Electronic Supplementary Material (ESI) for Chemical Science.

Supporting information for

Cobalt-Copper Dual Light-Driven Catalytic Reduction of Aldehydes and Aromatic Ketones in Aqueous Media

Arnau Call,[a] Carla Casadevall,[a] Ferran Acuña-Parés,[a] Alicia Casitas,[a] and Julio Lloret-Fillol[a, b]*

[a] Institute of Chemical Research of Catalonia (ICIQ), The Barcelona Institute of Science and Technology, Avinguda Països Catalans 16, 43007 Tarragona, Spain.

[b] Catalan Institution for Research and Advanced Studies (ICREA), Passeig Lluïs Companys, 23, 08010, Barcelona (Spain).

Corresponding author: jlloret@iciq.es

SI.2. NMR spectra and GC chromatograms of the substrates and products

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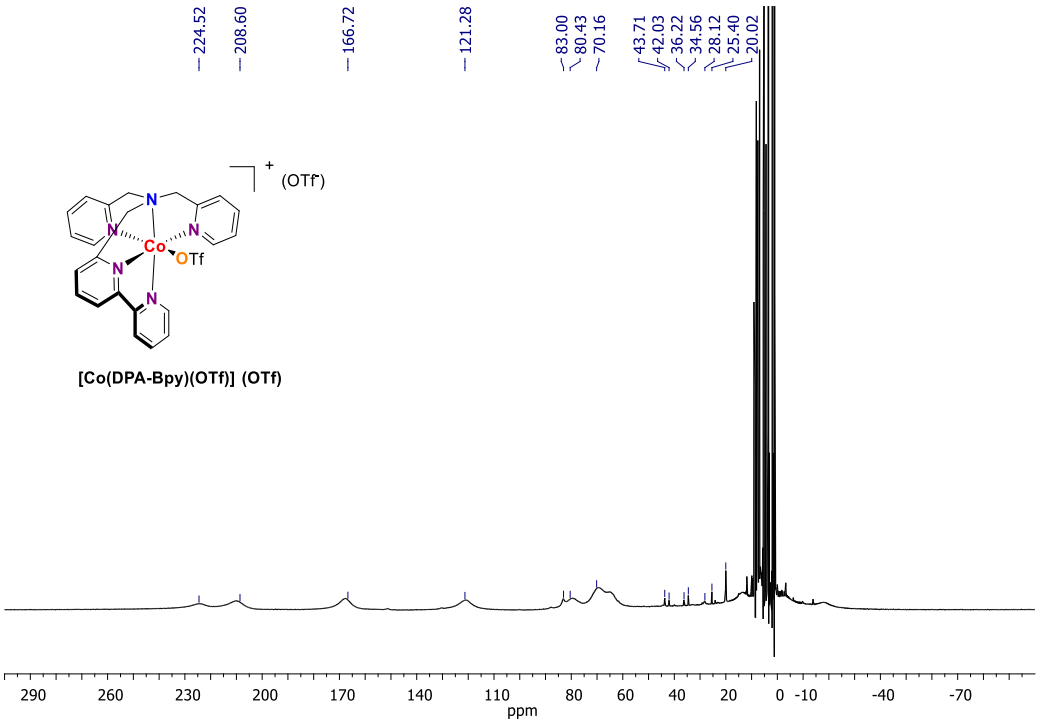

Figure SI.2.1. ^{1}H-NMR (CD_3CN, 400 MHz, 260 K) spectrum of **[Co(OTf)(DPA-Bpy)](OTf)**.

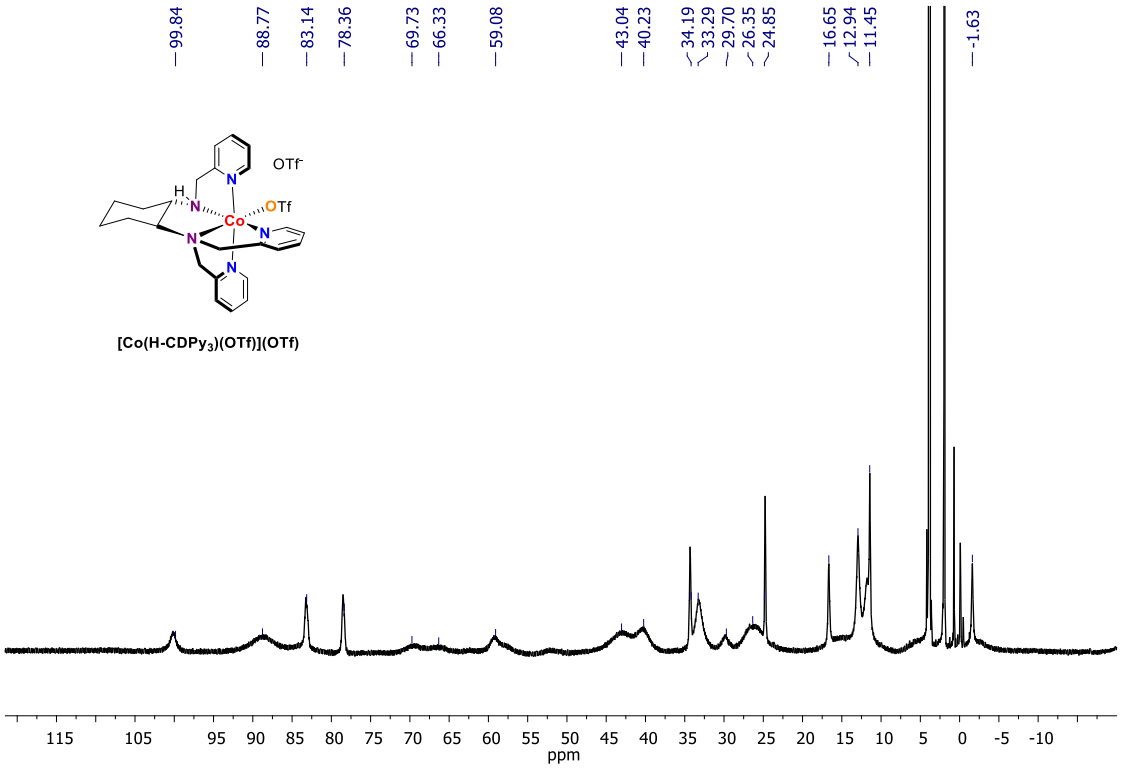

Figure SI.2.2. ^{1}H-NMR (CD_3CN, 500 MHz, 260 K) spectrum of **[Co(OTf)(H-CDPy$_3$)](OTf).**

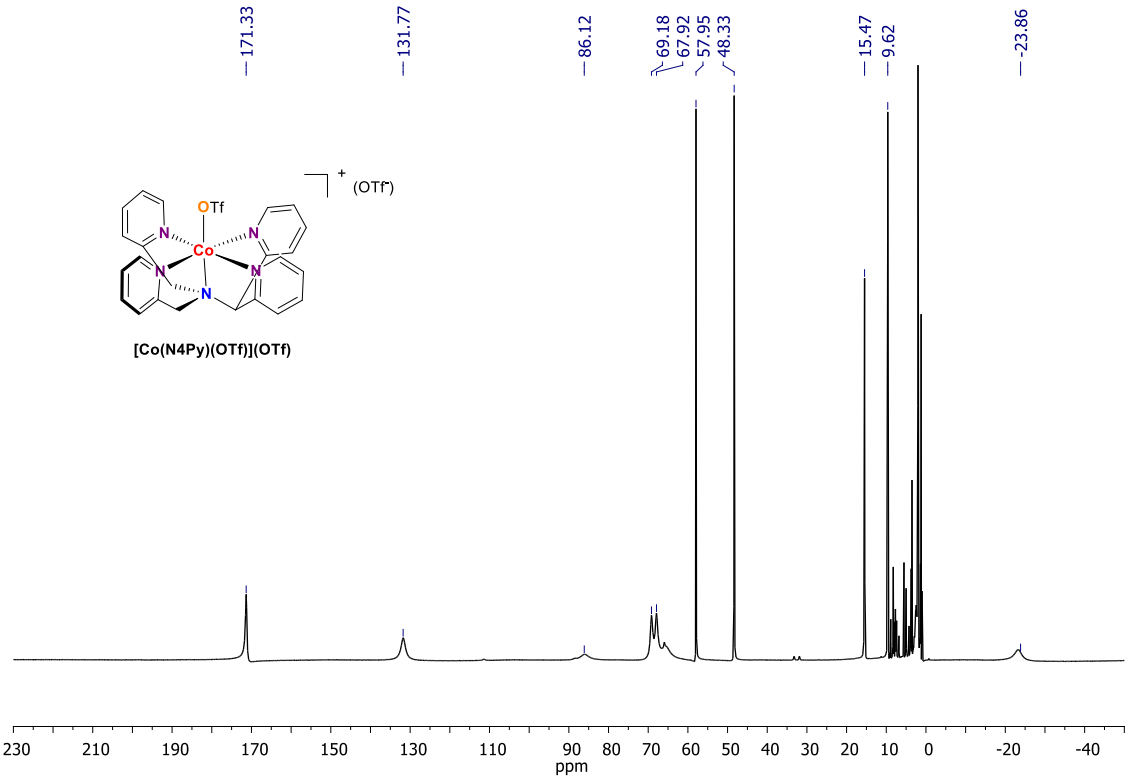

Figure SI.2.3. ^{1}H-NMR (CD_3CN, 400 MHz, 260 K) spectrum of **[Co(OTf)(N4Py)](OTf).**

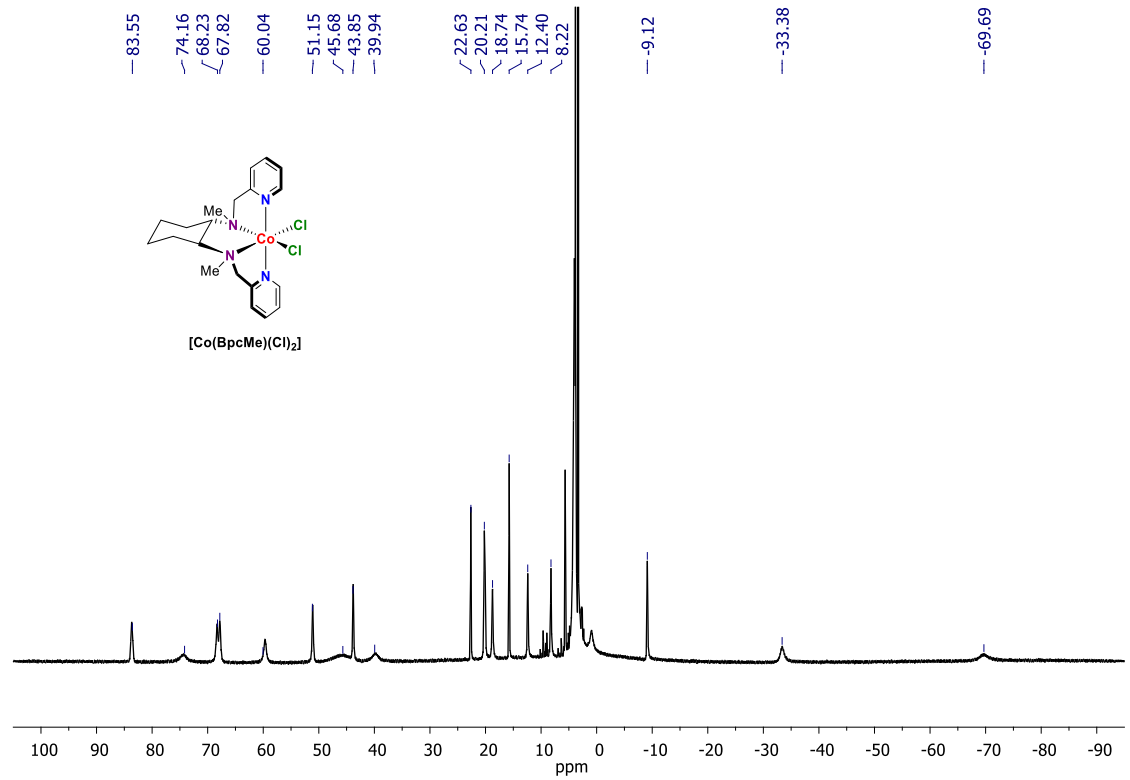

Figure SI.2.4. ^{1}H-NMR (CD_3CN, 500 MHz, 260 K) spectrum of **[Co(BpcMe)Cl$_2$].**

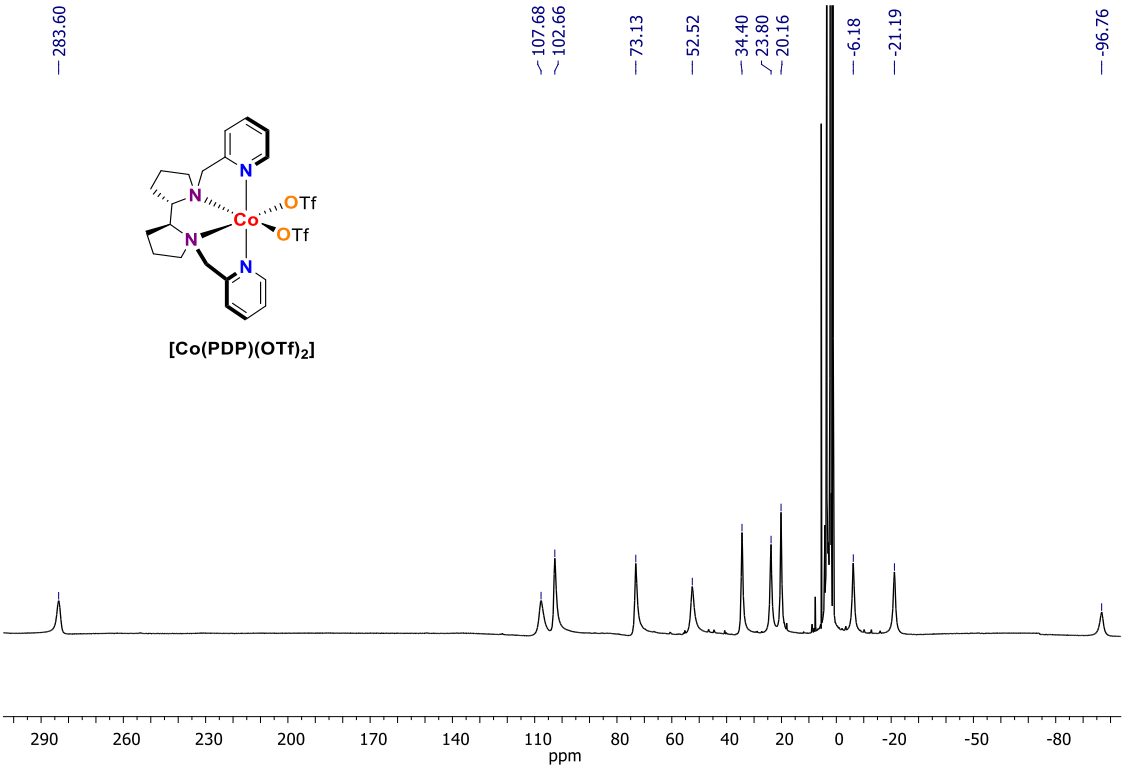

Figure SI.2.5. ^{1}H-NMR (CD_3CN, 400 MHz, 260 K) spectrum of **[Co((S,S)-PDP)(OTf)$_2$].**

2. Experimental NMR data of the synthesised substrates

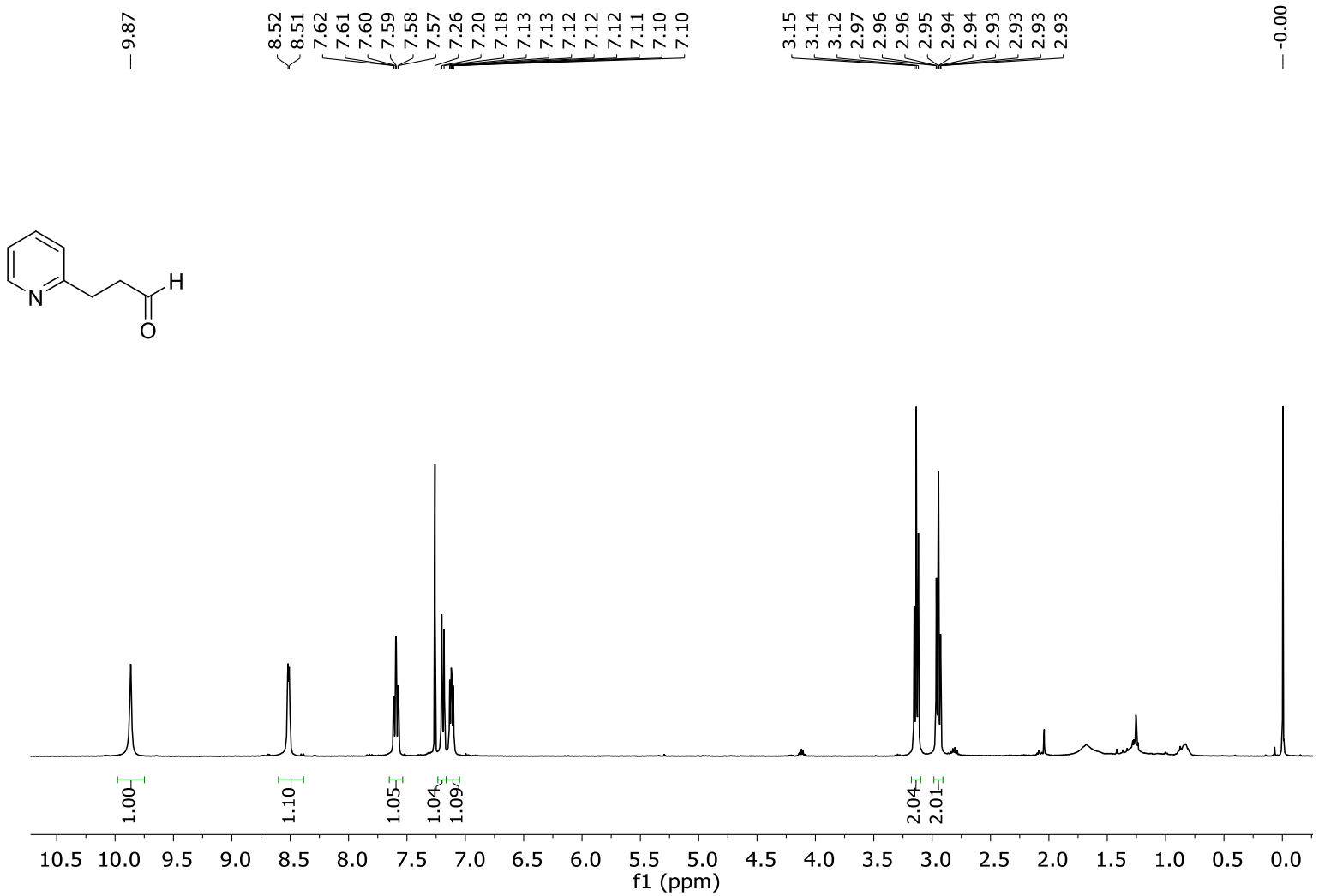

Figure SI.2.6. ^{1}H-NMR ($CDCl_3$, 400 MHz, 300 K) spectrum of substrate **11f.**

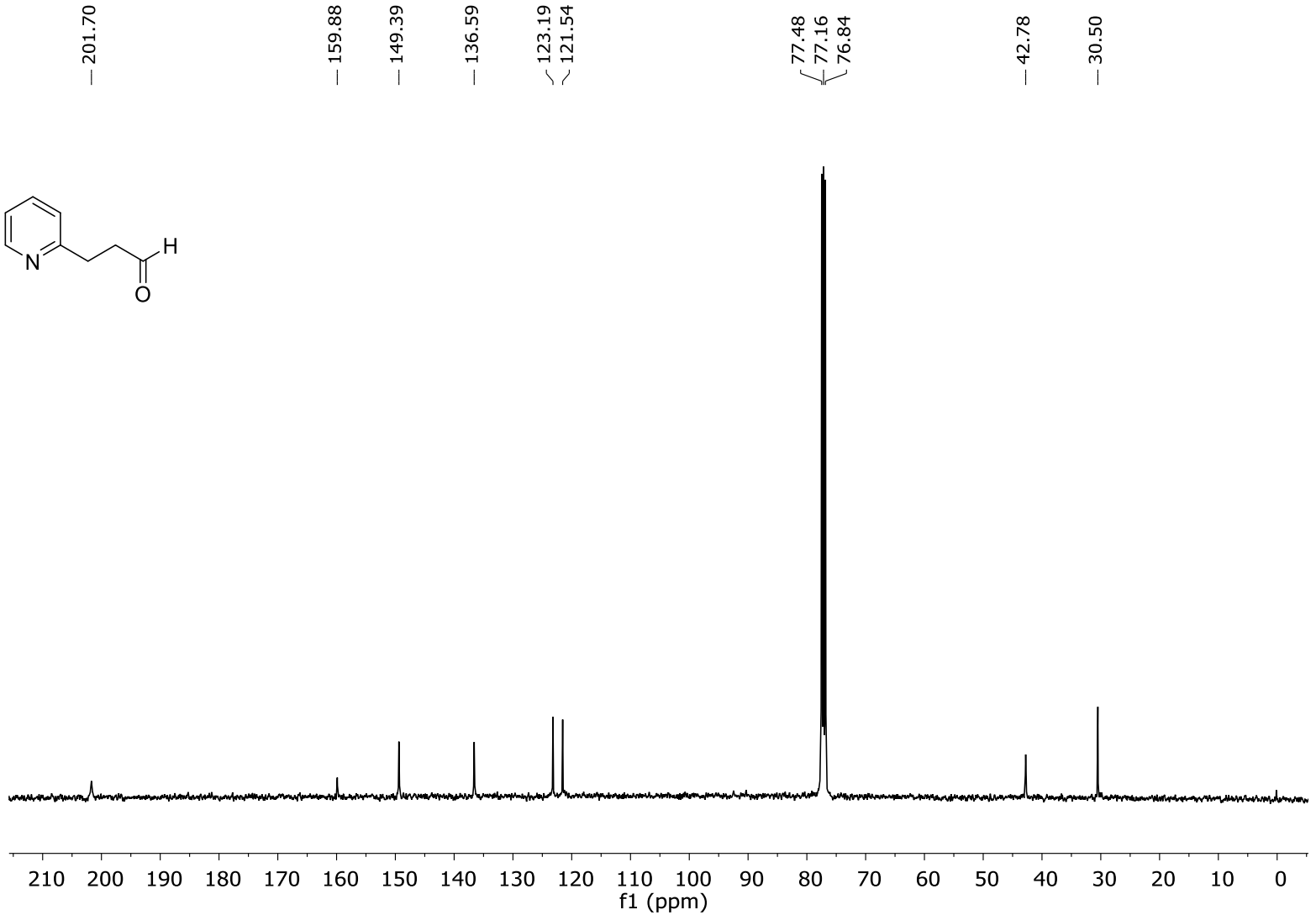

Figure SI.2.7. $^{13}C\{^{1}H\}$-NMR ($CDCl_3$, 100.6 MHz, 300 K) spectrum of substrate **11f.**

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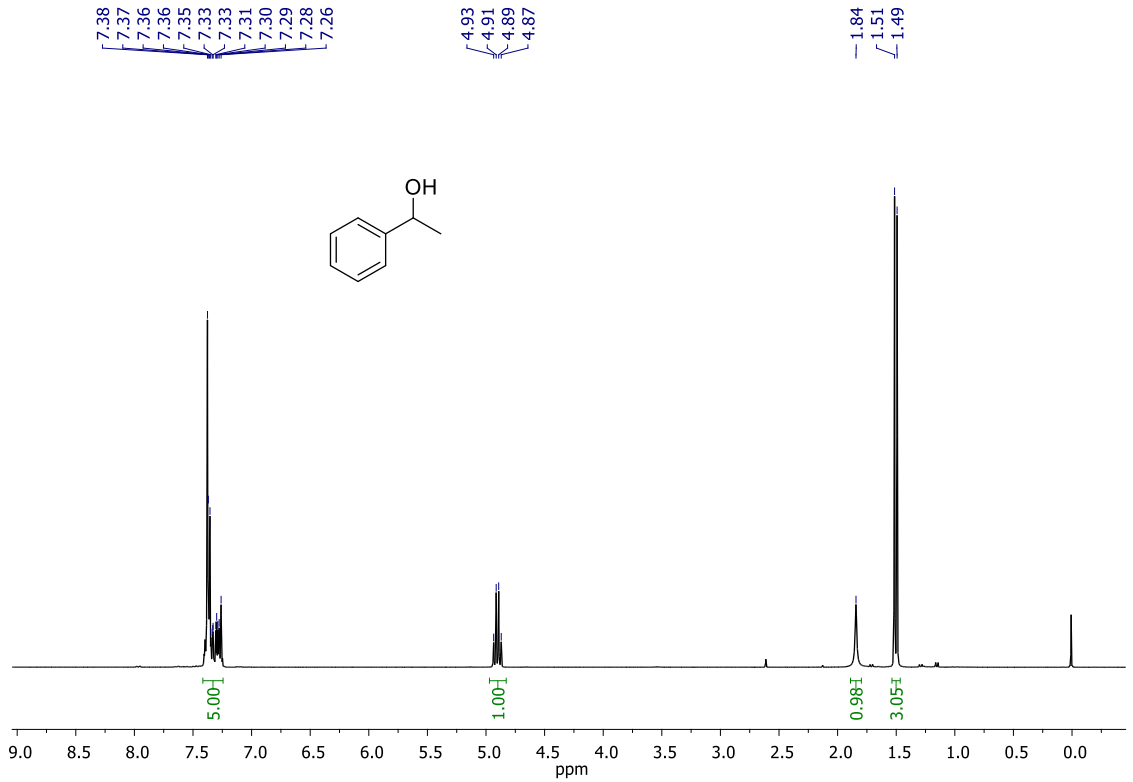


Figure SI.2.8. ^{1}H-NMR ($CDCl_3$, 300 MHz, 300 K) spectrum of product **10a.**

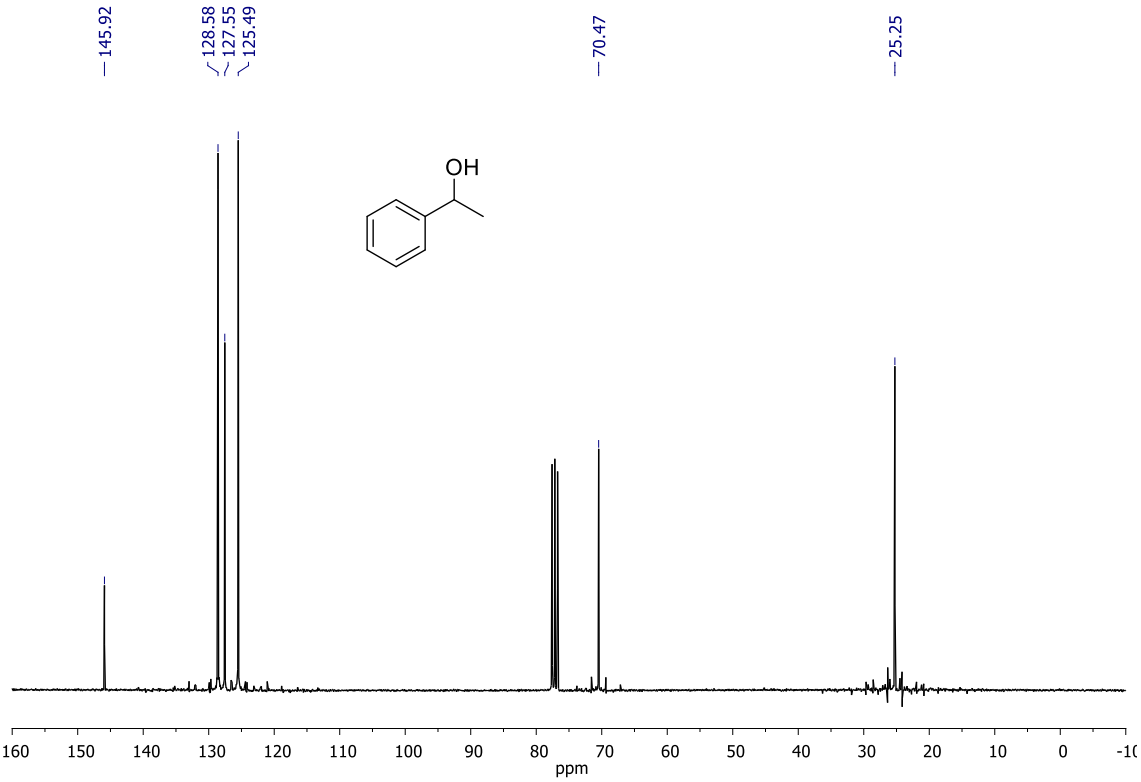


Figure SI.2.9. ^{13}C{^{1}H}-NMR ($CDCl_3$, 75.4 MHz, 300 K) spectrum of product **10a.**

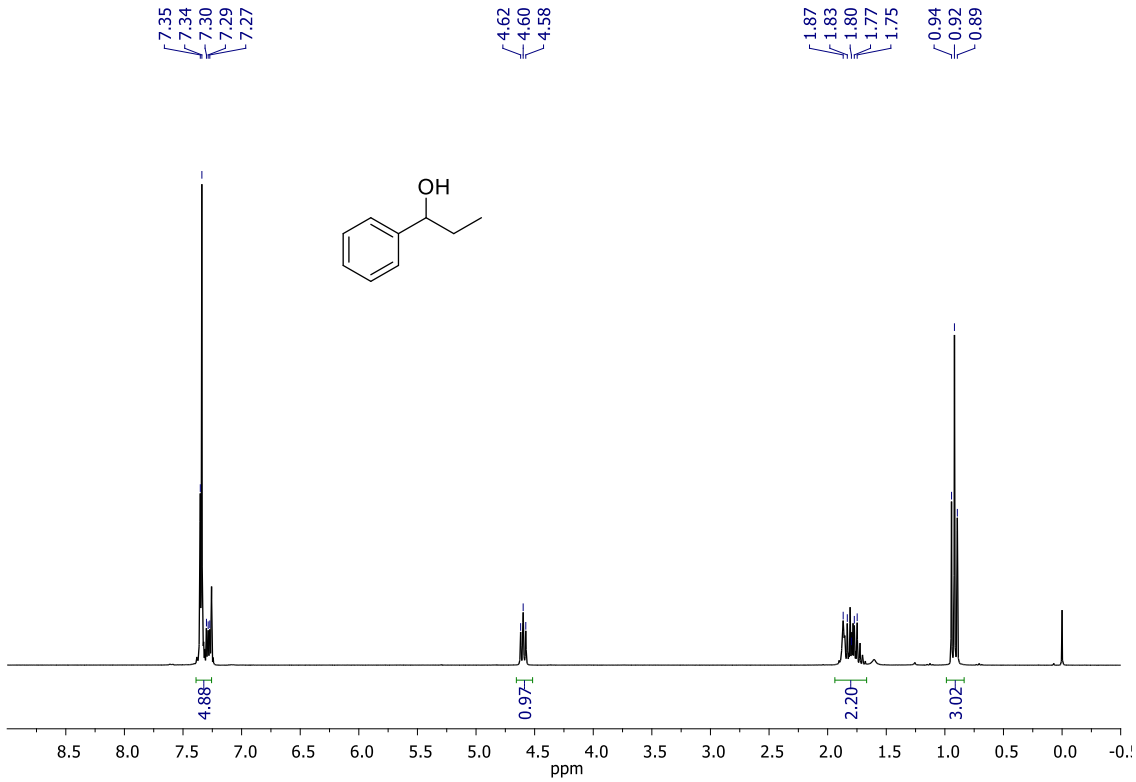


Figure SI.2.10. ^{1}H-NMR ($CDCl_3$, 300 MHz, 300 K) spectrum of product **10b.**

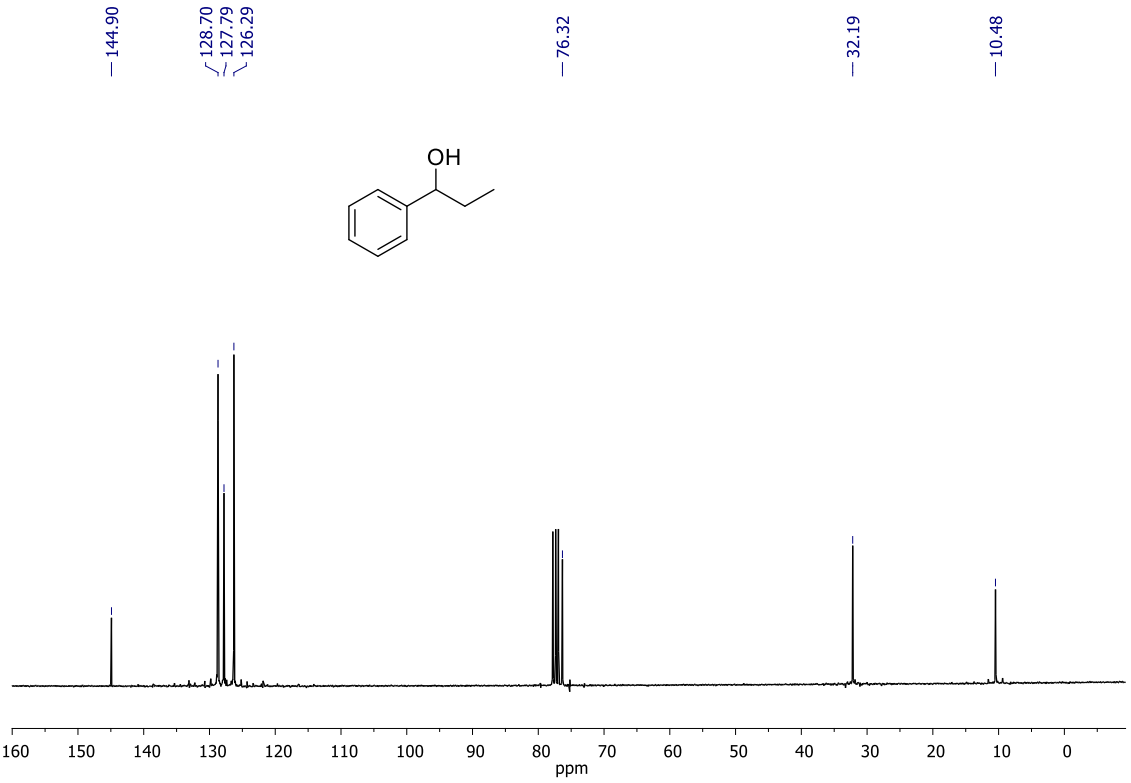


Figure SI.2.11. $^{13}C\{^{1}H\}$-NMR ($CDCl_3$, 75.4 MHz, 300 K) spectrum of product **10b.**

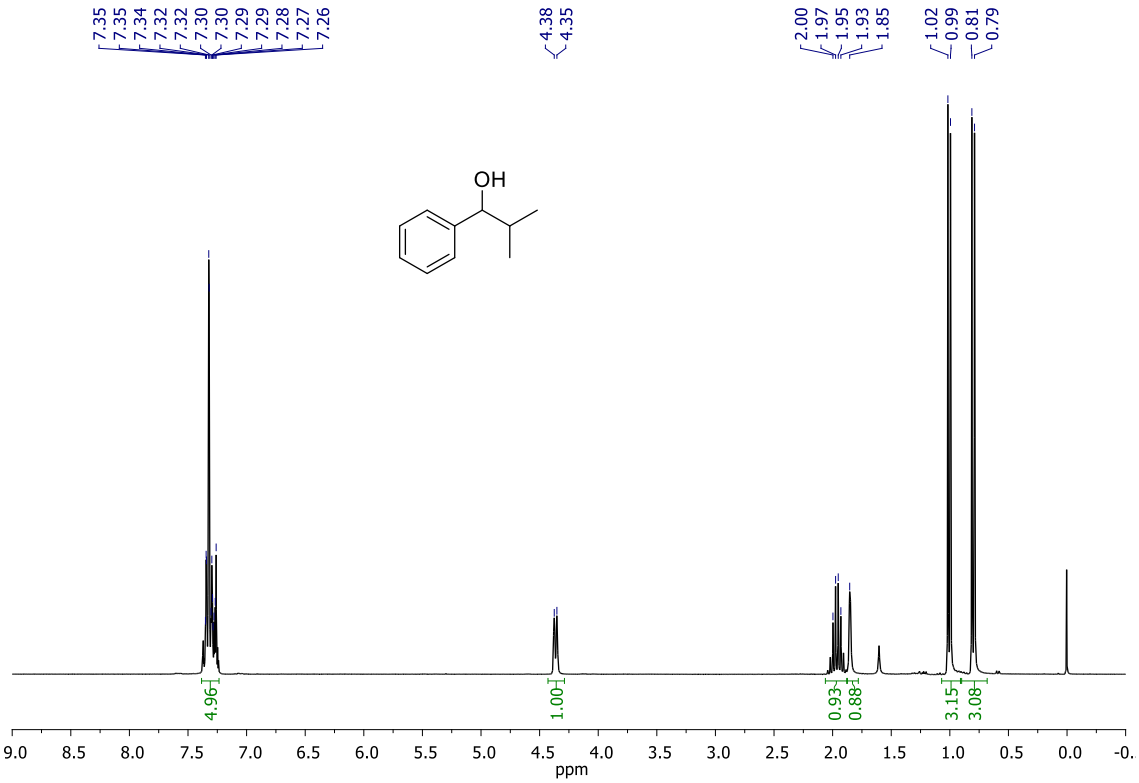


Figure SI.2.12. ^{1}H-NMR ($CDCl_3$, 300 MHz, 300 K) spectrum of product **10c.**

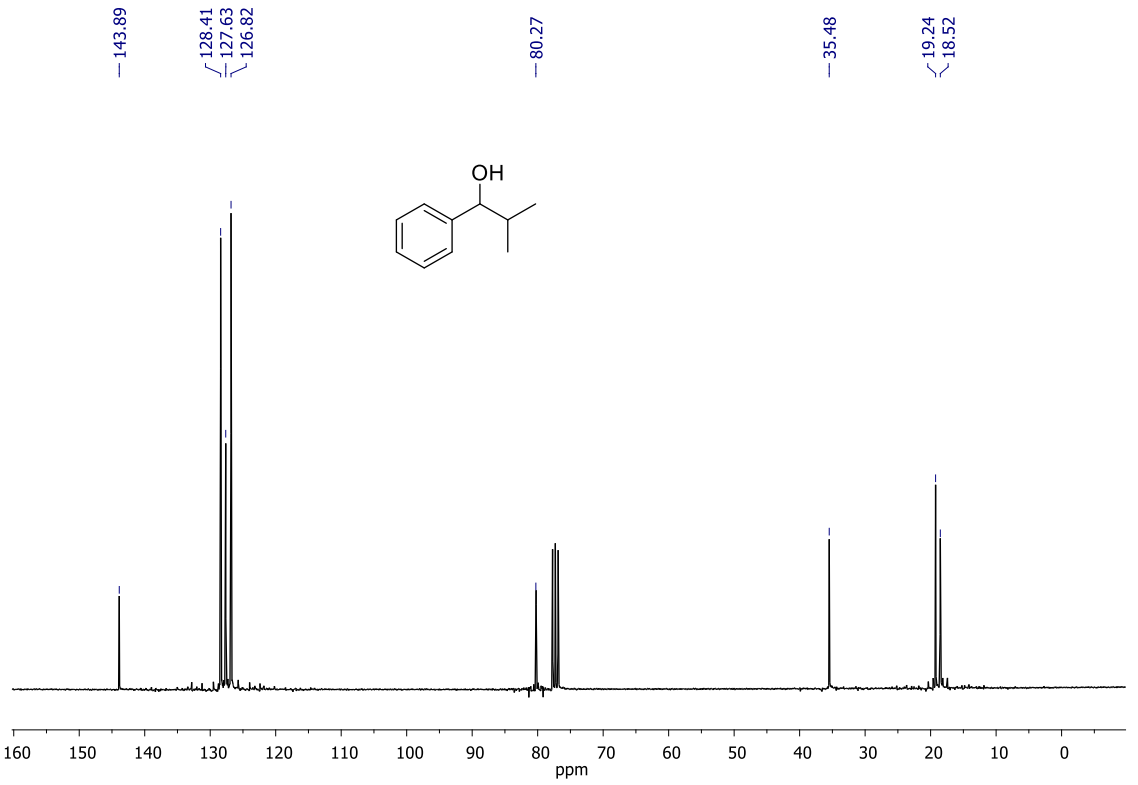


Figure SI.2.13. $^{13}C\{^{1}H\}$-NMR ($CDCl_3$, 75.4 MHz, 300 K) spectrum of product **10c.**

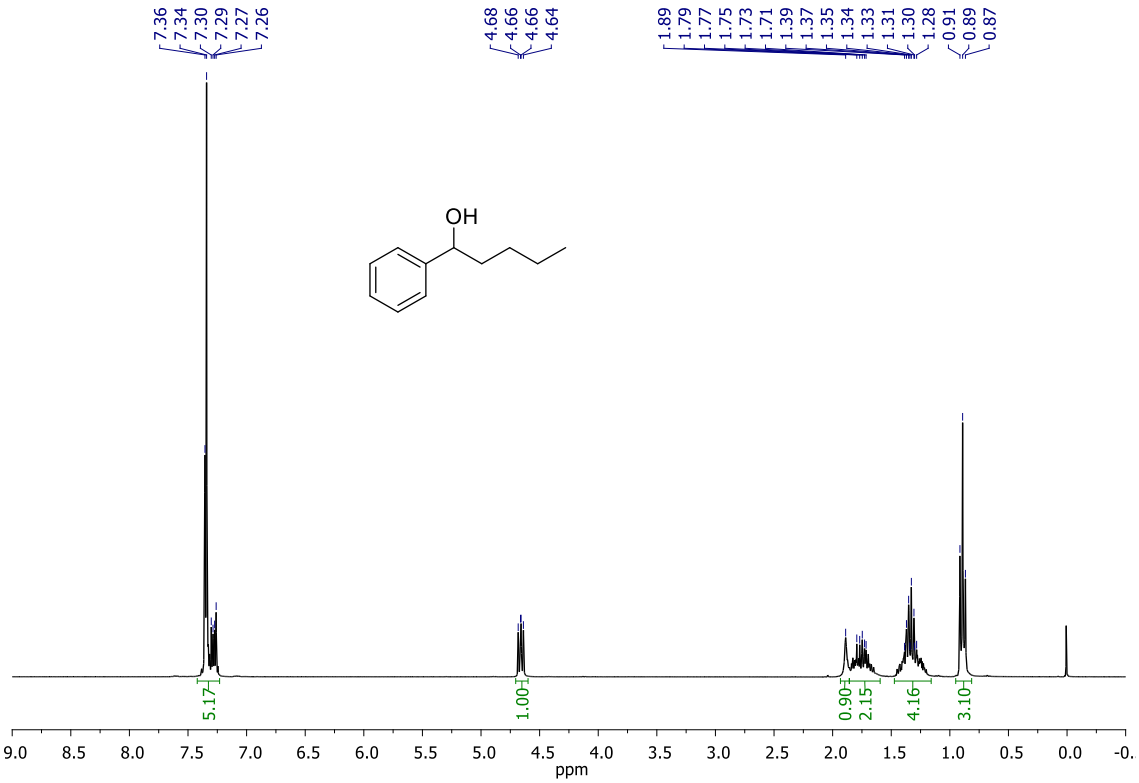
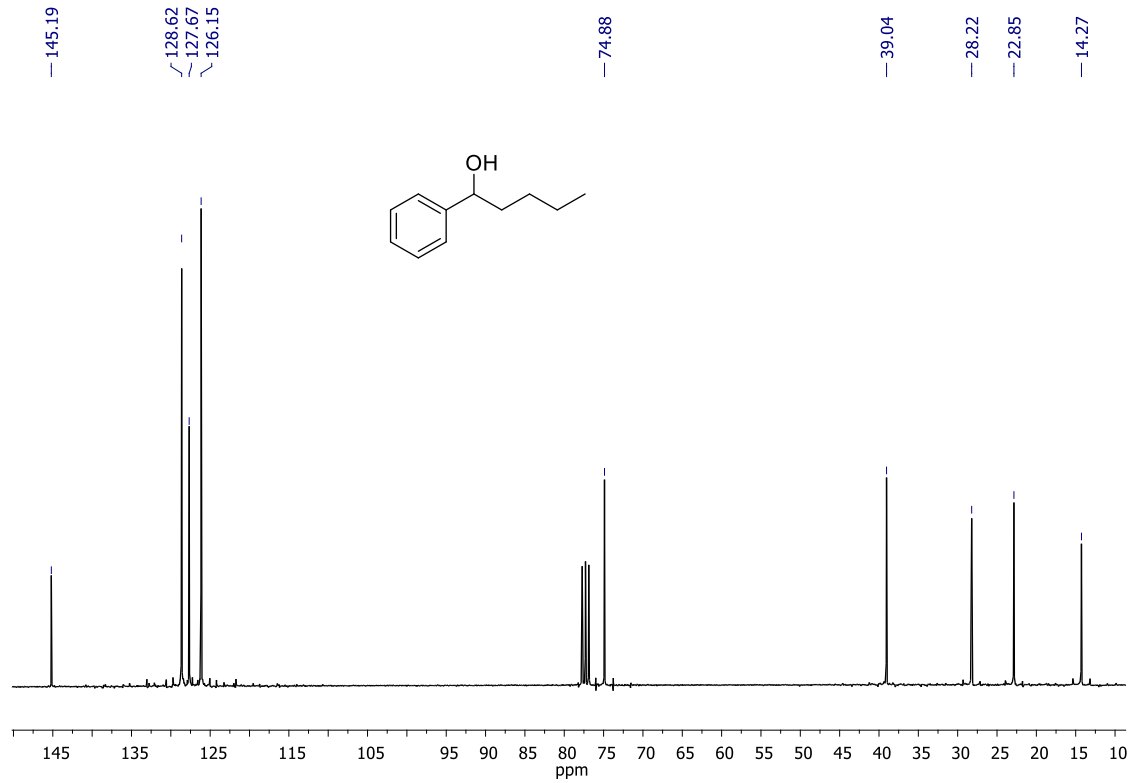


Figure SI.2.14. ^{1}H-NMR ($CDCl_3$, 300 MHz, 300 K) spectrum of product **10d.**



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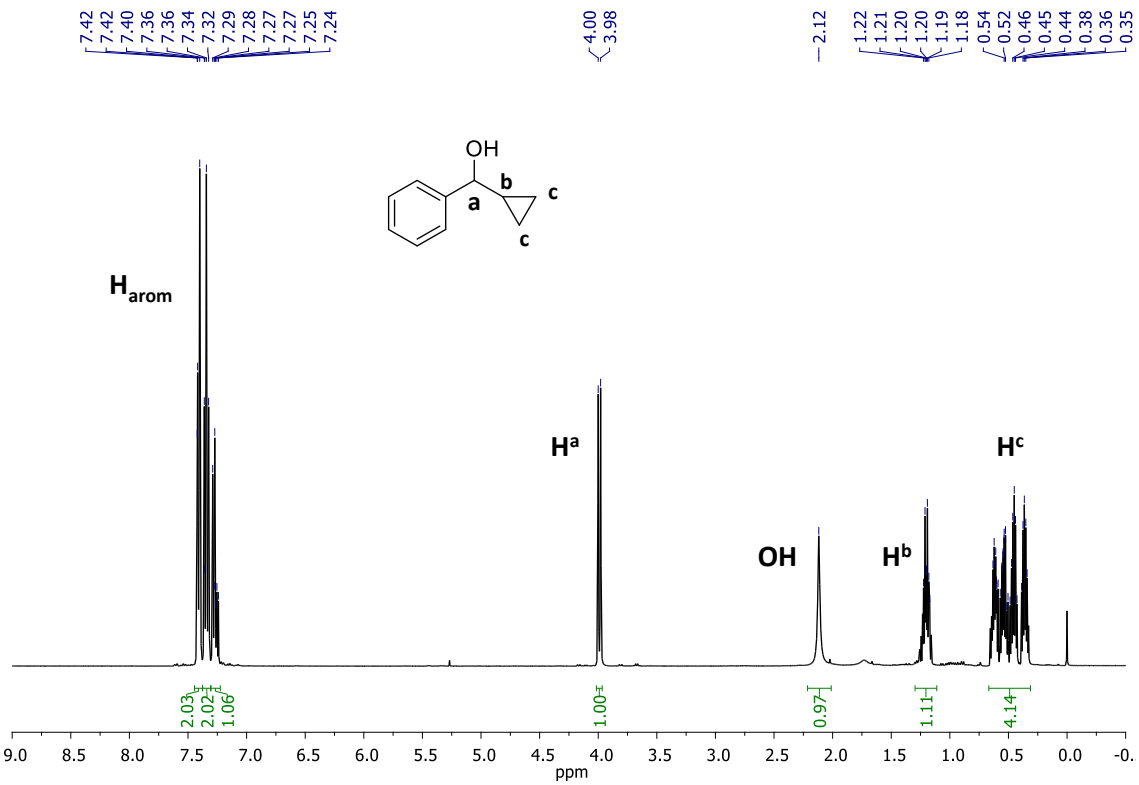

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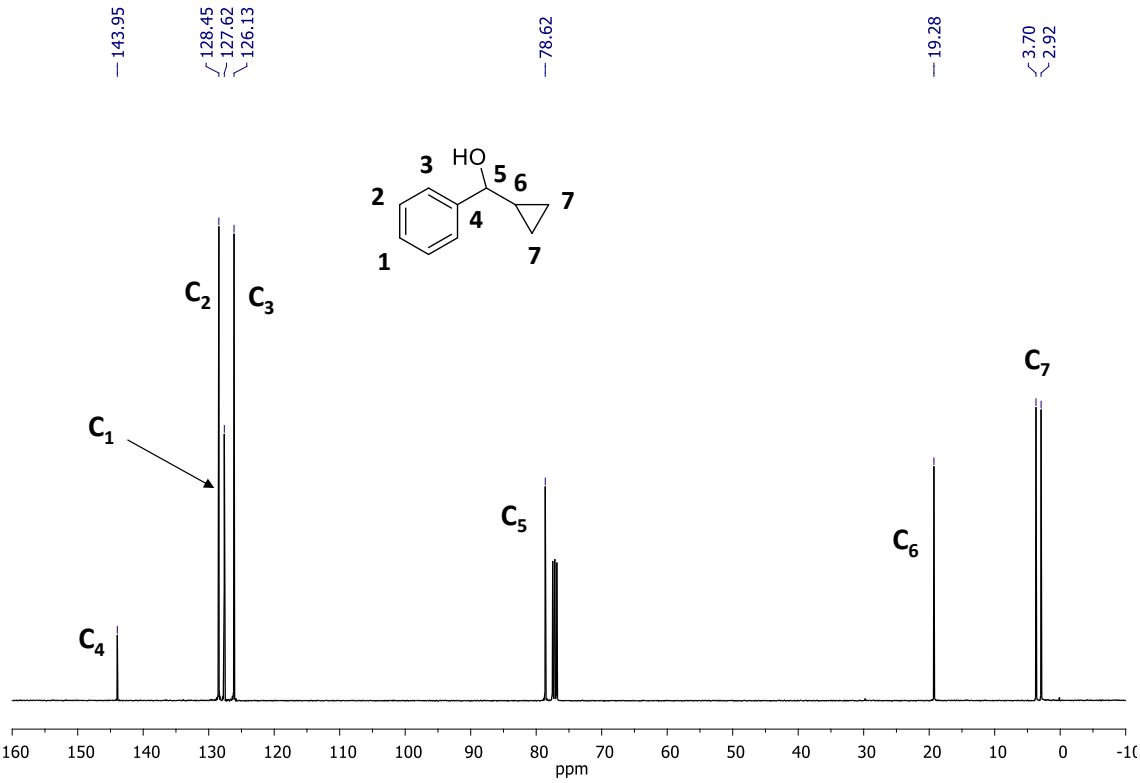

