

Supporting Information

**Chiral Binaphthyl-Derived Amine-Thiourea Organocatalyst Promoted
Asymmetric Morita-Baylis-Hillman Reaction**

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General. Commercial reagents were used as received, unless otherwise stated. Merck 60 silica gel was used for chromatography, and Whatman silica gel plates with fluorescence F254 were used for thin-layer chromatography (TLC) analysis. ^1H and ^{13}C NMR spectra were recorded on Bruker Advance 500, and tetramethylsilane (TMS) was used as a reference. Data for ^1H are reported as follows: chemical shift (ppm), and multiplicity (s = singlet, d = doublet, t = triplet, q = quartet, m = multiplet). High resolution mass spectra (HRMS) are obtained from Department of Chemistry, Ohio State University MS facility.

Procedures for preparation of binaphthyl-based thiourea catalyst II.

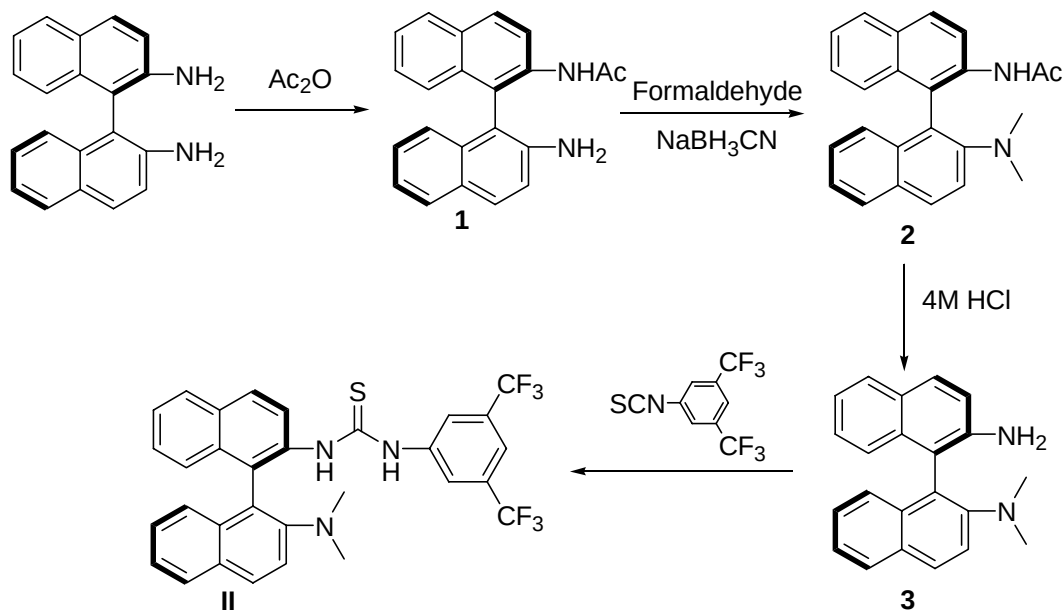
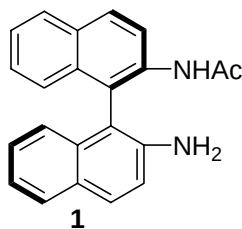
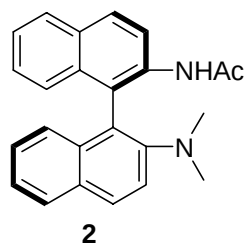


Figure. Synthesis of binaphthal-based thiourea catalyst II.

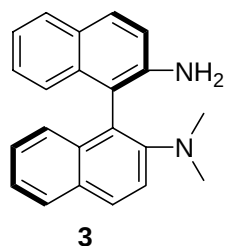


(R)-N-(1-(2-Aminonaphthalen-1-yl)naphthalen-2-yl)acetamide (1).¹ To a solution of (R)-(+)-1,1'-Binaphthyl-2,2'-diamine (284 mg, 1.0 mmol) and AcOH (0.6 mL, 10 mmol) in 10 mL of dried CH_2Cl_2 was added acetic anhydride (104 μL , 1.0 mmol) at 0 $^\circ\text{C}$ under N_2 . The resulting solution was stirred for overnight at room temperature, then 2N NaOH aqueous solution was added until pH $\approx$ 7. The reaction mixture was extracted by CH_2Cl_2 (3 $\times$ 50 mL) and the combined organic phases were washed with saturated brine and dried over MgSO_4 . The solvent was removed under reduced pressure and the crude product was purified by flash chromatography (ethyl acetate/hexane = 2/1) to afford a colorless oil in 77% yield (0.25 g, 0.77 mmol).

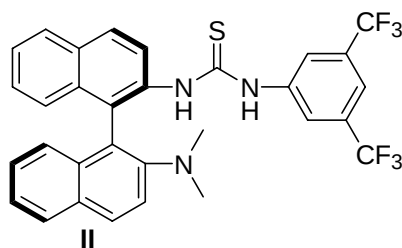


(R)-N-(1-(2-(Dimethylamino)naphthalen-1-yl)naphthalen-2-yl)acetamide (2).²

N-(1-(2-aminonaphthalen-1-yl)naphthalen-2-yl)acetamide **1** (0.25 g, 0.77 mmol) and aqueous formaldehyde (37%, 0.75 mL, 9.0 mmol) were combined in 10 mL of THF and stirred for 15 min. NaBH₃CN (200 mg, 5.3 mmol) was added, followed 15 min later by AcOH (1.0 mL). The resulting solution was stirred for 4 h at room temperature, then 1N NaOH aqueous solution was added until pH $\approx$ 7. The reaction mixture was extracted by CH₂Cl₂ (3 $\times$ 50 mL) and the combined organic phases were washed with saturated brine and dried over MgSO₄. The solvent was removed under reduced pressure and the crude product was purified by flash chromatography (ethyl acetate/hexane = 1/5) to afford a brown powder in quantitative yield (272 mg, 0.77 mmol).



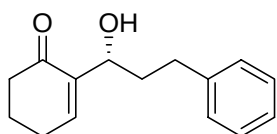
(R)-1-(2-(Dimethylamino)naphthalen-1-yl)naphthalen-2-amine (3).² To a solution of *N*-(1-(2-(dimethylamino)naphthalen-1-yl)naphthalen-2-yl)acetamide **2** (0.18 g, 0.51 mmol) in 15 mL of EtOH was added 4M HCl (6 mL). The resulting solution was stirred for overnight at room temperature, then 1N NaOH aqueous solution was added until pH $\approx$ 7. The reaction mixture was extracted by CH₂Cl₂ (3 $\times$ 50 mL) and the combined organic phases were washed with saturated brine and dried over MgSO₄. The solvent was removed under reduced pressure and the crude product was purified by flash chromatography (ethyl acetate/hexane = 1/10) to afford a colorless oil in 93% yield (148 mg, 0.47 mmol).



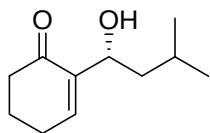
(R)-1-(3,5-Bis(trifluoromethyl)phenyl)-3-(1-(2-(dimethylamino)naphthalen-1-yl)naphthalen-2-yl)thiourea (II). To a solution of 1-(2-(dimethylamino)naphthalen-1-yl)naphthalen-2-amine **3** (36 mg, 0.12 mmol) in 2 mL of dried CH₂Cl₂ was added 3,5-bis(trifluoromethyl)phenyl isothiocyanate (22 mg, 0.132 mmol) at 0 °C under N₂. The resulting solution was stirred for overnight at room temperature. The reaction was concentrated *in vacuo* and the residue was purified by flash chromatography (ethyl acetate/hexane = 1/10) to afford a slight yellow solid in 91% yield (64 mg, 0.11 mmol). $[\alpha]_D^{25} = -8.3$ ($c = 0.5$ in CHCl₃); ¹H NMR (500 MHz, CDCl₃, TMS): δ = 8.37 (s, 1H), 8.06 (d, 1H, $J = 8.5$ Hz), 7.98

(d, 2H, $J = 9.0$ Hz), 7.82 (d, 1H, $J = 8.0$ Hz), 7.71 (d, 1H, $J = 8.5$ Hz), 7.56-7.50 (m, 5H), 7.41 (s, 1H), 7.36 (s, 2H), 7.26 (m, 2H), 7.09 (t, 1H, $J = 7.5$ Hz), 6.90 (d, 1H, $J = 7.5$ Hz), 2.59 (s, 6H); ^{13}C NMR (125 MHz, CDCl_3 , TMS): $\delta = 179.7, 149.9, 139.6, 134.0, 133.3, 133.2, 132.9, 132.0, 131.8, 131.6, 130.5, 130.0, 129.9, 128.5, 128.4, 127.5, 127.2, 126.8, 125.0, 124.6, 124.2, 123.9, 122.9, 121.8, 118.9, 44.0$. HRMS (EI) calcd for $\text{C}_{31}\text{H}_{23}\text{N}_3\text{SF}_6 + \text{Na}$ 606.1409, obsd 606.1415.

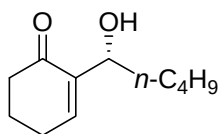
General Procedure for Baylis-Hillman Reaction (Table 2): The catalyst amino-thiourea **IV** (10 mg, 0.019 mmol) was added to a vial containing 2-cyclohexen-1-one **1a** (36 μL , 0.374 mmol) in CH_3CN (1 mL) at 0 °C. The mixture was stirred vigorously for 10 min, and then aldehyde **2** (27 μL , 0.187 mmol) was added. After 48-120 h stirring, the reaction mixture was concentrated *in vacuo*. The residue was then purified by flash silica gel chromatography, eluting with EtOAc/hexane (1:10 to 1:2) to afford a clear oil.



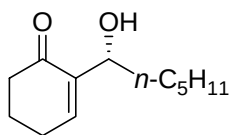
2-((R)-1-Hydroxy-3-phenylpropyl)cyclohex-2-enone³ (Table 2, entry 1): The reaction was carried out following the general procedure to provide a clear oil (35 mg, 80%). $[\alpha]_{\text{D}}^{25} = -49.4$ ($c = 0.5$, CHCl_3); HPLC (Daicel CHIRALCEL OD-H, Hexane/2-PrOH = 90:10, flow rate 1.0 mL/min, $\lambda = 254$ nm); $t_{\text{R}} = 12.62$ (minor), 9.62 (major) min.



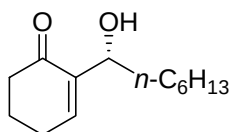
2-((R)-1-Hydroxy-3-methylbutyl)cyclohex-2-enone³ (Table 2, entry 2): The reaction was carried out following the general procedure to provide a clear oil (25 mg, 72%). $[\alpha]_{\text{D}}^{25} = -25.0$ ($c = 0.2$, CHCl_3); HPLC (Daicel CHIRALPAK AS-H, Hexane/2-PrOH = 90:10, flow rate 1.0 mL/min, $\lambda = 254$ nm); $t_{\text{R}} = 6.92$ (minor), 8.96 (major) min.



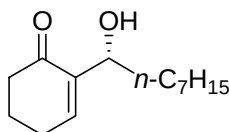
2-((R)-1-Hydroxypentyl)cyclohex-2-enone (Table 2, entry 3): The reaction was carried out following the general procedure to provide a clear oil (31 mg, 84%). ^1H NMR (500 MHz, CDCl_3): δ 6.87 (t, 1H, $J = 4.0$ Hz), 4.28 (brs, 1H), 2.90 (brs, 1H), 2.50-2.38 (m, 4H), 2.05-1.95 (m, 2H), 1.70-1.56 (m, 2H), 1.45-1.22 (m, 4H), 0.91 (t, 3H, $J = 6.5$ Hz); ^{13}C NMR (125 MHz, CDCl_3): δ 200.7, 145.8, 140.9, 71.8, 38.7, 35.9, 28.2, 25.7, 22.6, 22.5, 14.0; $[\alpha]_{\text{D}}^{25} = -28.4$ ($c = 0.4$, CHCl_3); HPLC (Daicel CHIRALPAK AS-H, Hexane/2-PrOH = 90:10, flow rate 1.0 mL/min, $\lambda = 254$ nm); $t_{\text{R}} = 7.77$ (minor), 11.25 (major) min. HRMS (EI) calcd for $[\text{C}_{11}\text{H}_{18}\text{O}_2 + \text{Na}]$ 205.1199, obsd 205.1206.



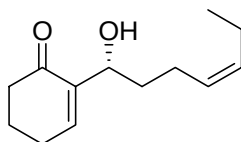
2-((R)-1-Hydroxyhexyl)cyclohex-2-enone (Table 2, entry 4): The reaction was carried out following the general procedure to provide a clear oil (25 mg, 75%). ^1H NMR (500 MHz, CDCl_3): δ 6.87 (t, 1H, J = 4.0 Hz), 4.29 (brs, 1H), 2.90 (brs, 1H), 2.49-2.38 (m, 4H), 2.04-1.95 (m, 2H), 1.70-1.56 (m, 2H), 1.48-1.36 (m, 1H), 1.35-1.23 (m, 5H), 0.88 (t, 3H, J = 6.0 Hz); ^{13}C NMR (125 MHz, CDCl_3): δ 200.7, 145.8, 140.9, 71.8, 38.7, 36.2, 31.6, 25.7, 25.6, 22.6, 14.0; $[\alpha]^{25}_{\text{D}} = -44.0$ (c = 0.5, CHCl_3); HPLC (Daicel CHIRALPAK AS-H, Hexane/2-PrOH = 90:10, flow rate 1.0 ml/ min, λ = 254 nm); t_{R} = 7.42 (minor), 10.10 (major) min. HRMS (EI) calcd for $[\text{C}_{12}\text{H}_{20}\text{O}_2 + \text{Na}]$ 219.1355, obsd 219.1353.



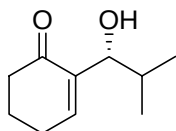
2-((R)-1-Hydroxyheptyl)cyclohex-2-enone (Table 2, entry 5): The reaction was carried out following the general procedure to provide a clear oil (28 mg, 71%). ^1H NMR (500 MHz, CDCl_3): δ 6.87 (t, 1H, J = 4.0 Hz), 4.28 (dd, 1H, J = 13.0 Hz, 6.0 Hz), 2.88 (d, 1H, 7.0 Hz), 2.48-2.38 (m, 4H), 2.04-1.95 (m, 2H), 1.70-1.56 (m, 2H), 1.45-1.36 (m, 1H), 1.35-1.23 (m, 7H), 0.88 (t, 3H, J = 7.0 Hz); ^{13}C NMR (125 MHz, CDCl_3): δ 200.7, 145.8, 140.9, 71.9, 38.7, 36.2, 31.8, 29.1, 26.0, 25.7, 25.6, 14.1; $[\alpha]^{25}_{\text{D}} = -33.0$ (c = 0.1, CHCl_3); HPLC (Daicel CHIRALPAK AS-H, Hexane/2-PrOH = 90:10, flow rate 1.0 ml/ min, λ = 254 nm); t_{R} = 6.71 (minor), 8.79 (major) min. HRMS (EI) calcd for $[\text{C}_{13}\text{H}_{22}\text{O}_2 + \text{Na}]$ 233.1512, obsd 233.1515.



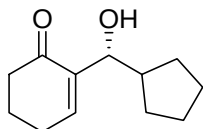
2-((R)-1-Hydroxyoctyl)cyclohex-2-enone (Table 2, entry 6): The reaction was carried out following the general procedure to provide a clear oil (31 mg, 74%). ^1H NMR (500 MHz, CDCl_3): δ 6.87 (t, 1H, J = 4.0 Hz), 4.28 (dd, 1H, J = 12.0 Hz, 6.0 Hz), 2.89 (d, 1H, 6.5 Hz), 2.47-2.38 (m, 4H), 2.04-1.95 (m, 2H), 1.70-1.56 (m, 2H), 1.45-1.36 (m, 1H), 1.35-1.23 (m, 9H), 0.88 (t, 3H, J = 6.5 Hz); ^{13}C NMR (125 MHz, CDCl_3): δ 200.7, 145.8, 140.9, 71.8, 38.7, 36.2, 31.8, 29.4, 29.2, 26.0, 25.7, 22.6, 22.5, 14.1; $[\alpha]^{25}_{\text{D}} = -28.2$ (c = 0.5, CHCl_3); HPLC (Daicel CHIRALPAK AS-H, Hexane/2-PrOH = 90:10, flow rate 1.0 ml/ min, λ = 254 nm); t_{R} = 6.24 (minor), 8.13 (major) min. HRMS (EI) calcd for $[\text{C}_{14}\text{H}_{24}\text{O}_2 + \text{Na}]$ 247.1668, obsd 247.1674.



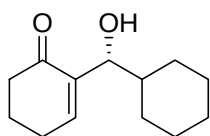
2-((R,Z)-1-Hydroxyhept-4-enyl)cyclohex-2-enone³ (Table 2, entry 7): The reaction was carried out following the general procedure to provide a clear oil (32 mg, 82%). $[\alpha]^{25}_{\text{D}} = -26.5$ (c = 0.4, CHCl_3); HPLC (Daicel CHIRALPAK AS-H, Hexane/2-PrOH = 90:10, flow rate 1.0 ml/ min, λ = 254 nm); t_{R} = 7.72 (minor), 10.67 (major) min.



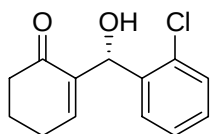
2-((R)-1-Hydroxy-2-methylpropyl)cyclohex-2-enone³ (Table 2, entry 8): The reaction was carried out following the general procedure to provide a clear oil (20 mg, 63%). $[\alpha]_D^{25} = -48.0$ ($c = 0.1$, CHCl_3); HPLC (Daicel CHIRALPAK AS-H, Hexane/2-PrOH = 90:10, flow rate 1.0 ml/min, $\lambda = 254$ nm); $t_R = 9.11$ (minor), 15.11 (major) min.



2-((R)-Cyclopentyl(hydroxy)methyl)cyclohex-2-enone⁴ (Table 2, entry 9): The reaction was carried out following the general procedure to provide a clear oil (26 mg, 76%). $[\alpha]_D^{25} = -57.0$ ($c = 0.7$, CHCl_3); HPLC (Daicel CHIRALPAK AS-H, Hexane/2-PrOH = 90:10, flow rate 1.0 ml/min, $\lambda = 254$ nm); $t_R = 10.01$ (minor), 15.45 (major) min.



