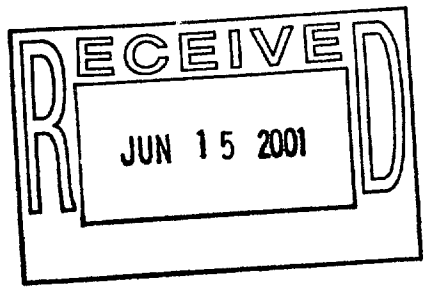
OL010135P

Supplementary Information (De Boos, Fullbrook, Percy)

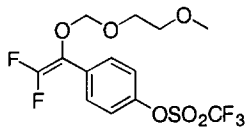
1. Procedures and full data for **4c**, **11e**; ^{19}F and R_f data for all other compounds.
2. GC trace for **4c**.
3. HPLC trace (3 wavelengths) for **11e**.
4. Crude ^{19}F NMR spectra for reaction of **4c** with:
   a) PhSCl
   b) NCS
   c) Br_2
   d) I_2
   e) TMSCl/MeOH
5. ^{13}C **(a)**, ^{1}H **(b)** and ^{19}F **(c)** NMR spectra for **4c.**
6. ^{13}C **(a)**, ^{1}H **(b)** and ^{19}F **(c)** NMR spectra for **11e.**
7. Elemental analysis report for **11e.**



Supporting Information:

General Procedure for Stille couplings to stannane **2**:

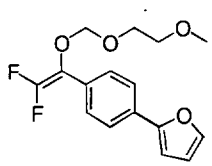
4-[(2,2-Difluoro-1-(2-methoxy-ethoxymethoxy))-vinyl)-phenyl] trifluoromethanesulfonate 4c



A mixture of copper(I) iodide (3.97 mmol, 0.756 g, 22 mol%), triphenylphosphine (1.79 mmol, 0.469 g, 10 mol%) and palladium(II) acetate (0.48 mmol, 0.107 g, 2.7 mol%) was pump-purged twice with argon, then dry, thoroughly degassed DMF (45 ml) was added. 4-Iodophenyl triflate **3c** (18.54 mmol, 6.53 g) was added and the mixture heated to 50°C. Stannane **2** (17.76 mmol, 8.12 g) was subsequently added and the mixture stirred for 16 hours at this temperature. The mixture was diluted with diethyl ether and the mixture extracted with water (100 ml) and diethyl ether (3 × 25 ml). The combined organic extracts were dried ($MgSO_4$) and concentrated *in vacuo*. Purification by column chromatography (Silica gel; 5 % diethyl ether in petroleum ether then 20% ethyl acetate in petroleum ether) afforded triflate **4c** (6.32 g, 96 %) as a pale orange oil (97 % by GC); R_f 0.44 (20% ethyl acetate in light petroleum); ν_{max} (film/cm^{-1}) 1731m, 1503m, 1428s, 1271m, 1215s, 1142s, 889s; δ_H (300.13 MHz, $CDCl_3$) 7.50 (2H, d, $^3J_{HH}$ 8.88 Hz, CH), 7.24 (2H, d, $^3J_{HH}$ 8.88 Hz, CH), 4.82 (2H, s, OCH_2O), 3.80-3.77 (2H, m, OCH_2CH_2O), 3.49-3.46 (2H, m, OCH_2CH_2O), 3.31 (3H, s, OCH_3); δ_C (75.47 MHz, $CDCl_3$) 155.8 (t, $^1J_{CF}$ 292 Hz), 148.9 (t, $^5J_{CF}$ 2.3 Hz, C_q), 130.7 (dd, $^3J_{CF}$ 4.7, 1.7 Hz, C_q), 128.5 (dd, $^4J_{CF}$ 6.2, 3.4 Hz, CH), 121.6 (s, CH), 118.7 (q, $^1J_{CF}$ 320 Hz), 114.6 (dd, $^2J_{CF}$ 34.4, 19.5 Hz), 95.8 (ca. t, $^5J_{CF}$ 3 Hz), 71.5, 68.7, 59.0; δ_F (282 MHz, $CDCl_3$) -95.79 (d, $^2J_{FF}$ 51.5 Hz), -104.51 (d, $^2J_{FF}$ 51.5 Hz), -73.0 (s, CF_3); m/z (ES, M$^+$+Na) 415.1 (100%); [HRMS (ES, M$^+$+Na) Found: 415.0247. Calc. For $C_{13}H_{13}O_6F_5NaS$: 415.0251].

General Procedure for Suzuki couplings to triflates **4b** or **4c** under conditions **a**:

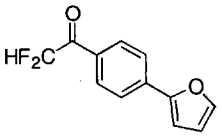
2-{4-[2,2-Difluoro-1-(2-methoxy-ethoxymethoxy)-vinyl]-phenyl}-furan 9e



A mixture of dichloro*bis*(triphenylphosphine)-palladium(II) (0.028 mmol, 0.02 g, 5.5 mol%) and benzeneboronic acid (0.96 mmol, 0.12 g) was pump-purged twice with nitrogen, then taken up in dry, degassed DMF (2 ml). The mixture was warmed to 90°C. Triethylamine (2.0 mmol, 0.28 ml) was added at 30°C, followed by a solution of triflate **4c** (0.52 mmol, 0.21 g) in DMF (1 ml). The resulting dark black solution was stirred at 90°C for 90 hours, then diluted with diethyl ether. Water was added to wash out DMF, then the aqueous phase was extracted with diethyl ether (3 × 5 ml). The combined organic extracts were dried ($MgSO_4$) and concentrated *in vacuo* to afford a crude brown oil. Dissolution with acetone, followed by adsorption onto silica afforded an orange powder. Purification by column chromatography (silica gel; 20% diethyl ether in light petroleum) afforded furan **9e** (76 mg, 49%) as a colourless oil; R_f 0.19 (20% diethyl ether in light petroleum); δ_H (300.13 MHz, $CDCl_3$) 7.67 (2H, d, $^3J_{HH}$ 8.64 Hz), 7.47 (2H, d, $^3J_{HH}$ 8.64 Hz), 7.35-7.34 (1H, m), 6.67-6.65 (1H, m), 6.46-6.44 (1H, m), 4.89 (2H, s), 3.87-3.84 (2H, m), 3.56-3.52 (2H, m), 3.36 (3H, s); δ_F (282 MHz, $CDCl_3$) -105.52 (d, $^2J_{FF}$ 54.6 Hz), -97.29 (d, 54.6 Hz). This material was cleaved as described below without further characterisation.

General procedure for protic cleavage of MEM ethers **8** or **9:**

2,2-Difluoro-1-(4-furan-2-yl-phenyl)-ethanone 11e



Enol acetal **9e** (0.87 mmol, 0.27 g) was dissolved in methanol (6 ml) and cooled to 0°C. Chlorotrimethylsilane (1.58 mmol, 0.2 ml) was then slowly added and the resulting solution allowed to warm to ambient temperature, and stirred overnight. Evaporation of the solution afforded crude difluoroketone **11e** as a dark green solid. Purification by flash column chromatography (silica gel; 15% diethyl ether in light petroleum) of pre-adsorbed material afforded difluoroketone **11e** (0.12 g, 60%) as a white solid (100% by HPLC); mp 113-114°C; R_f 0.58 (15 % diethyl ether in petroleum ether); (Found: C, 64.66; H, 3.75%. $C_{12}H_8F_2O_2$ requires: C, 64.87; H, 3.63%); ν_{max} (film/cm^{-1}) 1695w, 1608w; δ_H (300.13 MHz, $CDCl_3$) 8.06 (2H, d, 8.5 Hz), 7.87 (2H, d, 8.5 Hz), 7.70-7.69 (1H, m), 7.09-7.08 (1H, m), 6.84 (1H, t, $^2J_{HF}$ 53.1 Hz), 6.59-6.57 (1H, m); δ_C (75.47 MHz, CD_3COCD_3) 157.4 (s, C_q), 149.5 (s, CH), 141.3 (s, CH), 135.7 (s, C_q), 135.1 (s, CH), 128.8 (s, CH), 117.6 (s, CH), 115.2 (t, $^1J_{CF}$ 248 Hz), 114.1 (s, CH), CO signal absent; δ_F (282 MHz, $CDCl_3$) -121.71 (d, $^2J_{HF}$ 47.4 Hz); [HRMS (EI, M$^+$) Found: 222.0495. Calc. For $C_{12}H_8O_2F_2$: 222.0492]; m/z (EI, M$^+$) 222 (42%), 171 (100%), 143 (17%), 115 (53%).

