SUPPORTING INFORMATION

Rhenium-Loaded TiO_2: A Highly Versatile and Chemoselective Catalyst for the Hydrogenation of Carboxylic Acid Derivatives and the *N*-Methylation of Amines Using H_2 and CO_2

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1. Experimental (Detailed procedure for catalytic reactions)

Typical procedure for the hydrogenation of esters:

After the reduction with H_2 at T = 700 °C (*cf.* Catalyst Preparation), the catalyst (2 mol% with respect to the Re loading) and a mixture of 3-phenylpropionic acid methyl ester (1.0 mmol), octane (3 mL), and *n*-dodecane (0.29 mmol) were added to a stainless steel autoclave (10 cm^3). The resulting mixture was magnetically stirred (T = 180 °C, p_{H2} = 5 MPa) for 24 h. The products were analyzed by GCMS (SHIMADZU GCMS-QP2010 with an Ultra ALLOY capillary column UA+-1; Frontier Laboratories Ltd.) and GC (Shimadzu GC-14B with an Ultra ALLOY capillary column UA+-1; Frontier Laboratories Ltd.). Yields were determined by GC analysis using *n*-dodecane as the internal standard. All products were subjected to column chromatography on silica gel 60 (spherical, 63-210 μm, Kanto Chemical Co. Ltd.; eluent:hexane/ethyl acetate = 90/10, v/v), and subsequently analyzed by GC and GCMS. ^1H and ^{13}C NMR analysis was carried out for those products that were isolated successfully. ^1H and ^{13}C NMR spectra were recorded at ambient temperature on a JEOL-ECX 600 spectrometer (^1H: 600.17 MHz, ^{13}C: 150.92 MHz), using tetramethylsilane as the internal standard. Isolated yields were determined relative to the esters.

Typical procedure for the hydrogenation of amides:

After the reduction with H_2 at T = 700 °C, the catalyst (2 mol% with respect to the Re loading) and a mixture of *N*-benzylacetamide (1.0 mmol), octane (3 mL), and *n*-dodecane (0.29 mmol) were added to a stainless steel autoclave (10 cm^3). The resulting mixture was magnetically stirred (T = 180 °C, p_{H2} = 5 MPa) for 24 h. The products were analyzed by GCMS and GC, and the product yields were determined by GC analysis using *n*-dodecane as the internal standard. *N*-ethylbenzylamine as a product was isolated by column chromatography on silica gel 60, and subsequently analyzed by GC, GCMS, as well as by ^1H and ^{13}C NMR spectroscopy. Isolated yields were determined relative to the starting amide.

One-pot *N*-alkylation of amines with carboxylic acids or esters:

After the reduction with H_2 at T = 700 °C, the catalyst (2 mol% with respect to the Re loading) and a mixture of 3-phenylpropionic acid (1.0 mmol) or 3-phenylpropionic acid methyl ester (1.0 mmol), dimethylamine (3 mmol), octane (3 mL), and *n*-dodecane (0.29 mmol) were added to a stainless steel autoclave (10 cm^3). The resulting mixture was magnetically stirred (T = 200 °C, p_{H2} = 5 MPa) for 48 h. 3-phenylpropyl-dimethylamine as the product was isolated by column chromatography on silica gel 60, and subsequently analyzed by GC, GCMS, as well as by ^1H and ^{13}C NMR spectroscopy. Isolated yields were determined relative to the starting carboxylic acid or ester.

Typical procedure for the *N*-methylation of amines with CO_2 and H_2:

After the reduction with H_2 at T = 700 °C, the catalyst (2 mol% with respect to the Re loading) and a mixture of *N*-methylaniline (1.0 mmol), octane (3 mL), and *n*-dodecane (0.29 mmol) were added to a stainless steel autoclave (10 cm^3). The resulting mixture was magnetically stirred (T = 200 °C, p_{CO2} = 1 MPa, p_{H2} = 5 MPa) for 24 h. Products were analyzed by GCMS and GC, and the product yields were determined by GC analysis using *n*-dodecane as the internal standard. *N*,*N*-dimethylaniline as a product was isolated by column chromatography on silica

gel 60, and subsequently analyzed by GC, GCMS, as well as by ^{1}H and ^{13}C NMR spectroscopy. Isolated yields were determined relative to the starting amide.

2. Supplementary results

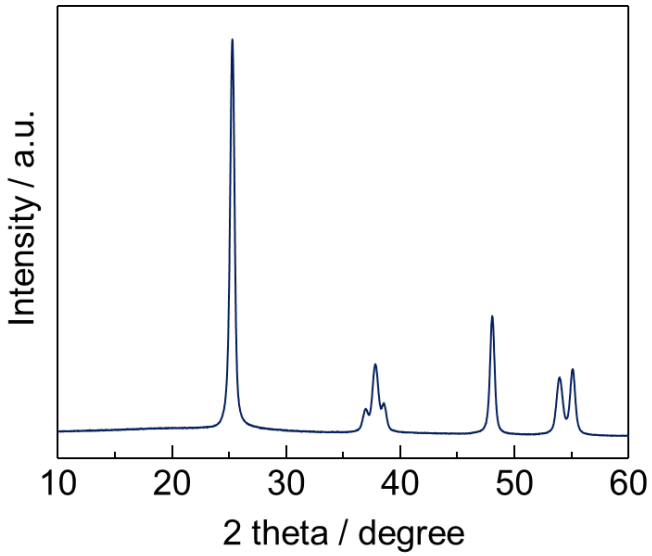


Figure S1. Powder XRD pattern for Re/TiO_2.

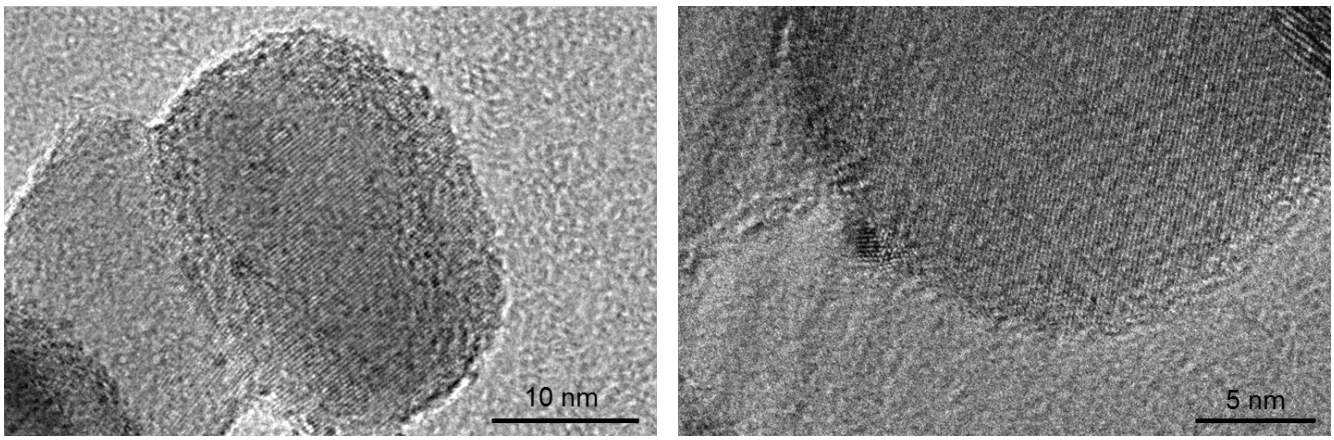


Figure S2. TEM images of Re/TiO_2.

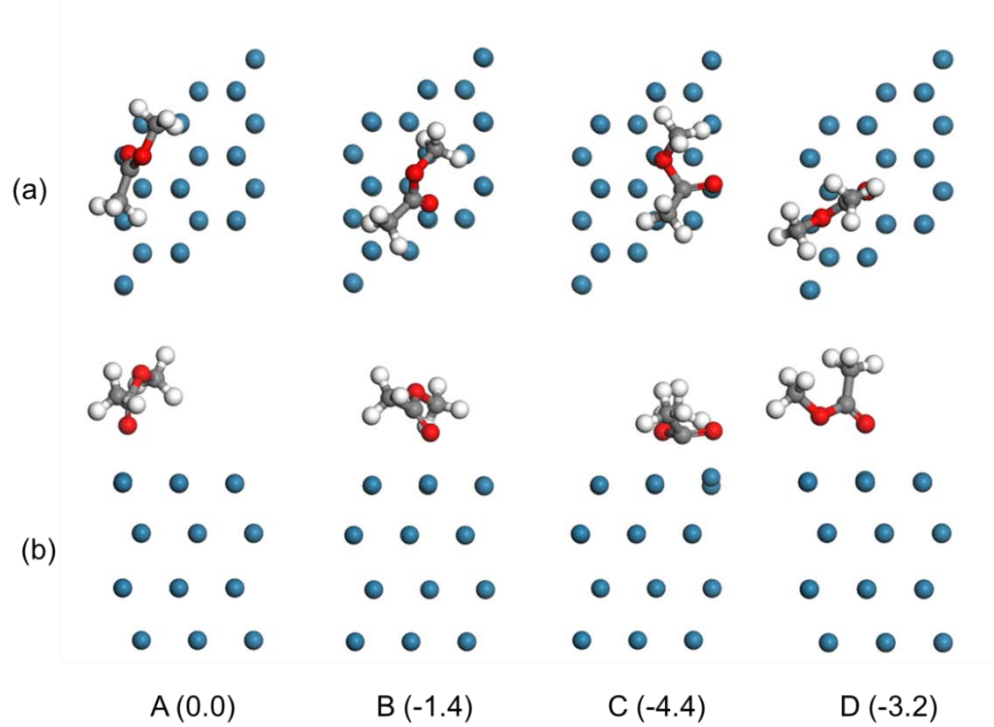


Figure S3. Possible adsorption modes for ethyl acetate on the Re(0001) surface (A-D): (a) top view and (b) side view. Color code: gray = C; red = O; white = H; blue = metal atoms. Relative energies in kcal/mol are given in parenthesis. Structure A represents the most stable adsorption mode.

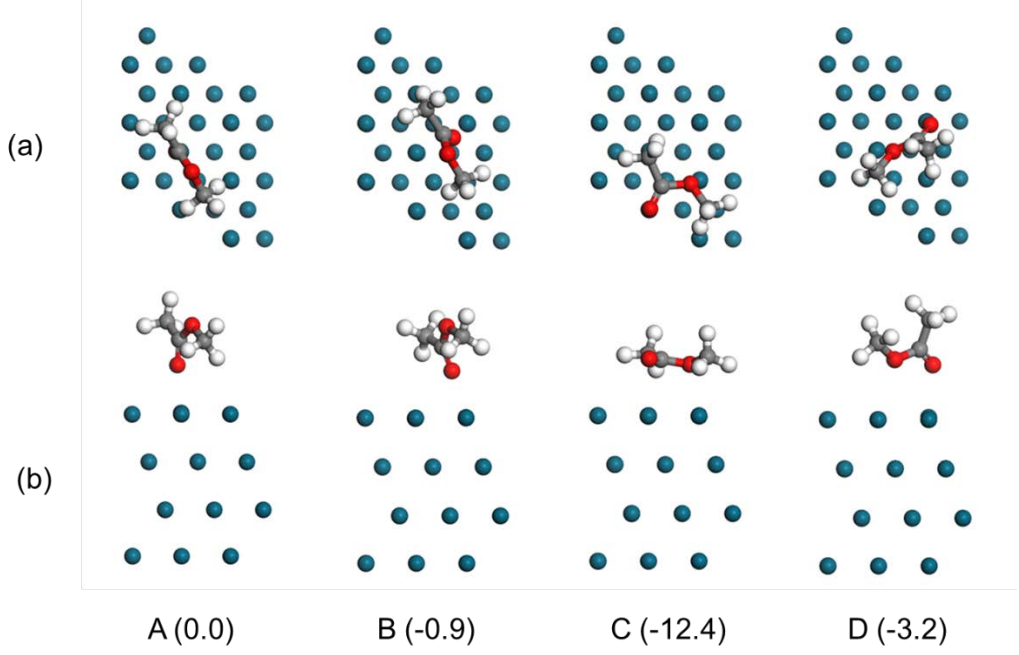


Figure S4. Possible adsorption modes of ethyl acetate on the Pd(111) surface (A-D): (a) top view and (b) side view. Color code: gray = C; red = O; white = H; blue = metal atoms. Relative energies in kcal/mol are given in parenthesis. Structure A represents the most stable adsorption mode.

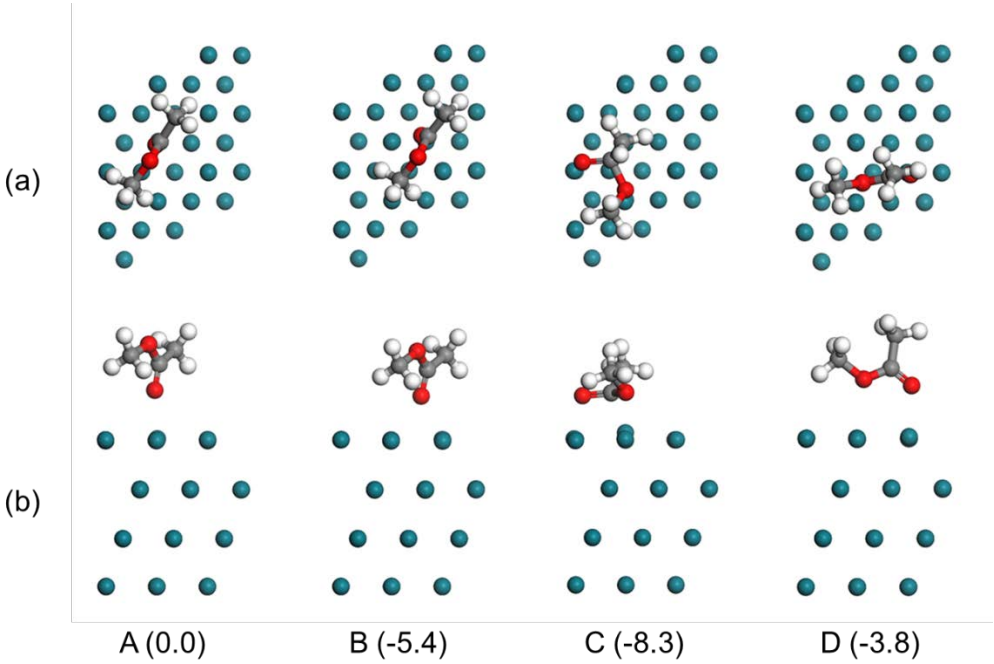
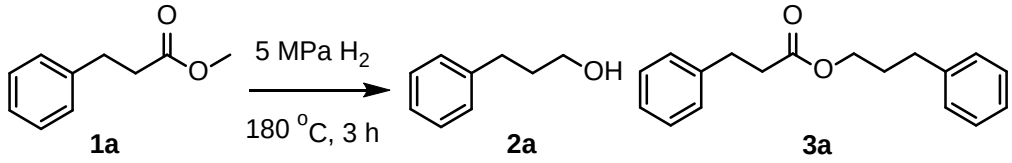


Figure S5. Possible adsorption modes of ethyl acetate on the Rh(111) surface (A-D): (a) top view and (b) side view. Color code: gray = C; red = O; white = H; blue = metal atoms. Relative energies in kcal/mol are given in parenthesis. Structure A represents the most stable adsorption mode.

Table S1. Total Mulliken charges of methyl acetate and benzene on metal surfaces

Metal surface	Methyl acetate	Benzene
Re(0001)	-0.03	-1.22
Pd(111)	-0.55	-1.35
Rh(111)	-0.20	-1.46

Table S2. Effect of Re loading on the hydrogenation of 3-phenylpropionic acid methyl ester catalyzed by Re/TiO_2.[a]

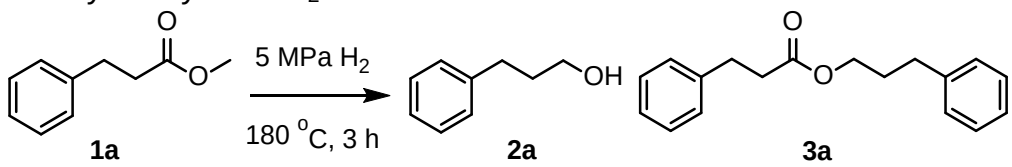


1a **2a** **3a**

Re loading [wt%]	Conv. [%]	Yield [%]	
		2a	**3a**
0	0	0	0
1	26	12	14
3	43	32	9
5	50	43	7
10	19	18	1

[a]Reaction conditions: 2 mol% Re, 1 mmol phenylpropionic acid methyl ester, 3 mL octane, p_{H2} = 5 MPa, T = 180 °C, t = 3 h. Yields were determined by GC using *n*-dodecane as the internal standard.

Table S3. Effect of the reduction temperature on the hydrogenation of 3-phenylpropionic acid methyl ester catalyzed by Re/TiO_2.[a]

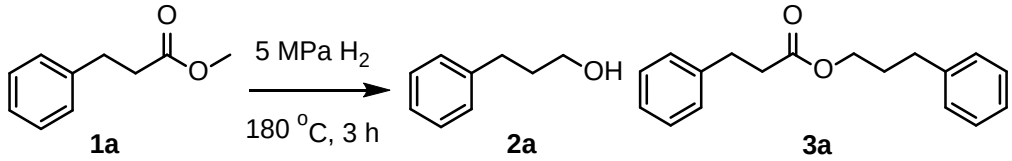


1a **2a** **3a**

Reduction temperature [°C]	Conv. [%]	Yield [%]	
		2a	**3a**
r.t.	20	17	1
100	25	21	3
200	31	25	6
300	41	35	5
400	55	46	8
500	58	49	9
600	55	46	8
700	50	43	7

[a]Reaction conditions: 2 mol% Re, 1 mmol phenylpropionic acid methyl ester, 3 mL octane, p_{H2} = 5 MPa, T = 180 °C, t = 3 h. Yields were determined by GC using *n*-dodecane as the internal standard.

Table S4. Effect of H_2 pressure on the hydrogenation of 3-phenylpropionic acid methyl ester catalyzed by Re/TiO_2.[a]

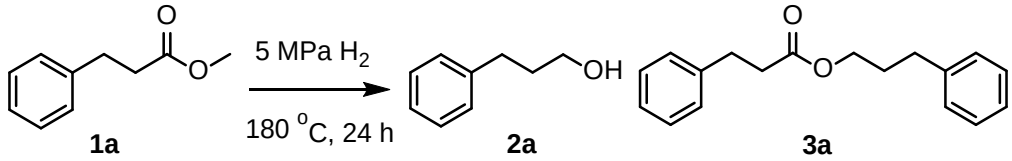


1a **2a** **3a**

H_2 pressure [MPa]	Conv. [%]	Yield [%]	
		2a	**3a**
0.1	1	1	0
1	12	0	1
2	20	18	1
3	32	25	6
4	34	31	2
5	50	43	7
6	47	45	1
7	45	44	1

[a]Reaction conditions: 2 mol% Re, 1 mmol phenylpropionic acid methyl ester, 3 mL octane, *T* = 180 °C, *t* = 3 h. Yields were determined by GC using *n*-dodecane as the internal standard.

Table S5. Effect of the solvent on the hydrogenation of 3-phenylpropionic acid methyl ester catalyzed by Re/TiO_2.[a]

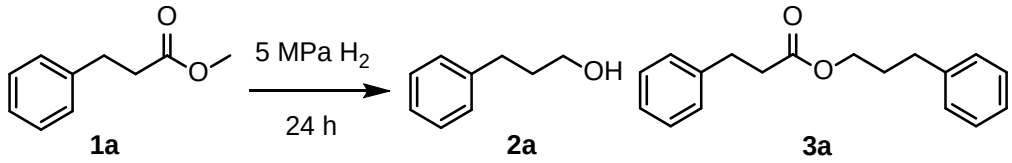


1a **2a** **3a**

Solvent	Conv. [%]	Yield [%]	
		2a	**3a**
None	100	96	4
Octane	99	96	3
Hexane	96	90	6
p-Xylene	99	97	2
o-Xylene	100	95	4
1,4-Dioxane	100	94	5
THF	99	96	2
DME	99	90	9
Ethanol	88	58	0
Diethylene glycol dimethyl ether	40	37	2

[a]Reaction conditions: 2 mol% Re, 1 mmol phenylpropionic acid methyl ester, 3 mL solvent, p_{H2} = 5 MPa, *T* = 180 °C, *t* = 24 h. Yields were determined by GC using *n*-dodecane as the internal standard.

Table S6. Effect of the reaction temperature on the hydrogenation of 3-phenylpropionic acid methyl ester catalyzed by Re/TiO_2.[a]



Temperature [°C]	Conv. [%]	Yield [%]	
		2a	**3a**
180	99	96	3
170	93	84	7
160	88	68	18
140	41	34	7

[a]Reaction conditions: 2 mol% Re, 1 mmol phenylpropionic acid methyl ester, 3 mL octane, p_{H2} = 5 MPa, *t* = 24 h. Yields were determined by GC using *n*-dodecane as the internal standard.

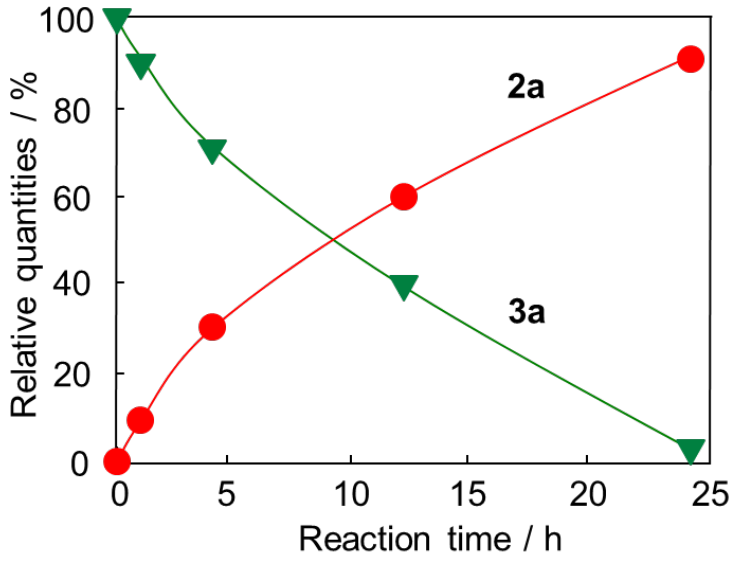


Figure S6. Time-course plot for the hydrogenation of 3-phenylpropyl 3-phenyl-propionate (**3a**) over Re/TiO_2 at *T* = 180 °C and p_{H2} = 5 MPa. **2a**: 3-phenylpropanol; **3a**: 3-phenylpropyl 3-phenyl-propionate.

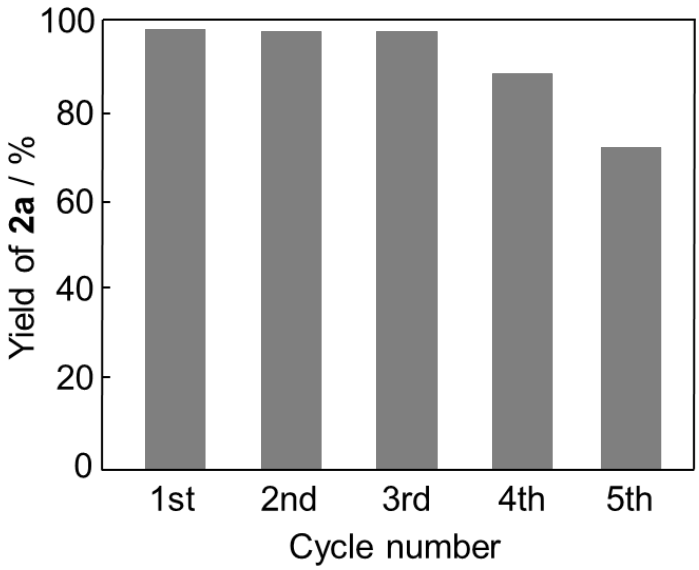


Figure S7. Recycling study for hydrogenation of 3-phenylpropionic acid methyl ester catalyzed by Re/TiO_2 at T = 180 °C and p_{H2} = 5 MPa.

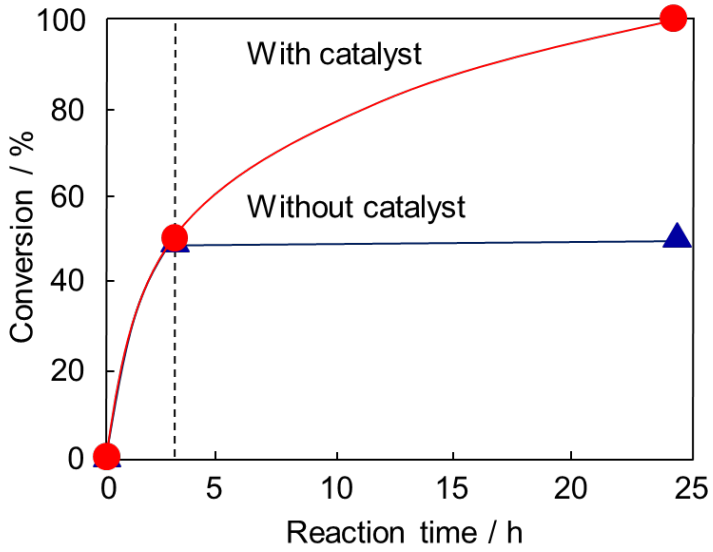
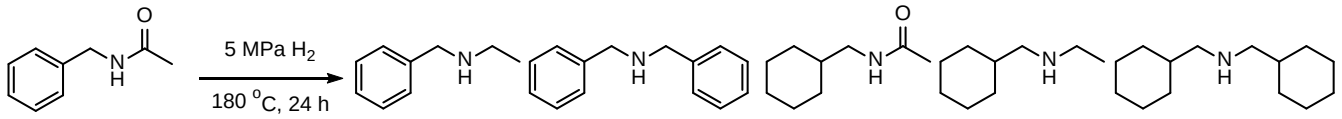


Figure S8. Leaching test for the hydrogenation of 3-phenylpropionic acid methyl ester over Re/TiO_2 at T = 180 °C and p_{H2} = 5 MPa. After t = 3 h, the catalyst was isolated by filtration. Subsequently, the reaction mixture was kept under reaction conditions in the absence of a solid catalyst.

Table S7. Heterogeneous catalytic hydrogenation of *N*-benzylacetamide.



1b **2b** **3b** **4b** **5b** **6b**

Entry	Catalysts	Conv. [%]	Yield [%]				
			2b	**3b**	**4b**	**5b**	**6b**
1	Re/TiO_2	99	86	3	0	0	0
2	Ru/TiO_2	100	0	0	2	51	35
3	Pt/TiO_2	98	0	0	2	42	31
4	Ir/TiO_2	100	0	0	17	35	12
5	Rh/TiO_2	100	0	0	15	64	12
6	Pd/TiO_2	100	0	0	92	0	0
7	Re/Carbon	76	60	3	0	0	0
8	$Re/\theta\text{-}Al_2O_3$	31	27	0	0	0	0
9	$Re/\gamma\text{-}Al_2O_3$	25	23	0	0	0	0

[a]Reaction conditions: 2 mol% catalyst, 1 mmol phenylpropionic acid methyl ester, 3 mL octane, p_{H2} = 5 MPa, T = 180 °C, t = 24 h. Yields were determined by GC using *n*-dodecane as the internal standard.

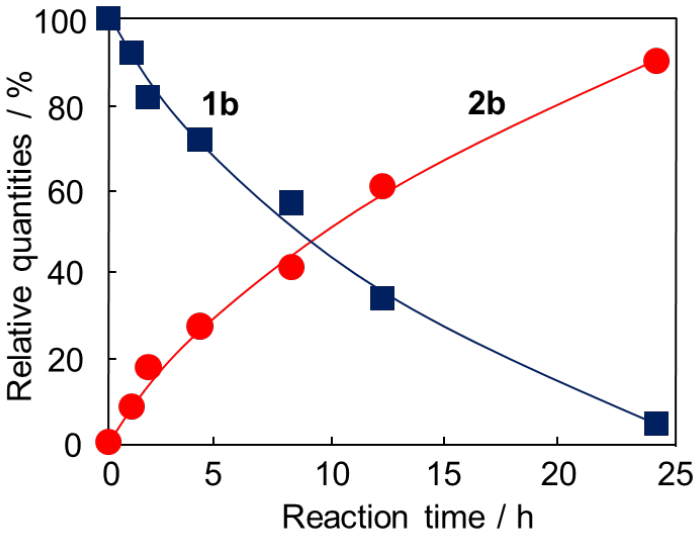
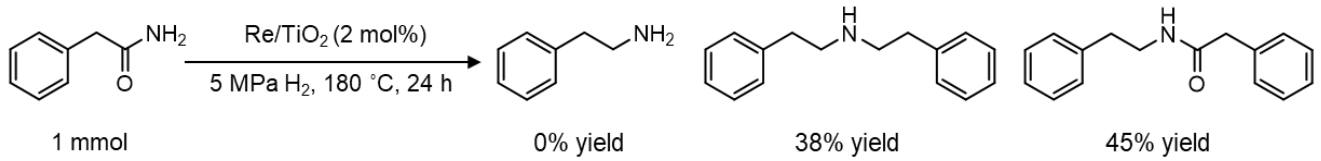


Figure S9. Time-course plot for the hydrogenation of *N*-benzylacetamide catalyzed by Re/TiO_2; **1b**: *N*-benzylacetamide; **2b**: *N*-ethylbenzylamine.



