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Supporting Information

Total Synthesis of Putative Chagosensine

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General. All reactions were carried out under Ar in flame-dried glassware unless otherwise noted or whenever H_2O was used as (co)solvent. The following solvents and organic bases were purified by distillation over the drying agents indicated and were transferred under Ar: THF, Et_2O (Mg/anthracene); hexanes, toluene (Na/K); triethylamine, diisopropylamine, diisopropylethylamine, 2,6-lutidine, HMPA, CH_2Cl_2, DMA, NMP (CaH_2); MeOH, EtOH, *i*-PrOH (Mg, stored over 3 Å MS). DMF, DMSO, 1,4-dioxane, MeCN and pyridine were dried by an adsorption solvent purification system based on molecular sieves. All other commercially available compounds (ABCR, Acros, Alfa Aesar, Aldrich, Fluka, STREM, TCI) were used as received unless otherwise noted. The following compounds were prepared according to the cited protocol: Me_2BBr[1], MOM chloride[2], $PPh_3CH_2I_2$[3], $Co(nmp)_2$[4], $Pd(t\text{-BuNC})_2Cl_2$[5], (*S*)-4-benzyl-3-(2-(benzyloxy)acetyl)oxazolidin-2-one[6], diethyl allyl phosphate[7], tetrabutylammonium diphenylphosphinate[8], diazomethane[9].

Thin layer chromatography (TLC) was performed on Macherey-Nagel precoated plates (POLYGRAM® SIL/UV254). Detection was achieved under UV light (254 nm) and by staining with either acidic *p*-anisaldehyde, cerium-ammonium-molybdenate or basic $KMnO_4$ solution.

Flash chromatography was performed with Merck silica gel 60 (40-63 µm pore size) by predistilled or HPLC-grade solvents. In some cases, fine Merck silica gel 60 (15-40 µm pore size) was necessary as indicated in the experimental procedures.

NMR spectra were recorded on Bruker AV 400, AV 500 or AVIII 600 spectrometers in the solvents indicated. Chemical shifts (δ) are reported in ppm relative to TMS; coupling constants (J) are given in Hz. The solvent signals were used as references and the chemical shifts converted to the TMS scale ($CDCl_3$: δ_C = 77.16 ppm, residual $CHCl_3$ in $CDCl_3$: δ_H = 7.26 ppm; CD_2Cl_2: δ_C = 53.84 ppm, residual CH_2Cl_2 in CD_2Cl_2: δ_H = 5.32 ppm; [D_5]-pyridine: δ_C = 123.5 ppm, residual pyridine in [D_5]-pyridine: δ_H = 7.19 ppm; CD_3OD: δ_C = 49.00 ppm, residual CD_2HOD in CD_3OD: δ_H = 3.30 ppm. Multiplets are indicated by the following abbreviations: s: singlet, d: doublet, t: triplet, q: quartet, quin: quintet, sept: septet, m: multiplet. The abbreviation br indicates a broad signal. ^{13}C spectra were recorded [^1H]-decoupled and the values of the chemical shifts are rounded to one decimal point.

IR spectra were recorded on Alpha Platinum ATR (Bruker) at room temperature, wavenumbers ($\tilde{\nu}$) are given in cm^{-1}.

Mass spectrometric samples were measured using the following instruments: MS (EI): Finnigan MAT 8200 (70 eV), ESI-MS: Bruker ESQ3000, accurate mass determinations: Bruker APEX III FT-MS (7 T magnet) or MAT 95 (Finnigan).

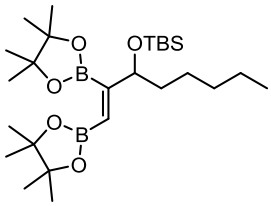
Optical rotations were measured with an A-Krüss Otronic Model P8000-t polarimeter at a wavelength of 589 nm. The values are given as specific optical rotation with exact temperature, concentration (c/(10 mg/mL)) and solvent.

LC-MS analyses were conducted on a Shimadzu LC-MS 2020 instrument (pumps LC-20AD, autosampler SIL-20AC, column oven CTO-20AC, diode array detector SPD-M20A, controller CBM-20A, ESI detector and software Labsolutions) with a ZORBAX Eclipse Plus column (C18 1.8 µm, 4.6 mm ID × 50 mm (Agilent)) or a YMC-ODS-A C18 column (S-5 µm, 120 Å, 4.6 mm ID × 150 mm). A binary gradient of MeCN or MeOH in water was used as eluent at a flow rate of 0.8 or 1.0 mL/min. The oven temperature was kept at 35 °C and the detection wave length at 250 nm. Conditions for each compound are specified below. Preparative LC was performed with a Shimadzu LC-20A prominence system (pumps LC-20AP, column oven CTO-20AC, diode array detector SPD-M20A, fraction collector FRC-10A, controller CBM-20A and LC-solutionsoftware); conditions for each compound are specified below.

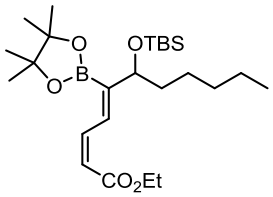
GC-MS was measured on a Shimadzu GCMS-QP2010 Ultra instrument. Chiral GC was measured on an Agilent 7890B GC instrument with the procedure specified conditions.

Model Studies

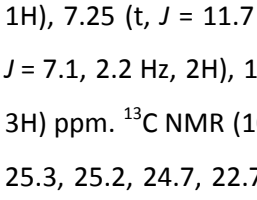
Bis-boronate 7. A pressure Schlenk flask charged with $Pt(PPh_3)_4$ (31 mg, 25 µmol) and B_2pin_2 (0.21 g, 0.83 mmol) was evacuated and backfilled with Argon. A solution of compound **6a** (R = TBS, 0.20 g, 0.83 mmol) in degassed DMF (1 mL) was added and the resulting mixture was stirred at 80 °C for 16 hours. The mixture was allowed to cool to room temperature, diluted with *t*-butyl methyl ether (20 mL) and washed with brine (3 × 5 mL). The combined organic phases were dried over $MgSO_4$, filtered through a small pad of Celite and concentrated. The residue was used in the next step without further purification. ^{1}H NMR (400 MHz, $CDCl_3$) δ = 5.95 (d, J = 1.5 Hz, 1H), 4.19 (ddd, J = 6.6, 5.0, 1.5 Hz, 1H), 1.56–1.41 (m, 2H), 1.39–1.16 (m, 30H), 0.89–0.83 (m, 12H), 0.02 (s, 3H), 0.00 (s, 3H) ppm. ^{13}C NMR (101 MHz, $CDCl_3$) δ = 83.6, 83.4, 78.0, 37.9, 32.0, 26.2, 25.2, 25.1, 25.1, 24.9, 22.7, 18.5, 14.3, –4.1, –4.7 ppm. ^{11}B NMR (128 MHz, $CDCl_3$) δ = 30.1 ppm. IR (film) $\tilde{\nu}$ = 2977, 2956, 2929, 2857, 1621; 1464, 1402, 1371, 1335, 1310, 1255, 1215, 1140, 969, 835 cm^{-1}. MS (ESIpos) *m/z* (%): 517.4 (100 (M+Na)). HRMS (ESIpos): *m/z* calcd. for $C_{26}H_{52}O_5B_2SiNa$: 517.3662, found: 517.3664.



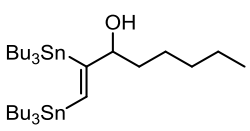
Dienylboronate 9. $PdCl_2$(dppf) (3.6 mg, 4.9 µmol), K_3PO_4 (0.1 g, 0.5 mmol), and ethyl 3-*cis*-iodoacrylate (**8**) (21 µL, 0.16 mmol) were added to a solution of teh crude bis-boronate **7** (80 mg, 0.16 mmol) in THF (1 mL) and H_2O (43 µL, 2.4 mmol). The mixture was stirred at 60 °C for 16 hours before it was allowed to cool to room temperature. The mixture was dried over $MgSO_4$, filtered and concentrated. The residue was purified by flash chromatography (hexane/EtOAc 9:1) to afford the title compound as a colorless oil (52 mg, 69%). ^{1}H NMR (400 MHz, $CDCl_3$) δ = 7.90 (dt, *J* = 11.7, 1.2 Hz, 1H), 7.25 (t, *J* = 11.7 Hz, 1H), 5.69 (dd, *J* = 11.5, 1.1 Hz, 1H), 4.35 (td, *J* = 6.4, 1.2 Hz, 1H), 4.18 (qd, *J* = 7.1, 2.2 Hz, 2H), 1.56-1.50 (m, 2H), 1.34–1.20 (m, 21H), 0.92–0.83 (m, 12H), 0.07 (s, 3H), 0.00 (s, 3H) ppm. ^{13}C NMR (101 MHz, $CDCl_3$) δ = 166.4, 142.8, 135.9, 119.0, 83.6, 75.9, 60.0, 38.4, 32.0, 26.1, 25.3, 25.2, 24.7, 22.7, 18.4, 14.5, 14.2, –4.2, –4.7 ppm. ^{11}B NMR (128 MHz, $CDCl_3$) δ = 30.1 ppm. IR (film) $\tilde{\nu}$ = 2956, 2929, 2857, 1719, 1580, 1464, 1380, 1309, 1255, 1181, 1142, 1086, 1059, 834, 776 cm^{-1}. MS (ESIpos) *m/z* (%): 489.3 (100 (M+Na)). HRMS (ESIpos): *m/z* calcd. for $C_{25}H_{47}O_5BSiNa$: 489.3178, found: 489.3174.



Ethyl (2*Z*,4*Z*)-6-((tert-butyldimethylsilyl)oxy)-5-chloroundeca-2,4-dienoate (10). (Ph_3P)AuCl (5.3 mg, 11 µmol) was added to a suspension of dienylboronate **9** (5.0 mg, 11 µmol) and Cs_2CO_3 (3.5 mg, 11 µmol) in isopropanol (0.5 mL) and the resulting mixture was stirred at 50 °C for 1 hour. After reaching room temperature, NCS (7.2 mg, 54 µmol) was added and stirring continued for 16 hours. The mixture was filtered through a small pad of silica, rinsing with *t*-butyl methyl ether. The combined filtrates were concentrated and the residue was purified by flash chromatography (hexane/EtOAc 1:0 to 50:1) to afford the title compound as a colorless oil (3.0 mg, 75%). ^{1}H NMR (400 MHz, $CDCl_3$) δ = 7.69 (dt, *J* = 11.2, 0.9 Hz, 1H), 7.00 (t, *J* = 11.3 Hz, 1H), 5.79 (dd, *J* = 11.5, 1.1 Hz, 1H), 4.26 (t, *J* = 6.0 Hz, 1H), 4.19 (qd, *J* = 7.1, 1.5 Hz, 2H), 1.70–1.61 (m, 2H), 1.33–1.22 (m, 9H), 0.93–0.85 (m, 12H), 0.07 (d, *J* = 0.7 Hz, 3H), 0.04 (s, 3H) ppm. ^{13}C NMR (126 MHz, $CDCl_3$) δ = 166.2, 147.3, 138.0, 120.5, 120.0, 76.4, 60.3, 36.1, 31.8, 25.9, 24.8, 22.7, 18.3, 14.4, 14.2, –4.6, –4.9 ppm. IR (film) $\tilde{\nu}$ = 2956, 2930, 2858, 1718, 1630, 1464, 1417, 1257, 1186, 1143, 1093, 1033, 836, 777 cm^{-1}. MS (ESIpos) *m/z* (%): 397.2 (100 (M+Na)). HRMS (ESIpos): *m/z* calcd. for $C_{19}H_{35}O_3ClSiNa$: 397.1936, found: 397.1932.



Bis-stannane 11. A solution of 1-octin-3-ol (**6b**, R = H) (58 µL, 0.4 mmol) in THF (1 mL) was added to a solution of Pd(*t*-BuNC)$_2$Cl$_2$ (14 mg, 40 µmol) in THF (1 mL). Hexabutylditin (0.22 mL, 0.44 mmol) was introduced in one portion and the resulting mixture stirred at ambient temperature for 7 hours. The solvent was evaporated and the residue purified by flash chromatography (hexanes/Et_3N 200:1) to yield the title compound as a yellow oil (239 mg, 85%). ^{1}H NMR (300 MHz, $CDCl_3$): δ = 6.73 (d, *J* = 1.2 Hz, J_{SnH} = 179, 66.8 Hz, 1H),



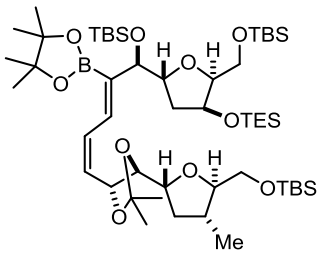
4.05 (tdd, *J* = 6.5, 3.6, 1.1 Hz, 1H), 2.52 (q, *J* = 7.2 Hz, 1H), 1.52–1.44 (m, 15H), 1.37–1.30 (m, 17H), 1.03 (t, *J* = 7.2 Hz, 3H), 0.92–0.87 (m, 12H), 0.90 (t, *J* = 7.2 Hz, 9H), 0.89 (t, *J* = 7.2 Hz, 9H) ppm. ^{13}C NMR (75 MHz, $CDCl_3$): δ = 172.0, 140.3, 84.0, 37.3, 32.0, 29.5, 29.3, 27.8, 27.6, 25.7, 22.8, 14.2, 13.8, 13.8, 11.3, 11.0 ppm. ^{119}Sn NMR (112 MHz, $CDCl_3$): δ = –60.5, –65.5 ppm. IR (film): $\tilde{\nu}$ = 3464, 2955, 2921, 2871, 2854, 1463, 1376, 1340 1291, 1071, 1021, 961, 863, 826, 666, 594 cm^{-1}. MS (ESIpos) *m/z* (%): 731.3 (100 (M+Na)). HRMS (ESIpos): *m/z* calcd for $C_{32}H_{68}OSn_2Na$: 731.3205, found: 731.3212.

Dienylstannane 12. Tetrabutylammonium diphenylphosphinate (52.1 mg, 11.3 mmol) was placed in a Schlenk tube, which was evacuated and flame-dried. A solution of bis-stannane **11** (50.0 mg, 70.8 µmol) in degassed DMF (0.5 mL) was added, followed by $Pd(PPh_3)_4$ (16.4 mg, 14.2 µmol). The resulting mixture was stirred at ambient temperature for 5 minutes before CuTC (20.2 mg, 106 µmol) was introduced, followed by a solution of ethyl 3-*cis*-iodoacrylate (**8**) (17.0 mg, 76.3 µmol) in degassed DMF (0.5 mL). The resulting mixture was stirred at ambient temperature for 1 hour before the reaction was quenched with water (3 mL). The aqueous layer was separated and extracted with *t*-butyl methyl ether (3 × 5 mL). The combined organic phases were dried over Na_2SO_4, filtered and concentrated. The residue was purified by flash chromatography (hexanes/*t*-butyl methyl ether/Et_3N 95:5:0.5) to yield the title compound as a colorless oil (21.5 mg, 59%). ^{1}H NMR (300 MHz, $CDCl_3$): δ = 7.94 (d, *J* = 11.5 Hz, J_{SnH} = 113 Hz, 1H), 6.57 (t, *J* = 11.4 Hz, 1H), 5.70 (dd, *J* = 11.3, 1.1 Hz, 1H), 4.32 (t, *J* = 6.2 Hz, 1H), 4.19 (q, *J* = 7.1 Hz, 2H), 1.61 (brs, 1H), 1.52–1.44 (m, 6H), 1.40–1.22 (m, 18H), 1.05–0.97 (m, 5H), 0.89 (t, *J* = 7.2 Hz, 12H) ppm. ^{13}C NMR (75 MHz, $CDCl_3$): δ = 166.4, 144.9, 134.7, 130.2, 117.9, 79.9, 60.2, 37.5, 31.9, 29.3, 27.5, 25.6, 22.8, 14.5, 1.45, 13.8, 11.8 ppm. ^{119}Sn NMR (112 MHz, $CDCl_3$): δ = –53.6 ppm. IR (film): $\tilde{\nu}$ = 3483, 2956, 2925, 2855, 1716, 1613, 1561, 1463, 1179, 1027, 821, 671, 596 cm^{-1}. MS (ESIpos) *m/z* (%): 539.3 (100 (M+Na)). HRMS (ESIpos): *m/z* calcd for $C_{25}H_{48}O_3SnNa$: 539.2517, found: 539.2522.

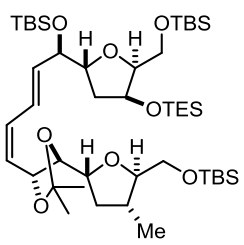
Ethyl (2*Z*,4*Z*)-5-chloro-6-hydroxyundeca-2,4-dienoate (13). Copper (II) chloride (6.5 mg, 49 µmol) was added to a solution of **12** (10 mg, 19 µmol) in THF (0.2 mL) followed by 2,6-lutidine (2.3 µL, 19 µmol). After stirring for 72 hours at ambient temperature the reaction was diluted with *t*-butyl methyl ether (2 mL). The aqueous layer was separated and extracted with *t*-butyl methyl ether (3 × 2 mL). The combined extracts were washed with sat. $NaHCO_3$ and brine, dried over $MgSO_4$, filtered and concentrated. The residue was purified by flash column chromatography (hexane/*t*-butyl methyl ether 9:1 to 6:1) to afford the title compound as a colorless oil. ^{1}H NMR (400 MHz, $CDCl_3$) δ = 7.74 (dt, *J* = 11.0, 0.8 Hz, 1H), 7.01 (dd, *J* = 11.4, 11.0 Hz, 1H), 5.84 (dd, *J* = 11.4, 1.1 Hz, 1H), 4.35–4.27 (m, 1H), 4.20 (q, *J* = 7.1

Hz, 2H), 1.99 (br s, 1H), 1.78–1.63 (m, 2H), 1.37–1.28 (m, 9H), 0.88 (t, *J* = 6.7 Hz, 3H) ppm. ^{13}C NMR (101 MHz, $CDCl_3$) δ = 166.3, 146.1, 137.8, 121.1, 120.7, 75.9, 60.5, 35.1, 31.7, 25.1, 22.6, 14.4, 14.1 ppm. IR (film) $\tilde{\nu}$ = 3460, 2956, 2928, 2859, 1715, 1629, 1464, 1417, 1386, 1285, 1186, 1137, 1029, 826 cm^{-1}. MS (ESIpos) *m/z* (%): 283.1 (100 (M+Na)). HRMS (ESIpos): *m/z* calcd. for $C_{13}H_{21}O_3ClNa$: 283.1071, found: 283.1071.

Dienylboronate 16a (X = BPin) and Diene 16b (X = H). A Schlenk flask was charged with $Pd_2(dba)_3$



(0.7 mg, 0.8 µmol), Ph_3As (1.0 mg, 3.1 µmol), Ag_2O (3.6 mg, 16 µmol, 3 equiv.), which was then evacuated and backfilled with argon 3 times. Solutions of bis-boronate **14** (5.0 mg, 6.5 µmol) and alkenyl iodide **15** (2.5 mg, 5.2 µmol) in THF (0.25 mL) and H_2O (5.6 µL, 0.3 mmol) were successively added. The mixture was stirred at 70 °C for 1 hour, cooled to room temperature, dried over $MgSO_4$ and filtered through a small pad of Celite. The filtrate was evaporated and the residue purified by flash chromatography (Hexane/EtOAc: 99/1 to 50/1 to 25/1) to afford the title compound **16a** (X = BPin) as a colorless oil (1.7 mg, 32%); a second fraction contained the proto-deborylated diene **16b** as a colorless oil (2.4 mg, 52%). Analytical and spectral data of **16a**: $[\alpha]_D^{25}$ = +12.2 (c = 0.5, $CHCl_3$); ^{1}H NMR (600 MHz, $CDCl_3$) δ = 7.01 (d, *J* = 12.0 Hz, 1H), 6.76 (ddd, *J* = 12.1, 10.9, 1.1 Hz, 1H), 5.56 (ddd, *J* = 10.8, 9.8, 1.1 Hz, 1H), 5.12 (ddd, *J* = 9.9, 6.6, 1.3 Hz, 1H), 4.60 (dd, *J* = 5.9, 0.8 Hz, 1H), 4.32 (dt, *J* = 9.4, 6.0 Hz, 1H), 4.28 (q, *J* = 3.2, 2.2 Hz, 1H), 4.06 (t, *J* = 6.7 Hz, 1H), 3.96 (ddd, *J* = 9.7, 7.0, 5.7 Hz, 1H), 3.81 (dd, *J* = 9.5, 7.0 Hz, 1H), 3.77 (ddd, *J* = 7.2, 4.7, 3.4 Hz, 1H), 3.75 (dd, *J* = 10.5, 3.9 Hz, 1H), 3.64 (dd, *J* = 10.6, 5.5 Hz, 1H), 3.63 (dd, *J* = 9.5, 4.6 Hz, 1H), 3.55 (ddd, *J* = 7.9, 5.5, 3.9 Hz, 1H), 2.15 (dq, *J* = 10.2, 7.2 Hz, 1H), 2.07 (ddd, *J* = 12.5, 7.3, 5.8 Hz, 1H), 1.75–1.64 (m, 2H), 1.52 (s, 3H), 1.38 (s, 3H), 1.27 (s, 6H), 1.26 (s, 6H), 1.27–1.18 (m, 1H), 1.06 (d, *J* = 6.5 Hz, 3H), 0.94 (t, *J* = 7.9 Hz, 9H), 0.90 (s, 9H), 0.89 (s, 9H), 0.87 (s, 9H), 0.58 (q, *J* = 8.0 Hz, 6H) 0.06 (s, 6H), 0.05 (s, 3H), 0.03 (s, 3H), 0.03 (s, 3H), 0.02 (s, 3H) ppm. ^{13}C NMR (151 MHz, $CDCl_3$) δ = 138.1, 134.4, 130.7, 128.2, 109.4, 85.9, 83.7, 83.5, 81.8, 80.8, 77.7, 75.6, 72.7, 71.9, 65.1, 61.5, 38.3, 36.9, 36.5, 28.0, 26.1, 26.1, 26.0, 25.7, 25.4, 24.7, 18.5, 18.5, 18.4, 17.8, 7.0, 5.0, –4.6, –4.7, –5.2, –5.2, –5.2 ppm. IR (film) $\tilde{\nu}$ = 2954, 2929, 2881, 2857, 1732, 1589, 1462, 1378, 1305, 1252, 1143, 1093, 1006, 837, 776 cm^{-1}. MS (ESIpos) *m/z* (%): 1019.6 (100 (M+Na)). HRMS (ESIpos): *m/z* calcd. for $C_{51}H_{101}BO_{10}Si_4Na$: 1019.6457, found: 1019.6457.



Analytical and spectral data of **16b**: $[\alpha]_D^{25}$ = +15.5 (c = 0.13, $CHCl_3$). ^{1}H NMR (600 MHz, $CDCl_3$) δ = 6.51 (ddt, *J* = 15.0, 11.5, 1.3 Hz, 1H), 6.16 (t, *J* = 11.1 Hz, 1H), 5.82 (dd, *J* = 15.1, 5.6 Hz, 1H), 5.48 (t, *J* = 10.4 Hz, 1H), 5.02 (ddd, *J* = 9.7, 6.2, 0.9 Hz, 1H), 4.32 (q, *J* = 3.2 Hz, 1H), 4.27 (td, *J* = 5.3, 1.3 Hz, 1H), 4.19 (td, *J* = 7.7, 5.1 Hz, 1H), 4.06 (dd, *J* = 7.2, 6.4 Hz, 1H), 3.94 (ddd, *J* = 9.7, 7.2, 5.8 Hz,

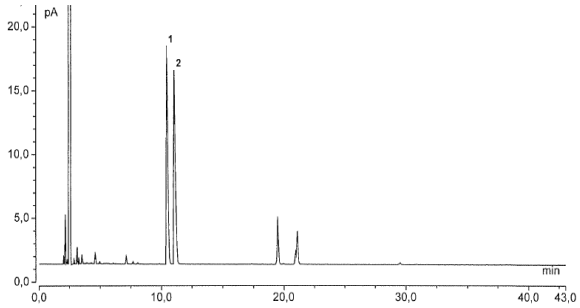
1H), 3.80 (dd, *J* = 9.8, 6.2 Hz, 1H), 3.76 (td, *J* = 6.2, 5.1, 3.2 Hz, 1H), 3.74 (dd, *J* = 10.5, 3.7 Hz, 1H), 3.69 (dd, *J* = 9.7, 5.1 Hz, 1H), 3.65 (dd, *J* = 10.5, 5.5 Hz, 1H), 3.56 (ddd, *J* = 7.8, 5.4, 3.7 Hz, 1H), 2.22–2.11 (m, 1H), 2.04 (ddd, *J* = 12.3, 7.2, 5.9 Hz, 1H), 1.82–1.77 (m, 2H), 1.52 (s, 3H), 1.39 (s, 3H), 1.20 (dt, *J* = 11.9, 10.1 Hz, 1H), 1.06 (d, *J* = 6.6 Hz, 3H), 0.95 (t, *J* = 8.0 Hz, 9H), 0.90 (s, 9H), 0.89 (s, 9H), 0.88 (s, 9H), 0.59 (q, *J* = 8.0 Hz, 6H), 0.06 (s, 3H), 0.06 (s, 3H), 0.05 (s, 3H), 0.05 (s, 3H), 0.04 (s, 3H), 0.04 (s, 3H) ppm. ^{13}C NMR (151 MHz, $CDCl_3$) δ = 136.0, 131.5, 126.8, 125.4, 109.5, 85.9, 84.0, 81.9, 80.7, 77.8, 74.6, 73.0, 72.3, 65.1, 61.7, 38.2, 37.1, 36.9, 28.1, 26.1, 26.1, 26.0, 25.8, 18.5, 18.4, 18.4, 17.9, 7.0, 5.0, –4.4, –4.6, –5.1, –5.2, –5.2, –5.2 ppm. IR (film) $\tilde{\nu}$ = 2955, 2928, 2883, 2856, 1462, 1378, 1255, 1093, 1007, 837, 777, 738 cm^{-1}. MS (ESIpos) *m/z* (%): 888.6 (100 (M+NH_4)). HRMS (ESIpos): *m/z* calcd. for $C_{45}H_{90}O_8Si_4Na$: 893.5605, found: 893.5606.

Preparation of the Southern Fragment

(*Z*)-But-2-en-1-ol (18) Quinoline (4.21 mL, 35.7 mmol) was added to a suspension of Pd/$BaSO_4$ (10%, 1.90 g, 17.8 mmol) in MeOH (125 mL) and the resulting mixture was stirred for 20 minutes at ambient temperature. 2-Butyn-1-ol (**17**) (25.0 g, 357 mmol) was added and seven balloons of hydrogen were slowly bubbled through the suspension over 12 hours. The reaction progress was monitored by GC-MS and the reaction was immediately stopped by replacing the H_2 atmosphere with Ar as soon as the starting material was fully consumed. The mixture was filtered through a pad of Celite® eluting with CH_2Cl_2 (40 mL). The resulting yellow solution was carefully concentrated via distillation (Vigreux column, 400 mbar, 30 °C) and the residue distilled (75 mbar, 75–80 °C) to afford the title compound as a pale yellow liquid (16.8 g, 232 mmol, 65%). ^{1}H NMR (400 MHz, $CDCl_3$): δ = 5.64–5.59 (m, 2H), 4.21 (d, *J* = 3.1 Hz, 1H), 4.20 (d, *J* = 4.6 Hz, 1H), 1.67 (d, *J* = 5.3 Hz, 3H) ppm. ^{13}C NMR (100 MHz, $CDCl_3$): δ = 129.3, 127.4, 58.4, 13.1 ppm. IR (film): $\tilde{\nu}$ = 3407, 3024, 2932, 1738, 1657, 1446, 1378, 1260, 1040, 813, 696 cm^{-1}. MS (EI) *m/z* (%): 72 (29), 57 (100), 54 (12), 43 (30), 41 (20), 39 (30), 31 (12), 29 (25), 27 (12). HRMS (EI): *m/z* calcd. for C_4H_8O: 72.0575, found: 72.0575. The analytical and spectroscopic data are in agreement with those reported in the literature.[10]

((2*S*,3*R*)-3-Methyloxiran-2-yl)methanol (S1). A 500 mL jacketed Schlenk flask was charged with activated powdered 4 Å MS (14 g) and CH_2Cl_2 (500 mL) and the resulting suspension was cooled to –20 °C. (+)-Diethyl L-tartrate (2.45 g, 11.9 mmol) and Ti(O*i*-Pr)$_4$ (2.94 mL, 9.92 mmol) were added, followed by allylic alcohol **18** (14.3 g, 198 mmol). The mixture was stirred for 45 minutes at the same temperature before *t*-BuOOH (5.5 M in decane, 54 mL, 0.30 mol) was added *via* a dropping funnel over 60 minutes. Stirring was continued for 40 hours at –20 °C. For work up, the septum was removed, dimethyl sulfide (21.8 mL, 297 mmol) was added and the resulting mixture stirred open to the atmosphere at ambient temperature for 24 hours. The mixture was then

filtered through a pad of Celite® which was rinsed with CH_2Cl_2 (300 mL). The combined filtrates were evaporated and the residue was purified by flash chromatography (pentane/Et_2O 4:1) followed by distillation (12 mbar, 59–64 °C) to yield the title compound as a colourless oil (12.9 g, 74%, 90% *ee*). $[\alpha]_D^{20}$ = –4.8 (c = 1.0, $CHCl_3$). ^{1}H NMR (400 MHz, $CDCl_3$): δ = 3.85 (dq, *J* = 11.3, 3.6 Hz, 1H), 3.68 (ddd, *J* = 11.6, 6.2, 3.7 Hz, 1H), 3.19–3.11 (m, 2H), 2.09 (brs, 1H), 1.31 (d, *J* = 5.5 Hz, 3H) ppm. ^{13}C NMR (100 MHz, $CDCl_3$): δ = 60.8, 56.9, 53.0, 13.5 ppm. IR (film): $\tilde{\nu}$ = 3397, 2930, 1451, 1040, 986, 877, 829, 783, 731 cm^{-1}. MS (EI) *m/z* (%): 45 (100), 44 (43), 43 (48), 31 (32), 29 (26), 27 (16). HRMS (ESIpos): *m/z* calcd.. for $C_4H_8O_2Na$: 111.0416, found: 111.0416. The *ee* was determined by GC (30 m, BGB-176/BGB-15 G/618, 80 1/min 120 8/min 220 3/min iso, flow rate 0.50 bar H_2: minor enantiomer t_R = 10.7 min, major enantiomer t_R = 11.1 min). The analytical and spectroscopic data are in agreement with those reported in the literature.[11]



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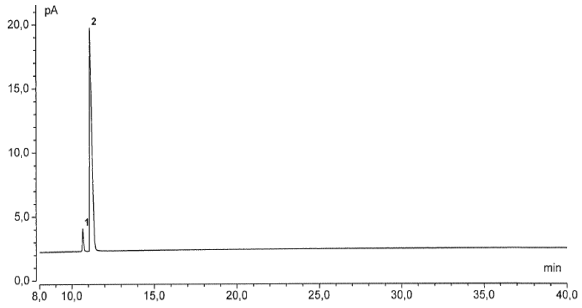
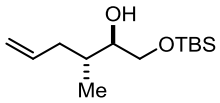


No.	Ret.Time min	area-% %
1	10,67	4,77
2	11,10	95,23

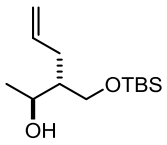
***t*-Dimethyl(((2*S*,3*R*)-3-methyloxiran-2-yl)methoxy)silane (19).** Imidazole (12.9 g, 190 mmol), 4-(dimethylamino)pyridine (892 mg, 7.30 mmol) and *tert*-butyldimethylsilyl chloride (26.5 g, 176 mmol) were added to a solution of epoxy alcohol **S1** (12.9 g, 146 mmol) in CH_2Cl_2 (280 mL) at 0 °C. The resulting mixture was stirred at ambient temperature for 3.5 hours. The reaction was quenched with sat. NH_4Cl (200 mL) and the aqueous layer extracted with CH_2Cl_2 (3 × 200 mL). The combined extracts were dried over Na_2SO_4, filtered and concentrated. The residue was purified by flash chromatography (pentane/Et_2O 99:1) to yield the title compound as a colourless oil (28.4 g, 96%). $[\alpha]_D^{20}$ = +7.1 (c = 1.0, $CHCl_3$). ^{1}H NMR (400 MHz, CD_2Cl_2): δ = 3.76 (d, *J* = 11.5, 4.8 Hz, 1H), 3.67 (ddd, *J* = 11.6, 6.0 Hz, 1H), 3.05 (qd, *J* = 5.5, 4.3 Hz, 1H), 2.99 (dt, *J* = 6.0, 4.6 Hz, 1H), 1.25 (d, *J* = 5.5 Hz, 3H), 0.90 (s, 9H), 0.082 (s, 3H), 0.076 (s, 3H) ppm. ^{13}C NMR (100 MHz, CD_2Cl_2): δ = 61.9, 57.1, 52.4, 25.9, 18.5, 13.5, –5.2, –5.3 ppm. IR (film): $\tilde{\nu}$ = 2955, 2930, 2857, 1472, 1391, 1361, 1254, 1091, 1006, 975, 939, 886, 834, 775, 666 cm^{-1}. MS (EI) *m/z* (%): 145 (46), 116 (11), 115 (100), 101 (65), 85 (25), 75 (38), 73 (20), 59 (30). HRMS (ESIpos): *m/z* calcd. for $C_{10}H_{22}O_2SiNa$: 225.1281, found: 225.1281.

(2*R*,3*R*)-1-((*t*-Butyldimethylsilyl)oxy)-3-methylhex-5-en-2-ol (20). A solution of allylmagesnium



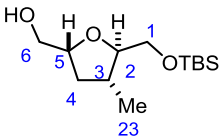
chloride (2 M in THF, 22.2 mL, 44.5 mmol) was added to a suspension of copper(I) iodide (847 mg, 4.45 mmol) in THF (70 mL) at –25 °C. The resulting mixture was stirred for 10 minutes, before a solution of compound **19** (6.00 g, 29.6 mmol) in THF (20 mL) was added dropwise over 30 minutes. The resulting mixture was stirred at –25 °C for 6 hours. The reaction was quenched with sat. NH_4Cl (50 mL) and the aqueous layer extracted with *t*-butyl methyl ether (3 × 50 mL). The combined extracts were dried over Na_2SO_4, filtered and concentrated. The residue was purified by flash chromatography (hexane/*t*-butyl methyl ether 300:1) to afford the title compound as a pale yellow oil (5.57 g, 77%, r.r. 10:1) and its regioisomer **S2** as a colourless oil (310 mg, 4%). $[\alpha]_D^{20}$ = –13.4 (c = 1.0, $CHCl_3$). ^{1}H NMR (400 MHz, $CDCl_3$): δ = 5.80 (dddd, *J* = 16.8, 10.1, 7.9, 6.4 Hz, 1H), 5.09–4.97 (m, 2H), 3.70 (dd, *J* = 9.6, 3.0 Hz, 1H), 3.48 (dd, *J* = 9.6, 7.7 Hz, 1H), 3.41 (td, *J* = 7.4, 3.0 Hz, 1H), 2.54 (brs, 1H), 2.43–2.34 (m, 1H), 1.95 (dddt, *J* = 13.9, 8.9, 7.9, 1.1 Hz, 1H), 1.66 (dddd, *J* = 12.9, 11.0, 5.8, 2.8 Hz, 1H), 0.90 (s, 9H), 0.85 (d, *J* = 6.9 Hz, 3H), 0.08 (s, 6H) ppm. ^{13}C NMR (100 MHz, $CDCl_3$): δ = 137.3, 116.2, 75.2, 65.2, 37.3, 35.7, 26.0, 18.4, 15.2, –5.2, –5.3 ppm. IR (film): $\tilde{\nu}$ = 3484, 2955, 2929, 2858, 1463, 1362, 1254, 1093, 993, 911, 835, 777, 670 cm^{-1}. MS (EI) *m/z* (%): 187 (15), 145 (13), 105 (57), 95 (100), 89 (13), 75 (82), 73 (25), 67 (11). HRMS (ESIpos): *m/z* calcd. for $C_{13}H_{28}O_2SiNa$: 267.1751, found: 267.1751.

Spectral and analytical data of the regioisomer **S2**: $[\alpha]_D^{20}$ = +2.1 (c = 0.7, $CHCl_3$). ^{1}H NMR (400 MHz,



$CDCl_3$): δ = 5.77 (ddt, *J* = 17.0, 10.1, 7.1 Hz, 1H), 5.09–4.97 (m, 2H), 4.02 (qd, *J* = 6.5, 2.7 Hz, 1H), 3.76 (dd, *J* = 10.0, 5.9 Hz, 1H), 3.72 (dd, *J* = 10.0, 4.0 Hz, 1H), 2.15–2.06 (m, 2H), 1.69 (dddd, *J* = 10.2, 8.7, 4.0, 2.7 Hz, 1H), 1.19 (d, *J* = 6.5 Hz, 3H), 0.90 (s, 9H), 0.07 (s, 3H), 0.07 (s, 3H) ppm. ^{13}C NMR (100 MHz, $CDCl_3$): δ = 137.3, 116.4, 70.8, 65.1, 44.9, 30.1, 26.0, 19.5, 18.2, -5.5, -5.5 ppm. IR (film): $\tilde{\nu}$ = 3443, 2956, 2929, 2858, 1472, 1362, 1254, 1094, 992, 911, 836, 776, 670 cm^{-1}. MS (EI) *m/z* (%): 105 (63), 95 (34), 75 (100), 73 (16). HRMS (ESIpos): *m/z* calcd. for $C_{13}H_{28}O_2SiNa$: 267.1751, found: 267.1749.

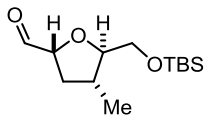
((2*R*,4*R*,5*R*)-5-(((*t*-butyldimethylsilyl)oxy)methyl)-4-methyltetrahydrofuran-2-yl)methanol (21). A



solution of alcohol **20** (4.00 g, 16.4 mmol) in *i*-PrOH (10 mL) was added to a solution of $Co(nmp)_2$ (925 mg, 1.64 mmol) in *i*-PrOH (90 mL). The pale red solution was purged with O_2 for 15 minutes before *t*-BuOOH (0.29 mL, 1.64 mmol) was added in one portion. The reaction mixture was stirred at 55 °C under oxygen atmosphere (balloon) for 5 hours, during which time the solution turned green. After cooling to ambient temperature, the solvent was evaporated. The residue was partitioned between sat. NH_4Cl (50 mL) and *t*-butyl methyl ether (50 mL) and the aqueous layer extracted with *t*-butyl methyl ether (2 × 80 mL). The combined extracts were washed with water (3 × 50 mL) and brine (50 mL), dried

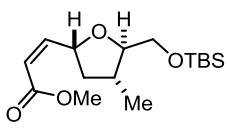
over Na_2SO_4, filtered and concentrated. The residue was purified by flash chromatography (hexanes/*t*-butyl methyl ether 25:1 to 20:1) to yield the title compound as a pale yellow oil (3.36 g, 79%). $[\alpha]_D^{20}$ = –16.4 (c = 1.0, $CHCl_3$). ^{1}H NMR (500 MHz, $CDCl_3$): δ = 4.08 (dtd, *J* = 9.8, 5.7, 3.2 Hz, 1H, H-5), 3.69 (ddd, *J* = 11.6, 6.4, 3.2 Hz, 1H, H-6), 3.69 (AB, *J* = 11.0, 4.5 Hz, 1H, H-1), 3.66 (AB, *J* = 11.0, 4.5 Hz, 1H, H-1), 3.53 (dt, *J* = 8.4, 4.5 Hz, 1H, H-2), 3.49 (dt, *J* = 11.9, 5.8 Hz, 1H, H-6), 2.15 (dddq, *J* = 10.8, 8.2, 7.0, 6.6 Hz, 1H, H-3), 2.06 (ddd, *J* = 12.0, 7.1, 5.8 Hz, 1H, H-4), 1.95 (t, *J* = 6.2 Hz, 1H, 6-OH), 1.41 (ddd, *J* = 11.9, 10.5, 9.8 Hz, 1H, H-4), 1.07 (d, *J* = 6.6 Hz, 3H, H-23), 0.90 (s, 9H, TBS), 0.07 (s, 6H, TBS) ppm. ^{13}C NMR (125 MHz, $CDCl_3$): δ = 86.2 (C2), 79.3 (C5), 65.1 (C6), 65.0 (C1), 36.8 (C4), 36.5 (C3), 26.1 (3C, TBS), 18.6 (TBS), 17.5 (C23), –5.1 (TBS), –5.2 ppm (TBS). IR (film): $\tilde{\nu}$ = 3432, 2955, 2929, 2857, 1729, 1462, 1388, 1361, 1253, 1128, 1085, 1054, 1005, 906, 834, 775, 729, 649 cm^{-1}. MS (EI) *m/z* (%): 229 (15), 203 (49), 185 (29), 117 (28), 115 (17), 111 (12), 105 (28), 103 (10), 101 (11), 93 (33), 89 (10), 83 (12), 81 (22), 75 (100), 73 (48), 69 (21), 59 (17), 57 (21), 55 (22), 43 (12), 41 (18). HRMS (ESIpos): *m/z* calcd. for $C_{13}H_{28}O_3SiNa$: 283.1700, found: 283.1700.

(2*R*,4*R*,5*R*)-5-(((*t*-butyldimethylsilyl)oxy)methyl)-4-methyltetrahydrofuran-2-carbaldehyde (S3).



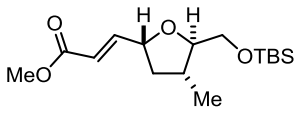
Hünig base (11.0 mL, 63.4 mmol) was added to a solution of alcohol **21** (3.28 g, 12.7 mmol) in CH_2Cl_2 (110 mL) at –25 °C. In a second flask, a suspension of sulfur trioxide pyridine complex (5.04 g, 31.7 mmol) in DMSO (9.00 mL, 126 mmol) was stirred for 10 minutes at ambient temperature before it was added to the alcohol solution at –25 °C (rinsing with CH_2Cl_2 (5 mL)). The resulting mixture was stirred for 30 minutes at –25 °C. The mixture was poured into pH 7 phosphate buffer (50 mL) and *t*-butyl methyl ether (50 mL) and the aqueous layer was extracted with *t*-butyl methyl ether (3 × 100 mL). The combined extracts were washed with pH 7 phosphate buffer (100 mL) and brine (100 mL) before they were dried over Na_2SO_4, filtered and concentrated under high vacuum to yield the crude aldehyde as a yellow oil, which was used in the next step without further purification. For analytical purposes an aliquot was purified by flash chromatography (hexane/*t*-butyl methyl ether 9:1): $[\alpha]_D^{20}$ = +3.4 (c = 1.0, $CHCl_3$). ^{1}H NMR (400 MHz, $CDCl_3$): δ = 9.66 (d, *J* = 2.2 Hz, 1H), 4.28 (ddd, *J* = 8.8, 7.4, 2.2 Hz, 1H), 3.77–3.71 (m, 1H), 3.68 (d, *J* = 4.1 Hz, 1H), 3.64 (dd, *J* = 7.9, 4.0 Hz, 1H), 2.35 (dt, *J* = 12.2, 7.4 Hz, 1H), 2.22 (dtd, *J* = 14.2, 7.4, 2.4 Hz, 1H), 1.58 (dt, *J* = 12.2, 9.0 Hz, 1H), 1.06 (d, *J* = 6.6 Hz, 3H), 0.89 (s, 9H), 0.06 (s, 3H), 0.06 (s, 3H) ppm. ^{13}C NMR (100 MHz, $CDCl_3$): δ = 203.1, 87.8, 82.8, 64.3, 36.5, 35.4, 26.1 (3C), 18.5, 17.3, –5.19, –5.25 ppm. IR (film): $\tilde{\nu}$ = 2956, 2929, 2857, 1734, 1462, 1388, 1361, 1254, 1130, 1087, 1058, 1004, 939, 834, 776, 671 cm^{-1}. MS (EI) *m/z* (%): 229 (25), 201 (34), 185 (13), 145 (12), 143 (11), 129 (13), 117 (11), 115 (18), 105 (11), 103 (19), 101 (20), 89 (13), 75 (100), 73 (72), 59 (23), 57 (12), 55 (12), 41 (14). HRMS (ESIpos): *m/z* calcd. for $C_{13}H_{26}O_3SiNa$: 281.1543, found: 281.1545.

Methyl (*Z*)-3-((2*R*,4*R*,5*R*)-5-(((*t*-butyldimethylsilyl)oxy)methyl)-4-methyltetrahydrofuran-2-yl)-acrylate (22). 18-Crown-6 (7.37 g, 27.9 mmol) was added to a solution of KHMDS (3.03 g, 15.2 mmol) in THF (60 mL). After cooling to –78 °C, methyl O,O'-bis(2,2,2-trifluoroethyl)phosphonoacetate (3.22 mL, 15.2 mmol) was added dropwise and the resulting mixture was stirred for 20 minutes. Next, a solution of aldehyde **S3** (3.27 g, 12.7 mmol) in THF (15 mL) was added dropwise over 10 minutes. The resulting mixture was stirred for 3 hours at –78 °C before it was poured into sat. aq. NH_4Cl (70 mL). The aqueous layer was extracted with EtOAc (3 × 70 mL), the combined extracts were washed with brine (100 mL), dried over Na_2SO_4, filtered and concentrated. The residue was purified twice by flash chromatography (fine SiO_2, hexane/*t*-butyl methyl ether 99:1) to yield the title compound (*Z*)-**22** as a pale yellow oil (2.50 g, 63% over two steps, *Z*/*E* 12:1); additional fractions contained the undesired (*E*)-**22** (190 mg, 5% over two steps) and traces of the β/γ-unsaturated ester **S4** (79 mg, 2% over two steps).



Analytical and spectral data of (*Z*)-**22**: $[\alpha]_D^{20}$ = +40.8 (c = 1.0, $CHCl_3$). ^{1}H NMR (400 MHz, $CDCl_3$): δ = 6.33 (dd, *J* = 11.7, 7.3 Hz, 1H), 5.75 (dd, *J* = 11.7, 1.6 Hz, 1H), 5.37 (dddd, *J* = 9.8, 7.4, 5.9, 1.6 Hz, 1H), 3.69 (s, 3H), 3.68–3.65 (m, 2H), 3.61 (ddd, *J* = 8.2, 5.0, 4.1 Hz, 1H), 2.48 (ddd, *J* = 12.4, 7.0, 5.9 Hz, 1H), 2.24–2.13 (m, 1H), 1.30 (ddd, *J* = 12.1, 10.6, 9.8 Hz, 1H), 1.07 (d, *J* = 6.6 Hz, 3H), 0.89 (s, 9H), 0.06 (s, 6H) ppm. ^{13}C NMR (100 MHz, $CDCl_3$): δ = 166.4, 152.3, 118.5, 86.5, 75.8, 65.0, 51.5, 41.4, 36.7, 26.1, 18.6, 17.5, –5.16, –5.17 ppm. IR (film): $\tilde{\nu}$ = 2954, 2929, 2857, 1724, 1648, 1462, 1438, 1404, 1254, 1198, 1180, 1083, 1038, 1005, 837, 777, 674 cm^{-1}. MS (EI) *m/z* (%): 258 (18), 257 (100), 227 (16), 225 (30), 197 (28), 169 (15), 165 (13), 139 (28), 137 (15), 133 (39), 121 (35), 117 (58), 111 (35), 107 (20), 105 (33), 89 (23), 81 (11), 79 (18), 75 (45), 73 (37), 59 (13). HRMS (ESIpos): *m/z* calcd. for $C_{16}H_{30}O_4SiNa$: 337.1806, found: 337.1806.

Analytical and spectral data of (*E*)-**22**: $[\alpha]_D^{20}$ = +17.3 (c = 0.93, $CHCl_3$). ^{1}H NMR (400 MHz, $CDCl_3$): δ = 6.94 (dd, *J* = 15.6, 5.2 Hz, 1H), 6.04 (dd, *J* = 15.6, 1.6 Hz, 1H), 4.54 (dddd, *J* = 9.9, 6.0, 5.2, 1.6 Hz, 1H), 3.73 (s, 3H), 3.70 (d, *J* = 4.4 Hz, 1H), 3.68 (d, *J* = 4.2 Hz, 1H), 3.60 (dd, *J* = 8.1, 4.1 Hz, 1H), 2.30 (ddd, *J* = 11.5, 7.0, 5.9 Hz, 1H), 2.22 (ddq, *J* = 10.4, 8.1, 6.5 Hz, 1H), 1.39 (dt, *J* = 11.6, 10.0 Hz, 1H), 1.07 (d, *J* = 6.5 Hz, 3H), 0.89 (s, 9H), 0.06 (s, 3H), 0.06 (s, 3H) ppm. ^{13}C NMR (100 MHz, $CDCl_3$): δ = 167.2, 149.0, 119.5, 86.5, 77.7, 64.6, 51.7, 41.7, 36.5, 26.1 (3C), 18.5, 17.4, –5.15, –5.19 ppm. IR (film): $\tilde{\nu}$ = 2955, 2930, 2857, 1728, 1662, 1462, 1436, 1361, 1300, 1258, 1166, 1125, 1089, 1006, 837, 777, 675 cm^{-1}. MS (ESIpos) *m/z* (%): 337.2 (100 (M+Na)). HRMS (ESIpos): *m/z* calcd. for $C_{16}H_{30}O_4SiNa$: 337.1806, found: 337.1807.



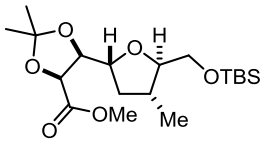
Diol S5. Potassium hexacyanoferrate (5.61 g, 17.0 mmol), potassium carbonate (2.36 g, 17.0 mmol), potassium osmate (VI) dihydrate (126 mg, 0.341 mmol), $(DHQD)_2PYR$ (150 mg, 0.171 mmol) and methanesulfonamide (540 mg, 5.68 mmol) were sequentially added to a mixture of alkene *Z*-**22** (1.79 g, 5.68 mmol) in *t*-BuOH/H_2O (1:1, 100 mL) at 0 °C. The resulting mixture was stirred at 0 °C for 72 hours before it was poured into a solution of sat. NH_4Cl, sat. NaS_2O_3 and water (1:1:2, 100 mL). The mixture was vigorously stirred for 10 minutes at ambient temperature, diluted with EtOAc. The aqueous layer was extracted with EtOAc (3 × 100 mL), and the combined extracts were washed with brine (200 mL), dried over Na_2SO_4, filtered and concentrated. The residue was purified twice by flash chromatography (fine SiO_2, hexane/EtOAc 19:1 to 8:1) to yield the desired diol (1.33 g, 67%, dr 5:1) and the undesired diastereoisomer **S6** (215 mg, 11%) as colourless oil each.

Analytical and spectral data of the major diastereoisomer **S5**: $[\alpha]_D^{20}$ = –8.0 (c = 1.0, $CHCl_3$). ^{1}H NMR (500 MHz, $CDCl_3$): δ = 4.29 (dd, *J* = 9.2, 4.3 Hz, 1H, H-7), 4.05 (ddd, *J* = 10.0, 5.6, 3.4 Hz, 1H, H-5), 3.78 (s, 3H, H-9), 3.74 (ddd, *J* = 8.4, 4.4, 3.6 Hz, 1H, H-6), 3.67 (dd, *J* = 10.9, 4.0 Hz, 1H, H-1), 3.62 (dd, *J* = 10.9, 4.6 Hz, 1H, H-1), 3.54 (ddd, *J* = 8.6, 4.6, 4.0 Hz, 1H, H-2), 3.39 (d, *J* = 9.6 Hz, 1H, 7-OH), 2.75 (d, *J* = 8.5 Hz, 1H, 6-OH), 2.12 (ddqd, *J* = 10.6, 8.6, 6.8, 6.6 Hz, 1H, H-3), 2.07 (ddd, *J* = 11.8, 6.8, 5.6 Hz, 1H, H-4), 1.64 (dt, *J* = 11.4, 10.6 Hz, 1H, H-4), 1.07 (d, *J* = 6.4 Hz, 3H, H-23), 0.89 (s, 9H, TBS), 0.06 (s, 6H, TBS) ppm. ^{13}C NMR (125 MHz, $CDCl_3$): δ = 172.9 (C8), 87.0 (C2), 78.7 (C5), 73.7 (C7), 73.4 (C6), 64.6 (C1), 52.5 (C9), 37.4 (C4), 36.0 (C3), 26.0 (3C, TBS), 18.5 (TBS), 17.0 (C23), –5.19 (TBS), –5.23 ppm (TBS). IR (film): $\tilde{\nu}$ = 3458, 2954, 2929, 2857, 1740, 1461, 1440, 1388, 1253, 1128, 1080, 1004, 836, 777, 647 cm^{-1}. MS (EI) *m/z* (%): 292 (14), 291 (77), 259 (25), 155 (11), 231 (39), 230 (15), 229 (82), 213 (11), 186 (12), 185 (80), 181 (17), 171 (24), 167 (11), 157 (12), 153 (11), 149 (15), 145 (13), 143 (14), 139 (27), 129 (11), 127 (13), 126 (12), 121 (19), 117 (48), 115 (66), 113 (11), 109 (23), 107 (11), 105 (24), 103 (12), 101 (14), 97 (19), 93 (23), 89 (22), 85 (12), 81 (23), 75 (88), 73 (100), 69 (12), 59 (16), 55 (14), 43 (12), 41 (11). HRMS (ESIpos): *m/z* calcd. for $C_{16}H_{32}O_6SiNa$: 371.1860, found: 371.1863.

Analytical and spectral data of the minor diastereoisomer **S6**: $[\alpha]_D^{20}$ = –17.6 (c = 1.4, $CHCl_3$). ^{1}H NMR (500 MHz, $CDCl_3$): δ = 4.32 (t, *J* = 4.4 Hz, 1H, H-7), 4.03 (ddd, *J* = 9.2, 7.4, 6.0 Hz, 1H, H-5), 3.80 (s, 3H, H-9), 3.81 (ddd, *J* = 9.2, 7.4, 6.0 Hz, 1H, H-6), 3.64 (dd, *J* = 11.7, 4.3 Hz, 1H, H-1), 3.60 (dd, *J* = 11.0, 4.6 Hz, 1H, H-1), 3.48 (dt, *J* = 8.6, 4.4 Hz, 1H, H-2), 3.31 (d, *J* = 4.8 Hz, 1H, 7-OH), 2.53 (d, *J* = 6.0 Hz, 1H, 6-OH), 2.28 (ddd, *J* = 12.4, 6.8, 6.0 Hz, 1H, H-4), 2.10 (dddq, *J* = 10.8, 8.5, 7.0, 6.6 Hz, 1H, H-3), 1.55 (ddd, *J* = 12.4, 10.6, 9.2 Hz, 1H, H-4), 1.07 (d, *J* = 6.6 Hz, 3H, H-23), 0.89 (s, 9H, TBS), 0.05 (s, 6H, TBS) ppm. ^{13}C NMR (125 MHz, $CDCl_3$): δ = 173.2 (C8), 86.6 (C2), 78.4 (C5), 75.2 (C6), 72.7 (C7), 64.8 (C1), 52.7 (C9), 38.4 (C4), 36.2 (C3), 26.1 (3C, TBS), 18.5 (TBS), 17.3 (C23), –5.19 (TBS), –5.21 ppm (TBS). IR (film): $\tilde{\nu}$ = 3439,

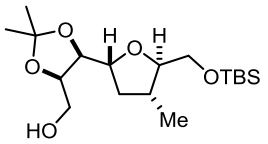
2954, 2929, 2857, 1741, 1462, 1388, 1254, 1129, 1087, 1004, 837, 777, 671 cm^{-1}. MS (ESIpos) *m/z* (%): 371.2 (100 (M+Na)). HRMS (ESIpos): *m/z* calcd. for $C_{16}H_{32}O_6SiNa$: 371.1860, found: 371.1858.

