

## **Total Synthesis of (5*R*,6*R*,8*R*,9*S*)-(-)-5, 9*Z*-Indolizidine 221T using**

### **Sulfinimine-Derived *N*-Sulfinyl $\beta$ -Amino Ketones**

Franklin A. Davis\*, Minsoo Song, Hui Qiu, and Jing Chai

Department of Chemistry, Temple University, Philadelphia, PA 19122

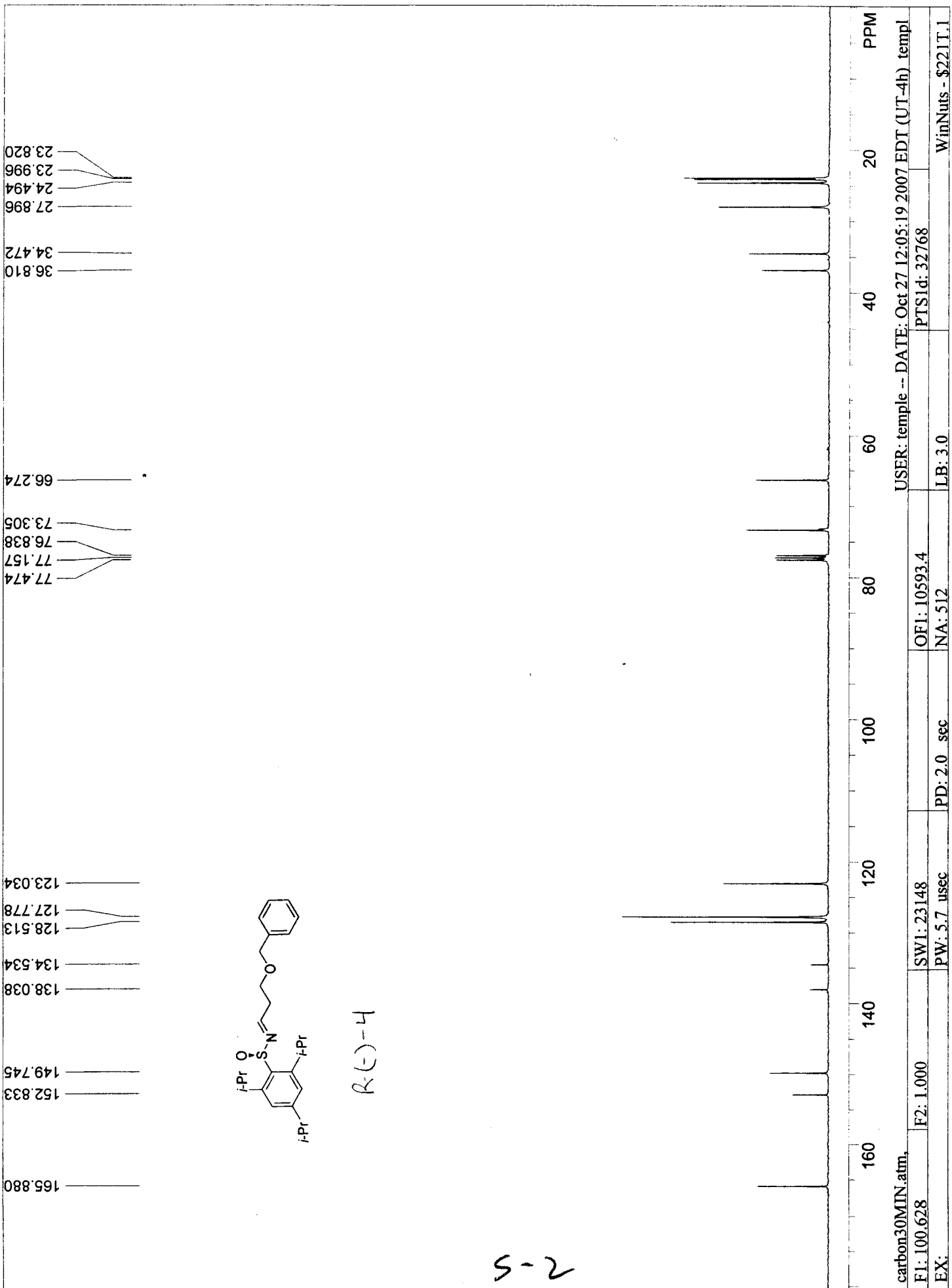
fdavis@temple.edu

#### **Supporting Information Available**

Contents:

NMR spectra for:

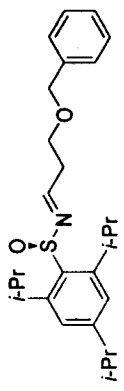
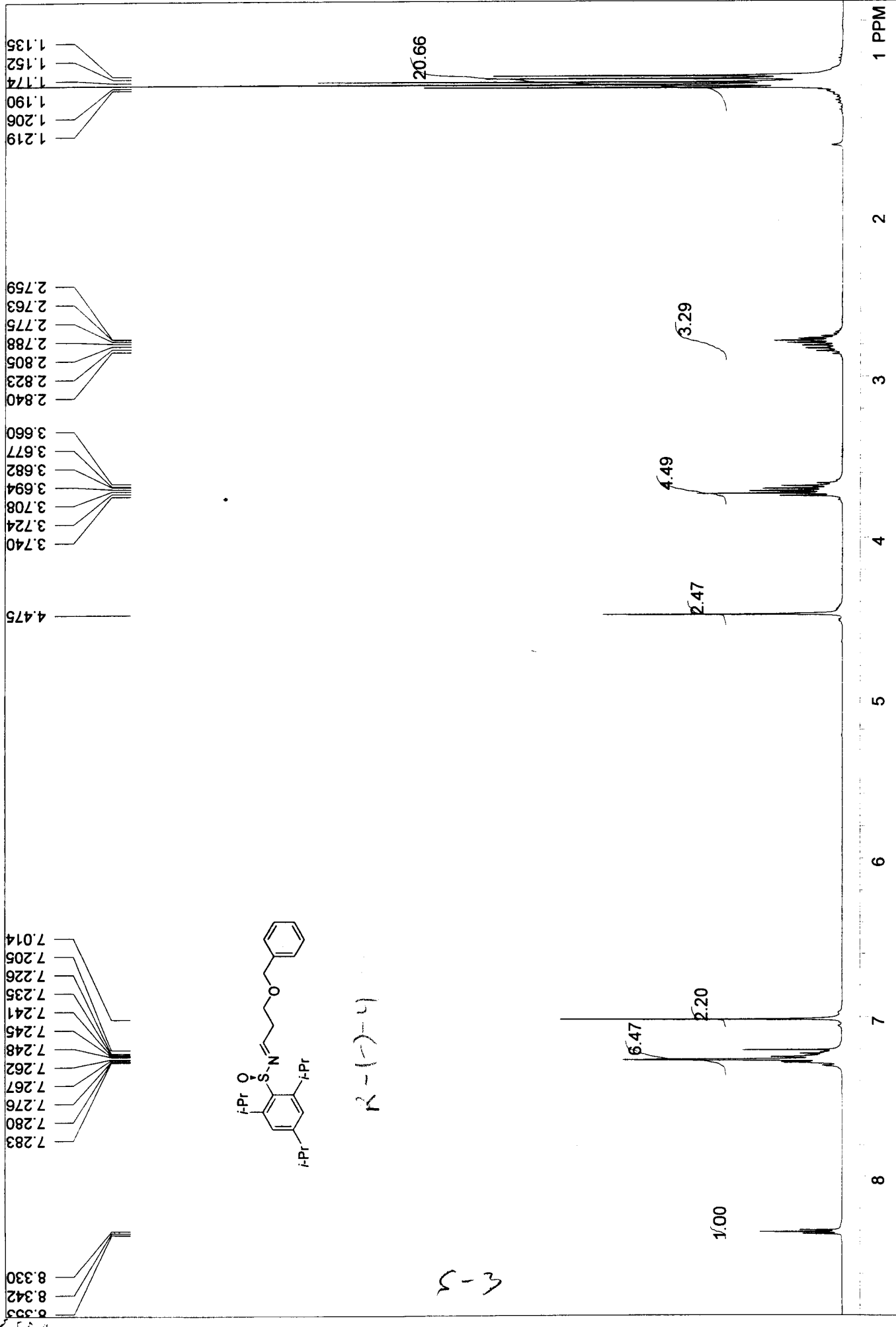
<b>Compound</b>	<b>Page</b>	<b><sup>1</sup>H</b>	<b><sup>13</sup>C</b>
(-)-4	S2	S3	
(-)-7	S4	S5	
(-)-8	S6	S7	
(+)-9	S8	S9	
(-)-11	S10	S11	
(+)-13	S12	S13	
(-)-14	S14	S15	
(-)-16	S16	S17	
(-)-18	S18	S19	
(-)-19	S20	S21	
(-)-1	S22	S23	



carbon30MIN.atm. USER: temple -- DATE: Oct 27 12:05:19 2007 EDT (UT-4h) templ

F1: 100.628	F2: 1.000	SW1: 23148	OF1: 10593.4	PTSId: 32768
EX:		PW: 5.7 usec	NA: 512	LB: 3.0
		PD: 2.0 sec		WinNuts - \$221T.1

