Supporting Information for

Total Synthesis, Structural Elucidation and Biological Evaluation of Ac_2SGL; a 1,3-Methyl Branched Sulfoglycolipid from *Mycobacterium tuberculosis*

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Table of Contents

General remarks

All reactions were performed using oven or flame-dried glassware and dry solvents. Solvents were distilled prior to use: MTBE, Et_2O and THF (Na/benzophenone), DCM (CaH_2) or taken from a MBraun solvent purification system (SPS-800). All other reagents were purchased from Sigma Aldrich, Acros, TCI Europe, Alfa Aesar, Chempur or Fluorochem, and used without further purification unless noted otherwise. Grignard reagents were titrated using *s*-BuOH and catalytic amounts of 1,10-phenanthroline. Ligand **L3** and $[Pt_2(dba)_3]$ were prepared following a literature procedure and stored in a glovebox afterwards.[1] B_2pin_2 was recrystallized from pentane prior to use.

^1H- and ^{13}C-NMR spectra were recorded on a Varian AMX400 or a Varian 400-MR (400, 100.59 MHz, respectively) using $CDCl_3$ or CD_3OD as solvent, unless stated otherwise. Chemical shift values are reported in ppm with the solvent resonance as the internal standard ($CDCl_3$: δ 7.26 for ^1H, δ 77.0 for ^{13}C, CD_3OD: δ 3.31 for ^1H). Data are reported as follows: chemical shifts (δ), multiplicity (s = singlet, d = doublet, dd = double doublet, td = triple doublet, t = triplet, q = quartet, br = broad, m = multiplet), coupling constants *J* (Hz), and integration. Due to the (multiple) long alkyl chains in some of the compounds we were unfortunately not able to resolve all the individual signals for every carbon atom in the spectra. High resolution mass spectra (HRMS) were recorded on a Thermo Scientific LTQ Orbitrap XL or on a AEI-MS-902 spectrometer.

HPLC analysis of the two synthetic diastereomers **17** and **18** was performed on an Alltima HP Silica 3µ 100 mm x 2.1 mm column (Grace Davison Discovery Sciences) with an ELS detector (ELSD) and heptane/isopropanol 99.5/0.5 as the mobile phase.

Flash chromatography was performed using SiliCycle silica gel type SiliaFlash P60 (230 – 400 mesh) as obtained from Screening Devices or with automated column chromatography using a Reveleris flash system purchased from Grace Davison Discovery Sciences. TLC analysis was performed on Merck silica gel 60/Kieselguhr F254, 0.25 mm. Compounds were visualized using either Seebach's reagent (a mixture of phosphomolybdic acid (25 g),cerium (IV) sulfate (7.5 g), H_2O (500 mL) and H_2SO_4 (25 mL)) or a $KMnO_4$ stain (K_2CO_3 (40 g), $KMnO_4$ (6 g), H_2O (600 mL) and 10% NaOH (5 mL)).

T-cell-activation assays with human DCs as APCs and Ac_2SGL-specific and CD1b-restricted Z4B27 T cell clone were performed as described by Gilleron et al.[2] and Guiard et al.[3]

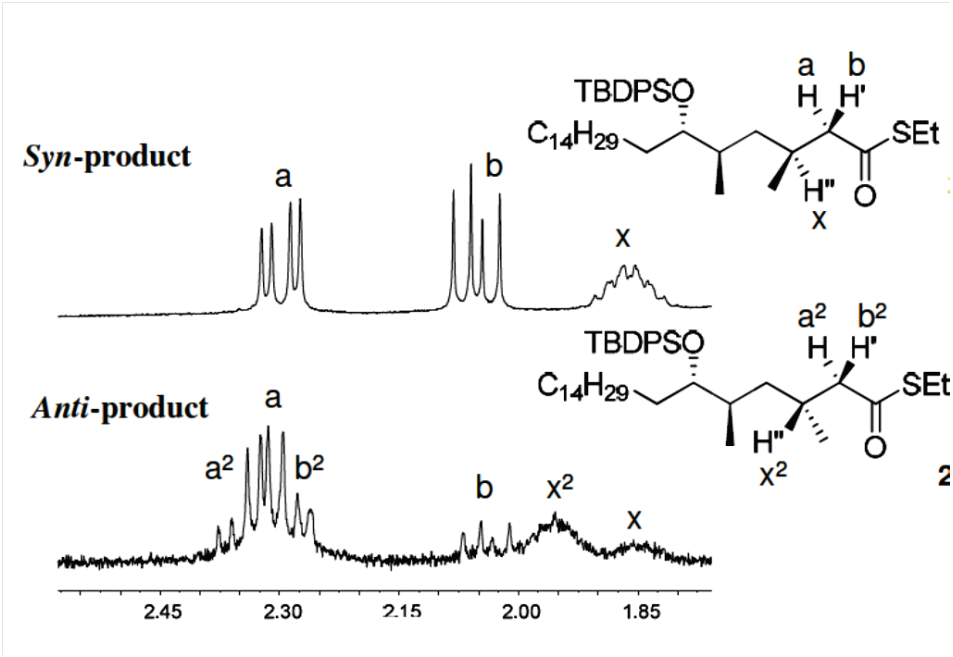

Figure 1 Partial ^{1}H NMR spectra from syn and anti addition products

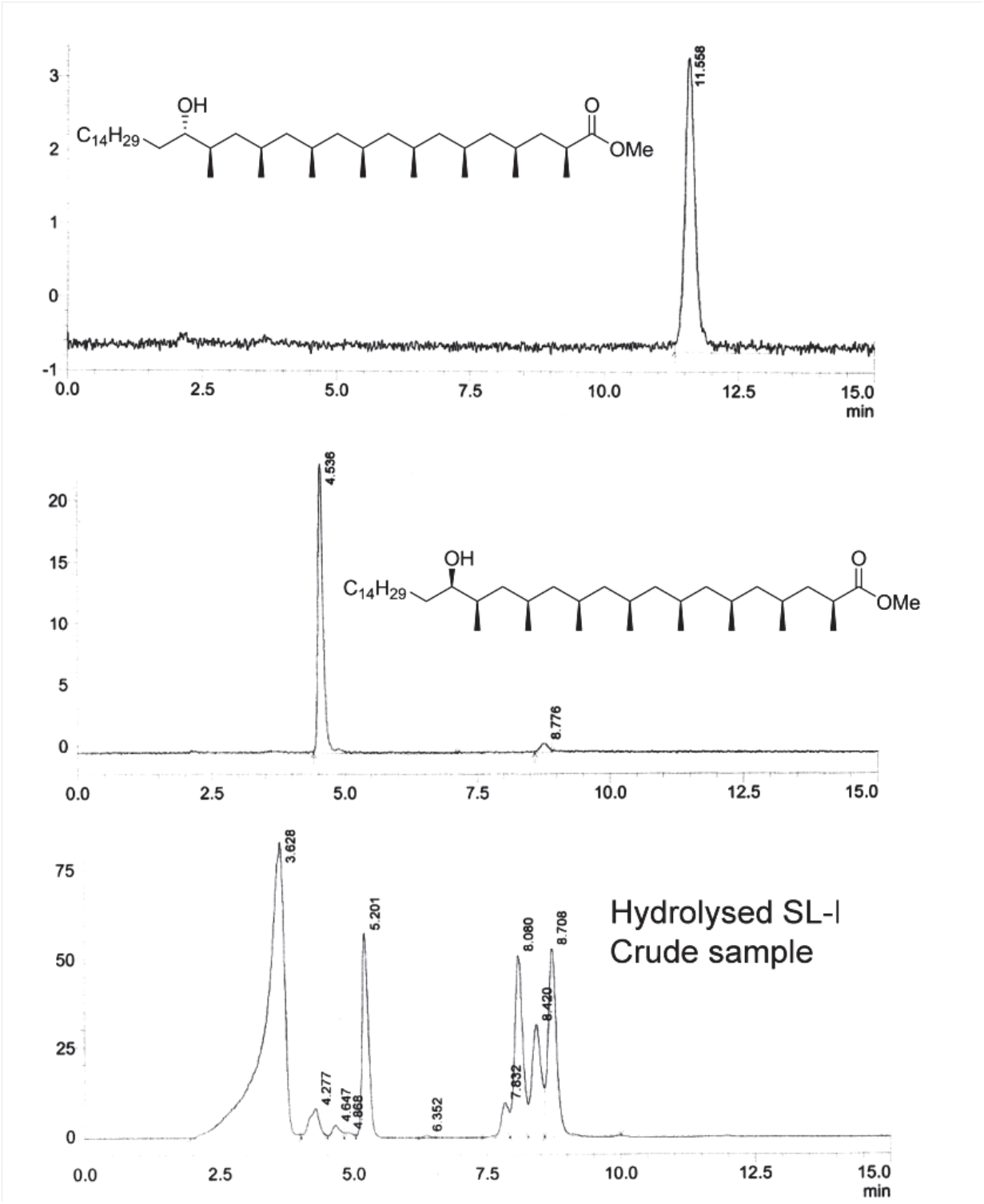

Figure 2 HPLC traces from synthetic anti and syn products **17** and **18**, compared to the natural sample.

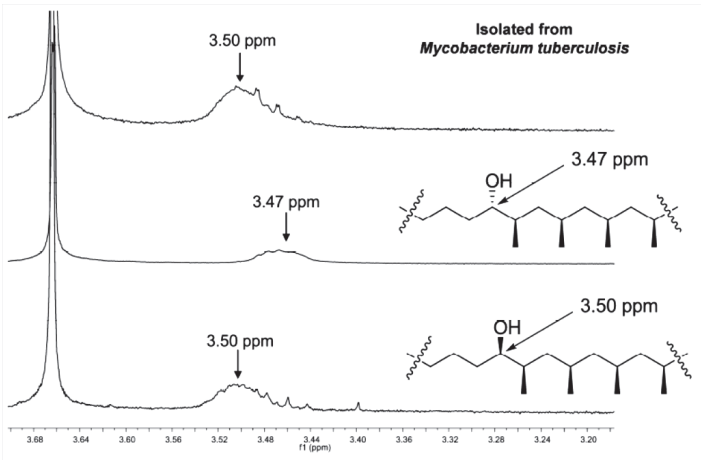

Figure 3 Partial ^{1}H NMR spectra of isolated hydroxyphthioceranic acid methylester and synthesized *anti*-**17** and *syn*-**18**.

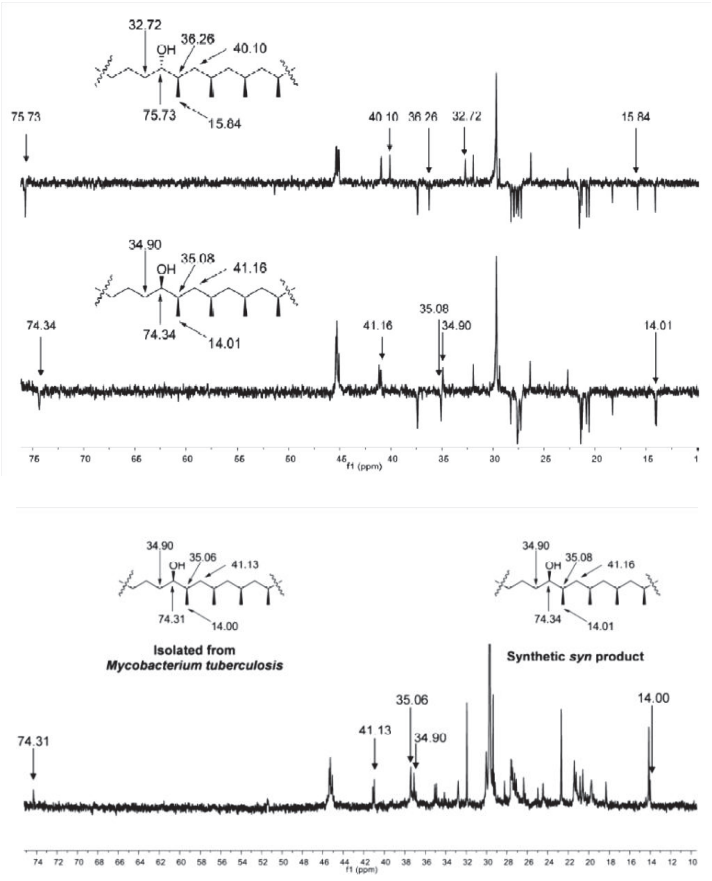

Figure 4 Partial ^{13}C NMR spectra of isolated hydroxyphthioceranic acid methylester and synthesized *anti*-**17** and *syn*-**18**.

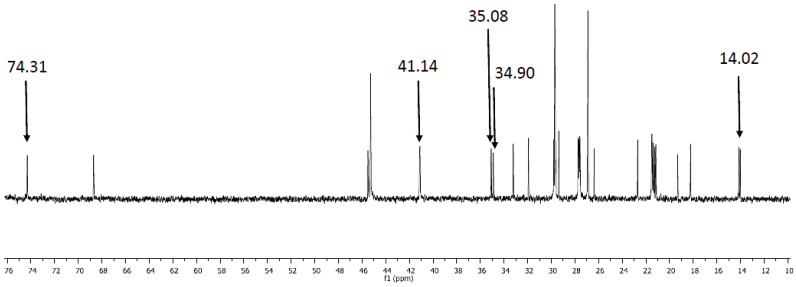

Figure 5 Partial ^{13}C NMR of compound **28** indicating formation of the *syn* alcohol.

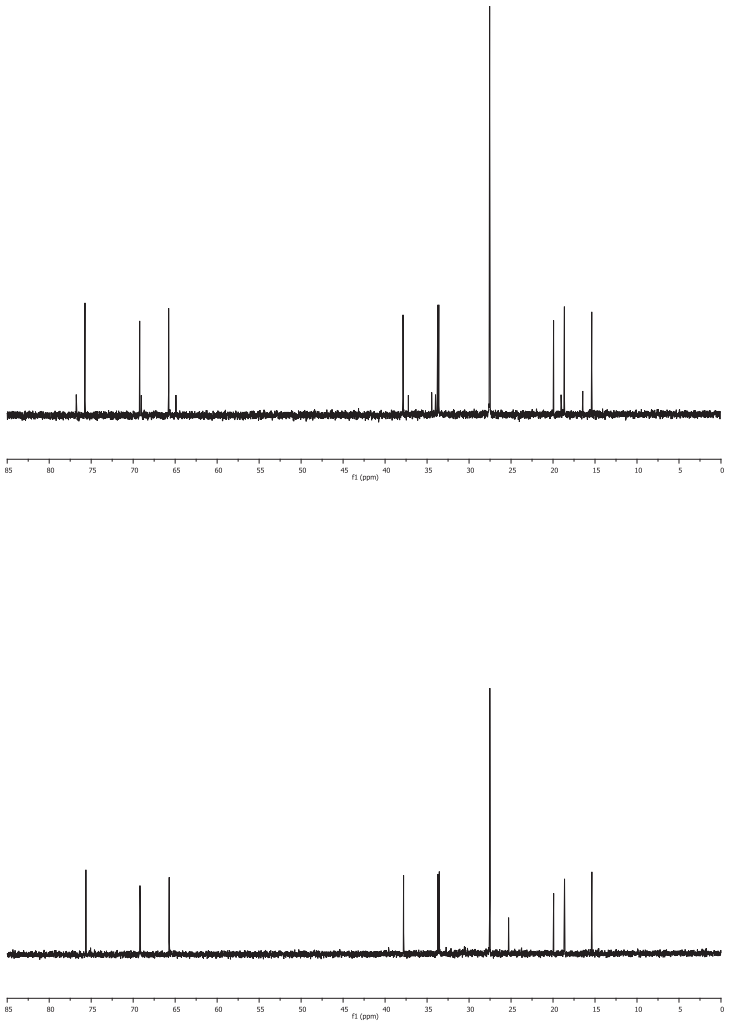

Figure 6 Partial ^{13}C NMR of compound **33** indicating the difference in diastereoselectivity for the Sharpless (top spectrum) and Morken (bottom spectrum) dihydroxylation procedures.

Modeling and Docking

The CD1b-diacylsulfoglycolipid (PDB code: 3T8X)[4] X-ray co-crystal structures was used for the evaluation of the binding mode of **1** to CD1b. The natural product **1** was manually docked into the binding groove, and the energy of the system minimized using the MAB force field as implemented in the computer program MOLOC,[5] whilst keeping the protein coordinates fixed (Figure 7SI).

The protein was prepared for docking using the program LeadIT;[7] the binding site was localized by a sphere of radius 8 Å around the co-crystallized SGL.[4] The three-dimensional structure of **1** was generated using the software CORINA,[8] optimized in the presence of the protein in MOLOC and protonated with FCONV.[9] The binding mode obtained in this way is almost identical to the one found by modeling.

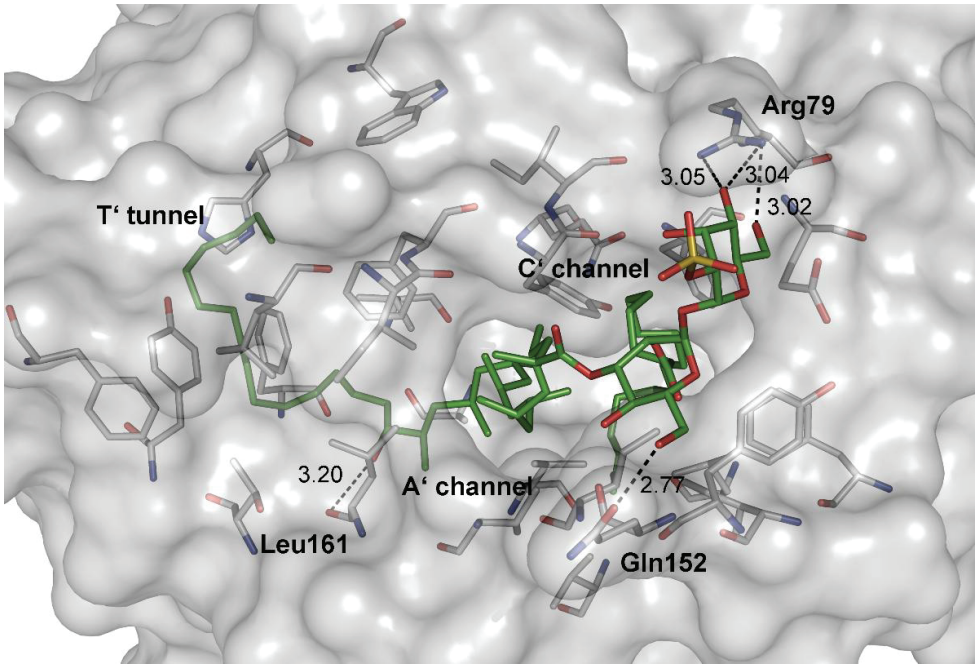

Figure 7 Top view from the MOLOC-generated molecular model of **1** in the hydrophobic binding pocket of human CD1b (PDB code: 3T8X). Color code: protein skeleton: C: gray; inhibitor skeleton: C: green; O: red; S: yellow. Hydrogen bonds are represented as dashed lines. Distances between heavy atoms are given in Å. Image generated with Pymol.[6]

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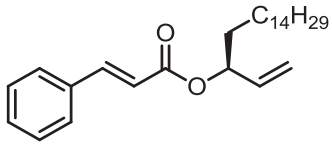
(*S*)-octadec-1-en-3-yl cinnamate (6)



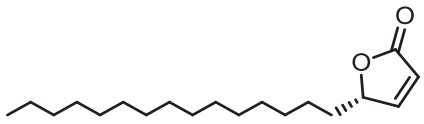
To a solution of pentadecylmagnesium bromide in Et_2O (0.45 M) cooled to –60 °C, was added DCM (120 mL), and the mixture was stirred vigorously. A solution of (+)-(R,R_{Fe})-Taniaphos (**L1**) (142 mg, 1.1 mol%) and CuBr·SMe_2 (38.5 mg, 1.0 mol%) in DCM (5 mL) was added and the suspension was stirred for 10 min. Substrate **5** (5.00 g, 18.73 mmol) was added dropwise in DCM (2 x 10 mL) over 1 h. The reaction mixture was quenched with MeOH (5 mL) at –60 °C after 16 h. A saturated aq. NH_4Cl solution (80 mL) was added together with Et_2O (200 mL) and the mixture was brought to rt and stirred for 30 min. The layers were separated and the aqueous layer was extracted with Et_2O (2 x 200 mL). The organic layers were combined and dried over $MgSO_4$ and concentrated under reduced pressure and the product purified by flash chromatography (pentane/Et_2O 40:1) to afford **6** as a colorless oil (5.68 g, 76% yield).

^{1}H NMR (400 MHz, $CDCl_3$): δ 7.70 (d, J = 16, 1H), 7.53 (m, 2H), 7.37 (m, 3H), 6.46 (d, J = 16.0, 1H), 5.85 (m, 1H), 5.37 (apparent q, J = 8.0, 1H), 5.29 (td, J = 1.3, 17.3, 1H), 5.18 (td, J = 1.1, 10.5, 1H), 1.74-1.61 (m, 2H), 1.48-1.08 (m, 26H), 0.88 (t, J = 6.8, 3H).

^{13}C NMR (101 MHz, $CDCl_3$) δ 166.32 (s), 144.61 (d) , 136.70 (d), 134.36 (s), 130.23 (d), 128.82 (d, 2 x C), 128.01 (d, 2 x C), 118.39 (d), 116.49 (t), 74.91 (d), 34.33 (t), 31.92 (t), 29.73 (t), 29.63-29.58 (t, 6 x C), 29.49 (t), 29.40 (t), 29.31 (t), 25.09 (t), 22.74 (t), 14.06 (q).

HRMS-(EI+) calculated for $C_{27}H_{42}O_2$ 398.3185, found 398.3180.

(*S*)-5-pentadecylfuran-2(5H)-one (7)



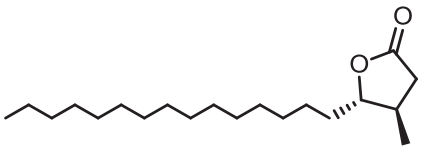
A solution of **6** (2.44 g, 6.12 mmol) in DCM (25 mL) was stirred at room temperature and nitrogen was bubbled trough the solution for 15 min. Hoveyda-Grubbs second generation catalyst (38 mg, 1 mol%) was added in one portion and the solution was refluxed for 24 h under a nitrogen atmosphere. After 24 h the reaction mixture was cooled down to room temperature and the solvents were removed under reduced pressure. The crude product was purified by flash chromatography (pentane/Et_2O 1:1) to afford **7** as a white wax (1.58 g, 87% yield).

^{1}H NMR (400 MHz, $CDCl_3$): δ 7.43 (dd, J = 1.5, 5.7, 1H), 6.09 (dd, J = 2.0, 5.7, 1H), 5.02 (m, 1H), 1.79-1.59 (m, 2H), 1.47-1.37 (m, 2H), 1.35-1.10 (m, 24H), 0.86 (t, J = 6.7, 3H).

^{13}C NMR (101 MHz, $CDCl_3$) δ 173.80 (s), 156.32 (d),121.51 (d), 83.42 (d), 33.37 (d), 31.91 (d), 29.57 (d, 4 x C), 29.60 (d), 29.55 (d), 29.51 (d), 29.33 (d), 29.25 (d), 29.35 (d), 24.90 (d), 22.71 (d), 14.08 (t)

HRMS-(EI+) for $C_{19}H_{34}O_2$ calculated 294.2559, found 294.2544

(4*R*,5*S*)-4-methyl-5-pentadecyldihydrofuran-2(3H)-one (8)



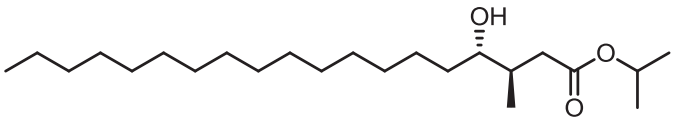
To a stirred solution of CuI (3.41 g, 17.9 mmol) in Et_2O (80 mL) at –20 °C (ice bath with NaCl), MeLi (21.3 mL, 1.6 M in Et_2O, 34.1 mmol) was carefully added over 10 min. After 15 min of stirring, a solution of substrate **7** (1.05 g, 3.59 mmol) in Et_2O (15 mL) was added and stirring was continued at -20 °C for 2 h. The reaction mixture was quenched with a saturated aq. NH_4Cl solution (50 mL) and stirred for 1 h. The organic layer was separated and the aqueous layer was extracted with 3 portions of 100 mL Et_2O. The combined organic fractions were dried on $MgSO_4$ and concentrated under reduced pressure. The crude product was purified by flash chromatography (pentane/Et_2O 1:1) to afford **8** as a white solid (1.05 g, 94%).

^{1}H NMR (400 MHz, $CDCl_3$): δ 4.00 (m, 1H), 2.71 - 2.62 (m, 1H), 2.28 - 2.10 (m, 2H), 1.69-1.14 (br m, 28H), 1.13 (d, *J* = 6.4, 3H), 0.87 (t, *J* = 6.4, 3H).

^{13}C NMR (101 MHz, $CDCl_3$) δ 176.43 (s), 87.34 (d), 37.00 (d), 36.02 (t), 33.89 (t), 31.76 (t), 29.62-29.51 (6 x C, t), 29.42 (t), 29.28 (t), 29.31 (t), 29.33 (t), 25.55 (t), 22.62 (t), 17.28 (q), 14.01(q).

HRMS-(EI+) calculated for $C_{20}H_{38}O_2$ 310.2872, found 310.2888.

(3*R*,4*S*)-isopropyl 4-hydroxy-3-methylnonadecanoate (9)



Lactone **8** (436 mg, 1.41 mmol) was dissolved in a mixture THF/H_2O (1:1, 10 mL) and KOH (90 mg, 1.41 mmol) was added. The mixture was heated to 60 °C for 16 h and then cooled down to rt. The solvents were removed under reduced pressure (caution, soap formation). The crude potassium salt was stripped with dry toluene (3 x 5 mL) to remove the final traces of water. The crude material was dissolved in dry DMF (30 mL) under a N_2 atmosphere and isopropyl bromide (0.66 mL, 7.03 mmol) was added. After 2 d of stirring Et_2O (100 mL) and H_2O (100 mL) were added and the organic layer

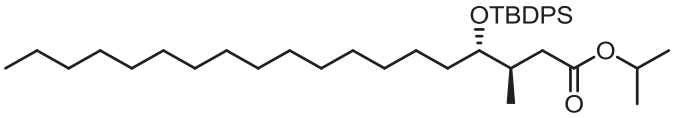
was separated from the water phase after vigorous shaking. The organic layer was washed with one portion of Et_2O (50 mL). The combined organic layers were washed with brine (100 mL) and subsequently dried on $MgSO_4$ and evaporated under reduced pressure. The crude ester was purified by flash chromatography (pentane/Et_2O 9:1) to afford **9** as a white solid (496 mg, 99%).

^{1}H NMR (400 MHz, $CDCl_3$): δ 4.99 (heptet, *J* = 6.4, 1H), 3.36 (m, 1H), 2.45 (dd, *J* = 5.4, 15.0, 1H), 2.16 (dd, *J* = 7.7, 15.0, 1H), 2.04-1.95 (m, 1H), 1.87 (d, *J* = 5.8, 1H), 1.52-1.11 (br, 28 H), 1.22 (d, *J* = 6.3, 6H), 0.94 (d, *J* = 6.9, 3H), 0.86 (t, *J* = 6.8, 3H).

^{13}C NMR (101 MHz, $CDCl_3$) δ 173.42 (s), 75.54 (d), 67.57 (d), 37.82 (t), 36.21 (d), 34.46 (t), 31.88 (t), 29.65-29.59 (9 x C, t), 29.32 (t), 25.77 (t), 22.65 (t), 21.80 (q), 21.76 (q), 16.63 (q), 14.08 (q).

HRMS-(EI+) calculated for $C_{23}H_{46}O_3Na$ [M + Na^+] 393.3345, found 393.3335.

(3*R*,4*S*)-isopropyl 4-(tert-butyldiphenylsilyl)-3-methylnonadecanoate



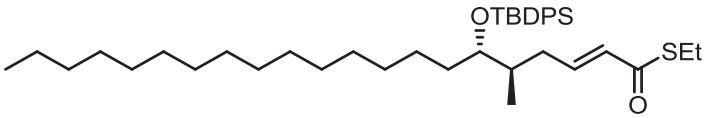
A solution of TBDPSCl (0.48 mL, 1.86 mmol) and AgOTf (526 mg, 2.05 mmol) was stirred in DCM (5 mL) for 1h under N_2 atmosphere. Lutidine (3.72 mmol) was added to the solution followed by iso-propyl ester **9** (330 mg, 0.93 mmol) in DCM (1 mL) at –20 °C (ice bath with NaCl). The temperature of the reaction mixture was allowed to rise to rt overnight and the mixture was then filtered and concentrated under reduced pressure. The crude material was purified by flash chromatography (pentane/Et_2O 40:1) to afford the product as a colorless oil (487 mg, 86%).

^{1}H NMR (400 MHz, $CDCl_3$): δ 6.35 (dd, *J* = 1.3, 7.7, 4H), 7.44-7.34 (m, 6H), 6.26 (heptet, *J* = 6.3, 1H), 3.58 (m, 1H), 2.44 (dd, *J* = 3.9, 14.3, 1H), 2.15 (m, 1H), 2.07 (dd, *J* = 9.8, 14.3, 1H), 1.38-1.10 (br, 25H), 1.22 (d, *J* = 6.3, 3H), 1.20 (d, *J* = 6.3, 3H), 1.07 (s, 9H), 0.97 (d, *J* = 6.6, 3H), 0.89 (t, *J* = 6.8, 3H).

^{13}C NMR (101 MHz, $CDCl_3$) δ 173.12 (s), (136.00, 135.94) (d, 4 x C), (134.67, 133.98) (s, 2 x C), (129.48, 129.34) (d, 4 x C), (127.42, 127.29) (d, 2 x C), 76.90 (d), 67.29 (d), 37.08 (t), 34.82 (d), 33.54 (t), 31.91 (t), 29.69-29.36 (7 x C, t), 27.12 (q, 3 x C), 25.29 (t), 22.68 (t), (21.86, 21.77) (q, 2 x C), 19.56 (s), 16.40 (q), 14.11 (q).

HRMS-(EI+) calculated for $C_{35}H_{55}O_3Si$ [M - *t*-butyl] 551.3921, found 551.3944.

(5*R*,6*S*,*E*)-S-ethyl 6-(tert-butyldiphenylsilyl)-5-methylhenicos-2-enethioate (10)



Solution A; To a stirred mixture of iso-propyl ester **9** (0.294 mmol) in DCM (4 mL) was added DIBAL-H (0.309 mmol, 1.0 M solution in DCM) at –60 °C under nitrogen. Stirring was continued until the reduction was completed (3-5 h).

Solution B; To a stirred solution of $(EtO)_2POCHCOSEt$ (0.59 mmol) in THF (10 mL) at 0 °C under nitrogen was added *n*-BuLi (0.44 mmol, 1.6 M solution in hexanes). The reaction mixture was stirred for an additional 20 min. Solution B was added dropwise to solution A and after addition the reaction mixture was slowly warmed to rt and stirred for 8 h. The reaction mixture was quenched with a saturated solution of NH_4Cl. The phases were separated and the aqueous layer extracted with 3 portions of Et_2O. The combined organic phases were dried over $MgSO_4$, concentrated under reduced pressure and purified by flash chromatography (pentane/Et_2O 40:1) to afford α,β-unsaturated thioester **10** as a colorless oil (159 mg, 85%).

^{1}H NMR (400 MHz, $CDCl_3$): δ 7.68 (d, *J* = 6.4, 4H) 7.41 (m, 6H) 6.76 (td, *J* = 7.4, 15.1, 1H) 6.03 (d, *J* = 15.4, 1H) 3.57 (m, 1H), 2.95 (q, *J* = 7.4, 2H) 2.27 (m, 1H) 1.96 (m, 1H) 1.76 (m, 1H), 1.50-1.00 (br, 31H), 1.06 (s, 9H), 0.91 (d, *J* = 6.9, 3H), 0.90 (t, *J* = 7.6, 3H).

^{13}C NMR (101 MHz, $CDCl_3$) δ 189.82 (s), 144.51 (d), 135.96 (d, 4 x C), (134.52, 134.07) (s, 2 x C), (129.57, 129.53) (d, 4 x C), 129.41 (d), (127.45, 127.33) (d, 2 x C), 76.86 (d), 37.30 (d), 34.92 (t), 33.00 (t), 31.91 (t), 29.70 (t, 3 x C), 29.66 (t), 29.61 (t), 29.53 (t), 29.51 (t), 29.46 (t), 29.36 (t), 27.12 (q, 3 x C), 25.35 (t), 22.99 (t), 22.68 (t), 22.33 (t), 19.54 (s), 15.58 (q), 14.82 (q), 14.11 (q), 14.05 (q).

HRMS-(EI+) calculated for $C_{36}H_{55}O_2SSi$ [M – *t*-butyl] 579.3692, found 579.3691.

General procedure for the catalytic asymmetric conjugate addition of Grignard reagents to *α,β*-unsaturated thioesters (procedure A)

Josiphos·CuBr (**L2**) (29.1 mg, 1 mol%) was dissolved in *t*-BuOMe (24 mL) and stirred at rt for 30 min under nitrogen atmosphere. The mixture was cooled to –75 °C and MeMgBr (4.69 mmol, 3 M solution in Et_2O) was added dropwise. After stirring for 10 min, a solution of thioester (3.91 mmol) in *t*-BuOMe (7 mL) was added via a syringe pump over 1-2 h. The reaction mixture was stirred at –75 °C for 16 h, then quenched by the addition of MeOH and allowed to warm to rt. Saturated aqueous NH_4Cl solution was added, the phases were separated and the aqueous layer extracted with Et_2O. The combined organic phases were dried over $MgSO_4$, filtered, concentrated under reduced pressure and the product was purified by flash chromatography.

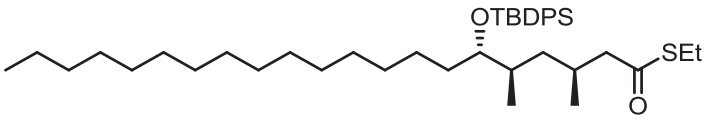
DIBAL-H reduction (procedure B)

To a stirred mixture of the thioester (0.50 mmol) in DCM or THF (7 mL) was added DIBAL-H (0.60 mmol, 1 M solution in DCM or toluene) at –65 °C under nitrogen. Stirring was continued until the reduction was completed (3-5 h). The reaction was quenched with a saturated solution of Rochelle's salt (potassium sodium tartrate) and the mixture was stirred for 1 h at rt. The phases were separated and the aqueous layer extracted with 3 portions of Et_2O. The combined organic phases were dried over $MgSO_4$, concentrated under reduced pressure and purified by flash chromatography to give the pure aldehyde which was used in the next step without complete removal of the eluent.

Horner-Wadsworth-Emmons olefination (HWE olefination) (procedure C)

To a stirred solution of $(EtO)_2POCHCOSEt$ (3.06 mmol) in THF (17 mL) at 0 °C under nitrogen was added *n*-BuLi (2.30 mmol, 1.6 M solution in hexane). The reaction mixture was stirred for an additional 20 min. A solution of aldehyde (1.53 mmol) in THF (2 mL) was added dropwise and after addition the reaction mixture was slowly warmed to rt and subsequently stirred for 8 h. The reaction mixture was quenched with a saturated aq. solution of NH_4Cl. The phases were separated and the aqueous layer extracted with 3 portions of Et_2O. The combined organic phases were dried over $MgSO_4$, concentrated under reduced pressure and the product purified by flash chromatography to afford the desired α,β-unsaturated thioester.

(3*S*,5*R*,6*S*)-S-ethyl 6-(tert-butyldiphenylsilyl)-3,5-dimethylhenicosanethioate (11)



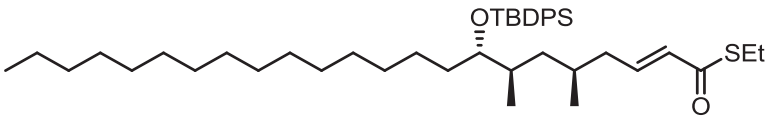
The title compound was prepared from **10** following procedure A. The crude material was purified by flash chromatography (pentane/Et_2O 40:1) to afford **11** as a colorless oil (440 mg, 91%).

^{1}H NMR (400 MHz, $CDCl_3$): δ 7.68 (m, 4H), 7.40 (m, 6H), 3.57 (m, 1H), 2.85 (q, *J* = 7.3, 2H), 2.30 (dd, *J* = 5.1, 14.5, 1H), 2.06 (dd, *J* = 8.8, 14.4, 1H), 1.87 (m, 1H), 1.56 (m, 1H), 1.40-0.90 (br, 42H), 0.89 (t, *J* = 6.7, 3H), 0.90 (d, *J* = 6.8, 3H), 0.79 (d, *J* = 6.6, 3H).

^{13}C NMR (101 MHz, $CDCl_3$) δ 199.03 (s), (135.94, 135.92) (d, 4 x C), (134.71, 134.39) (s, 2 x C), (129.36, 129.24) (d, 4 x C), (127.31, 127.21) (d, 2 x C), 76.98 (d), 50.54 (t), 39.80 (t), 35.31 (d), 31.99 (t), 31.84 (t), 29.62 (t, 6 x C), 29.58 (t), 29.48 (t), 29.44 (t), 29.28 (t), 28.54 (d), 27.07 (q, 3 x C), 26.07 (t), 23.13 (t), 22.60 (t), 20.45 (q), 19.47 (s), 14.83 (q), 14.72 (q), 14.04 (q).

HRMS-(EI+) calculated for $C_{37}H_{59}O_2SSi$ [M – *t*-butyl] 595.4005, measured 595.4017.

(5*R*,7*R*,8*S*,*E*)-*S*-ethyl 8-(tert-butyldiphenylsilyl)-5,7-dimethyltricos-2-enethioate



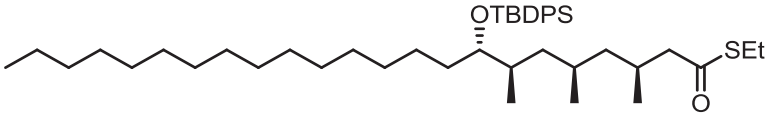
The title compound was prepared from **11** following procedure B and C. The crude material was purified by flash chromatography (eluent pentane/Et_2O 40:1) to give the product as a colorless oil (1.62 g, 90%).

^{1}H NMR (400 MHz, $CDCl_3$): δ 7.68 (m, 4H), 7.40 (m, 6H), 6.75 (dt, *J* = 8.0, 15.2 Hz, 1H), 5.99 (dt, *J* = 1.4, 15.5 Hz, 1H), 3.55 (m, 1H), 2.95 (q, *J* = 7.4 Hz, 2H), 2.00 (m, 1H), 1.72 (m, 1H), 1.61 (m, 1H), 1.49-1.00 (br, 34H), 1.07 (s, 9H), 0.89 (t, *J* = 6.4 Hz, 3H), 0.89 (d, *J* = 6.1 Hz, 3H), 0.76 (d, *J* = 6.6 Hz, 3H).

^{13}C NMR (101 MHz, $CDCl_3$) δ 189.82 (d), 143.94 (d), (135.99, 135.96) (d, 4 x C), (134.67, 134.45) (s, 2 x C), 129.74 (d), (129.39, 129.29) (d, 2 x C), (127.33, 127.25) (d, 4 x C), 76.95 (d), 39.82 (t), 38.55 (t), 35.43 (d), 31.88 (t), 29.89 (d), 29.65 (t, 7 x C), 29.62 (t), 29.52 (t), 29.48 (t), 29.32 (t), 27.10 (q, 3 x C), 26.18 (t), 22.96 (t), 22.65 (t), 20.46 (q), 19.49 (s), 14.80 (q), 14.78 (q), 14.09 (q).

HRMS-(EI+) calculated for $C_{39}H_{61}O_2SSi$ [M – *t*-butyl] 621.4162, found 621.4191.

(3*S*,5*R*,7*R*,8*S*)-*S*-ethyl 8-(tert-butyldiphenylsilyl)-3,5,7-trimethyltricosanethioate



The title compound was prepared from the unsaturated thioester following procedure A. The crude material was purified by flash chromatography (pentane/Et_2O 40:1) to afford the product as a colorless oil (499 mg, 95%).

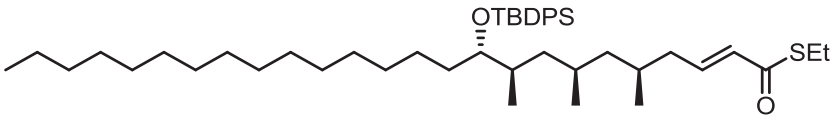
^{1}H NMR (400 MHz, $CDCl_3$): δ 7.70 (m, 4H), 7.39 (m, 6H), 3.57 (m, 1H), 2.88 (q, *J* = 7.4, 2H), 2.45 (dd, *J* = 4.8, 14.3, 1H), 2.14 (dd, *J* = 8.8, 14.3, 1H), 2.02 (m, 1H) 1.64 (m, 1H), 1.50-1.00 (br, 29H), 1.08 (s, 9H), 0.90 (t, *J* = 7.6, 3H), 0.89 (d, *J* = 6.7, 3H) 0.85 (d, *J* = 6.5, 3H), 0.71 (d, *J* = 6.4, 3H).

^{13}C NMR (101 MHz, $CDCl_3$): δ 199.17 (s), (136.04, 136.01) (d, 4 x C), (134.79, 134.57) (s, 2 x C), (129.39, 129.29) (d, 2 x C), (127.33, 127.26) (d, 4 x C), 76.79 (d), 50.73 (t), 44.25 (t), 40.68 (t), 35.54 (d), 31.92 (t), 31.64 (t), 29.71 (t, 6 x C), 29.66 (t), 29.57 (t), 29.55 (t), 29.37 (t), 28.50 (d), 27.51 (d),

27.14 (q, 3 x C), 26.35 (t), 23.23 (t), 22.69 (t), 20.75 (q), 20.46 (q), 19.52 (s), 14.97 (q), 14.82 (q), 14.13 (q).

HRMS-(EI+) calculated for $C_{40}H_{65}O_2SSi$ [M – *t*-butyl] 637.4475, found 637.4440.

(5*S*,7*R*,9*R*,10*S*,*E*)-S-ethyl 10-(tert-butyldiphenylsilyl)-5,7,9-trimethylpentacos-2-enethioate



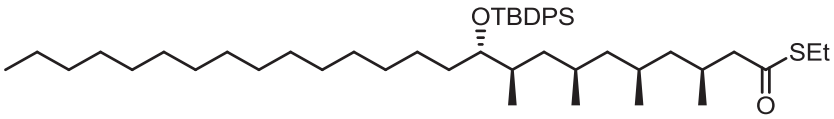
The title compound was prepared following procedure B and C. The crude material was purified by flash chromatography (eluent pentane/Et_2O 40:1) to afford the product as a colorless oil (1.23 g, 71%).

^{1}H NMR (400 MHz, $CDCl_3$): δ 7.68 (m, 4H), 7.38 (m, 6H), 6.82 (dt, *J* = 8.0, 15.2, 1H), 6.07 (dt, *J* = 1.4, 15.5, 1H), 3.56 (m, 1H), 2.95 (q, *J* = 7.4, 2H), 2.14 (m, 1H), 1.82 (m, 1H), 1.64 (m, 2H), 1.50-1.00 (br, 36H), 1.07 (s, 9H), 0.89 (t, *J* = 7.0, 3H), 0.88 (d, *J* = 7.1, 3H), 0.80 (d, *J* = 6.6, 3H), 0.70 (d, *J* = 6.5, 3H).

^{13}C NMR (101 MHz, $CDCl_3$): δ 189.89 (s), 144.10 (d), (136.05, 136.01) (d, 4 x C), (134.82, 134.57) (s, 2 x C), 129.80 (d), (129.37, 129.28 (d, 2 x C), (127.32, 127.25) (d, 4 x C), 76.84 (d), 44.29 (t), 40.72 (t), 38.91 (t), 35.58 (d), 31.91 (t), 31.71 (t), 29.84 (d), 29.70 (t, 7 x C), 29.66 (t), 29.57 (t), 29.53 (t), 29.36 (t), 27.15 (q, 3 x C), 26.32 (t), 23.00 (t), 22.68 (t), 20.89 (q), 20.40 (q), 19.52 (s), 15.04 (q), 14.80 (q), 14.11 (q).

HRMS-(EI+) calculated for $C_{42}H_{67}O_2SSi$ [M – *t*-butyl] 663.4631, found 663.4597.

(3*S*,5*S*,7*R*,9*R*,10*S*)-S-ethyl 10-(tert-butyldiphenylsilyl)-3,5,7,9-tetramethylpentacosanethioate



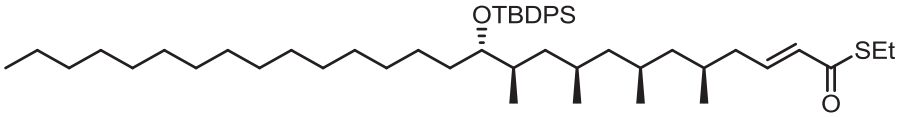
The title compound was prepared following procedure A. The crude material was purified by flash chromatography (pentane/Et_2O 40:1) to give the product as a colorless oil (1.111 g, 88%).

^{1}H NMR (400 MHz, $CDCl_3$): δ 7.69 (dd, 1H, *J* = 1.2, 7.7 Hz, 4H), 7.38 (m, 6H), 3.58 (m, 1H), 2.88 (q, *J* = 7.4 Hz, 2H), 2.53 (dd, *J* = 4.9, 14.3 Hz, 1H), 2.24 (dd, *J* = 8.8, 14.3 Hz, 1H), 2.09 (m, 1H), 1.67 (m, 1H), 1.50-1.00 (br, 39H), 1.08 (s, 9H), 0.92 (d, *J* = 6.5 Hz, 3H) 0.90 (t, *J* = 7.6 Hz, 3H), 0.90 (d, *J* = 6.8 Hz, 3H), 0.78 (d, *J* = 6.5 Hz, 3H), 0.68 (d, *J* = 6.4 Hz, 3H).

^{13}C NMR (101 MHz, $CDCl_3$): δ 199.21 (s), (136.05, 136.01) (d, 4 x C), (134.85, 134.55) (s, 2 x C), (129.36, 129.26) (d, 2 x C), (127.32, 127.24) (d, 4 x C), 76.66 (d), 50.88 (t), 45.01 (t), 44.28 (t), 40.61 (t), 35.64 (d), 31.92 (t), 31.65 (t), 29.71 (t, 7 x C), 29.66 (t), 29.56 (t), 29.54 (t), 29.37 (t), 28.59 (d), 27.45 (d), 27.39 (d), 27.16 (q, 3 x C), 26.36 (t), 22.69 (t), 20.74 (q, 2 x C), 20.53 (q), 19.53 (s), 15.19 (q), 14.82 (q), 14.14 (q).

HRMS-(EI+) calculated for $C_{43}H_{71}O_2SSi$ [M – *t*-butyl] 679.4944, found 679.4971.

(5*S*,7*R*,9*R*,11*R*,12*S*,*E*)-S-ethyl 12-(tert-butyldiphenylsilyl)-5,7,9,11-tetramethylheptacos-2-enethioate



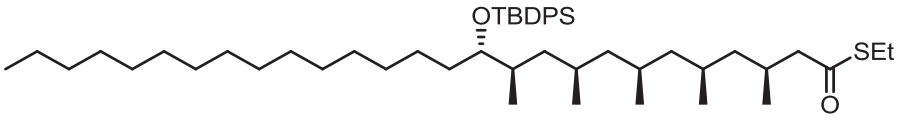
The title compound was prepared following procedure B and C. The crude material was purified by flash chromatography (eluent pentane/Et_2O 40:1) to afford the product as a colorless oil (862 mg, 75%).

^{1}H NMR (400 MHz, $CDCl_3$): δ 7.69 (dd, *J* = 1.5, 7.9, 4H), 7.38 (m, 6H), 6.87 (dt, *J* = 8.0, 15.2, 1H), 6.10 (dt, *J* = 1.3, 15.4, 1H), 3.58 (m, 1H), 2.95 (q, *J* = 7.4, 2H), 2.21 (m, 1H), 1.92 (m, 1H), 1.67 (m, 2H), 1.50-1.00 (br, 39H), 1.08 (s, 9H), 0.92-0.86 (m, 9H), 0.77 (d, *J* = 6.5, 3H), 0.69 (d, *J* = 6.5, 3H).

^{13}C NMR (101 MHz, $CDCl_3$): δ 189.87 (s), 144.07 (d), (136.05, 136.01) (d, 4 x C), (134.86, 134.56) (s, 2 x C), 129.85 (d), (129.35, 129.26) (d, 2 x C), (127.31, 127.24) (d, 4 x C), 76.73 (d), 45.08 (t), 44.30 (t), 40.61 (t), 38.98 (t), 35.65 (d), 31.92 (t), 31.87 (t), 29.89 (d), 29.83 (t, 3 x C), 29.80 (t), 29.71 (t), 29.67 (t), 29.57 (t), 29.54 (t), 29.49 (t), 29.37 (t), 27.52 (d), 27.41 (d), 27.15 (q, 3 x C), 26.32 (t), 23.00 (t), 22.69 (t), 21.20 (q), 20.82 (q), 20.51 (q), 19.53 (s), 15.19 (q), 14.81 (q), 14.12 (q).

HRMS-(EI+) calculated for $C_{45}H_{73}O_2SSi$ [M – *t*-butyl] 705.5101, found 705.5079.

(3*S*,5*S*,7*R*,9*R*,11*R*,12*S*)-S-ethyl 12-(tert-butyldiphenylsilyl)-3,5,7,9,11-pentamethylheptacosanethioate



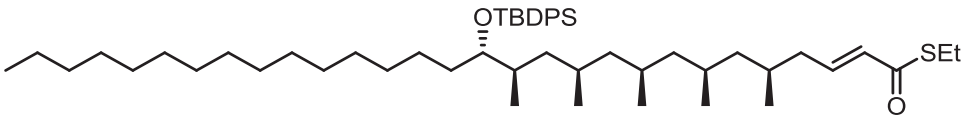
The title compound was prepared following procedure A. The crude material was purified by flash chromatography (pentane/Et_2O 40:1) to afford the product as a colorless oil (761 mg, 86%).

^{1}H NMR (400 MHz, $CDCl_3$): δ 7.68 (dd, *J* = 1.3, 7.8, 4H), 7.38 (m, 6H), 3.58 (m, 1H), 2.88 (q, *J* = 7.4, 2H), 2.55 (dd, *J* = 5.0, 14.3, 1H), 2.25 (dd, *J* = 8.8, 14.3, 1H), 2.12 (m, 1H), 1.68 (m, 1H), 1.56-1.00 (br, 42H), 1.07 (s, 9H), 0.89 (t, *J* = 6.7, 3H), 0.93 (d, *J* = 6.5, 3H), 0.89 (d, *J* = 6.8, 3H), 0.85 (d, *J* = 6.5, 3H), 0.74 (d, *J* = 6.5, 3H), 0.68 (d, *J* = 6.4, 3H).

^{13}C NMR (101 MHz, $CDCl_3$): δ 199.27 (s), (136.05, 136.01) (d, 4 x C), (134.88, 134.54) (s, 2 x C), (129.35, 129.25) (d, 2 x C), (127.32, 127.24) (d, 4 x C), 76.63 (d), 50.91 (t), 45.04 (t), 45.01 (t), 44.40 (t), 40.55 (t), 35.65 (d), 31.92 (t), 31.64 (t), 29.71 (t, 6 x C), 29.66 (t), 29.57 (t), 29.54 (t), 29.37 (t), 28.63 (d), 27.55 (d), 27.40 (d), 27.28 (d), 27.15 (q, 3 x C), 26.35 (t), 23.25 (t), 22.69(t), 21.25 (q), 21.15 (q), 20.79 (q), 20.55 (q), 19.53 (s), 15.27 (q), 14.82 (q), 14.13 (q).

HRMS-(EI+) calculated for $C_{46}H_{77}O_2SSi$ [M – *t*-butyl] 721.5414, found 721.5385.

(5*S*,7*S*,9*R*,11*R*,13*R*,14*S*,*E*)-S-ethyl 14-(tert-butyldiphenylsilyl)-5,7,9,11,13-pentamethylnonacos-2-enethioate



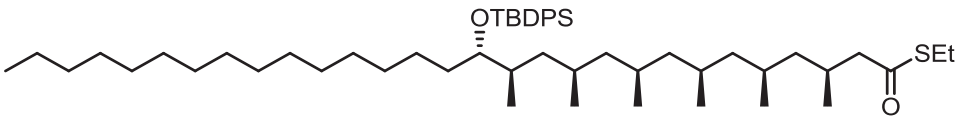
The title compound was prepared following procedure B and C. The crude material was purified by flash chromatography (eluent pentane/Et_2O 40:1) to afford the product as a colorless oil (689 mg, 88%).

^{1}H NMR (400 MHz, $CDCl_3$): δ 7.69 (dd, *J* = 1.3, 6.5, 4H), 7.38 (m, 6H), 6.88 (dt, *J* = 1.4, 15.3, 1H), 6.11 (d, *J* = 15.4, 1H), 3.58 (m, 1H), 2.95 (q, *J* = 7.4, 2H), 2.24 (m, 1H), 1.94 (m, 1H), 1.71 (m, 2H), 1.55-0.95(br, 42H), 1.07 (s, 9H), 0.90 (br, 9H), 0.84 (d, *J* = 6.5, 3H), 0.75 (d, *J* = 6.4, 3H), 0.68 (d, *J* = 6.2, 3H).

^{13}C NMR (101 MHz, $CDCl_3$): δ 189.91 (s), 144.12 (d), (136.05, 136.02) (d, 4 x C), (134.89, 134.55) (s, 2 x C), 129.85 (d), (129.36, 129.26) (d, 2 x C), (127.32, 127.24) (d, 4 x C), 76.67 (d), 45.09 (t), 45.05 (t), 44.41 (t), 40.60 (t), 39.00 (t), 35.65 (d), 31.93 (t), 31.68 (t), 29.93 (d), 29.71 (t, 8 x C), 29.67 (t), 29.57 (t), 29.55 (t), 29.37 (t), 27.59 (d), 27.42 (d), 27.35 (d), 27.16 (q, 3 x C), 26.35 (t), 23.00 (t), 22.69 (t), 21.25 (q), 21.23(q), 20.87 (q), 20.54 (q), 19.54 (s), 15.27 (q), 14.82 (q), 14.13 (q).

HRMS-(ESI+) calculated for $C_{52}H_{88}O_2SSiNa$ [M + Na^+] 827.6167, found 827.6167.

(3*S*,5*S*,7*S*,9*R*,11*R*,13*R*,14*S*)-S-ethyl 14-(tert-butyldiphenylsilyl)-3,5,7,9,11,13-hexamethylnonacosanethioate



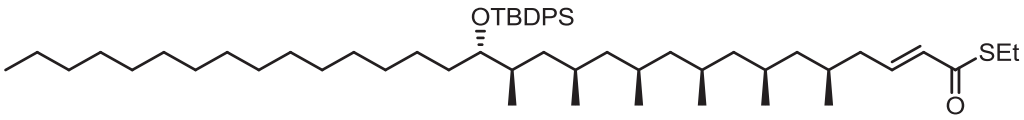
The title compound was prepared following procedure A. The crude material was purified by flash chromatography (pentane/Et_2O 40:1) to give the product as a colorless oil (643 mg, 92%).

^{1}H NMR (400 MHz, $CDCl_3$): δ 7.68 (dd, *J* = 1.4, 7.9, 4H), 7.37 (m, 6H), 3.57 (m, 1H), 2.88 (q, *J* = 7.4, 2H), 2.56 (dd, *J* = 5.0, 14.3, 1H), 2.26 (dd, *J* = 8.8, 14.3, 1H) 2.12 (m, 1H), 1.68 (m, 1H), 1.56-0.90 (br, 45H), 1.06 (s, 9H), 0.94 (d, *J* = 6.5, 3H), 0.89 (t, *J* = 6.6, 3H), 0.89 (d, *J* = 6.8, 3H), 0.86 (d, *J* = 6.7, 3H), 0.82 (d, *J* = 6.5, 3H), 0.74 (d, *J* = 6.5, 3H), 0.68 (d, *J* = 6.4, 3H).

^{13}C NMR (101 MHz, $CDCl_3$): δ 199.26 (s), (136.05, 136.01) (d, 4 x C), (134.89, 134.55) (s, 2 x C), (129.34, 129.24) (d, 2 x C), (127.31, 127.23) (d 4 x C), 76.66 (d), 50.91 (t), 45.15 (t), 45.08 (t), 44.40 (t), 40.53 (t), 35.66 (d), 31.91 (t), 31.66 (t), 29.70 (t, 7 x C), 29.65 (t), 29.55 (t), 29.53 (t), 29.35 (t), 28.65 (d), 27.63 (d), 27.47 (d), 27.43 (d), 27.34 (d), 27.15 (q, 3 x C), 26.35 (t), 23.25 (t), 22.68 (t), 21.30 (q), 21.23 (q), 21.20 (q), 20.80 (q), 20.55 (q), 19.53 (s), 15.29 (q), 14.80 (q), 14.11 (q).

HRMS-(ESI+) calculated for $C_{53}H_{92}O_2SSiNa$ [M + Na^+] 843.6485, found 843.6471.

(5*S*,7*S*,9*R*,11*R*,13*R*,15*R*,16*S*,*E*)-S-ethyl 16-(tert-butyldiphenylsilyl)-5,7,9,11,13,15-hexamethylhentriacont-2-enethioate



The title compound was prepared from following procedure B and C. The crude material was purified by flash chromatography (eluent pentane/Et_2O 40:1) to afford the product as a colorless oil (521 mg, 79%).

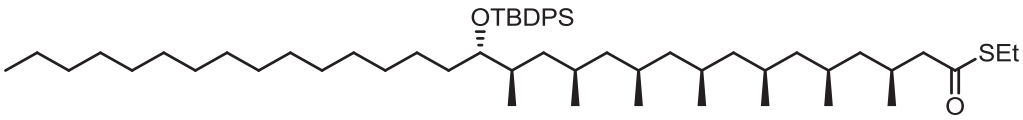
^{1}H NMR (400 MHz, $CDCl_3$): δ 7.69 (dd, *J* = 1.4, 7.9, 4H), 7.38 (m, 6H), 6.89 (m, 1H), 6.09 (dt, *J* = 1.4, 15.5, 1H), 3.59 (m, 1H), 2.95 (q, *J* = 7.4, 2H), 2.25 (m, 1H), 1.96 (m, 1H), 1.72 (m, 2H), 1.60-0.95 (br, 45H), 1.08 (s, 9H), 0.91 (m, 9H), 0.86 (d, *J* = 6.5, 3H), 0.83 (d, *J* = 6.5, 3H), 0.76 (d, *J* = 6.5, 3H), 0.69 (d, *J* = 6.4, 3H).

^{13}C NMR (101 MHz, $CDCl_3$): δ 190.13 (s), 144.34 (d), (136.31, 136.27) (d, 4 x C), (135.16, 134.82) (s, 2 x C), 130.12 (d), (129.60, 129.50) (d, 2 x C), (127.57, 127.49) (d, 4 x C), 76.95 (d), 45.27 (t), 45.15 (t), 45.12 (t), 44.40 (t), 40.59 (t), 38.99 (t), 35.69 (d), 31.93 (t), 31.70 (t), 29.96 (d), 29.71 (t, 6 x C), 29.67

(t), 29.56 (t), 29.54 (t), 29.37 (t), 27.67 (d), 27.50 (d), 27.48 (d), 27.41 (d), 27.17 (q, 3 x C), 26.37 (t), 23.00 (t), 22.69 (t), 21.33 (q), 21.31 (q), 21.27 (q), 20.89 (q), 20.55 (q), 19.54 (s), 15.30 (q), 14.82 (q), 14.12 (q).

HRMS-(ESI+) calculated for $C_{55}H_{94}O_2SSiNa$ [M + Na^+] 869.6641, found 869.6632.

(3*S*,5*S*,7*S*,9*R*,11*R*,13*R*,15*R*,16*S*)-S-ethyl 16-(tert-butyldiphenylsilyl)-3,5,7,9,11,13,15-heptamethylhentriacontanethioate



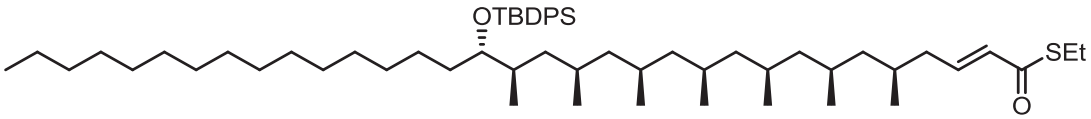
The title compound was prepared following procedure A. The crude material was purified by flash chromatography (pentane/Et_2O 40:1) to afford the product as a colorless oil (495 mg, 94%).

^{1}H NMR (400 MHz, $CDCl_3$): δ 7.69 (m, 4H), 7.38 (m, 6), 3.59 (m, 1H), 2.88 (q, *J* = 7.4, 2H), 2.57 (dd, *J* = 5.0, 14.3, 1H), 2.27 (dd, *J* = 8.7, 14.2, 1H), 2.13 (m, 1H), 1.69 (m, 1H), 1.60-0.95 (br, 48H), 1.07 (s, 9H), 0.95 (d, *J* = 6.6, 3H), 0.89 (m, 9H), 0.84 (d, *J* = 5.2, 3H), 0.83 (d, *J* = 5.1, 3H), 0.76 (d, *J* = 6.5, 3H), 0.69 (d, *J* = 6.4, 3H).

^{13}C NMR (101 MHz, $CDCl_3$): δ 199.22 (s), (136.06, 136.02) (d, 4 x C), (134.92, 134.57) (s, 2 x C), (129.35, 129.25) (d, 2 x C), (127.32, 127.24) (d, 4 x C), 76.70 (d), 50.95 (t), 45.26 (t), 45.21 (t), 45.15 (t), 45.11 (t), 44.45 (t), 40.58 (t), 35.70 (d), 31.93 (t), 31.70 (t), 29.71 (t, 6 x C), 29.67 (t), 29.56 (t), 29.54 (t), 29.37 (t), 28.68 (d), 27.69 (d), 27.53 (d, 3 x C), 27.44 (d), 27.17 (q, 3 x C), 26.37 (t), 23.25 (t), 22.69 (t), 21.39 (q, 2 x C), 21.33 (q), 21.24 (q), 20.82 (q), 20.57 (q), 19.54 (s), 15.31 (q), 14.81 (q), 14.12 (q).

HRMS-(ESI+) calculated for $C_{56}H_{98}O_2SSiNa$ [M + Na^+] 885.6954, found 885.6946.

(5*S*,7*S*,9*S*,11*R*,13*R*,15*R*,17*R*,18*S*,*E*)-S-ethyl 18-(tert-butyldiphenylsilyl)-5,7,9,11,13,15,17-heptamethyltritriacont-2-enethioate



(5*S*,7*S*,9*S*,11*R*,13*R*,15*R*,17*R*,18*S*,*E*)-*S*-ethyl 18-((*tert*-butyldiphenylsilyl)oxy)-5,7,9,11,13,15,17-heptamethyltritriacont-2-enethioate

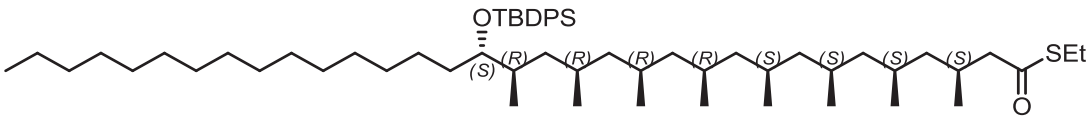
The title compound was prepared following procedure B and C. The crude material was purified by flash chromatography (eluent pentane/Et_2O 40:1) to afford the product as a colorless oil (380 mg, 75%).

^{1}H NMR (400 MHz, $CDCl_3$): δ 7.68 (m, 4H), 7.38 (m, 6H), 6.88 (m, 1H), 6.11 (dt, *J* = 1.0, 15.4, 1H), 3.58 (m, 1H), 2.95 (q, *J* = 7.4, 2H), 2.24 (m, 1H), 1.95 (m, 1H), 1.71 (m, 2H), 1.60-0.95 (br, 48H), 1.07 (s, 9H), 0.80-0.92 (m, 18H) 0.75 (d, *J* = 6.5, 3H), 0.68 (d, *J* = 6.3, 3H).

^{13}C NMR (101 MHz, $CDCl_3$): δ 189.93 (s), 144.14 (d), (136.06, 136.02) (d, 4 x C), (134.91, 134.56) (s, 2 x C), 129.86 (d), (129.36, 129.25) (d, 2 x C), (127.32, 127.25) (d, 4 x C), 76.68 (d), 45.26 (t), 45.24 (t), 45.14 (t), 45.09 (t), 44.39 (t), 40.57 (t), 38.99 (t), 35.68 (d), 31.93 (t), 31.69 (t), 29.95 (d), 29.72 (t, 5 x C), 29.67 (t), 29.57 (t), 29.55 (t), 29.37 (t), 27.65 (d), 27.50 (d, 4 x C), 27.45 (d), 27.17 (q, 3 x C), 26.37 (t), 23.01 (t), 22.70 (t), 21.39 (q), 21.36 (q), 21.32 (q), 21.28 (q), 20.89 (q), 20.56 (q), 19.54 (s), 15.30 (q), 14.83 (q), 14.13 (q).

HRMS-(ESI+) calculated for $C_{58}H_{100}O_2SSiNa$ [M + Na^+] 911.7111, found 911.7105.

(3*S*,5*S*,7*S*,9*S*,11*R*,13*R*,15*R*,17*R*,18*S*)-S-ethyl 18-(tert-butyldiphenylsilyl)-3,5,7,9,11,13,15,17-octamethyltritriacontanethioate (13)



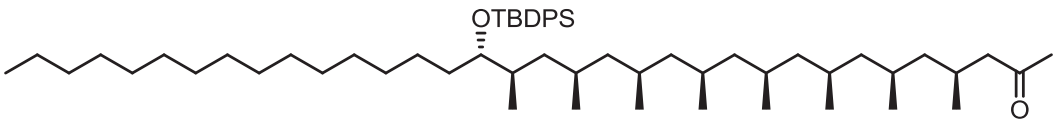
The title compound was prepared following procedure A. The crude material was purified by flash chromatography (pentane/Et_2O 40:1) to afford the **13** a colorless oil (336 mg, 90%).

^{1}H NMR (400 MHz, $CDCl_3$): δ 7.69 (m, 4H), 7.38 (m, 6H), 3.59 (m, 1H), 2.89 (q, *J* = 7.2, 2H), 2.57 (dd, *J* = 5.0, 14.3, 1H), 2.27 (dd, *J* = 8.7, 14.2, 1H), 2.14 (m, 1H), 1.70-0.95 (br, 52H), 1.07 (s, 9H), 0.95 (m, *J* = 6.5, 3H), 0.91-0.83 (m, 18H), 0.76 (d, *J* = 6.5, 3H), 0.69 (d, *J* = 6.4, 3H).

^{13}C NMR (101 MHz, $CDCl_3$): δ 199.25 (s), (136.06, 136.02) (d, 4 x C), (134.91, 134.56) (s, 2 x C), (129.35, 129.25) (d, 2 x C), (127.32, 127.24) (d, 4 x C), 76.67 (d), 50.94 (t), 45.26 (t, 2 x C), 45.19 (t), 45.13 (t), 45.10 (t), 44.44 (t), 40.58 (t), 35.68 (d), 31.93 (t), 31.67 (t), 29.71 (t, 6 x C), 29.67 (t), 29.56 (t), 29.54 (t), 29.37 (t), 28.67 (d), 27.65 (d), 27.57 (d, 2 x C), 27.51 (d, 2 x C), 27.44 (d), 27.16 (q, 3 x C), 26.36 (t), 23.26 (t), 22.69 (t), 21.44 (q), 21.40 (q), 21.39 (q), 21.32 (q), 21.25 (q), 20.82 (q), 20.57 (q), 19.54 (s), 15.30 (q), 14.82 (q), 14.13 (q).

HRMS-(ESI+) calculated for $C_{59}H_{104}O_2SSiNa$ [M + Na^+] 927.7424, found 927.7420.

(4*S*,6*S*,8*S*,10*S*,12*R*,14*R*,16*R*,18*R*,19*S*)-19-((tert-butyldiphenylsilyl)oxy)-4,6,8,10,12,14,16,18-octamethyltetratriacontan-2-one (14)



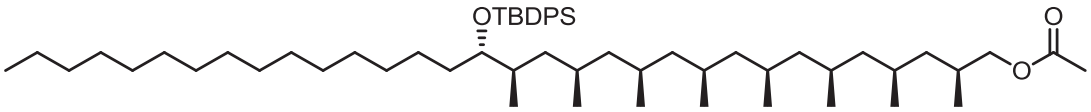
MeLi (2.12 mmol, solution in ether) was carefully added to a stirred solution of CuI (1.18 mmol) in Et_2O (8 mL) at 0 °C under a nitrogen atmosphere. The solution was stirred for 10 min and was then cooled down to –70 °C. Substrate **13** (0.24 mmol) in Et_2O (2 mL) was added in a dropwise fashion. The reaction mixture was stirred for 16 h and was quenched with a saturated aq. solution of NH_4Cl. The organic layer was separated and the aqueous layer was extracted with Et_2O (3 x 15 mL). The combined organic layers were dried on $MgSO_4$ and the solvents evaporated under reduced pressure. The crude material was purified by flash chromatography (pentane/Et_2O 40:1) to afford **14** as a colorless oil (170 mg, 84%).

^{1}H NMR (400 MHz, $CDCl_3$): δ 7.69 (dd *J* = 1.3, 7.8, 4H), 7.37 (m, 6H), 3.58 (m, 1H), 2.44 (dd, *J* = 3.4, 14.5, 1H), 2.11 (m, 4H), 1.68 (m, 1H), 1.65-0.95 (br, 52H), 1.07 (s, 9H), 0.91-0.83 (m, 18H), 0.76 (d, *J* = 6.5, 3H), 0.69 (d, *J* = 6.4, 3H).

^{13}C NMR (101 MHz, $CDCl_3$): δ 209.08 (s), (136.05, 136.02) (d, 4 x C), (134.90, 134.55) (s, 2 x C), (129.35, 129.25) (d , 2 x C), (127.32, 127.24) (d, 4 x C), 76.67 (d), 50.81 (t), 45.23 (t), 45.14 (t), 45.13 (t), 45.09 (t), 44.67 (t), 40.57 (t), 35.67 (d), 31.92 (t), 31.67 (t), 30.43 (d), 29.70 (t, 7 x C), 29.67 (t), 29.56 (t), 29.54 (t), 29.36 (t), 27.65 (d), 27.58 (d, 2 x C), 27.51 (d, 2 x C), 27.45 (d), 27.16 (q, 3 x C), 26.83 (q), 26.36 (t), 22.69 (t), 21.44 (q), 21.42 (q), 21.38 (q), 21.32 (q), 21.26 (q), 20.87 (q), 20.80 (q), 19.54 (s), 15.30 (q), 14.12 (q).

HRMS-(ESI+) calculated for $C_{58}H_{102}O_2SiNa$ [M + Na^+] 881.7547, found 881.7542.

(2*S*,4*S*,6*S*,8*S*,10*R*,12*R*,*14R*,16*R*,17*S*)-17-((tert-butyldiphenylsilyl)oxy)-2,4,6,8,10,12,14,16-octamethyldotriacontyl acetate



Methyl ketone **14** (0.076 mmol) was dissolved in DCM (2 mL), *m*CPBA (0.15 mmol) was added and the reaction mixture was stirred for 3 d at rt. An additional 2 equiv. of mCPBA (0.15 mmol) were added after 3 d and the mixture was stirred for an additional 2 days. The product partially hydrolyzed under the reaction conditions. The solvent was evaporated and the crude reaction mixture was used in the

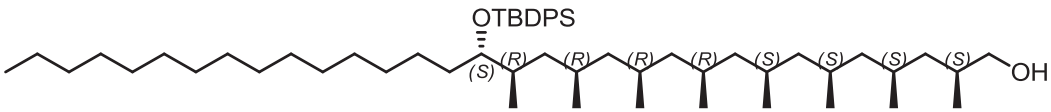
next step (hydrolysis) directly. The crude material can be purified by flash chromatography (eluent pentane/Et_2O 40:1) to afford the product as a colorless oil.

^{1}H NMR (400 MHz, $CDCl_3$): δ 7.68 (dd, *J* = 1.5, 7.9, 4H), 7.37 (m, 6H), 3.98 (dd, *J* = 5.0, 10.7, 1H), 3.83 (dd, *J* = 7.0, 10.7, 1H), 3.58 (m, 1H), 2.05 (s, 3H), 1.90 (m, 1H), 1.65-0.90 (br, 52H), 1.07 (s, 9H), 0.94 (d, *J* = 6.7, 3H), 0.90-0.82 (m, 15H), 0.75 (d, *J* = 6.5, 3H), 0.68 (d, *J* = 6.5, 3H).

