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β -Lactone 3b. R_f 0.36 (50:50-CH₂Cl₂:Hexanes); $[\alpha]_D^{26}$ 44.2 (*c* 1.20, CHCl₃); ¹H NMR (300 MHz, CDCl₃) δ 4.40 (ddd, *J* = 4.0, 4.5, 9.0 Hz, 1H), 3.80-3.88 (m, 1H), 3.58 (dd, *J* = 4.8, 9.9 Hz, 1H), 3.37 (dd, *J* = 7.5, 9.9 Hz, 1H), 3.28 (dq, *J* = 4.0, 7.5 Hz, 1H), 2.04 (ddd, *J* = 3.3, 9.0, 14.4 Hz, 1H), 1.88 (ddd, *J* = 4.5, 8.4, 14.4 Hz, 1H), 1.40 (d, *J* = 7.5 Hz, 3H), 0.892 (s, 9H), 0.889 (s, 9H), 0.087 (s, 3H), 0.080 (s, 3H), 0.051 (s, 6H); ¹³C NMR (75 MHz, CDCl₃) δ 172.0, 76.3, 69.3, 67.0, 50.8, 39.0, 25.84, 25.76, 18.2, 18.0, 12.3, -4.4, -5.0, -5.4, -5.5; IR (thin film) 1833 cm⁻¹; Anal. Calcd for C₁₉H₄₀O₄Si₂: C, 58.71; H, 10.37; Found: C, 58.64; H, 10.43.

β -Lactone 3c. R_f 0.29 (10:90-EtOAc:Hexanes); $[\alpha]_D^{26}$ 43.8 (*c* 2.85, CHCl₃); ¹H NMR (200 MHz, CDCl₃) δ 7.20-7.35 (m, 5H), 4.64 (AB q, *J* = 11.9 Hz, 2H), 4.15 (dd, *J* = 4.2, 6.3 Hz, 1H), 3.74 (dq, *J* = 6.3, 6.4 Hz, 1H), 3.40 (dq, *J* = 4.2, 7.6 Hz, 1H), 1.39 (d, *J* = 7.6 Hz, 3H), 1.24 (d, *J* = 6.4 Hz, 3H); ¹³C NMR (75 MHz, CDCl₃) δ 171.4, 137.9, 128.4, 127.7, 127.6, 81.4, 74.2, 71.4, 47.6, 15.1, 12.2; IR (thin film) 1826 cm⁻¹; FAB HRMS Calcd for [M+H]: 221.1178. Found: 221.1180.

β -Lactone 3d. R_f 0.29 (10:90-EtOAc:Hexanes); $[\alpha]_D^{26}$ 39.0 (*c* 0.82, CHCl₃); ¹H NMR (300 MHz, CDCl₃) δ 7.21-7.35 (m, 10H), 4.57 (s, 2H), 4.13 (dd, *J* = 4.2, 5.4 Hz, 1H), 3.77 (ddd, *J* = 5.4, 6.9, 6.9 Hz, 1H), 3.39 (dq, *J* = 4.2, 7.5 Hz, 1H), 3.00 (dd, *J* = 6.9, 13.5 Hz, 1H), 2.83 (dd, *J* = 6.9, 13.5 Hz, 1H), 1.27 (d, *J* = 7.5 Hz, 3H); ¹³C NMR (75 MHz, CDCl₃) δ 171.36, 137.52, 136.75, 129.36, 128.56, 128.34, 127.82, 127.77, 126.74, 79.82, 79.22, 72.73, 47.26, 36.73, 12.07; IR (thin film) 1829 cm⁻¹; Anal. Calcd for C₁₉H₂₀O₃: C, 77.00; H, 6.80; Found: C, 77.04; H, 6.86.

β -Lactone 3e. R_f 0.36 (1:5-EtOAc:Hexanes); ¹H NMR (300 MHz, CDCl₃) δ 7.26-7.41 (m, 10H), 4.51 (d, *J* = 6.6 Hz, 1H), 4.48 (ABqt, *J* = 12.0 Hz, 2H), 4.35 (dd, *J* = 4.2, 6.6 Hz, 1H), 3.33 (dq, *J* = 4.2, 7.8 Hz, 1H), 1.10 (d, *J* = 7.8 Hz, 3H); ¹³C NMR (75 MHz, CDCl₃) δ 171.2, 137.4, 135.9, 129.0, 128.9, 128.4, 127.8, 127.7, 127.5, 81.1, 80.1, 70.4, 47.8, 11.9; IR (thin film) 1826 cm⁻¹; FAB HRMS Calcd for [M+Na]: 305.1154. Found: 305.1168.

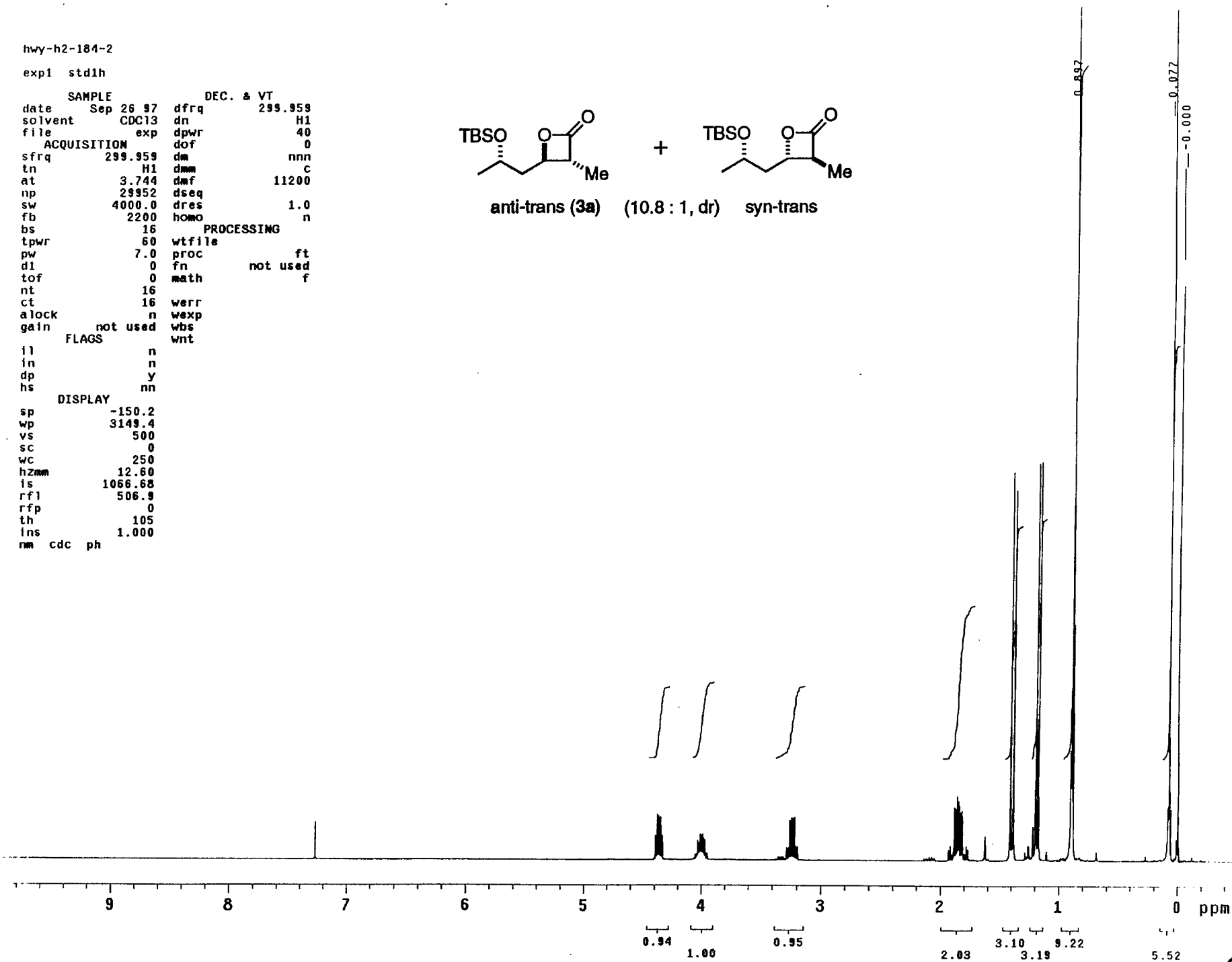
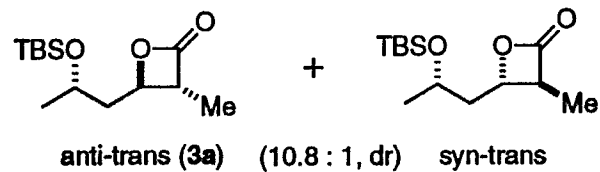
β -Lactone 3f. R_f 0.18 (10:90-EtOAc:Hexanes); $[\alpha]_D^{26}$ 27.9 (*c* 1.49, CHCl₃); ¹H NMR (300 MHz, CDCl₃) δ 4.31 (ddd, *J* = 4.8, 6.3, 6.3 Hz, 1H), 4.15 (dd, *J* = 6.3, 9.0 Hz, 1H), 4.08 (dd, *J* = 3.9, 6.3 Hz, 1H), 3.84 (dd, *J* = 4.8, 9.0 Hz, 1H), 3.57 (dq, *J* = 3.9, 7.5 Hz, 1H), 1.45 (s, 3H), 1.44 (d, *J* = 7.5 Hz, 3H), 1.37 (d, *J* = 0.6 Hz, 3H); ¹³C NMR (75 MHz, CDCl₃) δ 170.8, 110.2, 77.1, 75.1, 66.0, 48.1, 26.4, 24.7, 12.4; IR (thin film) 1826 cm⁻¹; FAB HRMS Calcd for [M+H]: 187.0970. Found: 187.0974. Anal. Calcd for C₉H₁₄O₄: C, 58.05; H, 7.58; Found: C, 58.16; H, 7.55.

β -Lactone 3g. R_f 0.21 (10:90-EtOAc:Hexanes); ¹H NMR (300 MHz, CDCl₃) δ 7.26-7.38 (m, 5H), 4.51 (s, 2H), 4.18 (dd, *J* = 4.2, 7.8 Hz, 1H), 3.52 (dd, *J* = 4.8, 10.5 Hz, 1H), 3.49 (dd, *J* = 4.5, 10.5 Hz, 1H), 3.38 (dq, *J* = 4.2, 7.2 Hz, 1H), 2.10-2.19 (m, 1H), 1.37 (d, *J* = 7.2 Hz, 3H), 1.04 (d, *J* = 6.9 Hz, 3H); ¹³C NMR (75 MHz, CDCl₃) δ 171.9, 138.0, 128.3, 127.6, 127.5, 80.3, 73.2, 70.8, 48.8, 37.5, 12.7, 11.8; IR (thin film) 1822 cm⁻¹; FAB HRMS Calcd for [M+H]: 235.1334. Found: 235.1329.

hwy-h2-184-2

exp1 std1h

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tn	H1	dmm	C
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np	29952	dseq	
sw	4000.0	dres	1.0
fb	2200	homo	n
bs	16	PROCESSING	
tpwr	60	wfile	
pw	7.0	proc	ft
d1	0	fn	not used
tof	0	math	f
nt	16		
ct	16	werr	
alock	n	wexp	
gain	not used	wbs	
	FLAGS	wnt	
il	n		
in	n		
dp	y		
hs	nn		
DISPLAY			
sp	-150.2		
wp	3149.4		
vs	500		
sc	0		
wc	250		
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is	1066.68		
rfl	506.9		
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th	105		
ins	1.000		
nm	cdc ph		

