Electronic Supplementary Material (ESI) for ChemComm.

Decarboxylative Dearomatization and Mono-α-Arylation of Ketones

Shehani N. Mendis and Jon A. Tunge*

Department of Chemistry, University of Kansas, 2010 Malott Hall, 1251 Wescoe Hall Drive, Lawrence, KS 66045

Supporting Information

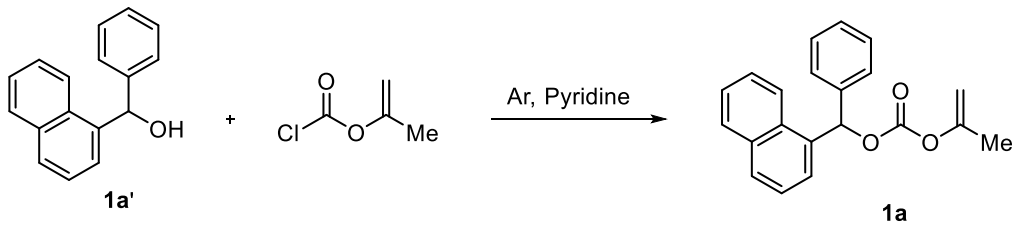
Table of Contents

General Information:

All reactions were run under an argon atmosphere using standard Schlenk techniques or an inert atmosphere glove box. All glassware were oven or flame dried prior to use. All palladium catalysts and ligands were purchased from Strem and stored in the glove box under an argon atmosphere. Toluene and THF were dried over sodium and distilled in the presence of benzophenone. Dried toluene was taken to the glove box in a Schlenk flask with activated molecular sieves. CH_2Cl_2 was dried over alumina. Other commercially available solvents were used without additional purification. Compound purification was effected by flash chromatography using 230x400 mesh, 60 Å porosity silica obtained from Sorbent Technologies.

^1H NMR and ^{13}C NMR spectra were obtained on a Bruker Avance 400 or a Bruker Avance 500 DRX spectrometer equipped with a QNP cryoprobe and referenced to residual protio solvent signals. Structural assignments were based on ^1H, ^{13}C, DEPT-135, COSY, NOESY and HSQC. Mass spectrometry was run using EI or ESI techniques.

Representative procedure for the synthesis of benzyl vinyl carbonates:



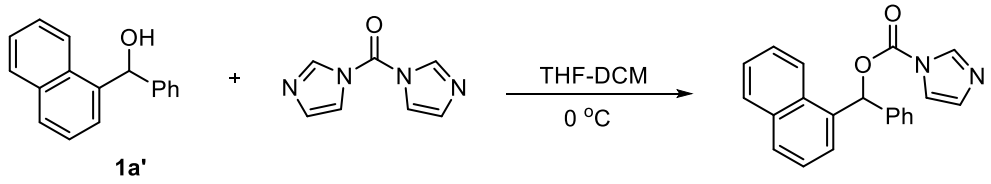
1a' **1a**

A flask with a stir bar was charged with benzyl alcohol **1a′** (500 mg, 2.1 mmol) and pyridine (0.50 mL, 6.3 mmol). This was cooled in an ice bath for 30 minutes. Isopropenyl chloroformate (0.27 mL, 2.6 mmol) was added dropwise to the reaction mixture and left for overnight stirring with gradual warming to room temperature. The resulting mixture was quenched with 2M HCl (5 mL)

and extracted with diethyl ether twice (25 mL x 2). Combined organics were washed with brine (10 mL) and dried over $MgSO_4$ and concentrated *in vacuo.* The crude mixture was purified by flash chromatography over silica gel to isolate **1a** (514 mg, 1.6 mmol, 77%).

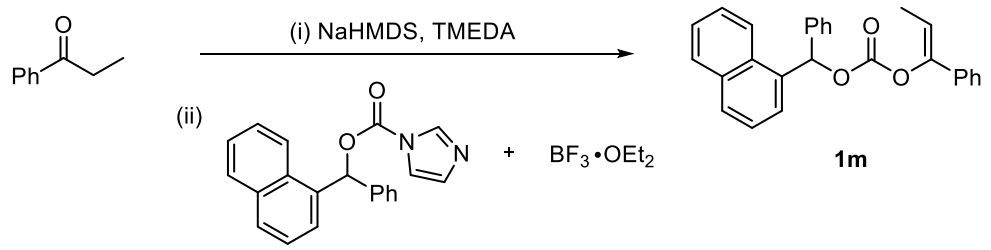
General procedure for the synthesis of naphthalen-1-yl(phenyl)methyl 1*H*-imidazole-1-carboxylate:

Followed the general procedure reported by Trost by replacing the allyl alcohol with benzyl alcohol **1a′**.[1]



Representative procedure for the synthesis acyclic (*Z*)-benzyl vinyl carbonates:

A slightly modified procedure was followed to that reported by Trost.[1]

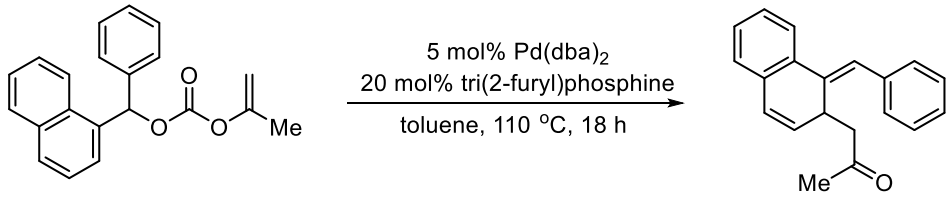


In a glove box, a clean 100 mL Schlenk flask with a stir bar was charged with hexamethyldisilazane sodium salt (NaHMDS) (366 mg, 2 mmol). The Schlenk flask was sealed with a septum, and taken out of the glove box. Then the flask was cooled in a dry ice/acetone bath for 5 min, and dry THF (7 mL) was transferred slowly. The flask was warmed to 0 °C to make a clear solution, and TMEDA (0.29 mL, 2 mmol) was added. The flask was again placed in the dry ice/acetone bath,

and a solution of propiophenone (0.22 mL, 1.6 mmol) in THF (1.6 mL) was added slowly to the reaction mixture over 3 minutes. This reaction mixture was allowed to stir for 1 hour. A separate flask was charged with benzyl 1*H*-imidazole-1-carboxylate (656.7 mg, 2 mmol) and THF (1.6 mL) and this was cooled to -78 °C. Upon cooling $BF_3.OEt_2$ (0.24 mL, 2 mmol) was added to the 1*H*-imidazole-1-carboxylate, and this was stirred for 15 minutes. After 1 hour benzyl 1*H*-imidazole-1-carboxylate and $BF_3.OEt_2$ solution was transferred to the enolate mixture via a cannula and the reaction mixture was stirred overnight. The resulting reaction mixture was quenched with NH_4Cl (10 mL) and extracted with diethyl ether twice (25 mL x 2). The combined organics were washed with brine (10 mL), dried over $MgSO_4$ and evaporated *in vacuo*. The crude mixture was purified by flash chromatography with 2% diethyl ether in petroleum ether to yield **1m** (211 mg, 0.53 mmol, 35%).

All the synthesized benzyl vinyl carbonates cleanly provided a single isomer. From 2D-NMR studies it was confirmed that this method provides *Z*-benzyl vinyl carbonates.

Representative procedure for the Pd-catalyzed decarboxylative dearomatization of acetone:



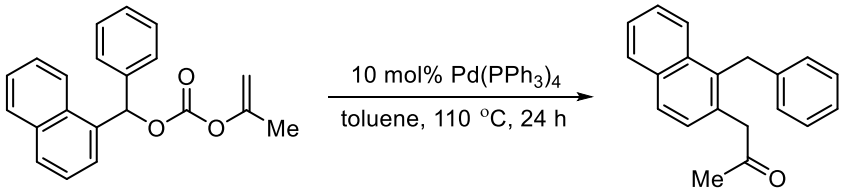
1a **2a**

In a glove box, under an argon atmosphere, a flame dried 10 mL microwave vial with a stir bar was charged with benzyl vinyl carbonate **1a** (100 mg, 0.31 mmol), $Pd(dba)_2$ (9 mg, 0.016 mmol), tri(2-furyl)phosphine (14.6 mg, 0.063 mmol) and toluene (1.6 mL). The Schlenk tube was equipped with a septum and the sealed tube was removed from the glove box and stirred at 110 °C

for 18 hours. The resulting reaction mixture was cooled to room temperature and concentrated *in vacuo* and was purified via flash chromatography over silica gel. The isolated compound **2a** (77 mg, 0.28 mmol, 91%) was stored in the fridge dissolved in chloroform.

(From 1D and 2D NMR data the product was conformed as the *E*-isomer)

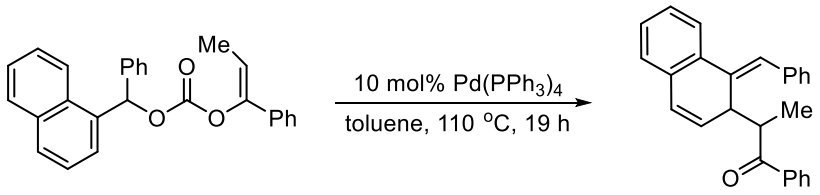
Representative procedure for the Pd-catalyzed decarboxylative arylation:



1a **3a**

In a glove box, under an argon atmosphere, a flame dried 10 mL microwave vial equipped with a stir bar was charged with benzyl vinyl carbonate **1a** (80 mg, 0.25 mmol), $Pd(PPh_3)_4$ (29 mg, 0.025 mmol), and toluene (1.3 mL). The Schlenk tube was equipped with a septum and the sealed tube was removed from the glove box and stirred at 110 °C for 24 hours. The resulting reaction mixture was cooled to room temperature and concentrated *in vacuo* and was purified via flash chromatography over silica gel to isolate **3a** (50.8 mg, 0.19 mmol, 74%).

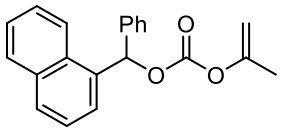
Representative procedure for the Pd-catalyzed decarboxylative dearomatization of ketones:



1m **2m**

In a glove box, under an argon atmosphere, a flame dried 10 mL microwave vial was charged with (*Z*)-benzyl vinyl carbonate **1m** (64 mg, 0.16 mmol), $Pd(PPh_3)_4$ (18.7 mg, 0.016 mmol), and toluene (0.8 mL). The Schlenk tube was equipped with a septum and the sealed tube was removed from the glove box and stirred at 110 °C for 18 hours. The resulting reaction mixture was cooled to room temperature and concentrated *in vacuo* and was purified via flash chromatography over silica gel to afford **2m** (48 mg, 0.14 mmol, 86%).

Characterization data for benzyl vinyl carbonates:



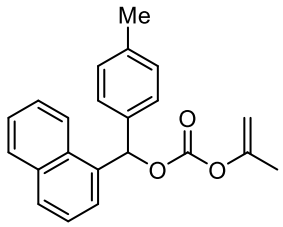
naphthalen-1-yl(phenyl)methyl prop-1-en-2-yl carbonate (1a)

White solid isolated from flash chromatography using: 98:2 hexanes:EtOAc as eluent (514 mg, 1.6 mmol, 77%).

^{1}H NMR (400 MHz, $CDCl_3$) δ 8.04 – 7.96 (m, 1H), 7.91 – 7.83 (m, 2H), 7.67 (dt, *J* = 7.2, 0.9 Hz, 1H), 7.54 – 7.50 (m, 1H), 7.50 – 7.45 (m, 3H), 7.42 (dd, *J* = 8.1, 1.7 Hz, 2H), 7.37 – 7.33 (m, 1H), 7.33 – 7.28 (m, 2H), 4.82 (d, *J* = 1.6 Hz, 1H), 4.69 (t, *J* = 1.3 Hz, 1H), 1.95 (d, *J* = 1.0 Hz, 3H).

^{13}C NMR (126 MHz, $CDCl_3$) δ 153.19, 152.60, 139.04, 134.68, 134.09, 130.64, 129.36, 129.01, 128.79, 128.51, 127.58, 126.69, 125.98, 125.55, 125.40, 123.90, 102.10, 78.97, 19.40.

HRMS calcd for $C_{21}H_{18}O_3Na$ [M+Na] 341.1154, found 341.1159.



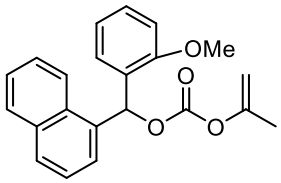
naphthalen-1-yl(p-tolyl)methyl prop-1-en-2-yl carbonate (1b)

White solid isolated from flash chromatography using: 98:2 hexanes:EtOAc as eluent (195 mg, 0.58 mmol, 70%).

^{1}H NMR (500 MHz, $CDCl_3$) δ 8.01 – 7.94 (m, 1H), 7.90 – 7.81 (m, 2H), 7.68 (dt, *J* = 7.2, 0.9 Hz, 1H), 7.51 (dd, *J* = 8.2, 7.2 Hz, 1H), 7.48 – 7.44 (m, 2H), 7.43 (s, 1H), 7.33 – 7.27 (m, 2H), 7.14 (d, *J* = 8.0 Hz, 2H), 4.81 (d, *J* = 1.6 Hz, 1H), 4.68 (p, *J* = 1.2 Hz, 1H), 2.32 (s, 3H), 1.94 (d, *J* = 1.0 Hz, 3H).

^{13}C NMR (126 MHz, $CDCl_3$) δ 153.20, 152.61, 138.38, 136.07, 134.84, 134.06, 130.59, 129.48, 129.22, 128.98, 127.65, 126.64, 125.94, 125.40, 125.23, 123.90, 102.06, 78.91, 21.35, 19.42.

HRMS calcd for $C_{22}H_{24}O_3N$ [M+NH4] 350.1756, found 350.1765.



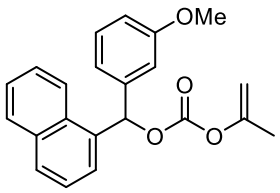
(2-methoxyphenyl)(naphthalen-1-yl)methyl prop-1-en-2-yl carbonate (1c)

White solid isolated from flash chromatography using: 98:2 hexanes:EtOAc as eluent (114 mg, 0.32 mmol, 29%).

^{1}H NMR (400 MHz, $CDCl_3$) δ 8.11 – 8.02 (m, 1H), 7.89 (s, 1H), 7.88 – 7.80 (m, 2H), 7.60 (dd, *J* = 7.1, 1.2 Hz, 1H), 7.52 – 7.44 (m, 3H), 7.34 – 7.27 (m, 1H), 7.22 (dd, *J* = 7.7, 1.7 Hz, 1H), 6.94 (dd, *J* = 8.3, 1.0 Hz, 1H), 6.89 (td, *J* = 7.5, 1.0 Hz, 1H), 4.81 (d, *J* = 1.5 Hz, 1H), 4.67 (q, *J* = 1.3 Hz, 1H), 3.87 (s, 3H), 1.95 (d, *J* = 1.0 Hz, 3H).

^{13}C NMR (126 MHz, $CDCl_3$) δ 157.01, 153.22, 152.44, 134.98, 133.91, 130.98, 129.94, 128.98, 128.84, 128.66, 127.19, 126.54, 125.90, 125.39, 124.78, 123.86, 120.75, 110.91, 101.88, 73.10, 55.79, 19.41.

HRMS calcd for $C_{22}H_{21}O_4$ [M+H] 349.1440, found 349.1436.



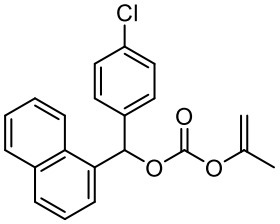
(3-methoxyphenyl)(naphthalen-1-yl)methyl prop-1-en-2-yl carbonate (1d)

Colorless oil isolated from flash chromatography using: 98:2 hexanes:EtOAc as eluent (586 mg, 1.68 mmol, 89%).

^{1}H NMR (400 MHz, $CDCl_3$) δ 8.01 (dt, *J* = 7.0, 3.6 Hz, 1H), 7.91 – 7.82 (m, 2H), 7.65 (dd, *J* = 7.2, 1.1 Hz, 1H), 7.54 – 7.45 (m, 3H), 7.43 (s, 1H), 7.30 – 7.21 (m, 1H), 7.05 – 6.94 (m, 2H), 6.84 (dd, *J* = 8.2, 2.5 Hz, 1H), 4.82 (d, *J* = 1.6 Hz, 1H), 4.70 (q, *J* = 1.2 Hz, 1H), 3.76 (d, *J* = 0.9 Hz, 3H), 1.95 (s, 3H).

^{13}C NMR (126 MHz, $CDCl_3$) δ 159.88, 153.18, 152.57, 140.61, 134.57, 134.07, 130.68, 129.85, 129.40, 129.00, 126.72, 125.98, 125.64, 125.38, 123.86, 119.89, 113.68, 113.38, 102.11, 78.77, 55.40, 19.41.

HRMS calcd for $C_{22}H_{19}O_4$ [M-H] 347.1283, found 347.1288.



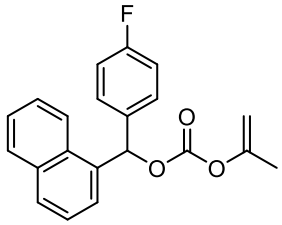
(4-chlorophenyl)(naphthalen-1-yl)methyl prop-1-en-2-yl carbonate (1e)

White solid isolated from flash chromatography using: 98:2 hexanes:EtOAc as eluent (503 mg, 1.42 mmol, 76%).

^{1}H NMR (400 MHz, $CDCl_3$) δ 7.97 – 7.91 (m, 1H), 7.90 – 7.84 (m, 2H), 7.66 (dd, *J* = 7.2, 1.1 Hz, 1H), 7.55 – 7.50 (m, 1H), 7.50 – 7.44 (m, 2H), 7.41 (s, 1H), 7.38 – 7.28 (m, 4H), 4.82 (d, *J* = 1.6 Hz, 1H), 4.70 (dt, *J* = 1.8, 1.1 Hz, 1H), 1.95 (s, 3H).

^{13}C NMR (126 MHz, $CDCl_3$) δ 153.13, 152.50, 137.62, 134.44, 134.15, 134.11, 130.44, 129.59, 129.10, 129.01, 129.00, 126.82, 126.09, 125.56, 125.40, 123.73, 102.20, 78.29, 19.38.

HRMS calcd for $C_{21}H_{17}ClO_3Li$ [M+Li] 359.1026, found 359.1016.



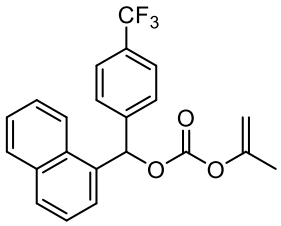
(4-fluorophenyl)(naphthalen-1-yl)methyl prop-1-en-2-yl carbonate (1f)

Colorless oil isolated from flash chromatography using: 98:2 hexanes:EtOAc as eluent (257 mg, 0.76 mmol, 65%).

^{1}H NMR (500 MHz, $CDCl_3$) δ 7.95 – 7.90 (m, 1H), 7.90 – 7.84 (m, 2H), 7.68 (dt, *J* = 7.2, 1.1 Hz, 1H), 7.52 (dd, *J* = 8.3, 7.2 Hz, 1H), 7.49 – 7.46 (m, 1H), 7.46 (d, *J* = 4.1 Hz, 1H), 7.43 (s, 1H), 7.39 (dd, *J* = 8.7, 5.3 Hz, 2H), 7.06 – 6.96 (m, 2H), 4.82 (d, *J* = 1.6 Hz, 1H), 4.70 (p, *J* = 1.2 Hz, 1H), 1.95 (d, *J* = 1.0 Hz, 3H).

^{13}C NMR (126 MHz, $CDCl_3$) δ 162.78 (d, *J* = 247.7 Hz), 153.16, 152.53, 134.91 (d, *J* = 3.2 Hz), 134.40, 134.10, 130.43, 129.60 (d, *J* = 8.3 Hz), 129.47, 129.09, 126.76, 126.06, 125.40, 125.25, 123.75, 115.76 (d, *J* = 21.6 Hz), 102.16, 78.32, 19.39.

HRMS calcd for $C_{21}H_{17}FO_3Na$ [M+Na] 359.1059, found 359.1051.



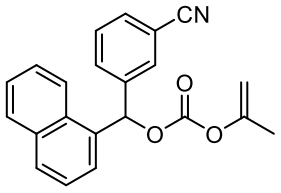
naphthalen-1-yl(4-(trifluoromethyl)phenyl)methyl prop-1-en-2-yl carbonate (1g)

Colorless oil isolated from flash chromatography using: 97:3 hexanes:EtOAc as eluent (242 mg, 0.63 mmol, 63%).

^{1}H NMR (400 MHz, $CDCl_3$) δ 7.99 – 7.93 (m, 1H), 7.93 – 7.85 (m, 2H), 7.66 – 7.57 (m, 3H), 7.55 (s, 3H), 7.47 (s, 3H), 4.82 (d, *J* = 1.7 Hz, 1H), 4.71 (p, *J* = 1.4 Hz, 1H), 1.95 (d, *J* = 1.2 Hz, 3H).

^{13}C NMR (126 MHz, $CDCl_3$) δ 153.13, 152.49, 143.10, 134.17, 133.89, 130.74, 130.48, 130.53, 130.22, 129.83, 129.17, 127.67, 126.97, 126.14 (d, *J* = 12.2 Hz), 125.81 (q, *J* = 3.6 Hz), 125.43, 123.66, 102.25, 78.23, 19.36.

HRMS calcd for $C_{22}H_{18}F_3O_3$ [M+H] 387.1208, found 387.1202.



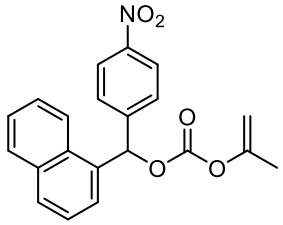
(3-cyanophenyl)(naphthalen-1-yl)methyl prop-1-en-2-yl carbonate (1h)

Colorless oil isolated from flash chromatography using: 97:3 hexanes:EtOAc as eluent (357 mg, 1.04 mmol, 54%).

^{1}H NMR (400 MHz, $CDCl_3$) δ 7.94 – 7.86 (m, 3H), 7.71 (td, *J* = 1.9, 0.7 Hz, 1H), 7.68 – 7.62 (m, 2H), 7.58 (s, 1H), 7.56 – 7.52 (m, 1H), 7.52 – 7.46 (m, 2H), 7.44 (d, *J* = 11.2 Hz, 2H), 4.83 (d, *J* = 1.8 Hz, 1H), 4.71 (dq, *J* = 2.2, 1.2 Hz, 1H), 1.96 (d, *J* = 1.0 Hz, 3H).

^{13}C NMR (101 MHz, $CDCl_3$) δ 153.12, 152.41, 140.92, 134.25, 133.44, 132.13, 131.81, 130.97, 130.38, 130.04, 129.69, 129.28, 127.08, 126.28, 126.05, 125.46, 123.52, 118.64, 113.11, 102.26, 77.88, 19.35.

HRMS calcd for $C_{22}H_{21}N_2O_3$ [M+NH4] 361.1552, found 361.1562.



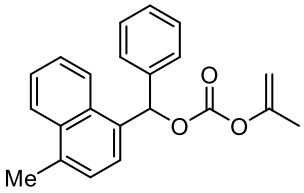
naphthalen-1-yl(4-nitrophenyl)methyl prop-1-en-2-yl carbonate (1i)

Colorless oil isolated from flash chromatography using: 97:3 hexanes:EtOAc as eluent (390 mg, 1.07 mmol, 86%).

^{1}H NMR (400 MHz, $CDCl_3$) δ 8.24 – 8.15 (m, 2H), 7.97 – 7.86 (m, 3H), 7.63 (d, *J* = 7.1 Hz, 1H), 7.61 (s, 2H), 7.54 – 7.51 (m, 1H), 7.51 – 7.44 (m, 3H), 4.83 (d, *J* = 1.8 Hz, 1H), 4.72 (dt, *J* = 2.2, 1.1 Hz, 1H), 1.96 (d, *J* = 1.1 Hz, 3H).

^{13}C NMR (126 MHz, $CDCl_3$) δ 153.09, 152.41, 147.85, 146.34, 134.25, 133.41, 130.44, 130.15, 129.27, 128.06, 127.12, 126.48, 126.30, 125.44, 124.06, 123.56, 102.34, 77.99, 19.34.

HRMS calcd for $C_{21}H_{17}NO_5$ [M+] 363.1107, found 363.1111.



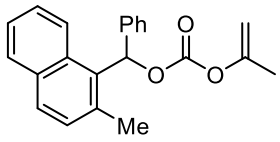
(4-methylnaphthalen-1-yl)(phenyl)methyl prop-1-en-2-yl carbonate (1j)

White solid isolated from flash chromatography using: 98:2 hexanes:EtOAc as eluent (246 mg, 0.74 mmol, 46%).

^{1}H NMR (400 MHz, $CDCl_3$) δ 8.08 – 7.95 (m, 2H), 7.54 (d, *J* = 7.3 Hz, 1H), 7.51 (s, 1H), 7.46 (s, 1H), 7.45 – 7.38 (m, 3H), 7.37 – 7.32 (m, 2H), 7.32 – 7.28 (m, 2H), 4.81 (d, *J* = 1.6 Hz, 1H), 4.69 (q, *J* = 1.3 Hz, 1H), 2.71 (s, 3H), 1.94 (d, *J* = 1.1 Hz, 3H).

^{13}C NMR (126 MHz, $CDCl_3$) δ 153.20, 152.62, 139.25, 135.67, 133.21, 132.87, 130.72, 128.75, 128.41, 127.52, 126.32, 126.20, 125.82, 125.50, 125.07, 124.48, 102.06, 79.13, 19.86, 19.42.

HRMS calcd for $C_{22}H_{20}O_3Na$ [M+Na] 355.1310, found 355.1316.



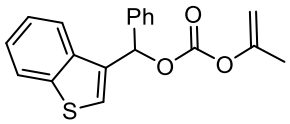
(2-methylnaphthalen-1-yl)(phenyl)methyl prop-1-en-2-yl carbonate (1k)

Yellow solid isolated from flash chromatography using: 98:2 hexanes:EtOAc as eluent (281 mg, 0.85 mmol, 68%).

^{1}H NMR (500 MHz, $CDCl_3$) δ 8.00 (d, *J* = 8.5 Hz, 1H), 7.84 – 7.76 (m, 2H), 7.64 (s, 1H), 7.40 – 7.34 (m, 2H), 7.32 (dd, *J* = 8.8, 1.7 Hz, 1H), 7.31 – 7.26 (m, 3H), 7.22 (dt, *J* = 8.3, 1.3 Hz, 2H), 4.78 (d, *J* = 1.5 Hz, 1H), 4.72 – 4.62 (m, 1H), 2.67 (s, 3H), 1.92 (d, *J* = 1.0 Hz, 3H).

^{13}C NMR (126 MHz, $CDCl_3$) δ 153.22, 153.10, 139.32, 136.27, 133.40, 131.66, 131.23, 129.59, 129.43, 128.68, 128.62, 127.69, 126.26, 126.03, 125.89, 124.99, 102.20, 77.27, 20.92, 19.42.

HRMS calcd for $C_{22}H_{20}O_3Li$ [M+Li] 339.1573, found 339.1570.

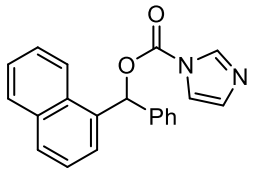


benzo[*b*]thiophen-3-yl(phenyl)methyl prop-1-en-2-yl carbonate (1l)

Colorless oil isolated from flash chromatography using: 98:2 hexanes:EtOAc as eluent (268 mg, 0.83 mmol, 58%).

^{1}H NMR (500 MHz, $CDCl_3$) δ 7.89 – 7.81 (m, 1H), 7.72 – 7.65 (m, 1H), 7.50 – 7.45 (m, 2H), 7.43 (d, *J* = 0.9 Hz, 1H), 7.41 – 7.35 (m, 3H), 7.34 (dd, *J* = 3.4, 1.5 Hz, 1H), 7.33 – 7.29 (m, 1H), 7.10 (s, 1H), 4.82 (d, *J* = 1.7 Hz, 1H), 4.70 (p, *J* = 1.1 Hz, 1H), 1.96 (d, *J* = 1.0 Hz, 3H).

^{13}C NMR (126 MHz, $CDCl_3$) δ 153.16, 152.53, 140.89, 138.08, 137.07, 134.17, 128.86, 128.82, 127.46, 125.70, 124.82, 124.55, 123.05, 122.55, 102.14, 77.07, 19.40.



naphthalen-1-yl(phenyl)methyl 1H-imidazole-1-carboxylate

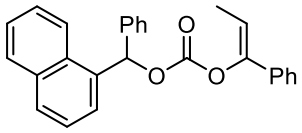
Colorless oil isolated from flash chromatography using: 95:5 hexanes:EtOAc as eluent (328 mg, 0.99 mmol, 78%).

^{1}H NMR (400 MHz, $CDCl_3$) δ 8.22 (t, *J* = 1.1 Hz, 1H), 8.01 – 7.95 (m, 1H), 7.94 – 7.87 (m, 2H), 7.76 (s, 1H), 7.62 (d, *J* = 7.3 Hz, 1H), 7.52 (d, *J* = 1.1 Hz, 1H), 7.49 (tt, *J* = 3.5, 1.8 Hz, 3H), 7.45 – 7.39 (m, 2H), 7.39 – 7.33 (m, 3H), 7.10 – 7.05 (m, 1H).

^{13}C NMR (126 MHz, $CDCl_3$) δ 148.29, 138.07, 137.36, 134.19, 133.54, 131.02, 130.64, 129.97, 129.21, 129.03, 128.98, 127.58, 127.02, 126.25, 126.05, 125.34, 123.69, 117.40, 79.35.

HRMS calcd for $C_{21}H_{16}N_2O_2$ [M+] 328.1212, found 328.1211.

Characterization data for (*Z*)-benzyl vinyl carbonates:



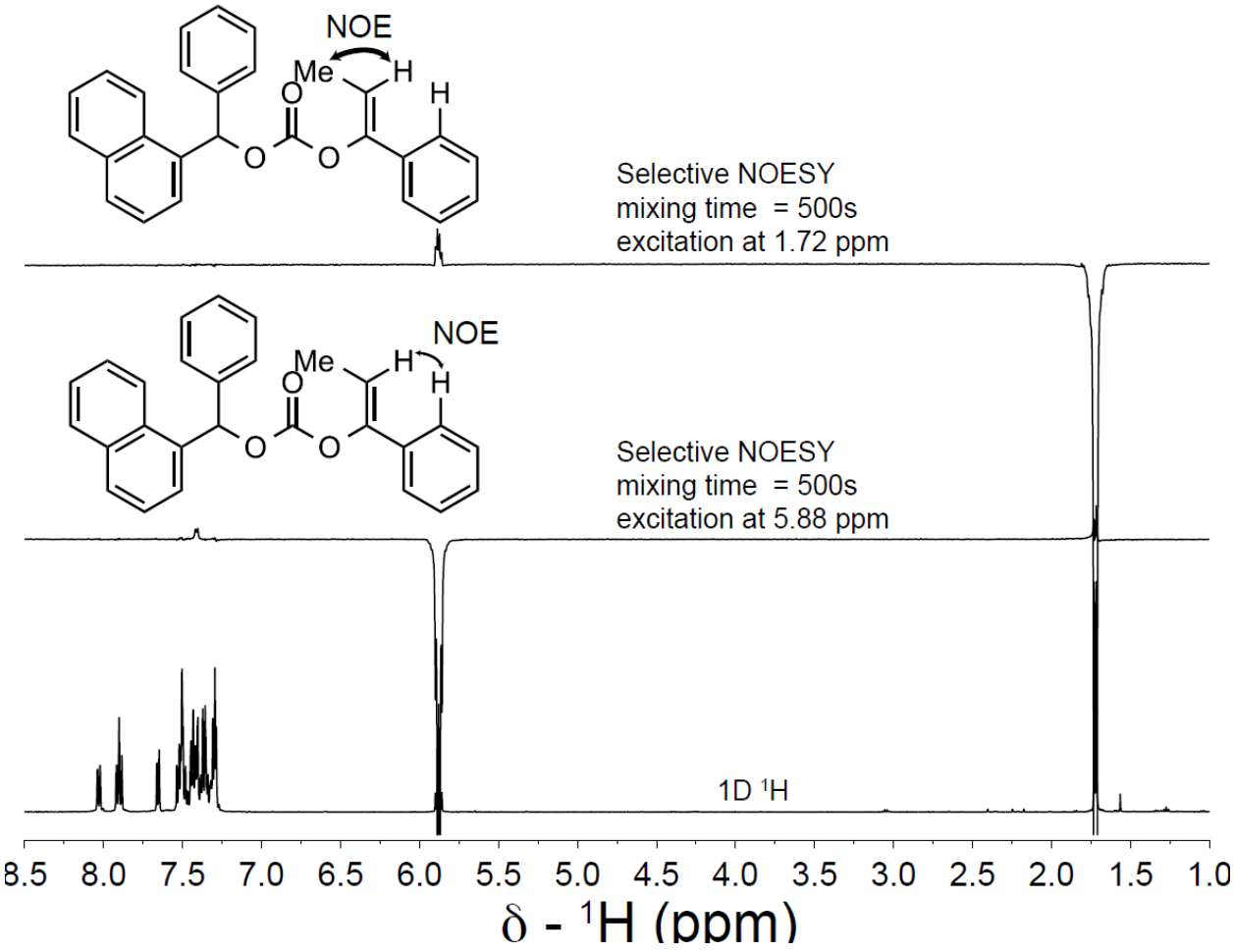
(*Z*)-naphthalen-1-yl(phenyl)methyl (1-phenylprop-1-en-1-yl) carbonate (1m)

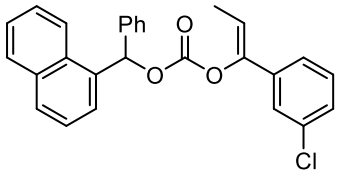
White solid isolated from flash chromatography using: 98:2 hexanes:EtOAc as eluent (211 mg, 0.53 mmol, 35%).

^{1}H NMR (500 MHz, $CDCl_3$) δ 7.99 (dd, *J* = 8.5, 1.5 Hz, 1H), 7.90 – 7.83 (m, 2H), 7.61 (d, *J* = 7.1 Hz, 1H), 7.51 – 7.45 (m, 4H), 7.45 (d, *J* = 1.5 Hz, 1H), 7.40 (dd, *J* = 7.7, 1.8 Hz, 2H), 7.39 – 7.36 (m, 2H), 7.33 (ddd, *J* = 8.7, 7.3, 5.9 Hz, 3H), 7.27 (d, *J* = 6.3 Hz, 2H), 5.90 – 5.78 (m, 1H), 1.69 (d, *J* = 6.9 Hz, 3H).

^{13}C NMR (101 MHz, $CDCl_3$) δ 152.55, 147.68, 138.95, 134.85, 134.68, 134.12, 130.78, 129.41, 129.00, 128.76, 128.69, 128.51, 128.33, 127.55, 126.69, 125.99, 125.72, 125.34, 124.47, 123.92, 113.01, 79.38, 11.40.

HRMS calcd for $C_{27}H_{22}O_3Na$ [M+Na] 417.1467, found 417.1466.





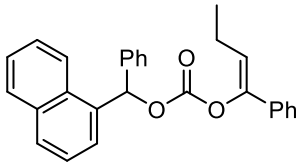
(*Z*)-1-(3-chlorophenyl)prop-1-en-1-yl (naphthalen-1-yl(phenyl)methyl) carbonate (1n)

Yellow oil isolated from flash chromatography using: 98:2 hexanes:EtOAc as eluent (360 mg, 0.84 mmol, 40%).

^{1}H NMR (400 MHz, $CDCl_3$) δ 8.01 – 7.94 (m, 1H), 7.91 – 7.83 (m, 2H), 7.61 (d, *J* = 7.1 Hz, 1H), 7.54 – 7.44 (m, 4H), 7.43 – 7.38 (m, 2H), 7.38 – 7.30 (m, 4H), 7.25 – 7.15 (m, 3H), 5.86 (d, *J* = 7.0 Hz, 1H), 1.69 (d, *J* = 7.0 Hz, 3H).

^{13}C NMR (126 MHz, $CDCl_3$) δ 152.41, 146.37, 138.71, 136.69, 134.78, 134.47, 134.09, 130.71, 129.96, 129.48, 129.03, 128.83, 128.61, 128.36, 127.52, 126.76, 126.04, 125.64, 125.35, 124.63, 123.78, 122.57, 114.56, 79.58, 11.48.

HRMS calcd for $C_{27}H_{21}ClO_3Na$ [M+Na] 451.1077, found 451.1072.



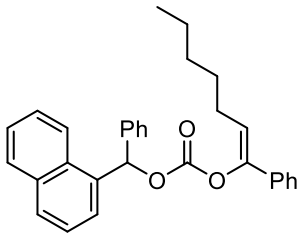
(*Z*)-naphthalen-1-yl(phenyl)methyl (1-phenylbut-1-en-1-yl) carbonate (1o)

Colorless oil isolated from flash chromatography using: 98:2 hexanes:EtOAc as eluent (287 mg, 0.7 mmol, 34%).

^{1}H NMR (400 MHz, $CDCl_3$) δ 8.01 – 7.95 (m, 1H), 7.91 – 7.83 (m, 2H), 7.63 – 7.57 (m, 1H), 7.52 – 7.41 (m, 4H), 7.38 (ddd, *J* = 7.7, 4.7, 2.0 Hz, 4H), 7.34 – 7.30 (m, 2H), 7.29 – 7.23 (m, 4H), 5.75 (t, *J* = 7.4 Hz, 1H), 2.12 (p, *J* = 7.5 Hz, 2H), 0.97 (t, *J* = 7.5 Hz, 3H).

^{13}C NMR (101 MHz, $CDCl_3$) δ 152.70, 146.38, 138.94, 134.87, 134.66, 134.11, 130.77, 129.39, 128.99, 128.75, 128.68, 128.49, 128.34, 127.55, 126.67, 125.98, 125.73, 125.33, 124.55, 123.94, 120.07, 79.40, 19.49, 13.58.

HRMS calcd for $C_{28}H_{24}O_3Na$ [M+Na] 431.1623, found 431.1619.



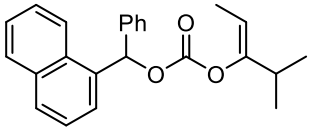
(*Z*)-naphthalen-1-yl(phenyl)methyl (1-phenylhept-1-en-1-yl) carbonate (1p)

White solid isolated from flash chromatography using: 98:2 hexanes:EtOAc as eluent (124 mg, 0.28 mmol, 33%).

^{1}H NMR (400 MHz, $CDCl_3$) δ 8.00 (dd, *J* = 7.8, 1.9 Hz, 1H), 7.91 – 7.83 (m, 2H), 7.61 (d, *J* = 7.1 Hz, 1H), 7.53 – 7.44 (m, 4H), 7.43 – 7.37 (m, 4H), 7.37 – 7.30 (m, 3H), 7.30 – 7.26 (m, 3H), 5.78 (t, *J* = 7.4 Hz, 1H), 2.09 (q, *J* = 7.5 Hz, 2H), 1.36 (h, *J* = 7.6 Hz, 2H), 1.31 – 1.13 (m, *J* = 3.6 Hz, 4H), 0.86 (t, *J* = 6.7 Hz, 3H).

^{13}C NMR (126 MHz, $CDCl_3$) δ 152.66, 146.67, 138.90, 134.86, 134.62, 134.08, 130.73, 129.38, 128.98, 128.73, 128.67, 128.47, 128.30, 127.53, 126.66, 125.97, 125.73, 125.31, 124.50, 123.91, 118.70, 79.35, 31.63, 28.70, 26.02, 22.56, 14.18.

HRMS calcd for $C_{31}H_{34}O_3N$ [M+NH_4] 468.2539, found 468.2531.



(*Z*)-4-methylpent-2-en-3-yl (naphthalen-1-yl(phenyl)methyl) carbonate (1q)

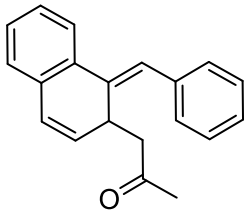
Yellow oil isolated from flash chromatography using: 98:2 hexanes:EtOAc as eluent (352 mg, 0.98 mmol, 47%).

^{1}H NMR (400 MHz, $CDCl_3$) δ 8.06 – 7.98 (m, 1H), 7.91 – 7.82 (m, 2H), 7.65 (d, *J* = 7.1 Hz, 1H), 7.54 – 7.40 (m, 6H), 7.39 – 7.27 (m, 3H), 5.07 (q, *J* = 6.8 Hz, 1H), 2.43 (hept, *J* = 7.1 Hz, 1H), 1.42 (dd, *J* = 6.9, 1.3 Hz, 3H), 1.02 (dd, *J* = 6.9, 2.8 Hz, 6H).

^{13}C NMR (126 MHz, $CDCl_3$) δ 154.75, 152.61, 139.13, 134.89, 134.07, 130.76, 129.29, 128.99, 128.75, 128.46, 127.59, 126.65, 125.97, 125.51, 125.35, 123.89, 109.02, 78.80, 32.24, 20.32, 10.63.

HRMS calcd for $C_{24}H_{25}O_3$ [M+H] 361.1804, found 361.1807.

Characterization data for dearomatized ketones:



(*E*)-1-(1-benzylidene-1,2-dihydronaphthalen-2-yl)propan-2-one (2a)

Yellow oil isolated from flash chromatography using: 96:4 hexanes:EtOAc as eluent (77 mg, 0.28 mmol, 91%)

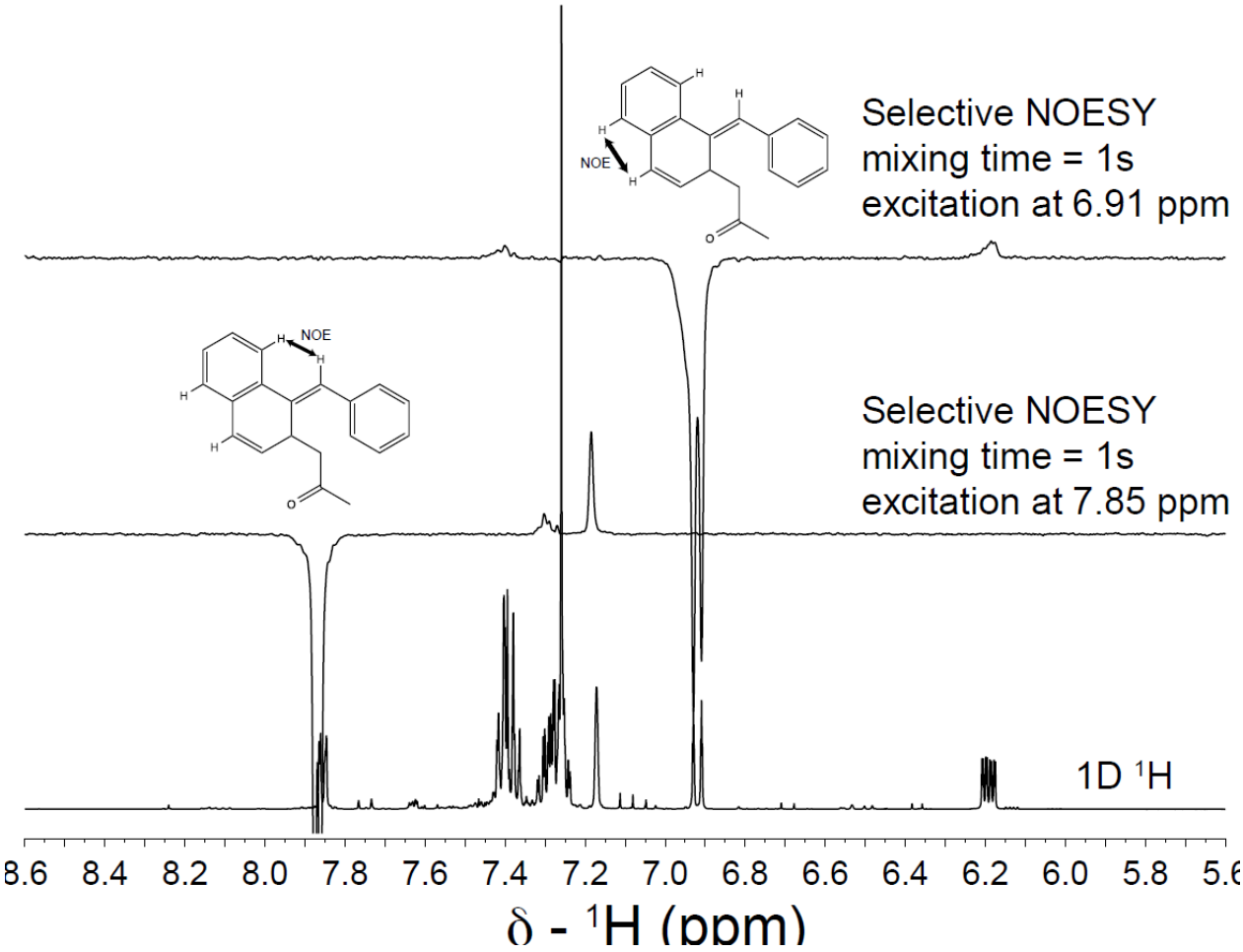
^{1}H NMR (400 MHz, $CDCl_3$) δ 7.89 – 7.82 (m, 1H), 7.44 – 7.39 (m, 3H), 7.38 (s, 1H), 7.33 – 7.27 (m, 3H), 7.24 (d, *J* = 2.7 Hz, 1H), 7.17 (s, 1H), 6.92 (d, *J* = 10.1 Hz, 1H), 6.19 (ddd, *J* = 10.2, 5.0, 1.6 Hz, 1H), 4.14 (dt, *J* = 9.5, 5.0 Hz, 1H), 2.86 (dd, *J* = 17.0, 5.0 Hz, 1H), 2.73 (dd, *J* = 17.1, 8.8 Hz, 1H), 2.12 (s, 3H).

^{13}C NMR (101 MHz, $CDCl_3$) δ 207.22, 138.33, 137.63, 133.89, 131.97, 131.04, 129.62, 128.44, 128.34, 127.77, 127.08, 126.86, 125.08, 123.64, 123.17, 53.14, 36.73, 30.82.

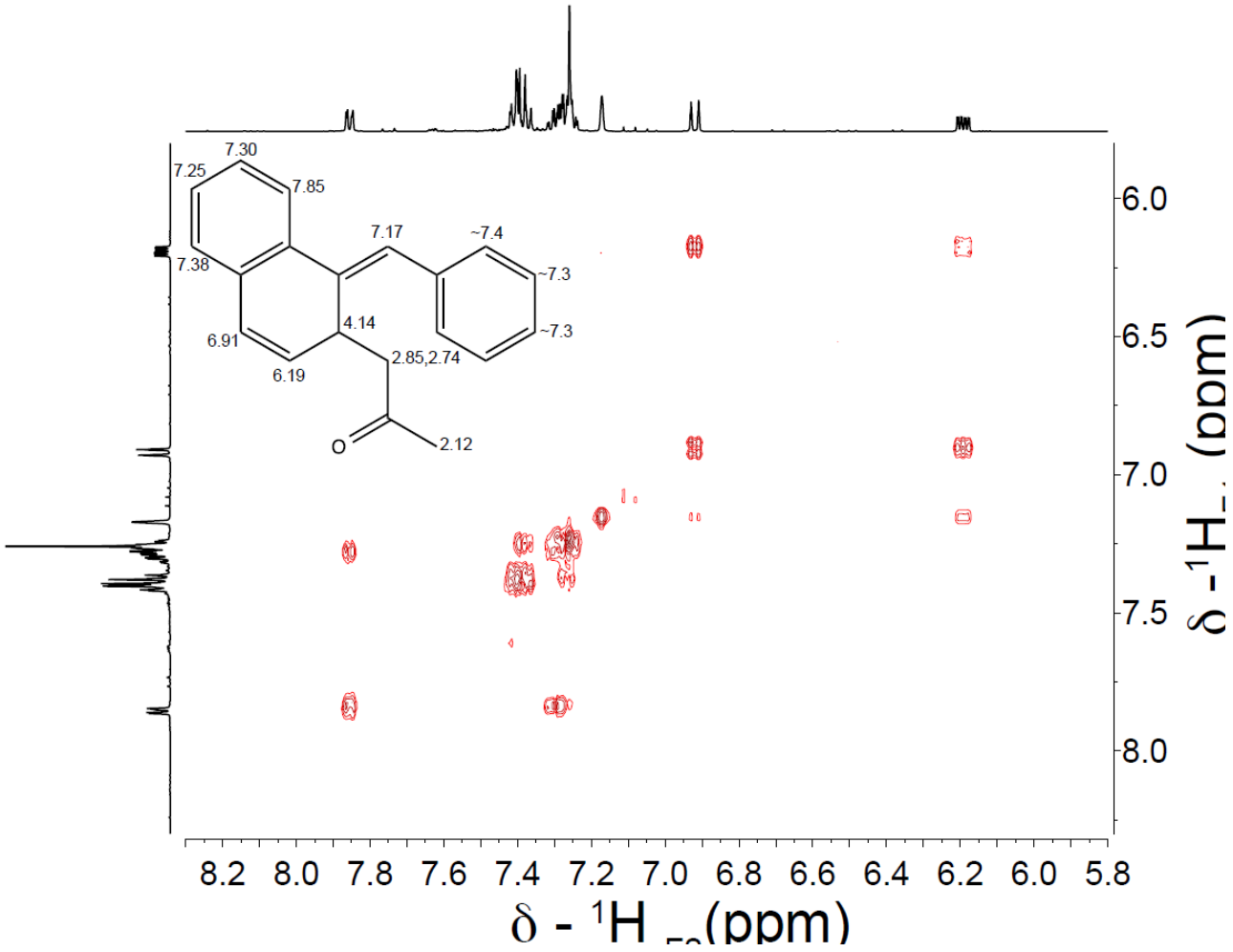
HRMS calcd for $C_{20}H_{18}ONa$ [M+Na] 297.1255, found 297.1255.

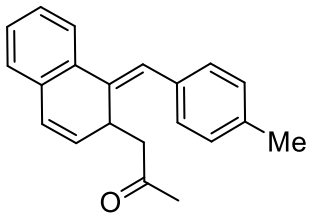
1D selective NOESY and COSY for product **2a** are provided in the next two pages to support for the (*E*)-configuration of **2a**.[2]

1D selective NOESY of 2a:



2D COSY of 2a:





(*E*)-1-(1-(4-methylbenzylidene)-1,2-dihydronaphthalen-2-yl)propan-2-one (2b)

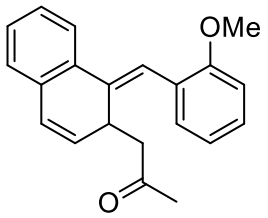
Yellow oil isolated from flash chromatography using: 96:4 hexanes:EtOAc as eluent (57 mg, 0.19 mmol, 82%).

^{1}H NMR (400 MHz, $CDCl_3$) δ 7.89 – 7.83 (m, 1H), 7.36 – 7.30 (m, 2H), 7.29 (d, *J* = 4.5 Hz, 1H), 7.28 – 7.27 (m, 1H), 7.24 (d, *J* = 2.6 Hz, 1H), 7.20 (d, *J* = 7.8 Hz, 2H), 7.15 (s, 1H), 6.94 (dd, *J* =

10.1, 1.2 Hz, 1H), 6.19 (ddd, *J* = 10.1, 5.0, 1.7 Hz, 1H), 4.14 (dt, *J* = 9.6, 5.0 Hz, 1H), 2.86 (dd, *J* = 17.0, 4.9 Hz, 1H), 2.74 (dd, *J* = 17.0, 8.8 Hz, 1H), 2.39 (s, 3H), 2.13 (s, 3H).

^{13}C NMR (126 MHz, $CDCl_3$) δ 207.32, 138.18, 136.89, 134.64, 133.99, 131.57, 130.44, 129.50, 129.13, 128.29, 127.60, 126.78, 125.15, 123.64, 123.06, 53.14, 36.68, 30.80, 21.41.

HRMS calcd for $C_{21}H_{20}ONa$ [M+Na] 311.1412, found 311.1418.



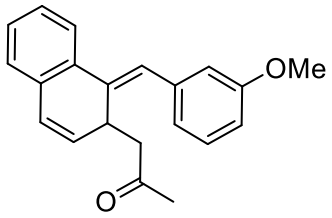
(*E*)-1-(1-(2-methoxybenzylidene)-1,2-dihydronaphthalen-2-yl)propan-2-one (2c)

Yellow oil isolated from flash chromatography using: 95:5 hexanes:EtOAc as eluent (44 mg, 0.14 mmol, 63%).

^{1}H NMR (400 MHz, $CDCl_3$) δ 7.92 (dd, *J* = 7.3, 1.9 Hz, 1H), 7.38 (dd, *J* = 7.3, 1.5 Hz, 1H), 7.33 – 7.27 (m, 3H), 7.26 (s, 1H), 7.25 (q, *J* = 1.8 Hz, 1H), 6.97 (td, *J* = 7.6, 1.1 Hz, 1H), 6.92 (dd, *J* = 8.3, 1.0 Hz, 1H), 6.89 – 6.83 (m, 1H), 6.13 (ddd, *J* = 10.2, 4.9, 1.7 Hz, 1H), 4.14 (dt, *J* = 9.6, 5.0 Hz, 1H), 3.87 (s, 3H), 2.86 (dd, *J* = 17.0, 4.9 Hz, 1H), 2.73 (dd, *J* = 17.0, 8.9 Hz, 1H), 2.12 (s, 3H).

^{13}C NMR (126 MHz, $CDCl_3$) δ 207.41, 157.78, 138.10, 133.99, 131.22, 131.02, 130.53, 128.65, 128.24, 127.61, 126.76, 126.43, 125.39, 123.46, 120.25, 119.56, 110.63, 55.65, 53.20, 36.65, 30.84.

HRMS calcd for $C_{21}H_{20}O_2Na$ [M+Na] 327.1361, found 327.1360.



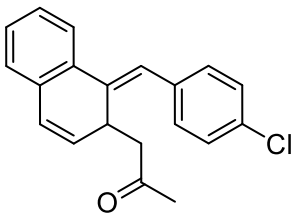
(*E*)-1-(1-(3-methoxybenzylidene)-1,2-dihydronaphthalen-2-yl)propan-2-one (2d)

Yellow oil isolated from flash chromatography using: 95:5 hexanes:EtOAc as eluent (60 mg, 0.19 mmol, 86%).

^{1}H NMR (400 MHz, $CDCl_3$) δ 7.89 – 7.81 (m, 1H), 7.31 (d, *J* = 8.0 Hz, 1H), 7.29 – 7.27 (m, 1H), 7.26 (d, *J* = 1.1 Hz, 2H), 7.14 (s, 1H), 7.04 – 6.98 (m, 1H), 6.94 (dt, *J* = 9.3, 1.3 Hz, 2H), 6.86 – 6.79 (m, 1H), 6.19 (ddd, *J* = 10.1, 5.0, 1.7 Hz, 1H), 4.14 (dt, *J* = 9.7, 5.1 Hz, 1H), 3.84 (s, 3H), 2.86 (dd, *J* = 17.1, 5.0 Hz, 1H), 2.73 (dd, *J* = 17.2, 8.9 Hz, 1H), 2.12 (s, 3H).

13C NMR (126 MHz, $CDCl_3$) δ 207.26, 159.63, 138.99, 138.34, 133.78, 132.05, 131.24, 129.40, 128.33, 127.79, 126.84, 125.07, 123.42, 123.16, 122.19, 115.16, 112.53, 55.44, 53.10, 36.65, 30.82.

HRMS calcd for $C_{21}H_{20}O_2Na$ [M+Na] 327.1361, found 327.1361.



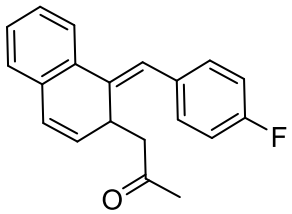
(*E*)-1-(1-(4-chlorobenzylidene)-1,2-dihydronaphthalen-2-yl)propan-2-one (2e)

Yellow oil isolated from flash chromatography using: 96:4 hexanes:EtOAc as eluent (59 mg, 0.19 mmol, 83%).

^{1}H NMR (400 MHz, $CDCl_3$) δ 7.79 – 7.72 (m, 1H), 7.26 (s, 3H), 7.24 – 7.20 (m, 2H), 7.18 (s, 2H), 7.03 – 6.98 (m, 1H), 6.77 (dd, *J* = 10.1, 1.0 Hz, 1H), 6.15 (ddd, *J* = 10.2, 5.0, 1.7 Hz, 1H), 4.07 (dt, *J* = 9.8, 5.1 Hz, 1H), 2.79 (dd, *J* = 17.1, 4.9 Hz, 1H), 2.65 (dd, *J* = 17.1, 8.9 Hz, 1H), 2.05 (s, 3H).

^{13}C NMR (126 MHz, $CDCl_3$) δ 207.12, 138.34, 136.03, 133.53, 132.75, 132.60, 131.51, 130.83, 128.60, 128.34, 127.94, 126.88, 124.61, 123.11, 122.14, 53.02, 36.64, 30.77.

HRMS calcd for $C_{20}H_{17}ClONa$ [M+Na] 331.0866, found 331.0871.



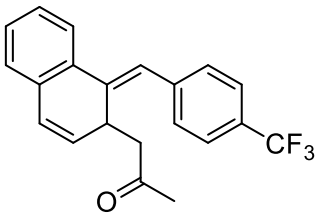
(*E*)-1-(1-(4-fluorobenzylidene)-1,2-dihydronaphthalen-2-yl)propan-2-one (2f)

Yellow oil isolated from flash chromatography using: 96:4 hexanes:EtOAc as eluent (67 mg, 0.23 mmol, 86%).

^{1}H NMR (400 MHz, $CDCl_3$) δ 7.88 – 7.77 (m, 1H), 7.36 (ddd, *J* = 8.6, 5.6, 2.6 Hz, 2H), 7.31 – 7.26 (m, 2H), 7.24 (d, *J* = 2.9 Hz, 1H), 7.14 – 7.08 (m, 1H), 7.08 – 7.02 (m, 2H), 6.85 (d, *J* = 10.0 Hz, 1H), 6.20 (ddt, *J* = 7.6, 4.3, 2.1 Hz, 1H), 4.14 (dt, *J* = 9.5, 5.0 Hz, 1H), 2.86 (dd, *J* = 17.1, 4.9 Hz, 1H), 2.73 (dd, *J* = 17.1, 8.9 Hz, 1H), 2.12 (d, *J* = 5.2 Hz, 2H).

