

## **Supporting Information**

### **NHC-Catalyzed**

### **Ring Expansion of Oxacycloalkane-2-**

### **Carboxaldehydes: A Versatile**

### **Synthesis of Lactones**

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## I. Experimental Procedures

### *General Methods.*

Anhydrous solvents were dried using a Braun Solvent Purification System and stored under nitrogen over 3 Å molecular sieves. Commercially available aldehydes were purified by bulb-to-bulb distillation prior to use. 2-Iodoxybenzoic acid (IBX) and Dess-Martin periodinane (DMP) were synthesized according to literature.<sup>1,2</sup> Unless otherwise noted, all other reagents used were commercially available.

Thin layer chromatography (TLC) was performed on Merck Silica Gel 60 F<sub>254</sub> and was visualized with UV light and 5 % phosphomolybdic acid (PMA) and/or KMnO<sub>4</sub>. Silica gel 60 (40-63 μm) used for column chromatography was purchased from Silicycle Chemical Division. NMR spectra were measured in CDCl<sub>3</sub> solution at 500 MHz for <sup>1</sup>H and 125 MHz for <sup>13</sup>C. The residual solvent protons (<sup>1</sup>H) or the solvent carbons (<sup>13</sup>C) were used as internal standards for chemical shifts. Relative configurations were determined when necessary by NOE experiments. High-resolution mass spectra (HRMS) were obtained on a VG 70E double focusing high resolution spectrometer. EI ionization was accomplished at 7 eV and CI at 50 eV with ammonia as the reagent gas. IR spectra were recorded on a Fourier transform interferometer using a diffuse reflectance cell (DRIFT); only diagnostic and/or intense peaks are reported. Unless otherwise stated, all samples were prepared as a film on a KBr pellet for IR analysis. Optical rotations were determined from an average of 5 measurements at ambient temperature using a 1 mL, 1 dm cell; the units are 10<sup>-1</sup>deg cm<sup>2</sup> g<sup>-1</sup>, the concentrations are reported in units of g/100 mL. The enantiomeric excess was determined, when necessary, using an HP 1200 HPLC system. CHIRALPAK® IC column was purchased from Daicel Chemical Industries, Ltd.

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<sup>1</sup> IBX Synthesis: Frigerio, M.; Santagostino; Sputore, S. *J. Org. Chem.* **1999**, *64*, 4537-4538.

<sup>2</sup> Dess-Martin periodinane synthesis: Boeckman, R. K.; Shao, P. Jr.; Mullins, J. J. *Org. Synth.* **2004**, *10*, 696-708.

## General Procedures

### Epoxidation-Ring Closing Reactions.

*Method A.* A solution of the alcohol in CH<sub>2</sub>Cl<sub>2</sub> (0.2 M) was cooled to 0 °C. *m*CPBA (1.2 equiv.) was added in one portion and the reaction was allowed to warm up to room temperature. Upon complete consumption of the alcohol, camphorsulfonic acid (0.25 equiv.) was added and stirred for an additional 24 hours. The reaction was quenched with saturated NaHCO<sub>3</sub> (aq) and extracted with CH<sub>2</sub>Cl<sub>2</sub> (3×). The combined organic extracts were dried over MgSO<sub>4</sub> or Na<sub>2</sub>SO<sub>4</sub>, then concentrated under reduced pressure. The resulting residue was purified by column chromatography.

*Method B.* A solution of the alcohol in CH<sub>2</sub>Cl<sub>2</sub> (0.2 M) was cooled to 0 °C. *m*CPBA (1.2 equiv) was added in one portion and the reaction was allowed to warm up to room temperature, then stirred for 48 hours. The reaction was quenched with saturated NaHCO<sub>3</sub> (aq) and extracted with CH<sub>2</sub>Cl<sub>2</sub> (3×). The combined organic extracts were dried over MgSO<sub>4</sub> or Na<sub>2</sub>SO<sub>4</sub>, then concentrated under reduced pressure. The resulting residue was purified by column chromatography.

### Oxidation reactions.

*IBX oxidation.* A suspension of alcohol and IBX (1.4 equiv.) in CH<sub>3</sub>CN (0.2 M) was refluxed until complete consumption of the alcohol. The mixture was cooled to room temperature, then filtered through a pad of basic alumina or celite, washing with ethyl acetate. The filtrate was collected and concentrated under reduced pressure.

*Swern oxidation.* A solution of oxalyl chloride (1.1 equiv.) in dry CH<sub>2</sub>Cl<sub>2</sub> (0.2 M) was cooled to -78 °C, under inert atmosphere. DMSO (2.2 equiv.) was added to the reaction mixture, followed by the alcohol (1 equiv.) and the reaction was stirred for 30 minutes at -78 °C. Et<sub>3</sub>N (5 equiv.) was added dropwise and the reaction was allowed to warm up to room temperature. After complete consumption of the alcohol, the reaction was quenched with saturated NH<sub>4</sub>Cl (aq), stirred for 5 minutes and the reaction mixture was extracted

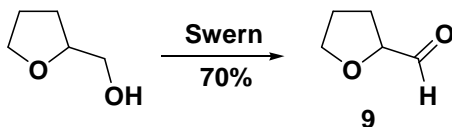
with  $\text{CH}_2\text{Cl}_2$ . The combined organic extracts were dried over  $\text{MgSO}_4$ , then concentrated under reduced pressure.

*Dess-Martin Periodinane oxidation.* DMP was added to a solution of the appropriate alcohol in  $\text{CH}_2\text{Cl}_2$  (0.2 M) at 0 °C. The reaction was allowed to warm up to room temperature. Upon consumption of the alcohol, the mixture was diluted with  $\text{CH}_2\text{Cl}_2$  and washed several times with a 1:1 mixture of saturated  $\text{NaHCO}_3$  (aq) and saturated  $\text{Na}_2\text{S}_2\text{O}_3$  (aq). The resulting organic extract was dried over  $\text{MgSO}_4$  or  $\text{Na}_2\text{SO}_4$ , then concentrated under reduced pressure.

### **NHC-catalyzed ring expansion reaction.**

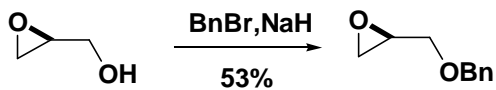
To a 0.5 M solution of oxacycloalkane-2-carboxaldehyde (x mmol) in anhydrous  $\text{CH}_2\text{Cl}_2$  was added 1,3-bis-(2,6-diisopropylphenyl)imidazolium chloride (0.1x mmol), followed by DBU (0.08x mmol) under nitrogen at room temperature. The reaction was monitored by thin layer chromatography, and quenched using 10 %  $\text{NH}_4\text{Cl}$  (aq.). The mixture was then extracted using  $\text{CH}_2\text{Cl}_2$  (3×). The combined organic layers were dried over  $\text{Na}_2\text{SO}_4$ , concentrated under reduced pressure, and purified by column chromatography to afford the lactone.

## II. Synthesis and Characterization Data



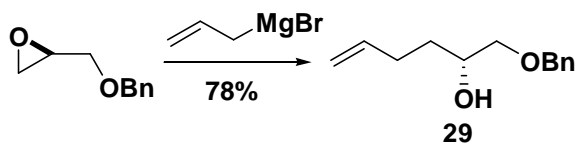
### Tetrahydrofuran-2-carbaldehyde (9).

Tetrahydrofuran-2-carbaldehyde was prepared from commercially available racemic tetrahydrofurfuryl alcohol as reported.<sup>3</sup> <sup>1</sup>H NMR (500 MHz, CDCl<sub>3</sub>) δ 9.65 (d, *J* = 1.4 Hz, 1H), 4.26 (dd, *J* = 13.1, 6.6 Hz, 1H), 3.95-3.90 (m, 2H), 2.13-1.87 (m, 4H).



### (*R*)-2-(Benzyloxymethyl)oxirane.

(*R*)-2-(Benzyloxymethyl)oxirane was prepared from commercially available (*S*)-glycidol as reported.<sup>4</sup> <sup>1</sup>H NMR (500 MHz, CDCl<sub>3</sub>) δ 7.45-7.19 (m, 5H), 4.59 (dd, *J* = 27.7, 11.9 Hz, 2H), 3.77 (dd, *J* = 11.4, 2.8 Hz, 1H), 3.45 (d, *J* = 11.4, 5.7 Hz, 1H), 3.20-3.18 (m, 1H), 2.80 (dd, *J* = 4.8, 4.8 Hz, 1H), 2.62 (dd, *J* = 2.6, 1.8 Hz, 1H).



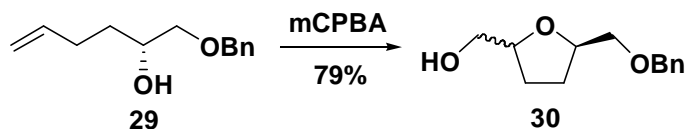
### (*R*)-1-(Benzyloxy)hex-5-en-2-ol. (29)

Allylmagnesium bromide (2.44 mL of a 1.0 M solution in Et<sub>2</sub>O, 2.44 mmol) was added dropwise to a solution of (*R*)-2-(benzyloxymethyl)oxirane (100 mg, 0.61 mmol) and

<sup>3</sup> Bianchi, P.; Roda, G.; Riva, S.; Danieli, B.; Zabelinskaja-Mackova, A.; Griengl, H. *Tetrahedron* **2001**, *57*, 2213-2220.

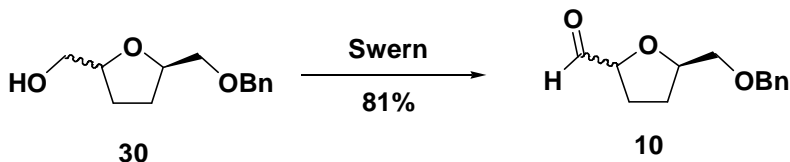
<sup>4</sup> Heathcock, C. H.; Hubbs, J. L. *J. Am. Chem. Soc.* **2003**, *125*, 12836-12843.

copper (I) iodide (11.6 mg, 0.061 mmol) in THF (6 mL) at 0 °C. After 30 min, the reaction was quenched with aqueous saturated NH<sub>4</sub>Cl (5 mL) and extracted with Et<sub>2</sub>O (3×5 mL). The combined organic layers were dried over Na<sub>2</sub>SO<sub>4</sub>, concentrated, and purified by column chromatography (10 % EtOAc/ Hexanes) to afford the title compound (97 mg, 78% yield) as a colorless oil. [ $\alpha$ ]<sub>D</sub> -11 (*c* 1.00, CHCl<sub>3</sub>); **IR**  $\nu_{\text{max}}$ : 3442, 2976, 2919, 1640, 1496 cm<sup>-1</sup>; **<sup>1</sup>H NMR** (500 MHz, CDCl<sub>3</sub>)  $\delta$  7.38-7.29 (m, 5H), 5.86-5.80 (m, 1H), 5.04 (d, *J* = 17.0 Hz, 1H), 4.98 (d, *J* = 10.1 Hz, 1H), 4.56 (s, 2H), 3.86-3.81 (m, 1H), 3.51 (dd, *J* = 9.4, 3.9 Hz, 1H), 3.35 (dd, *J* = 7.9, 7.9 Hz, 1H), 2.49 (br s, 1H), 2.25-2.20 (m, 1H), 2.17-2.11 (m, 1H), 1.62-1.50 (m, 2H); **<sup>13</sup>C NMR** (125 MHz, CDCl<sub>3</sub>)  $\delta$  138.4, 138.2, 128.6, 127.9, 127.88, 115.0, 74.7, 73.5, 70.0, 32.5, 29.9; **HRMS** (EI<sup>+</sup>) *m/z* calcd for C<sub>13</sub>H<sub>18</sub>O<sub>2</sub> [M]<sup>+</sup>: 206.1306, found: 206.1305.



**(5(*R*)-(Benzyloxymethyl)tetrahydrofuran-2-yl)methanol. (30)**

Reaction of (*R*)-1-(benzyloxy)hex-5-en-2-ol (90 mg, 0.44 mmol) with *m*CPBA (182 mg, 0.53 mmol) following the general procedure A afforded 76 mg (79% yield) of the title alcohol as a colorless oil (1.3:1 mixture of epimers). **IR**  $\nu_{\text{max}}$ : 3441, 2867, 1496, 1364 cm<sup>-1</sup>; **<sup>1</sup>H NMR** (500 MHz, CDCl<sub>3</sub>)  $\delta$  7.42-7.27 (m, 10H, both epimers), 4.61-4.53 (m, 4H, both epimers), 4.22-4.09 (m, 4H, both epimers), 3.77 (dd, *J* = 11.6, 2.9 Hz, 1H, major epimer), 3.69 (dd, *J* = 11.6, 3.2 Hz, 1H, minor epimer), 3.61 (dd, *J* = 10.0, 3.6 Hz, 1H, major epimer), 3.62-3.49 (m, 1H, minor epimer), 3.50-3.45 (m, 4H), 2.04-1.87 (m, 8H, both epimers), 1.79-1.65 (m, 2H, both epimers); **<sup>13</sup>C NMR** (125 MHz, CDCl<sub>3</sub>)  $\delta$ : 138.4, 138.1, 128.5, 128.4, 127.84, 127.81, 127.8, 127.7, 80.2, 79.9, 78.7, 78.4, 73.5, 73.47, 73.0, 72.6, 65.3, 65.26, 64.6, 29.0, 28.5, 27.6; **HRMS** (EI<sup>+</sup>) *m/z* calcd for C<sub>13</sub>H<sub>18</sub>O<sub>3</sub> [M]<sup>+</sup>: 222.1256, found: 222.1251.



**(5R)-5-(Benzyloxymethyl)tetrahydrofuran-2-carbaldehyde (10).**

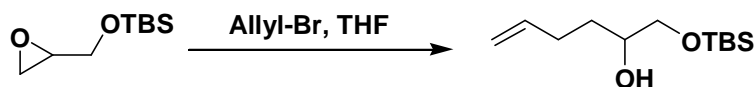
Swern oxidation of (5R)-5-(benzyloxymethyl)tetrahydrofuran-2-ylmethanol (76 mg, 0.34 mmol) following the general procedure afforded 40 mg (81 % yield) of the title aldehyde as a colorless oil (1.3:1 mixture of epimers). **IR**  $\nu_{\text{max}}$ : 2865, 1731, 1496, 1453, 1365  $\text{cm}^{-1}$ ;  **$^1\text{H}$  NMR** (500 MHz,  $\text{CDCl}_3$ )  $\delta$  9.684 (s, 1H, major epimer), 9.681 (s, 1H, minor epimer), 7.36-7.27 (m, 10H, both epimers), 4.59-4.57 (m, 4H, both epimers), 4.36-4.27 (m, 4H, both epimers), 3.57-3.51 (m, 4H, both epimers), 2.13-1.72 (m, 8H, both epimers);  **$^{13}\text{C}$  NMR** (125 MHz,  $\text{CDCl}_3$ )  $\delta$  203.4, 202.8, 138.2, 128.5, 127.8, 83.6, 83.3, 80.1, 79.9, 73.6, 72.7, 72.4, 28.0, 27.9, 27.3; **HRMS** ( $\text{EI}^+$ )  $m/z$  calcd for  $\text{C}_{13}\text{H}_{16}\text{O}_3$  [ $\text{M}$ ] $^+$ : 220.1099, found: 220.1098.



**tert-Butyldimethylsilyl glycidyl ether.<sup>5</sup>**

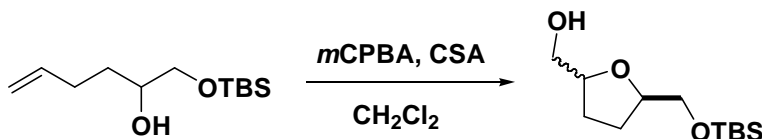
Imidazole (1.20 g, 17.5 mmol) was added to ( $\pm$ ) glycidol (895 mL, 13.5 mmol) in dry THF (120 mL) at 0 °C, under nitrogen. *tert*-Butyldimethylsilyl chloride in THF (5 mL) was slowly added and the reaction mixture was allowed to warm up to room temperature and stirred for 24 hours. The reaction mixture was washed with sat.  $\text{NaHCO}_3$  (100 mL) then brine (100 mL). The resulting organic extract was dried over  $\text{MgSO}_4$  then concentrated under reduced pressure. The crude mixture was purified by flash column chromatography (40 % EtOAc/Hexanes), to yield a colorless oil (2.25 g, 90 % yield).  **$^1\text{H}$  NMR** (500 MHz,  $\text{CDCl}_3$ )  $\delta$  3.84 (dd,  $J = 11.6, 3.2$  Hz, 1H), 3.66 (dd,  $J = 12.6, 3.4$  Hz, 1H), 3.10-3.07 (m, 1H), 2.77 (dd,  $J = 4.0, 4.0$  Hz, 1H), 2.64-2.3 (m, 1H), 0.90 (s, 9H), 0.08 (s, 3H), 0.07 (s, 3H).

<sup>5</sup> Ichimaru, N.; Mura, M.; Kakutani, N.; Kako, J.; Ishihara, A.; Nakagawa, Y.; Nishioka, T.; Yagi, T.; Miyoshi, H. *Biochemistry* **2008**, *47*, 10816-10826.



#### 1-(*tert*-Butyldimethylsilyloxy)hex-5-en-2-ol.

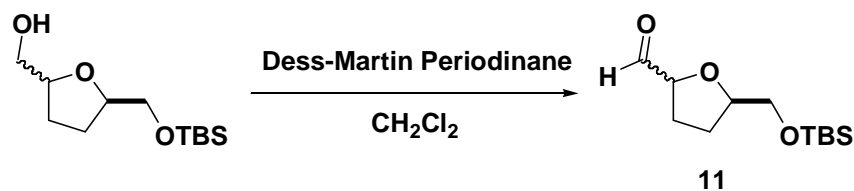
Synthesized as described by Wolfe et al.<sup>6</sup> **IR**  $\nu_{\max}$  3443, 3079, 2955, 2930, 2858  $\text{cm}^{-1}$ . **<sup>1</sup>H NMR** (500 MHz,  $\text{CDCl}_3$ )  $\delta$  5.87-5.81 (m, 1H), 5.04 (d,  $J = 17.1$  Hz, 1H), 4.97 (d,  $J = 10.2$  Hz, 1H), 3.66-3.62 (m, 2H), 3.43 (dd,  $J = 9.0, 7.5$  Hz, 1H), 2.33 (d,  $J = 3.0$  Hz, 1H), 2.27-2.20 (m, 1H), 2.18-2.10 (m, 1H), 1.59-1.46 (m, 2H), 0.92 (s, 9H), 0.08 (s, 6H). **<sup>13</sup>C NMR** (125 MHz,  $\text{CDCl}_3$ )  $\delta$  138.5, 114.9, 71.4, 67.4, 32.2, 30.0, 26.0, 18.4, -5.2, -5.2. **HRMS** ( $\text{Cl}^+/\text{NH}_3$ )  $m/z$  calcd. for  $\text{C}_{12}\text{H}_{30}\text{NO}_2\text{Si}$  [ $\text{M}+\text{NH}_4$ ]<sup>+</sup>: 248.2044, found: 248.2046.



#### 4-(2'-*tert*-Butyl-dimethylsilyloxymethyl)tetrahydrofurfuryl alcohol.

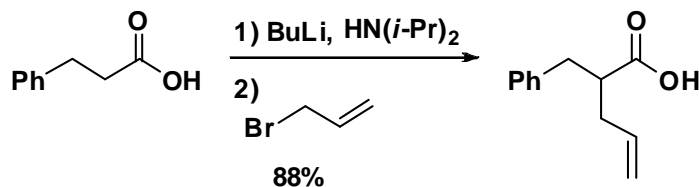
Epoxidation-cyclization of alkenol (487 mg, 2.12 mmol) with *m*CPBA (876 mg, 2.54 mmol) was performed as described in method B. The resulting residue was purified by column chromatography (4% MeOH in  $\text{CH}_2\text{Cl}_2$ ,  $R_f = 0.39$ ) to yield a colorless oil (399 mg, 76 % yield, 1.5:1 diastereomer ratio). **IR**  $\nu_{\max}$  3496, 2959, 2927, 2855  $\text{cm}^{-1}$ . **<sup>1</sup>H NMR** (500 MHz,  $\text{CDCl}_3$ )  $\delta$  for major isomer 4.11-4.05 (m, 2H), 3.79-3.74 (m, 2H), 3.60 (dd,  $J = 19.7, 3.1$  Hz, 1H), 3.50-3.46 (m, 1H), 2.71 (br s, 1H), 1.95-1.87 (m, 4H), 0.90 (s, 9H), 0.07 (s, 6H); **<sup>13</sup>C NMR** (125 MHz,  $\text{CDCl}_3$ )  $\delta$  for major isomer 80.3, 80.1, 65.8, 65.6, 27.8, 27.7, 26.1, 26.1, 18.7, -5.1, -5.2, -5.3. **HRMS** ( $\text{Cl}^+/\text{NH}_3$ )  $m/z$  calcd. for  $\text{C}_{12}\text{H}_{30}\text{NO}_3\text{Si}$  [ $\text{M}+\text{NH}_4$ ]<sup>+</sup>: 247.1733, found: 247.1729.

<sup>6</sup> Hay, M.B., Hardin, A.R., and Wolfe, J.P. *J. Org. Chem.* **2005**, *70*, 3099-3107.



#### 4-(2'-*tert*-Butyl-dimethylsilyloxymethyl)tetrahydrofurfuryl aldehyde (**11**).

4-(2'-*tert*-Butyl-dimethylsilyloxymethyl)tetrahydrofurfuryl alcohol (117 mg, 0.475 mmol) was oxidized using the Dess-Marin periodinane (242 mg, 0.570 mmol) general method. The reaction gave rise to pure aldehyde **11**, no purification was required (103 mg, 89 % yield). **IR**  $\nu_{\text{max}}$  2957, 2857, 1255  $\text{cm}^{-1}$ .  **$^1\text{H}$  NMR** (500 MHz,  $\text{CDCl}_3$ ) (1.5:1 mixture of diastereomers)  $\delta$  9.66 (dd,  $J = 1.7, 1.7$  Hz, 1H, both epimers), 4.35-4.32 (m, 1H, one epimer), 4.24 (dddd, 1H,  $J = 7.8, 7.8, 1.5, 1.5$  Hz, one epimer), 4.21-4.17 (m, 1H, both epimers), 3.71 (dddd,  $J = 11.1, 11.1, 4.4, 4.4$  Hz, 1H, one epimer) 3.69-3.53 (m, 2H, both epimers), 2.21-2.10 (m, 1H, one epimer), 2.11-2.02 (m, 1H, one epimer), 1.98-1.61 (m, 12H, epimer), 0.89 (s, 9H, both epimers), 0.88 (s, 9H, both epimers),  **$^{13}\text{C}$  NMR** (125 MHz,  $\text{CDCl}_3$ )  $\delta$  204.0, 203.1, 83.7, 83.6, 81.7, 81.5, 67.7, 65.6, 28.2, 27.6, 27.5, 27.4, 26.1, 26.1, 18.5, -5.14, -5.17, -5.23. **HRMS** ( $\text{CI}^+/\text{NH}_3$ )  $m/z$  calcd. for  $\text{C}_{12}\text{H}_{28}\text{NO}_3\text{Si}$   $[\text{M}+\text{NH}_4]^+$ : 262.1838, found: 262.1827.

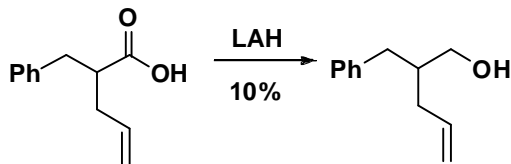


#### 2-Benzylpent-4-enoic acid.

2-Benzylpent-4-enoic acid was prepared from commercially available hydrocinnamic acid as reported.<sup>7</sup> **IR**  $\nu_{\text{max}}$ : 2925 (br), 2676, 1706, 1642, 1584, 1496, 1283  $\text{cm}^{-1}$ ;  **$^1\text{H}$  NMR** (500 MHz,  $\text{CDCl}_3$ )  $\delta$  11.67 (br s, 1H), 7.32-7.20 (m, 5H), 5.81-5.78 (m, 1H), 5.13 (d,  $J = 15.1$  Hz, 1H), 5.08 (d,  $J = 15.1$  Hz, 1H), 3.02-2.99 (m, 1H), 2.82 (dd,  $J = 14.3, 6.7$  Hz, 2H), 2.45-2.11 (m, 2H);  **$^{13}\text{C}$  NMR** (125 MHz,  $\text{CDCl}_3$ )  $\delta$  181.6, 139.0, 134.9, 129.1, 128.6,

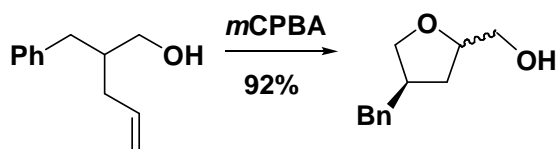
<sup>7</sup> Serna, S.; Tellitu, I.; Domínguez, E.; Moreno, I.; SanMartin, R. *Tetrahedron* **2004**, *60*, 6533- 6539.

126.7, 117.7, 47.2, 37.5, 35.8; **HRMS** ( $\text{Cl}^+$ )  $m/z$  calcd for  $\text{C}_{12}\text{H}_{18}\text{NO}_2$   $[\text{M}+\text{NH}_4]^+$ : 208.1337, found: 208.1333.



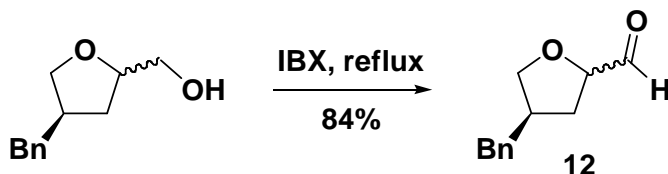
### 2-Benzylpent-4-en-1-ol.

Lithium aluminum hydride (0.43 g, 11.3 mmol) was added to a solution of racemic 2-benzylpent-4-enoic acid (2.50 g, 13.2 mmol) in dry  $\text{Et}_2\text{O}$  (45 mL) slowly at 0 °C. The reaction was allowed to warm up to ambient temperature. After 1.5 hour, the reaction was refluxed at 50 °C for another 5 hours. The reaction was cooled to room temperature, and was poured into a mixture of 50 mL of 1M NaOH (aq) and ice with vigorous stirring. After the formation of a white precipitate, the suspension was filtered, then extracted with  $\text{Et}_2\text{O}$  (3×50 mL). The combined organic layers were washed using 1M HCl (aq) (3×40 mL) then brine (1×40 mL), dried over  $\text{Na}_2\text{SO}_4$ , concentrated, and purified by column chromatography (20 % EtOAc/ Hexanes) to afford the title compound (340 mg, 10 % yield) as a colorless oil. **IR**  $\nu_{\text{max}}$ : 3346, 3026, 2922, 1636, 1603, 1495, 1453  $\text{cm}^{-1}$ ;  **$^1\text{H}$  NMR** (500 MHz,  $\text{CDCl}_3$ )  $\delta$  7.30-7.27 (m, 2H), 7.21-7.18 (m, 3H), 5.86-5.80 (m, 1H), 5.09 (d,  $J = 16.7$  Hz, 1H), 5.06 (d,  $J = 10.0$  Hz, 1H), 3.58-3.52 (m, 2H), 2.67-2.61 (m, 2H), 2.14 (dd,  $J = 7.0, 7.0$  Hz, 2H), 1.97-1.89(m, 1H), 1.26 (br s, 1H);  **$^{13}\text{C}$  NMR** (125 MHz,  $\text{CDCl}_3$ )  $\delta$  140.6, 136.8, 129.3, 128.4, 126.0, 116.6, 64.5, 42.4, 37.2, 35.4; **HRMS** ( $\text{Cl}^+$ )  $m/z$  calcd for  $\text{C}_{12}\text{H}_{20}\text{NO}$   $[\text{M}+\text{NH}_4]^+$ : 194.1544, found: 194.1553.



#### (4-Benzyltetrahydrofuran-2-yl)methanol.

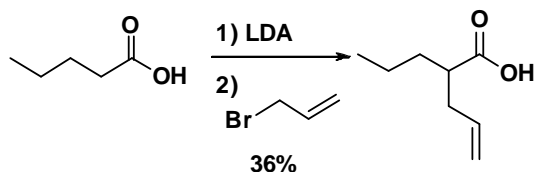
Reaction of racemic 2-benzylpent-4-en-1-ol (310 mg, 1.76 mmol) with *m*CPBA (0.85 g, 2.46 mmol) following the general procedure B afforded 294 mg (92% yield) of the title alcohol as a colorless oil (1.2:1 mixture of epimers). **IR**  $\nu_{\text{max}}$ : 3423, 3026, 2924, 1603, 1496, 1453  $\text{cm}^{-1}$ ;  **$^1\text{H}$  NMR** (500 MHz,  $\text{CDCl}_3$ )  $\delta$  (Major epimer) 7.29-7.15 (m, 5H), 4.16-4.13 (m, 1H), 3.92 (dd,  $J = 8.4, 5.6$  Hz, 1H), 3.60 (d,  $J = 11.3$  Hz, 1H), 3.52 (dd,  $J = 16.1, 8.1$  Hz, 2H), 3.03 (br s, 1H), 2.75-2.70 (m, 2H), 2.61-2.49 (m, 1H), 1.83-1.77 (m, 1H), 1.72-1.67 (m, 1H); (Minor epimer) 7.29-7.15 (m, 5H), 4.04-3.99 (m, 1H), 3.87 (dd,  $J = 7.7, 7.7$  Hz, 1H), 3.68 (d,  $J = 11.4$  Hz, 1H), 3.47 (dd,  $J = 10.2, 4.3$  Hz, 2H), 3.09 (br s, 1H), 2.68-2.64 (m, 2H), 2.60-2.49 (m, 1H), 2.04-1.96 (m, 1H), 1.43-1.37 (m, 1H);  **$^{13}\text{C}$  NMR** (125 MHz,  $\text{CDCl}_3$ )  $\delta$  140.6, 140.5, 128.6, 128.5, 128.4, 128.1, 126.11, 126.10, 80.3, 79.1, 73.2, 72.9, 65.0, 64.7, 41.6, 40.9, 39.1, 39.0, 33.9, 33.3; **HRMS** ( $\text{EI}^+$ )  $m/z$  calcd for  $\text{C}_{12}\text{H}_{16}\text{O}_2$   $[\text{M}]^+$ : 192.1150, found: 192.1148.



#### 4-Benzyltetrahydrofuran-2-carbaldehyde (12)

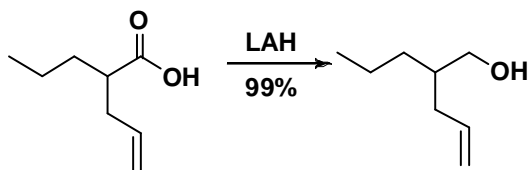
Oxidation of (4-benzyltetrahydrofuran-2-yl)methanol (100 mg, 0.52 mmol) using IBX following the general procedure afforded the title aldehyde (82 mg, 84 % yield) as a colorless oil (1.2:1 mixture of two epimers). **IR**  $\nu_{\text{max}}$ : 3061, 3026, 2924, 2856, 2713, 1732, 1602, 1496, 1453  $\text{cm}^{-1}$ ;  **$^1\text{H}$  NMR** (500 MHz,  $\text{CDCl}_3$ )  $\delta$  (major epimer) 9.65 (s, 1H), 7.31-7.14 (m, 5H), 4.37 (dd,  $J = 8.8, 5.2$  Hz, 1H), 4.04-3.98 (m, 1H), 3.66-3.61 (m, 1H), 2.73-2.64 (m, 2H), 2.52-2.48 (m, 1H), 2.15-2.10 (m, 1H), 1.93-1.88 (m, 1H); (minor epimer) 9.70 (d,  $J = 1.6$  Hz, 1H), 7.31-7.14 (m, 5H), 4.27 (dd,  $J = 7.7, 7.7$  Hz, 1H), 4.04-3.98 (m, 1H), 3.66-3.61 (m, 1H), 2.73-2.64 (m, 2H), 2.62-2.58 (m, 1H), 2.29-2.38 (m,

1H), 1.71-1.66 (m, 1H);  $^{13}\text{C}$  NMR (125 MHz,  $\text{CDCl}_3$ )  $\delta$  202.8, 202.6, 140.2, 140.0, 128.73, 128.72, 128.71, 128.70, 128.68, 126.4, 83.0, 82.7, 74.3, 74.2, 41.3, 40.6, 38.7, 38.6, 33.7, 33.4; HRMS ( $\text{EI}^+$ )  $m/z$  calcd for  $\text{C}_{12}\text{H}_{14}\text{O}_2$   $[\text{M}]^+$ : 190.0994, found: 190.0989.



### 2-Propylpent-4-enoic acid.

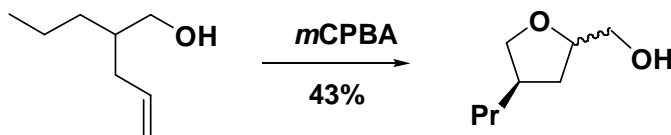
Valeric acid (2.16 mL, 19.9 mmol) was added dropwise to a solution of LDA [prepared from  $n\text{BuLi}$  (42.0 mmol) and  $(i\text{Pr})_2\text{NEt}$  (42.0 mmol)] in dry THF (50 mL) at  $0^\circ\text{C}$ . After 30 min; allylbromide (1.81 mL, 21.0 mmol) was added slowly. The reaction was then allowed to warm to ambient temperature. After 30 hours, the reaction was quenched using 1M HCl (aq) (20 mL). The mixture was washed using saturated  $\text{NaHCO}_3$  (aq.) (3 $\times$ 30 mL), then brine (1 $\times$ 30 mL). The combined aqueous layers were extracted using  $\text{CH}_2\text{Cl}_2$  (2 $\times$ 20 mL). The combined organic layers were dried over  $\text{Na}_2\text{SO}_4$ , concentrated, and distilled ( $150^\circ\text{C}$  at 50 torr) to afford 1.0 g (36% yield) of 2-propylpent-4-enoic acid as a colorless oil. IR  $\nu_{\text{max}}$ : 3080 (br), 2960, 1707, 1466, 1280  $\text{cm}^{-1}$ ;  $^1\text{H}$  NMR (500 MHz,  $\text{CDCl}_3$ )  $\delta$  12.12 (br s, 1H), 5.80-5.72 (m, 1H), 5.08 (d,  $J = 17.0$  Hz, 1H), 5.03 (d,  $J = 10.2$  Hz, 1H), 2.45-2.44 (m, 1H), 2.44-2.36 (m, 1H), 2.26-2.23 (m, 1H), 1.63-1.61 (m, 1H), 1.48-1.47 (m, 1H), 1.39-1.32 (m, 2H), 0.91 (t,  $J = 7.3$  Hz, 3H);  $^{13}\text{C}$  NMR (125 MHz,  $\text{CDCl}_3$ )  $\delta$  182.7, 135.4, 117.1, 45.2, 36.3, 33.9, 20.6, 14.1; HRMS ( $\text{EI}^+$ )  $m/z$  calcd for  $\text{C}_8\text{H}_{14}\text{O}_2$   $[\text{M}]^+$ : 142.0993, found: 142.0989.



### 2-Propylpent-4-en-1-ol.

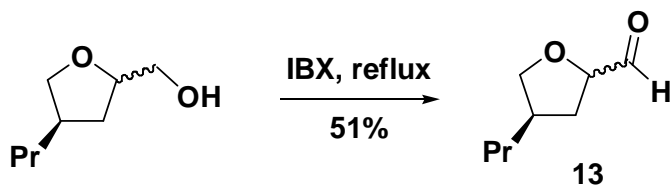
Lithium aluminum hydride (0.5g, 13.1 mmol) was added slowly to a solution of racemic 2-propylpent-4-enoic acid (930 mg, 6.55 mmol) in dry  $\text{Et}_2\text{O}$  (33 mL) at  $0^\circ\text{C}$ . After 20

minutes, the reaction was quenched by adding 1M HCl (aq) (100 mL) slowly. The combined aqueous layers were extracted using CH<sub>2</sub>Cl<sub>2</sub> (3×50 mL). The combined organic layers were dried over Na<sub>2</sub>SO<sub>4</sub>, and concentrated to afford the title compound (830 mg, 99%) as a colorless oil without further purification. **IR**  $\nu_{\text{max}}$ : 3334, 2958, 2873, 1640, 1466, 1043 cm<sup>-1</sup>; **<sup>1</sup>H NMR** (500 MHz, CDCl<sub>3</sub>)  $\delta$  5.86-5.78 (m, 1H), 5.06 (d,  $J = 17.1$  Hz, 1H), 4.99 (d,  $J = 15.8$  Hz, 1H), 3.58-3.52 (m, 2H), 2.12 (dd,  $J = 6.9, 6.9$  Hz, 2H), 1.65-1.57 (m, 1H), 1.40-1.20 (br m, 1H), 1.37-1.25 (m, 4H), 0.90 (t,  $J = 6.3$  Hz, 3H); **<sup>13</sup>C NMR** (125 MHz, CDCl<sub>3</sub>)  $\delta$  137.3, 116.2, 65.5, 40.3, 35.8, 33.0, 20.2, 14.5. **HRMS** (CI<sup>+</sup>)  $m/z$  calcd for C<sub>8</sub>H<sub>20</sub>NO [M+NH<sub>4</sub>]<sup>+</sup>: 146.1545, found: 146.1551.



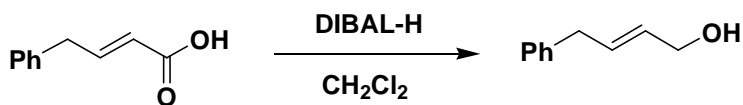
#### (4-Propyltetrahydrofuran-2-yl)methanol.

Reaction of racemic 2-propylpent-4-en-1-ol (830 mg, 6.48 mmol) with *m*CPBA (3.14g, 9.10 mmol) following the general procedure afforded 360 mg (43%) of the title alcohol as a colorless oil (1:1 mixture of epimers). **IR**  $\nu_{\text{max}}$ : 3428, 2957, 2926, 2872, 1456, 1379, 1047 cm<sup>-1</sup>; **<sup>1</sup>H NMR** (500 MHz, CDCl<sub>3</sub>)  $\delta$  4.03-3.99 (m, 1H, one epimer), 3.98-3.96 (m, 1H, one epimer), 3.94 (dd,  $J = 8.3, 7.0$  Hz, 1H, one epimer), 3.87 (dd,  $J = 7.8, 7.8$  Hz, 1H, one epimer), 3.61 (dd,  $J = 11.7, 3.1$  Hz, 1H, one epimer), 3.54 (dd,  $J = 11.6, 3.5$  Hz, 1H, one epimer), 3.43 (ddd,  $J = 17.8, 11.7, 6.1$  Hz, 2H, both epimers), 3.31 (ddd,  $J = 16.7, 8.4, 8.4$  Hz, 2H, both epimers), 2.96 (br s, 2H, both epimers), 2.25-2.10 (m, 2H, both epimers), 1.98 (ddd,  $J = 12.3, 6.7, 6.7$  Hz, 1H, one epimer), 1.77 (ddd,  $J = 14.1, 8.3, 5.9$  Hz, 1H, one epimer), 1.51 (ddd,  $J = 15.0, 7.6, 7.6$  Hz, 1H, one epimer), 1.34- 1.13 (m, 9H, both epimers), 0.88-0.83 (m, 6H, both epimers).; **<sup>13</sup>C NMR** (125 MHz, CDCl<sub>3</sub>)  $\delta$  80.4, 79.3, 73.9, 73.4, 65.3, 64.9, 39.9, 39.2, 35.4, 35.3, 34.3, 33.9, 21.7, 21.6, 14.2, 14.2; **HRMS** (CI<sup>+</sup>)  $m/z$  calcd for C<sub>8</sub>H<sub>20</sub>NO<sub>2</sub> [M+NH<sub>4</sub>]<sup>+</sup>: 162.1494, found: 162.1489.



#### 4-Propyltetrahydrofuran-2-carbaldehyde (13).

Oxidation of (4-propyltetrahydrofuran-2-yl)methanol (200 mg, 1.39 mmol) using IBX following the general procedure afforded the title aldehyde 100 mg (51% yield) as a colorless oil (1:1 mixture of epimers). **IR**  $\nu_{\text{max}}$ : 2959, 2873, 1734, 1466, 1380  $\text{cm}^{-1}$ ;  **$^1\text{H}$  NMR** (500 MHz,  $\text{CDCl}_3$ )  $\delta$  9.64-9.62 (m, 1H, one epimer), 9.62-9.59 (m, 1H, one epimer), 4.29-4.24 (m, 1H, one epimer), 4.24-4.18 (m, 1H, one epimer), 3.47-3.41 (m, 2H, both epimers), 2.29-2.19 (m, 1H, one epimer), 2.15-2.08 (m, 1H, one epimer), 1.75-1.68 (m, 1H, one epimer), 1.53-1.46 (m, 1H, one epimer), 1.37-1.19 (m, 4H, both epimers), 0.89-0.84 (m, 3H, both epimers);  **$^{13}\text{C}$  NMR** (125 MHz,  $\text{CDCl}_3$ )  $\delta$  203.2, 202.8, 83.1, 82.9, 74.78, 74.75, 39.5, 38.8, 34.9, 34.7, 34.2, 34.0, 21.7, 21.6, 14.2, 14.2; **HRMS** ( $\text{CI}^+$ )  $m/z$  calcd for  $\text{C}_8\text{H}_{18}\text{NO}_2$   $[\text{M}+\text{NH}_4]^+$ : 160.1324, found: 160.1331.



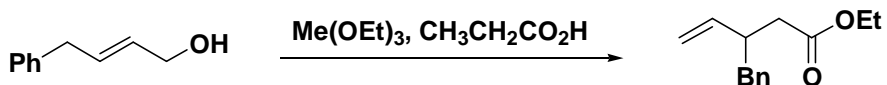
#### (2E)-4-Phenylbut-2-en-1-ol.<sup>8</sup>

Diisopropylaluminum hydride (12.0 mL of a 1.0 M solution in hexane, 12.0 mmol) was added to a solution of the ethyl 4-phenylbut-2-enoate, prepared as described by Trippier *et al.*,<sup>9</sup> in dry  $\text{CH}_2\text{Cl}_2$  (18 mL) at 0 °C under inert atmosphere. The mixture was stirred at 0 °C for 45 min, then warmed up to room temperature for 30 minutes. The mixture was quenched with 2M HCl (aq) (20 mL) at 0 °C and extracted with  $\text{CH}_2\text{Cl}_2$  (3×20 mL). The combined organic extracts were dried over  $\text{Na}_2\text{SO}_4$ , then concentrated under reduced pressure to yield the alcohol as a colorless oil (794 mg, 76 % yield), no purification was required.  **$^1\text{H}$  NMR** (500 MHz,  $\text{CDCl}_3$ )  $\delta$  7.31-7.28 (m, 2H), 7.22-7.18 (m, 3H), 5.88-

<sup>8</sup> Fernandes, R.A. *Tetrahedron Asymm.* **2008**, *19*, 15-18.