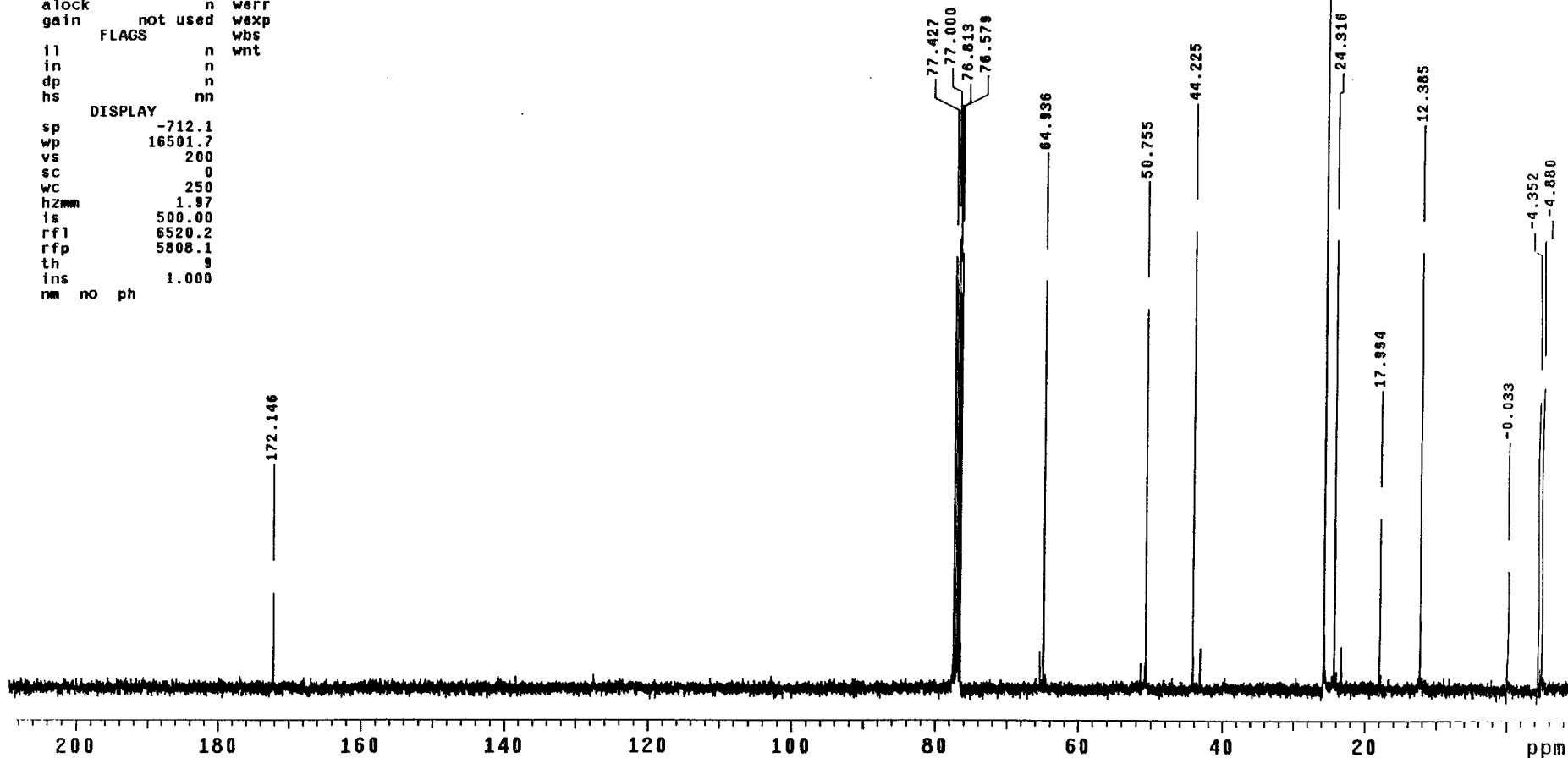
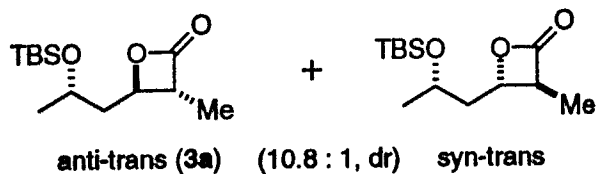


ω

hwy-c2-184-2

exp1 std13c

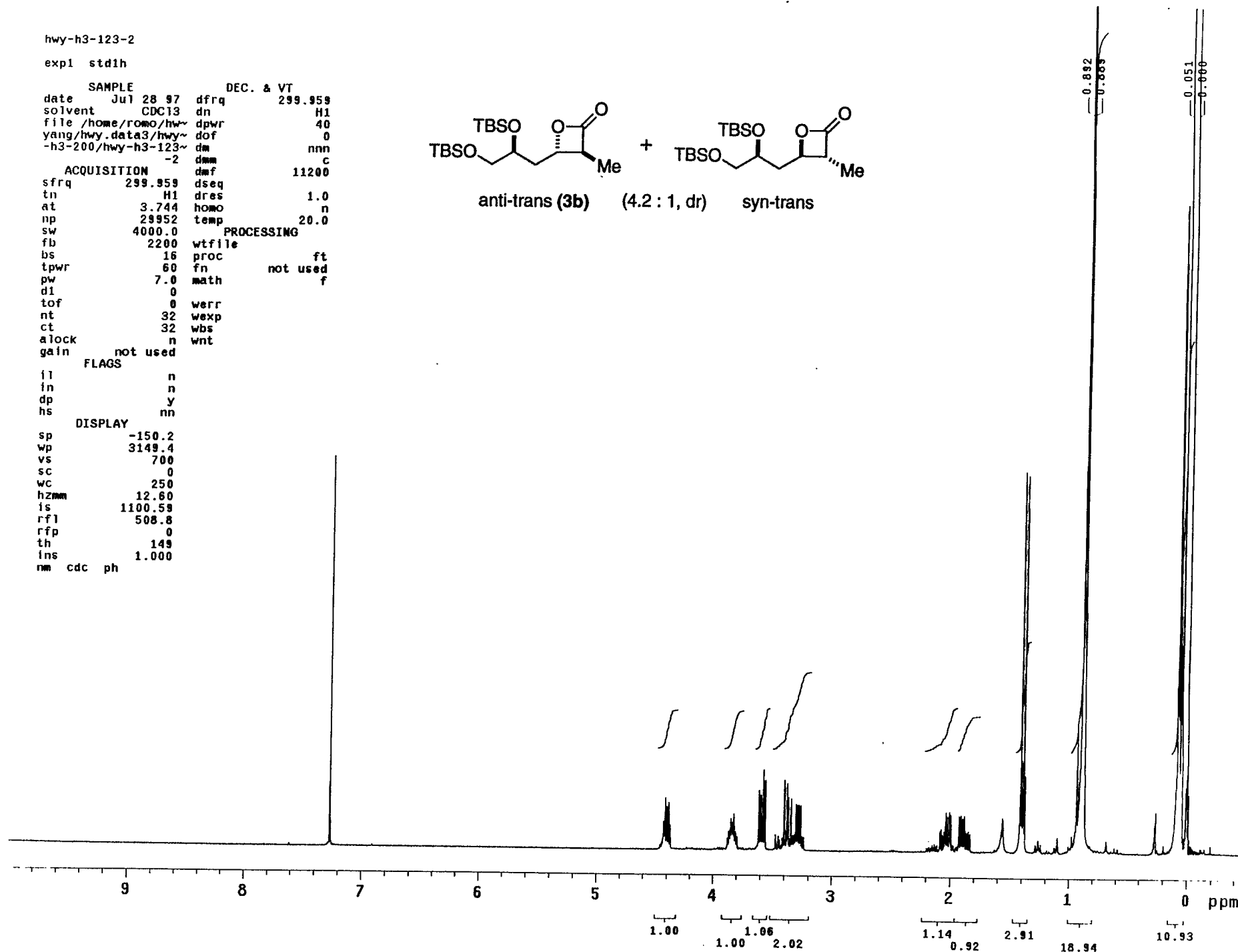
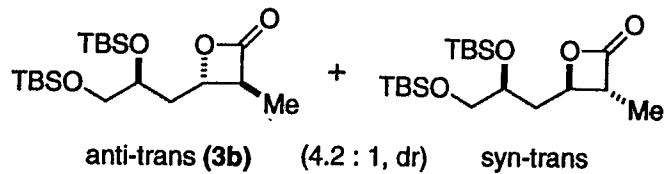
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solvent	CDC13	dn	H1
file	exp	dpwr	40
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tn	C13	dmm	w
at	1.815	dmf	11200
np	59904	dseq	
sw	16501.7	dres	1.0
fb	9200	homo	n
bs	16	PROCESSING	
tpwr	55	lb	1.00
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d1	0	proc	ft
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ct	1296		
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gain	not used	wexp	
FLAGS		wbs	
il	n	wnt	
in	n		
dp	nn		
hs	nn		
DISPLAY			
sp	-712.1		
wp	16501.7		
vs	200		
sc	0		
wc	250		
hzmm	1.97		
is	500.00		
rfl	6520.2		
rfp	5808.1		
th	g		
ins	1.000		
nm	no ph		



hwy-h3-123-2

expl std1h

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 -h3-200/hwy-h3-123~ dm nnn
 -2 dnm c
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 sfrq 299.959 dseq
 tn H1 dres 1.0
 at 3.744 homo n
 np 29952 temp 20.0
 sw 4000.0
 fb 2200
 bs 16
 tpwr 60
 pw 7.0
 dl 0
 tof 0
 nt 32
 ct 32
 alock n
 gain not used
 werr
 wexp
 wbs
 wnt
 PROCESsing
 wtfile
 proc ft
 fn not used
 math f
 FLAGS
 il n
 in n
 dp y
 hs nn
 DISPLAY
 sp -150.2
 wp 3149.4
 vs 700
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 th 149
 ins 1.000
 nm cdc ph



5

exp1 std13c

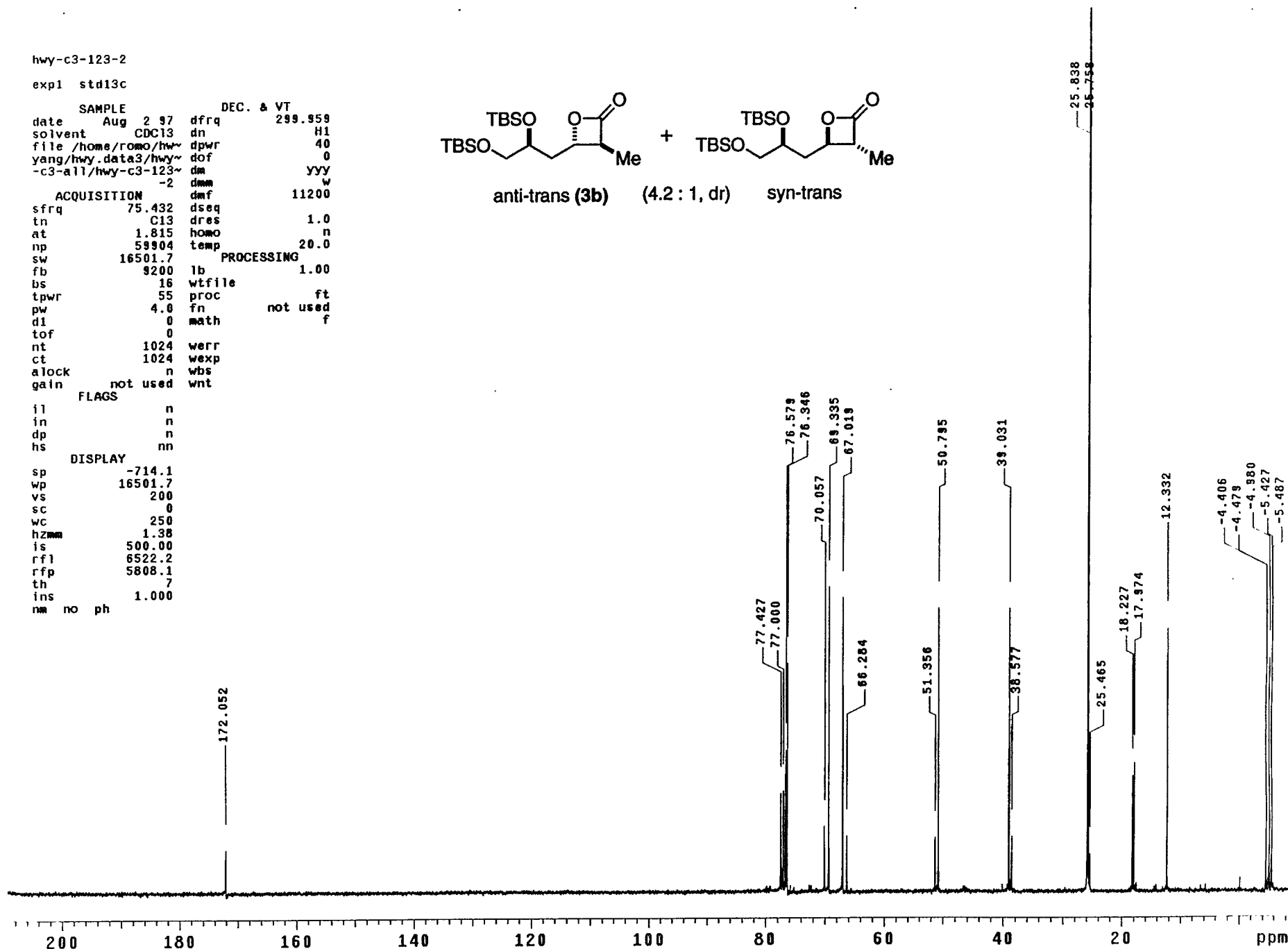
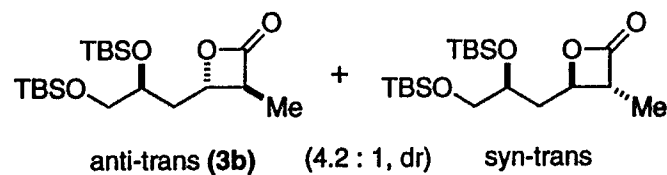
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-c3-a11/hwy-c3-123~ dm      yyy
                                     w
                                     -2      dmm
ACQUISITION      dmf      11200
sfrq      75.432      dseq
tn      C13      dres      1.0
at      1.815      homo      n
np      58904      temp      20.0
sw      16501.7      PROCESSING
fb      9200      lb      1.00
bs      16      wtfile
tpwr      55      proc      ft
pw      4.0      fn      not used
d1      0      math      f
tof      0
nt      1024      werr
ct      1024      wexp
alock      n      wbs
gain      not used      wnt

