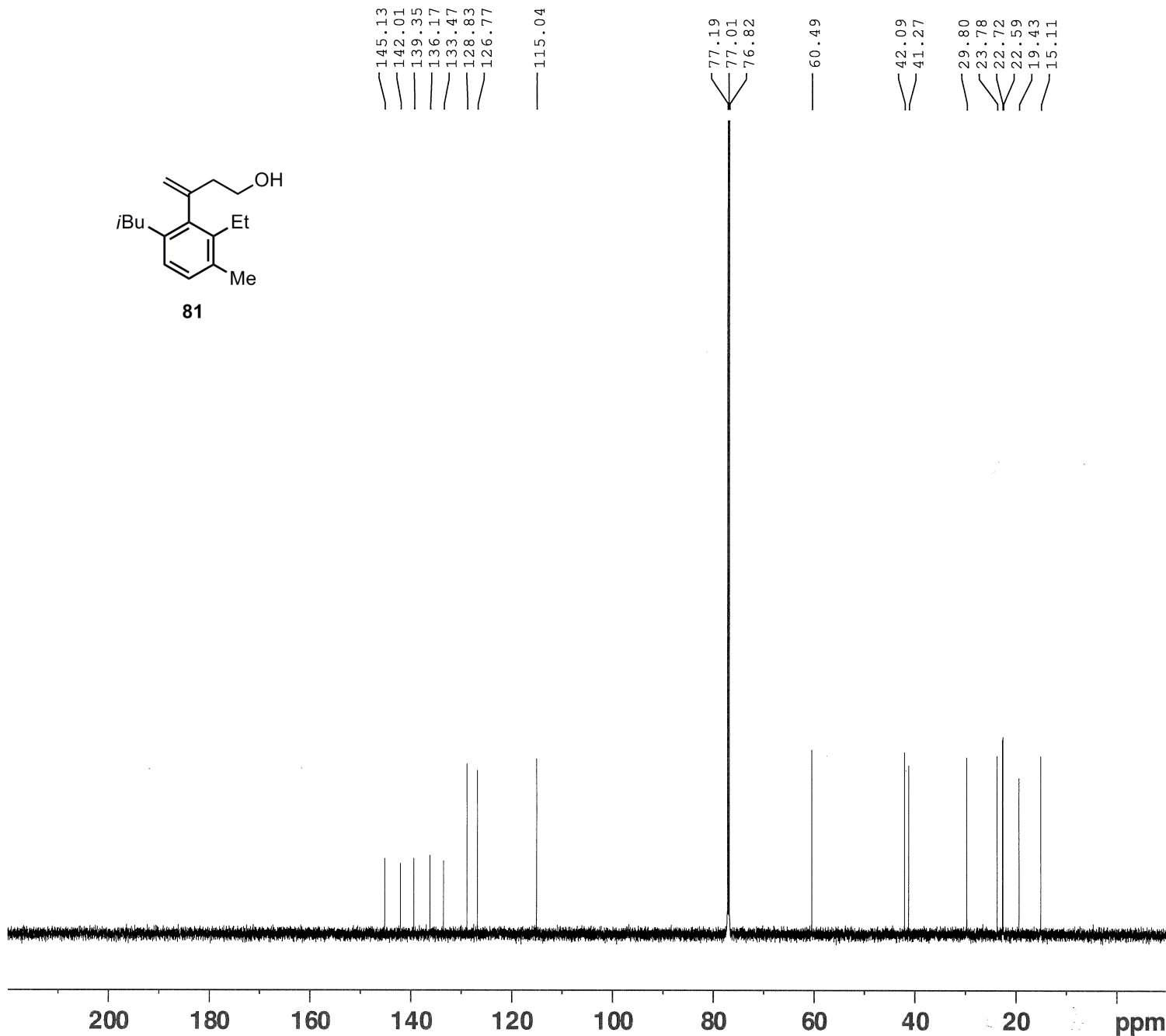
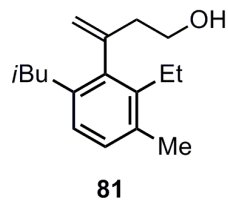
81

Current Data Parameters
NAME XZ-3-193
EXPNO 1
PROCNO 1

F2 - Acquisition Parameter
Date_ 20190606
Time 18.00 h
INSTRUM spect
PROBHD Z566801_0015 (
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 10504.202 Hz
FIDRES 0.320563 Hz
AQ 3.1195135 sec
RG 128
DW 47.600 usec
DE 6.50 usec
TE 303.2 K
D1 1.000000000 sec
TD0 1
SFO1 700.0115500 MHz
NUC1 1H
P1 12.88 usec
PLW1 40.00000000 W

F2 - Processing parameters
SI 131072
SF 700.0070164 MHz
WDW no
SSB 0
LB 0 Hz
GB 0
PC 1.00



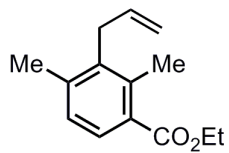


Current Data Parameters
 NAME XZ-3-193
 EXPNO 2
 PROCNO 1

F2 - Acquisition Parameter
 Date_ 20190606
 Time 18.13 h
 INSTRUM spect
 PROBHD Z566801_0015 (
 PULPROG zgpg30
 TD 65536
 SOLVENT CDCl3
 NS 192
 DS 4
 SWH 42613.637 Hz
 FIDRES 1.300465 Hz
 AQ 0.7689557 sec
 RG 203
 DW 11.733 usec
 DE 6.50 usec
 TE 303.2 K
 D1 2.00000000 sec
 D11 0.03000000 sec
 TD0 1
 SFO1 176.0362620 MHz
 NUC1 13C
 P1 8.95 usec
 PLW1 100.0000000 W
 SFO2 700.0098000 MHz
 NUC2 1H
 CPDPRG[2] waltz16
 PCPD2 65.00 usec
 PLW2 40.00000000 W
 PLW12 1.57060003 W
 PLW13 0.79086000 W

F2 - Processing parameters
 SI 131072
 SF 176.0169002 MHz
 WDW EM
 SSB 0
 LB 1.00 Hz
 GB 0
 PC 1.40

7.573
7.562
7.262
7.060
7.048
5.931
5.924
5.916
5.914
5.909
5.906
5.899
5.892
5.019
5.017
5.014
5.011
5.005
5.002
4.999
4.997
4.823
4.821
4.818
4.815
4.799
4.796
4.794
4.791
4.358
4.348
4.337
4.327
3.454
3.451
3.449
3.446
3.444
3.441
2.478
2.322
1.393
1.383
1.372