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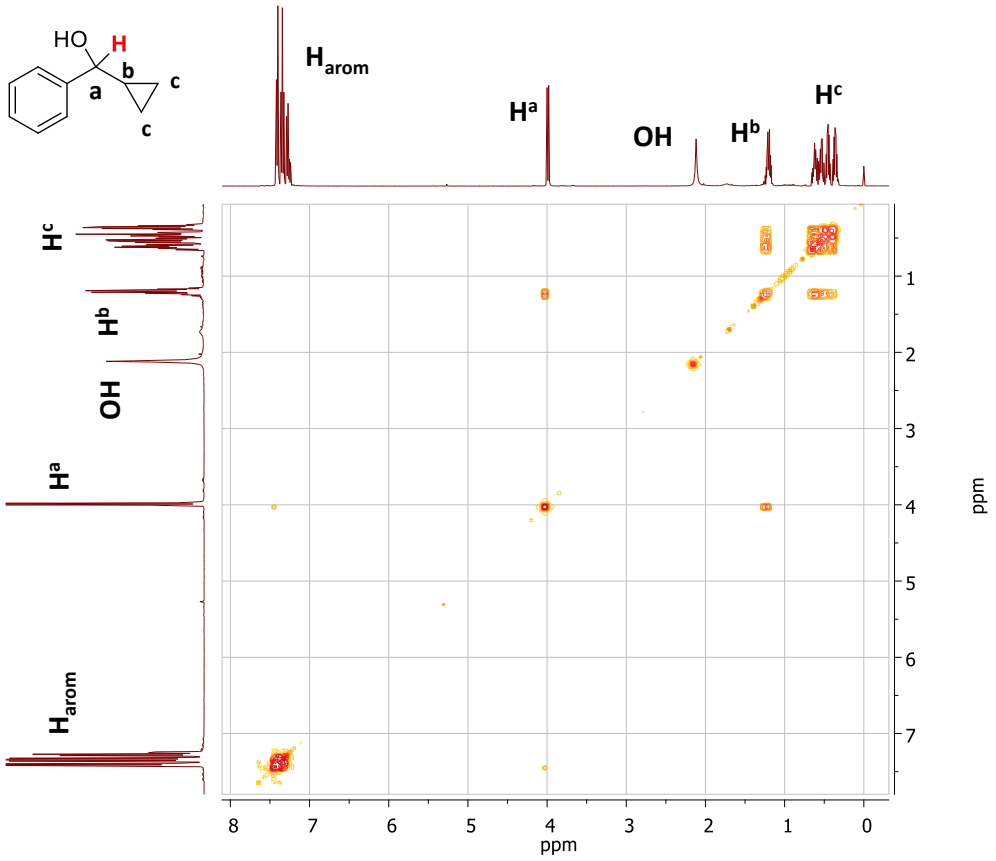

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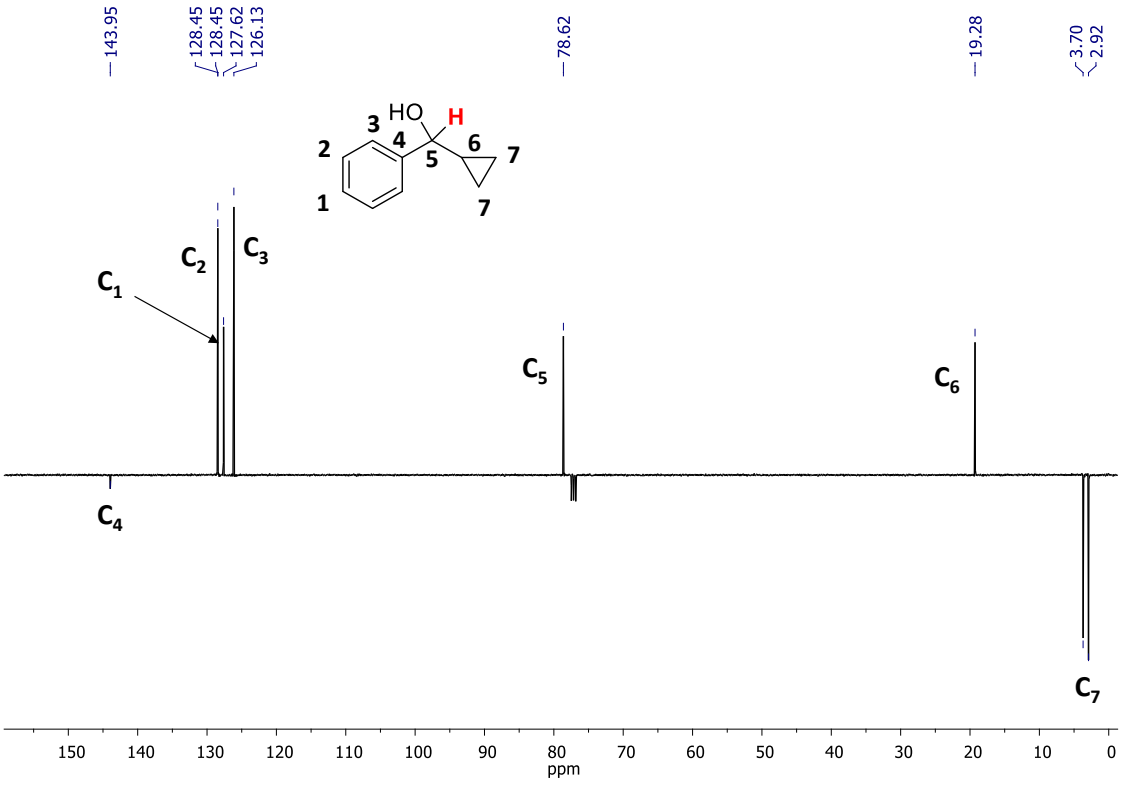

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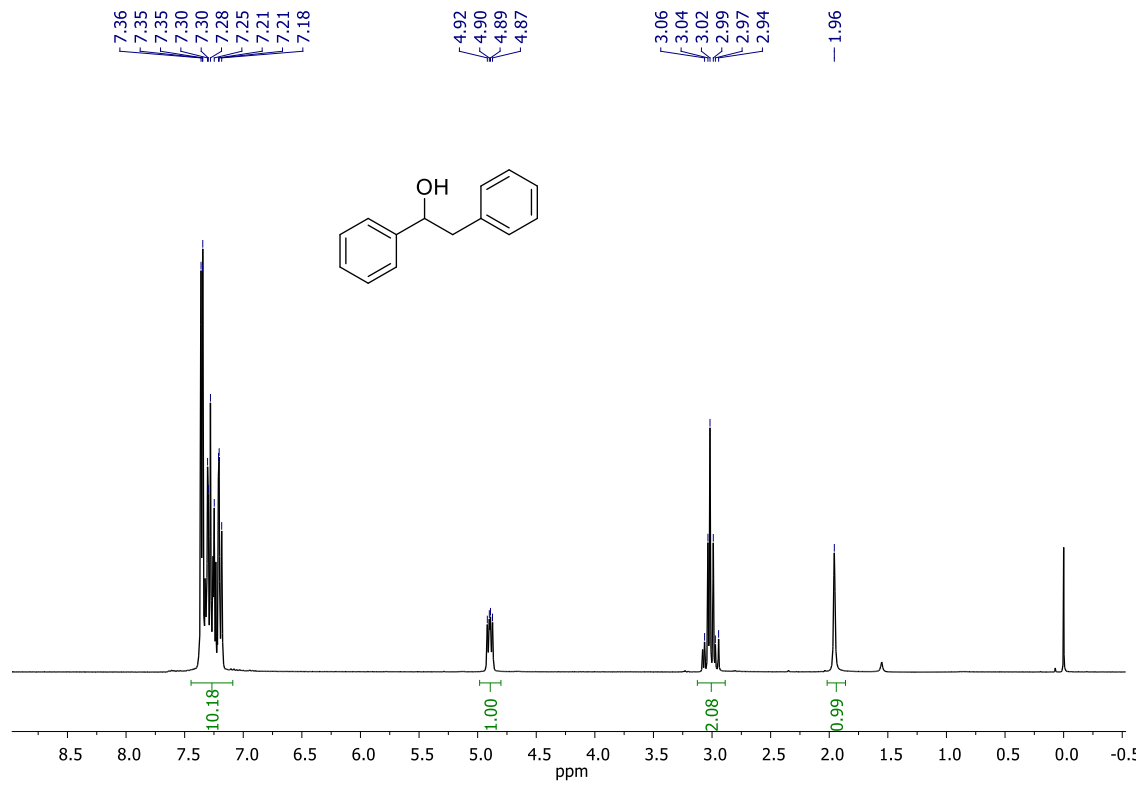


Figure SI.2.20. ^{1}H-NMR ($CDCl_3$, 300 MHz, 300 K) spectrum of product **10f.**

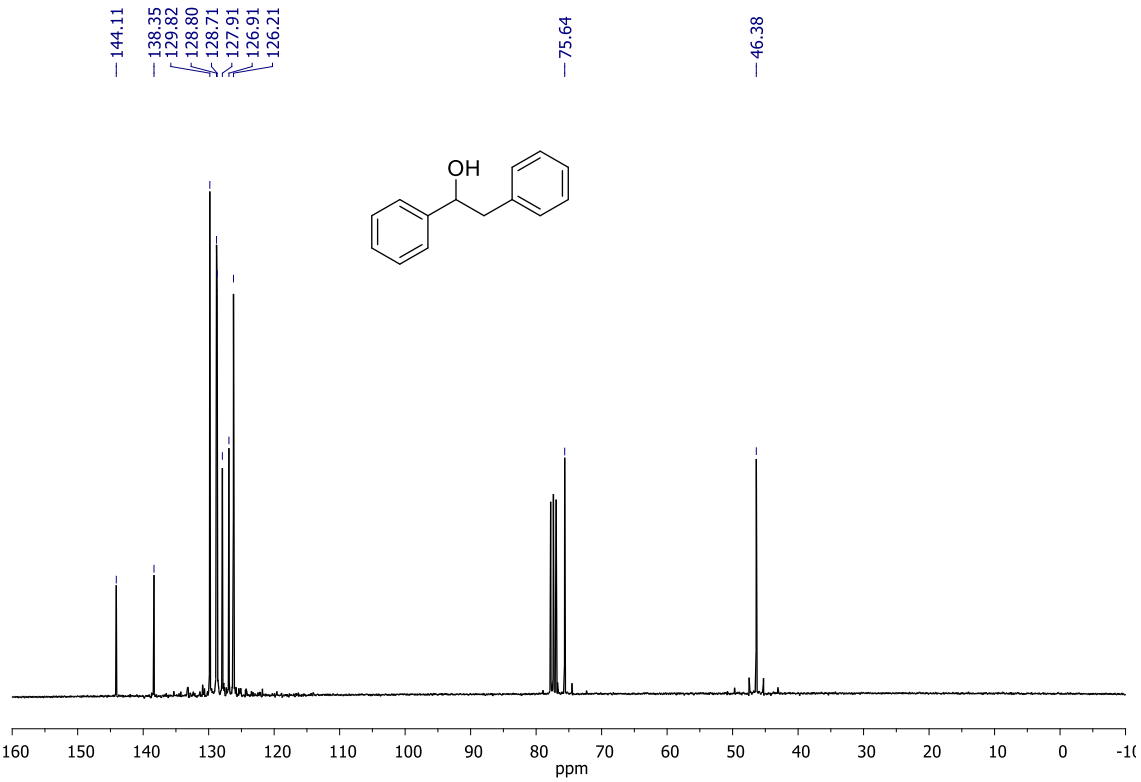


Figure SI.2.21. $^{13}C\{^{1}H\}$-NMR ($CDCl_3$, 75.4 MHz, 300 K) spectrum of product **10f.**

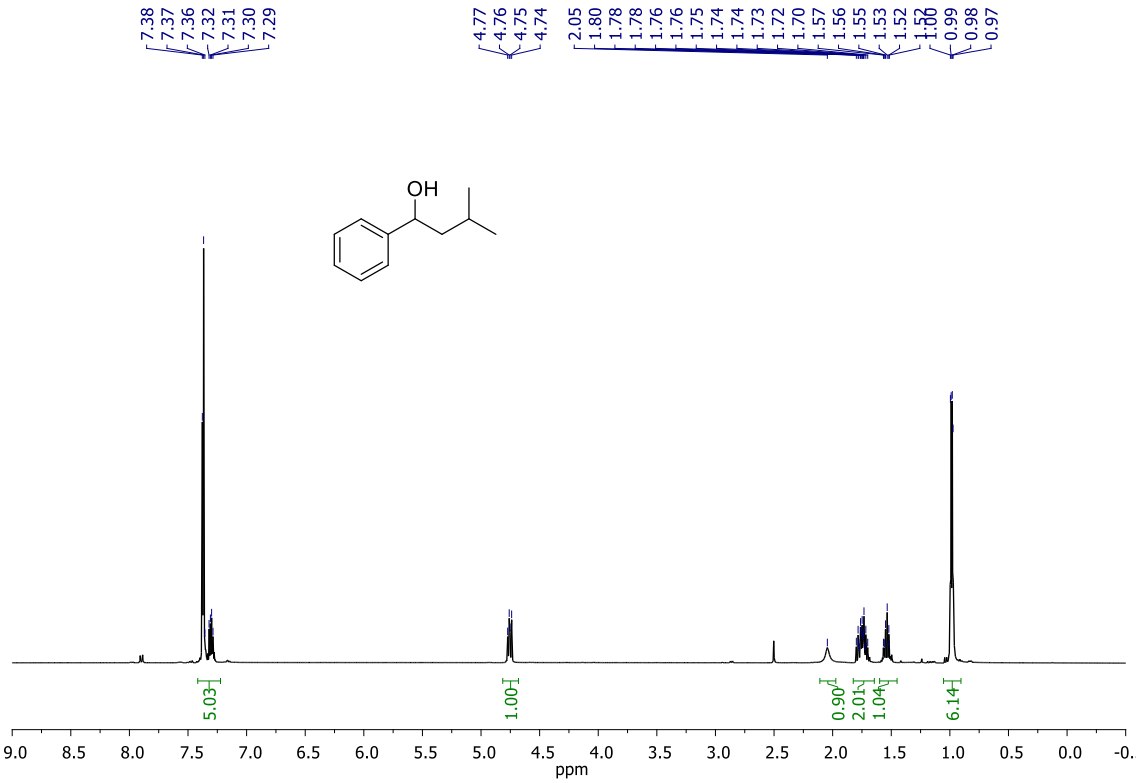
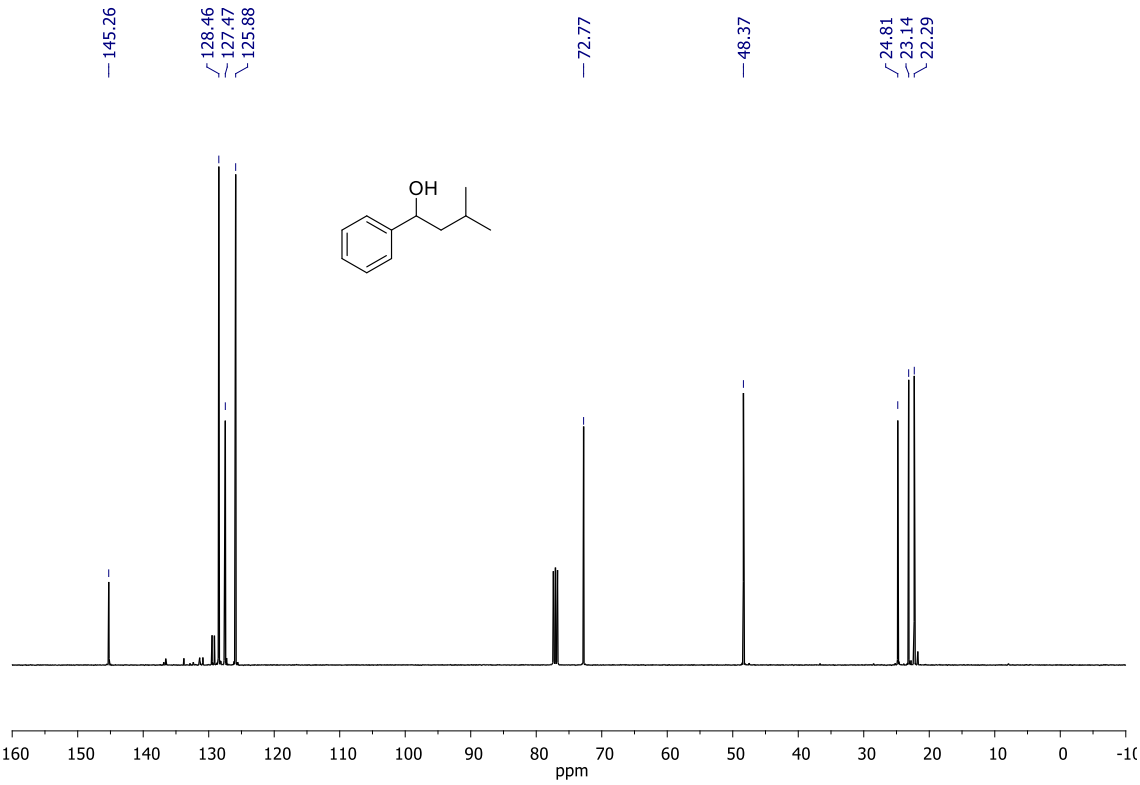


Figure SI.2.22. ^{1}H-NMR ($CDCl_3$, 400 MHz, 300 K) spectrum of product **10g**.



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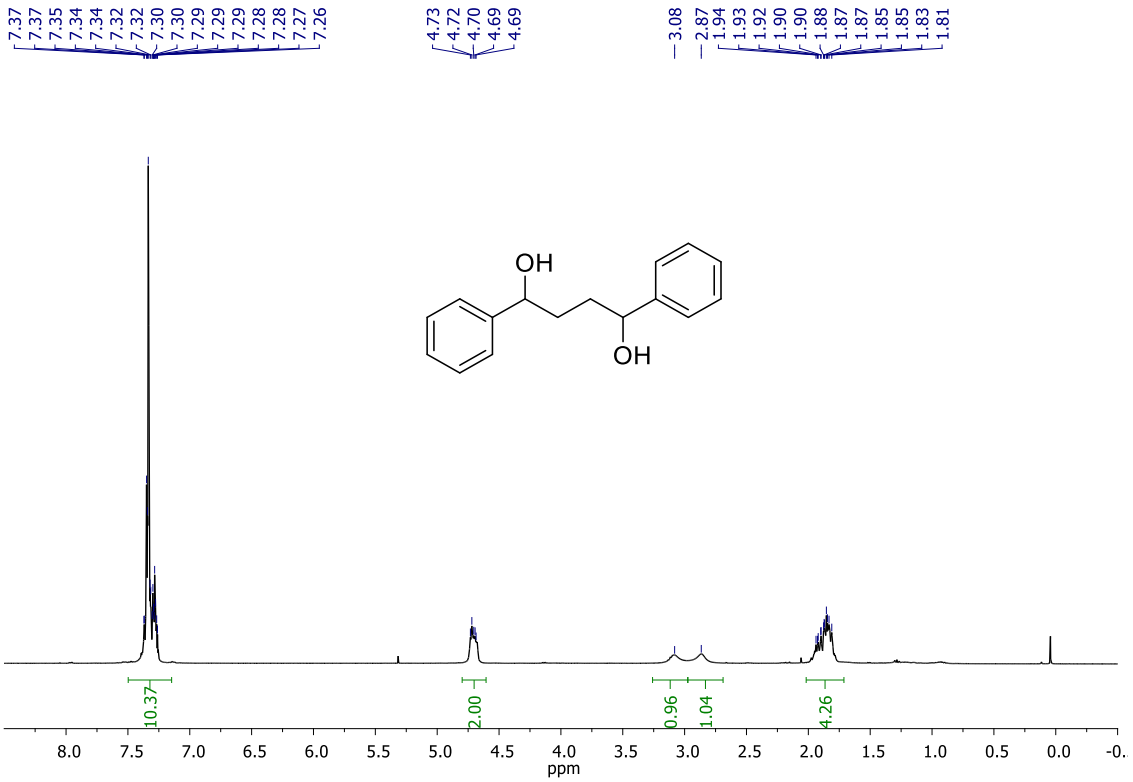


Figure SI.2.24. ^{1}H-NMR ($CDCl_3$, 400 MHz, 300 K) spectrum of product **10i**.

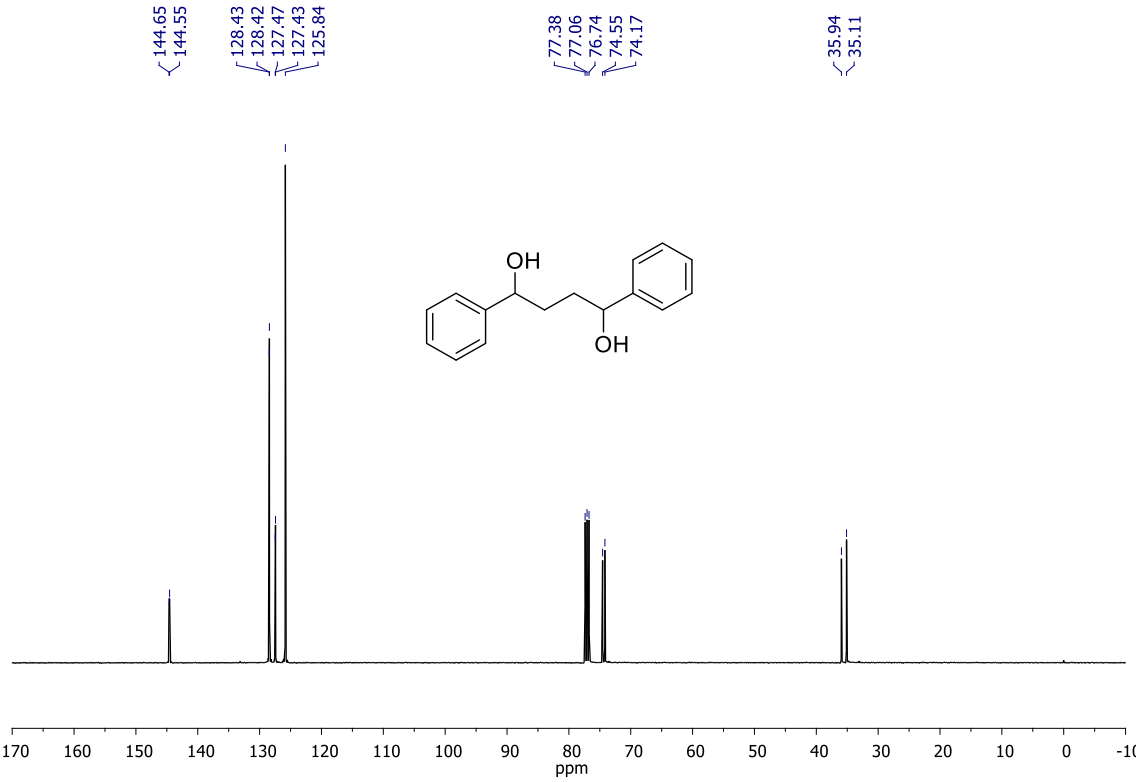


Figure SI.2.25. $^{13}C\{^{1}H\}$-NMR ($CDCl_3$, 100.6 MHz, 300 K) spectrum of product **10i**.

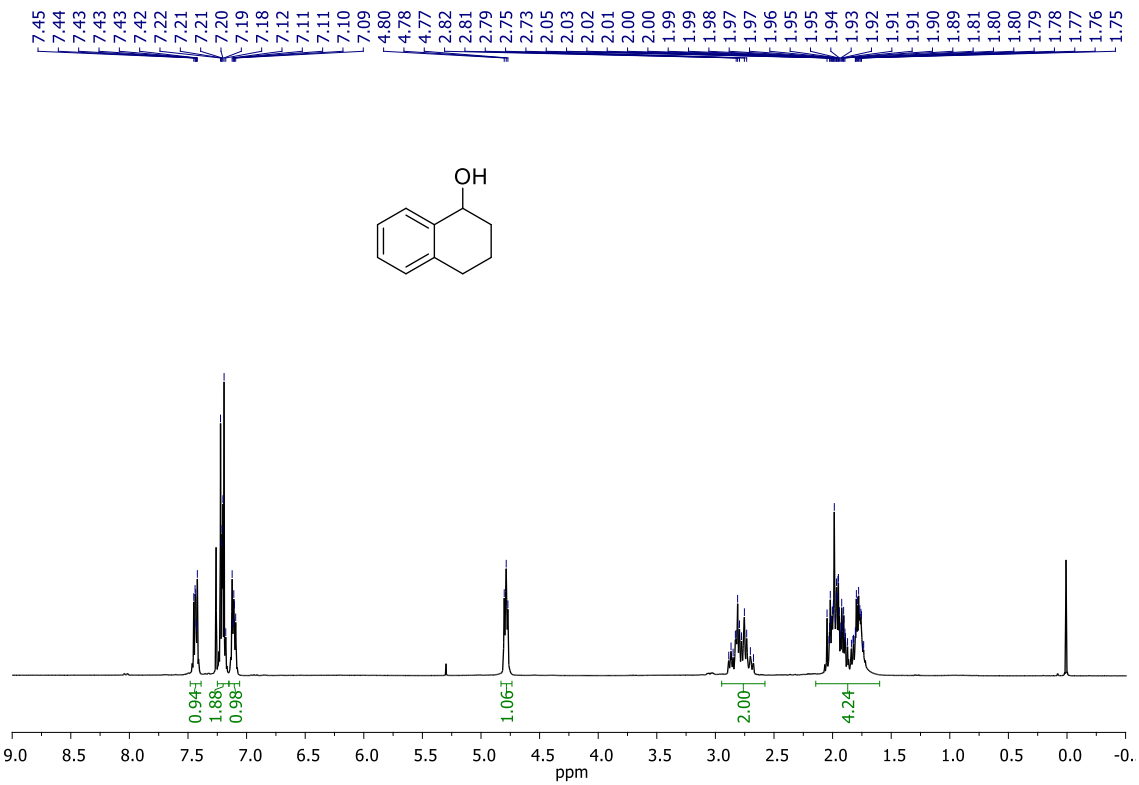


Figure SI.2.26. ^{1}H-NMR ($CDCl_3$, 300 MHz, 300 K) spectrum of product **10j**.

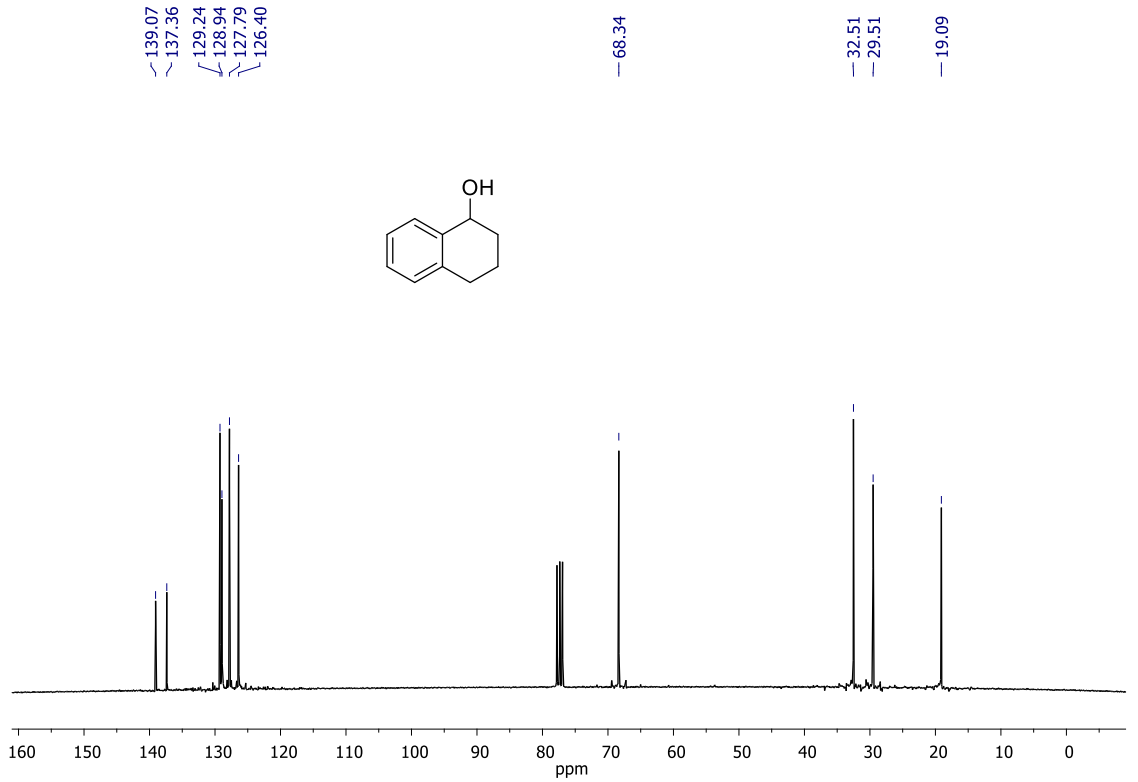


Figure SI.2.27. ^{13}C{^{1}H}-NMR ($CDCl_3$, 75.4 MHz, 300 K) spectrum of product **10j**.

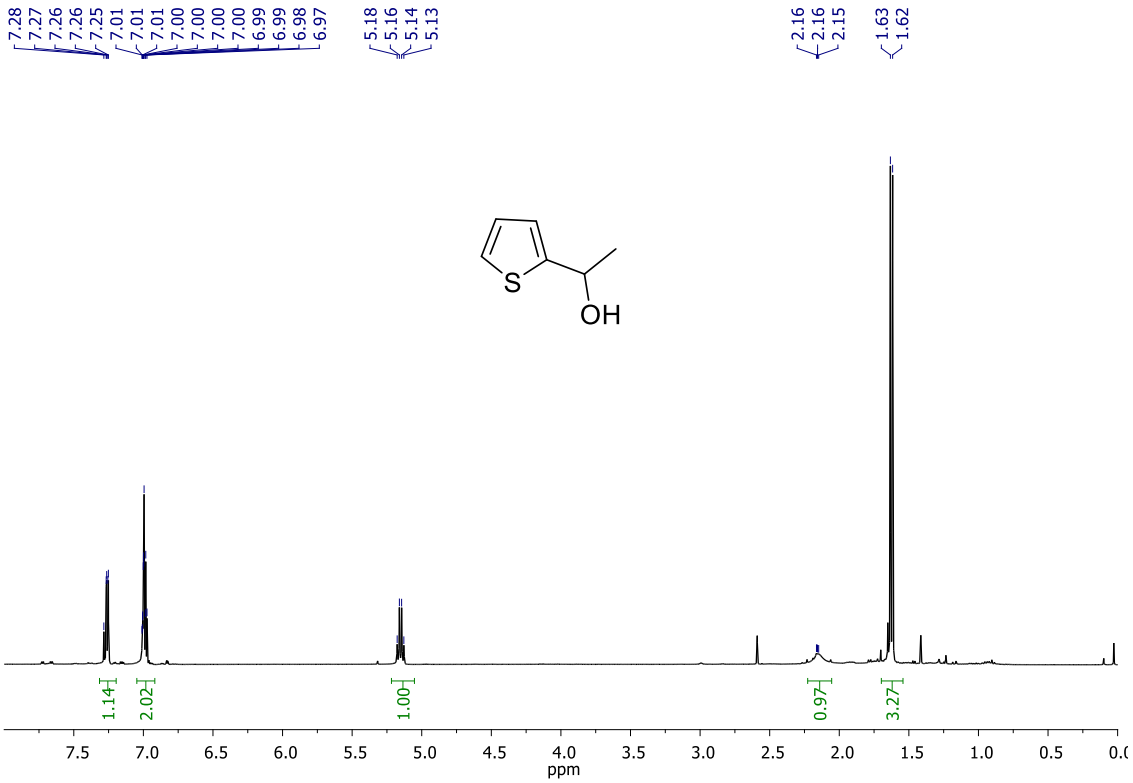


Figure SI.2.28. ^{1}H-NMR ($CDCl_3$, 400 MHz, 300 K) spectrum of product **10k**.

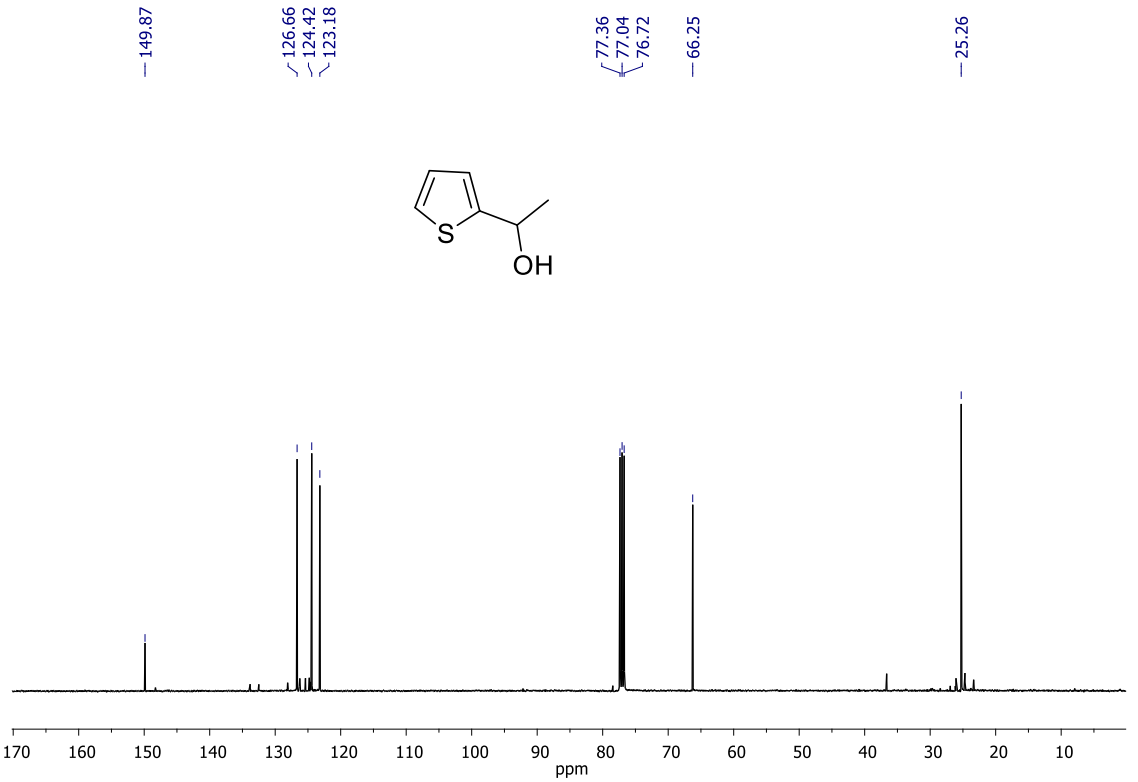


Figure SI.2.29. ^{13}C{^{1}H}-NMR ($CDCl_3$, 100.6 MHz, 300 K) spectrum of product **10k**.

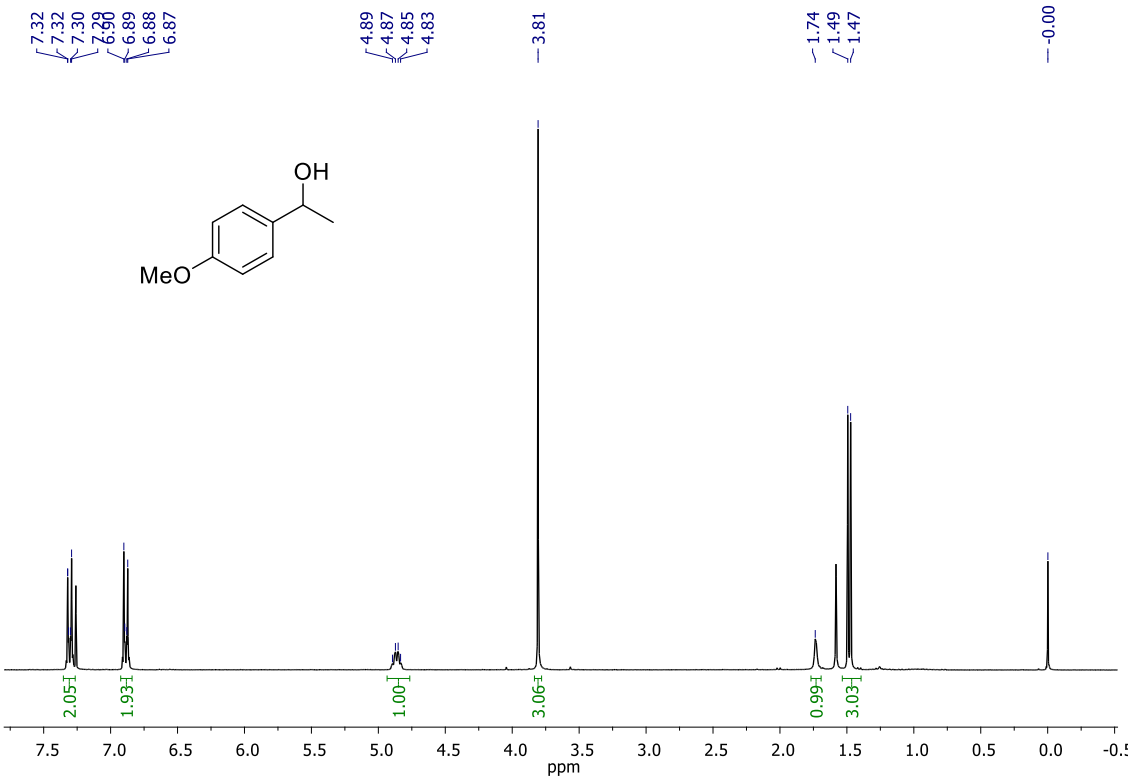


Figure SI.2.30. ^{1}H-NMR ($CDCl_3$, 300 MHz, 300 K) spectrum of product **10l**.

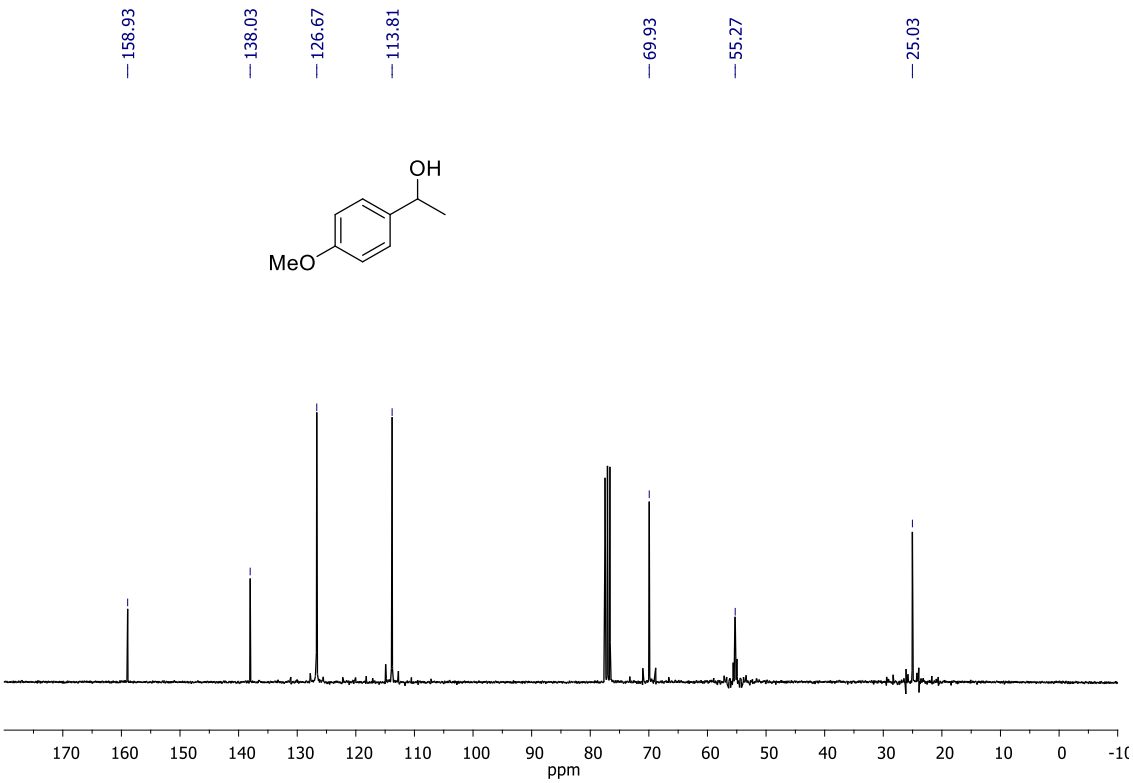


Figure SI.2.31. ^{13}C{^{1}H}-NMR ($CDCl_3$, 75.4 MHz, 300 K) spectrum of product **10l**.

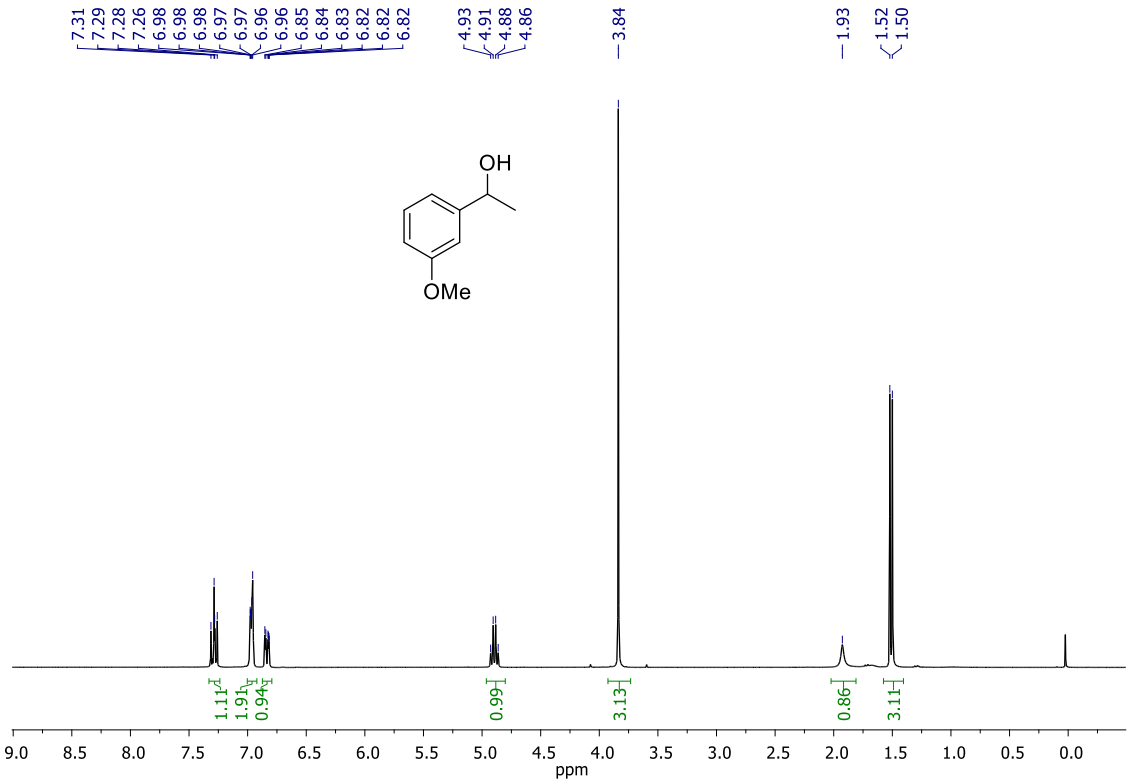


Figure SI.2.32. ^{1}H-NMR ($CDCl_3$, 300 MHz, 300 K) spectrum of product **10m**.

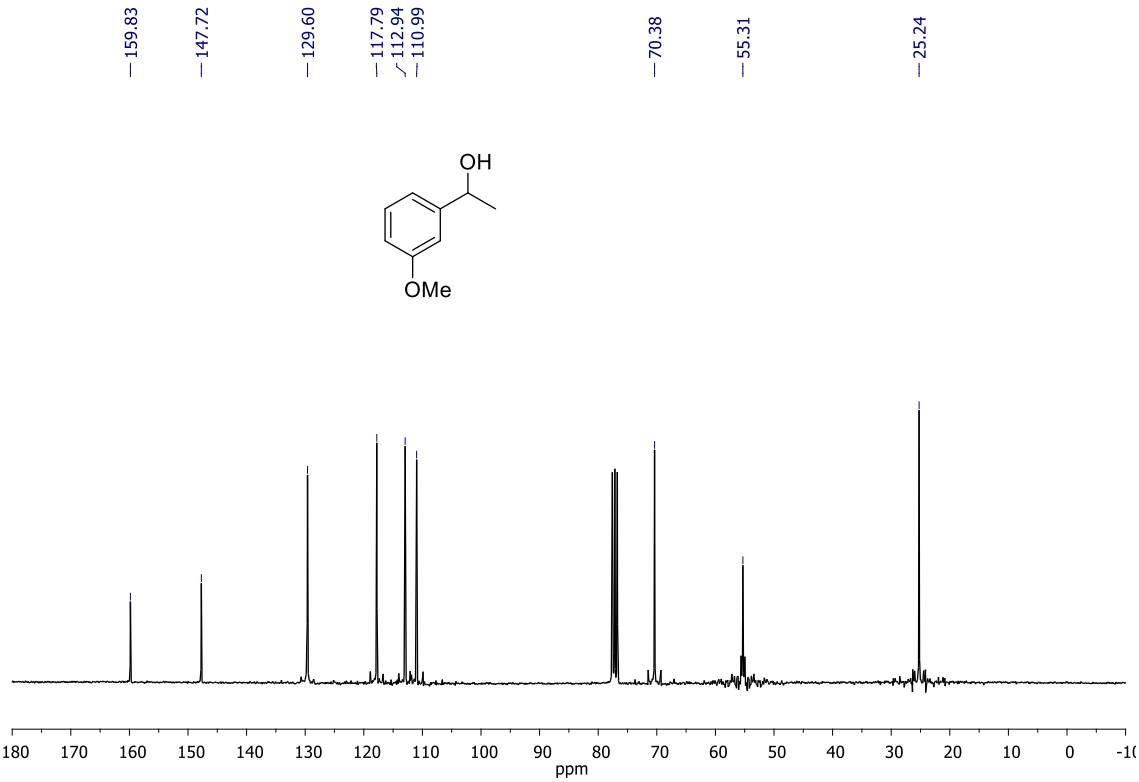


Figure SI.2.33. $^{13}C\{^{1}H\}$-NMR ($CDCl_3$, 75.4 MHz, 300 K) spectrum of product **10m**.

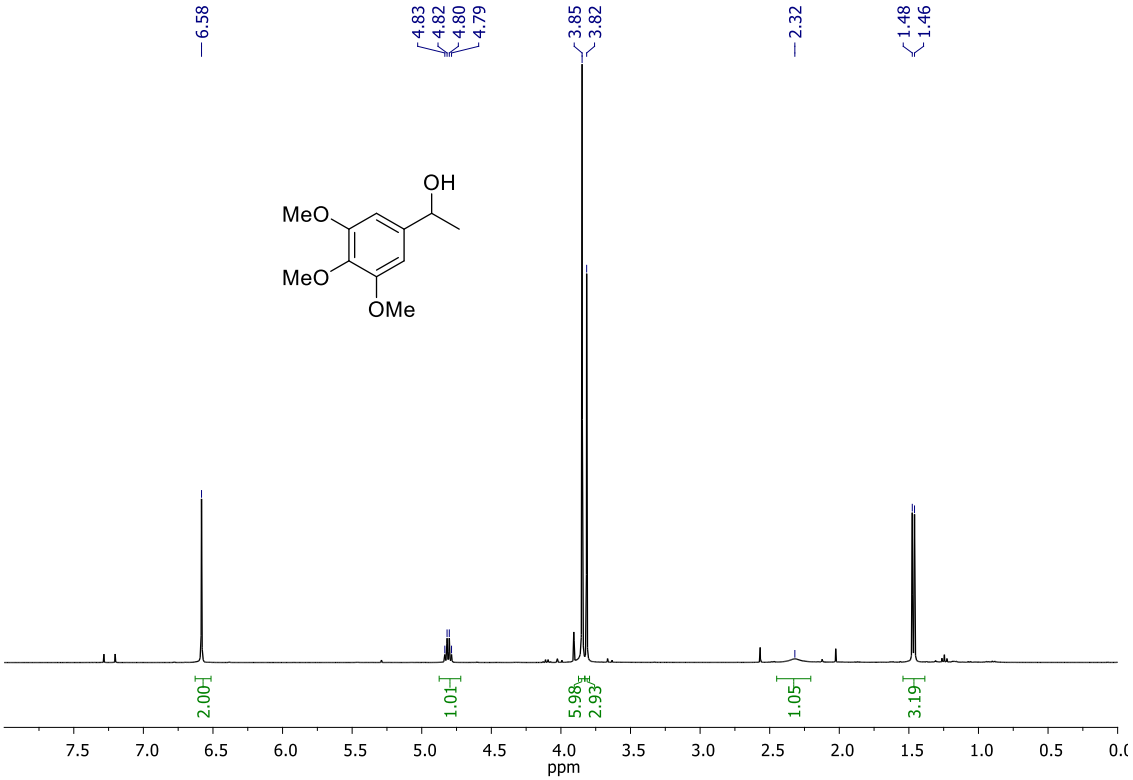


Figure SI.2.34. ^{1}H-NMR ($CDCl_3$, 400 MHz, 300 K) spectrum of product **10n**.