^{19}F NMR and R_f data for all compounds:

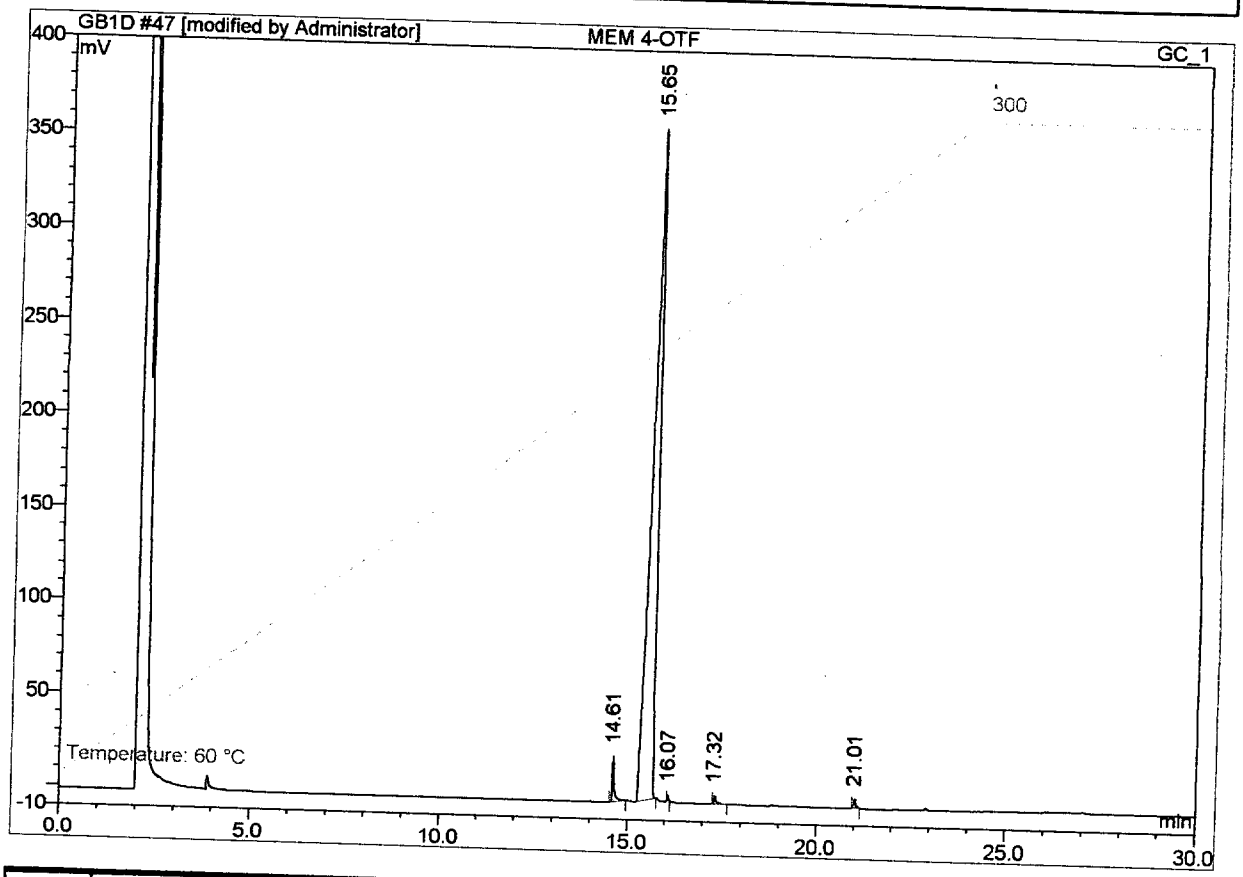
Compound No.	^{19}F NMR data	R_f	Eluent
4a	-106.05 d J=50.8 Hz, -98.40 1H, d J=50.8 Hz, -74.84 (3F) s	0.15	10% DE in LP
4b	-103.09 d J=49.4 Hz, -94.59 1H, d J=49.4 Hz, -72.83 (3F) s	0.27	20% DE in LP
4c	-104.51 d J=51.5 Hz, -95.79 d J=51.5 Hz, -73.0 (3F) s	0.44	20% EA in LP
4d	-103.60 d J=49.6 Hz, -94.18 d J=49.6 Hz, -73.41 (3F) s	0.22	30% DE in LP
4e	-109.91 d J=63.0 Hz, -101.16 d J= 63.0 Hz	0.25	20% DE in LP
4f	-103.78 d J=51.2 Hz, -95.11 d J=51.2 Hz	0.38	40% EA in LP
4g	-99.47 d J=38.2 Hz, -92.28 d J=38.2 Hz	0.22	30% DE in LP
4h	-102.42 d J=51.5 Hz, -98.76 d J=51.5 Hz	0.27	20% DE in LP
5	-119.85 dd J=79.1, 2.5 Hz; -100.73 dd, J=79.0, 16.4 Hz	-	-
6	-102.20 (2F) ca. d J=47.6 Hz, -95.20 (2F) ca. d J=47.6 Hz	-	-
8a	-106.69 d J=55.1 Hz, -98.18 d J=55.1 Hz	0.11	10% DE in LP
8b	-105.37 d J=54.2 Hz, -96.73 d J=54.2 Hz	-	-
8g	-106.03 d J=56.5 Hz, -97.53 d J=56.5 Hz	0.27	20% DE in LP
9a	-105.91 d J=55.2 Hz, -97.48 d J=55.2 Hz	0.41	30% DE in LP
9b	-104.93 d J=53.2 Hz, -96.42 d J=53.2 Hz	-	-
9c	-105.91 d J=55.4 Hz, -97.48 d J=55.4 Hz	0.17	20% DE in LP
9d	-106.68 d J=56.5 Hz, -98.18 d J=56.5 Hz	0.25	20% DE in LP
9e	-105.52 d J=54.6 Hz, -97.29 d J=54.6 Hz	0.19	20% DE in LP
9f	-105.37 d J=53.7 Hz, -97.09 d J= 53.7 Hz	0.21	20% DE in LP
9h	-105.78 d J=53.7 Hz, -97.67 d J=56.5 Hz	0.21	10% DE in LP
10e	-104.78 d J=51.5 Hz, -96.18 d J=51.5 Hz	0.28	20% EA in LP
11a	-122.15 (2F) d J=53.7 Hz	0.55	20% EA in LP
11e	-121.71 (2F) d J=47.4 Hz	0.58	15% DE in LP
11h	-122.00 (2F) d J=50.8 Hz	0.70	15% DE in LP
11g	-122.29 (2F) d J=53.9 Hz	0.55	20% EA in LP
4c + Br_2	-72.68 (3F) s, -52.56 (2F) s	-	-
4c + I_2	-72.61 (3F) s, -55.41 (2F) s	-	-
4c + NCS	-72.70 (3F) s, -61.38 (2F) s	-	-
4c + PhSCl	-77.95 (2F) s, -72.67 (3F) s	-	-

DE=diethyl ether
EA=ethyl acetate
LP=light petroleum (40-60°C)
Unless stated otherwise, all ^{19}F NMR signals correspond to 1 F atom

Operator:Administrator Timebase:GC1_1 Sequence:GB1D

47 MEM 4-OTF

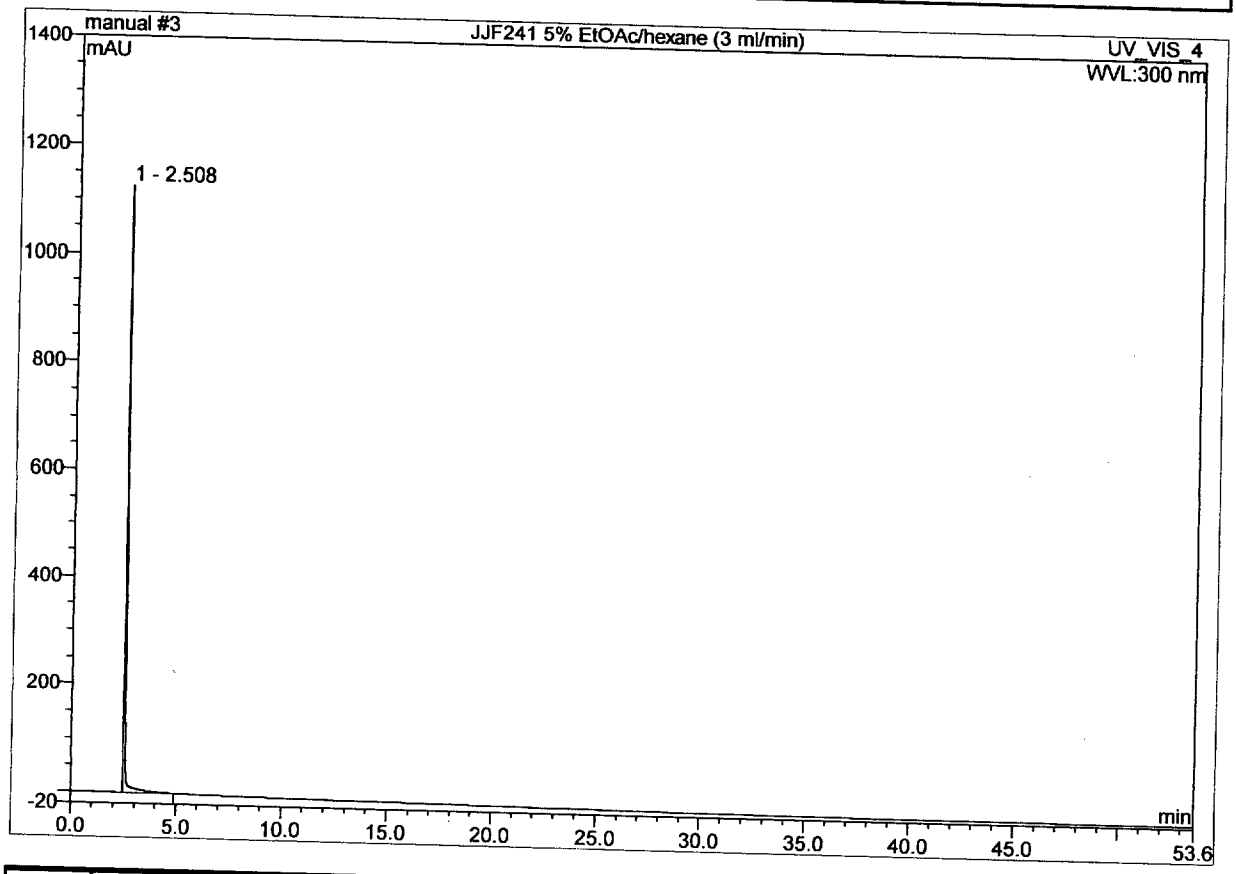
Sample Name:	**MEM 4-OTF**	*Injection Volume:*	**1.0**
Vial Number:	**47**	*Channel:*	**GC_1**
Sample Type:	**unknown**	*Wavelength:*	**n.a.**
Control Program:	**GB1**	*Bandwidth:*	**n.a.**
Quantif. Method:	**GB1**	*Dilution Factor:*	**1.0000**
Recording Time:	**11/7/00 12:55**	*Sample Weight:*	**1.0000**
Run Time (min):	**30.00**	*Sample Amount:*	**1.0000**



