Electronic Supplementary Material (ESI) for ChemComm.

Supporting Information

Application of Chiral Triazole-Substituted Iodoarenes in the Enantioselective Construction of Spirooxazolines

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1. General Information

Unless otherwise noted, all reactions were carried out under a nitrogen atmosphere using a *two-necked round-bottomed flask*. All chemicals were purchased from commercial suppliers and either used as received or purified according to *Purification of Common Laboratory Chemicals*.[1] Dry acetonitrile (MeCN) was obtained from an *inert* PS-MD-6 solvent purification system.

Thin layer chromatography was performed on fluorescence indicator marked precoated silica gel 60 plates (*Macherey-Nagel*, ALUGRAM Xtra SIL G/UV_{254}) and visualized by UV light (254 nm/366 nm). Flash column chromatography was performed on silica gel (0.040 – 0.063 mm) with the solvents given in the procedures.

NMR spectra were recorded on a *Bruker AVANCE NEO 600 MHz* spectrometer at 25 °C. Chemical shifts for ^{1}H-NMR spectra are reported as δ (parts per million) relative to the residual proton signal of $CDCl_3$ at 7.26 ppm (s), or DMSO-d_6 at 2.50 ppm (quin). Chemical shifts for ^{13}C-NMR spectra are reported as δ (parts per million) relative to the signal of $CDCl_3$ at 77.0 ppm (t), or DMSO-d_6 at 39.5 ppm (sept). The following abbreviations are used to describe splitting patterns: br. = broad, s = singlet, d = doublet, t = triplet, tt = triplet of triplets, q = quartet, sept = septet, m = multiplet. Coupling constants *J* are given in Hertz.

ESI and APCI mass spectra were recorded on an *Advion* Expression CMSL *via* ASAP probe or direct inlet. High resolution (HR) EI mass spectra were recorded on a double focusing mass spectrometer ThermoQuest MAT 95 XL from *Finnigan MAT*. HR-EI mass spectra were recorded on a *Bruker* impact II. All Signals are reported with the quotient from mass to charge *m/z*. APCI mass spectra were recorded on an Advion Expression CMSL via ASAP probe or direct inlet. All signals were reported with the quotient from mass to charge m/z.

IR spectra were recorded on a *Nicolet* Thermo iS10 scientific spectrometer with a diamond ATR unit.

Melting points of solids were measured on a *Büchi* M-5600 Melting Point apparatus and are uncorrected. The measurements were performed with a heating rate of 2 °C/min and the melting points are reported in °C.

Low temperature reactions were cooled using a *Julabo* FT902 cryostat. If not otherwise noted, solvents were removed on a *Büchi* Rotavapor R-300 with 40 °C water bath temperature.

HPLC chromatograms were recorded on Azura Analytical *Knauer.* UV detection 2.1 L monitored at different wavelength*, pump P6.1 L. Used Columns: Reprosil Chiral- OM, 5 µm (250x4,6* mm).

Optical rotations were measured on *Anton Paar MCP 150*, in chloroform at 23 °C.

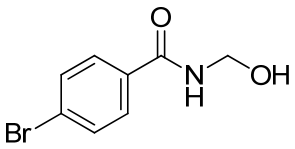
CD-spectra were recorded on a *Jasco J-810 CD-Spectrometer* at 25 °C in chloroform with a concentration of 1.75 m Molar.

2. Experimental Section

2.1. Synthesis of *N*-(hydroxymethyl)benzamide derivatives (GP1)

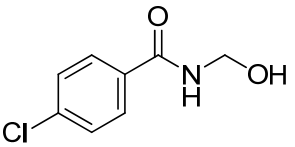
Benzamide derivative (1.00 mmol, 1.00 eq.) was dissolved in (5.00 ml) ethanol. A 37% aqueous formaldehyde solution (0.15 mL, 1.50 mmol, 1.50 eq.) and potassium carbonate (138 mg, 1.00 mmol, 1.00 eq.) were added and stirred at 60 °C for 8 h. Extracted three times with dichloromethane and water, and then washed with saturated brine, dried with anhydrous Na_2SO_4, evaporation of the solvent, and performed column chromatography using mixture of (DCM: MeOH) to yield the desired product.

2.1.1. Synthesis of 4-bromo-*N*-(hydroxymethyl)benzamide (a1)



Following GP1, 4-bromo benzamide (200 mg, 1.00 mmol, 1.00 eq.) was dissolved in (5.00 ml) ethanol. Then, a 37% aqueous formaldehyde solution (0.150 mL, 1.50 mmol, 1.50 eq.) and potassium carbonate (138 mg, 1.00 mmol, 1.00 eq.) were added and stirred at 60 °C for 8 h. After work-up and column chromatography (DCM:MeOH 20:1) **a1** (207 mg, 0.900 mmol, 90%) was obtained as a white solid. **Mp**: 137-139 °C. **^{1}H NMR (600 MHz, DMSO-*d*$_6$):** δ 9.21 (t, *J* = 6.0 Hz, 1H), 7.92 – 7.87 (m, 2H), 7.58 – 7.52 (m, 2H), 5.70 (t, *J* = 6.8 Hz, 1H), 4.70 (t, *J* = 6.5 Hz, 2H). **^{13}C NMR (150 MHz, DMSO-*d*$_6$):** δ 165.6, 136.7, 133.5, 129.7, 128.7, 63.4. **HR-MS (EI, 70 eV):** calculated for $[C_8H_8BrNNaO_2]^{+\cdot}$: *m/z*= 251.9741, found: 251.9744 (Dev.: 0.29 mu; 0.66 ppm). **IR (ATR):** $\tilde{\nu}$ (cm^{-1})= 3341, 2976, 2873, 2162, 1646, 1591, 1568, 1533, 1478, 1445, 1385, 1364, 1290, 1147, 1136, 1009, 845, 755, 708.

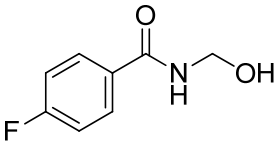
2.1.2. Synthesis of 4-chloro-*N*-(hydroxymethyl)benzamide (b1)



Following GP1, 4-chlorobenzamide (156 mg, 1.00 mmol, 1.00 eq.) was dissolved in (5.00 ml) ethanol. Then, a 37% aqueous formaldehyde solution (0.150 mL, 1.50 mmol, 1.50 eq.) and potassium carbonate (138 mg, 1.00 mmol, 1.00 eq.) were added and stirred at 60 °C for 8 h. After work-up and column chromatography (DCM:MeOH 20:2) **b1** (171 mg, 0.920 mmol, 92%) was obtained as a white solid. **Mp:** 144-146 °C. **^{1}H NMR (600 MHz, Chloroform-d):** δ 7.76 – 7.71 (m, 2H), 7.47 – 7.42 (m, 2H), 7.04 (bs, 1H), 4.96 (s, 2H), 3.35 (s, 1H). **^{13}C NMR (150 MHz, Chloroform-d):** δ 167.8, 138.6, 131.8, 129.1, 128.5, 65.5. **HR-MS (EI, 70 eV):** calculated for $[C_8H_8ClNNaO_2]^{+\cdot}$: m/z= 208.0133, found: 208.0135 (Dev.: 0.25 mu; 1.20 ppm). **IR (ATR): $\tilde{\nu}$ (cm^{-1})=** 3338,

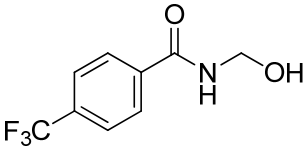
3272, 2839, 1638, 1594, 1548, 1311, 1113, 1007, 843, 720, 667. Analytical data is in accordance with literature data.[2]

2.1.3. Synthesis of 4-fluoro-*N*-(hydroxymethyl)benzamide (c1)



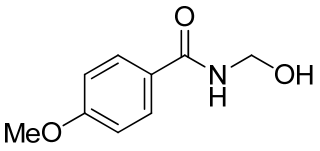
Following GP1, 4-fluorobenzamide (139 mg, 1.00 mmol, 1.00 eq.) was dissolved in (5.00 ml) ethanol. Then, a 37% aqueous formaldehyde solution (0.150 mL, 1.50 mmol, 1.50 eq.) and potassium carbonate (138 mg, 1.00 mmol, 1.00 eq.) were added and stirred at 60 °C for 8 h. After work-up and column chromatography (DCM:MeOH 20:1) **c1** (155 mg, 0.920 mmol, 92%) was obtained as a white solid. **Mp:** 196-198 °C. **^{1}H NMR (600 MHz, Chloroform-d):** δ 7.86 – 7.77 (m, 2H), 7.21 – 7.00 (m, 3H), 4.97 (s, 2H), 3.53 (s, 1H). **^{13}C NMR (150 MHz, Chloroform-d):** δ 167.8, 166.0, 164.3, 129.8, 129.6 (d, J = 9.0 Hz), 115.9 (d, J = 22.0 Hz), 65.4. **^{19}F NMR (376 MHz, $CDCl_3$)** δ = –118.40. **HR-MS (EI, 70 eV):** calculated for $[C_8H_8FNNaO_2]^{+\cdot}$: m/z= 192.0459, found: 192.0461 (Dev.: 0.19 mu; 0.37 ppm). **IR (ATR): $\tilde{\nu}$ (cm^{-1})=** 3275, 3114, 2758, 1645, 1590, 1434, 1384, 1004, 852, 747, 680. Analytical data is in accordance with literature data.[3]

2.1.4. Synthesis of *N*-(hydroxymethyl)-4-(trifluoromethyl)benzamide (d1)



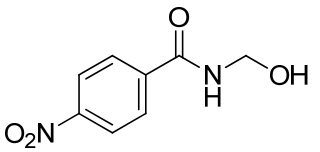
Following GP1, 4-trifluoromethylbenzamide (189 mg, 1.00 mmol, 1.00 eq.) was dissolved in (5.00 ml) ethanol. Then, a 37% aqueous formaldehyde solution (0.150 mL, 1.50 mmol, 1.50 eq.) and potassium carbonate (138 mg, 1.00 mmol, 1.00 eq.) were added and stirred at 60 °C for 8 h. After work-up and column chromatography (DCM:MeOH 20:3) **d1** (195 mg, 0.890 mmol, 89%) was obtained as a white solid. **Mp:** 114-116 °C. **^{1}H NMR (600 MHz, DMSO-d_6):** δ 9.38 (bs, 1H), 8.07 (d, *J* = 8.5 Hz, 2H), 7.86 (d, *J* = 7.6 Hz, 2H), 5.80 (bs, 1H), 4.73 (s, 2H). **^{13}C NMR (150 MHz, DMSO-d_6):** δ 165.5, 138.5, 1318 (d, J = 31.8 Hz), 128.8 (d, J = 19.0 Hz),125.9 (d, J = 3.6 Hz), 125.3, 123.5, 63.5. **^{19}F NMR (376 MHz, DMSO-d_6)** δ = –64.35. **HR-MS (EI, 70 eV):** calculated for $[C_9H_8F_3NNaO_2]^{+\cdot}$: m/z= 242.0977, found: 242.0981 (Dev.: 0.40 mu; 0.96 ppm). **IR (ATR): $\tilde{\nu}$ (cm^{-1})=** 3315, 2966, 1651, 1579, 1537, 1509, 1323, 1168, 1126, 1106, 1016, 861, 778, 689.

2.1.5. Synthesis of *N*-(hydroxymethyl)-4-methoxybenzamide (e1)



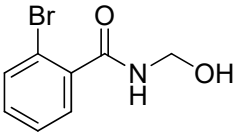
Following GP1, 4-methoxybenzamide (151 mg, 1.00 mmol, 1.00 eq.) was dissolved in (5.00 ml) ethanol. Then, a 37% aqueous formaldehyde solution (0.150 mL, 1.50 mmol, 1.50 eq.) and potassium carbonate (138 mg, 1.00 mmol, 1.00 eq.) were added and stirred at 60 °C for 8 h. After work-up and column chromatography (DCM:MeOH 20:1) **e1** (172 mg, 0.950 mmol, 95%) was obtained as a white solid. **Mp:** 203-205 °C. **^{1}H NMR (600 MHz, DMSO-*d*$_6$):** δ 9.01 (bs, 1H), 7.99 – 7.74 (m, 2H), 7.05 – 6.93 (m, 2H), 4.69 (s, 2H), 3.81 (s, 3H). **^{13}C NMR (150 MHz, DMSO-*d*$_6$):** δ 165.5, 161.1, 129.0, 126.3, 113.4, 62.7, 55.2. **HR-MS (EI, 70 eV):** calculated for $[C_9H_{11}NNaO_3]^{+\cdot}$: m/z= 204.0714, found: 204.0716 (Dev.: 0.15 mu; 0.33 ppm). **IR (ATR): $\tilde{\nu}$ (cm^{-1})=** 3387, 3310, 3163, 2841, 1643, 1606, 1533, 1422, 1248, 1180, 1023, 847, 714, 671. Analytical data is in accordance with literature data.[4]

2.1.6. Synthesis of *N*-(hydroxymethyl)-4-nitrobenzamide (f1)



Following GP1, 4-nitrobenzamide (166 mg, 1.00 mmol, 1.00 eq.) was dissolved in (5.00 ml) ethanol. Then, a 37% aqueous formaldehyde solution (0.150 mL, 1.50 mmol, 1.50 eq.) and potassium carbonate (138 mg, 1.00 mmol, 1.00 eq.) were added and stirred at 60 °C for 8 h. After work-up and column chromatography (DCM:MeOH 20:2) **f1** (183 mg, 0.930 mmol, 93%) was obtained as a yellow oil. **^{1}H NMR (600 MHz, DMSO *d*$_6$):** δ 9.52 (s, 1H), 8.36 – 8.27 (m, 2H), 8.16 – 8.05 (m, 2H), 7.72 (s, 1H), 4.74 (d, *J* = 3.8 Hz, 2H). **^{13}C NMR (150 MHz, DMSO-*d*$_6$):** δ 166.7, 149.5, 1405, 129.4, 123.9, 63.6. **HR-MS (EI, 70 eV):** calculated for $[C_8H_8N_2NaO_4]^{+\cdot}$: m/z= 219.0532, found: 219.0533 (Dev.: 0.12 mu; 0.25 ppm). **IR (ATR): $\tilde{\nu}$ (cm^{-1})=** 3370, 3176, 1655, 1623, 1521, 1338, 1144, 1069, 1013, 870, 800, 767, 705.

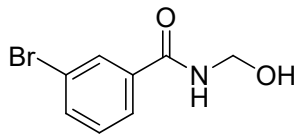
2.1.7. Synthesis of 2-bromo-*N*-(hydroxymethyl)benzamide (g1)



Following GP1, 2-bromobenzamide (200 mg, 1.00 mmol, 1.00 eq.) was dissolved in (5.00 ml) ethanol. Then, a 37% aqueous formaldehyde solution (0.150 mL, 1.50 mmol, 1.50 eq.) and potassium carbonate (138 mg, 1.00 mmol, 1.00 eq.) were added and stirred at 60 °C for 8 h. After work-up and column chromatography (DCM:MeOH 10:1) **g1** (194 mg, 0.840 mmol, 84%) was obtained as a pale-brown solid. **Mp:** 161-163 °C. **1H NMR (600 MHz, Chloroform-d):** δ 8.08 (dd, *J* = 7.9, 1.8 Hz, 1H), 7.71 (d, *J* = 8.4 Hz, 1H),

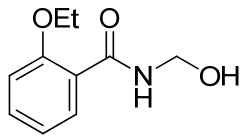
7.59 (d, *J* = 8.8 Hz, 1H), 7.38 (ddd, *J* = 8.3, 6.9, 1.3 Hz, 1H), 7.26 (ddd, *J* = 8.3, 7.3, 1.9 Hz, 1H), 6.90 (s, 1H), 4.83 (d, *J* = 6.6 Hz, 2H). **^{13}C NMR (150 MHz, Chloroform-d):** δ 167.1, 133.0, 129.4, 126.1, 122.3, 120.2, 111.6, 64.2. **HR-MS (EI, 70 eV):** calculated for $[C_8H_8BrNNaO_2]^{+\cdot}$: *m/z*= 251.9755, found: 251.9757 (Dev.: 0.21 mu; 0.53 ppm). **IR (ATR): $\tilde{\nu}$ (cm^{-1})=** 3320, 2986, 2100, 1642, 1421, 1365, 1240, 1162, 841, 733, 692.

2.1.8. Synthesis of 3-bromo-*N*-(hydroxymethyl)benzamide (h1)



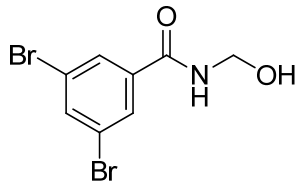
Following GP1, 3-bromobenzamide (200 mg, 1.00 mmol, 1.00 eq.) was dissolved in (5.00 ml) ethanol. Then, a 37% aqueous formaldehyde solution (0.150 mL, 1.50 mmol, 1.50 eq.) and potassium carbonate (138 mg, 1.00 mmol, 1.00 eq.) were added and stirred at 60 °C for 8 h. After work-up and column chromatography (DCM:MeOH 20:3) **h1** (186 mg, 0.810 mmol, 81%) was obtained as a brown solid. **Mp:** 146-148 °C. **^{1}H NMR (600 MHz, Chloroform-d):** δ 8.52 (s, 1H), 7.74 (d, *J* = 8.2 Hz, 1H), 7.65 (d, *J* = 8.8 Hz, 1H), 7.37 (t, *J* = 7.8 Hz, 1H), 7.21 (s, 1H), 4.95 (d, *J* = 6.5 Hz, 2H). **^{13}C NMR (150 MHz, Chloroform-d):** δ 167.5, 134.7, 132.6, 131.8, 130.4, 127.5, 122.0, 114.8. **HR-MS (EI, 70 eV):** calculated for $[C_8H_8BrNNaO_2]^{+\cdot}$: *m/z*= 251.9754, found: 251.9755 (Dev.: 0.11 mu; 0.24 ppm). **IR (ATR): $\tilde{\nu}$ (cm^{-1})=** 3299, 3011, 2781, 1640, 1532, 14888, 1420, 1366, 1202, 1007, 922, 836, 741, 694.

2.1.9. Synthesis of 2-ethoxy-*N*-(hydroxymethyl)benzamide (i1)



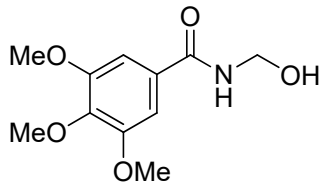
Following GP1, 2-ethoxybenzamide (165 mg, 1.00 mmol, 1.00 eq.) was dissolved in (5.00 ml) ethanol. Then, a 37% aqueous formaldehyde solution (0.150 mL, 1.50 mmol, 1.50 eq.) and potassium carbonate (138 mg, 1.00 mmol, 1.00 eq.) were added and stirred at 60 °C for 8 h. After work-up and column chromatography (DCM:MeOH 5:1) **i1** (162 mg, 0.830 mmol, 83%) was obtained as a white solid. **Mp:** 183-185 °C. **^{1}H NMR (600 MHz, Chloroform-d):** δ 7.87 (d, *J* = 8.4 Hz, 1H), 7.74 (d, *J* = 8.9 Hz, 1H), 7.44 – 7.40 (m, 1H), 7.35 (ddd, *J* = 8.0, 6.9, 1.0 Hz, 1H), 6.91 (d, *J* = 8.3 Hz, 1H), 4.98 (d, *J* = 6.6 Hz, 2H), 4.15 (q, *J* = 7.0 Hz, 2H), 1.54 (t, *J* = 7.0 Hz, 3H). 13C NMR (150 MHz, Chloroform-d): δ 166.5, 165.0, 156.6, 132.6, 120.5, 113.3, 113.1, 63.0, 14.6. **HR-MS (EI, 70 eV):** calculated for $[C_{10}H_{13}NNaO_3]^{+\cdot}$: m/z= 218.0873, found: 218.0874 (Dev.: 0.09 mu; 0.20 ppm). **IR (ATR): $\tilde{\nu}$ (cm^{-1})=** 3368, 2785, 2341, 1647, 1520, 1488, 1451, 1321, 1156, 1014, 930, 844, 736.

2.1.10. Synthesis of 3,5-dibromo-*N*-(hydroxymethyl)benzamide (j1)



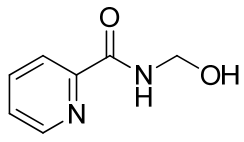
Following GP1, 3,5-dibromobenzamide (279 mg, 1.00 mmol, 1.00 eq.) was dissolved in (5.00 ml) ethanol. Then, a 37% aqueous formaldehyde solution (0.150 mL, 1.50 mmol, 1.50 eq.) and potassium carbonate (138 mg, 1.00 mmol, 1.00 eq.) were added and stirred at 60 °C for 8 h. After work-up and column chromatography (DCM:MeOH 20:3) **j1** (284 mg, 0.920 mmol, 92%) was obtained as a white solid. **Mp:** 219-221 °C. **^{1}H NMR (600 MHz, DMSO-*d*$_6$):** δ 9.39 (s, 1H), 8.09 – 8.05 (m, 3H), 4.69 (s, 2H). **^{13}C NMR (150 MHz, DMSO-*d*$_6$):** δ 163.8, 138.3, 136.6, 129.8, 123.1, 63.6. **HR-MS (EI, 70 eV):** calculated for $[C_8H_7Br_2NNaO_2]^{+\cdot}$: m/z= 329.8732, found: 329.8735 (Dev.: 0.36 mu; 1.09 ppm). **IR (ATR): $\tilde{\nu}$ (cm^{-1})=** 3370, 3055, 1622, 1574, 1495, 1335, 1236, 1156, 1117, 1013, 867, 789, 766, 704, 657.

2.1.11. Synthesis of *N*-(hydroxymethyl)-3,4,5-trimethoxybenzamide (k1)



Following GP1, 3,4,5-trimethoxybenzamide (211 mg, 1.00 mmol, 1.00 eq.) was dissolved in (5.00 ml) ethanol. Then, a 37% aqueous formaldehyde solution (0.150 mL, 1.50 mmol, 1.50 eq.) and potassium carbonate (138 mg, 1.00 mmol, 1.00 eq.) were added and stirred at 60 °C for 8 h. After work-up and column chromatography (DCM:MeOH 5:1) **k1** (209 mg, 0.870 mmol, 87%) was obtained as a white solid. **Mp:** 150-152 °C. **^{1}H NMR (600 MHz, DMSO-*d*$_6$):** δ 9.10 (t, J = 6.2 Hz, 1H), 7.22 (s, 2H), 5.67 (s, 1H), 4.72 (d, *J* = 5.9 Hz, 2H), 3.83 (s, 6H), 3.71 (s, 3H). **^{13}C NMR (150 MHz, DMSO-*d*$_6$):** δ 166.0, 153.0, 140.5, 129.9, 105.3, 63.5, 60.5, 56.4. **HR-MS (EI, 70 eV):** calculated for $[C_{11}H_{15}NNaO_5]^{+\cdot}$: m/z= 264.0841, found: 264.0842 (Dev.: 0.09 mu; 0.35 ppm). **IR (ATR): $\tilde{\nu}$ (cm^{-1})=** 3269, 2950, 2839, 1642, 1543, 1435, 1230, 1126, 1051, 991, 852, 773, 669.

2.1.12. Synthesis of *N*-(hydroxymethyl)picolinamide (l1)



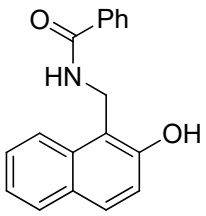
Following GP1, 3,4,5-trimethoxybenzamide (122 mg, 1.00 mmol, 1.00 eq.) was dissolved in (5.00 ml) ethanol. Then, a 37% aqueous formaldehyde solution (0.15 mL, 1.50 mmol, 1.50 eq.) and potassium carbonate (138 mg, 1.00 mmol, 1.00 eq.) were added and stirred at 60 °C for 8 h. After work-up and column chromatography (DCM:MeOH 10:1) **l1** (126 mg, 0.830 mmol, 83%) was obtained as a white solid. **Mp:** 125-127 °C. **^{1}H NMR (600 MHz, Chloroform-d):** δ 8.90 (s, 1H), 8.57 (ddd, *J* = 4.8, 1.7, 0.9 Hz, 1H), 8.19 (dt, *J* = 7.8,

1.1 Hz, 1H), 7.86 (td, *J* = 7.7, 1.7 Hz, 1H), 7.45 (ddd, *J* = 7.6, 4.8, 1.2 Hz, 1H), 5.02 (d, *J* = 6.8 Hz, 2H), 3.54 (s, 1H).**^{13}C NMR (150 MHz, Chloroform-d):** δ 165.8, 149.2, 148.3, 137.4, 126.7, 122.5, 64.7. **HR-MS (EI, 70 eV):** calculated for $[C_7H_8N_2NaO_2]^{+\cdot}$: m/z= 175.0544, found: 175.0546 (Dev.: 0.27 mu; 0.59 ppm). **IR (ATR): $\tilde{\nu}$ (cm^{-1})=** 3394, 3014, 2741, 1644, 1550, 1484, 1457, 1336, 1294, 1147, 948, 926, 801, 738, 695.

2.2. Synthesis of *N*-((2-hydroxynaphthalen-1-yl)methyl)benzamide derivatives (GP2)

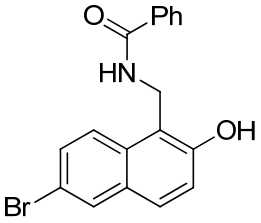
2-Naphthol derivatives (0.750 mmol, 1.00 eq.) and *N*-(hydroxymethyl)benzamide derivatives (0.750 mmol, 1.00 eq.) were dissolved in anhydrous ethanol (7.50 mL). Concentrated sulfuric acid (1.10 mL) was added dropwise and the reaction mixture was stirred for 7 h at 65 °C. The reaction mixture was cooled to room temperature and washed with (1 M) NaOH solution (10.0 mL), extract three times with EtOAc. Combined organic layers were dried Na_2SO_4, filtered, and concentrated under reduced pressure.

2.2.1. Synthesis of *N*-((2-hydroxynaphthalen-1-yl)methyl)benzamide (4a)



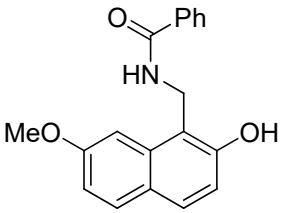
Following GP2, 2-Naphthol (108 mg, 0.750 mmol, 1.00 eq.) and *N*-(hydroxymethyl)benzamide (113 mg, 0.750 mmol, 1.00 eq.) were dissolved in anhydrous ethanol (7.50 mL). Then, conc H_2SO_4 (1.10 mL) and the reaction mixture was stirred for 7 h at 65 °C. The product was purified by column chromatography (80:20 Cyclohexane /EtOAc) to furnish **4a** (196 mg, 0.710 mmol, 94%) as a brown solid. **Mp:** 173-175 °C. **^{1}H NMR (600 MHz, DMSO-*d*$_6$):** δ 10.25 (s, 1H), 9.08 (t, *J* = 5.1 Hz, 1H), 8.07 (d, *J* = 8.5 Hz, 1H), 7.87 (d, *J* = 7.9 Hz, 2H), 7.78 (dd, J = 24.2, 8.4 Hz, 2H), 7.55 – 7.40 (m, 4H), 7.30 (t, *J* = 7.4 Hz, 1H), 7.18 (d, *J* = 8.8 Hz, 1H), 4.85 (d, *J* = 5.3 Hz, 2H).**^{13}C NMR (150 MHz, DMSO-*d*$_6$):** δ 167.4, 153.9, 133.7, 133.4, 131.5, 129.4, 128.4, 128.3, 127.5, 127.4, 126.5, 122.9, 122.7, 119.0, 115.7, 34.5. **HR-MS (APCI):** calculated for $[C_{18}H_{15}NO_2]^+$: m/z= 277.1124, found: 277.1127 (Dev: 0.37 mu; 0.81 ppm). **IR (ATR): $\tilde{\nu}$ (cm^{-1})=** 3234, 3102, 1662, 1654, 1265, 947, 844. Analytical data is in accordance with literature data.[5]

2.2.2. Synthesis of *N*-((6-bromo-2-hydroxynaphthalen-1-yl)methyl)benzamide (4b)



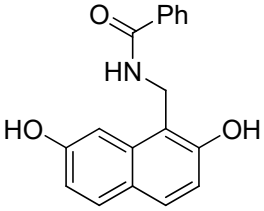
Following GP2, 6-bromonaphthalen-2-ol (167 mg, 0.750 mmol, 1.00 eq.) and *N*-(hydroxymethyl)benzamide (113 mg, 0.750 mmol, 1.00 eq.) were dissolved in anhydrous ethanol (7.50 mL). Then, conc H_2SO_4 (1.10 mL) and the reaction mixture was stirred for 7 h at 65 °C. The product was purified by column chromatography (85:15 Cyclohexane /EtOAc) to furnish **4b** (234 mg, 0.660 mmol, 88%) as off-white solid. **Mp:** 195-197 °C. **^{1}H NMR (600 MHz, Chloroform-d):** δ 10.21 (s, 1H), 7.94 (d, *J* = 2.0 Hz, 1H), 7.80 – 7.74 (m, 3H), 7.65 (d, *J* = 8.9 Hz, 1H), 7.59 (dd, *J* = 9.0, 2.1 Hz, 1H), 7.55 – 7.50 (m, 1H), 7.43 (t, *J* = 7.8 Hz, 2H), 7.27 (d, *J* = 8.9 Hz, 1H), 7.07 – 7.01 (m, 1H), 4.97 (d, *J* = 6.5 Hz, 2H). **^{13}C NMR (150 MHz, Chloroform-d):** δ 155.0, 132.6, 132.5, 131.6, 131.0, 130.2, 130.1, 129.4, 128.8, 127.2, 122.8, 121.9, 116.6, 115.9, 35.6. **HR-MS (APCI):** calculated for $[C_{18}H_{14}BrNO_2]^+$: m/z= 355.0278, found: 355.0280 (Dev.: 0.23 mu; 0.64 ppm). **IR (ATR): $\tilde{\nu}$ (cm^{-1})=** 3324, 22845, 1644, 1540, 1230, 1007, 874.

2.2.3. Synthesis of *N*-((2-hydroxy-7-methoxynaphthalen-1-yl)methyl)benzamide (4c)



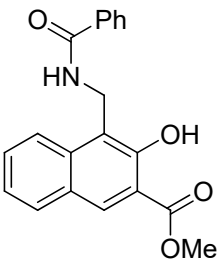
Following GP2, 7-methoxynaphthalen-2-ol (131 mg, 0.750 mmol, 1.00 eq.) and *N*-(hydroxymethyl)benzamide (113 mg, 0.750 mmol, 1.00 eq.) were dissolved in anhydrous ethanol (7.50 mL). Then, conc H_2SO_4 (1.10 mL) and the reaction mixture was stirred for 7 h at 65 °C. The product was purified by column chromatography (80:20 Cyclohexane /EtOAc) to furnish **4c** (206 mg, 0.670 mmol, 89%) as a brown solid. **Mp:** 150-152 °C. **^{1}H NMR (600 MHz, Chloroform-d):** δ 7.73 (dd, *J* = 17.6, 8.5 Hz, 3H), 7.67 (d, *J* = 8.8 Hz, 1H), 7.50 – 7.46 (m, 1H), 7.43 – 7.36 (m, 2H), 7.23 (d, *J* = 2.1 Hz, 1H), 7.10 (d, *J* = 8.8 Hz, 2H), 7.04 (dd, *J* = 8.8, 2.4 Hz, 1H), 6.97 – 6.88 (m, 1H), 4.96 (d, *J* = 6.5 Hz, 2H), 3.97 (s, 3H). **^{13}C NMR (150 MHz, Chloroform-d):** δ 170.0, 158.7, 155.1, 134.4, 132.3, 130.7, 130.1, 128.7, 127.2, 124.5, 118.0, 113.7, 102.0, 55.6, 35.8, 26.9. **HR-MS (APCI):** calculated for $[C_{19}H_{17}NO_3]^+$: m/z= 307.1280, found: 307.1281 (Dev.: 0.06 mu; 0.19 ppm). **IR (ATR): $\tilde{\nu}$ (cm^{-1})= 3356**, 3041, 1644, 1250, 1024, 962, 845.

2.2.4. Synthesis of *N*-((2,7-dihydroxynaphthalen-1-yl)methyl)benzamide (4d)



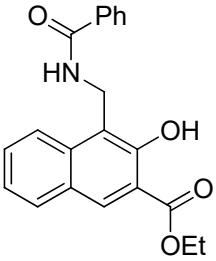
Following GP2, naphthalene-2,7-diol (120 mg, 0.750 mmol, 1.00 eq.) and *N*-(hydroxymethyl)benzamide (113 mg, 0.750 mmol, 1.00 eq.) were dissolved in anhydrous ethanol (7.50 mL). Then, conc H_2SO_4 (1.10 mL) and the reaction mixture was stirred for 7 h at 65 °C. The product was purified by column chromatography (60:40 Cyclohexane /EtOAc) to furnish **4d** (145 mg, 0.490 mmol, 66%) as a white solid. **Mp:** 211-213 °C. **^{1}H NMR (600 MHz, Chloroform-d):** δ 10.23 (s, 1H), 8.02 (dd, *J* = 17.6, 8.5 Hz, 3H), 7.95 (d, *J* = 8.8 Hz, 1H), 7.78 – 7.74 (m, 1H), 7.71 – 7.62 (m, 2H), 7.52 (d, *J* = 2.1 Hz, 1H), 7.38 (d, *J* = 8.8 Hz, 2H), 7.32 (dd, *J* = 8.8, 2.4 Hz, 1H), 5.24 (d, *J* = 6.5 Hz, 2H). **^{13}C NMR (150 MHz, Chloroform-d):** δ 167.0, 158.4, 151.0, 134.7, 132.6, 131.0, 130.4, 129.0, 127.5, 124.8, 121.8, 115.2, 114.0, 107.3, 37.7. A signal is missing due to overlap. **HR-MS (APCI)** calculated for $[C_{18}H_{15}NO_3]^+$: m/z= 293.1043, found: 293.1044 (Dev.: 0.13 mu; 0.22 ppm). **IR (ATR): $\tilde{\nu}$ (cm^{-1})=** 3378, 3246, 1668, 1642, 1345, 1148, 1026, 984.

2.2.5. Synthesis methyl 4-(benzamidomethyl)-3-hydroxy-2-naphthoate (4e)



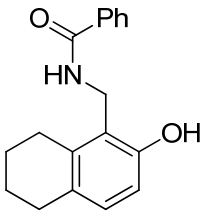
Following GP2, methyl 3-hydroxy-2-naphthoate (152 mg, 0.750 mmol, 1.00 eq.) and *N*-(hydroxymethyl)benzamide (113 mg, 0.750 mmol, 1.00 eq.) were dissolved in anhydrous ethanol (7.50 mL). Then, conc H_2SO_4 (1.10 mL) and the reaction mixture was stirred for 7 h at 65 °C. The product was purified by column chromatography (75:25 Cyclohexane /EtOAc) to furnish **4e** (226 mg, 0.670 mmol, 90%) as a yellow solid. **Mp:** 183-185 °C. **^{1}H NMR (600 MHz, Chloroform-d):** δ 10.97 (s, 1H), 8.51 (s, 1H), 8.28 (d, *J* = 8.6 Hz, 1H), 7.83 (d, *J* = 8.2 Hz, 1H), 7.75 (dd, *J* = 8.3, 1.2 Hz, 2H), 7.63 (ddd, *J* = 8.4, 6.8, 1.3 Hz, 1H), 7.47 – 7.43 (m, 1H), 6.71 (s, 1H), 7.40 – 7.35 (m, 3H), 5.17 (d, *J* = 5.7 Hz, 2H), 4.05 (s, 3H). **^{13}C NMR (150 MHz, Chloroform-d):** δ 170.5, 167.1, 154.9, 136.1, 134.6, 132.8, 131.4, 130.1, 130.0, 128.5, 127.1, 127.0, 124.1, 123.3, 118.0, 113.5, 52.8, 34.2. **HR-MS (APCI):** calculated for $[C_{20}H_{17}NO_4]^+$: m/z= 335.1228, found: 335.1230 (Dev.: 0.24 mu; 0.70 ppm). **IR (ATR): $\tilde{\nu}$ (cm^{-1})= 3345**, 3142, 1663, 1642, 1432, 1145, 980.

2.2.6. Synthesis of ethyl 4-(benzamidomethyl)-3-hydroxy-2-naphthoate (4f)



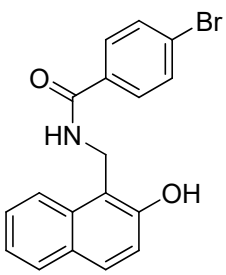
Following GP2, ethyl 3-hydroxy-2-naphthoate (162 mg, 0.750 mmol, 1.00 eq.) and *N*-(hydroxymethyl)benzamide (113 mg, 0.750 mmol, 1.00 eq.) were dissolved in anhydrous ethanol (7.50 mL). Then, conc H_2SO_4 (1.10 mL) and the reaction mixture was stirred for 7 h at 65 °C. The product was purified by column chromatography (70:30 Cyclohexane /EtOAc) to furnish **4f** (242 mg, 0.690 mmol, 92%) as a white solid. **Mp:** 169-171 °C. **^{1}H NMR (600 MHz, Chloroform-d):** δ 8.08 (d, *J* = 1.4 Hz, 2H), 7.57 – 7.53 (m, 1H), 7.54 – 7.49 (m, 3H), 7.48 (d, *J* = 7.8 Hz, 3H), 7.45 – 7.41 (m, 1H), 4.60 (d, *J* = 14.9 Hz, 1H), 4.36 (qt, *J* = 7.1, 3.7 Hz, 2H), 3.97 (d, *J* = 14.9 Hz, 1H), 1.38 (t, *J* = 7.1 Hz, 3H). **^{13}C NMR (150 MHz, Chloroform-d):** δ 168.3, 167.1, 160.1, 134.7, 134.2, 131.5, 129.6, 129.1, 128.6, 128.4, 127.3, 126.7, 125.3, 118.2, 1140, 61.6, 36.8, 14.2. **HR-MS (APCI):** calculated for $[C_{21}H_{19}NO_4]^+$: m/z= 349.1310, found: 349.1312 (Dev.: 0.22 mu; 0.64 ppm). **IR (ATR): $\tilde{\nu}$ (cm^{-1})=** 3341, 3150, 1654, 1640, 1165, 954.

2.2.7. Synthesis of *N*-((2-hydroxy-5,6,7,8-tetrahydronaphthalen-1-yl)methyl) benzamide (4g)



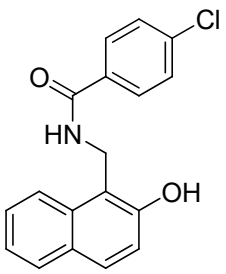
Following GP2, 5,6,7,8-tetrahydronaphthalen-2-ol (111 mg, 0.750 mmol, 1.00 eq.) and *N*-(hydroxymethyl)benzamide (113 mg, 0.750 mmol, 1.00 eq.) were dissolved in anhydrous ethanol (7.50 mL). Then, conc H_2SO_4 (1.10 mL) and the reaction mixture was stirred for 7 h at 65 °C. The product was purified by column chromatography (90:10 Cyclohexane /EtOAc) to furnish **4g** (189 mg, 0.670 mmol, 90%) as a white solid. **Mp:** 116-118 °C. **^{1}H NMR (600 MHz, Chloroform-d):** δ 7.82 – 7.73 (m, 3H), 7.49 – 7.46 (m, 1H), 7.41 (q, J = 7.5 Hz, 3H), 7.09 (dt, J = 7.8, 5.8 Hz, 1H), 4.62 (dd, J = 5.4, 6.2 Hz, 3H), 2.77 (dt, J = 7.4, 6.3 Hz, 3H), 1.84 – 1.67 (m, 3H), 1.65 – 1.52 (m, 1H). **^{13}C NMR (150 MHz, Chloroform-d):** δ 167.2, 151.5, 136.8, 134.3, 131.5, 128.4, 128.2, 121.5, 110.8, 38.9, 38.4, 36.9, 31.2, 28.4, 24.9. **HR-MS (APCI):** calculated for $[C_{18}H_{19}NO_2]^+$: m/z= 281.1487, found: 281.1488 (Dev.: 0.12 mu; 0.42 ppm). **IR (ATR): $\tilde{\nu}$ (cm^{-1})= 3437**, 3288, 2921, 1633, 1547, 1486, 1312, 1254, 1028, 1009, 918, 858, 742, 712, 689.

2.2.8. Synthesis of 4-bromo-*N*-((2-hydroxynaphthalen-1-yl)methyl)benzamide (4h)



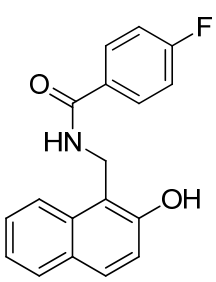
Following GP2, 2-Naphthol (108 mg, 0.750 mmol, 1.00 eq.) and 4-bromo-*N*-(hydroxymethyl)benzamide (173 mg, 0.750 mmol, 1.00 eq.) were dissolved in anhydrous ethanol (7.50 mL). Then, conc H_2SO_4 (1.10 mL) and the reaction mixture was stirred for 7 h at 65 °C. The product was purified by column chromatography (80:20 Cyclohexane /EtOAc) to furnish **4h** (214 mg, 0.600 mmol, 80%) as a pale-brown solid. **Mp:** 120-122 °C. **^{1}H NMR (600 MHz, Chloroform-d):** δ 10.35 (s, 1H), 8.09 (d, *J* = 7.5 Hz, 1H), 7.94 – 7.88 (m, 3H), 7.80 (d, *J* = 7.4 Hz, 1H), 7.76 – 7.70 (m, 1H), 7.69 – 7.64 (m, 1H), 7.57 – 7.38 (m, 2H), 7.19 (d, *J* = 8.1 Hz, 1H), 7.17 (s, 1H), 511 (d, *J* = 7.0 Hz, 2H). **^{13}C NMR (150 MHz, Chloroform-d):** δ 167.7, 151.1, 133.7, 133.5, 132.7, 132.0, 131.3, 131.1, 130.5, 129.9, 128.3, 123.9, 122.9, 117.6, 117.0, 36.7. **HR-MS (APCI):** calculated for $[C_{18}H_{14}BrNO_2]^+$: m/z= 355.0361, found: 355.0362 (Dev.: 0.07 mu; 0.18 ppm). **IR (ATR): $\tilde{\nu}$ (cm^{-1})=** 3352, 2976, 1646, 1590, 1536, 1313, 1289, 1091, 1009, 845, 755, 699.

2.2.9. Synthesis of 4-bromo-*N*-((2-hydroxynaphthalen-1-yl)methyl)benzamide (4i)



Following GP2, 2-Naphthol (108 mg, 0.750 mmol, 1.00 eq.) and 4-chloro-*N*-(hydroxymethyl)benzamide (127 mg, 0.750 mmol, 1.00 eq.) were dissolved in anhydrous ethanol (7.50 mL). Then, conc H_2SO_4 (1.10 mL) and the reaction mixture was stirred for 7 h at 65 °C. The product was purified by column chromatography (80:20 Cyclohexane /EtOAc) to furnish **4i** (192 mg, 0.650 mmol, 87%) as a brown solid. **Mp:** 162-164 °C. **^{1}H NMR (600 MHz, Chloroform-d):** δ 9.58 (s, 1H), 8.31 (d, *J* = 8.8 Hz, 2H), 7.98 (d, *J* = 8.8 Hz, 2H), 7.94 (d, *J* = 8.5 Hz, 1H), 7.86 (d, *J* = 8.1 Hz, 1H), 7.82 (d, *J* = 8.9 Hz, 1H), 7.59 (t, *J* = 8.0 Hz, 1H), 7.41 (t, *J* = 7.4 Hz, 1H), 7.30 (d, *J* = 8.9 Hz, 2H), 7.22 (s, 1H). **^{13}C NMR (150 MHz, Chloroform-d):** δ 166.8, 153.2, 148.9, 137.3, 131.8, 129.5, 128.0, 127.3, 126.1, 122.8, 122.1, 119.8, 119.3, 114.0, 34.8. **HR-MS (APCI):** calculated for $[C_{18}H_{14}ClNO_2]^+$: m/z= 311.0736, found: 311.0738 (Dev.: 0.23 mu; 0.54 ppm). **IR (ATR): $\tilde{\nu}$ (cm^{-1})= 3298**, 2874, 1641, 1258, 1140, 964, 833.

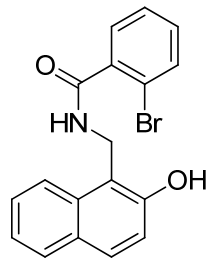
2.2.10. Synthesis of 4-fluoro-*N*-((2-hydroxynaphthalen-1-yl)methyl)benzamide (4j)



Following GP2, 2-Naphthol (108 mg, 0.750 mmol, 1.00 eq.) and 4-fluoro-*N*-(hydroxymethyl)benzamide (127 mg, 0.750 mmol, 1.00 eq.) were dissolved in anhydrous ethanol (7.50 mL). Then, conc H_2SO_4 (1.10 mL) and the reaction mixture was stirred for 7 h at 65 °C. The product was purified by column chromatography (85:15 Cyclohexane /EtOAc) to furnish **4j** (192 mg, 0.650 mmol, 87%) as a pale-yellow solid. **Mp:** 156-158 °C. **^{1}H NMR (600 MHz, Chloroform-d):** δ 9.86 (s, 1H), 8.93 (t, *J* = 5.1 Hz, 1H), 7.87 – 7.78 (m, 3H), 7.60 (d, *J* = 8.3 Hz, 3H), 7.57 (d, *J* = 8.8 Hz, 1H), 7.28 – 7.24 (m, 1H), 7.10 (ddd, *J* = 7.9, 6.7, 0.9 Hz, 1H), 7.00 (d, *J* = 8.8 Hz, 1H), 4.69 (d, *J* = 5.1 Hz, 2H). **^{13}C NMR (150 MHz, Chloroform-d):** δ 166.0, 164.3, 162.1, 151.0, 133.1, 131.5, 130.5 (d, J = 19.2 Hz), 130.3, 129.6 (d, J = 9.6 Hz), 126.4, 126.2, 123.0, 121.6, 115.9 (d, J = 21.8 Hz), 113.6, 38.8.

^{19}F NMR (376 MHz, $CDCl_3$) δ = –120.24. **HR-MS (APCI):** calculated for $[C_{18}H_{14}FNO_2]^+$: m/z= 295.1012, found: 295.1016 (Dev.: 0.43 mu; 0.95 ppm). **IR (ATR): $\tilde{\nu}$ (cm^{-1})=** 3365, 3009, 1644, 1574, 1330, 1296, 1048, 932, 851.

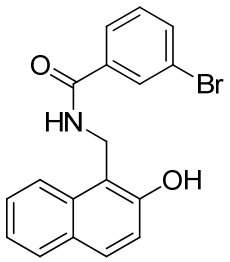
2.2.11. Synthesis of 2-bromo-*N*-((2-hydroxynaphthalen-1-yl)methyl)benzamide (4k)



Following GP2, 2-Naphthol (108 mg, 0.750 mmol, 1.00 eq.) and 2-bromo-*N*-(hydroxymethyl)benzamide (173 mg, 0.750 mmol, 1.00 eq.) were dissolved in anhydrous ethanol (7.50 mL). Then, conc H_2SO_4 (1.10 mL) and the reaction mixture was stirred for 7 h at 65 °C. The product was purified by column chromatography (75:25 Cyclohexane /EtOAc) to furnish **4k** (244 mg, 0.680 mmol, 91%) as a white solid. **Mp:** 172-174 °C. **^{1}H NMR (600 MHz, Chloroform-d):** 9.44 (s, 1H), 8.43 (dd, *J* = 7.9, 1.9 Hz, 1H), 8.06 (d, *J* = 8.4 Hz, 1H), 7.93 (d, *J* = 8.9 Hz, 1H), 7.72 (ddd, *J* = 8.3, 6.9, 1.3 Hz, 1H), 7.63 – 7.59 (m, 1H), 7.54 (ddd, *J* = 8.0, 6.9, 1.0 Hz, 1H), 7.46 (d, *J* = 8.8 Hz, 2H), 7.27 – 7.22 (m, 1H), 7.10 (d, *J* = 8.3 Hz, 1H), 5.17 (d, *J* = 6.6 Hz, 2H). **^{13}C NMR (150 MHz, Chloroform-d):** δ 165.5, 150.5, 144.1, 135.4, 133.1, 123.3, 131.5, 130.5, 130.0, 129.0, 127.8, 126.7, 122.9, 121.4, 119.6, 113.3, 38.6. A signal is missing due to overlap. **HR-MS (APCI):** calculated for $[C_{18}H_{14}BrNO_2]^+$: m/z= 355.0234,

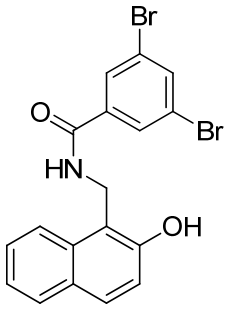
found: 355.0235 (Dev.: 0.14 mu; 0.32 ppm). **IR (ATR): $\tilde{\nu}$ (cm^{-1})=** 3341, 2991, 1643, 1544, 1260, 1125, 966, 812.

2.2.12. Synthesis of 3-bromo-*N*-((2-hydroxynaphthalen-1-yl)methyl)benzamide (4l)



Following GP2, 2-Naphthol (108 mg, 0.750 mmol, 1.00 eq.) and 3-bromo-*N*-(hydroxymethyl)benzamide (173 mg, 0.750 mmol, 1.00 eq.) were dissolved in anhydrous ethanol (7.50 mL). Then, conc H_2SO_4 (1.10 mL) and the reaction mixture was stirred for 7 h at 65 °C. The product was purified by column chromatography (80:20 Cyclohexane /EtOAc) to furnish **4l** (231 mg, 0.650 mmol, 86%) as off-white solid. **Mp:** 183-185 °C. **^{1}H NMR (600 MHz, Chloroform-d):** δ 9.91 (s, 1H), 9.15 (t, *J* = 7.0 Hz, 1H), 8.21 (s, 1H), 8.07 (d, *J* = 7.8 Hz, 2H), 8.02 (d, *J* = 7.6 Hz, 1H), 7.83 (d, *J* = 7.6 Hz, 2H), 7.79 (d, *J* = 7.5 Hz, 1H), 7.51 – 7.45 (m, 1H), 7.35 – 7.28 (m, 1H), 7.22 (d, *J* = 8.2 Hz, 1H), 4.91 (d, *J* = 8.1 Hz, 2H). **^{13}C NMR (150 MHz, Chloroform-d):** δ 167.4, 151.2, 137.3, 134.5, 133.9, 133.0, 131.1, 130.1, 129.4, 128.9, 126.5, 126.1, 123.1, 122.3, 122.2, 114.7, 37.7. A signal is missing due to overlap. **HR-MS (APCI):** calculated for $[C_{18}H_{14}BrNO_2]^+$: m/z= 355.0216, found: 355.0219 (Dev.: 0.24 mu; 0.54 ppm). **IR (ATR): $\tilde{\nu}$ (cm^{-1})=** 3312, 2985, 1645, 1425, 1355, 1236, 972, 870.

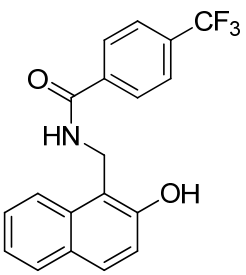
2.2.13. Synthesis of *3*,5-dibromo-*N*-((2-hydroxynaphthalen-1-yl)methyl) benzamide (4m)



Following GP2, 2-Naphthol (108 mg, 0.750 mmol, 1.00 eq.) and 3,5-dibromo-*N*-(hydroxymethyl)benzamide (232 mg, 0.750 mmol, 1.00 eq.) were dissolved in anhydrous ethanol (7.50 mL). Then, conc H_2SO_4 (1.10 mL) and the reaction mixture was stirred for 7 h at 65 °C. The product was purified by column chromatography (80:20 Cyclohexane /EtOAc) to furnish **4m** (280 mg, 0.650 mmol, 86%) as a white solid. **Mp:** 176-178 °C. **^{1}H NMR (600 MHz, Chloroform-d):** δ 9.99 (s, 1H), 9.02 (t, *J* = 4.9 Hz, 1H), 8.08 (d, *J* = 1.8 Hz, 2H), 8.00 (t, *J* = 1.8 Hz, 1H), 7.94 (d, *J* = 8.5 Hz, 1H), 7.81 (d, *J* = 7.9 Hz, 1H), 7.77 (d, *J* = 8.8 Hz, 1H), 7.46 (ddd, *J* = 8.3, 6.8, 1.2 Hz, 1H), 7.32 – 7.28 (m, 1H), 7.21 (d, *J* = 8.9 Hz, 1H), 4.87 (d, *J* = 4.9 Hz, 2H). **^{13}C NMR (150 MHz, Chloroform-d):** δ 164.2, 154.2, 137.9, 136.4, 133.9, 129.9, 129.8, 128.8, 128.6, 127.1, 123.2, 123.0, 123.0, 118.9, 115.2,

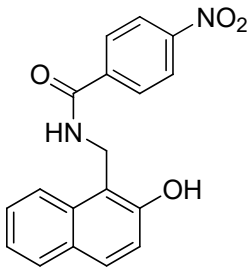
34.8. **HR-MS (APCI):** calculated for $[C_{18}H_{13}Br_2NO_2]^+$: m/z= 432.9379, found: 432.9385 (Dev.: 0.64 mu; 1.47 ppm). **IR (ATR): $\tilde{\nu}$ (cm^{-1})=** 3341, 3026, 1664, 1641, 1466, 1320, 1174, 1003, 962, 866.

2.2.14. Synthesis of *N*-((2-hydroxynaphthalen-1-yl)methyl)-4-(trifluoromethyl) benzamide (4n)



Following GP2, GP2, 2-Naphthol (108 mg, 0.750 mmol, 1.00 eq.) and 4-trifluoromethyl-*N*-(hydroxymethyl)benzamide (164 mg, 0.750 mmol, 1.00 eq.) were dissolved in anhydrous ethanol (7.50 mL). Then, conc H_2SO_4 (1.10 mL) and the reaction mixture was stirred for 7 h at 65 °C. The product was purified by column chromatography (85:15 Cyclohexane /EtOAc) to furnish **4n** (212 mg, 0.610 mmol, 82%) as a white solid. **Mp:** 136-138 °C. **^{1}H NMR (600 MHz, DMSO-*d*$_6$):** δ 10.06 (s, 1H), 9.13 (t, *J* = 5.1 Hz, 1H), 8.06 (d, *J* = 8.2 Hz, 2H), 8.01 (d, *J* = 8.5 Hz, 1H), 7.81 (d, *J* = 8.3 Hz, 3H), 7.77 (d, *J* = 8.8 Hz, 1H), 7.47 (ddd, *J* = 8.3, 6.7, 1.3 Hz, 1H), 7.21 (d, *J* = 8.8 Hz, 1H), 4.90 (d, *J* = 5.1 Hz, 2H). **^{13}C NMR (150 MHz, DMSO-*d*$_6$):** δ 166.6, 154.2, 138.2, 133.9, 131.7, 131.5, 129.8, 128.9, 128.8 (d, J = 14.1 Hz), 127.0, 125.7 (d, J = 3.7 Hz), 123.2 (d, J = 25.5 Hz), 119.1, 115.6, 55.4, 34.8. **^{19}F NMR (376 MHz, DMSO-*d*$_6$)** δ = –67.96. **HR-MS (APCI):** calculated for $[C_{19}H_{14}F_3NO_2]^+$: m/z= 345.0984, found: 345.0986 (Dev.: 0.16 mu; 0.41 ppm). **IR (ATR): $\tilde{\nu}$ (cm^{-1})=** 3214, 2714, 1650, 1322, 1006, 987, 684.

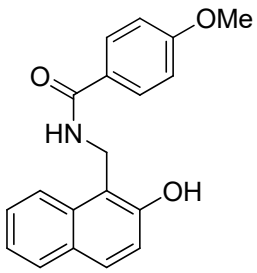
2.2.15. Synthesis of *N*-((2-hydroxynaphthalen-1-yl)methyl)-4-nitrobenzamide (4o)



Following GP2, 2-Naphthol (108 mg, 0.750 mmol, 1.00 eq.) and 4-nitro-*N*-(hydroxymethyl)benzamide (147 mg, 0.750 mmol, 1.00 eq.) were dissolved in anhydrous ethanol (7.50 mL). Then, conc H_2SO_4 (1.10 mL) and the reaction mixture was stirred for 7 h at 65 °C. The product was purified by column chromatography (80:20 Cyclohexane /EtOAc) to furnish **4o** (218 mg, 0.680 mmol, 90%) as a off-white solid. **Mp:** 188-190 °C. **^{1}H NMR (600 MHz, DMSO-*d*$_6$):** δ 9.54 (s, 1H), 8.26 (d, *J* = 8.8 Hz, 2H), 7.94 (d, *J* = 8.8 Hz, 2H), 7.82 (d, *J* = 8.1 Hz, 1H), 7.77 (d, *J* = 8.9 Hz, 1H), 7.54 (t, *J* = 8.0 Hz, 1H), 7.37 (t, *J* = 7.4 Hz, 1H), 7.30 – 7.23 (m, 2H), 7.18 (s, 1H), 5.04 (d, *J* = 6.5 Hz, 2H). **^{13}C NMR (150 MHz, DMSO-*d*$_6$):** δ 167.9, 154.3, 150.0, 138.4, 132.9, 130.6, 129.2, 128.5, 127.2, 123.9, 123.3, 120.9, 120.5,

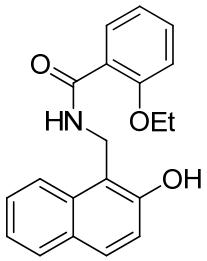
115.1, 35.9. A signal is missing due to overlap. **HR-MS (APCI):** calculated for $[C_{18}H_{14}N_2O_4]^+$: m/z= 322.0975, found: 322.0977 (Dev.: 0.17 mu; 0.42 ppm). **IR (ATR): $\tilde{\nu}$ (cm^{-1})=** 3316, 3074, 1636, 1599, 1489, 1350, 1223, 1157, 1052, 857, 869, 746, 701, 681.

2.2.16. Synthesis of *N*-((2-hydroxynaphthalen-1-yl)methyl)-4-methoxy benzamide (4p)



Following GP2, 2-Naphthol (108 mg, 0.750 mmol, 1.00 eq.) and 4-methoxy-*N*-(hydroxymethyl)benzamide (136 mg, 0.750 mmol, 1.00 eq.) were dissolved in anhydrous ethanol (7.50 mL). Then, conc H_2SO_4 (1.10 mL) and the reaction mixture was stirred for 7 h at 65 °C. The product was purified by column chromatography (60:40 Cyclohexane /EtOAc) to furnish **4p** (215 mg, 0.700 mmol, 93%) as a pale-brown solid. **Mp:** 147-149 °C. **^{1}H NMR (600 MHz, DMSO-d_6):** δ 10.11 (s, 1H), 9.18 (t, *J* = 5.1 Hz, 1H), 8.10 (d, *J* = 8.2 Hz, 2H), 8.05 (d, *J* = 8.5 Hz, 1H), 7.85 (d, *J* = 8.3 Hz, 3H), 7.82 (d, *J* = 8.8 Hz, 1H), 7.51 (ddd, *J* = 8.3, 6.7, 1.3 Hz, 1H), 7.35 (ddd, *J* = 7.9, 6.7, 0.9 Hz, 1H), 7.25 (d, *J* = 8.8 Hz, 1H), 4.94 (d, *J* = 5.1 Hz, 2H), 3.37 (s, 3H). **^{13}C NMR (150 MHz, DMSO-d_6):** δ 162.3, 150.0, 138.4, 133.5, 132.9, 130.6, 129.2, 128.5, 127.2, 125.6, 123.3, 120.9, 120.5, 115.1, 112.3, 55.3, 38.7. **HR-MS (APCI):** calculated for $[C_{19}H_{17}NO_3]^+$: m/z= 307.1456, found: 307.1459 (Dev.: 0.38 mu; 0.70 ppm). **IR (ATR): $\tilde{\nu}$ (cm^{-1})=** 3373, 3060, 1621, 1605, 1499, 1347, 1207, 1071, 860, 750, 730, 671.

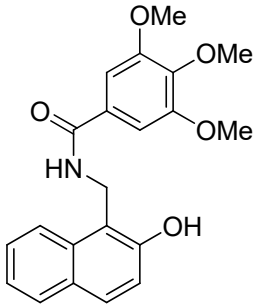
2.2.17. Synthesis of 2-ethoxy-*N*-((2-hydroxynaphthalen-1-yl)methyl)benzamide (4q)



Following GP2, 2-Naphthol (108 mg, 0.750 mmol, 1.00 eq.) and 2-ethoxy-*N*-(hydroxymethyl)benzamide (146 mg, 0.750 mmol, 1.00 eq.) were dissolved in anhydrous ethanol (7.50 mL). Then, conc H_2SO_4 (1.10 mL) and the reaction mixture was stirred for 7 h at 65 °C. The product was purified by column chromatography (70:30 Cyclohexane /EtOAc) to furnish **4q** (220 mg, 0.680 mmol, 90%) as a brown oil. **^{1}H NMR (600 MHz, Chloroform-d):** δ 9.25 (s, 1H), 8.23 (dd, *J* = 7.9, 1.9 Hz, 1H), 7.86 (d, *J* = 8.4 Hz, 1H), 7.80 (d, *J* = 8.1 Hz, 1H), 7.73 (d, *J* = 8.9 Hz, 1H), 7.52 (ddd, *J* = 8.3, 6.9, 1.3 Hz, 1H), 7.43 – 7.39 (m, 1H), 7.34 (ddd, *J* = 8.0, 6.9, 1.0 Hz, 1H), 7.29 – 7.23 (m, 2H), 7.07 – 7.03 (m, 1H), 6.90 (d, *J* = 8.3 Hz, 1H), 4.97 (d, *J*

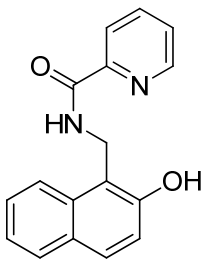
= 6.6 Hz, 2H), 4.14 (q, *J* = 7.0 Hz, 2H), 1.54 (t, *J* = 7.0 Hz, 3H). **^{13}C NMR (150 MHz, Chloroform-d):** δ 167.7, 157.3, 154.4, 133.6, 133.1, 132.3, 130.0, 129.1, 129.0, 126.7, 122.9, 121.4, 121.0, 120.8, 119.6, 116.5, 112.2, 64.8, 35.1, 14.9. **HR-MS (APCI):** calculated for $[C_{20}H_{19}NO_3]^+$: m/z= 321.1542, found: 321.1544 (Dev.: 0.16 mu; 0.41 ppm). **IR (ATR): $\tilde{\nu}$ (cm^{-1})=** 3391, 3014, 2841, 1648, 1589, 1477, 1230, 1140, 944, 899.