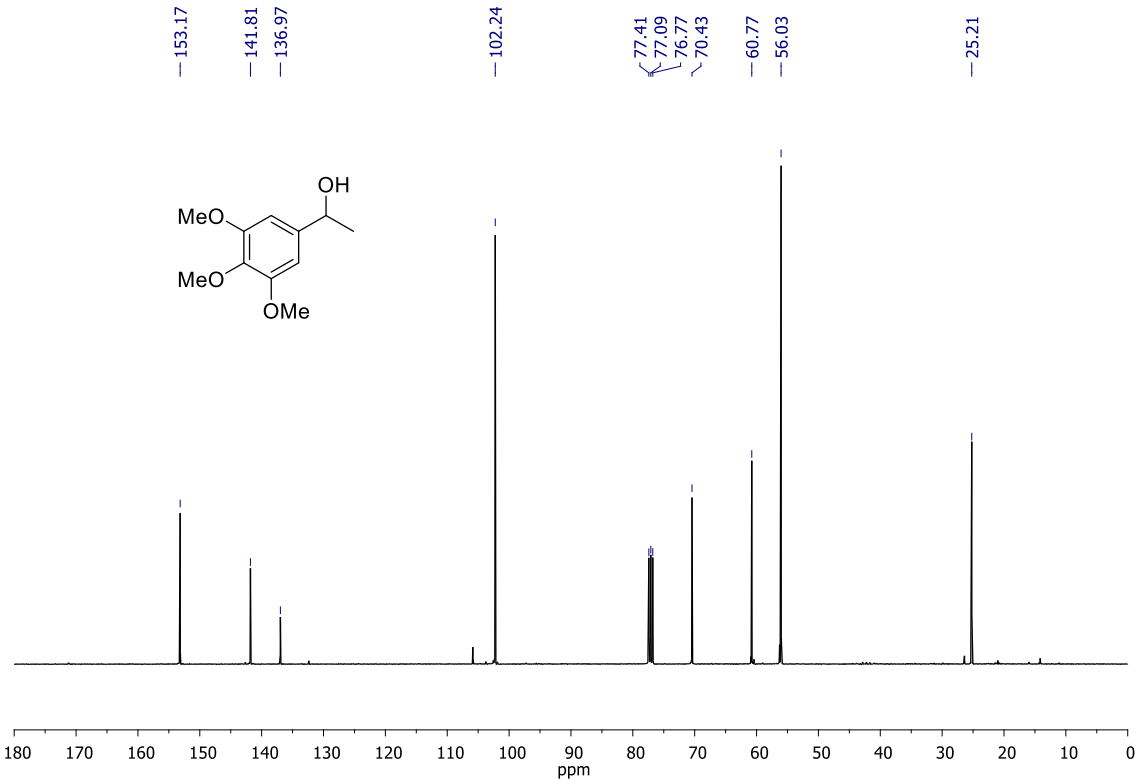


Figure SI.2.35. ^{13}C{^{1}H}-NMR ($CDCl_3$, 100.6 MHz, 300 K) spectrum of product **10n**.

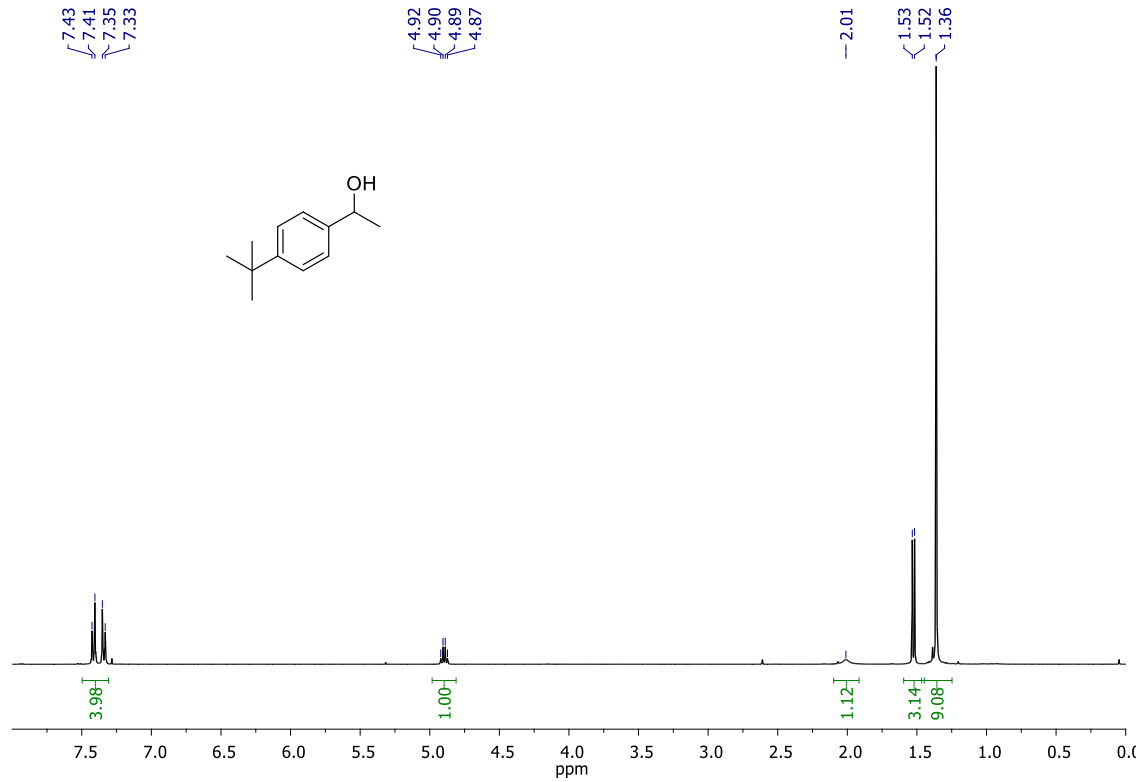


Figure SI.2.36. ^{1}H-NMR ($CDCl_3$, 400 MHz, 300 K) spectrum of product **10o**.

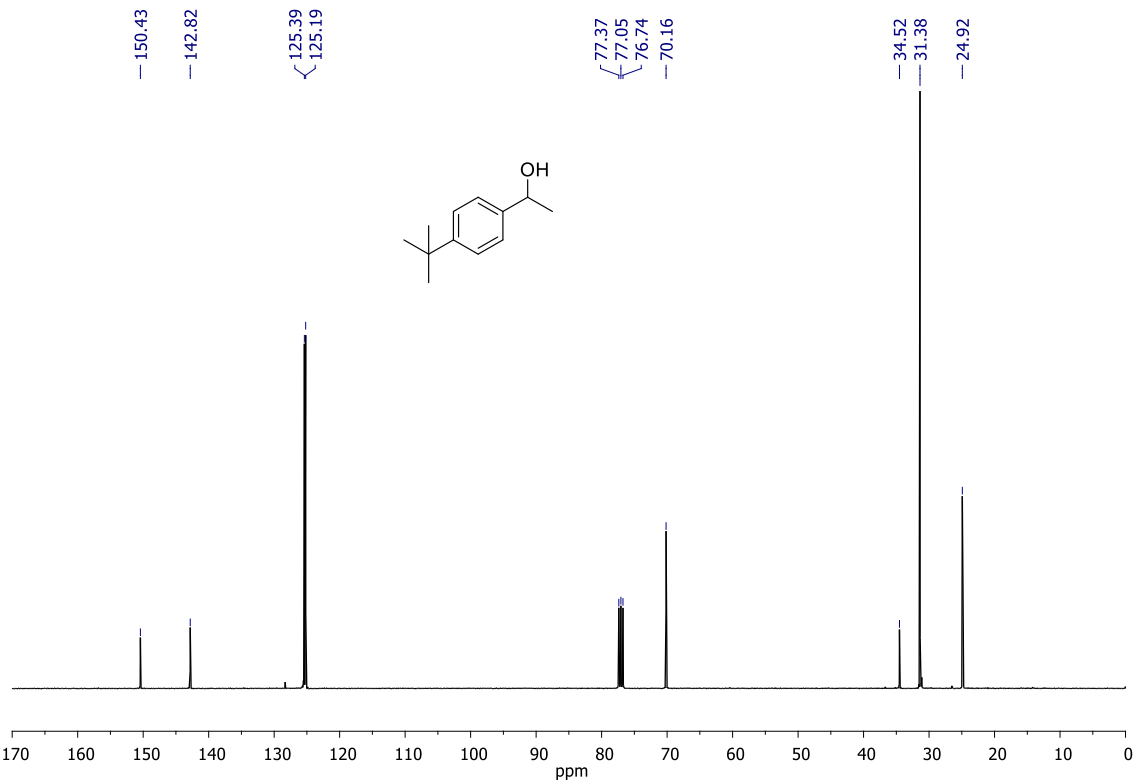


Figure SI.2.37. $^{13}C\{^{1}H\}$-NMR ($CDCl_3$, 100.6 MHz, 300 K) spectrum of product **10o**.

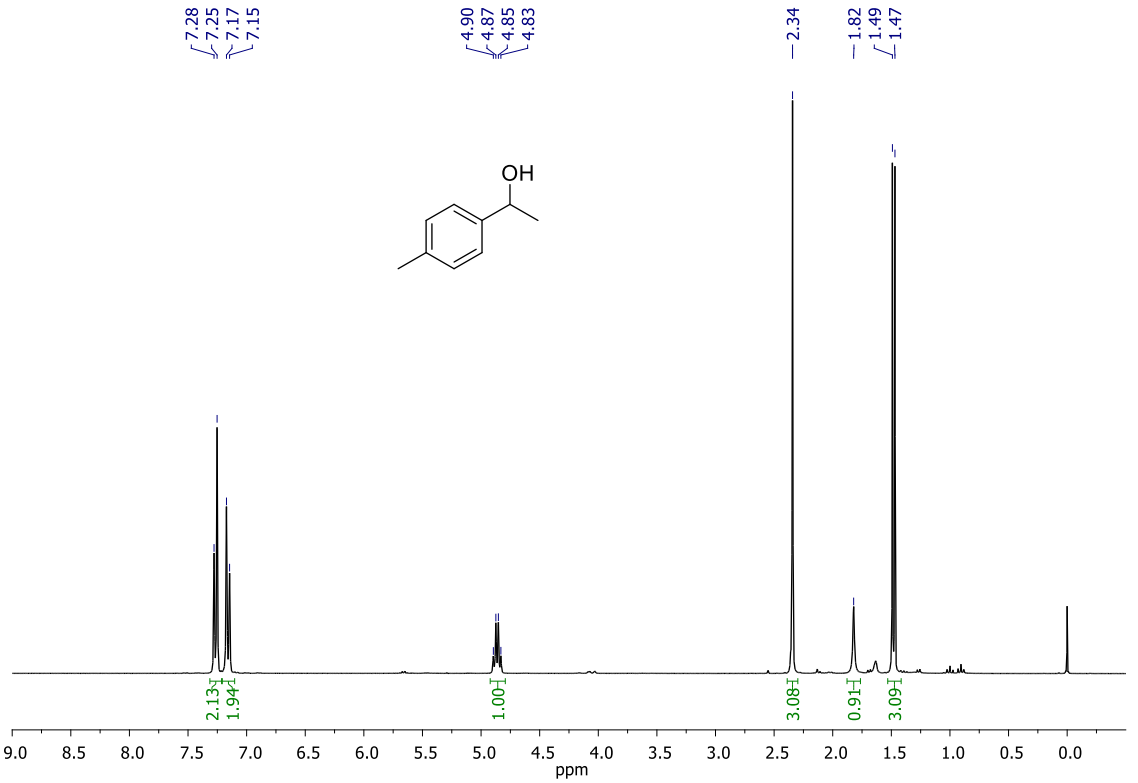


Figure SI.2.38. ^{1}H-NMR ($CDCl_3$, 300 MHz, 300 K) spectrum of product **10p**.

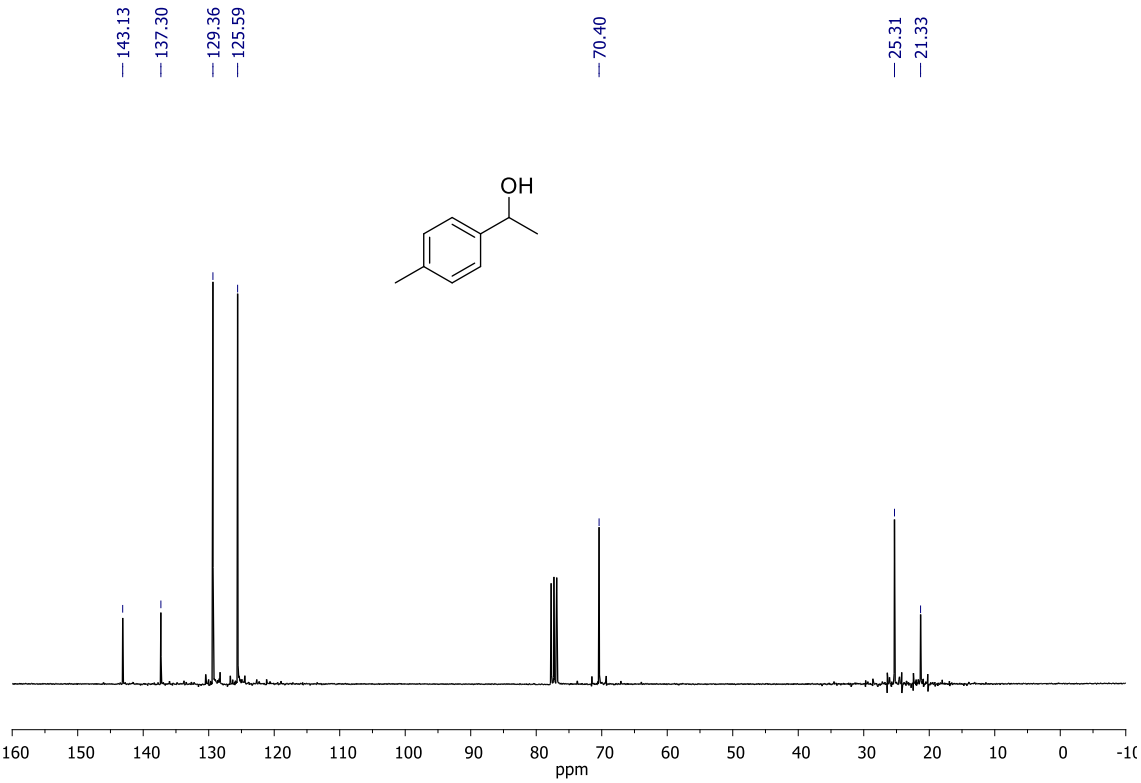


Figure SI.2.39. $^{13}C\{^{1}H\}$-NMR ($CDCl_3$, 75.4 MHz, 300 K) spectrum of product **10p**.

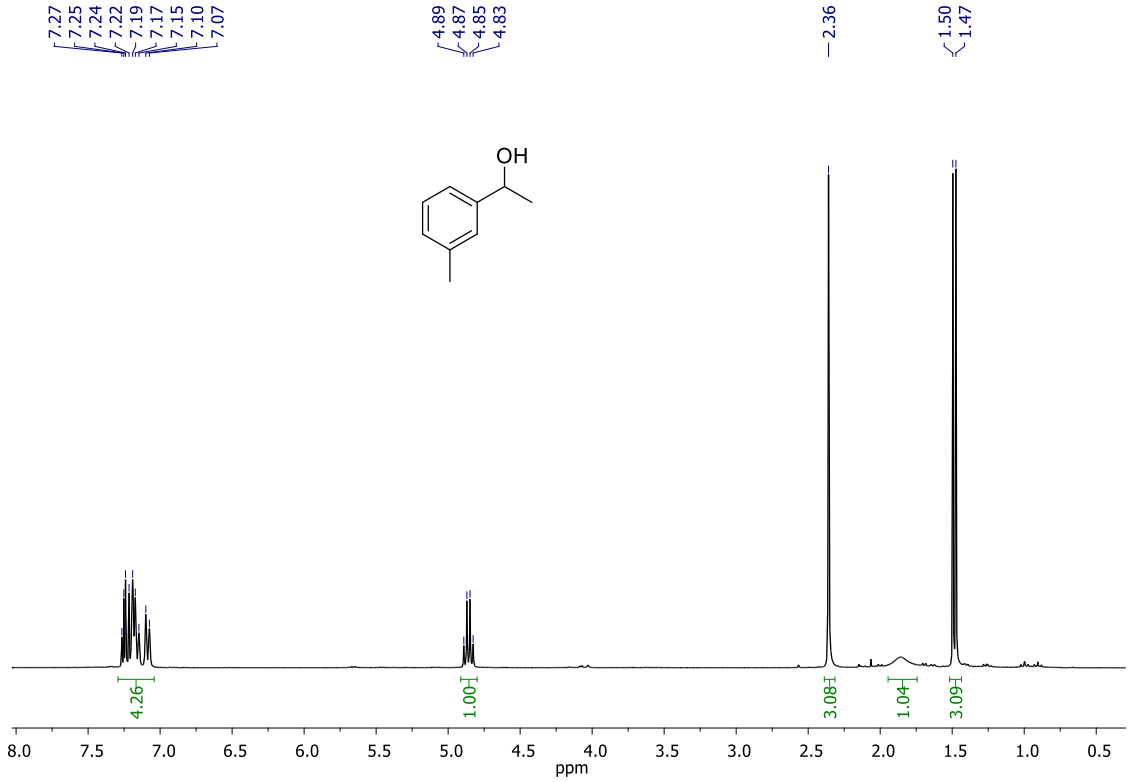


Figure SI.2.40. ^{1}H-NMR ($CDCl_3$, 300 MHz, 300 K) spectrum of product **10q**.

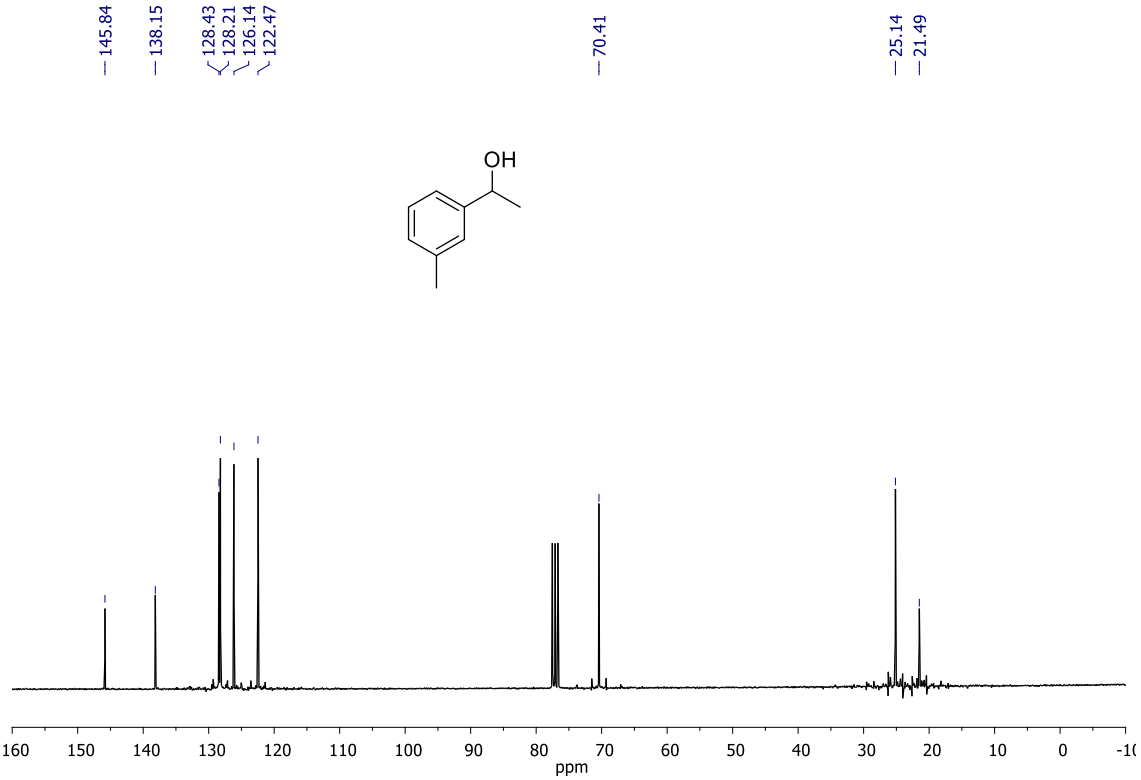


Figure SI.2.41. $^{13}C\{^{1}H\}$-NMR ($CDCl_3$, 75.4 MHz, 300 K) spectrum of product **10q**.

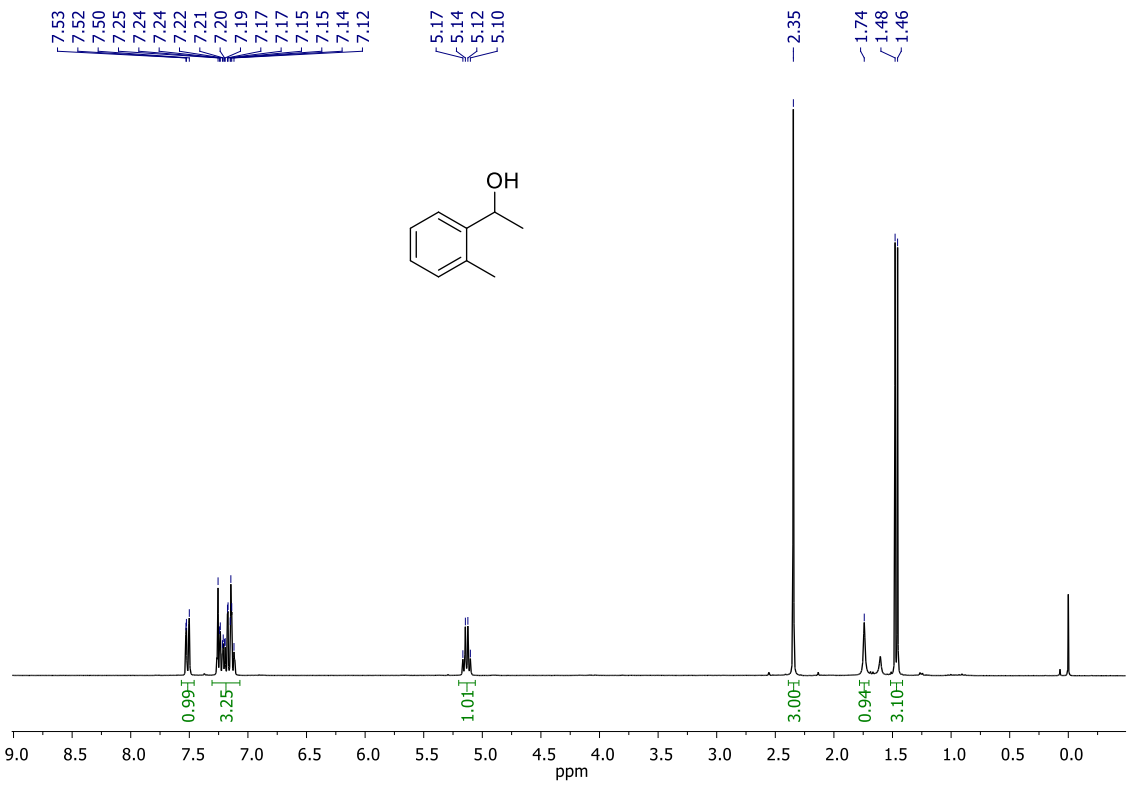


Figure SI.2.42. ^{1}H-NMR ($CDCl_3$, 300 MHz, 300 K) spectrum of product **10r**.

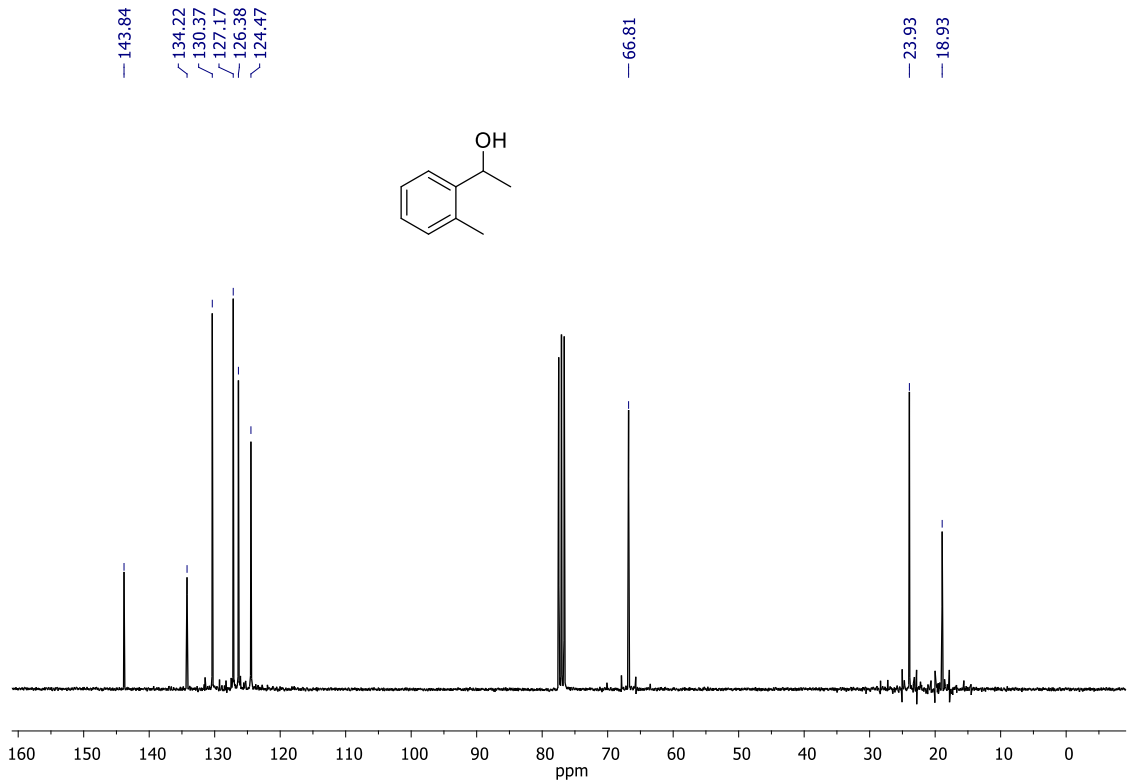


Figure SI.2.43. $^{13}C\{^{1}H\}$-NMR ($CDCl_3$, 75 MHz, 300 K) spectrum of product **10r**.

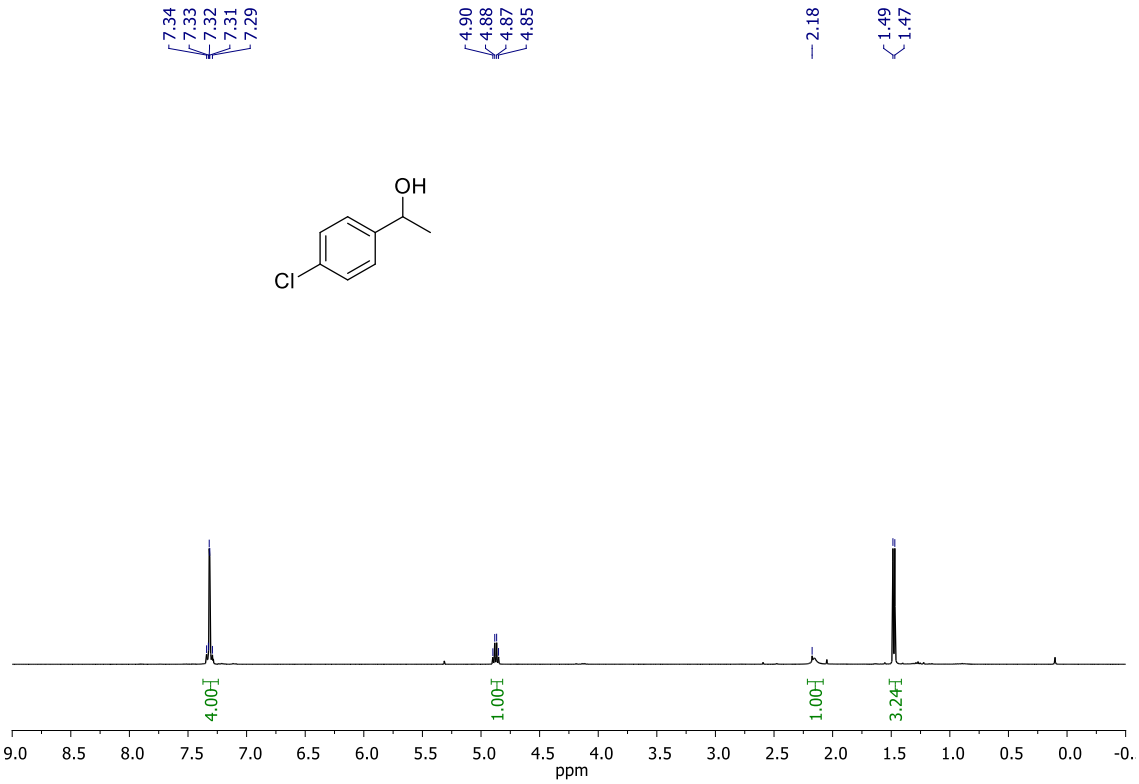


Figure SI.2.44. ^{1}H-NMR ($CDCl_3$, 400 MHz, 300 K) spectrum of product **10s**.

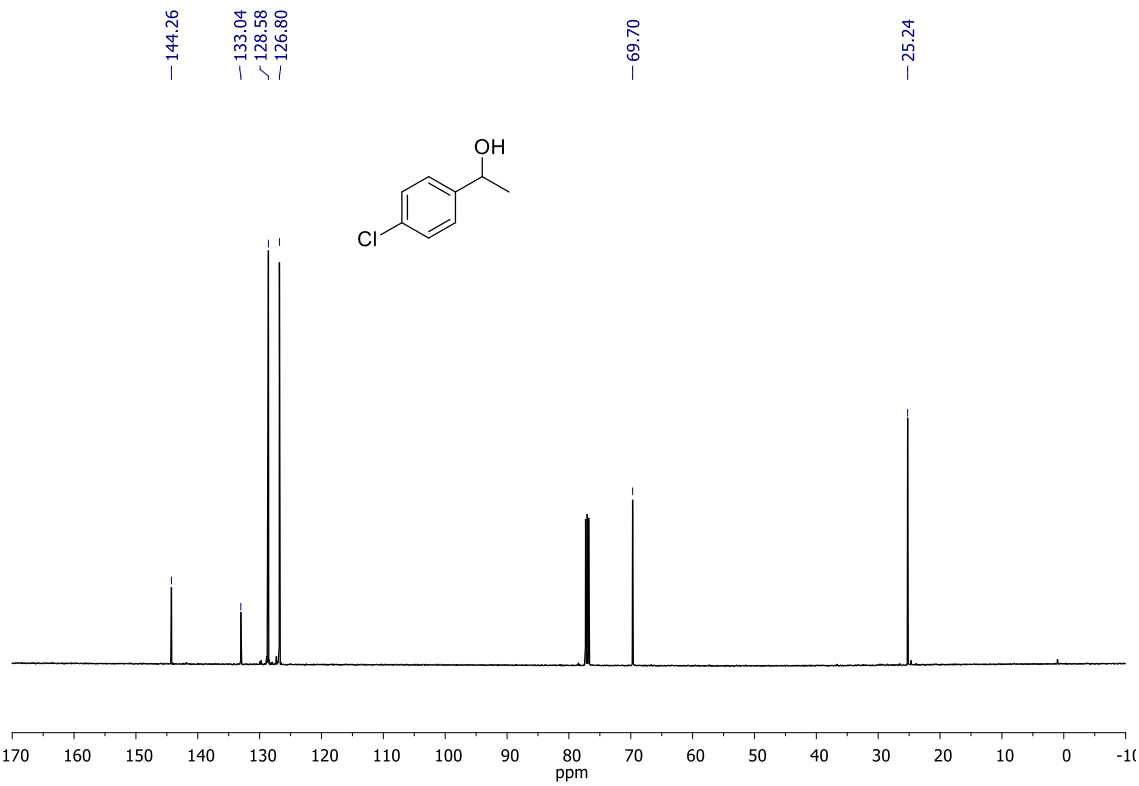


Figure SI.2.45. $^{13}C\{^{1}H\}$-NMR ($CDCl_3$, 100.6 MHz, 300 K) spectrum of product **10s**.

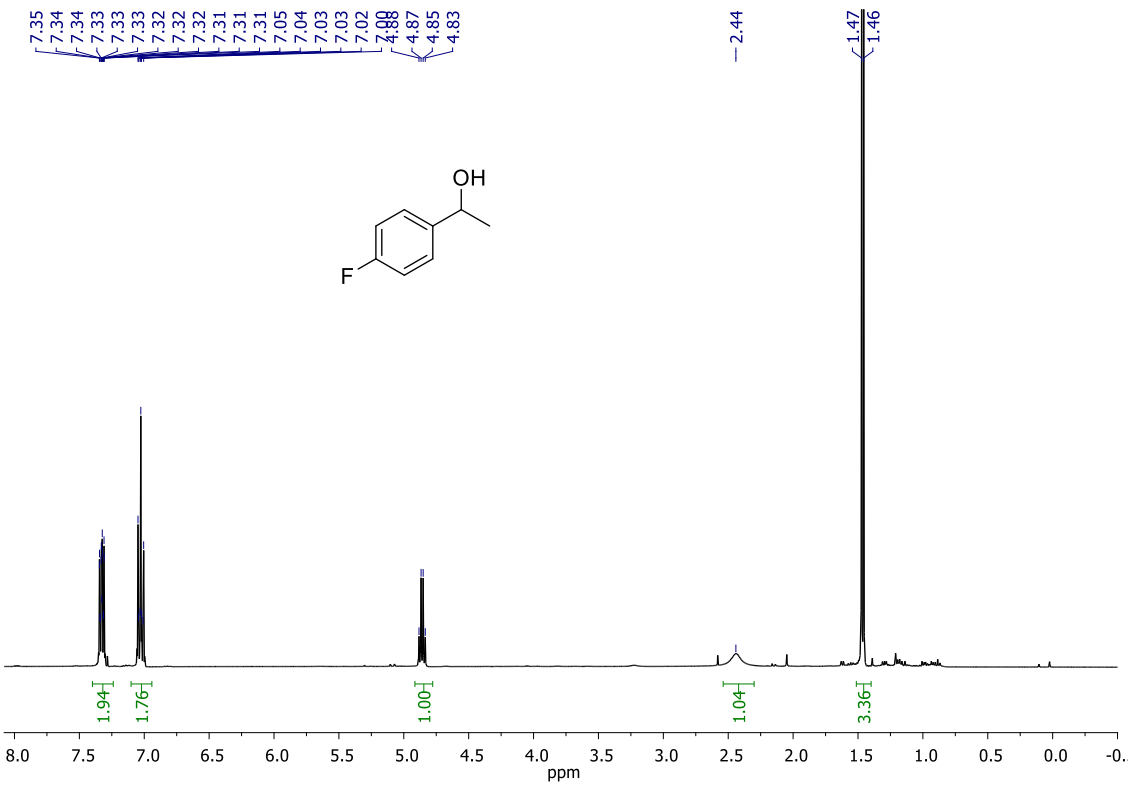


Figure SI.2.46. ^{1}H-NMR ($CDCl_3$, 400 MHz, 300 K) spectrum of product **10t**.

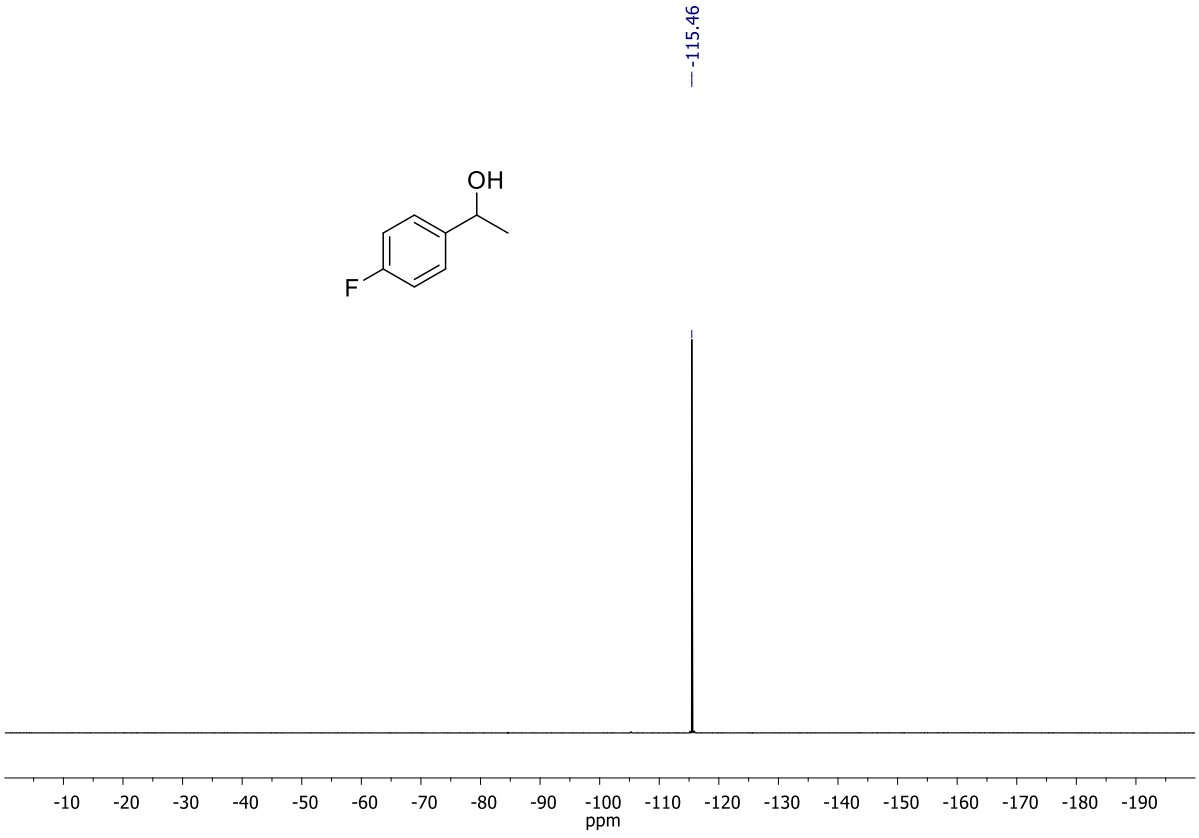


Figure SI.2.47. $^{19}F\{^{1}H\}$-NMR ($CDCl_3$, 376 MHz, 300 K) spectrum of product **10t**.

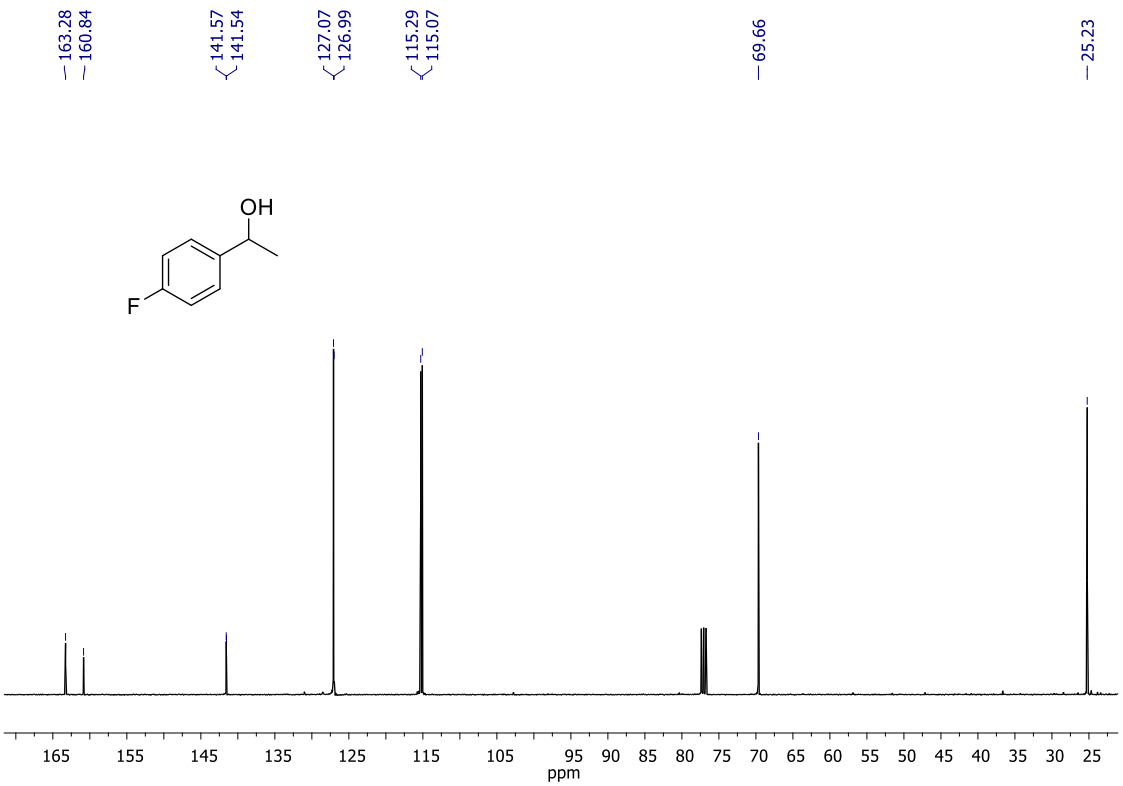


Figure SI.2.48. $^{13}C\{^{1}H\}$-NMR ($CDCl_3$, 100.6 MHz, 300 K) spectrum of product **10t**.

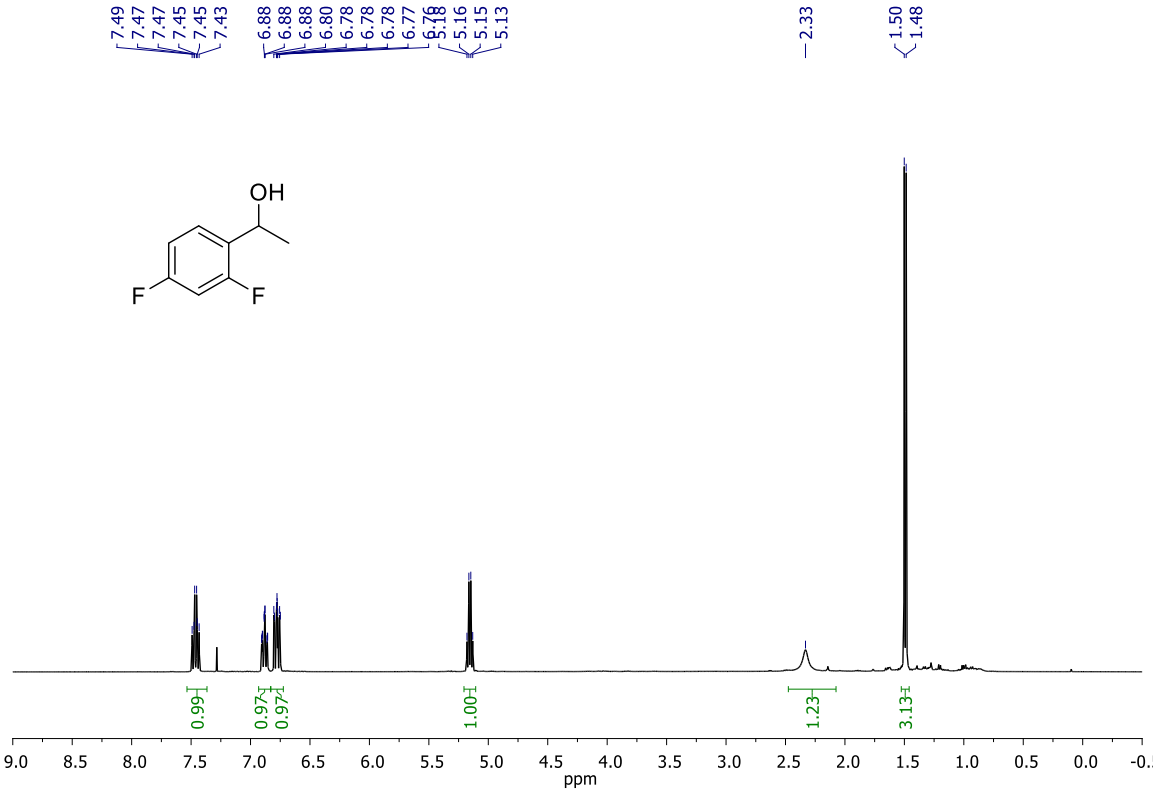


Figure SI.2.49. ^{1}H-NMR ($CDCl_3$, 400 MHz, 300 K) spectrum of product **10v**.

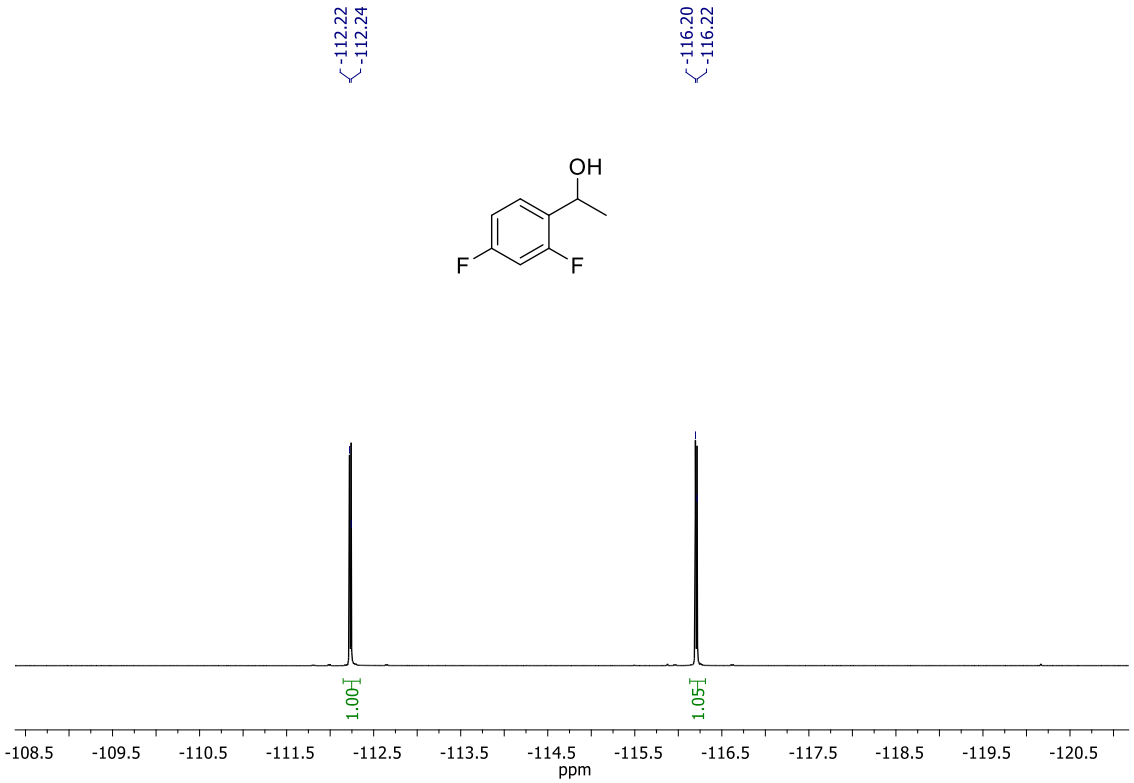


Figure SI.2.50. $^{19}F\{^{1}H\}$-NMR ($CDCl_3$, 376 MHz, 300 K) spectrum of product **10v**.

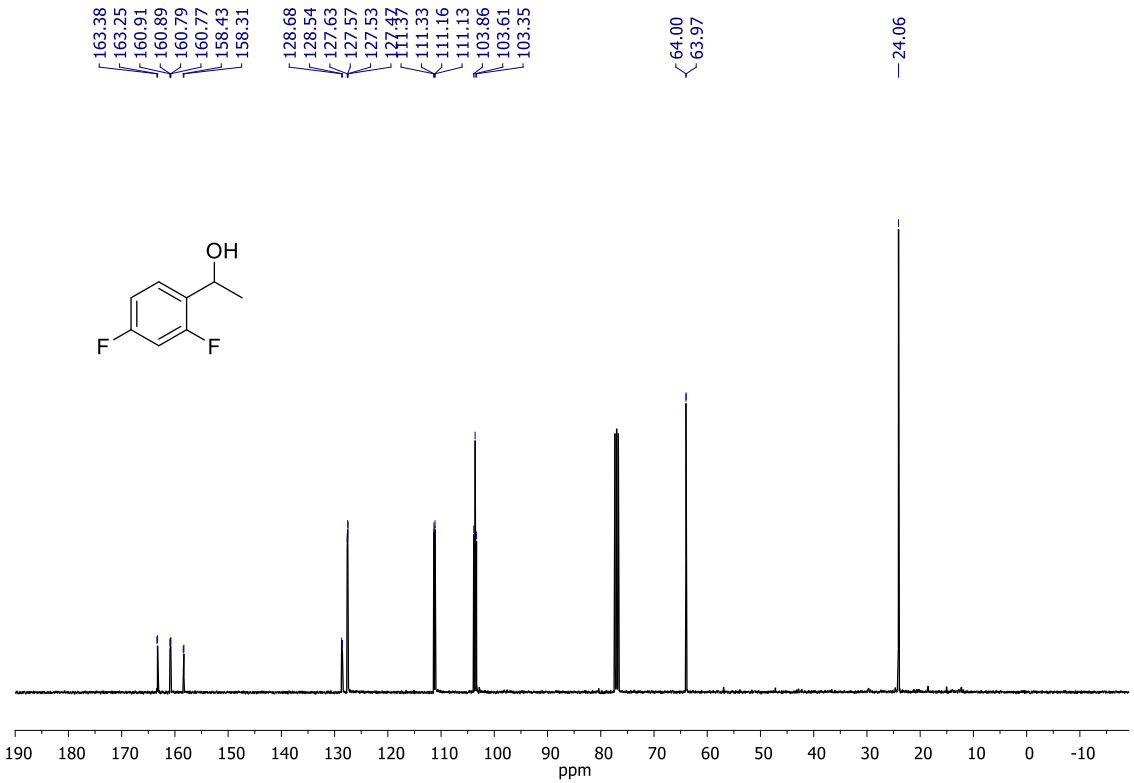


Figure SI.2.51. $^{13}C\{^{1}H\}$-NMR ($CDCl_3$, 100.6 MHz, 300 K) spectrum of product **10v**.