^{13}C NMR (101 MHz, $CDCl_3$): δ 171.23 (s), (136.06, 136.03) (d, 4 x C), (134.93, 134.58) (s, 2 x C), (129.35, 129.25) (d, 2 x C), (127.32, 127.24) (d, 4 x C), 76.67 (d), 69.17 (t), 45.28 (t), 45.26 (t), 45.16 (t), 45.11 (t), 41.00 (t), 40.58 (t), 35.69 (d), 31.92 (t), 31.71 (t), 29.94 (d), 29.71 (t, 7 x C), 29.67 (t), 29.56 (t), 29.54 (t), 29.36 (t), 27.68 (d), 27.57 (d, 2 x C), 27.54 (d, 2 x C), 27.48 (d), 27.17 (q, 3 x C), 26.37 (t), 22.69 (t), 21.43 (q), 21.38 (q, 2 x C), 21.32 (q), 21.16 (q), 21.00 (q), 20.93 (q), 19.54 (s), 18.17 (q), 15.31 (q), 14.11 (q).

HRMS-(ESI+) calculated for $C_{58}H_{102}O_3SiNa$ [M + Na^+] 897.7496, found 897.7491.

(2*S*,4*S*,6*S*,8*S*,10*R*,12*R*,14*R*,16*R*,17*S*)-17-((tert-butyldiphenylsilyl)oxy)-2,4,6,8,10,12,14,16-octamethyldotriacontan-1-ol (15)



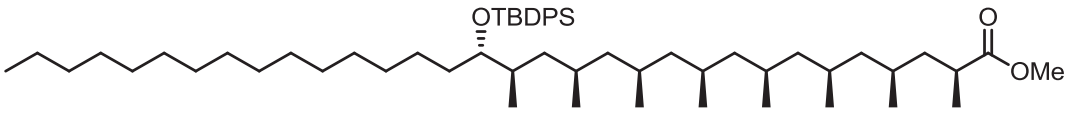
The crude product from the BVO was dissolved in a mixture of THF/MeOH/H_2O (60/30/10, 4 mL total volume), KOH (43 mg, 0.760 mmol, 10 eq.) was added and the mixture was stirred at rt for 16 h. Et_2O (10 mL) and H_2O (4 mL) were added. The organic layer was separated and the water layer was extracted with Et_2O (3 x 15 mL). The combined organic layers were dried over $MgSO_4$ and the solvent evaporated under reduced pressure. The crude material was purified by flash chromatography (pentane/Et_2O 9:1) to afford **15** as a waxy oil (40 mg, 63% over 2 steps).

^{1}H NMR (400 MHz, $CDCl_3$): δ 7.69 (dd, *J* = 1.2, 6.7, 4H), 7.37 (m, 6H), 3.54 (m, 1H), 3.56 (dd, *J* = 4.9, 10.4, 1H), 3.38 (dd, *J* = 6.9, 10.4, 1H), 1.80-0.90 (br, 54H), 1.07 (s, 9H), 0.95 (d, *J* = 6.7, 3H), 0.91-0.83 (m, 15H), 0.76 (d, *J* = 6.5, 3H), 0.69 (d, *J* = 6.4, 3H).

^{13}C NMR (101 MHz, $CDCl_3$): δ (136.07, 136.03) (d, 4 x C), (134.93, 134.58) (s, 2 x C), (129.35, 129.25) (d, 2 x C), (127.32, 127.24) (d, 4 x C), 76.67 (d), 68.12 (t), 45.28 (t, 2 x C), 45.16 (t), 45.12 (t), 40.92 (t), 40.59 (t), 35.70 (d), 33.10 (d), 31.93 (t), 31.70 (t), 29.71 (t, 7 x C), 29.67 (t), 29.57 (t), 29.55 (t), 29.37 (t), 27.70 (d), 27.65 (d, 4 x C), 27.58 (d), 27.17 (q, 3 x C), 26.37 (t), 22.69 (t), 21.46 (q, 2 x C), 21.39 (q), 21.33 (q, 2 x C), 21.18 (q), 19.55 (s), 17.73 (q), 15.31 (q), 14.12 (q).

HRMS-(ESI+) calculated for $C_{56}H_{100}O_2SiNa$ [M + Na^+] 855.7390, found 855.7382.

(2*S*,4*S*,6*S*,8*S*,10*R*,12*R*,14*R*,16*R*,17*S*)-methyl 17-((tert-butyldiphenylsilyl)oxy)-2,4,6,8,10,12,14,16-octamethyldotriacontanoate (16)



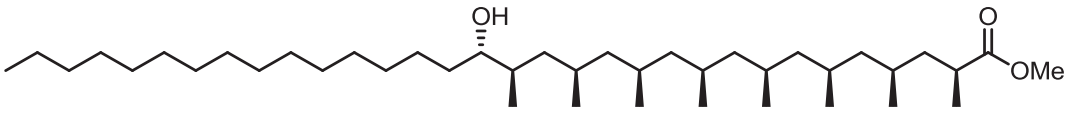
To a stirred mixture of **15** (70 mg, 0.084 mmol) in CCl_4 (1.2 mL), CH_3CN (1.2 mL) and H_2O (2.4 mL) was added $RuCl_3 \cdot (H_2O)_x$ (1.0 mg, 0.005 mmol) and $NaIO_4$ (51.4 mg, 0.22 mmol) at rt under nitrogen. After 3 h the reaction mixture was poured in DCM (2 mL) and H_2O (0.5 mL) was added. The phases were separated and the aqueous layer was extracted with DCM (3 x 5 mL). The combined organic phases were dried over $MgSO_4$ and concentrated under reduced pressure to yield the crude acid, which was directly converted into methyl ester **16**. The acid was dissolved in MeOH (3 mL) and trimethylsilyldiazomethane (0.25 mmol, solution in Et_2O) was added and the reaction mixture was stirred at rt for 30 min. The solvents were evaporated and the crude material was purified by flash chromatography (pentane/Et_2O 9:1) to afford **16** as a colorless oil (54 mg, 75%).

^{1}H NMR (400 MHz, $CDCl_3$): δ 7.68 (m, 4H), 7.37 (m, 6H), 3.67 (s, 3H), 3.58 (m, 1H), 2.58 (m, 1H), 1.75-0.90 (br, 56H), 1.16 (d, *J* = 6.9, 3H), 1.06 (s, 9H), 0.90-0.82 (m, 15H), 0.75 (d, *J* = 6.6, 3H), 0.68 (d, *J* = 6.4, 3H).

^{13}C NMR (101 MHz, $CDCl_3$): δ 177.40 (s), (136.06, 136.02) (d, 4 x C), (134.91, 134.56) (s, 2 x C), (129.35, 129.25) (d, 2 x C), (127.32, 127.24) (d, 2 x C), 76.68 (d), 51.36 (q), 45.35 (t), 45.32 (t), 45.14 (t), 45.09 (t), 45.03 (t), 40.95 (t), 40.57 (t), 37.38 (d), 35.66 (d), 31.93 (t), 31.68 (t), 29.71 (t, 8 x C), 29.67 (t), 29.56 (t), 29.54 (t), 29.37 (t), 28.22 (d), 27.64 (d), 27.49(d, 2 x C), 27.42 (d), 27.22 (d), 27.16 (q, 3 x C), 26.36 (t), 22.69 (t), 21.36 (q, 2 x C), 21.31 (q), 21.23 (q), 20.83 (q), 20.58 (q), 19.54 (s), 18.31 (q), 15.29 (q), 14.12 (q).

HRMS-(ESI+) calculated for $C_{57}H_{100}O_3SiNa$ [M + Na^+] 883.7339, found 883.7333.

(2*S*,4*S*,6*S*,8*S*,10*R*,12*R*,14*R*,16*R*,17*S*)-methyl 17-hydroxy-2,4,6,8,10,12,14,16-octamethyldotriacontanoate (17)



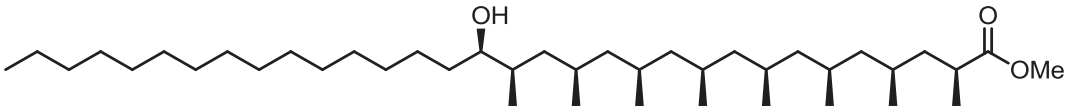
To a stirred mixture of **16** (22 mg, 0.025 mmol) in THF (2 mL) at rt under nitrogen was added TBAF (0.075 mL, 0.075 mmol, 1.0 M solution in THF), and the mixture was stirred for 2 d. The reaction mixture was concentrated under reduced pressure and the crude material was purified by flash chromatography (pentane/Et_2O 9:1) to afford *anti*-**17** as a colorless oil (11.2 mg, 72%).

^{1}H NMR (400 MHz, $CDCl_3$): δ 3.66 (s, 3H,), 3.47 (m, 1H), 2.57 (m, 1H), 1.75-0.90 (br, 53H), 1.15 (d *J* = 6.9, 3H), 0.86 (m, 21H).

^{13}C NMR (101 MHz, $CDCl_3$): δ 177.43 (s), 75.73 (d), 51.39 (q), 45.36 (t), 45.32 (t), 45.18 (t), 45.08 (t),40.95 (t), 40.10 (t), 37.38 (d), 36.26 (d), 32.72 (t), 31.92 (t), 29.76 (t), 29.69 (t, 9 x C), 29.36 (t), 28.23 (d), 27.95 (d), 27.72 (d), 27.64 (d), 27.49 (d), 27.25 (d), 26.29 (t), 22.69 (t), 21.55 (q), 21.52 (q), 21.47 (q), 21.27 (q), 20.84 (q), 20.58, (q) 18.31 (q), 15.84 (q), 14.12 (q).

HRMS-(ESI+) calculated for $C_{41}H_{80}O_2$ [M – H_2O] 605.6231, found 605.6260.

(2*S*,4*S*,6*S*,8*S*,10*R*,12*R*,14*R*,16*R*,17*R*)-methyl 17-hydroxy-2,4,6,8,10,12,14,16-octamethyldotriacontanoate (18)



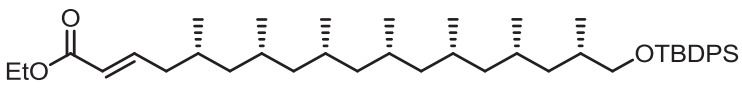
To a solution of *anti*-**17** (6 mg, 0.010 mmol), DEAD (diethylazadicarboxylate, 0.044 mmol) and triphenylphosphine (0.038 mmol) in toluene (0.5 mL), *p*-nitrobenzoic acid (0.039 mmol) was added and the mixture was stirred at rt for 48 h under nitrogen atmosphere. The solvent was evaporated and the crude product was dissolved in MeOH (2 mL). A catalytic amount of NaCN (0.005 mmol) was added and the mixture was stirred at rt for 16 h. The solvent was evaporated and the crude material was purified by flash chromatography (pentane/Et_2O 9:1) to afford *syn*-**18** as a colorless oil (5.1 mg, 85%).

^{1}H NMR (400 MHz, $CDCl_3$): δ 3.66 (s, 3H,), 3.51 (m, 1H), 2.57 (m, 1H), 1.75-0.90 (br, 53H), 1.15 (d J = 6.9 Hz, 3H), 0.86 (m, 21H).

^{13}C NMR (101 MHz, $CDCl_3$): δ 177.43 (s), 74.37 (s), 45.36 (t), 45.30 (t), 45.08 (t), 41.15 (t), 40.99 (t), 37.39 (d), 35.08 (d) , 34.89 (t), 31.92 (t), 29.76 (t), 29.68 (t), 29.35 (t), 28.26 (d), 27.62 (d), 27.50 (d), 27.29 (d), 26.36 (t), 22.68 (t), 21.41 (q), 21.27 (q), 21.23 (q), 20.85 (q), 20.57 (q), 18.29 (q), 14.11 (q), 14.00 (q).

HRMS-(ESI+) calculated for $C_{41}H_{80}O_2$ [M – H_2O] 605.6231, found 605.6255.

(5*R*,7*R*,9*R*,11*S*,13*S*,15*S*,17*S*,*E*)-ethyl 18-((tert-butyldiphenylsilyl)oxy)-5,7,9,11,13,15,17-heptamethyloctadec-2-enoate (22)



A flame dried Schlenk flask equipped with stirring bar was charged with THF (4.5 mL, final concentration of substrate is 0.15 M) and triethyl phosphonoacetate (1.6 eq, 242 mg, 214 uL, 1.08

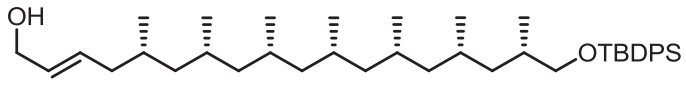
mmol). The solution was cooled to 0 °C and *n*-BuLi (506 μL, 0.81 mmol, 1.6 M solution in hexanes) was added dropwise over a period of 10 min. After an additional 20 min of stirring, the aldehyde obtained from the reduction of **19** with DIBALH, was added as a solution in THF (1 mL). The reaction was allowed to warm up to rt and TLC showed complete consumption of starting material after 14 h. The reaction was quenched with a saturated solution of aq. NH_4Cl (5 mL) and the layers were separated. The aqueous layer was extracted with Et_2O (3 x 10 mL) and the combined organic layers were dried over anhydrous $MgSO_4$, concentrated and purified using column chromatography (pentane/Et_2O 50:1) to afford pure α,β-unsaturated ester **22** (381 mg, 85%) as a colorless oil.

^{1}H NMR (400 MHz, $CDCl_3$): δ 7.69 (dd, *J* = 7.8, 1.5, 4H), 7.47 – 7.33 (m, 6H), 6.96 (ddd, *J* = 15.3, 8.0, 7.0, 1H), 5.83 (dt, *J* = 15.5, 1.3, 1H), 4.20 (q, *J* = 7.1, 2H), 3.53 (dd, *J* = 9.8, 4.9, 1H), 3.43 (dd, 9.8, 6.4, 1H), 2.33 – 2.17 (m, 1H), 2.0 – 1.93 (m, 1H), 1.83 – 1.67 (m, 2H), 1.67 – 1.48 (m, 6H), 1.47 – 1.35 (m, 2H), 1.33 – 1.26 (m, 6H), 1.25 – 1.15 (m, 6H), 1.07 (s, 9H), 0.95 (d, *J* = 6.7, 3H), 0.93 – 0.76 (m, 18H).

^{13}C NMR (101 MHz, $CDCl_3$) δ 166.58, 148.21, 135.60, 134.04, 129.43, 127.52, 122.43, 68.64, 60.09, 45.45, 45.25, 45.22, 44.36, 41.06, 39.03, 35.41, 33.18, 31.88, 29.86, 27.67, 27.49, 27.45, 26.88, 22.69, 21.40, 21.33, 21.29, 21.12, 20.91, 20.52, 19.30, 18.22, 14.28.

HRMS-(APCI+) calculated for $C_{33}H_{59}O_2Si$ [M-C_6H_5] 585.4703, found 585.4697.

(5*R*,7*R*,9*R*,11*S*,13*S*,15*S*,17*S*,*E*)-18-((tert-butyldiphenylsilyl)oxy)-5,7,9,11,13,15,17-heptamethyloctadec-2-en-1-ol (23)



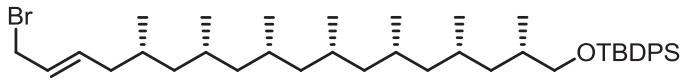
To a stirred solution of **22** (333 mg, 0.50 mmol) in DCM (2.5 mL, 0.2 M) at –75ºC was added DIBAL-H (3 eq, 1.5 mL, 1.50 mmol, 1 M solution in DCM). The reaction was allowed to stir for 30 minutes after which TLC showed that no starting material was left. The mixture was quenched with a saturated aqueous Rochelle salt solution (5 mL) and allowed to warm up over 2 h with vigorous stirring. The layers were separated and the aqueous layer was extracted with Et_2O (3 x 10 mL). The combined organic layers were dried over $MgSO_4$ and all volatiles were evaporated. The product was purified using column chromatography (pentane/Et_2O 5:1) to afford pure allylic alcohol **23** (301 mg, 97%) as a colorless oil.

^{1}H NMR (400 MHz, $CDCl_3$) δ 7.71 (dd, *J* = 7.7, 1.5, 4H), 7.50 – 7.34 (m, 6H), 5.73 – 5.64 (m, 2H), 4.12 (d, *J* = 4.6, 2H), 3.56 (dd, *J* = 9.8, 4.9, 1H), 3.45 (dd, *J* = 9.8, 6.4, 1H), 2.17 – 2.11 (m, 1H), 1.88 – 1.75 (m, 2H), 1.70 – 1.53 (m, 7H), 1.46 – 1.38 (m, 1H), 1.32 – 1.18 (m, 7H), 1.08 (s, 9H), 0.98 (d, *J* = 6.7, 3H), 0.92 – 0.84 (m, 21H).

^{13}C NMR (101 MHz, $CDCl_3$) δ 135.58, 134.03, 131.75, 130.23, 129.42, 127.52, 68.64, 63.77, 45.49, 45.36, 45.30, 45.27, 44.32, 41.06, 38.98, 33.17, 30.17, 27.67, 27.52, 27.49, 27.48, 27.46, 26.89, 21.42, 21.33, 21.13, 21.04, 20.42, 19.29, 18.22.

HRMS-(APCI+) calculated for $C_{41}H_{68}O_2SiNa$ [M + Na^+] 643.4881, found 643.4886.

(((2*S*,4*S*,6*S*,8*S*,10*R*,12*R*,14*R*,*E*)-18-bromo-2,4,6,8,10,12,14-heptamethyloctadec-16-en-1-yl)oxy)(tert-butyl)diphenylsilane (24)



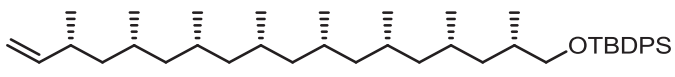
To allylic alcohol **23** (272 mg, 0.44 mmol) in DCM (2.2 mL, 0.2 M) was added PPh_3 (1.2 eq, 138 mg, 0.53 mmol). After all PPh_3 was dissolved, the solution was cooled to 0ºC and NBS (1.3 eq, 101 mg, 0.57 mmol) was added in one portion. The reaction was stirred for 1 h at 0ºC and an additional hour at rt after which the reaction was quenched with pentane (20 mL). The white precipitate was removed by filtration over Celite. The cake was rinsed with pentane (20 mL) and the collected solution was evaporated to dryness. The crude product was purified using column chromatography (pentane/Et_2O 200:1) to afford pure allylic bromide **24** (265 mg, 88%) as a colorless oil.

^{1}H NMR (400 MHz, $CDCl3_3$) δ 7.71 (dd, *J* = 7.7, 1.6, 4H), 7.50 – 7.34 (m, 6H), 5.85 – 5.63 (m, 2H), 3.98 (d, *J* = 6.8, 2H), 3.56 (dd, *J* = 9.8, 5.0, 1H), 3.46 (dd, *J* = 9.8, 6.4, 1H), 2.18 – 2.12 (m, 1H), 1.91 – 1.81 (m, 1H), 1.78 (dd, *J* = 12.4, 6.4, 1H), 1.71 – 1.54 (m, 7H), 1.48 – 1.38 (m, 1H), 1.29 – 1.18 (m, 7H), 1.09 (s, 9H), 0.98 (d, *J* = 6.7, 3H), 0.94 – 0.79 (m, 21H).

^{13}C NMR (101 MHz, $CDCl_3$) δ 135.61, 135.15, 134.05, 129.44, 127.60, 127.54, 68.69, 45.54, 45.42, 45.35, 45.33, 44.33, 41.12, 38.81, 33.42, 33.22, 30.21, 27.73, 27.58, 27.56, 27.53, 26.92, 21.45, 21.37, 21.17, 21.02, 20.44, 19.32, 18.24.

HRMS-(ESI+) calculated for $C_{41}H_{68}OSi^{79}Br$ [M + H^+] 683.4223, found 683.4217.

tert-butyl(((2*S*,4*S*,6*S*,8*S*,10*R*,12*R*,14*R*,16*R*)-2,4,6,8,10,12,14,16-octamethyloctadec-17-en-1-yl)oxy)diphenylsilane (25)



$CuBr{\cdot}SMe_2$ (0.07 eq, 11.8 mg, 0.057 mmol) and (+)-TaniaPhos ligand (0.08 eq, 46.4 mg, 0.067 mmol) were added to a Schlenk and dissolved in 5 mL of DCM. The mixture was stirred for 10 minutes and subsequently cooled to –75ºC. MeMgBr (1.2 eq, 337 uL, 1.01 mmol, 3 M solution in Et_2O) was added dropwise over a period of 10 minutes. Allylic bromide (577 mg, 0.84 mmol) was then added dropwise

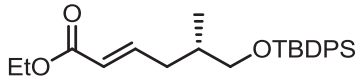
over 20 minutes as a solution in DCM (final concentration of substrate = 0.15 M) using a syringe pump. The reaction was quenched after 14 h by the addition of MeOH (1 mL) and allowed to warm up to rt. A saturated solution of aq. NH_4Cl (10 mL) was added and the organic layer was separated. The aqueous layer was extracted with Et_2O (3 x 5 mL) after which the combined organic layers were dried over $MgSO_4$. All solvents were evaporated and the crude product was purified using column chromatography (pentane/Et_2O 100:1) to yield pure terminal olefin **25** (459 mg, 88%, de > 95%) as a colorless oil.

^{1}H NMR (400 MHz, $CDCl_3$) δ 7.67 (dd, *J* = 7.8, 1.5, 4H), 7.47 – 7.31 (m, 6H), 5.61 (ddd, *J* = 17.3, 10.2, 8.2, 1H), 5.01 – 4.85 (dd, *J* = 18.2, 10.2, 2H), 3.52 (dd, *J* = 9.8, 5.0, 1H), 3.41 (dd, *J* = 9.8, 6.5, 1H), 2.23 (m, 1H), 1.80 – 1.65 (m, 1H), 1.63 – 1.45 (m, 7H), 1.44 – 1.24 (m, 3H), 1.24 – 1.11 (m, 7H), 1.05 (s, 9H), 0.98 (d, *J* = 6.7, 3H), 0.93 (d, *J* = 6.7, 3H), 0.88 – 0.75 (m, 21H).

^{13}C NMR (101 MHz, $CDCl_3$) δ 144.71, 135.62, 134.10, 129.45, 127.54, 112.56, 68.72, 45.54, 45.50, 45.39, 45.37, 43.88, 41.14, 35.64, 33.22, 27.72, 27.62, 27.58, 27.54, 27.38, 26.91, 21.63, 21.43, 21.36, 21.35, 21.15, 21.08, 20.53, 19.32, 18.22.

HRMS-(ESI+) calculated for $C_{42}H_{70}OSiNa$ [M + Na^+] 641.5094, found 641.5088.

(*S*,*E*)-ethyl 6-((tert-butyldiphenylsilyl)oxy)-5-methylhex-2-enoate



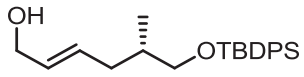
The title compound was prepared following the same procedure as used for compound **22**. The product was obtained as a colorless oil.

^{1}H NMR (400 MHz, $CDCl_3$) δ 7.66 (dd, *J* = 7.2, 0.7, 4H), 7.48 – 7.34 (m, 6H), 7.01 – 6.87 (m, 1H), 5.84 (d, *J* = 15.6, 1H), 4.20 (q, *J* = 7.1, 2H), 3.52 (dd, *J* = 9.8, 5.0, 1H), 3.42 (dd, *J* = 9.8, 6.4, 1H), 2.53 – 2.39 (m, 1H), 2.15 – 1.98 (m, 1H), 1.87 (m, 1H), 1.30 (t, *J* = 7.1, 3H), 1.07 (s, 9H), 0.92 (d, *J* = 6.8, 3H).

^{13}C NMR (101 MHz, $CDCl_3$) δ 166.54, 147.90, 135.56, 135.54, 133.70, 133.68, 129.57, 127.61, 122.52, 68.11, 60.10, 36.04, 35.36, 26.83, 19.27, 16.42, 14.28.

HRMS-(APCI+) calculated for $C_{19}H_{29}O_3Si$ [M – C_6H_5] 333.1886, found 333.1881.

(*S*,*E*)-6-((tert-butyldiphenylsilyl)oxy)-5-methylhex-2-en-1-ol



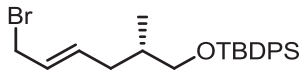
The title compound was prepared following the same procedure as used for compound **23**. The product was obtained as a colorless oil.

^{1}H NMR (400 MHz, $CDCl_3$) δ 7.70 (dd, *J* = 7.7, 1.6, 4H), 7.49 – 7.33 (m, 6H), 5.71 – 5.55 (m, 2H), 4.06 (s, 2H), 3.52 (d, *J* = 5.9, 2H), 2.35 – 2.16 (m, 1H), 2.02 – 1.85 (m, 1H), 1.85 – 1.70 (m, 1H), 1.09 (s, 9H), 0.94 (d, *J* = 6.7, 3H).

^{13}C NMR (101 MHz, $CDCl_3$) δ 135.60, 135.59, 133.92, 133.91, 131.49, 130.34, 129.51, 127.55, 68.14, 63.75, 35.87, 35.81, 26.85, 19.29, 16.52.

HRMS-(APCI+) calculated for $C_{23}H_{32}O_2SiNa$ [M + Na^+] 391.2064, found 391.2064

(*S*,*E*)-((6-bromo-2-methylhex-4-en-1-yl)oxy)(tert-butyl)diphenylsilane



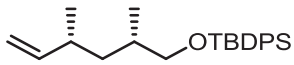
The title compound was prepared following the same procedure as used for compound **24**. The product was obtained as a colorless oil.

^{1}H NMR (400 MHz, $CDCl_3$) δ 7.71 – 7.64 (m, 4H), 7.48 – 7.33 (m, 6H), 5.78 – 5.62 (m, 2H), 3.93 (d, *J* = 6.2, 2H), 3.50 (dd, *J* = 5.9, 1.9, 2H),2.33 – 2.23 (m, 1H), 2.00 – 1.89 (m, 1H), 1.83 – 1.70 (m, 1H), 1.08 (s, 9H), 0.93 – 0.91 (d, *J* = 6.7, 3H).

^{13}C NMR (101 MHz, $CDCl_3$) δ 135.60, 135.59, 134.87, 133.88, 133.86, 129.54, 127.69, 127.59, 68.08, 35.74, 35.73, 33.40, 26.88, 19.31, 16.45.

HRMS-(APCI+) calculated for $C_{23}H_{32}OSi^{79}Br$ [M + H^+] 431.1406, found 431.1400.

tert-butyl(((2*S*,4*R*)-2,4-dimethylhex-5-en-1-yl)oxy)diphenylsilane (32)



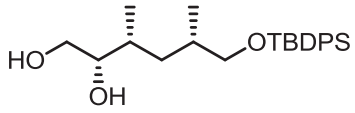
The title compound was prepared following the same procedure as used for compound **25**. The product was obtained as a colorless oil.

^{1}H NMR (400 MHz, $CDCl_3$) δ 7.76 (dd, *J* = 7.2, 0.6, 4H), 7.55 – 7.37 (m, 6H), 5.79 – 5.61 (m, 1H), 5.03 (d, *J* = 17.2, 2H), 4.98 (d, *J* = 10.2, 2H), 3.58 (dd, *J* = 9.7, 5.8, 1H), 3.52 (dd, *J* = 9.7, 6.4, 1H), 2.28 (dq, *J* = 14.0, 7.1, 1H), 1.87 – 1.74 (m, 1H), 1.51 (ddd, *J* = 23.8, 12.0, 7.4, 1H), 1.15 (s, 9H), 1.05 (d, *J* = 6.6, 3H), 1.00 (d, *J* = 6.6, 3H).

^{13}C NMR (101 MHz, $CDCl_3$) δ 144.65, 135.64, 134.10, 129.48, 127.56, 112.57, 69.28, 40.43, 35.47, 33.40, 26.91, 21.33, 19.34, 16.79.

HRMS-(APCI+) calculated for $C_{24}H_{35}OSi$ [M + H^+] 367.2457, found 367.2452.

(2*S*,3*R*,5*S*)-6-((tert-butyldiphenylsilyl)oxy)-3,5-dimethylhexane-1,2-diol (33)



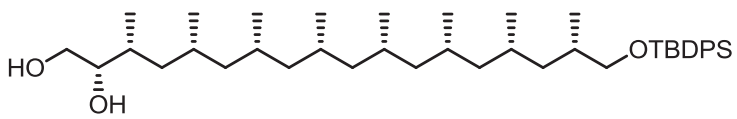
Tris(dibenzylideneacetone)diplatinum and ligand **L3** were prepared according to a previously reported literature.[1] To a flame dried Schlenk flask, in a glovebox, was added [$Pt_2(dba)_3$] (0.025 eq, 6.71 mg, 0.006 mmol), ligand **L3** (0.051 eq, 10.0 mg, 0.013 mmol) and B_2pin_2 (1.05 eq, 66 mg, 0.26 mmol, recrystallized from pentane). THF (1.8 mL) was added and the Schlenk was closed, taken out from the glovebox and heated at 80ºC for 30 minutes. The reaction was allowed to cool down and returned to the glovebox. The Schlenk was charged with terminal alkene **32** (90 mg, 0.25 mmol, prepared following the same procedure as compound **25**) dissolved in THF (0.7 mL, final concentration of substrate = 0.1 M). The Schlenk was again removed from the glovebox and heated to 60 ºC for 14 h. The reaction was cooled down to 0ºC and the flask was charged with 3 M NaOH (2 mL) and H_2O_2 (2 mL, 50% in water). The mixture was allowed to slowly reach rt and stirred for a total of 4h. The flask was cooled down to 0ºC and a saturated solution of aqueous $Na_2S_2O_3$ (2 mL) was added dropwise. The mixture was diluted with EtOAc (5 mL) and the layers were separated. The aqueous layer was extracted with EtOAc (3 x 5 mL) and the combined organic layers were dried over $MgSO_4$. The solvent was evaporated and the crude product was purified using flash chromatography (pentane/EtOAc 4:1) to give pure diol **33** (74 mg, 95%, de > 95%) as a colorless oil.

^{1}H NMR (400 MHz, C_6D_6) δ 7.71 (dd, *J* = 7.6, 1.5, 4H), 7.30 – 7.22 (m, 6H), 3.60 (dd, *J* = 9.8, 4.9, 1H), 3.46 (m, 4H), 2.85 (br, 2H), 2.36 (br, 1H), 1.75 (m, 1H), 1.68 – 1.42 (m, 3H), 1.29 (m, 2H), 1.19 (s, 9H), 0.98 (d, *J* = 6.6, 3H), 0.84 (d, *J* = 6.6, 3H).

^{13}C NMR (101 MHz, C_6D_6) δ 136.11, 134.35, 130.00, 128.11, 75.30, 68.86, 65.38, 37.47, 33.38, 33.21, 27.20, 19.60, 18.30, 15.04.

HRMS-(ESI+) calculated for $C_{24}H_{36}O_3SiNa$ [M + Na^+] 423.2331, found 423,2339

(2*S*,3*R*,5*R*,7*R*,9*R*,11*S*,13*S*,15*S*,17*S*)-18-((tert-butyldiphenylsilyl)oxy)-3,5,7,9,11,13,15,17-octamethyloctadecane-1,2-diol (26)



Tris(dibenzylideneacetone)diplatinum and ligand **L3** were prepared according to a previously reported literature.[1] To a flame dried Schlenk flask, in a glovebox, was added [$Pt_2(dba)_3$] (0.05 eq, 11.9 mg, 0.011 mmol), ligand **L3** (0.105 eq, 18.3 mg, 0.023 mmol) and B_2pin_2 (3 eq, 166 mg, 0.65 mmol, recrystallized from pentane). THF (1.5 mL) was added and the Schlenk was closed, taken out from the glovebox and heated at 80ºC for 30 minutes. The reaction was allowed to cool down and returned to the glovebox. The Schlenk was charged with terminal alkene **25** (135 mg, 0.22 mmol, dissolved in 0.7 mL THF, final concentration of substrate = 0.1 M). The Schlenk was again removed from the glovebox and heated to 60 ºC for 14 h. The reaction was cooled down to 0ºC and the flask was charged with 3 M NaOH (2 mL) and H_2O_2 (2 mL, 50% in water). The mixture was allowed to slowly reach rt and stirred for a total of 4h. The flask was cooled down to 0ºC and a saturated solution of aqueous $Na_2S_2O_3$ (2 mL) was added dropwise. The mixture was diluted with EtOAc (5 mL) and the layers were separated. The aqueous layer was extracted with EtOAc (3 x 5 mL) and the combined organic layers were dried over $MgSO_4$. The solvent was evaporated and the crude product was purified using flash chromatography (pentane/EtOAc 4:1) to give pure diol **26** (139 mg, 98%, de > 95%) as a colorless oil.

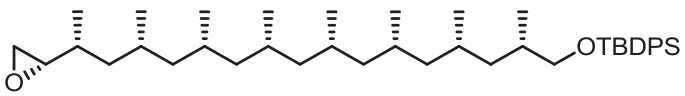
^{1}H NMR (300 MHz, $CDCl_3$) δ 7.69 (dd, *J* = 7.7, 1.5, 4H), 7.40 (m, 6H), 3.71 – 3.39 (m, 5H), 2.49 (br, 2H), 1.82 – 1.51 (m, 8H), 1.47 – 1.36 (m, 2H), 1.32 – 1.15 (m, 6H), 1.08 (s, 9H), 0.97 – 0.83 (m, 32H).

^{13}C NMR (101 MHz, $CDCl_3$) δ 135.59, 134.06, 129.42, 127.52, 75.10, 68.68, 65.45, 45.47, 45.25, 45.21, 45.15, 45.00, 41.07, 40.96, 33.20, 32.86, 27.71, 27.66, 27.61, 27.58, 27.55, 27.52, 26.89, 21.52, 21.50, 21.47, 21.38, 21.20, 21.16, 19.29, 18.22, 15.03.

^{13}C NMR (101 MHz, C_6D_6) δ 136.41, 134.74, 130.28, 75.44, 69.41, 66.14, 46.23, 46.07, 46.01, 45.82, 41.81, 41.78, 34.00, 33.58, 28.48, 28.45, 28.35, 28.19, 27.59, 25.38, 22.18, 22.16, 22.06, 21.89, 21.81, 19.97, 18.86, 15.75.

HRMS-(ESI+) calculated for $C_{42}H_{72}O_3SiNa$ [M + Na^+] 675.5148, found 675.5143.

tert-butyl(((2*S*,4*S*,6*S*,8*S*,10*R*,12*R*,14*R*,16*R*)-2,4,6,8,10,12,14-heptamethyl-16-((*S*)-oxiran-2-yl)heptadecyl)oxy)diphenylsilane (27)



To a stirred solution of diol **26** (90.8 mg, 0.14 mmol) and cetrimide (0.1 eq, 5.07 mg, 0.014 mmol) in DCM (1 mL) was added an aq. solution of NaOH (50 eq, 1.6 mL, 25%) with vigorous stirring. A solution of tosyl chloride (1.2 eq, 32 mg, 0.17 mmol) in DCM (600 µL) was then added over a period of 10 minutes. The mixture was stirred for 60 min after which TLC showed complete consumption of starting material. The reaction was diluted with H_2O (5 mL) and DCM (5 mL). The layers were separated and the aqeuous layer was extracted with Et_2O (3 x 5 mL). The combined organic layers

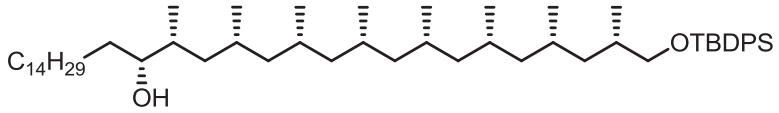
were dried (Na_2SO_4) and all volatiles were evaporated. The product was purified using column chromatography (pentane/Et_2O 50:1) to afford epoxide **27** (77 mg, 88%) as a colorless oil.

^{1}H NMR (400 MHz, $CDCl_3$) δ 7.67 (dd, *J* = 7.7, 1.5, 4H), 7.47 – 7.31 (m, 6H), 3.52 (dd, *J* = 9.8, 5.0, 1H), 3.42 (dd, *J* = 9.8, 6.4, 1H), 2.78 (dd, *J* = 4.9, 4.0, 1H), 2.67 – 2.61 (m, 1H), 2.56 (dd, *J* = 5.0, 2.8, 1H), 1.78 - 1.70 (m, 1H), 1.63 – 1.51 (m, 7H), 1.43 - 1.35 (m, 4H), 1.23 - 1.16 (m, 7H), 1.06 (s, 9H), 1.03 (d, *J* = 6.4, 3H), 0.94 (d, *J* = 6.7, 3H), 0.87 (d, *J* = 6.5, 3H), 0.85 - 0.81 (m, 18H).

^{13}C NMR (101 MHz, $CDCl_3$) δ 135.61, 134.09, 129.44, 127.53, 68.70, 57.12, 47.24, 45.50, 45.30, 41.21, 41.10, 33.62, 33.21, 27.71, 27.58, 27.54, 27.49, 26.90, 21.44, 21.38, 21.35, 21.15, 21.06, 19.31, 17.96.

HRMS-(ESI+) calculated for $C_{42}H_{71}O_2Si$ [M + H^+] 635.5223, found 635.5218.

(16*R*,17*R*,19*R*,21*R*,23*R*,25*S*,27*S*,29*S*,31*S*)-32-((tert-butyldiphenylsilyl)oxy)-17,19,21,23,25,27,29,31-octamethyldotriacontan-16-ol (28)



The Grignard reagent was freshly prepared as a 0.15 M solution in THF starting from 1-bromotetradecane and magnesium turnings following a previously reported procedure.[10]

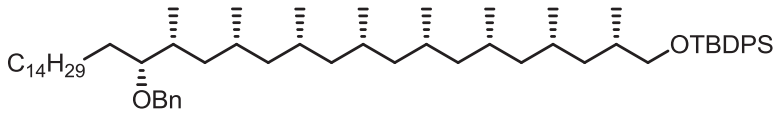
Copper bromide dimethyl sulfide complex (0.15 eq, 1.5 mg, 7.1 μmol) was added to a stirred solution of freshly distilled THF (0.5 mL). The solution was cooled down to –40ºC after which the Grignard reagent (3 eq, 0.14 mmol, 945 μL, 0.15 M solution in THF) was added dropwise over 10 min. The solution was allowed to stir for 10 mins after which epoxide **27** (30 mg, 0.047 mmol) in THF (0.2 mL) was added over 10 minutes using a syringe pump. The reaction was monitored by TLC and quenched after 3 hours with MeOH (1 mL). The mixture was allowed to warm to rt and a saturate solution of NH_4Cl (5 mL) was added. The layers were separated and the aqueous layer was extracted with Et_2O (2 x 5 mL). The organic layers were pooled, dried ($MgSO_4$) and concentrated under reduced pressure. The crude product was purified using column chromatography (pentane/Et_2O 20:1) to afford pure compound **28** (29 mg, 74%).

^{1}H NMR (400 MHz, $CDCl_3$) δ 7.67 (dd, *J* = 7.7, 1.5, 4H), 7.45 – 7.33 (m, 6H), 3.52 (dd, *J* = 9.8, 5.0, 2H), 3.42 (dd, *J* = 9.8, 6.5, 1H), 1.78 – 1.70 (m, 1H), 1.65 – 1.49 (m, 7H), 1.47 – 1.38 (m, 5H), 1.32 – 1.25 (m, 28H), 1.23 – 1.16 (m, 10H), 1.06 (s, 9H), 0.94 (d, *J* = 6.7, 3H), 0.92 – 0.77 (m, 24H).

^{13}C NMR (101 MHz, $CDCl_3$) δ 135.61, 134.09, 129.43, 127.53, 74.31, 68.70, 45.50, 45.30, 45.28, 41.14, 41.10, 35.09, 34.91, 33.22, 31.93, 29.78, 29.70, 29.69, 29.68, 29.66, 29.64, 29.37, 27.72, 27.68, 27.65, 27.62, 27.58, 27.56, 26.90, 26.38, 22.70, 21.50, 21.48, 21.46, 21.38, 21.26, 21.16, 19.31, 18.23, 14.13, 14.03.

HRMS-(APCI+) calculated for $C_{56}H_{100}O_2SiNa$ [M + Na^+] 855.7390, found 855.7385.

(((2*S*,4*S*,6*S*,8*S*,10*R*,12*R*,14*R*,16*R*,17*R*)-17-(benzyloxy)-2,4,6,8,10,12,14,16-octamethyldotriacontyl)oxy)(tert-butyl)diphenylsilane (29)



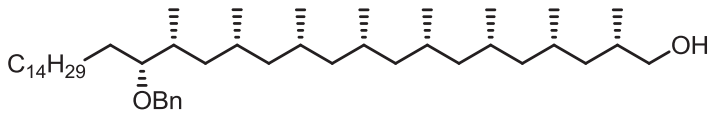
To a Schlenk equipped with a stirring bar was added alcohol **28** (26 mg, 0.031 mmol) and a 9:1 mixture of *c*-hexane/DCM (0.3 mL, 0.1 M). The solution was cooled to 0ºC and benzyl 2,2,2-trichloroacetimidate (2 eq, 15.8 mg, 0.063 mmol) and trimethylsilyl trifluoromethanesulfonate (0.1 eq, 0.7 mg, 3.1 µmol) were added. The reaction was allowed to warm to rt and stirred until complete conversion was obtained according to TLC. The reaction was quenched with a saturated aq. $NaHCO_3$ solution (1 mL) and the layers were separated. The aqueous layer was extracted with Et_2O (2 x 5 mL) and all organic layers were combined, dried over $MgSO_4$ and evaporated to dryness. The product was purified using column chromatography (pentane/Et_2O 100:1) to afford benzyl ether **29** with traces of an unidentified impurity (22 mg, 76%).

^{1}H NMR (400 MHz, $CDCl_3$) δ 7.69 (dd, *J* = 7.6, 1.4, 4H), 7.47 – 7.30 (m, 11H), 4.53 (s, 2H), 3.54 (dd, *J* = 9.8, 5.0, 1H), 3.43 (dd, *J* = 9.8, 6.5, 1H), 3.29 – 3.22 (m, 1H), 1.87 – 1.81 (m, 1H), 1.78 – 1.72 (m, 1H), 1.66 – 1.51 (m, 7H), 1.48 – 1.37 (m, 5H), 1.36 – 1.15 (m, 36H), 1.08 (s, 9H), 0.96 (d, *J* = 6.7, 3H), 0.94 – 0.75 (m, 24H).

^{13}C NMR (101 MHz, $CDCl_3$) δ 139.34, 135.61, 134.07, 129.44, 128.20, 127.58, 127.53, 127.24, 82.82, 71.81, 68.67, 45.46, 45.25, 45.23, 45.19, 41.06, 40.55, 33.20, 32.87, 31.93, 30.75, 29.90, 29.71, 29.67, 29.37, 27.91, 27.73, 27.68, 27.58, 27.52, 26.89, 26.84, 26.20, 22.70, 21.64, 21.54, 21.51, 21.48, 21.37, 21.16, 19.31, 18.24, 15.70, 14.14.

HRMS-(APCI+) calculated for $C_{56}H_{100}O_2SiNa$ [M + Na^+] 945.7860, found 945.7854.

(2*S*,4*S*,6*S*,8*S*,10*R*,12*R*,14*R*,16*R*,17*R*)-17-(benzyloxy)-2,4,6,8,10,12,14,16-octamethyldotriacontan-1-ol (30)



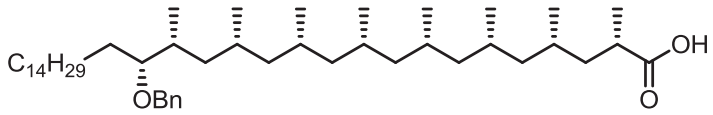
To a solution of compound **29** (42 mg, 0.045 mmol) in THF (455 µL, 0.1 M) was added TBAF (2 eq, 91 µL, 0.091 mmol, 1 M solution in THF). After completion, the reaction was concentrated and the crude product was subjected to column chromatography. Primary alcohol **30** (28 mg, 90% based on integration in ^{1}H NMR) was obtained as a colorless oil combined with siloxane as an inseparable side product.

^{1}H NMR (400 MHz, $CDCl_3$) δ 7.42 – 7.32 (m, 5H), 4.52 (s, 2H), 3.55 (dd, *J* = 10.4, 4.8, 1H), 3.37 (dd, *J* = 10.2, 7.1, 1H), 3.27 – 3.22 (m, 1H), 1.86 – 1.79 (s, 1H), 1.78 – 1.69 (m, 1H), 1.64 – 1.53 (m, 7H), 1.52 – 1.38 (m, 5H), 1.36 – 1.18 (m, 36H), 0.94 (d, *J* = 6.7, 3H), 0.92 – 0.78 (m, 24H).

^{13}C NMR (101 MHz, $CDCl_3$) δ 139.33, 128.19, 127.69, 127.24, 82.85, 71.80, 68.12, 45.28, 40.91, 40.58, 33.07, 32.90, 31.92, 30.76, 29.89, 29.70, 29.66, 29.36, 27.76, 27.73, 27.67, 27.64, 27.57, 26.55, 26.19, 22.69, 21.62, 21.54, 21.49, 21.48, 21.33, 21.17, 17.72, 15.69, 14.12.

HRMS-(ESI+) calculated for $C_{47}H_{89}O_2$ [M + H$^+$] 685.6862, found 685.6857.

(2*S*,4*S*,6*S*,8*S*,10*R*,12*R*,14*R*,16*R*,17*R*)-17-(benzyloxy)-2,4,6,8,10,12,14,16-octamethyldotriacontanoic acid (31)



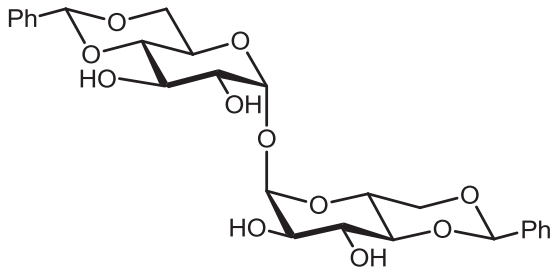
To alcohol **30** (28 mg, 0.041 mmol) in acetonitrile (234 µL) was added a buffer solution of KH_2PO_4 (175 µL, 0.1 M, pH 7) and the mixture was stirred vigorously. A 2 M aqueous solution of sodium chlorite (50 µL, 2.5 eq, 0.1 mmol) and TEMPO (0.07 eq, 0.5 mg, 2.9 µmol) were added and the mixture was heated to 35ºC. An aqueous 0.5% sodium hypochlorite (0.03 eq, 15 µL, 1.2 µmol) solution was added and the reaction was stirred for 15 h after which it was quenched by the addition of a saturated aq. solution of Na_2SO_3 (0.3 mL). The mixture was carefully acidified to pH = 2, and Et_2O (4mL) was added. After stirring vigorously for 30 minutes the layers were separated and the aqueous layer was extracted with Et_2O (2 x 4 mL). The combined organic layers were dried ($MgSO_4$) and all volatiles were evaporated. The crude product could again not be separated from the siloxane side product produced in the previous step. Carboxylic acid **31** (24 mg, 85% based on integration in ^{1}H NMR) with siloxane was obtained as a colorless oil.

^{1}H NMR (400 MHz, $CDCl_3$) δ 7.47 – 7.29 (m, 5H), 4.52 (s, 2H), 3.29 – 3.15 (m, 1H), 2.65 – 2.49 (m, 1H), 1.86 – 1.73 (m, 2H), 1.64 – 1.53 (m, 7H), 1.51 – 1.40 (m, 5H), 1.28 – 1.21 (m, 36H), 1.19 (d, *J* = 6.7, 3H), 0.92 – 0.82 (m, 24H).

^{13}C NMR (101 MHz, $CDCl_3$) δ 182.32, 139.33, 128.19, 127.71, 127.25, 82.86, 71.80, 45.36, 45.33, 45.27, 45.26, 45.05, 40.76, 40.57, 32.91, 31.93, 30.75, 30.30, 29.89, 29.71, 29.66, 29.37, 28.18, 27.92, 27.72, 27.64, 27.50, 27.27, 26.55, 26.19, 22.69, 21.59, 21.50, 21.45, 21.29, 20.93, 20.59, 19.01, 18.18, 15.71, 14.12.

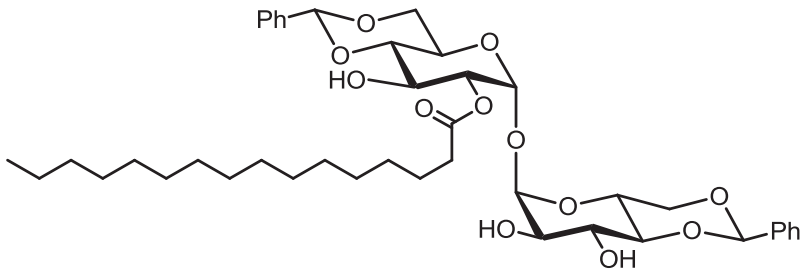
HRMS-(ESI+) calculated for $C_{47}H_{89}O_2$ [M + H$^+$] 685.6862, found 685.6857.

(2*R*,2'*R*,4a*R*,4a'*R*,6*R*,6'*R*,7*R*,7'*R*,8*R*,8a*S*,8'*R*,8a'*S*)-6,6'-oxybis(2-phenylhexahydropyrano[3,2-d][1,3]dioxine-7,8-diol)



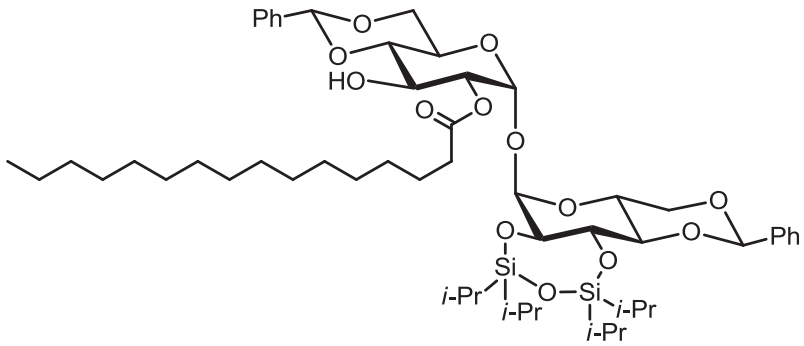
The diacetal was prepared according to a previously reported procedure. All analytical data were in accordance with those reported.[11]

(2*R*,4a*R*,6*R*,7*R*,8*S*,8a*S*)-6-(((2*R*,4a*R*,6*R*,7*R*,8*R*,8a*S*)- 7,8-dihydroxy-2-phenyl hexahydropyrano[3,2-d][1,3]dioxin-6-yl)oxy)-8-hydroxy-2-phenylhexahydropyrano[3,2-d][1,3]dioxin-7-yl palmitate



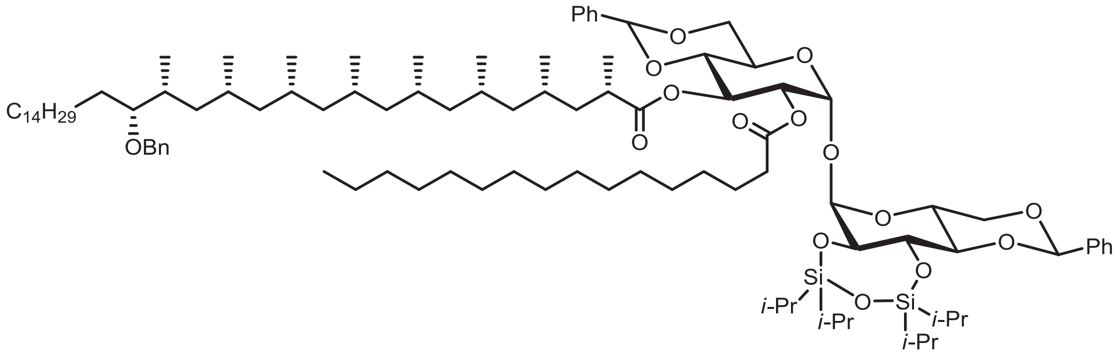
The product was prepared according to a previously reported procedure. All analytical data were in accordance with those reported.[11]

(2*R*,4a*R*,6*R*,7*R*,8*S*,8a*S*)-8-hydroxy-2-phenyl-6-(((5a*R*,6*R*,7a*R*,10*R*,11a*R*,11b*S*)-2,2,4,4-tetraisopropyl-10-phenylhexahydro-[1,3]dioxino[4',5':5,6]pyrano[3,4-f][1,3,5,2,4]trioxadisilepin-6-yl)oxy)hexahydropyrano[3,2-d][1,3]dioxin-7-yl palmitate (34)



The product was prepared according to a previously reported procedure. All analytical data were in accordance with those reported.[11]

(2*R*,4*R*,6*R*,8*R*,10*S*,12*S*,14*S*,16*S*,17*S*)-(2*R*,4a*R*,6*R*,7*R*,8*S*,8a*R*)-7-(palmitoyloxy)-2-phenyl-6-(((5a*R*,6*R*,7a*R*,10*R*,11a*R*,11b*S*)-2,2,4,4-tetraisopropyl-10-phenylhexahydro-[1,3]dioxino[4',5':5,6]pyrano[3,4-f][1,3,5,2,4]trioxadisilepin-6-yl)oxy)hexahydropyrano[3,2-d][1,3]dioxin-8-yl 17-(benzyloxy)-2,4,6,8,10,12,14,16-octamethyldotriacontanoate (35)



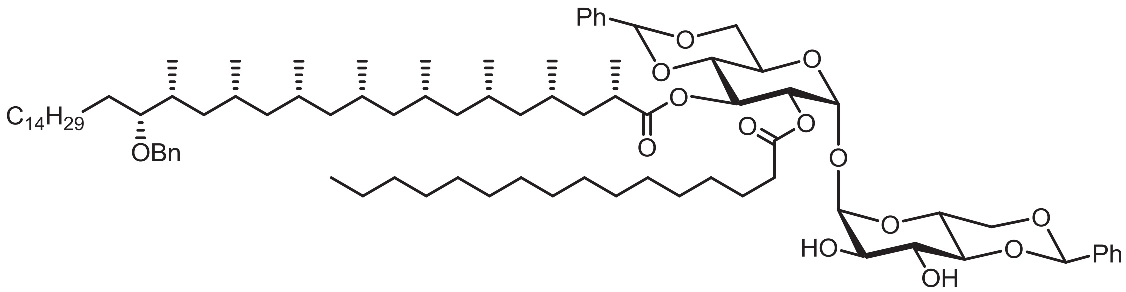
To carboxylic acid **31** (14.3 mg, 0.020 mmol) in benzene (0.5 mL) was added Et_3N (2.1 eq, 4.35 mg, 0.043 mmol) and 2,4,6-trichlorobenzoyl chloride (1.05 eq, 5.24 mg, 0.021 mmol). After 1 h, compound **34** (1.1 eq, 22.48 mg, 0.022 mmol) in 300 µL of benzene and DMAP (1.1 eq, 2.75 mg, 0.022 mmol) were added. The reaction was stirred for 48 h and quenched with an aq. saturated solution of $NaHCO_3$ (1 mL). The layers were separated and the aqueous layer was extracted with EtOAc (3 x 3 mL). The combined organic layers were dried ($MgSO_4$) and all volatiles were evaporated. The crude product was purified using flash chromatography (pentane/ethyl acetate 20:1) to give pure **35** as a colorless oil (26 mg, 76%).

^{1}H NMR (400 MHz, $CDCl_3$) δ 7.49 – 7.37 (m, 4H), 7.34 – 7.29 (m, 11H), 5.66 (t, *J* = 9.8, 1H), 5.53 (s, 1H), 5.46 (s, 1H), 5.38 (d, *J* = 3.8, 1H), 5.13 (d, *J* = 4.0, 1H), 5.02 (dd, *J* = 10.0, 3.7, 1H), 4.51 (s, 2H), 4.34 – 4.27 (m, 1H), 4.25 – 4.19 (m, 1H), 4.15 (d, *J* = 3.6, 1H), 4.12 (d, *J* = 6.8, 1H), 4.06 (t, *J* = 6.1, 1H), 3.90 (dd, *J* = 8.4, 4.1, 1H), 3.84 – 3.78 (m, 1H), 3.76 – 3.63 (m, 2H), 3.52 (t, *J* = 9.2, 1H), 3.26 – 3.20 (m, 1H), 2.61 – 2.52 (m, 1H), 2.38 – 2.25 (m, 3H), 1.84 – 1.71 (m, 4H), 1.61 – 1.50 (m, 9H), 1.35 – 1.02 (m, 90H), 0.90 – 0.77 (m, 30H).

^{13}C NMR (101 MHz, $CDCl_3$) δ 175.19, 173.12, 139.33, 137.59, 137.05, 128.78, 128.54, 128.17, 127.96, 127.91, 127.54, 127.22, 126.10, 125.88, 101.40, 101.07, 94.41, 91.90, 82.80, 81.08, 79.41, 75.23, 73.39, 71.79, 70.87, 68.70, 68.37, 62.81, 62.50, 45.52, 45.28, 45.23, 45.16, 44.88, 40.53, 39.78, 37.54, 33.89, 32.84, 31.91, 30.74, 29.87, 29.69, 29.68, 29.65, 29.54, 29.46, 29.36, 29.35, 29.13, 29.09, 27.88, 27.80, 27.65, 27.52, 27.31, 27.00, 26.18, 24.60, 22.68, 21.56, 21.48, 21.35, 21.08, 20.68, 20.56, 18.53, 17.43, 17.39, 17.30, 17.19, 17.13, 17.10, 16.99, 15.68, 14.11, 12.88, 12.63, 12.27, 11.69.

HRMS-(ESI+) calculated for $C_{101}H_{170}O_{15}Si_2NaH$ [M + Na$^+$ + H$^+$] 1703.2054, found 1703.2004.

(2*R*,4*R*,6*R*,8*R*,10*S*,12*S*,14*S*,16*S*,17*S*)-(2*R*,4a*R*,6*R*,7*R*,8*S*,8a*R*)-6-(((2*R*,4a*R*,6*R*,7*R*,8i,8a*S*)-7,8-dihydroxy-2-phenylhexahydropyrano[3,2-d][1,3]dioxin-6-yl)oxy)-7-(palmitoyloxy)-2-phenylhexahydropyrano[3,2-d][1,3]dioxin-8-yl 17-(benzyloxy)-2,4,6,8,10,12,14,16-octamethyldotriacontanoate (36)



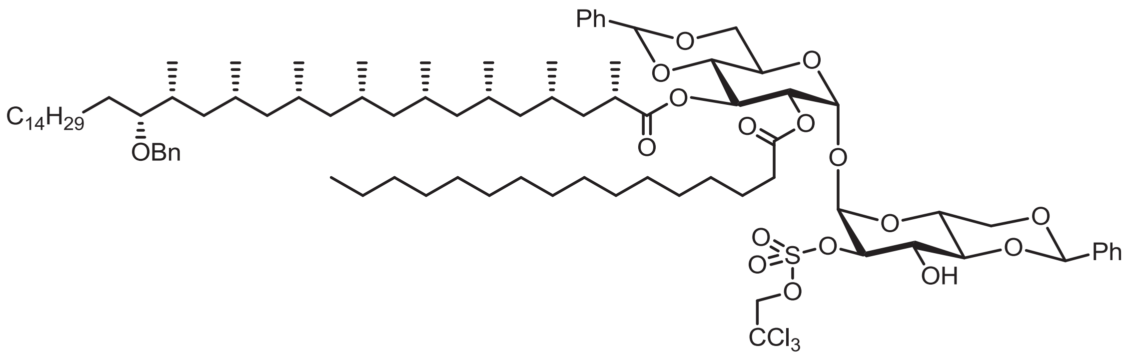
To compound **35** (19.5 mg, 0.012 mmol) in THF (0.5 mL) was added TBAF (40 eq, 0.46 mmol, 1 M solution in THF, acidified to pH = 6.5 with TFA). The mixture was heated at 40ºC for 24 h and afterwards EtOAc (2 mL) was added. The organic layer was washed with an equal amount of water and then dried ($MgSO_4$). After all volatiles were evaporated the product was purified using flash column chromatography (pentane/EtOAc 4:1) to afford pure **36** (14.2 mg, 85%) as a colorless oil.

^{1}H NMR (400 MHz, $CDCl_3$) δ 7.50 – 7.39 (m, 4H), 7.38 – 7.28 (m, 11H), 5.66 (t, *J* = 9.9, 1H), 5.50 (d, *J* = 2.7, 2H), 5.40 (d, *J* = 3.8, 1H), 5.16 (d, *J* = 3.5, 1H), 5.07 (dd, *J* = 10.1, 3.7, 1H), 4.51 (s, 2H), 4.33 (dd, *J* = 10.2, 4.8, 1H), 4.24 – 4.10 (m, 2H), 4.07 (t, *J* = 9.2, 1H), 3.86 – 3.76 (m, 1H), 3.76 – 3.62 (m, 4H), 3.51 (t, *J* = 9.3, 1H), 3.27 – 3.18 (m, 1H), 2.68 – 2.55 (m, 1H), 2.44 – 2.27 (m, 3H), 1.88 – 1.74 (m, 3H), 1.68 – 1.49 (m, 9H), 1.49 – 1.36 (m, 2H), 1.22 - 1.14 (m, 62H), 0.98 – 0.72 (m, 30H).

^{13}C NMR (101 MHz, $CDCl_3$) δ 175.55, 172.93, 139.32, 136.98, 136.74, 129.17, 128.86, 128.20, 128.17, 128.08, 127.55, 127.23, 126.28, 125.92, 101.88, 101.17, 94.80, 92.33, 82.81, 80.77, 79.37, 73.78, 72.10, 71.78, 71.07, 70.65, 68.64, 68.60, 68.38, 63.25, 62.95, 47.15, 45.47, 45.25, 45.22, 45.15, 44.89, 40.98, 40.53, 39.77, 37.61, 34.32, 33.87, 33.28, 32.86, 31.91, 31.38, 31.35, 30.73, 29.87, 29.69, 29.66, 29.65, 29.55, 29.50, 29.35, 29.20, 27.86, 27.64, 27.50, 27.30, 27.00, 26.43, 26.18, 24.63, 23.63, 23.06, 22.67, 22.03, 21.55, 21.47, 21.39, 21.08, 20.72, 20.70, 20.54, 18.63, 16.54, 15.67, 14.11.

HRMS-(ESI+) calculated for $C_{89}H_{145}O_{14}$ [M + H^+] 1438.0634, found 1438.0629

(2*R*,4*R*,6*R*,8*R*,10*S*,12*S*,14*S*,16*S*,17*S*)-(2*R*,4a*R*,6*R*,7*R*,8*S*,8a*R*)-6-(((2*R*,4a*R*,6*R*,7*R*,8*S*,8a*S*)-8-hydroxy-2-phenyl-7-(((2,2,2-trichloroethoxy)sulfonyl)oxy)hexahydropyrano[3,2-d][1,3]dioxin-6-yl)oxy)-7-(palmitoyloxy)-2-phenylhexahydropyrano[3,2-d][1,3]dioxin-8-yl 17-(benzyloxy)-2,4,6,8,10,12,14,16-octamethyldotriacontanoate (38)



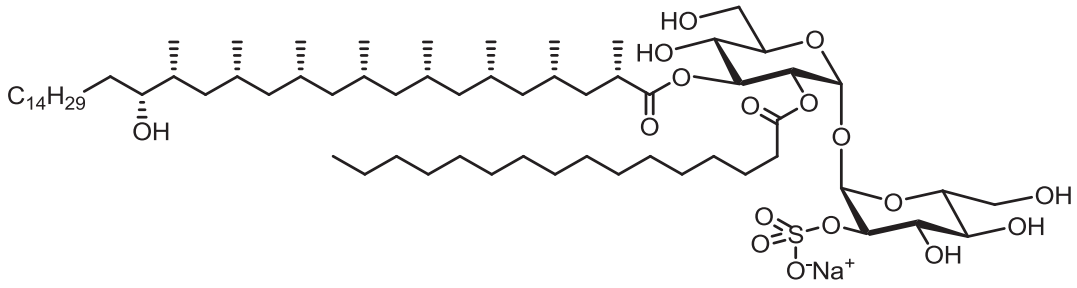
To compound **36** (14.5 mg, 10 µmol) in DCM (0.5 mL) was added imidazolium salt **37** (2 eq, 9.23 mg, 20 µmol, prepared according to a previously reported procedure).[12] The mixture was cooled to 0ºC and 1,2-dimethylimidazole (2.5 eq, 2.42 mg, 25 µmol) was added as solution in DCM (300 µL) over 4 h. The reaction was allowed to slowly reach rt after which it was stirred for 72 h. The mixture was diluted with DCM (3 mL) and the organic layer was washed with brine (2 mL). The organic layer was dried over $MgSO_4$ and all volatiles were evaporated. The crude mixture was purified using flash chromatography (pentane/EtOAC 15:1) to afford pure **38** as a colorless oil (10.2 mg, 61%).

^{1}H NMR (400 MHz, $CDCl_3$) δ 7.48 – 7.41 (m, 4H), 7.39 – 7.28 (m, 11H), 5.63 (t, *J* = 9.9, 1H), 5.53 (s, 1H), 5.49 (s, 1H), 5.47 (d, *J* = 3.7, 1H), 5.36 (d, *J* = 4.0, 1H), 5.08 (dd, *J* = 10.1, 4.0, 1H), 4.99, 4.83 (AB system, *J* = 10.7, 2H), 4.62 (dd, *J* = 9.6, 3.8, 1H), 4.50 (s, 2H), 4.43 (dd, *J* = 10.2, 5.0, 1H), 4.37 (t, *J* = 9.4, 1H), 4.21 – 4.12 (m, 2H), 3.96 (td, *J* = 10.0, 4.9, 1H), 3.71 (dt, *J* = 12.6, 10.1, 3H), 3.56 (t, *J* = 9.4, 1H), 3.26 – 3.19 (m, 1H), 2.80 (d, *J* = 1.9, 1H), 2.66 – 2.55 (m, 1H), 2.35 (t, *J* = 7.8, 2H), 1.87 – 1.74 (m, 2H), 1.67 – 1.50 (m, 9H), 1.50 – 1.38 (m, 2H), 1.35 – 1.15 (m, 59H), 1.14 (d, *J* = 6.9, 3H), 0.89 – 0.75 (m, 30H).

^{13}C NMR (101 MHz, $CDCl_3$) δ 175.44, 172.76, 139.33, 136.90, 136.43, 129.48, 128.79, 128.33, 128.19, 128.00, 127.57, 127.25, 126.23, 126.09, 102.24, 101.26, 94.22, 93.78, 92.49, 82.83, 81.01, 80.88, 80.03, 79.00, 77.21, 71.78, 70.56, 68.46, 68.37, 68.20, 63.42, 62.81, 45.48, 45.26, 45.23, 45.16, 44.93, 40.54, 39.79, 37.60, 33.84, 32.87, 31.92, 30.75, 29.88, 29.70, 29.66, 29.55, 29.49, 29.36, 29.21, 29.20, 27.87, 27.66, 27.53, 27.31, 27.02, 26.19, 24.66, 22.69, 21.57, 21.49, 21.42, 21.11, 20.72, 20.55, 18.63, 15.68, 14.12.

HRMS-(ESI+) calculated for $C_{91}H_{145}O_{17}SNa^{35}Cl$ [M + Na^+] 1669.9166, found 1669.9160.

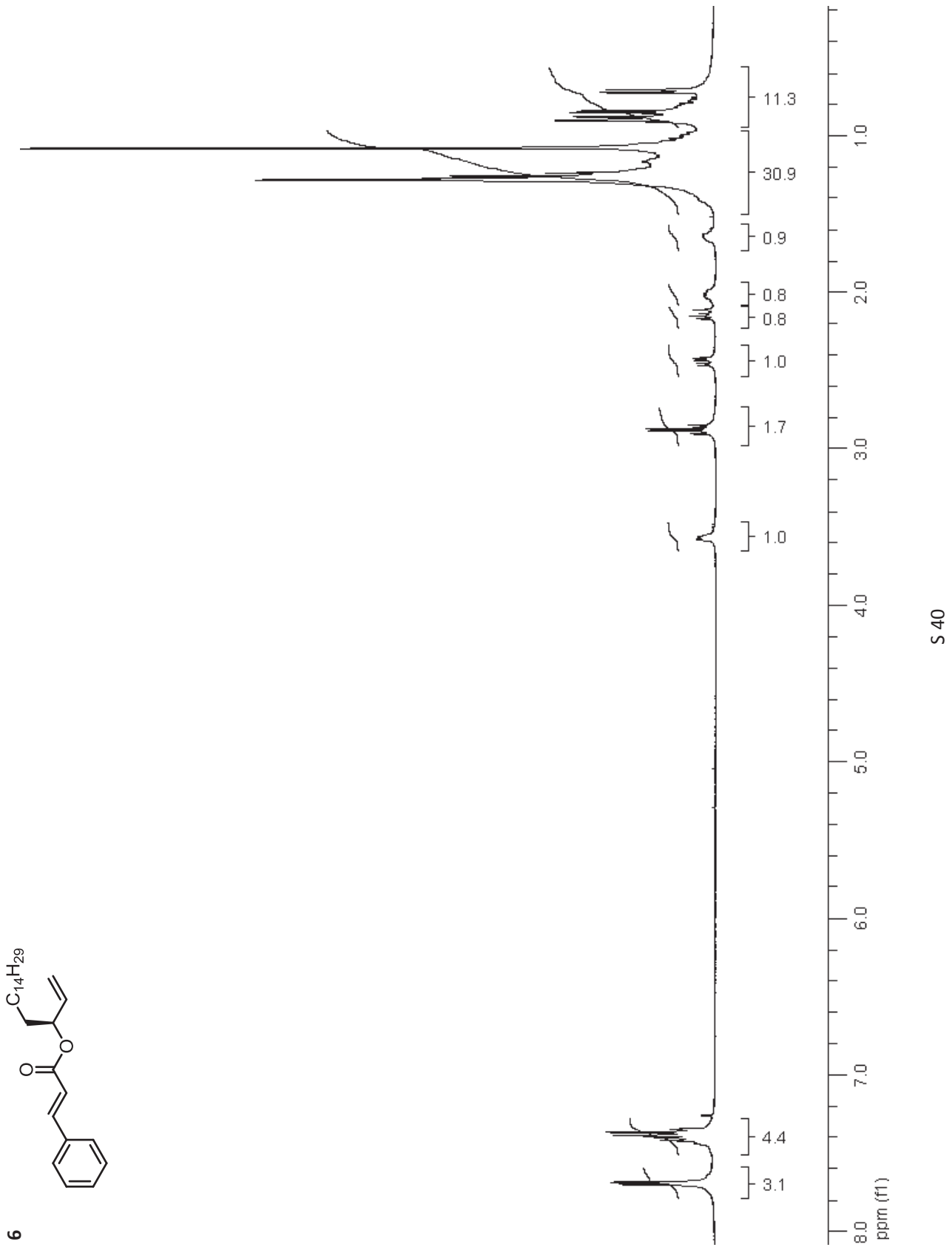
Sodium (2*R*,3*R*,4*S*,5*S*,6*R*)-4,5-dihydroxy-2-(((2*R*,3*R*,4*S*,5*R*,6*R*)-5-hydroxy-4-(((2*R*,4*R*,6*R*,8*R*,10*S*,12*S*,14*S*,16*S*,17*S*)-17-hydroxy-2,4,6,8,10,12,14,16-octamethyldotriacontanoyl)oxy)-6-(hydroxymethyl)-3-(palmitoyloxy)tetrahydro-2H-pyran-2-yl)oxy)-6-(hydroxymethyl)tetrahydro-2H-pyran-3-yl sulfate (1)



To compound **38** (9.5 mg, 5.8 µmol) was added DCM (0.5 mL) and MeOH (1 mL). Ammonium formate (20 eq, 7.26 mg, 0.12 mmol) was added and the mixture was stirred until all ammonium formate dissolved. $Pd(OH)_2$ (1 eq, 4 mg, 20% weight on carbon) was added and the mixture was placed under 1 bar of H_2 atmosphere (balloon) using three vacuum/N_2 cycles followed by four vacuum/H_2 cycles. The reaction was monitored after 16 h and showed complete disappearance of the starting material. The mixture was filtered over Celite and concentrated. ^{1}H NMR showed complete removal of the TCE group but still remaining acetal and benzyl ether protecting groups. The crude product was redissolved in 0.5 mL of DCM and 1 mL of MeOH. $Pd(OH)_2$ (1 eq, 4 mg) was added and the reaction was placed under H_2 (1 bar, balloon) and left for 48 h. After this period, TLC indicated the appearance of one major product, which was purified using column chromatography (first DCM/MeOH 95:5, than DCM/acetone/MeOH 65:25:10, R_f = 0.15). The ammonium salt was flushed over a DOWEX Na^+ ion-exchange column (DCM/MeOH 9:1) to give the pure sodium salt product as a white solid (3.6 mg, 49%).

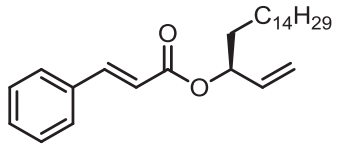
^{1}H NMR (400 MHz, $CD_3OD/CDCl_3$ 4:1) δ 5.47 (d, *J* = 3.7, 1H), 5.43 (t, *J* = 9.8, 1H), 5.29 (d, *J* = 3.6, 1H), 4.88 (dd, *J* = 10.2, 3.7, 1H), 4.46 (br, 1H), 4.24 – 4.17 (m, 2H), 3.96 – 3.89 (m, 2H), 3.76 – 3.63 (m, 4H), 3.56 (t, *J* = 9.8, 1H), 3.45 (t, *J* = 9.2, 1H), 3.42 – 3.38 (m, 1H), 2.65 – 2.54 (m, 1H), 2.40 – 2.16 (m, 3H), 1.83 – 1.73 (m, 1H), 1.66 – 1.53 (m, 9H), 1.47 – 1.38 (m, 3H), 1.36 – 1.19 (m, 59H), 1.17 (d, *J* = 6.9, 3H), 0.92 – 0.78 (m, 30H).