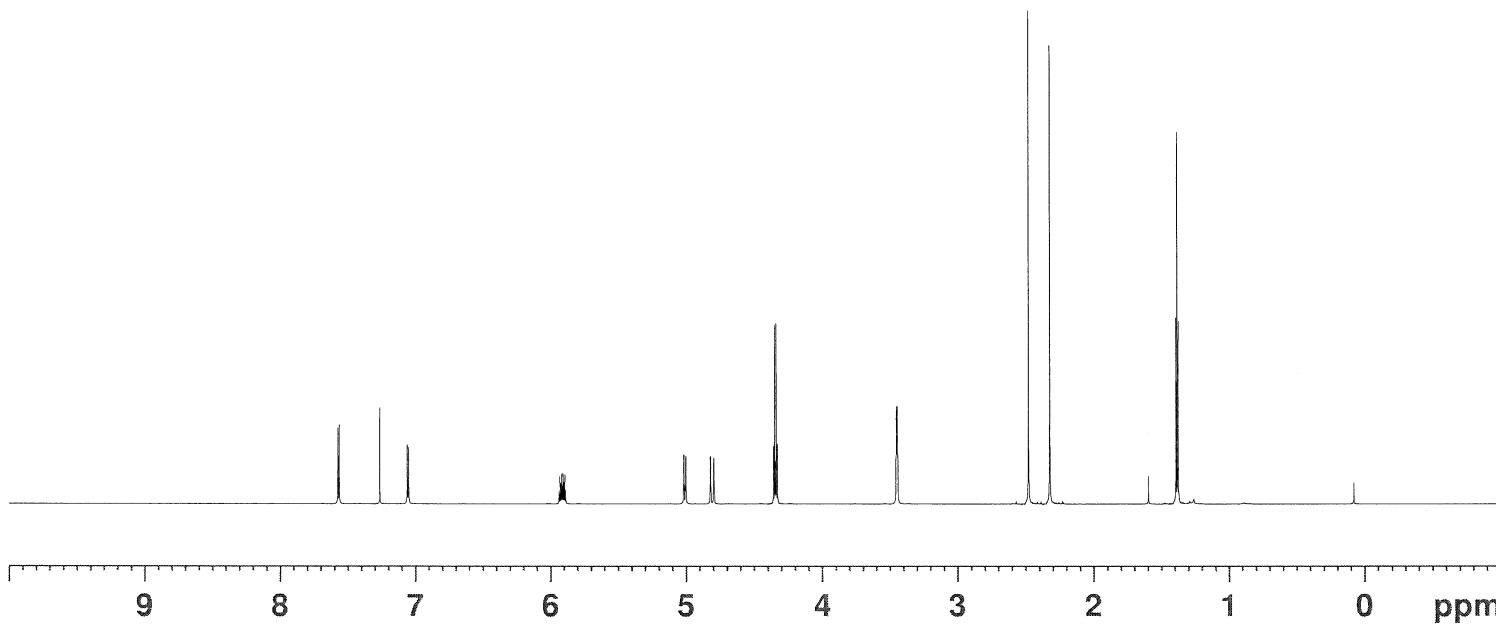


82

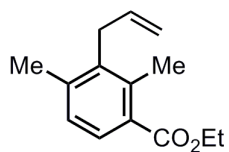
Current Data Parameters
NAME XZ-3-189
EXPNO 4
PROCNO 1

F2 - Acquisition Parameters
Date_ 20200709
Time 0.26 h
INSTRUM spect
PROBHD z151340_0001 (
PULPROG zg30
TD 65536
SOLVENT CDC13
NS 16
DS 2
SWH 10504.202 Hz
FIDRES 0.320563 Hz
AQ 3.1195135 sec
RG 22.6
DW 47.600 usec
DE 20.00 usec
TE 303.2 K
D1 1.00000000 sec
TD0 1
SFO1 700.0115500 MHz
NUC1 1H
P0 3.17 usec
P1 9.50 usec
PLW1 13.00000000 W

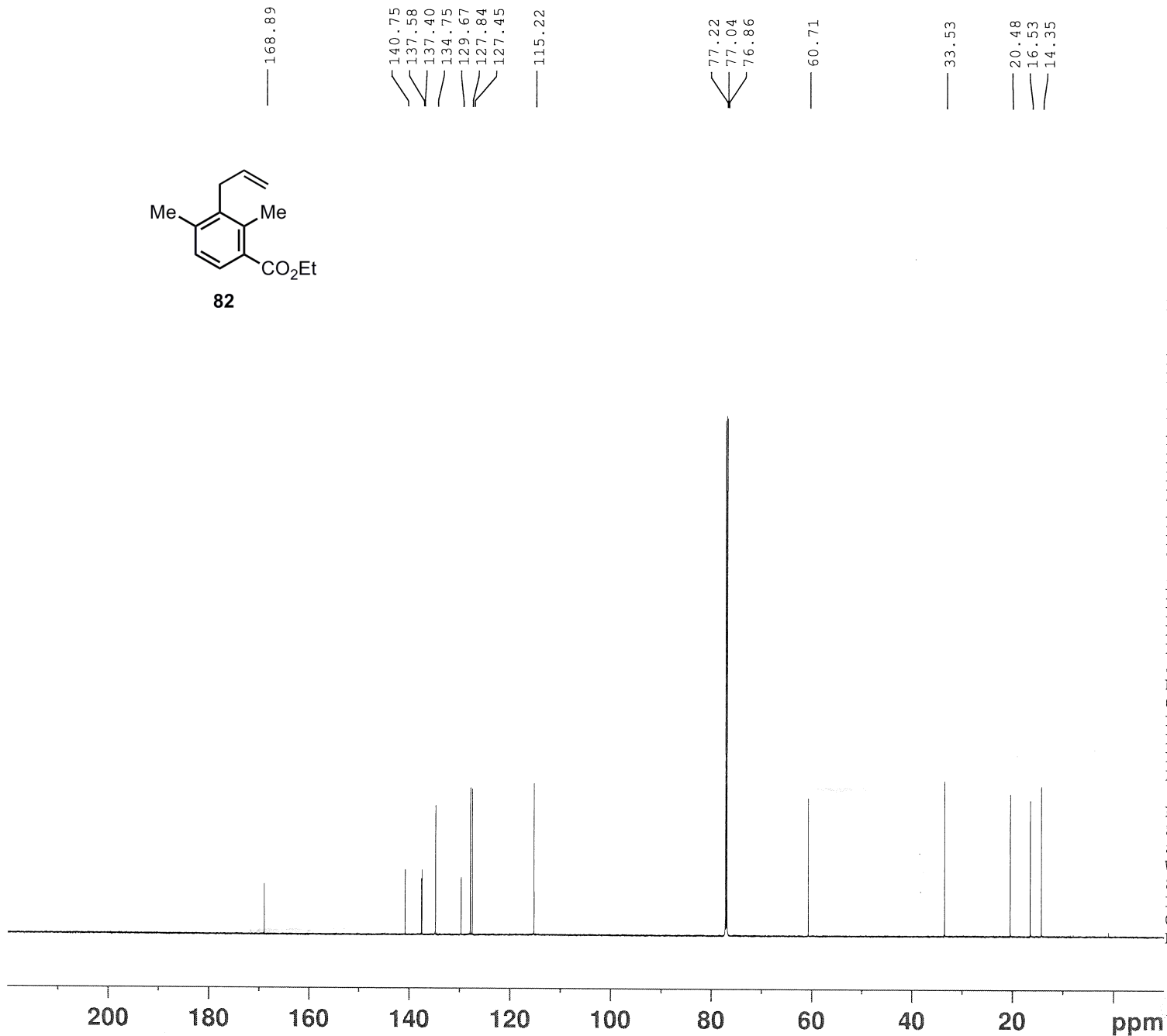
F2 - Processing parameters
SI 131072
SF 700.0070146 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00



1.00
1.02
1.01
1.04
1.04
2.05
2.13
3.13
3.19
3.20



82

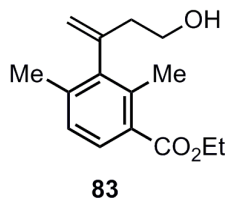


168.89	140.75	137.58	137.40	134.75	129.67	127.84	127.45	115.22	77.22	77.04	76.86	60.71	33.53	20.48	16.53	14.35
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Current Data Parameters
 NAME XZ-3-189
 EXPNO 5
 PROCNO 1