Scheme S1. Hydrogenation of 2-phenylacetamide (p_{H2} = 5 MPa and T = 180 ºC) catalyzed by Re/TiO_2.

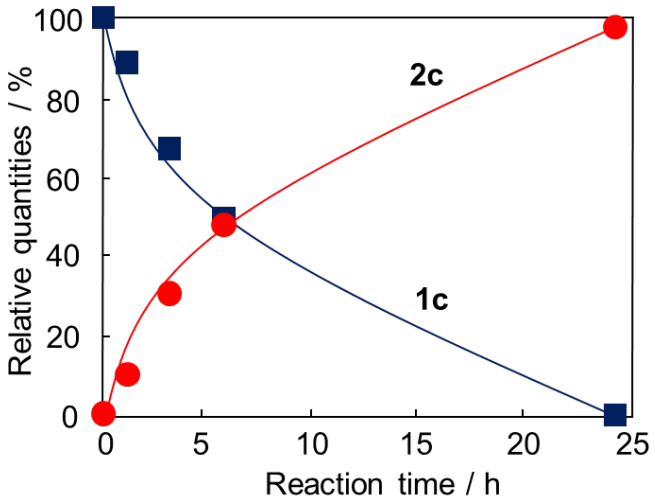
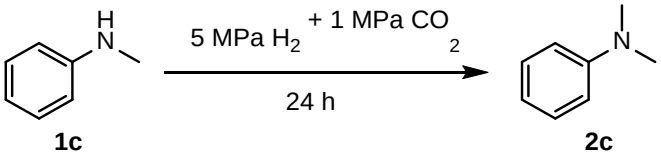


Figure S10. Time-course plot for the *N*-methylation of *N*-methylaniline with CO_2 and H_2 catalyzed by Re/TiO_2; **1c**: *N*-methylaniline; **2c**: *N,N*-dimethylaniline.

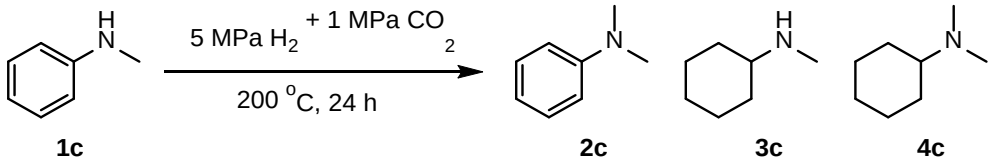
Table S8. Effect of the reaction temperature on the *N*-methylation of *N*-methylaniline with CO_2 and H_2 catalyzed by Re/TiO_2.[a]



Temperature [°C]	Conv. [%]	Yield [%]
200	98	97
180	85	80
160	64	58
140	42	35

[a]Reaction conditions: 2 mol% Re, 1 mmol *N*-methylaniline, 3 mL octane, p_{CO2} = 1 MPa and p_{H2} = 5 MPa, t = 24 h. Yields were determined by GC using *n*-dodecane as the internal standard.

Table S9. Heterogeneous catalytic *N*-methylation of *N*-methylaniline with CO_2 and H_2.



1c **2c** **3c** **4c**

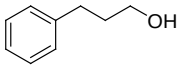
Entry	Catalysts	Conv. [%]	Yield [%]		
			2c	**3c**	**4c**
1	Re/TiO_2	98	97	0	0
2	Ru/TiO_2	94	0	22	31
3	Pt/TiO_2	38	15	0	0
4	Ir/TiO_2	14	8	3	0
5	Rh/TiO_2	10	5	3	0
6	Pd/TiO_2	19	3	1	0
7	Ag/TiO_2	5	5	0	0
8	Cu/TiO_2	6	4	0	0
9	Ni/TiO_2	4	2	0	0
10	Co/TiO_2	4	1	0	0
11	TiO_2	1	1	0	0
12	Re/Carbon	8	7	0	0
13	$Re/\theta\text{-}Al_2O_3$	32	31	0	0
14	$Re/\gamma\text{-}Al_2O_3$	32	32	0	0
15	Re/ZrO_2	23	20	0	0
16	Re/HZSM-5(22)	15	6	0	0
17	Re/SiO_2	7	3	0	0
18	Re/Nb_2O_5	25	18	0	0
19	Re/CeO_2	12	8	0	0
20	Re/MgO	8	5	0	0

[a]Reaction conditions: 2 mol% catalyst, 1 mmol *N*-methylaniline, 3 mL octane, p_{CO2} = 1 MPa and p_{H2} = 5 MPa, T = 200 °C, t = 24 h. Yields were determined by GC using *n*-dodecane as the internal standard.

3. NMR data

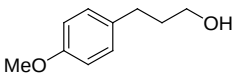
^{1}H and ^{13}C NMR spectra for the obtained products were assigned according to previous reports in the literature. Abbreviations used in the NMR experiments: s = singlet; d = doublet; t = triplet; q = quartet; m = multiplet. GC-MS spectra were recorded on a SHIMADZU QP2010.

3-Phenyl-propan-1-ol: [1]



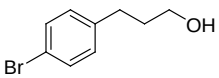
^{1}H NMR (600.17 MHz, $CDCl_3$, TMS): δ 7.29-7.27 (m, 2H), 7.19 (d, *J* = 6.84 Hz, 3H), 3.66 (t, *J* = 6.18 Hz, 2H), 2.70 (t, *J* = 7.56 Hz, 2H), 1.90-1.88 (m, 2H), 1.45 (s. 1H); ^{13}C NMR (150.92 MHz, $CDCl_3$): δ 141.78, 128.38 (C×2), 128.36 (C×2), 125.83, 62.22, 34.18, 32.03; GC-MS m/e 136.15.

3-(3-Methoxyphenyl)-propan-1-ol: [1]



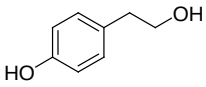
^{1}H NMR (600.17 MHz, $CDCl_3$, TMS): δ 7.18 (t, *J* = 7.92 Hz, 1H), 6.77 (d, *J* = 7.56 Hz, 1H), 6.74-6.71 (m, 2H), 3.77 (s, 3H), 3.64 (t, *J* = 6.54 Hz, 2H), 2.66 (t, *J* = 7.56 Hz, 2H), 2.00 (br s, 1H), 1.89-1.84 (m, 2H); ^{13}C NMR (150.92 MHz, $CDCl_3$): δ 159.54, 143.42, 129.25, 120.75, 114.13, 111.01, 62.04, 55.02, 33.99, 32.02; GC-MS m/e 166.15.

3-(3-bromophenyl)-propan-1-ol: [2]



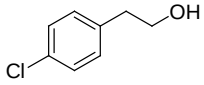
^{1}H NMR (600.17 MHz, $CDCl_3$, TMS): δ 7.40 (t, *J* = 6.12 Hz, 2H), 7.06 (d, *J* = 6.9 Hz, 2H), 3.65 (s, 2H), 2.66 (t, *J* = 6.87 Hz, 2H), 1.85 (t, *J* = 6.87 Hz, 2H), 1.40 (s, 1H); ^{13}C NMR (150.92 MHz, $CDCl_3$): δ 140.73, 131.04 (C×2), 130.17 (C×2), 119.55, 61.95, 33.97, 31.41; GC-MS m/e 214.15.

4-(2-hydroxy-ethyl)-phenol: [3]



^{1}H NMR (600.17 MHz, $CDCl_3$, TMS): δ 8.07 (br, s, 1H), 7.04 (d, *J* = 8.28 Hz, 2H), 6.73 (d, *J* = 8.22 Hz, 2H), 3.68 (td, *J* = 8.00, 4.82 Hz, 2H), 3.61 (br, t, *J* = 5.49 Hz, 1H), 2.70 (t, *J* = 7.02 Hz, 2H); ^{13}C NMR (150.92 MHz, $CDCl_3$): δ 156.11, 130.60, 130.29 (C×2), 115.47 (C×2), 63.86, 39.07; GC-MS m/e 138.10.

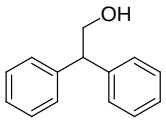
4-(2-chloro-ethyl)-phenol: [4]



^{1}H NMR (600.17 MHz, $CDCl_3$, TMS): δ 7.28 (d, *J* = 8.22 Hz, 2H), 7.15 (d, *J* = 8.22 Hz, 2H), 3.82 (t, *J* = 6.18 Hz, 2H), 2.82 (t, *J* = 6.18 Hz, 2H), 1.60 (br s, 1H); ^{13}C NMR (150.92 MHz, $CDCl_3$): δ 137.02, 132.23, 130.32 (C×2), 128.61 (C×2), 63.39, 38.44; GC-MS m/e 156.10.

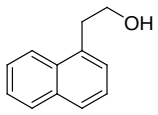
Note: 2-phenyl-ethanol was observed in 16% yield by NMR and GCMS analysis.

3,3-diphenyl-propan-1ol: [5]



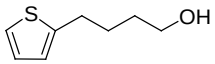
^{1}H NMR (600.17 MHz, $CDCl_3$, TMS): δ7.32-7.29 (m, 4H), 7.25-7.22 (m, 4H), 7.21-7.20 (m, 2H), 4.19 (t, *J* = 7.23 Hz, 1H), 4.15 (t, *J* = 6.15 Hz, 2H), 1.60 (br s, 1H); ^{13}C NMR (150.92 MHz, $CDCl_3$): δ 141.36 (C×2), 128.67 (C×4), 128.28 (C×4), 126.77 (C×2), 66.08, 53.59; GC-MS m/e 198.15.

2-Napthalene-1-yl-ethanol:[5]



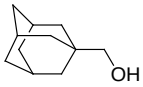
^{1}H NMR (600.17 MHz, $CDCl_3$, TMS): δ 8.00 (d, *J* = 8.22 Hz, 1H), 7.81 (d, *J* = 7.56 Hz, 1H), 7.70 (d, *J* = 7.56 Hz, 1H), 7.49-7.43 (m, 2H), 7.37 (t, *J* = 7.56 Hz, 1H), 7.31 (d, *J* = 6.90 Hz, 1H), 3.89 (t, *J* = 6.54 Hz, 2H), 3.27 (t, *J* = 6.51 Hz, 2H), 1.83 (br s, 1H); ^{13}C NMR (150.92 MHz, $CDCl_3$): δ 134.34, 133.86, 131.96, 128.74, 127.18, 127.03, 125.93, 125.54, 125.40, 123.56, 62.85, 36.07; GC-MS m/e 172.10.

4-thiophen-2-yl-butane-1-ol: [6]



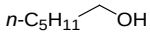
^{1}H NMR (600.17 MHz, $CDCl_3$, TMS): δ 7.09 (d, *J* = 6.18 Hz, 1H), 6.91-6.89 (m, 1H), 6.77 (d, *J* = 3.84 Hz, 1H), 3.64 (t, *J* = 6.54 Hz, 2H), 2.85 (t, *J* = 7.56 Hz, 2H), 1.77-1.72 (m, 2H), 1.65-1.60 (m, 3H); ^{13}C NMR (150.92 MHz, $CDCl_3$): δ 145.13, 126.63, 124.06, 122.86, 62.52, 32.03, 29.57, 27.88; GC-MS m/e 156.10.

Adamantan-1-yl-methanol: [7]



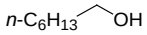
^{1}H NMR (600.17 MHz, $CDCl_3$, TMS): δ 3.19 (s, 2H), 1.99 (s, 3H), 1.73 (pseudo-d, *J* = 12.36 Hz, 3H), 1.65 (pseudo-d, *J* = 12.36 Hz, 3H), 1.50 (s, 6H), 1.27 (br, s, 1H); ^{13}C NMR (150.92 MHz, $CDCl_3$): δ 73.86, 39.02 (C×3), 37.16 (C×3), 34.46 (C×2), 28.16 (C×2); GC-MS m/e 166.15.

Hexan-1-ol:[6]



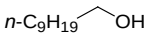
^{1}H NMR (600.17 MHz, $CDCl_3$, TMS): δ 3.64 (t, *J* = 6.09 Hz, 2H), 1.58-1.53 (m, 2H), 1.38-1.27 (m, 6H), 1.19 (br s, 1H), 0.89 (t, *J* = 6.75 Hz, 3H); ^{13}C NMR (150.92 MHz, $CDCl_3$): δ 63.10, 32.70, 31.52, 25.36, 22.54, 14.01; GC-MS m/e 102.15.

Heptan-1-ol:[6]



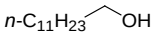
^{1}H NMR (600.17 MHz, $CDCl_3$, TMS): δ 3.58 (t, *J* = 6.87 Hz, 2H), 3.44 (br s, 1H), 1.54 (t, *J* = 6.90 Hz, 2H), 1.32-1.28 (m, 8H), 0.88 (t, *J* = 6.51 Hz, 3H); ^{13}C NMR (150.92 MHz, $CDCl_3$): δ 62.38, 32.53, 31.72, 29.03, 25.63, 22.47, 13.85; GC-MS m/e 116.15.

Decan-1-ol:[6]



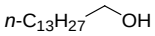
^{1}H NMR (600.17 MHz, $CDCl_3$, TMS): δ 3.60 (t, *J* = 6.51 Hz, 2H), 2.46 (br s, 1H), 1.56-1.54 (m, 2H), 1.33-1.26 (m, 14H), 0.88 (t, *J* = 6.87 Hz, 3H); ^{13}C NMR (150.92 MHz, $CDCl_3$): δ 62.72, 32.66, 31.83, 29.57, 29.51, 29.40, 29.26, 25.71, 22.60, 13.98; GC-MS m/e 158.20.

Dodecan-1-ol:[6]



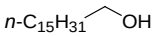
^{1}H NMR (600.17 MHz, $CDCl_3$, TMS): δ 3.63 (pseudo-t, *J* = 6.54 Hz, 2H), 1.56-1.54 (m, 2H), 1.33-1.26 (m, 19H), 0.88 (t, *J* = 6.18 Hz, 3H); ^{13}C NMR (150.92 MHz, $CDCl_3$): δ 63.06, 32.79, 31.90, 29.64, 29.60, 29.59, 29.58, 29.42, 29.32, 25.72, 22.67, 14.09; GC-MS m/e 186.25.

Tetradecan-1-ol:[6]



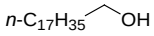
^{1}H NMR (600.17 MHz, $CDCl_3$, TMS): δ 3.61 (t, *J* = 6.84 Hz, 2H), 1.96 (br s, 1H), 1.56-1.53 (m, 2H), 1.34-1.26 (m, 22H), 0.87 (t, *J* = 6.56 Hz, 3H); ^{13}C NMR (150.92 MHz, $CDCl_3$): δ 62.88, 32.73, 31.88, 29.65 (C×2), 29.59 (C×2), 29.42 (C×2), 29.32 (C×2), 25.72, 22.64, 14.04; GC-MS m/e 214.25.

Hexadecan-1-ol:[6]



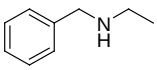
^{1}H NMR (600.17 MHz, $CDCl_3$, TMS): δ 3.63 (t, *J* = 6.54 Hz, 2H), 1.57-1.55 (m, 2H), 1.34-1.25 (m, 27H), 0.88 (t, *J* = 7.20 Hz, 3H); ^{13}C NMR (150.92 MHz, $CDCl_3$): δ 63.07, 32.80, 31.91, 29.68 (C×2), 29.65 (C×2), 29.60 (C×2), 29.42 (C×2), 29.35 (C×2), 25.72, 22.68, 14.10; GC-MS m/e 242.30.

Octadecan-1-ol:[6]



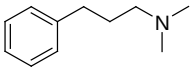
^{1}H NMR (600.17 MHz, $CDCl_3$, TMS): δ 3.63 (t, *J* = 6.54 Hz, 2H), 1.57-1.55 (m, 2H), 1.35-1.25 (m, 31H), 0.88 (t, *J* = 6.87 Hz, 3H); ^{13}C NMR (150.92 MHz, $CDCl_3$): δ 63.06, 32.79, 31.91, 29.69 (C×4), 29.65 (C×2), 29.59 (C×2), 29.43 (C×2), 29.35 (C×2), 25.72, 22.68, 14.10; GC-MS m/e 270.30.

Benzyl-ethyl-amine:[8]



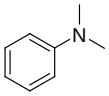
^{1}H NMR (600.17 MHz, $CDCl_3$, TMS): δ 7.33-7.29 (m, 4H), 7.22 (d, *J* = 8.28 Hz, 1H), 3.77 (s, 2H), 2.68-2.65 (m, 2 H), 1.15-1.11 (m, 4H); ^{13}C NMR (150.92 MHz, $CDCl_3$): δ 140.43, 128.25 (C×2), 128.00 (C×2), 126.73, 53.87, 43.55, 15.20; GC-MS m/e 136.10.

Dimethyl (3- phenyl-propyl)-amine:[9]

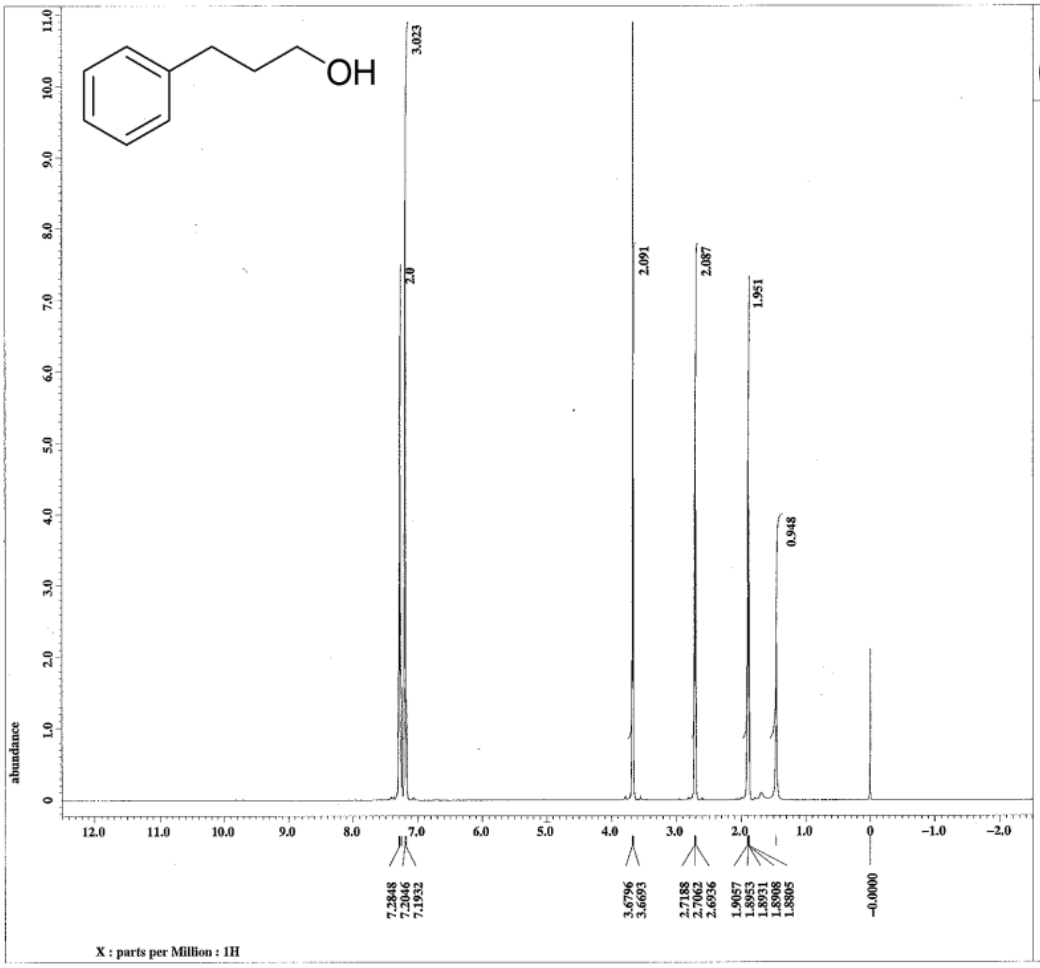


^{1}H NMR (600.17 MHz, $CDCl_3$, TMS): δ 7.27 (d, *J* = 6.84 Hz, 2H), 7.18 (t, *J* = 7.56 Hz, 3H), 2.63 (t, *J* = 7.82 Hz, 2H), 2.29 (t, *J* = 7.56 Hz, 2H), 2.22 (s, 6H), 1.80-1.77 (m, 2H); ^{13}C NMR (150.92 MHz, $CDCl_3$): δ 142.26, 128.33 (C×2), 128.26 (C×2), 125.67, 59.27, 45.47 (C×2), 33.63, 29.44; GC-MS m/e 163.25.

Dimethyl-phenyl-amine:[10]



^{1}H NMR (600.17 MHz, $CDCl_3$, TMS): δ 7.24 (t, *J* = 7.56 Hz, 2H), 6.75-6.70 (m, 3H), 2.93 (s, 6H); ^{13}C NMR (150.92 MHz, $CDCl_3$): δ 150.61, 129.02 (C×2), 116.58, 112.60 (C×2), 40.58 (C×2); GC-MS m/e 122.10.



JEOL

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Revision_time     = 18-JAN-2017 16:21:02
Current_time      = 18-JAN-2017 16:21:07

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Dim_units         = [ppm]
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Clipped           = FALSE
Mod_return        = 1
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Total_scans       = 8

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X_angle           = 45[deg]
X_atn             = 3.6[dB]
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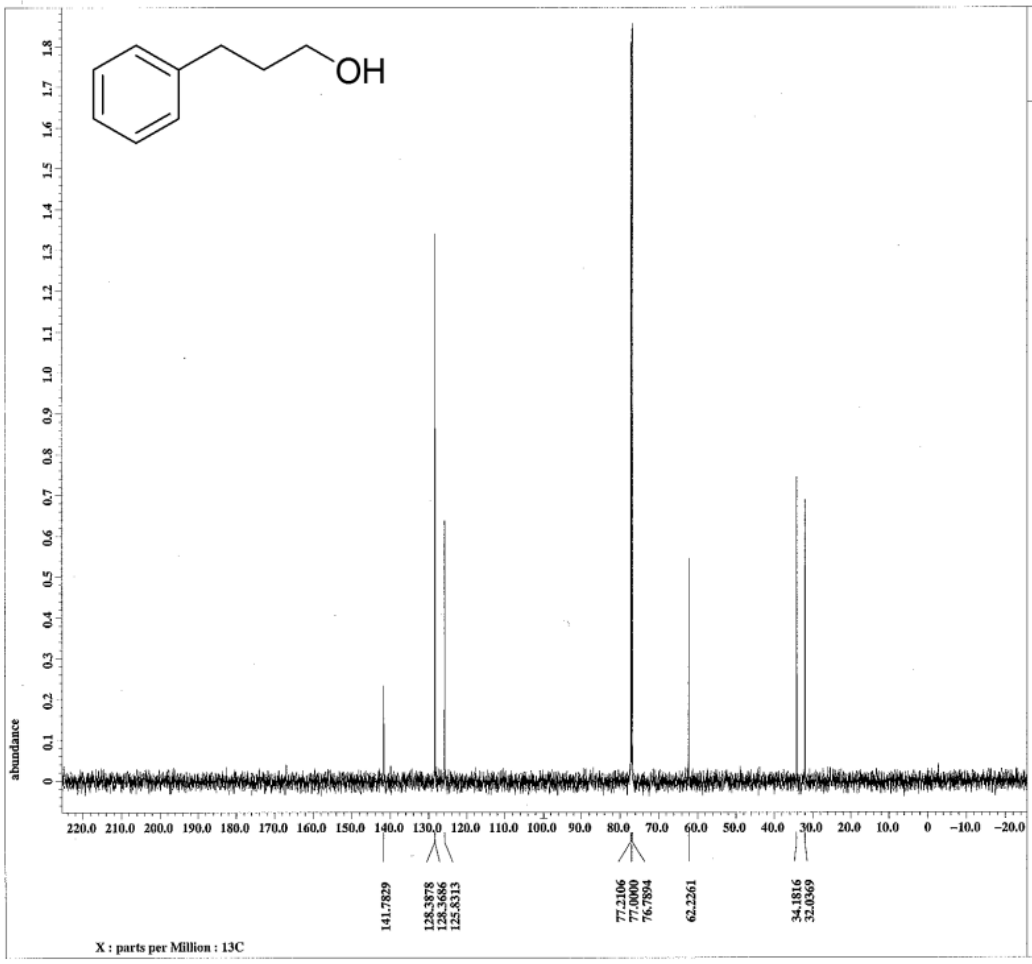

JEOL

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Solvent           = CHLOROFORM-D
Creation_time     = 18-JAN-2017 15:28:23
Revision_time     = 18-JAN-2017 16:22:38
Current_time      = 18-JAN-2017 16:22:41

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Dim_units         = [ppm]
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Spectrometer      = DELTA2_NMR

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X_offset          = 100[ppm]
X_points          = 32768
X_prescans        = 4
X_resolution      = 1.44496109[Hz]
X_sweep           = 47.34848485[kHz]
Irr_domain        = 1H
Irr_freq          = 600.1723046[MHz]
Irr_offset        = 5[ppm]
Clipped           = FALSE
Mod_return        = 1
Scans             = 53
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X_angle           = 30[deg]
X_atn             = 7.5[dB]
X_pulse           = 3.63333333[us]
Irr_atn_dec       = 19.21[dB]
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Irr_noise         = WALTZ
Decoupling        = TRUE
Initial_wait      = 1[s]
Noe               = TRUE
Noe_time          = 2.5[s]
Recvr_gain        = 60
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Repetition_time   = 3.19206016[s]
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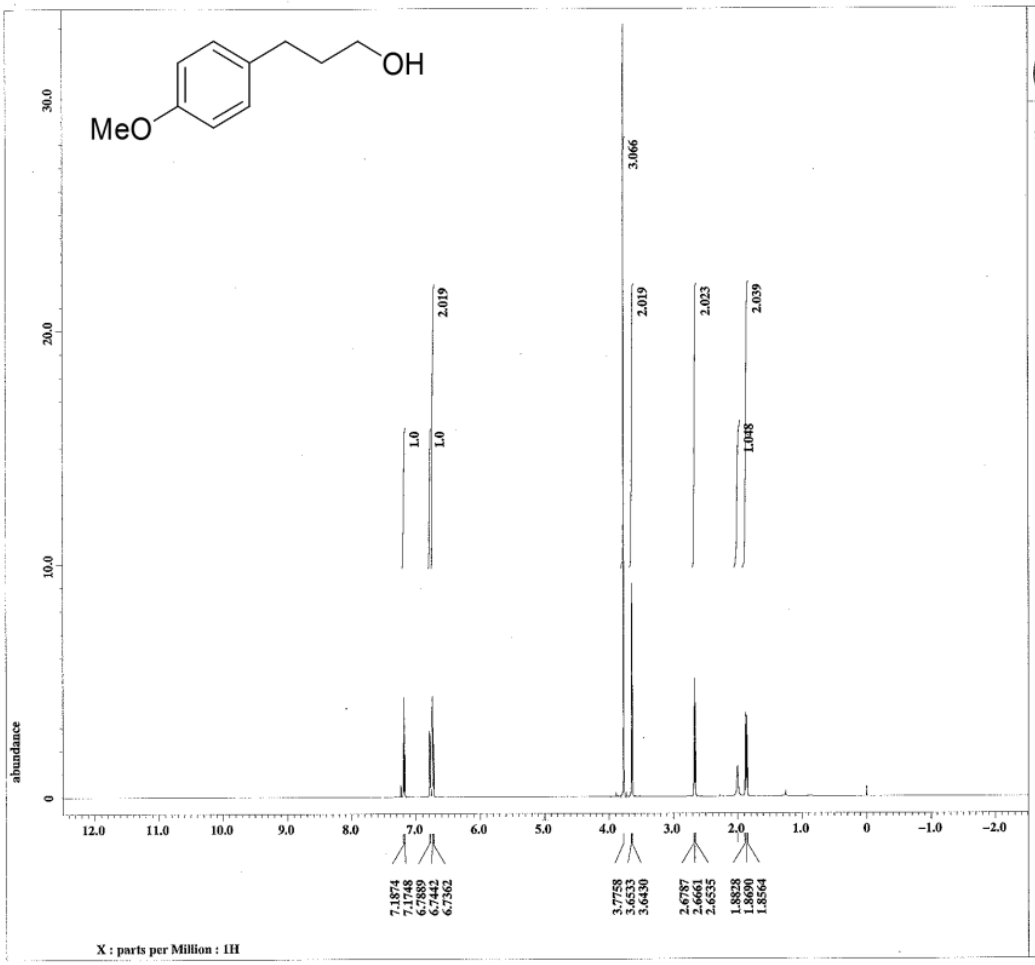