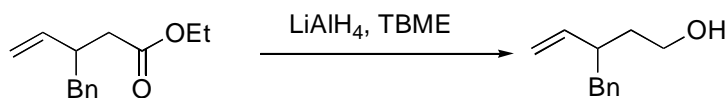
<sup>9</sup> Bulger, P.G.; Moloney, M.G.; Tippiar, P.C. *Org. Biomol. Chem.* **2003**, *1*, 3726-3737.

5.84 (m, 1H), 5.74-5.59 (m, 1H), 4.13 (d,  $J = 5.8$  Hz, 2H), 3.39 (d,  $J = 6.7$  Hz, 2H).



### Ethyl 3-benzylpent-4-enoate.

A solution of the alcohol (794 mg, 5.36 mmol), triethyl orthoacetate (6.5 mL, 35.4 mmol), and propanoic acid (240  $\mu$ L, 3.22 mmol) was stirred in a flask fitted with a Dean-Stark apparatus and a reflux condenser, at 150  $^{\circ}$ C for 17 h. The reaction was allowed to cool down to room temperature before diluting with Et<sub>2</sub>O (10 mL), followed by 1M HCl (aq) (10 mL). The two layers were separated, then the aqueous layer was extracted with Et<sub>2</sub>O (3 $\times$ 10 mL), the combined organic extracts were dried over Na<sub>2</sub>SO<sub>4</sub> then concentrated under reduced pressure. The residue was purified by column chromatography (10 % EtOAc/Hexanes,  $R_f = 0.35$ ) to yield a yellow oil (816 mg, 70 % yield).<sup>10</sup> <sup>1</sup>H NMR (500 MHz, CDCl<sub>3</sub>)  $\delta$  7.31-7.27 (m, 2H), 7.23-7.15 (m, 3H), 5.75 (dt,  $J = 18.1, 8.6$  Hz, 1H), 4.98 (dd,  $J = 16.0$  Hz, 12.3, 2H), 4.15-4.06 (dt,  $J = 14.5, 7.4$  Hz, 2H), 2.90 (dt,  $J = 15.6, 8.6$  Hz, 1H), 2.69 (d,  $J = 6.9$  Hz, 2H), 2.72 (dd,  $J = 8.2, 5.9$  Hz, 2H), 1.27 (dd,  $J = 13.9, 7.4$  Hz, 3H).

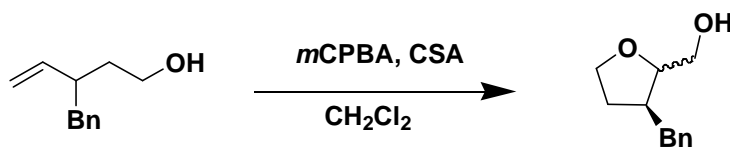


### 3-Benzylpent-4-en-1-ol.

Lithium aluminum hydride (148 mg, 3.69 mmol) was added in two portions to a stirring solution of ethyl 3-benzylpent-4-enoate in *tert*-butyl methyl ether (5 mL) at 0  $^{\circ}$ C. The suspension was stirred for 1 h at 0  $^{\circ}$ C, then poured into ice/water (10 mL). 5M Sulfuric acid (aq) was added until the aluminium salts dissolved. The two phases were separated

<sup>10</sup> The purity of the desired product was  $\sim 75$  %, contaminated with the starting material. When the reaction time was increased to 24 h, decomposition was observed.

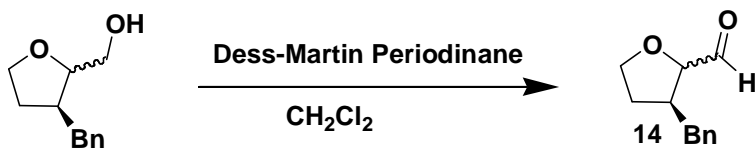
and the aqueous layer was extracted with Et<sub>2</sub>O (2 x 10 mL). The combined organic layers were dried over Na<sub>2</sub>SO<sub>4</sub> then concentrated under reduced pressure. The residue was purified by column chromatography (2:1 Hexanes/EtOAc, R<sub>f</sub> = 0.37) to yield a colorless oil (353 mg, 54 % yield). **IR**  $\nu_{\max}$  3337, 3064, 3027, 2928, 699 cm<sup>-1</sup>. **<sup>1</sup>H NMR** (500 MHz, CDCl<sub>3</sub>)  $\delta$  7.32-7.29 (m, 2H), 7.23-7.18 (m, 3H), 5.68 (dddd, *J* = 17.9, 17.9, 9.3, 9.3 Hz, 1H), 5.00 (dd, *J* = 17.7, 11.1 Hz, 2H), 3.71 (dt, *J* = 10.7, 6.3 Hz, 1H), 3.64 (dt, *J* = 14.1, 6.7 Hz, 1H), 2.70 (d, *J* = 7.0 Hz, 1H), 2.58-2.48 (m, 1H), 1.74 (dddd, *J* = 11.8, 11.8, 7.0, 7.0 Hz, 1H), 1.59-1.54 (m, 1H), 1.48 (s, 1H), **<sup>13</sup>C NMR** (125 MHz, CDCl<sub>3</sub>)  $\delta$  142.1, 140.3, 129.5, 128.3, 126.1, 115.4, 61.3, 42.9, 42.2, 37.0. **HRMS** (EI<sup>+</sup>) *m/z* calcd for C<sub>12</sub>H<sub>18</sub>O [M]<sup>+</sup>: 176.1201, found: 176.1208.



## 2-Benzyl tetrahydrofurfuryl alcohol.

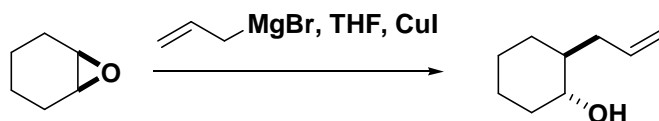
2-Benzyl tetrahydrofurfuryl alcohol was prepared by reacting 3-(benzyl)hex-4-en-1-ol (311 mg, 1.78 mmol) with *m*CPBA (731 mg, 2.12 mmol), following the procedures outlined in method A. The residue was purified by column chromatography (2:1 EtOAc/Hex, R<sub>f</sub>=0.31) to yield a colorless oil (130 mg, 38 % yield). **IR**  $\nu_{\max}$  3425, 3026, 2936 cm<sup>-1</sup>. **<sup>1</sup>H NMR** (500 MHz, CDCl<sub>3</sub>) (1.5:1 diastereomer ratio)  $\delta$  7.32-7.28 (m, 2H, two epimers), 7.22-7.17 (m, 3H, two epimers), 4.01 (ddd, *J* = 6.8, 6.8, 3.9 Hz, 1H, major epimer), 3.96 (ddd, *J* = 8.3, 8.3, 3.6 Hz, 1H, major epimer), 3.84 (ddd, *J* = 14.9, 14.9, 7.5 Hz, 1H, minor epimer), 3.77 (ddd, *J* = 7.5, 7.5, 7.5 Hz, 1H, minor epimer), 3.70 (ddd, *J* = 8.6, 8.6, 7.1 Hz, 1H, major epimer), 3.64 (ddd, *J* = 6.4, 6.4, 3.0 Hz, 1H, minor epimers), 3.63-3.58 (m, 2H, two epimers), 3.49 (dd, *J* = 11.8, 3.0 Hz, 1H, minor epimer), 3.34 (dd, *J* = 11.8, 5.8, 1H, major epimer), 2.78 (dd, *J* = 12.6, 4.3 Hz, 1H, major epimer), 2.70 (dd, *J* = 13.5, 6.8 Hz, 1H, minor epimer), 2.62 (dd, *J* = 13.5, 8.1 Hz, 1H, minor epimer), 2.59-2.54 (m, 2H, two epimers), 2.24 (ddd, *J* = 15.6, 15.6, 7.9 Hz, 1H, minor diastereomer), 1.96 (dddd, *J* = 15.0, 15.0, 7.3, 7.3 Hz, 1H, minor epimer), 1.88-1.82 (m, 1H, major epimer), 1.70-1.61 (m, 2H, two epimers), **<sup>13</sup>C NMR** (125 MHz, CDCl<sub>3</sub>)  $\delta$  140.8, 140.3,

128.9, 128.7, 128.6, 128.4, 128.3, 84.7, 90.0, 67.6, 67.3, 64.0, 62.6, 62.6, 42.6, 41.9, 39.3, 34.9, 33.0, 31.9. **HRMS** (EI<sup>+</sup>) *m/z* calcd for C<sub>12</sub>H<sub>16</sub>O<sub>2</sub> [M]<sup>+</sup>: 192.1150, found: 192.1131.



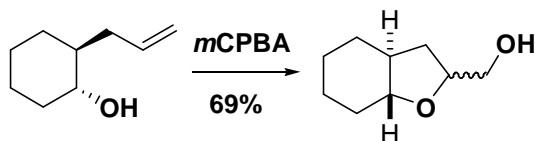
### 2-Benzyl tetrahydrofurfuryl aldehyde (**14**).

Dess-Martin periodinane (122 mg, 0.288 mmol) was added to a solution of oxacycloalkane alcohol (46 mg, 0.240 mmol) in CH<sub>2</sub>Cl<sub>2</sub> (1 mL) at 0 °C. The reaction was stirred at room temperature for 2 h. The resulting reaction mixture was diluted with CH<sub>2</sub>Cl<sub>2</sub> (10 mL), and then washed with (1:1, v/v, 3×20 mL) sat. NaHCO<sub>3</sub> (aq) and sat. Na<sub>2</sub>S<sub>2</sub>O<sub>3</sub>(aq). The resulting organic layer was dried over Na<sub>2</sub>SO<sub>4</sub>, and then concentrated under reduced pressure to yield a colorless oil. The reaction gave rise to pure aldehyde **14**, no purification was required (27 mg, 59 % yield). **IR**  $\nu_{\max}$  3027, 2940, 1730, 1496, 1454 cm<sup>-1</sup>. **<sup>1</sup>H NMR** (500 MHz, CDCl<sub>3</sub>) (1.5:1 mixture of diastereomers)  $\delta$  9.79 (d, *J* = 2.0 Hz, 1H, one epimer), 9.57 (d, *J* = 1.5 Hz, 1H, one epimer), 7.34-7.31 (m, 4H, both epimers), 7.24-7.20 (m, 6H, both epimers), 4.35 (dd, *J* = 7.6, 1.8 Hz, 1H, one epimer), 4.23-4.22 (m, 1H, one epimer), 4.09-4.05 (m, 1H, one epimer), 4.00-3.99 (m, 1H, one epimer), 3.96-3.90 (m, 2H, both epimers), 2.97-2.86 (m, 3H, both epimers), 2.73 (dd, *J* = 13.5, 8.5 Hz, 1H, one epimer), 2.63-2.56 (dddd, *J* = 14.0, 14.0, 7.0, 7.0 Hz, 1H, one epimer), 2.51-2.46 (m, 1H, one epimer), 2.06-1.98 (m, 2H, one epimer), 1.80-1.71 (m, 2H, one epimer), **<sup>13</sup>C NMR** (125 MHz, CDCl<sub>3</sub>)  $\delta$  203.2, 202.2, 139.9, 139.5, 129.0, 128.7, 128.7, 126.6, 126.6, 87.1, 85.1, 69.0, 68.6, 53.6, 44.8, 43.3, 38.7, 35.3, 31.9, 31.6. **HRMS** (CI<sup>+</sup>) *m/z* calcd for C<sub>12</sub>H<sub>18</sub>NO<sub>2</sub> [M+NH<sub>4</sub>]<sup>+</sup>: 208.1338, found: 208.1332.



### ***trans*-2-Allylcyclohexanol.**

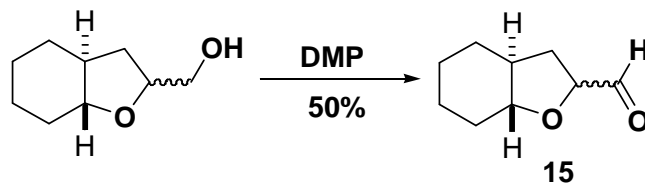
Allylmagnesium bromide (7.2 mL of a 1.0 M solution in Et<sub>2</sub>O, 7.2 mmol) was added dropwise to a solution of cyclohexene oxide (0.61 mL, 6.0 mmol) and copper (I) iodide (171.5 mg, 0.9 mmol) in THF (10 mL) at -20 °C. The reaction was allowed to warm up to ambient temperature. After 17 hours, the reaction was quenched with aqueous saturated NH<sub>4</sub>Cl (20 mL) and extracted with Et<sub>2</sub>O (3×20 mL). The combined organic layers were dried over Na<sub>2</sub>SO<sub>4</sub>, concentrated, and purified by column chromatography (20% EtOAc/Hexanes) to afford the title alcohol (635 mg, 76 % yield) as a colorless oil. **IR**  $\nu_{\text{max}}$ : 3343, 3075, 2927, 2856, 1640, 1448 cm<sup>-1</sup>; **<sup>1</sup>H NMR** (500 MHz, CDCl<sub>3</sub>)  $\delta$  5.85-5.78 (m, 1H), 5.04 (dd,  $J = 17.1, 1.6$  Hz, 1H), 4.99 (dd,  $J = 10.1, 0.9$  Hz, 1H), 3.26-3.19 (m, 1H), 2.46-2.41 (m, 1H), 1.96-1.92 (m, 2H), 1.84 (br s, 1H), 1.76- 1.20 (m, 7H), 0.94-0.83 (m, 1H); **<sup>13</sup>C NMR** (125 MHz, CDCl<sub>3</sub>)  $\delta$  137.7, 116.1, 74.7, 45.1, 37.6, 35.8, 30.5, 25.7, 25.1; **HRMS** (CI<sup>+</sup>)  $m/z$  calcd for C<sub>9</sub>H<sub>20</sub>NO [M+NH<sub>4</sub>]<sup>+</sup>: 158.1545, found: 158.2168.



### **(Octahydrobenzofuran-2-yl)methanol.**

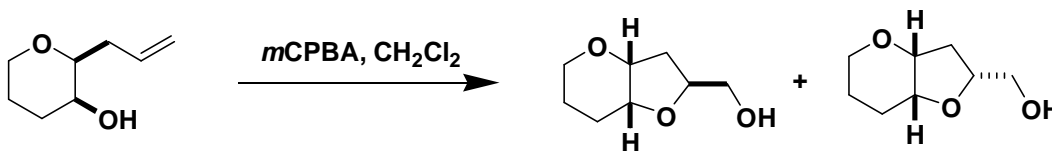
Reaction of *trans*-2-allylcyclohexanol (495 mg, 3.5 mmol) with *m*CPBA (1.47g, 4.25 mmol) following the general procedure afforded 375 mg (69%) of the title alcohol as a colorless oil (2:1 mixture of epimers). **IR**  $\nu_{\text{max}}$ : 3421, 2932, 2857, 1652 cm<sup>-1</sup>; **<sup>1</sup>H NMR** (500 MHz, CDCl<sub>3</sub>)  $\delta$  (major epimer) 4.09-4.02 (m, 1H), 3.65-3.53 (m, 1H), 3.51-3.41 (m, 1H), 3.11-2.99 (m, 1H), 2.69 (br s, 1H), 2.11-2.10 (m, 1H), 1.88-1.84 (m, 1H), 1.81-1.73 (m, 2H), 1.69-63 (m, 1H), 1.60-1.52 (m, 1H), 1.33- 0.97 (m, 5H); (minor epimer) 4.15-4.09 (m, 1H), 3.65-3.53 (m, 1H), 3.51-3.41 (m, 1H), 3.11-2.99 (m, 1H), 2.82 (br s, 1H), 2.11-2.10 (m, 1H), 2.00- 1.92 (m, 1H), 1.88-1.84 (m, 1H), 1.81-1.73 (m, 2H), 1.69-63 (m, 1H), 1.33- 0.97 (m, 5H); **<sup>13</sup>C NMR** (125 MHz, CDCl<sub>3</sub>)  $\delta$ : 84.2, 82.7, 79.2, 78.0, 66.0,

65.7, 46.0, 45.2, 33.3, 33.2, 31.47, 31.42, 29.3, 29.1, 25.9, 25.8, 24.45, 24.42; **HRMS** (CI<sup>+</sup>) *m/z* calcd for C<sub>9</sub>H<sub>20</sub>NO<sub>2</sub> [M+NH<sub>4</sub>]<sup>+</sup>: 174.1494, found: 174.1434.



### Octahydrobenzofuran-2-carbaldehyde (15).

Oxidation of racemic (octahydrobenzofuran-2-yl)methanol (50.3 mg, 0.320 mmol) using Dess-Martin periodinane following the general procedure afforded 22 mg (50 % yield) of the title aldehyde as a colorless oil (2: 1 mixture of epimers). **IR**  $\nu_{\text{max}}$ : 2934, 2858, 1731 cm<sup>-1</sup>; **<sup>1</sup>H NMR** (500 MHz, CDCl<sub>3</sub>)  $\delta$  (major epimer) 9.72 (s, 1H), 4.32 (d, *J* = 10.7 Hz, 1H), 3.21 (ddd, *J* = 10.5, 10.5, 3.7 Hz, 1H), 2.23-2.17 (m, 2H), 2.00- 1.72 (m, 4H), 1.53- 1.05 (m, 5H); (minor epimer) 9.68 (s, 1H), 4.36 (d, *J* = 8.2 Hz, 1H), 3.16 (ddd, *J* = 10.4, 10.4, 3.8 Hz, 1H), 2.34-2.27 (m, 2H), 2.00- 1.72 (m, 4H), 1.53- 1.05 (m, 5H); **<sup>13</sup>C NMR** (125 MHz, CDCl<sub>3</sub>)  $\delta$  203.4, 203.0, 85.0, 84.8, 81.8, 81.6, 45.4, 44.8, 34.0, 33.09, 33.07, 31.4, 31.2, 29.0, 28.96, 25.7, 24.3, 24.28; **HRMS** (CI<sup>+</sup>) *m/z* calcd for C<sub>9</sub>H<sub>18</sub>NO<sub>2</sub> [M+NH<sub>4</sub>]<sup>+</sup>: 172.1337, found: 172.1583.



### (±)-Hexahydro-2H-furo[3,2-b]pyran-2-yl)methanol.

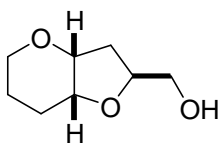
To a solution of 2-allyl-3-hydroxytetrahydropyran (582 mg, 4.10 mmol), (prepared as described by Rousseau *et al.*),<sup>11</sup> in CH<sub>2</sub>Cl<sub>2</sub> (21 mL) was added *m*CPBA (1.70g, 4.92 mmol) at 0 °C. The reaction was warmed up to room temperature and stirred for 12 h. The reaction mixture was concentrated under reduced pressure. CHCl<sub>3</sub> (20 mL) was added and mixed well, before cooling in an ice-water bath. The precipitate (*m*-chlorobenzoic acid) was filtered off by vacuum filtration. The mother filtrate was transferred to

<sup>11</sup> Simart, F.; Brunel, Y.; Robin, S.; Rousseau, G. *Tetrahedron* **1998**, *54*, 13557-13566.

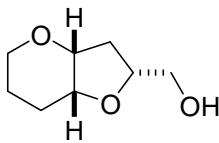
a separatory funnel and extracted with a sat.  $\text{NaHCO}_3$  (aq) (20 mL), the aqueous layer was saturated with solid  $\text{NaCl}$  and back-extracted with  $\text{CHCl}_3$  ( $3 \times 20$  mL). The combined organic extracts were dried over  $\text{Na}_2\text{SO}_4$ , then concentrated under reduced pressure. The residue was purified by column chromatography (4 %  $\text{MeOH}$  in  $\text{CH}_2\text{Cl}_2$ ,  $R_f(\text{cis-syn isomer}) = 0.22$ ,  $R_f(\text{cis-anti isomer}) = 0.16$ ) to yield both isomers as colorless oils (*cis-syn* isomer – 40 % yield, *cis-anti* isomer 21 % yield). The relative configurations of the two isomers were determined by NOE experiments.



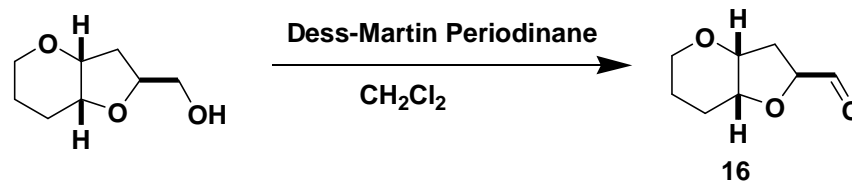
**Figure 1.** NOE Experiment Results.



***cis-syn isomer:*** IR  $\nu_{\text{max}}$  3425, 3026, 2936  $\text{cm}^{-1}$ .  $^1\text{H NMR}$  (500 MHz,  $\text{CDCl}_3$ )  $\delta$  4.19-4.17 (m, 1H), 3.87 (s, 2H), 3.74-3.70 (m, 2H), 3.55 (d,  $J = 11.1$  Hz, 1H), 3.37-3.32 (dd,  $J = 11.7, 11.7$  Hz, 1H), 3.08 (br s, 1H), 2.19-2.17 (m, 1H), 2.10-2.07 (m, 1H), 1.89-1.82 (m, 2H), 1.69-1.67 (m, 1H), 1.32-1.29 (m, 1H).  $^{13}\text{C NMR}$  (125 MHz,  $\text{CDCl}_3$ )  $\delta$  78.2, 76.4, 76.3, 66.8, 65.2, 35.6, 25.2, 20.2. **HRMS** ( $\text{CI}^+/\text{NH}_3$ )  $m/z$  calcd. for  $\text{C}_8\text{H}_{14}\text{O}_3$   $[\text{M}+\text{NH}_4]^+$ : 176.1285, found: 176.1287.



***cis-anti isomer:*** IR  $\nu_{\text{max}}$  3439, 2926, 2874  $\text{cm}^{-1}$ .  $^1\text{H NMR}$  (500 MHz,  $\text{CDCl}_3$ )  $\delta$  4.38 (d,  $J = 5.4$  Hz, 1H), 3.96 (s, 1H), 3.86-3.84 (m, 2H), 3.70 (d,  $J = 11.5$  Hz, 1H), 3.47 (dd,  $J = 11.3, 5.3$  Hz, 1H), 3.35-3.30 (dd,  $J = 11.9, 5.3$  Hz, 1H), 2.41 (s, 1H), 2.05 (d,  $J = 14.3$  Hz, 1H), 1.96-1.92 (dd,  $J = 13.2, 6.4$  Hz, 1H), 1.86-1.78 (m, 2H), 1.69-1.64 (dd,  $J = 14.2$  Hz, 1H), 1.32 (d, 1H,  $J = 11.9$  Hz).  $^{13}\text{C NMR}$  (125 MHz,  $\text{CDCl}_3$ )  $\delta$  79.1, 77.3, 75.8, 66.5, 65.1, 35.8, 25.7, 20.3. **HRMS** ( $\text{CI}^+/\text{NH}_3$ )  $m/z$  calcd. for  $\text{C}_8\text{H}_{14}\text{O}_3$   $[\text{M}+\text{NH}_4]^+$ : 176.1283, found: 176.1287.

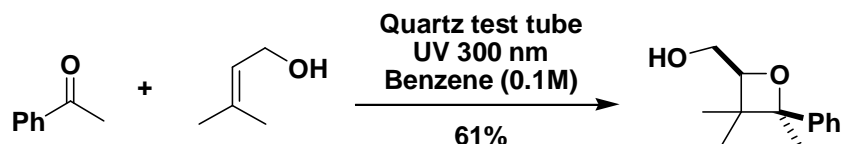


**(±)-Hexahydro-2*H*-furo[3,2-*b*]pyran-2-carbaldehyde (**16**).**

Dess-Martin periodinane (209 mg, 0.729 mmol) was added to a solution of alcohol (96 mg, 0.608 mmol) in CH<sub>2</sub>Cl<sub>2</sub> (3 mL) at 0 °C. The reaction was stirred at room temperature for 3 h. The resulting reaction mixture was filtered through a fritted funnel then washed with diethyl ether. The resulting mother filtrate was concentrated under reduced pressure. Diethyl ether was added and the solution was swirled and placed in an ice-bath, the precipitate (Dess-Martin periodinane byproducts) were filtered off through a cotton pipette and washed with cold diethyl ether. The resulting solution was then concentrated under reduced pressure. The residue was dissolved in CH<sub>2</sub>Cl<sub>2</sub> (5 mL) and quickly filtered through a pad of silica, and then concentrated under reduced pressure to yield a colorless oil (32 mg, 31 % yield).<sup>12</sup> The reaction gave rise to 90 % pure aldehyde **16**.<sup>13</sup> **IR**  $\nu_{\max}$  2954, 2916, 2848 cm<sup>-1</sup>. **<sup>1</sup>H NMR** (500 MHz, CDCl<sub>3</sub>)  $\delta$  9.77 (s, 1H), 4.27 (d, *J* = 10.2 Hz, 1H), 3.99-3.87 (m, 3H), 3.35 (dd, *J* = 12.2, 12.2 Hz, 1H), 2.30 (dddd, *J* = 10.2, 10.1, 3.6, 3.5 Hz, 1H), 2.20 (d, *J* = 13.7 Hz, 2H), 1.96-1.89 (m, 1H), 1.79-1.72 (m, 1H), 1.38 (d, *J* = 13.5 Hz, 1H). **<sup>13</sup>C NMR** (125 MHz, CDCl<sub>3</sub>)  $\delta$  205.2, 81.5, 77.8, 75.0, 66.6, 39.0, 25.5, 20.1. **HRMS** (CI<sup>+</sup>/NH<sub>3</sub>) *m/z* calcd. for C<sub>8</sub>H<sub>16</sub>O<sub>3</sub> [M+NH<sub>4</sub>]<sup>+</sup>: 174.1130, found: 174.1126.

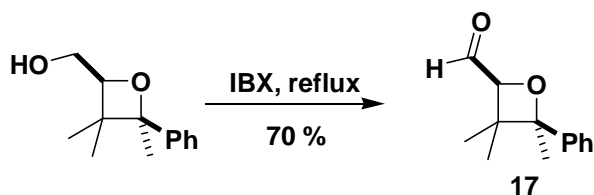
<sup>12</sup> Aldehyde **16** is water soluble, therefore, the general workup method (washing with saturated aqueous solutions of Na<sub>2</sub>S<sub>2</sub>O<sub>3</sub> and NaHCO<sub>3</sub>) had to be avoided. In addition, **16** appears to be unstable to silica gel column chromatography; therefore, filtration through a small pad of silica needs to be done quickly to avoid decomposition.

<sup>13</sup> Purity of aldehyde was determined by <sup>1</sup>H NMR.



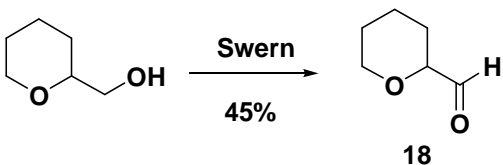
**(3,3,4-trimethyl-4-phenyloxetan-2-yl)methanol.**

(3,3,4-trimethyl-4-phenyloxetan-2-yl)methanol was prepared from commercially available acetophenone and 3-methyl-2-buten-1-ol as reported.<sup>14</sup> <sup>1</sup>H NMR (500 MHz, CDCl<sub>3</sub>) δ 7.34-7.31 (m, 2H), 7.26-7.21 (m, 3H), 4.56 (dd, *J* = 6.6, 4.8 Hz, 1H), 3.81 (dd, *J* = 11.7, 7.2 Hz, 1H), 3.69-3.66 (dd, *J* = 11.7, 4.4 Hz, 1H), 1.82 (s, 3H), 1.31 (s, 3H), 0.72 (s, 3H).



**3,3,4-Trimethyl-4-phenyloxetane-2-carbaldehyde (17).**

Oxidation of the alcohol (150 mg, 0.73 mmol) using IBX following the general procedure afforded the title aldehyde (101 mg, 70 % yield) as a colorless oil. IR  $\nu_{\text{max}}$ : 2937, 1727, 1467, 1255 cm<sup>-1</sup>; <sup>1</sup>H NMR (500 MHz, CDCl<sub>3</sub>) δ 9.86 (d, *J* = 1.5 Hz, 1H), 7.37-7.25 (m, 5H), 4.73 (d, *J* = 1.6 Hz, 1H), 1.76 (s, 3H), 1.41 (s, 3H), 0.71 (s, 3H); <sup>13</sup>C NMR (125 MHz, CDCl<sub>3</sub>) δ 203.5, 144.5, 128.2, 127.0, 124.3, 90.6, 87.4, 47.5, 25.7, 23.5, 22.0; HRMS (CI<sup>+</sup>) *m/z* calcd for C<sub>13</sub>H<sub>20</sub>NO<sub>2</sub> [M+NH<sub>4</sub><sup>+</sup>]<sup>+</sup>: 222.1494, found: 222.1488.

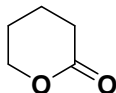


**Tetrahydro-2H-pyran-2-carbaldehyde (18).**

Swern oxidation of racemic tetrahydropyran-2-methanol (1.70 mL, 15 mmol) following the general procedure afforded 1.32 g (77 % yield) of the title aldehyde as a colorless oil

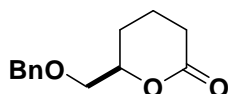
<sup>14</sup> Stegmann, V. R.; Adam, W. *Synthesis*, **2001**, 1203-1214.

as reported.<sup>3</sup>  $^1\text{H NMR}$  (500 MHz,  $\text{CDCl}_3$ )  $\delta$  9.61 (s, 1H), 4.08-4.05 (m, 1H), 3.82 (dd,  $J = 11.2, 2.8$  Hz, 1H), 3.54 (ddd,  $J = 11.2, 11.2, 3.0$  Hz, 1H), 1.94-1.83 (m, 2H), 1.68-1.41 (m, 4H).



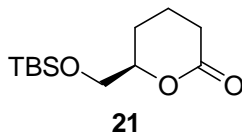
**Tetrahydro-2H-pyran-2-one (19).**

Lactone **19** was synthesized by reacting aldehyde **9** (60 mg, 0.6 mmol) with 10 mol % catalyst loading of **6** (25.6 mg, 0.06 mmol) and DBU (7.2  $\mu\text{L}$ , 0.048 mmol). The reaction was performed by following the general procedure. The crude was purified by column chromatography (50 % EtOAc/Hexane) to yield a colorless oil (47 mg, 78 % yield).  $^1\text{H NMR}$  (500 MHz,  $\text{CDCl}_3$ )  $\delta$  4.31 (t,  $J = 5.8$  Hz, 2H), 2.53(t,  $J = 6.9$  Hz, 2H), 1.91-1.83 (m, 4H).



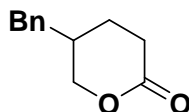
**(R)-6-(Benzyloxymethyl)tetrahydro-2H-pyran-2-one (20).**

Lactone **20** was synthesized by reacting aldehyde **10** (60 mg, 0.254 mmol) with 10 mol % catalyst loading of **6** (11 mg, 0.025 mmol) and DBU (3  $\mu\text{L}$ , 0.021 mmol). The reaction was performed by following the general procedure. The crude was purified by column chromatography (30 % EtOAc/Hexane) to yield a colorless oil (59 mg, 98 % yield).  $[\alpha]_D -16$  ( $c$  1.00,  $\text{CHCl}_3$ ); **IR**  $\nu_{\text{max}}$ : 3062, 3030, 2866, 1727, 1496, 1241  $\text{cm}^{-1}$ ;  $^1\text{H NMR}$  (500 MHz,  $\text{CDCl}_3$ )  $\delta$  7.59-7.18 (m, 5H), 4.58 (s, 2H), 4.48 (dd,  $J = 10.2, 3.8$  Hz, 1H), 3.65-3.58 (m, 2H), 2.58 (ddd,  $J = 17.7, 6.0, 6.0$  Hz, 1H), 2.47 (ddd,  $J = 17.6, 8.8, 6.8$  Hz, 1H), 1.97-1.25 (m, 4H);  $^{13}\text{C NMR}$  (125 MHz,  $\text{CDCl}_3$ )  $\delta$  171.2, 137.9, 128.5, 127.8, 127.7, 79.2, 73.6, 72.0, 29.7, 24.6, 18.3; **HRMS** ( $\text{EI}^+$ )  $m/z$  calcd for  $\text{C}_{13}\text{H}_{17}\text{O}_3$   $[\text{M}+1]^+$ : 221.1178, found: 221.1189. HPLC (CHIRALPAK® IC column 30 % *i*PrOH/Hexanes at 0.1 mL/min., UV detection at 254 nm, major peak at 29.5 min., minor peak at 27.4 min., >99% ee).



**Tetrahydro-6-*O*-(*tert*-butyldimethylsilylmethyl)-2H-pyran-2-one (21).**

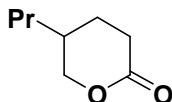
Lactone **21** was synthesized by reacting aldehyde **11** (62 mg, 0.254 mmol) with 30 mol % catalyst loading of **6** (33 mg, 0.0762 mmol) and DBU (9  $\mu$ L, 0.609 mmol). The reaction was performed by following the general procedure. The crude was purified by column chromatography (20 % EtOAc/Hexane,  $R_f$  = 0.31) to yield a colorless oil (18 mg, 29 % yield).<sup>15</sup> **IR**  $\nu_{\max}$  2955, 2930, 2857, 1742  $\text{cm}^{-1}$ . **<sup>1</sup>H NMR** (500 MHz,  $\text{CDCl}_3$ )  $\delta$  4.36-4.31 (dddd,  $J$  = 9.2, 9.2, 3.9, 3.9 Hz, 1H), 3.76 (ddd,  $J$  = 14.8, 10.8, 4.1 Hz, 1H) 3.70 (ddd,  $J$  = 16.2, 10.7, 5.4 Hz, 1H), 2.60-2.57 (ddd,  $J$  = 12.5, 12.5, 6.1 Hz, 1H), 2.47-2.42 (m, 1H), 1.97-1.92 (m, 1H), 1.73-1.69 (m, 1H), 0.88 (s, 9H), 0.07 (s, 3H), 0.06 (s, 3H), **<sup>13</sup>C NMR** (125 MHz,  $\text{CDCl}_3$ )  $\delta$  171.5, 80.5, 65.3, 30.1, 26.0, 24.6, 18.5, -5.2, -5.3, -5.4. **HRMS** ( $\text{Cl}^+/\text{NH}_3$ )  $m/z$  calcd for  $\text{C}_{12}\text{H}_{28}\text{NO}_3\text{Si}$  [ $\text{M}+\text{NH}_4$ ]<sup>+</sup>: 262.1838, found: 262.1833.



**5-Benzyltetrahydro-2H-pyran-2-one (22).**

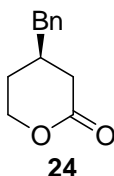
Lactone **22** was synthesized by reacting aldehyde **12** (60 mg, 0.316 mmol) with 10 mol % catalyst loading of **6** (13.5 mg, 0.0316 mmol) and DBU (3.8  $\mu$ L, 0.0253 mmol). The reaction was performed by following the general procedure. The crude was purified by column chromatography (30 % EtOAc/Hexane) to yield a colorless oil (54 mg, 90 % yield). **IR**  $\nu_{\max}$ : 2924, 1736, 1496, 1454, 1183  $\text{cm}^{-1}$ ; **<sup>1</sup>H NMR** (500 MHz,  $\text{CDCl}_3$ )  $\delta$  7.32-7.14 (m, 5H), 4.29 (dd,  $J$  = 10.7, 3.4 Hz, 1H), 4.01 (dd,  $J$  = 10.5, 10.5 Hz, 1H), 2.66-2.58 (m, 3H), 1.58-2.50 (m, 4H); **<sup>13</sup>C NMR** (125 MHz,  $\text{CDCl}_3$ )  $\delta$  171.4, 138.6, 129.0, 128.8, 126.8, 73.2, 38.0, 34.8, 29.1, 25.4; **HRMS** ( $\text{EI}^+$ )  $m/z$  calcd for  $\text{C}_{12}\text{H}_{14}\text{O}_2$  [ $\text{M}$ ]<sup>+</sup>: 190.0994, found: 190.0993.

<sup>15</sup> The carbene catalyzed reaction gave rise to > 95 % conversion, the crude only contained the carbene and the product. However, due to the instability of **22** on silica, only 29 % of the lactone was isolated pure.



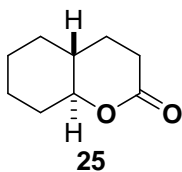
### 5-Propyltetrahydro-2H-pyran-2-one (**23**).

Lactone **23** was synthesized by reacting aldehyde **13** (50 mg, 0.35 mmol) with 10 mol % catalyst loading of **6** (15 mg, 0.035 mmol) and DBU (4.2  $\mu$ L, 0.028 mmol). The reaction was performed by following the general procedure. The crude was purified by column chromatography (20 % EtOAc/Hexane) to yield a colorless oil (47 mg, 94 % yield). **IR**  $\nu_{\max}$ : 2958, 2873, 1738, 1459, 1338, 1182, 1055  $\text{cm}^{-1}$ ;  **$^1\text{H}$  NMR** (500 MHz,  $\text{CDCl}_3$ )  $\delta$  4.32 (dd,  $J = 11.1, 4.5$  Hz, 1H), 3.94 (dd,  $J = 9.8, 9.8$  Hz, 1H), 2.60-2.49 (m, 2H), 2.08-1.85 (m, 2H), 1.58-1.51 (m, 1H), 1.41-1.23 (m, 4H), 0.93 (t,  $J = 6.9$  Hz, 3H);  **$^{13}\text{C}$  NMR** (125 MHz,  $\text{CDCl}_3$ )  $\delta$  171.7, 73.8, 33.8, 32.6, 29.2, 25.6, 20.0, 14.2; **HRMS** ( $\text{EI}^+$ )  $m/z$  calcd for  $\text{C}_8\text{H}_{14}\text{O}_2$  [ $\text{M}$ ] $^+$ : 142.0994, found: 142.0994.



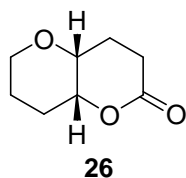
### Tetrahydro-4-(phenylmethyl)-2H-pyran-2-one (**24**).

Lactone **24** was synthesized by following the general procedure, from aldehyde **14** (27 mg, 0.142 mmol), 20 mol % catalyst loading of **6** (12 mg, 0.0284 mmol) and DBU (4  $\mu$ L, 0.0228 mmol). The crude mixture was dissolved in  $\text{CH}_2\text{Cl}_2$  and then quickly passed through a pad of silica to yield a colorless oil (26.5 mg, 98 % yield). **IR**  $\nu_{\max}$  2917, 1736, 1251, 1219, 1082  $\text{cm}^{-1}$ .  **$^1\text{H}$  NMR** (500 MHz,  $\text{CDCl}_3$ )  $\delta$  7.33-7.15 (m, 5H), 4.43-4.39 (m, 1H), 4.25-4.22 (m, 1H), 2.67-2.64 (m, 3H), 1.93-1.89 (m, 2H), 1.93-1.89 (m, 1H), 1.65-1.54 (m, 1H), 1.34-1.26 (m, 1H).  **$^{13}\text{C}$  NMR** (125 MHz,  $\text{CDCl}_3$ )  $\delta$  171.1, 138.6, 129.2, 129.1, 126.8, 68.7, 42.5, 36.5, 33.7, 28.7. **HRMS** ( $\text{EI}^+$ )  $m/z$  calcd for  $\text{C}_{12}\text{H}_{14}\text{O}_2$  [ $\text{M}$ ] $^+$ : 190.0994, found: 190.0995.



**Octahydro-2H-chromen-2-one (25).<sup>16</sup>**

Lactone **25** was synthesized by reacting aldehyde **15** (40 mg, 0.26 mmol) with 10 mol % catalyst loading of **6** (11.1 mg, 0.026 mmol) and DBU (3.1  $\mu$ L, 0.021 mmol). The reaction was performed by following the general procedure. The crude was purified by column chromatography (30 % EtOAc/Hexane) to yield a colorless oil (35 mg, 88 % yield). <sup>1</sup>H NMR (500 MHz, CDCl<sub>3</sub>)  $\delta$  3.87 (ddd,  $J$  = 10.8, 10.8, 4.2 Hz, 1H), 2.71-2.64 (m, 1H), 2.58-2.50 (m, 1H), 2.12-2.09 (m, 1H), 1.89-1.83 (m, 3H), 1.75-1.68 (m, 1H), 1.64-1.58 (m, 1H), 1.56-1.37 (m, 2H), 1.34-1.21 (m, 2H), 1.10-1.15 (m, 1H).

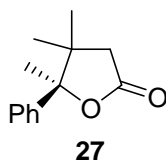


**(±)-Hexahdropyrano[3,2-b]pyran-2(3H)-one (26).**

Lactone **26** was synthesized by following the general procedure from aldehyde **16** (29 mg, 0.186 mmol), 30 mol % catalyst **6**, and DBU (2  $\mu$ L, 0.0149 mmol) was used. An aqueous workup was avoided, due to concerns of water solubility, therefore, the reaction was quickly filtered through a small pad of silica and concentrated under reduced pressure. The reaction was purified by column chromatography (100 % EtOAc, R<sub>f</sub> = 0.38) to yield a colorless oil (18 mg, 62 % yield).<sup>17</sup> IR  $\nu_{\text{max}}$  2950, 1724 cm<sup>-1</sup>. <sup>1</sup>H NMR (500 MHz, CDCl<sub>3</sub>)  $\delta$  4.32 (s, 1H), 4.00-3.96 (m, 1H), 3.65 (s, 1H), 3.52 (dd,  $J$  = 12.2 Hz, 1H), 2.71-2.63 (m, 1H), 2.48-2.42 (m, 1H), 2.13 (d,  $J$  = 14.1 Hz, 1H), 2.05-1.90 (m, 3H), 1.77-1.71 (m, 1H), 1.40 (d,  $J$  = 13.7 Hz, 1H). <sup>13</sup>C NMR (125 MHz, CDCl<sub>3</sub>)  $\delta$  171.3, 75.5, 69.4, 67.7, 28.3, 25.7, 25.2, 19.5. HRMS (EI<sup>+</sup>)  $m/z$  calcd. for C<sub>8</sub>H<sub>12</sub>O<sub>3</sub> [M]<sup>+</sup>: 156.0785, found: 156.0786.

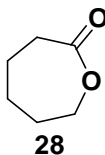
<sup>16</sup> Griffiths, D. V.; Wilcox, G. *J. Chem. Soc Perkin Trans. II* **1988**, 431-436.

<sup>17</sup> The yield was determined based on the NMR purity of the starting material.