F2 - Acquisition Parameters
 Date_ 20200709
 Time 0.30 h
 INSTRUM spect
 PROBHD Z151340_0001 (
 PULPROG zgpg30
 TD 65536
 SOLVENT CDCl3
 NS 11
 DS 4
 SWH 42613.637 Hz
 FIDRES 1.300465 Hz
 AQ 0.7689557 sec
 RG 203
 DW 11.733 usec
 DE 18.00 usec
 TE 303.2 K
 D1 2.00000000 sec
 D11 0.03000000 sec
 TD0 1
 SFO1 176.0362620 MHz
 NUC1 13C
 P0 3.75 usec
 P1 11.25 usec
 PLW1 29.00000000 W
 SFO2 700.0098000 MHz
 NUC2 1H
 CPDPRG[2] waltz16
 PCPD2 65.00 usec
 PLW2 13.00000000 W
 PLW12 0.27768999 W
 PLW13 0.13982999 W

F2 - Processing parameters
 SI 131072
 SF 176.0169002 MHz
 WDW EM
 SSB 0
 LB 1.00 Hz
 GB 0
 PC 1.40

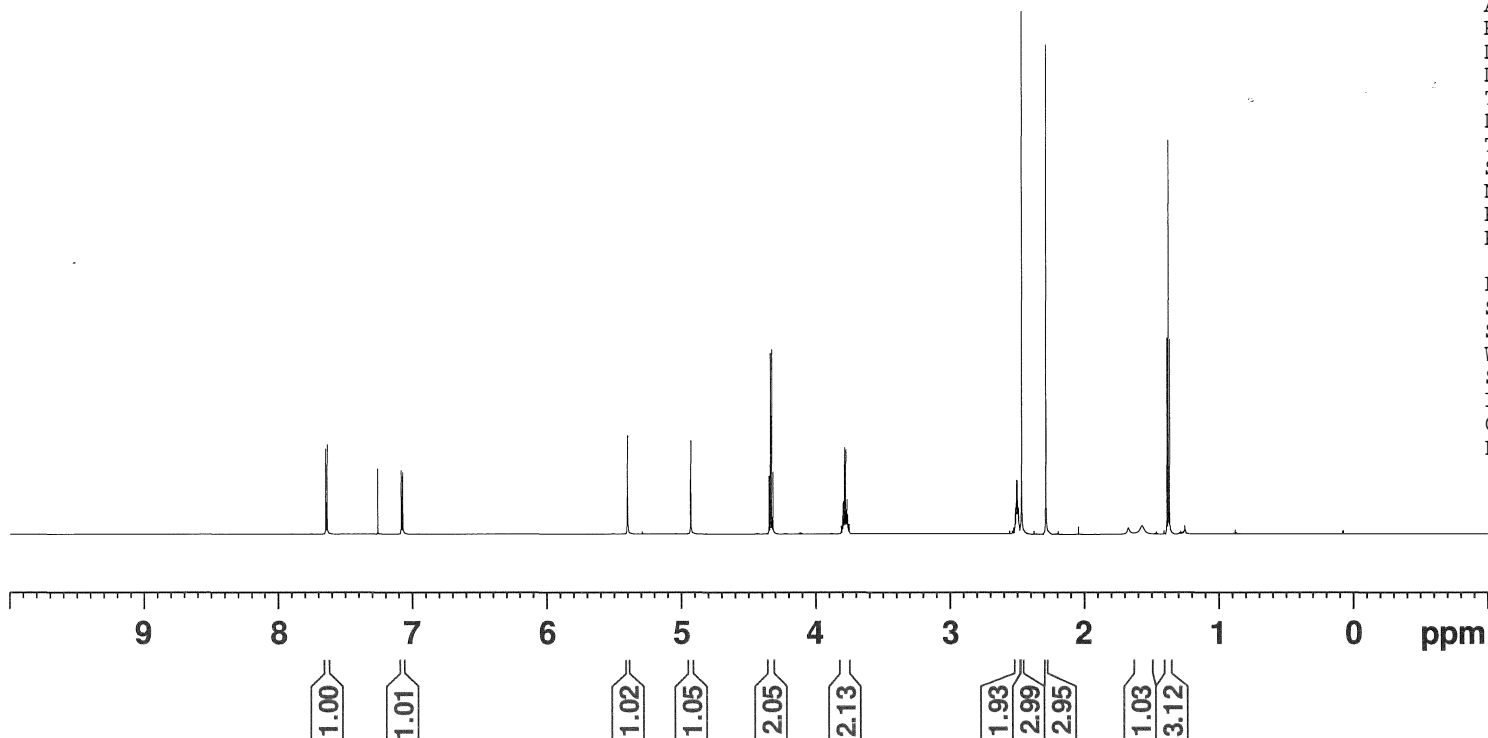


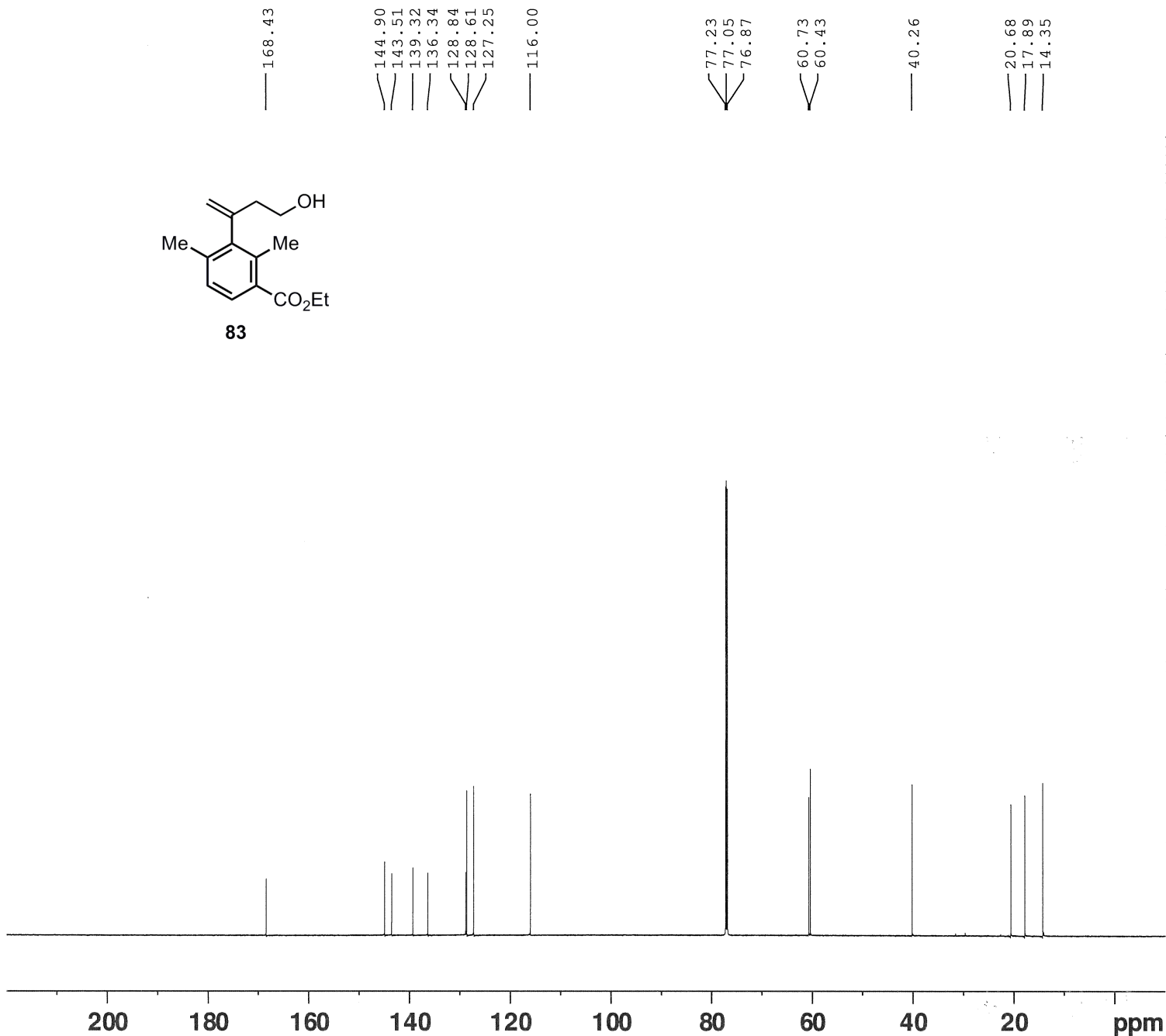
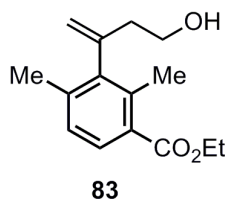
7.650
7.639
7.262
7.087
7.075
5.406
5.404
4.936
4.935
4.353
4.343
4.332
4.322
3.816
3.806
3.800
3.797
3.791
3.781
3.775
3.771
3.765
3.756
2.513
2.504
2.497
2.488
2.466
2.286
1.572
1.387
1.377
1.367