2.2.18. Synthesis of *N*-((2-hydroxynaphthalen-1-yl)methyl)-3,4,5-trimethoxy benzamide (4r)



Following GP2, 2-Naphthol (108 mg, 0.750 mmol, 1.00 eq.) and *N*-(hydroxymethyl)-3,4,5-trimethoxybenzamide (181 mg, 0.750 mmol, 1.00 eq.) were dissolved in anhydrous ethanol (7.50 mL). Then, conc H_2SO_4 (1.10 mL) and the reaction mixture was stirred for 7 h at 65 °C. The product was purified by column chromatography (60:40 Cyclohexane /EtOAc) to furnish **4r** (225 mg, 0.610 mmol, 82%) as a brown solid. **Mp:** 156-158 °C. **^{1}H NMR (600 MHz, Chloroform-d):** δ 10.22 (s, 1H), 8.93 (t, *J* = 5.2 Hz, 1H), 8.04 (d, *J* = 8.5 Hz, 1H), 7.81 (d, *J* = 8.0 Hz, 1H), 7.77 (d, *J* = 8.9 Hz, 1H), 7.48 (ddd, *J* = 8.3, 6.8, 1.2 Hz, 1H), 7.31 (ddd, *J* = 7.8, 6.7, 0.8 Hz, 1H), 7.20 (d, *J* = 8.9 Hz, 3H), 4.87 (d, *J* = 5.2 Hz, 2H), 3.80 (s, 6H), 3.68 (s, 3H). **^{13}C NMR (150 MHz, Chloroform-d):** δ 167.0, 154.3, 153.0, 140.5, 133.9, 129.8, 129.3, 128.8, 128.7, 127.0, 123.3, 123.1, 119.3, 116.0, 105.5, 60.5, 56.5, 34.9. **HR-MS (APCI):** calculated for $[C_{21}H_{21}NO_5]^+$: m/z= 367.1491, found: 367.1492 (Dev.: 0.13 mu; 0.35 ppm). **IR (ATR): $\tilde{\nu}$ (cm^{-1})=** 3370, 2997, 1623, 1574, 1431, 1235, 1174, 1156, 1119, 1000, 885, 789, 747, 703.

2.2.19. Synthesis of *N*-((2-hydroxynaphthalen-1-yl)methyl)picolinamide (4s)



Following GP2, 2-Naphthol (108 mg, 0.750 mmol, 1.00 eq.) and *N*-(hydroxymethyl)picolinamide (114 mg, 0.750 mmol, 1.00 eq.) were dissolved in anhydrous ethanol (7.50 mL). Then, conc H_2SO_4 (1.10 mL) and the reaction mixture was stirred for 7 h at 65 °C. The product was purified by column chromatography (85:15 Cyclohexane /EtOAc) to furnish **4s** (162 mg, 0.580 mmol, 78%) as a white solid. **Mp:** 187-189 °C. **^{1}H NMR (600 MHz, Chloroform-d):** δ 10.11 (s, 1H), 9.00 (s, 1H), 8.54 (dd, *J* = 4.3, 2.0 Hz, 1H), 8.22 (d, *J* = 3.8 Hz, 1H), 8.19 (d, *J* = 7.9 Hz, 1H), 7.98 (d, *J* = 8.5 Hz, 1H), 7.85 (td, *J* = 7.7, 1.6 Hz, 1H), 7.56 (ddd, *J* = 8.3, 6.9, 1.3 Hz, 1H),

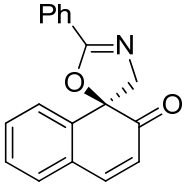
7.34 (d, *J* = 1.1 Hz, 1H), 7.32 (dd, *J* = 2.8, 1.0 Hz, 1H), 7.11 (d, *J* = 2.5 Hz, 1H), 7.10 (d, *J* = 2.5 Hz, 1H), 5.02 (d, *J* = 6.9 Hz, 2H). **^{13}C NMR (150 MHz, Chloroform-d):** δ 165.7, 151.6, 148.2, 130.2, 129.9, 128.9, 127.8, 126.5, 126.4, 123.6, 123.1, 121.3, 120.6, 118.1, 117.7, 109.5, 26.9. **HR-MS (APCI):** calculated for $[C_{17}H_{14}N_2O_2]^+$: m/z= 278.1035, found: 278.1038 (Dev.: 0.26 mu; 0.65 ppm). **IR (ATR): $\tilde{\nu}$ (cm^{-1})=** 3389, 3016, 2871, 1647, 1587, 1339, 1248, 1018, 985, 882.

2.3. Synthesis of Spirooxazoline compounds (GP3)

Racemic products: To a stirred solution of *N*-((2-Hydroxynaphthalen-1-yl)methyl)benzamide derivatives (0.500 mmol, 1.00 eq.) in MeCN (10.0 mL) was added 2-iodo anisole (0.500 mmol, 1.00 eq.) and *m*-CPBA (75%, 0.750 mmol, 1.50 eq.). The reaction mixture was stirred for 16 hours at room temperature. Then, aqueous $NaHCO_3$ solution (10.00 ml) was added and extracted with CH_2Cl_2 (15.00 mL x 2) and the organic layer was dried over Na_2SO_4. The solvent was removed under reduced pressure. The product was purified by column chromatography using mixture of (cyclohexane: EtOAc) to yield the desired product.

Optical Active Products: To a stirred solution of *N*-((2-Hydroxynaphthalen-1-yl)methyl)benzamide derivatives (0.150 mmol, 1.00 eq.) in MeCN (3.00 mL) was added **6d** (10.0 mol%) and *m*-CPBA (75%, 0.230 mmol, 1.50 eq.). The reaction mixture was stirred for 16 hours at 0 °C. Then, aqueous $NaHCO_3$ solution (3.00 ml) was added and extracted with CH_2Cl_2 (5.00 mL x 2) and the organic layer was dried over Na_2SO_4. The solvent was removed under reduced pressure. The product was purified by column chromatography using mixture of (cyclohexane: EtOAc) to yield the desired product.

2.3.1. Synthesis of (*S*)-2'-phenyl-2*H*,4'*H*-spiro[naphthalene-1,5'-oxazol]-2-one (5a)

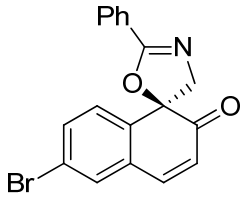


Following GP3, *N*-((2-hydroxynaphthalen-1-yl)methyl)benzamide (39.0 mg, 0.150 mmol, 1.00 eq.) was dissolved in MeCN (3.00 mL). Then, **6d** (9.00 mg, 0.015 mmol, 10 mol%) and *m*-CPBA (52.0 mg, 0.230 mmol, 1.50 eq.) were added and the reaction mixture was stirred for 16 h at 0 °C. The product was purified by column chromatography (80:20 Cyclohexane /EtOAc) to furnish **5a** (34.0 mg, 0.120 mmol, 82%) as a pale-yellow solid. **Mp:** 169-171 °C. **$[\alpha]_D^{23}$:** -3.60 (c 1.0 in $CHCl_3$); **^{1}H NMR (600 MHz, Chloroform-d):** δ

8.08 (dt, *J* = 8.5, 1.6 Hz, 2H), 7.56 – 7.52 (m, 1H), 7.51 – 7.35 (m, 7H), 6.22 (d, *J* = 10.0 Hz, 1H), 4.49 (d, *J* = 14.7 Hz, 1H), 4.02 (d, *J* = 14.7 Hz, 1H). **^{13}C NMR (150 MHz, Chloroform-d):** δ 197.7, 164.2, 145.7, 142.2, 131.9, 130.9, 129.6, 129.0, 128.9, 128.7, 128.5, 126.9, 125.6, 123.6, 86.5, 69.8. **HR-MS (APCI):** calculated for $[C_{18}H_{13}NO_2]^+$: m/z= 275.1024, found: 275.1108 (Dev.: 0.33 mu; 0.78 ppm). **IR (ATR): $\tilde{\nu}$ (cm^{-1})=** 3029, 2847, 1679, 1653, 1395, 1342, 1294, 1065, 1037, 925, 812, 780, 766, 690. Analytical data is in accordance with literature data.[6]

The enantiomeric excess was determined by HPLC analysis on the purified product: Chiracel OM column, 214 nm, 90:10 hexane/*i*-PrOH, 1 mL/min, t = 17.26 min (*major*), t = 24.09 min (*minor*).

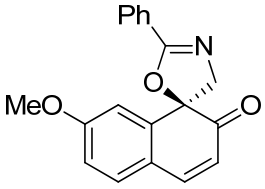
2.3.2. Synthesis of (*S*)-6-bromo-2'-phenyl-2*H*,4'*H*-spiro[naphthalene-1,5'-oxazol]-2-one (5b)



Following GP3, *N*-((6-bromo-2-hydroxynaphthalen-1-yl)methyl) benzamide (53.0 mg, 0.150 mmol, 1.00 eq.) was dissolved in MeCN (3.00 mL). Then, **6d** (9.00 mg, 0.015 mmol, 10 mol%) and *m*-CPBA (52.0 mg, 0.230 mmol, 1.50 eq.) were added and the reaction mixture was stirred for 16 h at 0 °C. The product was purified by column chromatography (85:15 Cyclohexane /EtOAc) to furnish **5b** (49.0 mg, 0.140 mmol, 92%) as a brown solid. **Mp:** 194-196 °C. **$[\alpha]_D^{23}$:** -18.5 (c 1.0 in $CHCl_3$); **^{1}H NMR (600 MHz, Chloroform-d):** δ 8.05 (dt, *J* = 8.5, 1.7 Hz, 2H), 7.57 – 7.49 (m, 3H), 7.49 – 7.44 (m, 2H), 7.41 (d, *J* = 10.0 Hz, 1H), 7.30 (d, *J* = 8.1 Hz, 1H), 6.25 (d, *J* = 10.0 Hz, 1H), 4.47 (d, *J* = 14.8 Hz, 1H), 3.99 (d, *J* = 14.8 Hz, 1H). **^{13}C NMR (150 MHz, Chloroform-d):** δ 196.7, 164.0, 143.9, 140.8, 133.4, 132.0, 131.9, 130.7, 128.6, 128.4, 127.1, 126.6, 124.7, 122.7, 86.0, 69.5. **HR-MS (APCI):** calculated for $[C_{18}H_{12}BrNO_2]^+$: m/z= 353.0121, found: 353.0124 (Dev.: 0.22 mu; 0.63 ppm). **IR (ATR): $\tilde{\nu}$ (cm^{-1})=** 3348, 3038, 1670, 1600, 1495, 1338, 1265, 1224, 1059, 894, 882, 831, 796, 673.

The enantiomeric excess was determined by HPLC analysis on the purified product: Chiracel OM column, 214 nm, 90:10 hexane/*i*-PrOH, 1.3 mL/min, t = 16.27 min (*minor*), t = 26.29 min (*major*).

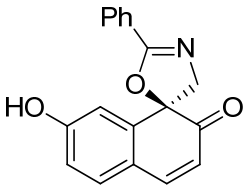
2.3.3. Synthesis of (*S*)-7-methoxy-2'-phenyl-2*H*,4'*H*-spiro[naphthalene-1,5'-oxazol]-2-one (5c)



Following GP3, *N*-((2-hydroxy-7-methoxynaphthalen-1-yl)methyl) benzamide (46.0 mg, 0.150 mmol, 1.00 eq.) was dissolved in MeCN (3.00 mL). Then, **6d** (9.00 mg, 0.015 mmol, 10 mol%) and *m*-CPBA (52.0 mg, 0.230 mmol, 1.50 eq.) were added and the reaction mixture was stirred for 16 h at 0 °C. The product was purified by column chromatography (75:25 Cyclohexane /EtOAc) to furnish **5c** (33.0 mg, 0.110 mmol, 72%) as a brown solid. **Mp:** 170-172 °C. **$[\alpha]_D^{23}$:** -10.6 (c 1.0 in $CHCl_3$); **^{1}H NMR (600 MHz, Chloroform-d):** δ 8.12 – 8.04 (m, 2H), 7.57 – 7.51 (m, 1H), 7.49 – 7.41 (m, 3H), 7.29 (d, *J* = 8.4 Hz, 1H), 6.96 (d, *J* = 2.6 Hz, 1H), 6.86 (dd, *J* = 8.4, 2.6 Hz, 1H), 6.07 (d, *J* = 9.9 Hz, 1H), 4.48 (d, *J* = 14.7 Hz, 1H), 4.01 (d, *J* = 14.7 Hz, 1H), 3.79 (s, 3H). **^{13}C NMR (150 MHz, Chloroform-d):** δ 197.7, 164.2, 162.0, 145.7, 144.6, 131.8, 131.4, 128.7, 128.5, 126.9, 122.1, 120.9, 113.5, 112.0, 86.6, 70.0, 55.6**. HR-MS (APCI):** calculated for $[C_{19}H_{15}NO_3]^+$: m/z= 305.1143, found: 305.1144 (Dev.: 0.16 mu; 0.38 ppm). **IR (ATR): $\tilde{\nu}$ (cm^{-1})=** 3338, 2978, 2874, 1646, 1568, 1445, 1316, 1291, 1092, 1058, 1010, 895, 784, 754, 674.

The enantiomeric excess was determined by HPLC analysis on the purified product: Chiracel OM column, 254 nm, 90:10 hexane/*i*-PrOH, 1.0 mL/min, t = 13.32 min (*minor*), t = 17.19 min (*major*).

2.3.4. Synthesis of (*S*)-7-hydroxy-2'-phenyl-2*H*,4'*H*-spiro[naphthalene-1,5'-oxazol]-2-one (5d)

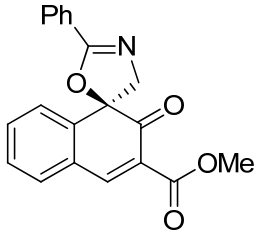


Following GP3, *N*-((2,7-dihydroxynaphthalen-1-yl)methyl) benzamide (46.0 mg, 0.150 mmol, 1.00 eq.) was dissolved in MeCN (3.00 mL). Then, **6d** (9.00 mg, 0.015 mmol, 10 mol%) and *m*-CPBA (52.0 mg, 0.230 mmol, 1.50 eq.) were added and the reaction mixture was stirred for 16 h at 0 °C. The product was purified by column chromatography (85:15 Cyclohexane /EtOAc) to furnish **5d** (24.0 mg, 0.080 mmol, 55%) as a white solid. **Mp:** 193-195 °C. **$[\alpha]_D^{23}$:** -5.00 (c 1.0 in $CHCl_3$); **^{1}H NMR (600 MHz, Chloroform-d):** δ 8.41 – 8.35 (m, 2H), 7.87 – 7.81 (m, 1H), 7.80 – 7.71 (m, 3H), 7.59 (d, *J* = 8.4 Hz, 1H), 7.26 (d, *J* = 2.6 Hz, 1H), 7.16 (dd, *J* = 8.4, 2.6 Hz, 1H), 6.38 (d, *J* = 9.9 Hz, 1H), 4.78 (d, *J* = 14.7 Hz, 1H), 4.31 (d, *J* = 14.7 Hz, 1H). **^{13}C NMR (150 MHz, Chloroform-d):** δ 194.0, 164.2, 158.4, 145.7, 139.3, 131.8, 131.4, 129.8, 128.5,

127.9, 126.9, 122.1, 115.1, 112.0, 90.0, 66.3**. HR-MS (APCI):** calculated for $[C_{18}H_{13}NO_3]^+$: m/z= 291.1032, found: 291.1034 (Dev.: 0.23 mu; 0.46 ppm). **IR (ATR): $\tilde{\nu}$ (cm^{-1})=** 3368, 3214, 2877, 2684, 1684, 1647, 1433, 1201, 1066, 972, 845, 688.

The enantiomeric excess was determined by HPLC analysis on the purified product: Chiracel OM column, 214 nm, 80:20 hexane/*i*-PrOH, 1.0 mL/min, t = 19.44 min (*major*), t = 22.20 min (*minor*).

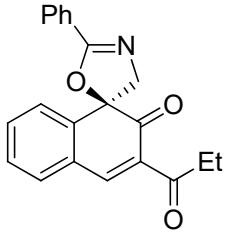
2.3.5. Synthesis of (*S*)-methyl 2-oxo-2'-phenyl-2*H*,4'*H*-spiro[naphthalene-1,5'-oxazole]-3-carboxylate (5e)



Following GP3, methyl 4-(benzamidomethyl)-3-hydroxy-2-naphthoatemethyl)benzamide (50.0 mg, 0.150 mmol, 1.00 eq.) was dissolved in MeCN (3.00 mL). Then, **6d** (9.00 mg, 0.015 mmol, 10 mol%) and *m*-CPBA (52.0 mg, 0.230 mmol, 1.50 eq.) were added and the reaction mixture was stirred for 16 h at 0 °C. The product was purified by column chromatography (70:30 Cyclohexane /EtOAc) to furnish **5e** (43.0 mg, 0.130 mmol, 86%) as a brown solid. **Mp:** 155-157 °C. **$[\alpha]_D^{23}$:** -22.4 (c 1.0 in $CHCl_3$); **^{1}H NMR (600 MHz, Chloroform-d):** δ 8.08 (dt, *J* = 8.5, 1.6 Hz, 2H), 7.57 – 7.42 (m, 8H), 4.59 (d, *J* = 14.9 Hz, 1H), 3.97 (d, *J* = 14.9 Hz, 1H), 3.90 (s, 3H). **^{13}C NMR (150 MHz, Chloroform-d):** δ 192.6, 164.4, 164.3, 151.0, 143.6, 132.9, 131.6, 129.2, 128.7, 128.5, 127.4, 126.8, 125.4, 124.9, 88.2, 68.3, 52.6, 26.9. **HR-MS (APCI):** calculated for $[C_{20}H_{15}NO_4]^+$: m/z= 333.1021, found: 333.1023 (Dev.: 0.19 mu; 0.43 ppm). **IR (ATR): $\tilde{\nu}$ (cm^{-1})=** 3120, 2914, 1685, 1643, 1421, 1258, 1105, 847, 658.

The enantiomeric excess was determined by HPLC analysis on the purified product: Chiracel OM column, 320 nm, 90:10 hexane/*i*-PrOH, 1 mL/min, t = 28.78 min (*minor*), t = 36.31 min (*major*).

2.3.6. Synthesis of (*S*)-2'-phenyl-3-propionyl-2*H*,4'*H*-spiro[naphthalene-1,5'-oxazol]-2-one (5f)

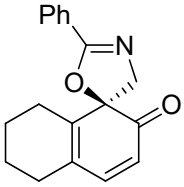


Following GP3, ethyl 4-(benzamidomethyl)-3-hydroxy-2-naphthoate (52.0 mg, 0.150 mmol, 1.00 eq.) was dissolved in MeCN (3.00 mL). Then, **6d** (9.00 mg, 0.015 mmol, 10 mol%) and *m*-CPBA (52.0 mg, 0.230 mmol, 1.50 eq.) were added and the reaction mixture was stirred for 16 h at 0 °C. The product was purified by column chromatography (75:25 Cyclohexane /EtOAc) to furnish **5f** (32.0 mg, 0.090 mmol,

61%) as a brown solid. **Mp:** 150-152 °C. **$[\alpha]_D^{23}$:** -11.4 (c 1.0 in $CHCl_3$); **^{1}H NMR (600 MHz, Chloroform-d):** δ 8.24 (s, 1H), 8.10 – 8.06 (m, 2H), 7.62 – 7.39 (m, 7H), 4.60 (d, *J* = 14.9 Hz, 1H), 4.36 (qt, *J* = 7.1, 3.7 Hz, 2H), 3.96 (d, *J* = 14.9 Hz, 1H), 1.37 (t, *J* = 7.1 Hz, 3H). **^{13}C NMR (150 MHz, Chloroform-d):** δ 192.8, 164.5, 164.1, 150.6, 144.0, 132.9, 132.1, 131.7, 129.3, 128.9, 128.7, 127.6, 126.9, 125.6, 125.4, 88.3, 68.5, 61.8, 14.4. **HR-MS (APCI):** calculated for $[C_{21}H_{17}NO_3]^+$: m/z= 331.1302, found: 331.1305 (Dev.: 0.27 mu; 0.68 ppm). **IR (ATR): $\tilde{\nu}$ (cm^{-1})=** 3147, 3012, 1662, 1654, 1426, 1399, 1201, 1008, 984, 880, 674.

The enantiomeric excess was determined by HPLC analysis on the purified product: Chiracel OM column, 320 nm, 90:10 hexane/*i*-PrOH, 1 mL/min, t = 13.22 min (*minor*), t = 17.03 min (*major*).

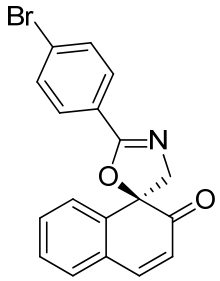
2.3.7. Synthesis of (*S*)-2'-phenyl-5,6,7,8-tetrahydro-2H,4'H-spiro[naphthalene-1,5'-oxazol]-2-one (5g)



Following GP3, *N*-((2-hydroxy-5,6,7,8-tetrahydronaphthalen-1-yl)methyl)benzamide (43.0 mg, 0.150 mmol, 1.00 eq.) was dissolved in MeCN (3.00 mL). Then, **6d** (9.00 mg, 0.015 mmol, 10 mol%) and *m*- CPBA (52.0 mg, 0.230 mmol, 1.50 eq.) were added and the reaction mixture was stirred for 16 h at 0 °C. The product was purified by column chromatography (85:15 Cyclohexane /EtOAc) to furnish **5g** (36.0 mg, 0.130 mmol, 85%) as a pale-yellow solid. **Mp:** 148-150 °C. **$[\alpha]_D^{23}$:** -12.9 (c 1.0 in $CHCl_3$); **^{1}H NMR (600 MHz, Chloroform-d):** δ 8.03 – 7.95 (m, 2H), 7.55 – 7.39 (m, 4H), 6.81 (d, *J* = 9.9 Hz, 1H), 6.00 (d, *J* = 9.9 Hz, 1H), 4.25 (d, *J* = 14.7 Hz, 1H), 3.94 (d, *J* = 14.7 Hz, 1H), 2.37 – 2.19 (m, 3H), 1.80 – 1.58 (m, 4H). **^{13}C NMR (150 MHz, Chloroform-d):** δ 200.3, 164.3, 157.2, 146.8, 145.3, 131.7, 128.6, 128.4, 127.3, 127.0, 121.7, 87.5, 66.4, 28.6, 23.3, 22.2, 21.5. A signal is missing due to overlap. **HR-MS (APCI):** calculated for $[C_{18}H_{17}NO_2]^+$: m/z= 279.1534, found: 279.1535 (Dev.: 0.11 mu; 0.26 ppm). **IR (ATR): $\tilde{\nu}$ (cm^{-1})=** 2930, 2859, 1731, 1676, 1494, 1448, 1336, 1247, 1088, 973, 956, 776, 749, 670.

The enantiomeric excess was determined by HPLC analysis on the purified product: Chiracel OM column, 254 nm, 85:15 hexane/*i*-PrOH, 1 mL/min, t = 6.28 min (*minor*), t = 7.71 min (*major*).

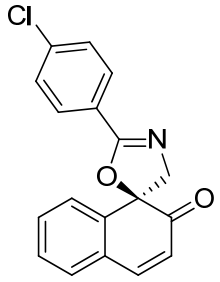
2.3.8. Synthesis of (*S*)-2'-(4-bromophenyl)-2*H*,4'*H*-spiro[naphthalene-1,5'-oxazol]-2-one (5h)



Following GP3, 4-bromo-*N*-((2-hydroxynaphthalen-1-yl)methyl) benzamide (53.0 mg, 0.150 mmol, 1.00 eq.) was dissolved in MeCN (3.00 mL). Then, **6d** (9.00 mg, 0.015 mmol, 10 mol%) and *m*-CPBA (52.0 mg, 0.230 mmol, 1.50 eq.) were added and the reaction mixture was stirred for 16 h at 0 °C. The product was purified by column chromatography (85:15 Cyclohexane /EtOAc) to furnish **5h** (34.0 mg, 0.100 mmol, 64%) as a brown solid. **Mp:** 186-188 °C. **$[\alpha]_D^{23}$:** -11.2 (c 1.0 in $CHCl_3$); **$[\alpha]_D^{23}$:** -20.6 (c 1.0 in $CHCl_3$); **^{1}H NMR (600 MHz, Chloroform-d):** δ 8.29 (dd, *J* = 8.3, 1.2 Hz, 2H), 7.81 – 7.73 (m, 3H), 7.73 – 7.67 (m, 2H), 7.65 (d, *J* = 10.0 Hz, 1H), 7.54 (d, *J* = 8.1 Hz, 1H), 6.49 (d, *J* = 10.0 Hz, 1H), 4.71 (d, *J* = 14.8 Hz, 1H), 4.23 (d, *J* = 14.8 Hz, 1H). **^{13}C NMR (150 MHz, Chloroform-d):** δ 195.4, 162.6, 142.5, 139.4, 132.0, 130.6, 130.5, 129.3, 127.2, 127.1, 125.8, 125.2, 123.3, 121.3, 84.6, 68.1**. HR-MS (APCI):** calculated for $[C_{18}H_{12}BrNO_2]^+$: m/z= 353.0078, found: 353.0079 (Dev.: 0.17 mu; 0.44 ppm). **IR (ATR): $\tilde{\nu}$ (cm^{-1})=** 3339, 3063, 1651, 1584, 1474, 1286, 1245, 1069, 1011, 967, 876, 844, 746, 686.

The enantiomeric excess was determined by HPLC analysis on the purified product: Chiracel OM column, 320 nm, 90:10 hexane/*i*-PrOH, 1 mL/min, t = 10.38 min (*minor*), t = 12.92 min (*major*).

2.3.9. Synthesis of (*S*)-2'-(4-chlorophenyl)-2*H*,4'*H*-spiro[naphthalene-1,5'-oxazol]-2-one (5i)

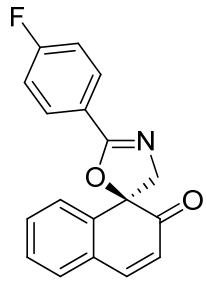


Following GP3, 4-chloro-*N*-((2-hydroxynaphthalen-1-yl)methyl) benzamide (47.0 mg, 0.150 mmol, 1.00 eq.) was dissolved in MeCN (3.00 mL). Then, **6d** (9.00 mg, 0.015 mmol, 10 mol%) and *m*-CPBA (52.0 mg, 0.230 mmol, 1.50 eq.) were added and the reaction mixture was stirred for 16 h at 0 °C. The product was purified by column chromatography (80:20 Cyclohexane /EtOAc) to furnish **5i** (35.0 mg, 0.110 mmol, 75%) as a colorless oil. **$[\alpha]_D^{23}$:** -14.6 (c 1.0 in $CHCl_3$); **$[\alpha]_D^{23}$:** -15.9 (c 1.0 in $CHCl_3$); **^{1}H NMR (600 MHz, Chloroform-d):** δ 8.10 – 8.00 (m, 2H), 7.52 (d, *J* = 9.9 Hz, 1H), 7.49 – 7.43 (m, 2H), 7.43 – 7.38 (m, 2H), 7.04 – 6.98 (m, 2H), 6.26 (d, *J* = 10.0 Hz, 1H), 4.50 (d, *J* = 14.5 Hz, 1H), 4.03 (d, *J* = 14.5 Hz, 1H). **^{13}C NMR (150 MHz, Chloroform-d):** δ 193.4, 164.1, 139.8, 138.2, 133.3, 132.0, 130.9, 130.5, 129.6,

128.8, 127.2, 125.6, 123.7, 90.8, 66.2**.** A signal is missing due to overlap. **HR-MS (APCI):** calculated for $[C_{18}H_{12}ClNO_2]^+$: m/z= 309.0582, found: 309.0584 (Dev.: 0.23 mu; 0.57 ppm). **(ATR): $\tilde{\nu}$ (cm^{-1})=** 3265, 2965, 1648, 1598, 1244, 1160, 1036, 954, 812, 745, 694.

The enantiomeric excess was determined by HPLC analysis on the purified product: Chiracel OM column, 214 nm, 85:15 hexane/*i*-PrOH, 1.0 mL/min, t = 7.11 min (*minor*), t = 10.87 min (*major*).

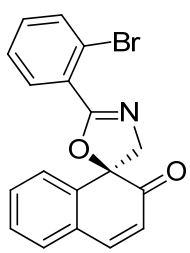
2.3.10. Synthesis of (*S*)-2'-(4-fluorophenyl)-2*H*,4'*H*-spiro[naphthalene-1,5'-oxazol]-2-one (5j)



Following GP3, 4-fluoro-*N*-((2-hydroxynaphthalen-1-yl)methyl) benzamide (44.0 mg, 0.150 mmol, 1.00 eq.) was dissolved in MeCN (3.00 mL). Then, **6d** (9.00 mg, 0.015 mmol, 10 mol%) and *m*-CPBA (52.0 mg, 0.230 mmol, 1.50 eq.) were added and the reaction mixture was stirred for 16 h at 0 °C. The product was purified by column chromatography (80:20 Cyclohexane /EtOAc) to furnish **5j** (31.0 mg, 0.110 mmol, 70%) as off-white solid. **Mp:** 166-168 °C. **$[\alpha]_D^{23}$:** -21.7 (c 1.0 in $CHCl_3$); **^{1}H NMR (600 MHz, Chloroform-d):** δ 8.12 – 7.98 (m, 2H), 7.64 (t, *J* = 7.0 Hz, 2H), 7.51 (dd, *J* = 9.9, 6.9 Hz, 1H), 7.35 – 7.24 (m, 4H), 6.05 (dd, *J* = 10.0, 5.5 Hz, 1H), 4.32 (dd, *J* = 15.2, 5.2 Hz, 1H), 3.86 (dd, *J* = 15.2, 4.9 Hz, 1H). **^{13}C NMR (150 MHz, Chloroform-d):** δ 195.4, 160.7, 144.6, 139.8, 131.2 (d, J = 32.4 Hz), 130.1, 129.4, 128.8, 128.3, 127.6 (d, J = 16.9 Hz), 127.4, 123.9, 123.1, 121.5, 84.7, 67.9. **^{19}F NMR (376 MHz, $CDCl_3$)** δ = –114.53. **HR-MS (APCI):** calculated for $[C_{18}H_{12}FNO_2]^+$: m/z= 293.0881, found: 293.0883 (Dev.: 0.17 mu; 0.39 ppm). **IR (ATR): $\tilde{\nu}$ (cm^{-1})=** 3387, 3102, 2964, 1684, 1651, 1542, 1436, 1332, 1162, 1008, 922, 722.

The enantiomeric excess was determined by HPLC analysis on the purified product: Chiracel OM column, 214 nm, 90:10 hexane/*i*-PrOH, 0.7 mL/min, t = 20.21 min (*major*), t = 23.51 min (*minor*).

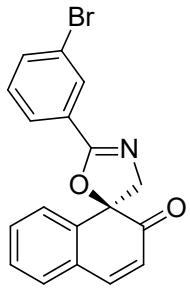
2.3.11. Synthesis of (*S*)-2'-(2-bromophenyl)-2*H*,4'*H*-spiro[naphthalene-1,5'-oxazol]-2-one (5k)



Following GP3, 2-bromo-*N*-((2-hydroxynaphthalen-1-yl)methyl) benzamide (53.0 mg, 0.150 mmol, 1.00 eq.) was dissolved in MeCN (3.00 mL). Then, **6d** (9.00 mg, 0.015 mmol, 10 mol%) and *m*-CPBA (52.0 mg, 0.230 mmol, 1.50 eq.) were added and the reaction mixture was stirred for 16 h at 0 °C. The product was purified by column chromatography (80:20 Cyclohexane /EtOAc) to furnish **5k** (46.0 mg, 0.130 mmol, 87%) as a brown solid. **Mp:** 185-187 °C. **$[\alpha]_D^{23}$:** -23.3 (c 1.0 in $CHCl_3$); **^{1}H NMR (600 MHz, Chloroform-d):** δ 8.16 (dd, *J* = 7.8, 1.8 Hz, 1H), 8.05 (t, *J* = 1.7 Hz, 1H), 7.97 – 7.88 (m, 2H), 7.83 (dd, *J* = 7.6, 1.8 Hz, 1H), 7.66 – 7.61 (m, 1H), 7.54 (dt, *J* = 2.1, 1.0 Hz, 1H), 7.04 – 6.98 (m, 2H), 6.30 (d, *J* = 9.9 Hz, 1H), 4.46 (d, *J* = 14.6 Hz, 1H), 4.01 (d, *J* = 14.6 Hz, 1H). **^{13}C NMR (150 MHz, Chloroform-d):** δ 195.5, 168.0, 163.5, 150.5, 139.2, 132.6, 131.8, 131.1, 130.3, 129.4, 129.4, 127.0, 125.2, 124.0, 123.2, 120.0, 87.4, 68.3. **HR-MS (APCI):** calculated for $[C_{18}H_{12}BrNO_2]^+$: m/z= 353.0120, found: 353.0124 (Dev.: 0.33 mu; 0.95 ppm). **IR (ATR): $\tilde{\nu}$ (cm^{-1})=** 3248, 2836, 1657, 1348, 1244, 1062, 933, 842.

The enantiomeric excess was determined by HPLC analysis on the purified product: Chiracel OM column, 214 nm, 90:10 hexane/*i*-PrOH, 1 mL/min, t = 12.28 min (*major*), t = 15.57 min (*minor*).

2.3.12. Synthesis of (*S*)-2'-(3-bromophenyl)-2*H*,4'*H*-spiro[naphthalene-1,5'-oxazol]-2-one (5l)

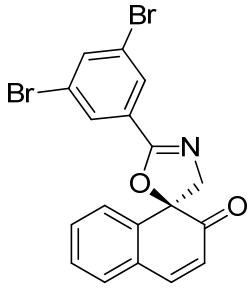


Following GP3, 3-bromo-*N*-((2-hydroxynaphthalen-1-yl)methyl) benzamide (53.0 mg, 0.150 mmol, 1.00 eq.) was dissolved in MeCN (3.00 mL). Then, **6d** (9.00 mg, 0.015 mmol, 10 mol%) and *m*-CPBA (52.0 mg, 0.230 mmol, 1.50 eq.) were added and the reaction mixture was stirred for 16 h at 0 °C. The product was purified by column chromatography (80:20 Cyclohexane /EtOAc) to furnish **5l** (43.0 mg, 0.120 mmol, 81%) as a brown solid. **Mp:** 191-193 °C. **$[\alpha]_D^{23}$:** -14.8 (c 1.0 in $CHCl_3$); **^{1}H NMR (600 MHz, Chloroform-d):** δ 8.21 – 8.02 (m, 2H), 7.58 – 7.53 (m, 1H), 7.51 – 7.41 (m, 3H), 7.31 (d, *J* = 8.4 Hz, 1H), 6.98 (d, *J* = 2.6 Hz, 1H), 6.88 (dd, *J* = 8.4, 2.6 Hz, 1H), 6.09 (d, *J* = 9.9 Hz, 1H), 4.49 (d, *J* = 14.7 Hz, 1H), 4.03 (d, *J* = 14.7 Hz, 1H). **^{13}C NMR (150 MHz, Chloroform-d):** δ 164.3, 145.8, 144.7, 138.9, 134.0, 133.1,

131.9, 131.5, 129.6, 128.8, 128.6, 127.0, 125.3, 124.1, 122.2, 121.0, 86.7, 70.1. **HR-MS (APCI):** calculated for $[C_{18}H_{12}BrNO_2]^+$: m/z= 353.0121, found: 353.0124 (Dev.: 0.30 mu; 0.85 ppm). **IR (ATR): $\tilde{\nu}$ (cm^{-1})=** 3301, 3014, 2710, 1652, 1588, 1452, 1365, 1112, 930, 851.

The enantiomeric excess was determined by HPLC analysis on the purified product: Chiracel OM column, 214 nm, 85:15 hexane/*i*-PrOH, 1 mL/min, t = 12.62 min (*major*), t = 15.74 min (*minor*).

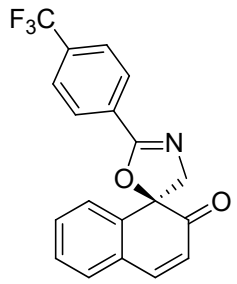
2.3.13. Synthesis (*S*)-2'-(3,5-dibromophenyl)-2*H*,4'*H*-spiro[naphthalene-1,5'-oxazol]-2-one (5m)



Following GP3, 3,5-dibromo-*N*-((2-hydroxynaphthalen-1-yl) methyl)benzamide (65.0 mg, 0.150 mmol, 1.00 eq.) was dissolved in MeCN (3.00 mL). Then, **6d** (9.00 mg, 0.015 mmol, 10 mol%) and *m*-CPBA (52.0 mg, 0.230 mmol, 1.50 eq.) were added and the reaction mixture was stirred for 16 h at 0 °C. The product was purified by column chromatography (80:20 Cyclohexane /EtOAc) to furnish **5m** (51.0 mg, 0.120 mmol, 79%) as a pale-brown solid. **Mp:** 161-163 °C. **$[\alpha]_D^{23}$:** -13.8 (c 1.0 in $CHCl_3$); **^{1}H NMR (600 MHz, Chloroform d):** δ 8.15 (d, *J* = 1.8 Hz, 2H), 7.83 (t, *J* = 1.8 Hz, 1H), 7.50 (d, *J* = 10.0 Hz, 1H), 7.47 – 7.36 (m, 4H), 6.22 (d, *J* = 10.0 Hz, 1H), 4.49 (d, *J* = 15.1 Hz, 1H), 4.02 (d, *J* = 15.1 Hz, 1H). **^{13}C NMR (150 MHz, Chloroform-d):** δ 197.2, 161.7, 145.9, 141.5, 139.5, 137.2, 131.0, 130.4, 129.8, 129.2, 123.4, 123.1, 111.0, 86.7, 69.6. A signal is missing due to overlap. **HR-MS (APCI):** calculated for $[C_{18}H_{11}Br_2NO_2]^+$: m/z= 430.9302, found: 430.9304 (Dev.: 0.21 mu; 0.50 ppm). **IR (ATR): $\tilde{\nu}$ (cm^{-1})=** 3410, 3110, 1685, 1623, 1584, 1446, 1230, 1140, 942, 847, 732.

The enantiomeric excess was determined by HPLC analysis on the purified product: Chiracel OM column, 214 nm, 85:15 hexane/*i*-PrOH, 1 mL/min, t = 9.48 min (*minor*), t = 10.83 min (*major*).

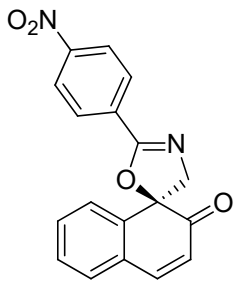
2.3.14. Synthesis of (*S*)-2'-(4-(trifluoromethyl)phenyl)-2*H*,4'*H*-spiro[naphth alene -1,5'-oxazol]-2-one (5n)



Following GP3, *N*-((2-hydroxynaphthalen-1-yl)methyl)-4-(trifluoro methyl)benzamide (52.0 mg, 0.150 mmol, 1.00 eq.) was dissolved in MeCN (3.00 mL). Then, **6d** (9.00 mg, 0.015 mmol, 10 mol%) and *m*- CPBA (52.0 mg, 0.230 mmol, 1.50 eq.) were added and the reaction mixture was stirred for 16 h at 0 °C. The product was purified by column chromatography (85:15 Cyclohexane /EtOAc) to furnish **5n** (35.0 mg, 0.100 mmol, 68%) as a brown solid. **Mp:** 158-160 °C. **$[\alpha]_D^{23}$:** -16.3 (c 1.0 in $CHCl_3$); **^{1}H NMR (600 MHz, DMSO-*d*$_6$):** δ 8.13 (d, *J* = 8.0 Hz, 2H), 7.72 (t, *J* = 7.0 Hz, 2H), 7.59 (dd, *J* = 9.9, 6.9 Hz, 1H), 7.45 – 7.32 (m, 4H), 6.13 (dd, *J* = 10.0, 5.5 Hz, 1H), 4.40 (dd, *J* = 15.2, 5.2 Hz, 1H), 3.94 (dd, *J* = 15.2, 4.9 Hz, 1H). **^{13}C NMR (150 MHz, DMSO-*d*$_6$):** δ 196.6, 161.9, 145.9, 141.0, 132.4, 132.2, 130.6, 130.1, 129.6, 128.8, 128.7 (d, J = 16.9 Hz),128.5, 125.2, 124.3, 122.8, 86.0, 69.1. **^{19}F NMR (376 MHz, DMSO-*d*$_6$)** δ = –66.15. **HR-MS (APCI):** calculated for $[C_{19}H_{12}F_3NO_2]^+$: m/z= 343.1047, found: 343.1049 (Dev.: 0.16 mu; 0.45 ppm). **IR (ATR): $\tilde{\nu}$ (cm^{-1})=** 3402, 3004, 1689, 1652, 1335, 1269, 1025, 935, 841, 774, 651.

The enantiomeric excess was determined by HPLC analysis on the purified product: Chiracel OM column, 214 nm, 93:7 hexane/*i*-PrOH, 1.0 mL/min, t = 15.81 min (*major*), t = 22.18 min (*minor*).

2.3.15. Synthesis of (*S*)-2'-(4-nitrophenyl)-2*H*,4'*H*-spiro[naphthalene-1,5'-oxazol]-2-one (5o)

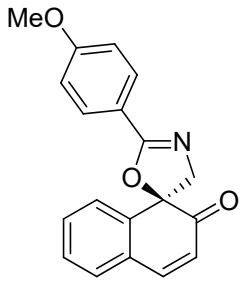


Following GP3, *N*-((2-hydroxynaphthalen-1-yl)methyl)-4-nitro benzamide (48.0 mg, 0.150 mmol, 1.00 eq.) was dissolved in MeCN (3.00 mL). Then, **6d** (9.00 mg, 0.015 mmol, 10 mol%) and *m*-CPBA (52.0 mg, 0.230 mmol, 1.50 eq.) were added and the reaction mixture was stirred for 16 h at 0 °C. The product was purified by column chromatography (85:15 Cyclohexane /EtOAc) to furnish **5o** (31.0 mg, 0.100 mmol, 65%) as a brown solid. **Mp:** 174-176 °C. **$[\alpha]_D^{23}$:** -10.4 (c 1.0 in $CHCl_3$); **^{1}H NMR (600 MHz, Chloroform-d):** δ 8.11 – 7.96 (m, 2H), 7.49 (d, *J* = 9.9 Hz, 1H), 7.46 – 7.34 (m, 4H), 7.00 – 6.94 (m, 2H), 6.22 (d, *J* = 10.0 Hz, 1H), 4.46 (d, *J* = 14.5 Hz, 1H), 3.99 (d, *J* = 14.5 Hz, 1H). **^{13}C NMR (150 MHz, Chloroform-d):** δ 194.2, 163.8, 149.3, 144.2, 139.6, 133.9, 132.7, 130.3, 129.3, 128.6, 124.0, 123.4,

122.5, 91.0, 68.0. A signal is missing due to overlap. **HR-MS (APCI):** calculated for $[C_{18}H_{12}N_2O_4]^+$: m/z= 320.0941, found: 320.0944 (Dev.: 0.27 mu; 0.60 ppm). **IR (ATR):** $\tilde{\nu}$ **(cm^{-1})=** 3321, 2935, 1657, 1580, 1325, 1040, 991, 802.

The enantiomeric excess was determined by HPLC analysis on the purified product: Chiracel OM column, 320 nm, 90:10 hexane/*i*-PrOH, 1 mL/min, t = 10.93 min (*minor*), t = 14.36 min (*major*).

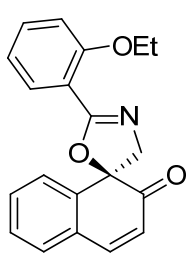
2.3.16. Synthesis of (*S*)-2'-(4-methoxyphenyl)-2*H*,4'*H*-spiro[naphthalene-1,5'-oxazol]-2-one (5p)



Following GP3, *N*-((2-hydroxynaphthalen-1-yl)methyl)-4-methoxy benzamide (46.0 mg, 0.150 mmol, 1.00 eq.) was dissolved in MeCN (3.00 mL). Then, **6d** (9.00 mg, 0.015 mmol, 10 mol%) and *m*-CPBA (52.0 mg, 0.230 mmol, 1.50 eq.) were added and the reaction mixture was stirred for 16 h at 0 °C. The product was purified by column chromatography (75:25 Cyclohexane /EtOAc) to furnish **5p** (42.0 mg, 0.140 mmol, 92%) as a brown solid. **Mp:** 180-182 °C. **[α]$_D^{23}$:** -17.3 (c 1.0 in $CHCl_3$); **^{1}H NMR (600 MHz, Chloroform-d):** δ 8.08 – 7.97 (m, 2H), 7.48 (d, *J* = 9.9 Hz, 1H), 7.45 – 7.34 (m, 4H), 6.99 – 6.93 (m, 2H), 6.21 (d, *J* = 10.0 Hz, 1H), 4.45 (d, *J* = 14.5 Hz, 1H), 3.99 (d, *J* = 14.5 Hz, 1H), 3.87 (s, 3H). **^{13}C NMR (150 MHz, Chloroform-d):** δ 197.9, 164.1, 162.5, 145.6, 142.4, 130.9, 130.5, 129.6, 129.0, 128.8, 125.6, 123.7, 119.4, 113.9, 86.5, 69.7, 55.5. **HR-MS (APCI):** calculated for $[C_{19}H_{15}NO_3]^+$: m/z= 305.1285, found: 305.1288 (Dev.: 0.33 mu; 0.76 ppm). **IR (ATR):** $\tilde{\nu}$ **(cm^{-1})=** 3345, 3106, 2845, 1680, 1640, 1265, 1104, 934, 900, 831.

The enantiomeric excess was determined by HPLC analysis on the purified product: Chiracel OM column, 320 nm, 90:10 hexane/*i*-PrOH, 0.7 mL/min, t = 14.48 min (*minor*), t = 15.26 min (*major*).

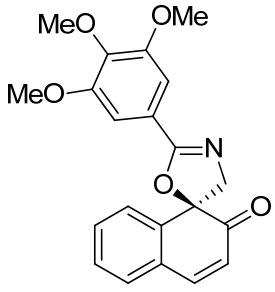
2.3.17. Synthesis of (*S*)-2'-(2-ethoxyphenyl)-2*H*,4'*H*-spiro[naphthalene-1,5'-oxazol]-2-one (5q)



Following GP3, 2-ethoxy-*N*-((2-hydroxynaphthalen-1-yl)methyl) benzamide (48.0 mg, 0.150 mmol, 1.00 eq.) was dissolved in MeCN (3.00 mL). Then, **6d** (9.00 mg, 0.015 mmol, 10 mol%) and *m*-CPBA (52.0 mg, 0.230 mmol, 1.50 eq.) were added and the reaction mixture was stirred for 16 h at 0 °C. The product was purified by column chromatography (70:30 Cyclohexane /EtOAc) to furnish **5q** (41.0 mg, 0.130 mmol, 86%) as a pale-yellow solid. **Mp:** 176-178 °C. **$[\alpha]_D^{23}$:** -8.00 (c 1.0 in $CHCl_3$); **^{1}H NMR (600 MHz, Chloroform-d):** δ 8.19 (dd, *J* = 7.8, 1.8 Hz, 1H), 8.08 (t, *J* = 1.7 Hz, 1H), 7.99 – 7.92 (m, 2H), 7.87 (dd, *J* = 7.6, 1.8 Hz, 1H), 7.70 – 7.65 (m, 1H), 7.57 (dt, *J* = 2.1, 1.0 Hz, 1H), 7.06 – 7.01 (m, 2H), 6.33 (d, *J* = 9.9 Hz, 1H), 4.49 (d, *J* = 14.6 Hz, 1H), 4.22 (q, *J* = 6.9 Hz, 2H), 4.04 (d, *J* = 14.6 Hz, 1H), 1.47 (t, *J* = 7.0 Hz, 3H). **^{13}C NMR (150 MHz, Chloroform-d):** δ 194.7, 165.6, 157.2, 140.0, 133.6, 131.8, 130.7, 130.0, 129.8, 128.7, 128.2, 124.3, 123.6, 121.1, 120.4, 112.3, 86.3, 64.8, 64.6, 14.7. **HR-MS (APCI):** calculated for $[C_{20}H_{17}NO_3]^+$: m/z= 319.1433, found: 319.1437 (Dev.: 0.41 mu; 0.97 ppm). **IR (ATR): $\tilde{\nu}$ (cm^{-1})=** 3394, 3104, 2901, 1674, 1452, 1334, 1024, 941, 874, 714.

The enantiomeric excess was determined by HPLC analysis on the purified product: Chiracel OM column, 254 nm, 80:20 hexane/*i*-PrOH, 1 mL/min, t = 6.93 min (*major*), t = 9.15 min (*minor*).

2.3.18. Synthesis of (*S*)-2'-(3,4,5-trimethoxyphenyl)-2*H*,4'*H*-spiro[naphthalene-1,5'-oxazol]-2-one (5r)

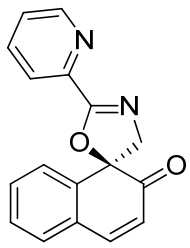


Following GP3, *N*-((2-hydroxynaphthalen-1-yl)methyl)-3,4,5-trimethoxybenzamide (55.0 mg, 0.150 mmol, 1.00 eq.) was dissolved in MeCN (3.00 mL). Then, **6d** (9.00 mg, 0.015 mmol, 10 mol%) and *m*-CPBA (52.0 mg, 0.230 mmol, 1.50 eq.) were added and the reaction mixture was stirred for 16 h at 0 °C. The product was purified by column chromatography (65:35 Cyclohexane /EtOAc) to furnish **5r** (50.0 mg, 0.140 mmol, 91%) as a brown solid. **Mp:** 172-174 °C. **$[\alpha]_D^{23}$:** -20.7 (c 1.0 in $CHCl_3$); **^{1}H NMR (600 MHz, Chloroform-d):** δ 7.49 (d, *J* = 10.0 Hz, 1H), 7.47 – 7.41 (m, 2H), 7.41 – 7.35 (m, 2H), 7.32 (s, 2H), 6.22 (d, *J* = 10.0 Hz, 1H), 4.47 (d, *J* = 14.7 Hz, 1H), 4.01 (d, *J* = 14.7 Hz, 1H), 3.90 (s, 9H). **^{13}C**

NMR (150 MHz, Chloroform-d): δ 197.7, 164.1, 153.2, 145.7, 142.1, 141.2, 130.9, 129.6, 129.0, 129.0, 125.7, 123.6, 122.1, 105.9, 86.5, 69.8, 61.0, 56.3. **HR-MS (APCI):** calculated for $[C_{21}H_{19}NO_5]^+$: m/z= 365.1302, found: 365.1303 (Dev.: 0.12 mu; 0.26 ppm). **IR (ATR): $\tilde{\nu}$ (cm^{-1})=** 3346, 3125, 2871, 1688, 1654, 1447, 1399, 1268, 1164, 943, 877, 801, 685.

The enantiomeric excess was determined by HPLC analysis on the purified product: Chiracel OM column, 254 nm, 90:10 hexane/*i*-PrOH, 1 mL/min, t = 9.35 min (*major*), t = 10.73 min (*minor*).

2.3.19. Synthesis of (*S*)-2'-(pyridin-2-yl)-2*H*,4'*H*-spiro[naphthalene-1,5'-oxazol]-2-one (5s)

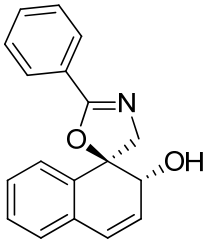


Following GP3, *N*-((2-hydroxynaphthalen-1-yl)methyl)picolinamide (48.0 mg, 0.150 mmol, 1.00 eq.) was dissolved in MeCN (3.00 mL). Then, **6d** (9.00 mg, 0.015 mmol, 10 mol%) and *m*-CPBA (52.0 mg, 0.230 mmol, 1.50 eq.) were added and the reaction mixture was stirred for 16 h at 0 °C. The product was purified by column chromatography (85:15 Cyclohexane /EtOAc) to furnish **5s** (32.0 mg, 0.120 mmol, 82%) as a white solid. **Mp:** 191-193 °C. **$[\alpha]_D^{23}$:** -6.90 (c 1.0 in $CHCl_3$); **^{1}H NMR (600 MHz, Chloroform-d):** δ 8.71 (ddd, *J* = 4.8, 1.6, 0.9 Hz, 1H), 8.37 (dt, *J* = 7.9, 1.0 Hz, 1H), 8.16 (d, *J* = 8.6 Hz, 1H), 7.95 (dd, *J* = 7.8, 1.6 Hz, 1H), 7.92 (d, *J* = 8.8 Hz, 1H), 7.74 (ddd, *J* = 8.4, 6.9, 1.3 Hz, 1H), 7.63 – 7.60 (m, 1H), 7.55 – 7.52 (m, 2H), 7.01 (dd, *J* = 8.2, 1.3 Hz, 1H), 5.20 (d, *J* = 6.9 Hz, 2H). **^{13}C NMR (150 MHz, Chloroform-d):** δ 193.5, 163.9, 148.9, 145.4, 139.5, 137.4, 132.4, 130.8, 129.5, 128.8, 127.0, 123.8, 123.3, 122.5, 89.4, 66.1. **HR-MS (APCI):** calculated for $[C_{17}H_{12}N_2O_2]^+$: m/z= 276.0964, found: 276.0964 (Dev.: 0.08 mu; 0.19 ppm). **IR (ATR): $\tilde{\nu}$ (cm^{-1})=** 3392, 3212, 2714, 1690, 1644, 1454, 1381, 1140, 942, 814, 742.

The enantiomeric excess was determined by HPLC analysis on the purified product: Chiracel OM column, 214 nm, 85:15 hexane/*i*-PrOH, 1 mL/min, t = 7.22 min (*minor*), t = 9.13 min (*major*).

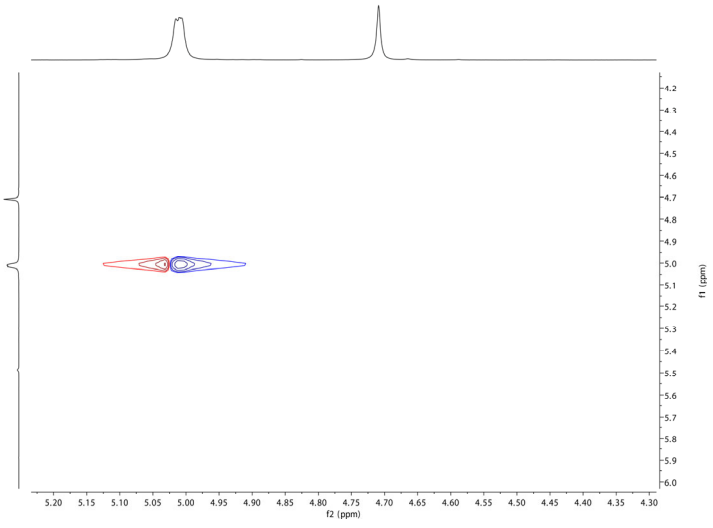
2.4. Derivetizations

2.4.1. Synthesis of (1*S*,2*R*)-2'-phenyl-2*H*,4'*H*-spiro[naphthalene-1,5'-oxazol]-2-ol (7)

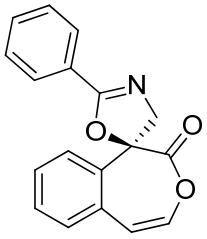


To a solution of **5a** (22.0 mg, 0.080 mmol, 1.00 eq.) and CeCl3 (5.00 mg, 0.080 mmol, 1.00 eq.) in (4.00 mL) of a mixture solution of MeOH:THF (1:1) was added $NaBH_4$ (4.00 mg, 0.080 mmol, 1.00 eq.) at -78 °C . The reaction mixture was stirred for 20 min, then diluted with EtOAc (5.00 mL), washed with 1M HCl, dried over Na_2SO_4 and evaporate the solvent under reduced pressure. The product was purified by column chromatography (80:20 Cyclohexane /EtOAc) to furnish **7** (19.0 mg, 0.070 mmol, 86%) as off-white solid. **Mp:** 188-190 °C. **$[\alpha]_D^{23}$:** -18.33 (c 1.0 in $CHCl_3$); **^{1}H NMR (600 MHz, Chloroform-d):** δ 7.90 (d, *J* = 8.2 Hz, 1H), 7.84 – 7.75 (m, 3H), 7.57 – 7.48 (m, 2H), 7.47 – 7.39 (m, 2H), 7.36 (dd, *J* = 12.6, 5.9 Hz, 3H), 7.07 (bs, 1H), 5.08 – 4.96 (m, 2H), 4.71 (d, *J* = 7.4 Hz, 1H). **^{13}C NMR (150 MHz, Chloroform-d):** δ 170.0, 154.5, 132.3, 130.3, 129.1, 128.8, 128.6, 127.2, 125.6, 123.0, 121.0, 120.7, 115.7, 99.7, 35.7, 30.3. **HR-MS (APCI):** calculated for $[C_{18}H_{15}NO_2]^+$: m/z= 277.0642, found: 277.0644 (Dev.: 0.23 mu; 0.52 ppm). **IR (ATR): $\tilde{\nu}$ (cm^{-1})=** 3411, 3145, 2632, 1661, 1642, 1366, 1185, 965, 830, 702.

The enantiomeric excess was determined by HPLC analysis on the purified product: Chiracel OM column, 254 nm, 90:10 hexane/*i*-PrOH, 1 mL/min, t = 12.82 min (*minor*), t = 19.54 min (*major*). The suggested relative stereochemistry is based on an NOE-Experiment showing no cross peaks between the oxazolines methylene protons 5.08 – 4.96 ppm) and the tertiary proton of the 2-naphthalenone (4.71 ppm).



2.4.2. Synthesis of (*S*)-2'-phenyl-2*H*,4'*H*-spiro[benzo[d]oxepine-1,5'-oxazol]-2-one (8)

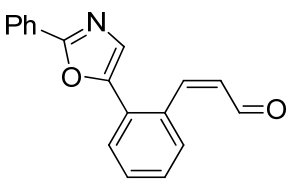


To a solution of **5a** (22.0 mg, 0.080 mmol, 1.00 eq.) dissolved in DCM (0.4 mL) was added phosphate buffer (pH = 7.00, 0.4 mL) and *m*- CPBA (28.0 mg, 0.080 mmol, 1.00 eq.). The reaction mixture was stirred at room temperature for 4 h at -78 °C. Then, diluted with Et_2O (5.00 mL) and quenched with aqueous $Na_2S_2O_3$ and extract with Et_2O (2x 5), washed with brine. dried over Na_2SO_4 and evaporate the solvent under reduced pressure. The product was purified by column chromatography (90:10 Cyclohexane /EtOAc) to furnish **8** (14.7 mg, 0.050 mmol, 63%) as colorless oil.

$[\alpha]_D^{23}$: -23.82 (c 1.0 in $CHCl_3$); **^{1}H NMR (600 MHz, Chloroform-d):** δ 7.90 (dd, *J* = 8.2, 1.2 Hz, 2H), 7.39 – 7.34 (m, 1H), 7.34 – 7.26 (m, 4H), 7.24 (dd, *J* = 6.6, 2.0 Hz, 1H), 7.23 – 7.17 (m, 2H), 6.04 (d, *J* = 10.0 Hz, 1H), 4.31 (d, *J* = 14.7 Hz, 1H), 3.84 (d, *J* = 14.7 Hz, 1H). **^{13}C NMR (150 MHz, Chloroform-d):** δ 167.9, 165.7, 138.9, 136.9, 130.3, 130.1, 129.5, 128.9, 128.5, 128.0, 127.5, 126.7, 126.6, 112.2, 94.0, 67.0. **HR-MS (APCI):** calculated for $[C_{18}H_{13}NO_3]^+$: m/z= 291.0842, found: 291.0841 (Dev.: 0.18 mu; 0.47 ppm). **IR (ATR): $\tilde{\nu}$ (cm^{-1})=** 3241, 3015, 2744, 2480, 1653, 1455, 1268, 1102, 866, 714.

The enantiomeric excess was determined by HPLC analysis on the purified product: Chiracel OM column, 214 nm, 90:10 hexane/*i*-PrOH, 1 mL/min, t = 10.43 min (*minor*), t = 11.41 min (*major*).

2.4.3. Synthesis of (*Z*)-3-(2-(2-phenyloxazol-5-yl)phenyl)acrylaldehyde (9)



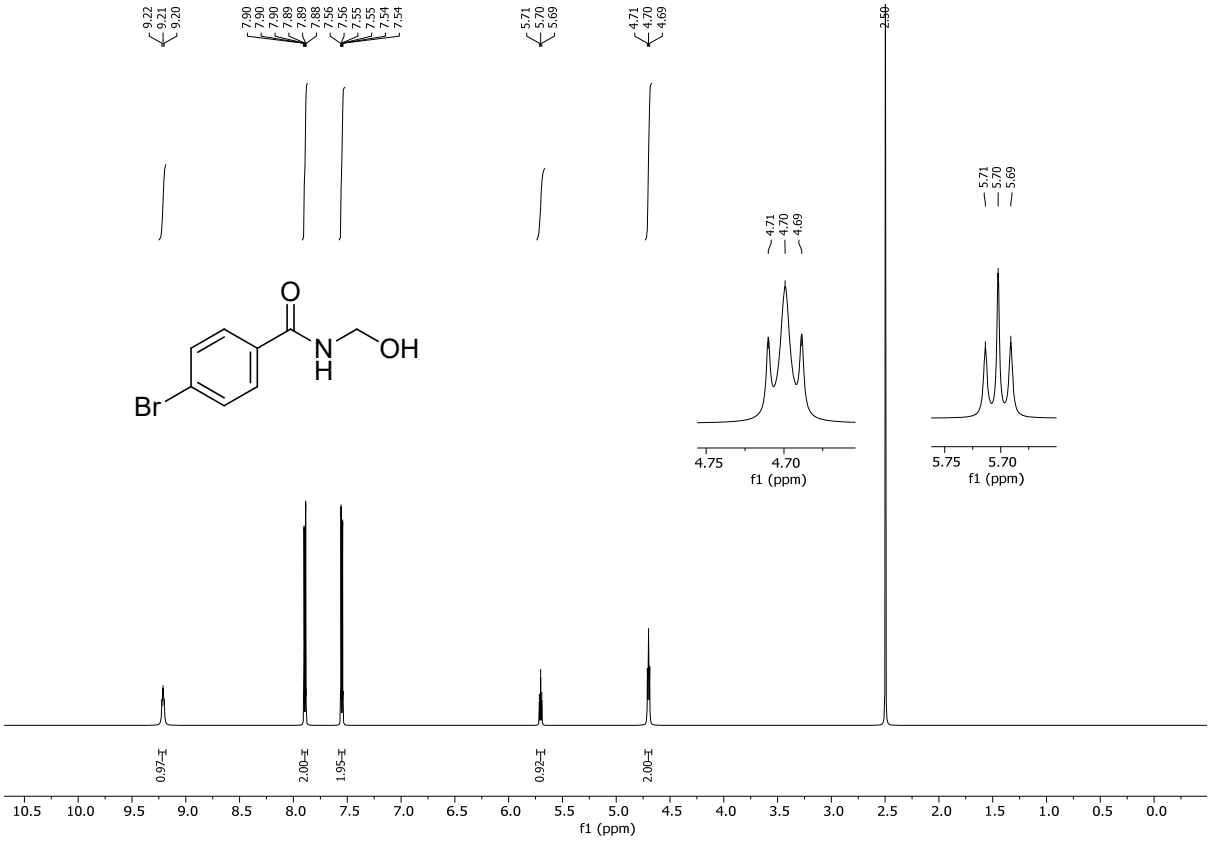
5a (27.0 mg, 0.100 mmol, 1.00 eq.) was dissolved in DCM (2.00 mL) and irradiate by UV lamp 350 nm for 2 h. After evaporating the solvent under reduced pressure. The product **9** isolated (26.5 mg, 0.100 mmol, 98%) as a yellow oil.