No.	Ret.Time min	Peak Name	Height mV	Area mV*min	Rel.Area %	Amount	Type
1	14.61	n.a.	23.996	1.464	2.10	n.a.	BMB
2	15.65	n.a.	357.685	67.571	96.83	n.a.	BMB
3	16.07	n.a.	3.420	0.137	0.20	n.a.	BMB*
4	17.32	n.a.	4.475	0.319	0.46	n.a.	BMB*
5	21.01	n.a.	4.859	0.292	0.42	n.a.	BMB*
Total:			394.436	69.783	100.00	0.000	

3 JJF241 5% EtOAc/hexane (3 ml/min)

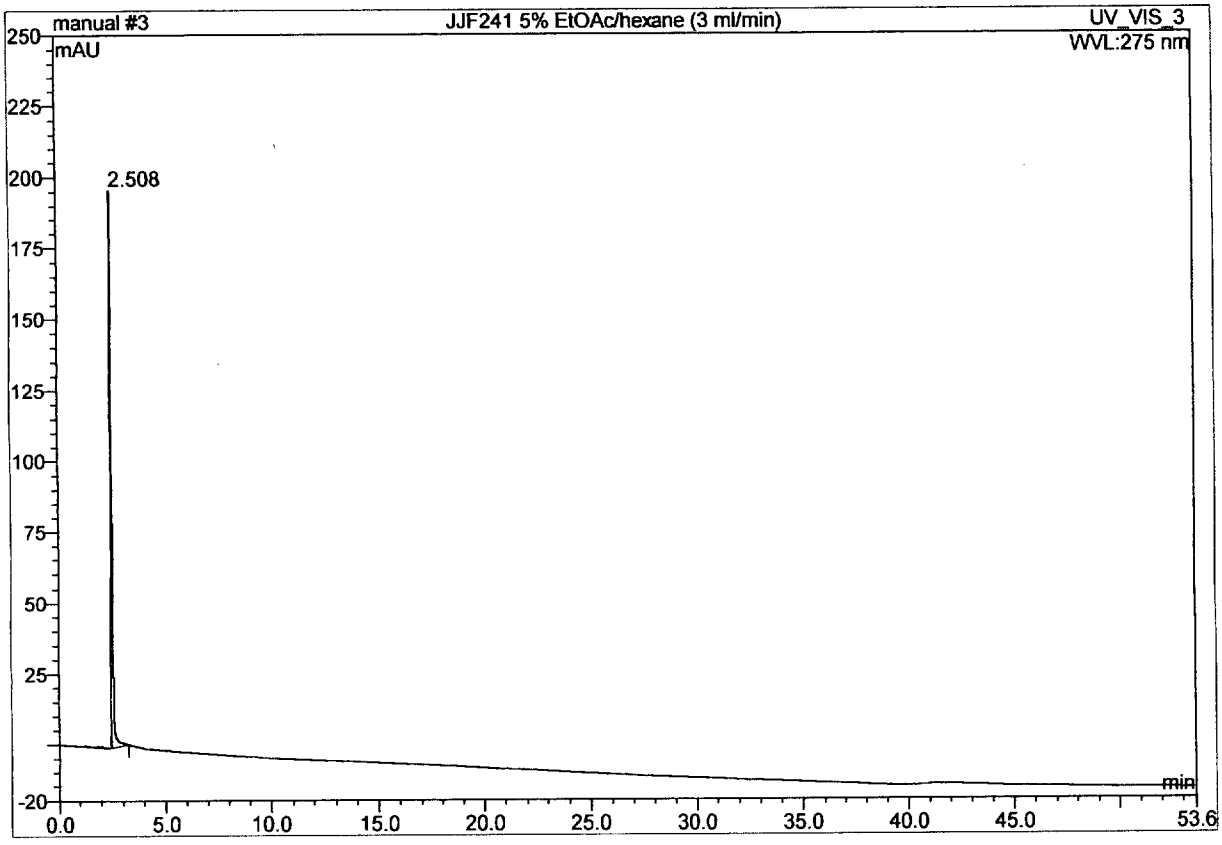
Sample Name:	**JJF241 5% EtOAc/hexane (3 ml/min)**	*Injection Volume:*	**20.0**
Vial Number:	**1**	*Channel:*	**UV_VIS_4**
Sample Type:	**unknown**	*Wavelength:*	**300**
Control Program:		*Bandwidth:*	**1**
Quantif. Method:	**default**	*Dilution Factor:*	**1.0000**
Recording Time:	**31/5/01 11:10**	*Sample Weight:*	**1.0000**
Run Time (min):	**53.62**	*Sample Amount:*	**1.0000**



No.	Ret.Time min	Peak Name	Height mAU	Area mAU*min	Rel.Area %	Amount	Type
1	2.51	n.a.	1126.072	73.712	100.00	n.a.	BMB
Total:			1126.072	73.712	100.00	0.000	

3 JJF241 5% EtOAc/hexane (3 ml/min)

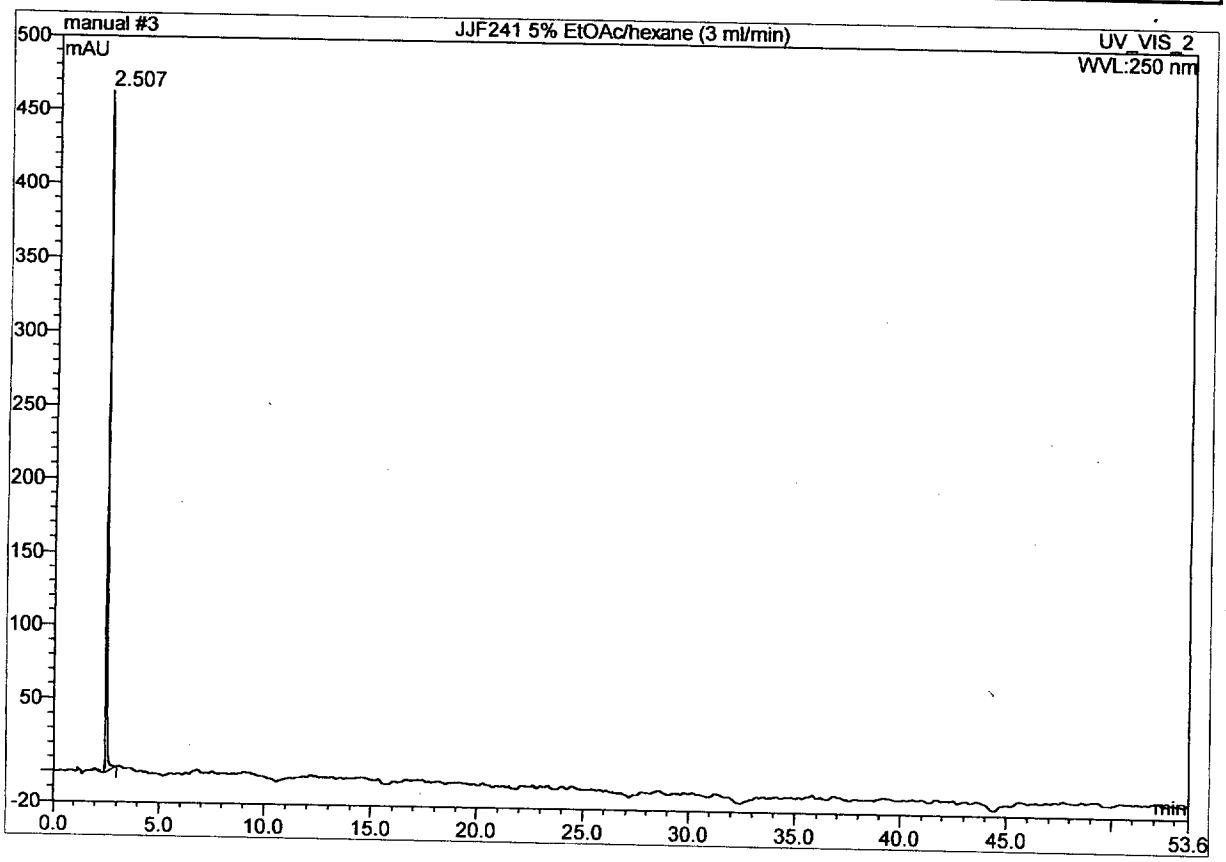
Sample Name:	**JJF241 5% EtOAc/hexane (3 ml/min)**	*Injection Volume:*	**20.0**
Vial Number:	**1**	*Channel:*	**UV_VIS_3**
Sample Type:	**unknown**	*Wavelength:*	**275**
Control Program:		*Bandwidth:*	**1**
Quantif. Method:	**default**	*Dilution Factor:*	**1.0000**
Recording Time:	**31/5/01 11:10**	*Sample Weight:*	**1.0000**
Run Time (min):	**53.60**	*Sample Amount:*	**1.0000**