Current Data Parameters
NAME XZ-3-188
EXPNO 1
PROCNO 1

F2 - Acquisition Parameter
Date_ 20190602
Time 16.10 h
INSTRUM spect
PROBHD Z151340_0001 (
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 10504.202 Hz
FIDRES 0.320563 Hz
AQ 3.1195135 sec
RG 5.6
DW 47.600 usec
DE 10.00 usec
TE 303.2 K
D1 1.00000000 sec
TD0 1
SFO1 700.0115500 MHz
NUC1 1H
P1 9.50 usec
PLW1 13.00000000 W

F2 - Processing parameters
SI 131072
SF 700.0070164 MHz
WDW no
SSB 0
LB 0 Hz
GB 0
PC 1.00



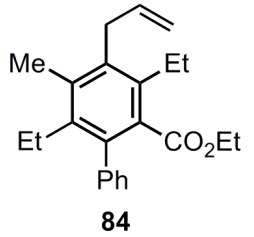


Current Data Parameters
 NAME XZ-3-188
 EXPNO 2
 PROCNO 1

F2 - Acquisition Parameter
 Date_ 20190602
 Time 16.16 h
 INSTRUM spect
 PROBHD Z151340_0001 (
 PULPROG zgpg30
 TD 65536
 SOLVENT CDC13
 NS 35
 DS 4
 SWH 42613.637 Hz
 FIDRES 1.300465 Hz
 AQ 0.7689557 sec
 RG 203
 DW 11.733 usec
 DE 18.00 usec
 TE 303.2 K
 D1 2.00000000 sec
 D11 0.03000000 sec
 TD0 1
 SFO1 176.0362620 MHz
 NUC1 13C
 P1 11.25 usec
 PLW1 29.00000000 W
 SFO2 700.0098000 MHz
 NUC2 1H
 CPDPRG[2] waltz16
 PCPD2 65.00 usec
 PLW2 13.00000000 W
 PLW12 0.27768999 W
 PLW13 0.13982999 W

F2 - Processing parameters
 SI 131072
 SF 176.0169002 MHz
 WDW EM
 SSB 0
 LB 1.00 Hz
 GB 0
 PC 1.40

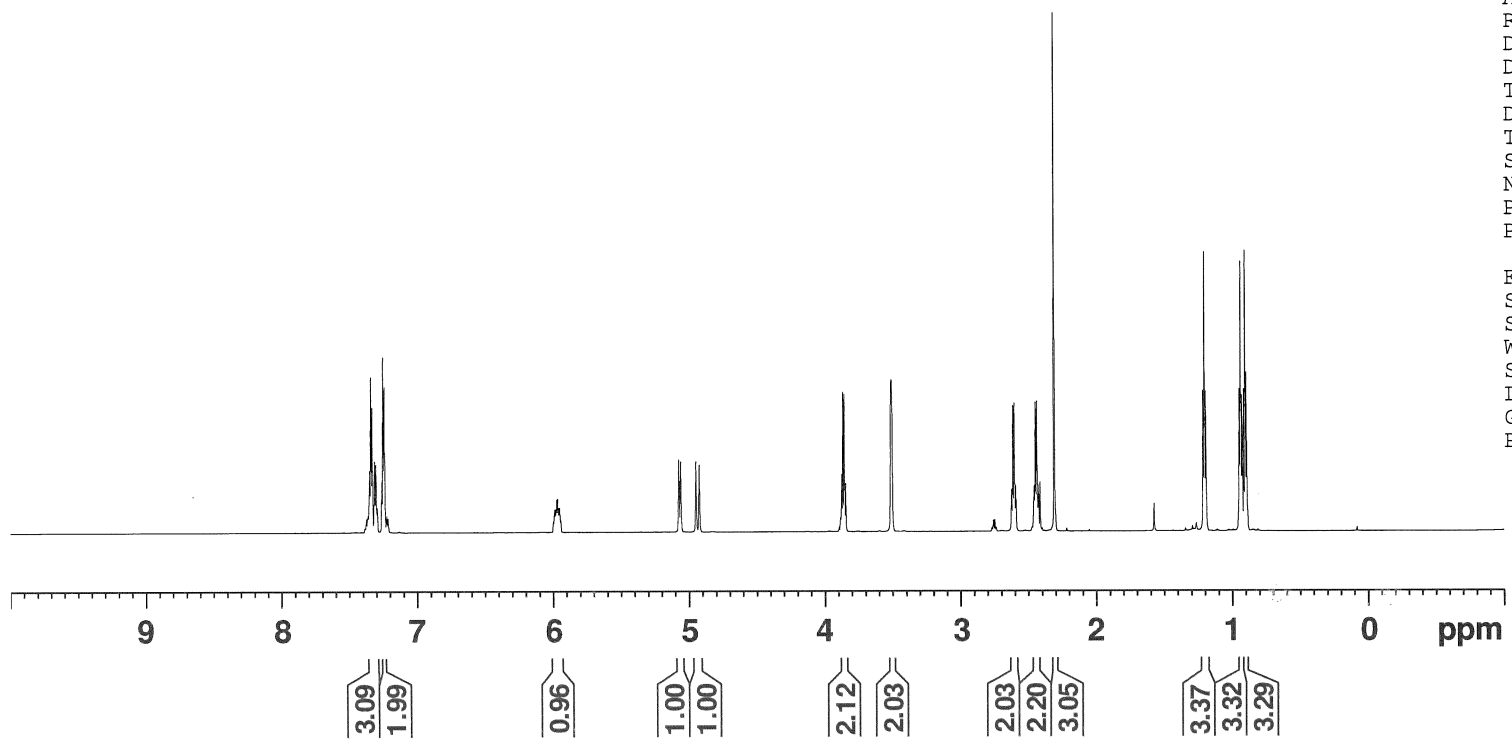
7.353
7.342
7.332
7.315
7.305
7.294
7.262
7.252
7.242
5.991
5.984
5.976
5.967
5.959
5.952
5.075
5.060
4.949
4.924
4.924
3.876
3.866
3.856
3.846
3.511
3.506
2.624
2.614
2.603
2.592
2.458
2.448
2.437
2.427
2.414
2.310
1.213
1.203
1.192
0.946
0.936
0.926
0.914
0.904
0.894