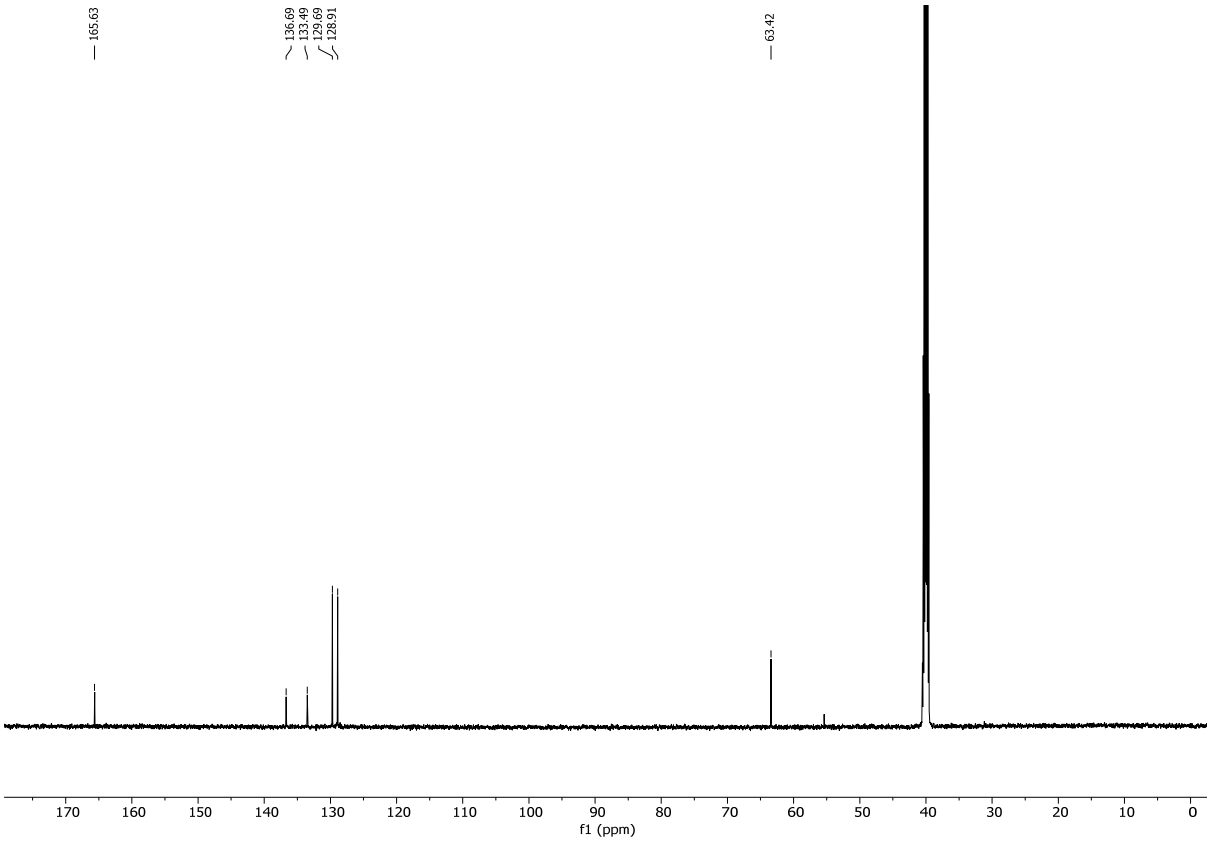
^{1}H NMR (600 MHz, Chloroform-d): δ 9.16 (d, J = 10.3 Hz, 1H), 8.16 (d, J = 7.2 Hz, 2H), 7.99 (d, J = 8.4 Hz, 1H), 7.70 – 7.64 (m, 2H), 7.57 (t, J = 7.7 Hz, 2H), 7.51 (d, J = 8.8 Hz, 2H), 7.35 (t, J = 8.0 Hz, 1H), 6.66 (d, J = 9.6 Hz, 1H). **^{13}C NMR (150 MHz, Chloroform-d):** δ 195.1, 157.9, 143.5, 141.8, 133.7, 131.6, 129.8, 129.7, 129.2, 129.0, 128.7, 128.5, 127.4, 126.9, 126.1, 120.3. **HR-MS (APCI):** calculated for

$[C_{18}H_{13}NO_2]^+$: m/z= 275.0955, found: 275.0953 (Dev.: 0.28 mu; 0.62 ppm). **IR (ATR): $\tilde{\nu}$ (cm^{-1})=** 3310, 3124, 2842, 2455, 1641, 1510, 1320, 1144, 976, 850.

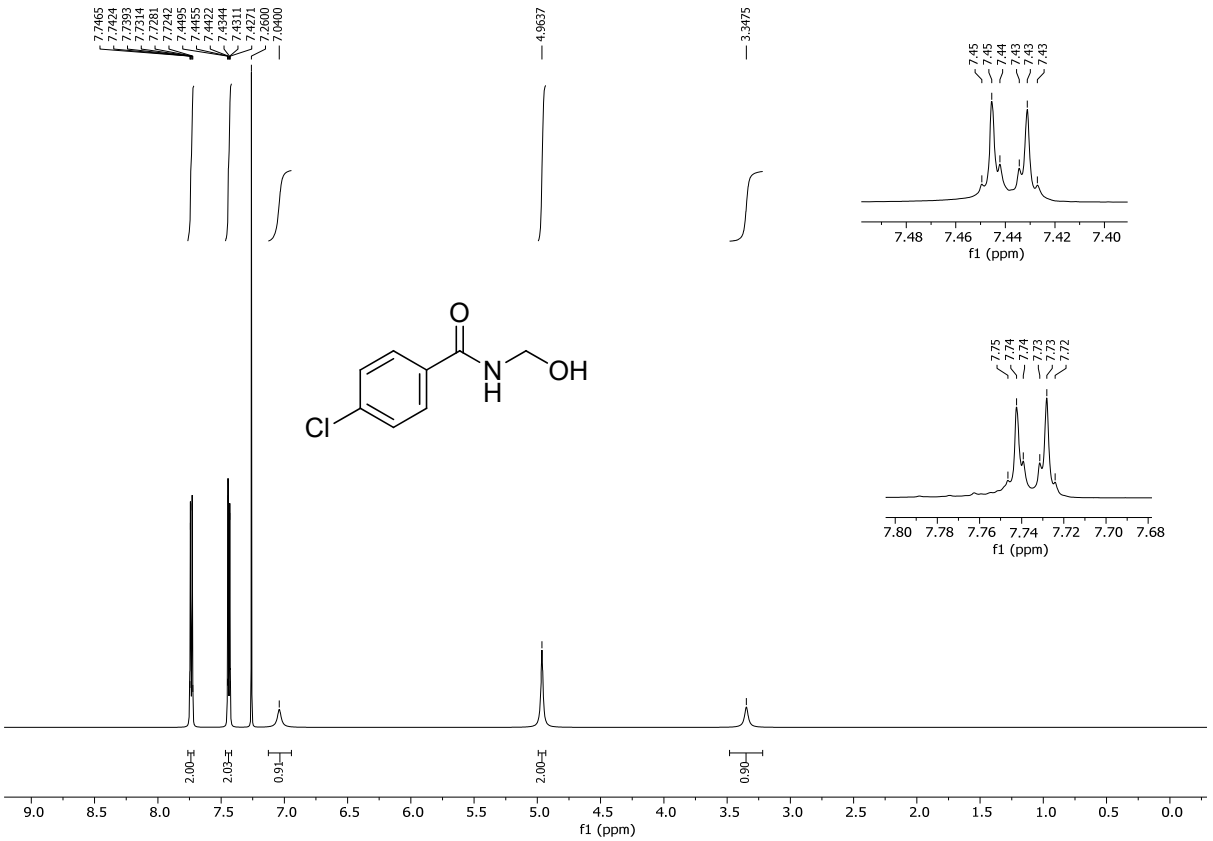
3. NMR Spectra for New Compounds

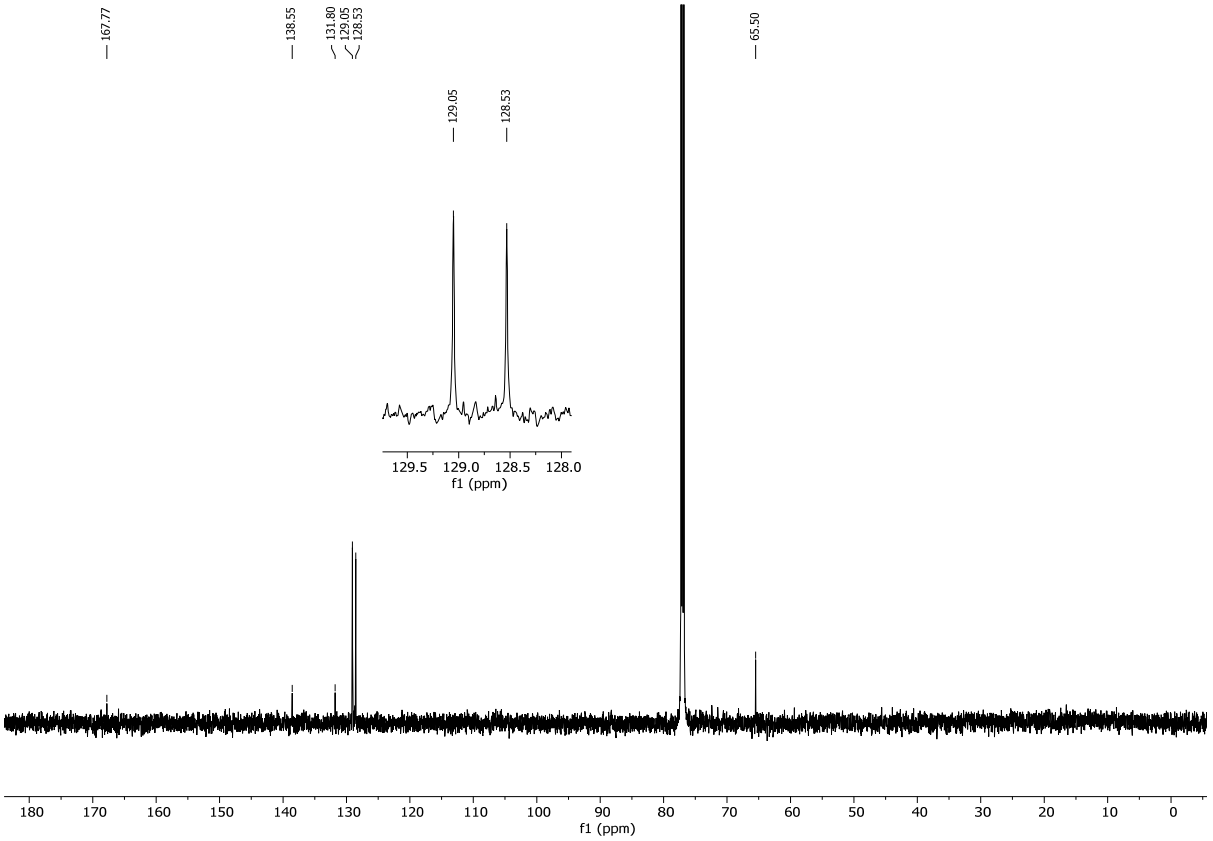
3.1.NMR of 4-bromo-*N*-(hydroxymethyl)benzamide (a1) in DMSO-d_6



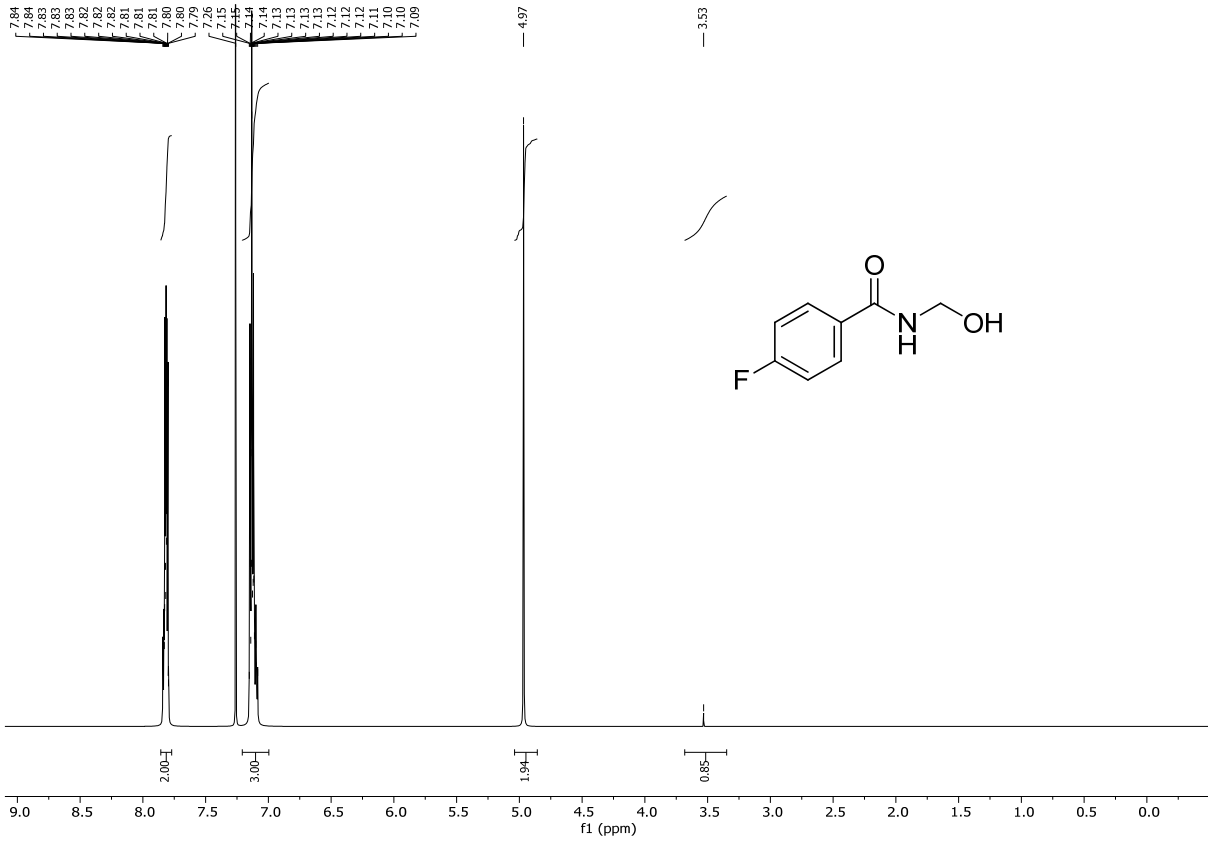


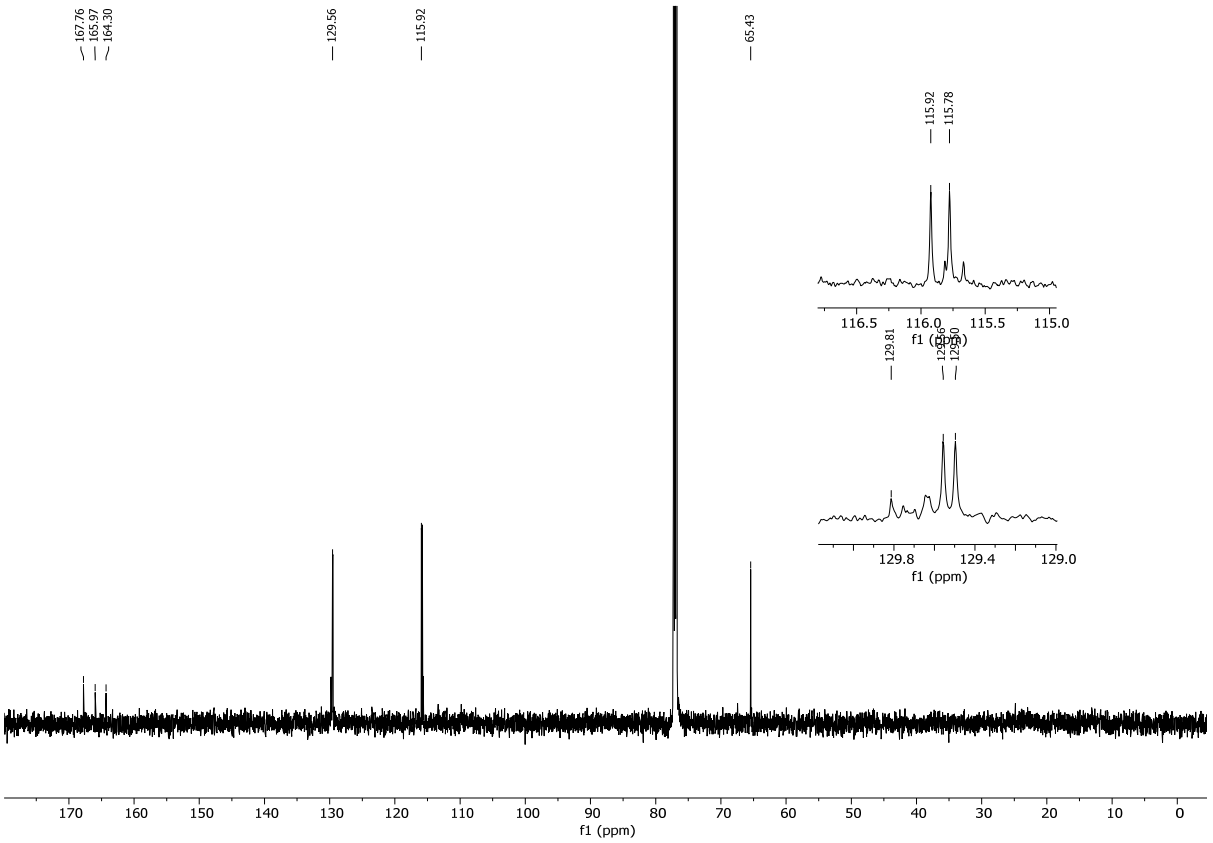
3.2. NMR of 4-chloro-*N*-(hydroxymethyl)benzamide (b1) in $CDCl_3$

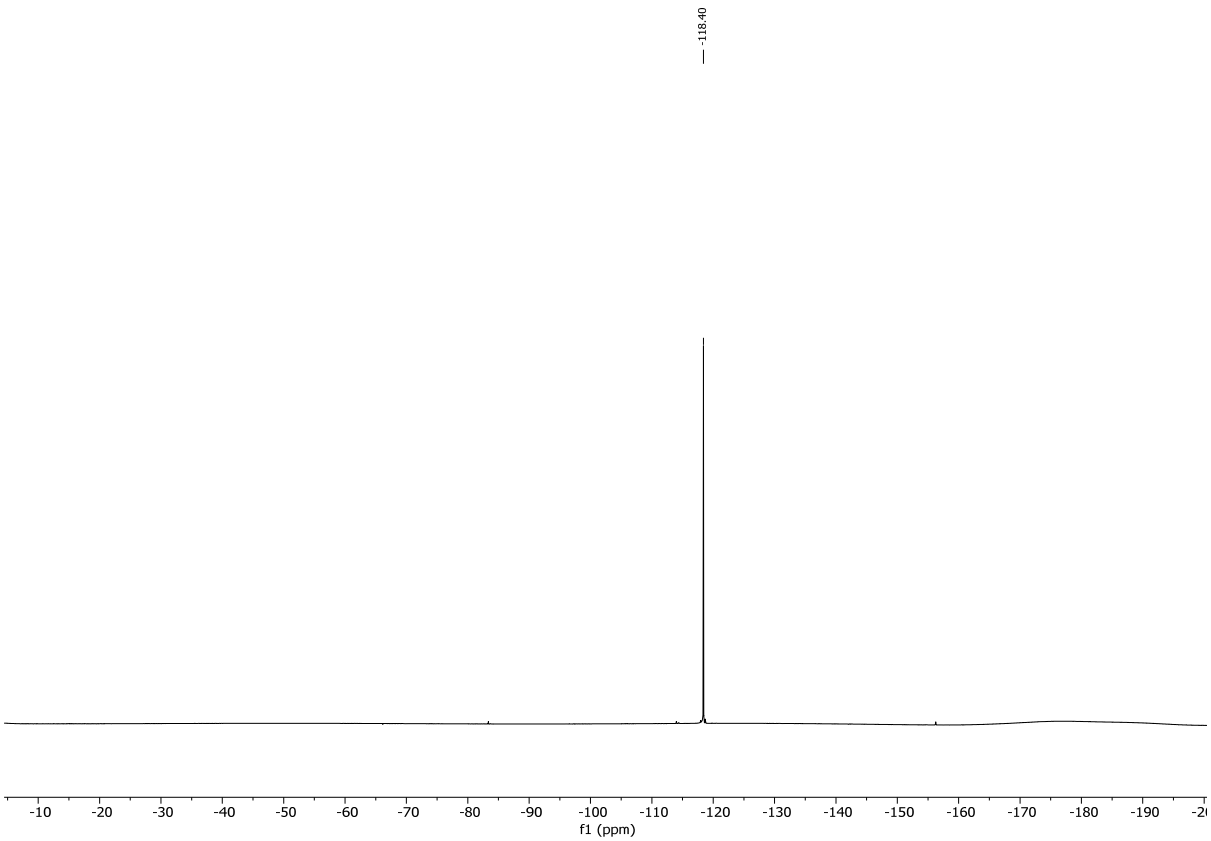

7.7465
7.7424
7.7393
7.7314
7.7281
7.7242
7.4495
7.4455
7.4422
7.4344
7.4311
7.4271
7.2600
7.0400
4.9637
3.3475
7.45
7.45
7.44
7.43
7.43
7.43
7.48 7.46 7.44 7.42 7.40
f1 (ppm)
O
N
H
OH
Cl
7.75
7.74
7.74
7.73
7.73
7.72
7.80 7.78 7.76 7.74 7.72 7.70 7.68
f1 (ppm)
2.00
2.03
0.91
2.00
0.90
9.0 8.5 8.0 7.5 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)


167.77
138.55
131.80
129.05
128.53
65.50
129.05
128.53
129.5 129.0 128.5 128.0
f1 (ppm)
180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
f1 (ppm)

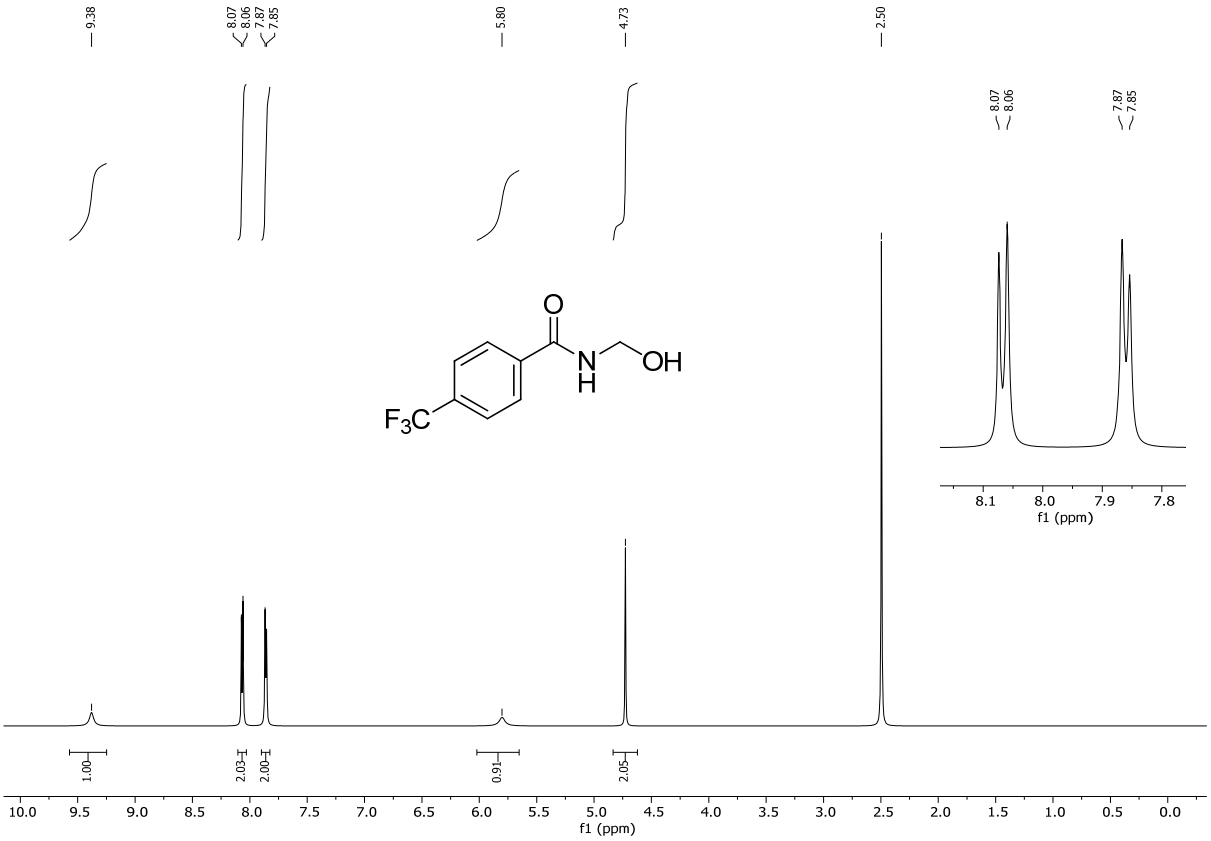
3.3.NMR of 4-fluoro-*N*-(hydroxymethyl)benzamide (c1) in $CDCl_3$

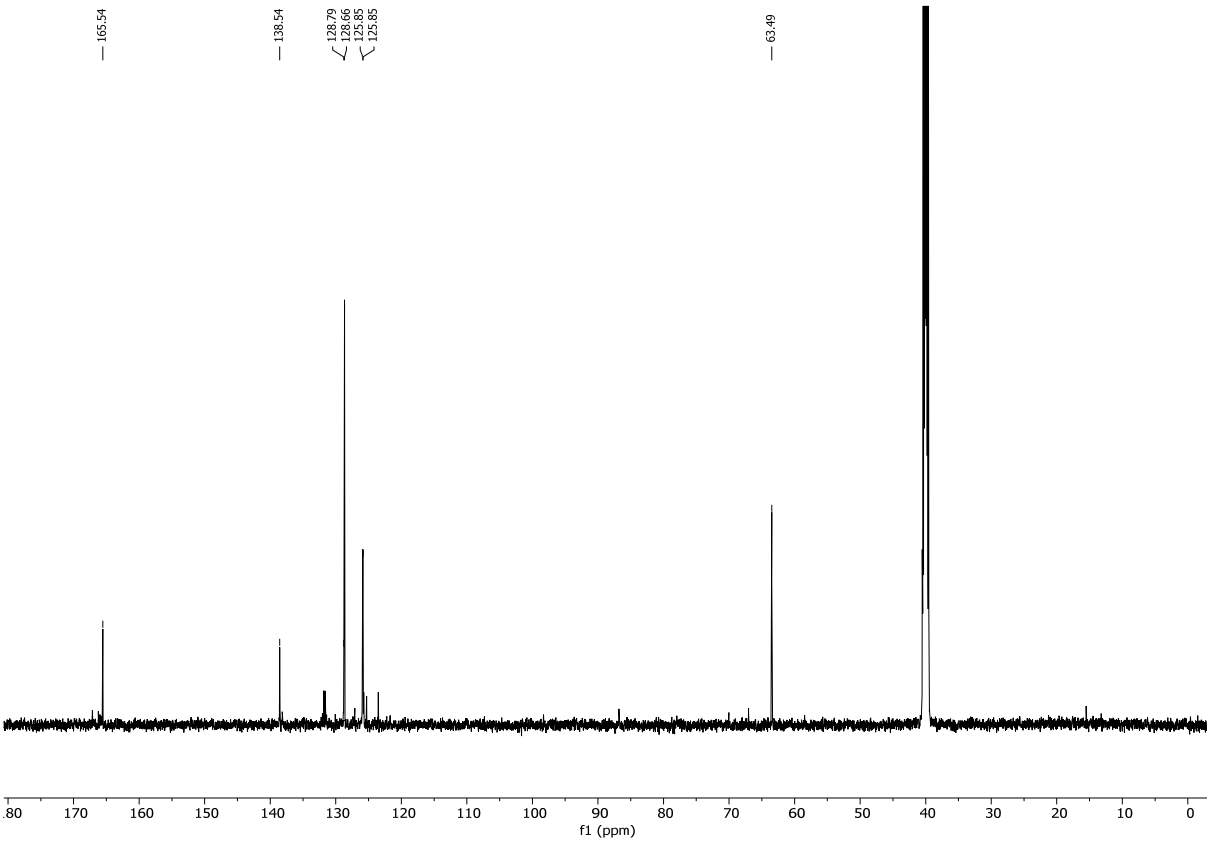


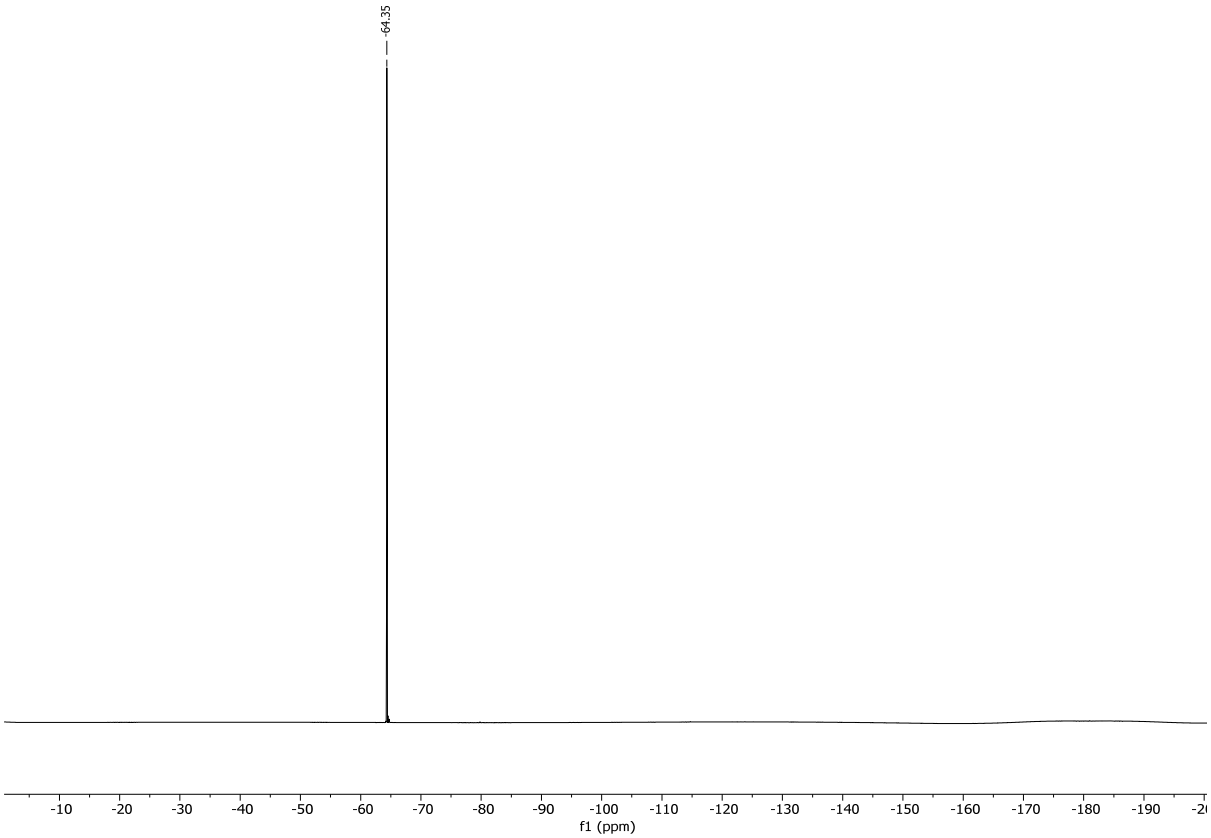



-118.40
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110
-120
-130
-140
-150
-160
-170
-180
-190
f1 (ppm)

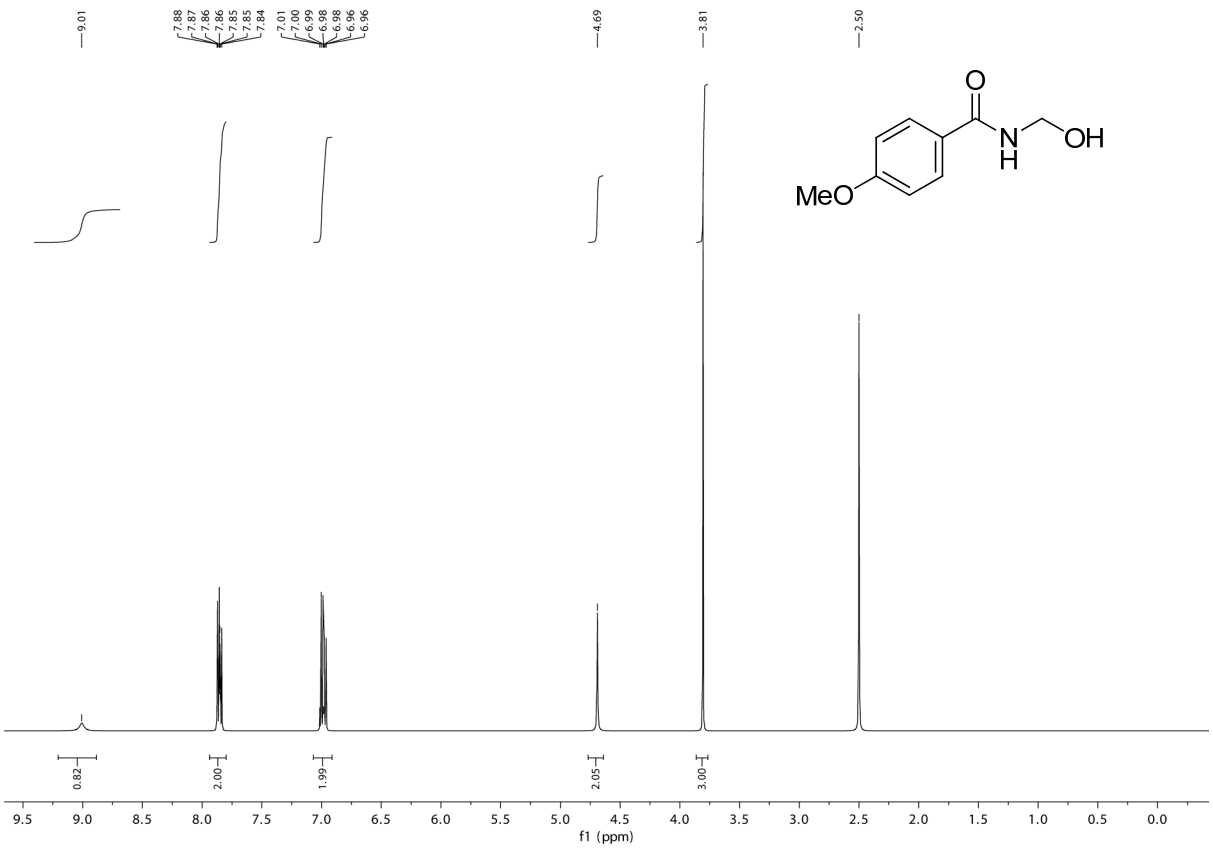
3.4.NMR of *N*-(hydroxymethyl)-4-(trifluoromethyl)benzamide in (d1) $CDCl_3$

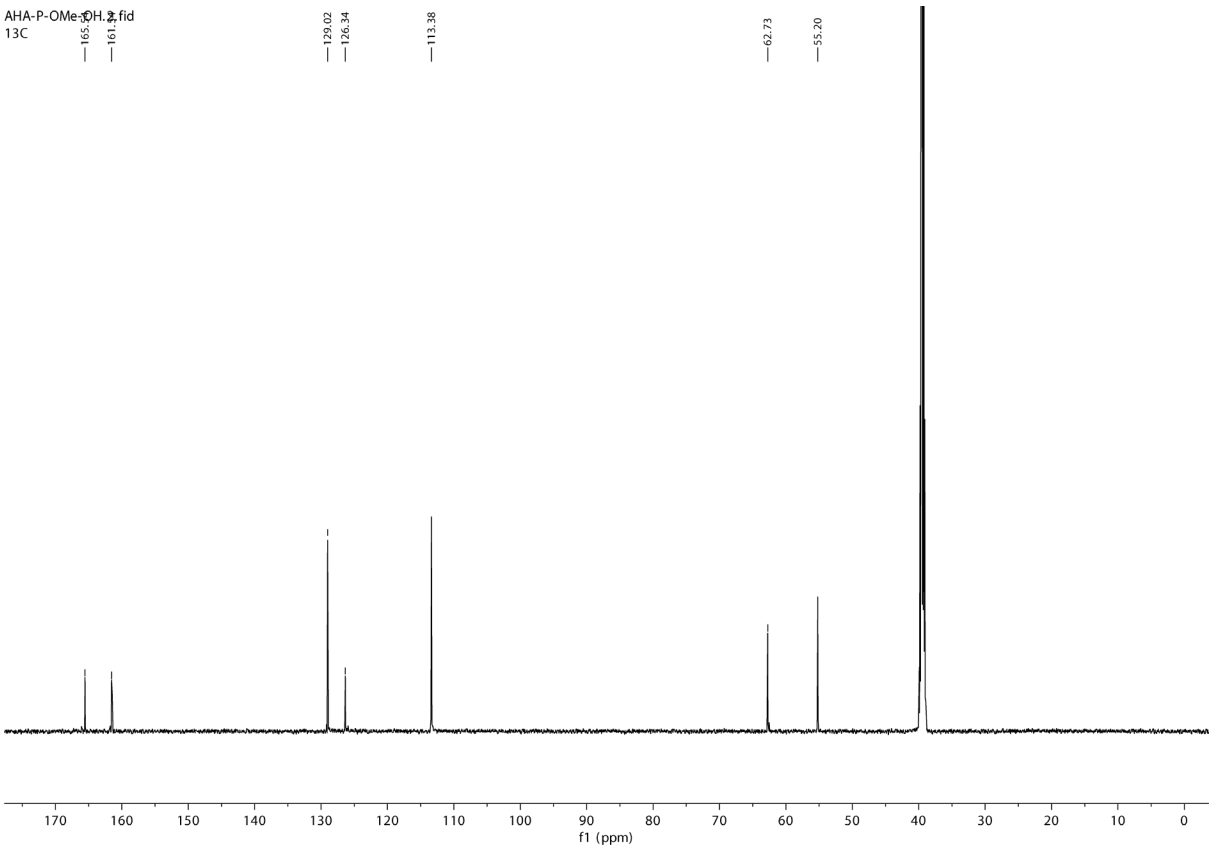




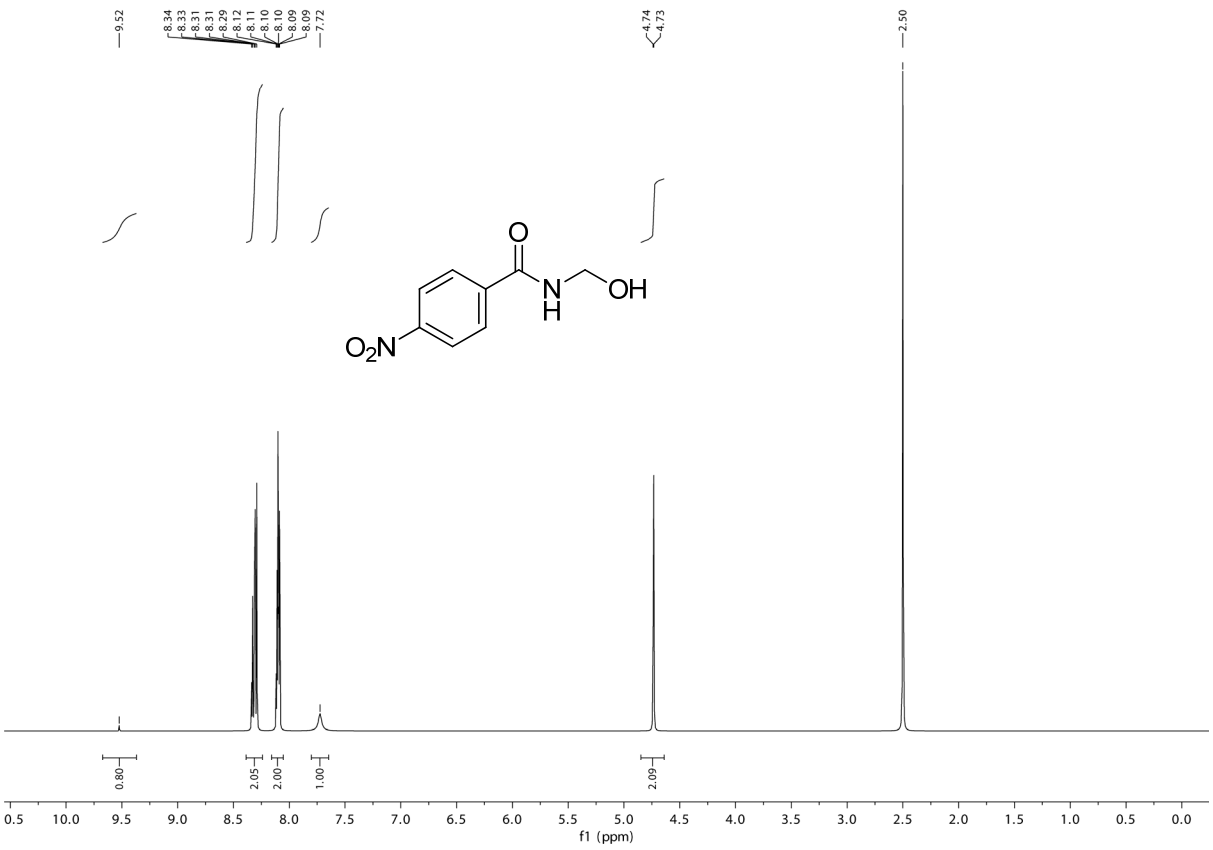

-64.35
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110
-120
-130
-140
-150
-160
-170
-180
-190
f1 (ppm)

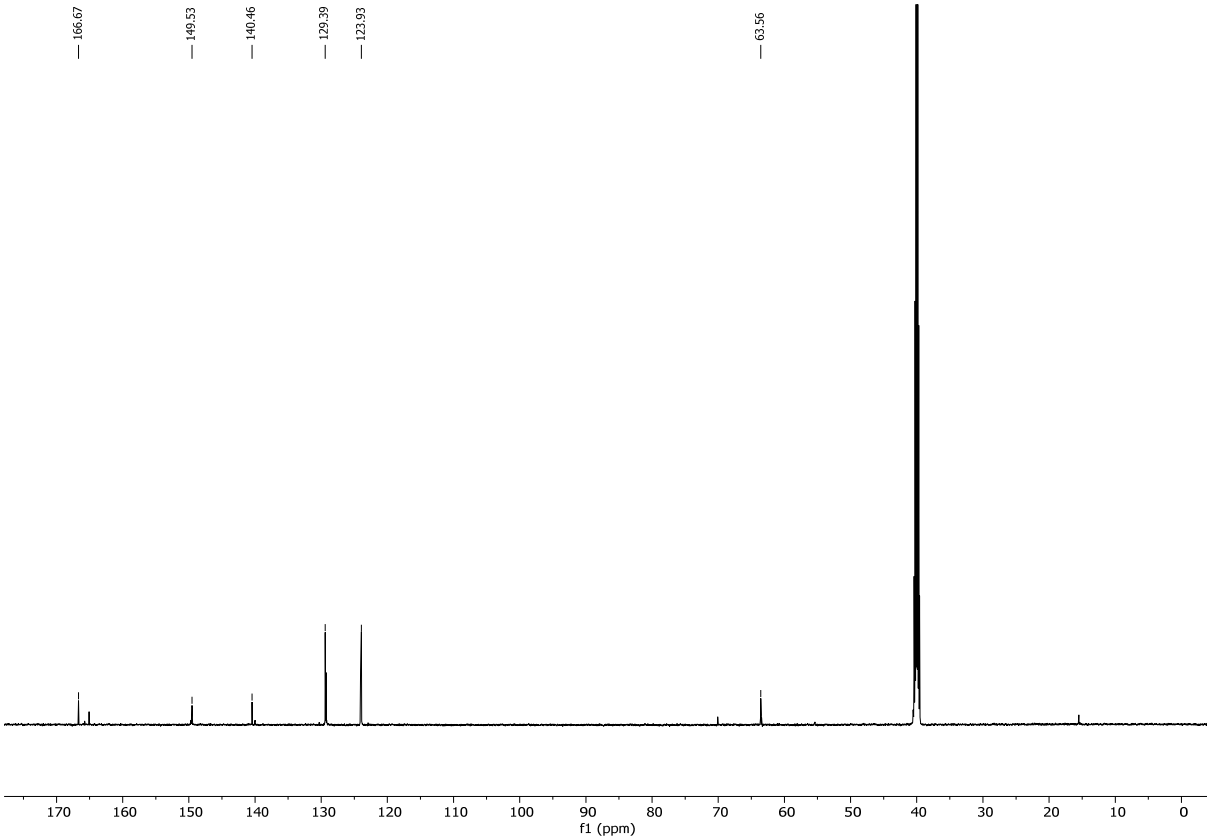
3.5.NMR of *N*-(hydroxymethyl)-4-methoxybenzamide (e1) in DMSO-d_6



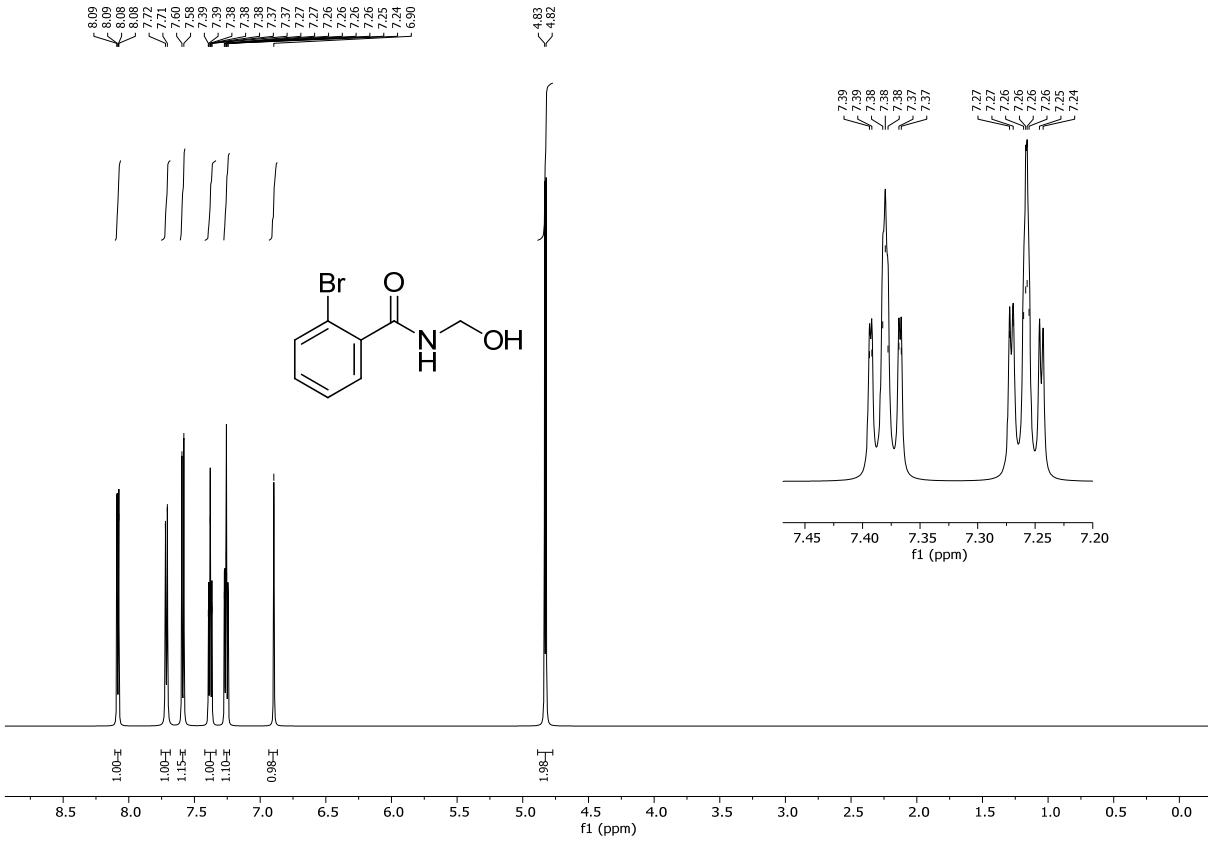


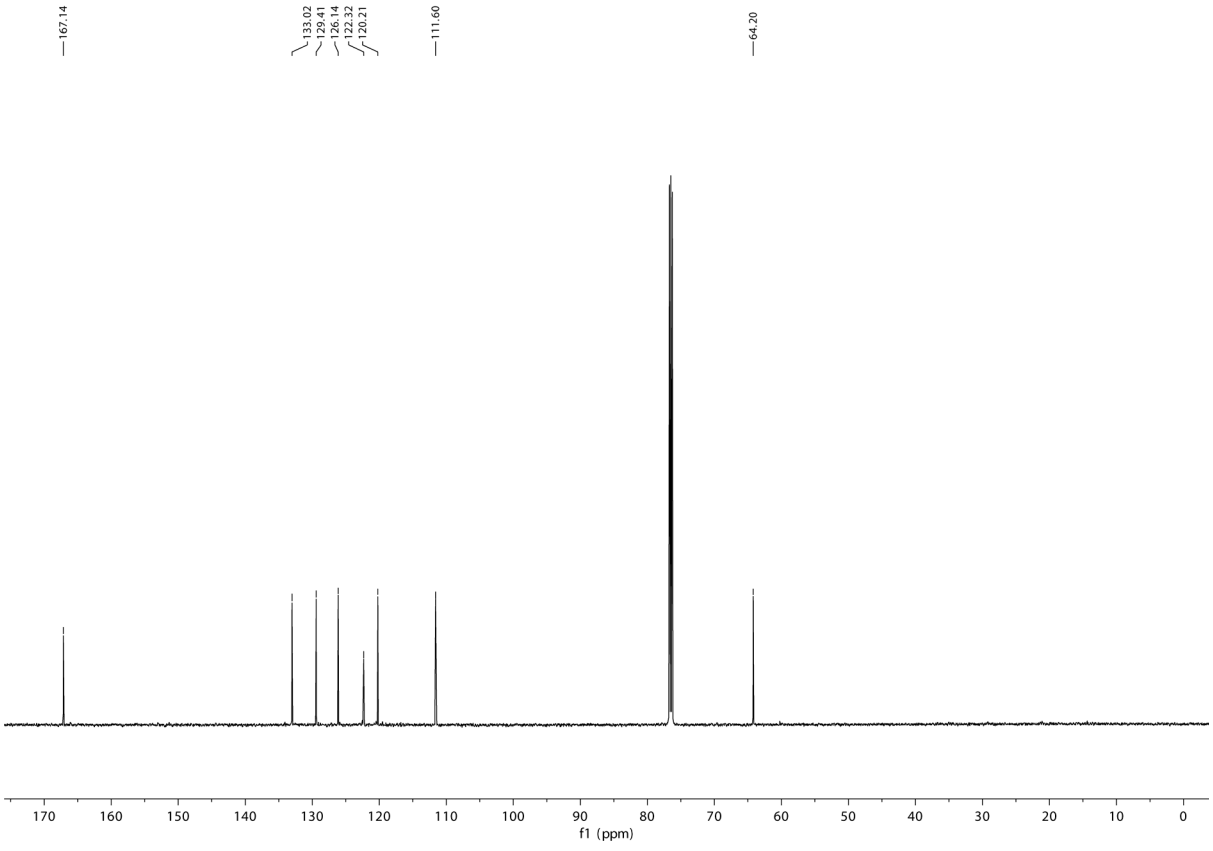
3.6.NMR of *N*-(hydroxymethyl)-4-nitrobenzamide (f1) in DMSO-d_6



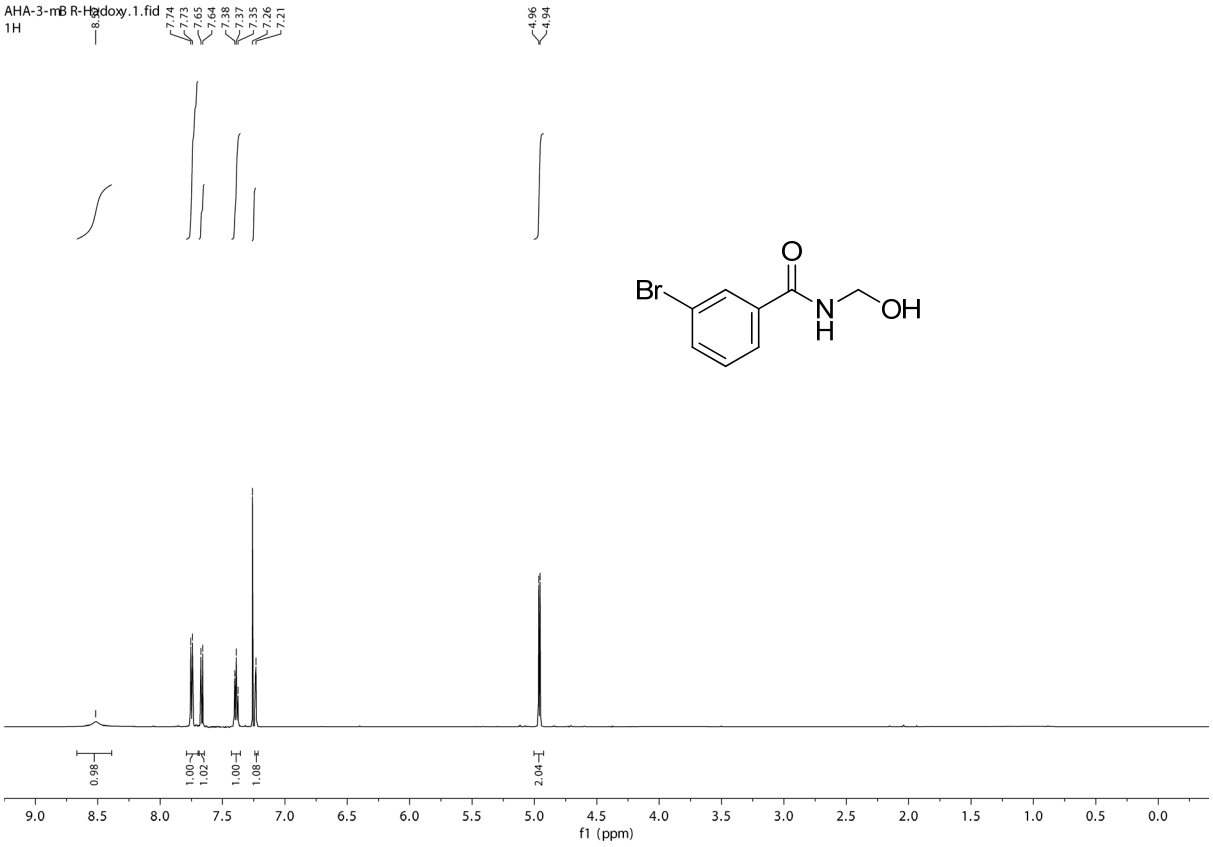


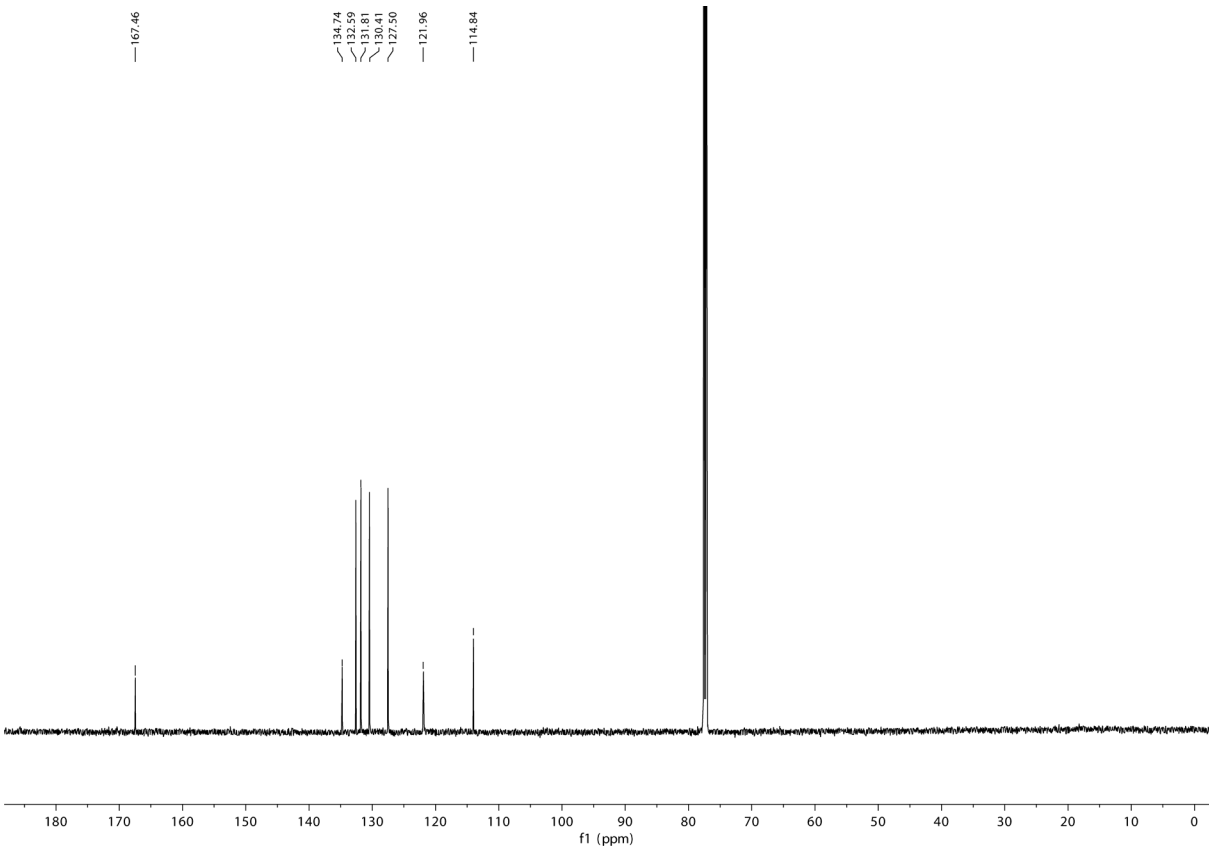
3.7.NMR of 2-bromo-*N*-(hydroxymethyl)benzamide (g1) $CDCl_3$



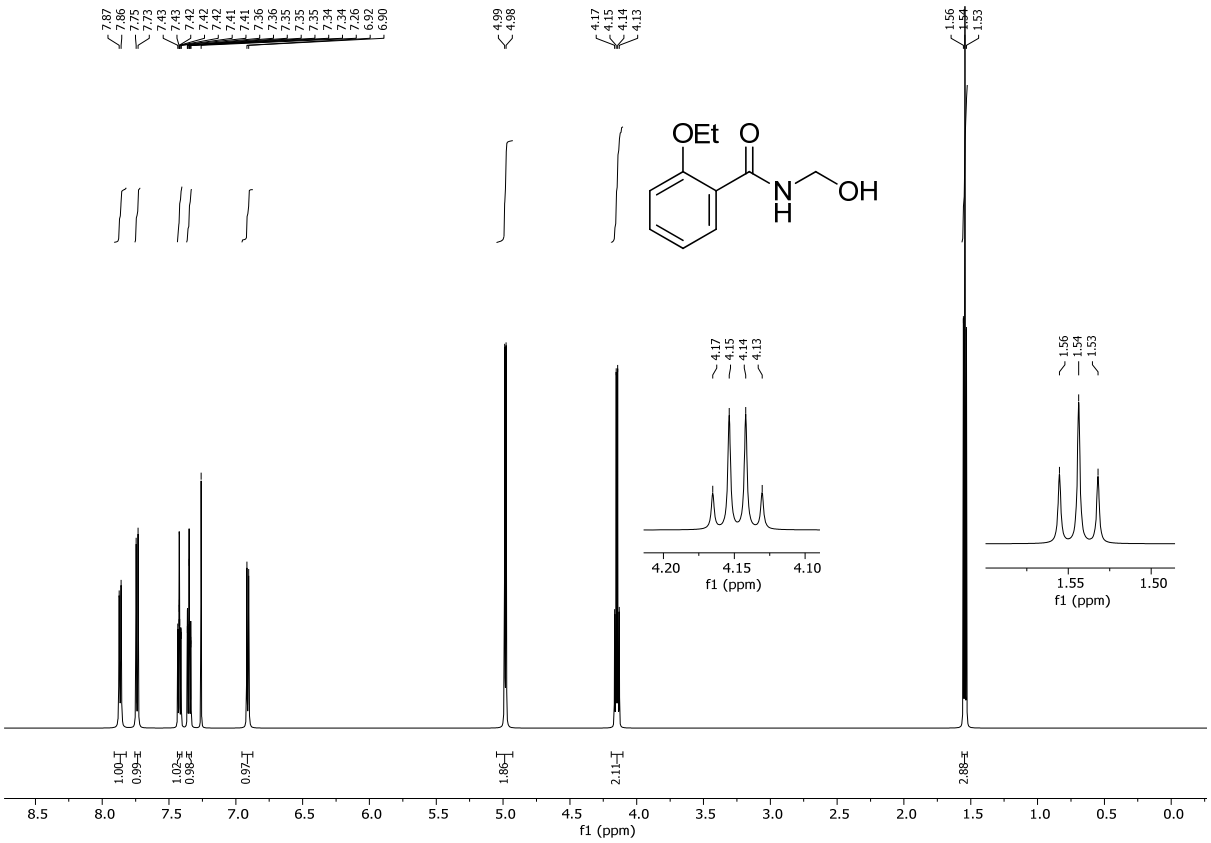


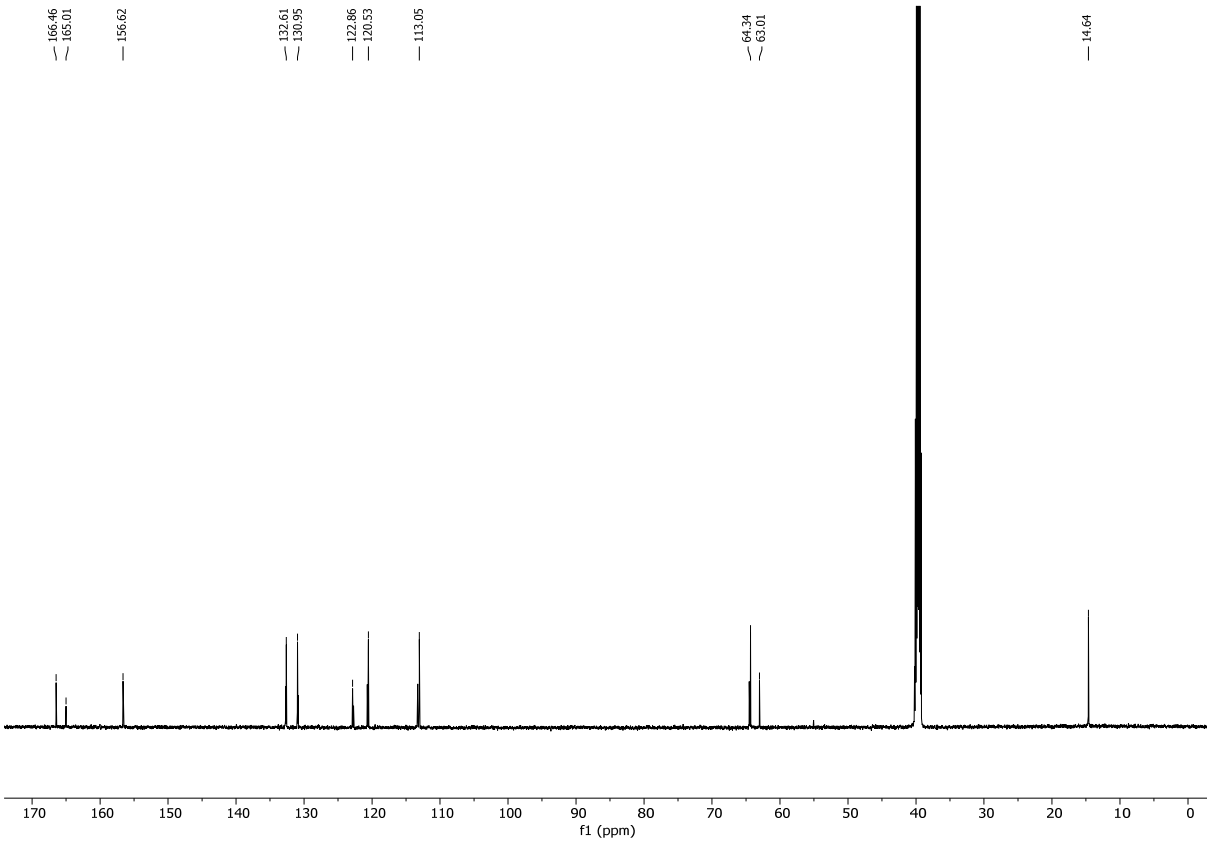
3.8.NMR of 3-bromo-*N*-(hydroxymethyl)benzamide (h1) in $CDCl_3$