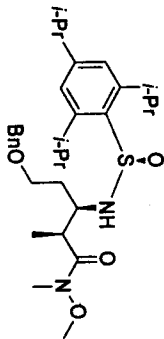
S-2



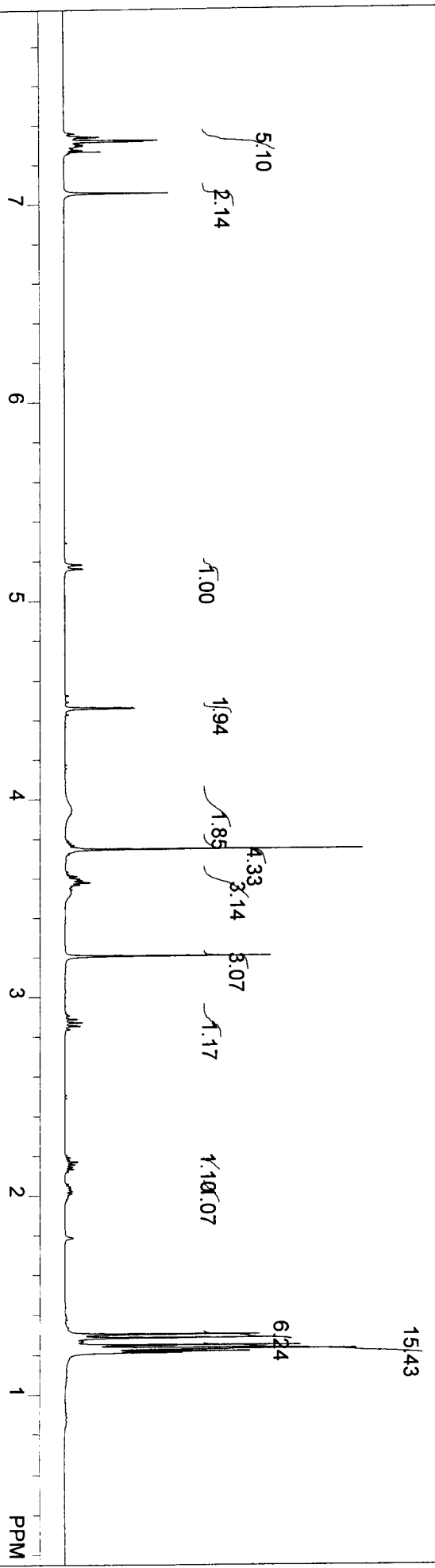
R-(+)-4

S-3

MS-II-129A, proton.atm	USER: temple -- DATE: May 18 16:49:06 2006 EDT (UT-4h) temp!	PTSId: 32768	WinNuts - \$Minsoo.I
F1: 400.191	OF1: 1980.1	LB: 0.1	
F2: 1.000	NA: 16		
EX:	PD: 1.0 sec		
	SW1: 8278		
	PW: 9.8 usec		

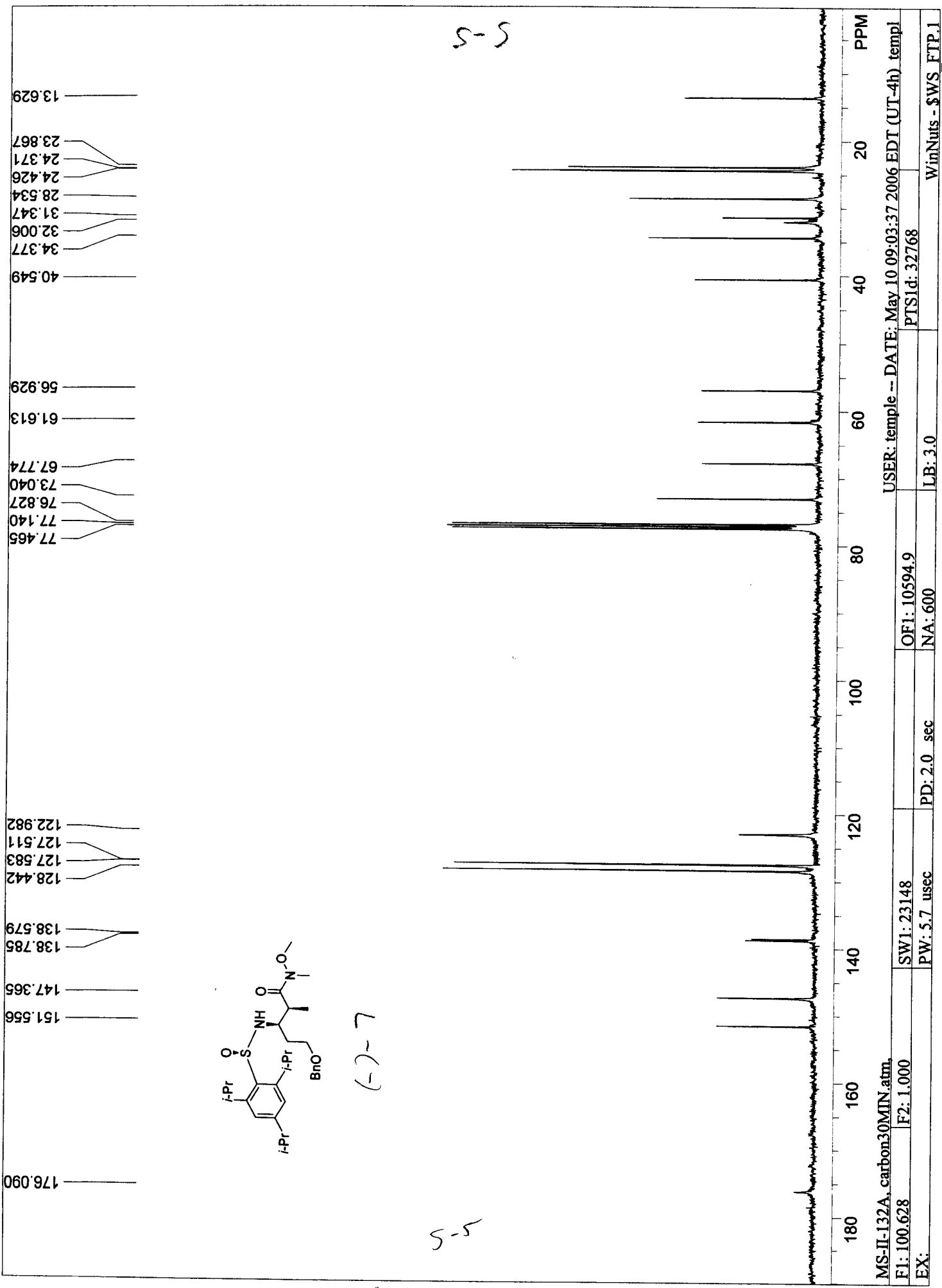


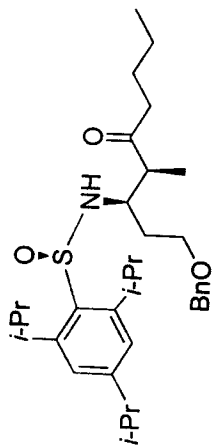
(-)-7



h-5

proton atm.		F1: 400.191		F2: 1.000		SW1: 8278		PD: 1.0 sec		OF1: 2004.6		NA: 16		LB: 0.1		PTSID: 32768		WinNuts - \$221T.1	
EX: USER: temple -- DATE: Nov 14 19:17:19 2007 EST (UT-5h) templ																			

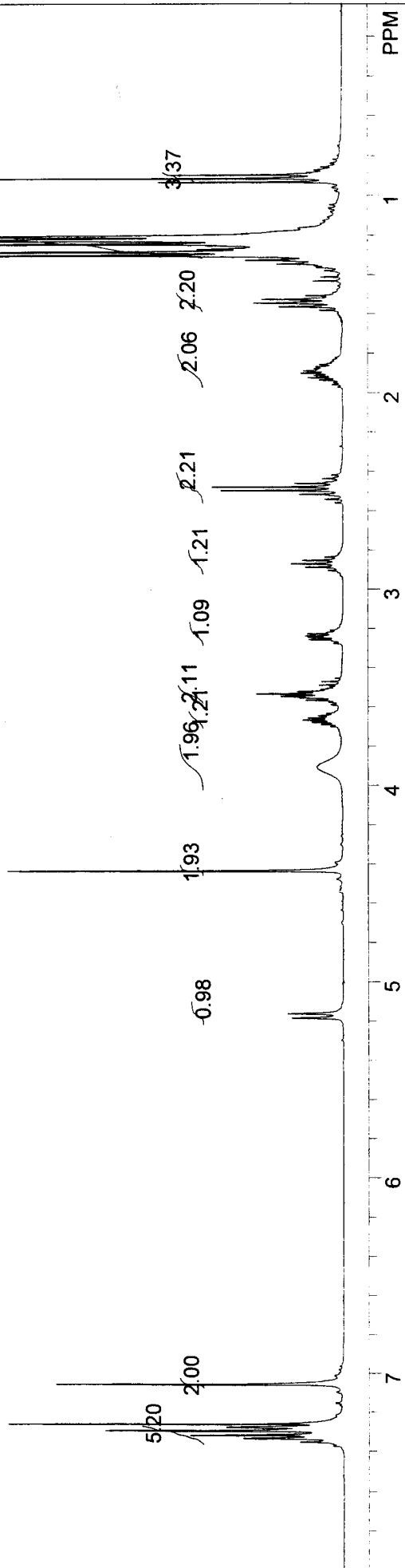




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9-5

5-6



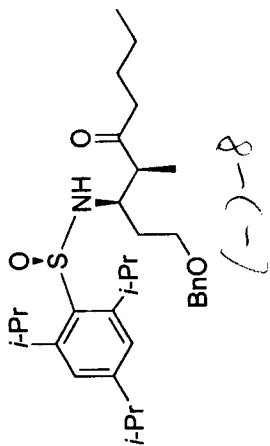
MS-II-138A, proton.atm.		USER: temple -- DATE: May 17 17:42:41 2006 EDT (UT-4h) temp/	
F1: 400.191	F2: 1.000	OF1: 2002.1	PTS1d: 32768
EX:	PW: 9.8 usec	NA: 16	LB: 0.1
	PD: 1.0 sec		WinNuts - \$221T.1