Acetonide 23. *p*-Toluenesulfonic acid monohydrate (50.5 mg, 0.27 mmol) was added to a solution of



diol **S5** (2.00 g, 5.74 mmol) in 2,2-dimethoxypropane (60 mL). The resulting mixture was stirred at ambient temperature for 4 hours. After quenching with sat. $NaHCO_3$ (50 mL), the layers were separated and the aqueous phase was extracted with EtOAc (3 × 50 mL). The combined extracts were washed with brine, dried over Na_2SO_4 and concentrated. The residue was purified by flash chromatography (hexane/EtOAc 20:1) to afford the title compound as a colourless oil (1.98 g, 89%). $[\alpha]_D^{20}$ = +10.3 (c = 1.0, $CHCl_3$). ^{1}H NMR (400 MHz, $CDCl_3$): δ = 4.55 (d, *J* = 6.8 Hz, 1H), 4.24 (t, *J* = 6.8 Hz, 1H), 3.97 (ddd, *J* = 9.4, 6.7, 5.7 Hz, 1H), 3.73 (s, 3H), 3.71 (dd, *J* = 10.7, 3.9 Hz, 1H), 3.63 (dd, *J* = 10.5, 5.3 Hz, 1H), 3.56 (ddd, *J* = 7.3, 5.2, 3.6 Hz, 1H), 2.26–2.17 (m, 2H), 1.62 (s, 3H), 1.46–1.36 (m, 1H), 1.40 (s, 3H), 1.09 (d, *J* = 6.1 Hz, 3H), 0.87 (s, 9H), 0.03 (s, 6H) ppm. ^{13}C NMR (100 MHz, $CDCl_3$): δ = 170.9, 111.5, 85.9, 81.3, 76.8, 75.7, 64.7, 52.3, 38.1, 36.8, 26.9, 26.0, 25.8, 18.4, 17.8, -5.2, -5.3 ppm. IR (film): $\tilde{\nu}$ = 2954, 2930, 2858, 1765, 1734, 1461, 1380, 1253, 1202, 1166, 1091, 1005, 871, 838, 777 cm^{-1}. MS (EI) *m/z* (%): 331 (25), 241 (19), 230 (11), 229 (57), 185 (39), 171 (10), 159 (16), 157 (14), 139 (51), 117 (95), 115 (14), 107 (12), 101 (10), 89 (22), 75 (54), 73 (100), 59 (24), 55 (10), 43 (26), 41 (12), 40 (42). HRMS (ESIpos): *m/z* calcd. for $C_{19}H_{36}O_6SiNa$: 411.2173, found: 411.2174.

Alcohol S7. A solution of lithium aluminium hydride (1 M in THF, 2.83 mL, 2.83 mmol) was added to a



solution of ester **23** (550 mg, 1.42 mmol) in THF (14 mL) at 0 °C. The resulting mixture was stirred at ambient temperature for 1 hour. The reaction was cooled to 0 °C and carefully quenched with MeOH until gas evolution ceased. The mixture was poured via cannula into sat. Rochelle salt (15 mL), rinsing the flask with *t*-butyl methyl ether (5 mL). The resulting emulsion was vigorously stirred for 16 hours at ambient temperature. The layers were separated and the aqueous layer was extracted with *t*-butyl methyl ether (3 × 20 mL). The combined extracts were washed with brine (25 mL), dried over Na_2SO_4, filtered and concentrated. The residue was purified by flash chromatography (hexane/*t*-butyl methyl ether 19:1) to afford the title compound as a colourless oil (487 mg, 95%). $[\alpha]_D^{20}$ = +2.8 (c = 1.0, $CHCl_3$). ^{1}H NMR (400 MHz, $CDCl_3$): δ = 4.19–4.10 (m, 2H), 4.08 (dd, *J* = 6.3, 3.8 Hz, 1H), 3.73–3.59 (m, 5H), 3.12 (t, *J* = 6.5 Hz, 1H), 2.24–2.12 (m, 2H), 1.63 (ddd, *J* = 14.0, 13.8, 9.7 Hz, 1H) 1.50 (s, 3H), 1.37 (s, 3H), 1.08 (d, *J* = 6.1 Hz, 3H), 0.88 (s, 9H), 0.04 (s, 6H) ppm. ^{13}C NMR (100 MHz, $CDCl_3$): δ = 108.7, 86.5, 78.9, 77.5, 76.0, 64.4, 61.6, 38.3, 36.0, 27.6, 26.0, 25.8, 18.4, 17.1, –5.3, –5.3 ppm. IR (film): $\tilde{\nu}$ = 3475, 2955, 2930, 2857, 1462, 1378, 1251, 1216, 1168, 1124, 1078, 1040, 1005, 836, 777, 668 cm^{-1}. MS (EI) *m/z* (%): 303 (28), 245 (30), 229 (43), 227 (35), 185 (38), 157 (18), 153 (18), 145 (21), 135 (57), 131

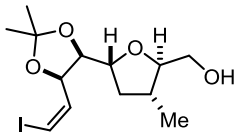
(17), 117 (47), 115 (15), 109 (20), 107 (13), 105 (29), 101 (15), 97 (16), 95 (19), 93 (15), 89 (18), 85 (14), 81 (28), 75 (98), 73 (100), 59 (73), 57 (22), 55 (24), 43 (52), 41 (25). HRMS (ESIpos): *m/z* calcd. for $C_{18}H_{36}O_5SiNa$: 383.2224, found: 383.2226.

Aldehyde S8. Hünig base (1.40 mL, 8.03 mmol) was added to a solution of alcohol **S7** (579 mg, 1.61 mmol) in CH_2Cl_2 (8 mL) at –25 °C. In a second flask, a suspension of sulfur trioxide pyridine complex (639 mg, 4.01 mmol) in DMSO (1.15 mL, 16.1 mmol) was stirred for 10 minutes at ambient temperature before it was added to the alcohol solution at –25 °C, rinsing the flask with CH_2Cl_2 (2 mL). The resulting mixture was stirred at –25 °C for 45 minutes. The mixture was poured into pH 7 phosphate buffer (15 mL) and *t*-butyl methyl ether (15 mL), the layers were separated and the aqueous layer was extracted with *t*-butyl methyl ether (3 × 20 mL). The combined extracts were washed with pH 7 phosphate buffer (20 mL) and brine (20 mL), dried over Na_2SO_4, filtered and concentrated in vacuum to yield the crude aldehyde as a pale yellow oil, which was pure by NMR spectroscopy and used without further treatment. $[\alpha]_D^{20}$ = –30.9 (c = 1.0, $CHCl_3$). ^{1}H NMR (400 MHz, $CDCl_3$): δ = 9.66–9.59 (m, 1H), 4.34–4.29 (m, 2H), 4.01 (dtd, *J* = 8.0, 3.8, 2.0 Hz, 1H), 3.65–3.59 (m, 2H), 3.55 (dt, *J* = 8.7, 4.4 Hz, 1H), 2.17–2.06 (m, 2H), 1.57 (s, 3H), 2.52 (ddd, *J* = 14.8, 5.2, 1.5 Hz, 1H), 1.40 (s, 3H), 1.05 (d, *J* = 6.1 Hz, 3H), 0.86 (s, 9H), 0.02 (s, 3H), 0.02 (s, 3H) ppm. ^{13}C NMR (100 MHz, $CDCl_3$): δ = 201.6, 111.3, 86.7, 81.6, 81.3, 75.6, 64.6, 37.0, 36.7, 27.1, 26.0, 25.5, 18.4, 17.1, –5.3 ppm (2C). IR (film): $\tilde{\nu}$ = 2956, 2930, 2857, 1732, 1461, 1381, 1361, 1252, 1214, 1164, 1075, 1004, 835, 776, 667 cm^{-1}. MS (EI) *m/z* (%): 301 (59), 243 (24), 230 (18), 229 (100), 213 (15), 201 (38), 185 (57), 183 (27), 171 (38), 157 (29), 145 (15), 143 (16), 129 (22), 117 (40), 115 (15), 113 (18), 105 (17), 103 (20), 101 (22), 75 (59), 73 (63), 59 (18), 43 (15). HRMS (ESIpos): *m/z* calcd. for $C_{18}H_{34}O_5SiNa$: 381.2068, found: 381.2068.

(*Z*)-Vinyl iodide 24. Iodomethyltriphenylphosphonium iodide (1.82 g, 4.17 mmol) was added in portions to a solution of sodium bis(trimethylsilyl)amide (753 mg, 4.11 mmol) in THF (25 mL). The resulting yellow mixture was stirred at ambient temperature for 30 minutes before it was cooled to –78 °C. HMPA (1.40 mL, 8.02 mmol) was added, followed by a solution of aldehyde **S8** (575 mg, 1.60 mmol) in THF (6 mL). The resulting mixture was stirred at –78 °C for 4 hours. The reaction was quenched with H_2O (15 mL) and the aqueous layer was extracted with *t*-butyl methyl ether (3 × 20 mL). The combined extracts were dried over Na_2SO_4, filtered and concentrated. The residue was purified by flash chromatography (hexane/*t*-butyl methyl ether 70:1 to 40:1) to afford the title compound as a colourless oil (517 mg, 67% two steps, *Z*/*E* > 20:1). $[\alpha]_D^{20}$ = –53.2 (c = 0.875, $CHCl_3$). ^{1}H NMR (400 MHz, $CDCl_3$): δ = 6.47 (dd, *J* = 7.7, 0.9 Hz, 1H), 6.36 (dd, *J* = 8.6, 7.7 Hz, 1H), 4.82 (ddd, *J* = 8.6, 6.3, 0.6 Hz, 1H), 4.14 (t, *J* = 6.6 Hz, 1H), 3.89 (dt, *J* = 9.8, 6.3 Hz, 1H), 3.72 (dd, *J* = 10.6, 3.9 Hz, 1H),

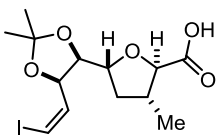
3.65 (dd, *J* = 10.6, 5.1 Hz, 1H), 3.56 (ddd, *J* = 8.9, 5.1, 3.9 Hz, 1H), 2.18 (ddq, *J* = 13.9, 10.1, 6.5 Hz, 1H), 2.07 (ddd, *J* = 13.0, 7.2, 5.9 Hz, 1H), 1.50 (s, 3H), 1.41 (s, 3H), 1.33 (dt, *J* = 11.9, 10.1 Hz, 1H), 1.09 (d, *J* = 6.5 Hz, 3H), 0.88 (s, 9H), 0.04(s, 6H) ppm. ^{13}C NMR (100 MHz, $CDCl_3$): δ = 137.6, 110.0, 86.0, 85.6, 81.1, 79.8, 77.2, 64.9, 38.1, 36.7, 27.8, 26.0, 25.8, 18.4, 17.8, –5.2, –5.2 ppm. IR (film): $\tilde{\nu}$ = 2955, 2929, 2857, 1461, 1378, 1252, 1214, 1164, 1125, 1085, 1059, 999, 837, 777, 677 cm^{-1}. MS (EI) *m/z* (%): 483 (11), 482 (24), 467 (12), 426 (19), 425 (87), 367 (22), 337 (12), 293 (11), 243 (21), 230 (19), 229 (100), 186 (12), 185 (61), 171 (28), 157 (34), 149 (17), 117 (18), 93 (11), 75 (31), 73 (43). HRMS (ESIpos): *m/z* calcd. for $C_{19}H_{35}O_4ISiNa$: 505.1242, found: 505.1244.

Alcohol S9. Pyridine (5.5 ml, 68 mmol), and HF·pyridine (0.70 ml, 7.8 mmol) were successively added



to a solution of compound **24** (241 mg, 0.500 mmol) in THF (12 mL) in a Teflon® vial. The resulting mixture was stirred at ambient temperature for 16 hours. The mixture was diluted with EtOAc (10 mL) and the reaction carefully quenched with sat. $NaHCO_3$ (20 mL). The layers were separated and the aqueous layer was extracted with EtOAc (3 × 20 mL). The combined organic phases were washed with a 1:3 mixture of sat. aq. NH_4Cl and brine (50 ml), dried over Na_2SO_4, filtered and concentrated. The residue was purified by flash chromatography (hexane/EtOAc 4:1 to 2:1) to afford the title compound as a colourless oil (220 mg, 99%). $[\alpha]_D^{20}$ = –50.7 (c = 1.0, $CHCl_3$). ^{1}H NMR (400 MHz, $CDCl_3$): δ = 6.50 (dd, *J* = 7.7, 1.0 Hz, 1H), 6.34 (dd, *J* = 8.7, 7.7 Hz, 1H), 4.82 (ddd, *J* = 8.6, 6.3, 1.0 Hz, 1H), 4.16 (t, *J* = 6.6 Hz, 1H), 3.94 (ddd, *J* = 9.7, 7.0, 5.7 Hz, 1H), 3.80 (dd, *J* = 11.9, 2.7 Hz, 1H), 3.58 (ddd, *J* = 8.9, 3.9, 2.7 Hz, 1H), 3.50 (dd, *J* = 11.9, 4.0 Hz, 1H), 2.21–2.12 (m, 1H), 2.12–2.06 (m, 1H), 1.98 (brs, 1H), 1.51 (s, 3H), 1.42 (s, 3H), 1.42–1.32 (m, 1H), 1.05 ppm (d, *J* = 6.2 Hz, 3H). ^{13}C NMR (100 MHz, $CDCl_3$): δ = 137.3, 110.1, 86.3, 85.8, 81.2, 79.7, 77.3, 62.4, 37.9, 34.7, 27.9, 25.7, 16.3 ppm. IR (film): $\tilde{\nu}$ = 3442, 2983, 2957, 2930, 2872, 1455, 1372, 1249, 1251, 1160, 1088, 1053, 926, 866, 816 cm^{-1}. MS (ESIpos) *m/z* (%): 391.0 (100 (M+Na)). HRMS (ESIpos): *m/z* calcd. for $C_{13}H_{21}O_4INa$: 391.0377, found: 391.0375.

Carboxylic Acid S10. Water (0.09 mL, 5 mmol), (diacetoxyiodo)benzene (348 mg, 1.08 mmol) and



TEMPO (23 mg, 0.15 mmol) were successively added to a solution of alcohol **S9** (180 mg, 0.489 mmol) in MeCN (2.4 mL). The pale orange solution was stirred for 19 hours at ambient temperature. The reaction was quenched with aqueous NaOH (5% w/w, 100 mL) and the aqueous layer washed with *t*-butyl methyl ether (2 × 50 mL). The aqueous solution was acidified with HCl (2 M) until pH 3 was reached; pH 3.5 phosphate buffer solution (50 mL) was added and the aqueous phase was extracted with EtOAc (2 × 200 mL). The combined organic layers were washed with a 1:1 mixture of pH 5 phosphate buffer and brine (200 mL). After drying over Na_2SO_4 and filtration, the residue was concentrated under reduced pressure. The yellow residual oil (183 mg, 98%) was used without further purification. $[\alpha]_D^{20}$ = –64,5

(c = 1.04, $CHCl_3$). ^{1}H NMR (400 MHz, $CDCl_3$): δ = 6.54 (dd, *J* = 7.8, 1.0 Hz, 1H), 6.45 (t, *J* = 7.9 Hz, 1H), 4.88 (ddd, *J* = 7.8, 6.6, 1.0 Hz, 1H), 4.22 (dd, *J* = 6.5, 5.6 Hz, 1H), 4.12 (dt, *J* = 9.9, 5.7 Hz, 1H), 4.04 (d, *J* = 8.7 Hz, 1H), 2.37 (ddp, *J* = 10.5, 8.7, 6.7 Hz, 1H), 2.17 (ddd, *J* = 12.7, 7.2, 5.8 Hz, 1H), 1.56–1.47 (m, 4H), 1.42 (s, 3H), 1.27 (d, *J* = 6.6 Hz, 3H) ppm. ^{13}C NMR (101 MHz, $CDCl_3$): δ = 174.9, 137.6, 110.1, 85.8, 83.1, 79.9, 79.7, 79.1, 39.8, 37.5, 27.6, 25.6, 17.6 ppm. IR (film) $\tilde{\nu}$ = 3461, 3070, 2982, 2933, 1733, 1380, 1274, 1248, 1216, 1162, 1055, 866 cm^{-1}. MS (EI) *m/z* (%): 367 (21), 253 (13), 224 (100), 195 (68), 129 (36), 97 (43), 83 (25), 43 (22). HRMS (ESIpos): *m/z* calcd. for $C_{13}H_{19}O_5INa$: 405.0169, found: 405.0173.

Ester 25. DMAP (36.5 mg, 0.299 mmol), N-(3-dimethylaminopropyl)-N'-ethylcarbodiimide hydrochloride (411 mg, 2.14 mmol) and 2-(trimethylsilyl)-ethanol (0.56 mL, 3.9 mmol) were added to a solution of carboxylic acid **S10** (600 mg, 1.49 mmol) in CH_2Cl_2 (7.5 mL). After stirring for 4 hours at ambient temperature, the mixture was diluted with EtOAc (10 mL) and the reaction was quenched with sat. aq. $NaHCO_3$ (10 mL). The aqueous phase was separated and extracted with EtOAc (3 × 10 mL). The combined organic layers were washed with brine (30 mL), dried over Na_2SO_4, filtered and concentrated. The residue was purified by flash chromatography (hexane/*t*-butyl methyl ether 96:4 to 94:6 to 92:8) to yield the title compound as a colourless oil (512 mg, 71%). $[\alpha]_D^{20}$ = –56.3 (c = 1.57, $CHCl_3$). ^{1}H NMR (400 MHz, $CDCl_3$): δ = 6.51 (d, *J* = 7.9 Hz, 1H), 6.46 (t, *J* = 7.8 Hz, 1H), 4.86 (dd, *J* = 7.9, 6.3 Hz, 1H), 4.24–4.09 (m, 4H), 4.01 (d, *J* = 7.5 Hz, 1H), 2.35 (ddq, *J* = 12.0, 9.5, 6.8 Hz, 1H), 2.11 (ddd, *J* = 12.0, 7.5, 5.8 Hz, 1H), 1.51 (s, 3H), 1.45–1.37 (m, 4H), 1.20 (d, *J* = 6.7 Hz, 3H), 1.02–0.97 (m, 2H), 0.04 (s, 9H) ppm. ^{13}C NMR (101 MHz, $CDCl_3$): δ = 173.1, 137.6, 110.1, 85.7, 83.9, 80.0, 79.9, 78.9, 63.2, 39.6, 37.2, 27.6, 25.7, 18.3, 17.5, -1.4 ppm. IR (film) $\tilde{\nu}$ = 2956, 2897, 1748, 1731, 1456, 1371, 1274, 1250, 1215, 1175, 1131, 1086, 1059, 860, 838 cm^{-1}. MS (EI) *m/z* (%): 467 (13), 279 (21), 224 (100), 195 (41), 173 (61), 97 (41), 73 (90). HRMS (ESIpos): *m/z* calcd. for $C_{18}H_{31}O_5ISiNa$: 505.0877, found: 505.0878.

Preparation of the Northern Fragment

(*S*)-2-(2,6-Dimethylhept-5-en-1-yl)-1,3-dioxolane (S11). Triethylorthoformate (69 mL, 0.42 mol) and ethylene glycol (117 mL, 2.09 mol) were added to a solution of (±)-10-camphorsulfonic acid (1.62 g, 6.99 mmol) in CH_2Cl_2 (1.0 L). Neat (*S*)-citronellal (25.2 mL, 139 mmol) was added dropwise *via* syringe over 10 minutes. The colourless solution was stirred at ambient temperature for 20 minutes before it was quenched with sat. aq. $NaHCO_3$ solution (300 mL). The organic phase was separated and the aqueous layer was extracted with CH_2Cl_2 (3 × 200 mL). The combined organic phases were washed with brine (2 × 200 mL), dried over Na_2SO_4 and concentrated to a colourless liquid. This liquid can be purified by flash chromatography

(hexane/*t*-butyl methyl ether 70:30) to give the title compound as a colourless liquid (27.1 g, 98%). More conveniently, the crude mixture was distilled under high vacuum, discarding the fore-run but collecting the fraction distilling between 66–69 °C at 1.6×10^{-2} mbar. The product was isolated as a colourless liquid in a slightly reduced yield (23.1 g, 84%). $[\alpha]_D^{20}$ = –4.3 (c = 1.15, $CHCl_3$). ^{1}H NMR (400 MHz, $CDCl_3$): δ = 5.10 (tq, *J* = 7.1, 2.2 Hz, 1H), 4.90 (dd, *J* = 5.2, 4.7 Hz, 1H), 4.02–3.91 (m, 2H), 3.89–3.80 (m, 2H), 2.08–1.88 (m, 2H), 1.76–1.62 (m, 5H), 1.60 (s, 3 H), 1.54–1.44 (m, 1H), 1.44–1.32 (m, 1H), 1.28–1.13 (m, 1H), 0.95 (d, *J* = 6.5 Hz, 3H) ppm. ^{13}C NMR (100 MHz, $CDCl_3$): δ = 131.2, 124.7, 103.8, 64.7, 64.6, 40.9, 37.5, 29.1, 25.7, 25.4, 19.8, 17.6 ppm. IR (film): $\tilde{\nu}$ = 2960, 2915, 2877, 1454, 1409, 1378, 1130, 1040, 945 cm^{-1}. MS (EI) *m/z* (%): 136 (10), 113 (28), 69 (20), 41 (35). HRMS (ESIpos) *m/z* calcd. for $C_{12}H_{23}O_2$: 199.1693, found: 199.1692. The analytical and spectroscopic data are in agreement with those reported in the literature.[12]

(*S*)-5-(1,3-dioxolan-2-yl)-4-methylpentanal (27). Sudan Red III (5-10 mg) was added to a solution of ketal **S11** (22.5 g, 114 mmol) in CH_2Cl_2 (500 mL). The solution was cooled to –78 °C before ozone was bubbled (35-40 g/Nm^3, 420 minutes) through the mixture until a colour change from red/pink to pale yellow was observed. After purging with oxygen for 30 minutes dimethyl sulfide (17 mL, 0.23 mol) was added and the mixture was allowed to reach ambient temperature over 12 hours. The mixture was concentrated to give a yellow oil which was dissolved in pentane (300 mL). This solution was washed with brine (3 × 200 mL), the combined brine washes were back-extracted with pentane (200 mL) and the combined pentane layers were dried over Na_2SO_4 and concentrated to a yellow oil. This residue was purified by flash chromatography (hexane/EtOAc 100:0 to 80:20) to yield the title compound as a colourless liquid (19 g, 97%). Alternatively, the crude product can be purified by distillation under high vacuum, collecting the fraction distilling between 72-75 °C at 6×10^{-2} mbar; in this case, the title compound was isolated as a colourless liquid in a deminished yield (10.3 g, 53 %). $[\alpha]_D^{20}$ = –5.9 (c = 1.36, $CHCl_3$). ^{1}H NMR (400 MHz, $CDCl_3$): δ = 9.77 (t, *J* = 1.8 Hz, 1H), 4.89 (dd, *J* = 5.4, 4.6 Hz, 1H), 3.99–3.92 (m, 2H), 3.86–3.80 (m, 2H), 2.52–2.37 (m, 2H), 1.79–1.60 (m, 3H), 1.58–1.48 (m, 2H), 0.96 (d, *J* = 6.4 Hz, 3H) ppm. ^{13}C NMR (100 MHz, $CDCl_3$): δ = 202.8, 103.6, 64.9, 64.8, 41.7, 40.7, 30.0, 29.1, 19.9 ppm. IR (film): $\tilde{\nu}$ = 2955, 2880, 2722, 1722, 1411, 1137, 1034, 948 cm^{-1}. MS (EI) *m/z* (%): 113 (3), 73 (100), 55 (6), 45 (20). HRMS (ESIpos) *m/z* calcd. for $C_9H_{16}O_3Na$: 195.0992, found: 195.0993. The analytical and spectroscopic data are in agreement with those reported in the literature.[13]

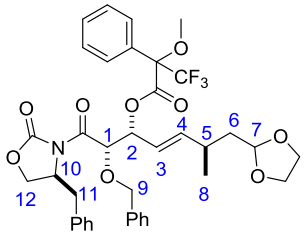
(*R*,*E*)-5-(1,3-dioxolan-2-yl)-4-methylpent-2-enal (28). Diethyl allyl phosphate (12.7 mL, 71.3 mmol) was added to a solution of aldehyde **27** (10.2 g, 59.4 mmol) in THF (48 mL). Palladium(II) acetate (530 mg, 2.36 mmol) and $NaHCO_3$ (6.00 g, 71.4 mmol) were introduced and the orange heterogeneous mixture was placed in a pre-heated oil bath at 86 °C. The

mixture was stirred at reflux temperature under a stream of argon for 60 hours, causing a gradual color change to pale green/brown. The mixture was allowed to cool and partitioned between *t*-butyl methyl ether (200 mL) and deionized water (100 mL). The organic phase was separated and the aqueous phase was further extracted with portions of *t*-butyl methyl ether (2 × 100 mL). The combined organic layers were washed with sat. NH_4Cl solution (100 mL) and brine (100 mL), dried over Na_2SO_4 and concentrated. The resulting orange oil was first purified by flash chromatography (hexane/*t*-butyl methyl ether 50:50) giving the product as a colourless liquid contaminated with the corresponding allyl enol ether. This material was further purified by Kugelrohr distillation, collecting the fraction that distilled between 80–90 °C at 2×10^{-2} mbar to give the title compound as a pale-yellow pungent oil (5.87 g, 58%). $[\alpha]_D^{20}$ = –59.5 (c = 0.79, $CHCl_3$). ^{1}H NMR (400 MHz, $CDCl_3$): δ = 9.51 (d, *J* = 7.8 Hz, 1H), 6.80 (dd, *J* = 15.6, 7.6 Hz, 1H), 6.10 (ddd, *J* = 15.7, 7.8, 1.2 Hz, 1H), 4.87 (t, *J* = 4.8 Hz, 1H), 4.02–3.89 (m, 2H), 3.88–3.80 (m, 2H), 2.81–2.65 (m, 1H), 1.89–1.67 (m, 2H), 1.16 (d, *J* = 6.8 Hz, 3H) ppm. ^{13}C NMR (100 MHz, $CDCl_3$): δ = 194.4, 163.2, 131.3, 102.9, 65.1, 65.0, 39.9, 33.2, 19.8 ppm. IR (film): $\tilde{\nu}$ = 2965, 2882, 1688, 1410, 1130, 1029, 977 cm^{-1}. MS (EI) *m/z* (%): 113 (3), 73 (100), 55 (3), 45 (15). HRMS (ESIpos) *m/z* calcd. for $C_9H_{14}O_3Na$: 193.0835, found: 193.0837.

Aldol S12. Triethylamine (5.4 mL, 39 mmol) was added to a solution of (*S*)-4-benzyl-3-(2-(benzyloxy)acetyl)oxazolidin-2-one (**36**) (9.68 g, 29.8 mmol) in CH_2Cl_2 (100 mL). The mixture was cooled to –78 °C before a solution of dibutylboron triflate (1 M solution in CH_2Cl_2, 30 mL, 30 mmol) was added at such a rate as to kept the internal temperature below –65 °C. The reaction was allowed to reach 0 °C over 1.25 hours. At this point the reaction was re-cooled to –78 °C before a solution of enal **28** (4.22 g, 24.8 mmol) in CH_2Cl_2 (5 mL) was added at such a rate as to keep the internal temperature below –65 °C. The mixture was stirred at –78 °C for 20 minutes and then allowed to reach 0 °C over 1.5 hours. The reaction was quenched with MeOH (140 mL) followed by pH 7 buffer (80 mL). Aqueous hydrogen peroxide (35% aq. solution, 40 mL) was added cautiously ensuring that the temperature remained below 10 °C. The mixture was stirred for an additional hour at 0 °C and the aqueous phase was extracted with CH_2Cl_2 (3 × 100 mL). The combined organic layers were washed with sat. sodium thiosulfate solution (200 mL, CAUTION: EXOTHERM!) and brine (100 mL), dried over Na_2SO_4 and concentrated. The residue was purified by flash chromatography (hexane/EtOAc 40:60) to give the *syn*-aldol adduct **S12** as a colourless syrup (9.84 g, 80%, d.r. 12:1). $[\alpha]_D^{20}$ = +17.9 (c = 1.13, $CHCl_3$). ^{1}H NMR (400 MHz, $CDCl_3$): δ = 7.43–7.27 (m, 8H), 7.22–7.17 (m, 2H), 5.71 (ddd, *J* = 15.6, 7.4, 1.1 Hz, 1H), 5.56 (ddd, *J* = 15.5, 6.3, 1.0 Hz, 1H), 5.24 (d, *J* = 4.2 Hz, 1H), 4.84 (dd, *J* = 5.8, 4.4 Hz, 1H), 4.71 (d, *J* = 11.6 Hz, 1H), 4.66 – 4.57 (m, 2H), 4.37 (d, *J* = 5.4 Hz, 1H), 4.24–4.13 (m, 2H), 4.00–3.87 (m, 2H), 3.84–3.75 (m, 2H), 3.20 (dd, *J* = 13.4, 3.4 Hz, 1H), 2.66 (dd, *J* = 13.4, 9.7 Hz, 1H), 2.59 (s, 1H), 2.48–2.36 (m, 1H), 1.67 (ddd, *J* = 13.8, 7.8, 4.4 Hz, 1H), 1.58 (dt, *J* = 13.8, 6.2

Hz, 1H), 1.02 (d, *J* = 6.8 Hz, 3H) ppm. ^{13}C NMR (100 MHz, $CDCl_3$): 170.6, 153.4, 139.1, 137.1, 135.2, 129.5, 129.1, 128.7, 128.6, 128.4, 127.6, 126.6, 103.3, 80.2, 73.7, 73.5, 66.9, 64.8, 64.8, 55.7, 40.7, 37.9, 32.7, 20.7 ppm. IR (film): $\tilde{\nu}$ = 3467, 2957, 1776, 1707, 1389, 1210, 1110, 1028, 974 cm^{-1}. MS (EI) *m/z* (%): 1013.4 (30), 518.2 (100), 327.1 (2). HRMS (ESIpos) *m/z* calcd. for $C_{28}H_{33}NO_7Na$: 518.2149, found: 518.2154.

Mosher Ester Analysis of Alcohol S12 Triethylamine (14 µL, 0.1 mmol) and DMAP (0.8 mg, 0.01 mmol) were added to a solution of alcohol **S12** (17 mg, 0.034 mmol) in CH_2Cl_2 (2 mL) followed by (*R*)-(–)-α-methoxy-α-trifluoromethyl-phenylacetyl chloride ((*R*)-MTPA-Cl) (7.6 µL, 0.04 mmol). The resulting mixture was stirred at ambient temperature for 2 hours. After quenching with sat. $NaHCO_3$ (3 mL) the aqueous layer was separated and extracted with CH_2Cl_2 (3 × 5 mL). The combined extracts were dried over Na_2SO_4, filtered and concentrated. The residue was purified by flash chromatography (hexane/EtOAc 70:30) to give the corresponding (*S*)-Mosher ester (*S*)-**S13** (19.1 mg, 79%). $[\alpha]_D^{20}$ = +6.7 (c = 1.91, $CHCl_3$). ^{1}H NMR (400 MHz, $CDCl_3$): δ = 7.59–7.53 (m, 2H), 7.41–7.25 (m, 11H), 7.19–7.13 (m, 2H), 5.87 (dd, *J* = 15.5, 7.8 Hz, 1H), 5.81 (dd, *J* = 8.2, 5.6 Hz, 1H), 5.61 (ddd, *J* = 15.5, 8.2, 1.0 Hz, 1H), 5.45 (d, *J* = 5.6 Hz, 1H), 4.76 (dd, *J* = 5.9, 4.3 Hz, 1H), 4.50 (d, *J* = 1.6 Hz, 2H), 4.49–4.39 (m, 1H), 4.23–4.08 (m, 2H), 3.93–3.86 (m, 2H), 3.79–3.70 (m, 2H), 3.53 (d, *J* = 1.2 Hz, 3H), 3.13 (dd, *J* = 13.4, 3.3 Hz, 1H), 2.54 (dd, *J* = 13.4, 9.8 Hz, 1H), 2.49–2.34 (m, 1H), 1.66–1.54 (m, 2H), 0.99(d, *J* = 6.8 Hz, 3H) ppm. IR (film): $\tilde{\nu}$ = 2957, 2878, 1779, 1749, 1709, 1454, 1390, 1246, 1169, 1109, 1019, 979, 699 cm^{-1}. MS (EI) *m/z* (%): 1445.5 (25), 734.3 (100), 478.2 (3), 375.6 (5). HRMS (ESIpos) *m/z* calcd. for $C_{38}H_{40}NO_9F_3Na$: 734.2547, found: 734.2548.



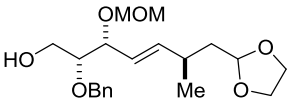
(*R*)-**S13** was prepared analogously (17.6 mg, 76%). $[\alpha]_D^{20}$ = +46.1 (c = 1.73, $CHCl_3$). ^{1}H NMR (400 MHz, $CDCl_3$): δ = 7.56–7.51 (m, 2H), 7.39– 7.27 (m, 11H), 7.21–7.14 (m, 2H), 5.82 (ddd, *J* = 7.6, 4.7, 0.8 Hz, 1H), 5.72 (ddd, *J* = 15.6, 7.8, 0.9 Hz, 1H), 5.55–5.47 (m, 1H), 5.44 (d, *J* = 4.7 Hz, 1H), 4.76–4.63 (m, 2H), 4.57 (d, *J* = 11.8 Hz, 1H), 4.53–4.46 (m, 1H), 4.24 (dd, *J* = 9.0, 7.7 Hz, 1H), 4.15 (dd, *J* = 9.0, 2.5 Hz, 1H), 3.95–3.80 (m, 2H), 3.77–3.66 (m, 2H), 3.60 (d, *J* = 1.2 Hz, 3H), 3.18 (dd, *J* = 13.5, 3.4 Hz, 1H), 2.65 (dd, *J* = 13.5, 9.7 Hz, 1H), 2.44–2.28 (m, 1H), 1.68–1.46 (m, 2H), 0.95 (d, *J* = 6.8 Hz, 3H) ppm. IR (film): $\tilde{\nu}$ = 2957, 2878, 1779, 1749, 1709, 1454, 1390, 1246, 1169, 1109, 1019, 979, 699 cm^{-1}. MS (EI) *m/z* (%): 1445.5 (25), 734.3 (100), 478.2 (3), 375.6 (5). HRMS (ESIpos) *m/z* calcd. for $C_{38}H_{40}NO_9F_3Na$: 734.2547, found: 734.2549.

Table S-1. Mosher ester analysis for *syn*-aldol adduct **S12** according to Hoye and co-workers[14]

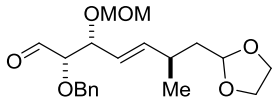
Assignment	S12 [ppm]	(*S*)-S13 [ppm]	(*R*)-S13 [ppm]	Δ (δ (S–R)) [ppm]
1	5.24	5.45	5.44	+0.01
2	4.37	5.81	5.82	–0.01
3	5.56	5.61	5.51	+0.10
4	5.71	5.87	5.72	+0.15
5	2.41	2.42	2.36	+0.06
6	1.63	1.60	1.55	+0.05
7	4.84	4.76	4.68	+0.08
8	1.02	0.99	0.95	+0.04
9a	4.71	4.50	4.67	–0.12
9b	4.60	4.50	4.57	–0.07
10	4.63	4.45	4.49	–0.04
11a	3.20	3.13	3.18	–0.05
11b	2.66	2.54	2.65	–0.11
12a	4.18	4.16	4.24	–0.08
12b	4.18	4.12	4.15	–0.03

MOM-Ether S14. Tetrabutylammonium iodide (73 mg, 0.20 mmol) was added to a solution of alcohol **S12** (9.78 g, 19.7 mmol) in CH_2Cl_2 (60 mL), whereupon the solution turned yellow. The solution was cooled to 0 °C before Hünig base (24 mL, 0.14 mol) was added dropwise, causing the yellow colour to disappear. MOM-chloride (6.0 mL, 79 mmol) was added dropwise with vigorous stirring at such as rate as to keep the internal temperature ≤ +10 °C. Once the addition was complete the mixture was allowed to reach ambient temperature and stirring was continued for 12 hours. The reaction was quenched with sat. NH_4Cl solution (100 mL) and the phases were separated. The aqueous layer was extracted with CH_2Cl_2 (3 × 100 mL) and the combined organic phases were washed with brine (100 mL), dried over Na_2SO_4 and concentrated. The residue was purified by flash chromatography (hexane/EtOAc 50:50) to give the title compound as a colourless syrup (10.7 g, quant.). $[\alpha]_D^{20}$ = –18.5 (c = 1.16, $CHCl_3$). ^{1}H NMR (400 MHz, $CDCl_3$): δ = 7.41–7.37 (m, 2H), 7.36–7.27 (m, 6H), 7.21–7.17 (m, 2H), 5.69 (dd, *J* = 15.5, 7.8 Hz, 1H), 5.51 (ddd, *J* = 15.6, 7.9, 1.0 Hz, 1H), 5.33 (d, *J* = 4.7 Hz, 1H), 4.82 (dd, *J* = 5.7, 4.6 Hz, 1H), 4.75 (d, *J* = 12.0 Hz, 1H), 4.66–4.53 (m, 4H), 4.41 (dd, *J* = 7.9, 4.6 Hz, 1H), 4.20–4.12 (m, 2H), 3.96–3.88 (m, 2H), 3.82–3.75 (m, 2H), 3.29 (s, 3H), 3.21 (dd, *J* = 13.4, 3.4 Hz, 1H), 2.69 (dd, *J* = 13.4, 9.6 Hz, 1H), 2.48–2.36 (m, 1H), 1.70–1.54 (m, 2H), 1.01 (d, *J* = 6.8 Hz, 3H) ppm. ^{13}C NMR (100 MHz, $CDCl_3$): 170.2, 153.3, 141.8, 137.6, 135.3, 129.6, 129.1, 128.5, 128.5, 128.1, 127.6, 123.9, 103.4, 94.0, 79.8, 77.2, 73.7, 66.8, 64.9, 64.8, 55.8, 55.6, 40.8, 37.8, 32.9, 20.8 ppm. IR (film): $\tilde{\nu}$ = 2954, 1779, 1709, 1389, 1210, 1105, 1032, 978 cm^{-1}. MS (EI)

m/z (%): 1101.5 (30), 562.2 (100), 478.2 (8). HRMS (ESIpos) *m/z* calcd. for $C_{30}H_{37}NO_8Na$: 562.2411, found: 562.2416.

(2*R*,3*R*,6*R*,*E*)-2-(Benzyloxy)-7-(1,3-dioxolan-2-yl)-3-(methoxymethoxy)-6-methylhept-4-en-1-ol (S15). 

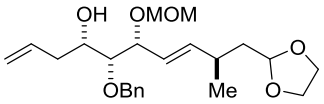
Water (395 µL, 21.9 mmol) was added to a solution of oxazolidinone **S14** (10.7 g, 19.8 mmol) in Et_2O (400 mL). The reaction was cooled to 0 °C before a solution of lithium borohydride (4 M in THF, 5.45 mL, 21.8 mmol) was added cautiously, causing evolution of hydrogen gas. After the addition was complete stirring was continued at 0 °C for 50 minutes. The reaction was quenched with NaOH (1 M, 10 mL), the mixture was diluted with *t*-butyl methyl ether (100 mL) and stirred until clean phase separation was reached. The aqueous phase was extracted with *t*-butyl methyl ether (3 × 100 mL). The combined organic layers were washed with brine (100 mL), dried over Na_2SO_4 and concentrated. The residue was purified by flash chromatography (*t*-butyl methyl ether) to give the title compound as a colourless syrup (6.42 g, 88%). $[\alpha]_D^{20}$ = –67.5 (c = 1.25, $CHCl_3$). ^{1}H NMR (400 MHz, $CDCl_3$): δ = 7.32 (dd, *J* = 67.5, 11.9 Hz, 5H), 5.68 (ddd, *J* = 15.6, 7.7, 0.8 Hz, 1H), 5.41 (ddd, *J* = 15.6, 8.0, 1.1 Hz, 1H), 4.83 (dd, *J* = 5.6, 4.6 Hz, 1H), 4.79 (d, *J* = 11.7 Hz, 1H), 4.70 (d, *J* = 6.6 Hz, 1H), 4.65 (d, *J* = 11.7 Hz, 1H), 4.56 (d, *J* = 6.6 Hz, 1H), 4.20 (ddd, *J* = 8.1, 5.6, 0.9 Hz, 1H), 3.99–3.90 (m, 2H), 3.87–3.77 (m, 2H), 3.72 (ddd, *J* = 10.9, 7.1, 3.9 Hz, 1H), 3.64–3.51 (m, 2H), 3.37 (s, 3H), 2.54–2.37 (m, 1H), 2.26–2.12 (m, 1H), 1.80–1.56 (m, 2H), 1.04 (d, *J* = 6.9 Hz, 3H) ppm. ^{13}C NMR (100 MHz, $CDCl_3$): δ = 141.2, 138.5, 128.6, 128.1, 127.9, 124.6, 103.5, 93.9, 81.4, 77.6, 73.5, 64.8 (2C), 62.1, 55.7, 40.8, 33.0, 20.9 ppm. IR (film): $\tilde{\nu}$ = 3489, 2955, 2885, 1454, 1406, 1098, 1028, 977 cm^{-1}. MS (EI) *m/z* (%): 755.4 (45), 389.2 (100), 305.2 (6). HRMS (ESIpos) *m/z* calcd. for $C_{20}H_{30}O_6Na$: 389.1935, found: 389.1933.

(2*S*,3*R*,6*R*,*E*)-2-(Benzyloxy)-7-(1,3-dioxolan-2-yl)-3-(methoxymethoxy)-6-methylhept-4-enal (30). 

Sulfur trioxide pyridine complex (5.6 g, 35 mmol) was suspended in CH_2Cl_2 (100 mL) and the resulting mixture was cooled to –30 °C. After adding DMSO (11.2 mL, 158 mmol) a solution of alcohol **S15** (6.42 g, 17.5 mmol) and Hünig base (12.2 mL, 70.0 mmol) in CH_2Cl_2 (50 mL) was added at –30 °C. The mixture was allowed to reach 0 °C over 2 hours and the reaction was quenched with sat. NH_4Cl solution (50 mL). The aqueous phase was extracted with CH_2Cl_2 (3 × 100 mL), and the combined organic layers were washed with brine (100 mL), dried over Na_2SO_4 and concentrated. The resulting yellow oil was purified by flash chromatography (*t*-butyl methyl ether) to give the title compound as a colourless syrup (6.29 g, 98%, d.r. 13:1). $[\alpha]_D^{20}$ = –145.0 (c = 1.33, $CHCl_3$). ^{1}H NMR (400 MHz, $CDCl_3$): δ = 9.74 (d, *J* = 1.6 Hz, 1H), 7.40–7.29 (m, 5H), 5.72 (ddd, *J* = 15.6, 7.6, 0.6 Hz, 1H), 5.54 (ddd, *J* = 15.6, 8.2, 1.0 Hz, 1H), 4.90–4.77 (m, 2H), 4.70 (d, *J* = 6.8 Hz, 1H), 4.65 (d, *J* = 12.2 Hz, 1H), 4.51 (d, *J* = 6.8 Hz, 1H), 4.44 (dd, *J* = 8.2, 3.6 Hz, 1H), 4.03–3.93 (m, 2H), 3.88–3.78 (m, 3H), 3.29 (s, 3H), 2.53–2.41 (m, 1H), 1.76–

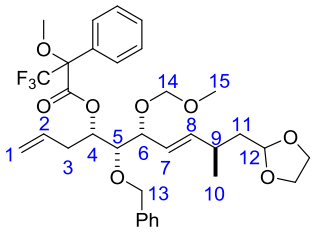
1.60 (m, 2H), 1.04 (d, *J* = 6.7 Hz, 3H) ppm. ^{13}C NMR (100 MHz, $CDCl_3$): *δ* = 202.9, 142.1, 136.9, 128.5, 128.3, 128.2, 123.4, 103.3, 93.3, 85.4, 76.3, 73.5, 64.7, 64.6, 55.7, 40.5, 32.9, 20.6 ppm. IR (film): $\tilde{\nu}$ = 2954, 2887, 1733, 1149, 1096, 1027, 978 cm^{-1}. MS (EI) *m/z* (%): 751.4 (40), 419.2 (3), 387.2 (100). HRMS (ESIpos) *m/z* calcd. for $C_{20}H_{28}O_6Na$: 387.1778, found: 387.1779.

(4*S*,5*R*,6*R*,9*R*,*E*)-5-(Benzyloxy)-10-(1,3-dioxolan-2-yl)-6-(methoxymethoxy)-9-methyldeca-1,7-dien-



4-ol (31). Magnesium bromide diethyl etherate (8.90 g, 34.5 mmol) was added to a solution of the aldehyde **30** (6.29 g, 17.3 mmol) in CH_2Cl_2 (100 mL) at 0 °C. The suspension became instantly yellow and was stirred at 0 °C for 1 hour. Allyl trimethylsilane (5.5 mL, 35 mmol) was added in one portion and stirring continued at ambient temperature for 16 hours before the reaction was quenched with sat. NH_4Cl solution (50 mL). The organic phase was separated and the aqueous phase extracted with CH_2Cl_2 (3 × 100 mL). The combined organic layers were washed with brine (100 mL), dried over Na_2SO_4 and concentrated to a yellow oil, which was purified by flash chromatography (*t*-butyl methyl ether) to give the title compound as a pale yellow syrup (6.47 g, 92%, d.r. 14:1). $[\alpha]_D^{20}$ = –65.9 (c = 0.7, $CHCl_3$). ^{1}H NMR (400 MHz, $CDCl_3$): *δ* = 7.37–7.27 (m, 5H), 5.85–5.68 (m, 2H), 5.42 (ddd, *J* = 15.6, 8.1, 1.1 Hz, 1H), 5.09–5.06 (m, 1H), 5.06–5.01 (m, 1H), 4.90 (d, *J* = 11.2 Hz, 1H), 4.83 (dd, *J* = 5.6, 4.6 Hz, 1H), 4.72 (d, *J* = 6.6 Hz, 1H), 4.63 (d, *J* = 11.3 Hz, 1H), 4.56 (d, *J* = 6.6 Hz, 1H), 4.30 (ddd, *J* = 8.1, 6.3, 0.8 Hz, 1H), 3.99–3.90 (m, 2H), 3.84–3.78 (m, 2H), 3.78–3.72 (m, 1H), 3.38–3.32 (m, 4H), 2.50–2.39 (m, 1H), 2.35 (dd, *J* = 7.0, 0.7 Hz, 1H), 2.33–2.27 (m, 2H), 1.75–1.60 (m, 2H), 1.05 (d, *J* = 6.8 Hz, 3H) ppm. ^{13}C NMR (100 MHz, $CDCl_3$): *δ* = 141.3, 138.4, 135.0, 128.6, 128.3, 128.0, 125.2, 117.5, 103.5, 93.9, 82.7, 78.0, 77.4, 75.1, 70.6, 64.9 (2C), 55.8, 40.8, 39.0, 33.1, 20.9 ppm. IR (film): $\tilde{\nu}$ = 3477, 2929, 2886, 1454, 1401, 1212, 1097, 1028, 917 cm^{-1}. MS (EI) *m/z* (%): 835.5 (30), 629.3 (3), 429.2 (100), 345.2 (5). HRMS (ESIpos) *m/z* calcd. for $C_{23}H_{34}O_6Na$: 429.2248, found: 429.2247.

Mosher Ester Analysis of Alcohol 31. Triethylamine (21 µL, 0.15 mmol) and DMAP (1 mg, 0.01 mmol)



were added to a solution of alcohol **31** (21 mg, 0.051 mmol) in CH_2Cl_2 (2 mL), followed by (*R*)-(–)-α-methoxy-α-trifluoromethyl-phenylacetyl chloride ((*R*)-MTPA-Cl) (14.2 µL, 0.08 mmol). The resulting mixture was stirred at ambient temperature for 2 hours, quenched with sat. $NaHCO_3$ (3 mL) and extracted with CH_2Cl_2 (3 × 5 mL). The combined extracts were dried over Na_2SO_4, filtered and concentrated. The residue was purified by flash chromatography (hexane/EtOAc 70:30) to give the corresponding (*S*)-Mosher ester **(*S*)-S16** (24.5 mg, 78%). $[\alpha]_D^{20}$ = –64.2 (c = 2.45, $CHCl_3$). ^{1}H NMR (400 MHz, $CDCl_3$): *δ* = 7.54 (d, *J* = 7.4 Hz, 2H), 7.39–7.24 (m, 8H), 5.68 (dddd, *J* = 16.8, 10.6, 7.8, 6.4 Hz, 1H), 5.56 (dd, *J* = 15.5, 7.8 Hz, 1H), 5.48–5.32 (m, 2H), 5.06 (d, *J* = 1.2 Hz, 1H), 5.02 (dd, *J* = 8.9, 1.8 Hz, 1H), 4.80 (dd, *J* = 5.6, 4.6 Hz, 1H), 4.74 (d, *J* = 11.6 Hz, 1H), 4.68 (d, *J* =

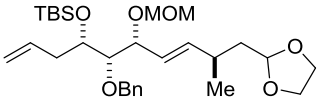
6.7 Hz, 1H), 4.62 (d, *J* = 11.6 Hz, 1H), 4.52 (d, *J* = 6.7 Hz, 1H), 4.19 (dd, *J* = 8.1, 5.3 Hz, 1H), 3.99–3.89 (m, 2H), 3.86–3.75 (m, 2H), 3.57 (t, *J* = 5.4 Hz, 1H), 3.51 (s, 3H), 3.34 (s, 3H), 2.62 (dddd, *J* = 13.3, 6.7, 3.4, 1.5 Hz, 1H), 2.53–2.33 (m, 2H), 1.74–1.55 (m, 2H), 0.99 (d, *J* = 6.8 Hz, 3H) ppm. IR (film): $\tilde{\nu}$ = 2953, 2888, 1746, 1453, 1250, 1169, 1122, 1026, 698 cm^{-1}. MS (EI) *m/z* (%): 1267.5 (20), 645.3 (100), 501.3 (2). HRMS (ESIpos) *m/z* calcd. for $C_{33}H_{41}O_8F_3Na$: 645.2646, found: 645.2645.

The corresponding ester (*R*)-**S16** was prepared analogously (11.7 mg, 46%). $[\alpha]_D^{20}$ = –34.4 (c = 1.17, $CHCl_3$). ^1H NMR (400 MHz, $CDCl_3$): δ = 7.61–7.55 (m, 2H), 7.40–7.23 (m, 8H), 5.73 (dddd, *J* = 16.9, 10.5, 7.5, 6.4 Hz, 1H), 5.50 (ddd, *J* = 15.5, 8.0, 0.7 Hz, 1H), 5.35–5.28 (m, 1H), 5.22 (ddd, *J* = 15.6, 8.3, 1.0 Hz, 1H), 5.12–5.10 (m, 1H), 5.07 (dd, *J* = 10.2, 1.7 Hz, 1H), 4.79 (dd, *J* = 5.7, 4.6 Hz, 1H), 4.69 (d, *J* = 11.7 Hz, 1H), 4.62 (d, *J* = 6.7 Hz, 1H), 4.53 (d, *J* = 11.7 Hz, 1H), 4.48 (d, *J* = 6.6 Hz, 1H), 4.07 (dd, *J* = 8.3, 5.7 Hz, 1H), 3.97–3.90 (m, 2H), 3.83–3.77 (m, 2H), 3.56–3.48 (m, 4H), 3.29 (s, 3H), 2.65 (dddd, *J* = 12.0, 6.6, 3.5, 1.5 Hz, 1H), 2.57–2.45 (m, 1H), 2.41–2.30 (m, 1H), 1.72–1.54 (m, 2H), 0.98 (d, *J* = 6.8 Hz, 3H) ppm. IR (film): $\tilde{\nu}$ = 2954, 2886, 1746, 1453, 1254, 1168, 1124, 1026, 920, 721, 698 cm^{-1}. MS (EI) *m/z* (%): 1267.5 (15), 1123.5 (3), 645.3 (100), 501.3 (4). HRMS (ESIpos) *m/z* calcd. for $C_{33}H_{41}O_8F_3Na$: 645.2646, found: 645.2647.

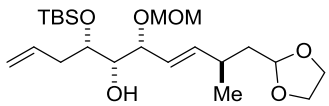
Table S-2. Mosher ester analysis for product **31** according to Hoye and co-workers[14]

Assignment	31 [ppm]	(*S*)-S16 [ppm]	(*R*)-S16 [ppm]	Δ (δ (S–R)) [ppm]
1a	5.07	5.06	5.11	–0.05
1b	5.04	5.02	5.07	–0.05
2	5.79	5.68	5.73	–0.05
3a	2.36	2.62	2.65	–0.03
3b	2.30	2.42	2.50	–0.08
4	3.75	5.37	5.30	+0.07
5	3.35	3.57	3.53	+0.04
6	4.30	4.19	4.07	+0.12
7	5.43	5.37	5.22	+0.15
8	5.70	5.56	5.50	+0.06
9	2.44	2.42	2.35	+0.07
10	1.05	0.99	0.98	+0.01
11ab	1.66	1.63	1.61	+0.02
12	4.83	4.80	4.79	+0.01
13a	4.90	4.74	4.69	+0.05
13b	4.63	4.62	4.53	+0.09
14a	4.72	4.68	4.62	+0.06
14b	4.56	4.52	4.48	+0.04
15	3.33	3.34	3.29	+0.05

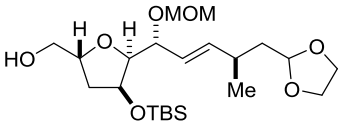
Compound S17. 2,6-Lutidine (3.7 mL, 32 mmol) and *t*-butyl dimethylsilyltriflate (5.44 mL, 23.7 mmol) were added to a solution of alcohol **31** (6.42 g, 15.8 mmol) in CH_2Cl_2 (100 mL) at 0 °C. The reaction was stirred at 0 °C for 2 hours before it was quenched with sat. NH_4Cl solution (50 mL). The organic phase was separated and the aqueous phase was extracted with CH_2Cl_2 (2 × 100 mL). The combined organic layers were washed with brine (100 mL), dried over Na_2SO_4 and concentrated. The residue was purified by flash chromatography (hexane/EtOAc 80:20) to give the title compound as a colourless syrup (7.21 g, 88%). $[\alpha]_D^{20}$ = –68.4 (c = 1.02, $CHCl_3$). ^{1}H NMR (400 MHz, $CDCl_3$): δ = 7.48–7.22 (m, 5H), 5.89–5.73 (m, 1H), 5.56 (dd, *J* = 15.6, 7.7 Hz, 1H), 5.43 (ddd, *J* = 15.6, 8.3, 0.9 Hz, 1H), 5.08–5.04 (m, 1H), 5.02 (d, *J* = 1.3 Hz, 1H), 4.81 (dd, *J* = 5.8, 4.5 Hz, 1H), 4.72–4.67 (m, 3H), 4.53 (d, *J* = 6.7 Hz, 1H), 4.24 (dd, *J* = 8.2, 4.3 Hz, 1H), 3.97–3.91 (m, 2H), 3.92–3.87 (m, 1H), 3.82–3.76 (m, 2H), 3.35 (s, 3H), 3.34–3.30 (m, 1H), 2.60–2.45 (m, 1H), 2.45–2.27 (m, 2H), 1.80–1.58 (m, 2H), 0.99 (d, *J* = 6.8 Hz, 3H), 0.89 (s, 9H), 0.02 (s, 3H), –0.01 (s, 3H) ppm. ^{13}C NMR (100 MHz, $CDCl_3$): δ = 140.2, 138.9, 135.8, 128.4, 128.2, 127.6, 126.1, 117.0, 103.6, 93.6, 83.5, 76.4, 74.6, 72.6, 64.9, 64.8, 56.0, 40.8, 37.8, 33.1, 26.1, 20.8, 18.3, –4.2, –4.2 ppm. IR (film): $\tilde{\nu}$ = 2954, 2884, 1472,1255, 1147, 1098, 1028, 916, 835 cm^{-1}. MS (EI) *m/z* (%): 1063.6 (30), 543.3 (100), 459.3 (13), 351.2 (3). HRMS (ESIpos) *m/z* calcd. for $C_{29}H_{48}O_6SiNa$: 543.3112, found: 543.3111.