**4,4,5-Trimethyl-5-phenyldihydrofuran-2(3H)-one (27).**

Lactone **27** was synthesized by reacting aldehyde **17** (50 mg, 0.25 mmol) with 10 mol % catalyst loading of **6** (10.7 mg, 0.025 mmol) and DBU (2.98  $\mu$ L, 0.02 mmol). The reaction was performed by following the general procedure. The crude was purified by column chromatography (30 % EtOAc/Hexane) to yield a colorless oil (43 mg, 86 % yield). **IR**  $\nu_{\text{max}}$ : 2975, 1772, 1446, 1242, 1056  $\text{cm}^{-1}$ ;  **$^1\text{H}$  NMR** (500 MHz,  $\text{CDCl}_3$ )  $\delta$  7.38-7.26 (m, 5H), 2.66 (d,  $J = 17.1$  Hz, 1H), 2.20 (d,  $J = 17.8$  Hz, 1H), 1.81 (s, 3H), 1.30 (s, 3H), 0.69 (s, 3H);  **$^{13}\text{C}$  NMR** (125 MHz,  $\text{CDCl}_3$ )  $\delta$  175.6, 141.4, 128.4, 127.6, 124.7, 91.4, 44.4, 42.8, 26.0, 24.3, 23.1; **HRMS** ( $\text{EI}^+$ )  $m/z$  calcd for  $\text{C}_{13}\text{H}_{16}\text{O}_2$  [ $\text{M}$ ] $^+$ : 204.1150, found: 204.1147.

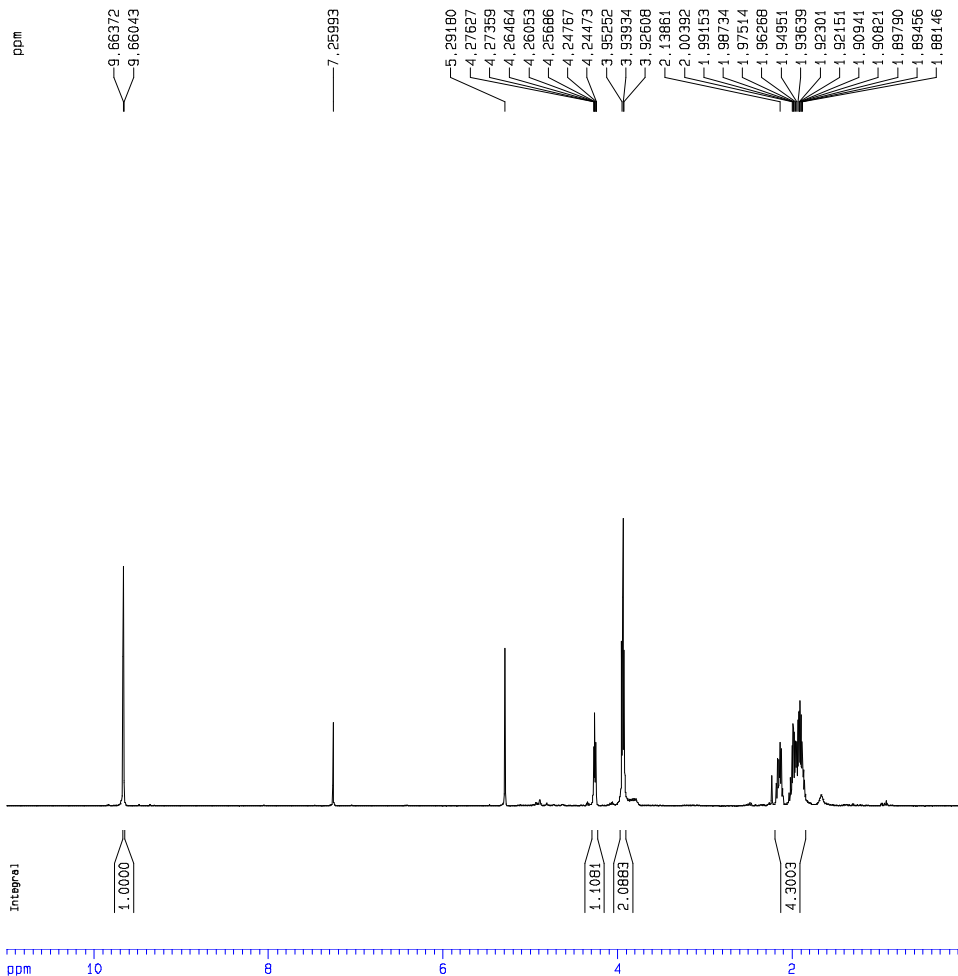
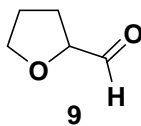


**Oxepan-2-one (28).**<sup>18</sup>

Lactone **28** was synthesized by reacting aldehyde **18** (60 mg, 0.53 mmol) with 10 mol % catalyst loading of **6** (22.6 mg, 0.053 mmol) and DBU (6.3  $\mu$ L, 0.042 mmol). The reaction was performed under reflux for 10 days. The crude was purified by column chromatography (30 % EtOAc/Hexane) to yield a colorless oil (29 mg, 48 % yield).  **$^1\text{H}$  NMR** (500 MHz,  $\text{CDCl}_3$ )  $\delta$  4.23 (t,  $J = 4.6$  Hz, 2H), 2.63 (t,  $J = 6.5$  Hz, 2H), 1.64-1.59 (m, 6H).

<sup>18</sup> Brodsky, B. H.; Bois, J. D. *J. Am. Chem. Soc.* **2005**, *127*, 94305-95080.

### III. <sup>1</sup>H NMR and <sup>13</sup>C NMR Spectra



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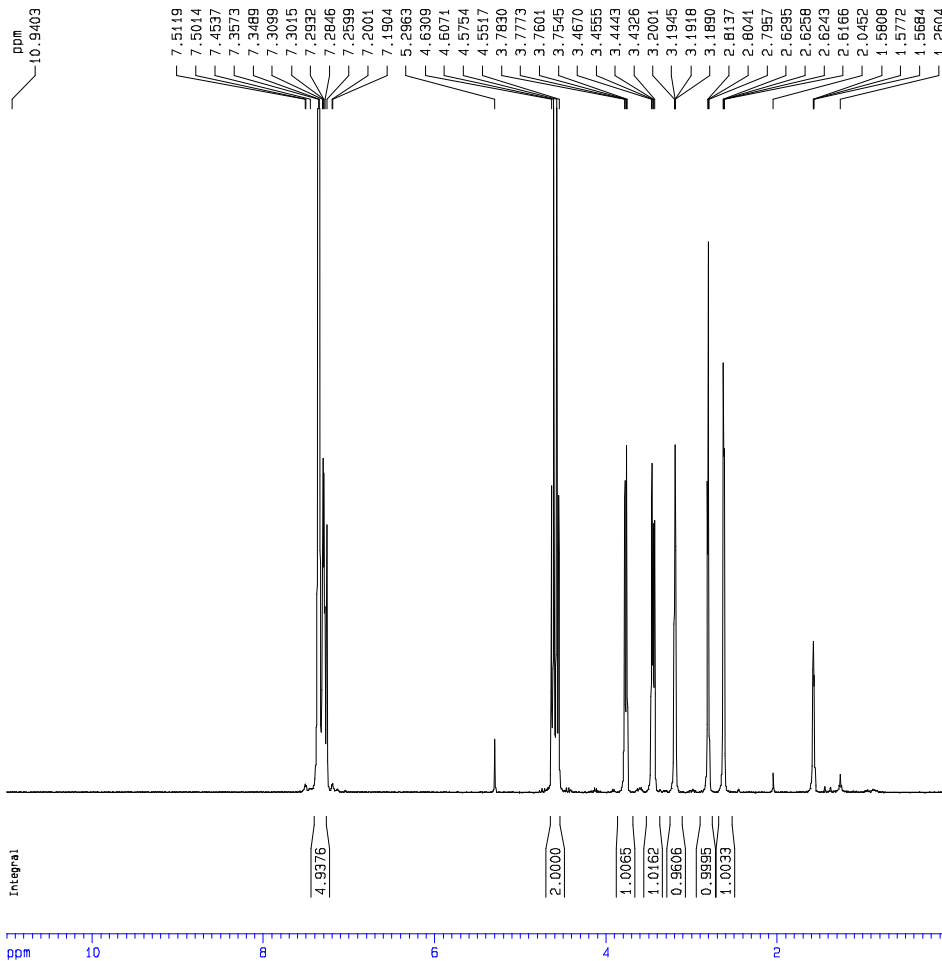
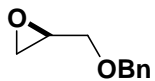
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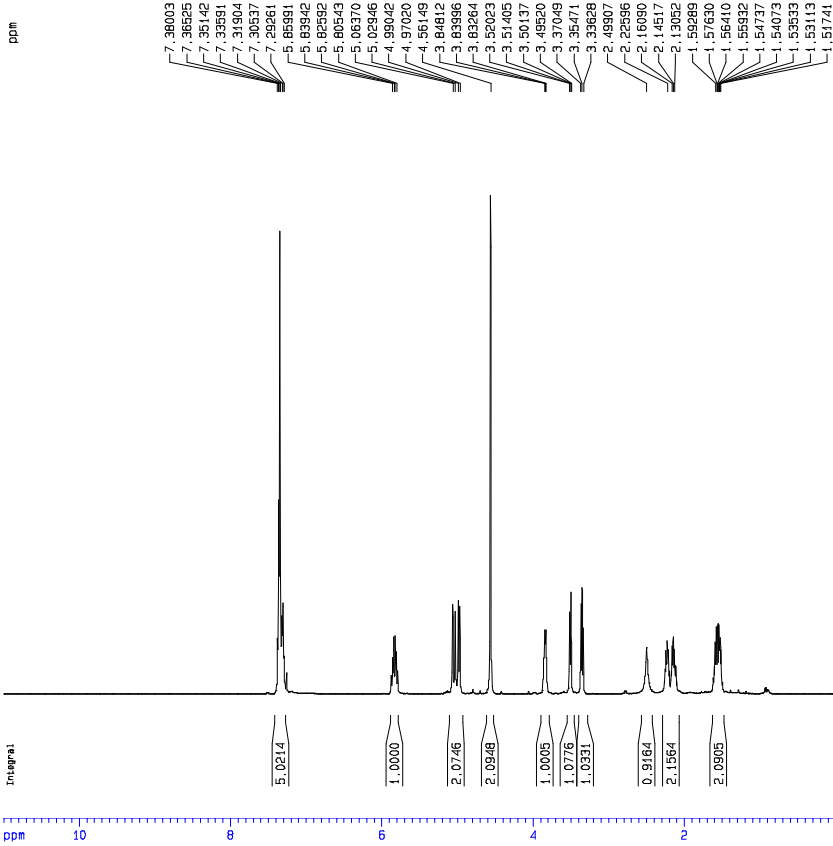
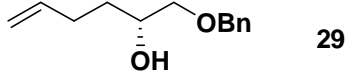
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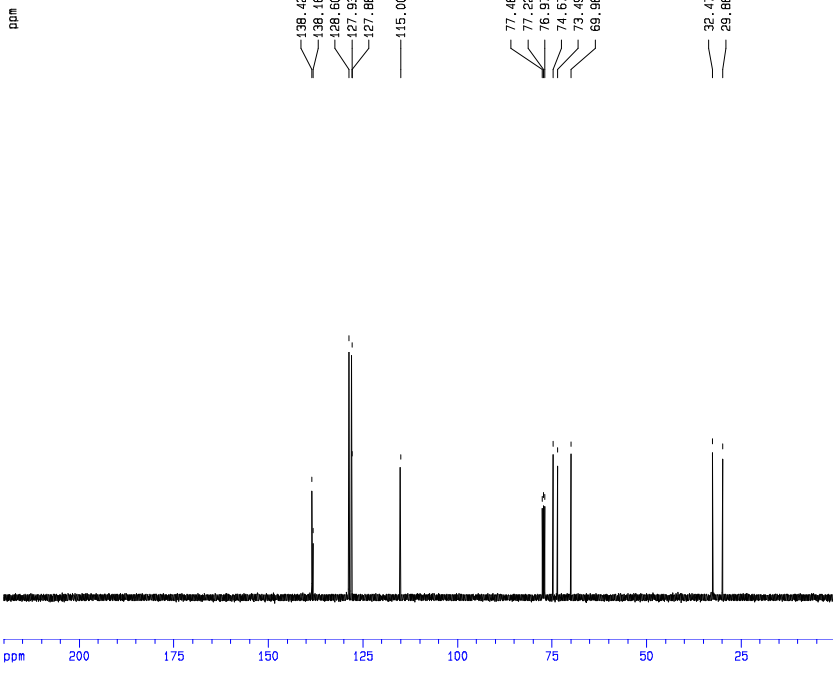
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FHM000   Status

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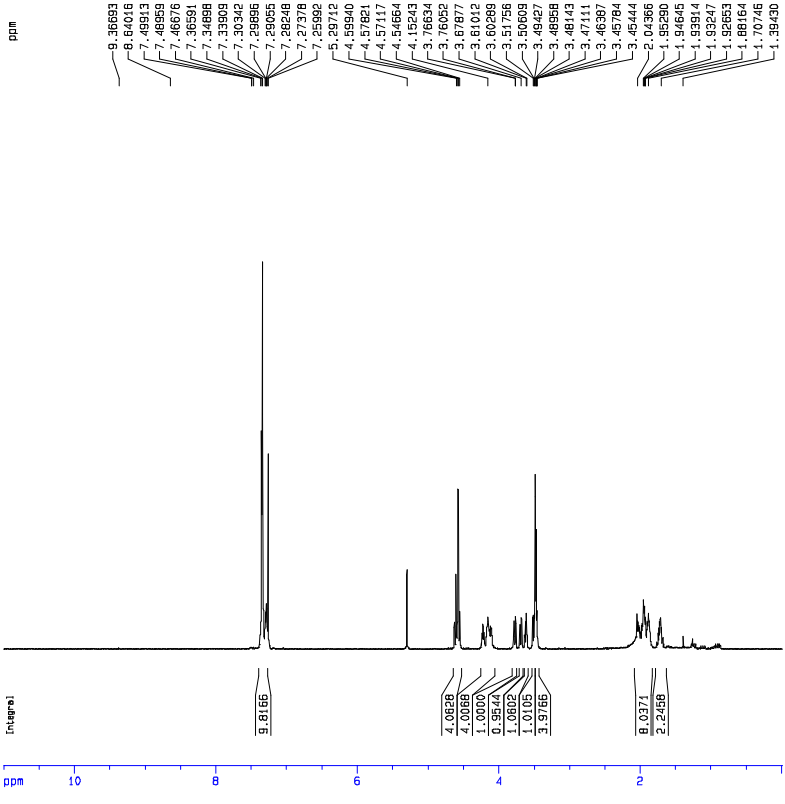
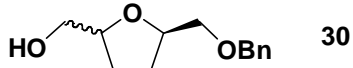
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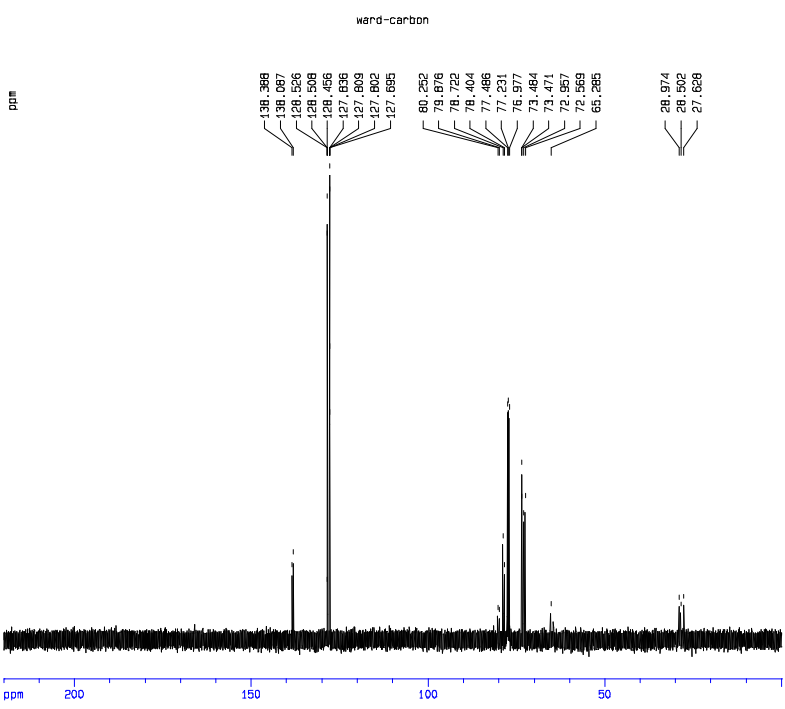
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F1 - Processing parameters
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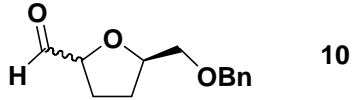
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DE         6.00 usec
TE        298.1 K
D1        0.0000000 sec
d11       0.0300000 sec
MCHEST   0.0000000 sec
MCWK     0.0150000 sec

===== CHANNEL f1 =====
NUC1      13C
P1        11.00 usec
PL1       -3.00 dB
SFO1     125.7703194 MHz

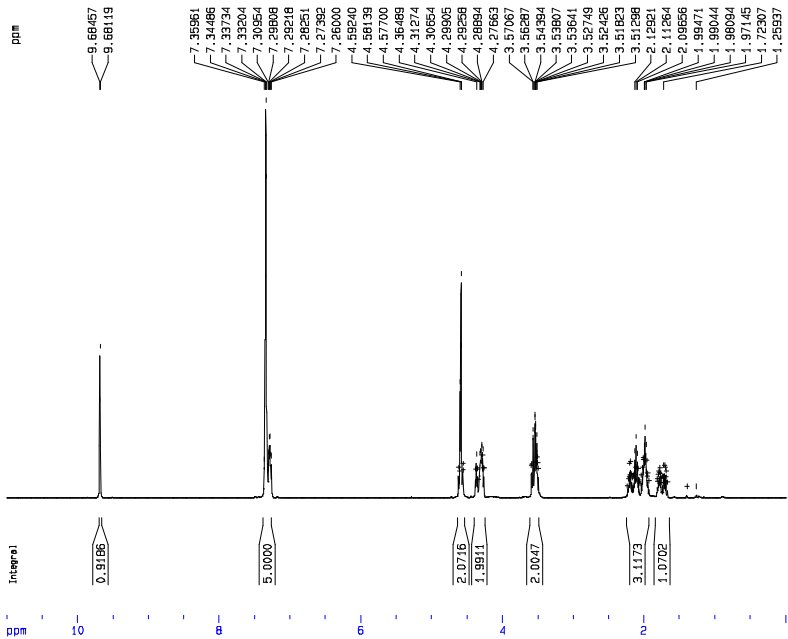
===== CHANNEL f2 =====
CPDPRG2  waltz16
NUC2      1H
PCPD2    80.00 usec
PL2       0.00 dB
PL12     21.16 dB
SFO2     500.1320000 MHz

F2 - Processing parameters
SI        65536
SF        125.7577780 MHz
WDW        EX
SSB        0
LB         0.00 Hz
GB         0
PC         1.40

ID NMR plot parameters
CX        20.00 cm
CY        12.00 cm
F1P       220.000 ppm
F1        27866.71 Hz
F2P       0.000 ppm
F2        0.00 Hz
PPMCH    11.00000 ppm/cm
HZCM     1393.33545 Hz/cm
  
```



ward-proton



```

Current Data Parameters
NAME      LW-3-90-2
EXPNO    1
PROCNO   1

F2 - Acquisition Parameters
Date_    20080401
Time     15.18
INSTRUM  spect
PROBHD   5 mm TXI 13C Z
PULPROG  zgpg30
TD        32768
SOLVENT  CDCl3
NS        2
DS        4
SWH       8245.098 Hz
FIDRES   0.150735 Hz
AQ        2.8244917 sec
RG        65
DM        80.000 usec
DE        6.00 usec
TE        298.2 K
D1        1.0000000 sec
d11       0.0000000 sec
d12       0.0000000 sec
d13       0.0150000 sec
d14       0.0150000 sec
  
```

```

----- CHANNEL f1 -----
NUC1      1H
P1        10.00 usec
PL1       0.00 dB
SFO1      500.1378000 MHz
  
```

```

F1 - Acquisition parameters
MD        2
TD        256
SFO1      500.1304 MHz
FIDRES    20.011268 Hz
SWH       10.243 ppm
FWDQZ     States
  
```

```

F2 - Processing parameters
SI        32768
SF        500.130136 MHz
WDW       EM
SSB       0
LB        0.30 Hz
GB        0
PC        1.00
  
```

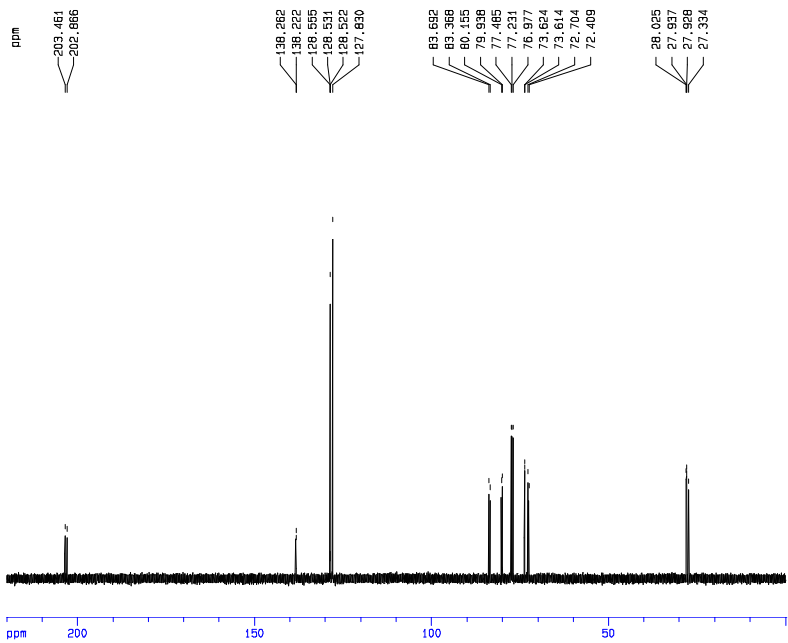
```

F1 - Processing parameters
SI        1024
SF        500.130000 MHz
WDW       EM
SSB       0
LB        0.30 Hz
GB        0
PC        0.1
  
```

```

1D NMR plot parameters
CX        20.00 cm
CY        10.00 cm
F1P       11.000 ppm
F1         9501.43 Hz
F2P       0.000 ppm
F2         0.00 Hz
PRNCHN    0.25000 ppm/cm
HZCM      275.07150 Hz/cm
  
```

ward-carbon



```

Current Data Parameters
NAME      LW-3-90-2
EXPNO    3
PROCNO   1
  
```

```

F2 - Acquisition Parameters
Date_    20080401
Time     15.34
INSTRUM  spect
PROBHD   5 mm TXI 13C Z
PULPROG  zgpg30
TD        65536
SOLVENT  CDCl3
NS        4
DS        4
SWH       31446.541 Hz
FIDRES   0.475836 Hz
AQ        1.0420724 sec
RG        8192
DM        15.900 usec
DE        6.00 usec
TE        298.1 K
D1        0.0000000 sec
d11       0.0000000 sec
d12       0.0000000 sec
d13       0.0150000 sec
d14       0.0150000 sec
  
```

```

----- CHANNEL f1 -----
NUC1      13C
P1        11.00 usec
PL1       -2.00 dB
SFO1      125.7703194 MHz
  
```

```

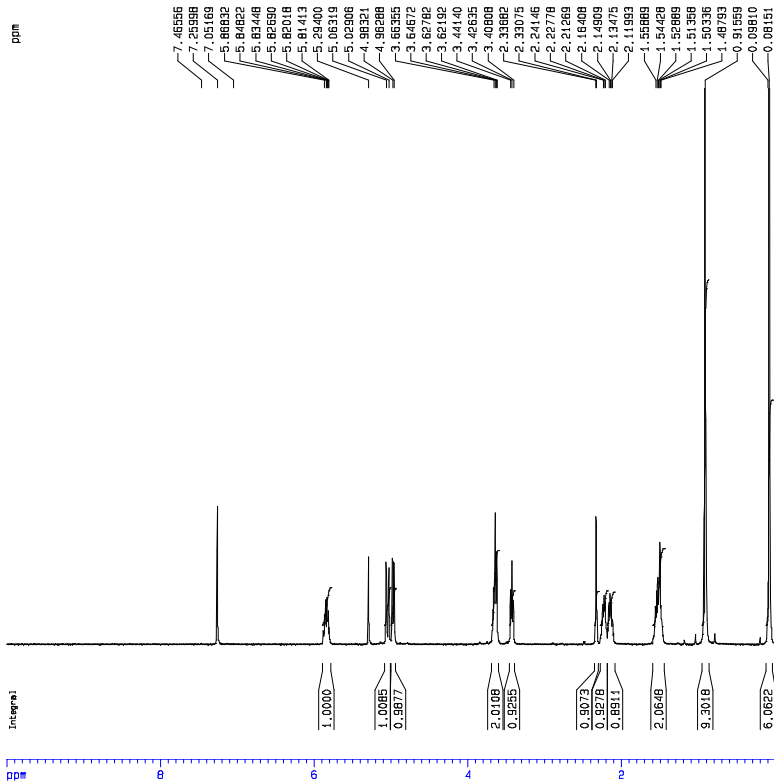
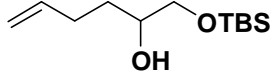
----- CHANNEL f2 -----
CPDPRG2  hb1z116
NUC2      1H
PCPD2    80.00 usec
PL2       0.00 dB
PL12     21.16 dB
SFO2     500.1300000 MHz
  
```

```

F2 - Processing parameters
SI        65536
SF        125.777713 MHz
WDW       EM
SSB       0
LB        0.00 Hz
GB        0
PC        1.40
  
```

```

1D NMR plot parameters
CX        20.00 cm
CY        9.00 cm
F1P       250.000 ppm
F1        27665.71 Hz
F2P       0.000 ppm
F2         0.00 Hz
PRNCHN    11.00000 ppm/cm
HZCM      1363.33545 Hz/cm
  
```



```

Current Data Parameters
NAME      K1-3-18C
EXPNO    1
PROCNO   1

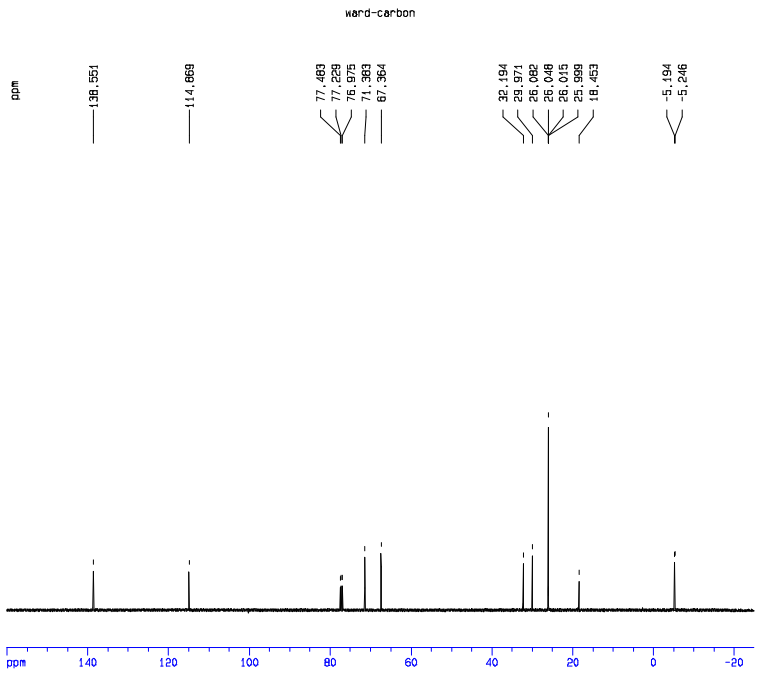
F2 - Acquisition Parameters
Date_    20080303
Time     17:02
INSTRUM  spect
PROBHD   5 mm Dual 1H/
PULPROG  zg30
TD        32768
SOLVENT  Acetone
NS        8
DS        2
SWH       6048.888 Hz
FIDRES    0.180729 Hz
AQ        2.8514917 sec
RG        512
DE        80.000 usec
TE        315.0 K
D1        1.0000000 sec
d11       0.0000000 sec
d12       0.0150000 sec
MCHEST    0.0000000 sec
MCUR      0.0150000 sec

----- CHANNEL f1 -----
NUC1      1H
P1        10.00 usec
PL1       0.00 dB
SFO1      500.136095 MHz

F1 - Acquisition parameters
RG        2
TD        256
SFO1      500.1361 MHz
FIDRES    26.011826 Hz
SW        10.243 ppm
PROBHD    5mmQNP
F2 - Processing parameters
SI        32768
SF        500.136095 MHz
WDW       EM
SSB       0
LB        0.30 Hz
GB        0
PC        1.00

F1 - Processing parameters
SI        256
SF        500.136095 MHz
WDW       EM
SSB       2
LB        0.30 Hz
GB        0.1

ID NMR plot parameters
CX        20.00 cm
CY        80.00 cm
F1P       10.000 ppm
F1        5001.30 Hz
F2P       0.000 ppm
F2        0.00 Hz
PRNCH     0.50000 ppm/cm
RDCN      250.0000 Hz/cm
  
```



```

Current Data Parameters
NAME      K1-3-18C (Carbon)
EXPNO    2
PROCNO   1

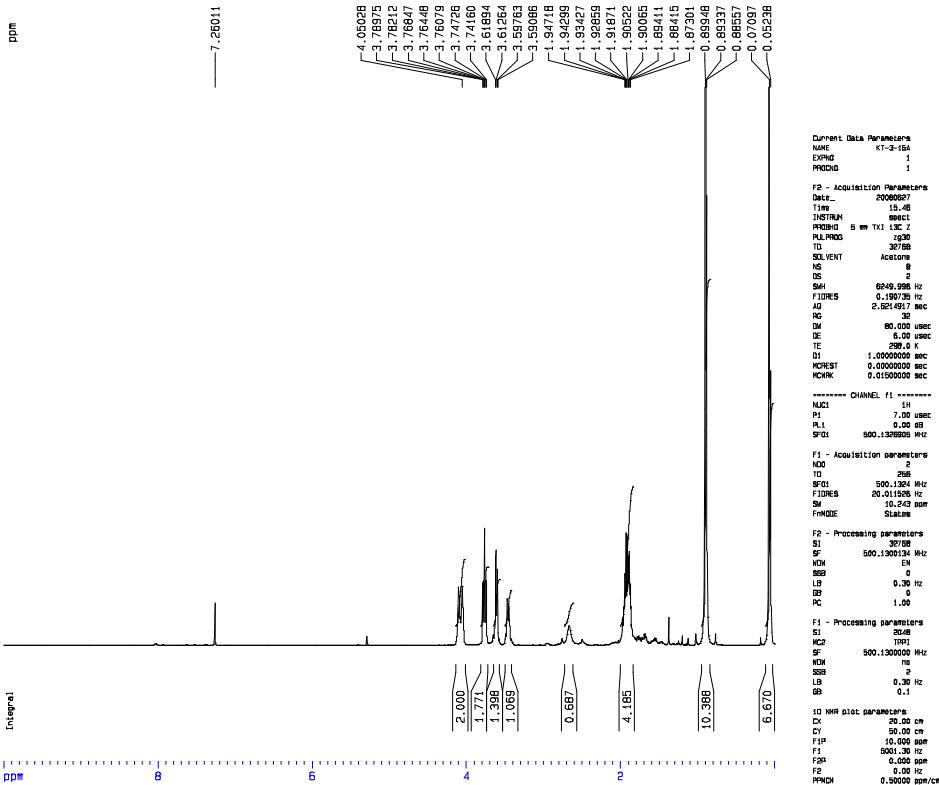
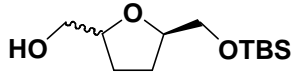
F2 - Acquisition Parameters
Date_    20080304
Time     15:28
INSTRUM  spect
PROBHD   5 mm TXI 1H-13
PULPROG  zgpg30
TD        32768
SOLVENT  CDCl3
NS        128
DS        4
SWH       21445.541 Hz
FIDRES    0.959972 Hz
AQ        0.5210812 sec
RG        25.4
DE        15.800 usec
TE        8.00 usec
D1        297.25 sec
D11       0.5000000 sec
D12       0.0300000 sec
D13       0.0300000 sec
MCHEST    0.0000000 sec
MCUR      0.0150000 sec

----- CHANNEL f1 -----
NUC1      13C
P1        13.00 usec
PL1       -3.00 dB
SFO1      125.8000004 MHz

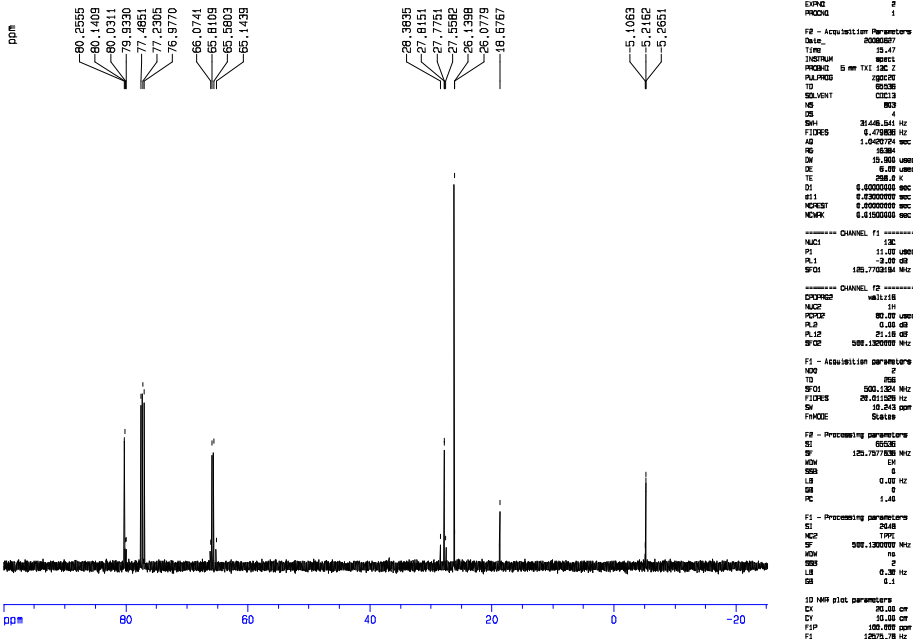
----- CHANNEL f2 -----
PROBHD    waltz16
NUC2      1H
PCPD2     80.00 usec
PL2       0.00 dB
PL12      19.01 dB
SFO2      500.330000 MHz

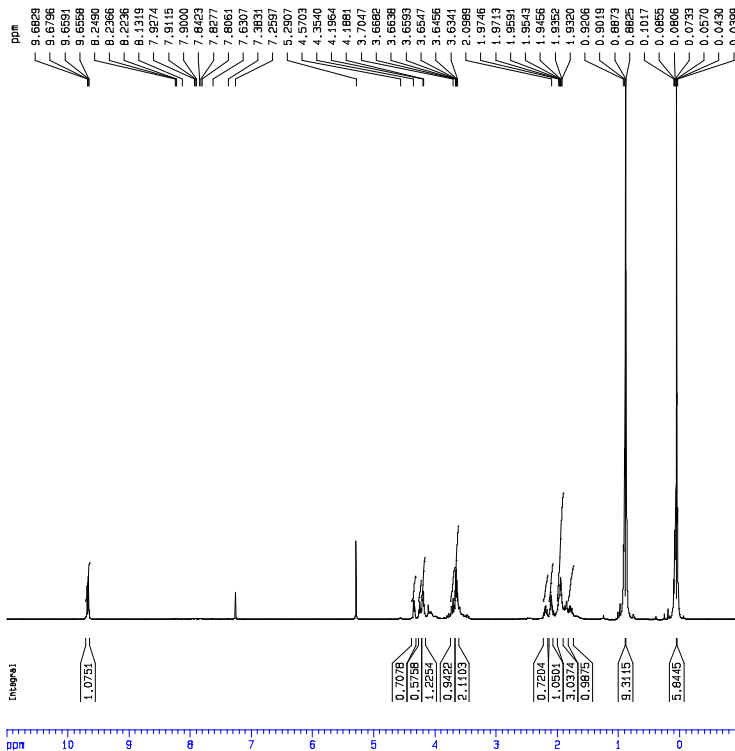
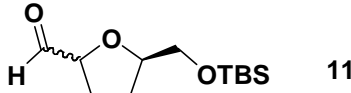
F2 - Processing parameters
SI        65536
SF        125.800000 MHz
WDW       EM
SSB       0
LB        1.00 Hz
GB        0
PC        1.40

ID NMR plot parameters
CX        20.00 cm
CY        5.00 cm
F1P       160.000 ppm
F1        20126.29 Hz
F2P       -24.268 ppm
F2        -3118.84 Hz
PRNCH     9.23995 ppm/cm
RDCN      1162.46155 Hz/cm
  
```



ward-carbon





```

Current Data Parameters
NAME      KT-3-SIA
EXPNO    1
PROCNO   1

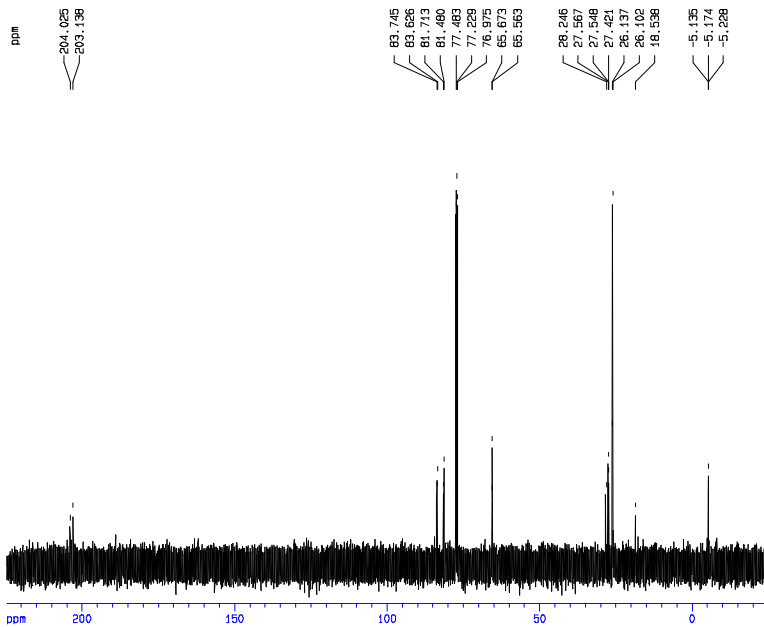
F2 - Acquisition Parameters
Date_    20080703
Time     15.05
INSTRUM spect
PROBHD   5 mm TXI 13C Z
PULPROG zgpg30
RG       655.36
SOLVENT Acetone
NS       4
DS       4
SHF      500.130038 Hz
FIDRES   0.192736 Hz
AQ       2.6814817 sec
RG2      655.36
DE       80.000 usec
TE       300.2 K
D1       1.0000000 sec
d11      0.0000000 sec
d12      0.0000000 sec
d13      0.0000000 sec
===== CHANNEL f1 =====
NUC1      13C
P1       11.00 usec
PL1      0.00 dB
SFO1     500.1300380 MHz

F1 - Acquisition parameters
AQ       2.6814817 sec
RG2      655.36
DE       80.000 usec
TE       300.2 K
D1       1.0000000 sec
d11      0.0000000 sec
d12      0.0000000 sec
d13      0.0000000 sec

F2 - Processing parameters
SI       65536
SF       125.763154 MHz
WDW      EM
SSB      0
GB       0
PC       1.40

ID NMR slit parameters
CX       20.00 cm
CY       10.00 cm
F1JP     224.809 ppm
F1       28277.84 Hz
F2JP     -25.188 ppm
F2       -3169.50 Hz
P1MCH   12.50282 ppm/cm
H2MCH   1972.32703 Hz/cm
  
```

ward-carbon



```

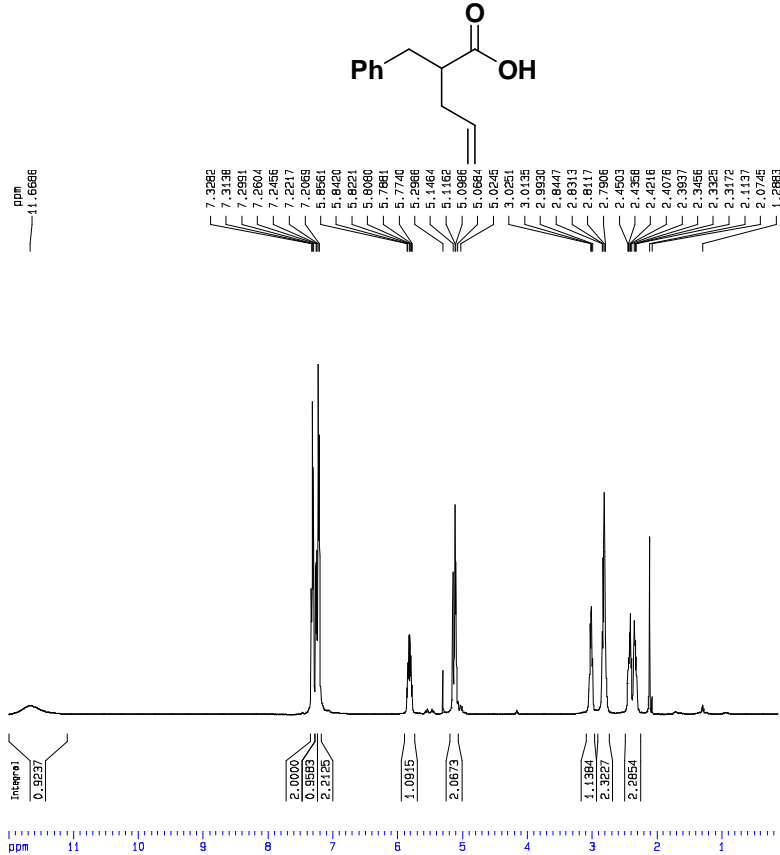
Current Data Parameters
NAME      KT-3-SIA
EXPNO    3
PROCNO   1

F2 - Acquisition Parameters
Date_    20080703
Time     15.16
INSTRUM spect
PROBHD   5 mm TXI 13C Z
PULPROG zgpg30
RG       655.36
SOLVENT CDCl3
NS       4
DS       4
SHF      500.130038 Hz
FIDRES   0.478836 Hz
AQ       1.0420724 sec
RG2      655.36
DE       15.900 usec
TE       300.2 K
D1       0.0000000 sec
d11      0.0000000 sec
d12      0.0000000 sec
d13      0.0000000 sec
===== CHANNEL f1 =====
NUC1      13C
P1       11.00 usec
PL1      -3.00 dB
SFO1     125.7703194 MHz

===== CHANNEL f2 =====
CPDPRG2 waltz16
NUC2      1H
P2       80.00 usec
PL2      0.00 dB
PL12     21.15 dB
SFO2     500.1300000 MHz

F2 - Processing parameters
SI       65536
SF       125.763154 MHz
WDW      EM
SSB      0
GB       0
PC       1.40