L-5

24.521  
24.412

77.510  
77.194  
76.870

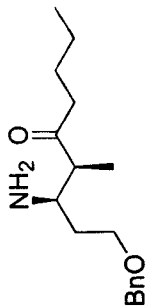
128.558  
127.748  
127.549



S-7

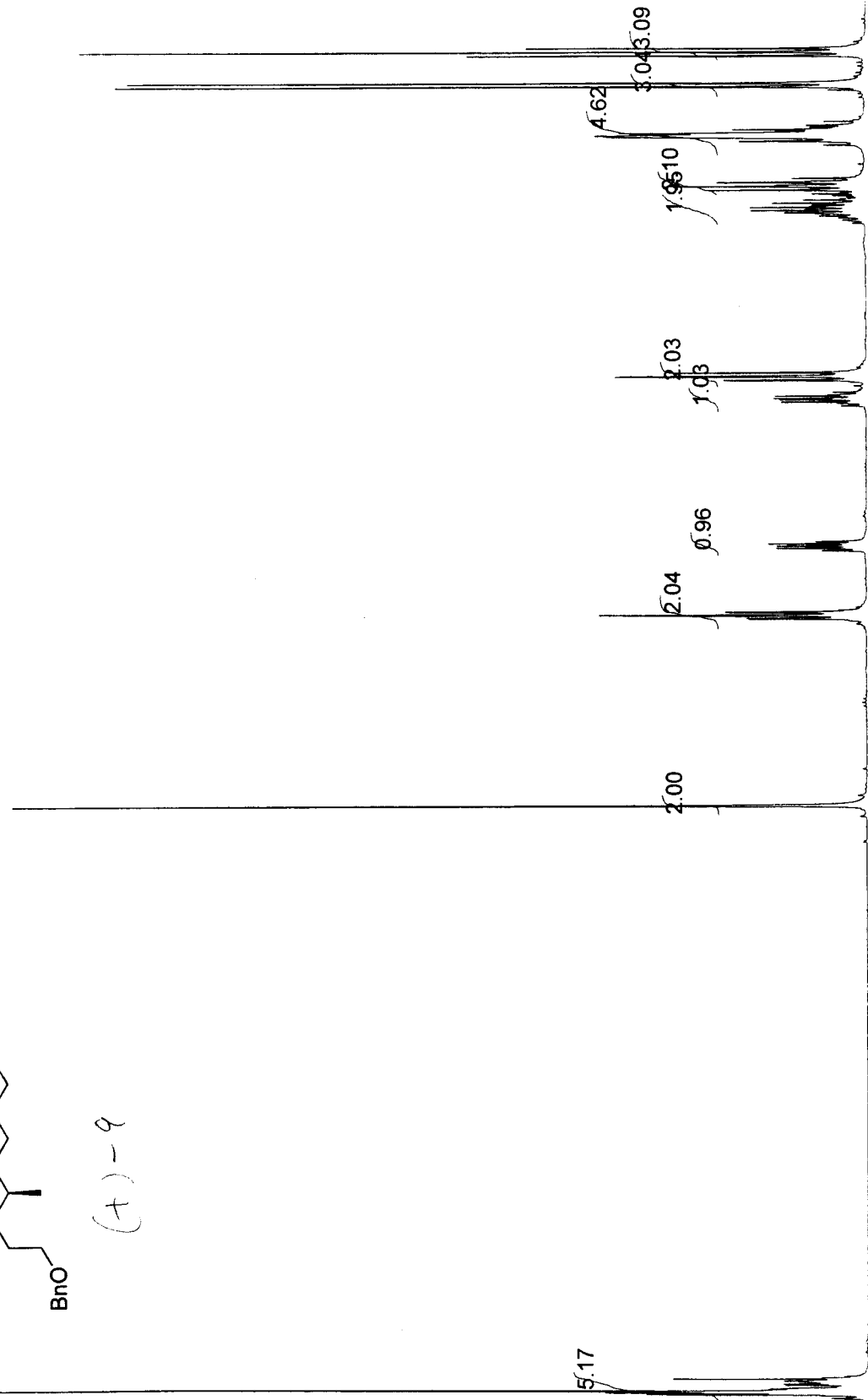
MS-II-138A, pendant90MIN.atm.	USER: temple -- DATE: May 17 18:38:13 2006 EDT (UT-4h) templ
F1: 100.629 F2: 1.000	PTSId: 65536
EX:	WinNuts - \$221T.1
SW1: 25126	OF1: 10823.7
PW: 5.7 usec	NA: 600
	PD: 4.0 sec
	LB: 3.0
200	150
100	50
0	PPM

8-5



(+)-9

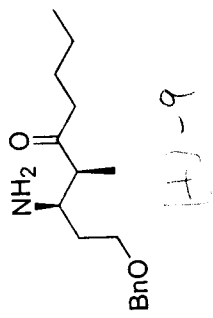
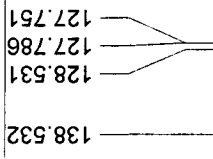
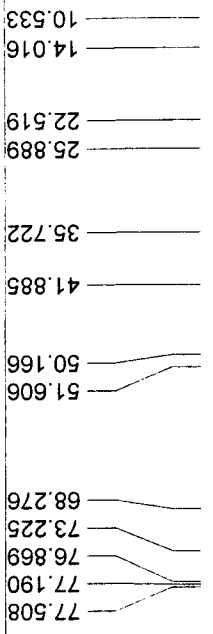
5-8



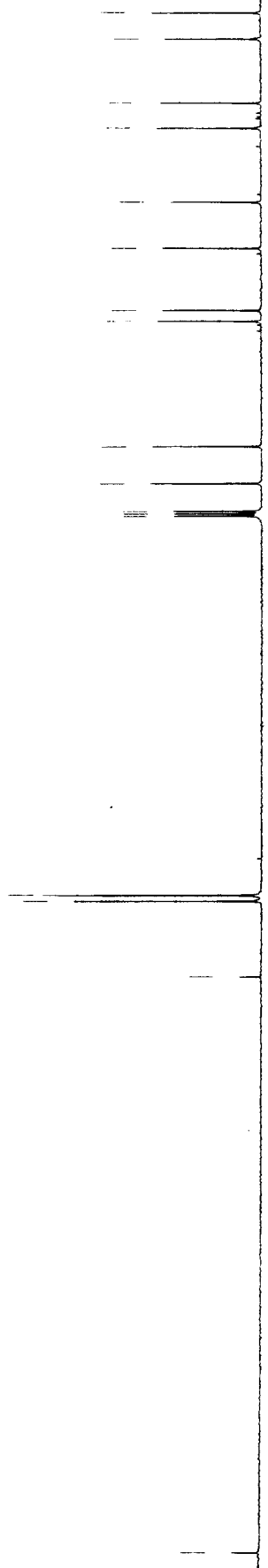
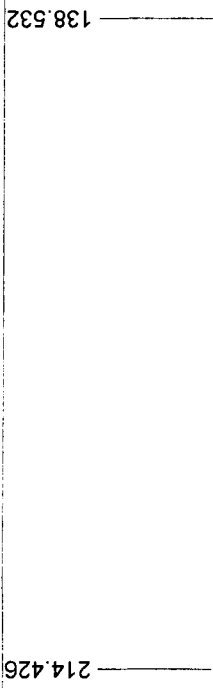
MS-II-224A, proton.atm.	USER: temple -- DATE: Oct 30 15:40:52 2006 EST (UT-5h) .templ
F1: 400.191	F2: 1.000
EX:	PD: 1.0 sec
	SW1: 8278
	PW: 9.8 usec
	OF1: 2001.5
	NA: 16
	PTS1d: 32768
	LB: 0.1
	W/inNuts - \$221T.1



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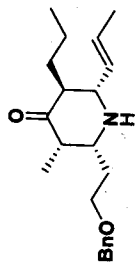