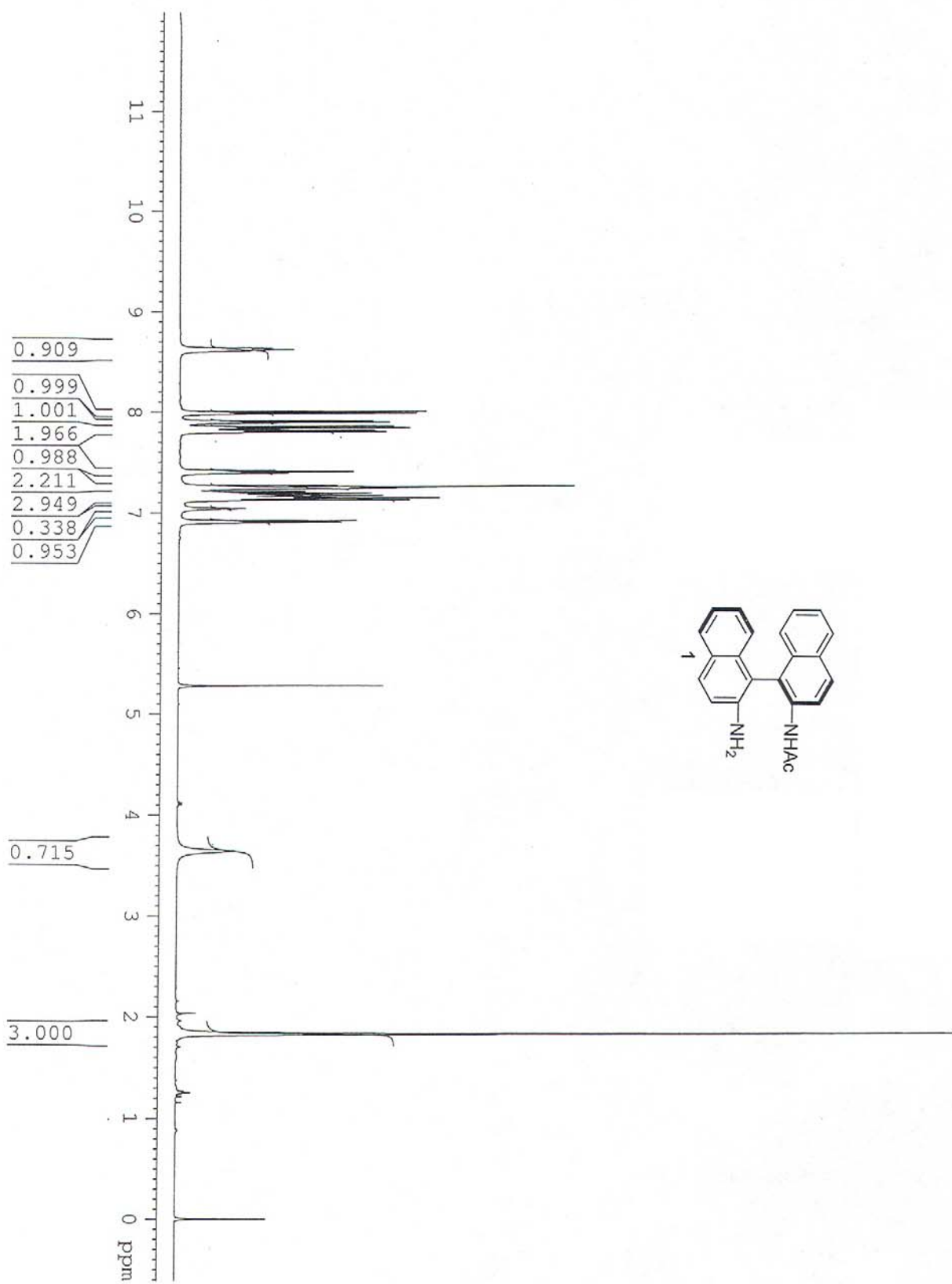
2-((R)-Cyclohexyl(hydroxy)methyl)cyclohex-2-enone³ (Table 2, entry 10): The reaction was carried out following the general procedure to provide a clear oil (26 mg, 67%). $[\alpha]_D^{25} = -73.7$ ($c = 0.3$, CHCl_3); HPLC (Daicel CHIRALPAK AS-H, Hexane/2-PrOH = 90:10, flow rate 1.0 ml/min, $\lambda = 254$ nm); $t_R = 10.35$ (minor), 14.07 (major) min.

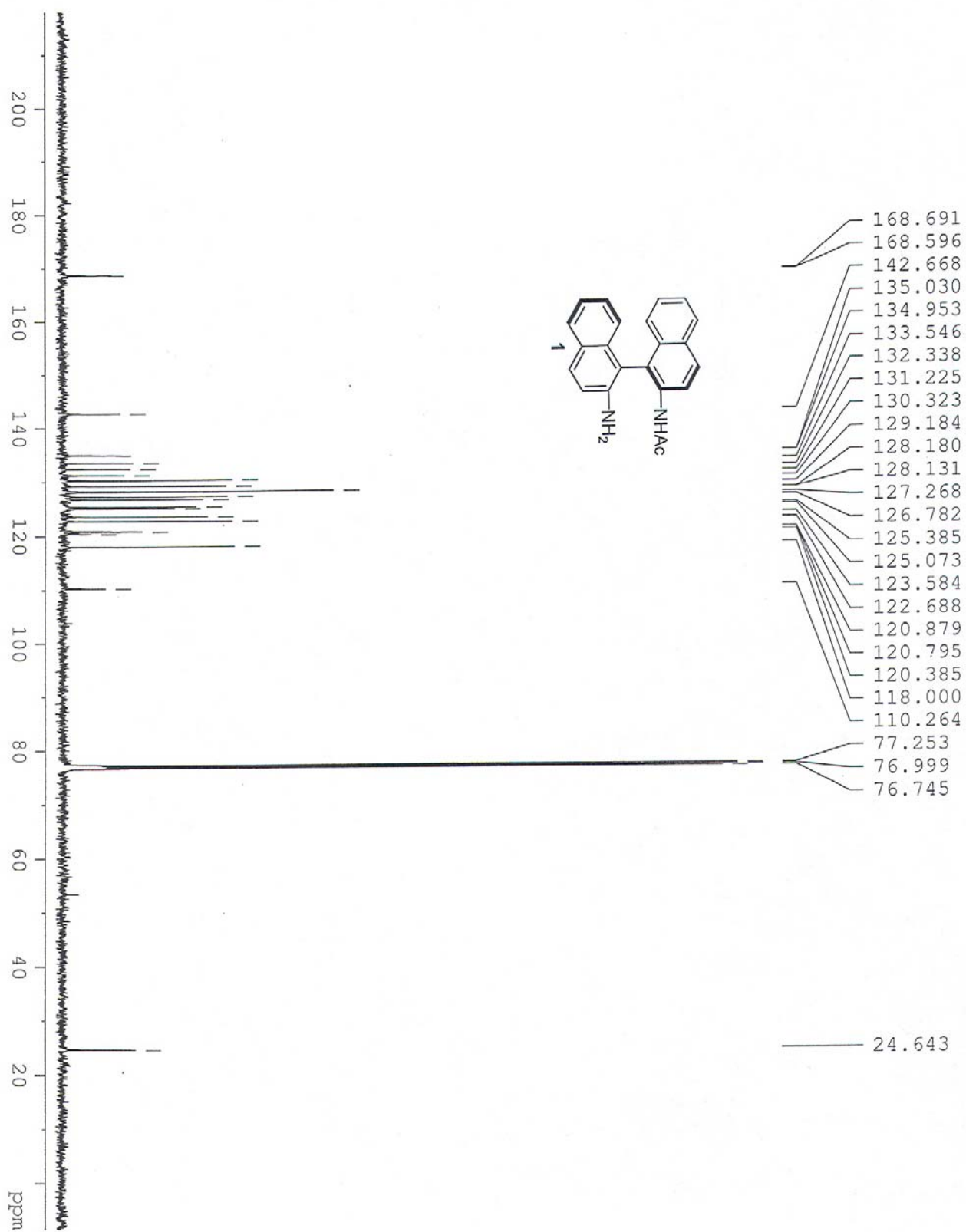


2-((S)-(2-chlorophenyl)(hydroxy)methyl)cyclohex-2-enone (Table 2, entry 11): The reaction was carried out following the general procedure to provide a clear oil (24 mg, 55%). ^1H NMR (500 MHz, CDCl_3): δ 7.33-7.27 (m, 4H), 6.74 (t, 1H, $J = 4.0$ Hz), 5.51 (bs, 1H), 2.48-2.37 (m, 4H), 2.03-1.96 (m, 2H); ^{13}C NMR (125 MHz, CDCl_3): δ 200.8, 147.9, 139.3, 138.4, 132.4, 129.3, 128.7, 128.2, 127.0, 68.8, 38.5, 25.8, 24.5; $[\alpha]_D^{25} = -8.5^\circ$ ($c = 0.3$, CHCl_3); HPLC (Daicel CHIRALPAK AS-H, Hexane/2-PrOH = 85:15, flow rate 1.0 ml/min, $\lambda = 254$ nm); $t_R = 9.91$ (minor), 14.98 (major) min. HRMS (EI) calcd for $[\text{C}_{13}\text{H}_{13}\text{O}_2\text{Cl} + \text{Na}]$ 259.0496, obsd 259.0491.

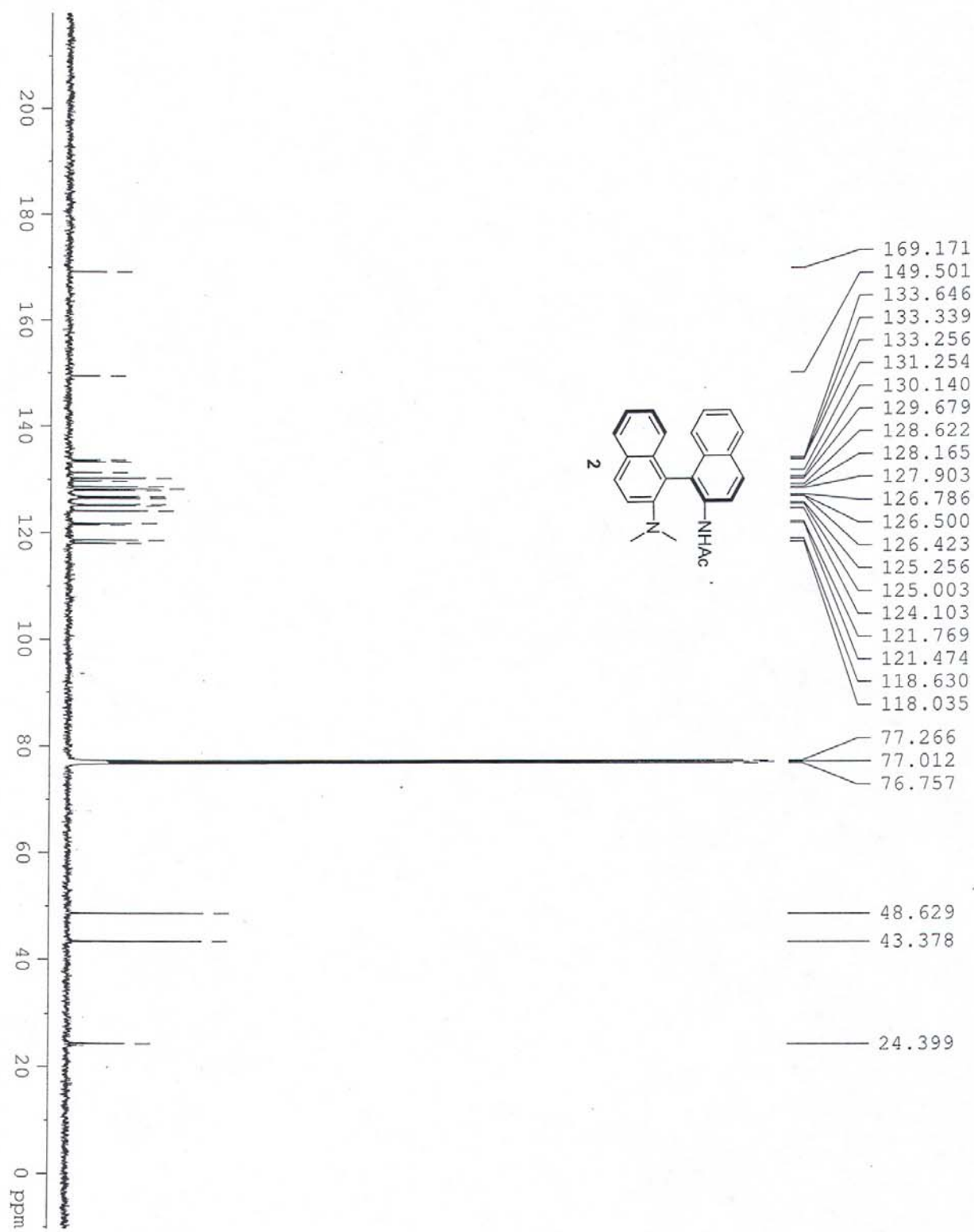
Reference:

- (1) Pieraccini, S.; Gottarelli, G.; Labruto, R.; Masiero, S.; Pandoli, O.; Spada, G. P. *Chem. Eur. J.* **2004**, *10*, 5632-5639.
- (2) Wang, C. -J.; Shi, M. *J. Org. Chem.* **2003**, *68*, 6229-6234.
- (3) McDougal, N. T.; Schaus, S. E. *J. Am. Chem. Soc.* **2005**, *125*, 12094-12095.
- (4) Yoshihiro, S.; Aya, T.; Yuichi, H.; Kazuo, N. *Tetrahedron Lett.* **2004**, *45*, 5589-5592.