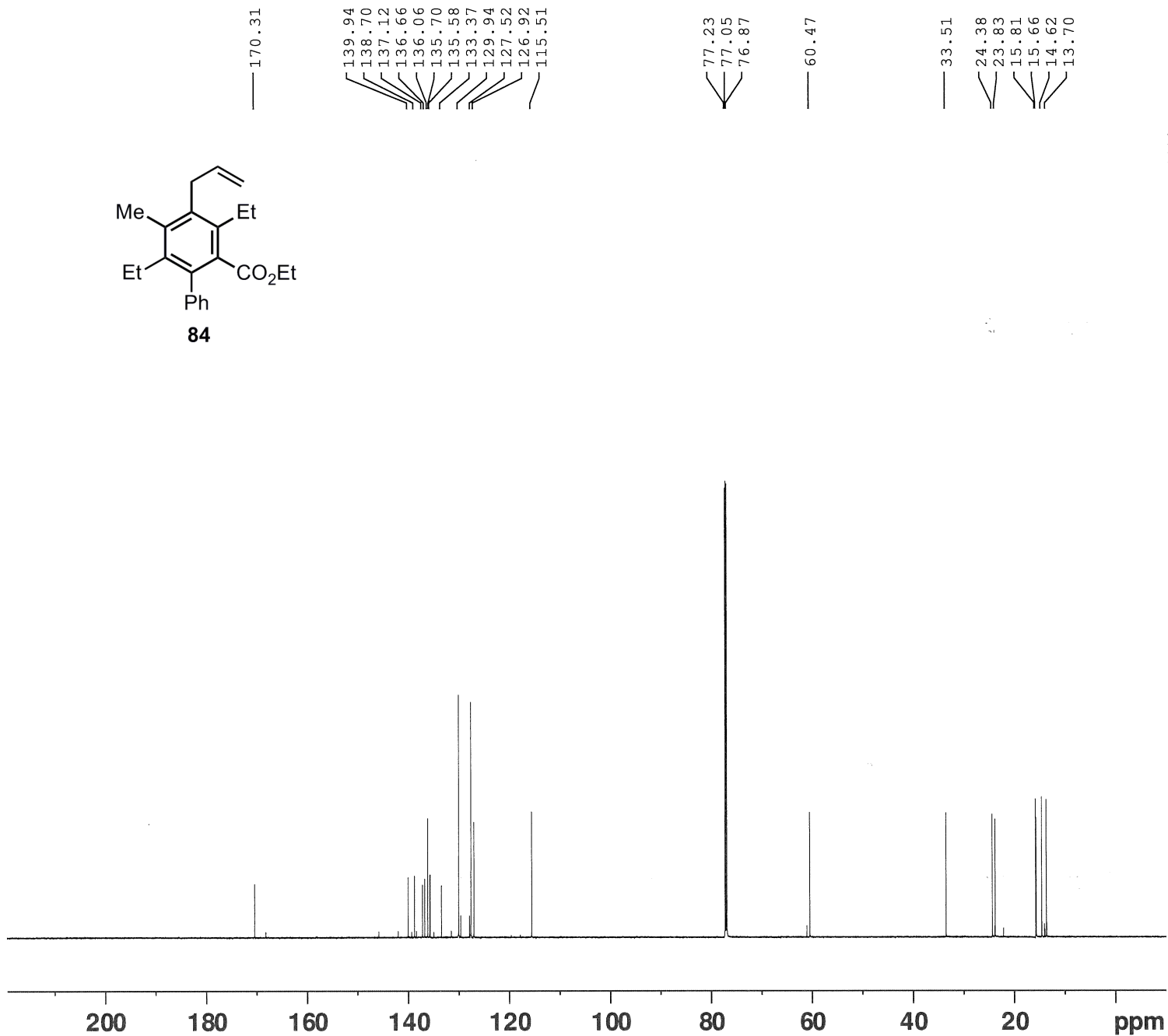
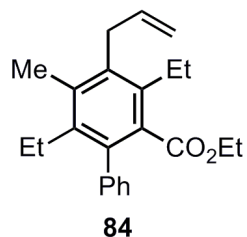


Current Data Parameters
NAME XZ-3-230
EXPNO 2
PROCNO 1

F2 - Acquisition Parameter
Date_ 20190708
Time 14.33 h
INSTRUM spect
PROBHD Z151340_0001 (
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 10504.202 Hz
FIDRES 0.320563 Hz
AQ 3.1195135 sec
RG 20.2
DW 47.600 usec
DE 20.00 usec
TE 303.4 K
D1 1.00000000 sec
TD0 1
SFO1 700.0115500 MHz
NUC1 1H
P1 9.50 usec
PLW1 13.00000000 W

F2 - Processing parameters
SI 131072
SF 700.0070167 MHz
WDW no
SSB 0
LB 0 Hz
GB 0
PC 1.00



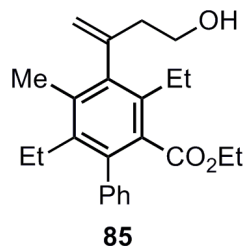


Current Data Parameters
 NAME XZ-3-230
 EXPNO 3
 PROCNO 1

F2 - Acquisition Parameter
 Date_ 20190708
 Time 14.41 h
 INSTRUM spect
 PROBHD Z151340_0001 (
 PULPROG zgpg30
 TD 65536
 SOLVENT CDCl3
 NS 32
 DS 4
 SWH 42613.637 Hz
 FIDRES 1.300465 Hz
 AQ 0.7689557 sec
 RG 203
 DW 11.733 usec
 DE 18.00 usec
 TE 303.2 K
 D1 2.00000000 sec
 D11 0.03000000 sec
 TD0 1
 SFO1 176.0362620 MHz
 NUC1 13C
 P1 11.25 usec
 PLW1 29.00000000 W
 SFO2 700.0098000 MHz
 NUC2 1H
 CPDPRG[2] waltz16
 PCPD2 65.00 usec
 PLW2 13.00000000 W
 PLW12 0.27768999 W
 PLW13 0.13982999 W

F2 - Processing parameters
 SI 131072
 SF 176.0169002 MHz
 WDW EM
 SSB 0
 LB 1.00 Hz
 GB 0
 PC 1.40