6-5



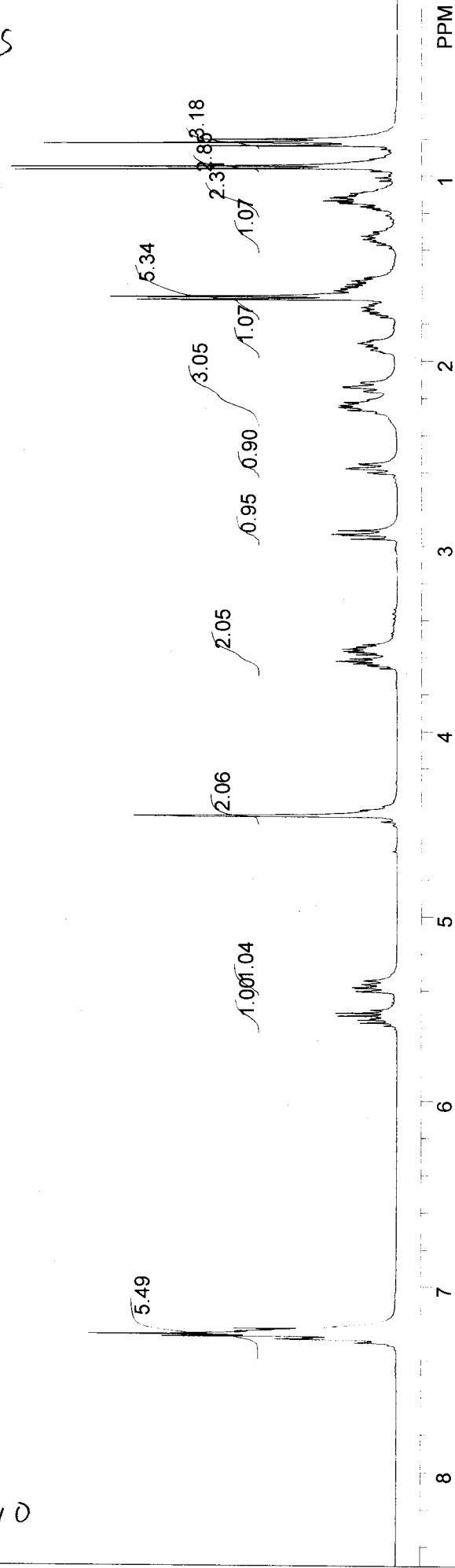
MS-IL-224A, carbon30MIN.atm,	USER: temple -- DATE: Oct 30 16:44:07 2006 EST (UT-5h) templ
F1: 100.628	F2: 1.000
EX:	PTSId: 32768
	LB: 3.0
	NA: 1024
	PD: 2.0 sec
	PW: 5.7 usec
	SW1: 23148
	OFI: 10600.7
	WinNuts - \$221T.1

01-5



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S-10

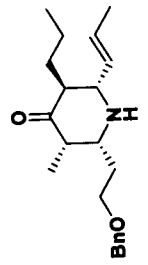


2. proton.atm. 1024  
 F1: 400.130 F2: 1.000  
 EX: SW1: 8013 PW: 9.8 usec PD: 1.0 sec OF1: 1990.8 NA: 16  
 USER: temple -- DATE: Apr 1 10:23:06 2008 EST (UT-5h) templ  
 PTS1d: 32768  
 LB: 0.1  
 WinNuts - \$221T.1

11-5

10.271  
14.484  
17.814  
21.124  
27.516  
33.893  
50.787  
55.842  
62.533  
65.226  
68.577  
73.130  
76.178  
76.291  
76.348  
76.780  
77.099  
77.418  
77.828  
77.922  
77.967  
78.041  
78.091

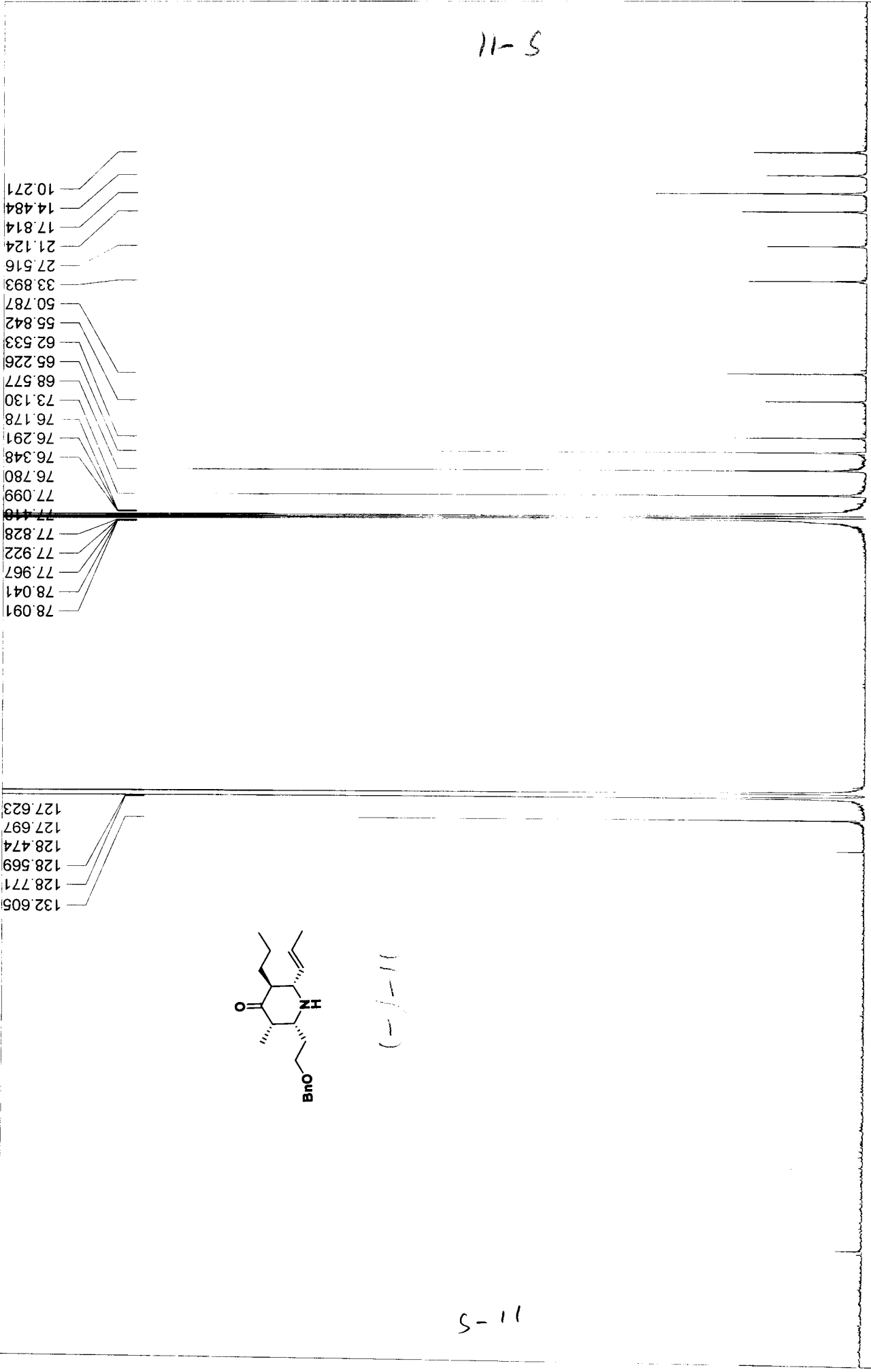
132.605  
128.771  
128.569  
128.474  
127.697  
127.623

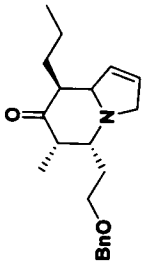


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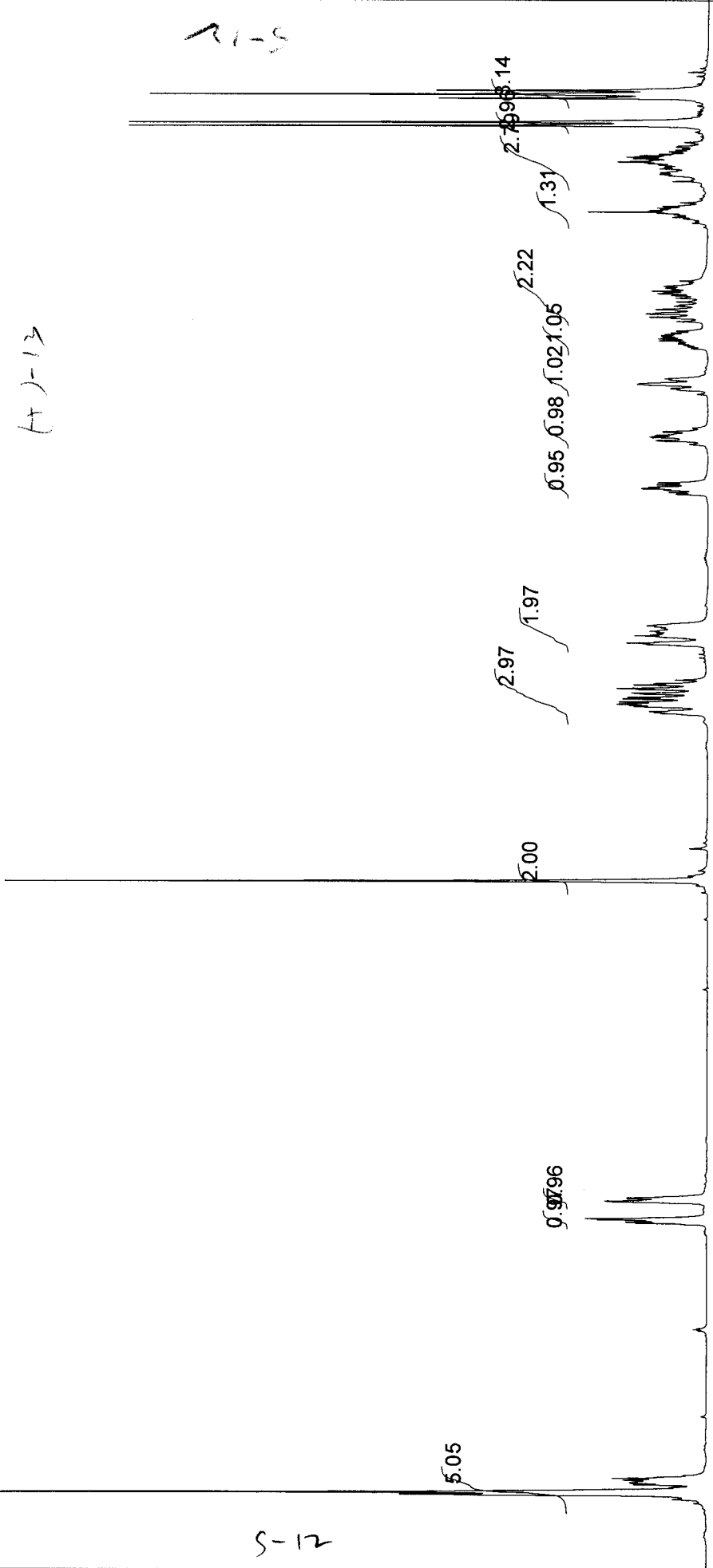
MS-II-301A, pendant90MIN.atm	USER: temple -- DATE: May 19 15:43:37 2007 EDT (UT-4h) templ
F1: 100.629	PTSId: 65536
F2: 1.000	LB: 3.0
EX:	WinNuts - \$221T.1
SW1: 25126	OF1: 10815.1
PW: 5.7 usec	NA: 1160
PD: 4.0 sec	