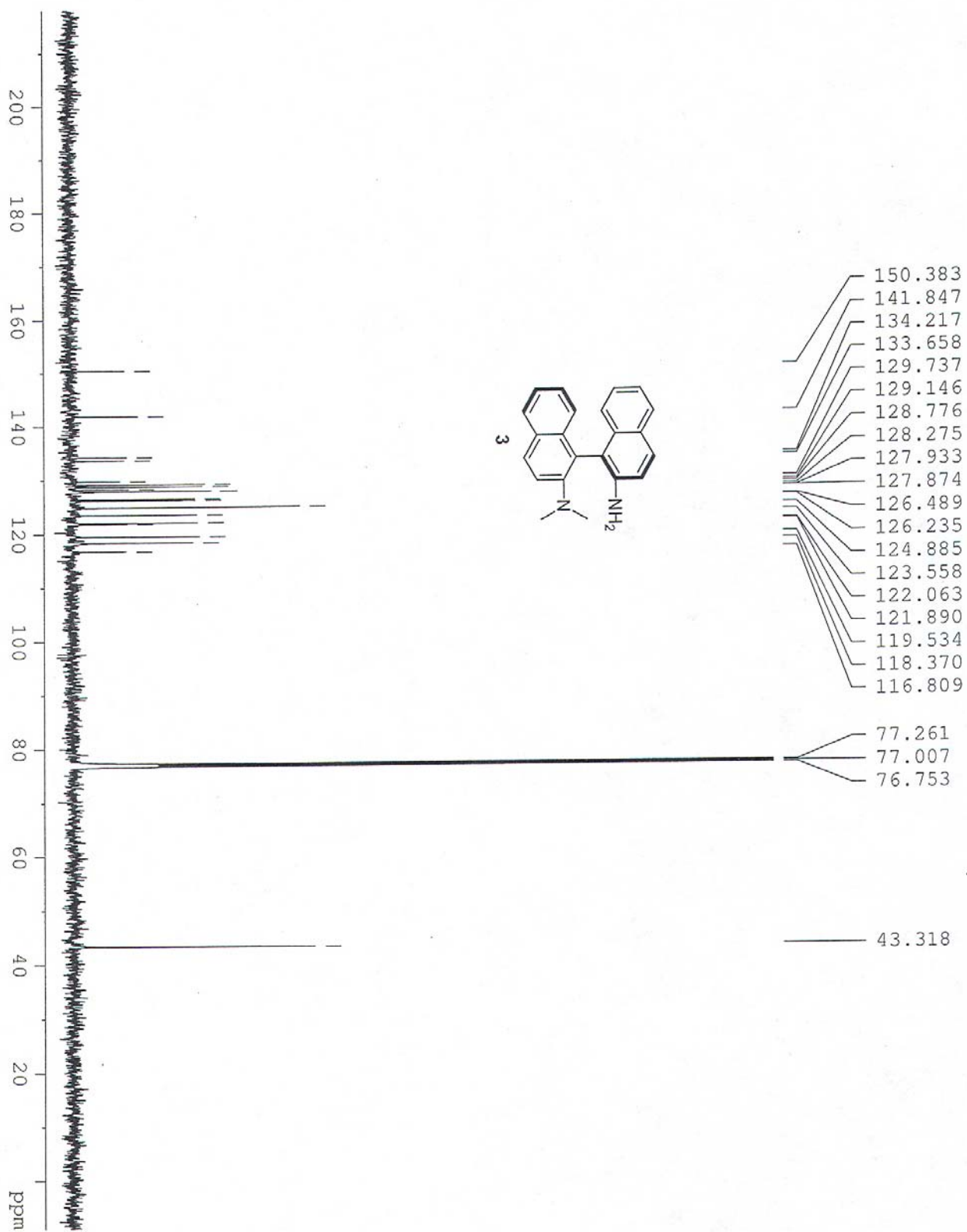


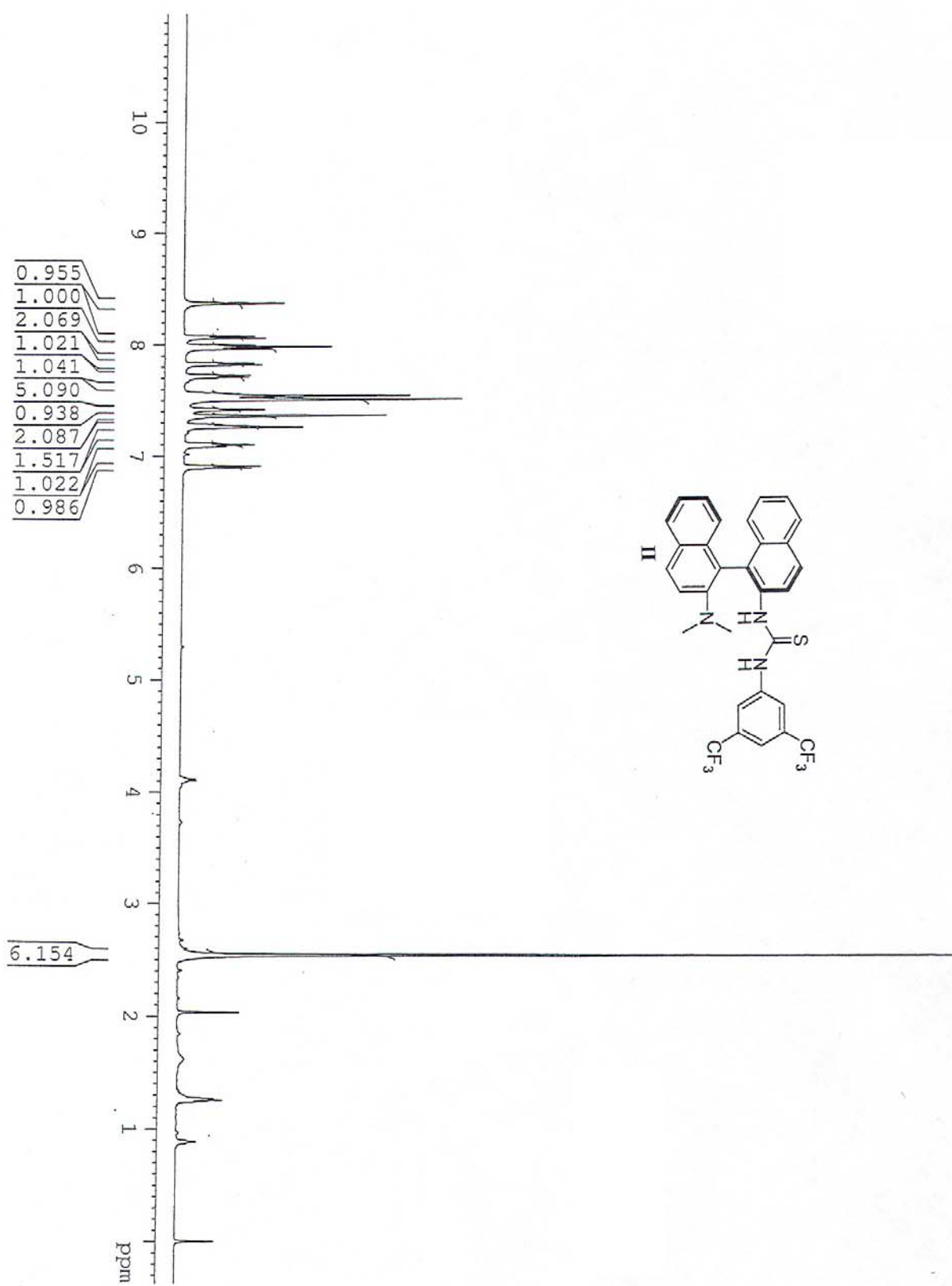


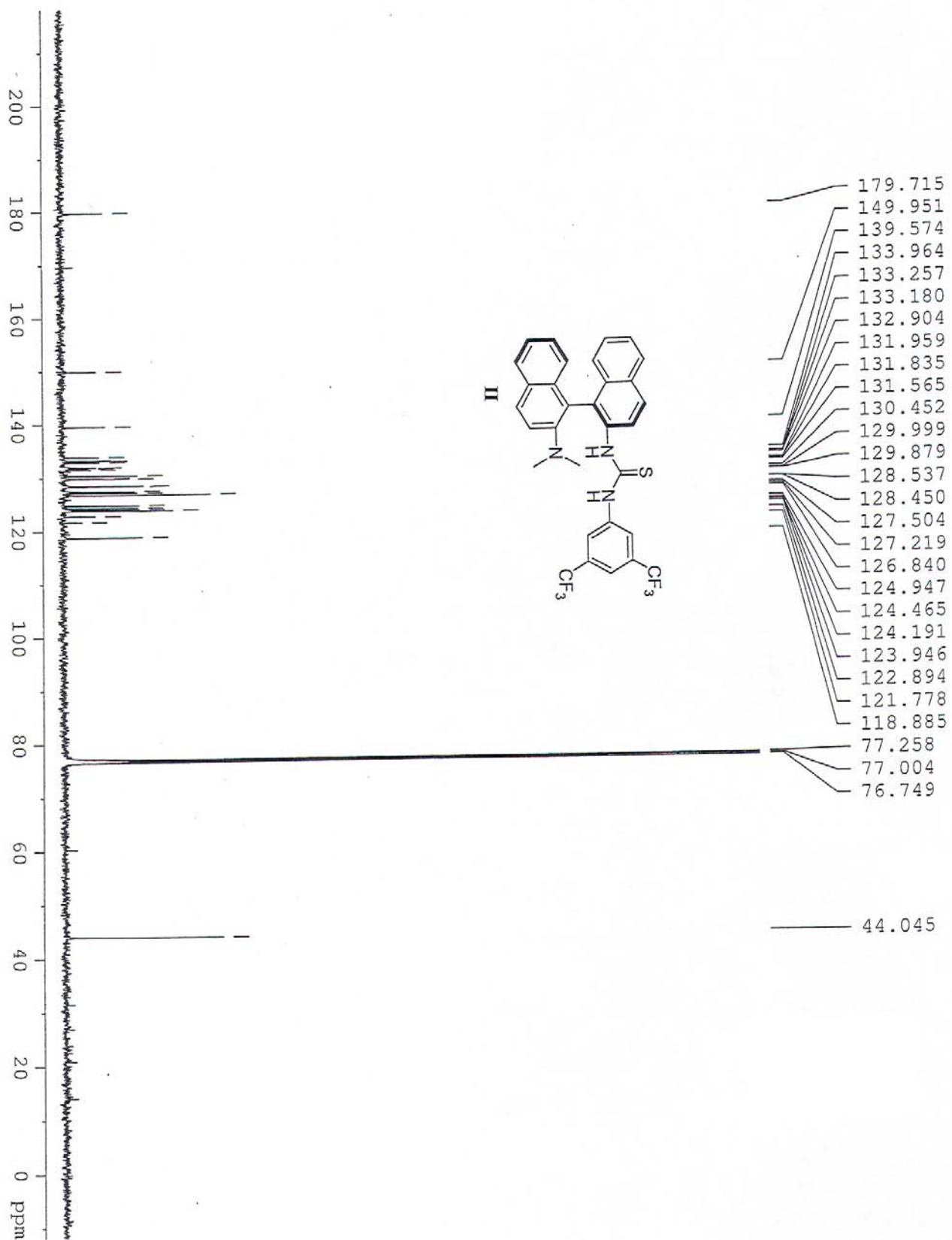


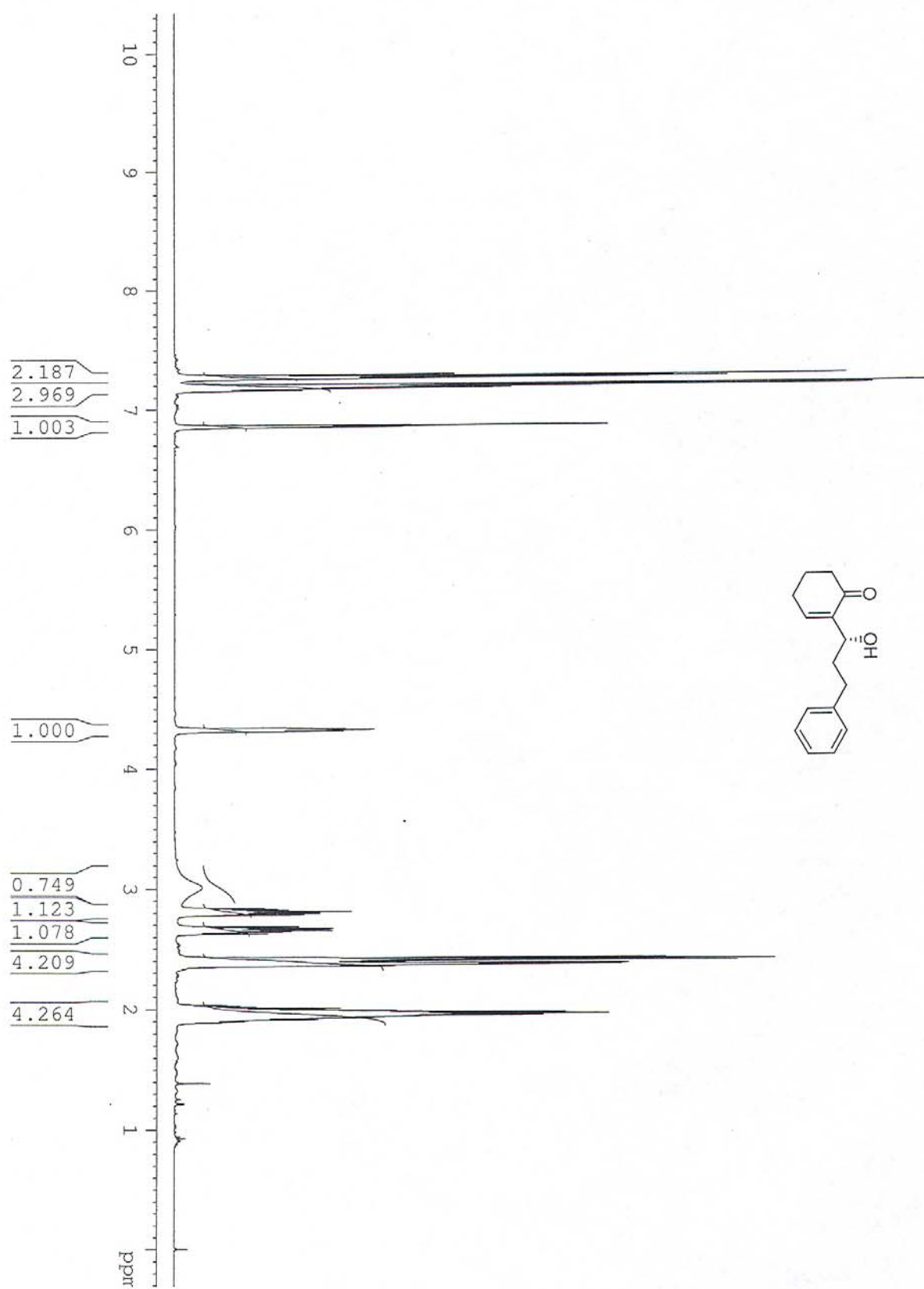


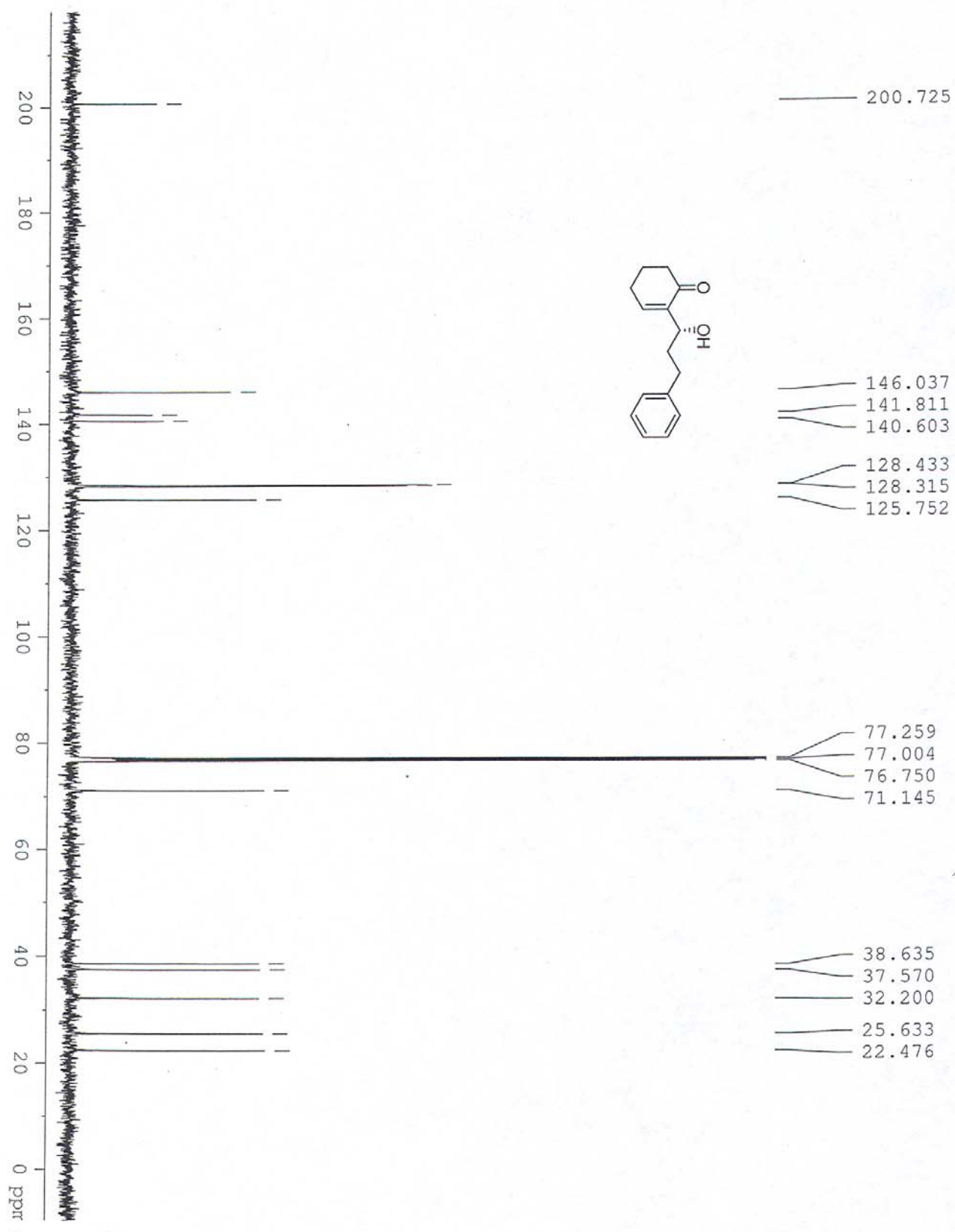


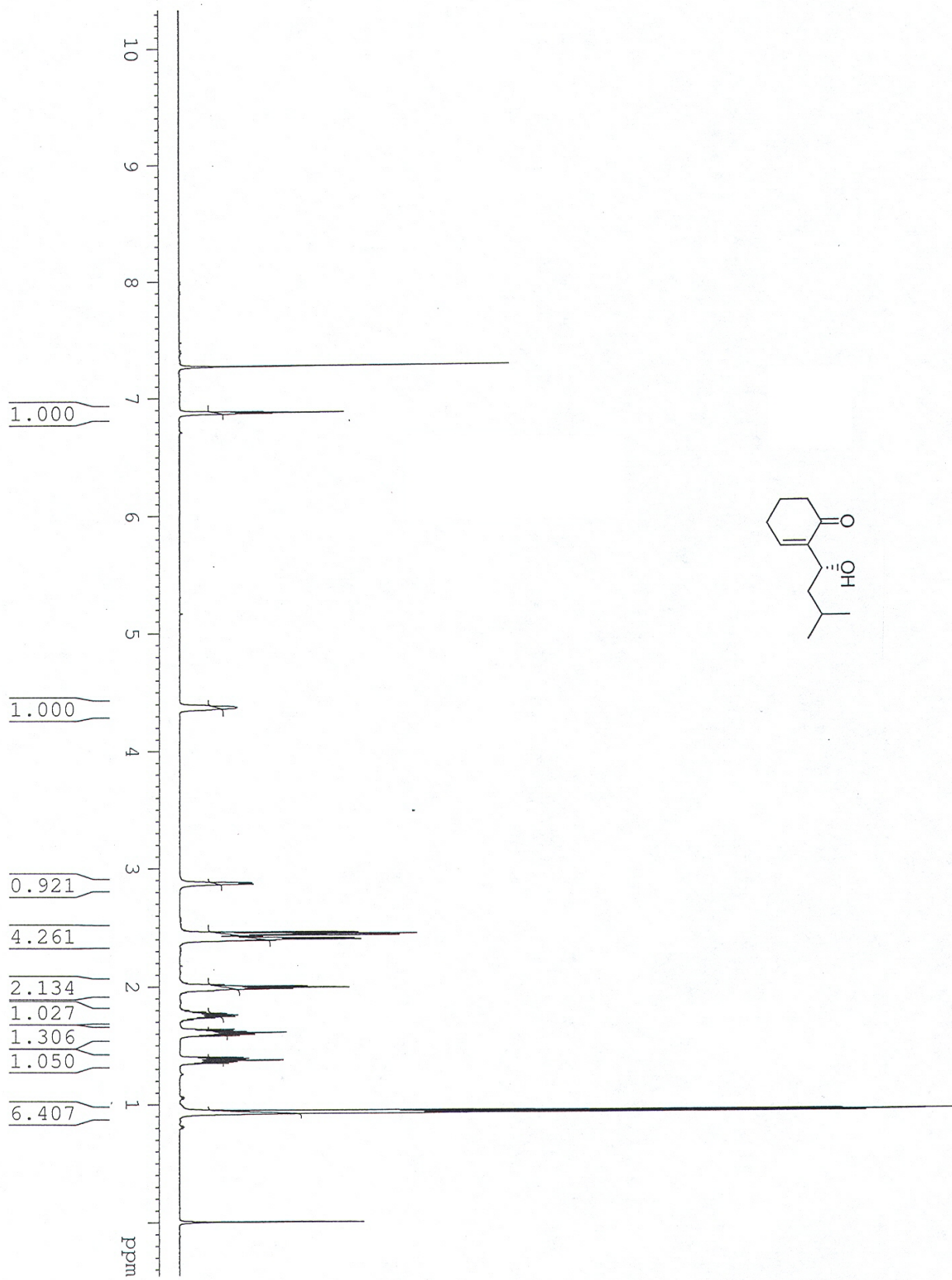


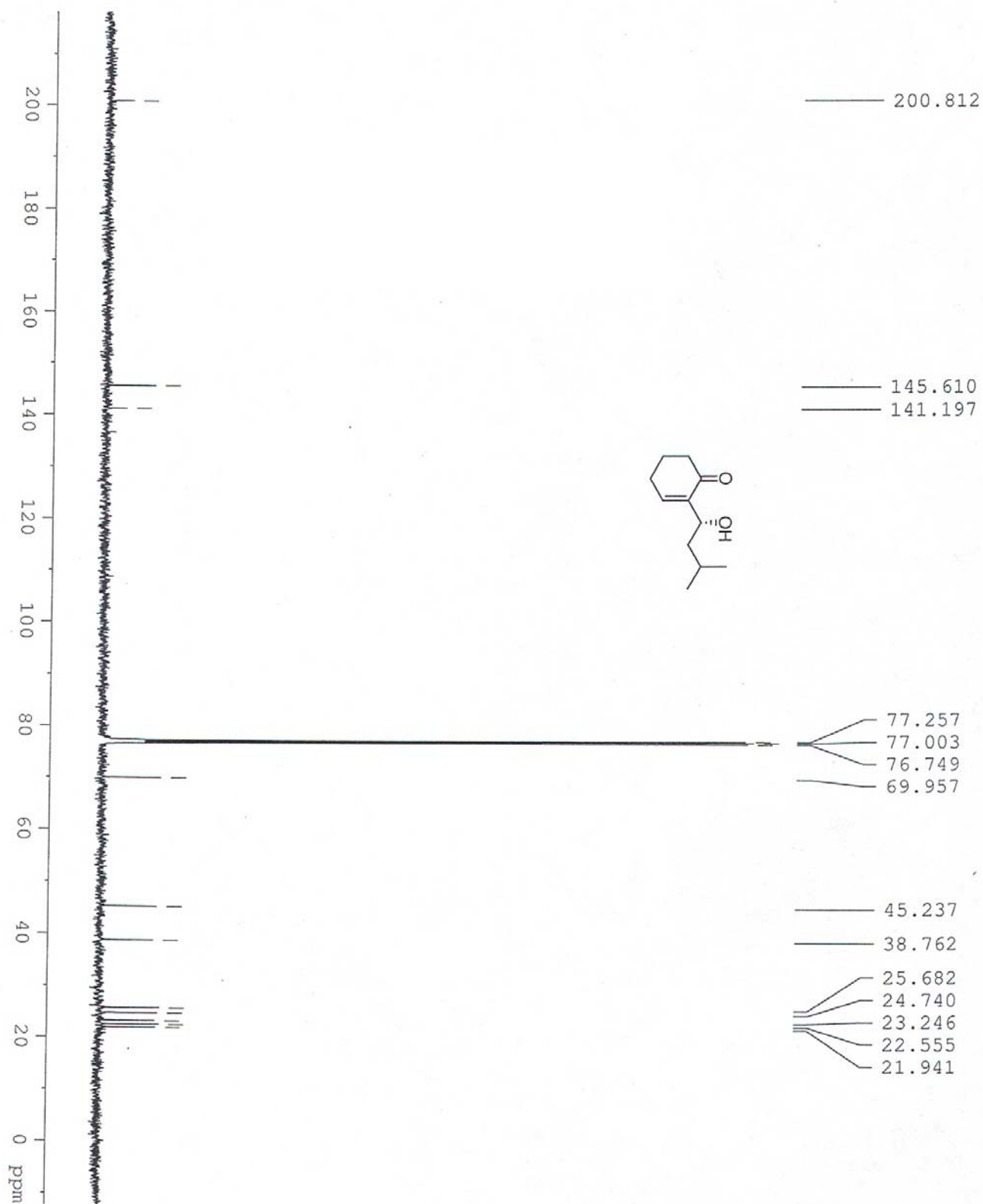


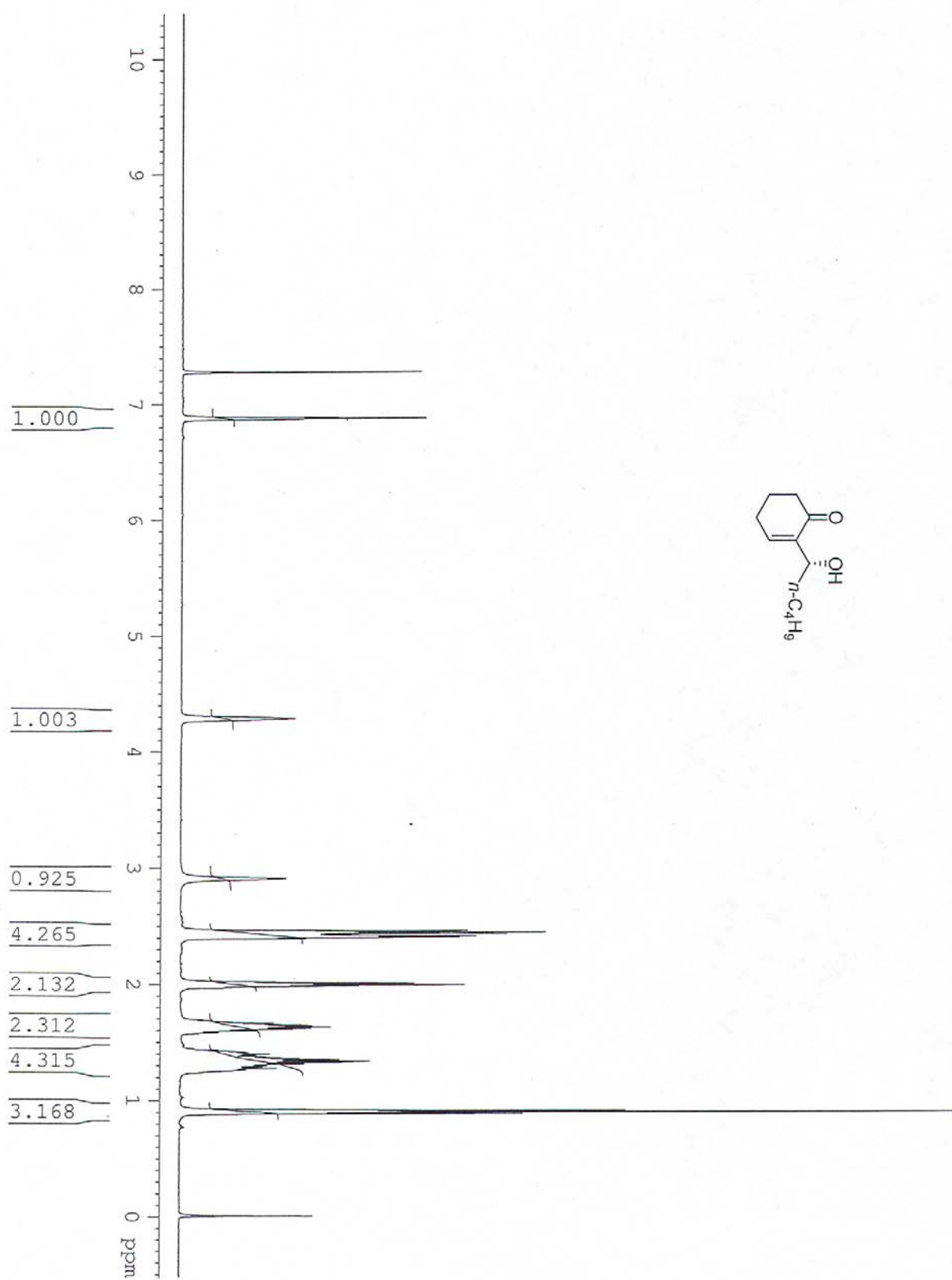