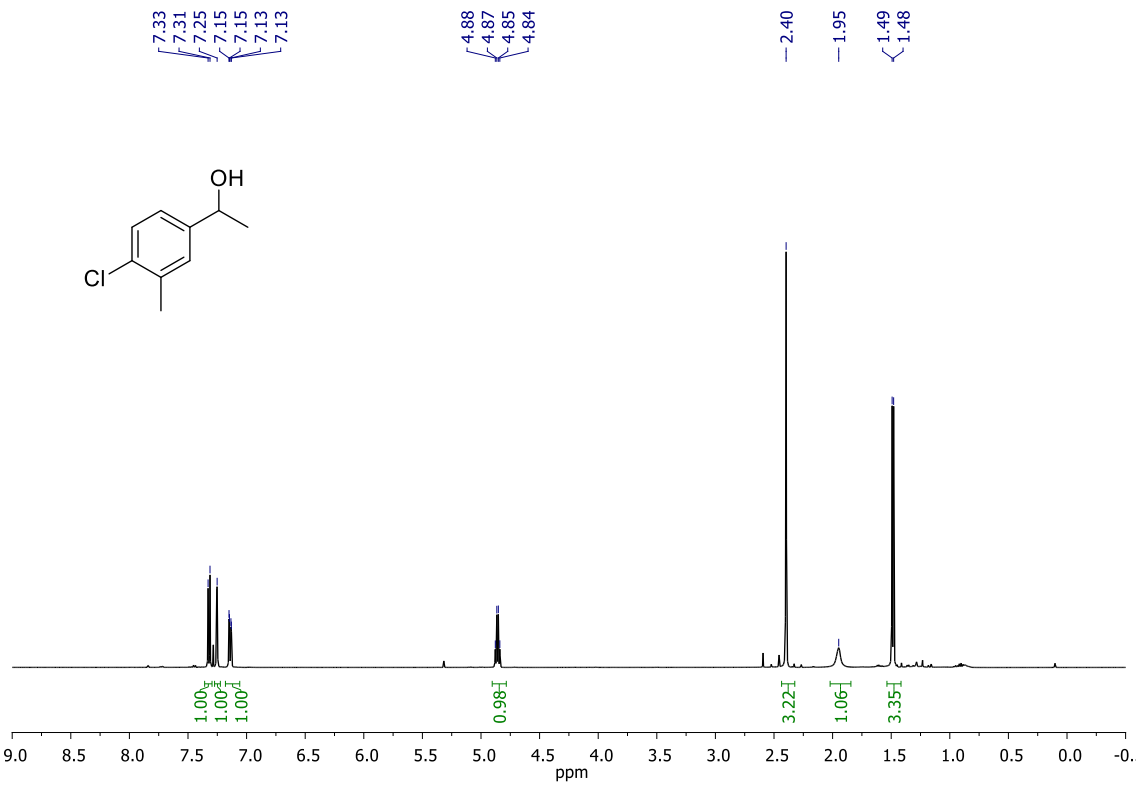


Figure SI.2.52. ^{1}H-NMR ($CDCl_3$, 500 MHz, 300 K) spectrum of product **10w**.

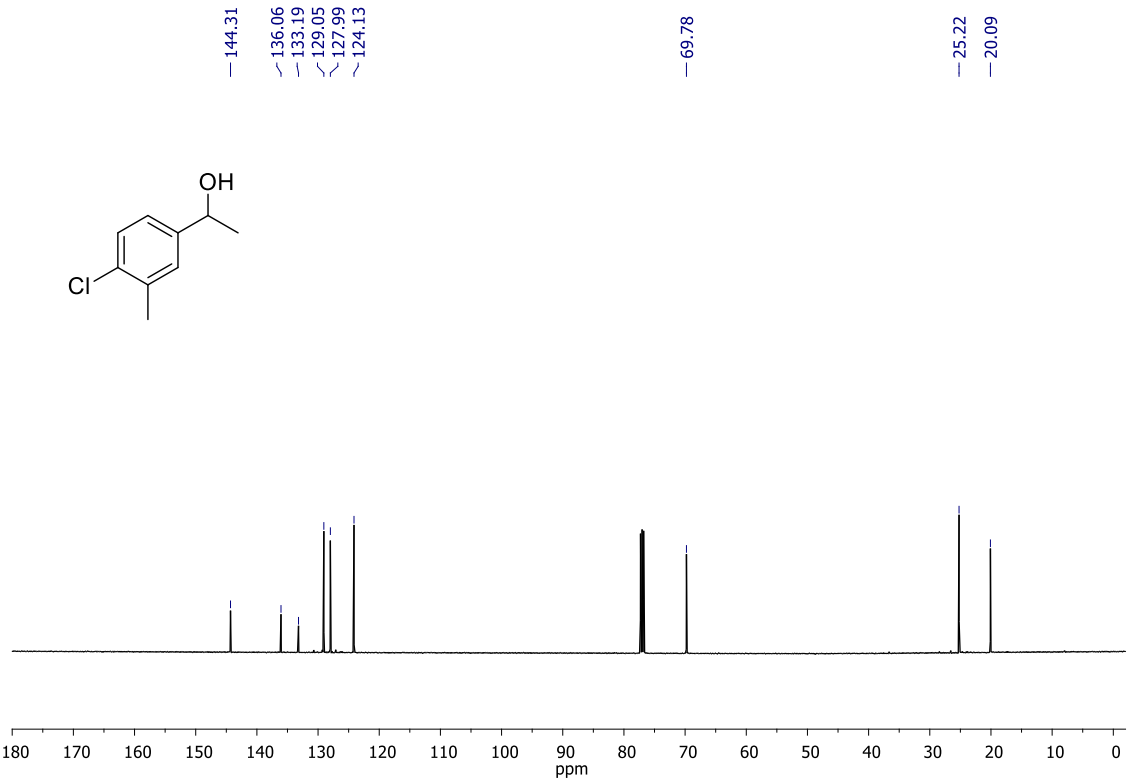


Figure SI.2.53. ^{13}C{^{1}H}-NMR ($CDCl_3$, 125.8 MHz, 300 K) spectrum of product **10w**.

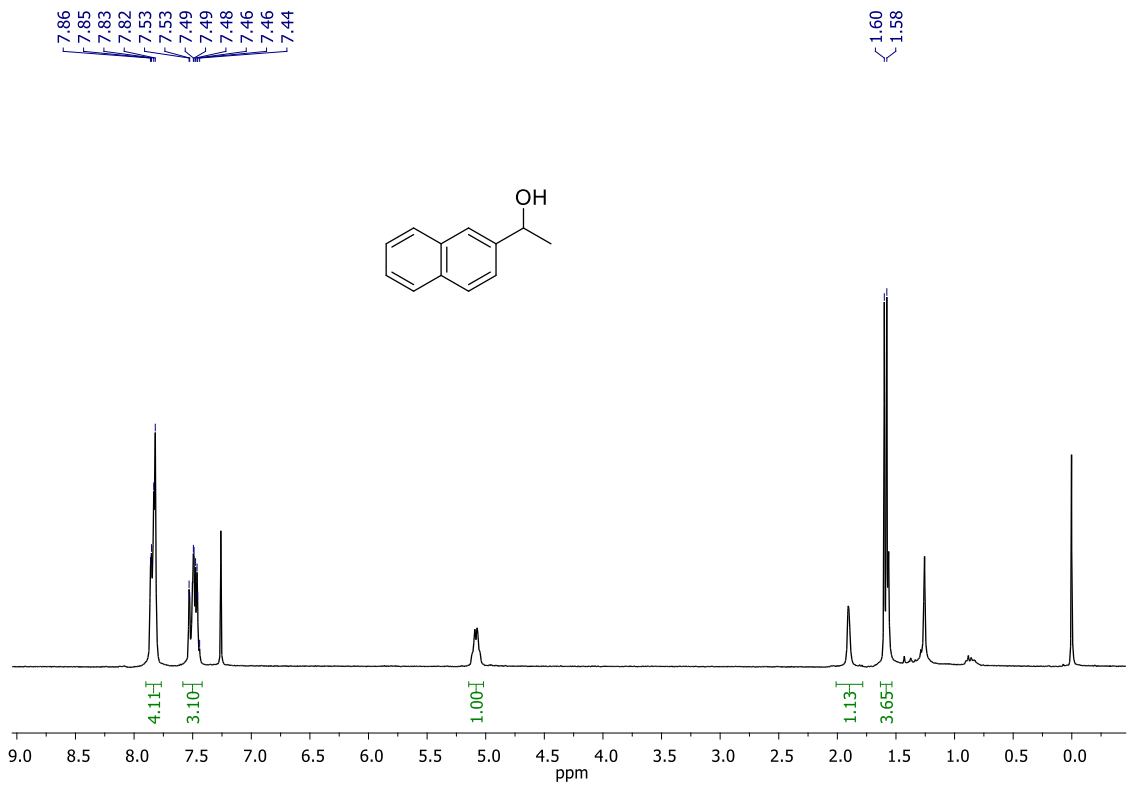


Figure SI.2.54. ^{1}H-NMR ($CDCl_3$, 300 MHz, 300 K) spectrum of product **10x**.

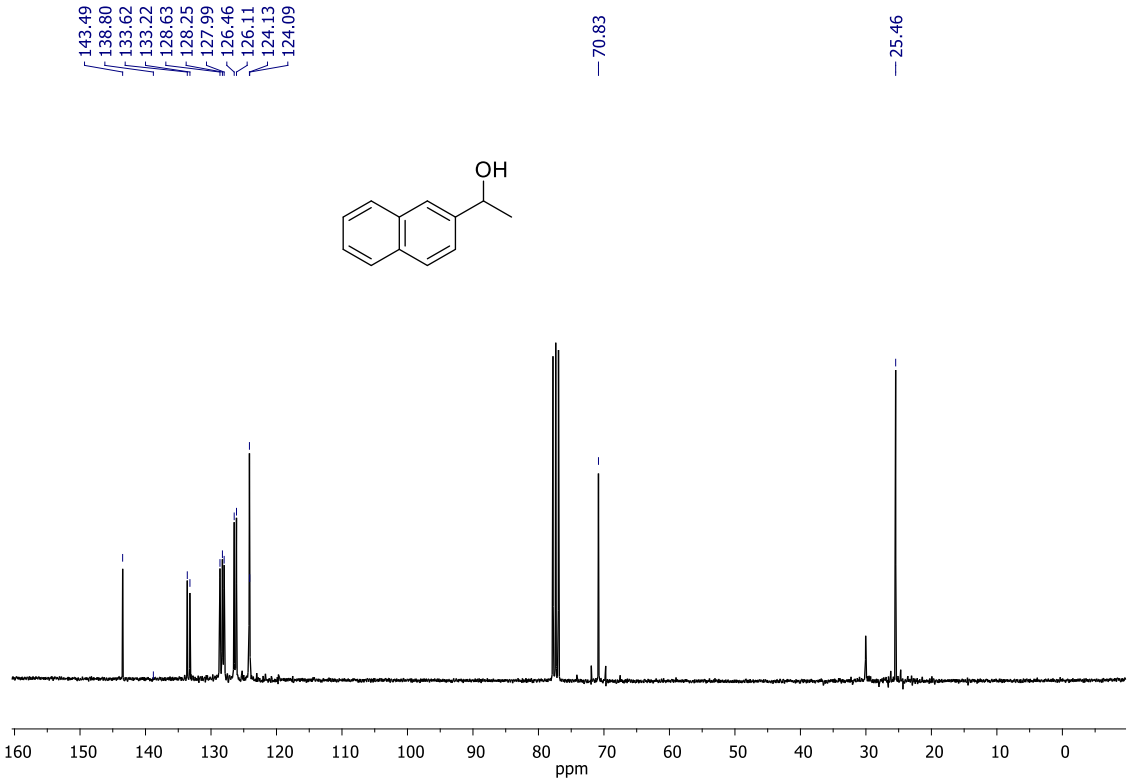


Figure SI.2.55. $^{13}C\{^{1}H\}$-NMR ($CDCl_3$, 75.4 MHz, 300 K) spectrum of product **10x**.

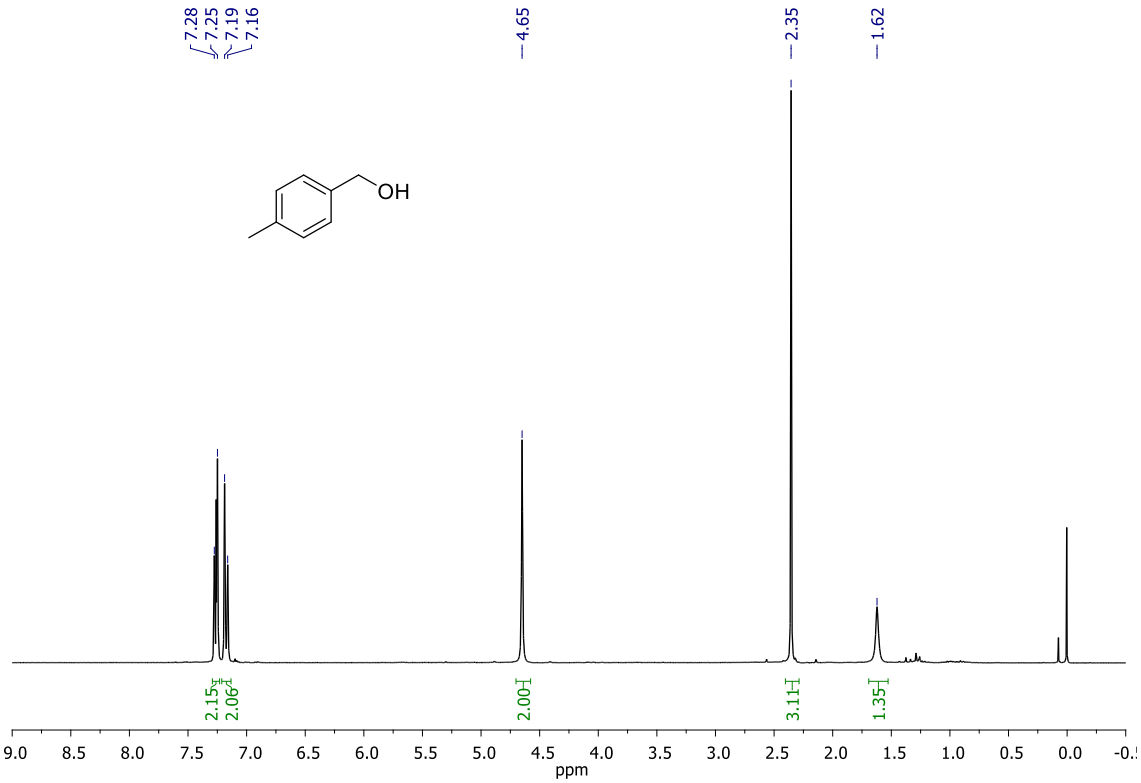


Figure SI.2.56. ^{1}H-NMR ($CDCl_3$, 300 MHz, 300 K) spectrum of product **12a**.

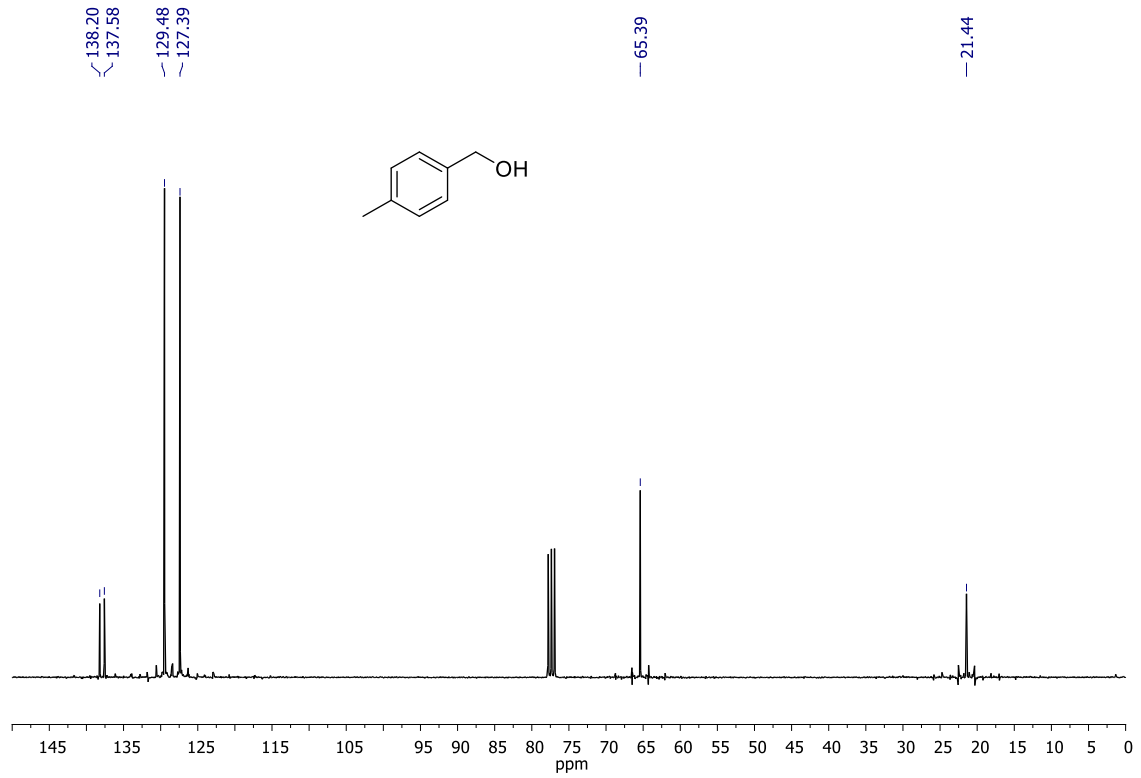


Figure SI.2.57. $^{13}C\{^{1}H\}$-NMR ($CDCl_3$, 75.4 MHz, 300 K) spectrum of product **12a**.

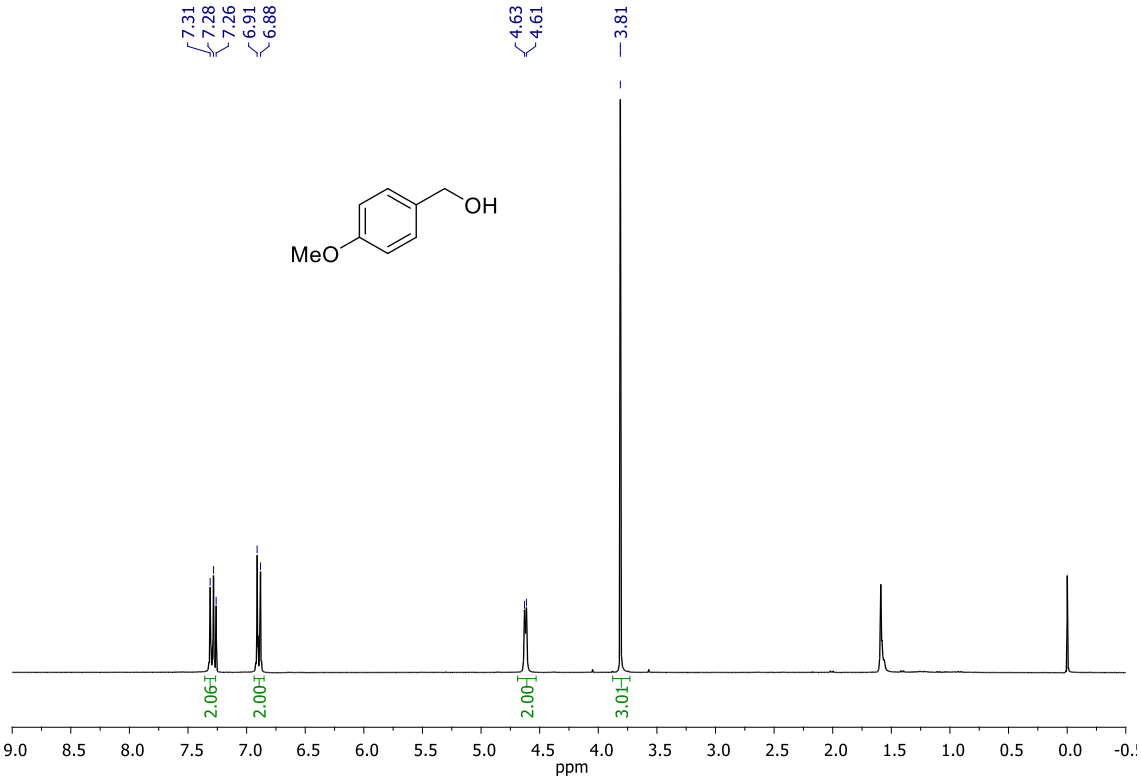


Figure SI.2.58. ^{1}H-NMR ($CDCl_3$, 300 MHz, 300 K) spectrum of product **12b**.

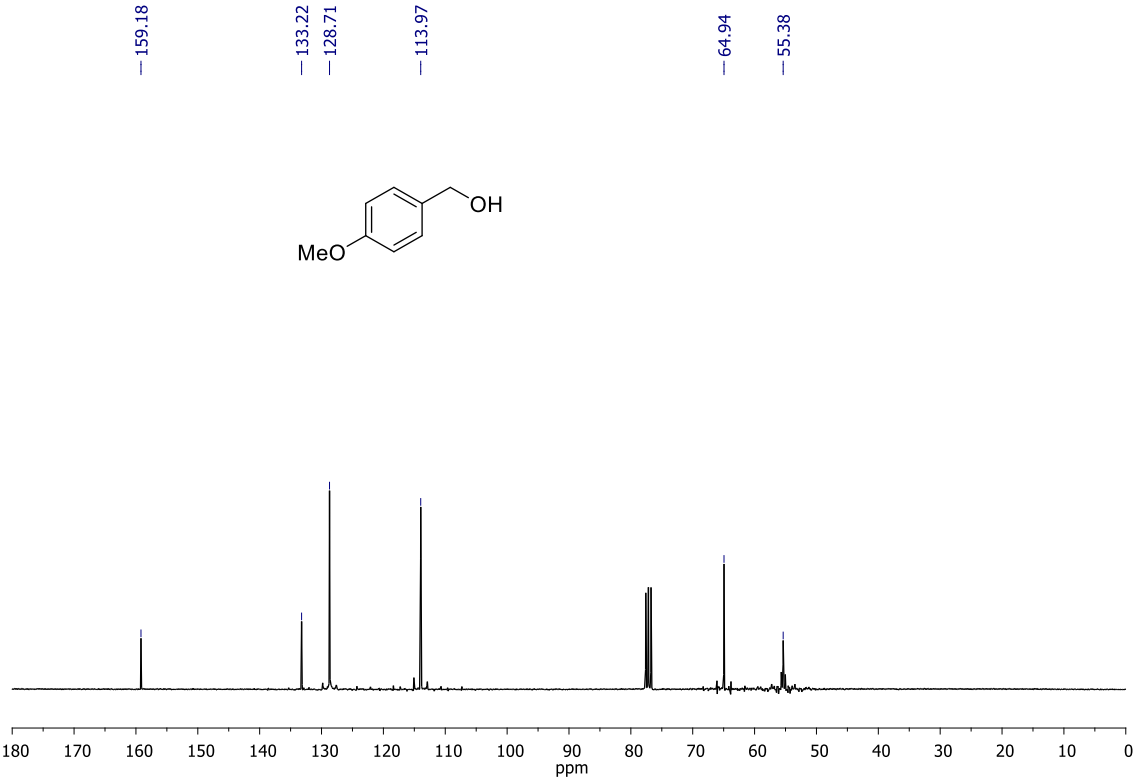


Figure SI.2.59. $^{13}C\{^{1}H\}$-NMR ($CDCl_3$, 75.4 MHz, 300 K) spectrum of product **12b**.

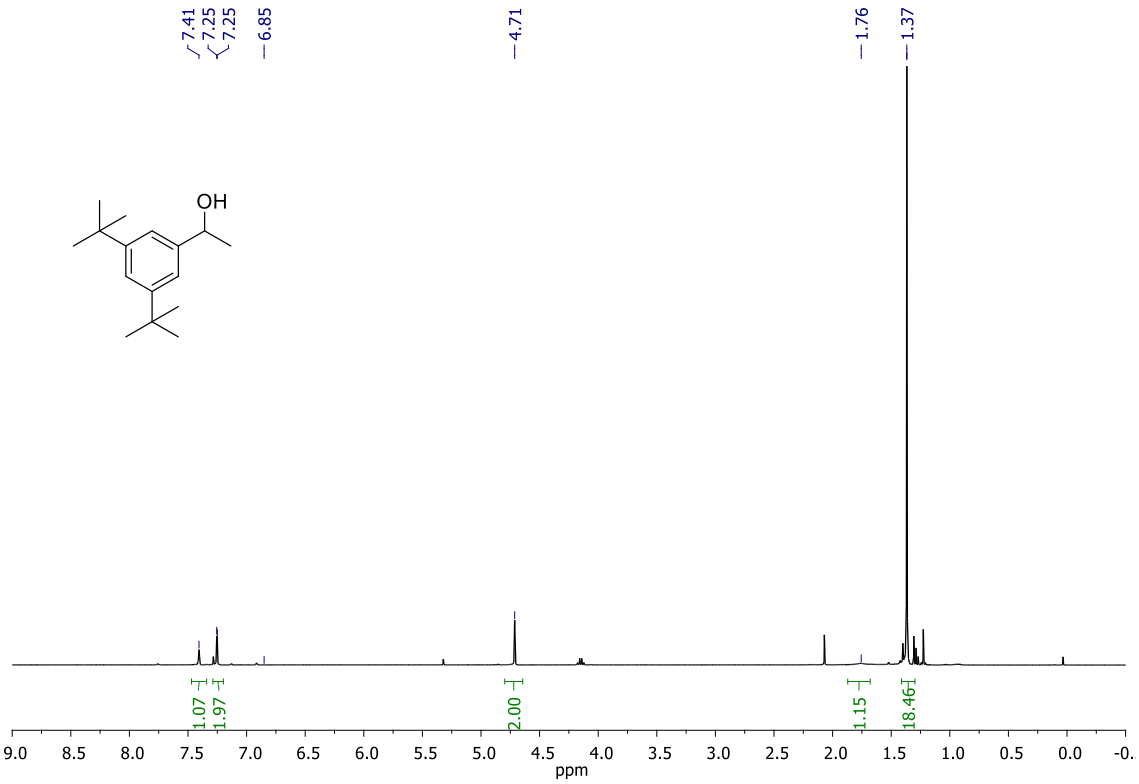


Figure SI.2.60. ^{1}H-NMR ($CDCl_3$, 400 MHz, 300 K) spectrum of product **12c**.

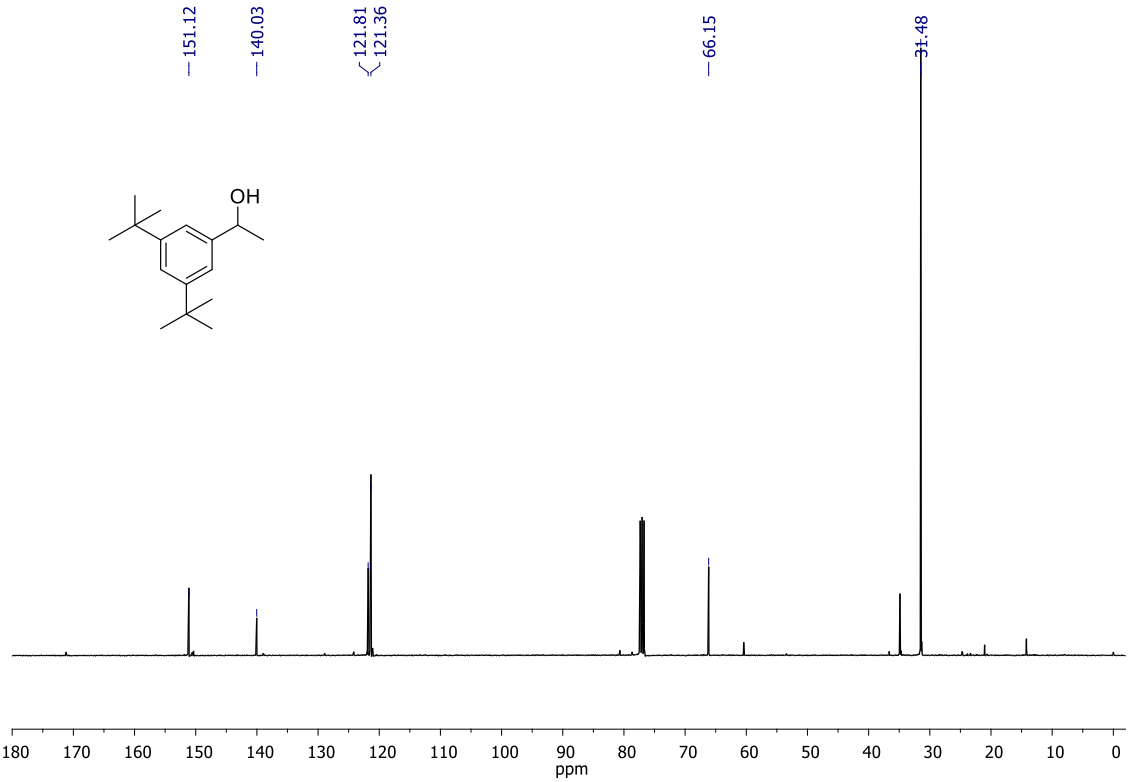


Figure SI.2.61. ^{13}C{^{1}H}-NMR ($CDCl_3$, 100.6 MHz, 300 K) spectrum of product **12c**.

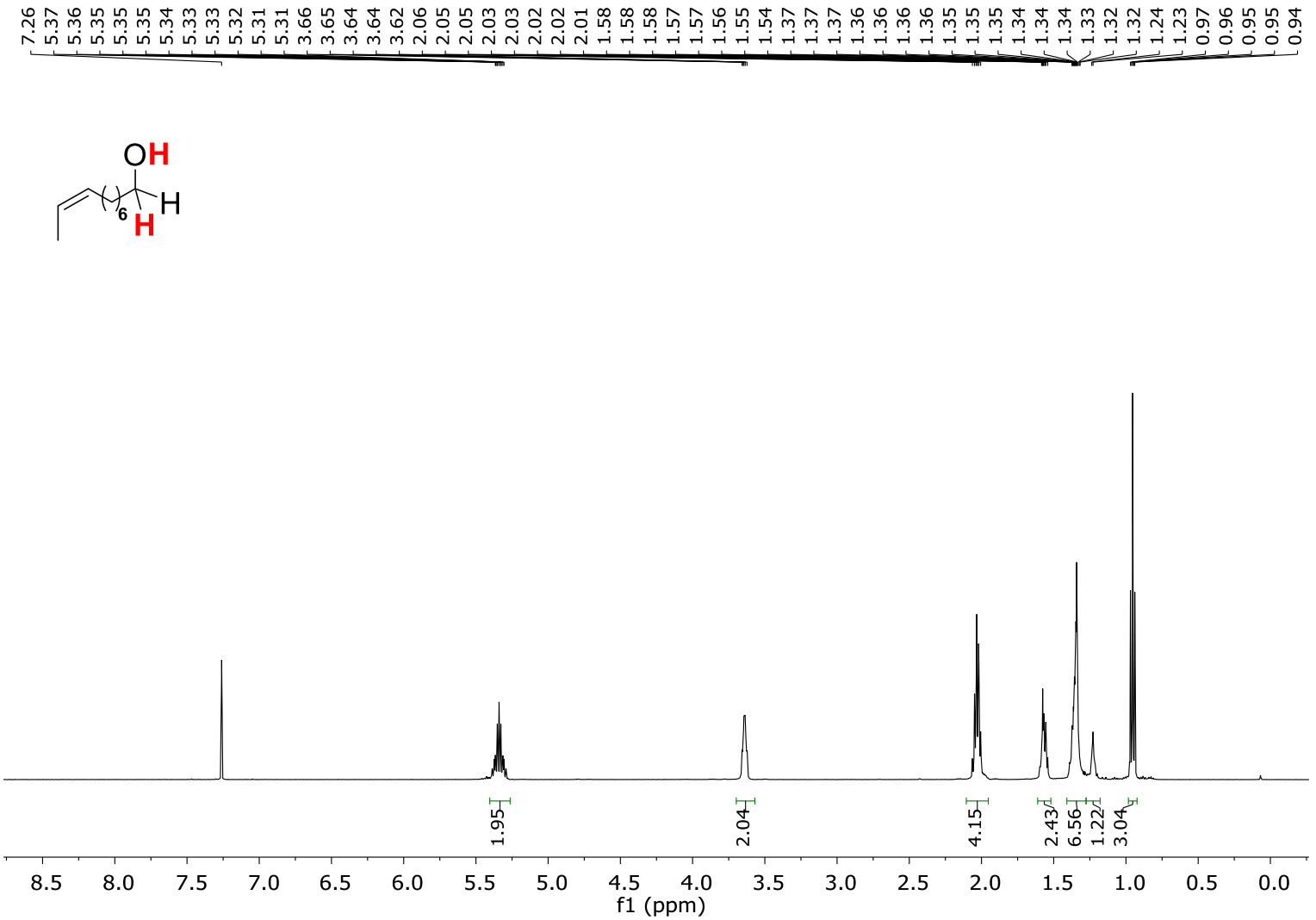


Figure SI.2.62. ^{1}H-NMR ($CDCl_3$, 500 MHz, 300 K) spectrum of product **12d.**

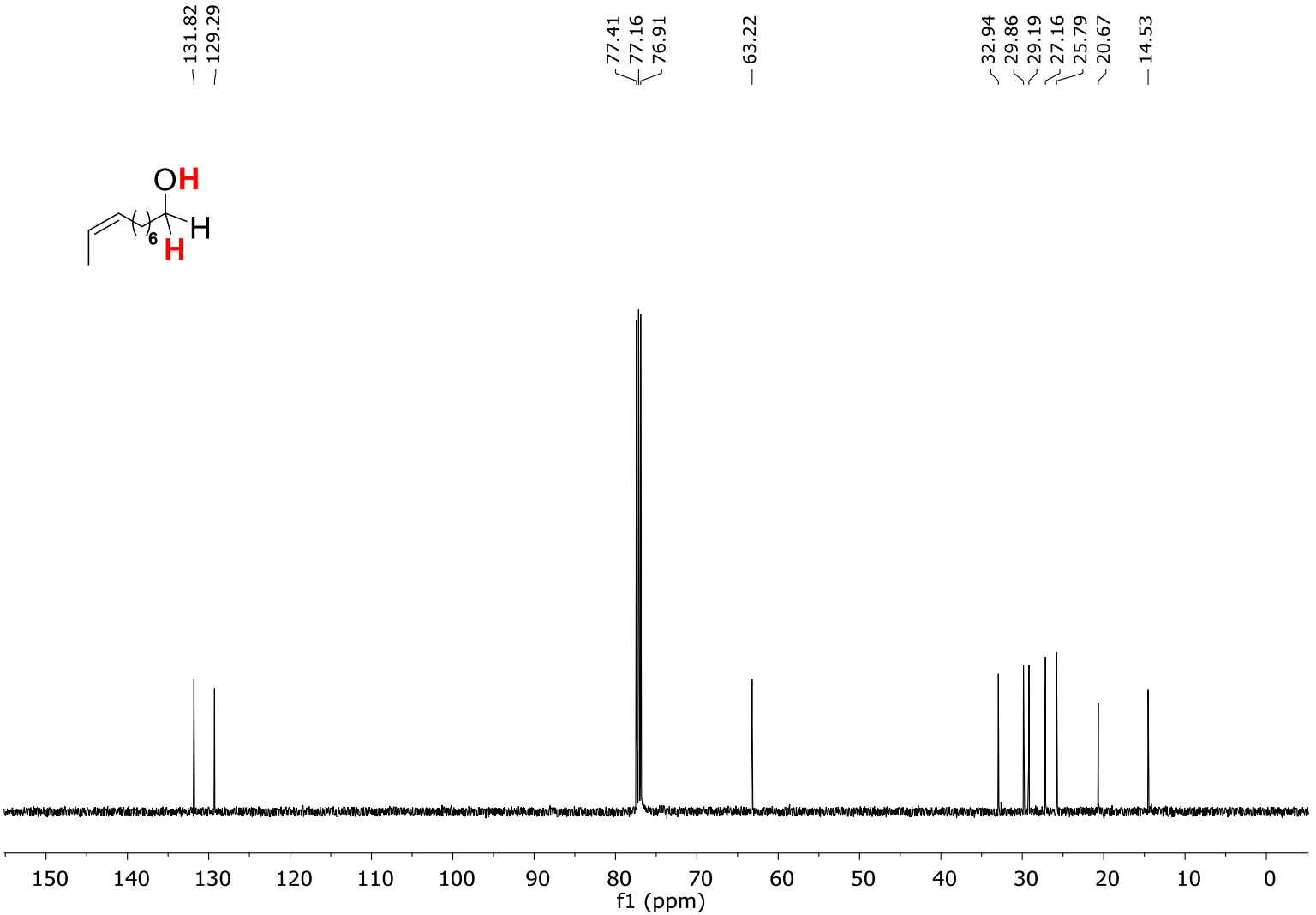


Figure SI.2.63. $^{13}C\{^{1}H\}$-NMR ($CDCl_3$, 125.8 MHz, 300 K) spectrum of product **12d.**

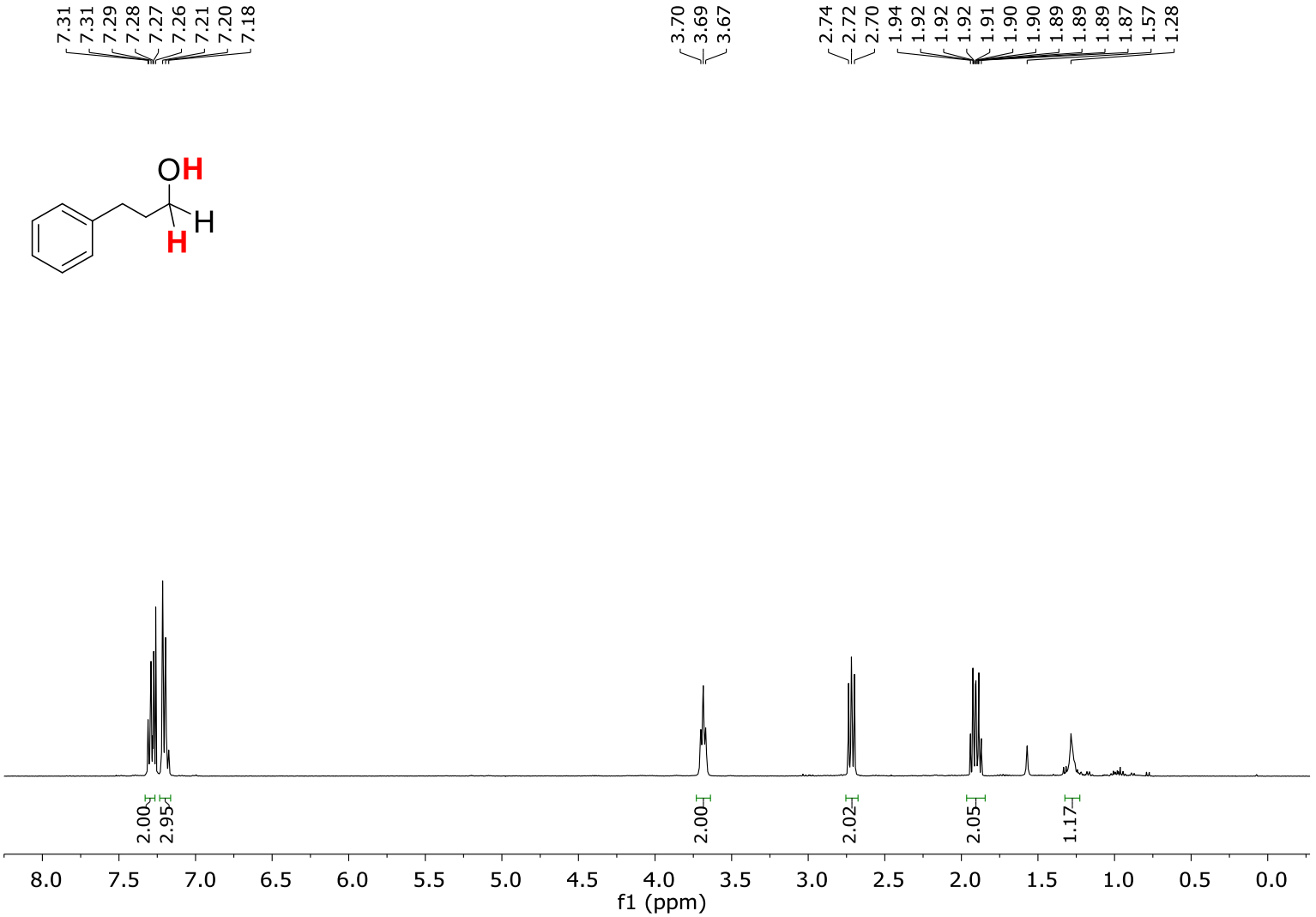


Figure SI.2.64. ^{1}H-NMR ($CDCl_3$, 400 MHz, 300 K) spectrum of product **12e.**

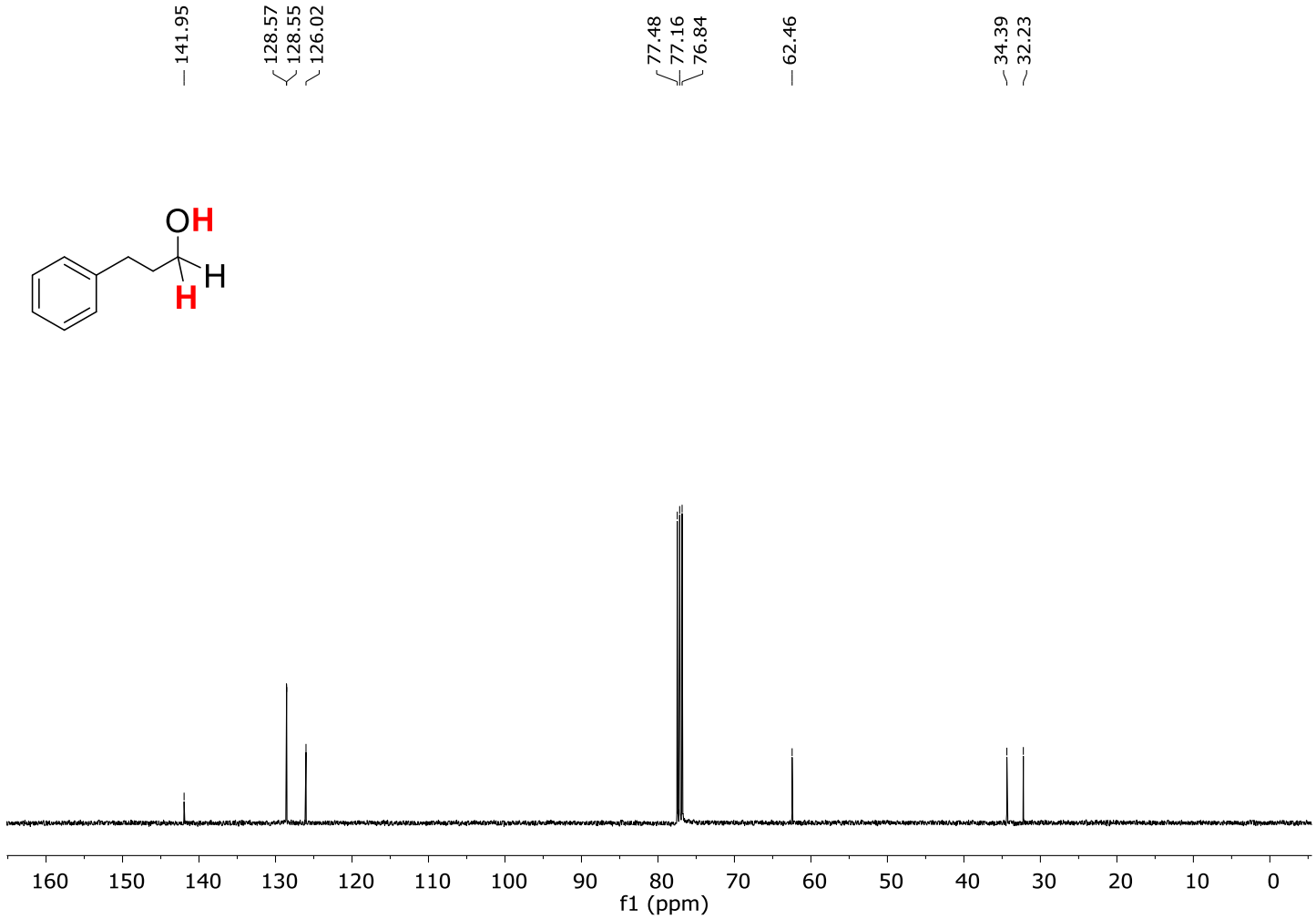


Figure SI.2.65. $^{13}C\{^{1}H\}$-NMR ($CDCl_3$, 100.6 MHz, 300 K) spectrum of product **12e.**

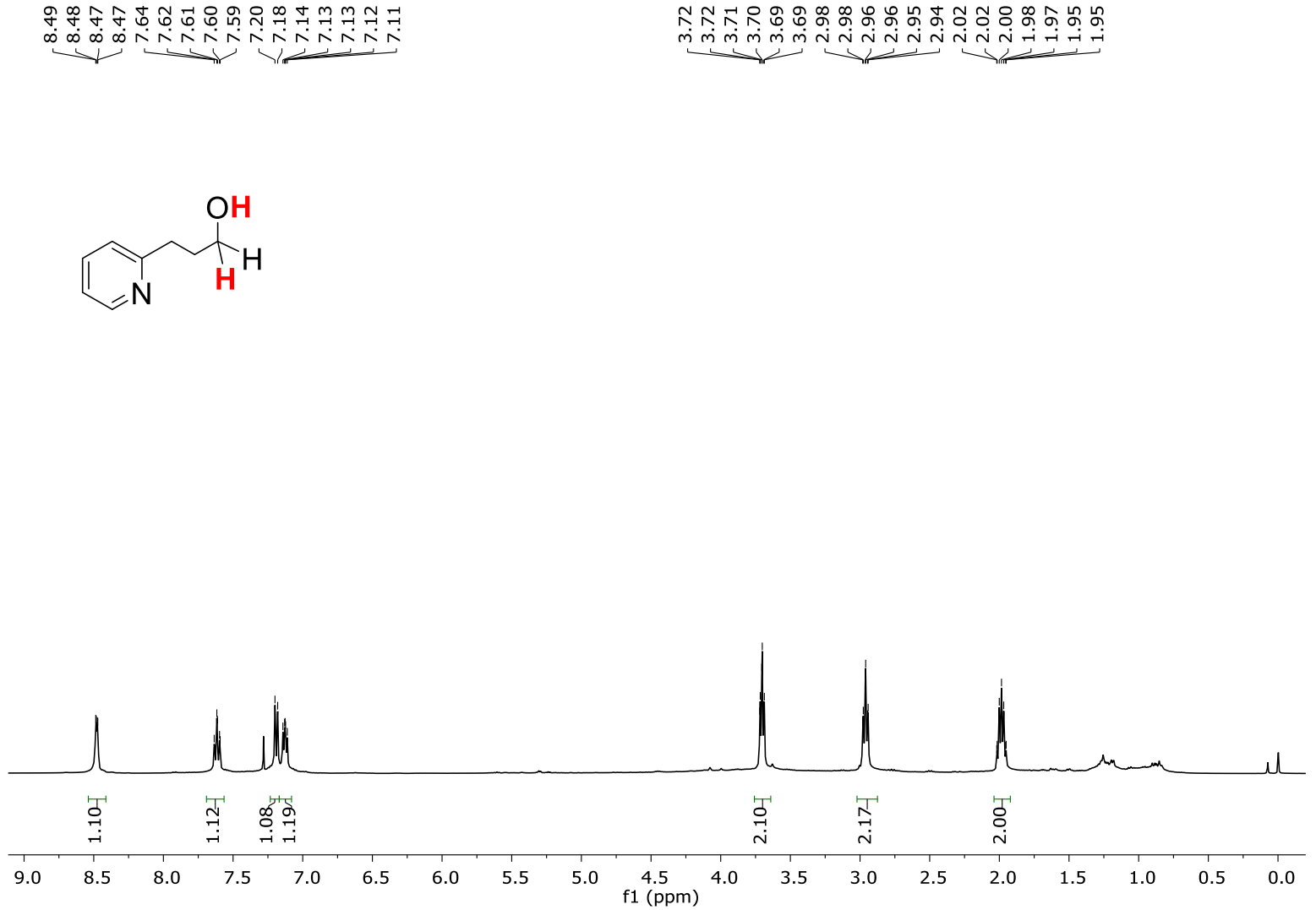


Figure SI.2.66. ^{1}H-NMR ($CDCl_3$, 400 MHz, 300 K) spectrum of product **12f.**

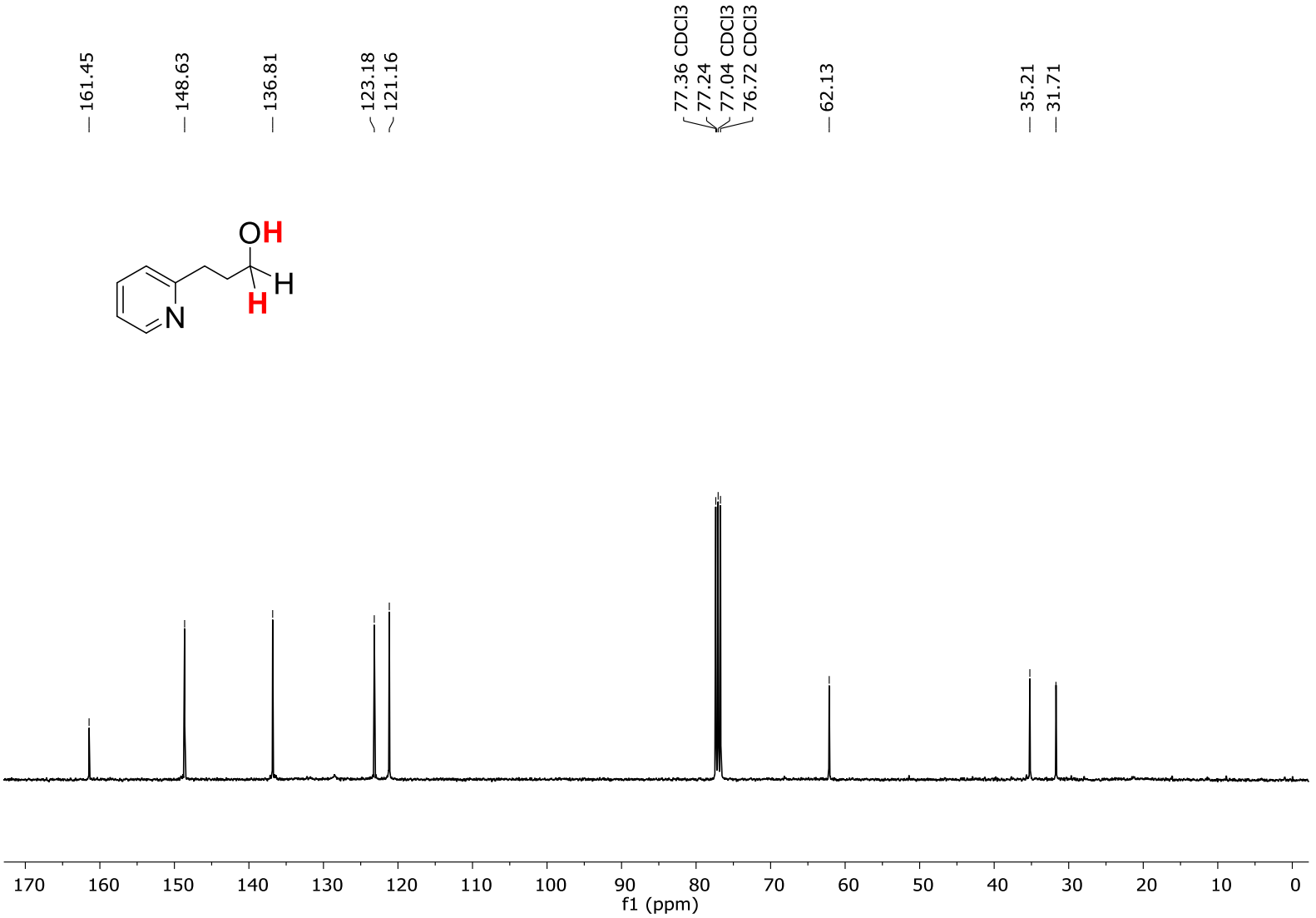


Figure SI.2.67. $^{13}C\{^{1}H\}$-NMR ($CDCl_3$, 100.6 MHz, 300 K) spectrum of product **12f.**

4. NMR of the deuterated products

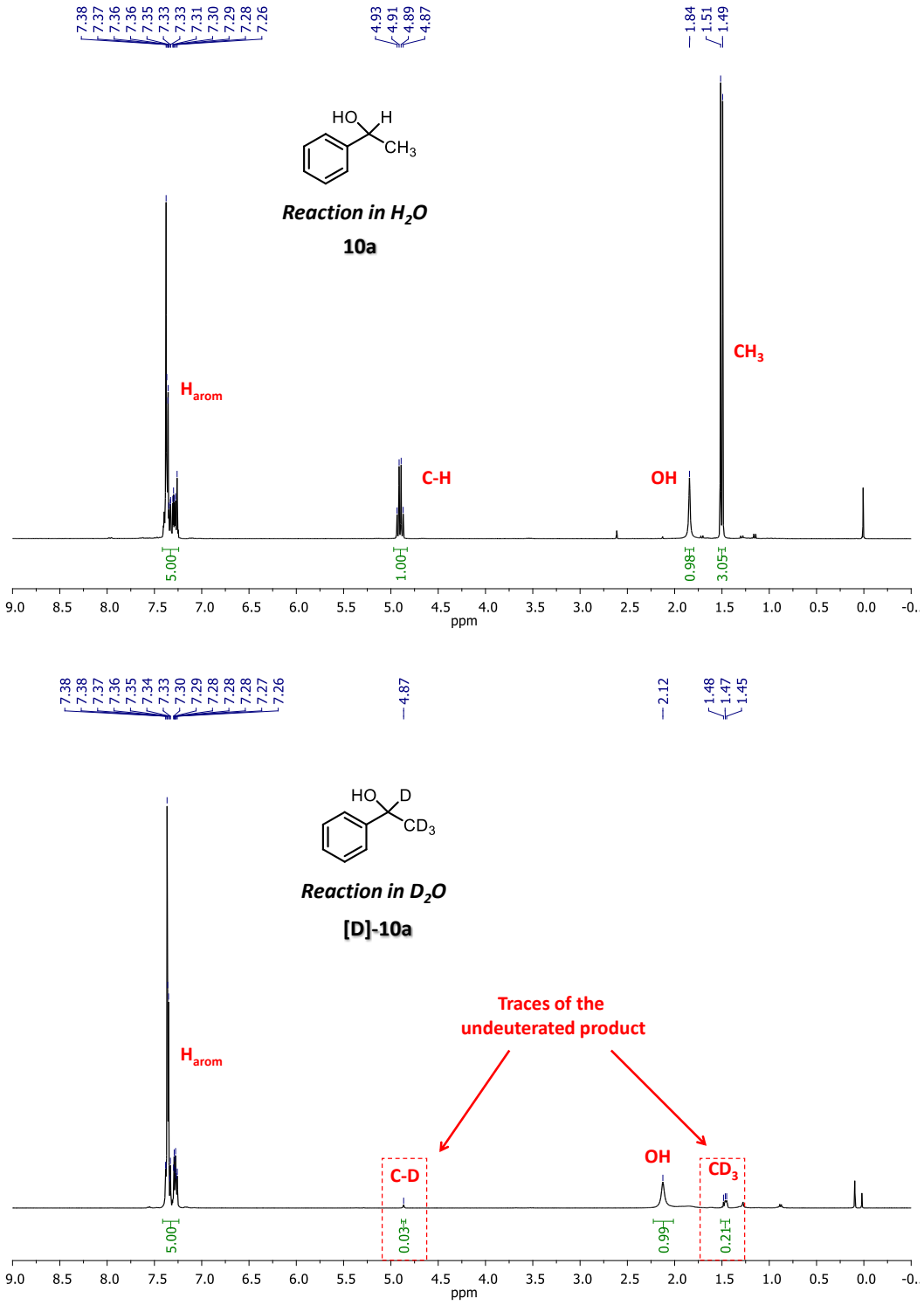


Figure SI.2.68. ^{1}H-NMR spectrum ($CDCl_3$, 400 MHz, 300 K) of the isolated product **10a** and **[D]-10a** using H_2O (Top) or D_2O (99.9% in deuterium) (Bottom) in the solvent mixture, respectively. Conditions: **1** (3.8 μmol, 3 mol%), **PS$_{Ir}$** (2.5 μmol, 2 mol%), substrate (0.126 mmols, 12.4 mM) in H_2O (or D_2O):CH_3CN:Et_3N (7:3:0.2 mL) irradiated at λ= 447 nm and 30 ºC, under N_2.

