Electron Supplementary Information

Pd-Catalyzed Arylation of Silyl Enol Ethers of Substituted α-Fluoroketones

*Yong Guo Brendan Twamley and Jean'ne M. Shreeve**

Department of Chemistry, University of Idaho, Moscow, Idaho, 83844-2343

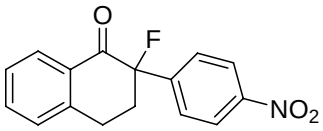
jshreeve@uidaho.edu

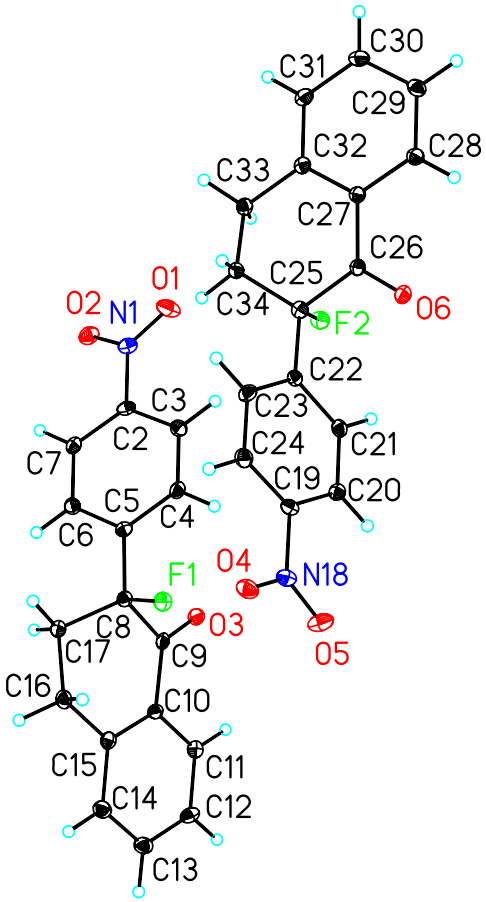
S2–S21 X-ray structure of **3e**

S22-S35 Spectroscopic data of new products

S36- Spectroscopic data of known compounds

Single-Crystal X-ray Diffraction of 2-Fluoro-2-(4-nitrophenyl)-1-tetralone (**3e**)





The crystal structure has been deposited at the Cambridge Crystallographic Data Centre and allocated the deposition number CCDC 715296.

Experimental:

Crystals of compound **3e** were removed from the flask, a suitable crystal was selected, attached to a

glass fiber and data were collected at 90(2) K using a Bruker/Siemens SMART APEX instrument (Mo Kα radiation, λ = 0.71073 Å) equipped with a Cryocool NeverIce low temperature device. Data were measured using omega scans 0.3 ° per frame for 5 seconds, and a full sphere of data was collected. A total of 2400 frames were collected with a final resolution of 0.71 Å. Cell parameters were retrieved using SMART[1] software and refined using SAINTPlus[2] on all observed reflections. Data reduction and correction for Lp and decay were performed using the SAINTPlus software. Absorption corrections were applied using SADABS.[3] The structure was solved by direct methods and refined by least squares method on F^2 using the SHELXTL program package.[4] The structure was solved in the space group Pna2(1) (# 33) by analysis of systematic absences. The absolute configuration could not be determined reliably fo this all light atom structure and the data was merged. All non-hydrogen atoms were refined anisotropically. Hydrogen atoms were added geometrically (riding model). No decomposition was observed during data collection. Details of the data collection and refinement are given in Table 1. Further details are provided in the Supporting Information.

Acknowledgement

The Bruker (Siemens) SMART APEX diffraction facility was established at the University of Idaho with the assistance of the NSF-EPSCoR program and the M. J. Murdock Charitable Trust, Vancouver, WA, USA.

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[1] SMART: v. 5.632, Bruker AXS, Madison, WI, **2005**.

[2] SAINTPlus: v. 7.23a, Data Reduction and Correction Program, Bruker AXS, Madison, WI, **2004**.

[3] SADABS: v.2007/4, an empirical absorption correction program, Bruker AXS Inc., Madison, WI, **2007**.

[4] SHELXTL: v. 6.14, Structure Determination Software Suite, Sheldrick, G.M., Bruker AXS Inc., Madison, WI, **2004**.

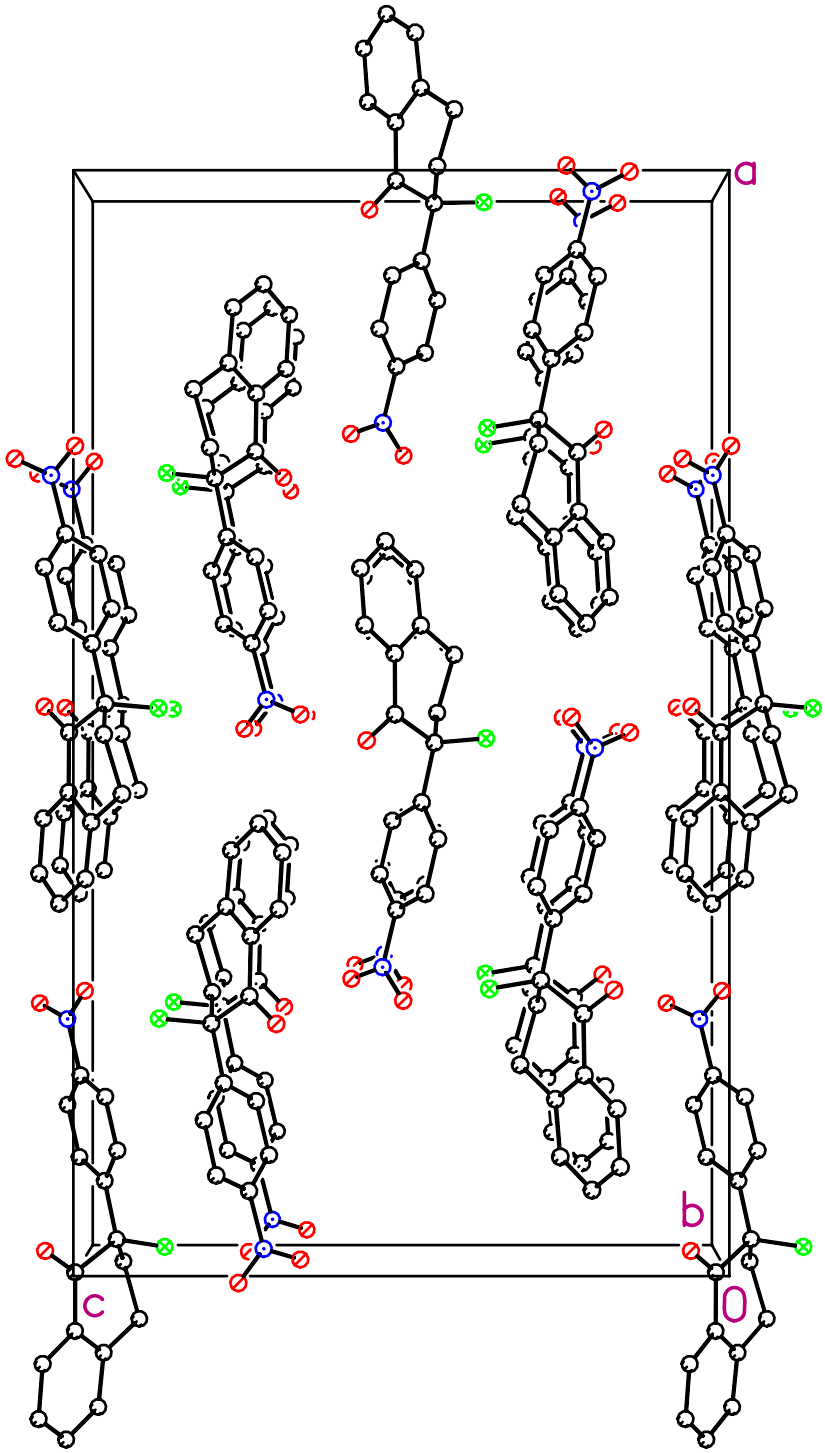

a
b
c
0

Table 1. Crystal data and structure refinement for C16 H12 F N O3.

Identification code	bt1303	
Empirical formula	C16 H12 F N O3	
Formula weight	285.27	
Temperature	90(2) K	
Wavelength	0.71073 Å	
Crystal system	Orthorhombic	
Space group	Pna2(1)	
Unit cell dimensions	a = 27.274(3) Å	α= 90°.
	b = 5.7146(7) Å	β= 90°.
	c = 16.204(2) Å	γ = 90°.
Volume	2525.5(5) $Å^3$	
Z	8	
Density (calculated)	1.501 Mg/m^3	
Absorption coefficient	0.114 mm^{-1}	
F(000)	1184	
Crystal size	0.53 x 0.15 x 0.08 mm^3	
Crystal color and habit	colorless needle	
Diffractometer	Bruker/Siemens SMART APEX	
Theta range for data collection	1.49 to 30.06°.	
Index ranges	-38<=h<=36, -8<=k<=8, -21<=l<=22	
Reflections collected	37390	
Independent reflections	3771 [R(int) = 0.0655]	
Completeness to theta = 30.06°	98.8 %	

Absorption correction	Semi-empirical from equivalents
Max. and min. transmission	0.992 and 0.862
Solution method	XS, SHELXTL v. 6.14 (Bruker, 2003)
Refinement method	Full-matrix least-squares on F^2
Data / restraints / parameters	3771 / 1 / 379
Goodness-of-fit on F^2	1.024
Final R indices [I>2sigma(I)]	R1 = 0.0468, wR2 = 0.1052
R indices (all data)	R1 = 0.0637, wR2 = 0.1150
Absolute structure parameter	0
Largest diff. peak and hole	0.456 and -0.219 e.$Å^{-3}$

Table 2. Atomic coordinates (x 10^4) and equivalent isotropic displacement parameters ($Å^2$x 10^3) for bt1303. U(eq) is defined as one third of the trace of the orthogonalized U^{ij} tensor.

	x	y	z	U(eq)
C(2)	4258(1)	6092(5)	2341(2)	20(1)
C(3)	4071(1)	4272(4)	2810(2)	21(1)
C(4)	3574(1)	4312(4)	2998(2)	19(1)
C(5)	3276(1)	6138(4)	2730(2)	17(1)
C(6)	3476(1)	7935(4)	2258(2)	21(1)
C(7)	3972(1)	7921(4)	2059(2)	21(1)
C(8)	2730(1)	6075(4)	2917(2)	17(1)
C(9)	2460(1)	4432(4)	2309(2)	18(1)
C(10)	1920(1)	4613(4)	2292(2)	17(1)
C(11)	1659(1)	2924(4)	1843(2)	21(1)
C(12)	1154(1)	3032(5)	1792(2)	24(1)
C(13)	907(1)	4849(5)	2175(2)	24(1)
C(14)	1160(1)	6527(5)	2623(2)	24(1)
C(15)	1672(1)	6419(4)	2698(2)	19(1)
C(16)	1945(1)	8197(4)	3207(2)	22(1)
C(17)	2481(1)	8439(4)	2949(2)	19(1)
C(19)	3301(1)	1220(5)	5083(2)	19(1)
C(20)	3464(1)	-698(5)	4638(2)	19(1)
C(21)	3958(1)	-837(4)	4444(2)	19(1)

C(22)	4283(1)	927(4)	4692(2)	17(1)
C(23)	4105(1)	2814(5)	5146(2)	21(1)
C(24)	3611(1)	2973(5)	5342(2)	22(1)
C(25)	4824(1)	710(4)	4497(2)	18(1)
C(26)	5082(1)	-1005(4)	5098(2)	17(1)
C(27)	5628(1)	-939(4)	5103(2)	17(1)
C(28)	5875(1)	-2673(4)	5548(2)	20(1)
C(29)	6381(1)	-2641(5)	5612(2)	22(1)
C(30)	6639(1)	-826(5)	5244(2)	23(1)
C(31)	6399(1)	885(5)	4792(2)	22(1)
C(32)	5890(1)	846(4)	4706(2)	18(1)
C(33)	5630(1)	2654(4)	4189(2)	19(1)
C(34)	5097(1)	3002(4)	4452(2)	18(1)
F(1)	2670(1)	4961(3)	3694(1)	22(1)
F(2)	4864(1)	-432(3)	3715(1)	22(1)
N(1)	4782(1)	6053(4)	2115(1)	22(1)
N(18)	2776(1)	1389(4)	5295(1)	21(1)
O(1)	5053(1)	4693(4)	2481(1)	34(1)
O(2)	4918(1)	7387(4)	1569(1)	28(1)
O(3)	2687(1)	3056(3)	1885(1)	22(1)
O(4)	2649(1)	2919(4)	5784(1)	26(1)
O(5)	2491(1)	3(4)	4976(1)	31(1)
O(6)	4847(1)	-2334(3)	5521(1)	22(1)

Table 3. Bond lengths [Å] and angles [°] for bt1303.