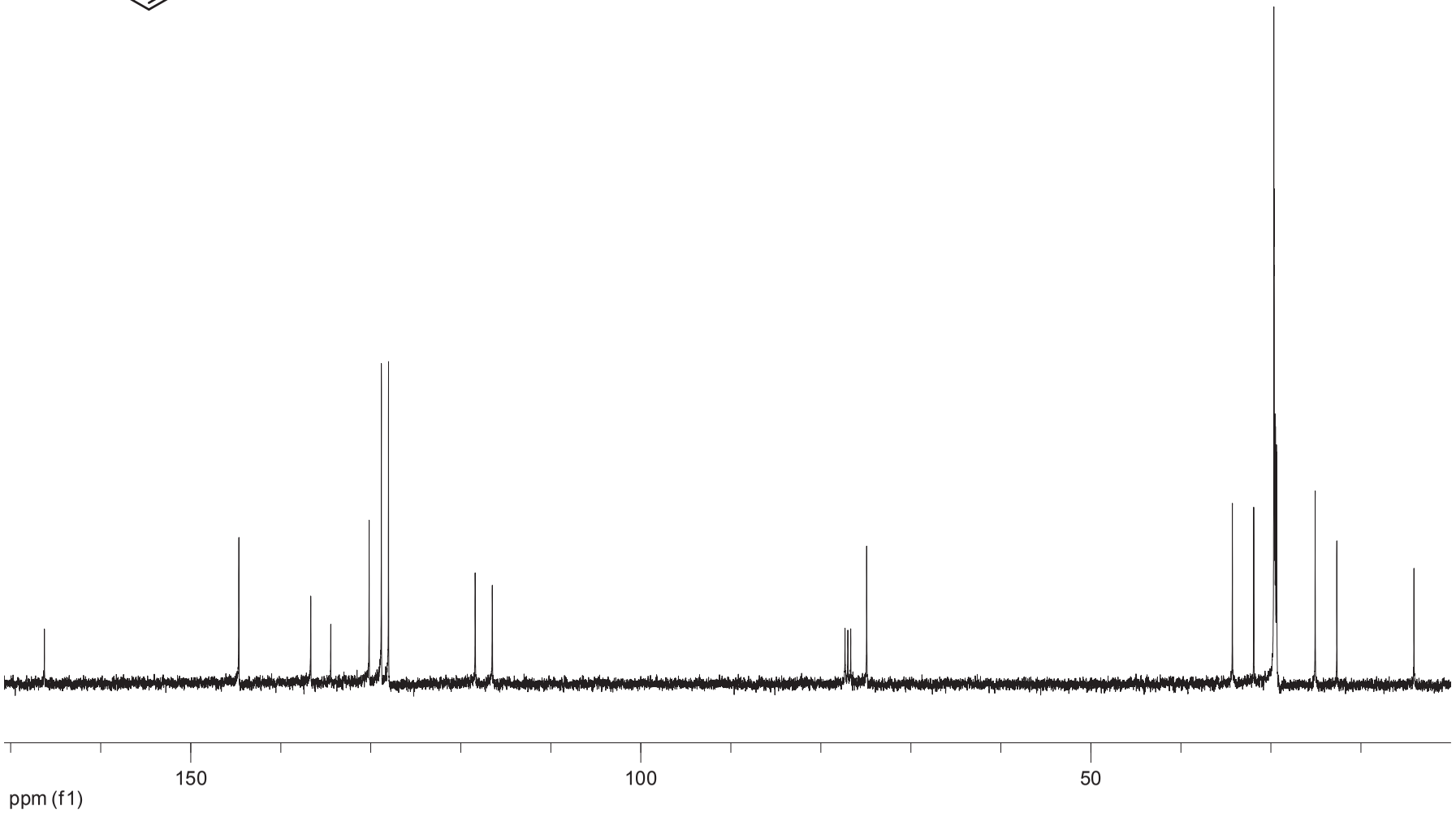
HRMS-(ESI+) calculated for $C_{68}H_{129}O_{17}SNa_2$ [M + 2Na^+] 1295.8746, found 1295.8740.


11.3
30.9
0.9
0.8
0.8
1.0
1.7
1.0
4.4
3.1
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
ppm (f1)
$C_{14}H_{29}$
O
O
O

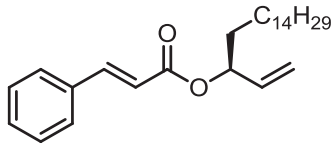
6

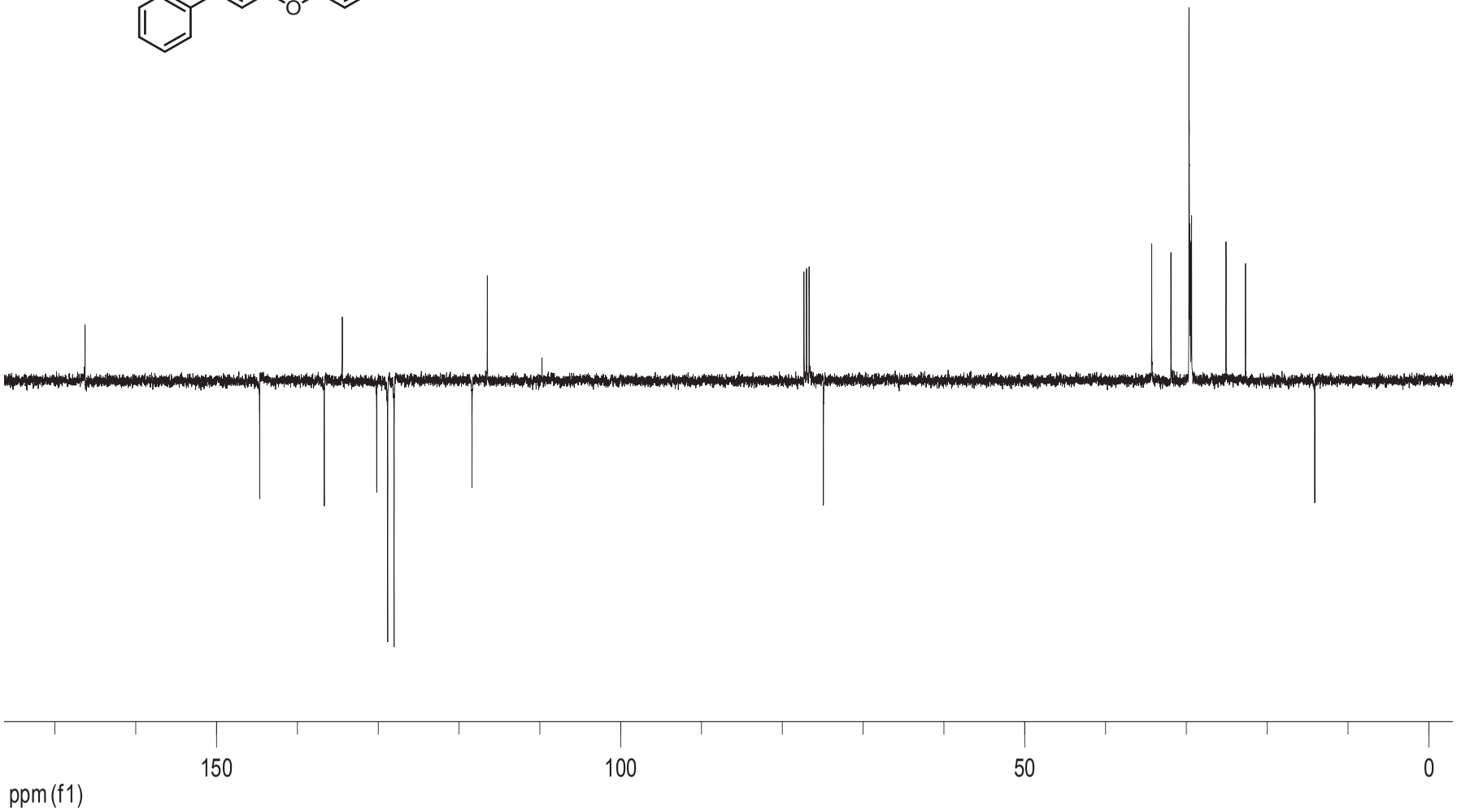
6

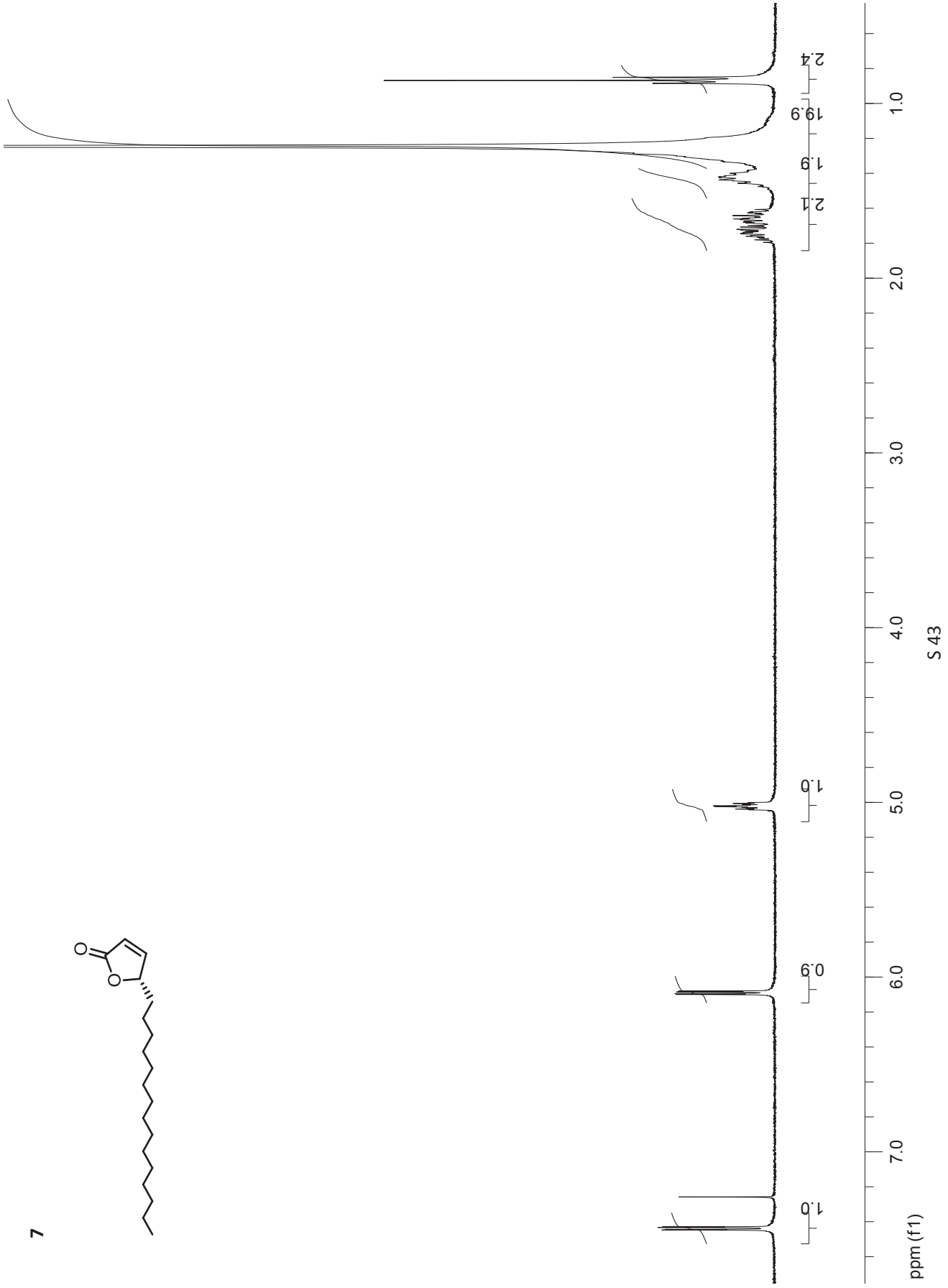


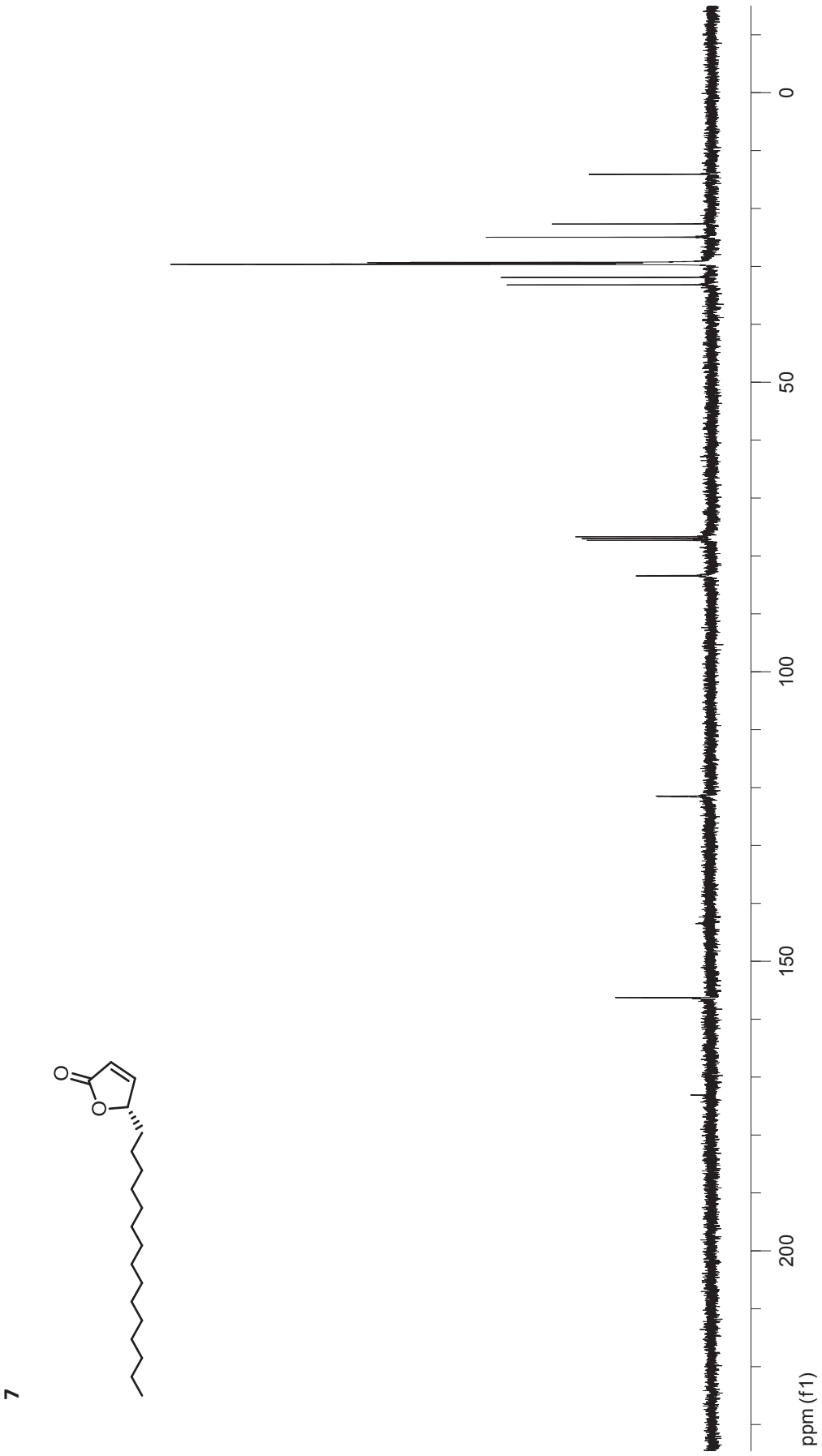


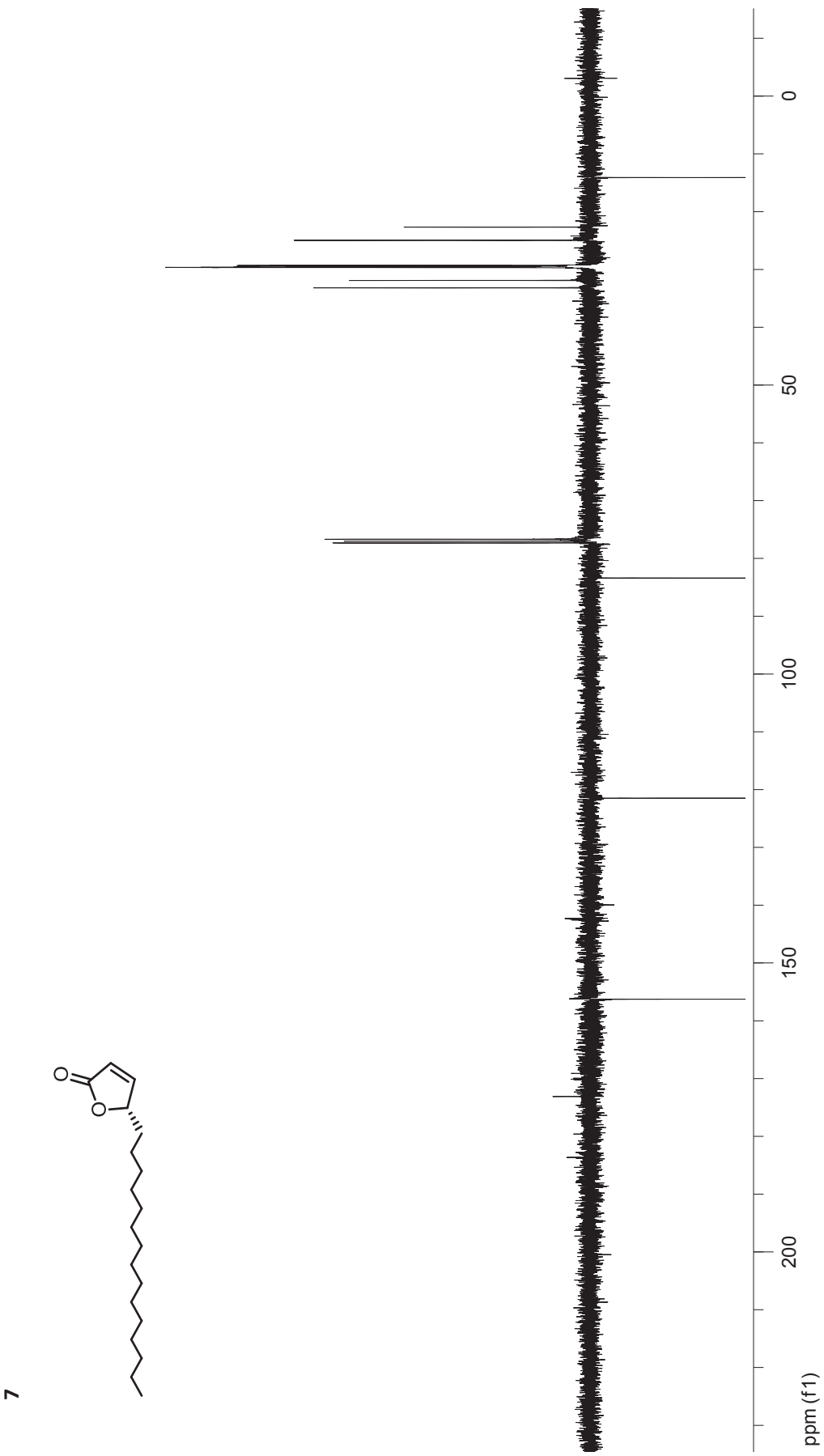
6

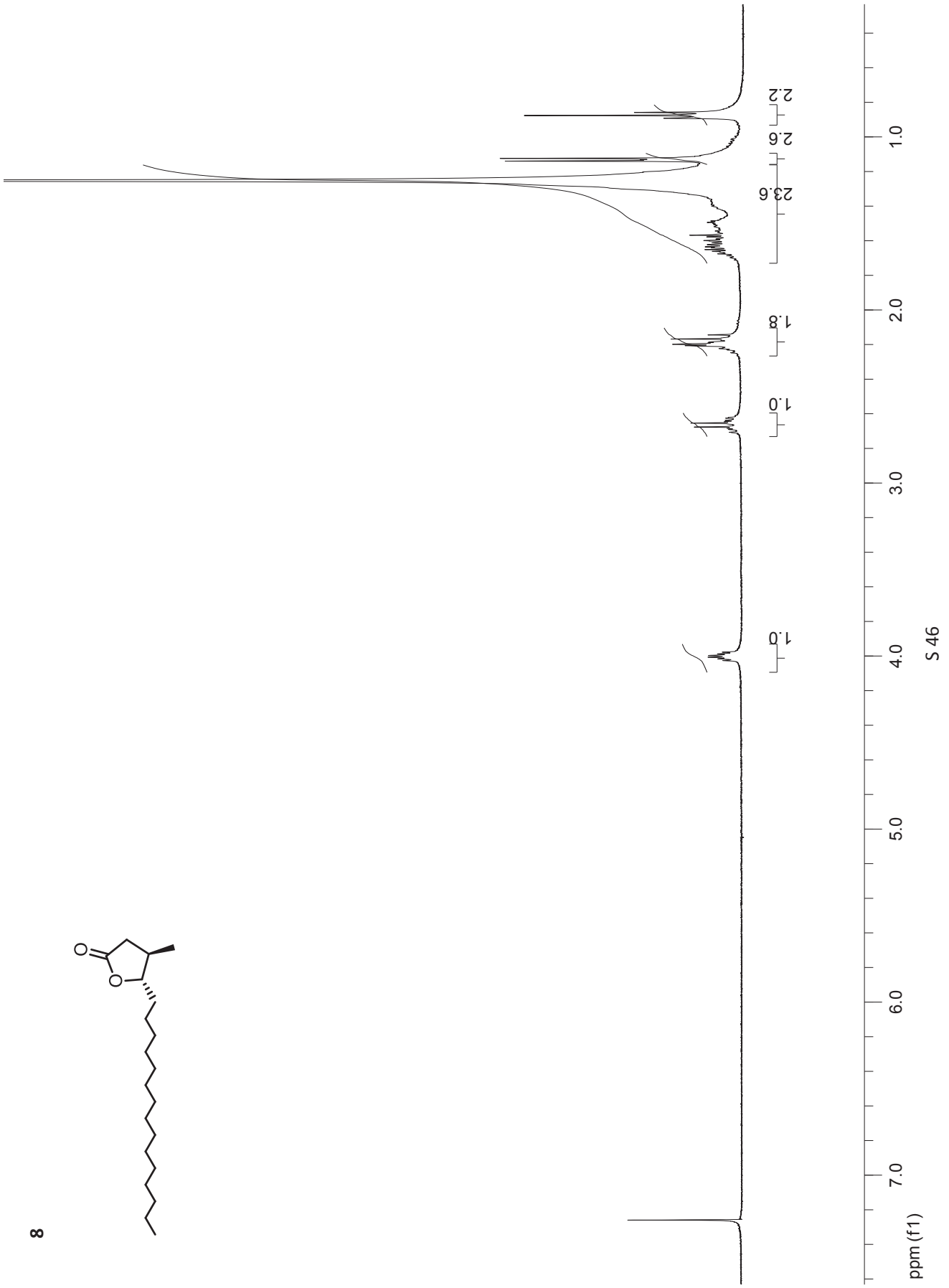


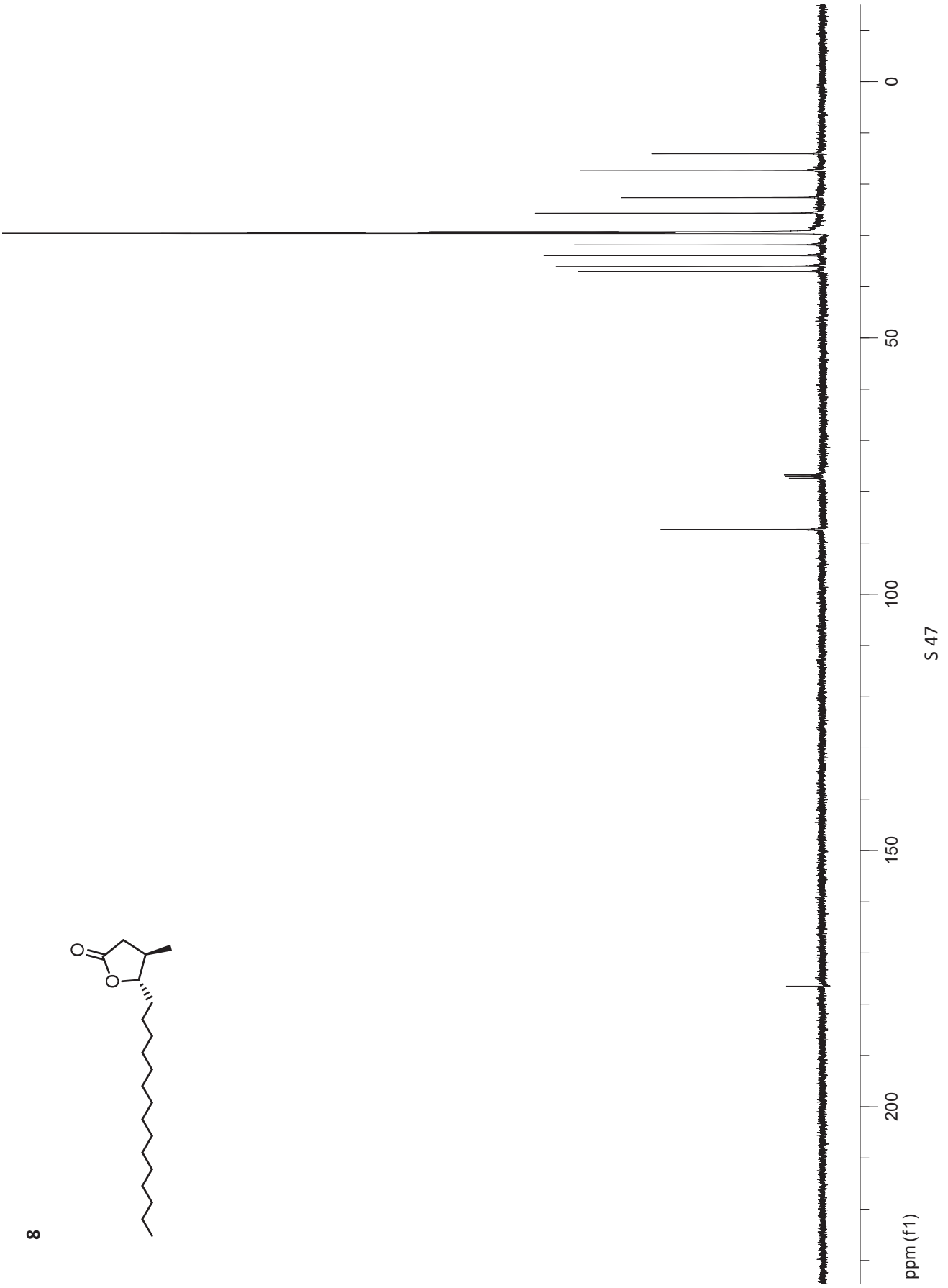





7
ppm (f1)
200
150
100
50
0

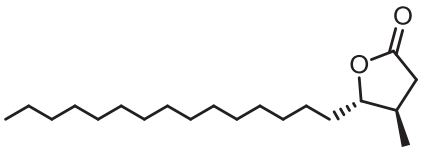


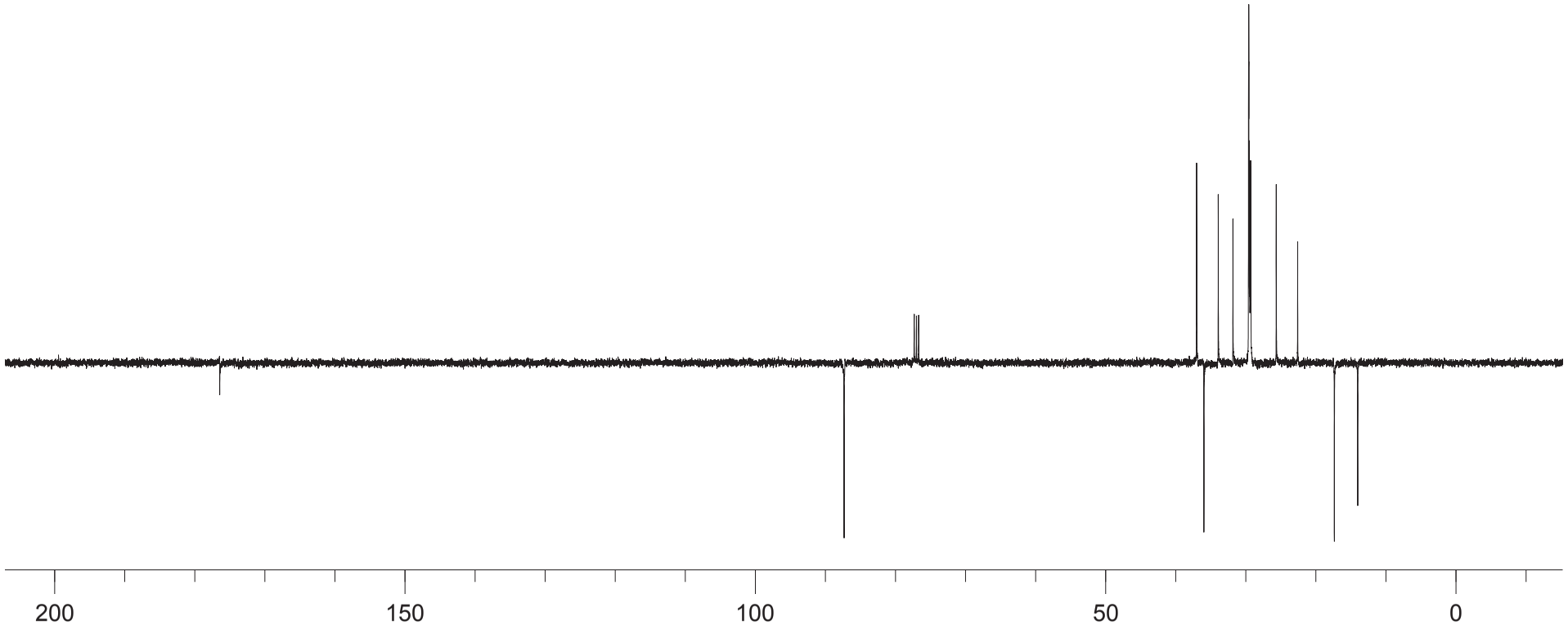


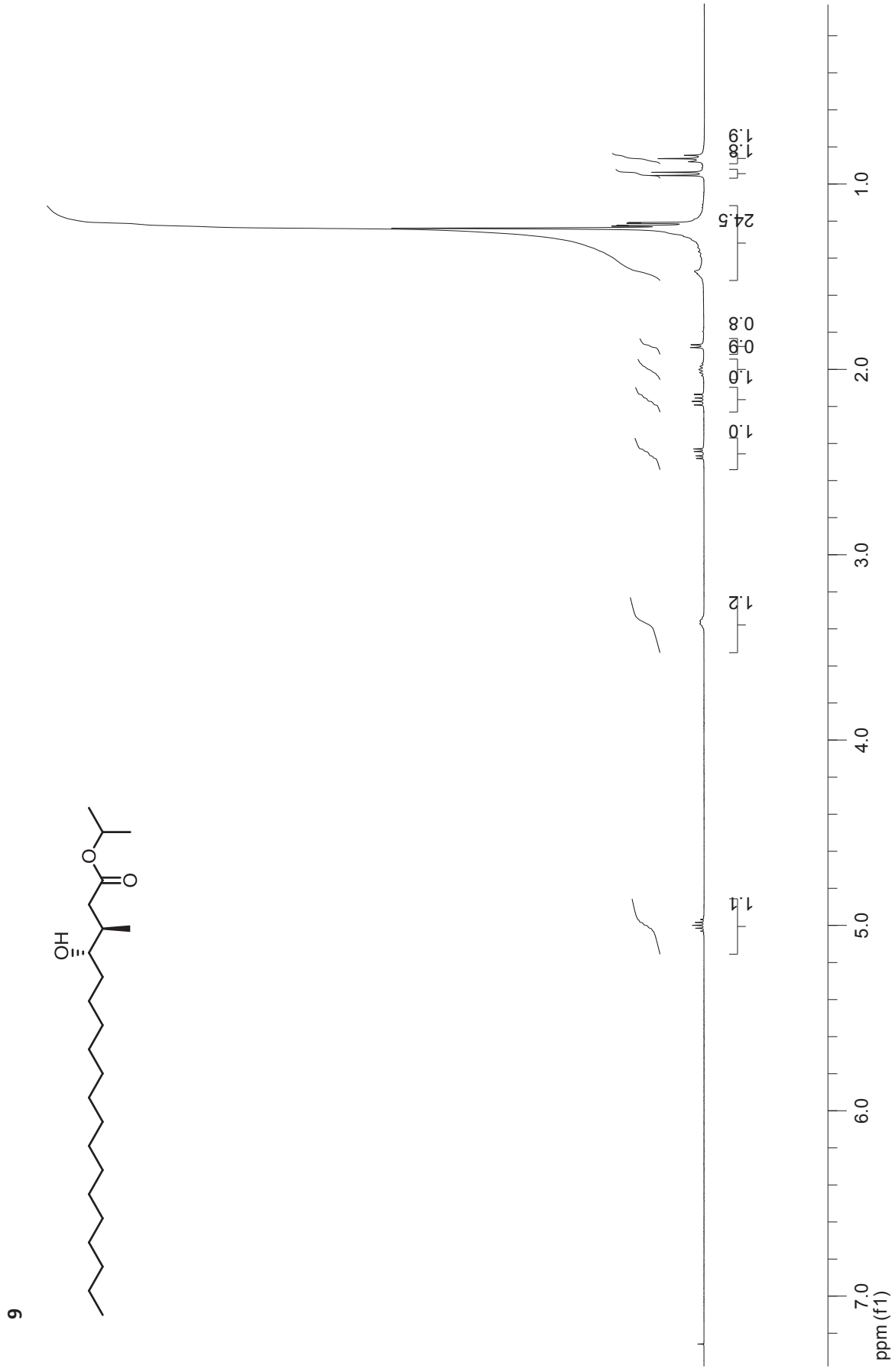


8

8



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OH
O
O
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24.5
0.8
0.9
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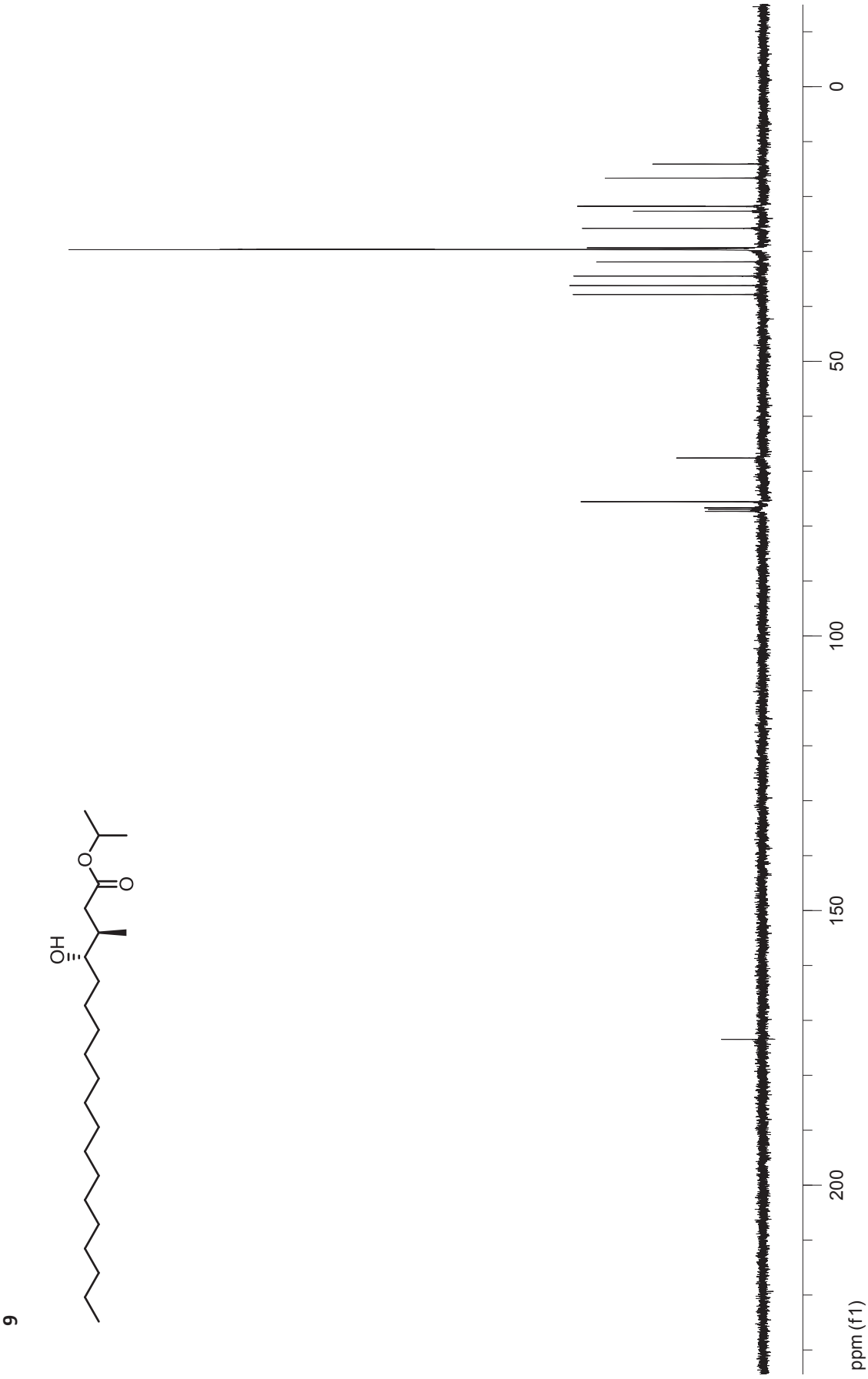
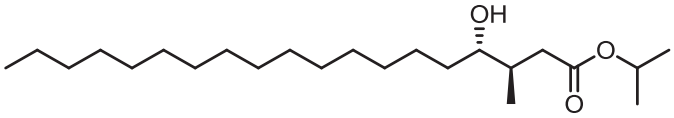
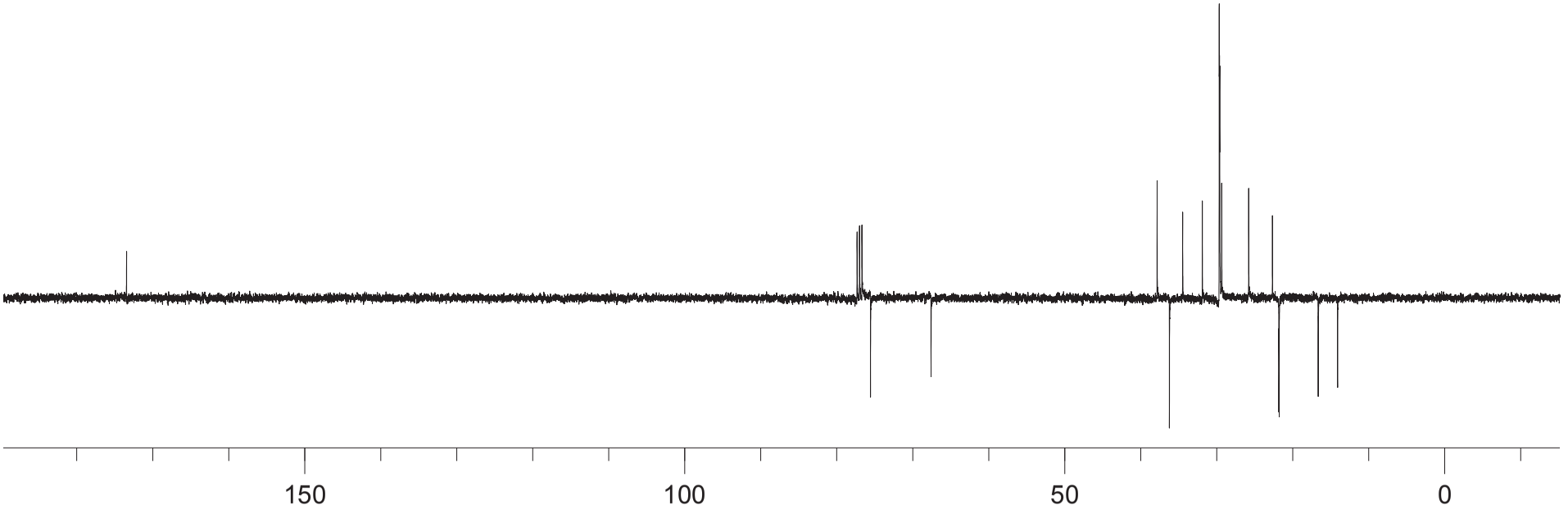
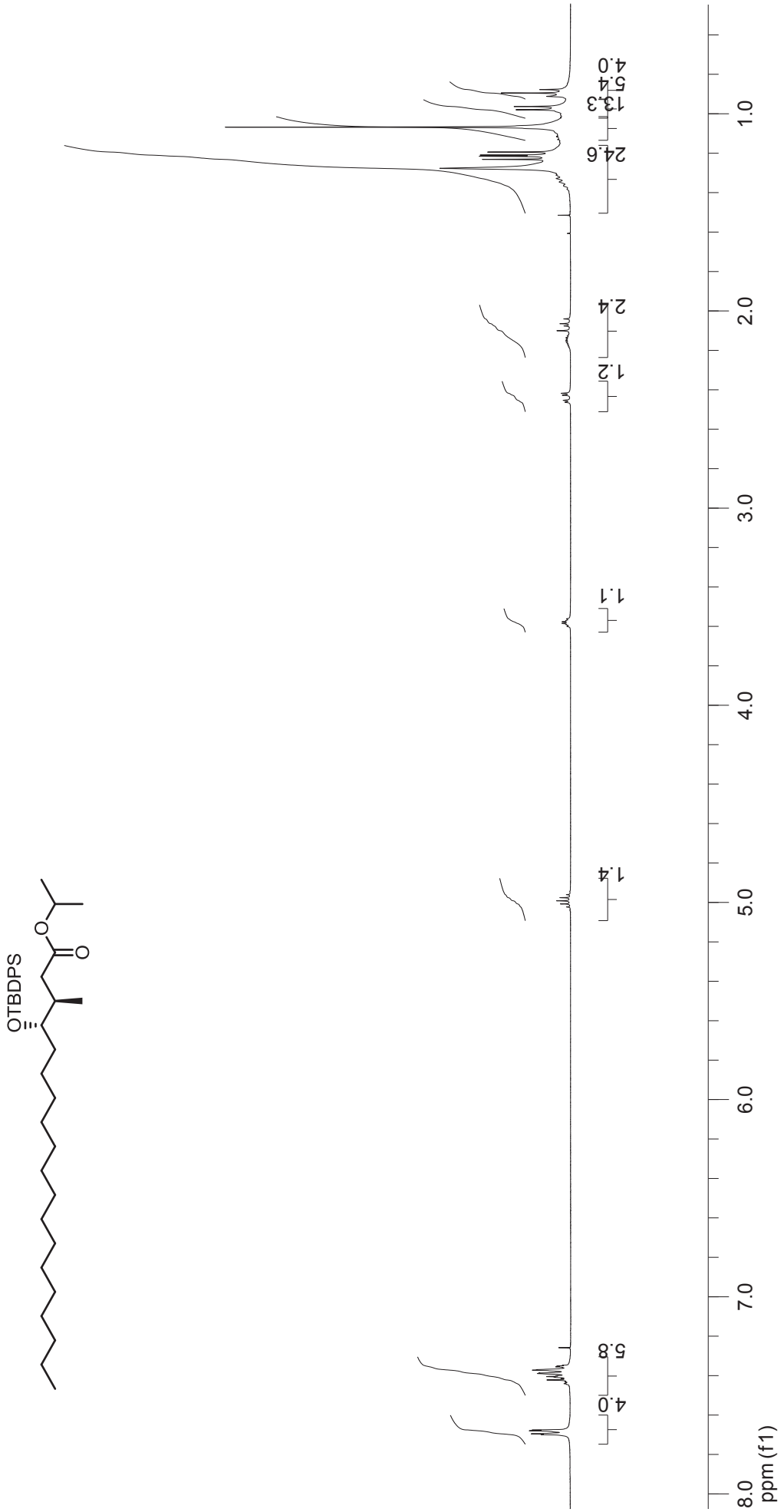
1.1
7.0
6.0
5.0
4.0
3.0
2.0
1.0
ppm (f1)

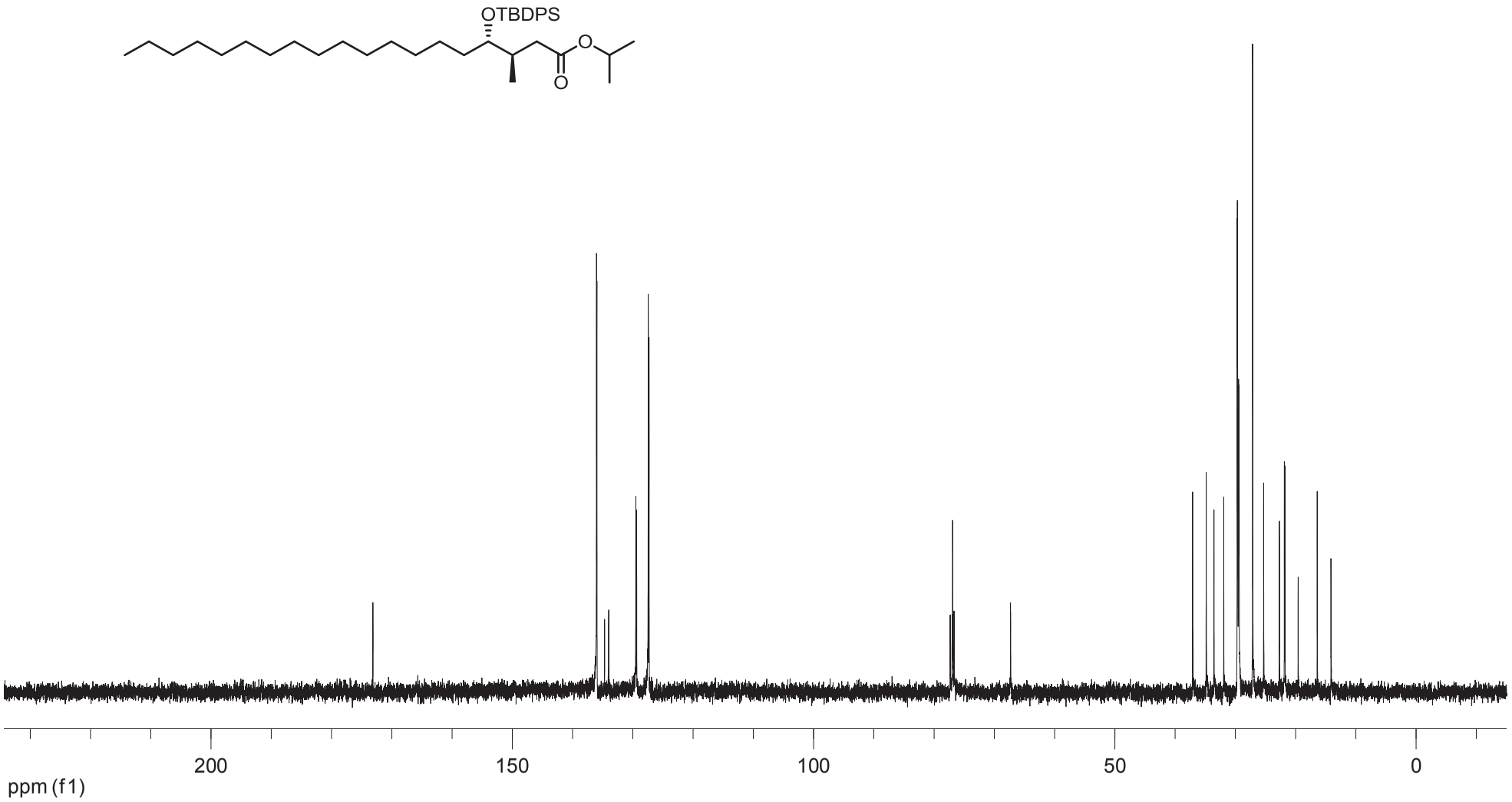

9
OH
O
O
0
50
100
150
200
ppm (f1)

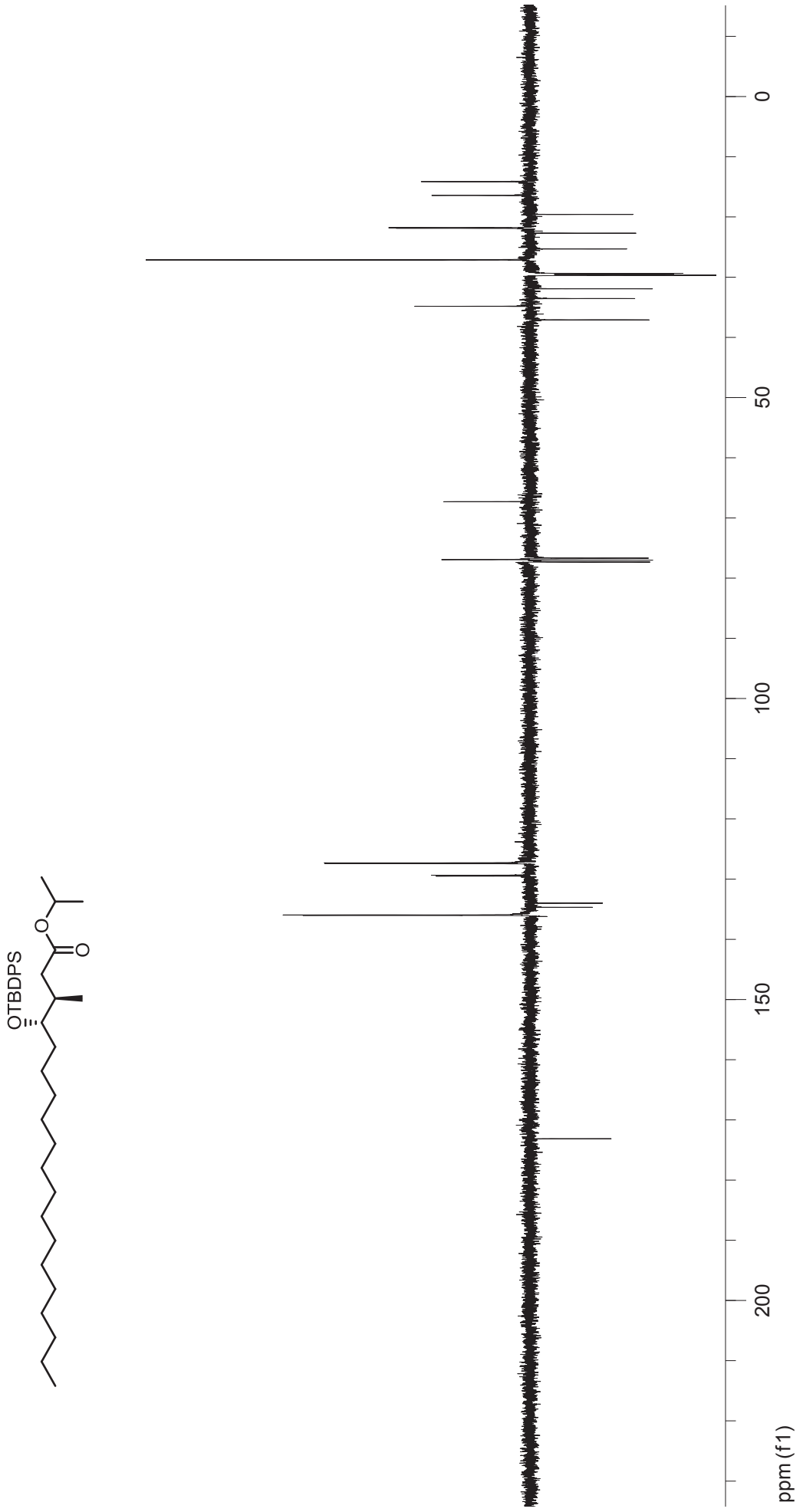
9

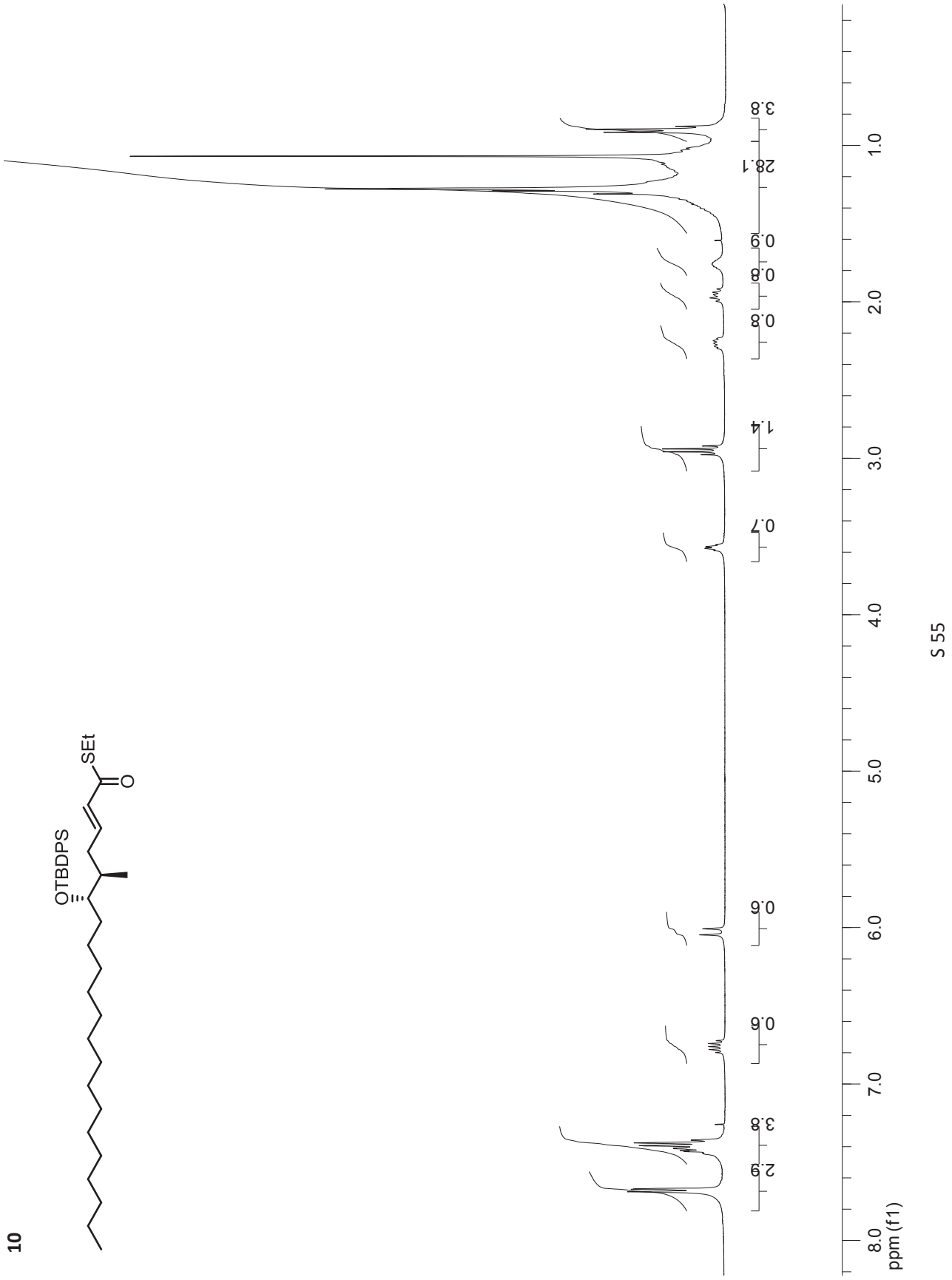








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OTBDPS
SEt
O
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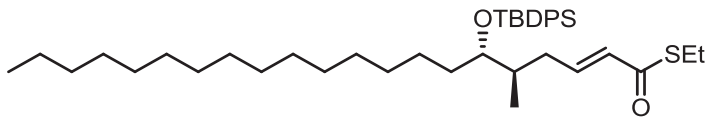
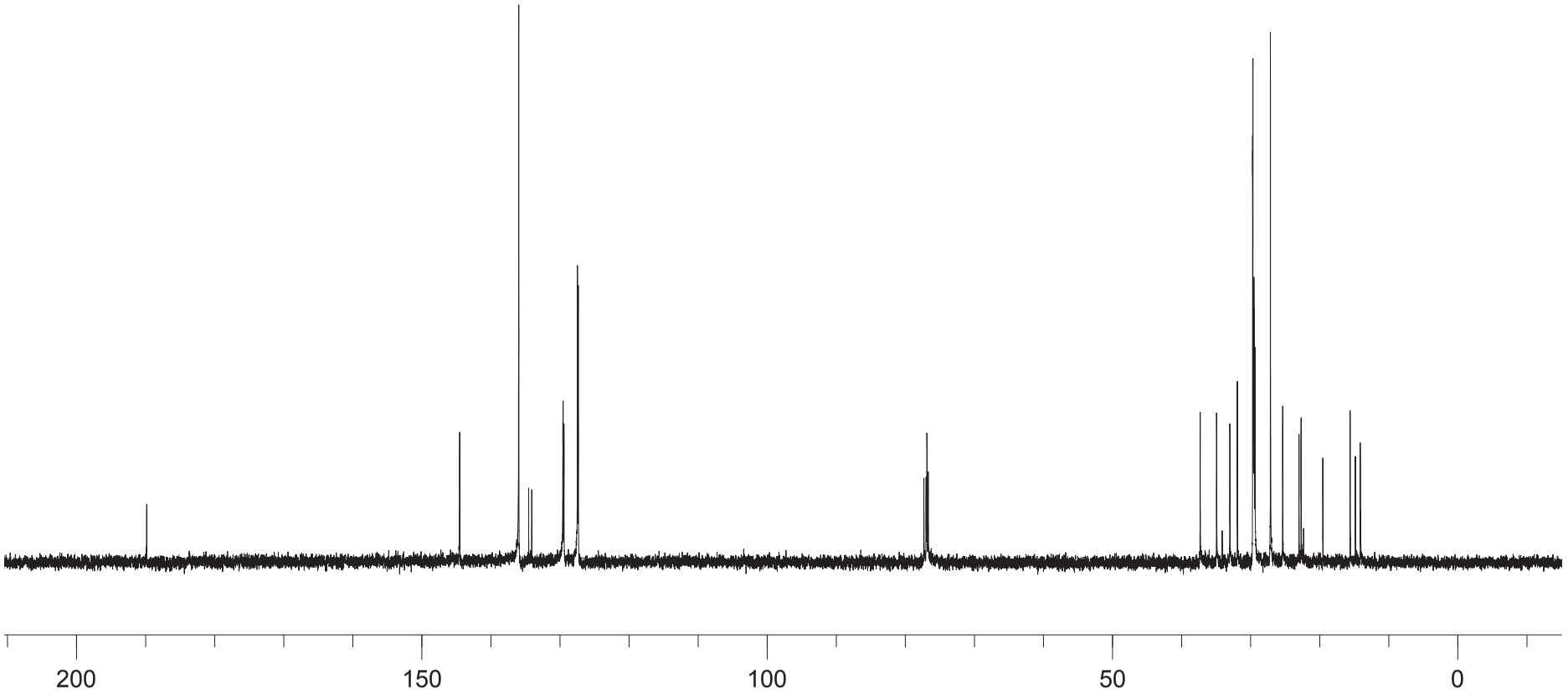
0.8
0.8
1.4
0.7
0.6
0.6
3.8
2.9
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
ppm (f1)

10





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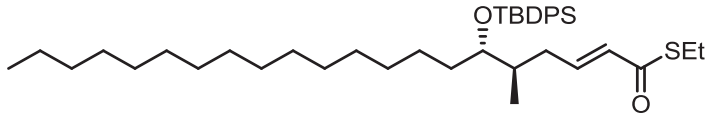

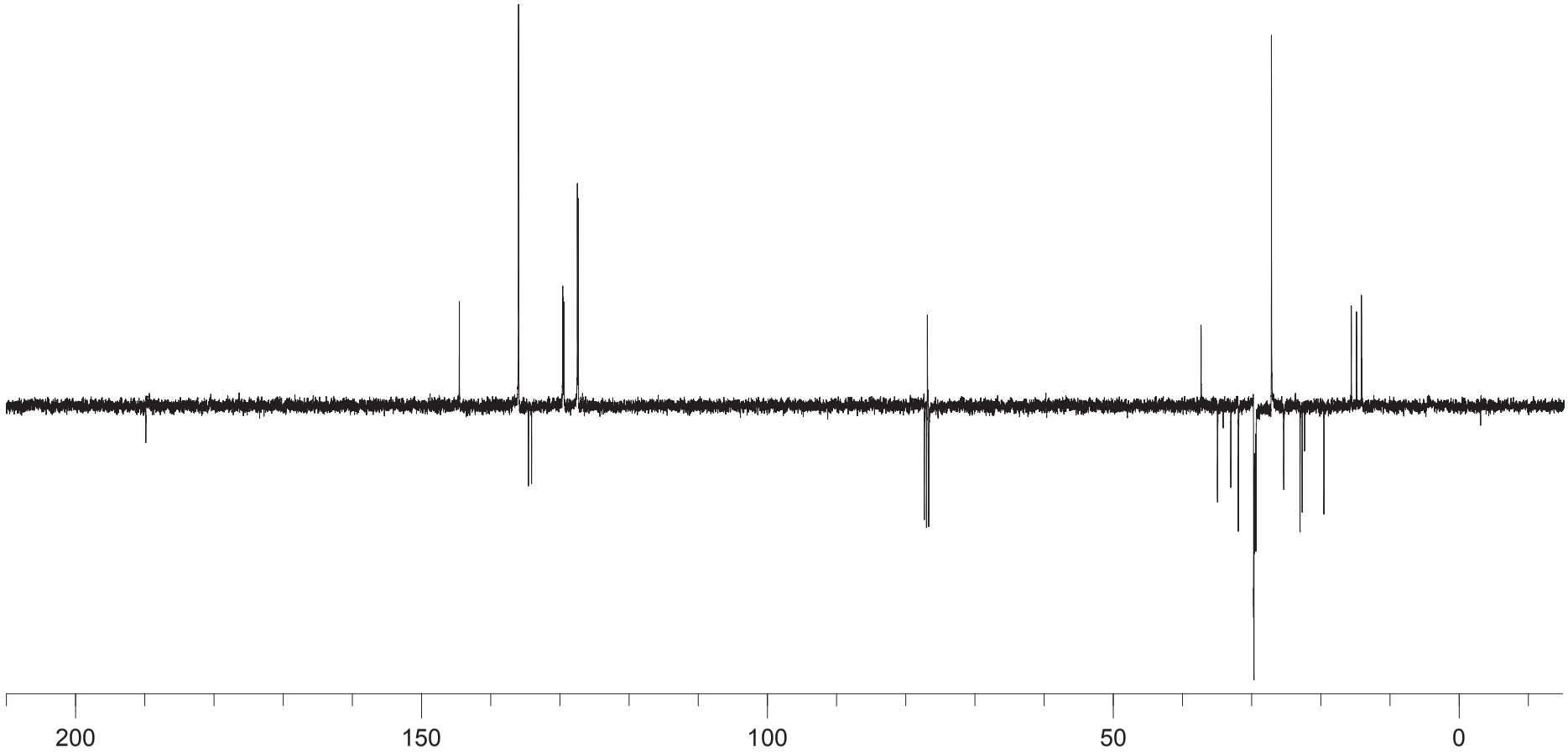

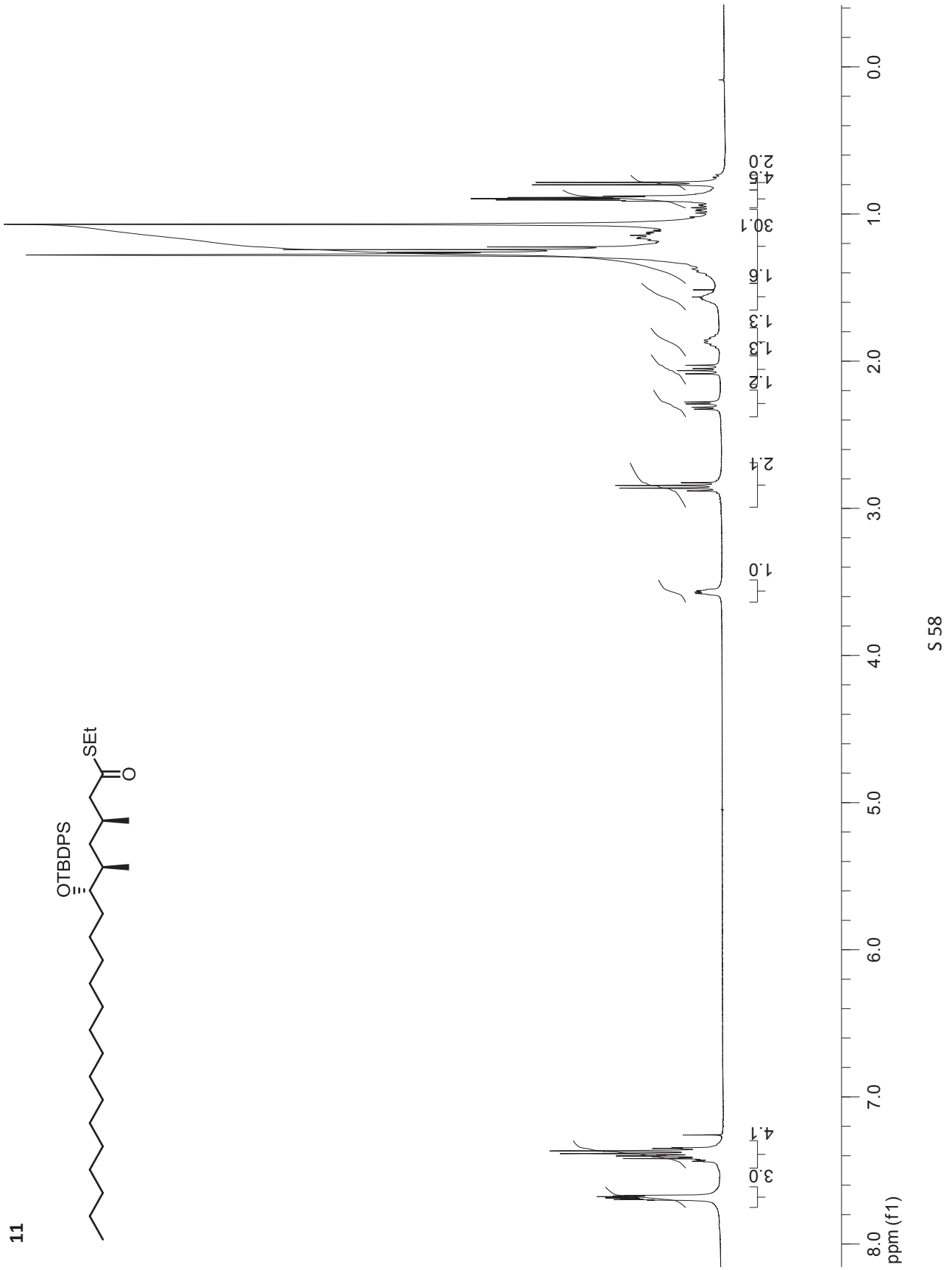
11
OTBDPS
SEt
O
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1.0
2.4
1.2
1.3
1.3
1.6
30.1
4.5
2.0
8.0
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6.0
5.0
4.0
3.0
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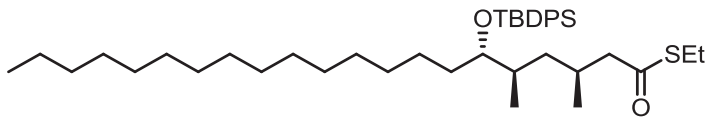
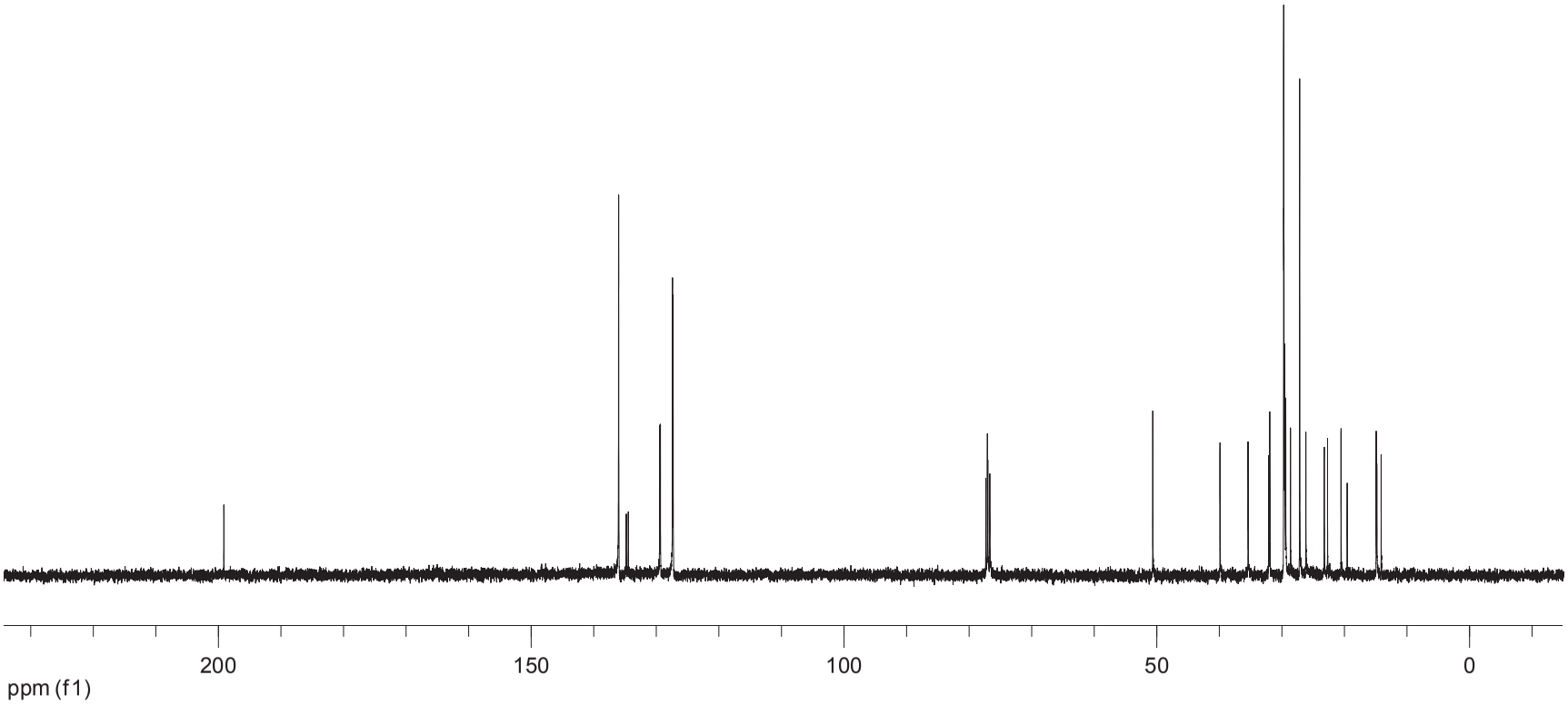
1.0
0.0
ppm (f1)

11





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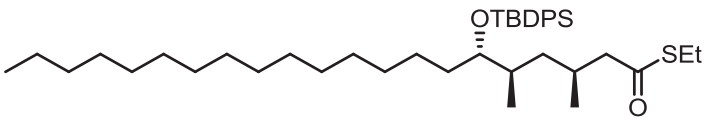