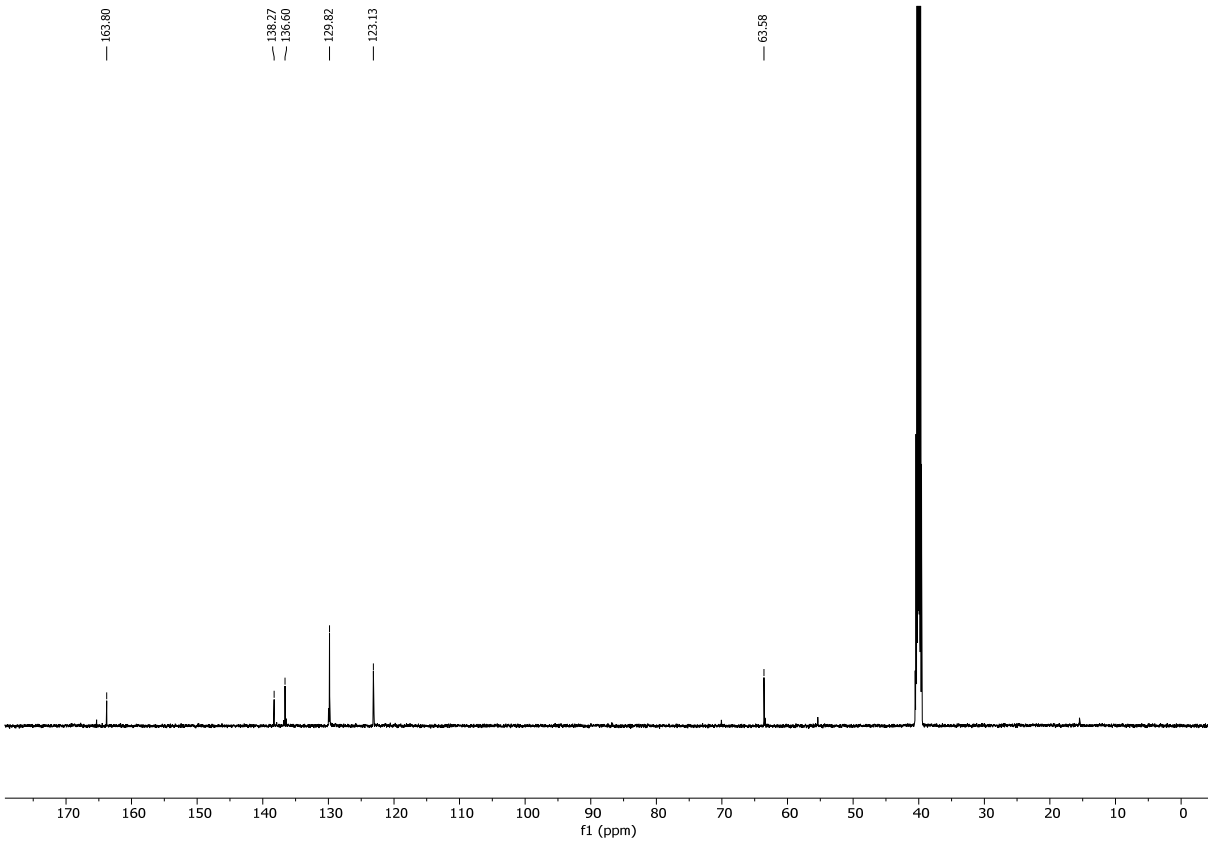


3.9.NMR of 2-ethoxy-*N*-(hydroxymethyl)benzamide (i1) in $CDCl_3$

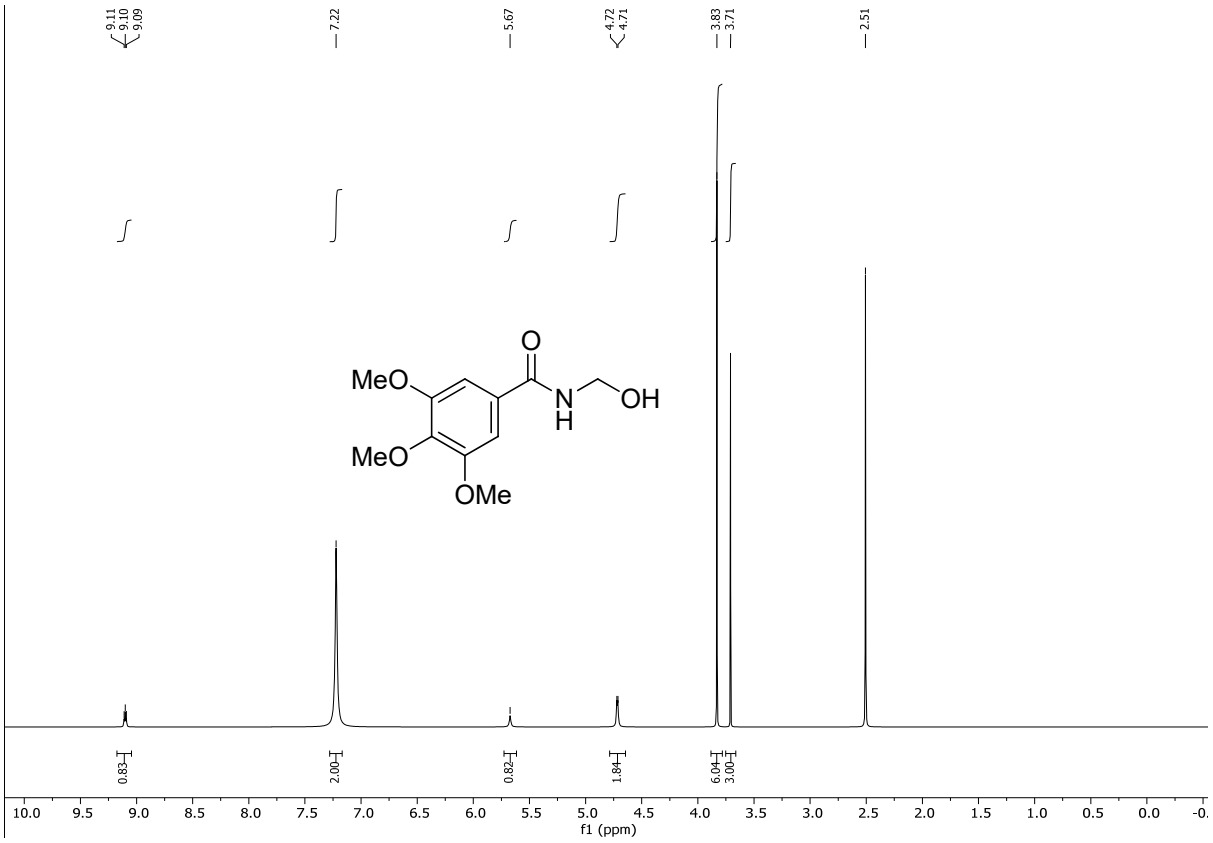


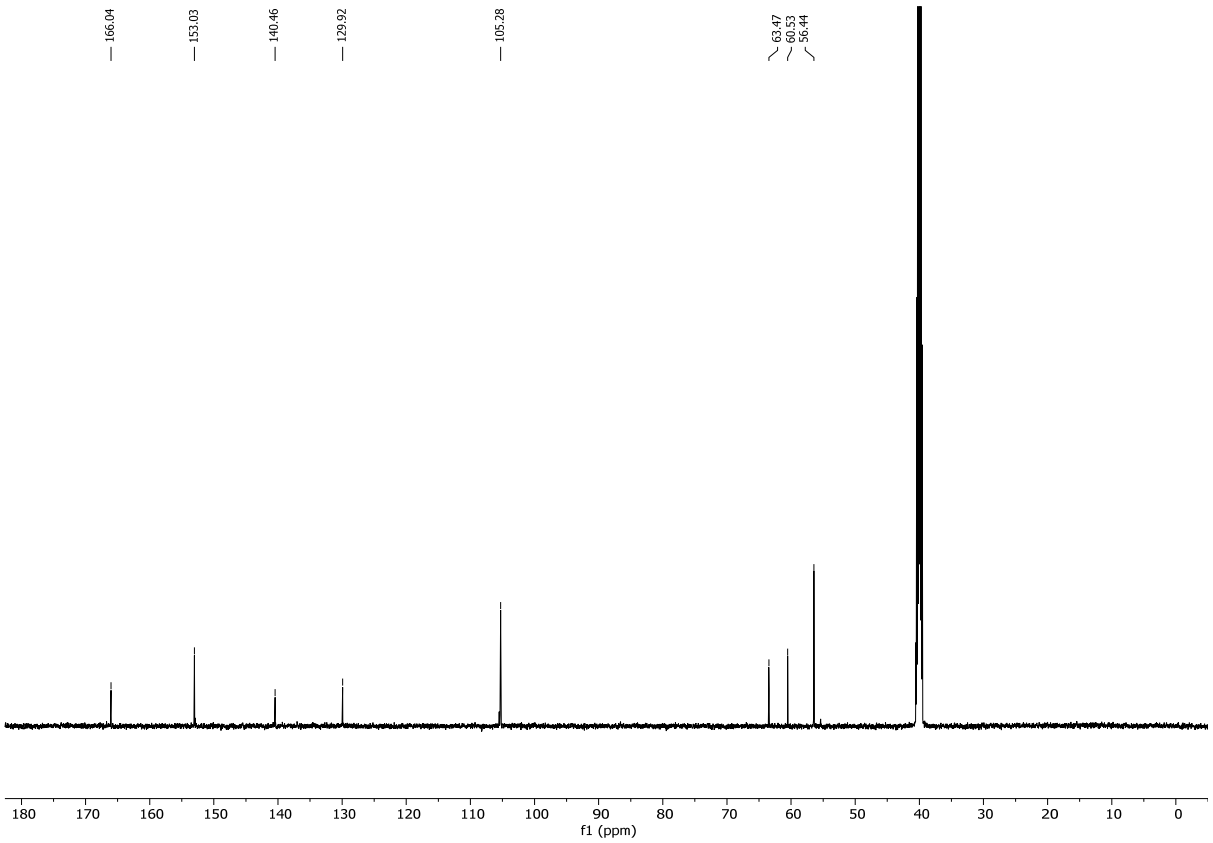


3.10. NMR of 3,5-dibromo-*N*-(hydroxymethyl)benzamide (j1) in DMSO-d_6

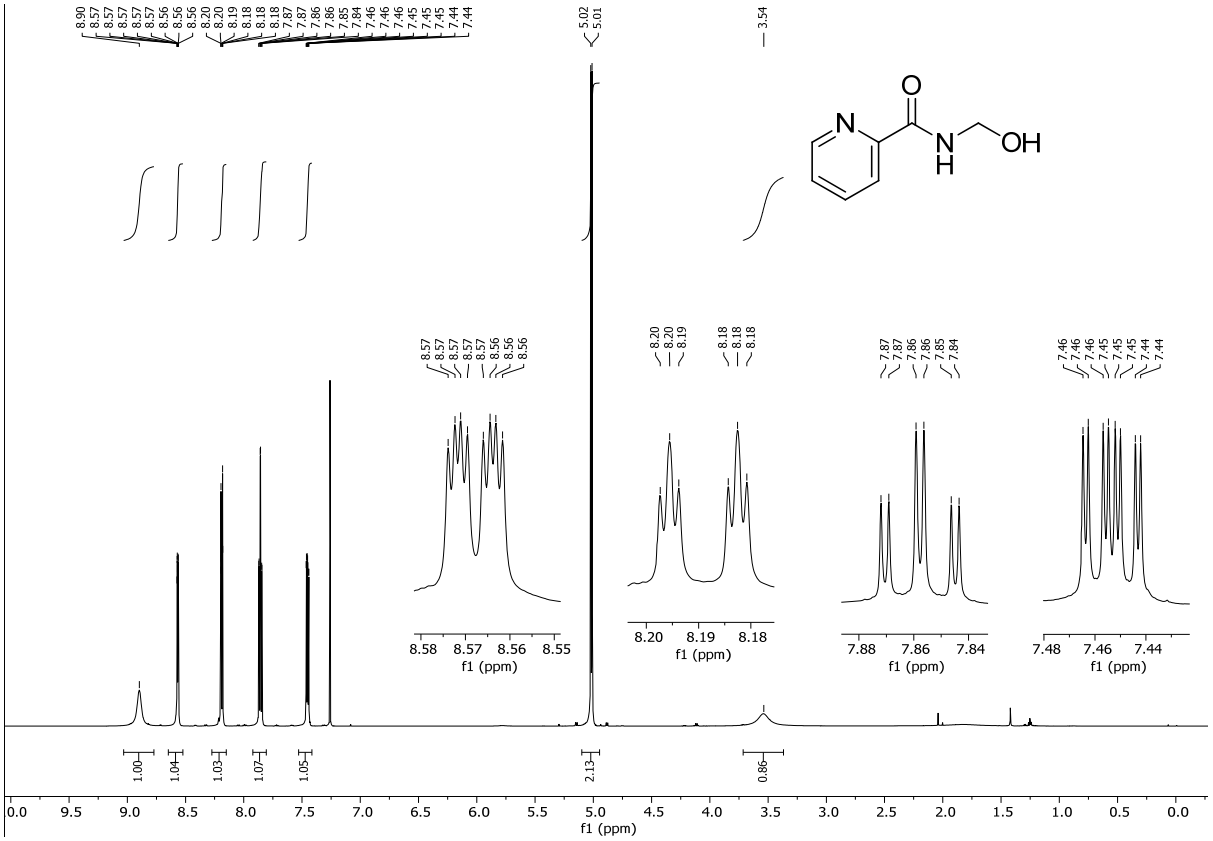


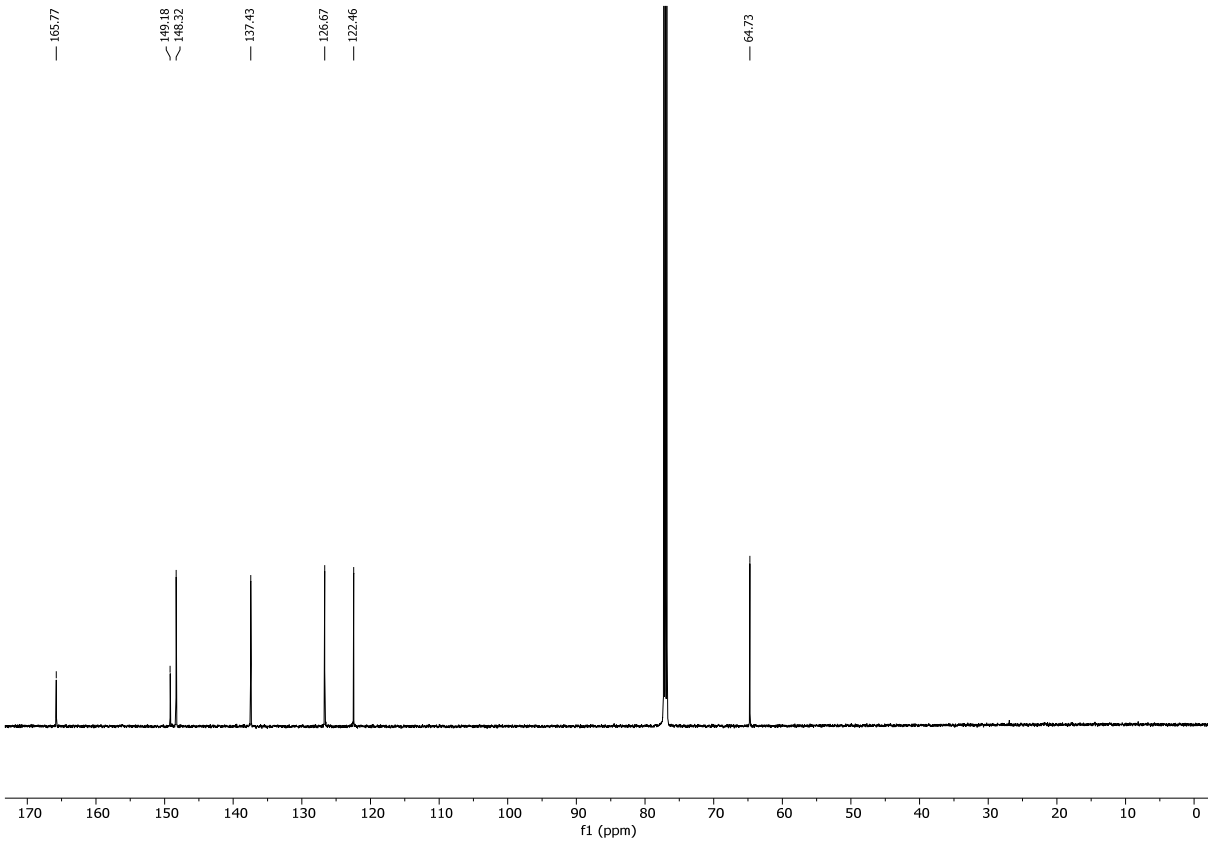
3.11. NMR of *N*-(hydroxymethyl)-3,4,5-trimethoxybenzamide (k1) in DMSO-d_6



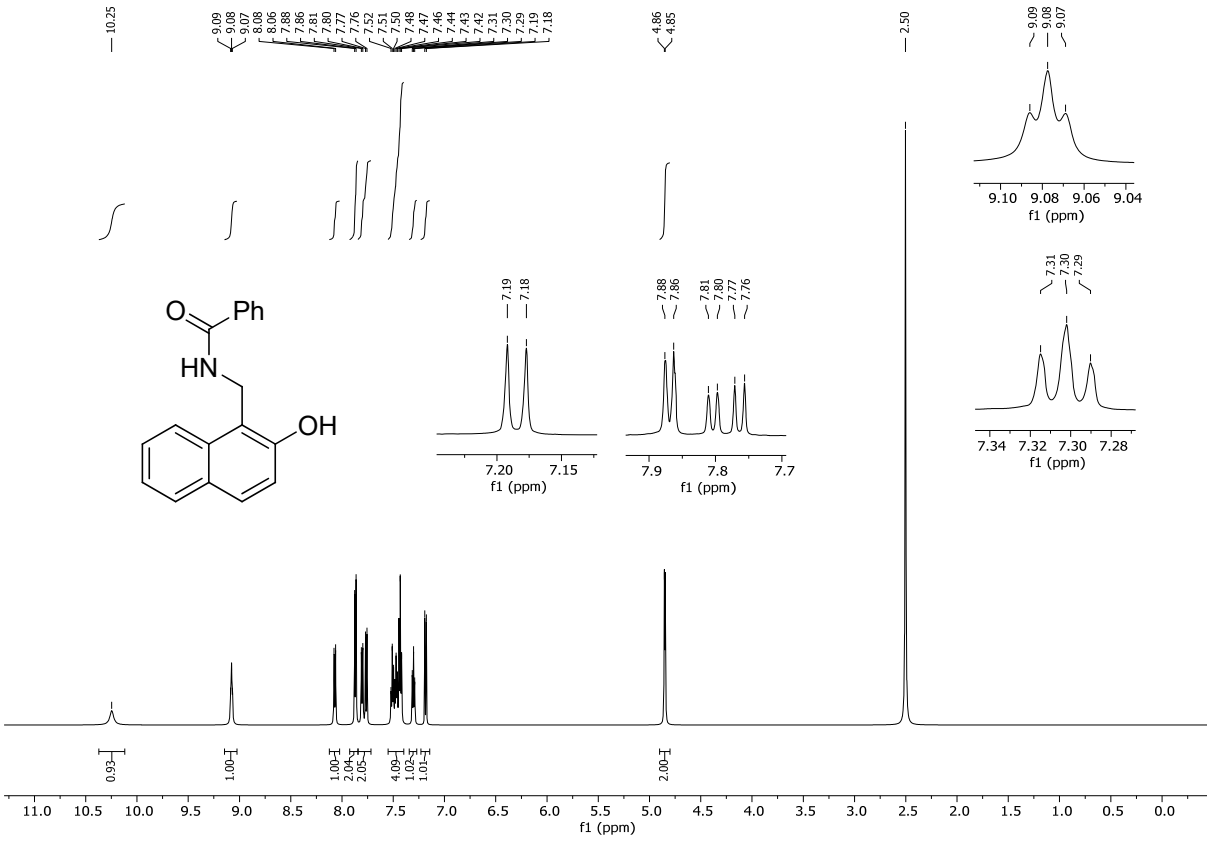


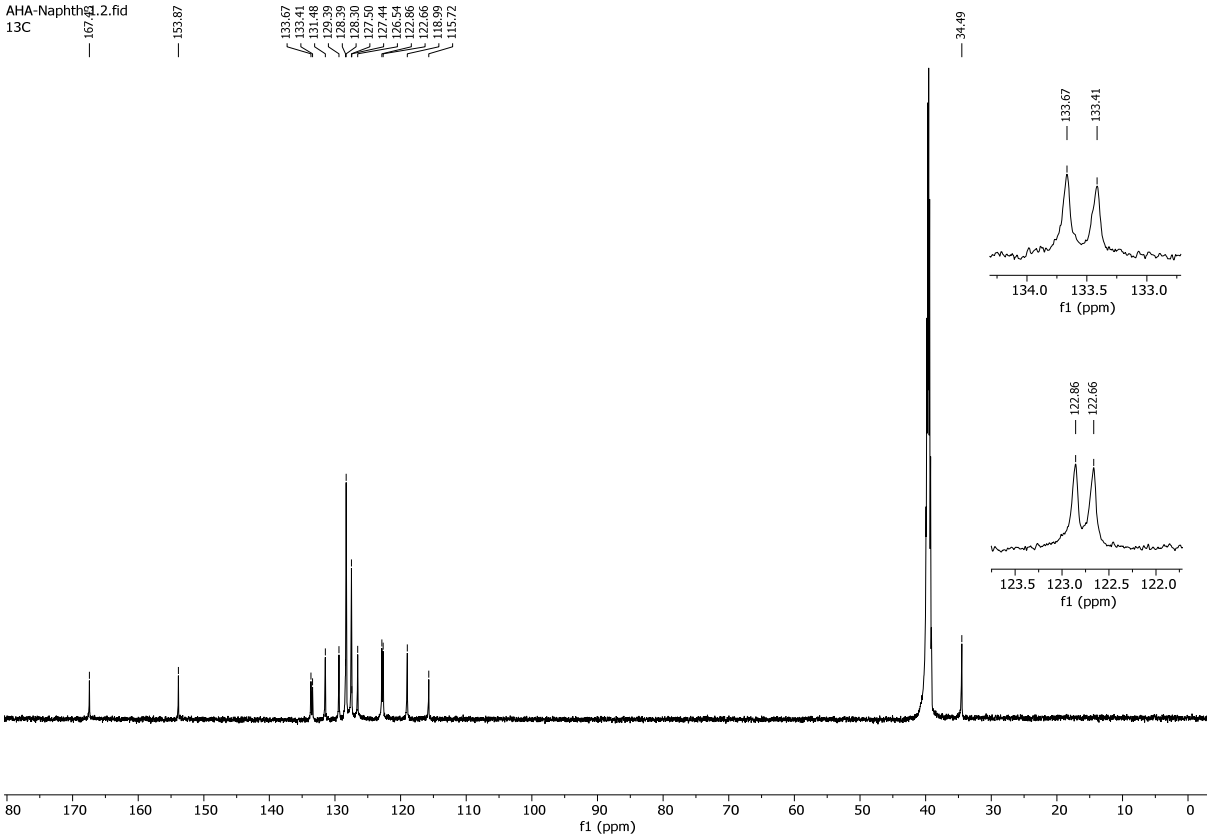
3.12.NMR of *N*-(hydroxymethyl)picolinamide (I1) in $CDCl_3$



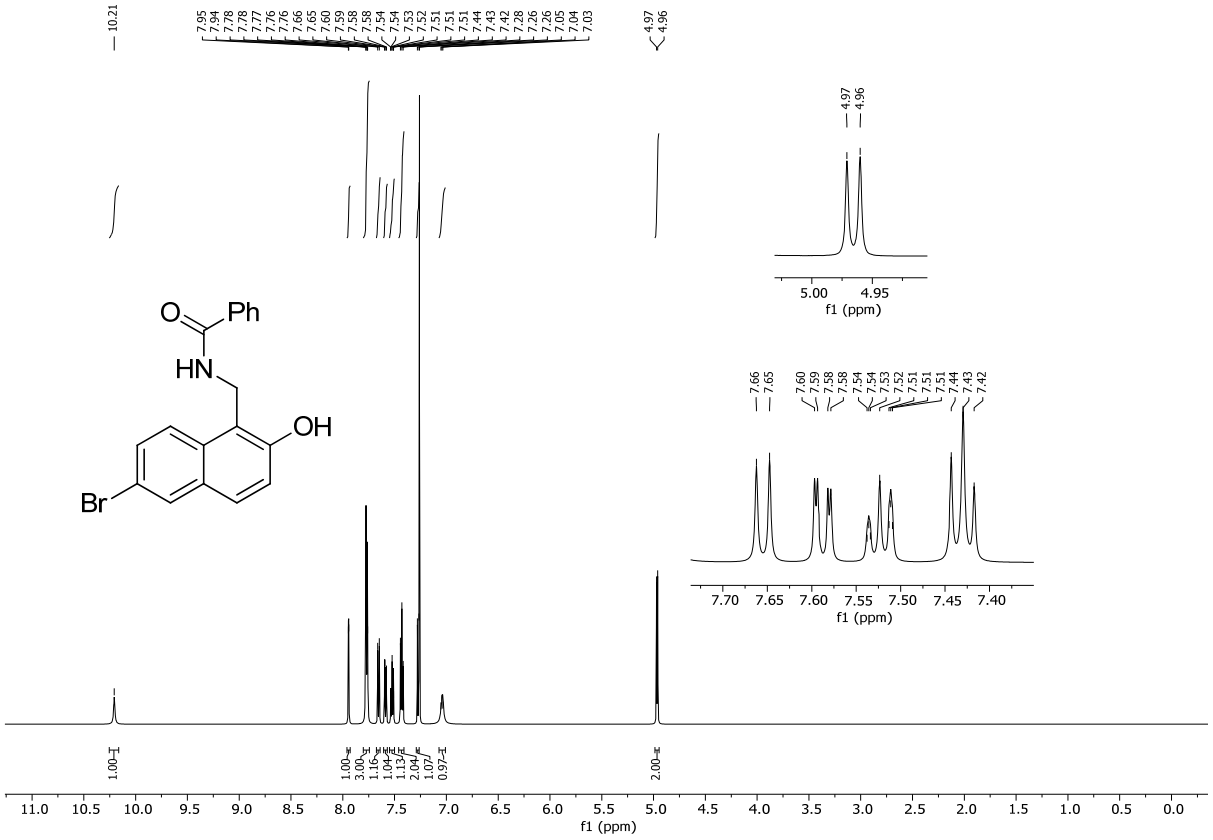


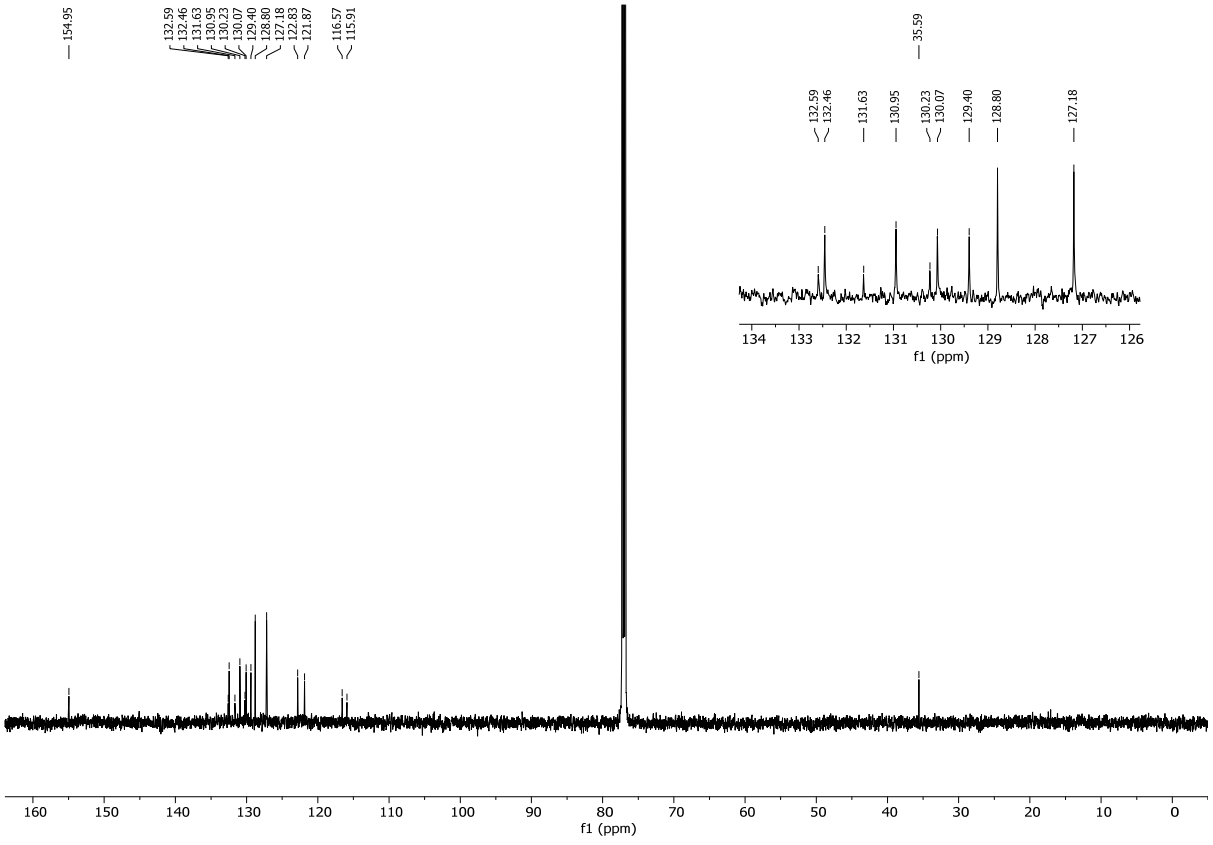
3.13. NMR of *N*-((2-hydroxynaphthalen-1-yl)methyl)benzamide (4a) in DMSO-d_6



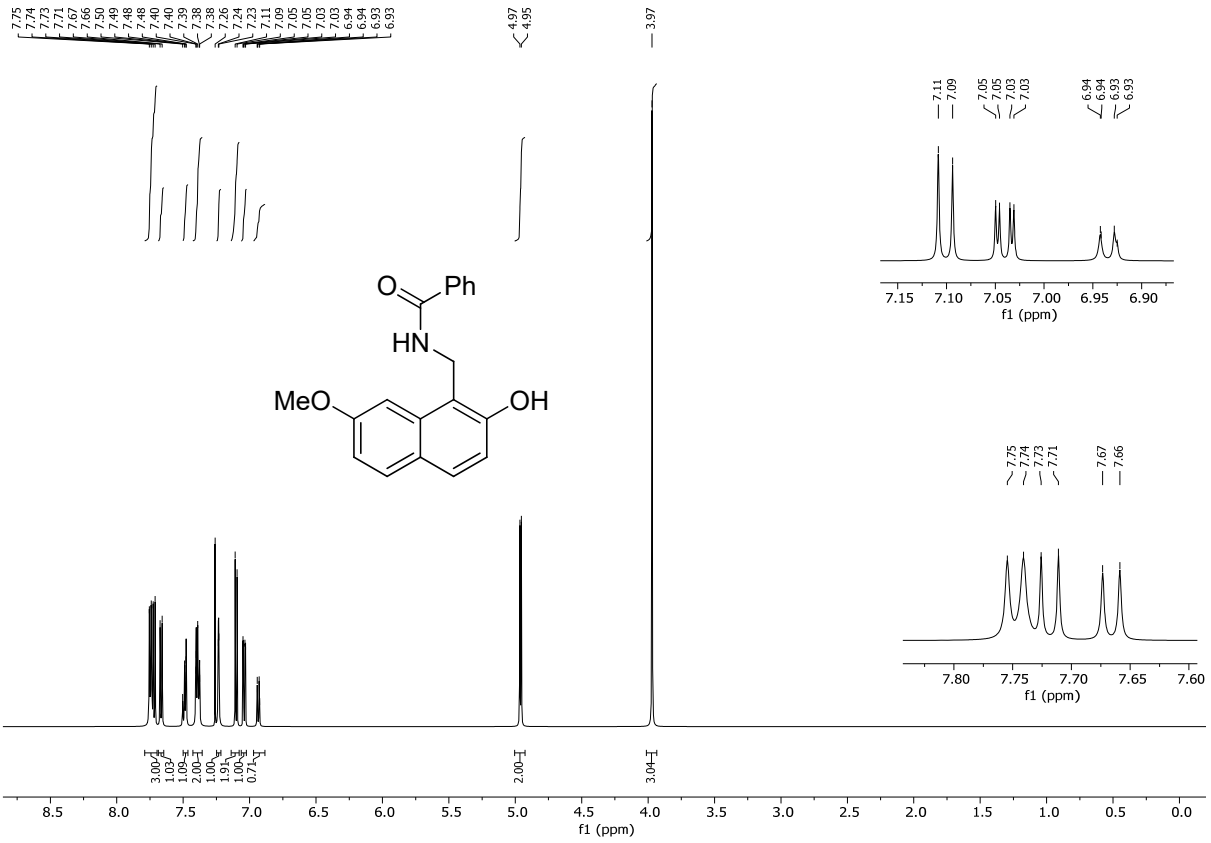


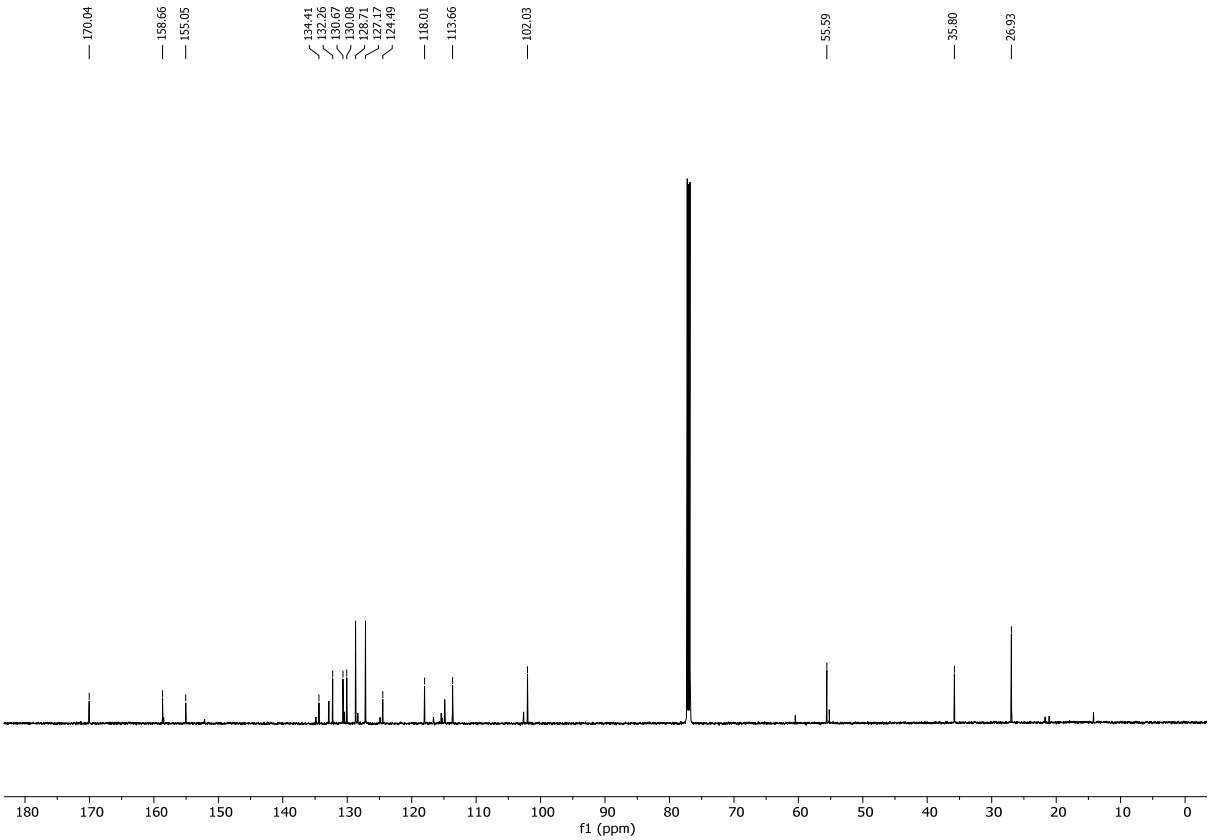
3.14.NMR of *N*-((6-bromo-2-hydroxynaphthalen-1-yl)methyl)benzamide (4b) in $CDCl_3$



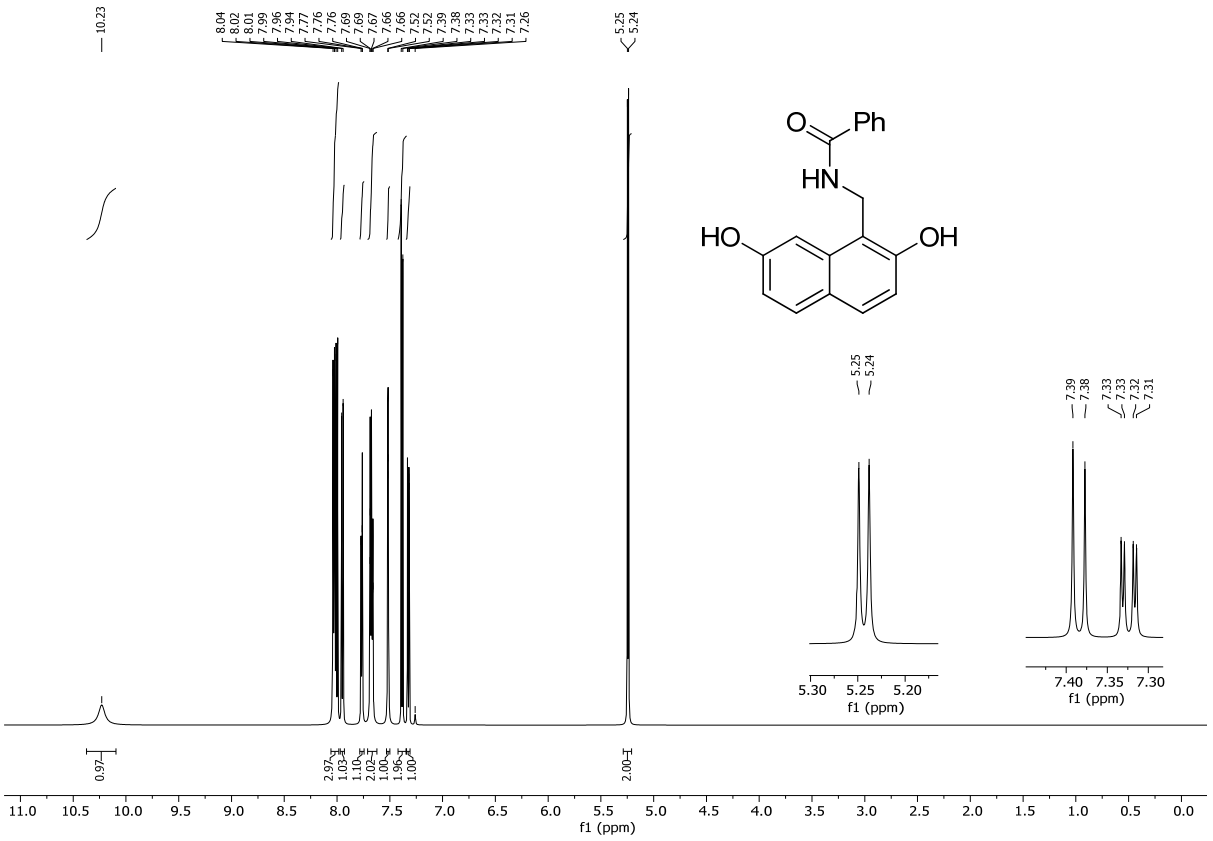


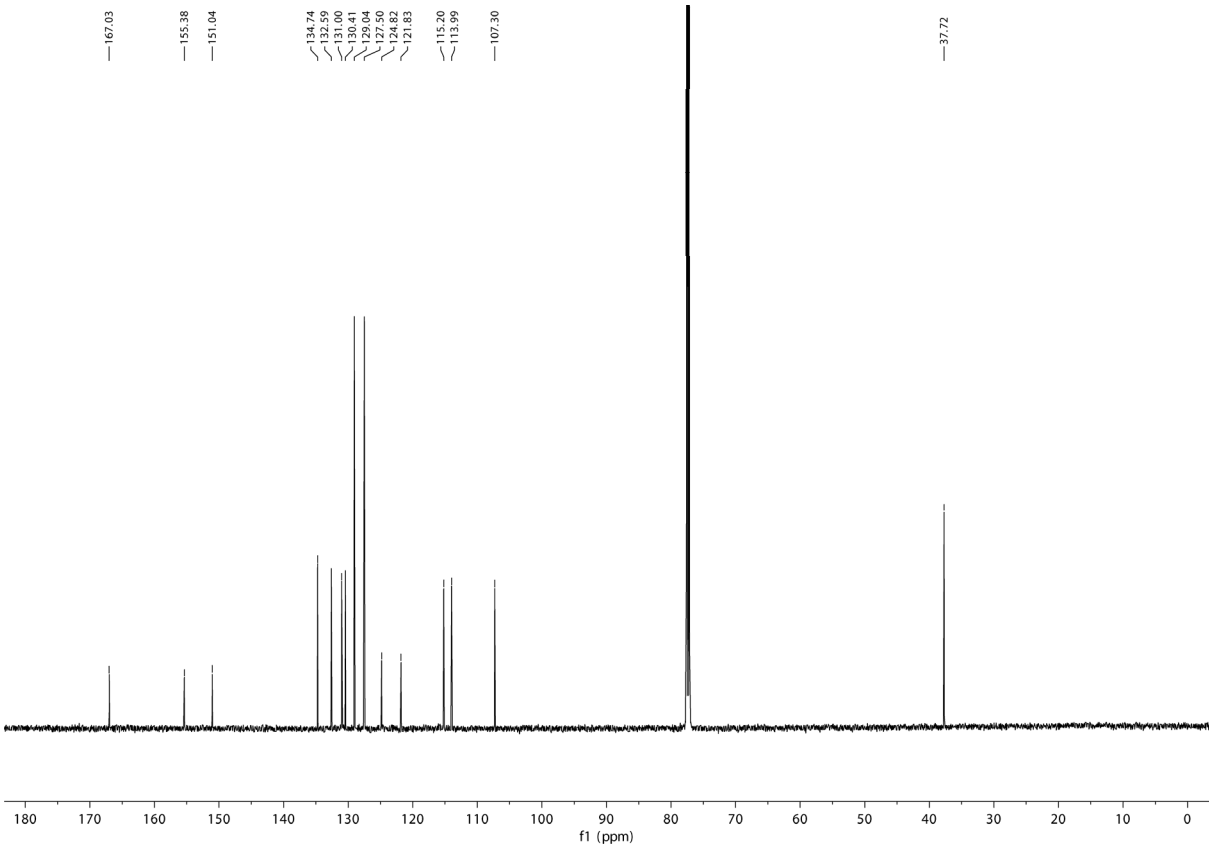
3.15. NMR of N-((2-hydroxy-7-methoxynaphthalen-1-yl)methyl)benzamide (4c) in $CDCl_3$



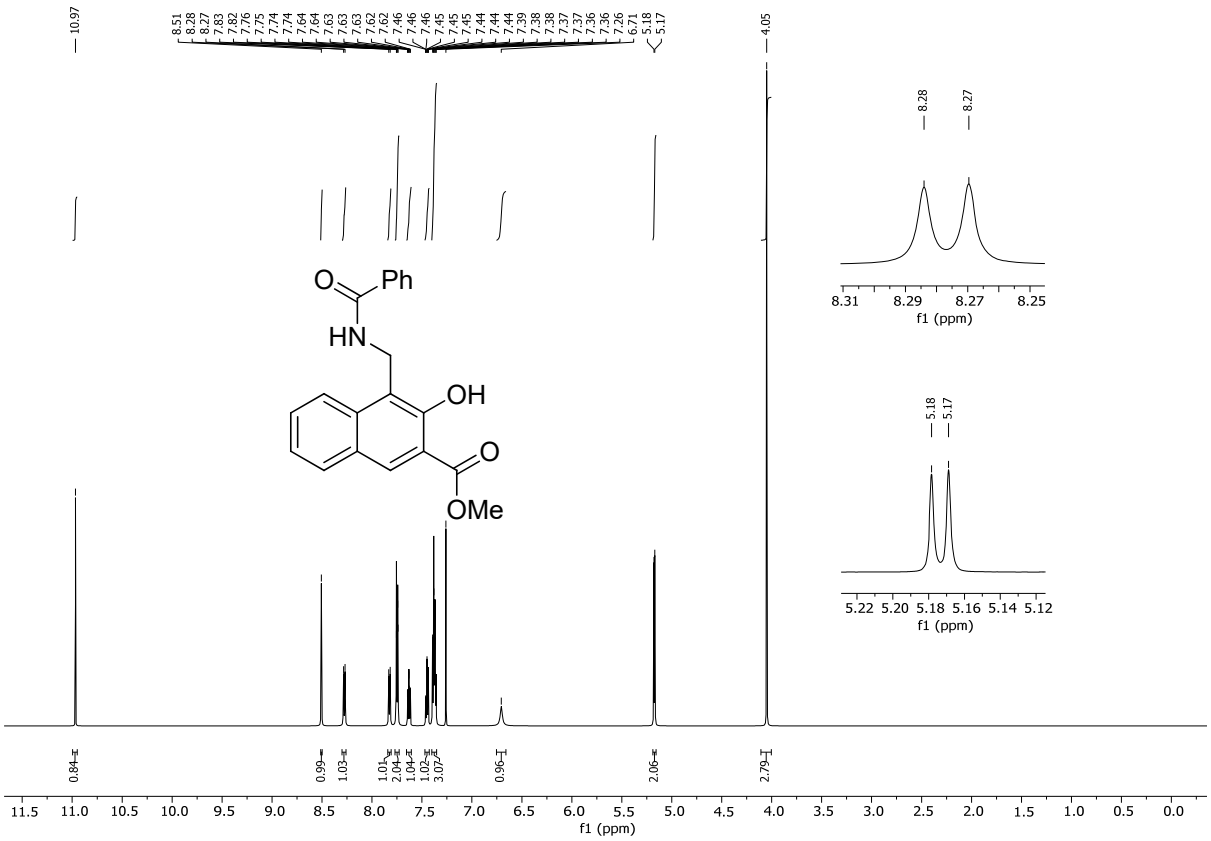


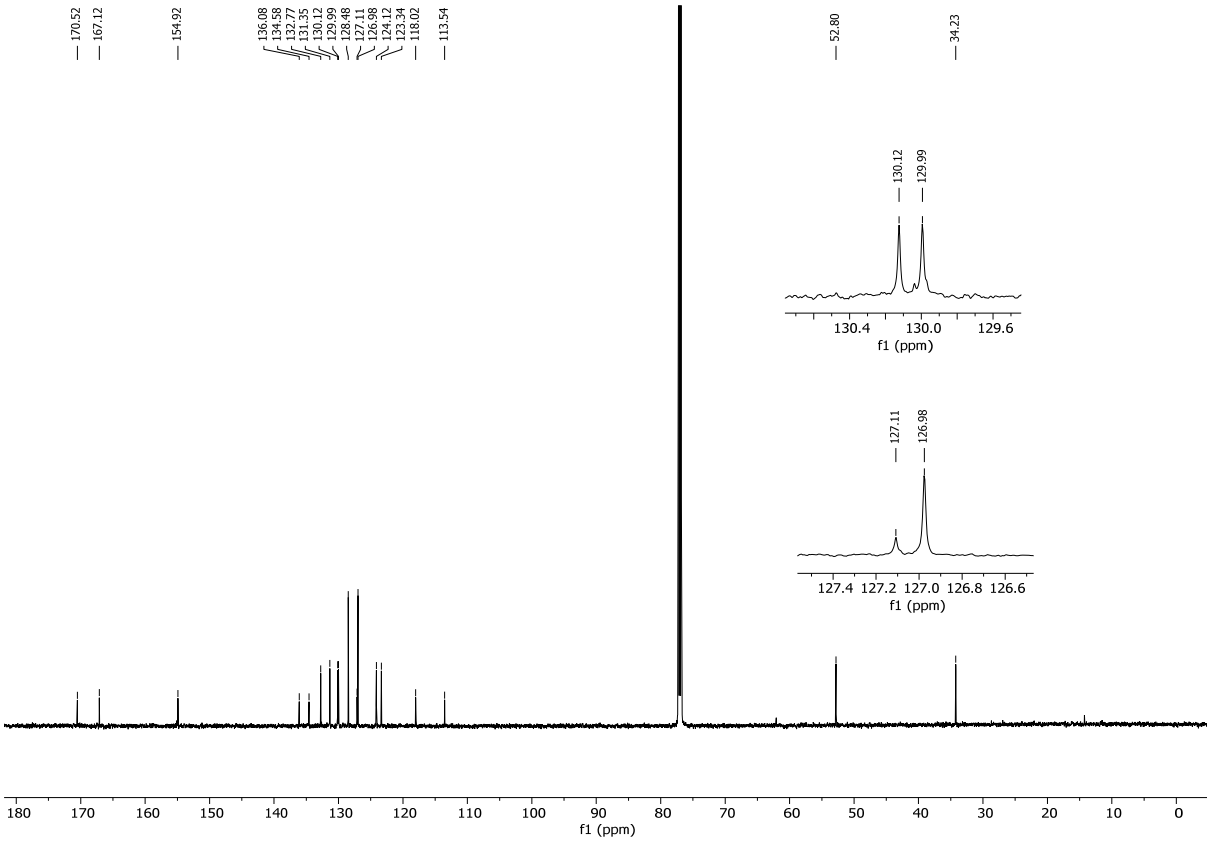
3.16. NMR of *N*-((2,7-dihydroxynaphthalen-1-yl)methyl)benzamide (4d) in $CDCl_3$



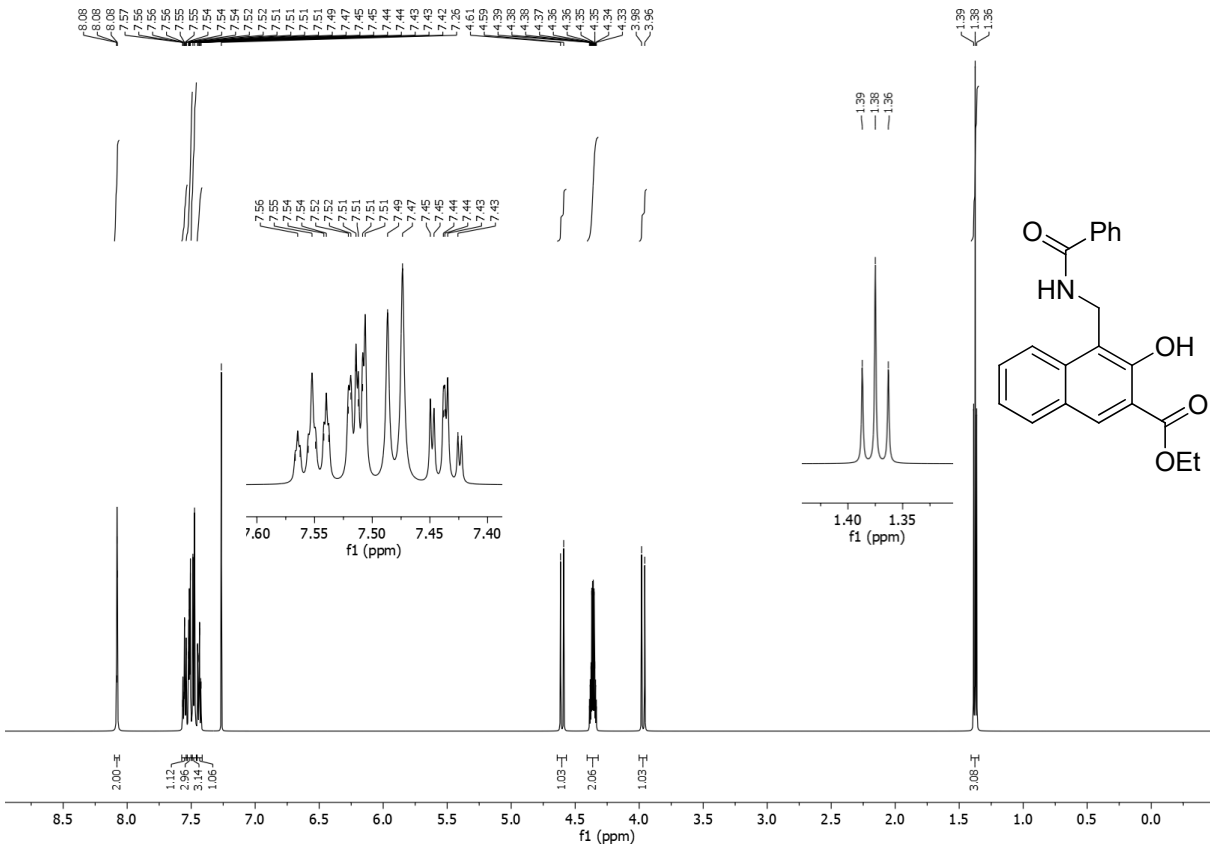


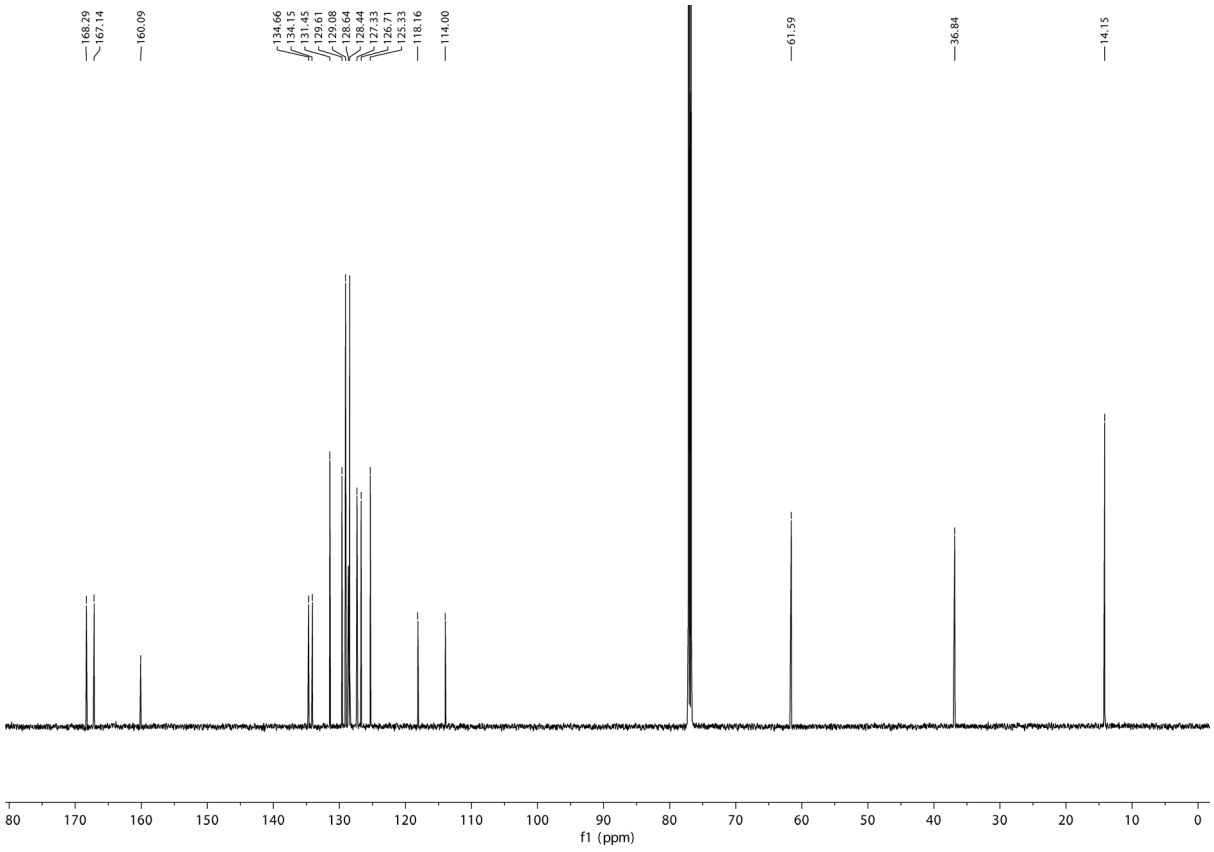
3.17.NMR of 4-(benzamidomethyl)-3-hydroxy-2-naphthoate (4e) in $CDCl_3$



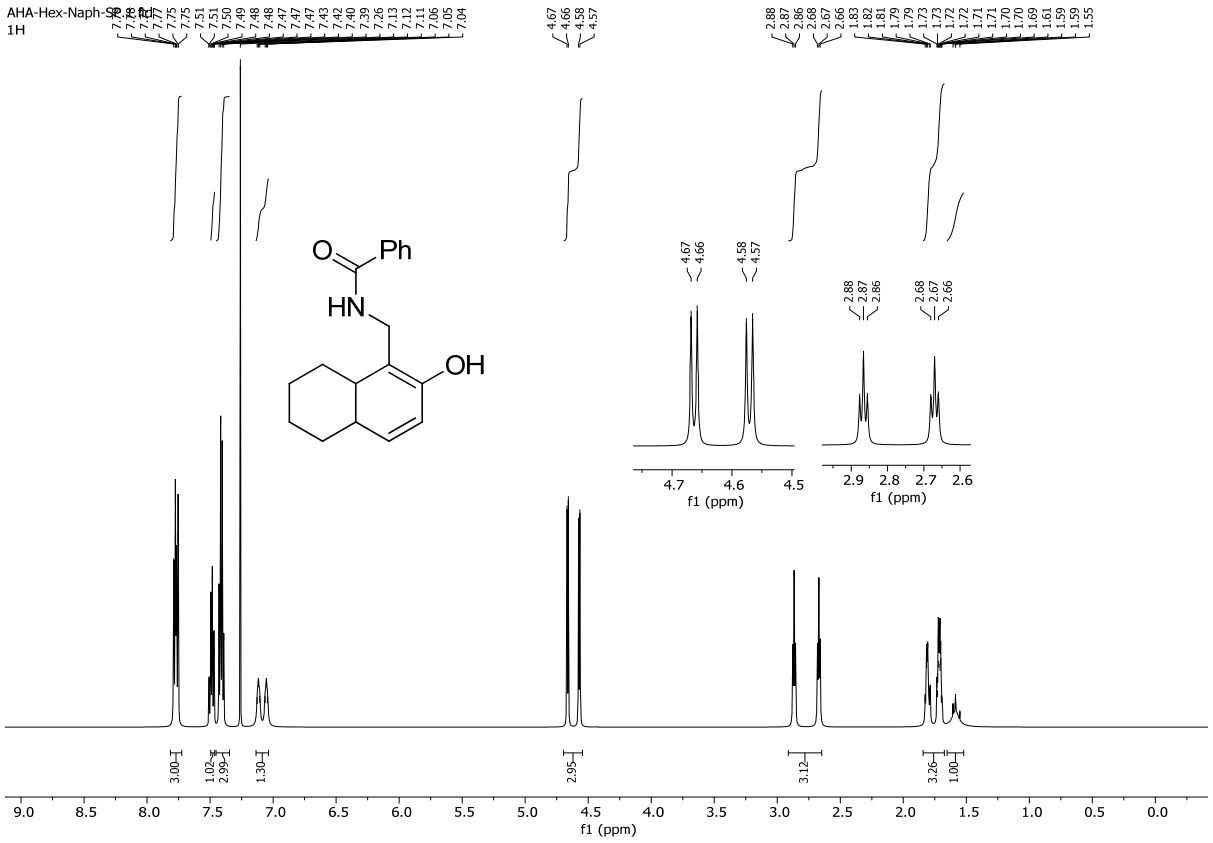


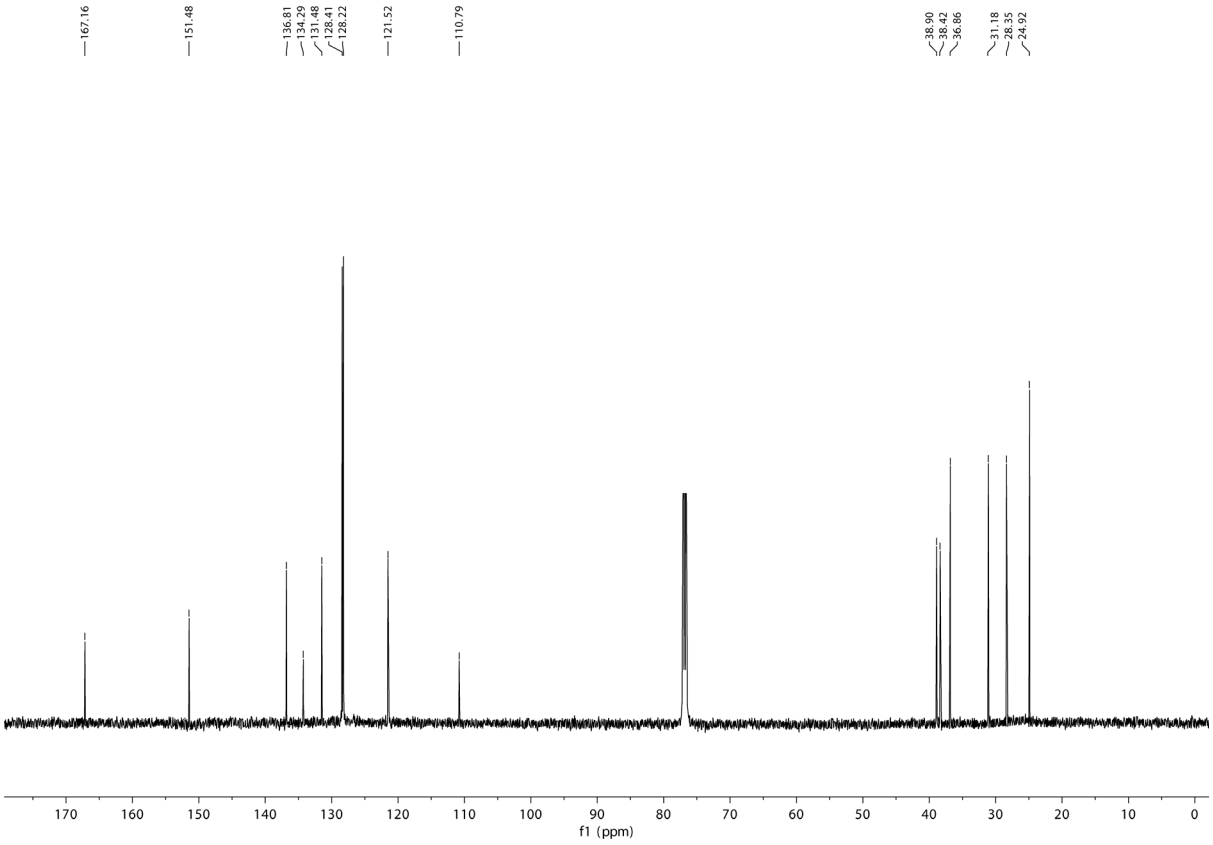
3.18. NMR of ethyl 4-(benzamidomethyl)-3-hydroxy-2-naphthoate (4f) in $CDCl_3$