FLAGS
il      n
in      n
dp      n
hs      nn

DISPLAY
sp      -714.1
wp      16501.7
vs      200
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ins      1.000
nm no ph

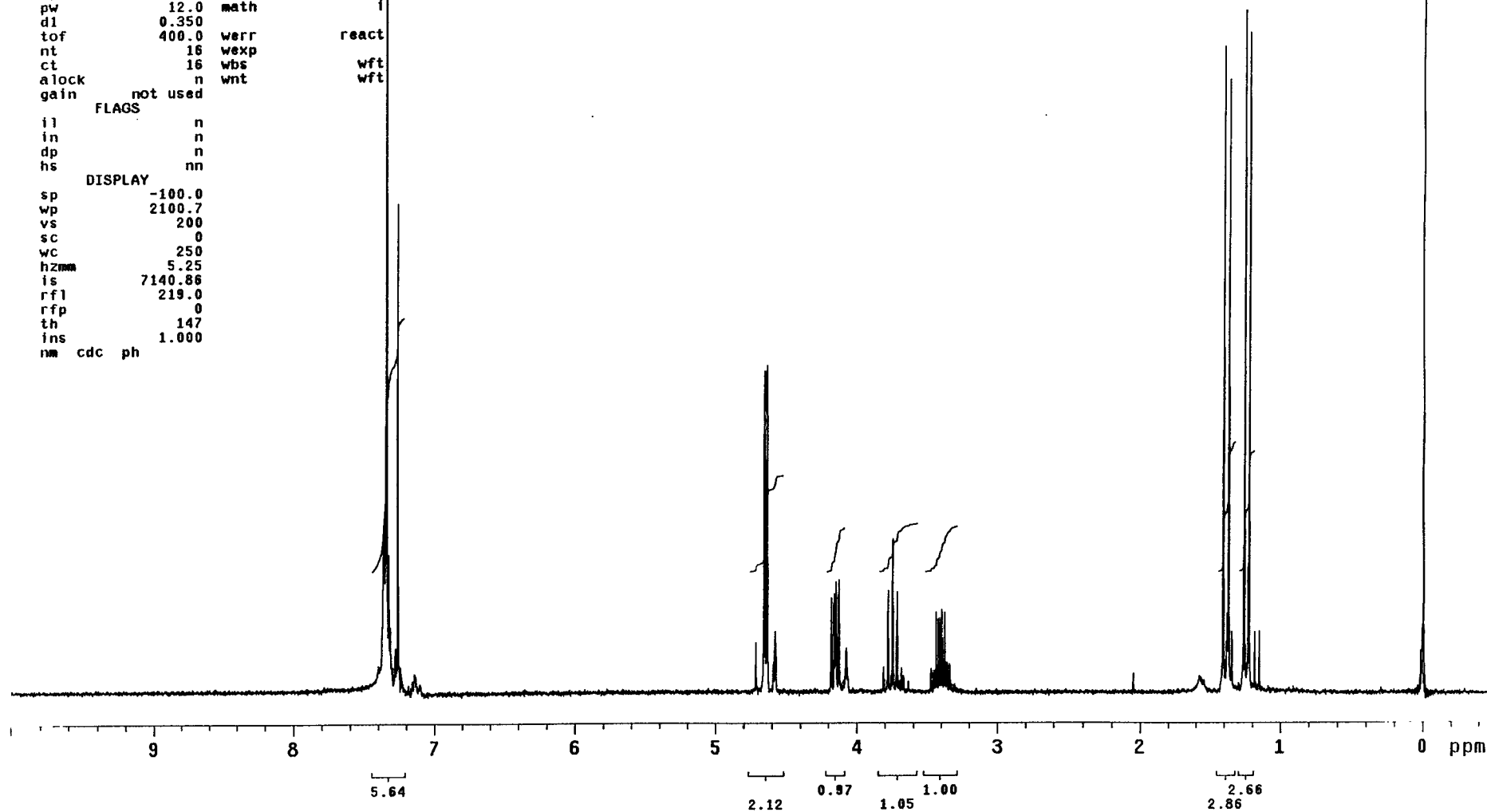
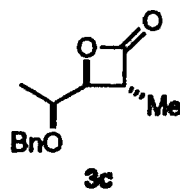
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HWY-H3-058-3

exp1 std1h

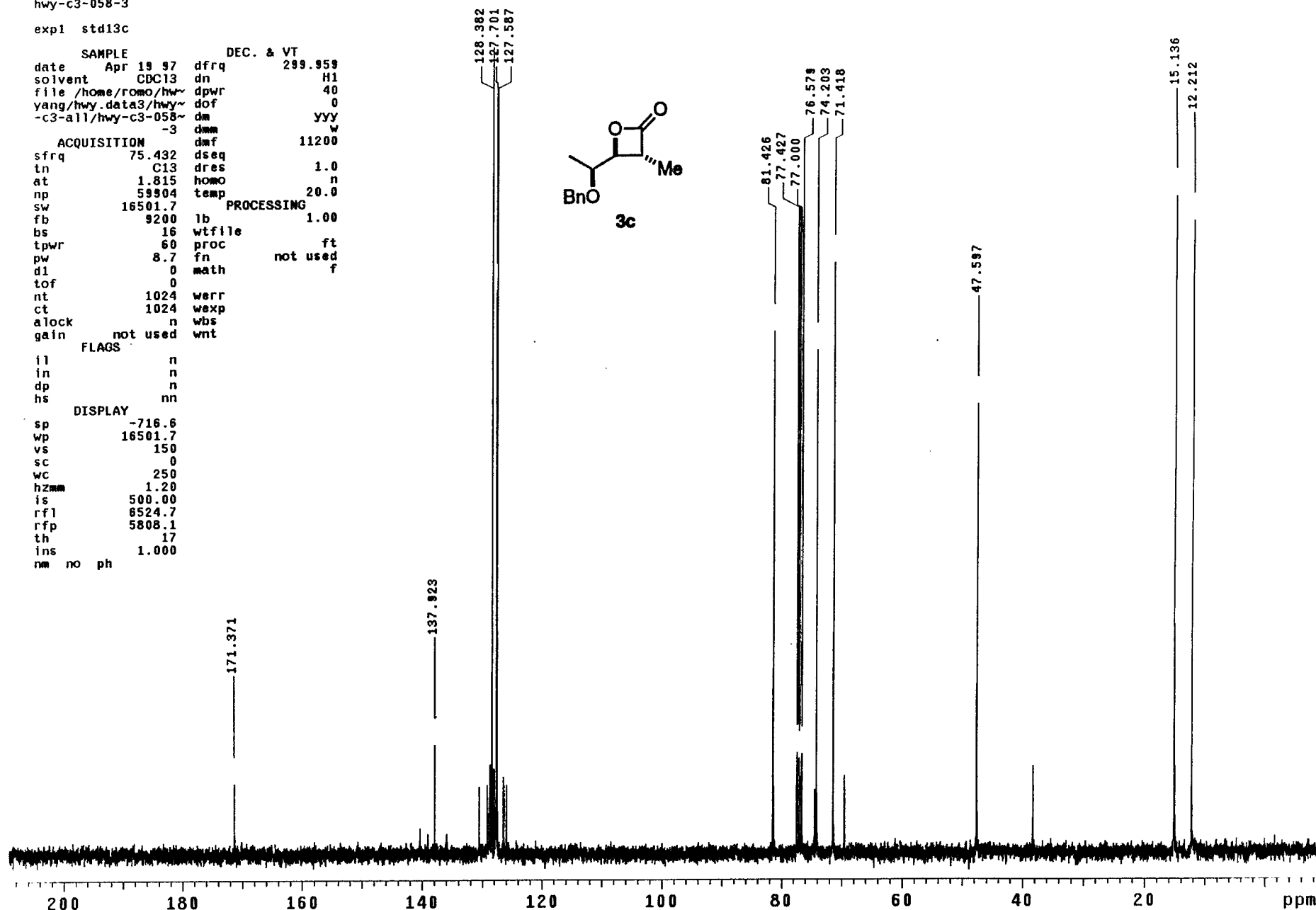
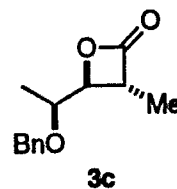
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 -h3-100/hwy-h3-058~ dm nnn
 -3 dmm c
 ACQUISITION dmf 200
 sfrq 200.057 dseq undefined
 tn H1 dres undefined
 at 2.691 homo n
 np 15616
 sw 2901.1 wtfile
 fb 1600 proc ft
 tpwr 10 fn 32768
 pw 12.0 math i
 dl 0.350
 tof 400.0 werr react
 nt 16 wexp
 ct 16 wbs wft
 alock n wnt wft
 gain not used
 FLAGS
 il n
 in n
 dp n
 hs nn
 DISPLAY
 sp -100.0
 wp 2100.7
 vs 200
 sc 0
 wc 250
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 rfl 219.0
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 nm cdc ph



hwy-c3-058-3

exp1 std13c

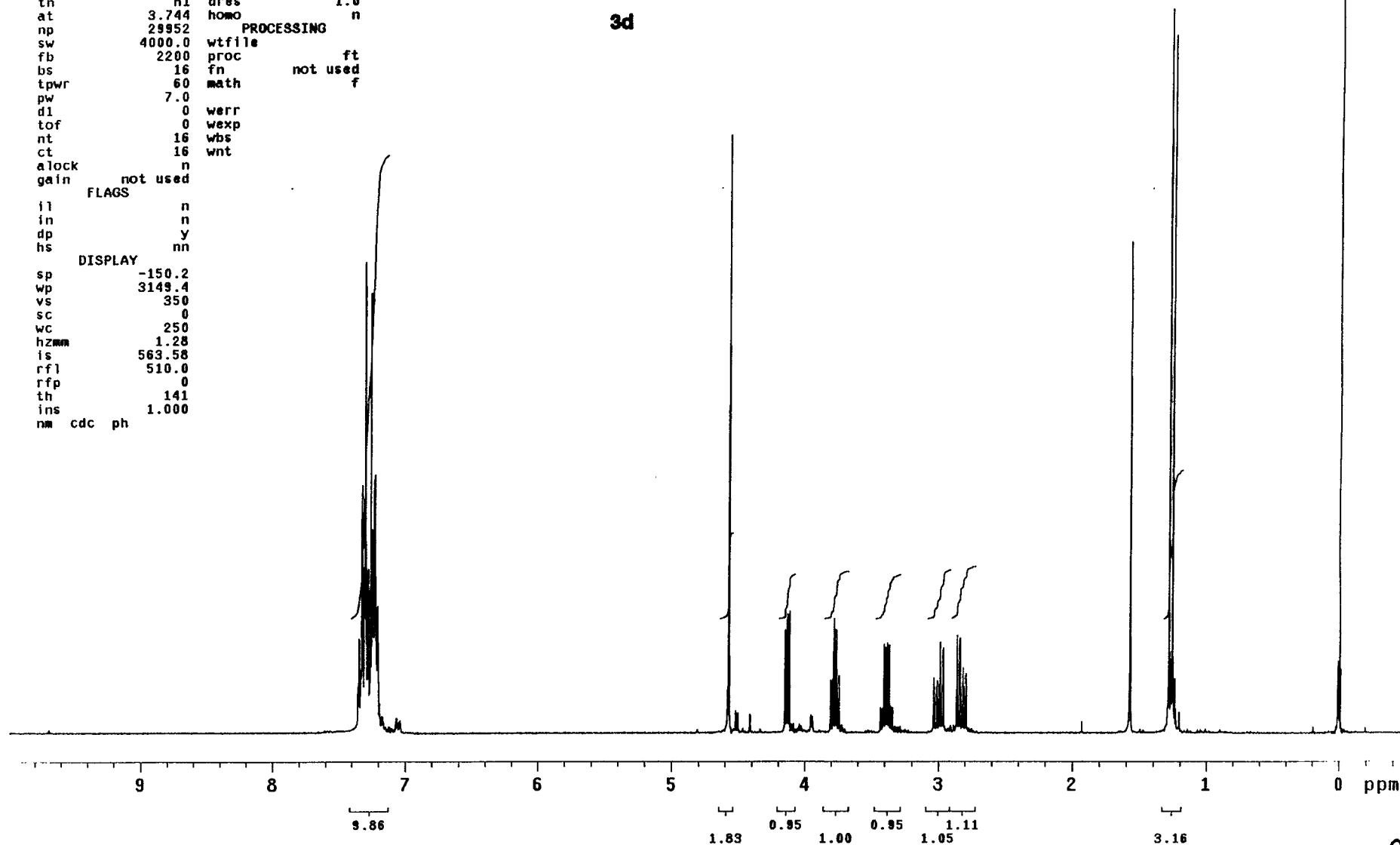
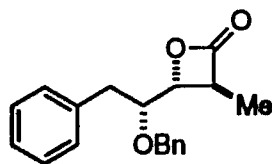
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-3		dmm	w
ACQUISITION		PROCESSING	
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tn	C13	dres	1.0
at	1.815	homo	n
np	59904	temp	20.0
sw	16501.7		
fb	9200	lb	1.00
bs	16	wfile	
tpwr	60	proc	ft
pw	8.7	fn	not used
d1	0	math	f
tof	0		
nt	1024	werr	
ct	1024	wexp	
alock	n	wbs	
gain	not used	wnt	
FLAGS			
il	n		
in	n		
dp	n		
hs	nn		
DISPLAY			
sp	-716.6		
wp	16501.7		
vs	150		
sc	0		
wc	250		
hzm	1.20		
is	500.00		
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rpf	5808.1		
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ins	1.000		
nm	no ph		