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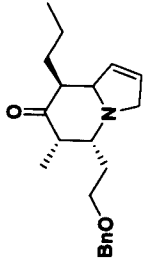
S-12



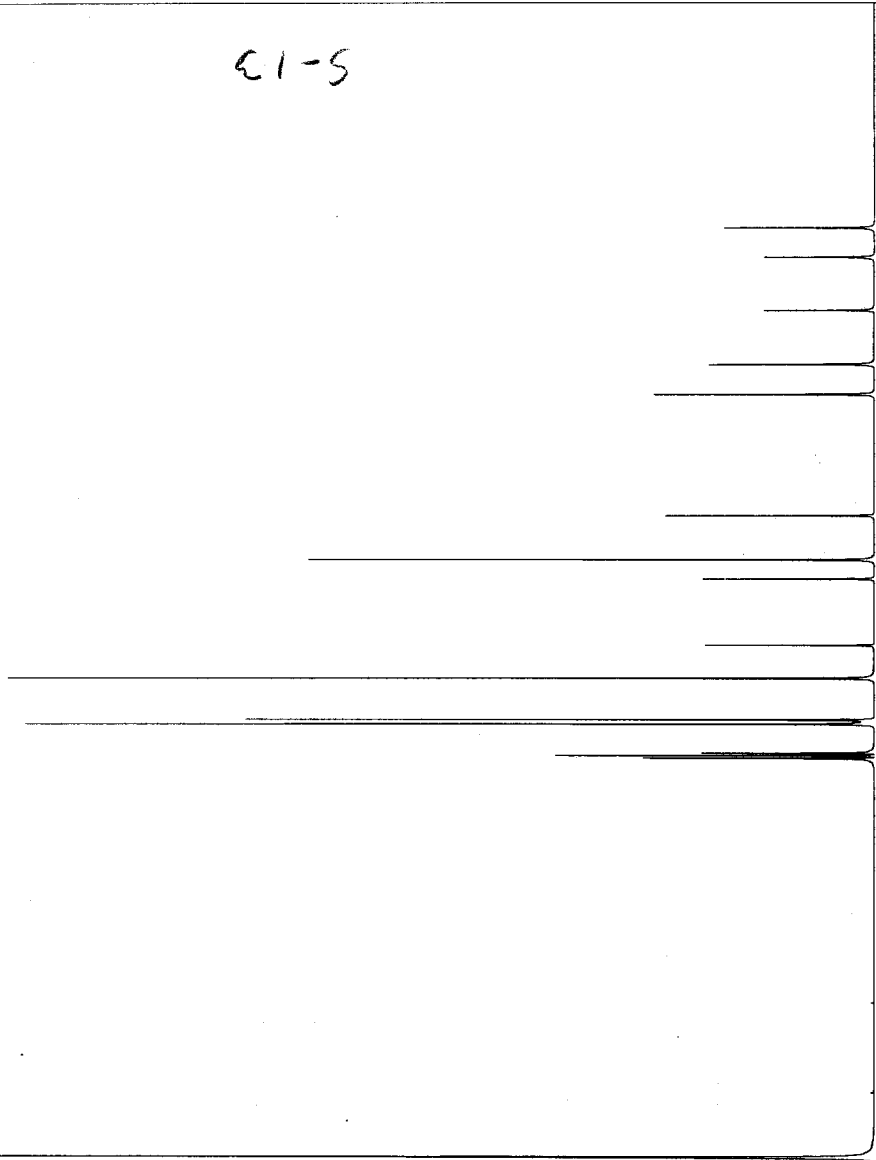
S-12

MS-III-96B-2, proton.atm.		USER: temple -- DATE: Jul 3 15:50:02 2007 EDT (UT-4h) temp	
F1: 400.191	F2: 1.000	OF1: 1972.2	PTSId: 32768
EX:	PW: 9.8 usec	NA: 16	LB: 0.1
	PD: 1.0 sec		WinNuts - \$Minsoc.1

S-13



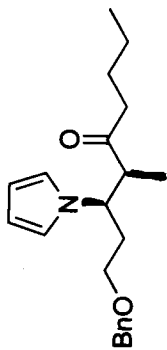
(+)-13



200 150 100 50 0 PPM

S-13

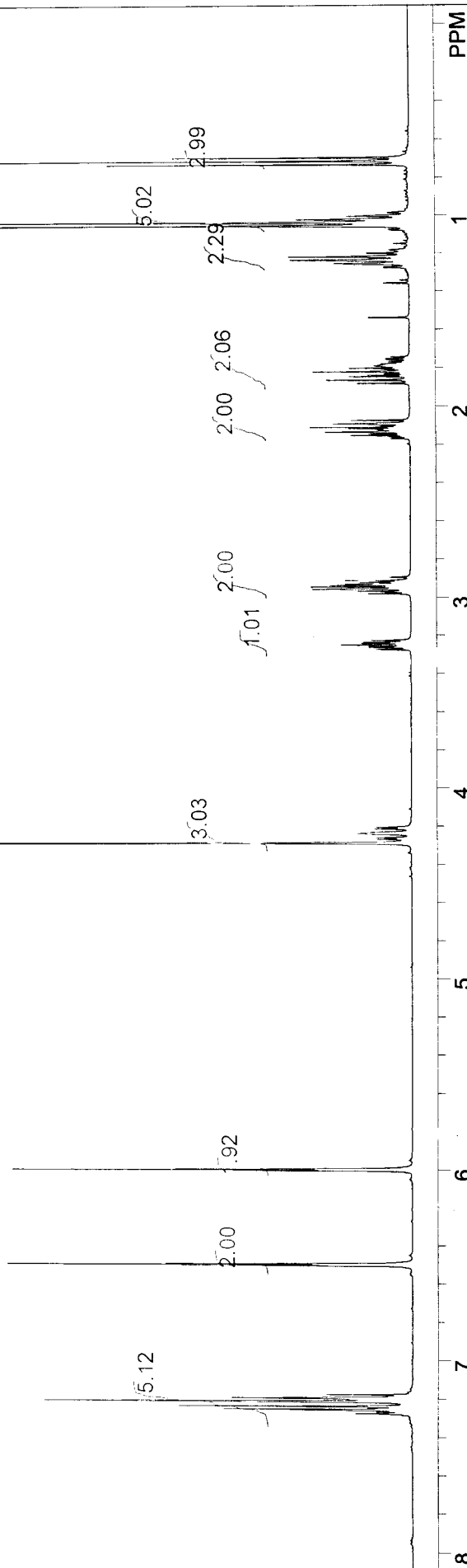
MS-III-96B-2.pendant10MIN.atm.		USER: temple -- DATE: Jul 3 16:43:19 2007 EDT (UT-4h) templ	
F1: 100.629	F2: 1.000	OF1: 10875.4	PTS1d: 65536
EX:		PD: 4.0 sec	LB: 3.0
		SW1: 25126	WinNuts - \$WS FTP.1
		PW: 5.7 usec	
		NA: 560	



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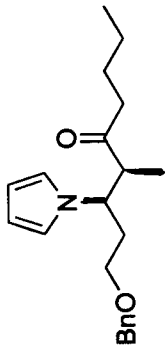
h1-5

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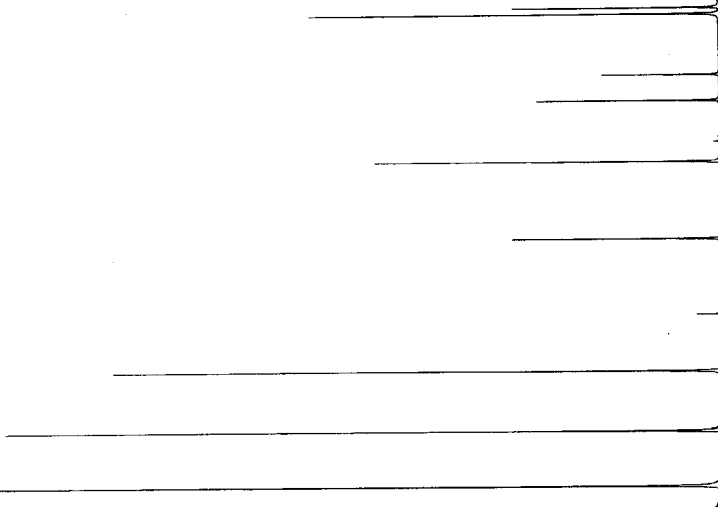