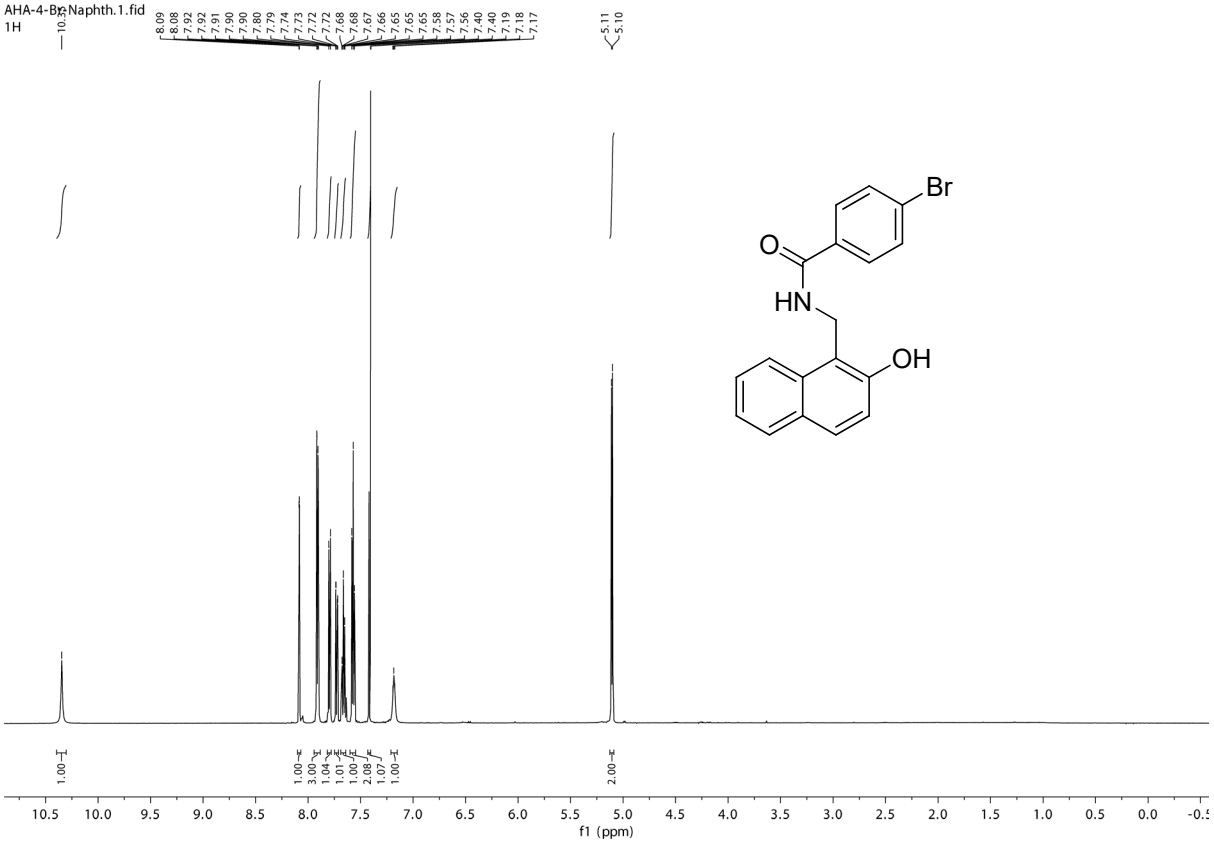


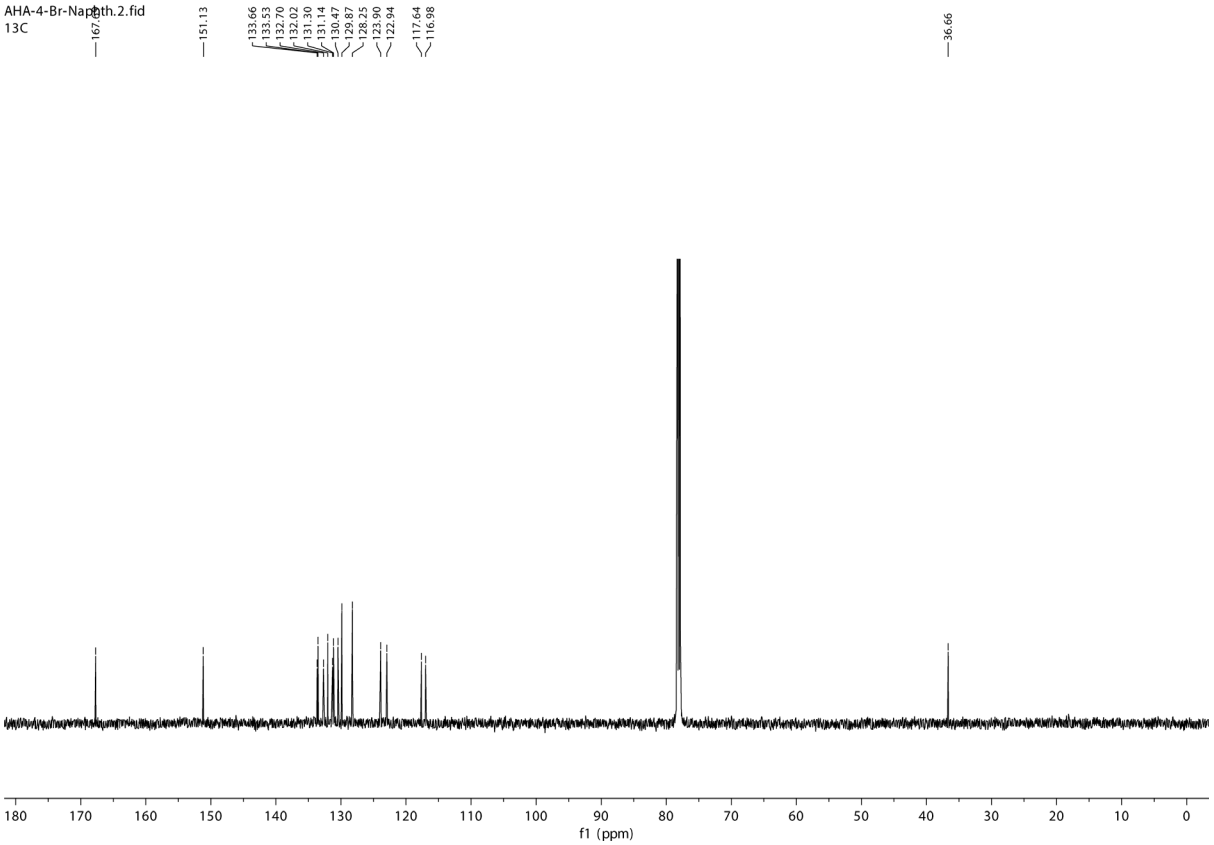
3.19.NMR of *N*-((2-hydroxy-4a,5,6,7,8,8a-hexahydronaphthalen-1-yl)methyl) benzamide (4g) in $CDCl_3$



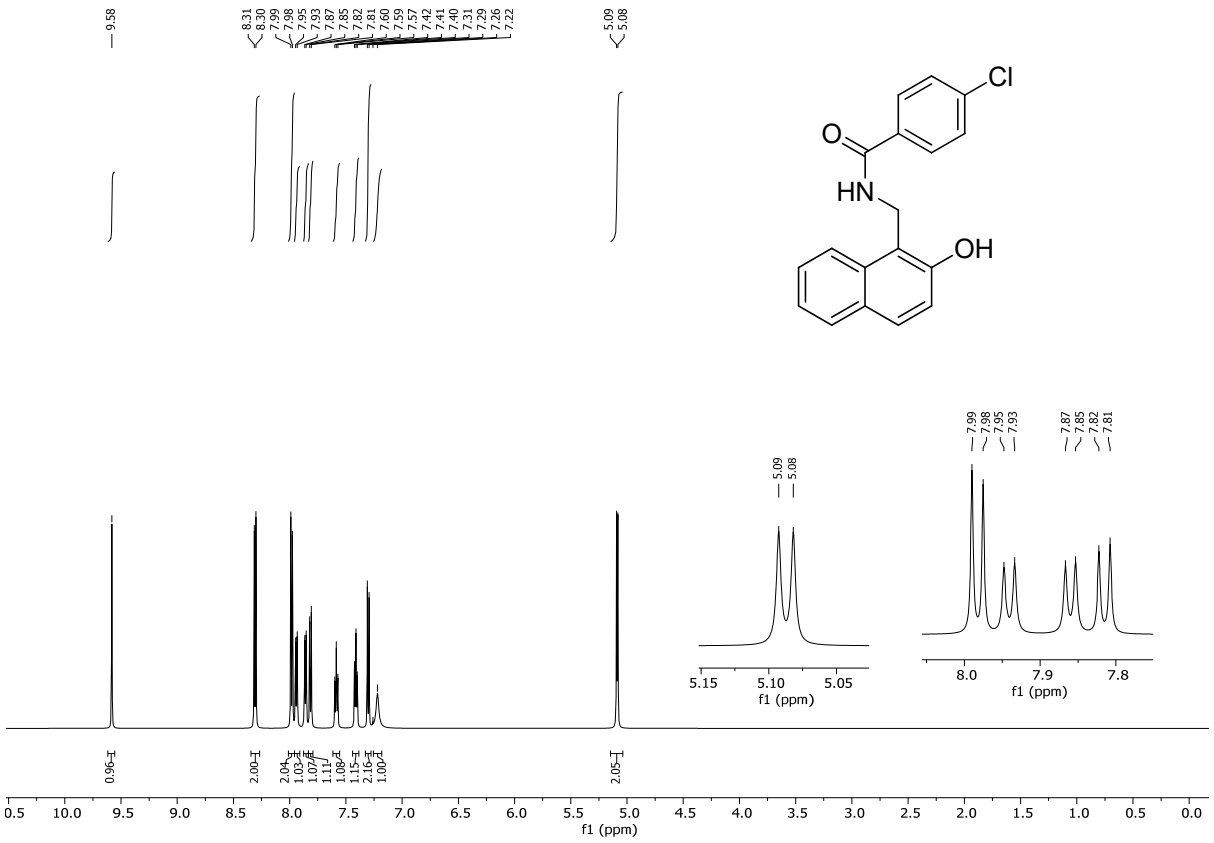


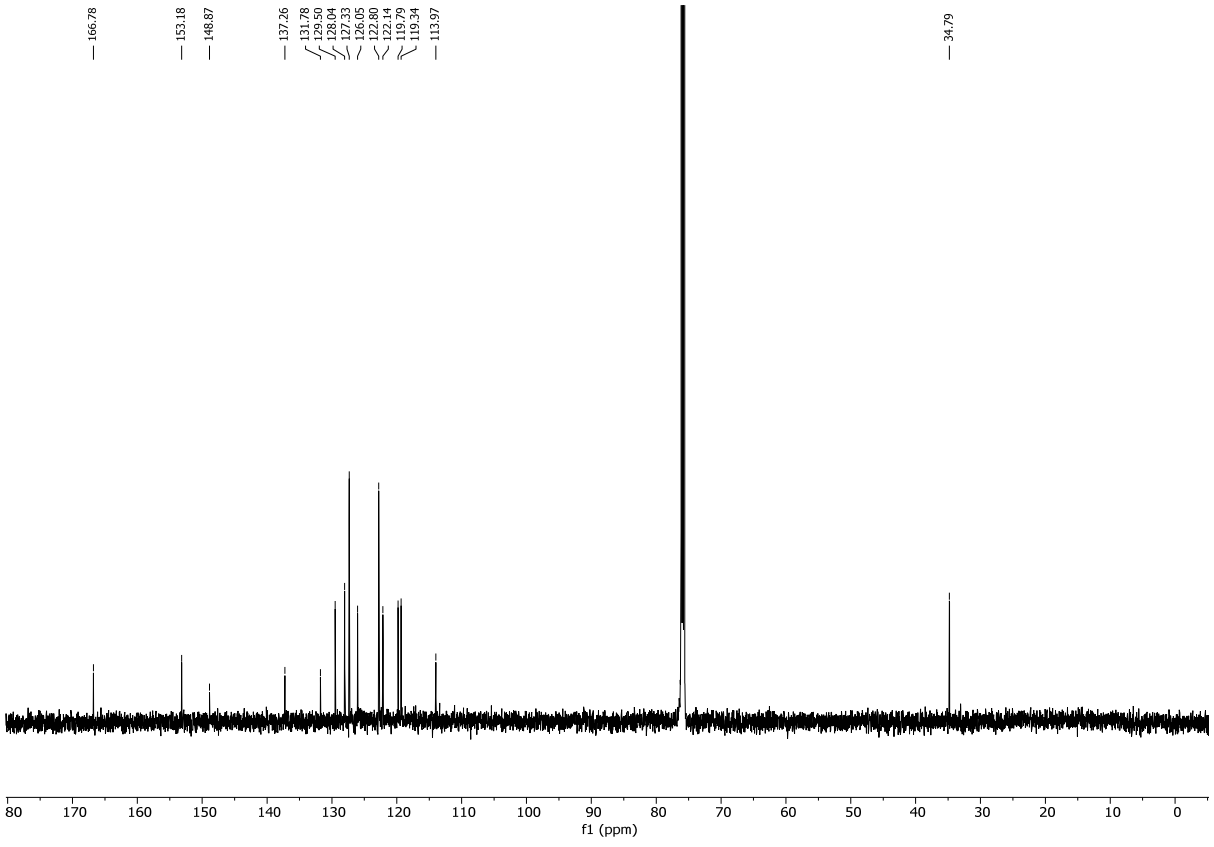
3.20.NMR of 4-bromo-*N*-((2-hydroxynaphthalen-1-yl)methyl)benzamide (4h) in $CDCl_3$



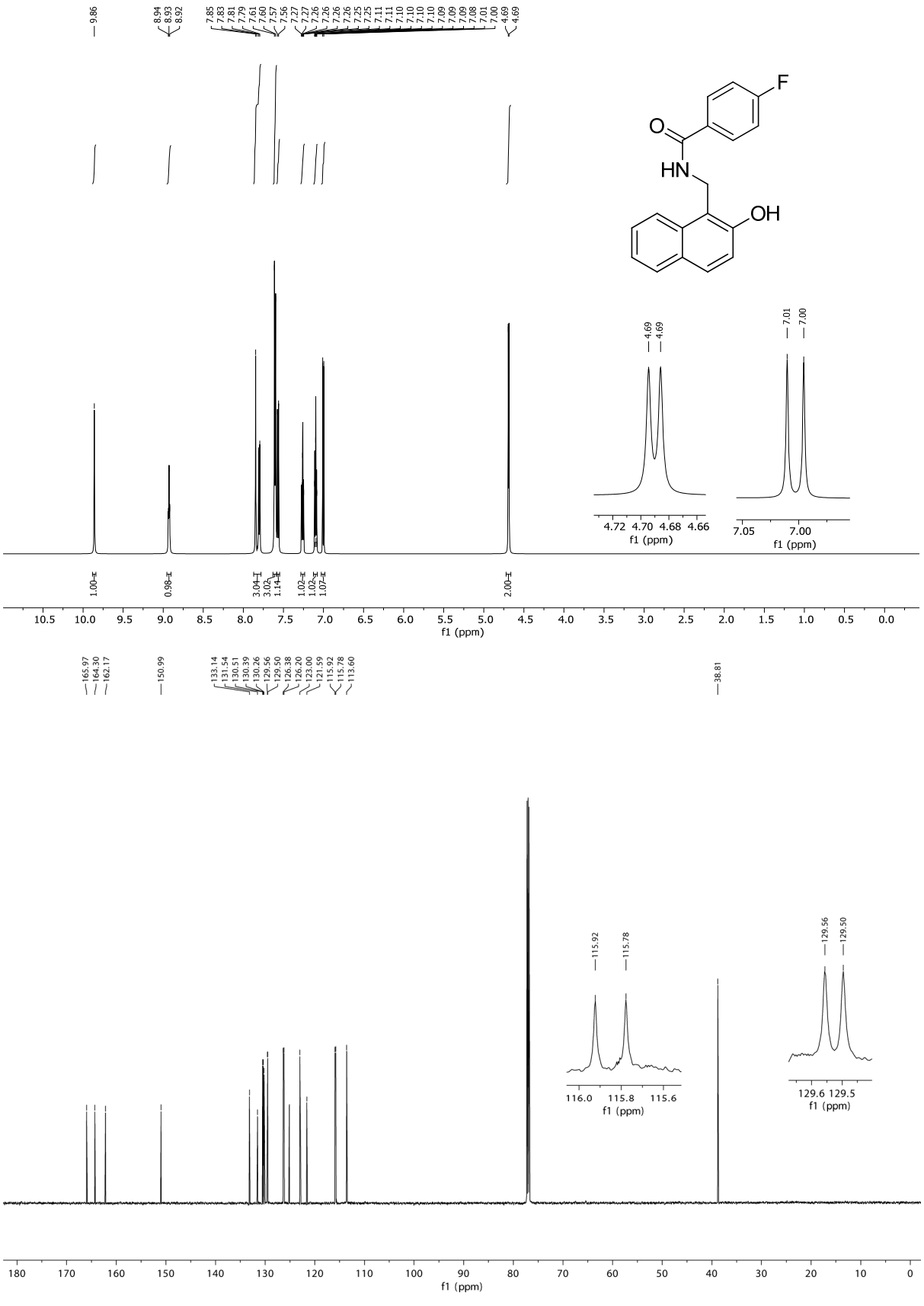


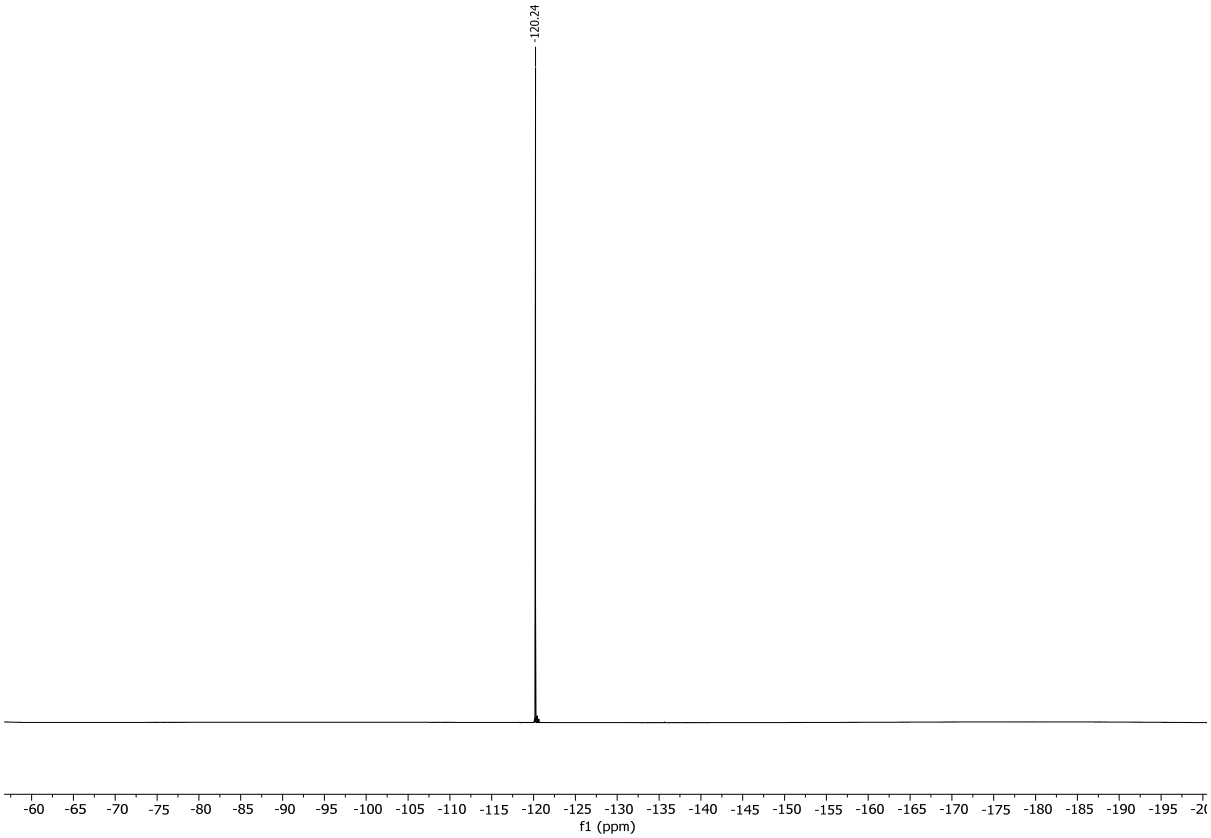
3.21. NMR of 4-chloro-*N*-((2-hydroxynaphthalen-1-yl)methyl)benzamide (4i) in $CDCl_3$



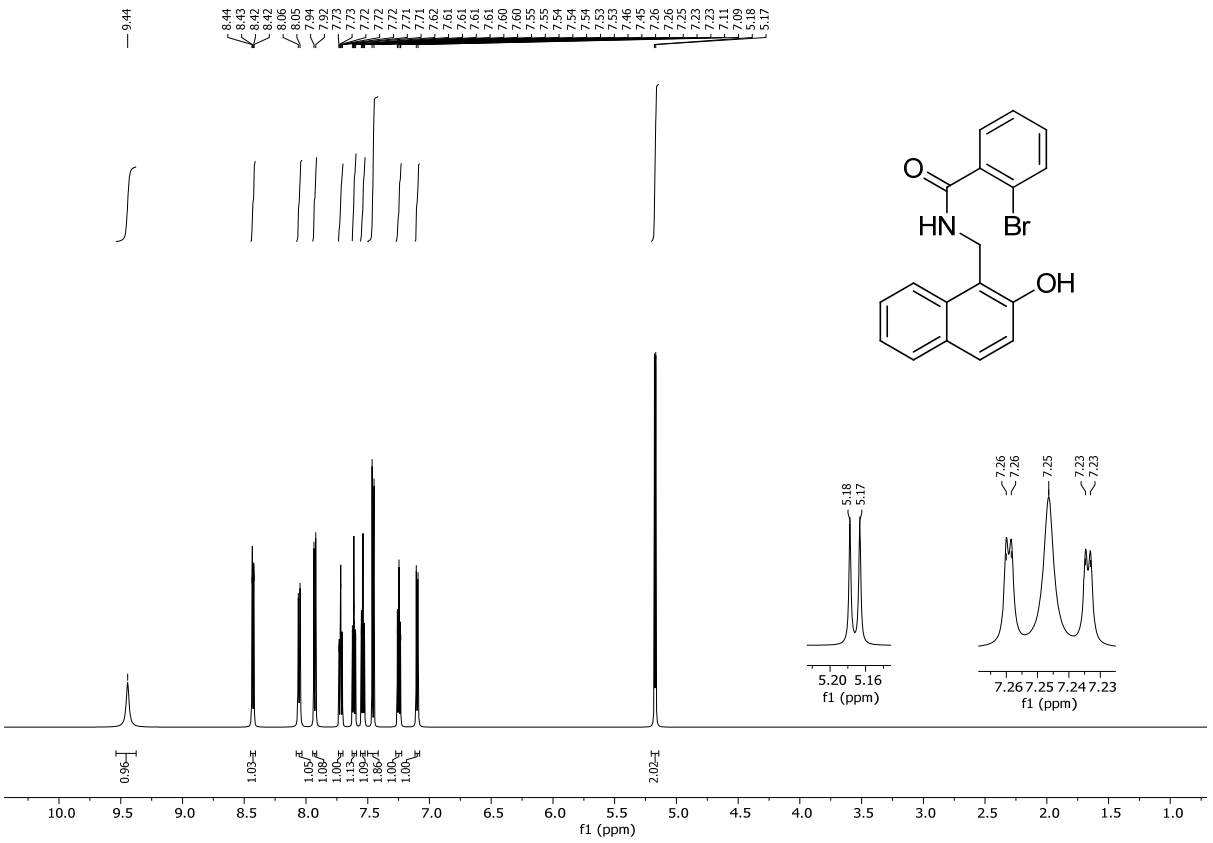


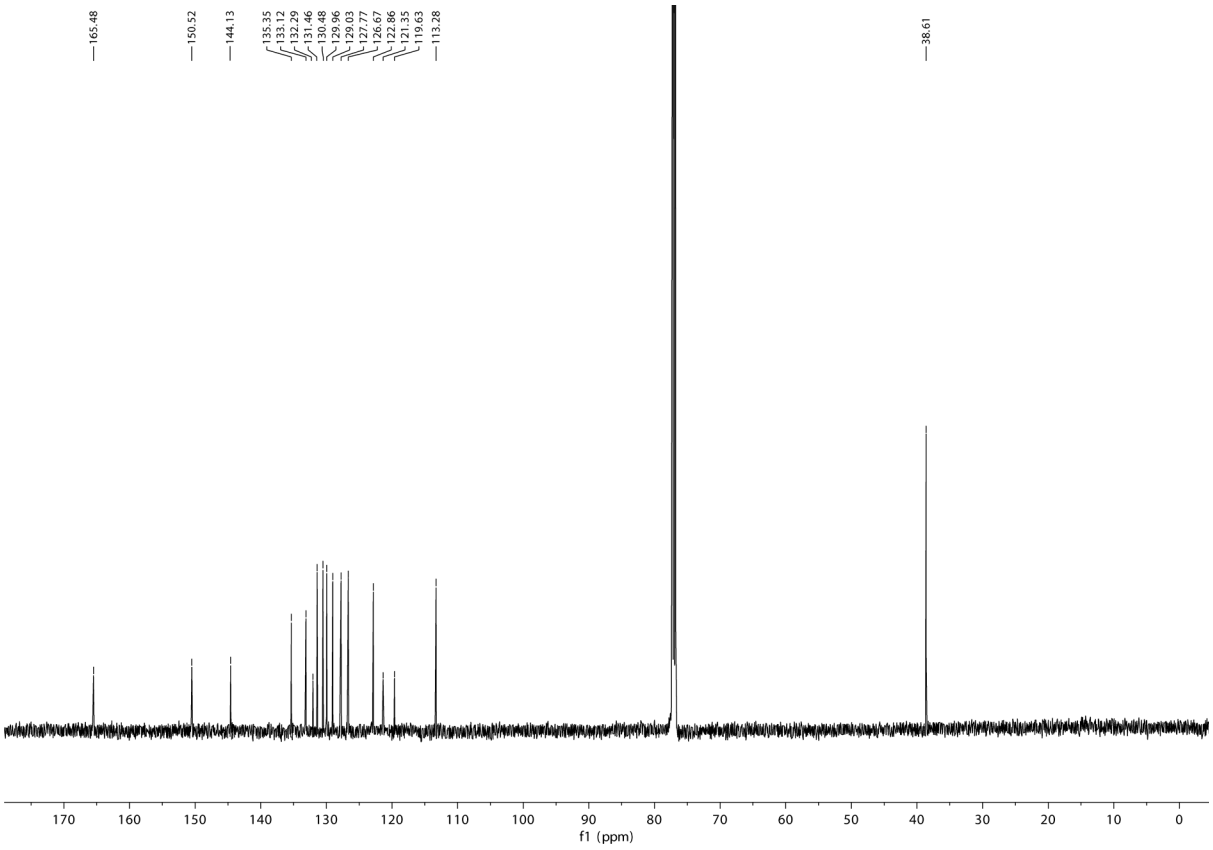
3.22. NMR of 4-fluoro-*N*-((2-hydroxynaphthalen-1-yl)methyl)benzamide (4j) in $CDCl_3$



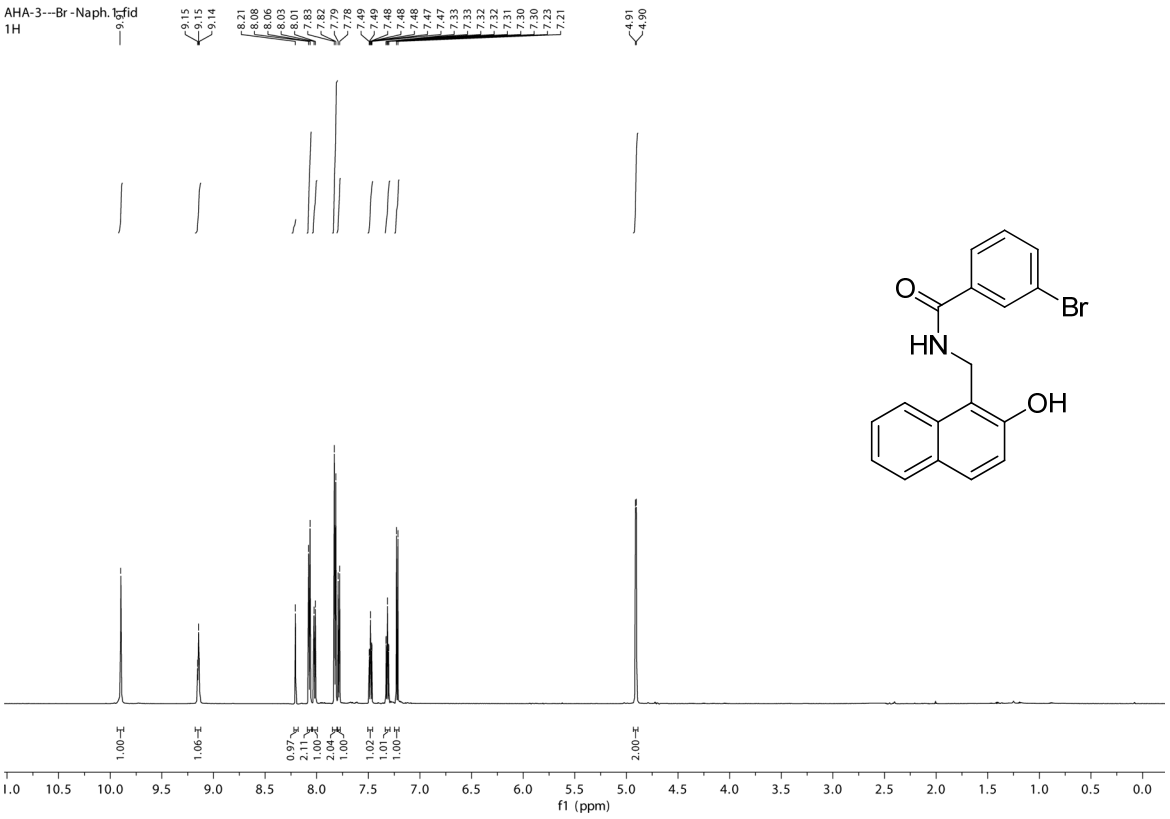

-120.24
-60 -65 -70 -75 -80 -85 -90 -95 -100 -105 -110 -115 -120 -125 -130 -135 -140 -145 -150 -155 -160 -165 -170 -175 -180 -185 -190 -195
f1 (ppm)

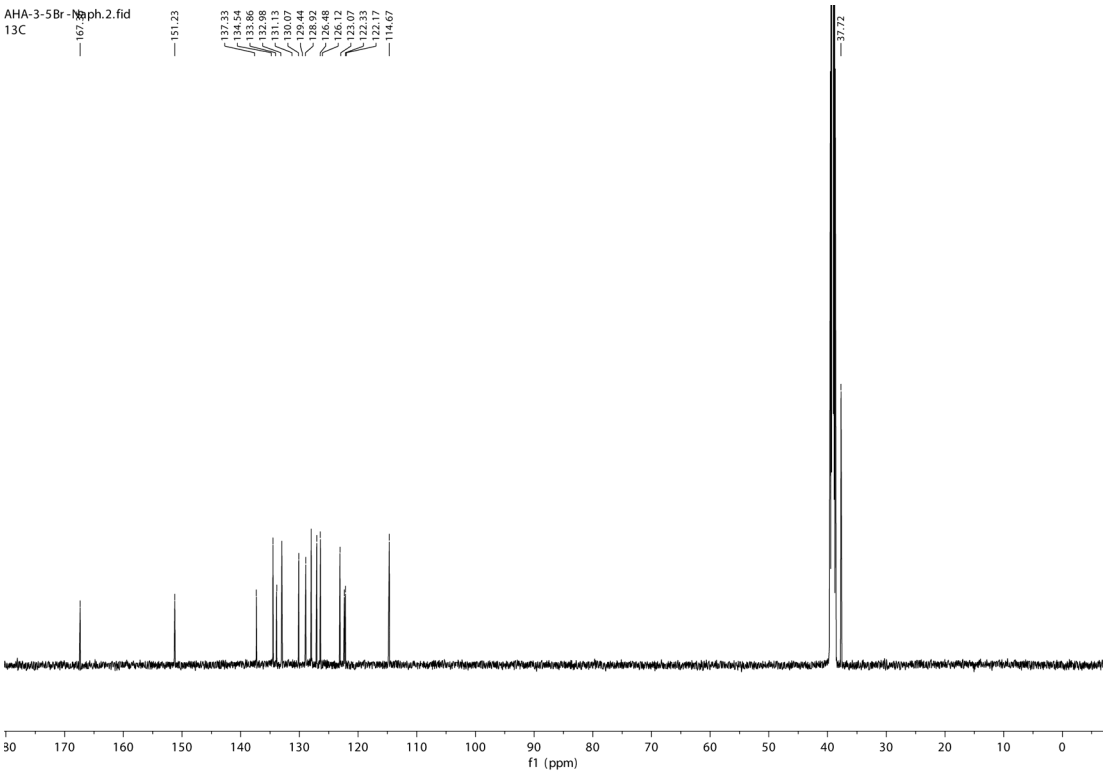
3.23. NMR of 2-bromo-*N*-((2-hydroxynaphthalen-1-yl)methyl)benzamide mide (4k) in $CDCl_3$



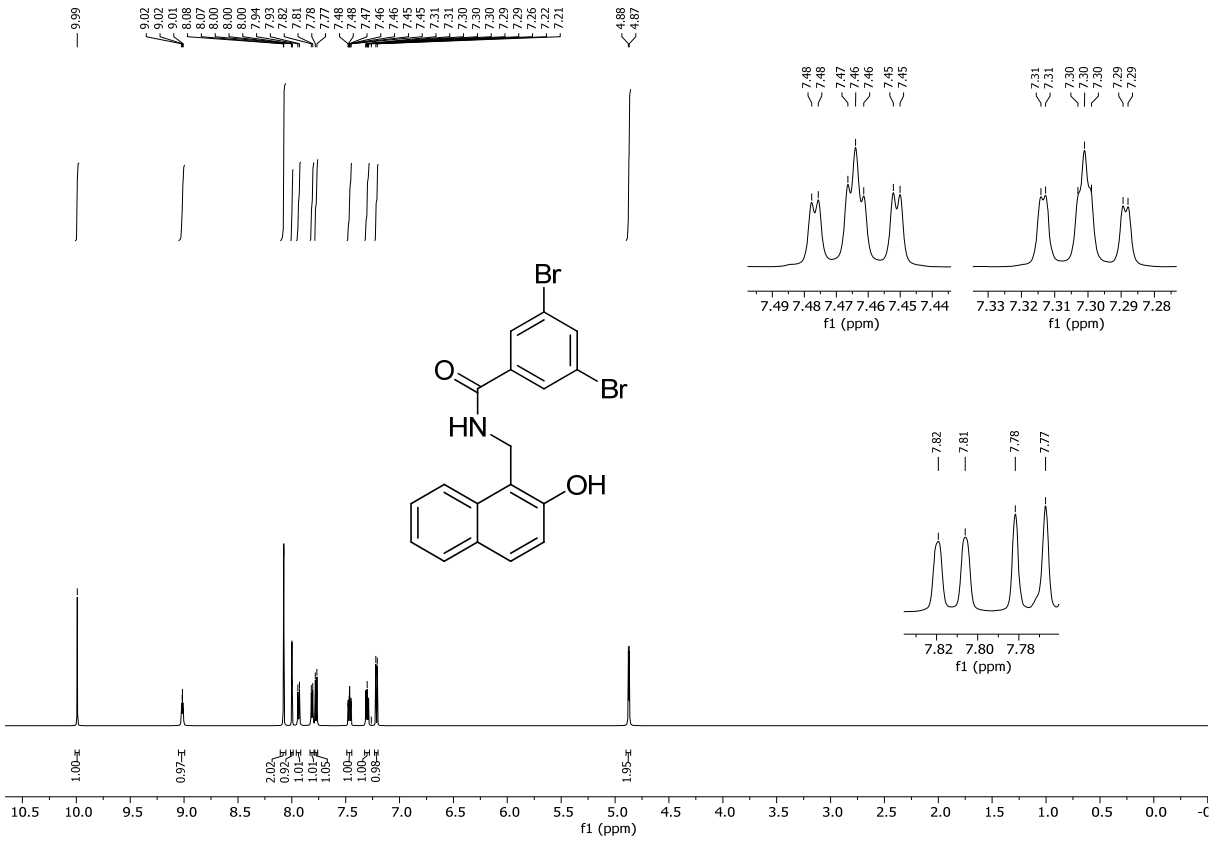


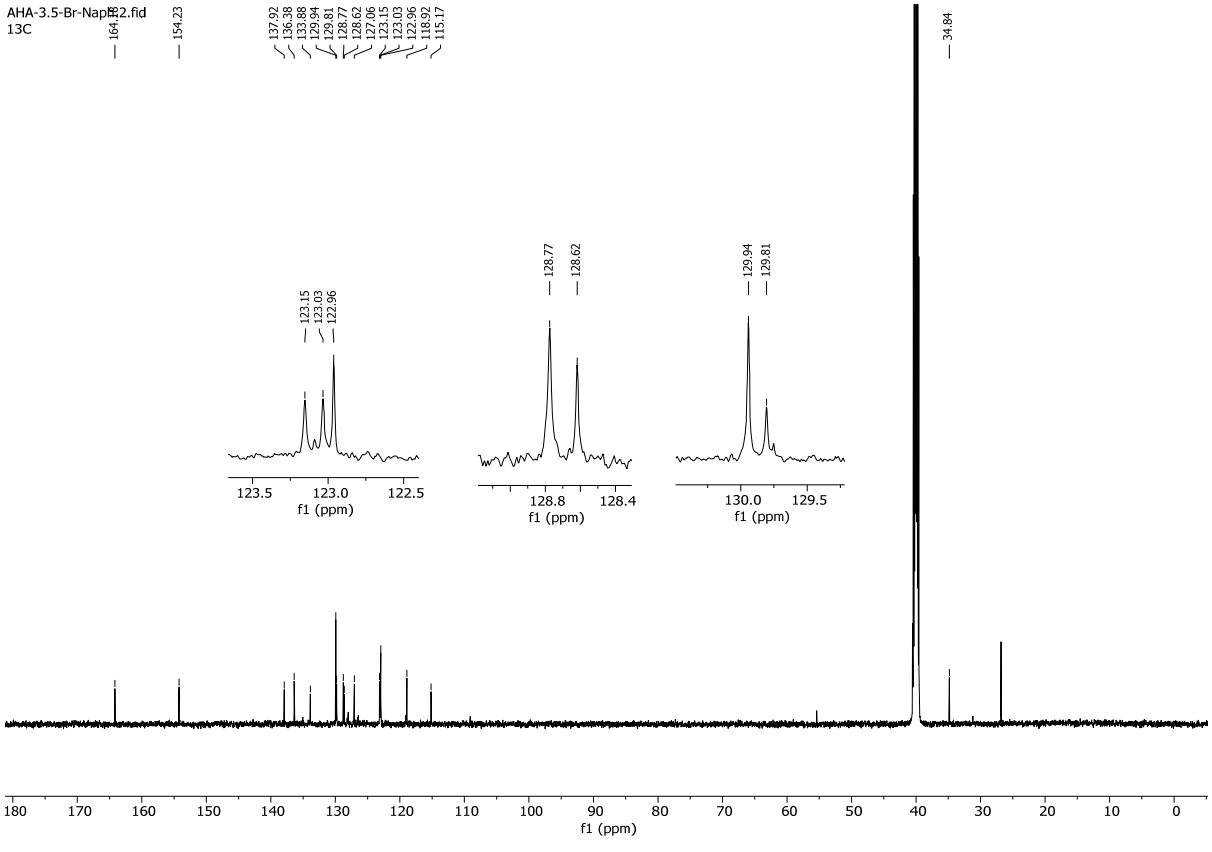
3.24. NMR of 3-bromo-*N*-((2-hydroxynaphthalen-1-yl)methyl)benzamide (4l) in $CDCl_3$



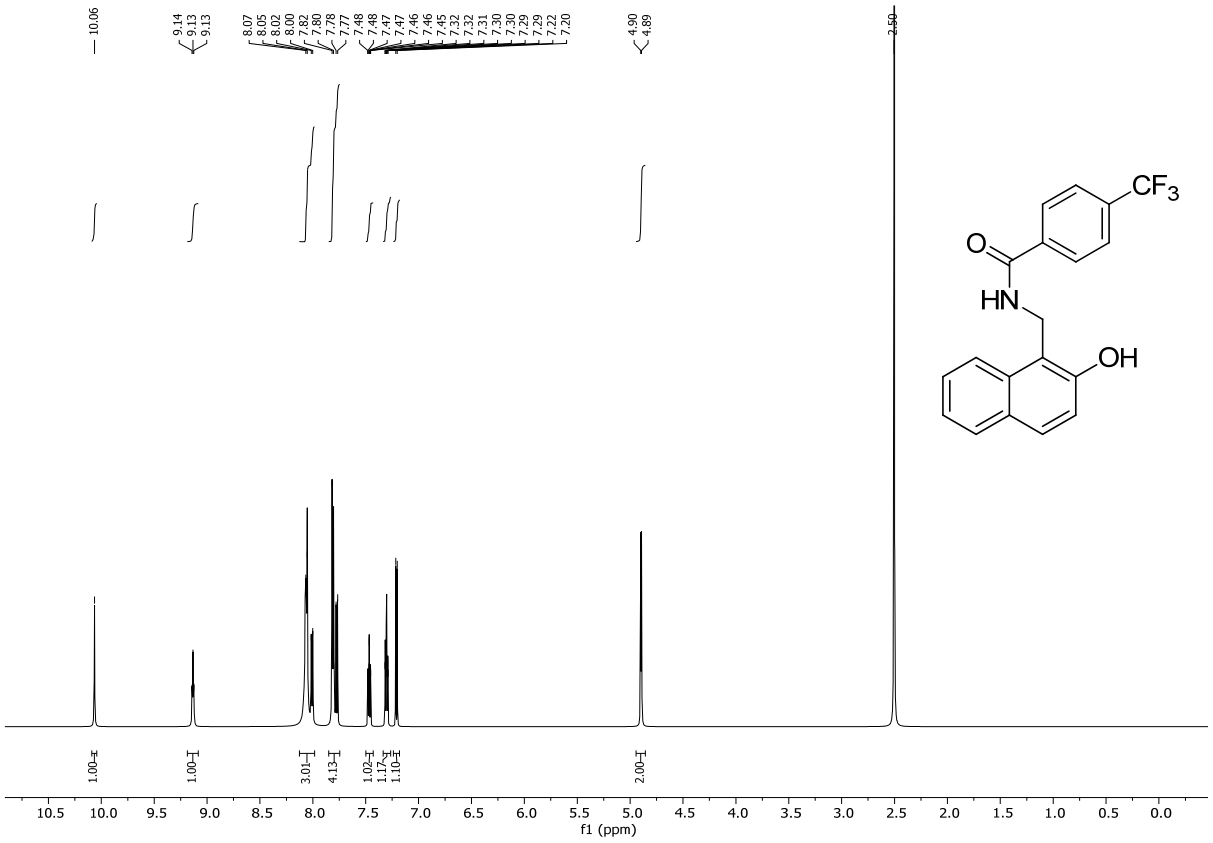


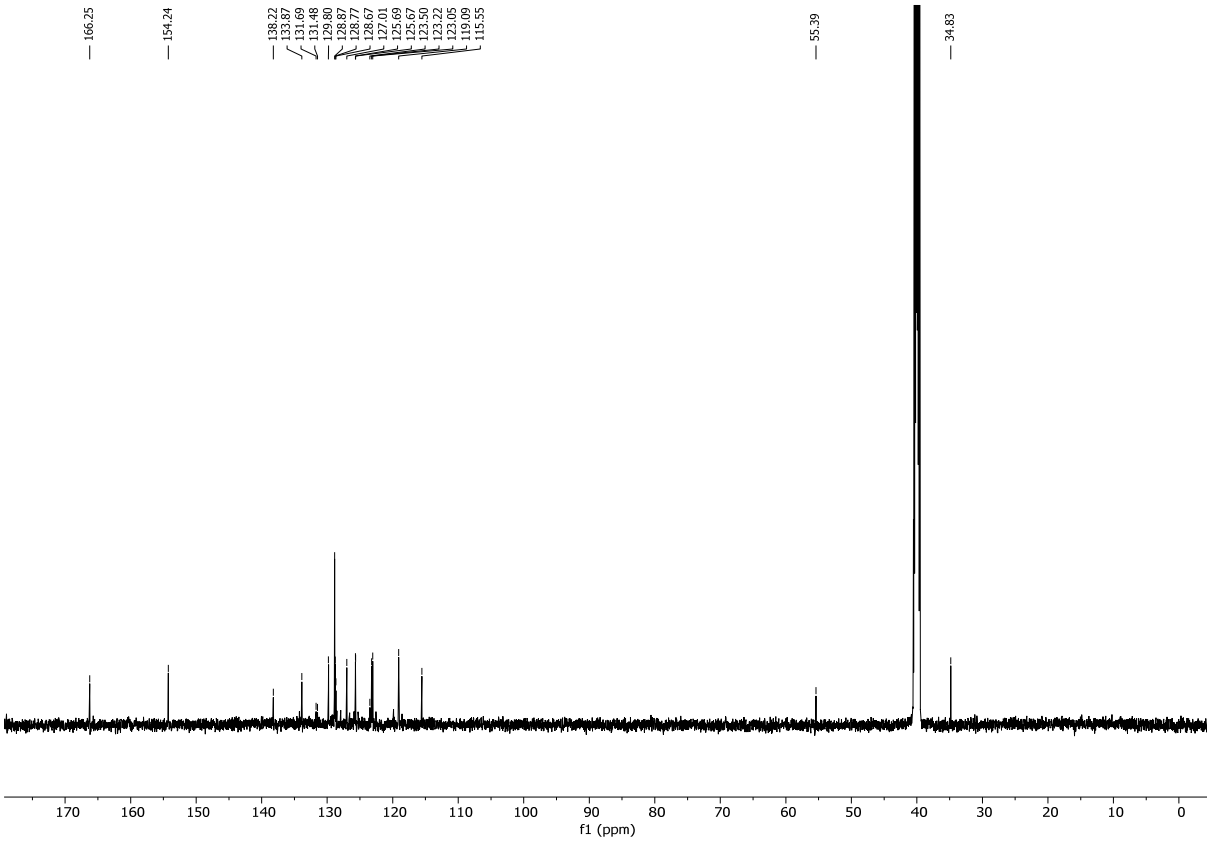
3.25. NMR of 3,5-dibromo-N-((2-hydroxynaphthalen-1-yl)methyl) benzamide (4m) in $CDCl_3$

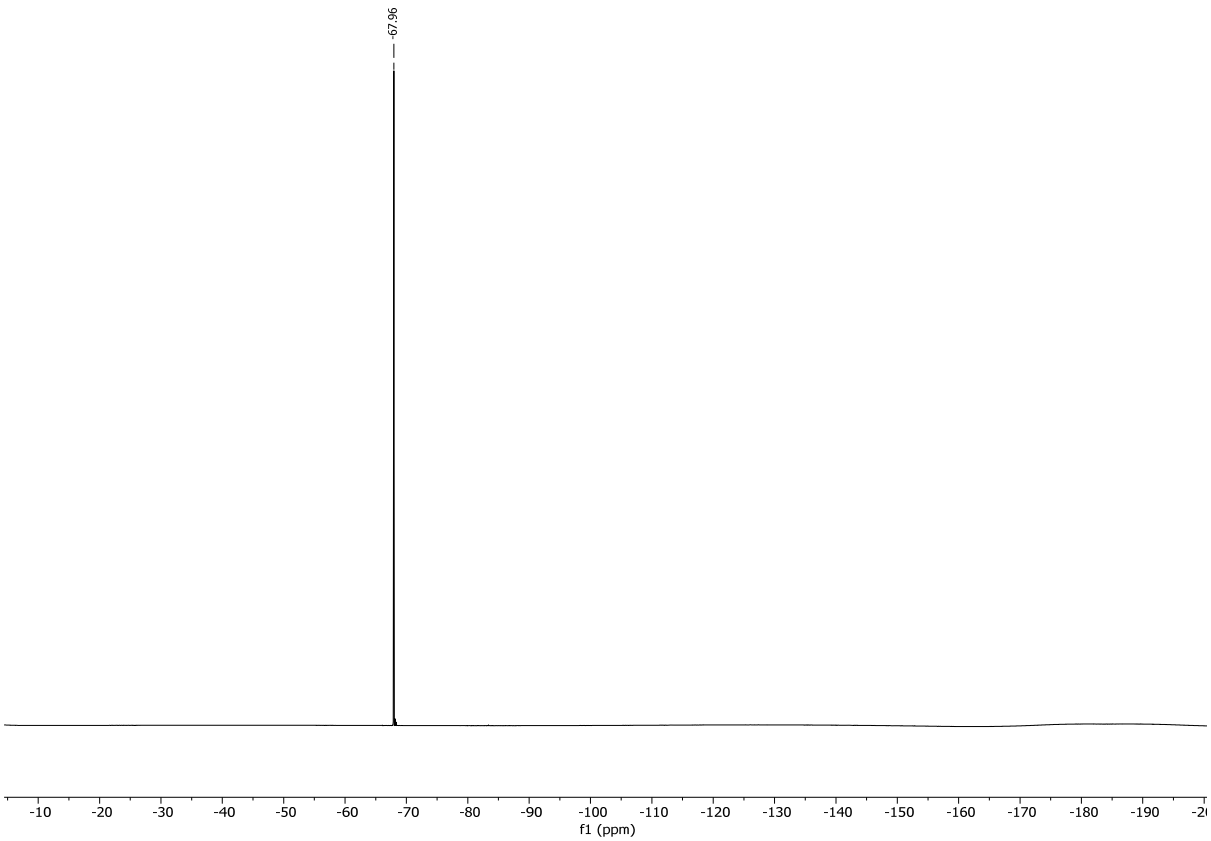




3.26. NMR of *N*-((2-hydroxynaphthalen-1-yl)methyl)-4-(trifluoromethyl) benzamide (4n) in $CDCl_3$



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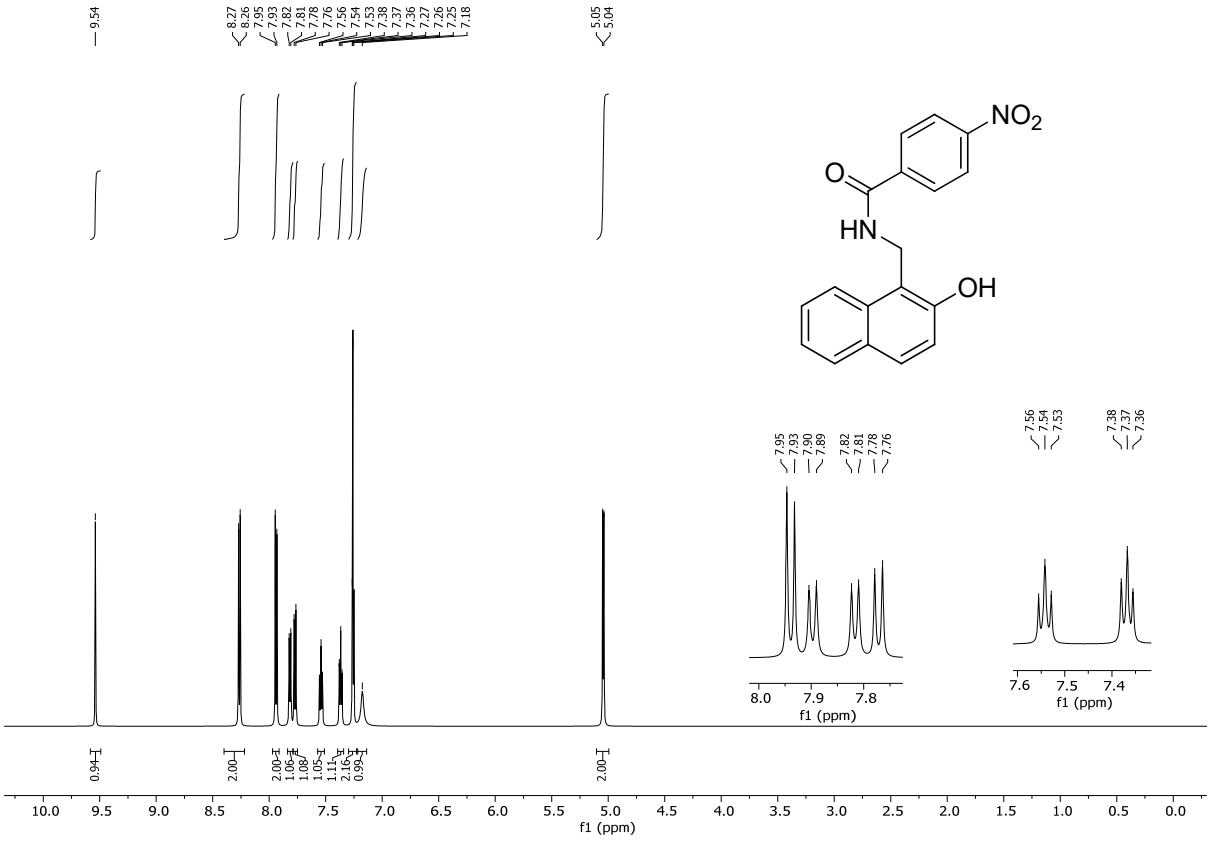
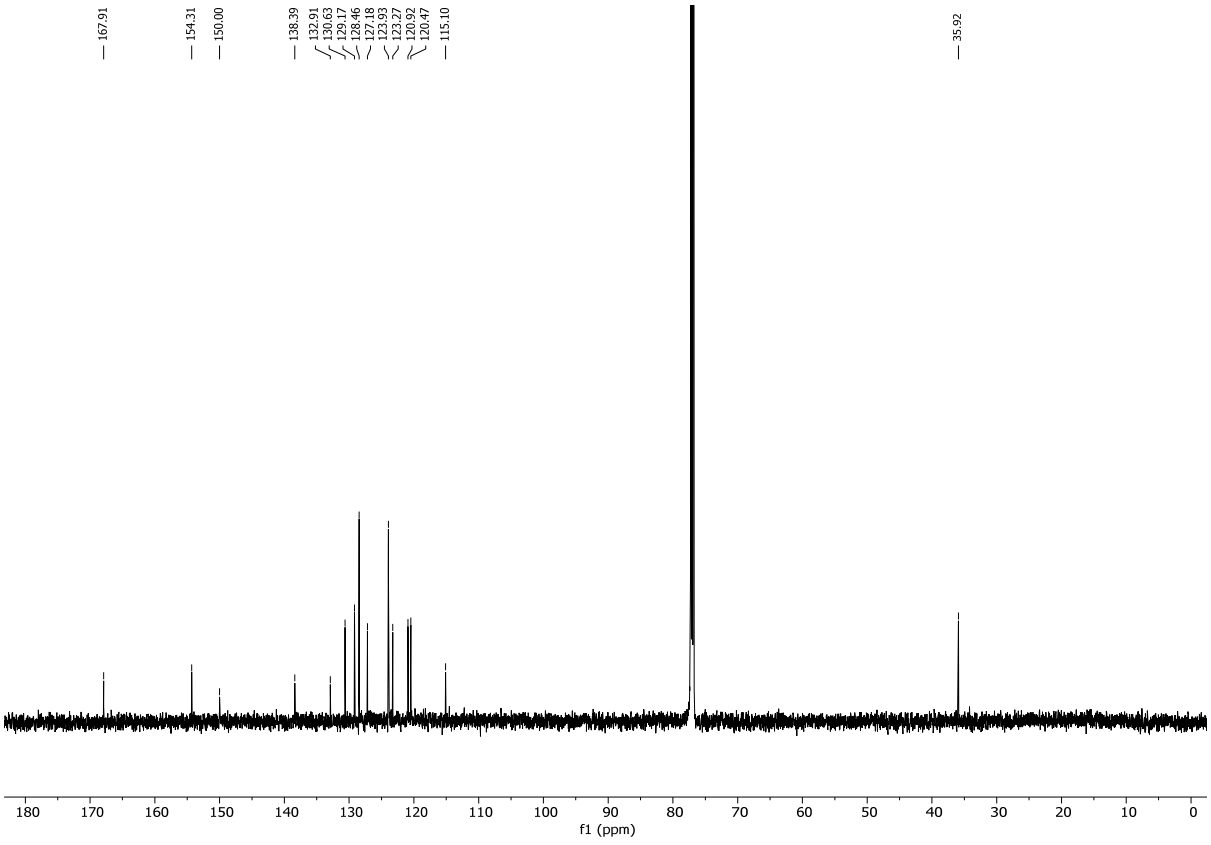
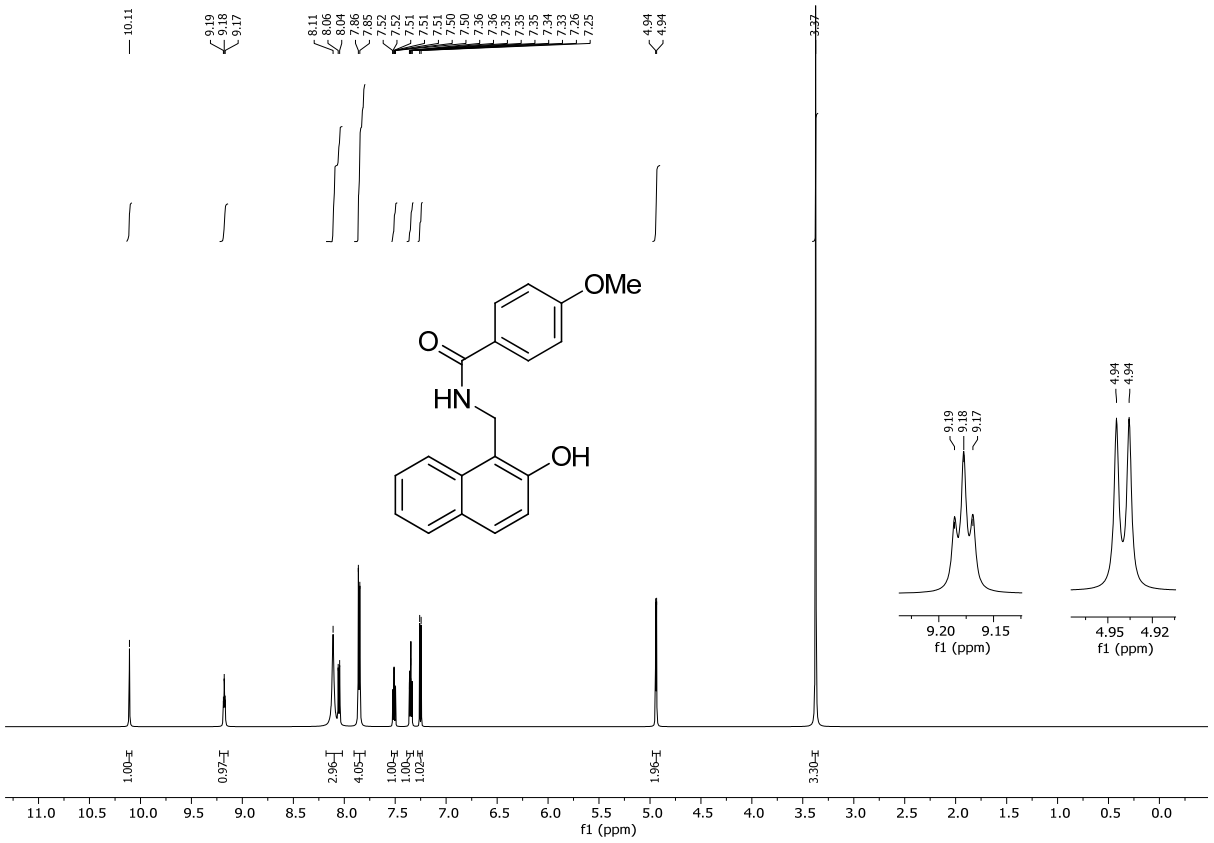
f1 (ppm)

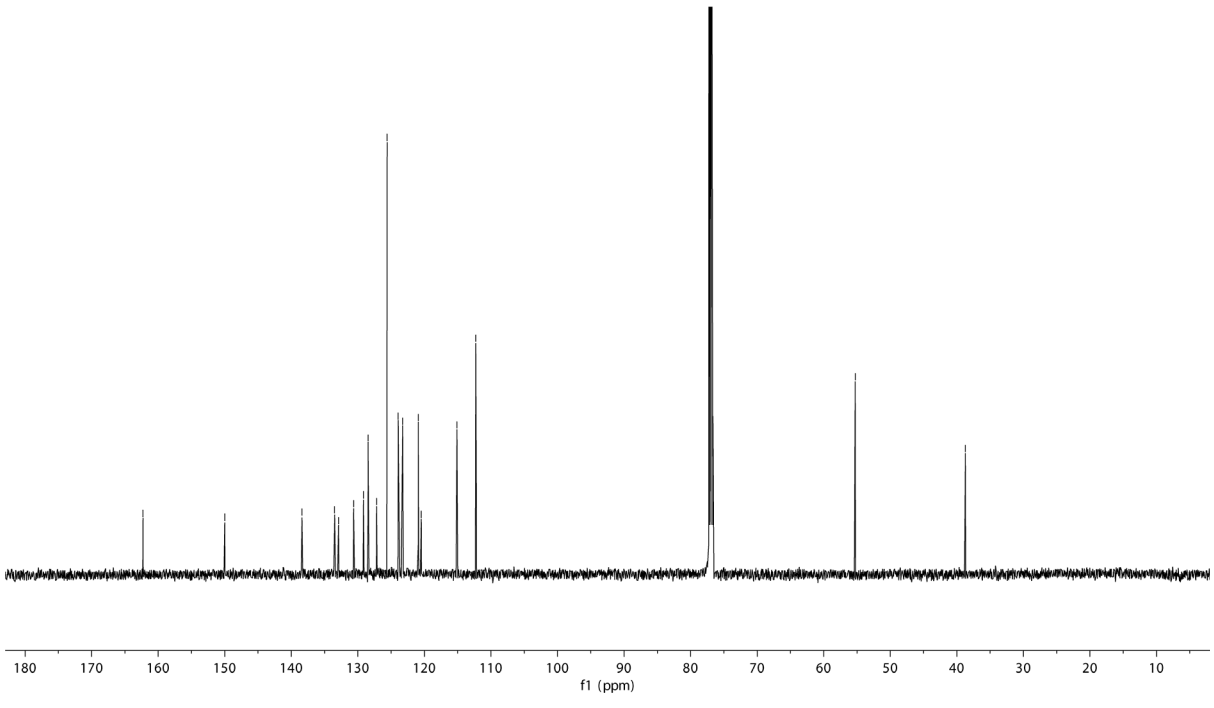
3.27. NMR of *N*-((2-hydroxynaphthalen-1-yl)methyl)-4-nitrobenzamide (4o) in $CDCl_3$