C(2)-C(7)	1.381(4)	C(12)-H(12)	0.9500
C(2)-C(3)	1.385(4)	C(13)-C(14)	1.386(4)
C(2)-N(1)	1.475(3)	C(13)-H(13)	0.9500
C(3)-C(4)	1.391(4)	C(14)-C(15)	1.404(4)
C(3)-H(3)	0.9500	C(14)-H(14)	0.9500
C(4)-C(5)	1.392(3)	C(15)-C(16)	1.505(4)
C(4)-H(4)	0.9500	C(16)-C(17)	1.525(4)
C(5)-C(6)	1.390(4)	C(16)-H(16A)	0.9900
C(5)-C(8)	1.521(3)	C(16)-H(16B)	0.9900
C(6)-C(7)	1.392(4)	C(17)-H(17A)	0.9900
C(6)-H(6)	0.9500	C(17)-H(17B)	0.9900
C(7)-H(7)	0.9500	C(19)-C(24)	1.378(4)
C(8)-F(1)	1.420(3)	C(19)-C(20)	1.386(4)
C(8)-C(17)	1.514(3)	C(19)-N(18)	1.475(3)
C(8)-C(9)	1.548(3)	C(20)-C(21)	1.385(4)
C(9)-O(3)	1.214(3)	C(20)-H(20)	0.9500
C(9)-C(10)	1.476(3)	C(21)-C(22)	1.401(3)
C(10)-C(15)	1.398(3)	C(21)-H(21)	0.9500
C(10)-C(11)	1.402(4)	C(22)-C(23)	1.394(4)
C(11)-C(12)	1.382(4)	C(22)-C(25)	1.513(3)
C(11)-H(11)	0.9500	C(23)-C(24)	1.385(4)
C(12)-C(13)	1.385(4)	C(23)-H(23)	0.9500

C(24)-H(24)	0.9500	N(18)-O(5)	1.224(3)
C(25)-F(2)	1.429(3)	N(18)-O(4)	1.229(3)
C(25)-C(34)	1.509(3)		
C(25)-C(26)	1.551(3)	C(7)-C(2)-C(3)	122.9(2)
C(26)-O(6)	1.208(3)	C(7)-C(2)-N(1)	118.4(2)
C(26)-C(27)	1.489(3)	C(3)-C(2)-N(1)	118.7(2)
C(27)-C(28)	1.398(4)	C(2)-C(3)-C(4)	117.7(2)
C(27)-C(32)	1.402(4)	C(2)-C(3)-H(3)	121.1
C(28)-C(29)	1.384(3)	C(4)-C(3)-H(3)	121.1
C(28)-H(28)	0.9500	C(3)-C(4)-C(5)	120.9(2)
C(29)-C(30)	1.388(4)	C(3)-C(4)-H(4)	119.6
C(29)-H(29)	0.9500	C(5)-C(4)-H(4)	119.6
C(30)-C(31)	1.386(4)	C(6)-C(5)-C(4)	119.8(2)
C(30)-H(30)	0.9500	C(6)-C(5)-C(8)	120.7(2)
C(31)-C(32)	1.396(3)	C(4)-C(5)-C(8)	119.4(2)
C(31)-H(31)	0.9500	C(5)-C(6)-C(7)	120.3(2)
C(32)-C(33)	1.506(4)	C(5)-C(6)-H(6)	119.9
C(33)-C(34)	1.529(3)	C(7)-C(6)-H(6)	119.9
C(33)-H(33A)	0.9900	C(2)-C(7)-C(6)	118.4(2)
C(33)-H(33B)	0.9900	C(2)-C(7)-H(7)	120.8
C(34)-H(34A)	0.9900	C(6)-C(7)-H(7)	120.8
C(34)-H(34B)	0.9900	F(1)-C(8)-C(17)	108.5(2)
N(1)-O(2)	1.225(3)	F(1)-C(8)-C(5)	107.48(19)
N(1)-O(1)	1.226(3)	C(17)-C(8)-C(5)	115.2(2)

F(1)-C(8)-C(9)	103.77(18)	C(15)-C(16)-C(17)	112.6(2)
C(17)-C(8)-C(9)	110.4(2)	C(15)-C(16)-H(16A)	109.1
C(5)-C(8)-C(9)	110.7(2)	C(17)-C(16)-H(16A)	109.1
O(3)-C(9)-C(10)	123.0(2)	C(15)-C(16)-H(16B)	109.1
O(3)-C(9)-C(8)	120.6(2)	C(17)-C(16)-H(16B)	109.1
C(10)-C(9)-C(8)	116.4(2)	H(16A)-C(16)-H(16B)	107.8
C(15)-C(10)-C(11)	120.4(2)	C(8)-C(17)-C(16)	111.1(2)
C(15)-C(10)-C(9)	121.7(2)	C(8)-C(17)-H(17A)	109.4
C(11)-C(10)-C(9)	117.9(2)	C(16)-C(17)-H(17A)	109.4
C(12)-C(11)-C(10)	120.5(2)	C(8)-C(17)-H(17B)	109.4
C(12)-C(11)-H(11)	119.8	C(16)-C(17)-H(17B)	109.4
C(10)-C(11)-H(11)	119.8	H(17A)-C(17)-H(17B)	108.0
C(11)-C(12)-C(13)	119.4(3)	C(24)-C(19)-C(20)	122.4(2)
C(11)-C(12)-H(12)	120.3	C(24)-C(19)-N(18)	118.6(2)
C(13)-C(12)-H(12)	120.3	C(20)-C(19)-N(18)	119.0(2)
C(12)-C(13)-C(14)	120.8(2)	C(21)-C(20)-C(19)	118.4(2)
C(12)-C(13)-H(13)	119.6	C(21)-C(20)-H(20)	120.8
C(14)-C(13)-H(13)	119.6	C(19)-C(20)-H(20)	120.8
C(13)-C(14)-C(15)	120.7(3)	C(20)-C(21)-C(22)	120.6(2)
C(13)-C(14)-H(14)	119.7	C(20)-C(21)-H(21)	119.7
C(15)-C(14)-H(14)	119.7	C(22)-C(21)-H(21)	119.7
C(10)-C(15)-C(14)	118.2(2)	C(23)-C(22)-C(21)	119.1(2)
C(10)-C(15)-C(16)	121.1(2)	C(23)-C(22)-C(25)	120.9(2)
C(14)-C(15)-C(16)	120.7(2)	C(21)-C(22)-C(25)	119.9(2)

C(24)-C(23)-C(22)	120.7(2)	C(31)-C(30)-C(29)	121.0(2)
C(24)-C(23)-H(23)	119.6	C(31)-C(30)-H(30)	119.5
C(22)-C(23)-H(23)	119.6	C(29)-C(30)-H(30)	119.5
C(19)-C(24)-C(23)	118.7(2)	C(30)-C(31)-C(32)	120.7(2)
C(19)-C(24)-H(24)	120.6	C(30)-C(31)-H(31)	119.7
C(23)-C(24)-H(24)	120.6	C(32)-C(31)-H(31)	119.7
F(2)-C(25)-C(34)	108.4(2)	C(31)-C(32)-C(27)	118.2(2)
F(2)-C(25)-C(22)	107.25(19)	C(31)-C(32)-C(33)	120.8(2)
C(34)-C(25)-C(22)	114.9(2)	C(27)-C(32)-C(33)	120.9(2)
F(2)-C(25)-C(26)	103.50(18)	C(32)-C(33)-C(34)	112.5(2)
C(34)-C(25)-C(26)	110.8(2)	C(32)-C(33)-H(33A)	109.1
C(22)-C(25)-C(26)	111.3(2)	C(34)-C(33)-H(33A)	109.1
O(6)-C(26)-C(27)	122.9(2)	C(32)-C(33)-H(33B)	109.1
O(6)-C(26)-C(25)	120.8(2)	C(34)-C(33)-H(33B)	109.1
C(27)-C(26)-C(25)	116.2(2)	H(33A)-C(33)-H(33B)	107.8
C(28)-C(27)-C(32)	120.5(2)	C(25)-C(34)-C(33)	111.7(2)
C(28)-C(27)-C(26)	117.7(2)	C(25)-C(34)-H(34A)	109.3
C(32)-C(27)-C(26)	121.7(2)	C(33)-C(34)-H(34A)	109.3
C(29)-C(28)-C(27)	120.6(2)	C(25)-C(34)-H(34B)	109.3
C(29)-C(28)-H(28)	119.7	C(33)-C(34)-H(34B)	109.3
C(27)-C(28)-H(28)	119.7	H(34A)-C(34)-H(34B)	107.9
C(28)-C(29)-C(30)	118.9(2)	O(2)-N(1)-O(1)	124.0(2)
C(28)-C(29)-H(29)	120.5	O(2)-N(1)-C(2)	117.7(2)
C(30)-C(29)-H(29)	120.5	O(1)-N(1)-C(2)	118.3(2)

O(5)-N(18)-O(4)	123.7(2)	O(4)-N(18)-C(19)	118.0(2)
O(5)-N(18)-C(19)	118.3(2)		

Table 4. Anisotropic displacement parameters ($Å^2 x\ 10^3$)for bt1303. The anisotropic displacement factor exponent takes the form: $-2\pi^2[\ h^2 a^{*2} U^{11} + ... + 2\ h\ k\ a^*\ b^*\ U^{12}\ ]$

	U^{11}	U^{22}	U^{33}	U^{23}	U^{13}	U^{12}
C(2)	16(1)	25(1)	18(1)	-2(1)	-2(1)	-4(1)
C(3)	21(1)	22(1)	19(1)	2(1)	-3(1)	1(1)
C(4)	22(1)	17(1)	18(1)	4(1)	-1(1)	-4(1)
C(5)	17(1)	20(1)	14(1)	-2(1)	-1(1)	-2(1)
C(6)	22(1)	19(1)	21(1)	0(1)	-2(1)	1(1)
C(7)	23(1)	18(1)	21(1)	2(1)	1(1)	-4(1)
C(8)	18(1)	18(1)	16(1)	2(1)	1(1)	-1(1)
C(9)	22(1)	13(1)	20(1)	3(1)	-1(1)	-2(1)
C(10)	16(1)	19(1)	18(1)	2(1)	-1(1)	-2(1)
C(11)	23(1)	19(1)	21(1)	0(1)	0(1)	0(1)
C(12)	19(1)	29(1)	23(2)	1(1)	-3(1)	-7(1)
C(13)	20(1)	29(1)	25(1)	7(1)	-2(1)	1(1)
C(14)	21(1)	25(1)	25(1)	3(1)	3(1)	2(1)
C(15)	22(1)	18(1)	16(1)	4(1)	1(1)	-1(1)
C(16)	24(1)	17(1)	24(1)	-2(1)	3(1)	2(1)
C(17)	21(1)	16(1)	21(1)	1(1)	0(1)	-1(1)
C(19)	16(1)	22(1)	18(1)	2(1)	0(1)	3(1)
C(20)	20(1)	19(1)	17(1)	0(1)	-3(1)	-2(1)
C(21)	22(1)	15(1)	19(1)	-2(1)	-2(1)	2(1)
C(22)	17(1)	16(1)	17(1)	2(1)	-1(1)	1(1)

C(23)	20(1)	20(1)	23(1)	-5(1)	0(1)	-4(1)
C(24)	23(1)	19(1)	25(2)	-5(1)	1(1)	3(1)
C(25)	20(1)	18(1)	14(1)	-4(1)	0(1)	1(1)
C(26)	19(1)	14(1)	18(1)	-5(1)	-1(1)	1(1)
C(27)	18(1)	16(1)	18(1)	-4(1)	-1(1)	1(1)
C(28)	19(1)	19(1)	20(1)	-2(1)	-2(1)	1(1)
C(29)	23(1)	23(1)	20(2)	-2(1)	-5(1)	3(1)
C(30)	16(1)	28(1)	26(2)	-6(1)	-1(1)	1(1)
C(31)	19(1)	22(1)	25(1)	-3(1)	2(1)	-3(1)
C(32)	20(1)	18(1)	17(1)	-3(1)	1(1)	0(1)
C(33)	20(1)	19(1)	20(1)	1(1)	3(1)	0(1)
C(34)	18(1)	16(1)	19(1)	1(1)	1(1)	0(1)
F(1)	24(1)	24(1)	16(1)	6(1)	1(1)	-1(1)
F(2)	23(1)	25(1)	19(1)	-7(1)	0(1)	2(1)
N(1)	19(1)	28(1)	19(1)	-2(1)	0(1)	-3(1)
N(18)	17(1)	26(1)	21(1)	1(1)	0(1)	2(1)
O(1)	22(1)	48(1)	33(1)	11(1)	0(1)	6(1)
O(2)	26(1)	32(1)	27(1)	4(1)	4(1)	-6(1)
O(3)	21(1)	19(1)	26(1)	-6(1)	2(1)	0(1)
O(4)	21(1)	29(1)	28(1)	-4(1)	2(1)	6(1)
O(5)	21(1)	41(1)	32(1)	-9(1)	1(1)	-8(1)
O(6)	20(1)	18(1)	28(1)	2(1)	2(1)	-2(1)

Table 5. Hydrogen coordinates (x 10^4) and isotropic displacement parameters ($Å^2$x 10^3) for bt1303.

	x	y	z	U(eq)
H(3)	4277	3038	2998	25
H(4)	3435	3077	3314	23
H(6)	3273	9177	2072	25
H(7)	4111	9141	1737	25
H(11)	1831	1697	1573	25
H(12)	977	1870	1496	28
H(13)	560	4947	2131	29
H(14)	985	7763	2881	28
H(16A)	1930	7734	3795	26
H(16B)	1781	9736	3151	26
H(17A)	2498	9187	2399	23
H(17B)	2654	9458	3347	23
H(20)	3242	-1889	4469	22
H(21)	4077	-2140	4140	23
H(23)	4324	4004	5324	25
H(24)	3490	4265	5649	27
H(28)	5693	-3884	5810	24
H(29)	6548	-3841	5903	26
H(30)	6985	-756	5304	28

H(31)	6584	2097	4537	27
H(33A)	5639	2165	3603	23
H(33B)	5806	4163	4236	23
H(34A)	5088	3771	4999	21
H(34B)	4931	4046	4051	21

Table 6. Torsion angles [°] for bt1303.