JEOL

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Creation_time     =  9-MAR-2017 16:31:27
Revision_time     = 24-MAR-2017 11:17:45
Current_time      = 24-MAR-2017 11:17:48

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X_offset          = 5[ppm]
X_points          = 16384
X_prescans        = 1
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X_sweep           = 11.26126126[kHz]
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Irr_freq          = 600.1723046[MHz]
Irr_offset        = 5[ppm]
Tri_domain        = 1H
Tri_freq          = 600.1723046[MHz]
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Clipped           = FALSE
Mod_return        = 1
Scans             = 8
Total_scans       = 8

X_90_width        = 12.6[us]
X_acq_time        = 1.4548992[s]
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X_pulse           = 6.3[us]
Irr_mode          = Off
Tri_mode          = Off
Dante_presat      = FALSE
Initial_wait      = 1[s]
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Repetition_time   = 6.4548992[s]
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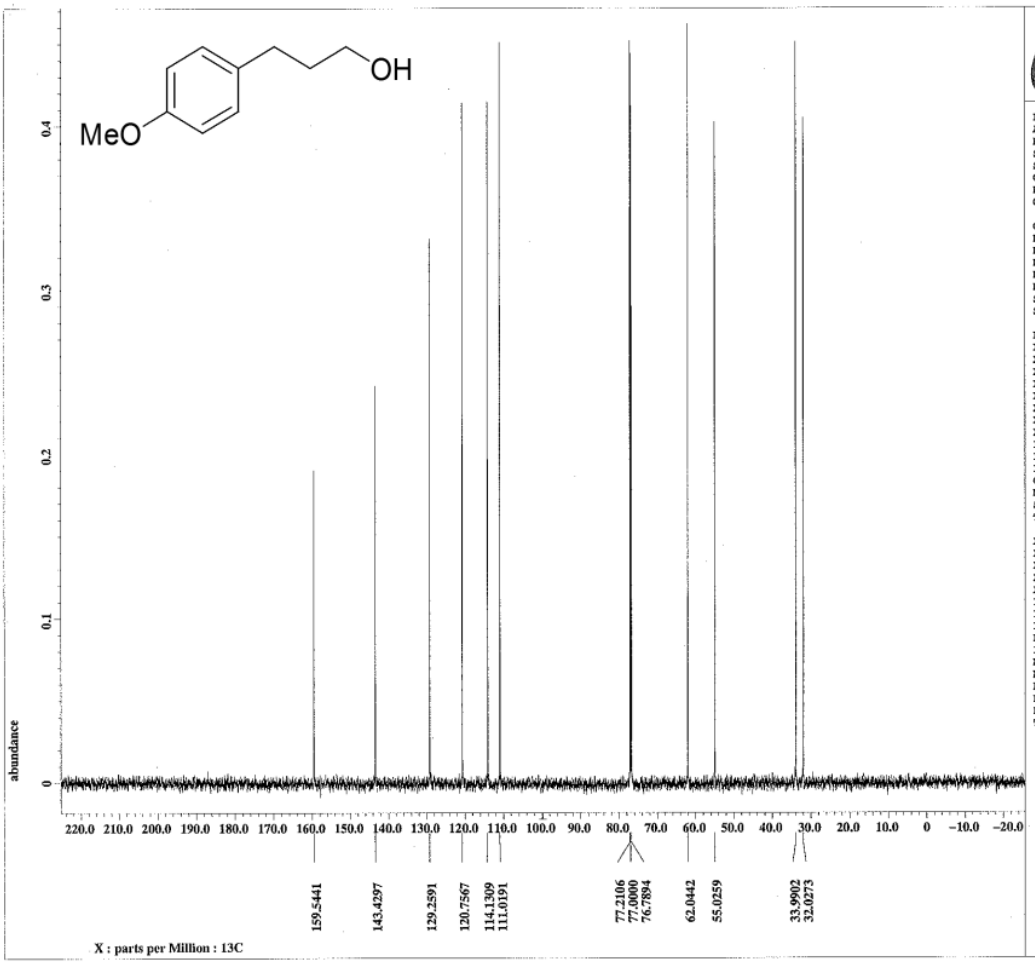

JEOL

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Revision_time     = 24-MAR-2017 11:19:03
Current_time      = 24-MAR-2017 11:19:16

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Spectrometer      = DELTA2_NMR

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X_points          = 32768
X_prescans        = 4
X_resolution      = 1.44496109[Hz]
X_sweep           = 47.34848485[kHz]
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Irr_freq          = 600.1723046[MHz]
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Mod_return        = 1
Scans             = 103
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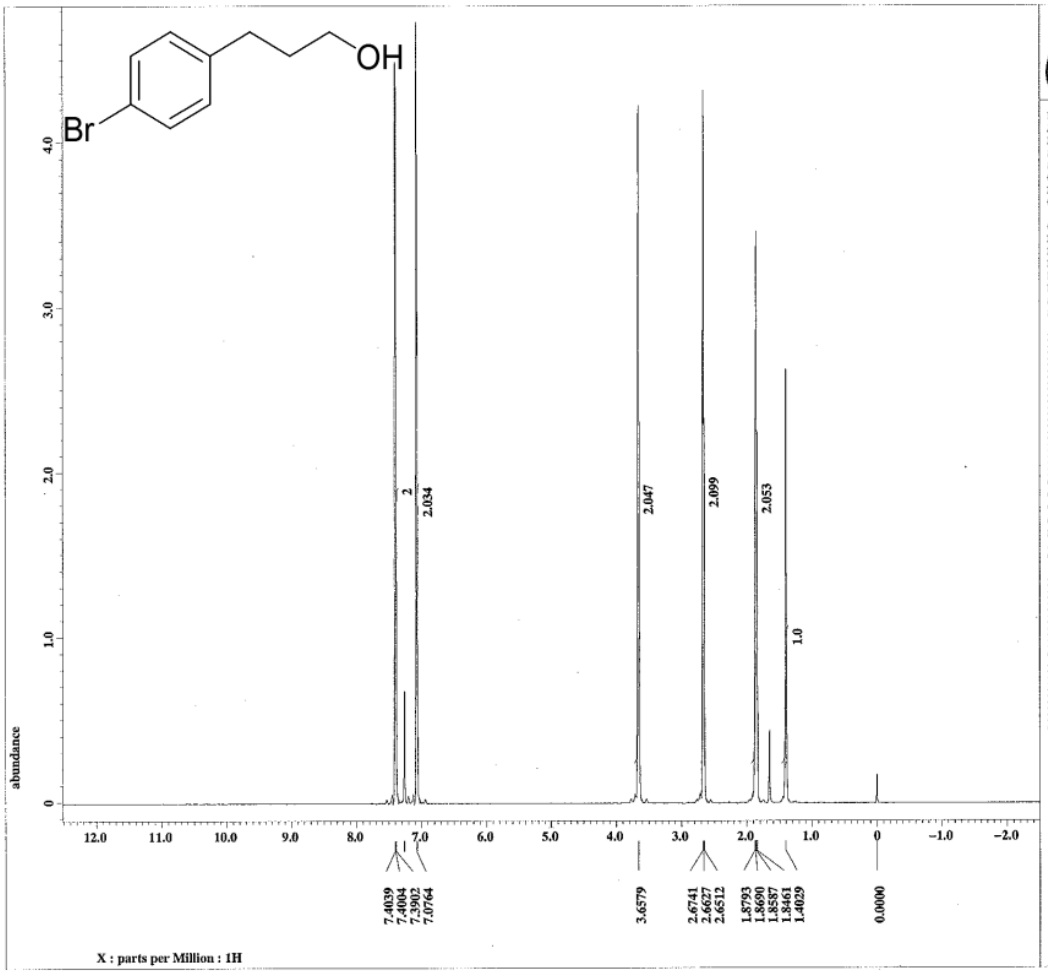
X_atn             = 7.5[dB]
X_pulse           = 3.63333333[us]
Irr_atn_dec       = 19.21[dB]
Irr_atn_noe       = 19.21[dB]
Irr_noise         = WALTZ
Decoupling        = TRUE
Initial_wait      = 1[s]
Noe               = TRUE
Noe_time          = 2.5[s]
Recvr_gain        = 48
Relaxation_delay  = 2.5[s]
Repetition_time   = 3.19206016[s]
Temp_get          = 24.4[dC]
```



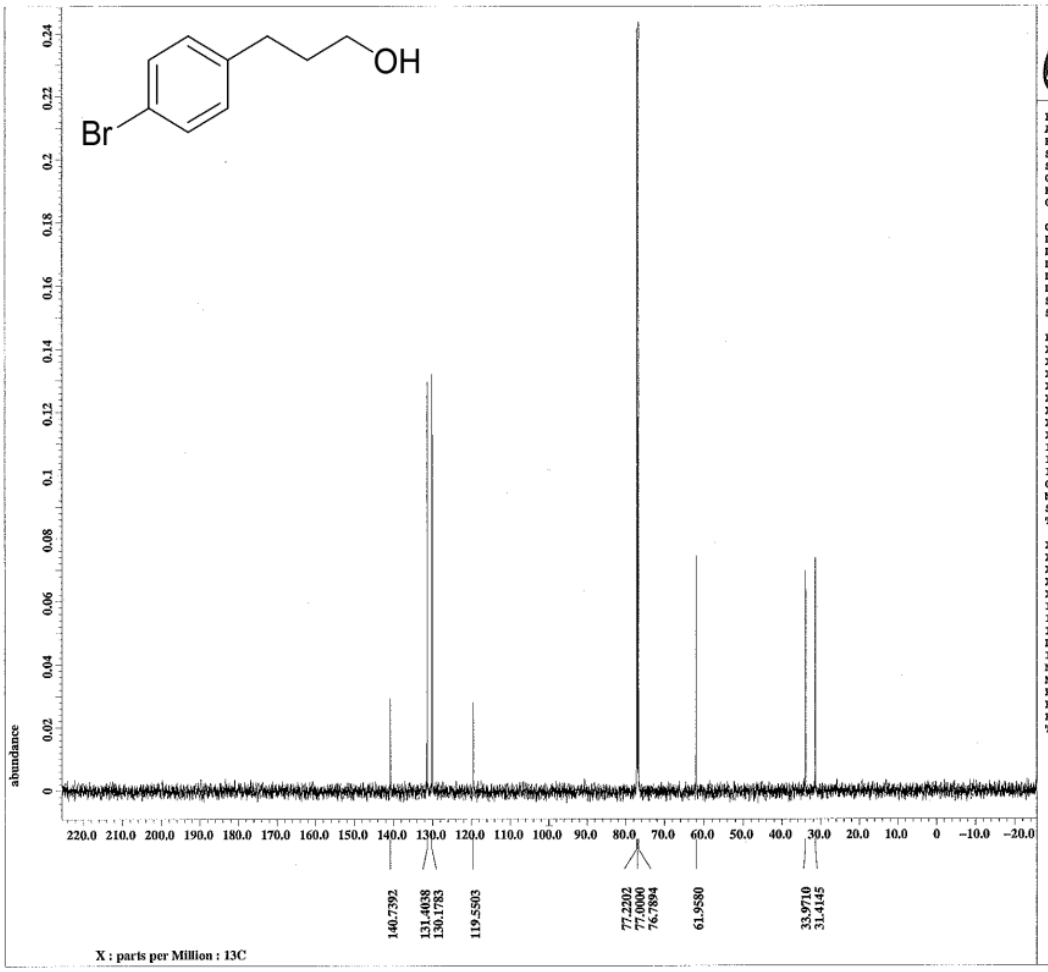
JEOL

```
Filename          = Exp-AB-Est-red-Br-Ph-
Author            = delta
Experiment        = single_pulse.ex2
Sample_id         = Exp-AB-Est-red-Br-Ph-
Solvent           = CHLOROFORM-D
Creation_time     = 18-JAN-2017 15:49:03
Revision_time     = 18-JAN-2017 16:53:22
Current_time      = 18-JAN-2017 16:53:29

Content           = Exp-AB-Est-red-Br-Ph-
Data_format       = 1D COMPLEX
Dim_size          = 13107
Dim_title         = 1H
Dim_units         = [ppm]
Dimensions        = X
Site              = ECA 600
Spectrometer      = DELTA2_NMR

Field_strength    = 14.09636928[T] (600[M
X_acq_duration    = 1.4548992[s]
X_domain          = 1H
X_freq            = 600.1723046[MHz]
X_offset          = 5[ppm]
X_points          = 16384
X_prescans        = 1
X_resolution      = 0.68733284[Hz]
X_sweep           = 11.26126126[kHz]
Irr_domain        = 1H
Irr_freq          = 600.1723046[MHz]
Irr_offset        = 5[ppm]
Tri_domain        = 1H
Tri_freq          = 600.1723046[MHz]
Tri_offset        = 5[ppm]
Clipped           = FALSE
Mod_return        = 1
Scans             = 8
Total_scans       = 8

X_90_width        = 12.6[us]
X_acq_time        = 1.4548992[s]
X_angle           = 45[deg]
X_atn             = 3.6[dB]
X_pulse           = 6.3[us]
Irr_mode          = Off
Tri_mode          = Off
Dante_presat      = FALSE
Initial_wait      = 1[s]
Recvr_gain        = 48
Relaxation_delay  = 5[s]
Repetition_time   = 6.4548992[s]
Temp_get          = 22.6[dC]
```



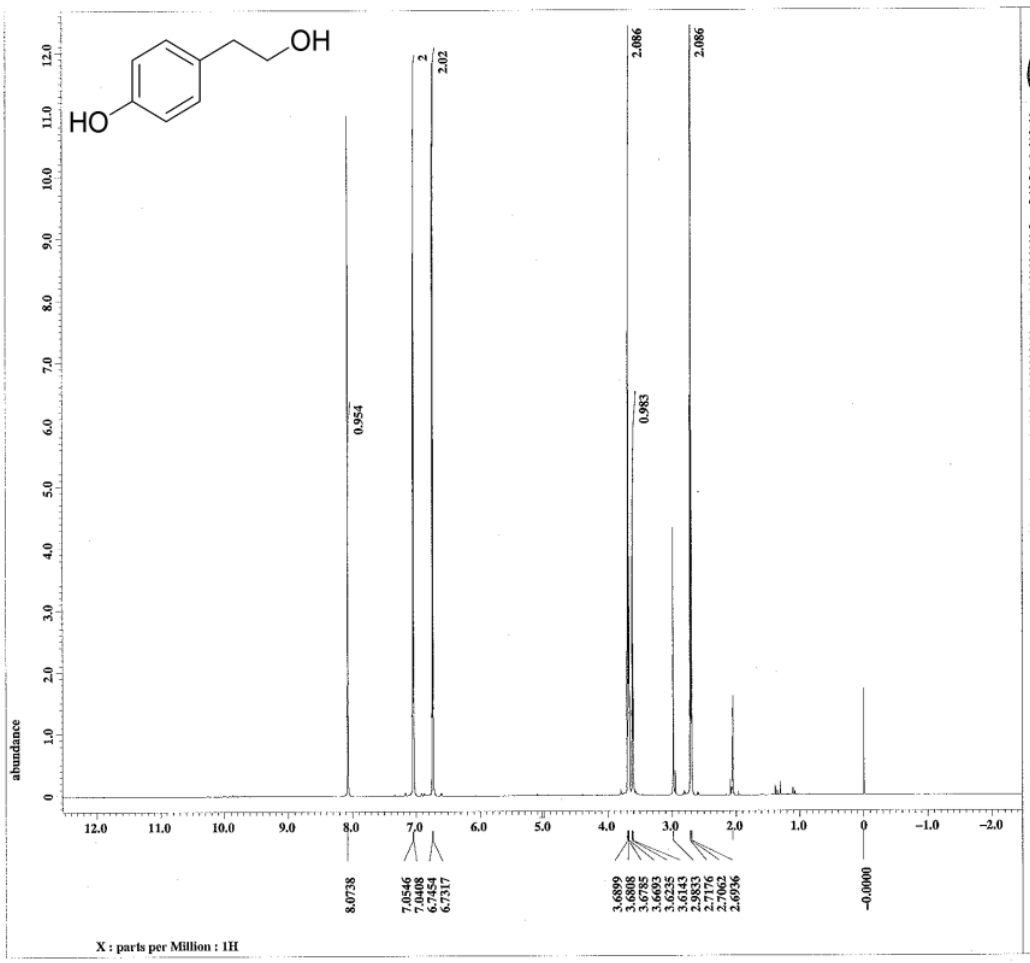
JEOL

```
Filename          = Exp-AB-Est-red-Br-Ph-
Author            = delta
Experiment        = single_pulse_dec
Sample_id         = Exp-AB-Est-red-Br-Ph-
Solvent           = CHLOROFORM-D
Creation_time     = 18-JAN-2017 15:56:44
Revision_time     = 18-JAN-2017 16:54:39
Current_time      = 18-JAN-2017 16:54:43

Content           = Exp-AB-Est-red-Br-Ph-
Data_format       = 1D COMPLEX
Dim_size          = 26214
Dim_title         = 13C
Dim_units         = [ppm]
Dimensions        = X
Site              = ECA 600
Spectrometer      = DELTA2_NMR

Field_strength    = 14.09636928[T] (600[M
X_acq_duration    = 0.69206016[s]
X_domain          = 13C
X_freq            = 150.91343039[MHz]
X_offset          = 100[ppm]
X_points          = 32768
X_prescans        = 4
X_resolution      = 1.44496109[Hz]
X_sweep           = 47.34848485[kHz]
Irr_domain        = 1H
Irr_freq          = 600.1723046[MHz]
Irr_offset        = 5[ppm]
Clipped           = TRUE
Mod_return        = 1
Scans             = 127
Total_scans       = 127

X_90_width        = 10.9[us]
X_acq_time        = 0.69206016[s]
X_angle           = 30[deg]
X_atn             = 7.5[dB]
X_pulse           = 3.63333333[us]
Irr_atn_dec       = 19.21[dB]
Irr_atn_noe       = 19.21[dB]
Irr_noise         = WALTZ
Decoupling        = TRUE
Initial_wait      = 1[s]
Noe               = TRUE
Noe_time          = 2.5[s]
Recvr_gain        = 44
Relaxation_delay  = 2.5[s]
Repetition_time   = 3.19206016[s]
Temp_get          = 23.2[dC]
```



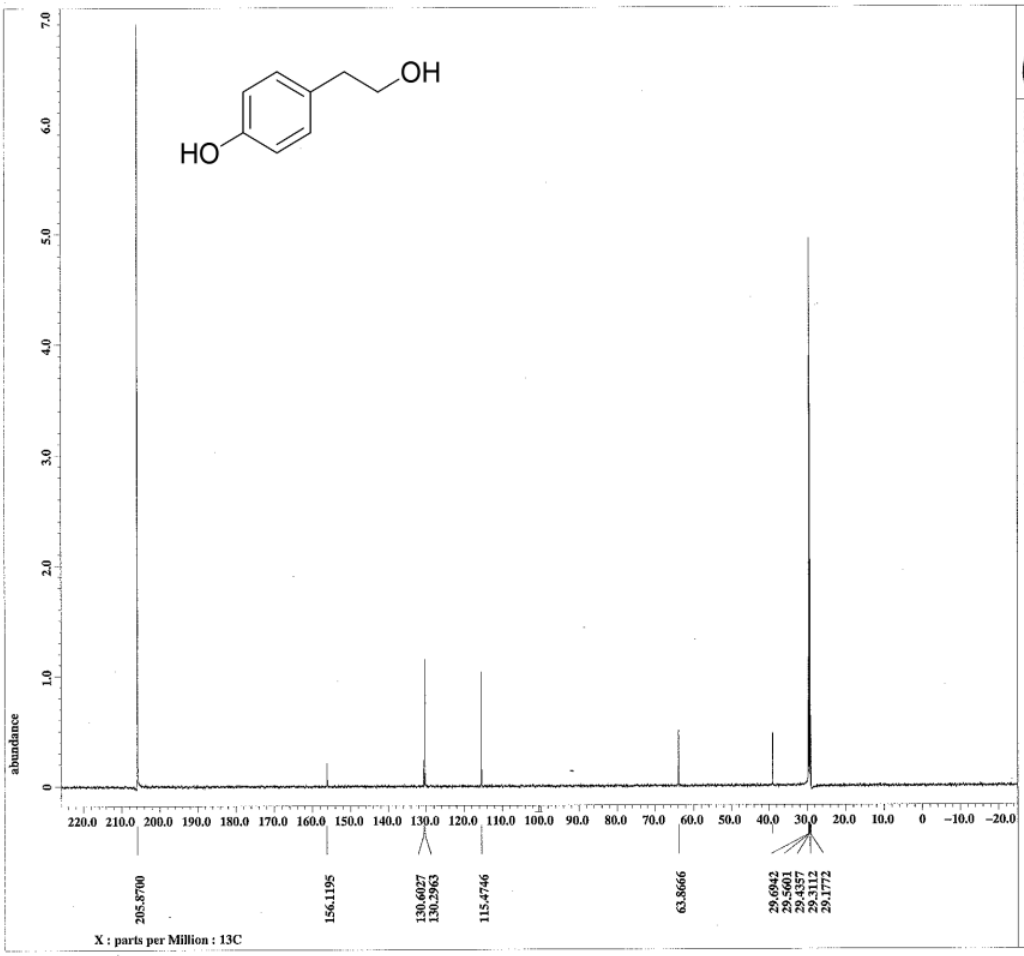
JEOL

```
Filename          = Exp-AB-phenyl-OH-P-4.
Author            = delta
Experiment        = single_pulse.ex2
Sample_id         = Exp-AB-phenyl-OH-P
Solvent           = ACETONE-D6
Creation_time     = 29-MAR-2017 10:36:18
Revision_time     = 29-MAR-2017 11:47:56
Current_time      = 29-MAR-2017 11:48:07

Content           = Exp-AB-phenyl-OH-P
Data_format       = 1D COMPLEX
Dim_size          = 13107
Dim_title         = 1H
Dim_units         = [ppm]
Dimensions        = X
Site              = ECA 600
Spectrometer      = DELTA2_NMR

Field_strength    = 14.09636928[T] (600[M
X_acq_duration    = 1.4548992[s]
X_domain          = 1H
X_freq            = 600.1723046[MHz]
X_offset          = 5[ppm]
X_points          = 16384
X_prescans        = 1
X_resolution      = 0.68733284[Hz]
X_sweep           = 11.26126126[kHz]
Irr_domain        = 1H
Irr_freq          = 600.1723046[MHz]
Irr_offset        = 5[ppm]
Tri_domain        = 1H
Tri_freq          = 600.1723046[MHz]
Tri_offset        = 5[ppm]
Clipped           = FALSE
Mod_return        = 1
Scans             = 8
Total_scans       = 8

X_90_width        = 12.6[us]
X_acq_time        = 1.4548992[s]
X_angle           = 45[deg]
X_atn             = 3.6[dB]
X_pulse           = 6.3[us]
Irr_mode          = Off
Tri_mode          = Off
Dante_presat      = FALSE
Initial_wait      = 1[s]
Recvr_gain        = 48
Relaxation_delay  = 5[s]
Repetition_time   = 6.4548992[s]
Temp_get          = 24.5[dC]
```



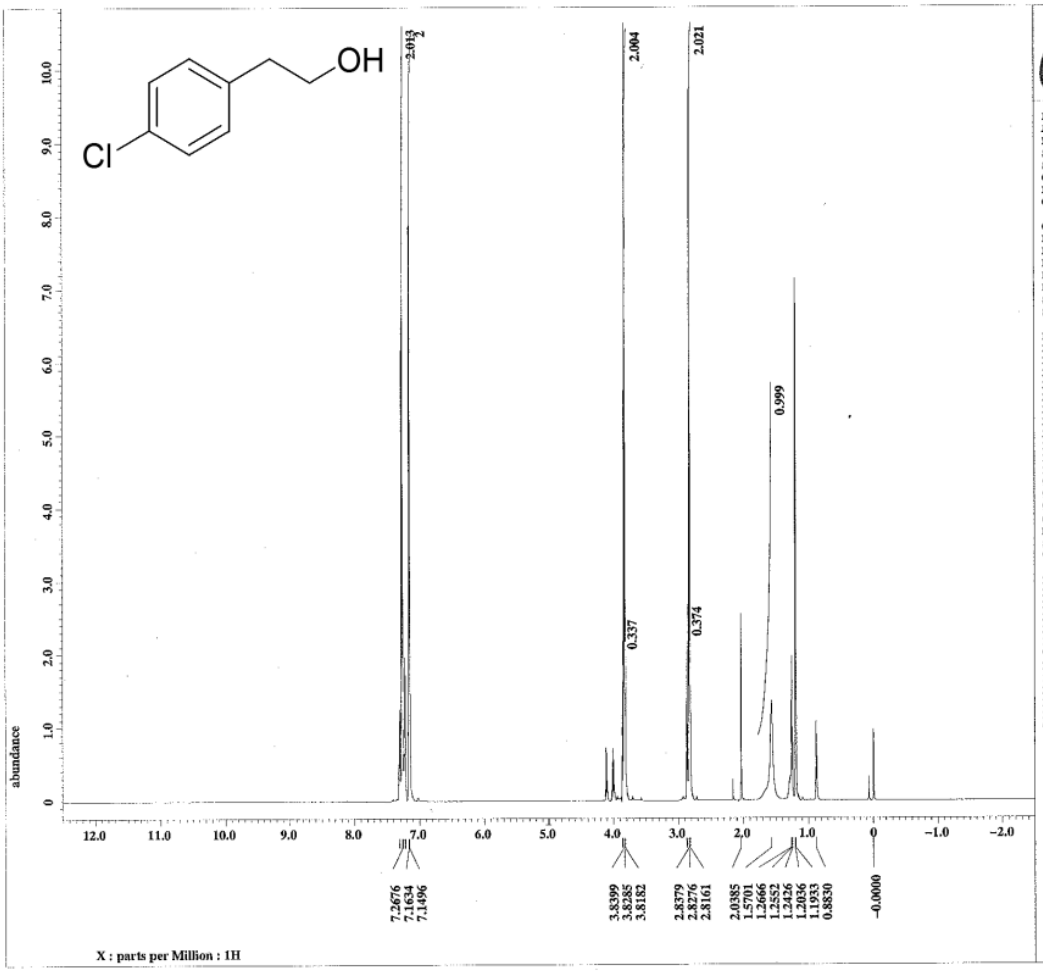
JEOL

```
Filename          = Exp-AB-phenyl-OH-C-4.
Author            = delta
Experiment        = single_pulse_dec
Sample_id         = Exp-AB-phenyl-OH-C
Solvent           = ACETONE-D6
Creation_time     = 29-MAR-2017 10:45:34
Revision_time     = 29-MAR-2017 11:52:10
Current_time      = 29-MAR-2017 11:52:23

Content           = Exp-AB-phenyl-OH-C
Data_format       = 1D COMPLEX
Dim_size          = 26214
Dim_title         = 13C
Dim_units         = [ppm]
Dimensions        = X
Site              = ECA 600
Spectrometer      = DELTA2_NMR

Field_strength    = 14.09636928[T] (600[M
X_acq_duration    = 0.69206016[s]
X_domain          = 13C
X_freq            = 150.91343039[MHz]
X_offset          = 100[ppm]
X_points          = 32768
X_prescans        = 4
X_resolution      = 1.44496109[Hz]
X_sweep           = 47.34848485[kHz]
Irr_domain        = 1H
Irr_freq          = 600.1723046[MHz]
Irr_offset        = 5[ppm]
Clipped           = FALSE
Mod_return        = 1
Scans             = 159
Total_scans       = 159