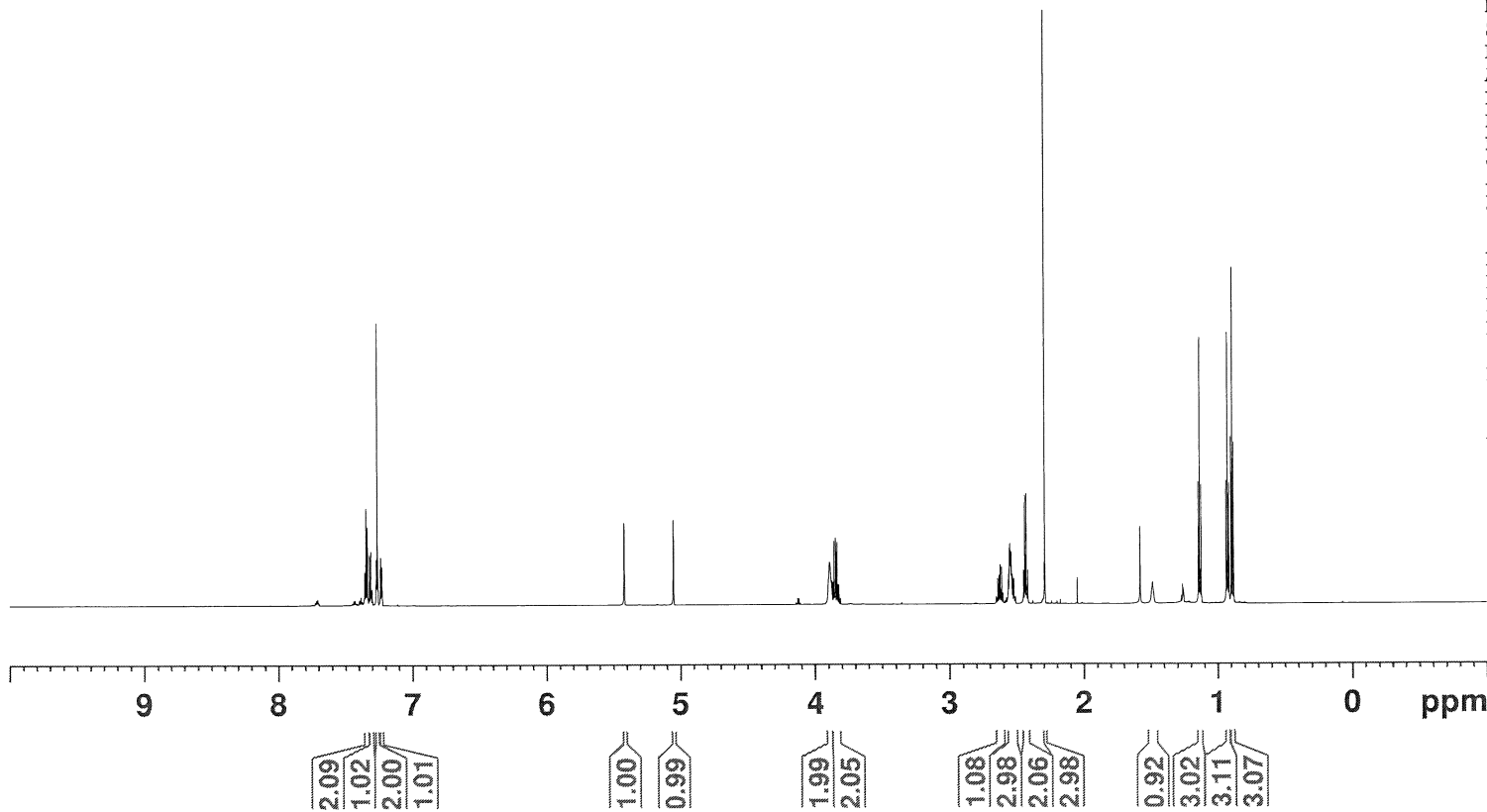
7.356
7.346
7.335
7.320
7.318
7.310
7.270
7.262
7.258
7.240
7.237
7.229
7.227
5.419
5.417
5.052
5.051
3.891
3.883
3.857
3.847
3.844
3.834
2.622
2.611
2.553
2.550
2.546
2.539
2.530
2.450
2.439
2.428
2.418
2.291
1.143
1.133
1.122
0.936
0.926
0.915
0.900
0.890
0.879

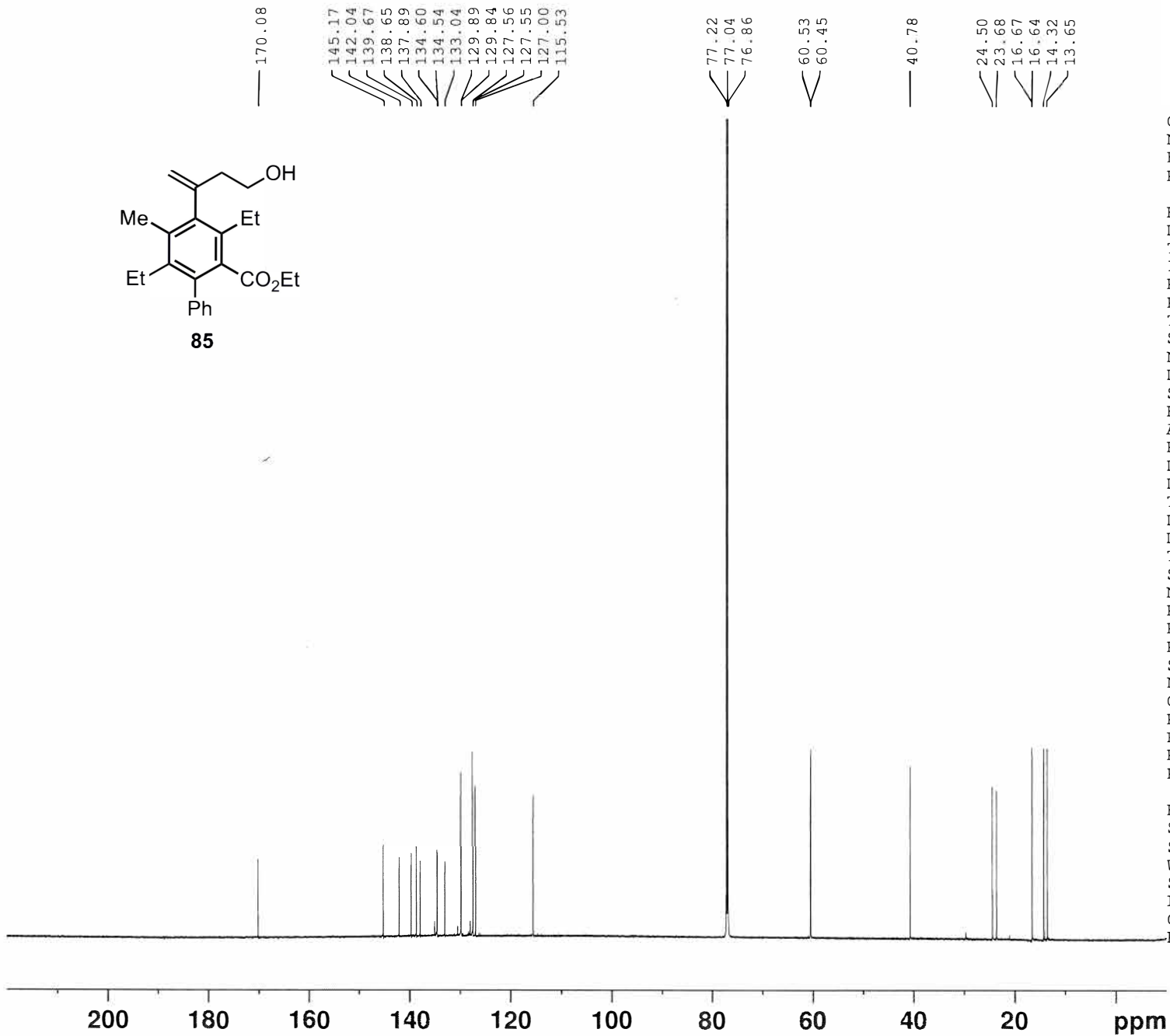
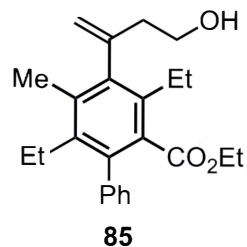