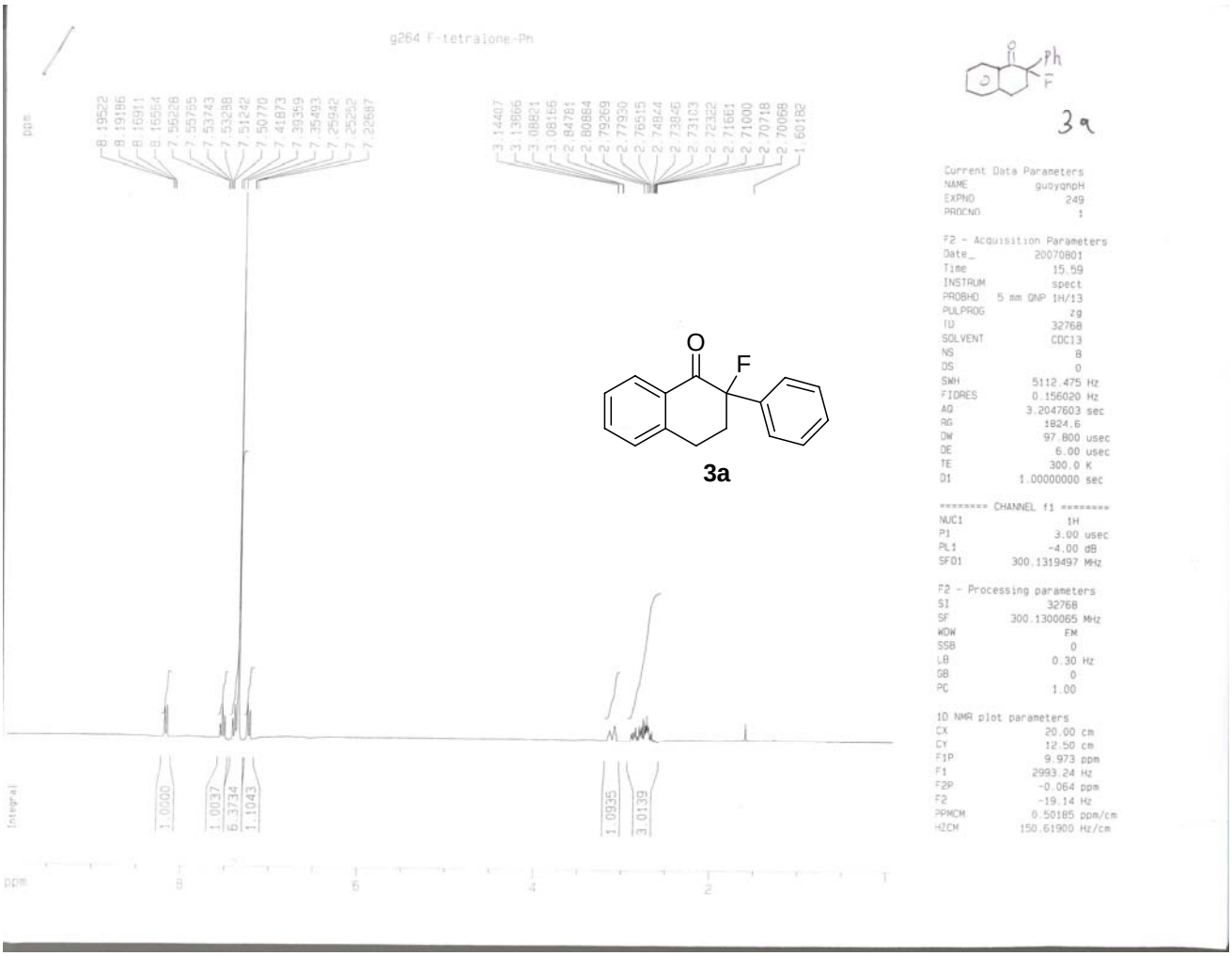
C(7)-C(2)-C(3)-C(4)	0.2(4)
N(1)-C(2)-C(3)-C(4)	-178.3(2)
C(2)-C(3)-C(4)-C(5)	-0.7(4)
C(3)-C(4)-C(5)-C(6)	0.8(4)
C(3)-C(4)-C(5)-C(8)	177.6(2)
C(4)-C(5)-C(6)-C(7)	-0.4(4)
C(8)-C(5)-C(6)-C(7)	-177.1(2)
C(3)-C(2)-C(7)-C(6)	0.2(4)
N(1)-C(2)-C(7)-C(6)	178.8(2)
C(5)-C(6)-C(7)-C(2)	-0.1(4)
C(6)-C(5)-C(8)-F(1)	-149.9(2)
C(4)-C(5)-C(8)-F(1)	33.4(3)
C(6)-C(5)-C(8)-C(17)	-28.8(3)
C(4)-C(5)-C(8)-C(17)	154.5(2)
C(6)-C(5)-C(8)-C(9)	97.4(3)
C(4)-C(5)-C(8)-C(9)	-79.3(3)
F(1)-C(8)-C(9)-O(3)	-100.2(3)
C(17)-C(8)-C(9)-O(3)	143.6(2)
C(5)-C(8)-C(9)-O(3)	14.8(3)
F(1)-C(8)-C(9)-C(10)	78.6(2)
C(17)-C(8)-C(9)-C(10)	-37.6(3)
C(5)-C(8)-C(9)-C(10)	-166.4(2)
O(3)-C(9)-C(10)-C(15)	-171.0(3)

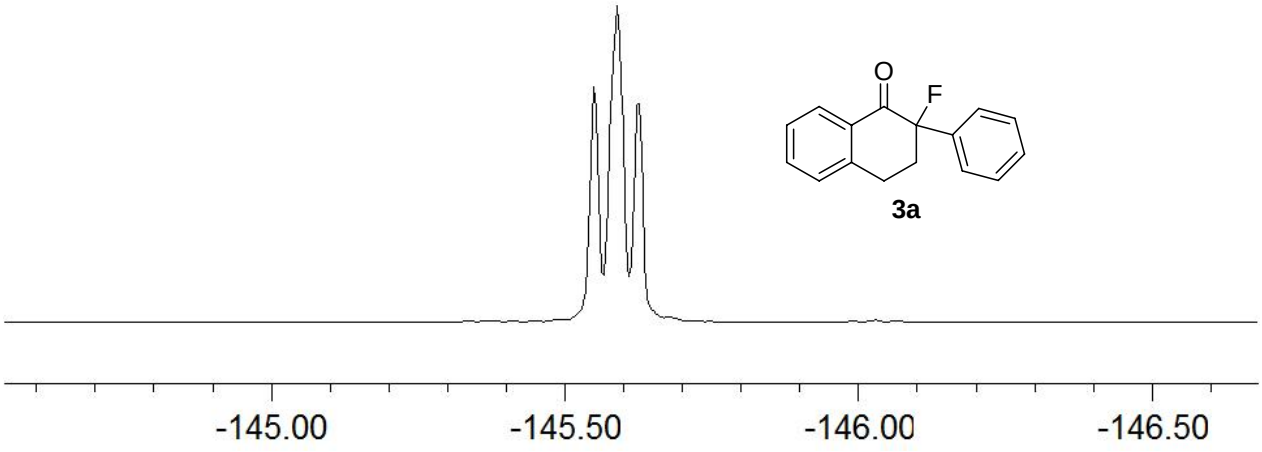
C(8)-C(9)-C(10)-C(15)	10.2(4)
O(3)-C(9)-C(10)-C(11)	8.1(4)
C(8)-C(9)-C(10)-C(11)	-170.6(2)
C(15)-C(10)-C(11)-C(12)	0.5(4)
C(9)-C(10)-C(11)-C(12)	-178.7(3)
C(10)-C(11)-C(12)-C(13)	1.1(4)
C(11)-C(12)-C(13)-C(14)	-1.4(4)
C(12)-C(13)-C(14)-C(15)	-0.1(4)
C(11)-C(10)-C(15)-C(14)	-1.9(4)
C(9)-C(10)-C(15)-C(14)	177.3(2)
C(11)-C(10)-C(15)-C(16)	177.8(2)
C(9)-C(10)-C(15)-C(16)	-3.1(4)
C(13)-C(14)-C(15)-C(10)	1.6(4)
C(13)-C(14)-C(15)-C(16)	-178.0(2)
C(10)-C(15)-C(16)-C(17)	23.7(3)
C(14)-C(15)-C(16)-C(17)	-156.7(2)
F(1)-C(8)-C(17)-C(16)	-55.0(3)
C(5)-C(8)-C(17)-C(16)	-175.5(2)
C(9)-C(8)-C(17)-C(16)	58.1(3)
C(15)-C(16)-C(17)-C(8)	-51.4(3)
C(24)-C(19)-C(20)-C(21)	-0.4(4)
N(18)-C(19)-C(20)-C(21)	-179.9(2)
C(19)-C(20)-C(21)-C(22)	-0.2(4)
C(20)-C(21)-C(22)-C(23)	0.8(4)
C(20)-C(21)-C(22)-C(25)	178.2(2)

C(21)-C(22)-C(23)-C(24)	-1.0(4)
C(25)-C(22)-C(23)-C(24)	-178.3(2)
C(20)-C(19)-C(24)-C(23)	0.3(4)
N(18)-C(19)-C(24)-C(23)	179.8(2)
C(22)-C(23)-C(24)-C(19)	0.4(4)
C(23)-C(22)-C(25)-F(2)	-148.1(2)
C(21)-C(22)-C(25)-F(2)	34.6(3)
C(23)-C(22)-C(25)-C(34)	-27.6(4)
C(21)-C(22)-C(25)-C(34)	155.1(2)
C(23)-C(22)-C(25)-C(26)	99.3(3)
C(21)-C(22)-C(25)-C(26)	-78.0(3)
F(2)-C(25)-C(26)-O(6)	-99.5(3)
C(34)-C(25)-C(26)-O(6)	144.6(2)
C(22)-C(25)-C(26)-O(6)	15.5(3)
F(2)-C(25)-C(26)-C(27)	79.2(2)
C(34)-C(25)-C(26)-C(27)	-36.8(3)
C(22)-C(25)-C(26)-C(27)	-165.8(2)
O(6)-C(26)-C(27)-C(28)	7.4(4)
C(25)-C(26)-C(27)-C(28)	-171.3(2)
O(6)-C(26)-C(27)-C(32)	-170.0(3)
C(25)-C(26)-C(27)-C(32)	11.3(3)
C(32)-C(27)-C(28)-C(29)	0.7(4)
C(26)-C(27)-C(28)-C(29)	-176.7(2)
C(27)-C(28)-C(29)-C(30)	1.6(4)
C(28)-C(29)-C(30)-C(31)	-2.5(4)

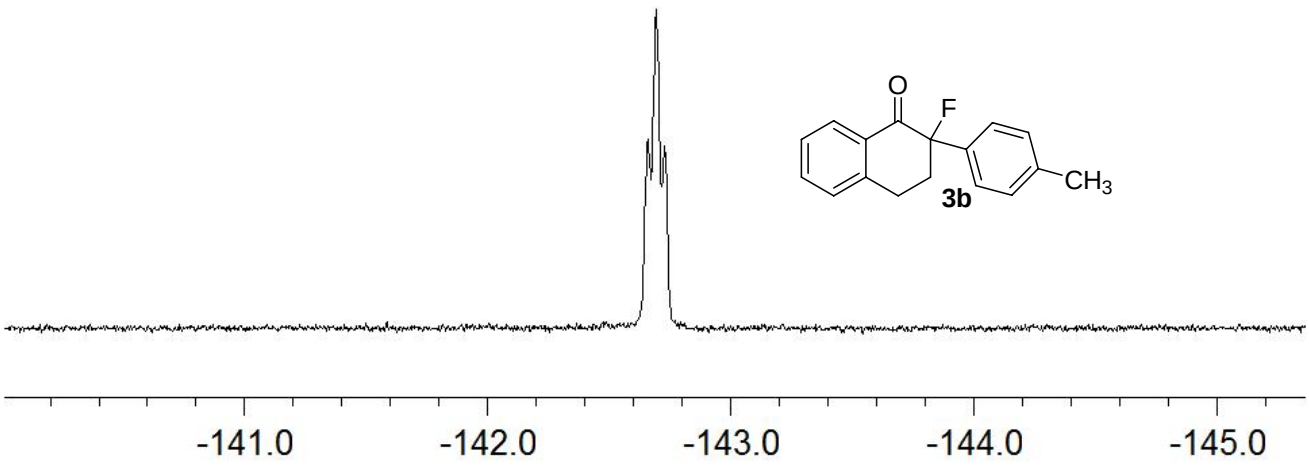
C(29)-C(30)-C(31)-C(32)	1.1(4)
C(30)-C(31)-C(32)-C(27)	1.3(4)
C(30)-C(31)-C(32)-C(33)	-177.8(3)
C(28)-C(27)-C(32)-C(31)	-2.2(4)
C(26)-C(27)-C(32)-C(31)	175.2(2)
C(28)-C(27)-C(32)-C(33)	177.0(2)
C(26)-C(27)-C(32)-C(33)	-5.7(4)
C(31)-C(32)-C(33)-C(34)	-155.3(2)
C(27)-C(32)-C(33)-C(34)	25.6(3)
F(2)-C(25)-C(34)-C(33)	-55.8(3)
C(22)-C(25)-C(34)-C(33)	-175.7(2)
C(26)-C(25)-C(34)-C(33)	57.1(3)
C(32)-C(33)-C(34)-C(25)	-51.7(3)
C(7)-C(2)-N(1)-O(2)	-13.2(3)
C(3)-C(2)-N(1)-O(2)	165.5(2)
C(7)-C(2)-N(1)-O(1)	166.9(3)
C(3)-C(2)-N(1)-O(1)	-14.5(4)
C(24)-C(19)-N(18)-O(5)	170.6(3)
C(20)-C(19)-N(18)-O(5)	-9.8(4)
C(24)-C(19)-N(18)-O(4)	-9.4(4)
C(20)-C(19)-N(18)-O(4)	170.2(2)

2-Fluoro-2-phenyl-1-tetralone (3a):