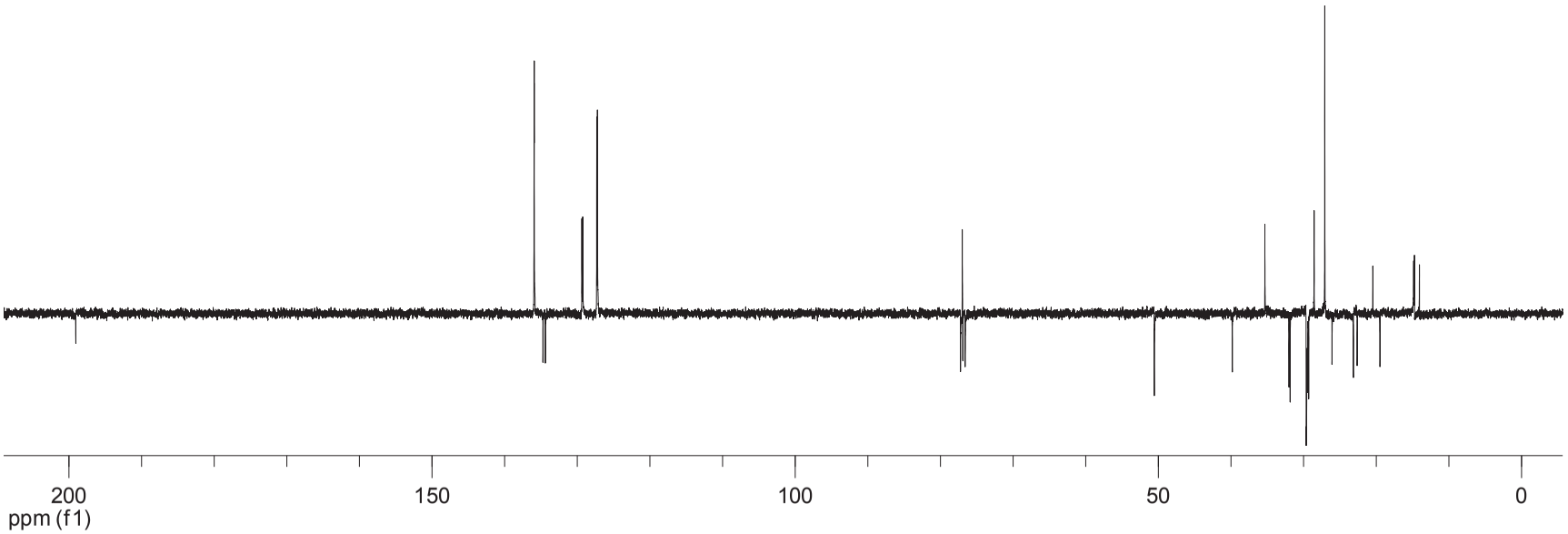

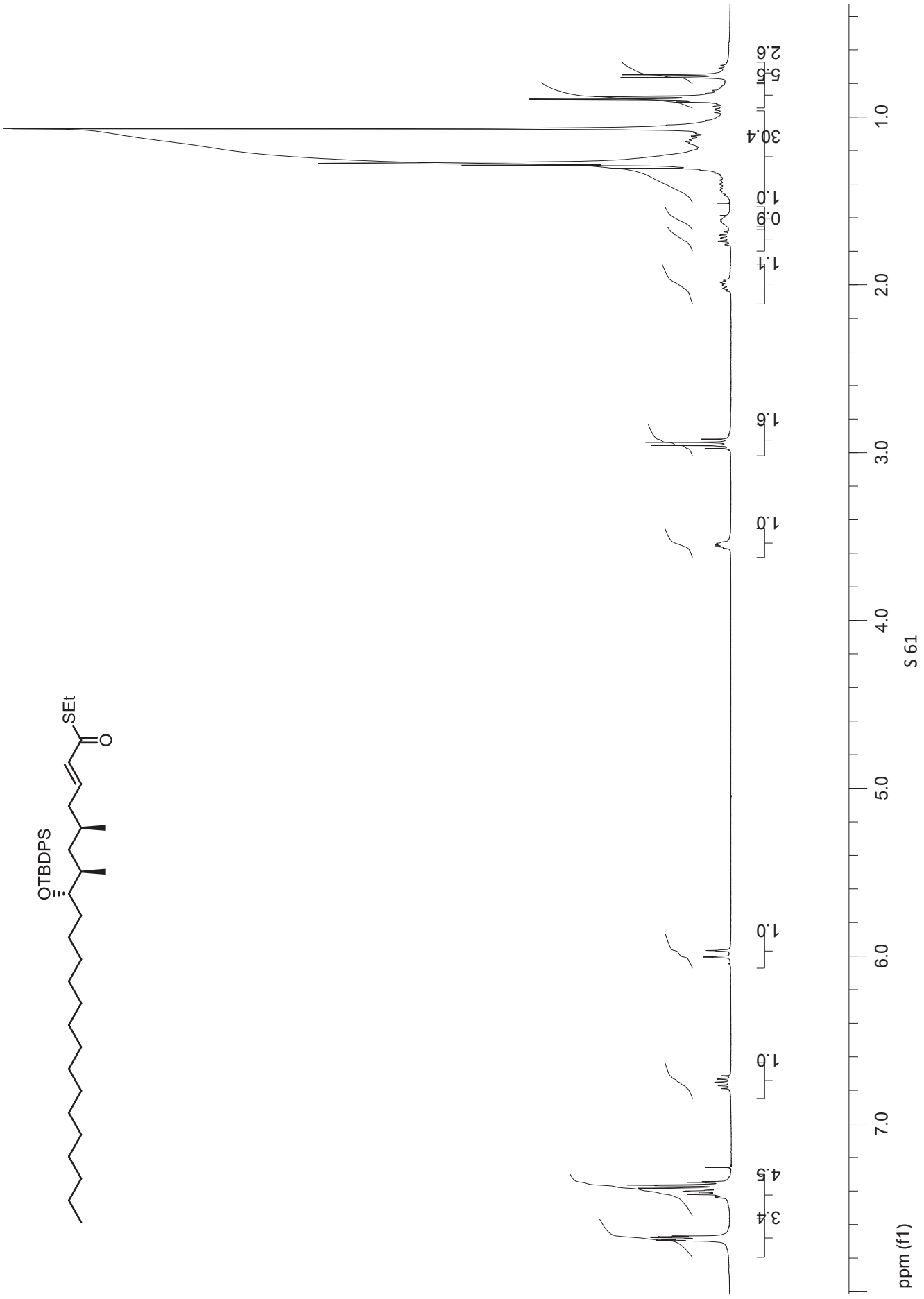

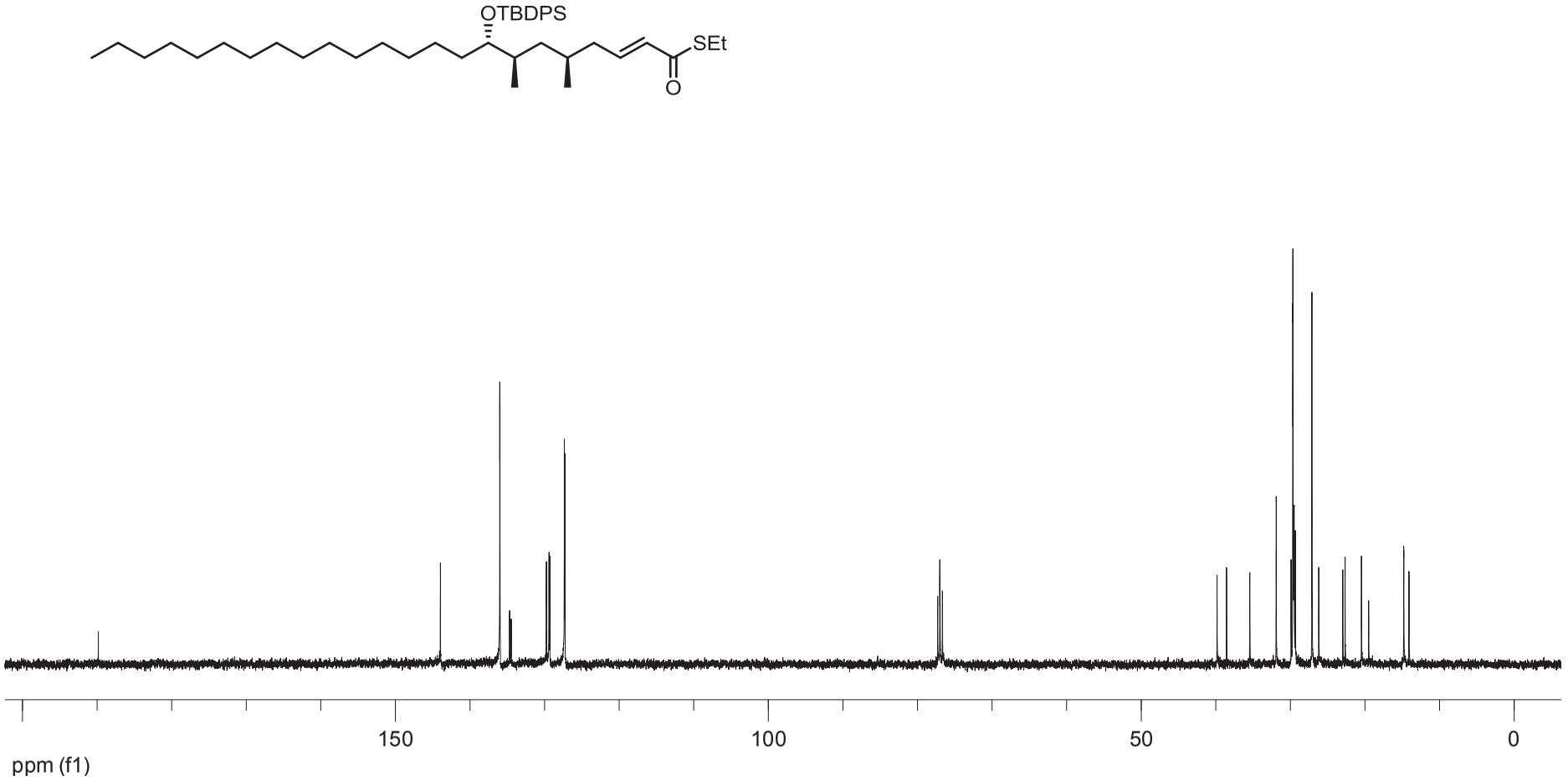

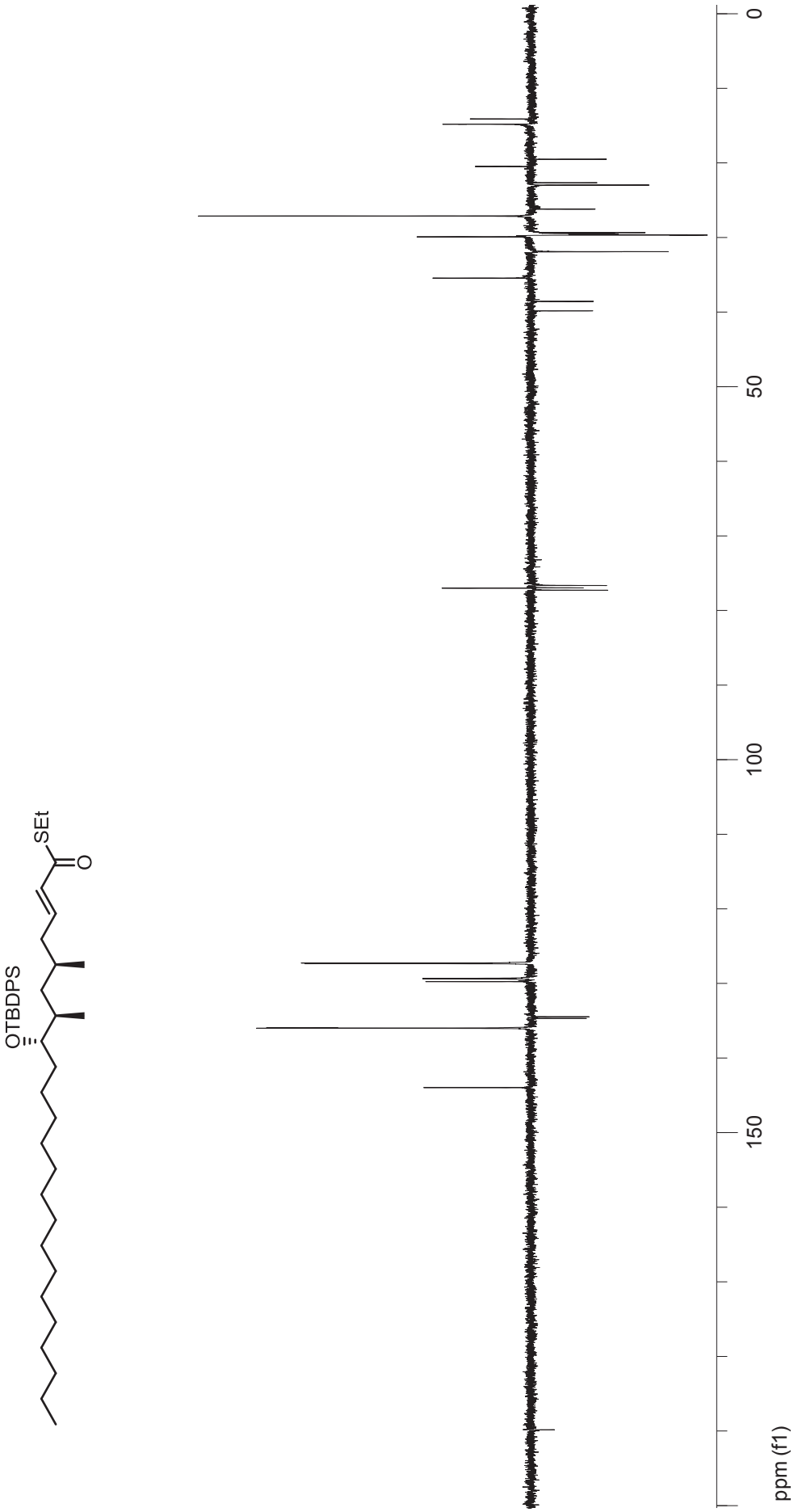

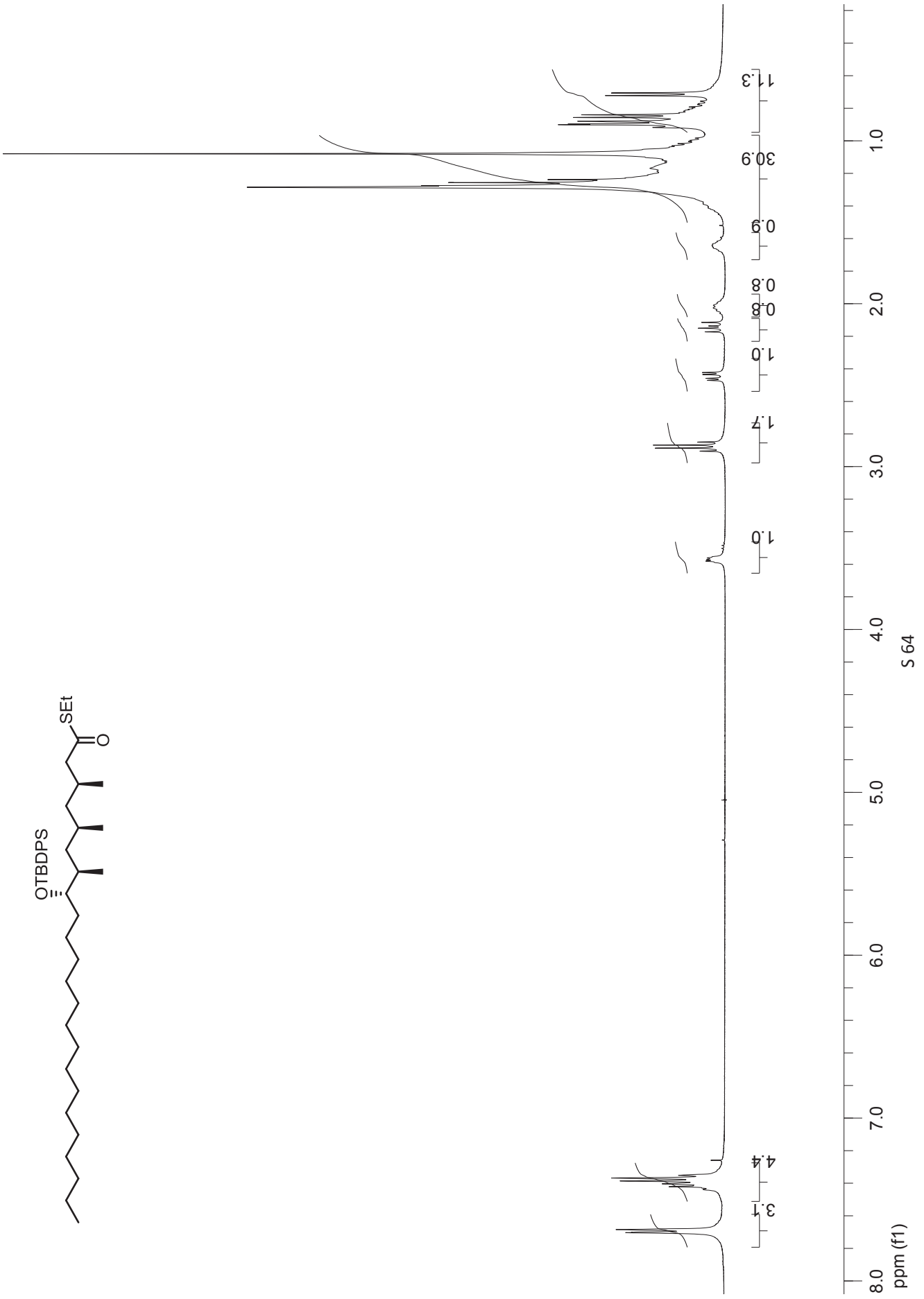

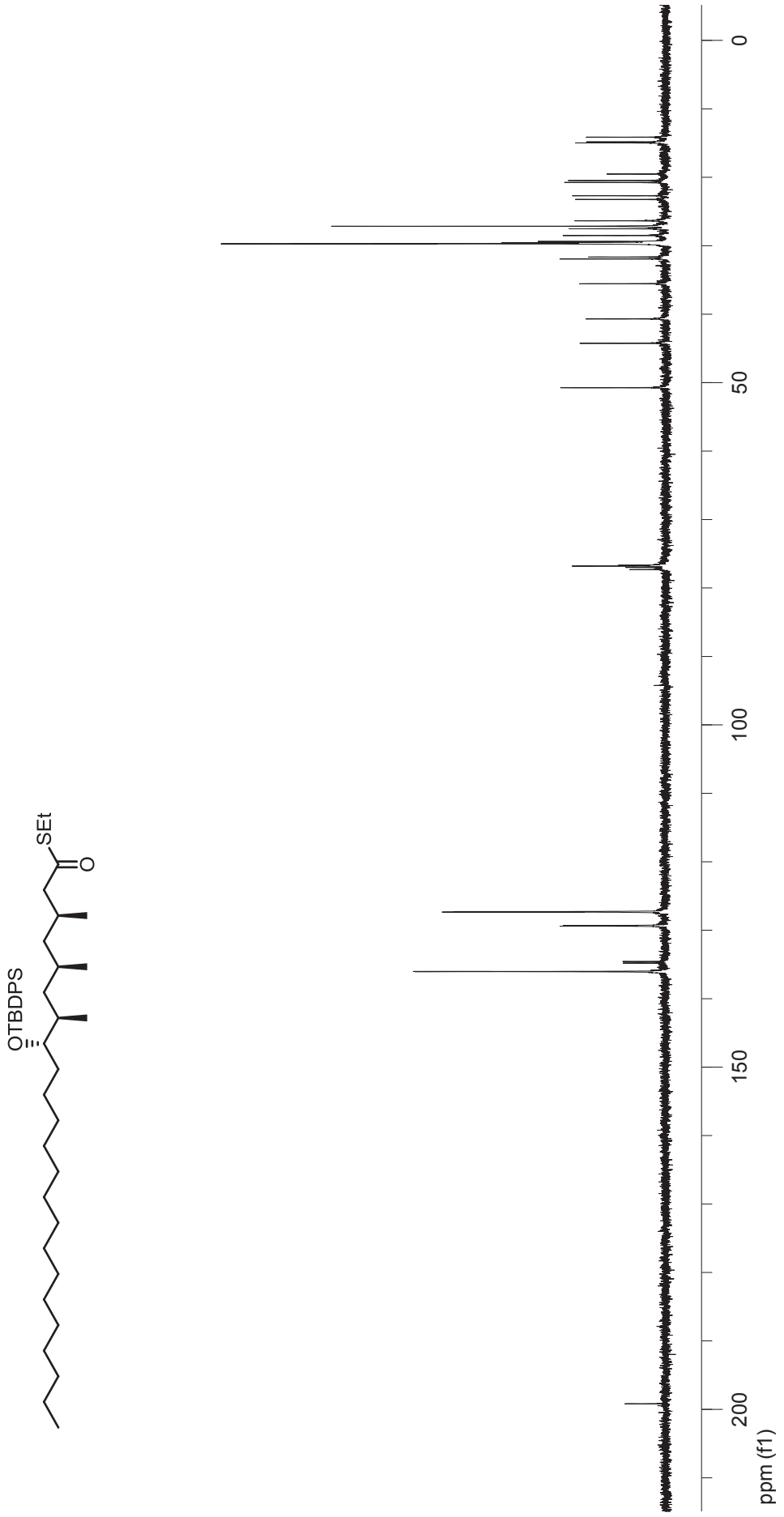

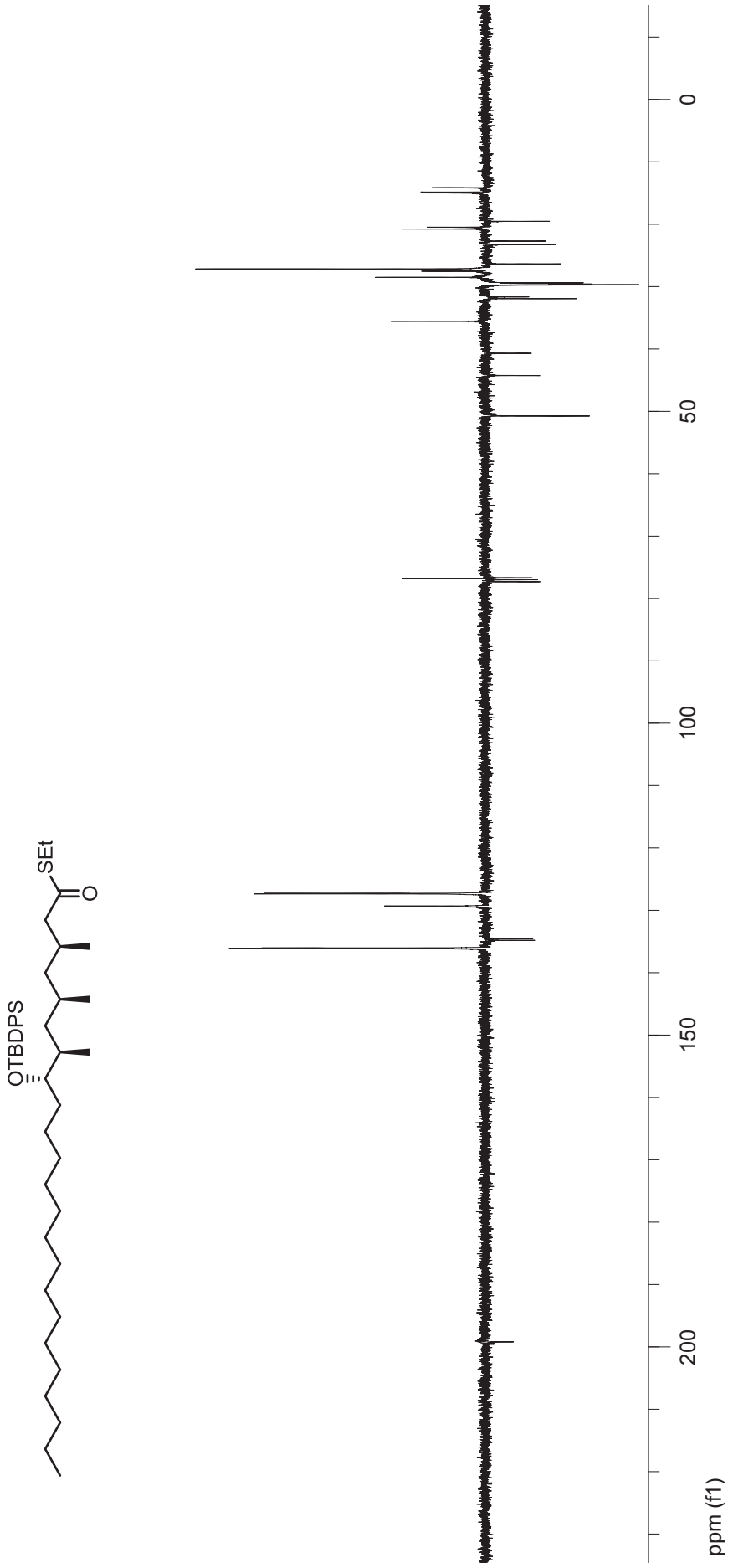

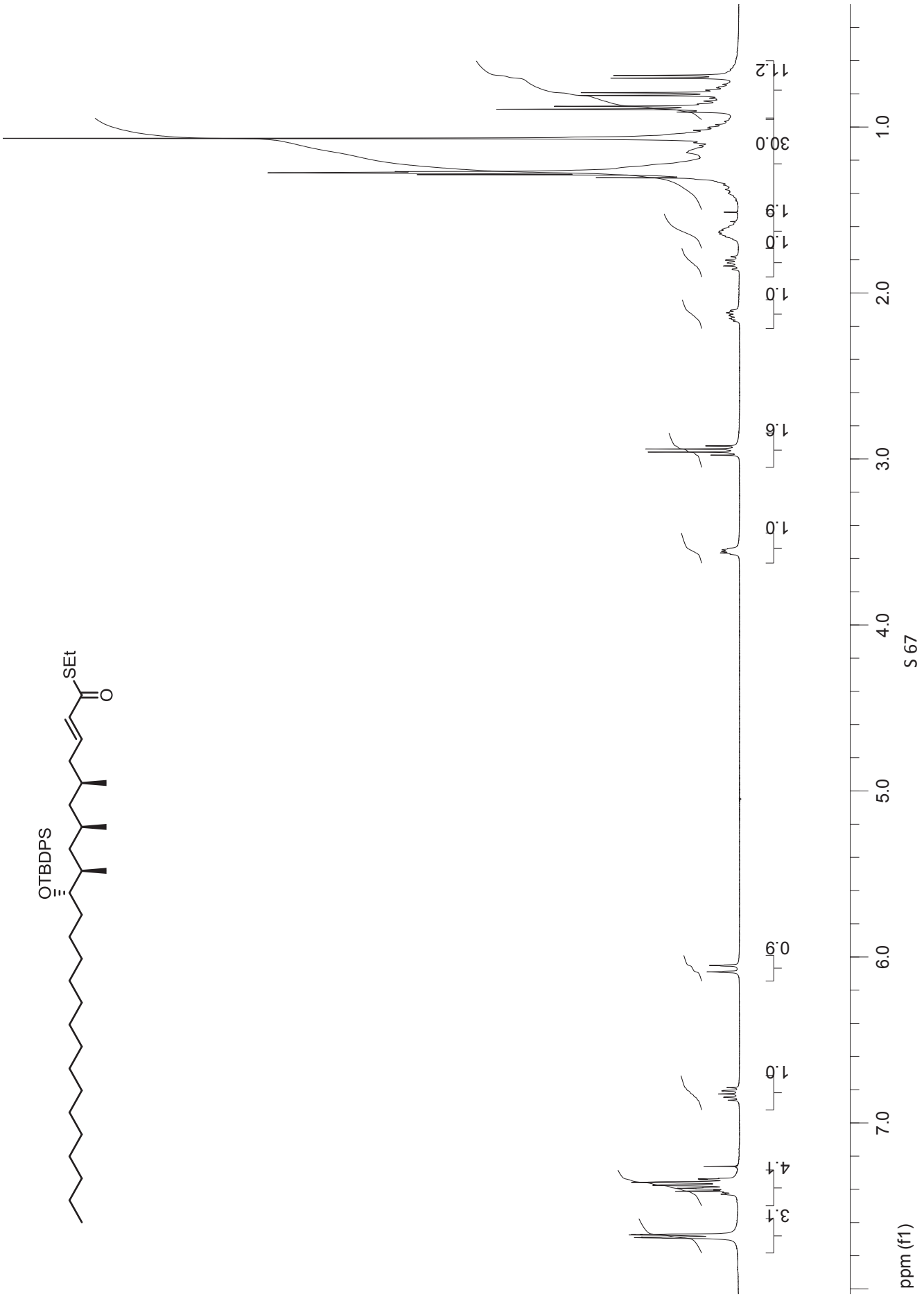

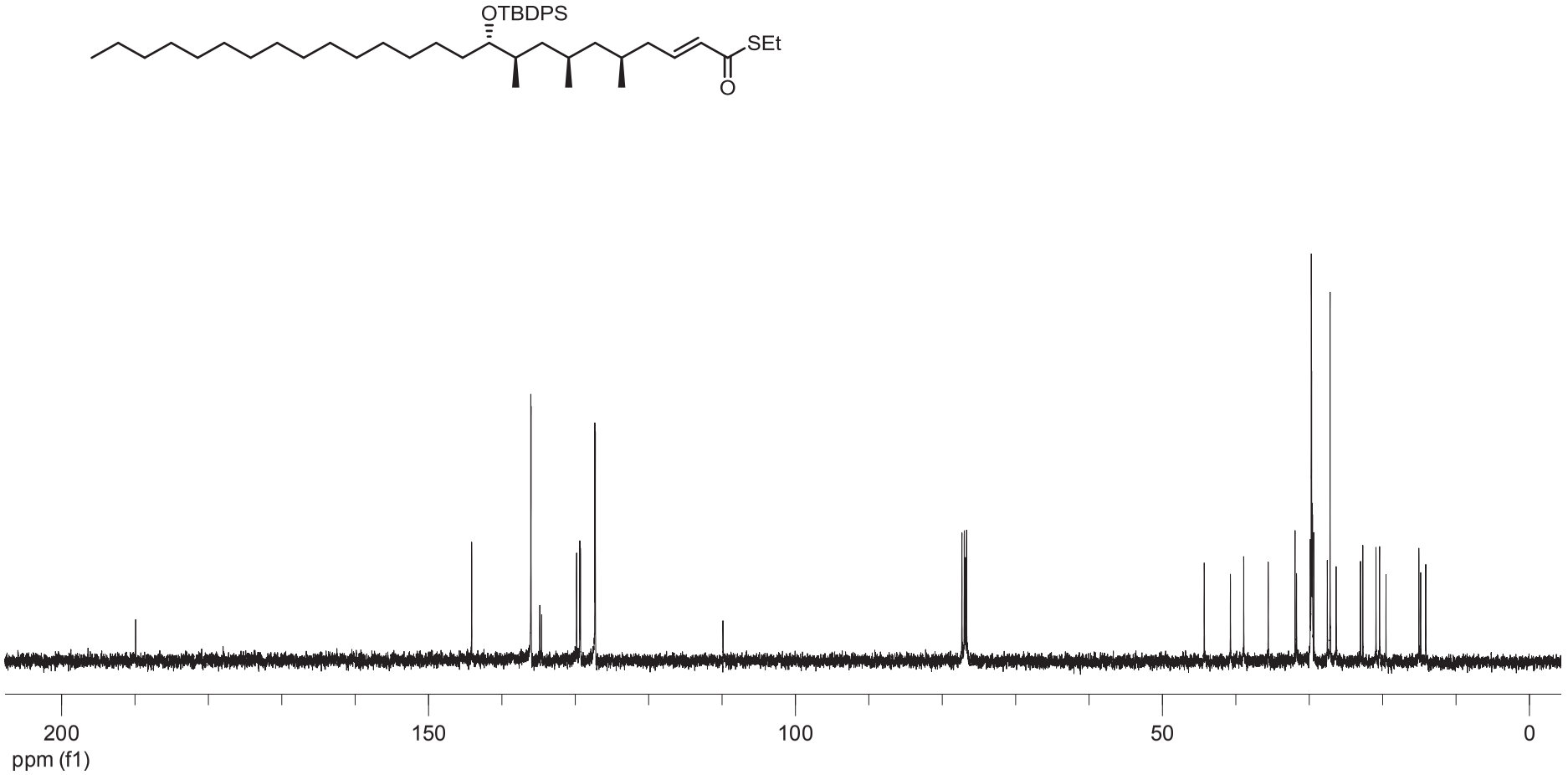

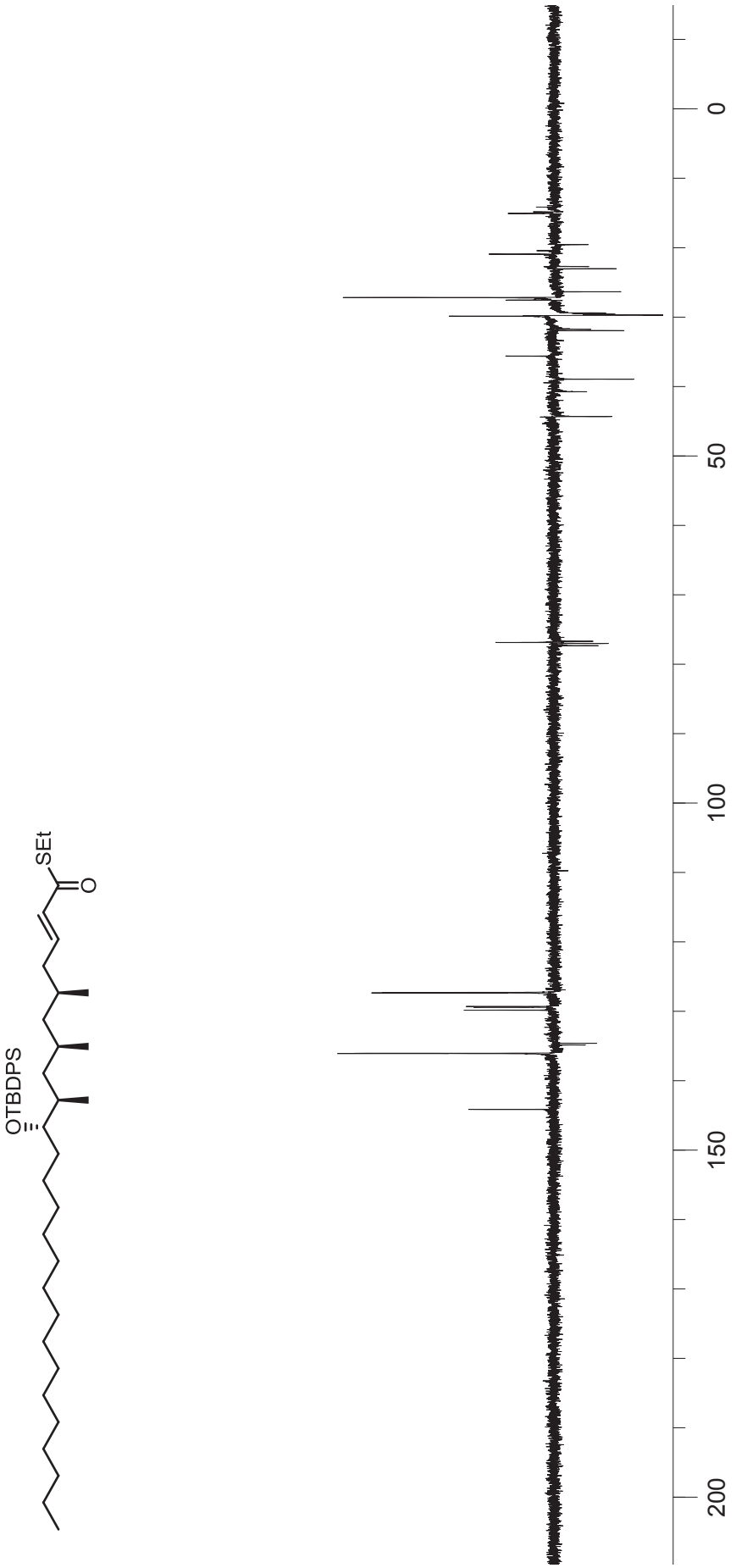

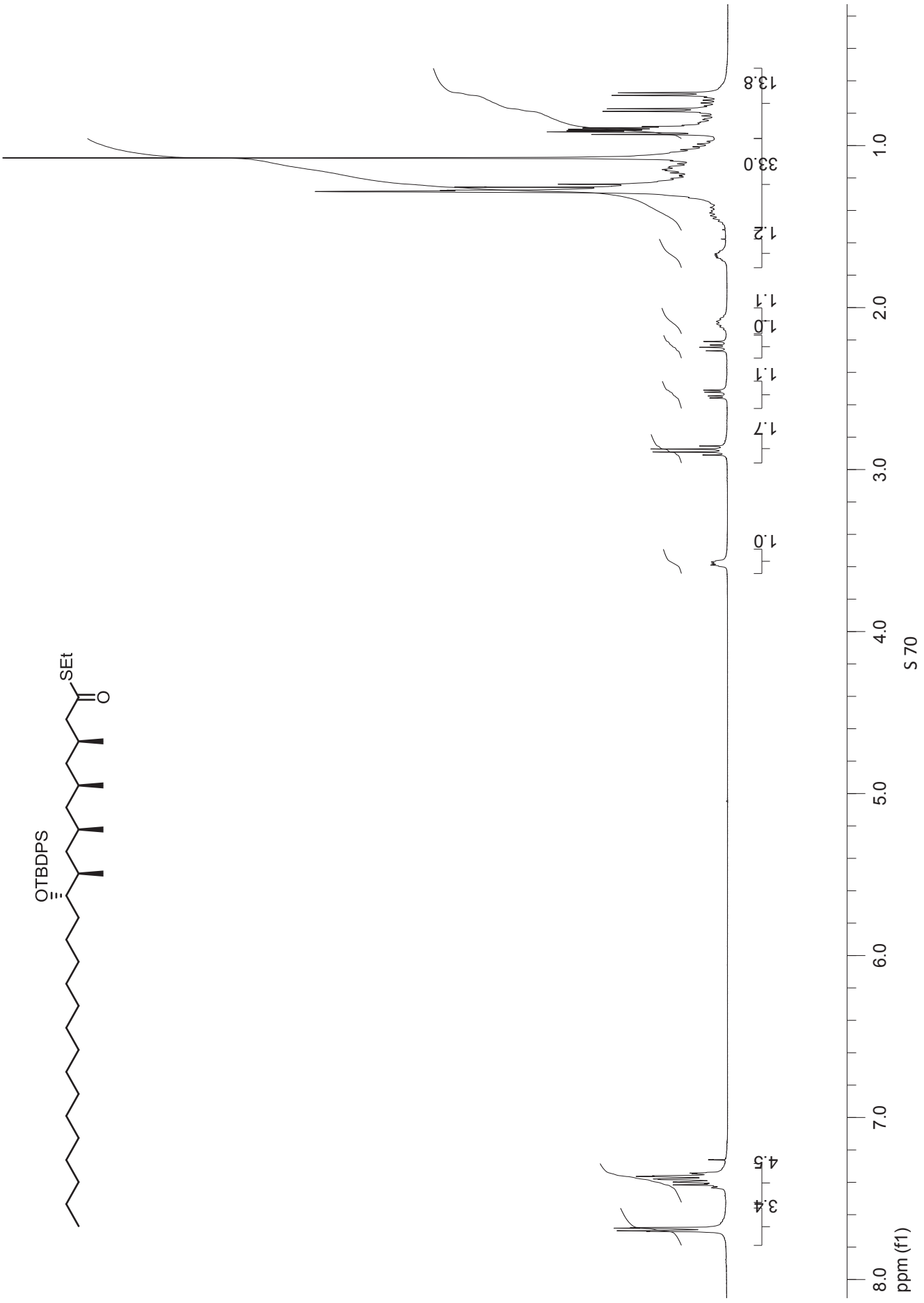

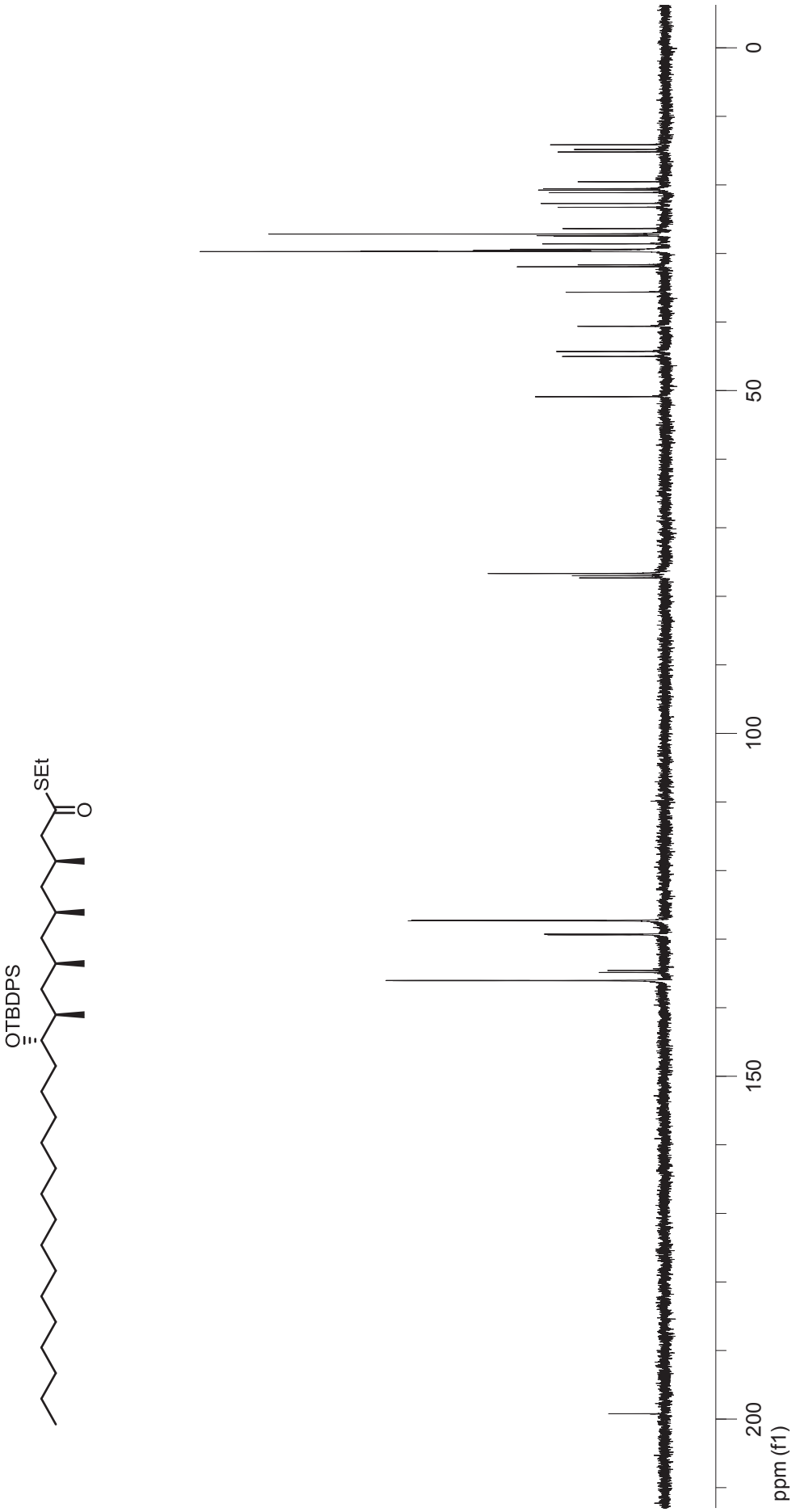

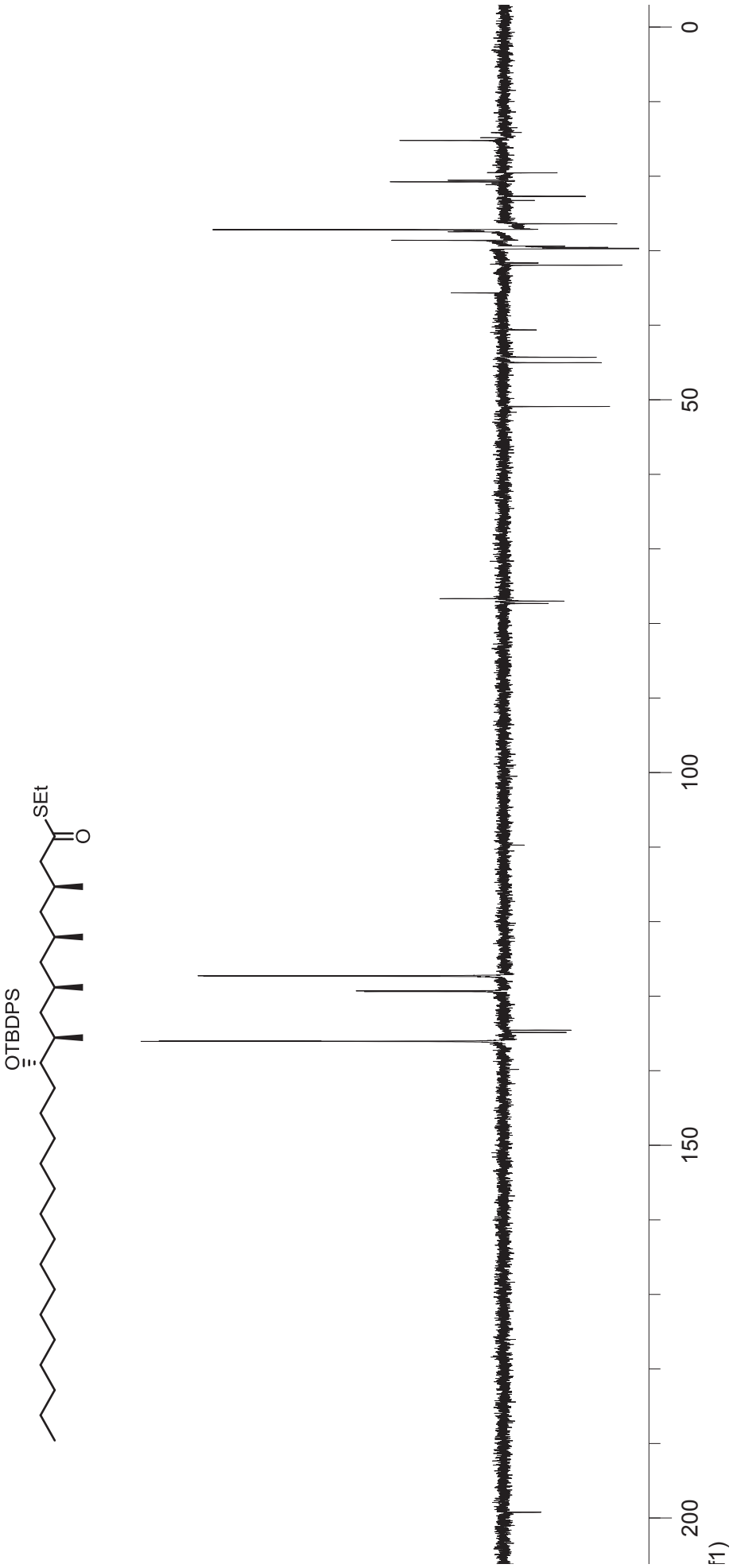

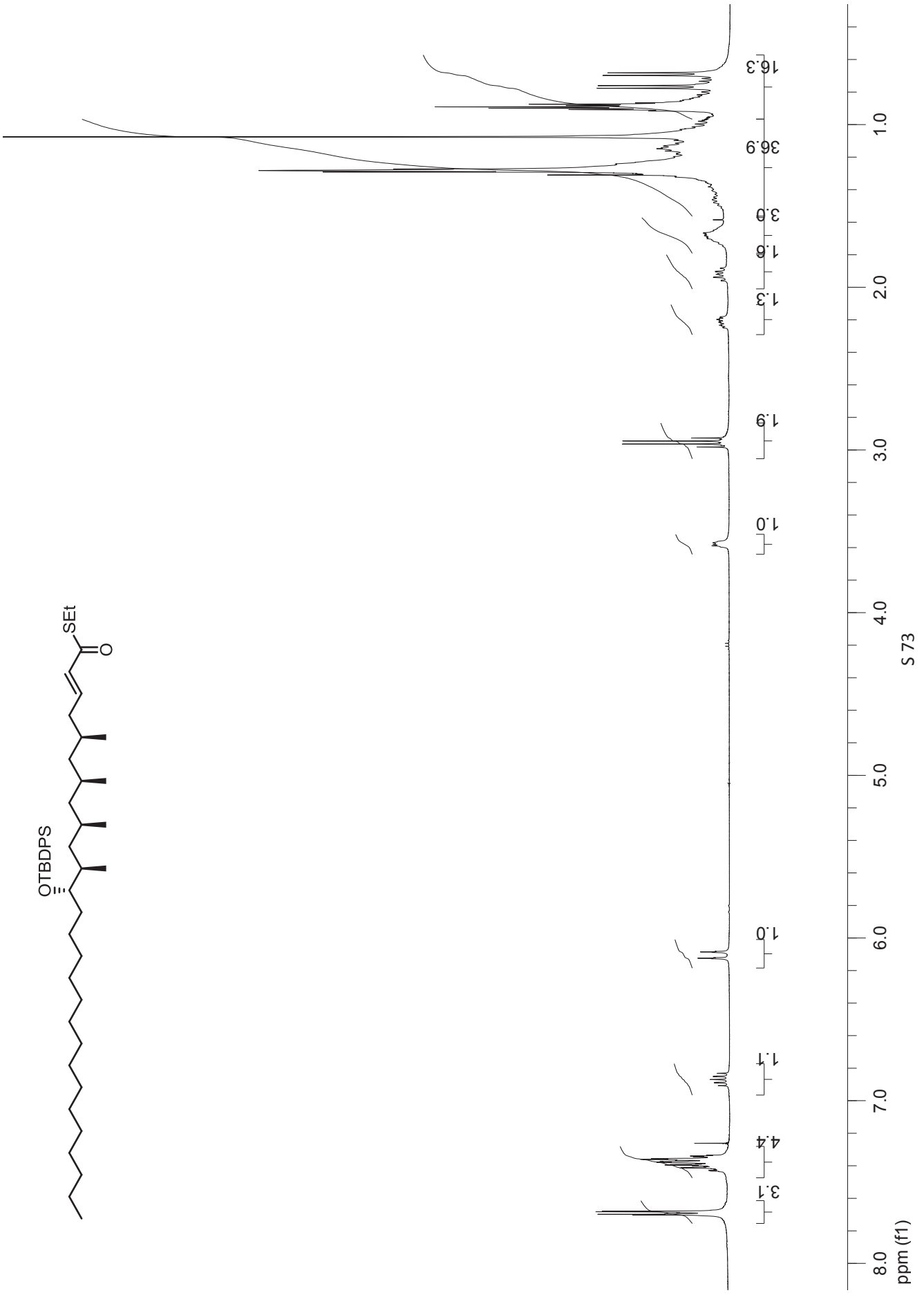

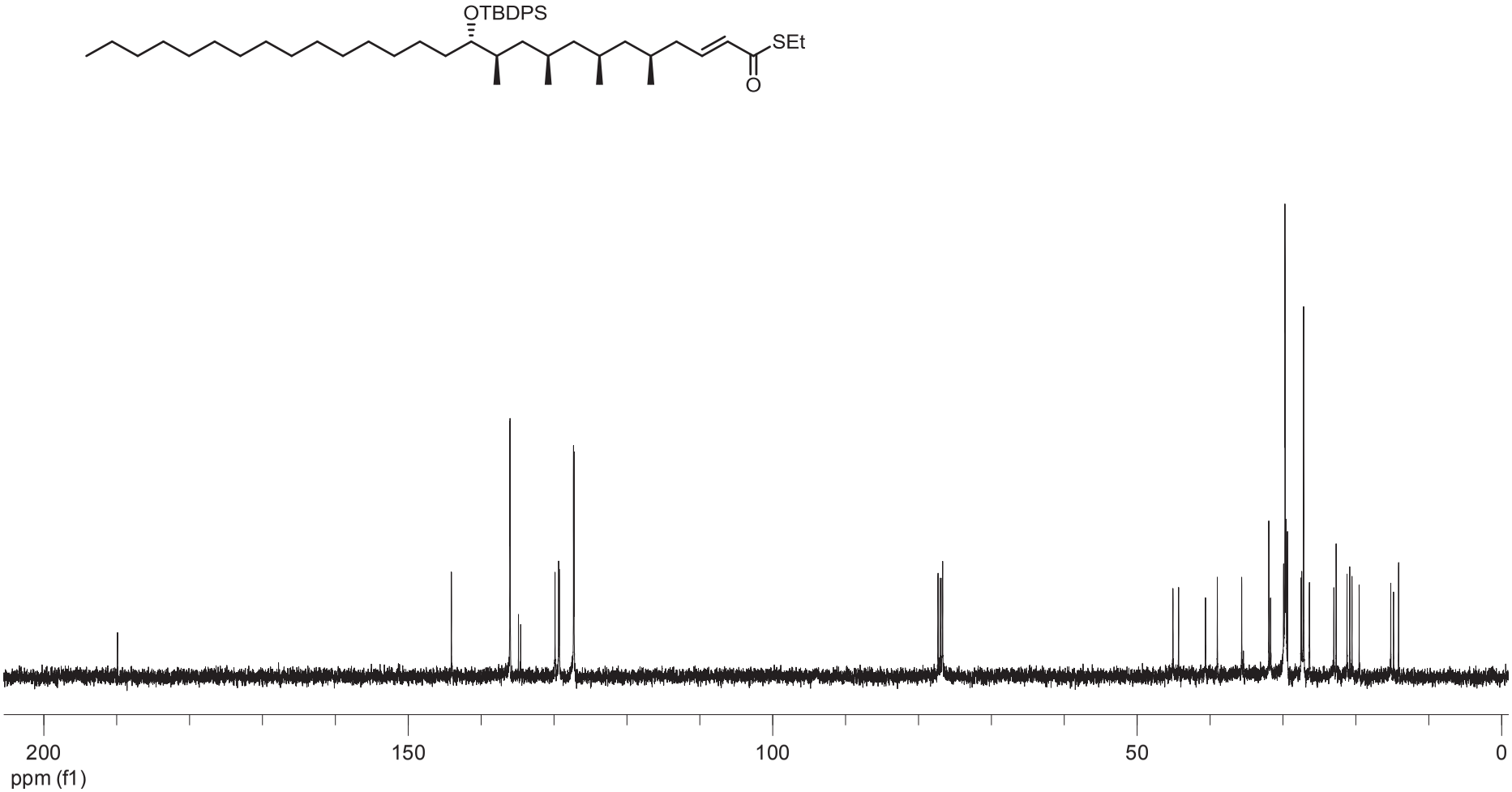

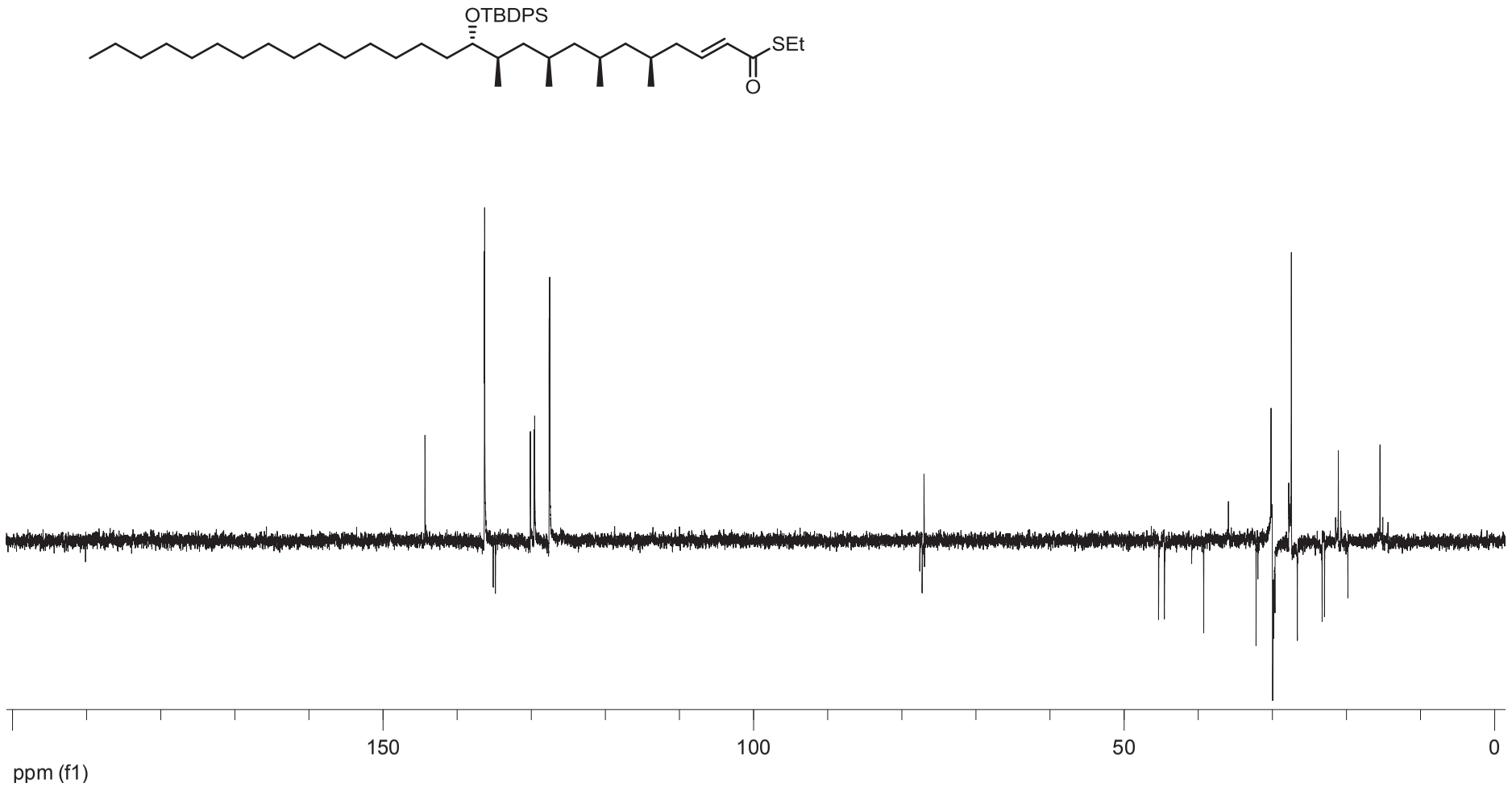

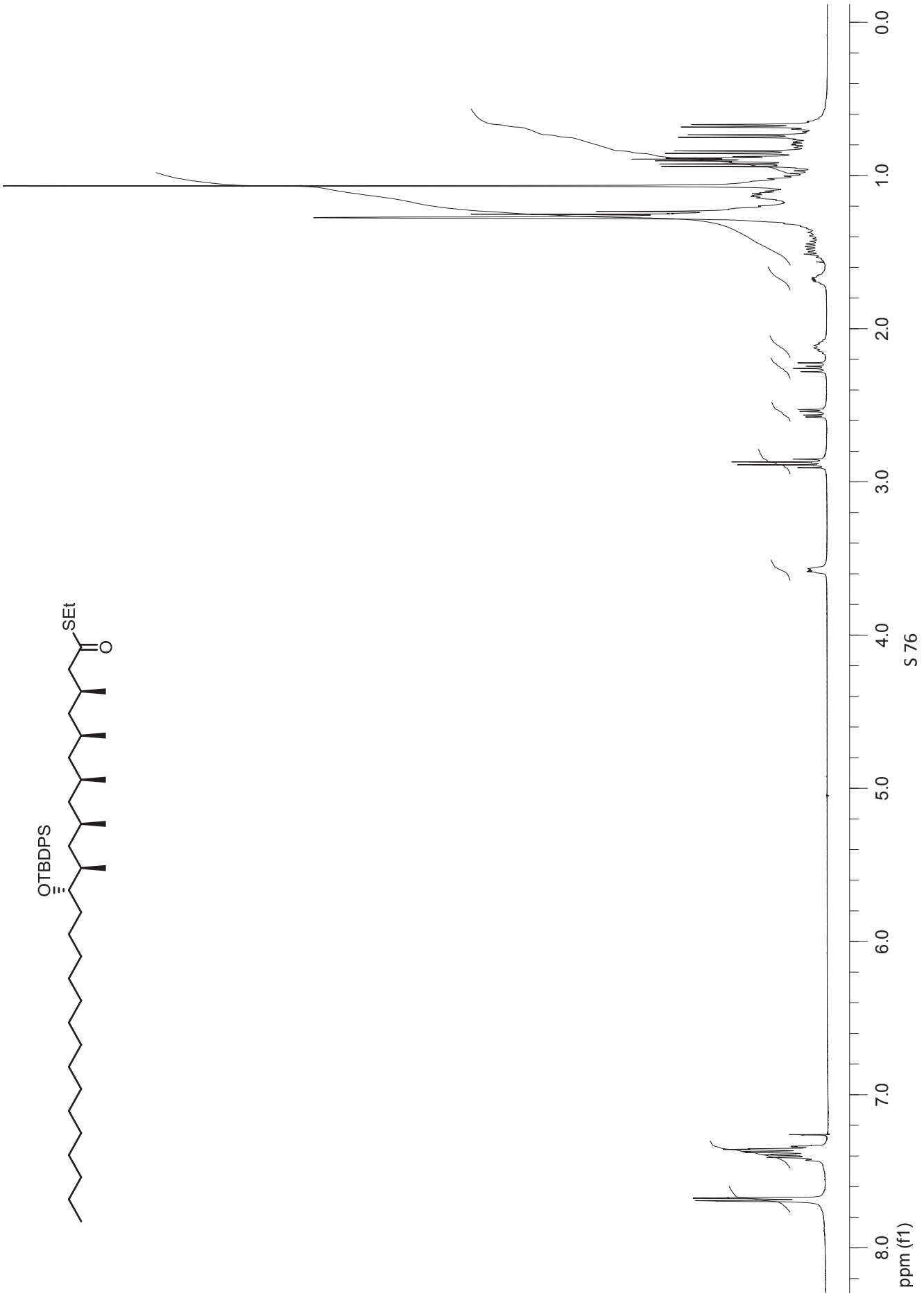

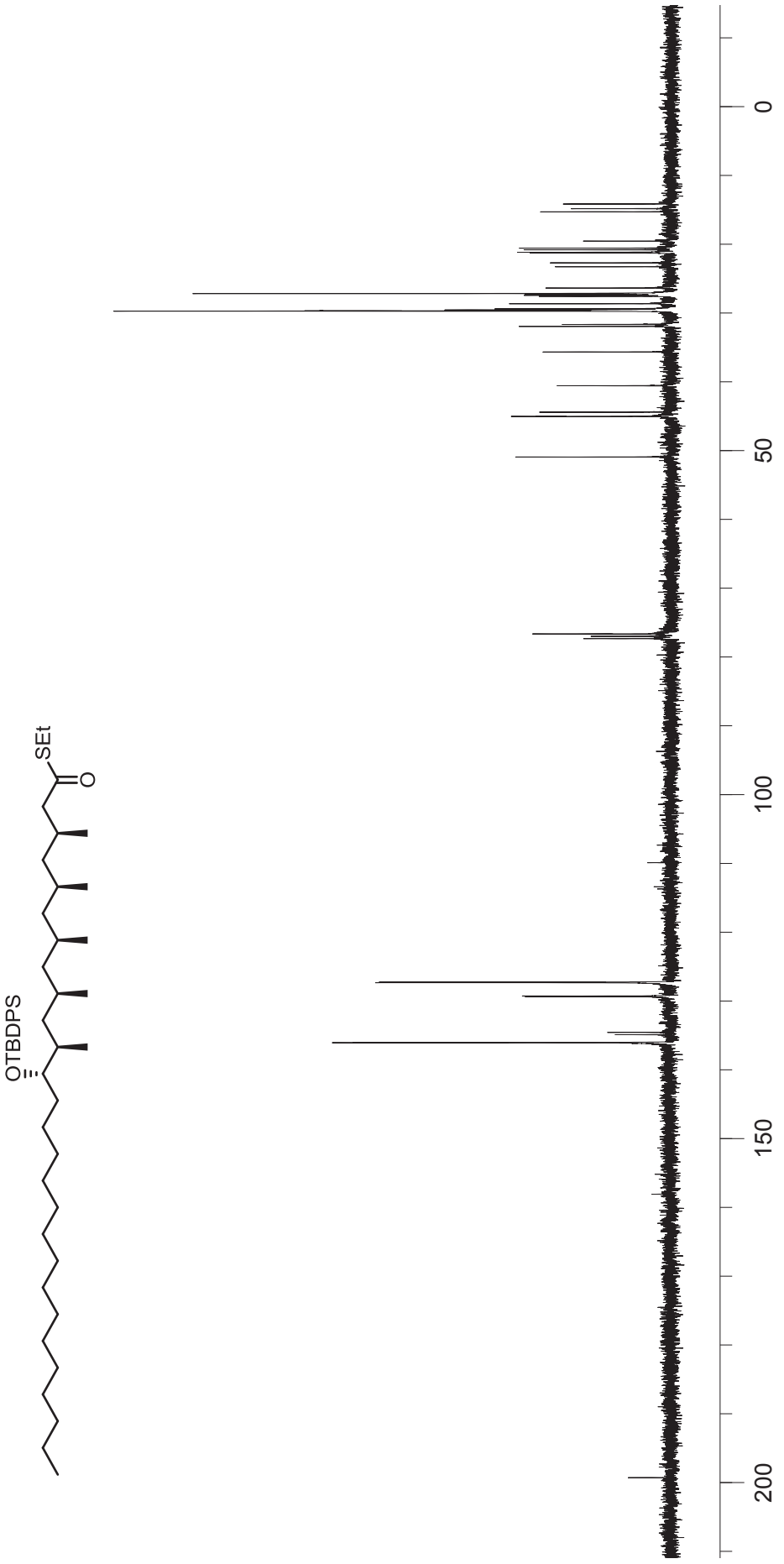

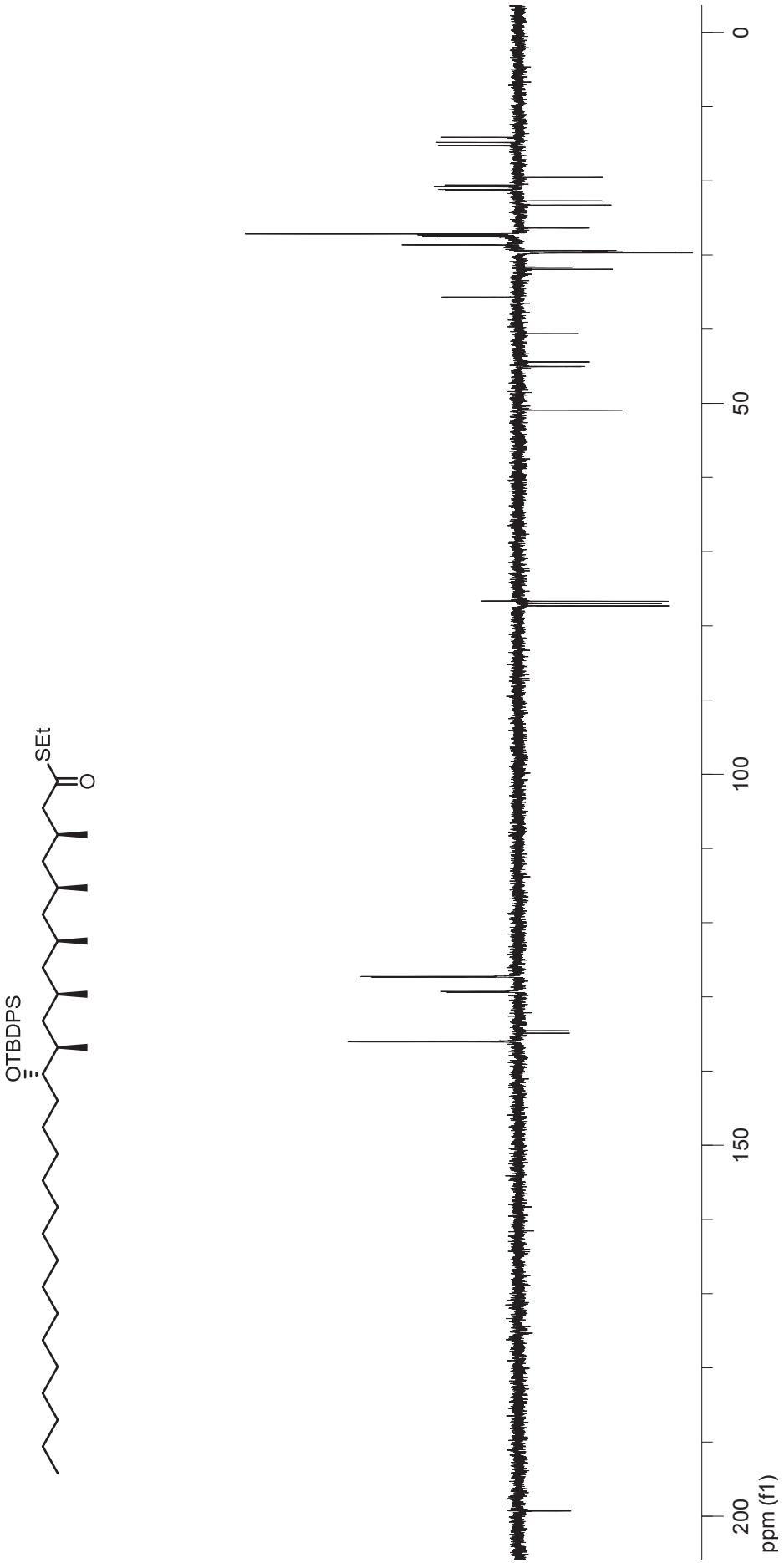

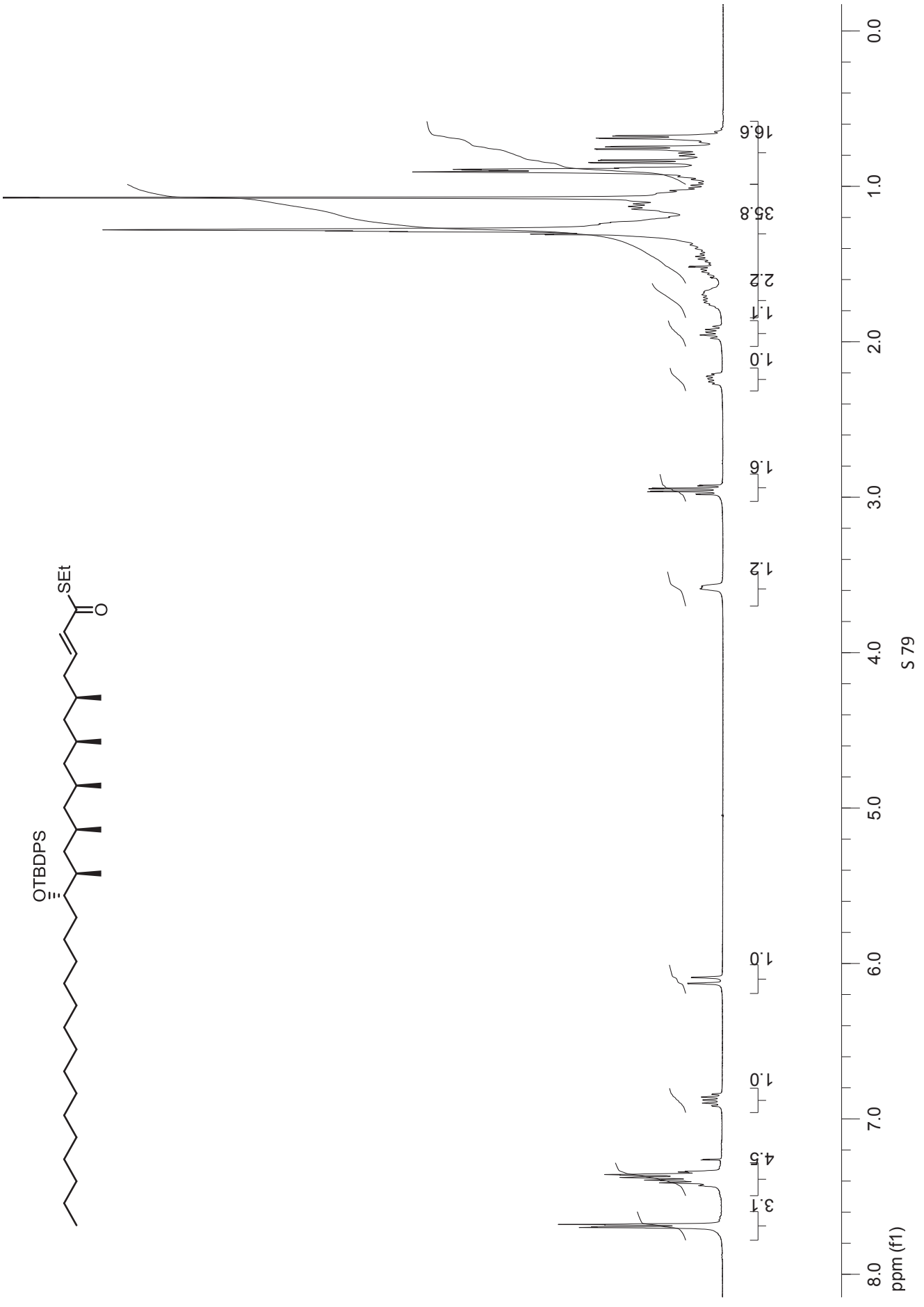

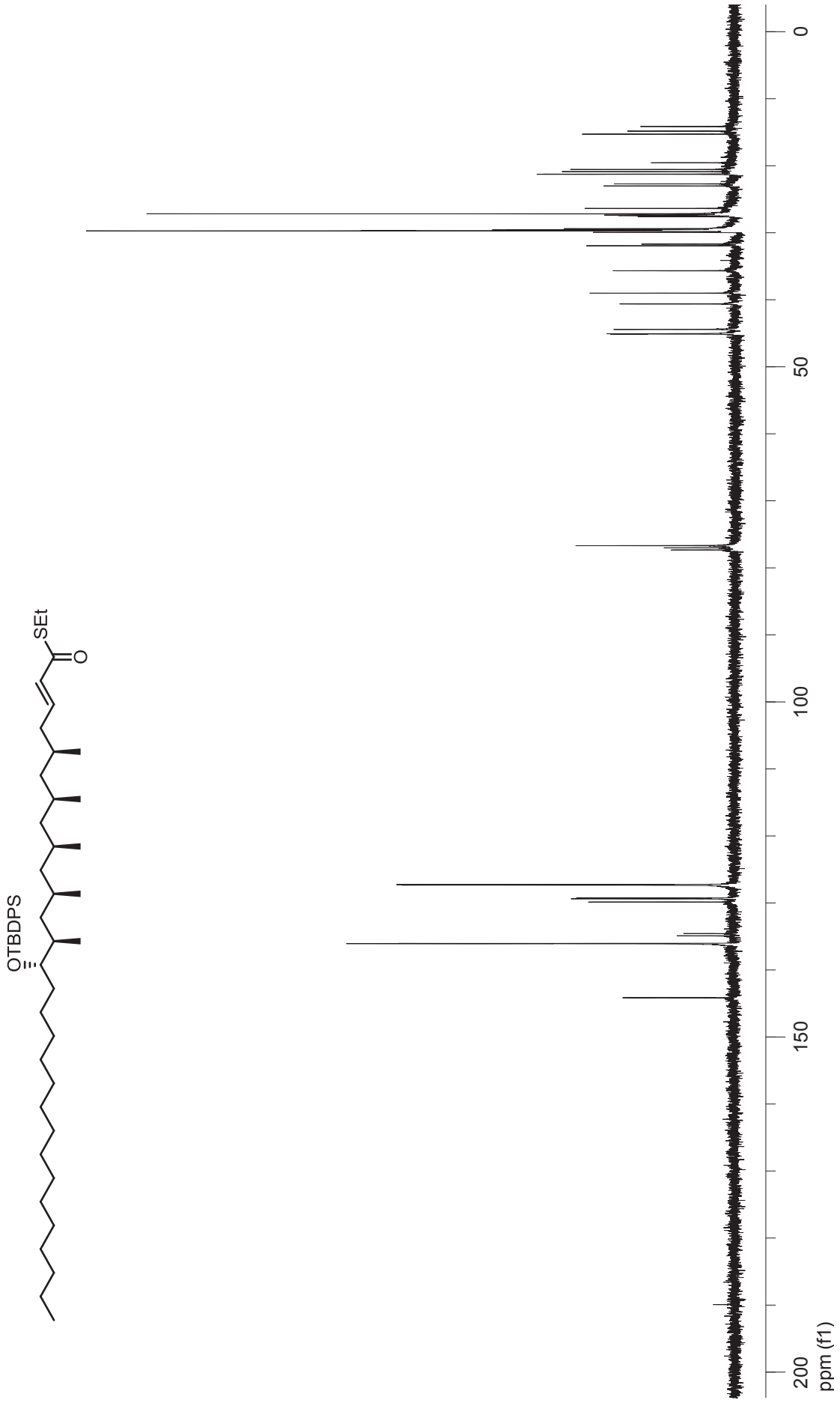

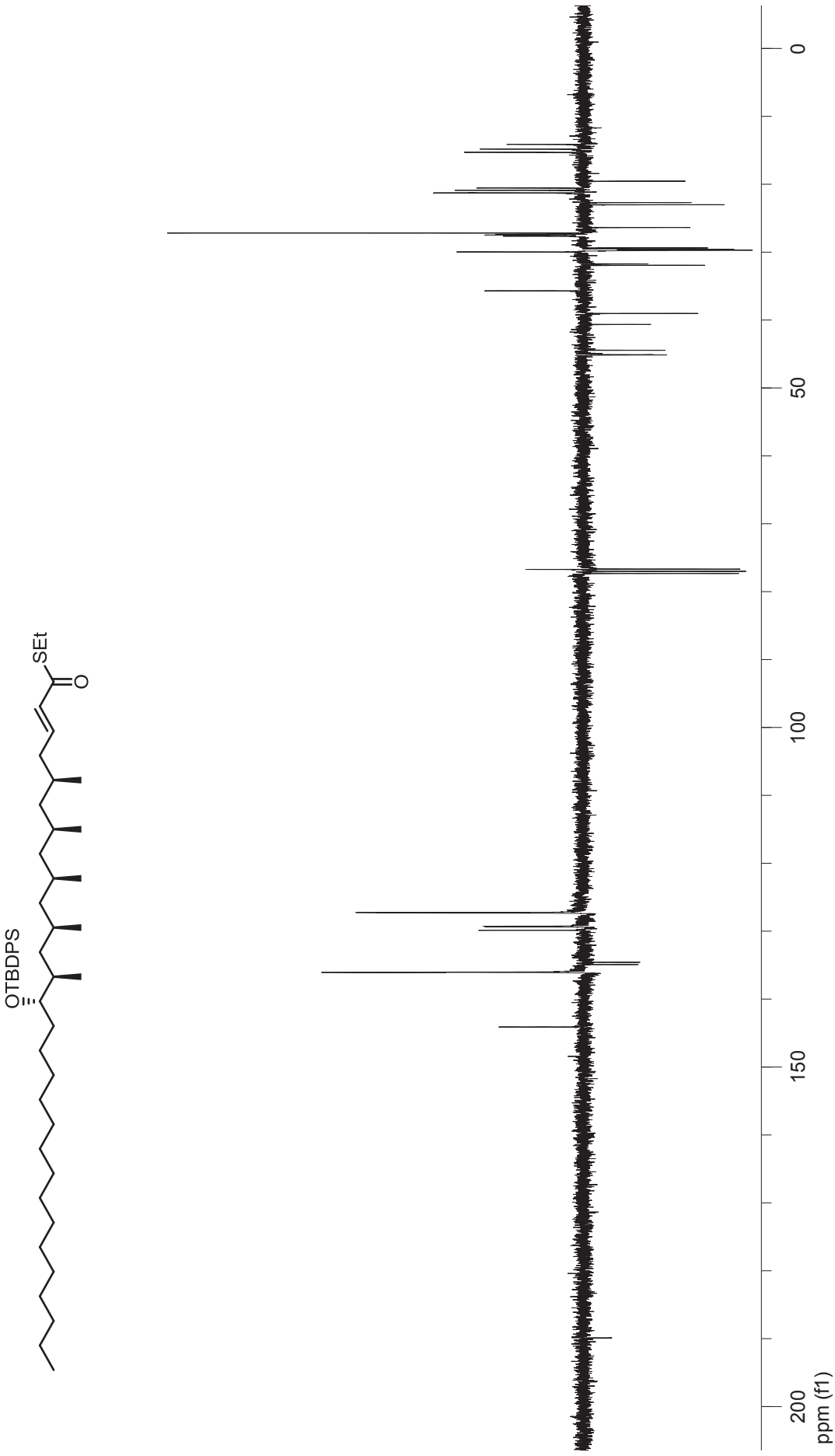

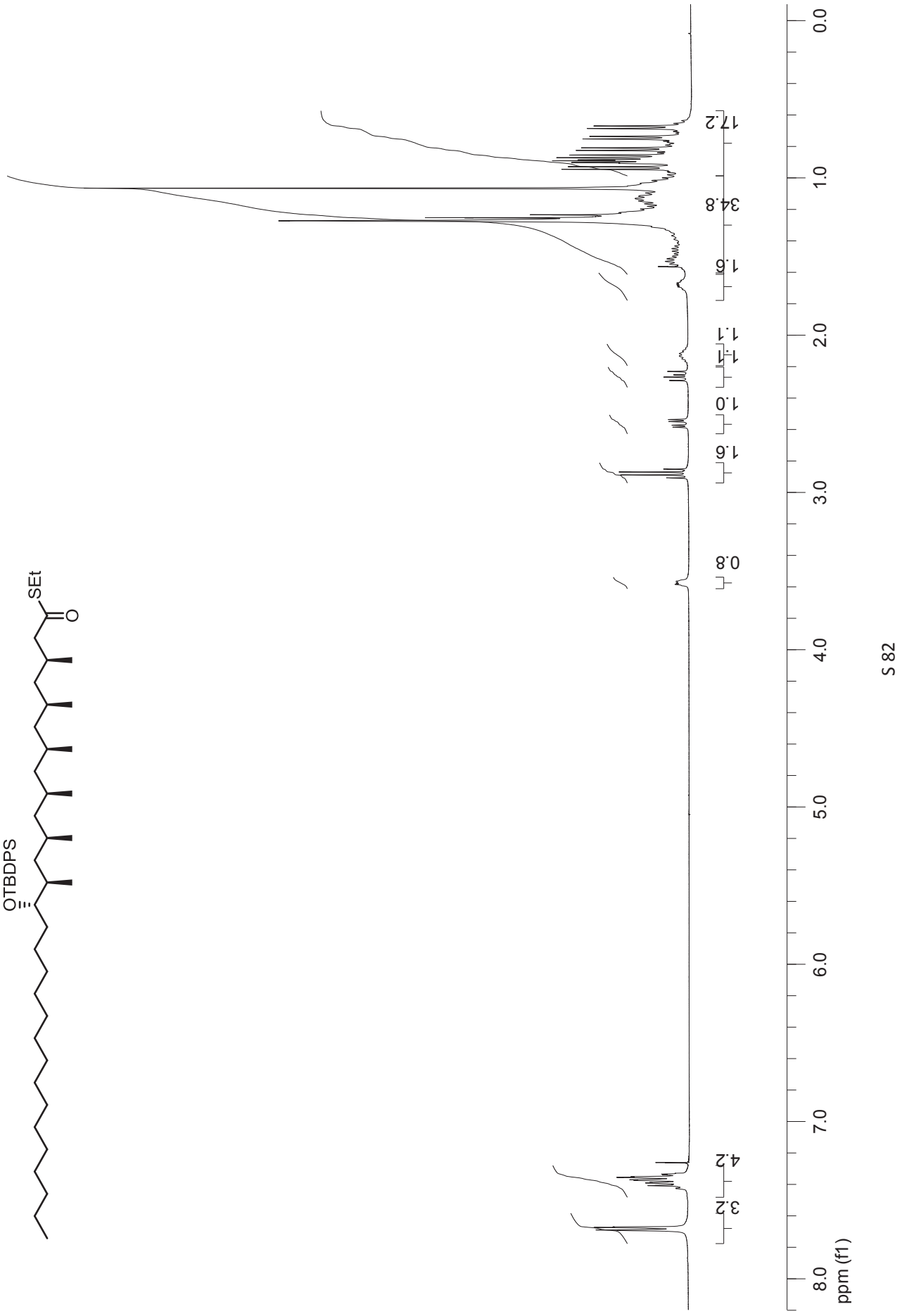

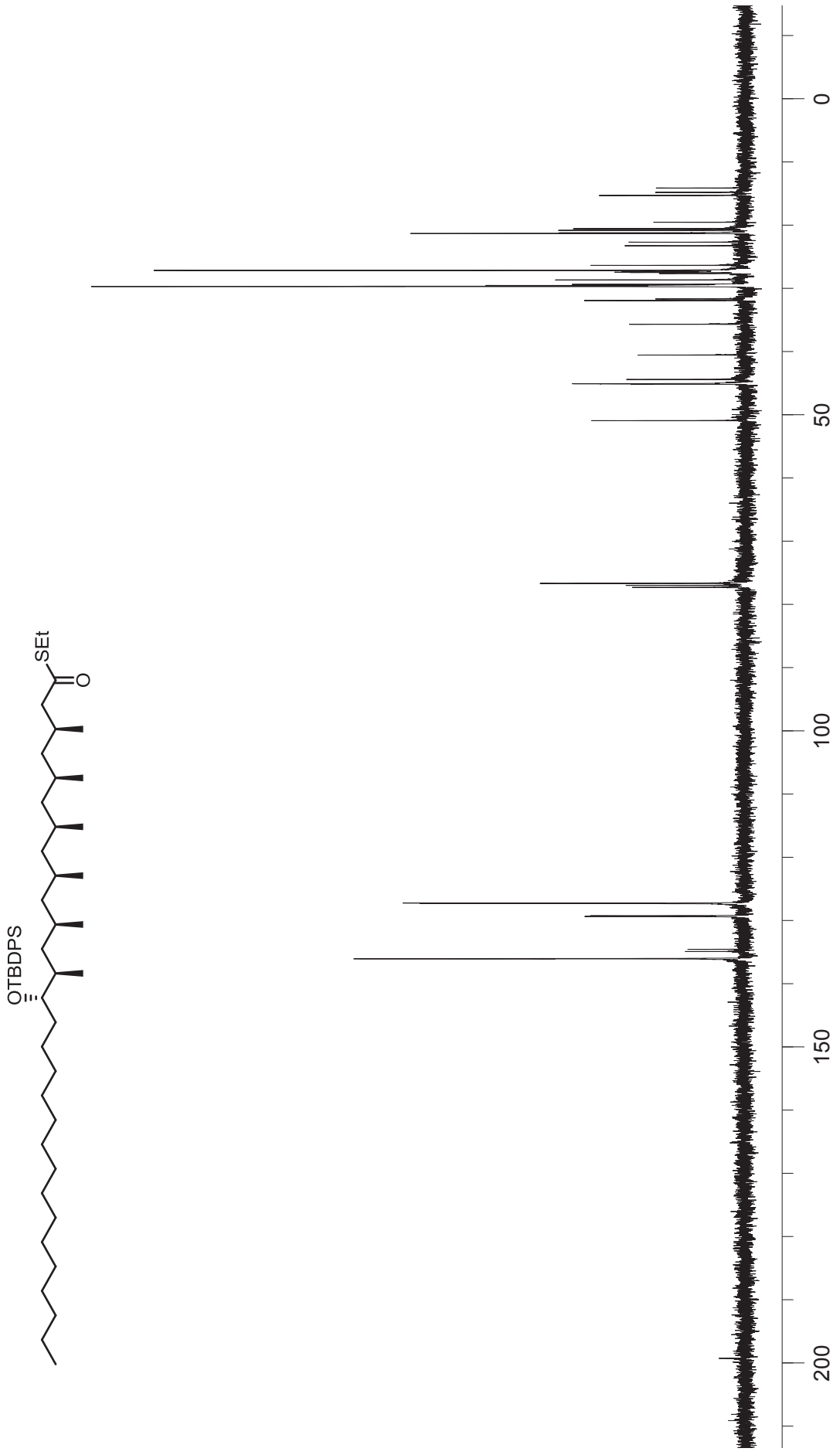