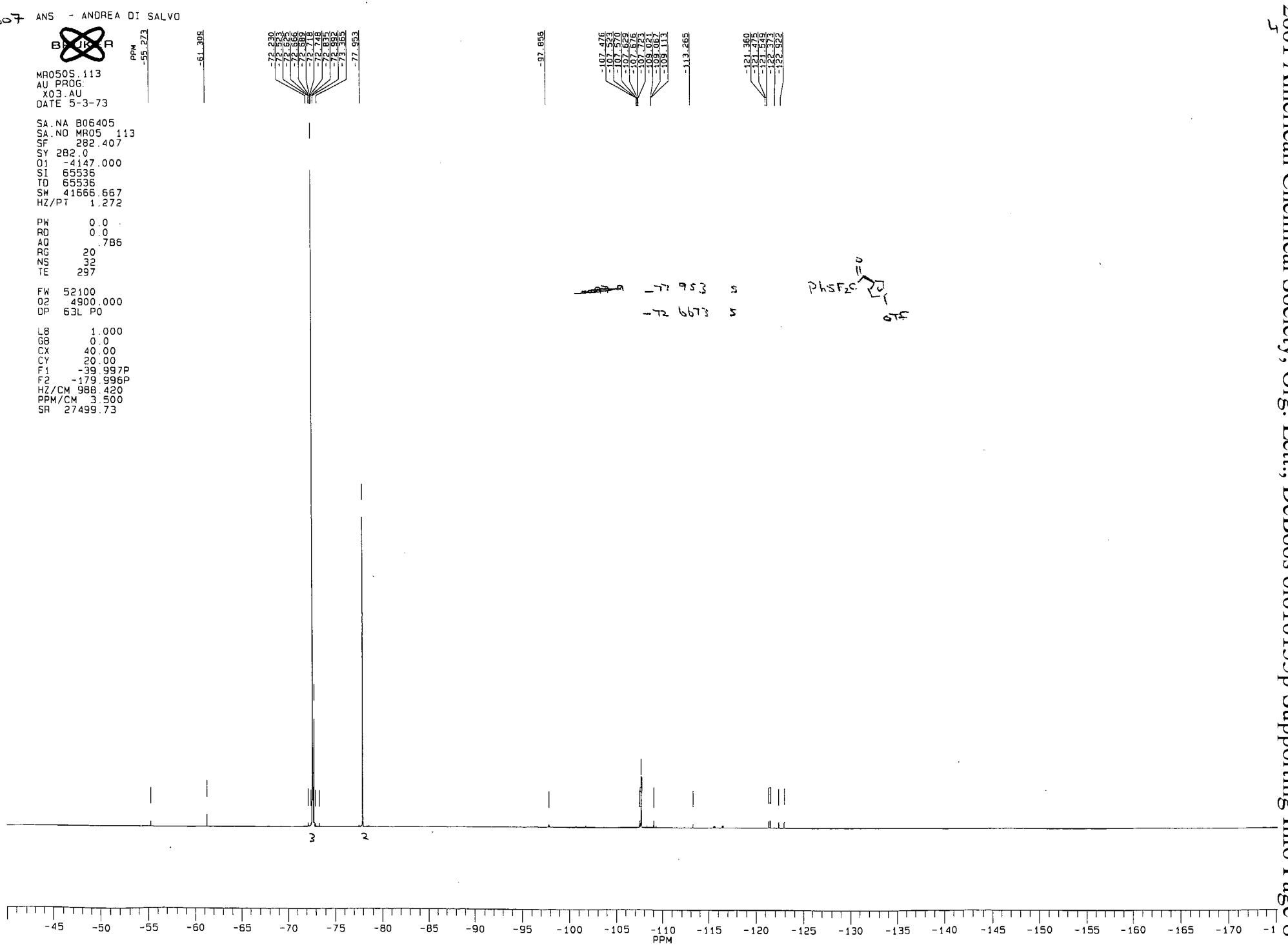
No.	Ret.Time min	Peak Name	Height mAU	Area mAU*min	Rel.Area %	Amount	Type
1	2.51	n.a.	196.595	12.712	100.00	n.a.	BMB
Total:			196.595	12.712	100.00	0.000	

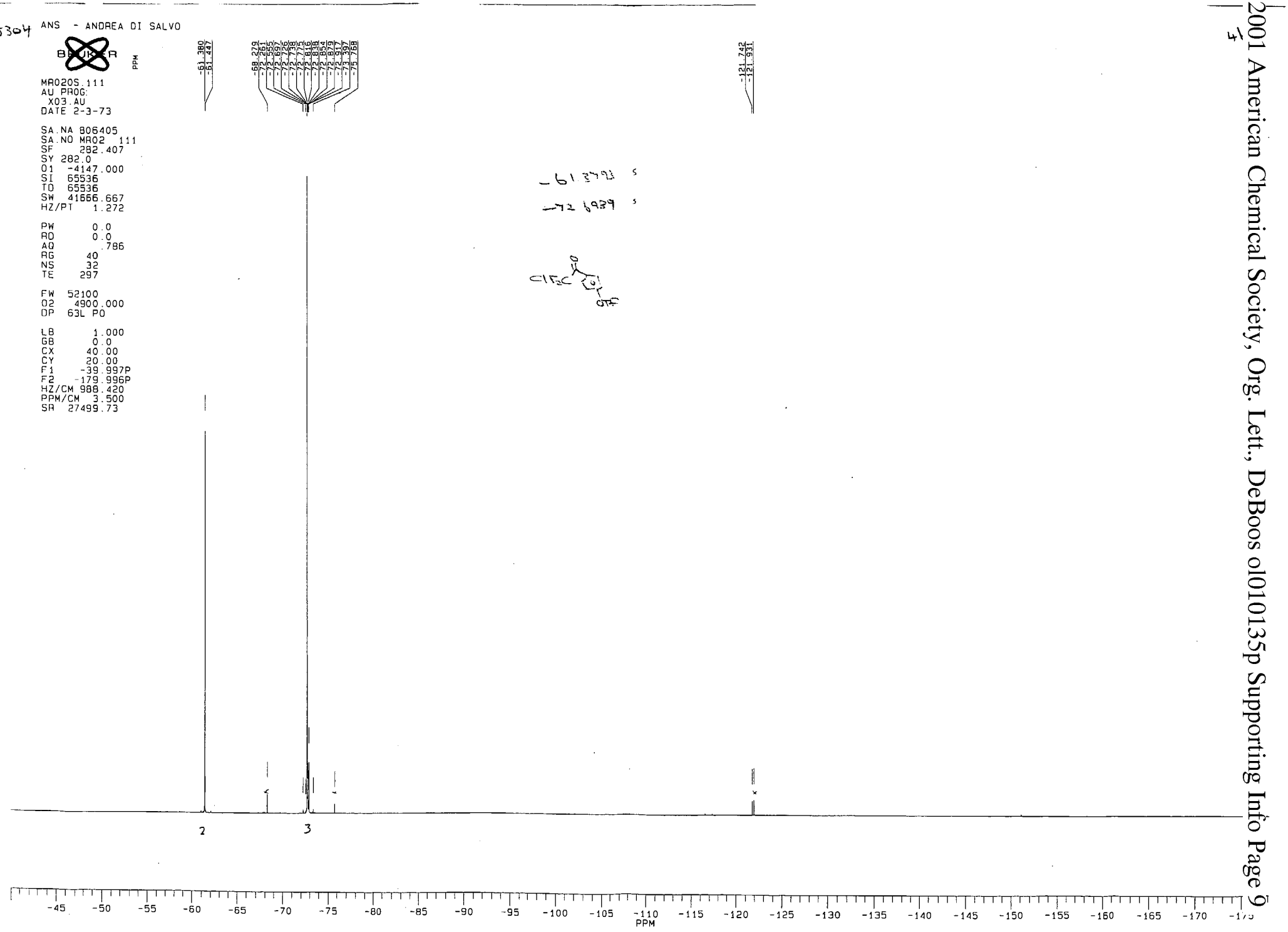
3 JJF241 5% EtOAc/hexane (3 ml/min)