hwy-h3-122-3

exp1 std1h

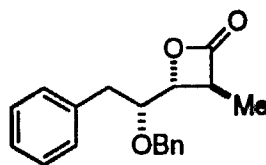
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 -h3-200/hwy-h3-122~ dm nnn
 -3 dmm C
 ACQUISITION dmf 11200
 sfrq 299.959 dseq
 tn H1 dres 1.0
 at 3.744 homo n
 np 29952
 sw 4000.0 wtfile
 fb 2200 proc ft
 bs 16 fn not used
 tpwr 60 math f
 pw 7.0
 dl 0 werr
 tof 0 wexp
 nt 16 wbs
 ct 16 wnt
 alock n
 gain not used
 FLAGS
 il n
 in n
 dp y
 hs nn
 DISPLAY
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 nm cdc ph



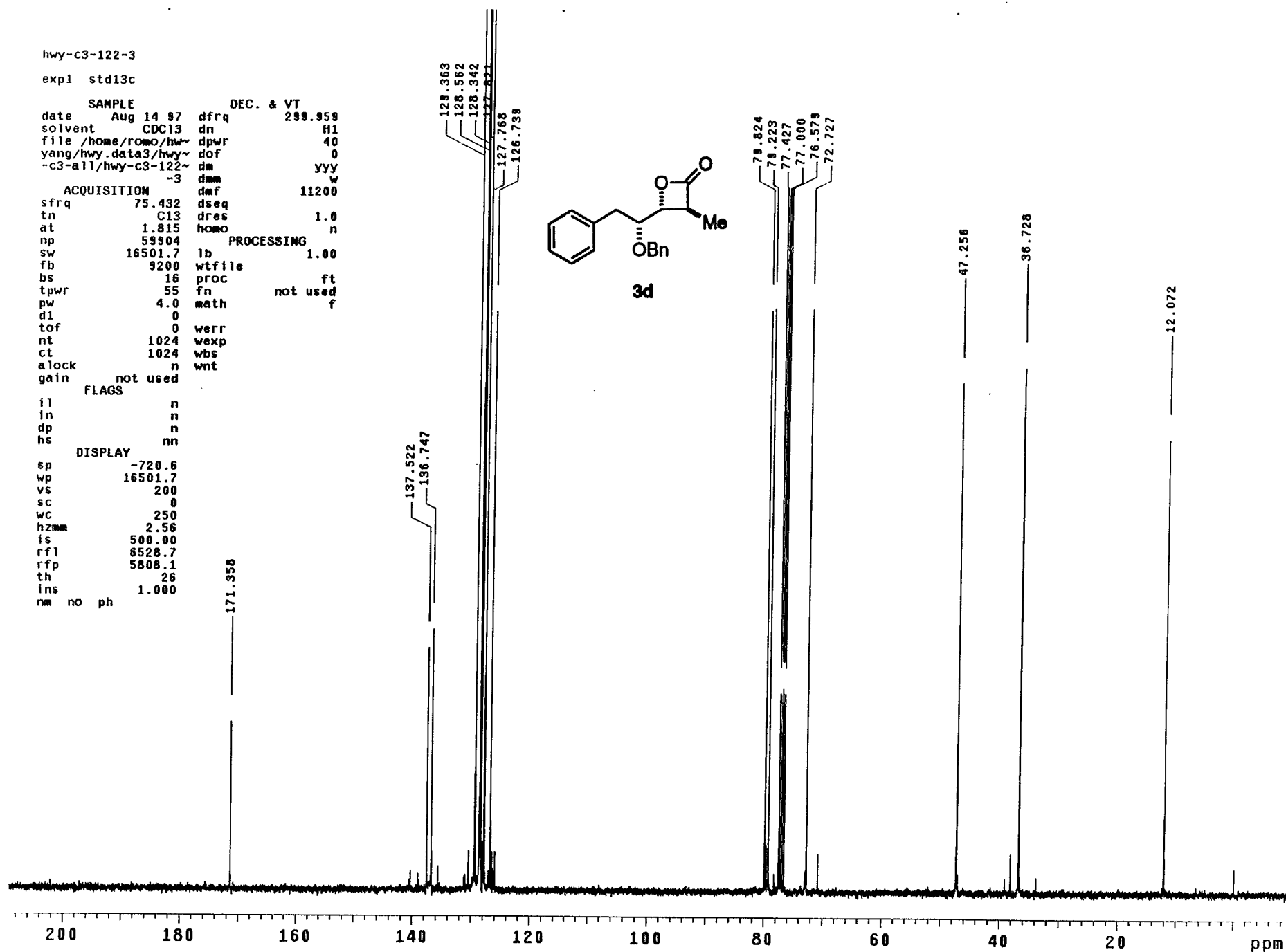
hwy-c3-122-3

expl std13c

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	-3	dmm	w
		dmf	11200
ACQUISITION		PROCESSING	
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tn	C13	dres	n
at	1.815	homo	
np	59904	lb	1.00
sw	16501.7	wfifile	
fb	9200	proc	ft
bs	16	fn	not used
tpwr	55	math	f
pw	4.0		
d1	0		
tof	0	werr	
nt	1024	wexp	
ct	1024	wbs	
alock	n	wnt	
gain	not used		
FLAGS			
il	n		
in	n		
dp	n		
hs	nn		
DISPLAY			
sp	-720.6		
wp	16501.7		
vs	200		
sc	0		
wc	250		
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th	26		
ins	1.000		
nm	no	ph	



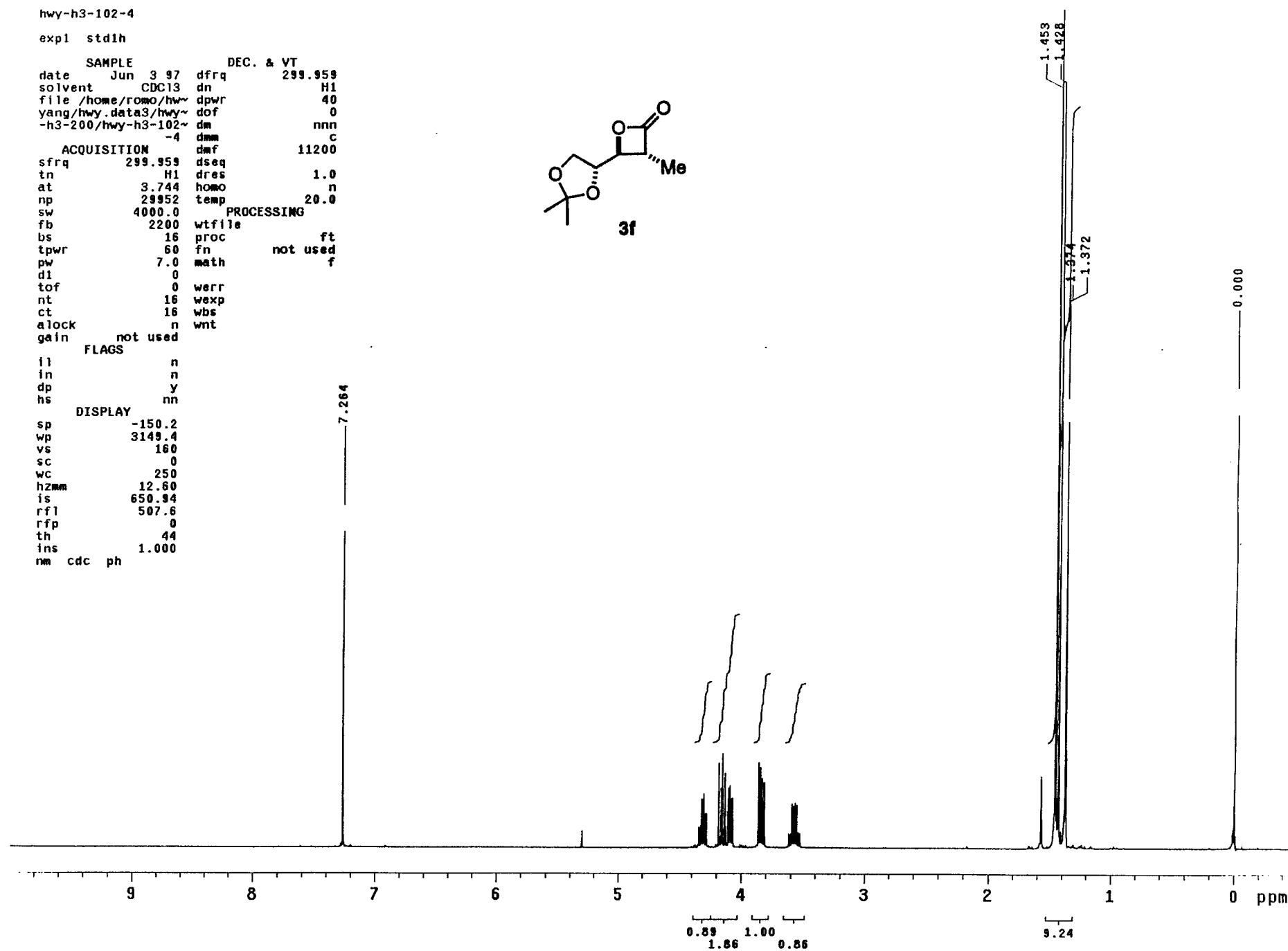
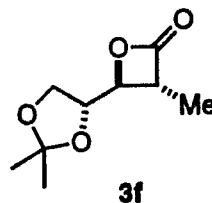
3d



hwy-h3-102-4

expl std1h

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	-4	dmm	c
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tn	H1	dres	1.0
at	3.744	homo	n
np	29952	temp	20.0
sw	4000.0	PROCESSING	
fb	2200	wtfile	
bs	16	proc	ft
tpwr	60	fn	not used
pw	7.0	math	f
d1	0		
tof	0	werr	
nt	16	wexp	
ct	16	wbs	
alock	n	wnt	
gain	not used		
FLAGS			
il	n		
in	n		
dp	y		
hs	nn		
DISPLAY			
sp	-150.2		
wp	3149.4		
vs	160		
sc	0		
wc	250		
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is	650.94		
rfl	507.6		
rfp	0		
th	44		
ins	1.000		
nm	cdc ph		