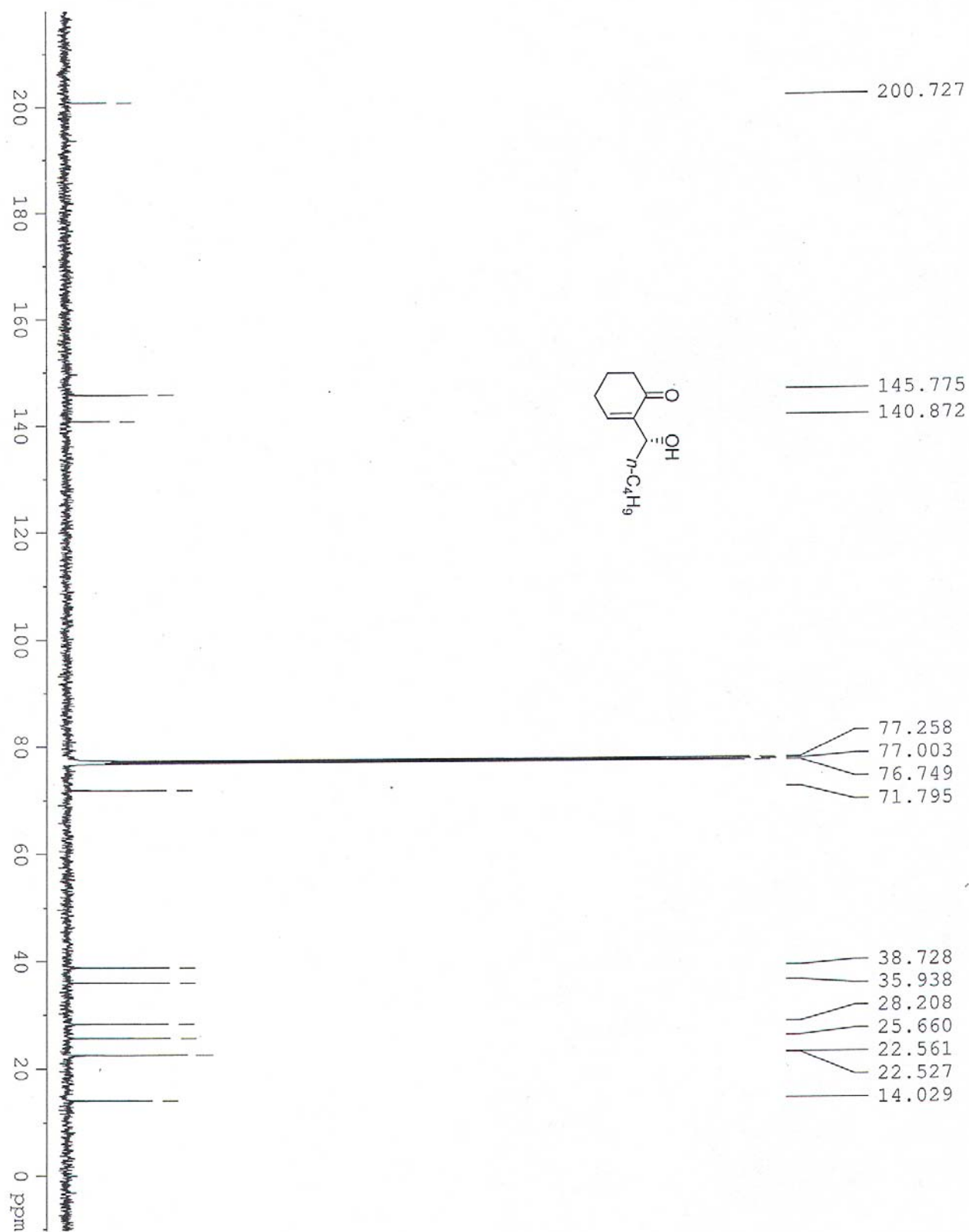


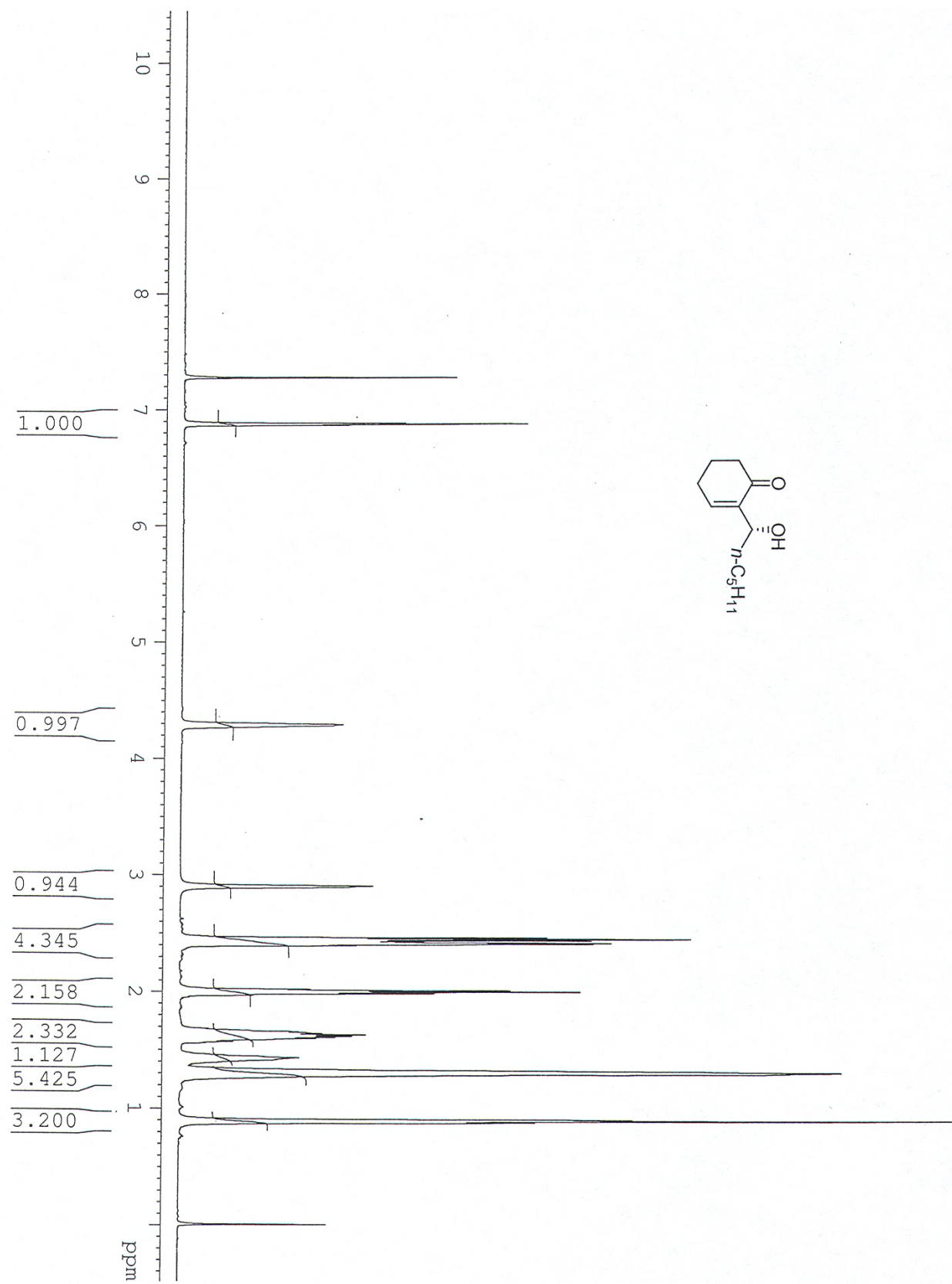


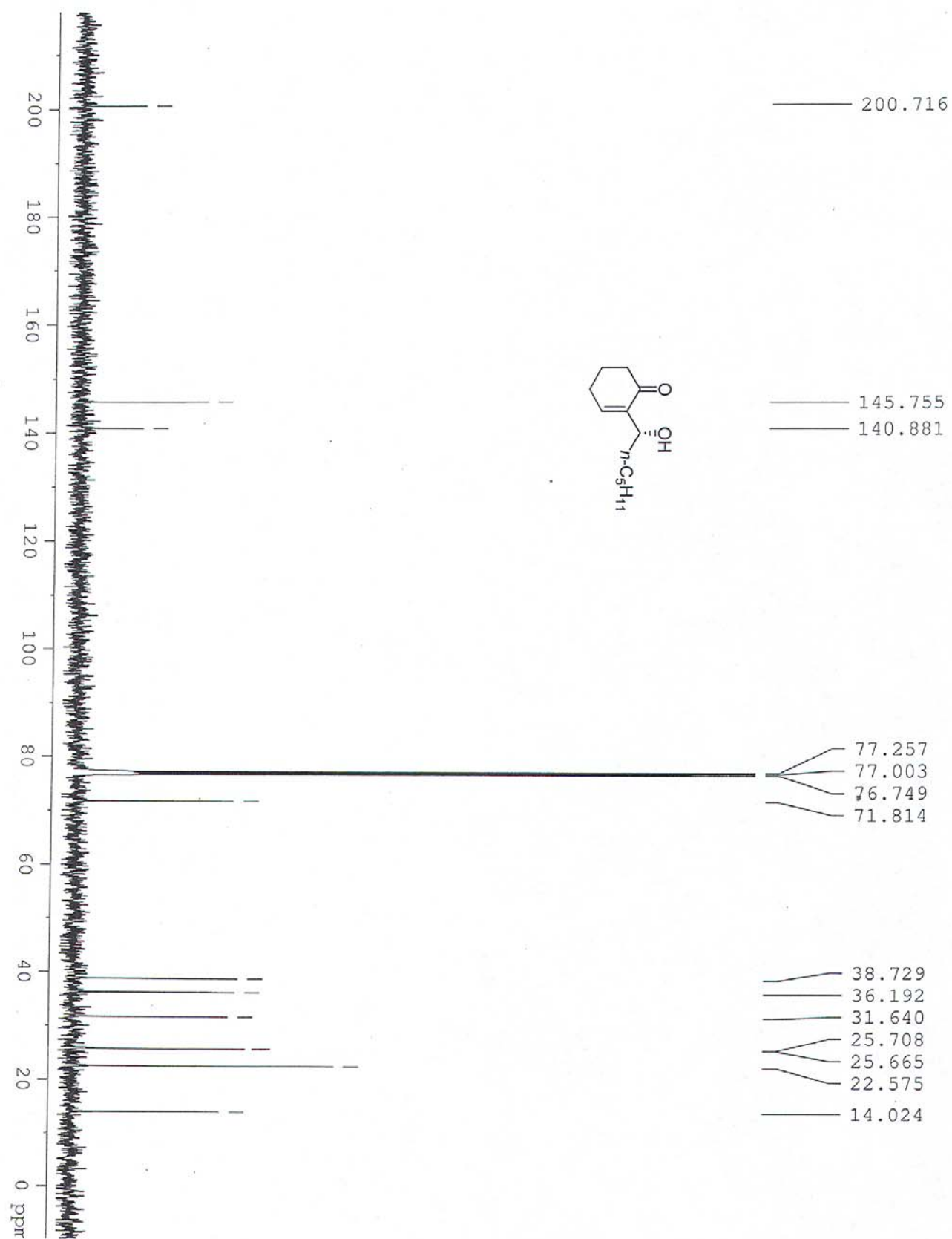


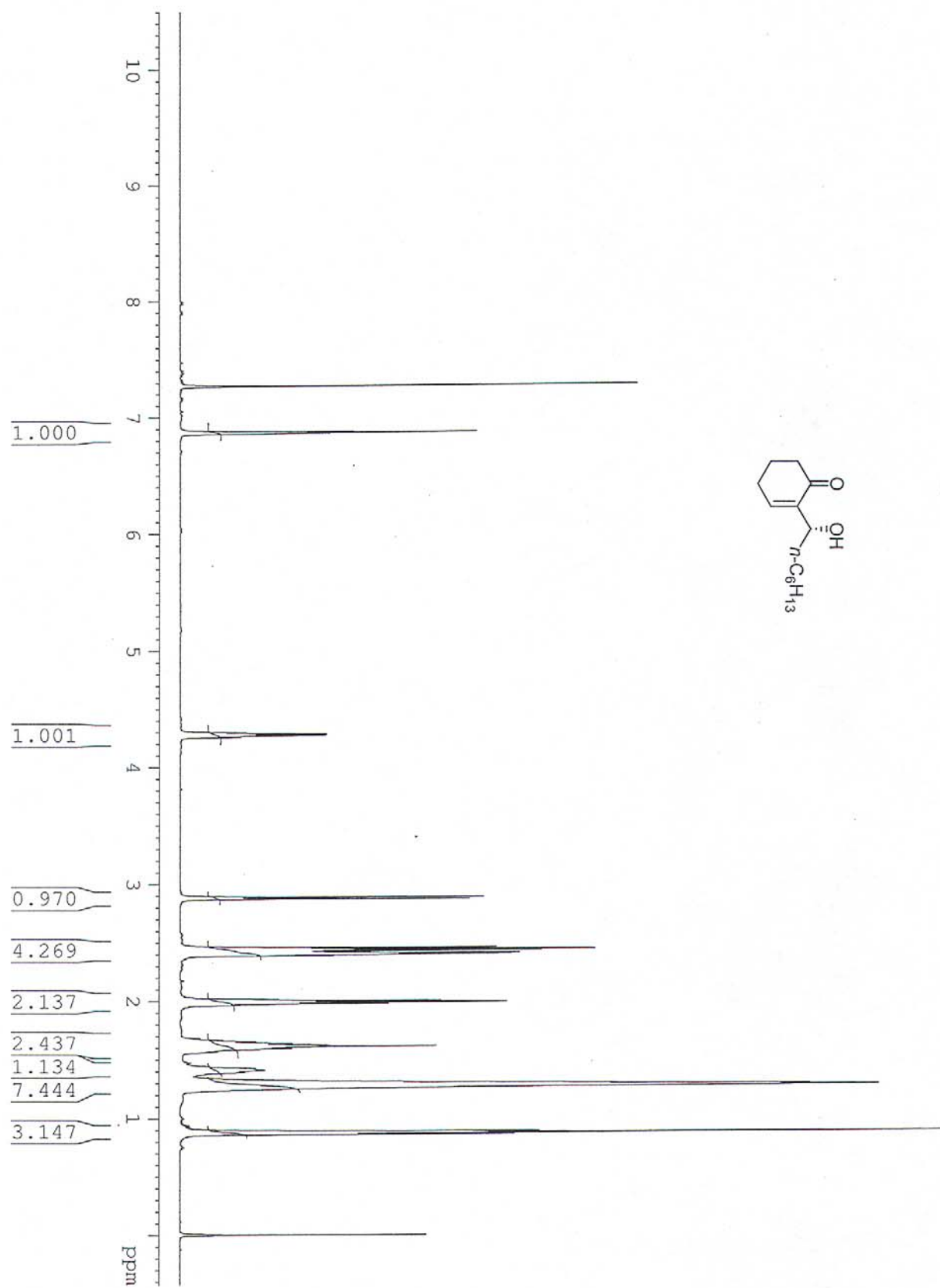


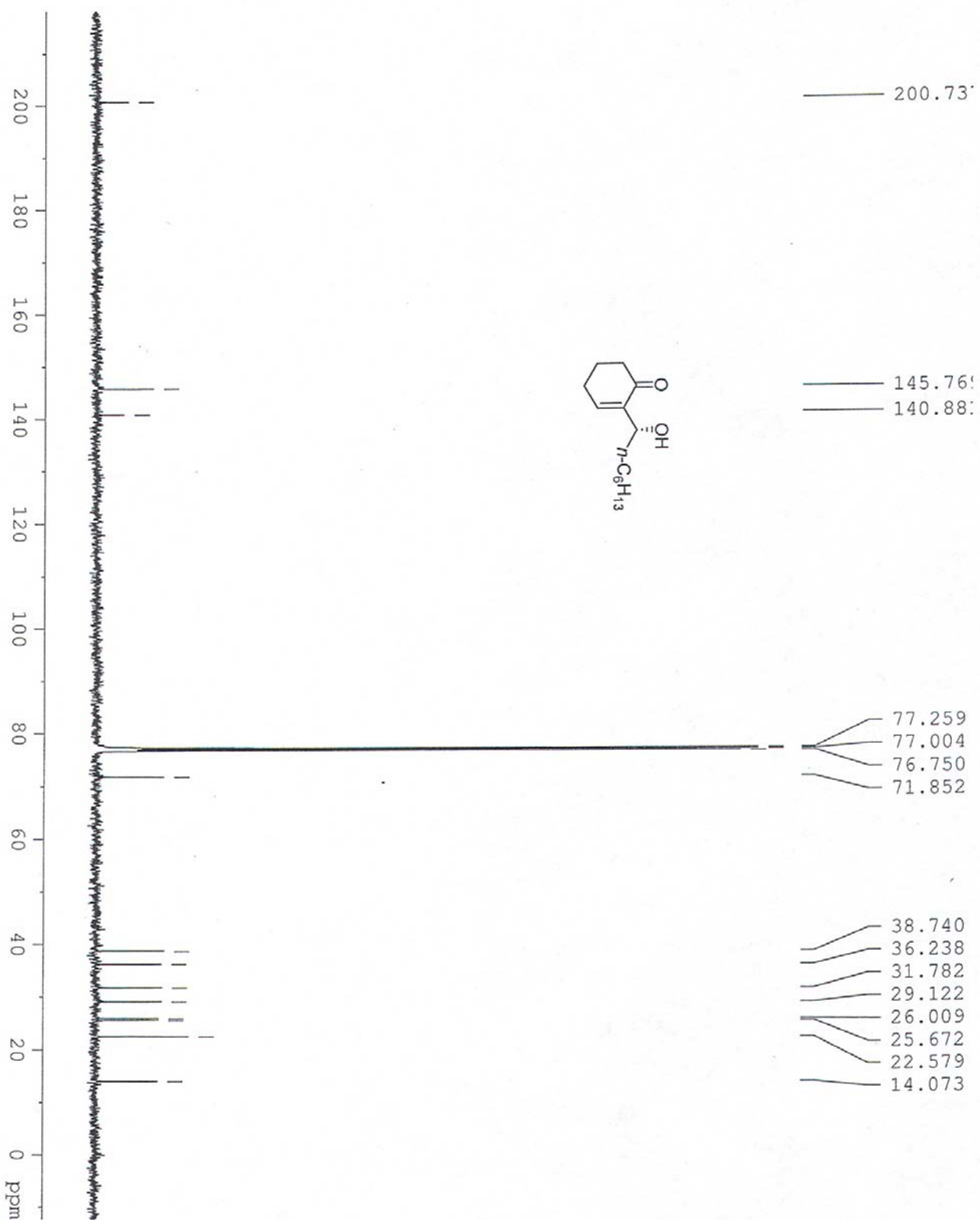


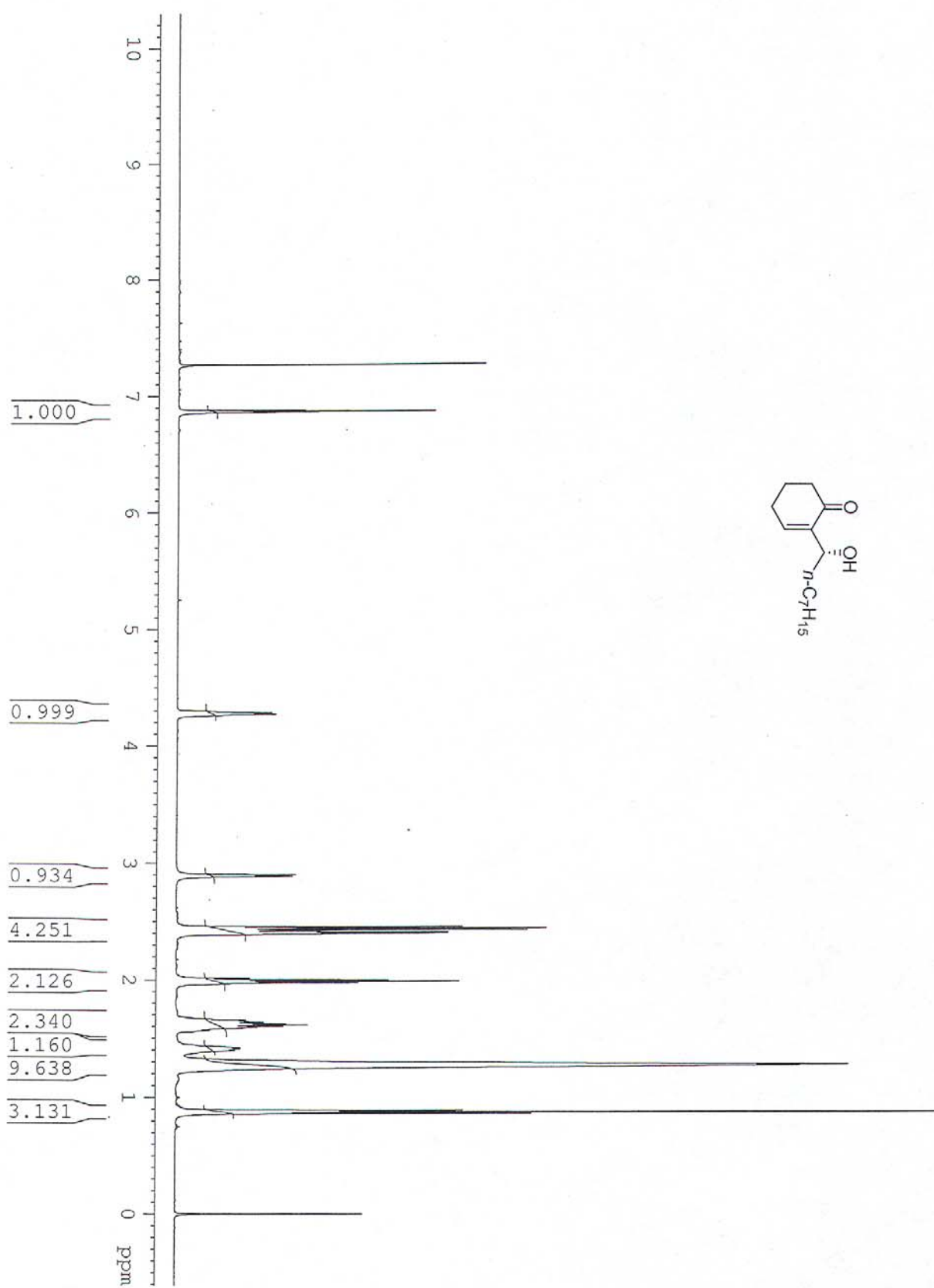


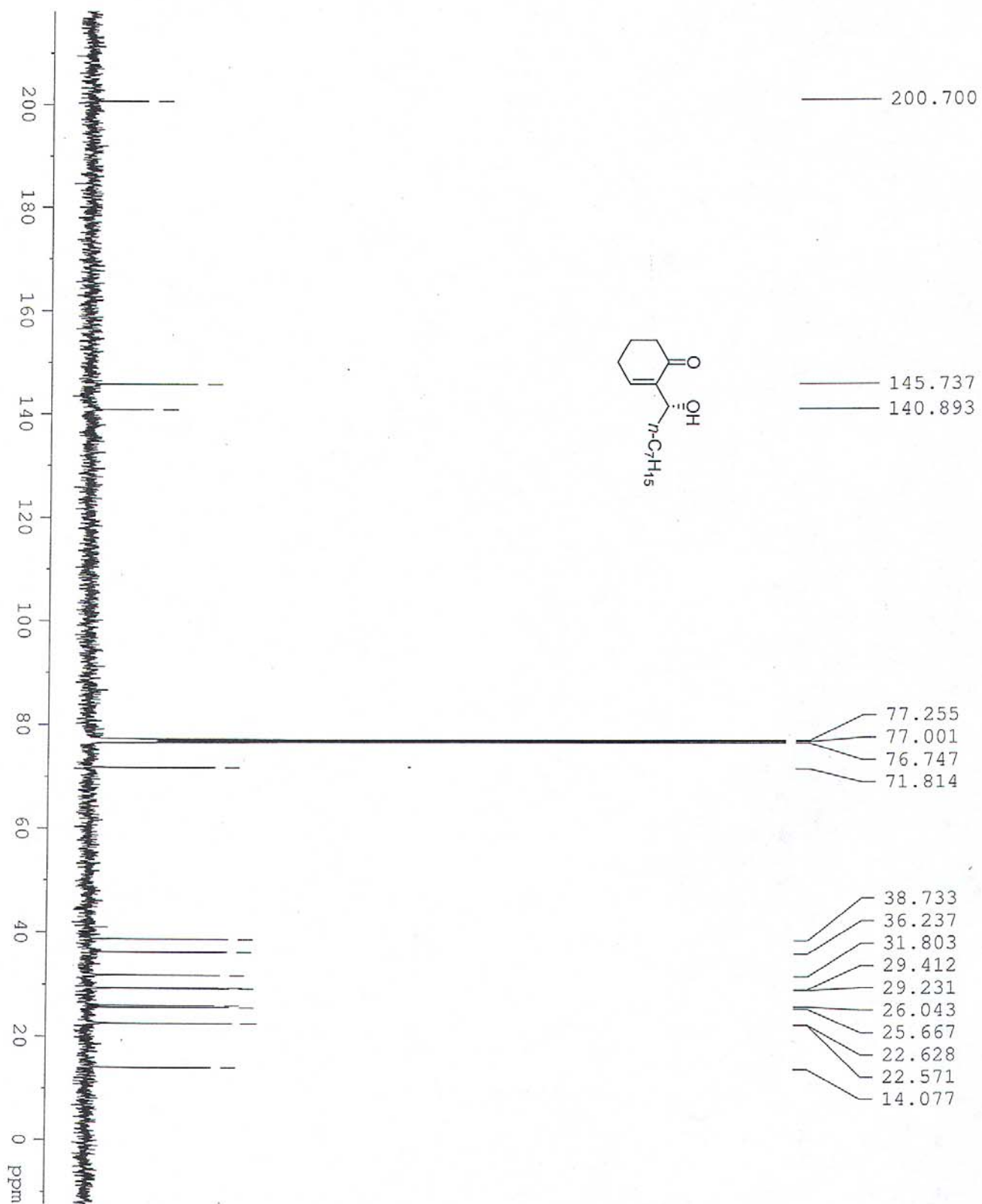


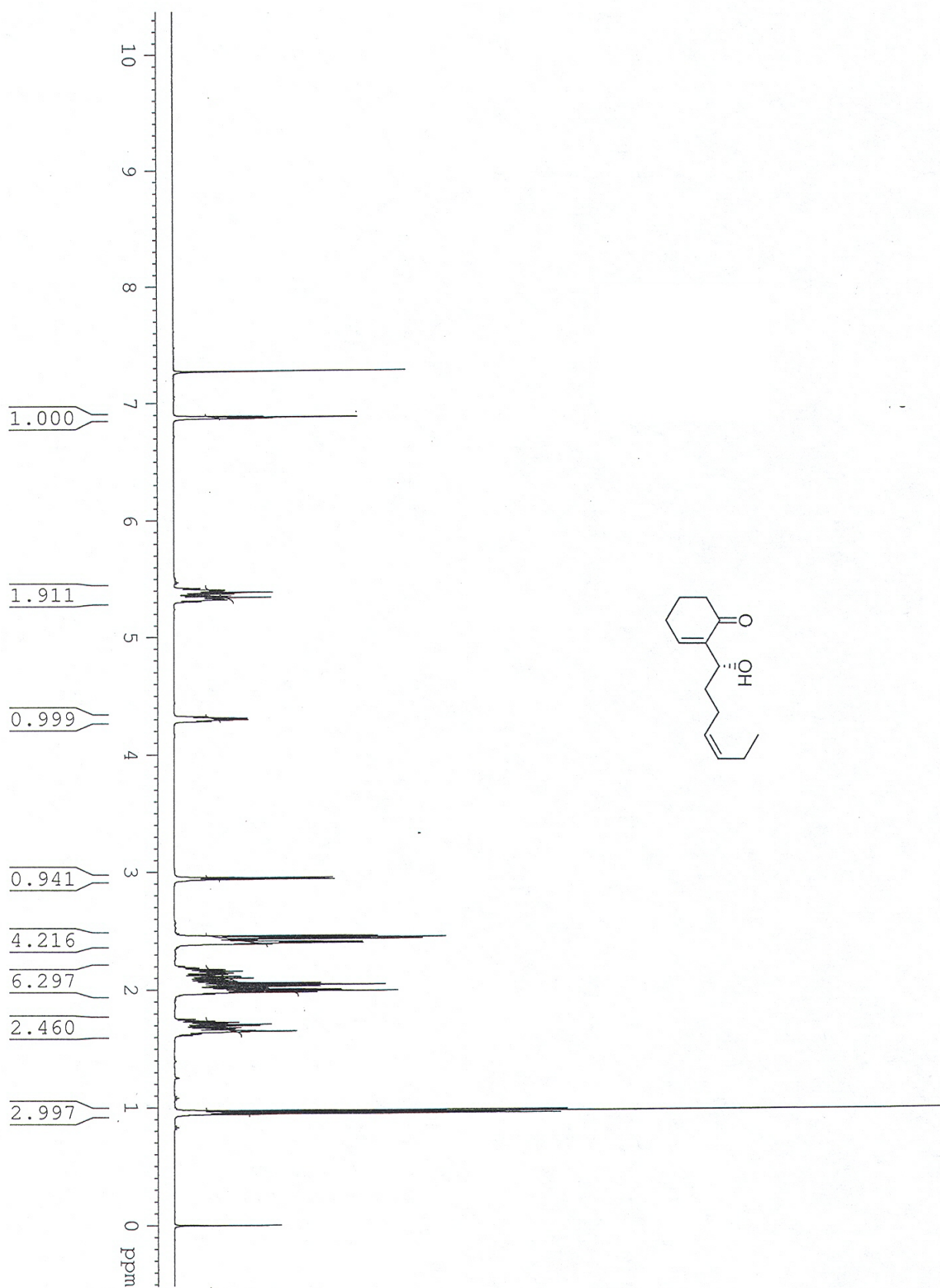


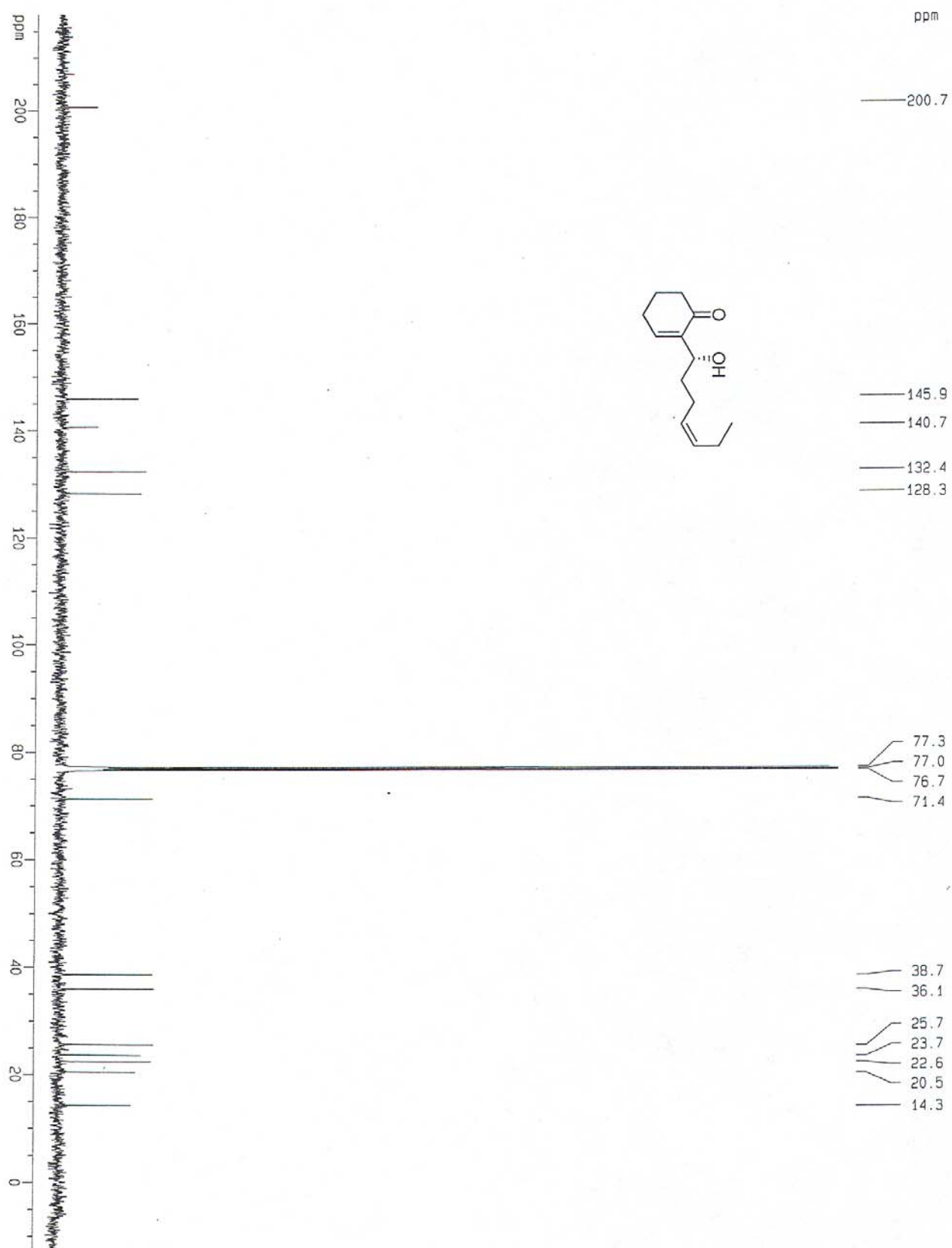