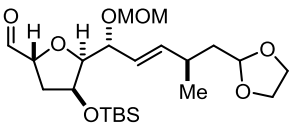
Alcohol 32. 2,3-Dichloro-5,6-dicyano-1,4-benzoquinone (233 mg, 1.00 mmol) was added in a single portion to a pre-heated solution of the benzyl ether **S17** (134 mg, 0.257 mmol) in a mixture of 1,2-dichloroethane (1.5 mL) and pH 7.4 buffer solution (1.5 mL) at 50 °C. The reaction was stirred at this temperature for 50 minutes before allowing the mixture to reach ambient temperature. The mixture was diluted with *t*-butyl methyl ether (20 mL) and washed with sat. $NaHCO_3$ solution (5 mL) and brine (5 mL). The organic layer was dried over Na_2SO_4 and concentrated, and the residue was purified by flash chromatography (hexane/EtOAc 70:30) to give the title compound as a colourless syrup (77.1 mg, 70%). $[\alpha]_D^{20}$ = –72.4 (c = 1.11, $CHCl_3$). ^{1}H NMR (400 MHz, $CDCl_3$): δ = 5.77 (ddt, *J* = 17.4, 10.2, 7.2 Hz, 1H), 5.64 (ddd, *J* = 15.6, 8.0, 0.7 Hz, 1H), 5.34 (ddd, *J* = 15.6, 8.5, 1.1 Hz, 1H), 5.13–5.04 (m, 2H), 4.83 (dd, *J* = 5.6, 4.7 Hz, 1H), 4.73 (d, *J* = 6.6 Hz, 1H), 4.56 (d, *J* = 6.7 Hz, 1H), 4.04 (dd, *J* = 8.3, 6.3 Hz, 1H), 3.97–3.92 (m, 2H), 3.85–3.79 (m, 3H), 3.47 (td, *J* = 6.4, 3.5 Hz, 1H), 3.38 (s, 3H), 2.57 (d, *J* = 6.4 Hz, 1H), 2.52–2.41 (m, 2H), 2.30–2.21 (m, 1H), 1.75–1.60 (m, 2H), 1.05 (d, *J* = 6.8 Hz, 3H), 0.91 (s, 9H), 0.10 (s, 3H), 0.09 (s, 3H) ppm. ^{13}C NMR (100 MHz, $CDCl_3$): δ = 141.8, 134.2, 125.1, 117.7, 103.4, 93.4, 77.2, 77.0, 74.5, 71.6, 64.7 (2 x), 55.5, 40.7, 38.5, 33.2, 25.9, 20.9, 18.1, –3.8, –4.4 ppm. IR (film): $\tilde{\nu}$ = 3494, 2954, 2929, 2885, 2857, 1472, 1408, 1361, 1253, 1147, 1094, 1030, 917, 836, 776 cm^{-1}. MS (EI) *m/z* (%): 883.5 (40), 453.3 (100), 369.2 (22), 237.1 (3). HRMS (ESIpos) *m/z* calcd. for $C_{22}H_{42}O_6SiNa$: 453.2643, found: 453.2645.



Alcohol 33. $Co(nmp)_2$ (355 mg, 0.628 mmol) was added to a solution of alcohol **32** (2.63 g, 6.12 mmol) in *i*-PrOH (61 mL). The solution was degassed by 3 freeze-pump-thaw cycles and back-filled with oxygen. After adding *t*-BuOOH (5 M in decane, 122 µL, 0.612 mmol) a balloon of oxygen was fitted to the flask which was placed in a pre-heated oil bath at 55 °C. The mixture turned green within 5 minutes of heating and stirring was continued for 16 hours. After reaching ambient temperature the mixture was concentrated to a green oil, which was purified by flash chromatography (hexane/EtOAc 20:80) to give the title product as a colourless syrup (1.89 g, 69%). $[\alpha]_D^{20}$ = –19.7 (c = 1.04, $CHCl_3$). ^{1}H NMR (400 MHz, $CDCl_3$): δ = 5.74 (ddd, *J* = 15.7, 7.6, 1.1 Hz, 1H), 5.44 (ddd, *J* = 15.7, 6.7, 1.1 Hz, 1H), 4.84 (dd, *J* = 5.8, 4.6 Hz, 1H), 4.72 (d, *J* = 6.5 Hz, 1H), 4.66 (d, *J* = 6.5 Hz, 1H), 4.43–4.34 (m, 1H), 4.31 (q, *J* = 3.2 Hz, 1H), 4.27 (ddd, *J* = 7.7, 6.6, 0.9 Hz, 1H), 4.00–3.90 (m, 2H), 3.87–3.74 (m, 4H), 3.49 (dd, *J* = 11.6, 5.7 Hz, 1H), 3.39 (s, 3H), 2.43 (dddd, *J* = 14.4, 7.7, 6.7, 1.1 Hz, 1H), 2.07–1.97 (m, 1H), 1.94–1.88 (m, 2H), 1.71 (ddd, *J* = 13.7, 7.7, 4.6 Hz, 1H), 1.66–1.56 (m, 1H), 1.06 (d, *J* = 6.8 Hz, 3H), 0.91 (s, 9H), 0.09 (s, 3H), 0.08 (s, 3H) ppm. ^{13}C NMR (100 MHz, $CDCl_3$): δ = 140.0, 125.2, 103.5, 94.3, 86.5, 78.6, 75.4, 73.4, 64.9, 64.8, 64.7, 55.5, 40.8, 37.1, 33.1, 26.0, 20.9, 18.1, –3.9, –4.6 ppm. IR (film): $\tilde{\nu}$ = 3467, 2954, 2927, 2885, 2856, 1472, 1361, 1255, 1131, 1035, 942, 836, 775 cm^{-1}. MS (EI) *m/z* (%): 915.5 (30), 469.3 (100), 385.2 (10). HRMS (ESIpos) *m/z* calcd. for $C_{22}H_{42}O_7SiNa$: 469.2592, found: 469.2597.

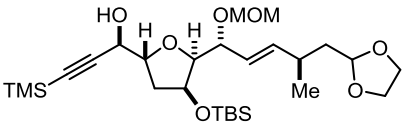


Aldehyde S18. Hünig base (2.8 mL, 16 mmol) was added at –30 °C to a solution of alcohol **33** (1.13 g, 2.53 mmol) in CH_2Cl_2 (16 mL) and the resulting mixture was stirred for 5 minutes at this temperature. In a second flask a suspension of sulfur trioxide pyridine complex (1.26 g, 7.92 mmol) in CH_2Cl_2 (2.0 mL) was treated with DMSO (2.3 mL, 3.4 mmol) and the resulting mixture was stirred for 15 minutes at ambient temperature. This suspension was added to the alcohol solution at –30 °C, rinsing the flask with CH_2Cl_2 (5.0 mL). The reaction mixture was allowed to slowly reach –20 °C over 1 hour and stirring was continued for another 0.5 hour at this temperature. The mixture was diluted with *t*-butyl methyl ether (20 mL) and the reaction was quenched with pH 7 phosphate buffer (50 mL). The aqeous layer was separated and extracted with *t*-butyl methyl ether (3 × 50 mL). The combined organic phases were washed with brine (150 mL), dried over Na_2SO_4 and concentrated under reduced pressure to yield the crude aldehyde **S18** as a yellow oil which was used in the next step without further purification. An aliquot was purified for analytical purposes by flash chromatography (EtOAc/hexane 1:1):$[\alpha]_D^{20}$ = –0.4 (c = 0.79, $CHCl_3$). ^{1}H NMR (400 MHz, $CDCl_3$): δ = 9.74 (d, *J* = 2.5 Hz, 1H), 5.77 (ddd, *J* = 15.6, 7.6, 1.0 Hz, 1H), 5.44 (ddd, *J* = 15.7, 6.9, 1.1 Hz, 1H), 4.84 (dd, *J* = 5.7, 4.6 Hz, 1H), 4.73 (d, *J* = 6.5 Hz, 1H), 4.66 (d, *J* = 6.5 Hz, 1H), 4.54 (ddd, *J* = 9.6, 7.2, 2.5 Hz, 1H), 4.35–4.25 (m, 2H), 3.98–3.92 (m, 2H), 3.86 (dd, *J* = 7.6, 3.3 Hz, 1H), 3.83–3.78 (m, 2H), 3.39 (s, 3H), 2.50–2.37 (m,



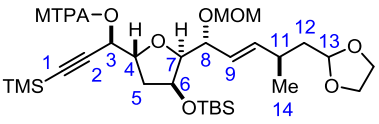
1H), 2.18 (ddd, *J* = 13.0, 7.2, 2.3 Hz, 1H), 2.00 (ddd, *J* = 13.3, 9.4, 4.5 Hz, 1H), 1.71 (ddd, *J* = 13.9, 7.7, 4.6 Hz, 1H), 1.65–1.58 (m, 1H), 1.06 (d, *J* = 6.8 Hz, 3H), 0.91 (s, 9H), 0.10 (s, 3H), 0.08 (s, 3H) ppm. ^{13}C NMR (101 MHz, $CDCl_3$): δ = 203.1, 140.6, 124.8, 103.5, 94.2, 87.5, 82.1, 74.9, 72.3, 64.9, 64.8, 55.6, 40.8, 37.2, 33.1, 25.9, 20.9, 18.1, –3.9, –4.6 ppm. IR (film) $\tilde{\nu}$ = 2956, 2928, 2884, 2858, 1733, 1472, 1258, 1128, 1097, 1028, 976, 939, 924, 833, 802, 775, 755, 733 cm^{-1}. MS (ESIpos) *m/z* (%): 467.2 (100 (M+Na)). HRMS (ESIpos): *m/z* calcd. for $C_{22}H_{40}O_7SiNa$: 467.2436, found: 467.2439.

Propargyl Alcohol 34. A Schlenk tube was charged with $Zn(OTf)_2$ (dried at 120 °C under high vacuum



for 24 hours, 2.25 mg, 6.18 mmol) and (–)-N-methylephedrine (dried aceotriopically by distilling toluene off the compound (3 x), 1.18 g, 6.60 mmol). After the addition of toluene (6.0 mL), Hünig base (1.2 mL, 6.9 mmol) was added and the resulting suspension was stirred for 2 hours at ambient temperature before ethynyltrimethylsilane (0.91 mL, 6.3 mmol) was introduced. After stirring for another 1.5 hours at ambient temperature a solution of aldehyde **S18** (1.09 g, 2.45 mmol) in toluene (15.0 mL with rinses) was added in one portion to the milky suspension. After stirring for 18 hours at ambient temperature, the reaction was quenched with sat. NH_4Cl (50 mL). The aqueous layer was separated and extracted with *t*-butyl methyl ether (3 × 50 mL). The combined extracts were dried over Na_2SO_4, filtered and concentrated. The residue was purified by flash chromatography (hexane/ EtOAc 7:3) to provide the title compound as a yellow oil (0.96 g, 65% over 2 steps, d.r. 10.7:1). $[\alpha]_D^{20}$ = –163 (c = 1.11, $CHCl_3$). ^{1}H NMR (400 MHz, $CDCl_3$): δ = 5.74 (ddd, *J* = 15.7, 7.6, 1.0 Hz, 1H), 5.43 (ddd, *J* = 15.7, 6.6, 1.2 Hz, 1H), 4.83 (dd, *J* = 5.8, 4.6 Hz, 1H), 4.70 (d, *J* = 6.6 Hz, 1H), 4.64 (d, *J* = 6.6 Hz, 1H), 4.36–4.22 (m, 4H), 3.983.91 (m, 2H), 3.85–3.79 (m, 2H), 3.76 (dd, *J* = 7.8, 3.3 Hz, 1H), 3.39 (s, 3H), 2.65 (br s, 1H), 2.42 (ddq, *J* = 7.0, 7.0, 7.0 Hz, 1H), 2.05 (ddd, *J* = 13.1, 6.1, 2.0 Hz, 1H), 1.91 (ddd, *J* = 13.2, 9.1, 4.5 Hz, 1H), 1.70 (ddd, *J* = 13.7, 7.7, 4.6 Hz, 1H), 1.60 (ddd, *J* = 13.1, 6.1, 6.1 Hz 1H), 1.05 (d, *J* = 6.8 Hz, 3H), 0.91 (s, 9H), 0.15 (s, 9H), 0.10 (s, 3H), 0.08 (s, 3H) ppm. ^{13}C NMR (101 MHz, $CDCl_3$): δ = 138.9, 124.0, 102.7, 102.5, 93.2, 89.6, 85.7, 80.1, 74.1, 72.1, 65.0, 63.9, 63.8, 54.6, 39.8, 37.1, 32.1, 25.0, 19.9, 17.2, -1.1, -4.9, -5.6 ppm. IR (film) $\tilde{\nu}$ = 3432, 2956, 2929, 2886, 2858, 1472, 1408, 1361, 1251, 1129, 1099, 1036, 949, 841, 775 cm^{-1}. MS (ESIpos) *m/z* (%): 565.3 (100 (M+Na)). HRMS (ESIpos): *m/z* calcd. for $C_{27}H_{50}O_7Si_2Na$: 565.2987, found: 565.2987.

Mosher Ester Analysis of Propargyl Alcohol 34. Hünig base (9.0 µL, 52 µmol) was added to a solution



of alcohol **34** (10.9 mg, 17 µmol) in CH_2Cl_2 (035 mL) followed by (*R*)-(–)-α-methoxy-α-trifluoromethyl-phenylacetyl chloride ((*R*)-MTPA-Cl) (6.0 µL, 32 µmol). After stirring for 17 hours at ambient temperature the mixture was diluted with CH_2Cl_2 (3 mL) and the reaction was quenched with sat. $NaHCO_3$ (3 mL) and extracted with CH_2Cl_2 (3 × 5 mL). The combined extracts were dried over Na_2SO_4,

filtered and concentrated. The residue was purified by flash chromatography (hexanes/ *t*-butyl methyl ether 4:1) to give the corresponding (*S*)-Mosher ester **(*S*)-S19** (10 mg, 76%). $[\alpha]_D^{20} = -38.8$ (c = 1.0, $CHCl_3$). ^{1}H NMR (400 MHz, $CDCl_3$): δ = 7.59–7.55 (m, 2H), 7.39 (tdd, *J* = 3.5, 2.3, 1.1 Hz, 3H), 5.72 (ddd, *J* = 15.8, 7.6, 1.1 Hz, 1H), 5.62 (d, *J* = 6.2 Hz, 1H), 5.43 (ddd, *J* = 15.6, 6.7, 1.1 Hz, 1H), 4.83 (dd, *J* = 5.8, 4.6 Hz, 1H), 4.64–4.59 (m, 2H), 4.41 (dt, *J* = 8.4, 6.5 Hz, 1H), 4.29 (ddd, *J* = 3.9, 3.3, 2.8 Hz, 1H), 4.21 (dd, *J* = 7.7, 6.6 Hz, 1H), 3.98–3.91 (m, 2H), 3.83–3.79 (m, 2H), 3.78 (dd, *J* = 7.5, 3.6 Hz, 1H), 3.57 (d, *J* = 1.1 Hz, 3H), 3.32 (s, 3H), 2.47–2.35 (m, 1H), 2.05–1.96 (m, 2H), 1.70 (ddd, *J* = 13.8, 7.7, 4.6 Hz, 1H), 1.60 (dt, *J* = 13.5, 5.9 Hz, 1H), 1.05 (d, *J* = 6.8 Hz, 3H), 0.89 (s, 9H), 0.17 (s, 9H), 0.06 (s, 3H), 0.06 (s, 3H) ppm. IR (film) $\tilde{\nu}$ = 2956, 2930, 2886, 2858, 1757, 1251, 1185, 1170, 1124, 1035, 844, 776 cm^{-1}. MS (ESIpos) *m/z* (%): 781.3 (100 (M+Na)). HRMS (ESIpos): *m/z* calcd. for $C_{37}H_{57}O_9Si_2F_3Na$: 781.3385, found: 781.3392.

The corresponding Mosher ester (*R*)-**S19** was prepared analogously (13.7 mg, 92%): $[\alpha]_D^{20} = -26.0$ (c = 1.3, $CHCl_3$). ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.58–7.52 (m, 2H), 7.42–7.35 (m, 3H), 5.73 (ddd, *J* = 15.7, 7.5, 1.0 Hz, 1H), 5.51–5.40 (m, 2H), 4.83 (dd, *J* = 5.8, 4.5 Hz, 1H), 4.63 (s, 2H), 4.47 (ddd, *J* = 8.8, 7.4, 6.4 Hz, 1H), 4.32 (dq, *J* = 4.6, 2.5 Hz, 1H), 4.26–4.19 (m, 1H), 4.00–3.90 (m, 2H), 3.86–3.77 (m, 3H), 3.65–3.57 (m, 3H), 3.31 (s, 3H), 2.48–2.36 (m, 1H), 2.11 (ddd, *J* = 13.1, 6.5, 2.4 Hz, 1H), 1.98 (ddd, *J* = 13.3, 8.9, 4.7 Hz, 1H), 1.70 (ddd, *J* = 13.8, 7.7, 4.6 Hz, 1H), 1.62 (dt, *J* = 13.6, 6.3, 5.8 Hz, 1H), 1.05 (d, *J* = 6.7 Hz, 3H), 0.90 (s, 9H), 0.14 (s, 9H), 0.08 (s, 3H), 0.07 (s, 3H) ppm. IR (film) $\tilde{\nu}$ = 2956, 2930, 2886, 2858, 1757, 1251, 1185, 1170, 1124, 1035, 844, 776 cm^{-1}. MS (ESIpos) *m/z* (%): 781.3 (100 (M+Na)). HRMS (ESIpos): *m/z* calcd. for $C_{37}H_{57}O_9Si_2F_3Na$: 781.3385, found: 781.3396.

Table S-3. Mosher ester analysis for the assignment of the C(3) stereocenter according to Hoye and co-workers;[14] arbitrary numbering as shown in the insert

Assignment	34 [ppm]	(*S*)-S19 [ppm]	(*R*)-S19 [ppm]	Δ (δ (S–R)) [ppm]
3	4.23	5.62	5.48	+0.19
4	4.31	4.41	4.47	–0.06
5a	2.04	2.02	2.11	–0.09
5b	1.92	1.99	1.98	+0.01
6	4.31	4.29	4.32	–0.03
7	3.76	3.78	3.81	–0.03
8	4.27	4.21	4.22	–0.01
9	5.43	5.43	5.44	–0.01
10	5.73	5.72	5.73	–0.02
11	2.42	2.41	2.42	+0.01
12a	1.70	1.70	1.70	0
12b	1.61	1.60	1.62	–0.02
13	4.83	4.83	4.83	0
14	1.05	1.05	1.05	0
TMS-Me	1.05	0.17	0.12	+0.05

Terminal Alkyne S20. Potassium carbonate (350 mg, 2.53 mmol) was added to a solution of propargyl alcohol **34** (890 mg, 1.64 mmol) in dry methanol (16 mL) at 0 °C. The suspension was allowed to warm to ambient temperature while it was vigouresly stirred for 2 hours. The mixture was diluted with *t*-butyl methyl ether (20 mL) and the reaction was quenched with sat. NH_4Cl solution (5 mL). The organic phase was separated and the aqueous phase was extracted with *t*-butyl methyl ether (2 × 20 mL). The combined organic layers were washed with brine (20 mL), dried over Na_2SO_4 and concentrated. The residue was purified by flash chromatography (hexane/EtOAc 60:40 to 40:60) to provide the title compund as a colourless syrup (698 mg, 85%, d.r. 16:1). $[\alpha]_D^{20}$ = –20.7 (c = 2.26, $CHCl_3$). ^{1}H NMR (500 MHz, $CDCl_3$): *see Table S-4;* ^{13}C NMR (126 MHz, $CDCl_3$): *see Table S-4*. ^{29}Si NMR (99 MHz, $CDCl_3$) δ = 19.00 ppm. IR (film): $\tilde{\nu}$ = 3420, 3309, 2955, 292, 2885, 2857, 1472, 1361, 1254, 1127, 1099, 1063, 947, 835, 775 cm^{-1}. MS (EI) *m/z* (%): 963.5 (13), 493.3 (100). HRMS (ESIpos) *m/z* calcd. for $C_{24}H_{42}O_7SiNa$: 493.2592, found: 493.2594.

Bis(alkenyl)stannane 35. $PdCl_2$(*t*-BuNC)$_2$ (21 mg, 61 µmol) was added to a solution of alkyne **S20** (284 mg, 0.603 mmol) in THF (2.0 mL) at ambient temperature. After dropwise addition of hexabutyldistannane (0.45 mL, 0.89 mmol) to the orange suspension the reaction mixture turned into a dark red solution, with increasing colour intensity over time. After stirring for 20 hours at ambient temperature the mixture was concentrated under reduced pressure. The residual oil was purified by flash chromatography ((hexane/NEt_3 99:1)/*t*-butyl methyl ether 9:1 to 8:1) to afford the title compound as a yellow-orange oil (588 mg, 93%). $[\alpha]_D^{20}$ = –8.1 (c = 1.0, $CHCl_3$). ^{1}H NMR (400 MHz, $CDCl_3$): δ = 6.81 (ddd, *J* = 89.0, 31.8, 1.2 Hz, 1H), 5.74 (ddd, *J* = 15.7, 7.6, 1.1 Hz, 1H), 5.43 (ddd, *J* = 15.7, 6.3, 1.1 Hz, 1H), 4.83 (dd, *J* = 5.8, 4.6 Hz, 1H), 4.69 (d, *J* = 6.5 Hz, 1H), 4.64 (d, *J* = 6.6 Hz, 1H), 4.29–4.23 (m, 2H), 4.13 (ddd, *J* = 9.2, 7.9, 6.0 Hz, 1H), 3.99–3.91 (m, 2H), 3.87–3.76 (m, 3H), 3.71 (dd, *J* = 8.1, 3.0 Hz, 1H), 3.38 (s, 3H), 2.82 (d, *J* = 2.0 Hz, 1H), 2.42 (ddt, *J* = 13.8, 6.3, 6.3 Hz, 1H), 1.82 (ddd, *J* = 13.1, 6.2, 1.7 Hz, 1H), 1.76–1.66 (m, 2H), 1.61 (ddd, *J* = 13.8, 6.6, 5.8 Hz, 1H), 1.55–1.38 (m, 12H), 1.31 (tt, *J* = 7.2, 7.2 Hz, 12H), 1.05 (d, *J* = 6.8 Hz, 3H), 0.99–0.82 (m, 39H), 0.06 (s, 6H) ppm. ^{13}C NMR (101 MHz, $CDCl_3$): δ = 168.1, 144.3, 139.5, 125.2, 103.5, 94.4, 87.8, 86.3, 80.4, 75.2, 73.4, 64.9, 64.8, 55.5, 40.8, 38.7, 33.1, 29.4, 29.3, 27.7, 27.5, 26.0, 20.9, 18.1, 13.8, 13.8, 11.5, 11.0, –3.8, –4.6 ppm. ^{119}Sn NMR (149 MHz, $CDCl_3$): δ = –59.2, –66.6 ppm. IR (film) $\tilde{\nu}$ = 3476, 2955, 2927, 2871, 2855, 1464, 1376, 1256, 1124, 1101, 1041, 951, 835, 775, 670 cm^{-1}. MS (ESIpos) *m/z* (%): 1073.5 (100 (M+Na)). HRMS (ESIpos): *m/z* calcd. for $C_{48}H_{96}O_7SiSn_2Na$: 1075.4860, found: 1075.4879.

Table S-4. NMR data of terminal alkyne **S20**; arbitrary numbering scheme as shown in the insert

atom n°	^{1}H NMR (500 MHz, $CDCl_3$)					^{13}C NMR (126 MHz, $CDCl_3$)	
	δ [ppm]	**m**	***J*** [Hz]	**COSY**	**NOESY**	**δ** [ppm]	**HMBC**
1	3.76	dd	7.8, 3.3	(2), 5	(3b)	86.6	3, (4), 5, 6
2	4.32–4.29	m	-	(1),(3a)	(21), (22), (19), (6)	73.0	(1), 3b, (5)
3a	2.06	ddd	13.1, 6.4, 2.0	3b, 4	4	37.9	(4)
3b	1.93	ddd	13.2, 8.9, 4.5	2, 3a, 4	(1), 15		
4	4.35	dt	8.9, 6.2	3ab, (15)	3b, 15-OH	80.9	3a, (15)
5	4.27	t	7.2	1, 6	7, 13ab, (14)	75.2	6, 7, 13ab
6	5.43	dd	15.7, 6.6	5, 7	(2), 8, (22)	125.0	5, 8
7	5.73	dd	15.6, 7.6	6, 8	5, (22)	140.0	5, 8, 9ab, 22
8	2.42	sept	7.0	9a, 7, 22	6, 22	33.1	6, 7, 10, 9ab
9a	1.70	ddd	13.8, 7.8, 4.6	9b, 8, (10)	9b	40.8	6, 7, 8
9b	1.60	dt	13.9, 6.2	9a, (10)	9a, 22		
10	4.83	t	5.2	(9ab)	(22)	103.5	11ab,12ab
11a	3.98–3.91	m	-	11b	11b, 12ab	64.9	12ab
11b	3.84–3.78	m	-	11a	11a, 12ab		
12a	3.98–3.91	m	-	12b	11ab, 12b	64.8	11ab
12b	3.84–3.78	m	-	12a	11ab, 12a		
13a	4.70	d	6.6	13b	5, 13b, 14ab	94.3	5, 8, 9ab, 14
13b	4.64	d	6.6	13a	2, 6-TBS, 14a		
14	3.39	s	-	-	13ab, (5)	55.6	13ab
15	4.24	d	6.2	4, (17)	(15-OH), 3a	65.3	3a(b), 17
16	-	-	-	-	-	82.1	4, (15), (15-OH), 17
17	2.42	d	2.1	15	-	73.8	-
18	-	-	-	-	-	18.1	19, 20 , 21
19	0.9	s	-	-	20, 21, (2)	26.0	-
20	0.09	s	-	-	19, (2)	–3.9	21
21	0.07	s	-	-	19, (2)	–4.6	20
22	1.05	d	6.8	8	(6), (7), 8, 9b, (10)	20.9	7, 8, 9ab
15-OH	2.91	s	16.9	15	(4), (15)	-	-

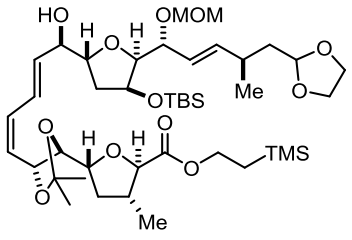
Completion of the Total Synthesis

Dienylstannane 37. A solution of bisstannane **35** (204 mg, 0.194 mmol) in degassed *N*-methyl-2-pyrrolidone (1.0 mL, with rinses) was added to a suspension of Pd(*t*-$Bu_3P)_2$ (15 mg, 29 µmol), tetrabutylammonium diphenylphosphinate (115 mg, 0.250 mmol) and lithium chloride (27 mg, 0.64 mmol) in degassed *N*-methyl-2-pyrrolidone (0.5 mL). The dark mixture was placed in a preheated oil bath at 60 °C. A

solution of alkenyliodide **25** (114 mg, 0.236 mmol) in degassed *N*-methyl-2-pyrrolidone (1.0 mL) was added via syringe pump over a period of 3 hours to the suspension at 60 °C. After stirring for additional 14 hours at 60 °C the brown mixture was cooled to ambient temperature and the reaction was quenched with pH 7 phosphate buffer (20 mL). The aqueous layer was separated and extracted with *t*-butyl methyl ether (3 × 30 mL). The combined extracts were washed with brine (2 × 50 mL), dried over Na_2SO_4 and concentrated. The residue was purified by flash chromatography ((hexane/NEt_3=99:1)/*t*-butyl methyl ether = 9:1 to 4:1 to 3:1 to 3:2 to 1:1 to 1:2) to afford the title compound as a pale yellow oil (109 mg, 50%); additional fractions contained the destannylated diene **S21** (18 mg, 11%), alkenyl chloride **S22** (11 mg, 12%) and a 7.6:1 mixture of homocoupled alkenyl iodide **S23** and starting bis(alkenyl)stannane **35** (20 mg, 20%).

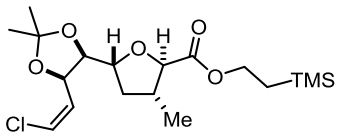
Analytical and spectral properties of compound **37**: $[\alpha]_D^{20}$ = –11.5 (c = 1.04, $CHCl_3$). ^{1}H NMR (400 MHz, $CDCl_3$): δ = 7.00 (dd, *J* = 109.2, 11.1 Hz, 1H), 6.18 (t, *J* = 11.5, 10.8 Hz, 1H), 5.74 (ddd, *J* = 15.7, 7.6, 1.0 Hz, 1H), 5.62 (t, *J* = 10.9, 10.1 Hz, 1H), 5.43 (ddd, *J* = 15.6, 6.3, 1.1 Hz, 1H), 5.12 (dd, *J* = 10.0, 6.3 Hz, 1H), 4.83 (dd, *J* = 5.8, 4.6 Hz, 1H), 4.69 (d, *J* = 6.5 Hz, 1H), 4.64 (d, *J* = 6.5 Hz, 1H), 4.29–4.17 (m, 5H), 4.14–4.06 (m, 2H), 4.02–3.91 (m, 4H), 3.85–3.77 (m, 2H), 3.70 (dd, *J* = 8.2, 2.9 Hz, 1H), 3.38 (s, 3H), 2.89 (brs, 1H), 2.43 (dp, *J* = 13.8, 6.8 Hz, 1H), 2.32 (dp, *J* = 13.7, 9.1, 6.6, 6.1 Hz, 1H), 2.07 (ddd, *J* = 12.7, 7.4, 5.7 Hz, 1H), 1.78 (ddd, *J* = 13.2, 6.2, 1.5 Hz, 1H), 1.69 (dddd, *J* = 36.6, 13.7, 7.6, 4.4 Hz, 1H), 1.65–1.57 (m, 2H), 1.53 (s, 3H), 1.51–1.42 (m, 6H), 1.41 (s, 3H), 1.35–1.26 (m, 7H), 1.17 (d, *J* = 6.6 Hz, 3H), 1.05 (d, *J* = 6.8 Hz, 3H), 1.02–0.96 (m, 8H), 0.92–0.83 (m, 18H), 0.06 (s, 6H), 0.04 (s, 9H) ppm. ^{13}C NMR (101 MHz, $CDCl_3$): δ = 173.0, 154.7, 139.7, 134.8, 132.7, 127.6, 125.0, 109.7, 103.5, 94.4, 86.2, 84.5, 83.9, 81.2, 80.8, 79.2, 75.2, 73.4, 72.6, 64.9, 64.8, 63.2, 55.5, 40.8, 39.6, 38.8, 37.2, 33.1, 29.2, 27.9, 27.5, 26.0, 25.8, 20.9, 18.3, 18.1, 17.5, 13.8, 11.7, –1.4, –3.8, –4.6 ppm. ^{119}Sn NMR (149 MHz, $CDCl_3$): δ = –50.8 ppm. IR (film) $\tilde{\nu}$ = 3482, 2955, 2928, 2857, 1749, 1731, 1463, 1378, 1251, 1215, 1178, 1127, 1099, 1048, 945, 860, 836, 776 cm^{-1}. MS (ESIpos) *m/z* (%): 1139.6 (100 (M+Na)). HRMS (ESIpos): *m/z* calcd. for $C_{54}H_{100}O_{12}Si_2SnNa$: 1139.5667, found: 1139.5679.

Analytical and spectral properties of diene **S21.** $[\alpha]_D^{20}$ = –23.8 (c = 1.0, $CHCl_3$). ^{1}H NMR (400 MHz, $CDCl_3$): δ = 6.60 (dd, *J* = 15.1, 11.3 Hz, 1H), 6.19 (t, *J* = 11.2 Hz, 1H), 5.80–5.69 (m, 2H), 5.62 (t, *J* = 10.5 Hz, 1H), 5.44 (ddd, *J* = 15.7, 6.4, 1.1 Hz, 1H), 5.07 (dd, *J* = 9.9, 6.2 Hz, 1H), 4.84 (dd, *J* = 5.8, 4.6 Hz, 1H), 4.71 (d, *J* = 6.6 Hz, 1H), 4.65 (d, *J* = 6.6 Hz, 1H), 4.30–4.06 (m, 7H), 4.03–3.91 (m, 4H), 3.87–3.79 (m, 2H), 3.73 (dd, *J* = 8.0, 3.1 Hz, 1H), 3.39 (s, 3H), 2.68 (br s, 1H), 2.49–2.28 (m, 2H), 2.12–2.04 (m, 1H), 1.91 (ddd, *J* = 13.0, 6.2, 1.8 Hz, 1H), 1.82–1.67 (m, 2H), 1.61 (ddd, *J* = 13.8, 6.6, 5.7 Hz, 1H), 1.52 (s, 3H), 1.40 (s, 3H), 1.34–1.27 (m, 1H), 1.18 (d, *J* = 6.3 Hz, 3H), 1.06 (d, *J* = 6.8 Hz, 3H), 1.03–0.97 (m, 2H), 0.90 (s, 9H), 0.08 (s, 3H), 0.07 (s,



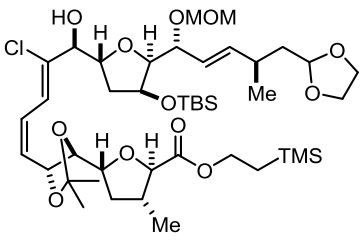
3H), 0.04 (s, 9H) ppm. ^{13}C NMR (101 MHz, $CDCl_3$): δ = 173.1, 139.8, 134.6, 131.9, 127.2, 126.4, 125.0, 109.6, 103.5, 94.4, 86.4, 83.9, 81.0, 80.8, 79.2, 75.4, 75.3, 73.2, 72.8, 64.9, 64.8, 63.2, 55.6, 40.8, 39.5, 38.1, 37.1, 33.1, 27.8, 26.0, 25.8, 20.9, 18.4, 18.1, 17.5, –1.4, –3.8, –4.6. ppm. IR (film) $\tilde{\nu}$ = 3486, 2956, 2930, 2891, 1747, 1462, 1379, 1251, 1214, 1131, 1100, 1048, 951, 861, 836, 809, 776 cm^{-1}. MS (ESIpos) *m/z* (%): 849.5 (100 (M+Na)). HRMS (ESIpos): *m/z* calcd. for $C_{42}H_{74}O_{12}Si_2Na$: 849.4611, found: 849.4617.

Analytical and spectral properties of (Z)-alkenyl chloride **S22.** $[\alpha]_D^{20}$ = –3.6 (c = 1.0, $CHCl_3$). ^{1}H NMR



(400 MHz, $CDCl_3$): δ = 6.27 (dd, *J* = 13.3, 0.7 Hz, 1H), 6.08 (dd, *J* = 13.3, 8.8 Hz, 1H), 4.55 (dd, *J* = 8.9, 6.4 Hz, 1H), 4.25–4.11 (m, 3H), 4.08 (t, *J* = 6.3 Hz, 1H), 4.01 (d, *J* = 7.5 Hz, 1H), 2.39 (dtq, *J* = 9.6, 6.9, 6.9 Hz, 1H), 2.12 (ddd, *J* = 12.0, 7.5, 5.7 Hz, 1H), 1.50 (s, 3H), 1.39–1.31 (m, 4H), 1.19 (d, *J* = 6.7 Hz, 3H), 1.05–0.98 (m, 2H), 0.03 (s, 9H) ppm. ^{13}C NMR (101 MHz, $CDCl_3$): δ = 173.0, 129.9, 123.0, 109.9, 83.9, 80.4, 79.1, 77.5, 77.2, 76.8, 76.3, 63.3, 39.4, 37.0, 27.6, 25.6, 18.4, 17.5, -1.4 ppm. IR (film) $\tilde{\nu}$ = 2956, 2898, 1746, 1729, 1629, 1456, 1379, 1249, 1214, 1175, 1129, 1084, 1056, 942, 857, 842, 695, 517 cm^{-1}. MS (ESIpos) *m/z* (%): 413.2 (100 (M+Na)). HRMS (ESIpos): *m/z* calcd. for $C_{18}H_{31}O_5Si_1ClNa$: 413.1522, found: 413.1525.

Chlorodiene 41. 2,6-Lutidine (115 µL, 0.987 mmol) and copper(II) chloride (125 mg, 0.930 mmol)



were added to a solution of dienylstannane **37** (174 mg, 0.156 mmol) in THF (3.2 mL). The resulting purple suspension was stirred for 20 hours at ambient temperature, during which time the colour of the mixture gradually turned brown. After filtration through a short plug of silica, rinsing with *t*-butyl methyl ether (25 mL), the filtrate was concentrated under reduced pressure. The residue was purified by flash chromatography (EtOAc/hexane 4:6 to 1:1 to 6:4) to afford the title compound as a colourless oil (105 mg, 78%). $[\alpha]_D^{20}$ = –28.3 (c = 0.90, $CHCl_3$). ^{1}H NMR (400 MHz, $CDCl_3$): δ = 6.70 (d, *J* = 11.0 Hz, 1H), 6.57 (td, *J* = 11.0, 1.0 Hz, 1H), 5.82 (t, *J* = 10.3 Hz, 1H), 5.75 (ddd, *J* = 15.7, 7.6, 1.1 Hz, 1H), 5.43 (ddd, *J* = 15.7, 6.3, 1.1 Hz, 1H), 5.00 (dd, *J* = 9.7, 6.4 Hz, 1H), 4.83 (dd, *J* = 5.7, 4.6 Hz, 1H), 4.70 (d, *J* = 6.5 Hz, 1H), 4.63 (d, *J* = 6.5 Hz, 1H), 4.47 (dt, *J* = 9.5, 5.9 Hz, 1H), 4.32–4.13 (m, 5H), 4.09 (t, *J* = 6.3 Hz, 1H), 4.05 (t, *J* = 4.9, 1.8 Hz, 1H), 4.01 (d, *J* = 7.5 Hz, 1H), 3.98 – 3.91 (m, 2H), 3.84–3.78 (m, 2H), 3.74 (dd, *J* = 8.1, 3.0 Hz, 1H), 3.37 (s, 3H), 3.06 (br s, 1H), 2.48–2.29 (m, 2H), 2.06 (ddd, *J* = 12.6, 7.4, 5.7 Hz, 1H), 1.97 (ddd, *J* = 13.1, 6.0, 1.6 Hz, 1H), 1.81 (ddd, *J* = 13.3, 9.6, 4.2 Hz, 1H), 1.70 (ddd, *J* = 13.7, 7.7, 4.6 Hz, 1H), 1.61 (dt, *J* = 13.8, 6.2 Hz, 1H), 1.52 (s, 3H), 1.40 (s, 3H), 1.34–1.27 (m, 1H), 1.18 (d, *J* = 6.6 Hz, 3H), 1.05 (d, *J* = 6.8 Hz, 3H), 1.03–0.97 (m, 2H), 0.90 (s, 9H), 0.08 (s, 3H), 0.07 (s, 3H), 0.04 (s, 9H) ppm. ^{13}C NMR (101 MHz, $CDCl_3$): δ = 173.1, 139.8, 136.9, 130.2, 126.6, 124.9, 121.0, 109.9,

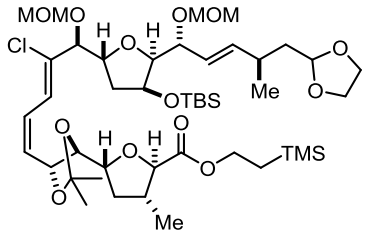
103.5, 94.5, 86.9, 83.9, 80.7, 79.3, 79.0, 78.1, 75.2, 73.2, 73.1, 64.9, 64.8, 63.2, 55.6, 40.8, 39.5, 38.6, 37.1, 33.1, 27.8, 26.0, 25.8, 20.9, 18.4, 18.1, 17.5, –1.4, –3.8, –4.6 ppm. IR (film) $\tilde{\nu}$ = 3447, 2955, 2931, 2859, 1730, 1463, 1379, 1252, 1214, 1132, 1102, 1045, 941, 861, 838, 776 cm^{-1}. MS (ESIpos) *m/z* (%): 883.4 (100 (M+Na)). HRMS (ESIpos): *m/z* calcd. for $C_{42}H_{73}O_{12}Si_2ClNa$: 883.4221, found: 883.4231.

Seco Acid 38. A solution of tetrabutylammonium fluoride trihydrate (29 mg, 93 µmol) in THF (0.15 mL) was added dropwise at 0 °C to a solution of compound **41** (10 mg, 12 µmol) in THF (0.05 mL) After stirring for 17 hours at 0°C, the mixture was slowly warmed to ambient temperature before it was diluted with EtOAc (5 mL) and sat. aq. NH_4Cl (5 mL). The aqueous layer was separated and extracted with EtOAc (2 × 5 mL). The combined organic phases were washed with a 1:3 mixture of sat. NH_4Cl and brine (10 mL), dried over Na_2SO_4 and concentrated under reduced pressure. The residue was purified by flash chromatography (EtOAc/AcOH 99:1) to afford the title compound as a colourless oil (6.0 mg, 80%). $[\alpha]_D^{20}$ = –34.8 (c = 0.60, $CHCl_3$). ^{1}H NMR (400 MHz, $CDCl_3$): δ = 6.74 (d, *J* = 11.0 Hz, 1H), 6.58 (td, *J* = 11.0, 1.1 Hz, 1H), 5.94 (dd, *J* = 15.7, 6.7 Hz, 1H), 5.73 (ddd, *J* = 10.5, 9.6, 1.0 Hz, 1H), 5.40 (ddd, *J* = 15.7, 8.8, 1.3 Hz, 1H), 5.02 (dd, *J* = 9.4, 5.7 Hz, 1H), 4.85 (t, *J* = 4.8 Hz, 1H), 4.73 (d, *J* = 6.6 Hz, 1H), 4.60 (d, *J* = 6.5 Hz, 1H), 4.52 (dt, *J* = 9.5, 5.9 Hz, 1H), 4.37–4.27 (m, 2H), 4.19–4.08 (m, 2H), 4.07 (d, *J* = 5.7 Hz, 1H), 4.01 (d, *J* = 8.9 Hz, 1H), 4.01–3.90 (m, 2H), 3.90 (dd, *J* = 7.2, 3.1 Hz, 1H), 3.87–3.76 (m, 2H), 3.37 (s, 3H), 2.50 (ddq, *J* = 14.2, 7.6, 7.0 Hz, 1H), 2.43–2.26 (m, 1H), 2.17 – 2.00 (m, 2H), 1.93 (ddd, *J* = 13.6, 9.6, 4.8 Hz, 1H), 1.79 (dt, *J* = 14.0, 5.1 Hz, 1H), 1.67 (ddd, *J* = 14.0, 8.5, 4.6 Hz, 1H), 1.52 (s, 3H), 1.45–1.38 (m, 4H), 1.25 (d, *J* = 6.6 Hz, 3H), 1.09 (d, *J* = 6.8 Hz, 3H) ppm. ^{13}C NMR (101 MHz, $CDCl_3$): δ = 174.1, 142.3, 137.2, 129.8, 126.7, 123.8, 120.8, 109.9, 103.5, 93.6, 85.2, 83.2, 80.5, 79.7, 79.3, 77.8, 77.0, 73.3, 72.8, 64.9, 64.8, 55.6, 41.0, 39.6, 38.0, 37.5, 32.1, 27.7, 25.6, 19.8, 17.6 ppm. IR (film) $\tilde{\nu}$ = 3448, 2958, 2928, 1733, 1380, 1259, 1215, 1100, 1031, 869 cm^{-1}. MS (ESIneg) *m/z* (%): 645.3 (100 (M+Na)). HRMS (ESIneg): *m/z* calcd. for $C_{31}H_{46}O_{12}Cl$: 645.2683, found: 645.2687.

Lactone 40. Sodium hydrogen carbonate (217 mg, 2.58 mmol) was added to a suspension of 2-bromo-1-ethyl-pyridinium tetrafluoroborate (**39**) (74 mg, 0.27 mmol) and seco acid **38** (5.5 mg, 8.5 µmol) in 1,2-dichloroethane (17 mL) in a sealed tube. The tube was placed in a pre-heated oil bath at 80 °C and the mixture was stirred for 22 hours. The light purple suspension was cooled to ambient temperature before the reaction was quenched with pH 7 phosphate buffer (10 mL). The aqueous layer was separated and extracted with EtOAc (2 × 15 mL). The combined organic layers were washed with brine (30 mL), dried over Na_2SO_4

and concentrated. The residue was purified by flash chromatography (hexane/EtOAc/AcOH 1:1:0 to 1:2:0 to 100:0:0 to 99:0:1) to provide the title compound as a colourless oil (1.6 mg, 30%); a second fraction contained recovered starting material **38** (3.1 mg, 56%) [Conditions for LC-MS: ZORBAX Eclipse Plus C-18, 1.8 µm, 50 × 4.6 mm, MeCN/H_2O = 70:30, v = 0.8 mL/min, λ = 250 nm, 35 °C, 181 bar, t(carboxylate) = 1.0 min, t(carboxylic acid) = 1.1 min, t(lactone) = 11.6 min]. $[\alpha]_D^{20}$ = –83.3 (c = 0.15, $CHCl_3$). ^{1}H NMR (600 MHz, $CDCl_3$): *see Table S-5;* ^{13}C NMR (150 MHz, $CDCl_3$): *see Table S-5*. IR (film): $\tilde{\nu}$ = 3455, 2959, 2923, 1747, 1651, 1456, 1379, 1365, 1260, 1215, 1149, 1096, 1030, 870, 847, 800 cm^{-1}. MS (ESIpos) *m/z* (%): 651.3 (100 (M+Na)). HRMS (ESIpos): *m/z* calcd. for $C_{31}H_{45}O_{11}ClNa$: 651.2542, found: 651.2548.

Compound S24. Hünig's base (0.55 mL, 3.2 mmol), tetrabutylammonium iodide (11 mg, 30 µmol) and

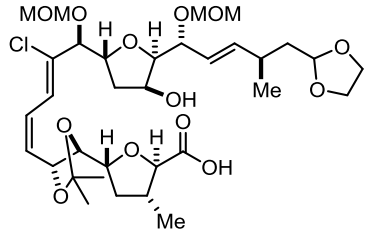


MOM-chloride (0.14 mL, 1.8 mmol) were added to a solution of alcohol **41** (103 mg, 120 µmol) in 1,2-dichloroethane (1.2 mL),. The dark orange mixture was stirred for 4 hours at 50 °C. After reaching ambient temperature, the mixture was diluted with *t*-butyl methyl ether (10 mL) and sat. aq. $NaHCO_3$ (15 mL). The aqueous layer was separated and extracted with *t*-butyl methyl ether (2 × 30 mL). The combined extracts were washed with brine (40 mL), dried over Na_2SO_4 and concentrated. The residue was purified by flash chromatography (hexane/EtOAc 7:3 to 6:4 to 1:1 to 1:2) to afford the title compound as a yellow oil (99.5 mg, 92%). $[\alpha]_D^{20}$ = –50.8 (c = 0.75, $CHCl_3$). ^{1}H NMR (400 MHz, $CDCl_3$): δ = 6.65–6.52 (m, 2H), 5.84 (t, *J* = 9.9 Hz, 1H), 5.74 (ddd, *J* = 15.6, 7.6, 1.1 Hz, 1H), 5.47 (ddd, *J* = 15.7, 6.1, 1.0 Hz, 1H), 4.99 (dd, *J* = 9.8, 6.3 Hz, 1H), 4.83 (dd, *J* = 5.9, 4.5 Hz, 1H), 4.73–4.61 (m, 4H), 4.53 (dt, *J* = 9.8, 6.4 Hz, 1H), 4.27–4.07 (m, 7H), 4.01 (d, *J* = 7.5 Hz, 1H), 3.98–3.90 (m, 2H), 3.86-3.77 (m, 2H), 3.72 (dd, *J* = 8.0, 3.0 Hz, 1H), 3.41 (s, 3H), 3.37 (s, 3H), 2.47–2.28 (m, 2H), 2.04 (ddd, *J* = 12.7, 7.4, 5.6 Hz, 1H), 1.92 (ddd, *J* = 13.0, 6.0, 1.6 Hz, 1H), 1.74-1.64 (m, 2H), 1.64–1.56 (m, 1H), 1.52 (s, 3H), 1.41 (s, 3H), 1.35–1.29 (m, 1H), 1.17 (d, *J* = 6.6 Hz, 3H), 1.05 (d, *J* = 6.8 Hz, 3H), 1.03–0.98 (m, 2H), 0.89 (s, 9H), 0.07 (s, 3H), 0.07 (s, 3H), 0.04 (s, 9H) ppm. ^{13}C NMR (101 MHz, $CDCl_3$): δ = 173.1, 139.1, 134.9, 130.8, 126.3, 125.4, 123.0, 110.0, 103.5, 95.0, 94.1, 86.8, 83.9, 82.1, 80.8, 79.1, 78.8, 75.6, 73.1, 72.8, 64.9, 64.8, 63.3, 55.7, 55.5, 40.8, 39.5, 38.3, 37.0, 33.1, 27.8, 26.0, 25.8, 21.0, 18.4, 18.1, 17.6, –1.4, –3.8, –4.6 ppm. IR (film): $\tilde{\nu}$ = 2954, 2929, 2894, 1748, 1458, 1379, 1251, 1216, 1137, 1101, 1047, 919, 862, 836 cm^{-1}. MS (ESIpos) *m/z* (%): 927.4 (100 (M+Na)). HRMS (ESIpos): *m/z* calcd. for $C_{44}H_{77}O_{13}ClSi_2Na$: 927.4483, found: 927.4493.

Table S-5. ^{1}H and ^{13}C NMR data of lactone **40**; numbering scheme as shown in the Insert

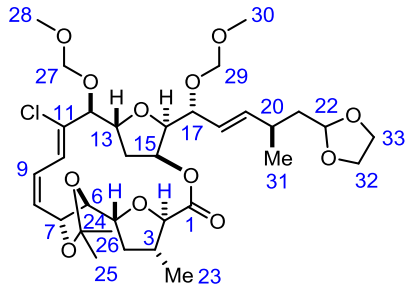
atom n°	^{1}H NMR (500 MHz, $CDCl_3$)					^{13}C NMR (126 MHz, $CDCl_3$)	
	δ [ppm]	**m**	***J*** [Hz]	**COSY**	**NOESY**	**δ** [ppm]	**HMBC**
1	-	-	-	-	-	170.5	2
2	4.04	d	5.4	3, 4a	(4a), 23	82.7	4, 23
3	2.84–2.74	m	-	2, (4a), 4b, 23	5, 4a, 23	32.3	23
4a	1.93	ddd	11.4, 7.4, 4.2	(2), 3, 4b, 5	3, 5, 4b	39.0	23
4b	1.52	td	11.5, 10.3	3, 4a, 5	4a, (23)		
5	3.31	dd	11.7, 4,2	4ab, (6)	4a, 6, 10	75.8	2, 7
6	4.06	d	5.5	7, (5), (8)	5, 7	77.4	7
7	4.75	dd	7.2, 5.4	(4), 7, 8	6, 8, 26	76.6	8, (9)
8	5.61	ddd	11.8, 7.1, 0.9	7,9, (10)	7, 9	125.2	7, 9
9	6.67	dd	11.8, 11.2	8, 10	8, 10	130.7	7
10	7.78	dt	11.2, 0.8	(8), 9, (12)	9, 13, 5, (25)	124.9	(8), 12
11	-	-	-	-	-	131.6	9, 10, 12
12	5.09	d	7.3	13, (10)	13	81.4	(10), (13)
13	4.57	ddd	9.6, 7.3, 6.2	12, 14a, 14b	10, 12, 14b	78.4	12
14a	2.14	ddd	13.2, 9.4, 4.6	13, 14b, (15)	12, 14b, 15	37.3	12, (16)
14b	2.08	ddd	13.2, 6.3, 1.7	13, 14a, 15	13, 14a, (15)		
15	4.40–4.36	m	-	16, 15-OH	16, 14a, (15-OH), (14b)	72.8	14b
16	3.94	dd	6.4, 3.3	15, 17	15, 17, 18	84.6	(14b), (17)
17	4.34	dd	8.8, 6.2	16, 18, (19)	16, 19, 29	76.8	19, 29ab
18	5.48	ddd	15.7, 8.8, 1.2	17, 19	16, 31, (20)	124.4	(20)
19	5.87	dd	15.7, 7.0	18, (17)	17, (20)	141.9	17, 20
20	2.49	tq	8.1, 6.9	19, 21b, 31	(18), 19, 31	32.4	31
21a	1.75	dt	13.9, 5.3	22, 21b	20	41.0	(22), 31
21b	1.67	ddd	13.9, 8.4, 4.5	20, 21a, (22)	32		
22	4.84	dd	5.1, 4.5	21a, 21b	28a, 29a	103.5	28b, 29b
23	1.13	d	6.9	3, (4a)	2, 3	18.8	2
24	-	-	-	-	-	109.7	6, 24, 25
25	1.67	s	-	26, (6)	(2), 26	25.8	26
26	1.40	s	-	25	7, 8	26.0	25
27a	3.98–3.92	m	-	27b, 28ab	28a, 28b	64.9	-
27b	3.86–3.78	m	-	27a, 28ab	28a, 28b		
28a	3.98–3.92	m	-	27ab, 28b	27a, 27b	64.8	-
28b	3.86–3.78	m	-	27ab, 28a	27a, 27b		
29a	4.74	d	6.6	29b	(17), 29b, (30)	93.7	30, (17)
29b	4.63	d	6.6	(17), 29a	(17), 29a, 30		
30	3.39	s	-	-	29b	55.8	29a, 29b
31	1.08	d	6.8	20	20, (21a), (21b)	20.1	20
15-OH	3.18	d	4.2	15	15	-	-

Seco Acid 42. A solution of tetrabutylammonium fluoride trihydrate in THF (1 M, 0.55 mL, 0.55 mmol)



was added dropwise to a solution of ester **S24** (99 mg, 0.11 mmol) in THF (0.7 mL) at 0 °C. After stirring for 2 hours at 0 °C the ice bath was removed and stirring was continued for 2.5 hours at ambient temperature. After cooling to 0 °C, additional tetrabutylammonium fluoride trihydrate in THF (1 M, 0.05 mL, 0.05 mmol) was added and the solution was stirred for another 1 hour at ambient temperature. After quenching of the reaction with sat. $NaHCO_3$ (5 mL), the aqueous layer was washed with *t*-butyl methyl ether (2 × 5 mL). The aqueous layer was then acidified with HCl (2 M, 0.1 mL) until pH 4 was reached and extracted with EtOAc (3 × 10 mL). The combined EtOAc layers were washed with a 3:1 mixture of brine and pH 4 phosphate buffer (15 mL), dried over Na_2SO_4 and concentrated under reduced pressure. The yellow residual oil (75.5 mg, 99%) was used in the next step without further purification. $[\alpha]_D^{20}$ = –65.6 (c = 0.91, $CHCl_3$). ^{1}H NMR (400 MHz, $CDCl_3$) δ = 6.63 (d, *J* = 11.0 Hz, 1H), 6.55 (td, *J* = 10.8, 1.1 Hz, 1H), 5.85 (dd, *J* = 15.6, 7.0 Hz, 1H), 5.75 (t, *J* = 10.2 Hz, 1H), 5.47 (ddd, *J* = 15.6, 8.6, 1.2 Hz, 1H), 4.99 (dd, *J* = 9.6, 5.7 Hz, 1H), 4.83 (t, *J* = 4.9 Hz, 1H), 4.69 (d, *J* = 6.6 Hz, 1H), 4.66–4.52 (m, 4H), 4.34-4.28 (m, 2H), 4.18–4.07 (m, 3H), 4.02 (d, *J* = 8.5 Hz, 1H), 3.97–3.90 (m, 2H), 3.86–3.77 (m, 3H), 3.40 (s, 3H), 3.36 (s, 3H), 3.30 (brs, 1H), 2.52–2.40 (m, 1H), 2.40–2.29 (m, 1H), 2.13–2.04 (m, 1H), 2.00 (ddd, *J* = 13.3, 6.4, 1.4 Hz, 1H), 1.80 (ddd, *J* = 13.7, 9.4, 4.8 Hz, 1H), 1.75–1.61 (m, 2H), 1.51 (s, 3H), 1.42–1.33 (m, 4H), 1.22 (d, *J* = 6.6 Hz, 3H), 1.06 (d, *J* = 6.8 Hz, 3H) ppm. ^{13}C NMR (101 MHz, $CDCl_3$): *δ* = 174.5, 141.5, 135.1, 130.4, 126.4, 124.4, 122.8, 110.0, 103.4, 94.1, 93.8, 84.5, 83.1, 81.7, 80.7, 79.3, 78.9, 76.8, 73.2, 72.8, 64.9, 64.8, 55.7, 55.6, 40.9, 39.6, 37.8, 37.3, 32.4, 27.7, 25.6, 20.1, 17.7 ppm. IR (film): $\tilde{\nu}$ = 3477, 2957, 2932, 2894, 1735, 1380, 1250, 1216, 1151, 1101, 1032, 918, 869 cm^{-1}. MS (ESIpos) *m/z* (%): 713.3 (100 (M+Na)). HRMS (ESIpos): *m/z* calcd. for $C_{33}H_{51}O_{13}ClNa$: 713.2910, found: 713.2917.