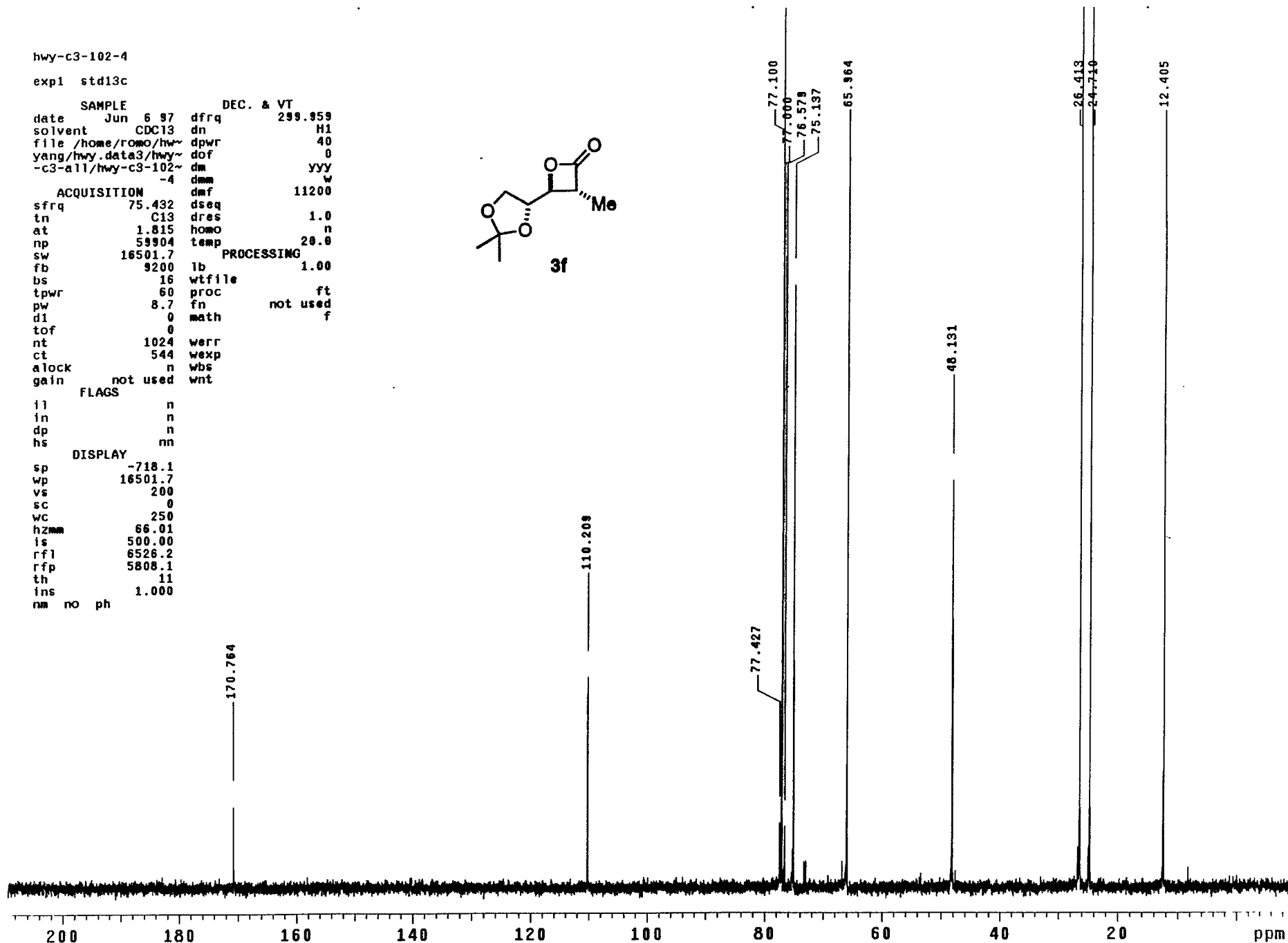
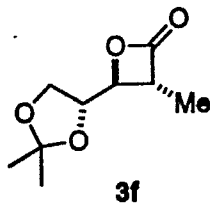


11

hwy-c3-102-4

exp1 std13c

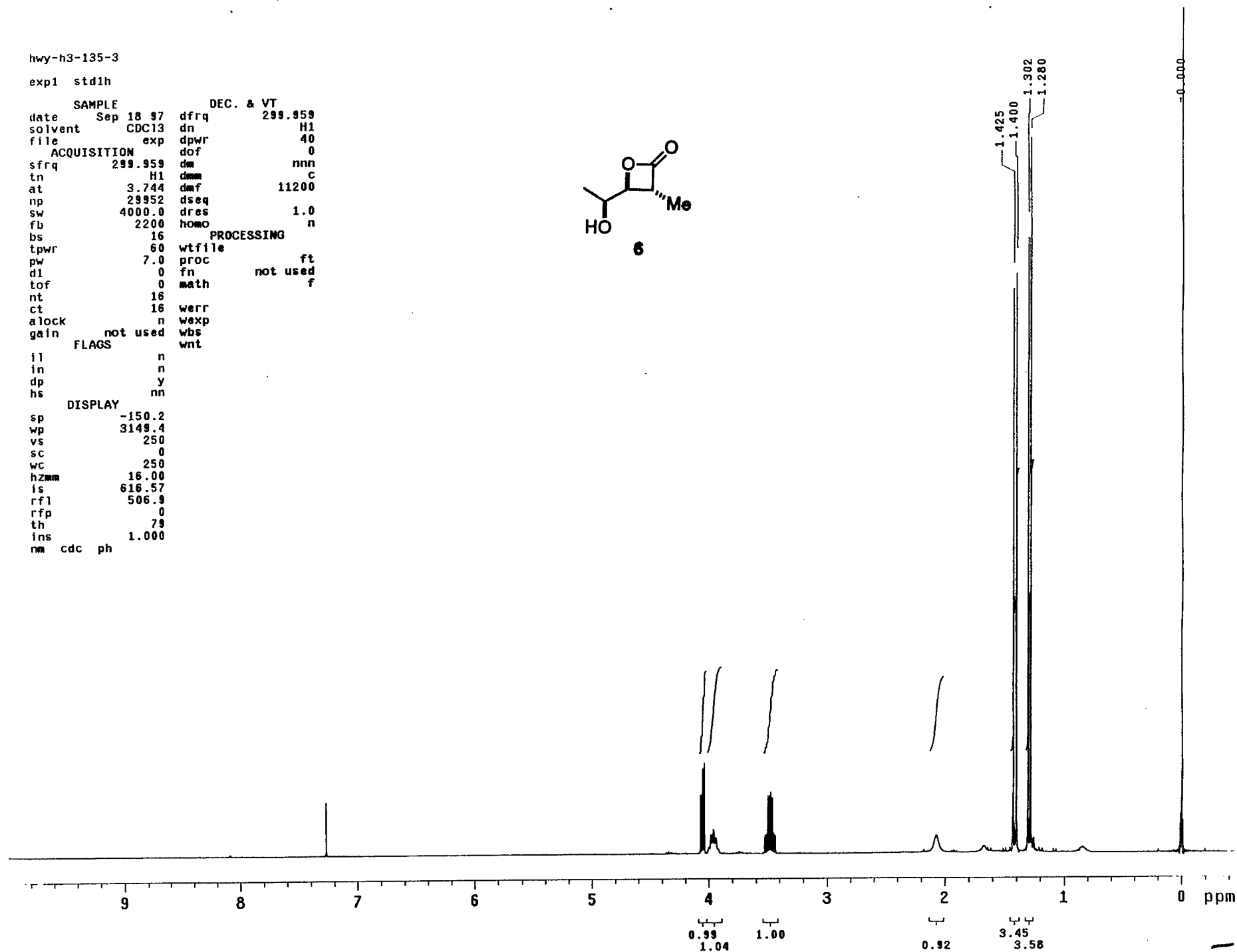
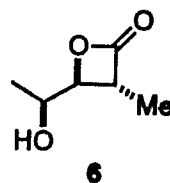
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	-4	dmm	w
		dmf	11200
ACQUISITION		PROCESSING	
sfrq	75.432	dseq	
tn	C13	dres	1.0
at	1.815	homo	n
np	59904	temp	20.0
sw	16501.7		
fb	9200	lb	1.00
bs	16	wtfile	
tpwr	60	proc	ft
pw	8.7	fn	not used
dl	0	math	f
tof	0		
nt	1024	werr	
ct	544	wexp	
alock	n	wbs	
gain	not used	wnt	
FLAGS			
il	n		
in	n		
dp	n		
hs	nn		
DISPLAY			
sp	-718.1		
wp	16501.7		
vs	200		
sc	0		
wc	250		
hzm	66.01		
is	500.00		
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rfp	5808.1		
th	11		
ins	1.000		
nm	no	ph	



hwy-h3-135-3

expl std1h

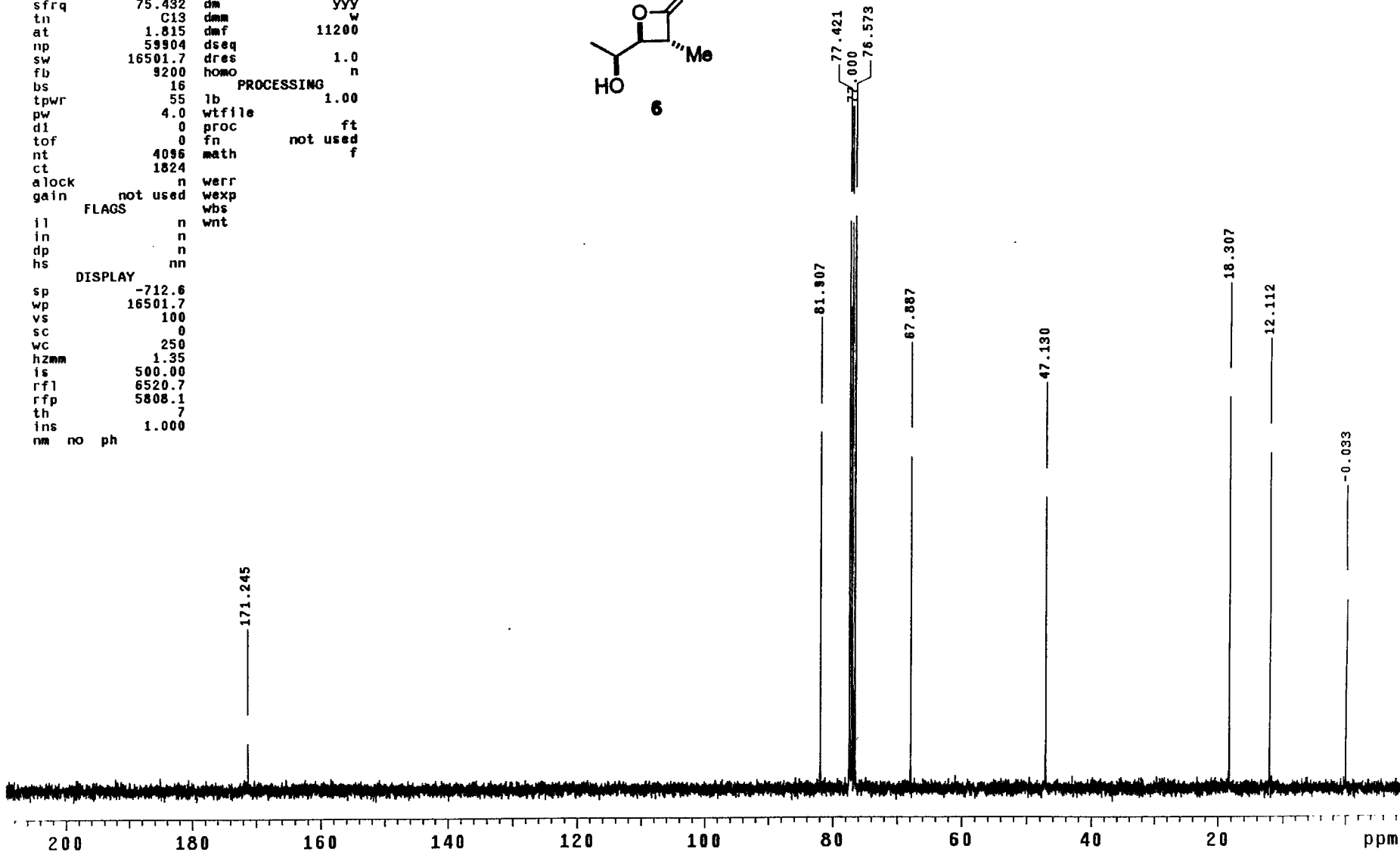
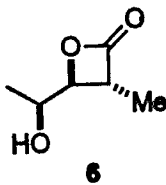
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tn	H1	dmm	C
at	3.744	dmc	11200
np	29952	dseq	
sw	4000.0	dres	1.0
fb	2200	homo	n
bs	16	PROCESSING	
tpwr	60	wtfile	
pw	7.0	proc	ft
d1	0	fn	not used
tof	0	math	f
nt	16		
ct	16	werr	
alock	n	wexp	
gain	not used	wbs	
	FLAGS	wnt	
il	n		
in	n		
dp	y		
hs	nn		
DISPLAY			
sp	-150.2		
wp	3149.4		
vs	250		
sc	0		
wc	250		
hzmm	16.00		
is	616.57		
rfl	506.9		
rff	0		
th	79		
ins	1.000		
nm	cdc ph		