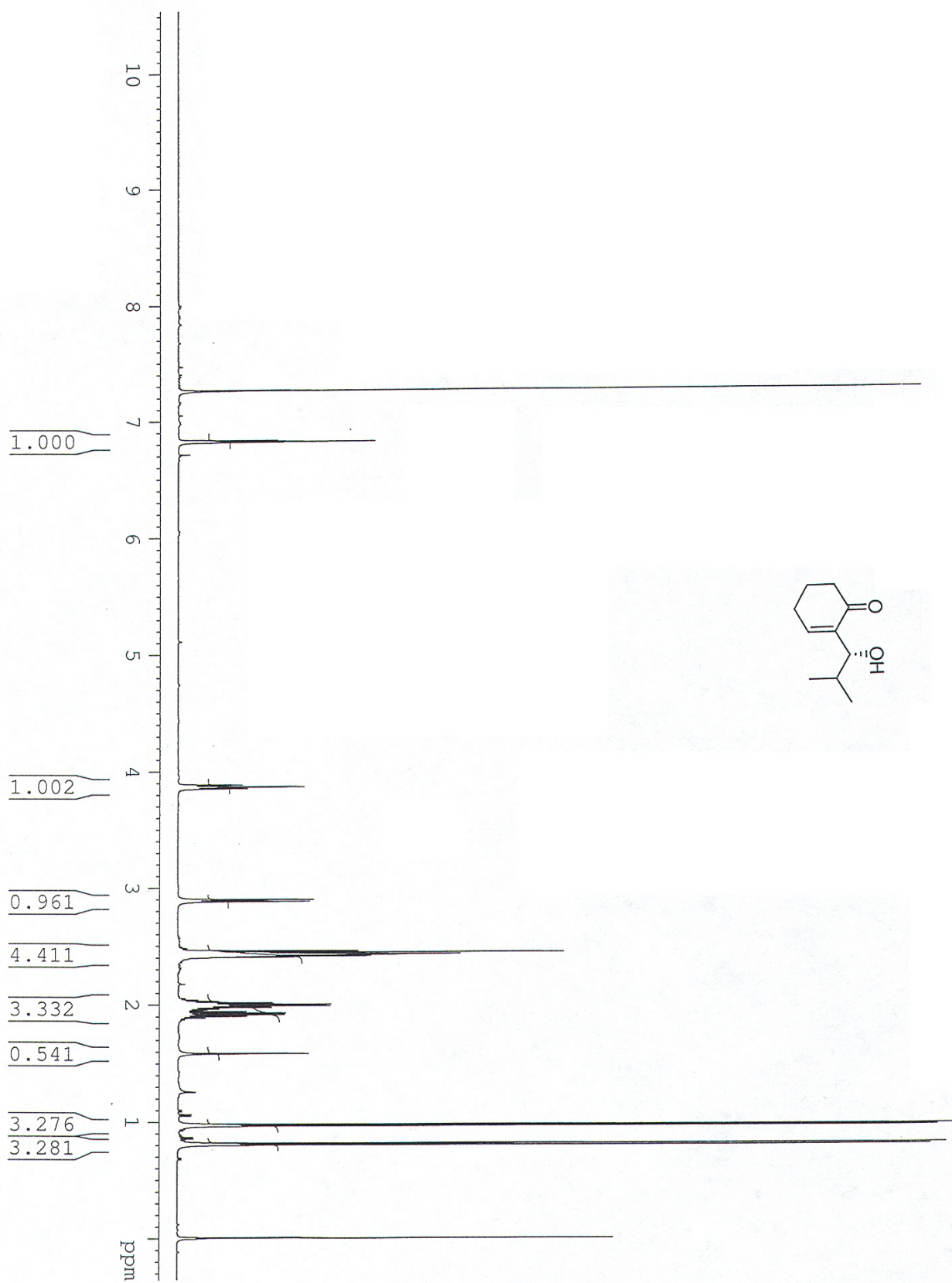


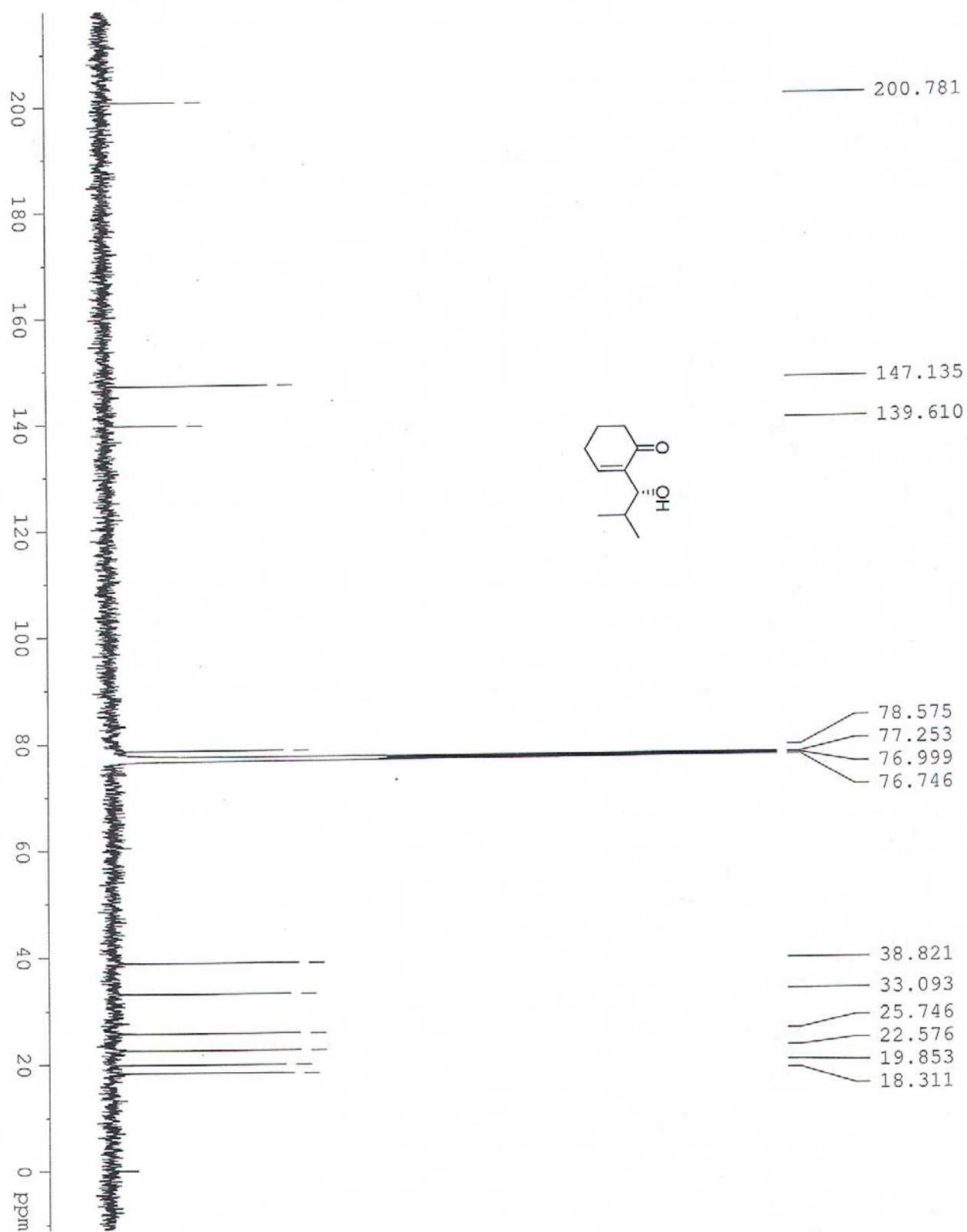


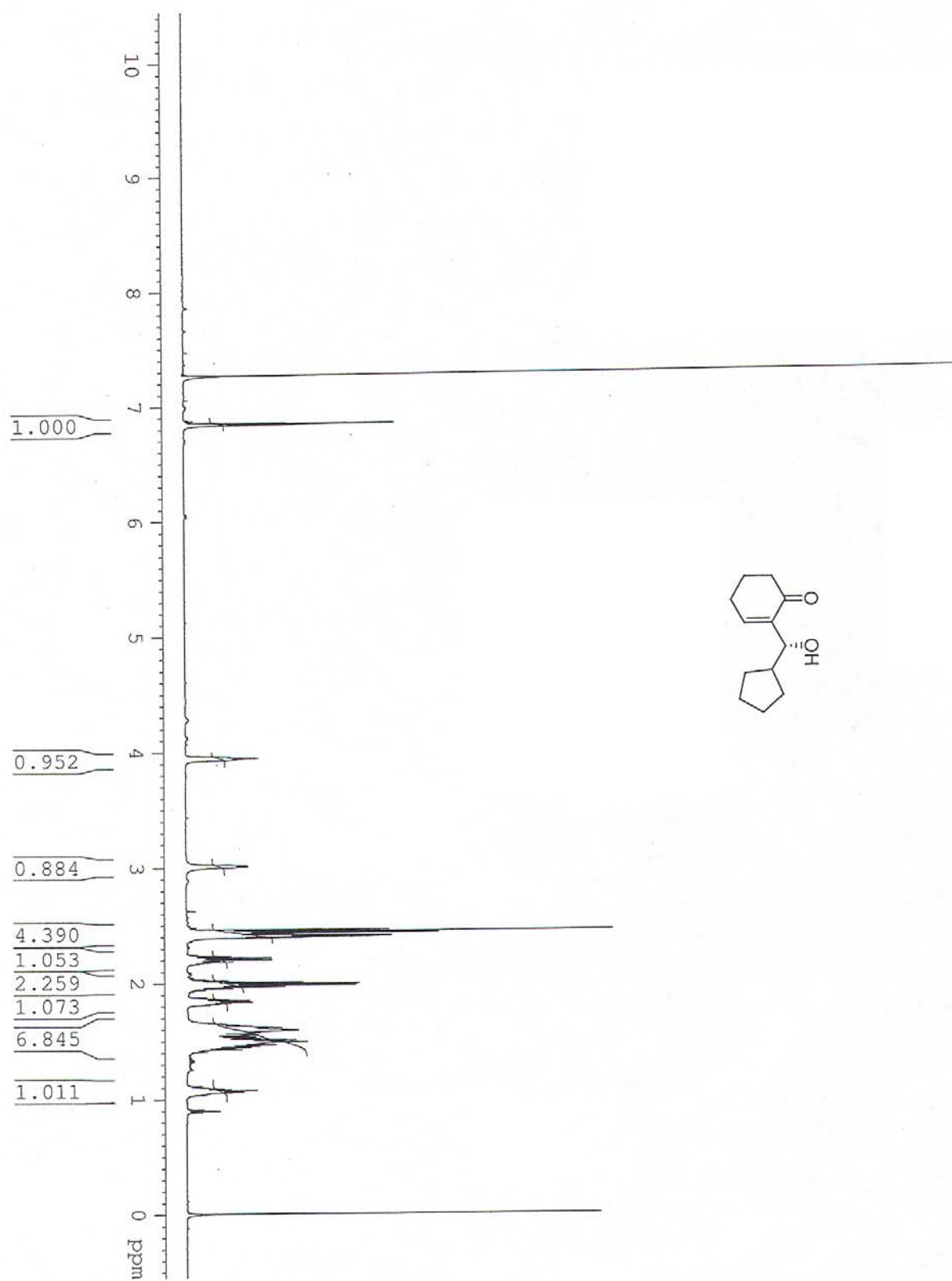


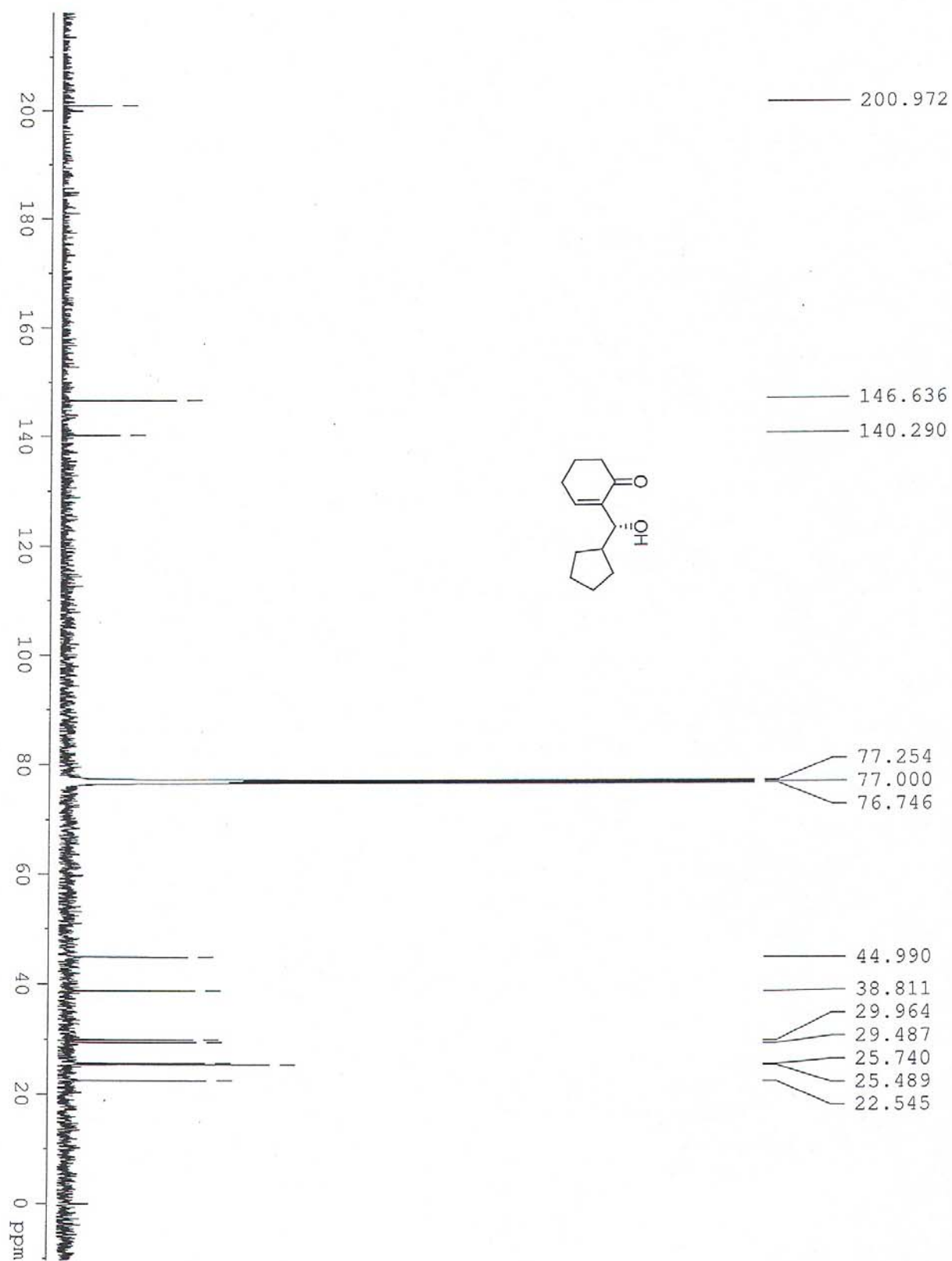


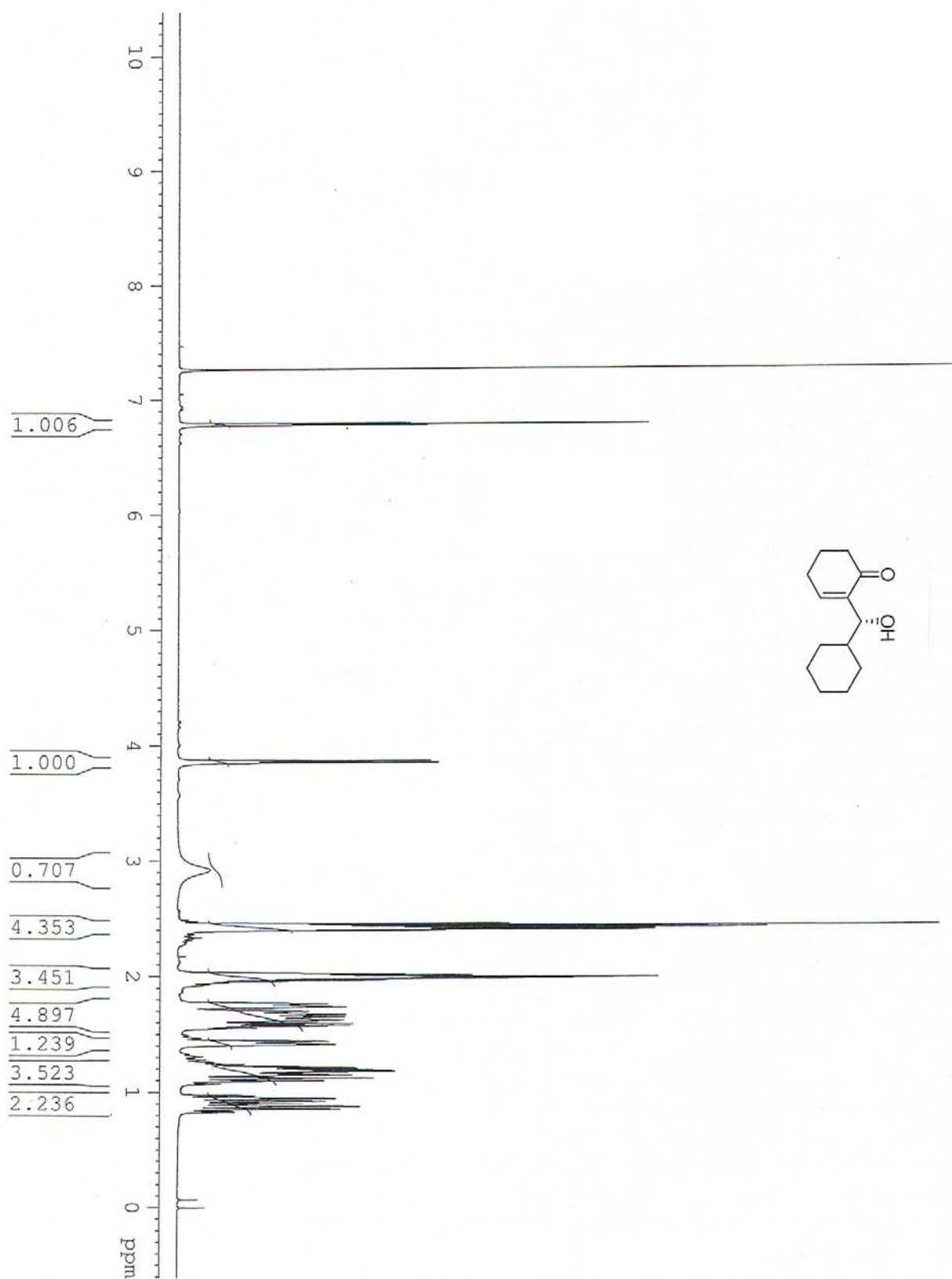


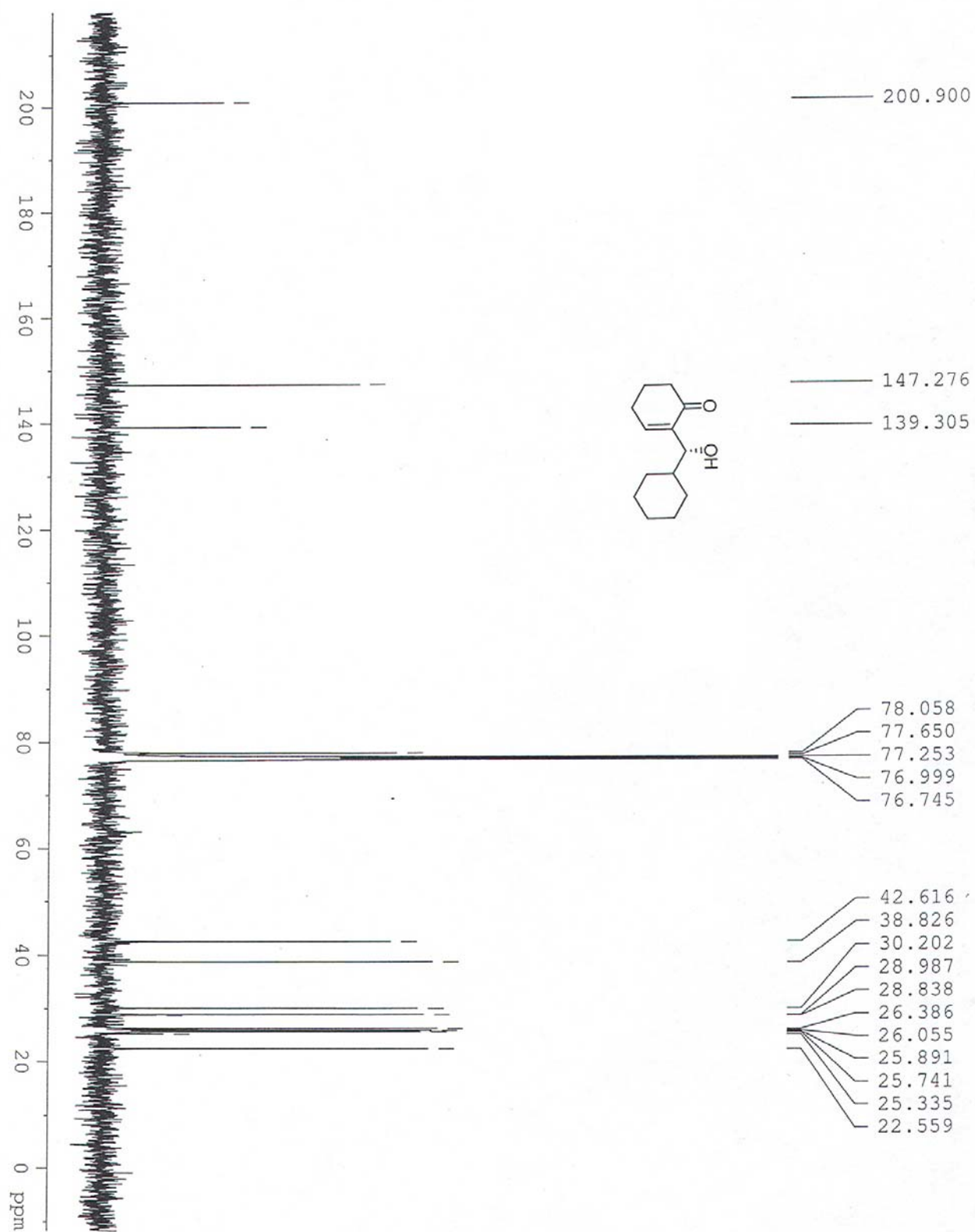






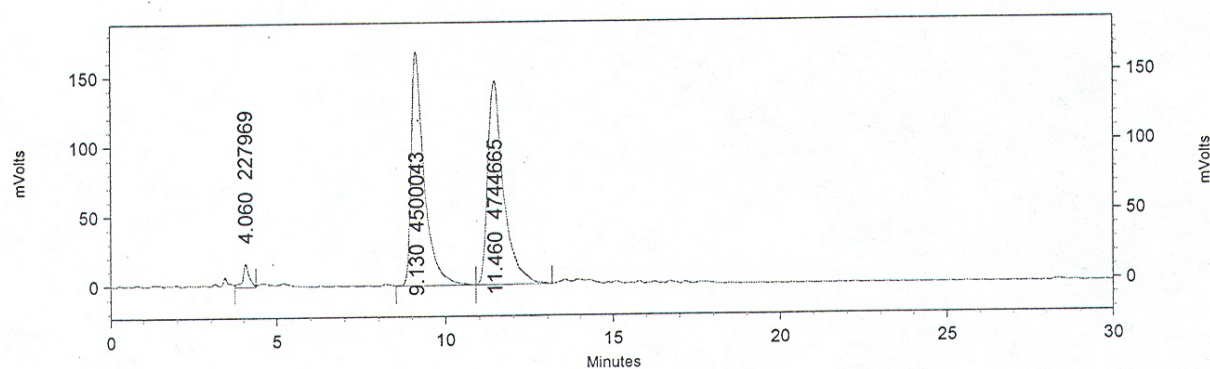
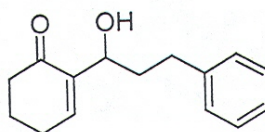