Macrolactone 43. Hünig's base (45 µL, 26 µmol) and 2,4,6-trichlorobenzoyl chloride (34 µL, 22 µmol)



were added to a solution of seco acid **42** (30 mg, 43 µmol) in THF (0.87 mL) at 0 °C. After stirring for 2 hours at this temperature, the solvent was removed under reduced pressure and the residue was redissolved in toluene (9.0 mL). The resulting solution of the mixed anhydride was added via syringe pump over a period of 20 hours to a solution of DMAP (132 mg, 1.08 mmol) in toluene (85 mL) at 110 °C. Once the addition was complete, stirring was continued for additional 2 hours at the same temperature. The mixture was then cooled to ambient temperature and the reaction was quenched with sat. aq. NH_4Cl solution (100 mL). The aqueous layer was separated and extracted with EtOAc (3 × 100 mL). The combined organic layers were washed with

brine (150 mL), dried over Na_2SO_4 and concentrated under reduced pressure. The residue was purified by flash chromatography (EtOAc/hexane 6:4 to 8:2 to 9:1) to provide the title compound as a light yellow oil (12 mg, 40%); additional fractions contained an epimerized macrolactone **S25** (1.8 mg, 6%) and the cyclic head-to-tail dimer **S26** (3.9 mg, 13%) [Conditions for LC-MS: ZORBAX Eclipse Plus C-18, 1.8 µm, 50 × 4.6 mm, MeCN/H_2O = 70:30, v = 0.8 mL/min, λ = 250 nm, 35 °C, 158 bar, t (epimerized macrolactone) = 2.7 min, t (macrolactone) = 3.4 min, t (dimer) = 16.0 min].

The cyclic monomer **43** and the head-to-tail dilactone (lactide) **S26** could be unambiguously distinguished by MS/MS fragmentation experiments, see below

Analytical and spectral data of compound **43**: $[\alpha]_D^{20}$ = –25.9 (c = 0.80, $CHCl_3$). ^{1}H NMR (600 MHz, $CDCl_3$, 2 main conformers, ratio 1:0.8, major conformer): *see Table S-6*. ^{13}C NMR (150 MHz, $CDCl_3$, 2 main conformers, ratio 1:0.8, major conformer): *see Table S-6*. ^{1}H NMR (600 MHz, $CDCl_3$, minor conformer): *see Table S-7*. ^{13}C NMR (150 MHz, $CDCl_3$, minor conformer): *see Table S-7*. IR (film): $\tilde{\nu}$ = 2958, 2933, 2892, 1741, 1454, 1381, 1256, 1213, 1151, 1099, 1031, 960 cm^{-1}. MS (ESIpos) *m/z* (%): 695.3 (100 (M+Na)) *see Figures S-1 – S-3;* HRMS (ESIpos): *m/z* calcd. for $C_{33}H_{49}O_{12}ClNa$: 695.2805, found: 695.2811.

Table S-6. NMR data of the major conformer of macrolactone **43**; numbering scheme as shown in the Insert

atom	**^{1}H NMR** (600 MHz, $CDCl_3$)						**^{13}C NMR** (151 MHz, $CDCl_3$)	
n°	**δ** [ppm]	**m**	***J*** [Hz]	**COSY**	**NOESY**	**ROESY**	**δ** [ppm]	**HMBC**
1	-	-	-	-	-		170.1	2, 15, (3)
2	3.90	d	9.2	3	2*	23	80.3	3, 23
3	2.81	ddd q	12.2, 9,2, 6.5, 6.5	2, 23, (4b)	3*	-	37.6	2, 4ab, 23
4a	2.17	ddd	11.8, 6.3, 5.1	4b, 5, (3)	4a*	-	37.0	6, 23
4b	1.55–1.59	m	-	4a, 5	4b*	23		
5	4.16–4.13	m	-	4b, (4a), (6)	5*	-	81.4	4b, 7
6	4.74–4.65	m	-	(5), 7	6*	-	77.9	4b, 5, 7, 8
7	5.20	ddd	6.2, 5.4, 1.7	6, 8	7*	-	75.3	5, 8
8	5.92–5.86	m	-	7, 9, 10	8*	-	130.8	7, 9, 10
9	6.61–6.55	m	-	8	9*	-	123.4	7
10	6.61–6.55	m	-	8	10*	-	122.9	8, 12
11	-	-	-	-	-		133.9	9, 10, 13
12	4.49	d	4.9	13	12*	-	78.3	14ab, 27ab
13	4.57–4.54	m	-	12	13*	-	81.1	12, 14ab
14a 14b	2.50–2.42	m	-	13, 15	14a* 14b*	-	32.2	12, 16
15	4.95	q	8.7	14ab, 16	15*	-	76.2	13,
16	4.05	dd	7.9, 1.3	15	16*	-	80.7	(15), (14)

17	4.22–4.13	m	-	18	-	-	75.2	15, 19, 13, 29ab
18	5.58	dd	15.6, 8.6	17, 19, 20	18*	-	125.5	17, 19, 20
19	5.63	dd	15.6, 7.3	18, 20	19*	-	141.3	17, 18, 20, 21ab
20	2.45	dq	7.4, 7.4	19, 31, (21ab)	20*	-	33.1	18, 19, 21ab, 22, 31
21a 21b	1.74–1.58	m	-	(20), 21b, 22 21a, 22	21a*b* 21a*b*	-	40.9	19, 20, 22, 31
22	4.83	dd	5.9, 4.4	21ab	22*	-	103.6	28b, 29b
23	1.11	d	6.5	3	23*	(2), (4b)	16.8	2, 4b
24	-	-	-	-	-	-	107.9	6, 25, 26
25	1.48	s	-	26	25*	-	27.2	-
26	1.38	s	-	25	26*	-	24.8	-
27a	4.66	d	6.5	27b	27a*	-	95.1	12, 28
27b	4.59	d	6.6	27a	27b*	-		
28	3.38	s	-	-	-	-	56.1	27ab
29a	4.72	d	6.6	29b	29ba*	-	93.8	17, 30
29b	4.67	d	6.7	29a	29ab*	-		
30	3.42	s	-	-	-	-	55.5	29ab
31	1.04	d	6.8	20	31*	-	20.8	20, 21ab
32a	3.96–3.91	m	-	-	-	-	64.8	33ab
32b	3.83–3.78	m						
33a	3.96–3.91	m	-	-	-	-	64.9	32ab
33b	3.83–3.78	m						

NOESY displays fast exchange with minor conformer (*).

Table S-7. NMR data of the minor conformer of macrolactone **43;** numbering scheme as shown in the Insert

atom n°	**^{1}H NMR** (600 MHz, $CDCl_3$)						**^{13}C NMR** (151 MHz, $CDCl_3$)	
	δ [ppm]	**m**	***J*** [Hz]	**COSY**	**NOESY**	**ROESY**	**δ** [ppm]	**HMBC**
1	-	-	-	-	-		170.8	3
2	4.09	d	7.0	3	2*	23	87.4	(3), 4a, 23
3	2.58	ddd q	9.7, 7.6, 7.0, 6.7	2, (4b), 23	3*	-	35.5	2, 4ab, 23
4a	2.33	ddd	12.8, 7.6, 6.0	4b, 5	4a*	-	39.4	(5), 6, 23
4b	1.93	dt	12.2, 9.9	4a, 5	4b*	23		
5	4.48	dd	9.8, 6.0	4ab	5*	-	77.8	2, 4b, 6
6	4.23–4.12	m	-	7	6*	-	80.0	4b, 5
7	4.91	ddd	7.2, 5.5, 1.7	6, 8	7*	-	75.7	6, 9
8	5.70	d	11.0, 7.4	7, 9	8*	-	134.3	6, (10)
9	6.34	td	11.3, 1.6	8, 10	9*, 10, 12	-	124.3	7
10	6.63	d	11.7	9	9, 10*	-	122.8	6, 8
11	-	-	-	-	-		134.1	6, 9, 10, 13

12	4.23–4.12	m	-	13	12*	-	81.6	(10), 27ab
13	3.96–3.90	m	-	10, 12, 14b	13*	-	84.6	12
14a	1.82	td	12.8, 3.3	13, 14b, 15	14a*	-	38.1	-
14b	1.74-1.57	m	-	14a	14b*			
15	5.30	td	3.5, 1.0	16	15*	-	75.0	(14b), (2)
16	4.23–4.12	m	-	15	16*	-	84.3	12, (15), 17
17	4.23–4.12	m	-	7	17*	-	75.5	16, 18, 19, 29a
18	5.27	dd	15.5, 7.5	17, 19	18*, 19, 19*	-	124.2	20
19	5.60	dd	15.6, 7.3	18, 20	19*	-	141.7	20, 21ab, 31
20	2.38	dq	7.1, 7.1	19, 31, (21ab)	20*	-	33.3	18, 19, 21ab, 22, 31
21a 21b	1.74–1.58	m	-	22	21a*b*	-	40.6	19, 20, 22, 31
22	4.77	dd	5.6, 4.6	21ab	22*	-	103.4	20, 32ab, 33ab
23	1.16	d	6.7	3	23*	(2), (4b)	17.8	4b
24	-	-	-	-	-	-	108.4	7, 25, 26
25	1.57	s	-	26	25*	-	28.1	-
26	1.38	s	-	25	26*	-	26.2	-
27a	4.72	d	6.5	27b	27a*	-	95.4	12, 28
27b	4.69	d	6.6	-	27b*	-		
28	3.38	s	-	-	-	-	56.0	27ab
29a	4.72	d	6.6	29b, 29b*	29ba*	-	93.5	16, 17, 30
29b	4.55	d	6.6	29a	29ab*	-		
30	3.44	s	-	-	-	-	56.3	29ab
31	0.97	d	6.8	20	31*	-	21.3	20, 21ab
32a	3.96–3.91	m	-	-	-	-	64.9	33ab
32b	3.83–3.78	m						
33a	3.96–3.91	m	-	-	-	-	64.9	32ab
33b	3.83–3.78	m						

NOESY displays fast exchange with major conformer (*).

Figure S-1. MS (ESIpos) analysis of macrocycle **43** *m/z* = 695.3 [M+Na], *m/z* = 1367.6 [2M+Na].

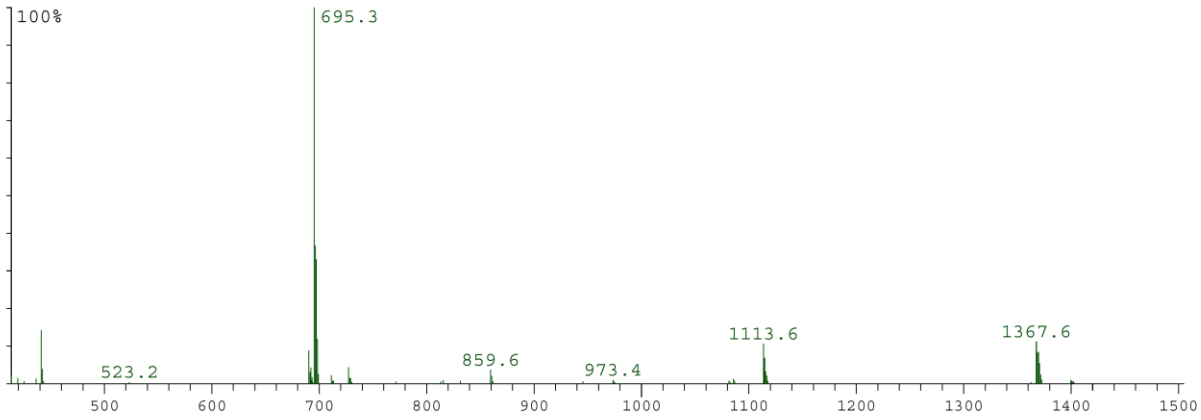


Figure S-2. MS-MS-Fragmentation of macrolactone **43** with *m/z* = 695.3 [M+Na] as the precursor with increasing normalized collision energy (NCE).

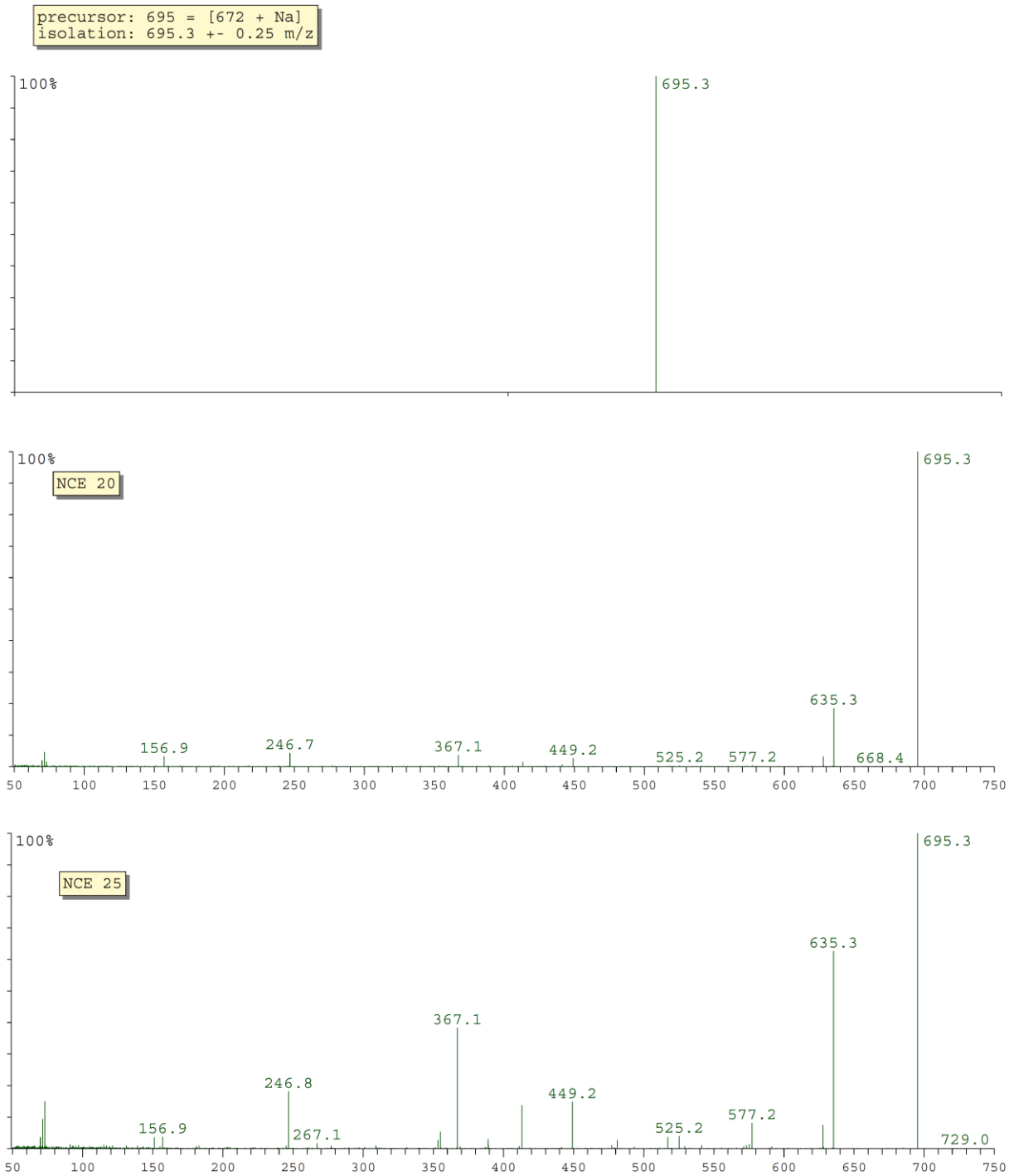
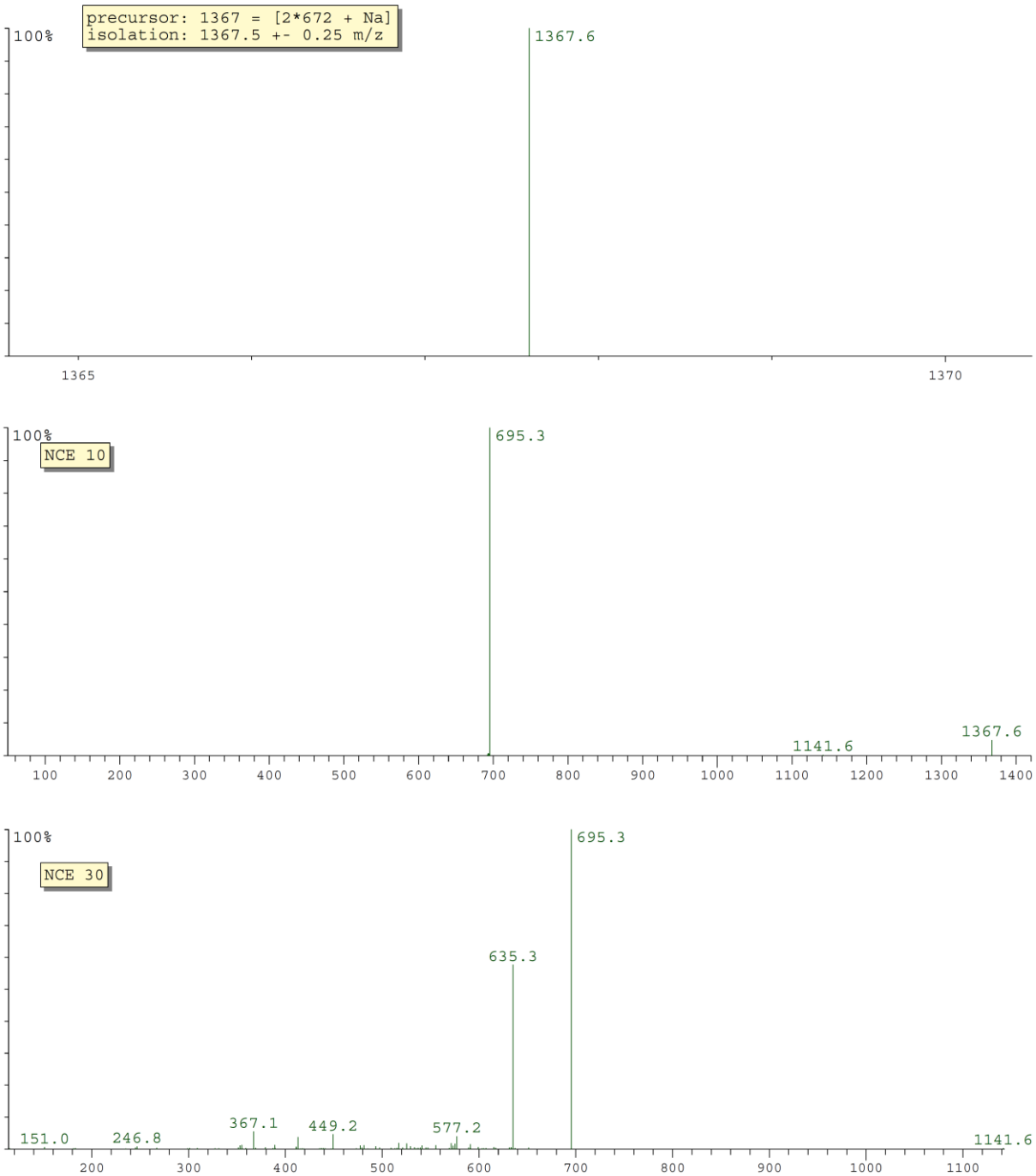


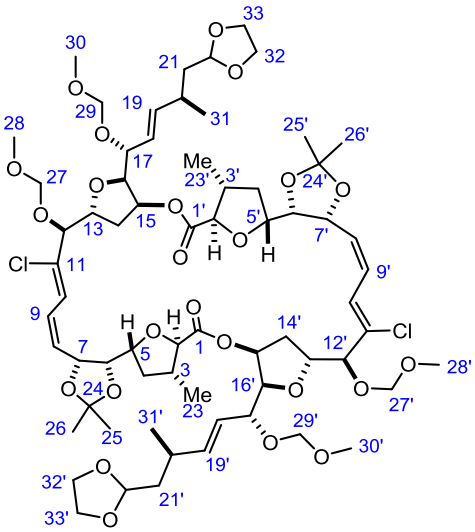
Figure S-3. MS-MS-Fragmentation of macrolactone **43** with *m/z* = 1367.6 [2M+Na] as the precursor with increasing normalized collision energy (NCE).



Analytical and spectral data of the epimeric macrolactone **S25** $[\alpha]_D^{20}$ = –7.6 (c = 0.17, $CHCl_3$). ^{1}H NMR (500 MHz, $CDCl_3$,): *see Table S-8;* ^{13}C NMR (126 MHz, $CDCl_3$,): *see Table S-8;* IR (film): $\tilde{\nu}$ = 2957, 2926, 2854, 1732, 1666, 1458, 1379, 1260, 1216, 1152, 1098, 1031, 867, 800 cm^{-1}. MS (ESIpos) *m/z* (%): 695.3 (100 (M+Na)). HRMS (ESIpos): *m/z* calcd. for $C_{33}H_{49}O_{12}ClNa$: 695.2805, found: 695.2809.

Table S-8. NMR data of epimerized macrolactone **S25**; numbering scheme as shown in the Insert

atom n°	^{1}H NMR (500 MHz, $CDCl_3$)					^{13}C NMR (126 MHz, $CDCl_3$)	
	δ [ppm]	m	*J* [Hz]	COSY	NOESY	δ [ppm]	HMBC
1	-	-	-	-	-	170.7	-
2	4.40	d	9.0	3	3, 5, 7	80.3	23
3	2.59–2.46	m	-	2, 6	2/6, 4a, 5, 23	39.6	23
4a	1.89	ddd	12.2, 5.6, 4.8	4b, (5)	3, 4b, 5, (7)	36.1	23
4b	1.02–0.98	m	-	3, 4a, 5	2/6, 4a		
5	4.06	ddd	13.2, 8.2, 4.7	2/6, 4b	2/6, 4a, 25, (3)	82.6	(7)
6	4.41	dd	8.0, 5.8	5, 7	3, 5, 7, 10	82.4	-
7	5.18	td	5.9, 2.4	2/6, 8	2/6, 8, 10, 24	75.8	(9)
8	5.86	ddd	10.9, 5.9, 1.0	7, 9	7, 9	129.9	-
9	6.44	td	10.9, 2.4	8, 10	8	125.4	-
10	6.78	dd	10.9, 1.0	9	6, 7, 13, (28/30)	124.5	-
11	-	-	-	-	-	134.1	12
12	4.19	d	9.5	13	14a, (28/30)	81.4	27ab
13	4.04	ddd	12.0, 9.6, 2.5	12, 14a	2/6, 10	83.8	(12)
14a	1.79	ddd	12.4, 11.6, 3.6	13, (15)	12, 14b, 15, 16	40.0	-
14b	1.70–1.64	m	-	14a	14a, 15		
15	5.78	t	3.7	16	14a, (14b), 16	74.5	-
16	4.26–4.21	m	-	15	14a, 15, 18, 19, 29ab, 28/30	84.3	(17)
17	4.26–4.21	m	-	18	15, 29ab	75.1	29ab
18	5.28	dd	15.5, 6.5	17, 19	16, 20	124.0	(20)
19	5.69	dd	15.5, 7.9	18, (20)	16, (31)	142.0	31
20	2.40	sept	7.0	19, 31	18, 31	33.2	31
21a	1.67	ddd	13.6, 7.8, 4.6	21b, 22	21b, 31	40.8	22
21b	1.60–1.56	m	-	21a, 22	21a, 31		
22	4.83	dd	5.7, 4.6	(21ab)	21b, (31), 32a, 33a	103.6	(21ab)
23	0.93	d	7.0	3	3, (14b)	14.5	-
24	-	-	-	-	-	108.9	25, 26
25	1.58	s	-	-	5, 26	28.8	-
26	1.47	s	-	-	7, 25	26.3	-
27a	4.75	d	6.7	27b	12, 28	95.5	28
27b	4.73	d	6.7	27a	12, 28		
28	3.39	s	-	-	27ab	56.0	27ab
29a	4.70	d	6.5	29b	30	94.4	17, 30
29b	4.68	d	6.5	29a	30		
30	3.39	s	-	-	29ab	55.4	29ab
31	1.00	d	6.8	20	(18), (19), 20, 21ab	20.5	-
32a	3.96–3.89	m	-	-	-	64.8	33ab
32b	3.85–3.78	m					
33a	3.96–3.91	m	-	-	-	64.8	32ab
33b	3.83–3.78	m					



Analytical and spectral data of the head-to-tail dilactone **S26.** $[\alpha]_D^{20}$ = –47.7 (c = 0.39, $CHCl_3$). ^{1}H NMR (600 MHz, $CDCl_3$, major conformer): *see Table S-9*. ^{13}C NMR (151 MHz, $CDCl_3$, major conformer, broad signals indicate time-averaged chemical shift): *see Table S-9;* IR (film): $\tilde{\nu}$ = 2956, 2927, 2855, 1740, 1462, 1379, 1259, 1214, 1150, 1099, 1029, 835 cm^{-1}. MS (ESIpos) *m/z* (%): 1367.6 (100 (M+Na)) *see Figure S-4 – S-6;* HRMS (ESIpos): *m/z* calcd. for $C_{66}H_{98}O_{24}Cl_2Na$: 1367.5717, found: 1367.5728.

Table S-9. NMR data of cyclic dimer **S26**; numbering scheme as shown in the Insert

atom n°	^{1}H NMR (600 MHz, $CDCl_3$)					^{13}C NMR (151 MHz, $CDCl_3$)	
	δ [ppm]	m	*J* [Hz]	COSY	NOESY	δ [ppm]	HMBC
1/1’	-	-	-	-	-	171.6	-
2/2’	4.07	d	6.2	3	(23)	83.0	23
3/3’	2.25–2.19	m	-	2, (4ab), 23	(4b)	39.6	23
4a/4a’	1.96	ddd	13.4, 7.6, 5.8	3, 4b, 5	-	37.0	2, 23
4b/4b’	1.19–1.16	m	-	(3), 4a, 5	(3)		
5/5’	4.19–4.10	m	-	4ab	-	79.3	2, (4b), (7)
6/6’	4.19–4.10	m	-	7	(25)	81.3	(4b)
7/7’	4.89	ddd	8.6, 6.0, 0.9	6	10, (25)	74.1	9
8/8’	5.66	ddd	11.4, 8.6, 0.9	7, 9	9	129.7	(6)
9/9’	6.50	td	11.3, 0.9	8, 10	8, (10)	125.8	(7)
10/10’	6.98	d	10.9	9	7	122.5	-
11/11’	-	-	-	-	-	134.1	9
12/12’	4.19–4.10	m	-	-	(26)	81.6	27ab
13/13’	4.19–4.10	m	-	14ab	-	80.8	(12)
14a/14a’	2.13	ddd	14.2, 9.7, 4.1	13, 14b, 15	14b	36.8	-
14b/14b’	1.91	dd	14.2, 5.6	13, 14a	14a		
15/15’	5.33	dd	4.2, 3.1	14a, 16	(16)	75.0	14b, 16
16/16’	3.98	dd	8.5, 2.9	15, 17	(15), (18)	83.6	17
17/17‘	4.18	ddd	8.6, 7.5, 0.9	16, 18	16, (29ab)	75.7	16, 18, 19, 29ab
18/18‘	5.26	ddd	15.5, 7.5, 0.9	17, 19	(31)	124.1	17, 20
19/19’	5.64	ddd	15.5, 8.2, 0.6	18, 20	(31)	141.4	17, 20, 21ab, 31
20/20‘	2.38	sept	7.0	19, 21ab, 31	22, 31	33.2	18, 19, 21ab, 22, 31

21a/21a‘ 21b/21b’	1.65 1.59	ddd ddd	13.8, 8.1, 4.6 13.8, 6.2, 5.7	20, 21b, 22 20, 21a, 22	(31) (31)	40.7	19, (20), 22, 31
22/22‘	4.78	dd	5.6, 4.6	21ab	20, 31, 32a, 33a	103.5	21ab, 32ab, 33ab
23/23’	1.18	d	6.8	3	2	19.7	(2)
24/24’	-	-	-	-	-	110.0	25, 26
25/25’	1.54	s	-	-	(26)	27.8	-
26/26‘	1.39	s	-	-	(25)	25.4	-
27a/27a’ 27b/27b’	4.67 4.66	d d	6.7 6.7	- -	(12) (12)	94.5	12, 28
28/28’	3.43	s	-	-	27ab	55.8	27ab
29a/29a’ 29b/29b‘	4.65 4.64	d d	6.5 6.5	29b 29a	30 30	94.4	17, 30
30/30‘	3.36	s	-	-	29ab	55.5	29ab
31/31‘	0.99	d	6.8	20	(18), (19), 20, 22	21.0	19, (20), 21ab
32a/32a‘ 32b/32b‘	3.96–3.90 3.84–3.79	m m	-	32b, 33b 32a, 33a	-	64.8	33ab
33a/33a‘ 33b/33b‘	3.96–3.90 3.84–3.79	m m	-	32b, 33b 32a, 33a	-	64.8	32ab

Figure S-4: MS (ESIpos) analysis of lactide **S26**. *m/z* = 1367.6 [M+Na], *m/z* = 695.3 [M+2Na].

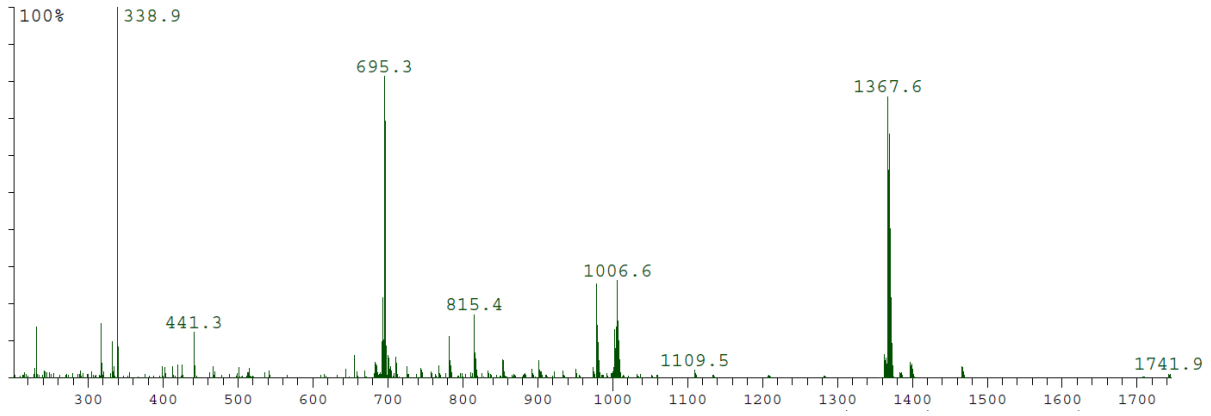


Figure S-5. MS-MS-Fragmentation of lactide **S26** with *m/z* = 1367.6 [M+Na] with increasing normalized collision energy (NCE).

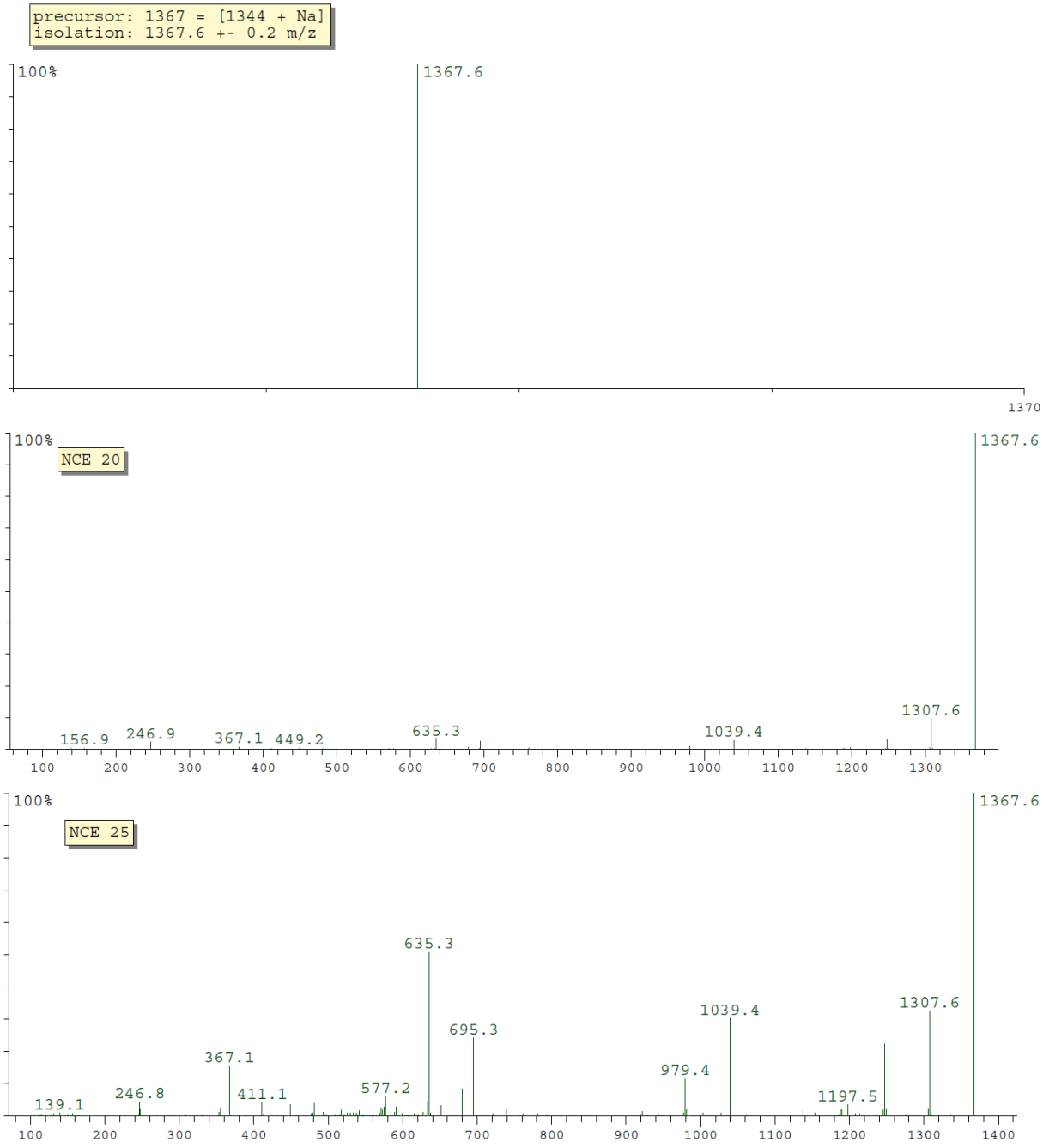
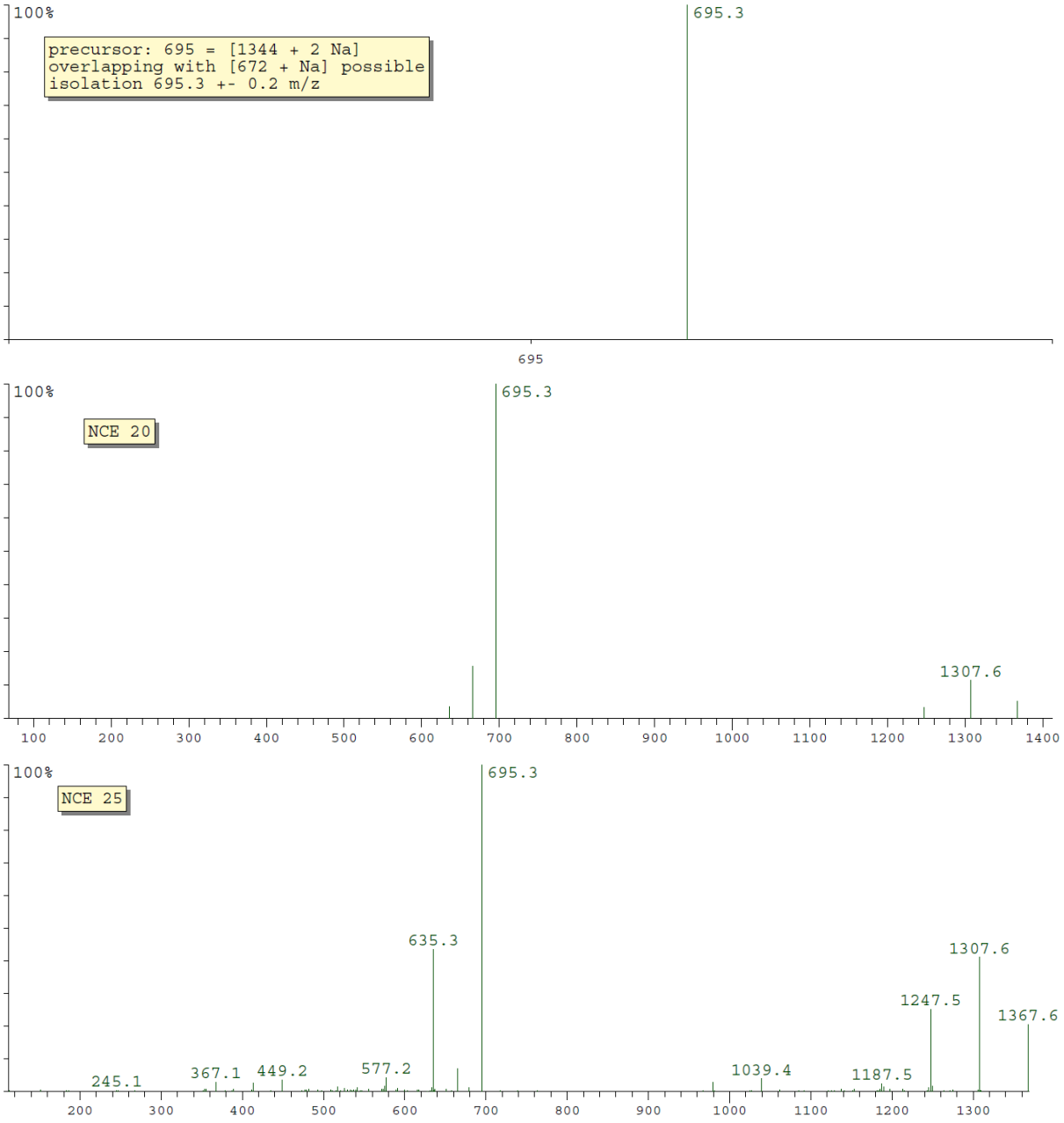
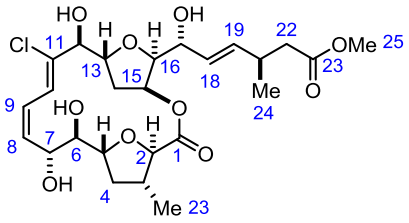


Figure S-6. MS-MS-Fragmentation of lactide **S26** with *m/z* = 695.3 [M+2Na] with increasing normalized collision energy (NCE).



Putative Chagosensine Methylester (44). Me_2BBr (0.5 M in CH_2Cl_2, 0.30 mL, 0.15 mmol) was added dropwise to a solution of macrolactone **43** (2.5 mg, 3.7 µmol) in CH_2Cl_2 (0.4 mL) at –78 °C. After stirring for 30 minutes at –78 °C the yellow mixture was poured into a solution of pH 7 phosphate buffer (0.15 ml), rinsing the flask with CH_2Cl_2 (1.5 mL). The emulsion was concentrated under reduced pressure to yield the crude aldehyde, which was used in the next step without further purification.



The residue was dissolved in THF (0.20 mL) and *t*-BuOH (0.20 mL) before 2-methyl-2-butene (0.04 mL, 0.4 mmol) was introduced. A solution of sodium chlorite (2.7 mg, 30 µmol) and sodium dihydrogenephosphate (4.3 mg, 36 µmol) in water (0.05 mL) was added at 0 °C with a glass pipette. After stirring for 30 minutes at 0 °C the reaction was quenched with sodium thiosulfate pentahydrate (11.5 mg, 46 mmol). After removing the ice bath, the mixture was stirred for 5 minutes before adding sodium sulfate (390 mg) in small poritons. The mixture was diluted with CH_2Cl_2 (2 mL), filtered through a short pad of sodium sulfate, rinsing with CH_2Cl_2 (15 mL in total). The combined filtrates were evaporated under reduced pressure at ambient temperature and the resulting crude acid was used in the next step without further purification.

A freshly prepared solution of diazomethane in diethyl ether (ca. 0.1 mL) was added dropwise to a solution of the crude carboxylic acid in CH_2Cl_2 (0.2 mL) at ambient temperature until a yellow colour presisted. After stirring for 5 minutes the yellow solution was quenched with formic acid (10 µL, 0.27 mmol), causing the yellow colour to disappear. After concentrating under reduced pressure at ambient temperatue the residue was purified by preparative HPLC (YMC-ODS-A C18, 5 µm, 150 × 30 mm, MeCN/H_2O = 30:70, v = 20 mL/min, λ = 250 nm, 35 °C, 95 bar, t(methyl ester) = 4.53 min) to yield the title compound as a colourless amorphous solid (0.4 mg, 20% over 3 steps) [Conditions for LC-MS: YMC-ODS-A C18, 5 µm, 150 × 4.6 mm, MeOH/H_2O = 40:60, v = 1.0 mL/min, λ = 250 nm, 35 °C, 153 bar, t(aldehyde) = 10.6 min, t(carboxylic acid) = 8.6 min, t(methyl ester) = 25.2 min]. $[\alpha]_D^{20}$ = +32.5 (c = 0.04, $CHCl_3$). ^{1}H NMR (600 MHz, CD_3OD/[D_5]-pyridine 1:1 (v/v), referenced on CD_2HOD): *see Table S-10;* ^{13}C NMR (151 MHz, CD_3OD/[D_5]-pyridine 1:1 (v/v), referenced on CD_2HOD): *see Table S-10*. IR (film): $\tilde{\nu}$ = 3386, 2958, 2922, 2852, 1736, 1455, 1259, 1095, 1063, 1039, 1010, 970, 876, 799, 758 cm^{-1}. MS (ESIpos) *m/z* (%): 553.2 (100 (M+Na)). HRMS (ESIpos): *m/z* calcd. for $C_{25}H_{35}O_{10}ClNa$: 553.1811, found: 553.1809.

Table S-10. NMR data of putative chagosensine methyl ester **44**; numbering scheme as shown in the Insert

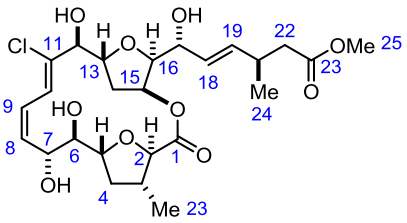
atom n°	^{1}H NMR (600 MHz, $CD_3OD/[D_5]$-pyridine 1:1 (v/v), referenced on CD_2HOD)					^{13}C NMR (151 MHz, $CD_3OD/[D_5]$-pyridine 1:1)	
	δ [ppm]	m	*J* [Hz]	COSY	NOESY	δ [ppm]	HMBC
1	-	-	-	-	-	171.3	-
2	4.09	d	4.2	(3)	(3), 23	87.1	23
3	2.58–2.50	m	-	2, (4ab)	(2), 4a, 23	36.4	(4ab), 23
4a	2.22	ddd	12.3, 7.5, 7.5	(3), 4b, (5)	3, 4b, 5	38.9	23
4b	1.35	ddd	12.3, 8.4, 6.0	4a, 5	4b, 6, 23		
5	3.77	ddd	8.4, 7.5, 6.5	4ab, 6,	4a, (6), 7, (10), (13)	81.7	(4b), (7)
6	4.02	d	6.5	5	4b, 5, 7	81.8	-
7	4.66	d	8.8	8	(4b), 5, 6, (8), 10	71.5	(6), 9
8	6.07	ddd	11.3, 8.8, 0.9	7, 9	(7), 9	137.2	(6), (7), 9, 10
9	6.35	ddd	11.2, 11.2, 1.1	8, 10	8	123.6	7
10	6.93	dd	10.9, 0.9	9	(5), 7, 13	123.2	(8), (12)
11	-	-	-	-	-	137.1	9, 10, 12
12	4.32	d	9.0	13	14a	79.5	(10), (13)
13	4.28	ddd	11.5, 9.1, 3.1	12, 14a, (14b)	(4a), (5), 10, 14b	85.5	12, (14a), (15)
14a	1.73	ddd	12.6, 11.4, 3.1	13, 14b, (15)	(12), (15), (16)	39.0	-
14b	1.67	ddd	12.8, 3.0, 0.6	(13), 14a	(5), (13), (15)		
15	5.40	m	-	(14a), 16	(14ab), 16	76.4	(14b)
16	4.20	dd	8.7, 3.7	(15), 17	15, (18)	86.9	(14b), 17
17	4.54	dd	8.7, 6.8	16, 18	(18), 19, (20)	72.1	(16), (18), 19
18	5.55	ddd	15.5, 6.8, 1.1	17, 19	(16), 17, 20, (24)	128.9	(17)
19	5.81	dd	15.5, 7.3, 1.1	18, (20)	17, (24)	138.0	17, (20), 21ab, 24
20	2.58–2.50	m	-	(19), 21ab, 24	(18), (19), 24	34.0	(18), 19, 21ab, 24
21a	2.18	dd	15.1, 7.5	20	(19), 20, 24	41.8	24
21b	2.15	dd	15.1, 6.9				
22	-	-	-	-	-	173.2	21ab, 25
23	0.83	d	7.0	3	2, 3	19.5	(2), (3), (4)
24	0.85	d	6.8	20	20, (18), (19)	20.4	21ab
25	3.46	s	-	-	-	51.8	-

Table S-11. Comparison of the ^{1}H NMR data of synthetic **44** with those of chagosensine methyl ester reported in the literature[15]

atom number	**chagosensine methyl ester**	**Synthetic 44 (CD_2HOD as reference)**
2	4.38 (d, $J_{(2-3)}$ = 8.8 Hz, 1H)	4.09 (d, $J_{(2-3)}$ = 4.2 Hz, 1H)
3	2.38 (m, 1 H)	2.58-2.50 (m, 2H)
4a	2.14 (dt, $J_{(4a-4b)}$ = 11.8, $J_{(4a-3)}$ = $J_{(4a-5)}$ = 6.5 Hz, 1H)	2.22 (ddd, $J_{(4a-4b)}$ = 12.3, $J_{(4a-3)}$ = $J_{(4a-5)}$ = 7.5 Hz, 1H)
4b	1.96 (m, 1 H)	1.35 (ddd, $J_{(4b-4a)}$ = 12.3, $J_{(4b-5)}$ = 8.4, $J_{(4b-3)}$ = 6.0 Hz, 1H)
5	4.19 (ddd, $J_{(5-4a)}$ = 6.5, $J_{(5-6)}$ = 4.5, $J_{(5-4b)}$ = 2.0 Hz, 1H)	3.77 (dt, $J_{(5-4b)}$ = 8.4, $J_{(5-4a)}$ = 7.5, $J_{(5-6)}$ = 6.5 Hz, 1H)
6	4.03 (dd, $J_{(6-7)}$ = 10.0, $J_{(6-5)}$ = 4.5 Hz, 1H)	4.02 (d, $J_{(6-5)}$ = 6.5 Hz, 1H)
7	4.31 (dd, $J_{(7-6)}$ = 10,0, $J_{(7-8)}$ = 8,1 Hz, 1H)	4.66 (d, $J_{(7-8)}$ = 8.8 Hz, 1H)
8	5.93 (dd, $J_{(8-9)}$ = 10.9, $J_{(8-7)}$ = 8.1 Hz, 1H)	6.07 (ddd, $J_{(8-9)}$ = 11.3, $J_{(8-7)}$ = 8.8, $J_{(8-10)}$ = 0.9 Hz, 1H)
9	6.17 (dd, $J_{(9-8)}$ = 10.9, $J_{(9-10)}$ = 7.7 Hz, 1H)	6.35 (ddd, $J_{(9-8)}$ = $J_{(9-10)}$ = 11.2, J = 1.1 Hz, 1H)
10	6.42 (d, $J_{(10-9)}$ = 7.7 Hz, 1H)	6.93 (dd, $J_{(10-9)}$ = 10.9 Hz, $J_{(10-8)}$ = 0.9 Hz, 1H)
12	4.42 (d, $J_{(12-13)}$ = 3.5 Hz, 1H)	4.32 (d, $J_{(12-13)}$ = 9.0 Hz, 1H)
13	4.15 (ddd, $J_{(13-14b)}$ = 7.8, $J_{(13-12)}$ = 3.5, $J_{(13-14a)}$ = 2.7 Hz, 1H)	4.28 (ddd, $J_{(13-14a)}$ = 11.5 , $J_{(13-12)}$ = 9.1, $J_{(13-14b)}$ = 3.1 Hz, 1H)
14a	2.14 (dt, $J_{(14a-14b)}$ = 12.3, $J_{(14a-13)}$ = $J_{(14a-15)}$ = 2.7 Hz, 1H)	1.73 (ddd, $J_{(14a-14b)}$ = 12.6, $J_{(14a-13)}$ = 11.4, $J_{(14a-15)}$ = 3.1 Hz, 1H)
14b	1.58 (m, 1 H)	1.67 (ddd, $J_{(14b-14a)}$ = 12.8, $J_{(14b-13)}$ = 3.0, $J_{(14b-15)}$ = 0.6 Hz, 1H)
15	5.08 (ddd, $J_{(15-14b)}$ = 8.1, $J_{(15-16)}$ = 5.9, $J_{(15-14a)}$ = 2.9 Hz, 1H)	5.40* (m, 1H)
16	4.20 (dd, $J_{(16-17)}$ = 7.7, $J_{(16-15)}$ = 5.9 Hz, 1H)	4.20 (dd, $J_{(16-17)}$ = 8.7, $J_{(16-15)}$ = 3.7 Hz, 1H)
17	4.52 (dd, $J_{(17-16)}$ = 7.7, $J_{(17-18)}$ = 6.1 Hz, 1H)	4.54 (dd, $J_{(17-16)}$ = 8.7, $J_{(17-18)}$ = 6.8 Hz, 1H)
18	5.52 (dd, $J_{(18-19)}$ = 15.0, $J_{(18-17)}$ = 6.1 Hz, 1H)	5.55 (ddd, $J_{(18-19)}$ = 15.5, $J_{(18-17)}$ = 6.8, $J_{(18-20)}$ = 1.1 Hz, 1H)
19	5.71 (dd, $J_{(19-18)}$) = 15.0, $J_{(19-20)}$ = 7.8 Hz, 1H)	5.81 (ddd, $J_{(19-18)}$) = 15.5, $J_{(19-20)}$ = 7.3, $J_{(19-17)}$ = 1.1 Hz, 1H)
20	2.75 (m, 1H)	2.58-2.50 (m, 2H)
21a	2.33 (dd, $J_{(21a-21b)}$ = 16, $J_{(21a-20)}$ = 5 Hz, 1H)	2.18 (dd, $J_{(21a-21b)}$ = 15.1, $J_{(21a-20)}$ = 7.5 Hz, 1H)
21b	2.45 (dd, $J_{(21b-21a)}$ = 16, $J_{(21b-20)}$ = 10 Hz, 1H)	2.15 (dd, $J_{(21b-21a)}$ = 15.1, $J_{(21b-20)}$ = 6.9 Hz, 1H)
23	0.98 (d, $J_{(23-3)}$ = 6.6 Hz, 3H)	0.83 (d, $J_{(23-3)}$ = 7.0 Hz, 3H)
24	1.08 (d, $J_{(24-20)}$ = 6.5 Hz, 3H)	0.85 (d, $J_{(24-20)}$ = 6.8 Hz, 3H)
25	3.67 (s, 3H)	3.58 (s, 3H)

* from COSY, signal underneath water signal

Table S-12. Comparison of the ^{13}C NMR data of synthetic **44** with those of chagosensine methyl ester reported in the literature; [15] color code: $\Delta\delta \leq$ 0.5 ppm; **0.5 < Δδ < 1.0 ppm**; **Δδ ≥ 1.0 ppm**



position	chagosensine methyl ester	44	Δδ
1	170.5	171.3	**0.8**
2	80.8	87.1	**6.8**
3	36.6	36.4	**–0.2**
4	38.0	38.9	**0.9**
5	72.4	81.7	**9.3**
6	75.5	81.8	**6.3**
7	72.0	71.5	**–0.5**
8	133.6	137.2	**3.6**
9	128.2	123.6	**5.4**
10	126.9	123.2	**–3.7**
11	136.2	137.1	**0.9**
12	61.3	79.5	**18.2**
13	70.7	85.5	**14.8**
14	32.9	39.0	**6.1**
15	72.7	76.4	**3.7**
16	81.8	86.9	**5.1**
17	67.2	72.1	**4.9**
18	128.5	128.9	**0.4**
19	133.4	138.0	**4.6**
20	30.4	34.0	**3.6**
21	40.2	41.8	**1.6**
22	172.0	173.2	**1.2**
23	14.8	19.5	**4.7**
24	19.5	20.4	**0.9**
25	51.2	51.8	**0.6**