ID NMR slit parameters
CX       20.00 cm
CY       10.00 cm
F1JP     224.809 ppm
F1       28277.84 Hz
F2JP     -25.188 ppm
F2       -3169.50 Hz
P1MCH   12.50282 ppm/cm
H2MCH   1972.32703 Hz/cm
  
```



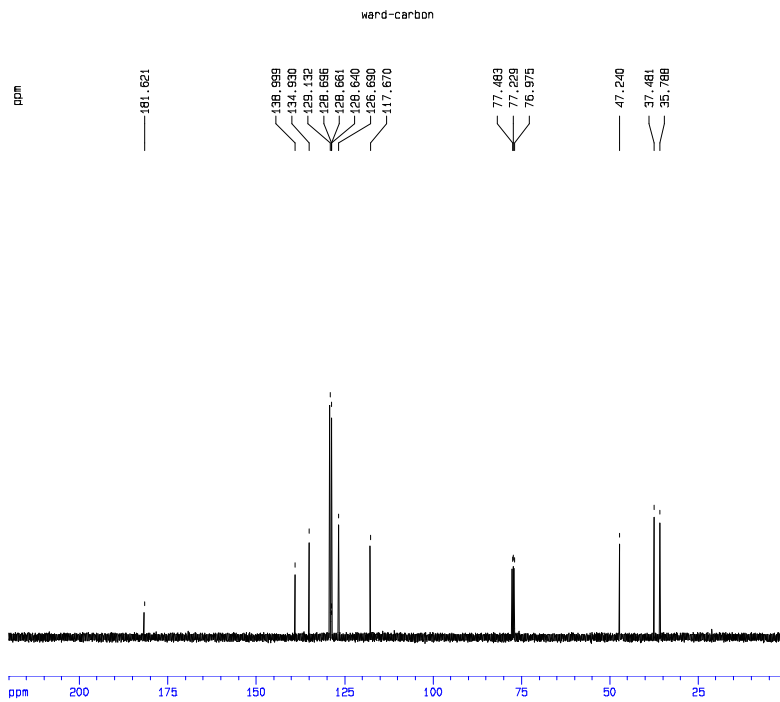
Current Data Parameters  
 NAME LW-S-40-2  
 EXPNO 1  
 PROCNO 1

F2 - Acquisition Parameters  
 Date\_ 20080930  
 Time 11.01  
 INSTRUM spect  
 PROBHD 5 mm TXI 1H-13  
 PULPROG zg30  
 TD 32768  
 SOLVENT CDCl3  
 NS 8  
 DS 2  
 SWH 6009.615 Hz  
 FIDRES 0.183399 Hz  
 AQ 2.7263477 sec  
 RG 25.4  
 DW 83.200 usec  
 DE 6.00 usec  
 TE 298.0 K  
 D1 1.0000000 sec  
 MCREST 0.0000000 sec  
 MCKK 0.0150000 sec

===== CHANNEL f1 =====  
 NUC1 1H  
 P1 10.00 usec  
 PL1 0.50 dB  
 SFO1 500.3330897 MHz

F2 - Processing parameters  
 SI 32768  
 SF 500.3300123 MHz  
 MDW EM  
 SSB 0  
 LB 0.30 Hz  
 GB 0  
 PC 1.00

1D NMR plot parameters  
 CX 20.00 cm  
 CY 9.00 cm  
 F1P 12.000 ppm  
 F1 6003.96 Hz  
 F2P -0.000 ppm  
 F2 -0.00 Hz  
 PRMCH 0.60000 ppm/cm  
 HZCN 300.19803 Hz/cm



Current Data Parameters  
 NAME LW-S-40-2  
 EXPNO 2  
 PROCNO 1

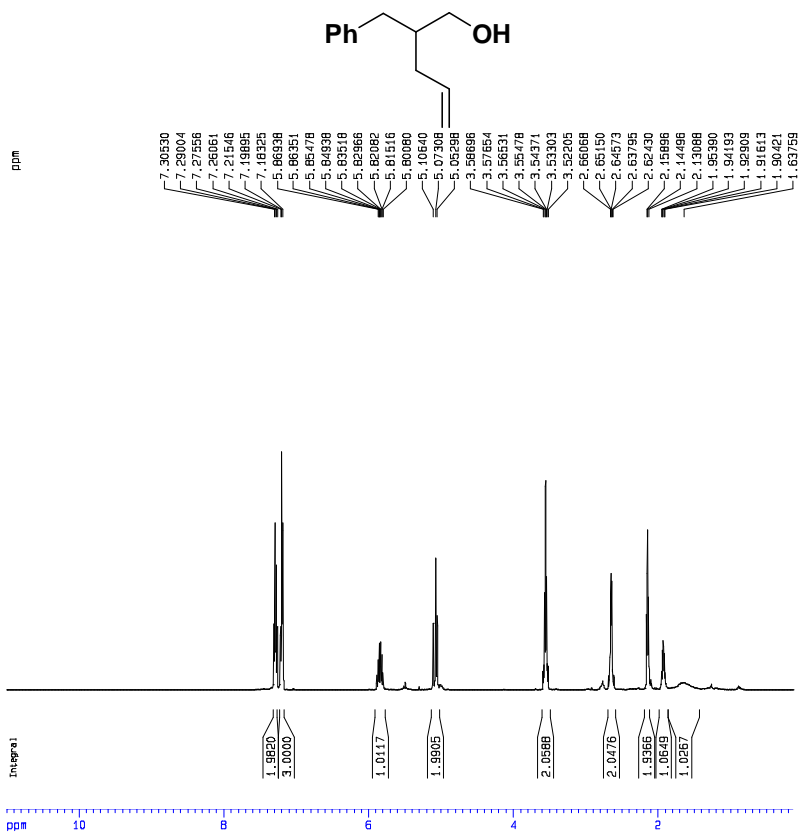
F2 - Acquisition Parameters  
 Date\_ 20080930  
 Time 11.02  
 INSTRUM spect  
 PROBHD 5 mm TXI 1H-13  
 PULPROG zgpg30  
 TD 32768  
 SOLVENT CDCl3  
 NS 274  
 DS 4  
 SWH 31446.341 Hz  
 FIDRES 0.959672 Hz  
 AQ 0.3216612 sec  
 RG 35.8  
 DW 15.300 usec  
 DE 6.00 usec  
 TE 298.0 K  
 D1 0.5000000 sec  
 D11 0.0300000 sec  
 MCREST 0.0000000 sec  
 MCKK 0.0150000 sec

===== CHANNEL f1 =====  
 NUC1 13C  
 P1 13.00 usec  
 PL1 -3.00 dB  
 SFO1 125.8060884 MHz

===== CHANNEL f2 =====  
 CPDPRG2 waltz16  
 NUC2 1H  
 PCPD2 80.00 usec  
 PL2 0.50 dB  
 PL12 19.01 dB  
 SFO2 500.3330000 MHz

F2 - Processing parameters  
 SI 65536  
 SF 125.8080959 MHz  
 MDW HG  
 SSB 0  
 LB 0.00 Hz  
 GB 0  
 PC 1.40

1D NMR plot parameters  
 CX 20.00 cm  
 CY 6.00 cm  
 F1P 220.000 ppm  
 F1 27677.71 Hz  
 F2P 0.000 ppm  
 F2 0.00 Hz  
 PRMCH 11.00000 ppm/cm  
 HZCN 1362.88867 Hz/cm



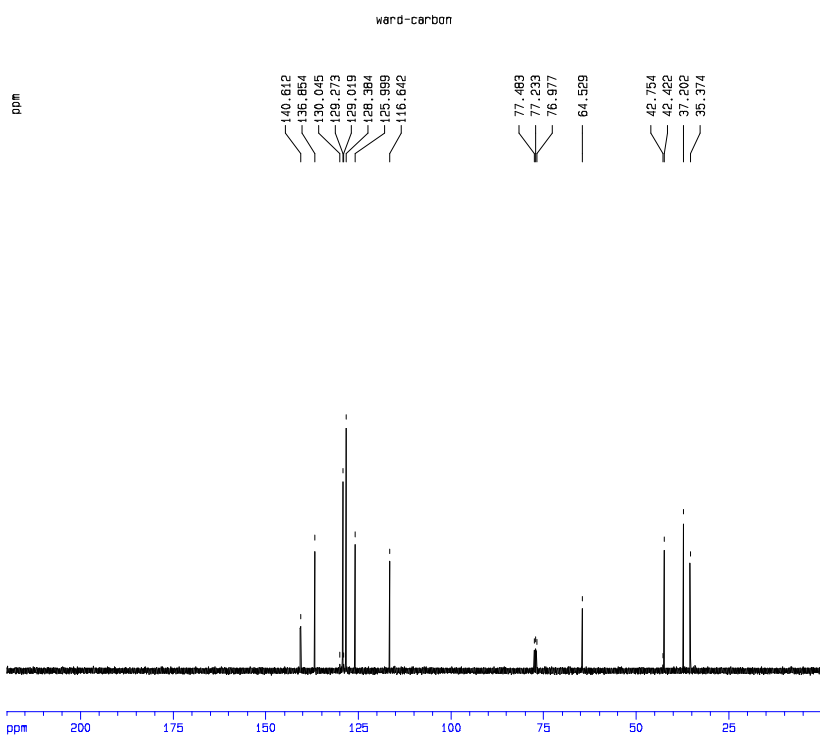
Current Data Parameters  
 NAME LW-5-43-2RE  
 EXPNO 1  
 PROCNO 1

F2 - Acquisition Parameters  
 Date\_ 20081001  
 Time 16.38  
 INSTRUM spect  
 PROBHD 5 mm TXI 1H-13  
 PULPROG zg30  
 TD 32768  
 SOLVENT CDCl3  
 NS 8  
 DS 2  
 SFO 6099.615 Hz  
 FIDRES 0.183388 Hz  
 AQ 2.7263477 sec  
 RG 80.6  
 DM 83.200 usec  
 DE 5.00 usec  
 TE 298.0 K  
 D1 1.00000000 sec  
 MCREST 0.00000000 sec  
 MCPRK 0.01500000 sec

----- CHANNEL f1 -----  
 NUC1 1H  
 P1 10.00 usec  
 PL1 0.50 dB  
 SFO1 500.3300897 MHz

F2 - Processing parameters  
 SI 32768  
 SF 500.3300125 MHz  
 NH 64  
 EX  
 SSB 0  
 LB 0.30 Hz  
 GB 0  
 PC 1.00

1D NMR plot parameters  
 CX 20.00 cm  
 CY 6.00 cm  
 F1P 11.000 ppm  
 F1 500.833 Hz  
 F2P 0.000 ppm  
 F2 0.00 Hz  
 PPMCM 0.95000 ppm/cm  
 HZCM 275.16148 Hz/cm



Current Data Parameters  
 NAME LW-5-43-2  
 EXPNO 2  
 PROCNO 1

F2 - Acquisition Parameters  
 Date\_ 20081001  
 Time 12.29  
 INSTRUM spect  
 PROBHD 5 mm TXI 13C-2  
 PULPROG zgpg30  
 TD 8192  
 SOLVENT CDCl3  
 NS 256  
 DS 4  
 SFO 125.7611700 Hz  
 FIDRES 0.478888 Hz  
 AQ 1.0420724 sec  
 RG 18384  
 DM 15.800 usec  
 DE 8.00 usec  
 TE 298.0 K  
 D1 0.00000000 sec  
 D11 0.03000000 sec  
 MCREST 0.00000000 sec  
 MCPRK 0.01500000 sec

----- CHANNEL f1 -----  
 NUC1 13C  
 P1 11.00 usec  
 PL1 -3.00 dB  
 SFO1 125.7709184 MHz

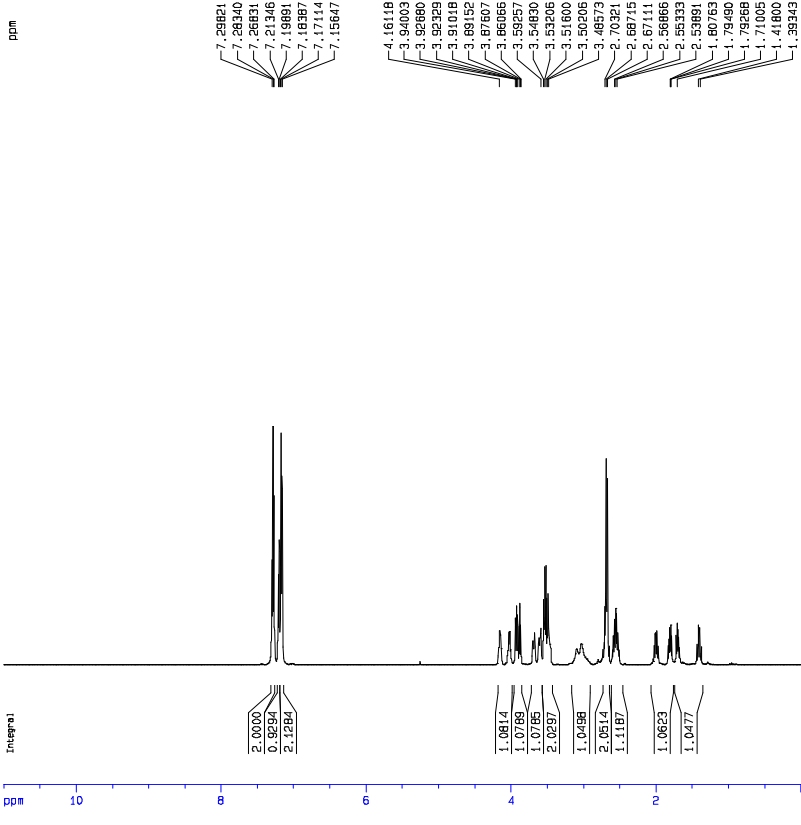
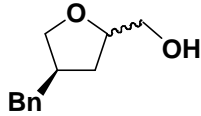
----- CHANNEL f2 -----  
 CPDPRG2 waltz16  
 NUC2 1H  
 P2P2 80.00 usec  
 PL2 0.00 dB  
 PL12 21.16 dB  
 SFO2 500.1300000 MHz

F1 - Acquisition parameters  
 NS 2  
 TD 2048  
 SF 500.1300000 MHz  
 FIDRES 20.011926 Hz  
 SW 10.243 ppm  
 HWDX

F2 - Processing parameters  
 SI 8192  
 SF 125.7677980 MHz  
 NH 16  
 SSB 0  
 LB 0.30 Hz  
 GB 0  
 PC 1.40

F1 - Processing parameters  
 SI 2048  
 SF 500.1300000 MHz  
 NH 16  
 SSB 0  
 LB 0.30 Hz  
 GB 0  
 PC 1.40

1D NMR plot parameters  
 CX 20.00 cm  
 CY 6.00 cm  
 F1P 200.000 ppm  
 F1 27686.71 Hz



```

Current Data Parameters
NAME      LW-5-46-3
EXPNO    1
PROCNO   1

F2 - Acquisition Parameters
Date_    20080902
Time     19.19
INSTRUM spect
PROBHD  5 mm TXI 13C Z
PULPROG zgpg30
TD       65536
SOLVENT Acetone
NS       2
DS       2
SWH      6049.936 Hz
FIDRES   0.180735 Hz
AQ       2.8214817 sec
RG       16
IN       80.000 usec
DE       8.00 usec
TE       298.0 K
D1       1.0000000 sec
NOREST   0.0000000 sec
NORMF    0.0150000 sec

***** CHANNEL f1 *****
NUC1     13C
P1       7.00 usec
PL1      0.00 dB
SFO1     500.130605 MHz

F1 - Acquisition parameters
NUC      13C
P2       2.00 usec
PL2      0.00 dB
SFO1     500.1304 MHz
FIDRES   20.811326 Hz
AQ       10.243 sec
RG        32
SFO2     500.1304 MHz
FIDRES   20.811326 Hz
AQ       10.243 sec
RG        32
SFO3     500.1304 MHz
FIDRES   20.811326 Hz
AQ       10.243 sec
RG        32

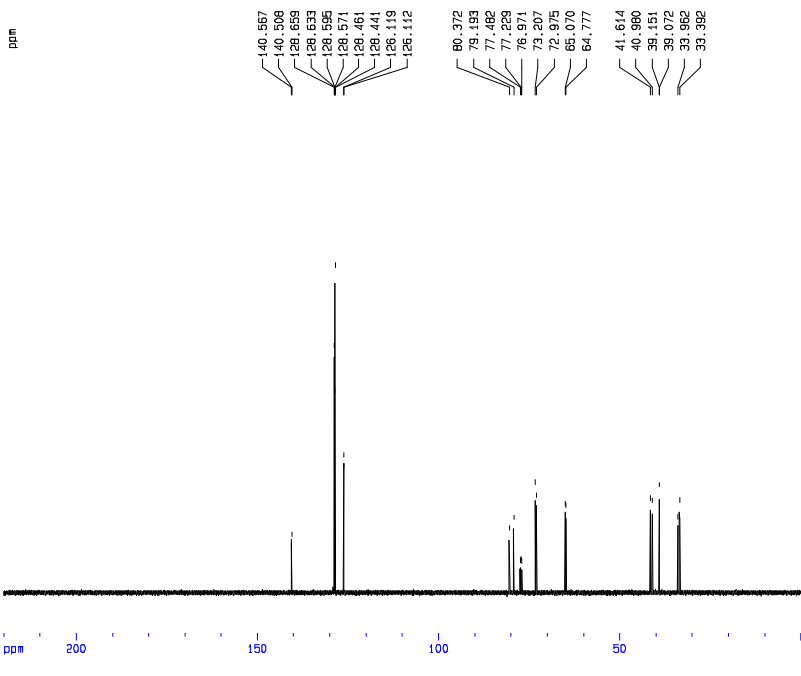
F2 - Processing parameters
SI       32768
SF       500.130605 MHz
WDW      EM
SSB      0
LB       0.30 Hz
GB       0
PC       1.00

F1 - Processing parameters
SI       32768
SF       500.130605 MHz
WDW      EM
SSB      0
LB       0.30 Hz
GB       0
PC       1.00

ID NMR plot parameters
CX      20.00 cm
CY      8.00 cm
F1P     500.130605 MHz
F2P     500.1304 MHz
F3P     500.1304 MHz
G1      0.00 Hz
G2      0.00 Hz
H1NCH   0.05000 ppm/cm
H2NCH   0.05000 ppm/cm
H3NCH   0.05000 ppm/cm

```

ward-carbon



```

Current Data Parameters
NAME      LW-5-46-3
EXPNO    2
PROCNO   1

F2 - Acquisition Parameters
Date_    20080902
Time     19.28
INSTRUM spect
PROBHD  5 mm TXI 13C Z
PULPROG zgpg30
TD       65536
SOLVENT Acetone
NS       2
DS       2
SWH      30488.241 Hz
FIDRES   0.4780050 Hz
AQ       1.0429734 sec
RG       16384
IN       150.000 usec
DE       8.00 usec
TE       298.0 K
D1       0.0000000 sec
D11      0.0000000 sec
NOREST   0.0000000 sec
NORMF    0.0150000 sec

***** CHANNEL f1 *****
NUC1     13C
P1       11.00 usec
PL1      3.00 dB
SFO1     125.7703104 MHz

***** CHANNEL f2 *****
DPPROG   zgpg30
NUC2     13C
P2       80.00 usec
PL2      0.00 dB
PL12     01.00 dB
SFO2     500.130605 MHz

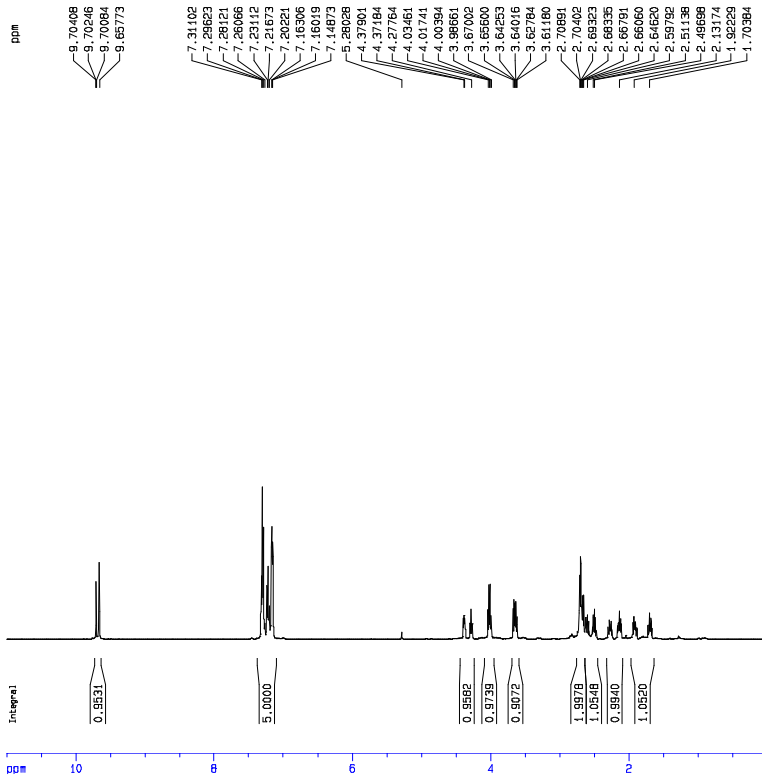
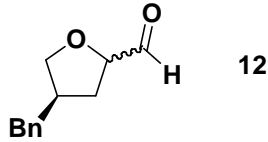
F1 - Acquisition parameters
NUC      13C
P2       2.00 usec
PL2      0.00 dB
SFO1     500.1304 MHz
FIDRES   20.811326 Hz
AQ       10.243 sec
RG        32
SFO2     500.1304 MHz
FIDRES   20.811326 Hz
AQ       10.243 sec
RG        32

F2 - Processing parameters
SI       32768
SF       125.7703104 MHz
WDW      EM
SSB      0
LB       0.30 Hz
GB       0
PC       1.00

F1 - Processing parameters
SI       32768
SF       500.130605 MHz
WDW      EM
SSB      0
LB       0.30 Hz
GB       0
PC       1.00

ID NMR plot parameters
CX      20.00 cm
CY      8.00 cm
F1P     125.7703104 MHz
F2P     500.130605 MHz
F3P     500.1304 MHz
G1      0.00 Hz
G2      0.00 Hz
H1NCH   0.05000 ppm/cm
H2NCH   0.05000 ppm/cm
H3NCH   0.05000 ppm/cm

```



```

Current Data Parameters
NAME      Lx-B-08-2
EXPNO     1
PROCNO    1

F2 - Acquisition Parameters
Date_     20080202
Time      14.28
INSTRUM   spect
PROBHD    5 mm 1H1 13C Z
PULPROG   zgpg
TD         32768
SOLVENT   Acetone
NS         8
DS         2
SWH        6249.586 Hz
FIDRES    0.190299 Hz
AQ         2.4210971 sec
RG         39
SQ         89.000 usec
DE         6.00 usec
TE         298.2 K
SI         1.0000000 sec
NOREST    0.0000000 sec
NOFWDK    0.0150000 sec

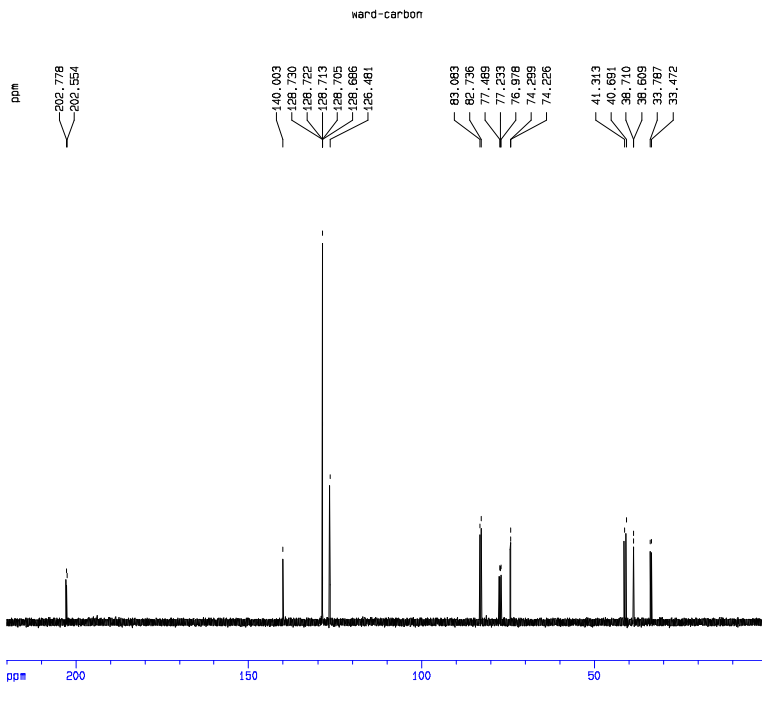
===== CHANNEL f1 =====
NUC1       13C
P1         7.00 usec
PL1        0.00 dB
SFO1      100.6283600 MHz

F1 - Acquisition parameters
NUC1       13C
P1         7.00 usec
PL1        0.00 dB
SFO1      100.6283600 MHz

F2 - Processing parameters
SI         32768
SF         500.1300000 MHz
WDW        EM
SSB        0
LB         0.30 Hz
GB         0
PC         1.00

F1 - Processing parameters
SI         32768
SF         500.1300000 MHz
WDW        EM
SSB        0
LB         0.30 Hz
GB         0.1
PC         1.00

S2 NMR plot parameters
CX         20.00 cm
CY         4.00 cm
F1P        200.1300000 MHz
F2P        200.1300000 MHz
F3P        0.0000000 MHz
F4P        0.0000000 MHz
F5P        0.0000000 MHz
F6P        0.0000000 MHz
F7P        0.0000000 MHz
F8P        0.0000000 MHz
F9P        0.0000000 MHz
F10P       0.0000000 MHz
F11P       0.0000000 MHz
F12P       0.0000000 MHz
F13P       0.0000000 MHz
F14P       0.0000000 MHz
F15P       0.0000000 MHz
F16P       0.0000000 MHz
F17P       0.0000000 MHz
F18P       0.0000000 MHz
F19P       0.0000000 MHz
F20P       0.0000000 MHz
F21P       0.0000000 MHz
F22P       0.0000000 MHz
F23P       0.0000000 MHz
F24P       0.0000000 MHz
F25P       0.0000000 MHz
F26P       0.0000000 MHz
F27P       0.0000000 MHz
F28P       0.0000000 MHz
F29P       0.0000000 MHz
F30P       0.0000000 MHz
F31P       0.0000000 MHz
F32P       0.0000000 MHz
F33P       0.0000000 MHz
F34P       0.0000000 MHz
F35P       0.0000000 MHz
F36P       0.0000000 MHz
F37P       0.0000000 MHz
F38P       0.0000000 MHz
F39P       0.0000000 MHz
F40P       0.0000000 MHz
F41P       0.0000000 MHz
F42P       0.0000000 MHz
F43P       0.0000000 MHz
F44P       0.0000000 MHz
F45P       0.0000000 MHz
F46P       0.0000000 MHz
F47P       0.0000000 MHz
F48P       0.0000000 MHz
F49P       0.0000000 MHz
F50P       0.0000000 MHz
F51P       0.0000000 MHz
F52P       0.0000000 MHz
F53P       0.0000000 MHz
F54P       0.0000000 MHz
F55P       0.0000000 MHz
F56P       0.0000000 MHz
F57P       0.0000000 MHz
F58P       0.0000000 MHz
F59P       0.0000000 MHz
F60P       0.0000000 MHz
F61P       0.0000000 MHz
F62P       0.0000000 MHz
F63P       0.0000000 MHz
F64P       0.0000000 MHz
F65P       0.0000000 MHz
F66P       0.0000000 MHz
F67P       0.0000000 MHz
F68P       0.0000000 MHz
F69P       0.0000000 MHz
F70P       0.0000000 MHz
F71P       0.0000000 MHz
F72P       0.0000000 MHz
F73P       0.0000000 MHz
F74P       0.0000000 MHz
F75P       0.0000000 MHz
F76P       0.0000000 MHz
F77P       0.0000000 MHz
F78P       0.0000000 MHz
F79P       0.0000000 MHz
F80P       0.0000000 MHz
F81P       0.0000000 MHz
F82P       0.0000000 MHz
F83P       0.0000000 MHz
F84P       0.0000000 MHz
F85P       0.0000000 MHz
F86P       0.0000000 MHz
F87P       0.0000000 MHz
F88P       0.0000000 MHz
F89P       0.0000000 MHz
F90P       0.0000000 MHz
F91P       0.0000000 MHz
F92P       0.0000000 MHz
F93P       0.0000000 MHz
F94P       0.0000000 MHz
F95P       0.0000000 MHz
F96P       0.0000000 MHz
F97P       0.0000000 MHz
F98P       0.0000000 MHz
F99P       0.0000000 MHz
F100P      0.0000000 MHz
  
```



```

Current Data Parameters
NAME      Lx-B-08-2
EXPNO     2
PROCNO    1

F2 - Acquisition Parameters
Date_     20080202
Time      14.43
INSTRUM   spect
PROBHD    5 mm 1H1 13C Z
PULPROG   zgpg
TD         32768
SOLVENT   CDCl3
NS         8
DS         4
SWH        31448.341 Hz
FIDRES    0.479286 Hz
AQ         1.0000000 sec
RG         1024
SQ         19.999 usec
DE         6.00 usec
TE         298.2 K
SI         0.0000000 sec
NOREST    0.0000000 sec
NOFWDK    0.0000000 sec
NOFWDK    0.0000000 sec

===== CHANNEL f1 =====
NUC1       13C
P1         11.00 usec
PL1        -3.00 dB
SFO1      125.7603500 MHz

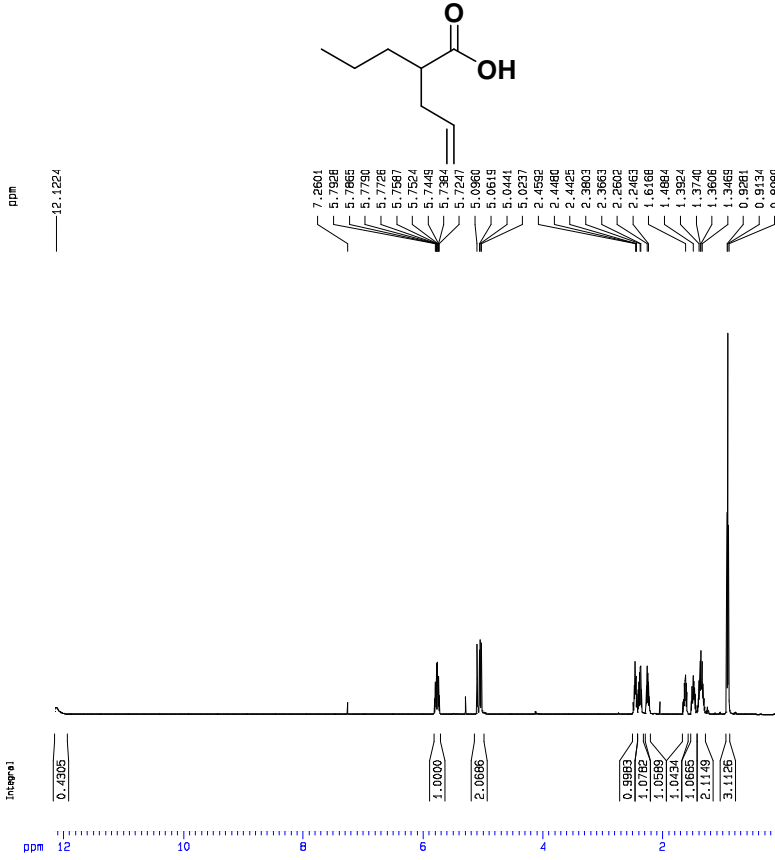
===== CHANNEL f2 =====
CPDPRG2   waltz16
NUC2       1H
PROBHD    5 mm 1H1 13C Z
PULPROG   zgpg
TD         32768
SOLVENT   CDCl3
NS         8
DS         4
SWH        31448.341 Hz
FIDRES    0.479286 Hz
AQ         1.0000000 sec
RG         1024
SQ         19.999 usec
DE         6.00 usec
TE         298.2 K
SI         0.0000000 sec
NOREST    0.0000000 sec
NOFWDK    0.0000000 sec

F1 - Acquisition parameters
NUC1       13C
P1         11.00 usec
PL1        -3.00 dB
SFO1      125.7603500 MHz

F2 - Acquisition parameters
NUC2       1H
P2         0.00 usec
PL2        0.00 dB
SFO2      500.1300000 MHz
WDW        EM
SSB        0
LB         0.30 Hz
GB         0
PC         1.40

F1 - Processing parameters
SI         32768
SF         500.1300000 MHz
WDW        EM
SSB        0
LB         0.30 Hz
GB         0.1
PC         1.40