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Method Name: C:\EZStart\Projects\Default\Method\WeiWang19.met
Data File: C:\EZStart\Projects\WeiWang\jwh87e2.dat
Date Acquired: 3/12/2005 7:13:41 PM Date Printed: 07/11/2005 03:13:23 PM
Sample ID: jwh87e



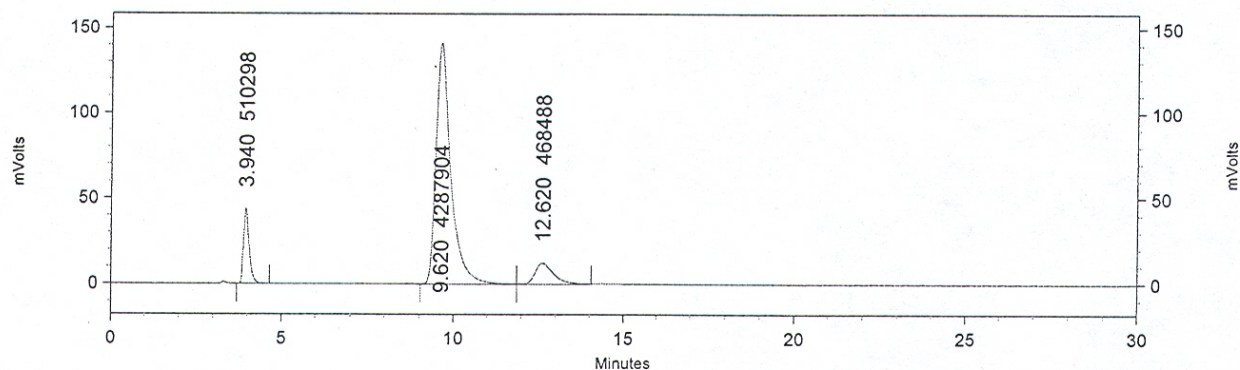
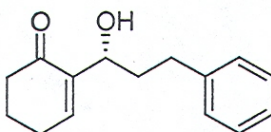
SPD-10Avp
Ch1-254nm Results