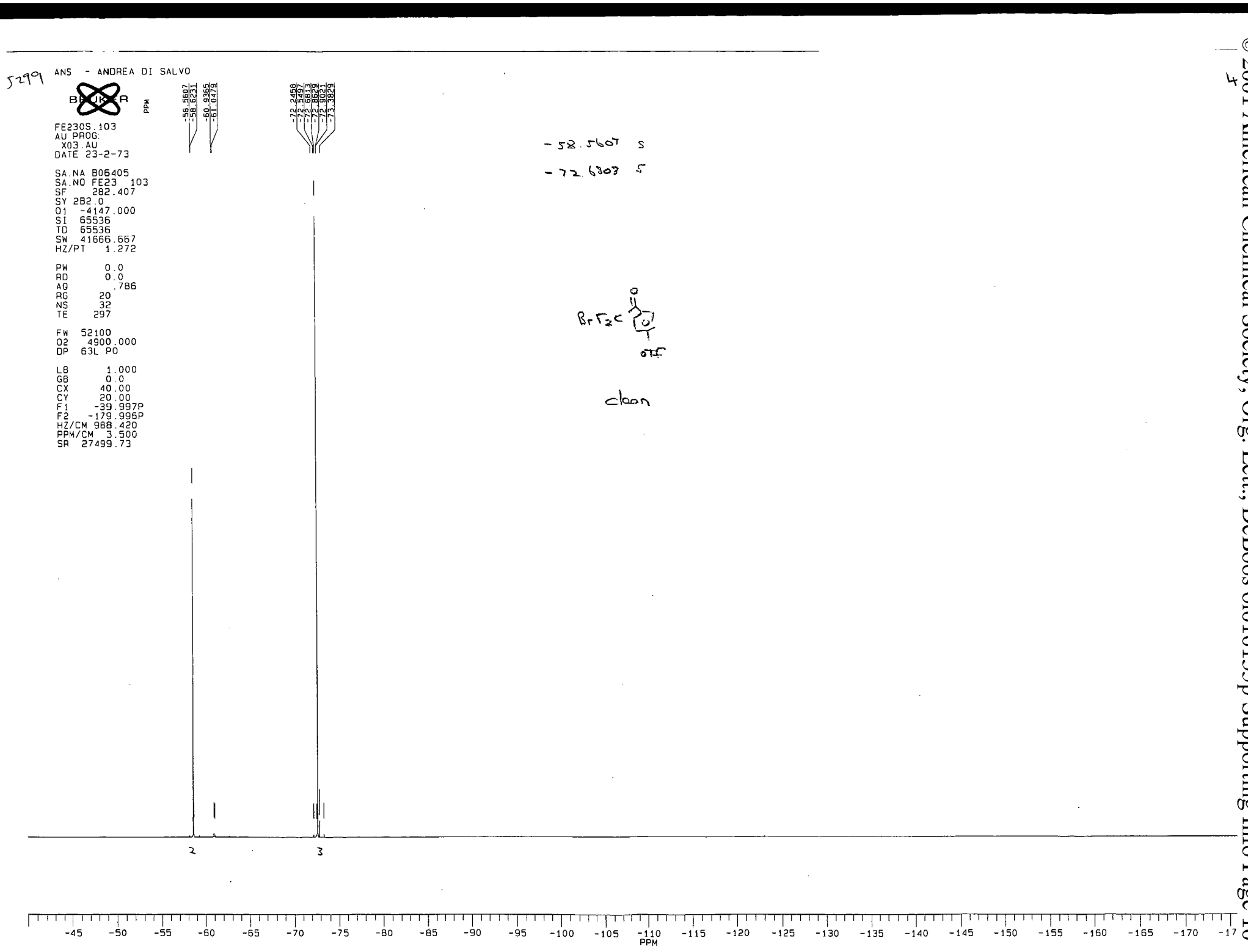
Sample Name:	**JJF241 5% EtOAc/hexane (3 ml/min)**	*Injection Volume:*	**20.0**
Vial Number:	**1**	*Channel:*	**UV_VIS_2**
Sample Type:	**unknown**	*Wavelength:*	**250**
Control Program:		*Bandwidth:*	**1**
Quantif. Method:	**default**	*Dilution Factor:*	**1.0000**
Recording Time:	**31/5/01 11:10**	*Sample Weight:*	**1.0000**
Run Time (min):	**53.65**	*Sample Amount:*	**1.0000**



No.	Ret.Time min	Peak Name	Height mAU	Area mAU*min	Rel.Area %	Amount	Type
1	2.51	n.a.	463.814	27.012	100.00	n.a.	BMB
Total:			463.814	27.012	100.00	0.000	







J300 ANS - ANDREA DI SALVO

BRUKER

FE260S.122
AU PROG:
X03.AU
DATE 26-2-73

SA.NA B06405
SA.NO FE26 122
SF 282.407
SY 282.0
O1 -4147.000
SI 65536
TO 65536
SW 41666.667
HZ/PT 1.272

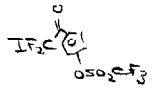
PW 0.0
RD 0.0
AQ .786
RG 32
NS 32
TE 297