MS-III-44A, proton.atm.		USER: temple -- DATE: Apr 9 13:27:47 2007 EDT (UT-4h) templ	
F1: 400.191	F2: 1.000	OF1: 1970.0	PTS1d: 32768
EX:		PD: 1.0 sec	WinNuts - \$WS FTP.1
		NA: 16	LB: 0.1

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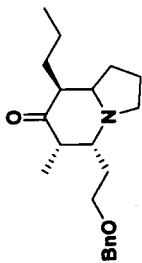
(4)-14



S-15

pendant.atm.		USER: root -- DATE: Mar 23 09:55:58 2007 EST (UT-5h) templ	
F1: 100.628	F2: 1.000	OF1: 10078.8	PTS1d: 65536
EX:	SW1: 25126	NA: 1597	LB: 3.5
	PW: 5.7 usec	PD: 4.0 sec	WinNuts - \$WS FTP.1

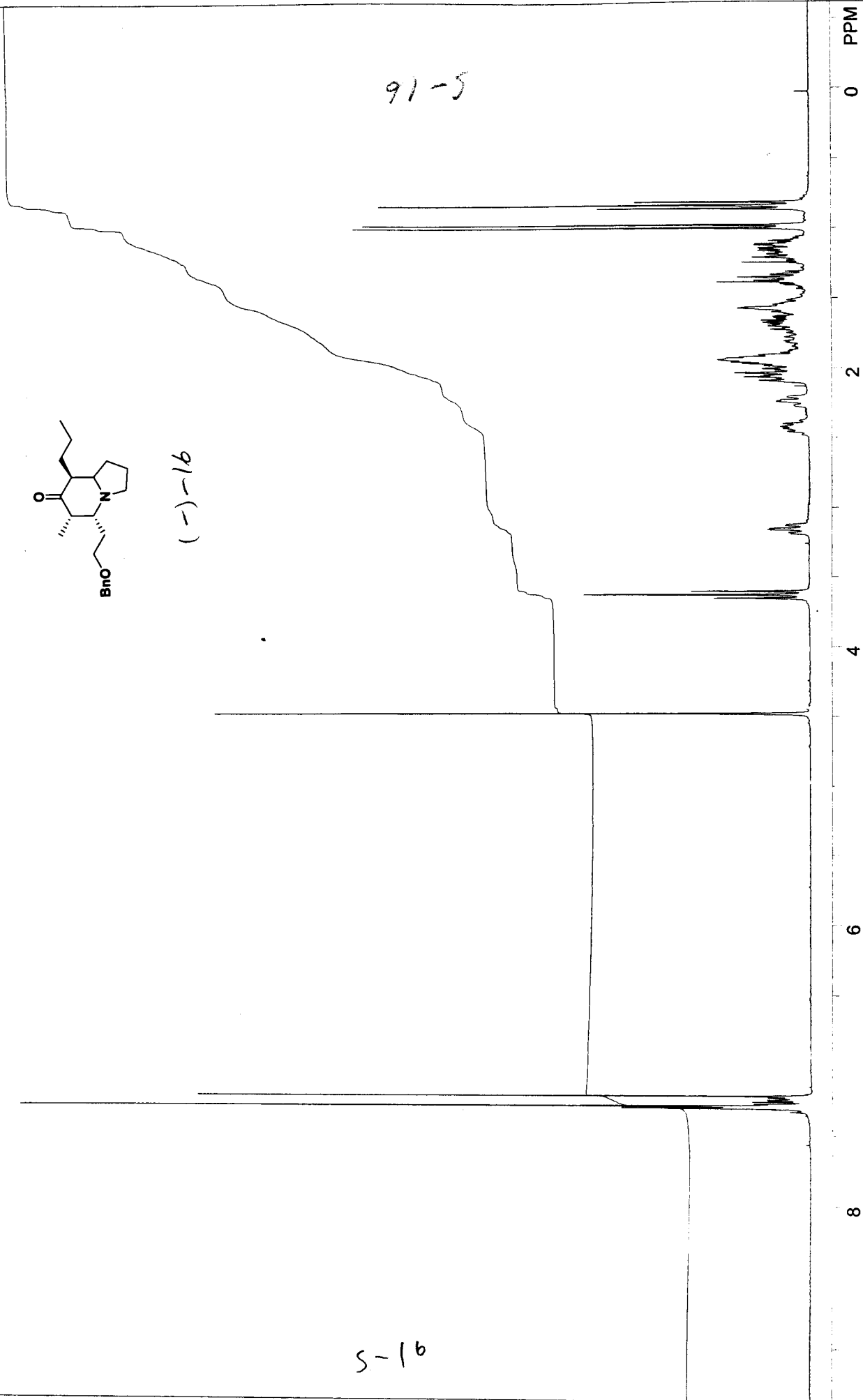
200 150 100 50 0 PPM



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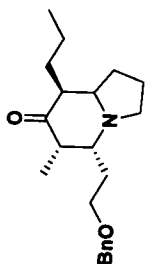
91-5

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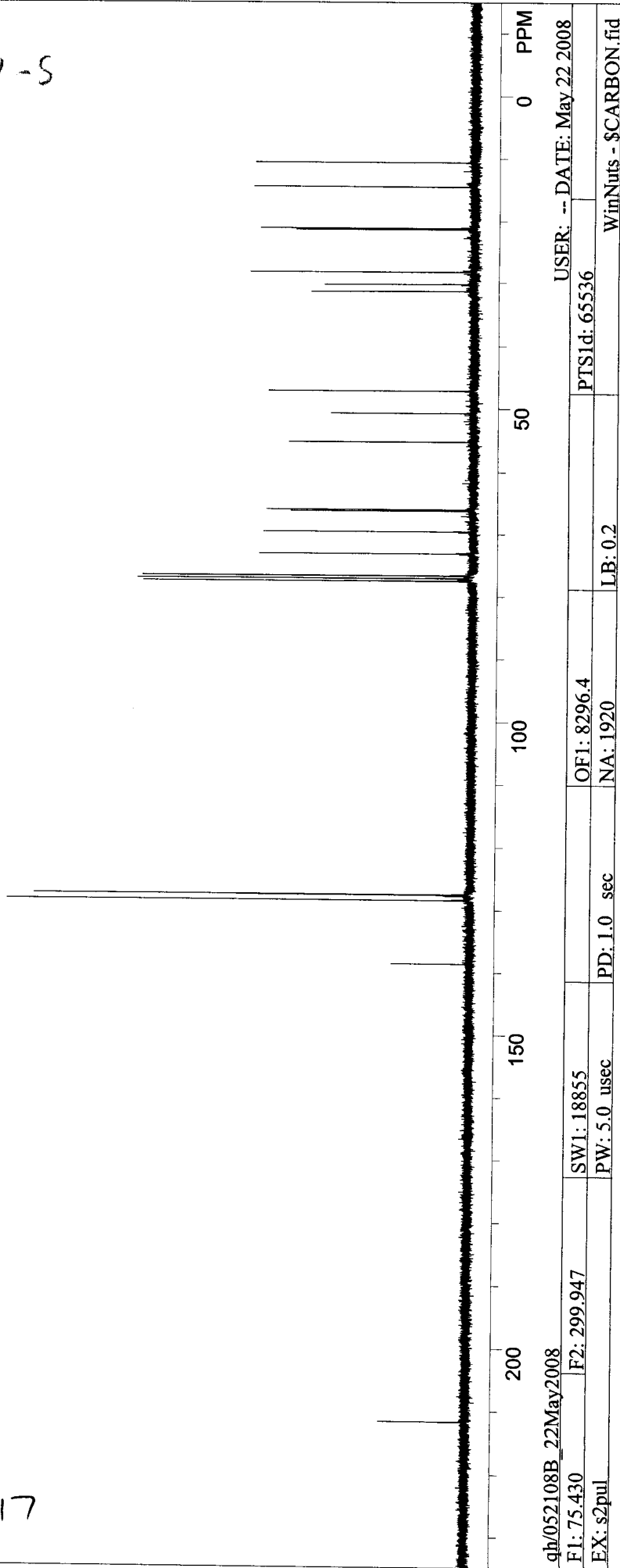
qh/052008A_21May2008 <i>pmc</i>	USER: -- DATE: May 21 2008
F1: 299.947	PTSId: 8192
SW1: 3000	OF1: 1312.9
PW: 4.0 usec	NA: 8
PD: 1.0 sec	LB: 0.2
EX: s2pul	WinNuts - \$PROTON.fid





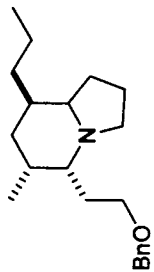
(-)-16

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S-17

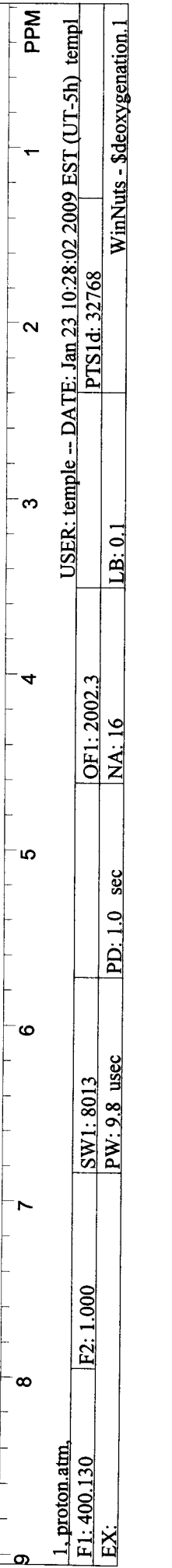
qh/052108B_22May2008	USER: -- DATE: May 22 2008
F1: 75.430	F2: 299.947
EX: s2pul	PTSId: 65536
	LB: 0.2
	OF1: 8296.4
	NA: 1920
	PD: 1.0 sec
	SW1: 18855
	PW: 5.0 usec
	WinNuts - \$CARBON.fid