^{13}C NMR (126 MHz, $CDCl_3$) δ 207.18, 161.90 (d, *J* = 247.0 Hz), 138.27, 133.67, 133.58 (d, *J* = 3.5 Hz), 132.25, 131.16 (d, *J* = 8.0 Hz), 131.01, 128.34, 127.84, 126.86, 124.71, 123.06, 122.37, 115.39 (d, *J* = 21.3 Hz), 53.08, 36.66, 30.79.

HRMS calcd for $C_{20}H_{17}FOLi$ [M+Li] 299.1423, found 299.1423.



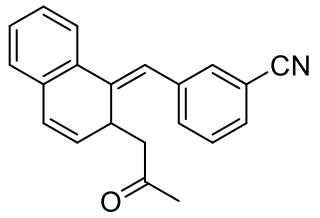
(*E*)-1-(1-(4-(trifluoromethyl)benzylidene)-1,2-dihydronaphthalen-2-yl)propan-2-one (2g)

Yellow oil isolated from flash chromatography using: 95:5 hexanes:EtOAc as eluent (34 mg, 0.09 mmol, 48%).

^{1}H NMR (400 MHz, $CDCl_3$) δ 7.89 – 7.82 (m, 1H), 7.62 (d, *J* = 8.1 Hz, 2H), 7.50 (d, *J* = 8.1 Hz, 2H), 7.31 (dt, *J* = 6.9, 2.3 Hz, 2H), 7.28 (d, *J* = 1.9 Hz, 1H), 7.15 (s, 1H), 6.89 – 6.81 (m, 1H), 6.26 (ddd, *J* = 10.1, 5.0, 1.8 Hz, 1H), 4.16 (dt, *J* = 9.4, 4.9 Hz, 1H), 2.88 (dd, *J* = 17.2, 4.9 Hz, 1H), 2.74 (dd, *J* = 17.1, 8.8 Hz, 1H), 2.13 (d, *J* = 2.0 Hz, 3H).

^{13}C NMR (126 MHz, $CDCl_3$) δ 207.01, 141.32, 138.54, 133.35, 133.26, 132.63, 129.76, 129.57 (d, *J* = 12.7 Hz), 128.92 (d, *J* = 6.4 Hz), 128.52, 128.31 (d, J = 22.5 Hz), 126.97, 125.34 (q, J = 3.8 Hz), 124.41, 123.24, 121.78, 52.96, 36.63, 30.77.

HRMS calcd for $C_{21}H_{21}F_3ON$ [M+NH4] 360.1575, found 360.1563.



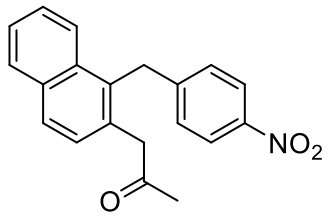
(*E*)-3-((2-(2-oxopropyl)naphthalen-1(2H)-ylidene)methyl)benzonitrile (2h)

Yellow oil isolated from flash chromatography using: 95:5 hexanes:EtOAc as eluent (42 mg, 0.14 mmol, 59%).

^{1}H NMR (500 MHz, $CDCl_3$) δ 7.82 (dd, *J* = 5.9, 3.4 Hz, 1H), 7.66 (d, *J* = 1.8 Hz, 1H), 7.60 (dt, *J* = 7.9, 1.5 Hz, 1H), 7.52 (dt, *J* = 7.8, 1.6 Hz, 1H), 7.46 (t, *J* = 7.7 Hz, 1H), 7.30 (dt, *J* = 7.1, 3.6 Hz, 2H), 7.28 – 7.23 (m, 1H), 7.06 (s, 1H), 6.76 (d, *J* = 10.2 Hz, 1H), 6.27 (ddd, *J* = 10.2, 4.9, 1.7 Hz, 1H), 4.15 (dt, *J* = 10.8, 5.7 Hz, 1H), 2.86 (dd, *J* = 17.3, 4.9 Hz, 1H), 2.72 (dd, *J* = 17.3, 8.8 Hz, 1H), 2.12 (s, 3H).

^{13}C NMR (101 MHz, $CDCl_3$) δ 206.81, 138.96, 138.60, 133.95, 133.83, 133.01, 132.96, 132.93, 130.31, 129.27, 128.42, 128.34, 127.00, 123.98, 123.20, 120.62, 119.01, 112.70, 52.87, 36.62, 30.72.

HRMS calcd for $C_{21}H_{17}NONa$ [M+Na] 322.1208, found 322.1205.



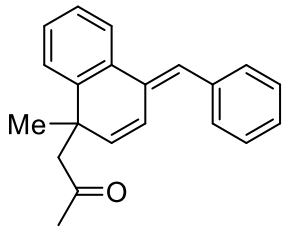
1-(1-(4-nitrobenzyl)naphthalen-2-yl)propan-2-one (2i)

Yellow solid isolated from flash chromatography using: 95:5 hexanes:EtOAc as eluent (40 mg, 0.125 mmol, 57%).

^{1}H NMR (400 MHz, $CDCl_3$) δ 8.12 (d, *J* = 8.7 Hz, 2H), 7.96 – 7.83 (m, 2H), 7.57 – 7.41 (m, 2H), 7.39 – 7.26 (m, 4H), 4.53 (s, 2H), 4.14 (s, 2H), 2.16 (s, *J* = 2.9 Hz, 3H).

^{13}C NMR (126 MHz, $CDCl_3$) δ 206.88, 148.52, 146.71, 134.88, 132.90, 132.37, 131.08, 129.58, 128.14, 127.60, 126.67, 126.54, 124.96, 124.82, 123.96, 49.35, 39.22, 29.33.

HRMS calcd for $C_{20}H_{16}NO_3$ [M-H] 318.1130, found 318.1133.



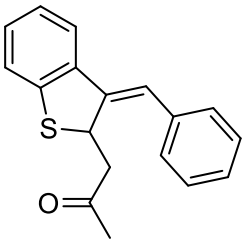
(*E*)-1-(4-benzylidene-1-methyl-1,4-dihydronaphthalen-1-yl)propan-2-one (2j)

Yellow oil isolated from flash chromatography using: 96:4 hexanes:EtOAc as eluent (29 mg, 0.1 mmol, 47%).

^{1}H NMR (400 MHz, $CDCl_3$) δ 7.89 (s, 1H), 7.44 (s, 1H), 7.43 – 7.37 (m, 4H), 7.32 (s, 3H), 7.21 (d, *J* = 1.7 Hz, 1H), 6.91 (dd, *J* = 10.2, 0.9 Hz, 1H), 5.96 (dd, *J* = 10.3, 1.7 Hz, 1H), 3.02 (d, *J* = 14.3 Hz, 1H), 2.72 (d, *J* = 14.4 Hz, 1H), 1.81 (s, 3H), 1.52 (s, 3H).

^{13}C NMR (126 MHz, $CDCl_3$) δ 207.46, 141.47, 137.60, 136.90, 132.86, 130.61, 129.66, 128.43, 128.04, 127.07, 126.86, 126.53, 123.95, 123.22, 123.11, 57.55, 39.67, 31.34, 30.79.

HRMS calcd for $C_{21}H_{24}ON$ [M+NH4] 306.1858, found 306.1860.



(*E*)-1-(3-benzylidene-2,3-dihydrobenzo[b]thiophen-2-yl)propan-2-one (2l)

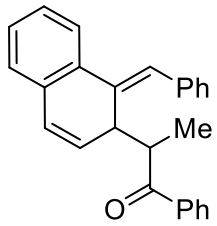
Yellow oil isolated from flash chromatography using: 94:6 hexanes:EtOAc as eluent (46 mg, 0.16 mmol, 63%).

^{1}H NMR (400 MHz, $CDCl_3$) δ 7.54 (d, *J* = 7.8 Hz, 1H), 7.45 – 7.32 (m, 4H), 7.32 – 7.23 (m, 1H), 7.23 – 7.17 (m, 2H), 7.11 (ddd, *J* = 8.1, 5.0, 3.2 Hz, 1H), 7.00 (d, *J* = 2.0 Hz, 1H), 5.28 (dd, *J* = 10.9, 2.4 Hz, 1H), 3.01 (dd, *J* = 18.5, 2.9 Hz, 1H), 2.91 (dd, *J* = 18.5, 11.0 Hz, 1H), 2.12 (s, 3H).

^{13}C NMR (126 MHz, $CDCl_3$) δ 206.67, 143.42, 142.44, 137.47, 136.27, 129.59, 129.15, 128.47, 127.64, 124.65, 123.03, 122.64, 121.79, 49.97, 44.89, 30.47.

HRMS calcd for $C_{18}H_{16}OSNa$ [M+Na] 303.0820, found 303.0818.

Characterization data for α-substituted dearomatized ketones:



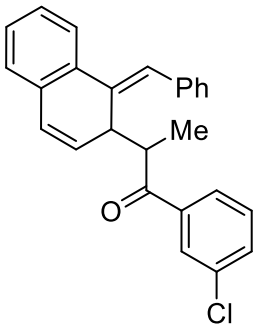
(*E*)-2-(1-benzylidene-1,2-dihydronaphthalen-2-yl)-1-phenylpropan-1-one (2m)

Yellow oil isolated from flash chromatography using: 94:6 hexanes:EtOAc as eluent (48 mg, 0.14 mmol, 86%).

^{1}H NMR (400 MHz, $CDCl_3$) δ 8.02 – 7.95 (m, 2H), 7.92 – 7.83 (m, 3H), 7.78 (dd, *J* = 7.6, 1.6 Hz, 1H), 7.62 – 7.53 (m, 2H), 7.53 – 7.46 (m, 3H), 7.46 – 7.42 (m, 3H), 7.42 – 7.34 (m, 9H), 7.34 – 7.28 (m, 5H), 7.26 (s, 4H), 7.21 (d, *J* = 2.3 Hz, 2H), 7.10 (s, 1H), 7.05 (d, *J* = 10.3 Hz, 1H), 6.84 (d, *J* = 9.9 Hz, 1H), 6.25 (ddd, *J* = 10.0, 5.6, 1.6 Hz, 1H), 6.02 (ddd, *J* = 10.3, 5.2, 1.7 Hz, 1H), 4.14 (d, *J* = 4.9 Hz, 1H), 3.95 (q, *J* = 5.4, 4.5 Hz, 2H), 3.70 – 3.55 (m, 1H), 1.16 (d, *J* = 6.9 Hz, 3H), 1.03 (d, *J* = 6.8 Hz, 3H).

^{13}C NMR (101 MHz, $CDCl_3$) δ 203.65, 202.87, 137.59, 137.52, 137.42, 137.17, 136.89, 136.51, 135.62, 135.11, 133.12, 133.09, 131.93, 131.82, 131.37, 129.73, 129.66, 129.57, 128.95, 128.88, 128.74, 128.66, 128.63, 128.60, 128.49, 128.43, 128.28, 127.66, 127.60, 127.12, 126.91, 126.85, 126.84, 126.79, 124.14, 123.79, 123.38, 123.04, 49.37, 48.57, 45.01, 43.12, 15.92, 11.69.

HRMS calcd for $C_{26}H_{22}ONa$ [M+Na] 373.1568, found 373.1571.



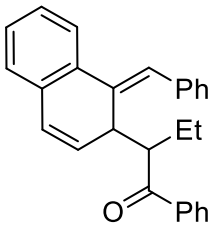
(*E*)-2-(1-benzylidene-1,2-dihydronaphthalen-2-yl)-1-(3-chlorophenyl)propan-1-one (2n)

Colorless oil isolated from flash chromatography using: 94:6 hexanes:EtOAc as eluent (59 mg, 0.15 mmol, 74%).

^{1}H NMR (400 MHz, $CDCl_3$) δ 7.82 – 7.70 (m, 2H), 7.66 (s, 1H), 7.50 – 7.44 (m, 1H), 7.36 (d, *J* = 4.3 Hz, 4H), 7.29 (dd, *J* = 6.1, 2.1 Hz, 4H), 7.22 (d, *J* = 5.1 Hz, 1H), 7.07 (s, 1H), 6.85 (d, *J* = 9.9 Hz, 1H), 6.21 (dd, *J* = 10.0, 5.5 Hz, 1H), 3.92 (t, *J* = 6.2 Hz, 1H), 3.61 (p, *J* = 6.8 Hz, 1H), 1.19 (d, *J* = 7.0 Hz, 3H).

^{13}C NMR (101 MHz, $CDCl_3$) δ 202.37, 138.83, 137.42, 136.34, 135.43, 135.00, 132.91, 131.63, 130.98, 129.90, 129.67, 129.44, 128.72, 128.45, 127.20, 126.97, 126.62, 124.37, 123.33, 49.00, 45.17, 16.01.

HRMS calcd for $C_{26}H_{21}ClONa$ [M+Na] 407.1179, found 407.1177.



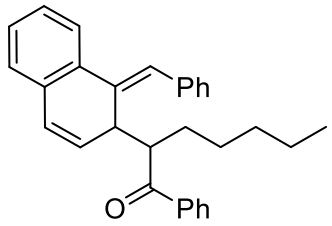
(*E*)-2-(1-benzylidene-1,2-dihydronaphthalen-2-yl)-1-phenylbutan-1-one (2o)

Colorless oil isolated from flash chromatography using: 94:6 hexanes:EtOAc as eluent (46 mg, 0.13 mmol, 81%).

^{1}H NMR (400 MHz, $CDCl_3$) δ 8.02 – 7.94 (m, 2H), 7.86 (dd, *J* = 7.2, 2.0 Hz, 1H), 7.61 – 7.53 (m, 1H), 7.53 – 7.47 (m, 2H), 7.47 – 7.44 (m, 1H), 7.44 – 7.41 (m, 2H), 7.40 – 7.32 (m, 3H), 7.32 – 7.27 (m, 2H), 7.20 (s, 1H), 7.05 – 6.98 (m, 1H), 6.03 (ddd, *J* = 10.2, 5.2, 1.6 Hz, 1H), 4.00 (t, *J* = 5.1 Hz, 1H), 3.79 (ddd, *J* = 10.4, 4.9, 3.3 Hz, 1H), 1.95 (ddd, *J* = 13.8, 10.4, 7.1 Hz, 1H), 1.36 (dd, *J* = 6.2, 3.2 Hz, 1H), 0.73 (t, *J* = 7.4 Hz, 3H).

^{13}C NMR (101 MHz, $CDCl_3$) δ 202.52, 137.97, 137.58, 137.36, 135.14, 133.11, 131.42, 129.75, 129.15, 128.91, 128.44, 128.40, 128.38, 127.60, 127.14, 127.08, 126.84, 123.79, 123.07, 56.49, 43.13, 20.26, 12.61.

HRMS calcd for $C_{27}H_{24}ONa$ [M+Na] 387.1725, found 387.1724.



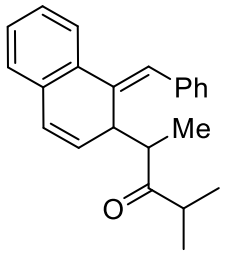
(*E*)-2-(1-benzylidene-1,2-dihydronaphthalen-2-yl)-1-phenylheptan-1-one (2p)

Yellow oil isolated from flash chromatography using: 94:6 hexanes:EtOAc as eluent (46 mg, 0.11 mmol, 72%).

^{1}H NMR (400 MHz, $CDCl_3$) δ 8.00 – 7.92 (m, 2H), 7.86 (d, *J* = 1.8 Hz, 1H), 7.55 (d, *J* = 7.4 Hz, 1H), 7.50 – 7.44 (m, 3H), 7.44 – 7.36 (m, 4H), 7.34 (dd, *J* = 7.3, 1.9 Hz, 1H), 7.31 – 7.27 (m, 2H), 7.20 (s, 1H), 7.01 (d, *J* = 10.2 Hz, 1H), 6.05 (ddd, *J* = 10.3, 5.1, 1.6 Hz, 1H), 4.07 – 3.92 (m, 1H), 3.91 – 3.73 (m, 1H), 2.01 – 1.82 (m, 1H), 1.38 – 1.23 (m, 2H), 1.11 (q, *J* = 4.2, 3.6 Hz, 5H), 0.74 (t, *J* = 6.8 Hz, 3H).

^{13}C NMR (101 MHz, $CDCl_3$) δ 202.72, 137.91, 137.64, 137.36, 135.14, 133.09, 131.48, 129.74, 129.30, 128.90, 128.44, 128.40, 128.38, 127.57, 127.13, 127.08, 126.82, 123.78, 123.08, 54.66, 43.21, 32.07, 27.73, 27.23, 22.54, 14.10.

HRMS calcd for $C_{30}H_{30}ONa$ [M+Na] 429.2194, found 429.2191.



(*E*)-2-(1-benzylidene-1,2-dihydronaphthalen-2-yl)-4-methylpentan-3-one (2q)

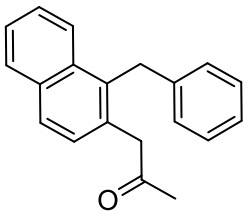
Yellow oil isolated from flash chromatography using: 94:6 hexanes:EtOAc as eluent (46 mg, 0.145 mmol, 88%)

^{1}H NMR (400 MHz, $CDCl_3$) δ 7.89 – 7.82 (m, 1H), 7.44 (d, *J* = 7.1 Hz, 2H), 7.39 (t, *J* = 7.5 Hz, 2H), 7.29 (dd, *J* = 7.7, 2.1 Hz, 2H), 7.25 – 7.20 (m, 2H), 7.18 (s, 1H), 7.01 (d, *J* = 10.2 Hz, 1H), 6.08 (ddd, *J* = 10.2, 5.4, 1.6 Hz, 1H), 4.00 (t, *J* = 5.4 Hz, 1H), 3.11 – 2.97 (m, 1H), 2.67 (p, *J* = 6.9 Hz, 1H), 1.08 (d, *J* = 6.9 Hz, 3H), 0.98 (dd, *J* = 9.8, 6.9 Hz, 6H).

^{13}C NMR (101 MHz, $CDCl_3$) δ 216.84, 137.60, 135.04, 131.51, 129.70, 129.66, 128.50, 128.43, 127.47, 127.22, 127.12, 126.77, 123.69, 123.08, 52.89, 42.83, 40.01, 18.70, 18.17, 12.44.

HRMS calcd for $C_{23}H_{24}ONa$ [M+Na] 339.1725, found 339.1729.

Characterization data for arylated ketones:



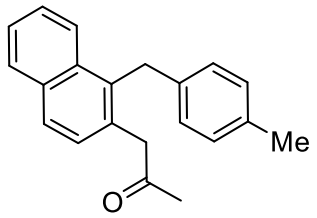
1-(1-benzylnaphthalen-2-yl)propan-2-one (3a)

White solid isolated from flash chromatography using: 94:6 hexanes:EtOAc as eluent (50.8mg, 0.19 mmol, 74%).

^{1}H NMR (400 MHz, $CDCl_3$) δ 8.05 (dd, *J* = 8.0, 1.7 Hz, 1H), 7.91 (dd, *J* = 7.8, 1.7 Hz, 1H), 7.50 (dddd, *J* = 15.1, 8.2, 6.9, 1.5 Hz, 2H), 7.34 (d, *J* = 7.2 Hz, 1H), 7.32 – 7.24 (m, 3H), 7.21 (dt, *J* = 9.3, 3.0 Hz, 3H), 4.46 (s, 2H), 4.11 (s, 2H), 2.14 (s, 3H).

^{13}C NMR (126 MHz, $CDCl_3$) δ 207.29, 140.55, 136.81, 132.72, 132.68, 130.19, 128.93, 128.65, 128.15, 127.21, 126.37, 126.29, 126.16, 125.21, 124.67, 49.50, 39.23, 29.16.

HRMS calcd for $C_{20}H_{18}ONa$ [M+Na] 297.1255, found 297.1258.



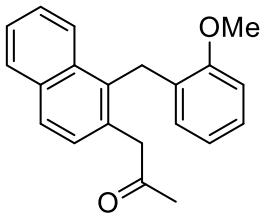
1-(1-(4-methylbenzyl)naphthalen-2-yl)propan-2-one (3b)

White solid isolated from flash chromatography using: 94:6 hexanes:EtOAc as eluent (45.8 mg, 0.16 mmol, 66%).

^{1}H NMR (400 MHz, $CDCl_3$) δ 8.29 – 8.17 (m, 1H), 8.13 – 7.98 (m, 1H), 7.78 – 7.55 (m, 2H), 7.49 (d, *J* = 7.1 Hz, 1H), 7.45 – 7.34 (m, 1H), 7.26 (s, 4H), 4.57 (s, 2H), 4.26 (s, 2H), 2.48 (s, 3H), 2.29 (s, 3H).

^{13}C NMR (126 MHz, $CDCl_3$) δ 207.35, 137.45, 137.10, 135.77, 132.71, 132.70, 130.09, 129.34, 128.81, 128.16, 127.11, 126.34, 126.13, 125.22, 124.65, 49.51, 38.80, 29.15, 21.18.

HRMS calcd for $C_{21}H_{21}O$ [M+H] 289.1592, found 289.1581.



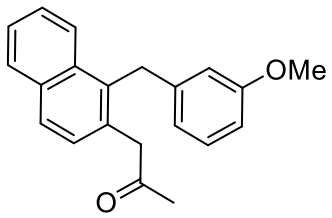
1-(1-(2-methoxybenzyl)naphthalen-2-yl)propan-2-one (3c)

White solid isolated from flash chromatography using: 94:6 hexanes:EtOAc as eluent (40 mg, 0.13 mmol, 57%).

^{1}H NMR (500 MHz, $CDCl_3$) δ 8.09 – 8.01 (m, 1H), 7.90 (dd, *J* = 8.4, 4.5 Hz, 1H), 7.54 – 7.43 (m, 2H), 7.31 (t, *J* = 6.3 Hz, 1H), 7.21 (td, *J* = 8.7, 8.1, 5.7 Hz, 2H), 6.96 – 6.89 (m, 1H), 6.85 (td, *J* = 6.5, 5.5, 1.9 Hz, 1H), 6.83 – 6.75 (m, 1H), 4.42 (d, *J* = 5.1 Hz, 2H), 4.10 (d, *J* = 5.3 Hz, 2H), 3.89 (d, *J* = 5.4 Hz, 3H), 2.12 (s, *J* = 5.4 Hz, 3H).

^{13}C NMR (126 MHz, $CDCl_3$) δ 207.48, 157.31, 136.81, 132.92, 132.63, 130.25, 129.87, 128.84, 128.23, 127.54, 126.92, 126.30, 126.04, 125.34, 124.60, 120.65, 110.29, 55.56, 49.58, 32.75, 29.17.

HRMS calcd for $C_{21}H_{20}O_2Na$ [M+Na] 327.1361, found 327.1363.



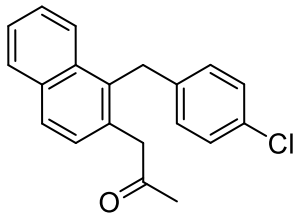
1-(1-(3-methoxybenzyl)naphthalen-2-yl)propan-2-one (3d)

White solid isolated from flash chromatography using: 94:6 hexanes:EtOAc as eluent (60 mg, 0.197 mmol, 90%).

^{1}H NMR (500 MHz, $CDCl_3$) δ 8.07 – 8.01 (m, 1H), 7.94 – 7.86 (m, 1H), 7.55 – 7.44 (m, 2H), 7.33 (d, *J* = 7.1 Hz, 1H), 7.27 – 7.23 (m, 1H), 7.22 – 7.15 (m, 1H), 6.80 (dt, *J* = 7.7, 1.1 Hz, 1H), 6.75 (dd, *J* = 6.8, 1.1 Hz, 2H), 4.42 (s, 2H), 4.10 (s, 2H), 3.75 (s, 3H), 2.13 (s, 3H).

^{13}C NMR (126 MHz, $CDCl_3$) δ 207.35, 159.90, 142.23, 136.66, 132.74, 130.24, 129.62, 128.16, 127.23, 126.40, 126.20, 125.20, 124.68, 121.42, 114.97, 111.37, 55.30, 49.55, 39.28, 29.18.

HRMS calcd for $C_{21}H_{20}O_2Na$ [M+Na] 327.1361, found 327.1360.



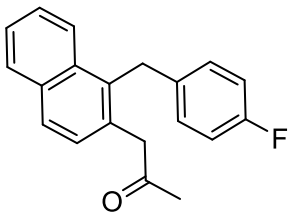
1-(1-(4-chlorobenzyl)naphthalen-2-yl)propan-2-one (3e)

White solid isolated from flash chromatography using: 94:6 hexanes:EtOAc as eluent (65 mg, 0.21 mmol, 92%).

^{1}H NMR (400 MHz, $CDCl_3$) δ 7.98 (dd, *J* = 8.1, 1.6 Hz, 1H), 7.91 (dd, *J* = 8.0, 1.6 Hz, 1H), 7.57 – 7.44 (m, 2H), 7.34 (d, *J* = 7.1 Hz, 1H), 7.30 – 7.21 (m, 3H), 7.18 – 7.08 (m, 2H), 4.41 (s, 2H), 4.12 (s, 2H), 2.15 (s, 3H).

^{13}C NMR (126 MHz, $CDCl_3$) δ 207.15, 139.06, 136.21, 132.78, 132.53, 132.07, 130.50, 130.23, 128.77, 128.14, 127.25, 126.48, 126.29, 125.05, 124.78, 49.45, 38.63, 29.23.

HRMS calcd for $C_{20}H_{17}ClOLi$ [M+Li] 315.1128, found 315.1031.



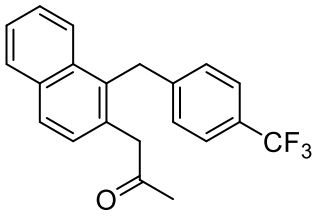
1-(1-(4-fluorobenzyl)naphthalen-2-yl)propan-2-one (3f)

White solid isolated from flash chromatography using: 94:6 hexanes:EtOAc as eluent (64 mg, 0.22 mmol, 93%).

^{1}H NMR (400 MHz, $CDCl_3$) δ 8.00 (d, *J* = 1.6 Hz, 1H), 7.92 (dd, *J* = 8.0, 1.5 Hz, 1H), 7.51 (ddd, *J* = 9.5, 7.9, 1.4 Hz, 2H), 7.34 (d, *J* = 7.1 Hz, 1H), 7.24 (d, *J* = 7.2 Hz, 1H), 7.16 (dd, *J* = 8.4, 5.6 Hz, 2H), 6.97 (t, *J* = 8.7 Hz, 2H), 4.42 (s, 2H), 4.12 (s, 2H), 2.15 (s, 3H).

^{13}C NMR (126 MHz, $CDCl_3$) δ 207.14, 161.54 (d, *J* = 244.2 Hz), 136.59, 136.16 (d, *J* = 3.3 Hz), 132.76, 132.54, 130.38, 130.26 (d, *J* = 7.8 Hz), 128.13, 127.14, 126.43, 126.23, 125.06, 124.75, 115.42 (d, *J* = 21.4 Hz), 49.43, 38.42, 29.20.

HRMS calcd for $C_{20}H_{17}FONa$ [M+Na] 315.1161, found 315.1160.



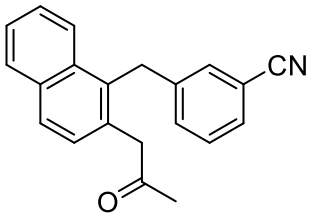
1-(1-(4-(trifluoromethyl)benzyl)naphthalen-2-yl)propan-2-one (3g)

White solid isolated from flash chromatography using: 95:5 hexanes:EtOAc as eluent (11 mg, 0.03 mmol, 16%).

^{1}H NMR (400 MHz, $CDCl_3$) δ 7.93 (ddd, *J* = 17.5, 7.8, 1.4 Hz, 2H), 7.56 – 7.44 (m, 4H), 7.35 (d, *J* = 7.2 Hz, 1H), 7.32 – 7.28 (m, 2H), 7.25 (s, 1H), 4.50 (s, 2H), 4.12 (s, 2H), 2.15 (s, 3H).

^{13}C NMR (126 MHz, $CDCl_3$) δ 207.05, 144.76, 135.67, 132.84, 132.51, 130.74, 129.16, 128.84, 128.46, 128.16, 127.44, 126.57, 126.42, 125.62 (q, *J* = 3.7 Hz), 124.99, 124.86, 49.46, 39.12, 29.27.

HRMS calcd for $C_{21}H_{17}F_3OLi$ [M+Li] 349.1392, found 349.1394.



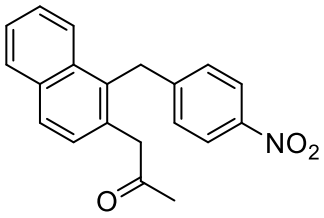
3-((2-(2-oxopropyl)naphthalen-1-yl)methyl)benzonitrile (3h)

Yellow solid isolated from flash chromatography using: 95:5 hexanes:EtOAc as eluent (51 mg, 0.17 mmol, 73%).

^{1}H NMR (400 MHz, $CDCl_3$) δ 7.92 (ddd, *J* = 8.7, 7.6, 1.5 Hz, 2H), 7.56 – 7.49 (m, 2H), 7.49 – 7.46 (m, 2H), 7.43 (d, *J* = 1.6 Hz, 1H), 7.37 (dd, *J* = 7.4, 5.2 Hz, 2H), 7.29 – 7.23 (m, 1H), 4.46 (s, 2H), 4.13 (s, 2H), 2.16 (s, 3H).

^{13}C NMR (126 MHz, $CDCl_3$) δ 206.92, 142.16, 135.01, 133.32, 132.87, 132.32, 132.27, 130.98, 130.17, 129.44, 128.11, 127.51, 126.61, 126.49, 124.93, 124.78, 119.08, 112.68, 49.37, 38.79, 29.29.

HRMS calcd for $C_{21}H_{17}NO$ [M+] 299.1310, found 299.1314.



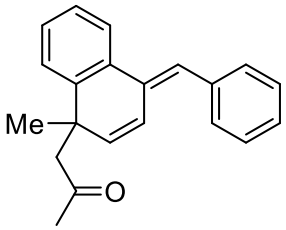
1-(1-(4-nitrobenzyl)naphthalen-2-yl)propan-2-one (3i)

White solid isolated from flash chromatography using: 95:5 hexanes:EtOAc as eluent (52 mg, 0.16 mmol, 74%).

^{1}H NMR (500 MHz, CDCl3) δ 8.15 – 8.09 (m, 2H), 7.94 – 7.86 (m, 2H), 7.53 (ddd, *J* = 8.3, 6.8, 1.4 Hz, 1H), 7.47 (ddd, *J* = 8.2, 6.8, 1.4 Hz, 1H), 7.38 – 7.31 (m, 3H), 7.28 (d, *J* = 7.1 Hz, 1H), 4.53 (s, 2H), 4.14 (s, 2H), 2.17 (s, 3H).

^{13}C NMR (126 MHz, $CDCl_3$) δ 206.88, 148.51, 146.70, 134.88, 132.89, 132.36, 131.08, 129.58, 128.14, 127.60, 126.66, 126.54, 124.96, 124.82, 123.95, 49.35, 39.21, 29.33.

HRMS calcd for $C_{20}H_{21}N_2O_3$ [M+NH4] 337.1552, found 337.1556.



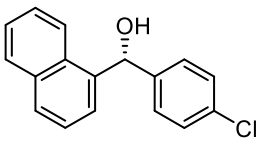
(*E*)-1-(4-benzylidene-1-methyl-1,4-dihydronaphthalen-1-yl)propan-2-one (3j)

Yellow oil isolated from flash chromatography using: 94:6 hexanes:EtOAc as eluent (57 mg, 0.197 mmol, 74%).

^{1}H NMR (400 MHz, $CDCl_3$) δ 7.89 (dd, *J* = 7.7, 1.7 Hz, 1H), 7.45 (dd, *J* = 7.7, 1.7 Hz, 1H), 7.42 – 7.37 (m, 4H), 7.37 – 7.33 (m, 1H), 7.33 – 7.29 (m, 1H), 7.28 (dd, *J* = 3.2, 1.8 Hz, 1H), 7.21 (d, *J* = 1.5 Hz, 1H), 6.92 (dd, *J* = 10.2, 0.9 Hz, 1H), 5.96 (dd, *J* = 10.3, 1.7 Hz, 1H), 3.02 (d, *J* = 14.3 Hz, 1H), 2.72 (d, *J* = 14.4 Hz, 1H), 1.81 (s, 3H), 1.52 (s, 3H).

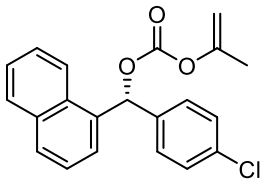
^{13}C NMR (126 MHz, $CDCl_3$) δ 207.48, 141.46, 137.60, 136.90, 132.85, 130.61, 129.66, 128.43, 128.04, 127.07, 126.86, 126.53, 123.94, 123.22, 123.11, 57.55, 39.67, 31.34, 30.79.

HRMS calcd for $C_{21}H_{24}ON$ [M+NH4] 306.1858, found 306.1848.



(*R*)-(4-chlorophenyl)(naphthalen-1-yl)methanol (*R*-1e′)

HPLC analysis: 75%ee (Chiralcel OD-H, 85:15 Hexanes/isopropanol, 0.55 mL/min, 254 nm, major R_t = 44.0 min, minor R_t = 20.1 min).



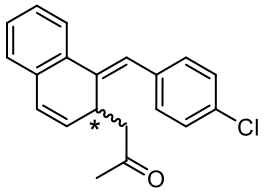
(*R*)-(4-chlorophenyl)(naphthalen-1-yl)methyl prop-1-en-2-yl carbonate (*R*-1e)

Colorless oil isolated from flash chromatography using: 98:2 hexanes:EtOAc as eluent.

^{1}H NMR (400 MHz, $CDCl_3$) δ 7.98 – 7.92 (m, 1H), 7.92 – 7.85 (m, 2H), 7.67 (d, *J* = 7.2 Hz, 1H), 7.57 – 7.44 (m, 3H), 7.42 (s, 1H), 7.36 (d, *J* = 8.4 Hz, 2H), 7.32 (d, *J* = 8.4 Hz, 2H), 4.83 (s, 1H), 4.71 (d, *J* = 1.9 Hz, 1H), 1.96 (s, 3H).

^{13}C NMR (126 MHz, $CDCl_3$) δ 153.14, 152.51, 137.63, 134.45, 134.16, 134.12, 130.45, 129.59, 129.11, 129.01, 126.82, 126.10, 125.57, 125.40, 123.74, 102.20, 78.30, 19.39.

HPLC analysis: 74%ee (Chiralpak AD-H, 98:2 Hexanes/isopropanol, 0.5 mL/min, 254 nm, major R_t = 25.8 min, minor R_t = 40.7 min).



(*E*)-1-(1-(4-chlorobenzylidene)-1,2-dihydronaphthalen-2-yl)propan-2-one (2e)

Yellow oil isolated from flash chromatography using: 94:6 hexanes:EtOAc as eluent.

^{1}H NMR (400 MHz, $CDCl_3$) δ 7.89 – 7.78 (m, 1H), 7.35 (s, 4H), 7.31 (d, *J* = 8.1 Hz, 2H), 7.27 (s, 1H), 7.10 (s, 1H), 6.86 (d, *J* = 10.2 Hz, 1H), 6.23 (dd, *J* = 10.2, 5.0 Hz, 1H), 4.16 (dt, *J* = 9.5, 5.0 Hz, 1H), 2.88 (dd, *J* = 17.2, 5.0 Hz, 1H), 2.74 (dd, *J* = 17.1, 8.8 Hz, 1H), 2.14 (s, 3H).

^{13}C NMR (126 MHz, $CDCl_3$) δ 207.12, 138.34, 136.03, 133.53, 132.75, 132.60, 131.51, 130.83, 128.60, 128.34, 127.94, 126.88, 124.61, 123.11, 122.14, 53.02, 36.64, 30.77.

HRMS calcd for $C_{20}H_{17}ClONa$ [M+Na] 331.0866, found 331.0873.

HPLC analysis: 63%ee (Chiralpak AD-H, 98:2 Hexanes/isopropanol, 0.5 mL/min, 254 nm, major R_t = 32.9 min, minor R_t = 28.4 min).

References

1. Trost, B. M.; Xu, J.; Schmidt, T. *J. Am. Chem. Soc.* **2009,** *131*, 18343-18357.
2. Peng, B.; Zhang, S.; Yu, X.; Feng, X.; Bao. *Org. Lett.* **2011,** *13*, 5402-5405.

NMR spectra and HPLC Chromatograms follow:

Decarboxylative Dearomatization and Mono-α-Arylation of Ketones

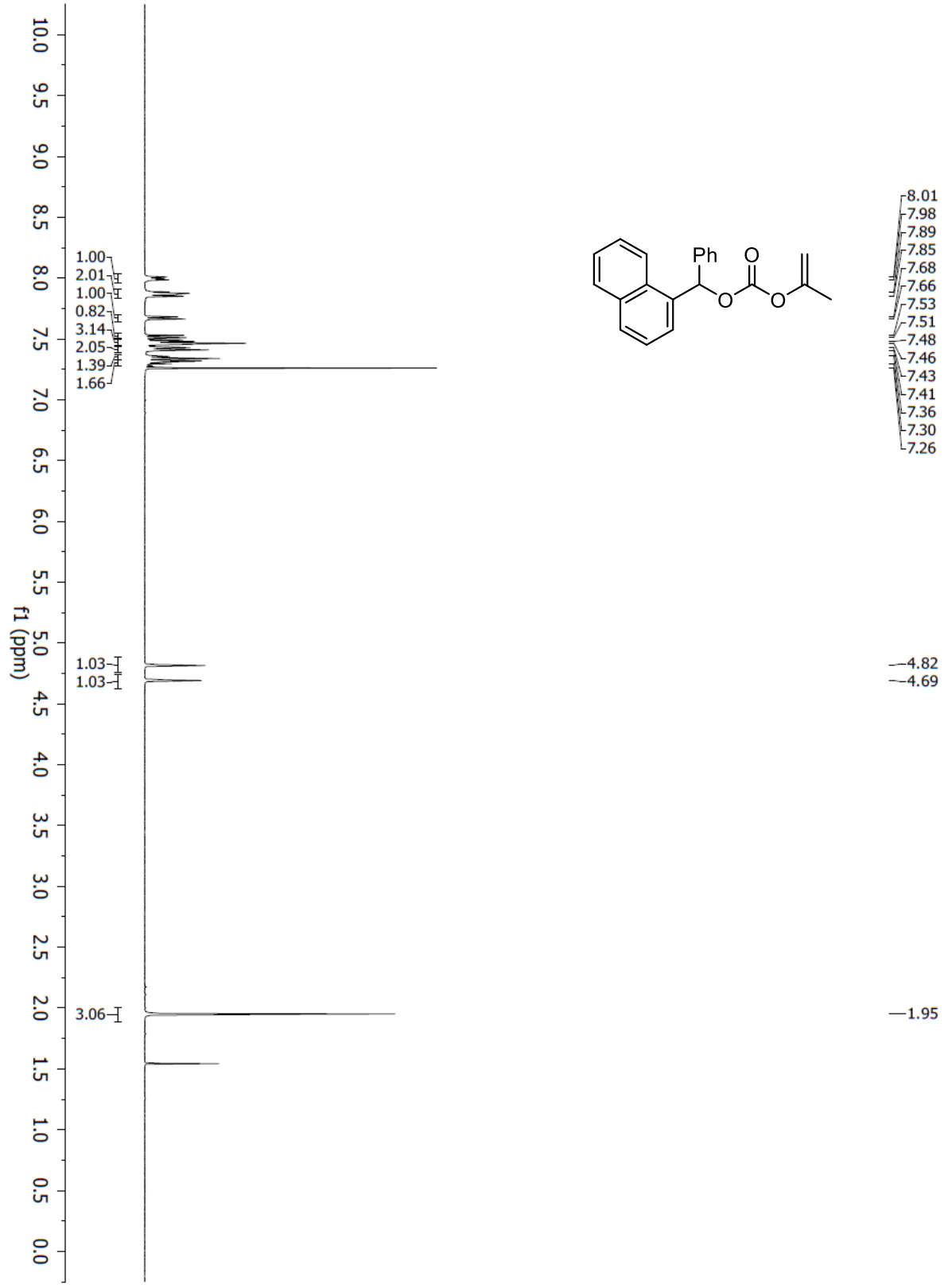
Shehani N. Mendis and Jon A. Tunge*

Department of Chemistry, University of Kansas, 2010 Malott Hall, 1251 Wescoe Hall Drive, Lawrence, KS 66045

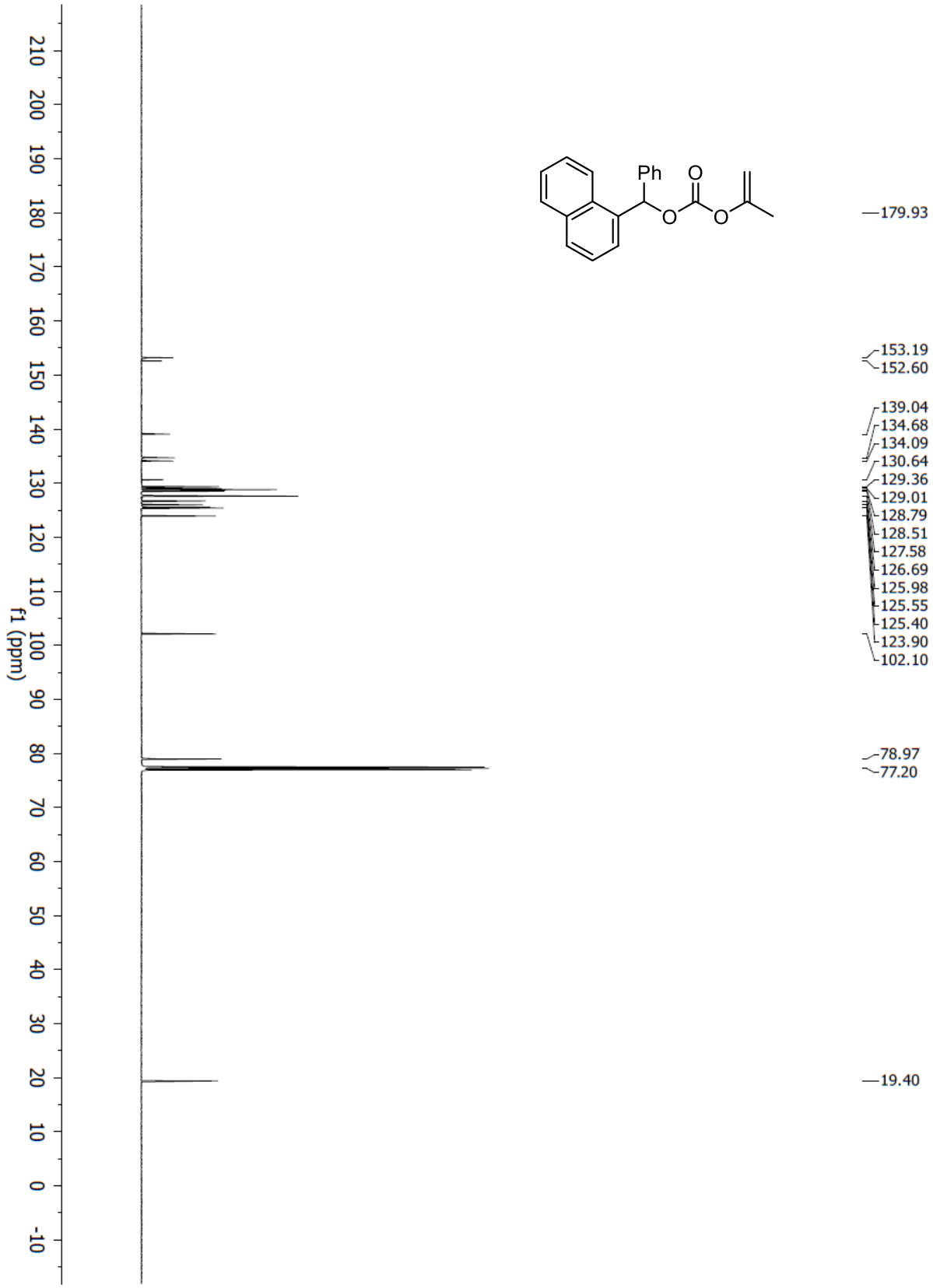
Supporting Information

This document contains ^{1}H and ^{13}C NMR spectra for all compounds.

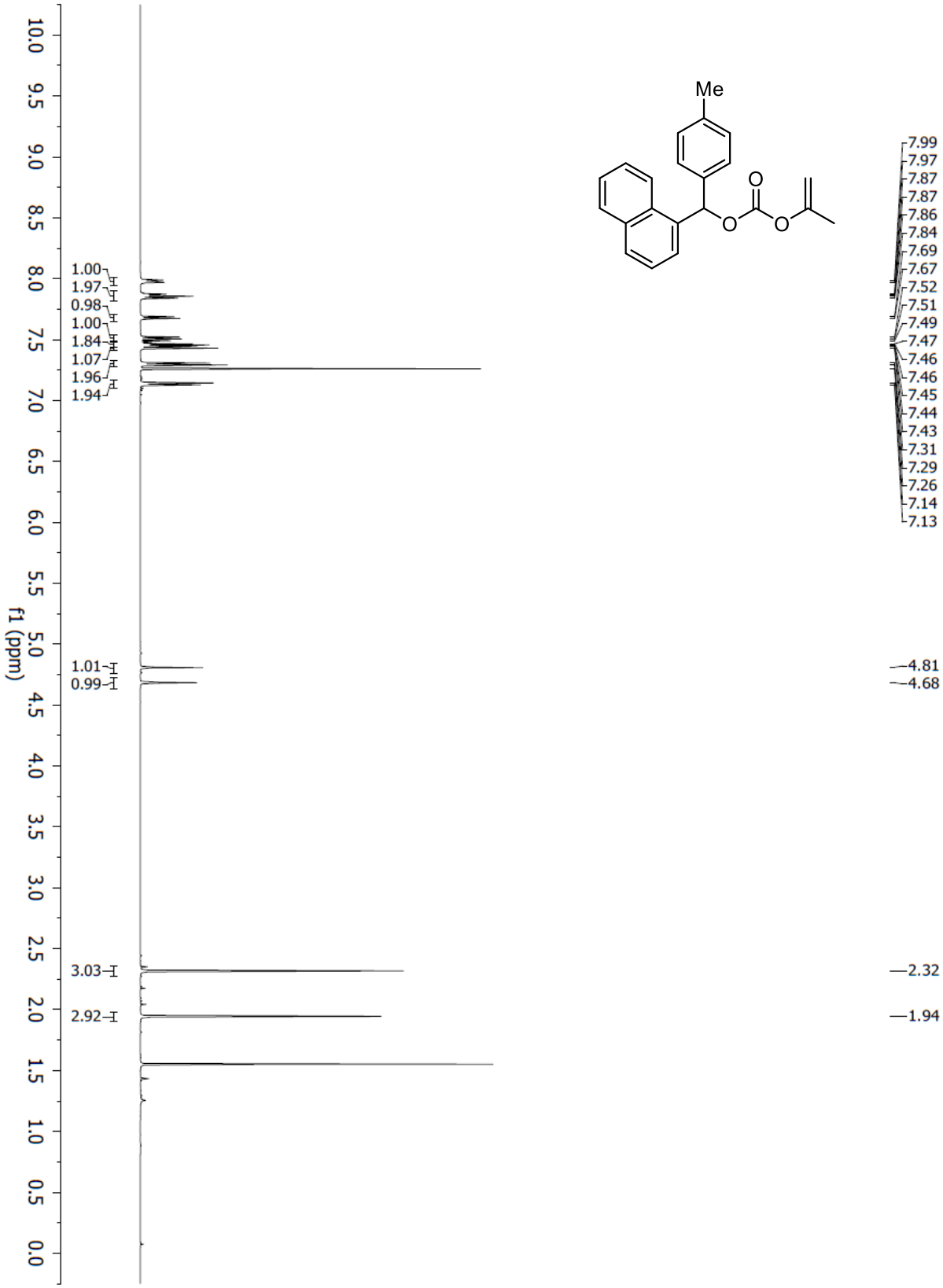
naphthalen-1-yl(phenyl)methyl prop-1-en-2-yl carbonate (1a)



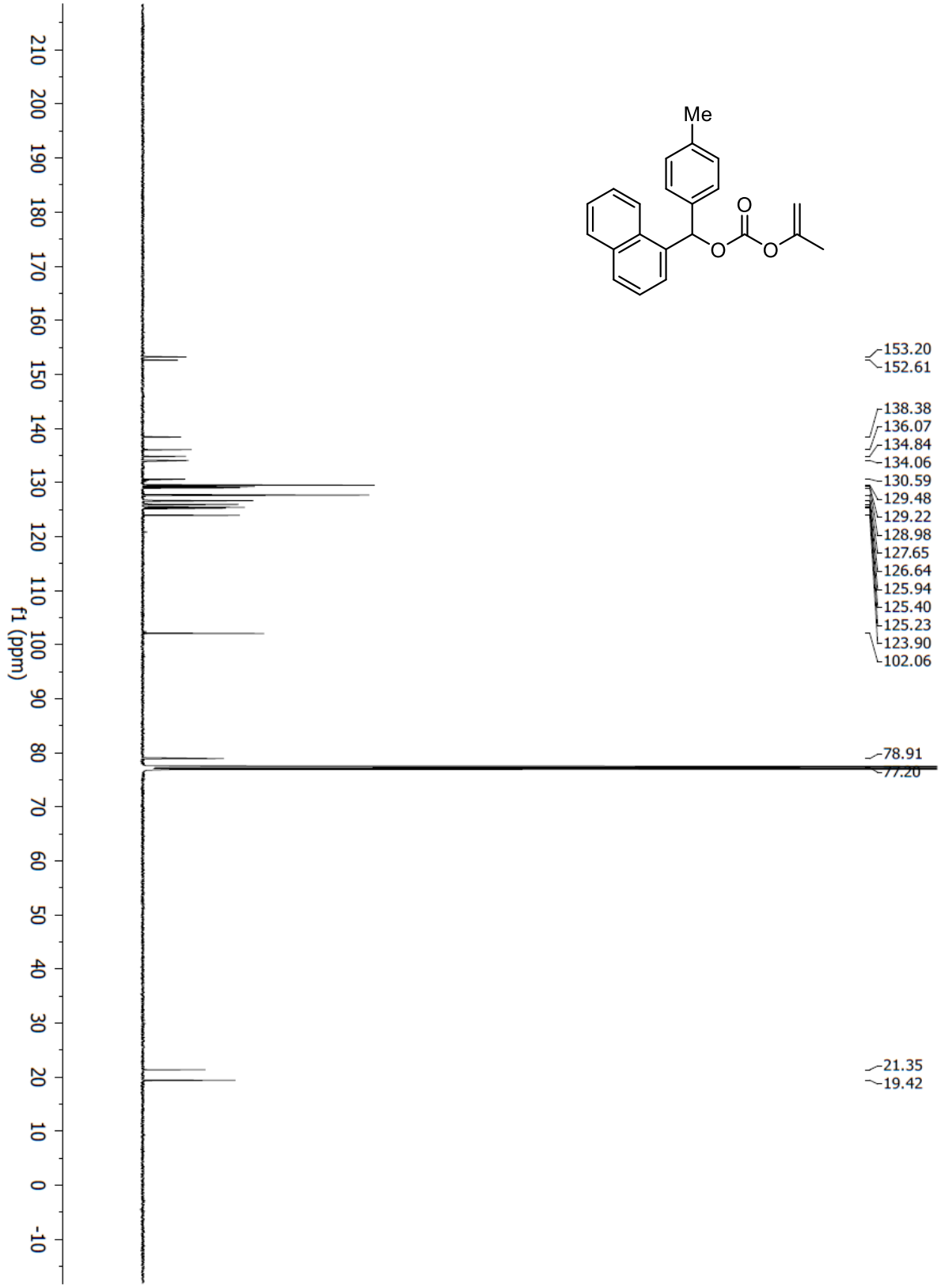
naphthalen-1-yl(phenyl)methyl prop-1-en-2-yl carbonate (1a)



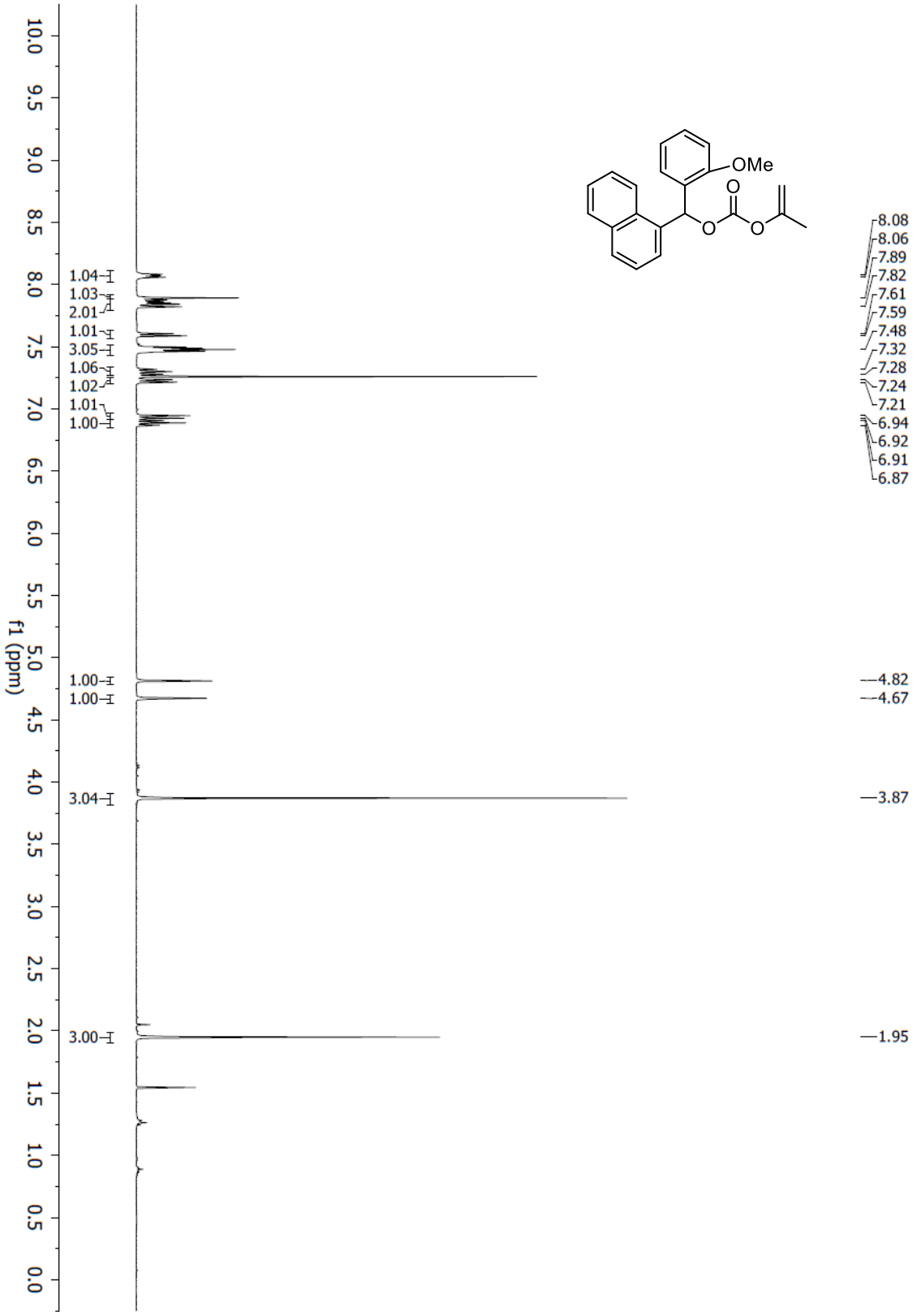
naphthalen-1-yl(p-tolyl)methyl prop-1-en-2-yl carbonate (1b)



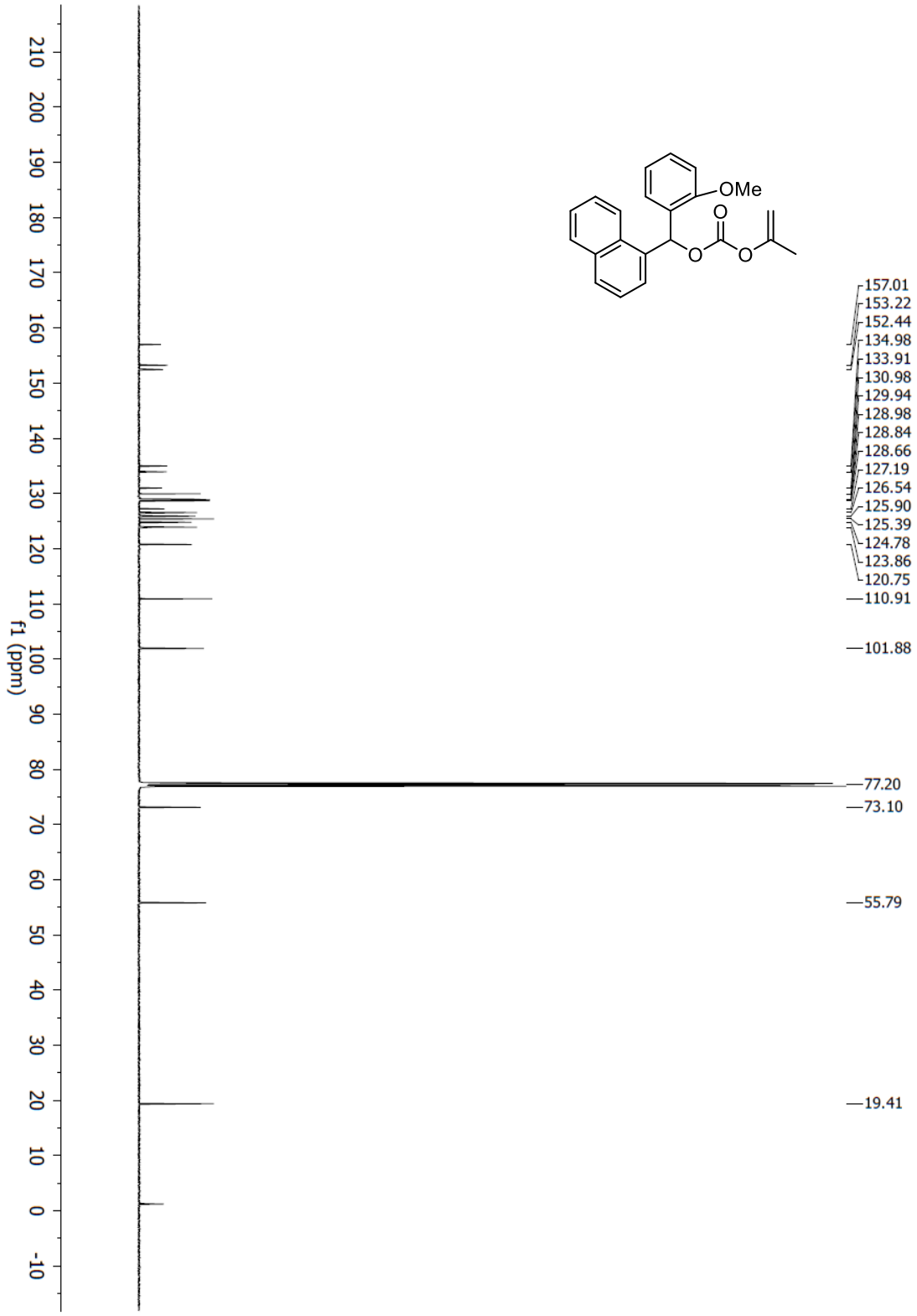
naphthalen-1-yl(p-tolyl)methyl prop-1-en-2-yl carbonate (1b)