hwy-c3-135-3

exp1 std13c

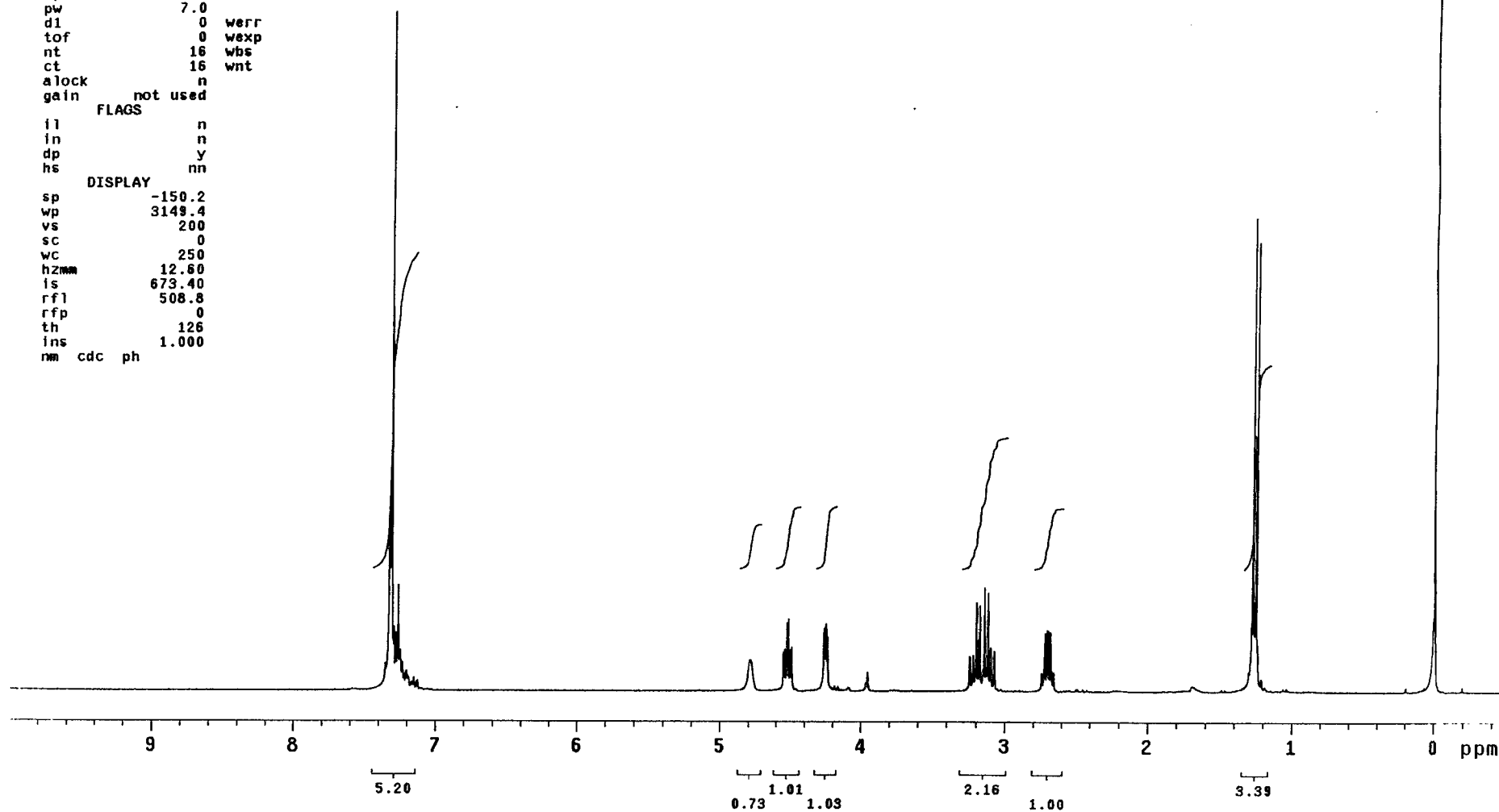
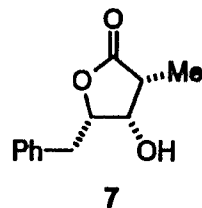
SAMPLE		DEC. & VT	
date	Sep 18 97	dfrq	299.959
solvent	CDC13	dn	H1
file	exp	dpwr	40
ACQUISITION			
sfrq	75.432	dm	yyy
tn	C13	dmm	w
at	1.815	dmr	11200
np	59904	dseq	
sw	16501.7	dres	1.0
fb	9200	homo	n
bs	16	PROCESSING	
tpwr	55	lb	1.00
pw	4.0	wtfile	
dl	0	proc	ft
tof	0	fn	not used
nt	4096	math	f
ct	1824		
alock	n	werr	
gain	not used	wexp	
FLAGS		wbs	
il	n	wnt	
in	n		
dp	n		
hs	nn		
DISPLAY			
sp	-712.6		
wp	16501.7		
vs	100		
sc	0		
wc	250		
hzmm	1.35		
is	500.00		
rfl	6520.7		
rfp	5808.1		
th	7		
ins	1.000		
nm	no	ph	



hwy-h3-133-4

expl std1h

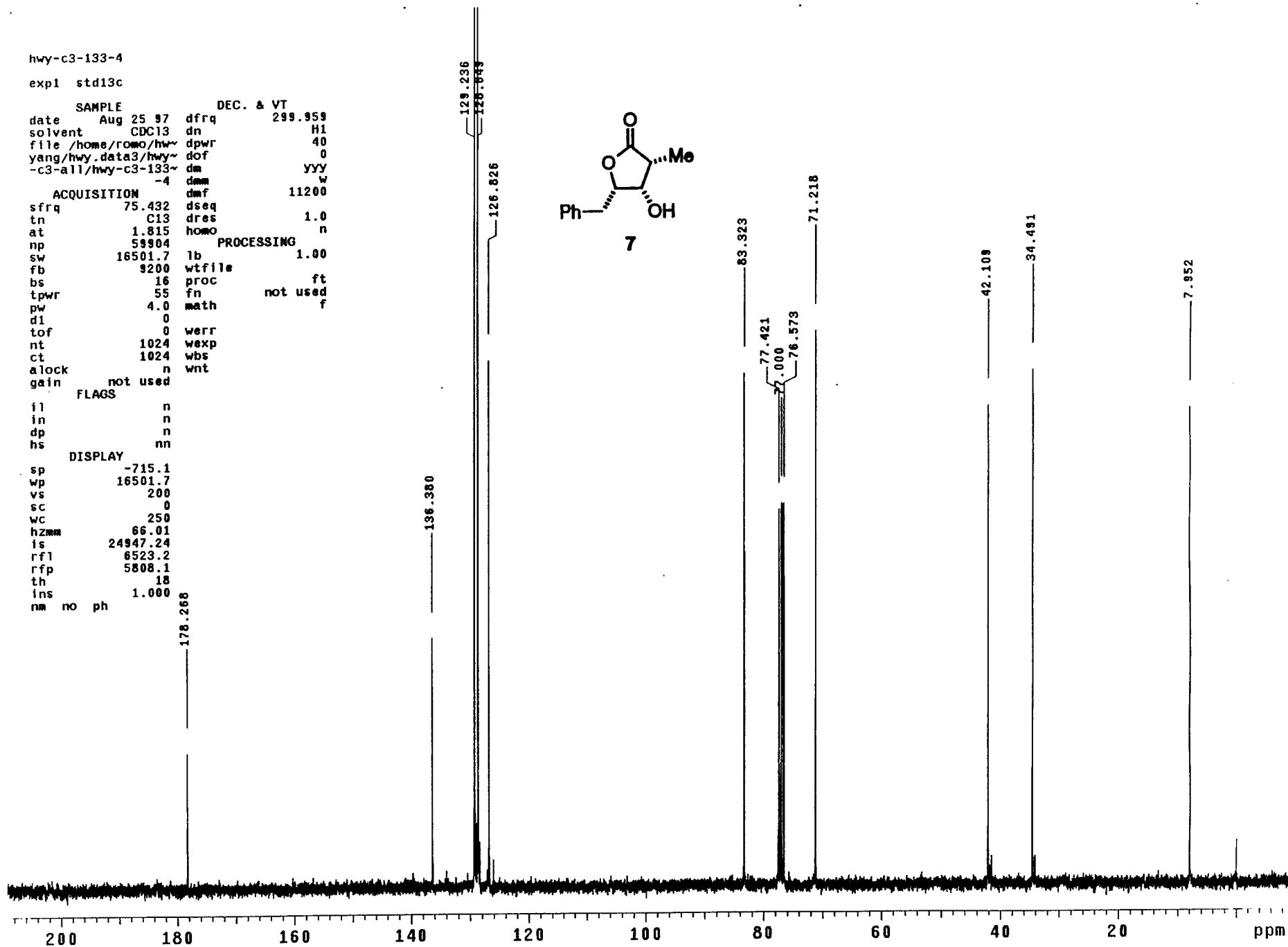
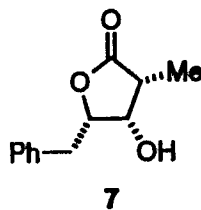
SAMPLE DEC. & VT
 date Sep 16 97 dfrq 299.959
 solvent CDC13 dn H1
 file /home/romo/hwy~ dpwr 40
 yang/hwy.data3/hwy~ dof 0
 -h3-200/hwy-h3-133~ dm nnn
 -4 dmm c
 ACQUISITION dmf 11200
 sfrq 299.959 dseq
 tn H1 dres 1.0
 at 3.744 homo n
 np 28952
 sw 4000.0 wtf file
 fb 2200 proc ft
 bs 16 fn not used
 tpwr 60 math f
 pw 7.0
 d1 0 werr
 tof 0 wexp
 nt 16 wbs
 ct 16 wnt
 alock n
 gain not used
 FLAGS
 il n
 in n
 dp y
 hs nn
 DISPLAY
 sp -150.2
 wp 3149.4
 vs 200
 sc 0
 wc 250
 hzmm 12.60
 is 673.40
 rfl 508.8
 rfp 0
 th 126
 ins 1.000
 nm cdc ph