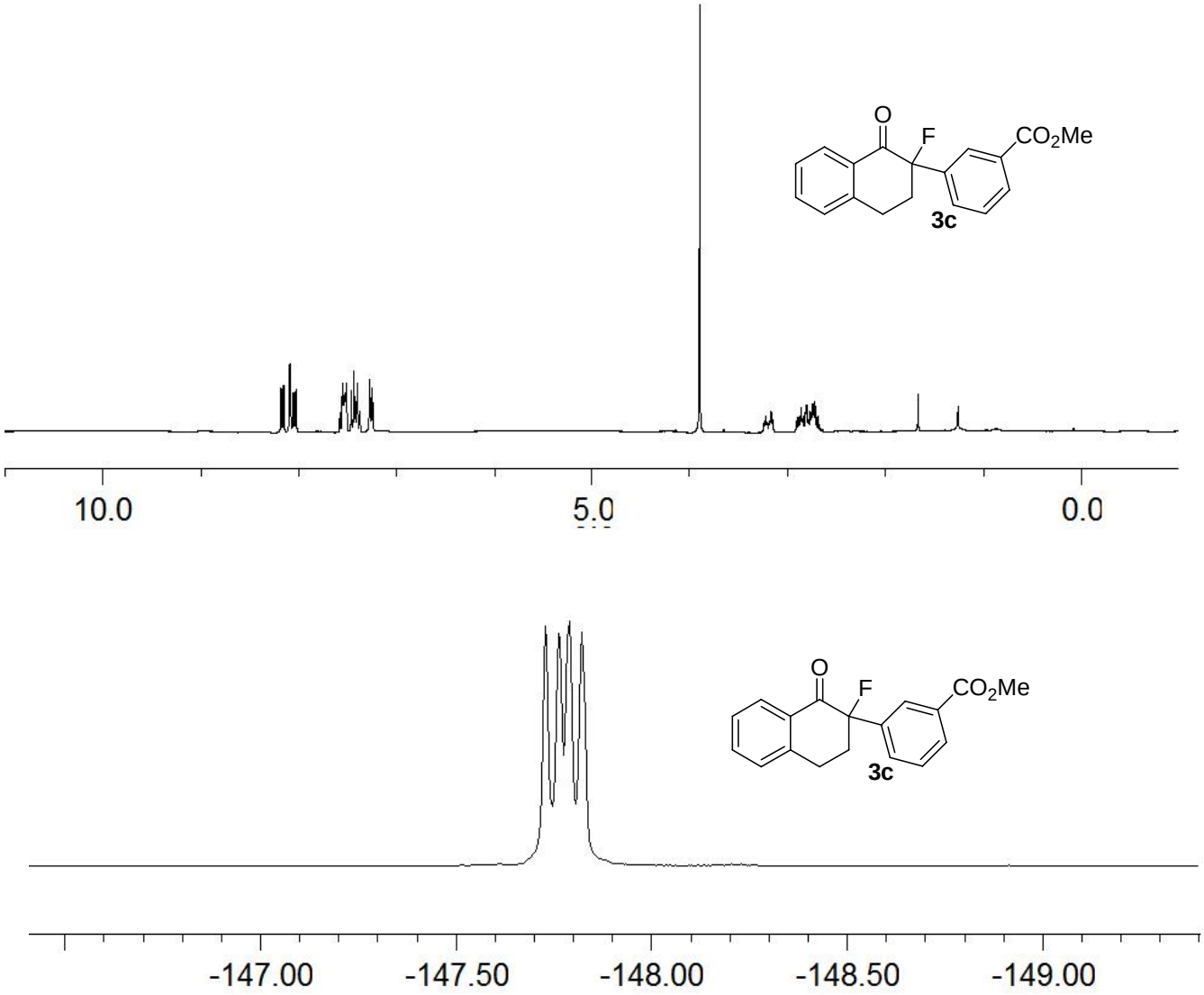




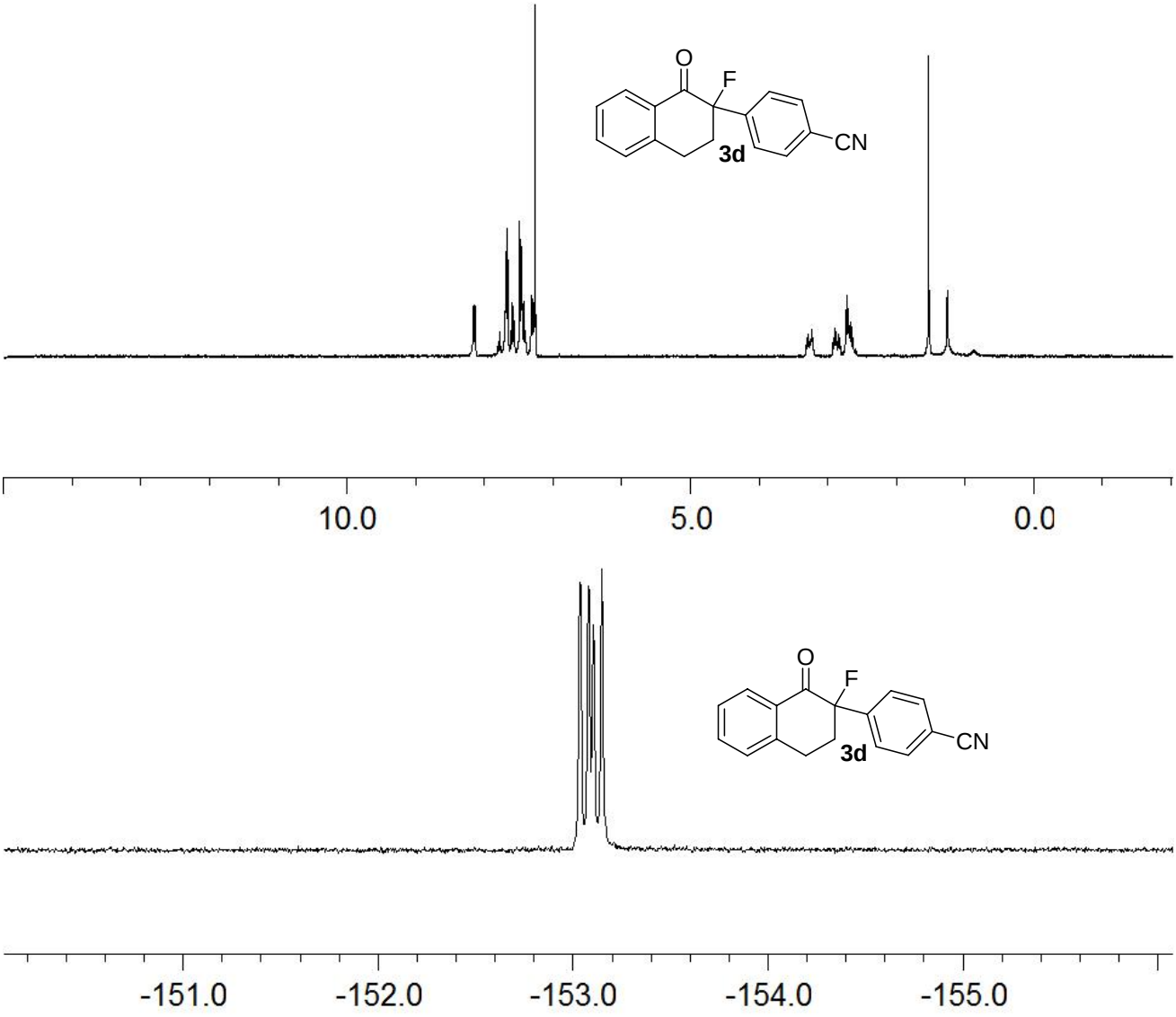
2-Fluoro-2-(4-methylphenyl)-1-tetralone (3b):



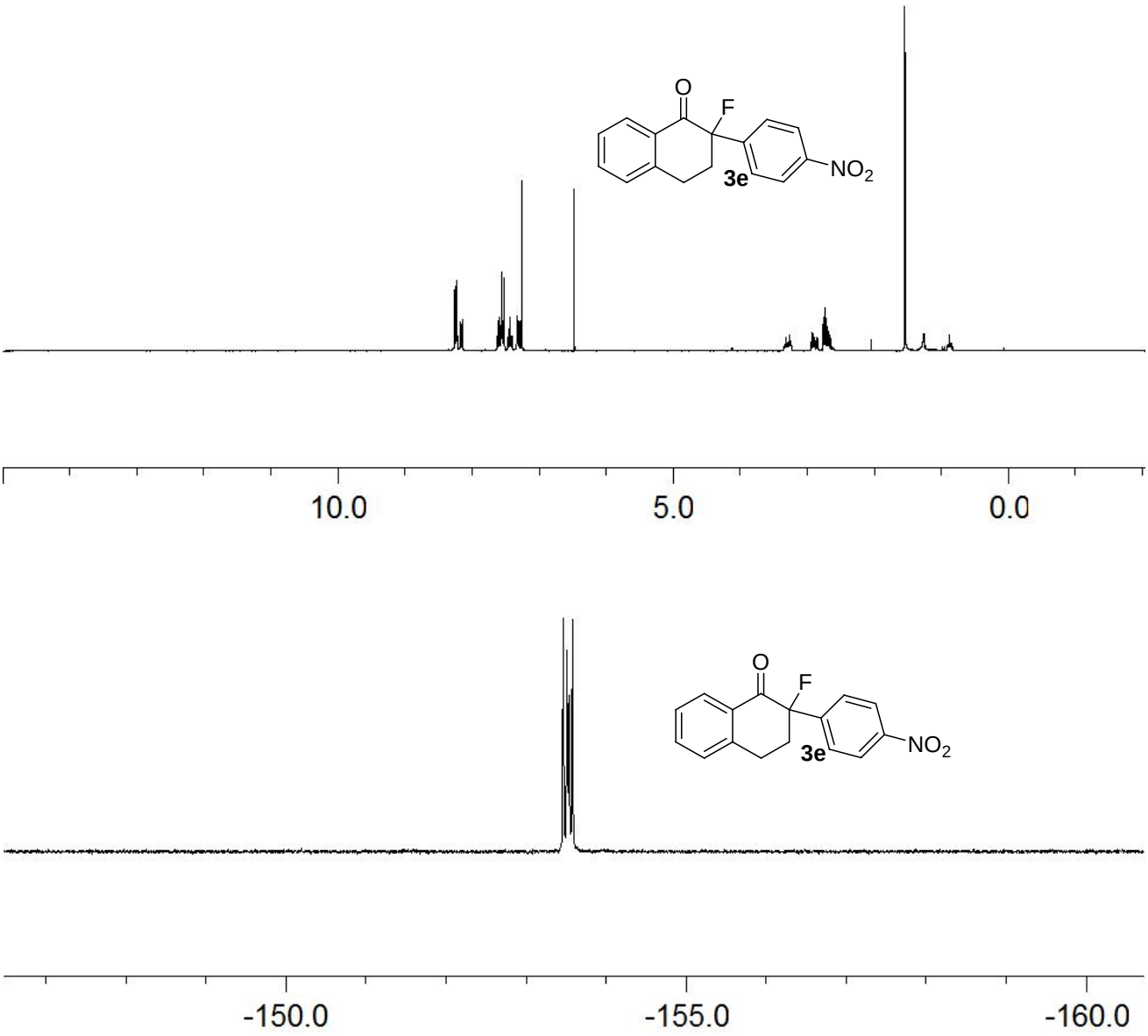
Ethyl 3-(1,2,3,4-tetrahydro-2-fluoro-1-oxo-2-naphthalenyl)benzonate (3c):



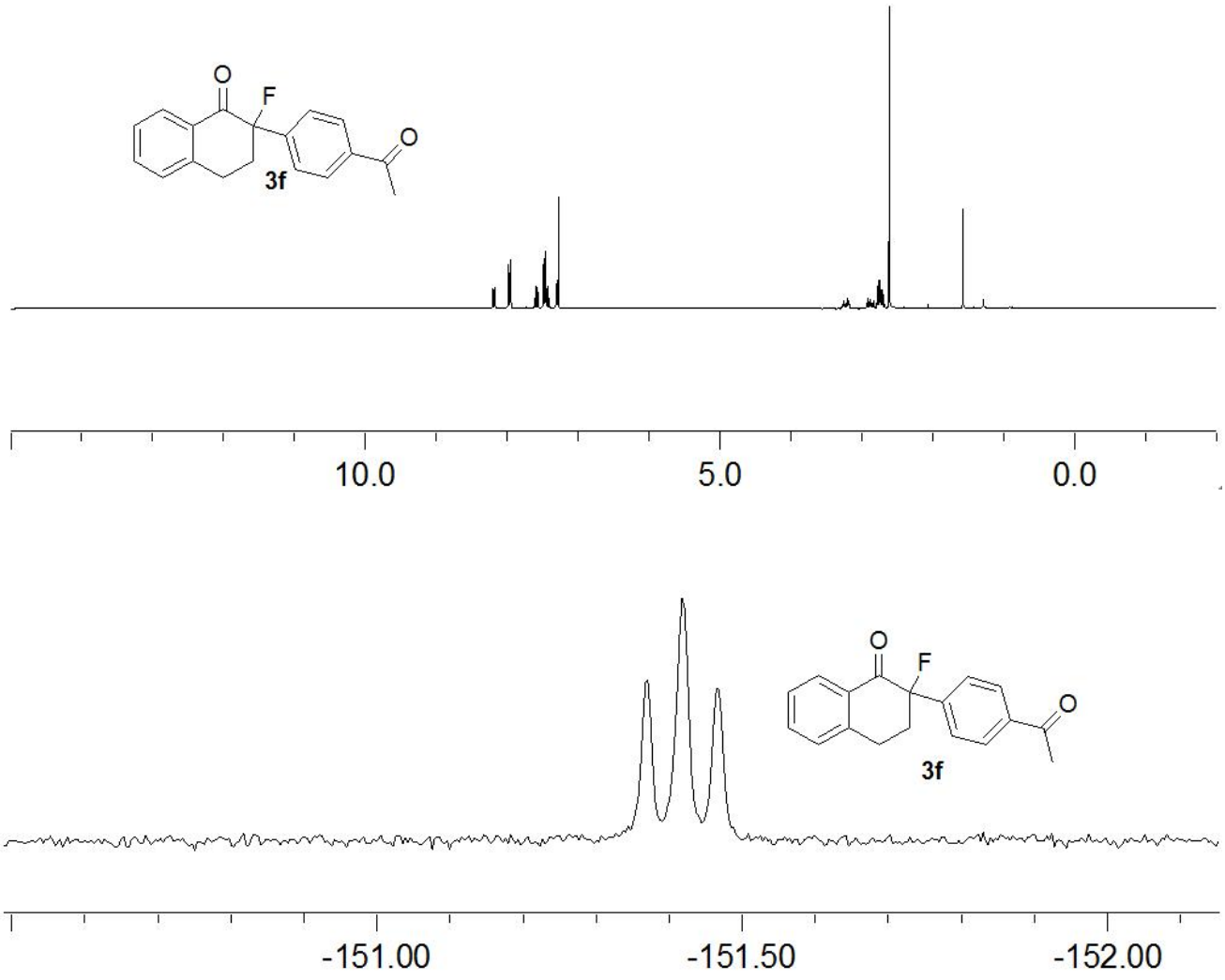
4-(1,2,3,4-Tetrahydro-2-fluoro-1-oxo-2-naphthalenyl)benzonitrile (3d):