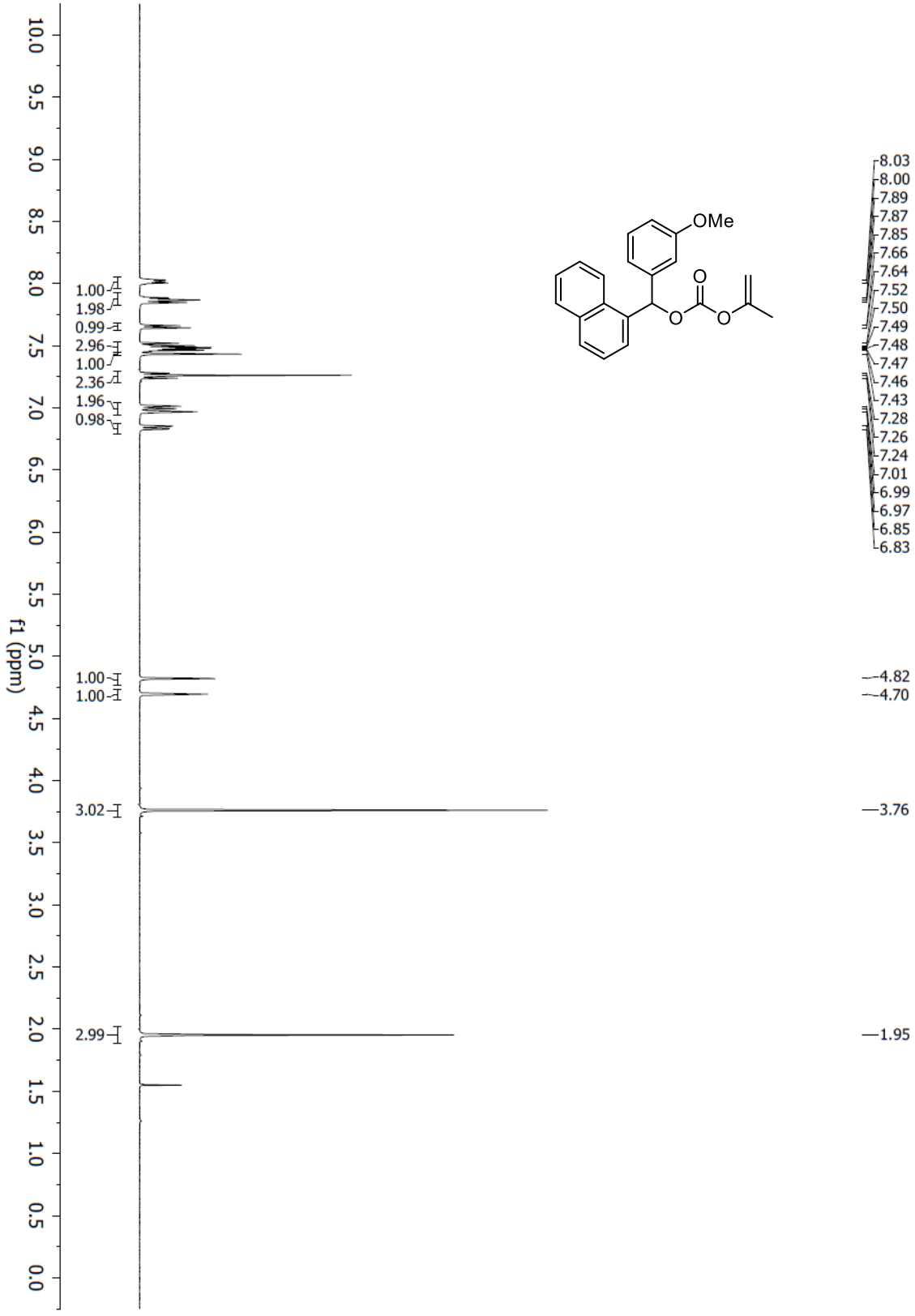
(2-methoxyphenyl)(naphthalen-1-yl)methyl prop-1-en-2-yl carbonate (1c)



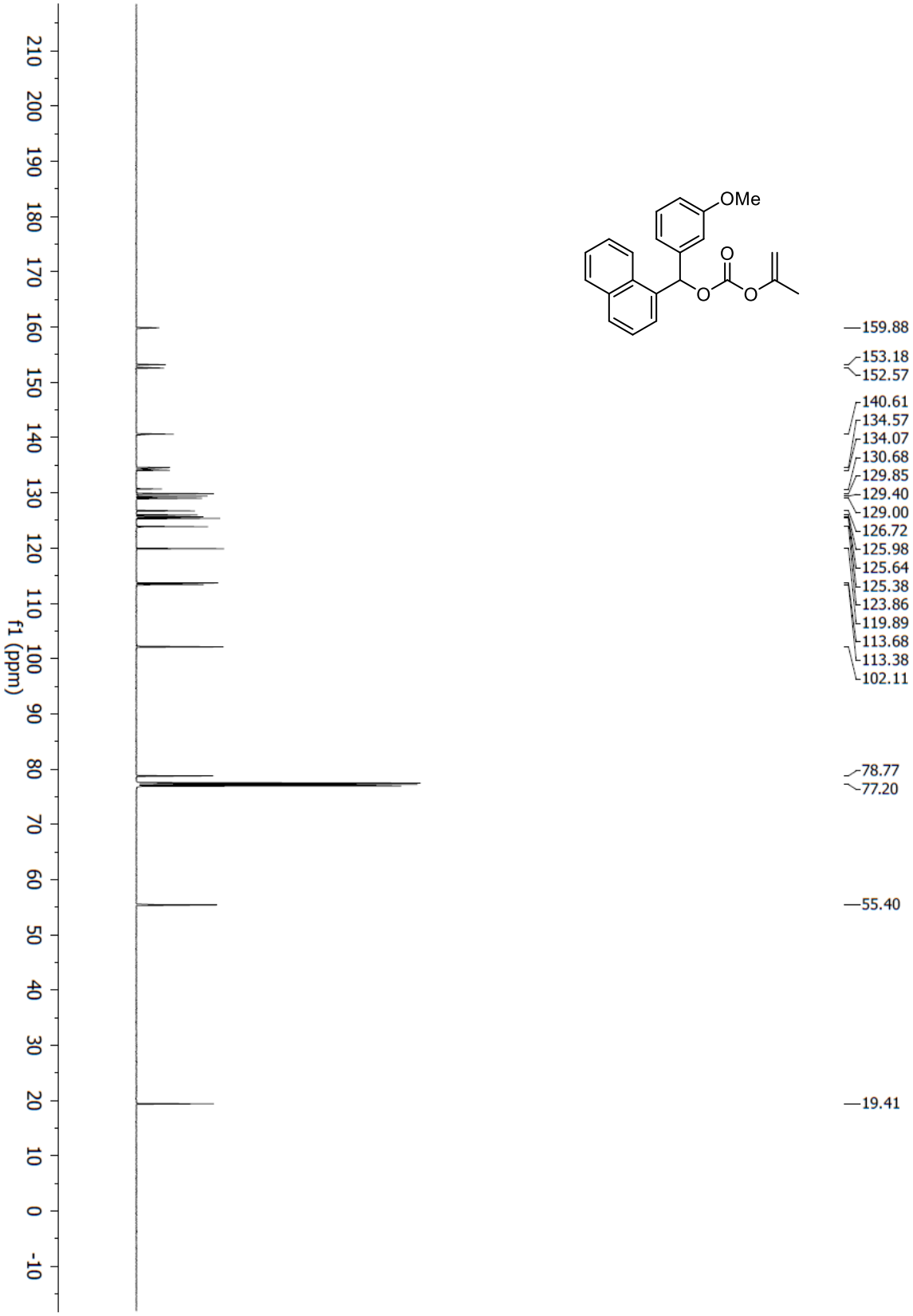
(2-methoxyphenyl)(naphthalen-1-yl)methyl prop-1-en-2-yl carbonate (1c)



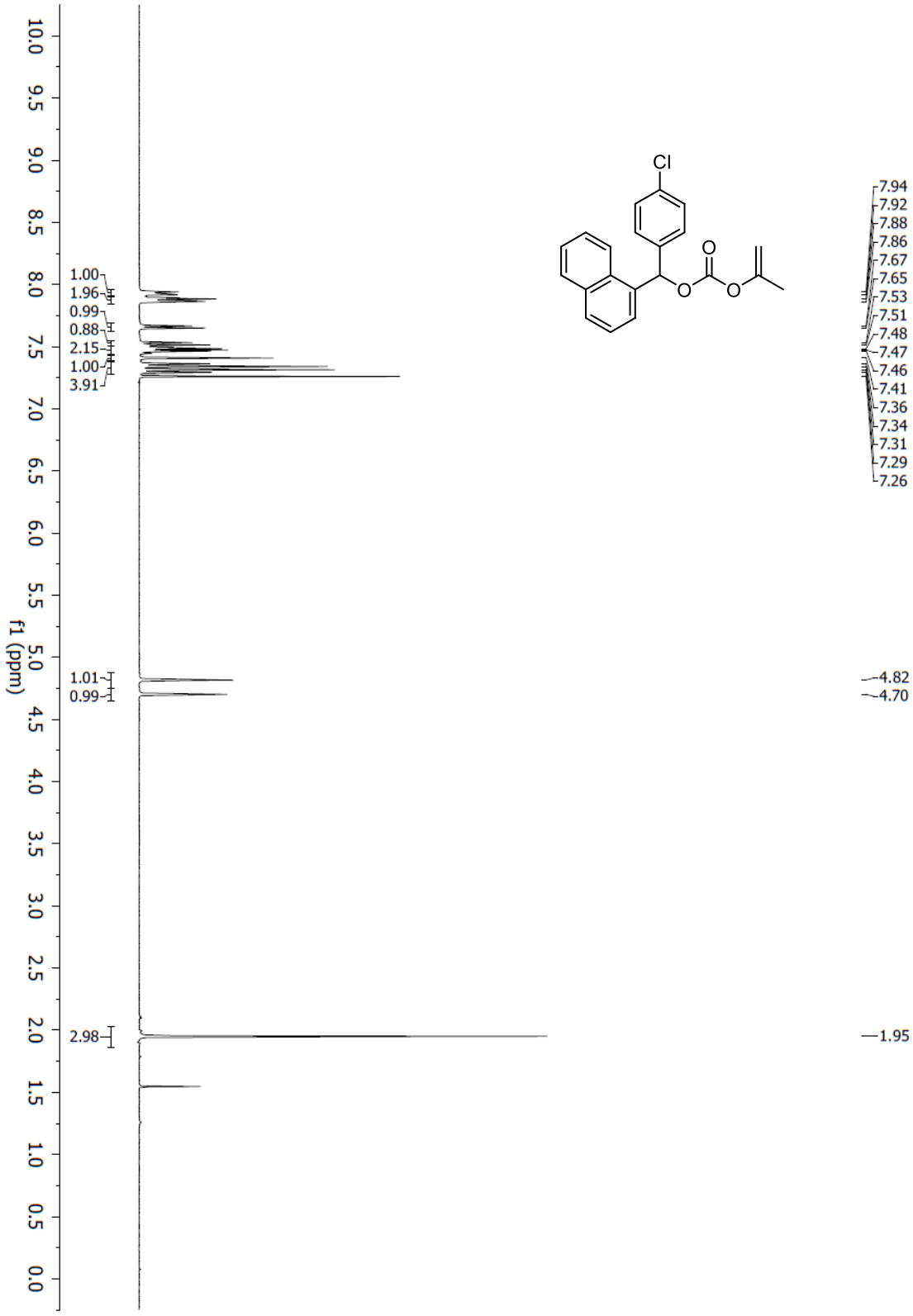
(3-methoxyphenyl)(naphthalen-1-yl)methyl prop-1-en-2-yl carbonate (1d)



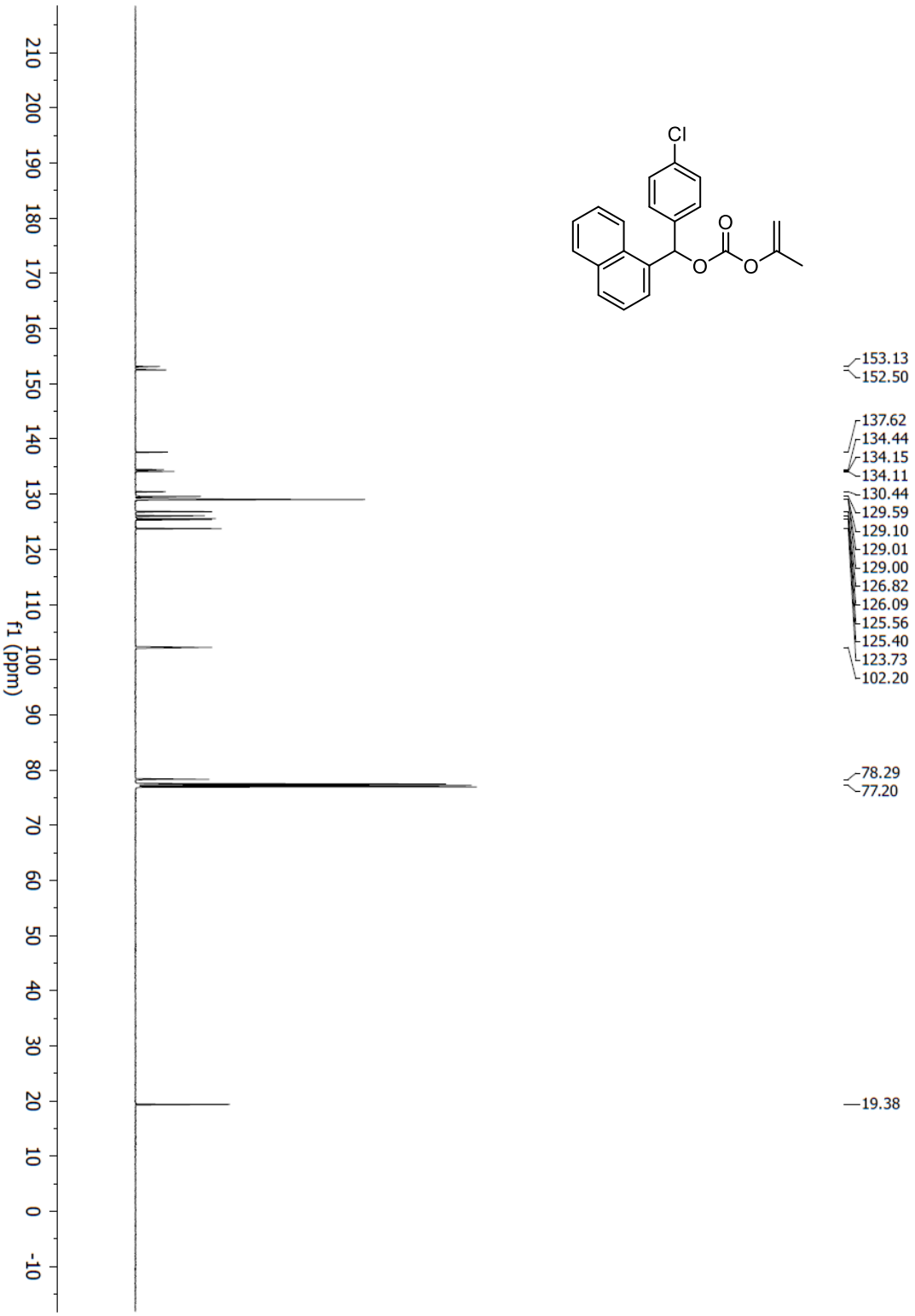
(3-methoxyphenyl)(naphthalen-1-yl)methyl prop-1-en-2-yl carbonate (1d)



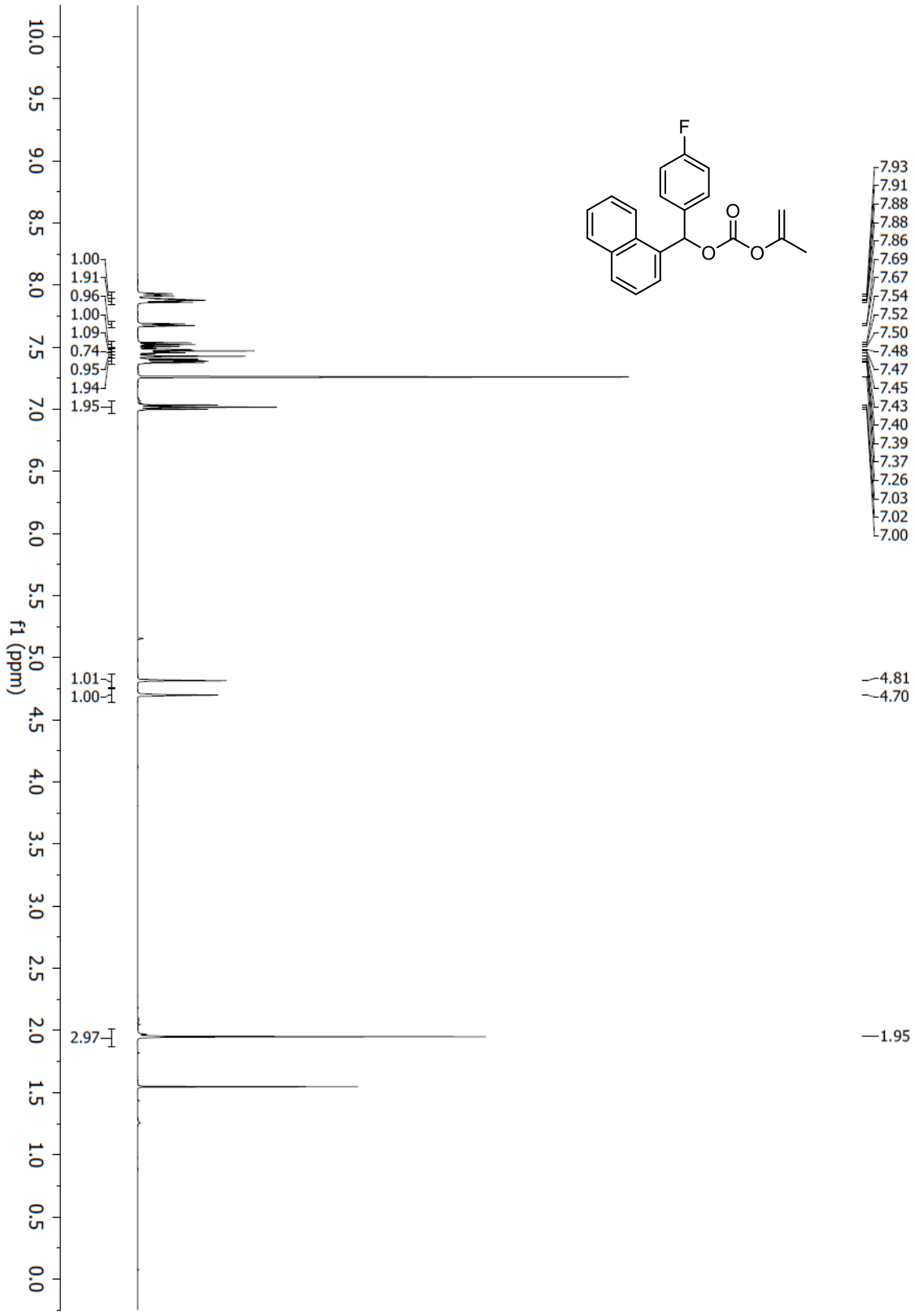
(4-chlorophenyl)(naphthalen-1-yl)methyl prop-1-en-2-yl carbonate (1e)



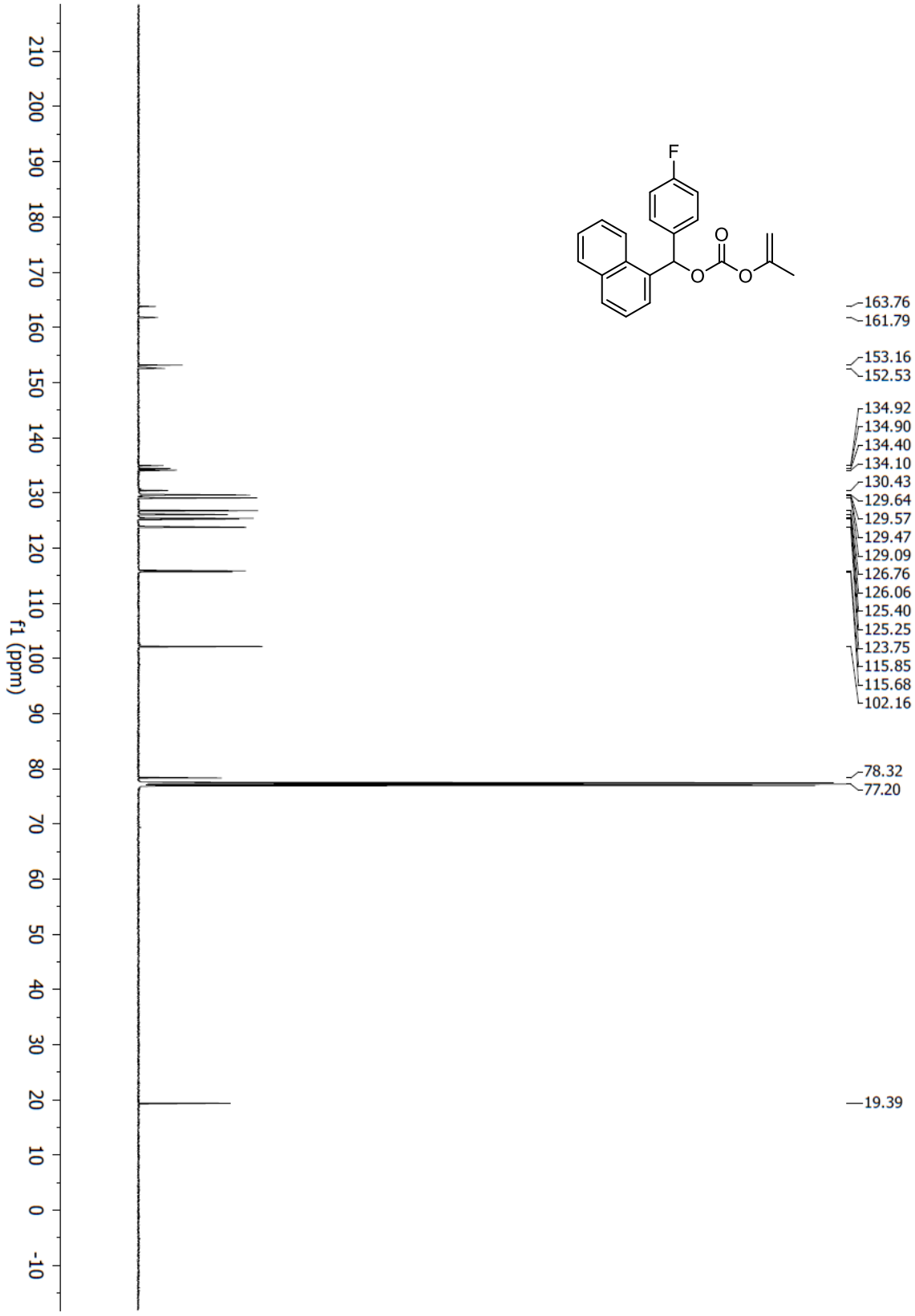
(4-chlorophenyl)(naphthalen-1-yl)methyl prop-1-en-2-yl carbonate (1e)



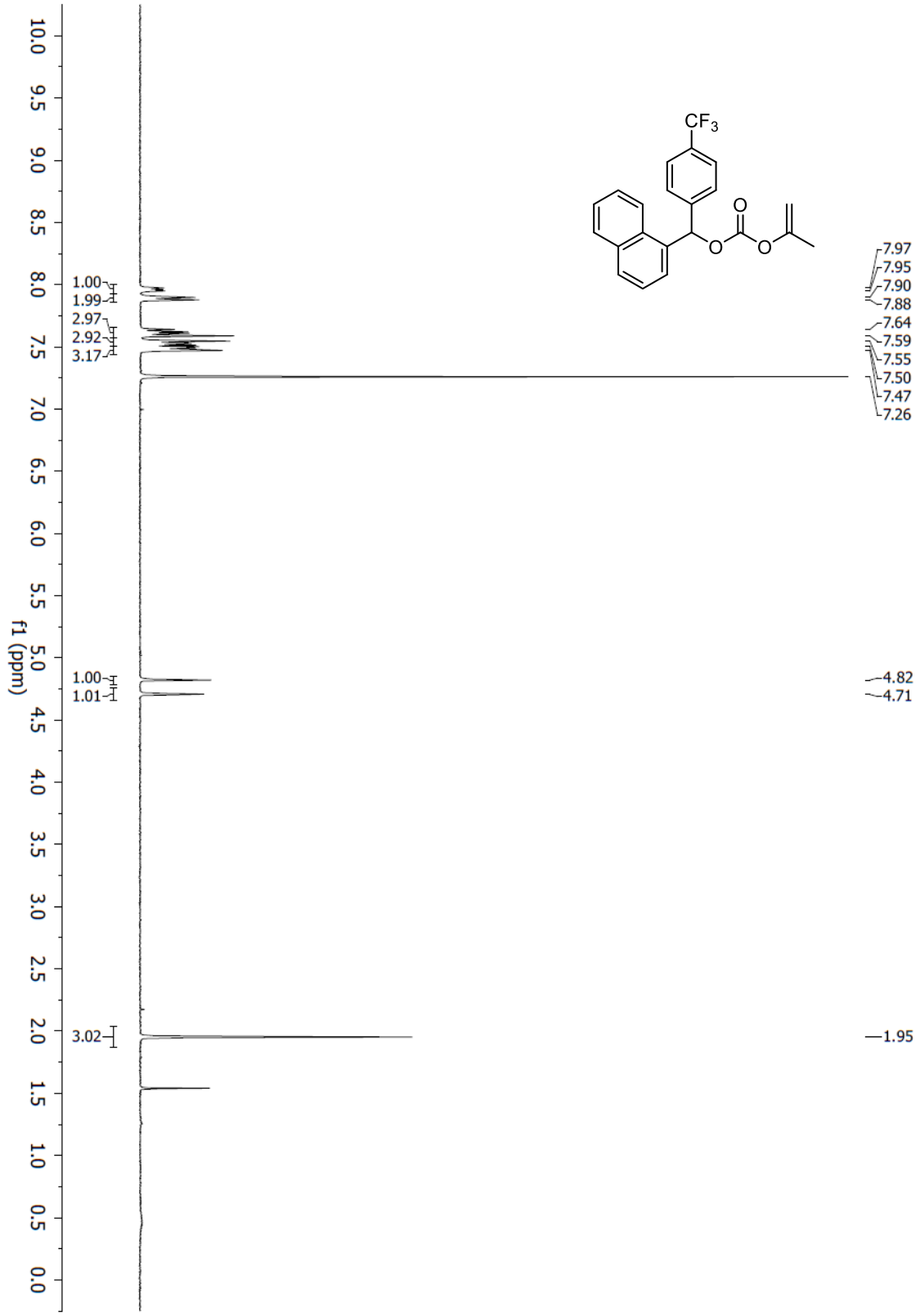
(4-fluorophenyl)(naphthalen-1-yl)methyl prop-1-en-2-yl carbonate (1f)



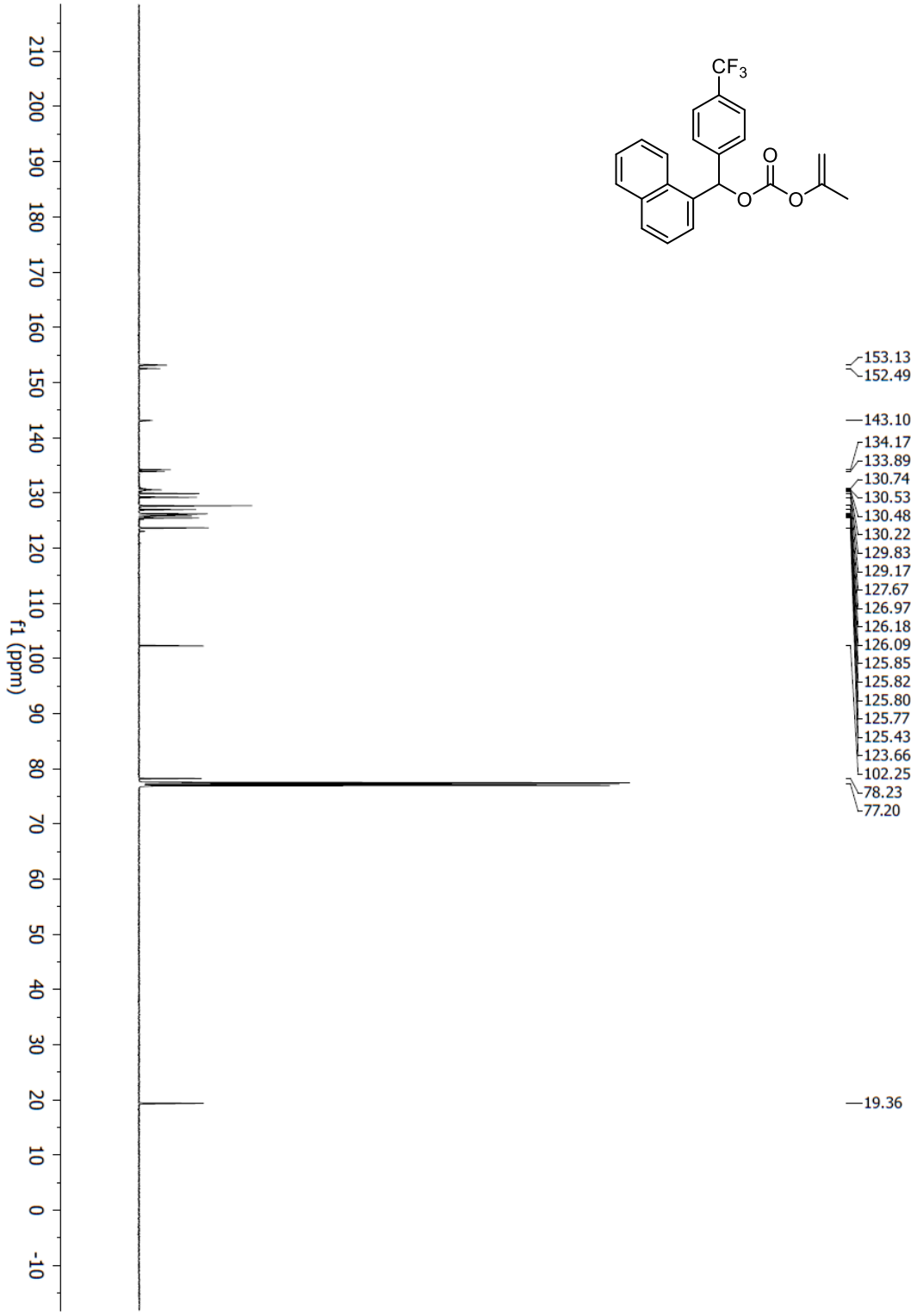
(4-fluorophenyl)(naphthalen-1-yl)methyl prop-1-en-2-yl carbonate (1f)



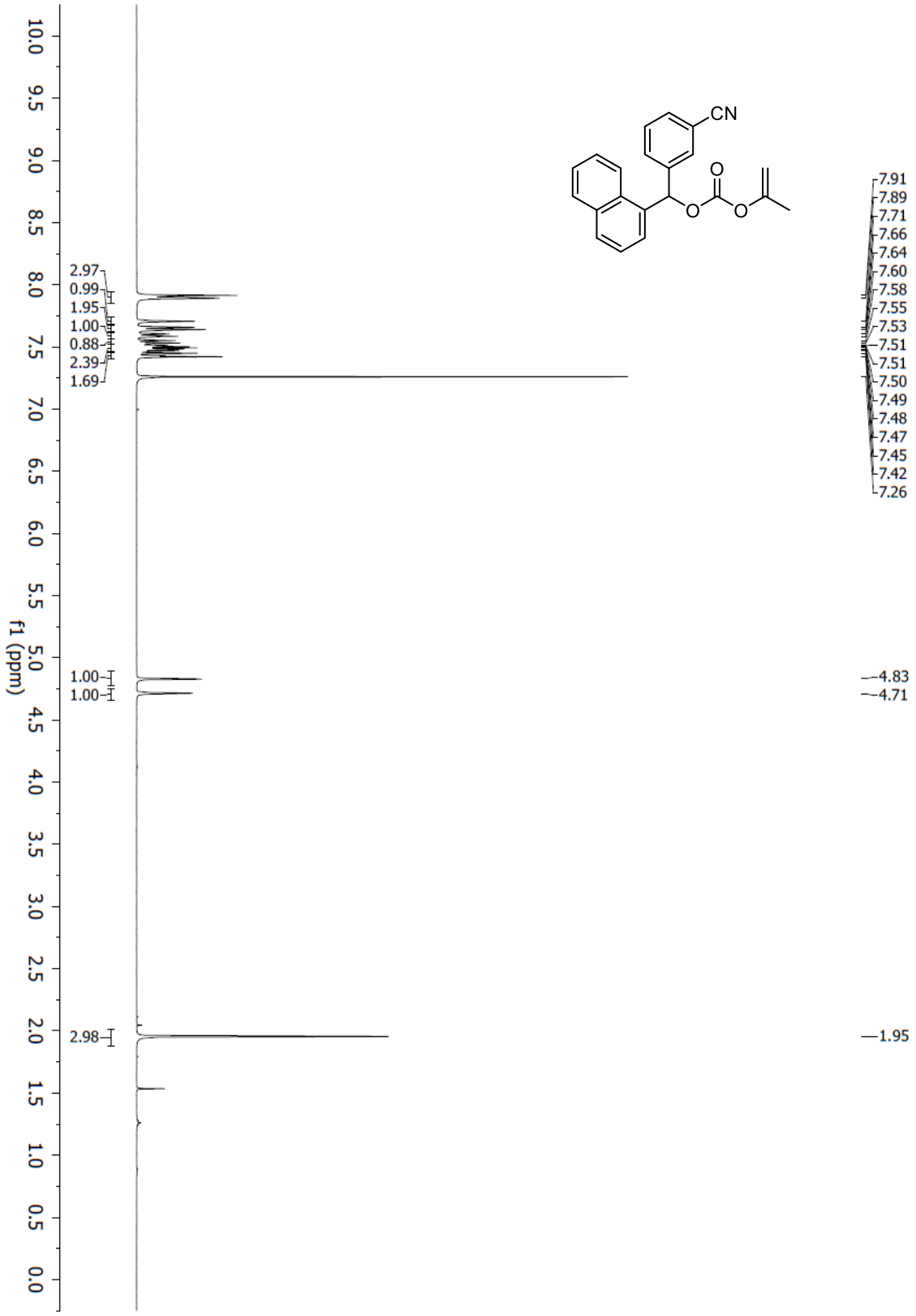
naphthalen-1-yl(4-(trifluoromethyl)phenyl)methyl prop-1-en-2-yl carbonate (1g)



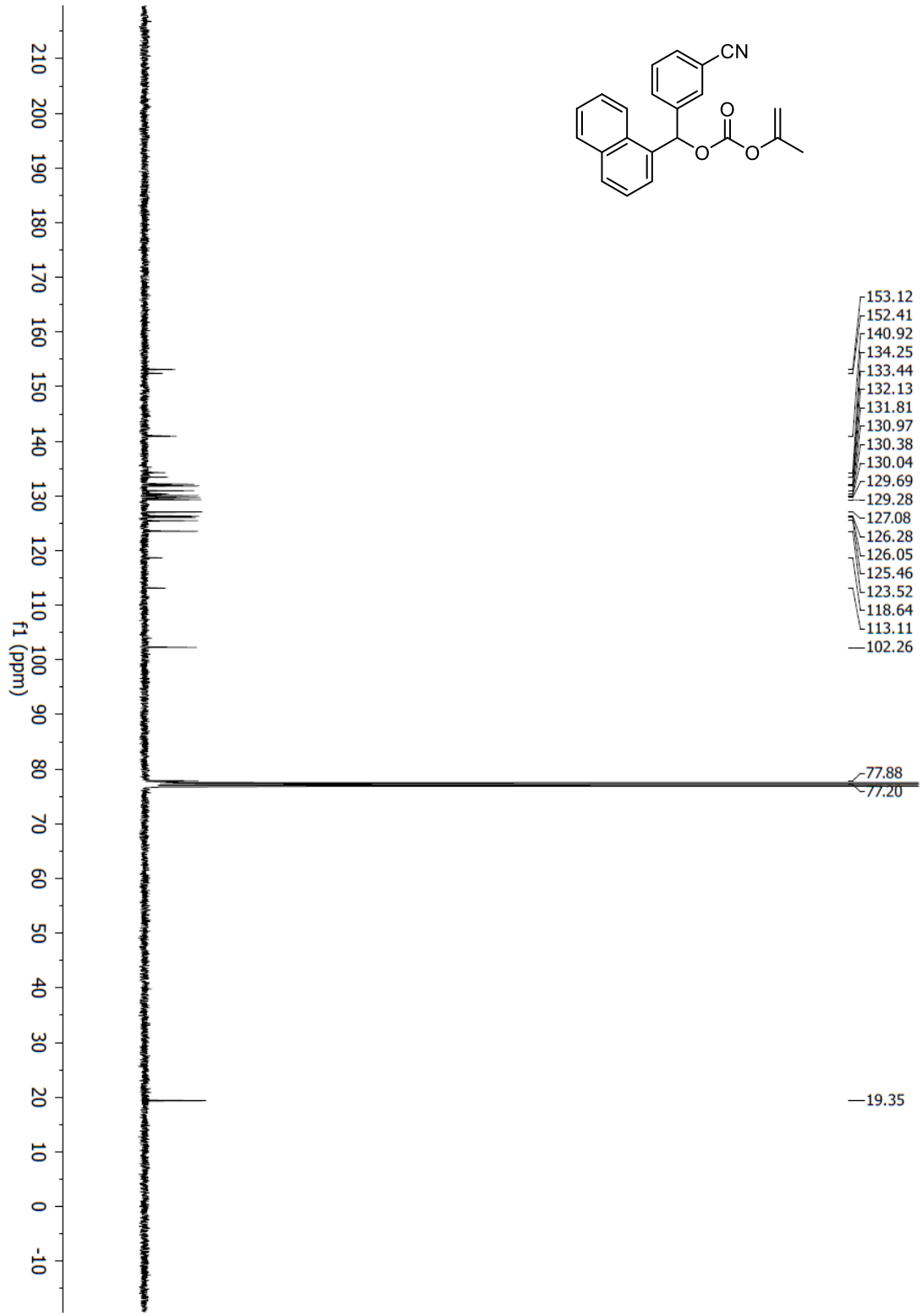
naphthalen-1-yl(4-(trifluoromethyl)phenyl)methyl prop-1-en-2-yl carbonate (1g)



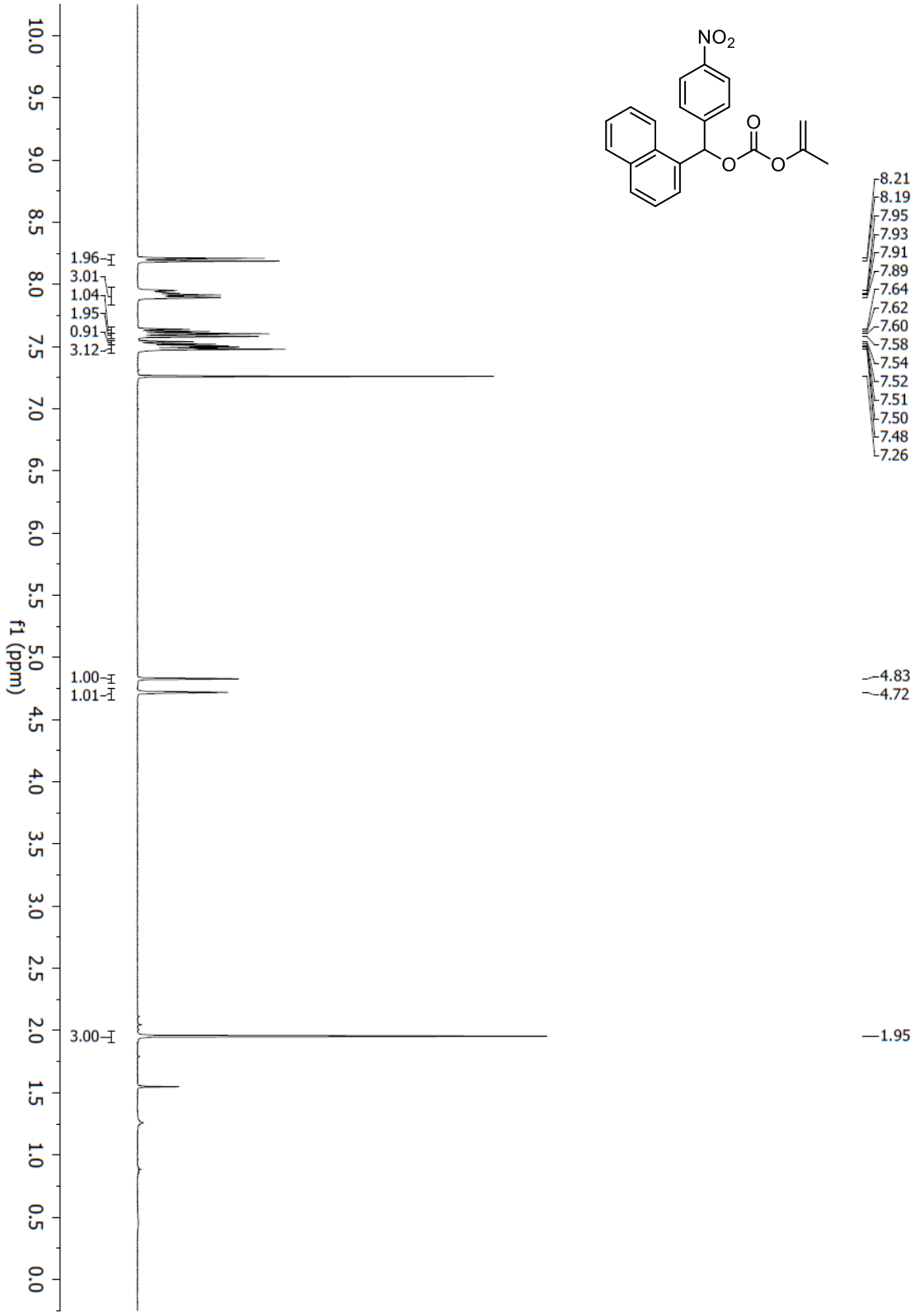
(3-cyanophenyl)(naphthalen-1-yl)methyl prop-1-en-2-yl carbonate (1h)



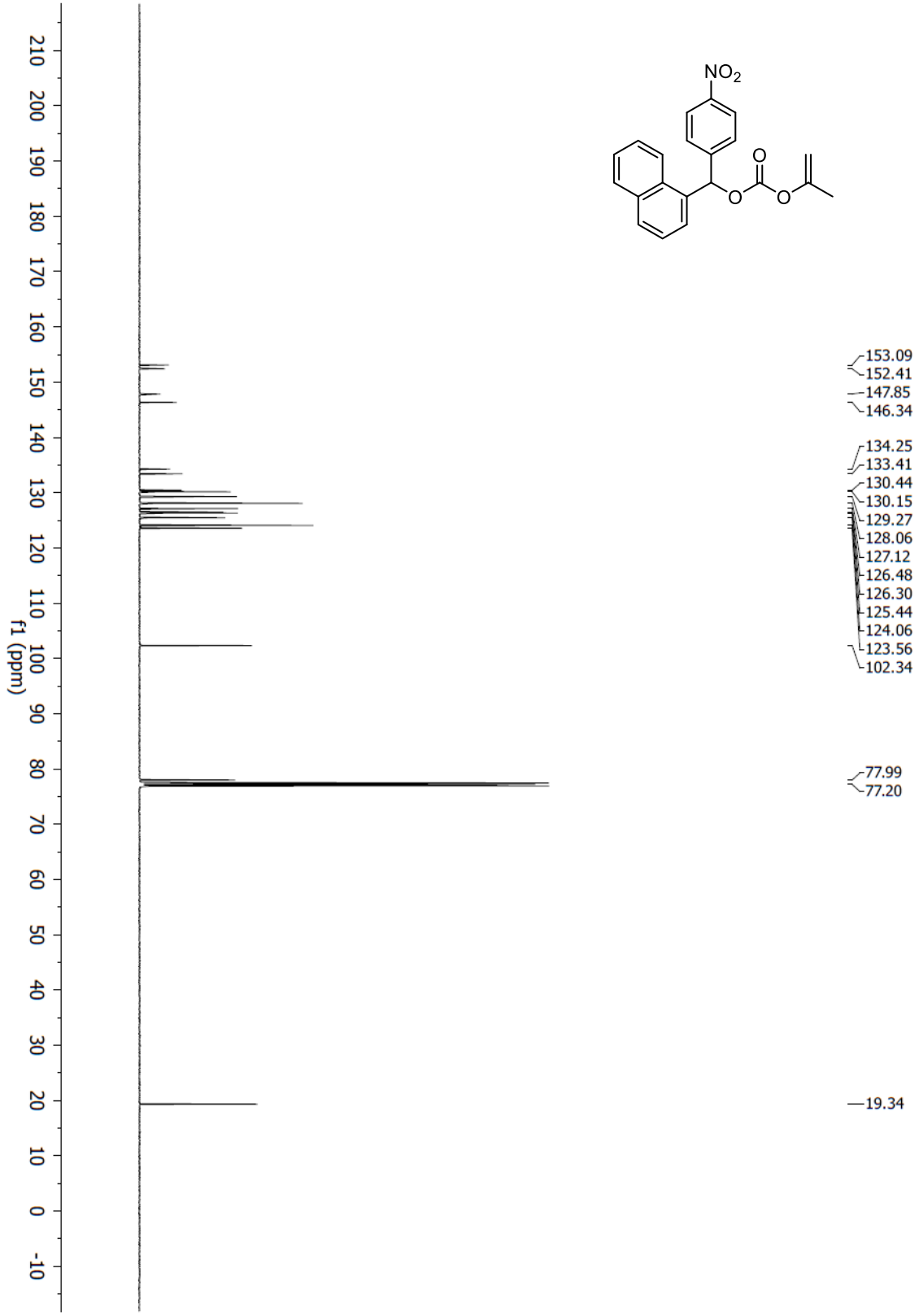
(3-cyanophenyl)(naphthalen-1-yl)methyl prop-1-en-2-yl carbonate (1h)



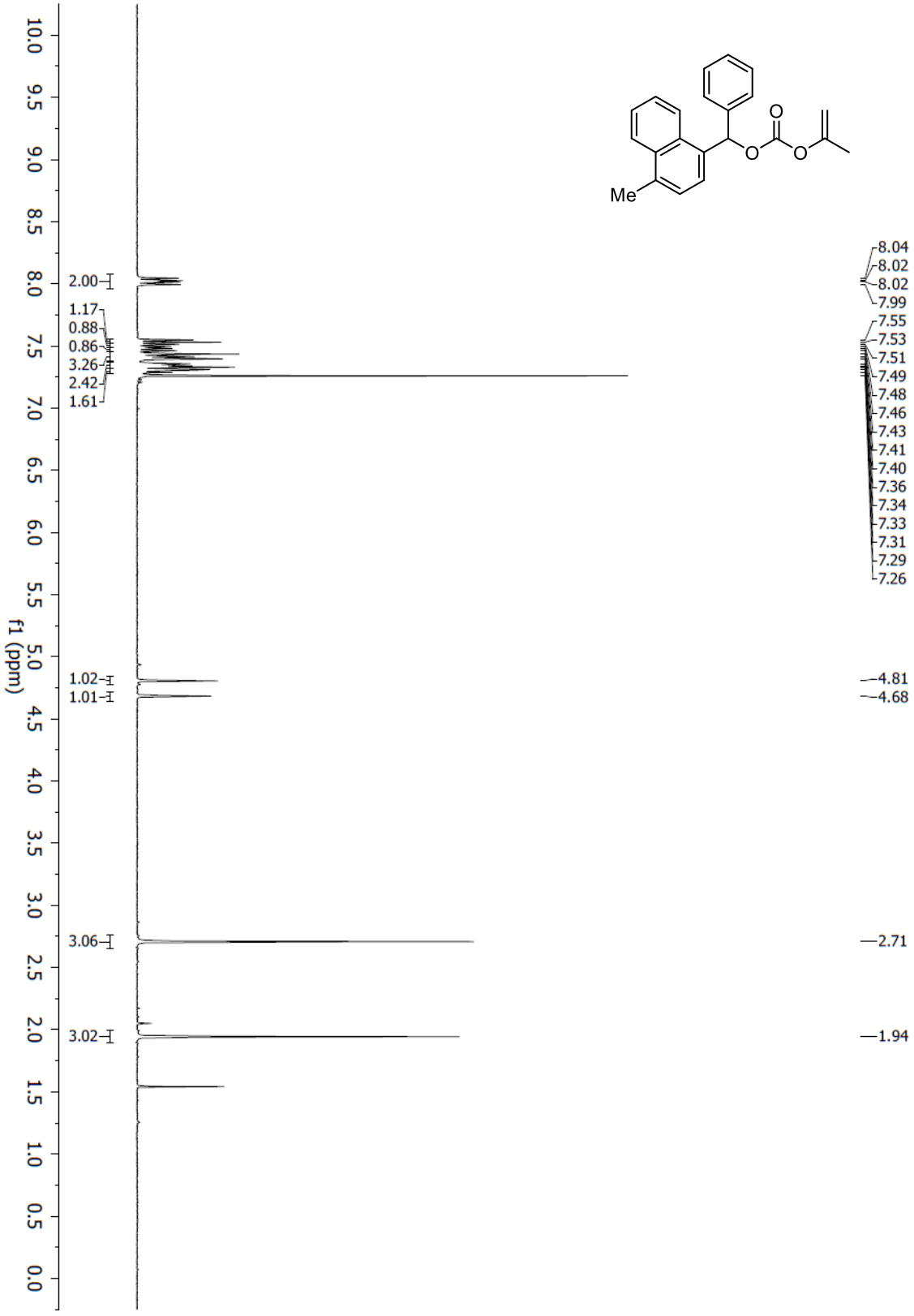
naphthalen-1-yl(4-nitrophenyl)methyl prop-1-en-2-yl carbonate (1i)



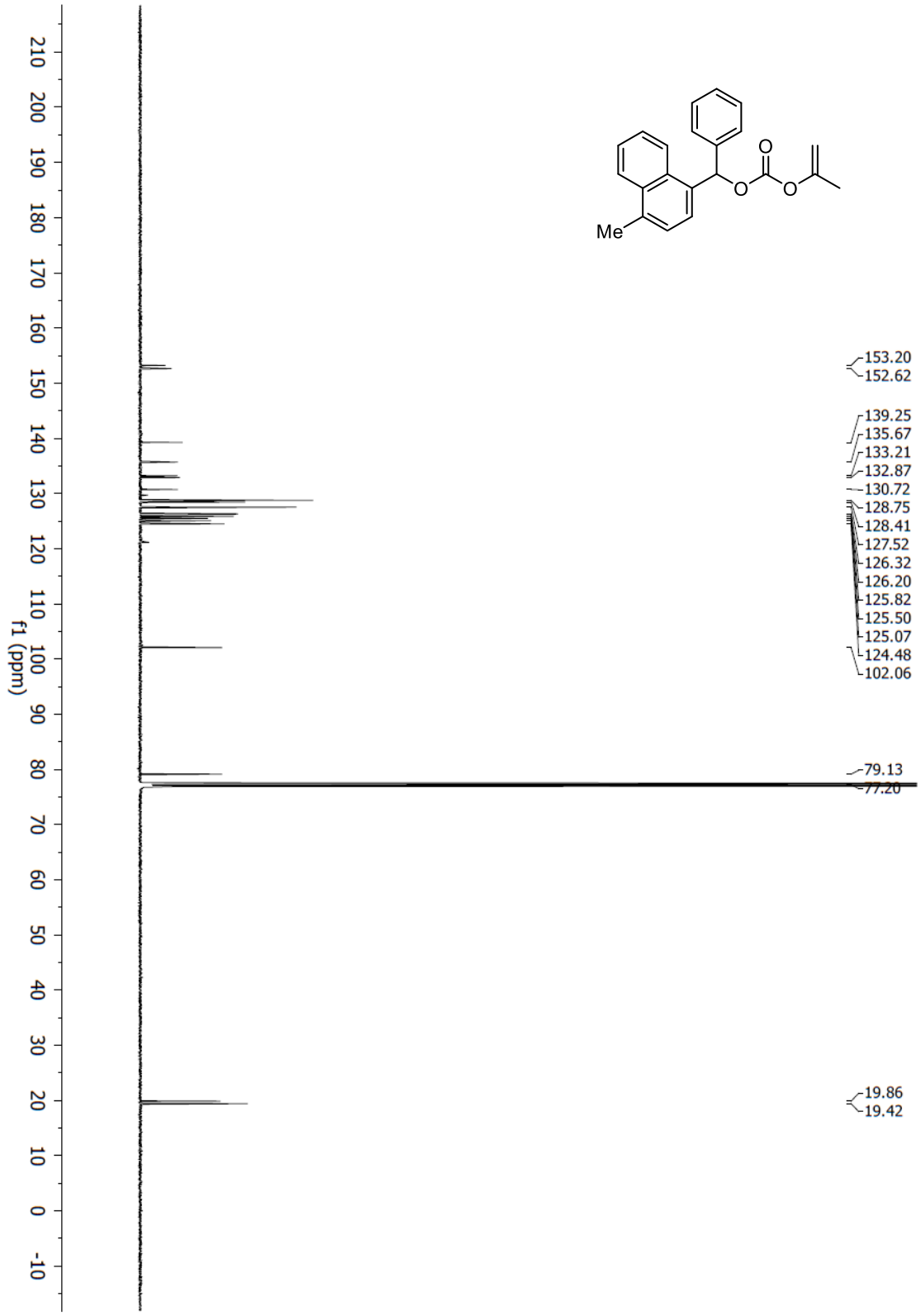
naphthalen-1-yl(4-nitrophenyl)methyl prop-1-en-2-yl carbonate (1i)



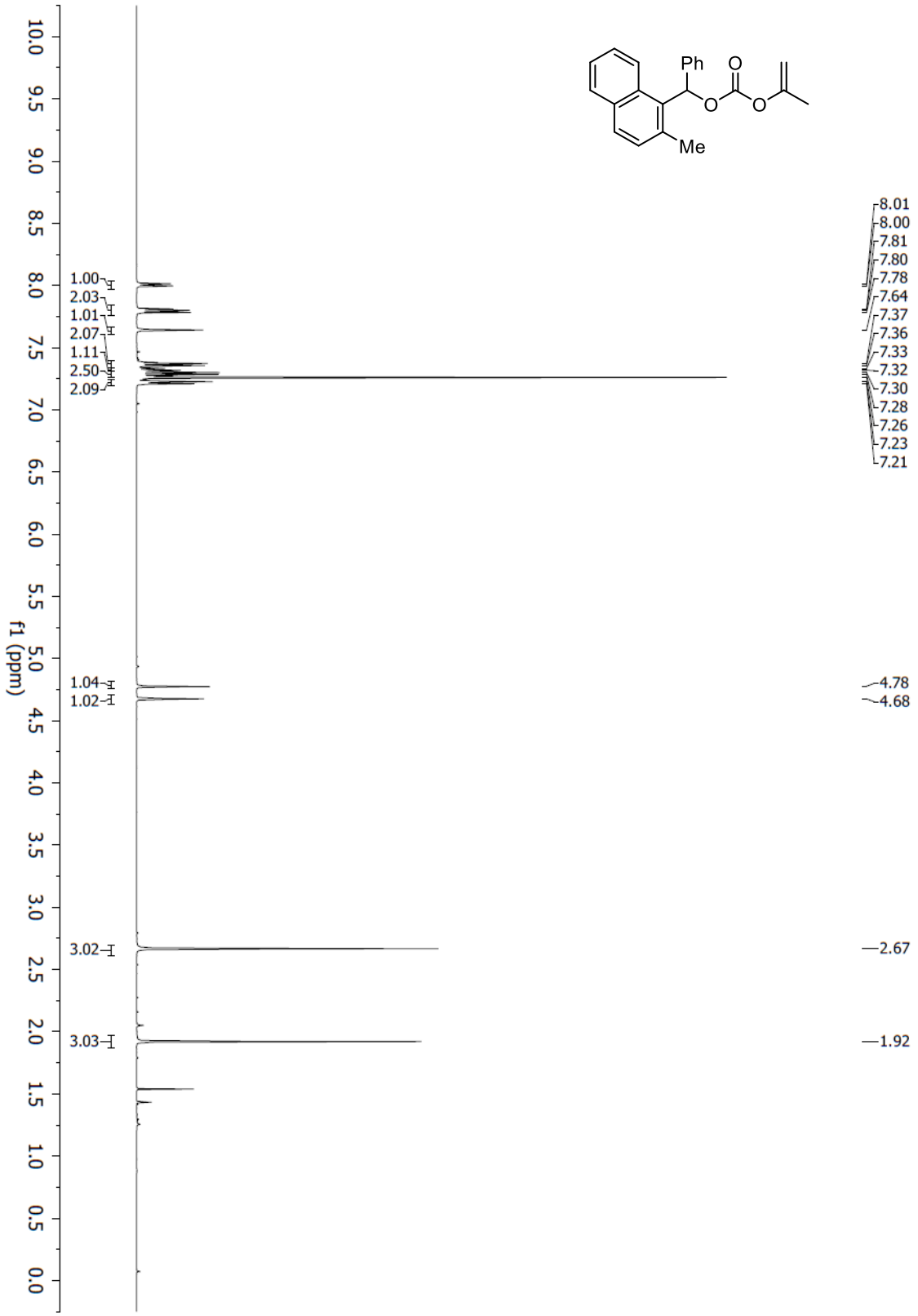
(4-methylnaphthalen-1-yl)(phenyl)methyl prop-1-en-2-yl carbonate (1j)