hwy-c3-133-4

expl std13c

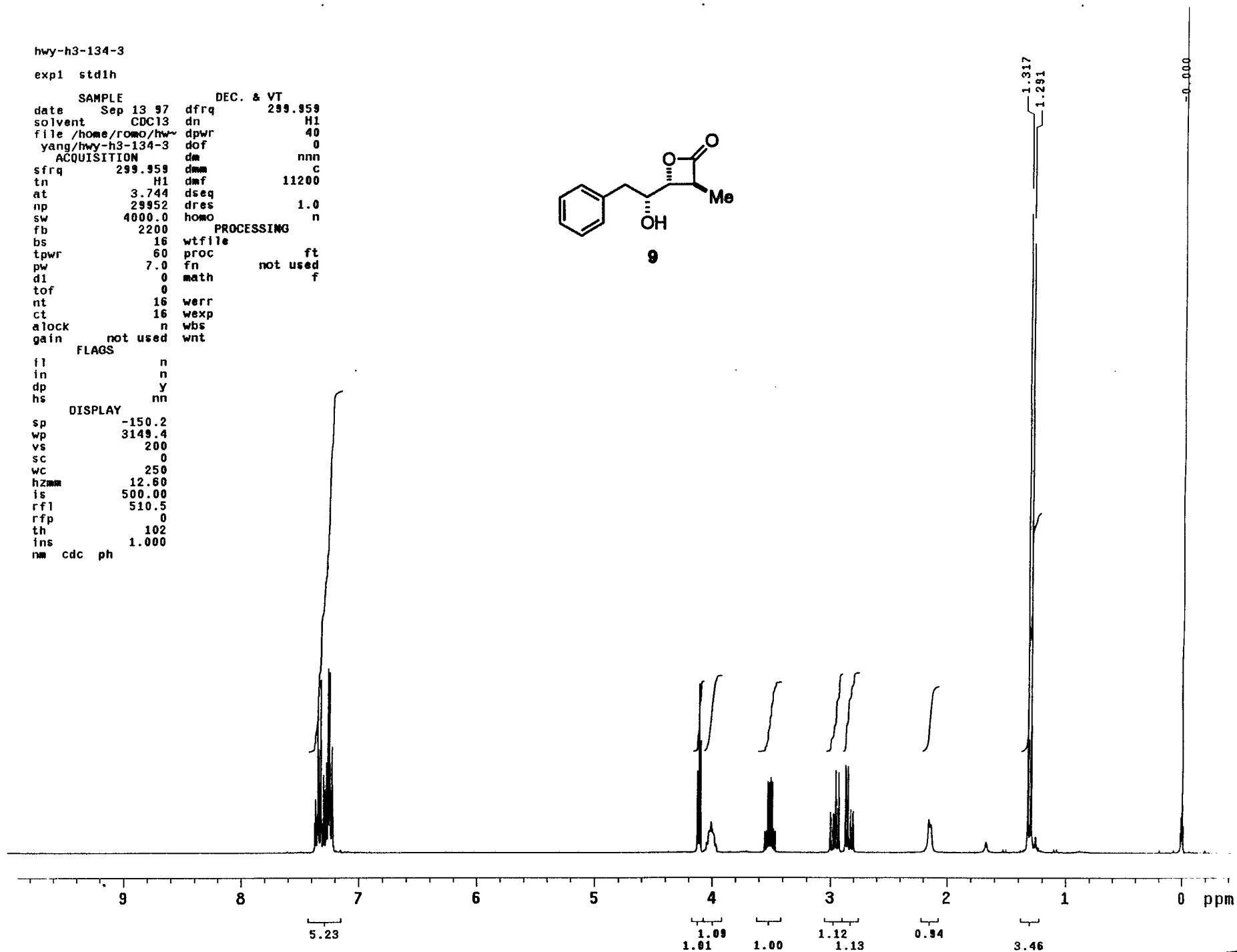
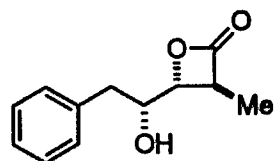
SAMPLE		DEC. & VT	
date	Aug 25 97	dfrq	299.959
solvent	CDC13	dn	H1
file	/home/romo/hwy~	dpwr	40
yang/hwy.data3/hwy~		dof	0
-c3-all/hwy-c3-133~		dm	yyy
	-4	dmm	w
ACQUISITION		dmf	11200
sfrq	75.432	dseq	
tn	C13	dres	1.0
at	1.815	homo	n
np	59904	PROCESSING	
sw	16501.7	lb	1.00
fb	9200	wtfile	
bs	16	proc	ft
tpwr	55	fn	not used
pw	4.0	math	f
d1	0		
tof	0	werr	
nt	1024	wexp	
ct	1024	wbs	
alock	n	wnt	
gain	not used		
FLAGS			
il	n		
in	n		
dp	n		
hs	nn		
DISPLAY			
sp	-715.1		
wp	16501.7		
vs	200		
sc	0		
wc	250		
hzmm	66.01		
is	24947.24		
rfl	6523.2		
rfp	5808.1		
th	18		
ins	1.000		
nm	no ph		



hwy-h3-134-3

exp1 std1h

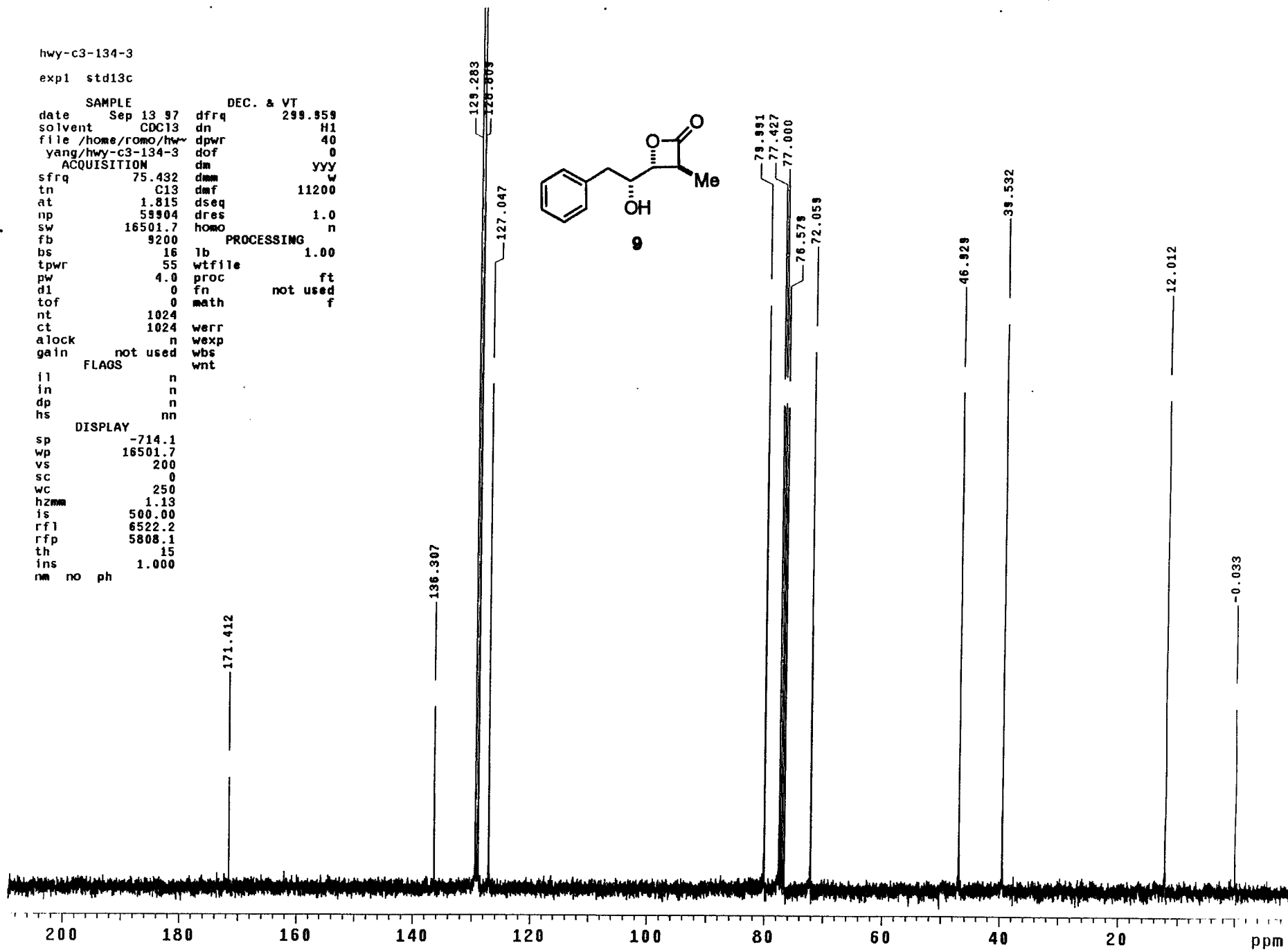
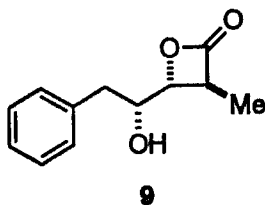
SAMPLE		DEC. & VT	
date	Sep 13 97	dfrq	299.959
solvent	CDC13	dn	H1
file	/home/romo/hwy	dpwr	40
yang/hwy-h3-134-3		dof	0
ACQUISITION		dm	nnn
sfrq	299.959	dmm	c
tn	H1	dmf	11200
at	3.744	dseq	
np	29952	dres	1.0
sw	4000.0	homo	n
fb	2200	PROCESSING	
bs	16	wfile	
tpwr	60	proc	ft
pw	7.0	fn	not used
dl	0	math	f
tof	0		
nt	16	werr	
ct	16	wexp	
alock	n	wbs	
gain	not used	wnt	
FLAGS			
il	n		
in	n		
dp	y		
hs	nn		
DISPLAY			
sp	-150.2		
wp	3149.4		
vs	200		
sc	0		
wc	250		
hzmm	12.60		
is	500.00		
rfl	510.5		
rfp	0		
th	102		
ins	1.000		
nm	cdc ph		



hwy-c3-134-3

expl std13c

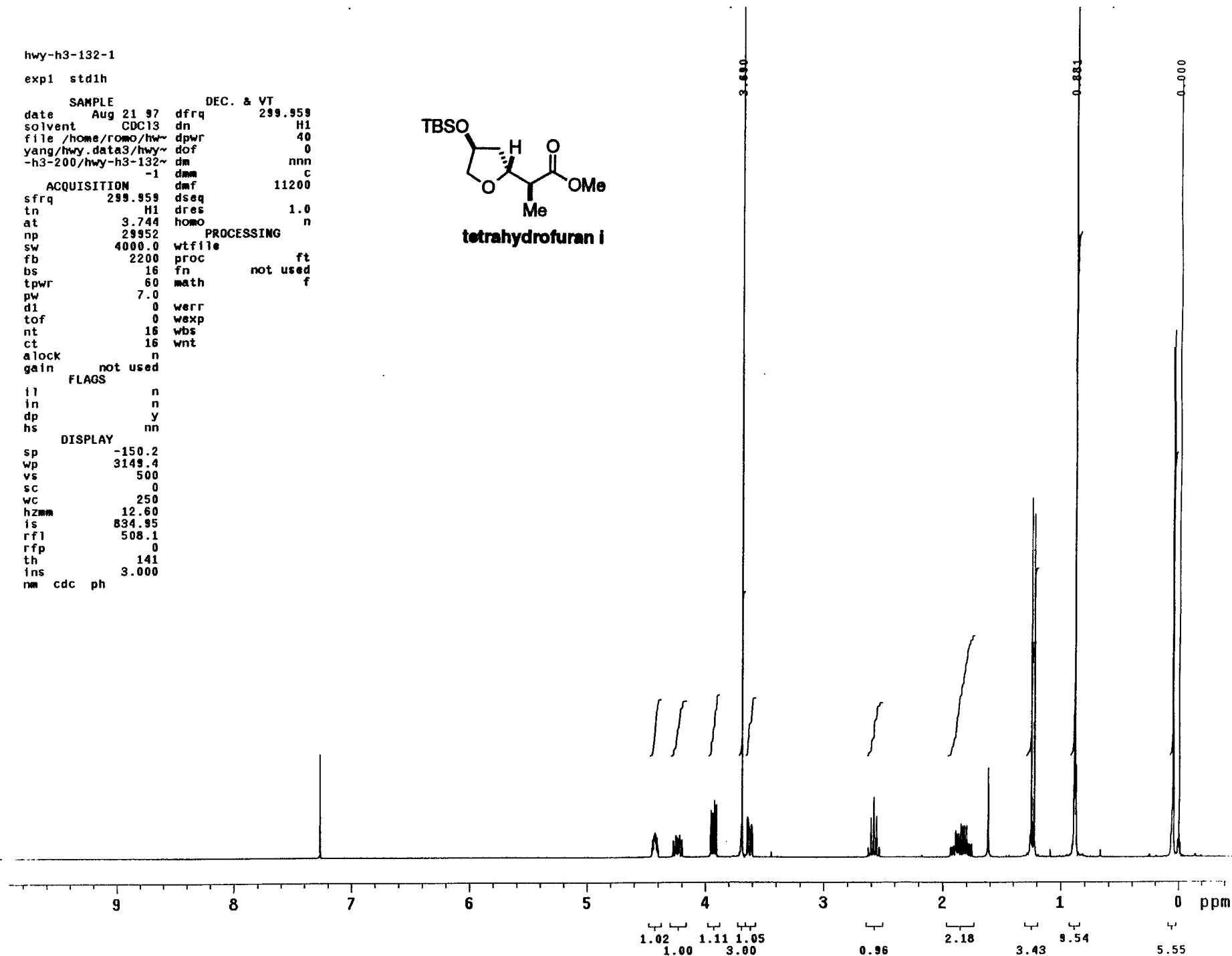
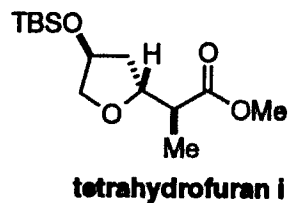
SAMPLE		DEC. & VT	
date	Sep 13 97	dfrq	299.959
solvent	CDC13	dn	H1
file	/home/romo/hwy	dpwr	40
yang/hwy-c3-134-3		dof	0
ACQUISITION			
sfrq	75.432	dm	yyy
tn	C13	dmm	w
at	1.815	dmf	11200
np	59904	dseq	
sw	16501.7	dres	1.0
fb	9200	homo	n
PROCESSING			
bs	16	lb	1.00
tpwr	55	wtfile	
pw	4.0	proc	ft
d1	0	fn	not used
tof	0	math	f
nt	1024		
ct	1024	werr	
alock	n	wexp	
gain	not used	wbs	
	FLAGS	wnt	
il	n		
in	n		
dp	n		
hs	nn		
DISPLAY			
sp	-714.1		
wp	16501.7		
vs	200		
sc	0		
wc	250		
hzmm	1.13		
is	500.00		
rfl	6522.2		
rfp	5808.1		
th	15		
ins	1.000		
nm	no ph		