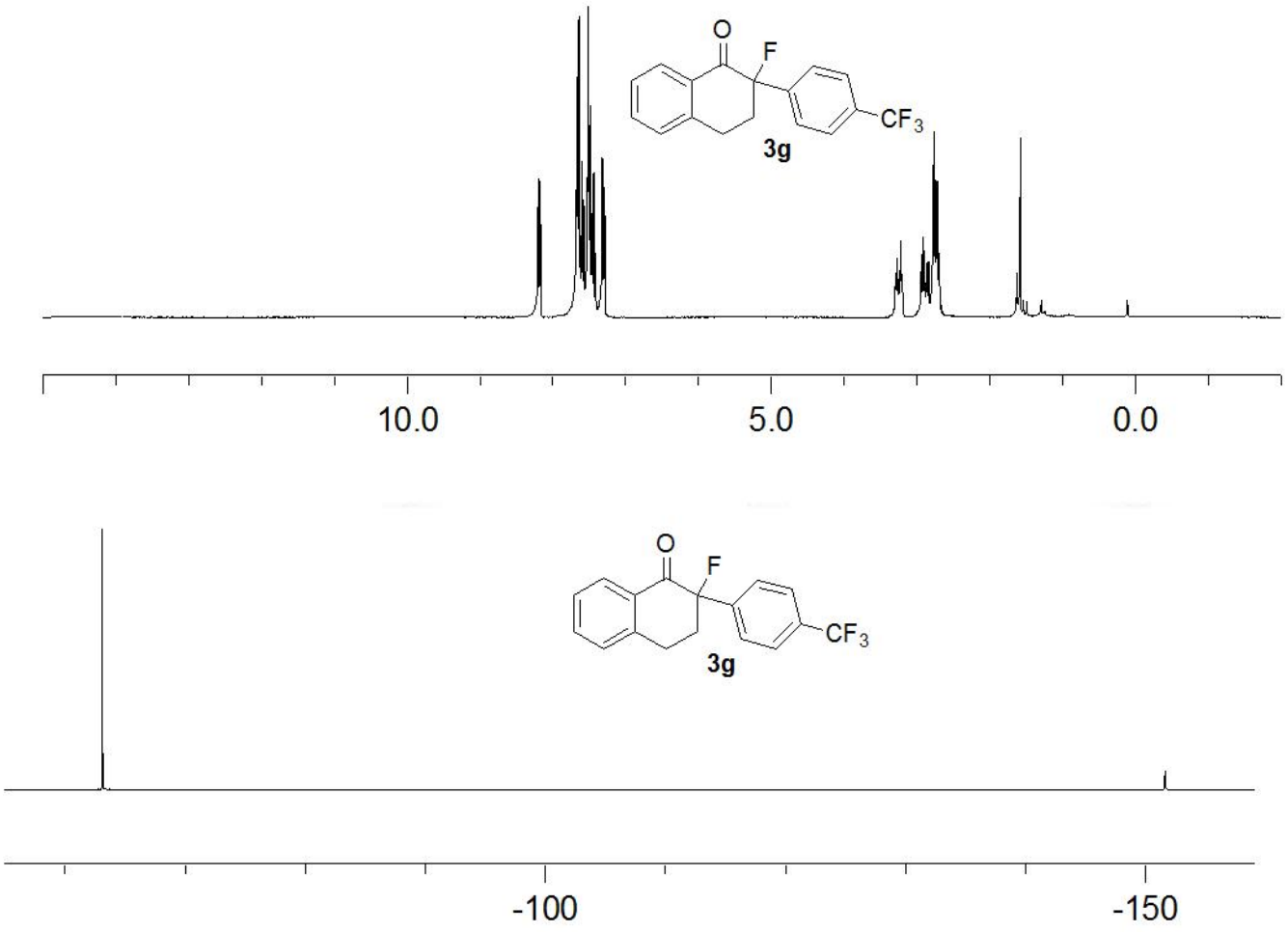
2-Fluoro-2-(4-nitrophenyl)-1-tetralone (3e):



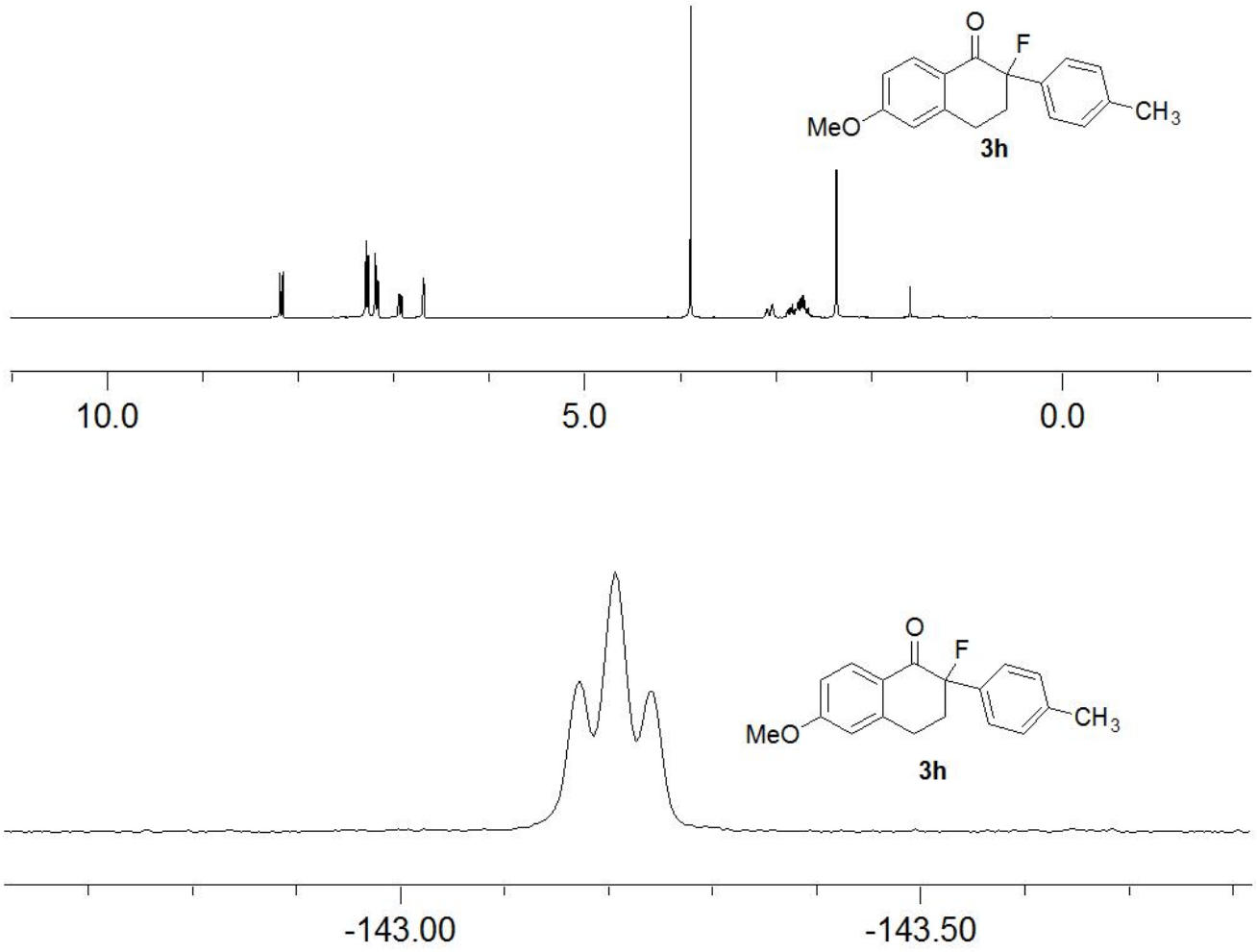
2-Fluoro-2-(4-acetylphenyl)-1-tetralone (3f):



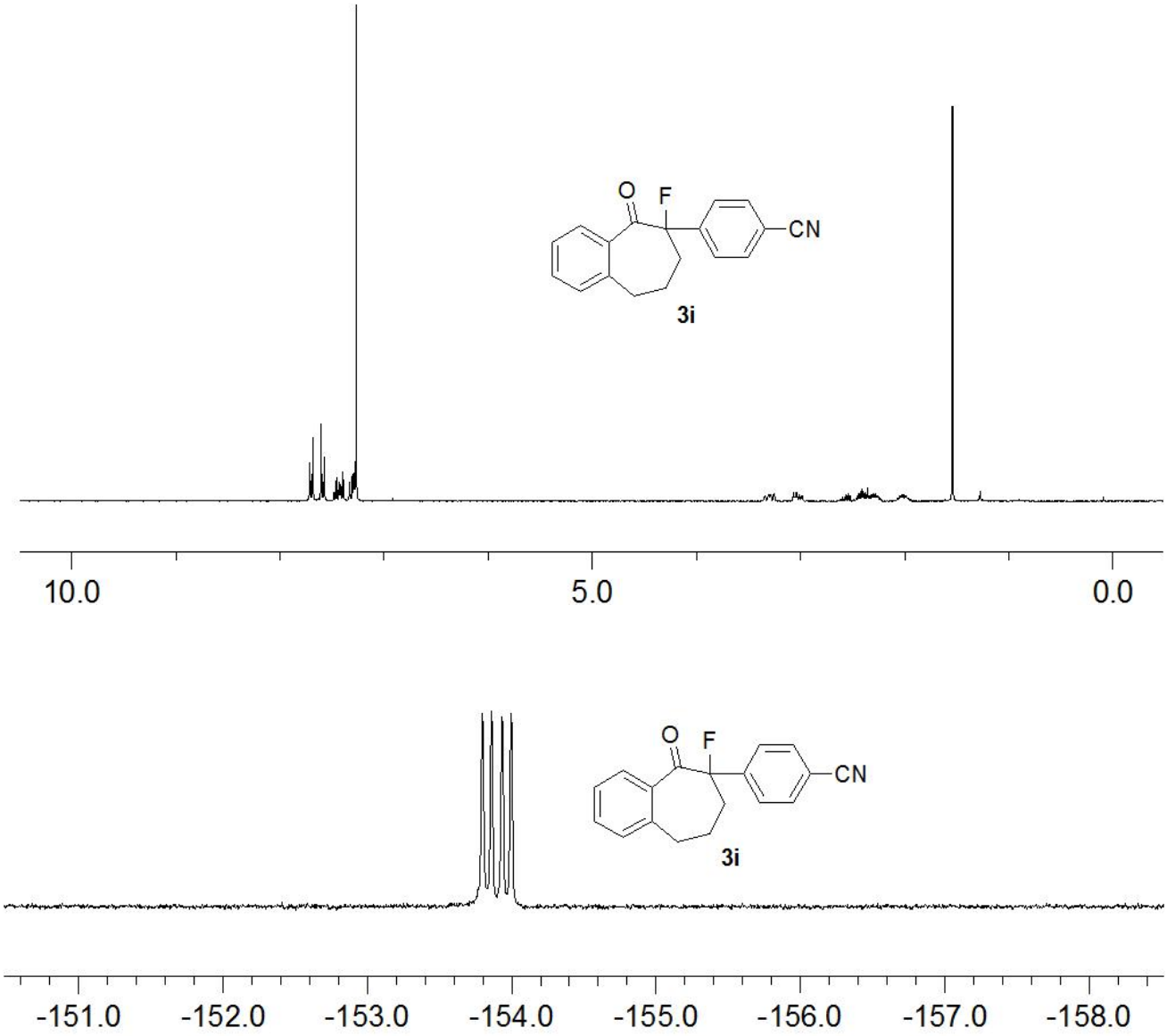
2-Fluoro-2-(4-trifluoromethylphenyl)-1-tetralone (3g):



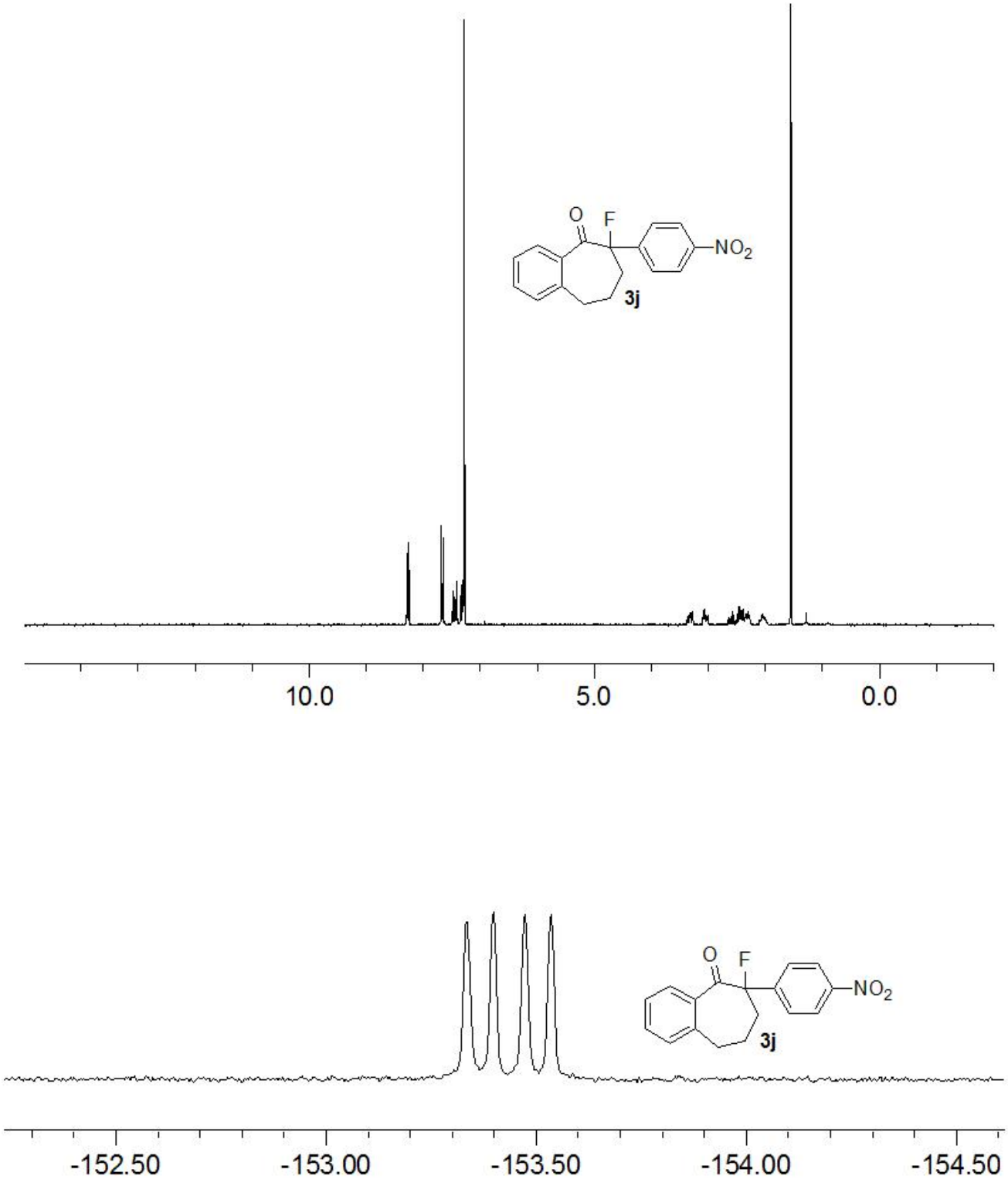
2-Fluoro-2-(4-methylphenyl)-6-methoxy-1-tetralone (3h):