S2 NMR plot parameters
CX         20.00 cm
CY         10.00 cm
F1P        125.7603500 MHz
F2P        500.1300000 MHz
F3P        0.0000000 MHz
F4P        0.0000000 MHz
F5P        0.0000000 MHz
F6P        0.0000000 MHz
F7P        0.0000000 MHz
F8P        0.0000000 MHz
F9P        0.0000000 MHz
F10P       0.0000000 MHz
F11P       0.0000000 MHz
F12P       0.0000000 MHz
F13P       0.0000000 MHz
F14P       0.0000000 MHz
F15P       0.0000000 MHz
F16P       0.0000000 MHz
F17P       0.0000000 MHz
F18P       0.0000000 MHz
F19P       0.0000000 MHz
F20P       0.0000000 MHz
F21P       0.0000000 MHz
F22P       0.0000000 MHz
F23P       0.0000000 MHz
F24P       0.0000000 MHz
F25P       0.0000000 MHz
F26P       0.0000000 MHz
F27P       0.0000000 MHz
F28P       0.0000000 MHz
F29P       0.0000000 MHz
F30P       0.0000000 MHz
F31P       0.0000000 MHz
F32P       0.0000000 MHz
F33P       0.0000000 MHz
F34P       0.0000000 MHz
F35P       0.0000000 MHz
F36P       0.0000000 MHz
F37P       0.0000000 MHz
F38P       0.0000000 MHz
F39P       0.0000000 MHz
F40P       0.0000000 MHz
F41P       0.0000000 MHz
F42P       0.0000000 MHz
F43P       0.0000000 MHz
F44P       0.0000000 MHz
F45P       0.0000000 MHz
F46P       0.0000000 MHz
F47P       0.0000000 MHz
F48P       0.0000000 MHz
F49P       0.0000000 MHz
F50P       0.0000000 MHz
F51P       0.0000000 MHz
F52P       0.0000000 MHz
F53P       0.0000000 MHz
F54P       0.0000000 MHz
F55P       0.0000000 MHz
F56P       0.0000000 MHz
F57P       0.0000000 MHz
F58P       0.0000000 MHz
F59P       0.0000000 MHz
F60P       0.0000000 MHz
F61P       0.0000000 MHz
F62P       0.0000000 MHz
F63P       0.0000000 MHz
F64P       0.0000000 MHz
F65P       0.0000000 MHz
F66P       0.0000000 MHz
F67P       0.0000000 MHz
F68P       0.0000000 MHz
F69P       0.0000000 MHz
F70P       0.0000000 MHz
F71P       0.0000000 MHz
F72P       0.0000000 MHz
F73P       0.0000000 MHz
F74P       0.0000000 MHz
F75P       0.0000000 MHz
F76P       0.0000000 MHz
F77P       0.0000000 MHz
F78P       0.0000000 MHz
F79P       0.0000000 MHz
F80P       0.0000000 MHz
F81P       0.0000000 MHz
F82P       0.0000000 MHz
F83P       0.0000000 MHz
F84P       0.0000000 MHz
F85P       0.0000000 MHz
F86P       0.0000000 MHz
F87P       0.0000000 MHz
F88P       0.0000000 MHz
F89P       0.0000000 MHz
F90P       0.0000000 MHz
F91P       0.0000000 MHz
F92P       0.0000000 MHz
F93P       0.0000000 MHz
F94P       0.0000000 MHz
F95P       0.0000000 MHz
F96P       0.0000000 MHz
F97P       0.0000000 MHz
F98P       0.0000000 MHz
F99P       0.0000000 MHz
F100P      0.0000000 MHz
  
```



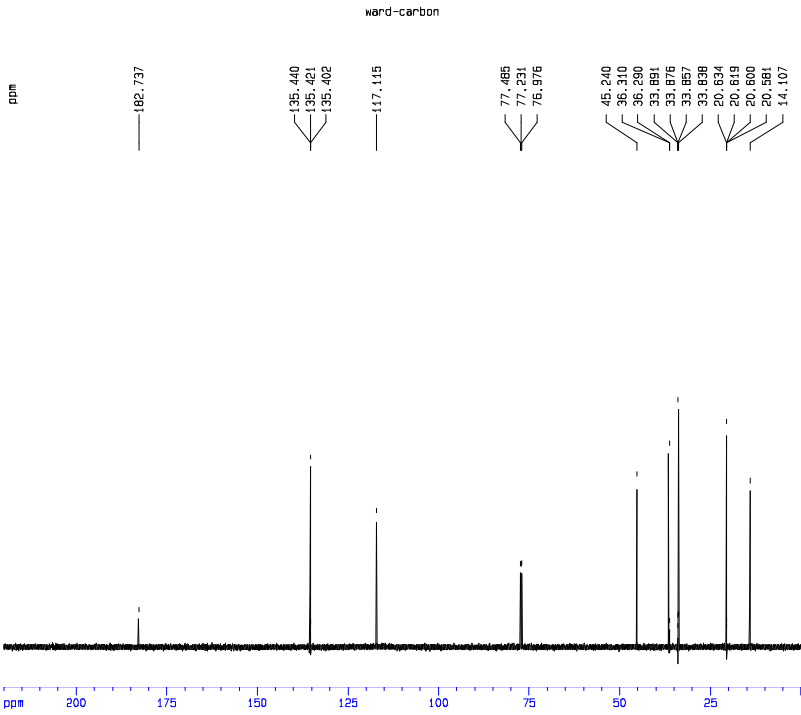
Current Data Parameters  
 NAME LW-8-82-2  
 EXPNO 1  
 PROCNO 1

F2 - Acquisition Parameters  
 Date\_ 20081023  
 Time 20.48  
 INSTRUM spect  
 PROBHD 5 mm TXI 5H-13  
 PULPROG zg30  
 TD 32768  
 SOLVENT CDCl3  
 NS 8  
 DS 2  
 SWH 6099.615 Hz  
 FIDRES 0.183999 Hz  
 AQ 2.7263477 sec  
 RG 14.3  
 DM 83.200 usec  
 DE 6.00 usec  
 TE 298.0 K  
 D1 1.0000000 sec  
 MCREST 0.0000000 sec  
 MCWK 0.0150000 sec

===== CHANNEL f1 =====  
 NUC1 1H  
 P1 10.00 usec  
 PL1 0.50 dB  
 SFO1 500.3330887 MHz

F2 - Processing parameters  
 SI 32768  
 SF 500.3300127 MHz  
 WDW EM  
 SSB 0  
 LB 0.30 Hz  
 GB 0  
 PC 1.00

1D NMR plot parameters  
 CX 20.00 cm  
 CY 9.81 cm  
 F1P 13.000 ppm  
 F1 6504.29 Hz  
 F2P 0.000 ppm  
 F2 0.00 Hz  
 PPMCM 0.85000 ppm/cm  
 HZCM 325.21451 Hz/cm



Current Data Parameters  
 NAME LW-8-82-2  
 EXPNO 1  
 PROCNO 1

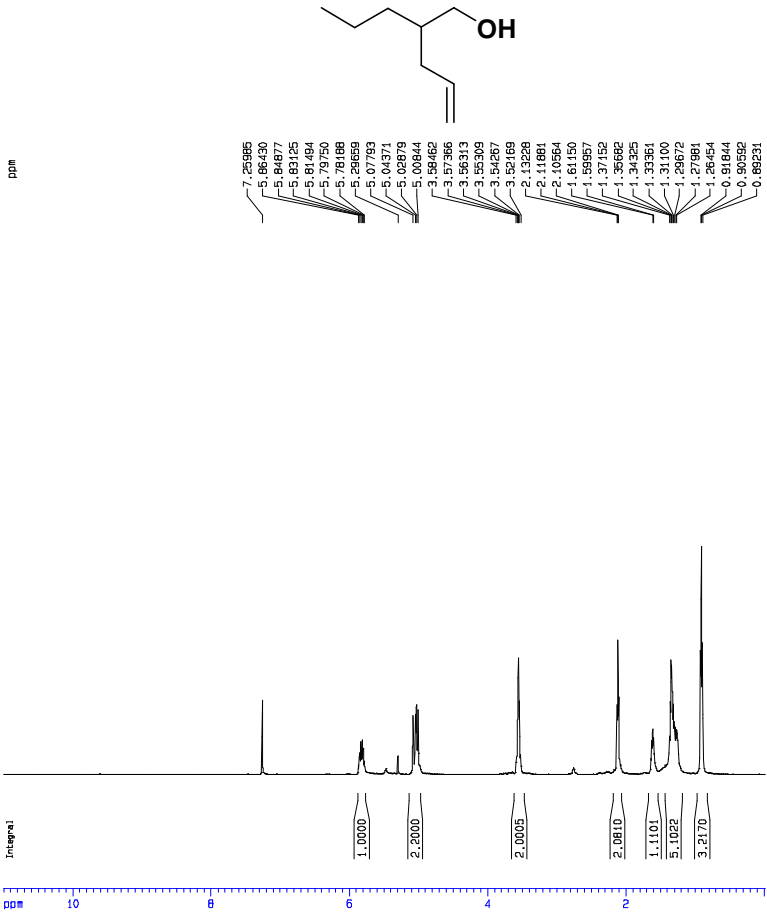
F2 - Acquisition Parameters  
 Date\_ 20081023  
 Time 20.54  
 INSTRUM spect  
 PROBHD 5 mm TXI 5H-13  
 PULPROG zgpg20  
 TD 32768  
 SOLVENT CDCl3  
 NS 346  
 DS 4  
 SWH 31446.541 Hz  
 FIDRES 0.959672 Hz  
 AQ 0.8210612 sec  
 RG 45.3  
 DM 151.900 usec  
 DE 6.00 usec  
 TE 298.0 K  
 D1 0.5000000 sec  
 D11 0.0300000 sec  
 MCREST 0.0000000 sec  
 MCWK 0.0190000 sec

===== CHANNEL f1 =====  
 NUC1 13C  
 P1 13.00 usec  
 PL1 -3.00 dB  
 SFO1 125.8206954 MHz

===== CHANNEL f2 =====  
 PULPROG2 waltz16  
 NUC2 1H  
 P2P2 80.00 usec  
 PL2 0.50 dB  
 PL12 19.01 dB  
 SFO2 500.3320000 MHz

F2 - Processing parameters  
 SI 80836  
 SF 125.8086222 MHz  
 WDW no  
 SSB 0  
 LB 0.00 Hz  
 GB 0  
 PC 1.40

1D NMR plot parameters  
 CX 20.00 cm  
 CY 6.00 cm  
 F1P 220.000 ppm  
 F1 27677.77 Hz  
 F2P 0.000 ppm  
 F2 0.00 Hz  
 PPMCM 11.00000 ppm/cm  
 HZCM 1383.88858 Hz/cm



Current Data Parameters  
NAME LW-6-70  
EXPNO 1  
PROCNO 1

F2 - Acquisition Parameters  
Date\_ 20081012  
Time 20:55  
INSTRUM spect  
PROBHD 5 mm TXI 13C Z  
PULPROG zgpg30  
TD 32768  
SOLVENT Acetone  
NS 8  
DS 2  
SWH 8543.866 Hz  
FIDRES 0.190736 Hz  
AQ 2.6214917 sec  
RG 128  
IN 80.000 usec  
DE 5.00 usec  
TE 298.2 K  
SI 1.00000000 sec  
WDWST 0.0000000 sec  
MORF 0.01500000 sec

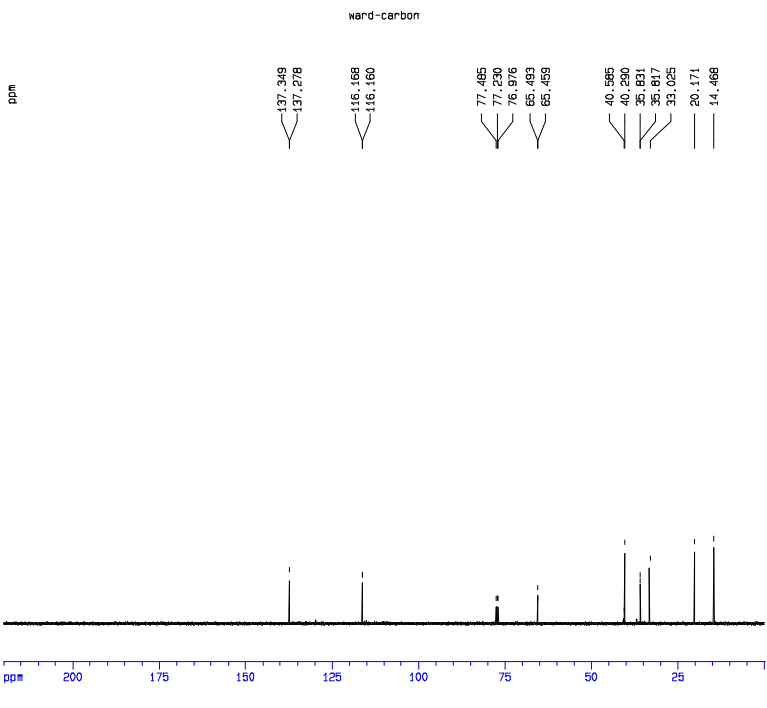
\*\*\*\*\* CHANNEL f1 \*\*\*\*\*  
NUC1 13C  
P1 10.00 usec  
PL1 0.00 dB  
SFO1 500.1300000 Mhz

F1 - Acquisition parameters  
WDW 2  
SSB 2  
SFO 500.1304 Mhz  
FIDRES 20.011508 Hz  
SN 10.243 dbm  
PRNDCE Status

F2 - Processing parameters  
SI 32768  
SF 500.1300136 Mhz  
MM 0  
SSB 0  
LB 0.30 Hz  
GB 0  
PC 1.00

F1 - Processing parameters  
SI 2048  
MC 1391  
SF 500.1300000 Mhz  
MM no  
SSB 2  
LB 0.30 Hz  
GB 0.1

2D NMR plot parameters  
CY 20.00 cm  
CX 8.00 cm  
F1P 11.000 dbm  
F1 500.131 Hz  
F2P 0.000 dbm  
F2 0.00 Hz  
RPM 0.562000 dbm/cm  
HZCM 275.07150 Hz/cm



Current Data Parameters  
NAME LW-6-70-3  
EXPNO 2  
PROCNO 1

F2 - Acquisition Parameters  
Date\_ 20081012  
Time 20:56  
INSTRUM spect  
PROBHD 5 mm TXI 13C Z  
PULPROG zgpg30  
TD 32768  
SOLVENT Acetone  
NS 8  
DS 2  
SWH 3148.541 Hz  
FIDRES 0.478888 Hz  
AQ 1.0000714 sec  
RG 128  
IN 80.000 usec  
DE 5.00 usec  
TE 298.2 K  
SI 1.00000000 sec  
WDWST 0.0000000 sec  
MORF 0.01500000 sec

\*\*\*\*\* CHANNEL f1 \*\*\*\*\*  
NUC1 13C  
P1 11.00 usec  
PL1 -3.00 dB  
SFO1 125.7678584 Mhz

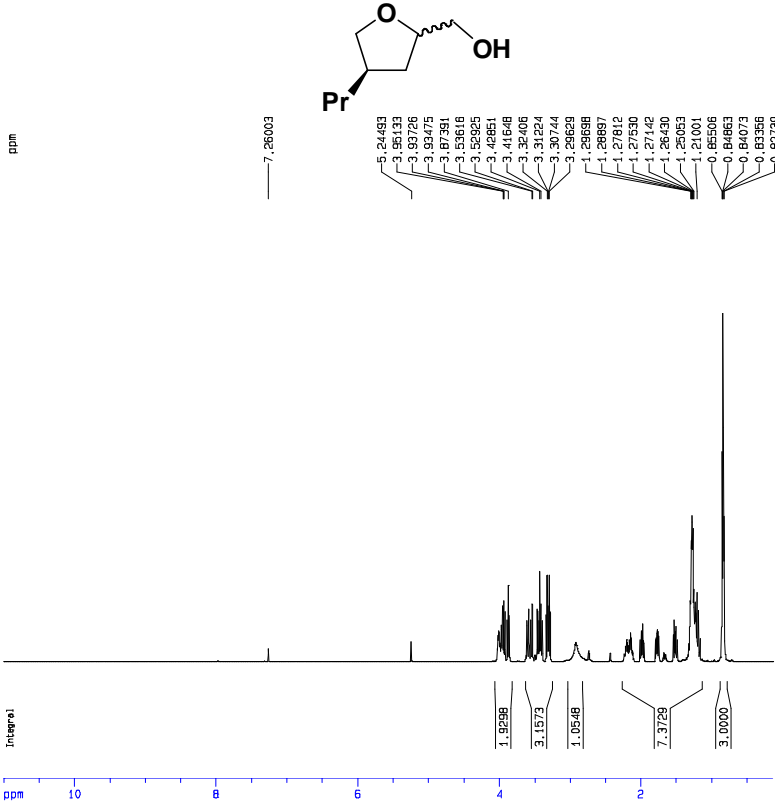
\*\*\*\*\* CHANNEL f2 \*\*\*\*\*  
CPDPRG2 waltz16  
NUC2 1H  
PCPD2 80.00 usec  
PL2 0.00 dB  
PL12 21.18 dB  
SFO2 500.1300000 Mhz

F1 - Acquisition parameters  
WDW 2  
SSB 2  
SFO 500.1304 Mhz  
FIDRES 20.011508 Hz  
SN 10.243 dbm  
PRNDCE Status

F2 - Processing parameters  
SI 32768  
SF 125.7678584 Mhz  
MM no  
SSB 0  
LB 0.30 Hz  
GB 0  
PC 1.40

F1 - Processing parameters  
SI 2048  
MC 1391  
SF 500.1300000 Mhz  
MM no  
SSB 2  
LB 0.30 Hz  
GB 0.1

2D NMR plot parameters  
CY 20.00 cm  
CX 8.00 cm  
F1P 20.000 dbm  
F1 200.000 Hz  
F2 27888.71 Hz



Current Data Parameters  
 NAME: Lx-5-84-2  
 EXPNO: 1  
 PROCNO: 1

F2 - Acquisition Parameters  
 Date\_: 20081024  
 Time: 18:23  
 INSTRUM: spect  
 PROBHD: 5 mm TXI 1H-13  
 PULPROG: zgpg30  
 TD: 32768  
 SOLVENT: CDCl3  
 NS: 8  
 DS: 2  
 SWH: 8005.818 Hz  
 FIDRES: 0.183268 Hz  
 AQ: 2.7763477 sec  
 RG: 11.3  
 DN: 83.200 usec  
 DE: 8.00 usec  
 TE: 298.2 K  
 D1: 1.0000000 sec  
 ICHEST: 0.0000000 sec  
 MCHK: 0.0150000 sec

----- CHANNEL f1 -----  
 NUC1: 1H  
 P1: 10.00 usec  
 PL1: 0.50 dB  
 SFO1: 500.1360987 MHz

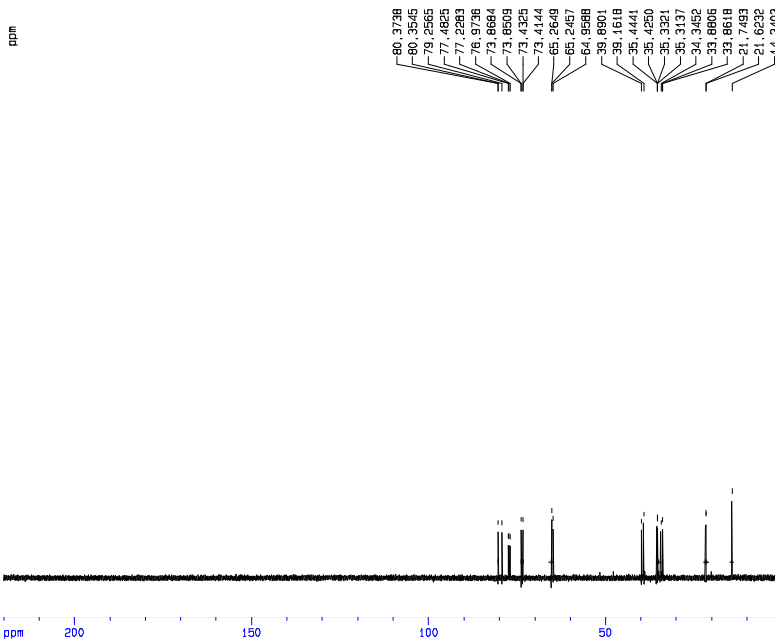
F1 - Acquisition parameters  
 MD: 2  
 TD: 256  
 SFO1: 500.1364 MHz  
 FIDRES: 20.011508 Hz  
 SW: 10.243 ppm  
 FWHM: States

F2 - Processing parameters  
 SI: 32768  
 SF: 500.1360987 MHz  
 MD: 2  
 SSB: 0  
 LB: 0.30 Hz  
 GB: 0  
 PC: 1.00

F1 - Processing parameters  
 SI: 256  
 SF: 500.1360987 MHz  
 MD: 2  
 SSB: 0  
 LB: 0.30 Hz  
 GB: 0.1

ID MR plot parameters  
 CX: 20.00 cm  
 CY: 8.00 cm  
 F1P: 11.000 ppm  
 F1: 5603.63 Hz  
 F2P: 0.100 ppm  
 F2: 0.00 Hz  
 FWHM: 0.15000 ppm  
 HCN: 278.18143 Hz

ward-carbon



Current Data Parameters  
 NAME: Lx-5-84-2  
 EXPNO: 2  
 PROCNO: 1

F2 - Acquisition Parameters  
 Date\_: 20081024  
 Time: 18:41  
 INSTRUM: spect  
 PROBHD: 5 mm TXI 1H-13  
 PULPROG: zgpg30  
 TD: 32768  
 SOLVENT: CDCl3  
 NS: 8  
 DS: 2  
 SWH: 31446.541 Hz  
 FIDRES: 0.288678 Hz  
 AQ: 0.2510612 sec  
 RG: 84  
 DN: 19.800 usec  
 DE: 5.00 usec  
 TE: 298.2 K  
 D1: 0.5000000 sec  
 D11: 0.0300000 sec  
 ICHEST: 0.0000000 sec  
 MCHK: 0.0150000 sec

----- CHANNEL f1 -----  
 NUC1: 13C  
 P1: 13.00 usec  
 PL1: -3.00 dB  
 SFO1: 125.7603504 MHz

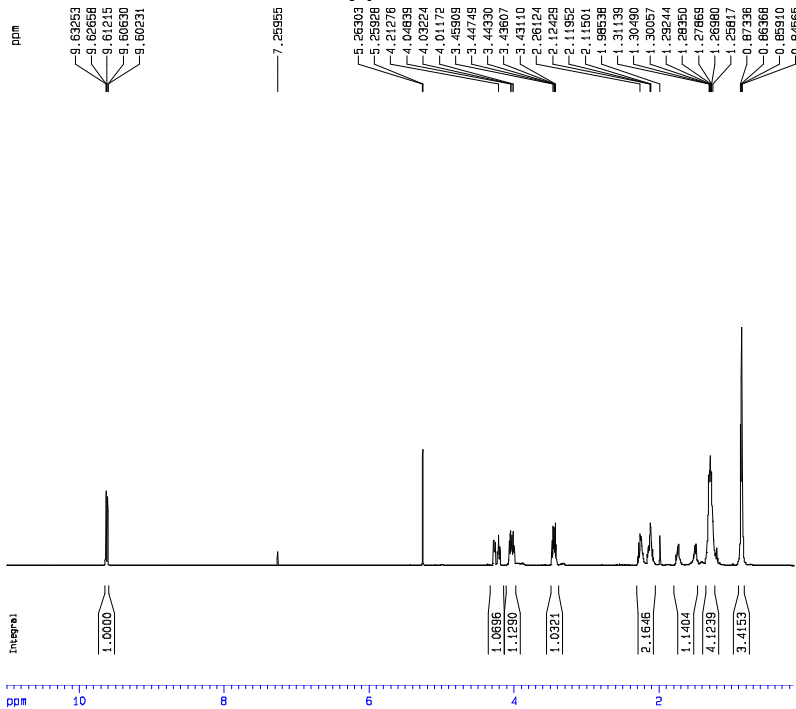
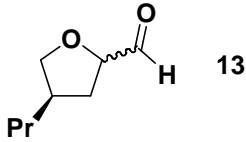
----- CHANNEL f2 -----  
 CPDPRG2: waltz16  
 NUC2: 1H  
 P2P2: 80.00 usec  
 PL2: 0.20 dB  
 PL3: 19.51 dB  
 SFO2: 500.1360980 MHz

F1 - Acquisition parameters  
 MD: 2  
 TD: 256  
 SFO1: 500.1364 MHz  
 FIDRES: 20.011508 Hz  
 SW: 10.243 ppm  
 FWHM: States

F2 - Processing parameters  
 SI: 65536  
 SF: 125.7603507 MHz  
 MD: 2  
 SSB: 0  
 LB: 0.20 Hz  
 GB: 0  
 PC: 1.40

F1 - Processing parameters  
 SI: 2548  
 SF: 125.7603507 MHz  
 MD: 2  
 SSB: 0  
 LB: 0.20 Hz  
 GB: 0.1

ID MR plot parameters  
 CX: 20.00 cm  
 CY: 8.00 cm  
 F1P: 250.000 ppm  
 F1: 27877.78 Hz



Current Data Parameters  
 NAME LW-5-88-3  
 EXPNO 1  
 PROCNO 1

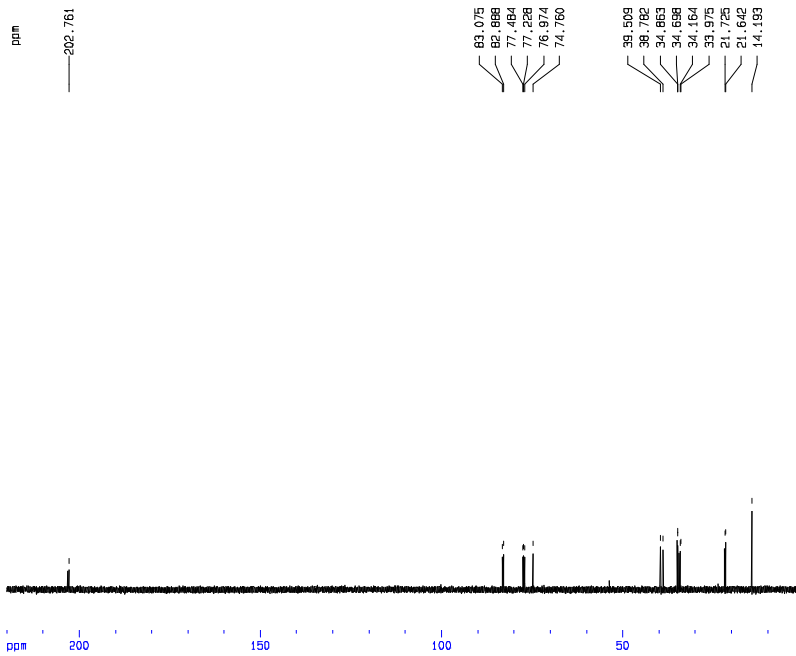
F2 - Acquisition Parameters  
 Date\_ 20081027  
 Time 16.01  
 INSTRUM spect  
 PROBHD 5 mm TXI 1H-13  
 PULPROG zg30  
 TD 32768  
 SOLVENT CDCl3  
 NS 8  
 DS 2  
 SMH 6009.615 Hz  
 FIDRES 0.183399 Hz  
 AQ 2.7263477 sec  
 RG 16  
 DM 83.200 usec  
 DE 6.00 usec  
 TE 298.0 K  
 D1 1.0000000 sec  
 MCREST 0.0000000 sec  
 MCKRK 0.0150000 sec

----- CHANNEL f1 -----  
 NUC1 1H  
 P1 10.00 usec  
 PL1 0.50 dB  
 SFO1 500.330087 MHz

F2 - Processing parameters  
 SI 32768  
 SF 500.3300127 MHz  
 MDW EN  
 SSB 0  
 LB 0.30 Hz  
 GB 0  
 PC 1.00

ID NMR plot parameters  
 CX 20.00 cm  
 CY 6.00 cm  
 F1P 11.000 ppm  
 F1 5503.63 Hz  
 F2P 0.000 ppm  
 F2 0.00 Hz  
 PPHM 0.55000 ppm/cm  
 HZCM 275.18148 Hz/cm

ward-carbon



Current Data Parameters  
 NAME LW-5-88-3  
 EXPNO 2  
 PROCNO 1

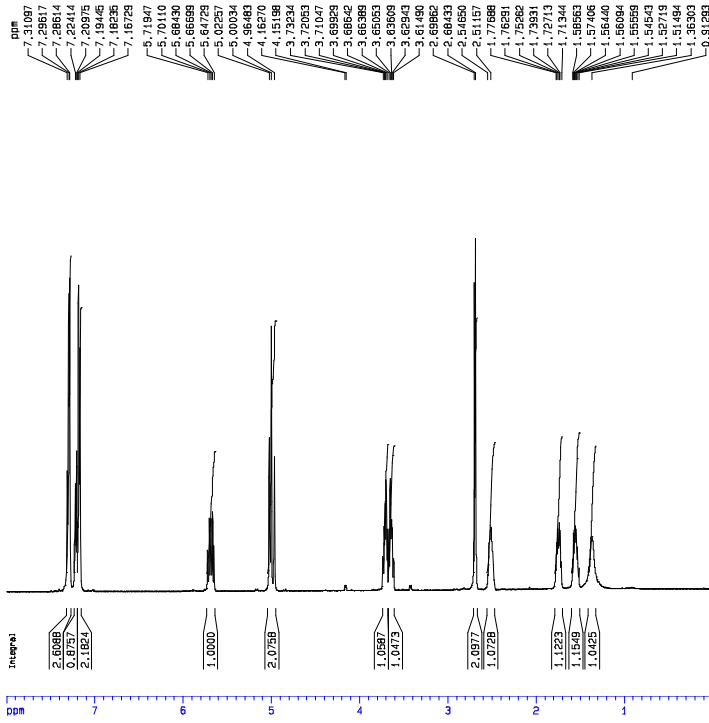
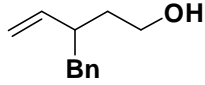
F2 - Acquisition Parameters  
 Date\_ 20081027  
 Time 16.07  
 INSTRUM spect  
 PROBHD 5 mm TXI 1H-13  
 PULPROG zgpg30  
 TD 32768  
 SOLVENT CDCl3  
 NS 8  
 DS 4  
 SMH 31446.541 Hz  
 FIDRES 0.358672 Hz  
 AQ 0.3210612 sec  
 RG 71.8  
 DM 15.900 usec  
 DE 6.00 usec  
 TE 298.0 K  
 D1 0.5000000 sec  
 D11 0.0300000 sec  
 MCREST 0.0000000 sec  
 MCKRK 0.0150000 sec

----- CHANNEL f1 -----  
 NUC1 13C  
 P1 13.00 usec  
 PL1 -3.00 dB  
 SFO1 125.8200584 MHz

----- CHANNEL f2 -----  
 CHPRG2 waltz16  
 NUC2 1H  
 PCPD2 80.00 usec  
 PL2 0.50 dB  
 PL12 15.01 dB  
 SFO2 500.3320000 MHz

F2 - Processing parameters  
 SI 8536  
 SF 125.8080613 MHz  
 MDW no  
 SSB 0  
 LB 0.00 Hz  
 GB 0  
 PC 1.40

ID NMR plot parameters  
 CX 20.00 cm  
 CY 2.00 cm  
 F1P 220.000 ppm  
 F1 27677.77 Hz  
 F2P 0.000 ppm  
 F2 0.00 Hz  
 PPHM 11.00000 ppm/cm  
 HZCM 1383.88887 Hz/cm



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Current Data Parameters
NAME      XT-4-1008
EXPNO    1
PROCNO   1

F2 - Acquisition Parameters
Date_     20061126
Time      20.43
INSTRUM   spect
PROBHD    5 mm TXI 13C Z
PULPROG   zgpg30
TD         65536
SOLVENT   Acetone
NS        8
DS        2
SWH        6349.886 Hz
FIDRES    0.190739 Hz
AQ         2.5214817 sec
RG         256
WDW        EM
SSB        0
LB         8.00 Usec
GB         0
PC         1.00
DQ         0.0000000 sec
DCREST    0.0000000 sec
MCOR      0.0000000 sec

===== CHANNEL f1 =====
NUC1      13C
P1         1.00 Usec
PL1        0.00 dB
SFO1      500.1300000 MHz

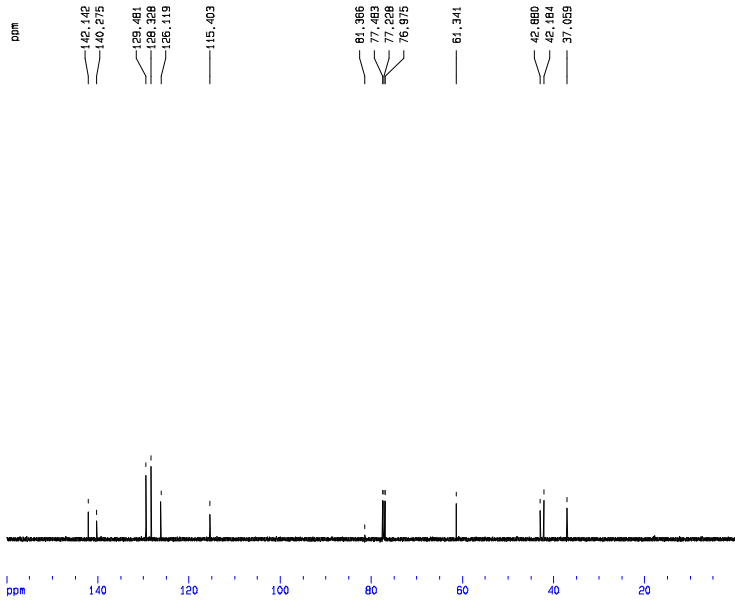
F1 - Acquisition parameters
RG         256
SFO1      500.1304 MHz
FIDRES    20.011808 Hz
AQ         10.242 sec
WDW        EM
SSB        0
LB         0.30 Hz
GB         0
PC         1.00

F2 - Processing parameters
SI         32768
SF         500.1300000 MHz
WDW        EM
SSB        0
LB         0.30 Hz
GB         0
PC         1.00

F1 - Processing parameters
SI         2048
SF         125.767814 MHz
WDW        EM
SSB        0
LB         0.30 Hz
GB         0
PC         1.40

13C NMR plot parameters
CX         20.00 cm
CY         10.00 cm
FIDRES    8.0000000 Hz
SFO1      4001.04 Hz
PULPROG   zgpg30
PC         0.0000000 sec
RG         65536
WDW        EM
SSB        0
LB         0.30 Hz
GB         0
PC         1.00
MCOR      0.0000000 sec
H2CH      200.262800 Hz/c
  
```

ward-carbon



```

Current Data Parameters
NAME      XT-4-1008
EXPNO    3
PROCNO   1

F2 - Acquisition Parameters
Date_     20061126
Time      14.27
INSTRUM   spect
PROBHD    5 mm TXI 13C Z
PULPROG   zgpg30
TD         65536
SOLVENT   Acetone
NS        8
DS        2
SWH        31446.344 Hz
FIDRES    0.470880 Hz
AQ         1.1603724 sec
RG         128
WDW        EM
SSB        0
LB         8.00 Usec
GB         0
PC         1.00
DQ         0.0000000 sec
DCREST    0.0000000 sec
MCOR      0.0000000 sec
MCOR      0.0000000 sec

===== CHANNEL f1 =====
NUC1      13C
P1         1.00 Usec
PL1        -3.00 dB
SFO1      125.7703184 MHz

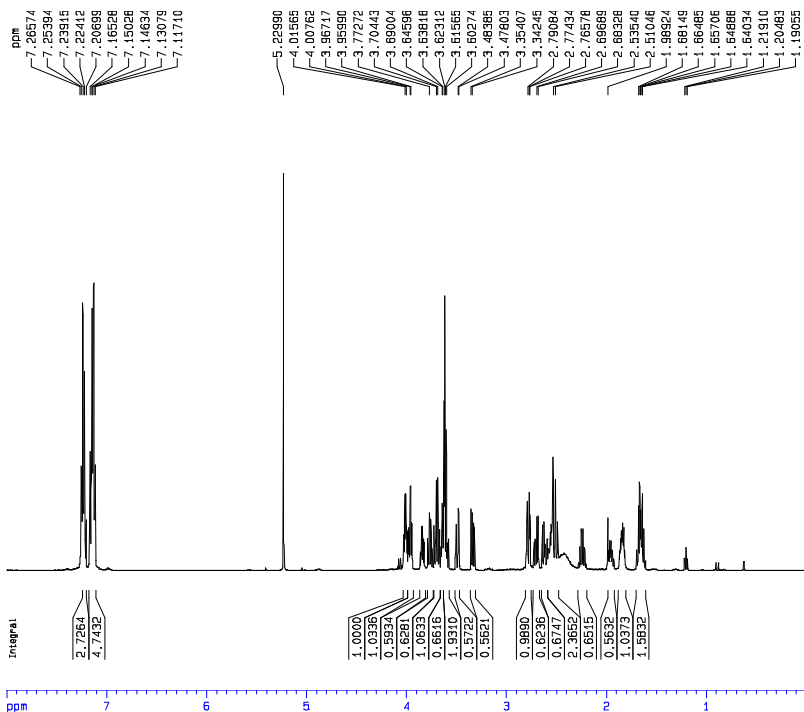
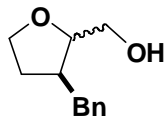
===== CHANNEL f2 =====
NAME      hll1716
NUC2      1H
PCOR2    40.00 Usec
PULPROG  zgpg30
RG         1.00 dB
SFO2      4001.04 Hz
SFO1      500.1300000 MHz
WDW        EM
SSB        0
LB         0.30 Hz
GB         0
PC         1.40

F1 - Acquisition parameters
RG         256
SFO1      500.1304 MHz
FIDRES    20.011808 Hz
AQ         10.242 sec
WDW        EM
SSB        0
LB         0.30 Hz
GB         0
PC         1.00

F2 - Processing parameters
SI         5000
SF         125.767814 MHz
WDW        EM
SSB        0
LB         0.30 Hz
GB         0
PC         1.40

F1 - Processing parameters
SI         2048
SF         500.1300000 MHz
WDW        EM
SSB        0
LB         0.30 Hz
GB         0
PC         1.00

13C NMR plot parameters
CX         20.00 cm
CY         10.00 cm
FIDRES    8.0000000 Hz
SFO1      4001.04 Hz
PULPROG   zgpg30
PC         0.0000000 sec
RG         65536
WDW        EM
SSB        0
LB         0.30 Hz
GB         0
PC         1.00
MCOR      0.0000000 sec
H2CH      200.262800 Hz/c
  
```



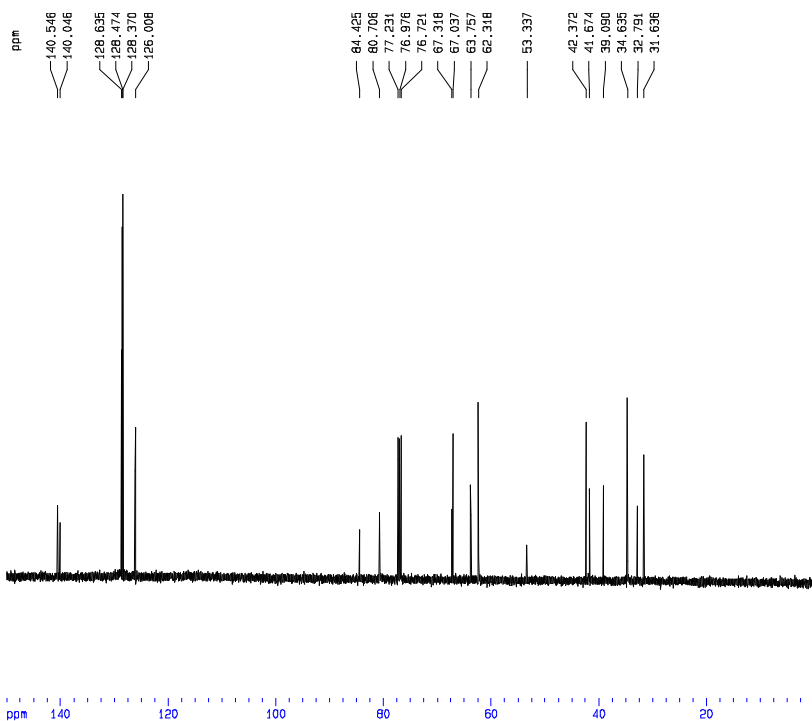
Current Data Parameters  
NAME KT-4-118B (1H)MR  
EXPNO 1  
PROCNO 1

F2 - Acquisition Parameters  
Date\_ 20081205  
Time 13.45  
INSTRUM spect  
PROBHD 5 mm TXI 1H-13  
PULPROG zg30  
TD 32768  
SOLVENT CDCl3  
NS 4  
DS 2  
SWH 7002.801 Hz  
FIDRES 0.213709 Hz  
AQ 2.3396892 sec  
RG 28.5  
DM 71.400 usec  
DE 6.00 usec  
TE 298.0 K  
D1 1.0000000 sec  
MCREST 0.0000000 sec  
MCMRK 0.0150000 sec

----- CHANNEL f1 -----  
NUC1 1H  
P1 10.00 usec  
PL1 0.50 dB  
SFO1 500.3300148 MHz

F2 - Processing parameters  
SI 32768  
SF 500.3300391 MHz  
WDW EM  
SSB 0  
LB 0.30 Hz  
GB 0  
PC 1.00

1D NMR plot parameters  
CX 20.00 cm  
CY 10.00 cm  
FIP 9.000 ppm  
F1 4002.64 Hz  
F2P 0.000 ppm  
F2 -0.00 Hz  
FREQM 0.40000 ppm/cm  
HZCM 200.13202 Hz/cm



Current Data Parameters  
NAME KT-4-118B  
EXPNO 2  
PROCNO 1

F2 - Acquisition Parameters  
Date\_ 20081205  
Time 13.47  
INSTRUM spect  
PROBHD 5 mm TXI 1H-13  
PULPROG zgpg30  
TD 32768  
SOLVENT CDCl3  
NS 4  
DS 2  
SWH 31446.541 Hz  
FIDRES 0.395872 Hz  
AQ 0.3210512 sec  
RG 1149.4  
DM 15.800 usec  
DE 6.00 usec  
TE 298.0 K  
D1 0.5000000 sec  
D11 0.0300000 sec  
MCREST 0.0000000 sec  
MCMRK 0.0150000 sec

----- CHANNEL f1 -----  
NUC1 13C  
P1 15.00 usec  
PL1 -3.00 dB  
SFO1 125.8206994 MHz

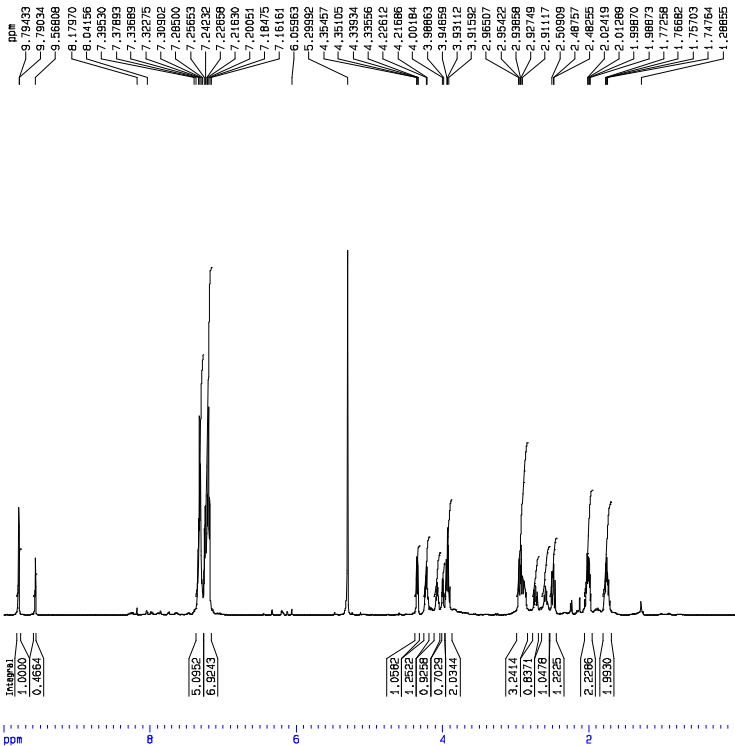
----- CHANNEL f2 -----  
P2PRG2 waltz16  
NUC2 1H  
PCPD2 80.00 usec  
PL2 0.50 dB  
PL12 19.01 dB  
SFO2 500.3300000 MHz

F2 - Processing parameters  
SI 32768  
SF 125.8208187 MHz  
WDW EM  
SSB 0  
LB 0.30 Hz  
GB 0  
PC 1.00

1D NMR plot parameters  
CX 20.00 cm  
CY 9.81 cm  
FIP 150.000 ppm  
F1 1887.121 Hz  
F2 -0.000 ppm  
F2 -0.00 Hz  
FREQM 1.50000 ppm/cm  
HZCM 943.56079 Hz/cm



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```

Current Data Parameters
NAME      KT-4-125a
EXPNO    1
PROCNO   1

F2 - Acquisition Parameters
Date_    2008130
Time     15.21
INSTRUM  spect
PROBHD   5 mm TXI 13C Z
PULPROG  zgpg30
TD        32768
SOLVENT  CDCl3
NS        8
DS        2
SWH       6243.896 Hz
FIDRES    0.190736 Hz
AQ        2.6214917 sec
RG        38
AQ        86.400 usec
RG        6.00 usec
TE        298.2 K
SI        1.0000000 sec
SFOFF     0.0000000 sec
NUC1      13C
NUC2      13C
===== CHANNEL f1 =====
NUC1      13C
P1        11.00 usec
PL1       0.00 dB
SFO1      100.6261200 MHz

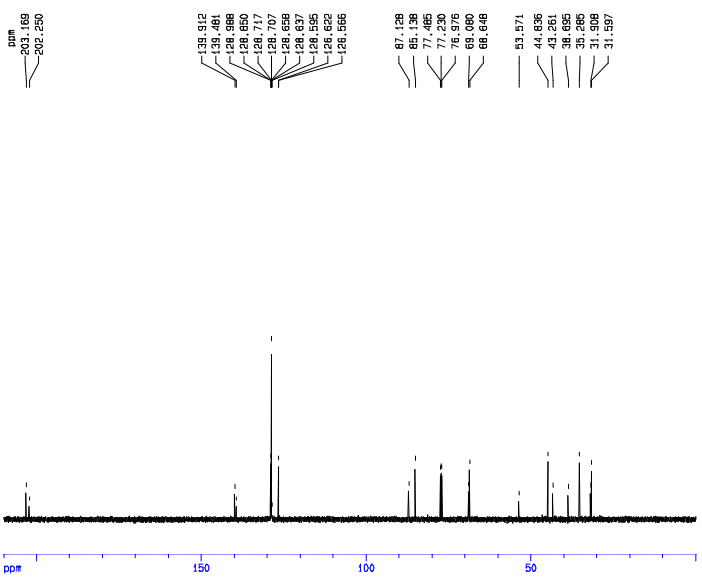
F1 - Acquisition Parameters
RG        38
DS        2
SWH       6243.896 Hz
FIDRES    0.190736 Hz
AQ        2.6214917 sec
RG        38
AQ        86.400 usec
RG        6.00 usec
TE        298.2 K
SI        1.0000000 sec
SFOFF     0.0000000 sec
NUC1      13C
NUC2      13C
===== CHANNEL f2 =====
NUC1      13C
P1        11.00 usec
PL1       0.00 dB
SFO1      100.6261200 MHz

F2 - Processing parameters
SI        32768
SF        100.6261200 MHz
WDW       EM
SSB       0
LB        0.30 Hz
GB        0
PC        1.00

F1 - Processing parameters
SI        32768
SF        100.6261200 MHz
WDW       EM
SSB       0
LB        0.30 Hz
GB        0
PC        0.1

ID NAME g10 parameters
CY        20.00 cm
CZ        10.00 cm
F1P       10.000 ppm
F2P       100.6261200 MHz
F3P       0.000 ppm
F4P       0.000 Hz
PRNDN     0.50050 ppm/cyc
ICNV      290.08850 Hz/cm
  
```

ward-carbon



```

Current Data Parameters
NAME      KT-4-125a
EXPNO    1
PROCNO   1

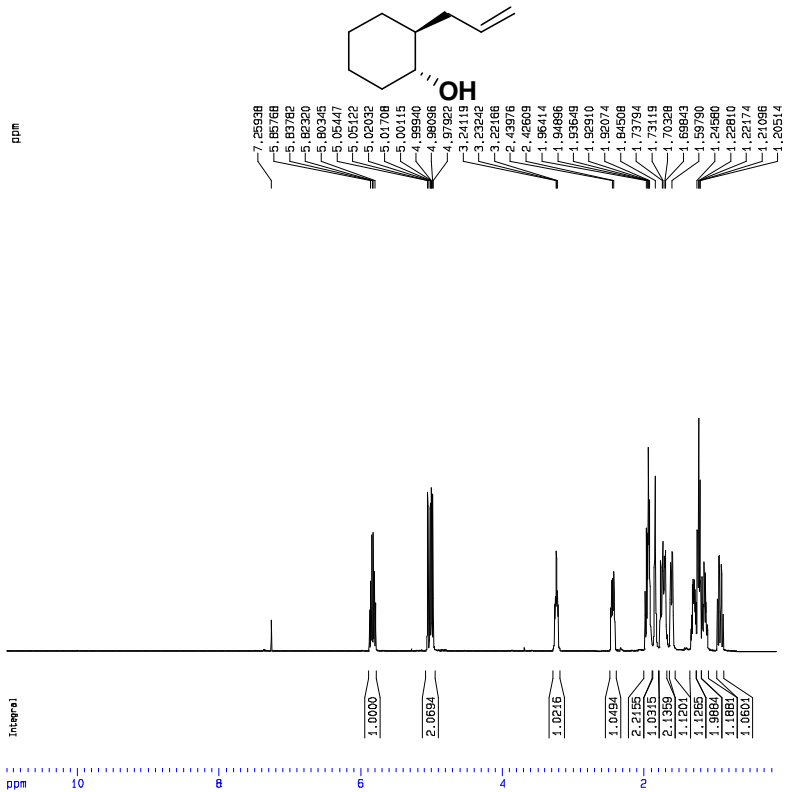
F2 - Acquisition Parameters
Date_    2008130
Time     15.28
INSTRUM  spect
PROBHD   5 mm TXI 13C Z
PULPROG  zgpg30
TD        32768
SOLVENT  CDCl3
NS        8
DS        2
SWH       16448.480 Hz
FIDRES    0.478859 Hz
AQ        1.1480274 sec
RG        1888
AQ        6.400 usec
RG        6.00 usec
TE        298.2 K
SI        1.0000000 sec
SFOFF     0.0000000 sec
NUC1      13C
NUC2      13C
===== CHANNEL f1 =====
NUC1      13C
P1        11.00 usec
PL1       0.00 dB
SFO1      100.6261200 MHz

F1 - Acquisition Parameters
RG        38
DS        2
SWH       6243.896 Hz
FIDRES    0.190736 Hz
AQ        2.6214917 sec
RG        38
AQ        86.400 usec
RG        6.00 usec
TE        298.2 K
SI        1.0000000 sec
SFOFF     0.0000000 sec
NUC1      13C
NUC2      13C
===== CHANNEL f2 =====
NUC1      13C
P1        11.00 usec
PL1       0.00 dB
SFO1      100.6261200 MHz

F2 - Processing parameters
SI        32768
SF        100.6261200 MHz
WDW       EM
SSB       0
LB        0.30 Hz
GB        0
PC        1.00

F1 - Processing parameters
SI        32768
SF        100.6261200 MHz
WDW       EM
SSB       0
LB        0.30 Hz
GB        0
PC        0.1

ID NAME g10 parameters
CY        20.00 cm
CZ        10.00 cm
F1P       10.000 ppm
F2P       100.6261200 MHz
F3P       0.000 ppm
F4P       0.000 Hz
  
```



```

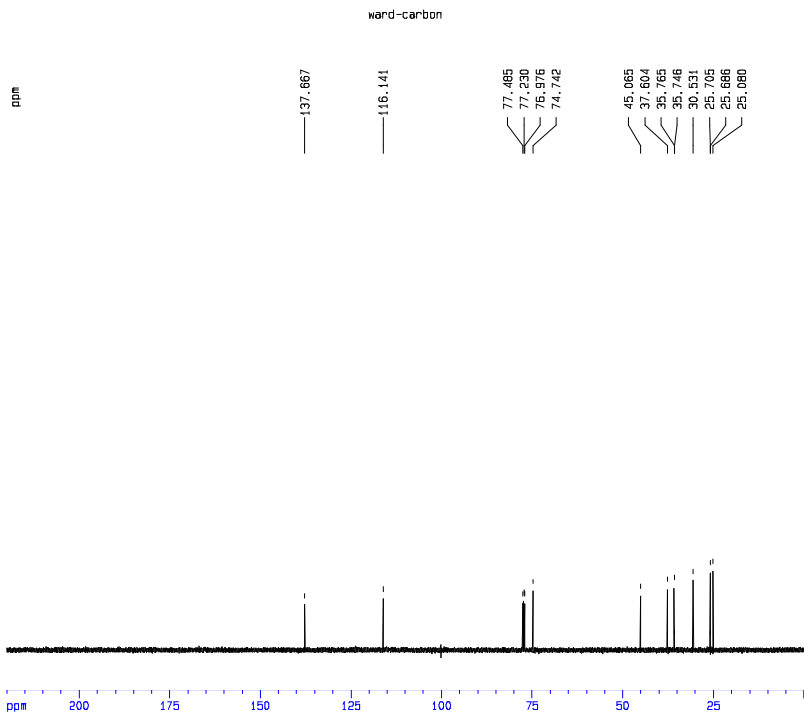
Current Data Parameters
NAME      LX-5-28-2
EXPNO    1
PROCNO   1