X_90_width        = 10.9[us]
X_acq_time        = 0.69206016[s]
X_angle           = 30[deg]
X_atn             = 7.5[dB]
X_pulse           = 3.63333333[us]
Irr_atn_dec       = 19.21[dB]
Irr_atn_noe       = 19.21[dB]
Irr_noise         = WALTZ
Decoupling        = TRUE
Initial_wait      = 1[s]
Noe               = TRUE
Noe_time          = 2.5[s]
Recvr_gain        = 60
Relaxation_delay  = 2.5[s]
Repetition_time   = 3.19206016[s]
Temp_get          = 25.1[dC]
```



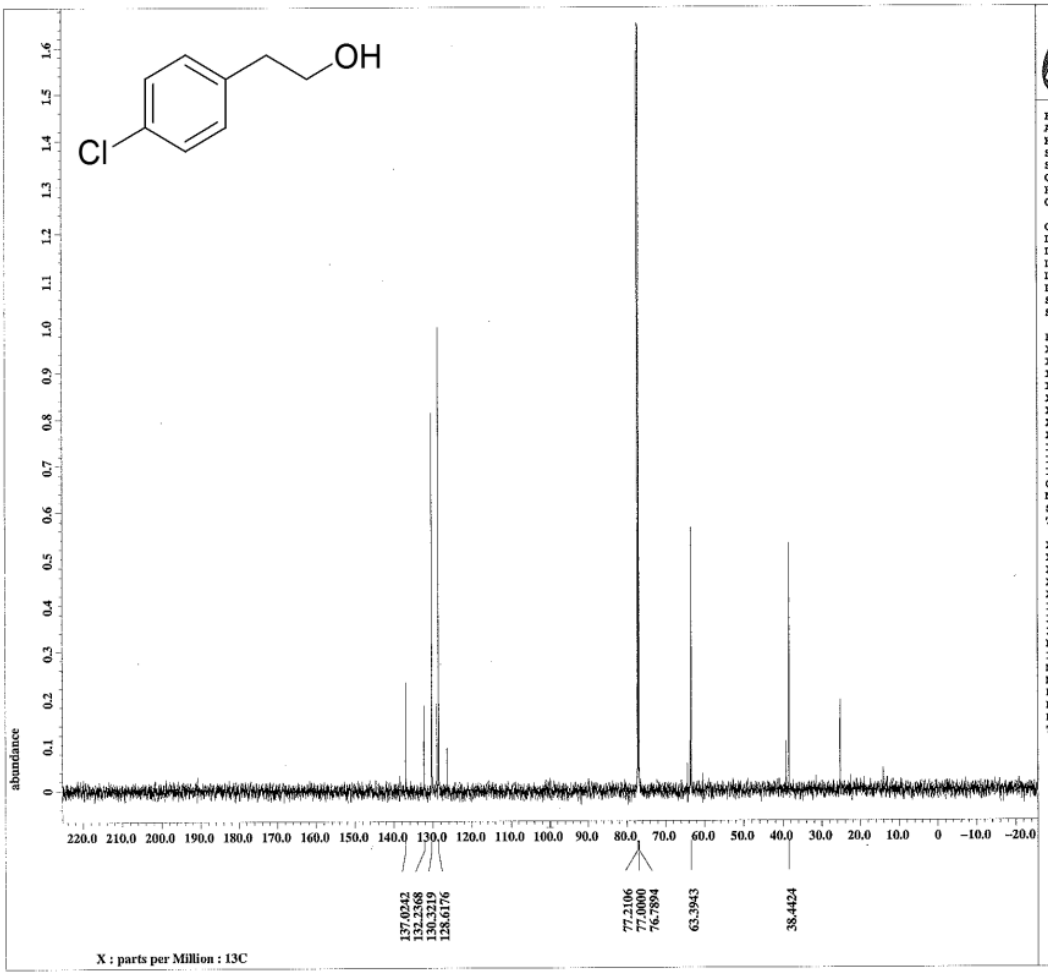
JEOL

```
Filename          = Exp-AB-Chloro-P-4.jdf
Author            = delta
Experiment        = single_pulse.ex2
Sample_id         = Exp-AB-Chloro-P
Solvent           = CHLOROFORM-D
Creation_time     = 28-MAR-2017 16:30:10
Revision_time     = 29-MAR-2017 11:01:09
Current_time      = 29-MAR-2017 11:01:11

Content           = Exp-AB-Chloro-P
Data_format       = 1D COMPLEX
Dim_size          = 13107
Dim_title         = 1H
Dim_units         = [ppm]
Dimensions        = X
Site              = ECA 600
Spectrometer      = DELTA2_NMR

Field_strength    = 14.09636928[T] (600[M
X_acq_duration    = 1.4548992[s]
X_domain          = 1H
X_freq            = 600.1723046[MHz]
X_offset          = 5[ppm]
X_points          = 16384
X_prescans        = 1
X_resolution      = 0.68733284[Hz]
X_sweep           = 11.26126126[kHz]
Irr_domain        = 1H
Irr_freq          = 600.1723046[MHz]
Irr_offset        = 5[ppm]
Tri_domain        = 1H
Tri_freq          = 600.1723046[MHz]
Tri_offset        = 5[ppm]
Clipped           = FALSE
Mod_return        = 1
Scans             = 8
Total_scans       = 8

X_90_width        = 12.6[us]
X_acq_time        = 1.4548992[s]
X_angle           = 45[deg]
X_atn             = 3.6[dB]
X_pulse           = 6.3[us]
Irr_mode          = Off
Tri_mode          = Off
Dante_presat      = FALSE
Initial_wait      = 1[s]
Recvr_gain        = 48
Relaxation_delay  = 5[s]
Repetition_time   = 6.4548992[s]
Temp_get          = 24.2[dC]
```



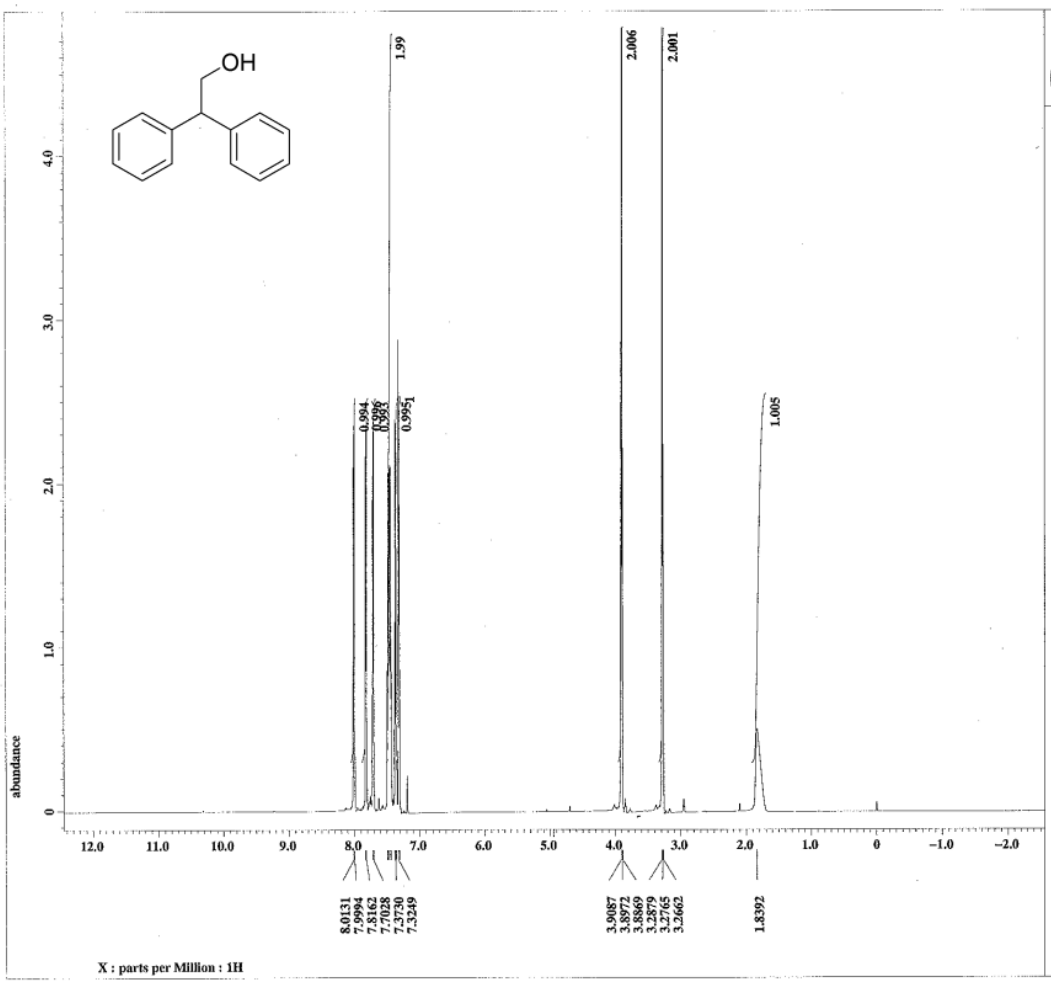
JEOL

```
Filename          = Exp-AB-Chloro-C-6.jdf
Author            = delta
Experiment        = single_pulse_dec
Sample_id         = Exp-AB-Chloro-C
Solvent           = CHLOROFORM-D
Creation_time     = 28-MAR-2017 16:36:31
Revision_time     = 29-MAR-2017 11:04:30
Current_time      = 29-MAR-2017 11:04:40

Content           = Exp-AB-Chloro-C
Data_format       = 1D COMPLEX
Dim_size          = 26214
Dim_title         = 13C
Dim_units         = [ppm]
Dimensions        = X
Site              = ECA 600
Spectrometer      = DELTA2_NMR

Field_strength    = 14.09636928[T] (600[M
X_acq_duration    = 0.69206016[s]
X_domain          = 13C
X_freq            = 150.91343039[MHz]
X_offset          = 100[ppm]
X_points          = 32768
X_prescans        = 4
X_resolution      = 1.44496109[Hz]
X_sweep           = 47.34848485[kHz]
Irr_domain        = 1H
Irr_freq          = 600.1723046[MHz]
Irr_offset        = 5[ppm]
Clipped           = FALSE
Mod_return        = 1
Scans             = 104
Total_scans       = 104

X_90_width        = 10.9[us]
X_acq_time        = 0.69206016[s]
X_angle           = 30[deg]
X_atn             = 7.5[dB]
X_pulse           = 3.63333333[us]
Irr_atn_dec       = 19.21[dB]
Irr_atn_noe       = 19.21[dB]
Irr_noise         = WALTZ
Decoupling        = TRUE
Initial_wait      = 1[s]
Noe               = TRUE
Noe_time          = 2.5[s]
Recvr_gain        = 60
Relaxation_delay  = 2.5[s]
Repetition_time   = 3.19206016[s]
Temp_get          = 24.8[dC]
```



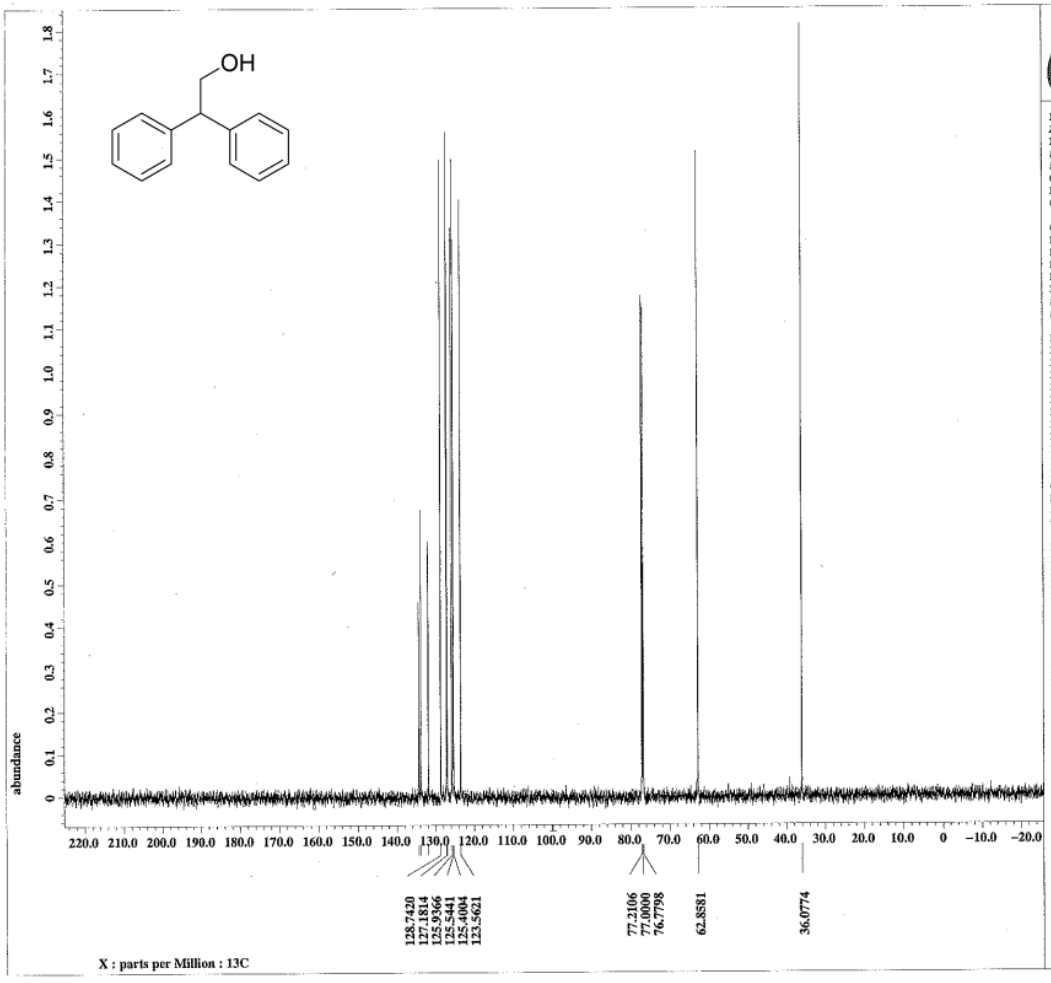
JEOL

```
Filename          = Exp-AB-Est Red-1-napt
Author            = delta
Experiment        = single_pulse.ex2
Sample_id         = Exp-AB-Est Red-1-napt
Solvent           = CHLOROFORM-D
Creation_time     =  9-MAR-2017 16:45:37
Revision_time     = 24-MAR-2017 11:13:32
Current_time      = 24-MAR-2017 11:13:38

Content           = Exp-AB-Est Red-1-napt
Data_format       = 1D COMPLEX
Dim_size          = 13107
Dim_title         = 1H
Dim_units         = [ppm]
Dimensions        = X
Site              = ECA 600
Spectrometer      = DELTA2_NMR

Field_strength    = 14.09636928[T] (600[M
X_acq_duration    = 1.4548992[s]
X_domain          = 1H
X_freq            = 600.1723046[MHz]
X_offset          = 5[ppm]
X_points          = 16384
X_prescans        = 1
X_resolution      = 0.68733284[Hz]
X_sweep           = 11.26126126[kHz]
Irr_domain        = 1H
Irr_freq          = 600.1723046[MHz]
Irr_offset        = 5[ppm]
Tri_domain        = 1H
Tri_freq          = 600.1723046[MHz]
Tri_offset        = 5[ppm]
Clipped           = FALSE
Mod_return        = 1
Scans             = 8
Total_scans       = 8

X_90_width        = 12.6[us]
X_acq_time        = 1.4548992[s]
X_angle           = 45[deg]
X_atn             = 3.6[dB]
X_pulse           = 6.3[us]
Irr_mode          = Off
Tri_mode          = Off
Dante_presat      = FALSE
Initial_wait      = 1[s]
Recvr_gain        = 36
Relaxation_delay  = 5[s]
Repetition_time   = 6.4548992[s]
Temp_get          = 23.9[dC]
```



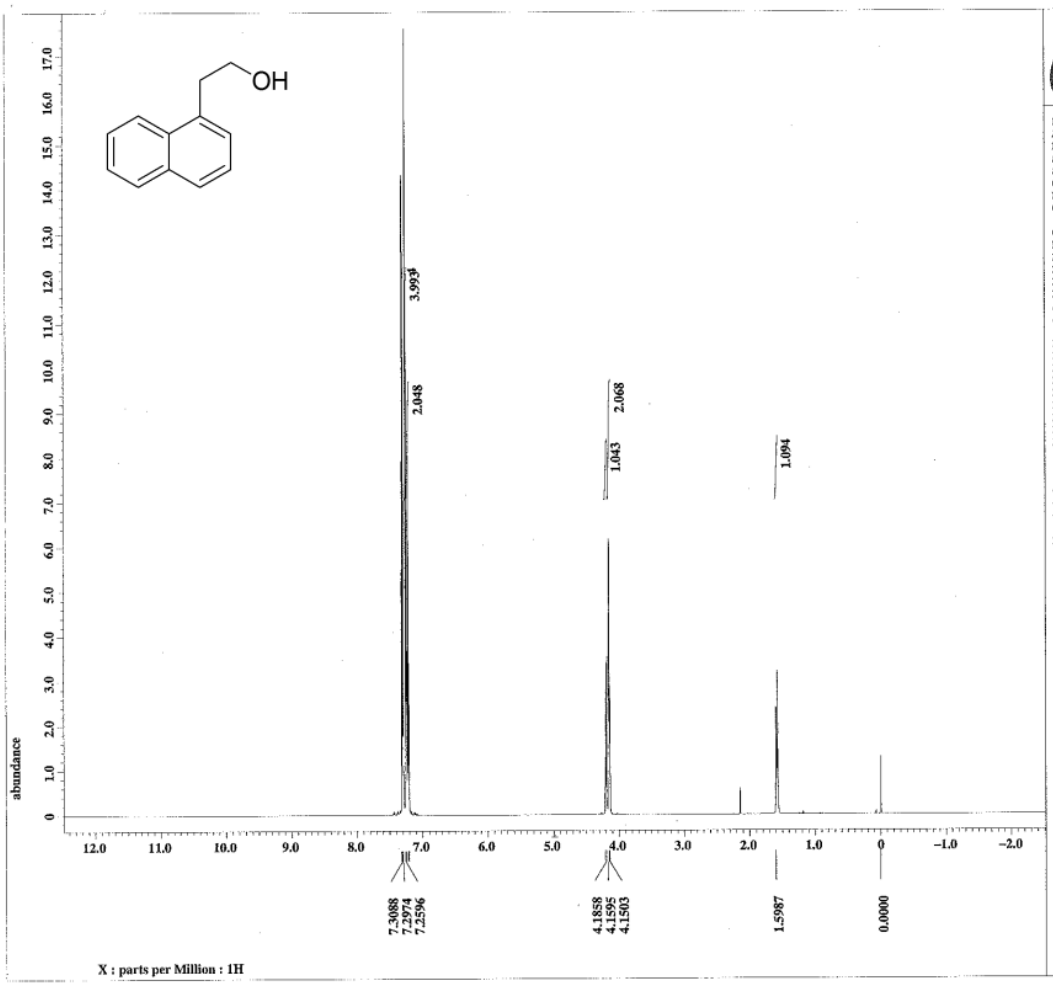
JEOL

```
Filename          = Exp-AB-Est Red-1-napt
Author            = delta
Experiment        = single_pulse_dec
Sample_id         = Exp-AB-Est Red-1-napt
Solvent           = CHLOROFORM-D
Creation_time     =  9-MAR-2017 16:51:55
Revision_time     = 24-MAR-2017 11:14:26
Current_time      = 24-MAR-2017 11:14:46

Content           = Exp-AB-Est Red-1-napt
Data_format       = 1D COMPLEX
Dim_size          = 26214
Dim_title         = 13C
Dim_units         = [ppm]
Dimensions        = X
Site              = ECA 600
Spectrometer      = DELTA2_NMR

Field_strength    = 14.09636928[T] (600[M
X_acq_duration    = 0.69206016[s]
X_domain          = 13C
X_freq            = 150.91343039[MHz]
X_offset          = 100[ppm]
X_points          = 32768
X_prescans        = 4
X_resolution      = 1.44496109[Hz]
X_sweep           = 47.34848485[kHz]
Irr_domain        = 1H
Irr_freq          = 600.1723046[MHz]
Irr_offset        = 5[ppm]
Clipped           = FALSE
Mod_return        = 1
Scans             = 103
Total_scans       = 103

X_90_width        = 10.9[us]
X_acq_time        = 0.69206016[s]
X_angle           = 30[deg]
X_atn             = 7.5[dB]
X_pulse           = 3.63333333[us]
Irr_atn_dec       = 19.21[dB]
Irr_atn_noe       = 19.21[dB]
Irr_noise         = WALTZ
Decoupling        = TRUE
Initial_wait      = 1[s]
Noe               = TRUE
Noe_time          = 2.5[s]
Recvr_gain        = 60
Relaxation_delay  = 2.5[s]
Repetition_time   = 3.19206016[s]
Temp_get          = 24.4[dC]
```



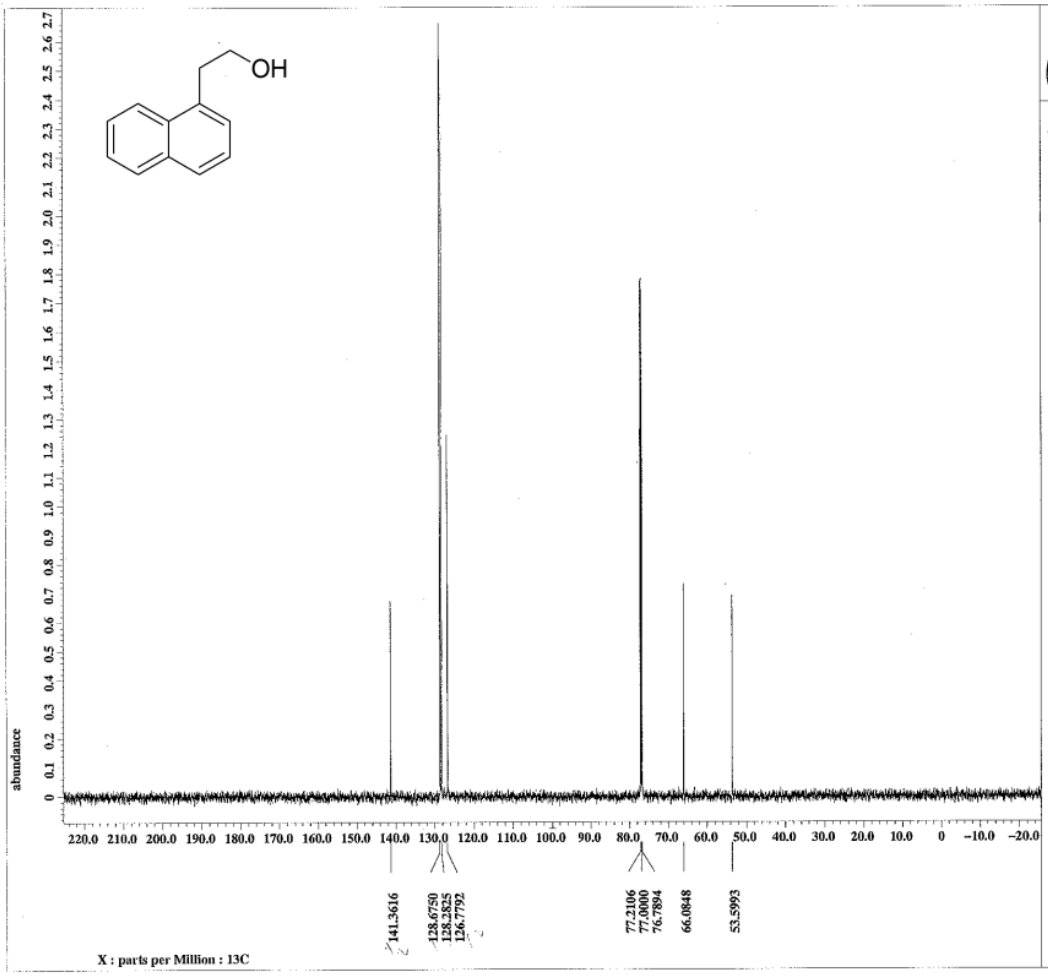
JEOL

```
Filename          = Exp-AB-diphenylethyl-
Author            = delta
Experiment        = single_pulse.ex2
Sample_id         = Exp-AB-diphenylethyl-
Solvent           = CHLOROFORM-D
Creation_time     = 29-MAR-2017 10:22:26
Revision_time     = 29-MAR-2017 11:26:58
Current_time      = 29-MAR-2017 11:27:02

Content           = Exp-AB-diphenylethyl-
Data_format       = 1D COMPLEX
Dim_size          = 13107
Dim_title         = 1H
Dim_units         = [ppm]
Dimensions        = X
Site              = ECA 600
Spectrometer      = DELTA2_NMR

Field_strength    = 14.09636928[T] (600[M
X_acq_duration    = 1.4548992[s]
X_domain          = 1H
X_freq            = 600.1723046[MHz]
X_offset          = 5[ppm]
X_points          = 16384
X_prescans        = 1
X_resolution      = 0.68733284[Hz]
X_sweep           = 11.26126126[kHz]
Irr_domain        = 1H
Irr_freq          = 600.1723046[MHz]
Irr_offset        = 5[ppm]
Tri_domain        = 1H
Tri_freq          = 600.1723046[MHz]
Tri_offset        = 5[ppm]
Clipped           = FALSE
Mod_return        = 1
Scans             = 8
Total_scans       = 8

X_90_width        = 12.6[us]
X_acq_time        = 1.4548992[s]
X_angle           = 45[deg]
X_atn             = 3.6[dB]
X_pulse           = 6.3[us]
Irr_mode          = Off
Tri_mode          = Off
Dante_presat      = FALSE
Initial_wait      = 1[s]
Recvr_gain        = 44
Relaxation_delay  = 5[s]
Repetition_time   = 6.4548992[s]
Temp_get          = 24.4[dC]
```



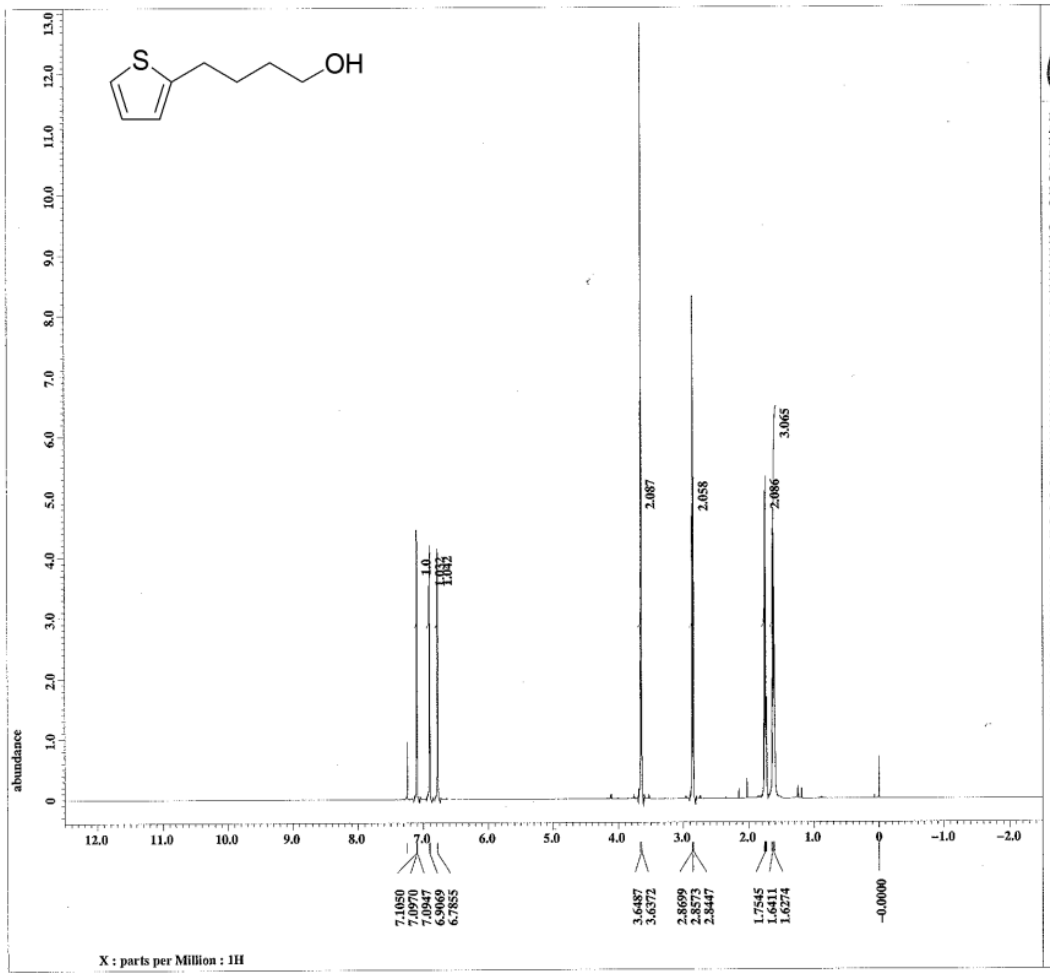
JEOL

```
Filename          = Exp-AB-diphenylethyl-
Author            = delta
Experiment        = single_pulse_dec
Sample_id         = Exp-AB-diphenylethyl-
Solvent           = CHLOROFORM-D
Creation_time     = 29-MAR-2017 10:27:37
Revision_time     = 29-MAR-2017 11:29:20
Current_time      = 29-MAR-2017 11:29:24

Content           = Exp-AB-diphenylethyl-
Data_format       = 1D COMPLEX
Dim_size          = 26214
Dim_title         = 13C
Dim_units         = [ppm]
Dimensions        = X
Site              = ECA 600
Spectrometer      = DELTA2_NMR