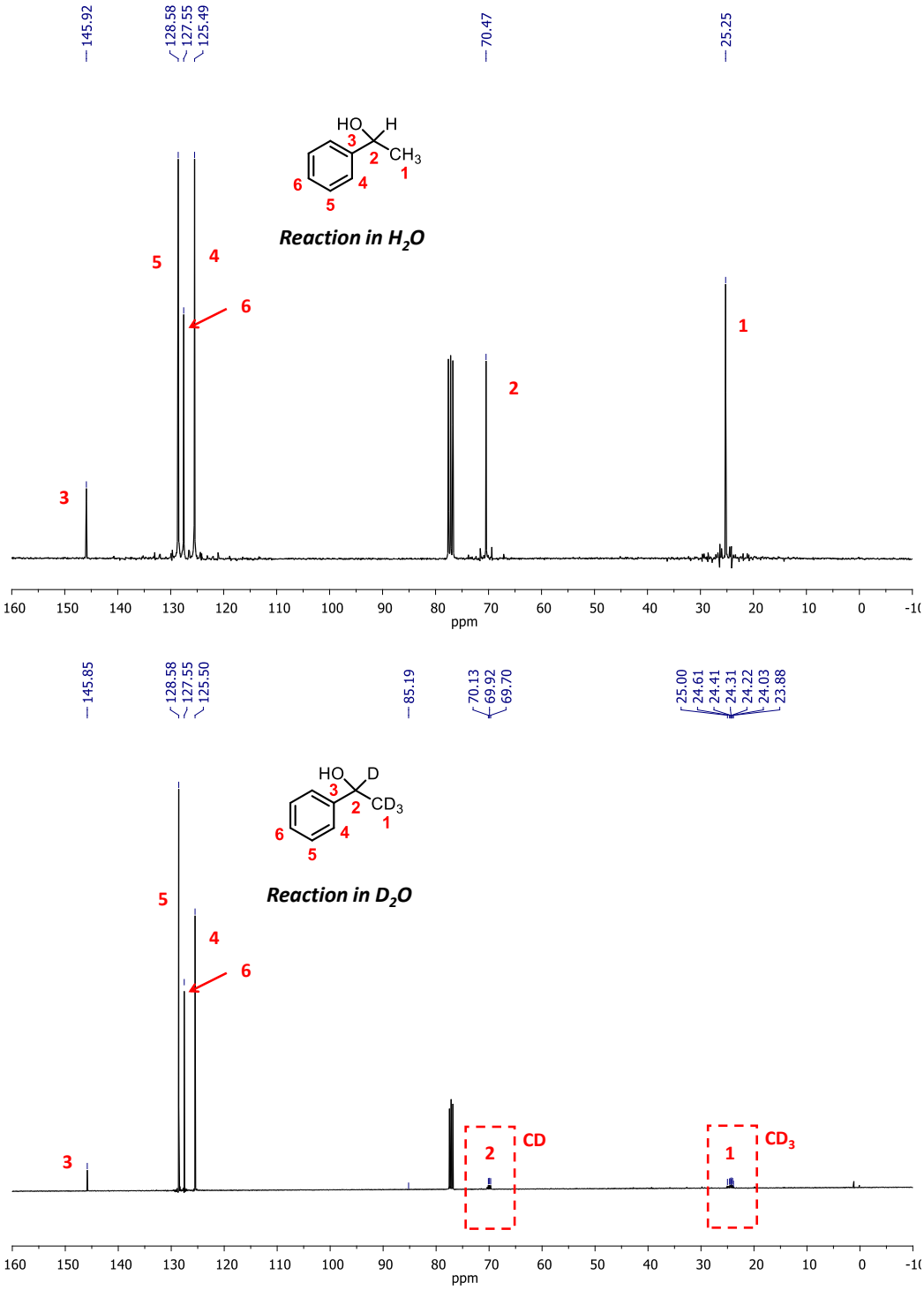


Figure SI.2.69. $^{13}C\{^{1}H\}$-NMR spectrum ($CDCl_3$, 100.6 MHz, 300 K) of the isolated product **10a** and **[D]-10a** using H_2O (Top) or D_2O (99.9% in deuterium) (Bottom) in the solvent mixture, respectively. Conditions: **1** (3.8 μmol, 3 mol%), **PS$_{Ir}$** (2.5 μmol, 2 mol%), substrate (0.126 mmols, 12.4 mM) in H_2O (or D_2O):CH_3CN:Et_3N (7:3:0.2 mL) irradiated at λ= 447 nm and 30 ºC, under N_2.

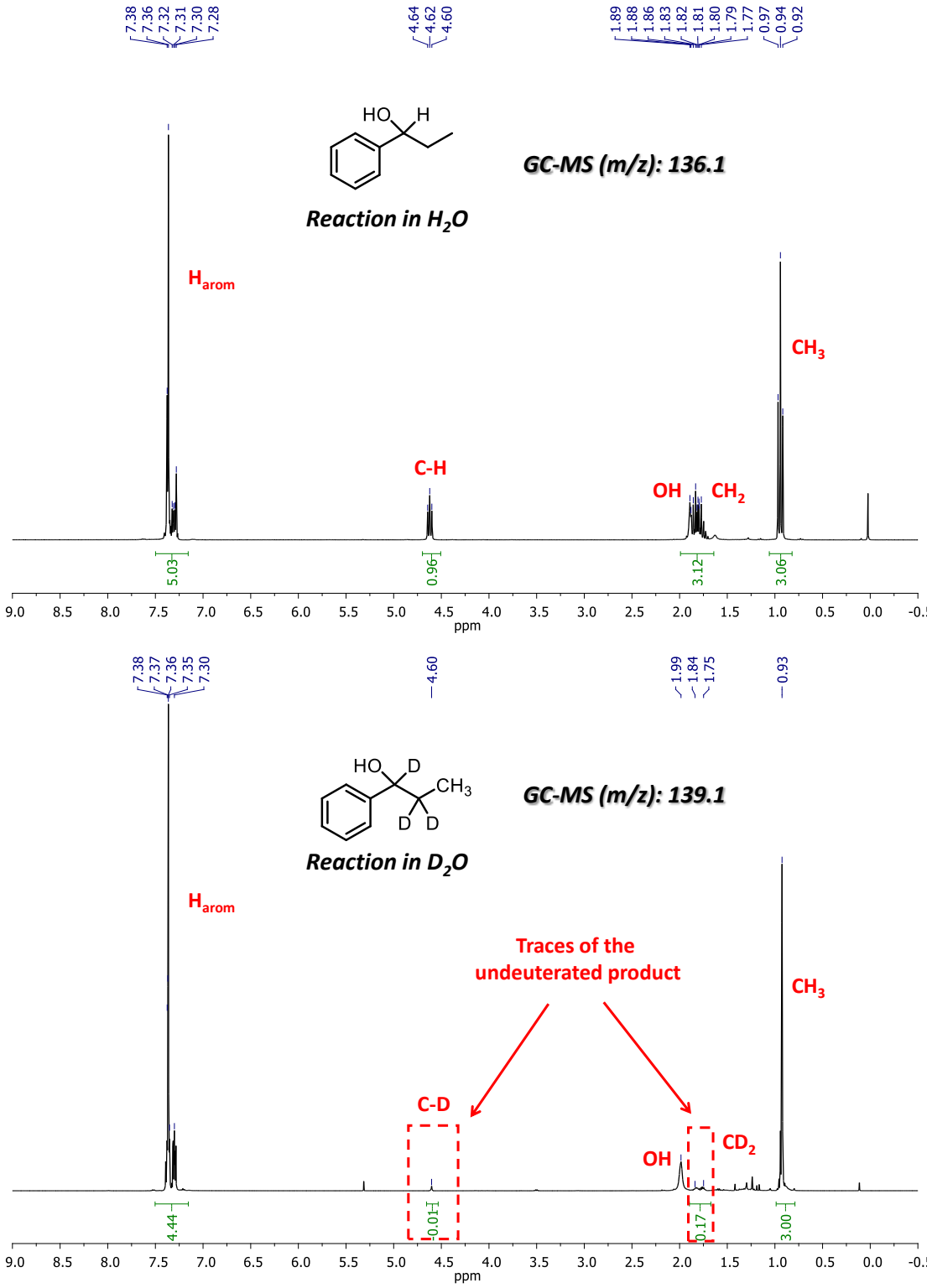


Figure SI.2.70. ^{1}H-NMR spectrum ($CDCl_3$, 400 MHz, 300 K) of the isolated product **10b** and **[D]-10b** using H_2O (Top) or D_2O (99.9 % in deuterium) (Bottom) in the solvent mixture, respectively. Conditions: **1** (3.8 μmol, 3 mol%), **PS$_{Ir}$** (2.5 μmol, 2 mol%), substrate (0.126 mmol, 12.4 mM) in H_2O (or D_2O):CH_3CN:Et_3N (7:3:0.2 mL) irradiated at λ= 447 nm and 30 ºC, under N_2.

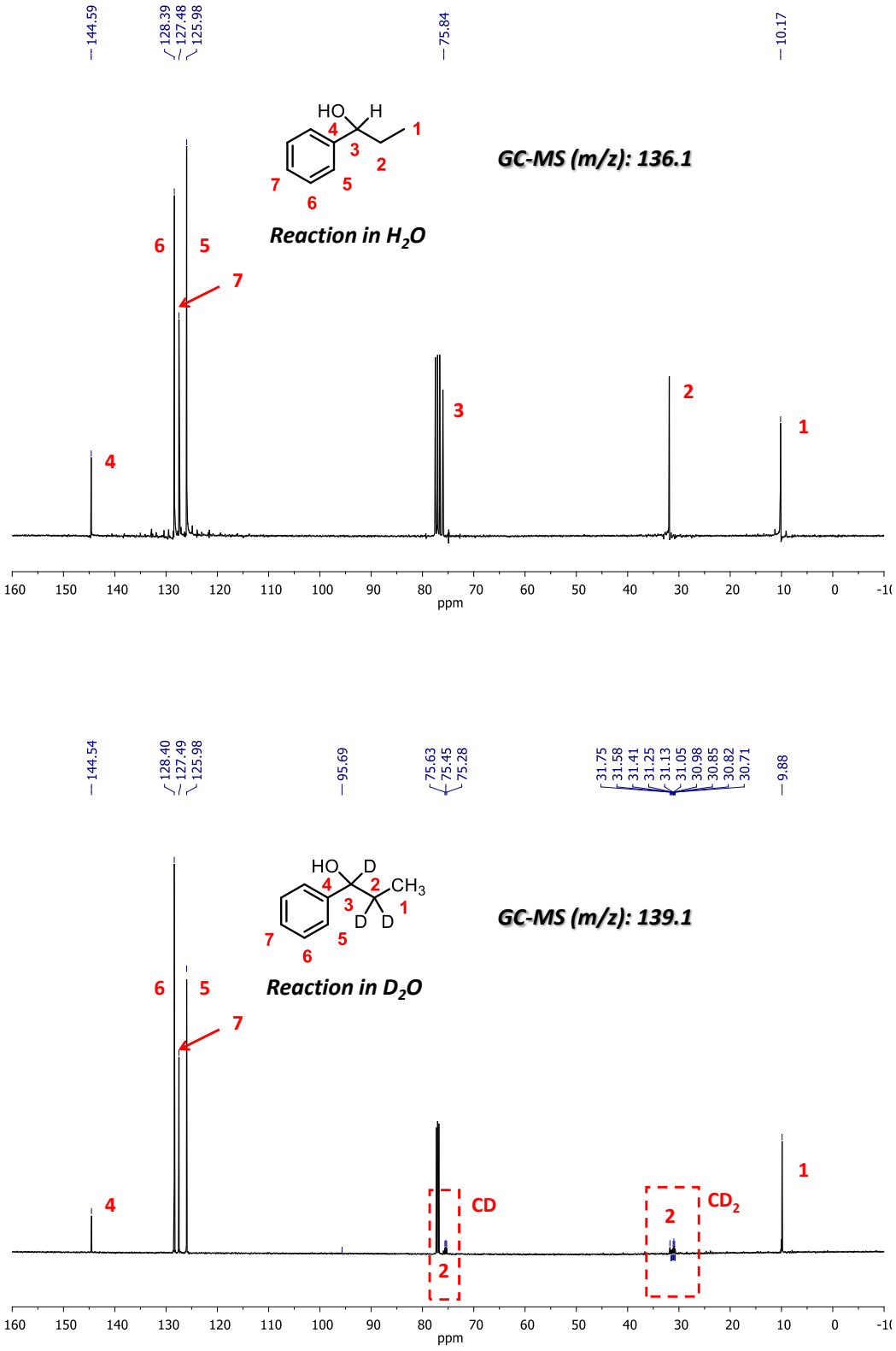


Figure SI.2.71. $^{13}C\{^{1}H\}$-NMR spectrum ($CDCl_3$, 100.6 MHz, 300 K) of the isolated product **10b** and **[D]-10b** using H_2O (Top) or D_2O (99.9 % in deuterium) (Bottom) in the solvent mixture, respectively. Conditions: **1** (3.8 μmol, 3 mol%), **PS$_{Ir}$** (2.5 μmol, 2 mol%), substrate (0.126 mmol, 12.4 mM) in H_2O (or D_2O):CH_3CN:Et_3N (7:3:0.2 mL) irradiated at λ= 447 nm and 30 ºC, under N_2.

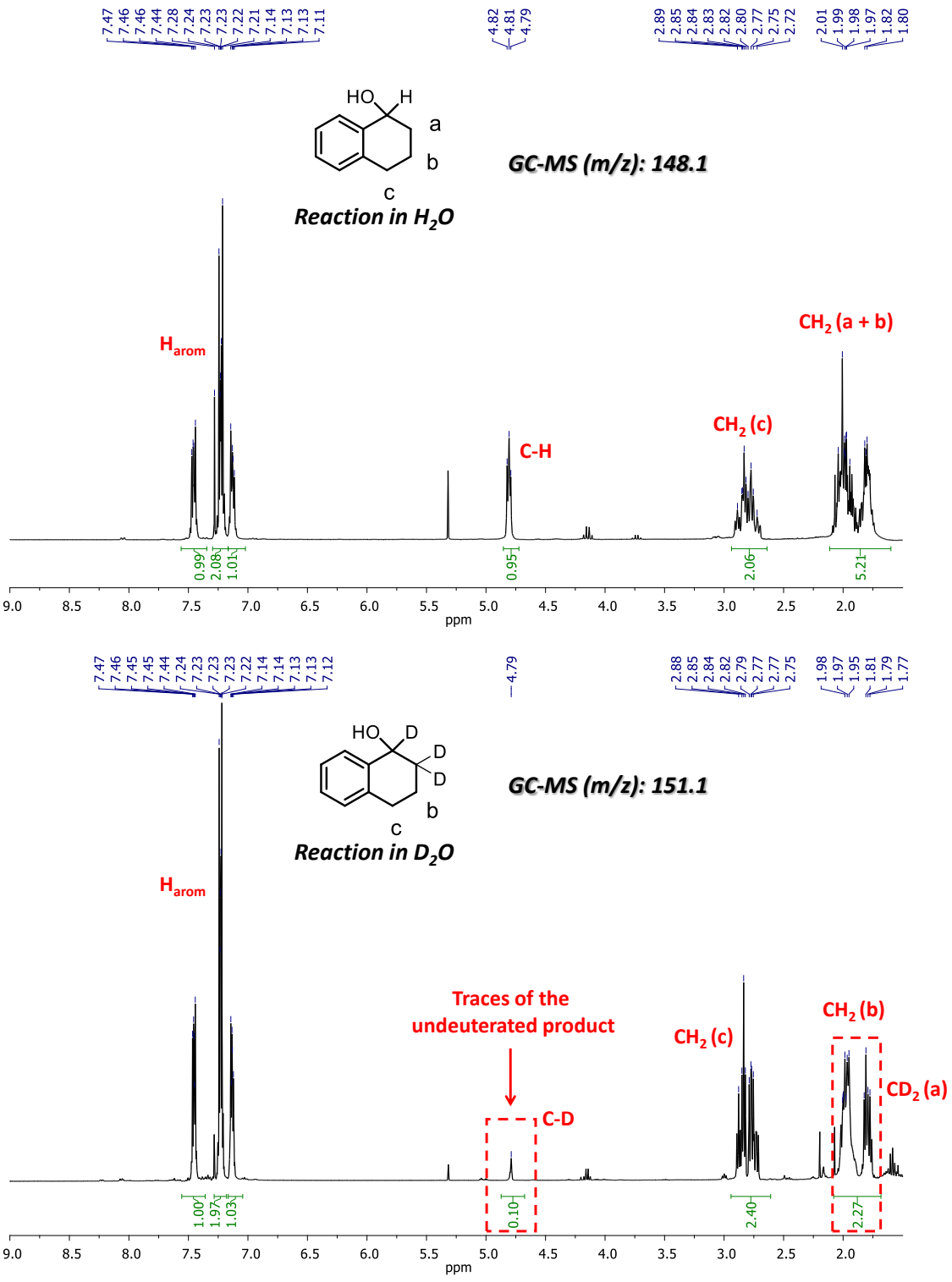


Figure SI.2.72. ^{1}H-NMR spectrum ($CDCl_3$, 400 MHz, 300 K) of the isolated product **10j** and **[D]-10j** using H_2O (Top) or D_2O (99.9 % in deuterium) (Bottom) in the solvent mixture, respectively. Conditions: **1** (3.8 μmol, 3 mol%), **PS$_{Ir}$** (2.5 μmol, 2 mol%), substrate (0.126 mmol, 12.4 mM) in H_2O (or D_2O):CH_3CN:Et_3N (7:3:0.2 mL) irradiated at λ= 447 nm and 30 ºC, under N_2.

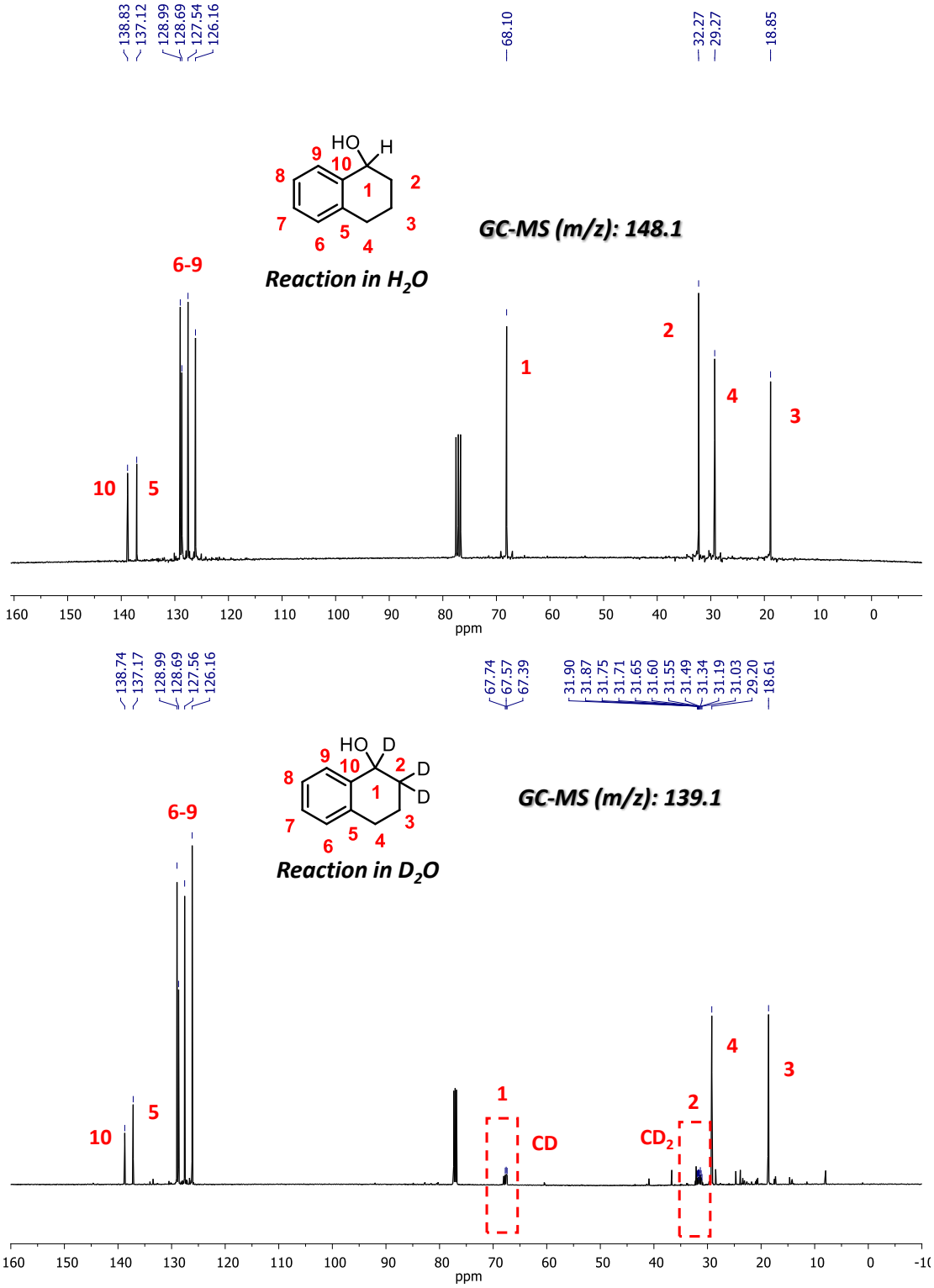


Figure SI.2.73. $^{13}C\{^1H\}$-NMR spectrum ($CDCl_3$, 100.6 MHz, 300 K) of the isolated product **10j** and **[D]-10j** using H_2O (Top) or D_2O (99.9 % in deuterium) (Bottom) in the solvent mixture, respectively. Conditions: **1** (3.8 μmol, 3 mol%), **PS$_{Ir}$** (2.5 μmol, 2 mol%), substrate (0.126 mmol, 12.4 mM) in H_2O (or D_2O):CH_3CN:Et_3N (7:3:0.2 mL) irradiated at λ= 447 nm and 30 ºC, under N_2.

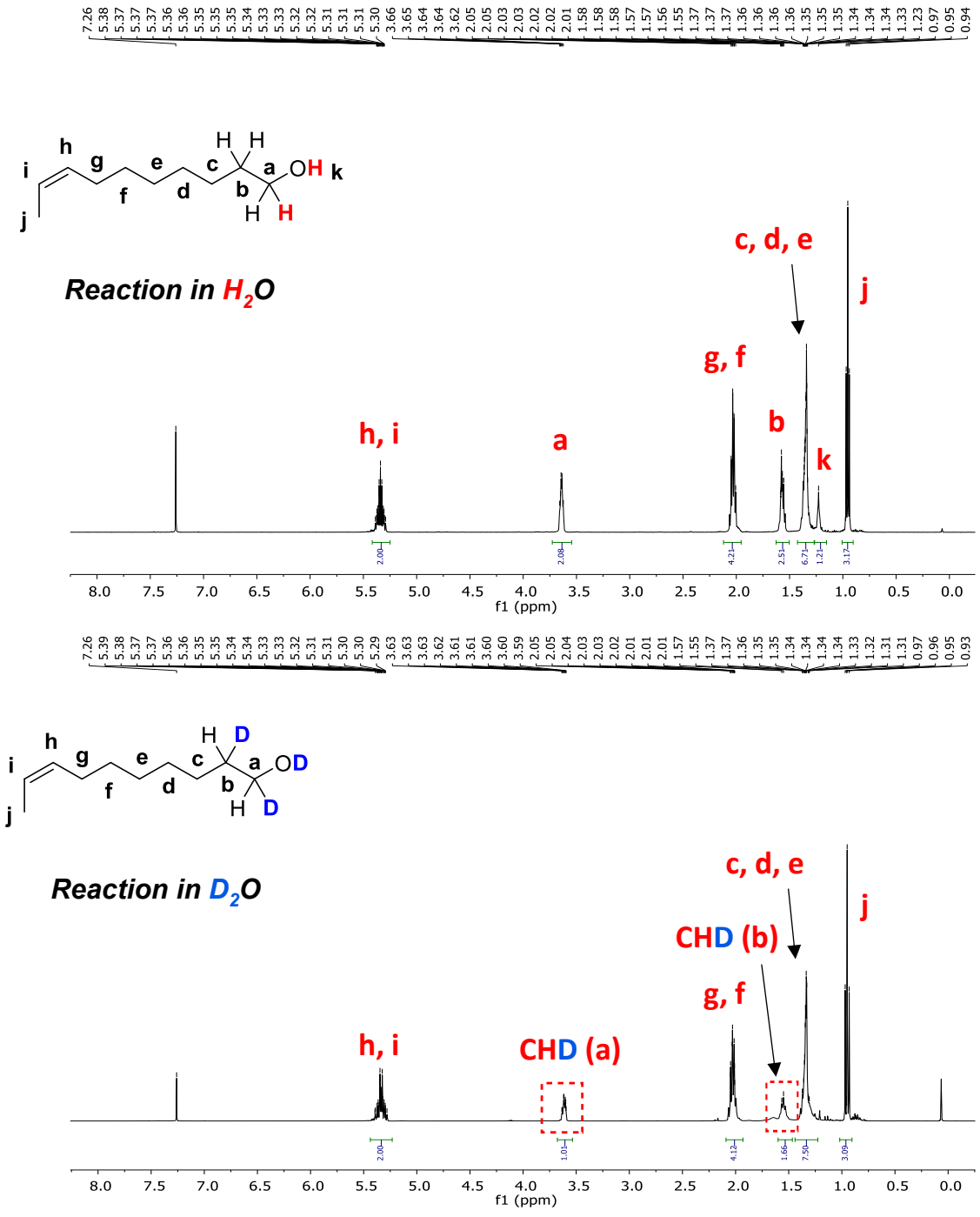


Figure SI.2.74. ^{1}H-NMR spectrum ($CDCl_3$, 400 MHz, 300 K) of the isolated products **16h** and **[D]-16h** using H_2O (Top) or D_2O (99.9 % in deuterium) (Bottom) in the solvent mixture, respectively. Conditions: **1** (6 mol%), **PS$_{Cu}$** (6 mol%), substrate (0.044 mmol, 4.4 mM) in H_2O (or D_2O):CH_3CN:^{i}Pr$_2$EtN (6:4:0.2 mL) irradiated at λ= 447 nm and 15 ºC for 5h, under N_2.

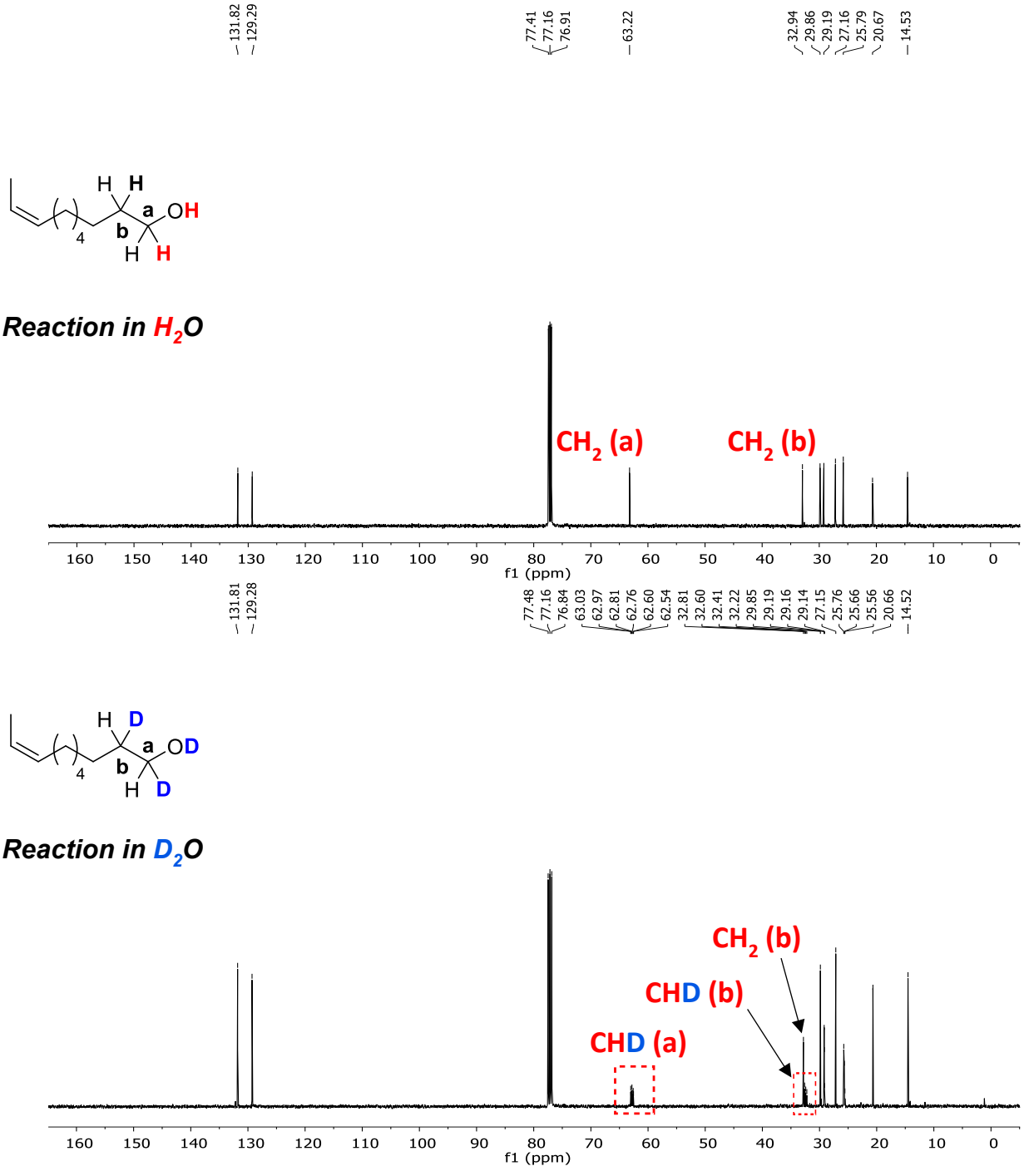


Figure SI.2.75. $^{13}C\{^{1}H\}$-NMR spectrum ($CDCl_3$, 100.6 MHz, 300 K) of the isolated products **16h** and **[D]-16h** using H_2O (Top) or D_2O (99.9 % in deuterium) (Bottom) in the solvent mixture, respectively. Conditions: **1** (6 mol%), **PS$_{Cu}$** (6 mol%), substrate (0.044 mmol, 4.4 mM) in H_2O (or D_2O):CH_3CN:$^{i}Pr_2EtN$ (6:4:0.2 mL) irradiated at λ= 447 nm and 15 ºC for 5h, under N_2.

5. Intramolecular reduction

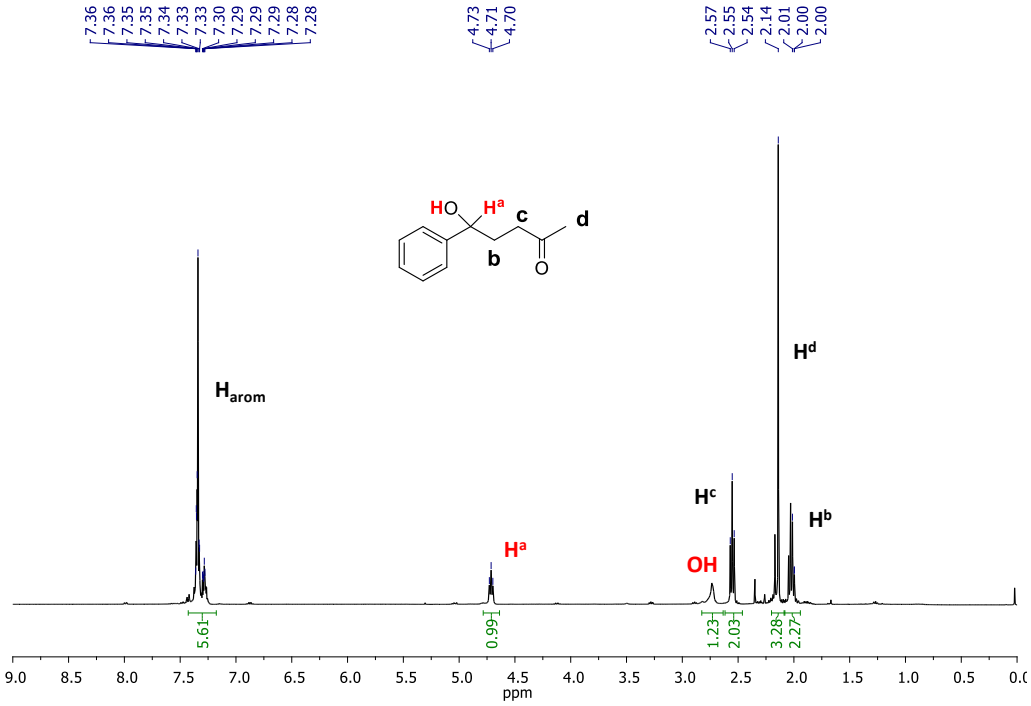


Figure SI.2.76. ^{1}H-NMR ($CDCl_3$, 400 MHz, 300 K) spectrum of the isolated product **5-Hydroxy-5-phenylpentan-2-one** (**9af**).

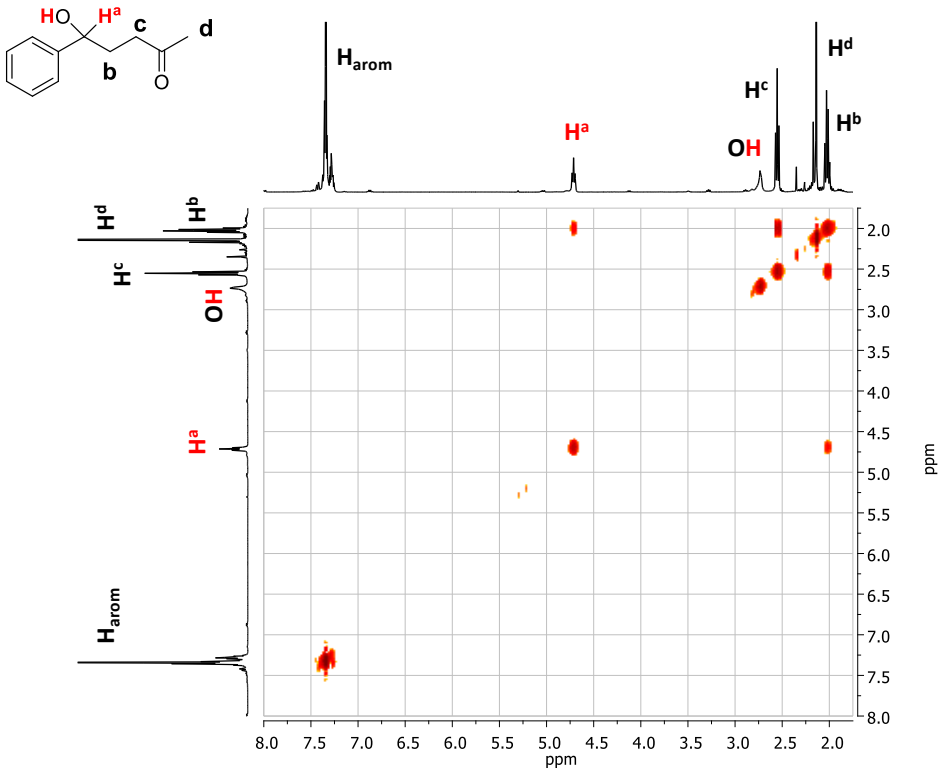


Figure SI.2.77. ^{1}H-^{1}H COSY ($CDCl_3$, 400 MHz, 300 K) spectrum of the isolated product **5-Hydroxy-5-phenylpentan-2-one** (**9af**).

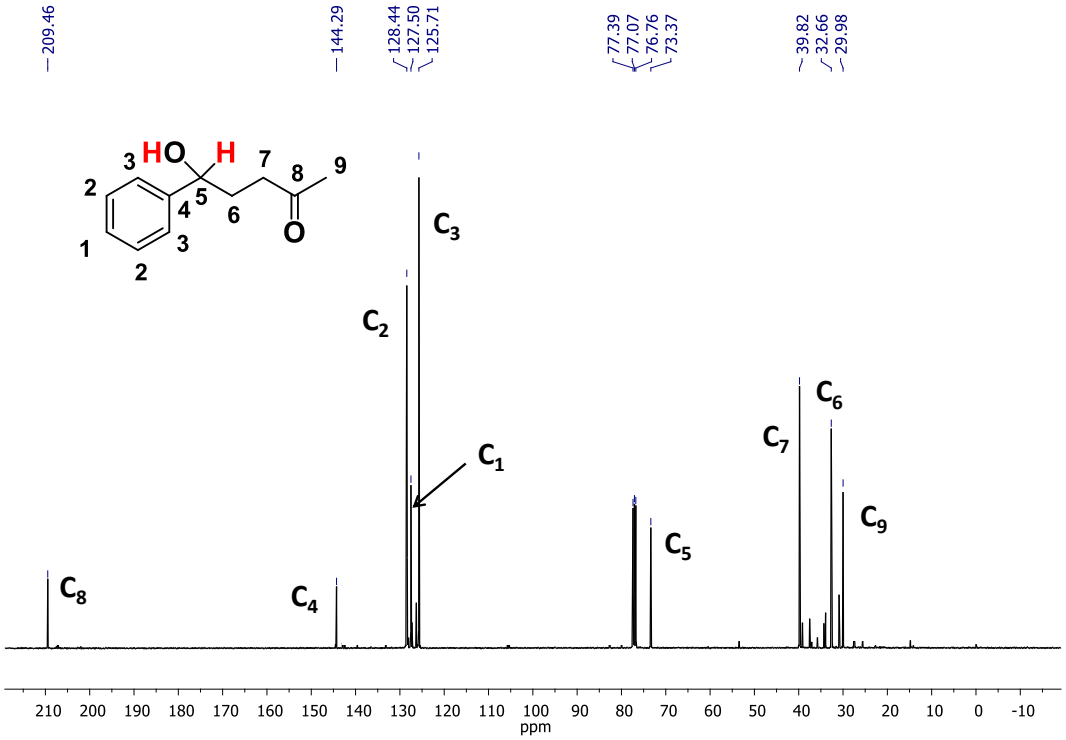


Figure SI.2.78. $^{13}C\{^{1}H\}$-NMR ($CDCl_3$, 101 MHz, 300 K) spectrum of the isolated product **5-Hydroxy-5-phenylpentan-2-one** (**9af**).

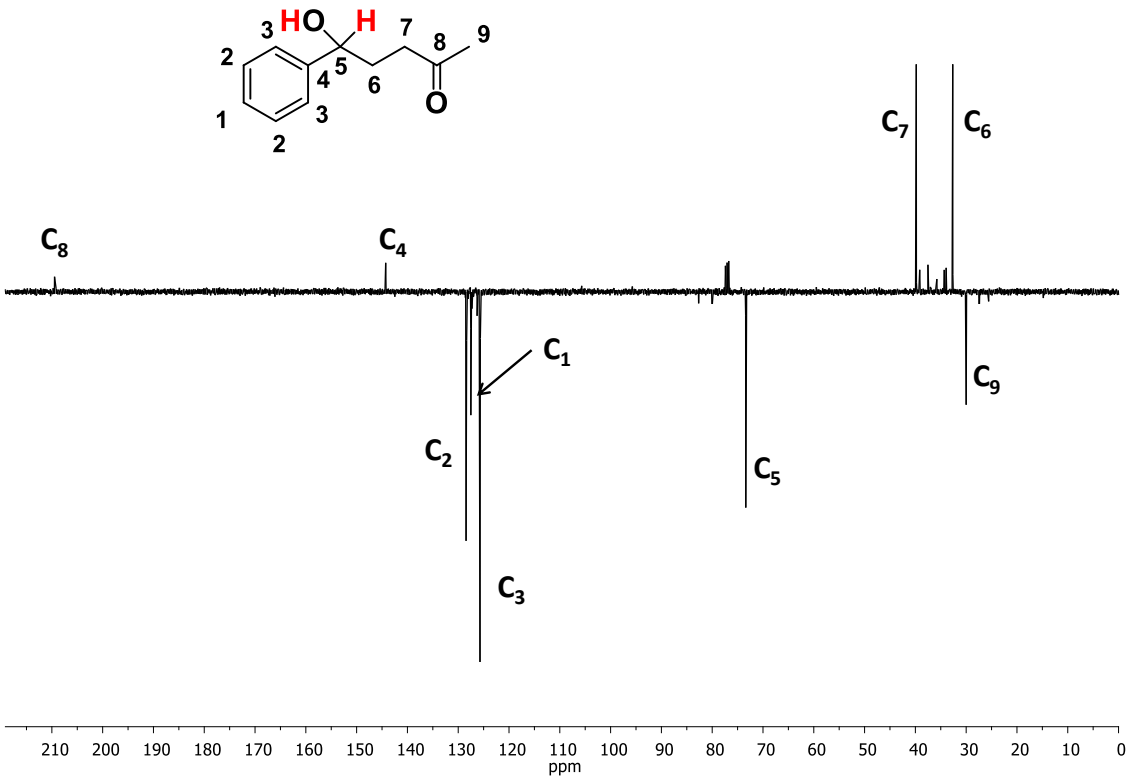


Figure SI.2.79. $^{13}C\{^{1}H\}$-DEPTQ-135-NMR ($CDCl_3$, 100.6 MHz, 300 K) spectrum of the isolated product **5-Hydroxy-5-phenylpentan-2-one** (**9af**).

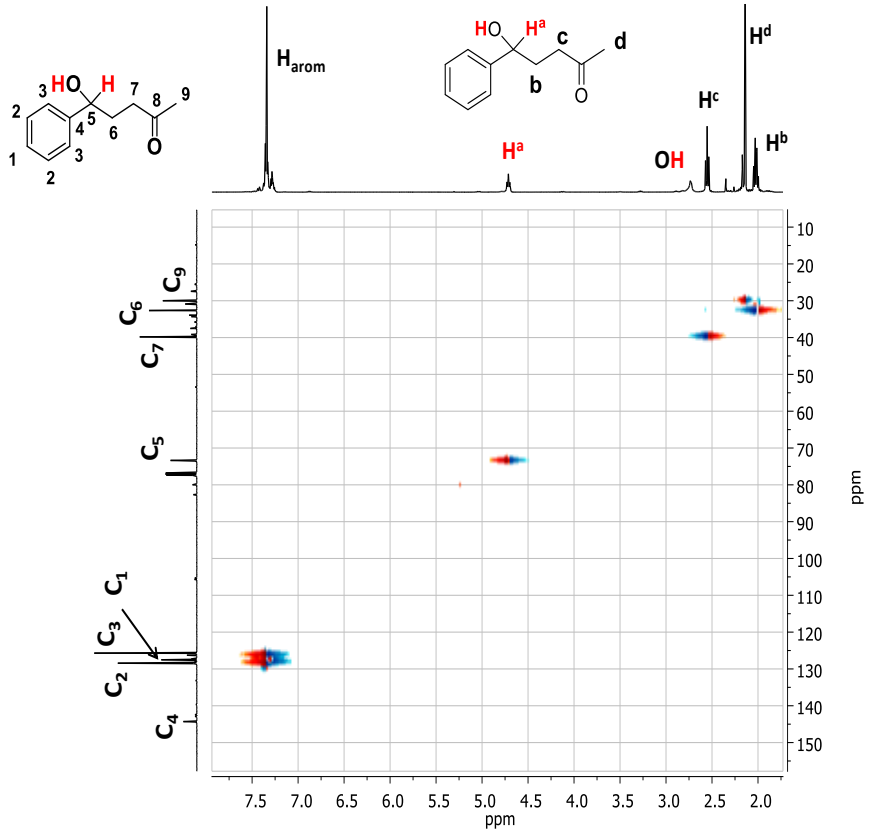


Figure SI.2.80. ^{1}H-^{13}C HSQC ($CDCl_3$, 400 MHz, 300 K) phase sensitive spectrum of the isolated product **5-Hydroxy-5-phenylpentan-2-one** (**9af**).