Pk #	RT	Area	Area %
2	9.130	4500043	47.506
3	11.460	4744665	50.088

Totals		9244708	97.593
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Department of Chemistry

Method Name: C:\EZStart\Projects\Default\Method\WeiWang41.met
Data File: C:\EZStart\Projects\WeiWang\jwh147e1.dat
Date Acquired: 3/30/2005 12:05:08 PM Date Printed: 07/11/2005 03:14:06 PM
Sample ID: jwh147e



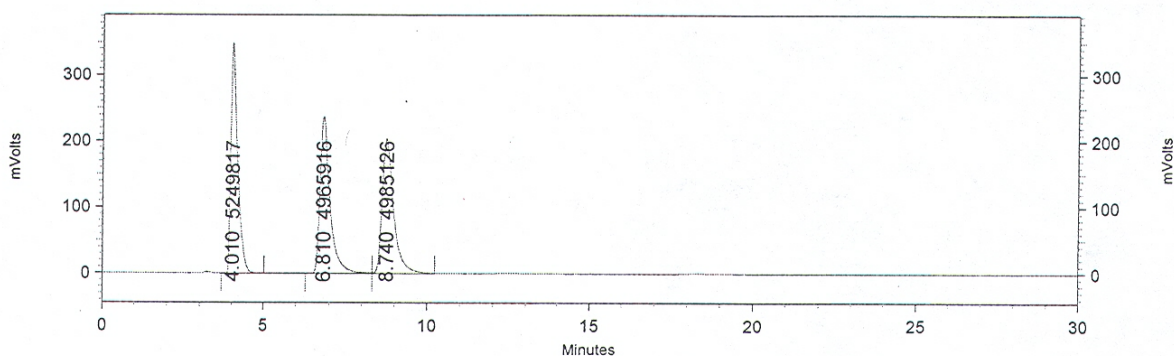
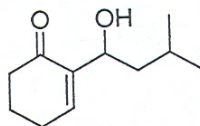
SPD-10Avp
Ch1-254nm Results

PK #	RT	Area	Area %
2	9.620	4287904	81.416
3	12.620	468488	8.895

Totals		4756392	90.311
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Department of Chemistry

Method Name: C:\EZStart\Projects\Default\Method\WeiWang19.met
Data File: C:\EZStart\Projects\WeiWang\jwh103e1.dat
Date Acquired: 3/17/2005 10:42:10 PM Date Printed: 07/11/2005 03:10:58 PM
Sample ID: jwh103e



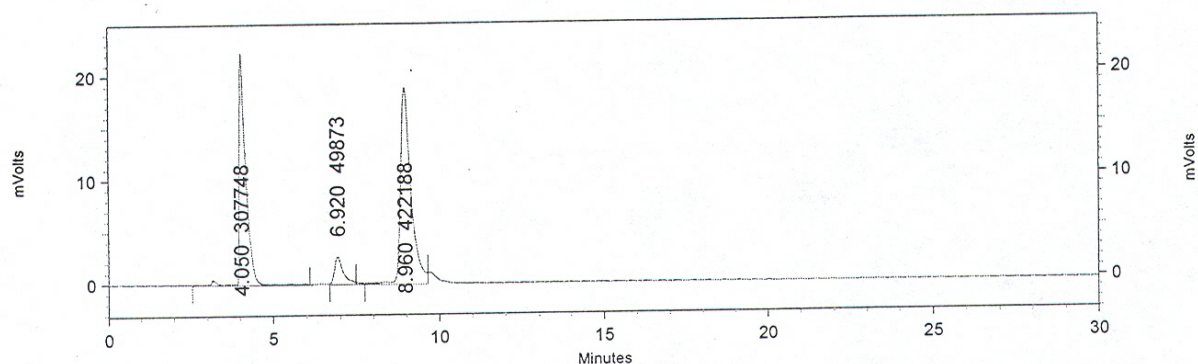
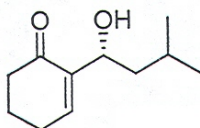
SPD-10Avp
Ch1-245nm Results

Pk #	RT	Area	Area %
2	6.810	4965916	32.669
3	8.740	4985126	32.795

Totals		9951042	65.464
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Department of Chemistry

Method Name: C:\EZStart\Projects\Default\Method\jw1.met
Data File: C:\EZStart\Projects\WeiWang\jwh151e1.dat
Date Acquired: 4/4/2005 3:53:34 PM Date Printed: 07/11/2005 03:11:54 PM
Sample ID: jwh151e



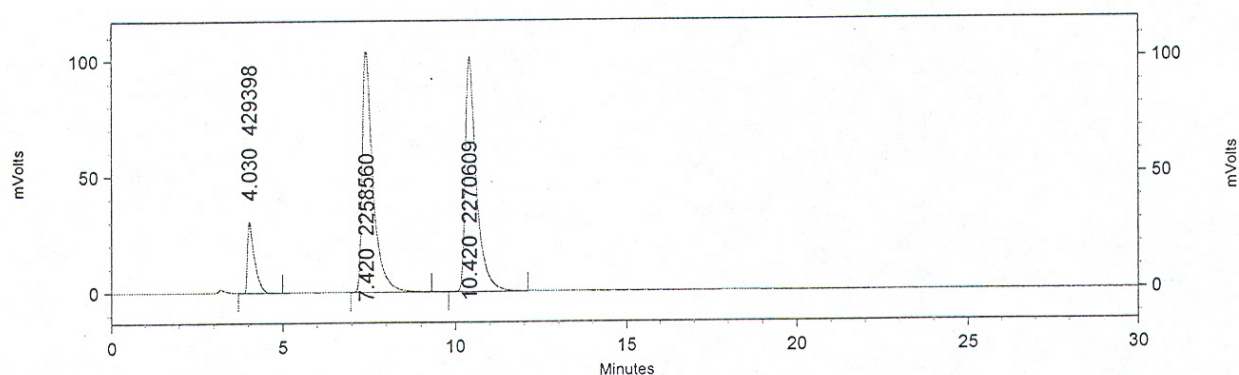
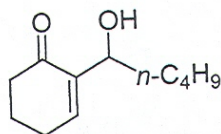
SPD-10Avp
Ch1-254nm Results

Pk #	RT	Area	Area %
2	6.920	49873	6.396
3	8.960	422188	54.140

Totals		472061	60.535
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Method Name: C:\EZStart\Projects\Default\Method\WeiWang19.met
Data File: C:\EZStart\Projects\WeiWang\jwh110e1.dat
Date Acquired: 3/18/2005 12:31:26 AM Date Printed: 07/11/2005 03:15:09 PM
Sample ID: jwh110e



SPD-10Avp

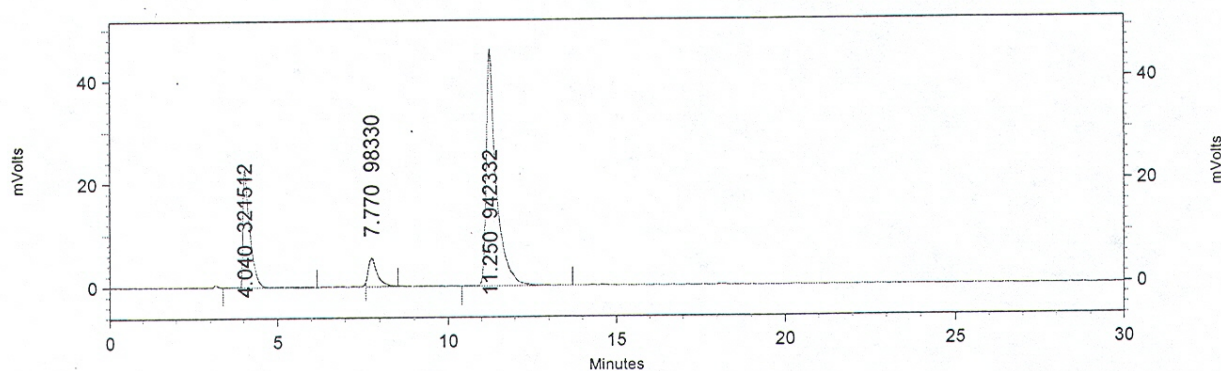
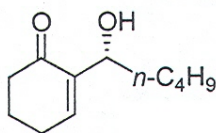
Ch1-254nm Results

Pk #	RT	Area	Area %
2	7.420	2258560	45.549
3	10.420	2270609	45.792

Totals		4529169	91.340
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Method Name: C:\EZStart\Projects\Default\Method\jw1.met
Data File: C:\EZStart\Projects\WeiWang\jwi7e1.dat
Date Acquired: 4/7/2005 3:40:37 PM Date Printed: 07/11/2005 03:16:07 PM
Sample ID: jwi7e



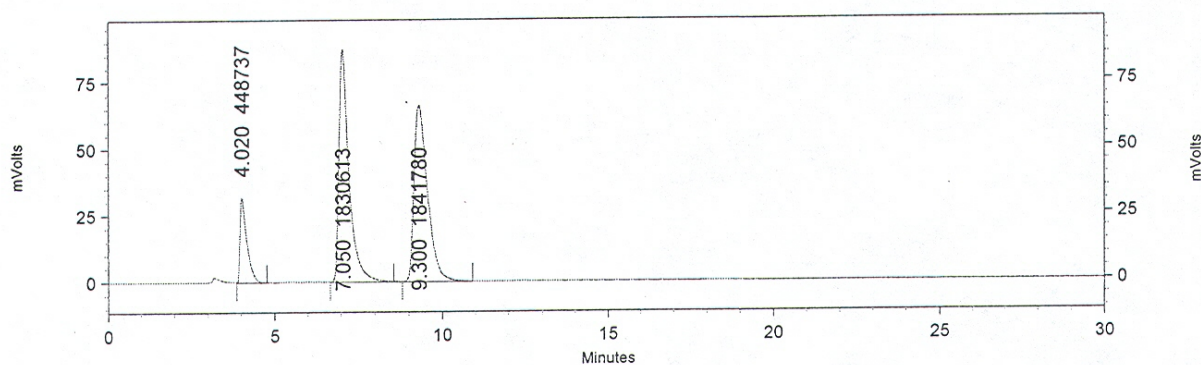
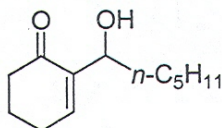
SPD-10Avp
Ch1-254nm Results

Pk #	RT	Area	Area %
2	7.770	98330	7.219
3	11.250	942332	69.179

Totals		1040662	76.397
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Method Name: C:\EZStart\Projects\Default\Method\WeiWang19.met
Data File: C:\EZStart\Projects\WeiWang\jwh104e1.dat
Date Acquired: 3/17/2005 11:15:44 PM Date Printed: 07/11/2005 03:17:00 PM
Sample ID: jwh104e



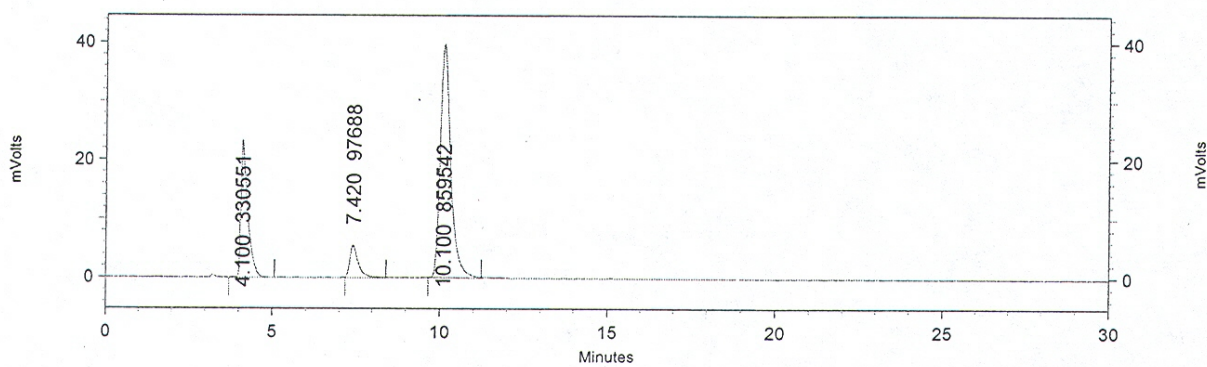
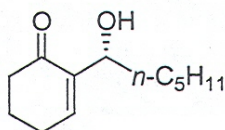
SPD-10Avp
Ch1-254nm Results

Pk #	RT	Area	Area %
2	7.050	1830613	44.420
3	9.300	1841780	44.691

Totals		3672393	89.111
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Method Name: C:\EZStart\Projects\Default\Method\jw1.met
Data File: C:\EZStart\Projects\WeiWang\jwi8e1.dat
Date Acquired: 4/7/2005 4:20:09 PM Date Printed: 07/11/2005 03:18:30 PM
Sample ID: jwi8e



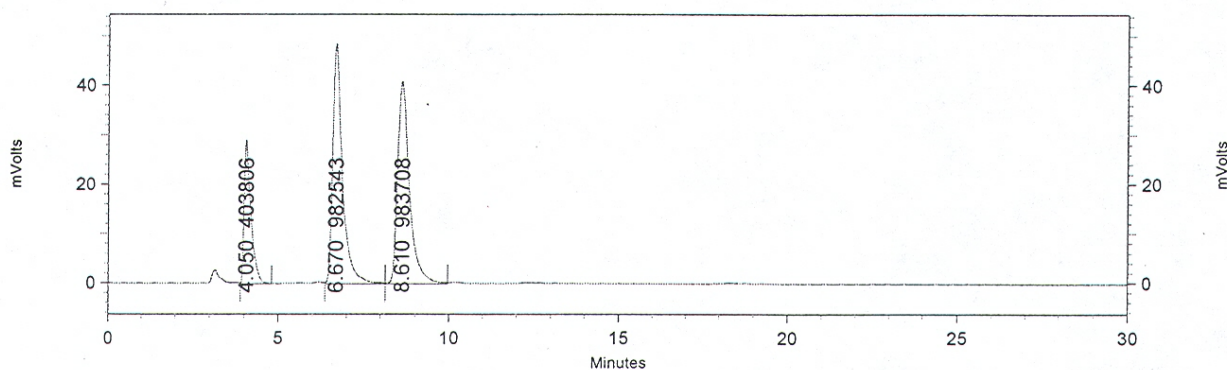
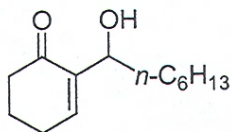
SPD-10Avp
Ch1-254nm Results

Pk #	RT	Area	Area %
2	7.420	97688	7.586
3	10.100	859542	66.746

Totals		957230	74.332
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Department of Chemistry

Method Name: C:\EZStart\Projects\Default\Method\WeiWang19.met
Data File: C:\EZStart\Projects\WeiWang\jwh111e1.dat
Date Acquired: 3/18/2005 1:04:21 AM Date Printed: 07/11/2005 03:19:21 PM
Sample ID: jwh111e



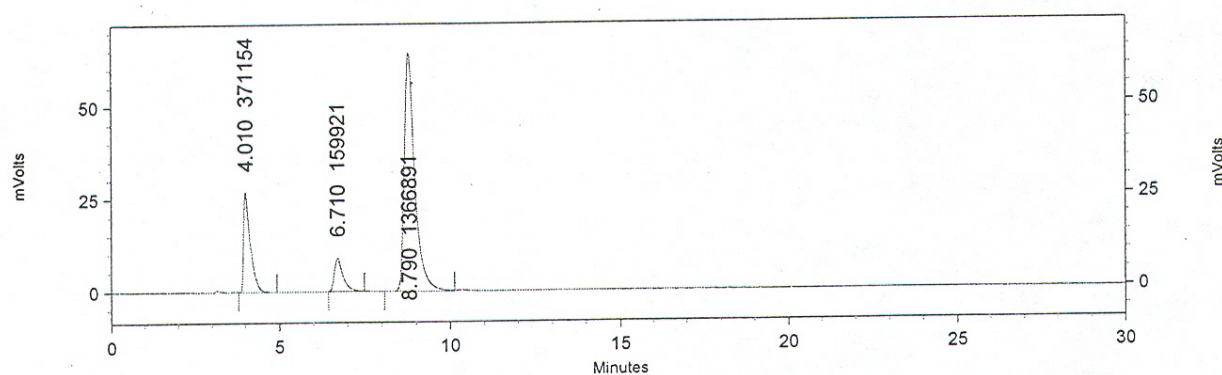
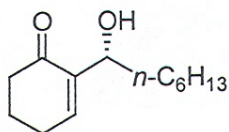
SPD-10Avp
Ch1-254nm Results

Pk #	RT	Area	Area %
2	6.670	982543	41.457
3	8.610	983708	41.506

Totals		1966251	82.962
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Department of Chemistry

Method Name: C:\EZStart\Projects\Default\Method\jw1.met
Data File: C:\EZStart\Projects\WeiWang\jwh150e2.dat
Date Acquired: 4/2/2005 7:30:06 PM Date Printed: 07/11/2005 03:20:20 PM
Sample ID: jwh150e



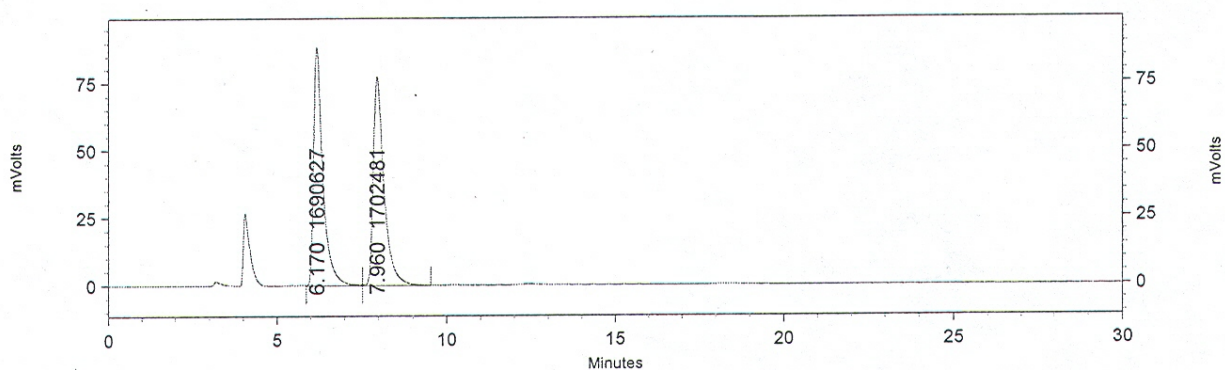
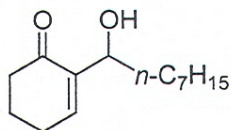
SPD-10Avp
Ch1-254nm Results

Pk #	RT	Area	Area %
2	6.710	159921	8.426
3	8.790	1366891	72.019

Totals		1526812	80.445
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Method Name: C:\EZStart\Projects\Default\Method\WeiWang19.met
Data File: C:\EZStart\Projects\WeiWang\jwh112e1.dat
Date Acquired: 3/18/2005 1:36:25 AM Date Printed: 07/11/2005 03:20:59 PM
Sample ID: jwh112e