F2 - Acquisition Parameters
Date_    20080923
Time     10.25
INSTRUM  spect
PROBHD   5 mm TXI 1H-13
PULPROG  zg30
TD        32768
SOLVENT  CDCl3
NS        8
DS        2
SFO1     500.615 Hz
FIDRES   0.183399 Hz
AQ        2.7253477 sec
RG        25.4
DK        83.200 usec
DE        6.00 usec
TE        298.0 K
D1        1.00000000 sec
MCREST   0.00000000 sec
MORF     0.01500000 sec

===== CHANNEL f1 =====
NUC1      1H
P1        10.00 usec
PL1       0.50 dB
SFO1     500.3330697 MHz

F2 - Processing parameters
SI        32768
SF        500.3300130 MHz
WDW       EM
SSB       0
LB        0.30 Hz
GB        0
PC        1.00

1D NMR plot parameters
CX        20.00 cm
CY        6.00 cm
F1P       11.000 ppm
F1        5503.63 Hz
F2P       0.000 ppm
F2        0.00 Hz
PRNDM    0.00000 ppm/cm
HZCM     275.18148 Hz/cm
  
```



```

Current Data Parameters
NAME      LX-5-28-2
EXPNO    2
PROCNO   1

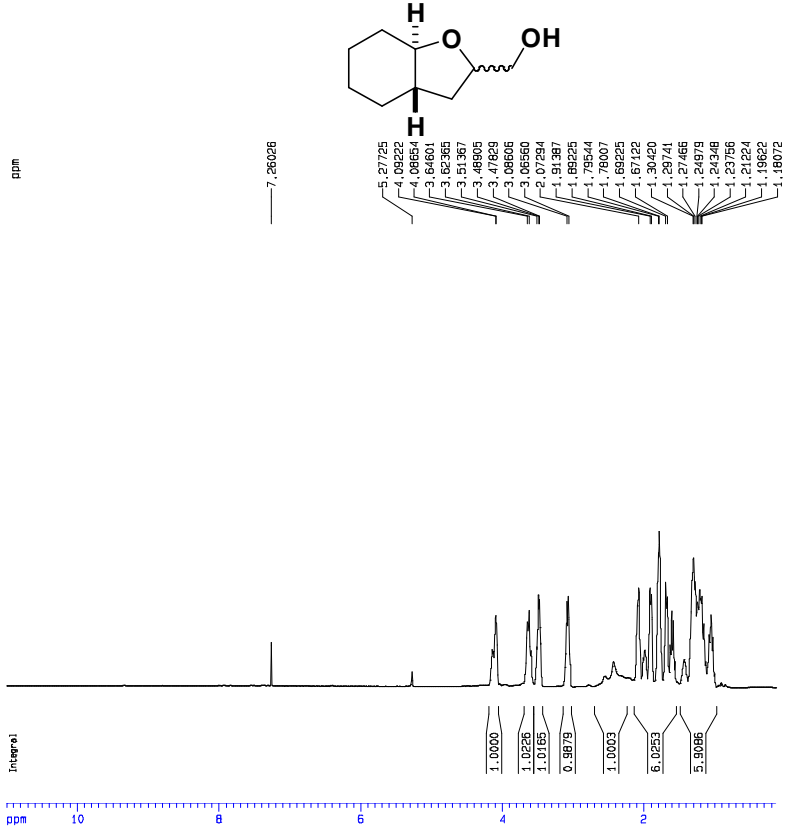
F2 - Acquisition Parameters
Date_    20080923
Time     10.58
INSTRUM  spect
PROBHD   5 mm TXI 1H-13
PULPROG  zgpg30
TD        32768
SOLVENT  CDCl3
NS        208
DS        4
SFO1     31446.541 Hz
FIDRES   0.998672 Hz
AQ        0.6210612 sec
RG        25.4
DK        15.900 usec
DE        6.00 usec
TE        298.0 K
D1        0.50000000 sec
D11       0.03000000 sec
MCREST   0.00000000 sec
MORF     0.01500000 sec

===== CHANNEL f1 =====
NUC1      13C
P1        13.00 usec
PL1       -3.00 dB
SFO1     125.8206994 MHz

===== CHANNEL f2 =====
CPDPRG2  waltz16
NUC2      1H
PCPD2    80.00 usec
PL2       0.50 dB
PL12     19.01 dB
SFO2     500.3300000 MHz

F2 - Processing parameters
SI        88336
SF        125.808075 MHz
WDW       no
SSB       0
LB        0.00 Hz
GB        0
PC        1.40

1D NMR plot parameters
CX        20.00 cm
CY        2.00 cm
F1P       220.000 ppm
F1        27677.77 Hz
F2P       0.000 ppm
F2        0.00 Hz
PRNDM    11.00000 ppm/cm
HZCM     1383.88867 Hz/cm
  
```



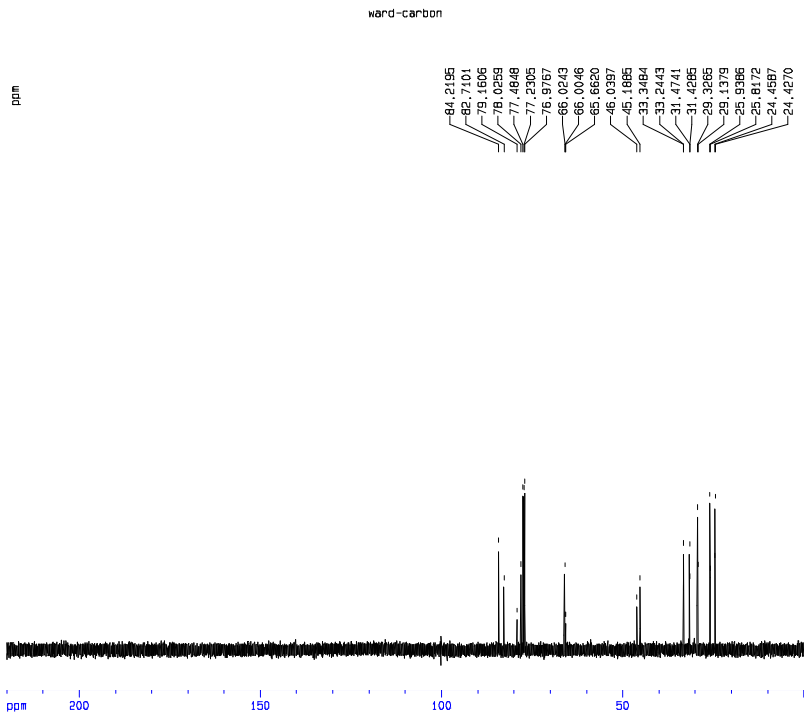
Current Data Parameters  
 NAME LW-5-32-2  
 EXPNO 1  
 PROCNO 1

F2 - Acquisition Parameters  
 Date\_ 20080523  
 Time 11.10  
 INSTRUM spect  
 PROBHD 5 mm TXI 1H-13  
 PULPROG zgpg30  
 TD 32768  
 SOLVENT CDCl3  
 NS 8  
 DS 2  
 SWH 5009.6115 Hz  
 FIDRES 0.183399 Hz  
 AQ 2.7263477 sec  
 RG 25.4  
 DM 83.200 usec  
 DE 6.00 usec  
 TE 298.0 K  
 D1 1.0000000 sec  
 MCREST 0.0000000 sec  
 MCKK 0.0150000 sec

----- CHANNEL f1 -----  
 NUC1 1H  
 P1 10.00 usec  
 PL1 0.90 dB  
 SF01 500.3330897 MHz

F2 - Processing parameters  
 SI 32768  
 SF 500.3300127 MHz  
 WDM EM  
 SSB 0  
 LB 0.30 Hz  
 GB 0  
 PC 1.00

1D NMR plot parameters  
 CX 20.00 cm  
 CY 4.00 cm  
 F1P 11.000 ppm  
 F1 5503.63 Hz  
 F2P 0.000 ppm  
 F2 0.00 Hz  
 PRMCM 0.55000 ppm/cm  
 HZCM 275.18149 Hz/cm



Current Data Parameters  
 NAME LW-5-32-2  
 EXPNO 2  
 PROCNO 1

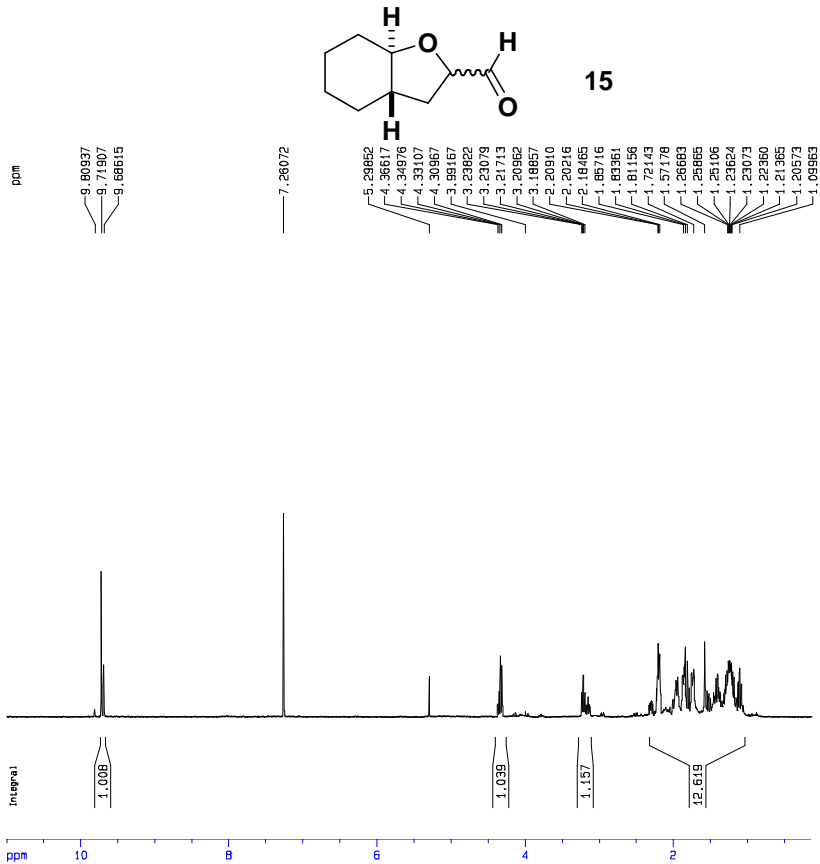
F2 - Acquisition Parameters  
 Date\_ 20080523  
 Time 11.25  
 INSTRUM spect  
 PROBHD 5 mm TXI 1H-13  
 PULPROG zgpg30  
 TD 32768  
 SOLVENT CDCl3  
 NS 4  
 DS 4  
 SWH 31446.541 Hz  
 FIDRES 0.352972 Hz  
 AQ 0.5210612 sec  
 RG 25.4  
 DM 15.900 usec  
 DE 6.00 usec  
 TE 298.0 K  
 D1 0.5000000 sec  
 S11 0.0300000 sec  
 MCREST 0.0000000 sec  
 MCKK 0.0150000 sec

----- CHANNEL f1 -----  
 NUC1 13C  
 P1 13.00 usec  
 PL1 3.00 dB  
 SF01 125.8200000 MHz

----- CHANNEL f2 -----  
 CHPROG waltz16  
 NUC2 1H  
 PCPD2 80.00 usec  
 PL2 0.30 dB  
 PL12 19.01 dB  
 SF02 500.3320000 MHz

F2 - Processing parameters  
 SI 85336  
 SF 125.8080575 MHz  
 WDM no  
 SSB 0  
 LB 0.00 Hz  
 GB 0  
 PC 1.40

1D NMR plot parameters  
 CX 20.00 cm  
 CY 4.00 cm  
 F1P 220.000 ppm  
 F1 27677.77 Hz  
 F2P 0.000 ppm  
 F2 0.00 Hz  
 PRMCM 11.00000 ppm/cm  
 HZCM 1383.88867 Hz/cm



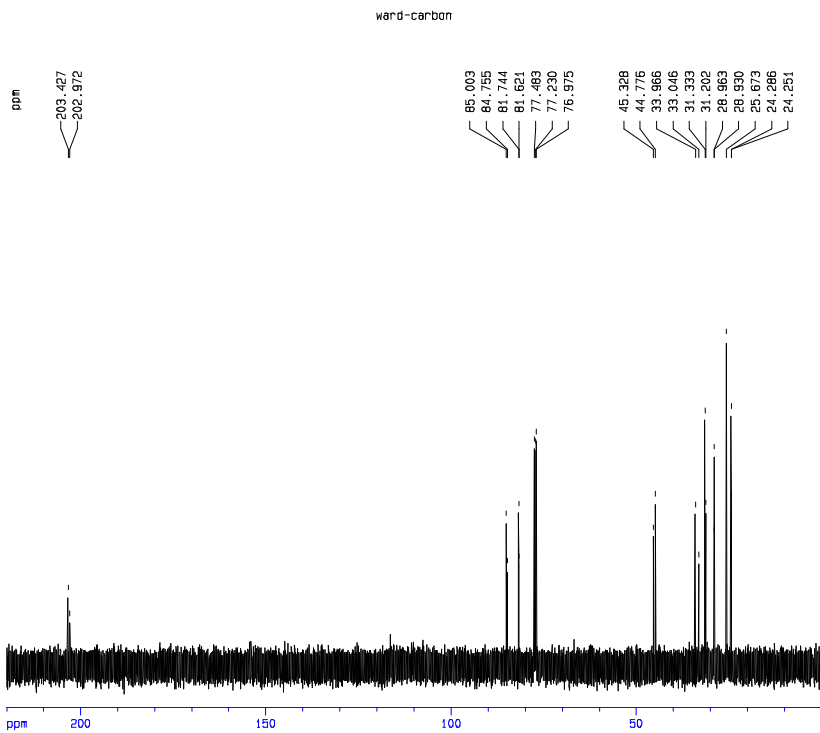
Current Data Parameters  
 NAME LW-5-34-2  
 EXPNO 1  
 PROCNO 1

F2 - Acquisition Parameters  
 Date\_ 20080925  
 Time 12.53  
 INSTRUM spect  
 PROBHD 5 mm TXI 1H-13  
 PULPROG zg30  
 TD 32768  
 SOLVENT CDCl3  
 NS 8  
 DS 2  
 SWH 6009.615 Hz  
 FIDRES 0.183399 Hz  
 AQ 2.7263477 sec  
 RG 181  
 SW 83.200 usec  
 DE 6.00 usec  
 TE 298.0 K  
 D1 1.0000000 sec  
 MCREST 0.0000000 sec  
 MCWRR 0.0150000 sec

===== CHANNEL f1 =====  
 NUC1 1H  
 P1 10.00 usec  
 PL1 0.50 dB  
 SFO1 500.3330697 MHz

F2 - Processing parameters  
 SI 32768  
 SF 500.3300129 MHz  
 MDW EX  
 SSB 0  
 LB 0.30 Hz  
 BB 0  
 PC 1.00

1D NMR plot parameters  
 CX 20.00 cm  
 CY 5.00 cm  
 F1P 11.000 ppm  
 F1 5003.63 Hz  
 F2P 0.000 ppm  
 F2 0.00 Hz  
 PRMCH 0.55000 ppm/cm  
 HZCM 275.18149 Hz/cm



Current Data Parameters  
 NAME LW-4-108-4  
 EXPNO 2  
 PROCNO 1

F2 - Acquisition Parameters  
 Date\_ 20080925  
 Time 19.48  
 INSTRUM spect  
 PROBHD 5 mm TXI 13C-2  
 PULPROG zgpg30  
 TD 65536  
 SOLVENT CDCl3  
 NS 253  
 DS 4  
 SWH 3146.541 Hz  
 FIDRES 0.478826 Hz  
 AQ 1.0480714 sec  
 RG 18384  
 SW 10.900 usec  
 DE 8.00 usec  
 TE 298.0 K  
 D1 0.0000000 sec  
 D11 0.0300000 sec  
 MCREST 0.0000000 sec  
 MCWRR 0.0100000 sec

===== CHANNEL f1 =====  
 NUC1 13C  
 P1 11.00 usec  
 PL1 -3.00 dB  
 SFO1 125.7703184 MHz

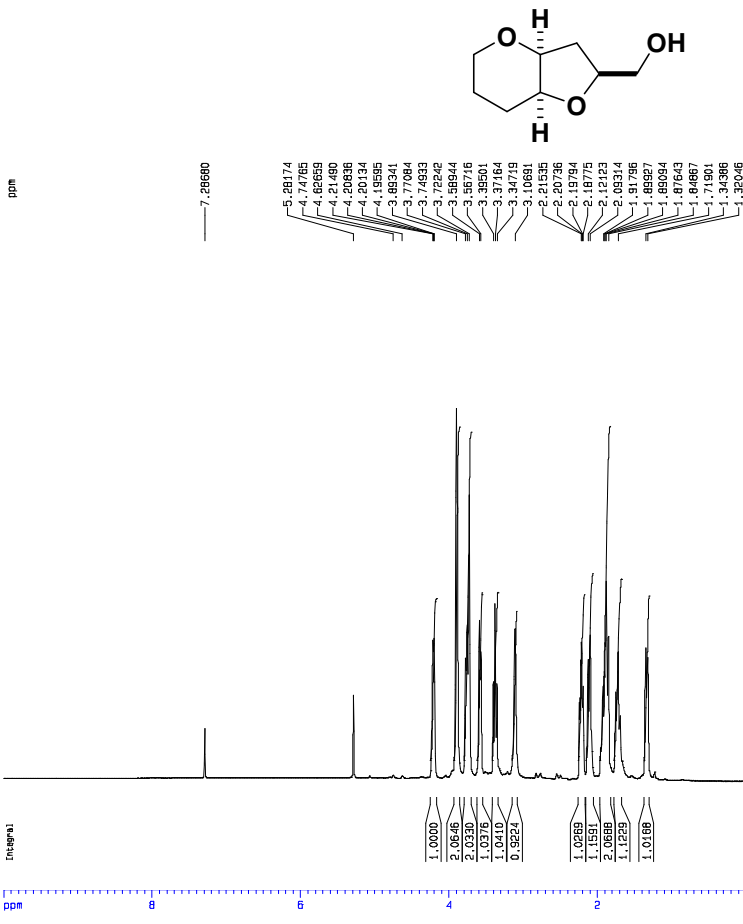
===== CHANNEL f2 =====  
 NUC2 1H  
 P2 10.00 usec  
 PL2 0.00 dB  
 SFO2 500.1300000 MHz

F1 - Acquisition Parameters  
 NS 2  
 TD 256  
 SFO1 500.1324 MHz  
 FIDRES 20.011925 Hz  
 SW 10.241 ppm  
 PRMCH Status

F2 - Processing parameters  
 SI 65536  
 SF 125.7677079 MHz  
 MDW no  
 SSB 0  
 LB 0.00 Hz  
 BB 0  
 PC 1.00

F1 - Processing parameters  
 SI 2048  
 SF 500.1300000 MHz  
 MDW no  
 SSB 2  
 LB 0.30 Hz  
 BB 0.1

1D NMR plot parameters  
 CX 20.00 cm  
 CY 8.00 cm  
 F1P 200.000 ppm  
 F1 27666.71 Hz



Current Data Parameters  
 NAME KT-4-7581  
 EXPNO 1  
 PROCNO 1

F2 - Acquisition Parameters  
 Date\_ 20081106  
 Time 18.08  
 INSTRUM spect  
 PROBHD 5 mm TXI 13C Z  
 PULPROG zgpg30  
 TD 65536  
 SOLVENT Acetone  
 NS 4  
 DS 2  
 SFO1 31446.541 Hz  
 FIDRES 0.479836 Hz  
 AQ 1.8420724 sec  
 RG 16384  
 DW 19.900 usec  
 DE 6.00 usec  
 TE 298.0 K  
 D1 0.02000000 sec  
 d11 0.03000000 sec  
 MDELTA 0.02000000 sec  
 MDELTA 0.01500000 sec

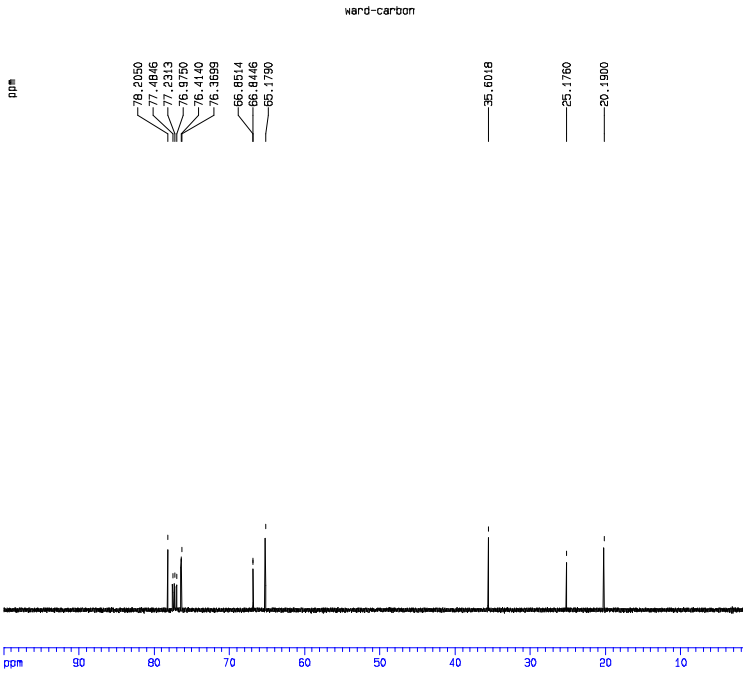
\*\*\*\*\* CHANNEL f1 \*\*\*\*\*  
 NUC1 13C  
 P1 11.00 usec  
 PL1 -3.00 dB  
 SFO1 125.7703184 MHz

F1 - Acquisition Parameters  
 NS 2  
 DS 256  
 SFO1 500.136000 MHz  
 FIDRES 20.211656 Hz  
 SFO2 16.243 ppm  
 FWHZ Status

F2 - Processing parameters  
 SI 30786  
 SF 500.1360000 MHz  
 DM 4  
 SSB 0  
 LB 0.30 Hz  
 GB 0  
 PC 1.00

F1 - Processing parameters  
 SI 2948  
 SF 500.1360000 MHz  
 DM 4  
 SSB 2  
 LB 0.30 Hz  
 GB 0  
 PC 0.1

ID NMR plot parameters  
 CX 26.00 cm  
 CY 2.00 cm  
 FIP 100.000 ppm  
 F1 125.770 Hz  
 F2 0.000 ppm  
 F2 0.00 Hz  
 PRNCH 5.00000 ppm/cm  
 HZCM 250.0000 Hz/cm



Current Data Parameters  
 NAME KT-4-7581  
 EXPNO 3  
 PROCNO 1

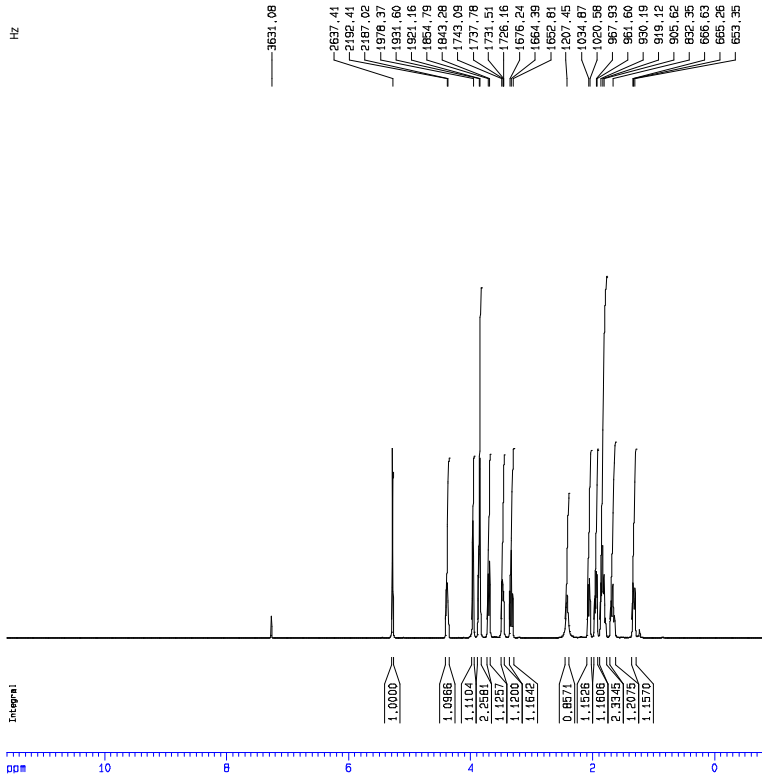
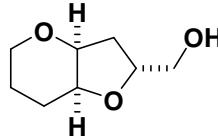
F2 - Acquisition Parameters  
 Date\_ 20081106  
 Time 16.20  
 INSTRUM spect  
 PROBHD 5 mm TXI 13C Z  
 PULPROG zgpg30  
 TD 65536  
 SOLVENT CDCl3  
 NS 227  
 DS 4  
 SFO1 31446.541 Hz  
 FIDRES 0.479836 Hz  
 AQ 1.8420724 sec  
 RG 16384  
 DW 19.900 usec  
 DE 6.00 usec  
 TE 298.0 K  
 D1 0.02000000 sec  
 d11 0.03000000 sec  
 MDELTA 0.02000000 sec  
 MDELTA 0.01500000 sec

\*\*\*\*\* CHANNEL f1 \*\*\*\*\*  
 NUC1 13C  
 P1 11.00 usec  
 PL1 -3.00 dB  
 SFO1 125.7703184 MHz

\*\*\*\*\* CHANNEL f2 \*\*\*\*\*  
 CPDPRG2 Meltz16  
 NUC2 1H  
 PCDPRG2 80.00 usec  
 PL2 0.00 dB  
 PL12 21.18 dB  
 SFO2 500.1360000 MHz

F2 - Processing parameters  
 SI 65536  
 SF 125.7577727 MHz  
 DM 4  
 SSB 0  
 LB 0.00 Hz  
 GB 0  
 PC 1.40

ID NMR plot parameters  
 CX 26.00 cm  
 CY 2.00 cm  
 FIP 100.000 ppm  
 F1 125.770 Hz  
 F2 0.000 ppm  
 F2 0.00 Hz  
 PRNCH 5.00000 ppm/cm  
 HZCM 626.78888 Hz/cm



```

Current Data Parameters
NAME      KT-4-75C1
EXPNO    1
PROCNO   1

F2 - Acquisition Parameters
Date_    2008108
Time     15.35
INSTRUM  spect
PROBHD   5 mm TXI 13C Z
PULPROG  zg30
TD        32768
SOLVENT  CDCl3
NS        178
DS        4
SWH       8249.596 Hz
FIDRES   0.190738 Hz
AQ        2.8214917 sec
RG         35
IN        80.000 usec
DE        6.00 usec
TE        298.0 K
D1        1.0000000 sec
MCREST   0.0000000 sec
MORF     0.0150000 sec

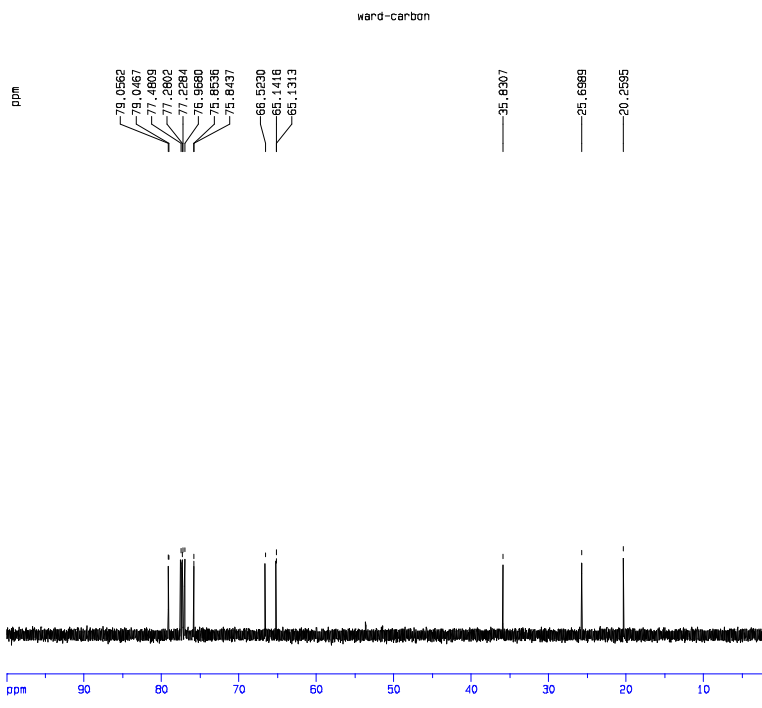
----- CHANNEL f1 -----
NUC1      13C
PL1       2.00 usec
PL2       0.00 dB
SFO1      500.1300000 MHz

F1 - Acquisition parameters
WDW       2
SSB       0
SF01      500.1304 MHz
FIDRES   20.010268 Hz
AQ        10.245 sec
RG         2
IN        80.000 usec
DE        6.00 usec
TE        298.0 K
D1        1.0000000 sec
MCREST   0.0000000 sec
MORF     0.0150000 sec

F2 - Processing parameters
SI        32768
SF        500.1300134 MHz
WDW       EM
SSB       0
LB        0.30 Hz
GB        0
PC        1.00

F1 - Processing parameters
SI        32768
SF        500.1300000 MHz
WDW       EM
SSB       0
LB        0.30 Hz
GB        0
PC        0.1

ID NMR plot parameters
CX        20.00 cm
CY        2.00 cm
F1P       11.601 ppm
F2P       500.00 ppm
F3P       -0.000 ppm
F4P       -447.50 Hz
PPM0      0.0000000 ppm/cm
HZ00      312.49982 Hz/cm
  
```



```

Current Data Parameters
NAME      KT-4-75C1
EXPNO    3
PROCNO   1

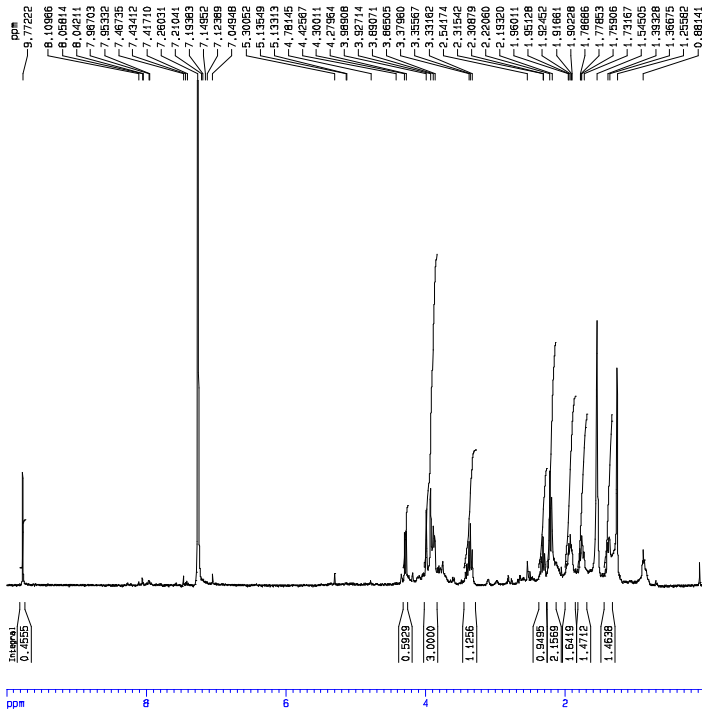
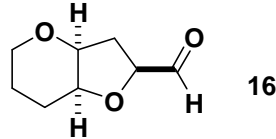
F2 - Acquisition Parameters
Date_    2008108
Time     15.47
INSTRUM  spect
PROBHD   5 mm TXI 13C Z
PULPROG  zgdc20
TD        65536
SOLVENT  CDCl3
NS        178
DS        4
SWH       31446.541 Hz
FIDRES   0.479936 Hz
AQ        1.0420724 sec
RG         16384
IN        15.500 usec
DE        6.00 usec
TE        298.0 K
D1        0.0000000 sec
d11       0.0300000 sec
MCREST   0.0000000 sec
MORF     0.0150000 sec

----- CHANNEL f1 -----
NUC1      13C
PL1       11.00 usec
PL2       -3.00 dB
SFO1      125.7703194 MHz

----- CHANNEL f2 -----
CPDPRG2  waltz16
NUC2      1H
PCPD2    80.00 usec
PL2       0.00 dB
PL12     21.16 dB
SFO2     500.1300000 MHz

F2 - Processing parameters
SI        65536
SF        125.7577684 MHz
WDW       EM
SSB       0
LB        0.00 Hz
GB        0
PC        1.40

ID NMR plot parameters
CX        20.00 cm
CY        2.00 cm
F1P       100.000 ppm
F2P       125.7578 Hz
F3P       0.000 ppm
F4P       0.00 Hz
PPM0      5.00000 ppm/cm
HZ00      628.78892 Hz/cm
  
```



Current Data Parameters  
NAME KT-4-859  
EXPNO 1  
PROCNO 1

F2 - Acquisition Parameters  
Date\_ 2008100  
Time 7:38  
INSTRUM spect  
PROBHD 5 mm TXI 13C Z  
PULPROG zg30  
SOLVENT CDCl3  
NS 38  
DS 2  
SWH 804.866 Hz  
FIDRES 0.160756 Hz  
AQ 2.8614917 sec  
RG 1024  
ZG 80.000 usec  
PC 8.00 usec  
TE 298.2 K  
SI 1.0000000 sec  
MCHST 0.0000000 sec  
MCHP 0.0100000 sec

----- CHANNEL f1 -----  
NUC1 13C  
P1 7.00 usec  
PL1 0.00 dB  
SFO1 500.1300000 MHz

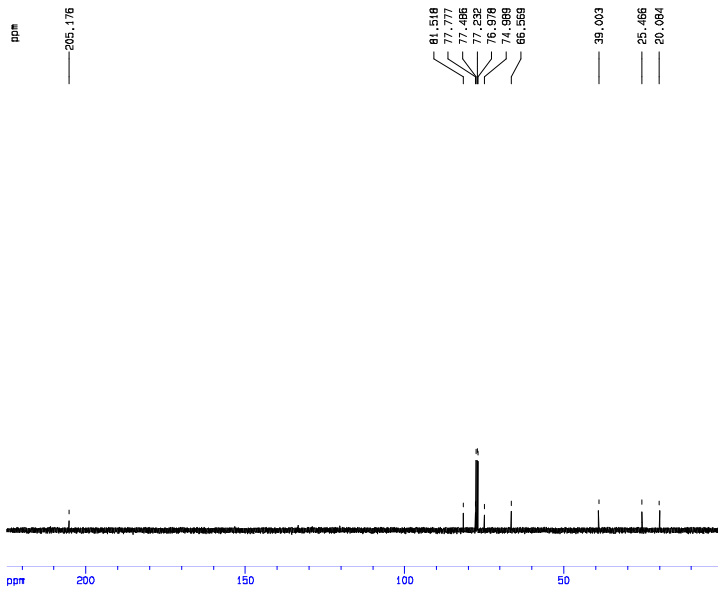
F1 - Acquisition Parameters  
NUC1 13C  
P1 2.00  
SFO1 500.1300000 MHz  
FIDRES 20.411688 Hz  
SW 10.243 ppm  
FHMDE States

F2 - Processing parameters  
SI 38768  
SF 500.1300130 MHz  
RG 1024  
WDW 0  
SSB 0  
LB 0.30 Hz  
GB 0  
PC 1.40

F1 - Processing parameters  
SI 2048  
SF 100.6261000 MHz  
RG 6816  
WDW 0  
SSB 0  
LB 0.30 Hz  
GB 0  
PC 0.1

13 NMR plot parameters  
CX 20.00 cm  
CY 89.00 cm  
CZ 16.000 ppm  
F1 5001.26 Hz  
F2 0.000 ppm  
F3 0.00 Hz  
MCHP 0.0000000  
MCH 250.06502 Hz/cm

word-carbon



Current Data Parameters  
NAME KT-4-859  
EXPNO 3  
PROCNO 1

F2 - Acquisition Parameters  
Date\_ 2008113  
Time 12:47  
INSTRUM spect  
PROBHD 5 mm TXI 13C Z  
PULPROG zgpg30  
SOLVENT CDCl3  
NS 667  
DS 4  
SWH 3048.341 Hz  
FIDRES 0.170858 Hz  
AQ 1.0480774 sec  
RG 1024  
ZG 10.000 usec  
PC 8.00 usec  
TE 298.2 K  
SI 0.0000000 sec  
MCHST 0.0000000 sec  
MCHP 0.0100000 sec

----- CHANNEL f1 -----  
NUC1 13C  
P1 11.00 usec  
PL1 -3.00 dB  
SFO1 125.7703184 MHz

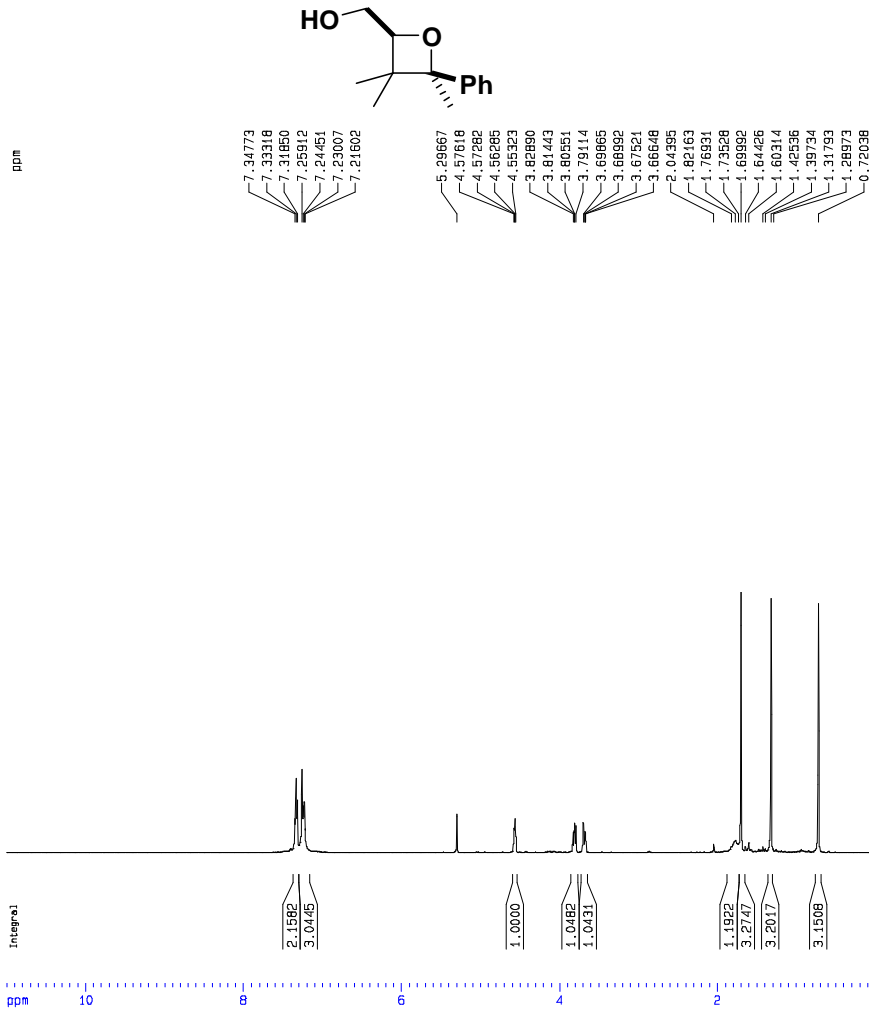
----- CHANNEL f2 -----  
CPDPRG2 waltz16  
NUC2 1H  
PCPD2 80.00 usec  
PL2 0.00 dB  
PL3 21.18 dB  
SFO2 500.1300000 MHz

F2 - Acquisition Parameters  
NUC1 13C  
P1 2.00  
SFO1 500.1300000 MHz  
FIDRES 20.411688 Hz  
SW 10.243 ppm  
FHMDE States

F2 - Processing parameters  
SI 66720  
SF 125.767541 MHz  
RG 1024  
WDW 0  
SSB 0  
LB 0.30 Hz  
GB 0  
PC 1.40

F1 - Processing parameters  
SI 2048  
SF 100.6261000 MHz  
RG 6816  
WDW 0  
SSB 0  
LB 0.30 Hz  
GB 0  
PC 0.1

13 NMR plot parameters  
CX 20.00 cm  
CY 89.00 cm  
CZ 16.000 ppm  
F1 25076.27 Hz



```

Current Data Parameters
NAME      LM-8-112-2
EXPNO    1
PROCNO   1

F2 - Acquisition Parameters
Date_    20081110
Time     17.09
INSTRUM  spect
PROBHD   5 mm TXI 13C Z
PULPROG  zg30
TD       32768
SOLVENT  Acetone
NS       8
DS       2
SWH      6240.086 Hz
FIDRES   0.190735 Hz
AQ       2.5214817 sec
RG       256
DM       80.000 usec
DE       6.00 usec
TE       298.2 K
D1       1.00000000 sec
MCHEST   0.00000000 sec
MCHW     0.01500000 sec

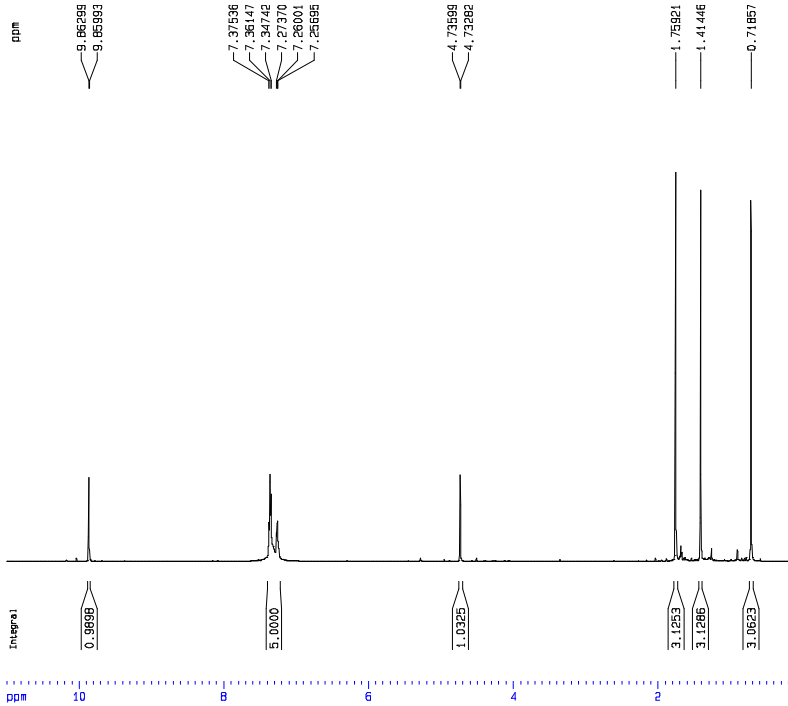
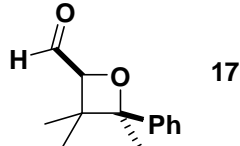
===== CHANNEL f1 =====
NUC1     1H
P1       7.00 usec
PL1      0.00 dB
SFO1     500.136095 MHz

F1 - Acquisition parameters
NUC1     13C
P1       2.00 usec
PL1      0.00 dB
SFO1     500.1324 MHz
FIDRES   20.011526 Hz
SM       10.243 ppm
FRANQE   Static