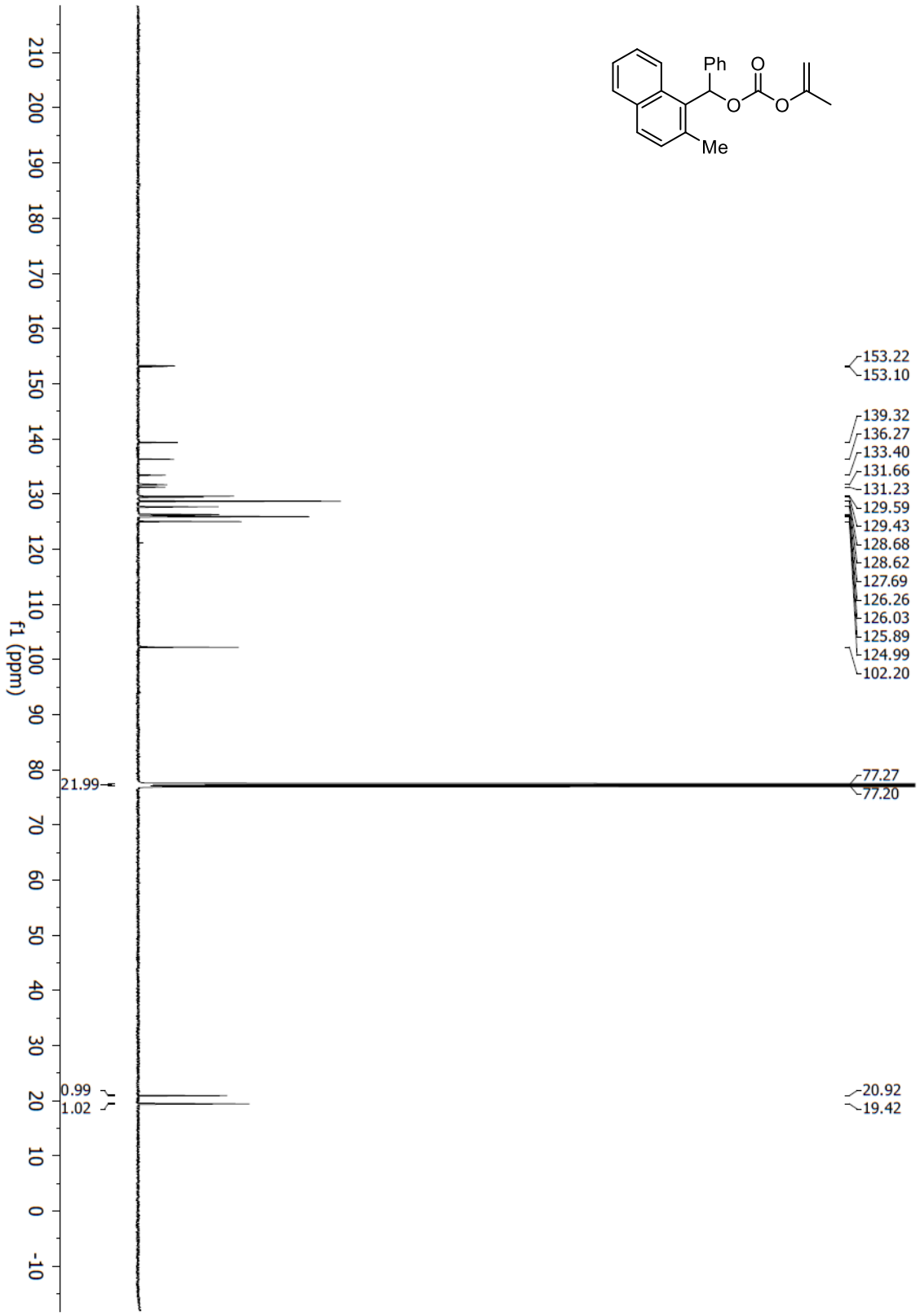
(4-methylnaphthalen-1-yl)(phenyl)methyl prop-1-en-2-yl carbonate (1j)



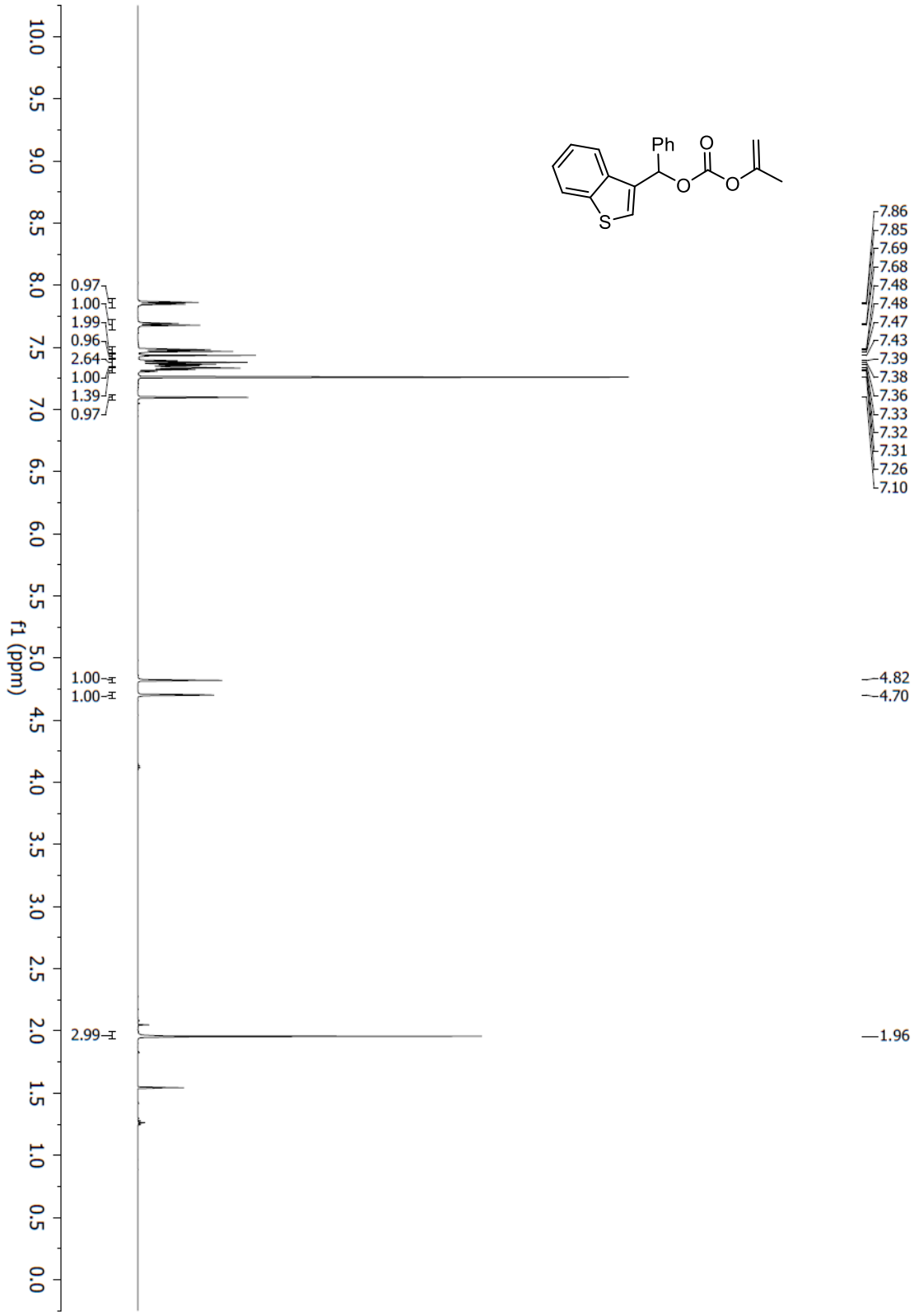
(2-methylnaphthalen-1-yl)(phenyl)methyl prop-1-en-2-yl carbonate (1k)



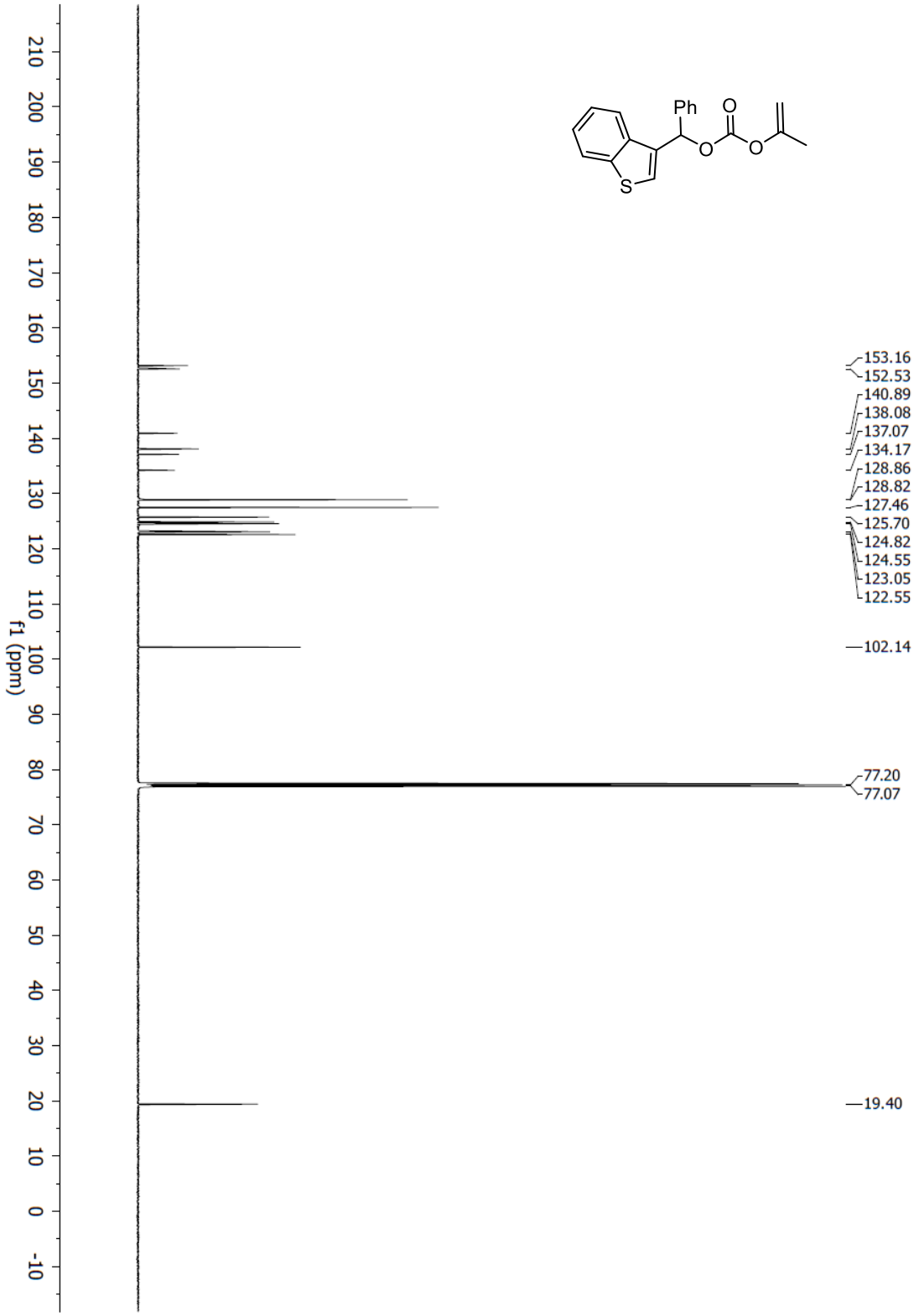
(2-methylnaphthalen-1-yl)(phenyl)methyl prop-1-en-2-yl carbonate (1k)



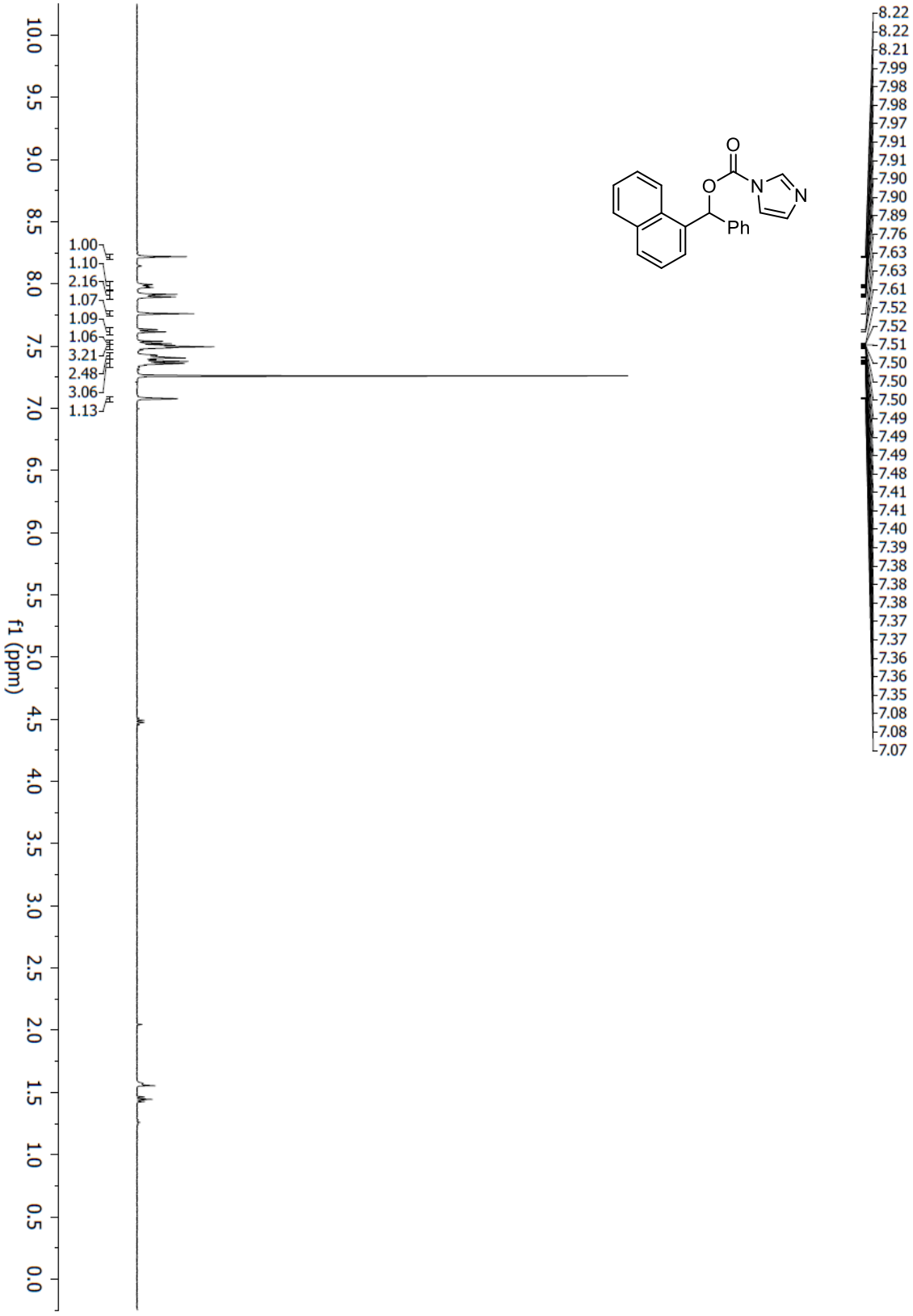
benzo[*b*]thiophen-3-yl(phenyl)methyl prop-1-en-2-yl carbonate (1l)



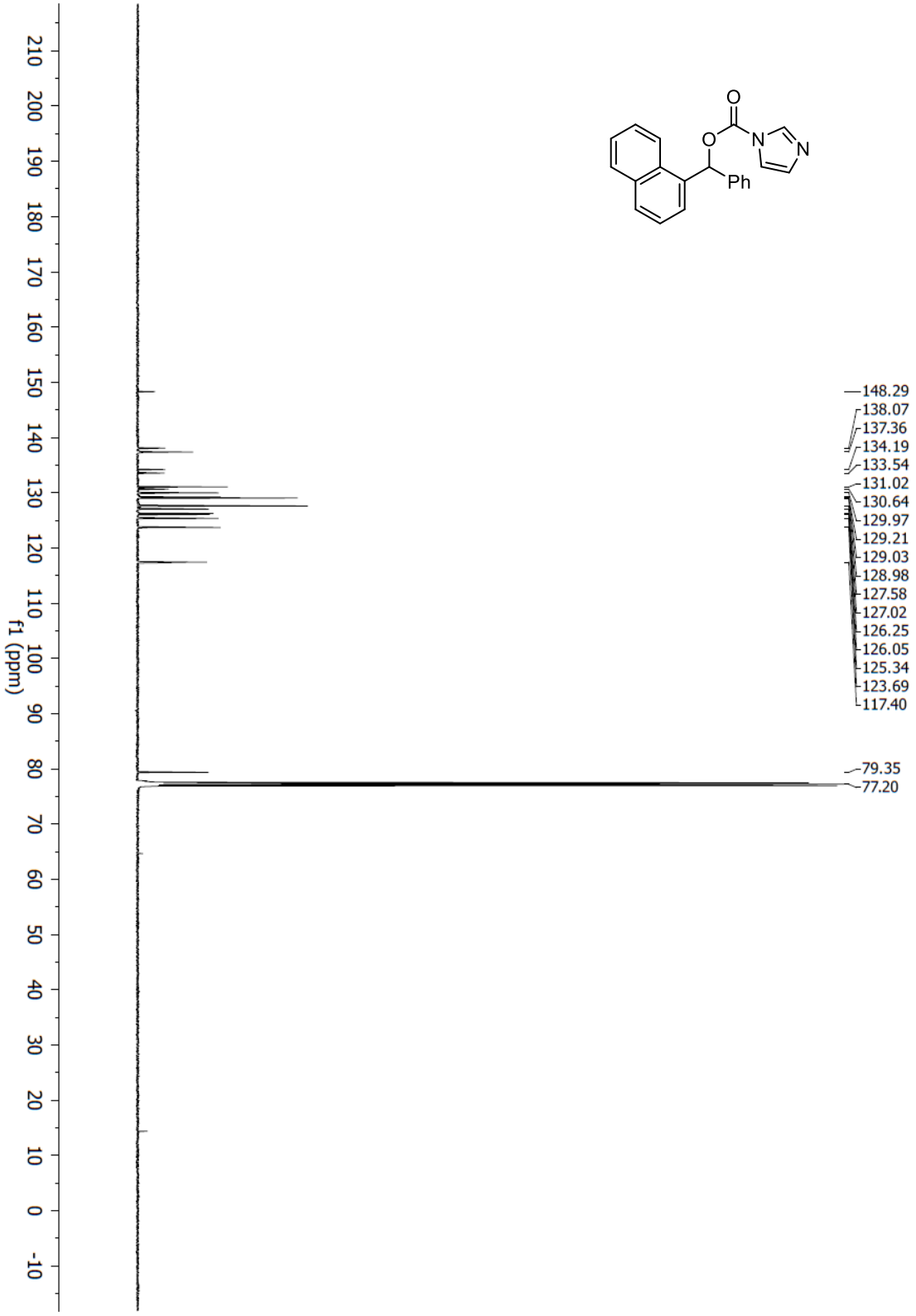
benzo[*b*]thiophen-3-yl(phenyl)methyl prop-1-en-2-yl carbonate (1l)



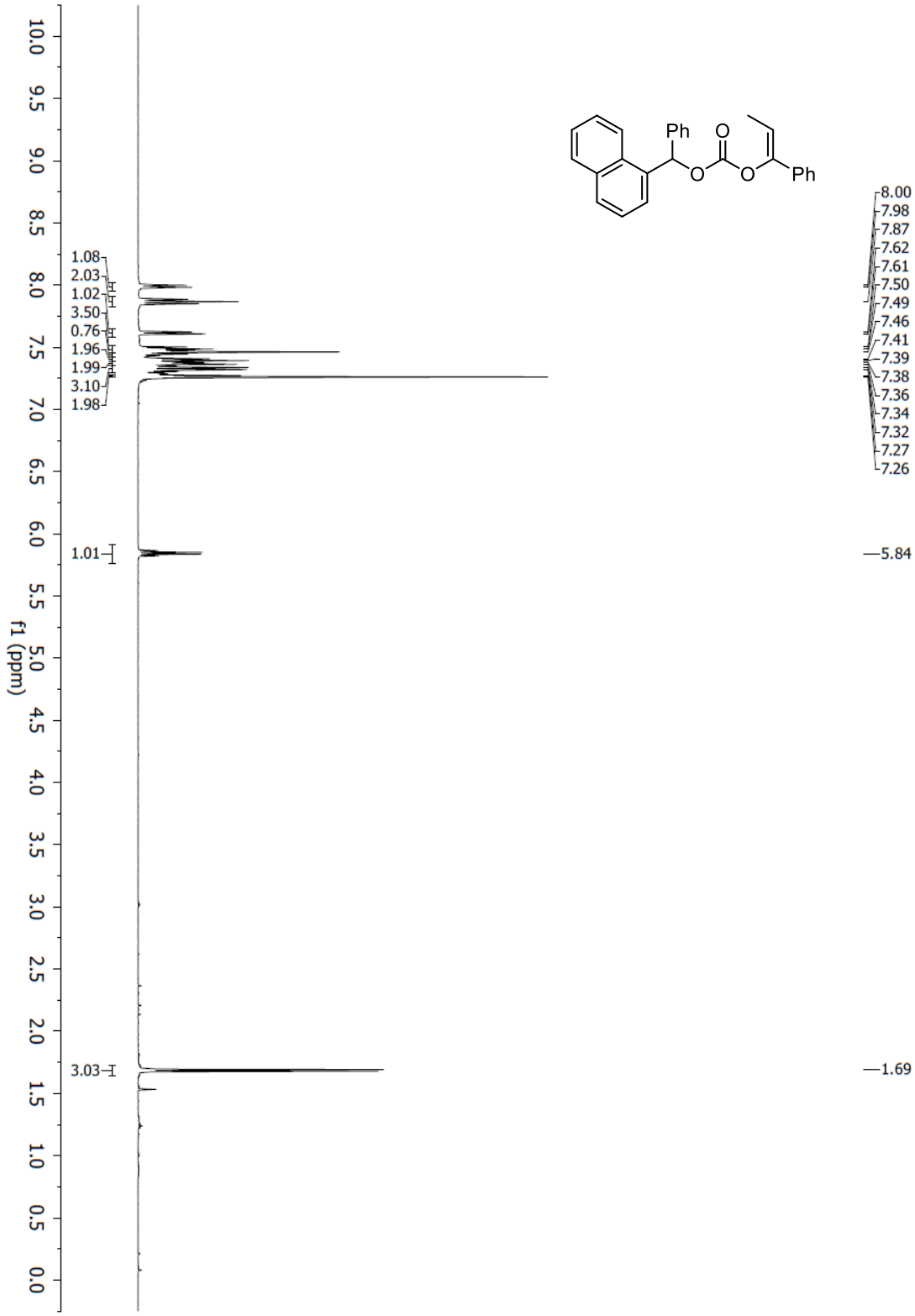
naphthalen-1-yl(phenyl)methyl 1H-imidazole-1-carboxylate



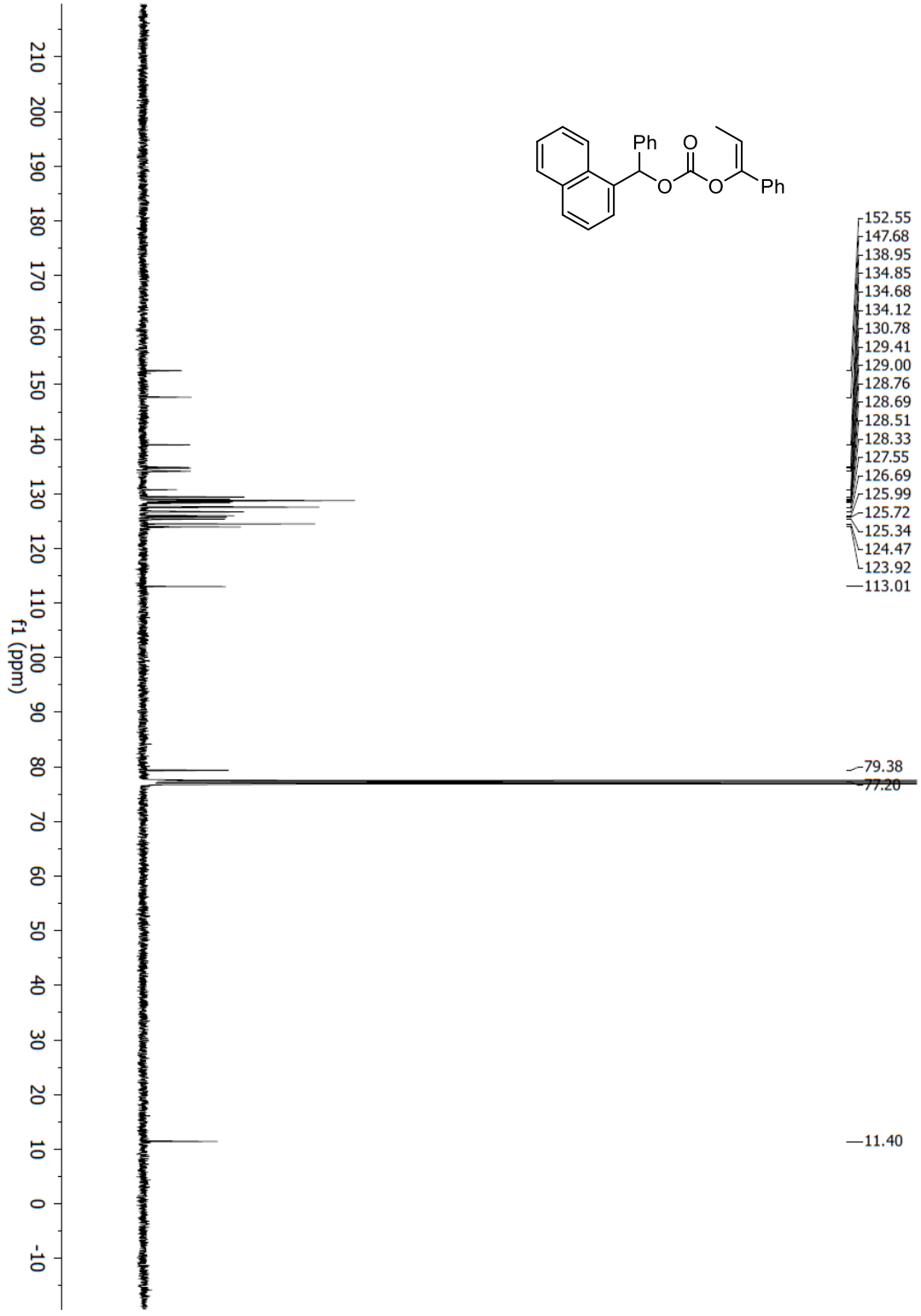
naphthalen-1-yl(phenyl)methyl 1H-imidazole-1-carboxylate



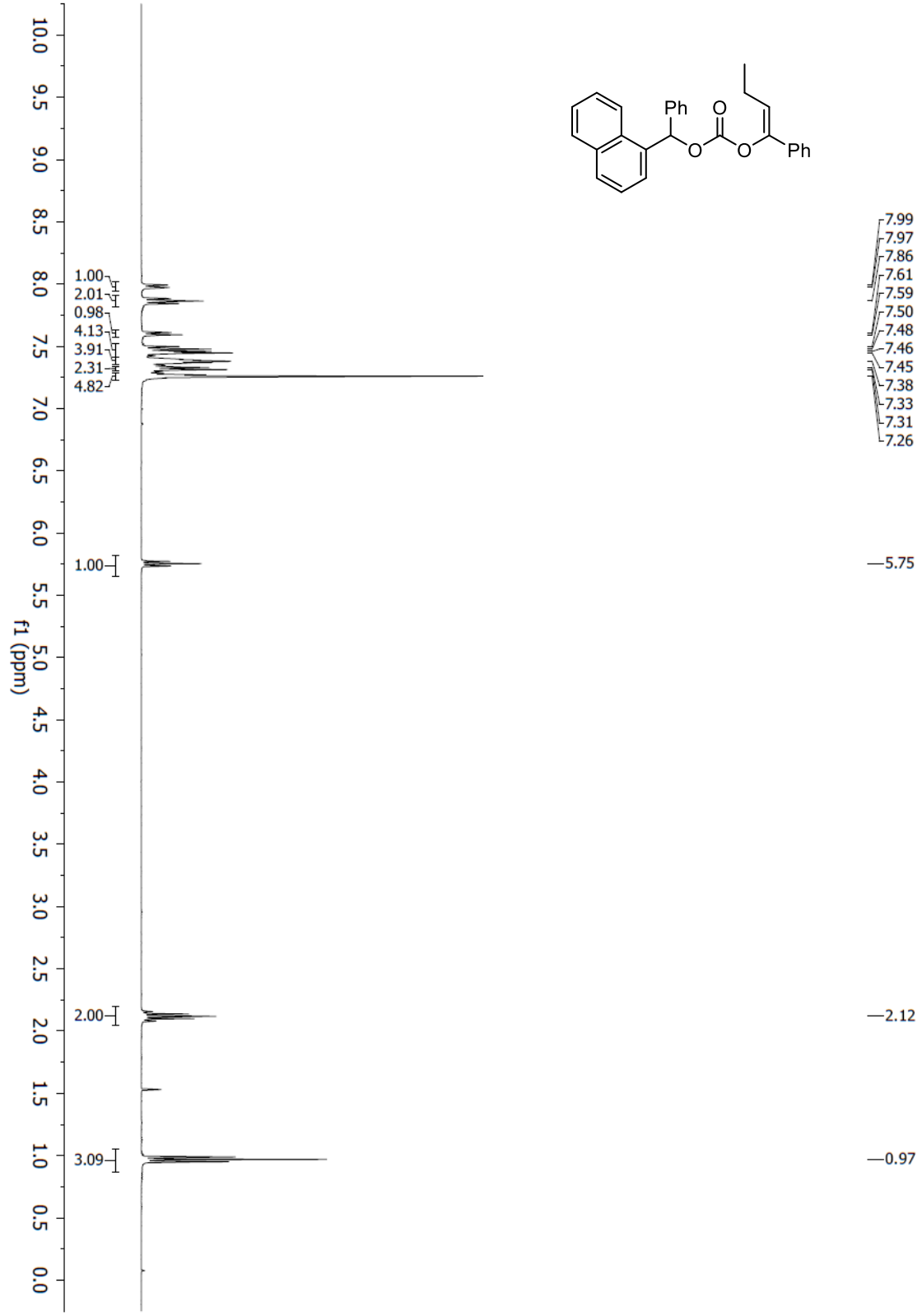
(*Z*)-naphthalen-1-yl(phenyl)methyl (1-phenylprop-1-en-1-yl) carbonate (4a)



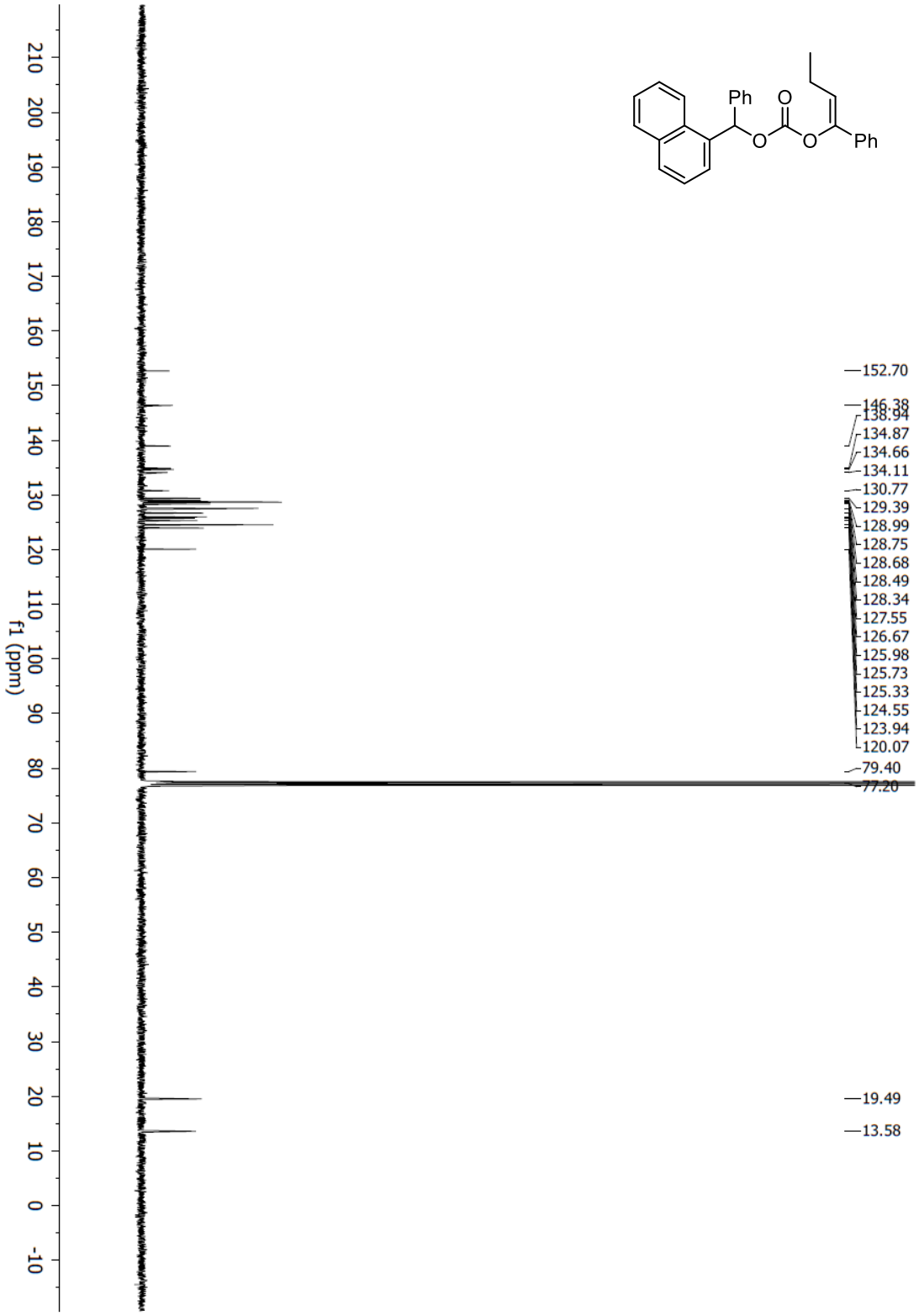
(*Z*)-naphthalen-1-yl(phenyl)methyl (1-phenylprop-1-en-1-yl) carbonate (4a)



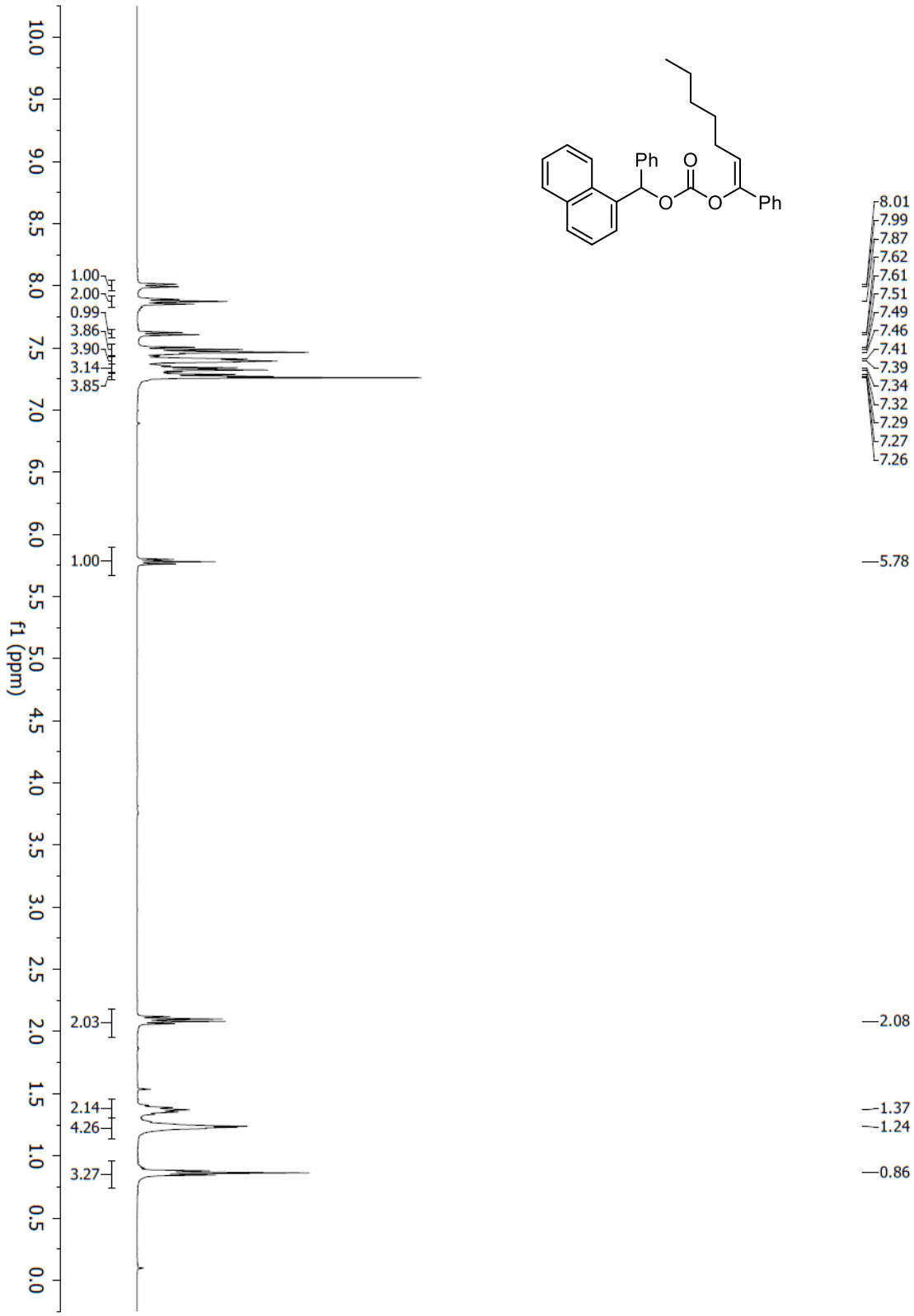
(*Z*)-naphthalen-1-yl(phenyl)methyl (1-phenylbut-1-en-1-yl) carbonate (4b)



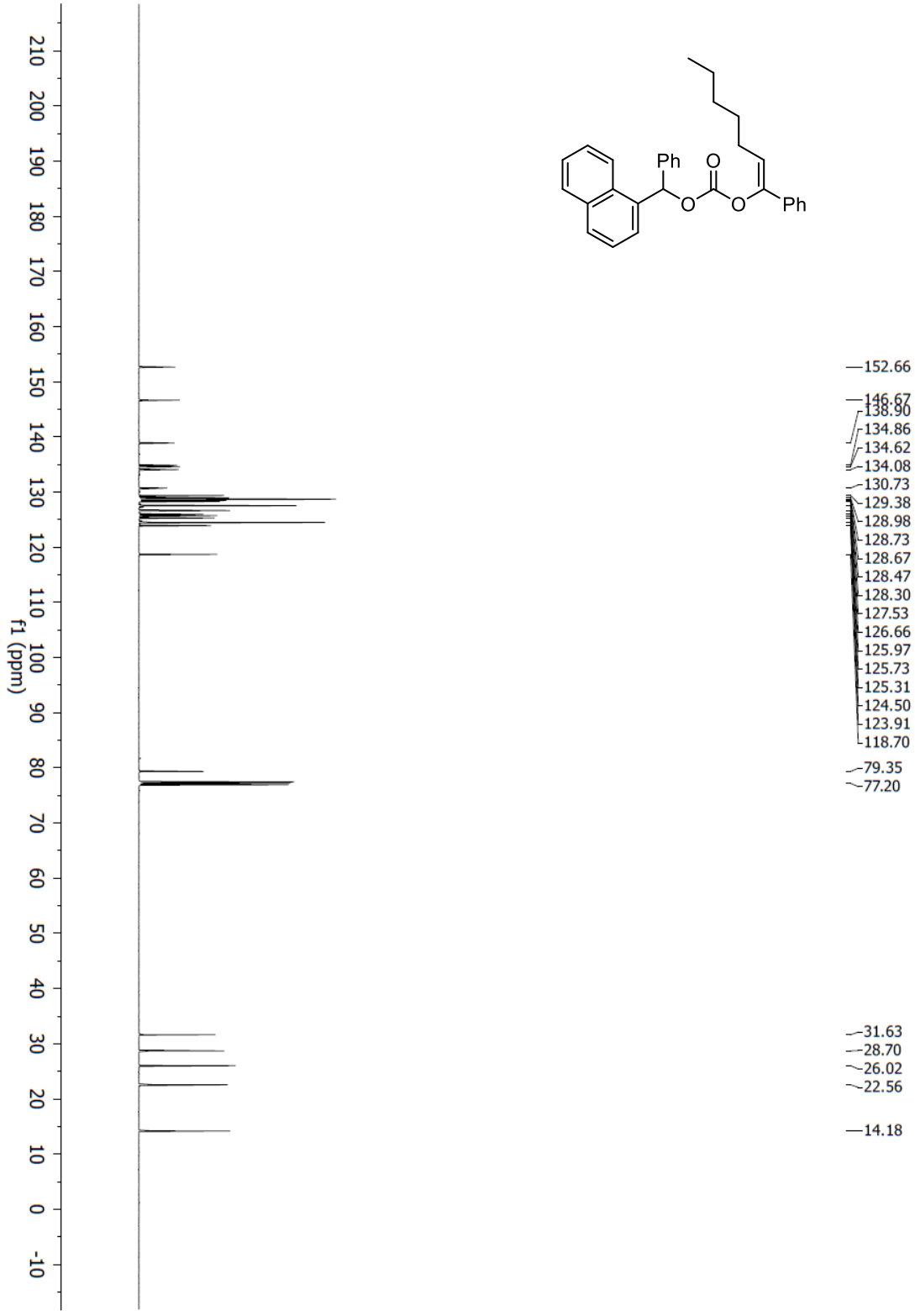
(*Z*)-naphthalen-1-yl(phenyl)methyl (1-phenylbut-1-en-1-yl) carbonate (4b)



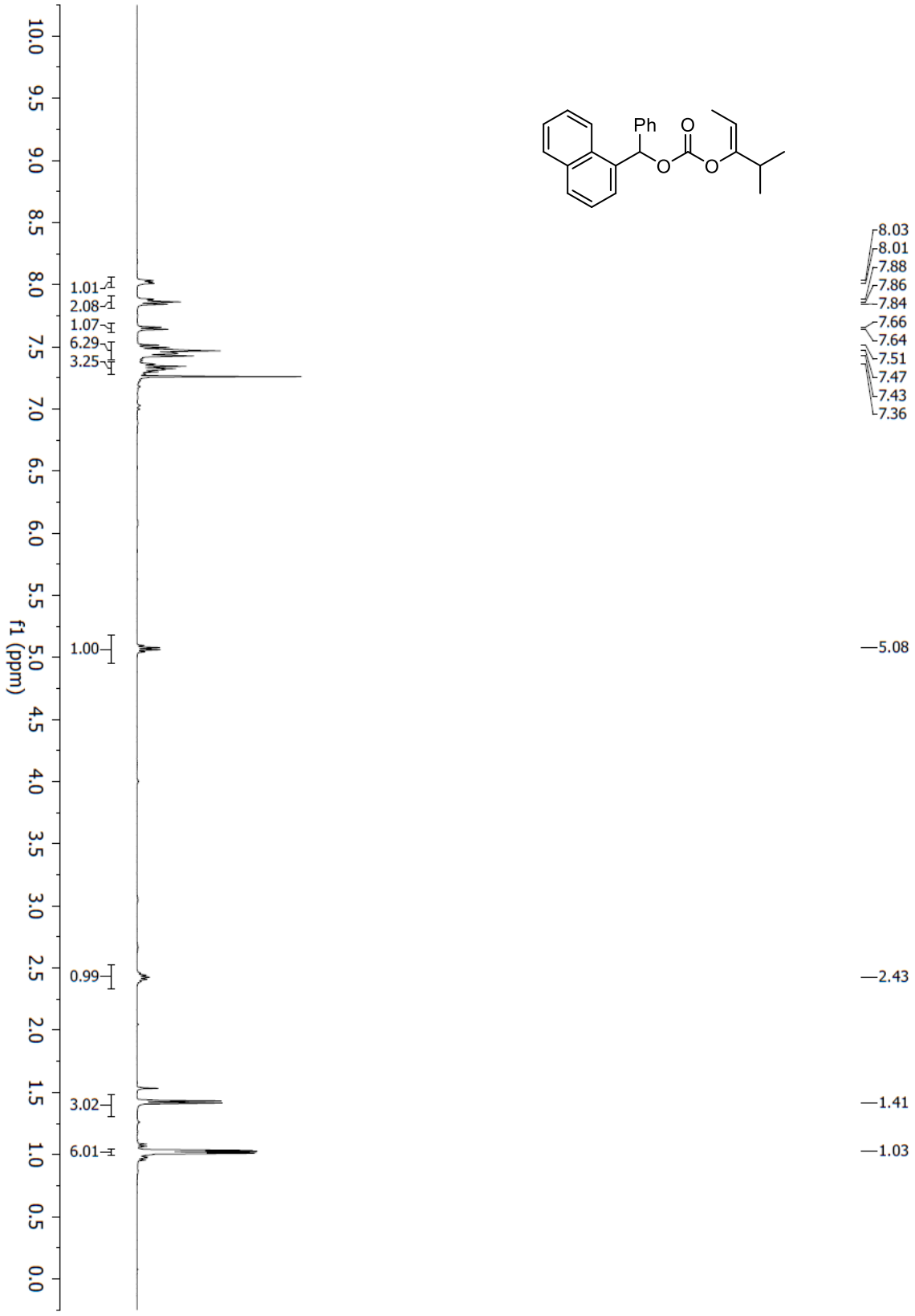
(*Z*)-naphthalen-1-yl(phenyl)methyl (1-phenylhept-1-en-1-yl) carbonate (4c)



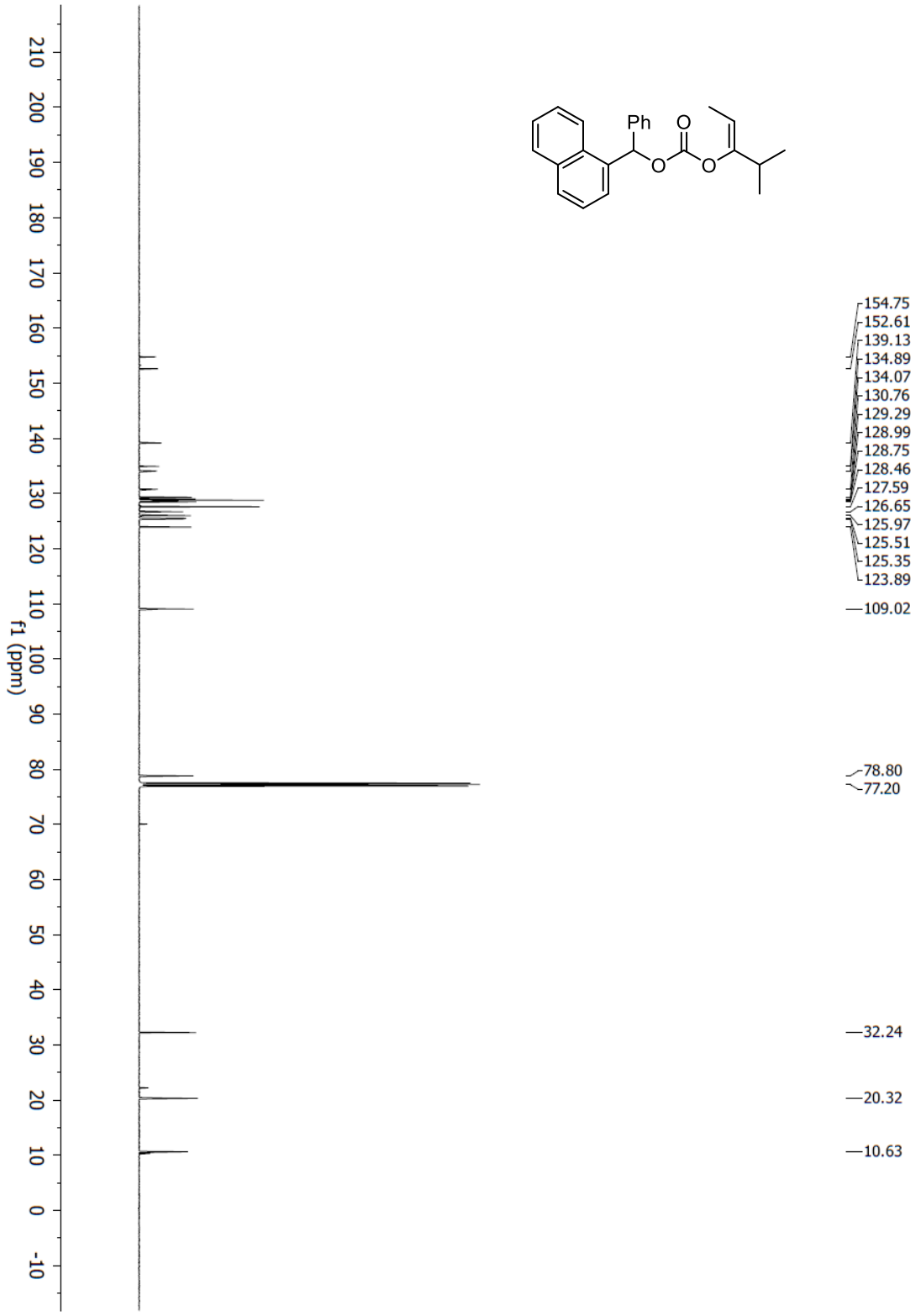
(*Z*)-naphthalen-1-yl(phenyl)methyl (1-phenylhept-1-en-1-yl) carbonate (4c)



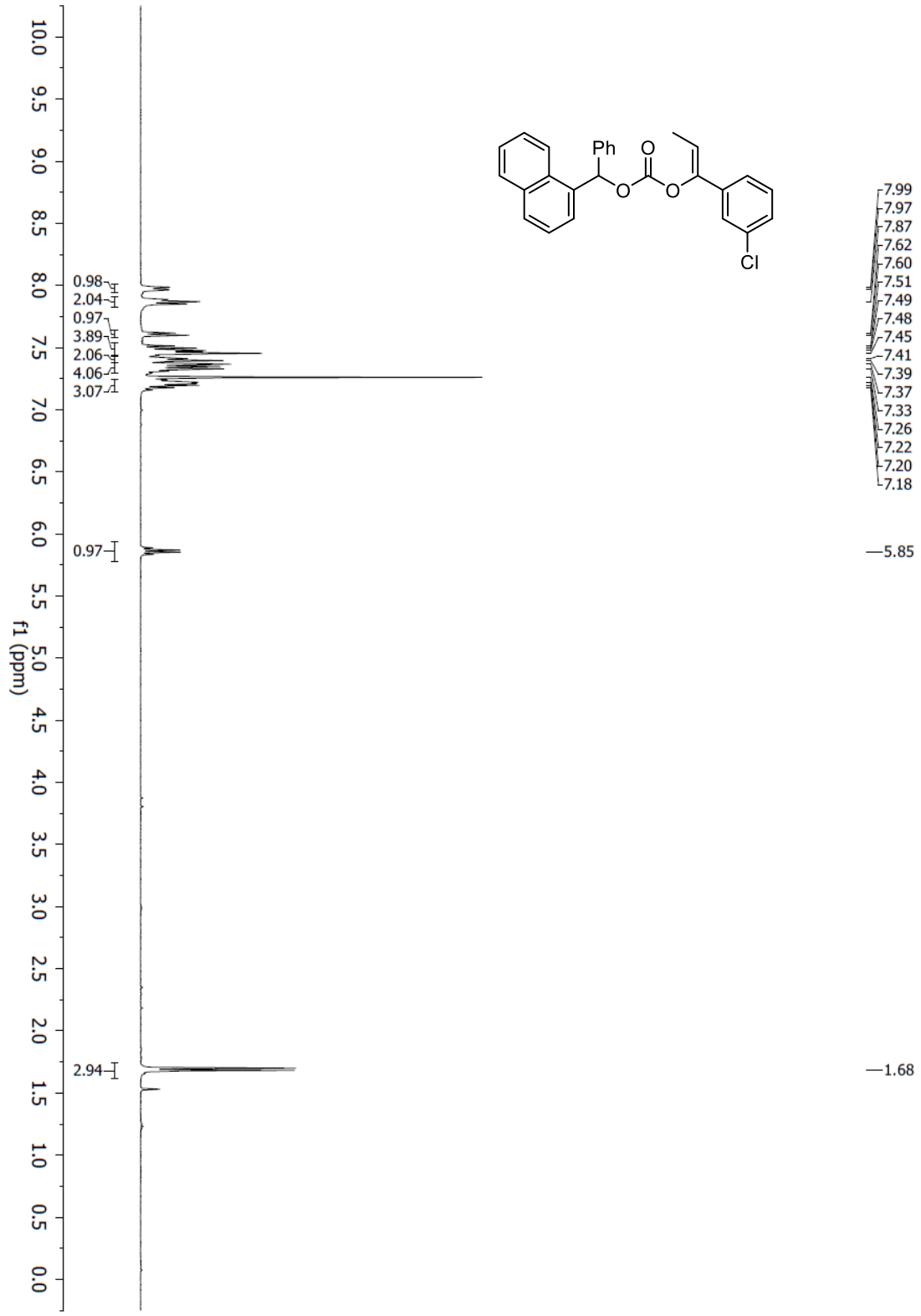
(*Z*)-4-methylpent-2-en-3-yl (naphthalen-1-yl(phenyl)methyl) carbonate (4d)



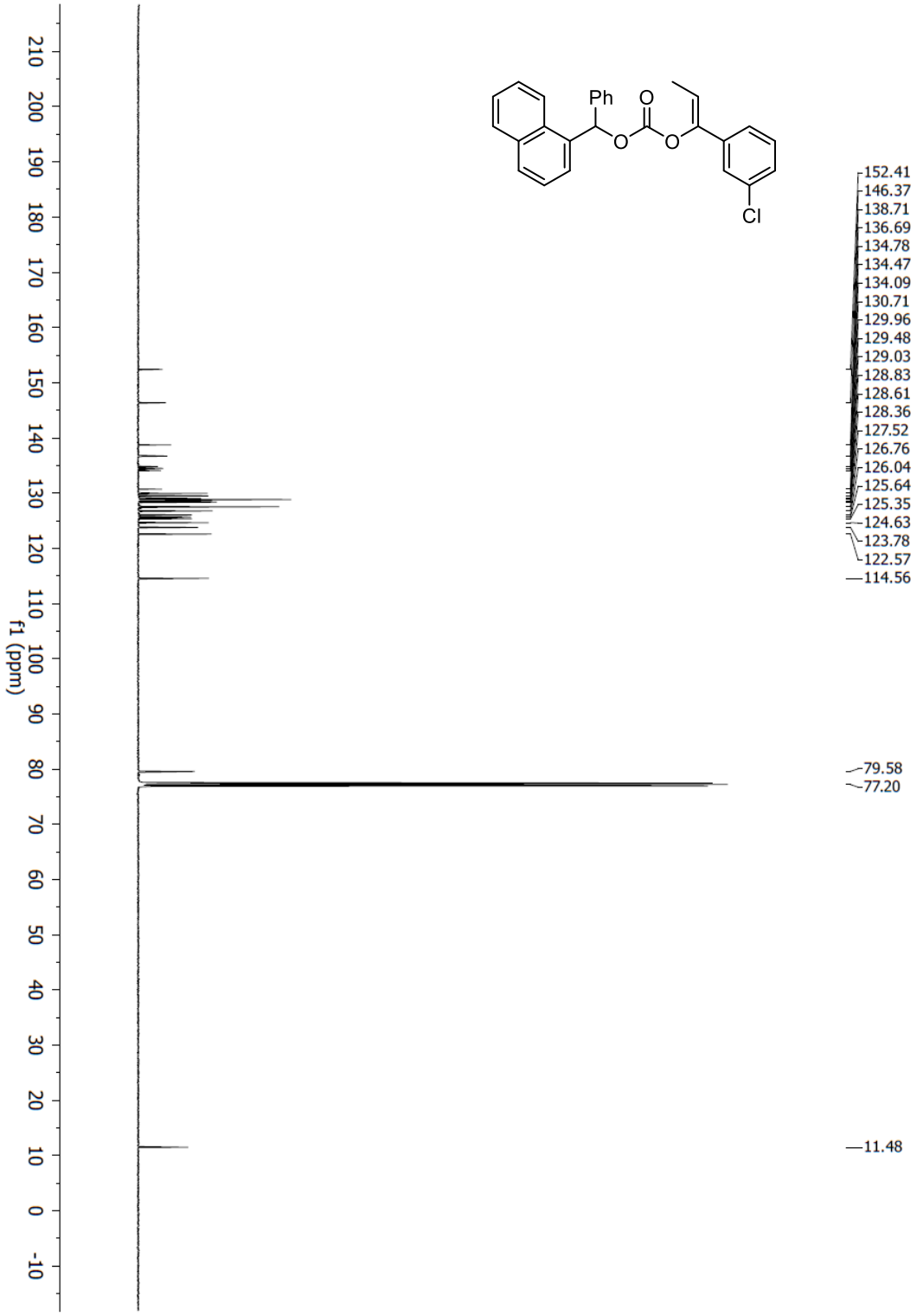
(*Z*)-4-methylpent-2-en-3-yl (naphthalen-1-yl(phenyl)methyl) carbonate (4d)