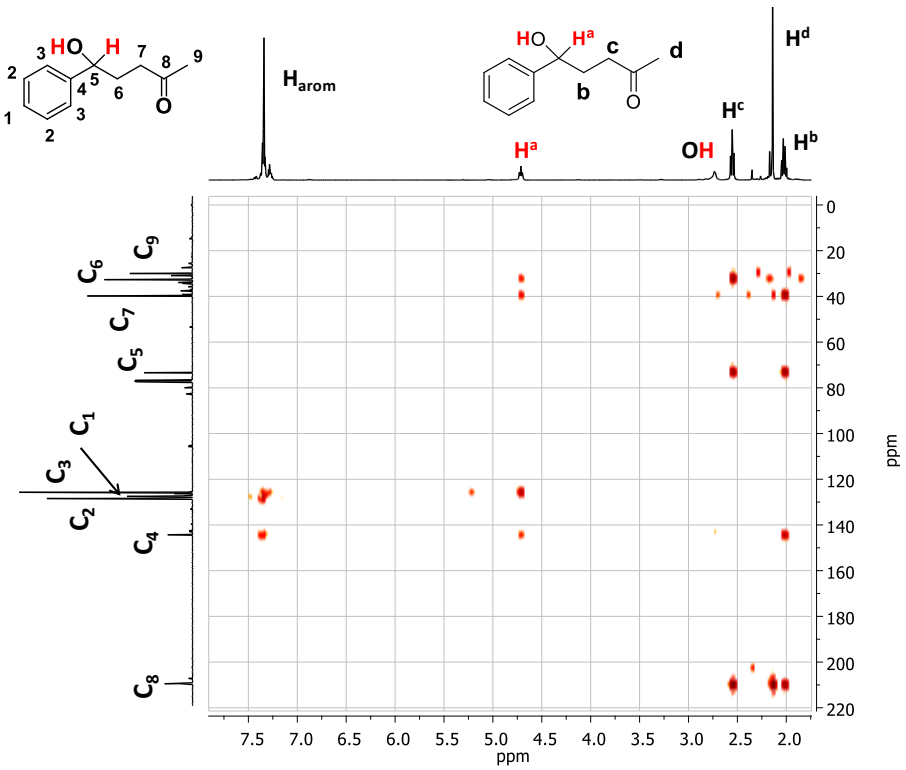


Figure SI.2.81. ^{1}H-^{13}C HMBC ($CDCl_3$, 400 MHz, 300 K) phase sensitive spectrum of the isolated product **5-Hydroxy-5-phenylpentan-2-one** (**9af**).

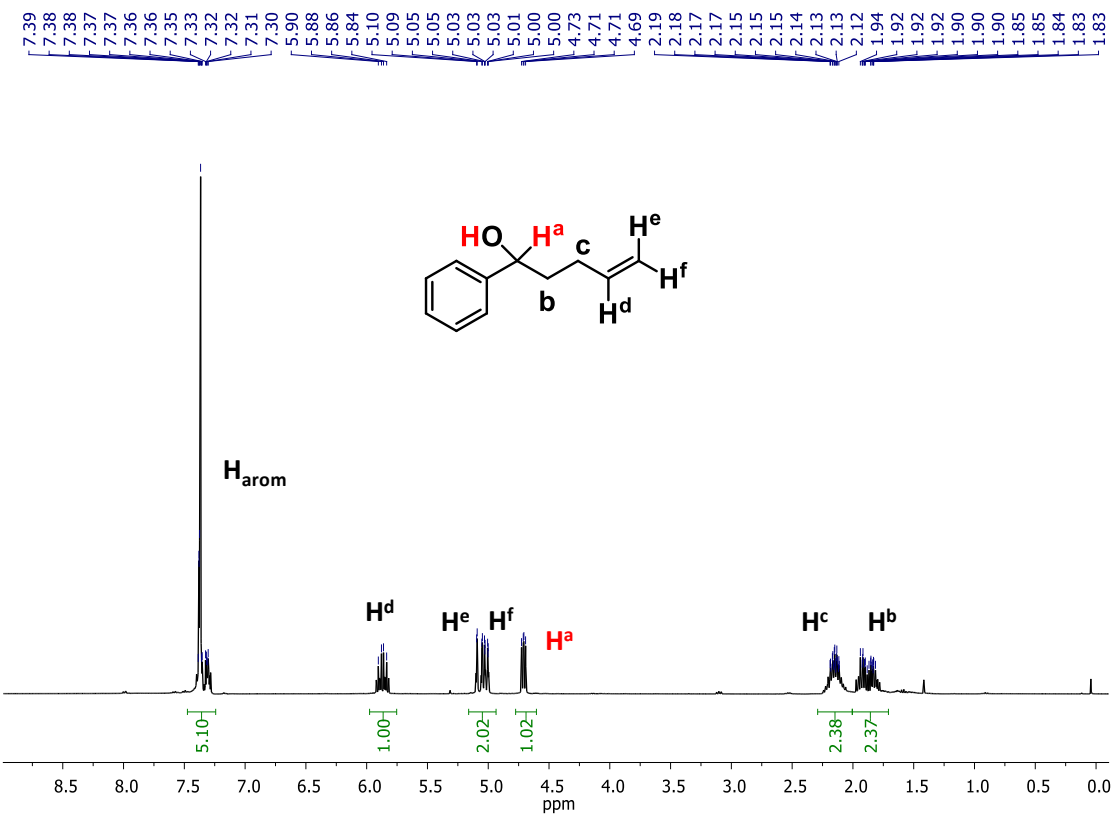


Figure SI.2.82. ^{1}H-NMR ($CDCl_3$, 400 MHz, 300 K) spectrum of the isolated product **1-Phenyl-4-penten-1-ol** (**9ag**).

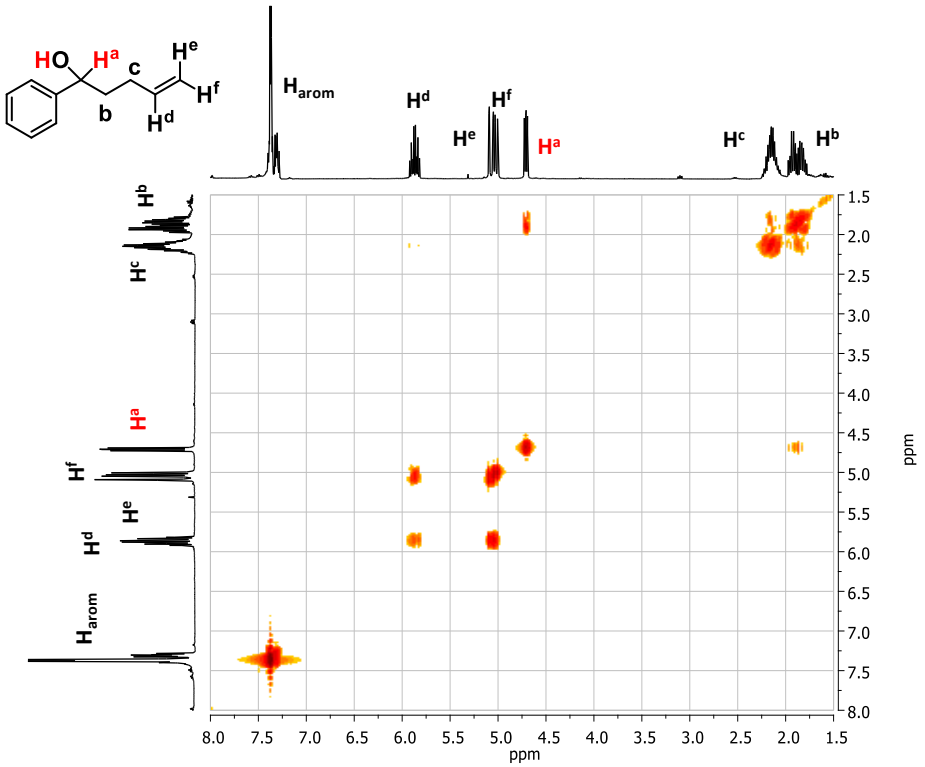


Figure SI.2.83. ^{1}H-^{1}H COSY ($CDCl_3$, 400 MHz, 300 K) spectrum of the isolated product **1-Phenyl-4-penten-1-ol** (**9ag**).

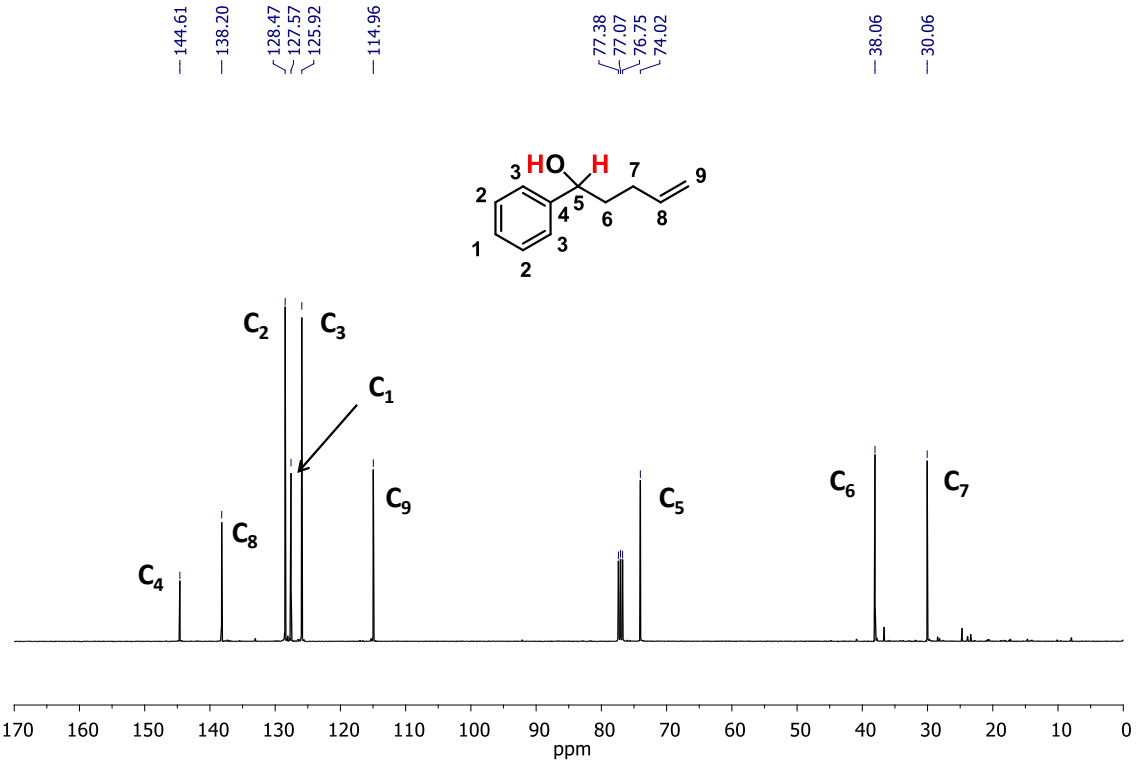


Figure SI.2.84. $^{13}C\{^{1}H\}$-NMR ($CDCl_3$, 100.6 MHz, 300 K) spectrum of the isolated product **1-Phenyl-4-penten-1-ol** (**9ag**).

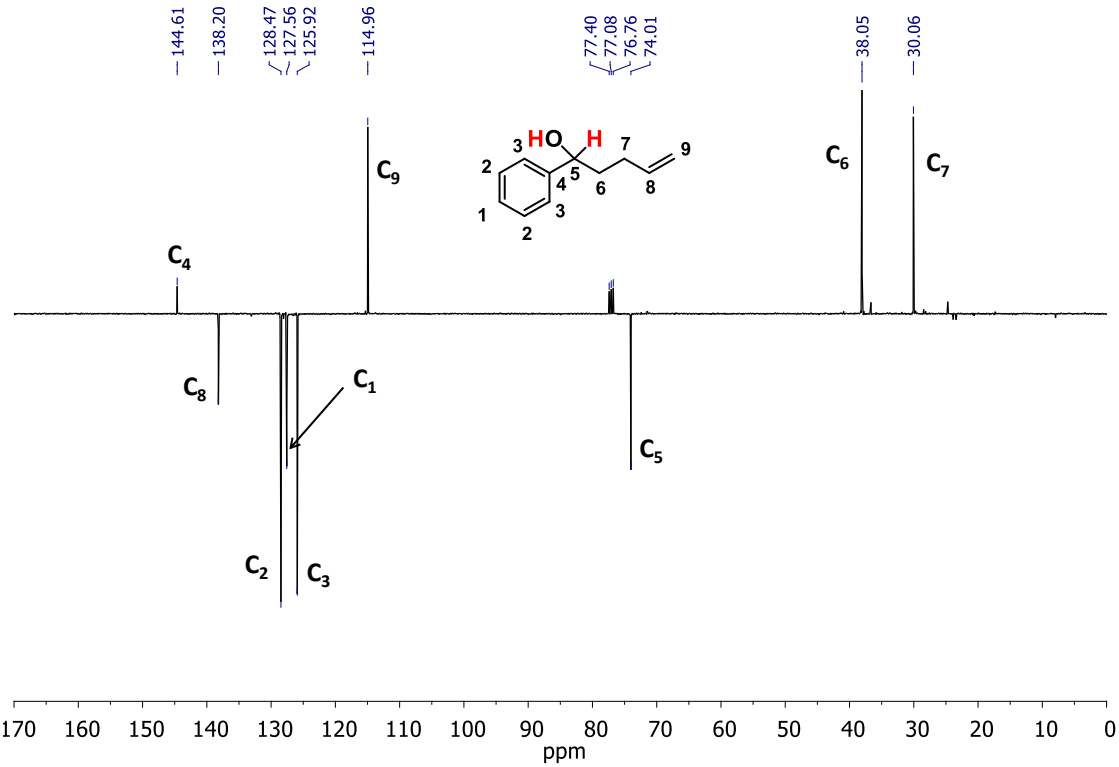


Figure SI.2.85. $^{13}C\{^{1}H\}$-DEPTQ-135-NMR ($CDCl_3$, 100.6 MHz, 300 K) spectrum of the isolated product **1-Phenyl-4-penten-1-ol** (**9ag**).

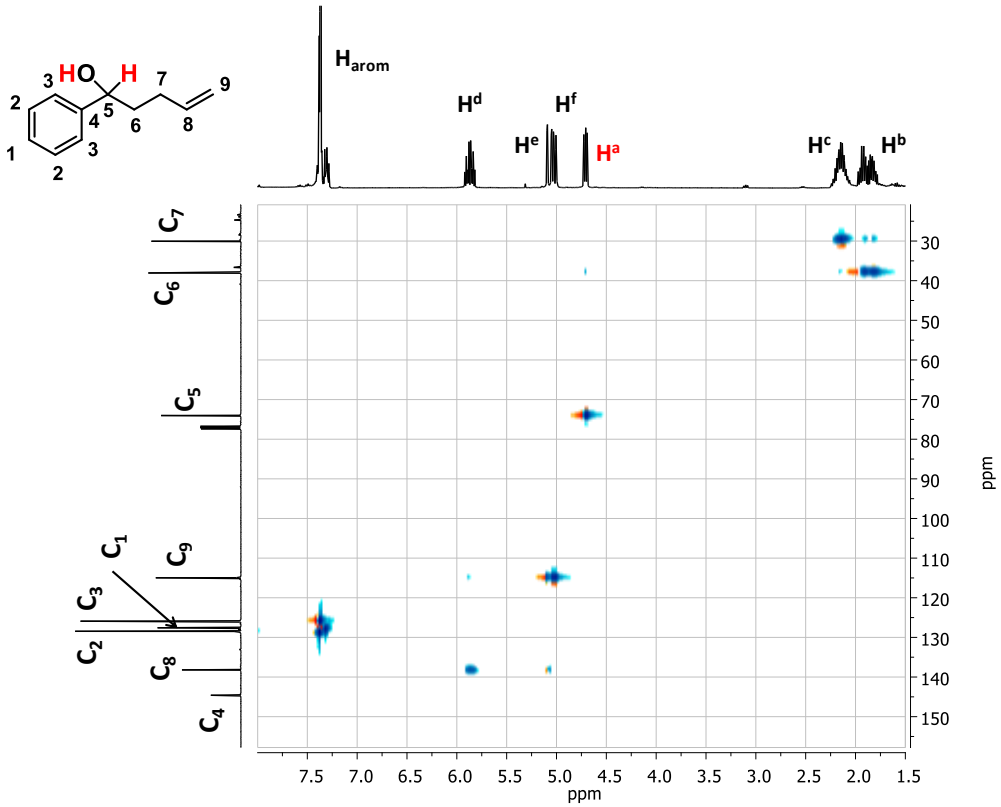


Figure SI.2.86. ^{1}H-^{13}C HSQC ($CDCl_3$, 400 MHz, 300 K) phase sensitive spectrum of the isolated product **1-Phenyl-4-penten-1-ol** (**9ag**).

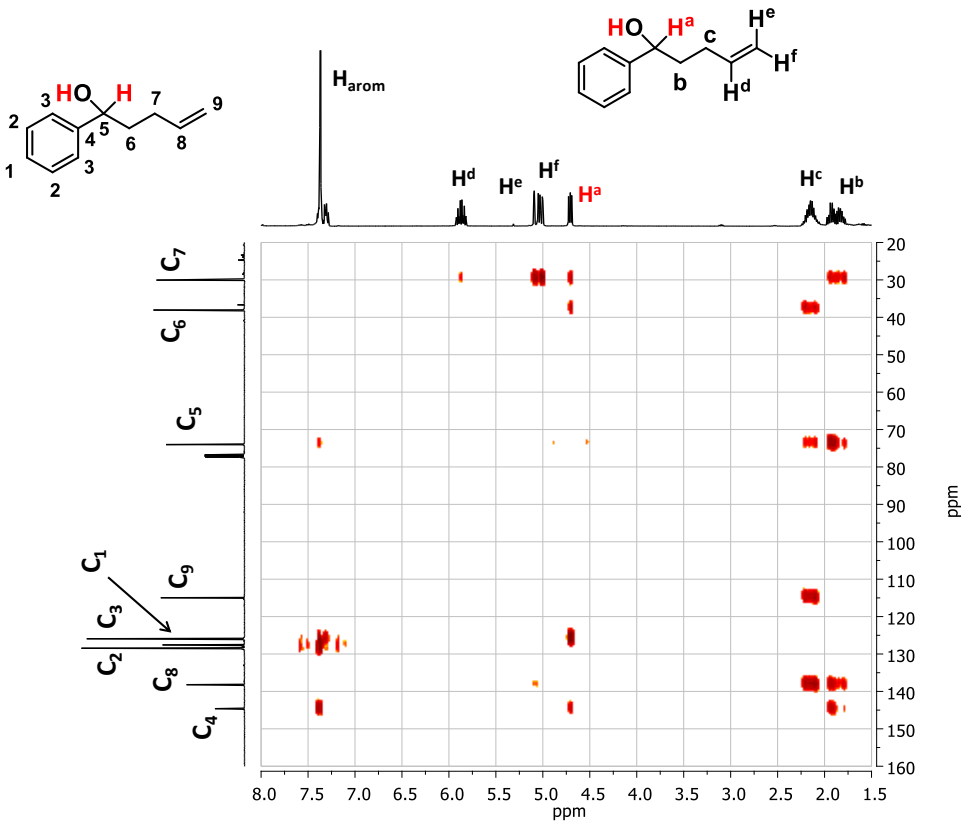


Figure SI.2.87. ^{1}H-^{13}C HMBC ($CDCl_3$, 400 MHz, 300 K) phase sensitive spectrum of the isolated product **1-Phenyl-4-penten-1-ol** (**9ag**).

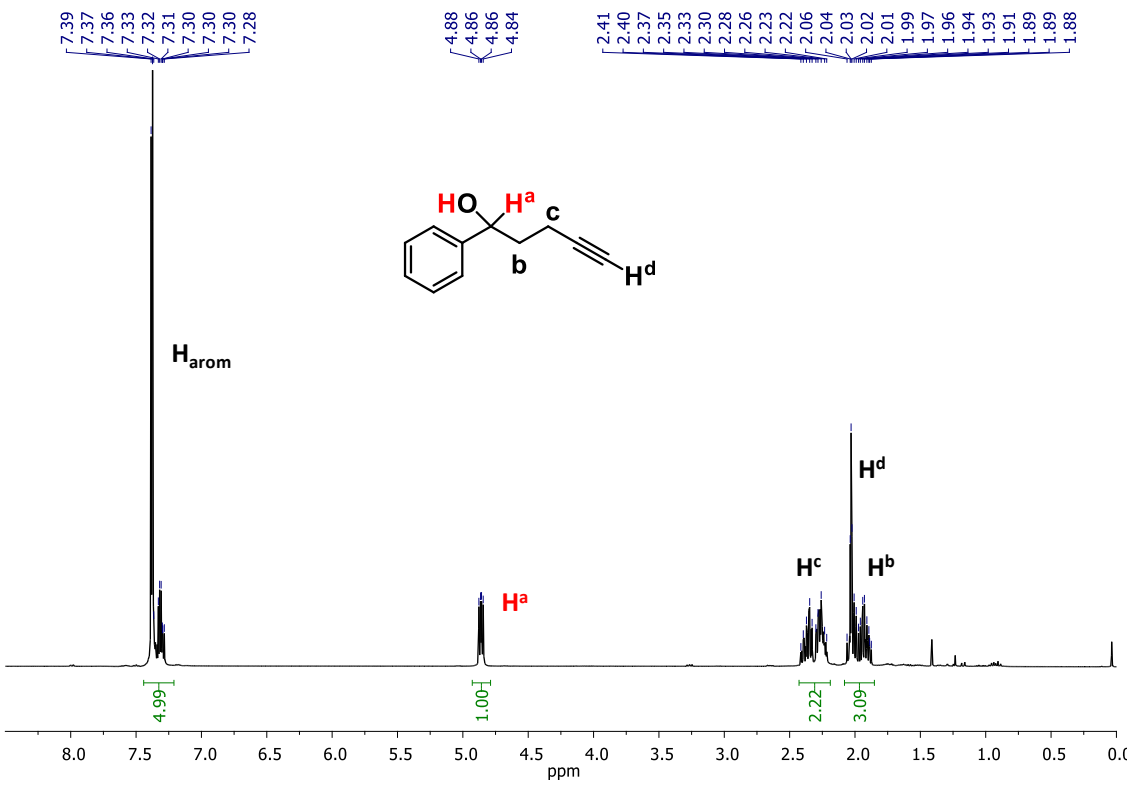


Figure SI.2.88. ^{1}H-NMR ($CDCl_3$, 400 MHz, 300 K) spectrum of the isolated product **1-Phenyl-4-pentyn-1-ol** (**9ah**).

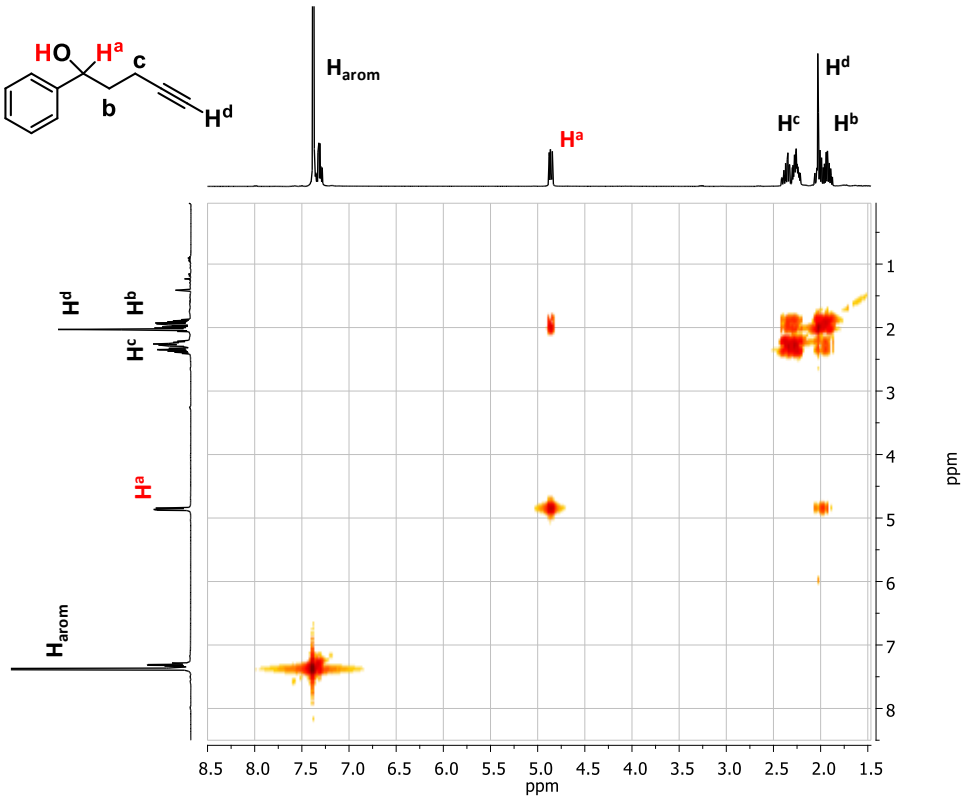


Figure SI.2.89. ^{1}H-^{1}H COSY ($CDCl_3$, 400 MHz, 300 K) spectrum of the isolated product **1-Phenyl-4-pentyn-1-ol** (**9ah**).

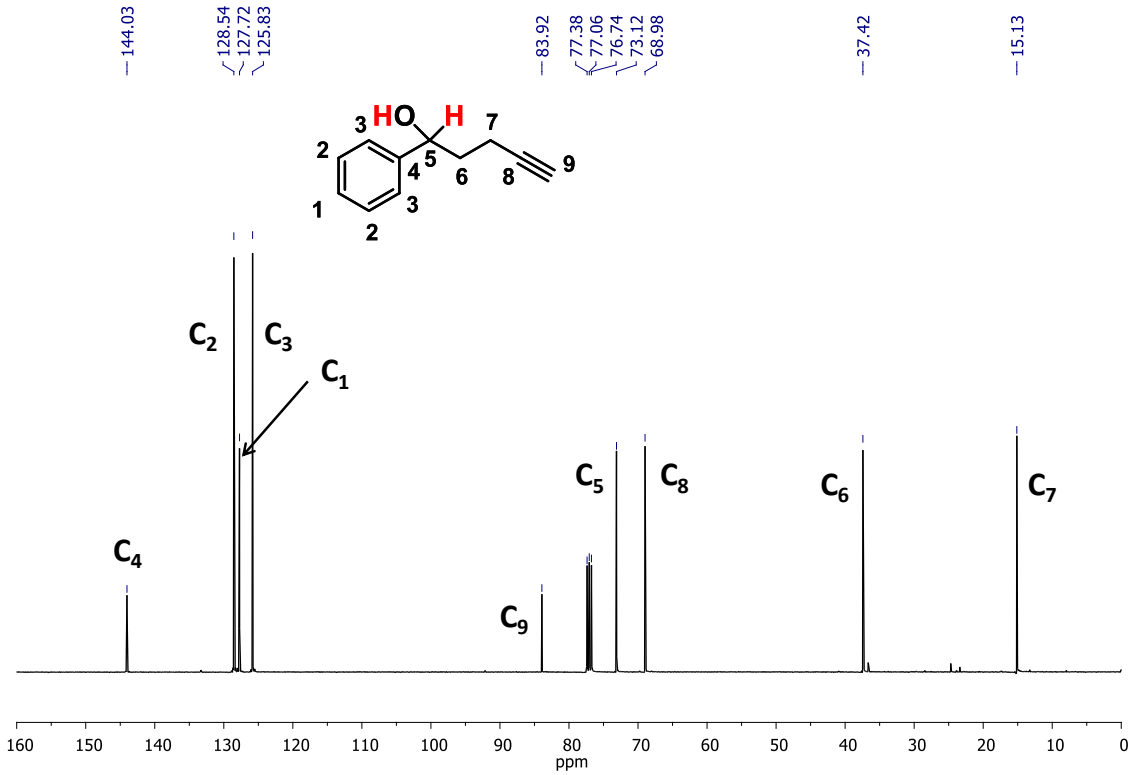


Figure SI.2.90. $^{13}C\{^{1}H\}$-NMR ($CDCl_3$, 100.6 MHz, 300 K) spectrum of the isolated product **1-Phenyl-4-pentyn-1-ol** (**9ah**).

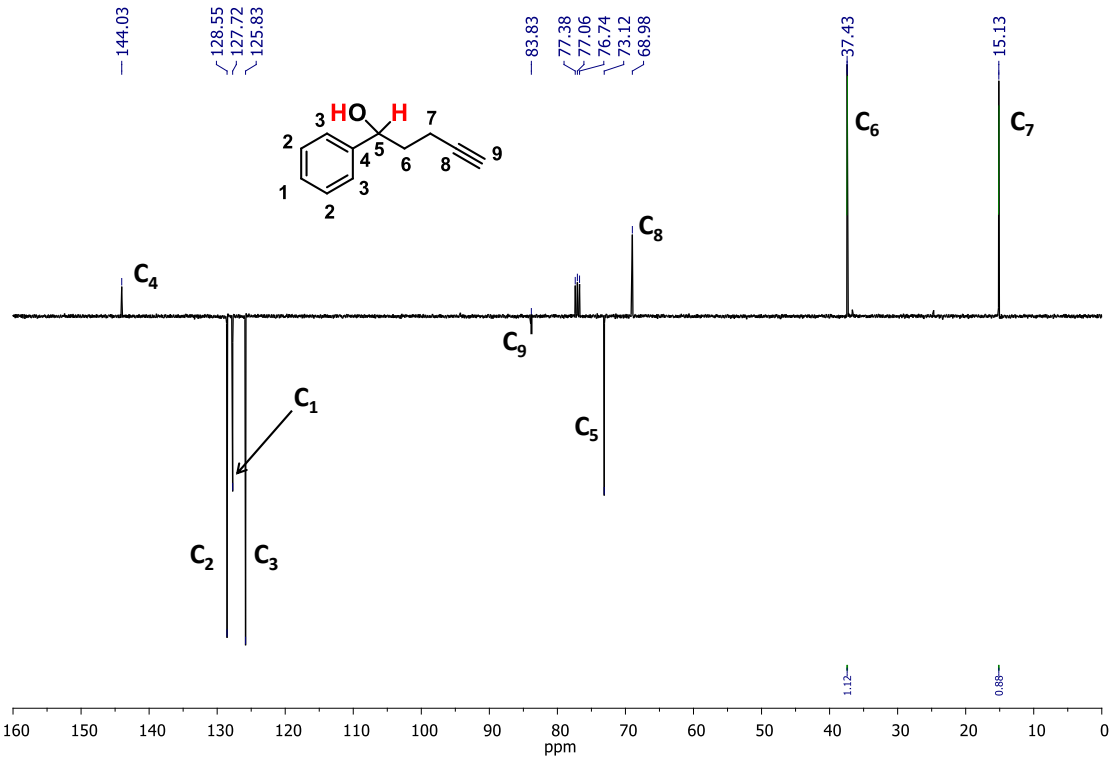


Figure SI.2.91. $^{13}C\{^{1}H\}$-DEPTQ-135-NMR ($CDCl_3$, 100.6 MHz, 300 K) spectrum of the isolated product **1-Phenyl-4-pentyn-1-ol** (**9ah**).

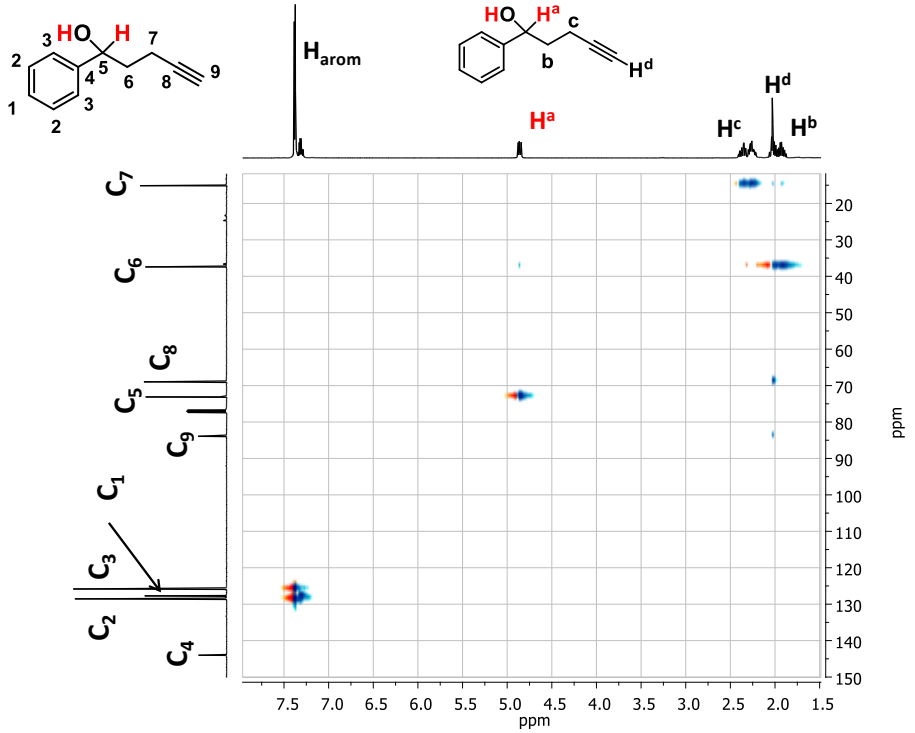


Figure SI.2.92. ^{1}H-^{13}C HSQC ($CDCl_3$, 400 MHz, 300 K) phase sensitive spectrum of the isolated product **1-Phenyl-4-pentyn-1-ol** (**9ah**).

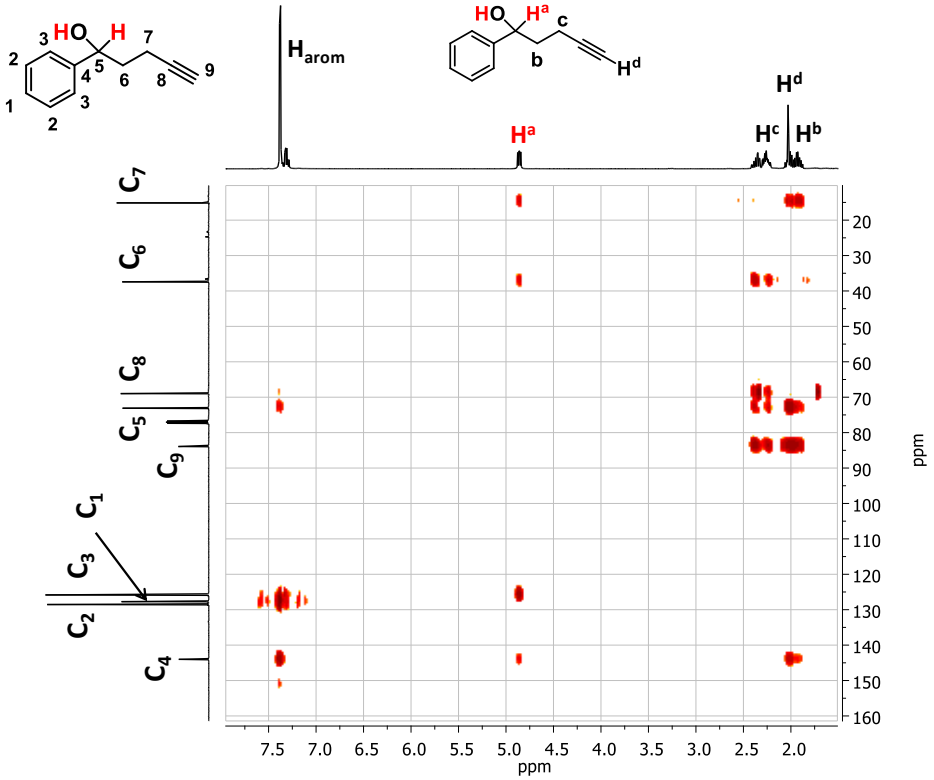


Figure SI.2.93. ^{1}H-^{13}C HMBC ($CDCl_3$, 400 MHz, 300 K) phase sensitive spectrum of the isolated product **1-Phenyl-4-pentyn-1-ol** (**9ah**).

6. NMR of the radical clock ring-opening products

Phenyl(2-phenylcyclopropyl)methanone

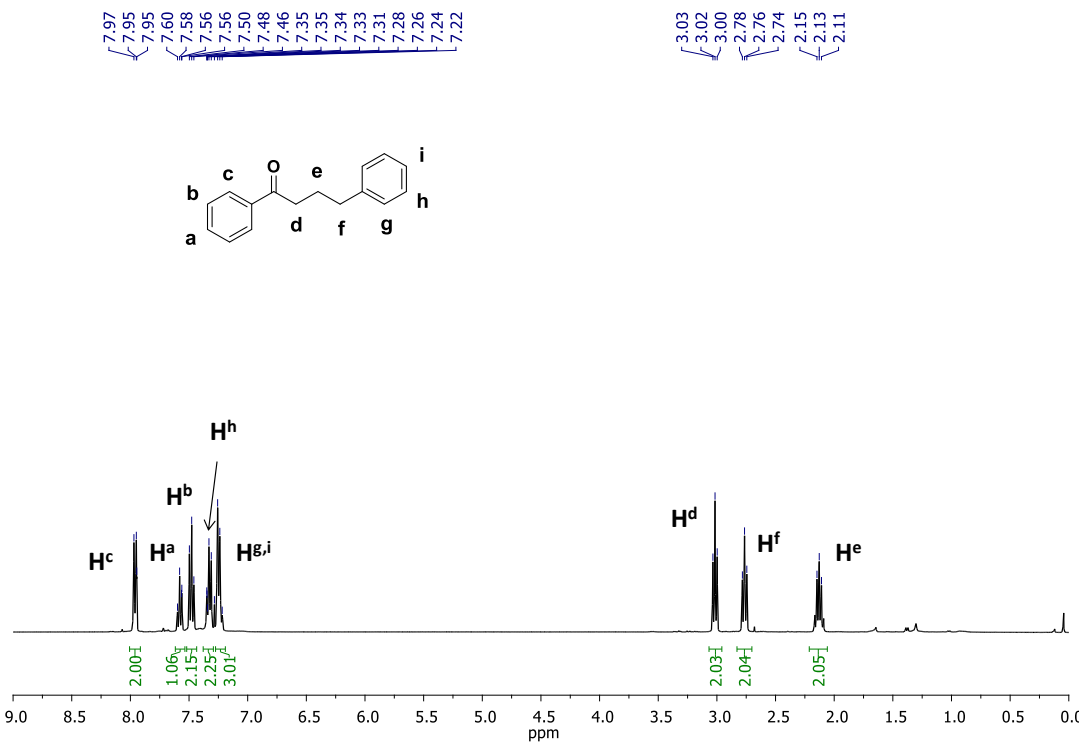


Figure SI.2.94. ^{1}H-NMR ($CDCl_3$, 400 MHz, 300 K) spectrum of the isolated product **1,4-diphenylbutan-1-one.**

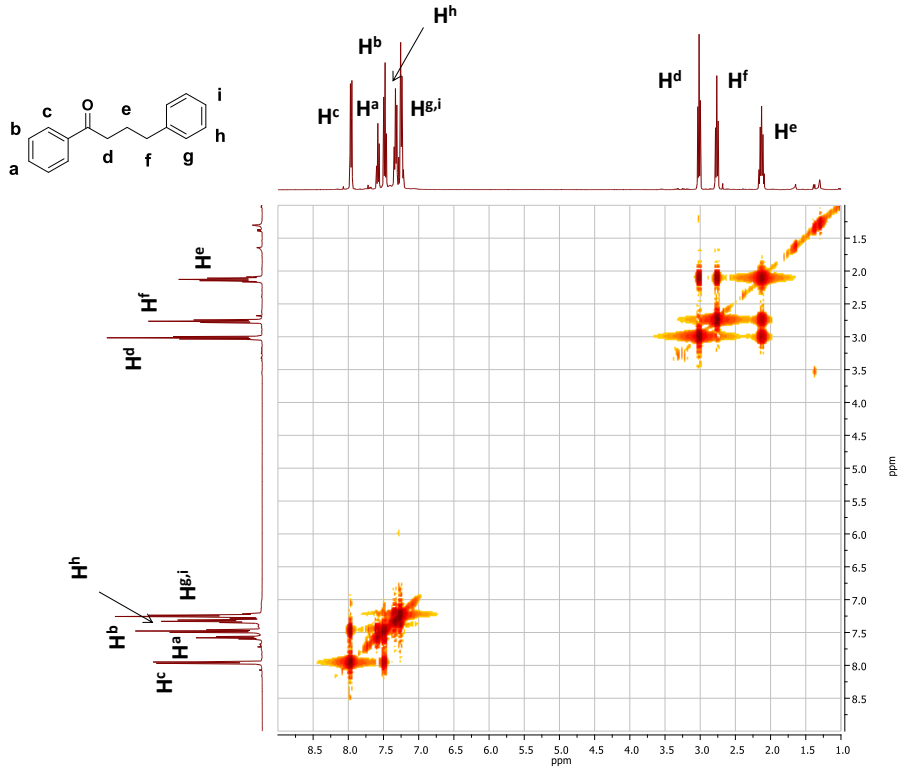


Figure SI.2.95. ^{1}H-^{1}H COSY ($CDCl_3$, 400 MHz, 300 K) spectrum of the isolated product **1,4-diphenylbutan-1-one.**

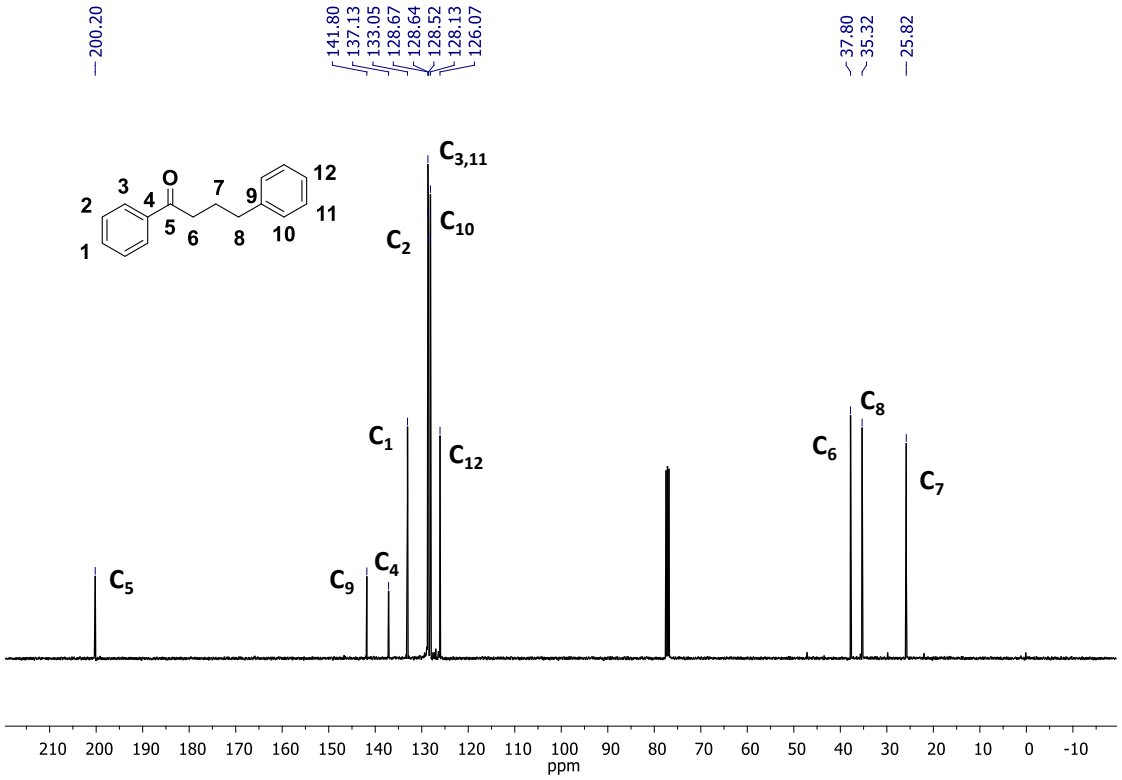


Figure SI.2.96. $^{13}C\{^{1}H\}$-NMR ($CDCl_3$,100.6 MHz, 300 K) spectrum of the isolated product **1,4-diphenylbutan-1-one.**

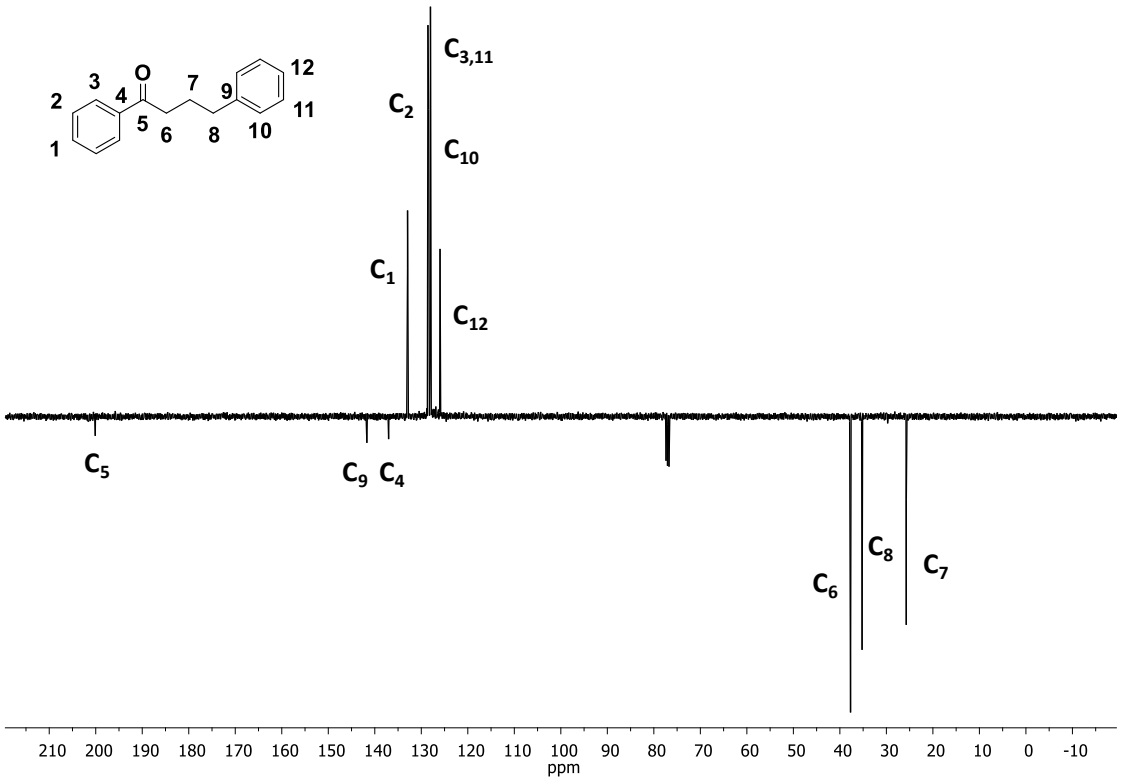


Figure SI.2.97. $^{13}C\{^{1}H\}$-DEPTQ-135-NMR ($CDCl_3$, 100.6 MHz, 300 K) spectrum of the isolated product **1,4-diphenylbutan-1-one.**

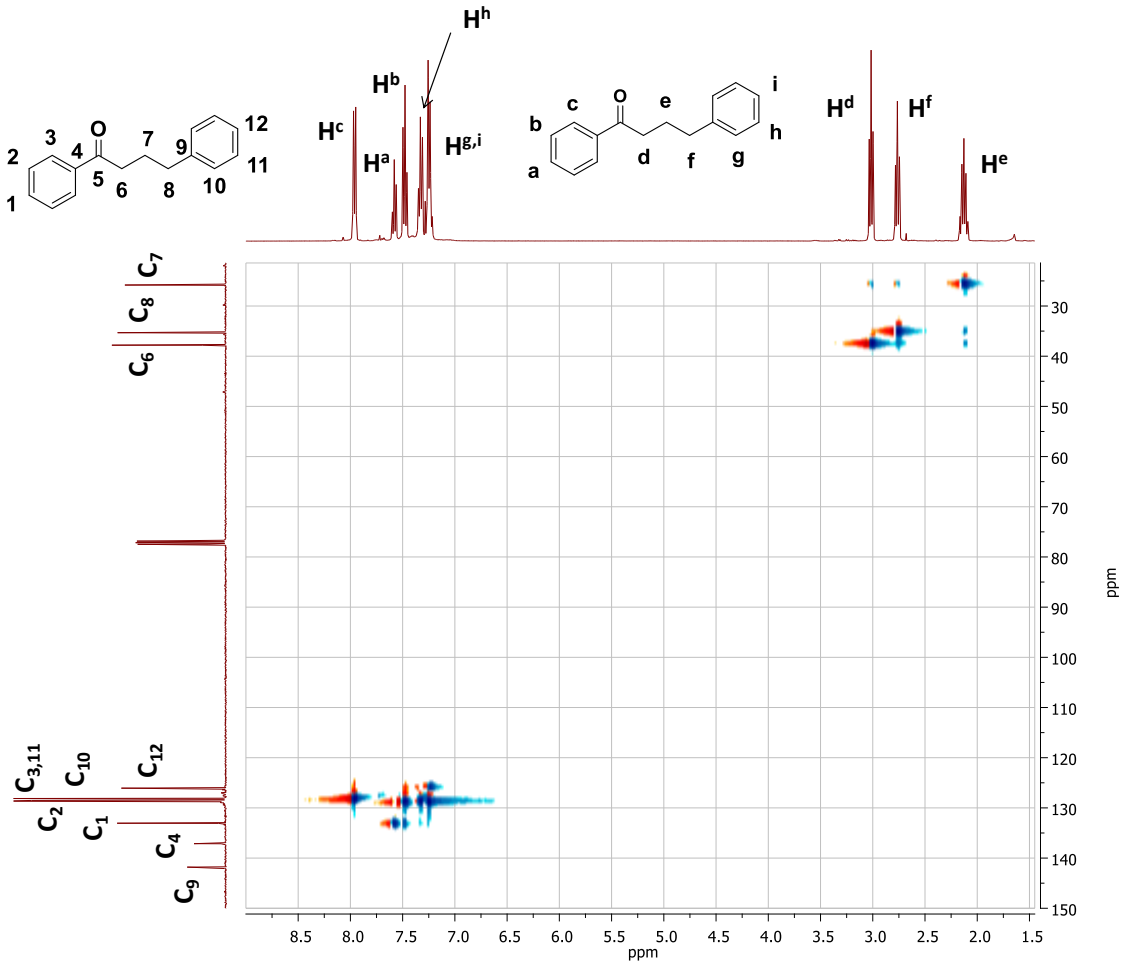


Figure SI.2.98. ^{1}H-^{13}C HSQC ($CDCl_3$, 400 MHz, 300 K) phase sensitive spectrum of the isolated product **1,4-diphenylbutan-1-one.**

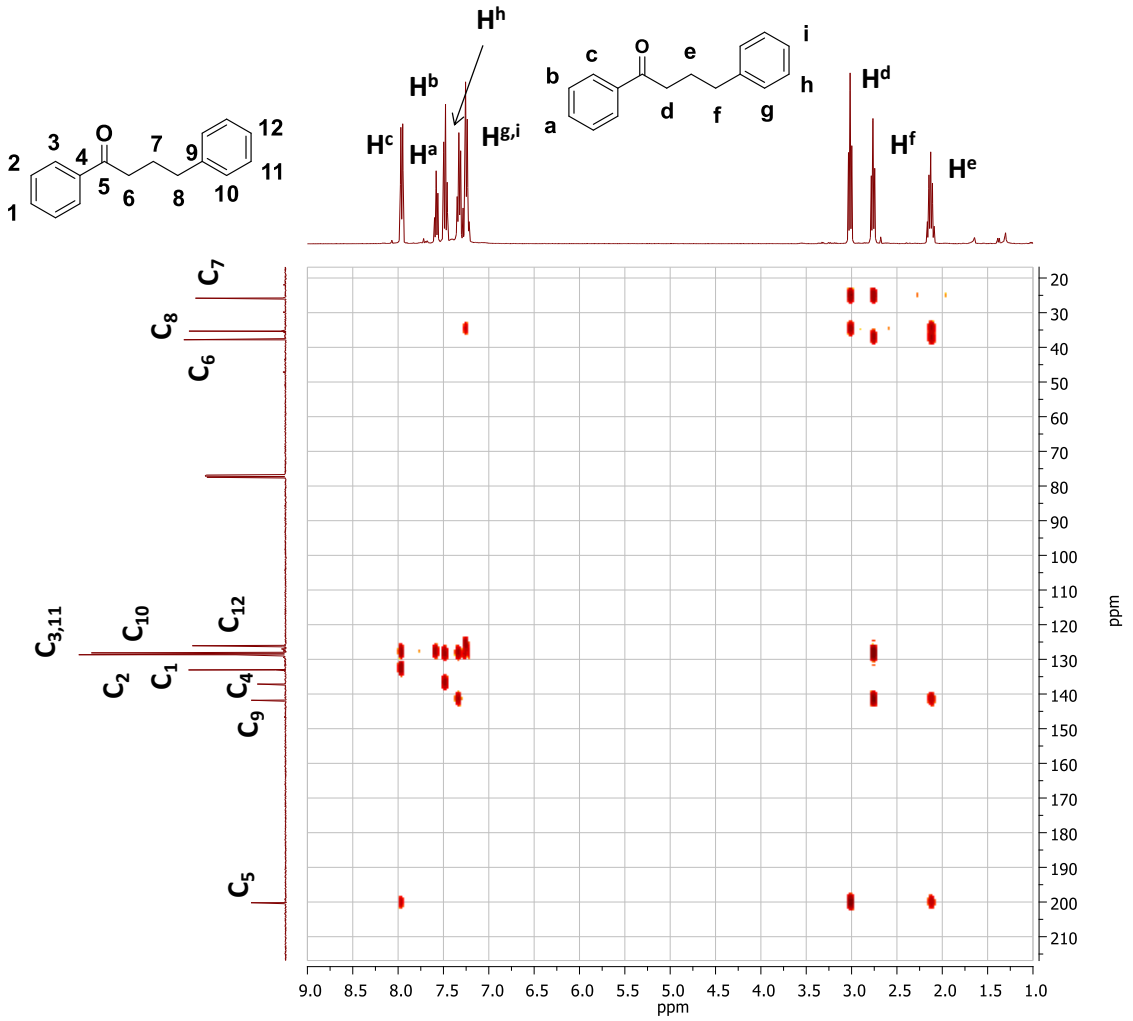


Figure SI.2.99. ^{1}H-^{13}C HMBC ($CDCl_3$, 400 MHz, 300 K) phase sensitive spectrum of the isolated product **1,4-diphenylbutan-1-one.**

7. GC chromatograms from the catalysis

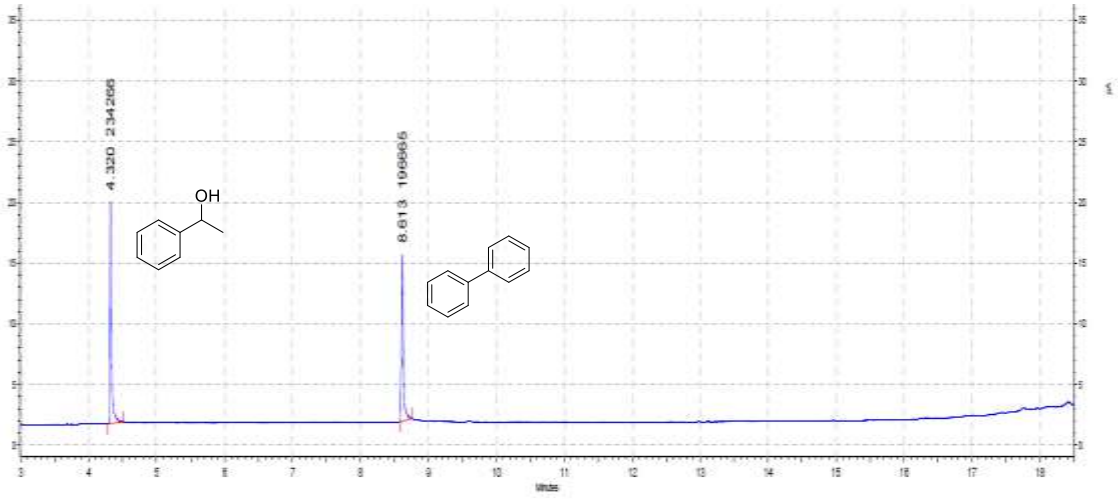


Figure SI.2.100. GC-FID chromatogram of the reduced product **10a** from the catalysis.