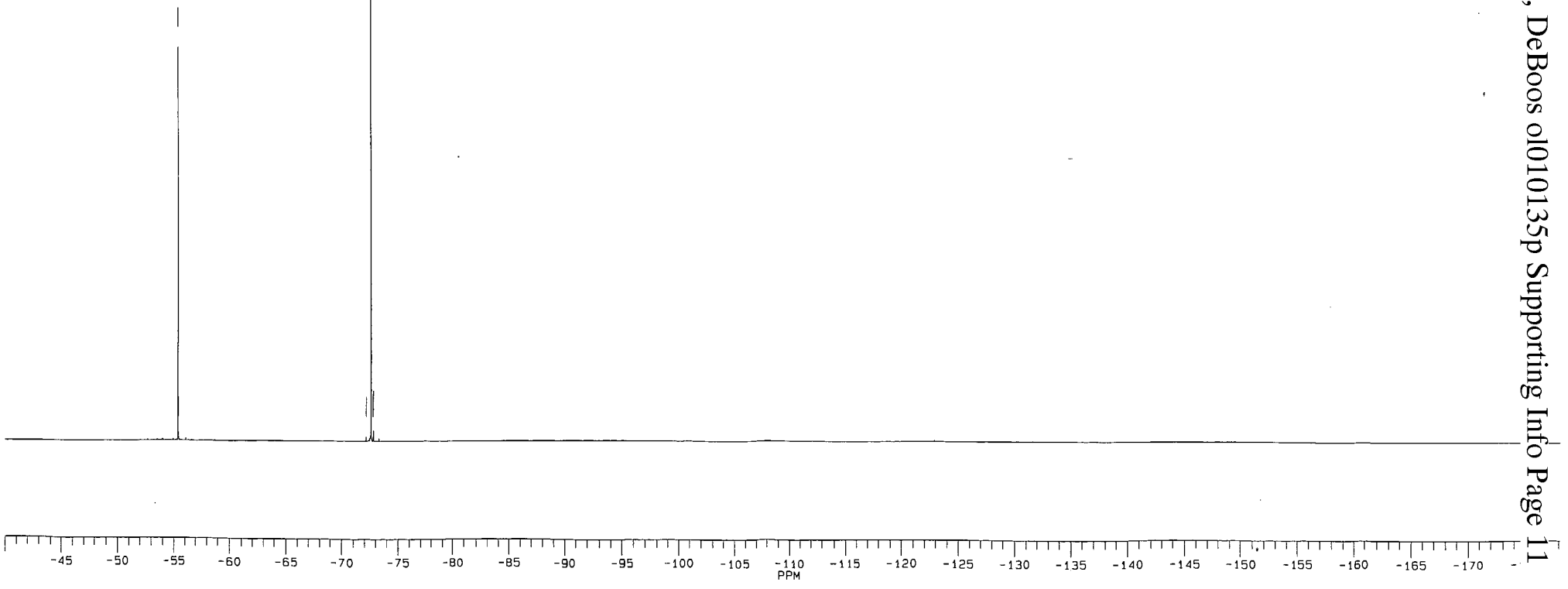
FW 52100
O2 4900.000
OP 63L PO

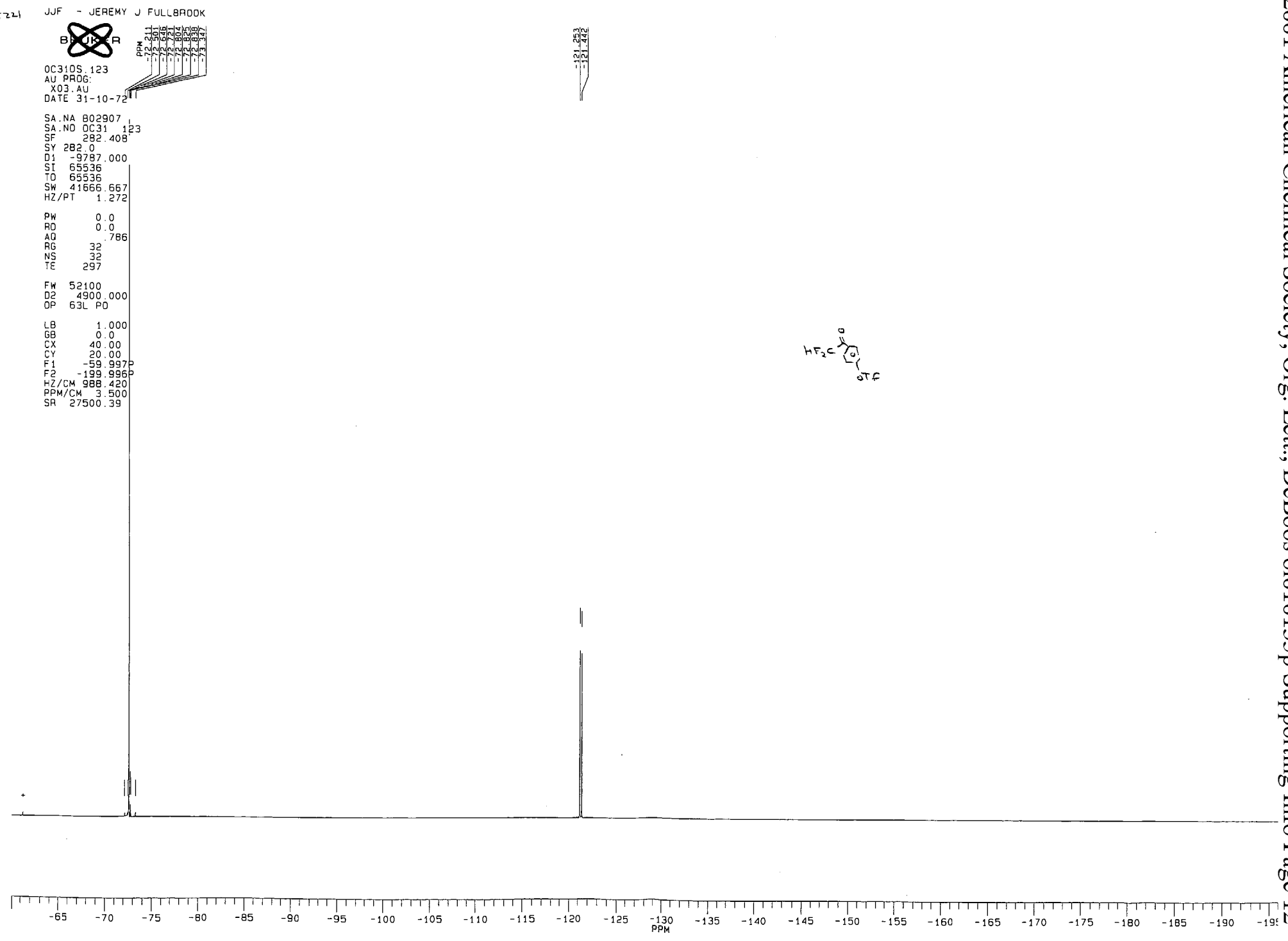
LB 1.000
GB 0.0
CX 40.00
CY 20.00
F1 -39.997P
F2 -179.996P
HZ/CM 988.420
PPM/CM 3.500
SR 27499.73