Current Data Parameters
NAME XZ-4-12
EXPNO 1
PROCNO 1

F2 - Acquisition Parameters
Date_ 20190919
Time 10.35 h
INSTRUM spect
PROBHD z151340_0001 (
PULPROG zg30
TD 65536
SOLVENT CDC13
NS 16
DS 2
SWH 10504.202 Hz
FIDRES 0.320563 Hz
AQ 3.1195135 sec
RG 32
DW 47.600 usec
DE 20.00 usec
TE 303.2 K
D1 1.0000000 sec
TD0 1
SFO1 700.0115500 MHz
NUC1 1H
P0 3.17 usec
P1 9.50 usec
PLW1 13.0000000 W

F2 - Processing parameters
SI 131072
SF 700.0070168 MHz
WDW no
SSB 0
LB 0 Hz
GB 0
PC 1.00



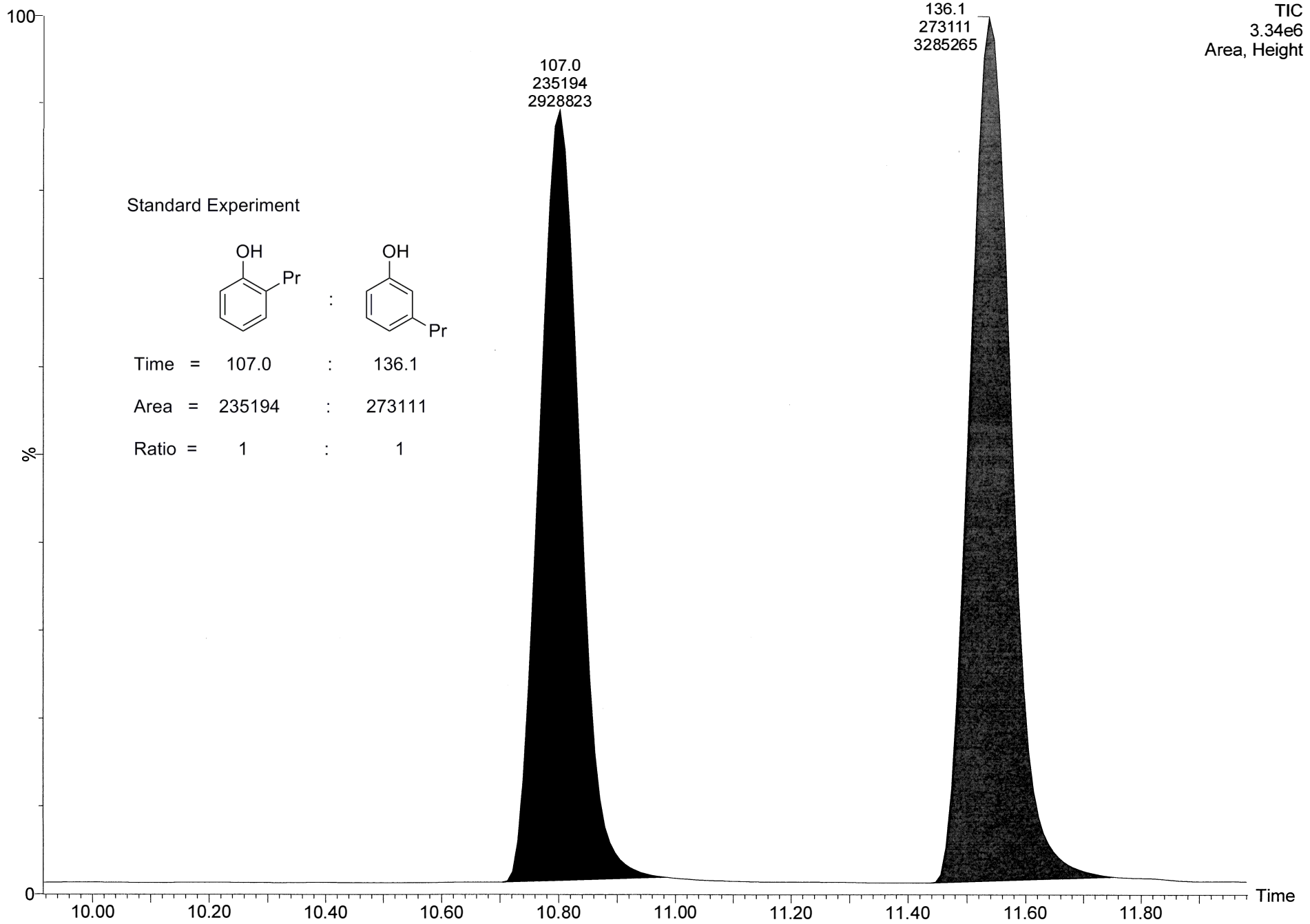


```

Current Data Parameters
NAME           XZ-4-12
EXPNO          2
PROCNO         1

F2 - Acquisition Parameters
Date_          20190919
Time           10.55 h
INSTRUM        spect
PROBHD         z151340_0001 (
PULPROG        zgpg30
ID             65536
SOLVENT        CDCl3
NS             256
DS             4
SWH            42613.637 Hz
FIDRES         1.300465 Hz
AQ            0.7689557 sec
RG            203
DW            11.733 usec
DE            18.00 usec
TE            303.2 K
D1            2.0000000 sec
D11           0.0300000 sec
TD0           1
SFO1          176.0362620 MHz
NUC1          13C
P0            3.75 usec
P1            11.25 usec
PLW1          29.0000000 W
SFO2          700.0098000 MHz
NUC2          1H
CPDPRG[2]     waltz16
PCPD2         65.00 usec
PLW2          13.0000000 W
PLW12         0.27768999 W
PLW13         0.13982999 W

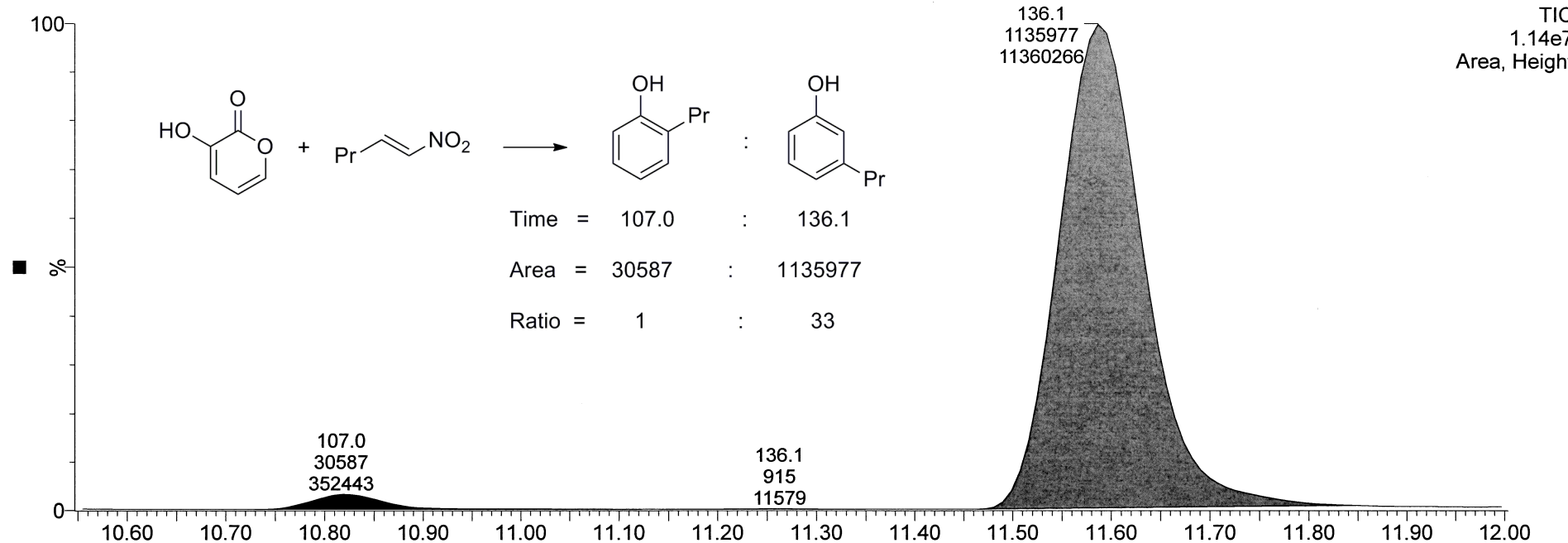
F2 - Processing parameters
SI            131072
SF            176.0169002 MHz
WDW           EM
SSB           0
LB            1.00 Hz
GB            0
PC            1.40
  