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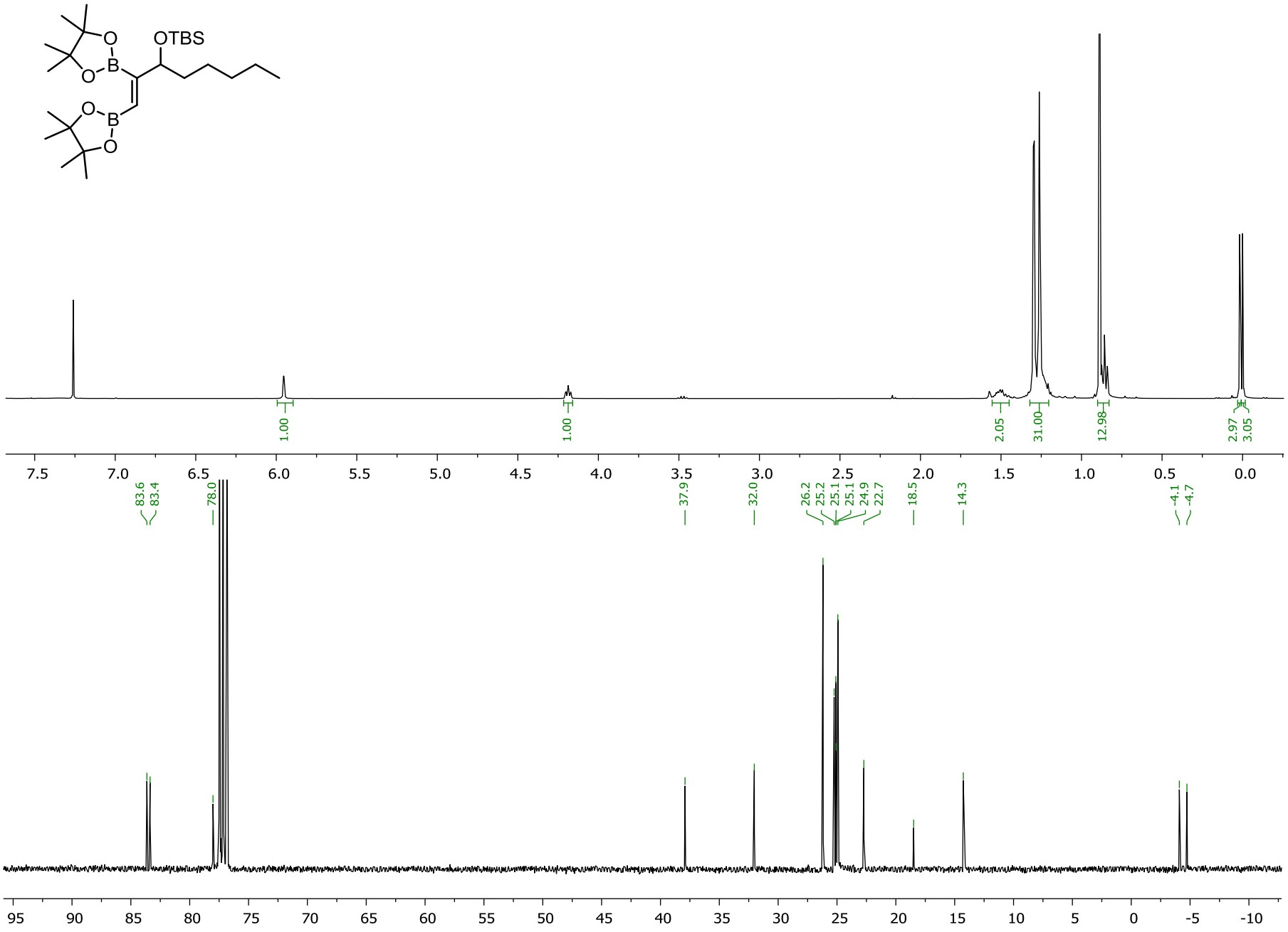
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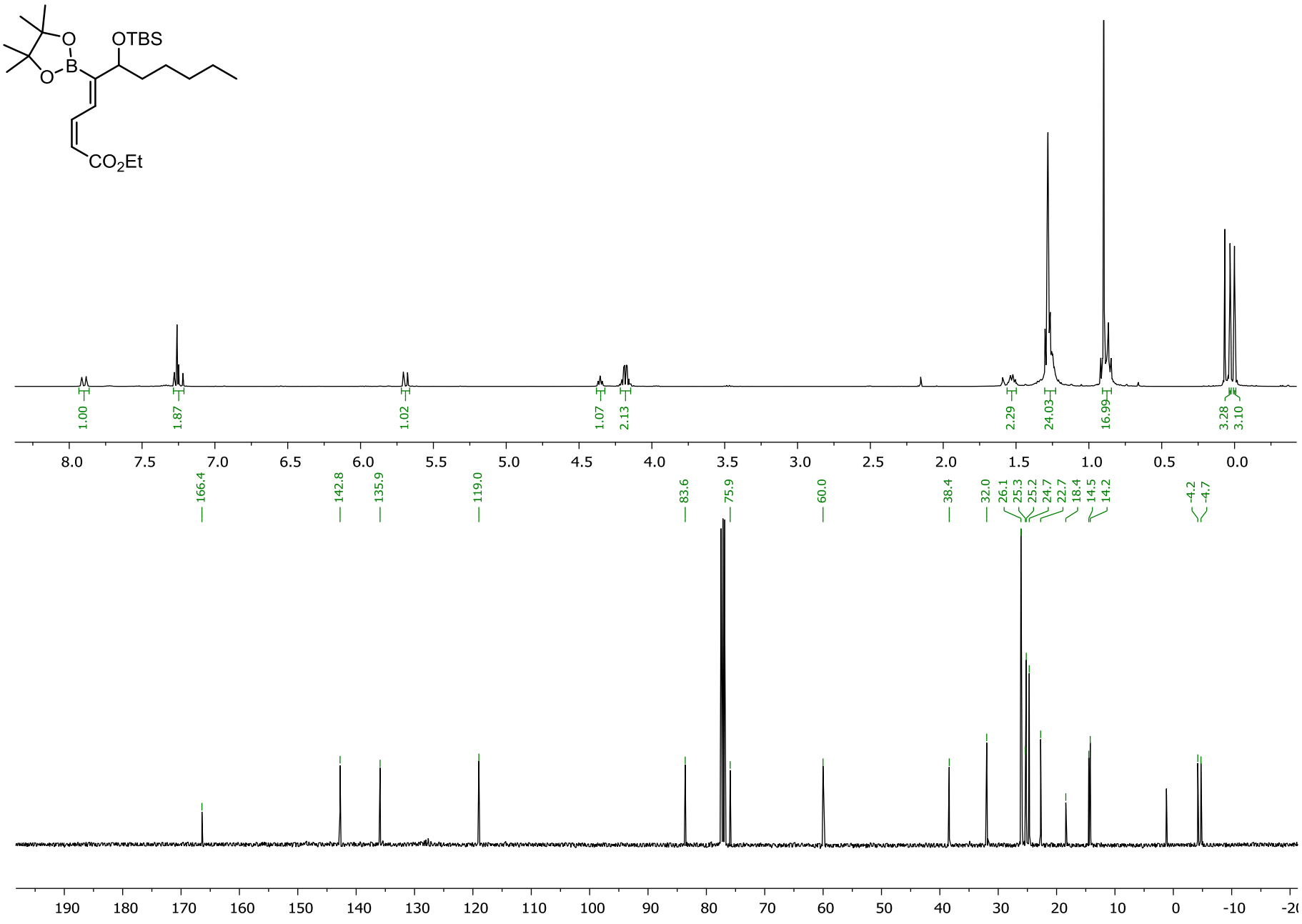
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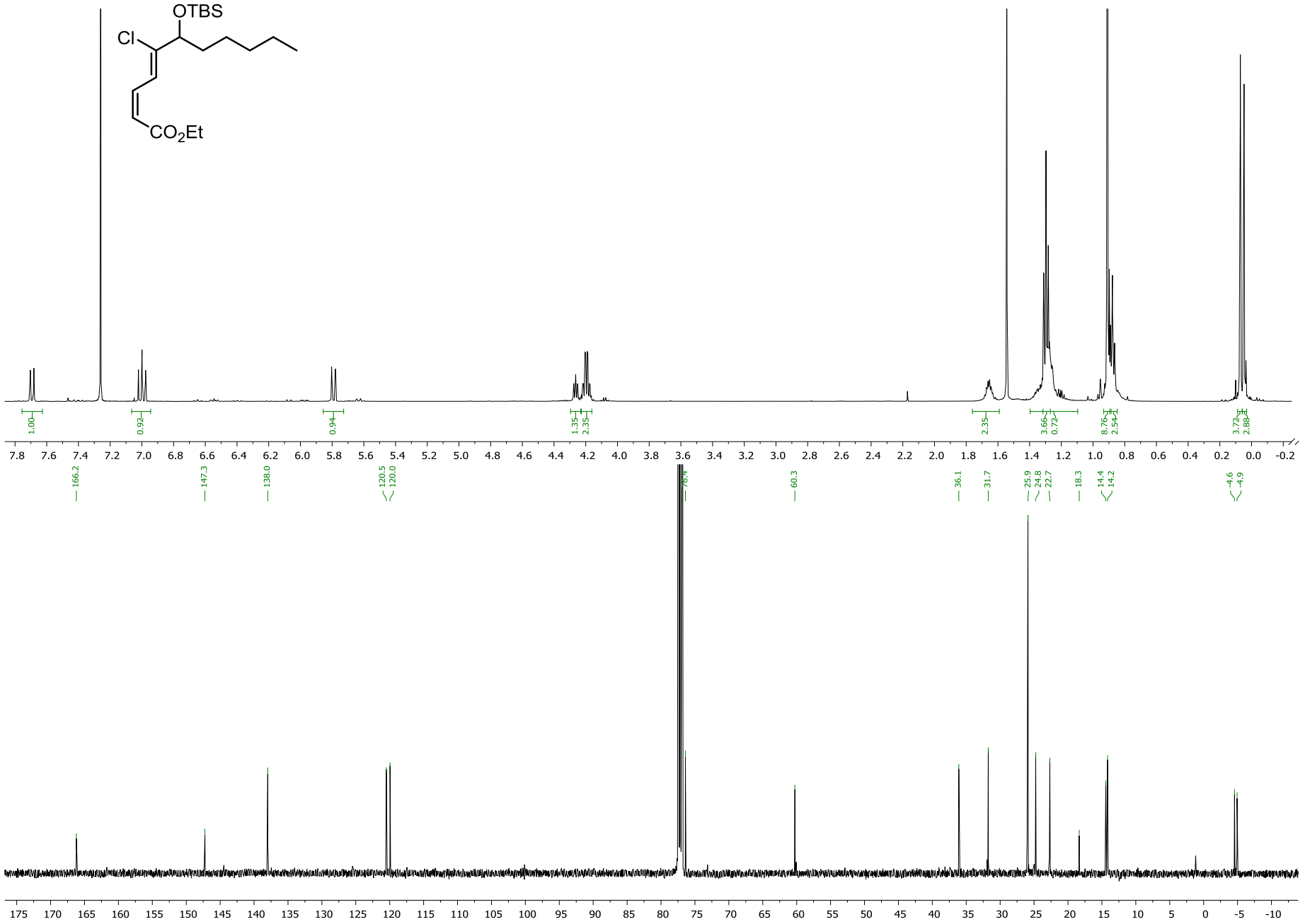
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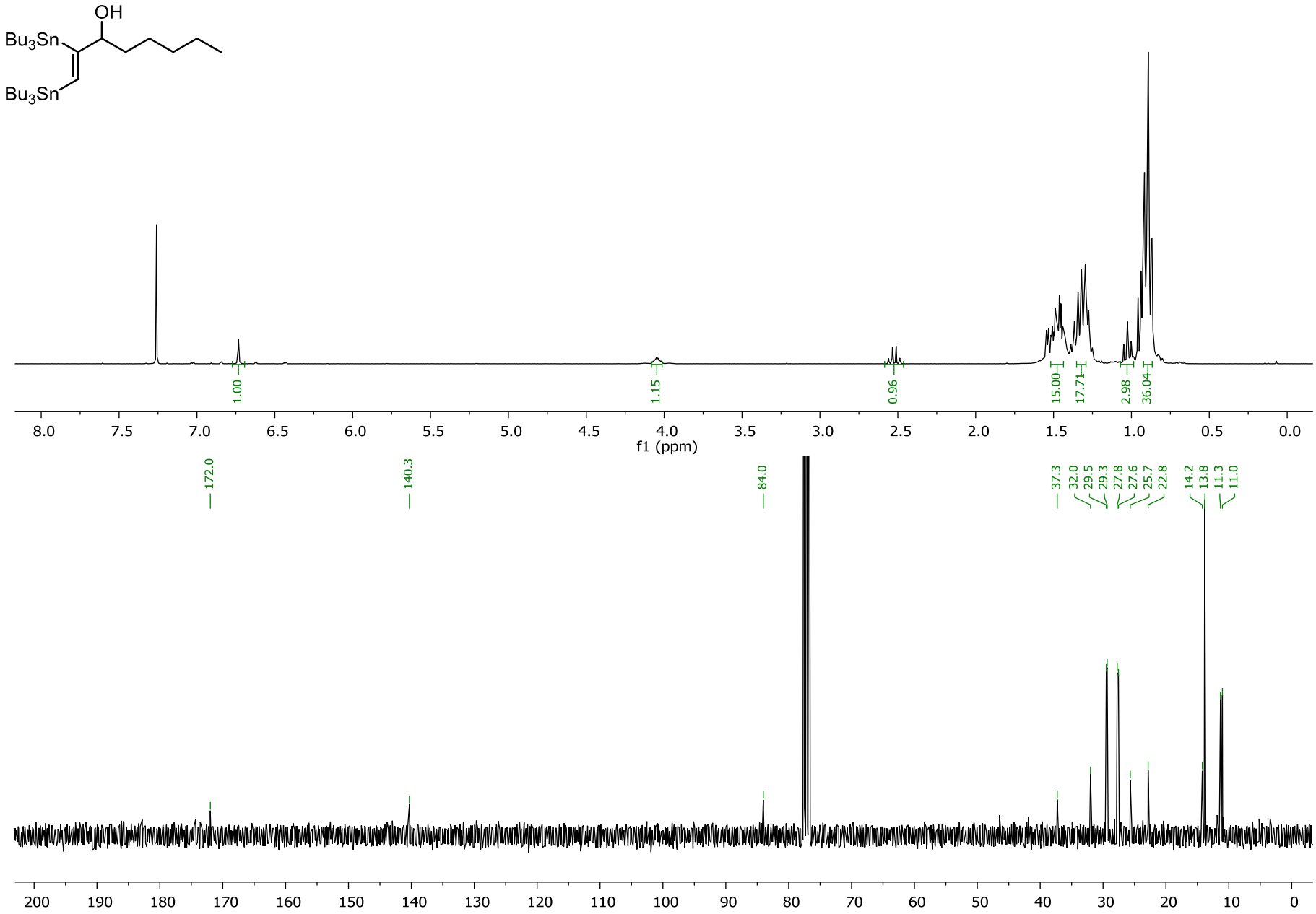
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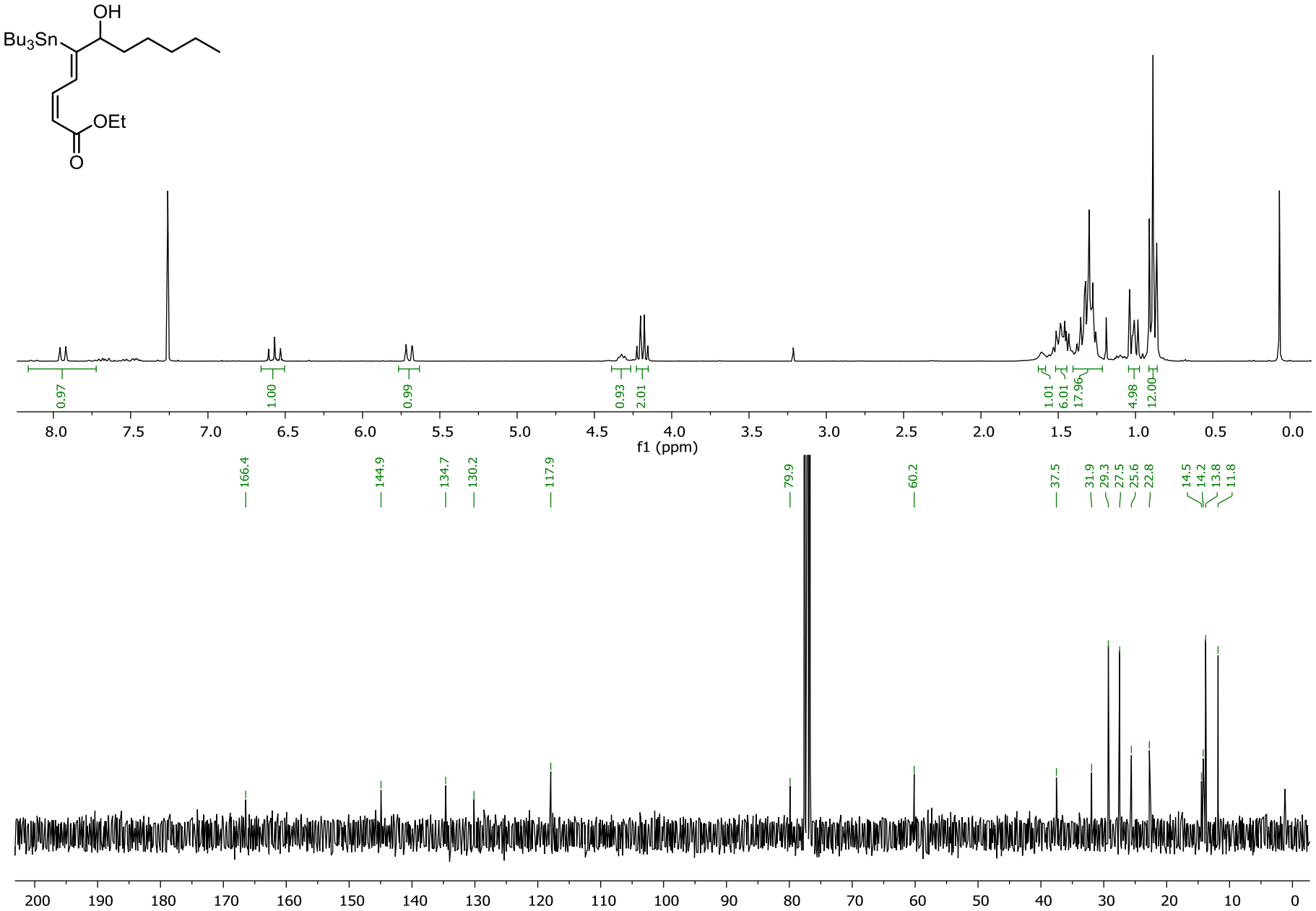
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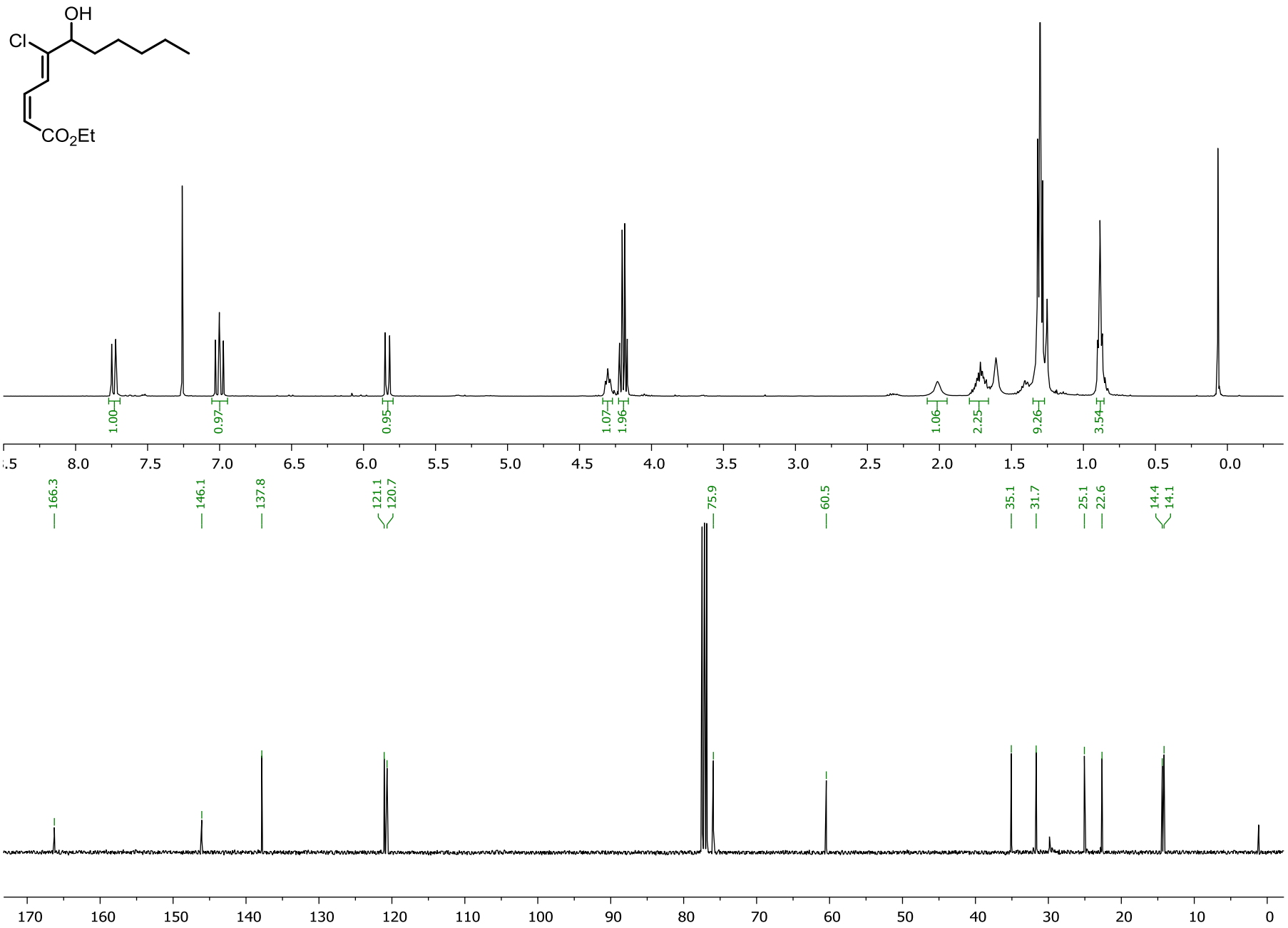
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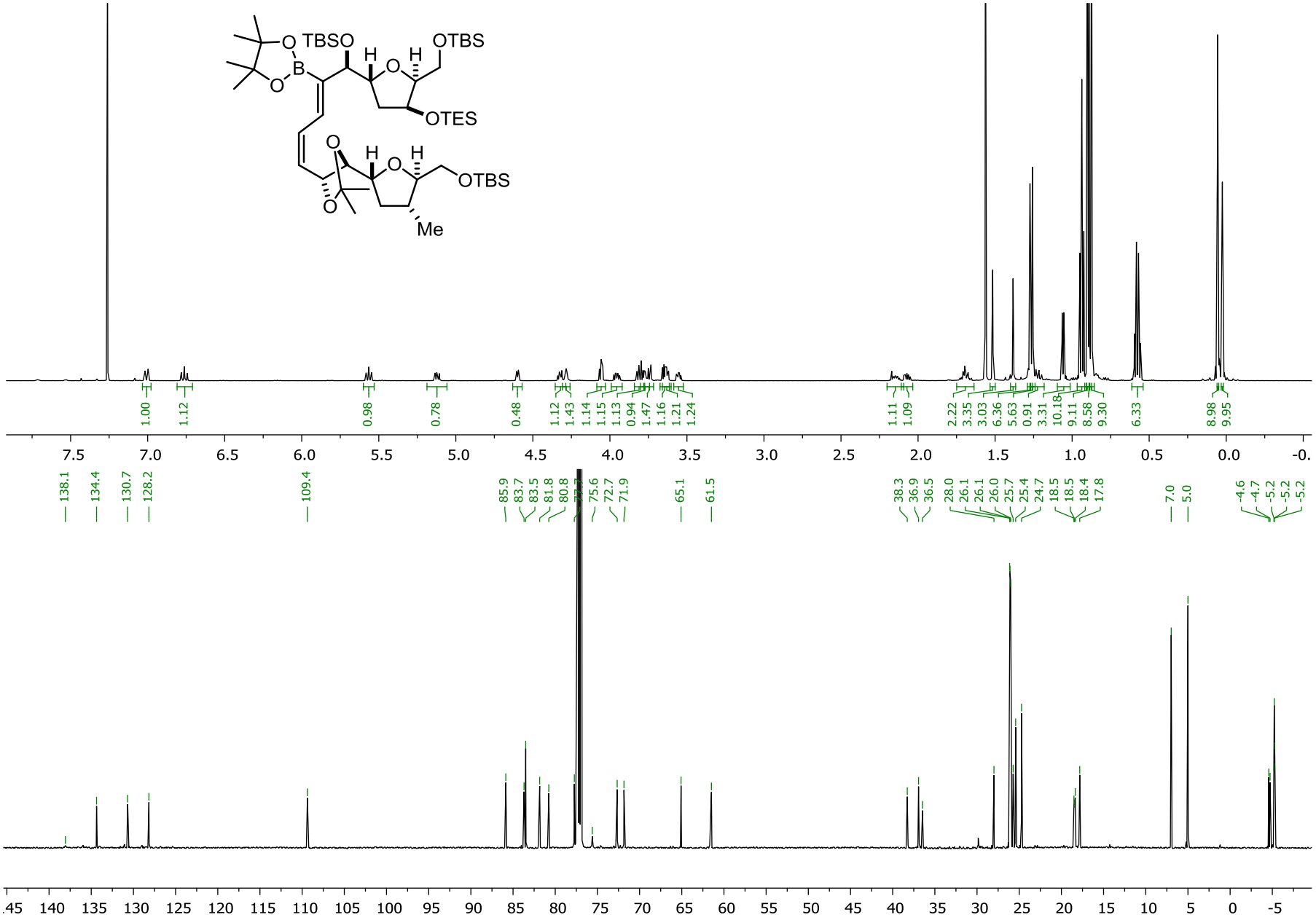
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OTES
OTBS
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1.24
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1.09
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9.95
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130.7
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80.8
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26.1
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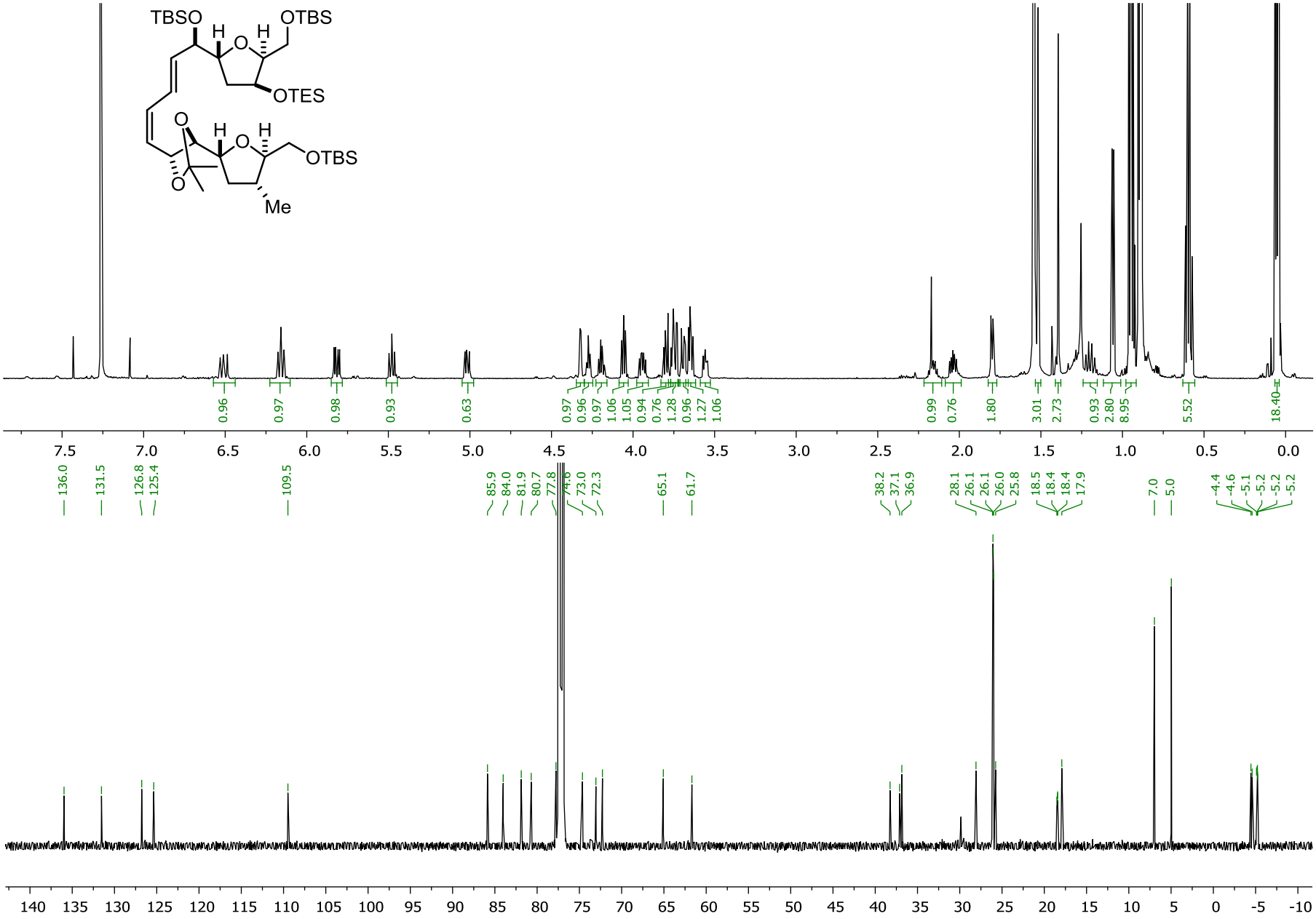
-5.2
-5.2