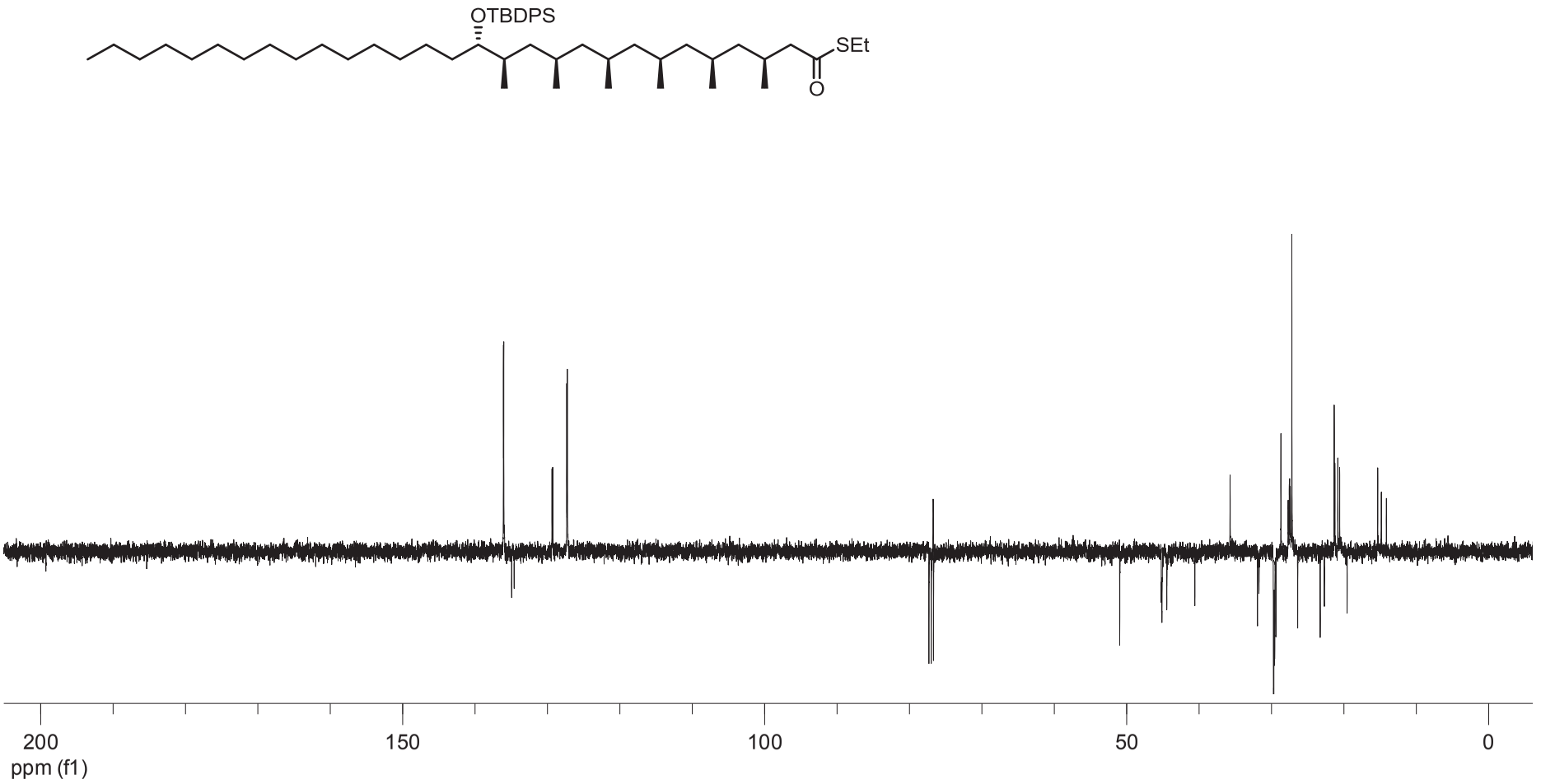

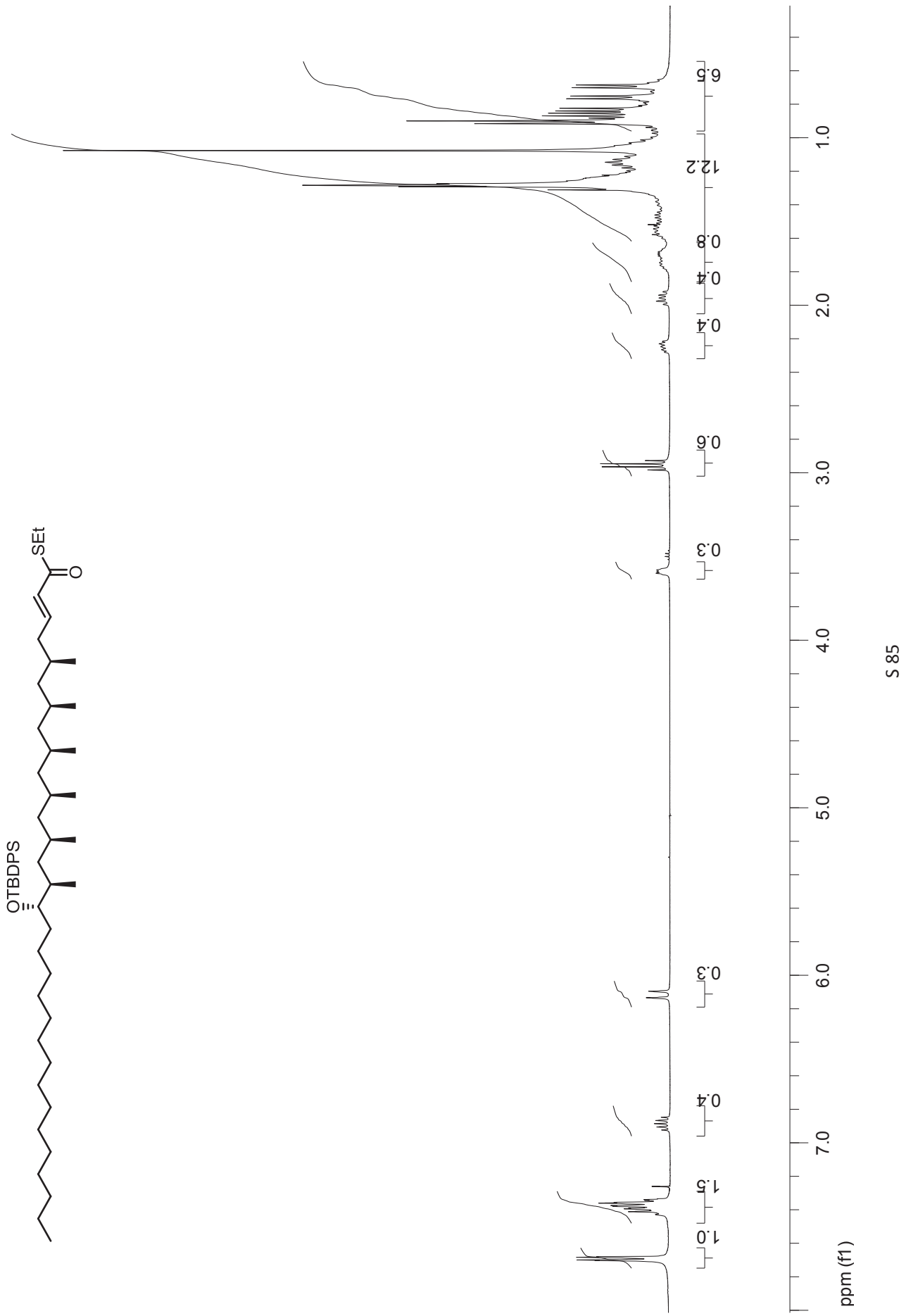
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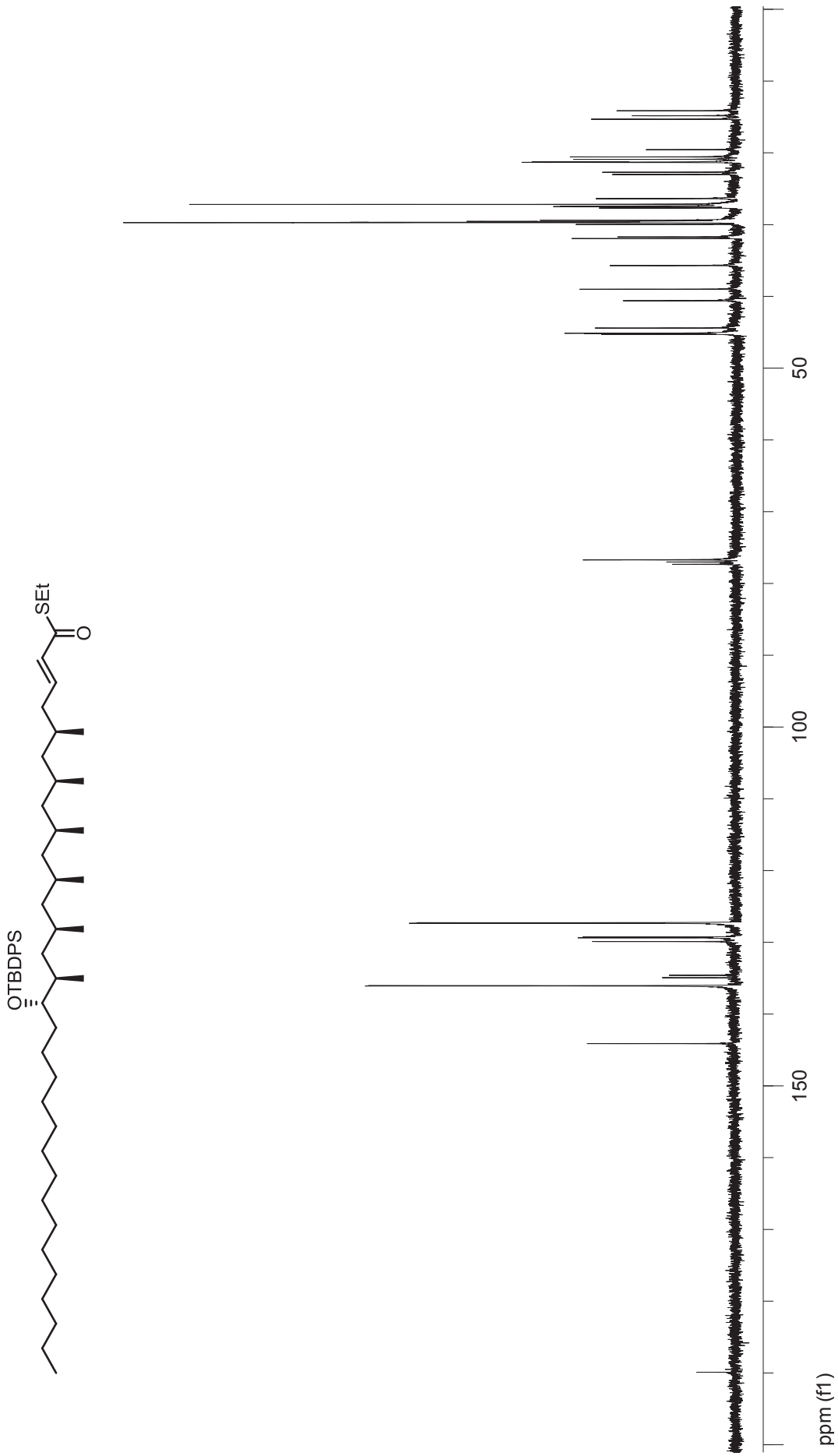

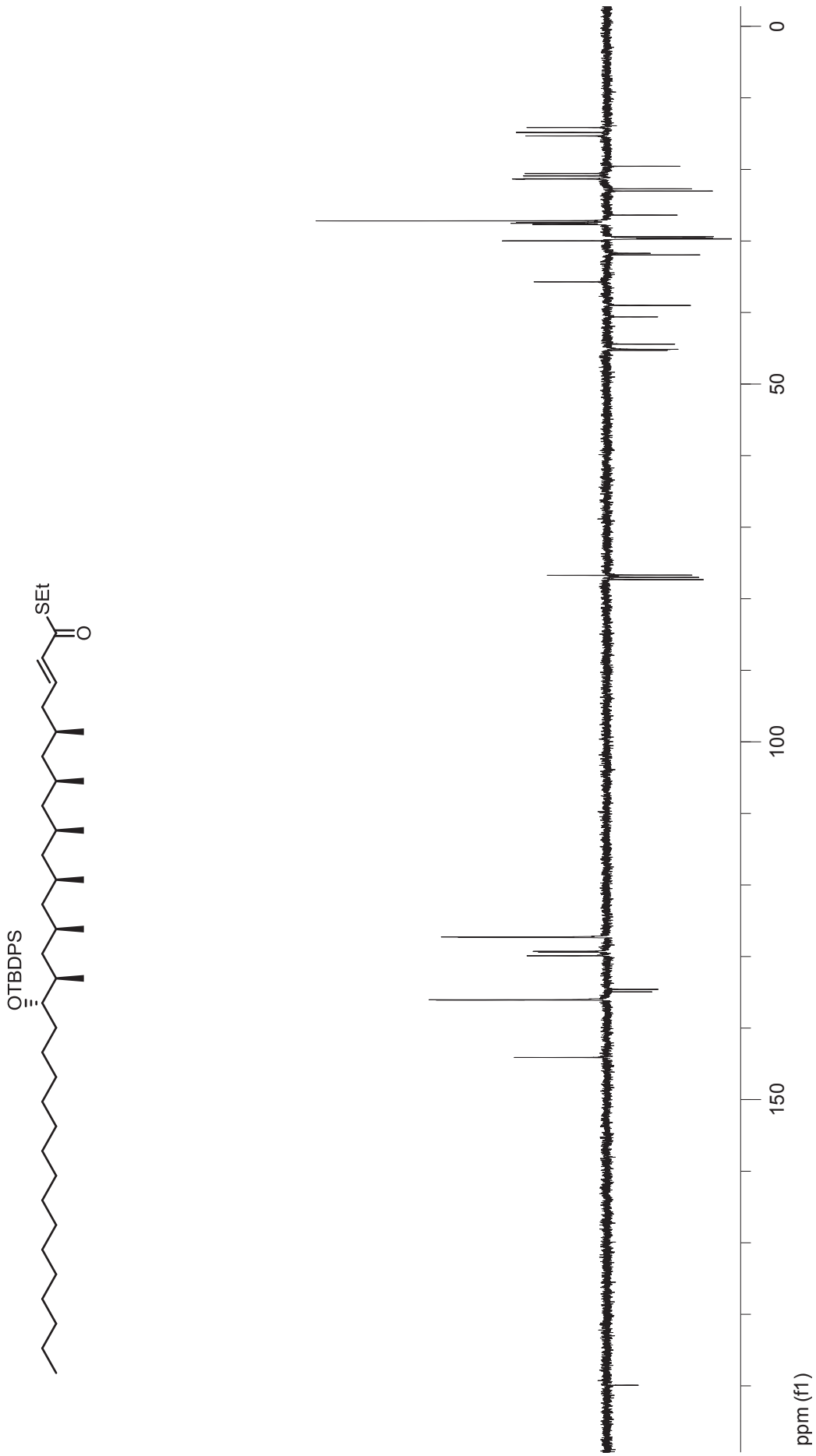

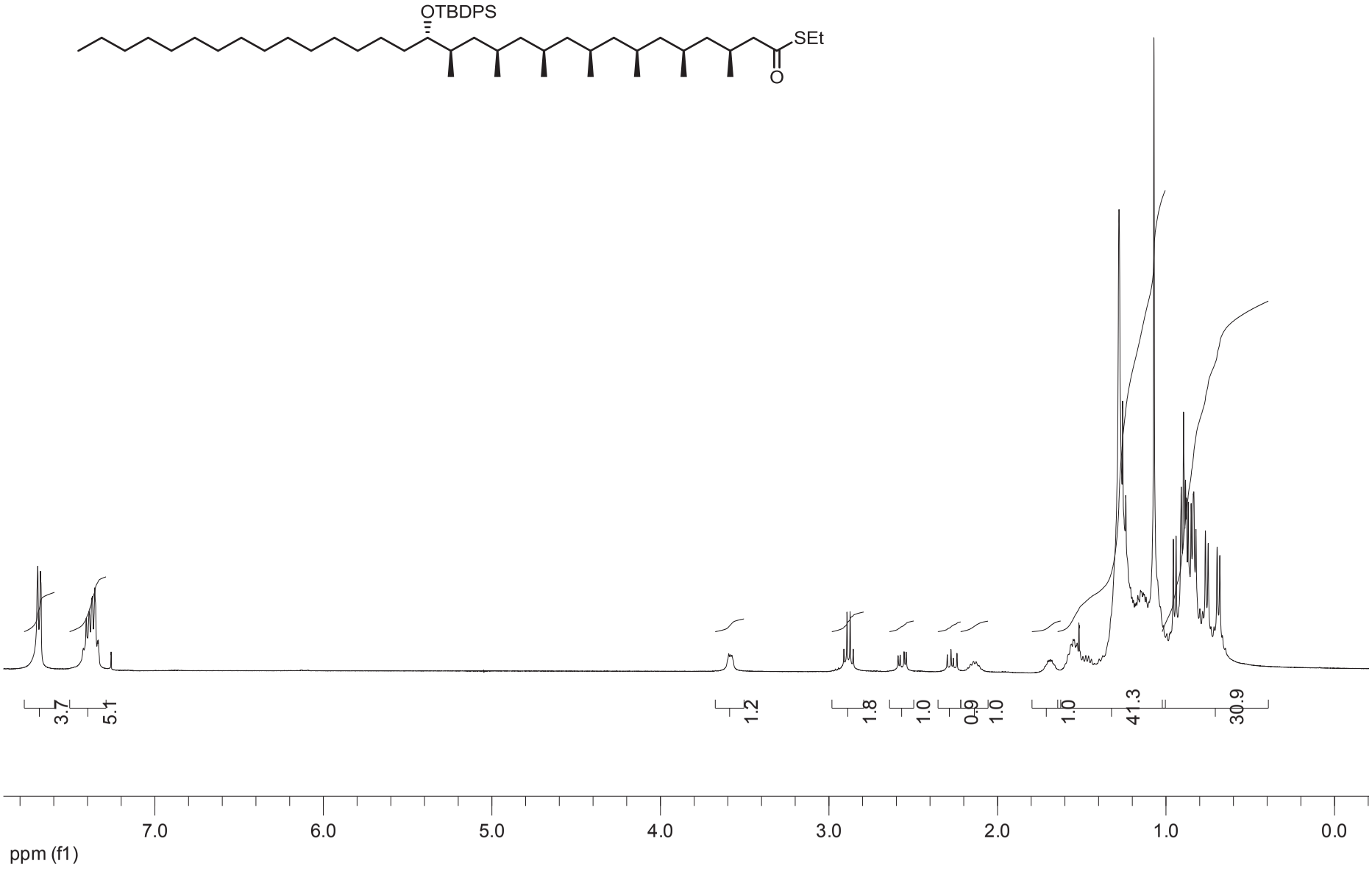

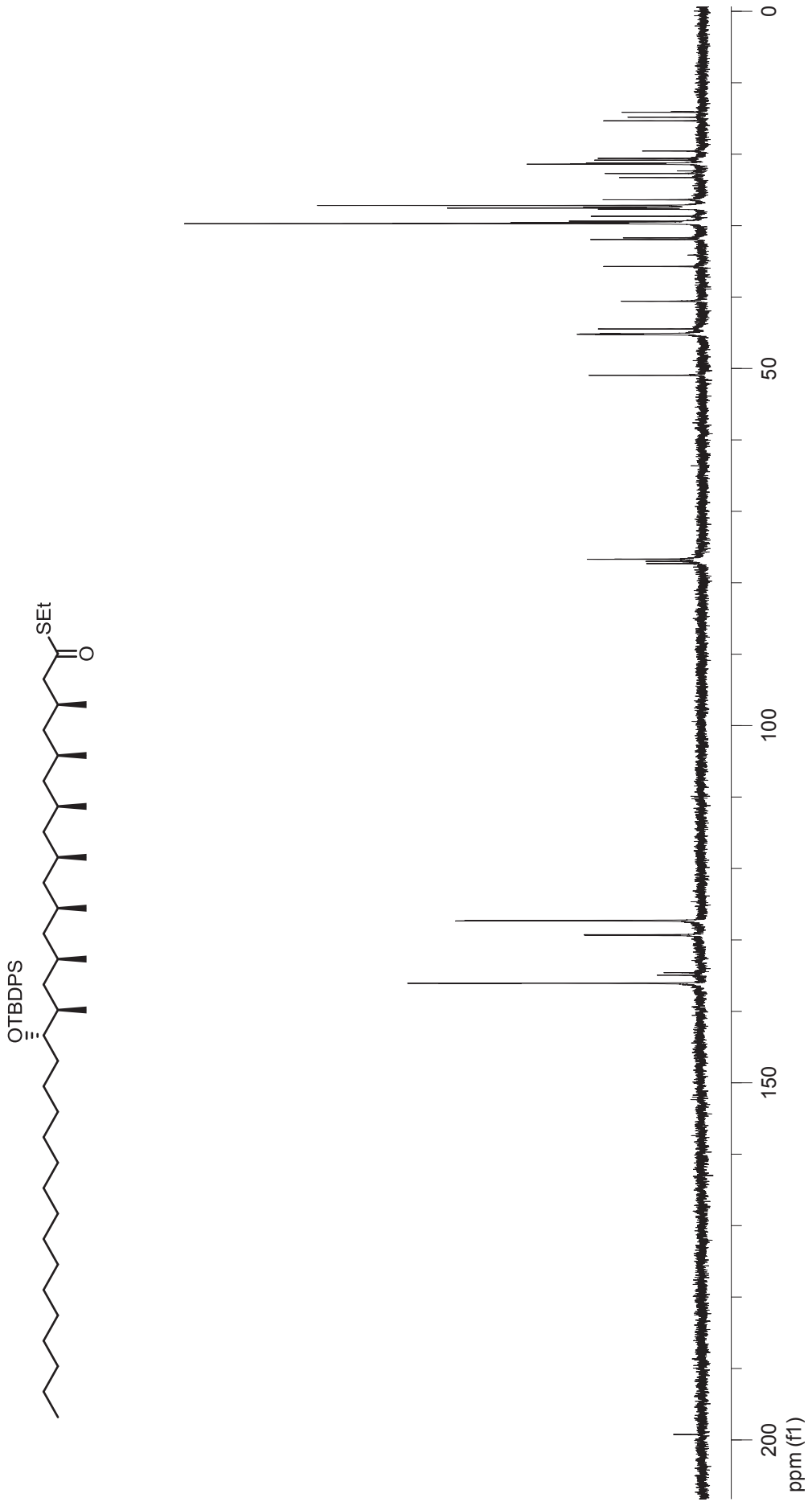

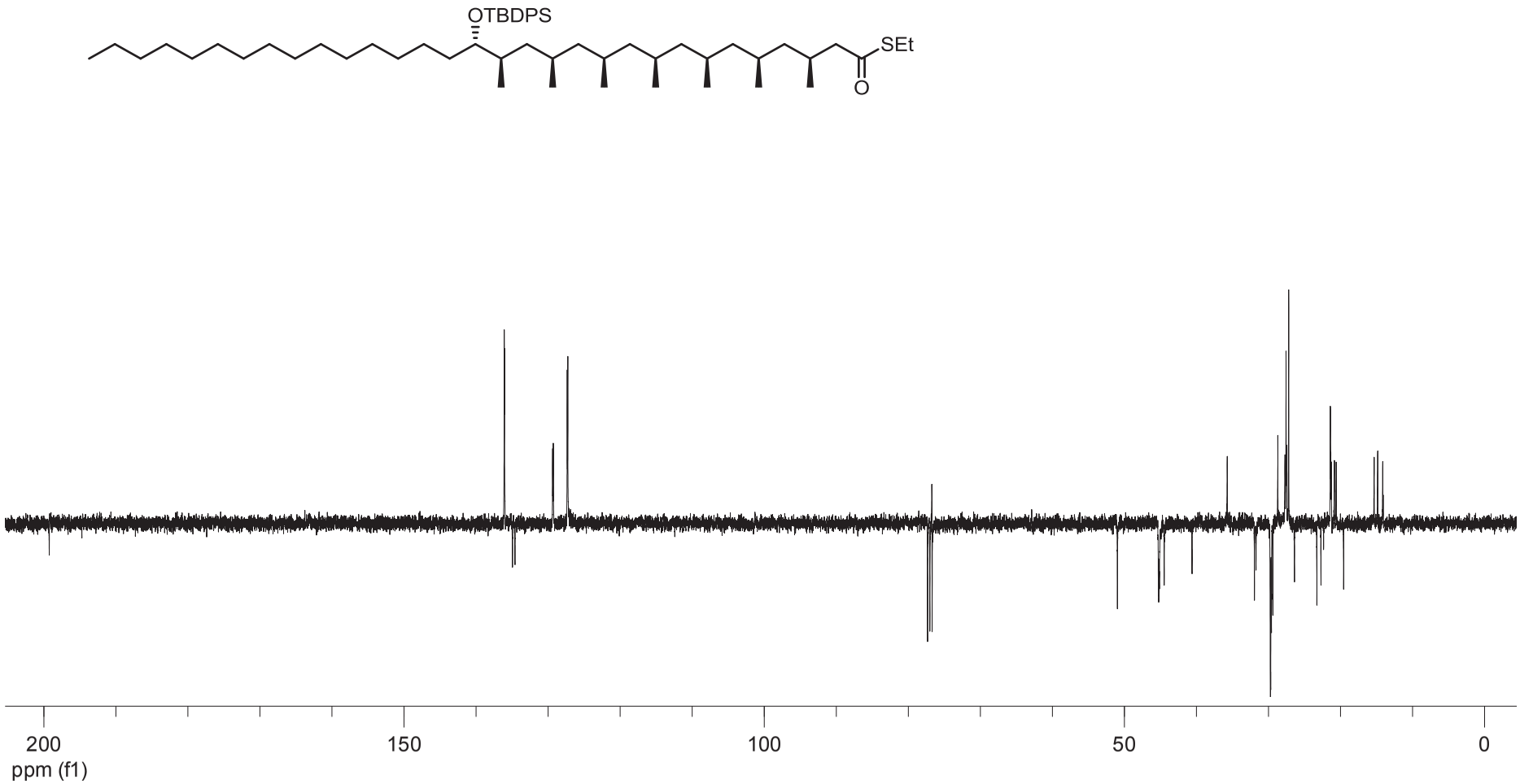

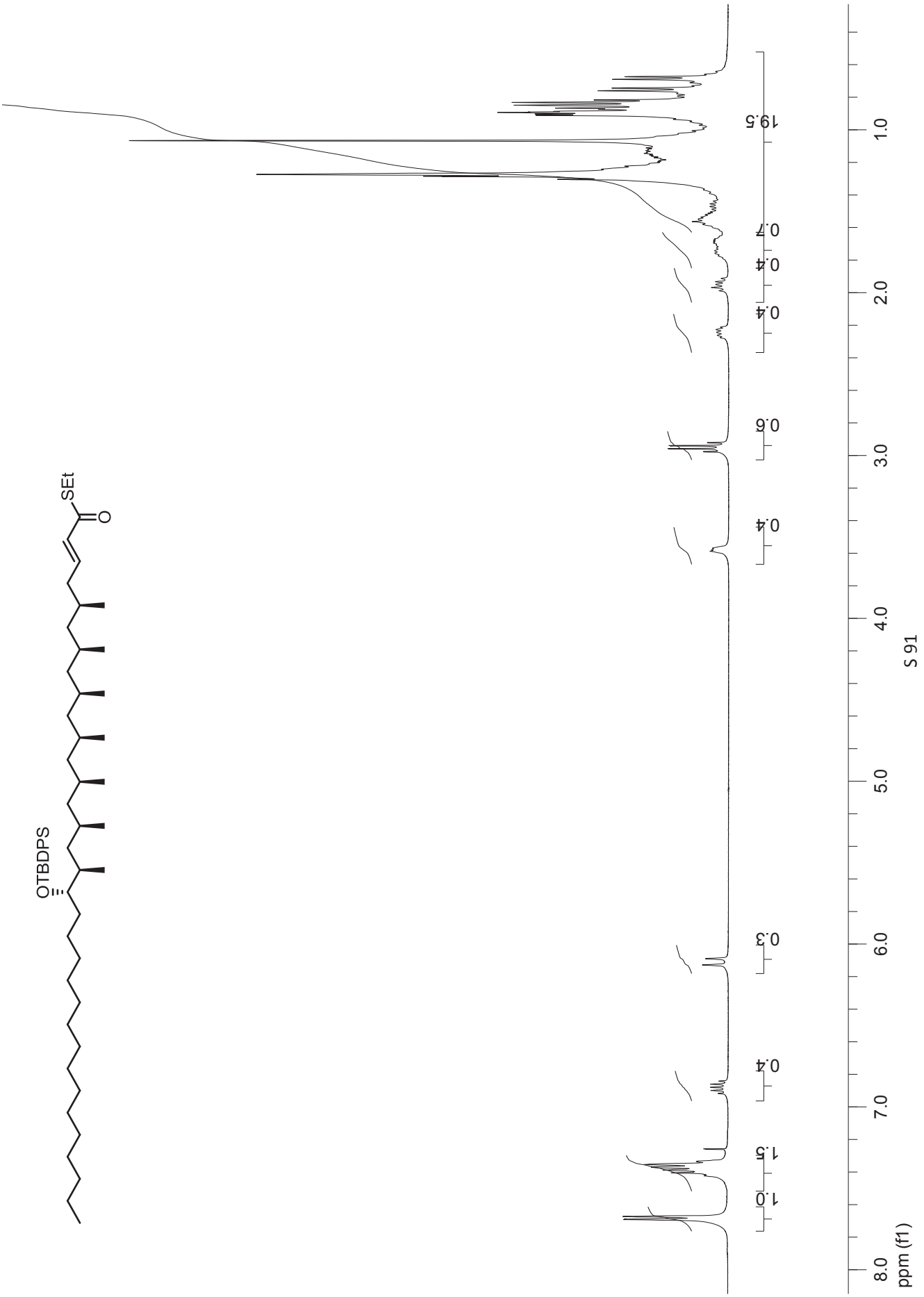

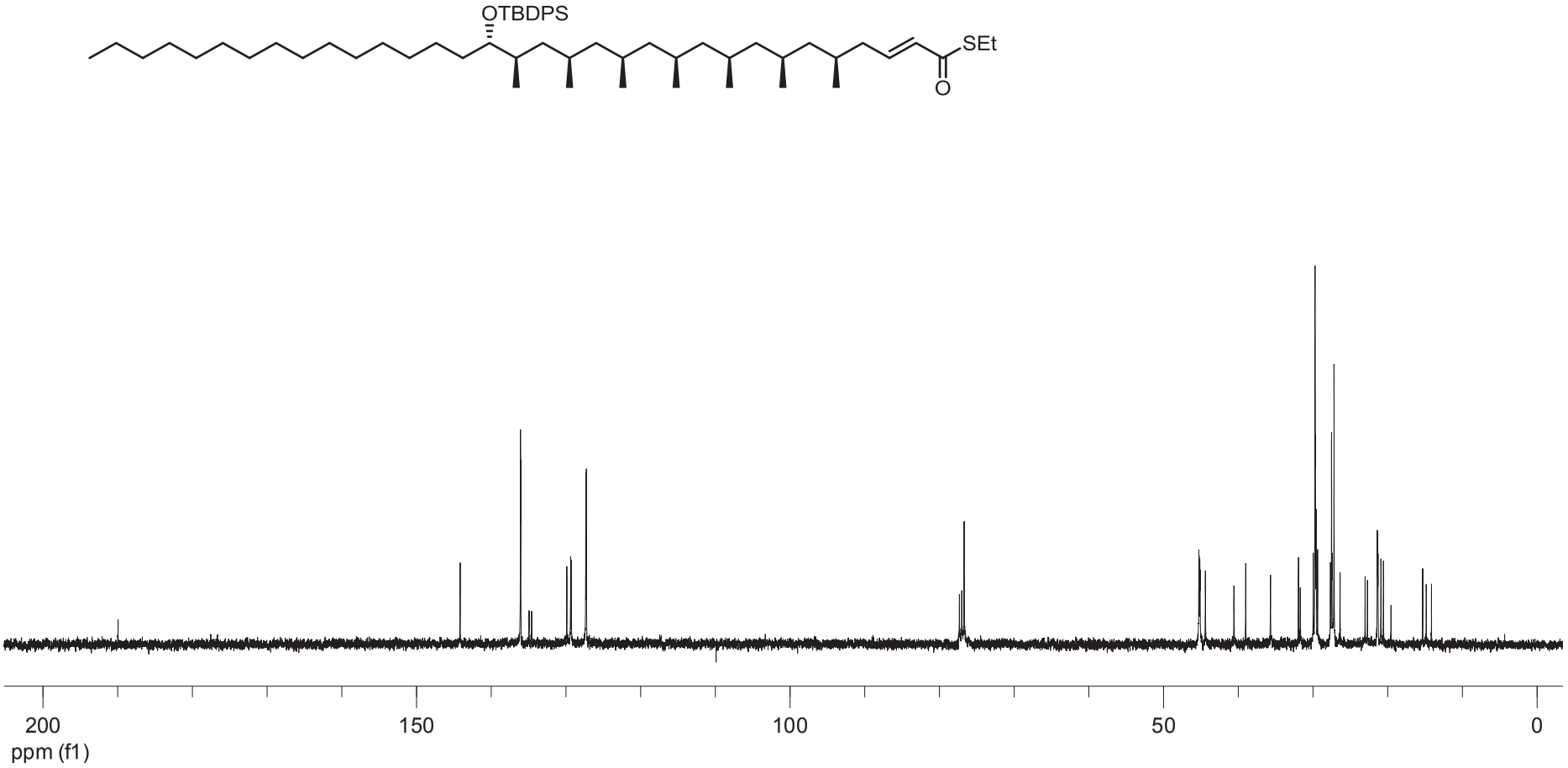

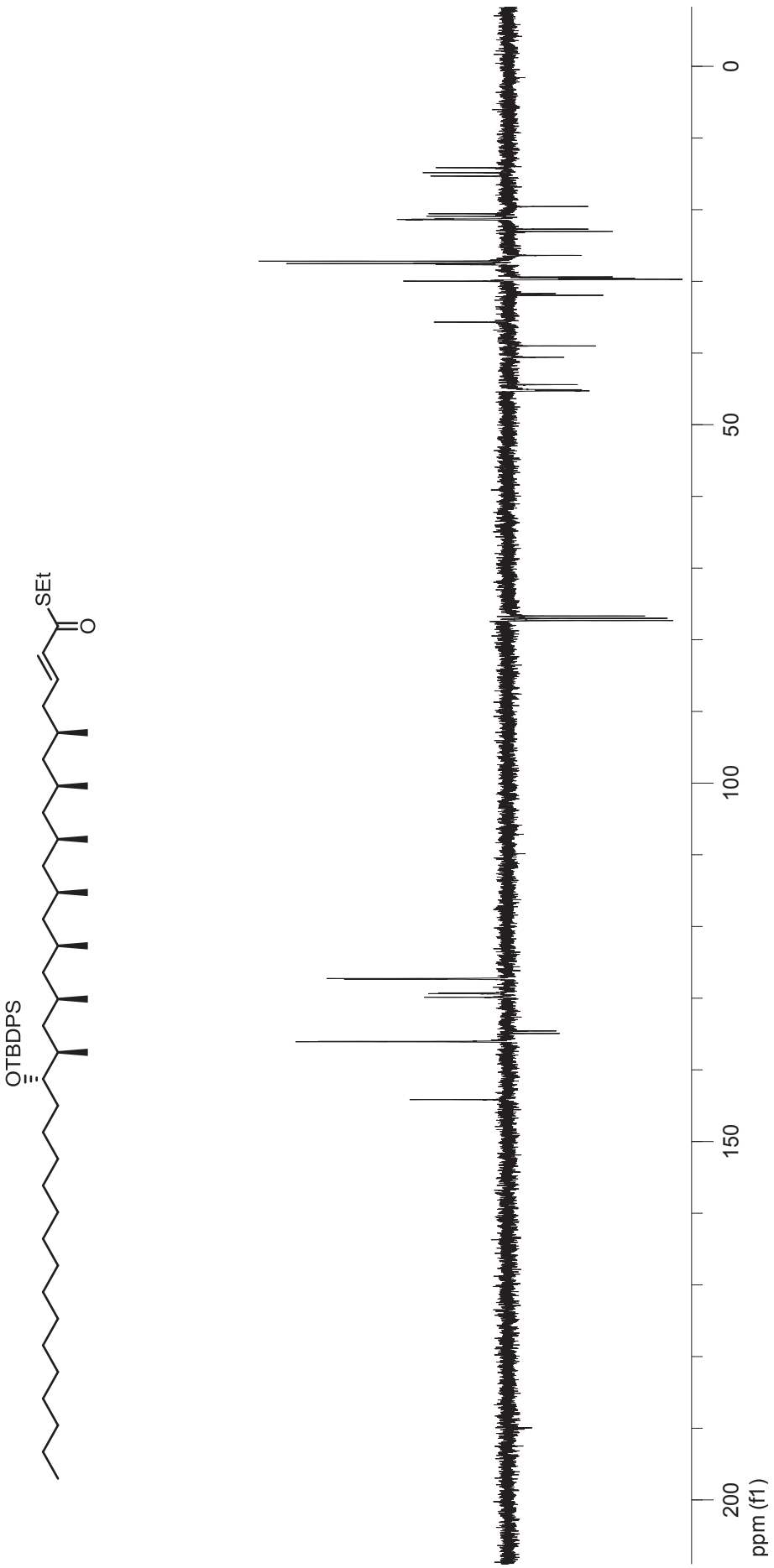

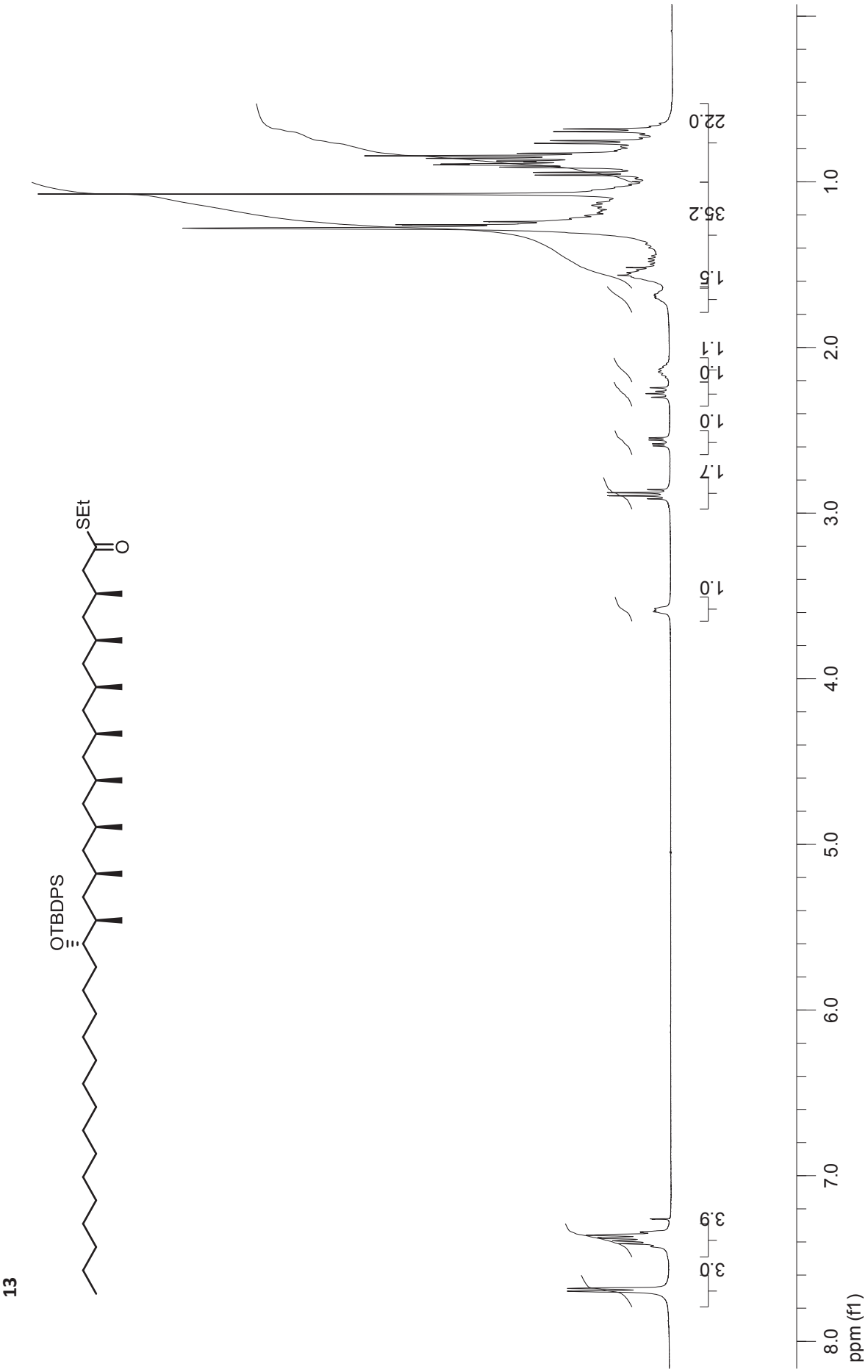
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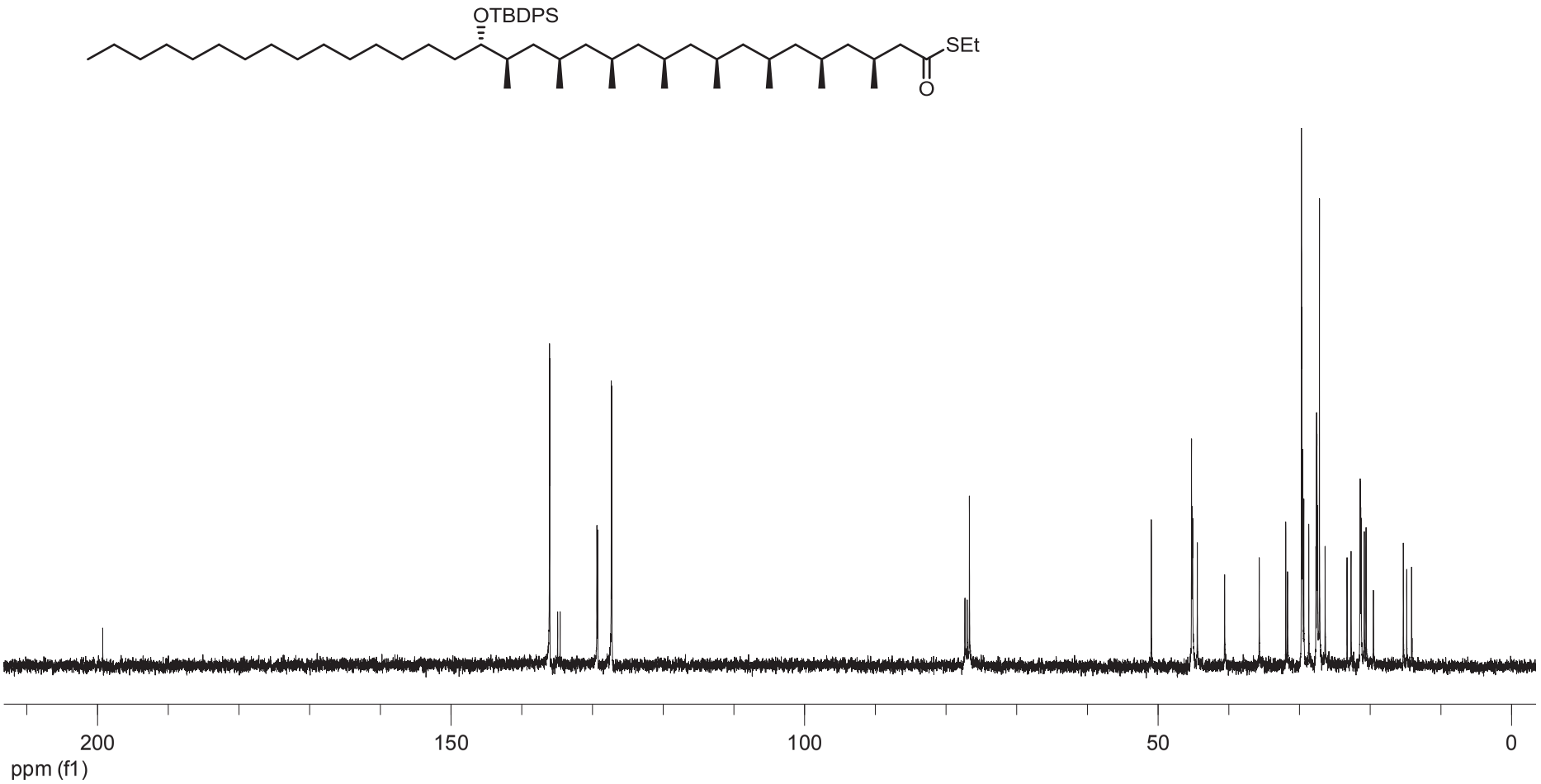
ppm (f1)

13



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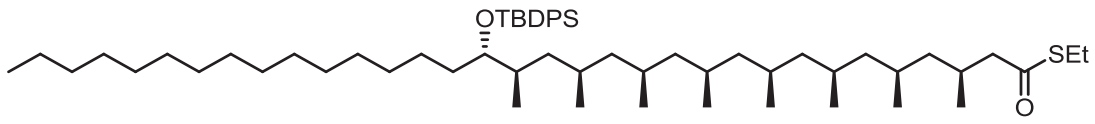

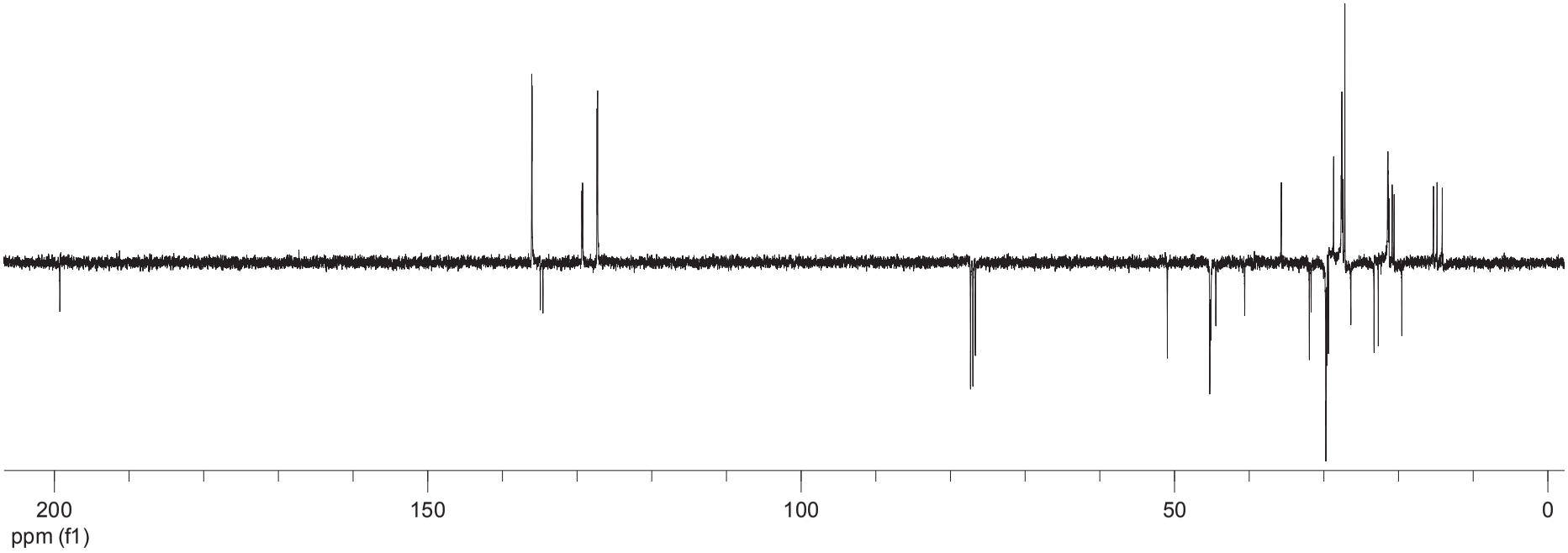

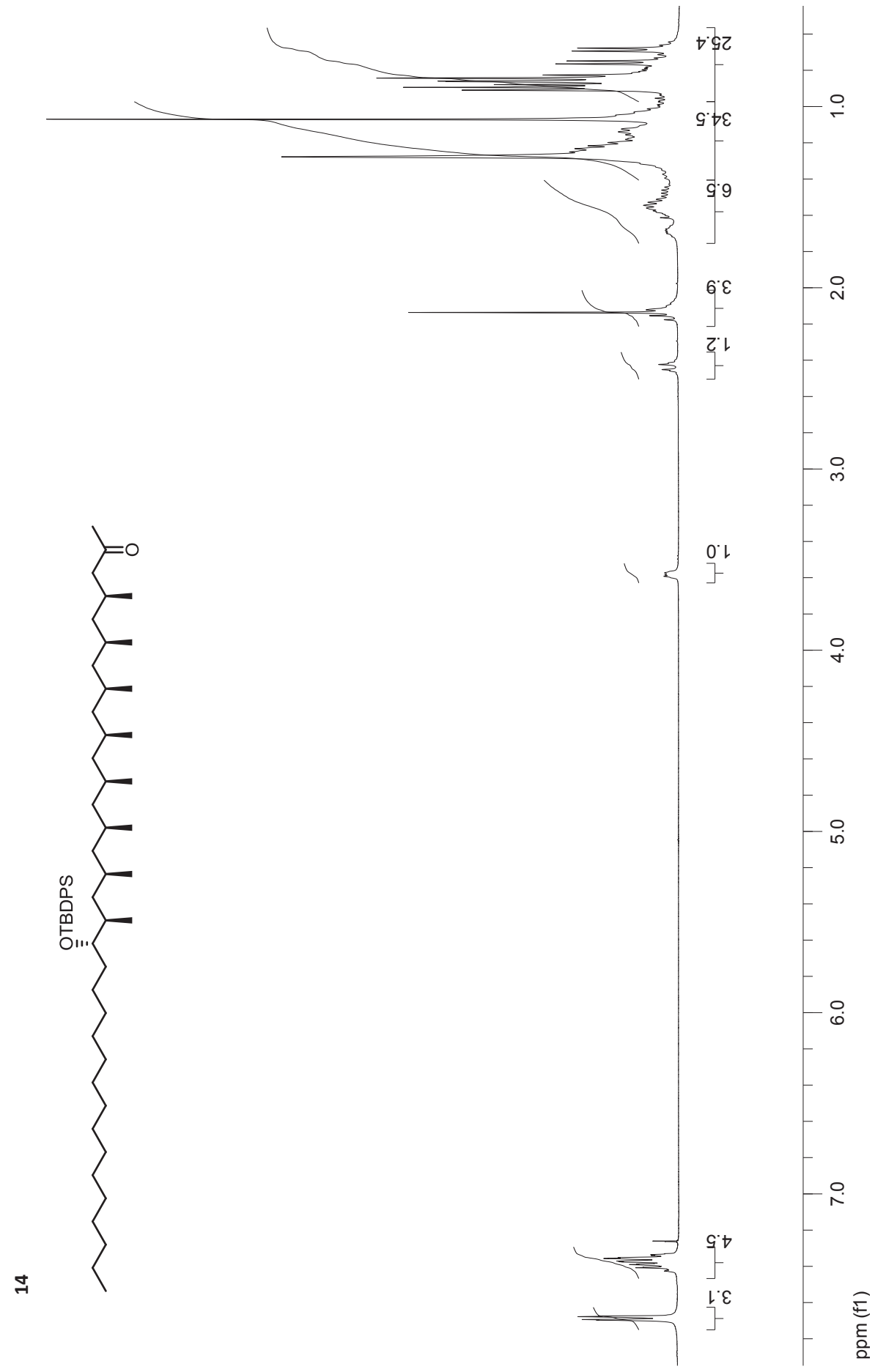

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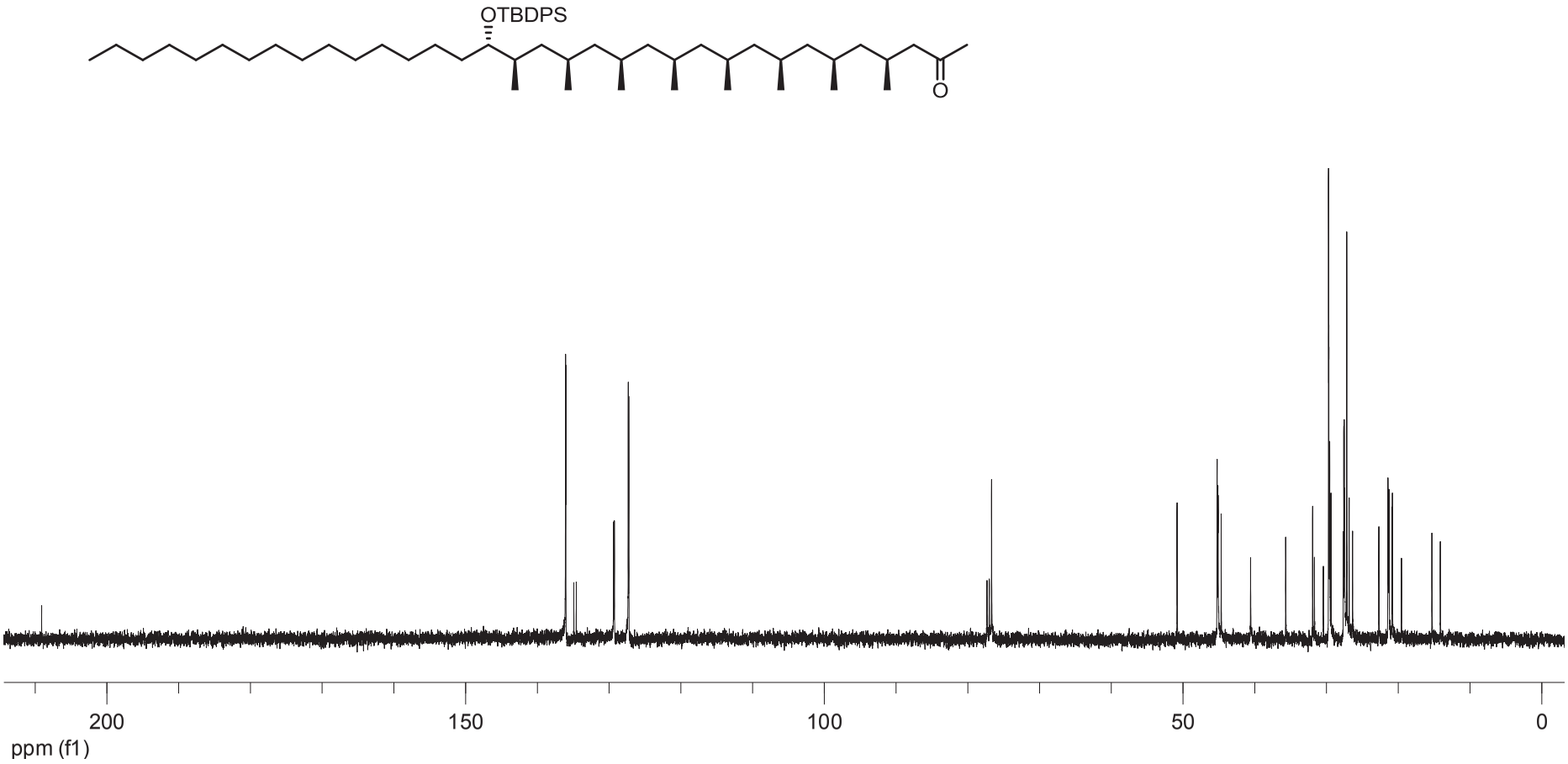

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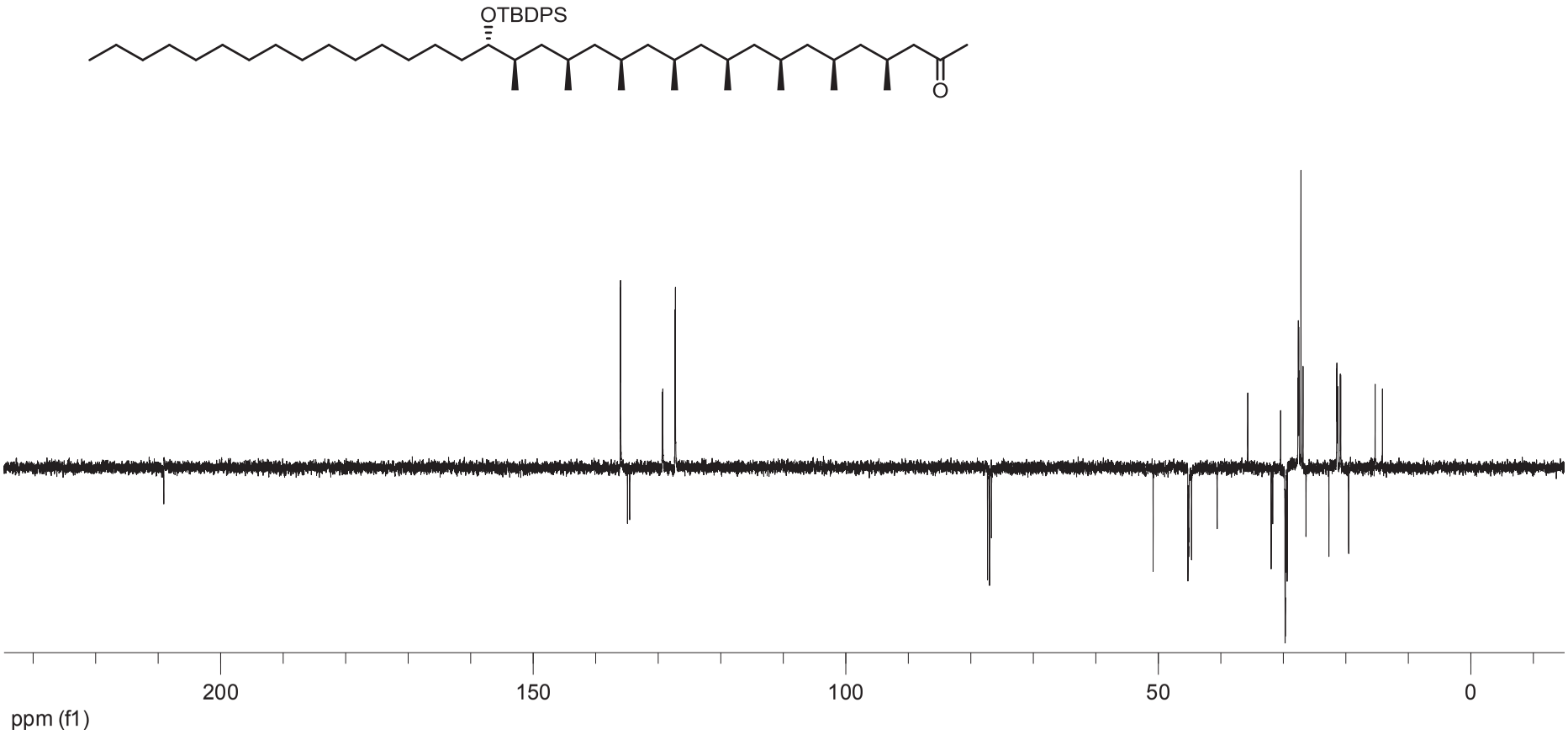