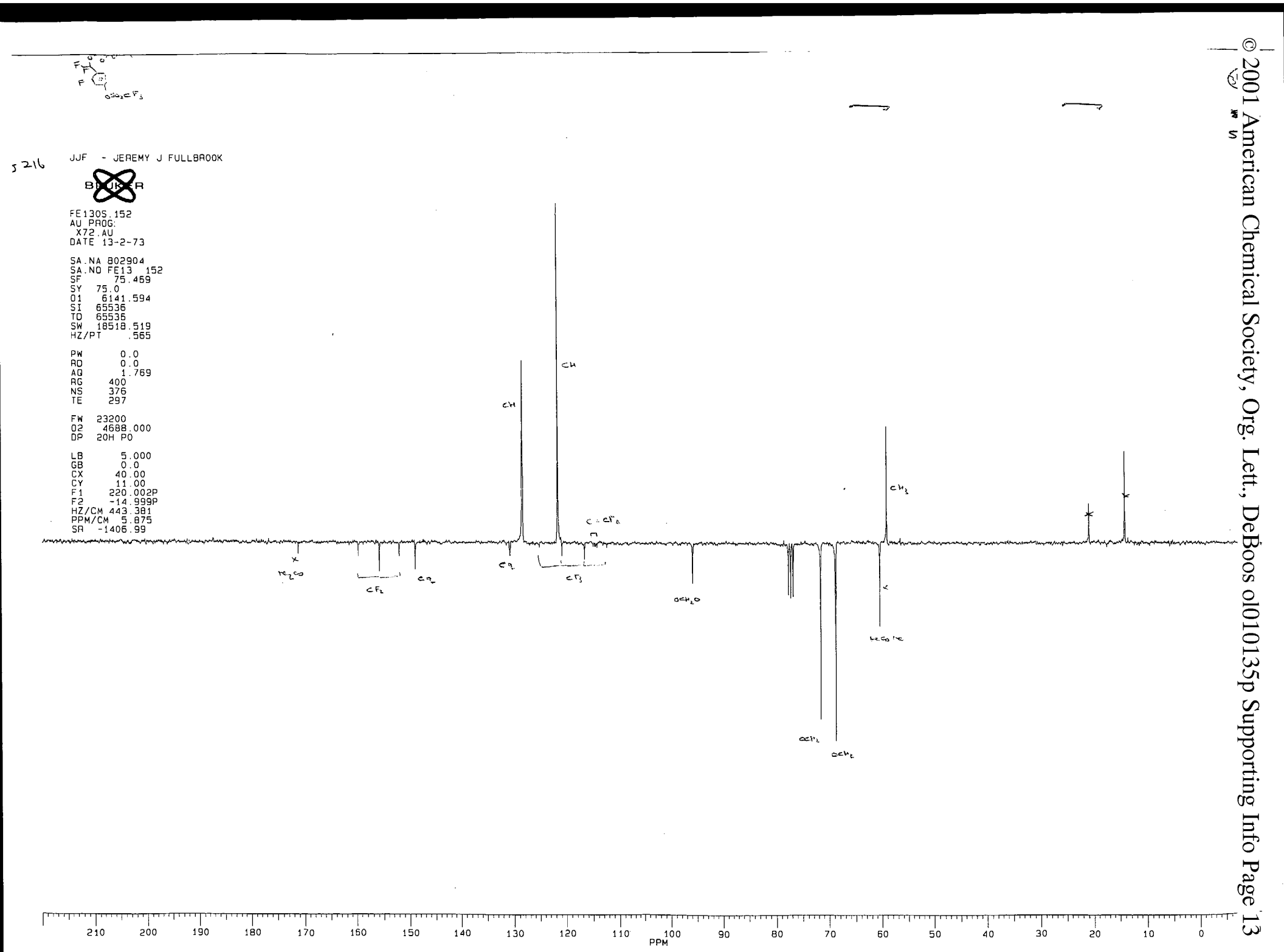
PPM
-55.4086
-55.4660

-72.1720
-72.5084
-72.7846
-72.8201









J234

Jeremy Fullbrook, CDCl3, +27C, AV300
1H, Barcode label 2901

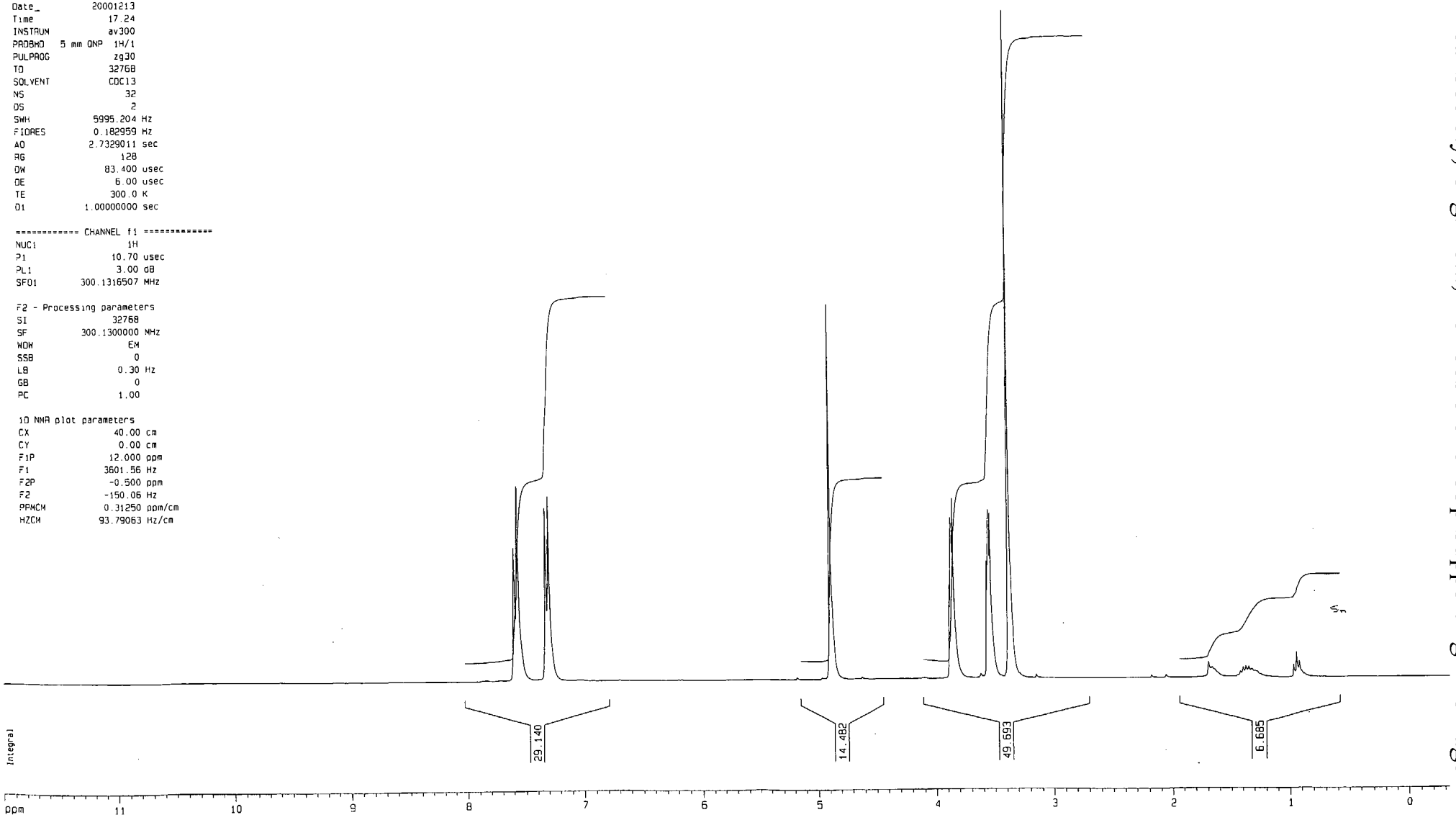
Current Data Parameters
NAME 12-13.43.FAC
EXPNO 10
PROCNO 1

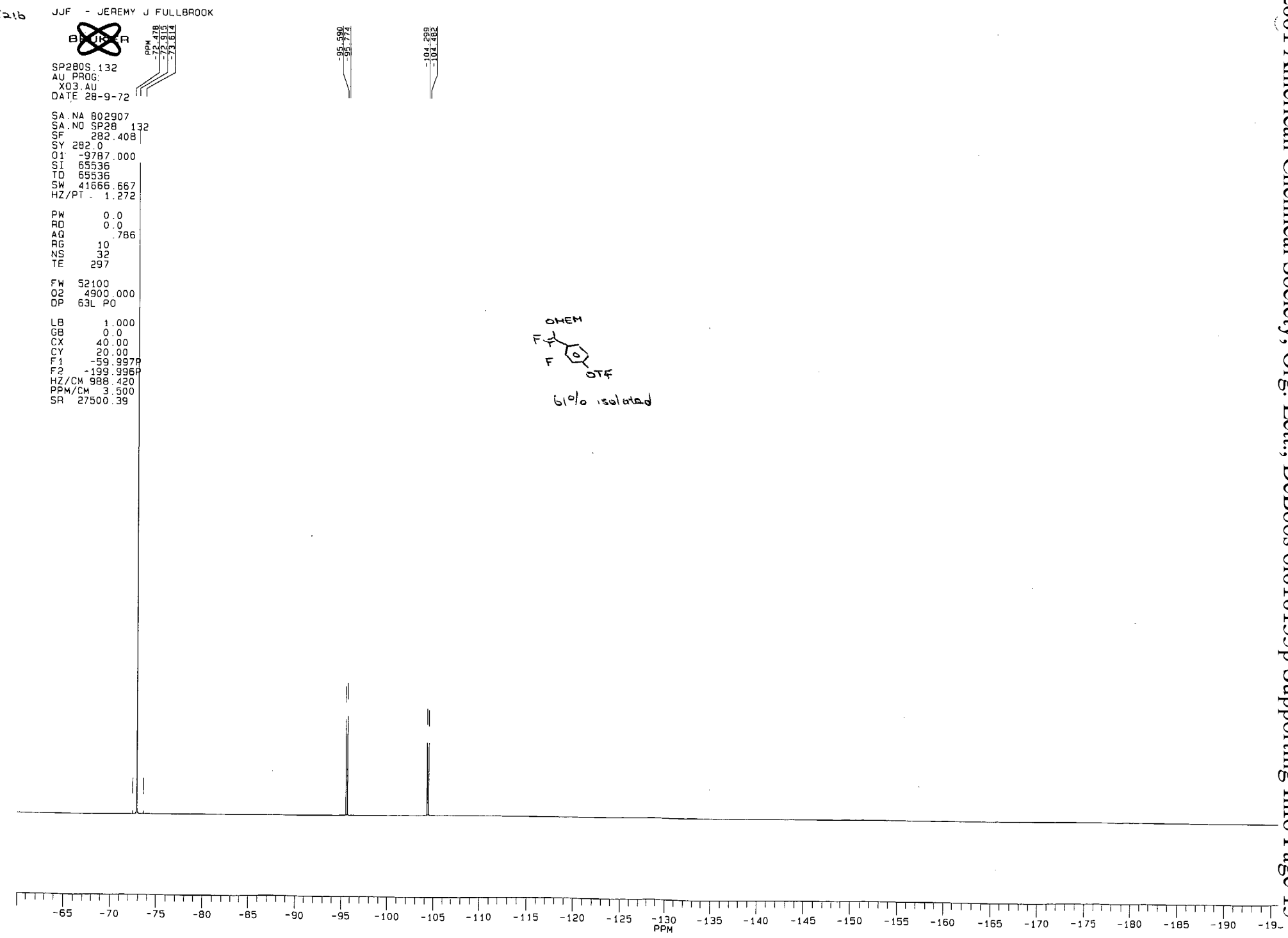
F2 - Acquisition Parameters
Date_ 20001213
Time 17.24
INSTRUM av300
PROBHD 5 mm QNP 1H/1
PULPROG zg30
TD 32768
SOLVENT CDCl3
NS 32
DS 2
SWH 5995.204 Hz
FIDRES 0.182959 Hz
AQ 2.7329011 sec
RG 128
DW 83.400 usec
DE 6.00 usec
TE 300.0 K
D1 1.00000000 sec