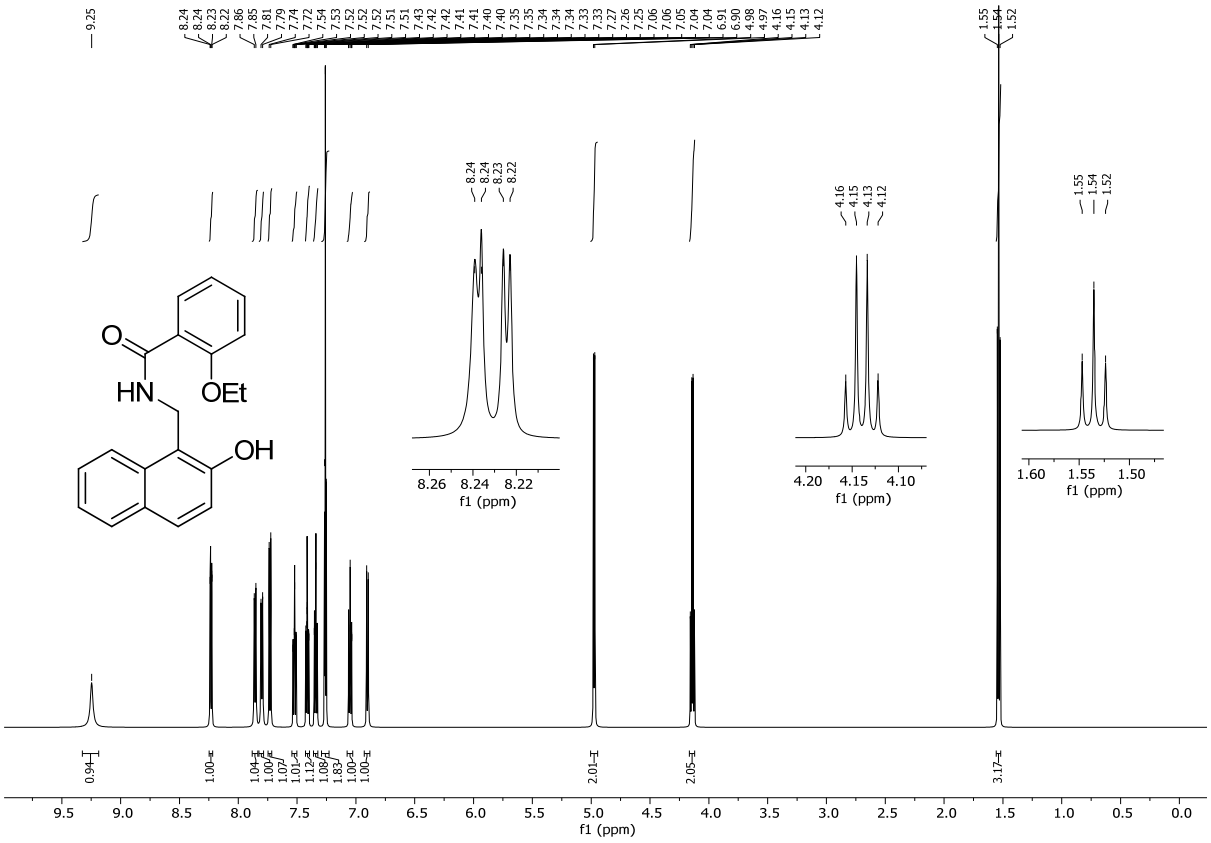


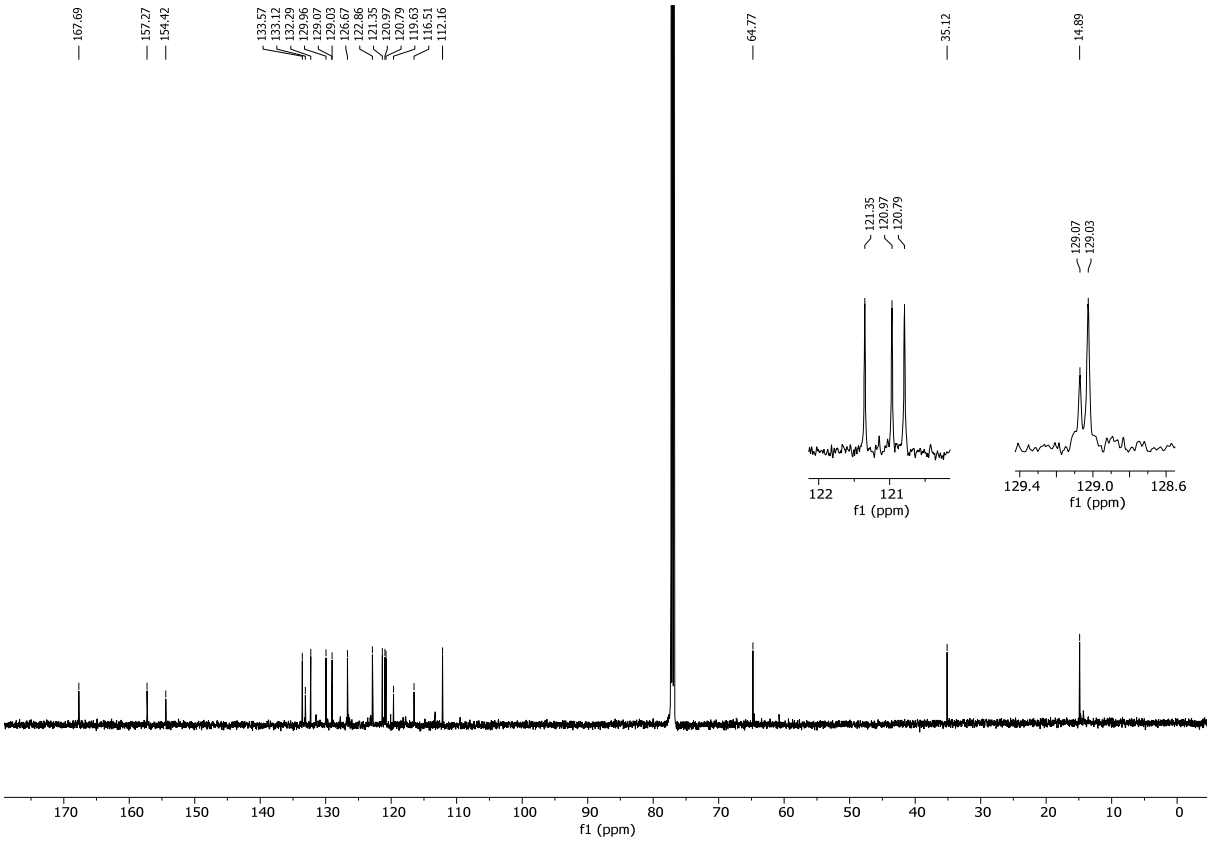
3.28. NMR of *N*-((2-hydroxynaphthalen-1-yl)methyl)-4-methoxy benzamide (4p) in $CDCl_3$



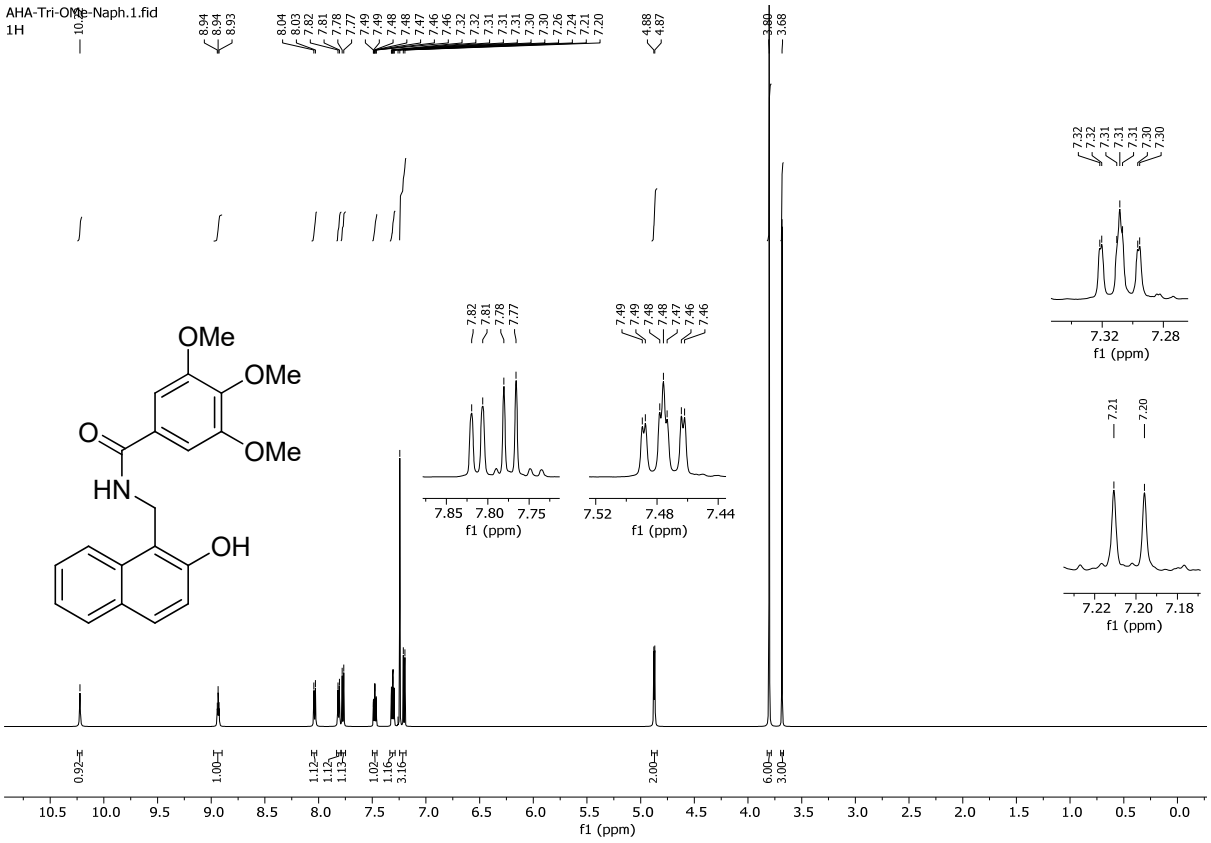


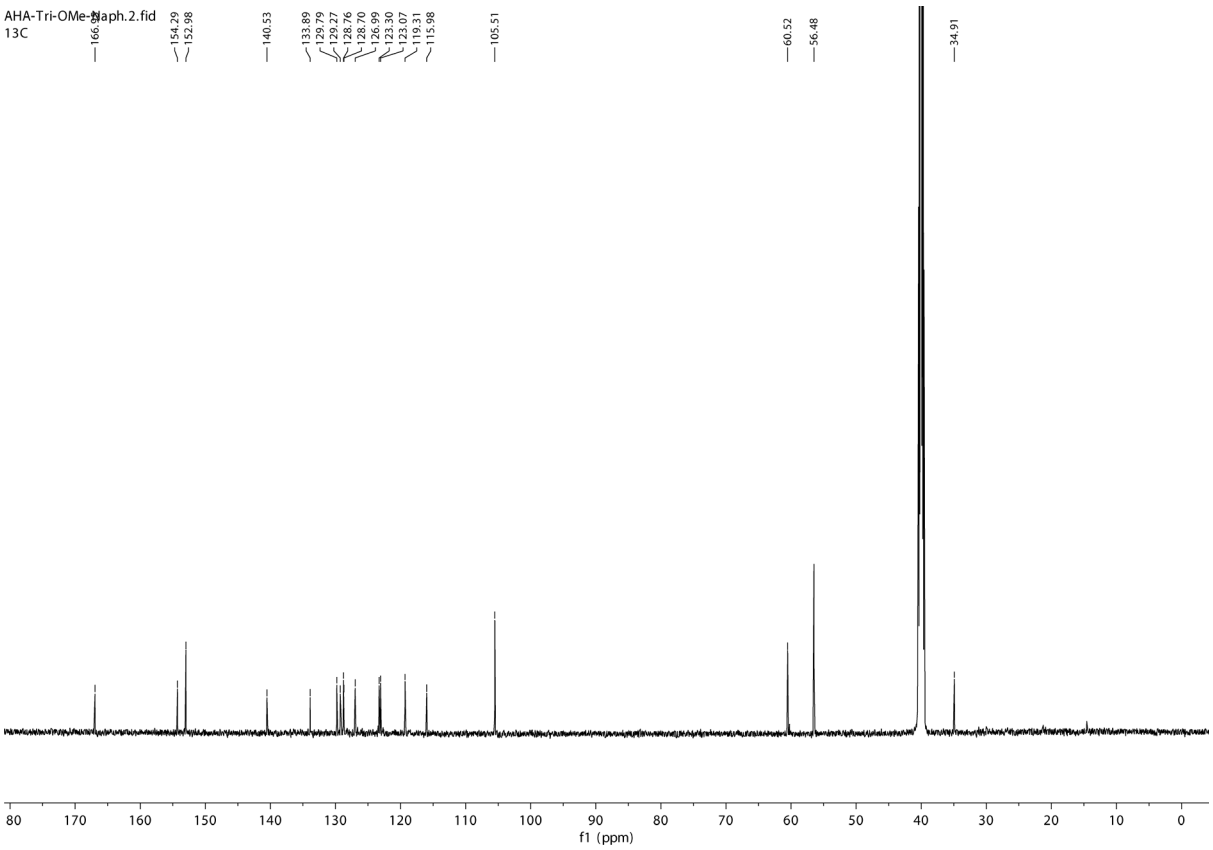
3.29. NMR of 2-ethoxy-*N*-((2-hydroxynaphthalen-1-yl)methyl)benzamide (4q) in $CDCl_3$



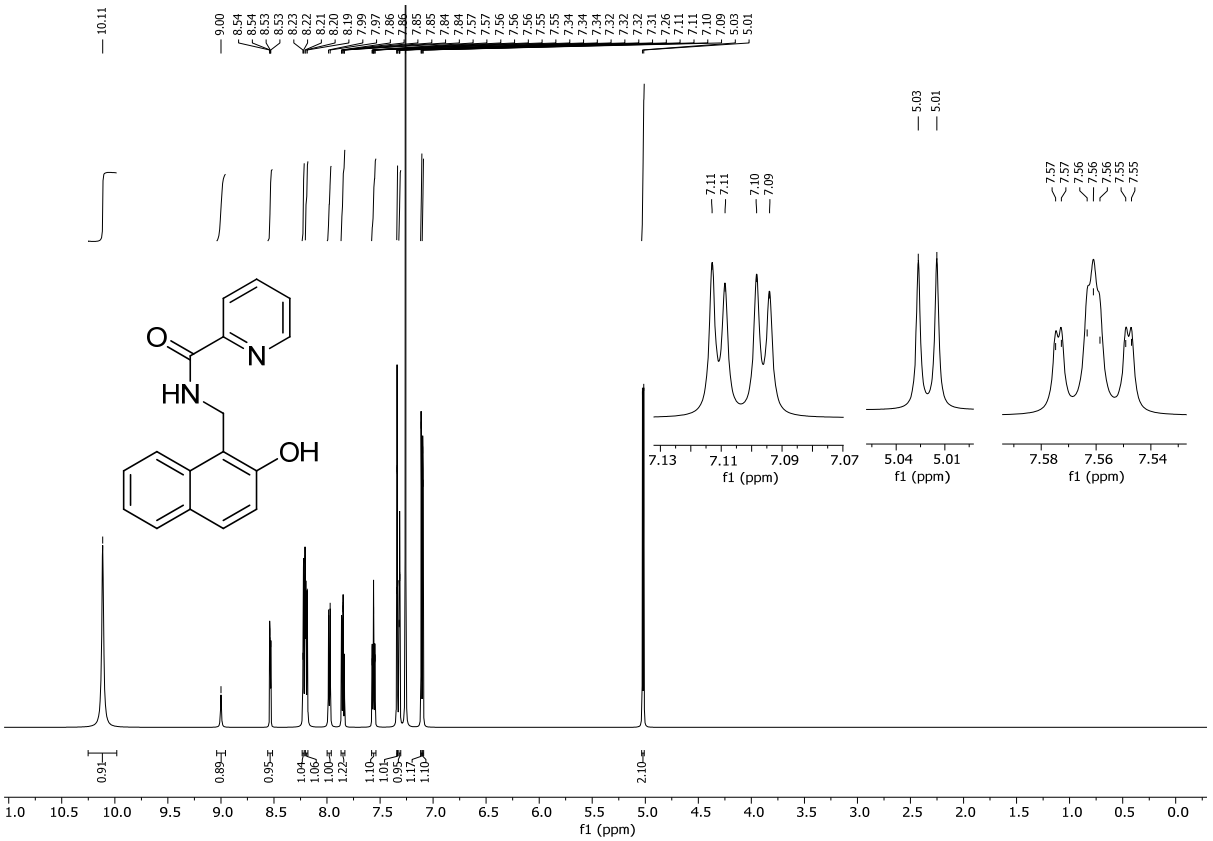


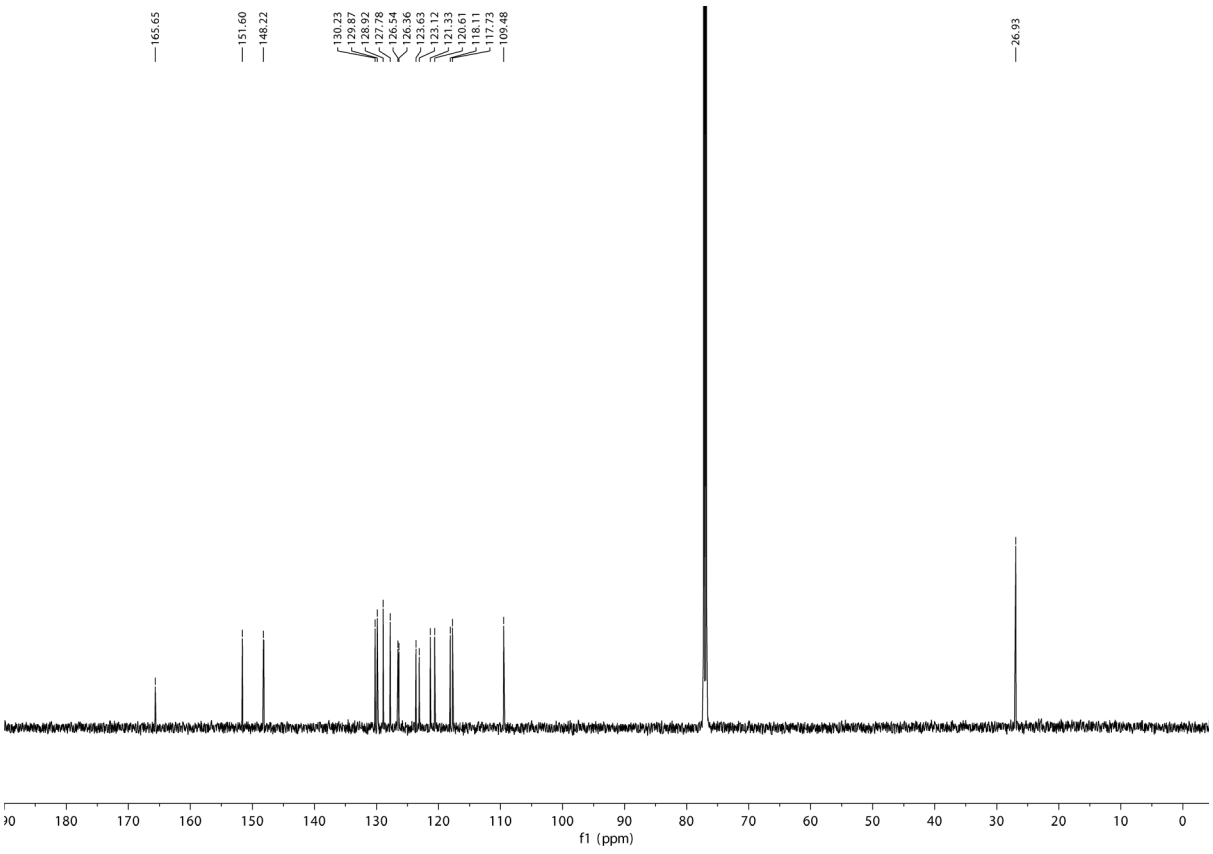
3.30. NMR of *N*-((2-hydroxynaphthalen-1-yl)methyl)-3,4,5-trimethoxy benzamide (4r) in $CDCl_3$



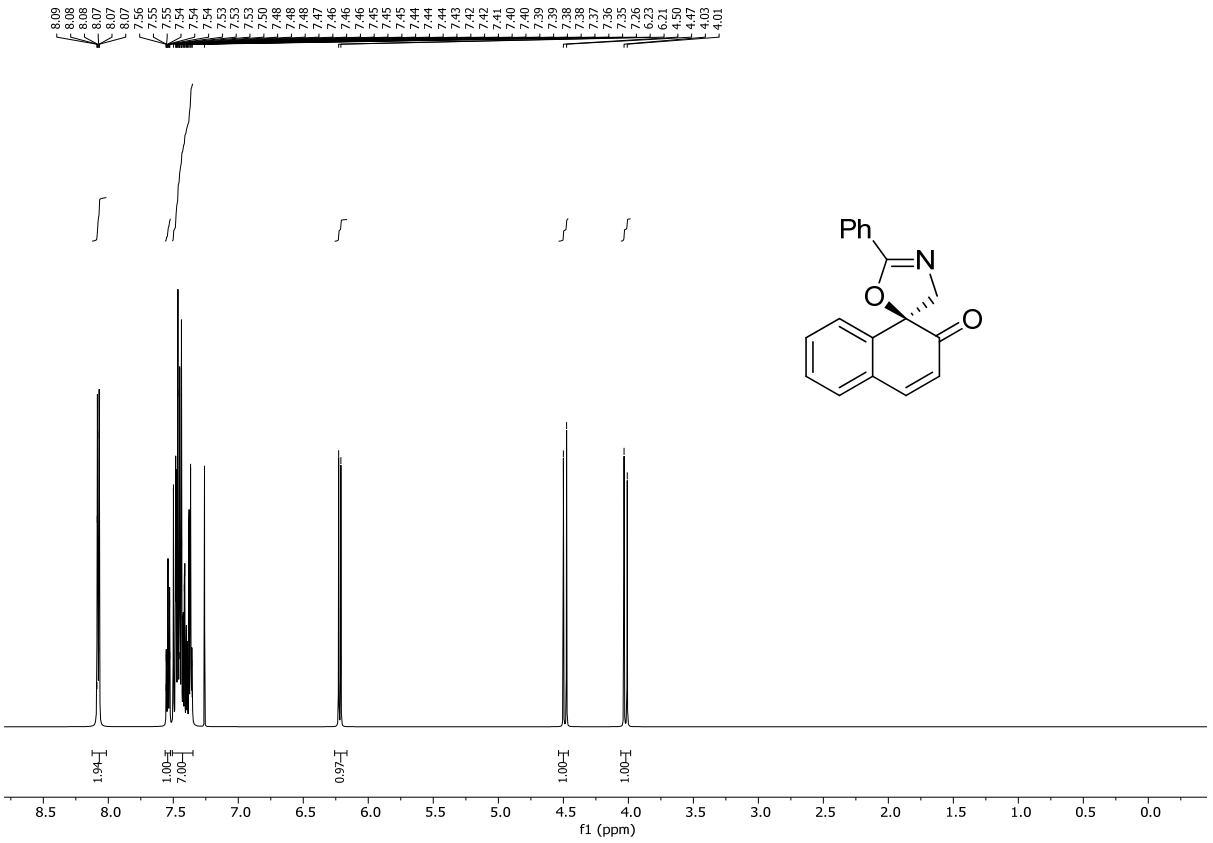


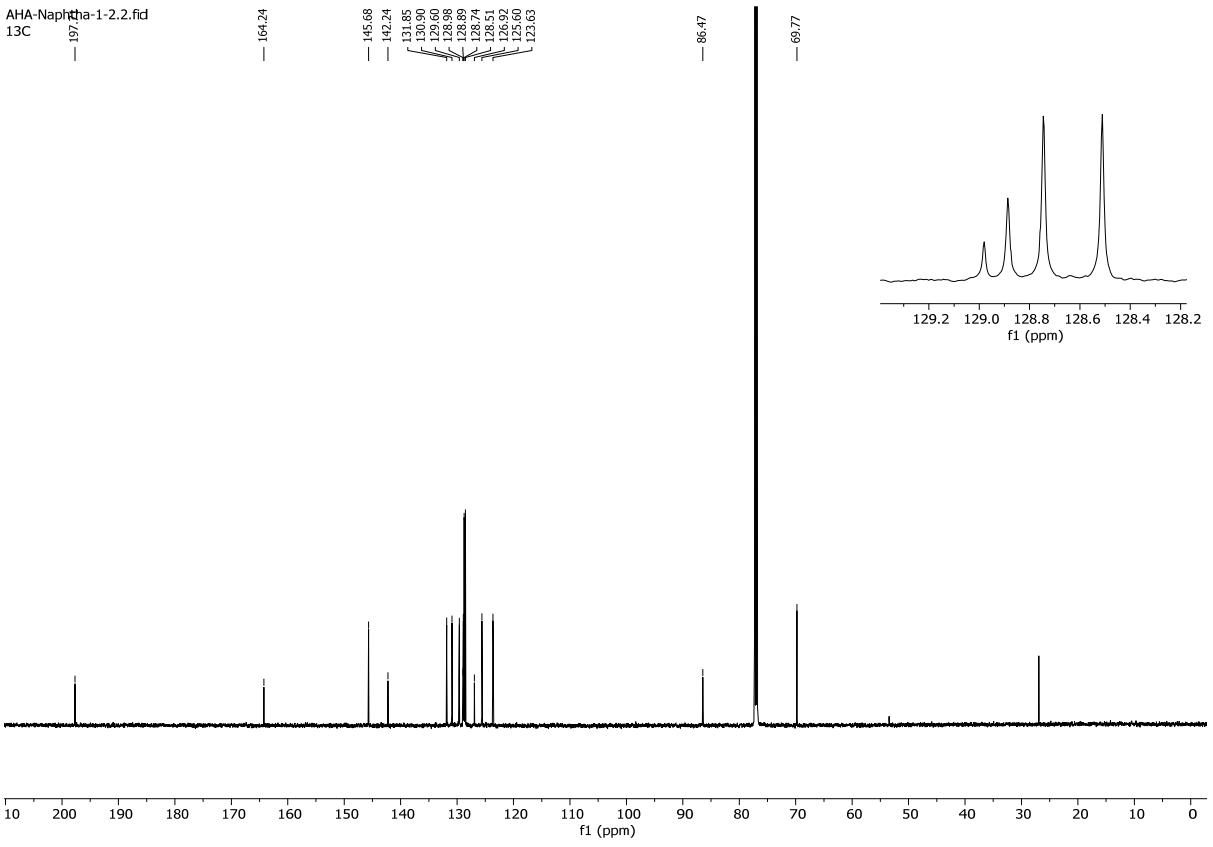
3.31. NMR of *N*-((2-hydroxynaphthalen-1-yl)methyl)picolinamide (4s) in $CDCl_3$



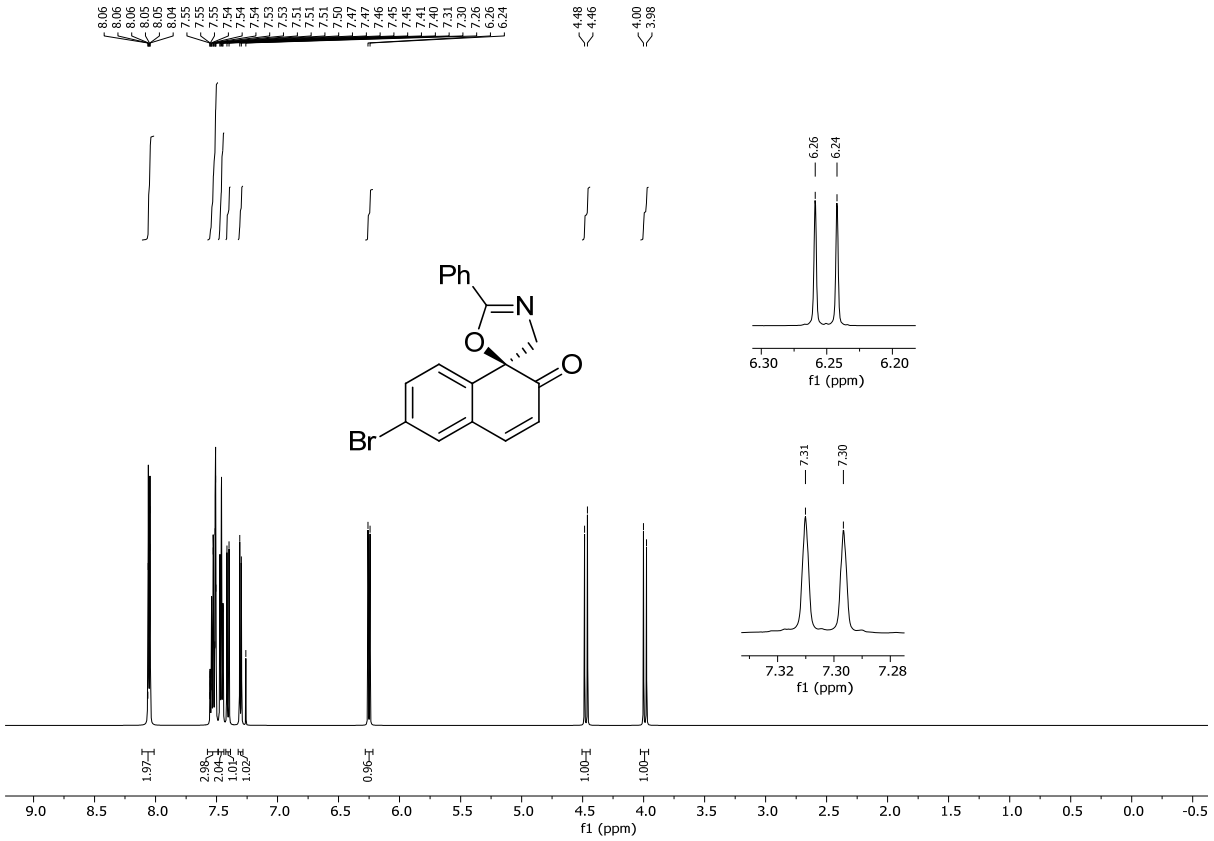


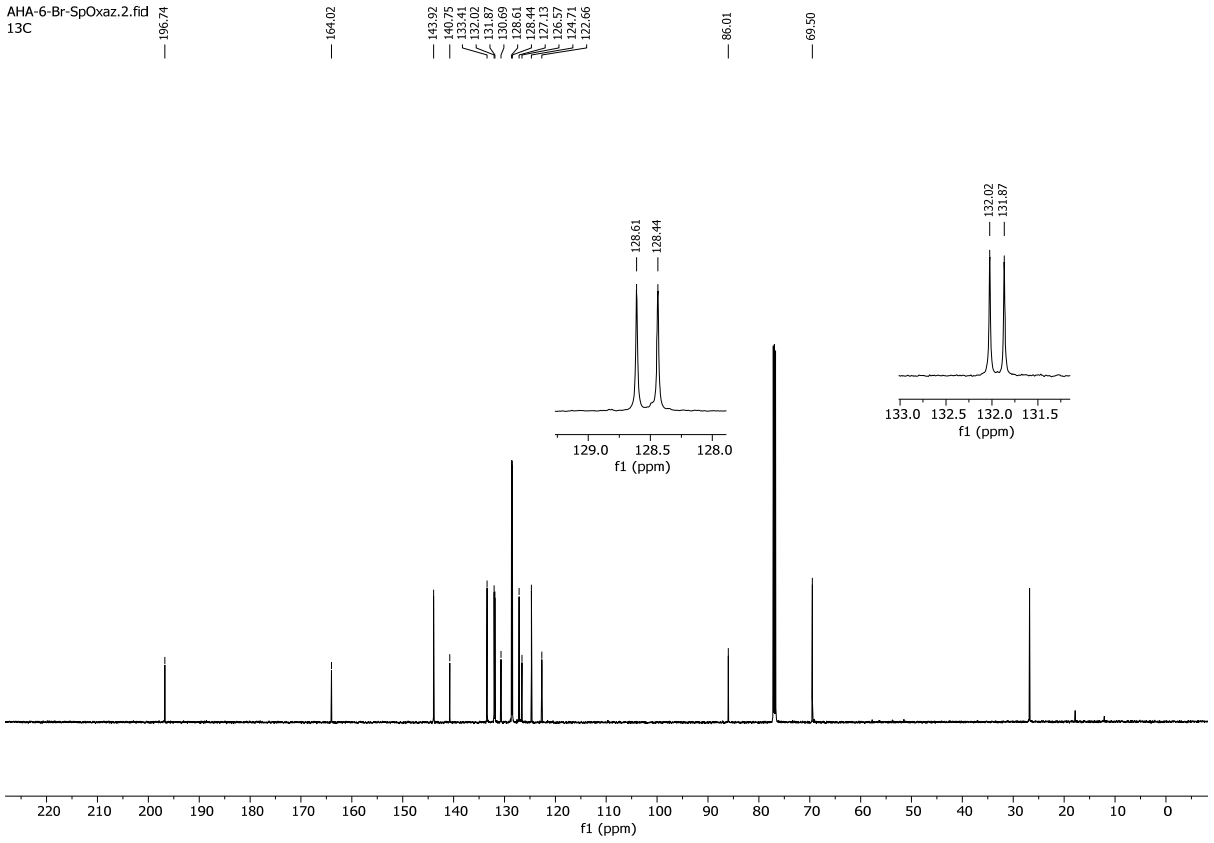
3.32. NMR of (*S*)-2'-phenyl-2*H*,4'*H*-spiro[naphthalene-1,5'-oxazol]-2-one (5a) in $CDCl_3$



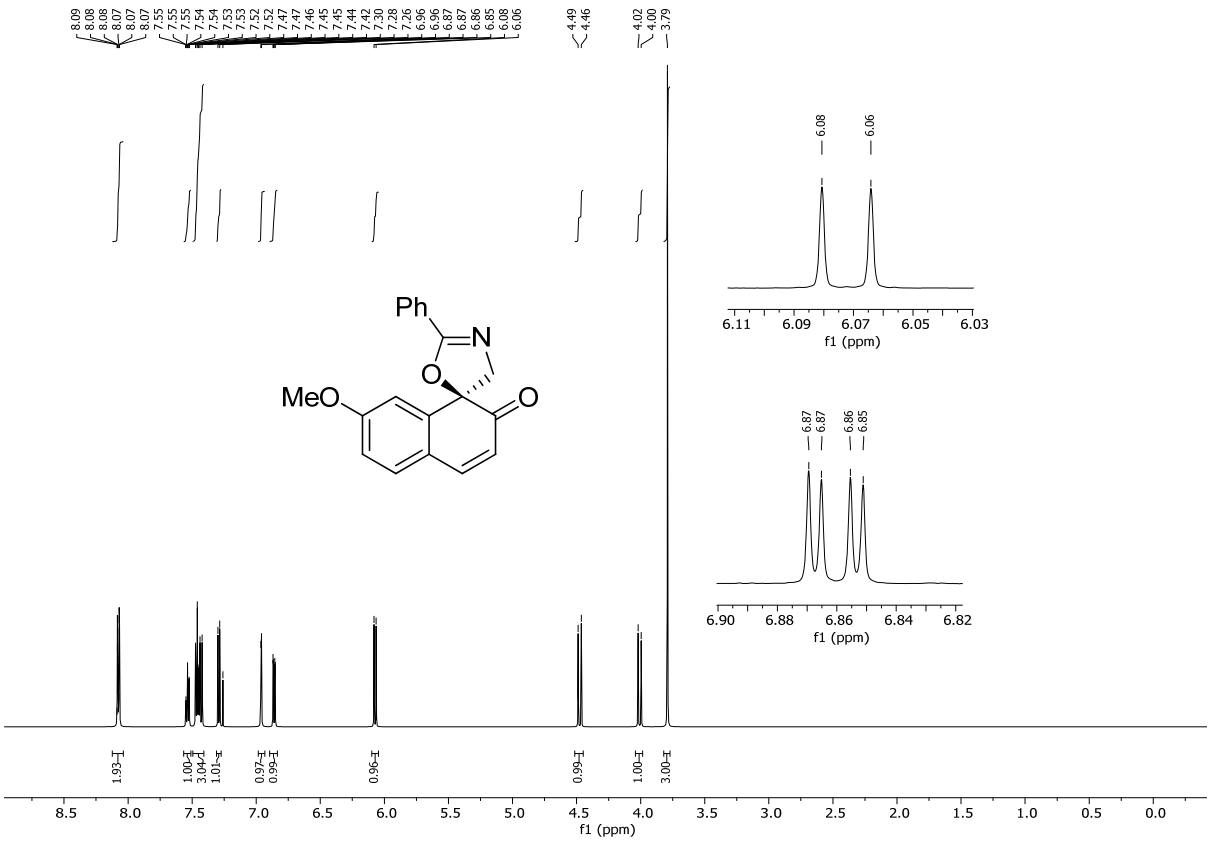


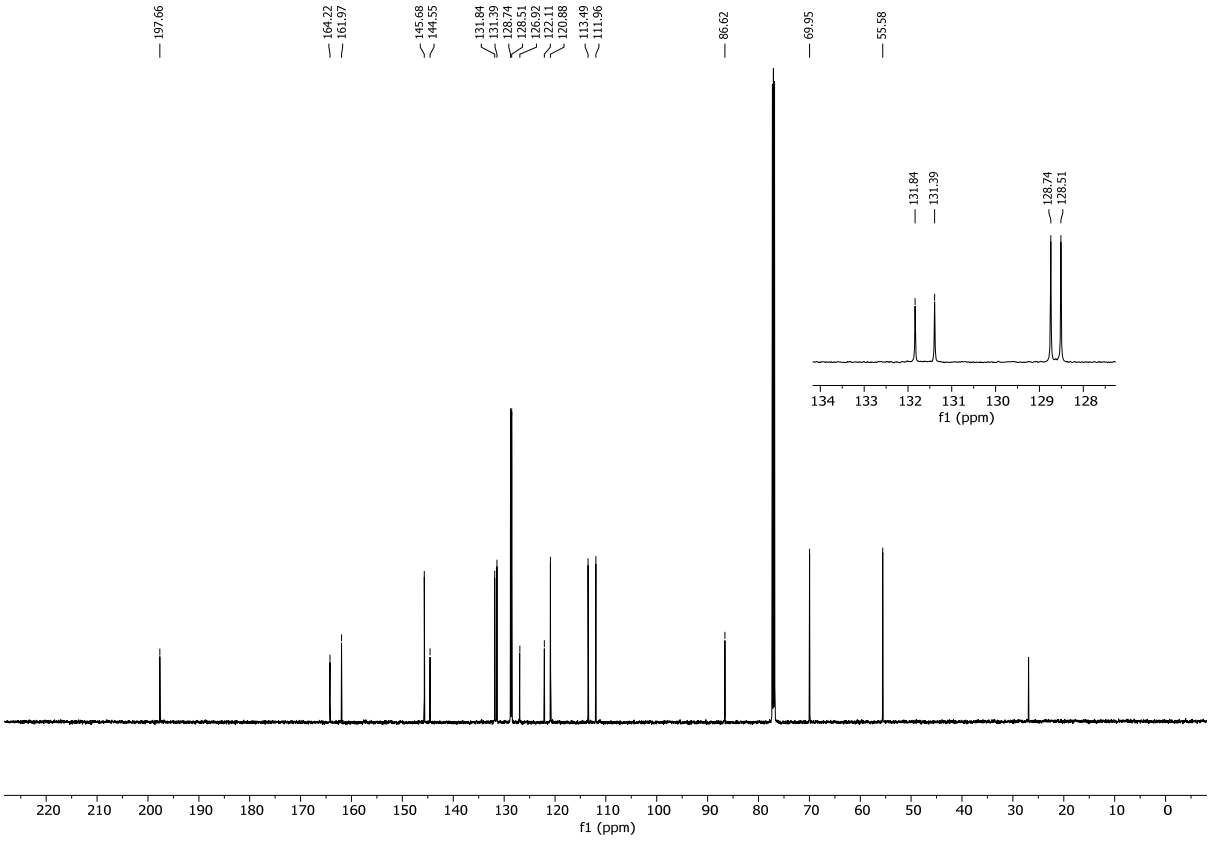
3.33. NMR of (*S*)-6-bromo-2'-phenyl-2*H*,4'*H*-spiro[naphthalene-1,5'-oxazol]-2-one (5b) in $CDCl_3$



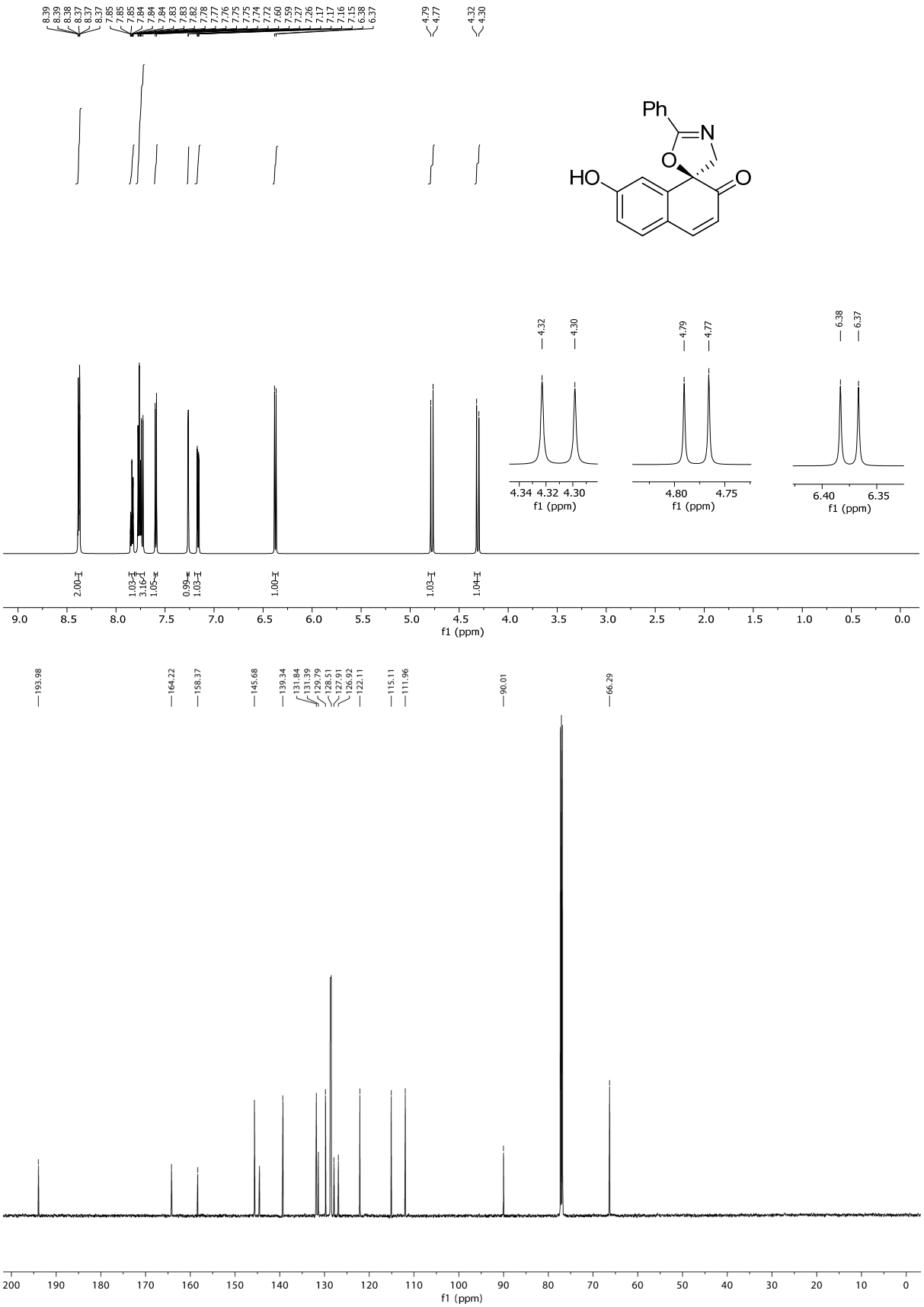


3.34. NMR of (*S*)-7-methoxy-2'-phenyl-2*H*,4'*H*-spiro[naphthalene-1,5'-oxazol]-2-one (5c) in $CDCl_3$

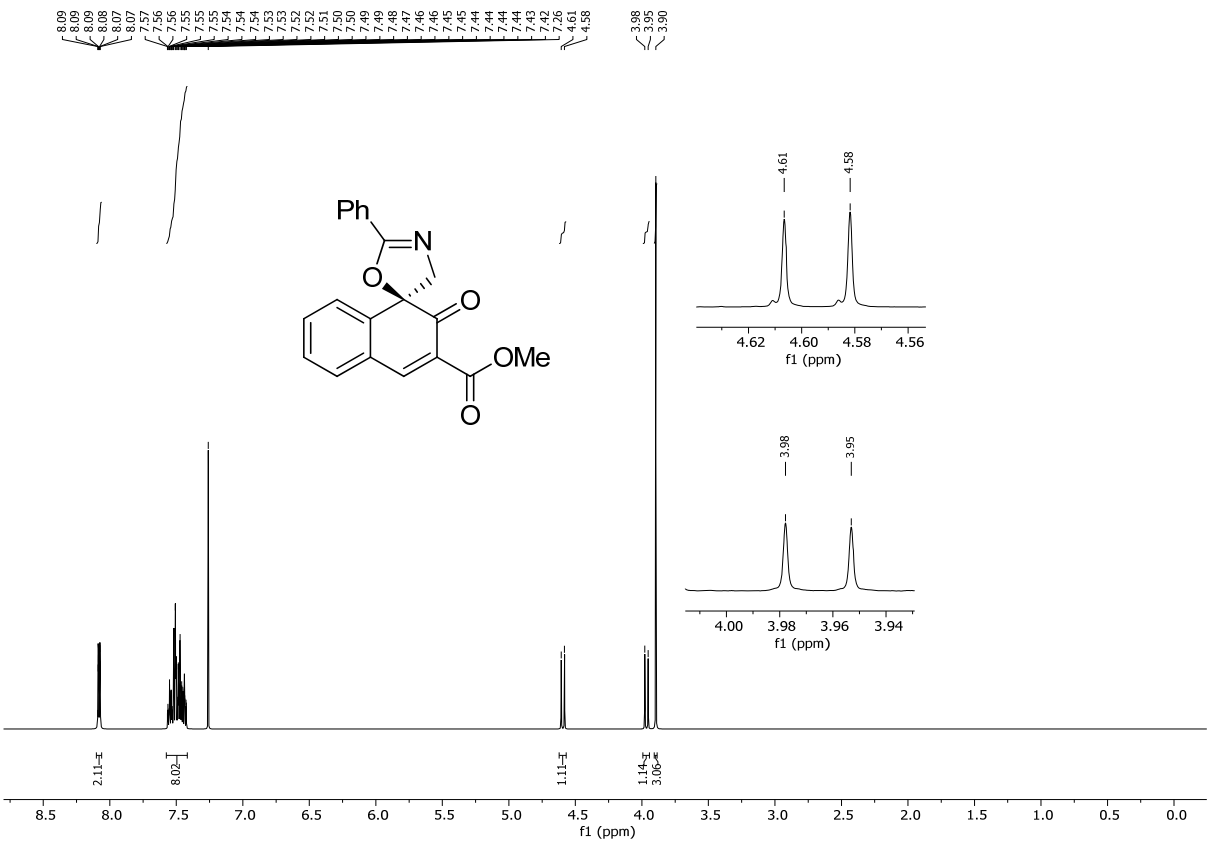


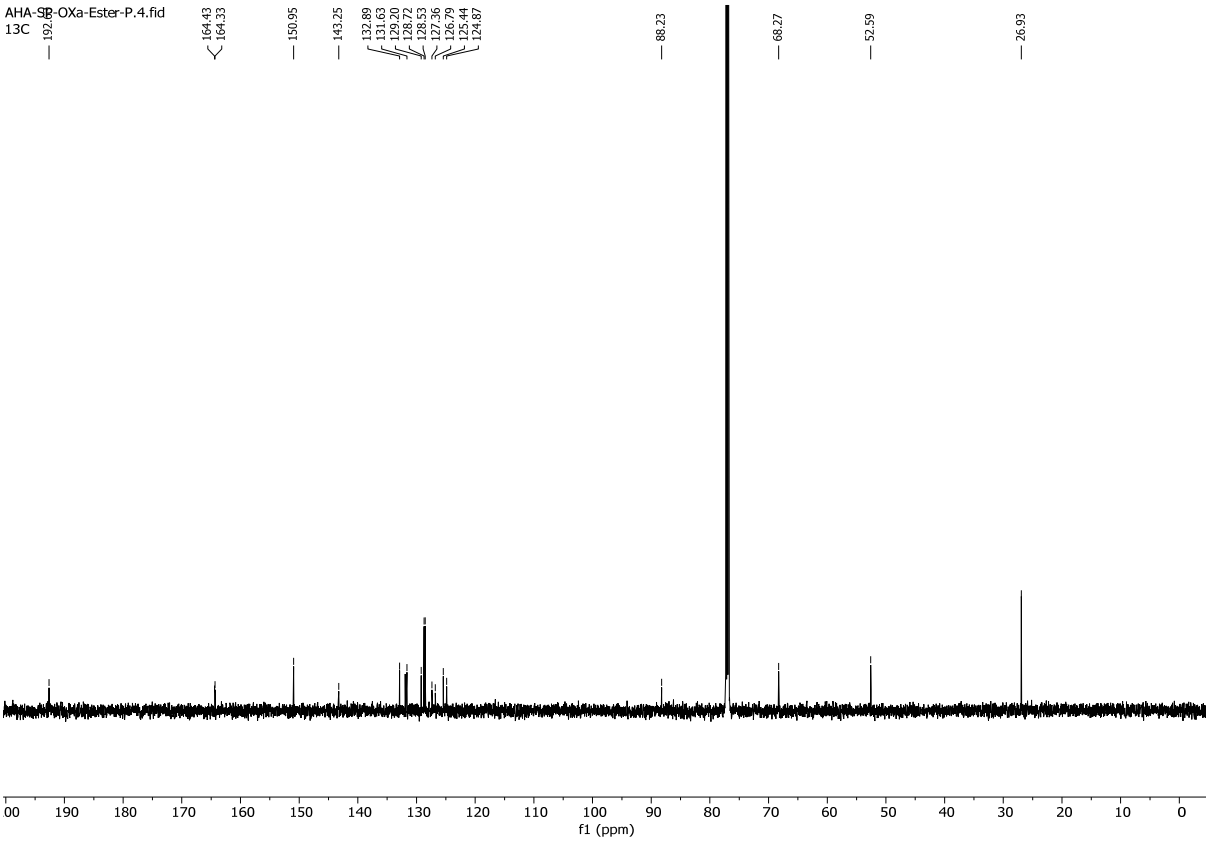


3.35. NMR of (*S*)-7-hydroxy-2'-phenyl-2*H*,4'*H*-spiro[naphthalene-1,5'-oxazol]-2-one (5d) in $CDCl_3$

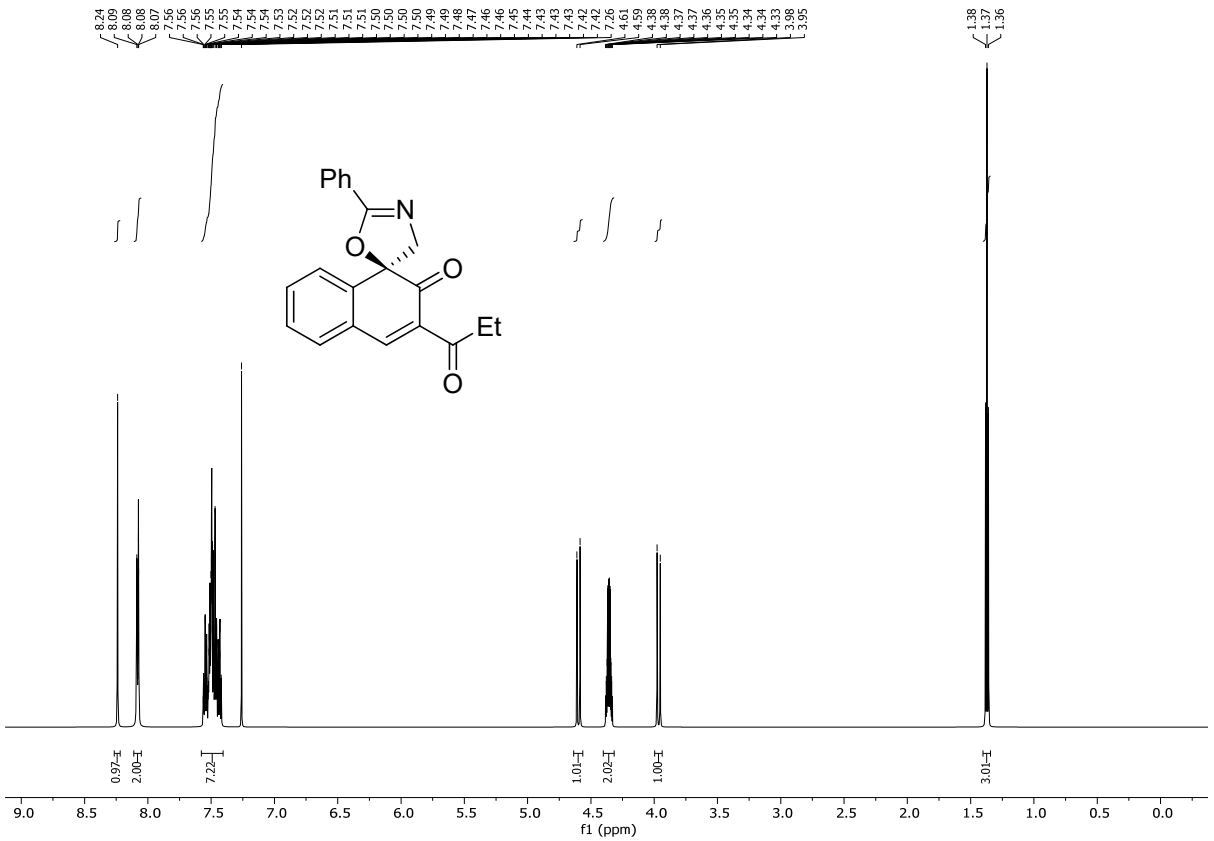


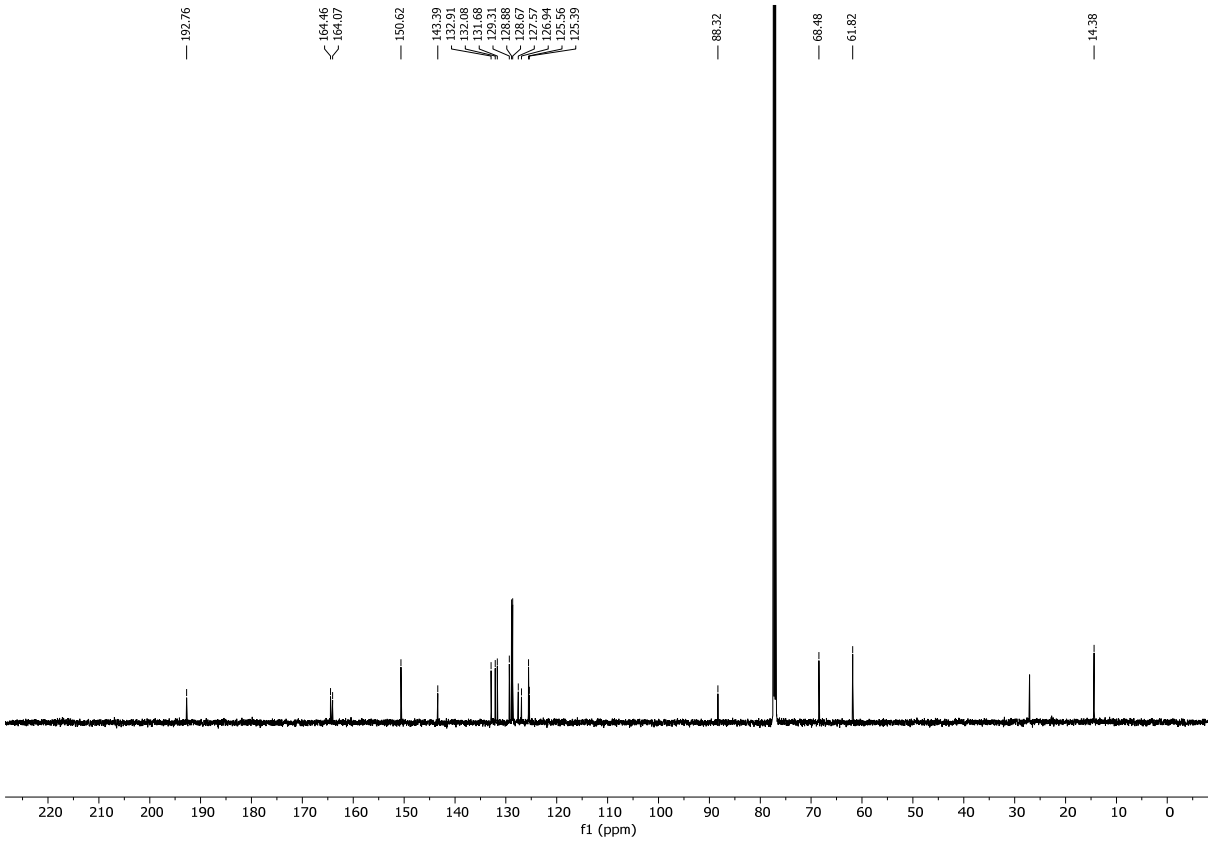
3.36. NMR of (*S*)-methyl 2-oxo-2'-phenyl-2*H*,4'*H*-spiro[naphthalene-1,5'-oxazole]-3-carboxylate (5e) in $CDCl_3$



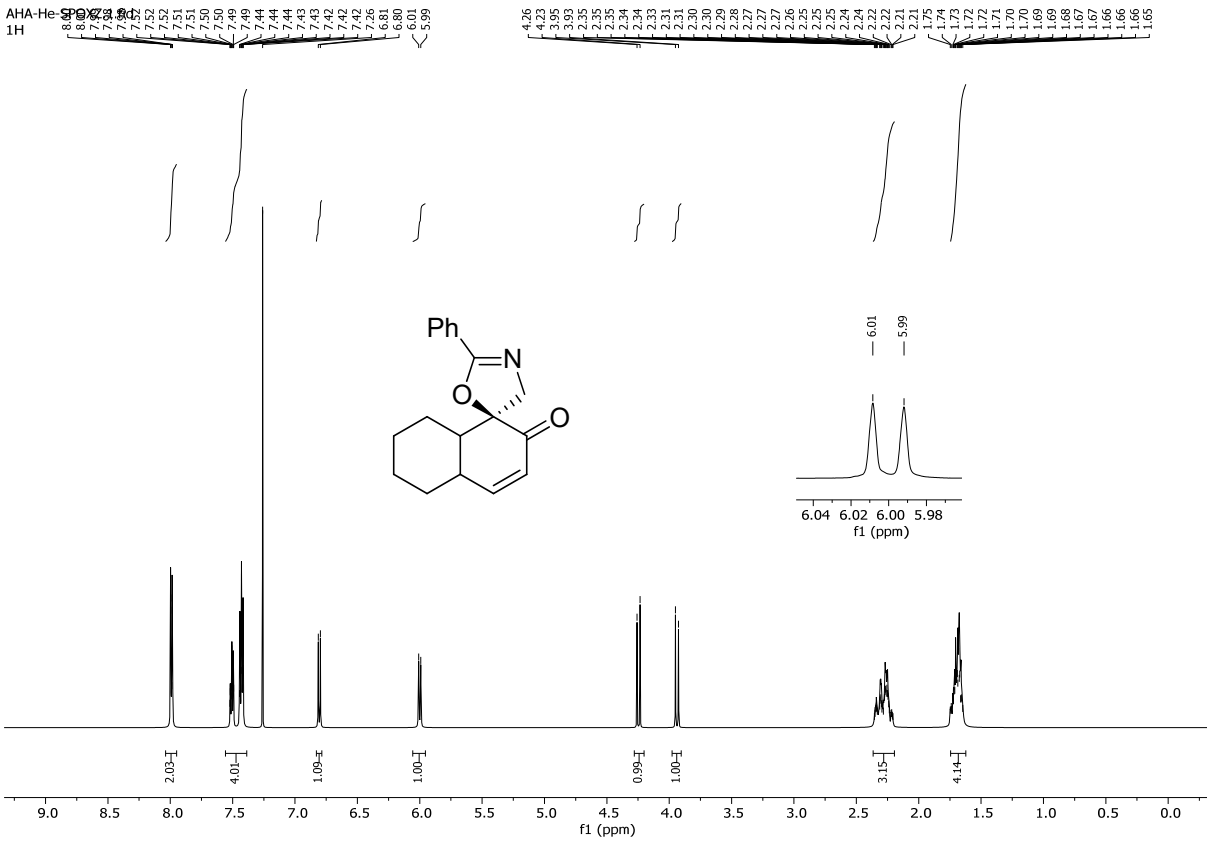


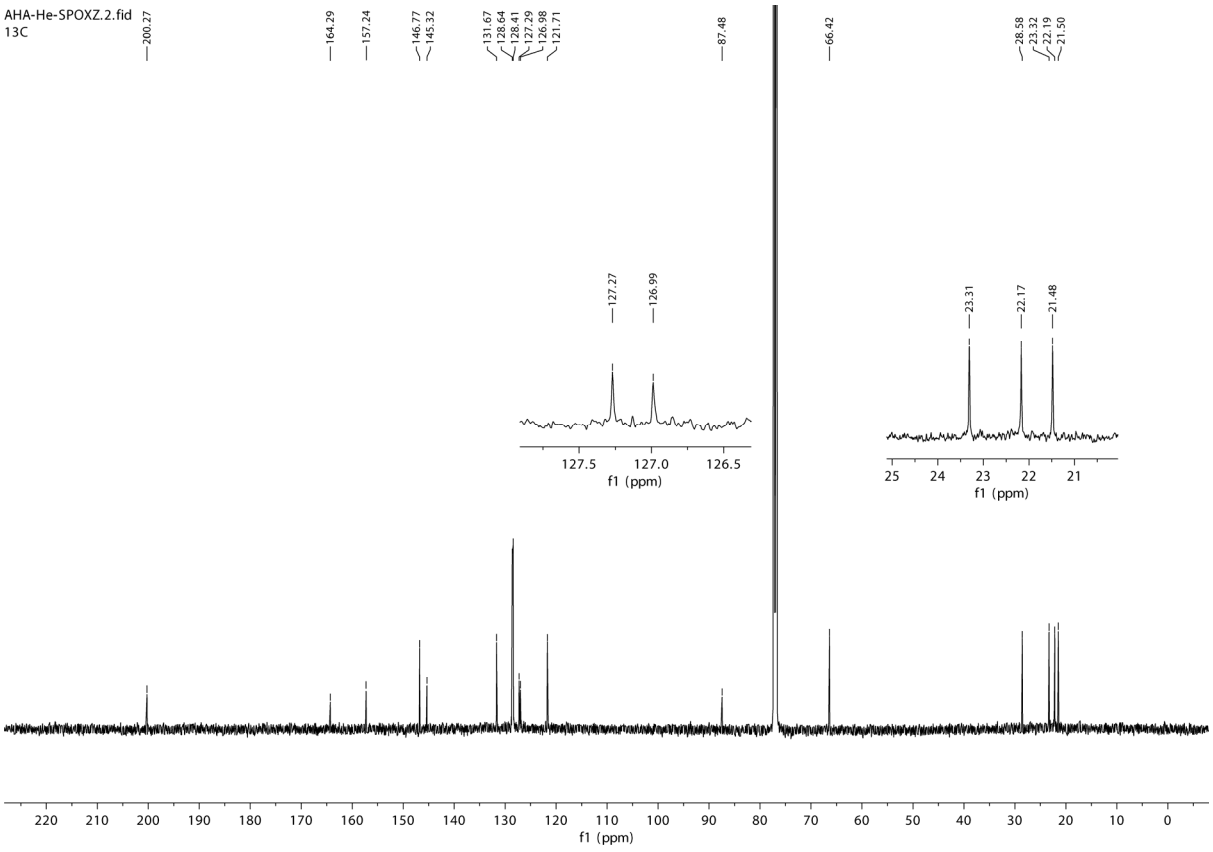
3.37. NMR of (*S*)-2'-phenyl-3-propionyl-2*H*,4'*H*-spiro[naphthalene-1,5'-oxazol]-2-one (5f) in $CDCl_3$