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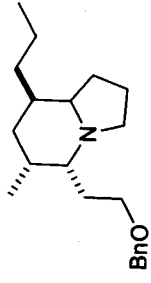
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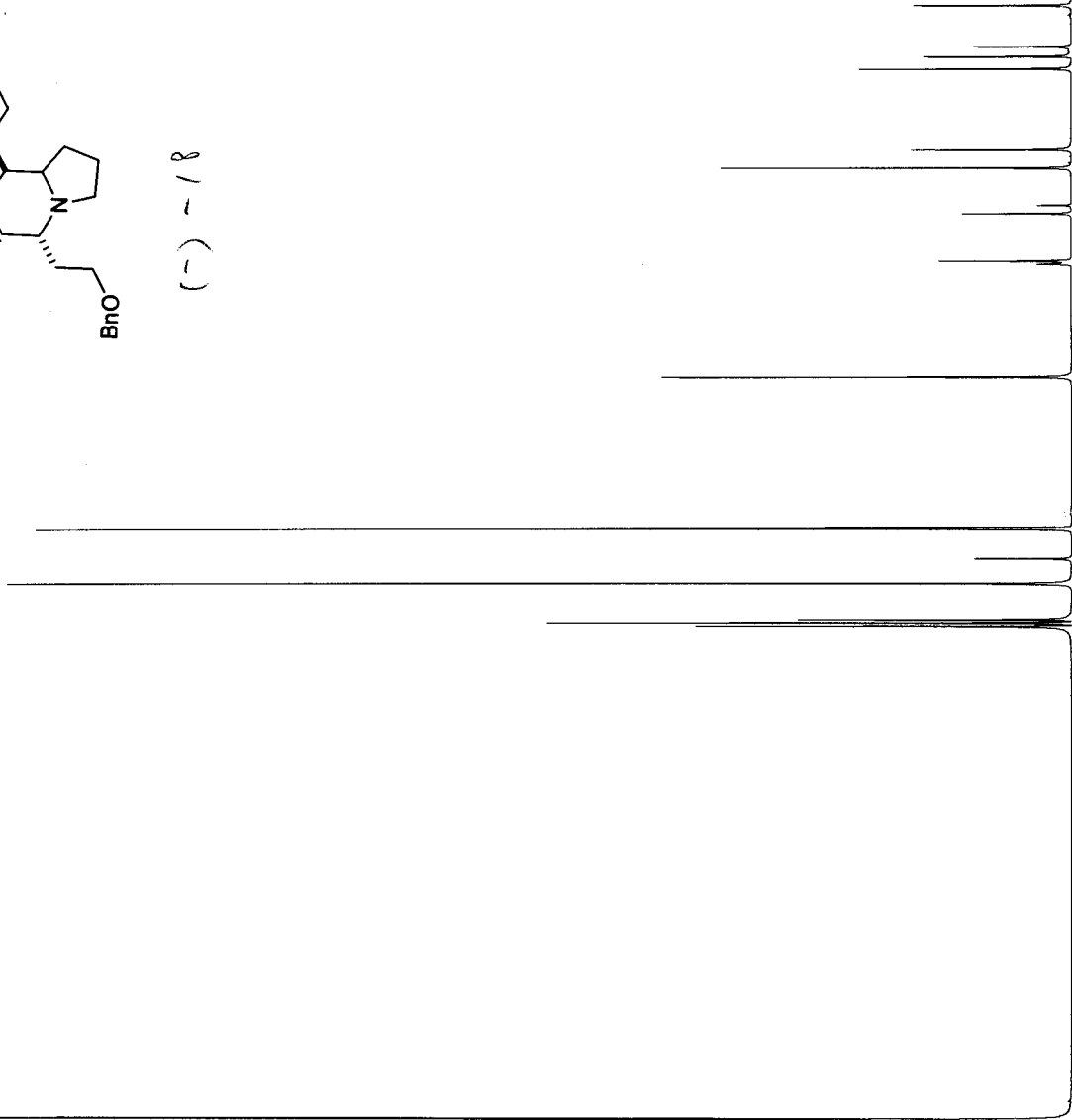


1. proton.atm		USER: temple -- DATE: Jan 23 10:28:02 2009 EST (UT-5h) templ	
F1: 400.130	F2: 1.000	OF1: 2002.3	PTSId: 32768
EX:	PW: 9.8 usec	PD: 1.0 sec	LB: 0.1
			WinNuts - Sdeoxygenation.1

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(-) - 18



PPM

50

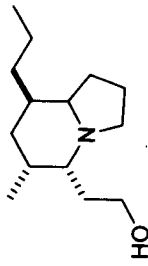
100

150

MS-III-89A, pendant90MIN.atm,	USER: temple -- DATE: Jun 20 13:30:50 2007 EDT (UT-4h) templ
F1: 100.629	F2: 1.000
SW1: 25126	OF1: 10808.1
PW: 5.7 usec	NA: 1024
EX:	PD: 4.0 sec
	PTSId: 65536
	LB: 3.0
	WinNuts - \$WS_FTP.1

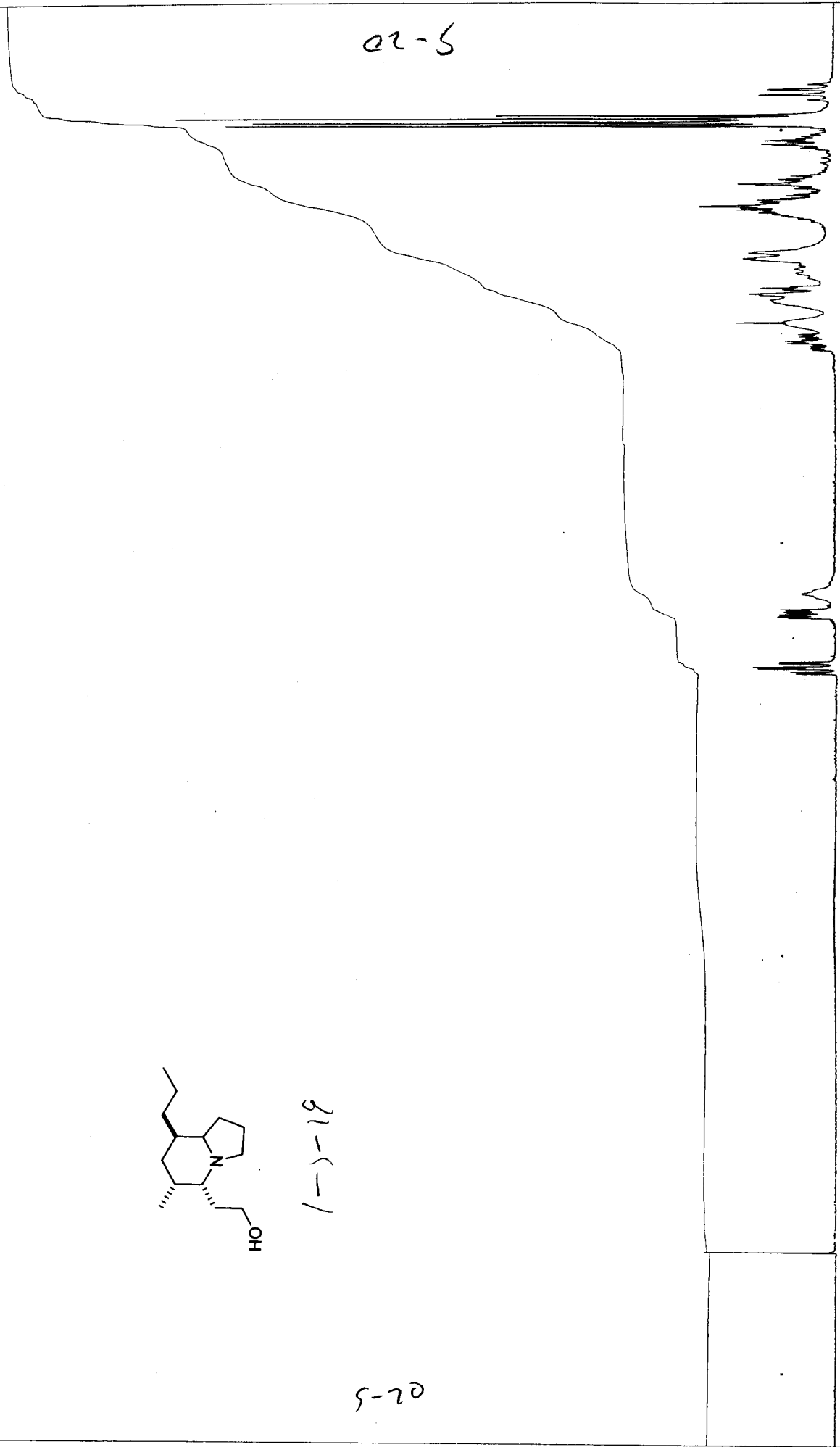
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02-5