TBSO
H
O
H
OTBS
OTES
O
H
O
H
OTBS
O
Me
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0.97
0.98
0.93
0.63
0.97
0.96
0.97
1.06
1.05
0.94
0.76
1.28
0.96
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1.06
0.99
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3.0
2.5
2.0
1.5
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0.5
0.0
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18.4
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5.0
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-4.6
-5.1
-5.2
-5.2
-5.2
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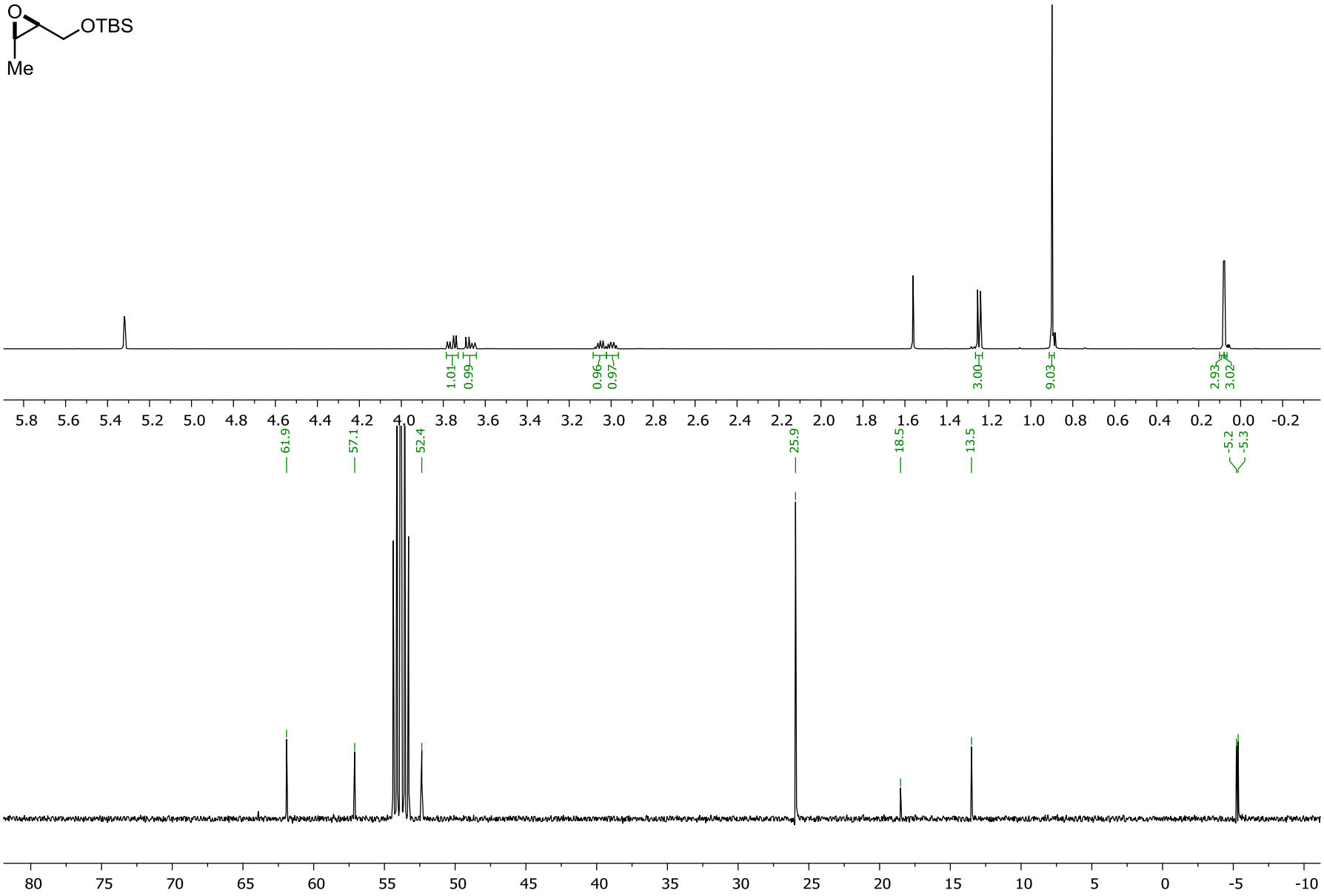
O
OTBS
Me
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2.93
3.02
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25.9
18.5
13.5
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-5.3
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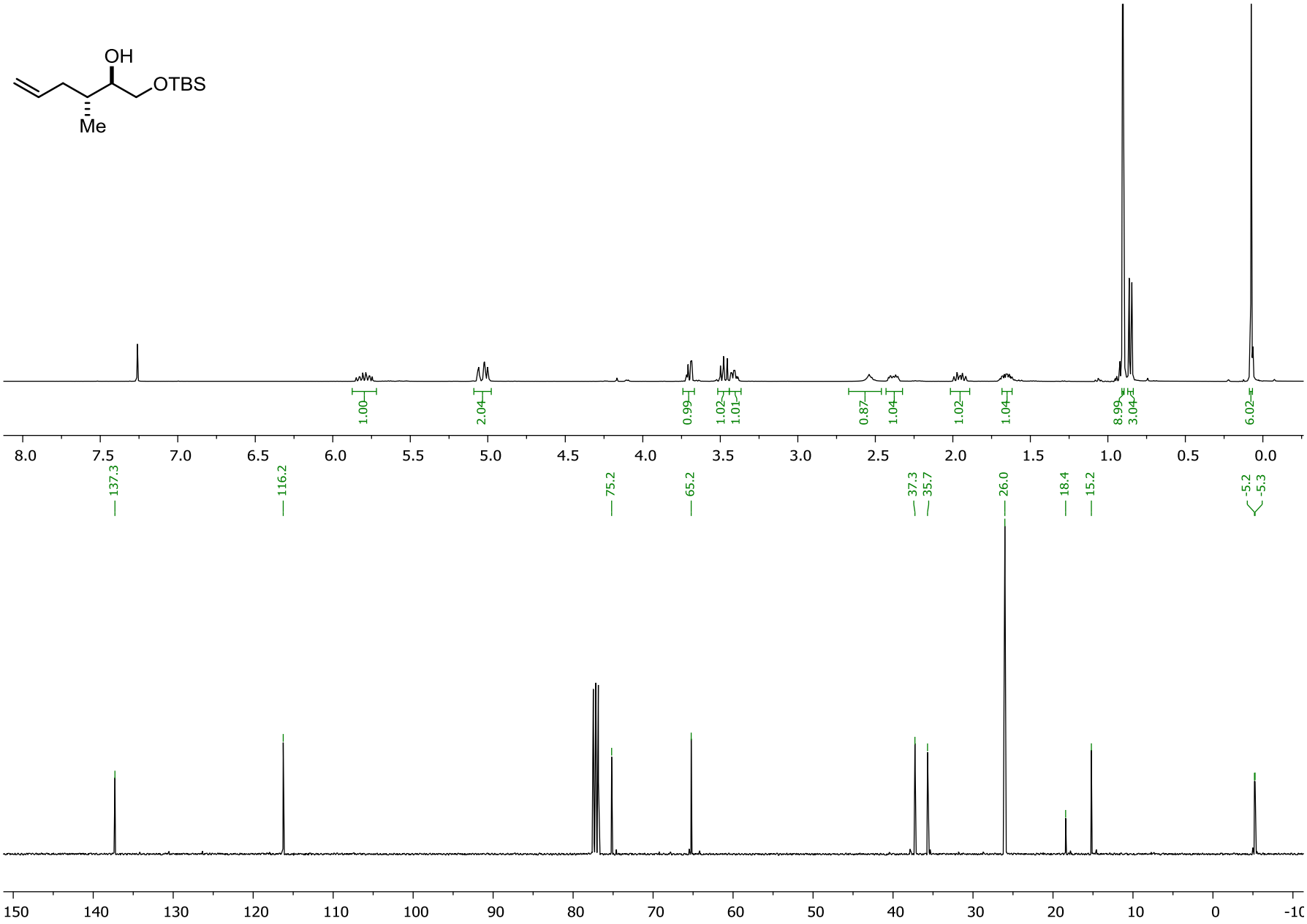
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1.02
1.04
8.99
3.04
6.02
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7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
137.3
116.2
75.2
65.2
37.3
35.7
26.0
18.4
15.2
-5.2
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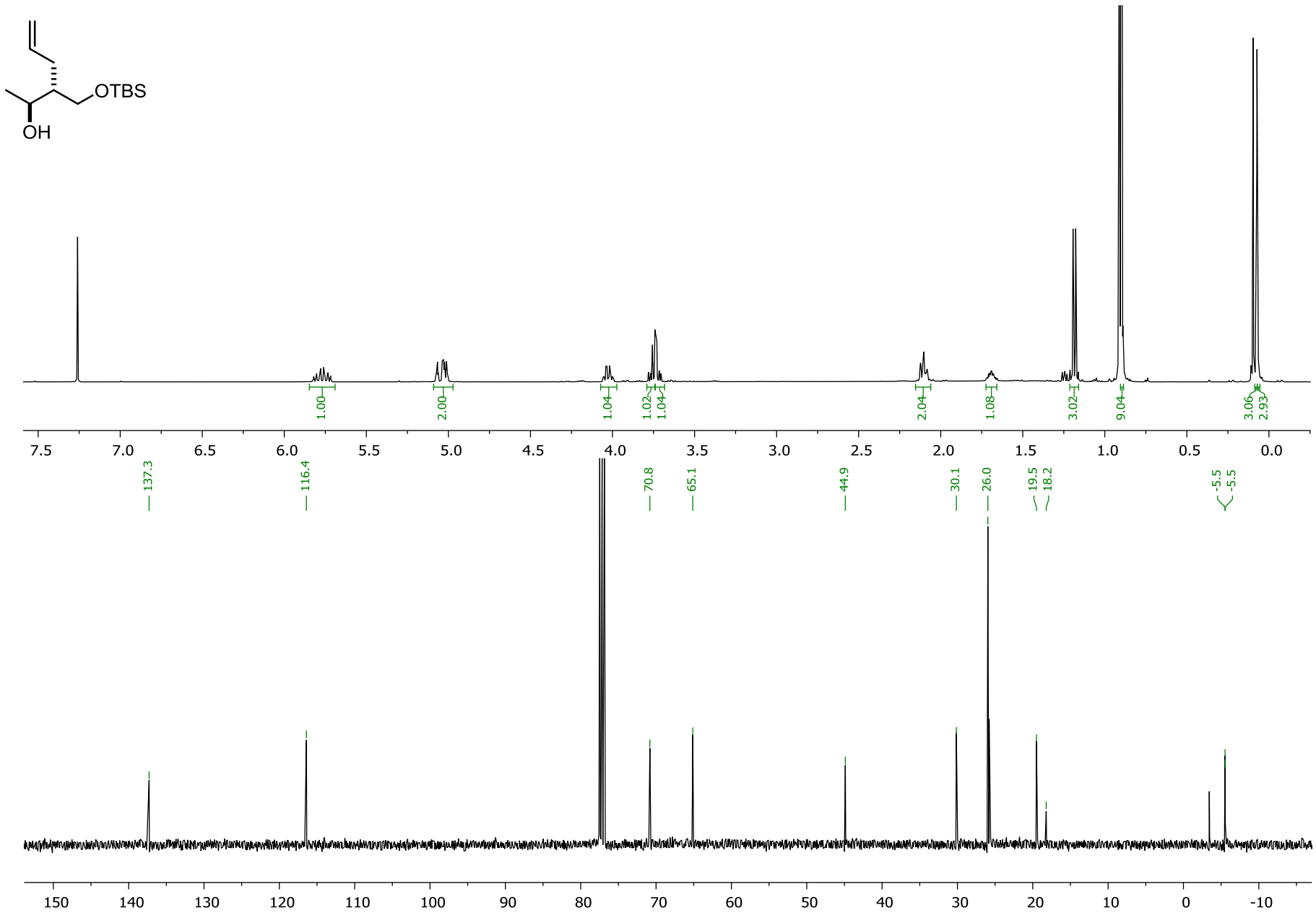
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1.02
1.04
2.04
1.08
3.02
9.04
3.06
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6.5
6.0
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5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
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0.0
137.3
116.4
70.8
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44.9
30.1
26.0
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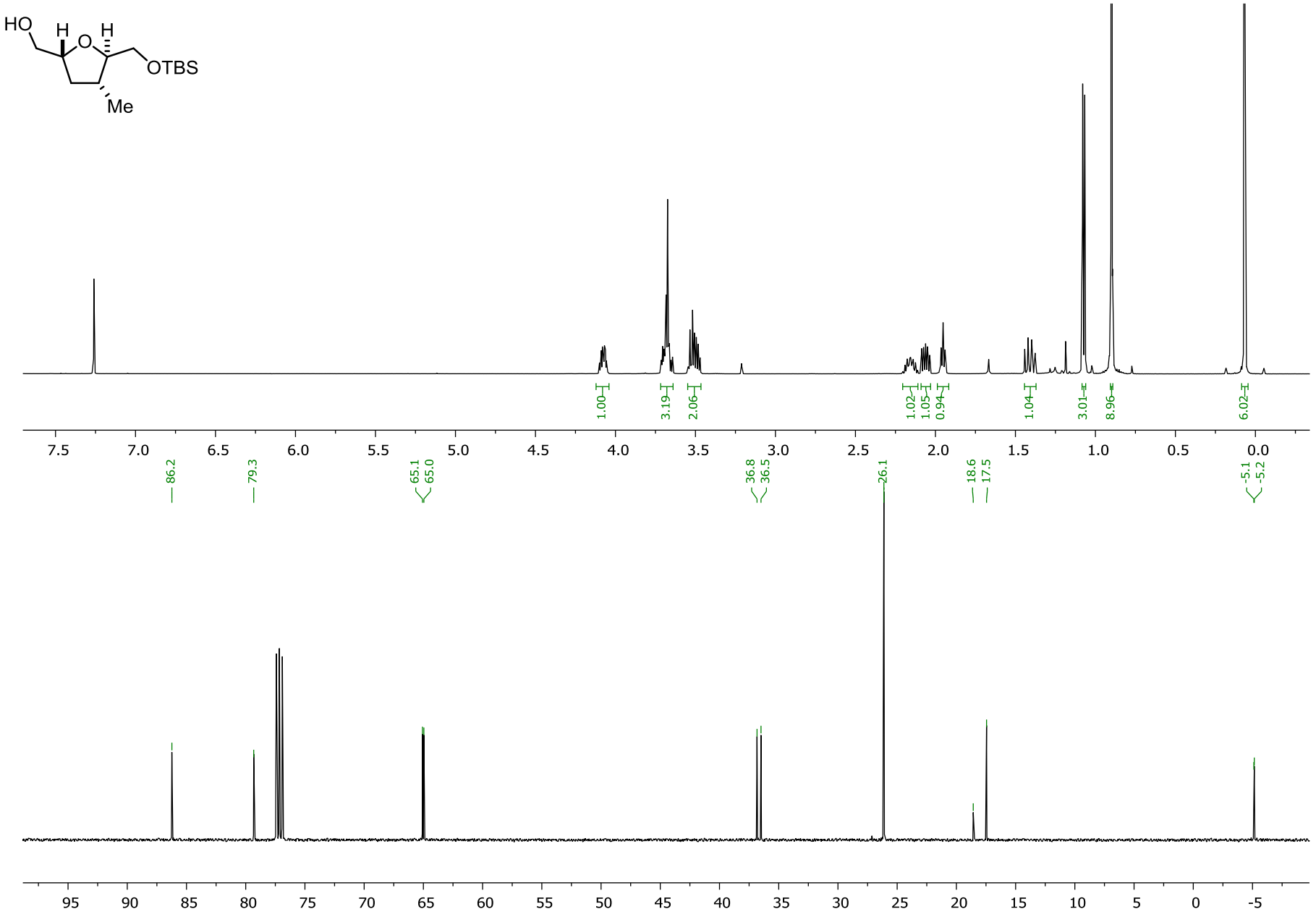
HO
H
O
H
OTBS
Me
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3.19
2.06
1.02
1.05
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1.04
3.01
8.96
6.02
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6.5
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4.5
4.0
3.5
3.0
2.5
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0.0
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79.3
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65.0
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26.1
18.6
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-5.1
-5.2
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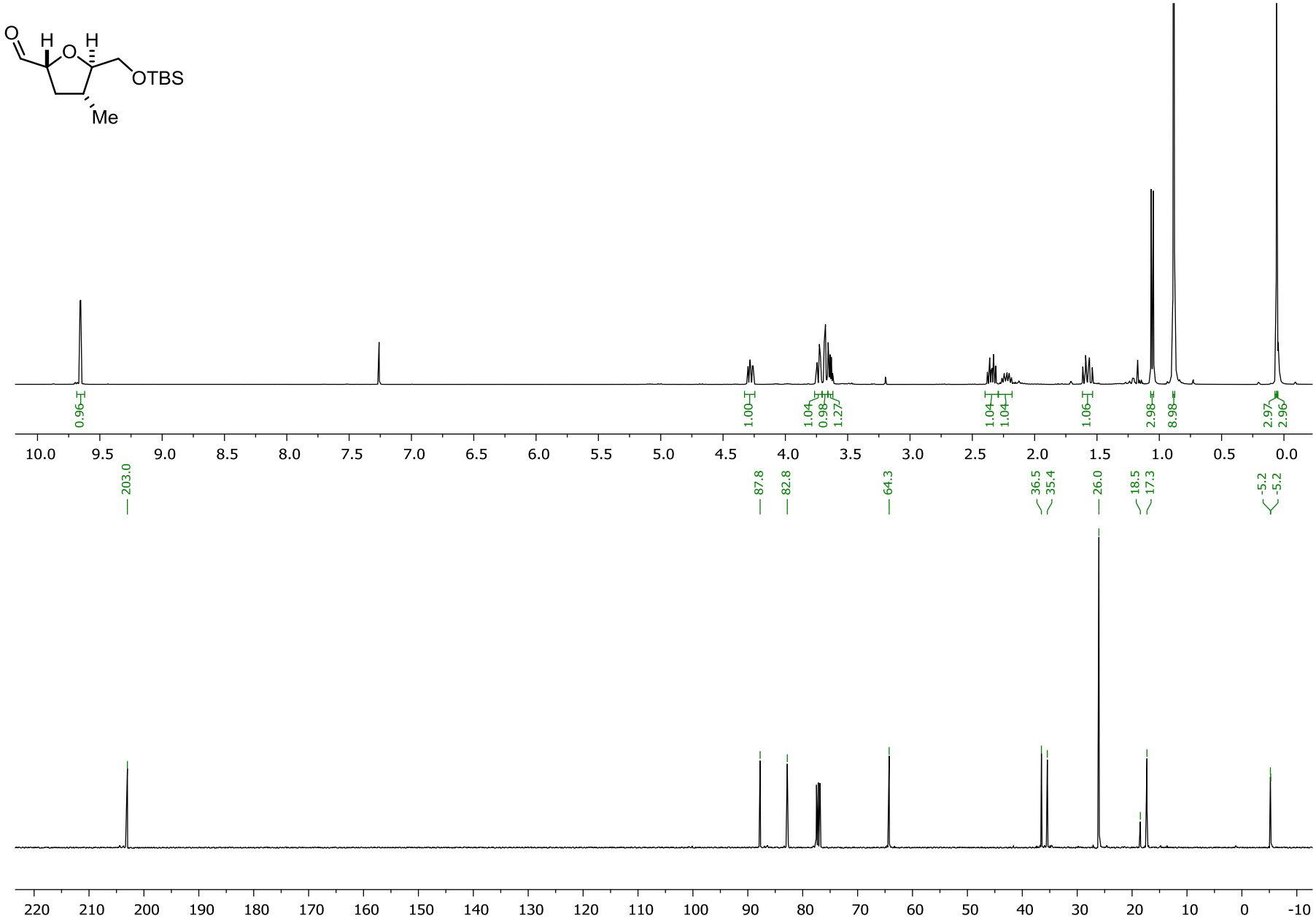
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H
OTBS
Me
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1.04
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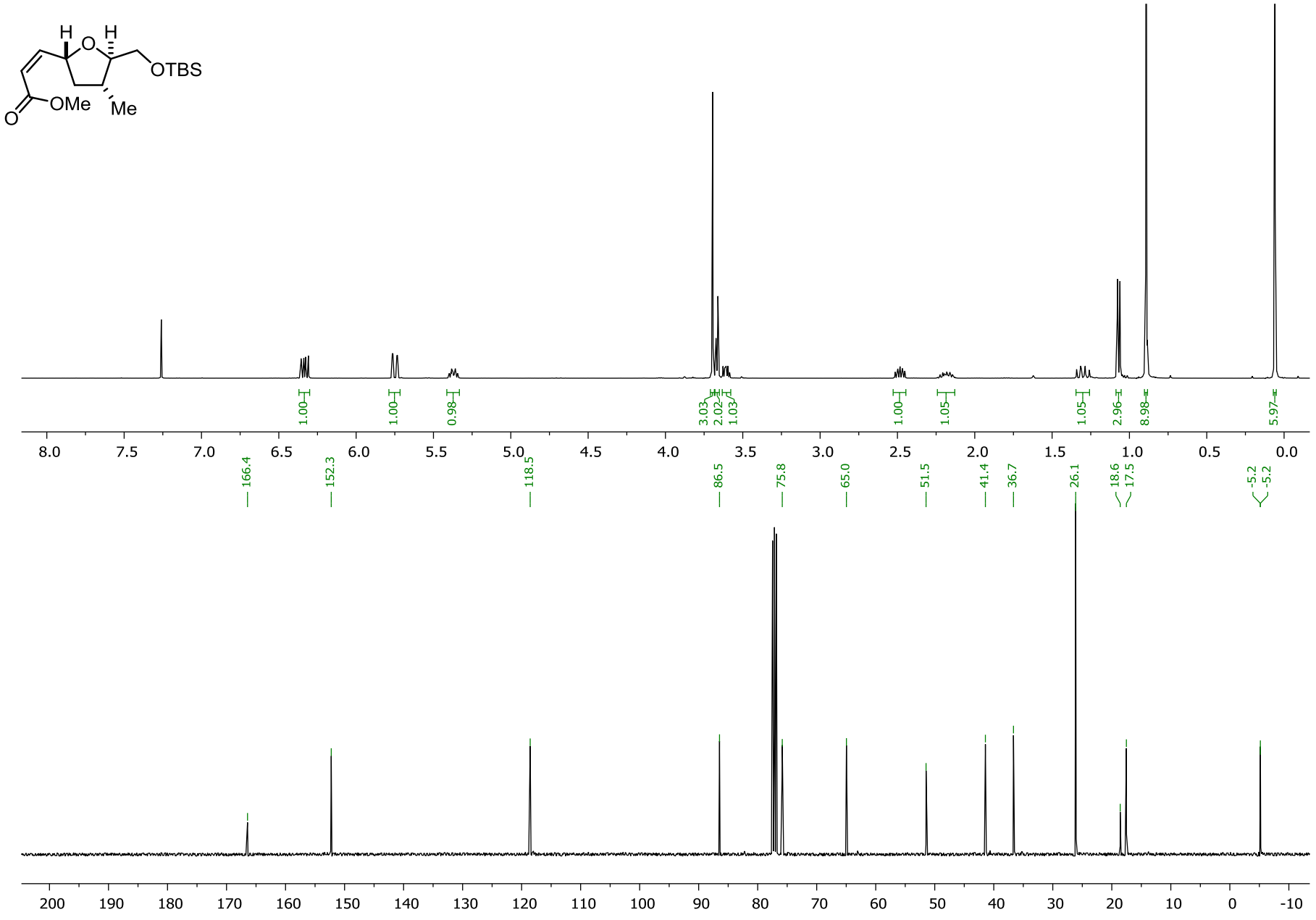
H
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H
OTBS
OMe
Me
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1.03
1.00
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1.05
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3.5
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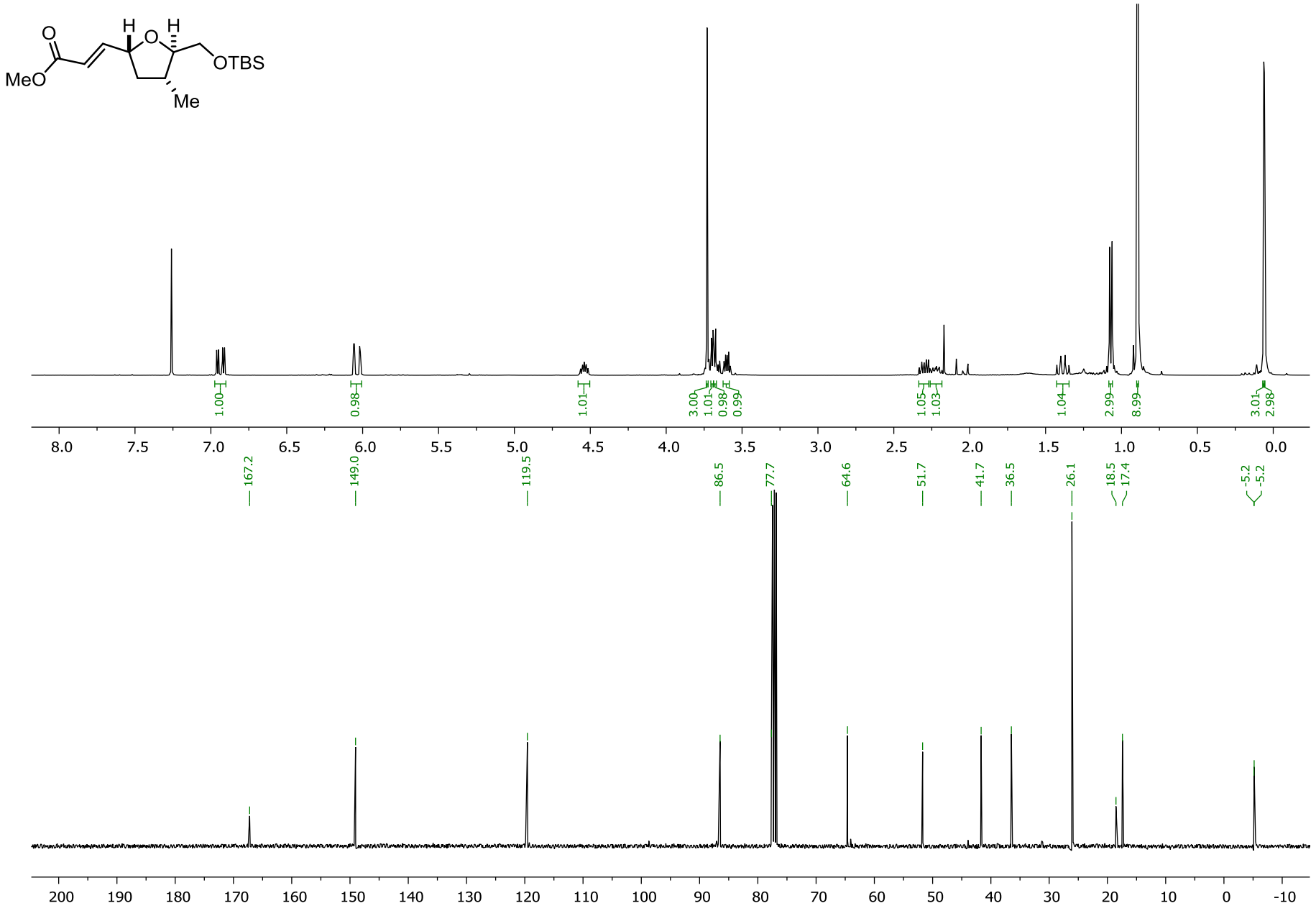
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H
MeO
OTBS
Me
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1.03
1.04
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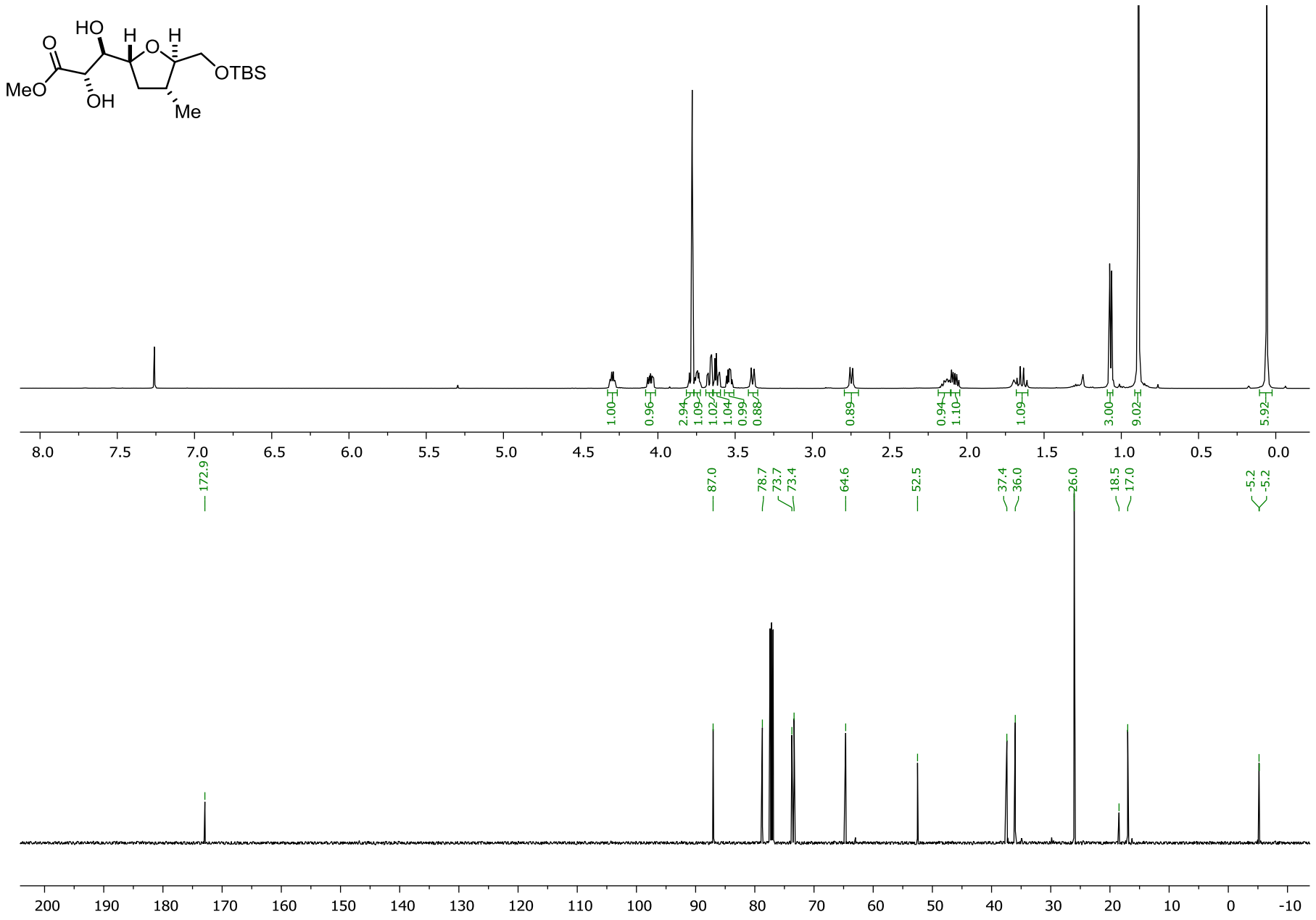
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OTBS
MeO
OH
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0.94
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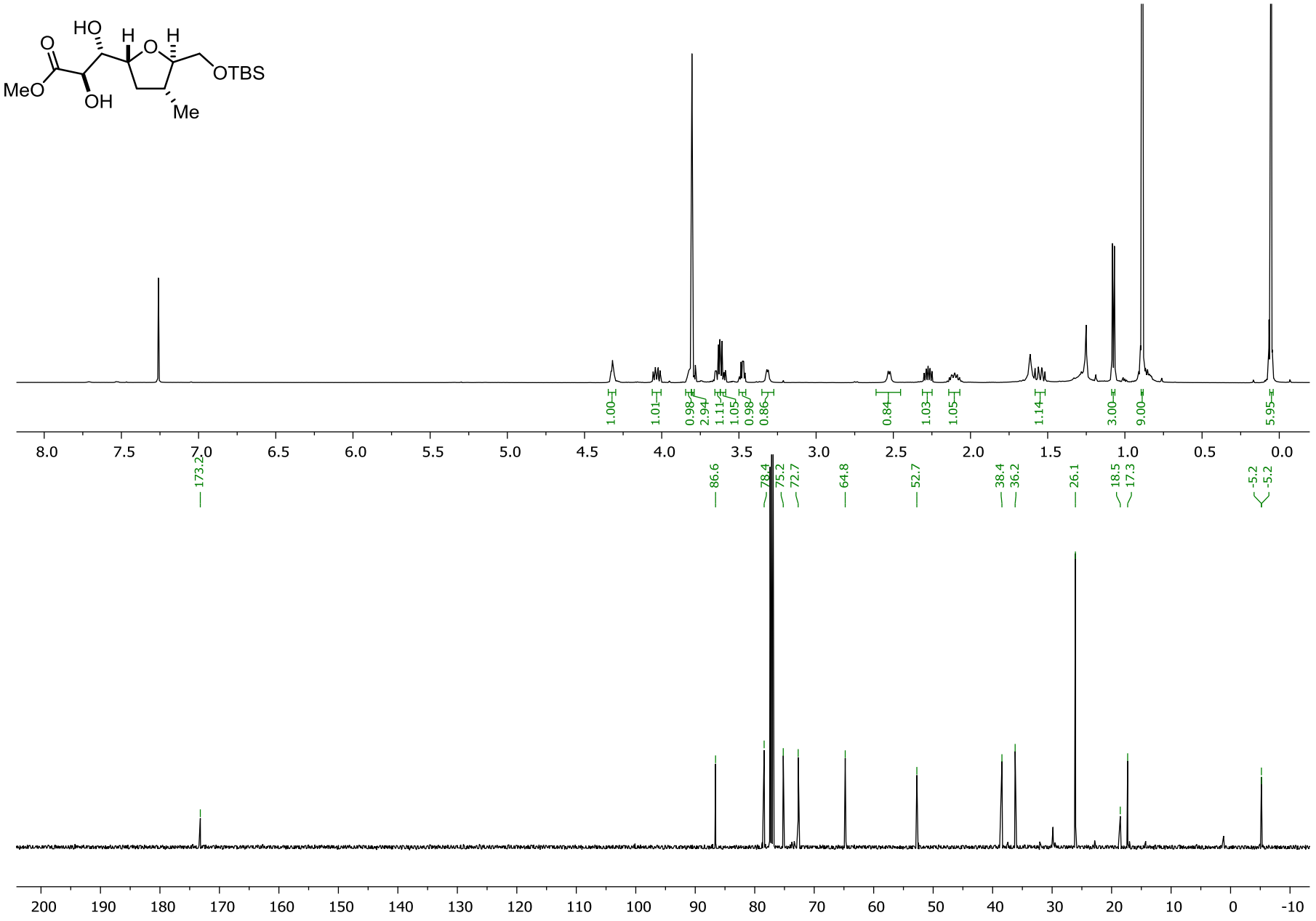
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MeO
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4.5
4.0
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0.0
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86.6
78.4
75.2
72.7
64.8
52.7
38.4
36.2
26.1
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17.3
-5.2
-5.2
200
190
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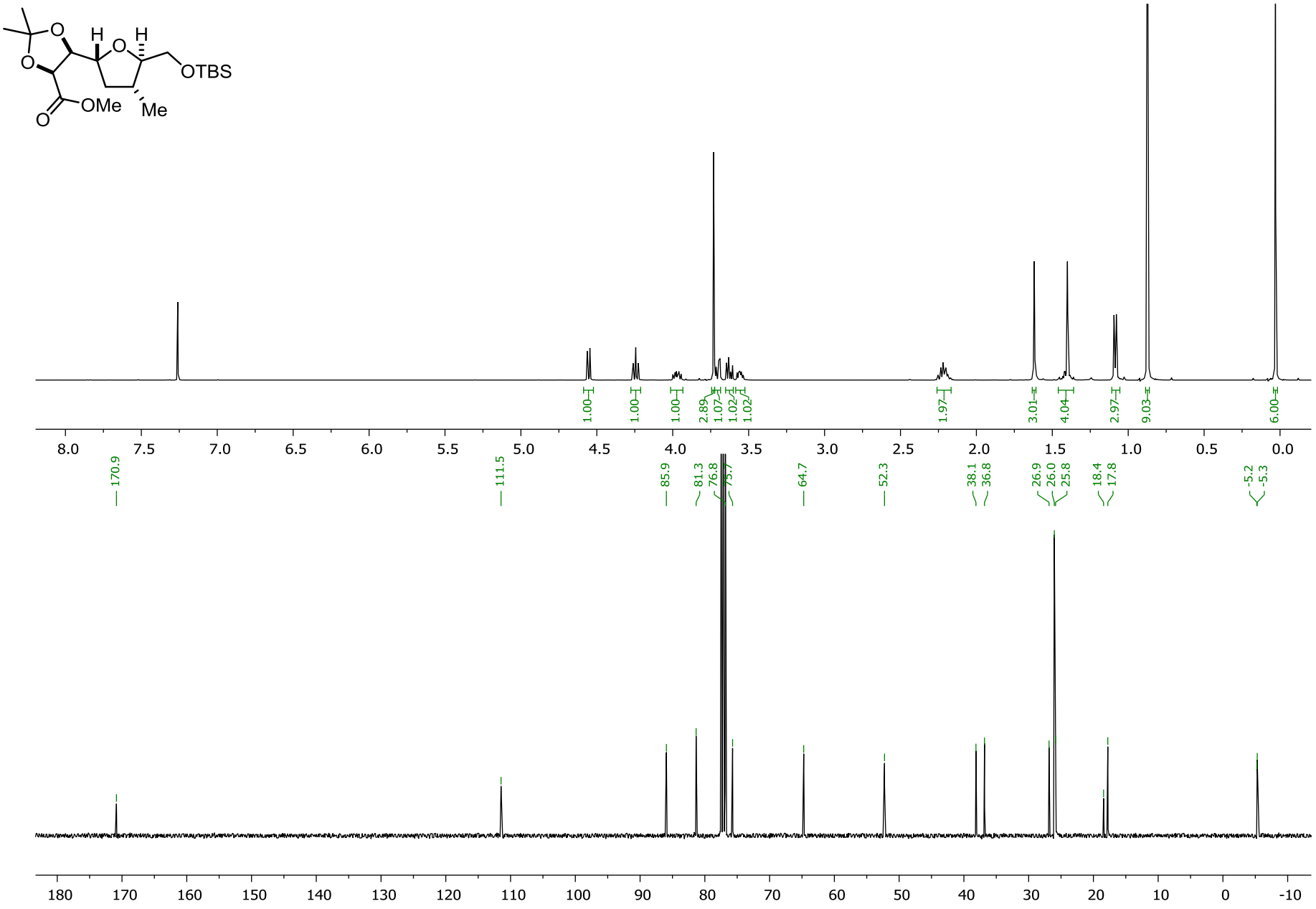
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OMe
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6.00
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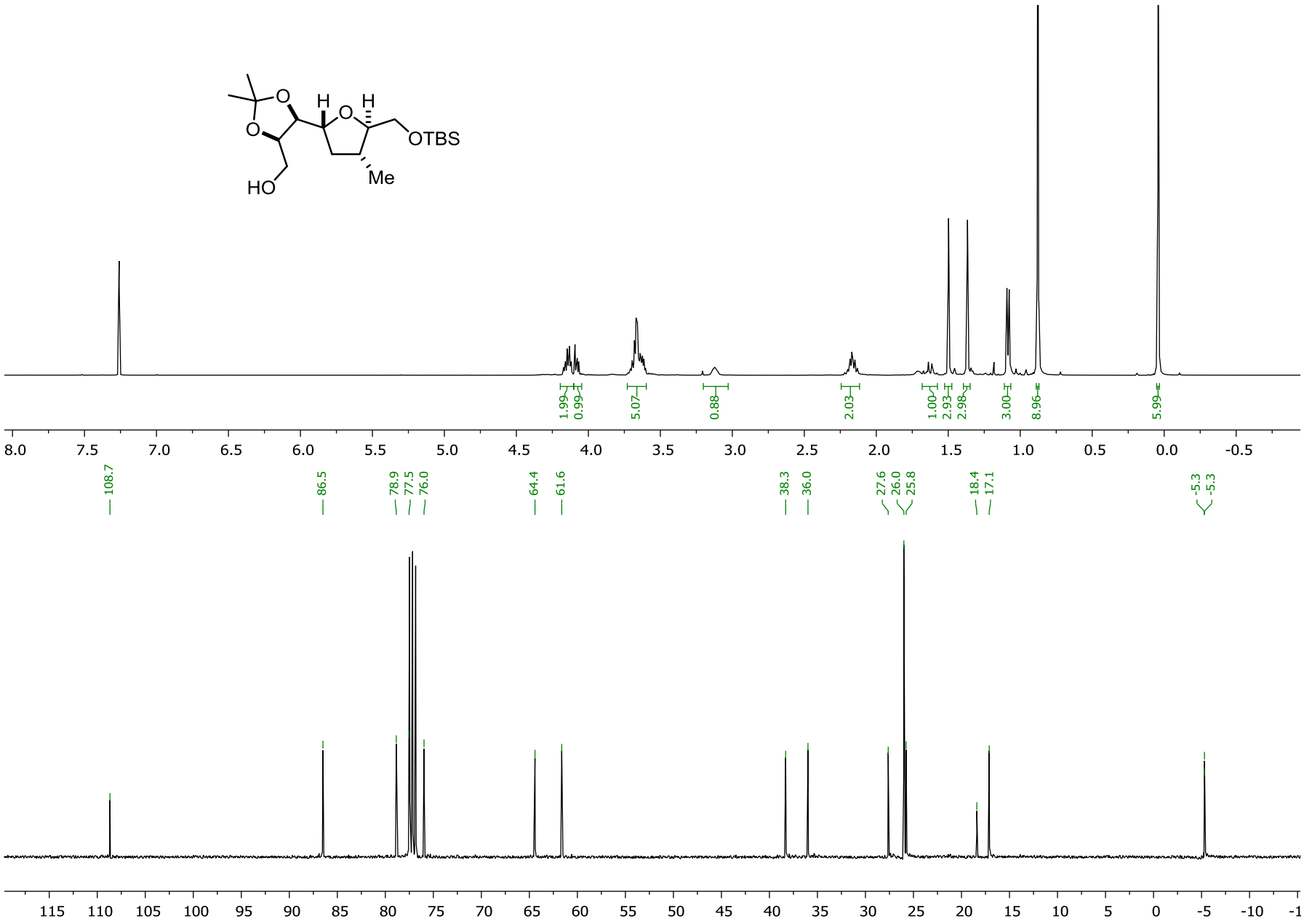
-5.3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H
OTBS
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Me
HO
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1.00
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3.0
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27.6
26.0
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-5.3
-5.3
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110
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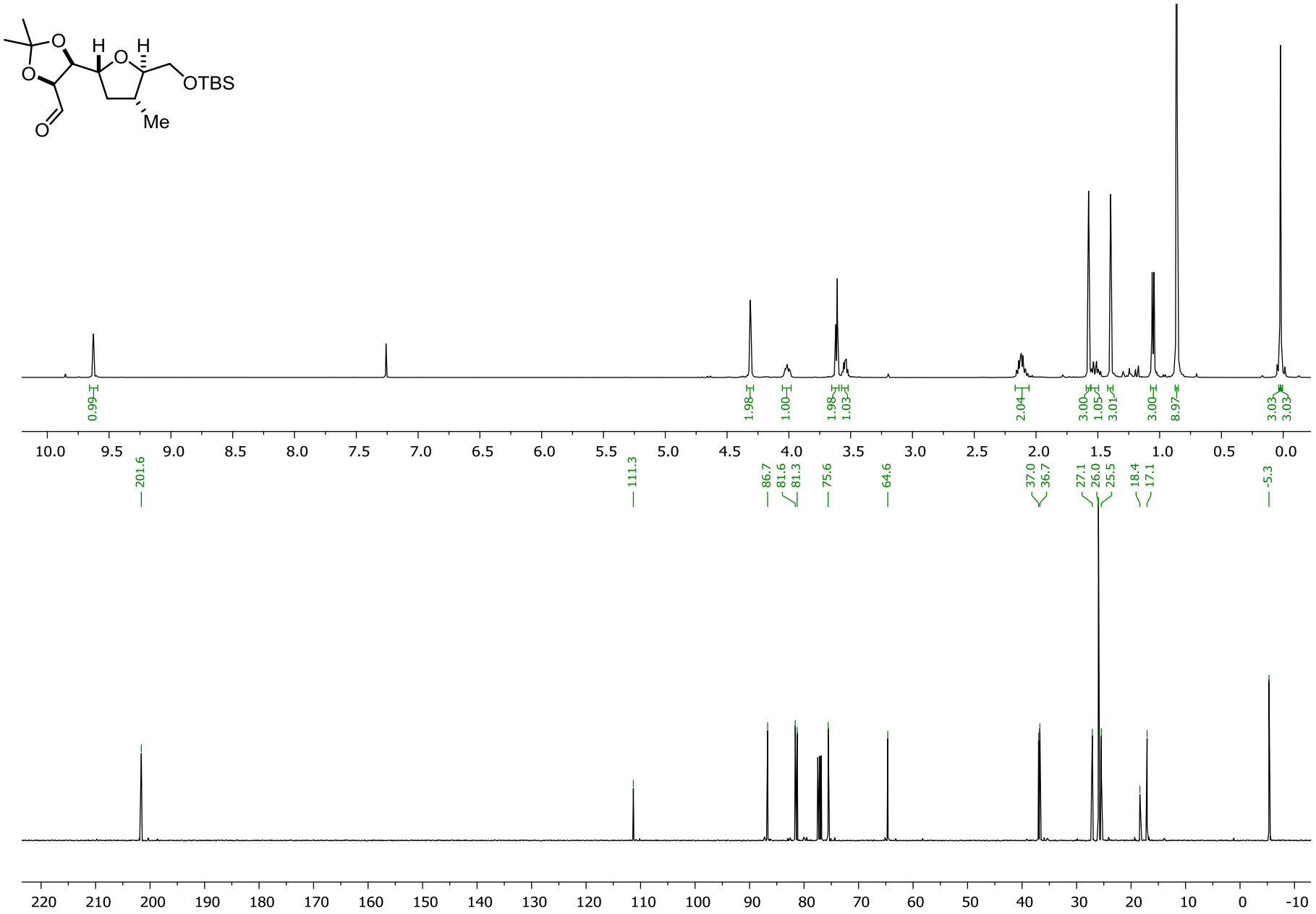
O
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111.3
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-5.3
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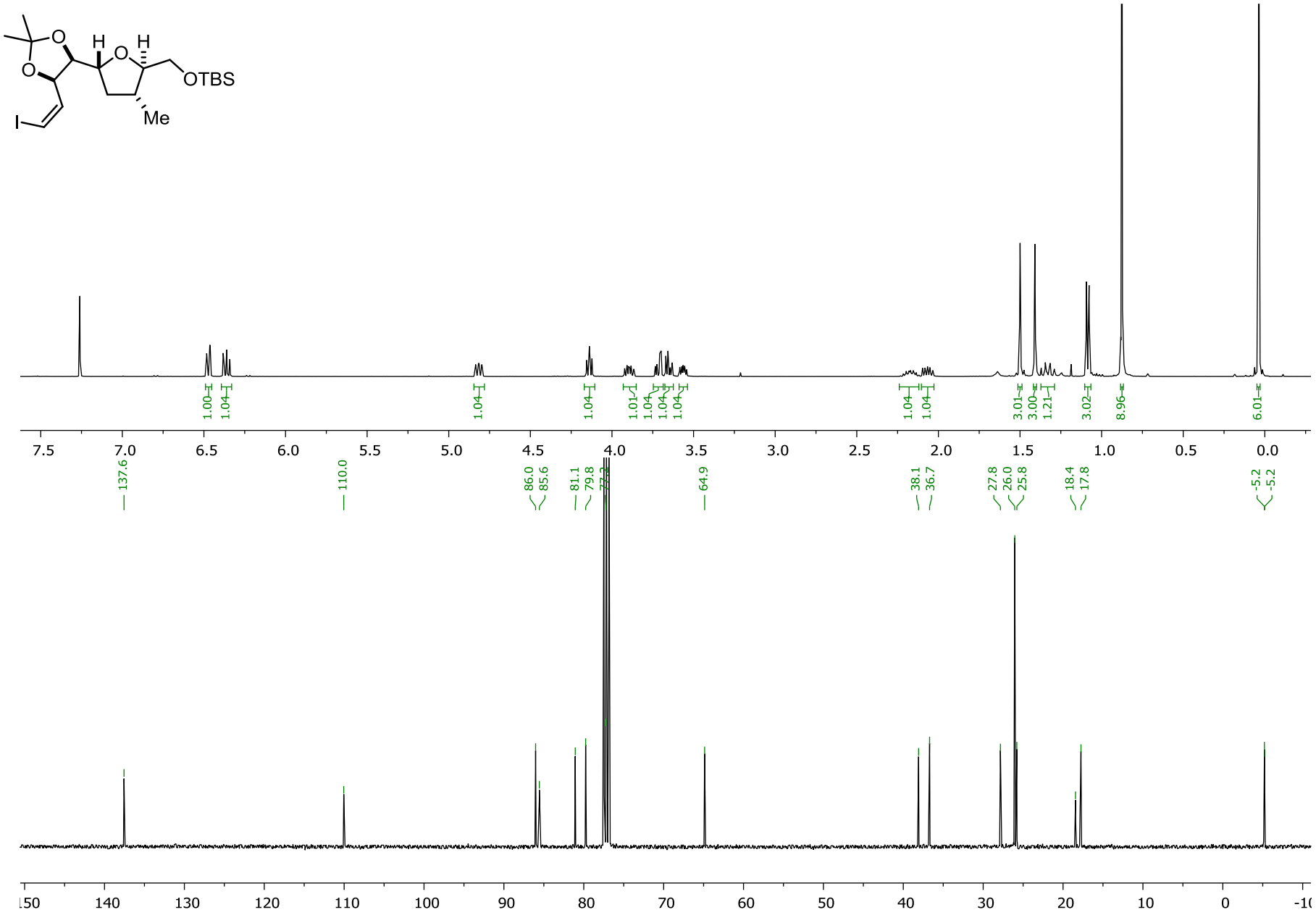
OTBS
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1.04
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27.8
26.0
25.8
18.4
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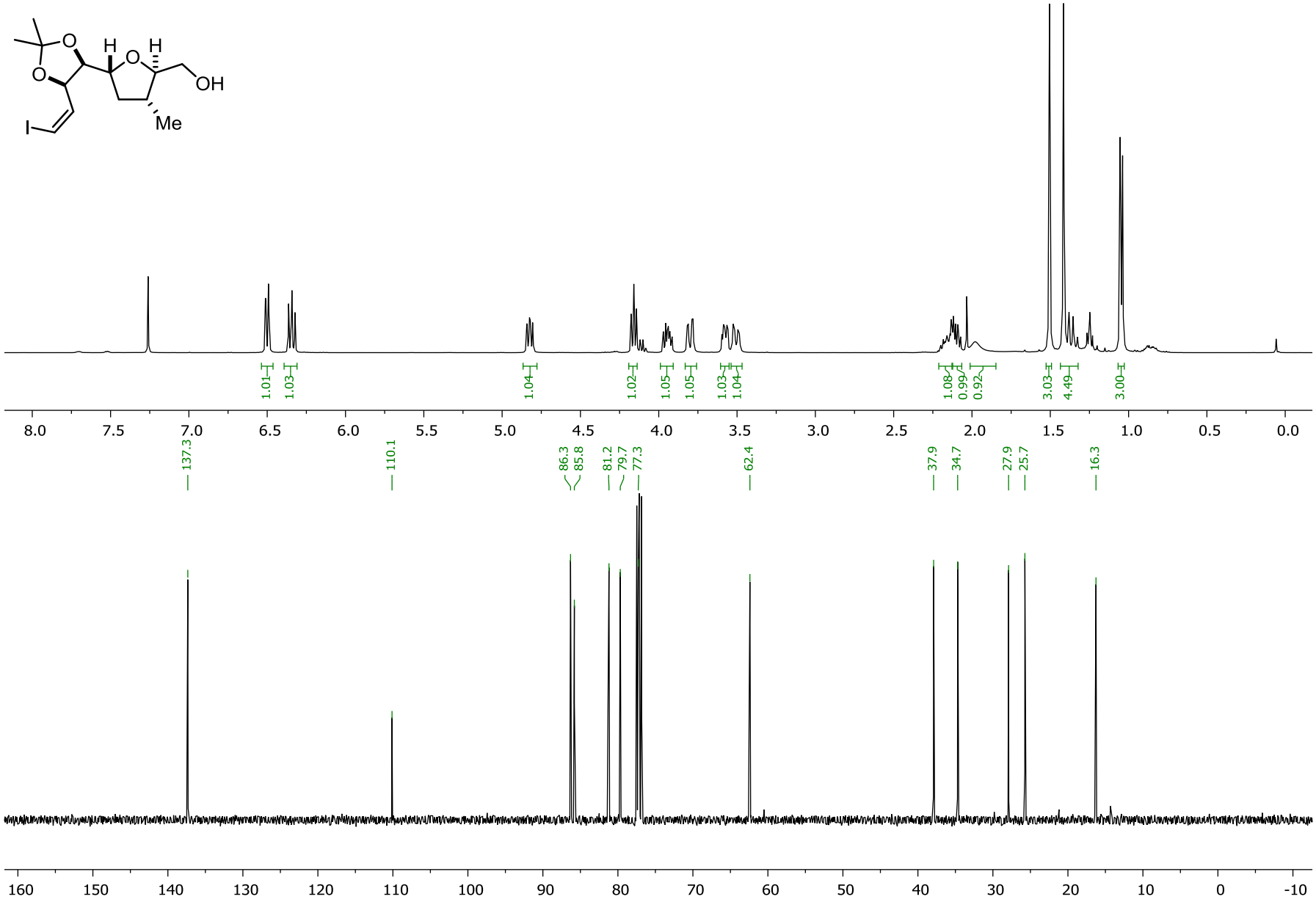
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H
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Me
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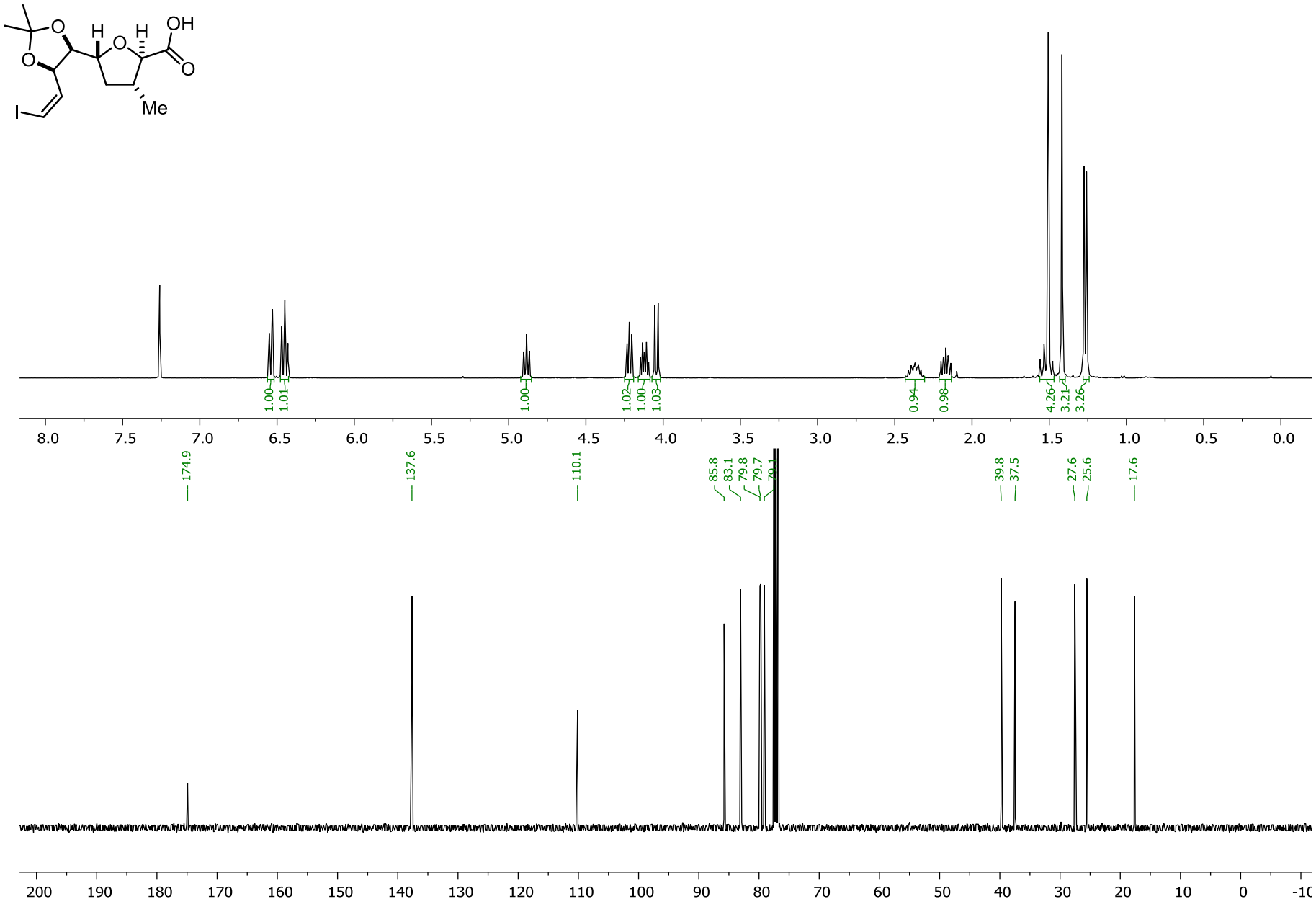
OH
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H
O
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O
O
Me
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1.00
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0.98
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17.6
200
190
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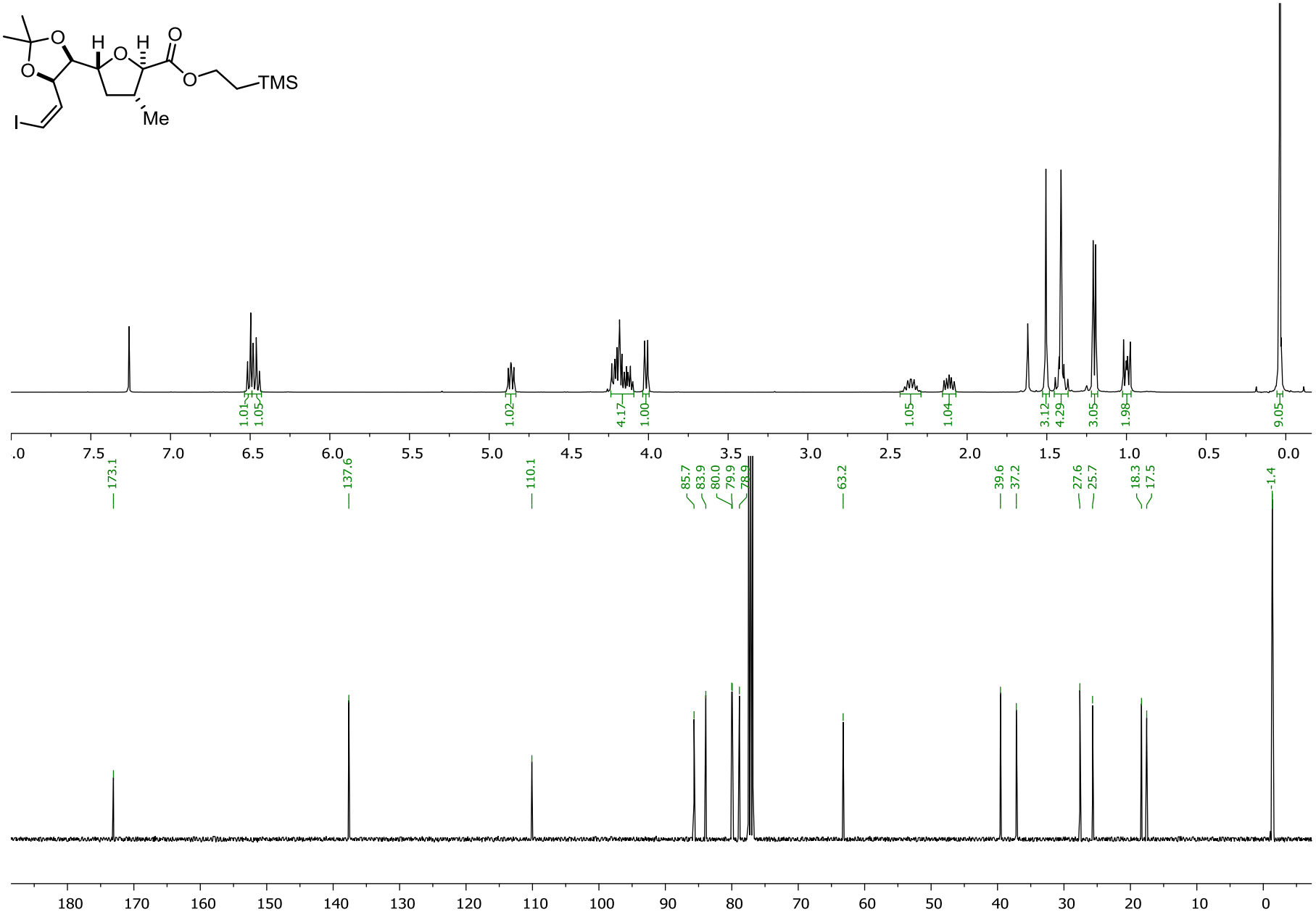
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1.05
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4.17
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1.05
1.04
3.12
4.29
3.05
1.98
9.05
.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
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2.0
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1.0
0.5
0.0
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137.6
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80.0
79.9
78.9
63.2
39.6
37.2
27.6
25.7
18.3
17.5
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150
140
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120
110
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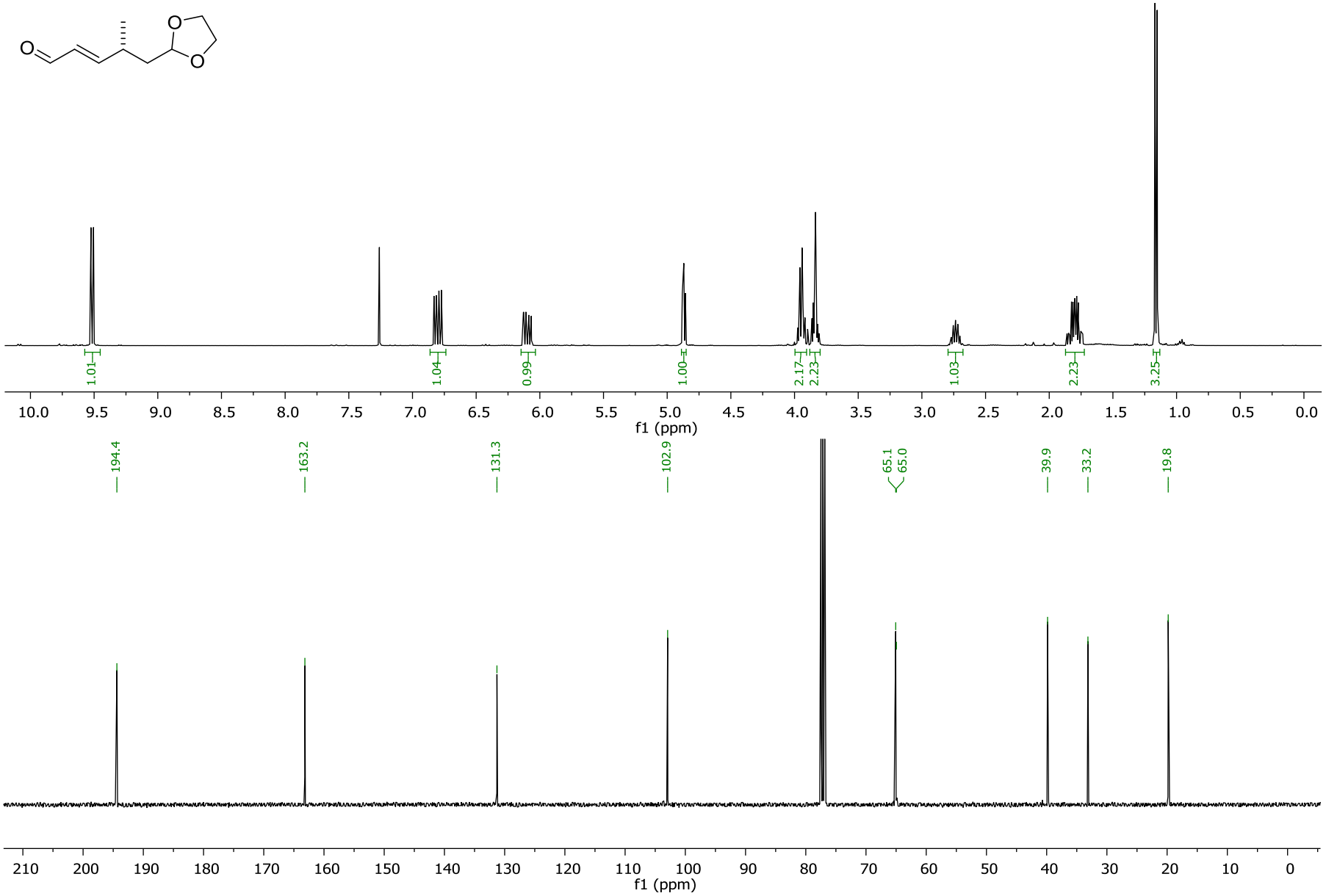
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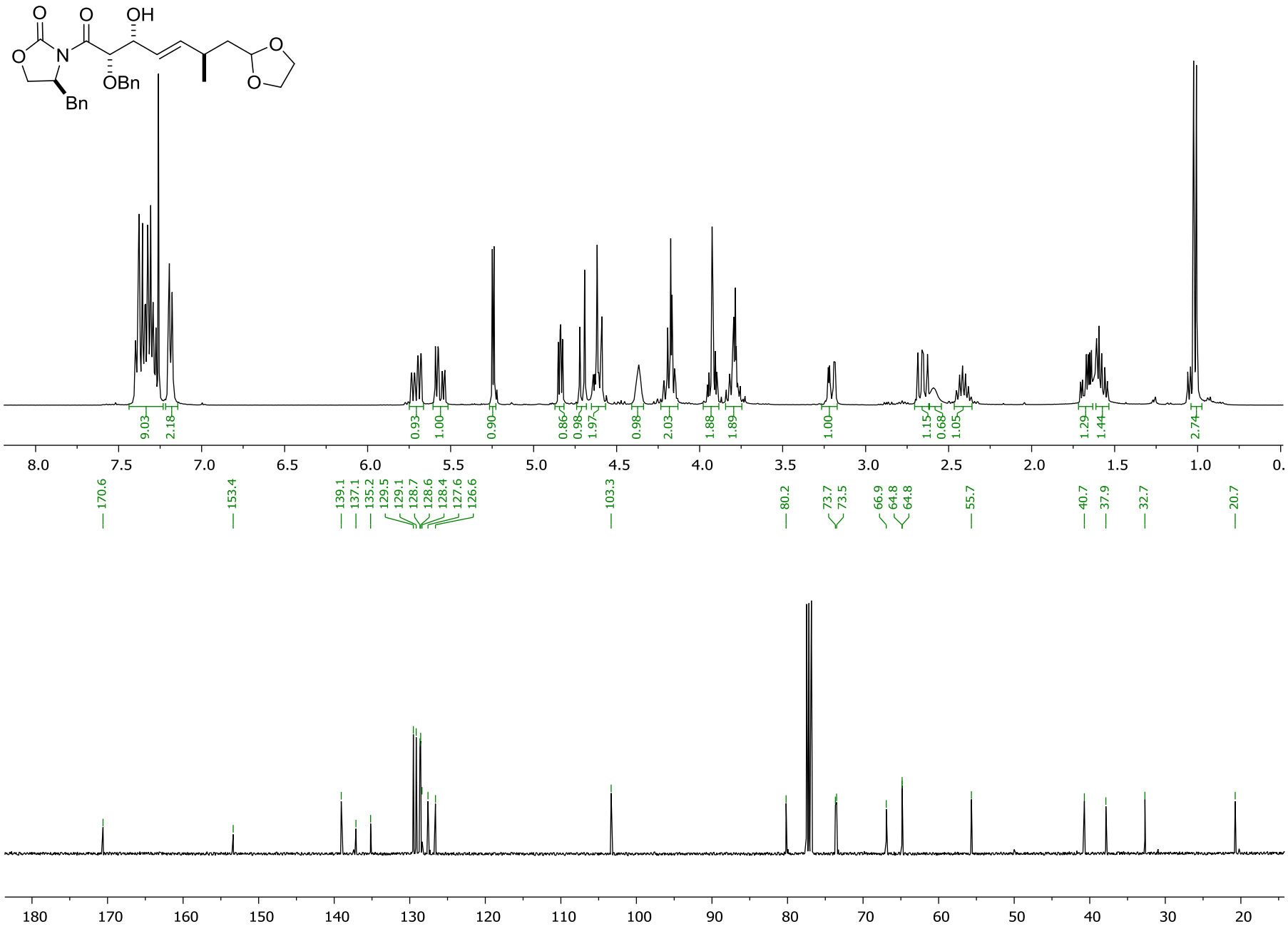
1.04
0.99
1.00
2.17
2.23
1.03
2.23
3.25
10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0
f1 (ppm)
194.4
163.2
131.3
102.9
65.1
65.0
39.9
33.2
19.8
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
f1 (ppm)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OH
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Bn
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O
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0.98
1.97
0.98
2.03
1.88
1.89
1.00
1.15
0.68
1.05
1.29
1.44
2.74
8.0
7.5
7.0
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6.0
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5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.
170.6
153.4
139.1
137.1
135.2
129.5
129.1
128.7
128.6
128.4
127.6
126.6
103.3
80.2
73.7
73.5
66.9
64.8
64.8
55.7
40.7
37.9
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160
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140
130
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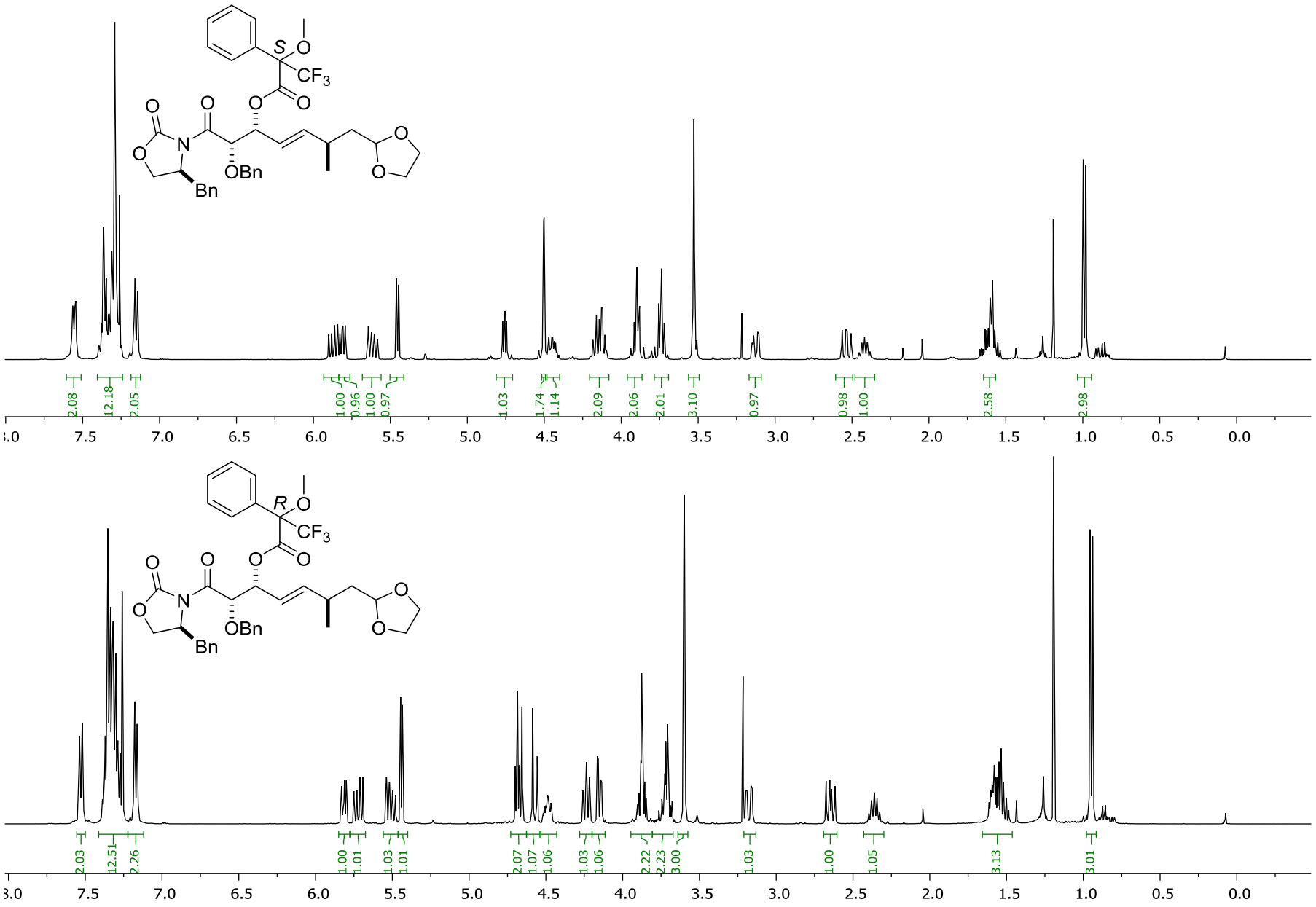
30
20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CF3
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O
O
N
O
OBn
Bn
O
O
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2.05
1.00
0.96
1.00
0.97
1.03
1.74
1.14
2.09
2.06
2.01
3.10
0.97
0.98
1.00
2.58
2.98
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
R
O
CF3
O
O
O
N
O
OBn
Bn
O
O
2.03
12.51
2.26
1.00
1.01
1.03
1.01
2.07
1.07
1.06
1.03
1.06
2.22
2.23
3.00
1.03
1.00
1.05
3.13
3.01
7.5
7.0
6.5
6.0
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1.0
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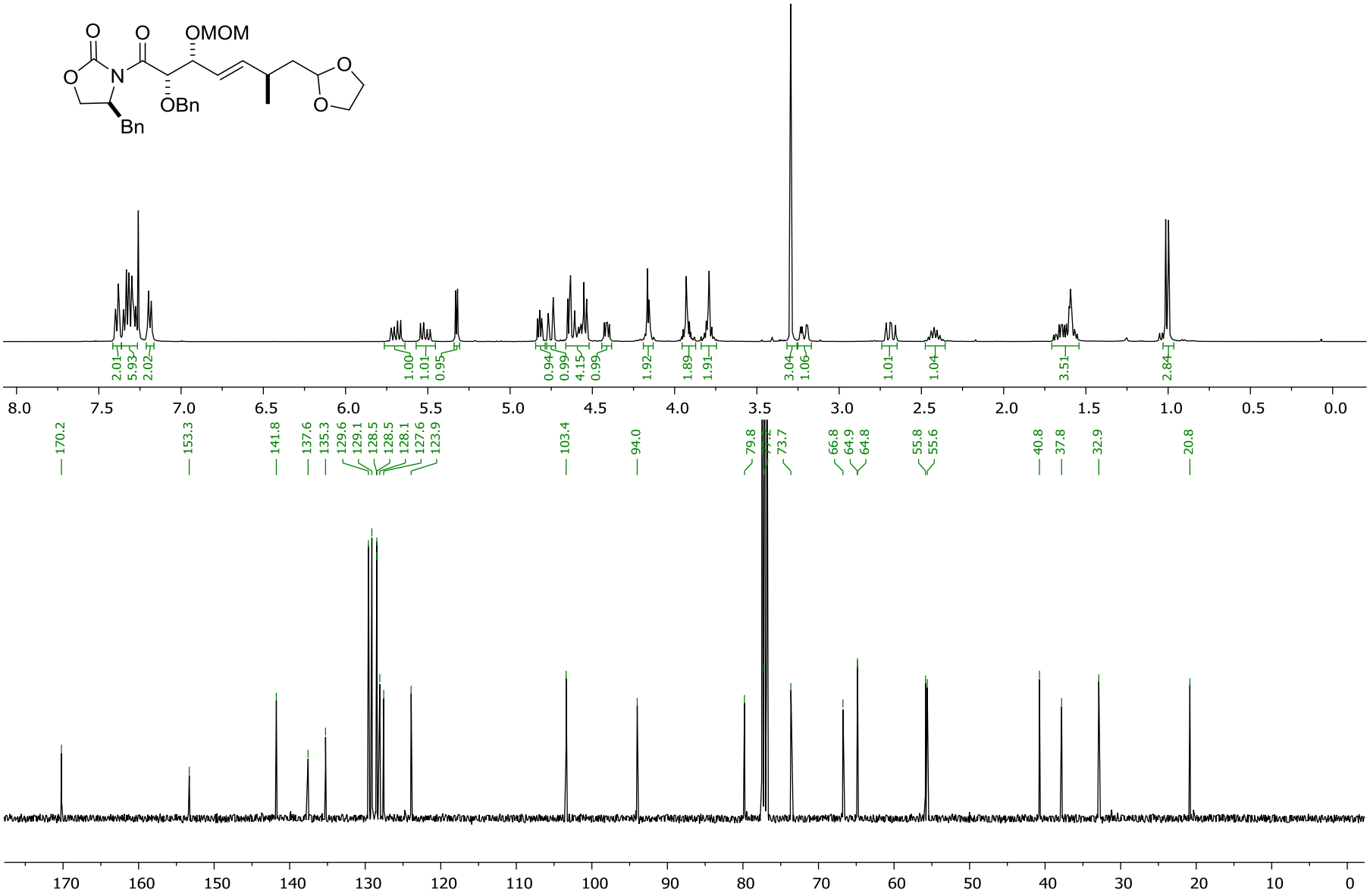
0.0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OMOM
N
O
OBn
Bn
O
O
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5.93
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1.00
1.01
0.95
0.94
0.99
4.15
0.99
1.92
1.89
1.91
3.04
1.06
1.01
1.04
3.51
2.84
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
170.2
153.3
141.8
137.6
135.3
129.6
129.1
128.5
128.5
128.1
127.6
123.9
103.4
94.0
79.8
77.2
73.7
66.8
64.9
64.8
55.8
55.6
40.8
37.8
32.9
20.8
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140
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120
110
100
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30
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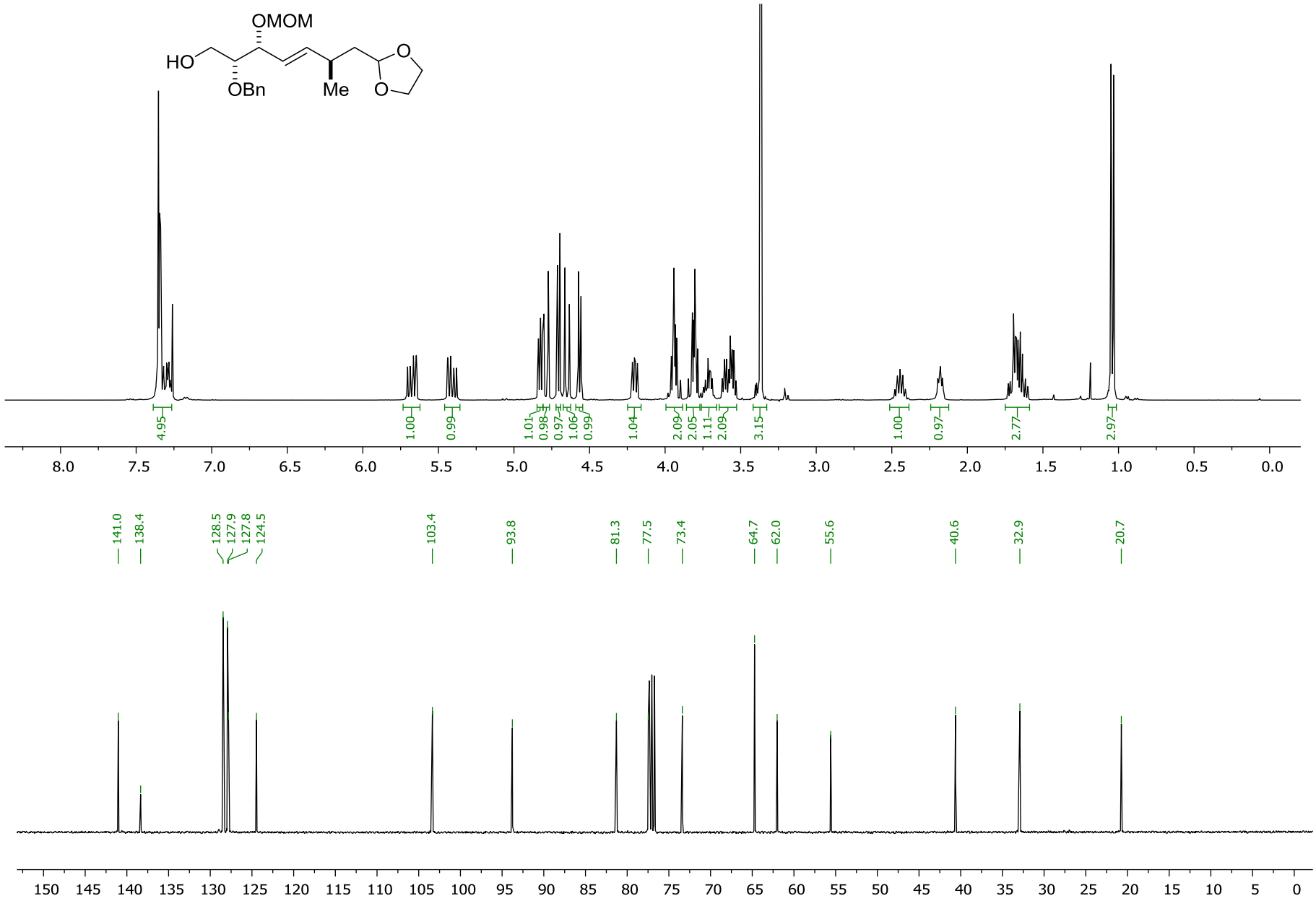
10
0