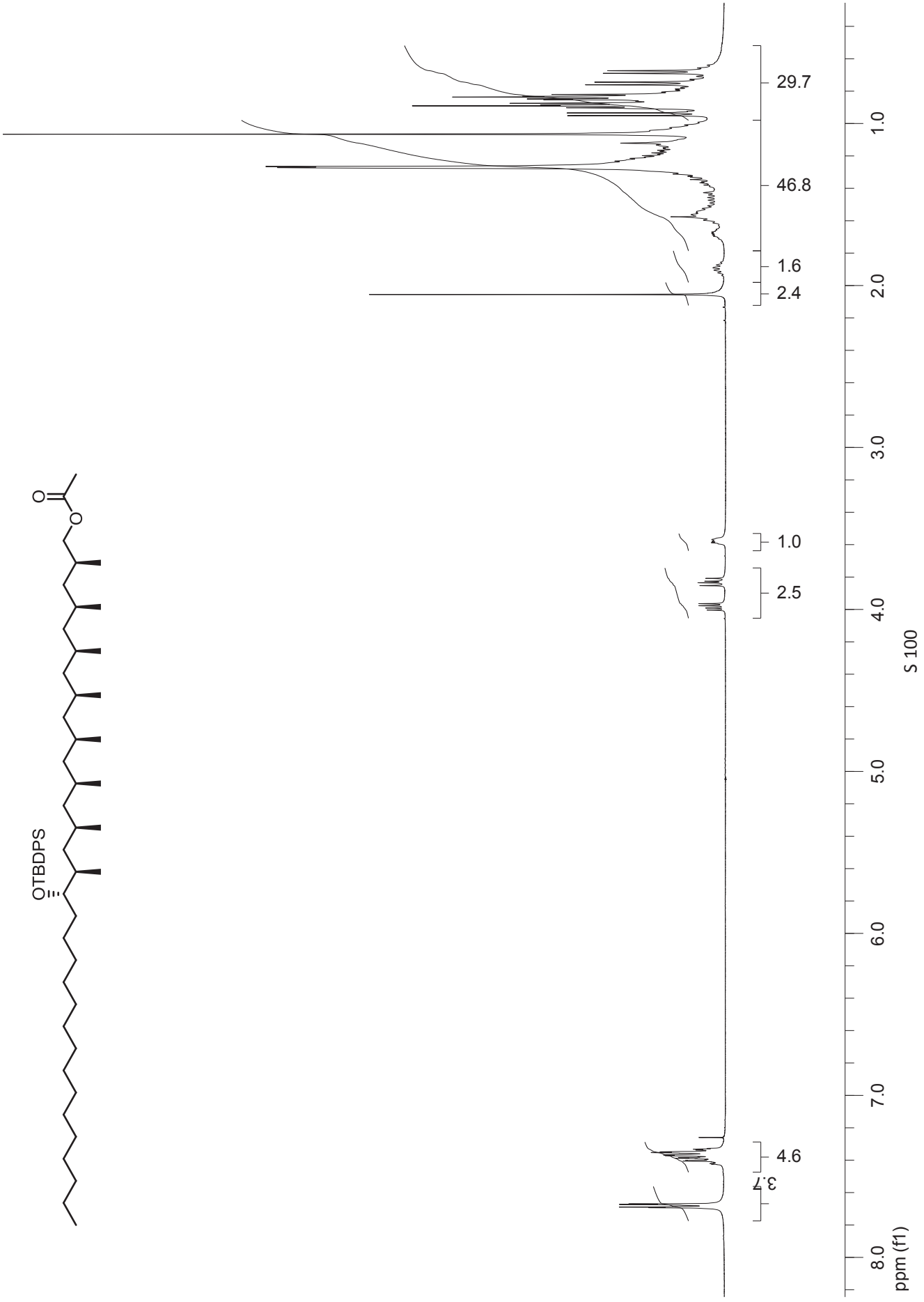

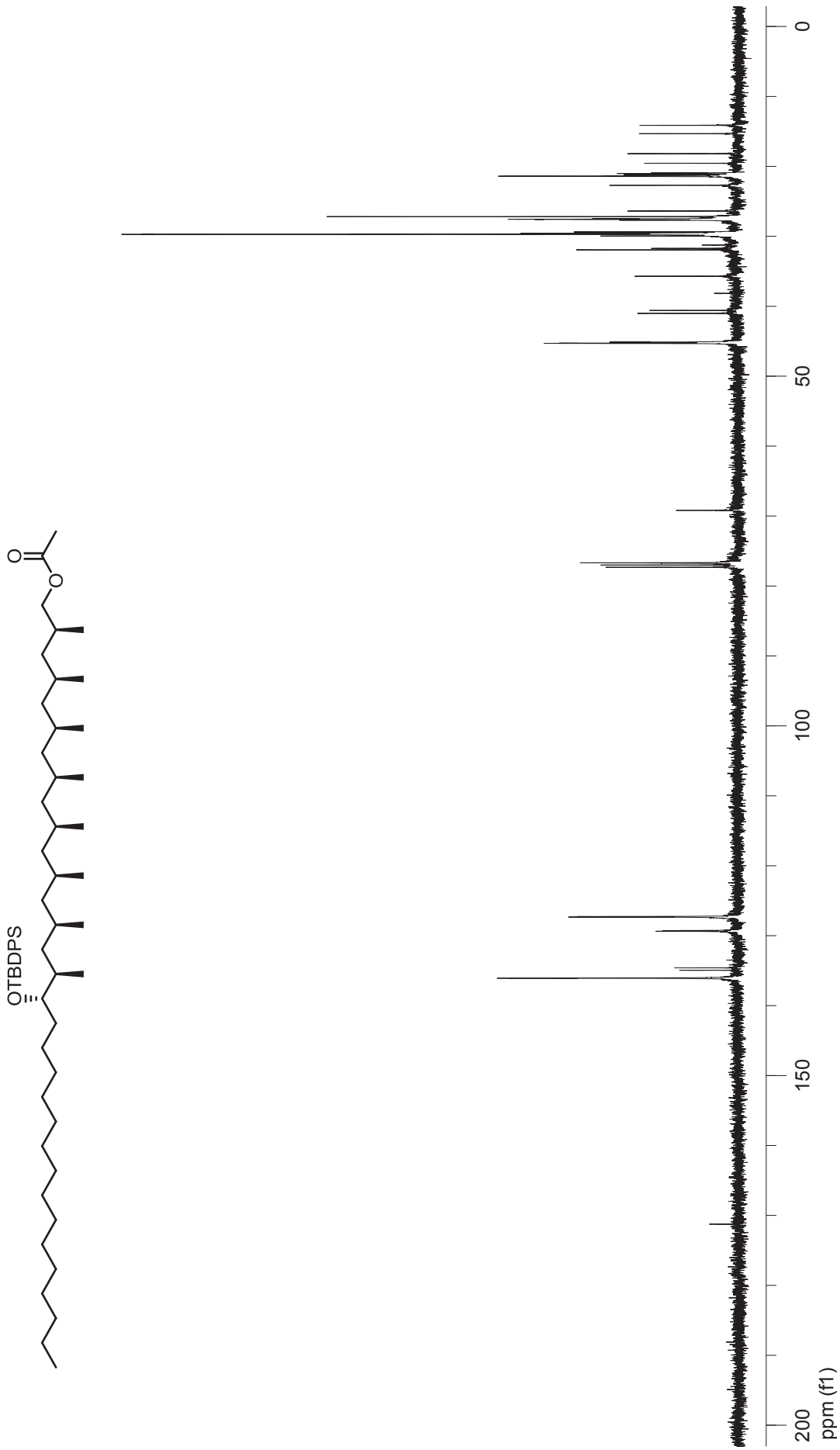

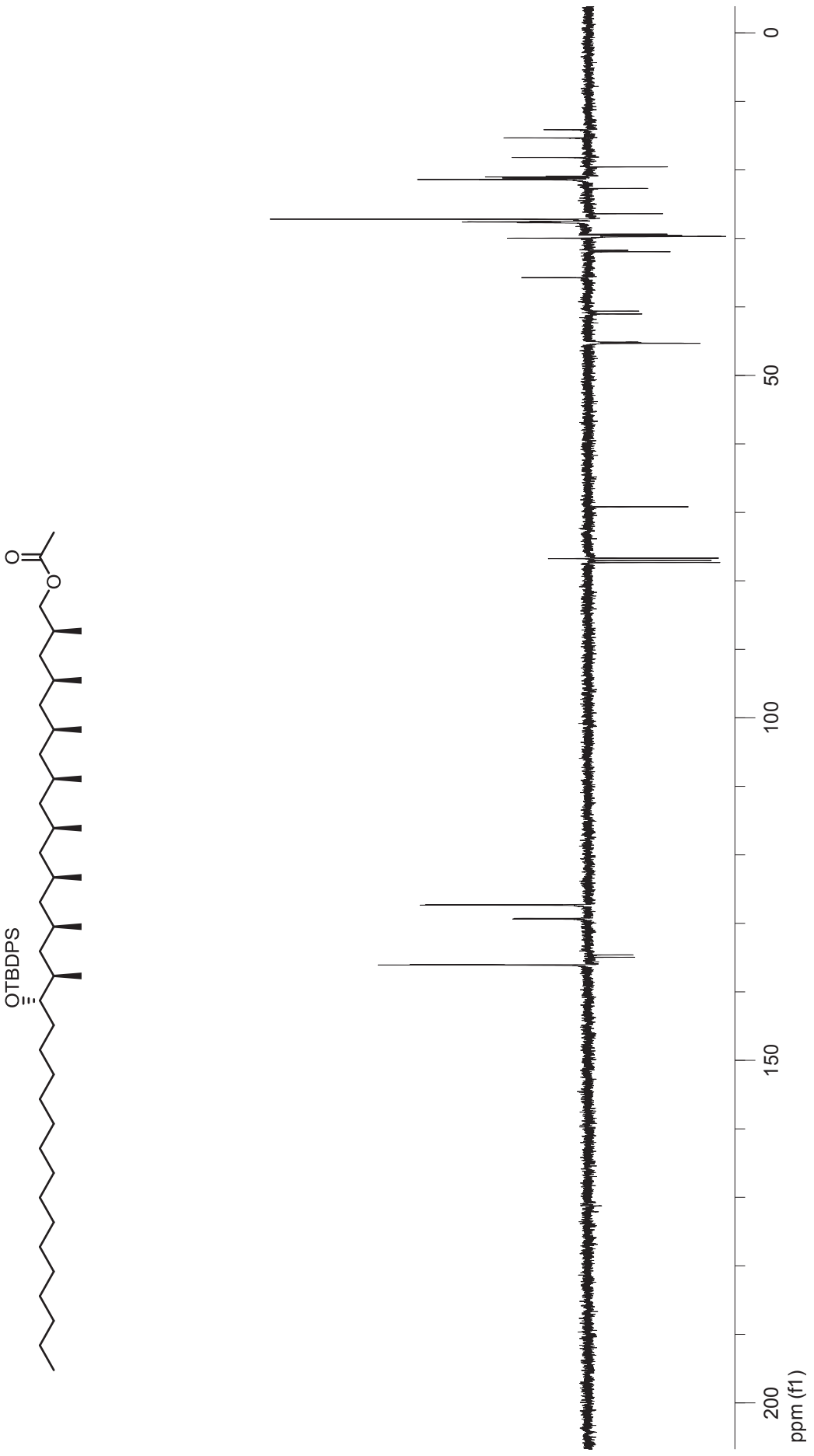

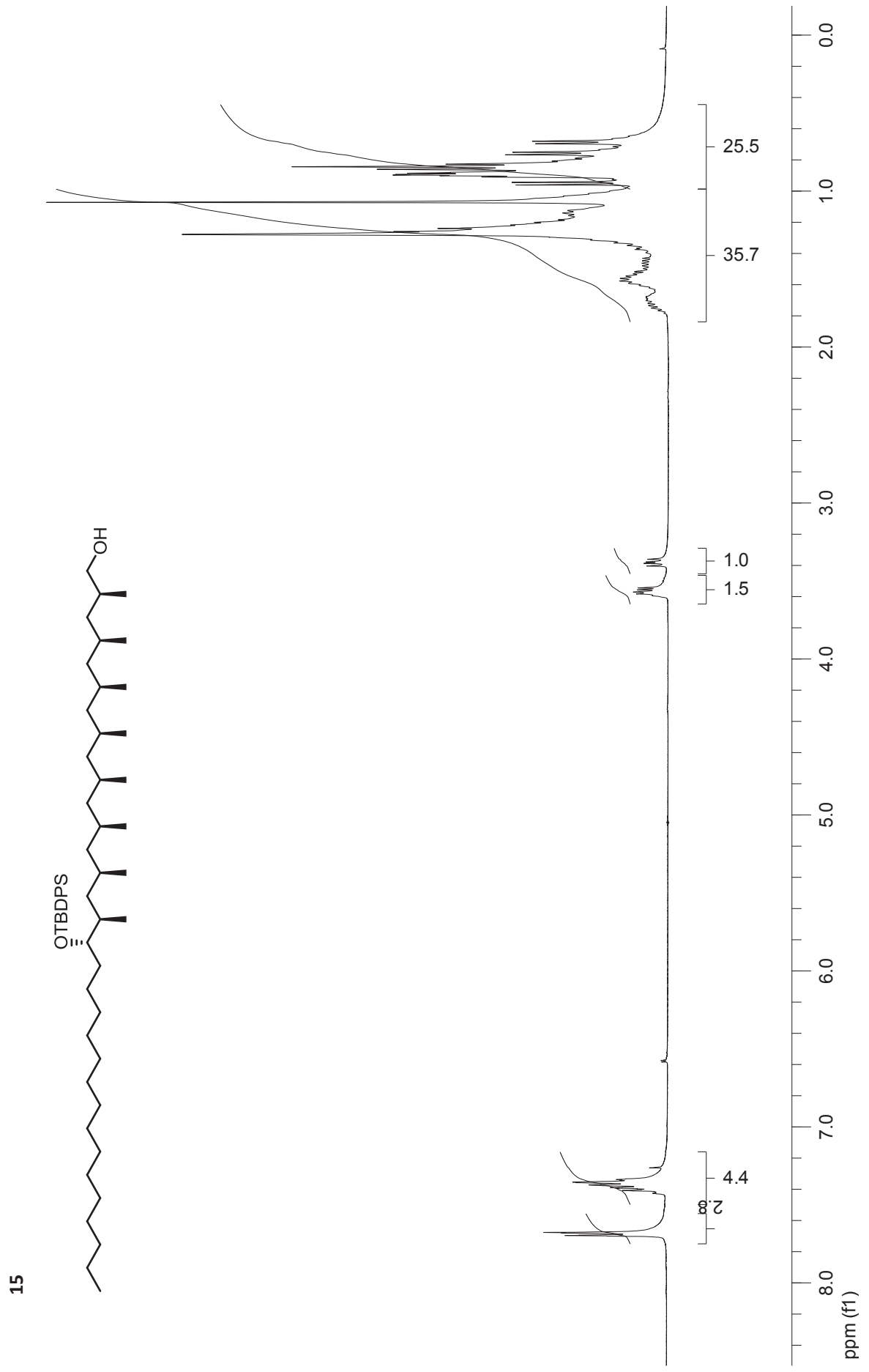

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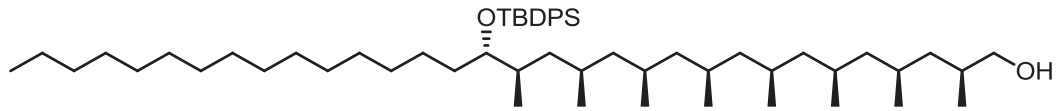

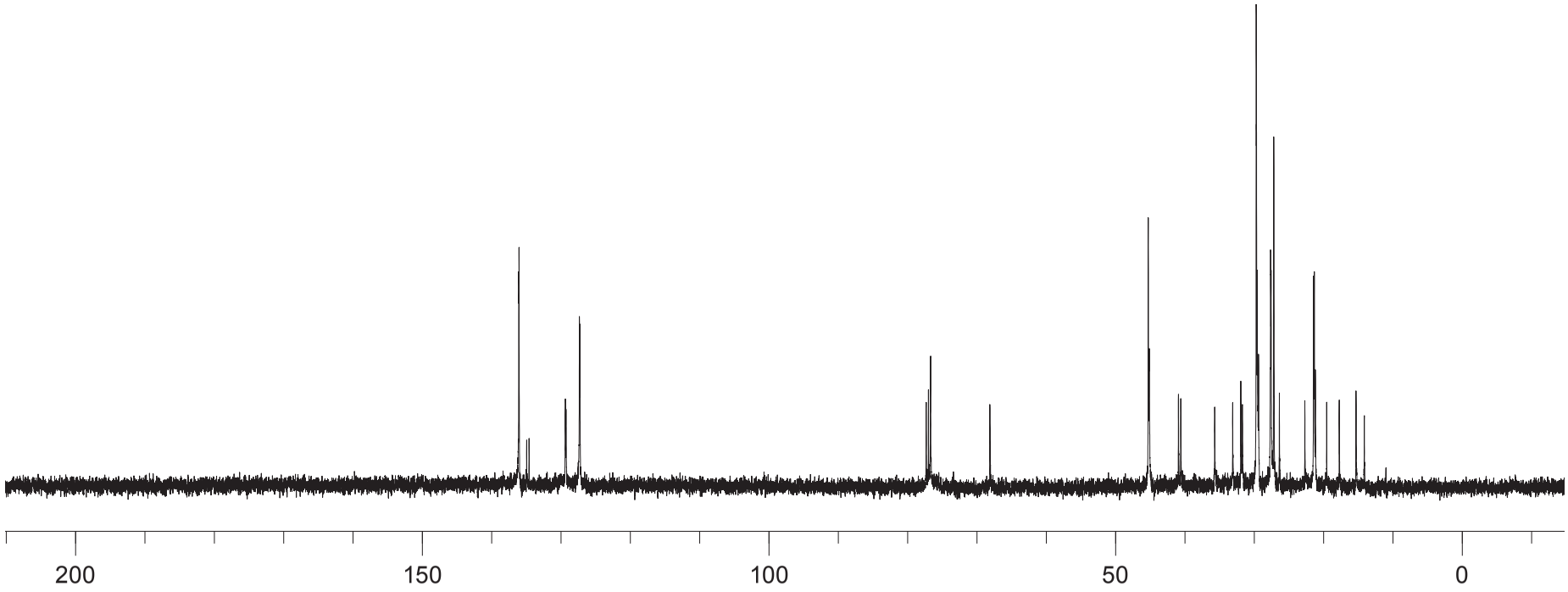

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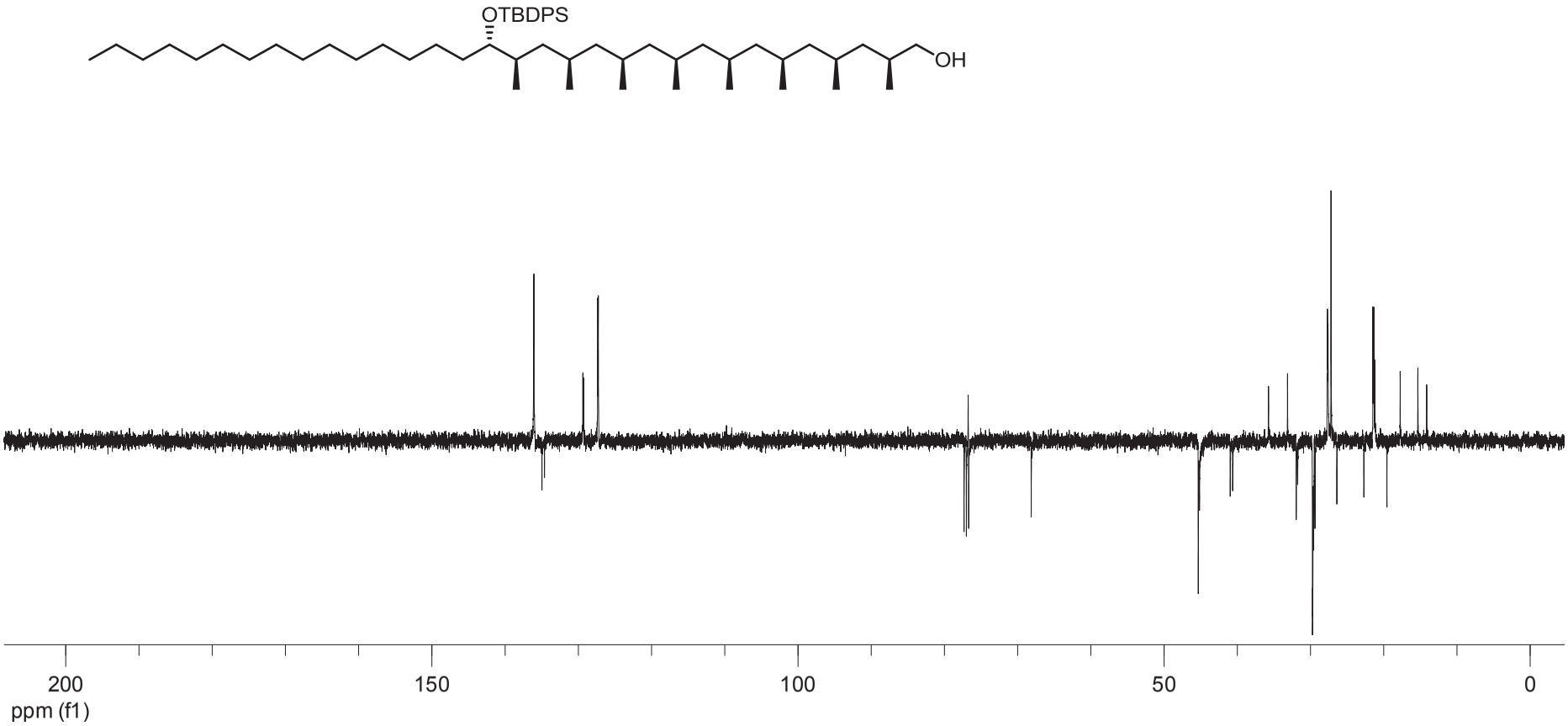

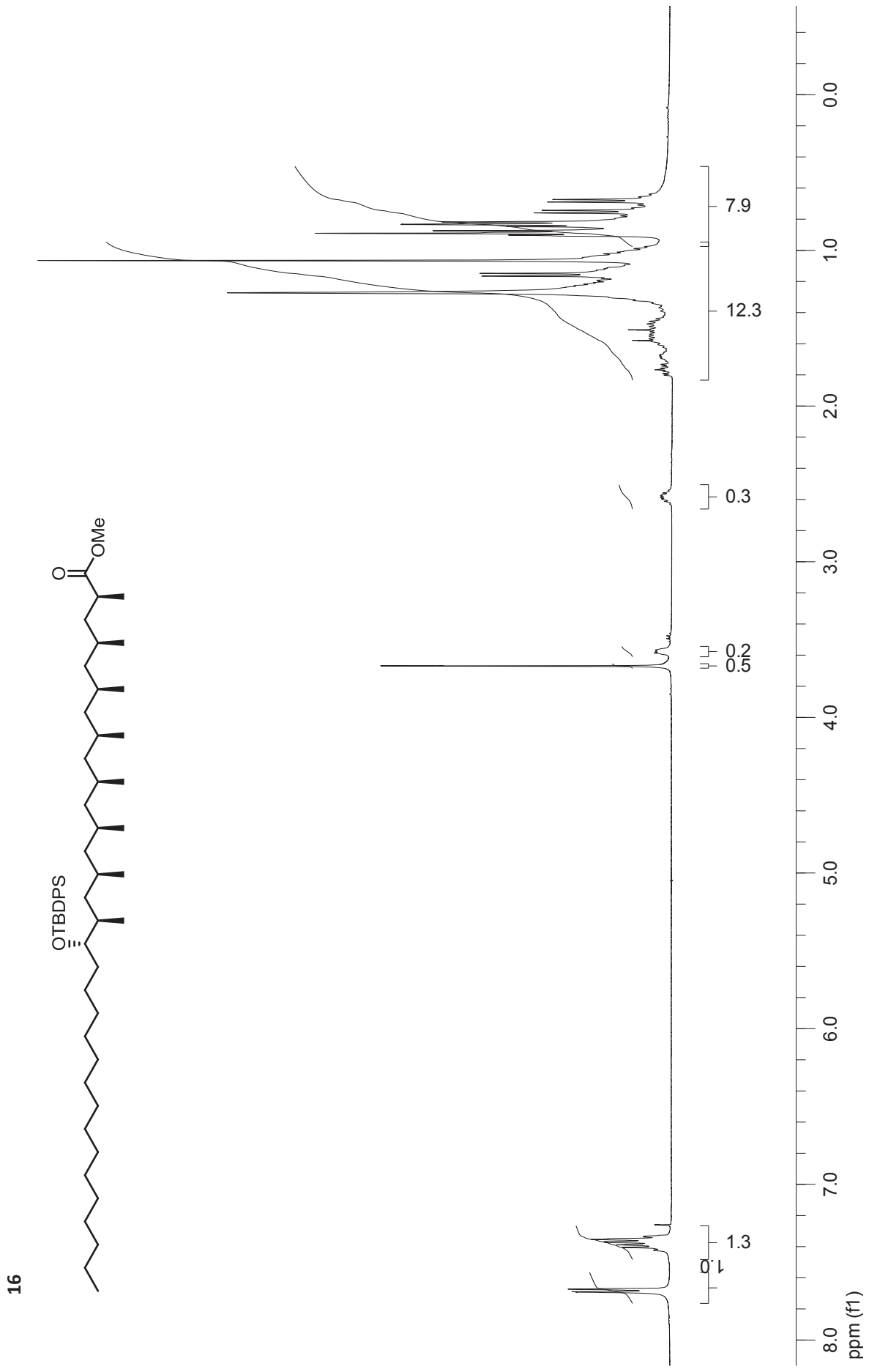

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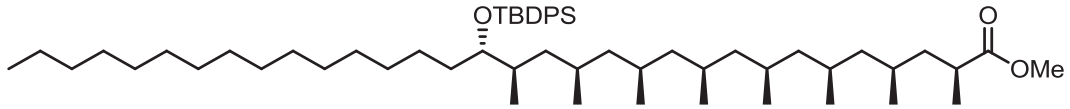

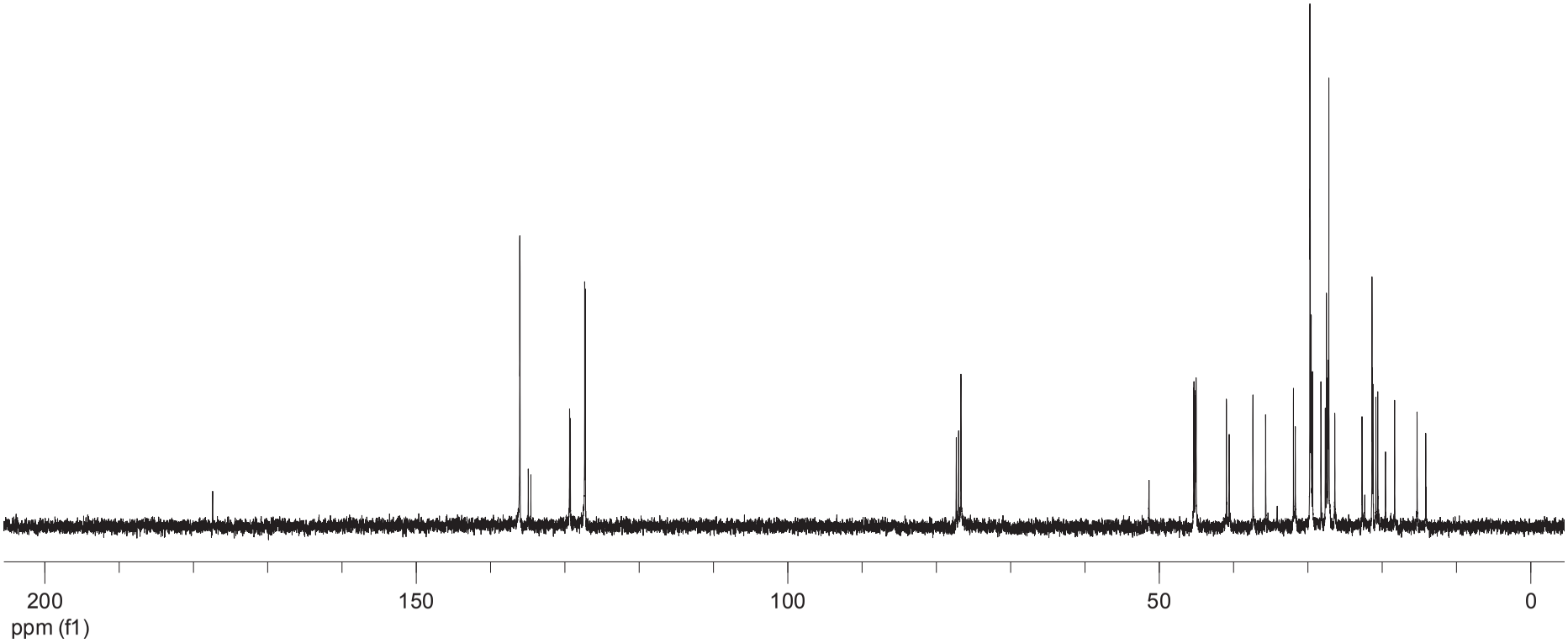

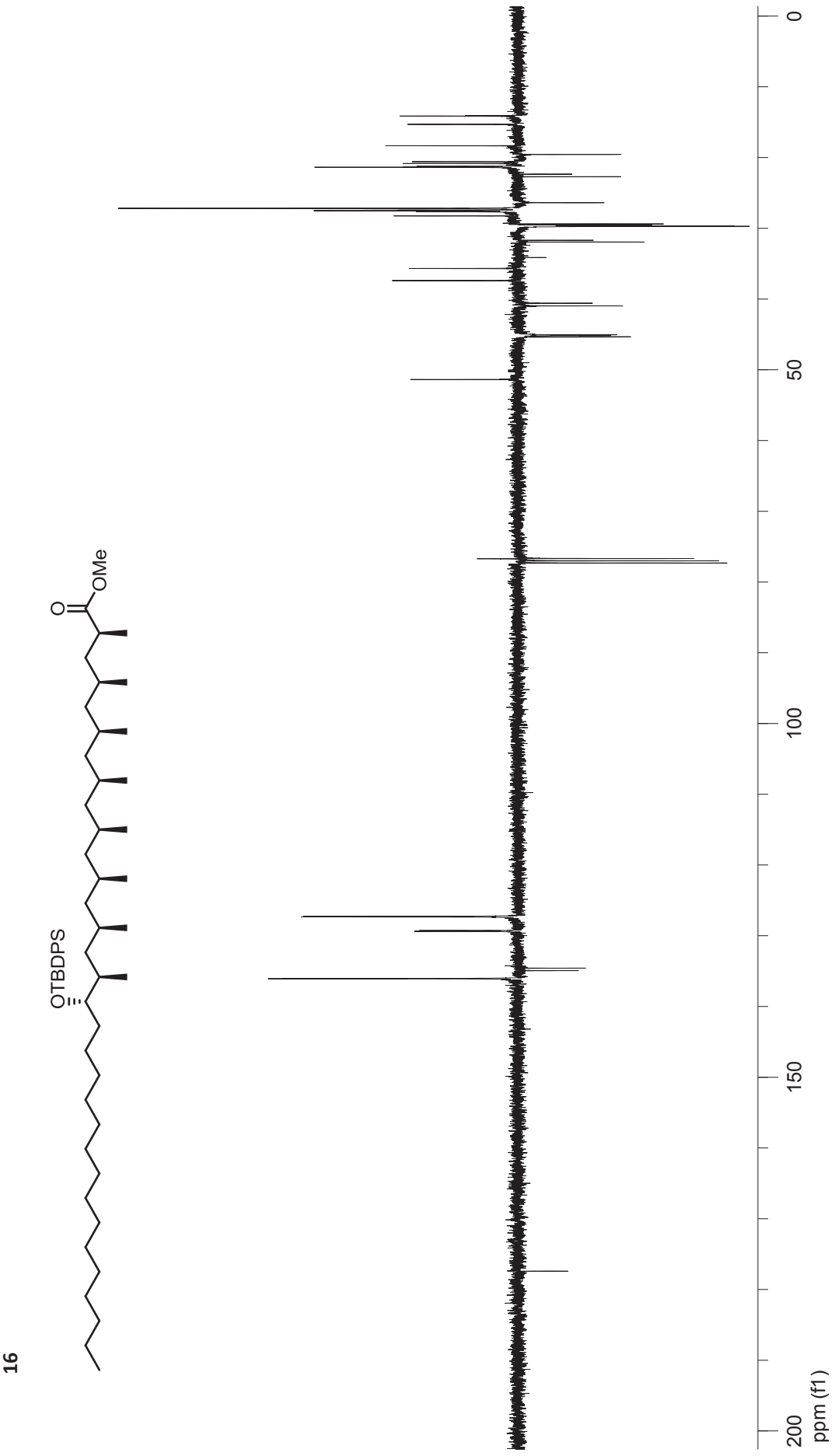

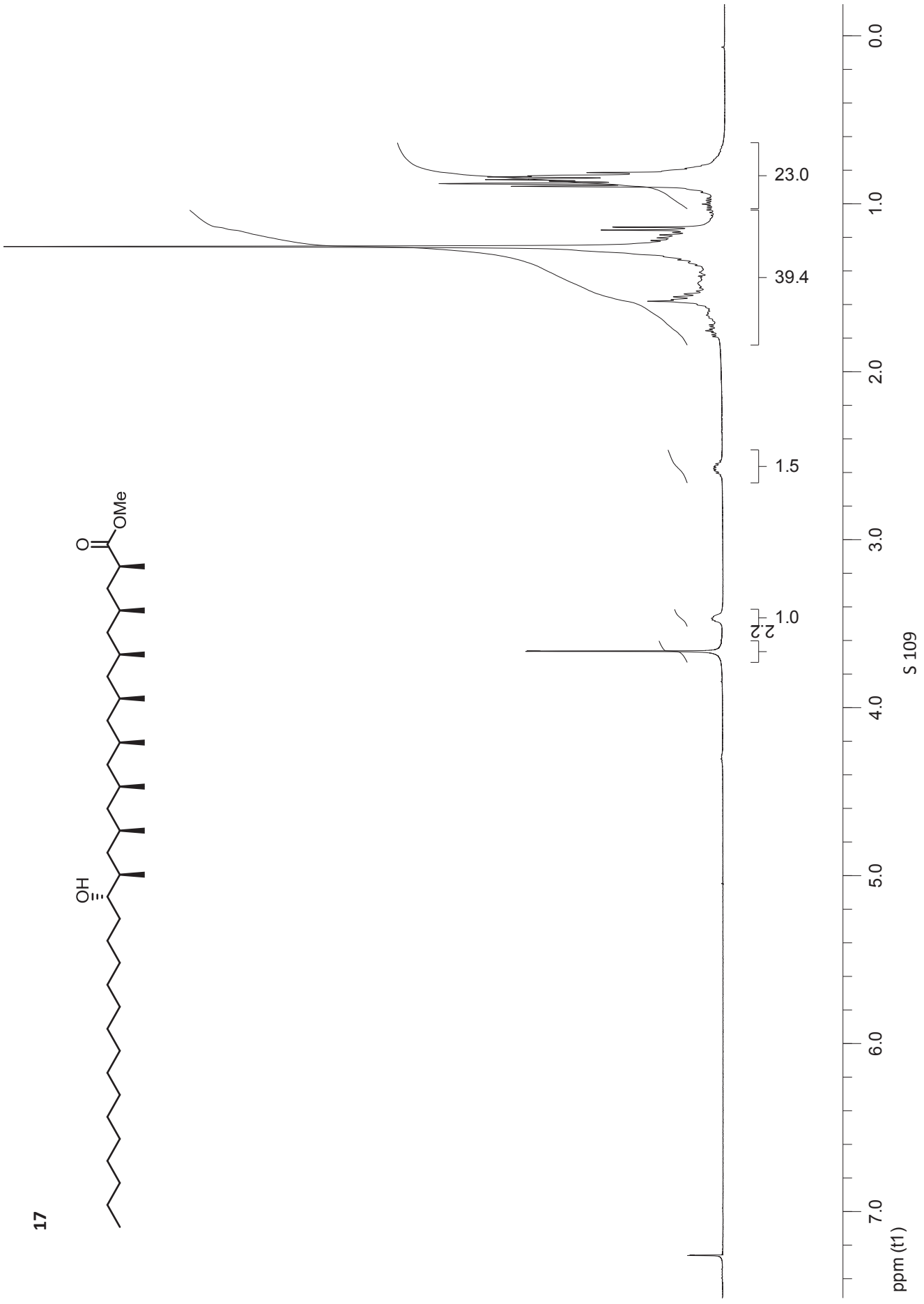

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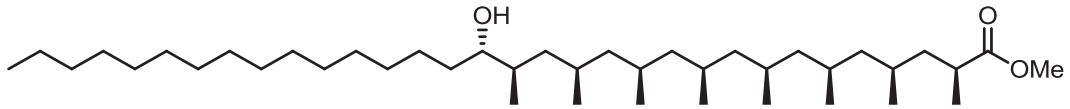

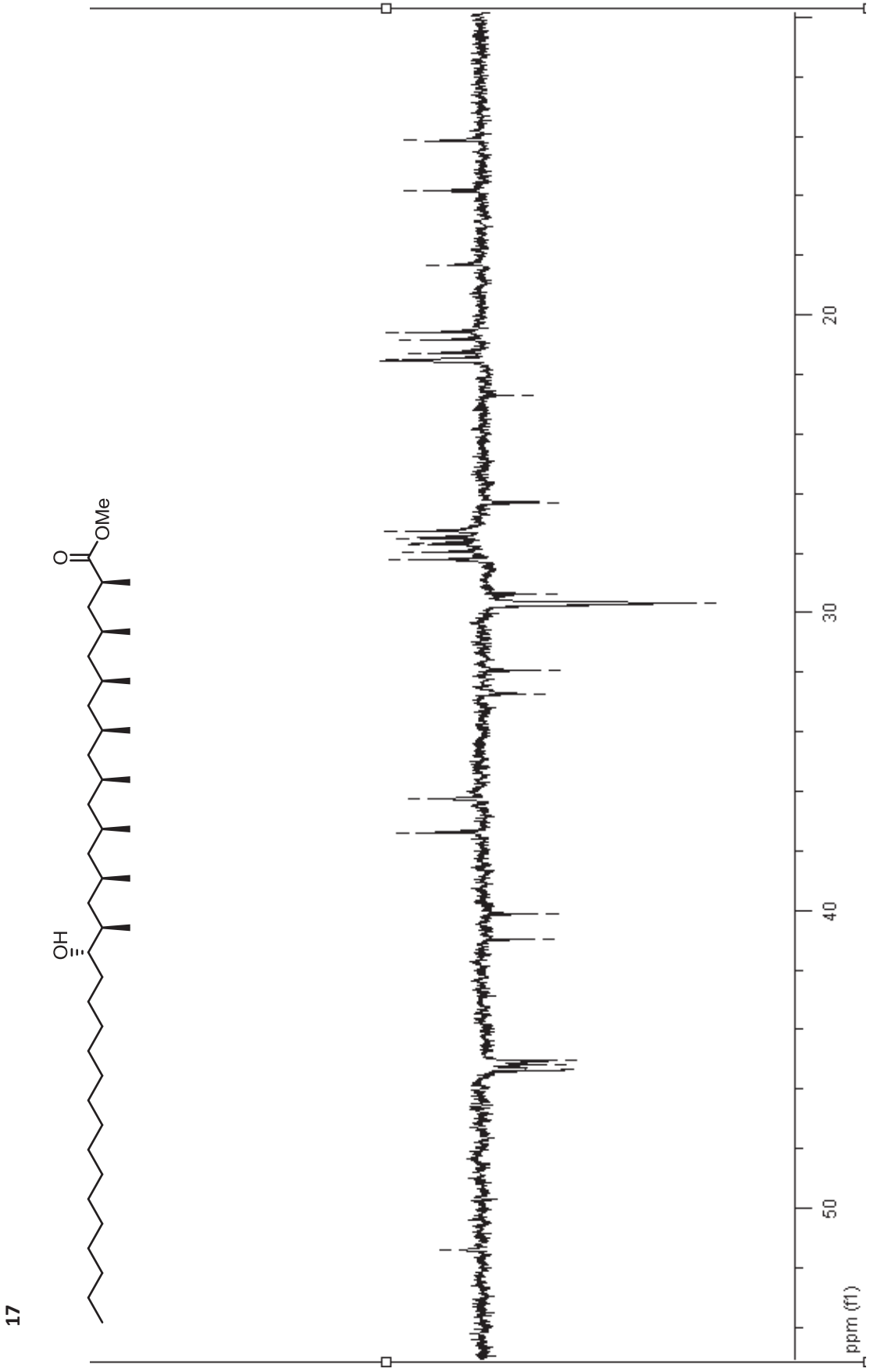
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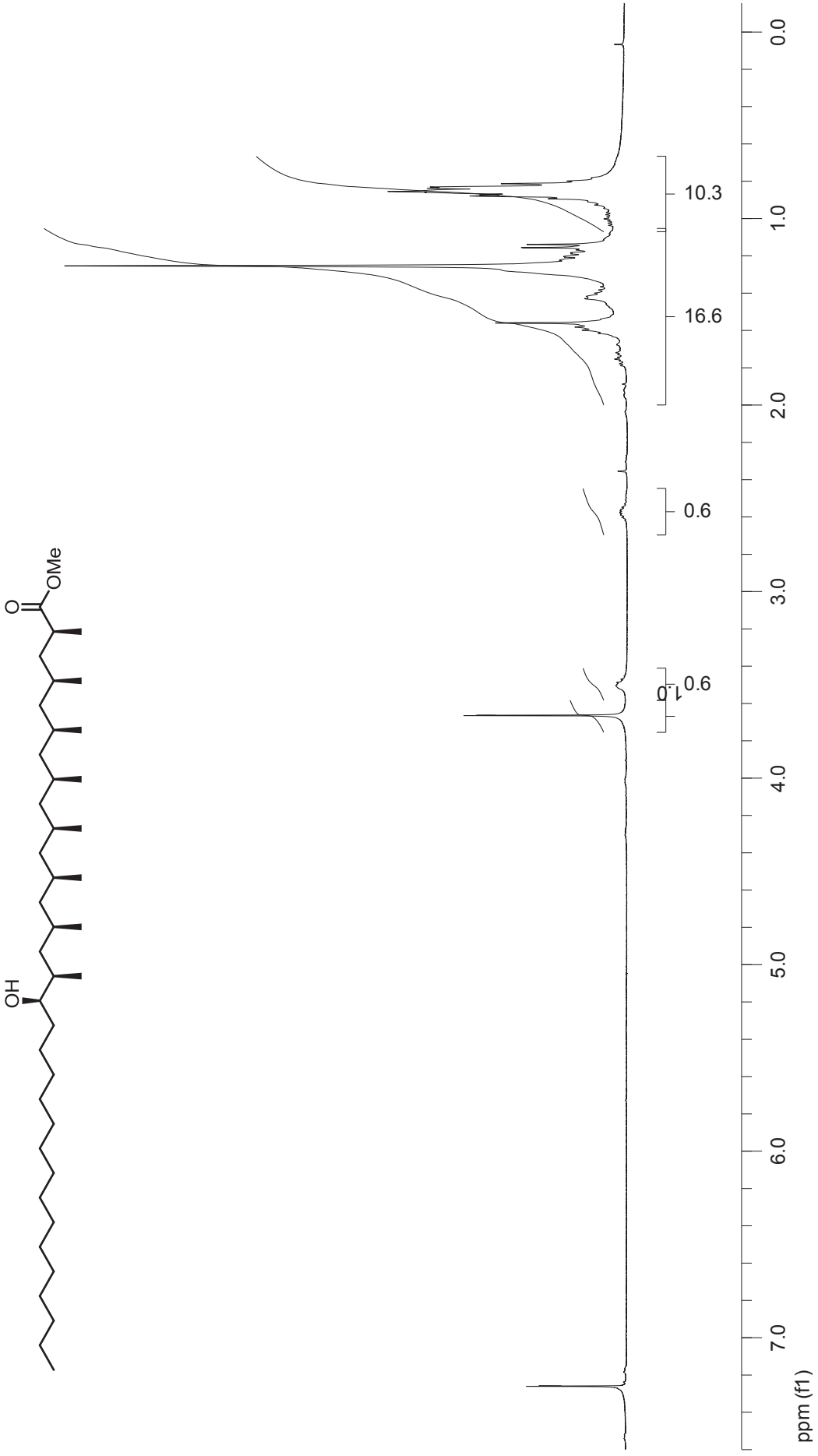
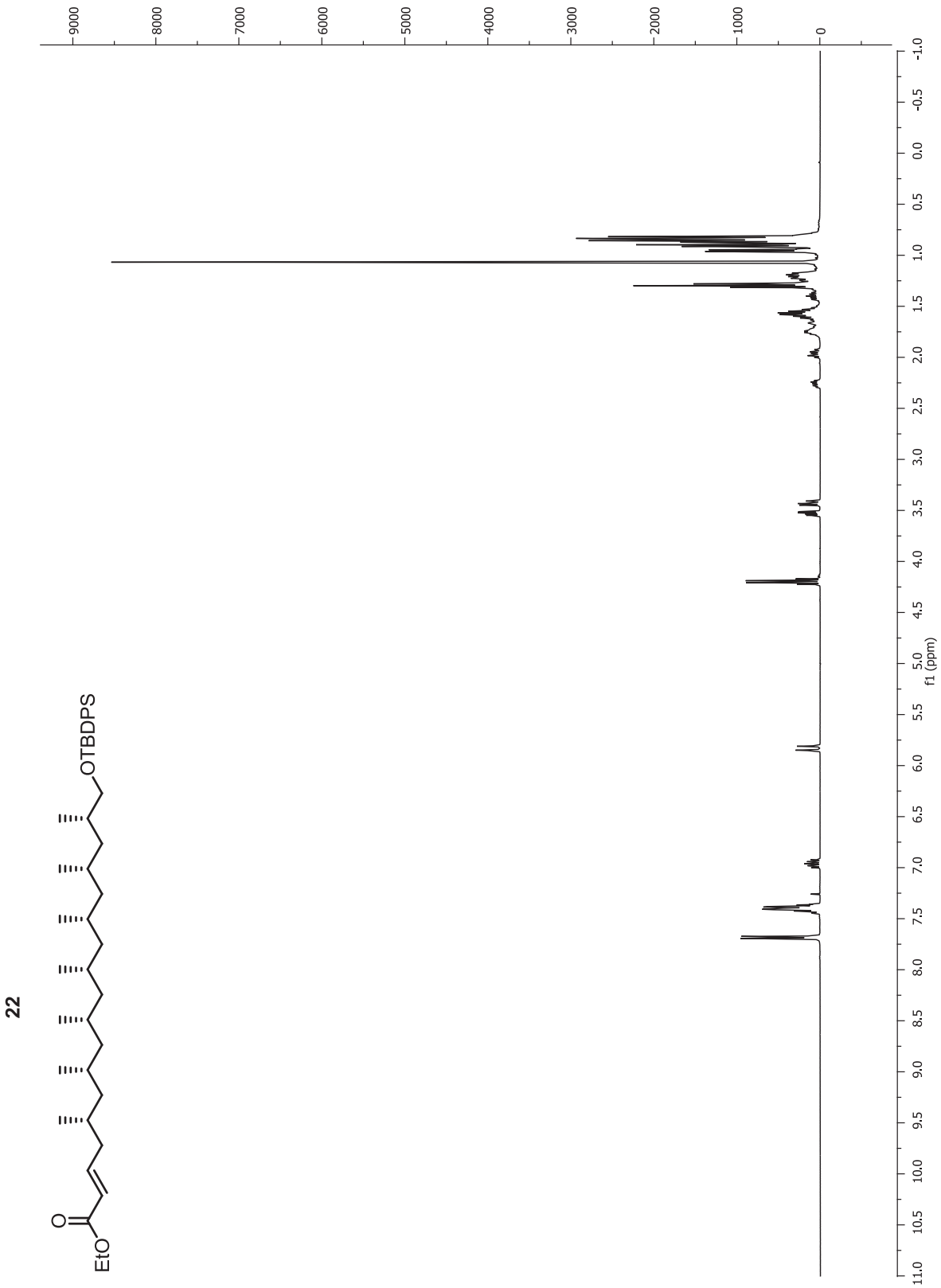
18

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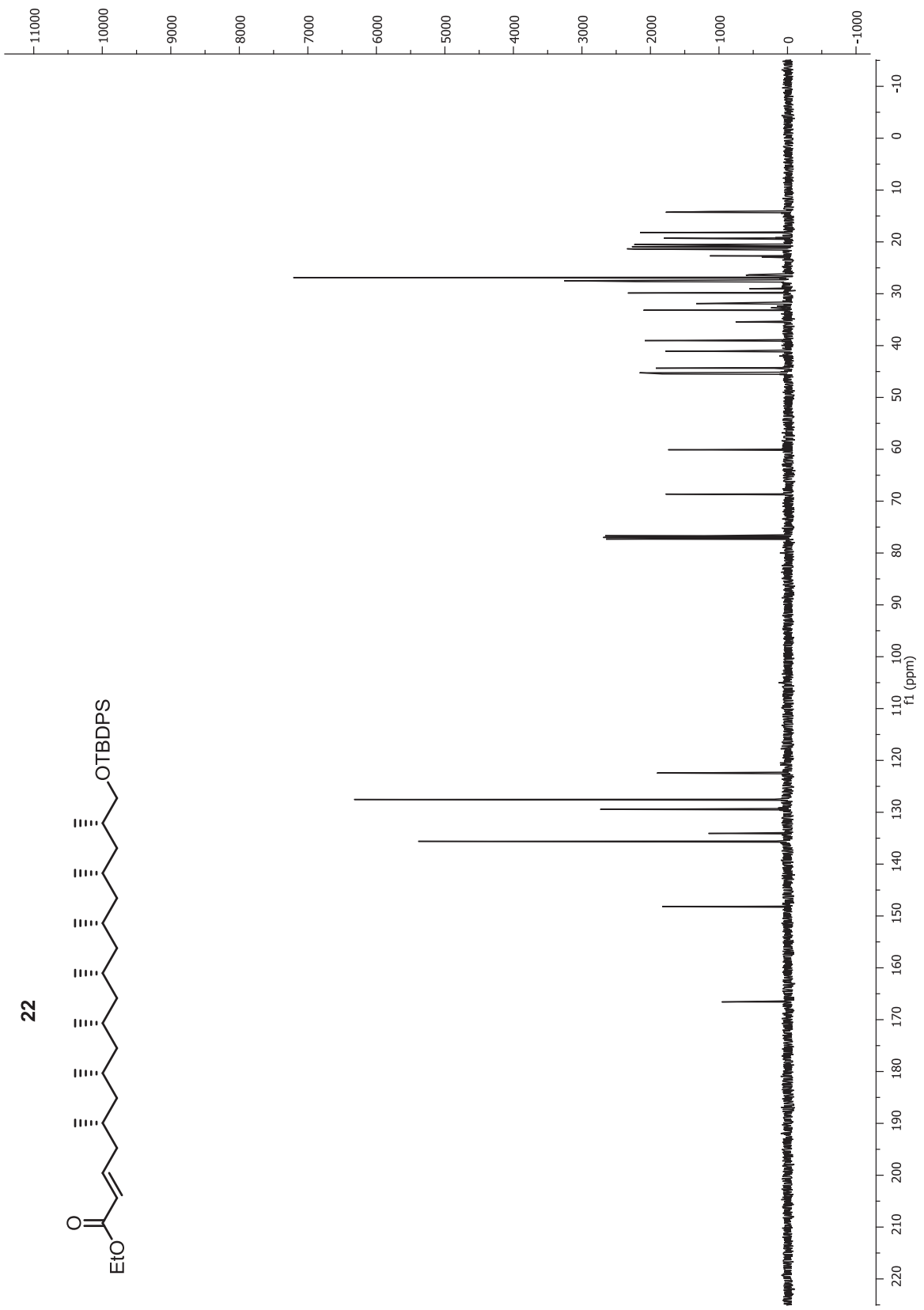
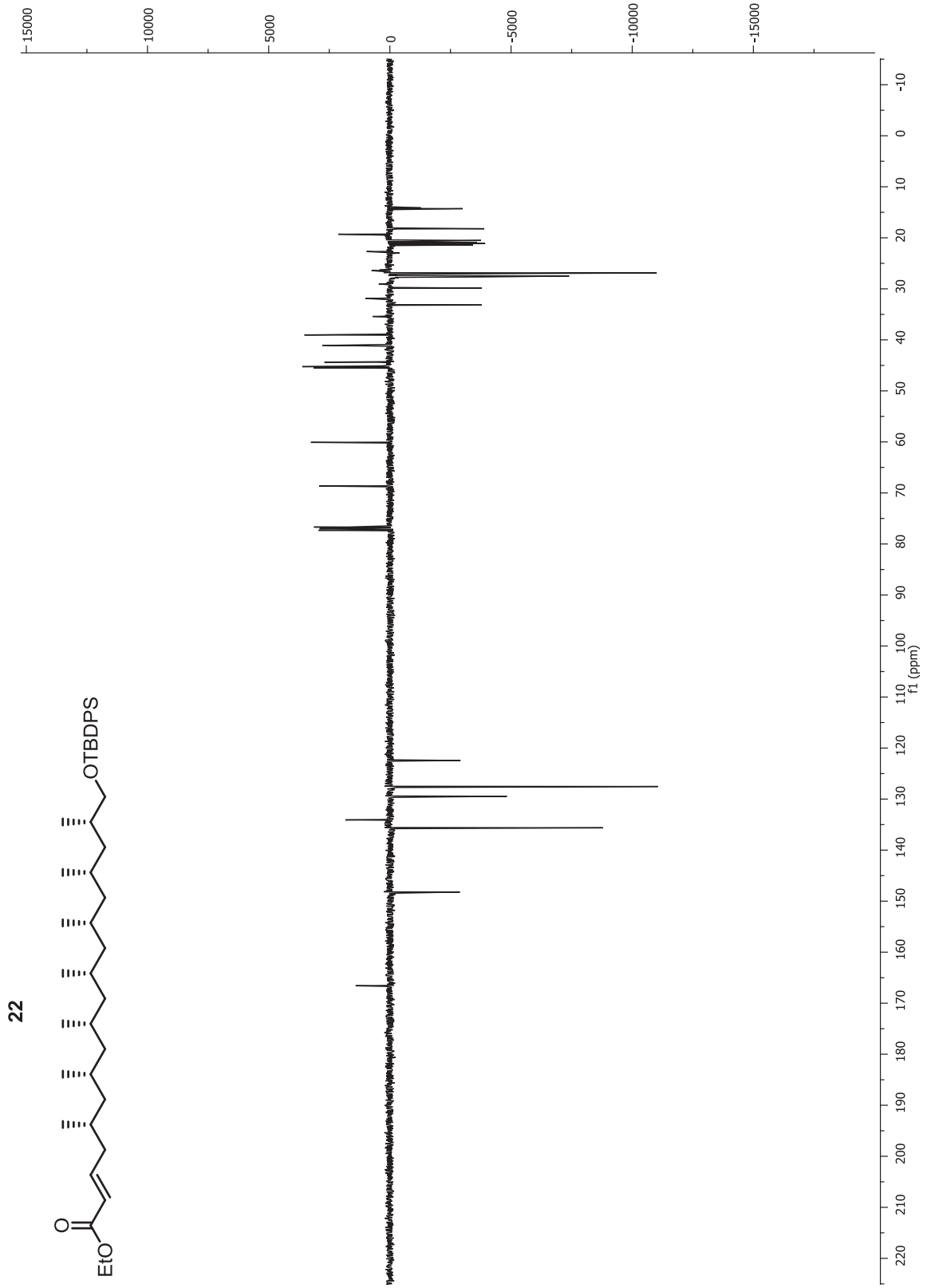
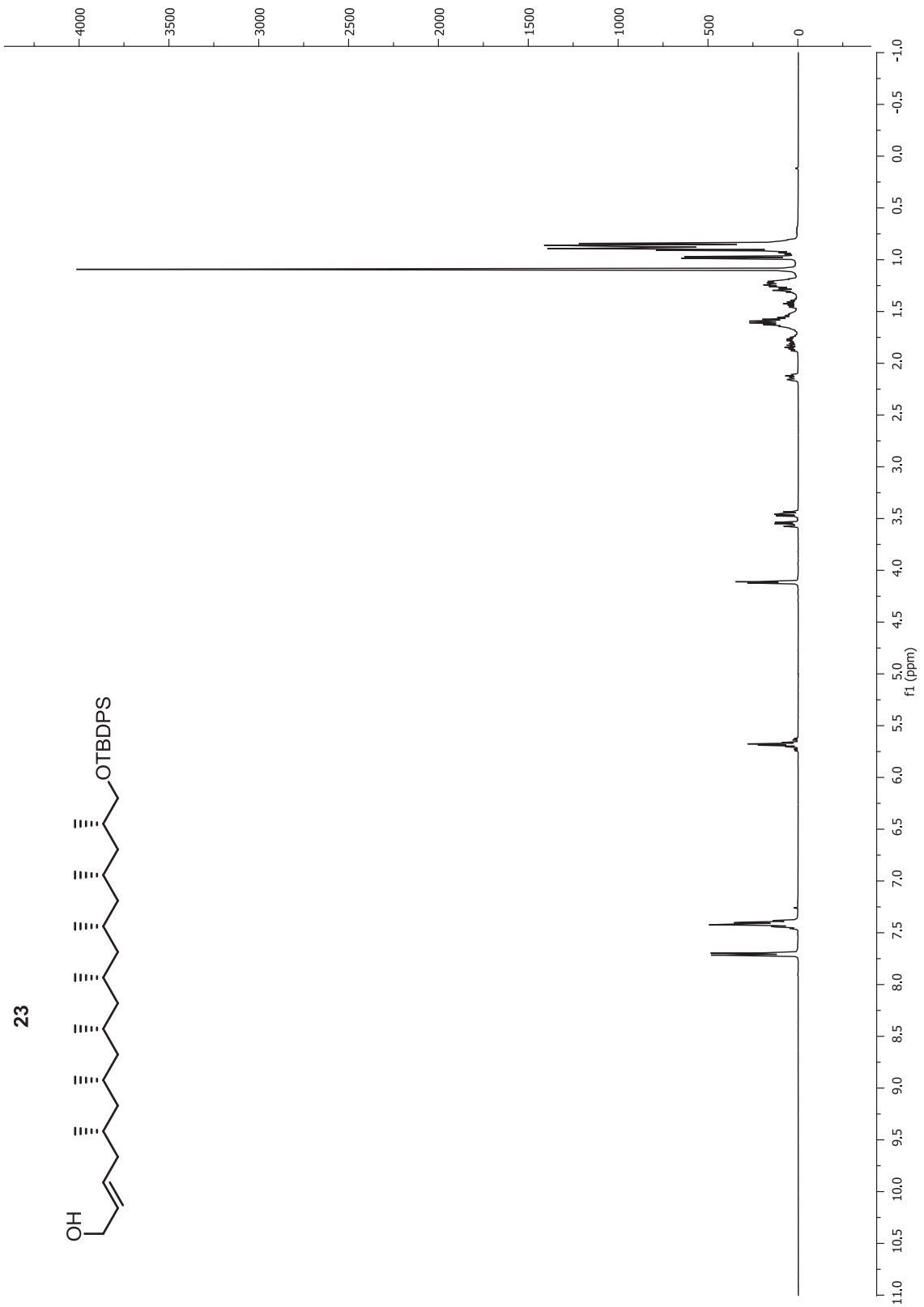
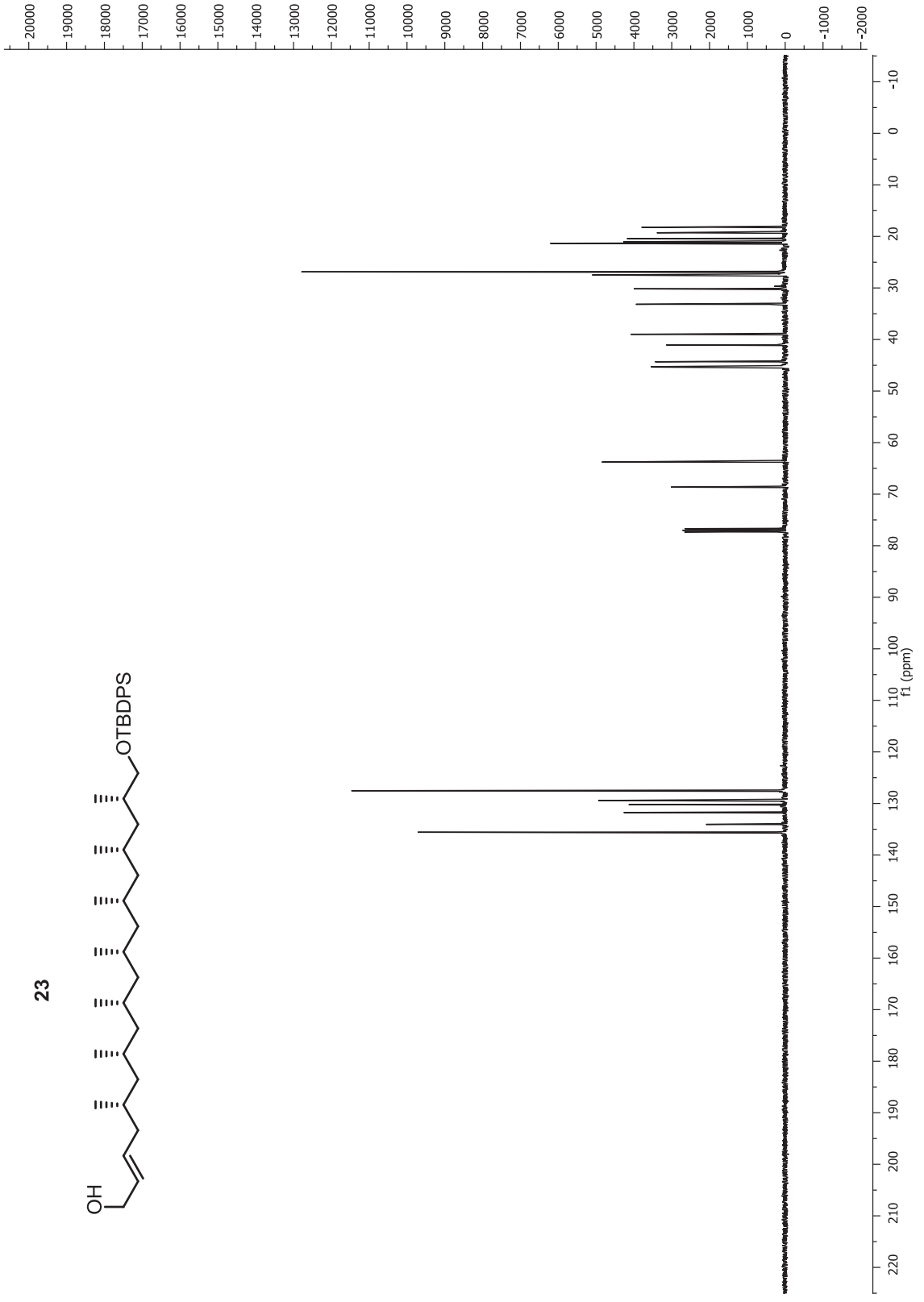
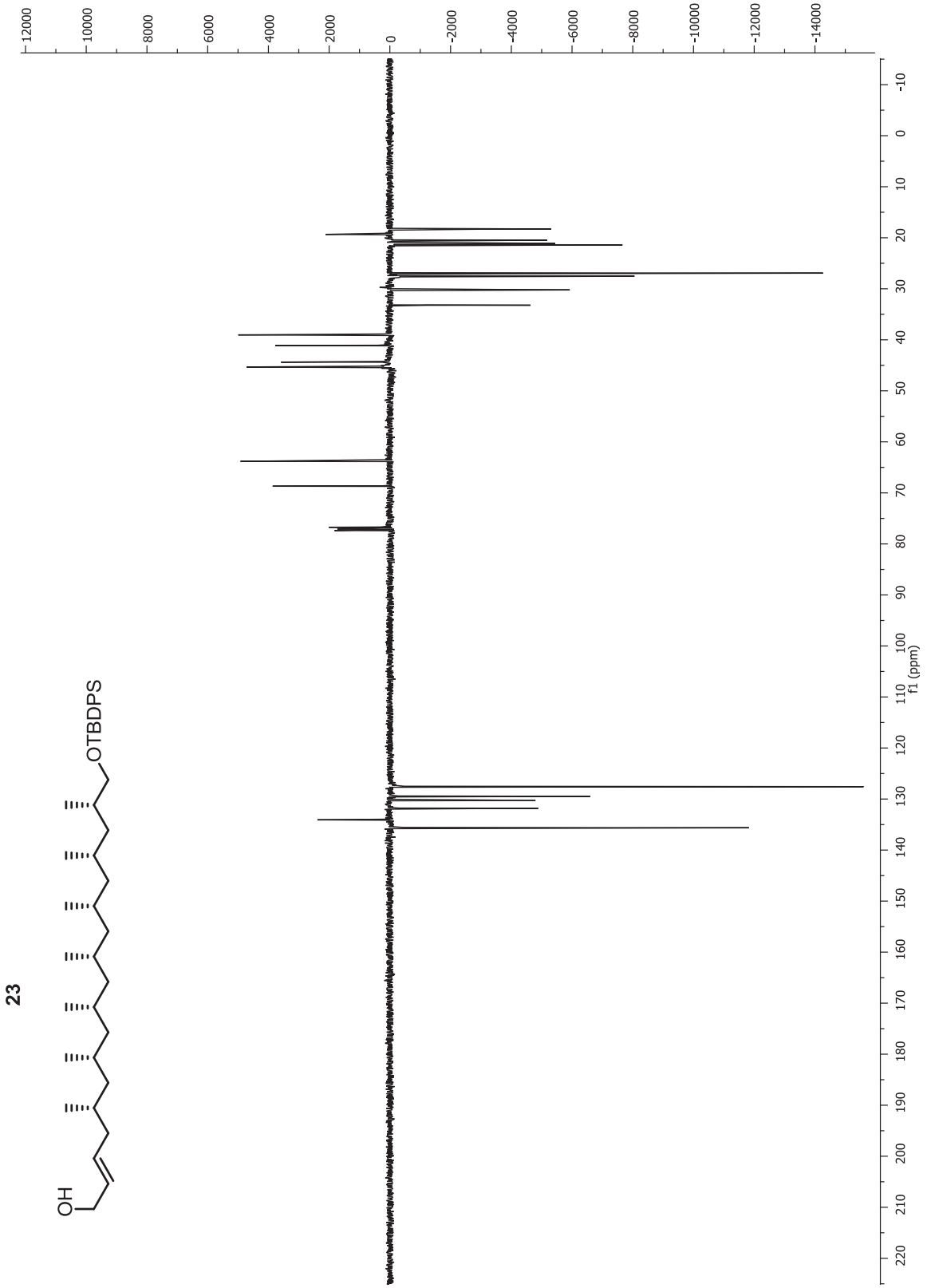
f1 (ppm)