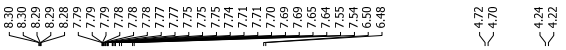


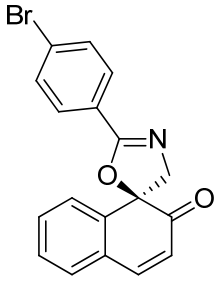
3.38. NMR of (1*S*)-2'-phenyl-4a,5,6,7,8,8a-hexahydro-2*H*,4'*H*-spiro [naphthalene-1,5'-oxazol]-2-one (5g) in $CDCl_3$

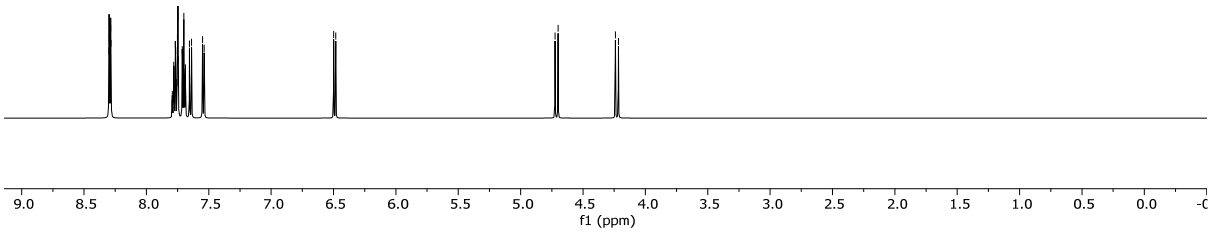


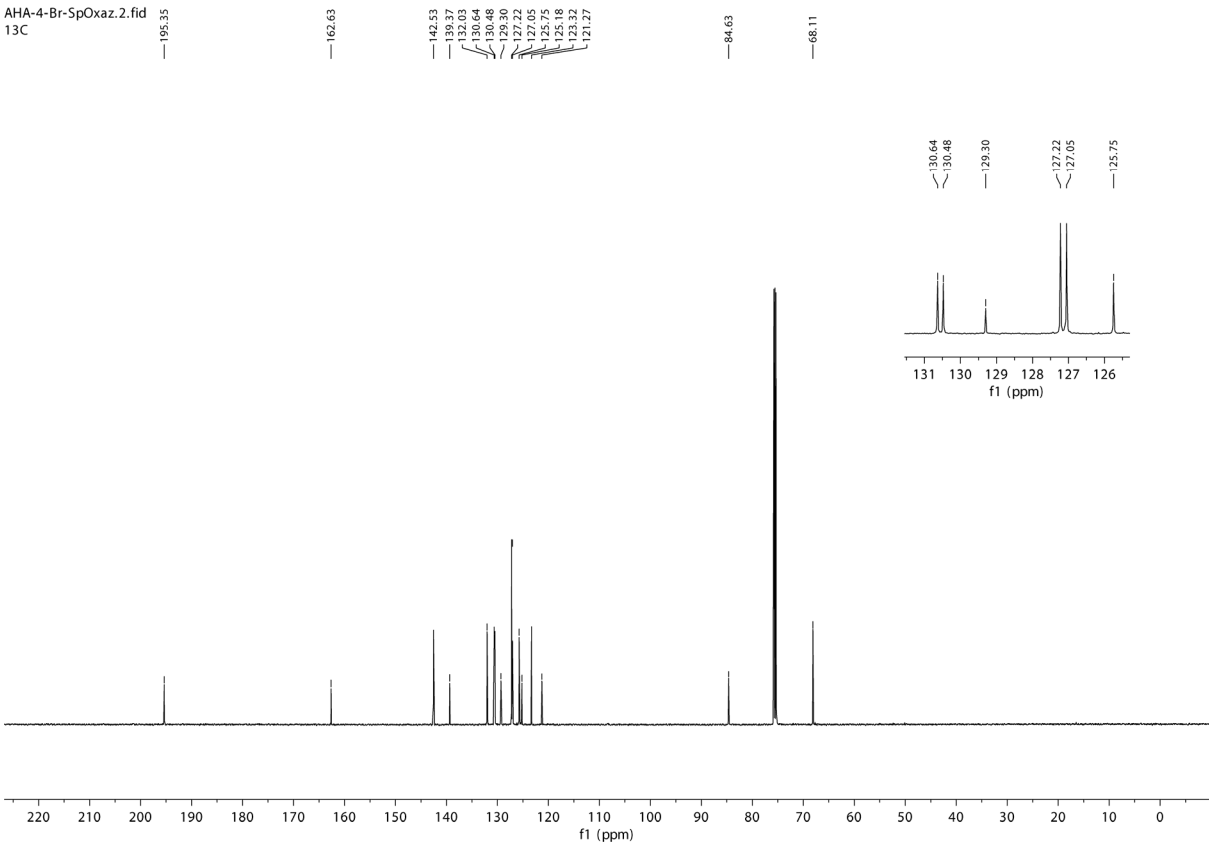


3.39. NMR of (*S*)-2'-(4-bromophenyl)-2*H*,4'*H*-spiro[naphthalene-1,5'-oxazol]-2-one (5h) in $CDCl_3$

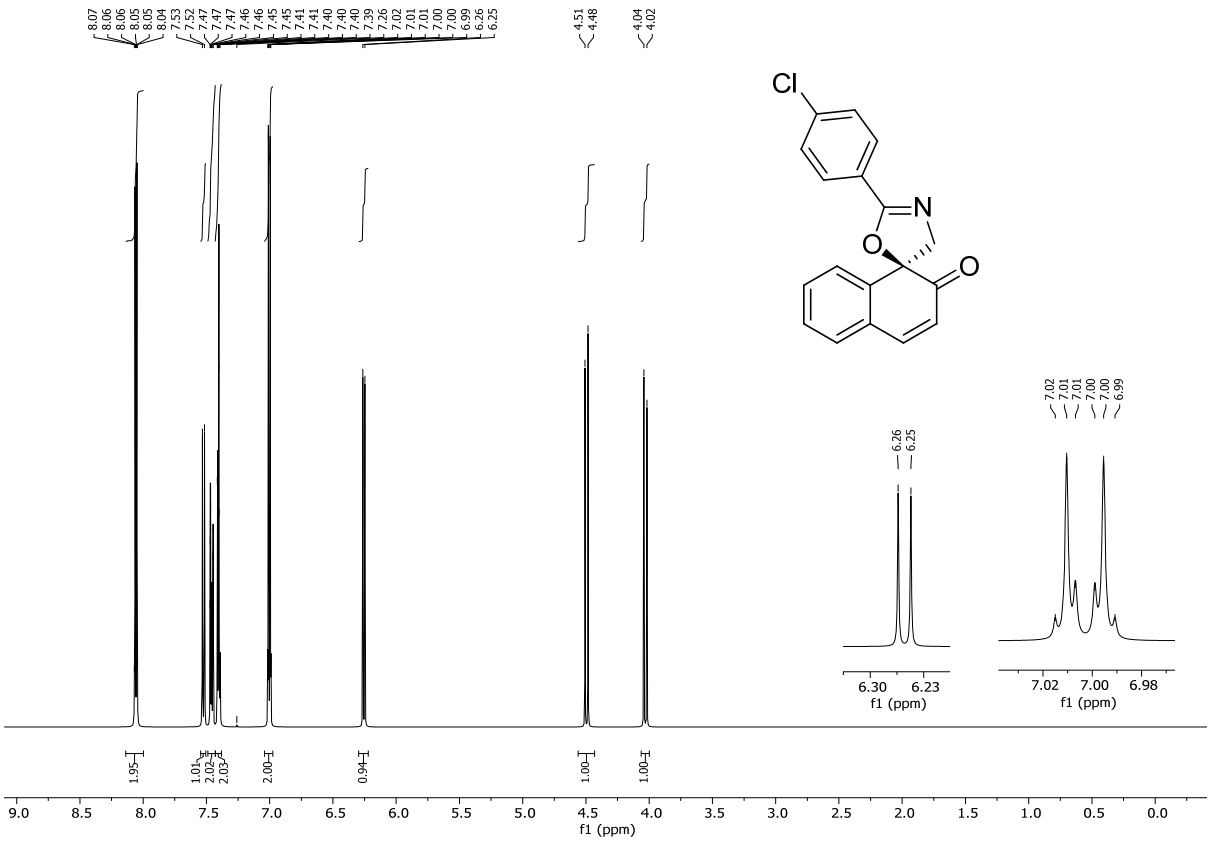


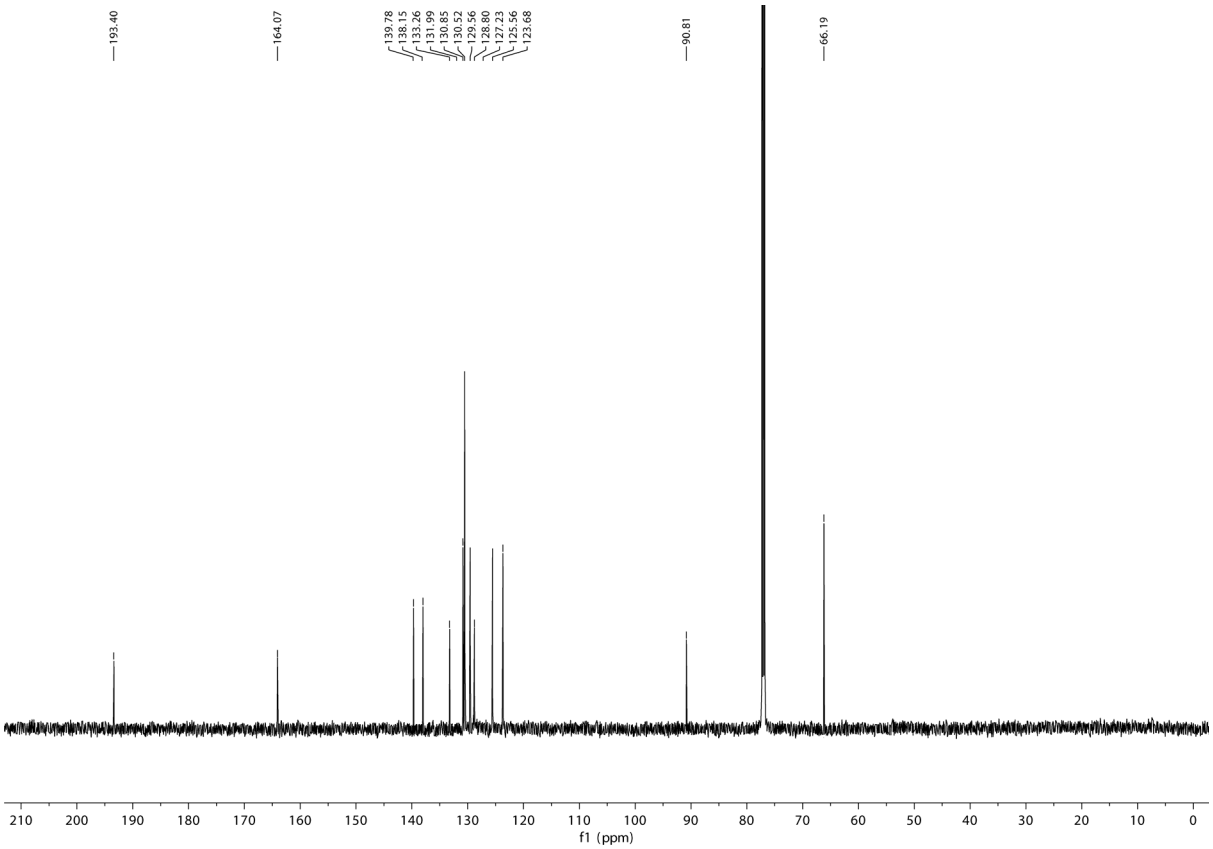




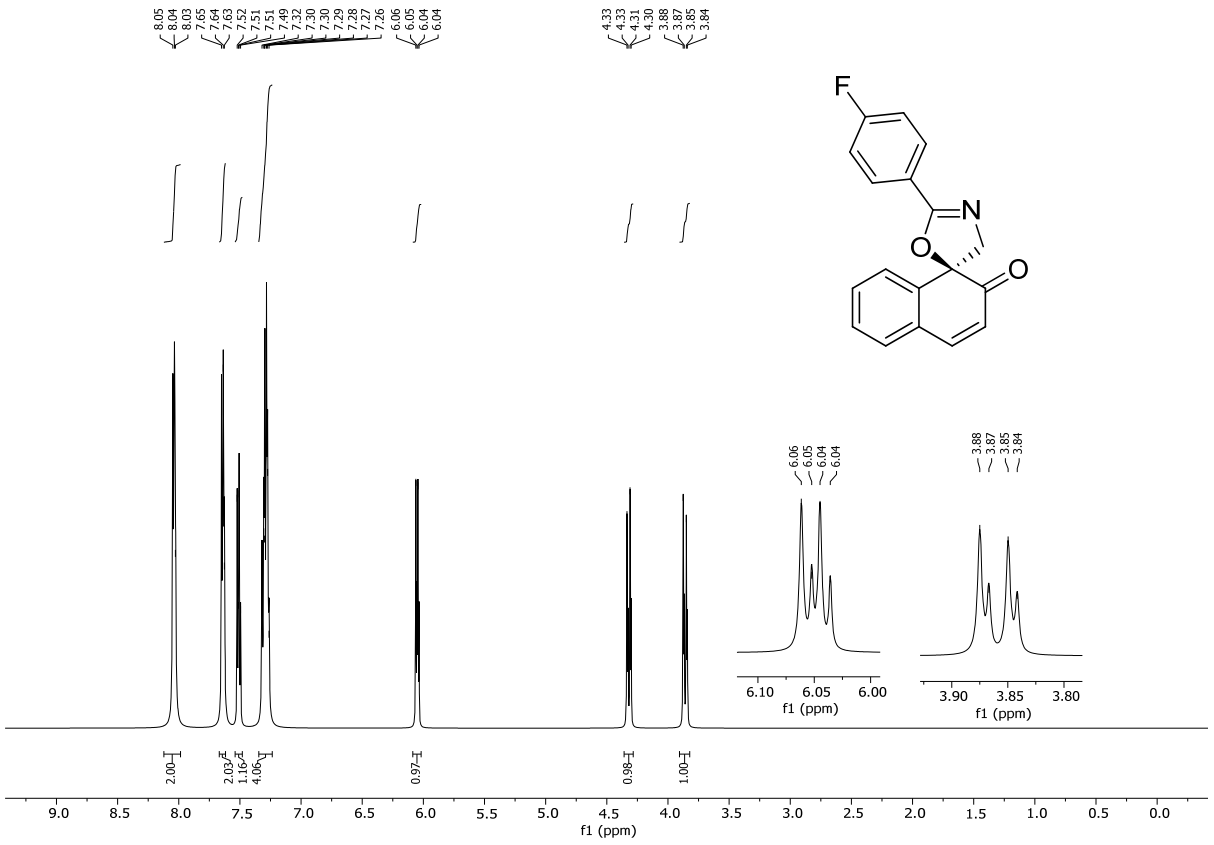


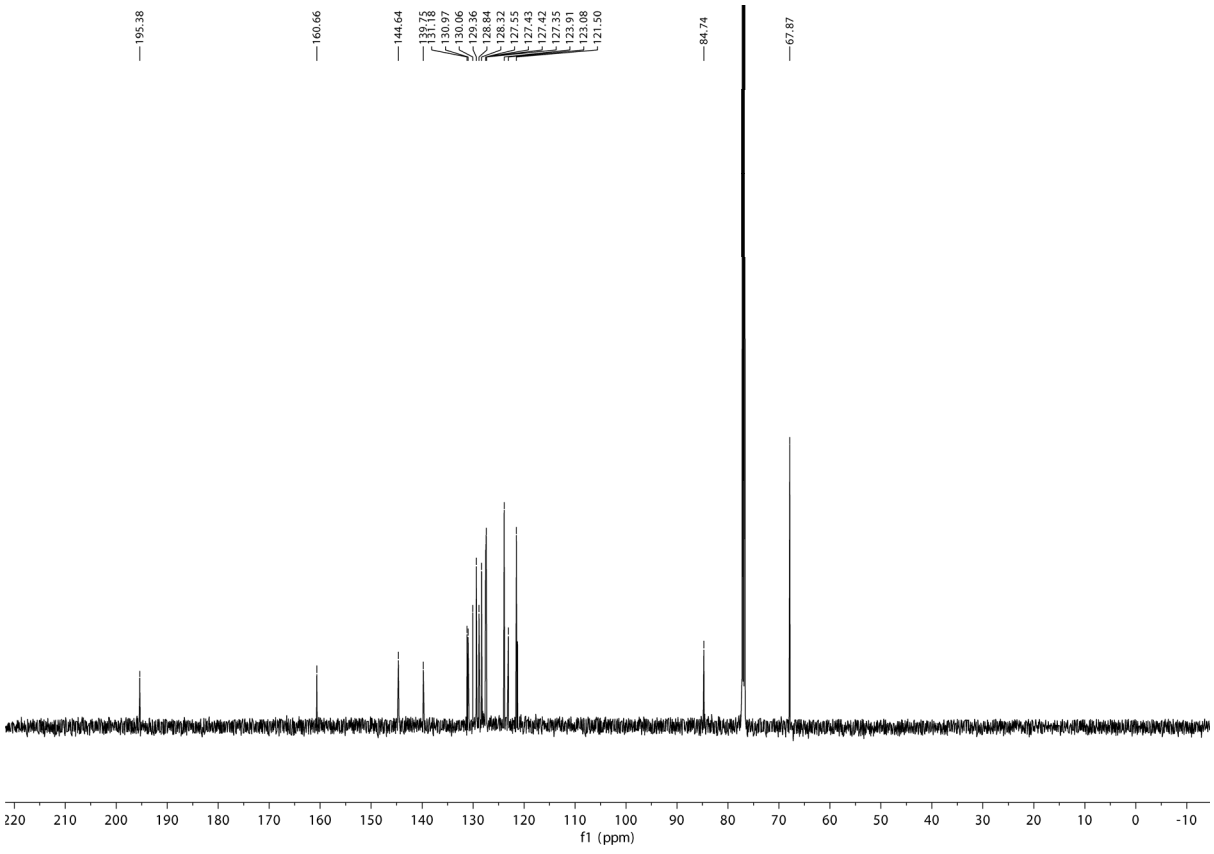
3.40. NMR of (*S*)-2'-(4-chlorophenyl)-2*H*,4'*H*-spiro[naphthalene-1,5'-oxazol]-2-one (5i) in $CDCl_3$

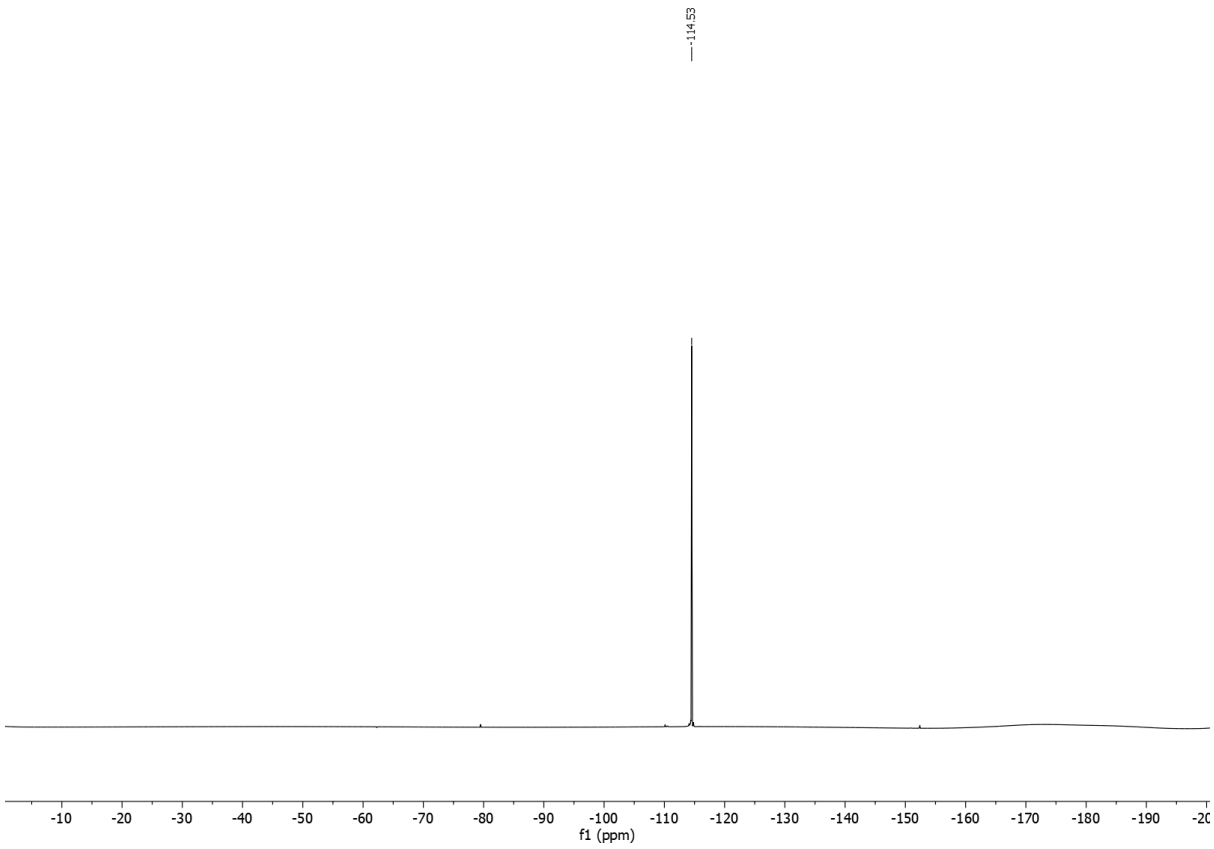




3.41. NMR of (*S*)-2'-(4-fluorophenyl)-2*H*,4'*H*-spiro[naphthalene-1,5'-oxazol]-2-one (5j) in $CDCl_3$



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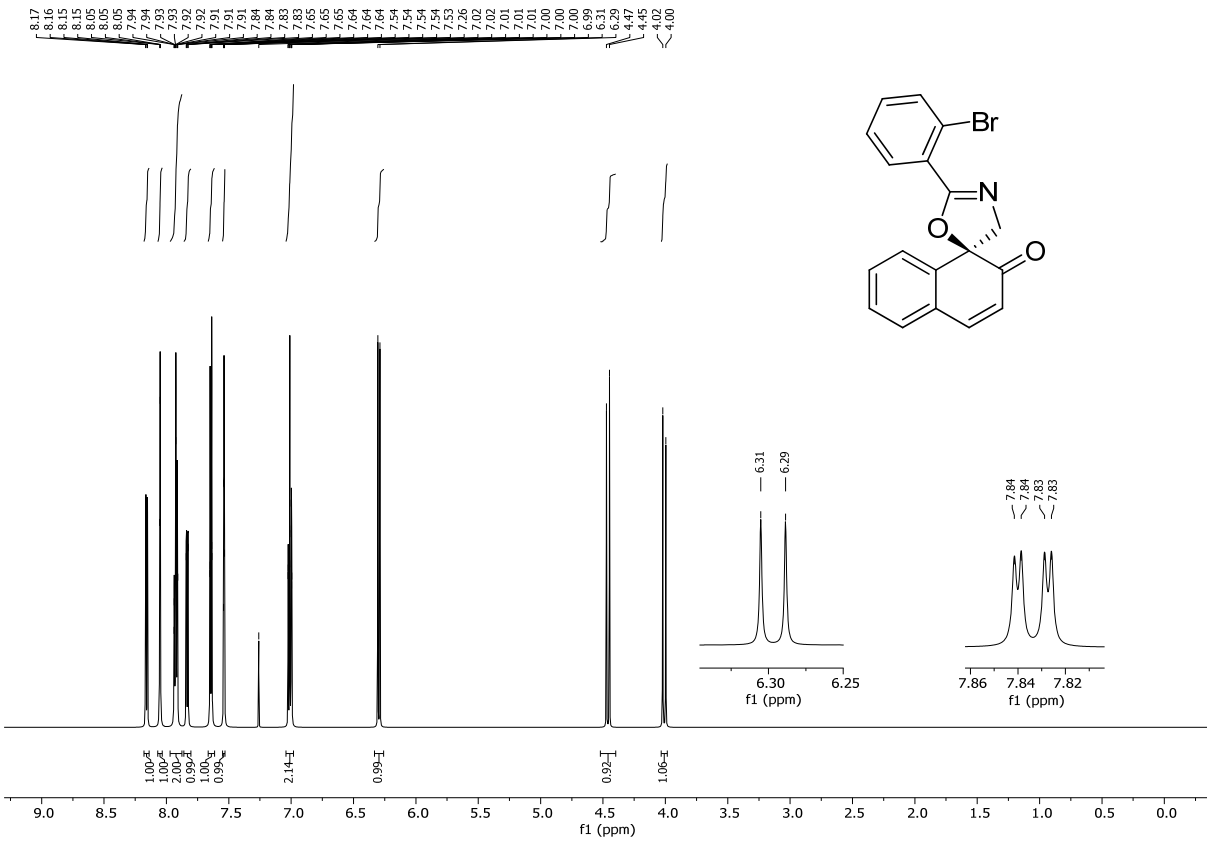
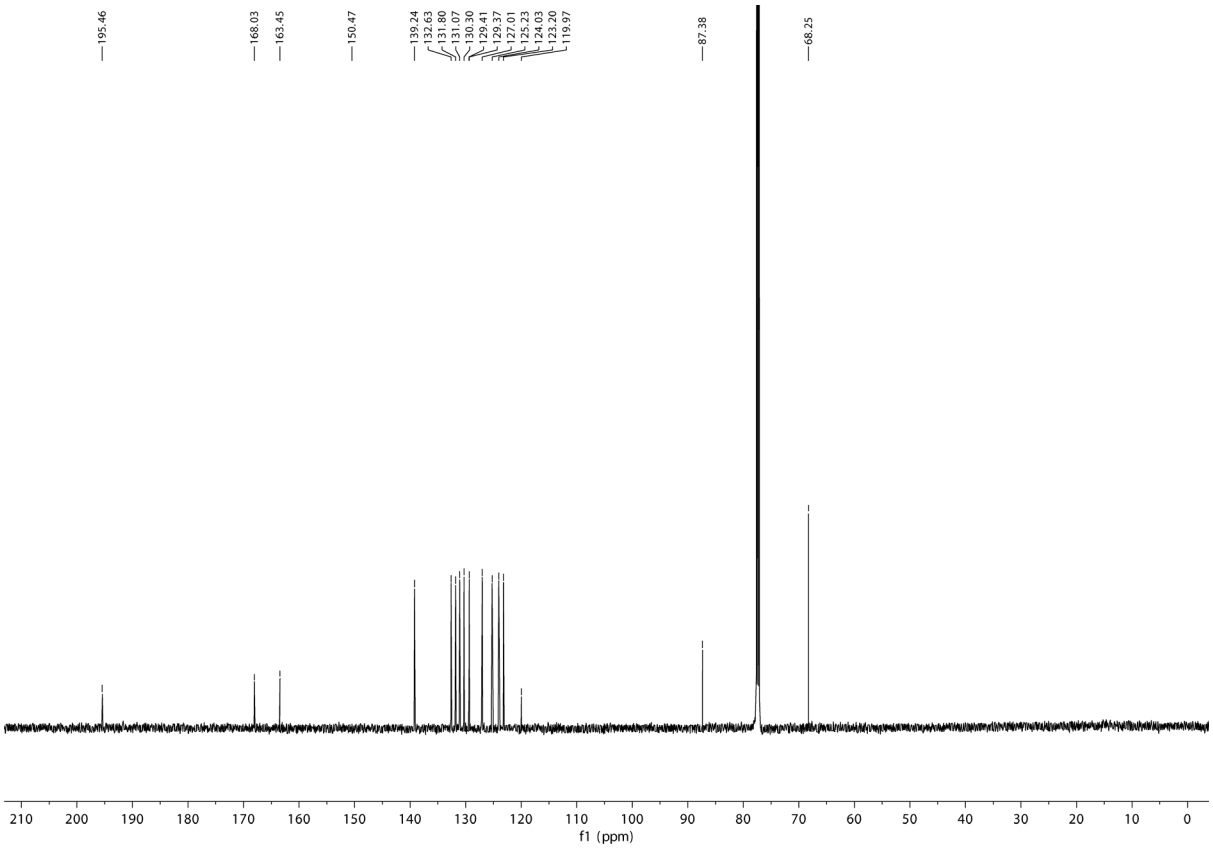
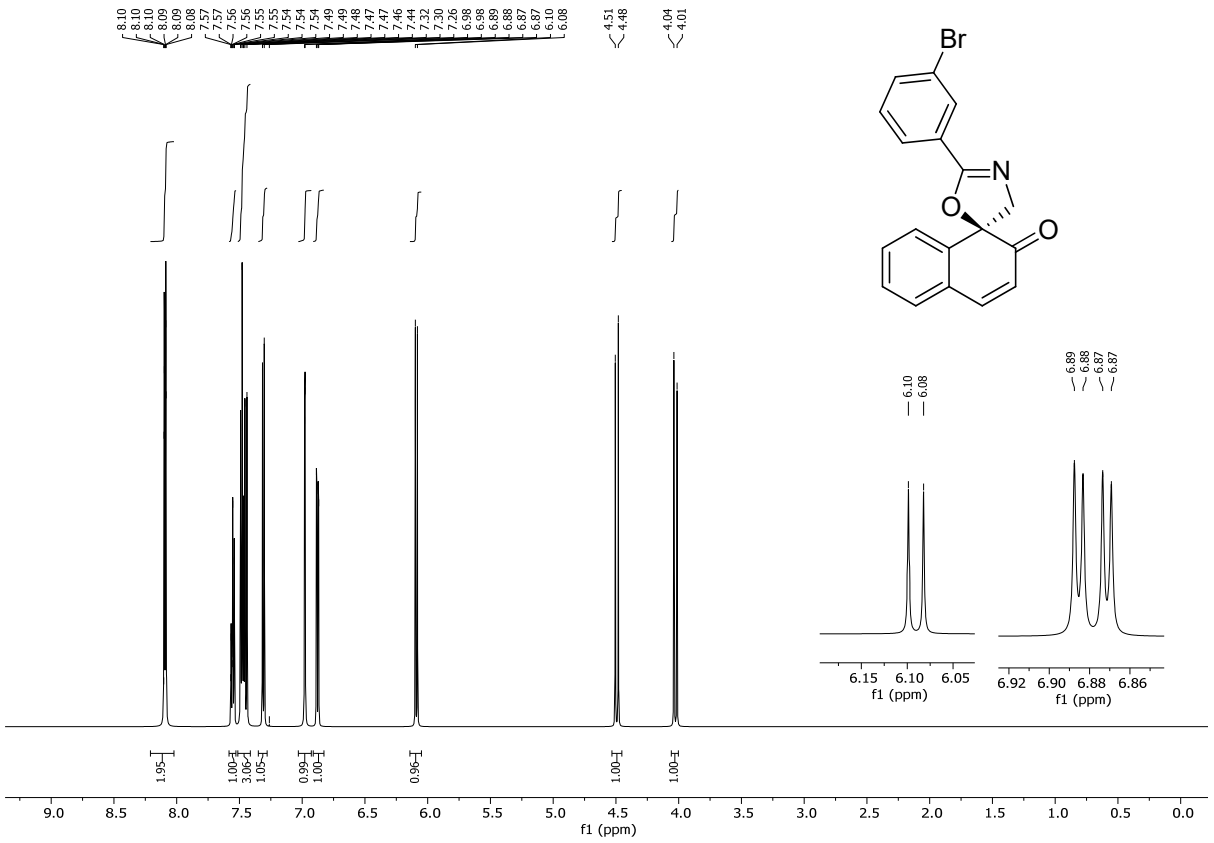
f1 (ppm)

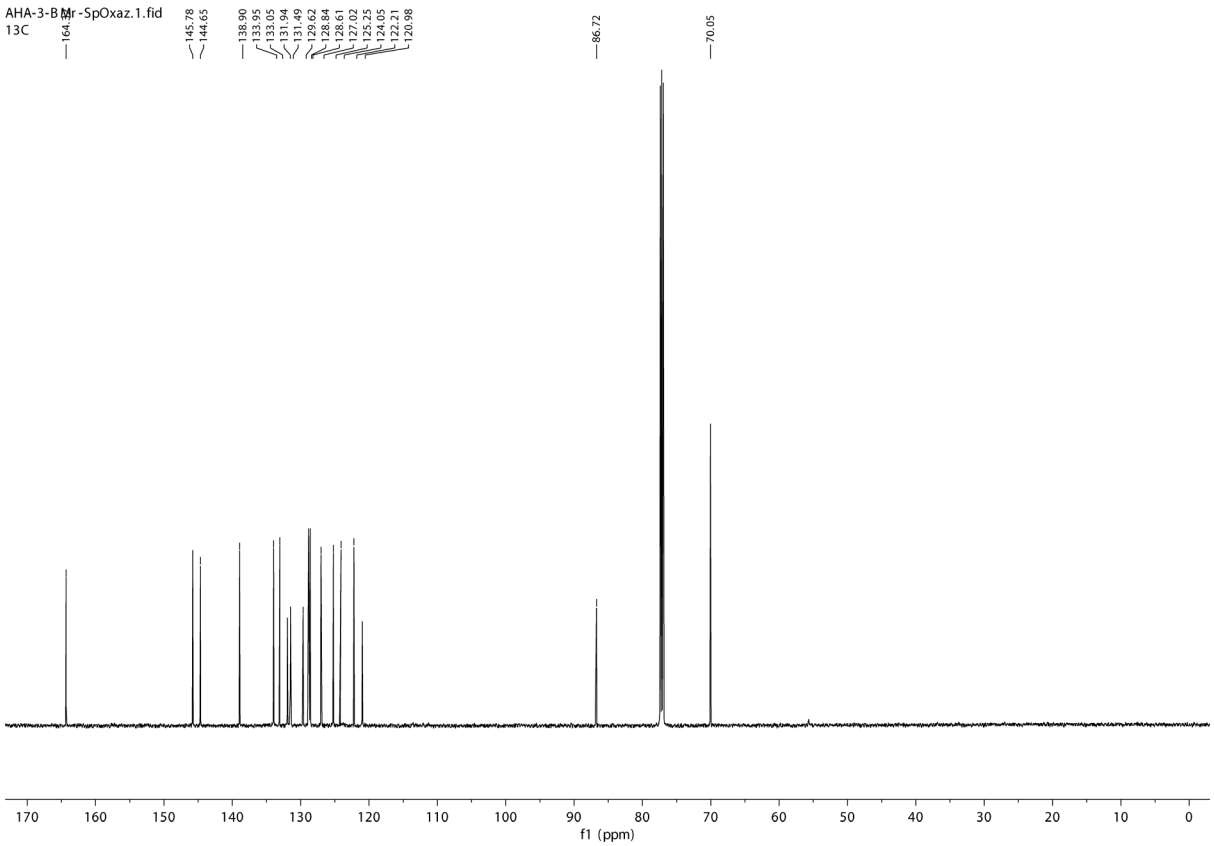
3.42. NMR of (*S*)-2'-(2-bromophenyl)-2*H*,4'*H*-spiro[naphthalene-1,5'-oxazol]-2-one (5k) in $CDCl_3$



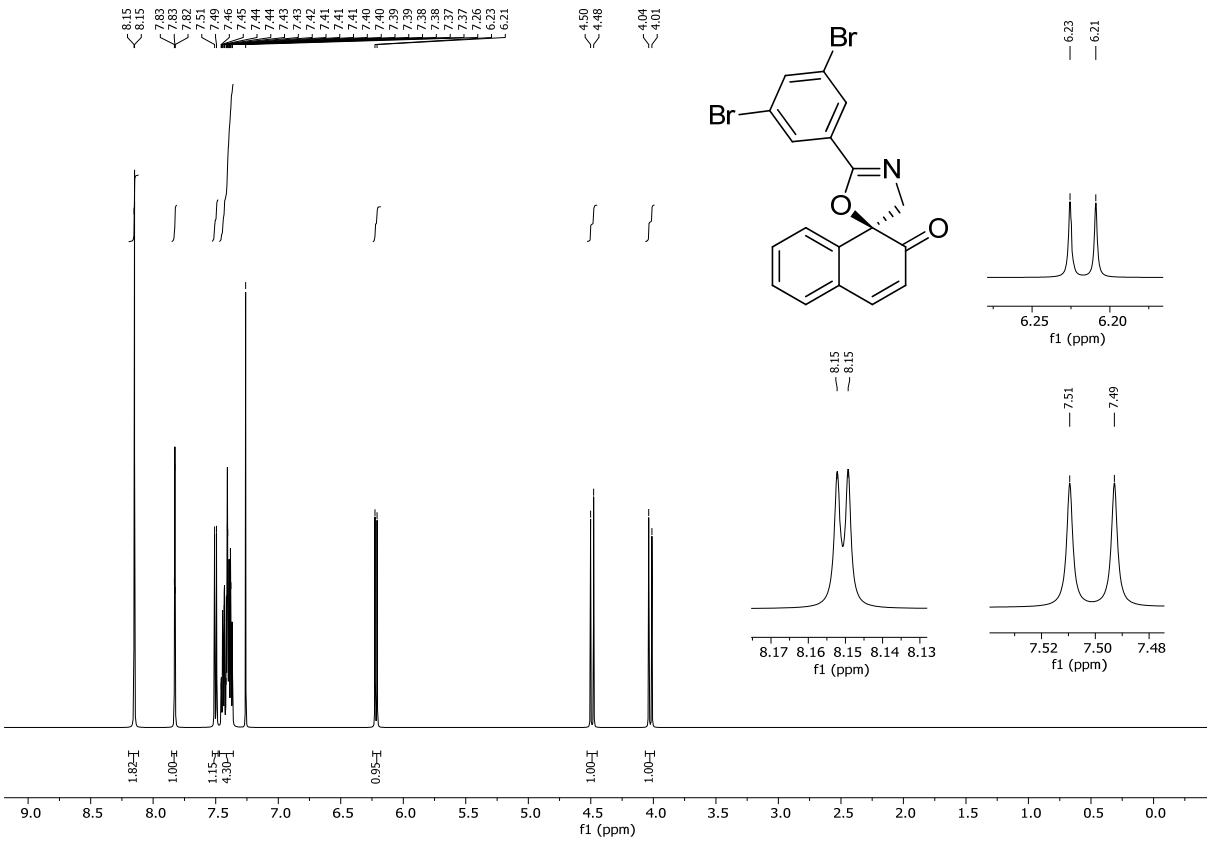


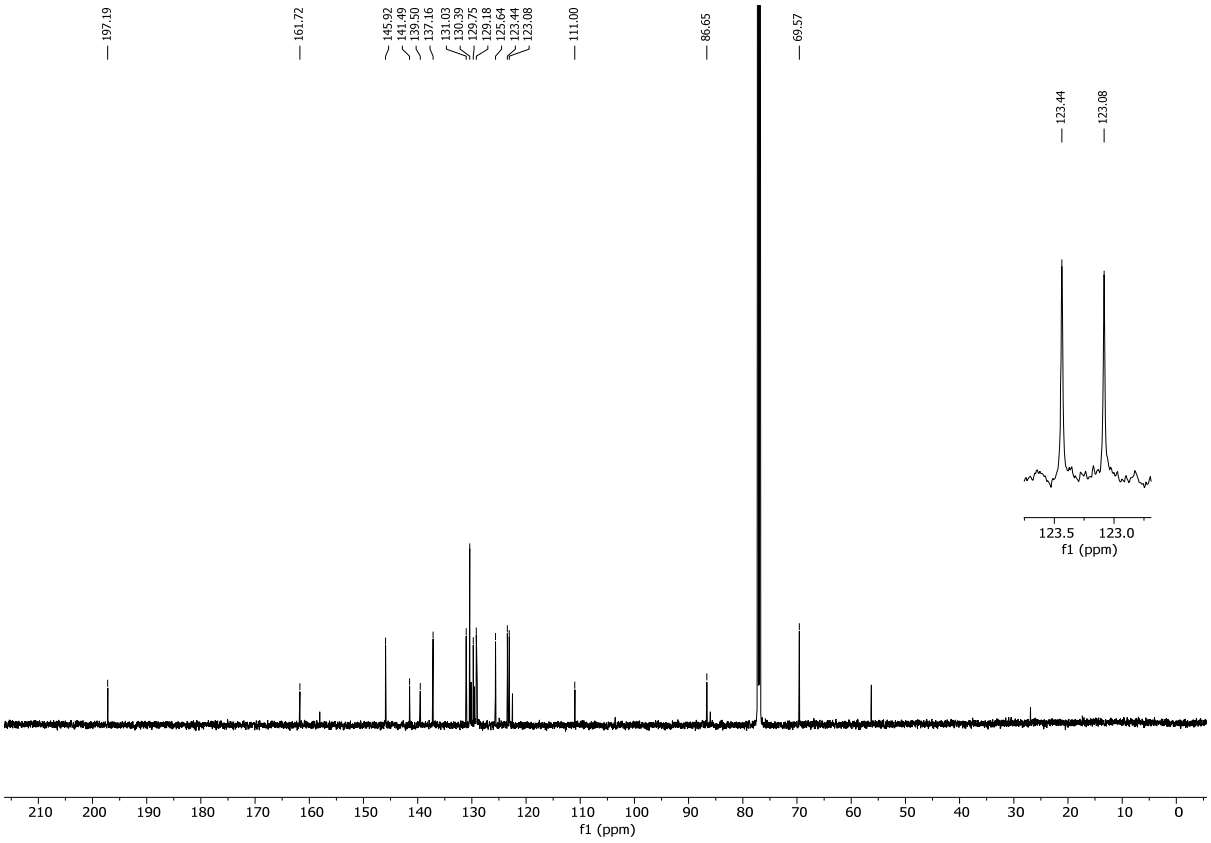
3.43. NMR of (*S*)-2'-(3-bromophenyl)-2*H*,4'*H*-spiro[naphthalene-1,5'-oxazol]-2-one (5l) in $CDCl_3$



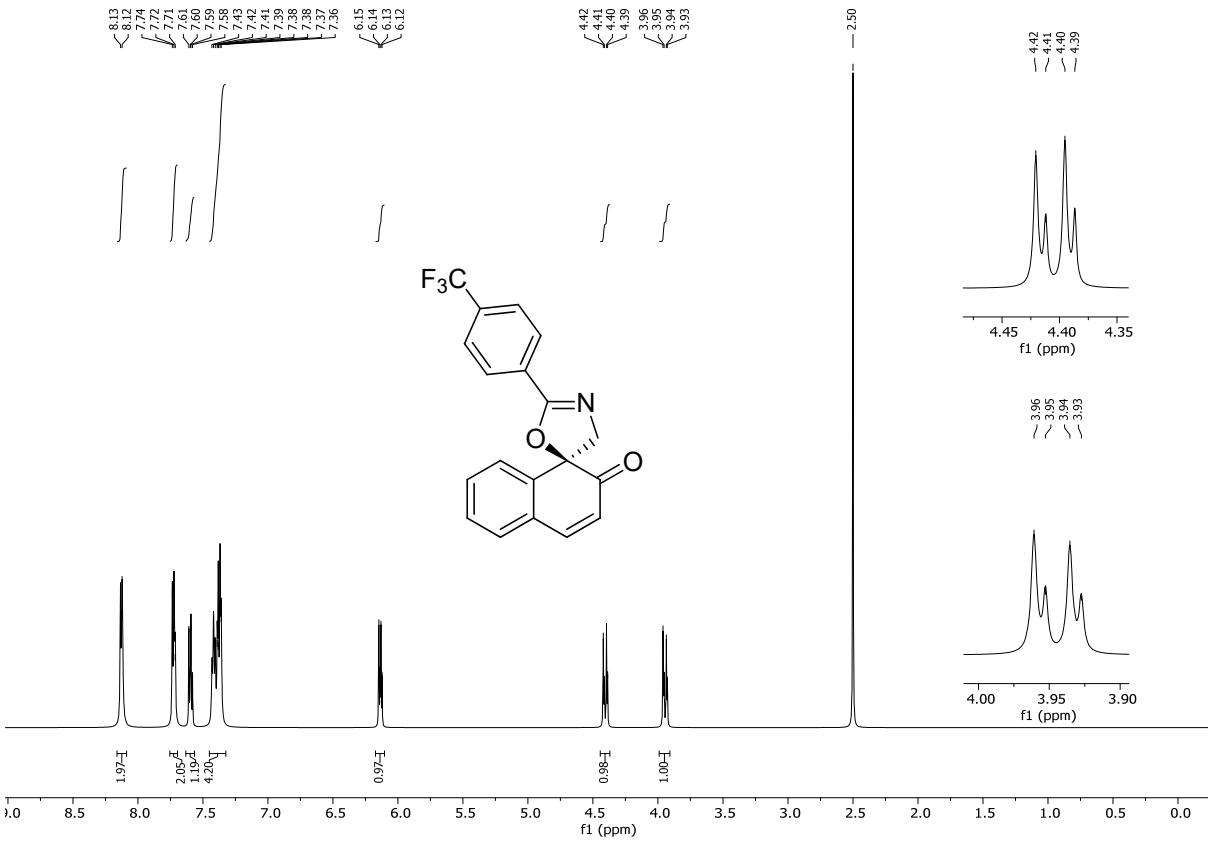


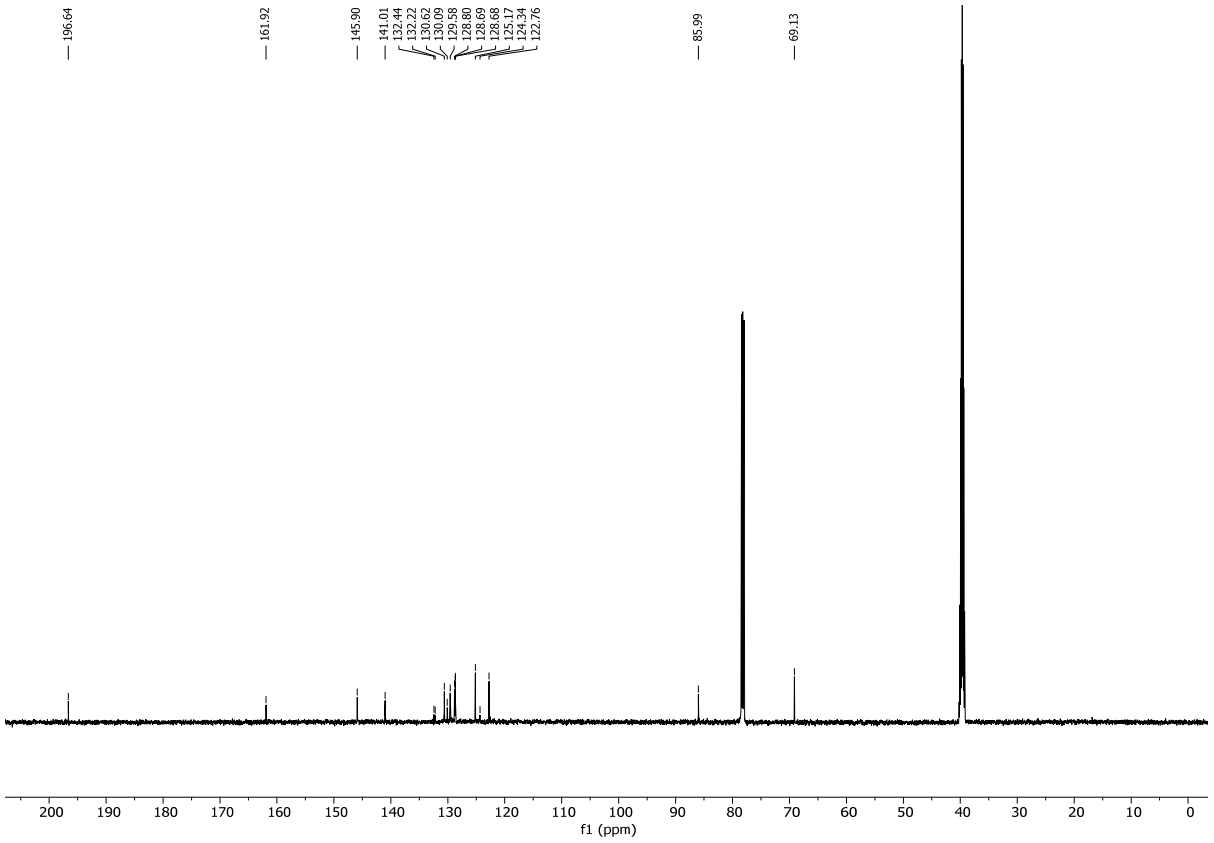
3.44. NMR of (*S*)-2'-(3,5-dibromophenyl)-2*H*,4'*H*-spiro[naphthalene-1,5'-oxazol]-2-one (5m) in $CDCl_3$

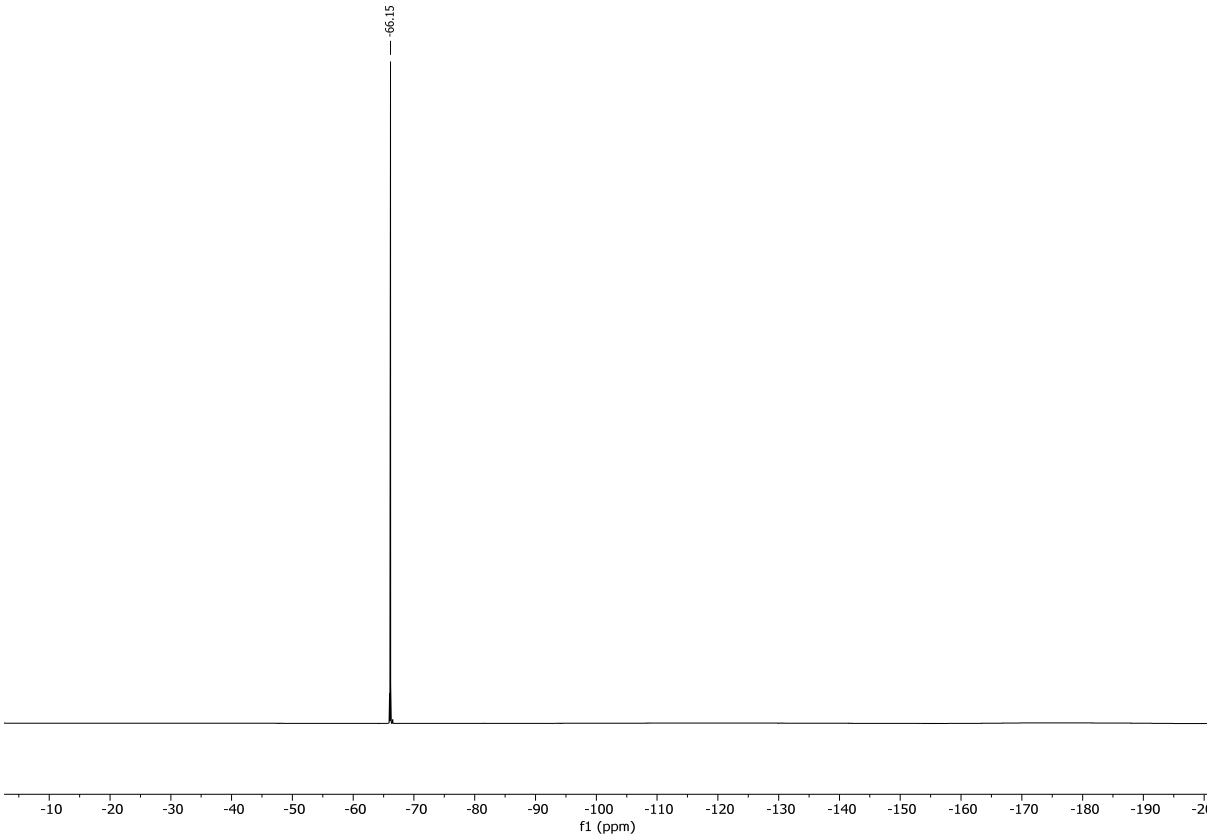




3.45. NMR of (*S*)-2'-(4-(trifluoromethyl)phenyl)-2*H*,4'*H*-spiro[naphth alene - 1,5'-oxazol]-2-one (5n) in $CDCl_3$



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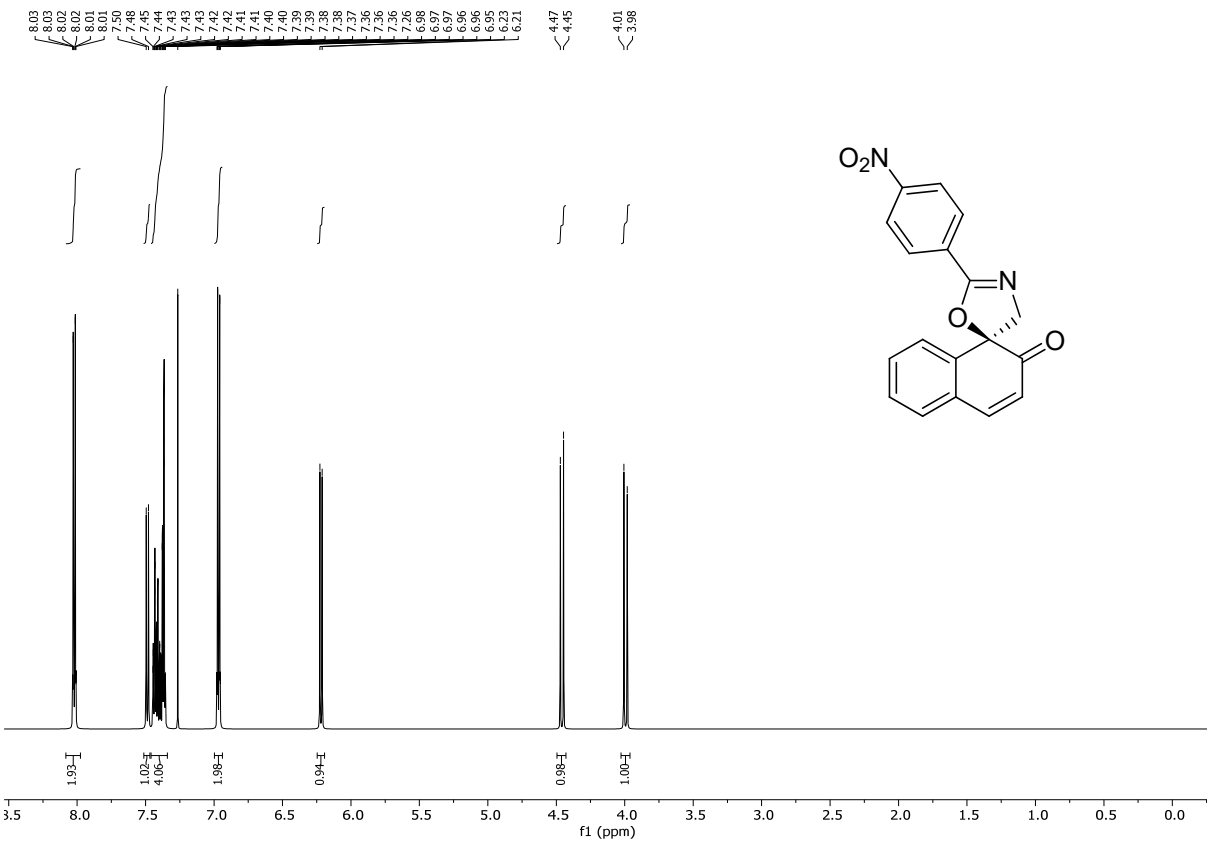
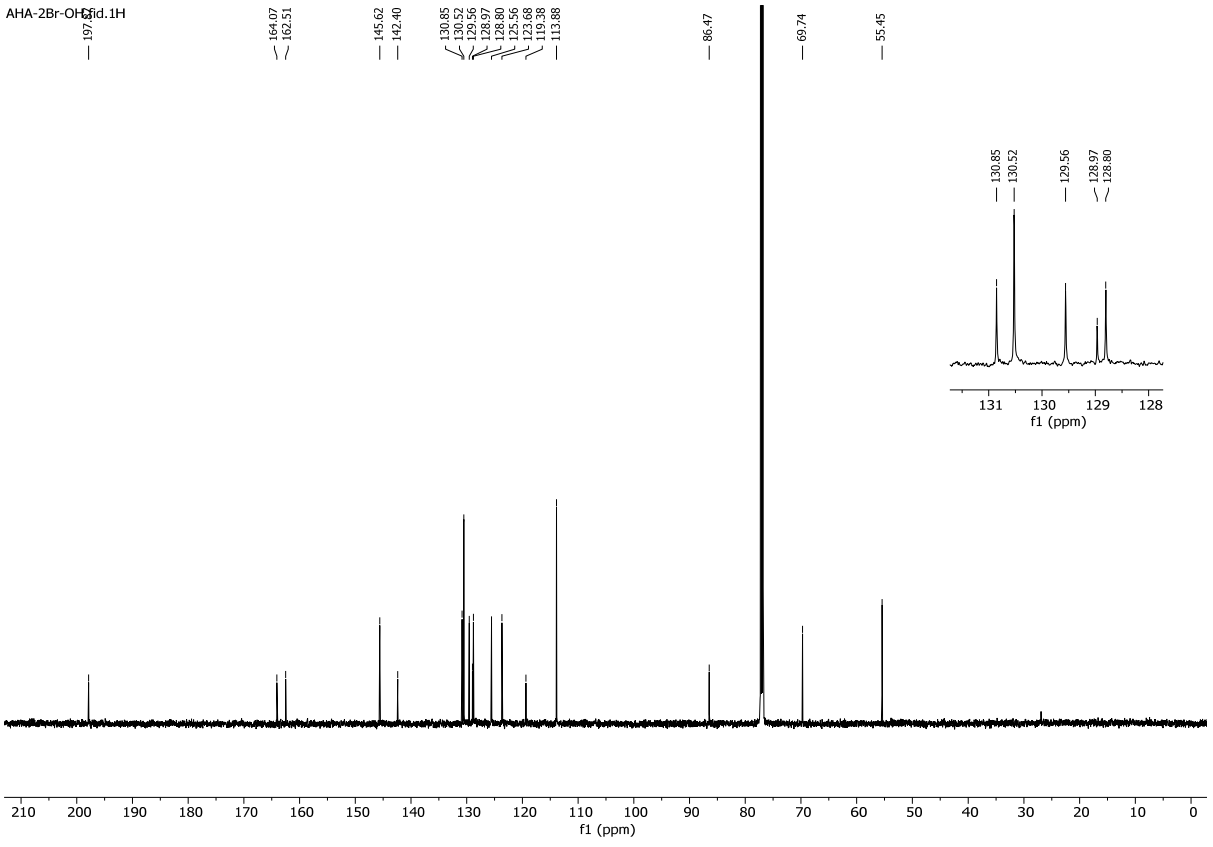
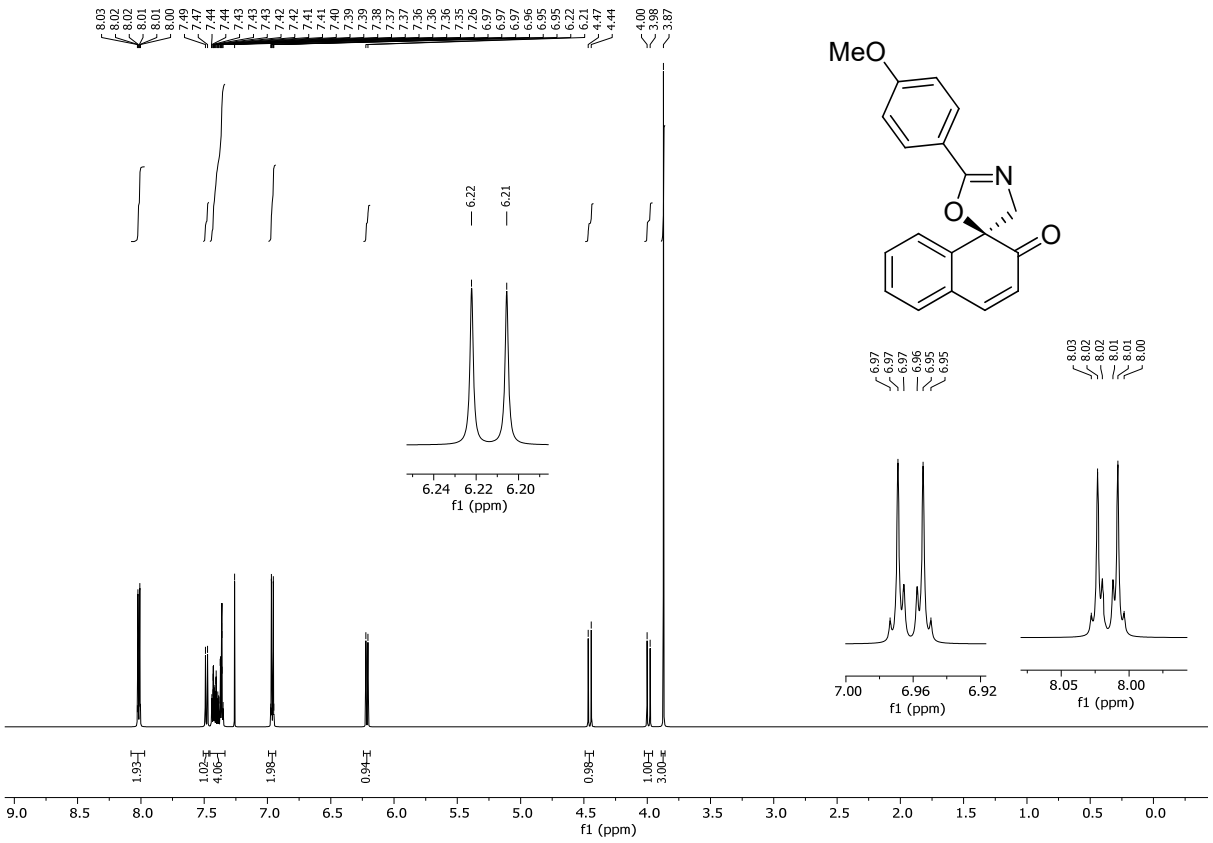
-170
-180
-190
f1 (ppm)