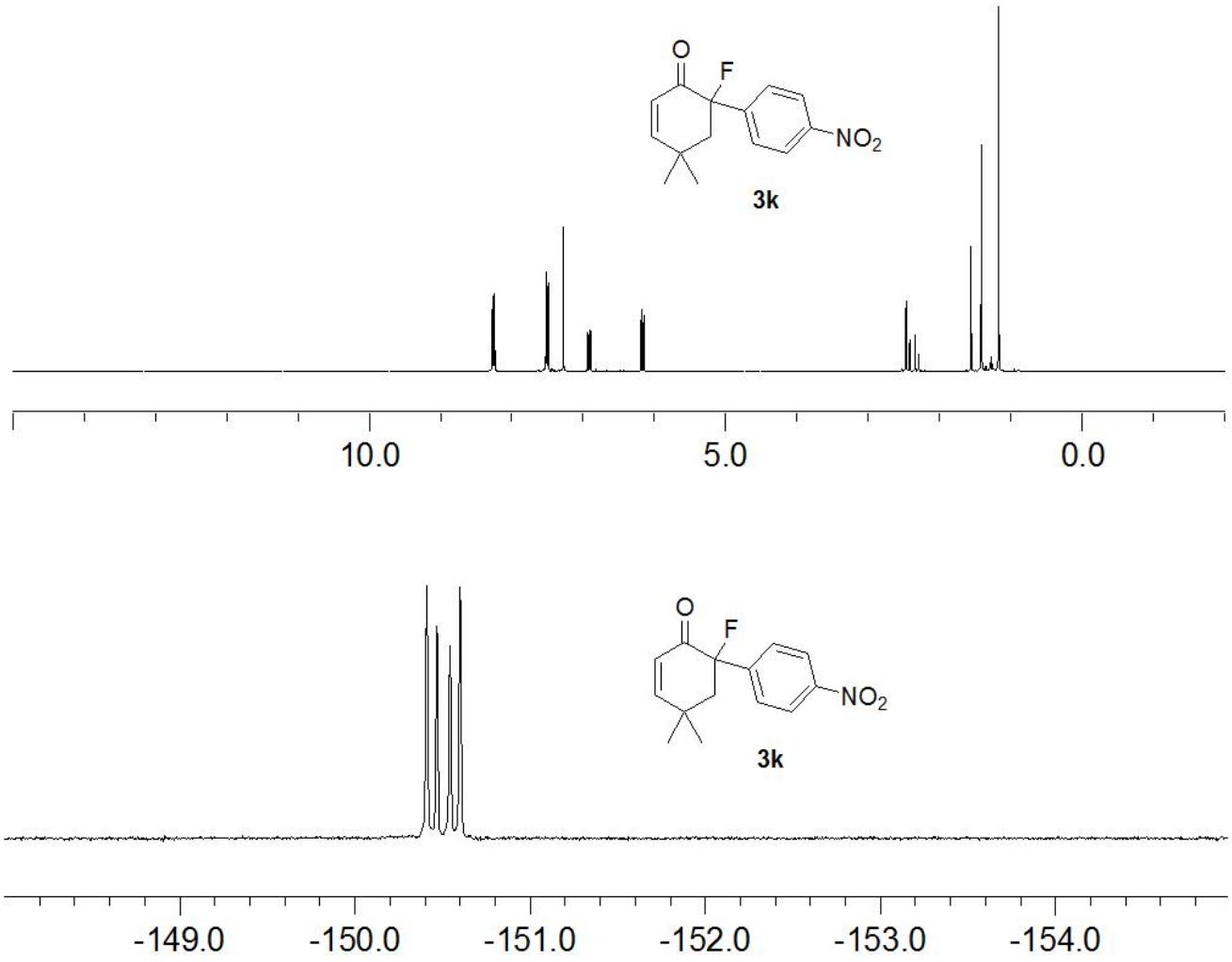
4-(6-Fluoro-6,7,8,9-tetrahydro-5-oxo-5H-benzocycloheptenyl)benzonitrile (3i):



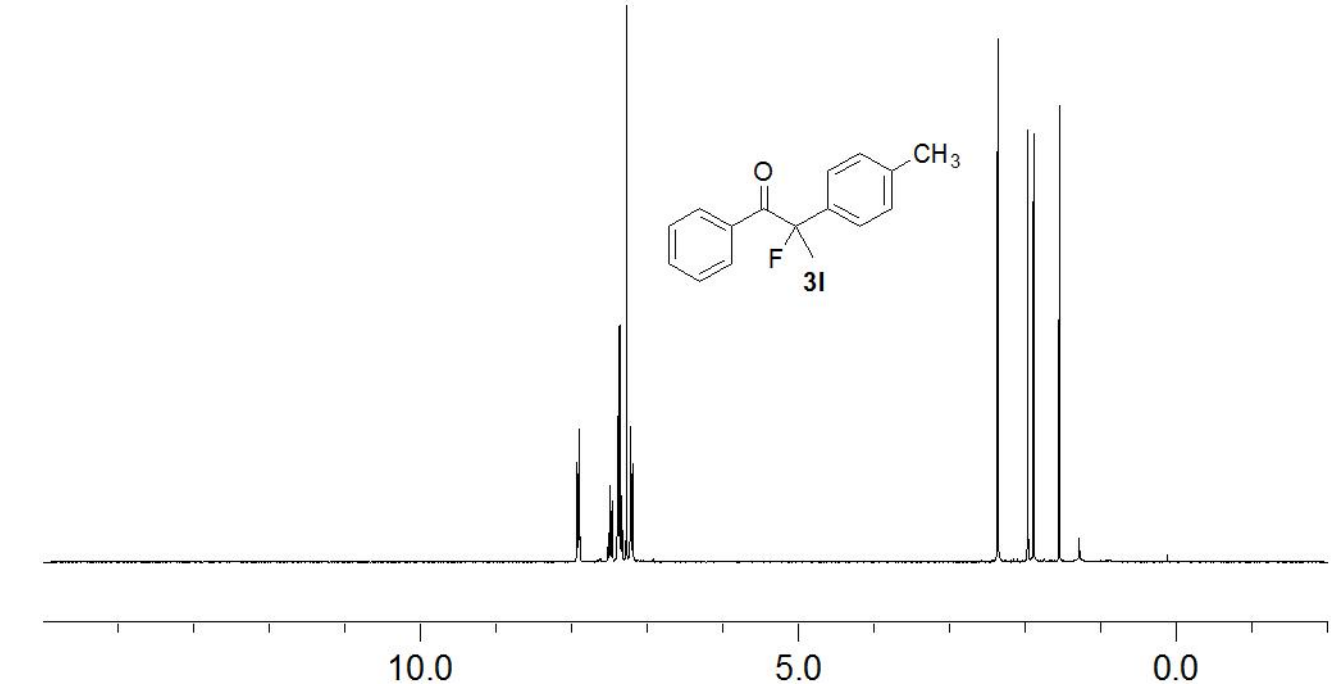
2-Fluoro-2-(4-nitrophenyl)- 2-Fluoro-2-(4-nitrophenyl)-1-benzosuberone (3j):

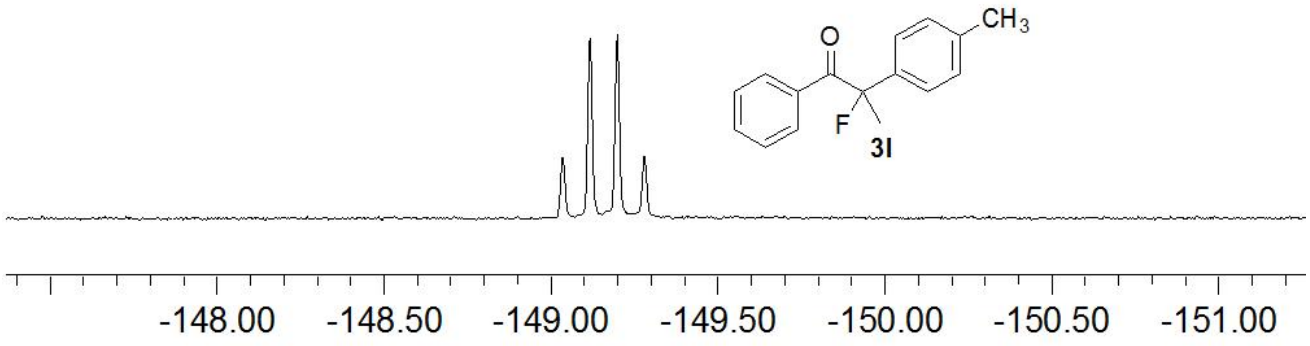


6-Fluoro-6-(4-nitrophenyl)-4,4-dimethylcyclohex-2-enone (3k)

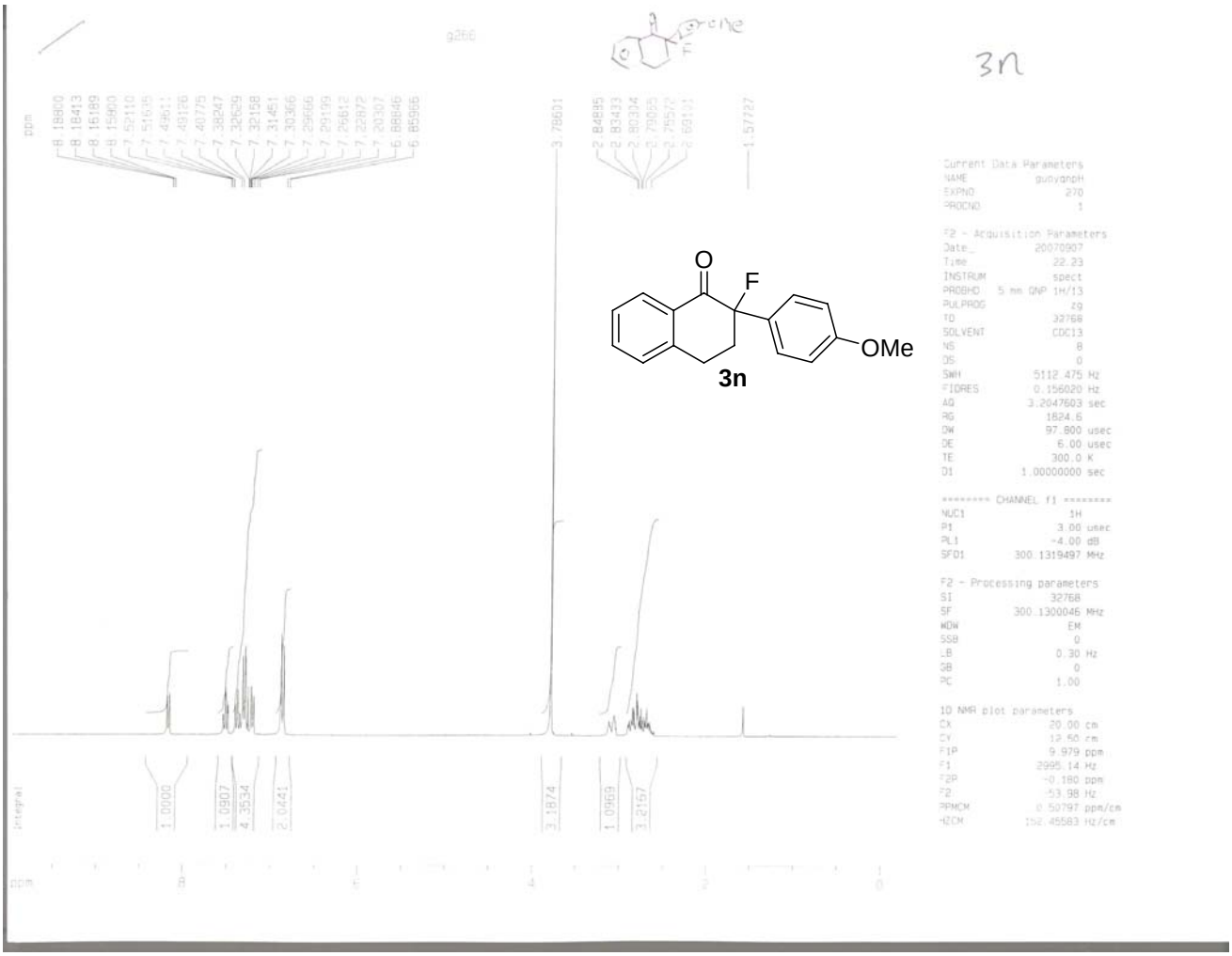


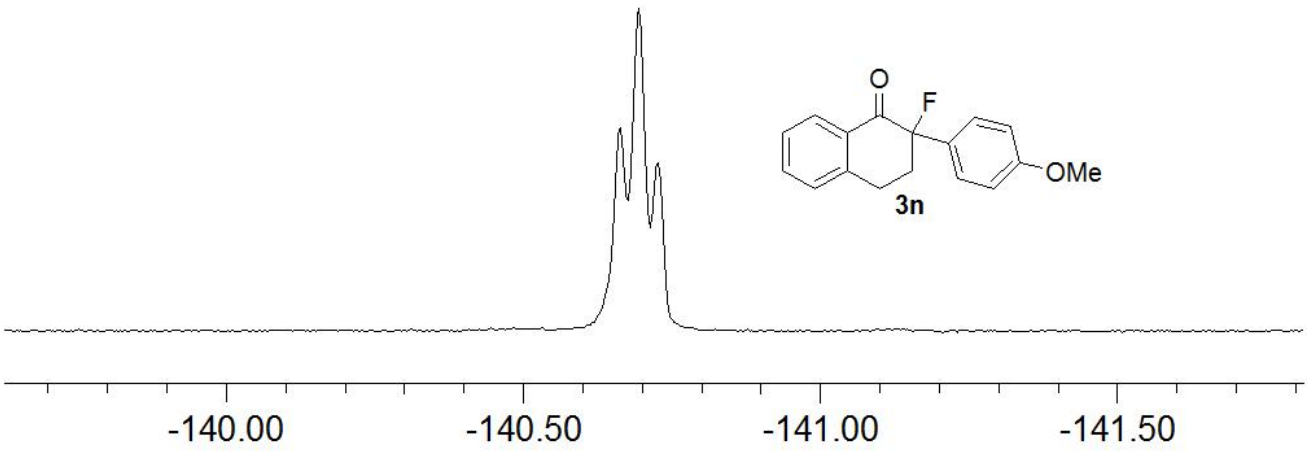
2-Fluoro-2-(4-methylphenyl)-1-phenyl-1-Propanone (3l):