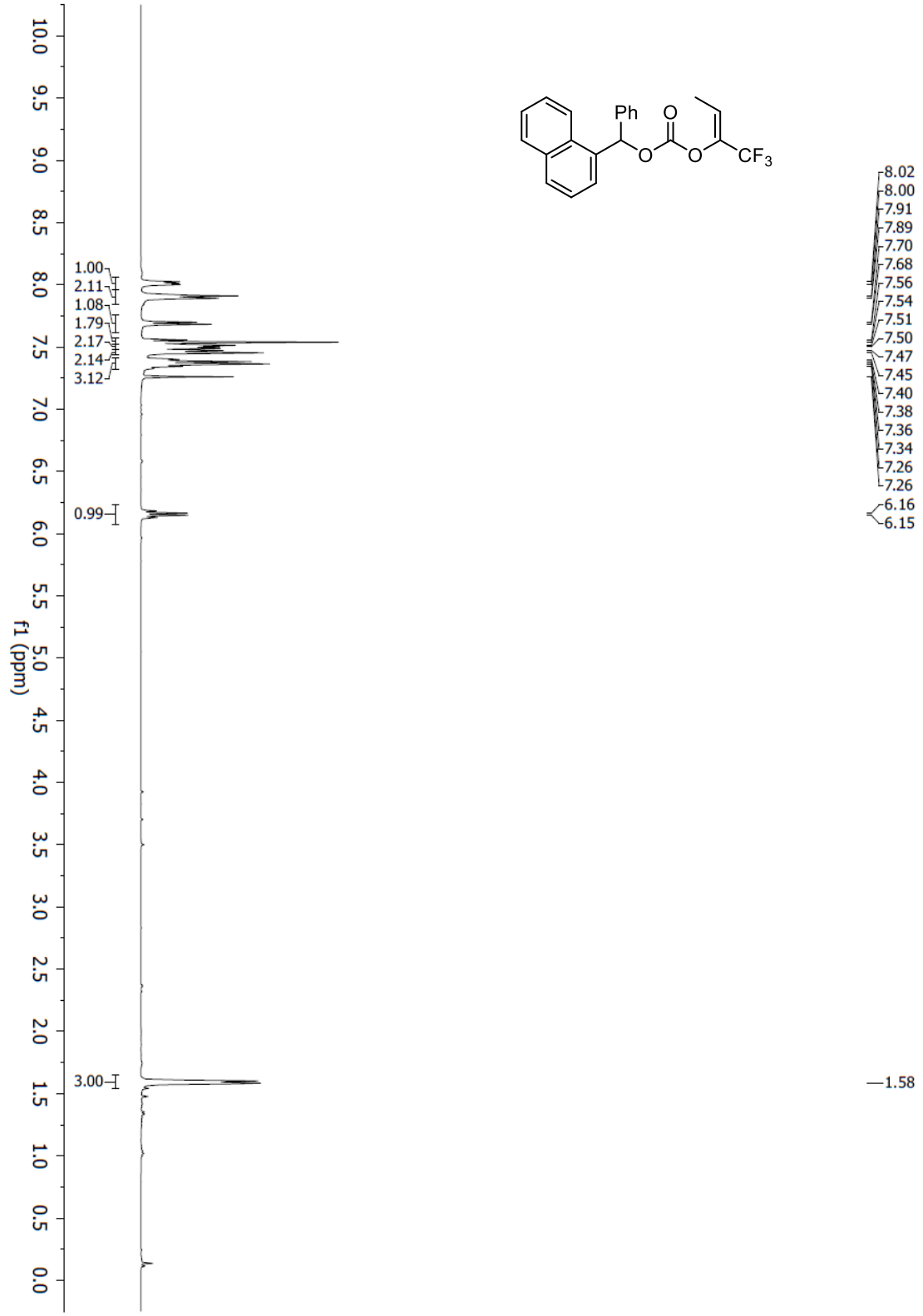
(*Z*)-1-(3-chlorophenyl)prop-1-en-1-yl (naphthalen-1-yl(phenyl)methyl) carbonate (4e)



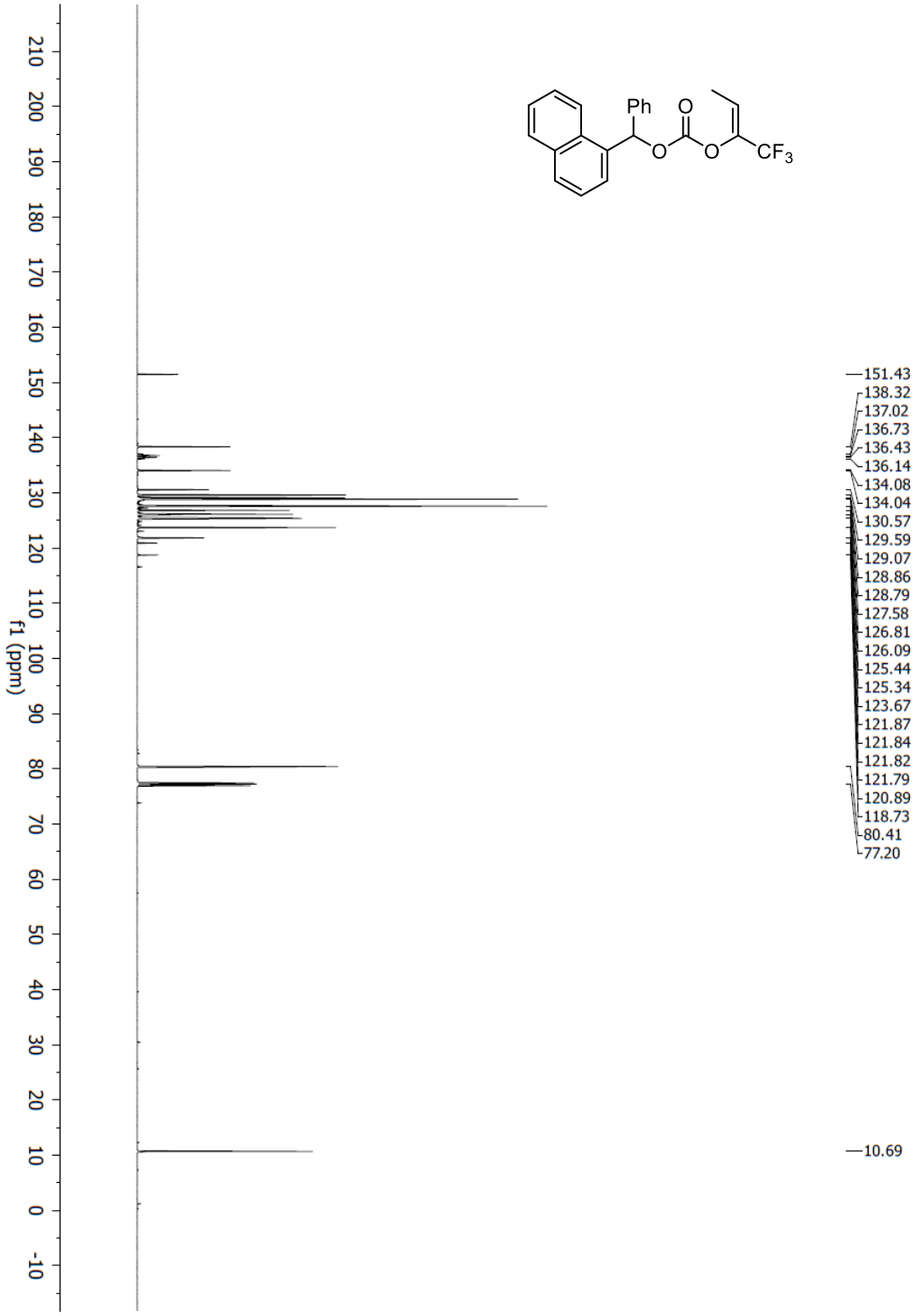
(*Z*)-1-(3-chlorophenyl)prop-1-en-1-yl (naphthalen-1-yl(phenyl)methyl) carbonate (4e)



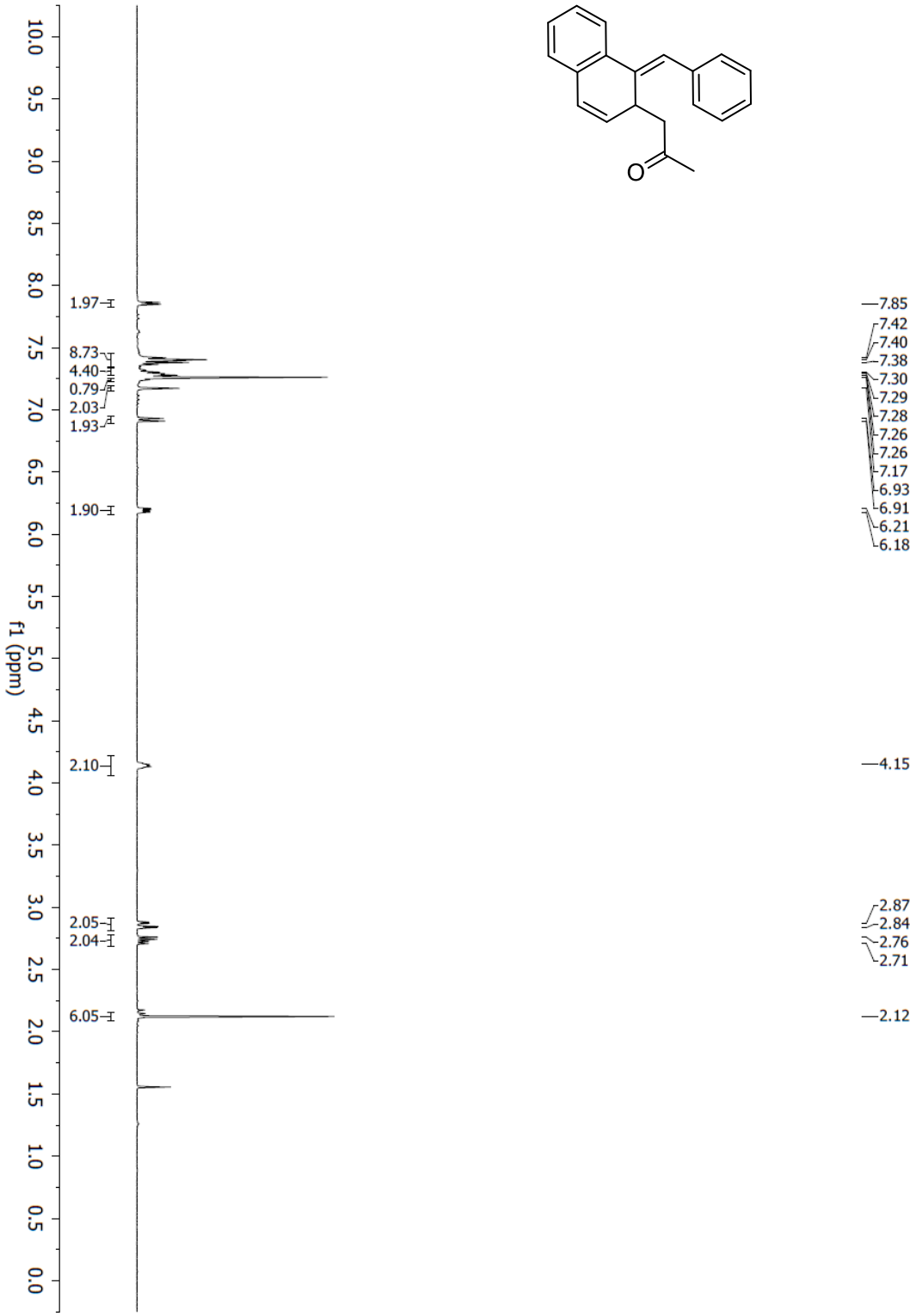
(*Z*)-naphthalen-1-yl(phenyl)methyl (1,1,1-trifluorobut-2-en-2-yl) carbonate (4f)



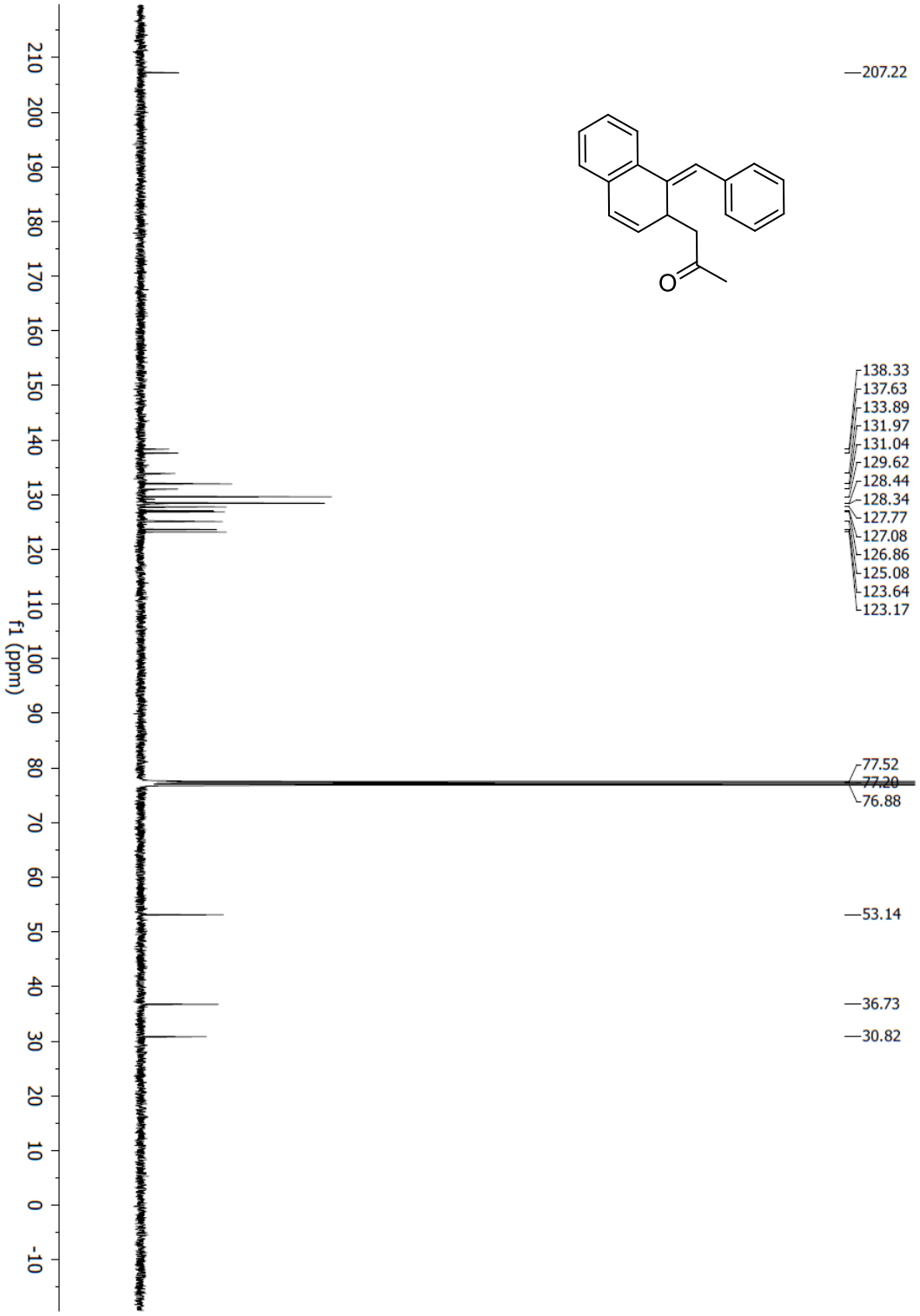
(*Z*)-naphthalen-1-yl(phenyl)methyl (1,1,1-trifluorobut-2-en-2-yl) carbonate (4f)



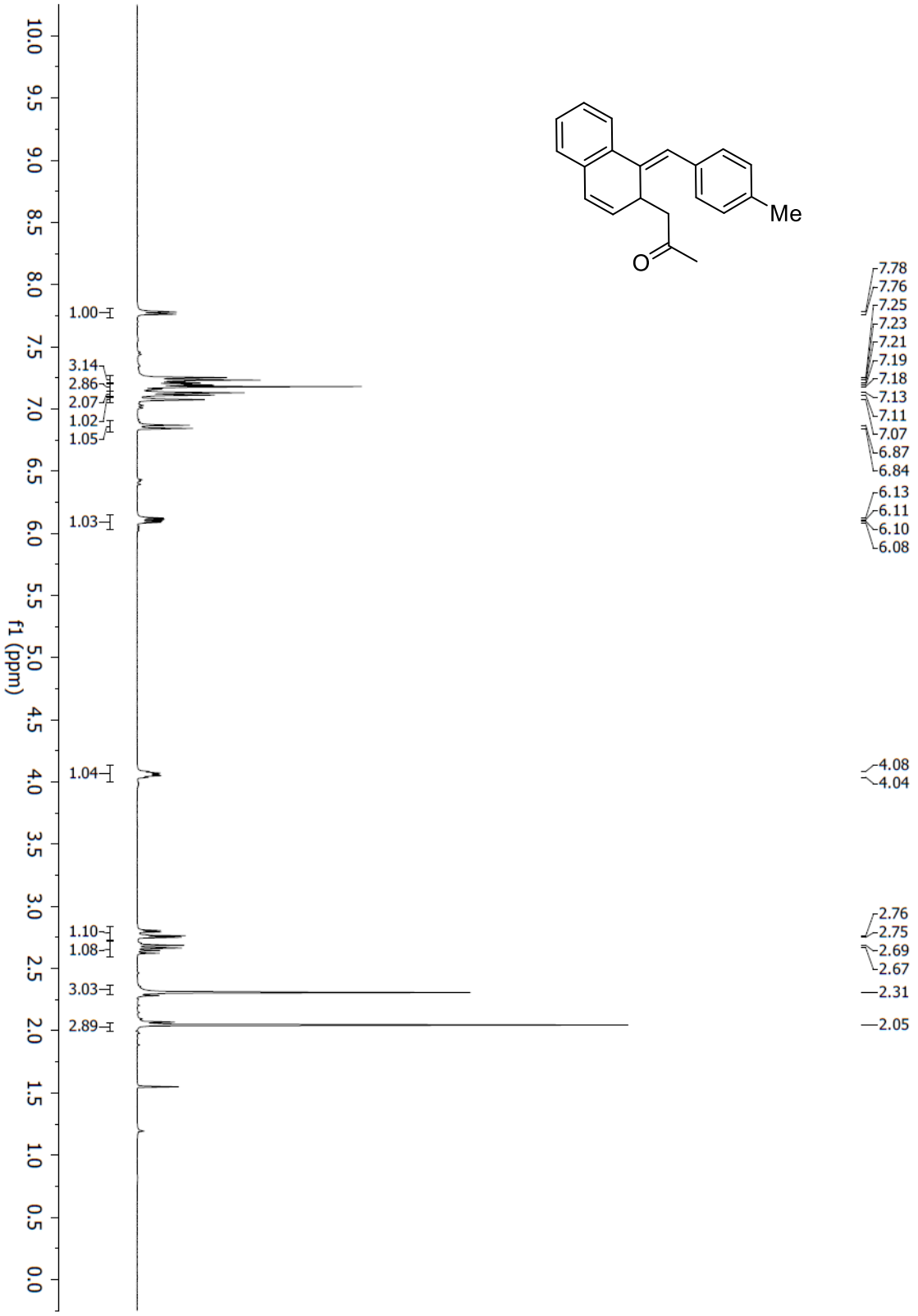
(*E*)-1-(1-benzylidene-1,2-dihydronaphthalen-2-yl)propan-2-one (2a)



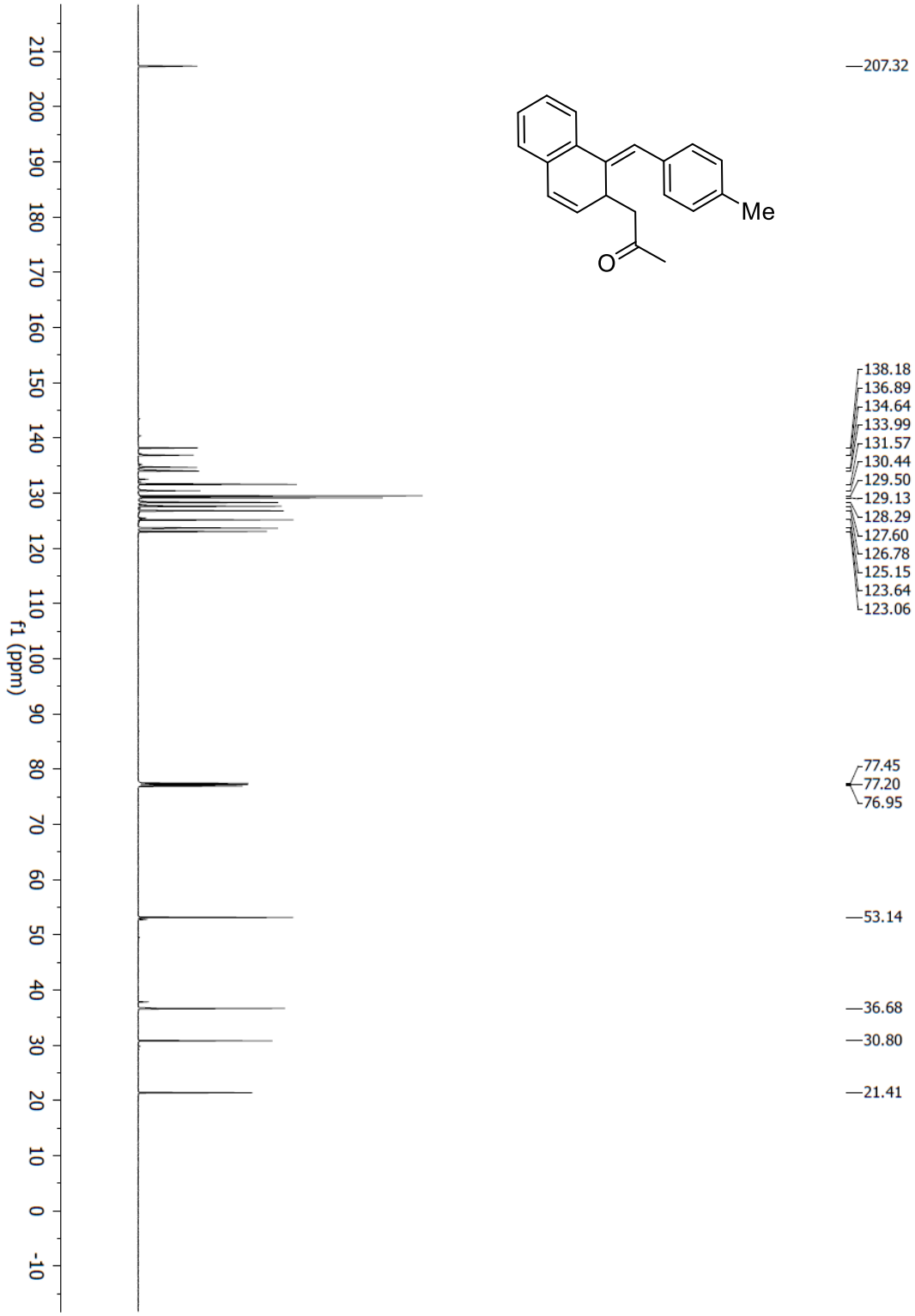
(*E*)-1-(1-benzylidene-1,2-dihydronaphthalen-2-yl)propan-2-one (2a)



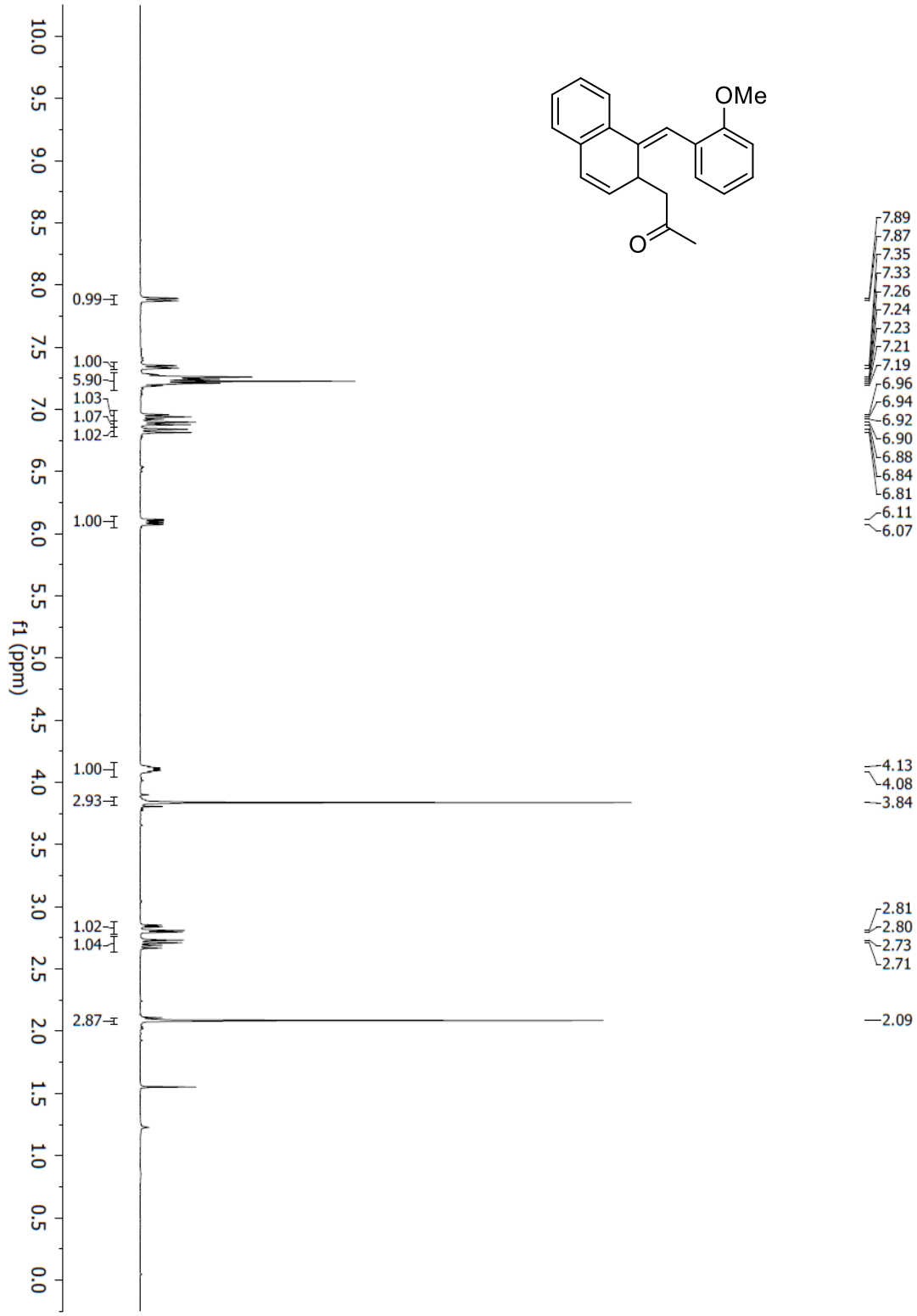
(*E*)-1-(1-(4-methylbenzylidene)-1,2-dihydronaphthalen-2-yl)propan-2-one (2b)



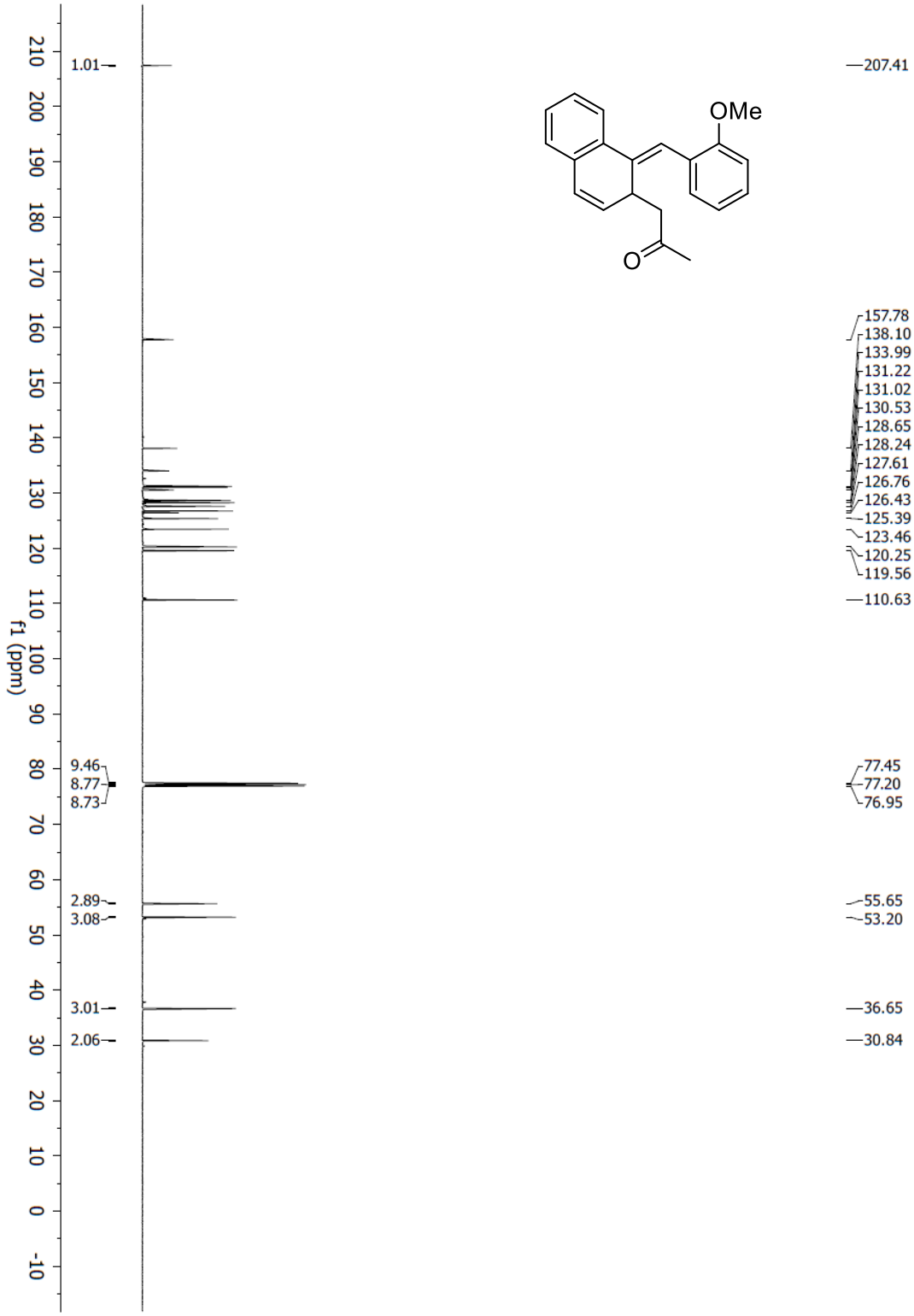
(*E*)-1-(1-(4-methylbenzylidene)-1,2-dihydronaphthalen-2-yl)propan-2-one (2b)



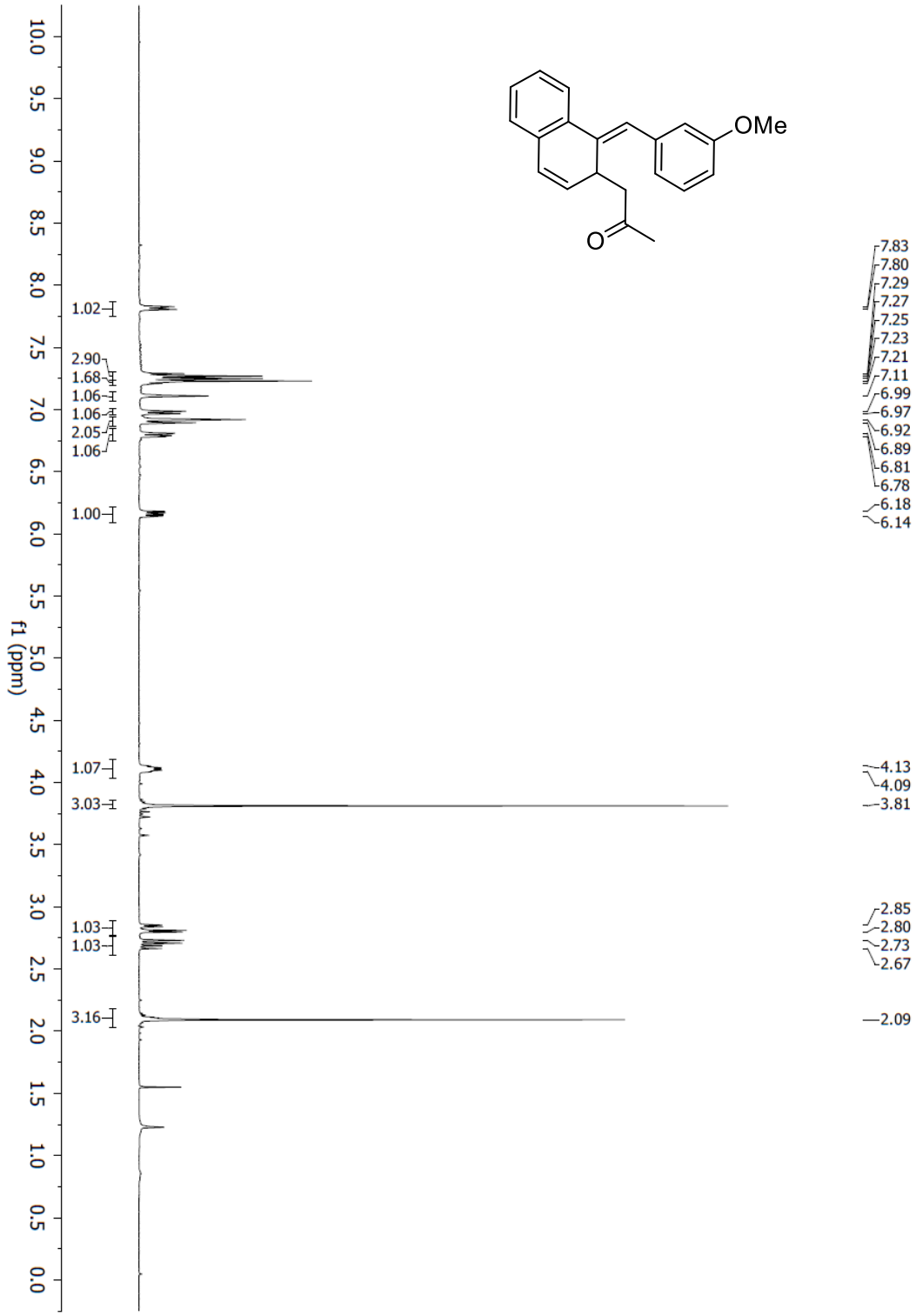
(*E*)-1-(1-(2-methoxybenzylidene)-1,2-dihydronaphthalen-2-yl)propan-2-one (2c)



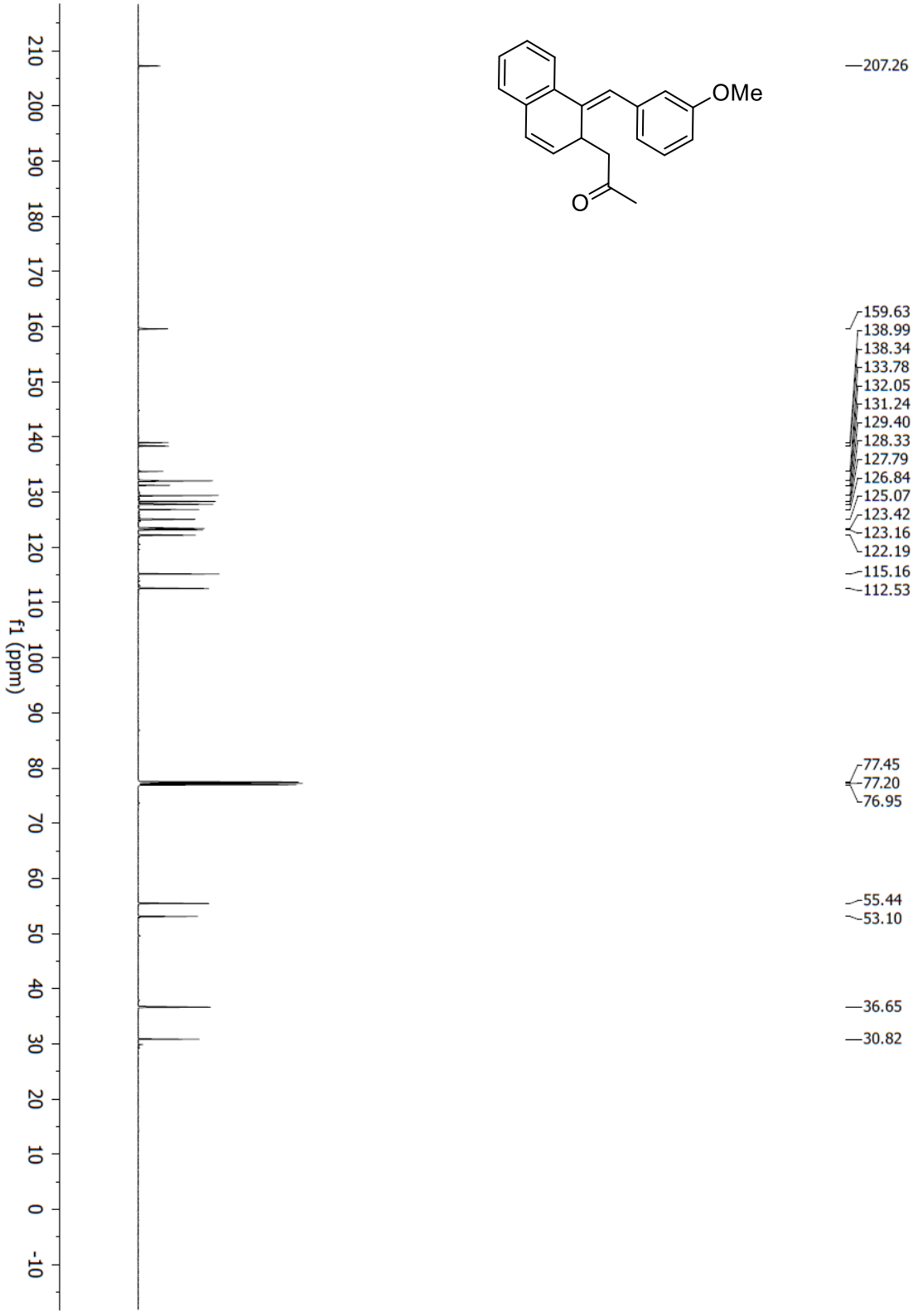
(*E*)-1-(1-(2-methoxybenzylidene)-1,2-dihydronaphthalen-2-yl)propan-2-one (2c)



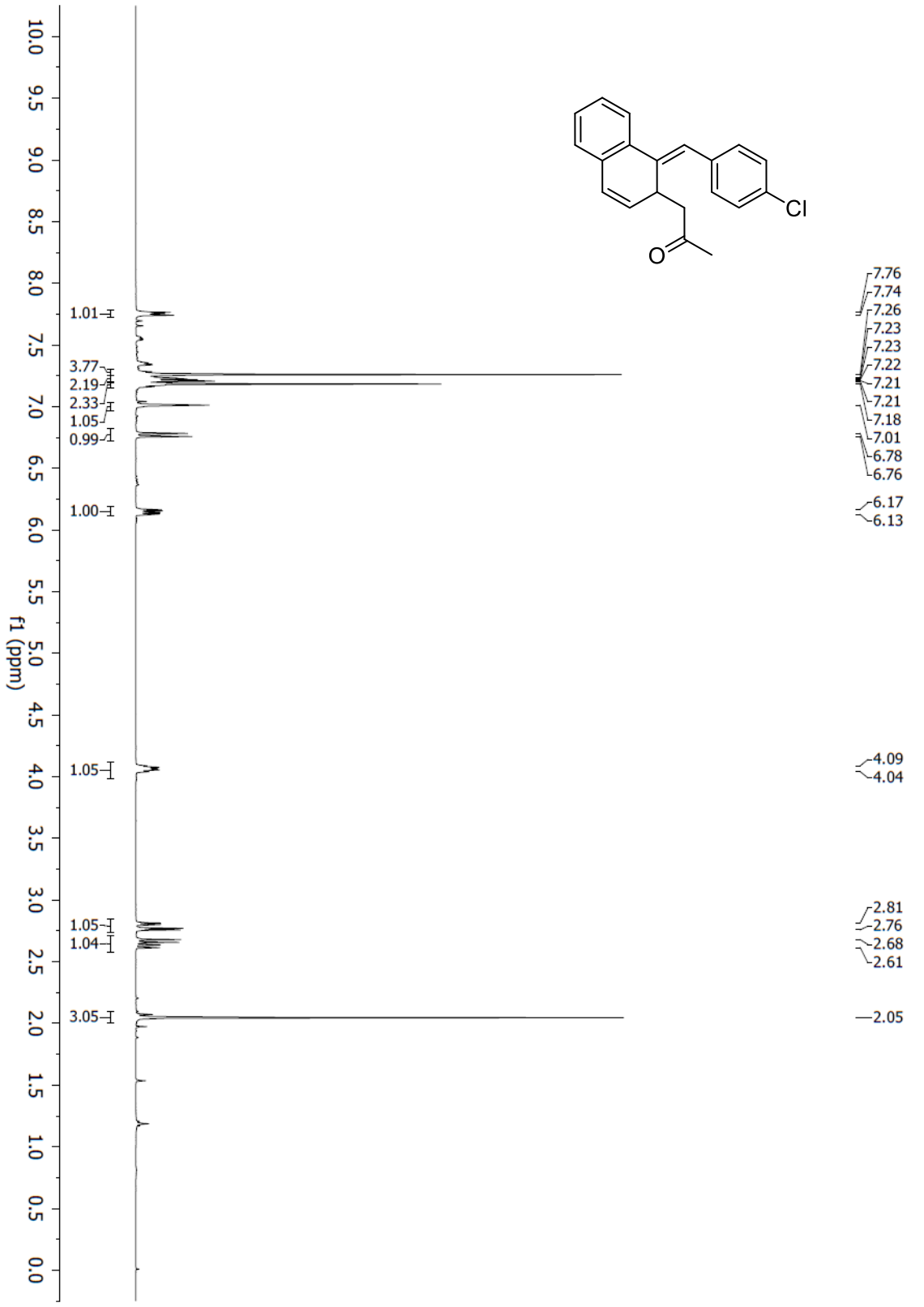
(*E*)-1-(1-(3-methoxybenzylidene)-1,2-dihydronaphthalen-2-yl)propan-2-one (2d)



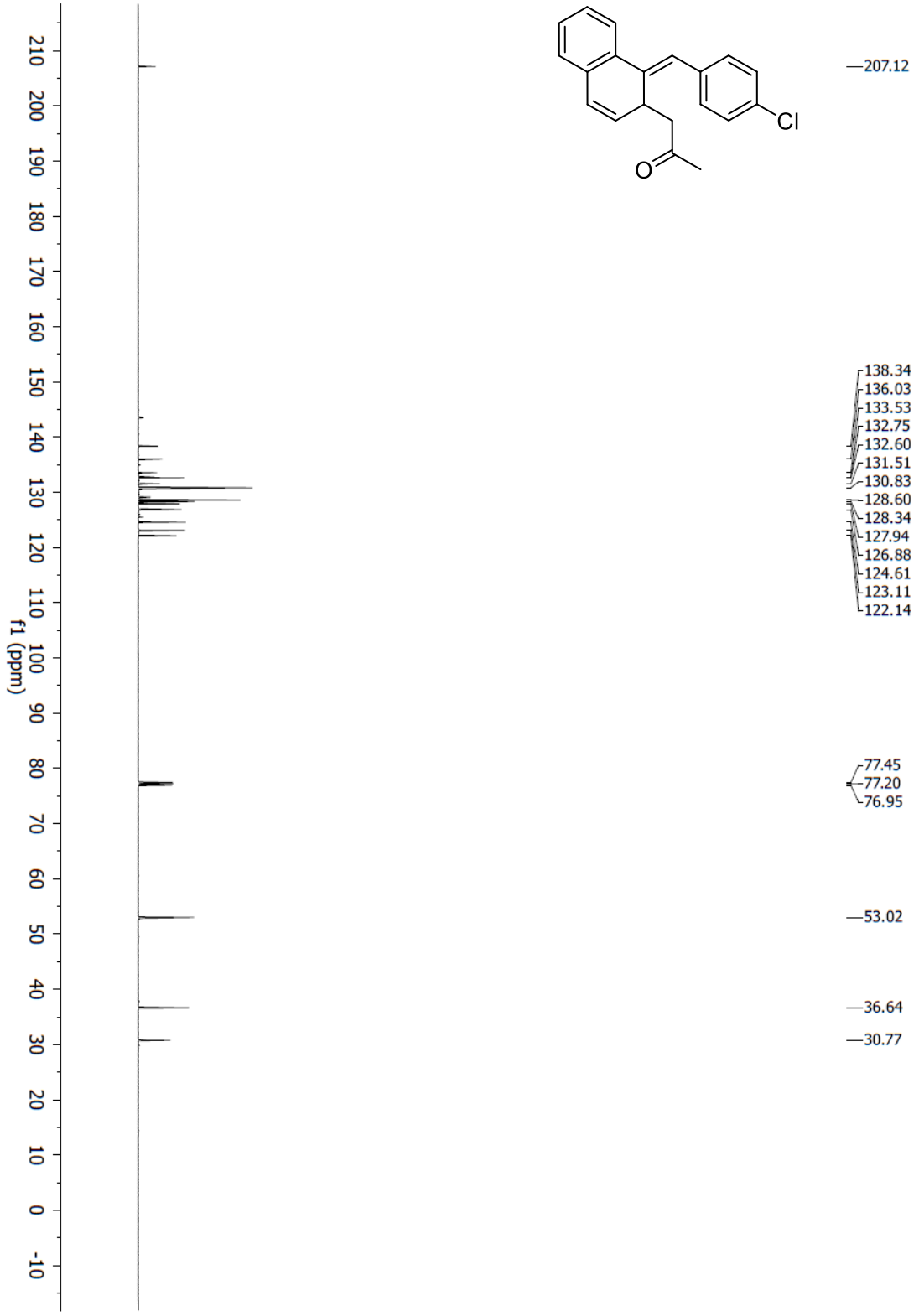
(*E*)-1-(1-(3-methoxybenzylidene)-1,2-dihydronaphthalen-2-yl)propan-2-one (2d)



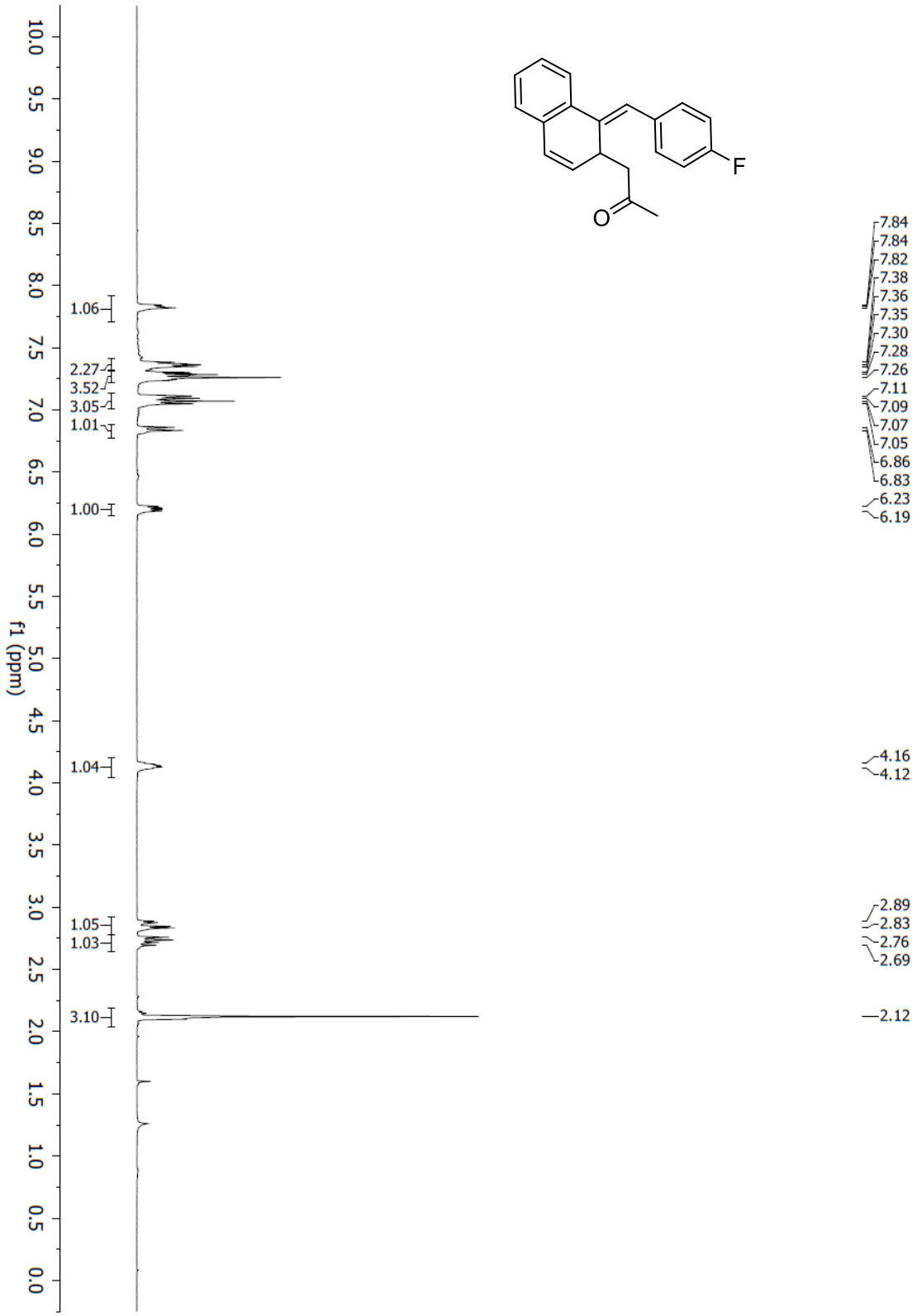
(*E*)-1-(1-(4-chlorobenzylidene)-1,2-dihydronaphthalen-2-yl)propan-2-one (2e)



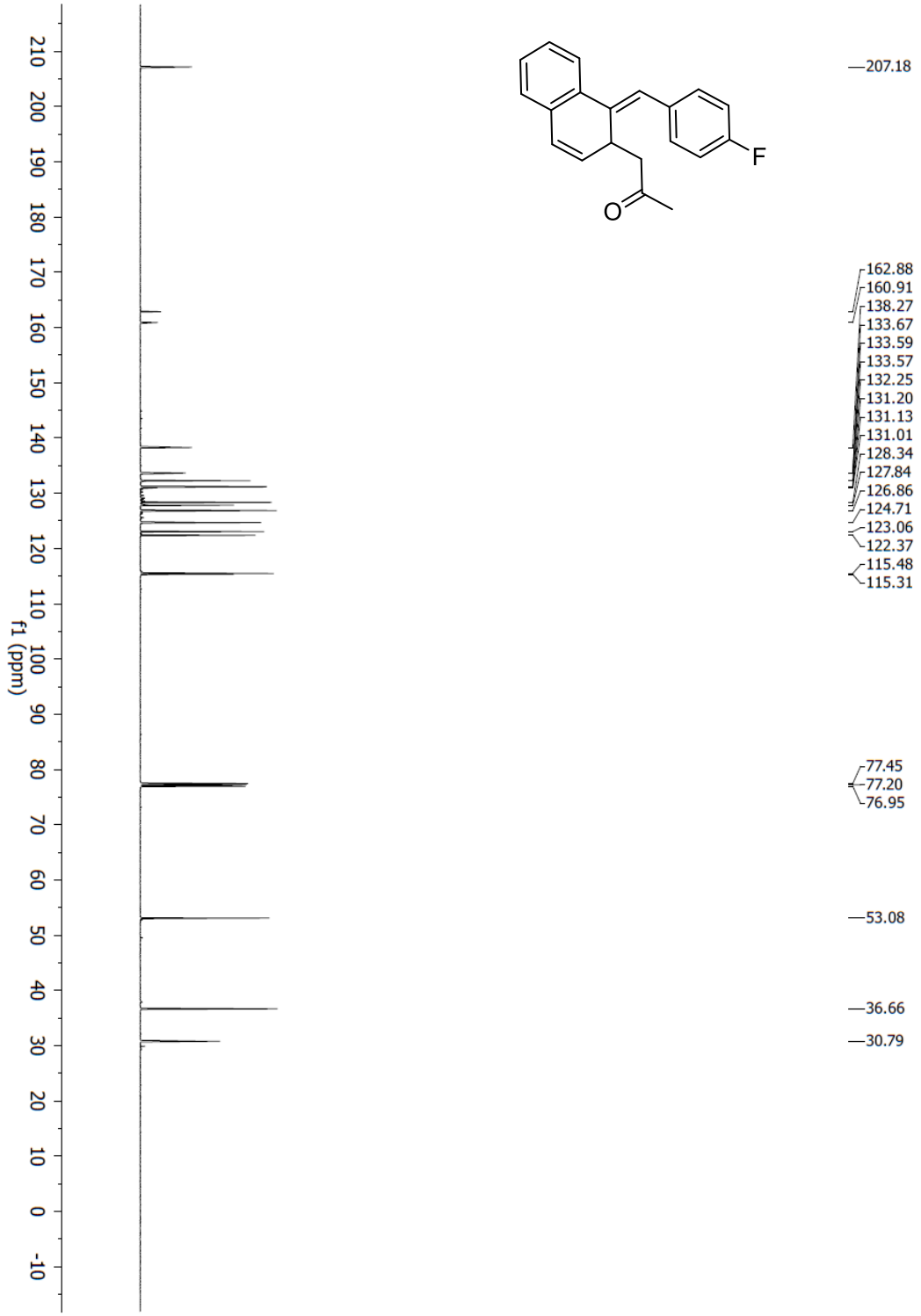
(*E*)-1-(1-(4-chlorobenzylidene)-1,2-dihydronaphthalen-2-yl)propan-2-one (2e)



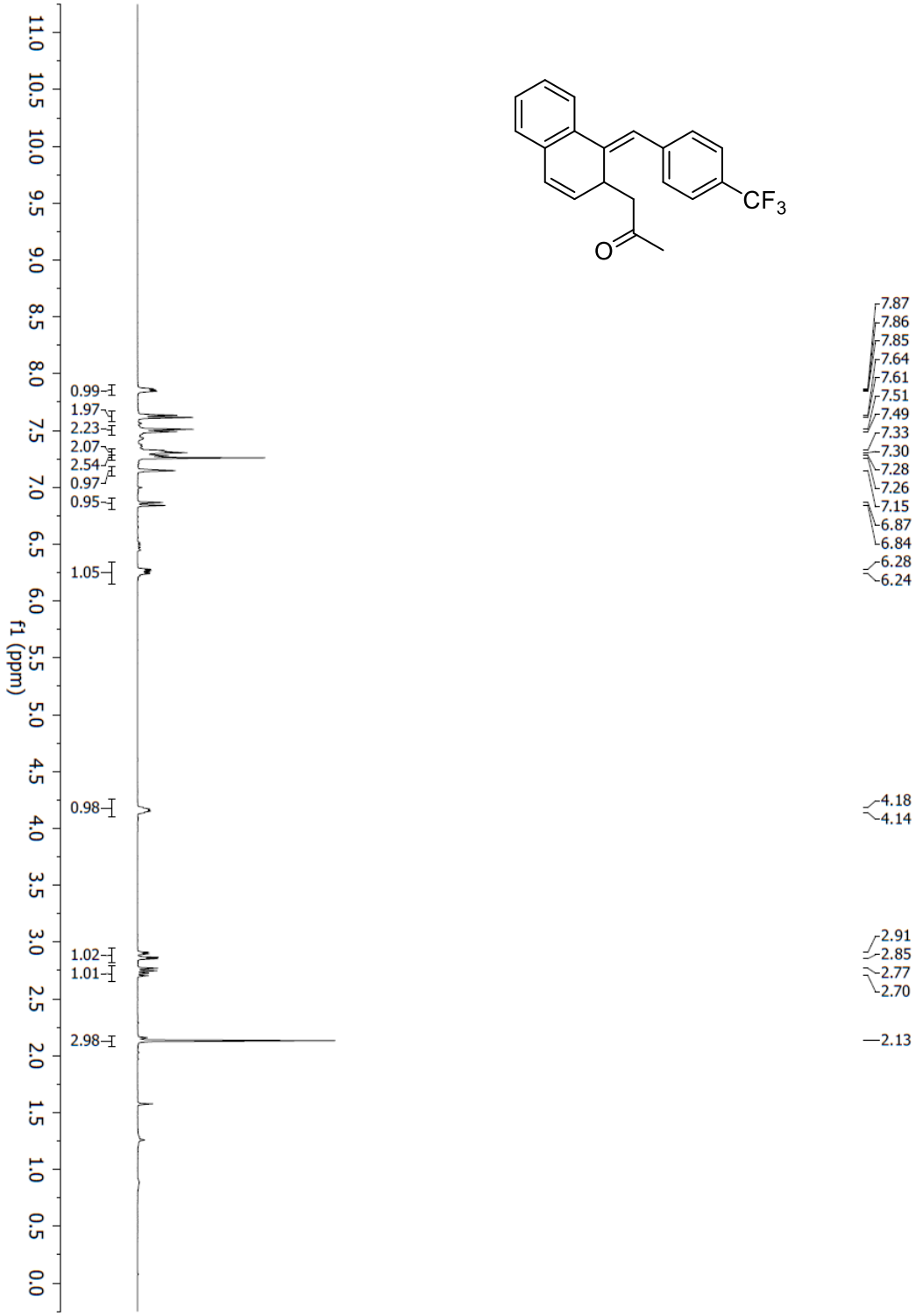
(*E*)-1-(1-(4-fluorobenzylidene)-1,2-dihydronaphthalen-2-yl)propan-2-one (2f)