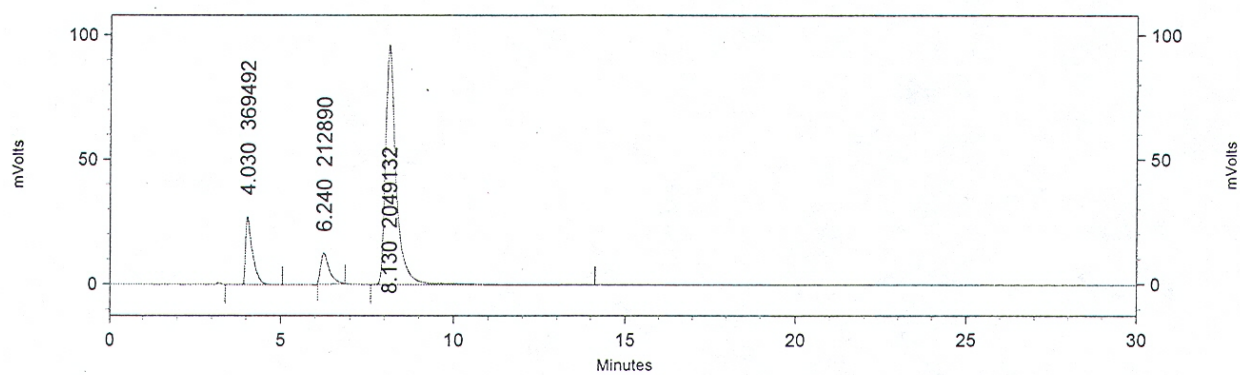
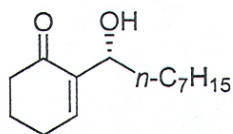
SPD-10Avp
Ch1-254nm Results

Pk #	RT	Area	Area %
1	6.170	1690627	49.825
2	7.960	1702481	50.175

Totals		3393108	100.000
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Department of Chemistry

Method Name: C:\EZStart\Projects\Default\Method\jw1.met
Data File: C:\EZStart\Projects\WeiWang\jwh152e1.dat
Date Acquired: 4/4/2005 12:42:18 PM Date Printed: 07/11/2005 03:21:40 PM
Sample ID: jwh152e



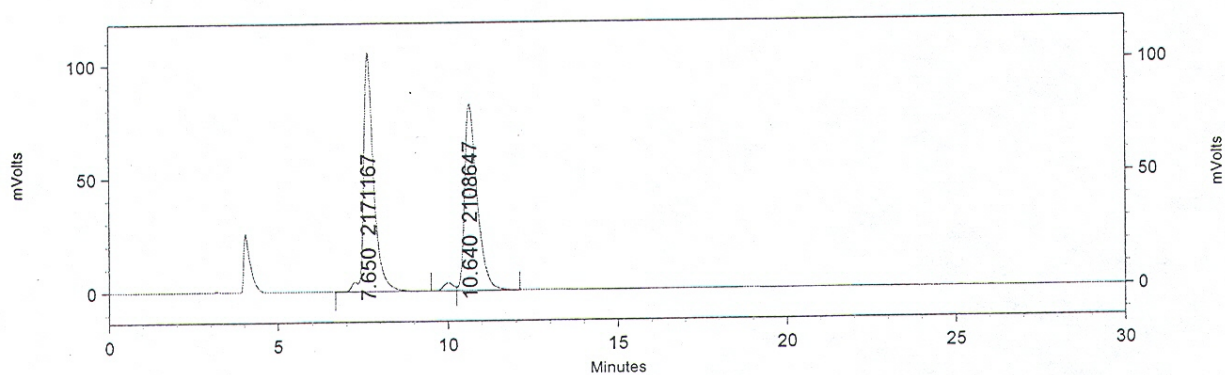
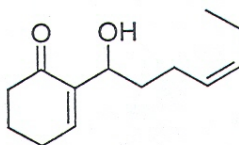
SPD-10Avp
Ch1-254nm Results

Pk #	RT	Area	Area %
2	6.240	212890	8.090
3	8.130	2049132	77.869

Totals		2262022	85.959
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Department of Chemistry

Method Name: C:\EZStart\Projects\Default\Method\jw5.met
 Data File: C:\EZStart\Projects\WeiWang\jwi22e1.dat
 Date Acquired: 4/16/2005 6:46:10 AM Date Printed: 07/11/2005 03:25:43 PM
 Sample ID: jwi22e



SPD-10Avp

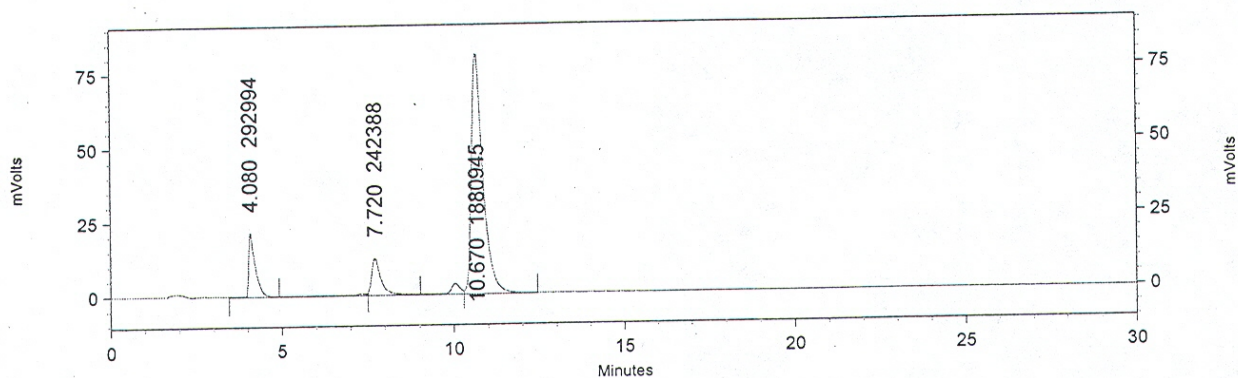
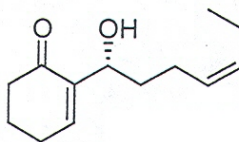
Ch1-254nm Results

PK #	RT	Area	Area %
1	7.650	2171167	50.730
2	10.640	2108647	49.270

Totals		4279814	100.000
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Department of Chemistry

Method Name: C:\EZStart\Projects\Default\Method\jw5.met
Data File: C:\EZStart\Projects\WeiWang\jwi25e1.dat
Date Acquired: 4/16/2005 7:38:04 AM Date Printed: 07/11/2005 03:26:40 PM
Sample ID: jwi25e



SPD-10Avp

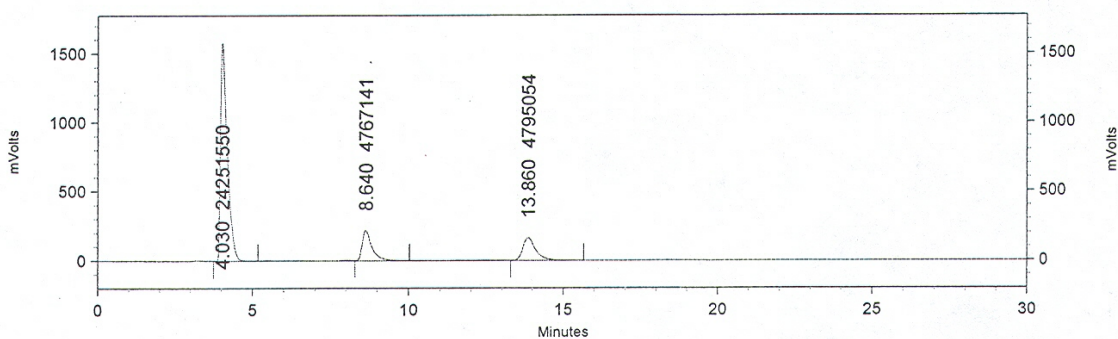
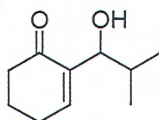
Ch1-254nm Results

Pk #	RT	Area	Area %
2	7.720	242388	10.031
3	10.670	1880945	77.843

Totals		2123333	87.874
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Department of Chemistry

Method Name: C:\EZStart\Projects\Default\Method\WeiWang19.met
 Data File: C:\EZStart\Projects\WeiWang\jwh102e1.dat
 Date Acquired: 3/17/2005 10:03:00 PM Date Printed: 07/11/2005 02:28:52 PM
 Sample ID: jwh102e



SPD-10Avp

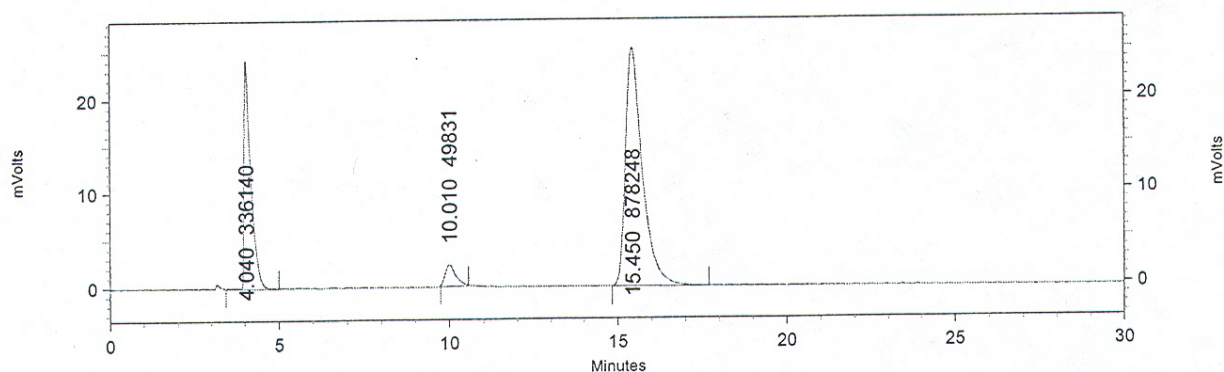
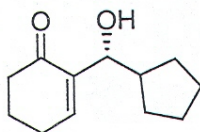
Ch1-235nm Results

Pk #	RT	Area	Area %
2	8.640	4767141	14.098
3	13.860	4795054	14.181

Totals		9562195	28.279
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Department of Chemistry

Method Name: C:\EZStart\Projects\Default\Method\jw5.met
Data File: C:\EZStart\Projects\WeiWang\jwi12e1.dat
Date Acquired: 4/14/2005 1:05:50 PM Date Printed: 07/11/2005 03:05:19 PM
Sample ID: jwi12e



SPD-10Avp

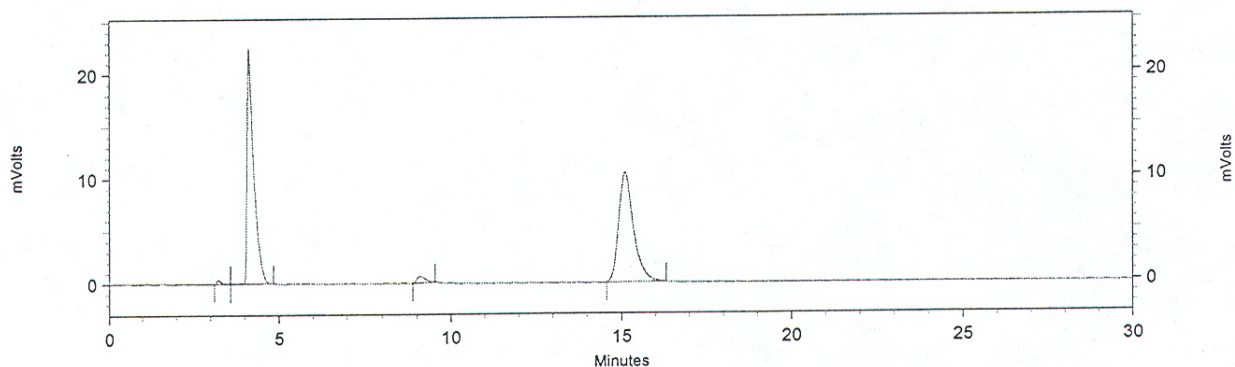
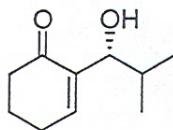
Ch1-254nm Results

Pk #	RT	Area	Area %
2	10.010	49831	3.942
3	15.450	878248	69.470

Totals		928079	73.411
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Method Name: C:\EZStart\Projects\Default\Method\jw4.met
 Data File: C:\EZStart\Projects\WeiWang\jwi5e1.dat
 Date Acquired: 4/8/2005 9:53:37 PM
 Date Printed: 07/11/2005 11:41:13 PM
 Analysis: System

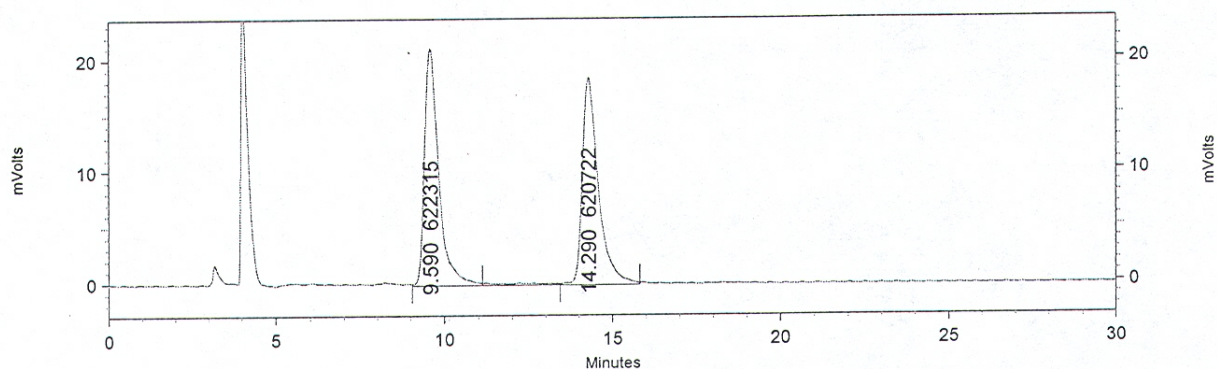
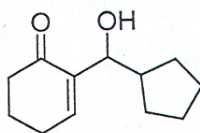


SPD-10Avp
 Ch1-254nm
 Results

Pk #	Name	RT	Area	ESTD conc	Chan
3	Peak @ 9.110 Minutes	9.110	10272	0.000	SPD-10Avp Ch1-254nm
4	Peak @ 15.110 Minutes	15.110	316544	0.000	SPD-10Avp Ch1-254nm
Totals			326816	0.000	

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Department of Chemistry

Method Name: C:\EZStart\Projects\Default\Method\WeiWang19.met
Data File: C:\EZStart\Projects\WeiWang\jwh105e2.dat
Date Acquired: 3/17/2005 11:47:25 PM Date Printed: 07/11/2005 03:02:58 PM
Sample ID: jwh105e



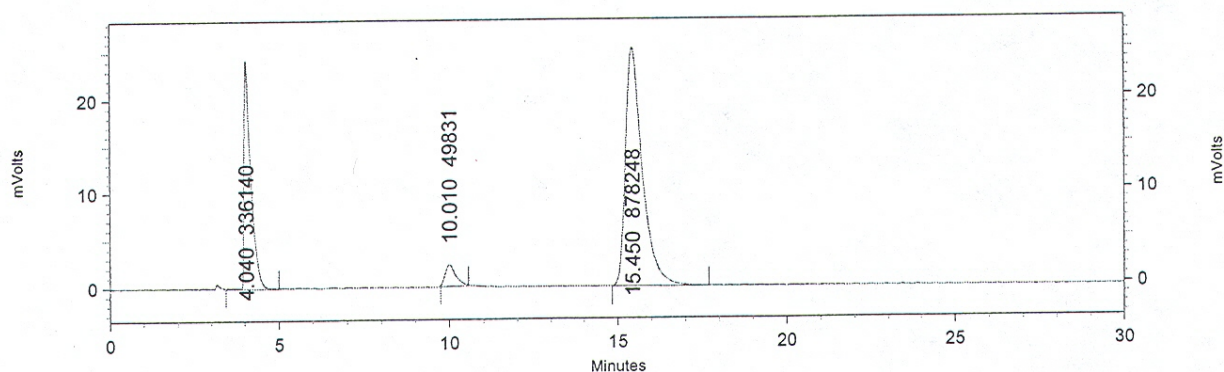
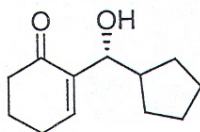
SPD-10Avp
Ch1-254nm Results

Pk #	RT	Area	Area %
1	9.590	622315	50.064
2	14.290	620722	49.936

Totals		1243037	100.000
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Department of Chemistry

Method Name: C:\EZStart\Projects\Default\Method\jw5.met
Data File: C:\EZStart\Projects\WeiWang\jwi12e1.dat
Date Acquired: 4/14/2005 1:05:50 PM Date Printed: 07/11/2005 03:05:19 PM
Sample ID: jwi12e



SPD-10Avp

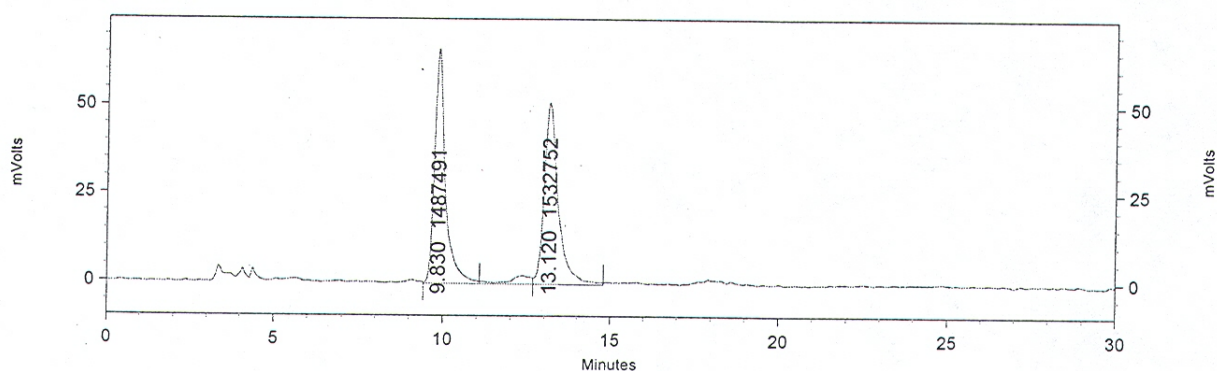
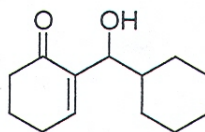
Ch1-254nm Results

Pk #	RT	Area	Area %
2	10.010	49831	3.942
3	15.450	878248	69.470

Totals		928079	73.411
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Department of Chemistry

Method Name: C:\EZStart\Projects\Default\Method\WeiWang19.met
 Data File: C:\EZStart\Projects\WeiWang\jwh91e1.dat
 Date Acquired: 3/13/2005 11:26:30 PM Date Printed: 07/11/2005 02:53:54 PM
 Sample ID: jwh91e



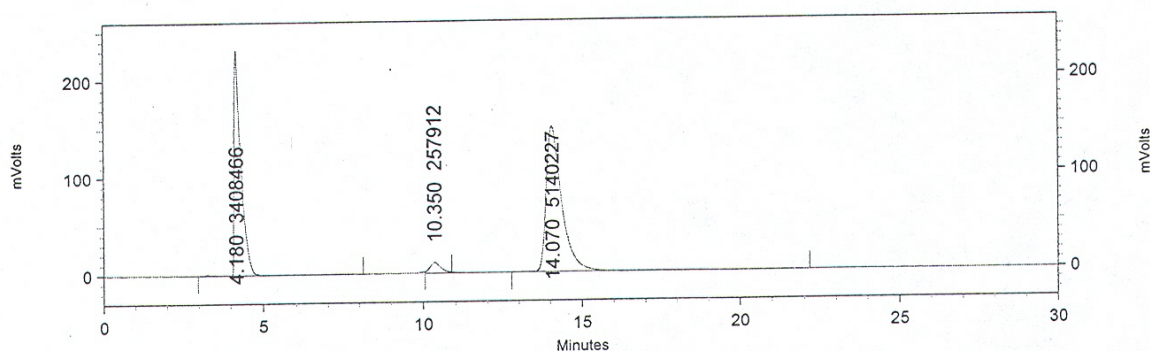
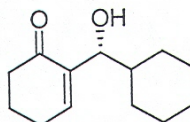
SPD-10Avp
Ch1-235nm Results

Pk #	RT	Area	Area %
1	9.830	1487491	49.251
2	13.120	1532752	50.749

Totals		3020243	100.000
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Method Name: C:\EZStart\Projects\Default\Method\jw1.met
Data File: C:\EZStart\Projects\WeiWang\jwh148e3.dat
Date Acquired: 4/6/2005 3:11:15 PM Date Printed: 07/11/2005 03:00:36 PM
Sample ID: jwh148e



SPD-10Avp

Ch1-245nm Results

Pk #	RT	Area	Area %
2	10.350	257912	2.929
3	14.070	5140227	58.368

Totals		5398139	61.296
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