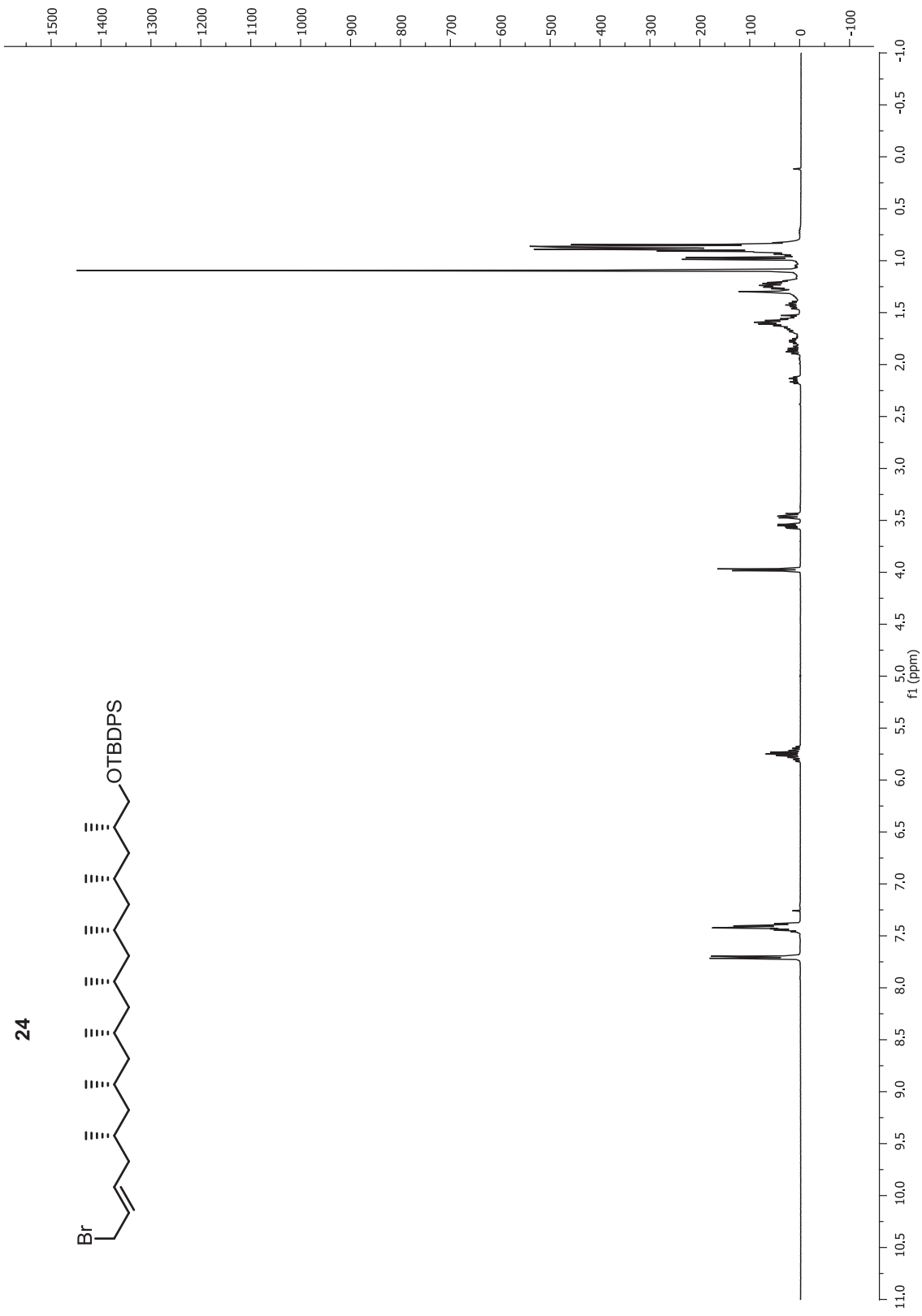


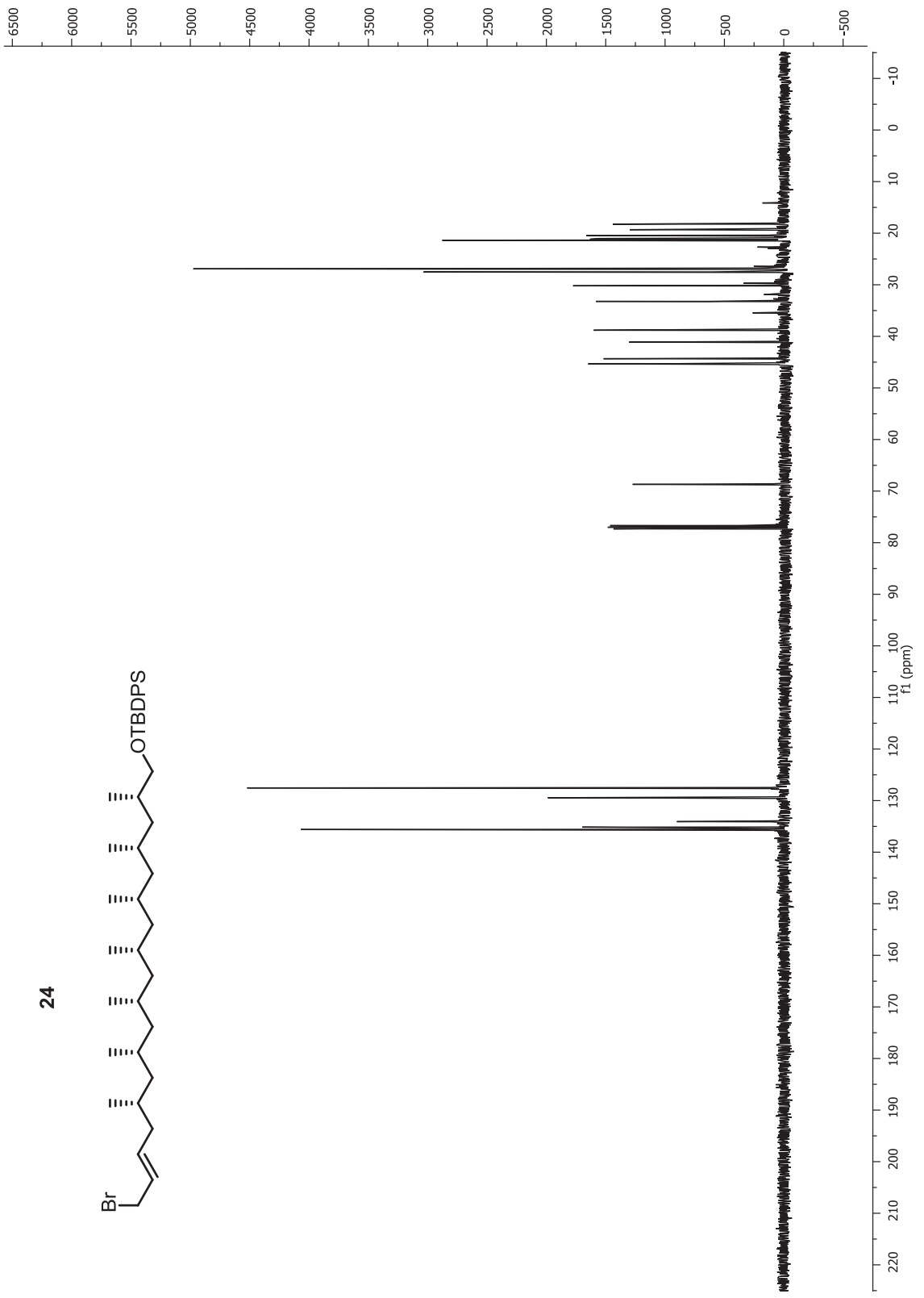


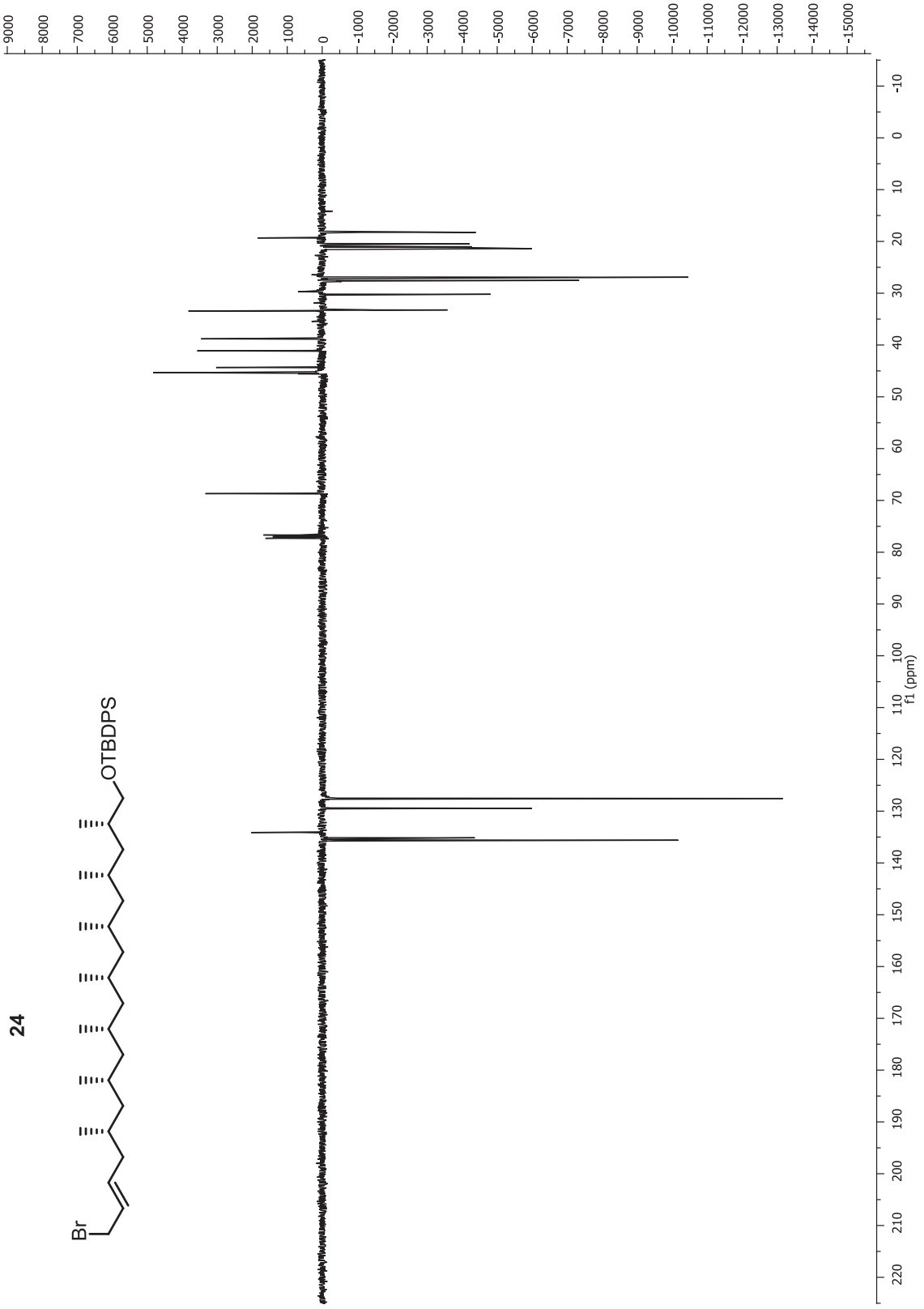


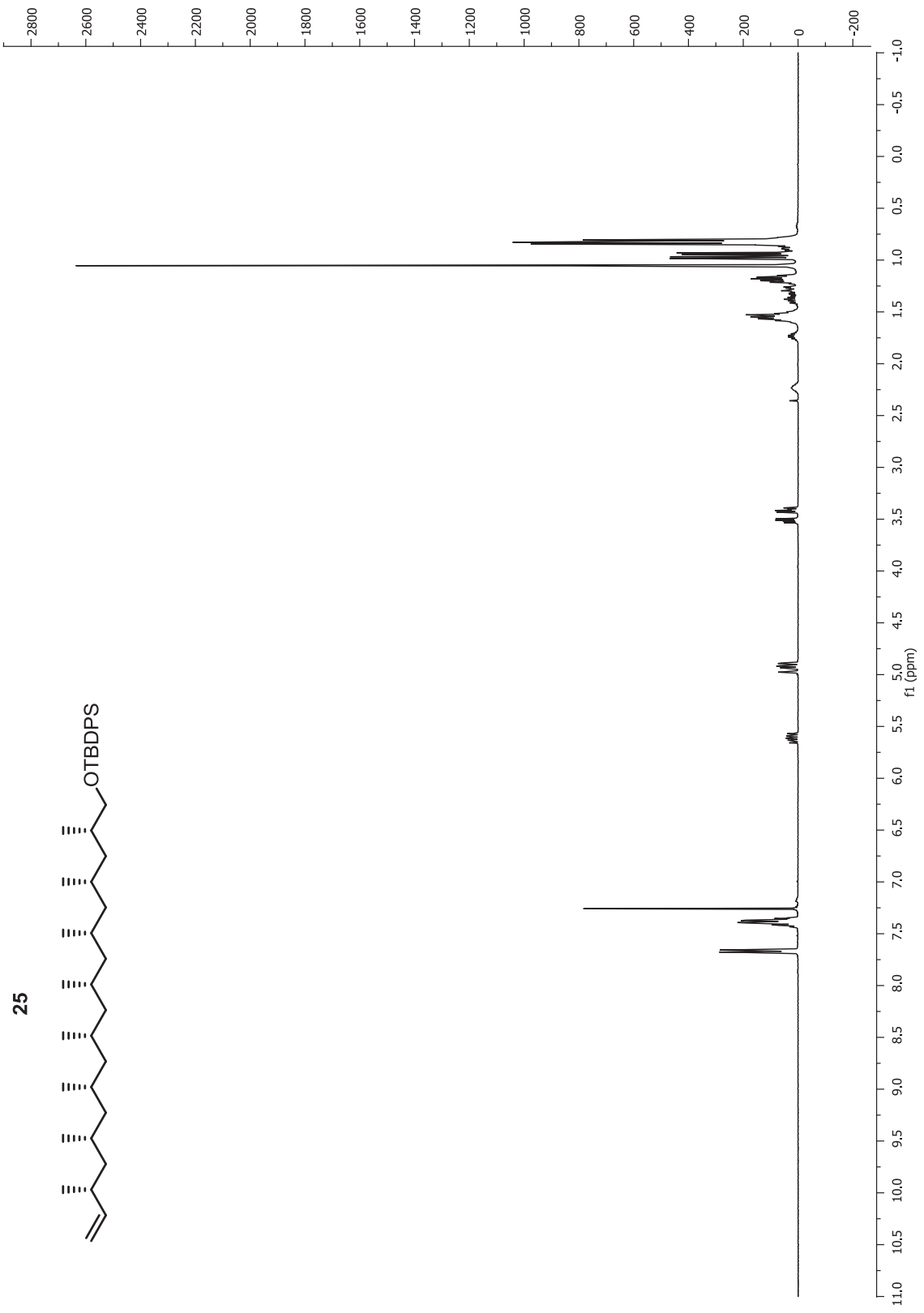


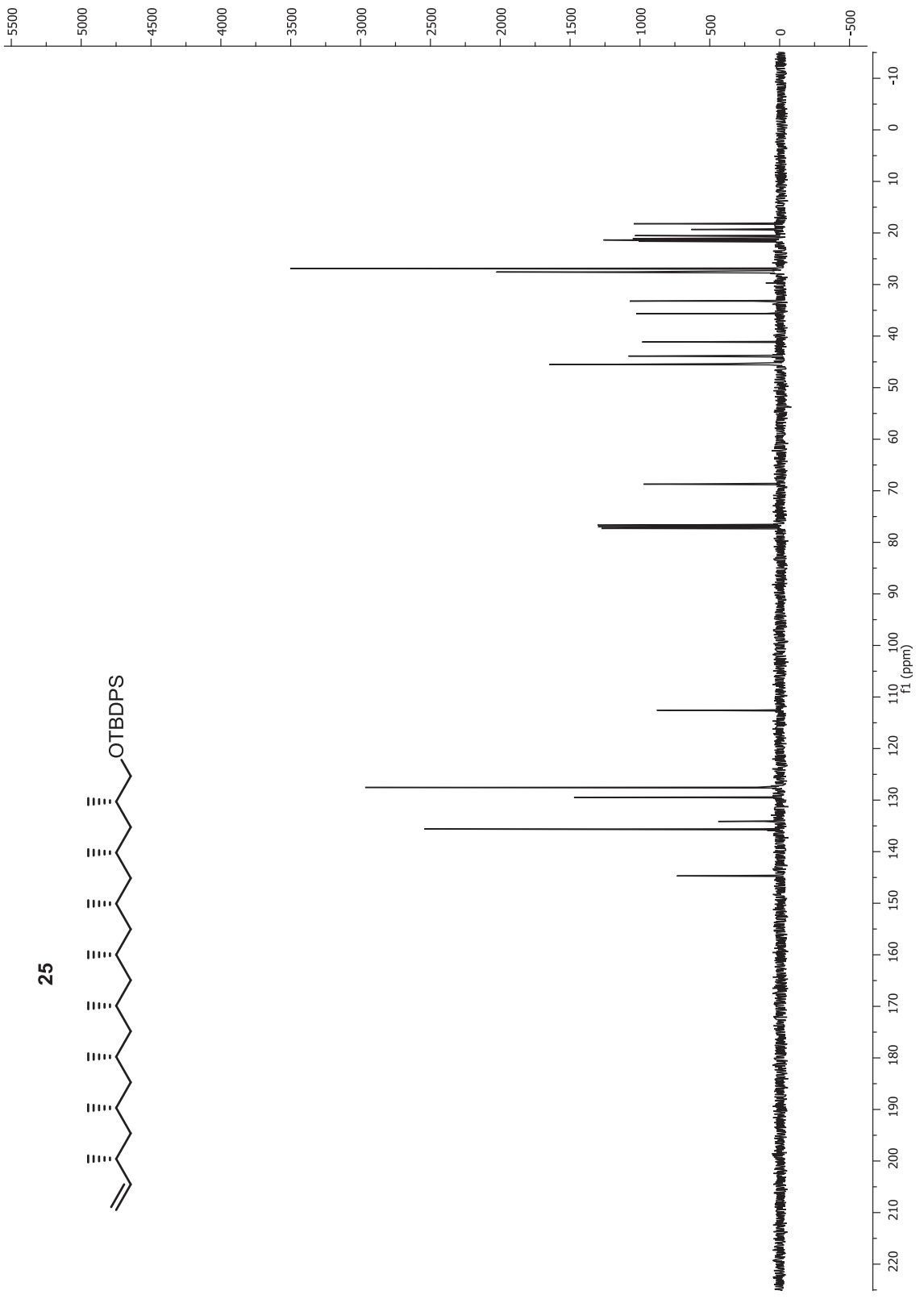


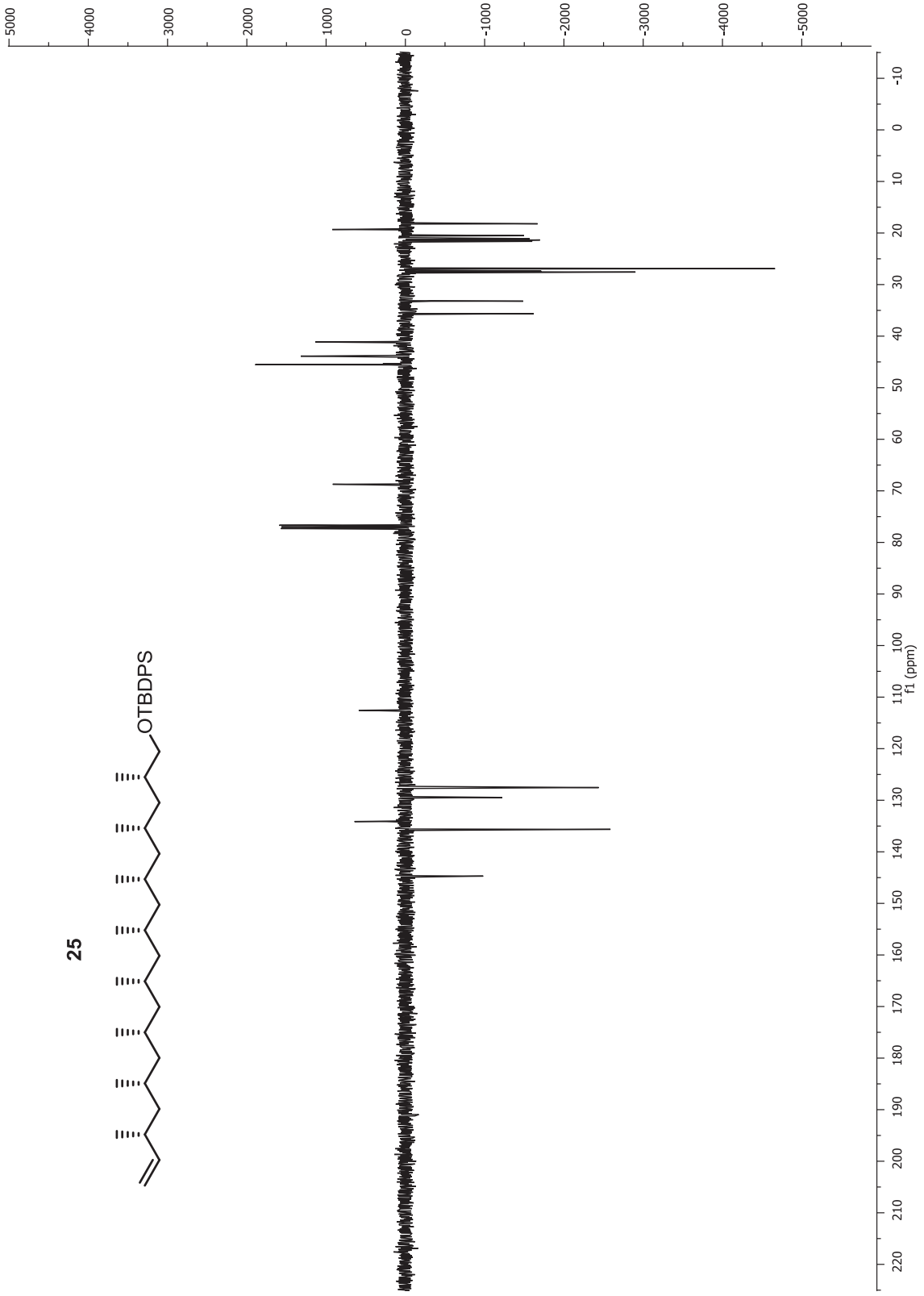


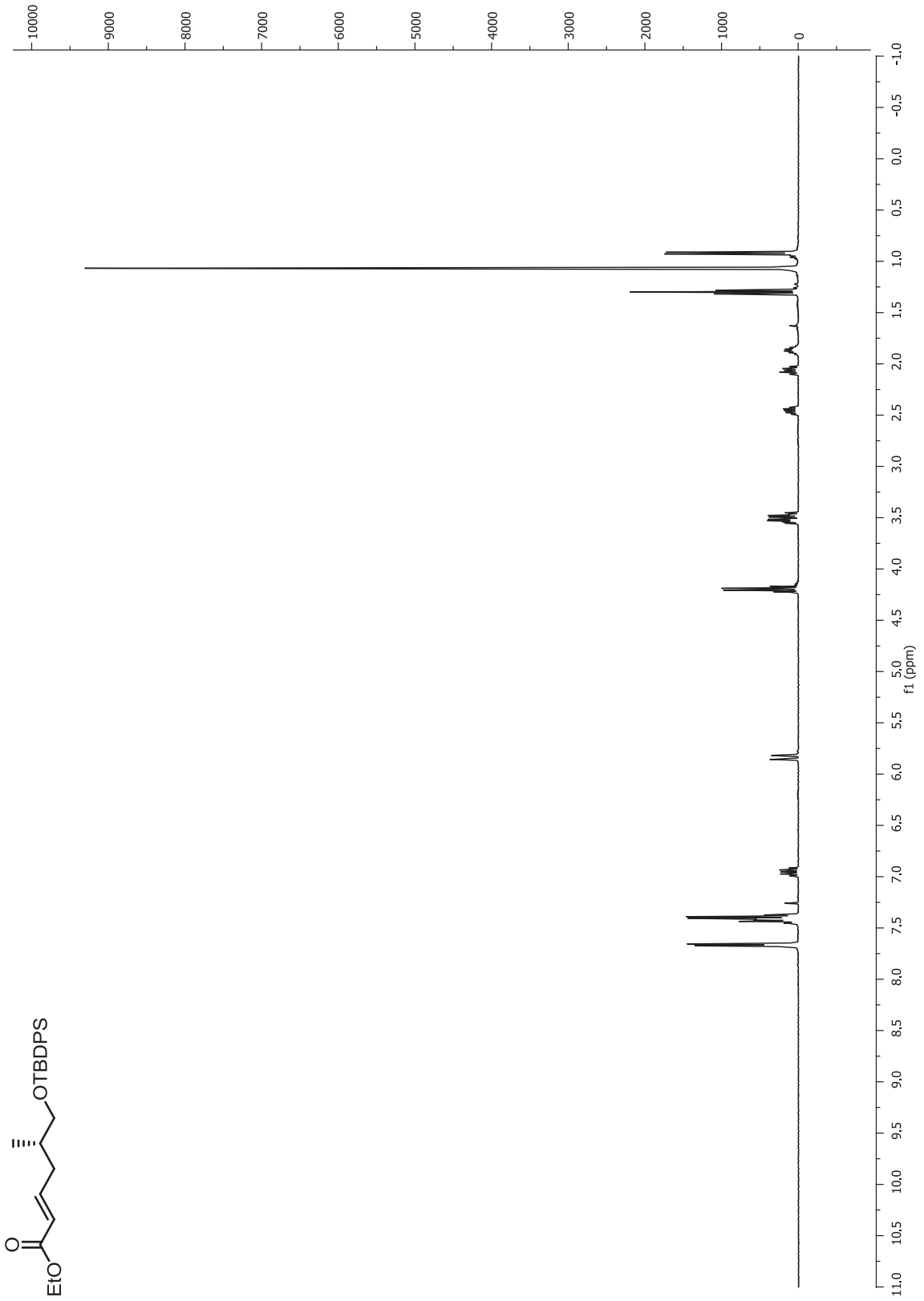


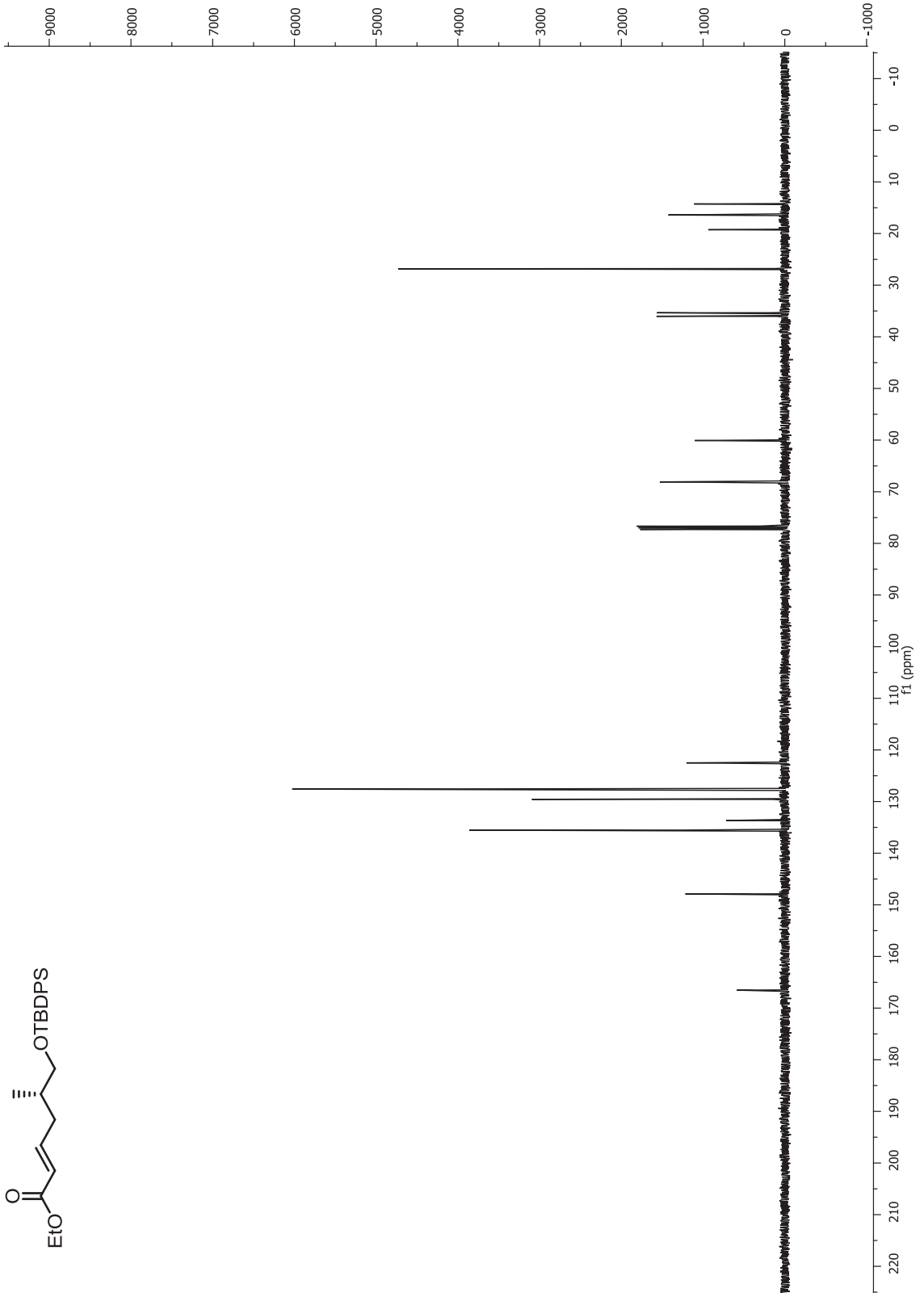


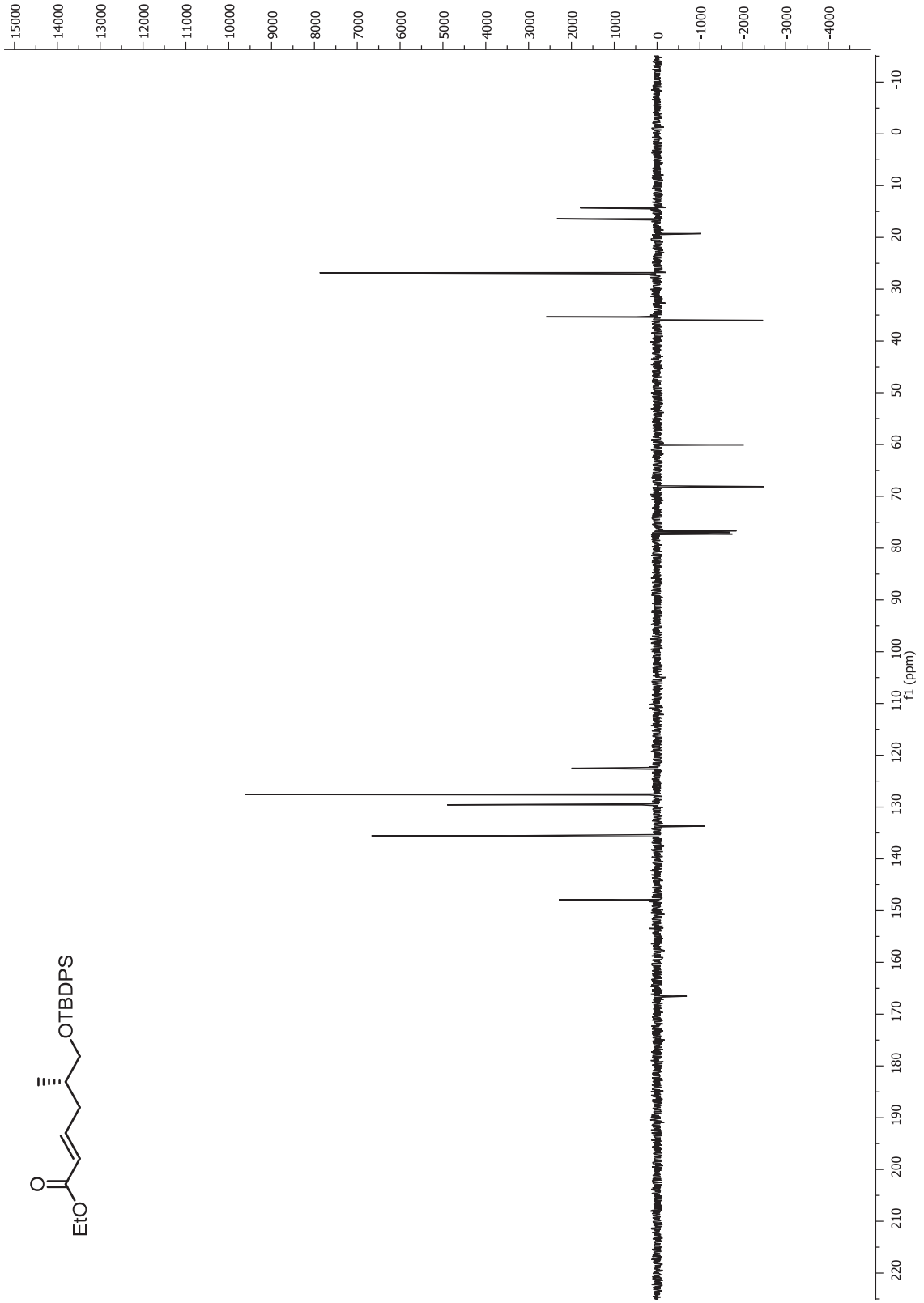


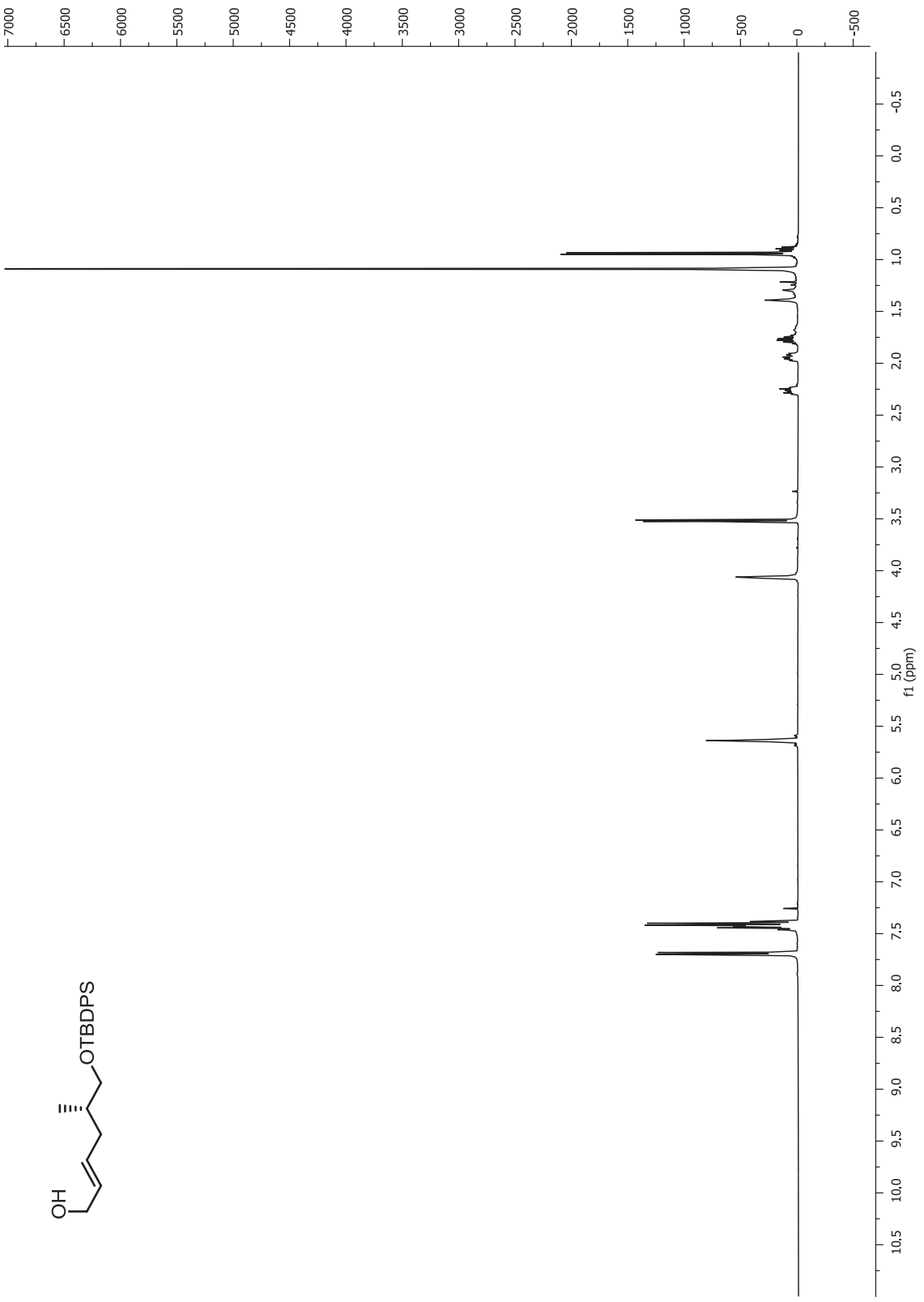


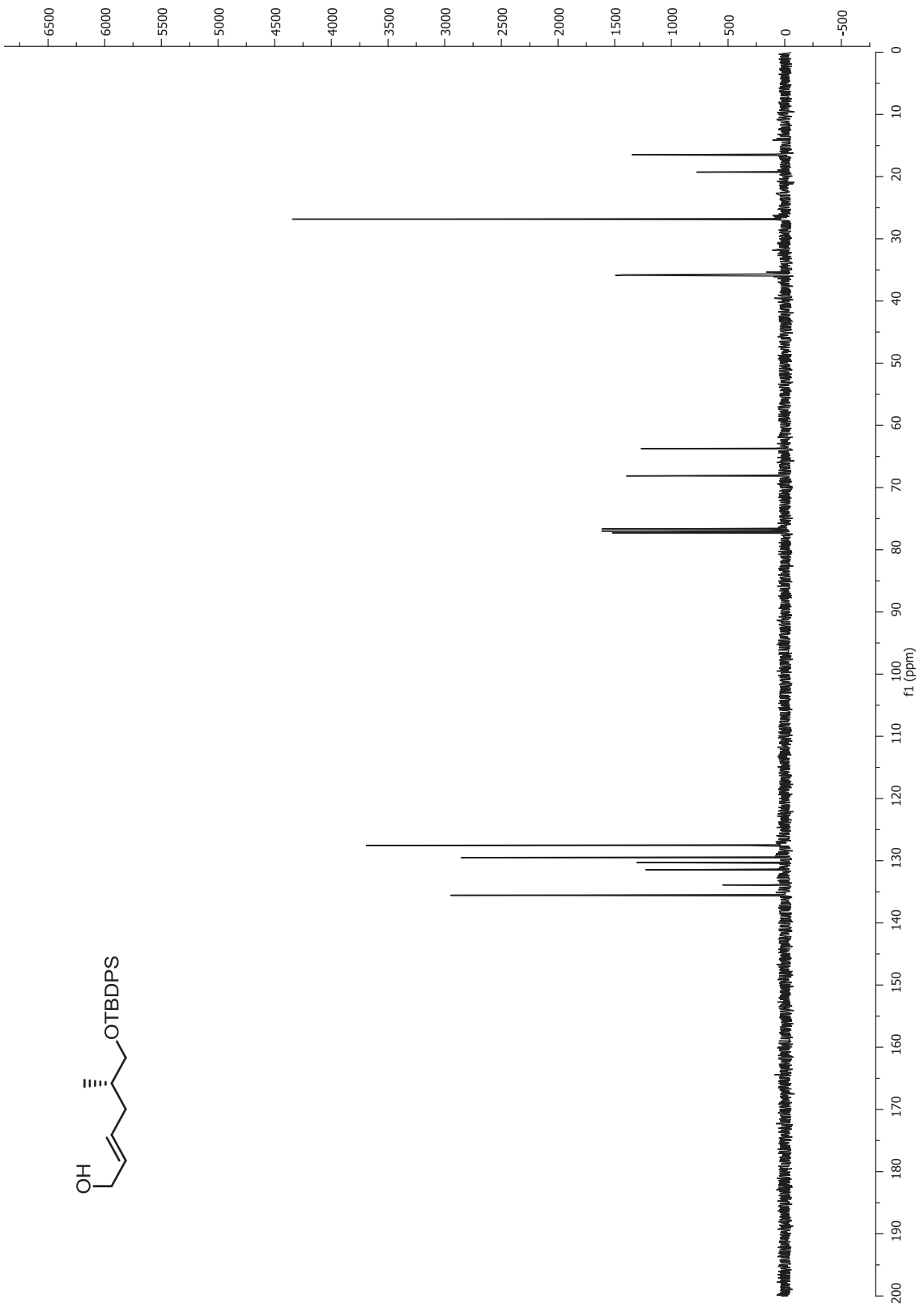


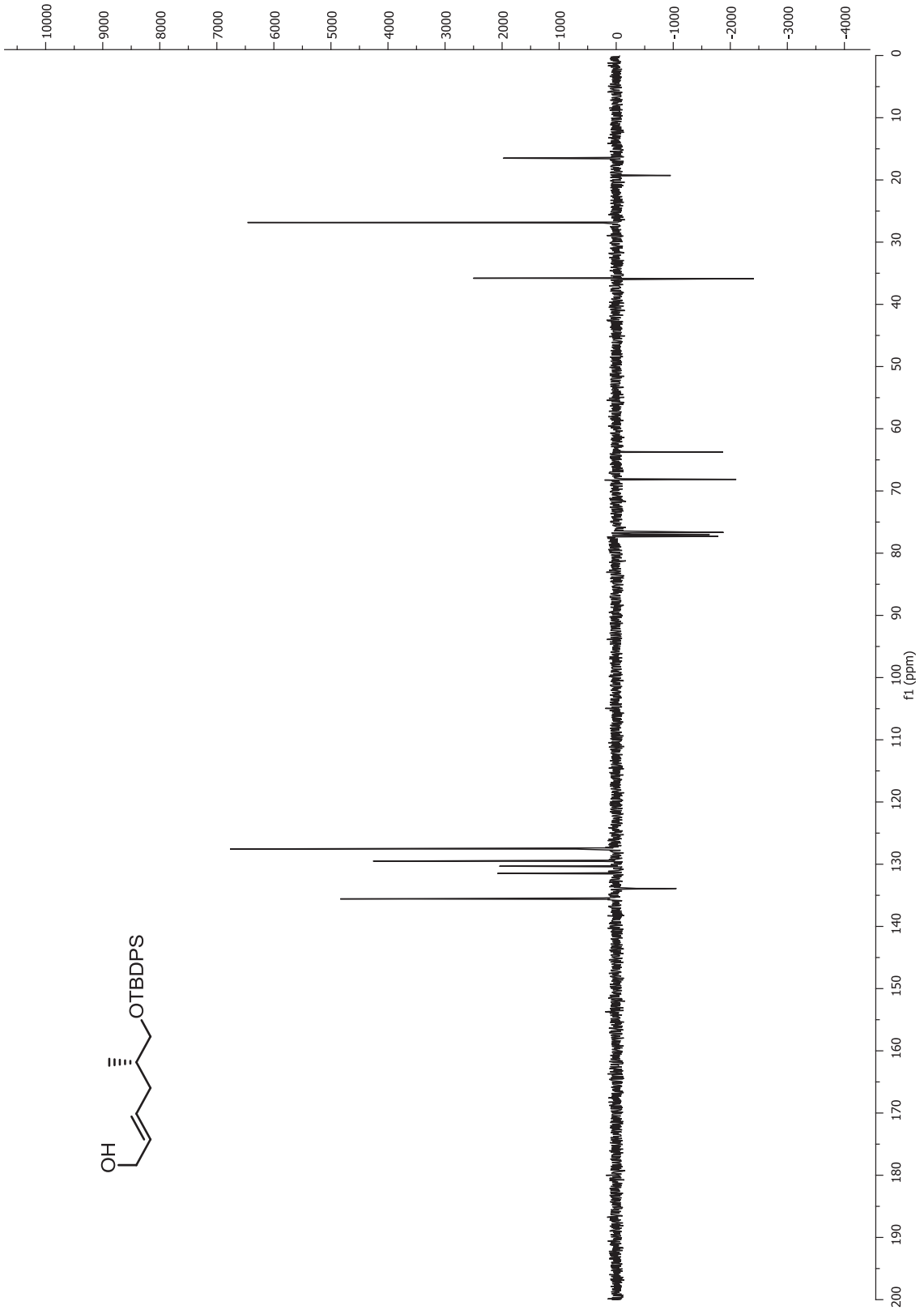


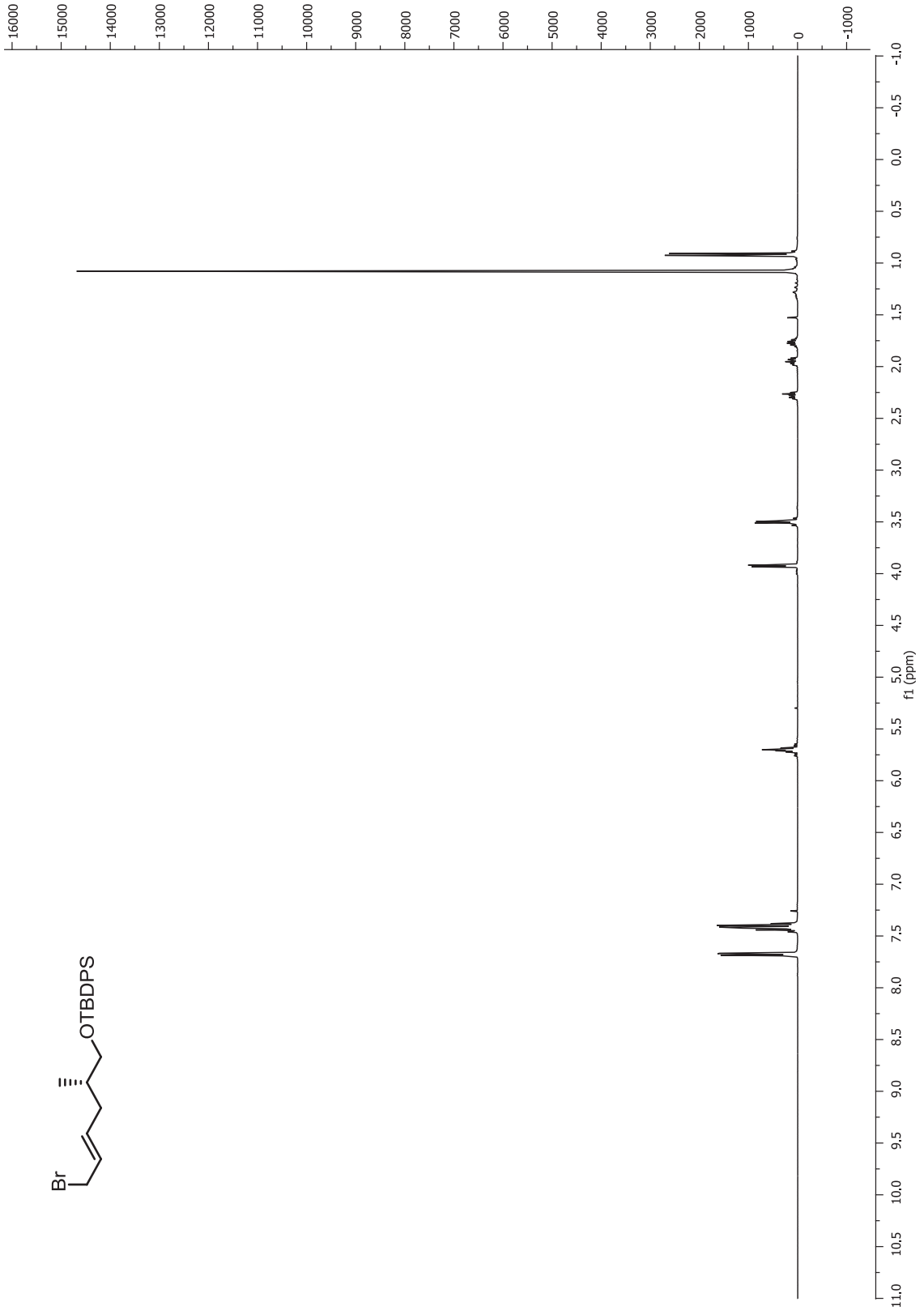


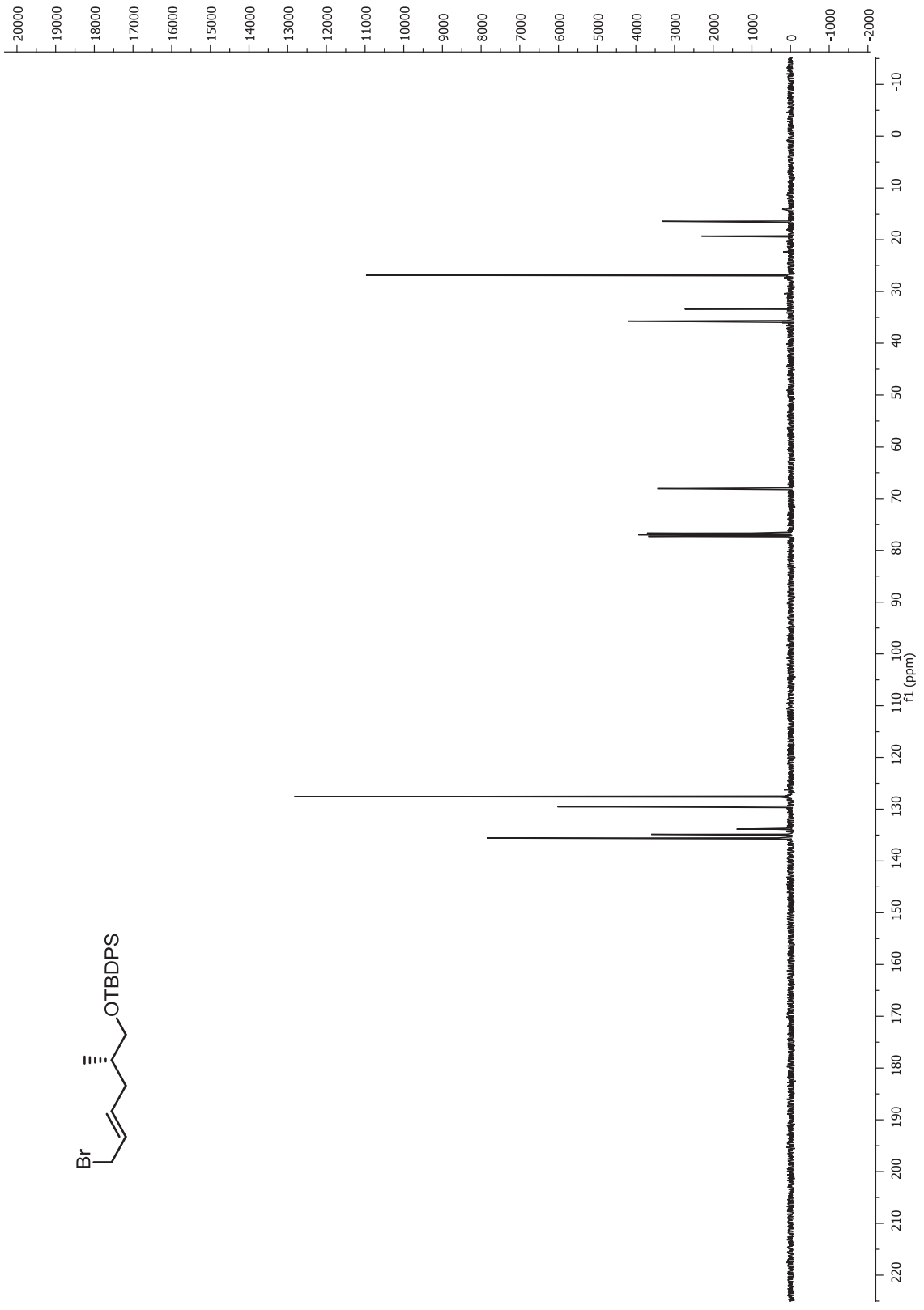


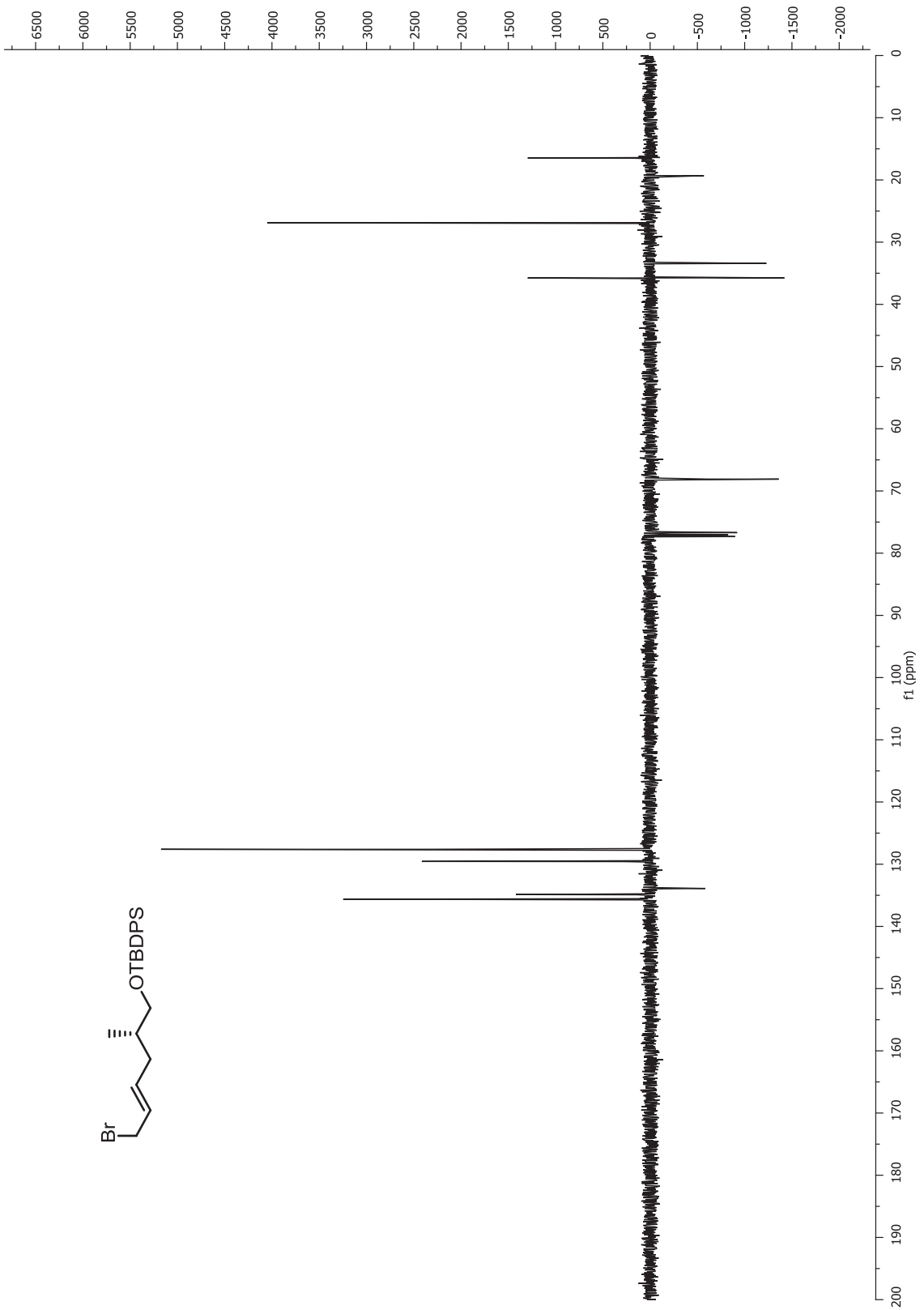


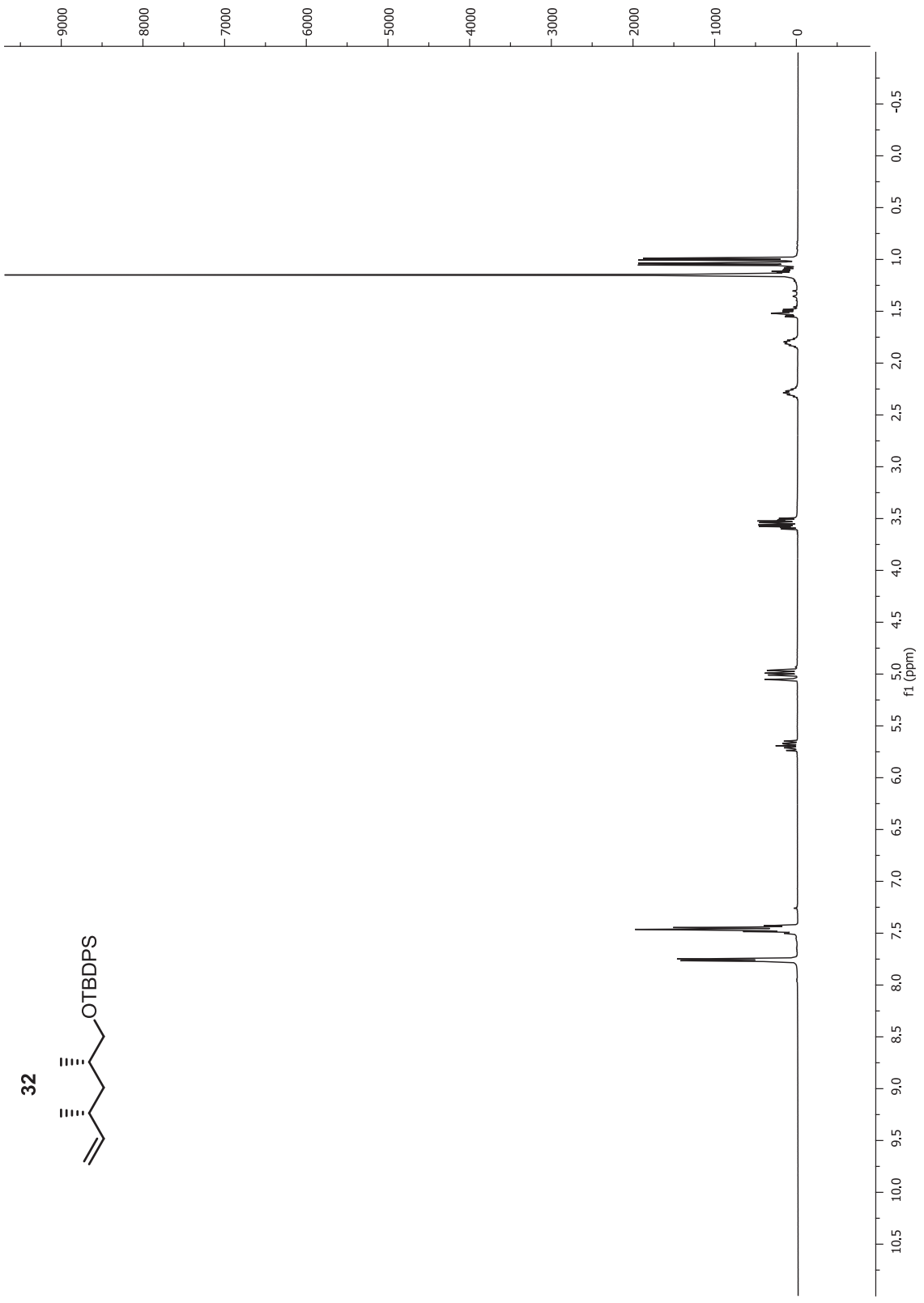


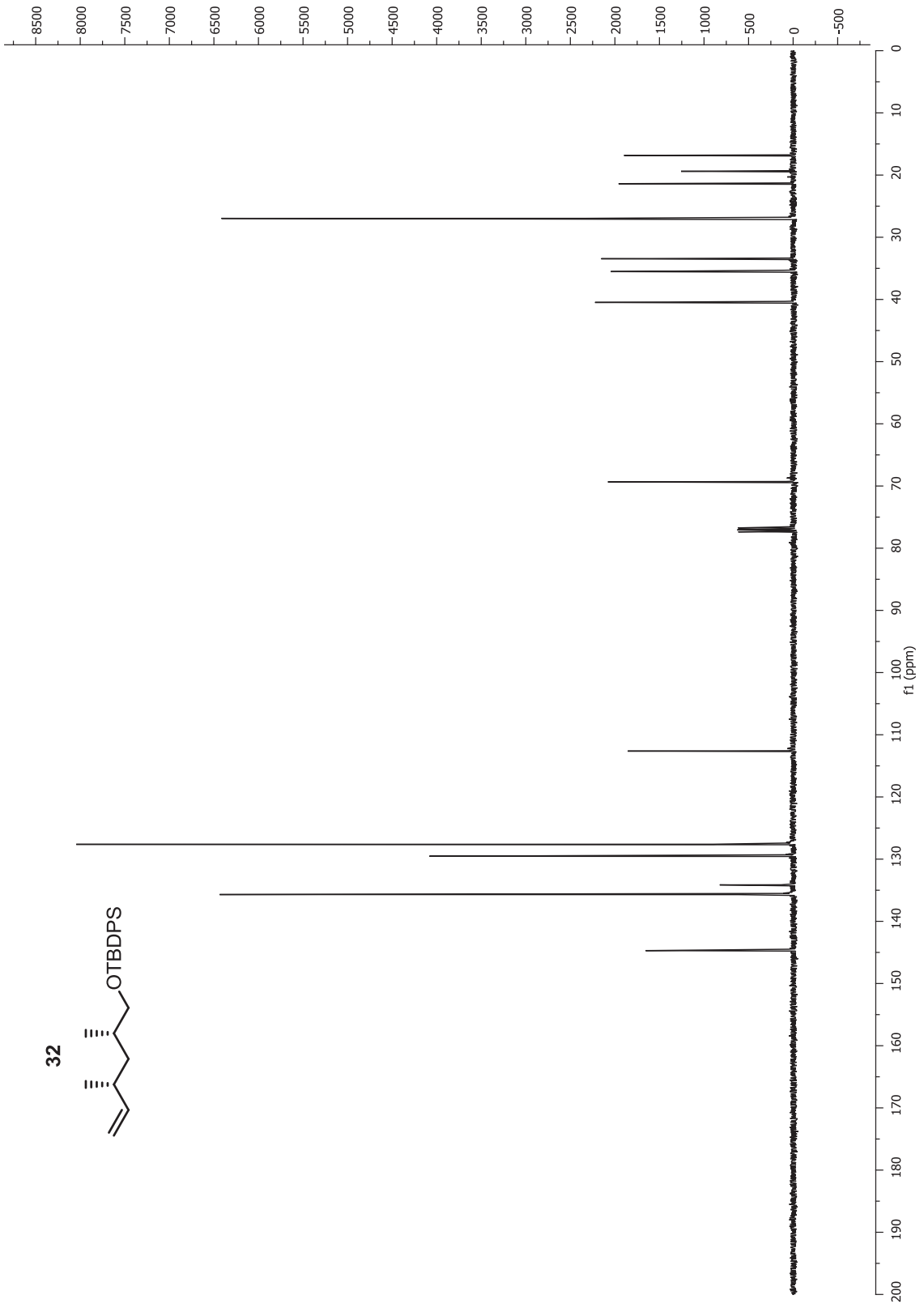


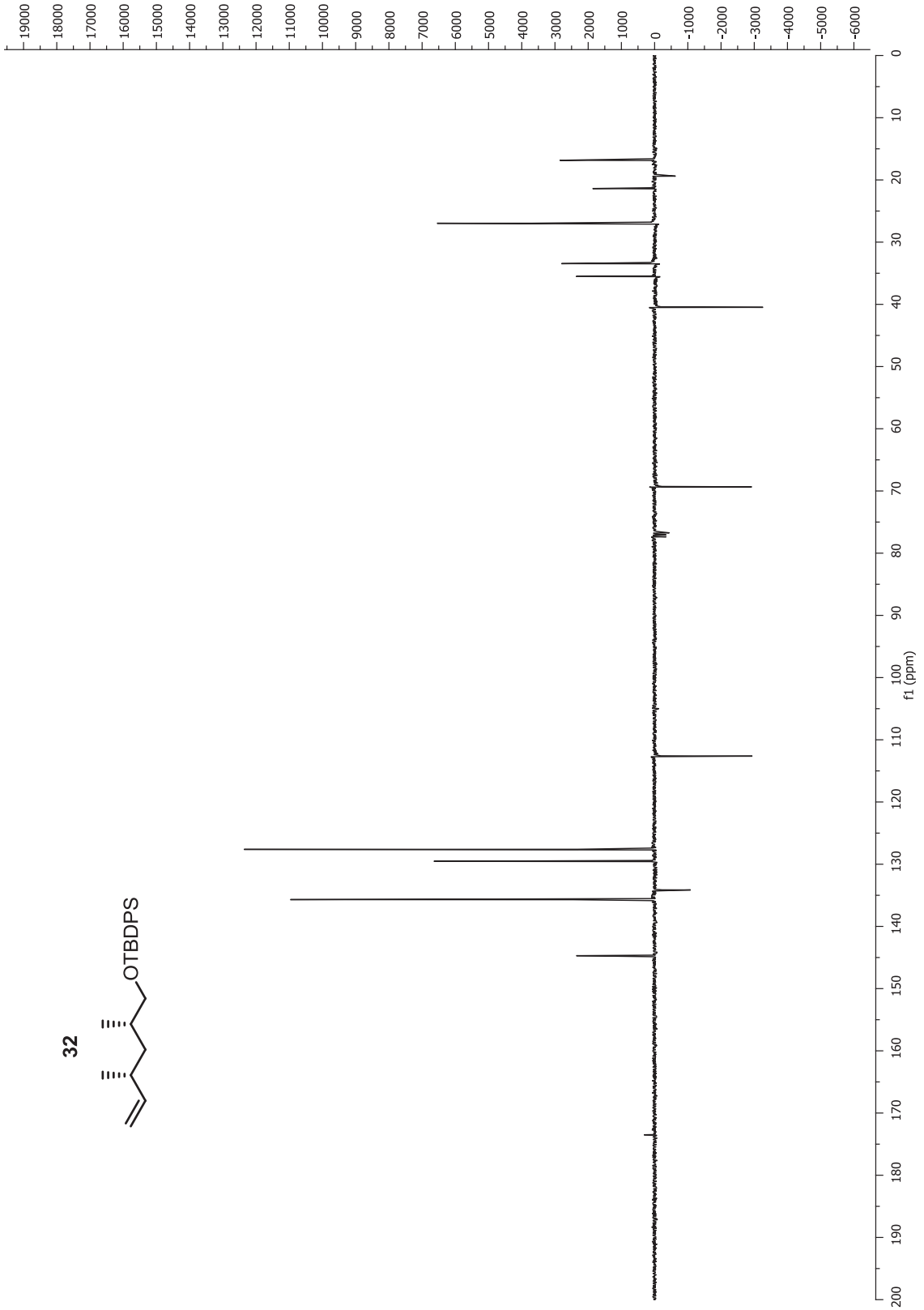


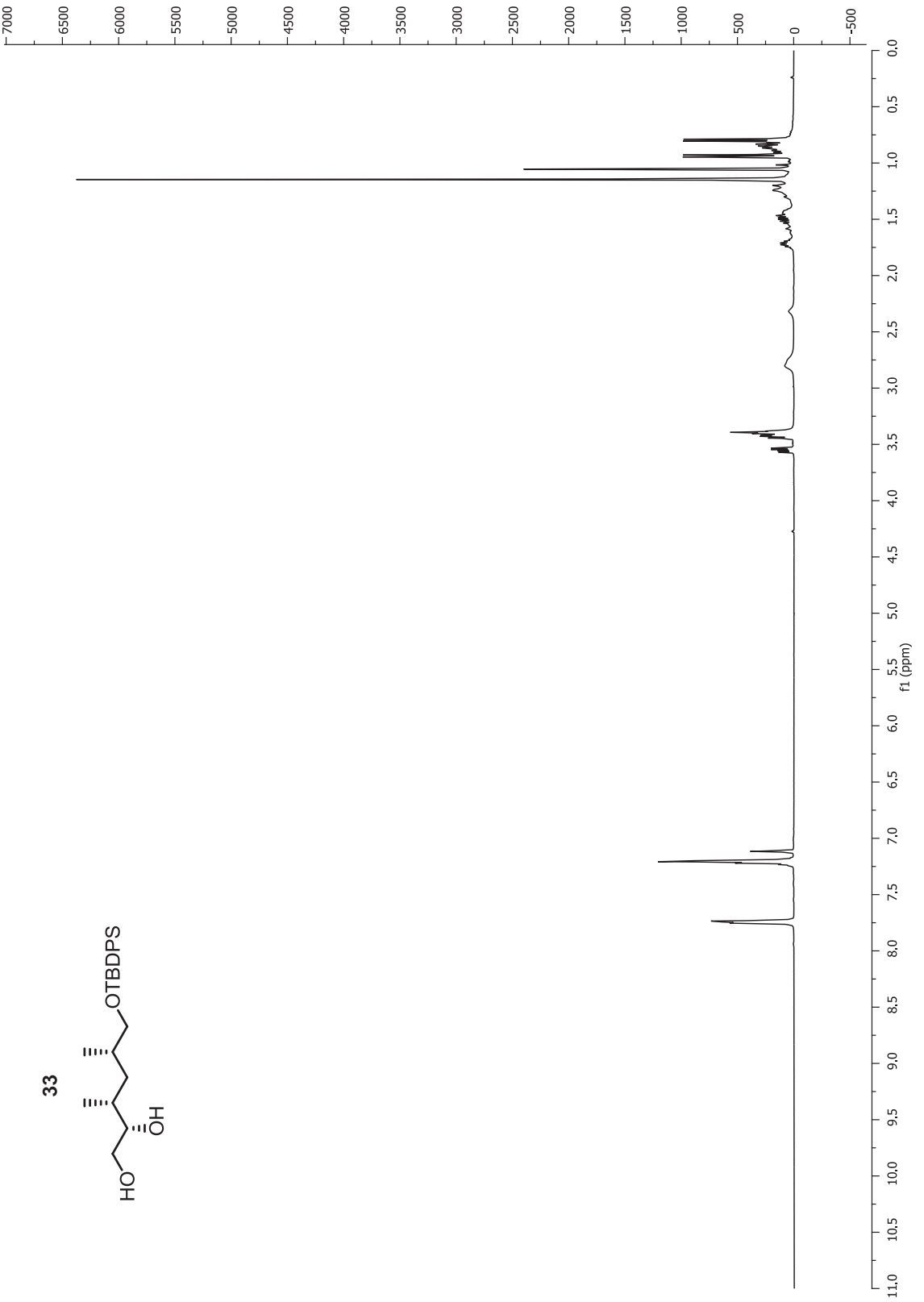


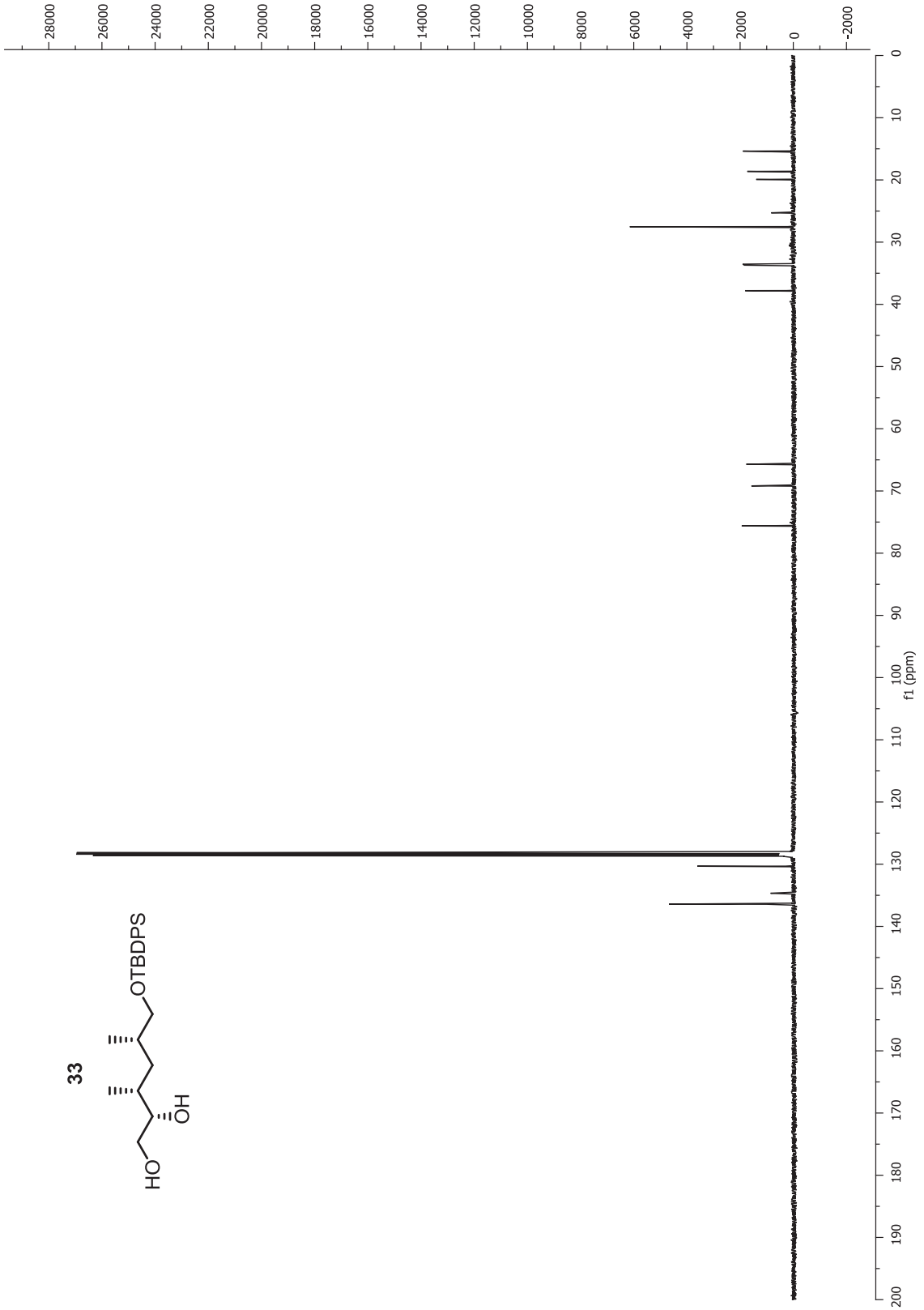


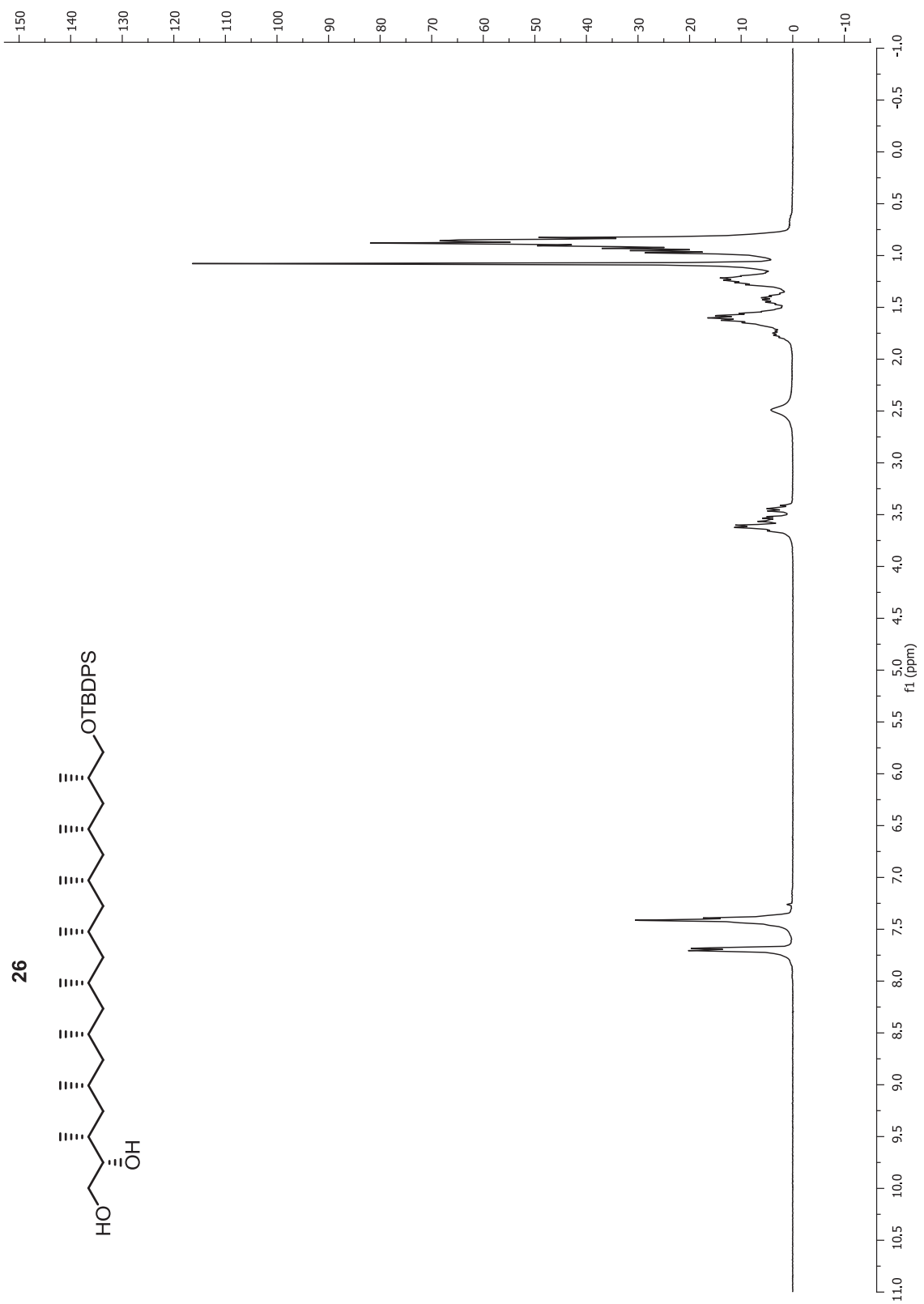


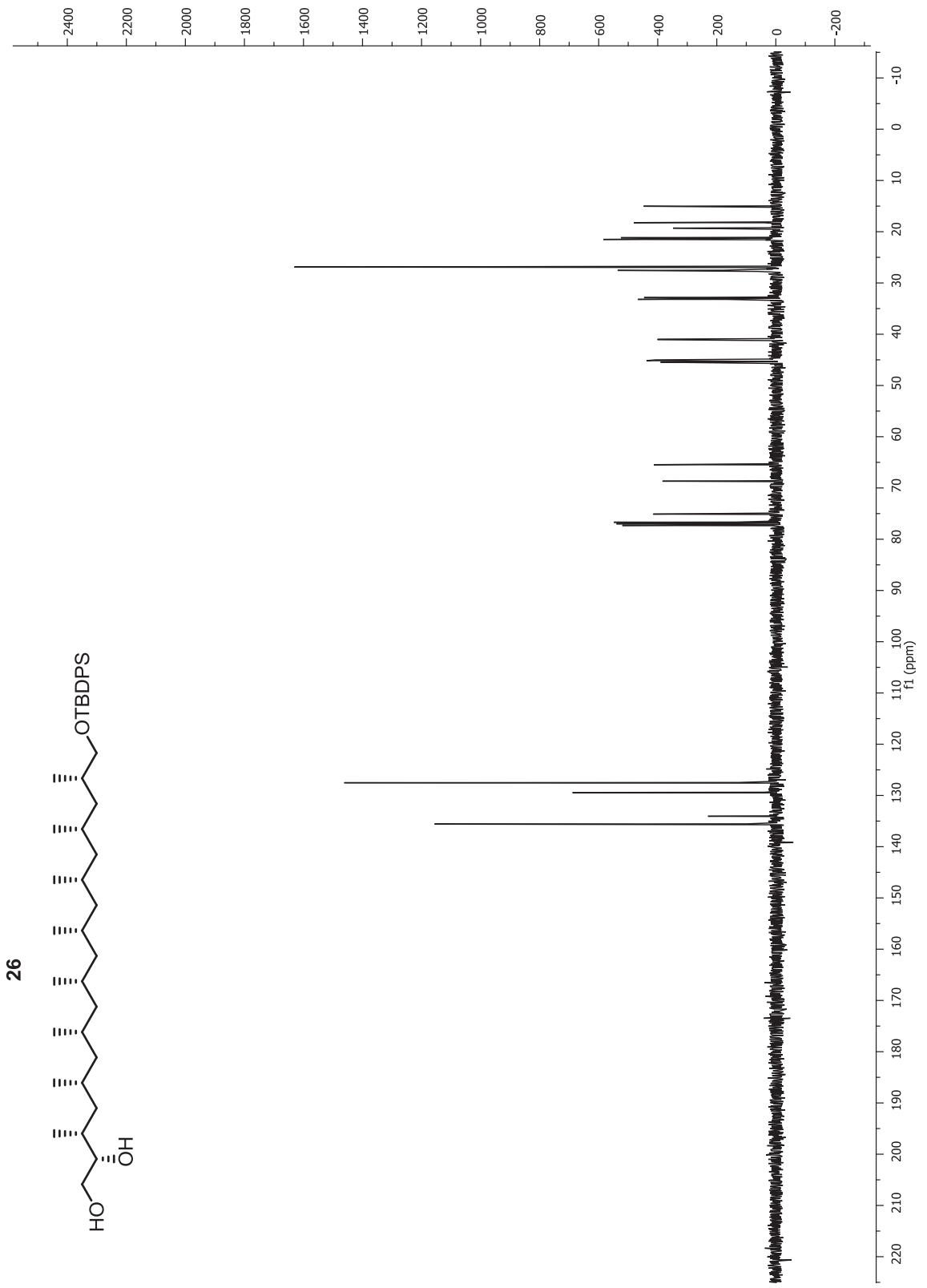


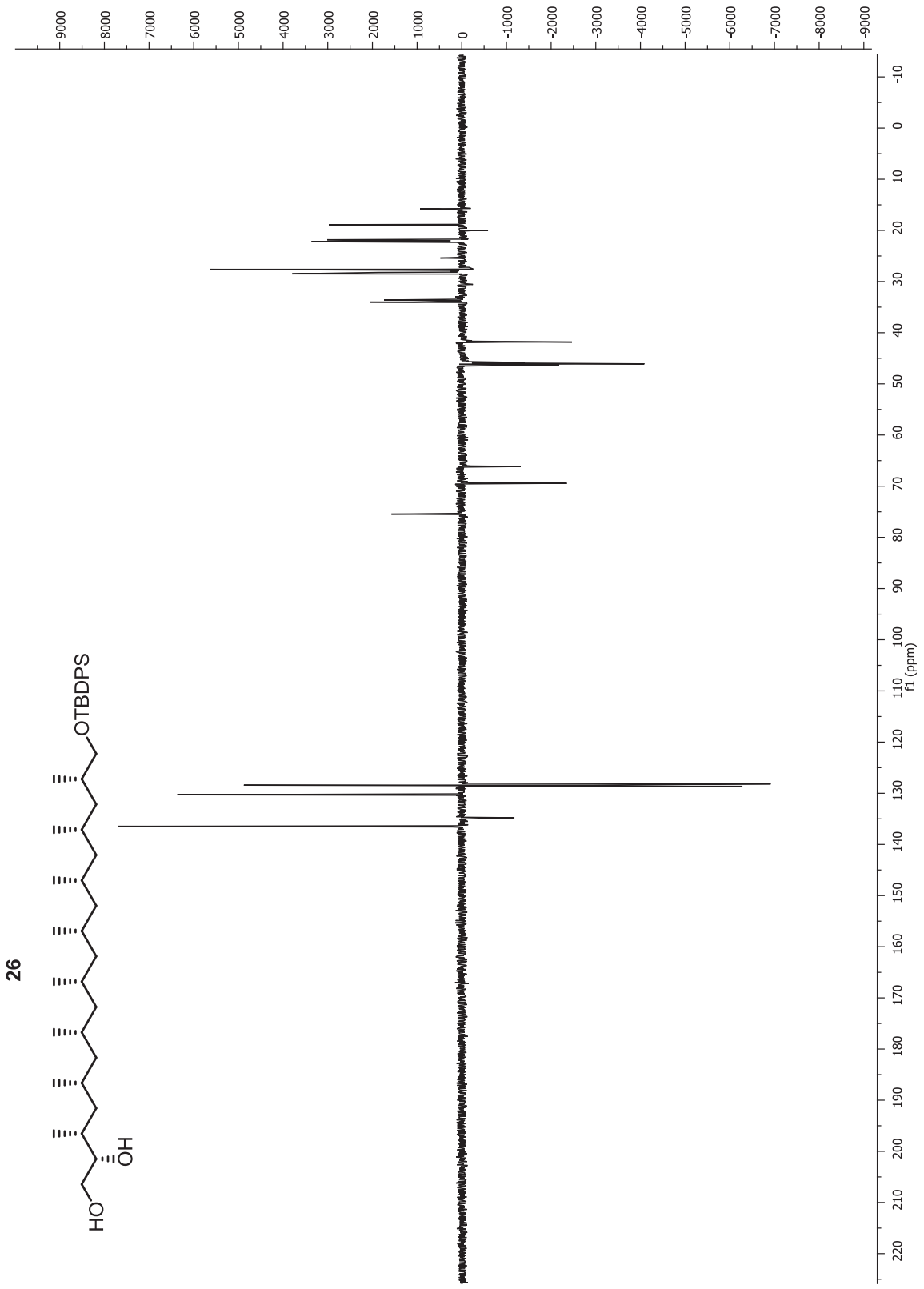


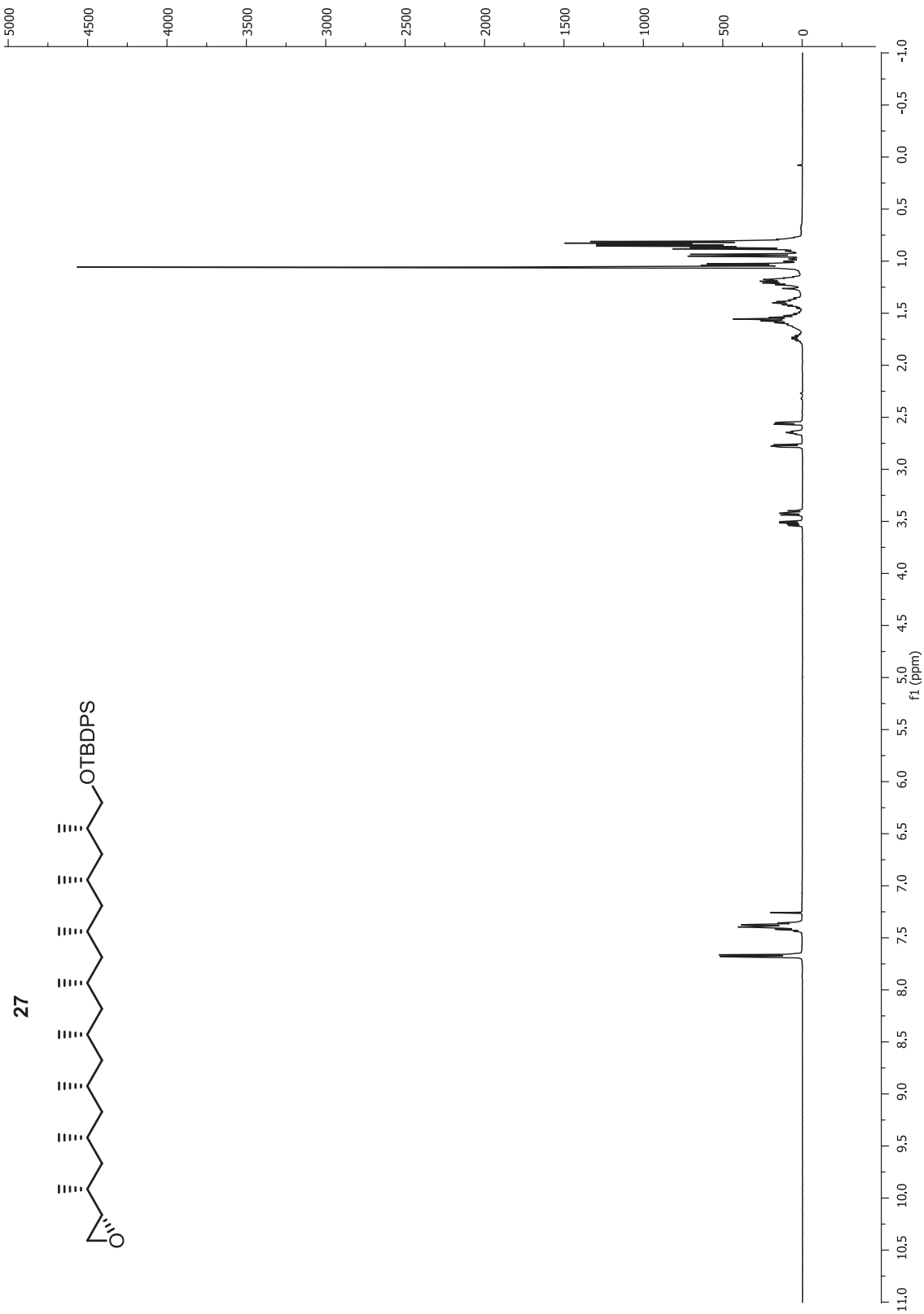