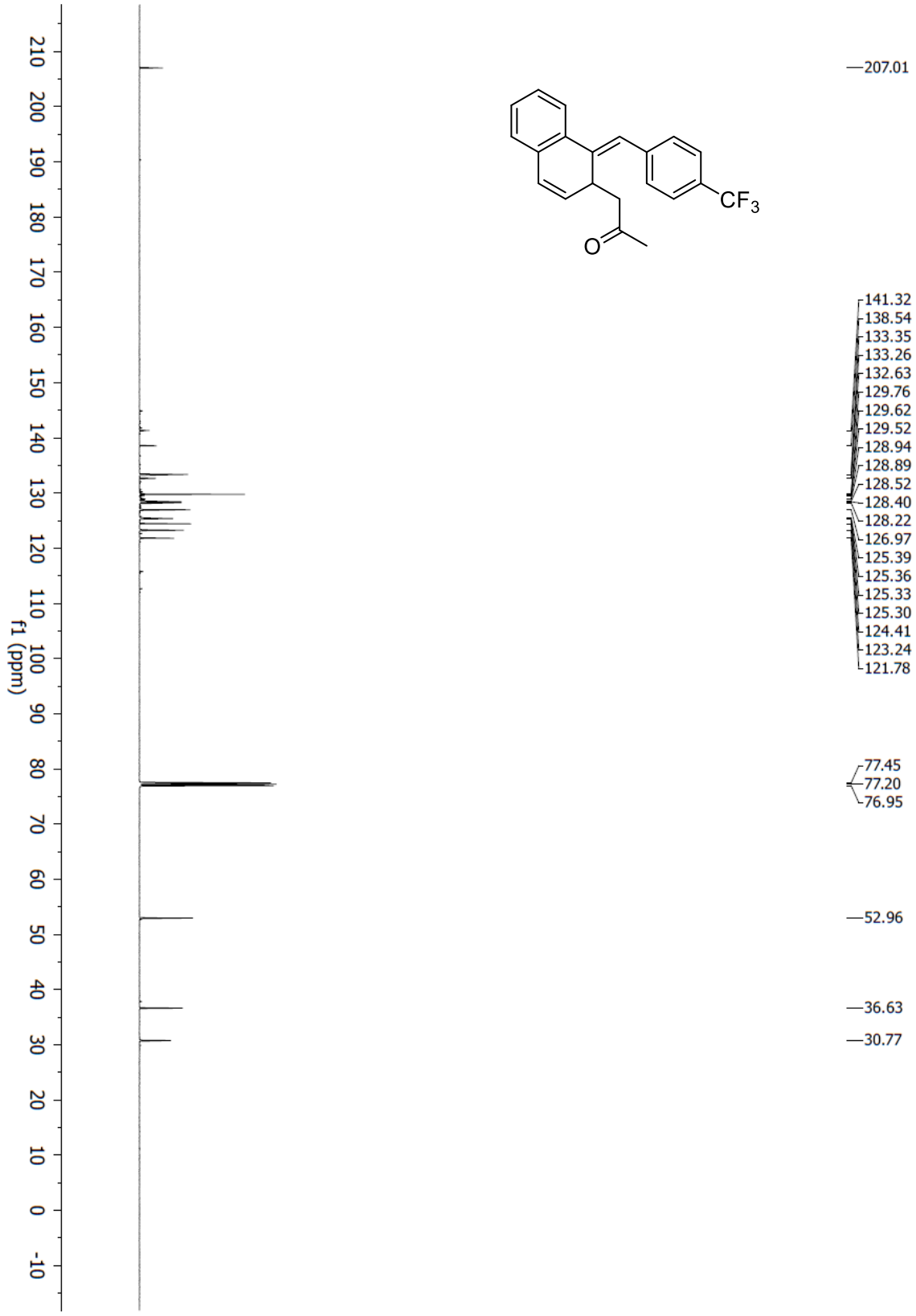
(*E*)-1-(1-(4-fluorobenzylidene)-1,2-dihydronaphthalen-2-yl)propan-2-one (2f)



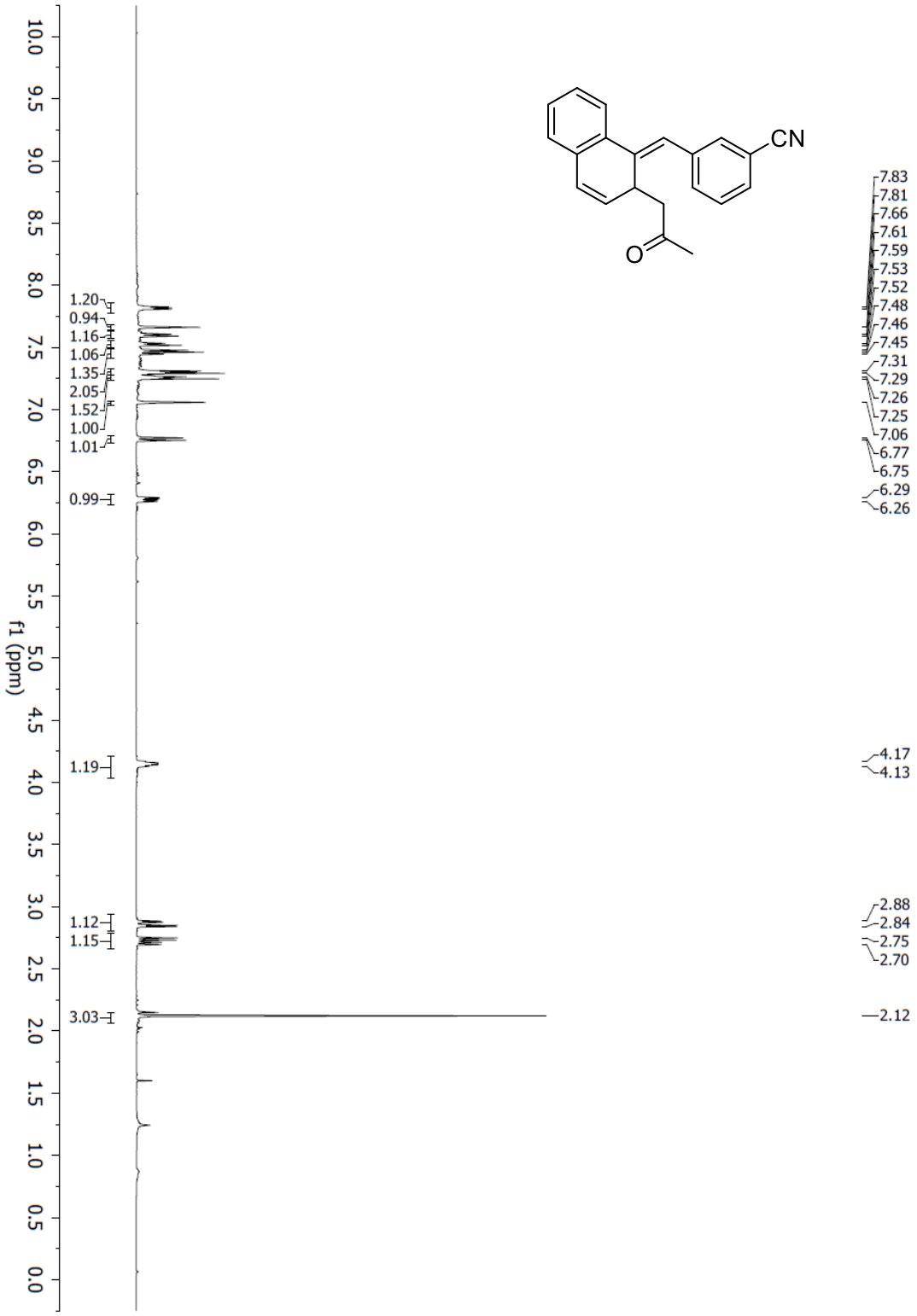
(*E*)-1-(1-(4-(trifluoromethyl)benzylidene)-1,2-dihydronaphthalen-2-yl)propan-2-one (2g)



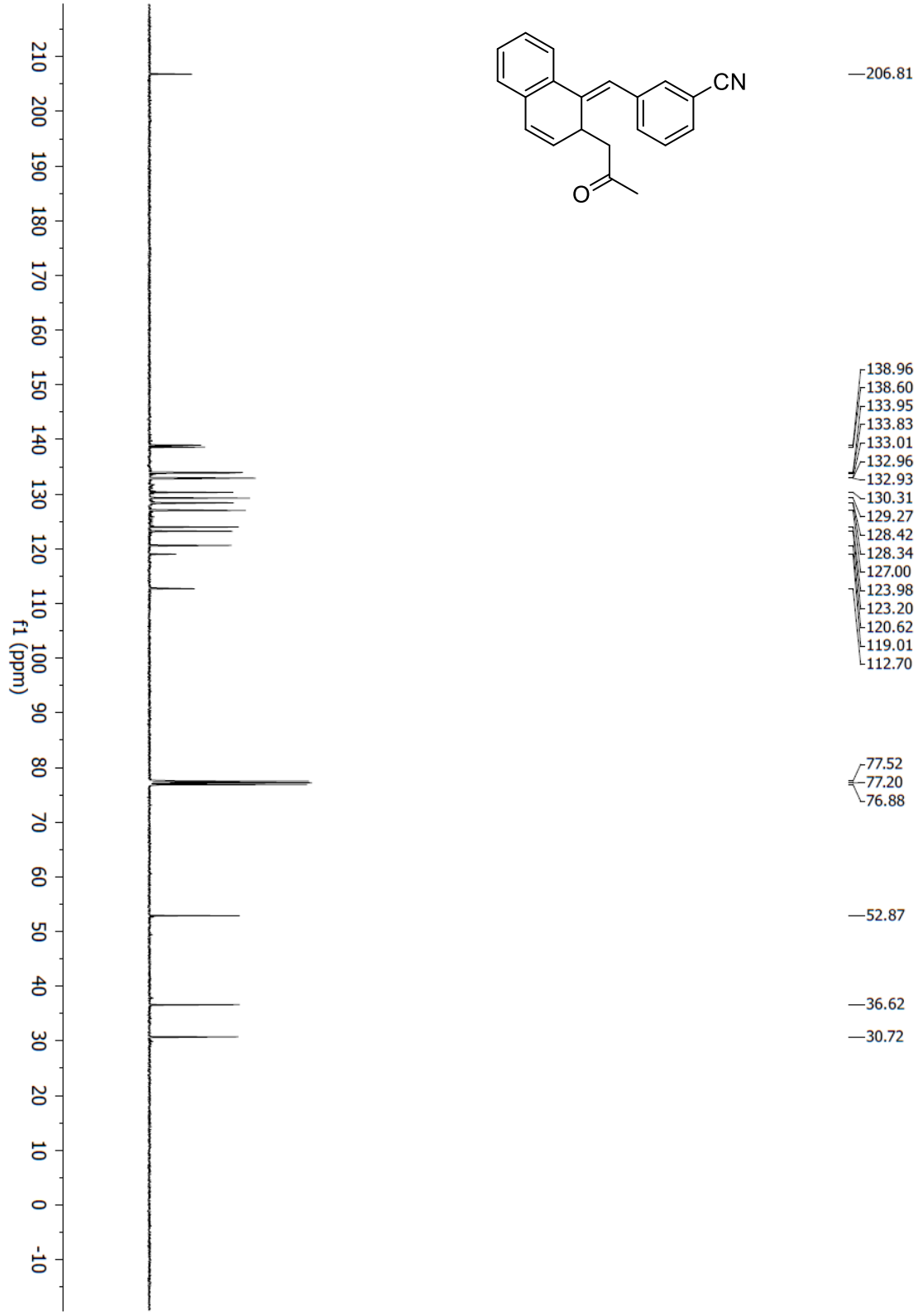
(*E*)-1-(1-(4-(trifluoromethyl)benzylidene)-1,2-dihydronaphthalen-2-yl)propan-2-one (2g)



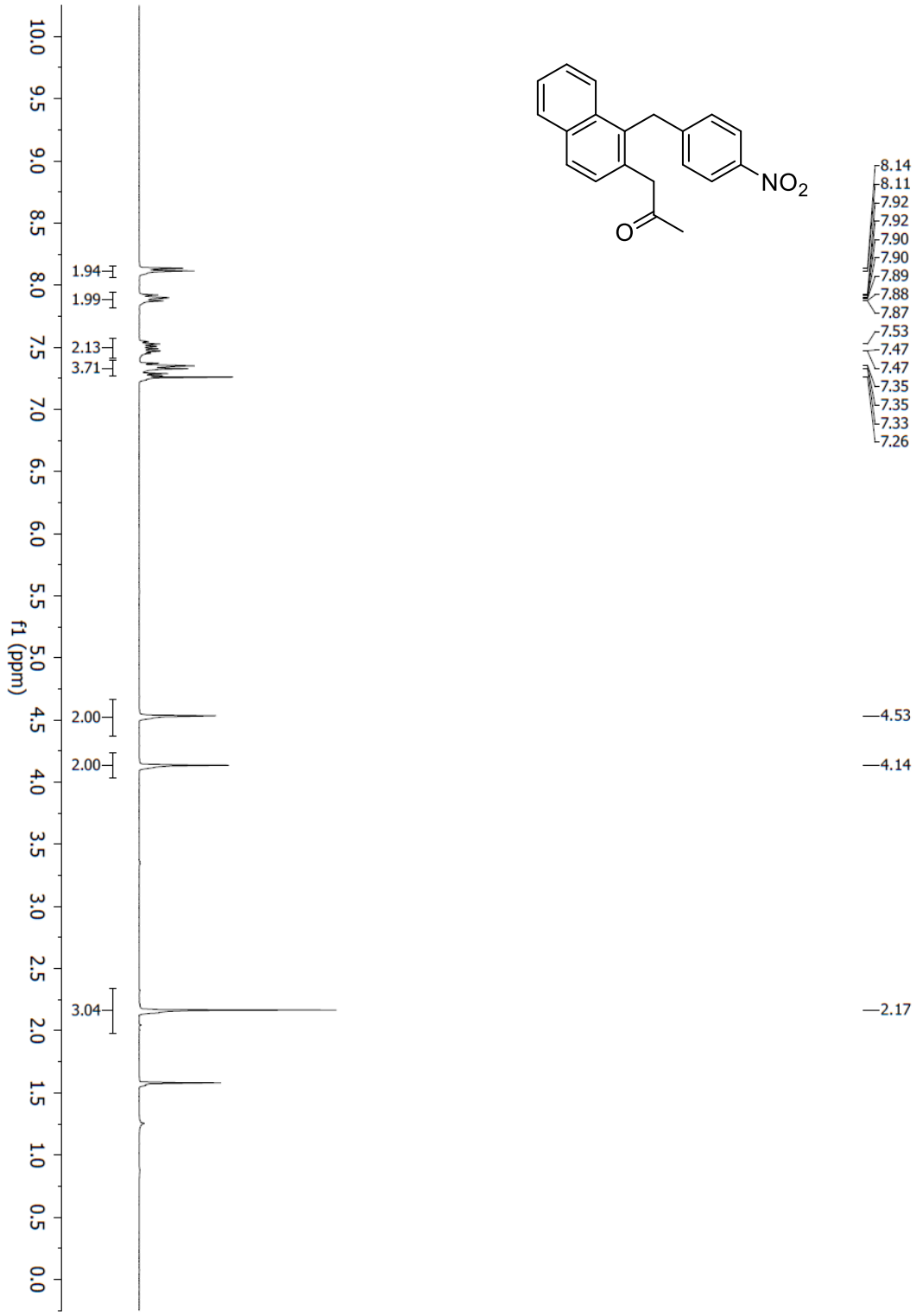
(*E*)-3-((2-(2-oxopropyl)naphthalen-1(2H)-ylidene)methyl)benzonitrile (2h)



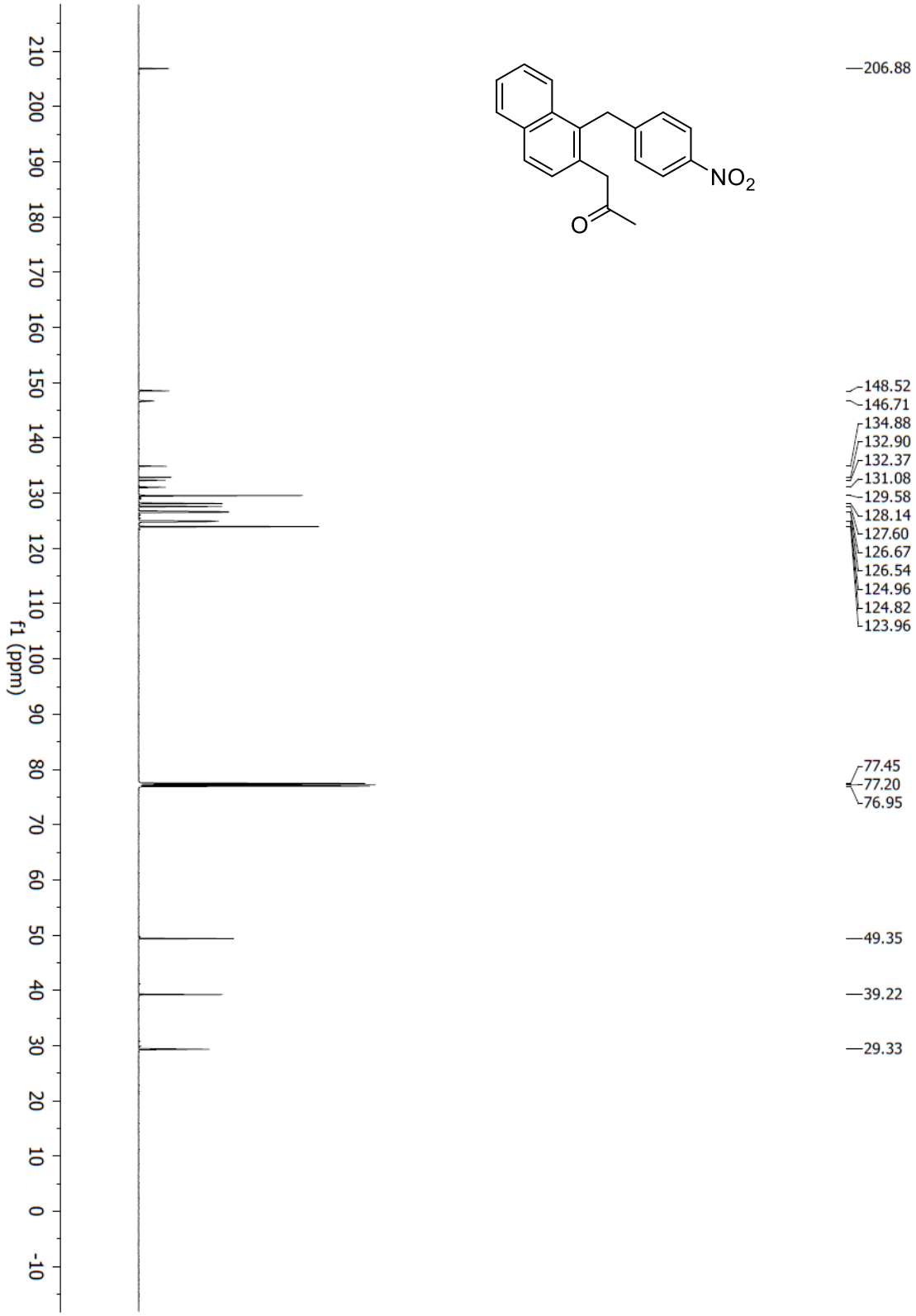
(*E*)-3-((2-(2-oxopropyl)naphthalen-1(2H)-ylidene)methyl)benzonitrile (2h)



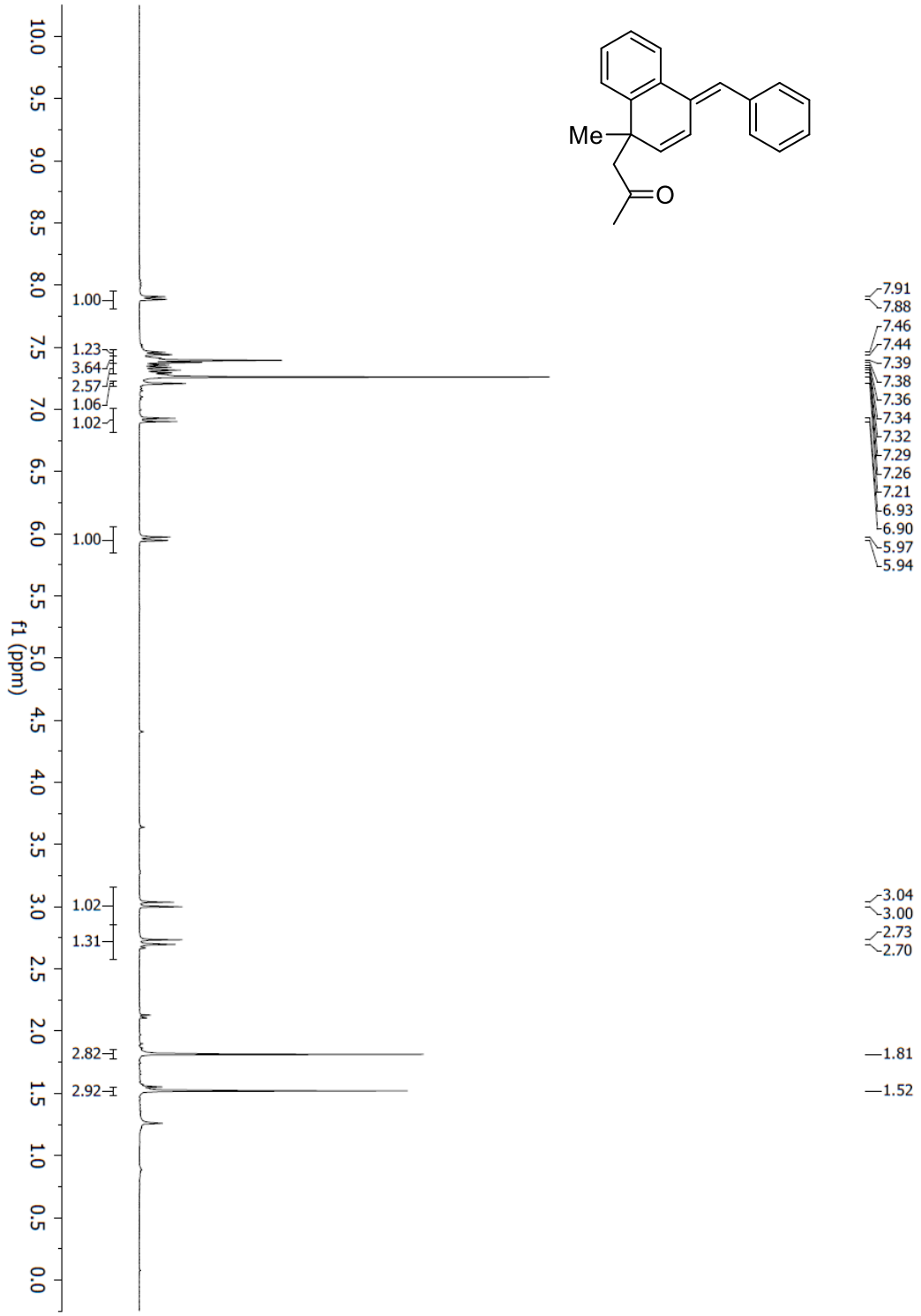
1-(1-(4-nitrobenzyl)naphthalen-2-yl)propan-2-one (2i)



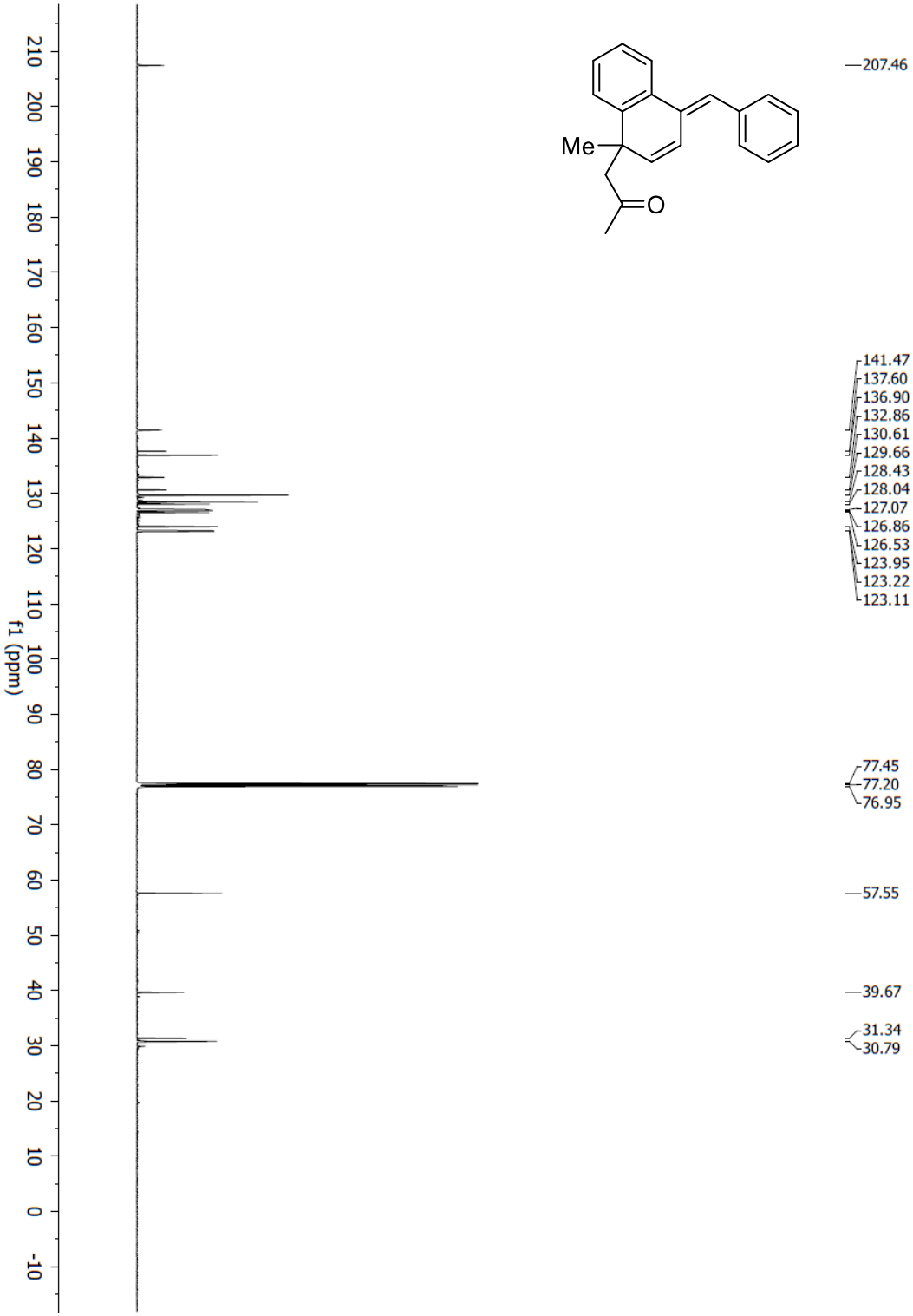
1-(1-(4-nitrobenzyl)naphthalen-2-yl)propan-2-one (2i)



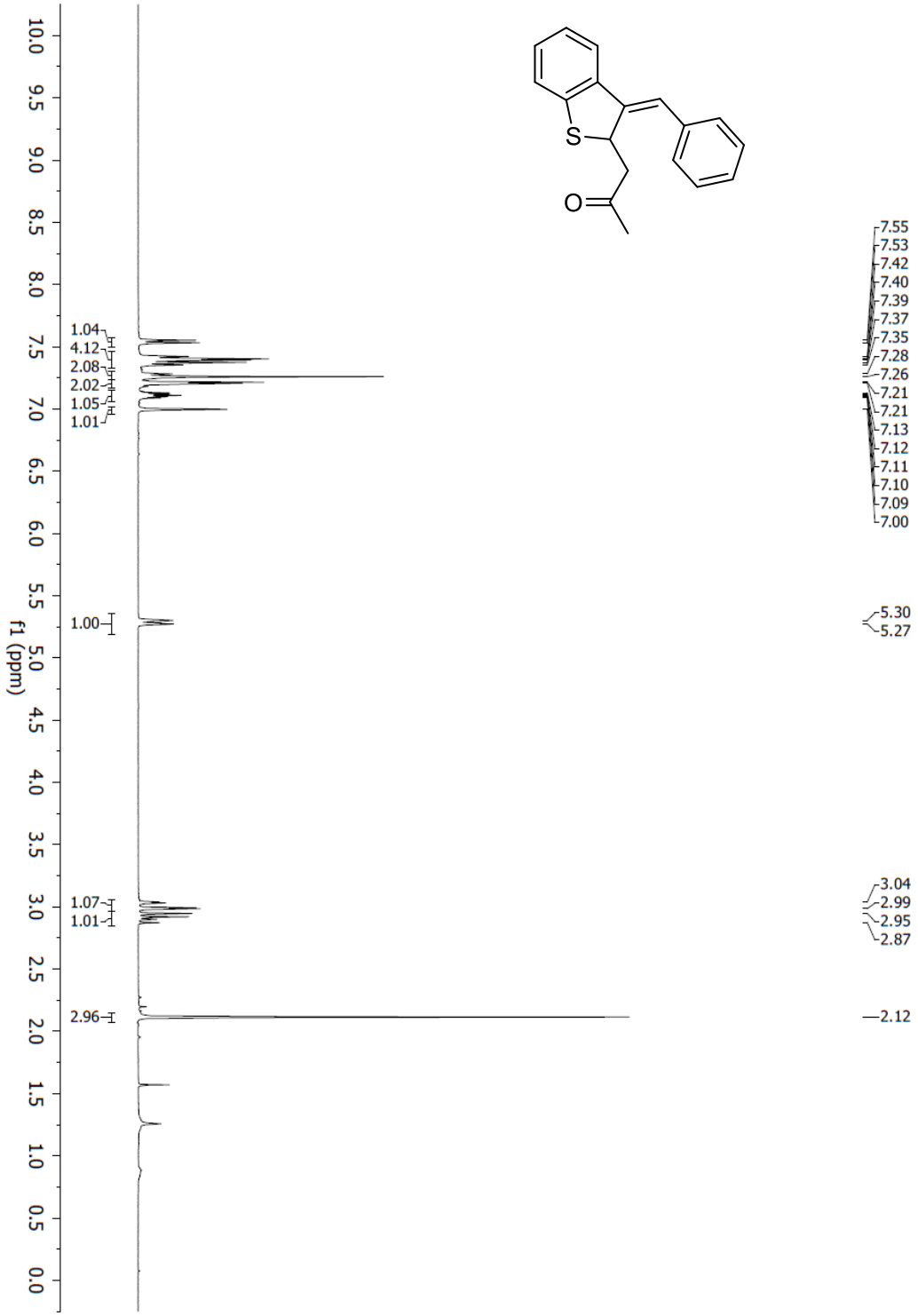
(*E*)-1-(4-benzylidene-1-methyl-1,4-dihydronaphthalen-1-yl)propan-2-one (2j)



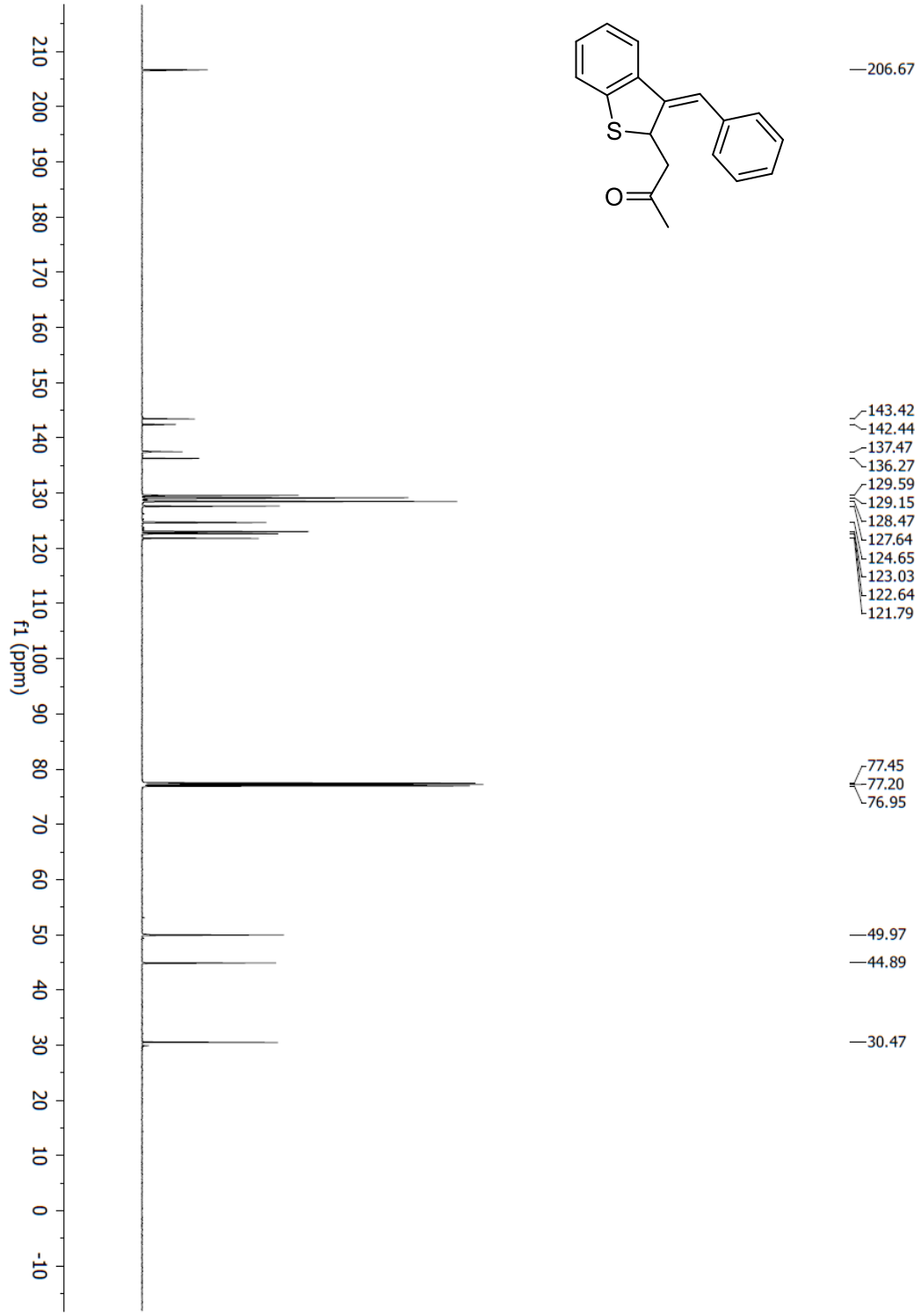
(*E*)-1-(4-benzylidene-1-methyl-1,4-dihydronaphthalen-1-yl)propan-2-one (2j)



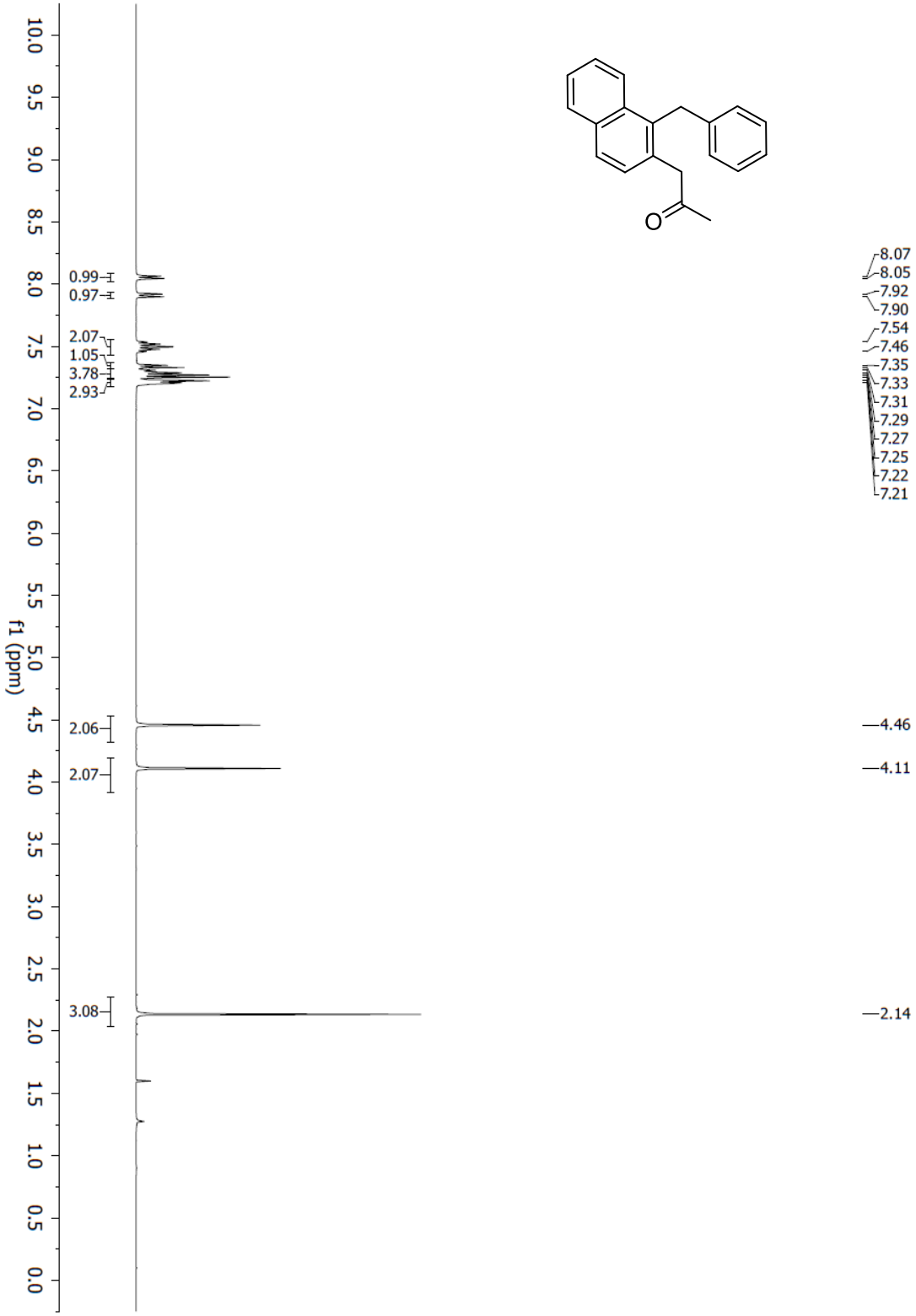
(*E*)-1-(3-benzylidene-2,3-dihydrobenzo[b]thiophen-2-yl)propan-2-one (2l)



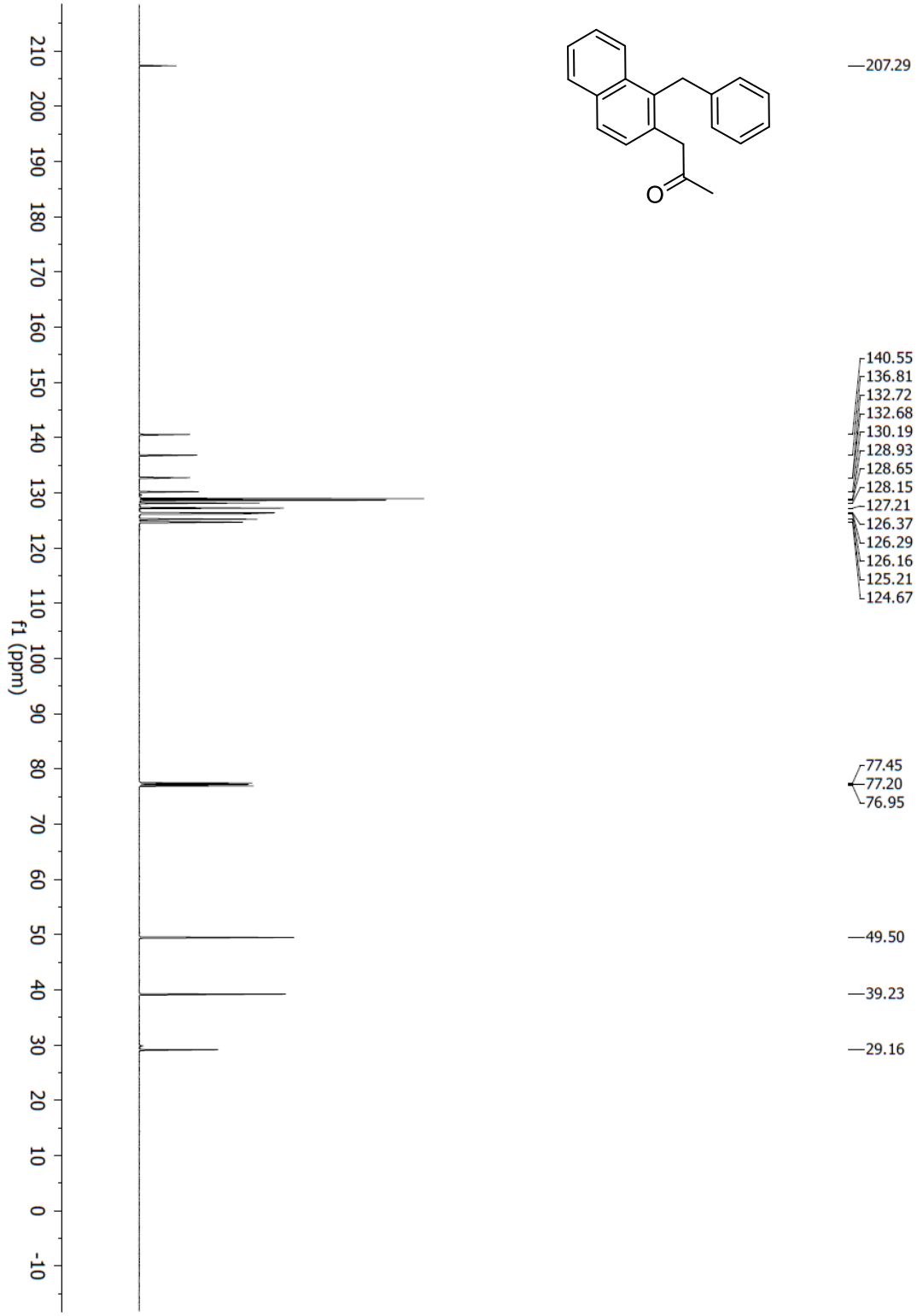
(*E*)-1-(3-benzylidene-2,3-dihydrobenzo[b]thiophen-2-yl)propan-2-one (2l)



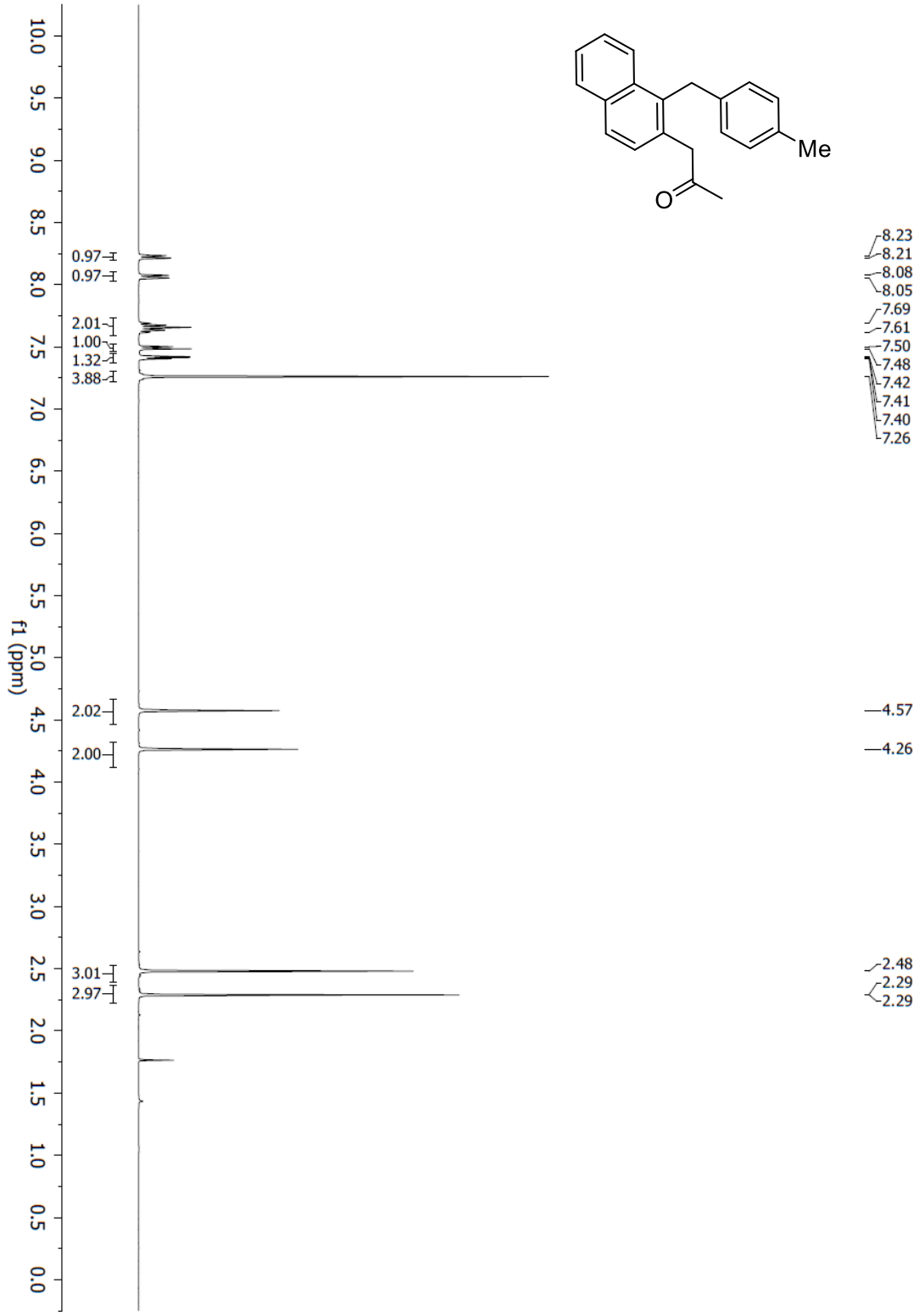
1-(1-benzylnaphthalen-2-yl)propan-2-one (3a)



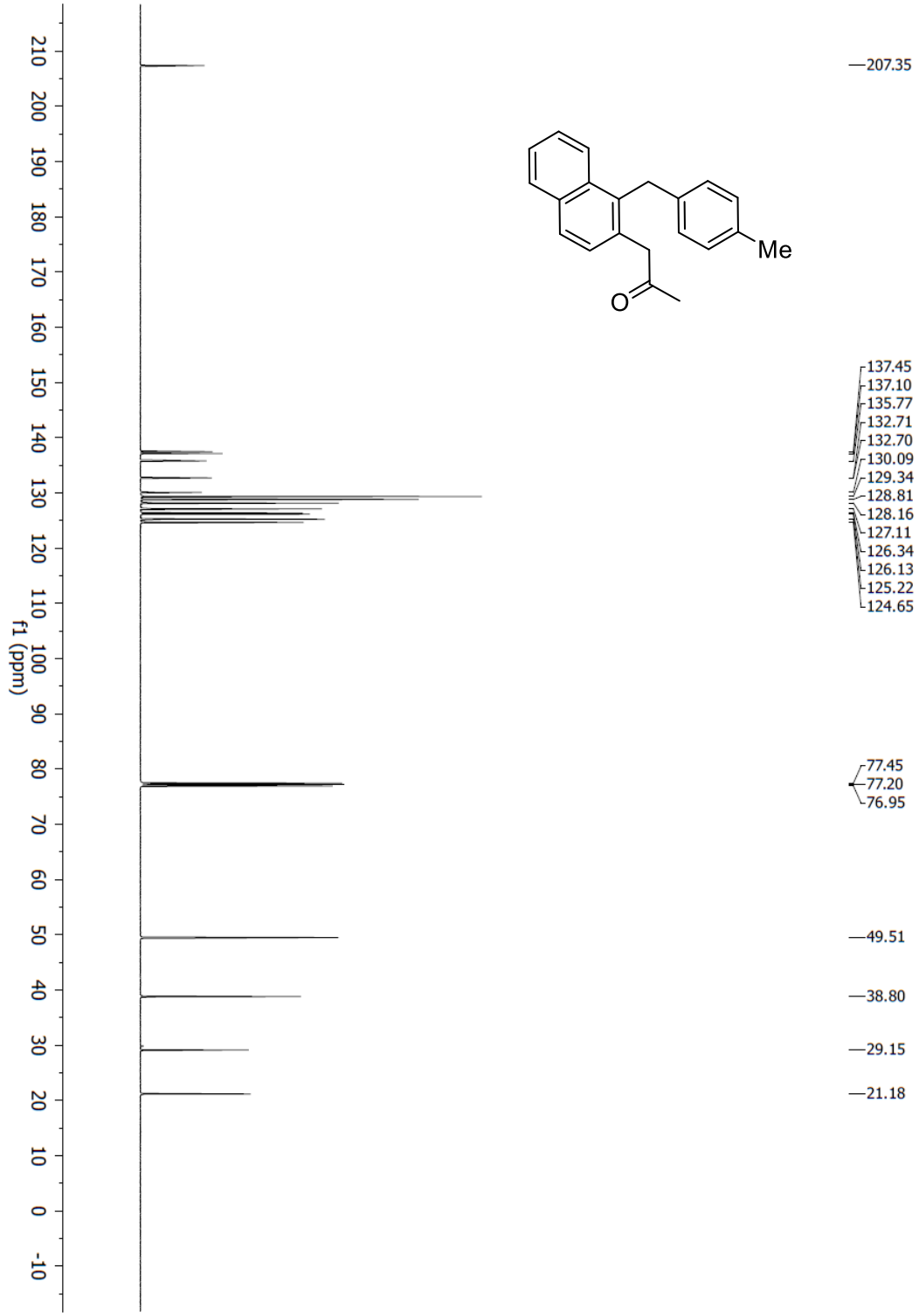
1-(1-benzylnaphthalen-2-yl)propan-2-one (3a)



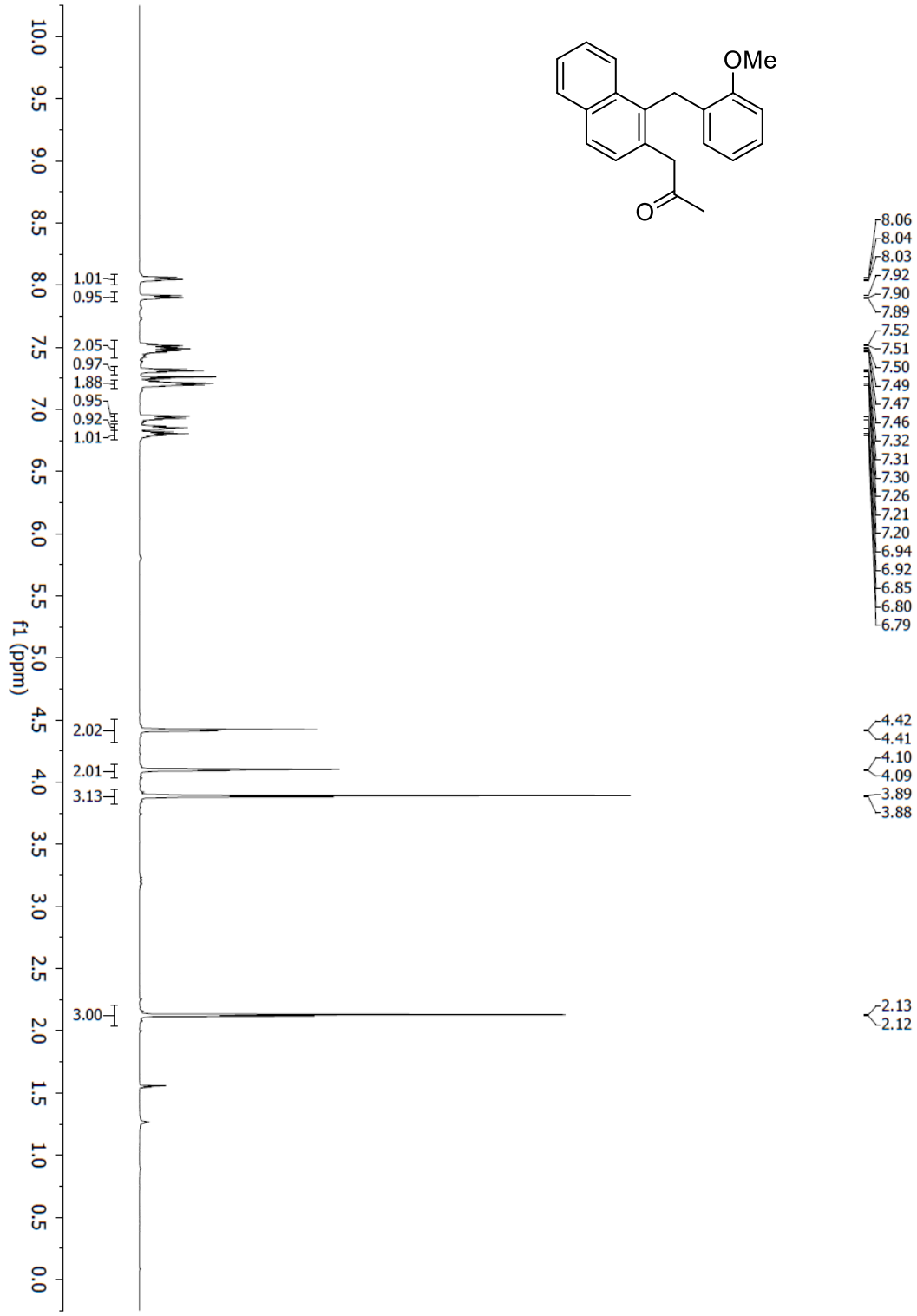
1-(1-(4-methylbenzyl)naphthalen-2-yl)propan-2-one (3b)



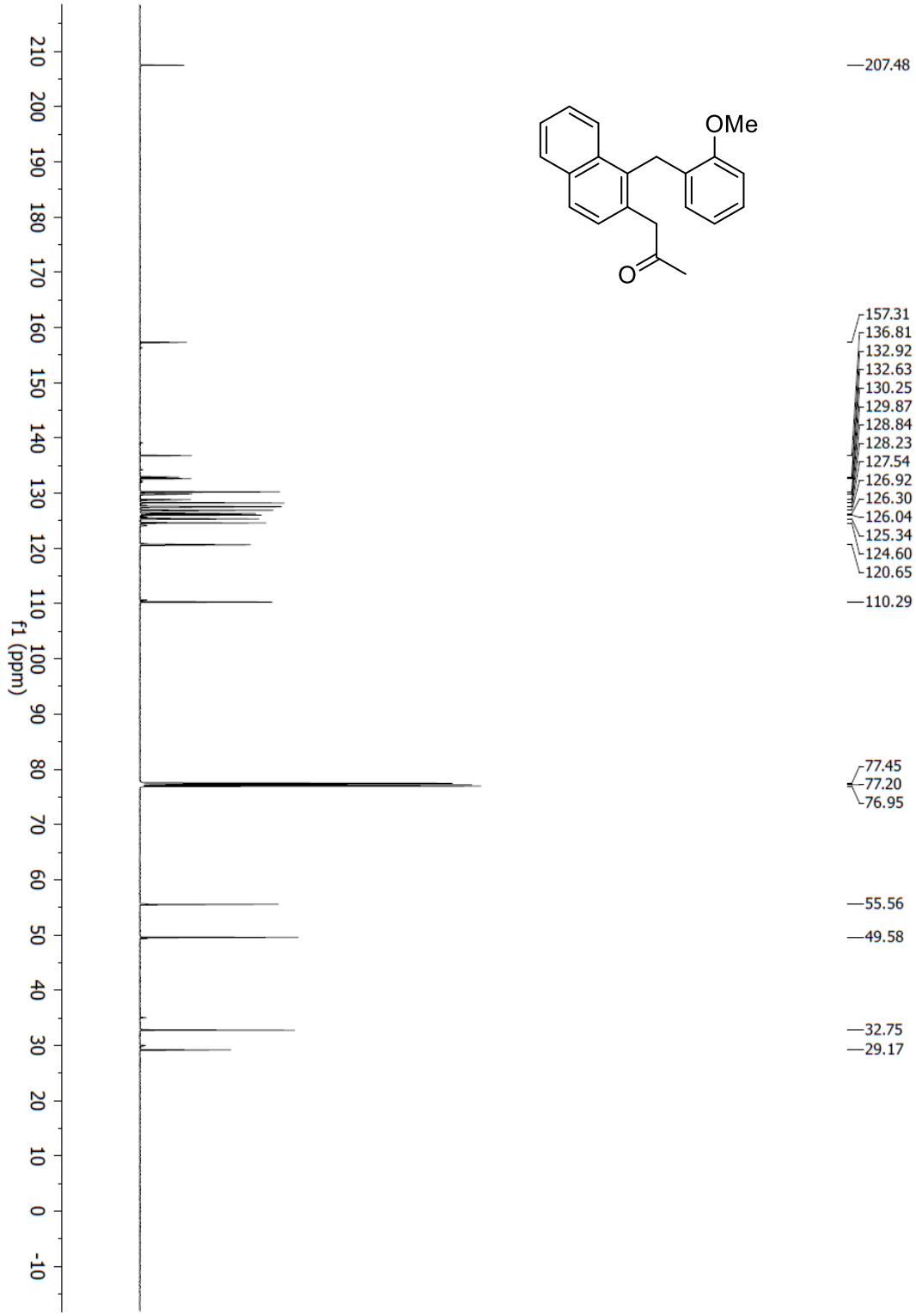
1-(1-(4-methylbenzyl)naphthalen-2-yl)propan-2-one (3b)