hwy-h3-132-1

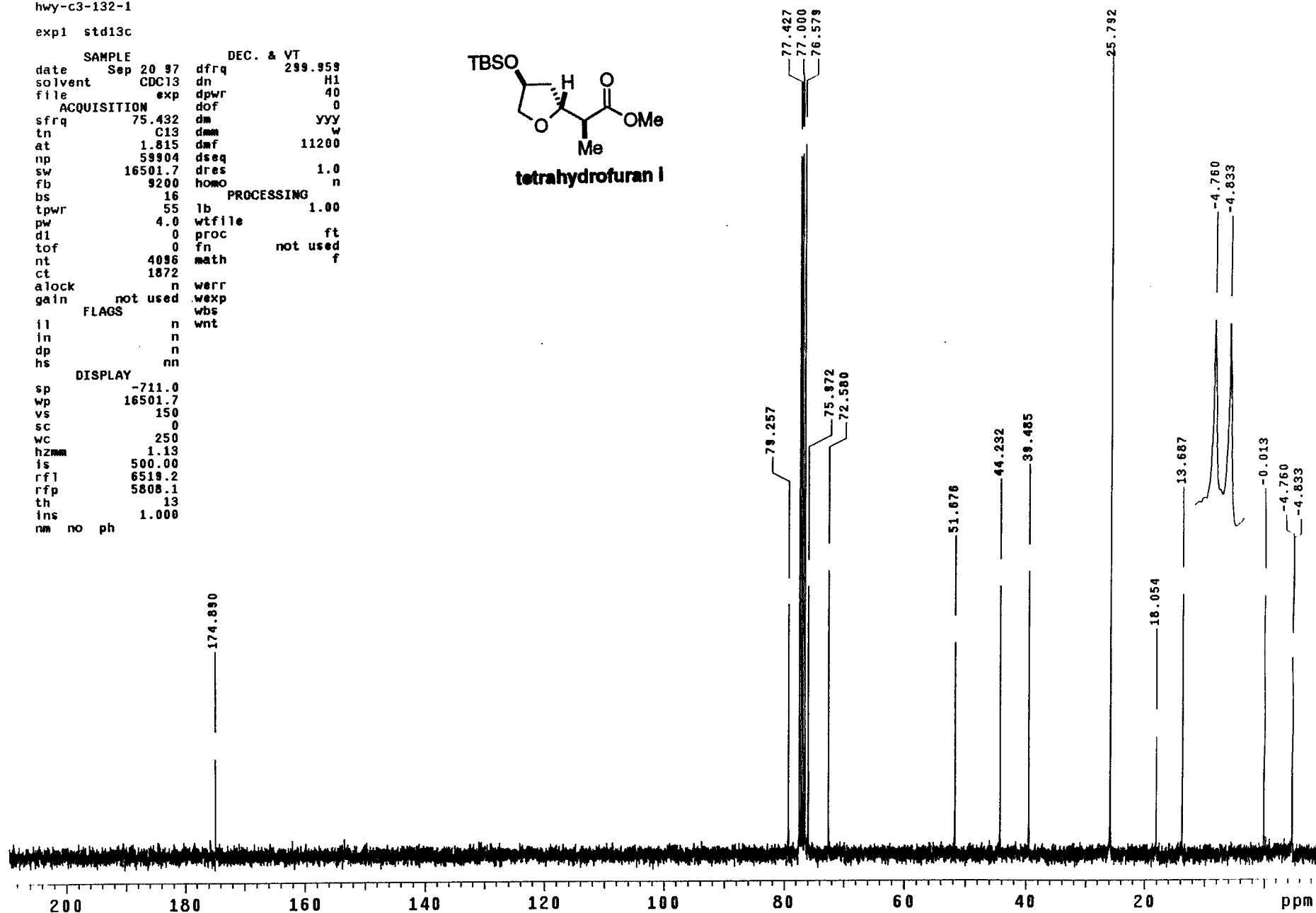
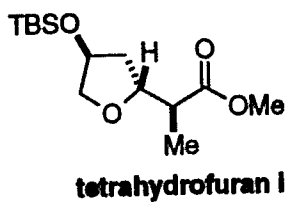
exp1 std1h

SAMPLE		DEC. & VT	
date	Aug 21 97	dfrq	299.959
solvent	CDC13	dn	H1
file	/home/romo/hwy	dpwr	40
yang/hwy.data3/hwy		dof	0
-h3-200/hwy-h3-132		dm	nnn
	-1	dmm	c
ACQUISITION		11200	
sfrq	299.959	dseq	
tn	H1	dres	1.0
at	3.744	homo	n
np	29952	PROCESSING	
sw	4000.0	wtfile	
fb	2200	proc	ft
bs	16	fn	not used
tpwr	60	math	f
pw	7.0		
d1	0	werr	
tof	0	wexp	
nt	16	wbs	
ct	16	wnt	
alock	n		
gain	not used		
FLAGS			
il	n		
in	n		
dp	y		
hs	nn		
DISPLAY			
sp	-150.2		
wp	3149.4		
vs	500		
sc	0		
wc	250		
hzmm	12.60		
is	834.95		
rfl	508.1		
rtp	0		
th	141		
ins	3.000		
nm	cdc ph		

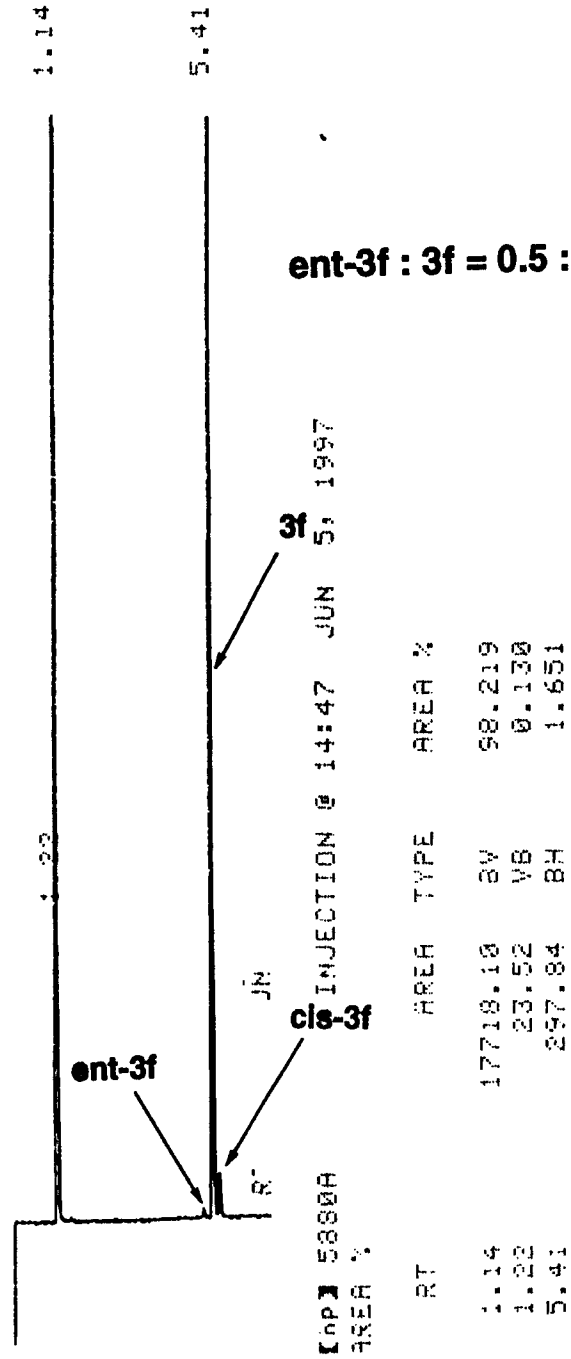
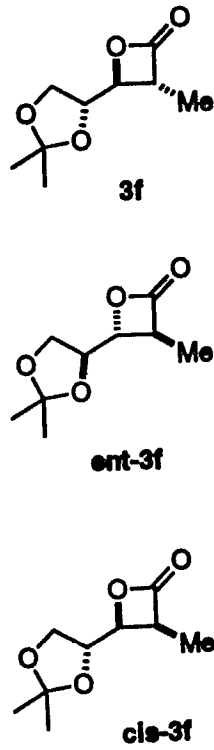
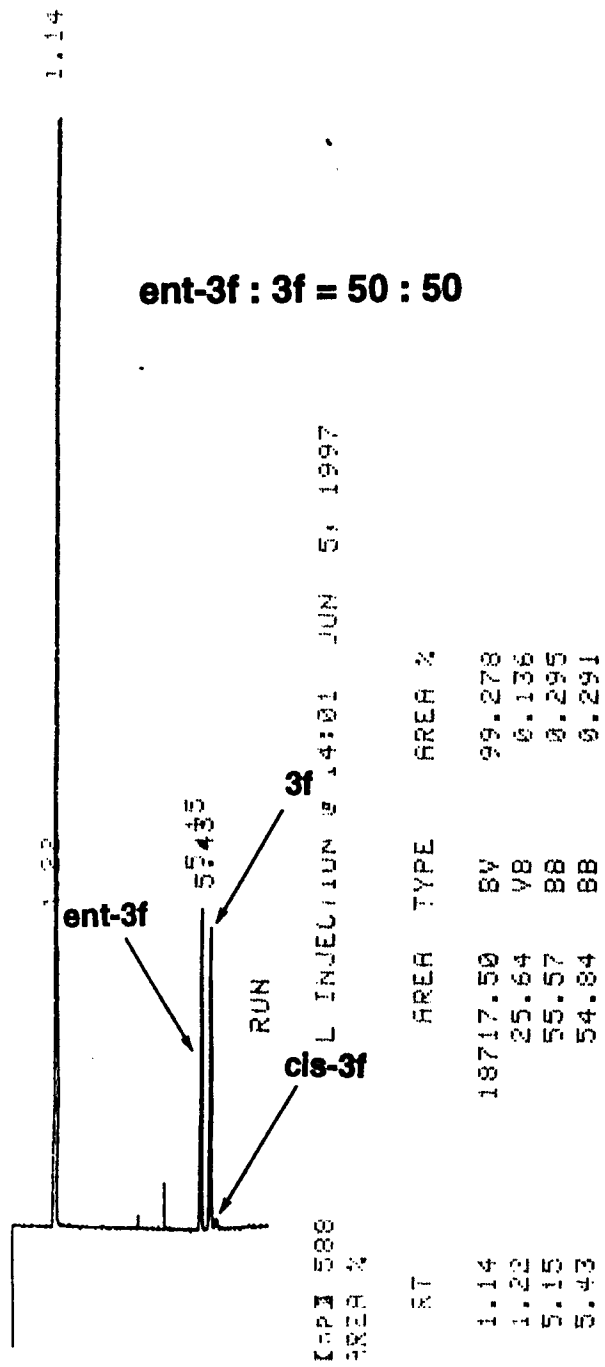


exp1 std13c

SAMPLE			DEC. & VT	
date	Sep	20 97	dfrq	299.959
solvent		CDC13	dn	H1
file		exp	dpwr	40
ACQUISITION			doF	0
sfrq		75.432	dm	yyy
tn		C13	dmm	w
at		1.815	dmf	11200
np		59904	dseq	
sw		16501.7	dres	1.0
fb		9200	homo	n
bs		16	PROCESSING	
tpwr		55	lb	1.00
pw		4.0	wtfile	
d1		0	proc	ft
tof		0	fn	not used
nt		4056	math	f
ct		1872		
alock		n	werr	
gain	not used		wexp	
FLAGS			wbs	
il		n	wnt	
in		n		
dp		n		
hs		nn		
DISPLAY				
sp		-711.0		
wp		16501.7		
vs		150		
sc		0		
wc		250		
hzmm		1.13		
is		500.00		
rfl		6519.2		
rfp		5808.1		
th		13		
ins		1.008		
nm	no	ph		



GC traces of racemic 3f and artificially made 199:1 mixture of 3f and ent-3f



POOR QUALITY ORIGINAL

POOR QUALITY ORIGINAL

GC trace of 3f obtained from TMAL reaction