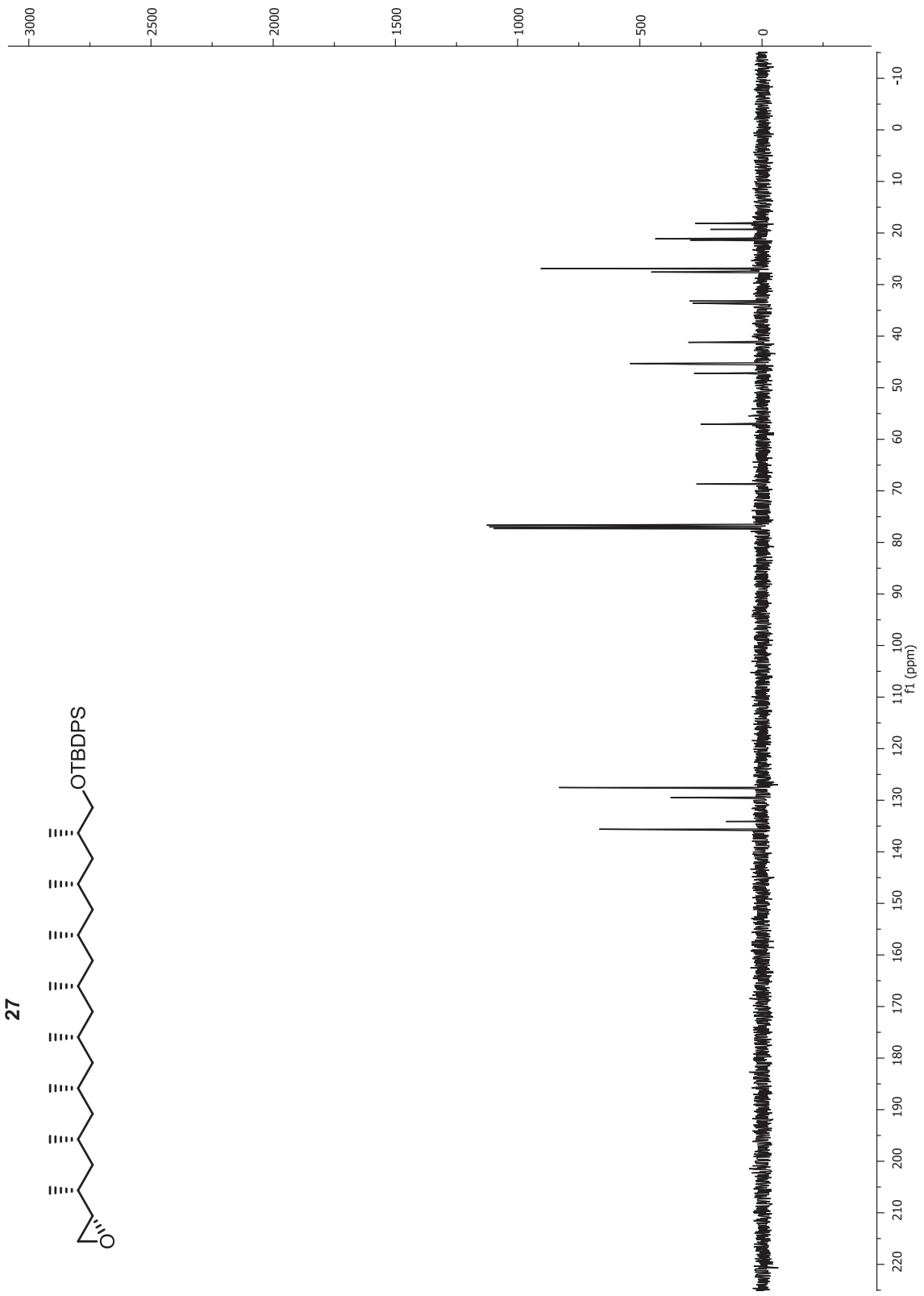


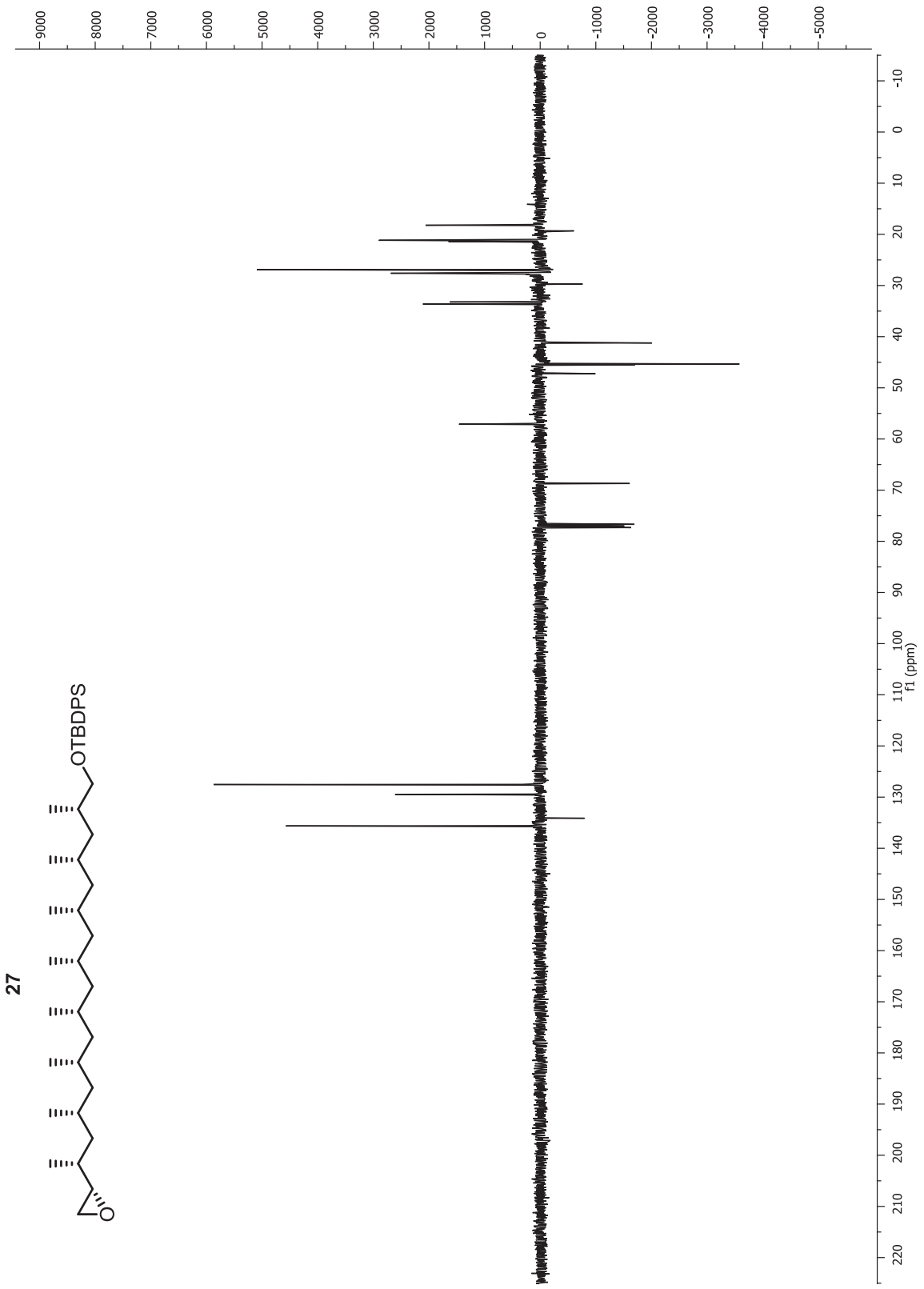


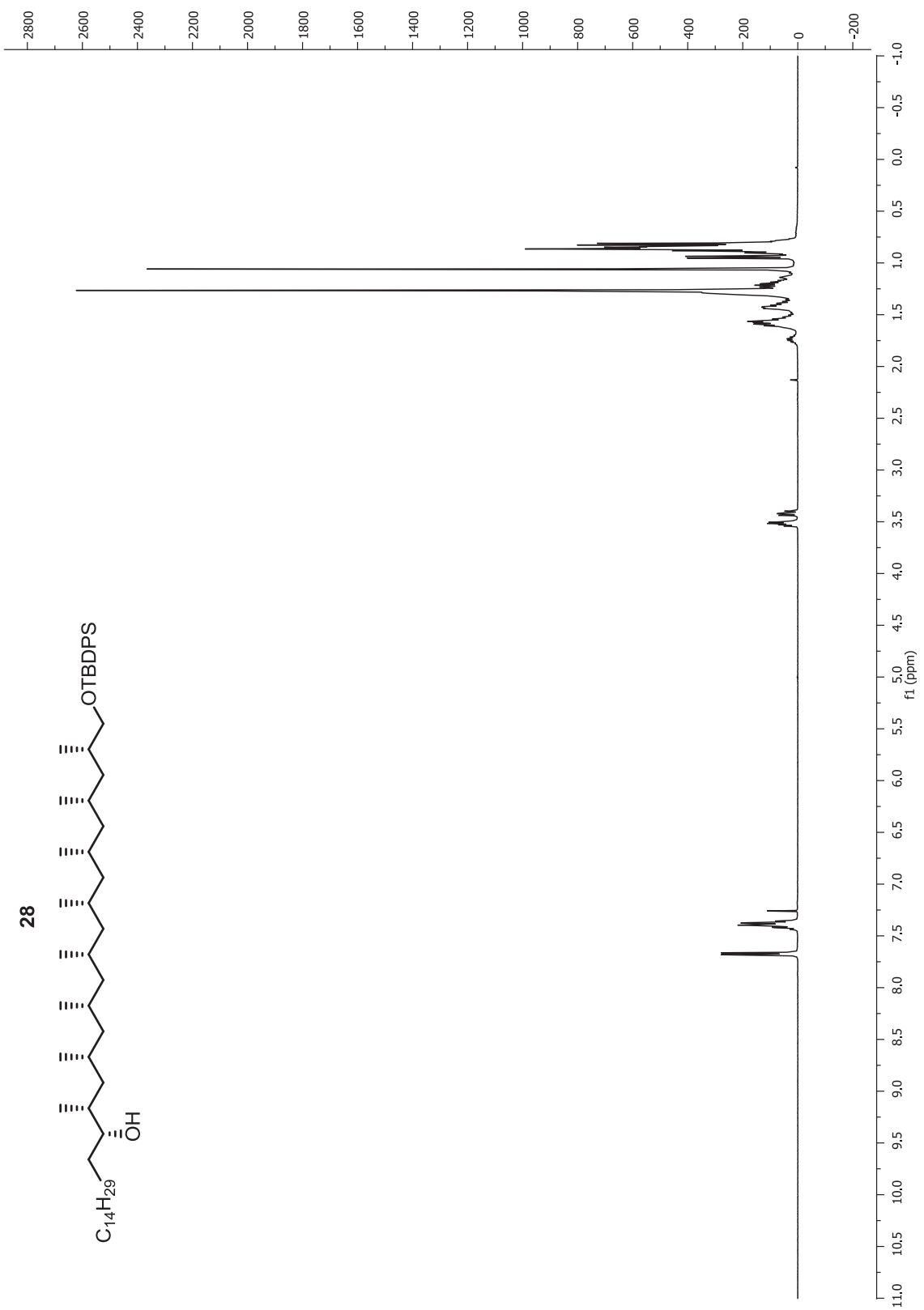


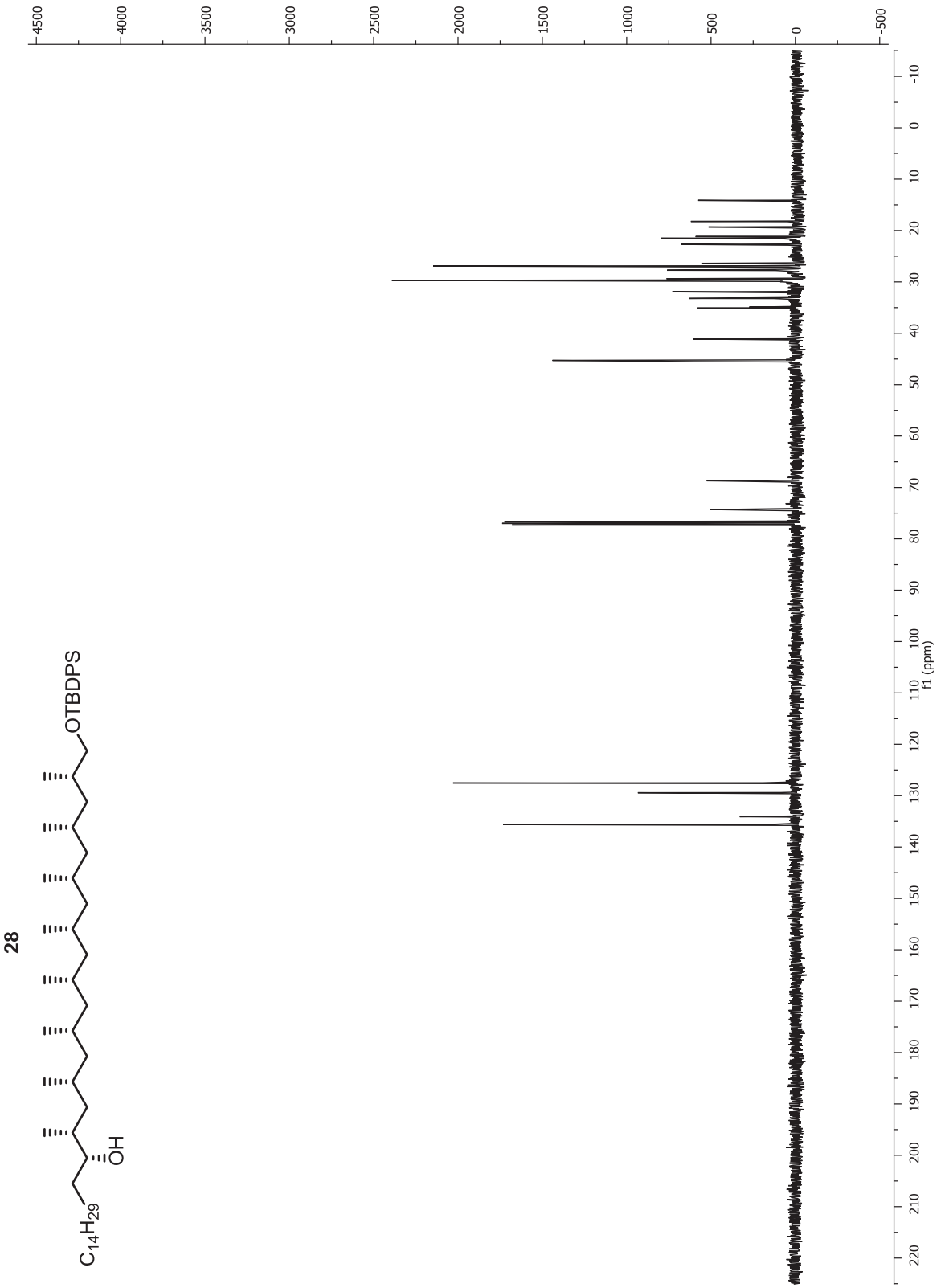


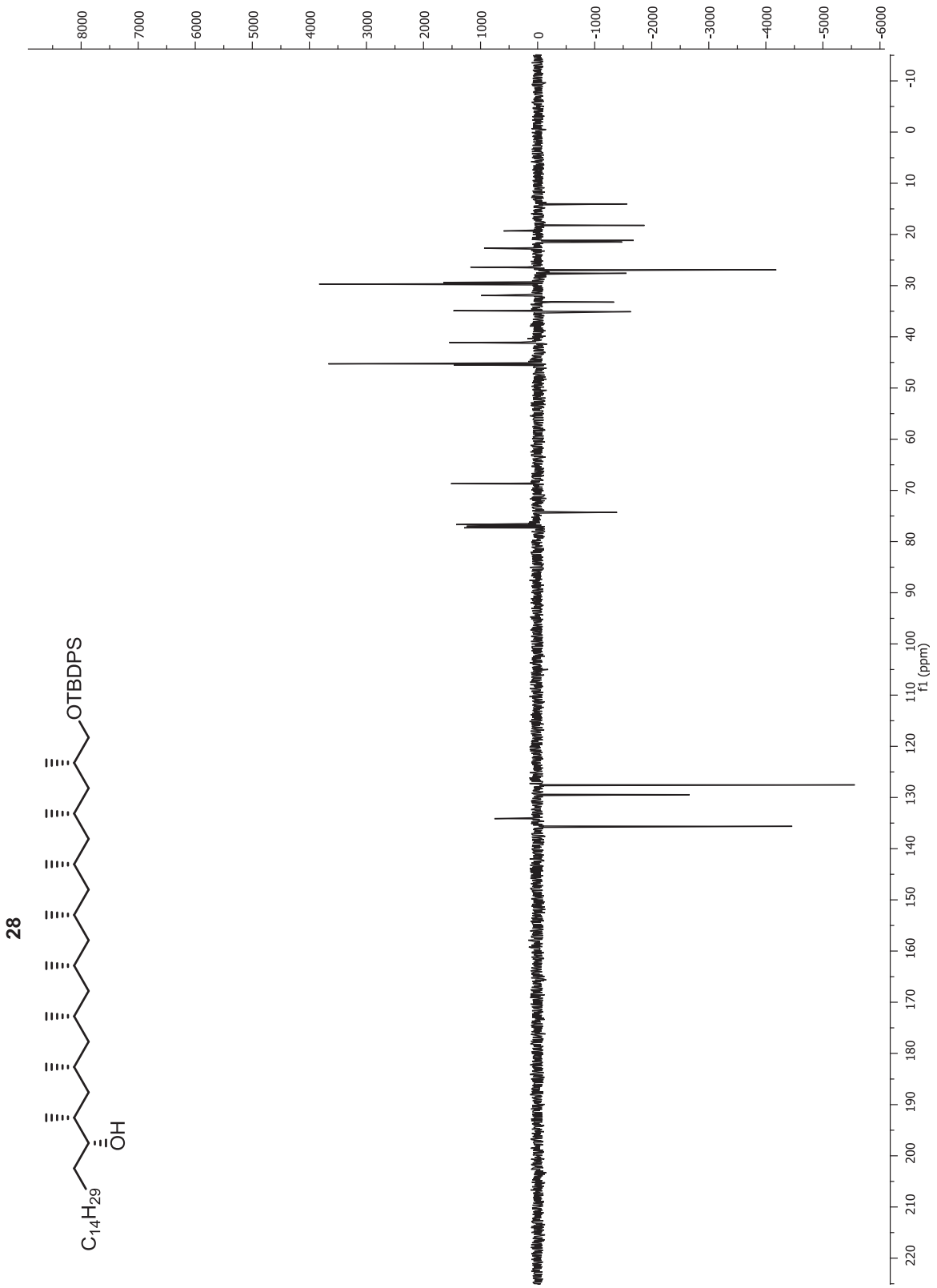


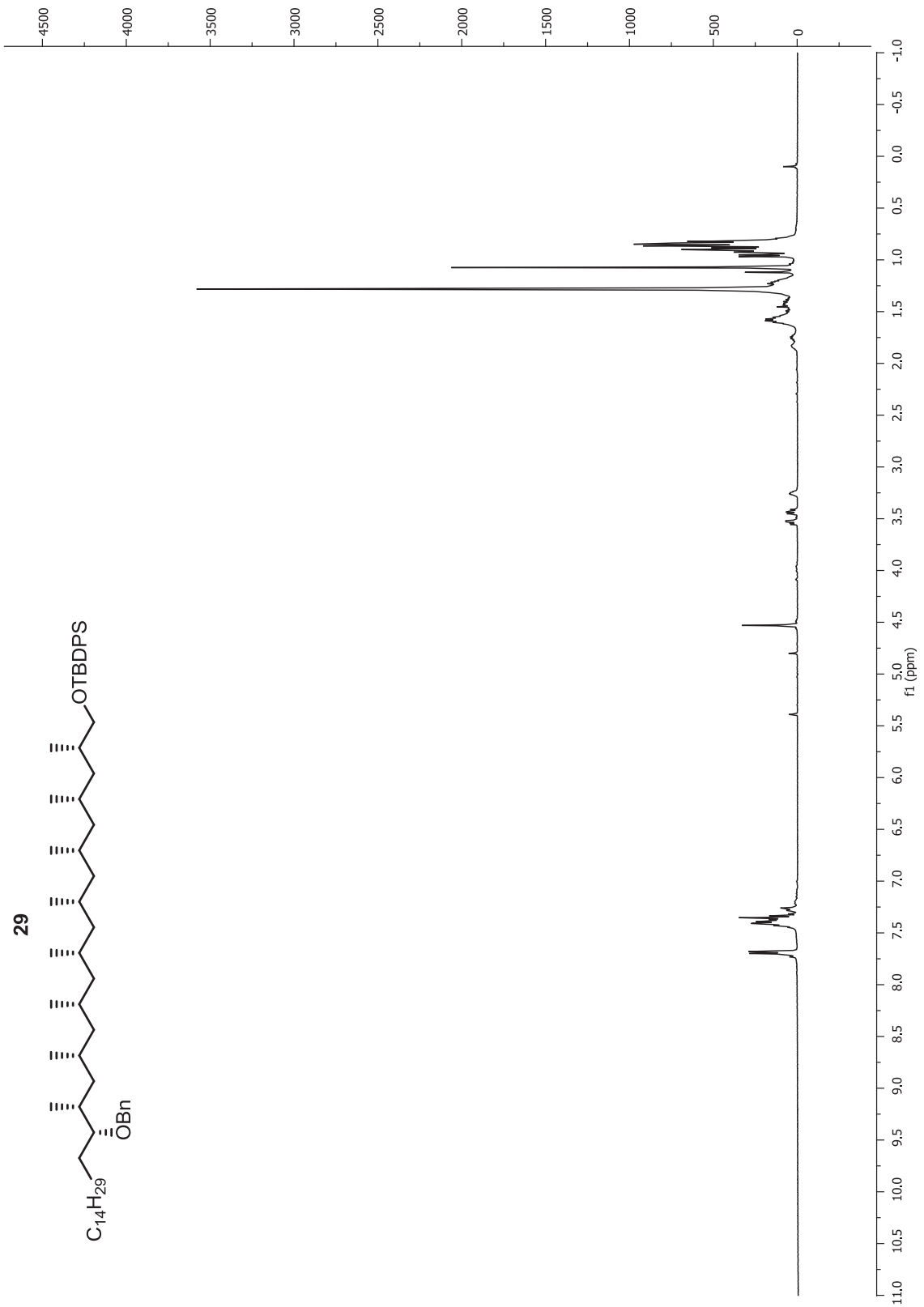


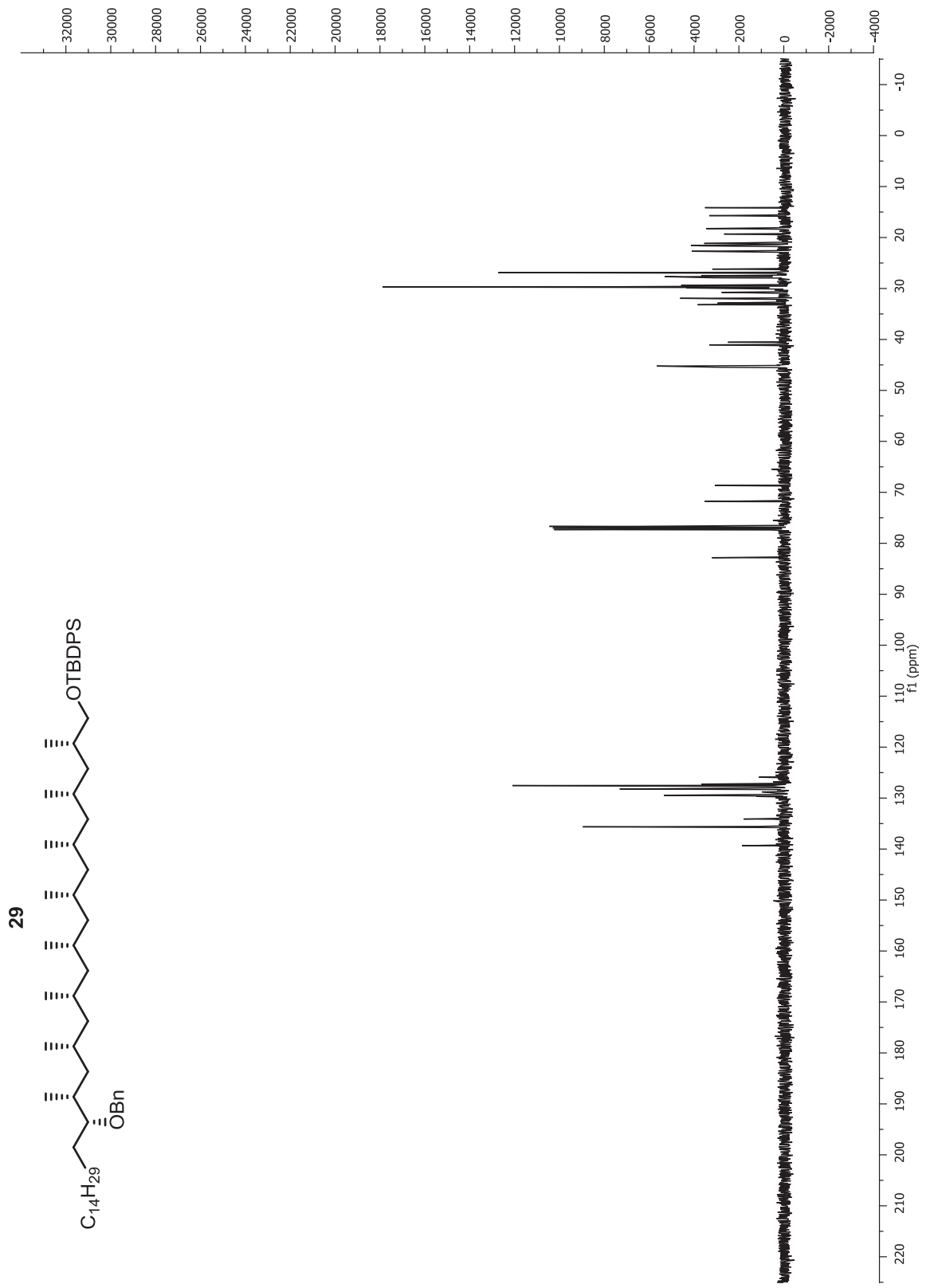


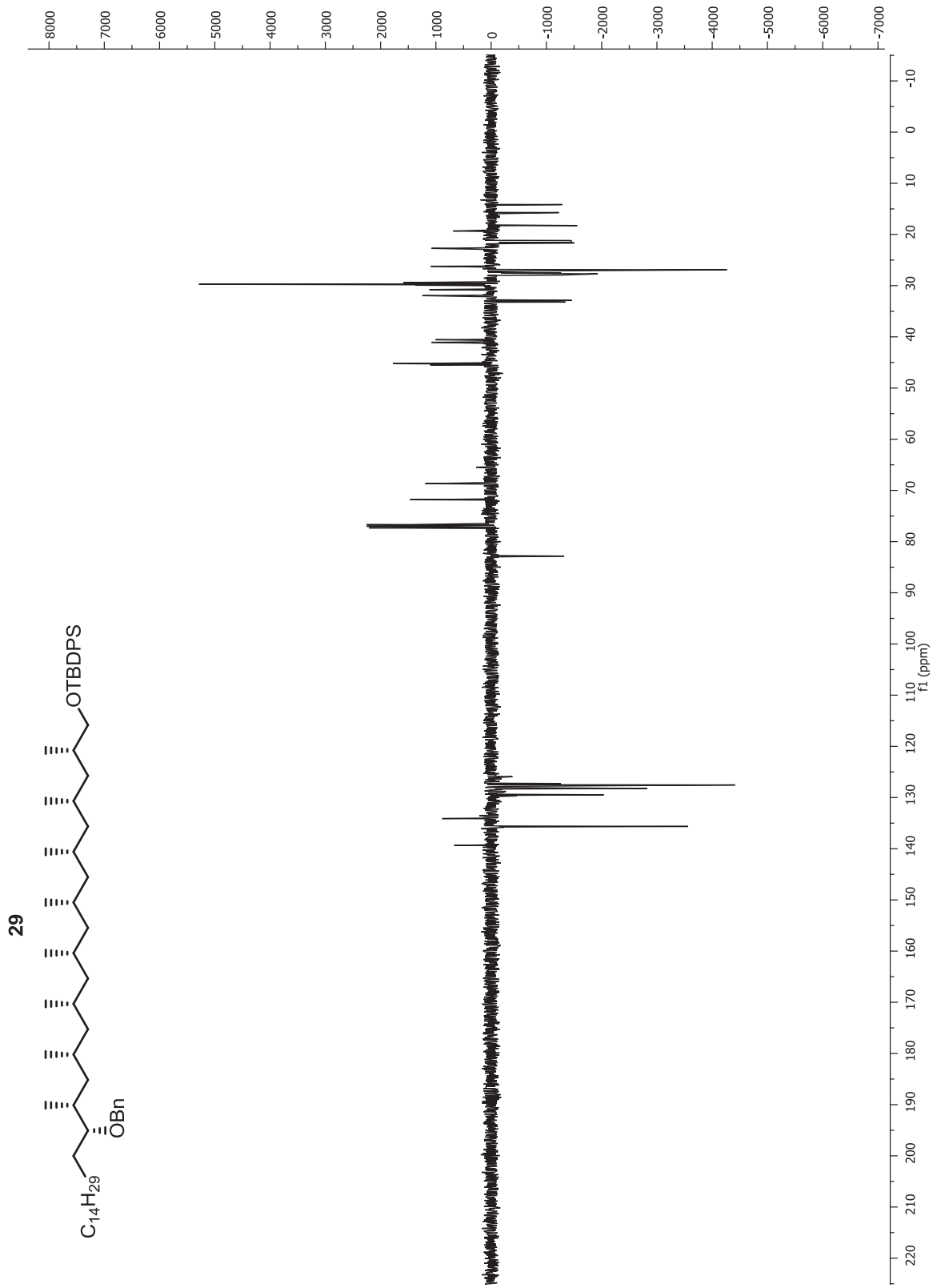

28
OTBDPS
OH
$C_{14}H_{29}$
f1 (ppm)

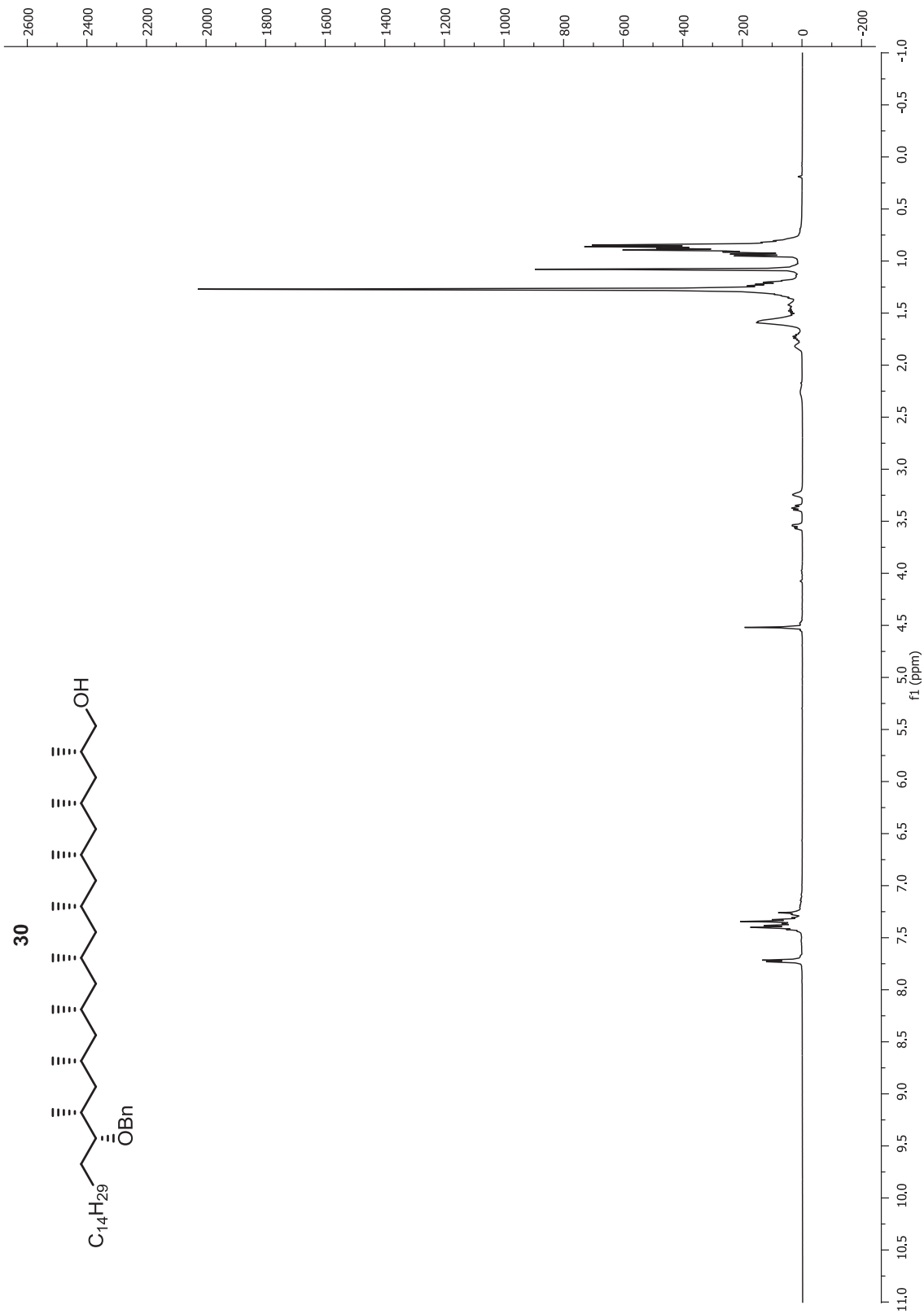


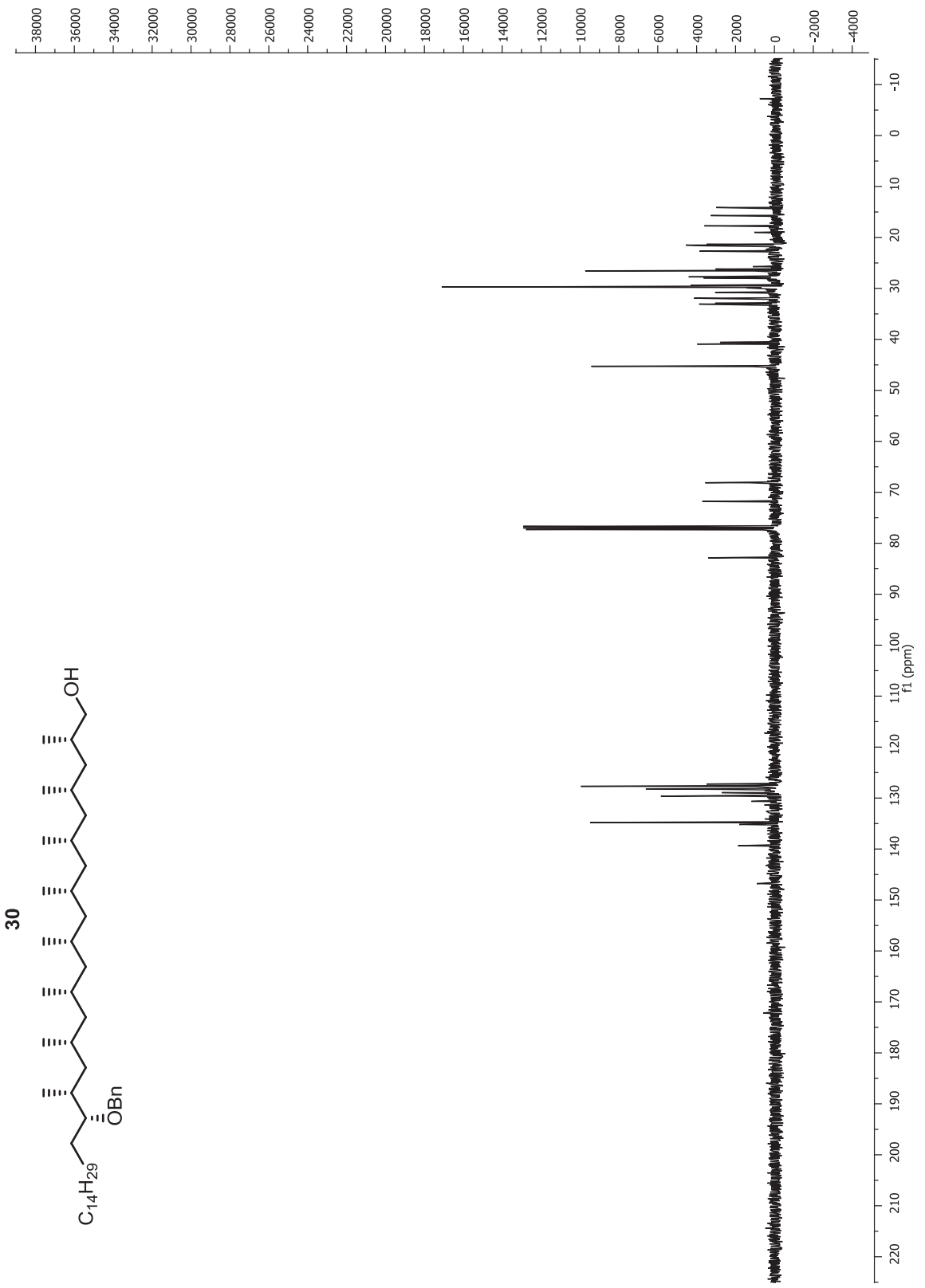


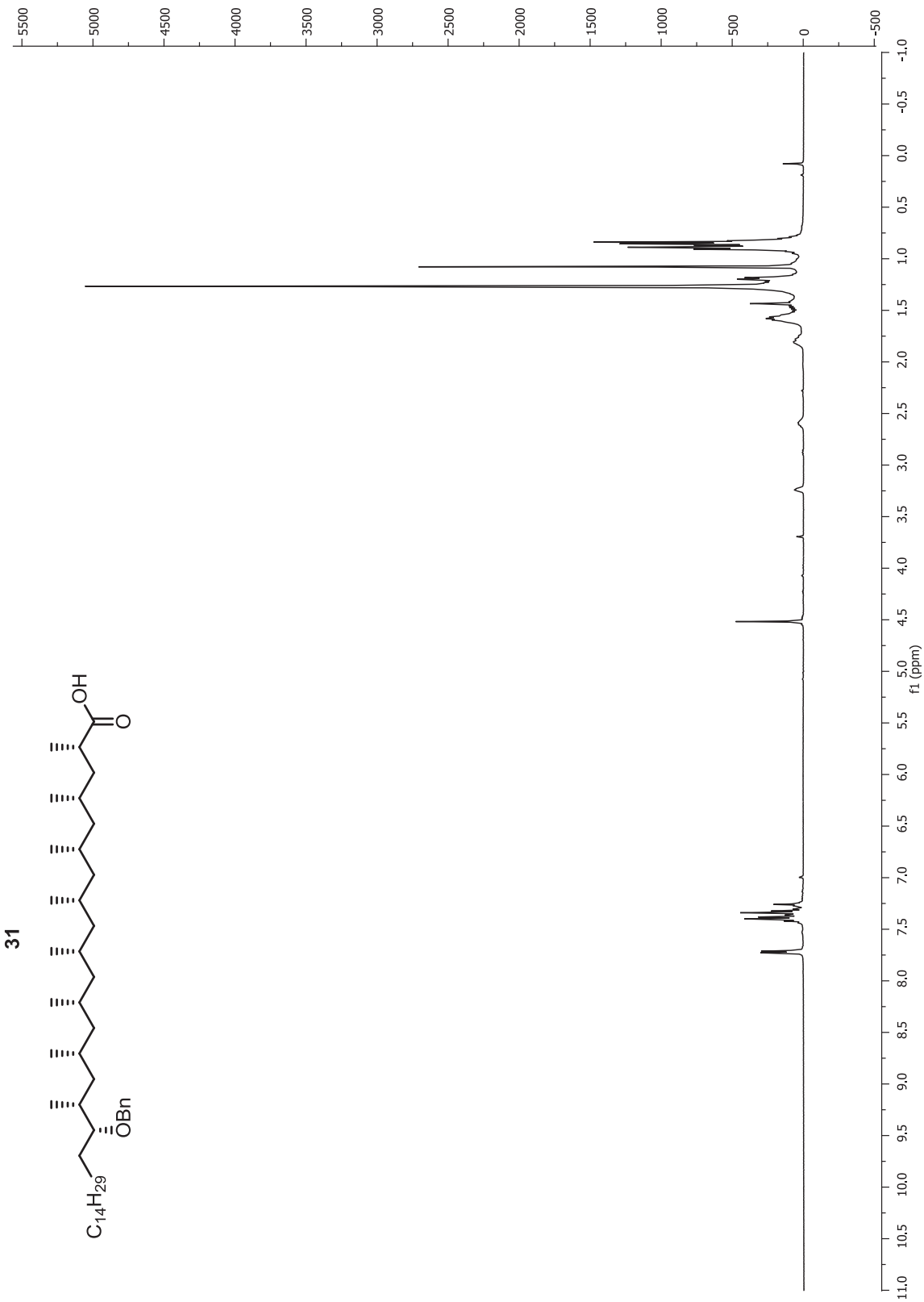


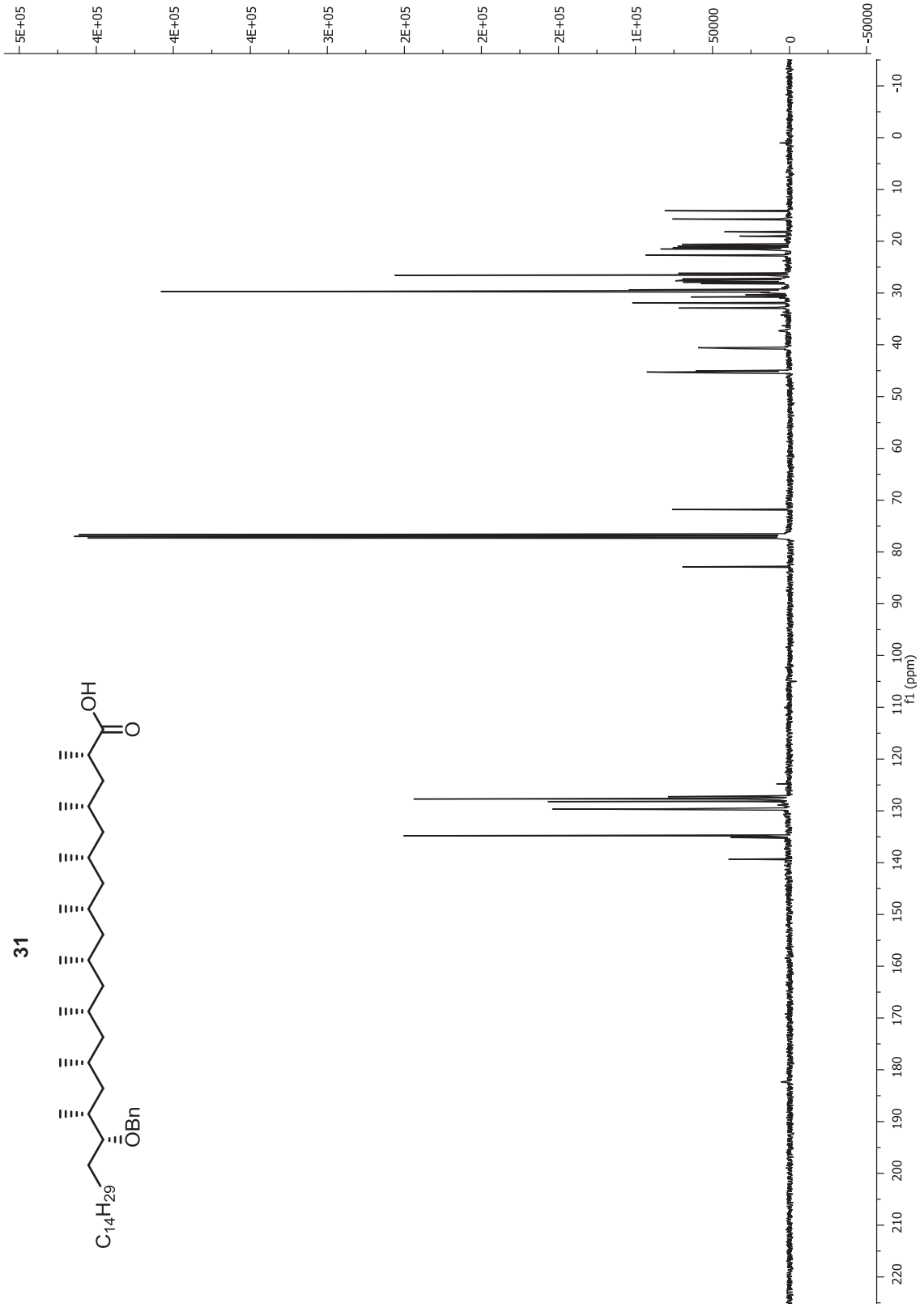


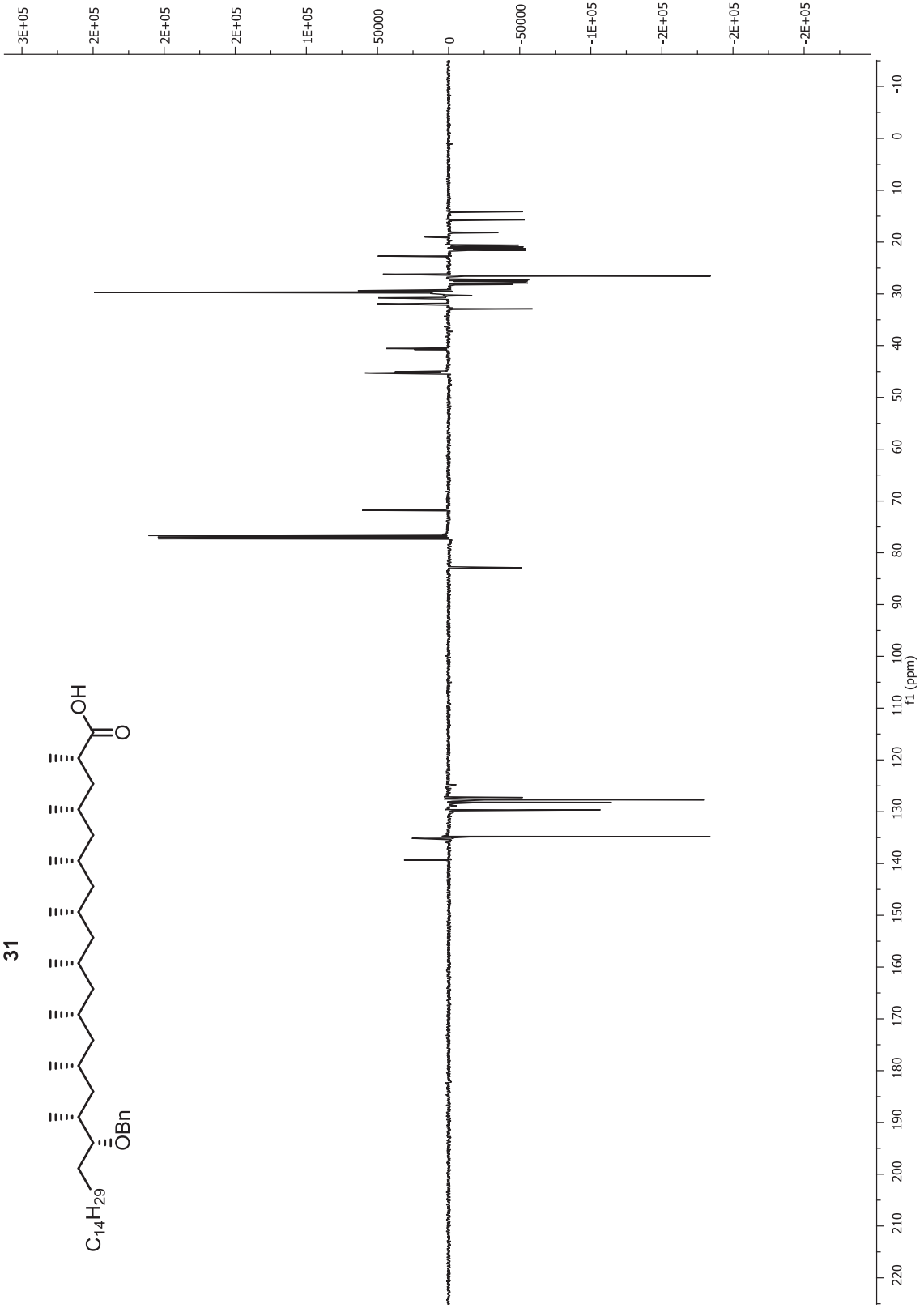


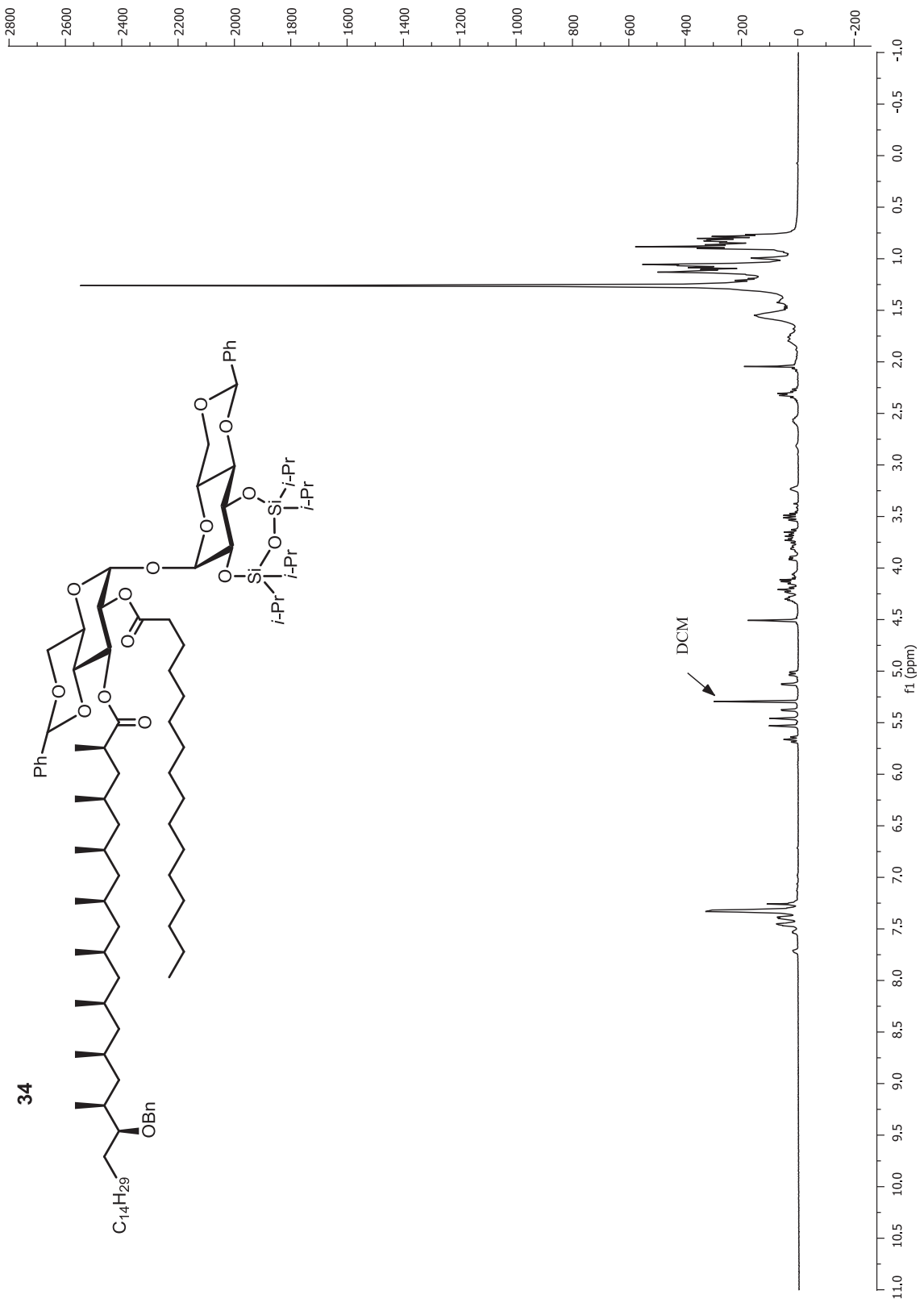


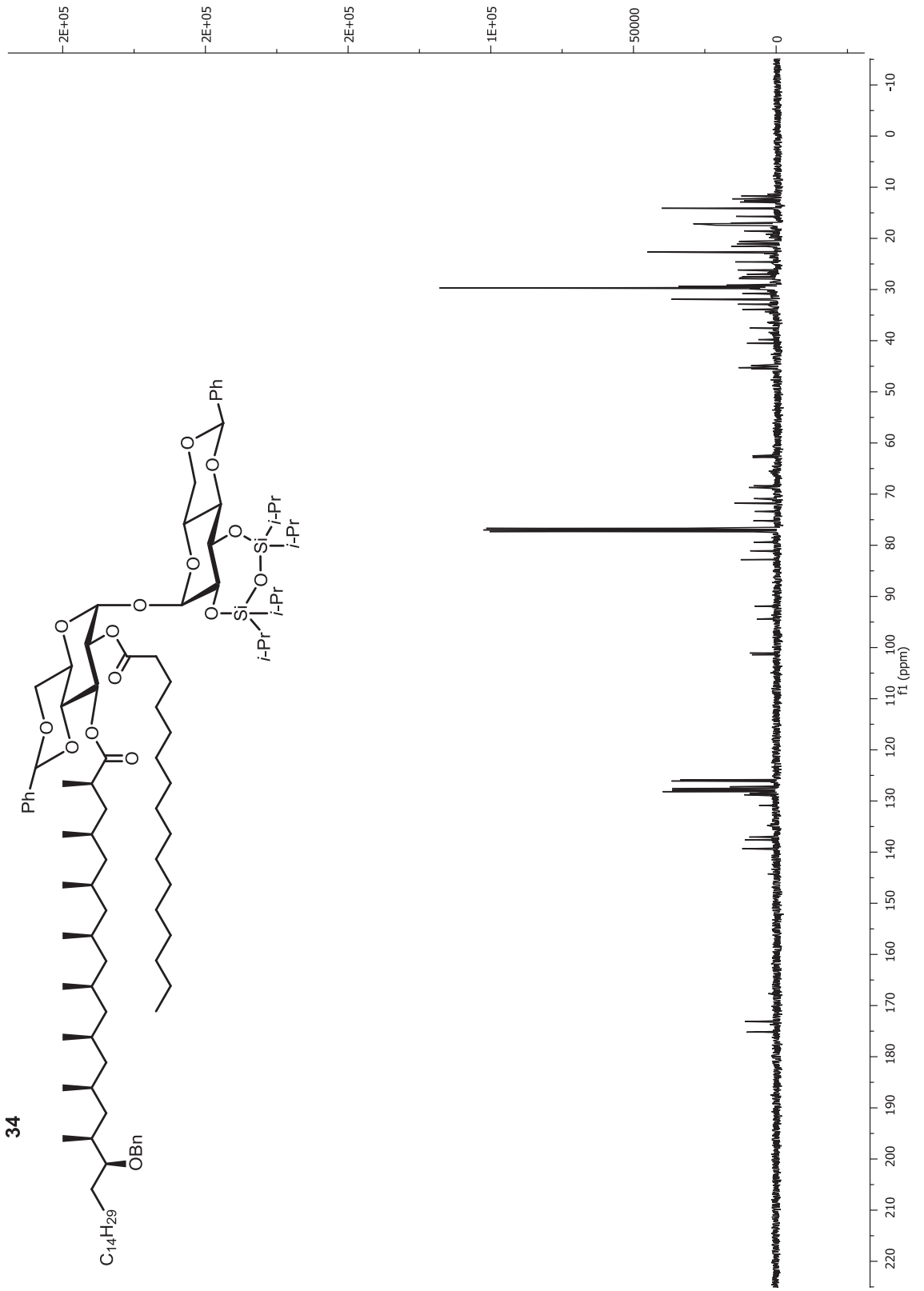


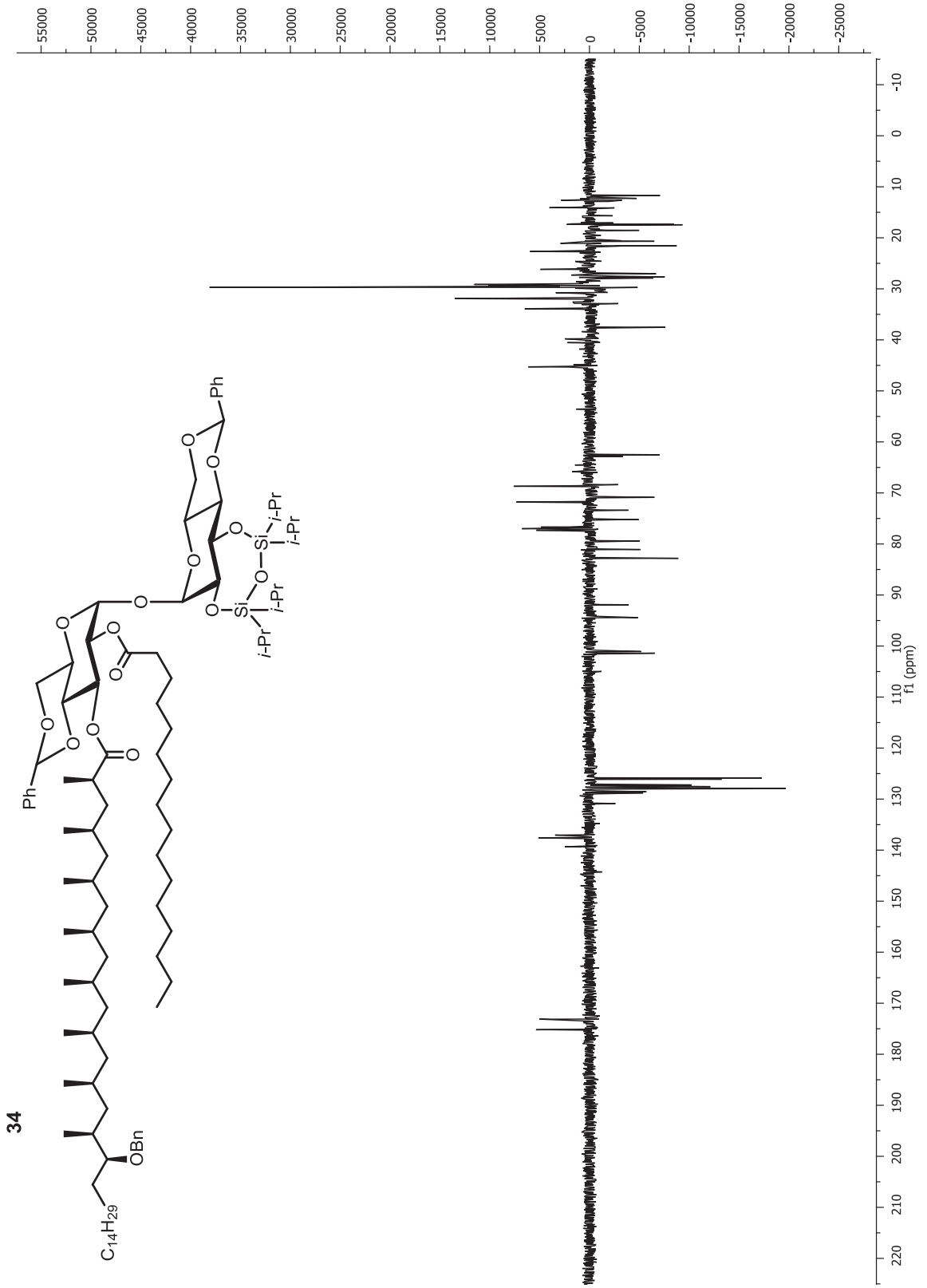

31
OH
O
OBn
$C_{14}H_{29}$
f1 (ppm)






34
Ph
OBn
$C_{14}H_{29}$
Si
i-Pr
DCM
f1 (ppm)


34
Ph
OBn
$C_{14}H_{29}$
Si
i-Pr
f1 (ppm)


34
Ph
OBn
$C_{14}H_{29}$
Si
i-Pr
f1 (ppm)

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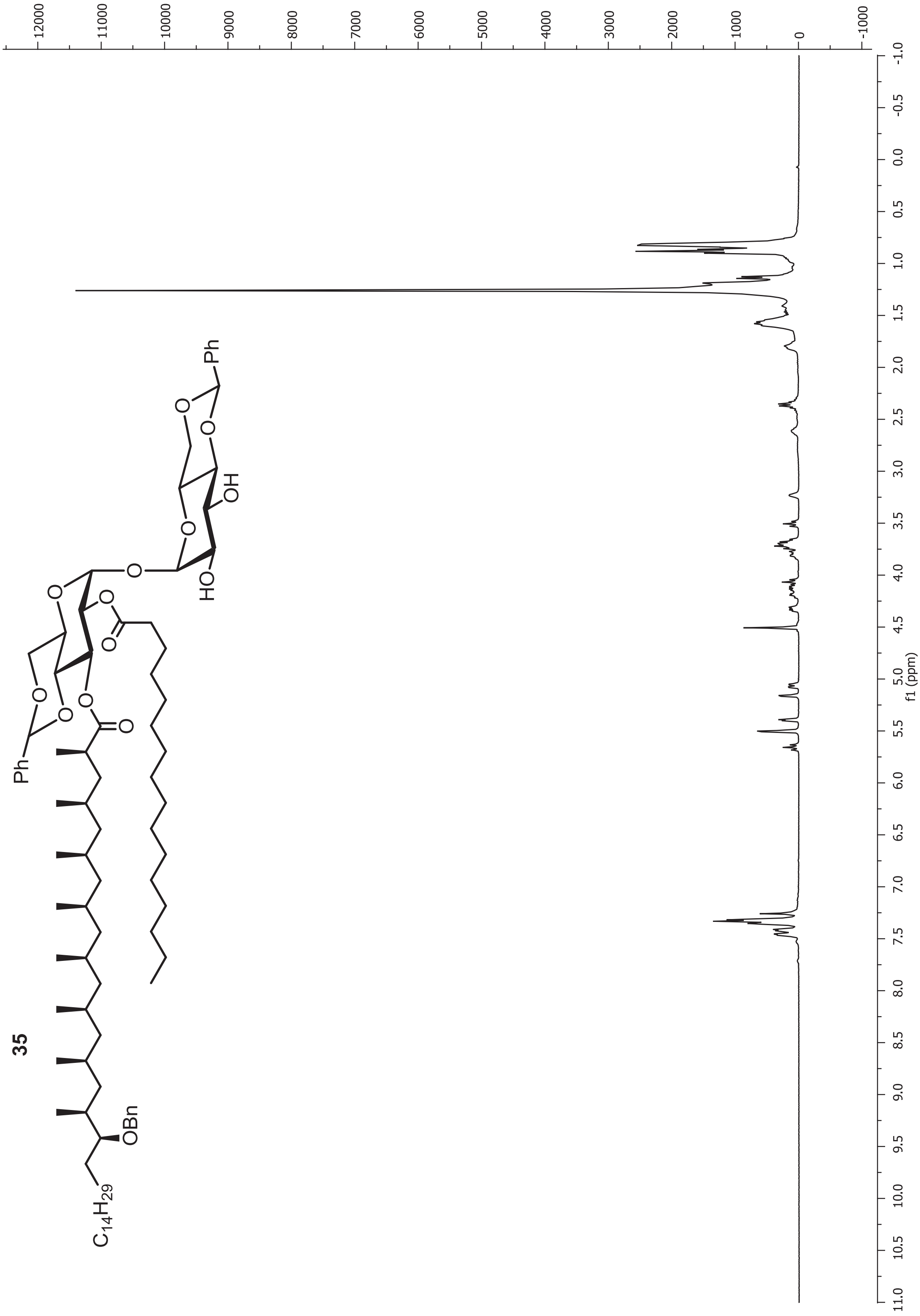

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