F2 - Processing parameters
SI       32768
SF       500.1300140 MHz
WDW      EM
SSB      0
LB       0.30 Hz
GB       0
PC       1.00

F1 - Processing parameters
SI       1024
SF       500.1300000 MHz
WDW      no
SSB      2
LB       0.30 Hz
GB       0.1

ID NMR plot parameters
CX       20.00 cm
CY       6.00 cm
F1P      11.000 ppm
F1       5001.43 Hz
F2P      0.000 ppm
F2       0.00 Hz
FREQM    0.95000 ppm/cm
HZDM     275.07190 Hz/cm
  
```



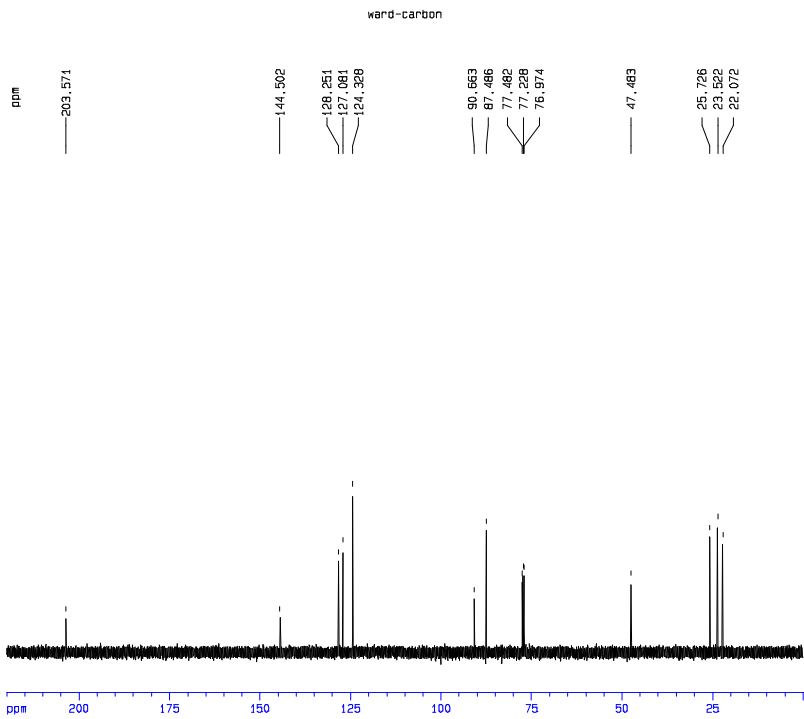
Current Data Parameters  
 NAME LW-5-114-2  
 EXPNO 1  
 PROCNO 1

F2 - Acquisition Parameters  
 Date\_ 20081112  
 Time 17.00  
 INSTRUM spect  
 PROBHD 5 mm TXI 1H-13  
 PULPROG zg30  
 TD 32768  
 SOLVENT CDCl3  
 NS 8  
 DS 2  
 SMI 6009.615 Hz  
 FIDRES 0.183399 Hz  
 AQ 2.7263477 sec  
 RG 25.4  
 DM 83.200 usec  
 DE 6.00 usec  
 TE 298.0 K  
 D1 1.0000000 sec  
 MCREST 0.0000000 sec  
 MDWRK 0.0150000 sec

----- CHANNEL f1 -----  
 NUC1 1H  
 P1 10.00 usec  
 PL1 0.50 dB  
 SFO1 500.3300897 MHz

F2 - Processing parameters  
 SI 32768  
 SF 500.3300121 MHz  
 WDW EM  
 SSB 0  
 LB 0.30 Hz  
 GB 0  
 PC 1.00

1D NMR plot parameters  
 CX 20.00 cm  
 CY 9.81 cm  
 F1P 11.000 ppm  
 F1 5003.63 Hz  
 F2P 0.000 ppm  
 F2 0.00 Hz  
 PPMCM 0.55000 ppm/cm  
 HZCM 275.18149 Hz/cm



Current Data Parameters  
 NAME LW-5-114-2  
 EXPNO 2  
 PROCNO 1

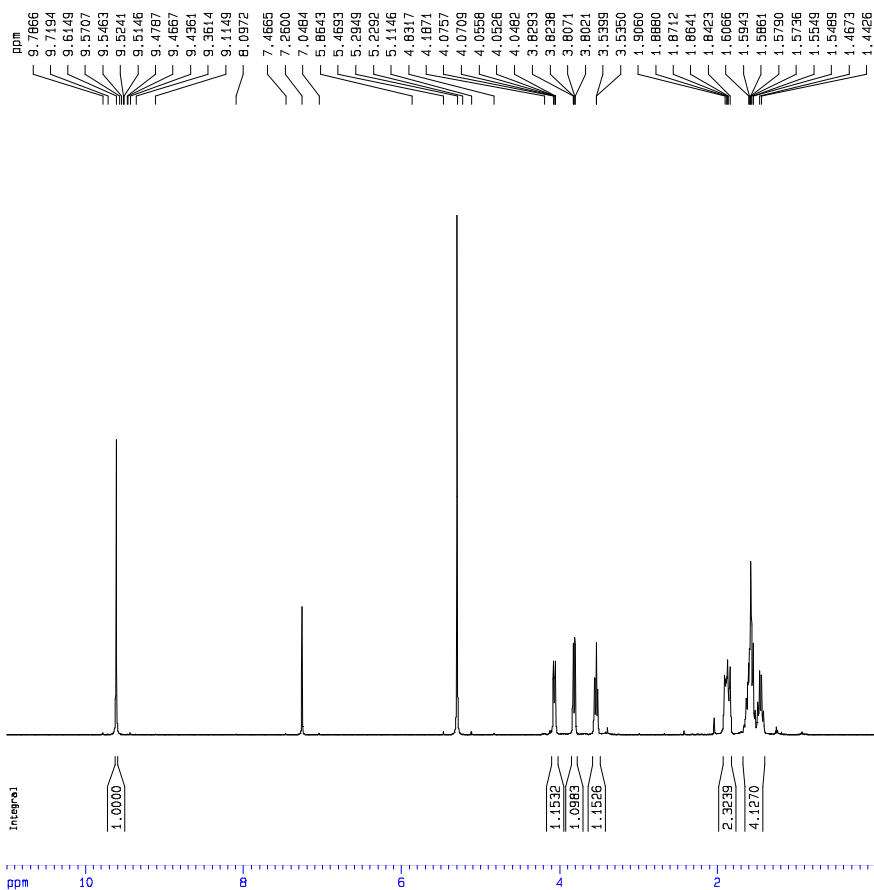
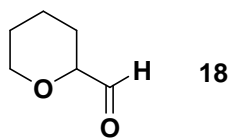
F2 - Acquisition Parameters  
 Date\_ 20081112  
 Time 17.05  
 INSTRUM spect  
 PROBHD 5 mm TXI 1H-13  
 PULPROG zgpg30  
 TD 32768  
 SOLVENT CDCl3  
 NS 119  
 DS 4  
 SMI 31448.341 Hz  
 FIDRES 0.258072 Hz  
 AQ 0.5210812 sec  
 RG 35.9  
 DM 15.900 usec  
 DE 6.00 usec  
 TE 298.0 K  
 D1 0.5000000 sec  
 D11 0.0300000 sec  
 MCREST 0.0000000 sec  
 MDWRK 0.0150000 sec

----- CHANNEL f1 -----  
 NUC1 13C  
 P1 13.00 usec  
 PL1 -1.00 dB  
 SFO1 125.8209594 MHz

----- CHANNEL f2 -----  
 CPDPRG2 waltz16  
 NUC2 1H  
 PCPD2 80.00 usec  
 PL2 0.50 dB  
 PL12 15.01 dB  
 SFO2 500.3300000 MHz

F2 - Processing parameters  
 SI 6536  
 SF 125.8080589 MHz  
 WDW no  
 SSB 0  
 LB 0.00 Hz  
 GB 0  
 PC 1.40

1D NMR plot parameters  
 CX 20.00 cm  
 CY 4.00 cm  
 F1P 220.000 ppm  
 F1 27877.77 Hz  
 F2P 0.000 ppm  
 F2 0.00 Hz  
 PPMCM 11.00000 ppm/cm  
 HZCM 1363.88867 Hz/cm



```

Current Data Parameters
NAME      LW-3-30-3
EXPNO    1
PROCNO   1

F2 - Acquisition Parameters
Date_    20080222
Time     14.27
INSTRUM  spect
PROBHD   5 mm TXI 132 Z
PULPROG  zg30
TD        32768
SOLVENT  Acetone
NS        8
DS        2
SWH       6240.386 Hz
FIDRES   0.190736 Hz
AQ        2.6214817 sec
RG        596
WDW       EM
SSB       0
GB        0
DE        6.00 usec
TE        298.0 K
SI        1.0000000 sec
MCREST   0.0000000 sec
MCMRK    0.0150000 sec

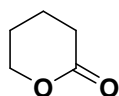
===== CHANNEL f1 =====
NUC1      1H
P1        7.00 usec
PL1       0.00 dB
SFO1     500.132605 MHz

F1 - Acquisition parameters
ND0       2
TD        256
SFO1     500.1324 MHz
FIDRES   20.011526 Hz
WDW       EM
SSB       0
GB        0
DE        1.00

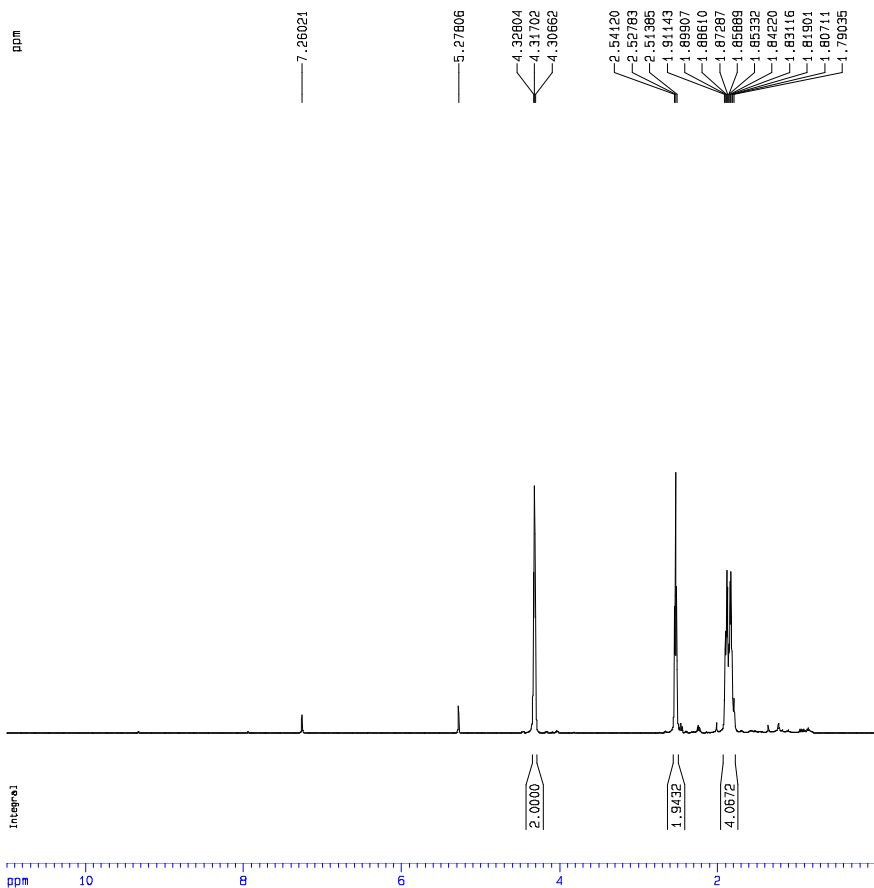
F2 - Processing parameters
SI        32768
SF        500.1300195 MHz
WDW       EM
SSB       0
LB        0.20 Hz
GB        0
PC        1.00

F1 - Processing parameters
SI        2048
SF        1391
WDW       EM
SSB       0
LB        0.20 Hz
GB        0.1

ID NMR plot parameters
CX        20.00 cm
CY        12.00 cm
F1P       11.000 ppm
F1        500.132 Hz
F2P       0.000 ppm
F2        0.000 Hz
SFO1CH    0.55000 ppm/cm
SFO1CH    278.07150 Hz/cm
  
```



19



```

Current Data Parameters
NAME      LW-4-205-2
EXPNO    1
PROCNO   1

F2 - Acquisition Parameters
Date_    20080817
Time     19.18
INSTRUM  spect
PROBHD   5 mm TXI 13C Z
PULPROG  zg30
TD       32768
SOLVENT  Acetone
NS       8
DS       2
SMH      6249.896 Hz
FIDRES   0.190735 Hz
AQ       2.6214817 sec
RG       128
DM       80.000 usec
DE       8.00 usec
TE       298.0 K
D1       1.0000000 sec
ICREST   0.0000000 sec
ICWPRK   0.0150000 sec

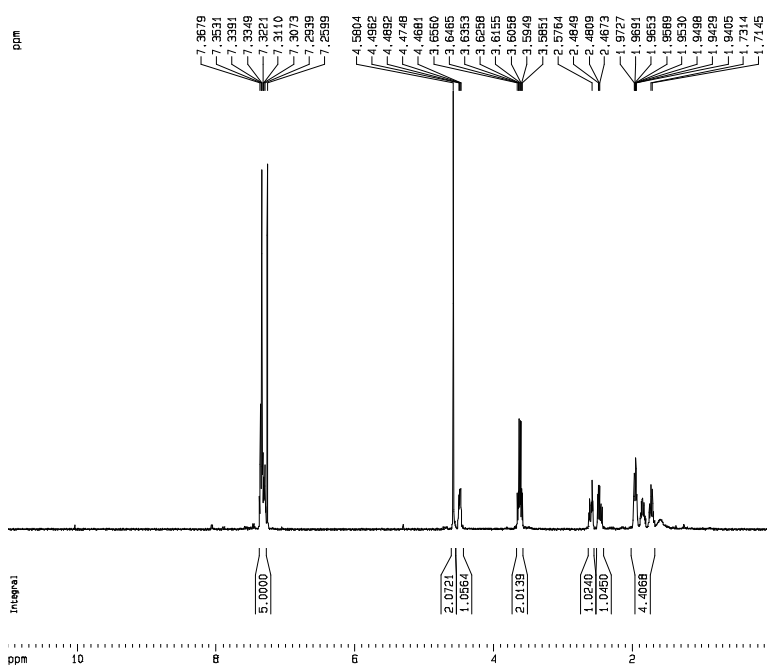
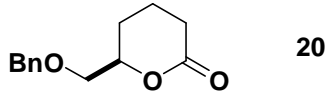
----- CHANNEL f1 -----
NUC1      1H
P1        10.00 usec
PL1       5.50 dB
SFO1     500.1362605 MHz

F1 - Acquisition parameters
MD       2
TD       256
SFO1     500.1324 MHz
FIDRES   20.011526 Hz
SM       10.243 ppm
FREQ0E   Static

F2 - Processing parameters
SI       32768
SF       500.1300134 MHz
WDW      EM
SSB      0
LB       0.30 Hz
GB       0
PC       1.00

F1 - Processing parameters
SI       256
SF       500.1300000 MHz
WDW      gm
SSB      2
LB       0.30 Hz
GB       0.1

ID NMR plot parameters
CX       20.00 cm
CY       6.00 cm
F1P      11.000 ppm
F1       5501.43 Hz
FAP      0.000 ppm
F2       0.00 Hz
PWHCH   0.05000 ppm/cm
HZCM    275.07150 Hz/cm
  
```



```

Current Data Parameters
NAME LW-3-100-2HE
EXPNO 1
PROCNO 1

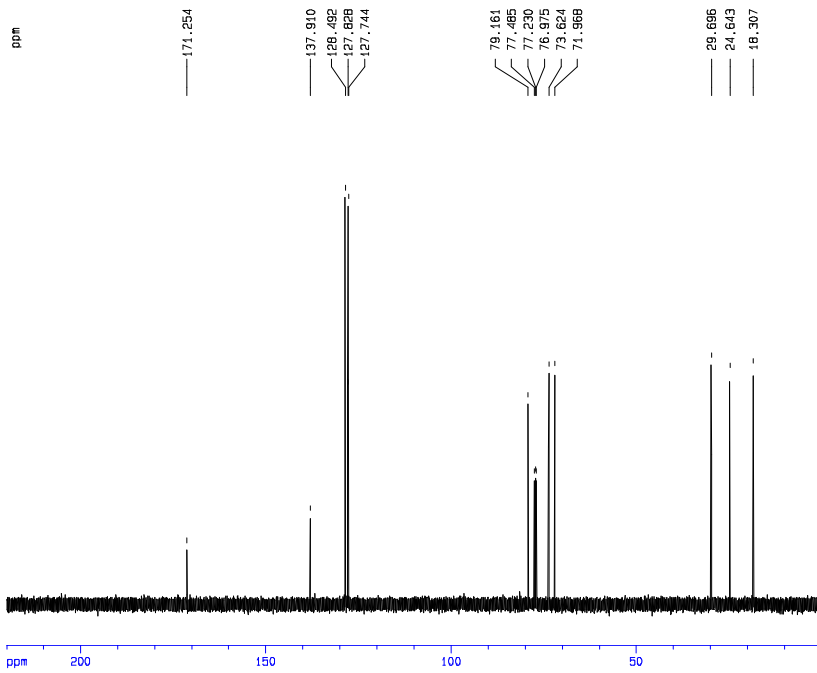
F2 - Acquisition Parameters
Date_ 20080417
Time 13.36
INSTRUM spect
PROBHD 5 mm PABBO SB-
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 10226.578 Hz
FIDRES 0.157632 Hz
AQ 3.1719923 sec
RG 256.1
DM 48.400 usec
DE 6.00 usec
TE 300.2 K
D1 1.0000000 sec
MCREST 0.0000000 sec
MCMK 0.01500000 sec

***** CHANNEL f1 *****
NUC1 1H
P1 17.00 usec
PL1 -2.00 dB
SFO1 500.1360984 MHz

F2 - Processing parameters
SI 32768
SF 500.1360984 MHz
WDW no
SSB 0
LB 0.00 Hz
GB 0
PC 1.00

ID NMR plot parameters
CX 20.00 cm
CY 12.00 cm
F1P 11.000 ppm
F1 500.136 Hz
F2P 0.000 ppm
F2 0.00 Hz
PRNCH 0.15000 ppm/cm
HZDM 276.15402 Hz/cm
  
```

ward-carbon



```

Current Data Parameters
NAME LW-5-38-2
EXPNO 2
PROCNO 1

F2 - Acquisition Parameters
Date_ 20080506
Time 13.36
INSTRUM spect
PROBHD 5 mm Txi 13C 2
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 4
DS 4
SWH 3046.541 Hz
FIDRES 0.478936 Hz
AQ 1.049754 sec
RG 1824
DM 15.900 usec
DE 6.00 usec
TE 300.2 K
D1 0.0000000 sec
SFO1 125.7703184 MHz

***** CHANNEL f1 *****
NUC1 13C
P1 11.00 usec
PL1 -2.00 dB
SFO1 125.7703184 MHz

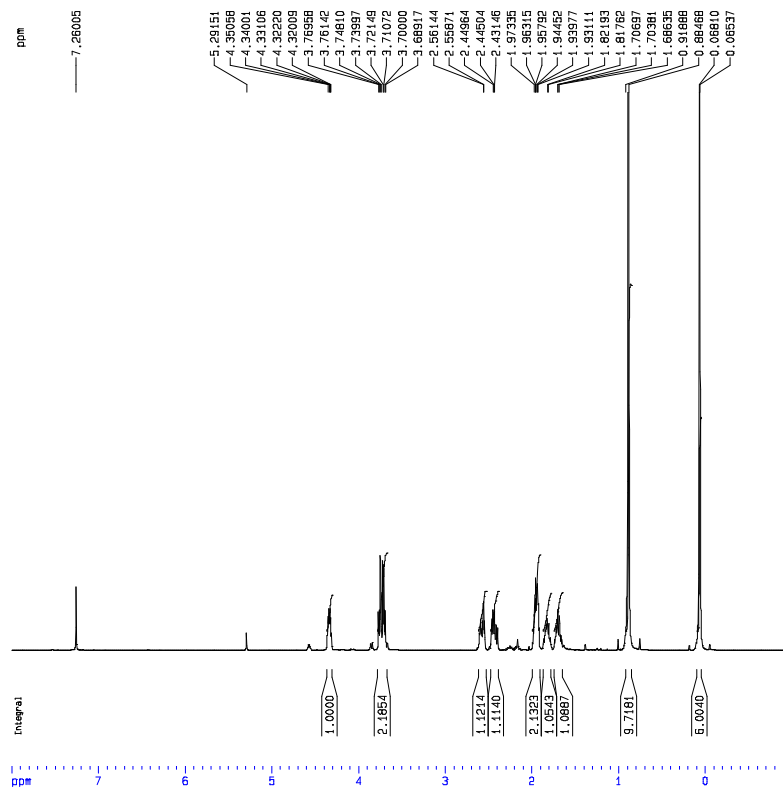
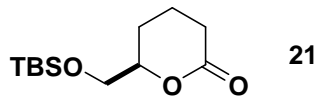
***** CHANNEL f2 *****
CPDPR2 waltz16
NUC2 1H
PULSE 80.00 usec
PL2 0.00 dB
PL12 01.16 dB
SFO2 500.1360984 MHz

F1 - Acquisition parameters
NUC 13C
TD 65536
SFO1 500.1364 MHz
FIDRES 20.011598 Hz
SE 10.2513 ppm
Status

F2 - Processing parameters
SI 65536
SF 125.7677888 MHz
WDW no
SSB 0
LB 0.00 Hz
GB 0
PC 1.40

F1 - Processing parameters
SI 32768
SF 500.1360984 MHz
WDW no
SSB 0
LB 0.30 Hz
GB 0.1

ID NMR plot parameters
CX 20.00 cm
CY 16.00 cm
F1P 200.000 ppm
F1 500.136 Hz
  
```



```

Current Data Parameters
NAME      K1-4-1202
EXPNO    2
PROCNO   1

F2 - Acquisition Parameters
Date_    20080502
Time     13.30
INSTRUM  spect
PROBHD  5 mm TAI 125 C
PULPROG zgpg30
TD       32768
SOLVENT acetone
NS       8
DS       2
SWH      6249.698 Hz
FIDRES  0.199739 Hz
AQ       0.2514917 sec
RG       64
DE       80.000 usec
TE       300.2 K
D1       1.0000000 sec
MCREST  0.0000000 sec
MCHRG   0.0150000 sec

----- CHANNEL f1 -----
NUC1     13C
P1       8.50 usec
PL1     1.00 dB
SFO1    500.1300000 MHz

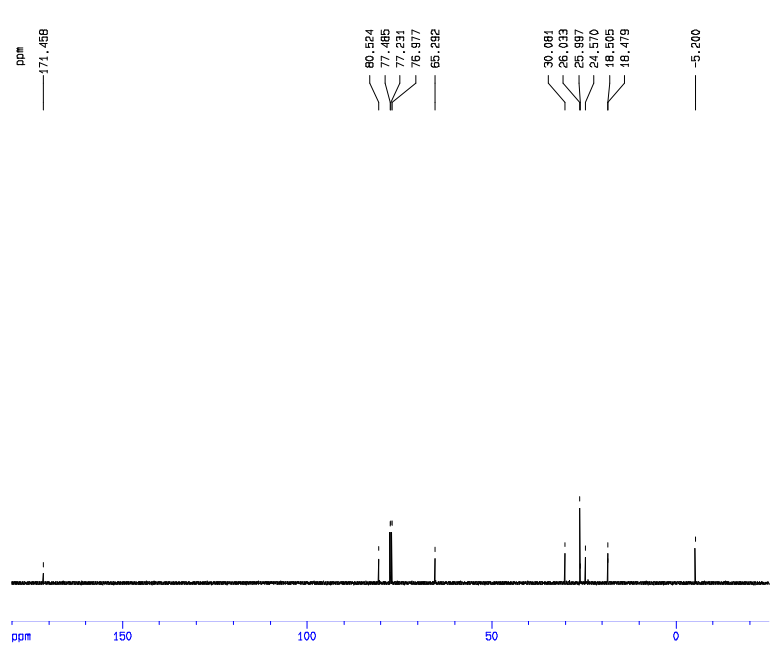
F1 - Acquisition parameters
NO      2
TD      256
SFO1    500.1304 MHz
FIDRES  20.011526 Hz
SW      10.243 ppm
FWDDE  Square

F2 - Processing parameters
SI      32768
SF      500.1300123 MHz
WDW     EM
SSB     0
LB      0.30 Hz
GB      0
PC      1.00

F1 - Processing parameters
SI      3048
SF      125.7694 MHz
WDW     EM
SSB     0
LB      0.30 Hz
GB      0.1

IS MRB list parameters
CY      20.00 cm
CY       50.00 cm
F1P     0.500 ppm
F1       4001.04 Hz
F2P     -0.895 ppm
F2       -441.73 Hz
PPMCH  0.44476 ppm/cm
H2CH   222.43840 Hz/cm
  
```

ward-carbon



```

Current Data Parameters
NAME      K1-4-1202
EXPNO    3
PROCNO   1

F2 - Acquisition Parameters
Date_    20080502
Time     13.34
INSTRUM  spect
PROBHD  5 mm TAI 125 C
PULPROG zgpg30
TD       65536
SOLVENT acetone
NS       1824
DS       4
SWH      21446.541 Hz
FIDRES  0.470800 Hz
AQ       1.0409701 sec
RG       4800
DE       15.000 usec
TE       300.2 K
D1       0.8000000 sec
D11     0.8000000 sec
MCREST  0.8000000 sec
MCHRG   0.6500000 sec

----- CHANNEL f1 -----
NUC1     13C
P1       11.20 usec
PL1     -2.00 dB
SFO1    125.7702104 MHz

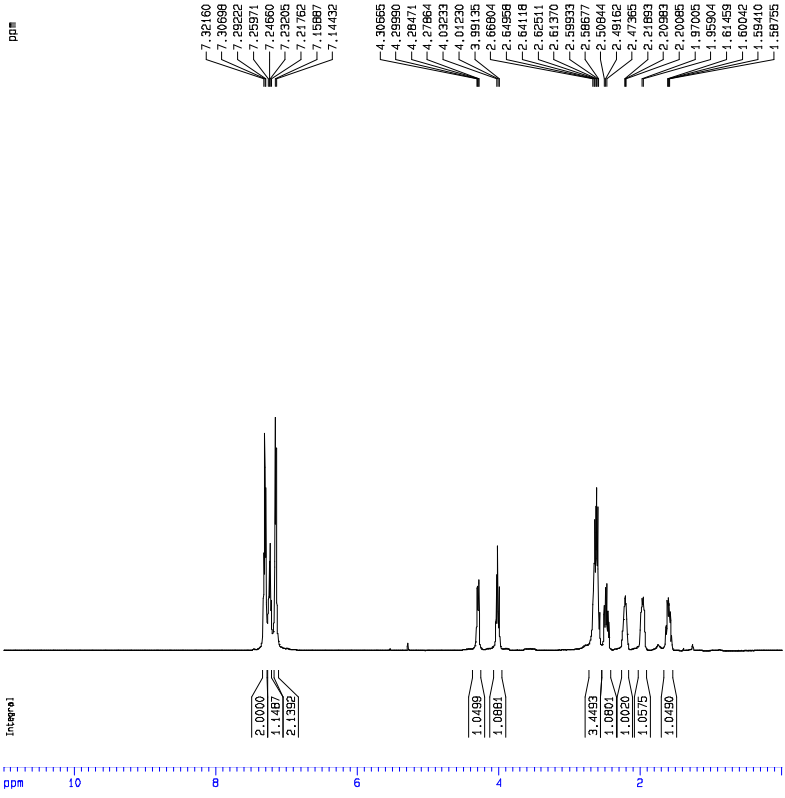
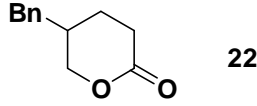
----- CHANNEL f2 -----
CPROGR  waltz16
NUC2     1H
PCPRD  80.00 usec
PL12    1.00 dB
PL12    20.47 dB
SFO2    500.1300000 MHz

F1 - Acquisition parameters
NO      256
TD      256
SFO1    500.1304 MHz
FIDRES  20.011526 Hz
SW      10.243 ppm
FWDDE  Square

F2 - Processing parameters
SI      65536
SF      125.7697128 MHz
WDW     EM
SSB     0
LB      0.00 Hz
GB      0
PC      1.40

F1 - Processing parameters
SI      2688
SF      125.7694 MHz
WDW     EM
SSB     0
LB      0.30 Hz
GB      0.1

IS MRB list parameters
CY      20.00 cm
CY       50.00 cm
F1P     0.500 ppm
F1       4001.04 Hz
  
```



```

Current Data Parameters
NAME      Lk-5-50-2HE
EXPNO    1
PROCNO   1

F2 - Acquisition Parameters
Date_    20080505
Time     9.37
INSTRUM  spect
PROBHD   5 mm TXI 13C Z
PULPROG  zgpg30
TD        32768
SOLVENT  Acetone
NS        8
DS        2
SWH       6249.985 Hz
FIDRES   0.190205 Hz
AQ        2.654817 sec
RG        64
SM        80.000 usec
DE        6.00 usec
TE        298.0 K
SI        1.00000000 sec
HOREST   0.00000000 sec
HOUK     0.01000000 sec

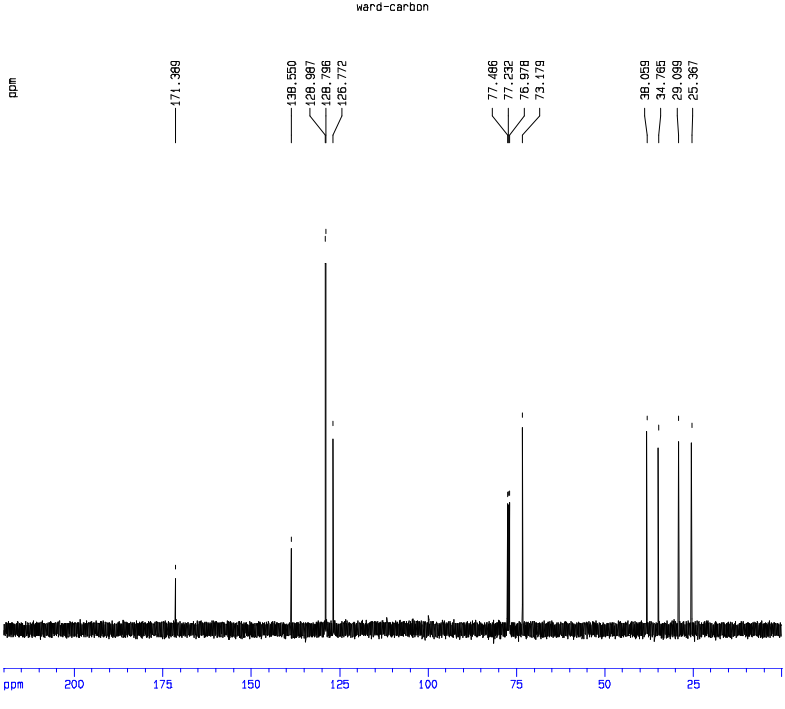
----- CHANNEL f1 -----
NUC1     13C
P1        7.00 usec
PL1       0.00 dB
SFO1     100.628350 MHz

F1 - Acquisition parameters
AQ        2
TD        256
SFO1     500.1304 MHz
FIDRES   20.011926 Hz
SM       15.242 ppm
SFO2     Scale8

F2 - Processing parameters
SI        32768
SF        500.130026 MHz
WDW       2
SSB       0
LB        0.30 Hz
GB        0
PC        1.00

F1 - Processing parameters
SI        2048
SF        100.628350 MHz
WDW       2
SSB       0
LB        0.30 Hz
GB        0
PC        0.1

1D NMR plot parameters
CY        20.00 cm
CP        8.00 cm
F1P       11.000 ppm
F2P       500.1304 Hz
F3P       0.000 ppm
F4P       0.00 Hz
PRNCH    0.65000 ppm/cm
KDCM     275.07190 Hz/cm
  
```



```

Current Data Parameters
NAME      Lk-5-50-2HE
EXPNO    1
PROCNO   1

F2 - Acquisition Parameters
Date_    20080505
Time     9.40
INSTRUM  spect
PROBHD   5 mm TXI 13C Z
PULPROG  zgpg30
TD        65536
SOLVENT  CDCl3
NS        4
DS        2
SWH       26426.641 Hz
FIDRES   0.409826 Hz
AQ        1.040574 sec
RG        65536
SM        10.000 usec
DE        6.00 usec
TE        298.0 K
SI        0.00000000 sec
HOREST   0.00000000 sec
HOUK     0.01000000 sec

----- CHANNEL f1 -----
NUC1     13C
P1       11.00 usec
PL1       0.00 dB
SFO1     125.7703184 MHz

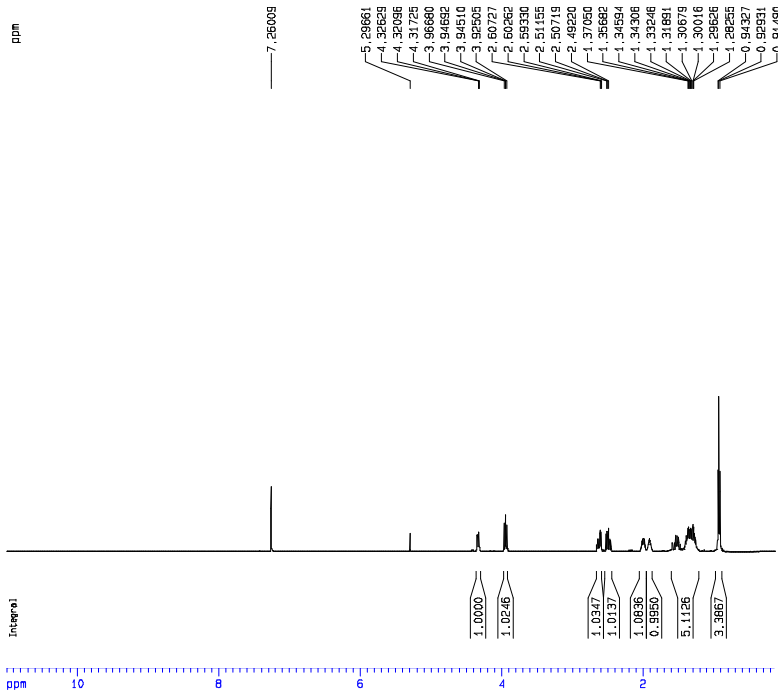
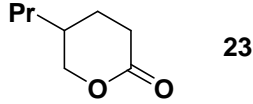
----- CHANNEL f2 -----
CPROGR   waltz16
NUC2     1H
PCPD2    80.00 usec
PL2P     0.00 dB
PL12     21.15 dB
SFO2     500.1300000 MHz

F1 - Acquisition parameters
AQ        2
TD        256
SFO1     500.1304 MHz
FIDRES   20.011926 Hz
SM       15.242 ppm
SFO2     Scale8

F2 - Processing parameters
SI        65536
SF        125.767732 MHz
WDW       2
SSB       0
LB        0.00 Hz
GB        0
PC        1.40

F1 - Processing parameters
SI        2048
SF        100.628350 MHz
WDW       2
SSB       0
LB        0.30 Hz
GB        0
PC        0.1

1D NMR plot parameters
CY        20.00 cm
CP        10.00 cm
F1P       200.000 ppm
F2P       27000.71 Hz
  
```



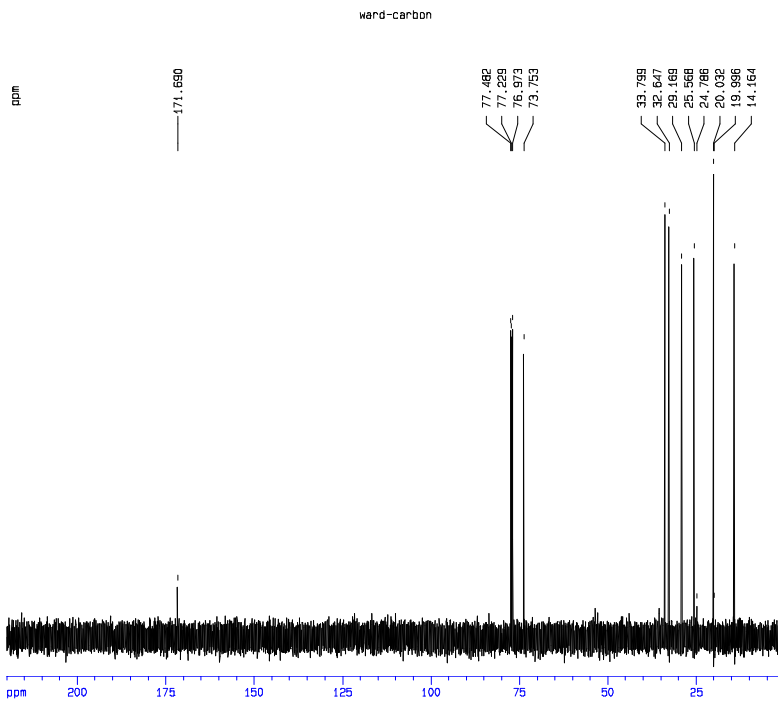
Current Data Parameters  
NAME LW-5-90-3RE  
EXPNO 1  
PROCNO 1

F2 - Acquisition Parameters  
Date\_ 20081028  
Time 21.58  
INSTRUM spect  
PROBHD 5 mm TXI 1H-13  
PULPROG zg30  
TD 32768  
SOLVENT CDCl3  
NS 8  
DS 2  
SWH 6009.615 Hz  
FIDRES 0.183399 Hz  
AQ 2.7263477 sec  
RG 161.3  
DW 83.200 usec  
DE 6.00 usec  
TE 298.0 K  
D1 1.0000000 sec  
NCREST 0.0000000 sec  
NORW 0.0150000 sec

===== CHANNEL f1 =====  
NUC1 1H  
P1 10.00 usec  
PL1 0.50 dB  
SFO1 500.333687 MHz

F2 - Processing parameters  
SI 32768  
SF 500.3300129 MHz  
WDW EM  
SSB 0  
LB 0.30 Hz  
GB 0  
PC 1.00

ID NMR plot parameters  
CX 20.00 cm  
CY 4.00 cm  
FIP 11.000 ppm  
F1 5503.63 Hz  
F2 0.000 ppm  
F3 0.00 Hz  
PPMCM 0.95000 ppm/cm  
HZCM 275.18149 Hz/cm



Current Data Parameters  
NAME LW-5-90-3  
EXPNO 2  
PROCNO 1

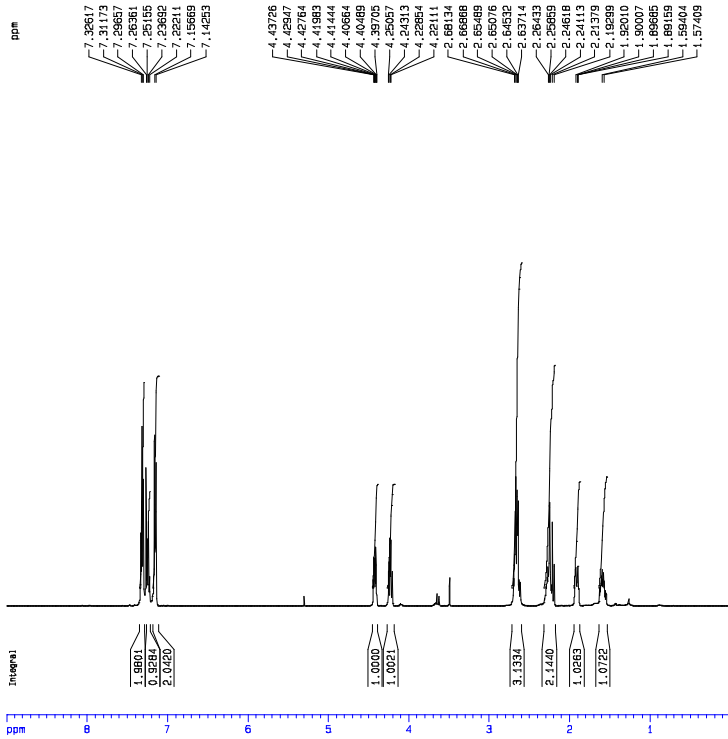
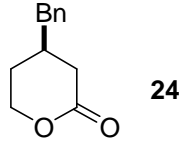
F2 - Acquisition Parameters  
Date\_ 20081028  
Time 20.34  
INSTRUM spect  
PROBHD 5 mm TXI 1H-13  
PULPROG zgpg30  
TD 32768  
SOLVENT CDCl3  
NS 201  
DS 4  
SWH 21446.541 Hz  
FIDRES 0.359672 Hz  
AQ 0.5210612 sec  
RG 32  
DW 15.900 usec  
DE 6.00 usec  
TE 298.0 K  
D1 0.5000000 sec  
D11 0.0300000 sec  
NCREST 0.0000000 sec  
NORW 0.0150000 sec

===== CHANNEL f1 =====  
NUC1 13C  
P1 13.00 usec  
PL1 -3.00 dB  
SFO1 125.8206584 MHz

===== CHANNEL f2 =====  
CPDPRG2 waltz16  
NUC2 1H  
PCPD2 80.00 usec  
PL2 0.30 dB  
PL12 19.51 dB  
SFO2 500.3320000 MHz

F2 - Processing parameters  
SI 65336  
SF 125.8080632 MHz  
WDW mg  
SSB 0  
LB 0.00 Hz  
GB 0  
PC 1.40

ID NMR plot parameters  
CX 20.00 cm  
CY 12.00 cm  
FIP 220.000 ppm  
F1 27677.77 Hz  
F2 0.000 ppm  
F3 0.00 Hz  
PPMCM 11.00000 ppm/cm  
HZCM 1393.88987 Hz/cm



```

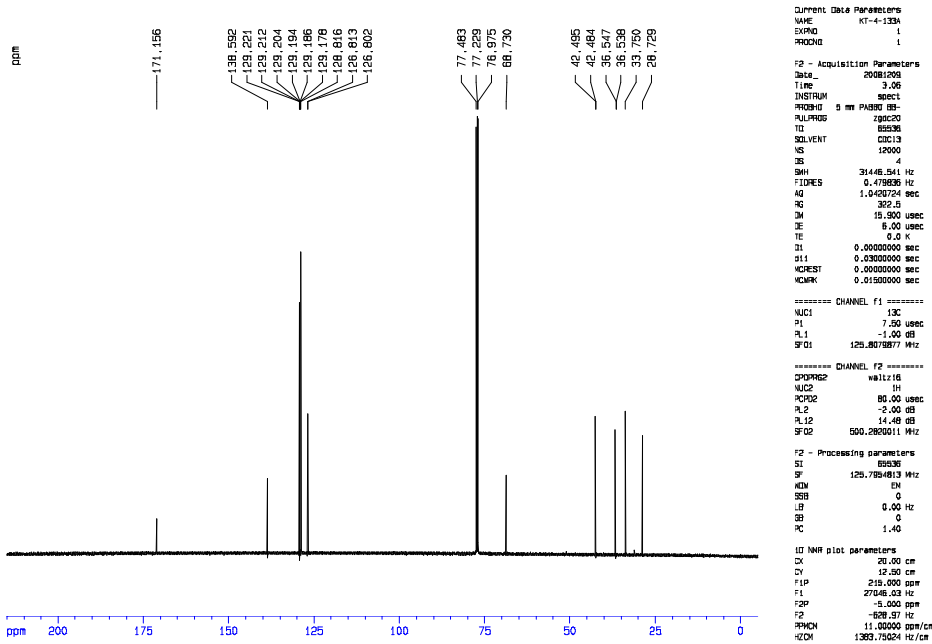
Current Data Parameters
NAME      KT-4-133A (Characterization)
EXPNO    1
PROCNO   1