```



Zhang, XZ-3-15-x-crude, S1714B, Beaudry
091719BY-04

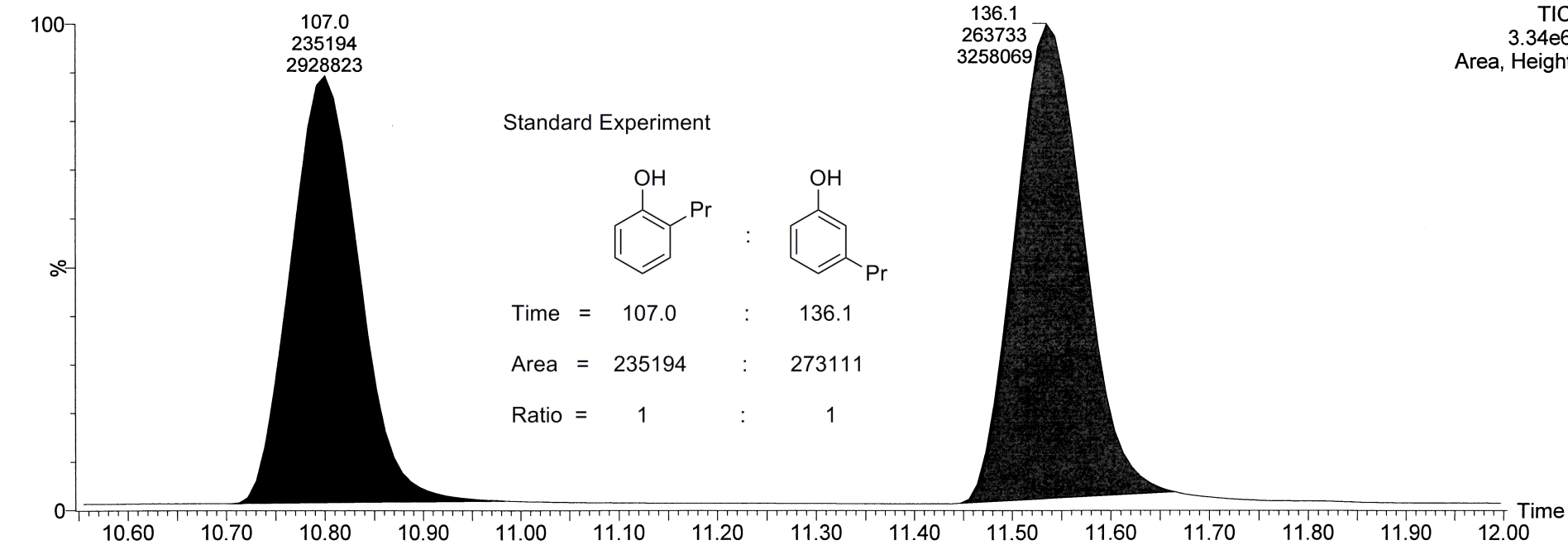
UCA138

TOF MS AP+
TIC
1.14e7
Area, Height



091819BY-17

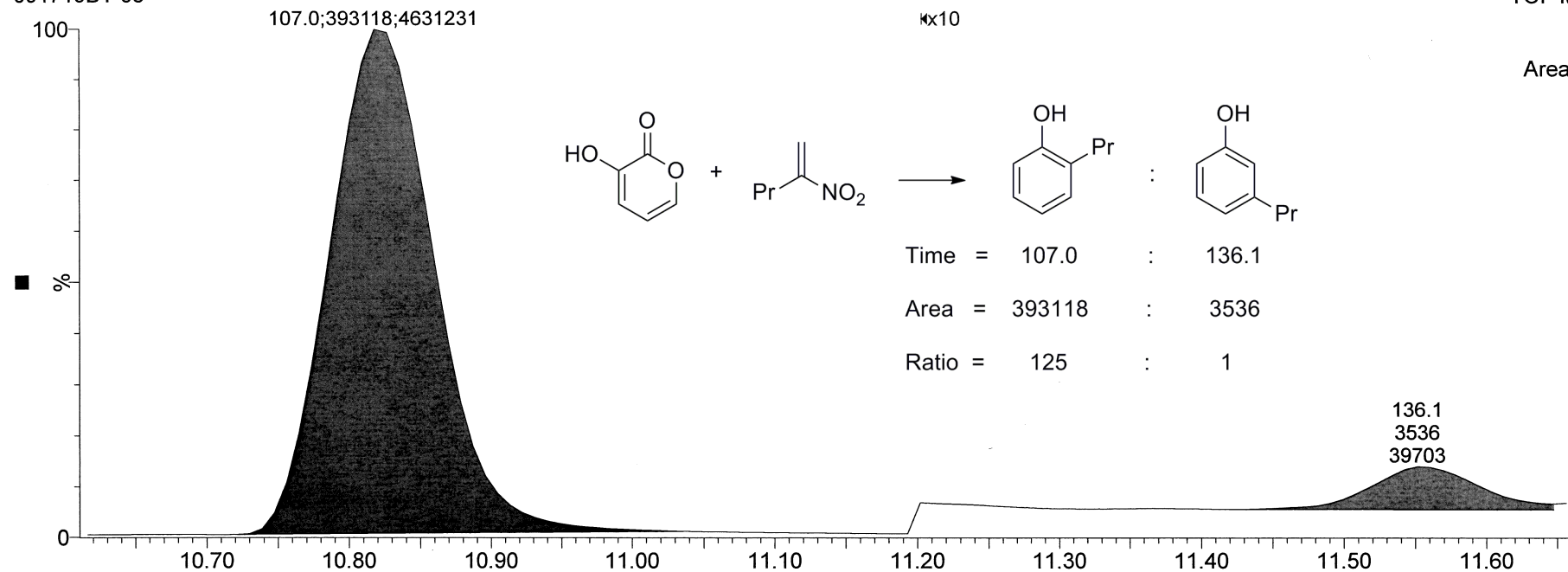
TOF MS AP+
TIC
3.34e6
Area, Height



Zhang, XZ-3-14-x-crude, S1714B, Beaudry
091719BY-05

UCA138

TOF MS AP+
TIC
4.67e6
Area, Height



091819BY-17