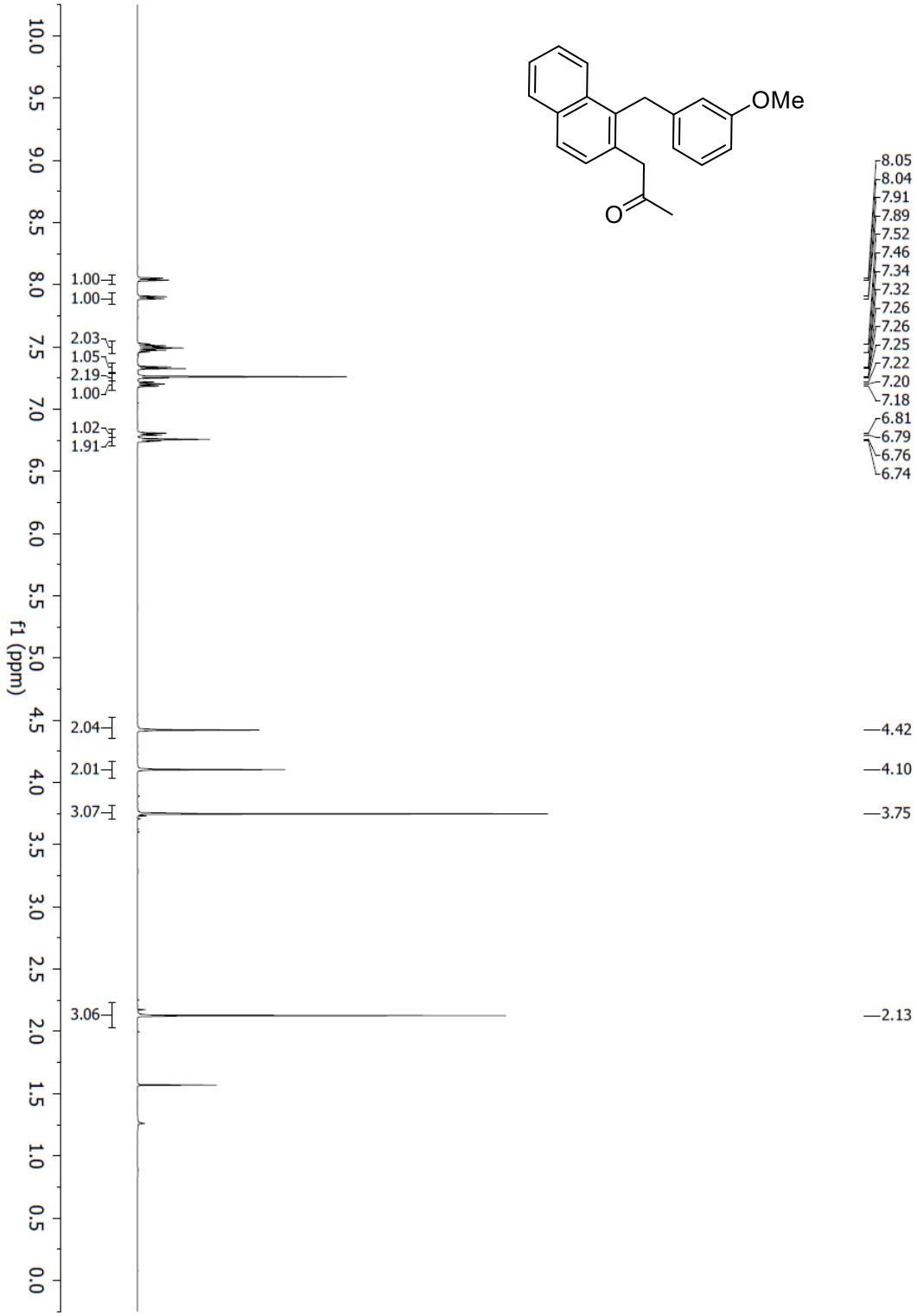
1-(1-(2-methoxybenzyl)naphthalen-2-yl)propan-2-one (3c)



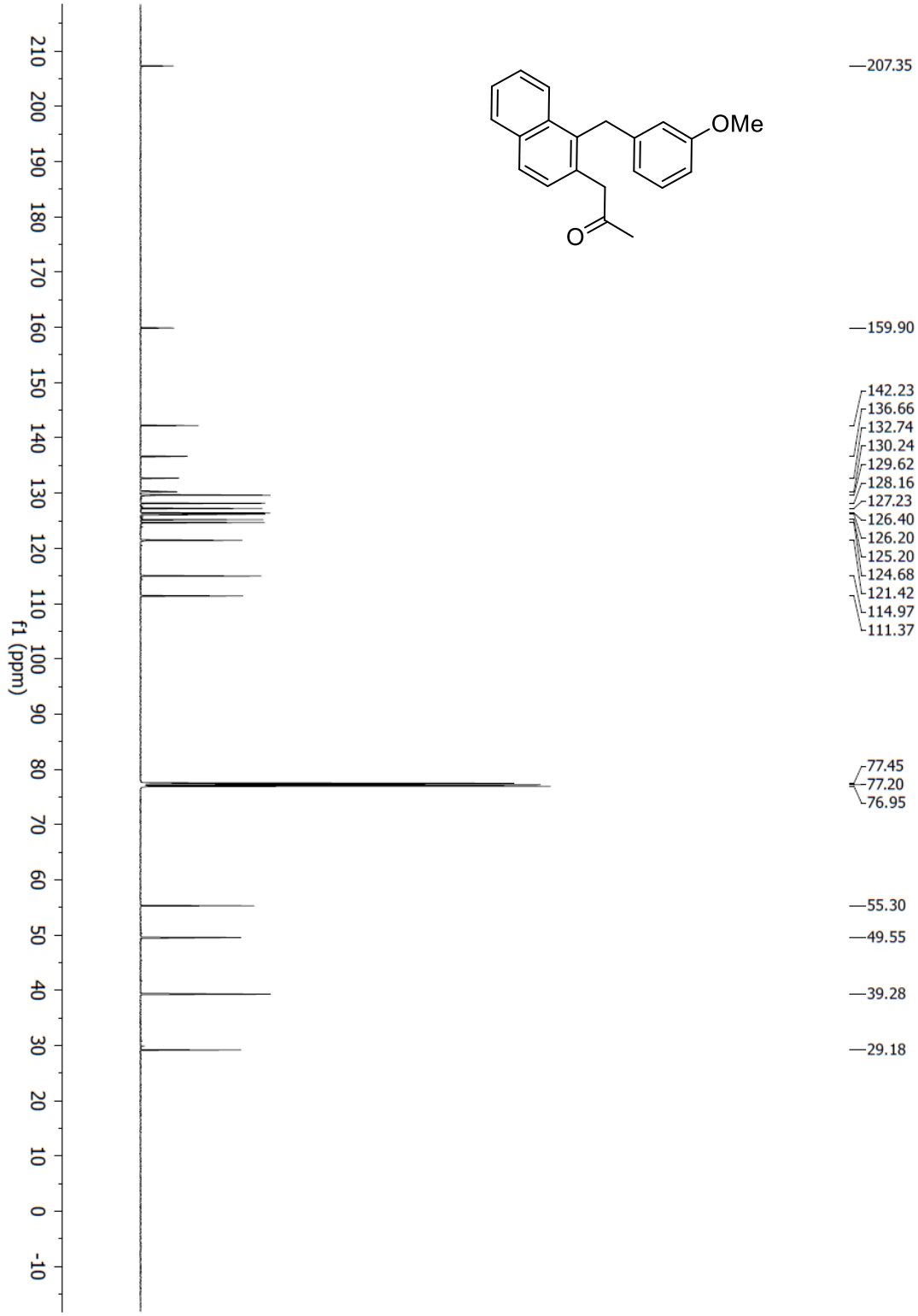
1-(1-(2-methoxybenzyl)naphthalen-2-yl)propan-2-one (3c)



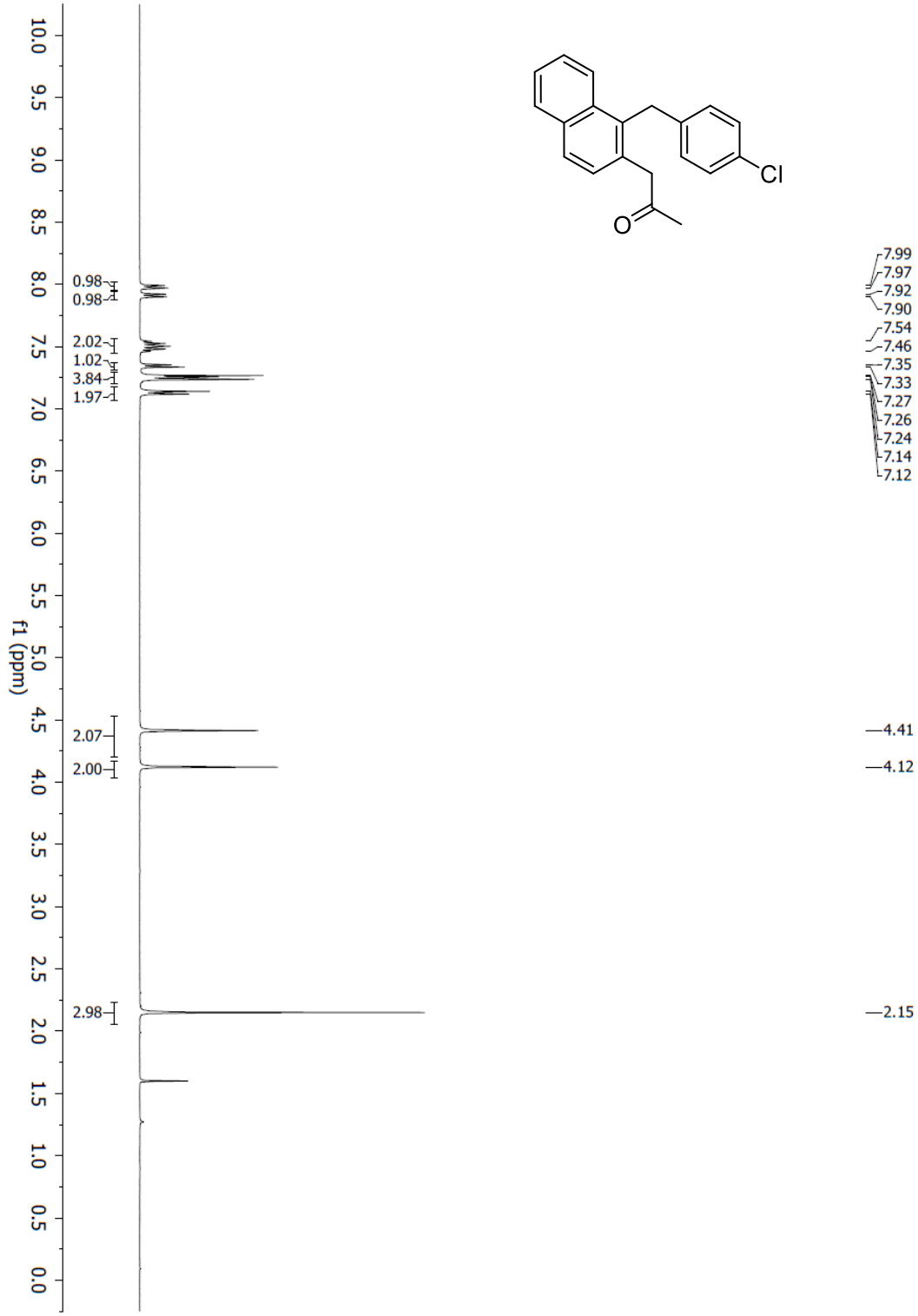
1-(1-(3-methoxybenzyl)naphthalen-2-yl)propan-2-one (3d)



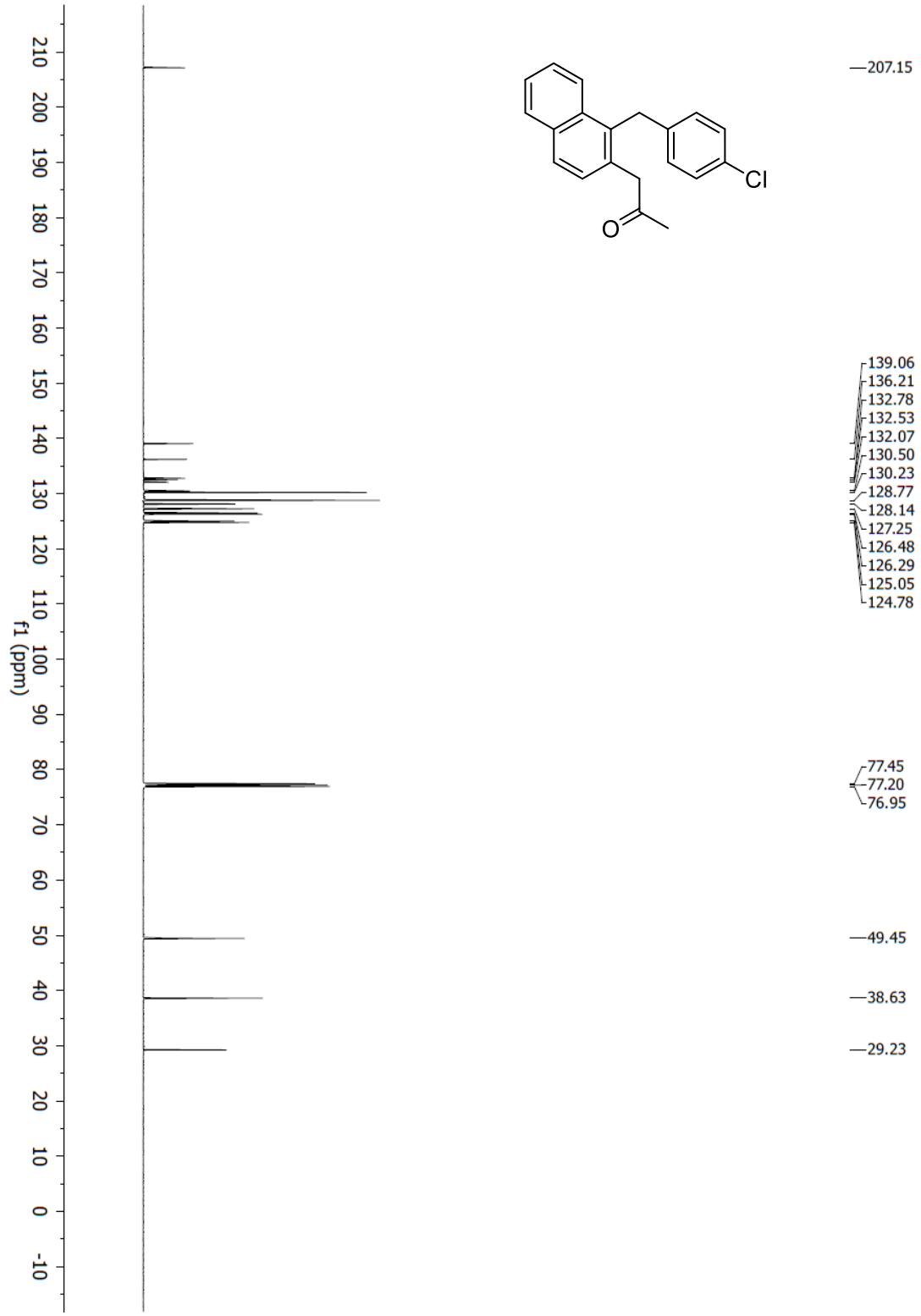
1-(1-(3-methoxybenzyl)naphthalen-2-yl)propan-2-one (3d)



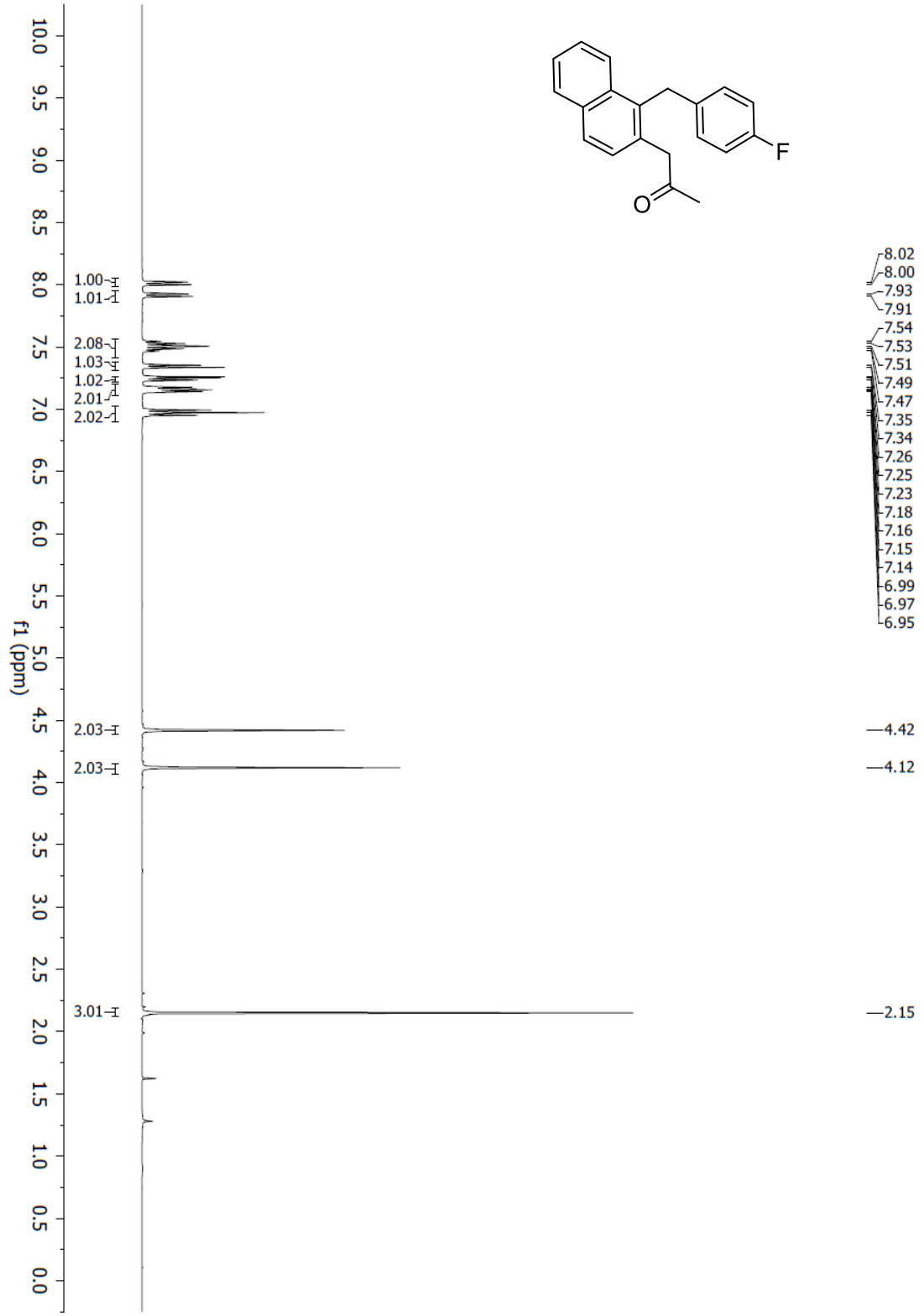
1-(1-(4-chlorobenzyl)naphthalen-2-yl)propan-2-one (3e)



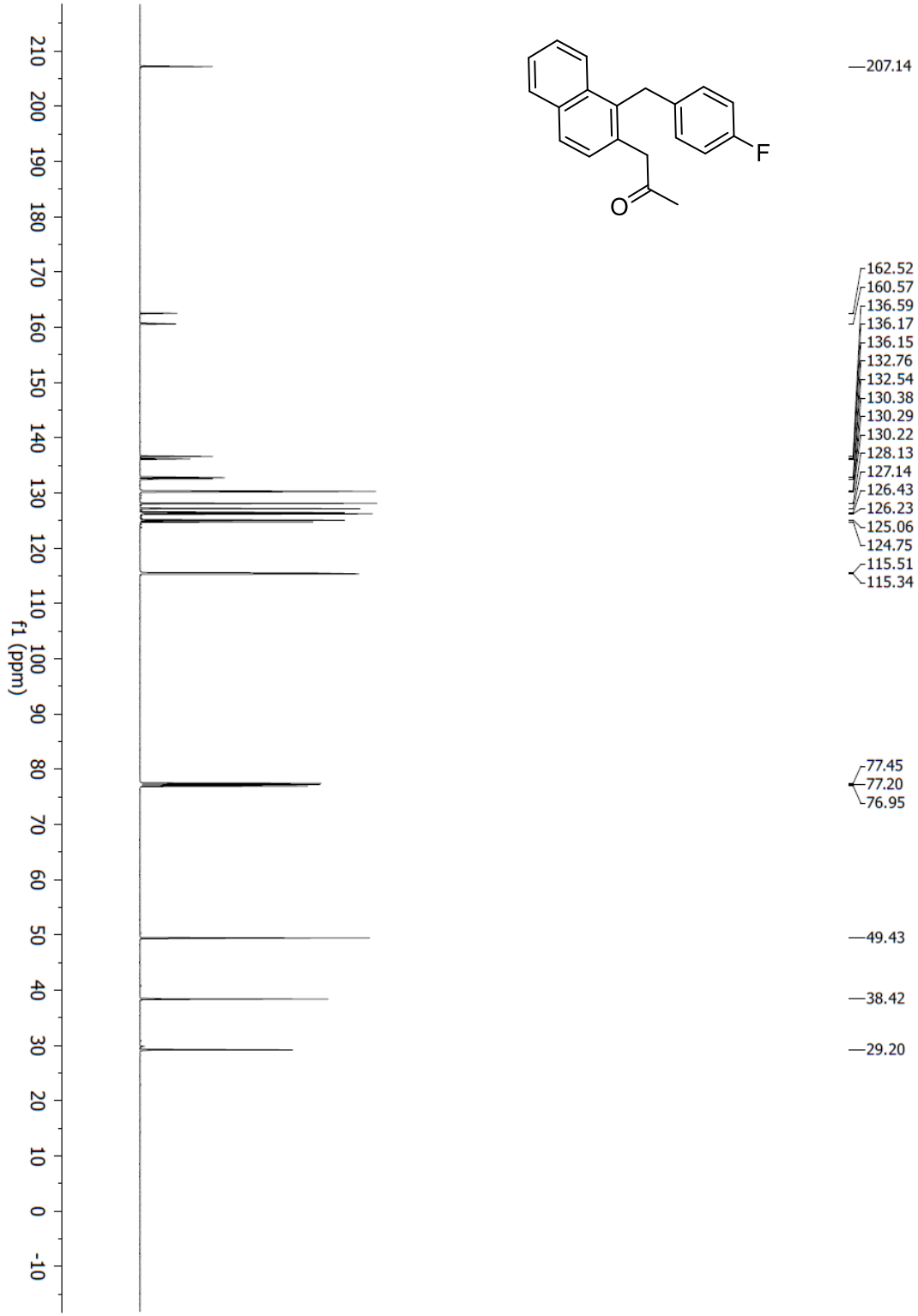
1-(1-(4-chlorobenzyl)naphthalen-2-yl)propan-2-one (3e)



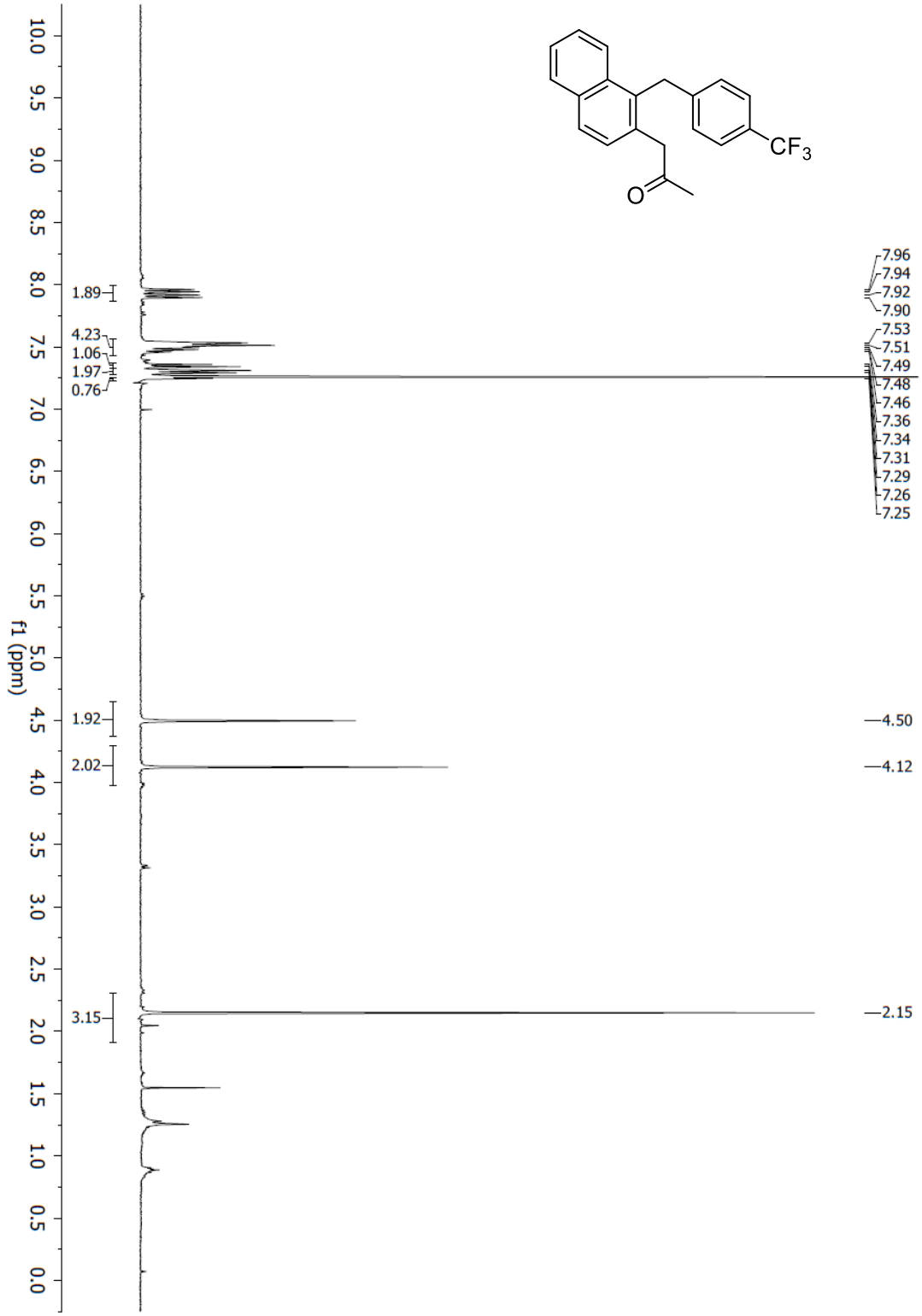
1-(1-(4-fluorobenzyl)naphthalen-2-yl)propan-2-one (3f)



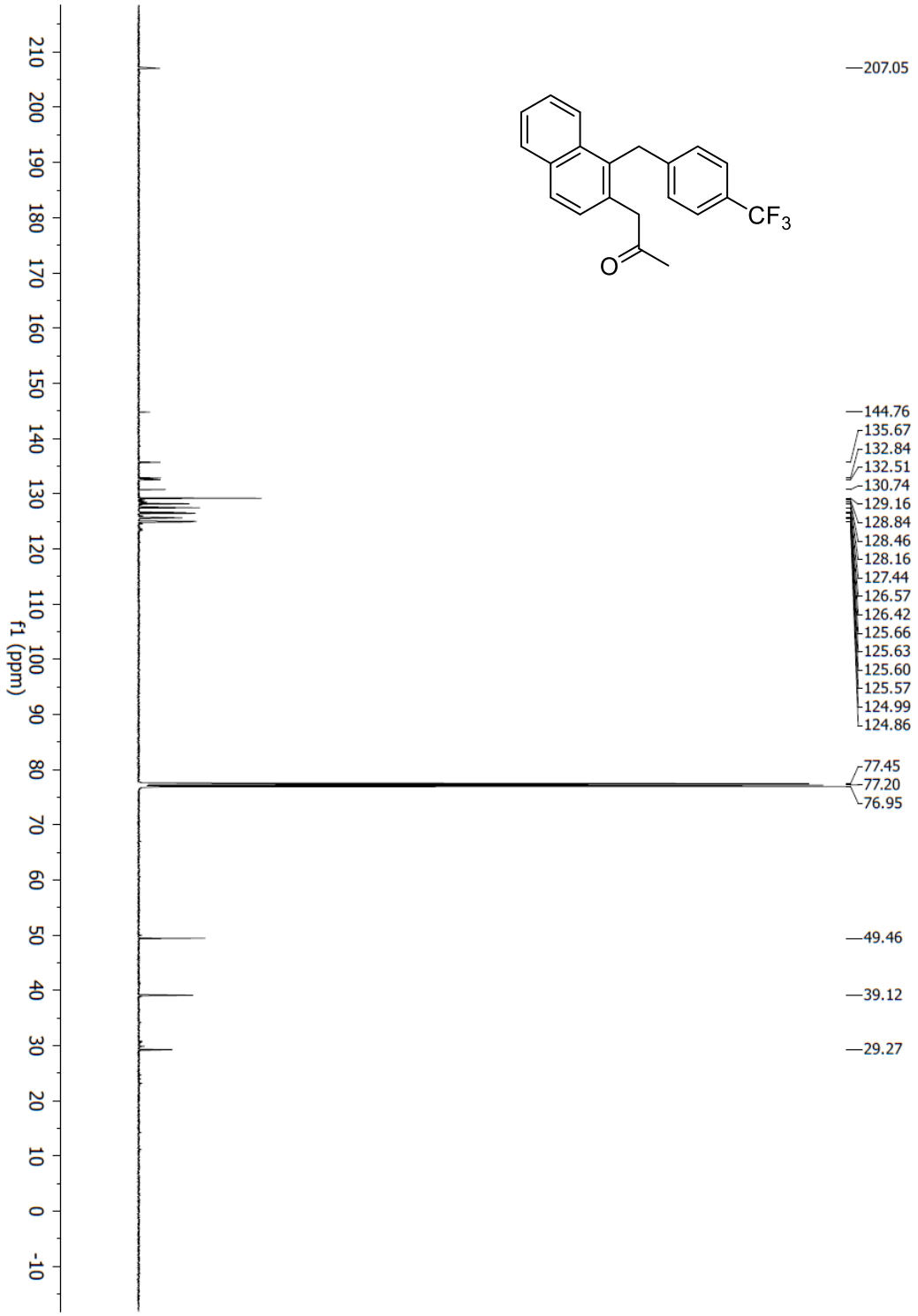
1-(1-(4-fluorobenzyl)naphthalen-2-yl)propan-2-one (3f)



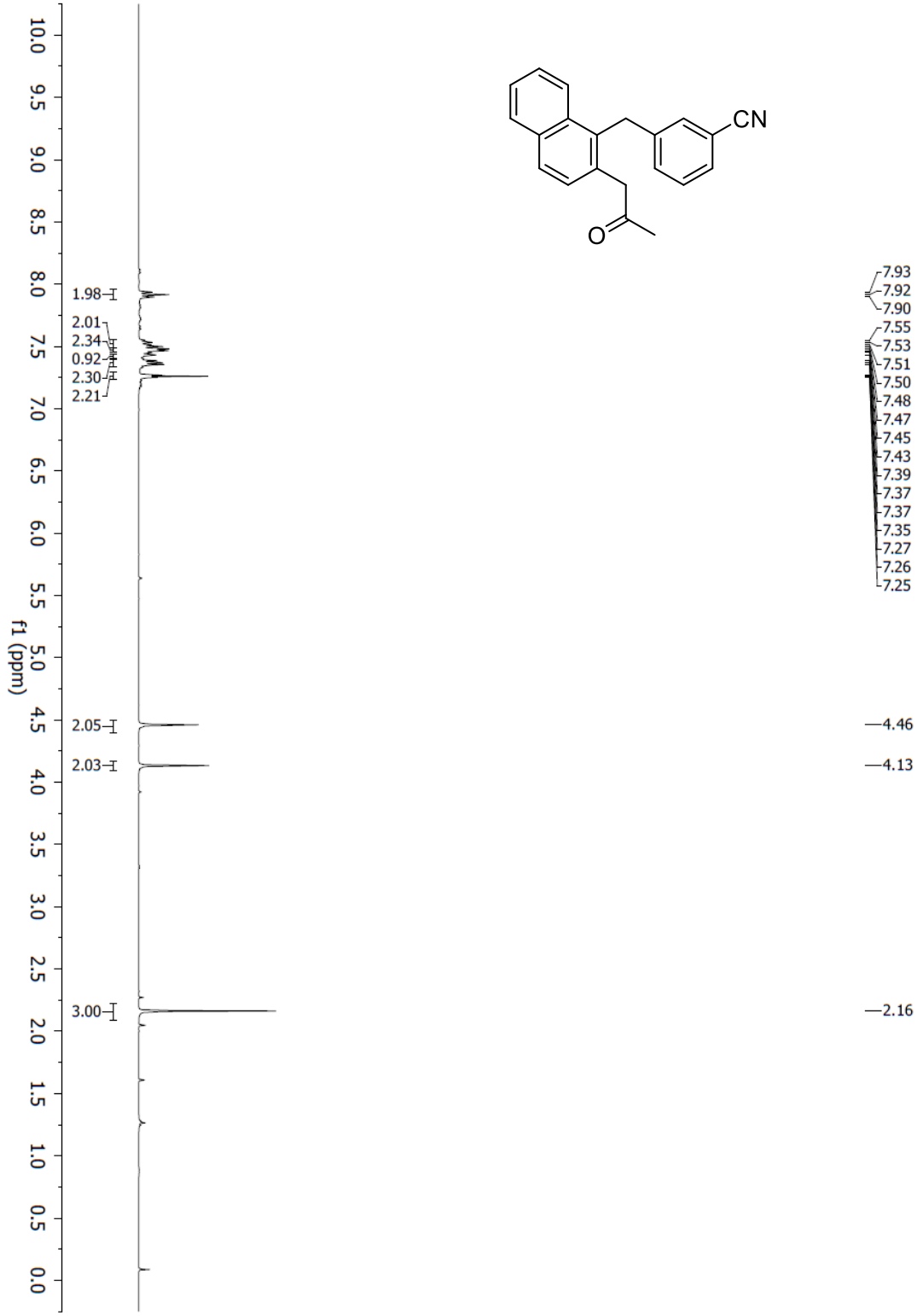
1-(1-(4-(trifluoromethyl)benzyl)naphthalen-2-yl)propan-2-one (3g)



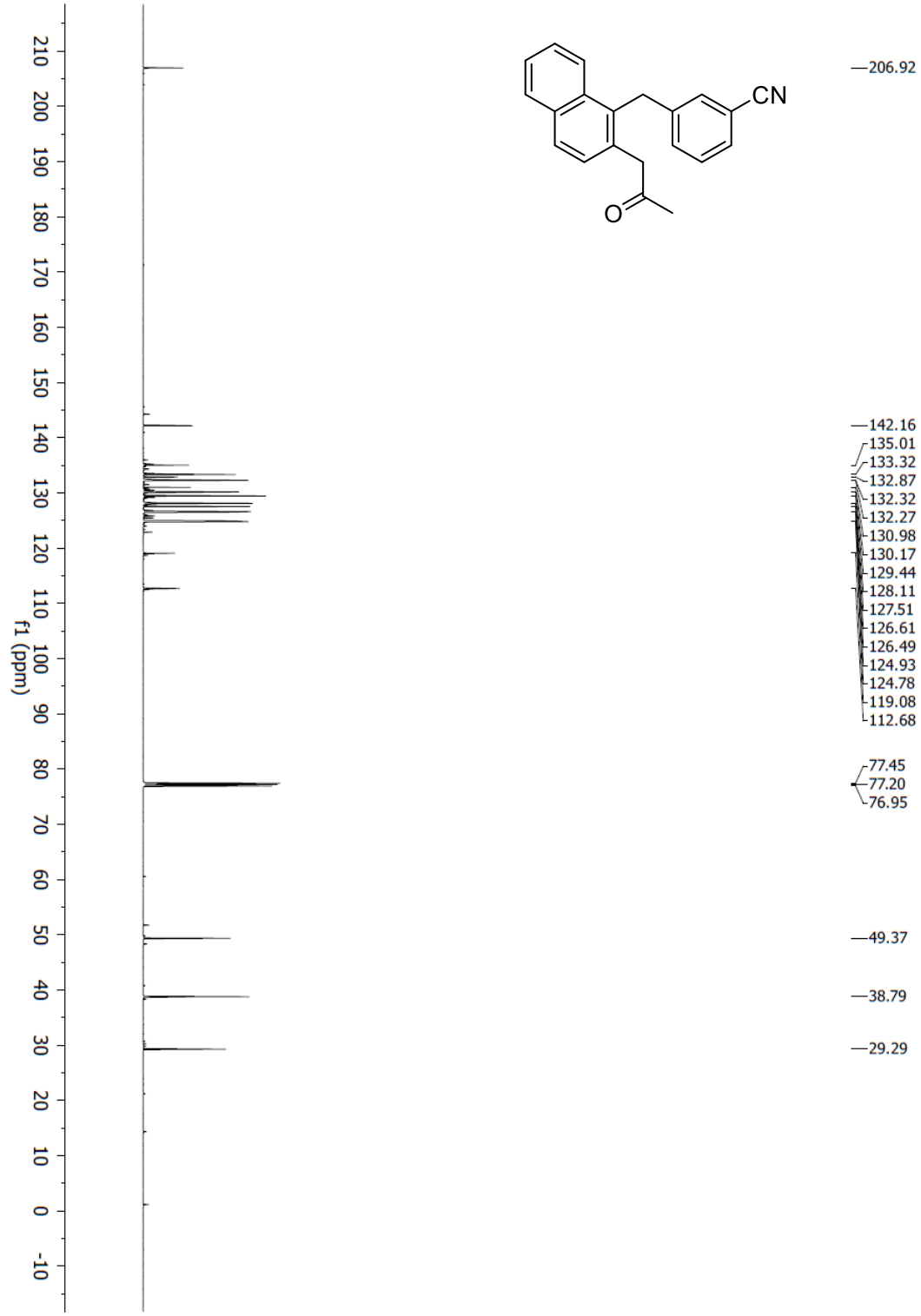
1-(1-(4-(trifluoromethyl)benzyl)naphthalen-2-yl)propan-2-one (3g)



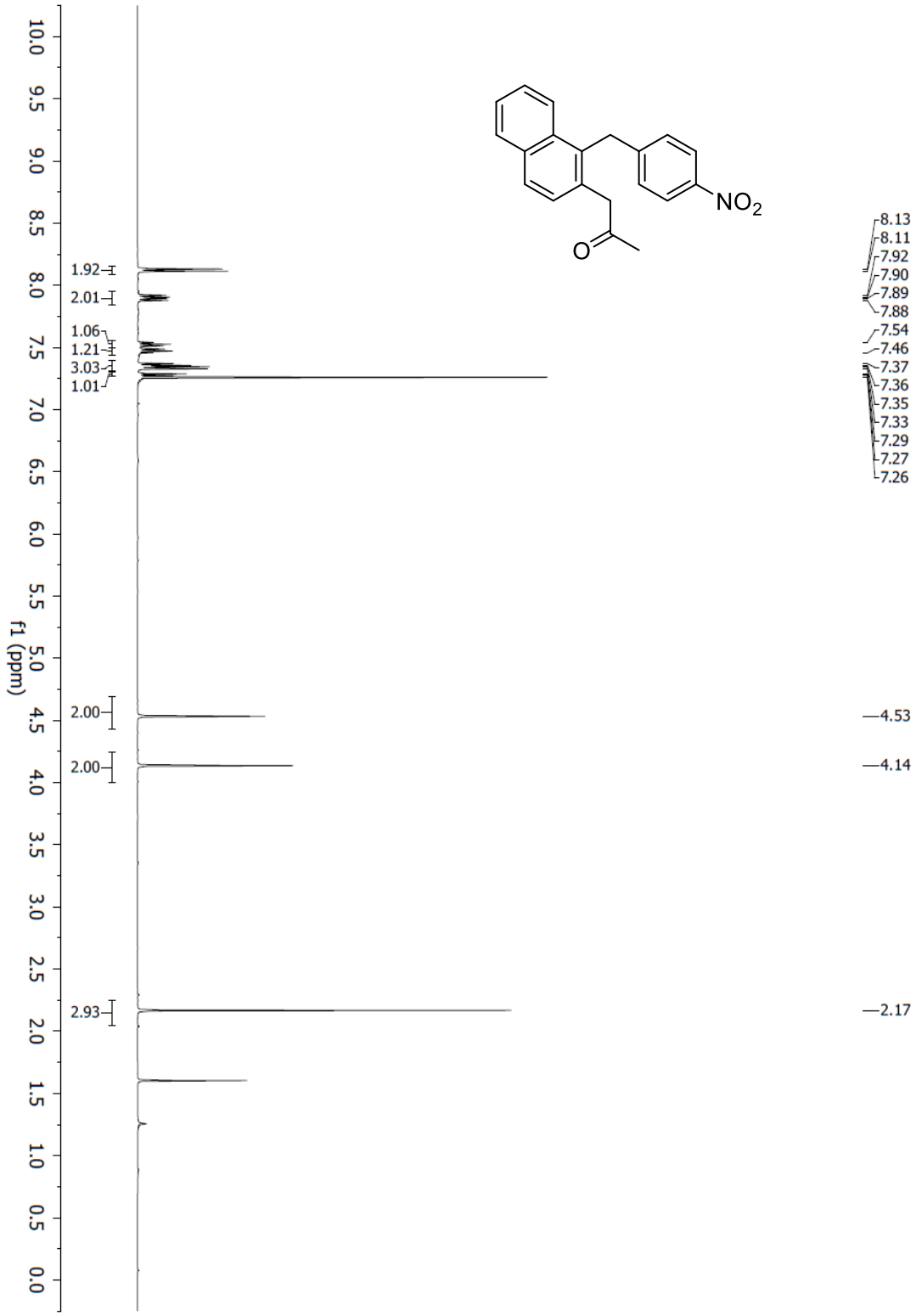
3-((2-(2-oxopropyl)naphthalen-1-yl)methyl)benzonitrile (3h)



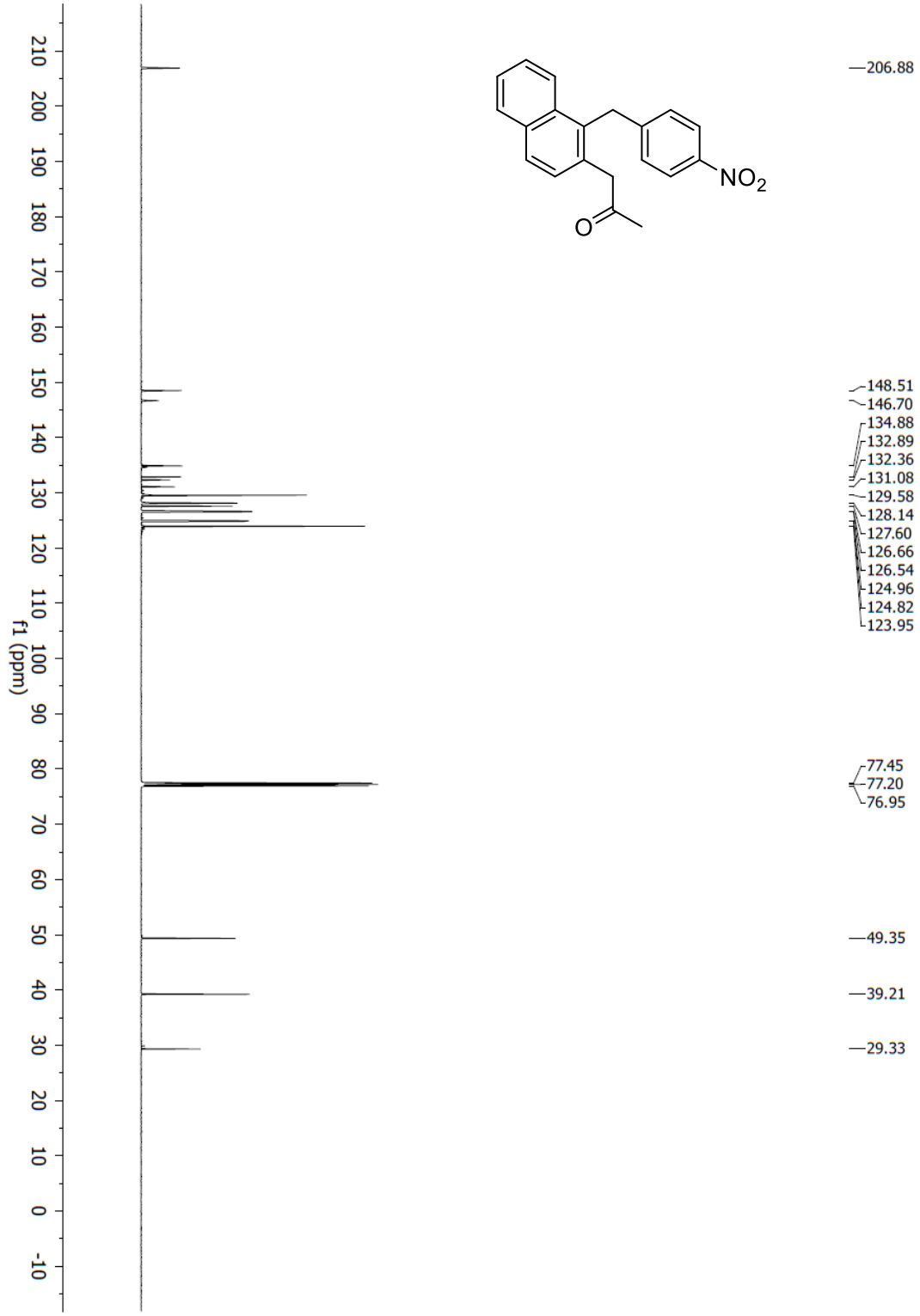
3-((2-(2-oxopropyl)naphthalen-1-yl)methyl)benzonitrile (3h)



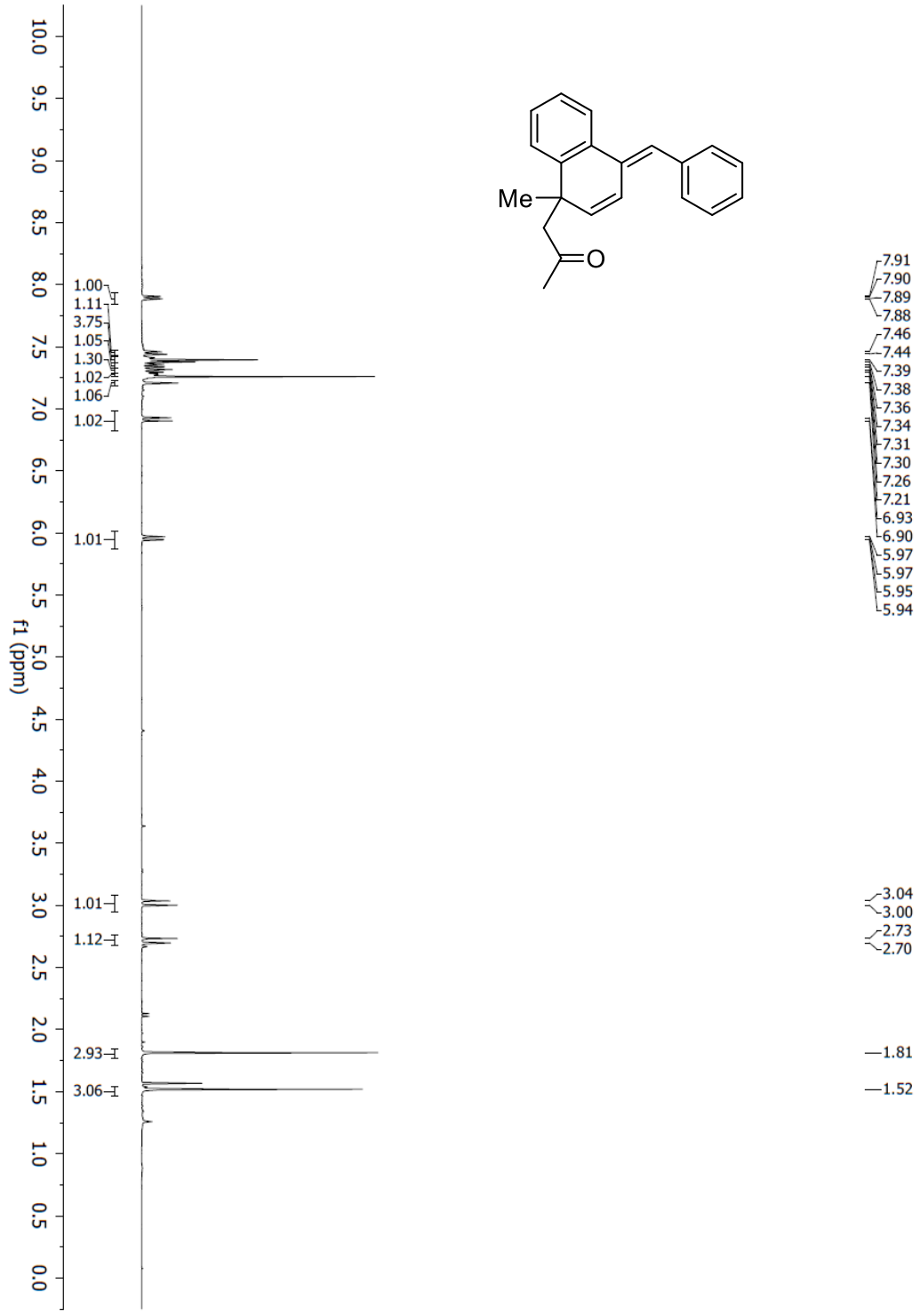
1-(1-(4-nitrobenzyl)naphthalen-2-yl)propan-2-one (3i)



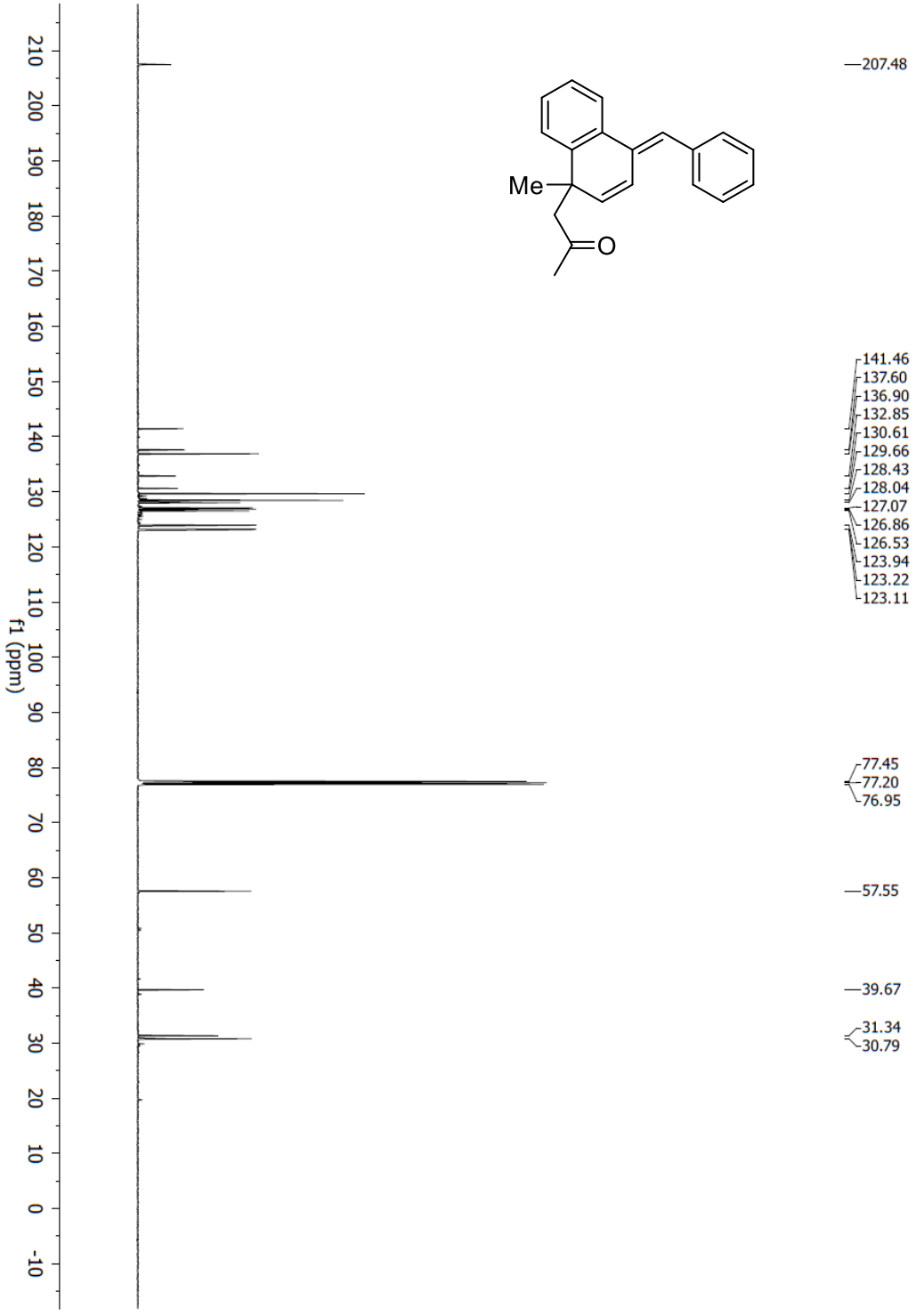
1-(1-(4-nitrobenzyl)naphthalen-2-yl)propan-2-one (3i)



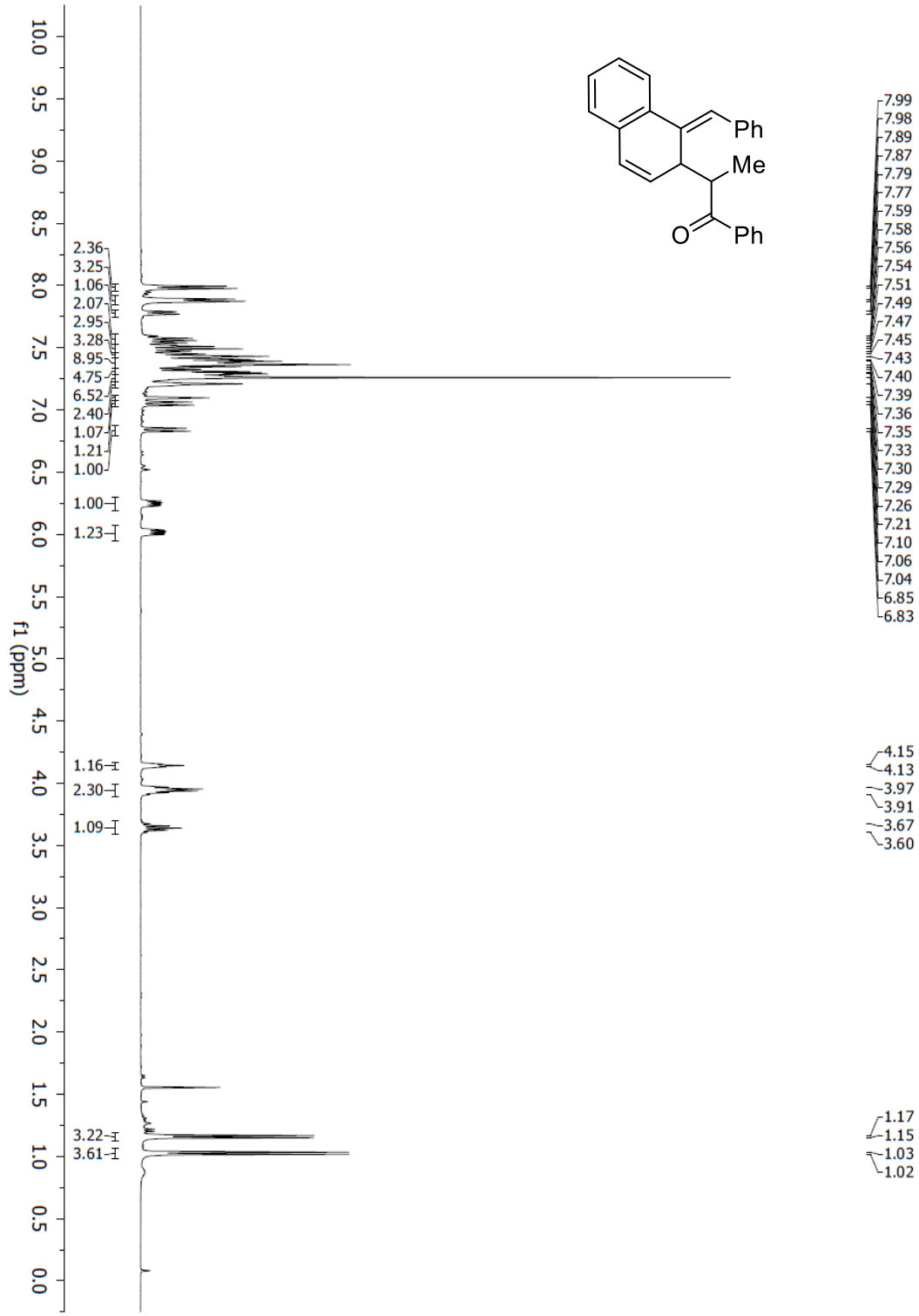
(*E*)-1-(4-benzylidene-1-methyl-1,4-dihydronaphthalen-1-yl)propan-2-one (3j)



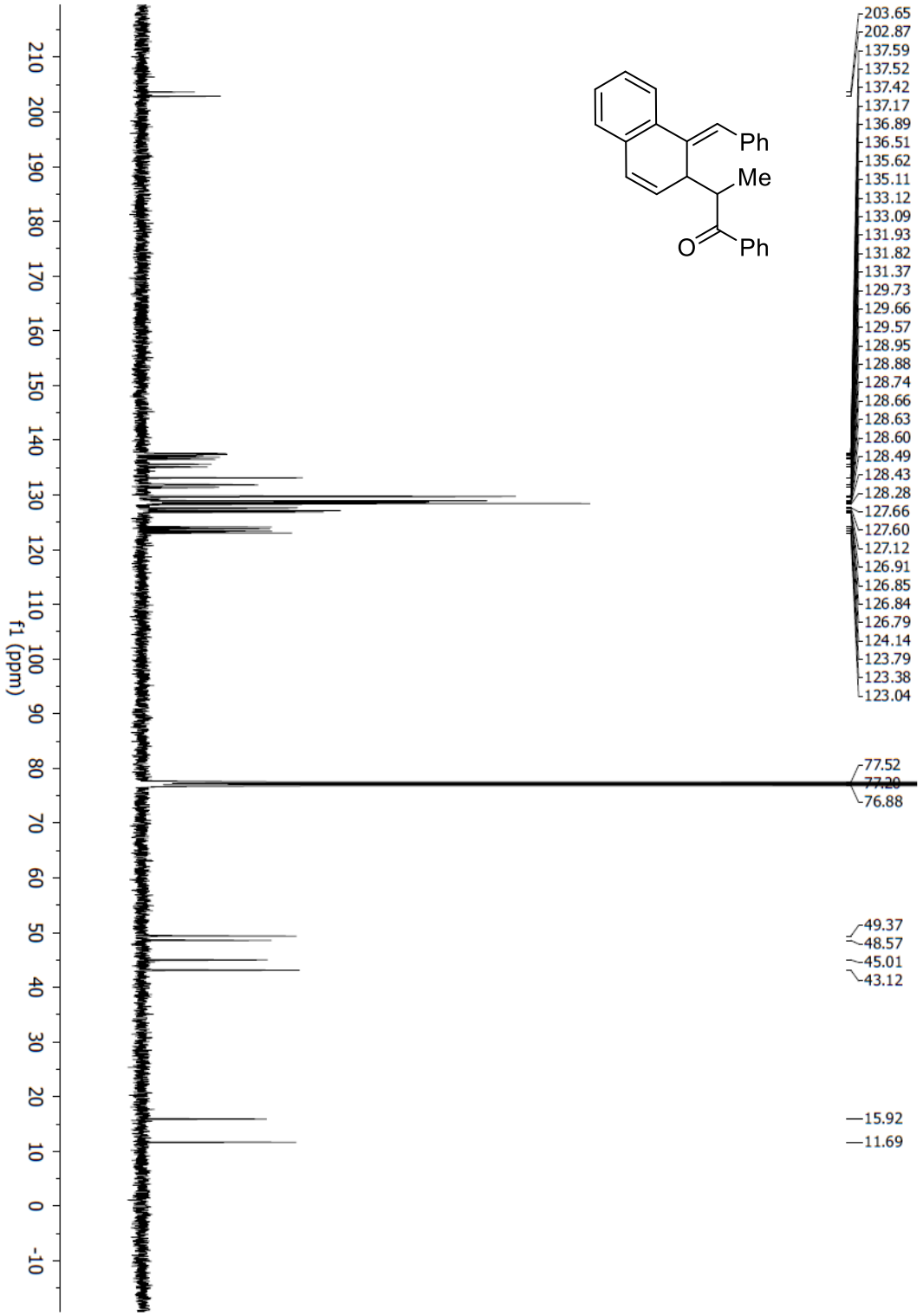
(*E*)-1-(4-benzylidene-1-methyl-1,4-dihydronaphthalen-1-yl)propan-2-one (3j)