Field_strength    = 14.09636928[T] (600[M
X_acq_duration    = 0.69206016[s]
X_domain          = 13C
X_freq            = 150.91343039[MHz]
X_offset          = 100[ppm]
X_points          = 32768
X_prescans        = 4
X_resolution      = 1.44496109[Hz]
X_sweep           = 47.34848485[kHz]
Irr_domain        = 1H
Irr_freq          = 600.1723046[MHz]
Irr_offset        = 5[ppm]
Clipped           = FALSE
Mod_return        = 1
Scans             = 82
Total_scans       = 82

X_90_width        = 10.9[us]
X_acq_time        = 0.69206016[s]
X_angle           = 30[deg]
X_atn             = 7.5[dB]
X_pulse           = 3.63333333[us]
Irr_atn_dec       = 19.21[dB]
Irr_atn_noe       = 19.21[dB]
Irr_noise         = WALTZ
Decoupling        = TRUE
Initial_wait      = 1[s]
Noe               = TRUE
Noe_time          = 2.5[s]
Recvr_gain        = 60
Relaxation_delay  = 2.5[s]
Repetition_time   = 3.19206016[s]
Temp_get          = 25[dC]
```



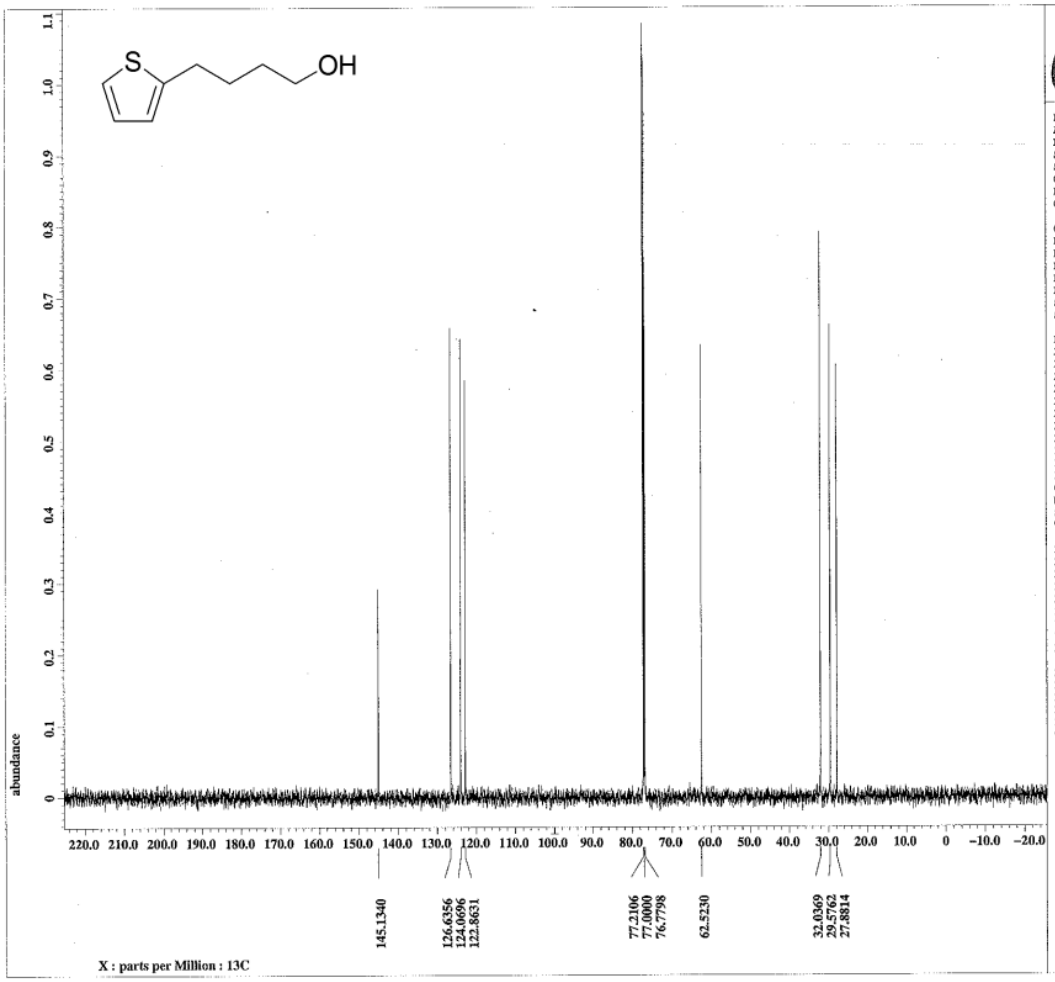
JEOL

```
Filename          = Exp-AB-OND-Sulpur-Pro
Author            = delta
Experiment        = single_pulse.ex2
Sample_id         = Exp-AB-OND-Sulpur-Pro
Solvent           = CHLOROFORM-D
Creation_time     = 24-MAR-2017 16:33:58
Revision_time     = 24-MAR-2017 17:36:49
Current_time      = 24-MAR-2017 17:36:53

Content           = Exp-AB-OND-Sulpur-Pro
Data_format       = 1D COMPLEX
Dim_size          = 13107
Dim_title         = 1H
Dim_units         = [ppm]
Dimensions        = X
Site              = ECA 600
Spectrometer      = DELTA2_NMR

Field_strength    = 14.09636928[T] (600[M
X_acq_duration    = 1.4548992[s]
X_domain          = 1H
X_freq            = 600.1723046[MHz]
X_offset          = 5[ppm]
X_points          = 16384
X_prescans        = 1
X_resolution      = 0.68733284[Hz]
X_sweep           = 11.26126126[kHz]
Irr_domain        = 1H
Irr_freq          = 600.1723046[MHz]
Irr_offset        = 5[ppm]
Tri_domain        = 1H
Tri_freq          = 600.1723046[MHz]
Tri_offset        = 5[ppm]
Clipped           = FALSE
Mod_return        = 1
Scans             = 8
Total_scans       = 8

X_90_width        = 12.6[us]
X_acq_time        = 1.4548992[s]
X_angle           = 45[deg]
X_atn             = 3.6[dB]
X_pulse           = 6.3[us]
Irr_mode          = Off
Tri_mode          = Off
Dante_presat      = FALSE
Initial_wait      = 1[s]
Recvr_gain        = 40
Relaxation_delay  = 5[s]
Repetition_time   = 6.4548992[s]
Temp_get          = 25.9[dC]
```



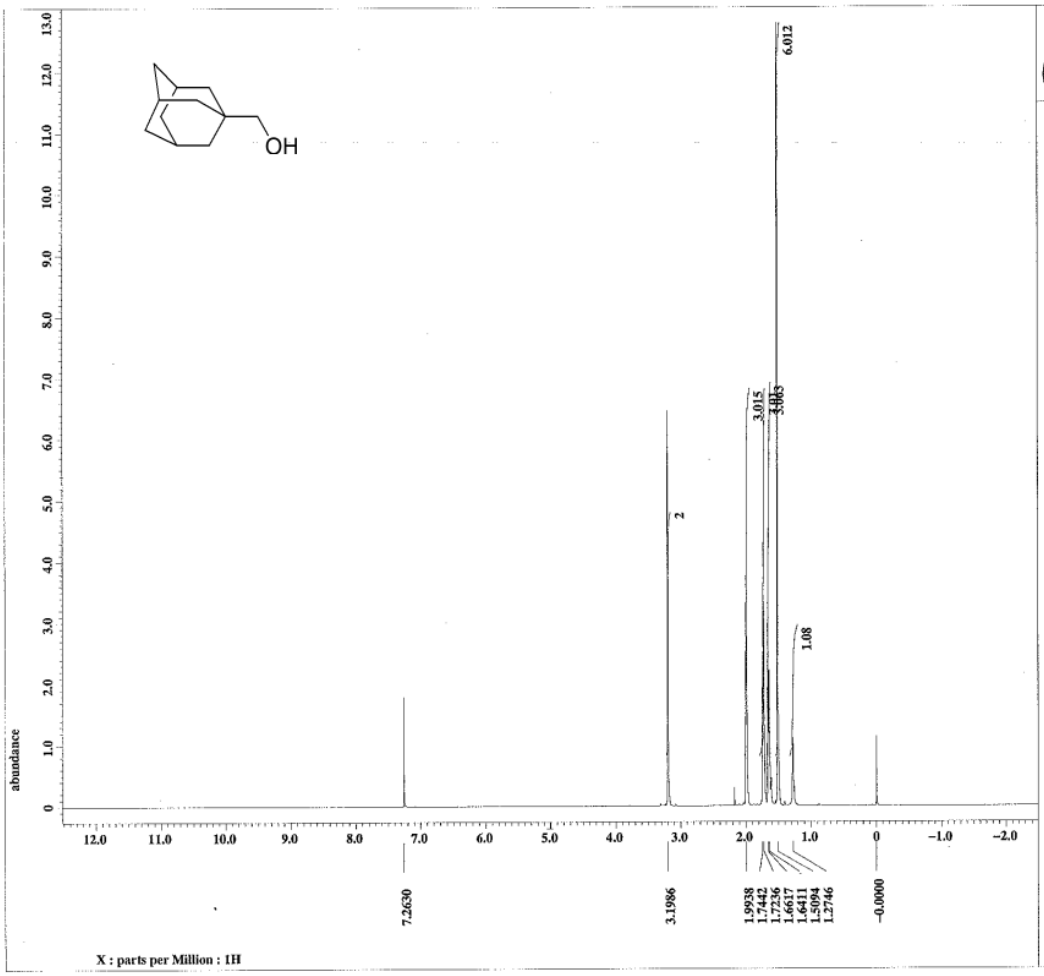
JEOL

```
Filename          = Exp-AB-OND-Sulpur-car
Author            = delta
Experiment        = single_pulse_dec
Sample_id         = Exp-AB-OND-Sulpur-car
Solvent           = CHLOROFORM-D
Creation_time     = 24-MAR-2017 16:39:12
Revision_time     = 24-MAR-2017 17:40:03
Current_time      = 24-MAR-2017 17:40:07

Content           = Exp-AB-OND-Sulpur-car
Data_format       = 1D COMPLEX
Dim_size          = 26214
Dim_title         = 13C
Dim_units         = [ppm]
Dimensions        = X
Site              = ECA 600
Spectrometer      = DELTA2_NMR

Field_strength    = 14.09636928[T] (600[M
X_acq_duration    = 0.69206016[s]
X_domain          = 13C
X_freq            = 150.91343039[MHz]
X_offset          = 100[ppm]
X_points          = 32768
X_prescans        = 4
X_resolution      = 1.44496109[Hz]
X_sweep           = 47.34848485[kHz]
Irr_domain        = 1H
Irr_freq          = 600.1723046[MHz]
Irr_offset        = 5[ppm]
Clipped           = TRUE
Mod_return        = 1
Scans             = 85
Total_scans       = 85

X_90_width        = 10.9[us]
X_acq_time        = 0.69206016[s]
X_angle           = 30[deg]
X_atn             = 7.5[dB]
X_pulse           = 3.63333333[us]
Irr_atn_dec       = 19.21[dB]
Irr_atn_noe       = 19.21[dB]
Irr_noise         = WALTZ
Decoupling        = TRUE
Initial_wait      = 1[s]
Noe               = TRUE
Noe_time          = 2.5[s]
Recvr_gain        = 56
Relaxation_delay  = 2.5[s]
Repetition_time   = 3.19206016[s]
Temp_get          = 25.7[dC]
```



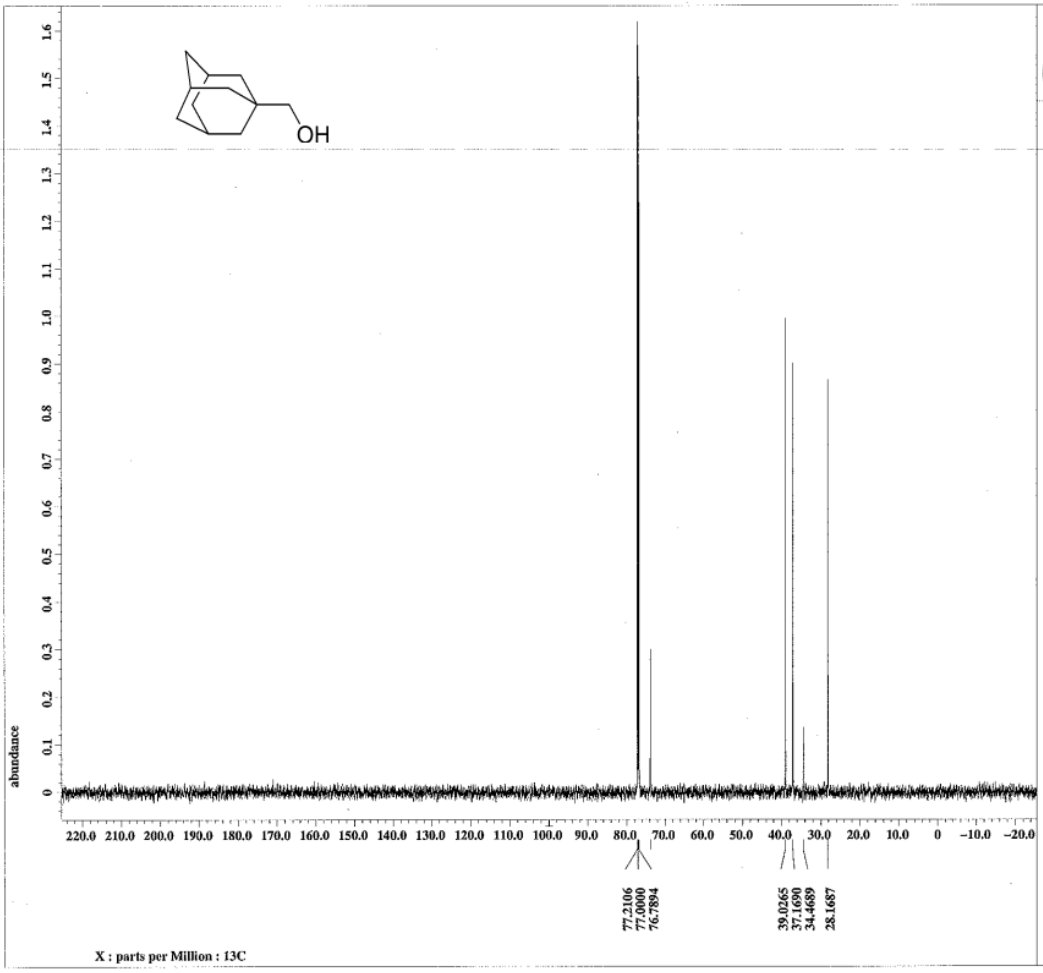
JEOL

```
Filename          = Exp-AB-adamentanol-P-
Author            = delta
Experiment        = single_pulse.ex2
Sample_id         = Exp-AB-adamentanol-P
Solvent           = CHLOROFORM-D
Creation_time     = 29-MAR-2017 10:04:31
Revision_time     = 29-MAR-2017 11:12:34
Current_time      = 29-MAR-2017 11:12:38

Content           = Exp-AB-adamentanol-P
Data_format       = 1D COMPLEX
Dim_size          = 13107
Dim_title         = 1H
Dim_units         = [ppm]
Dimensions        = X
Site              = ECA 600
Spectrometer      = DELTA2_NMR

Field_strength    = 14.09636928[T] (600[M
X_acq_duration    = 1.4548992[s]
X_domain          = 1H
X_freq            = 600.1723046[MHz]
X_offset          = 5[ppm]
X_points          = 16384
X_prescans        = 1
X_resolution      = 0.68733284[Hz]
X_sweep           = 11.26126126[kHz]
Irr_domain        = 1H
Irr_freq          = 600.1723046[MHz]
Irr_offset        = 5[ppm]
Tri_domain        = 1H
Tri_freq          = 600.1723046[MHz]
Tri_offset        = 5[ppm]
Clipped           = FALSE
Mod_return        = 1
Scans             = 8
Total_scans       = 8

X_90_width        = 12.6[us]
X_acq_time        = 1.4548992[s]
X_angle           = 45[deg]
X_atn             = 3.6[dB]
X_pulse           = 6.3[us]
Irr_mode          = Off
Tri_mode          = Off
Dante_presat      = FALSE
Initial_wait      = 1[s]
Recvr_gain        = 46
Relaxation_delay  = 5[s]
Repetition_time   = 6.4548992[s]
Temp_get          = 24.4[dC]
```



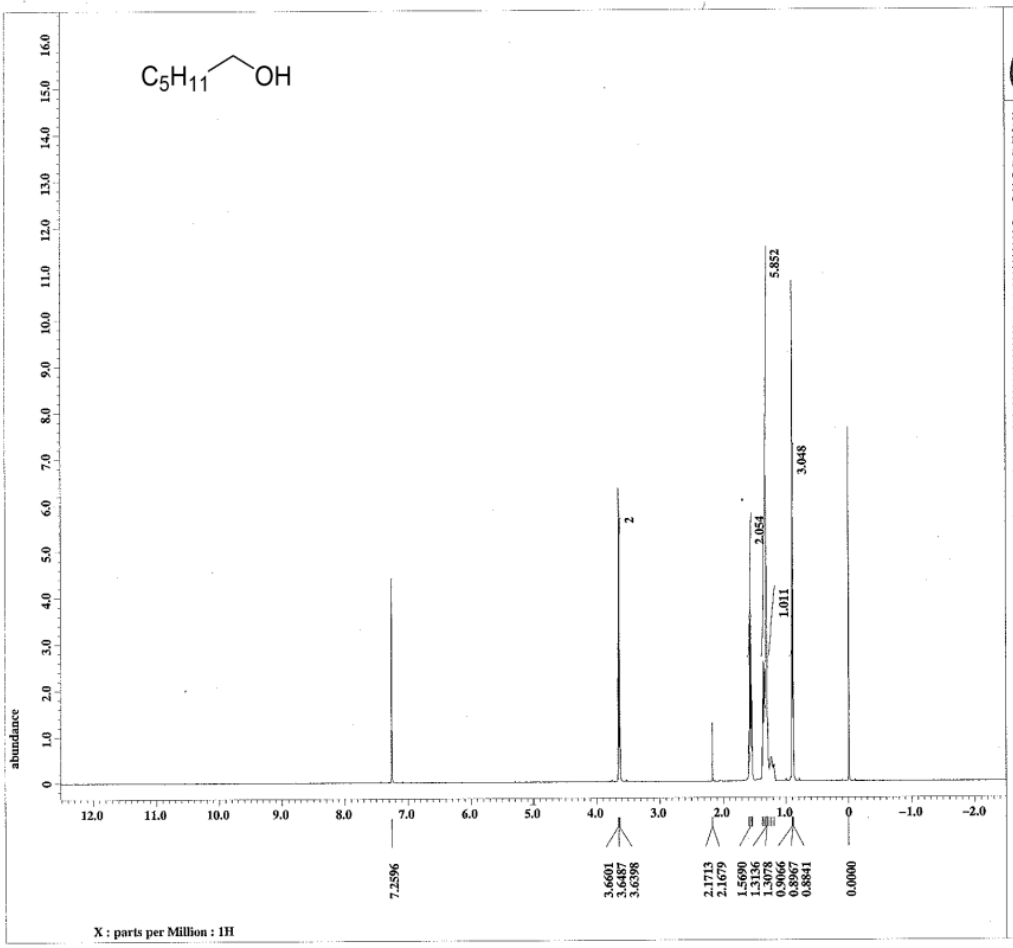
JEOL

```
Filename          = Exp-AB-adamentanol-C-
Author            = delta
Experiment        = single_pulse_dec
Sample_id         = Exp-AB-adamentanol-C
Solvent           = CHLOROFORM-D
Creation_time     = 29-MAR-2017 10:12:50
Revision_time     = 29-MAR-2017 11:14:59
Current_time      = 29-MAR-2017 11:15:51

Content           = Exp-AB-adamentanol-C
Data_format       = 1D COMPLEX
Dim_size          = 26214
Dim_title         = 13C
Dim_units         = [ppm]
Dimensions        = X
Site              = ECA 600
Spectrometer      = DELTA2_NMR

Field_strength    = 14.09636928[T] (600[M
X_acq_duration    = 0.69206016[s]
X_domain          = 13C
X_freq            = 150.91343039[MHz]
X_offset          = 100[ppm]
X_points          = 32768
X_prescans        = 4
X_resolution      = 1.44496109[Hz]
X_sweep           = 47.34848485[kHz]
Irr_domain        = 1H
Irr_freq          = 600.1723046[MHz]
Irr_offset        = 5[ppm]
Clipped           = FALSE
Mod_return        = 1
Scans             = 141
Total_scans       = 141

X_90_width        = 10.9[us]
X_acq_time        = 0.69206016[s]
X_angle           = 30[deg]
X_atn             = 7.5[dB]
X_pulse           = 3.63333333[us]
Irr_atn_dec       = 19.21[dB]
Irr_atn_noe       = 19.21[dB]
Irr_noise         = WALTZ
Decoupling        = TRUE
Initial_wait      = 1[s]
Noe               = TRUE
Noe_time          = 2.5[s]
Recvr_gain        = 60
Relaxation_delay  = 2.5[s]
Repetition_time   = 3.19206016[s]
Temp_get          = 25[dC]
```

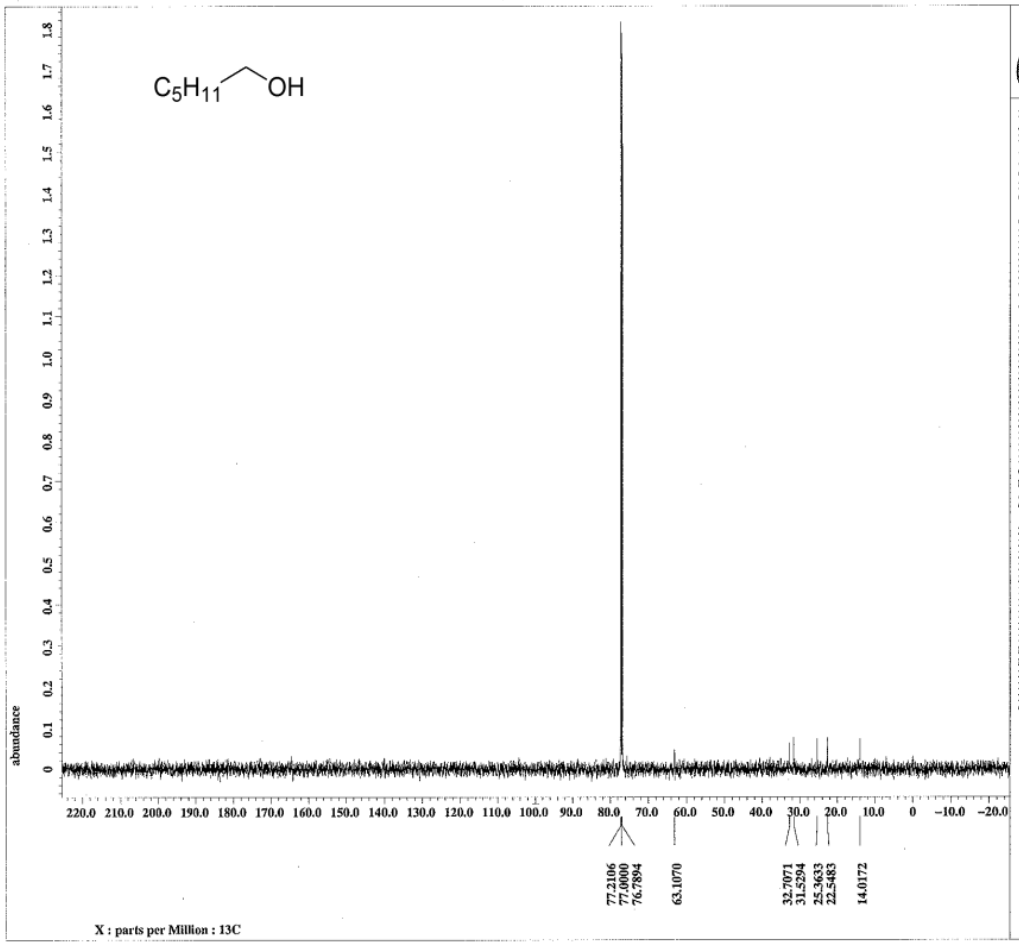



```
Filename          = Exp-AB-4-OND-C6OH-pro
Author            = delta
Experiment        = single_pulse.ex2
Sample_id         = Exp-AB-4-OND-C6OH-pro
Solvent           = CHLOROFORM-D
Creation_time     = 27-MAR-2017 15:47:54
Revision_time     = 27-MAR-2017 16:50:12
Current_time      = 27-MAR-2017 16:50:31

Content           = Exp-AB-4-OND-C6OH-pro
Data_format       = 1D COMPLEX
Dim_size          = 13107
Dim_title         = 1H
Dim_units         = [ppm]
Dimensions        = X
Site              = ECA 600
Spectrometer      = DELTA2_NMR

Field_strength    = 14.09636928[T] (600[M
X_acq_duration    = 1.4548992[s]
X_domain          = 1H
X_freq            = 600.1723046[MHz]
X_offset          = 5[ppm]
X_points          = 16384
X_prescans        = 1
X_resolution      = 0.68733284[Hz]
X_sweep           = 11.26126126[kHz]
Irr_domain        = 1H
Irr_freq          = 600.1723046[MHz]
Irr_offset        = 5[ppm]
Tri_domain        = 1H
Tri_freq          = 600.1723046[MHz]
Tri_offset        = 5[ppm]
Clipped           = FALSE
Mod_return        = 1
Scans             = 8
Total_scans       = 8

X_90_width        = 12.6[us]
X_acq_time        = 1.4548992[s]
X_angle           = 45[deg]
X_atn             = 3.6[dB]
X_pulse           = 6.3[us]
Irr_mode          = Off
Tri_mode          = Off
Dante_presat      = FALSE
Initial_wait      = 1[s]
Recvr_gain        = 60
Relaxation_delay  = 5[s]
Repetition_time   = 6.4548992[s]
Temp_get          = 24.7[dC]
```

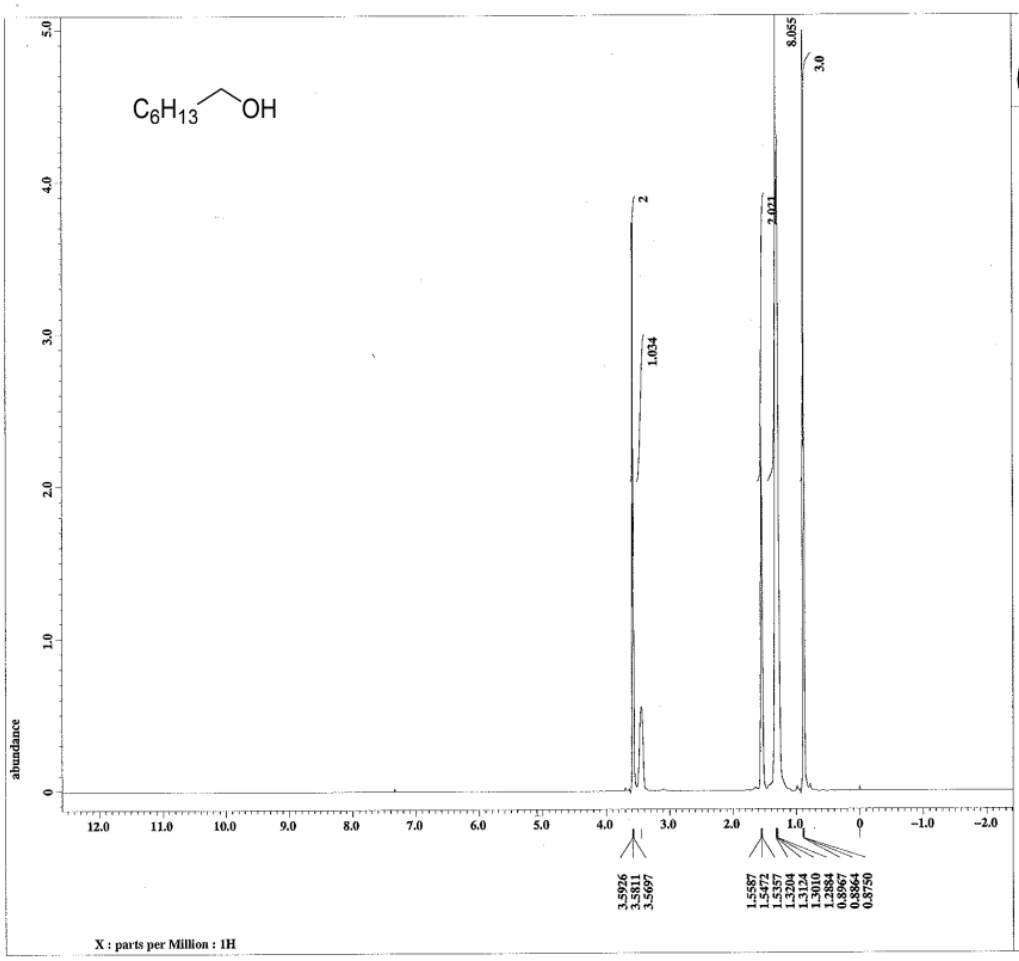