Figure SI.2.101. GC-FID chromatogram of the reduced product **10b** from the catalysis.

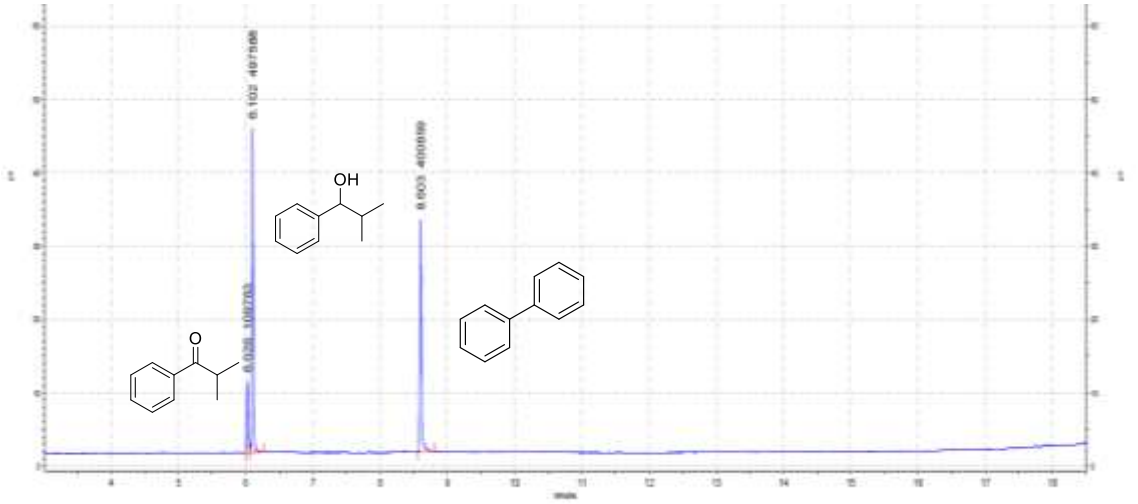


Figure SI.2.102. GC-FID chromatogram of the reduced product **10c** from the catalysis.

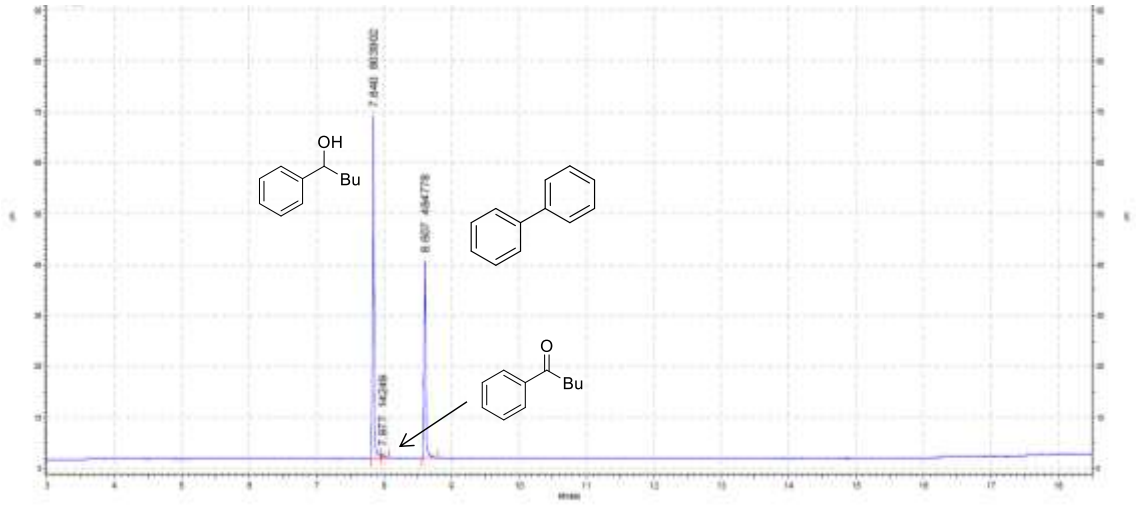


Figure SI.2.103. GC-FID chromatogram of the reduced product **10d** from the catalysis.

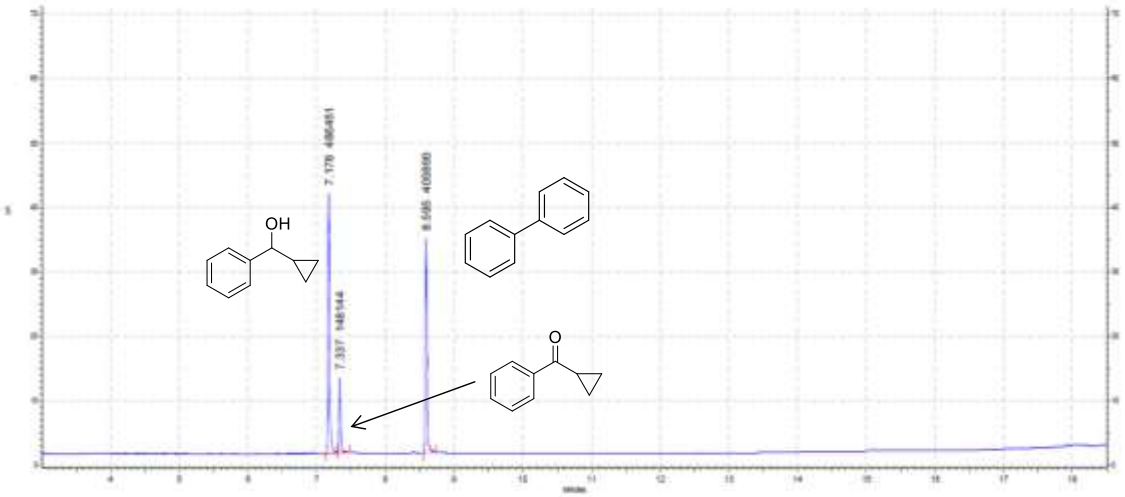


Figure SI.2.104. GC-FID chromatogram of the reduced product **10e** from the catalysis.

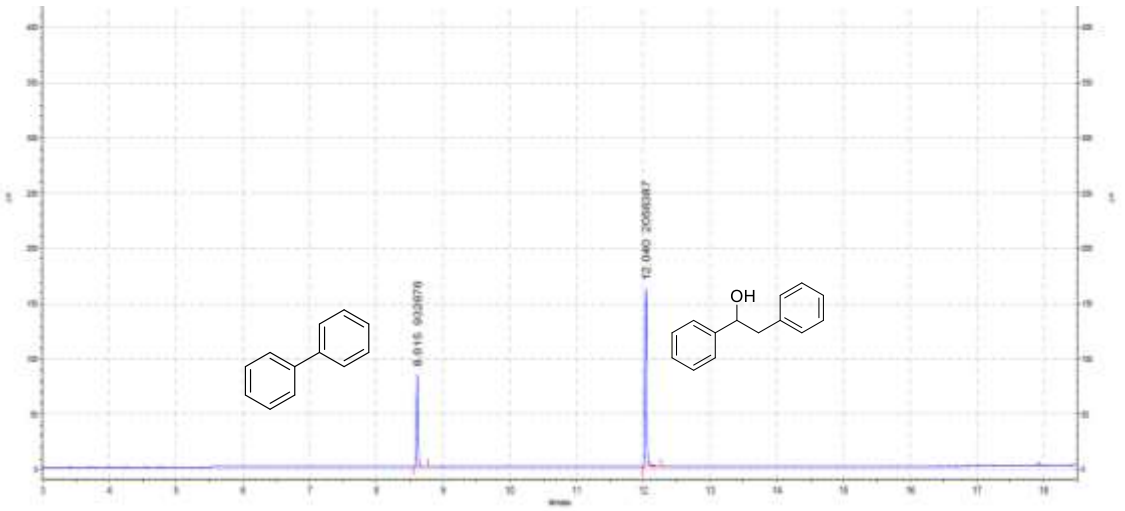


Figure SI.2.105. GC-FID chromatogram of the reduced product **10f** from the catalysis.

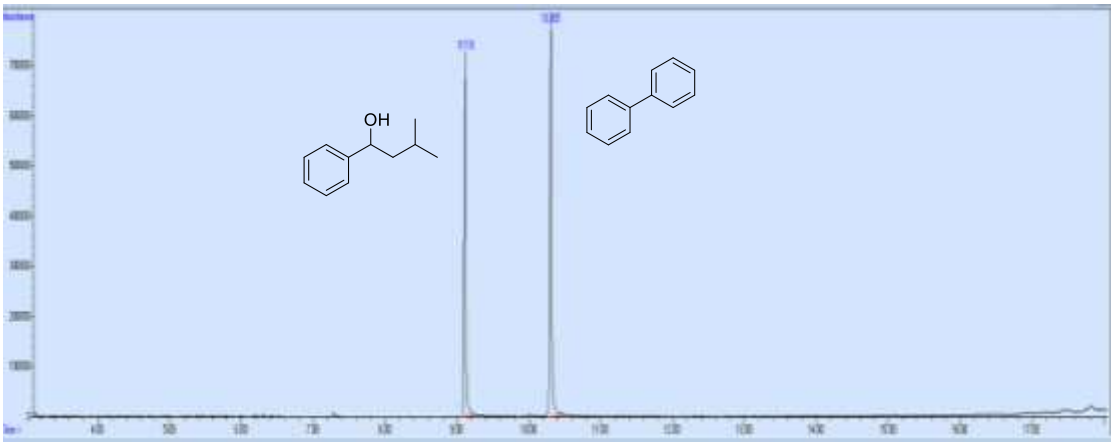


Figure SI.2.106. GC-FID chromatogram of the reduced product **10g** from the catalysis.

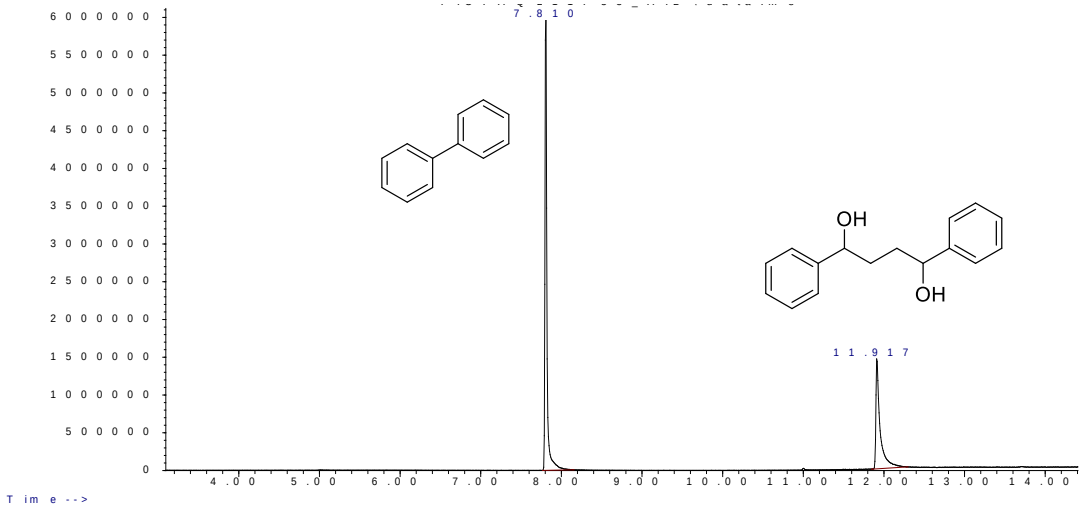


Figure SI.2.107. GC-FID chromatogram of the reduced product **10i** from the catalysis.

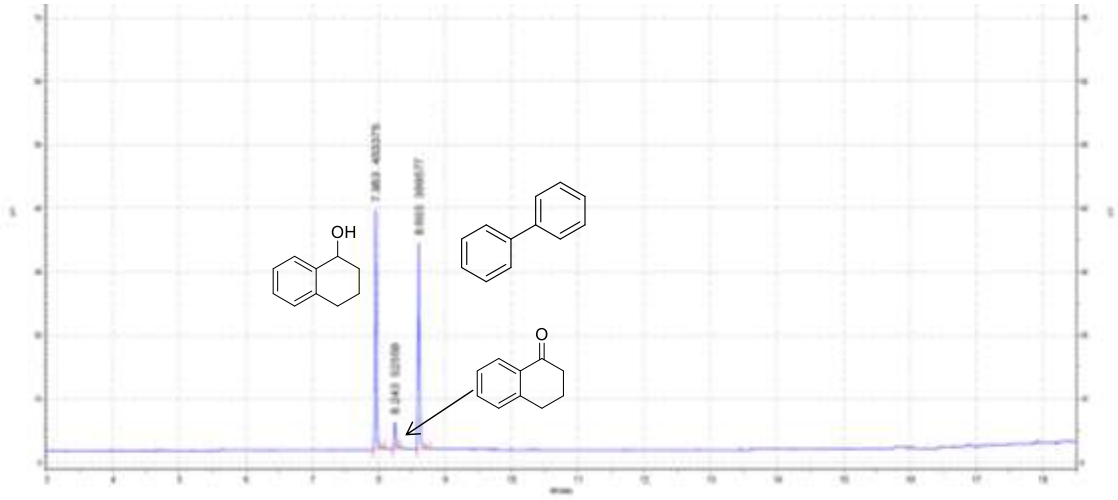


Figure SI.2.108. GC-FID chromatogram of the reduced product **10j** from the catalysis.

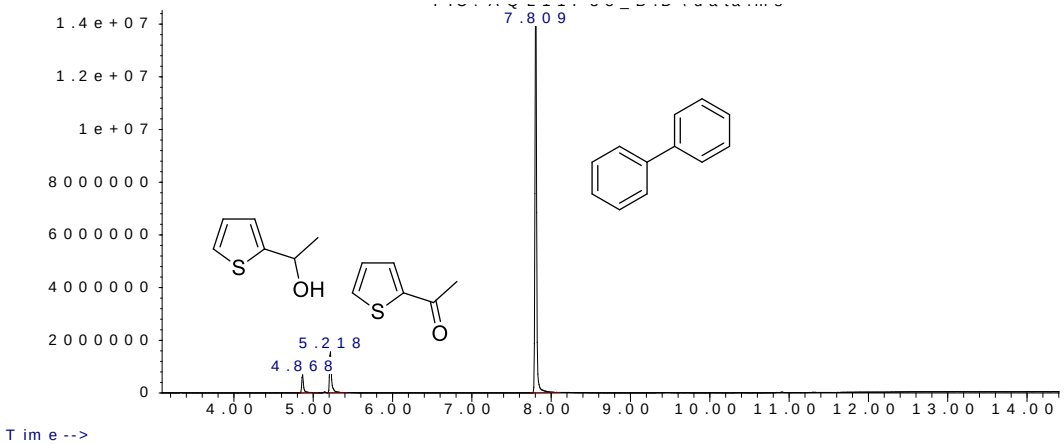


Figure SI.2.109. GC-FID chromatogram of the reduced product **10k** from the catalysis.

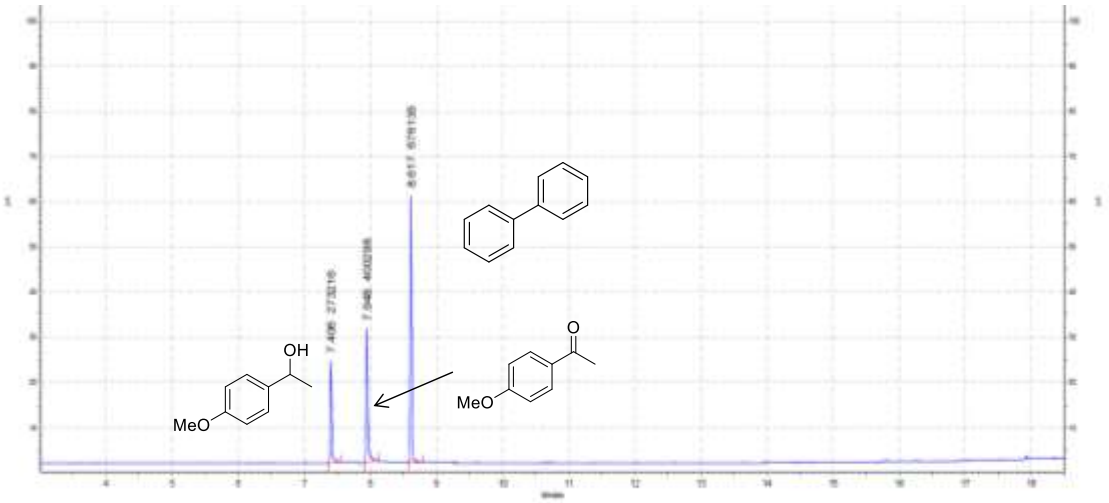


Figure SI.2.110. GC-FID chromatogram of the reduced product **10l** from the catalysis.

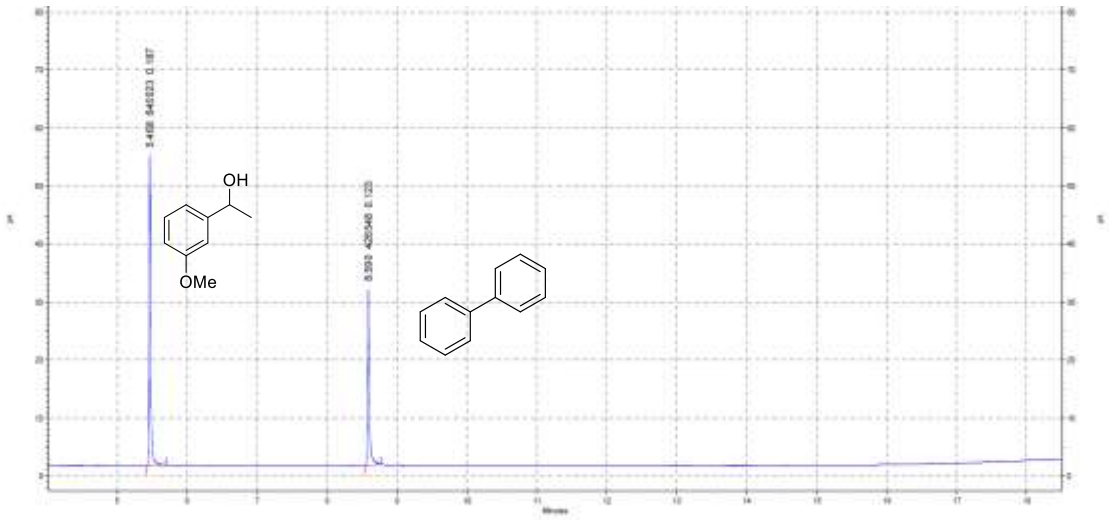


Figure SI.2.111. GC-FID chromatogram of the reduced product **10m** from the catalysis.

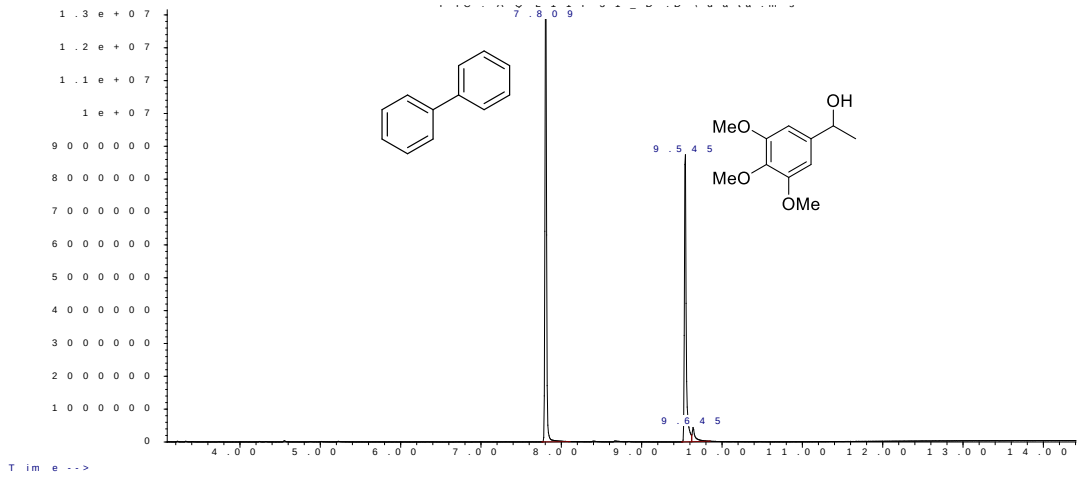


Figure SI.2.112. GC-FID chromatogram of the reduced product **10n** from the catalysis.

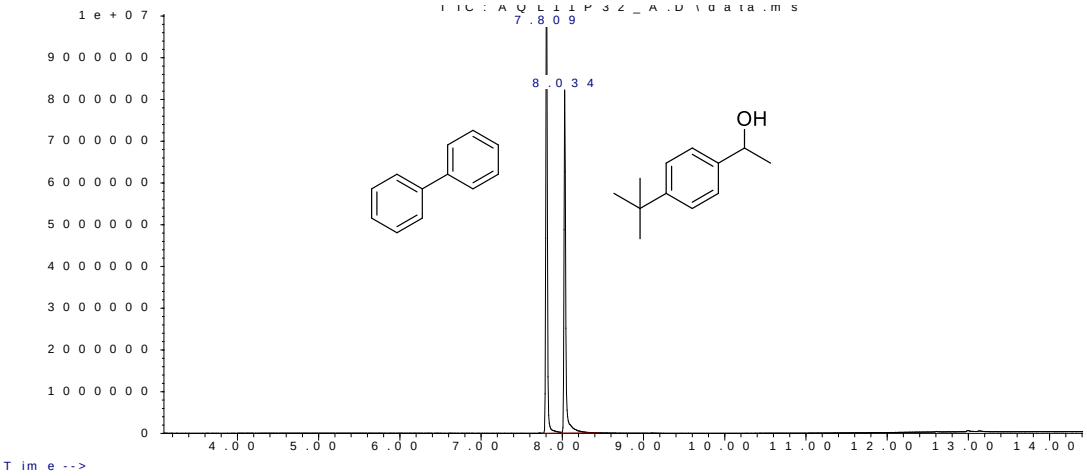


Figure SI.2.113. GC-FID chromatogram of the reduced product **10o** from the catalysis.

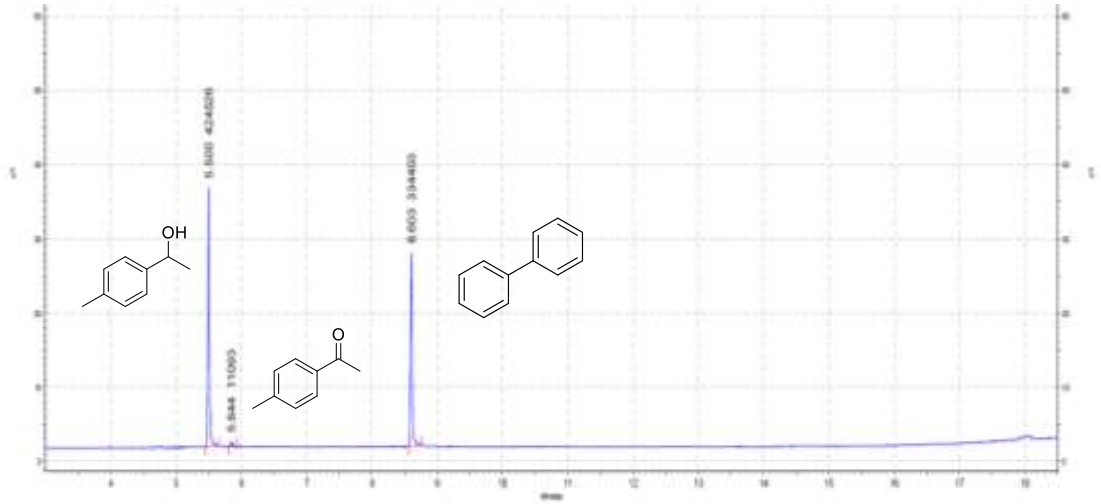


Figure SI.2.114. GC-FID chromatogram of the reduced product **10p** from the catalysis.

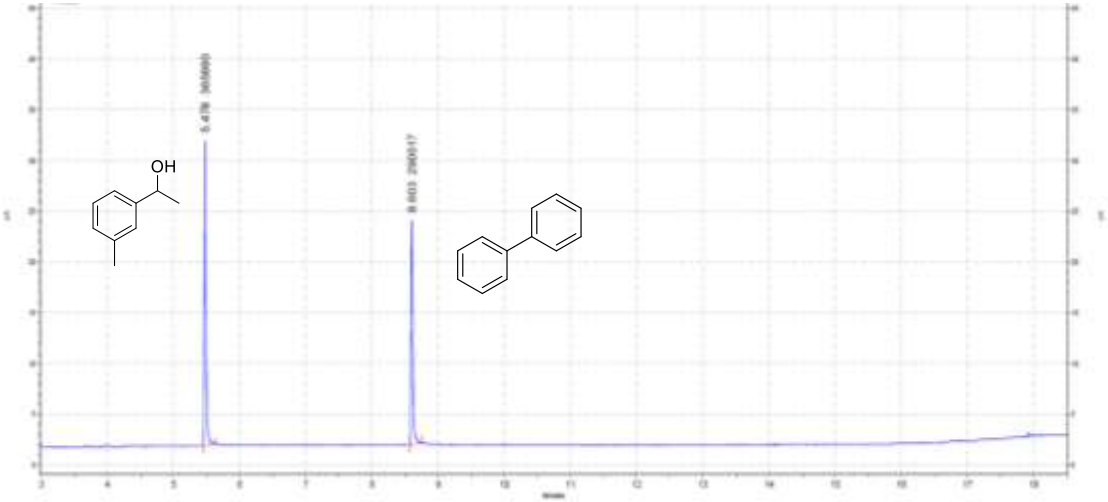


Figure SI.2.115. GC-FID chromatogram of the reduced product **10q** from the catalysis.

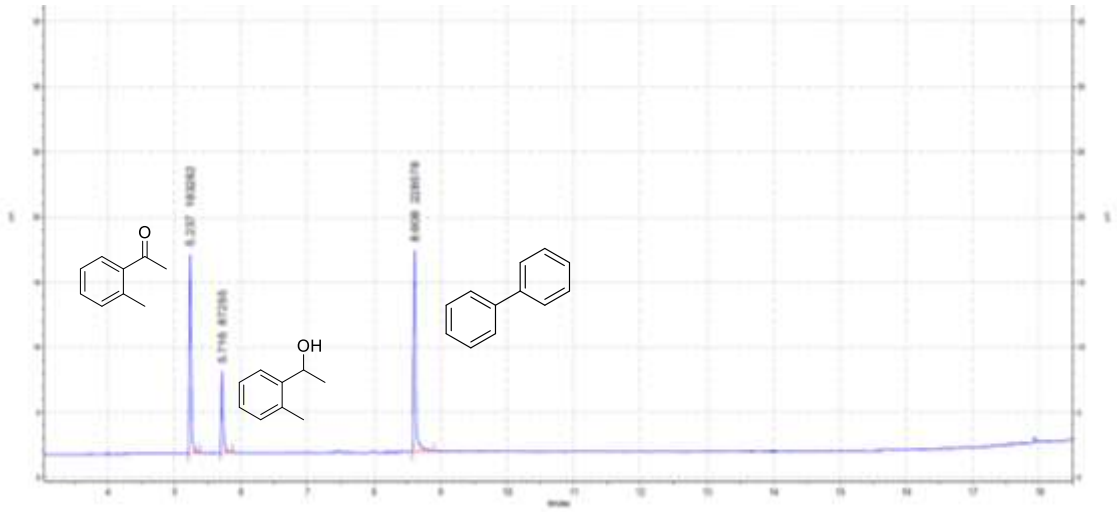


Figure SI.2.116. GC-FID chromatogram of the reduced product **10r** from the catalysis.

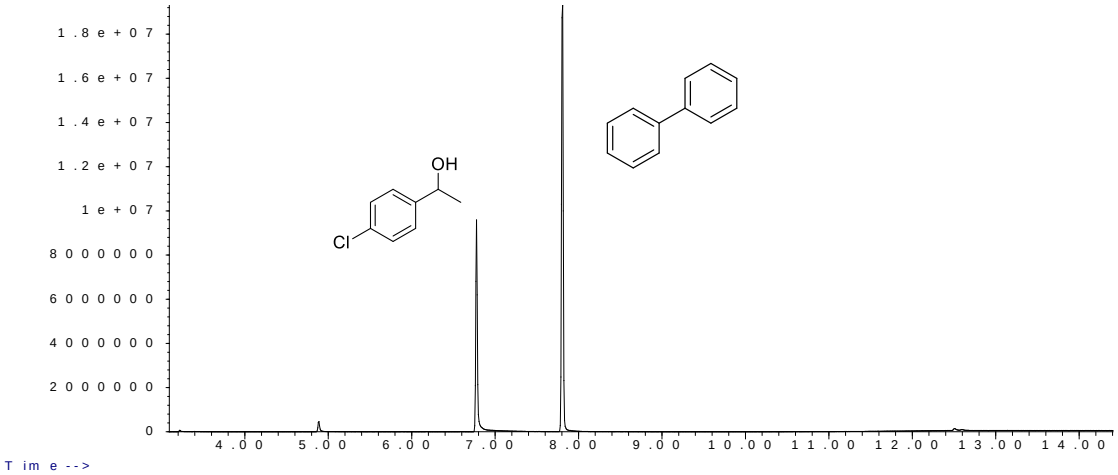


Figure SI.2.117. GC-FID chromatogram of the reduced product **10s** from the catalysis.

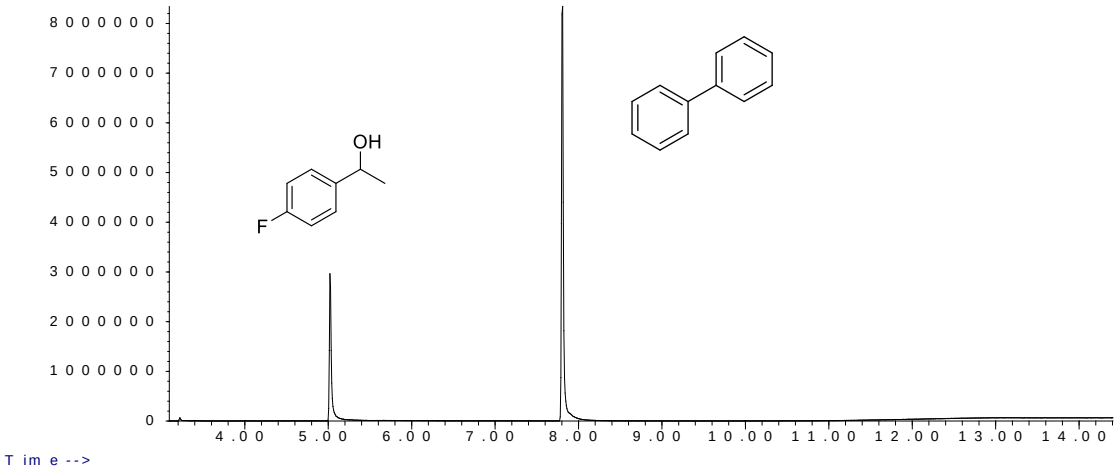


Figure SI.2.118. GC-FID chromatogram of the reduced product **10t** from the catalysis.

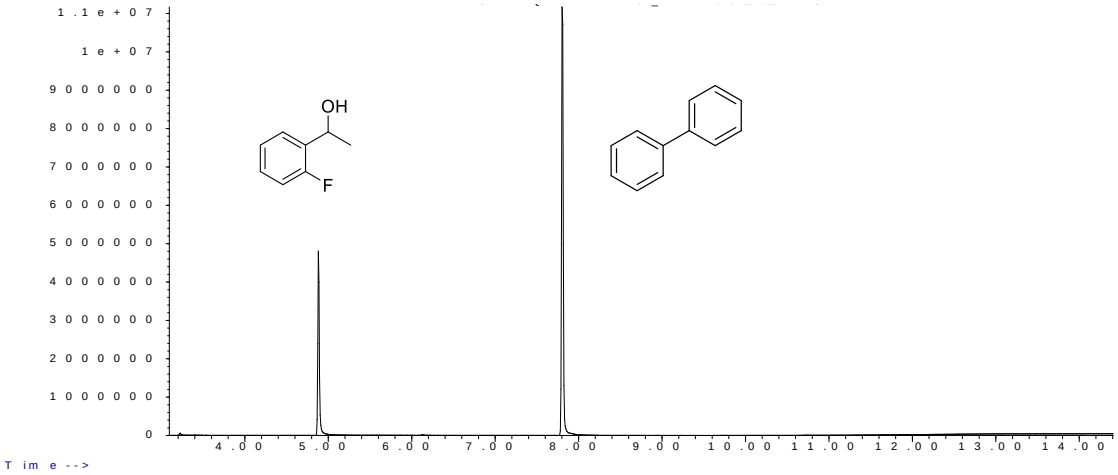


Figure SI.2.119. GC-FID chromatogram of the reduced product **10u** from the catalysis.

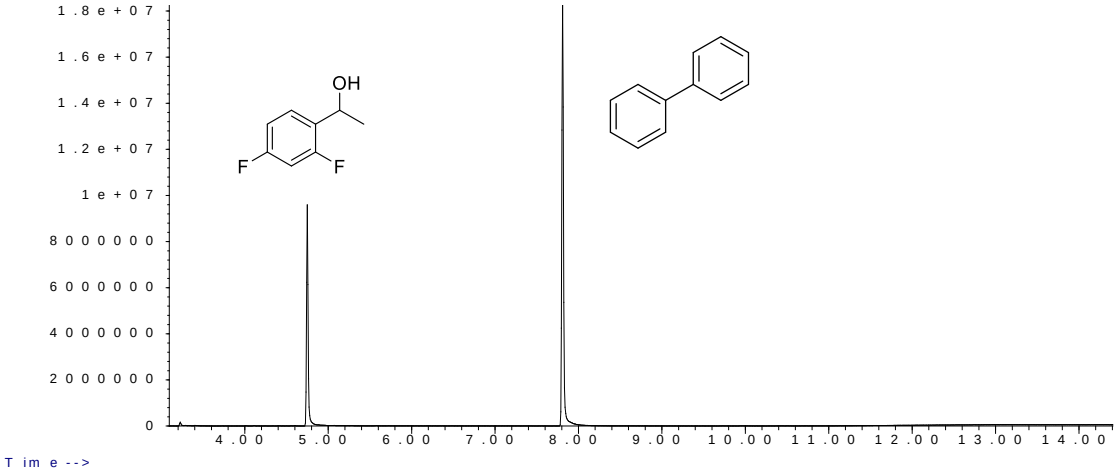


Figure SI.2.120. GC-FID chromatogram of the reduced product **10v** from the catalysis.

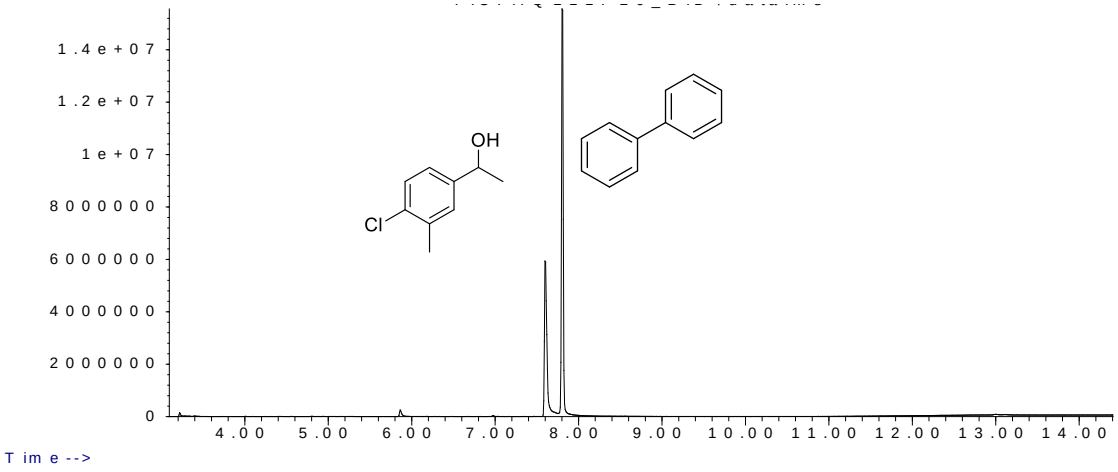


Figure SI.2.121. GC-FID chromatogram of the reduced product **10w** from the catalysis.

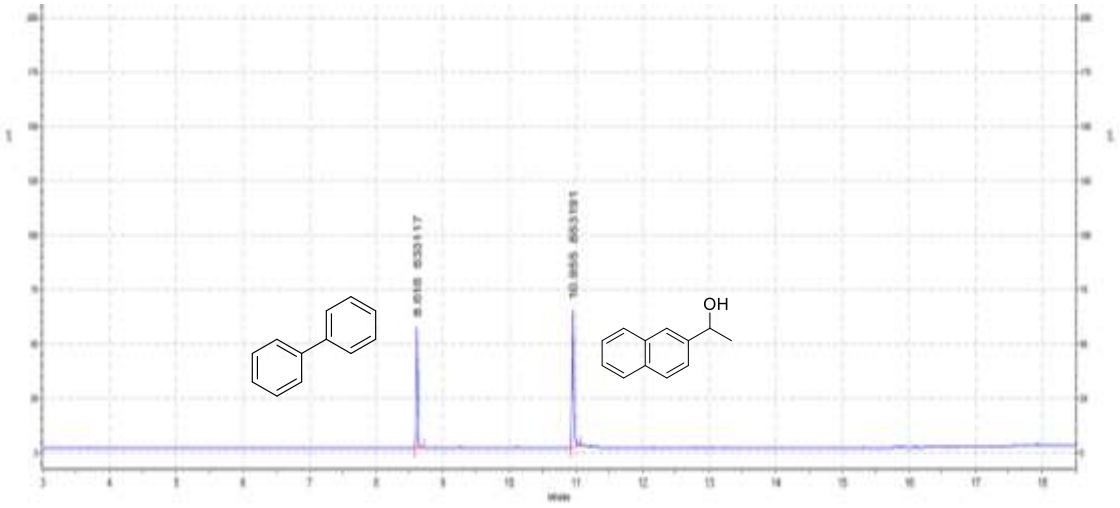


Figure SI.2.122. GC-FID chromatogram of the reduced product **10x** from the catalysis.

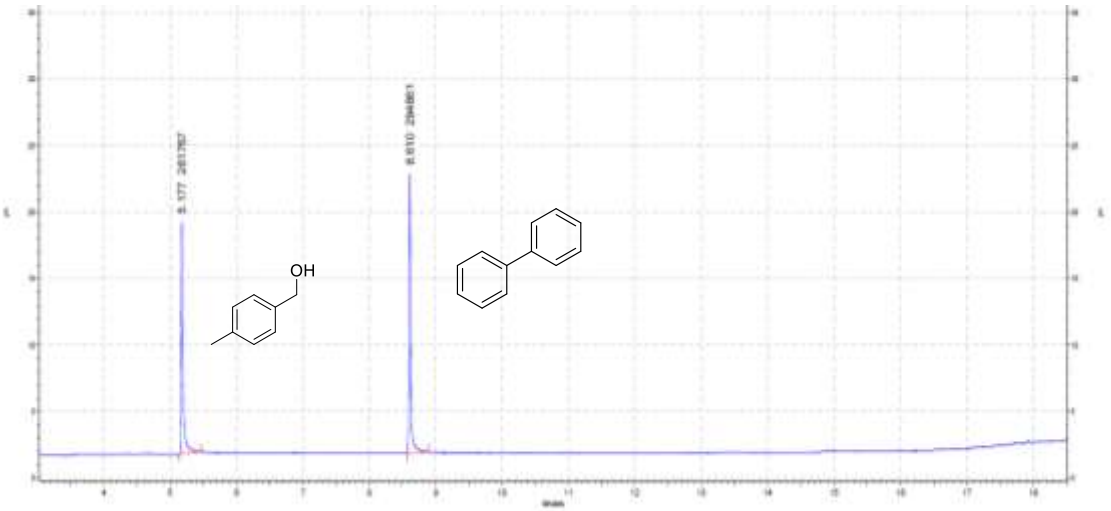


Figure SI.2.123. GC-FID chromatogram of the reduced product **12a** from the catalysis.

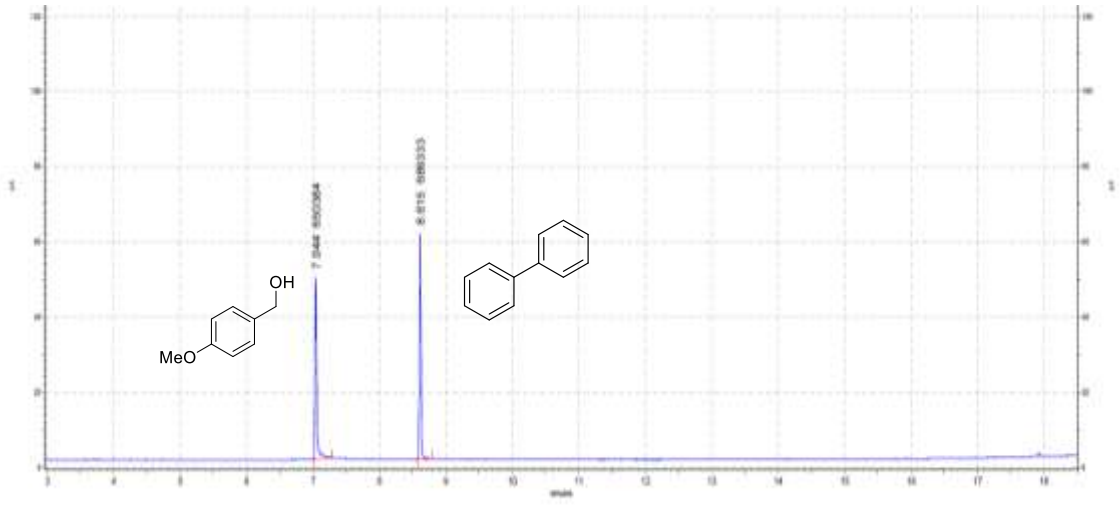


Figure SI.2.124. GC-FID chromatogram of the reduced product **12b** from the catalysis.

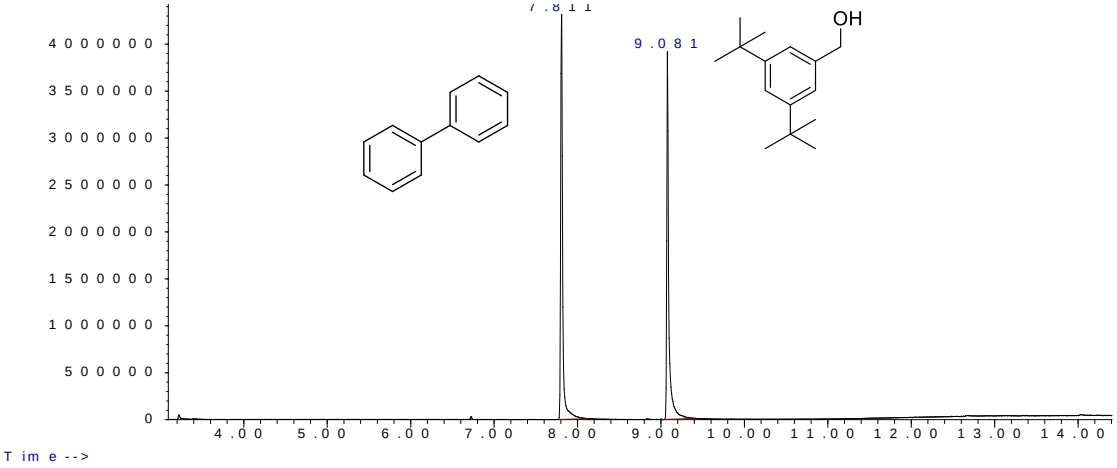


Figure SI.2.125. GC-FID chromatogram of the reduced product **12c** from the catalysis.