F2 - Acquisition Parameters
Date_    20090206
Time     17.30
INSTRUM  spect
PROBHD   5 mm PABBO QNP
PULPROG  zgpg30
TD        65536
SOLVENT  CDCl3
NS        4
DS        4
SWH       31446.541 Hz
FIDRES    0.190726 Hz
AQ        2.8214917 sec
RG         1.00
SM        15.300 usec
DE         5.00 usec
TE         298.2 K
D1         0.0000000 sec
d11        0.0000000 sec
d12        0.0000000 sec
d13        0.0000000 sec
d14        0.0000000 sec
d15        0.0000000 sec
===== CHANNEL f1 =====
NUC1      13C
P1         7.50 usec
PL1        -1.00 dB
SFO1      100.6280620 MHz

F1 - Acquisition Parameters
Date_    20090206
Time     18.45
INSTRUM  spect
PROBHD   5 mm PABBO QNP
PULPROG  zgpg30
TD        65536
SOLVENT  CDCl3
NS        4
DS        4
SWH       31446.541 Hz
FIDRES    0.190726 Hz
AQ        2.8214917 sec
RG         1.00
SM        15.300 usec
DE         5.00 usec
TE         298.2 K
D1         0.0000000 sec
d11        0.0000000 sec
d12        0.0000000 sec
d13        0.0000000 sec
d14        0.0000000 sec
d15        0.0000000 sec
===== CHANNEL f2 =====
CPDPRG2  waltz16
NUC2      1H
PCPD2     80.00 usec
PL2        -2.00 dB
PL12       14.48 dB
SFO2      500.2820011 MHz

F2 - Processing parameters
SI         65536
SF         125.7594613 MHz
WDW        EM
SSB        0
GB         0
PC         1.40

I0 NMR plot parameters
CX         20.00 cm
CY         12.00 cm
F1P        219.000 ppm
F1          27045.03 Hz
F2P        -5.000 ppm
F2          -628.51 Hz
PP4MCH     11.00000 ppm/cm
HZCM       1363.75024 Hz/cm
  
```



```

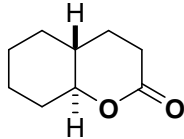
Current Data Parameters
NAME      KT-4-133A
EXPNO    1
PROCNO   1

F2 - Acquisition Parameters
Date_    20090206
Time     3.06
INSTRUM  spect
PROBHD   5 mm PABBO QNP
PULPROG  zgpg30
TD        65536
SOLVENT  CDCl3
NS        4
DS        4
SWH       31446.541 Hz
FIDRES    0.479626 Hz
AQ        1.0420724 sec
RG         1.00
SM        15.300 usec
DE         5.00 usec
TE         298.2 K
D1         0.0000000 sec
d11        0.0000000 sec
d12        0.0000000 sec
d13        0.0000000 sec
d14        0.0000000 sec
d15        0.0000000 sec
===== CHANNEL f1 =====
NUC1      13C
P1         7.50 usec
PL1        -1.00 dB
SFO1      125.7594613 MHz

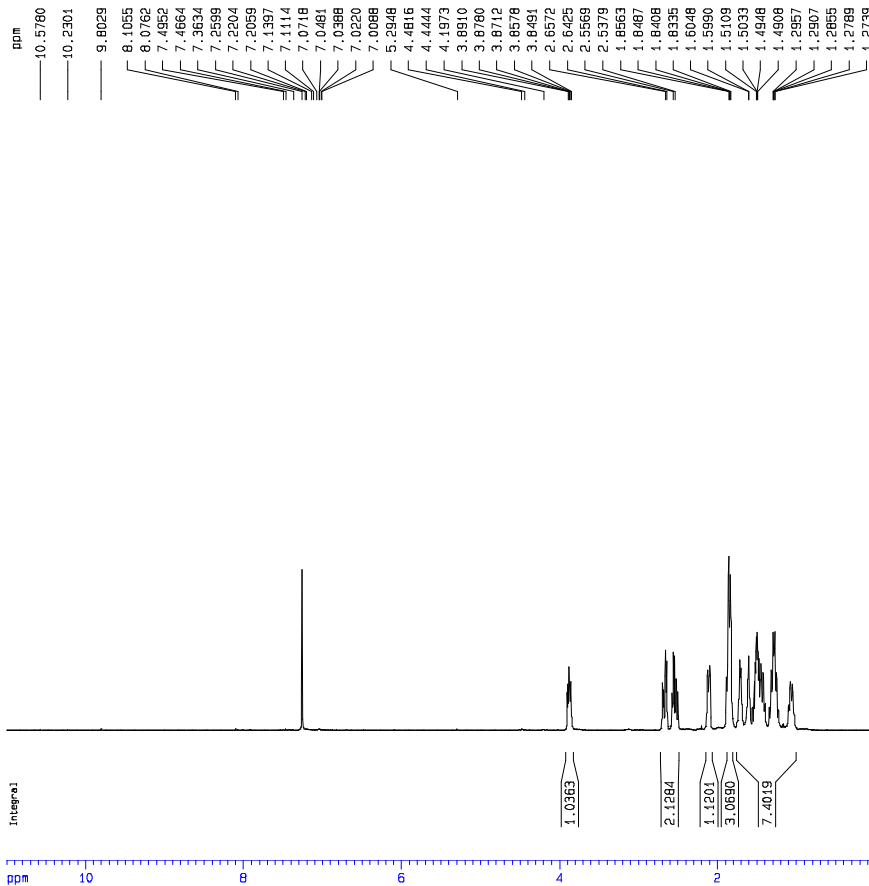
===== CHANNEL f2 =====
CPDPRG2  waltz16
NUC2      1H
PCPD2     80.00 usec
PL2        -2.00 dB
PL12       14.48 dB
SFO2      500.2820011 MHz

F2 - Processing parameters
SI         65536
SF         125.7594613 MHz
WDW        EM
SSB        0
GB         0
PC         1.40

I0 NMR plot parameters
CX         20.00 cm
CY         12.00 cm
F1P        219.000 ppm
F1          27045.03 Hz
F2P        -5.000 ppm
F2          -628.51 Hz
PP4MCH     11.00000 ppm/cm
HZCM       1363.75024 Hz/cm
  
```



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```

Current Data Parameters
NAME      LK-4-110-2IE
EXPNO    3
PROCNO   1

F2 - Acquisition Parameters
Date_    20080730
Time     14.00
INSTRUM  spect
PROBHD   5 mm TXI 13C Z
PULPROG  zg30
TD        32768
SOLVENT  Acetone
NS        8
DS        2
SHH       6249.996 Hz
FIDRES    0.150765 Hz
AQ        2.5214517 sec
RG        256
SM        80.000 usec
SE        6.00 usec
TE        298.0 K
D1        1.0000000 sec
MCREST    0.0000000 sec
MCHK      0.0100000 sec

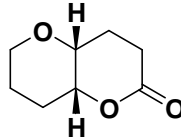
----- CHANNEL f1 -----
NUC1      1H
P1        7.00 usec
PL1       0.00 dB
SFO1      500.1362605 MHz

F1 - Acquisition parameters
AQ        2
TD        256
SFO1      500.1324 MHz
FIDRES    20.011676 Hz
SM        10.243 ppm
FHM02     Status

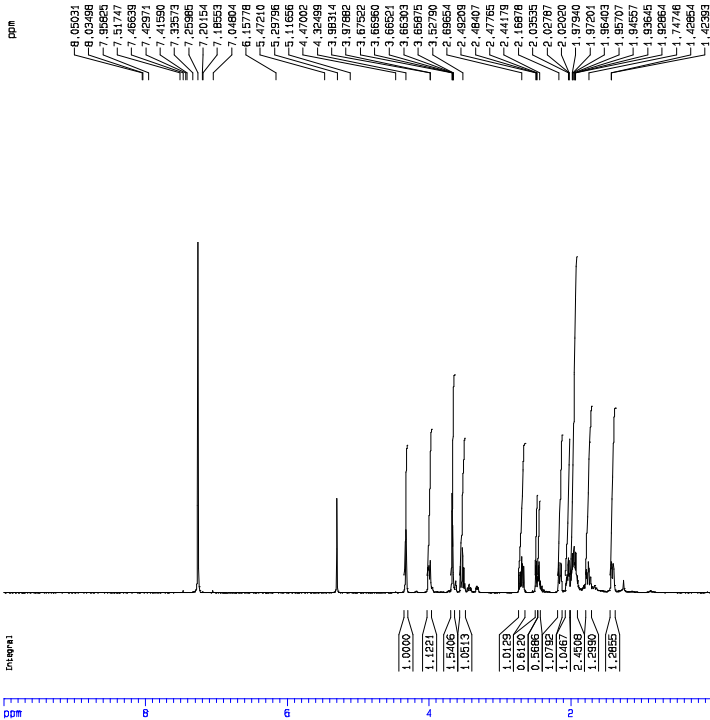
F2 - Processing parameters
SI        32768
SF        500.1300196 MHz
WDW       EM
SSB       0
LB        0.30 Hz
GB        0
PC        1.00

F1 - Processing parameters
SI        2048
MC2       TRF1
SF        500.1300000 MHz
WDW       RM
SSB       2
LB        0.30 Hz
GB        0.1

ID NMR plot parameters
CX        20.00 cm
CY        4.00 cm
F1P       11.000 ppm
F1        5501.43 Hz
F2P       0.000 ppm
F2        0.00 Hz
RMCHN     0.86000 ppm/cm
H2DM      875.07150 Hz/cm
  
```



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Current Data Parameters
NAME      KI-4-1248  (H NMR)
EXPNO    1
PROCNO   1

F2 - Acquisition Parameters
Date_    20081201
Time     2.33
INSTRUM  spect
PROBHD   5 mm TXI 13C
PULPROG  zgpg30
TD        32768
SOLVENT  CDCl3
NS        4
DS        4
SFO1     500.136060 MHz
FIDRES   0.160736 Hz
AQ        2.6214917 sec
RG         512
SM        800.000000 Hz
F2RES    0.160736 Hz
AD        2.6214917 sec
RG         512
SM        80.000000 usec
TE        300.2 K
D1        1.0000000 sec
dCREST   0.0000000 sec
dCMR     0.0160000 sec

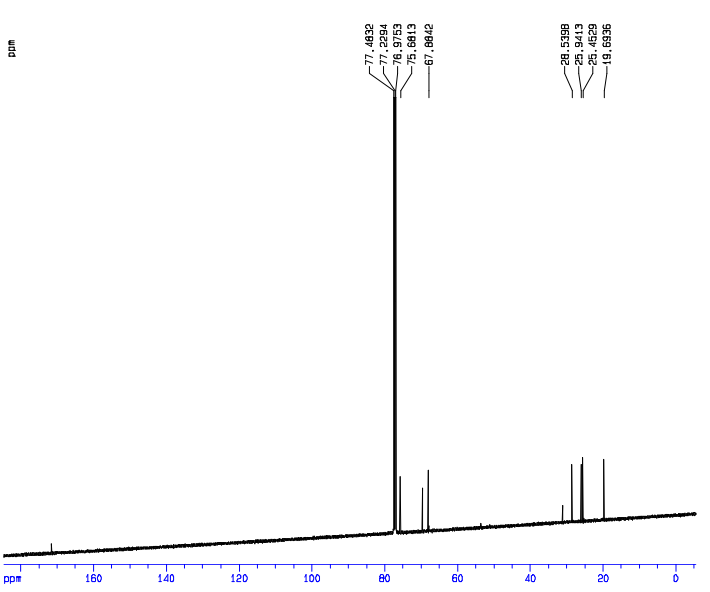
----- CHANNEL f1 -----
NUC1      13C
P1        6.50 usec
PL1       -1.00 dB
SFO1     500.136060 MHz

F1 - Acquisition parameters
AQ        2.6214917 sec
SM        800.136060 MHz
F1RES    0.0160000 Hz
SFO1     500.136060 MHz
SFO2     10.6433333 MHz
SFO3     10.6433333 MHz
SFO4     10.6433333 MHz
SFO5     10.6433333 MHz
SFO6     10.6433333 MHz
SFO7     10.6433333 MHz
SFO8     10.6433333 MHz
SFO9     10.6433333 MHz
SFO10    10.6433333 MHz
SFO11    10.6433333 MHz
SFO12    10.6433333 MHz
SFO13    10.6433333 MHz
SFO14    10.6433333 MHz
SFO15    10.6433333 MHz
SFO16    10.6433333 MHz
SFO17    10.6433333 MHz
SFO18    10.6433333 MHz
SFO19    10.6433333 MHz
SFO20    10.6433333 MHz
SFO21    10.6433333 MHz
SFO22    10.6433333 MHz
SFO23    10.6433333 MHz
SFO24    10.6433333 MHz
SFO25    10.6433333 MHz
SFO26    10.6433333 MHz
SFO27    10.6433333 MHz
SFO28    10.6433333 MHz
SFO29    10.6433333 MHz
SFO30    10.6433333 MHz
SFO31    10.6433333 MHz
SFO32    10.6433333 MHz
SFO33    10.6433333 MHz
SFO34    10.6433333 MHz
SFO35    10.6433333 MHz
SFO36    10.6433333 MHz
SFO37    10.6433333 MHz
SFO38    10.6433333 MHz
SFO39    10.6433333 MHz
SFO40    10.6433333 MHz
SFO41    10.6433333 MHz
SFO42    10.6433333 MHz
SFO43    10.6433333 MHz
SFO44    10.6433333 MHz
SFO45    10.6433333 MHz
SFO46    10.6433333 MHz
SFO47    10.6433333 MHz
SFO48    10.6433333 MHz
SFO49    10.6433333 MHz
SFO50    10.6433333 MHz
SFO51    10.6433333 MHz
SFO52    10.6433333 MHz
SFO53    10.6433333 MHz
SFO54    10.6433333 MHz
SFO55    10.6433333 MHz
SFO56    10.6433333 MHz
SFO57    10.6433333 MHz
SFO58    10.6433333 MHz
SFO59    10.6433333 MHz
SFO60    10.6433333 MHz
SFO61    10.6433333 MHz
SFO62    10.6433333 MHz
SFO63    10.6433333 MHz
SFO64    10.6433333 MHz
SFO65    10.6433333 MHz
SFO66    10.6433333 MHz
SFO67    10.6433333 MHz
SFO68    10.6433333 MHz
SFO69    10.6433333 MHz
SFO70    10.6433333 MHz
SFO71    10.6433333 MHz
SFO72    10.6433333 MHz
SFO73    10.6433333 MHz
SFO74    10.6433333 MHz
SFO75    10.6433333 MHz
SFO76    10.6433333 MHz
SFO77    10.6433333 MHz
SFO78    10.6433333 MHz
SFO79    10.6433333 MHz
SFO80    10.6433333 MHz
SFO81    10.6433333 MHz
SFO82    10.6433333 MHz
SFO83    10.6433333 MHz
SFO84    10.6433333 MHz
SFO85    10.6433333 MHz
SFO86    10.6433333 MHz
SFO87    10.6433333 MHz
SFO88    10.6433333 MHz
SFO89    10.6433333 MHz
SFO90    10.6433333 MHz
SFO91    10.6433333 MHz
SFO92    10.6433333 MHz
SFO93    10.6433333 MHz
SFO94    10.6433333 MHz
SFO95    10.6433333 MHz
SFO96    10.6433333 MHz
SFO97    10.6433333 MHz
SFO98    10.6433333 MHz
SFO99    10.6433333 MHz
SFO100   10.6433333 MHz

F2 - Processing parameters
SI        32768
SF        500.136060 MHz
WDW       EM
SSB       0
GB        0.30 Hz
PC        1.00

F1 - Processing parameters
SI        32768
SF        500.136060 MHz
WDW       EM
SSB       0
GB        0.30 Hz
PC        1.00

ID NMR plot parameters
CX       20.00 cm
CY       20.00 cm
F1P      10.000000 MHz
F1       500.136060 MHz
F2P      10.000000 MHz
F2       500.136060 MHz
F3P      10.000000 MHz
F3       500.136060 MHz
F4P      10.000000 MHz
F4       500.136060 MHz
F5P      10.000000 MHz
F5       500.136060 MHz
F6P      10.000000 MHz
F6       500.136060 MHz
F7P      10.000000 MHz
F7       500.136060 MHz
F8P      10.000000 MHz
F8       500.136060 MHz
F9P      10.000000 MHz
F9       500.136060 MHz
F10P     10.000000 MHz
F10      500.136060 MHz
F11P     10.000000 MHz
F11      500.136060 MHz
F12P     10.000000 MHz
F12      500.136060 MHz
F13P     10.000000 MHz
F13      500.136060 MHz
F14P     10.000000 MHz
F14      500.136060 MHz
F15P     10.000000 MHz
F15      500.136060 MHz
F16P     10.000000 MHz
F16      500.136060 MHz
F17P     10.000000 MHz
F17      500.136060 MHz
F18P     10.000000 MHz
F18      500.136060 MHz
F19P     10.000000 MHz
F19      500.136060 MHz
F20P     10.000000 MHz
F20      500.136060 MHz
F21P     10.000000 MHz
F21      500.136060 MHz
F22P     10.000000 MHz
F22      500.136060 MHz
F23P     10.000000 MHz
F23      500.136060 MHz
F24P     10.000000 MHz
F24      500.136060 MHz
F25P     10.000000 MHz
F25      500.136060 MHz
F26P     10.000000 MHz
F26      500.136060 MHz
F27P     10.000000 MHz
F27      500.136060 MHz
F28P     10.000000 MHz
F28      500.136060 MHz
F29P     10.000000 MHz
F29      500.136060 MHz
F30P     10.000000 MHz
F30      500.136060 MHz
F31P     10.000000 MHz
F31      500.136060 MHz
F32P     10.000000 MHz
F32      500.136060 MHz
F33P     10.000000 MHz
F33      500.136060 MHz
F34P     10.000000 MHz
F34      500.136060 MHz
F35P     10.000000 MHz
F35      500.136060 MHz
F36P     10.000000 MHz
F36      500.136060 MHz
F37P     10.000000 MHz
F37      500.136060 MHz
F38P     10.000000 MHz
F38      500.136060 MHz
F39P     10.000000 MHz
F39      500.136060 MHz
F40P     10.000000 MHz
F40      500.136060 MHz
F41P     10.000000 MHz
F41      500.136060 MHz
F42P     10.000000 MHz
F42      500.136060 MHz
F43P     10.000000 MHz
F43      500.136060 MHz
F44P     10.000000 MHz
F44      500.136060 MHz
F45P     10.000000 MHz
F45      500.136060 MHz
F46P     10.000000 MHz
F46      500.136060 MHz
F47P     10.000000 MHz
F47      500.136060 MHz
F48P     10.000000 MHz
F48      500.136060 MHz
F49P     10.000000 MHz
F49      500.136060 MHz
F50P     10.000000 MHz
F50      500.136060 MHz
F51P     10.000000 MHz
F51      500.136060 MHz
F52P     10.000000 MHz
F52      500.136060 MHz
F53P     10.000000 MHz
F53      500.136060 MHz
F54P     10.000000 MHz
F54      500.136060 MHz
F55P     10.000000 MHz
F55      500.136060 MHz
F56P     10.000000 MHz
F56      500.136060 MHz
F57P     10.000000 MHz
F57      500.136060 MHz
F58P     10.000000 MHz
F58      500.136060 MHz
F59P     10.000000 MHz
F59      500.136060 MHz
F60P     10.000000 MHz
F60      500.136060 MHz
F61P     10.000000 MHz
F61      500.136060 MHz
F62P     10.000000 MHz
F62      500.136060 MHz
F63P     10.000000 MHz
F63      500.136060 MHz
F64P     10.000000 MHz
F64      500.136060 MHz
F65P     10.000000 MHz
F65      500.136060 MHz
F66P     10.000000 MHz
F66      500.136060 MHz
F67P     10.000000 MHz
F67      500.136060 MHz
F68P     10.000000 MHz
F68      500.136060 MHz
F69P     10.000000 MHz
F69      500.136060 MHz
F70P     10.000000 MHz
F70      500.136060 MHz
F71P     10.000000 MHz
F71      500.136060 MHz
F72P     10.000000 MHz
F72      500.136060 MHz
F73P     10.000000 MHz
F73      500.136060 MHz
F74P     10.000000 MHz
F74      500.136060 MHz
F75P     10.000000 MHz
F75      500.136060 MHz
F76P     10.000000 MHz
F76      500.136060 MHz
F77P     10.000000 MHz
F77      500.136060 MHz
F78P     10.000000 MHz
F78      500.136060 MHz
F79P     10.000000 MHz
F79      500.136060 MHz
F80P     10.000000 MHz
F80      500.136060 MHz
F81P     10.000000 MHz
F81      500.136060 MHz
F82P     10.000000 MHz
F82      500.136060 MHz
F83P     10.000000 MHz
F83      500.136060 MHz
F84P     10.000000 MHz
F84      500.136060 MHz
F85P     10.000000 MHz
F85      500.136060 MHz
F86P     10.000000 MHz
F86      500.136060 MHz
F87P     10.000000 MHz
F87      500.136060 MHz
F88P     10.000000 MHz
F88      500.136060 MHz
F89P     10.000000 MHz
F89      500.136060 MHz
F90P     10.000000 MHz
F90      500.136060 MHz
F91P     10.000000 MHz
F91      500.136060 MHz
F92P     10.000000 MHz
F92      500.136060 MHz
F93P     10.000000 MHz
F93      500.136060 MHz
F94P     10.000000 MHz
F94      500.136060 MHz
F95P     10.000000 MHz
F95      500.136060 MHz
F96P     10.000000 MHz
F96      500.136060 MHz
F97P     10.000000 MHz
F97      500.136060 MHz
F98P     10.000000 MHz
F98      500.136060 MHz
F99P     10.000000 MHz
F99      500.136060 MHz
F100P    10.000000 MHz
F100     500.136060 MHz
  
```



```

Current Data Parameters
NAME      KI-4-1248  (13C NMR)
EXPNO    1
PROCNO   1

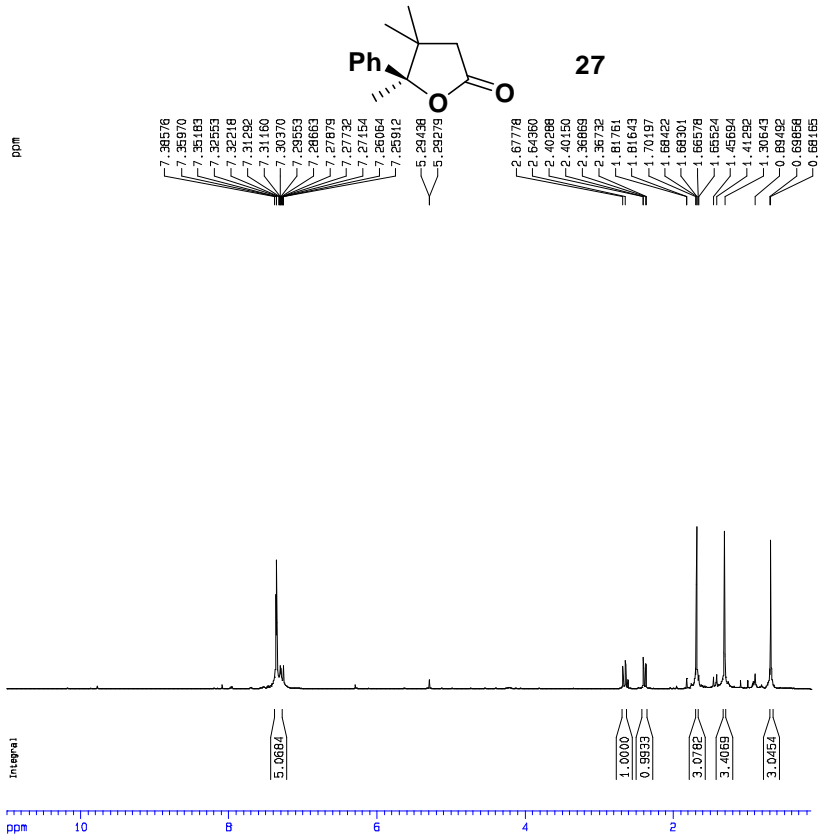
F2 - Acquisition Parameters
Date_    20081201
Time     2.33
INSTRUM  spect
PROBHD   5 mm PABBO 13C
PULPROG  zgpg30
TD        65536
SOLVENT  CDCl3
NS        4
DS        4
SFO1     125.764789 MHz
FIDRES   0.479836 Hz
AQ        1.0420724 sec
RG         512
SM        2648.2441 Hz
F2RES    0.479836 Hz
AD        1.0420724 sec
RG         512
SM        18.500000 usec
TE        300.2 K
D1        0.0000000 sec
d11       0.0000000 sec
dCREST   0.0000000 sec
dCMR     0.0150000 sec

----- CHANNEL f1 -----
NUC1      13C
P1        7.50 usec
PL1       -1.00 dB
SFO1     125.764789 MHz

----- CHANNEL f2 -----
CPDPRG2  waltz16
NUC2      1H
NUC3      13C
FOF2P    80.00 usec
PL2       -2.00 dB
PL12     14.49 dB
SFO2     500.260911 MHz

F2 - Processing parameters
SI        65536
SF        125.764789 MHz
WDW       EM
SSB       0
GB        0.30 Hz
PC        1.40

ID NMR plot parameters
CX       20.00 cm
CY       20.00 cm
F1P      10.000000 MHz
F1       500.136060 MHz
F2P      10.000000 MHz
F2       500.136060 MHz
F3P      10.000000 MHz
F3       500.136060 MHz
F4P      10.000000 MHz
F4       500.136060 MHz
F5P      10.000000 MHz
F5       500.136060 MHz
F6P      10.000000 MHz
F6       500.136060 MHz
F7P      10.000000 MHz
F7       500.136060 MHz
F8P      10.000000 MHz
F8       500.136060 MHz
F9P      10.000000 MHz
F9       500.136060 MHz
F10P     10.000000 MHz
F10      500.136060 MHz
F11P     10.000000 MHz
F11      500.136060 MHz
F12P     10.000000 MHz
F12      500.136060 MHz
F13P     10.000000 MHz
F13      500.136060 MHz
F14P     10.000000 MHz
F14      500.136060 MHz
F15P     10.000000 MHz
F15      500.136060 MHz
F16P     10.000000 MHz
F16      500.136060 MHz
F17P     10.000000 MHz
F17      500.136060 MHz
F18P     10.000000 MHz
F18      500.136060 MHz
F19P     10.000000 MHz
F19      500.136060 MHz
F20P     10.000000 MHz
F20      500.136060 MHz
F21P     10.000000 MHz
F21      500.136060 MHz
F22P     10.000000 MHz
F22      500.136060 MHz
F23P     10.000000 MHz
F23      500.136060 MHz
F24P     10.000000 MHz
F24      500.136060 MHz
F25P     10.000000 MHz
F25      500.136060 MHz
F26P     10.000000 MHz
F26      500.136060 MHz
F27P     10.000000 MHz
F27      500.136060 MHz
F28P     10.000000 MHz
F28      500.136060 MHz
F29P     10.000000 MHz
F29      500.136060 MHz
F30P     10.000000 MHz
F30      500.136060 MHz
F31P     10.000000 MHz
F31      500.136060 MHz
F32P     10.000000 MHz
F32      500.136060 MHz
F33P     10.000000 MHz
F33      500.136060 MHz
F34P     10.000000 MHz
F34      500.136060 MHz
F35P     10.000000 MHz
F35      500.136060 MHz
F36P     10.000000 MHz
F36      500.136060 MHz
F37P     10.000000 MHz
F37      500.136060 MHz
F38P     10.000000 MHz
F38      500.136060 MHz
F39P     10.000000 MHz
F39      500.136060 MHz
F40P     10.000000 MHz
F40      500.136060 MHz
F41P     10.000000 MHz
F41      500.136060 MHz
F42P     10.000000 MHz
F42      500.136060 MHz
F43P     10.000000 MHz
F43      500.136060 MHz
F44P     10.000000 MHz
F44      500.136060 MHz
F45P     10.000000 MHz
F45      500.136060 MHz
F46P     10.000000 MHz
F46      500.136060 MHz
F47P     10.000000 MHz
F47      500.136060 MHz
F48P     10.000000 MHz
F48      500.136060 MHz
F49P     10.000000 MHz
F49      500.136060 MHz
F50P     10.000000 MHz
F50      500.136060 MHz
F51P     10.000000 MHz
F51      500.136060 MHz
F52P     10.000000 MHz
F52      500.136060 MHz
F53P     10.000000 MHz
F53      500.136060 MHz
F54P     10.000000 MHz
F54      500.136060 MHz
F55P     10.000000 MHz
F55      500.136060 MHz
F56P     10.000000 MHz
F56      500.136060 MHz
F57P     10.000000 MHz
F57      500.136060 MHz
F58P     10.000000 MHz
F58      500.136060 MHz
F59P     10.000000 MHz
F59      500.136060 MHz
F60P     10.000000 MHz
F60      500.136060 MHz
F61P     10.000000 MHz
F61      500.136060 MHz
F62P     10.000000 MHz
F62      500.136060 MHz
F63P     10.000000 MHz
F63      500.136060 MHz
F64P     10.000000 MHz
F64      500.136060 MHz
F65P     10.000000 MHz
F65      500.136060 MHz
F66P     10.000000 MHz
F66      500.136060 MHz
F67P     10.000000 MHz
F67      500.136060 MHz
F68P     10.000000 MHz
F68      500.136060 MHz
F69P     10.000000 MHz
F69      500.136060 MHz
F70P     10.000000 MHz
F70      500.136060 MHz
F71P     10.000000 MHz
F71      500.136060 MHz
F72P     10.000000 MHz
F72      500.136060 MHz
F73P     10.000000 MHz
F73      500.136060 MHz
F74P     10.000000 MHz
F74      500.136060 MHz
F75P     10.000000 MHz
F75      500.136060 MHz
F76P     10.000000 MHz
F76      500.136060 MHz
F77P     10.000000 MHz
F77      500.136060 MHz
F78P     10.000000 MHz
F78      500.136060 MHz
F79P     10.000000 MHz
F79      500.136060 MHz
F80P     10.000000 MHz
F80      500.136060 MHz
F81P     10.000000 MHz
F81      500.136060 MHz
F82P     10.000000 MHz
F82      500.136060 MHz
F83P     10.000000 MHz
F83      500.136060 MHz
F84P     10.000000 MHz
F84      500.136060 MHz
F85P     10.000000 MHz
F85      500.136060 MHz
F86P     10.000000 MHz
F86      500.136060 MHz
F87P     10.000000 MHz
F87      500.136060 MHz
F88P     10.000000 MHz
F88      500.136060 MHz
F89P     10.000000 MHz
F89      500.136060 MHz
F90P     10.000000 MHz
F90      500.136060 MHz
F91P     10.000000 MHz
F91      500.136060 MHz
F92P     10.000000 MHz
F92      500.136060 MHz
F93P     10.000000 MHz
F93      500.136060 MHz
F94P     10.000000 MHz
F94      500.136060 MHz
F95P     10.000000 MHz
F95      500.136060 MHz
F96P     10.000000 MHz
F96      500.136060 MHz
F97P     10.000000 MHz
F97      500.136060 MHz
F98P     10.000000 MHz
F98      500.136060 MHz
F99P     10.000000 MHz
F99      500.136060 MHz
F100P    10.000000 MHz
F100     500.136060 MHz
  
```



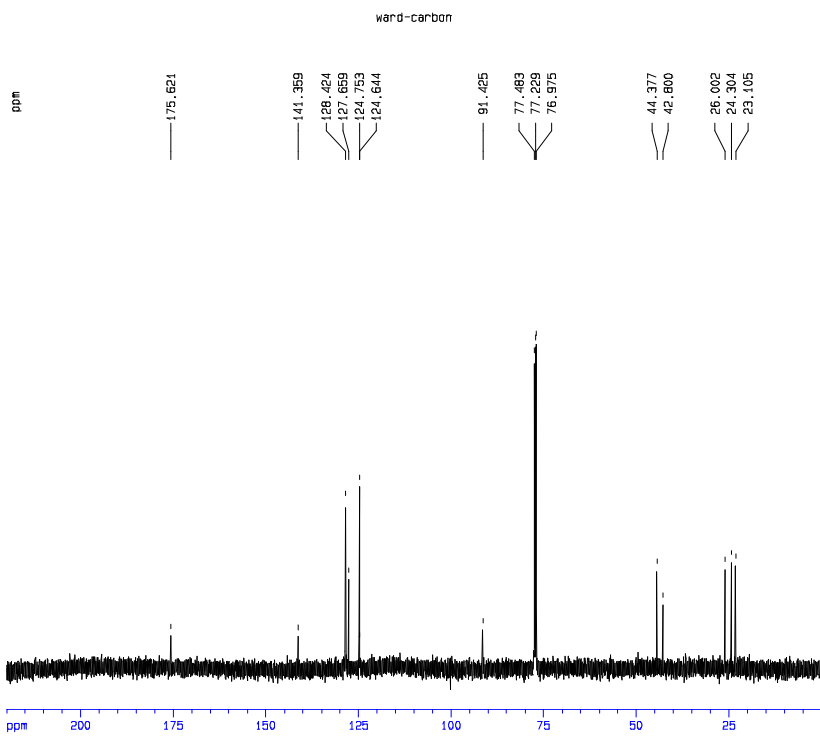
Current Data Parameters  
 NAME LW-5-116-5  
 EXPNO 1  
 PROCNO 1

F2 - Acquisition Parameters  
 Date\_ 20081114  
 Time 15.32  
 INSTRUM spect  
 PROBHD 5 mm TXI 1H-13  
 PULPROG zg30  
 TD 32768  
 SOLVENT CDCl3  
 NS 8  
 DS 2  
 SNH 6005.619 Hz  
 FIDRES 0.183389 Hz  
 AQ 2.7263477 sec  
 RG 87  
 DW 83.200 usec  
 DE 6.00 usec  
 TE 298.0 K  
 D1 1.0000000 sec  
 MCREST 0.0000000 sec  
 MCWRR 0.0150000 sec

===== CHANNEL f1 =====  
 NUC1 1H  
 P1 10.00 usec  
 PL1 0.50 dB  
 SFO1 500.330897 MHz

F2 - Processing parameters  
 SI 32768  
 SF 500.330129 MHz  
 MDW EM  
 SSB 0  
 LB 0.30 Hz  
 GB 0  
 PC 1.00

1D NMR plot parameters  
 CX 20.00 cm  
 CY 4.00 cm  
 F1P 11.000 ppm  
 F1 5603.63 Hz  
 F2P 0.000 ppm  
 F2 0.00 Hz  
 PPMCM 0.85000 ppm/cm  
 HZCM 275.18149 Hz/cm



Current Data Parameters  
 NAME LW-5-116-5  
 EXPNO 2  
 PROCNO 1

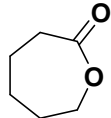
F2 - Acquisition Parameters  
 Date\_ 20081114  
 Time 15.44  
 INSTRUM spect  
 PROBHD 5 mm TXI 1H-13  
 PULPROG zgpg20  
 TD 32768  
 SOLVENT CDCl3  
 NS 512  
 DS 4  
 SNH 31446.841 Hz  
 FIDRES 0.369672 Hz  
 AQ 0.5210612 sec  
 RG 87  
 DW 15.800 usec  
 DE 6.00 usec  
 TE 298.0 K  
 D1 0.8000000 sec  
 D11 0.0300000 sec  
 MCREST 0.0000000 sec  
 MCWRR 0.0150000 sec

===== CHANNEL f1 =====  
 NUC1 13C  
 P1 13.00 usec  
 PL1 -3.00 dB  
 SFO1 125.8206594 MHz

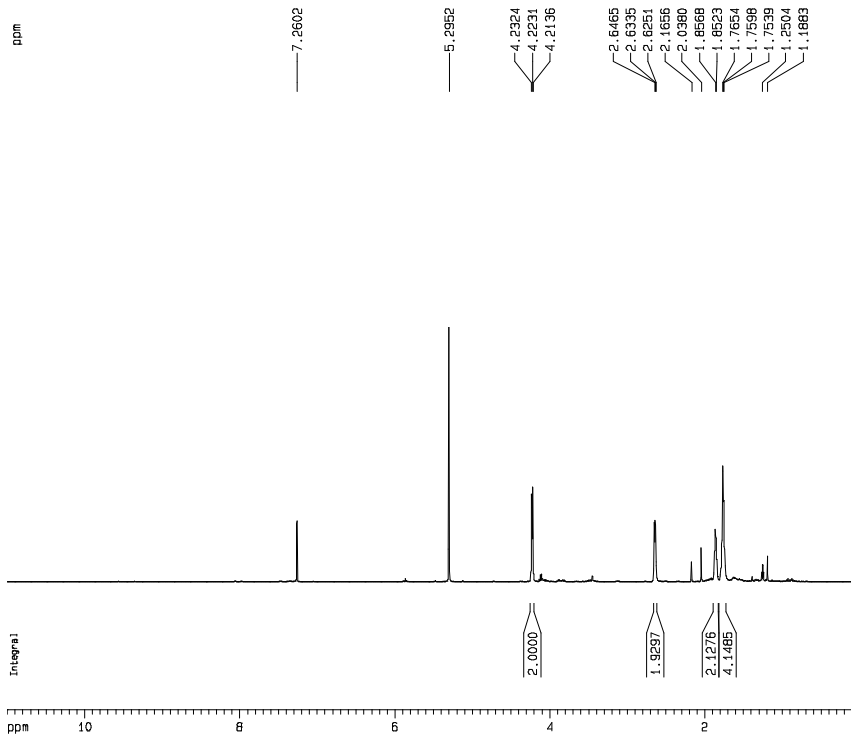
===== CHANNEL f2 =====  
 CPDPRG2 waltz16  
 NUC2 1H  
 P2P2 80.00 usec  
 PL2 0.50 dB  
 PL12 19.01 dB  
 SFO2 500.332000 MHz

F2 - Processing parameters  
 SI 65536  
 SF 125.8060546 MHz  
 MDW EM  
 SSB 0  
 LB 1.00 Hz  
 GB 0  
 PC 1.40

1D NMR plot parameters  
 CX 20.00 cm  
 CY 8.00 cm  
 F1P 220.000 ppm  
 F1 27877.77 Hz  
 F2P 0.000 ppm  
 F2 0.00 Hz  
 PPMCM 11.00000 ppm/cm  
 HZCM 1383.88895 Hz/cm



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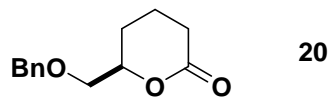


Current Data Parameters  
 NAME LW-2-198-2  
 EXPNO 1  
 PROCNO 1  
 F2 - Acquisition Parameters  
 Date\_ 20080211  
 Time 12.48  
 INSTRUM spect  
 PULPROG 5 mm PABBO SP-  
 TO zg30  
 TD 65536  
 SOLVENT CDCl3  
 NS 16  
 DS 2  
 SWH 10330.578 Hz  
 FIDRES 0.157632 Hz  
 AQ 3.1719823 sec  
 RG 143.7  
 DW 48.400 usec  
 DE 6.00 usec  
 TE 0.0 K  
 D1 1.00000000 sec  
 MCHST 0.00000000 sec  
 MCHK 0.01500000 sec

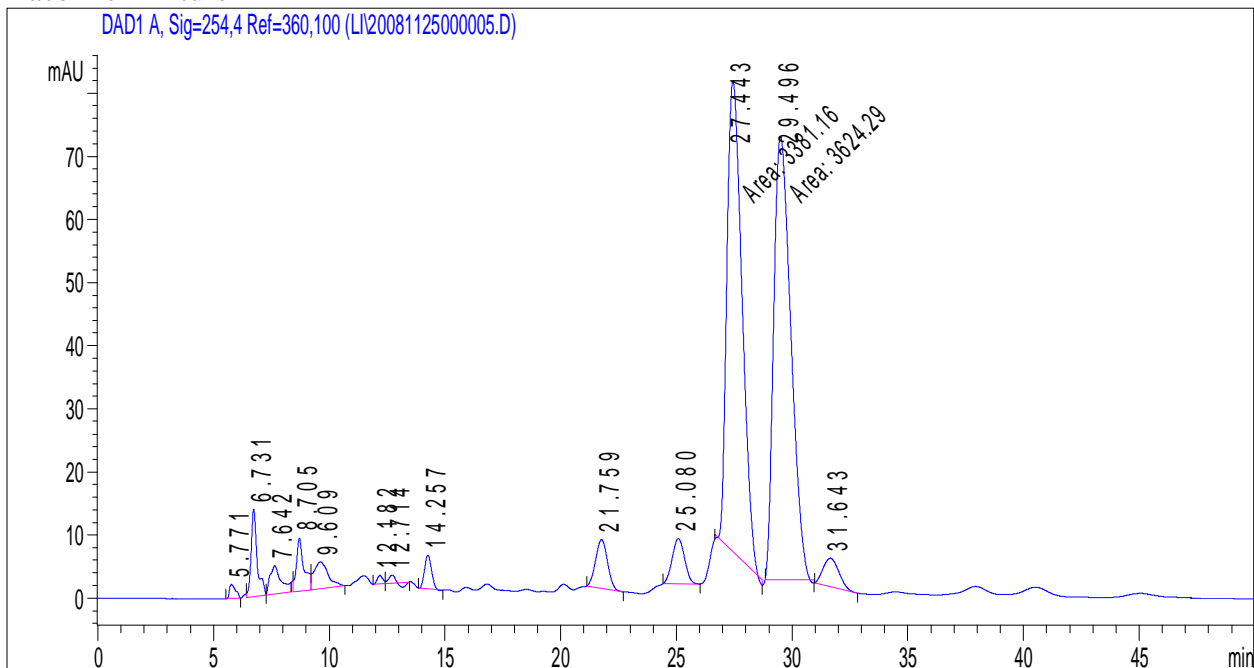
===== CHANNEL f1 =====  
 NUC1 1H  
 P1 12.00 usec  
 PL1 -2.00 dB  
 SFO1 500.2830894 MHz  
 F2 - Processing parameters  
 SI 32768  
 SF 500.2800145 MHz  
 MN no  
 SSB 0  
 LB 0.00 Hz  
 GB 0  
 PC 1.00

1D NMR plot parameters  
 CX 20.00 cm  
 CY 6.00 cm  
 F1P 11.000 ppm  
 F1 5503.08 Hz  
 F2P 0.000 ppm  
 F2 0.00 Hz  
 PPMCN 0.55000 ppm/cm  
 HZCN 275.15402 Hz/cm

## IV. HPLC Chromatograms



### Racemic Mixture



### Enantiomerically Enriched