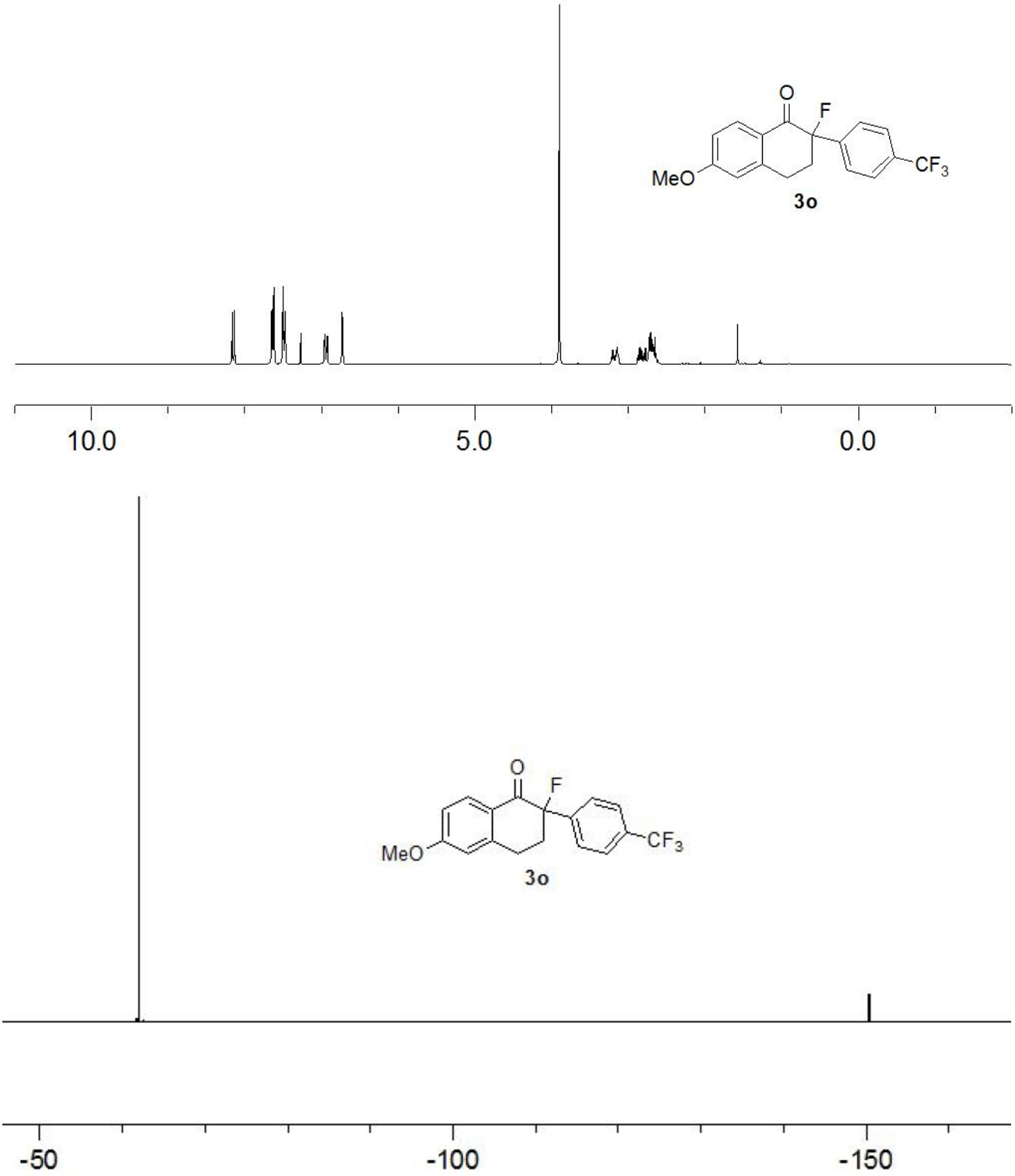


2-Fluoro-2-(4-methoxyphenyl)-1-tetralone (3n):

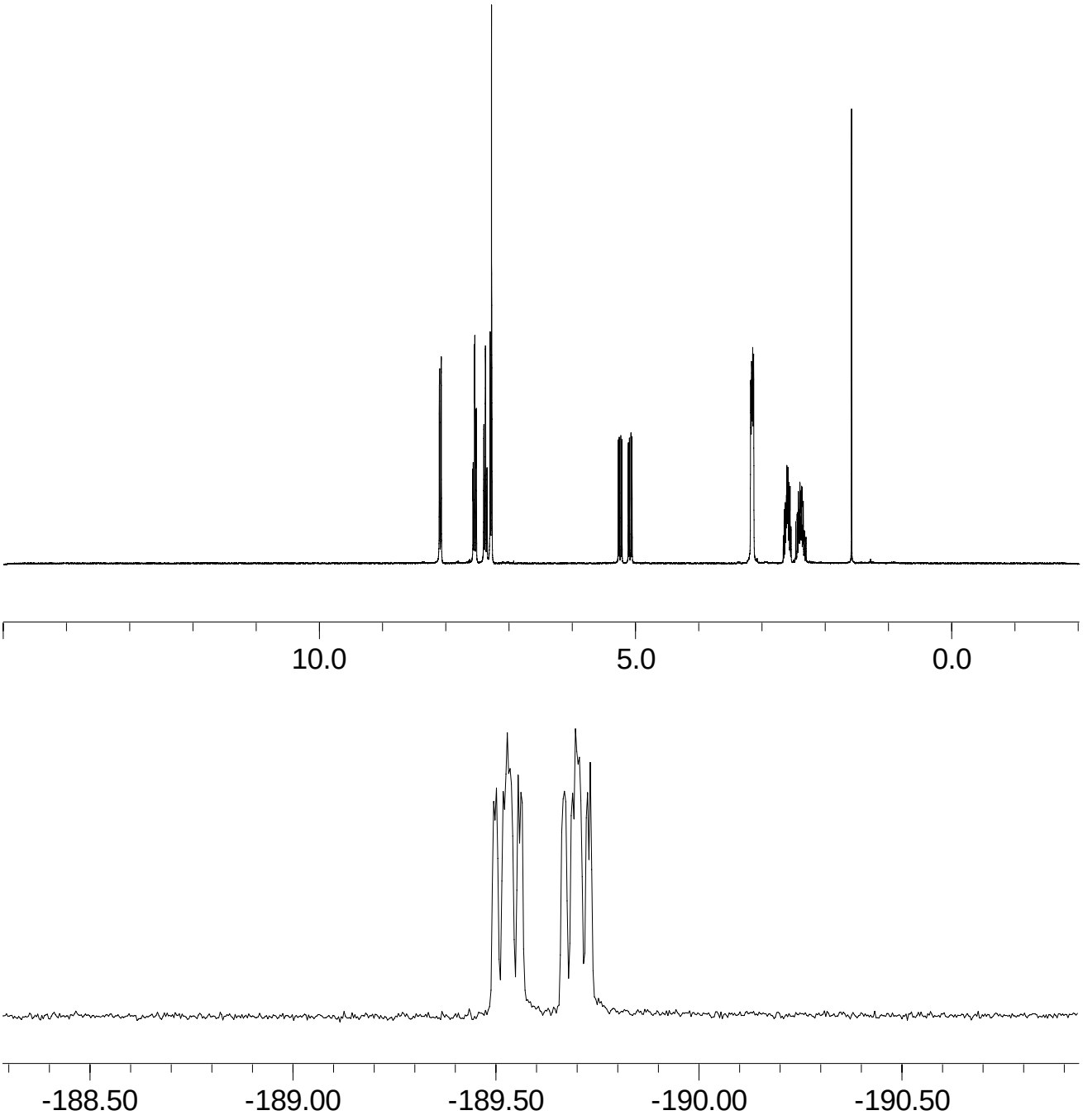




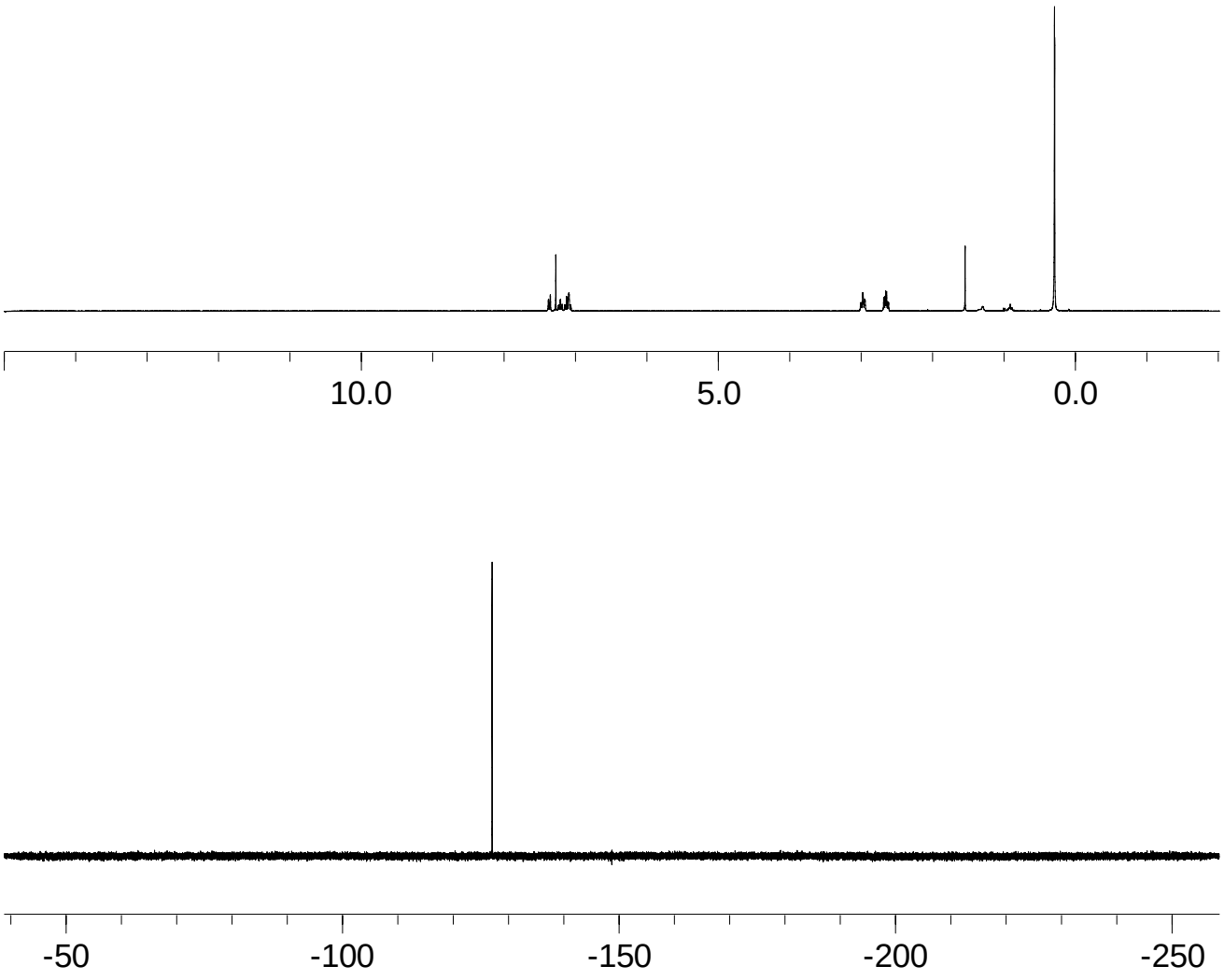
2-Fluoro-2-(4-trifluoromethylphenyl)-6-methoxy-1-tetralone (3o):



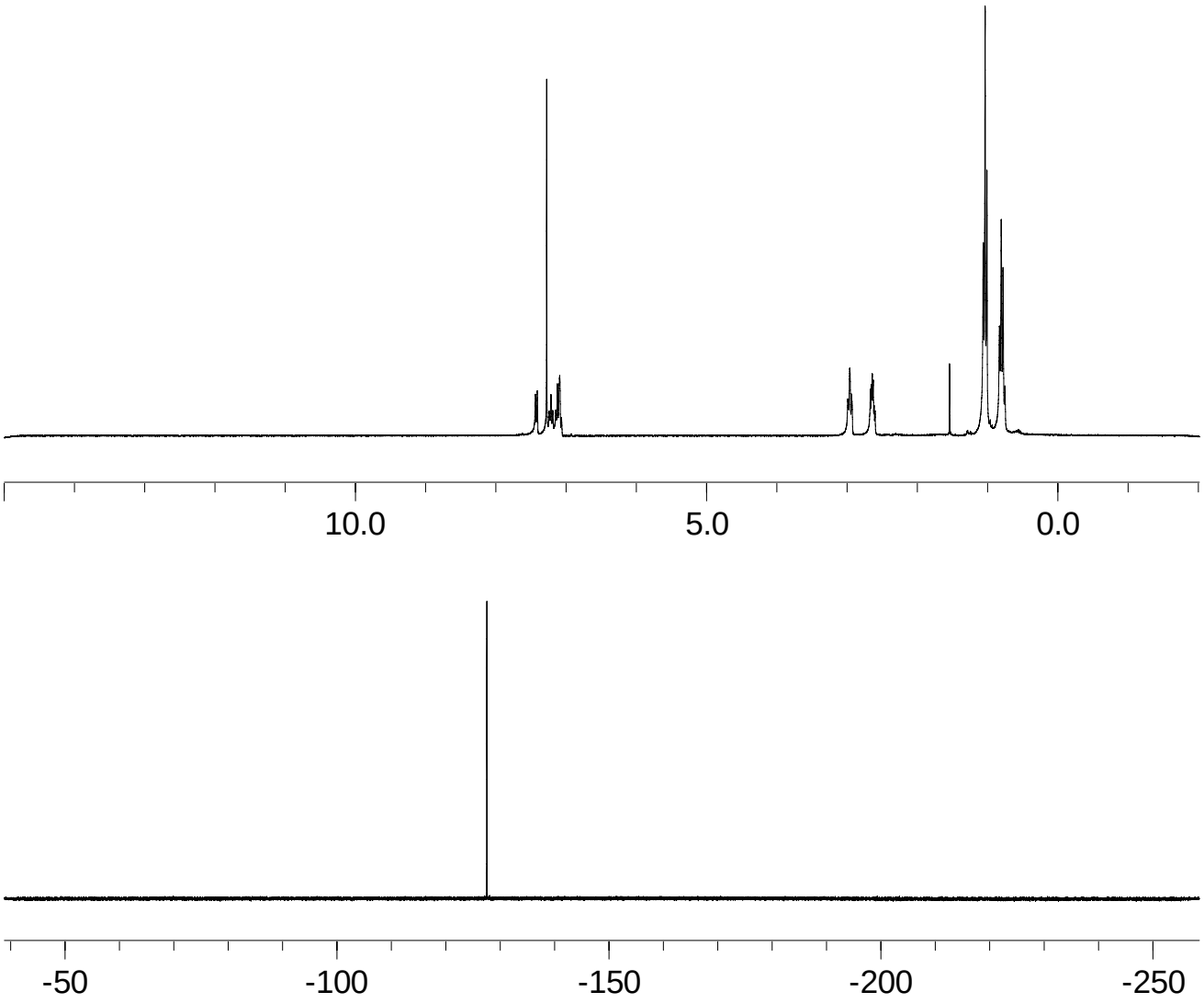
2-Fluoro-1-tetralone (4a)