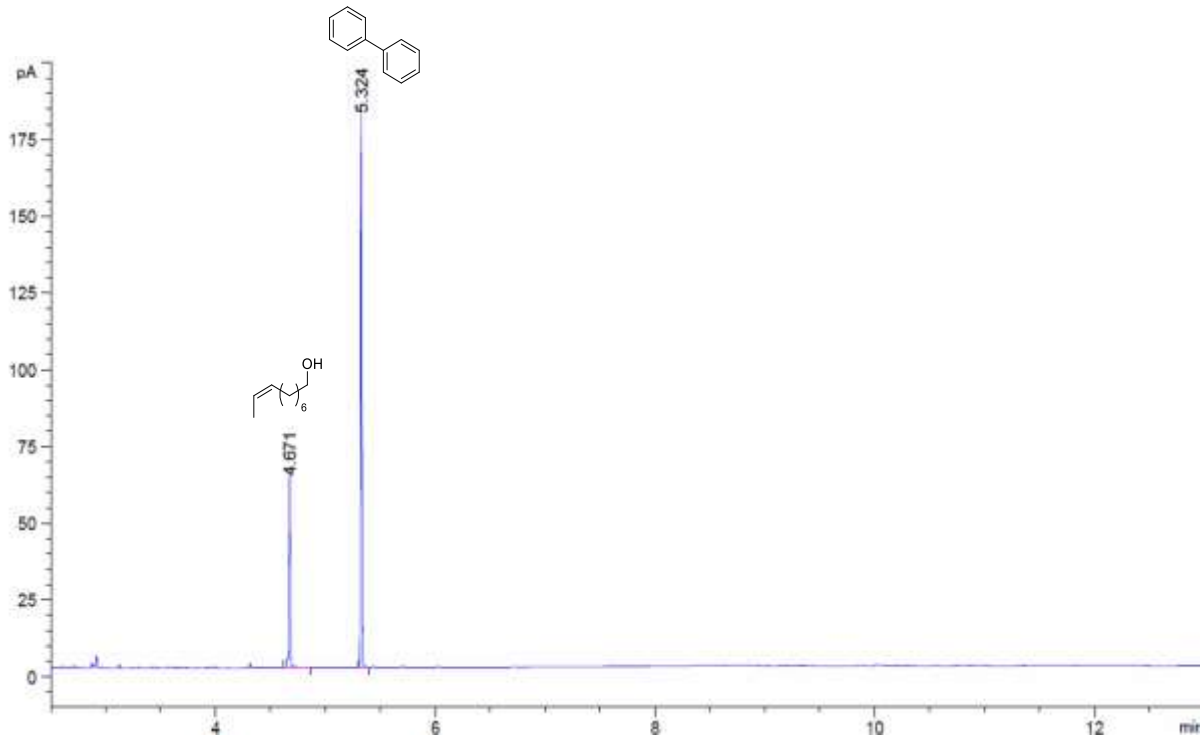


Figure SI.2.126. GC-FID chromatogram of the reduced product **12d** from the catalysis.

Figure SI.2.127. GC-FID chromatogram of the reduced product **12e** from the catalysis.

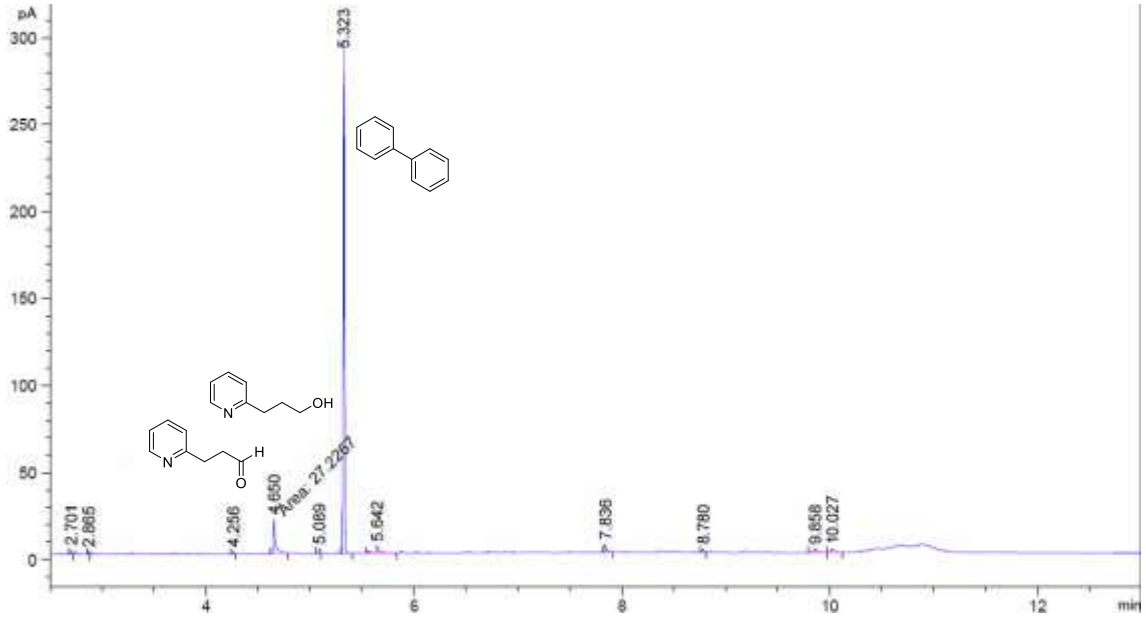
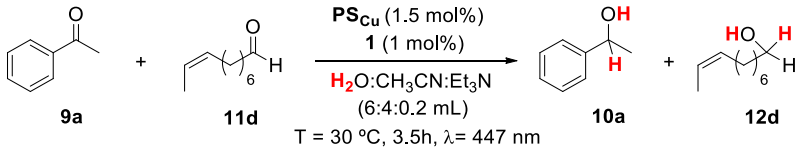


Figure SI.2.128. GC-FID chromatogram of the reduced product **12f** from the catalysis.

8. Selected chromatograms of the selectivity studies

Competition experiments



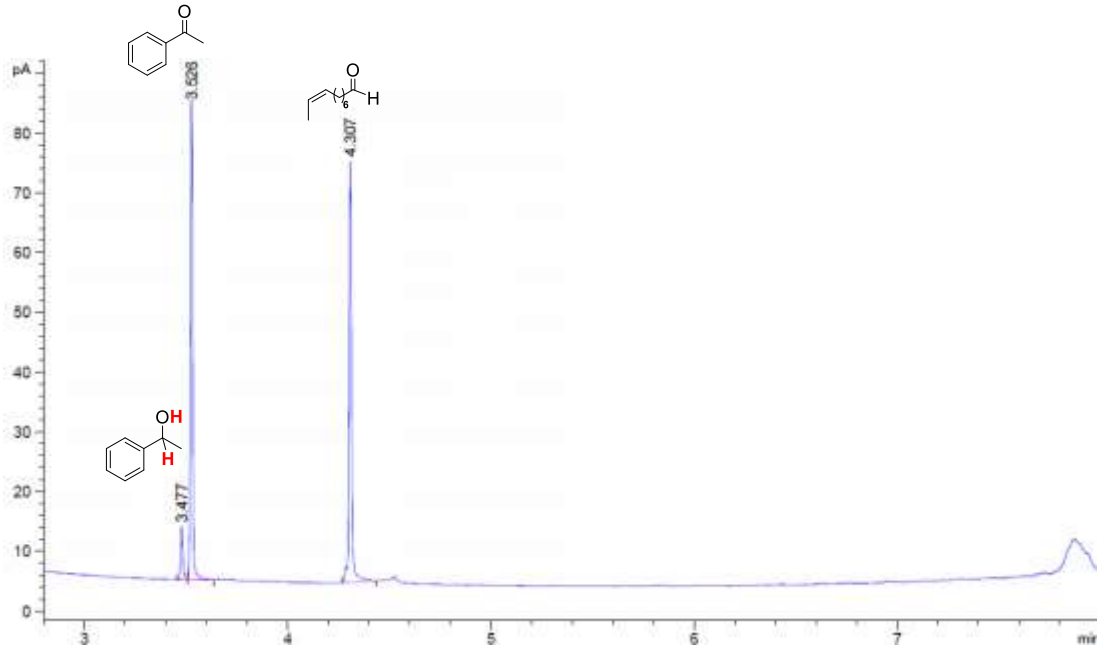


Figure SI.2.129. GC-FID chromatogram of the monitorization of the photoreduccion of acetophenone (**9a**) in the presence of (Z)-dec-8-enal (**11d**) after 4 minutes of irradiation.

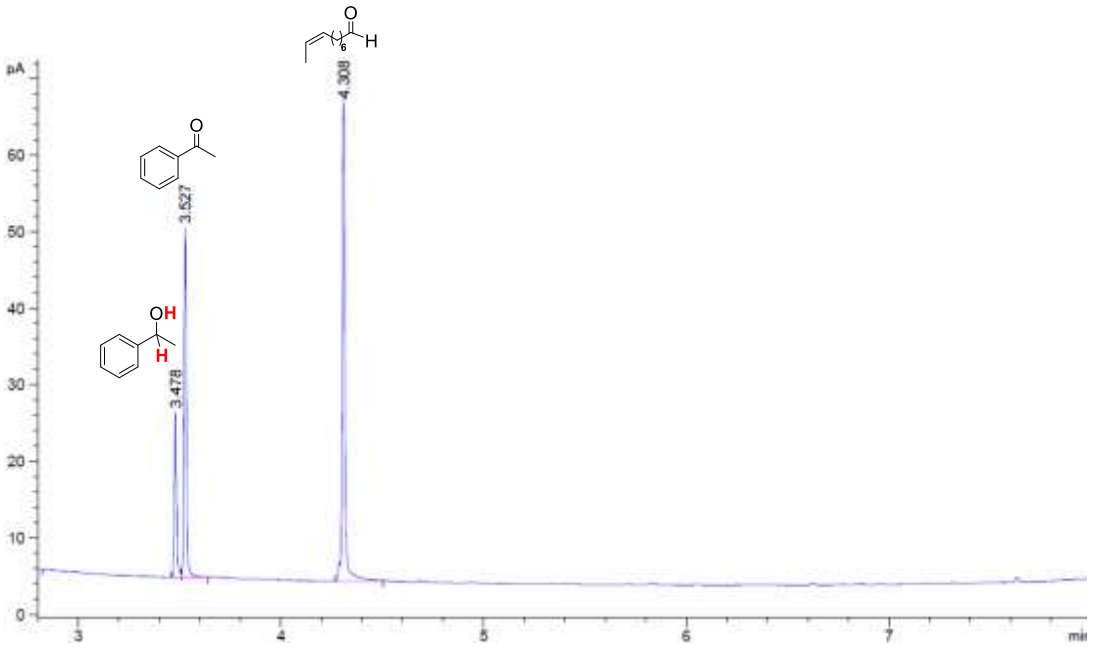


Figure SI.2.130. GC-FID chromatogram of the monitorization of the photoreduccion of acetophenone (**9a**) in the presence of (Z)-dec-8-enal (**11d**) after 10 minutes of irradiation.

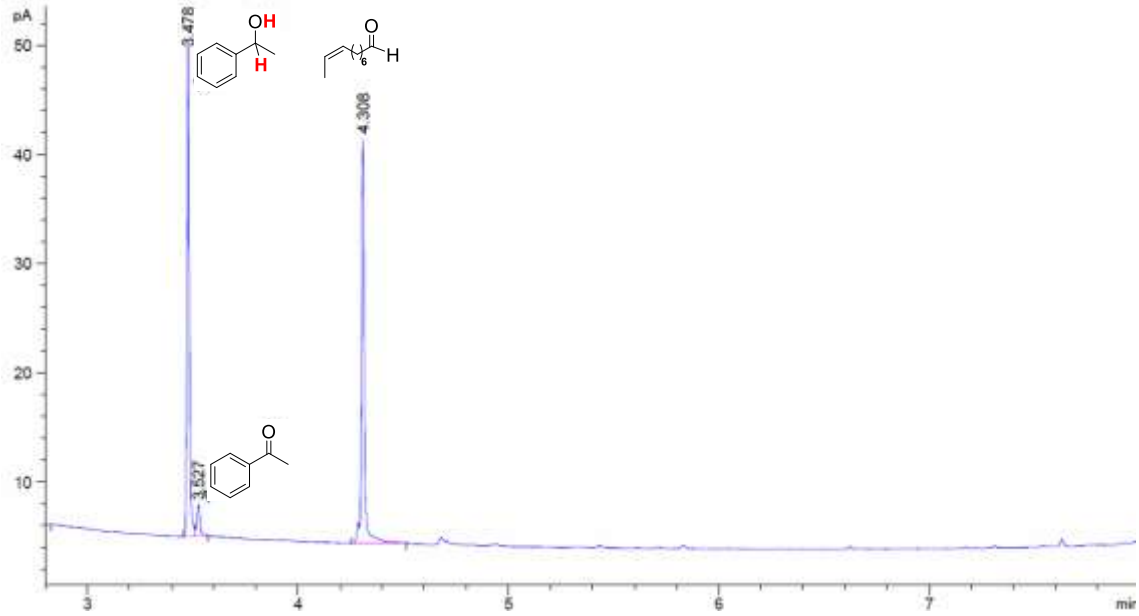


Figure SI.2.131. GC-FID chromatogram of the monitorization of the photoreduccion of acetophenone (**9a**) in the presence of (Z)-dec-8-enal (**11d**) after 30 minutes of irradiation.

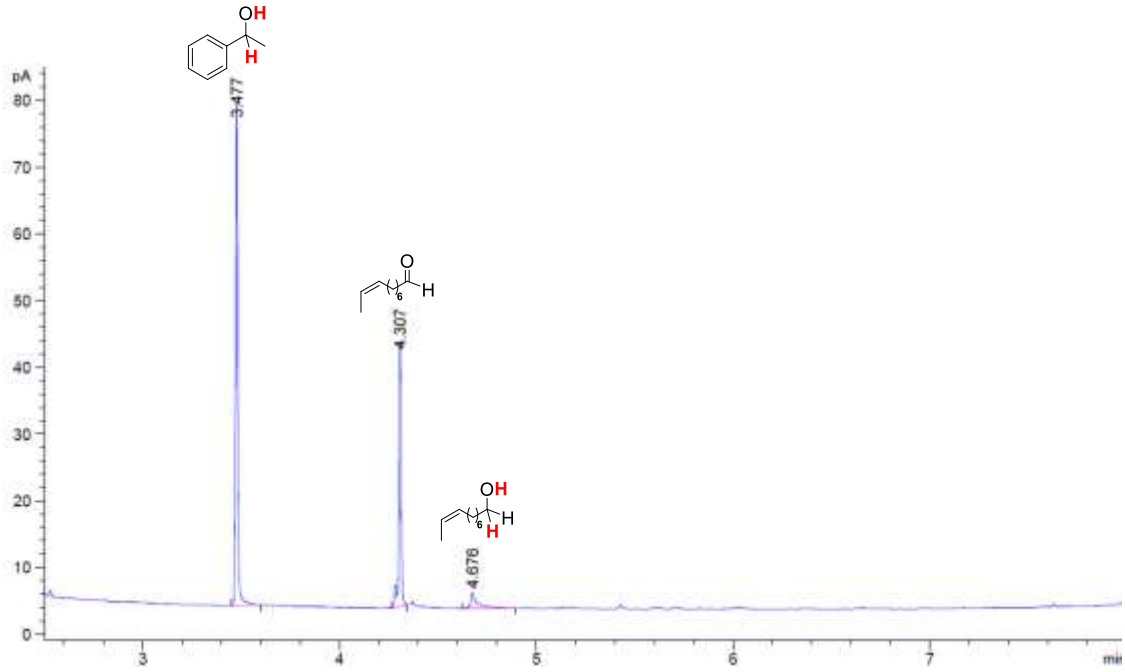


Figure SI.2.132. GC-FID chromatogram of the monitorization of the photoreduccion of acetophenone (**9a**) in the presence of (Z)-dec-8-enal (**11d**) after 50 minutes of irradiation.

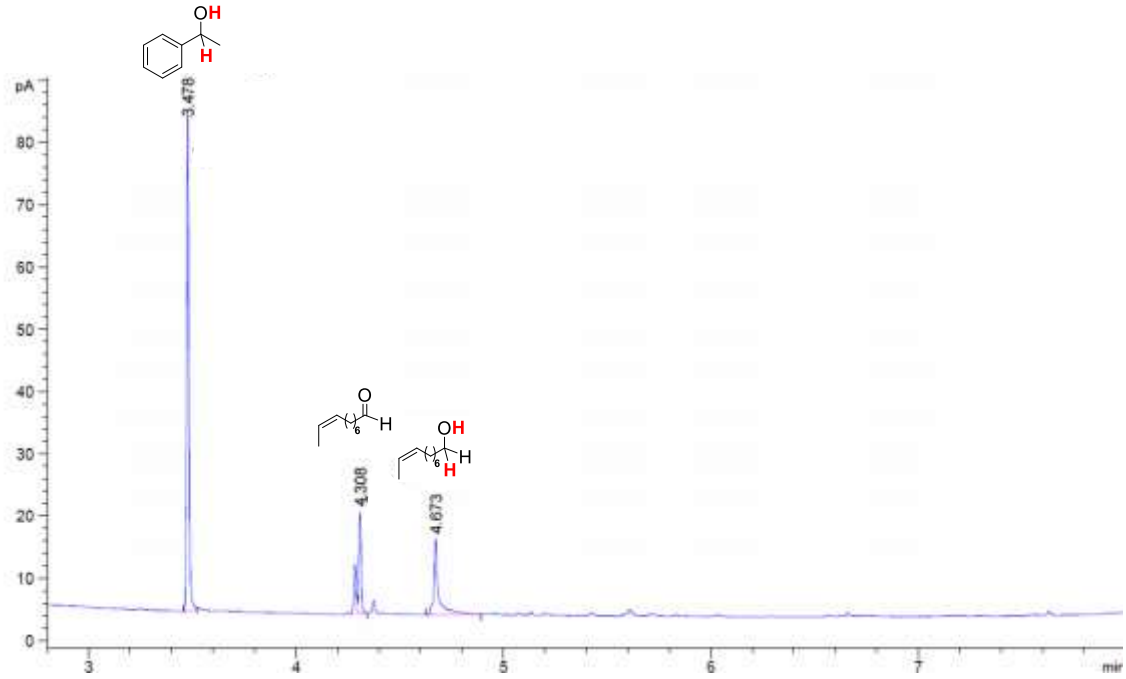


Figure SI.2.133. GC-FID chromatogram of the monitorization of the photoreduccion of acetophenone (**9a**) in the presence of (Z)-dec-8-enal (**11d**) after 120 minutes of irradiation.

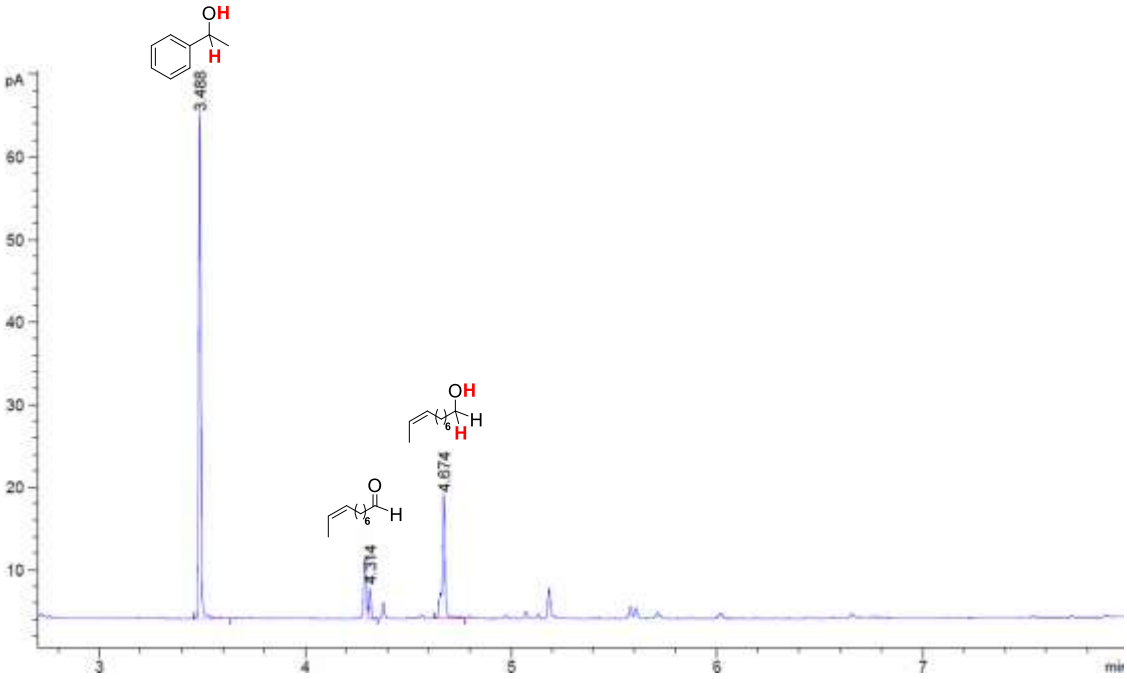
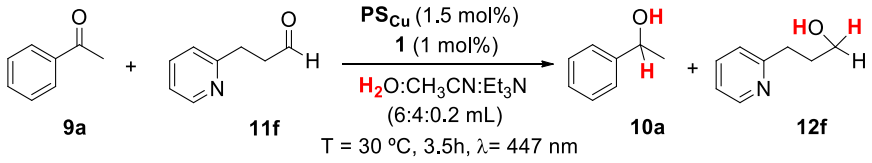


Figure SI.2.134. GC-FID chromatogram of the monitorization of the photoreduccion of acetophenone (**9a**) in the presence of (Z)-dec-8-enal (**11d**) after 210 minutes of irradiation.



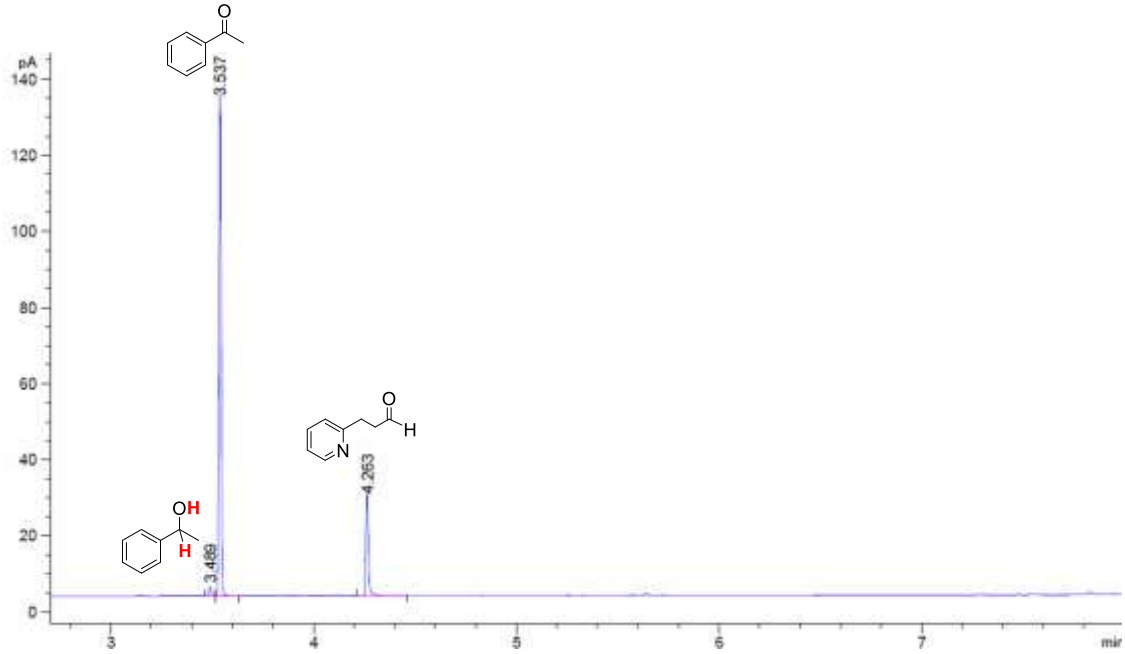


Figure SI.2.135. GC-FID chromatogram of the monitorization of the photoreduccion of acetophenone (**9a**) in the presence of 3(pydidin-2-yl)propanal (**11f**) after 4 minutes of irradiation.

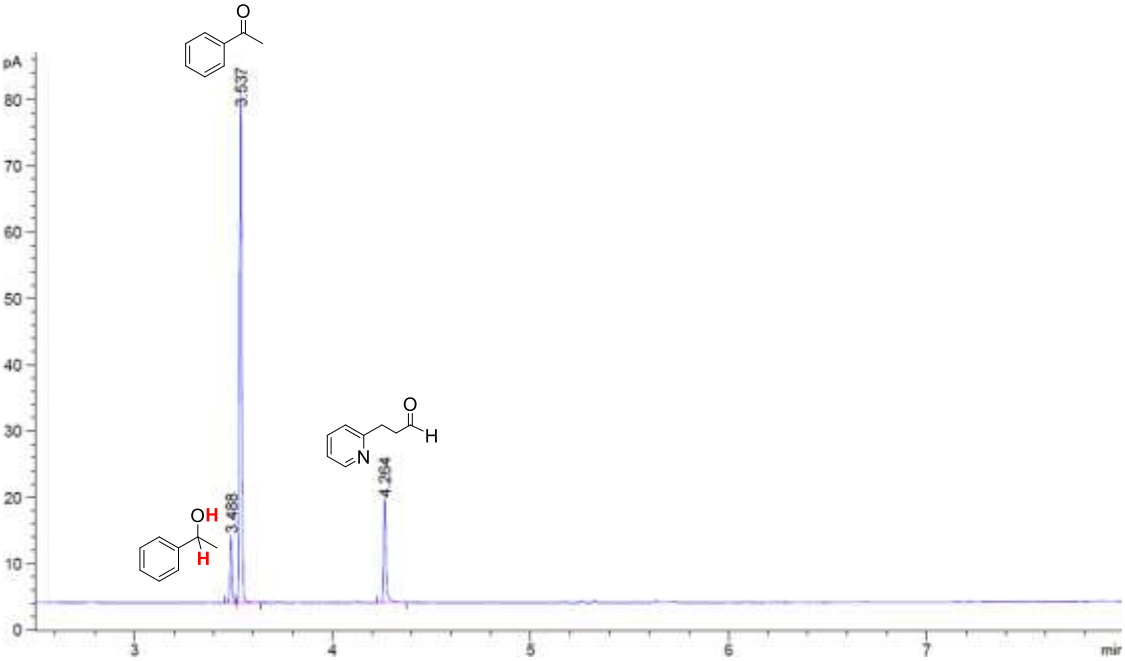


Figure SI.2.136. GC-FID chromatogram of the monitorization of the photoreduccion of acetophenone (**9a**) in the presence of 3(pydidin-2-yl)propanal (**11f**) after 10 minutes of irradiation.

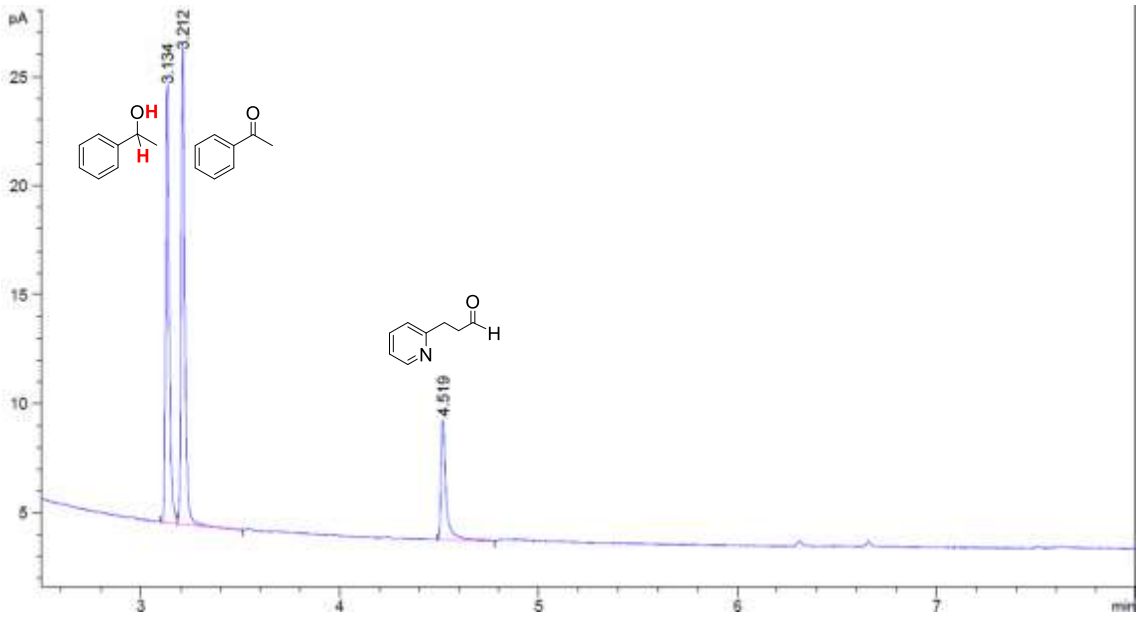


Figure SI.2.137. GC-FID chromatogram of the monitorization of the photoreduccion of acetophenone (**9a**) in the presence of 3(pydidin-2-yl)propanal (**11f**) after 20 minutes of irradiation.

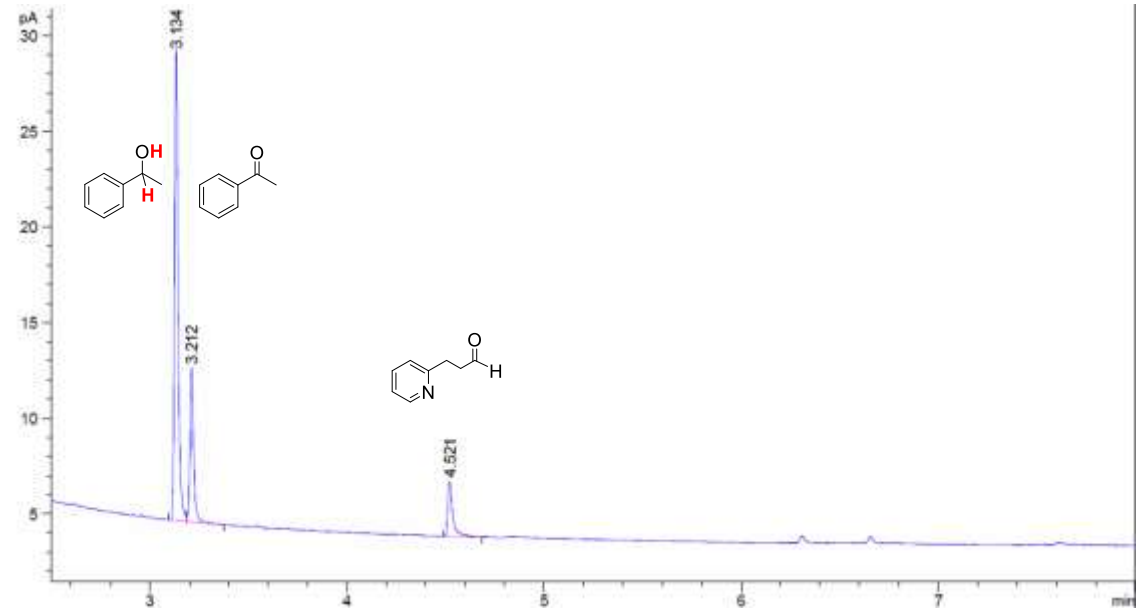


Figure SI.2.138. GC-FID chromatogram of the monitorization of the photoreduccion of acetophenone (**9a**) in the presence of 3(pydidin-2-yl)propanal (**11f**) after 30 minutes of irradiation.

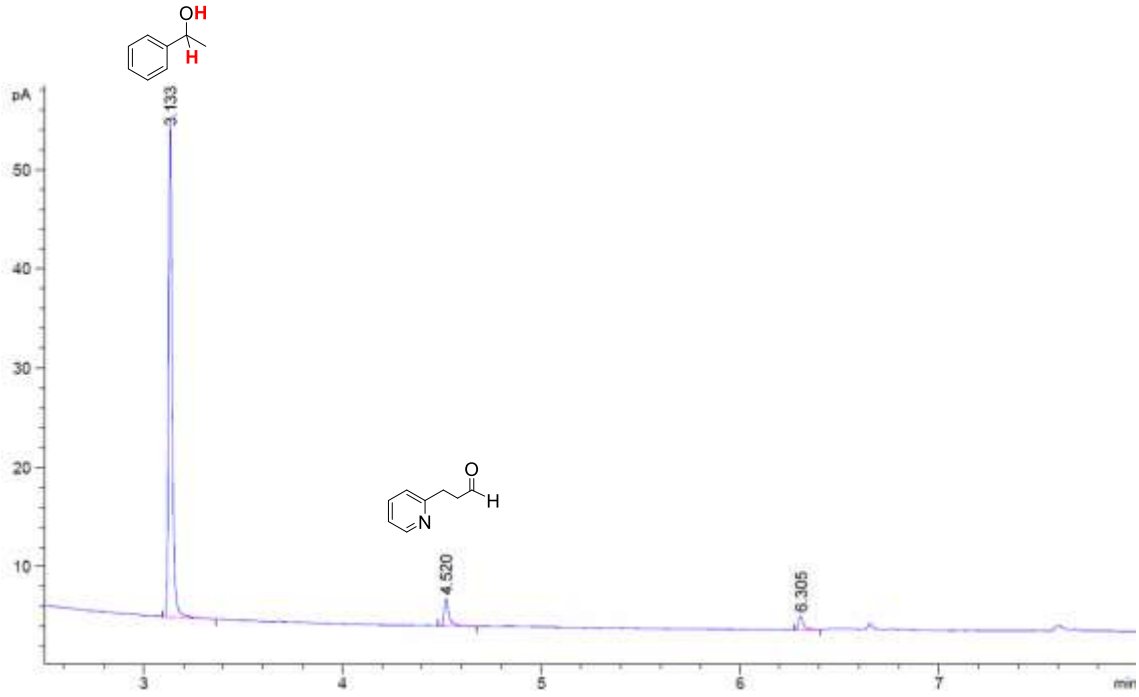


Figure SI.2.139. GC-FID chromatogram of the monitorization of the photoreduccion of acetophenone (**9a**) in the presence of 3(pydidin-2-yl)propanal (**11f**) after 50 minutes of irradiation.

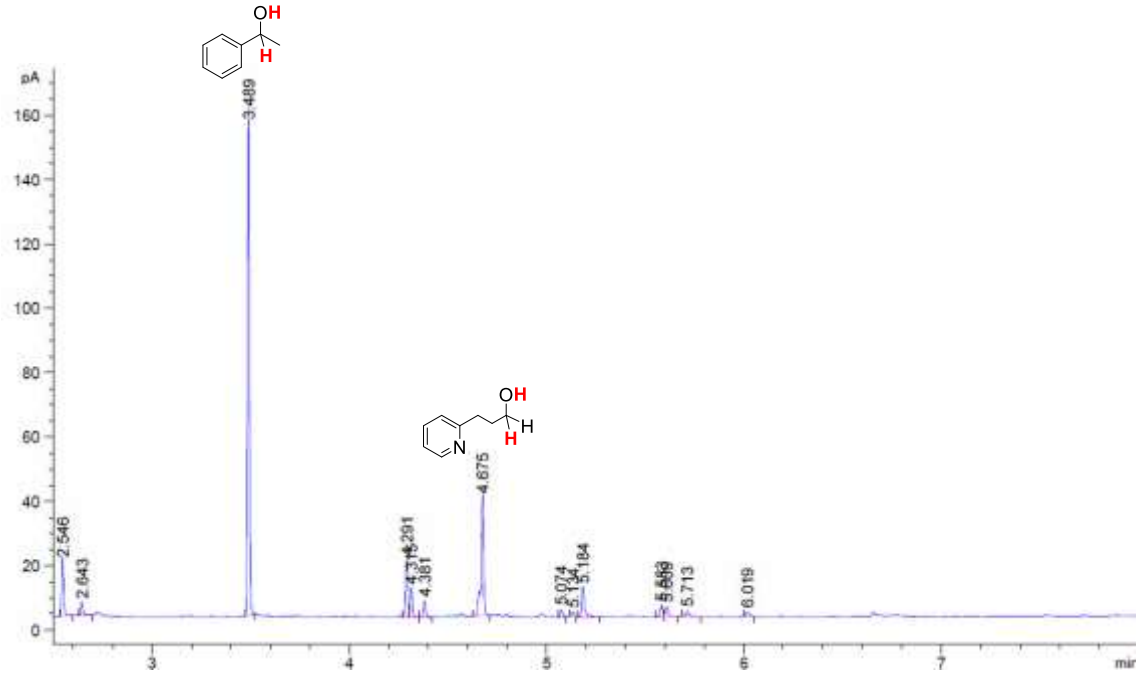
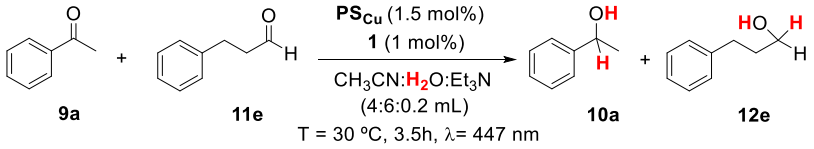


Figure SI.2.140. GC-FID chromatogram of the monitorization of the photoreduccion of acetophenone (**9a**) in the presence of 3(pydidin-2-yl)propanal (**11f**) after 210 minutes of irradiation.



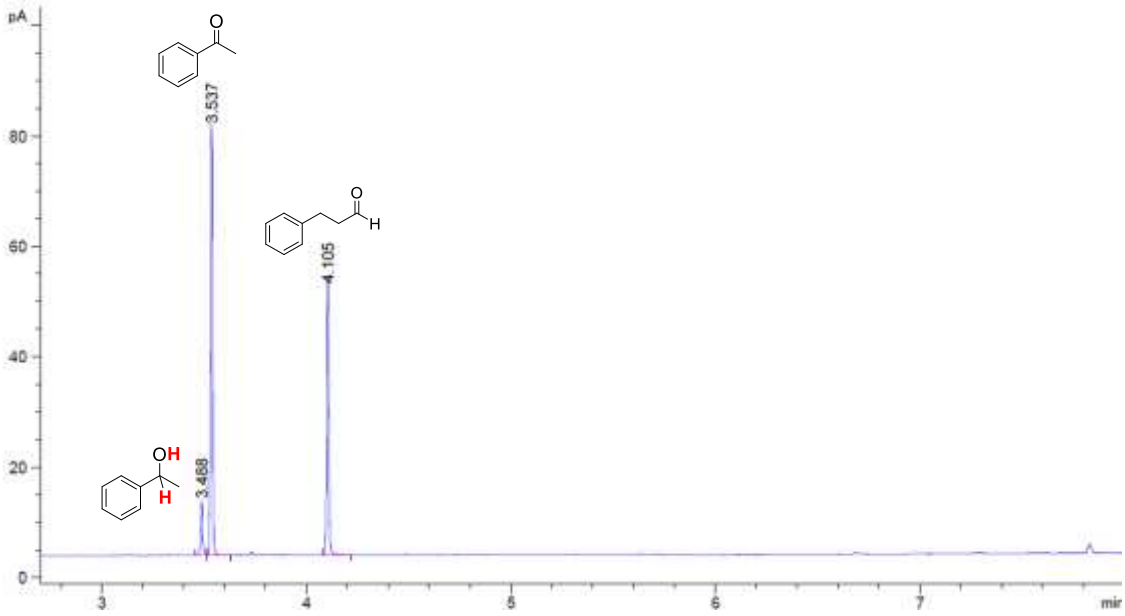


Figure SI.2.141. GC-FID chromatogram of the monitorization of the photoreduccion of acetophenone (**9a**) in the presence of 3-phenylpropanal (**11e**) after 4 minutes of irradiation.

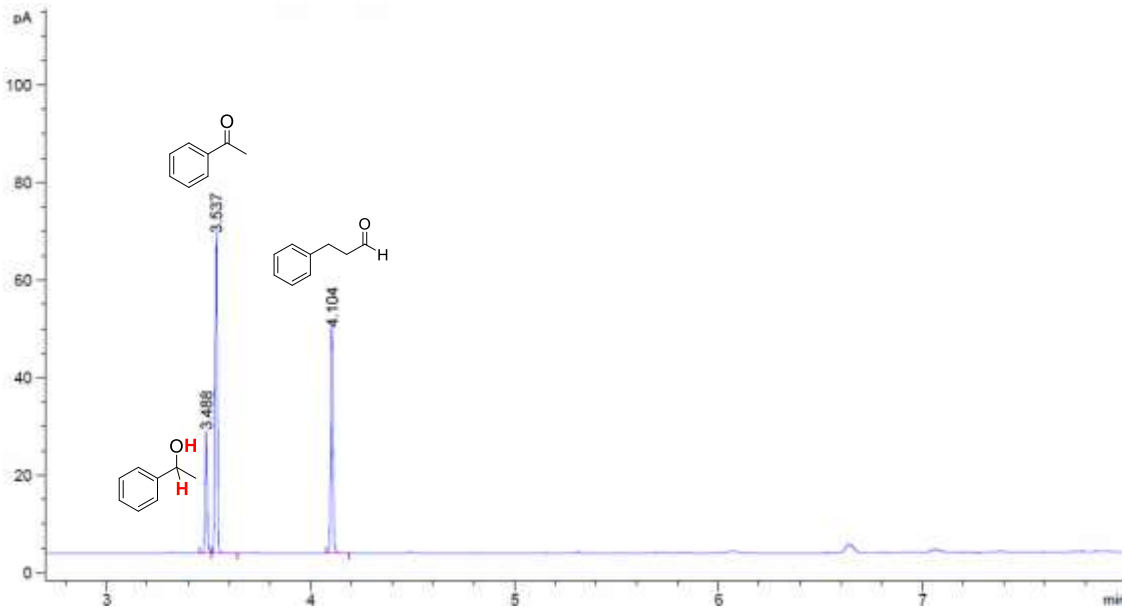


Figure SI.2.142. GC-FID chromatogram of the monitorization of the photoreduccion of acetophenone (**9a**) in the presence of 3-phenylpropanal (**11e**) after 10 minutes of irradiation.

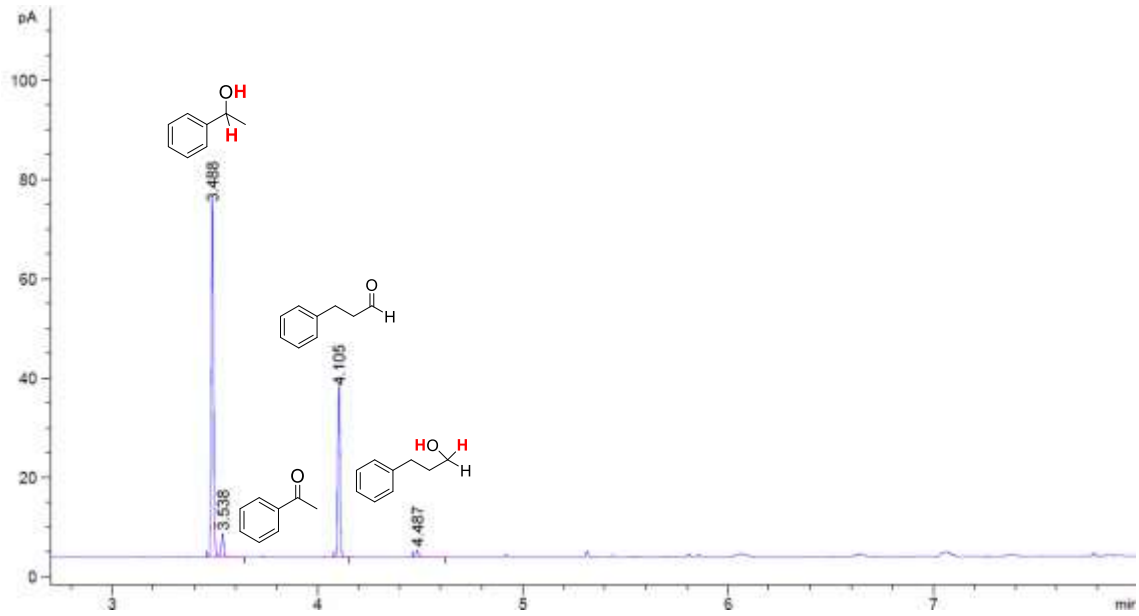


Figure SI.2.143. GC-FID chromatogram of the monitorization of the photoreduccion of acetophenone (**9a**) in the presence of 3-phenylpropanal (**11e**) after 30 minutes of irradiation.

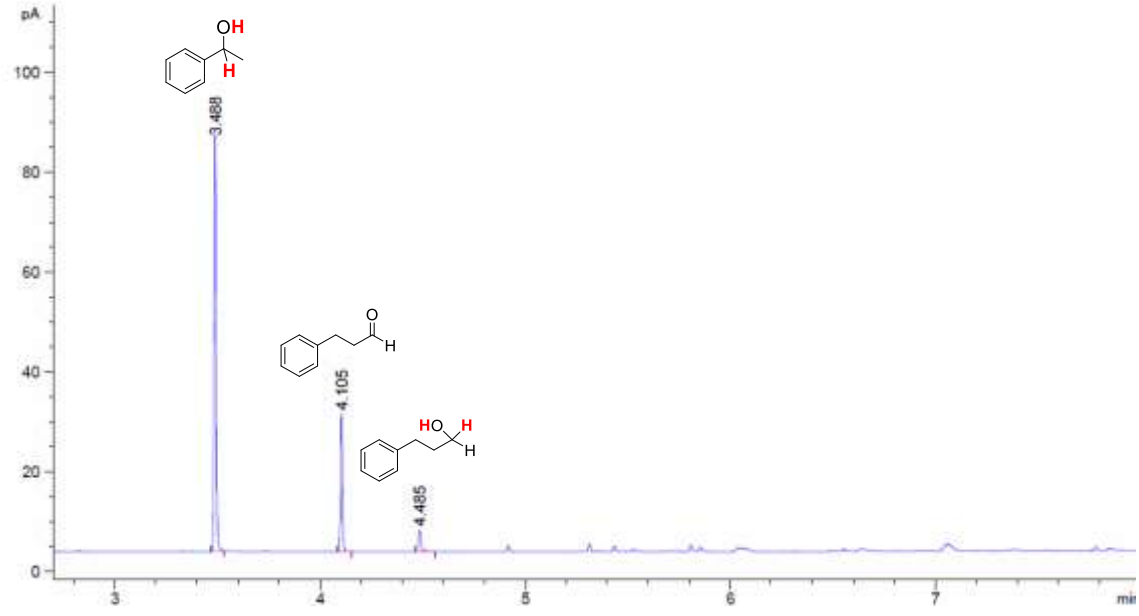


Figure SI.2.144. GC-FID chromatogram of the monitorization of the photoreduccion of acetophenone (**9a**) in the presence of 3-phenylpropanal (**11e**) after 50 minutes of irradiation.

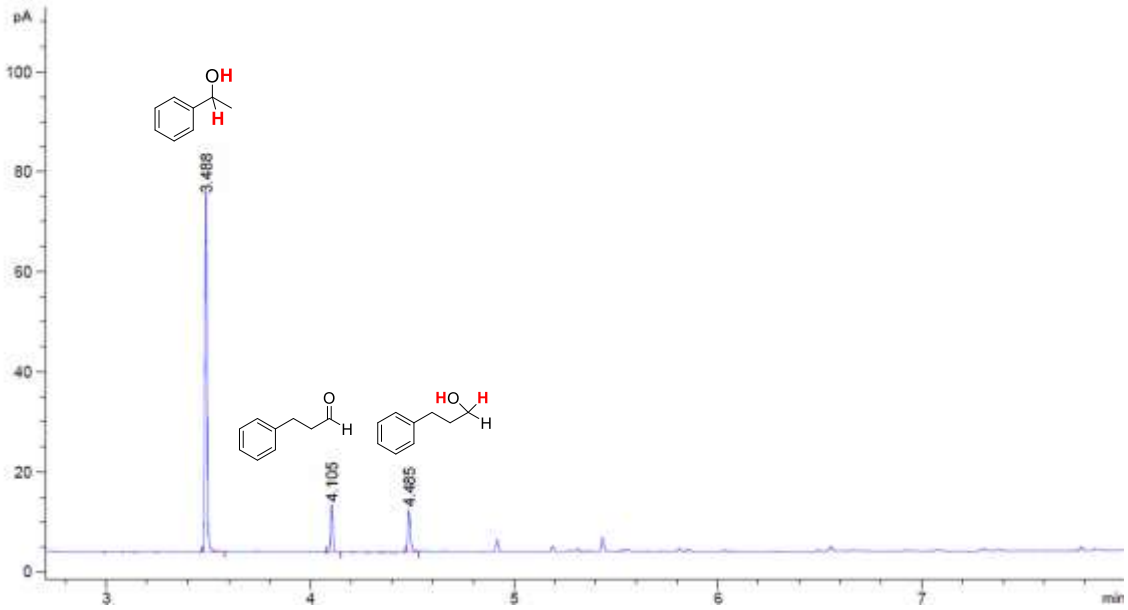


Figure SI.2.145. GC-FID chromatogram of the monitorization of the photoreduccion of acetophenone (**9a**) in the presence of 3-phenylpropanal (**11e**) after 120 minutes of irradiation.

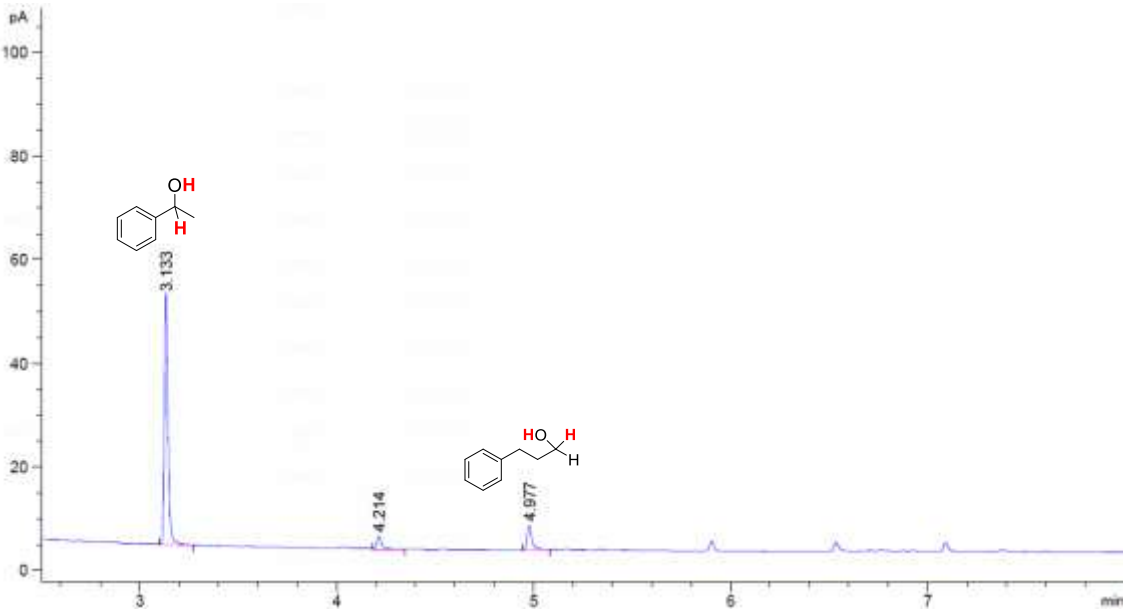


Figure SI.2.146. GC-FID chromatogram of the monitorization of the photoreduccion of acetophenone (**9a**) in the presence of 3-phenylpropanal (**11e**) after 200 minutes of irradiation.