```
Filename          = Exp-AB-4-OND-C6OH-car
Author            = delta
Experiment        = single_pulse_dec
Sample_id         = Exp-AB-4-OND-C6OH-car
Solvent           = CHLOROFORM-D
Creation_time     = 27-MAR-2017 15:53:17
Revision_time     = 27-MAR-2017 16:55:42
Current_time      = 27-MAR-2017 16:55:47

Content           = Exp-AB-4-OND-C6OH-car
Data_format       = 1D COMPLEX
Dim_size          = 26214
Dim_title         = 13C
Dim_units         = [ppm]
Dimensions        = X
Site              = ECA 600
Spectrometer      = DELTA2_NMR

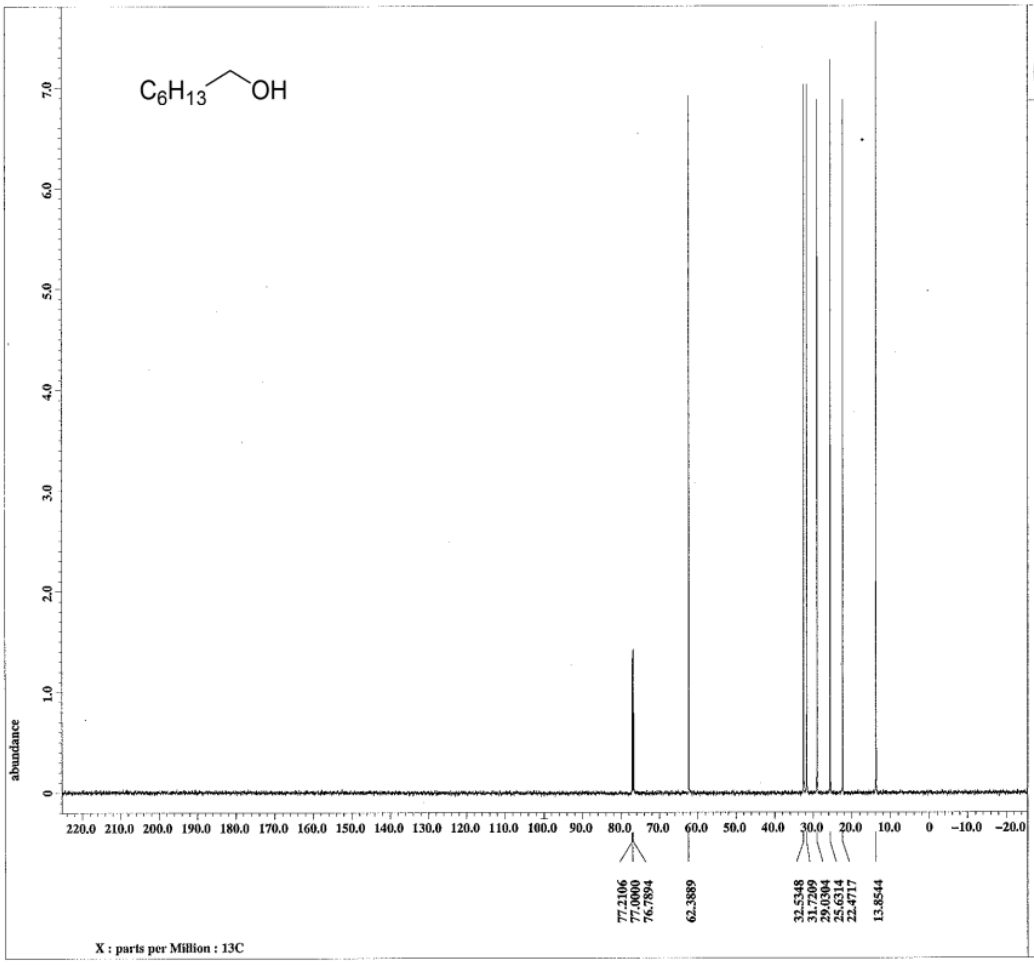
Field_strength    = 14.09636928[T] (600[M
X_acq_duration    = 0.69206016[s]
X_domain          = 13C
X_freq            = 150.91343039[MHz]
X_offset          = 100[ppm]
X_points          = 32768
X_prescans        = 4
X_resolution      = 1.44496109[Hz]
X_sweep           = 47.34848485[kHz]
Irr_domain        = 1H
Irr_freq          = 600.1723046[MHz]
Irr_offset        = 5[ppm]
Clipped           = FALSE
Mod_return        = 1
Scans             = 86
Total_scans       = 86

X_90_width        = 10.9[us]
X_acq_time        = 0.69206016[s]
X_angle           = 30[deg]
X_atn             = 7.5[dB]
X_pulse           = 3.63333333[us]
Irr_atn_dec       = 19.21[dB]
Irr_atn_noe       = 19.21[dB]
Irr_noise         = WALTZ
Decoupling        = TRUE
Initial_wait      = 1[s]
Noe               = TRUE
Noe_time          = 2.5[s]
Recvr_gain        = 60
Relaxation_delay  = 2.5[s]
Repetition_time   = 3.19206016[s]
Temp_get          = 25.3[dC]
```



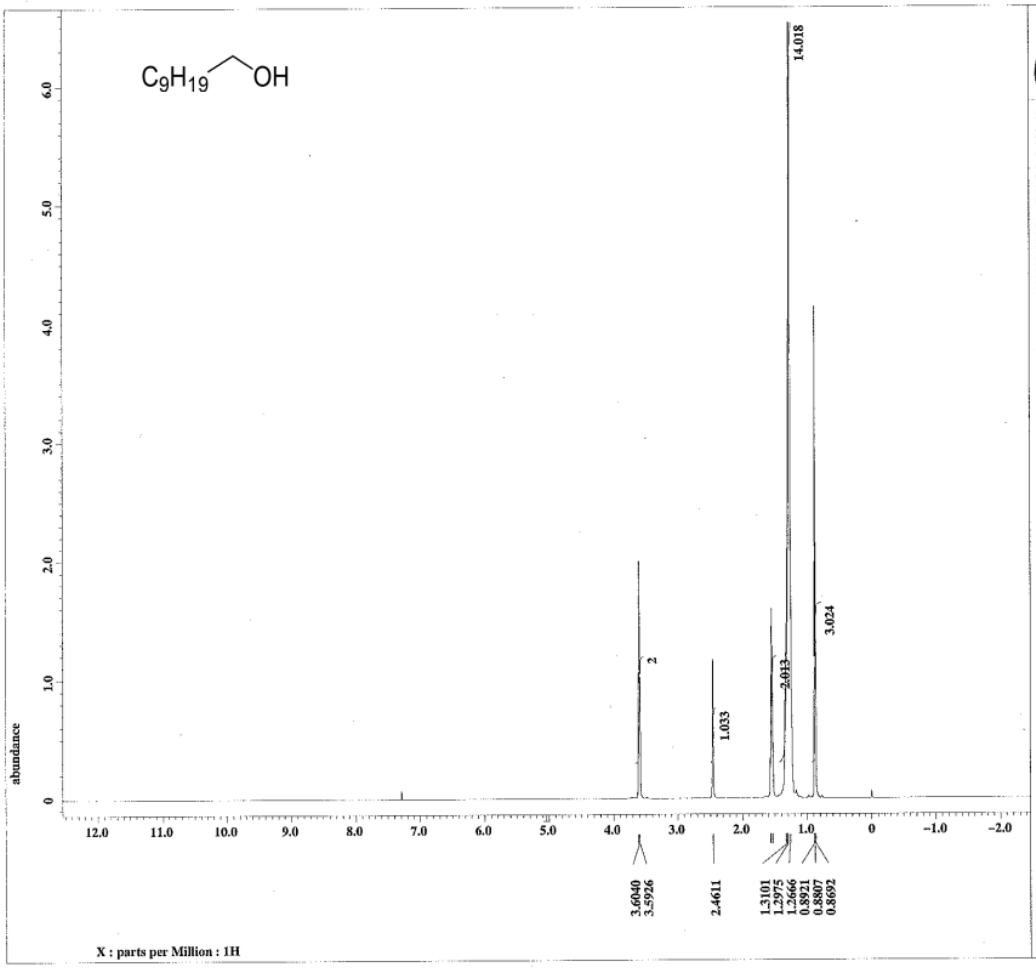
JEOL

Filename	= Exp-AB-Est-red-C7OH-p
Author	= delta
Experiment	= single_pulse.ex2
Sample_id	= Exp-AB-Est-red-C7OH-p
Solvent	= CHLOROFORM-D
Creation_time	= 18-JAN-2017 14:37:58
Revision_time	= 18-JAN-2017 15:34:00
Current_time	= 18-JAN-2017 15:34:08
Content	= Exp-AB-Est-red-C7OH-p
Data_format	= 1D COMPLEX
Dim_size	= 13107
Dim_title	= 1H
Dim_units	= [ppm]
Dimensions	= X
Site	= ECA 600
Spectrometer	= DELTA2_NMR
Field_strength	= 14.09636928[T] (600[M
X_acq_duration	= 1.4548992[s]
X_domain	= 1H
X_freq	= 600.1723046[MHz]
X_offset	= 5[ppm]
X_points	= 16384
X_prescans	= 1
X_resolution	= 0.68733284[Hz]
X_sweep	= 11.26126126[kHz]
Irr_domain	= 1H
Irr_freq	= 600.1723046[MHz]
Irr_offset	= 5[ppm]
Tri_domain	= 1H
Tri_freq	= 600.1723046[MHz]
Tri_offset	= 5[ppm]
Clipped	= FALSE
Mod_return	= 1
Scans	= 8
Total_scans	= 8
X_90_width	= 12.6[us]
X_acq_time	= 1.4548992[s]
X_angle	= 45[deg]
X_atn	= 3.6[dB]
X_pulse	= 6.3[us]
Irr_mode	= Off
Tri_mode	= Off
Dante_presat	= FALSE
Initial_wait	= 1[s]
Recvr_gain	= 22
Relaxation_delay	= 5[s]
Repetition_time	= 6.4548992[s]
Temp_get	= 22.7[dC]



JEOL

Filename	= Exp-AB-Est-red-C7OH-c
Author	= delta
Experiment	= single_pulse_dec
Sample_id	= Exp-AB-Est-red-C7OH-c
Solvent	= CHLOROFORM-D
Creation_time	= 18-JAN-2017 14:42:21
Revision_time	= 18-JAN-2017 15:38:46
Current_time	= 18-JAN-2017 15:38:56
Content	= Exp-AB-Est-red-C7OH-c
Data_format	= 1D COMPLEX
Dim_size	= 26214
Dim_title	= 13C
Dim_units	= [ppm]
Dimensions	= X
Site	= ECA 600
Spectrometer	= DELTA2_NMR
Field_strength	= 14.09636928[T] (600[M
X_acq_duration	= 0.69206016[s]
X_domain	= 13C
X_freq	= 150.91343039[MHz]
X_offset	= 100[ppm]
X_points	= 32768
X_prescans	= 4
X_resolution	= 1.44496109[Hz]
X_sweep	= 47.34848485[kHz]
Irr_domain	= 1H
Irr_freq	= 600.1723046[MHz]
Irr_offset	= 5[ppm]
Clipped	= FALSE
Mod_return	= 1
Scans	= 67
Total_scans	= 67
X_90_width	= 10.9[us]
X_acq_time	= 0.69206016[s]
X_angle	= 30[deg]
X_atn	= 7.5[dB]
X_pulse	= 3.63333333[us]
Irr_atn_dec	= 19.21[dB]
Irr_atn_noe	= 19.21[dB]
Irr_noise	= WALTZ
Decoupling	= TRUE
Initial_wait	= 1[s]
Noe	= TRUE
Noe_time	= 2.5[s]
Recvr_gain	= 60
Relaxation_delay	= 2.5[s]
Repetition_time	= 3.19206016[s]
Temp_get	= 23.2[dC]



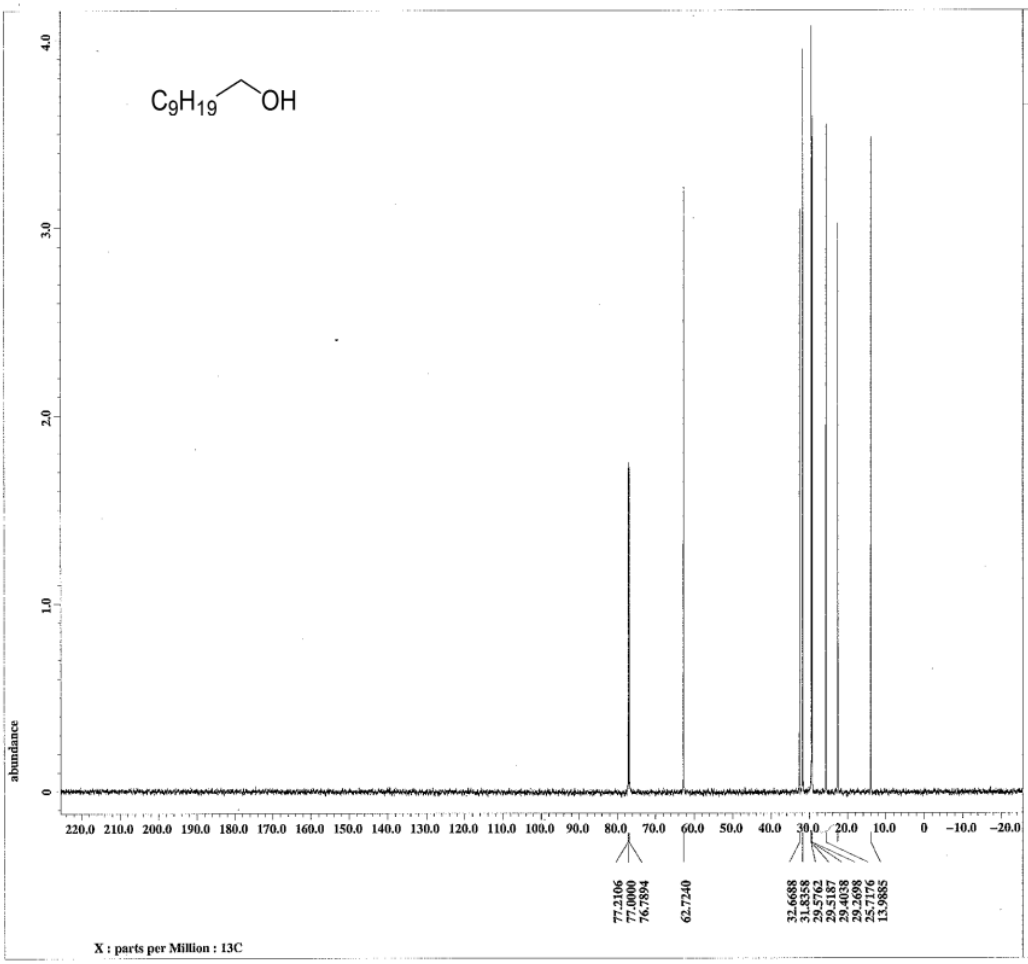
JEOL

```
Filename          = Exp-AB-Est-C10OH-P-5.
Author            = delta
Experiment        = single_pulse.ex2
Sample_id         = Exp-AB-Est-C10OH-P
Solvent           = CHLOROFORM-D
Creation_time     =  9-MAR-2017 16:17:21
Revision_time     = 24-MAR-2017 11:21:28
Current_time      = 24-MAR-2017 11:21:31

Content           = Exp-AB-Est-C10OH-P
Data_format       = 1D COMPLEX
Dim_size          = 13107
Dim_title         = 1H
Dim_units         = [ppm]
Dimensions        = X
Site              = ECA 600
Spectrometer      = DELTA2_NMR

Field_strength    = 14.09636928[T] (600[M
X_acq_duration    = 1.4548992[s]
X_domain          = 1H
X_freq            = 600.1723046[MHz]
X_offset          = 5[ppm]
X_points          = 16384
X_prescans        = 1
X_resolution      = 0.68733284[Hz]
X_sweep           = 11.26126126[kHz]
Irr_domain        = 1H
Irr_freq          = 600.1723046[MHz]
Irr_offset        = 5[ppm]
Tri_domain        = 1H
Tri_freq          = 600.1723046[MHz]
Tri_offset        = 5[ppm]
Clipped           = FALSE
Mod_return        = 1
Scans             = 8
Total_scans       = 8

X_90_width        = 12.6[us]
X_acq_time        = 1.4548992[s]
X_angle           = 45[deg]
X_atn             = 3.6[dB]
X_pulse           = 6.3[us]
Irr_mode          = Off
Tri_mode          = Off
Dante_presat      = FALSE
Initial_wait      = 1[s]
Recvr_gain        = 24
Relaxation_delay  = 5[s]
Repetition_time   = 6.4548992[s]
Temp_get          = 23.9[dC]
```



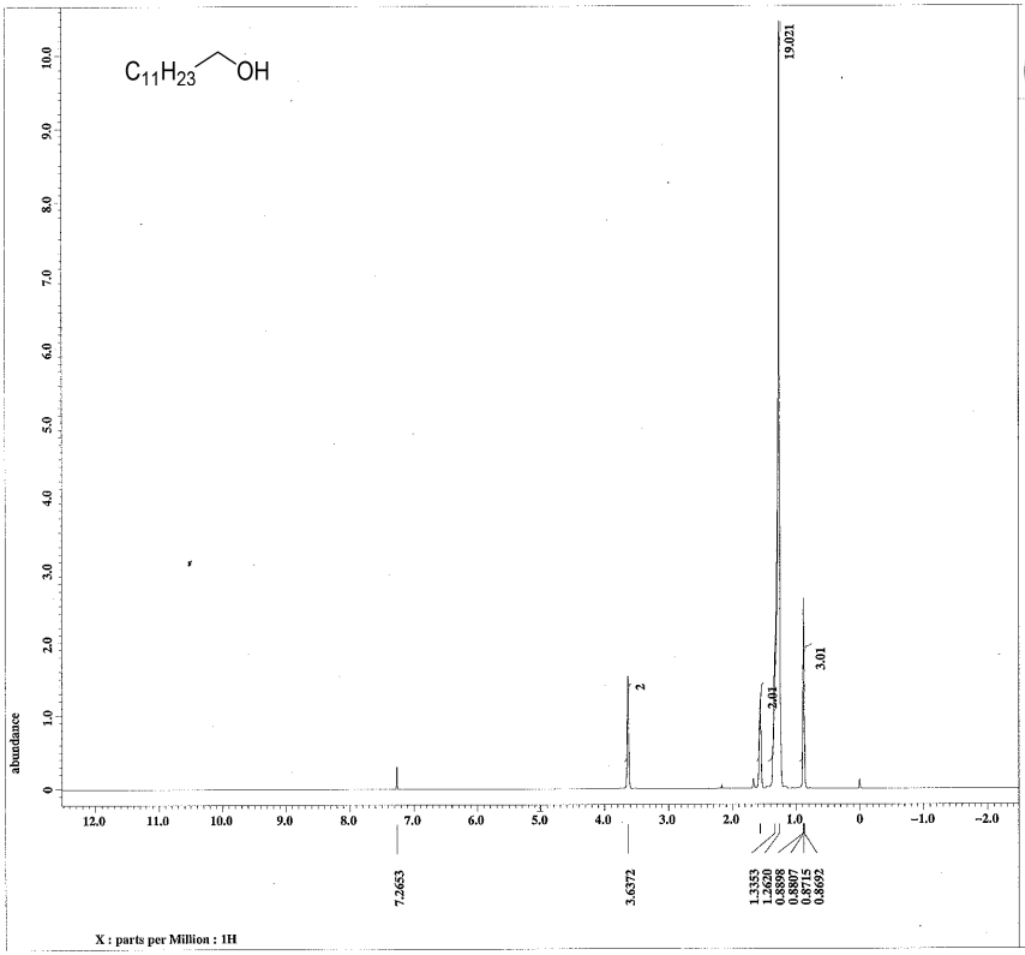
JEOL

```
Filename          = Exp-AB-Est-C10OH-C-3.
Author            = delta
Experiment        = single_pulse_dec
Sample_id         = Exp-AB-Est-C10OH-C
Solvent           = CHLOROFORM-D
Creation_time     =  9-MAR-2017 16:24:15
Revision_time     = 24-MAR-2017 11:22:31
Current_time      = 24-MAR-2017 11:22:34

Content           = Exp-AB-Est-C10OH-C
Data_format       = 1D COMPLEX
Dim_size          = 26214
Dim_title         = 13C
Dim_units         = [ppm]
Dimensions        = X
Site              = ECA 600
Spectrometer      = DELTA2_NMR

Field_strength    = 14.09636928[T] (600[M
X_acq_duration    = 0.69206016[s]
X_domain          = 13C
X_freq            = 150.91343039[MHz]
X_offset          = 100[ppm]
X_points          = 32768
X_prescans        = 4
X_resolution      = 1.44496109[Hz]
X_sweep           = 47.34848485[kHz]
Irr_domain        = 1H
Irr_freq          = 600.1723046[MHz]
Irr_offset        = 5[ppm]
Clipped           = TRUE
Mod_return        = 1
Scans             = 114.0
Total_scans       = 114.0

X_90_width        = 10.9[us]
X_acq_time        = 0.69206016[s]
X_angle           = 30[deg]
X_atn             = 7.5[dB]
X_pulse           = 3.63333333[us]
Irr_atn_dec       = 19.21[dB]
Irr_atn_noe       = 19.21[dB]
Irr_noise         = WALTZ
Decoupling        = TRUE
Initial_wait      = 1[s]
Noe               = TRUE
Noe_time          = 2.5[s]
Recvr_gain        = 60
Relaxation_delay  = 2.5[s]
Repetition_time   = 3.19206016[s]
Temp_get          = 24.4[dC]
```



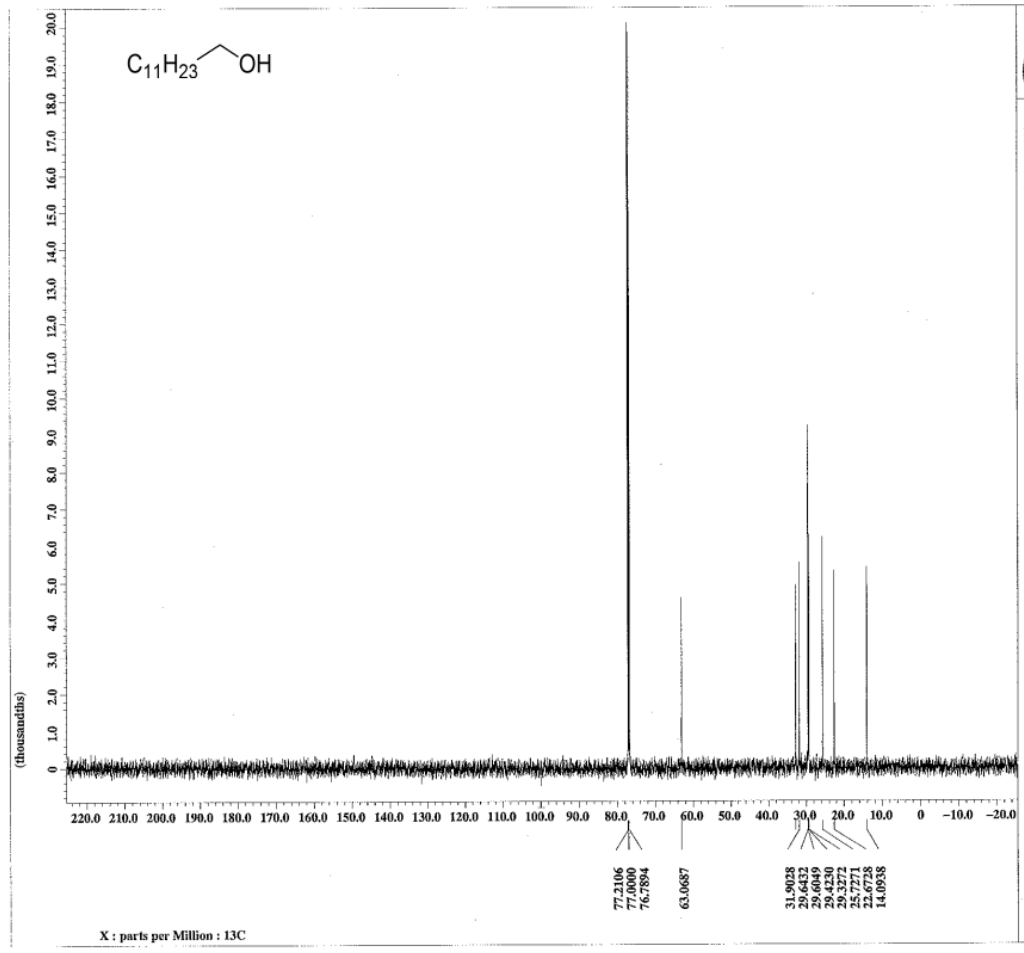
JEOL

```
Filename          = Exp-AB-Est-C12OH-P-5.
Author            = delta
Experiment        = single_pulse.ex2
Sample_id         = Exp-AB-Est-C12OH-P
Solvent           = CHLOROFORM-D
Creation_time     =  9-MAR-2017 16:02:10
Revision_time     = 24-MAR-2017 11:27:43
Current_time      = 24-MAR-2017 11:27:52

Content           = Exp-AB-Est-C12OH-P
Data_format       = 1D COMPLEX
Dim_size          = 13107
Dim_title         = 1H
Dim_units         = [ppm]
Dimensions        = X
Site              = ECA 600
Spectrometer      = DELTA2_NMR

Field_strength    = 14.09636928[T] (600[M
X_acq_duration    = 1.4548992[s]
X_domain          = 1H
X_freq            = 600.1723046[MHz]
X_offset          = 5[ppm]
X_points          = 16384
X_prescans        = 1
X_resolution      = 0.68733284[Hz]
X_sweep           = 11.26126126[kHz]
Irr_domain        = 1H
Irr_freq          = 600.1723046[MHz]
Irr_offset        = 5[ppm]
Tri_domain        = 1H
Tri_freq          = 600.1723046[MHz]
Tri_offset        = 5[ppm]
Clipped           = FALSE
Mod_return        = 1
Scans             = 8
Total_scans       = 8

X_90_width        = 12.6[us]
X_acq_time        = 1.4548992[s]
X_angle           = 45[deg]
X_atn             = 3.6[dB]
X_pulse           = 6.3[us]
Irr_mode          = Off
Tri_mode          = Off
Dante_presat      = FALSE
Initial_wait      = 1[s]
Recvr_gain        = 40
Relaxation_delay  = 5[s]
Repetition_time   = 6.4548992[s]
Temp_get          = 23.9[dC]
```



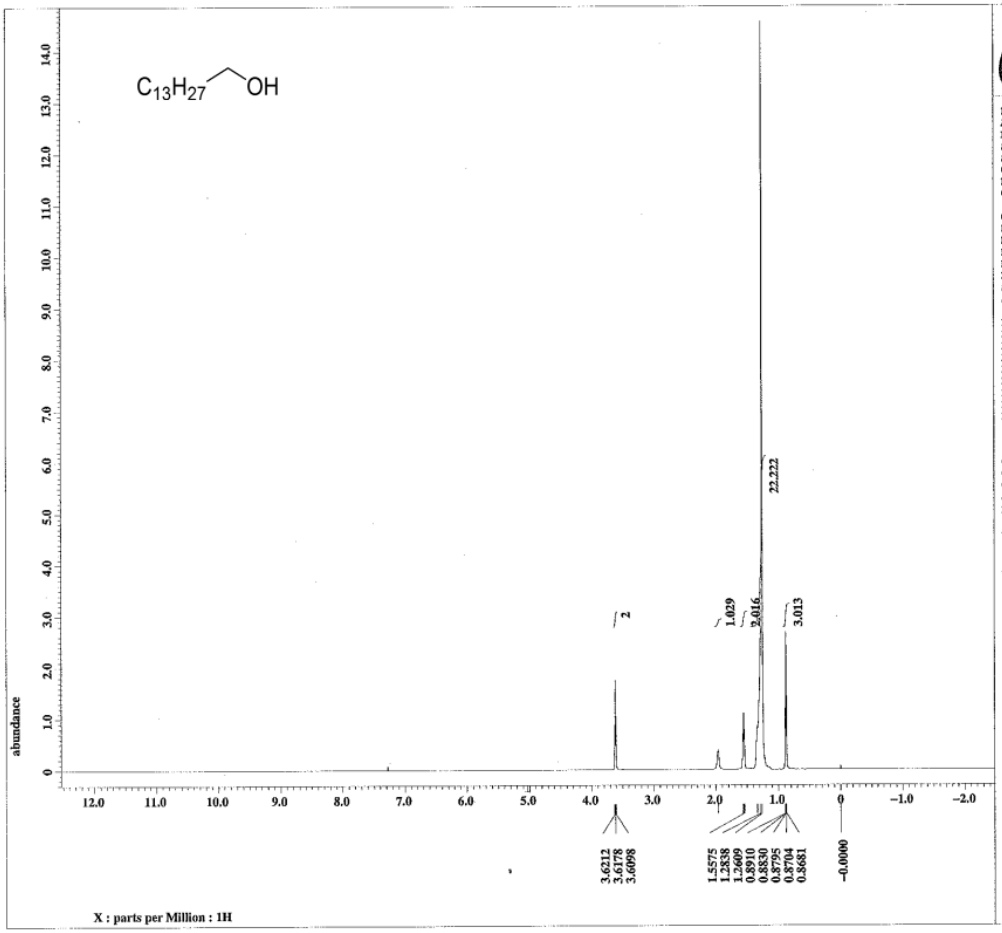
JEOL