OMOM
HO
OBn
Me
O
O
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1.00
0.99
1.01
0.98
0.97
1.06
0.99
1.04
2.09
2.05
1.11
2.09
3.15
1.00
0.97
2.77
2.97
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
141.0
138.4
128.5
127.9
127.8
124.5
103.4
93.8
81.3
77.5
73.4
64.7
62.0
55.6
40.6
32.9
20.7
150
145
140
135
130
125
120
115
110
105
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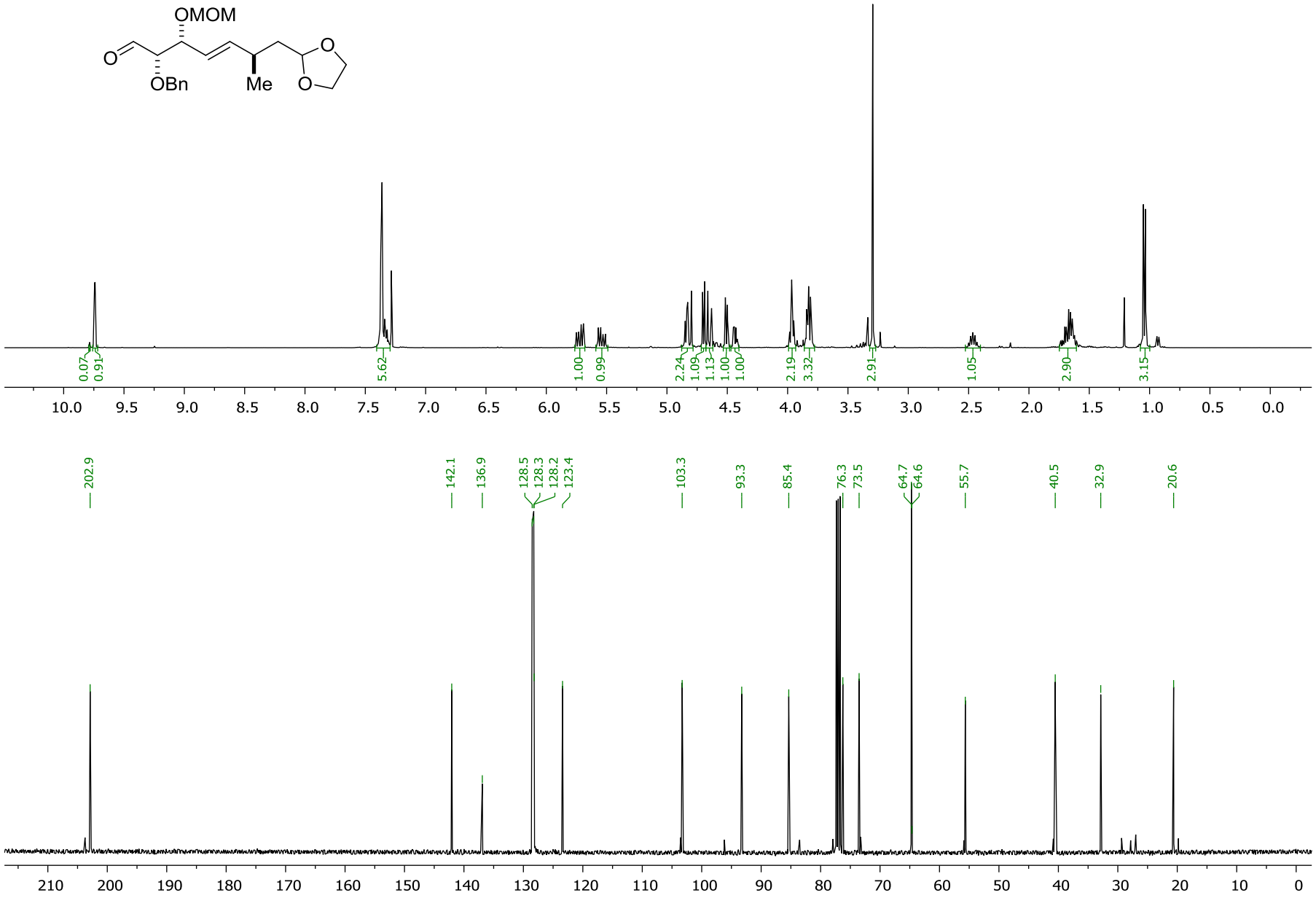
10
5
0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OBn
Me
O
O
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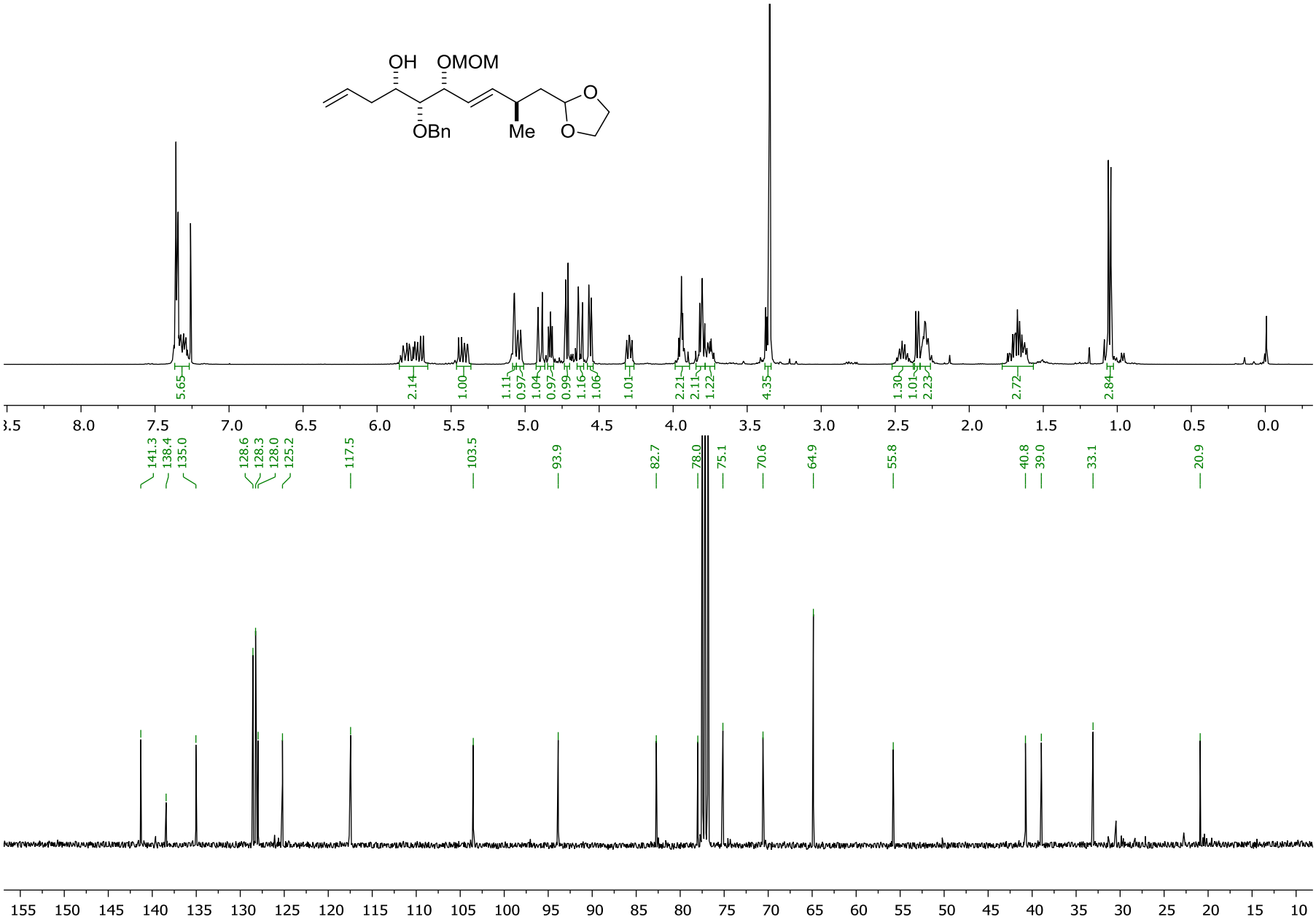
0.91
5.62
1.00
0.99
2.24
1.09
1.13
1.00
1.00
2.19
3.32
2.91
1.05
2.90
3.15
10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0
202.9
142.1
136.9
128.5
128.3
128.2
123.4
103.3
93.3
85.4
76.3
73.5
64.7
64.6
55.7
40.5
32.9
20.6
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0


OH
OMOM
OBn
Me
O
O
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2.14
1.00
1.11
0.97
1.04
0.97
0.99
1.16
1.06
1.01
2.21
2.11
1.22
4.35
1.30
1.01
2.23
2.72
2.84
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
141.3
138.4
135.0
128.6
128.3
128.0
125.2
117.5
103.5
93.9
82.7
78.0
75.1
70.6
64.9
55.8
40.8
39.0
33.1
20.9
155
150
145
140
135
130
125
120
115
110
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45
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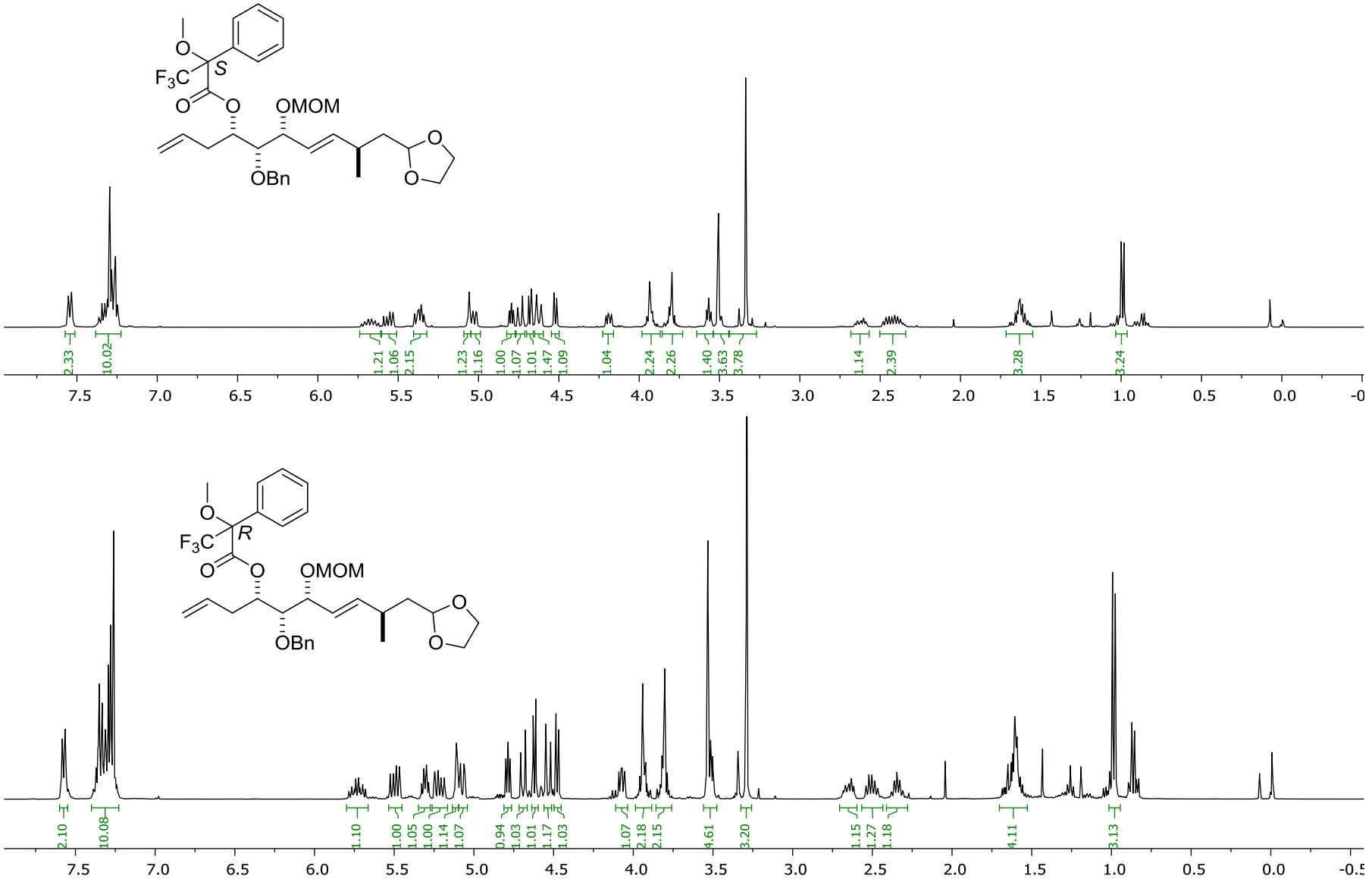
25
20
15
10


O
F3C
S
O
O
OMOM
OBn
O
O
2.33
10.02
1.21
1.06
2.15
1.23
1.16
1.00
1.07
1.01
1.47
1.09
1.04
2.24
2.26
1.40
3.63
3.78
1.14
2.39
3.28
3.24
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
O
F3C
R
O
O
OMOM
OBn
O
O
2.10
10.08
1.10
1.00
1.05
1.00
1.14
1.07
0.94
1.03
1.01
1.17
1.03
1.07
2.18
2.15
4.61
3.20
1.15
1.27
1.18
4.11
3.13
7.5
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6.5
6.0
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4.0
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3.0
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2.0
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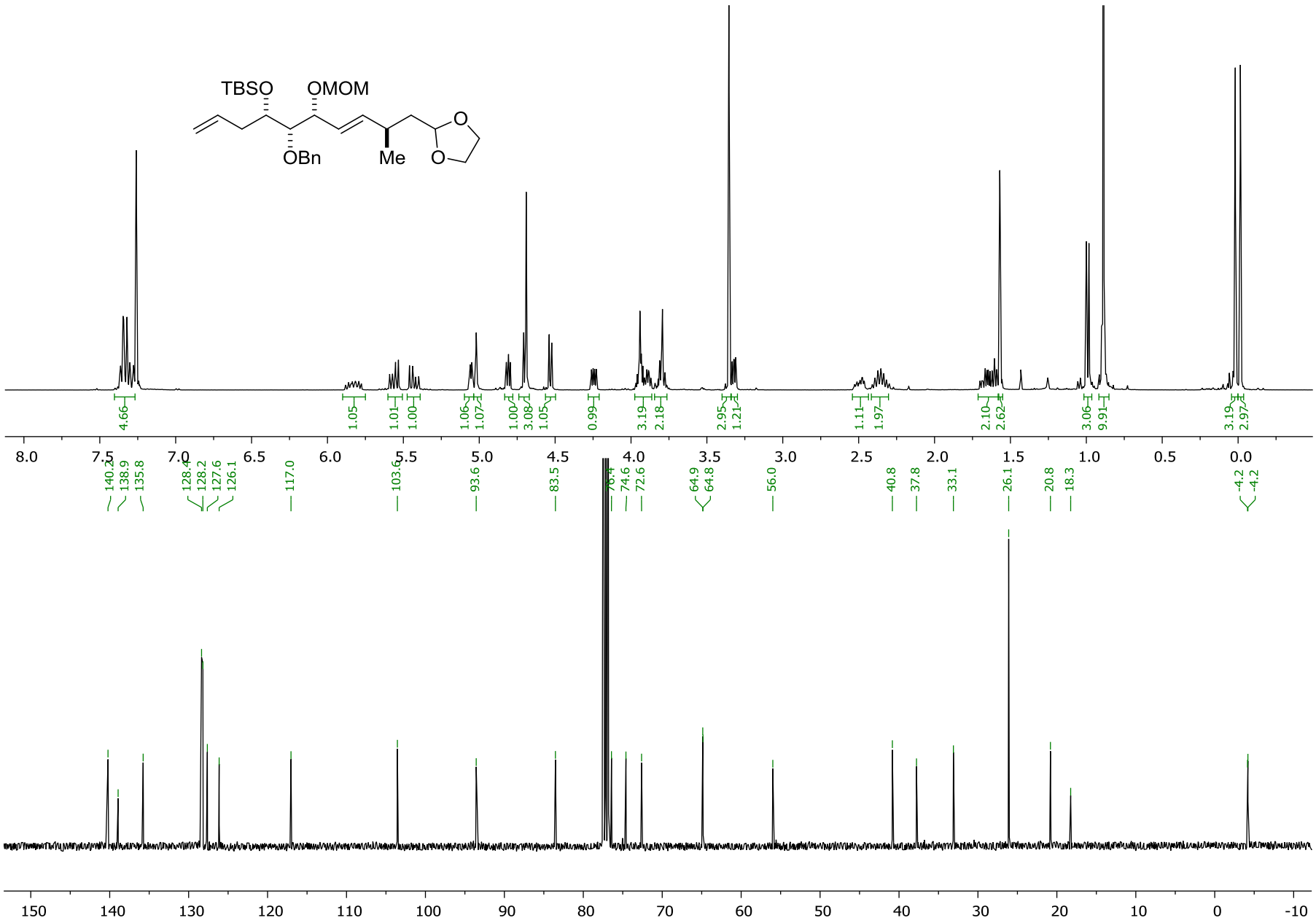
0.0


TBSO
OMOM
OBn
Me
O
O
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1.06
1.07
1.00
3.08
1.05
0.99
3.19
2.18
2.95
1.21
1.11
1.97
2.10
2.62
3.06
9.91
3.19
2.97
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
140.2
138.9
135.8
128.4
128.2
127.6
126.1
117.0
103.6
93.6
83.5
76.4
74.6
72.6
64.9
64.8
56.0
40.8
37.8
33.1
26.1
20.8
18.3
-4.2
-4.2
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140
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120
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100
90
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60
50
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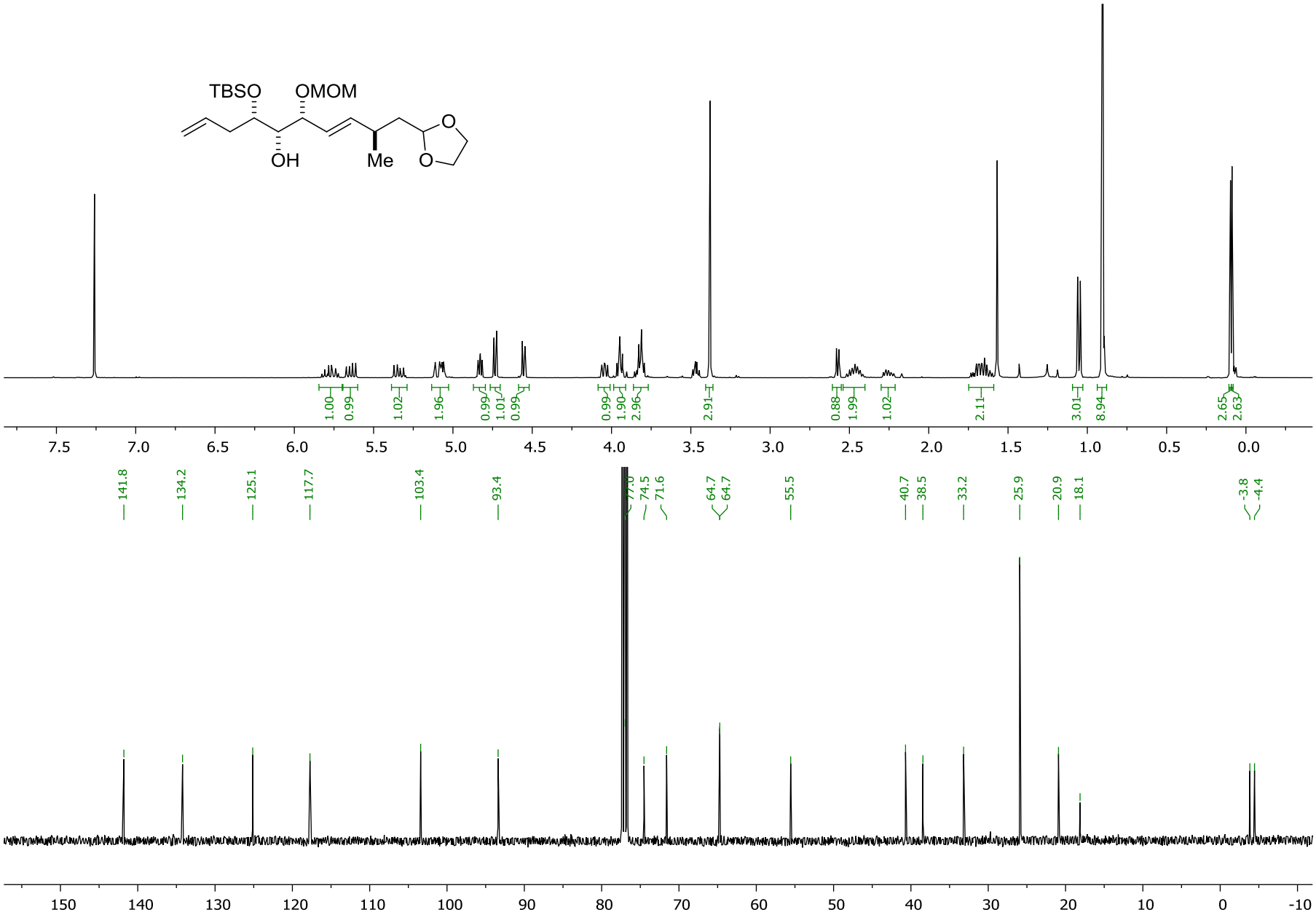
0
-10


TBSO
OMOM
OH
Me
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1.02
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1.01
0.99
0.99
1.90
2.96
2.91
0.88
1.99
1.02
2.11
3.01
8.94
2.65
2.63
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
141.8
134.2
125.1
117.7
103.4
93.4
77.0
74.5
71.6
64.7
64.7
55.5
40.7
38.5
33.2
25.9
20.9
18.1
-3.8
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140
130
120
110
100
90
80
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60
50
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20
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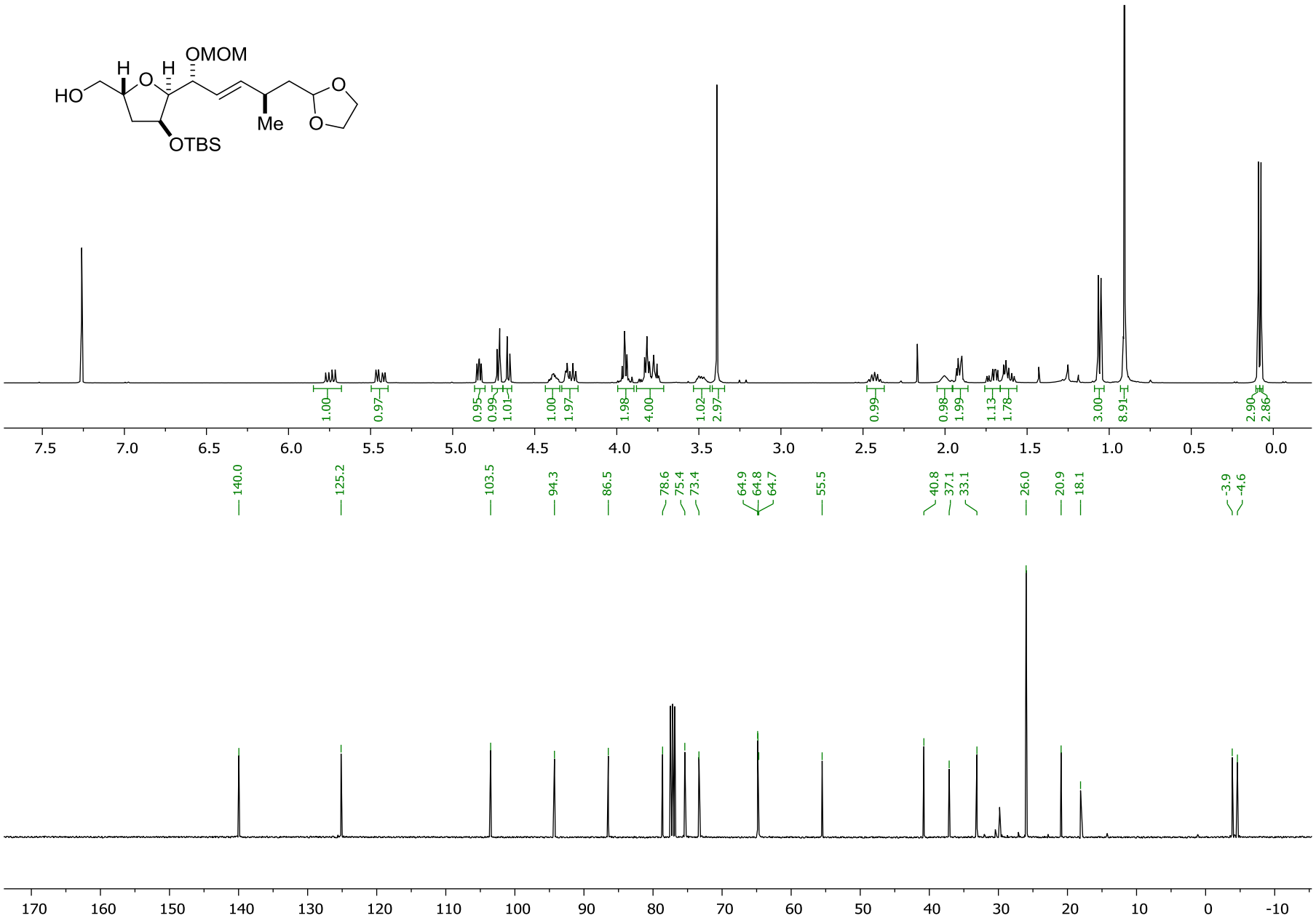
0
-10


OMOM
H
O
H
HO
O
O
Me
OTBS
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0.95
0.99
1.01
1.00
1.97
1.98
4.00
1.02
2.97
0.99
0.98
1.99
1.13
1.78
3.00
8.91
2.90
2.86
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
140.0
125.2
103.5
94.3
86.5
78.6
75.4
73.4
64.9
64.8
64.7
55.5
40.8
37.1
33.1
26.0
20.9
18.1
-3.9
-4.6
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140
130
120
110
100
90
80
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60
50
40
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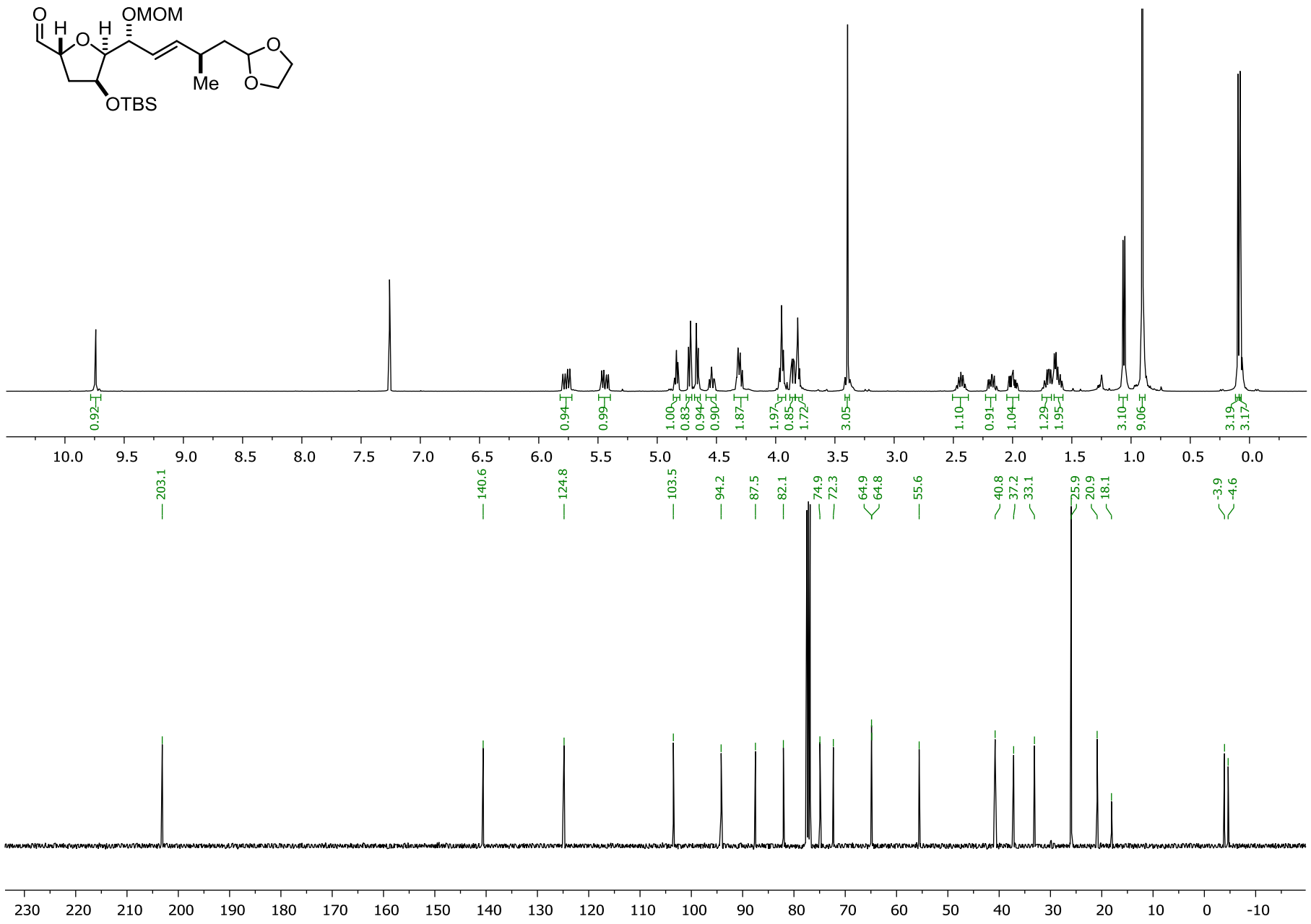
10
0
-10


O
H
O
H
OMOM
Me
O
O
OTBS
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0.94
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1.00
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0.94
0.90
1.87
1.97
0.85
1.72
3.05
1.10
0.91
1.04
1.29
1.95
3.10
9.06
3.19
3.17
10.0
9.5
9.0
8.5
8.0
7.5
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6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
203.1
140.6
124.8
103.5
94.2
87.5
82.1
74.9
72.3
64.9
64.8
55.6
40.8
37.2
33.1
25.9
20.9
18.1
-3.9
-4.6
230
220
210
200
190
180
170
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140
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120
110
100
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50
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20
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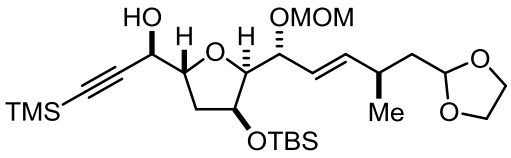
0
-10


HO
H
O
H
OMOM
TMS
OTBS
Me
O
O

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1.00
1.02
1.01
1.00
3.92
2.04
2.09
0.99
2.97
0.28
1.03
0.97
1.01
1.25
1.18
3.08
9.28
9.10
3.13
3.08
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
138.9
124.0
102.7
102.5
93.2
89.6
85.7
80.1
74.1
72.1
65.0
63.9
63.8
54.6
39.8
37.1
32.1
25.0
19.9
17.2
-1.1
-4.9
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140
130
120
110
100
90
80
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50
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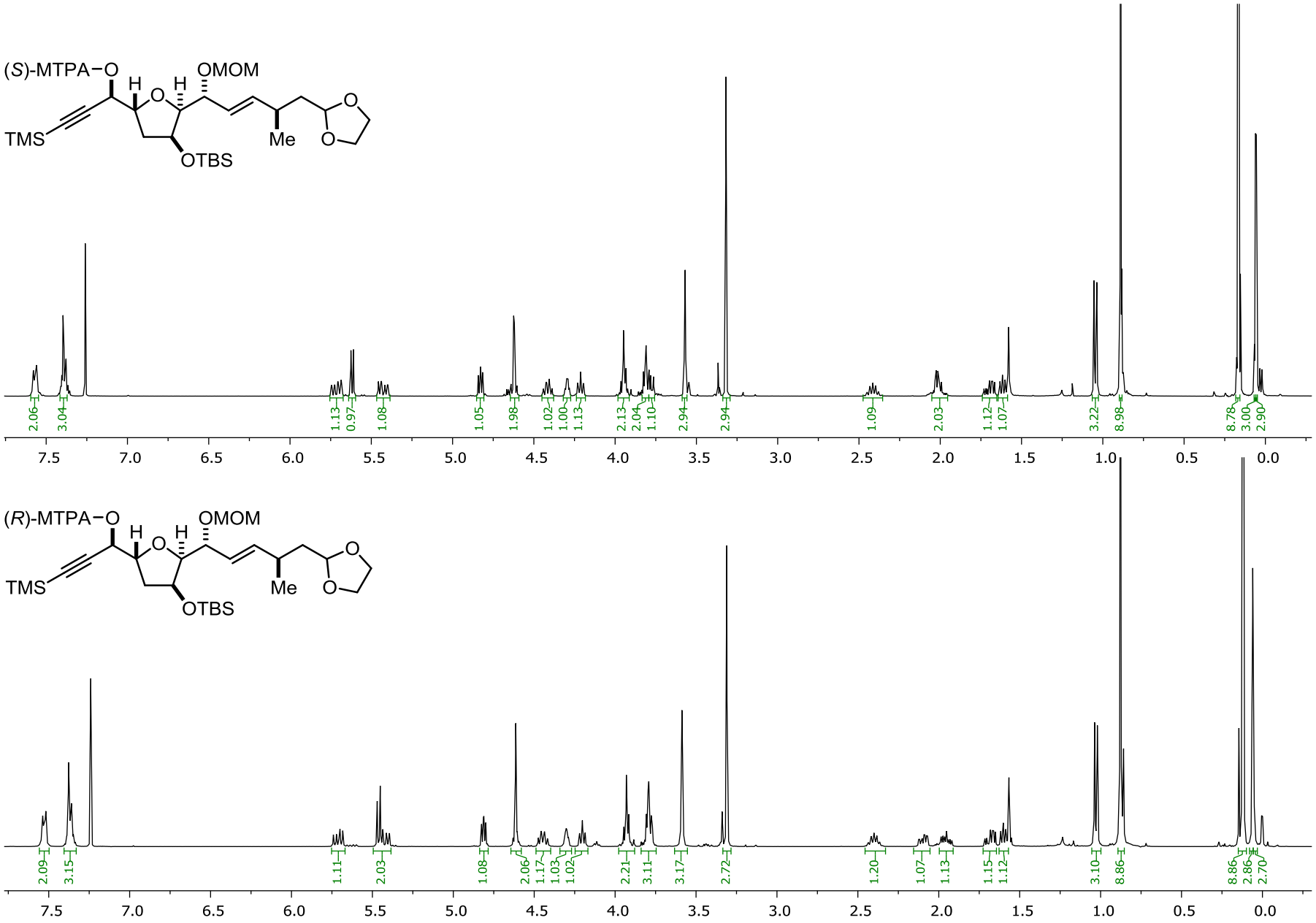
-10


(S)-MTPA−O
H
O
H
OMOM
TMS
OTBS
Me
O
O
O
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3.04
1.13
0.97
1.08
1.05
1.98
1.02
1.00
1.13
2.13
2.04
1.10
2.94
2.94
1.09
2.03
1.12
1.07
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6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
(R)-MTPA−O
H
O
H
OMOM
TMS
OTBS
Me
O
O
O
2.09
3.15
1.11
2.03
1.08
2.06
1.17
1.03
1.02
2.21
3.11
3.17
2.72
1.20
1.07
1.13
1.15
1.12
3.10
8.86
8.86
2.86
2.70
7.5
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6.5
6.0
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4.0
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2.0
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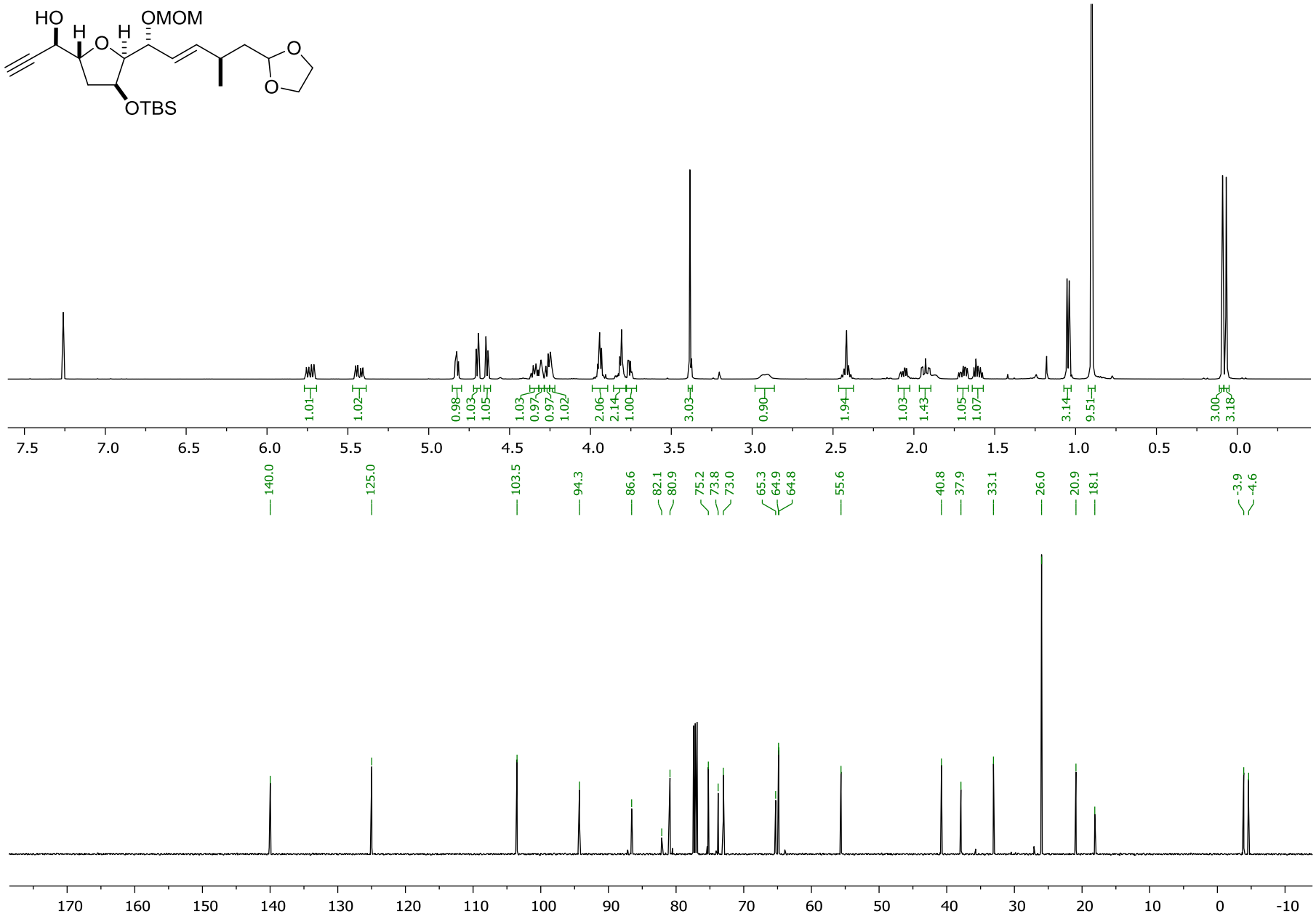
1.0
0.5
0.0