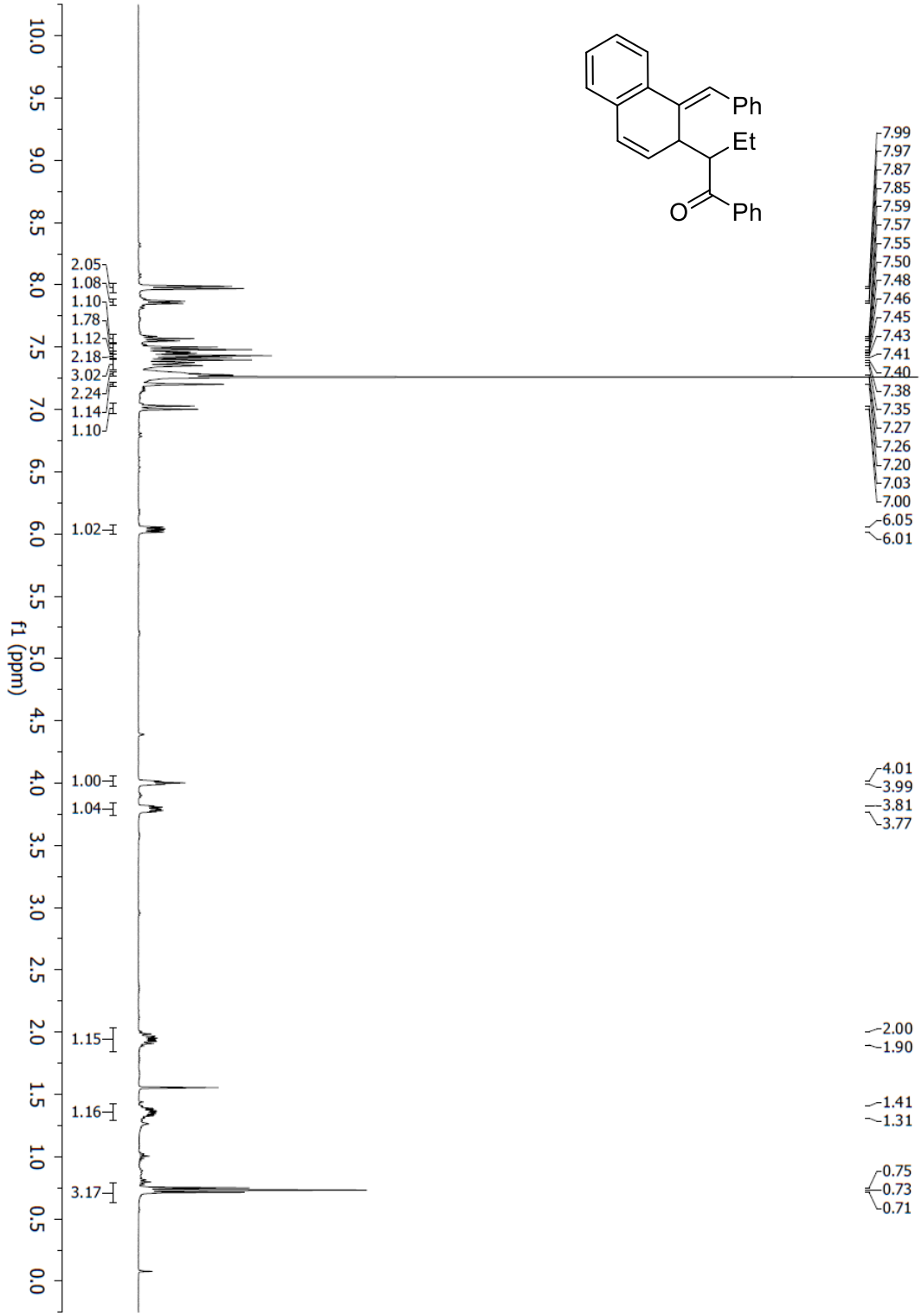
(*E*)-2-(1-benzylidene-1,2-dihydronaphthalen-2-yl)-1-phenylpropan-1-one (5a)



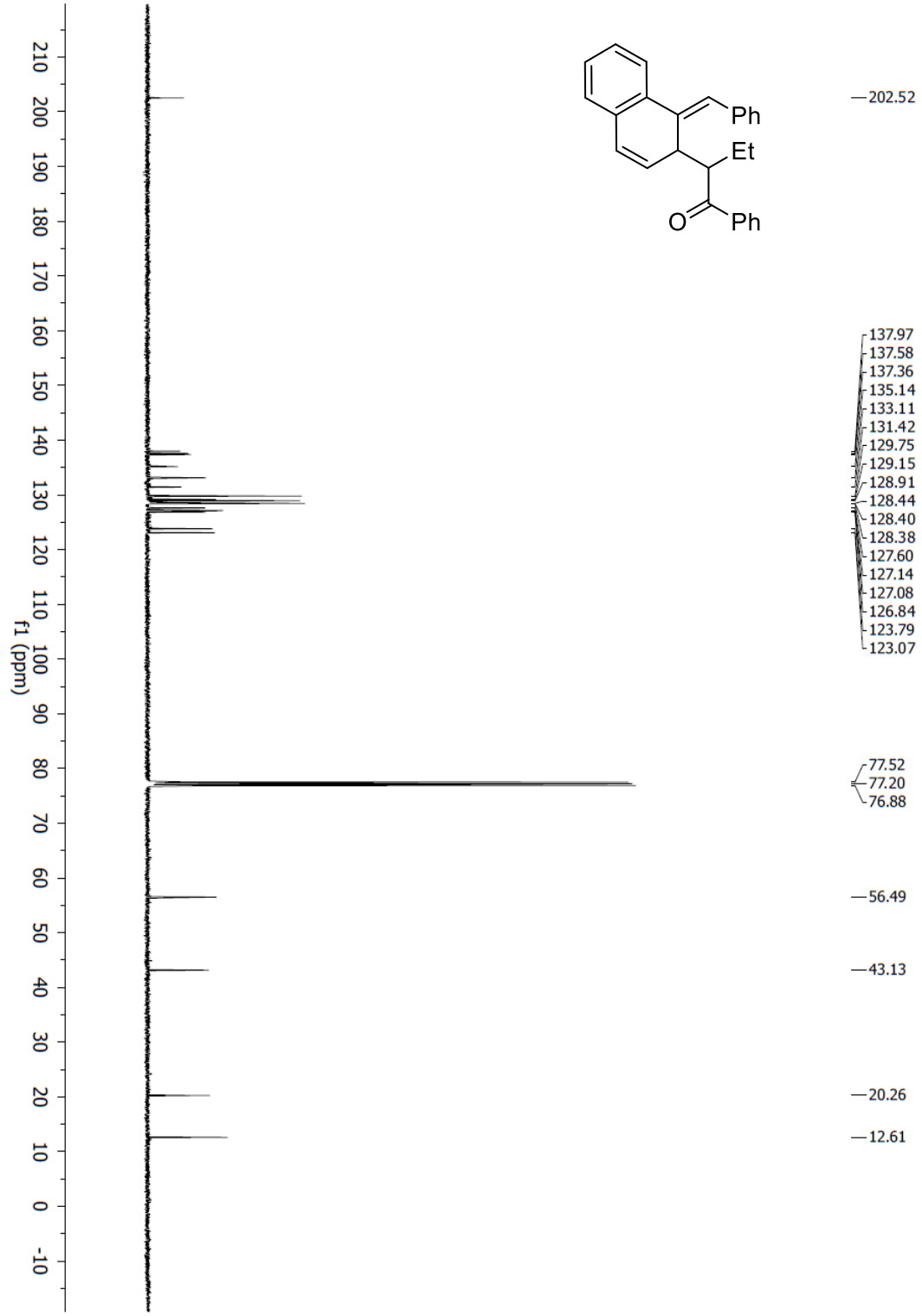
(*E*)-2-(1-benzylidene-1,2-dihydronaphthalen-2-yl)-1-phenylpropan-1-one (5a)



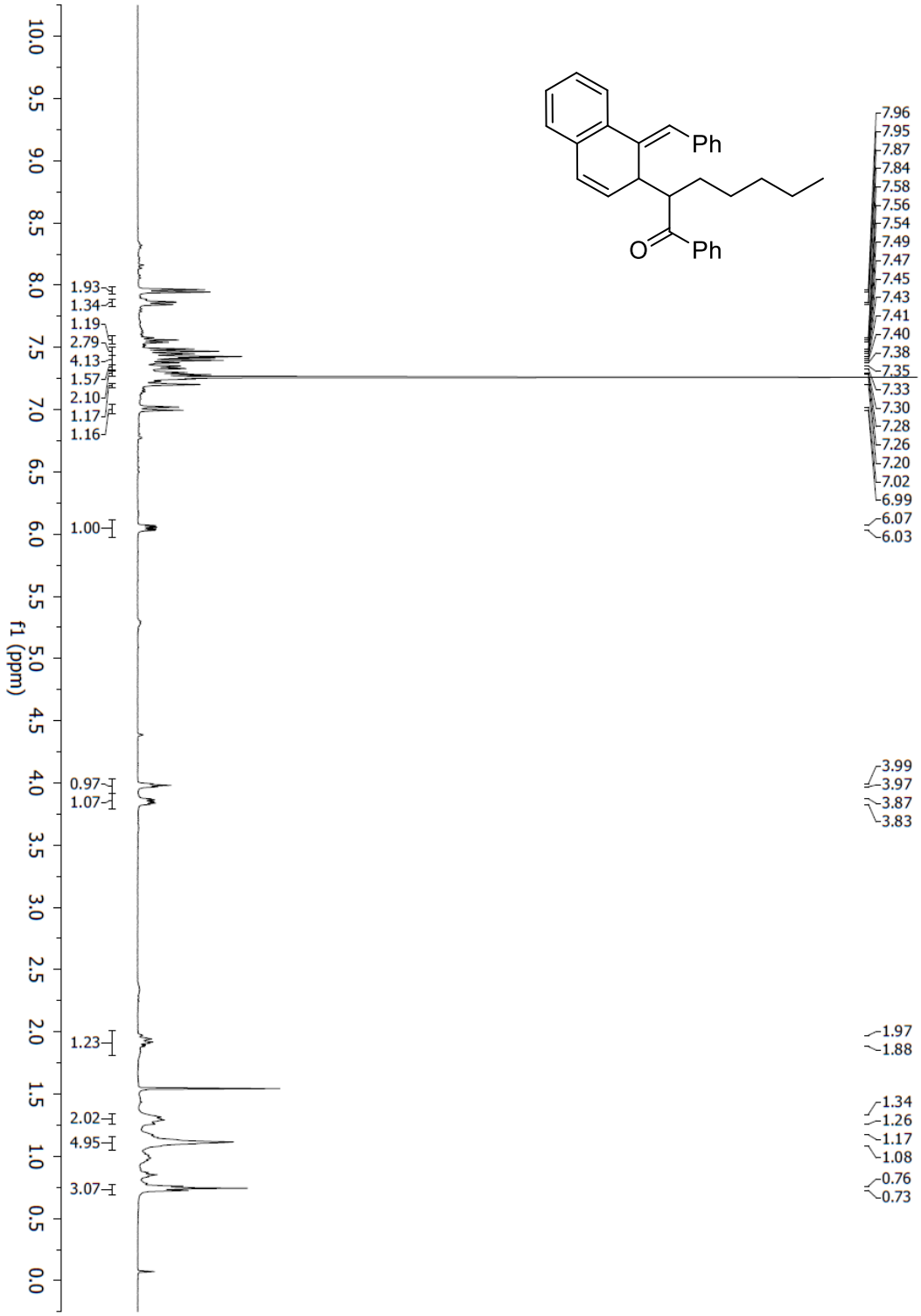
(*E*)-2-(1-benzylidene-1,2-dihydronaphthalen-2-yl)-1-phenylbutan-1-one (5b)



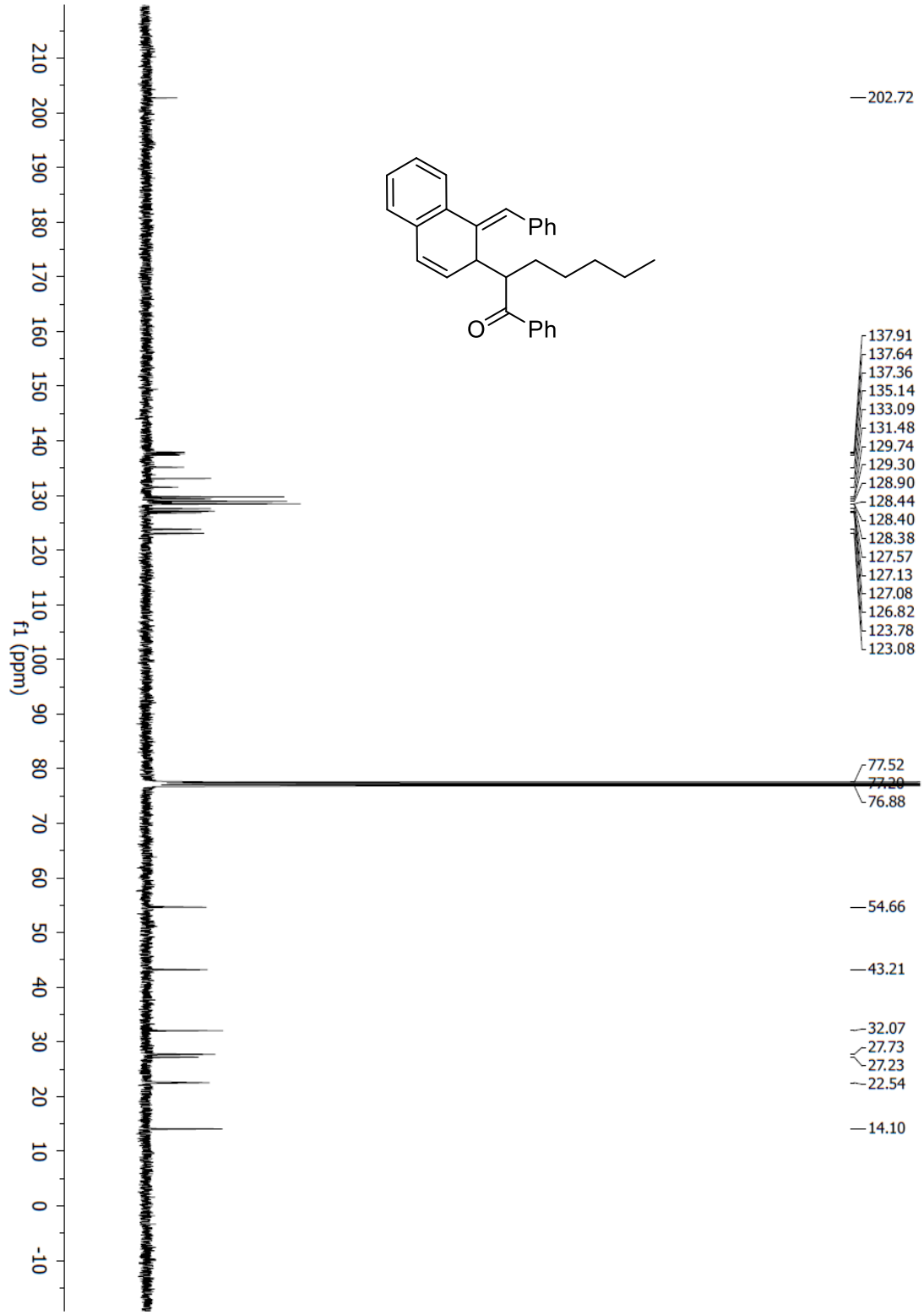
(*E*)-2-(1-benzylidene-1,2-dihydronaphthalen-2-yl)-1-phenylbutan-1-one (5b)



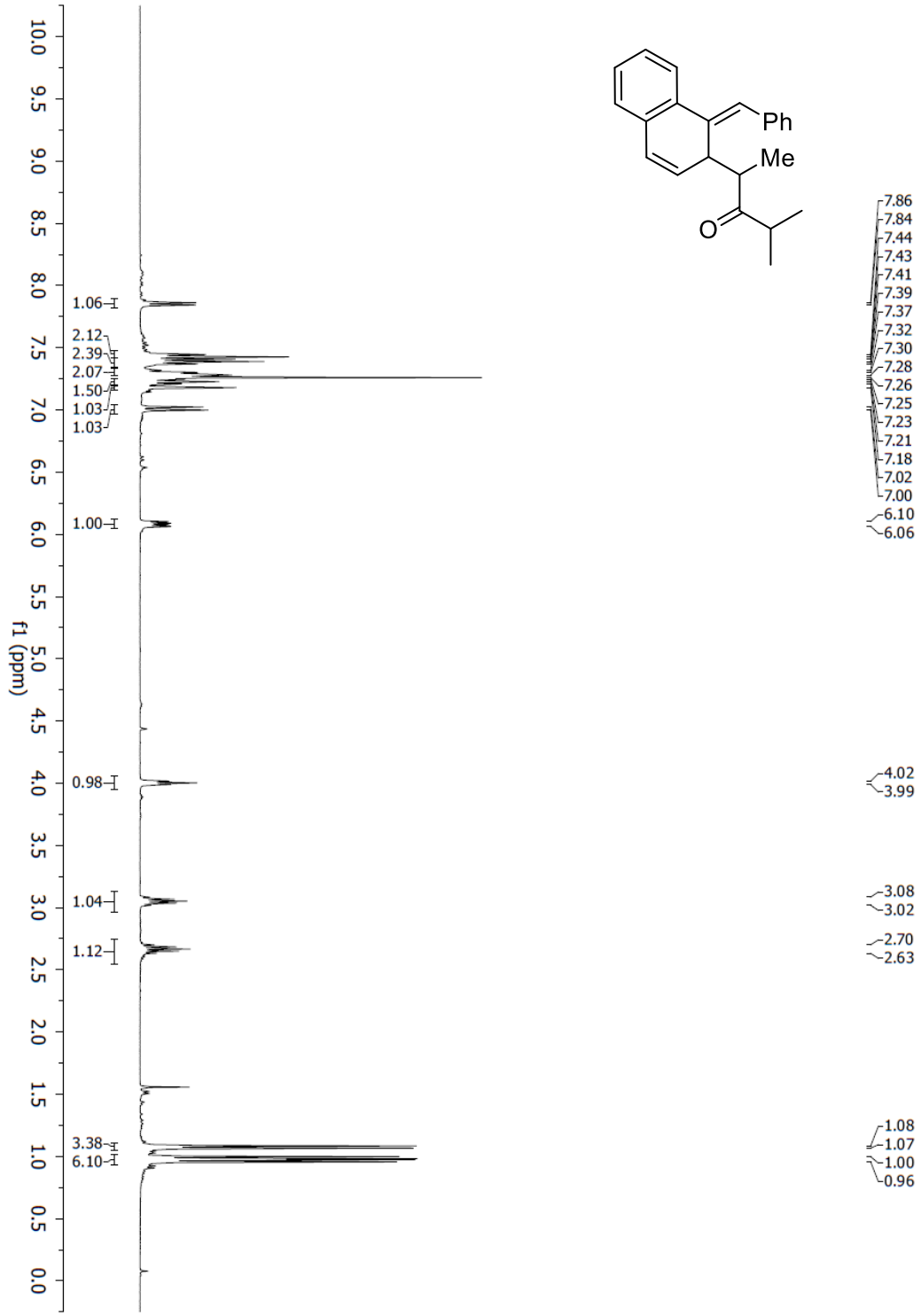
(*E*)-2-(1-benzylidene-1,2-dihydronaphthalen-2-yl)-1-phenylheptan-1-one (5c)



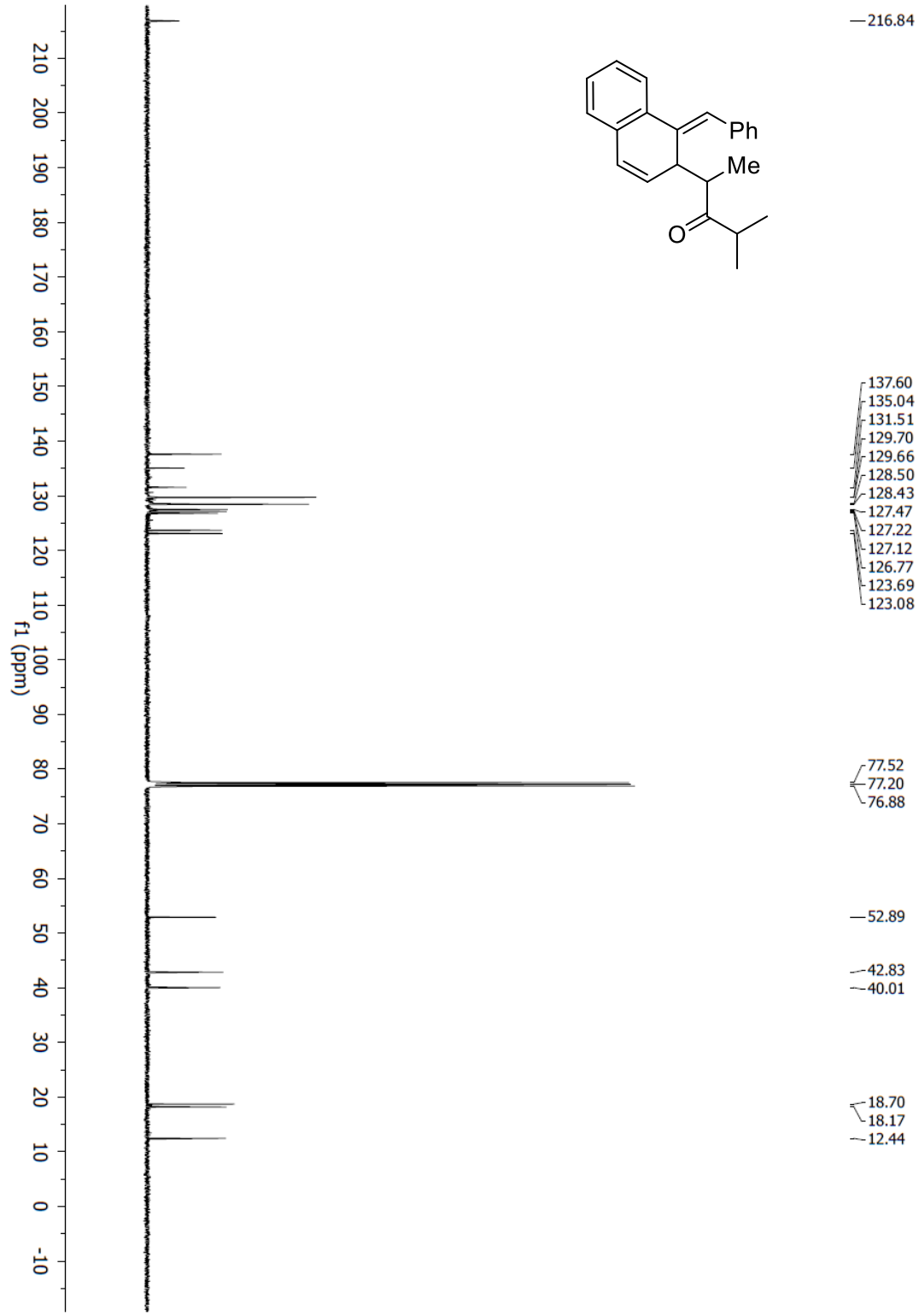
(*E*)-2-(1-benzylidene-1,2-dihydronaphthalen-2-yl)-1-phenylheptan-1-one (5c)



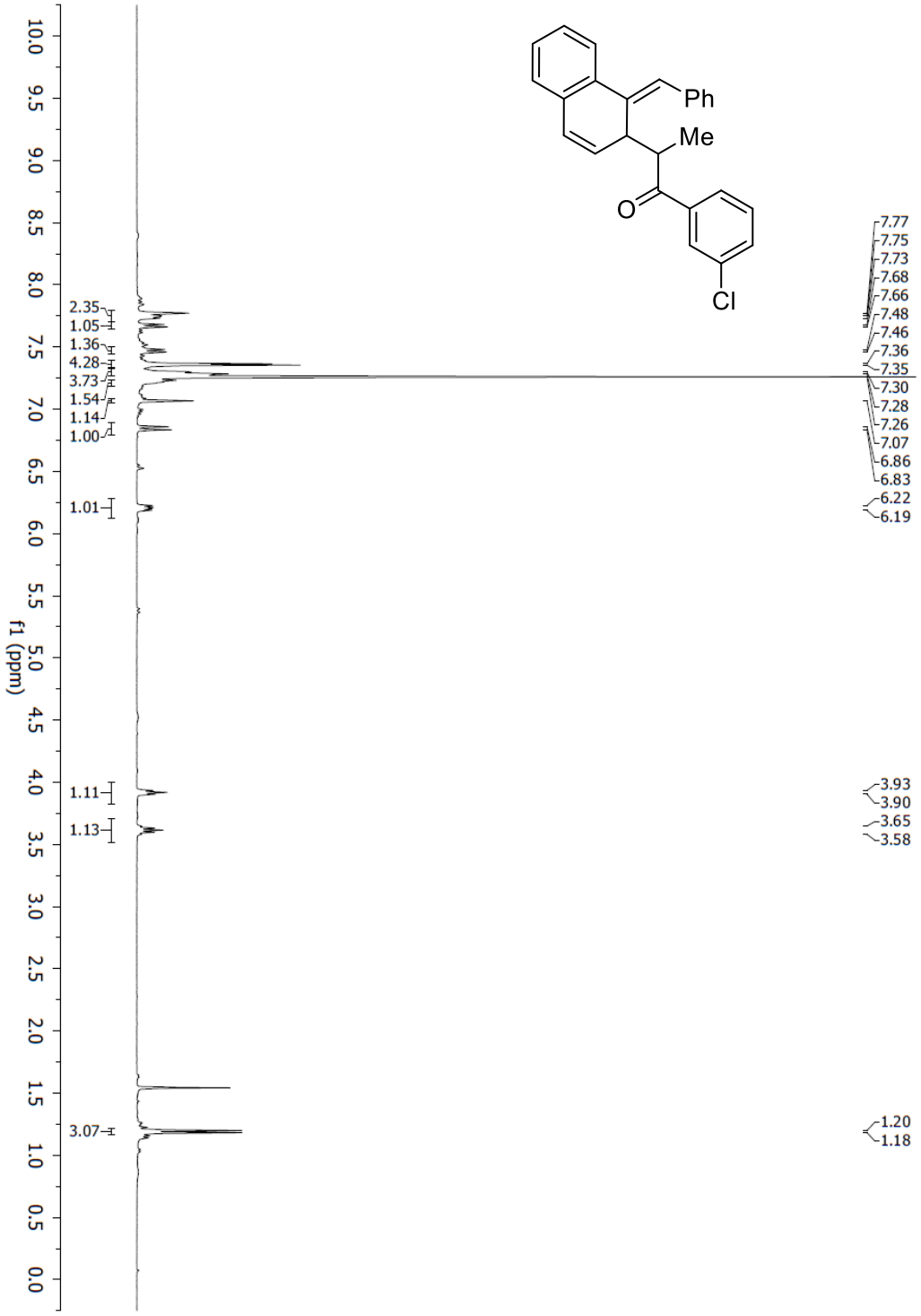
(*E*)-2-(1-benzylidene-1,2-dihydronaphthalen-2-yl)-4-methylpentan-3-one (5d)



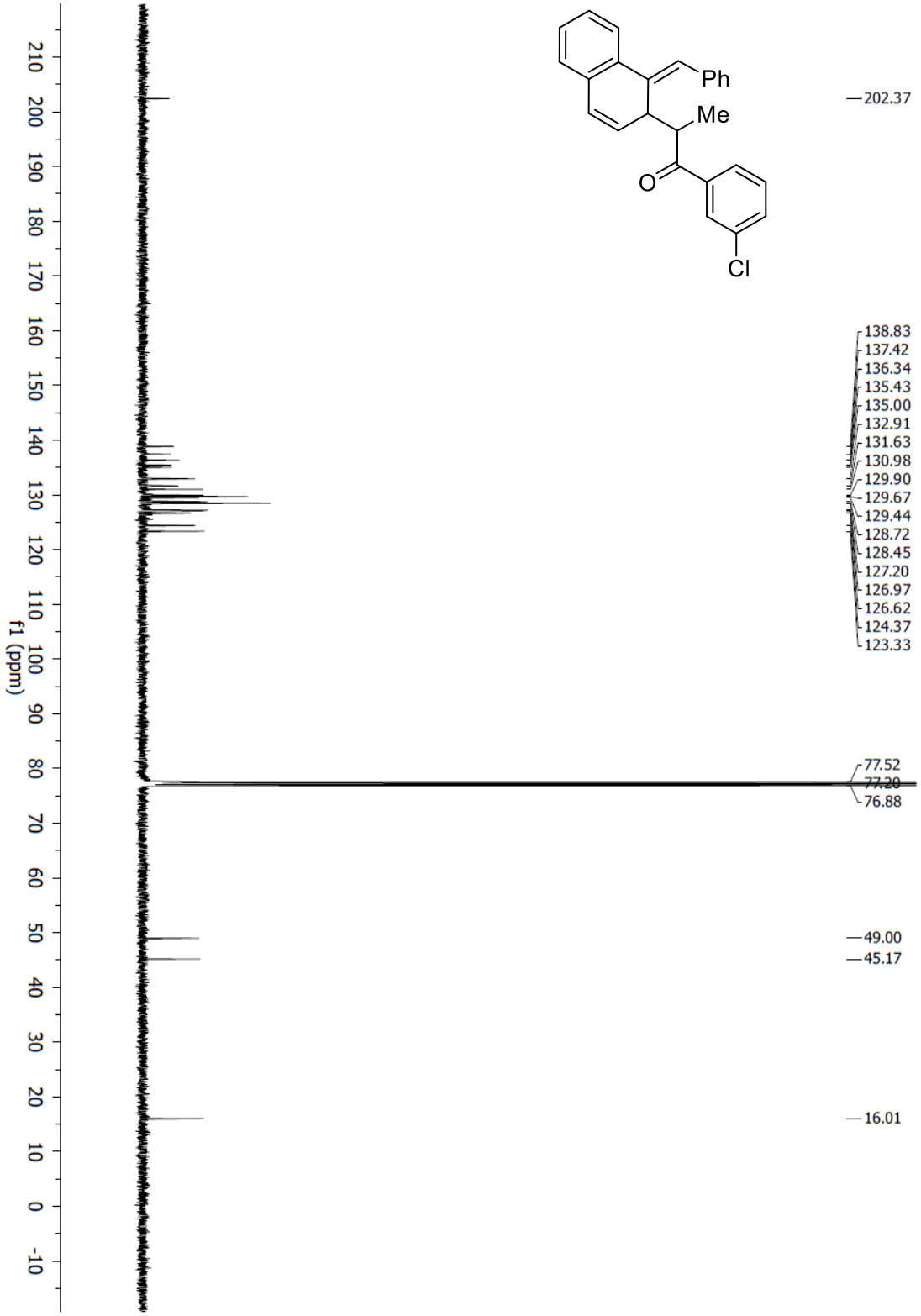
(*E*)-2-(1-benzylidene-1,2-dihydronaphthalen-2-yl)-4-methylpentan-3-one (5d)



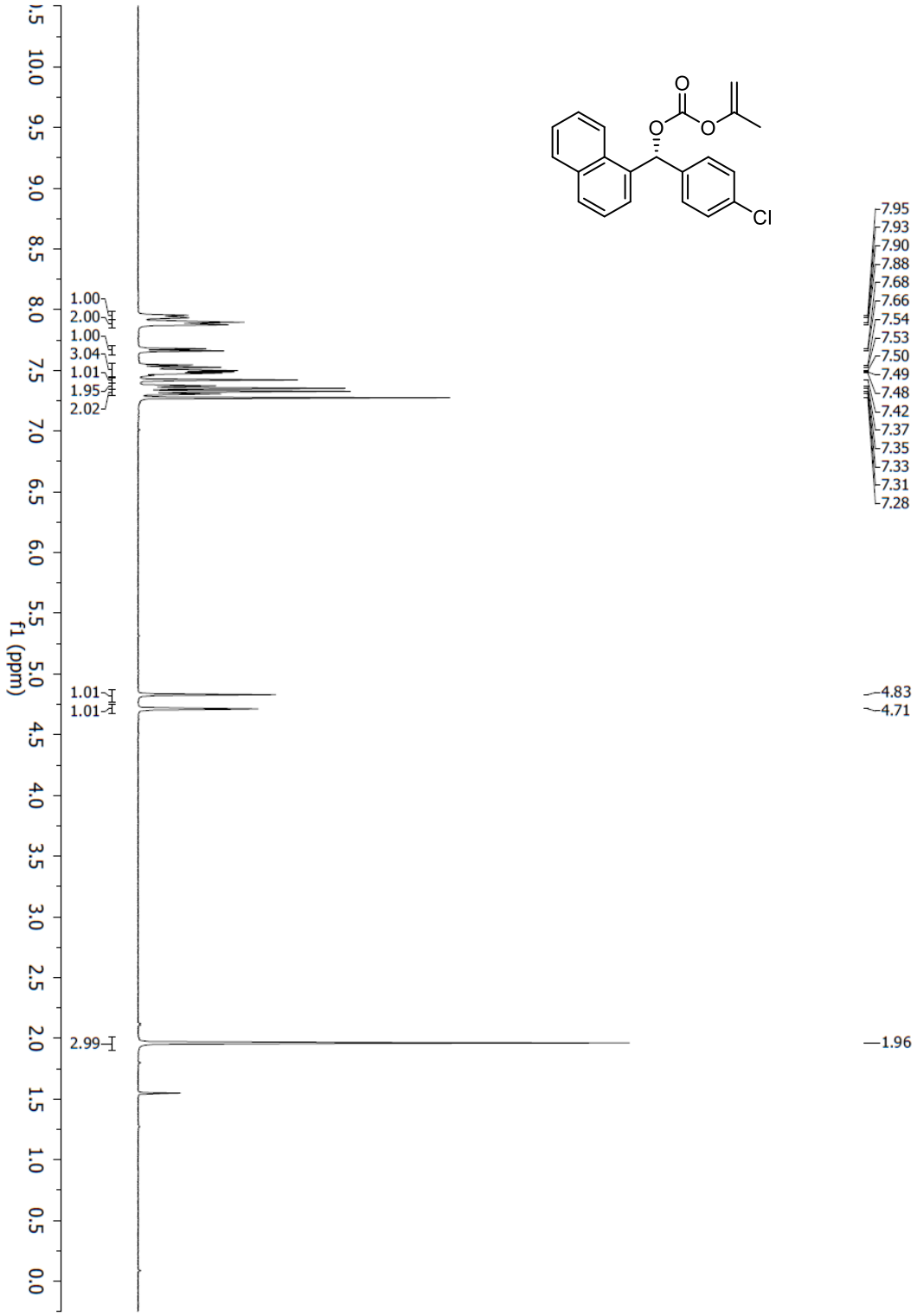
(*E*)-2-(1-benzylidene-1,2-dihydronaphthalen-2-yl)-1-(3-chlorophenyl)propan-1-one (5e)



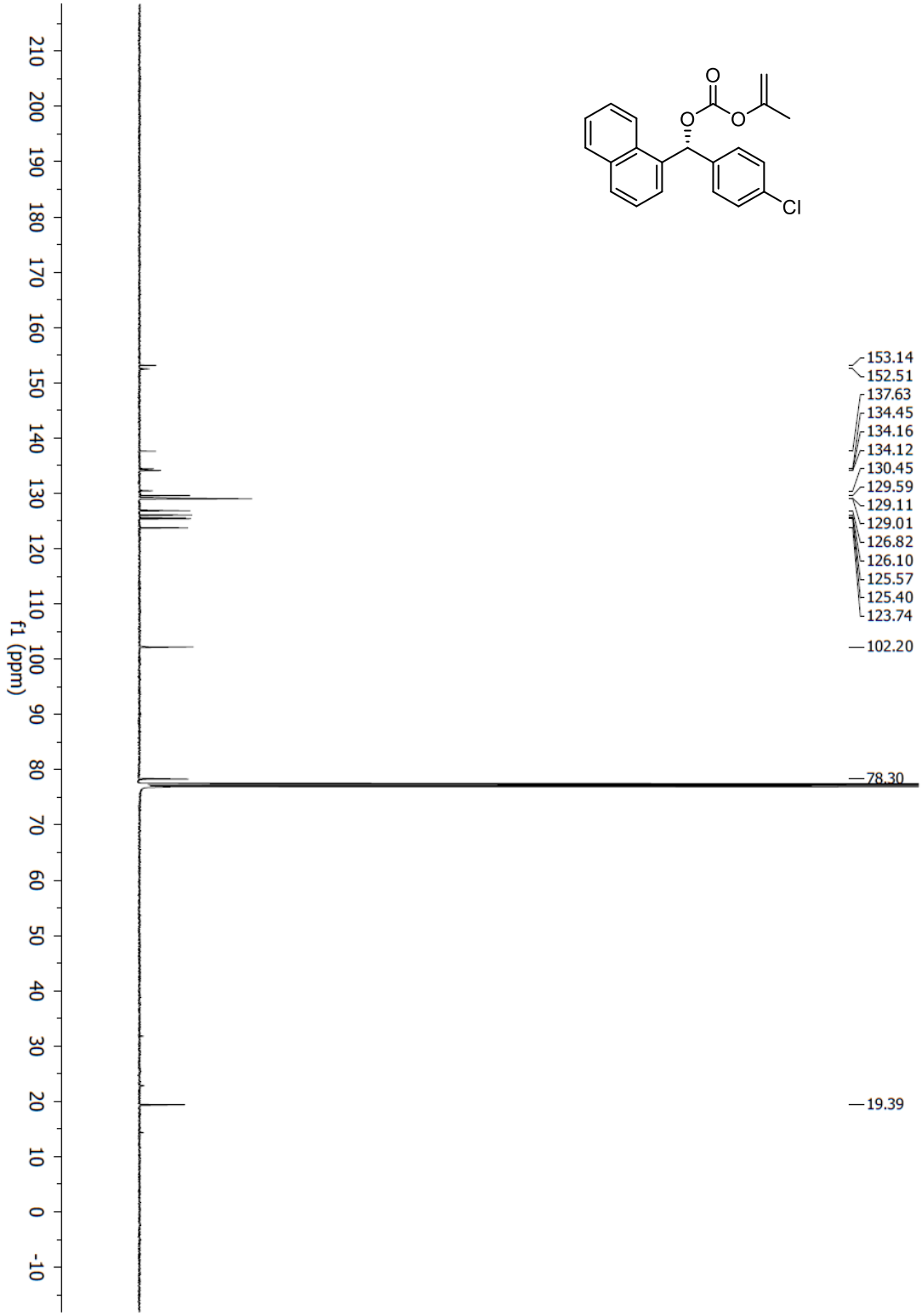
(*E*)-2-(1-benzylidene-1,2-dihydronaphthalen-2-yl)-1-(3-chlorophenyl)propan-1-one (5e)



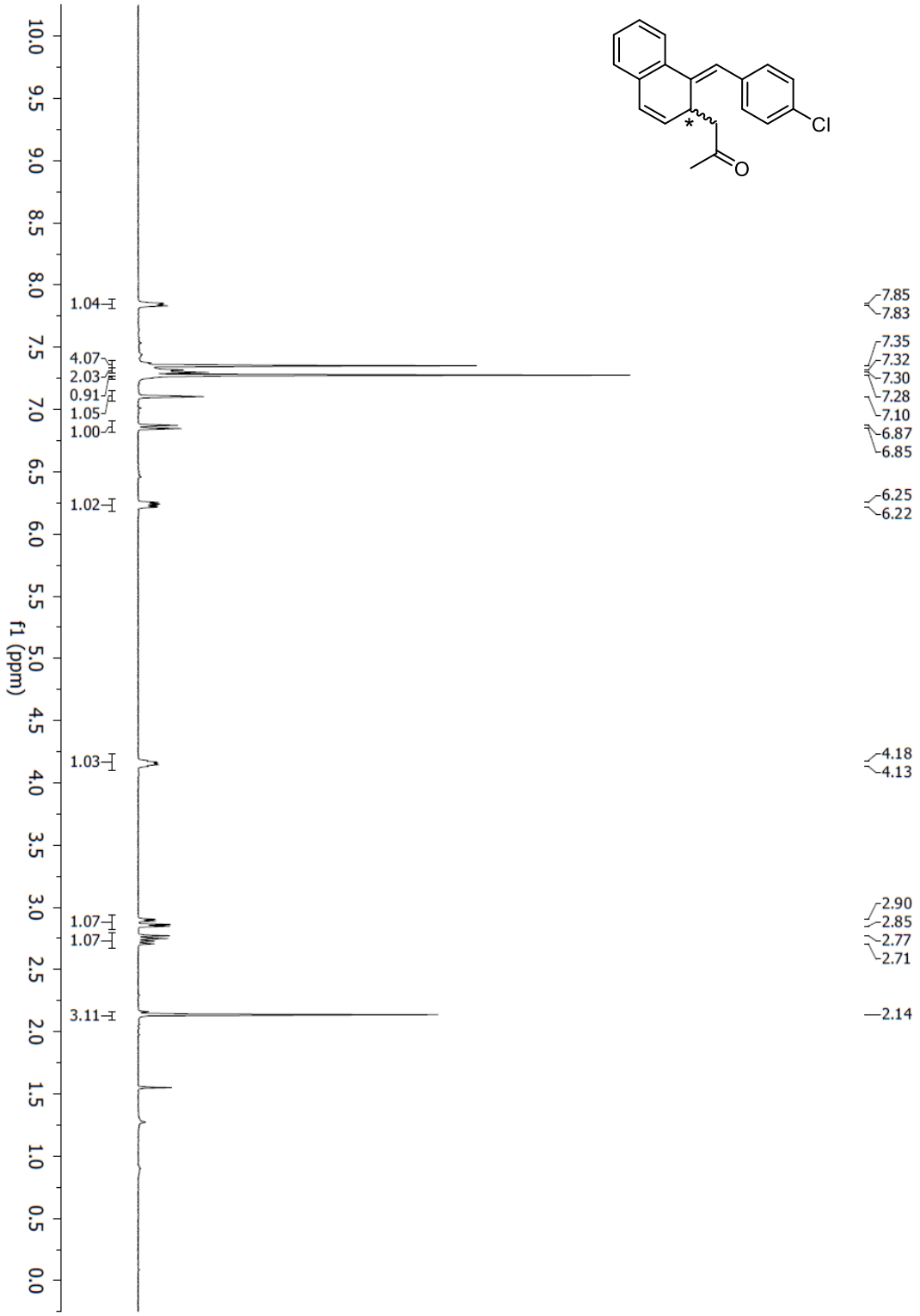
(*R*)-(4-chlorophenyl)(naphthalen-1-yl)methyl prop-1-en-2-yl carbonate (*R*-1e)



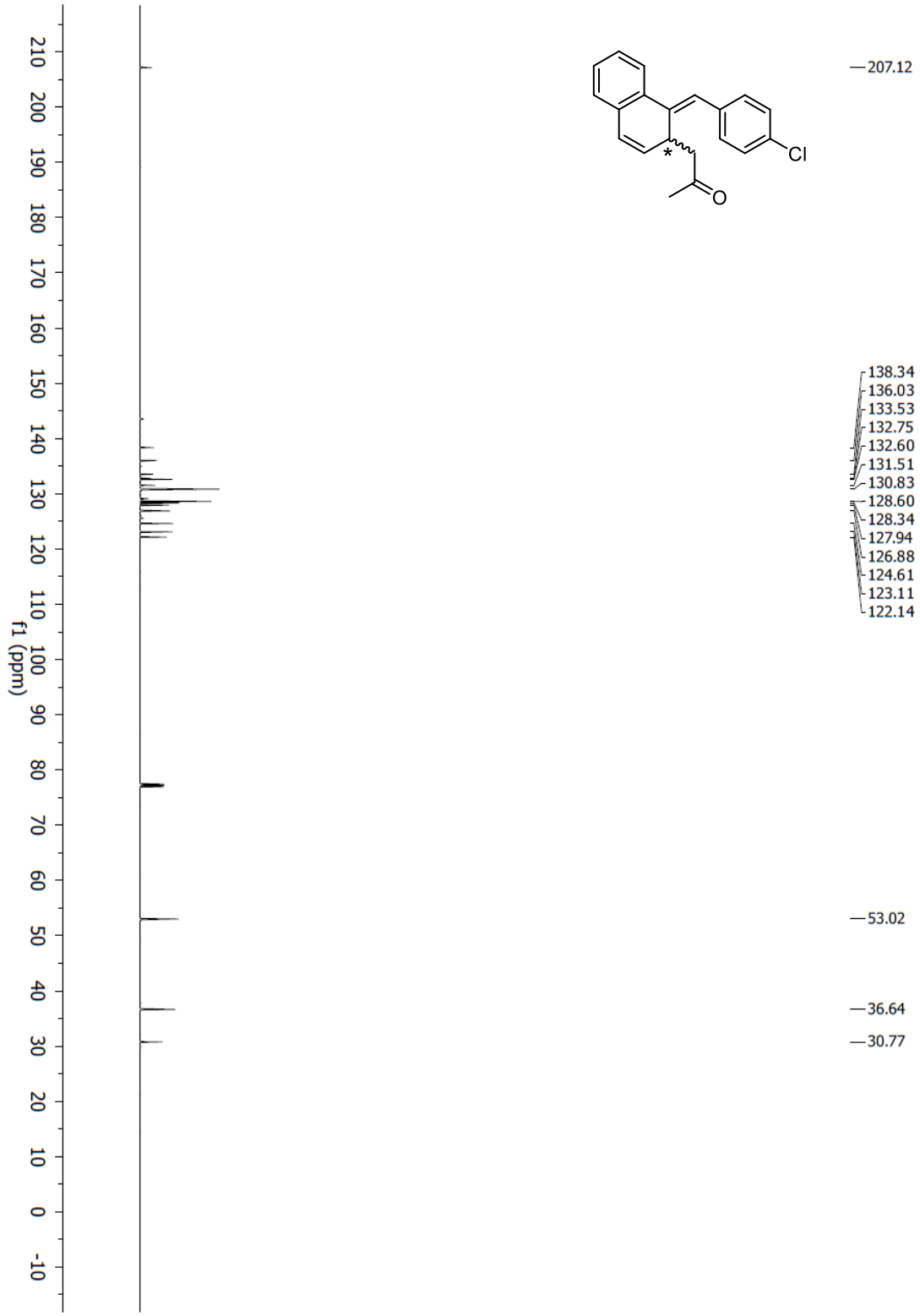
(*R*)-(4-chlorophenyl)(naphthalen-1-yl)methyl prop-1-en-2-yl carbonate (*R*-1e)



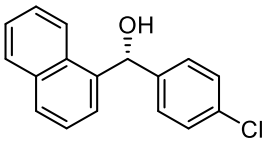
(*E*)-1-(1-(4-chlorobenzylidene)-1,2-dihydronaphthalen-2-yl)propan-2-one (*R* or *S*-2e)

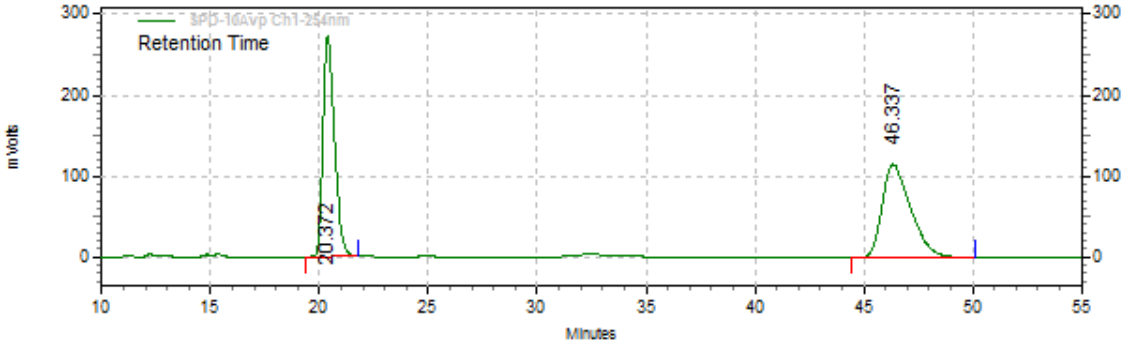


(*E*)-1-(1-(4-chlorobenzylidene)-1,2-dihydronaphthalen-2-yl)propan-2-one (*R* or *S*-2e)

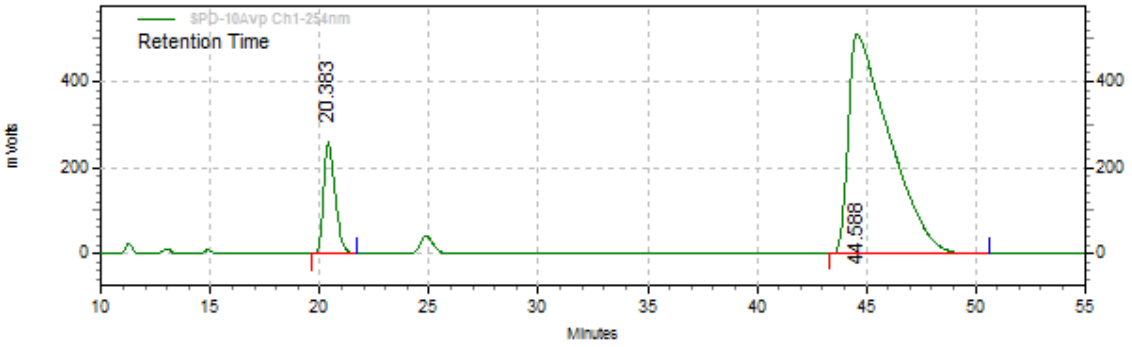


(*R*)-(4-chlorophenyl)(naphthalen-1-yl)methanol (*R*-1e′)

compound **1e'**	column	Eluent (hexane:i-PrOH)	Flow (ml/min)	λ (nm)	t_R (min) major	t_R (min) minor
	OD-H	85:15	0.55	254	44.5	20.3

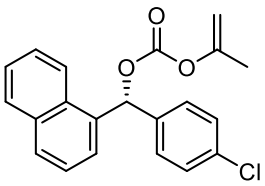


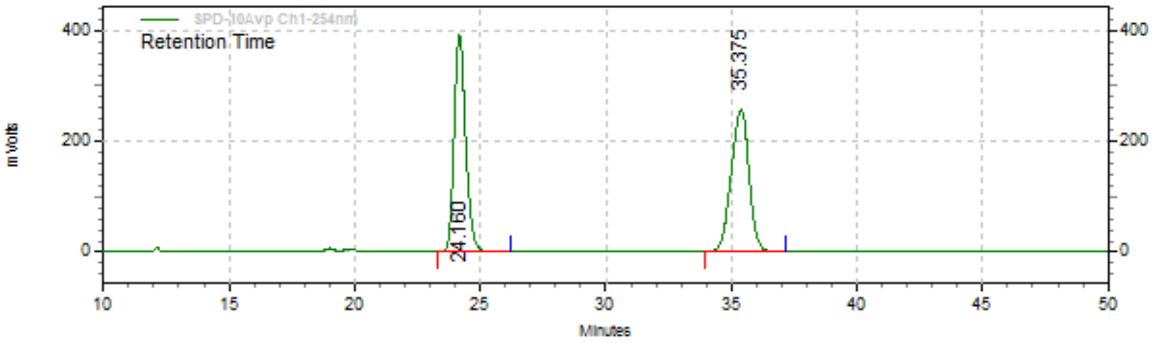
SPD-10Avp Ch1-254nm Results				
Retention Time	Area	Area %	Height	Height %
20.372	9812406	48.77	272504	70.43
46.337	10307277	51.23	114427	29.57
Totals				
	20119683	100.00	386931	100.00



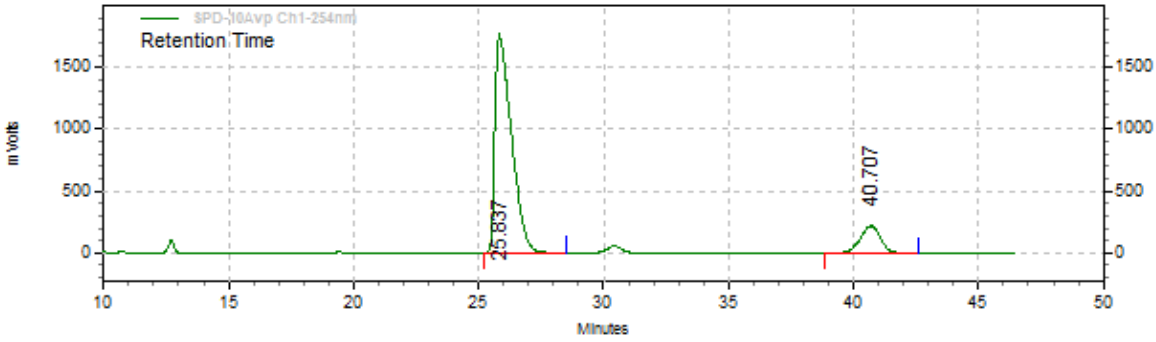
SPD-10Avp Ch1-254nm Results				
Retention Time	Area	Area %	Height	Height %
20.383	9231638	12.22	257331	33.56
44.588	66285661	87.78	509534	66.44
Totals				
	75517299	100.00	766865	100.00

(*R*)-(4-chlorophenyl)(naphthalen-1-yl)methyl prop-1-en-2-yl carbonate (*R*-1e)

compound **1e**	column	Eluent (hexane:i-PrOH)	Flow (ml/min)	λ (nm)	t_R (min) major	t_R (min) minor
	AD-H	98:2	0.5	254	25.8	40.7

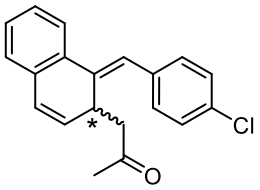


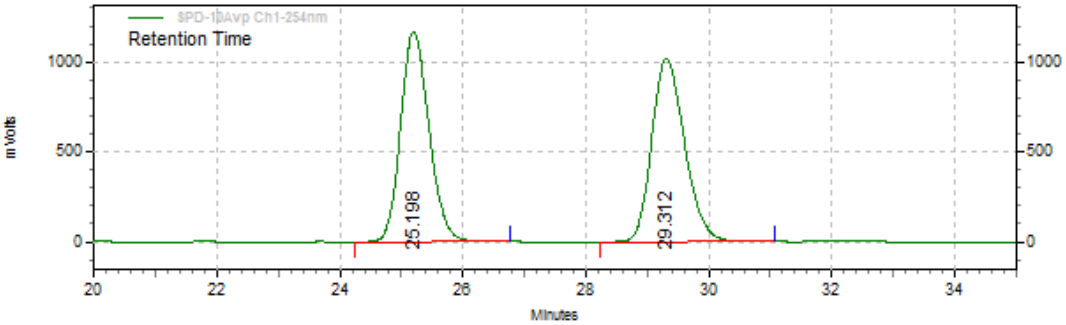
SPD-10Avp Ch1-254nm Results				
Retention Time	Area	Area %	Height	Height %
24.160	12633226	49.93	392128	60.46
35.375	12667944	50.07	256487	39.54
Totals				
	25301170	100.00	648615	100.00



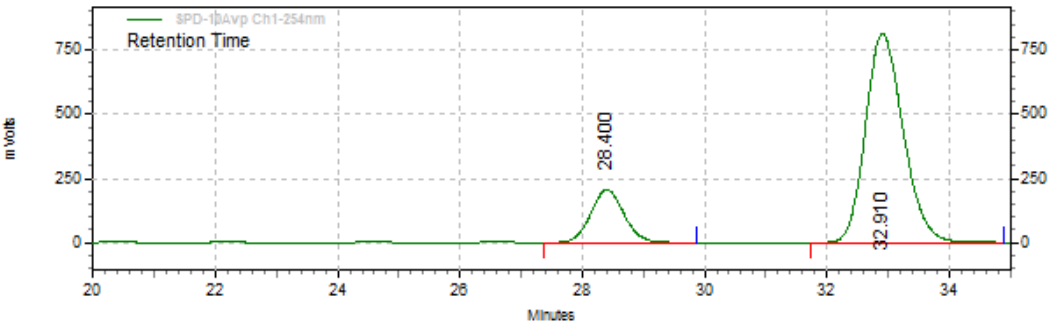
SPD-10Avp Ch1-254nm Results				
Retention Time	Area	Area %	Height	Height %
25.837	81240859	87.09	1773862	89.12
40.707	12044433	12.91	216617	10.88
Totals				
	93285292	100.00	1990479	100.00

(*E*)-1-(1-(4-chlorobenzylidene)-1,2-dihydronaphthalen-2-yl)propan-2-one (*R* or *S*-2e)

compound (***R***) or (***S***)-2e	column	Eluent (hexane:i-PrOH)	Flow (ml/min)	λ (nm)	t_R (min) major	t_R (min) minor
	AD-H	98:2	0.5	254	32.9	28.4



SPD-10Avp Ch1-254nm Results				
Retention Time	Area	Area %	Height	Height %
25.198	37517365	49.81	1165237	53.37
29.312	37804600	50.19	1018160	46.63
Totals				
	75321965	100.00	2183397	100.00



SPD-10Avp Ch1-254nm Results				
Retention Time	Area	Area %	Height	Height %
28.400	7771338	18.24	205278	20.18
32.910	34834023	81.76	811807	79.82
Totals				
	42605361	100.00	1017085	100.00