```
Filename          = Exp-AB-Est-C12OH-C-3.
Author            = delta
Experiment        = single_pulse_dec
Sample_id         = Exp-AB-Est-C12OH-C
Solvent           = CHLOROFORM-D
Creation_time     =  9-MAR-2017 16:08:25
Revision_time     = 24-MAR-2017 11:28:33
Current_time      = 24-MAR-2017 11:28:55

Content           = Exp-AB-Est-C12OH-C
Data_format       = 1D COMPLEX
Dim_size          = 26214
Dim_title         = 13C
Dim_units         = [ppm]
Dimensions        = X
Site              = ECA 600
Spectrometer      = DELTA2_NMR

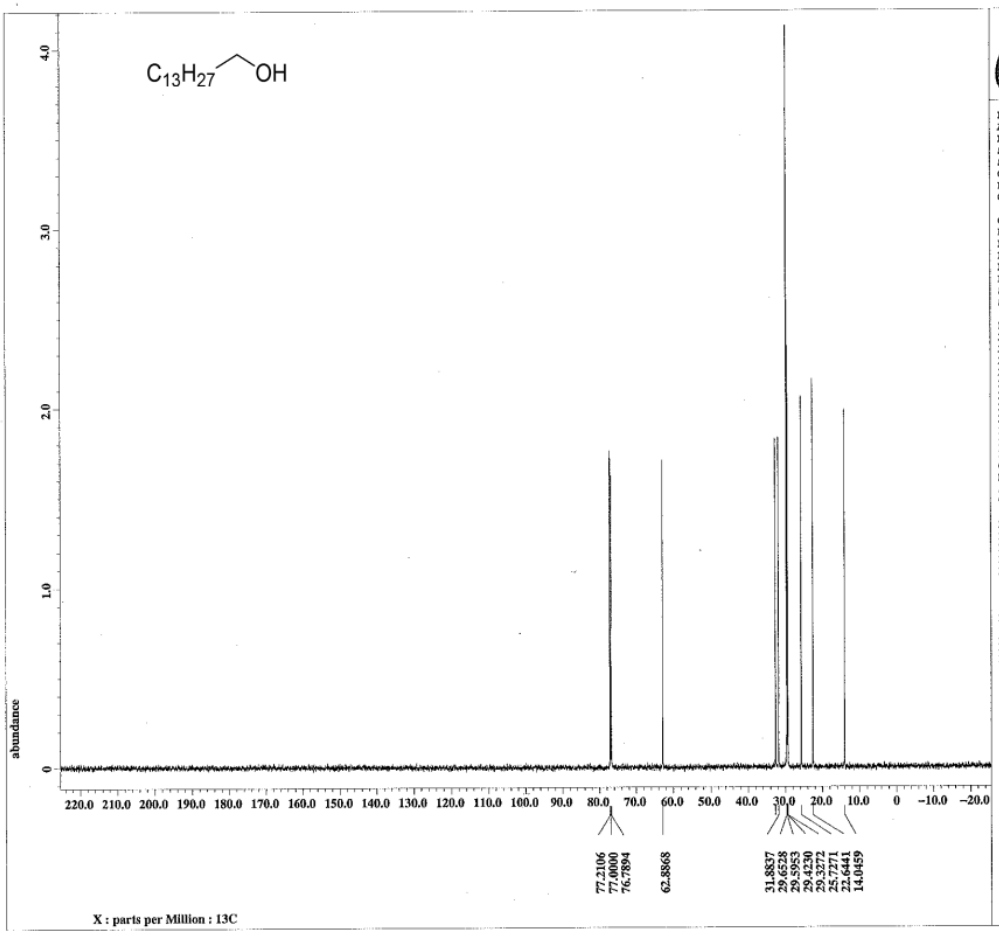
Field_strength    = 14.09636928[T] (600[M
X_acq_duration    = 0.69206016[s]
X_domain          = 13C
X_freq            = 150.91343039[MHz]
X_offset          = 100[ppm]
X_points          = 32768
X_prescans        = 4
X_resolution      = 1.44496109[Hz]
X_sweep           = 47.34848485[kHz]
Irr_domain        = 1H
Irr_freq          = 600.1723046[MHz]
Irr_offset        = 5[ppm]
Clipped           = FALSE
Mod_return        = 1
Scans             = 104
Total_scans       = 104

X_90_width        = 10.9[us]
X_acq_time        = 0.69206016[s]
X_angle           = 30[deg]
X_atn             = 7.5[dB]
X_pulse           = 3.63333333[us]
Irr_atn_dec       = 19.21[dB]
Irr_atn_noe       = 19.21[dB]
Irr_noise         = WALTZ
Decoupling        = TRUE
Initial_wait      = 1[s]
Noe               = TRUE
Noe_time          = 2.5[s]
Recvr_gain        = 22
Relaxation_delay  = 2.5[s]
Repetition_time   = 3.19206016[s]
Temp_get          = 24.4[dC]
```



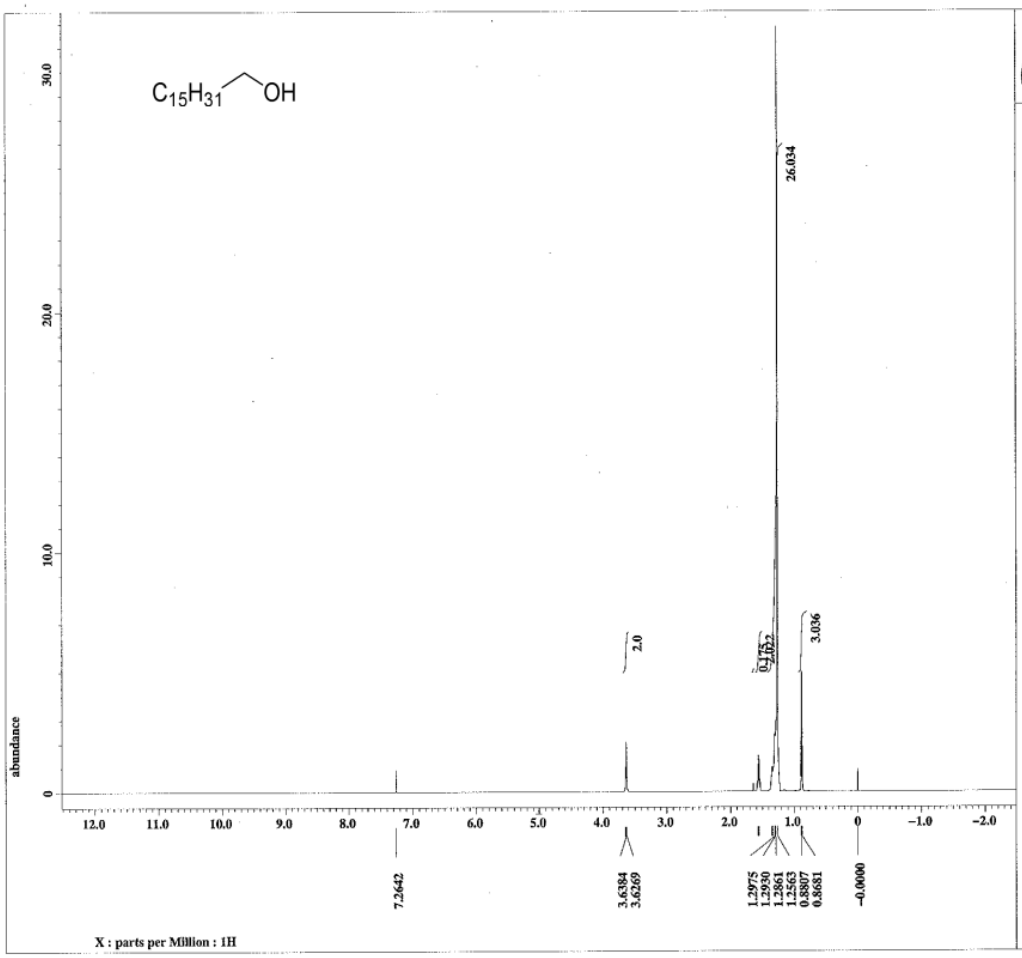
JEOL

Filename	= Exp-AB-Est-red-C14OH-
Author	= delta
Experiment	= single_pulse.ex2
Sample_id	= Exp-AB-Est-red-C14OH-
Solvent	= CHLOROFORM-D
Creation_time	= 18-JAN-2017 14:49:21
Revision_time	= 18-JAN-2017 15:49:09
Current_time	= 18-JAN-2017 15:49:15
Content	= Exp-AB-Est-red-C14OH-
Data_format	= 1D COMPLEX
Dim_size	= 13107
Dim_title	= 1H
Dim_units	= [ppm]
Dimensions	= X
Site	= ECA 600
Spectrometer	= DELTA2_NMR
Field_strength	= 14.09636928[T] (600[M
X_acq_duration	= 1.4548992[s]
X_domain	= 1H
X_freq	= 600.1723046[MHz]
X_offset	= 5[ppm]
X_points	= 16384
X_prescans	= 1
X_resolution	= 0.68733284[Hz]
X_sweep	= 11.26126126[kHz]
Irr_domain	= 1H
Irr_freq	= 600.1723046[MHz]
Irr_offset	= 5[ppm]
Tri_domain	= 1H
Tri_freq	= 600.1723046[MHz]
Tri_offset	= 5[ppm]
Clipped	= FALSE
Mod_return	= 1
Scans	= 8
Total_scans	= 8
X_90_width	= 12.6[us]
X_acq_time	= 1.4548992[s]
X_angle	= 45[deg]
X_atn	= 3.6[dB]
X_pulse	= 6.3[us]
Irr_mode	= Off
Tri_mode	= Off
Dante_presat	= FALSE
Initial_wait	= 1[s]
Recvr_gain	= 26
Relaxation_delay	= 5[s]
Repetition_time	= 6.4548992[s]
Temp_get	= 22.7[dC]



JEOL

Filename	= Exp-AB-Est-red-C14OH-
Author	= delta
Experiment	= single_pulse_dec
Sample_id	= Exp-AB-Est-red-C14OH-
Solvent	= CHLOROFORM-D
Creation_time	= 18-JAN-2017 14:56:34
Revision_time	= 18-JAN-2017 15:52:15
Current_time	= 18-JAN-2017 15:52:19
Content	= Exp-AB-Est-red-C14OH-
Data_format	= 1D COMPLEX
Dim_size	= 26214
Dim_title	= 13C
Dim_units	= [ppm]
Dimensions	= X
Site	= ECA 600
Spectrometer	= DELTA2_NMR
Field_strength	= 14.09636928[T] (600[M
X_acq_duration	= 0.69206016[s]
X_domain	= 13C
X_freq	= 150.91343039[MHz]
X_offset	= 100[ppm]
X_points	= 32768
X_prescans	= 4
X_resolution	= 1.44496109[Hz]
X_sweep	= 47.34848485[kHz]
Irr_domain	= 1H
Irr_freq	= 600.1723046[MHz]
Irr_offset	= 5[ppm]
Clipped	= TRUE
Mod_return	= 1
Scans	= 120
Total_scans	= 120
X_90_width	= 10.9[us]
X_acq_time	= 0.69206016[s]
X_angle	= 30[deg]
X_atn	= 7.5[dB]
X_pulse	= 3.63333333[us]
Irr_atn_dec	= 19.21[dB]
Irr_atn_noe	= 19.21[dB]
Irr_noise	= WALTZ
Decoupling	= TRUE
Initial_wait	= 1[s]
Noe	= TRUE
Noe_time	= 2.5[s]
Recvr_gain	= 60
Relaxation_delay	= 2.5[s]
Repetition_time	= 3.19206016[s]
Temp_get	= 23.2[dC]



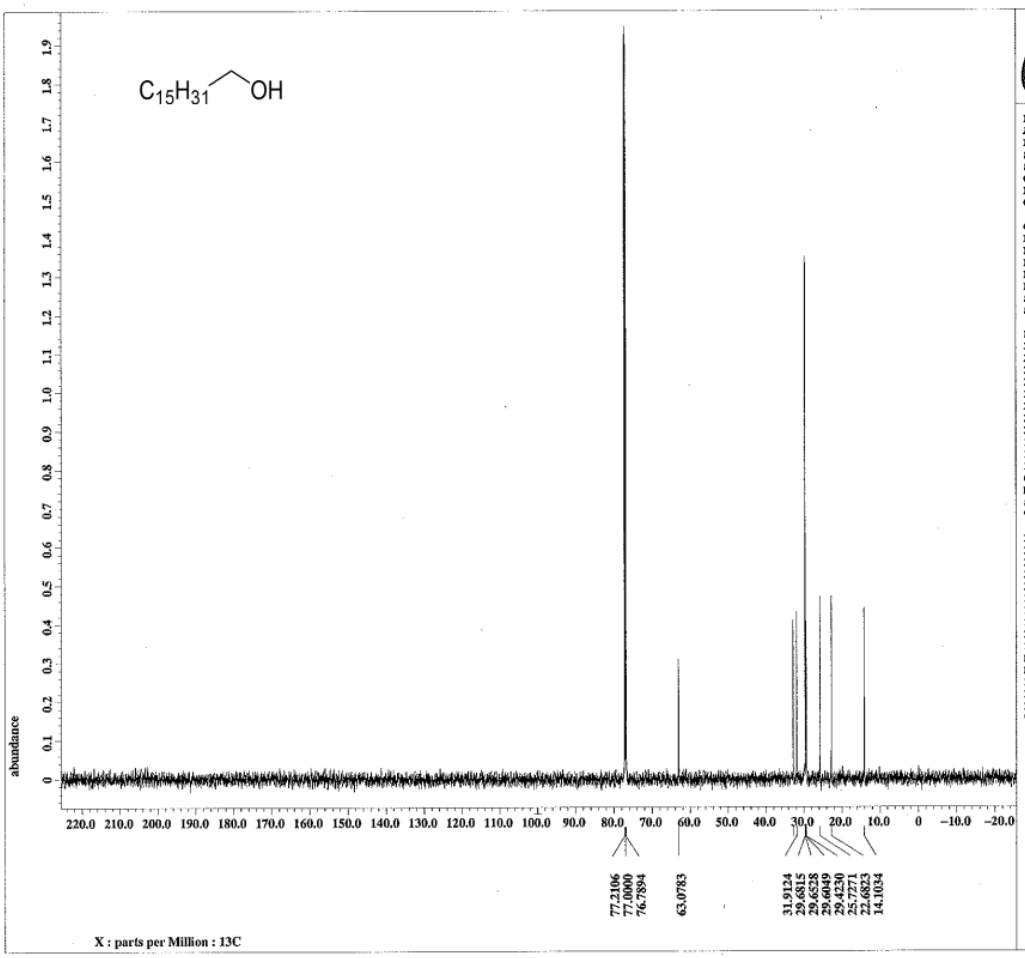
JEOL

```
Filename          = Exp-AB-Est-red-C16OH-
Author            = delta
Experiment        = single_pulse.ex2
Sample_id         = Exp-AB-Est-red-C16OH-
Solvent           = CHLOROFORM-D
Creation_time     = 18-JAN-2017 15:11:51
Revision_time     = 18-JAN-2017 16:08:58
Current_time      = 18-JAN-2017 16:09:20

Content           = Exp-AB-Est-red-C16OH-
Data_format       = 1D COMPLEX
Dim_size          = 13107
Dim_title         = 1H
Dim_units         = [ppm]
Dimensions        = X
Site              = ECA 600
Spectrometer      = DELTA2_NMR

Field_strength    = 14.09636928[T] (600[M
X_acq_duration    = 1.4548992[s]
X_domain          = 1H
X_freq            = 600.1723046[MHz]
X_offset          = 5[ppm]
X_points          = 16384
X_prescans        = 1
X_resolution      = 0.68733284[Hz]
X_sweep           = 11.26126126[kHz]
Irr_domain        = 1H
Irr_freq          = 600.1723046[MHz]
Irr_offset        = 5[ppm]
Tri_domain        = 1H
Tri_freq          = 600.1723046[MHz]
Tri_offset        = 5[ppm]
Clipped           = FALSE
Mod_return        = 1
Scans             = 8
Total_scans       = 8

X_90_width        = 12.6[us]
X_acq_time        = 1.4548992[s]
X_angle           = 45[deg]
X_atn             = 3.6[dB]
X_pulse           = 6.3[us]
Irr_mode          = Off
Tri_mode          = Off
Dante_presat      = FALSE
Initial_wait      = 1[s]
Recvr_gain        = 40
Relaxation_delay  = 5[s]
Repetition_time   = 6.4548992[s]
Temp_get          = 22.6[dC]
```



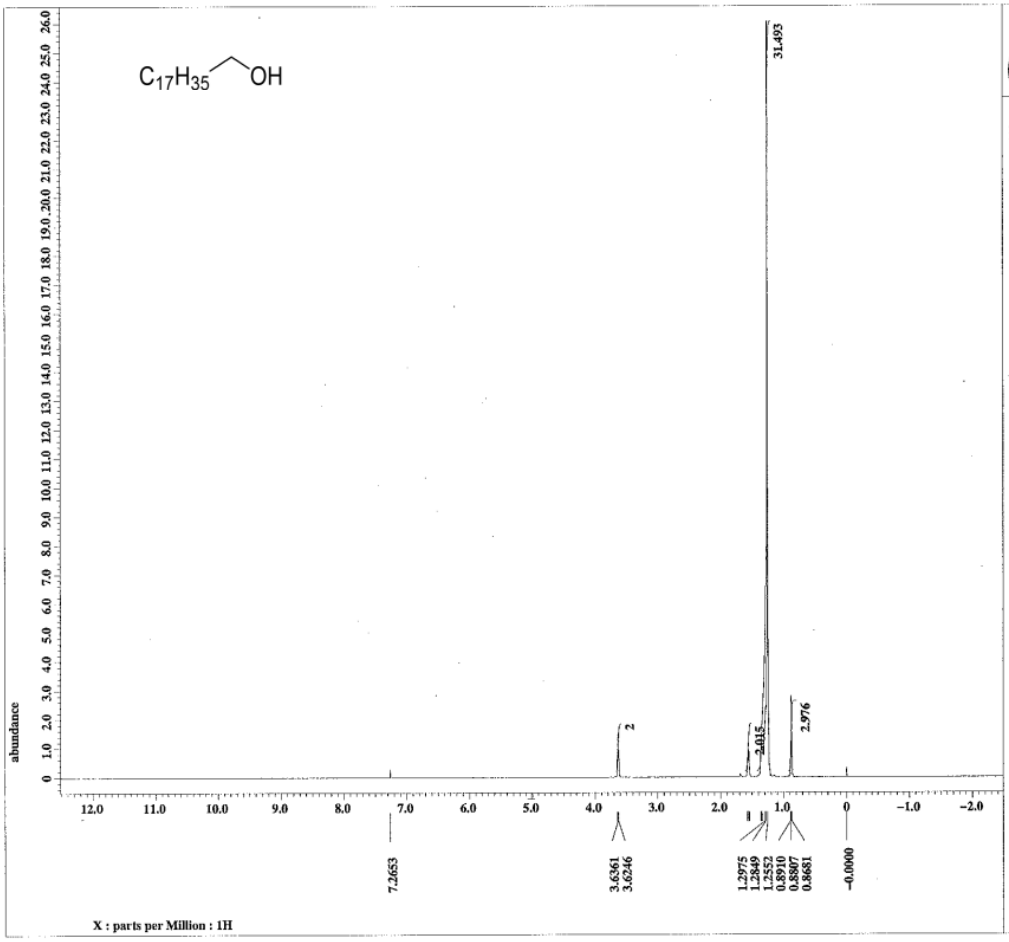
JEOL

```
Filename          = Exp-AB-Est-red-C16OH-
Author            = delta
Experiment        = single_pulse_dec
Sample_id         = Exp-AB-Est-red-C16OH-
Solvent           = CHLOROFORM-D
Creation_time     = 18-JAN-2017 15:17:05
Revision_time     = 18-JAN-2017 16:11:10
Current_time      = 18-JAN-2017 16:11:15

Content           = Exp-AB-Est-red-C16OH-
Data_format       = 1D COMPLEX
Dim_size          = 26214
Dim_title         = 13C
Dim_units         = [ppm]
Dimensions        = X
Site              = ECA 600
Spectrometer      = DELTA2_NMR

Field_strength    = 14.09636928[T] (600[M
X_acq_duration    = 0.69206016[s]
X_domain          = 13C
X_freq            = 150.91343039[MHz]
X_offset          = 100[ppm]
X_points          = 32768
X_prescans        = 4
X_resolution      = 1.44496109[Hz]
X_sweep           = 47.34848485[kHz]
Irr_domain        = 1H
Irr_freq          = 600.1723046[MHz]
Irr_offset        = 5[ppm]
Clipped           = TRUE
Mod_return        = 1
Scans             = 83
Total_scans       = 83

X_90_width        = 10.9[us]
X_acq_time        = 0.69206016[s]
X_angle           = 30[deg]
X_atn             = 7.5[dB]
X_pulse           = 3.63333333[us]
Irr_atn_dec       = 19.21[dB]
Irr_atn_noe       = 19.21[dB]
Irr_noise         = WALTZ
Decoupling        = TRUE
Initial_wait      = 1[s]
Noe               = TRUE
Noe_time          = 2.5[s]
Recvr_gain        = 60
Relaxation_delay  = 2.5[s]
Repetition_time   = 3.19206016[s]
Temp_get          = 23.2[dC]
```



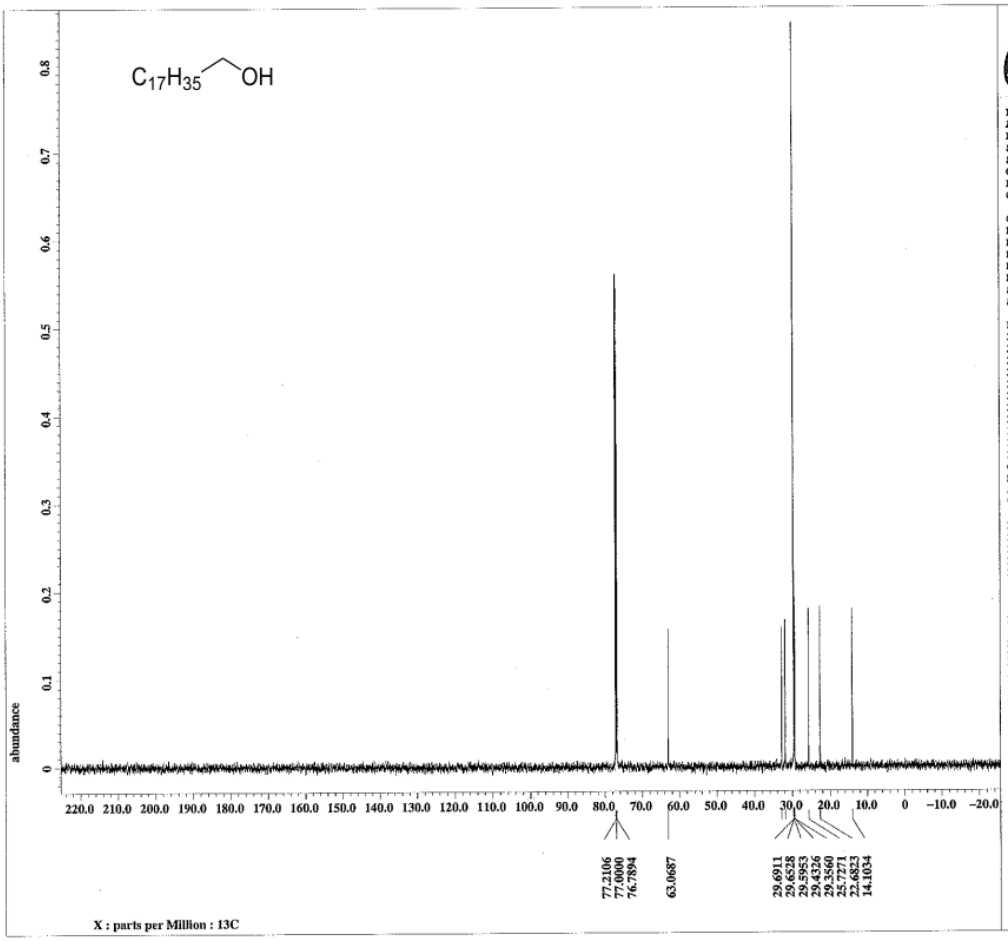
JEOL

```
Filename          = Exp-AB-Est-red-C18-OH
Author            = delta
Experiment        = single_pulse.ex2
Sample_id         = Exp-AB-Est-red-C18-OH
Solvent           = CHLOROFORM-D
Creation_time     = 18-JAN-2017 15:34:50
Revision_time     = 18-JAN-2017 16:49:03
Current_time      = 18-JAN-2017 16:49:09

Content           = Exp-AB-Est-red-C18-OH
Data_format       = 1D COMPLEX
Dim_size          = 13107
Dim_title         = 1H
Dim_units         = [ppm]
Dimensions        = X
Site              = ECA 600
Spectrometer      = DELTA2_NMR

Field_strength    = 14.09636928[T] (600[M
X_acq_duration    = 1.4548992[s]
X_domain          = 1H
X_freq            = 600.1723046[MHz]
X_offset          = 5[ppm]
X_points          = 16384
X_prescans        = 1
X_resolution      = 0.68733284[Hz]
X_sweep           = 11.26126126[kHz]
Irr_domain        = 1H
Irr_freq          = 600.1723046[MHz]
Irr_offset        = 5[ppm]
Tri_domain        = 1H
Tri_freq          = 600.1723046[MHz]
Tri_offset        = 5[ppm]
Clipped           = FALSE
Mod_return        = 1
Scans             = 8
Total_scans       = 8

X_90_width        = 12.6[us]
X_acq_time        = 1.4548992[s]
X_angle           = 45[deg]
X_atn             = 3.6[dB]
X_pulse           = 6.3[us]
Irr_mode          = Off
Tri_mode          = Off
Dante_presat      = FALSE
Initial_wait      = 1[s]
Recvr_gain        = 36
Relaxation_delay  = 5[s]
Repetition_time   = 6.4548992[s]
Temp_get          = 22.6[dC]
```



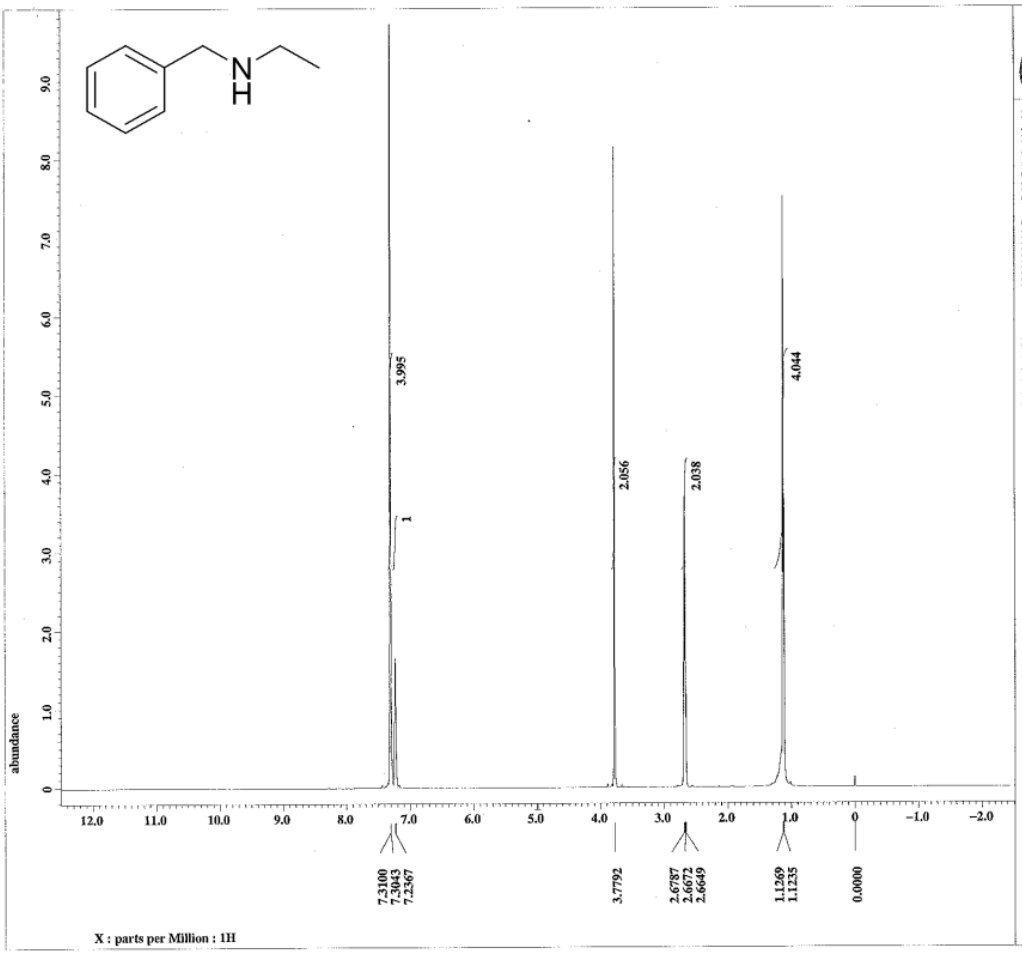
JEOL