HO
H
H
OMOM
O
O
O
OTBS
1.01
1.02
0.98
1.03
1.05
1.03
0.97
0.97
1.02
2.06
2.14
1.00
3.03
0.90
1.94
1.03
1.43
1.05
1.07
3.14
9.51
3.00
3.18
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
140.0
125.0
103.5
94.3
86.6
82.1
80.9
75.2
73.8
73.0
65.3
64.9
64.8
55.6
40.8
37.9
33.1
26.0
20.9
18.1
-3.9
-4.6
170
160
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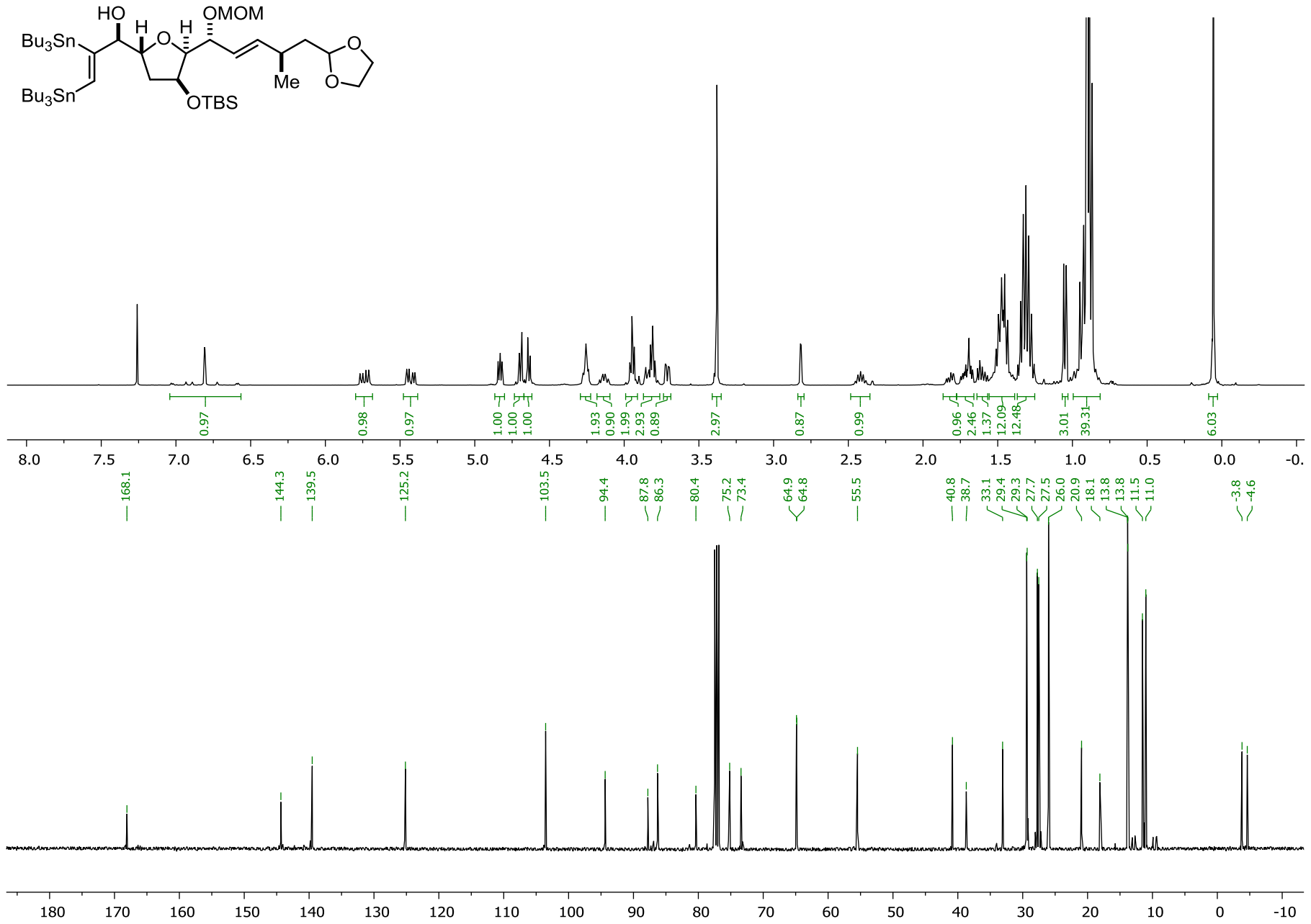
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73.4
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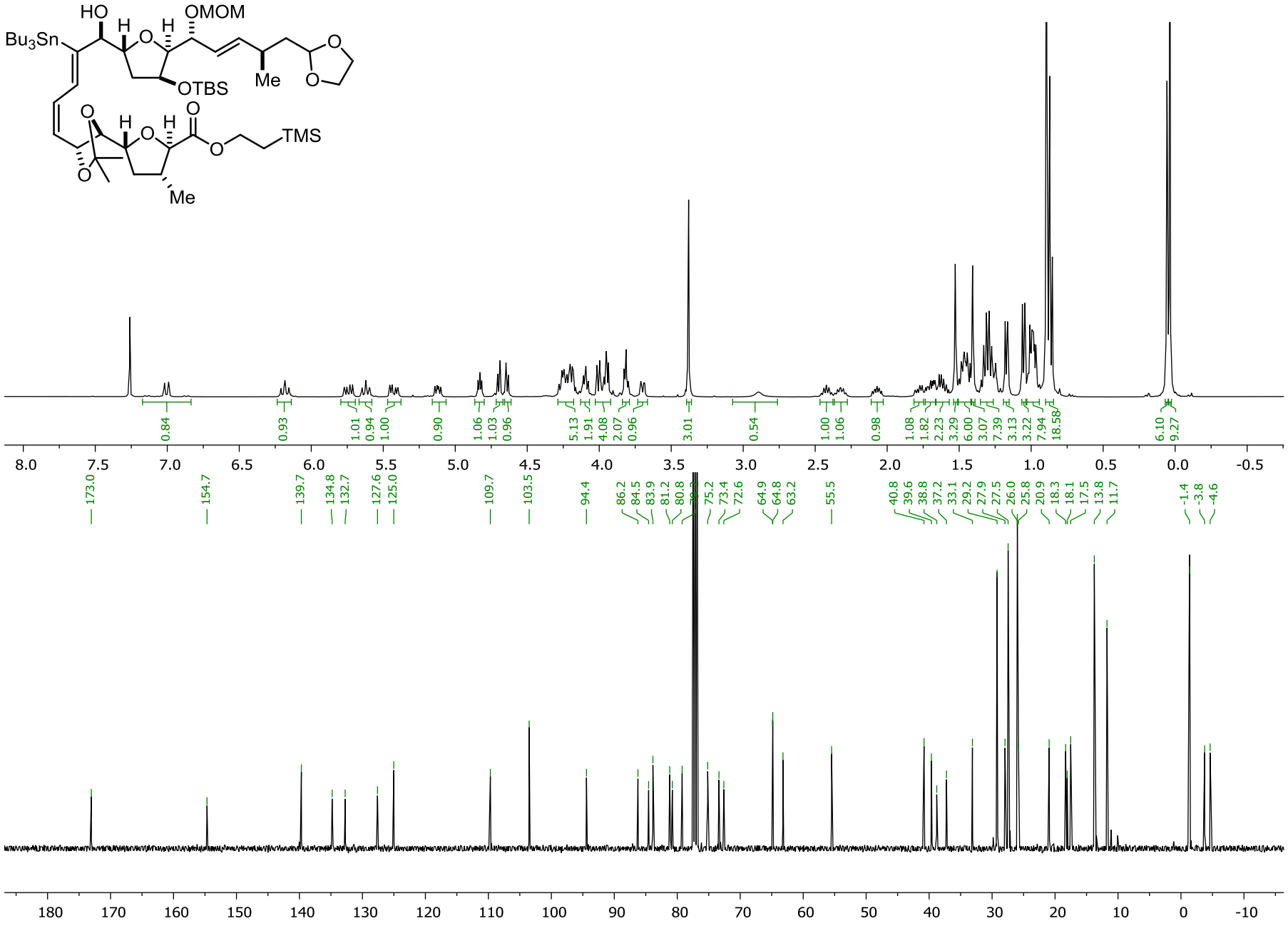
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OTBS
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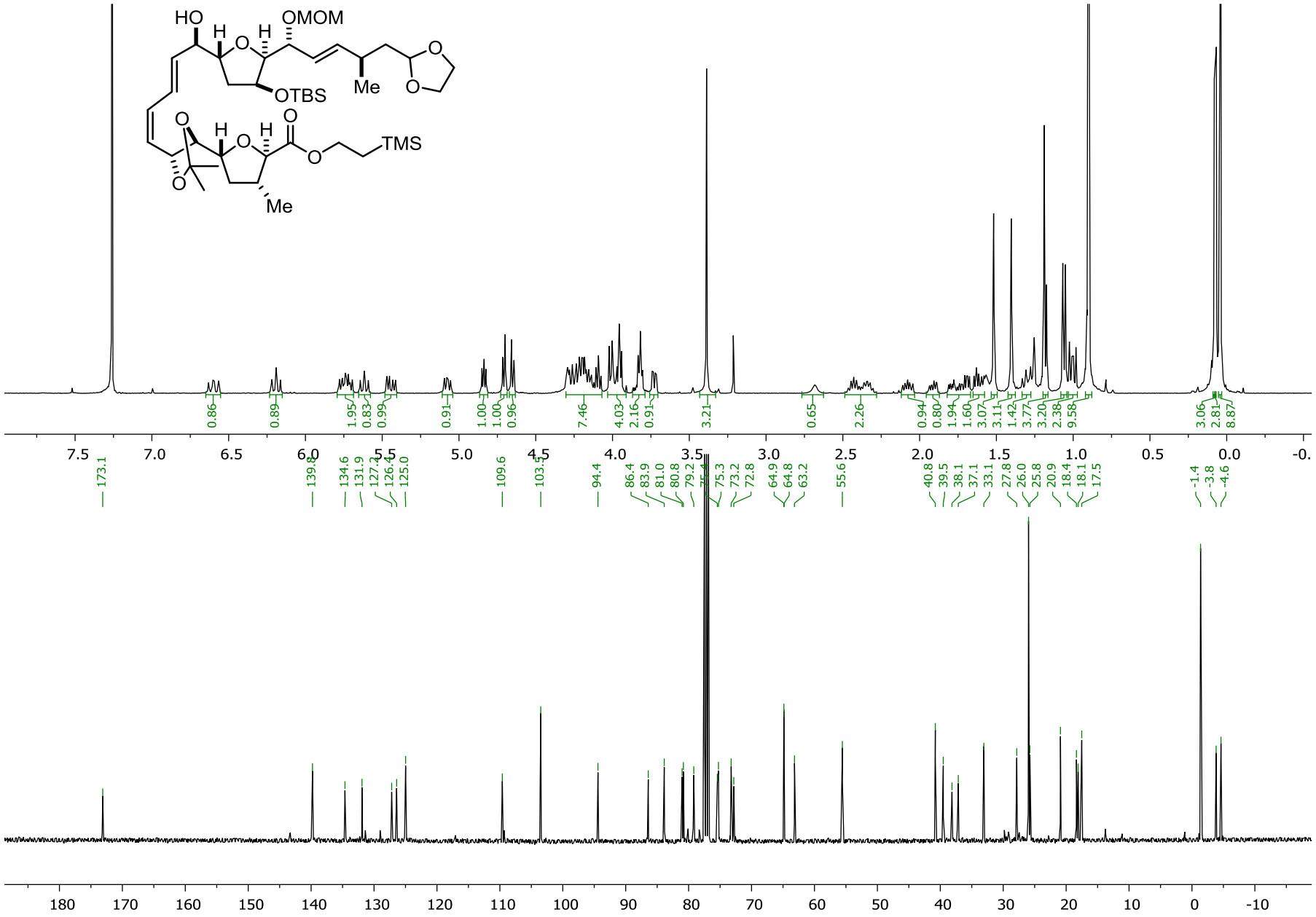
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TMS
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20.9
18.4
18.1
17.5
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-3.8
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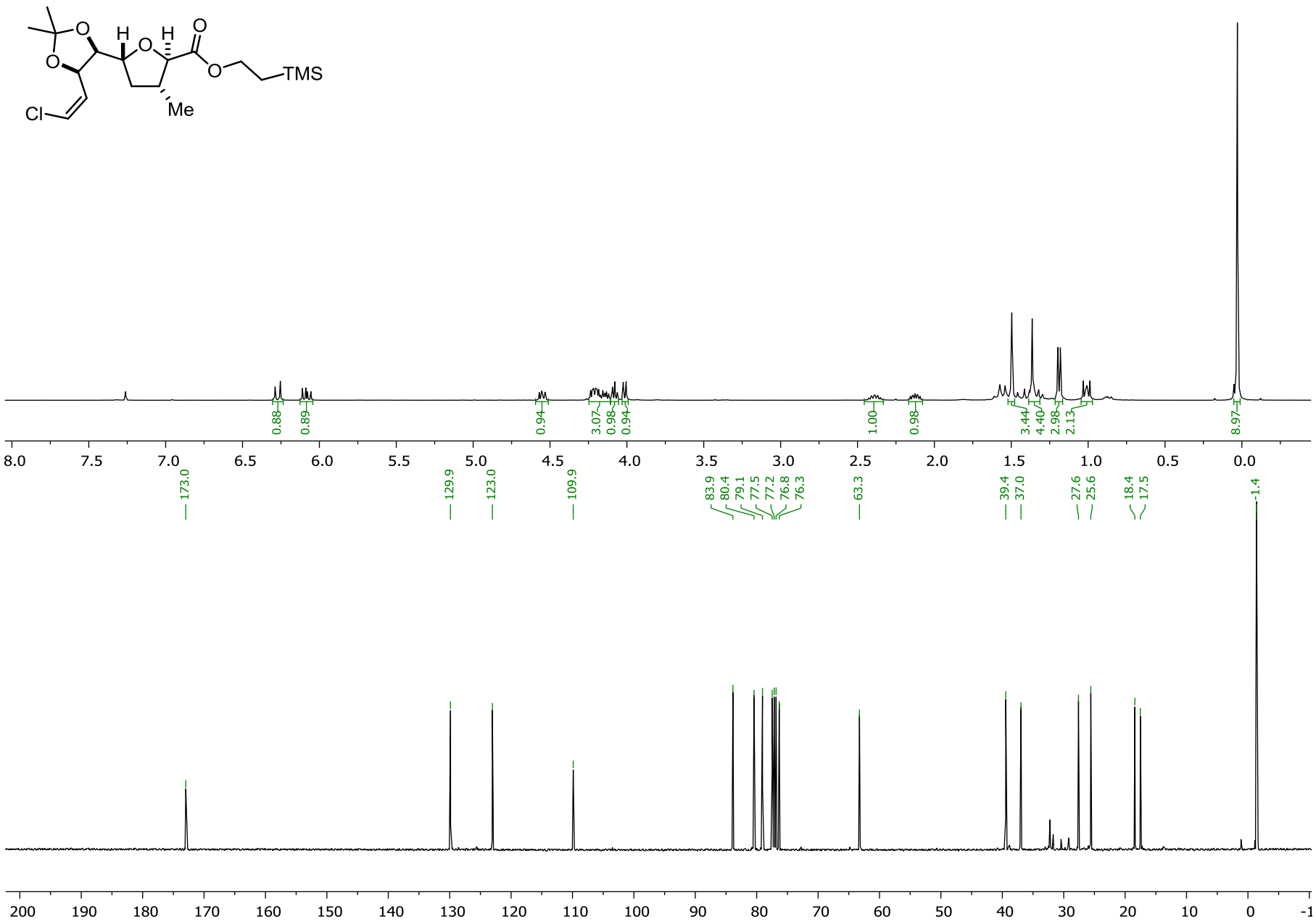
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109.9
83.9
80.4
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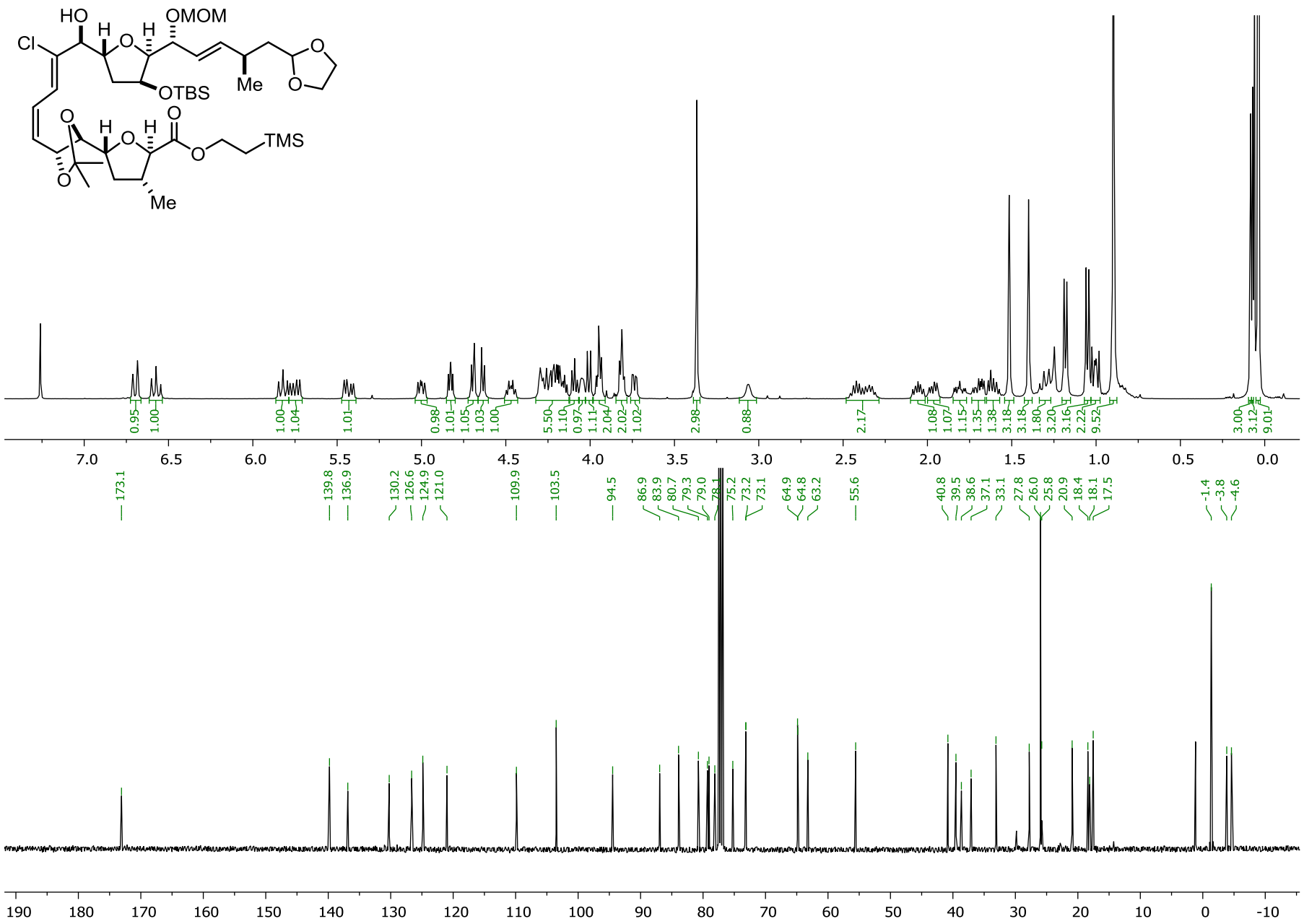
-1.4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OMOM
Cl
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Me
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OTBS
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TMS
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4.5
4.0
3.5
3.0
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0.0
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139.8
136.9
130.2
126.6
124.9
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86.9
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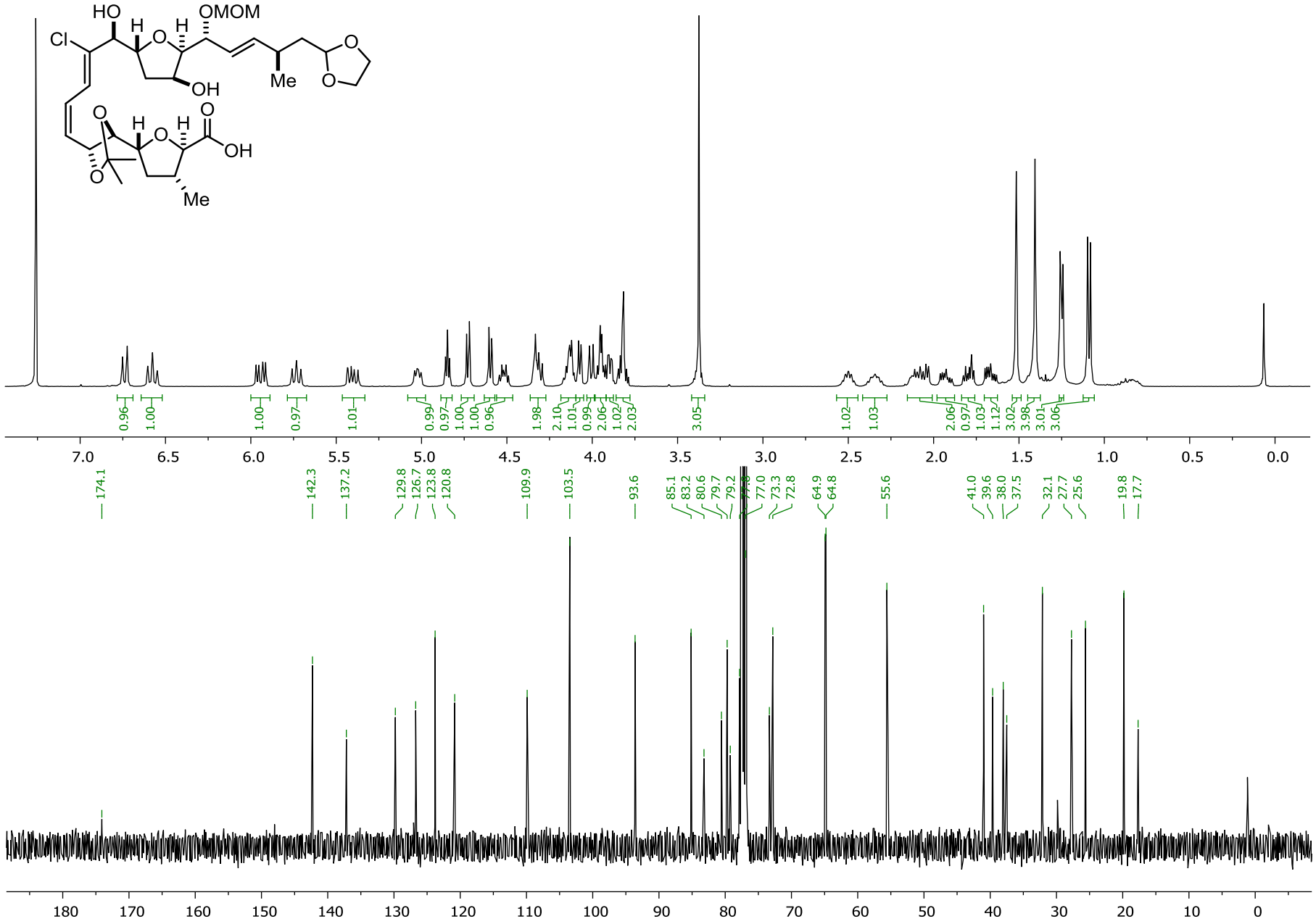
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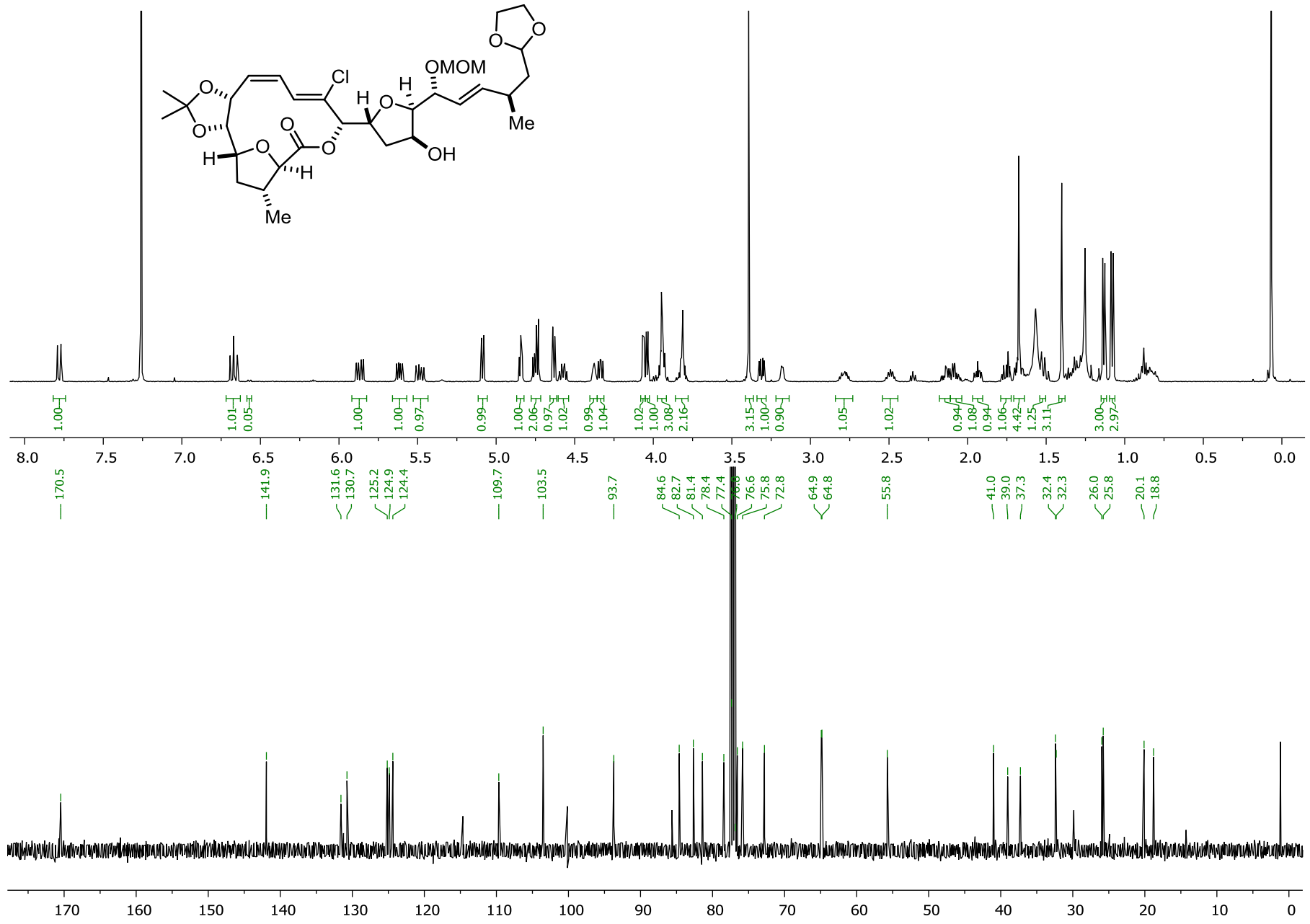
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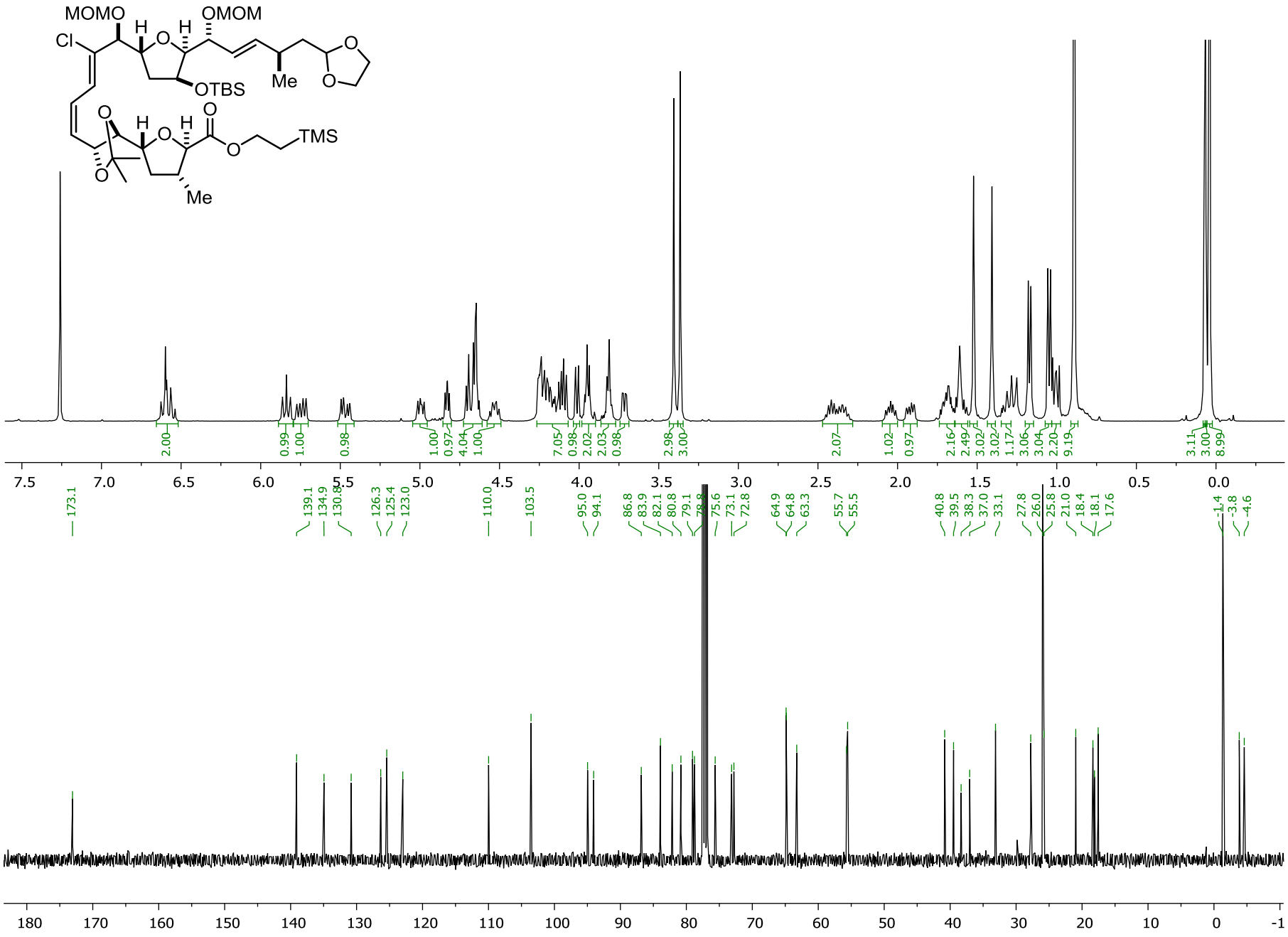
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TMS
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18.1
17.6
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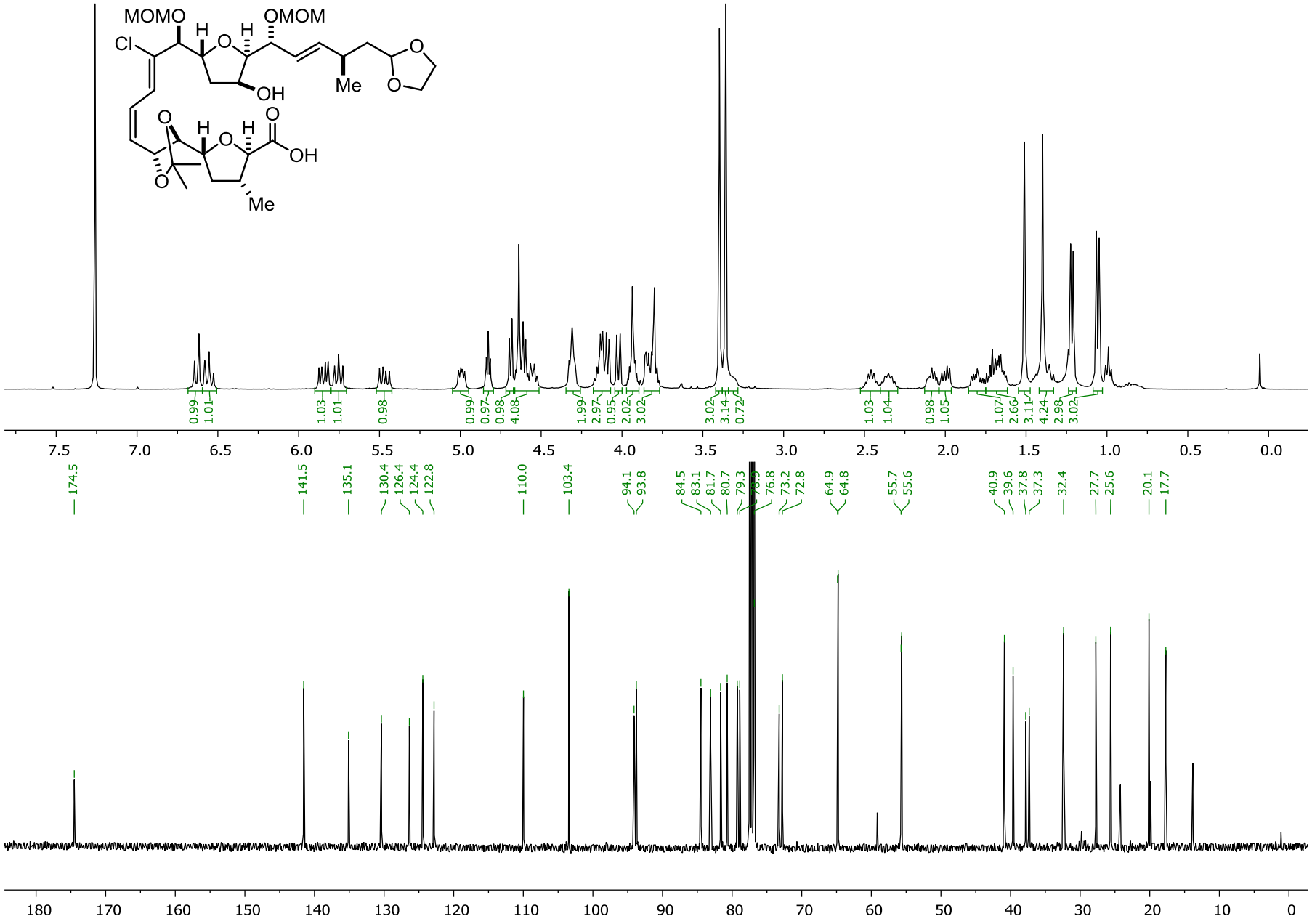
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OH
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7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0
174.5 141.5 135.1 130.4 126.4 124.4 122.8 110.0 103.4 94.1 93.8 84.5 83.1 81.7 80.7 79.3 76.9 76.8 73.2 72.8 64.9 64.8 55.7 55.6 40.9 39.6 37.8 37.3 32.4 27.7 25.6 20.1 17.7
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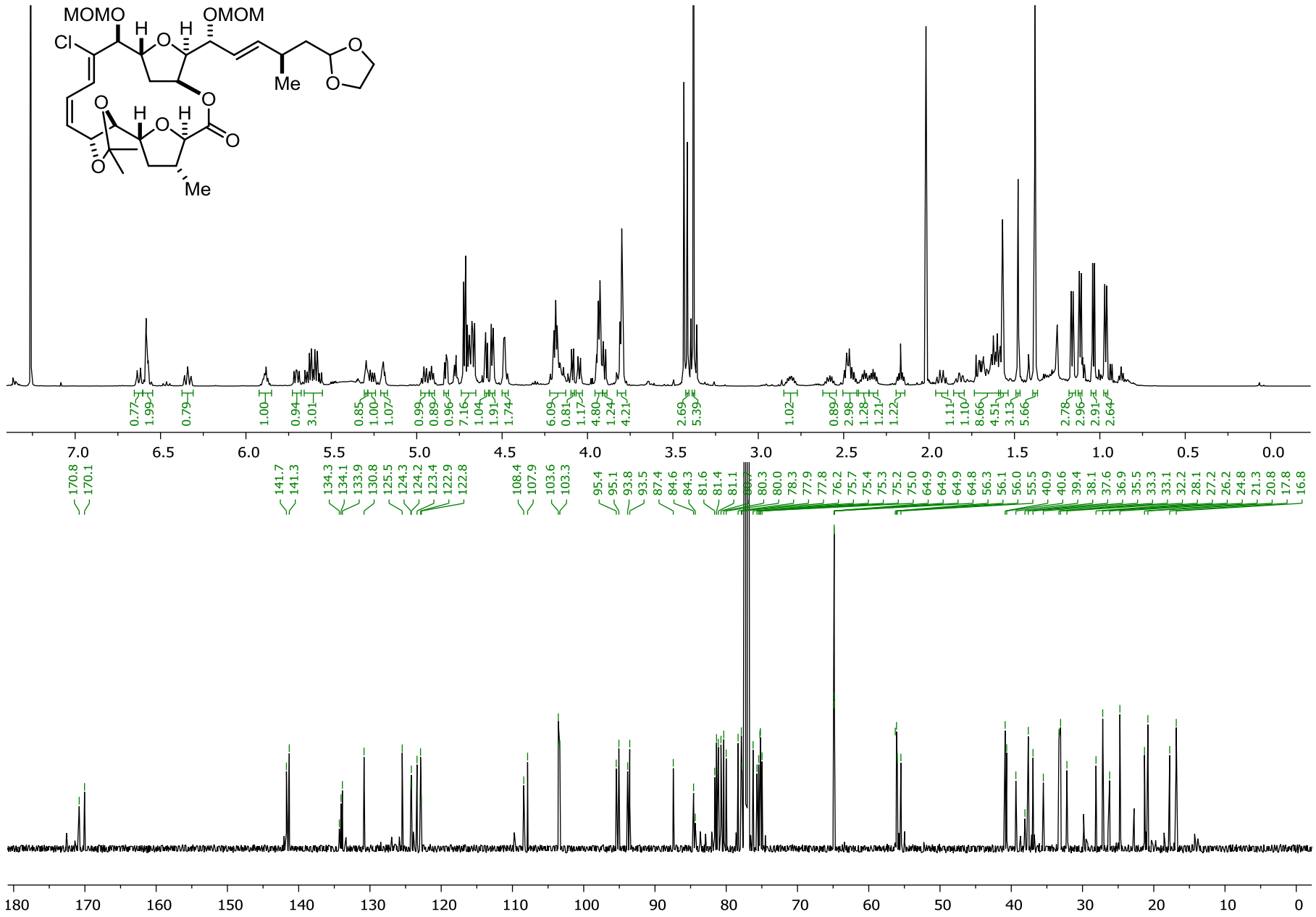
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Me
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Me
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7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0
170.8 170.1 141.7 141.3 134.3 134.1 133.9 130.8 125.5 124.3 124.2 123.4 122.9 122.8 108.4 107.9 103.6 103.3 95.4 95.1 93.8 93.5 87.4 84.6 84.3 81.6 81.4 81.1 80.3 80.0 78.3 77.9 77.8 76.2 75.7 75.4 75.3 75.2 75.0 64.9 64.9 64.9 64.8 56.3 56.1 56.0 55.5 40.9 40.6 39.4 38.1 37.6 36.9 35.5 33.3 33.1 32.2 28.1 27.2 26.2 24.8 21.3 20.8 17.8 16.8
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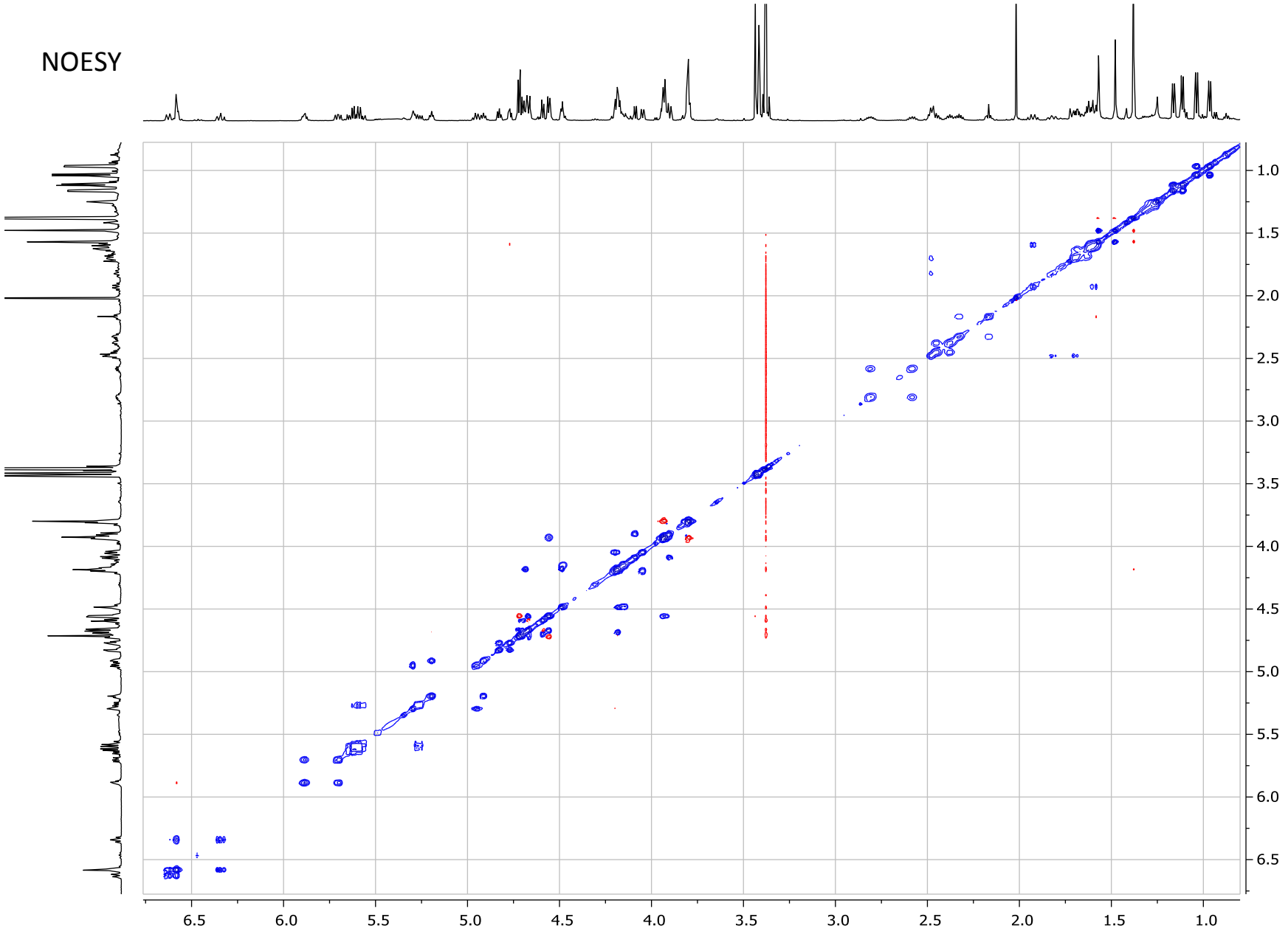
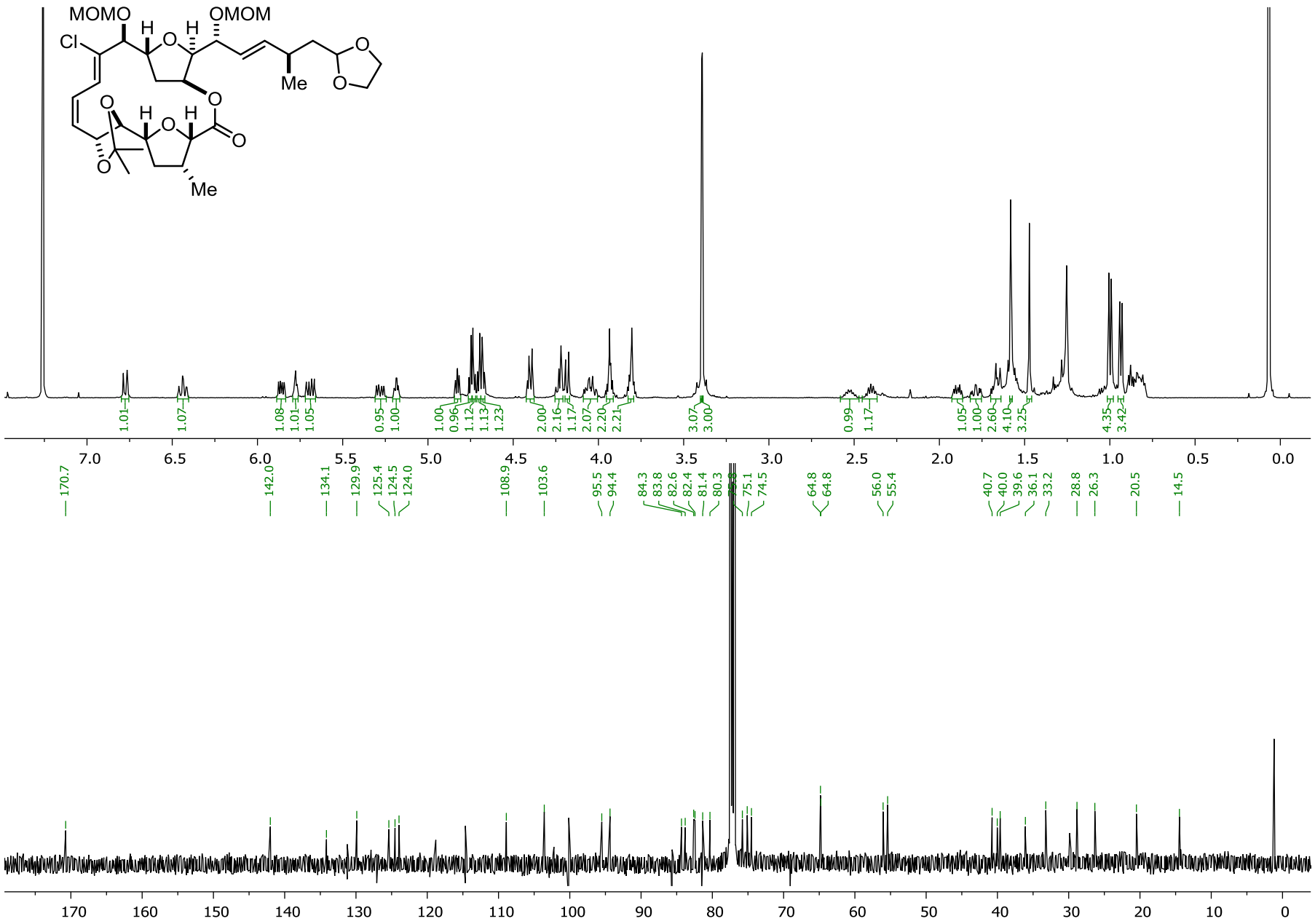
NOESY

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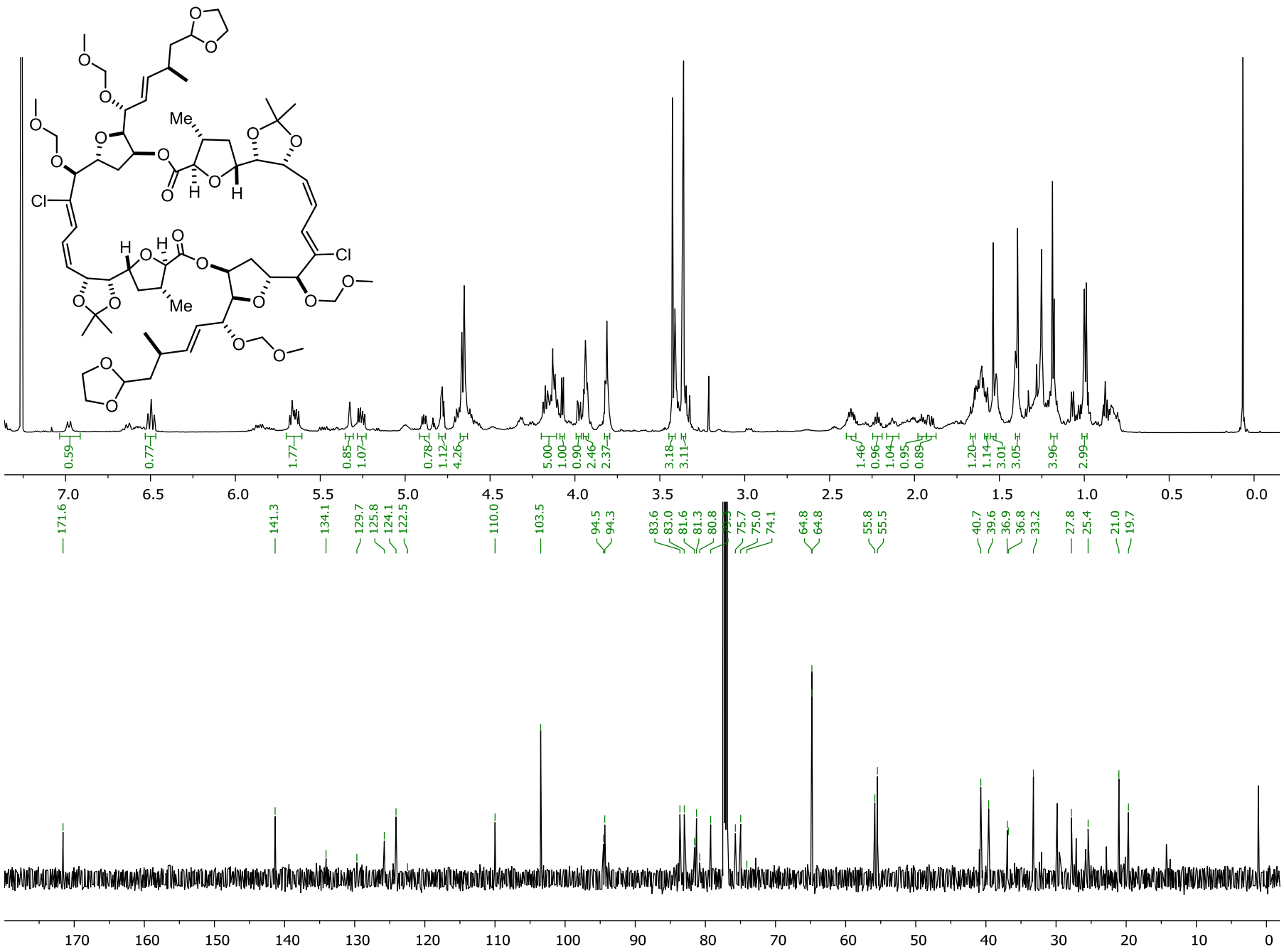
Me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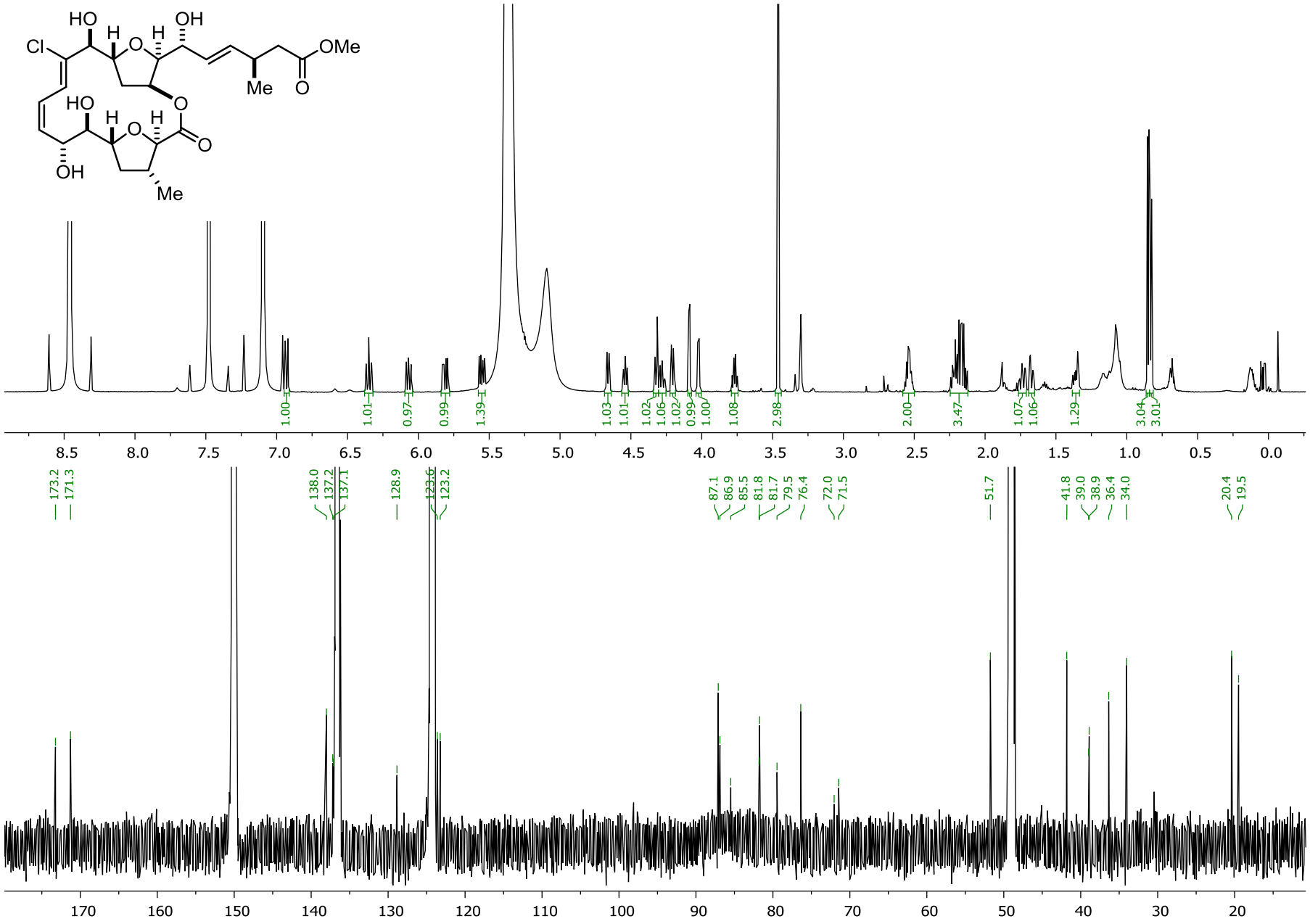
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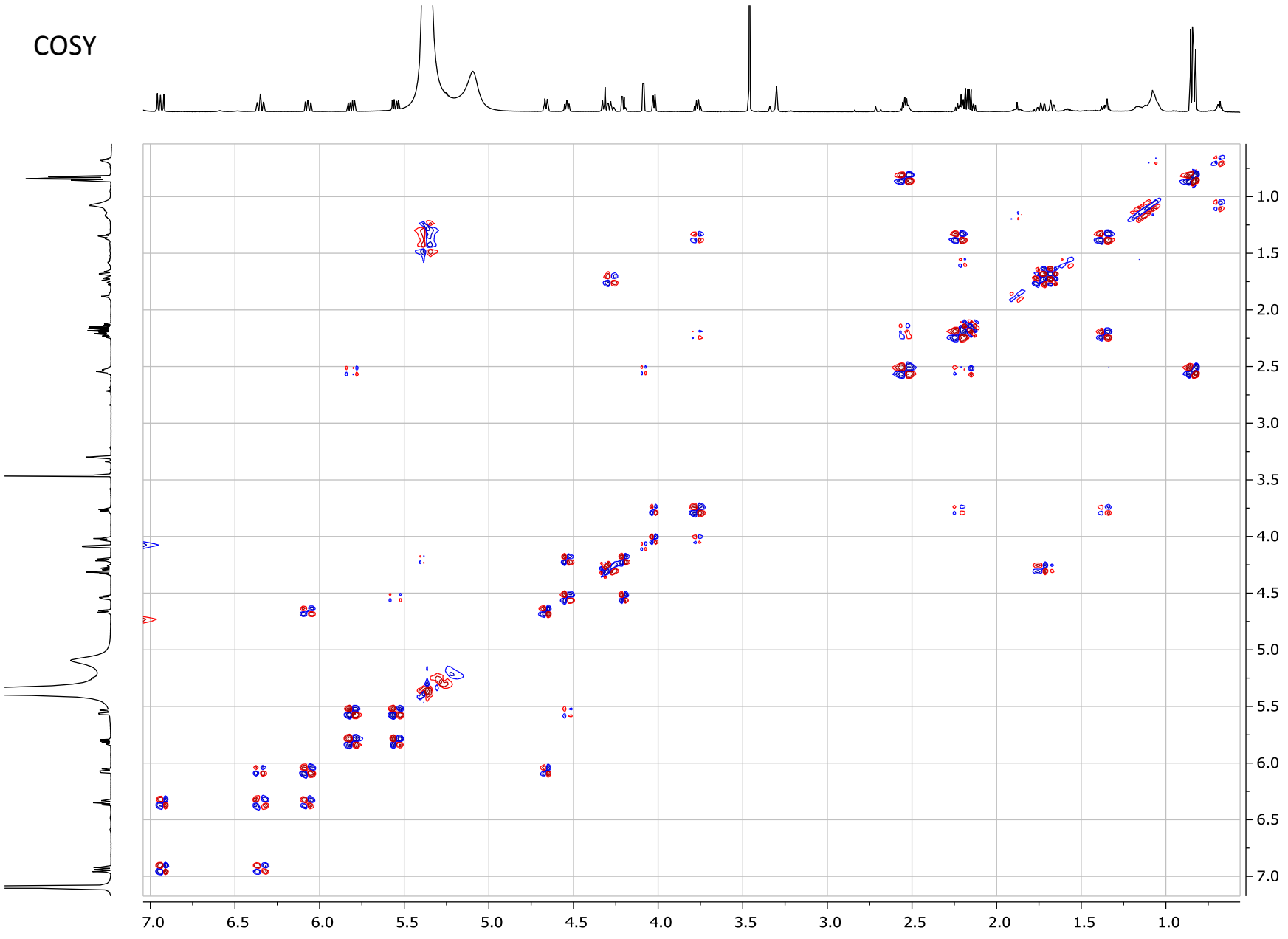
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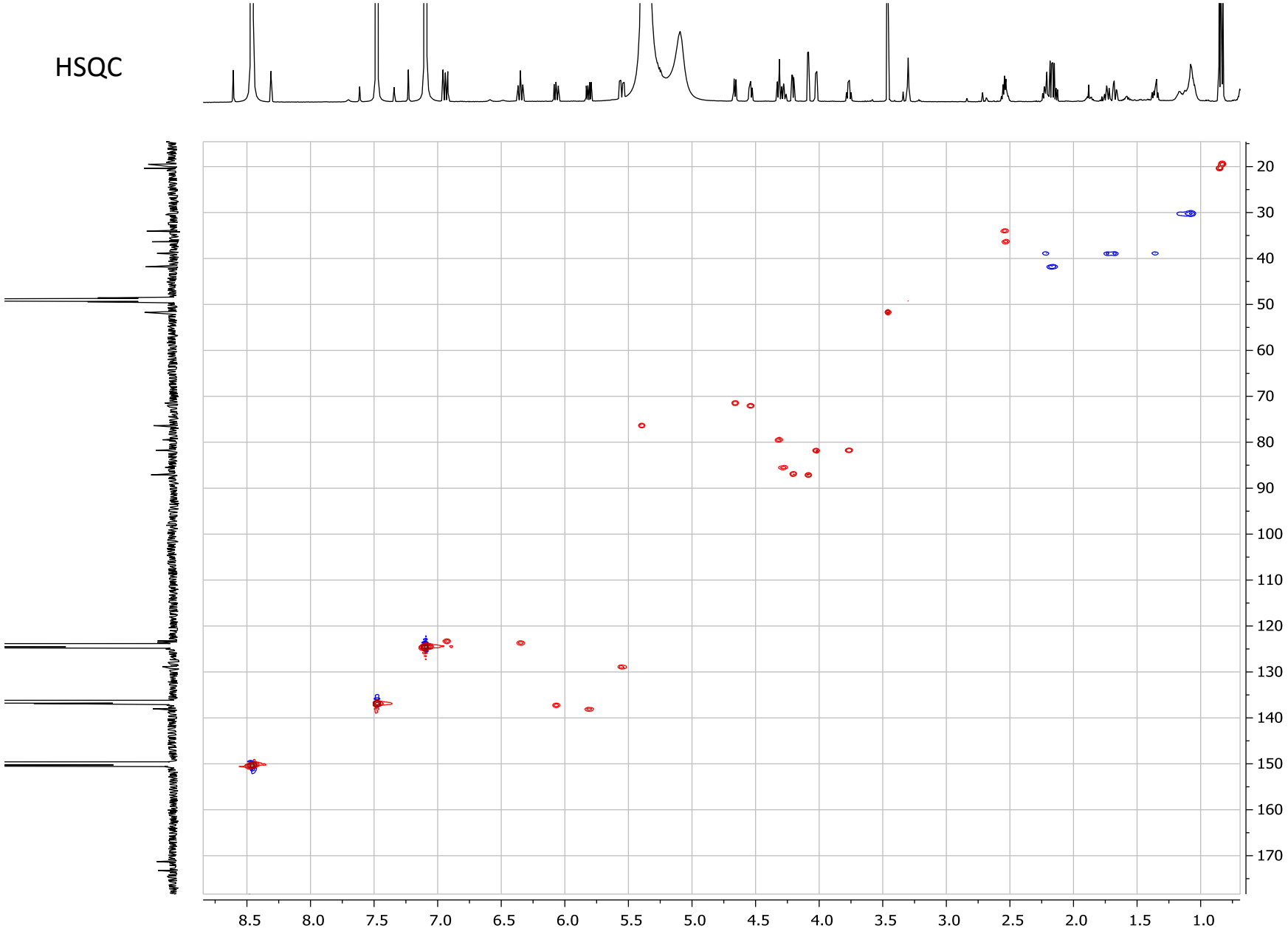
HSQC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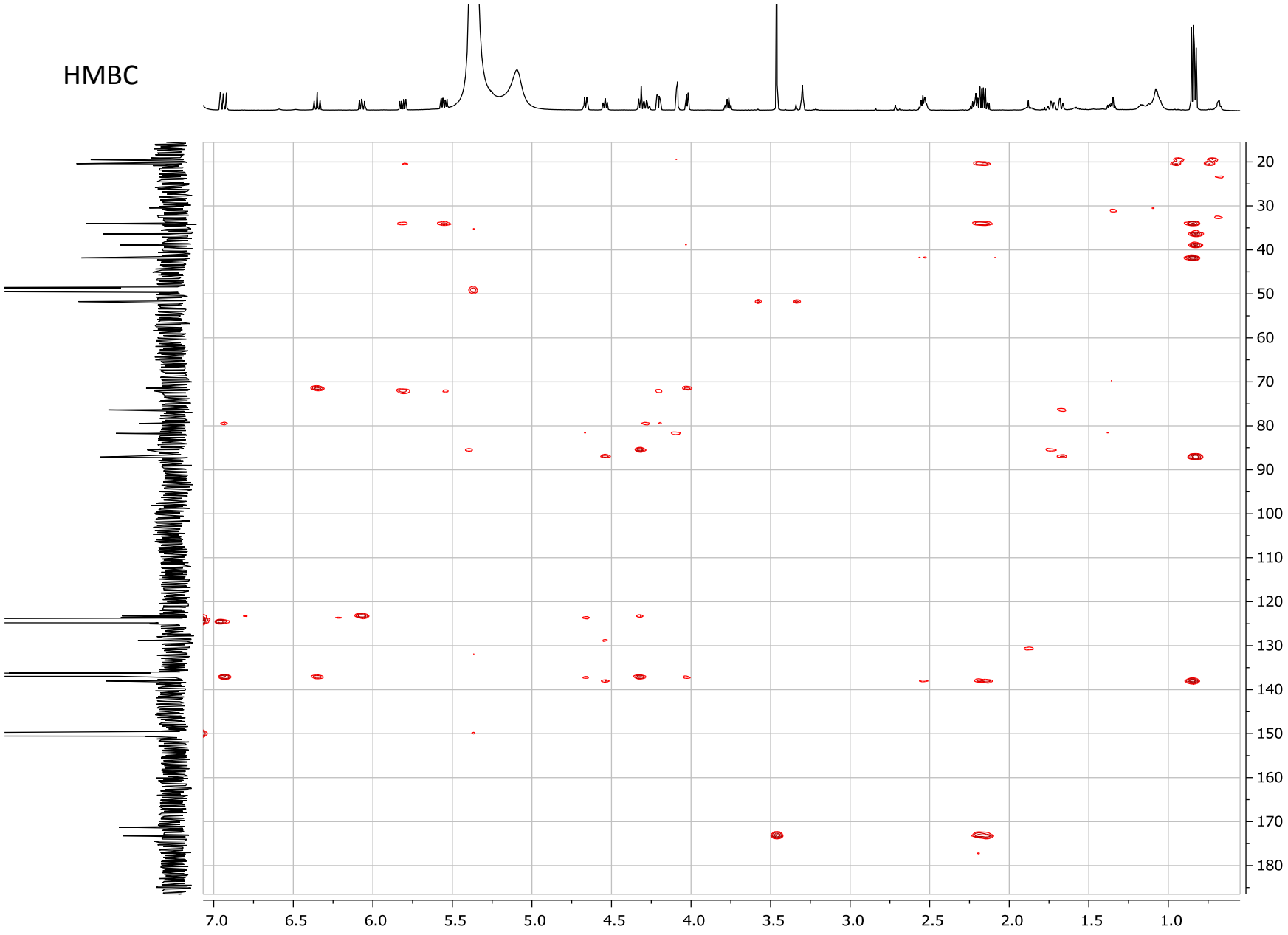
HMBC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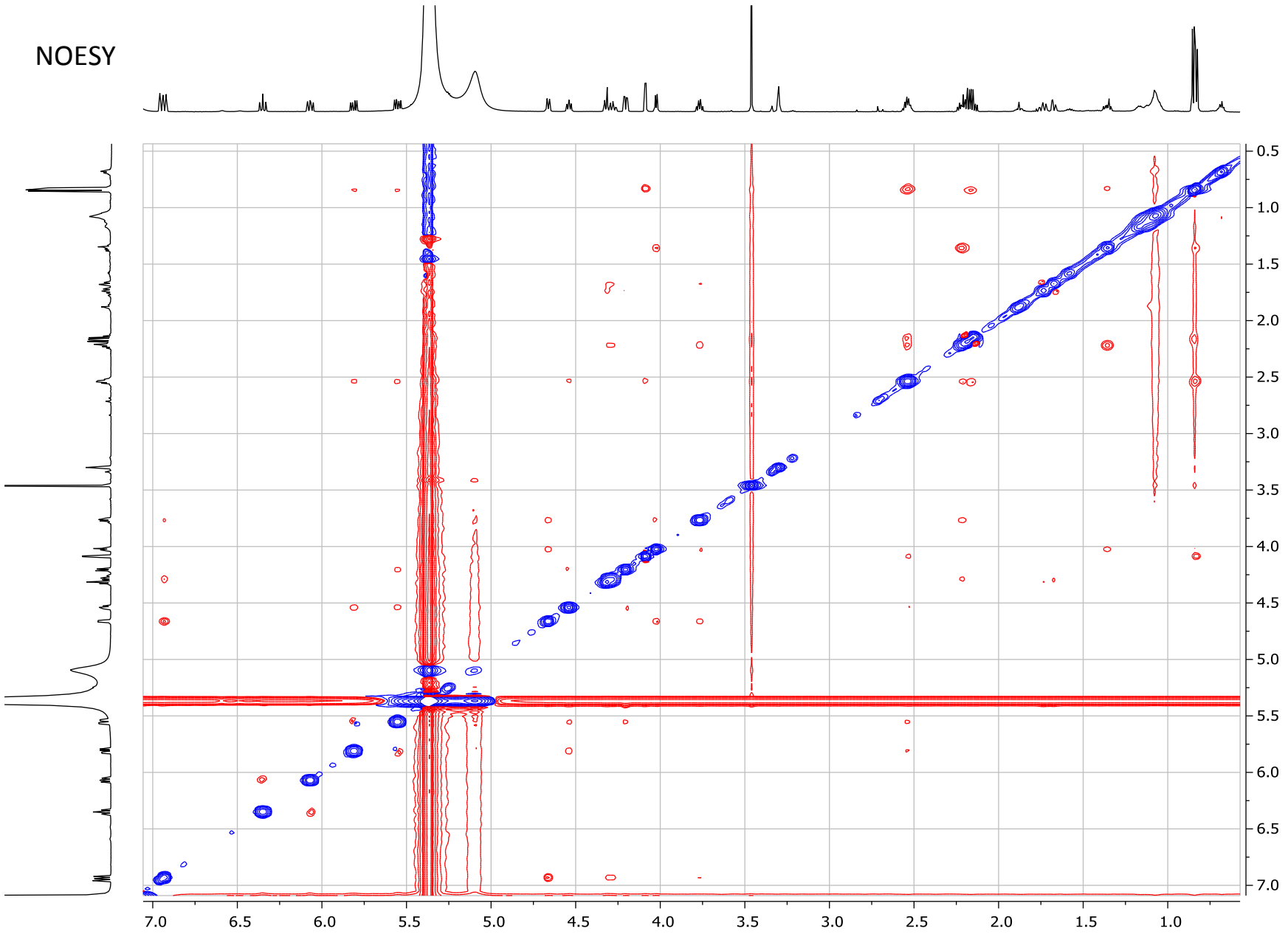
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