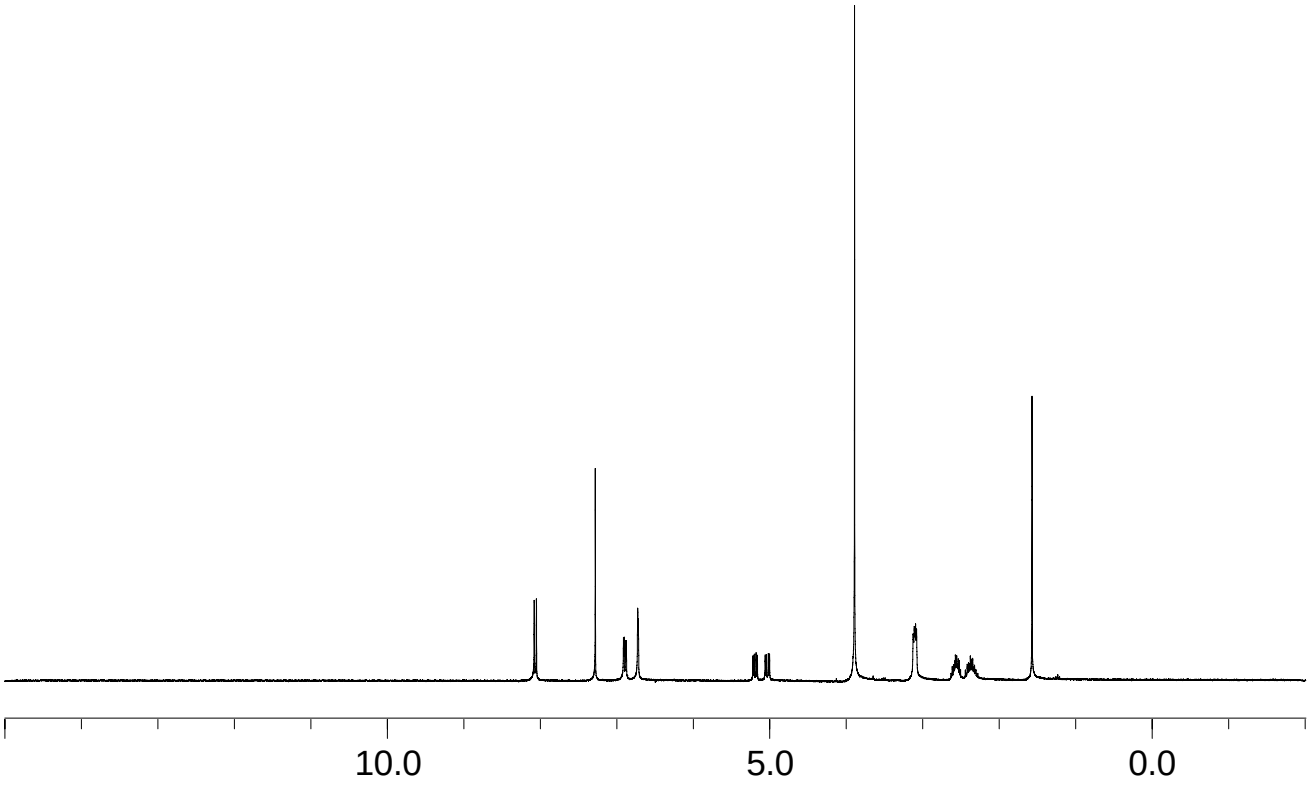
(2-Fluoro-3,4-dihydronaphthalen-1-yloxy)trimethylsilane (1b)

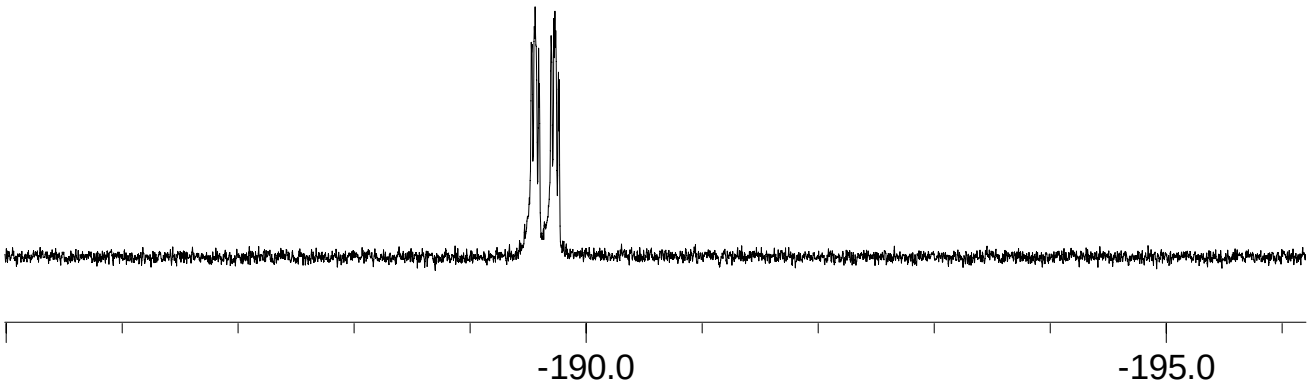


Triethyl(2-fluoro-3,4-dihydronaphthalen-1-yloxy)silane (1a)

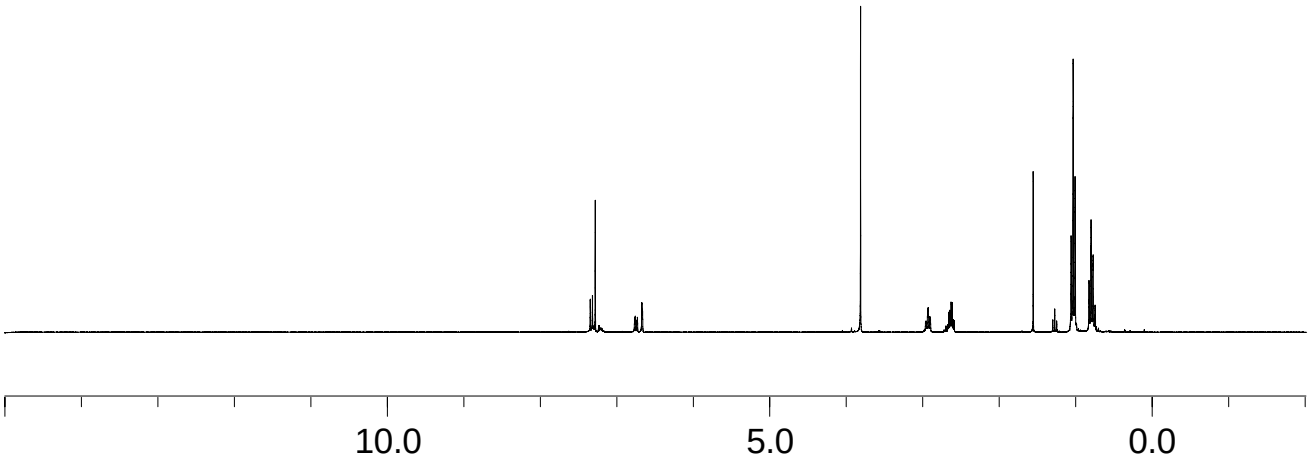


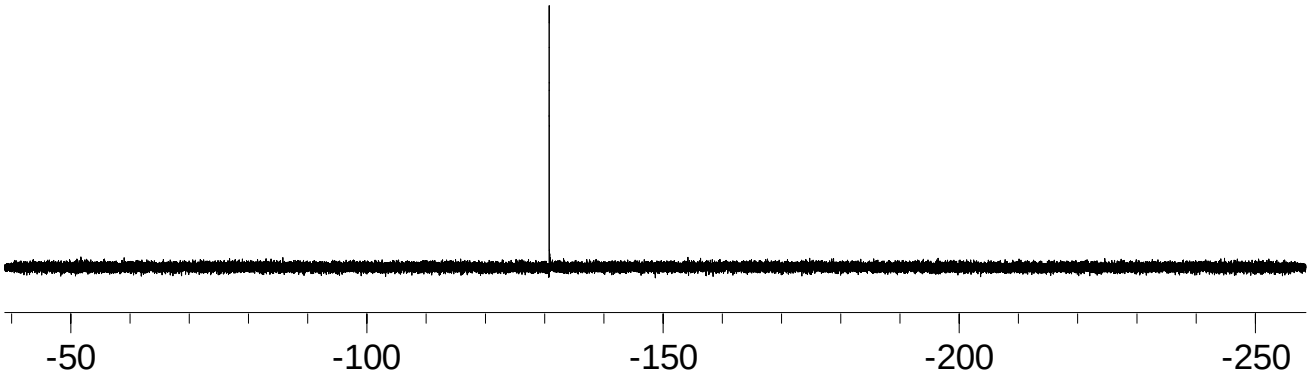
2-Fluoro-6-methoxy-1-tetralone (4b)



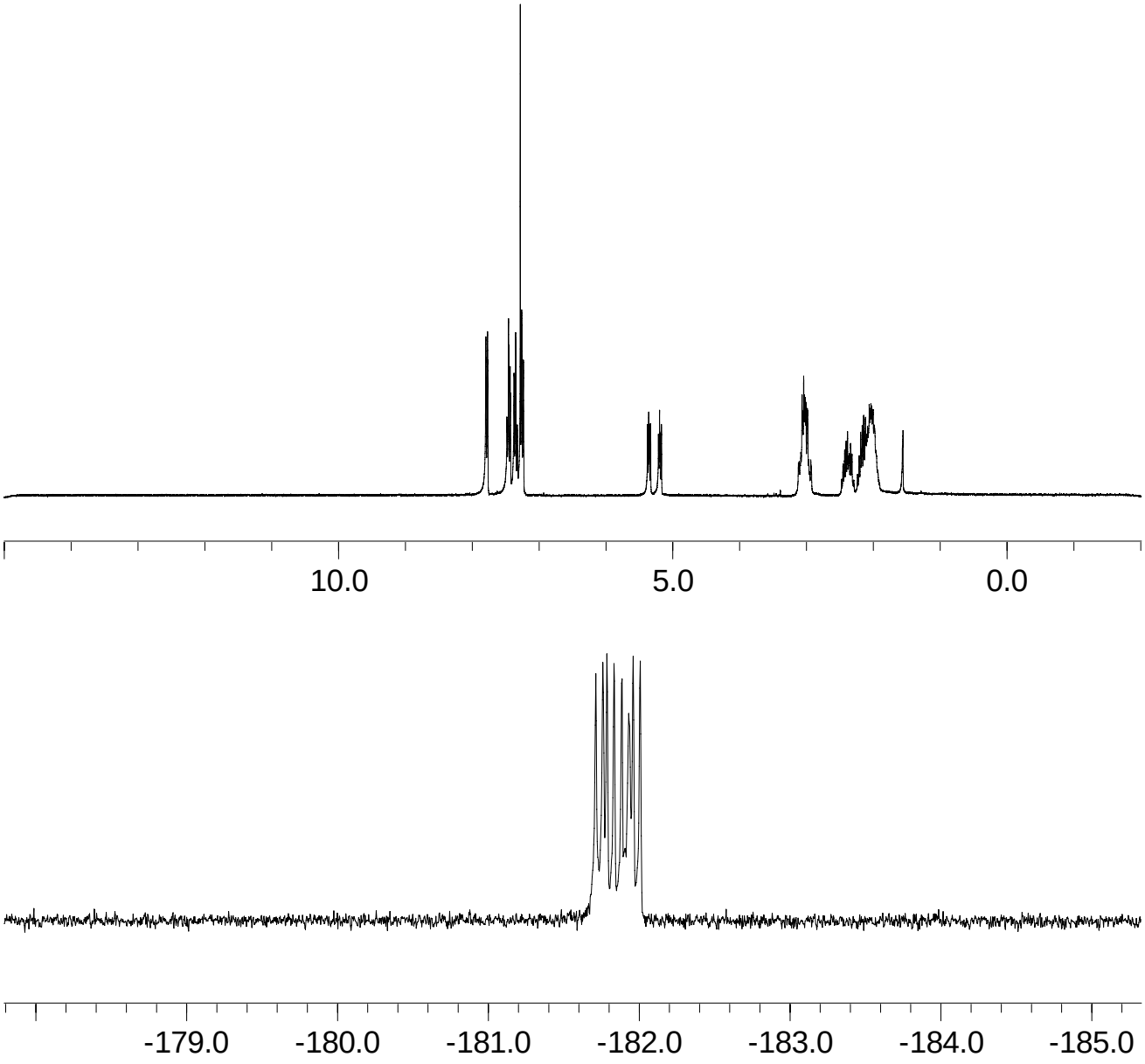


Triethyl(2-fluoro-6-methoxy-3,4-dihydronaphthalen-1-yloxy)silane (1c)





2-Fluoro-1-benzosuberone



6-Fluoro-4,4-dimethylcyclohex-2-enone