```
Filename          = Exp-AB-Est-red-C18-OH
Author            = delta
Experiment        = single_pulse_dec
Sample_id         = Exp-AB-Est-red-C18-OH
Solvent           = CHLOROFORM-D
Creation_time     = 18-JAN-2017 15:40:56
Revision_time     = 18-JAN-2017 16:50:39
Current_time      = 18-JAN-2017 16:50:41

Content           = Exp-AB-Est-red-C18-OH
Data_format       = 1D COMPLEX
Dim_size          = 26214
Dim_title         = 13C
Dim_units         = [ppm]
Dimensions        = X
Site              = ECA 600
Spectrometer      = DELTA2_NMR

Field_strength    = 14.09636928[T] (600[M
X_acq_duration    = 0.69206016[s]
X_domain          = 13C
X_freq            = 150.91343039[MHz]
X_offset          = 100[ppm]
X_points          = 32768
X_prescans        = 4
X_resolution      = 1.44496109[Hz]
X_sweep           = 47.34848485[kHz]
Irr_domain        = 1H
Irr_freq          = 600.1723046[MHz]
Irr_offset        = 5[ppm]
Clipped           = TRUE
Mod_return        = 1
Scans             = 103
Total_scans       = 103

X_90_width        = 10.9[us]
X_acq_time        = 0.69206016[s]
X_angle           = 30[deg]
X_atn             = 7.5[dB]
X_pulse           = 3.63333333[us]
Irr_atn_dec       = 19.21[dB]
Irr_atn_noe       = 19.21[dB]
Irr_noise         = WALTZ
Decoupling        = TRUE
Initial_wait      = 1[s]
Noe               = TRUE
Noe_time          = 2.5[s]
Recvr_gain        = 50
Relaxation_delay  = 2.5[s]
Repetition_time   = 3.19206016[s]
Temp_get          = 23.2[dC]
```

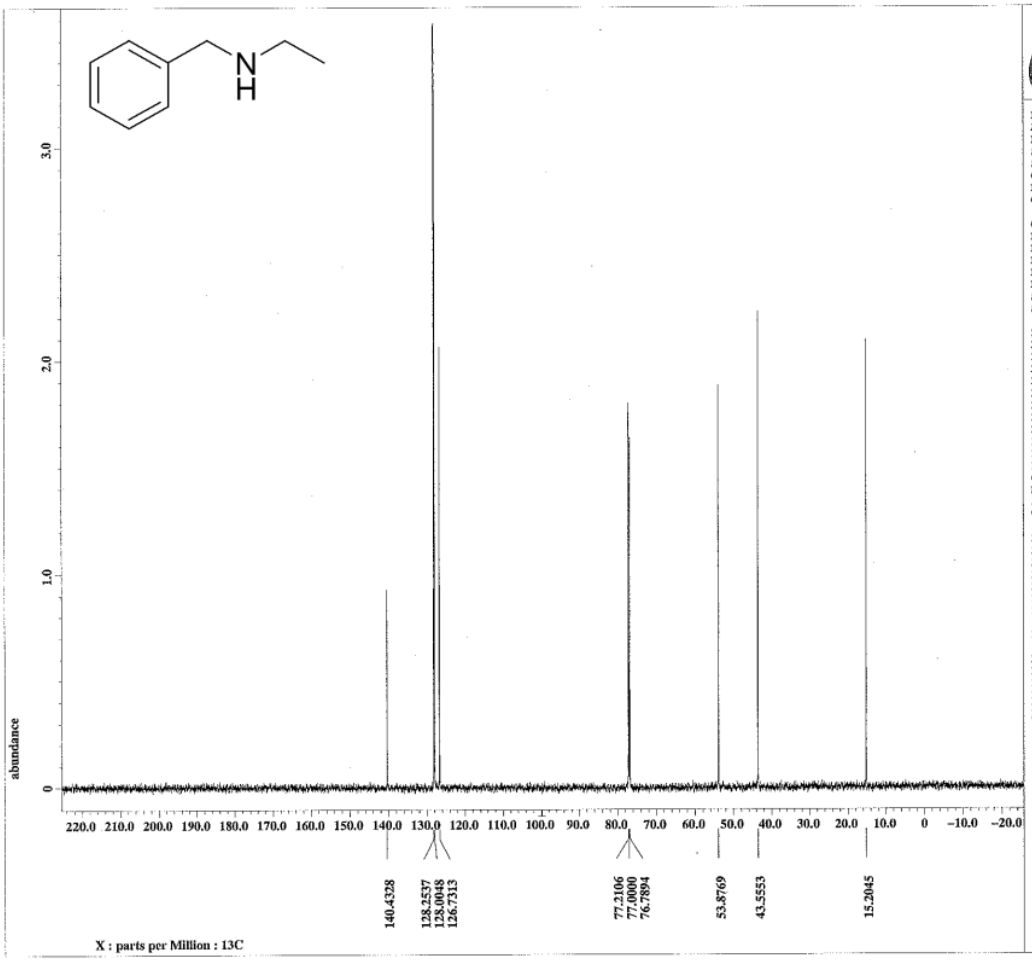



```
Filename          = Exp-AB-amide-amine-P-
Author            = delta
Experiment        = single_pulse.ex2
Sample_id         = Exp-AB-amide-amine-P
Solvent           = CHLOROFORM-D
Creation_time     = 11-APR-2017 12:11:30
Revision_time     = 11-APR-2017 13:10:16
Current_time      = 11-APR-2017 13:10:22

Content           = Exp-AB-amide-amine-P
Data_format       = 1D COMPLEX
Dim_size          = 13107
Dim_title         = 1H
Dim_units         = [ppm]
Dimensions        = X
Site              = ECA 600
Spectrometer      = DELTA2_NMR

Field_strength    = 14.09636928[T] (600[M
X_acq_duration    = 1.4548992[s]
X_domain          = 1H
X_freq            = 600.1723046[MHz]
X_offset          = 5[ppm]
X_points          = 16384
X_prescans        = 1
X_resolution      = 0.68733284[Hz]
X_sweep           = 11.26126126[kHz]
Irr_domain        = 1H
Irr_freq          = 600.1723046[MHz]
Irr_offset        = 5[ppm]
Tri_domain        = 1H
Tri_freq          = 600.1723046[MHz]
Tri_offset        = 5[ppm]
Clipped           = FALSE
Mod_return        = 1
Scans             = 8
Total_scans       = 8

X_90_width        = 12.6[us]
X_acq_time        = 1.4548992[s]
X_angle           = 45[deg]
X_atn             = 3.6[dB]
X_pulse           = 6.3[us]
Irr_mode          = Off
Tri_mode          = Off
Dante_presat      = FALSE
Initial_wait      = 1[s]
Recvr_gain        = 34
Relaxation_delay  = 5[s]
Repetition_time   = 6.4548992[s]
Temp_get          = 20.6[dC]
```

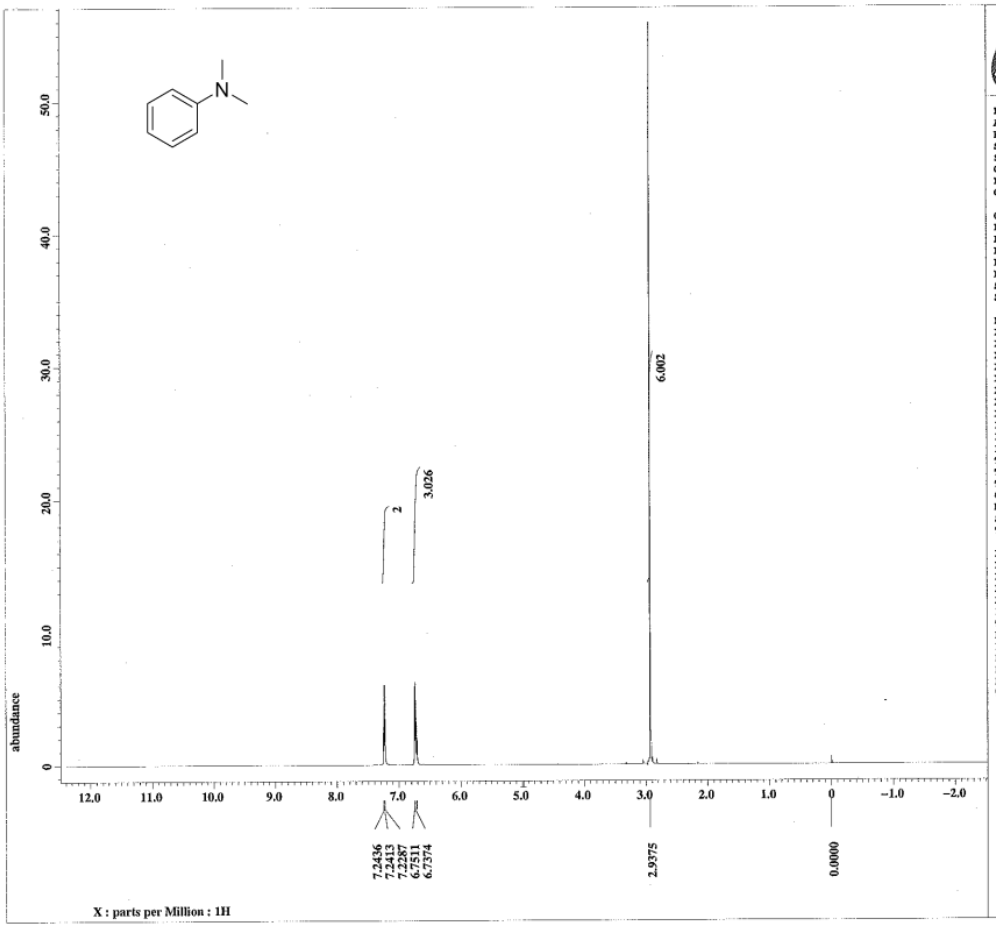



```
Filename          = Exp-AB-amide-amine-C-
Author            = delta
Experiment        = single_pulse_dec
Sample_id         = Exp-AB-amide-amine-C
Solvent           = CHLOROFORM-D
Creation_time     = 11-APR-2017 12:16:35
Revision_time     = 11-APR-2017 13:11:48
Current_time      = 11-APR-2017 13:11:52

Content           = Exp-AB-amide-amine-C
Data_format       = 1D COMPLEX
Dim_size          = 26214
Dim_title         = 13C
Dim_units         = [ppm]
Dimensions        = X
Site              = ECA 600
Spectrometer      = DELTA2_NMR

Field_strength    = 14.09636928[T] (600[M
X_acq_duration    = 0.69206016[s]
X_domain          = 13C
X_freq            = 150.91343039[MHz]
X_offset          = 100[ppm]
X_points          = 32768
X_prescans        = 4
X_resolution      = 1.44496109[Hz]
X_sweep           = 47.34848485[kHz]
Irr_domain        = 1H
Irr_freq          = 600.1723046[MHz]
Irr_offset        = 5[ppm]
Clipped           = FALSE
Mod_return        = 1
Scans             = 80
Total_scans       = 80

X_90_width        = 10.9[us]
X_acq_time        = 0.69206016[s]
X_angle           = 30[deg]
X_atn             = 7.5[dB]
X_pulse           = 3.63333333[us]
Irr_atn_dec       = 19.21[dB]
Irr_atn_noe       = 19.21[dB]
Irr_noise         = WALTZ
Decoupling        = TRUE
Initial_wait      = 1[s]
Noe               = TRUE
Noe_time          = 2.5[s]
Recvr_gain        = 60
Relaxation_delay  = 2.5[s]
Repetition_time   = 3.19206016[s]
Temp_get          = 21.7[dC]
```



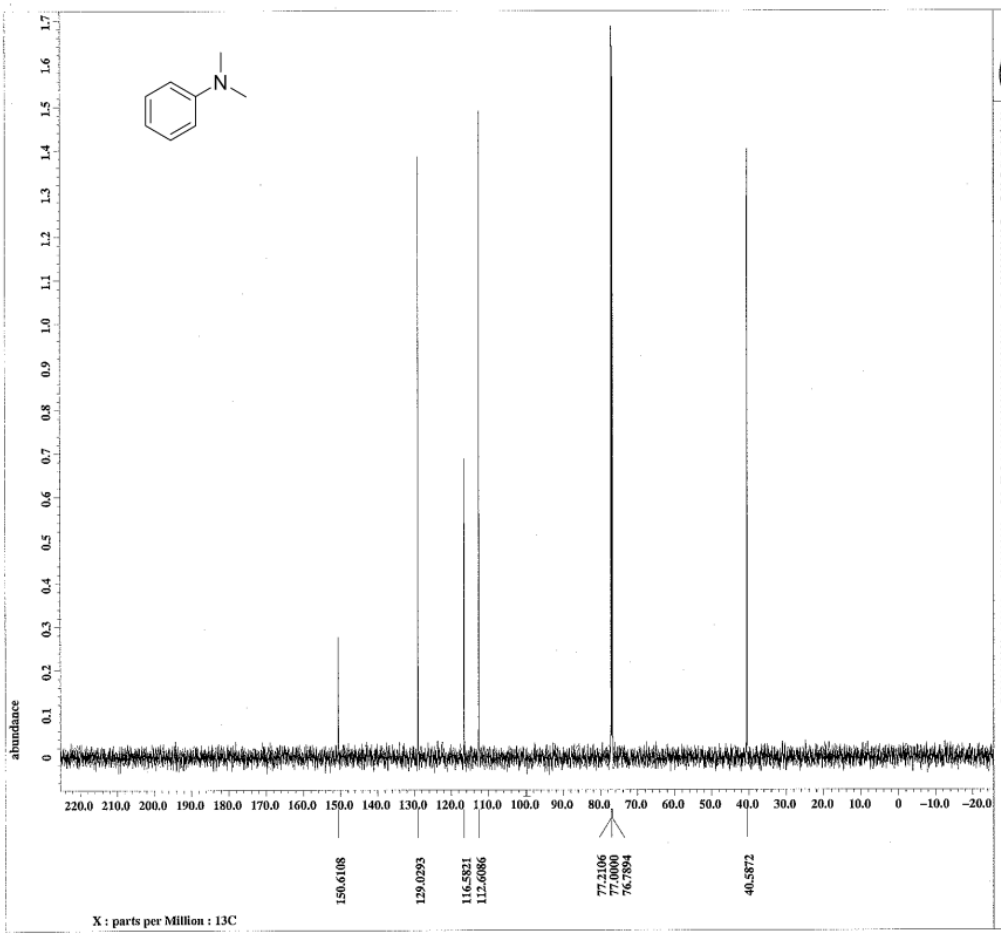
JEOL

```
Filename          = Exp-AB-amine Me-P-5.j
Author            = delta
Experiment        = single_pulse.ex2
Sample_id         = Exp-AB-amine Me-P
Solvent           = CHLOROFORM-D
Creation_time     = 11-APR-2017 12:01:40
Revision_time     = 11-APR-2017 12:58:37
Current_time      = 11-APR-2017 12:58:42

Content           = Exp-AB-amine Me-P
Data_format       = 1D COMPLEX
Dim_size          = 13107
Dim_title         = 1H
Dim_units         = [ppm]
Dimensions        = X
Site              = ECA 600
Spectrometer      = DELTA2_NMR

Field_strength    = 14.09636928[T] (600[M
X_acq_duration    = 1.4548992[s]
X_domain          = 1H
X_freq            = 600.1723046[MHz]
X_offset          = 5[ppm]
X_points          = 16384
X_prescans        = 1
X_resolution      = 0.68733284[Hz]
X_sweep           = 11.26126126[kHz]
Irr_domain        = 1H
Irr_freq          = 600.1723046[MHz]
Irr_offset        = 5[ppm]
Tri_domain        = 1H
Tri_freq          = 600.1723046[MHz]
Tri_offset        = 5[ppm]
Clipped           = FALSE
Mod_return        = 1
Scans             = 8
Total_scans       = 8

X_90_width        = 12.6[us]
X_acq_time        = 1.4548992[s]
X_angle           = 45[deg]
X_atn             = 3.6[dB]
X_pulse           = 6.3[us]
Irr_mode          = Off
Tri_mode          = Off
Dante_presat      = FALSE
Initial_wait      = 1[s]
Recvr_gain        = 44
Relaxation_delay  = 5[s]
Repetition_time   = 6.4548992[s]
Temp_get          = 21.2[dC]
```



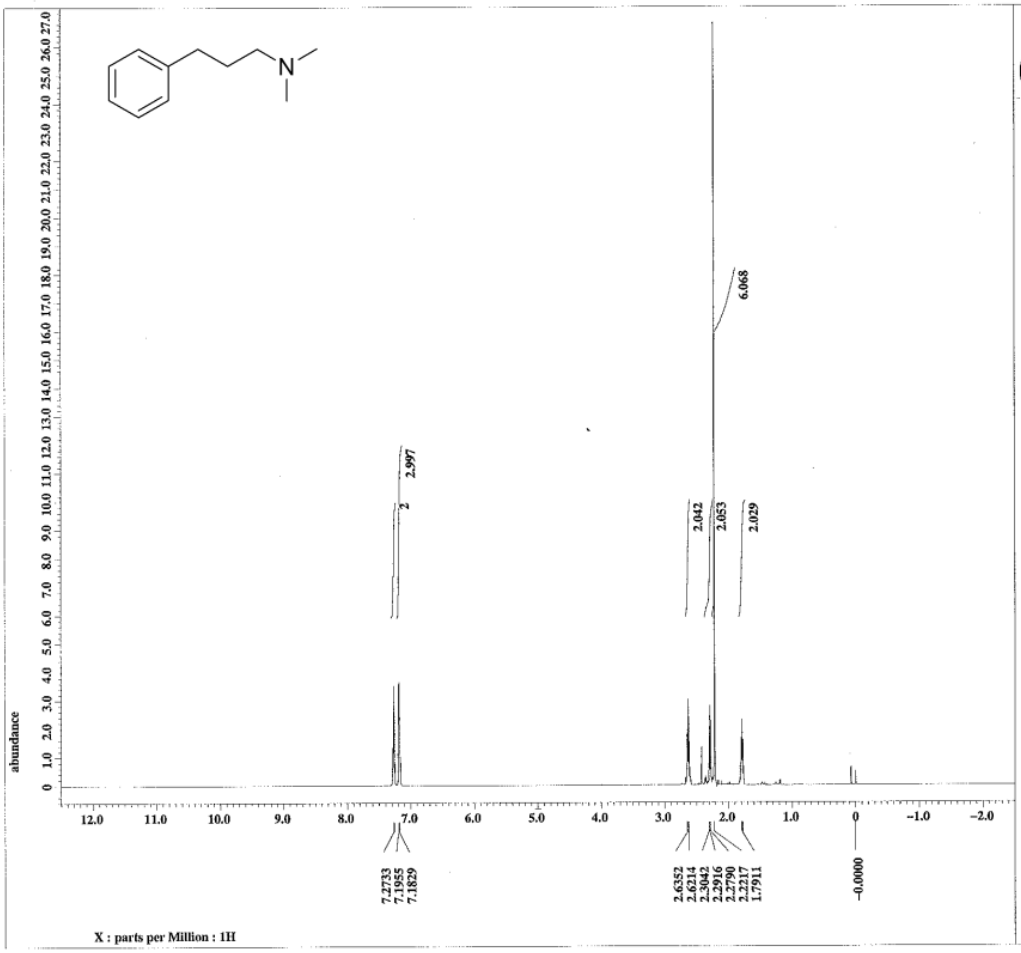
JEOL

```
Filename          = Exp-AB-amine Me-C-3.j
Author            = delta
Experiment        = single_pulse_dec
Sample_id         = Exp-AB-amine Me-C
Solvent           = CHLOROFORM-D
Creation_time     = 11-APR-2017 12:05:14
Revision_time     = 11-APR-2017 14:30:51
Current_time      = 11-APR-2017 14:31:11

Content           = Exp-AB-amine Me-C
Data_format       = 1D COMPLEX
Dim_size          = 26214
Dim_title         = 13C
Dim_units         = [ppm]
Dimensions        = X
Site              = ECA 600
Spectrometer      = DELTA2_NMR

Field_strength    = 14.09636928[T] (600[M
X_acq_duration    = 0.69206016[s]
X_domain          = 13C
X_freq            = 150.91343039[MHz]
X_offset          = 100[ppm]
X_points          = 32768
X_prescans        = 4
X_resolution      = 1.44496109[Hz]
X_sweep           = 47.34848485[kHz]
Irr_domain        = 1H
Irr_freq          = 600.1723046[MHz]
Irr_offset        = 5[ppm]
Clipped           = FALSE
Mod_return        = 1
Scans             = 52
Total_scans       = 52

X_90_width        = 10.9[us]
X_acq_time        = 0.69206016[s]
X_angle           = 30[deg]
X_atn             = 7.5[dB]
X_pulse           = 3.63333333[us]
Irr_atn_dec       = 19.21[dB]
Irr_atn_noe       = 19.21[dB]
Irr_noise         = WALTZ
Decoupling        = TRUE
Initial_wait      = 1[s]
Noe               = TRUE
Noe_time          = 2.5[s]
Recvr_gain        = 60
Relaxation_delay  = 2.5[s]
Repetition_time   = 3.19206016[s]
Temp_get          = 21.4[dC]
```



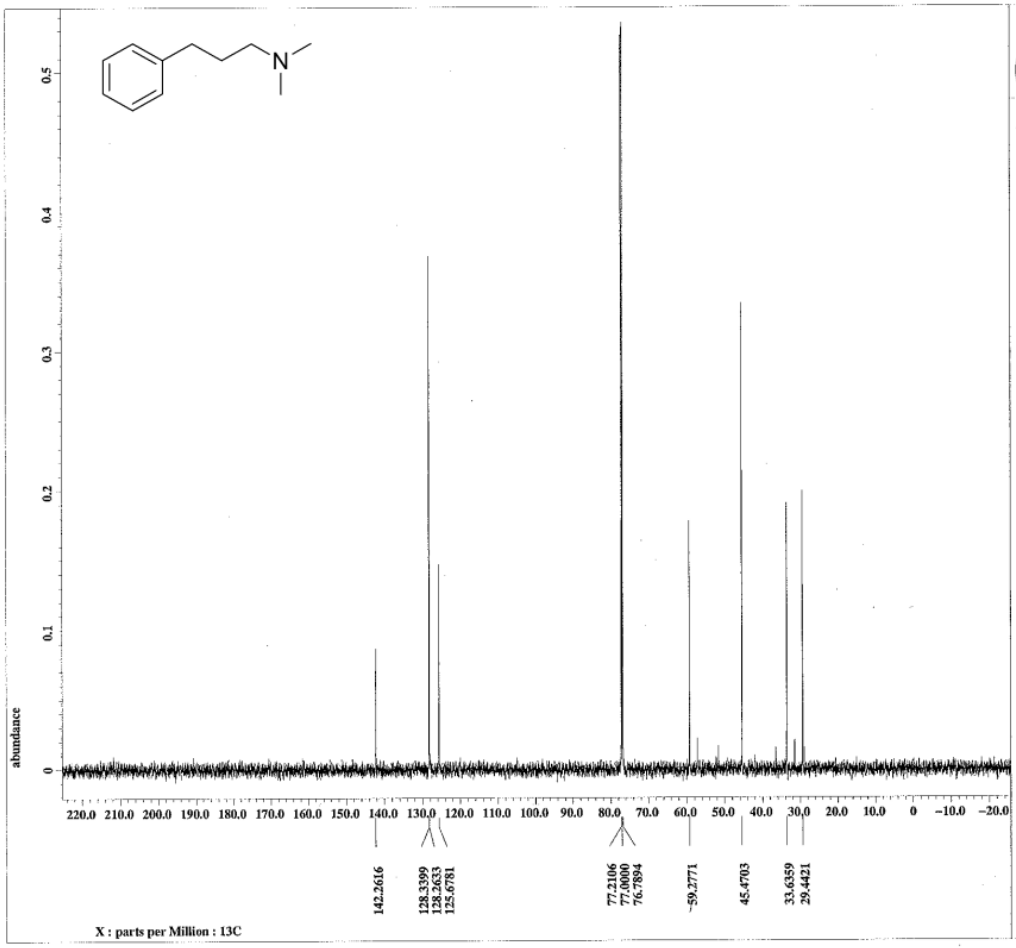
JEOL

```
Filename          = Exp-24-C-amide-amine-
Author            = delta
Experiment        = single_pulse.ex2
Sample_id         = Exp-24-C-amide-amine-
Solvent           = CHLOROFORM-D
Creation_time     = 30-MAR-2017 15:51:47
Revision_time     = 30-MAR-2017 16:54:26
Current_time      = 30-MAR-2017 16:54:30

Content           = Exp-24-C-amide-amine-
Data_format       = 1D COMPLEX
Dim_size          = 13107
Dim_title         = 1H
Dim_units         = [ppm]
Dimensions        = X
Site              = ECA 600
Spectrometer      = DELTA2_NMR

Field_strength    = 14.09636928[T] (600[M
X_acq_duration    = 1.4548992[s]
X_domain          = 1H
X_freq            = 600.1723046[MHz]
X_offset          = 5[ppm]
X_points          = 16384
X_prescans        = 1
X_resolution      = 0.68733284[Hz]
X_sweep           = 11.26126126[kHz]
Irr_domain        = 1H
Irr_freq          = 600.1723046[MHz]
Irr_offset        = 5[ppm]
Tri_domain        = 1H
Tri_freq          = 600.1723046[MHz]
Tri_offset        = 5[ppm]
Clipped           = FALSE
Mod_return        = 1
Scans             = 8
Total_scans       = 8

X_90_width        = 12.6[us]
X_acq_time        = 1.4548992[s]
X_angle           = 45[deg]
X_atn             = 3.6[dB]
X_pulse           = 6.3[us]
Irr_mode          = Off
Tri_mode          = Off
Dante_presat      = FALSE
Initial_wait      = 1[s]
Recvr_gain        = 40
Relaxation_delay  = 5[s]
Repetition_time   = 6.4548992[s]
Temp_get          = 24.6[dC]
```



JEOL

```
Filename          = Exp-24-C-amide-amine-
Author            = delta
Experiment        = single_pulse_dec
Sample_id         = Exp-24-C-amide-amine-
Solvent           = CHLOROFORM-D
Creation_time     = 30-MAR-2017 15:57:32
Revision_time     = 30-MAR-2017 17:00:12
Current_time      = 30-MAR-2017 17:00:19

Content           = Exp-24-C-amide-amine-
Data_format       = 1D COMPLEX
Dim_size          = 26214
Dim_title         = 13C
Dim_units         = [ppm]
Dimensions        = X
Site              = ECA 600
Spectrometer      = DELTA2_NMR

Field_strength    = 14.09636928[T] (600[M
X_acq_duration    = 0.69206016[s]
X_domain          = 13C
X_freq            = 150.91343039[MHz]
X_offset          = 100[ppm]
X_points          = 32768
X_prescans        = 4
X_resolution      = 1.44496109[Hz]
X_sweep           = 47.34848485[kHz]
Irr_domain        = 1H
Irr_freq          = 600.1723046[MHz]
Irr_offset        = 5[ppm]
Clipped           = TRUE
Mod_return        = 1
Scans             = 97
Total_scans       = 97

X_90_width        = 10.9[us]
X_acq_time        = 0.69206016[s]
X_angle           = 30[deg]
X_atn             = 7.5[dB]
X_pulse           = 3.63333333[us]
Irr_atn_dec       = 19.21[dB]
Irr_atn_noe       = 19.21[dB]
Irr_noise         = WALTZ
Decoupling        = TRUE
Initial_wait      = 1[s]
Noe               = TRUE
Noe_time          = 2.5[s]
Recvr_gain        = 50
Relaxation_delay  = 2.5[s]
Repetition_time   = 3.19206016[s]
Temp_get          = 25.1[dC]
```

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