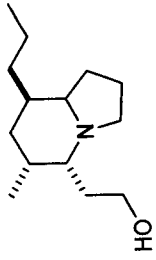
1-)-19

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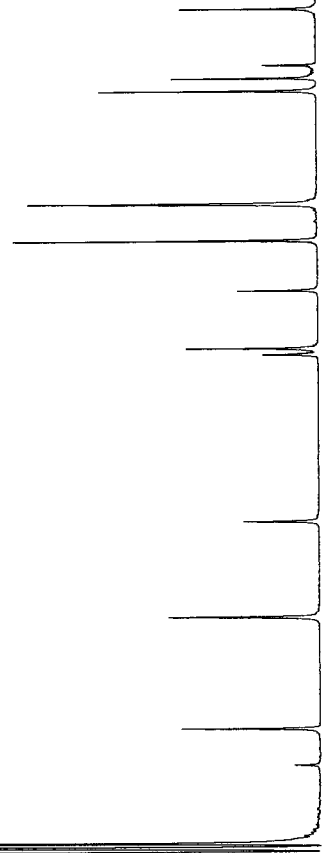
debenzylaton P, proton.atm, 11133	USER: temple -- DATE: Jan 25 12:56:57 2009 EST (UT-5h)
F1: 400.130	F2: 1.000
EX:	PTS1d: 32768
	LB: 0.1
	WinNuts - SWS_FTP.1

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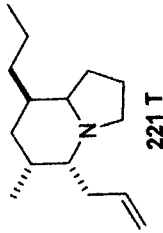
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S-21



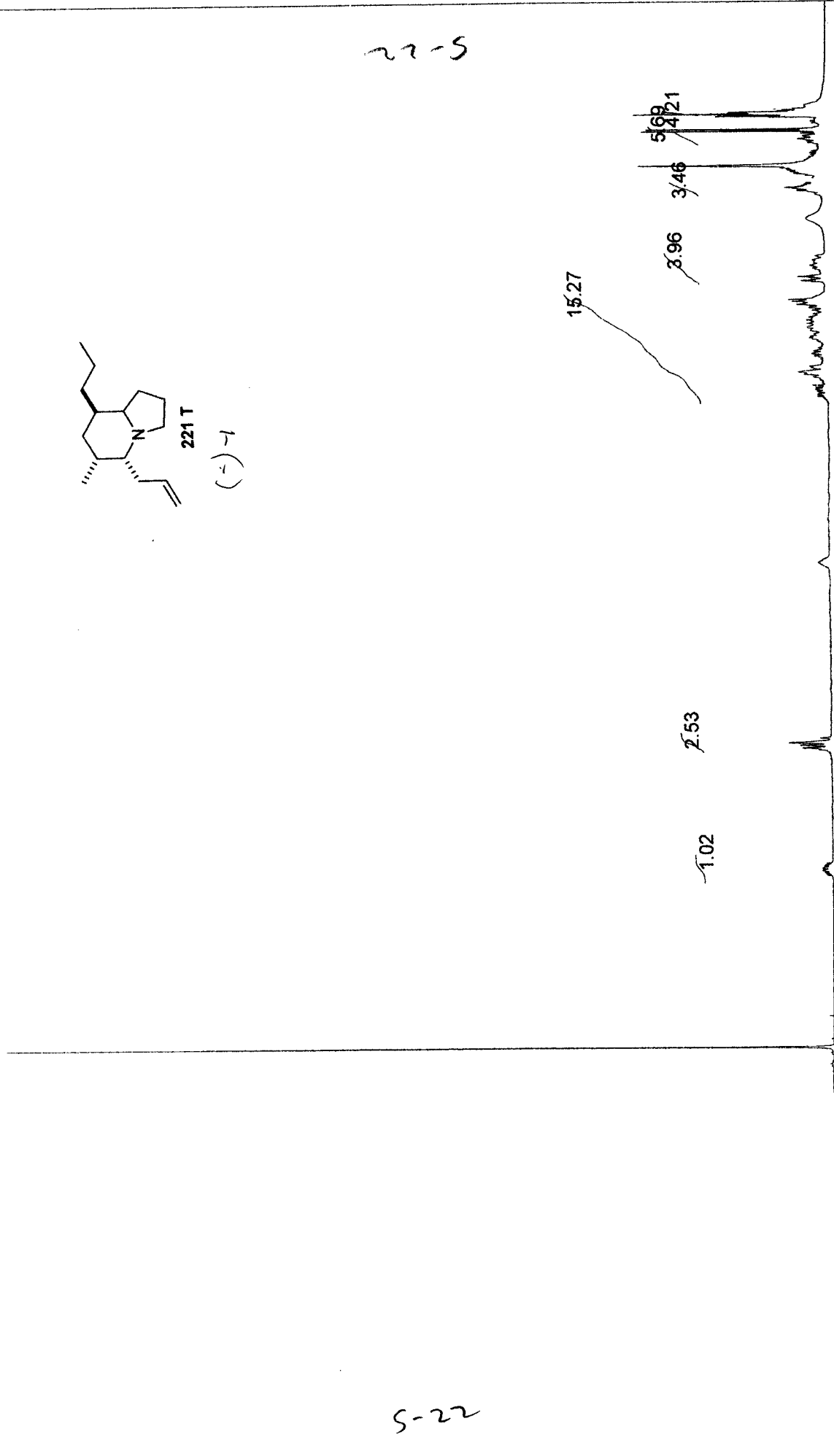
MS-III-106B\_pendant90MIN.atm. USER: temple -- DATE: Jul 14 16:46:04 2007 EDT (UT-4h) templ  
F1: 100.629 F2: 1.000 OF1: 10854.4 PTSId: 65536  
EX: PD: 4.0 sec NA: 1200 LB: 3.0 WinNuts - \$WS\_FTP.1

22-5



221 T

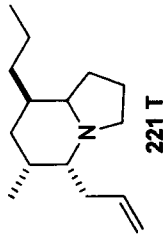
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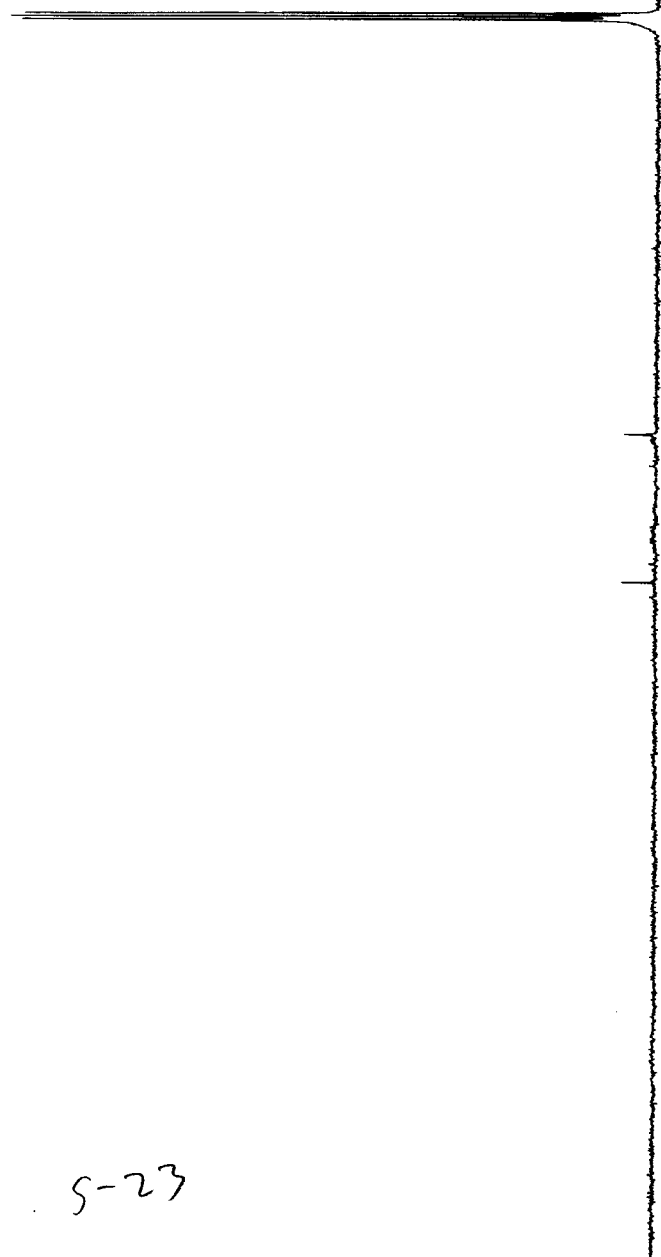
0	1	2	3	4	5	6	7	8	9	10
spect. CDCl3.										PPM
F1: 500.133										USER: nmrsu -- DATE: Fri Jan 30 20:09:36.2009
F2: 1.000										PTS1d: 32768
EX:										WinNuts - \$pdata
SW1: 10331										LB: 0.0
PW: 8.3 usec										NA: 32
PD: 1.0 sec										

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carbonOVNTE.all	USER: temple -- DATE: Jan 30 08:07:33 2009 EST (UT-5h) temp	PPM
F1: 100.613	OF1: 9820.4	50
F2: 1.000	NA: 11000	100
EX:	PD: 2.0 sec	150
	PW: 5.7 usec	
	LB: 3.0	
	PTSId: 32768	
	WinNuts - \$221.T.1	