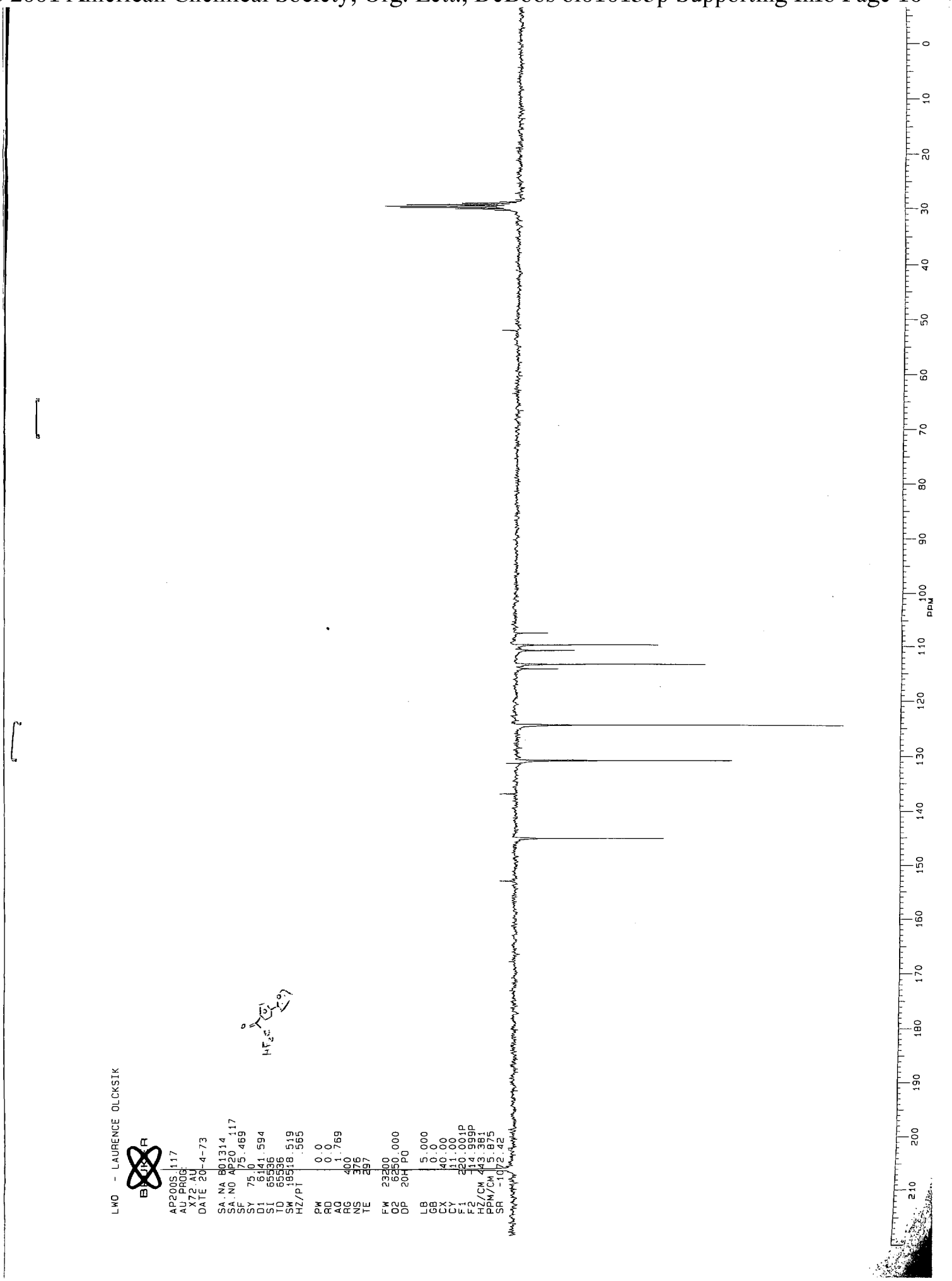
========== CHANNEL f1 ==========
NUC1 1H
P1 10.70 usec
PL1 3.00 dB
SFO1 300.1316507 MHz

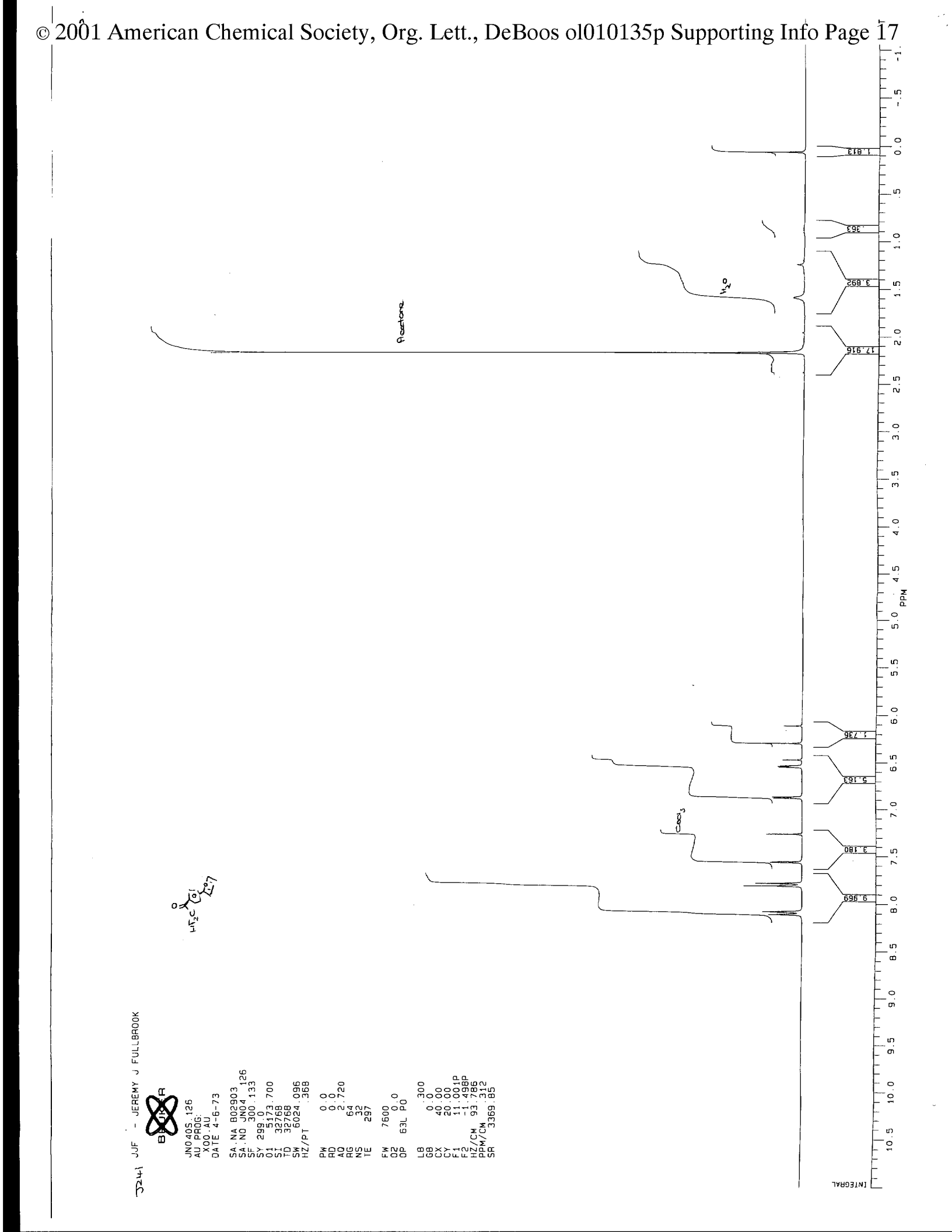
F2 - Processing parameters
SI 32768
SF 300.1300000 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

1D NMR plot parameters
CX 40.00 cm
CY 0.00 cm
F1P 12.000 ppm
F1 3601.56 Hz
F2P -0.500 ppm
F2 -150.06 Hz
PPMCM 0.31250 ppm/cm
HZCM 93.79063 Hz/cm

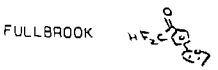





LWO - LAURENCE OLCKSIK
AP200S 117
AU PROG
X72 AU
DATE 20-4-73
SA NA B01314
SA NO AP20 117
SF 75.469
SY 75.0
D1 6141.594
SI 65536
TD 65536
SW 18518.519
HZ/PT .565
PW 0.0
RD 0.0
AQ 1.769
RG 400
NS 376
TE 297
FW 23200
O2 6250.000
DP 20H PO
LB 5.000
GB 0.0
CX 40.00
CY 111.00
F1 220.001P
F2 14.999P
HZ/CM 43.381
PPM/CM 5.875
SR -1072.42
PPM



J241 JJF - JEREMY J FULLBROOK



PPM

JN040S.116
AU PROG:
X03.AU
DATE 4-6-73

SA.NA B02913
SA.NO JN04 116
SF 282.407
SY 282.0
O1 -4147.000
SI 65536
TD 65536
SW 41666.667
HZ/PT 1.272

PW 0.0
RD 0.0
AQ .786
RG 64
NS 32
TE 297

FW 52100
O2 4900.000
DP 63L PO

LB 1.000
GB 0.0
CX 40.00
CY 20.00
F1 -39.997P
F2 -179.996P
HZ/CM 988.420
PPM/CM 3.500
SR 27499.73

-121.560
-121.749

-45 -50 -55 -60 -65 -70 -75 -80 -85 -90 -95 -100 -105 -110 -115 -120 -125 -130 -135 -140 -145 -150 -155 -160 -165 -170

Method Filename : MAY2001.MTH
Company name : Birmingham Uni
Operator ID : Lianne Hill

Group No : 25 Sample Name	Element % Nitrogen	Carbon	Hydrogen
J241	0.00	64.66	3.75
		64.87	3.63

1 Sample(s) in Group No : 25

Component Name
Nitrogen
Carbon
Hydrogen

I added VO_5 to the sample to aid combustion. This seems to have sorted out the problem so if you have any more sample I will run that so you have 2 sets of results!