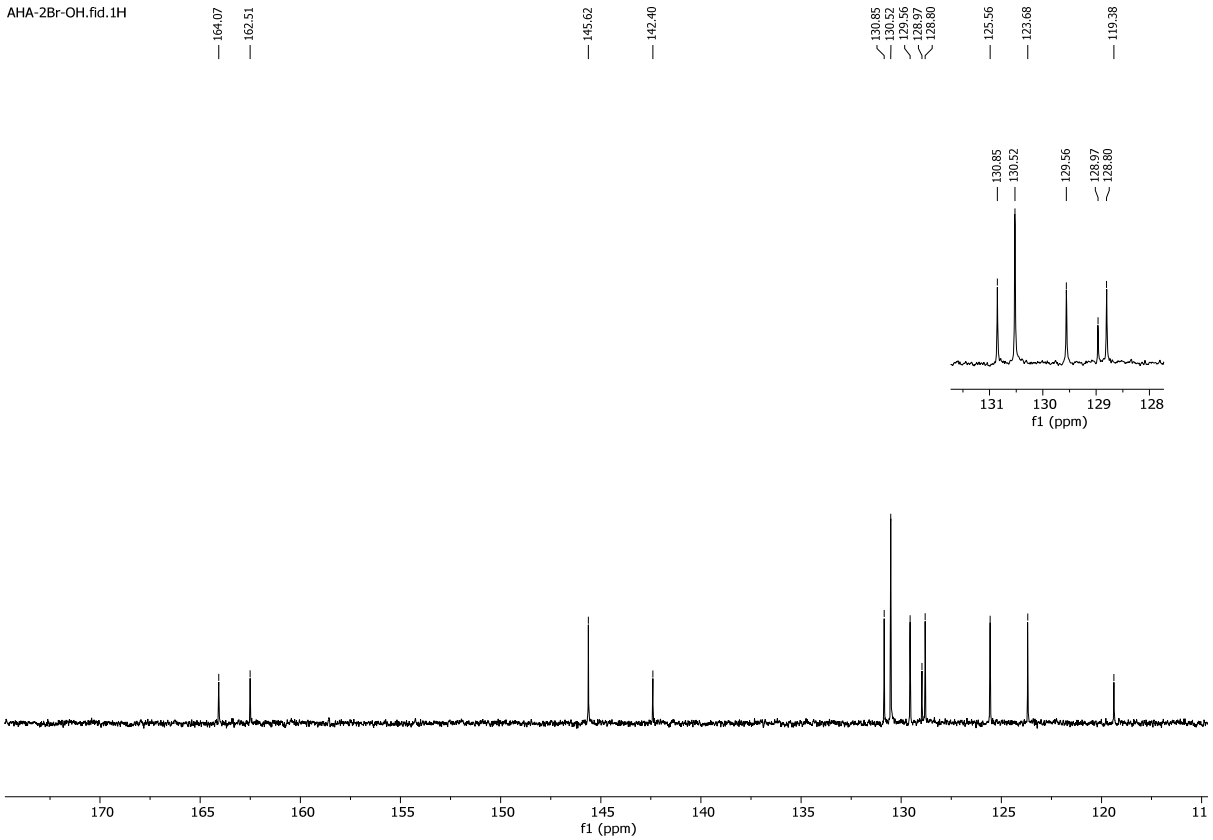
3.46. NMR of (*S*)-2'-(4-nitrophenyl)-2*H*,4'*H*-spiro[naphthalene-1,5'-oxazol]-2-one (5o) in $CDCl_3$



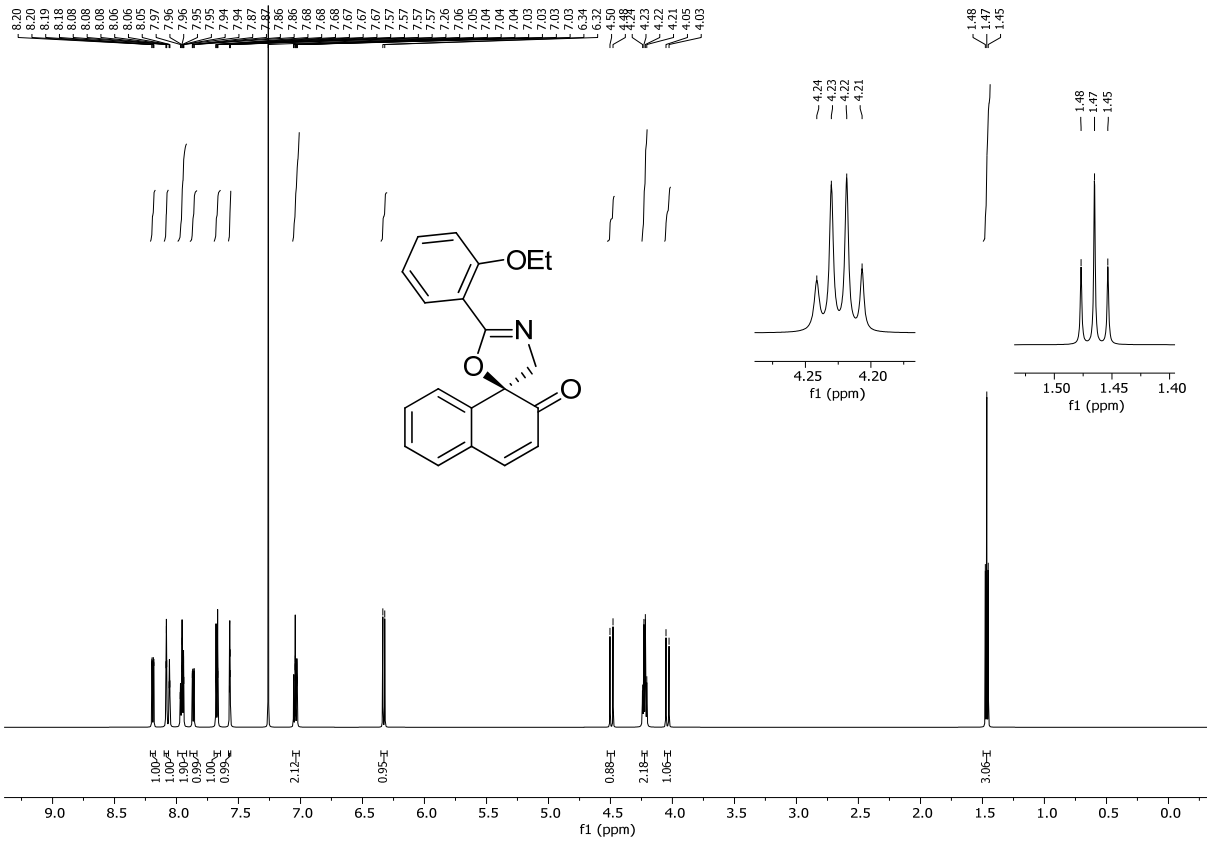


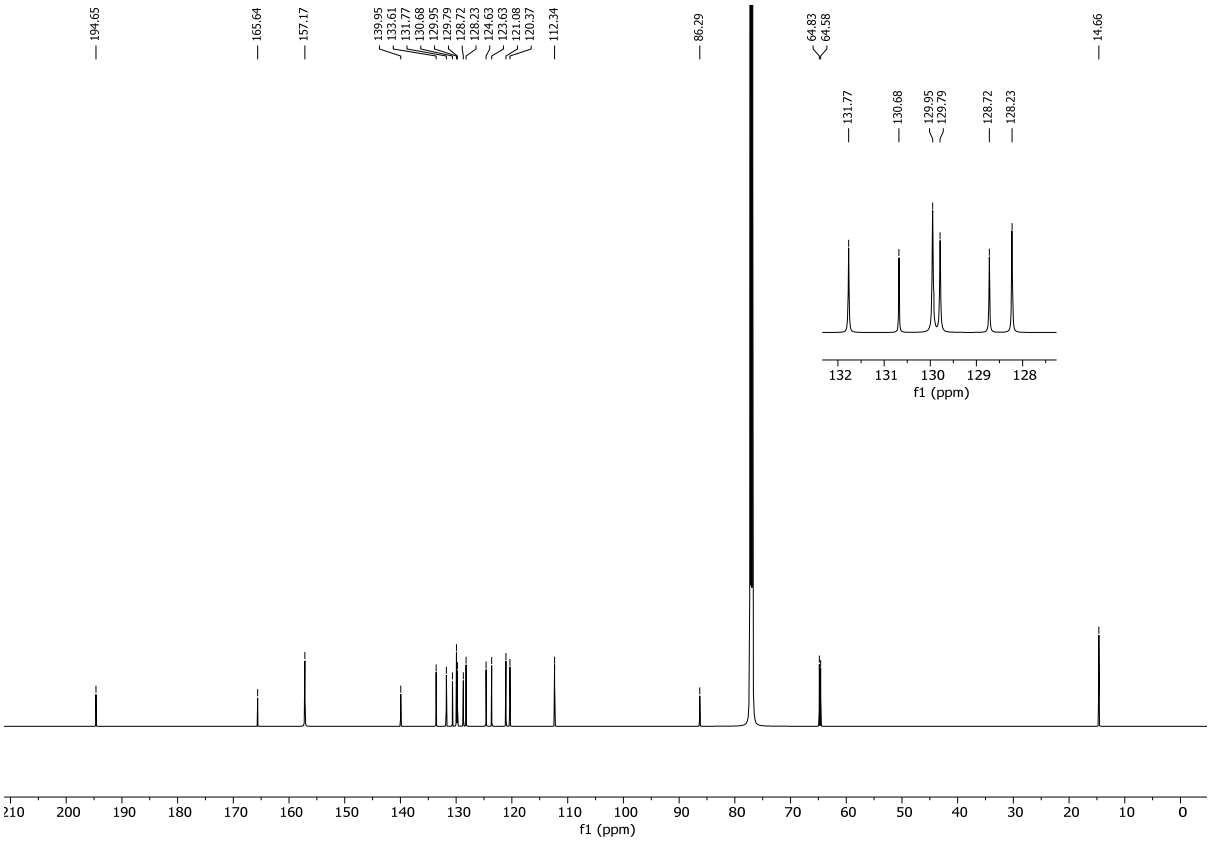
3.47. NMR of (*S*)-2'-(4-methoxyphenyl)-2*H*,4'*H*-spiro[naphthalene-1,5'-oxazol]-2-one (5p) in $CDCl_3$



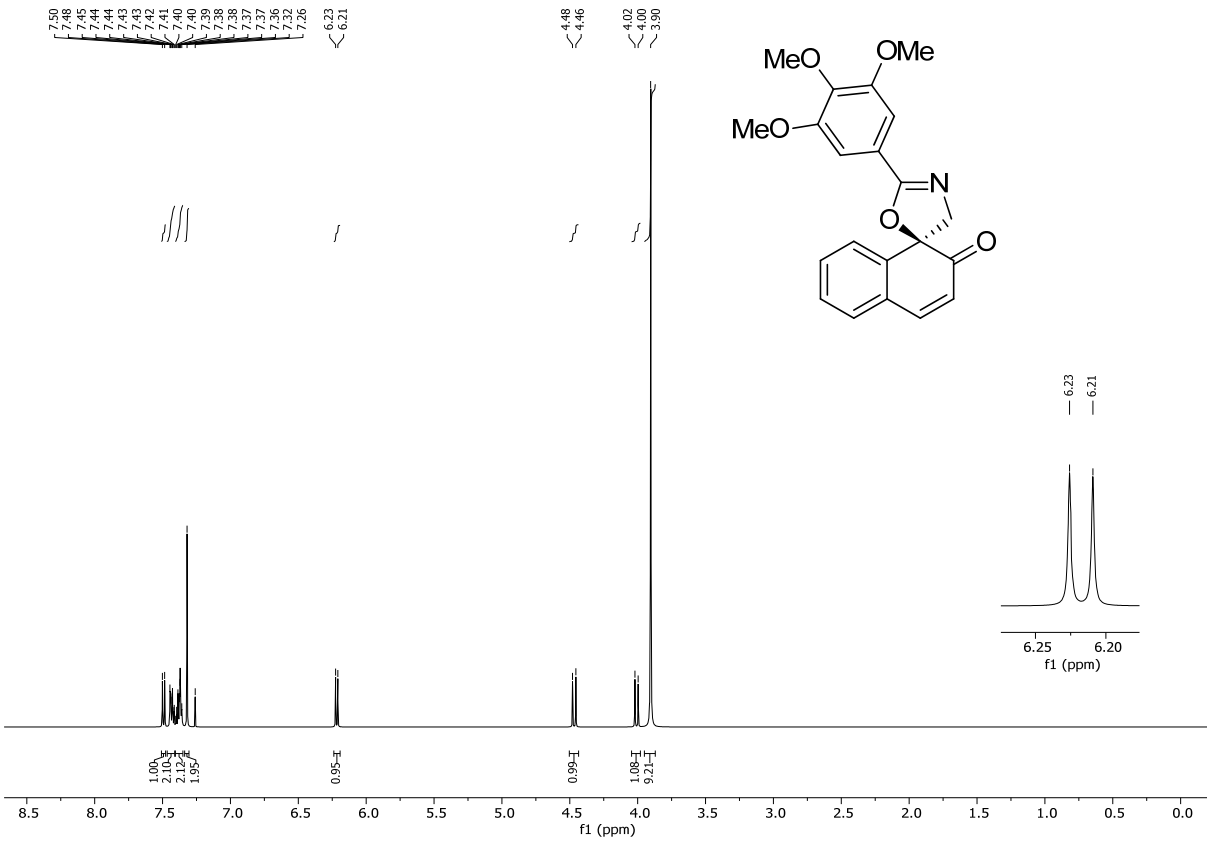


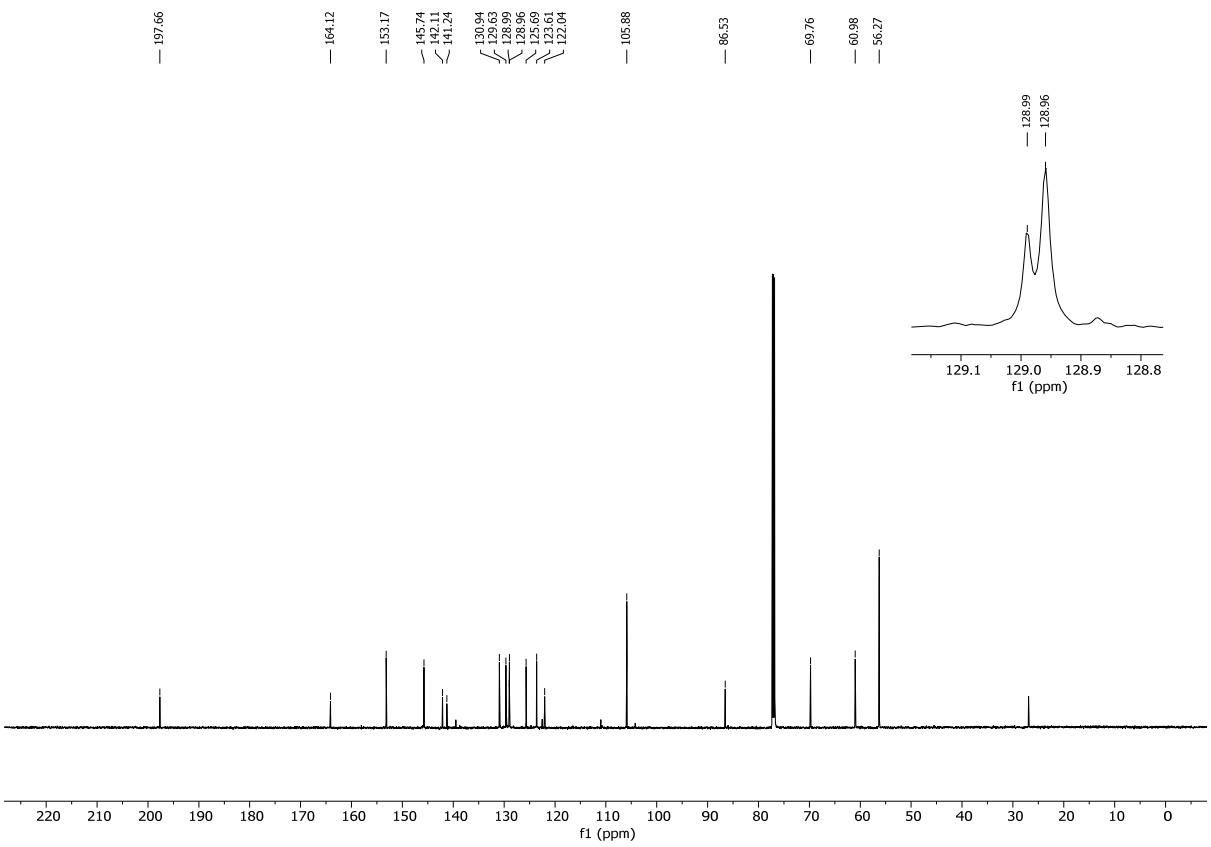
3.48. NMR of (*S*)-2'-(2-ethoxyphenyl)-2*H*,4'*H*-spiro[naphthalene-1,5'-oxazol]-2-one (5q) in $CDCl_3$



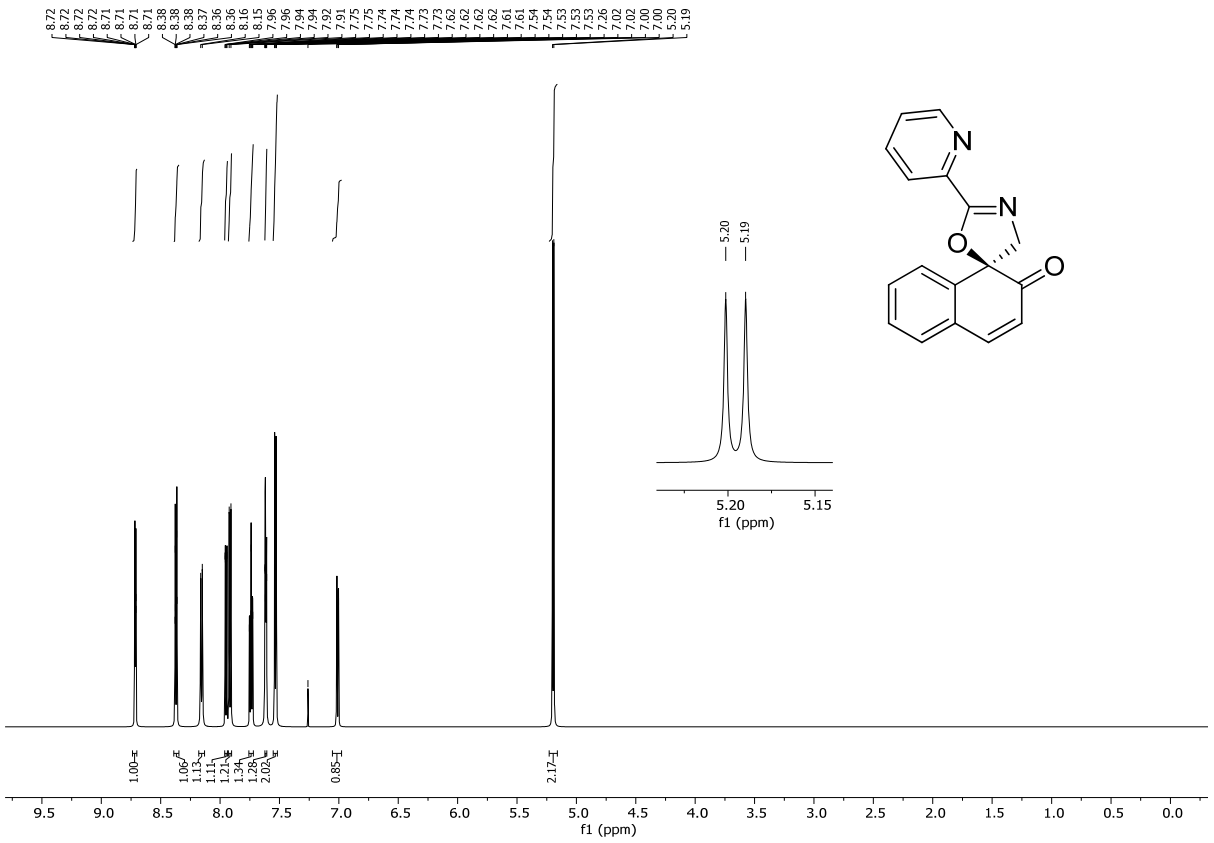


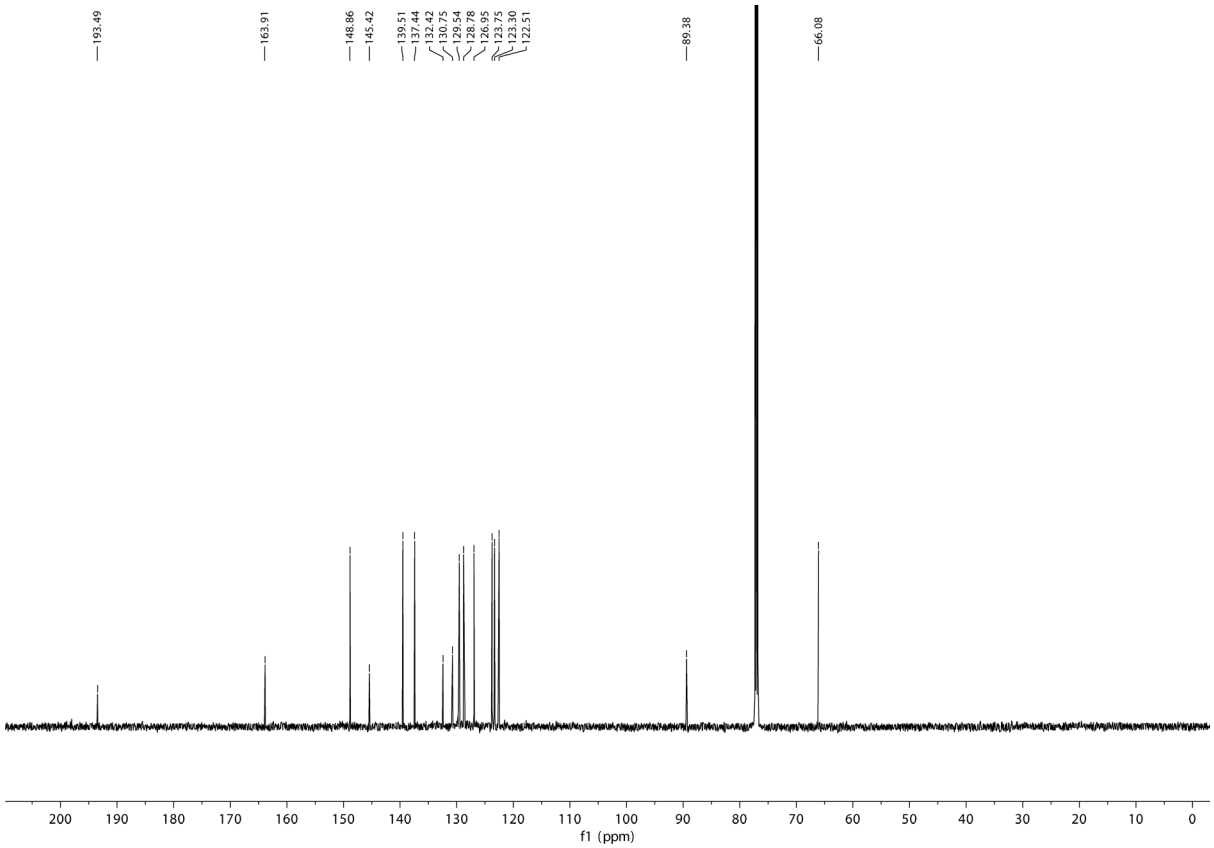
3.49. NMR of (*S*)-2'-(3,4,5-trimethoxyphenyl)-2*H*,4'*H*-spiro[naphthalene-1,5'-oxazol]-2-one (5r) in $CDCl_3$



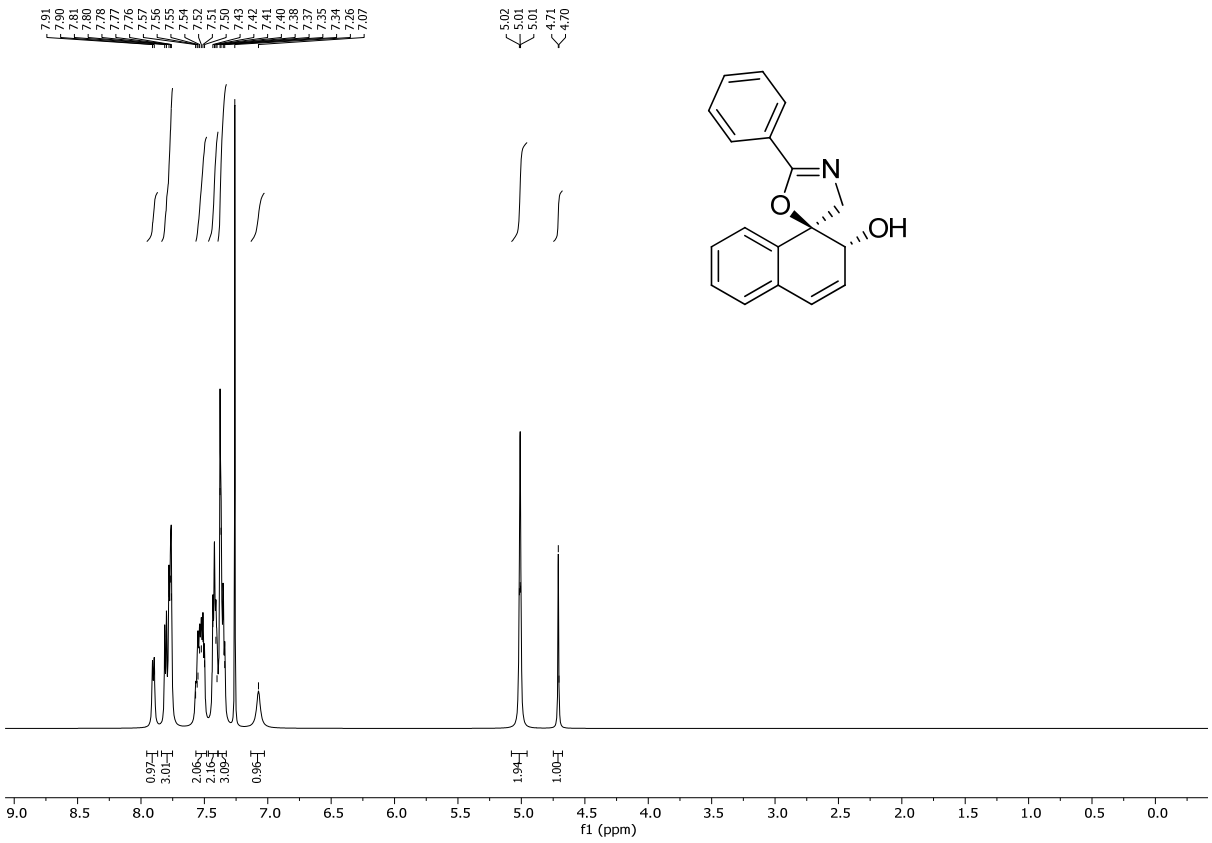


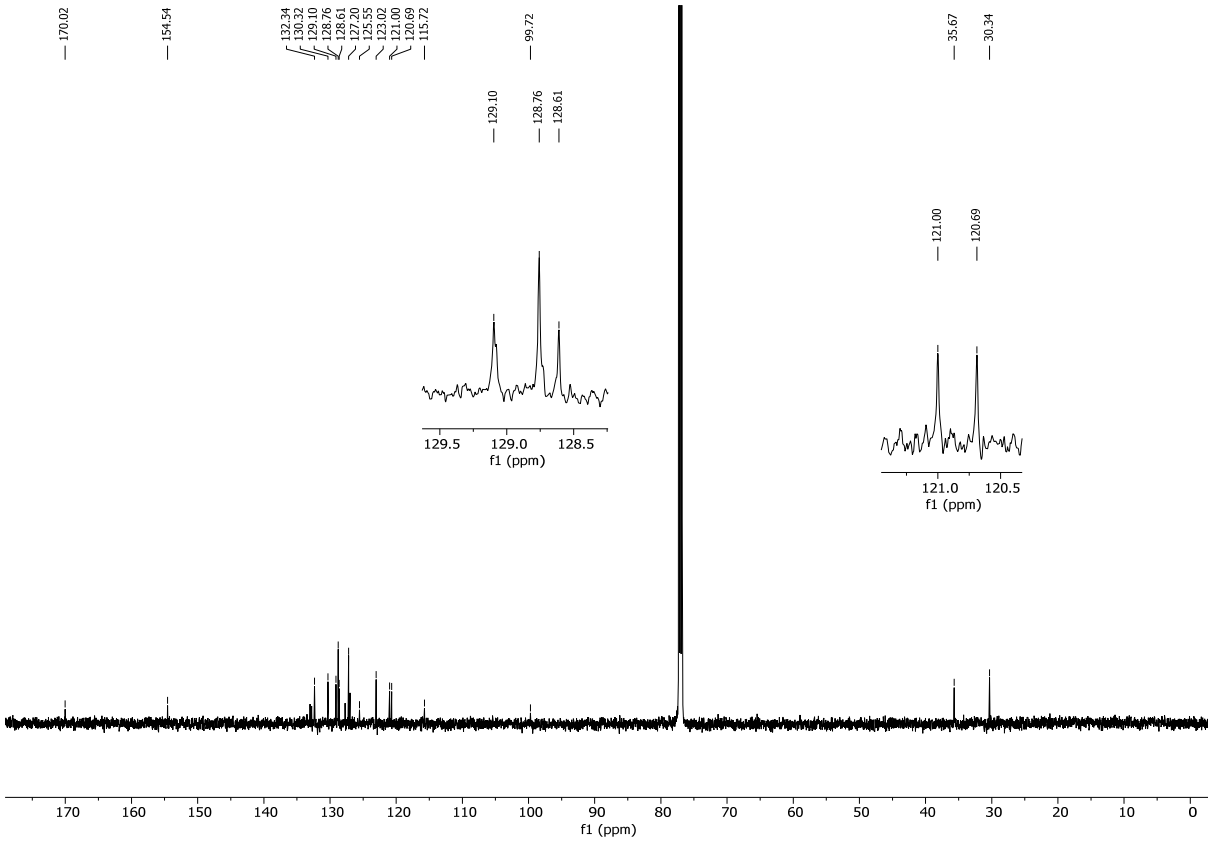
3.50. NMR of (*S*)-2'-(pyridin-2-yl)-2*H*,4'*H*-spiro[naphthalene-1,5'-oxazol]-2-one (5s) in $CDCl_3$



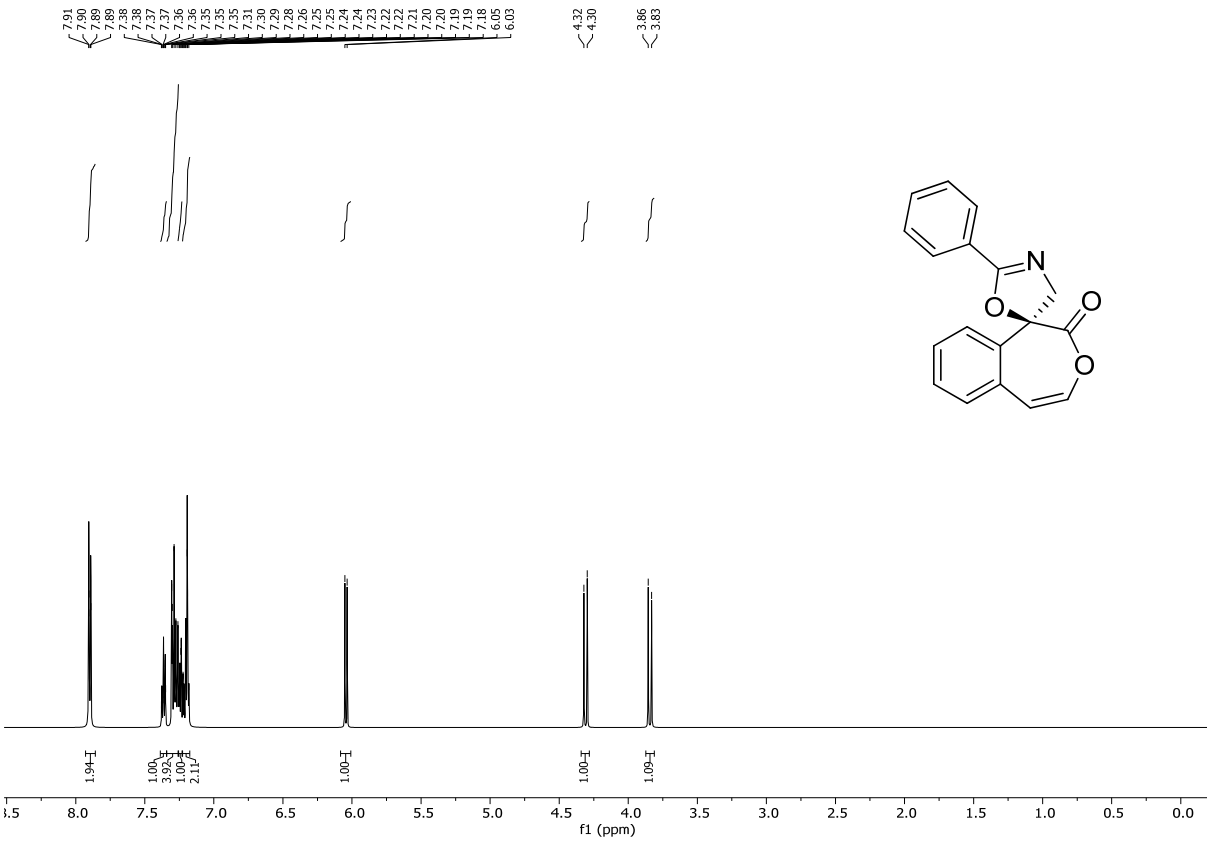


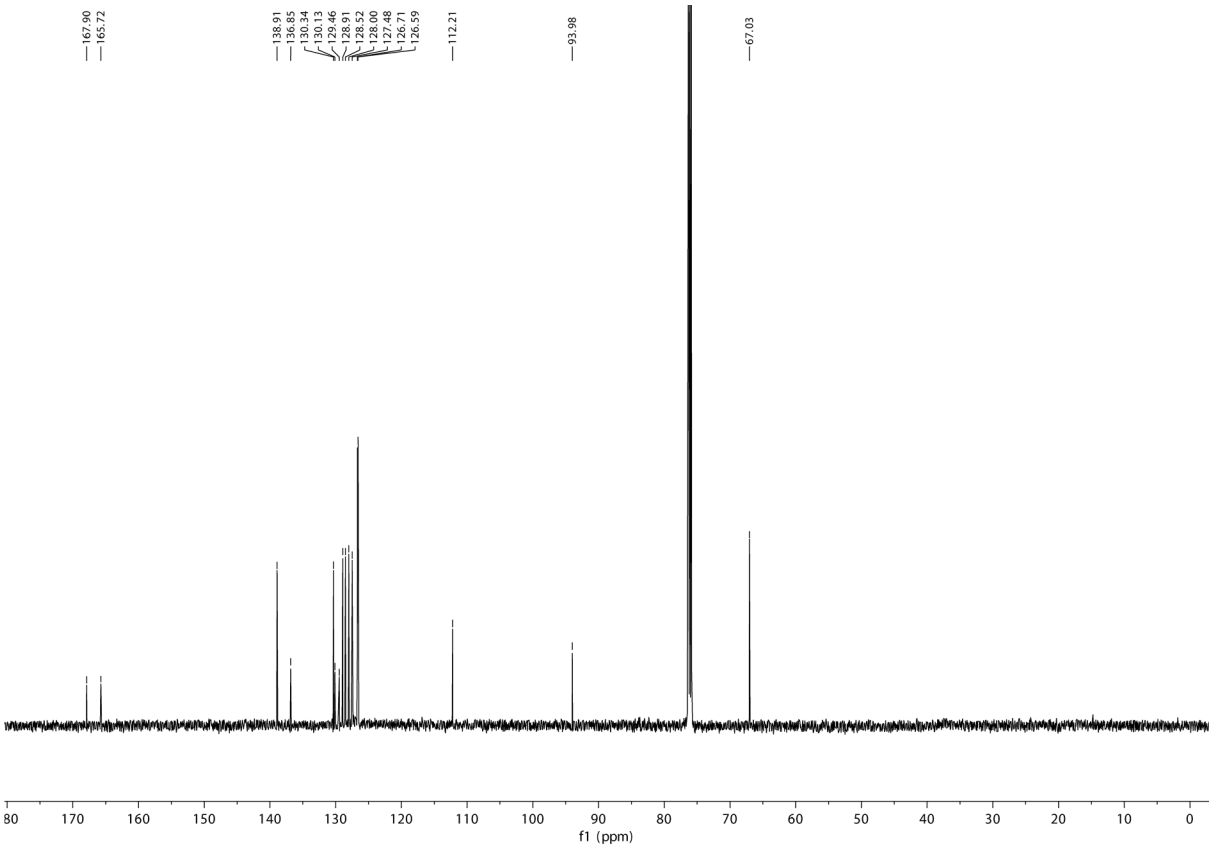
3.51. NMR of (1*S*,2*R*)-2'-phenyl-2*H*,4'*H*-spiro[naphthalene-1,5'-oxazol]-2-ol (7) in $CDCl_3$



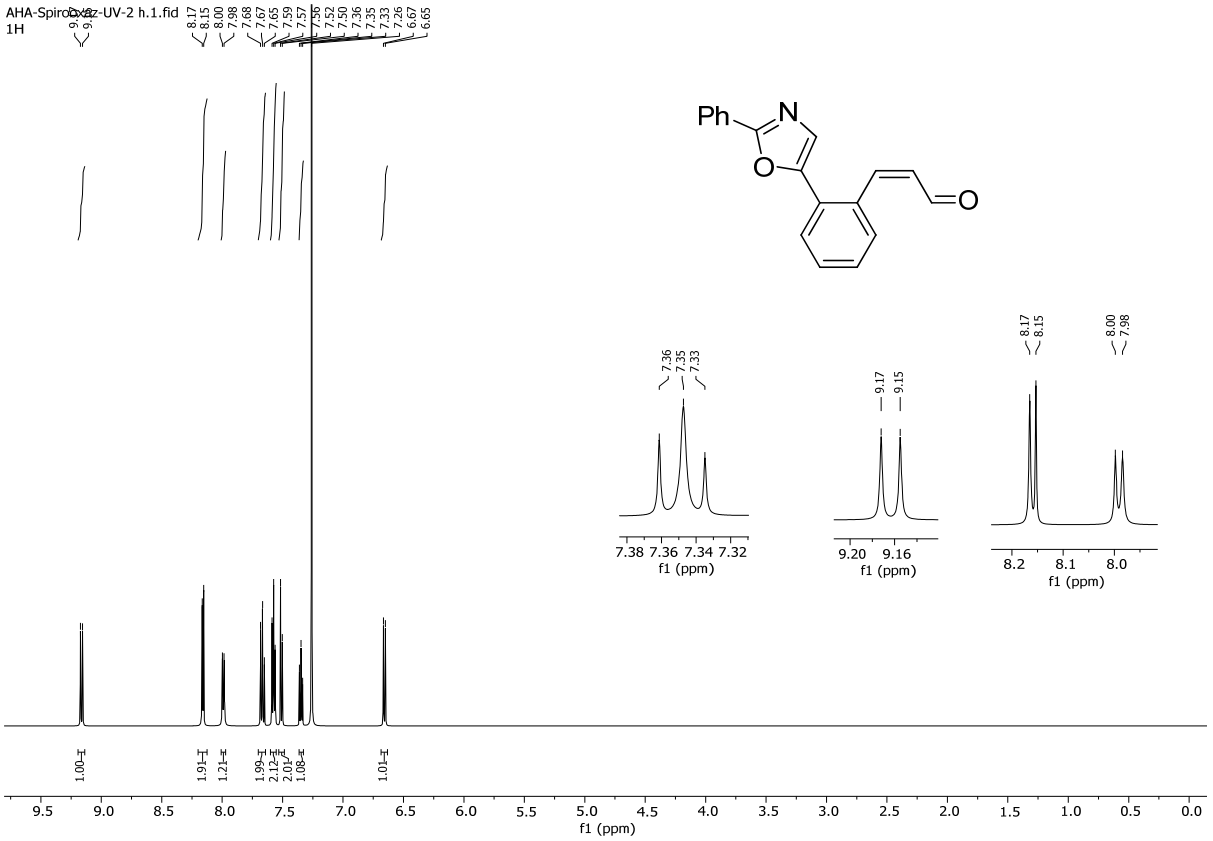


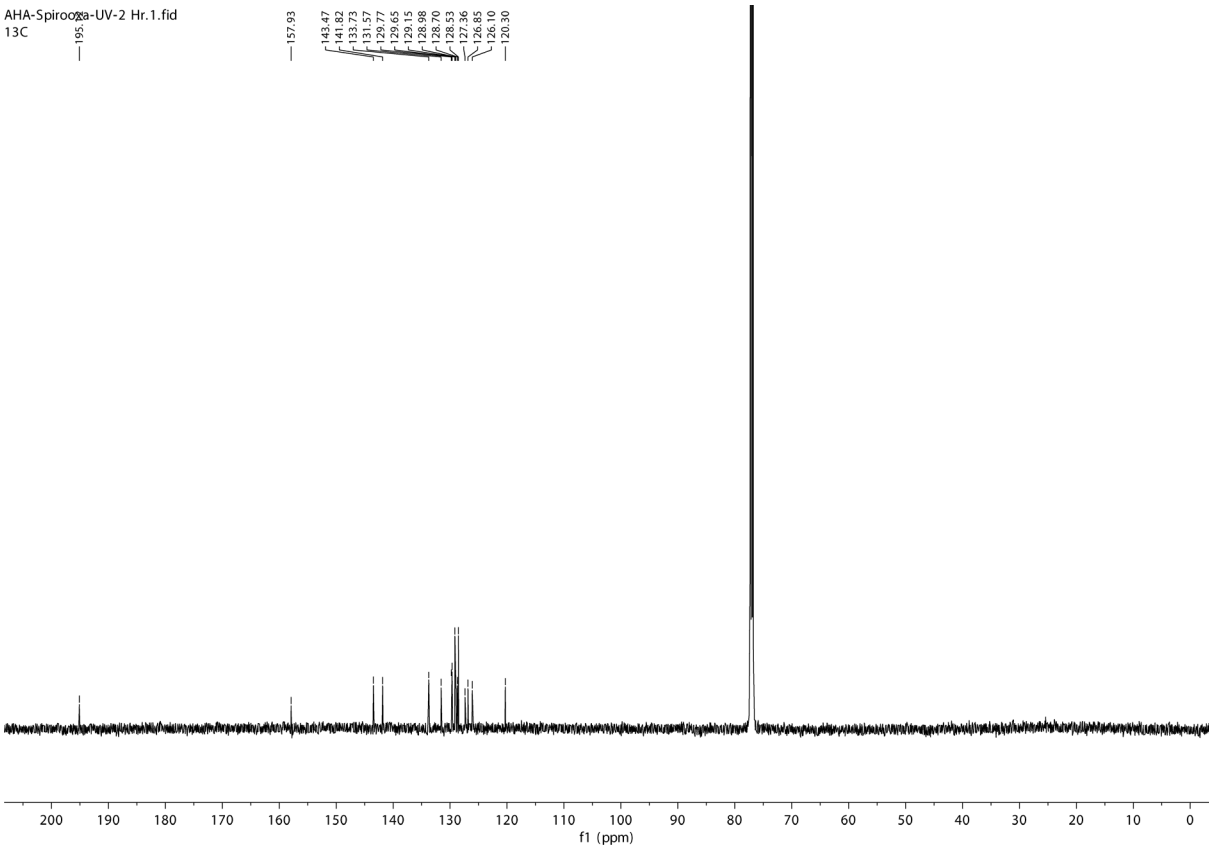
3.52. NMR of (*S*)-2'-phenyl-2*H*,4'*H*-spiro[benzo[d]oxepine-1,5'-oxazol]-2-one (8) in $CDCl_3$





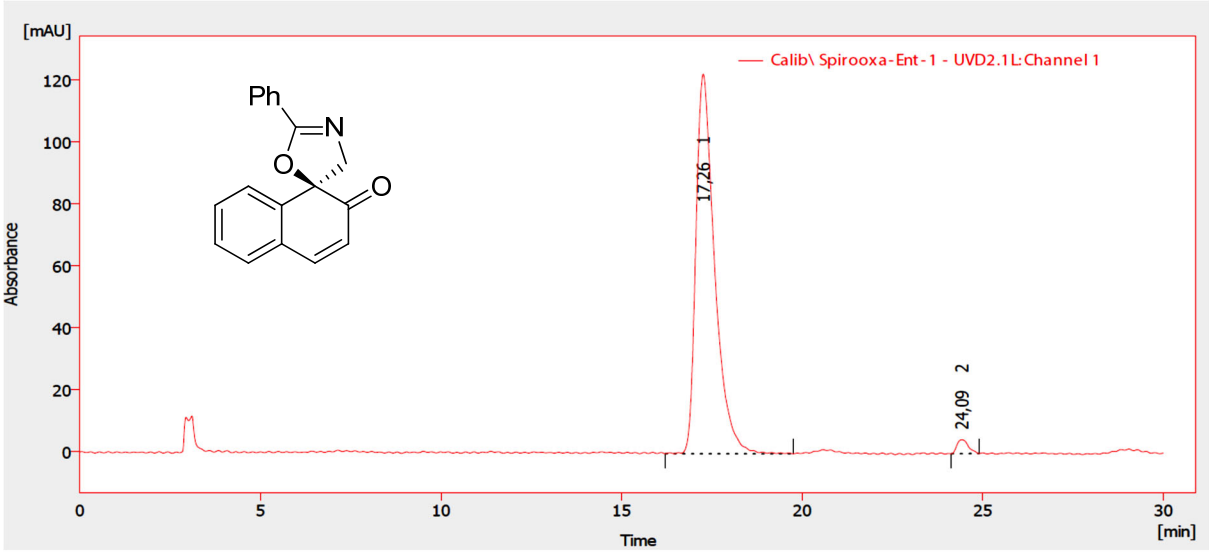
3.53. NMR of (*Z*)-3-(2-(2-phenyloxazol-5-yl)phenyl)acrylaldehyde (9) in $CDCl_3$



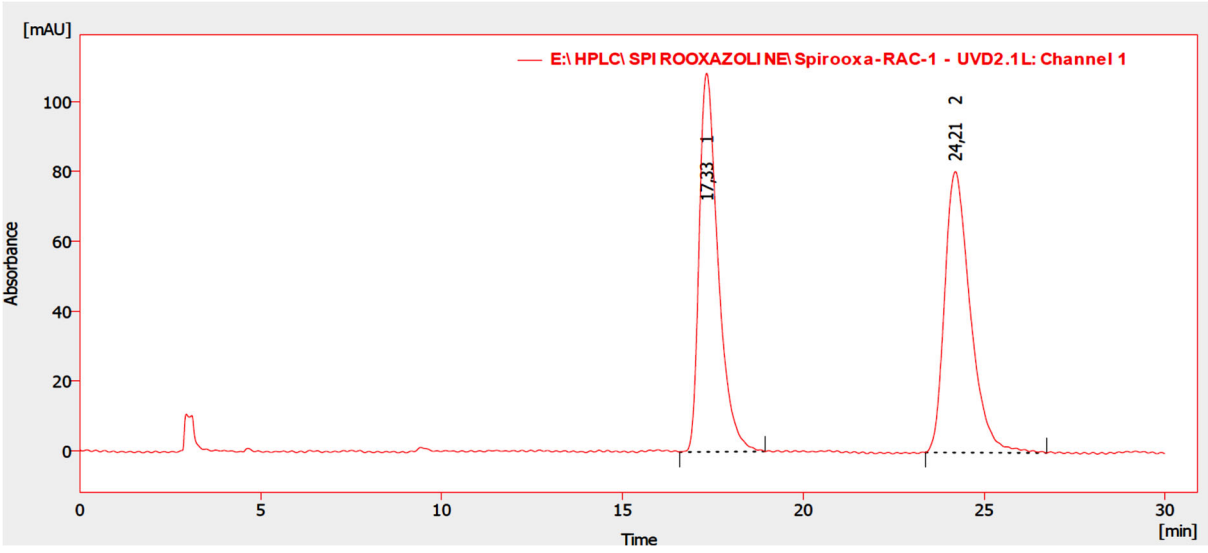


4. HPLC Chromatograms

4.1. HPLC Chromatograms of Compound (5a)

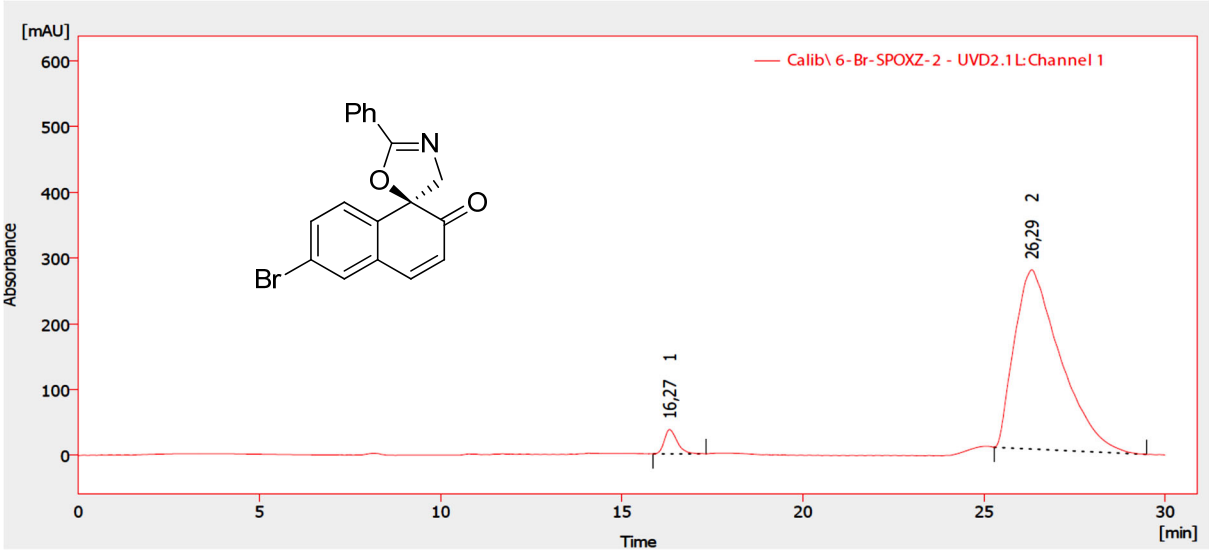


	Reten. Time [min]	Area [mAU.s]	Height [mAU]	Area [%]	Height [%]	W05 [min]	Compound Name
1	17,260	4425,185	122,520	97,8	96,5	0,54	
2	24,093	98,400	4,479	2,2	3,5	0,34	
	Total	4523,584	126,998	100,0	100,0		

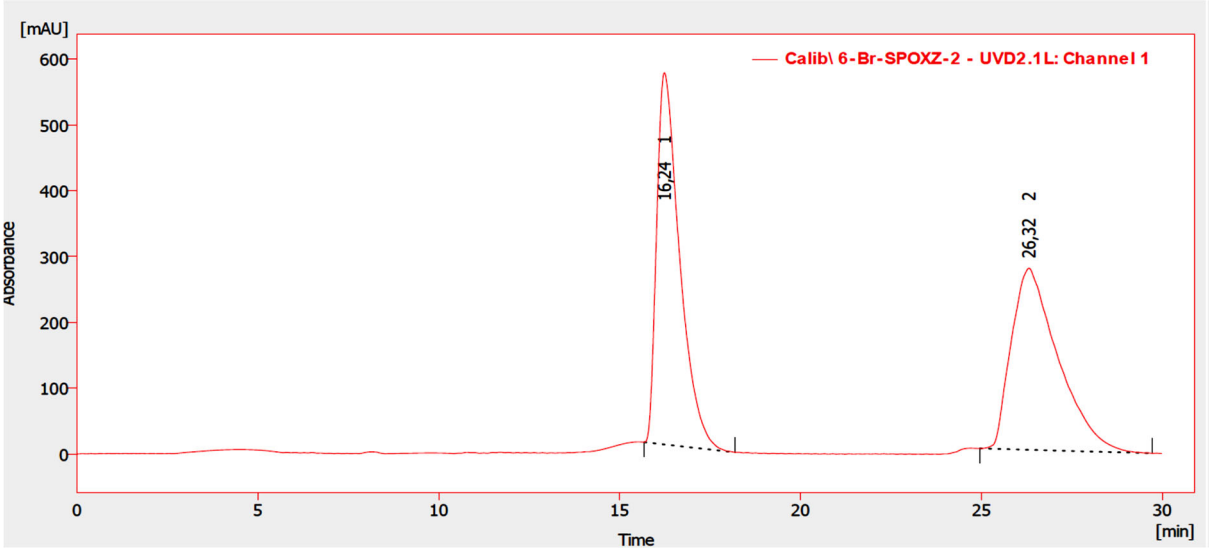


	Reten. Time [min]	Area [mAU.s]	Height [mAU]	Area [%]	Height [%]	W05 [min]	Compound Name
1	17,330	3930,622	108,320	49,7	57,4	0,54	
2	24,207	3972,113	80,415	50,3	42,6	0,74	
	Total	7902,735	188,734	100,0	100,0		

4.2. HPLC Chromatograms of Compound (5b)

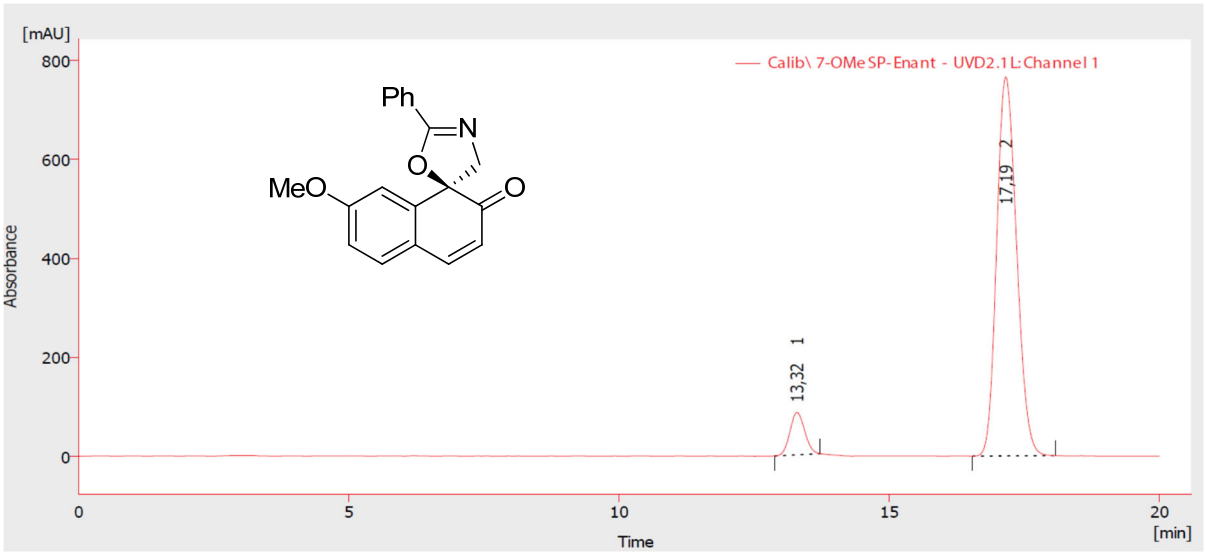


	Reten. Time [min]	Area [mAU.s]	Height [mAU]	Area [%]	Height [%]	W05 [min]	Compound Name
1	16,268	909,205	36,895	3,6	11,9	0,37	
2	26,287	24154,894	272,556	96,4	88,1	1,37	
	Total	25064,099	309,451	100,0	100,0		

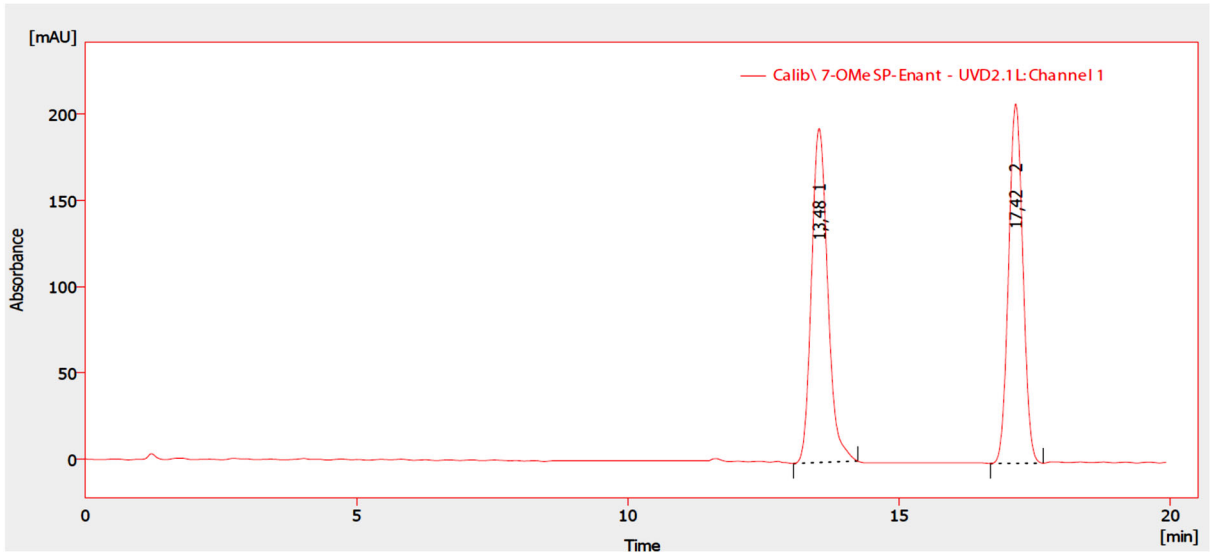


	Reten. Time [min]	Area [mAU.s]	Height [mAU]	Area [%]	Height [%]	W05 [min]	Compound Name
1	16,240	24981,599	564,890	50,2	67,2	0,67	
2	26,317	24760,345	276,015	49,8	32,8	1,38	
	Total	49741,944	840,906	100,0	100,0		

4.3. HPLC Chromatograms of Compound (5c)

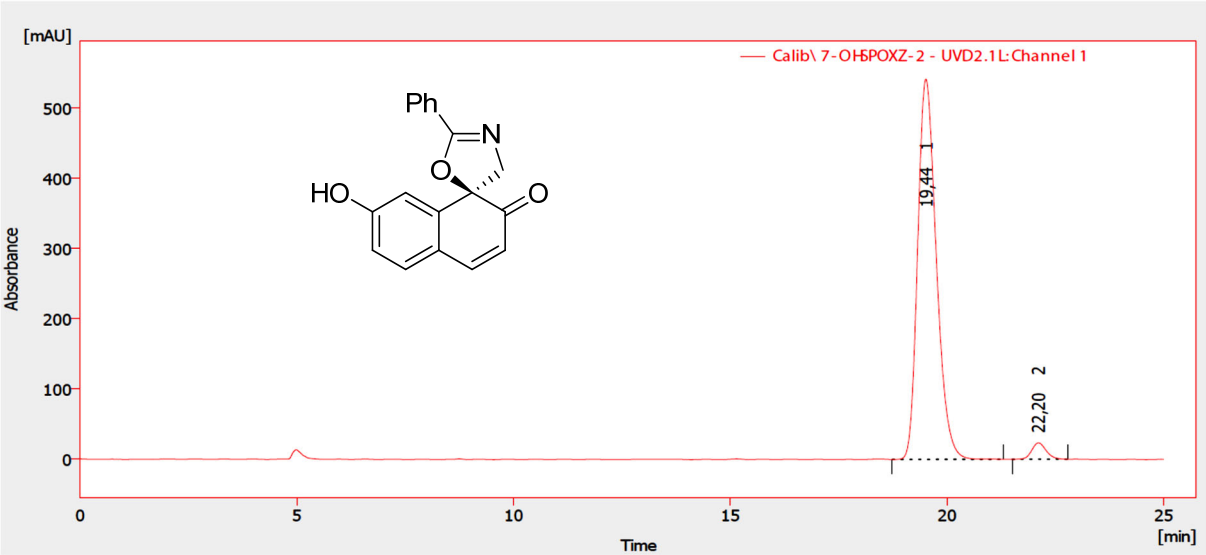


	Reten. Time [min]	Area [mAU.s]	Height [mAU]	Area [%]	Height [%]	W05 [min]	Compound Name
1	13,317	1592,499	89,206	7,8	10,3	0,30	
2	17,193	18824,158	776,876	92,2	89,7	0,41	
	Total	20416,657	866,082	100,0	100,0		

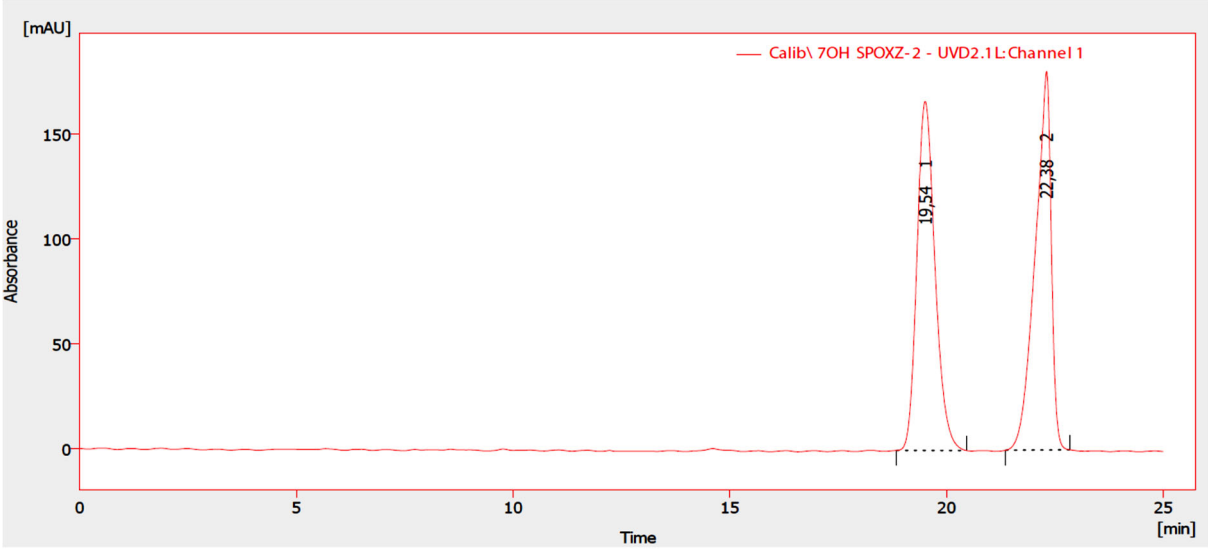


	Reten. Time [min]	Area [mAU.s]	Height [mAU]	Area [%]	Height [%]	W05 [min]	Compound Name
1	13,482	4135,212	196,249	50,9	48,0	0,32	
2	17,417	3988,977	212,604	49,1	52,0	0,29	
	Total	8124,189	408,853	100,0	100,0		

4.4. HPLC Chromatograms of Compound (5d)

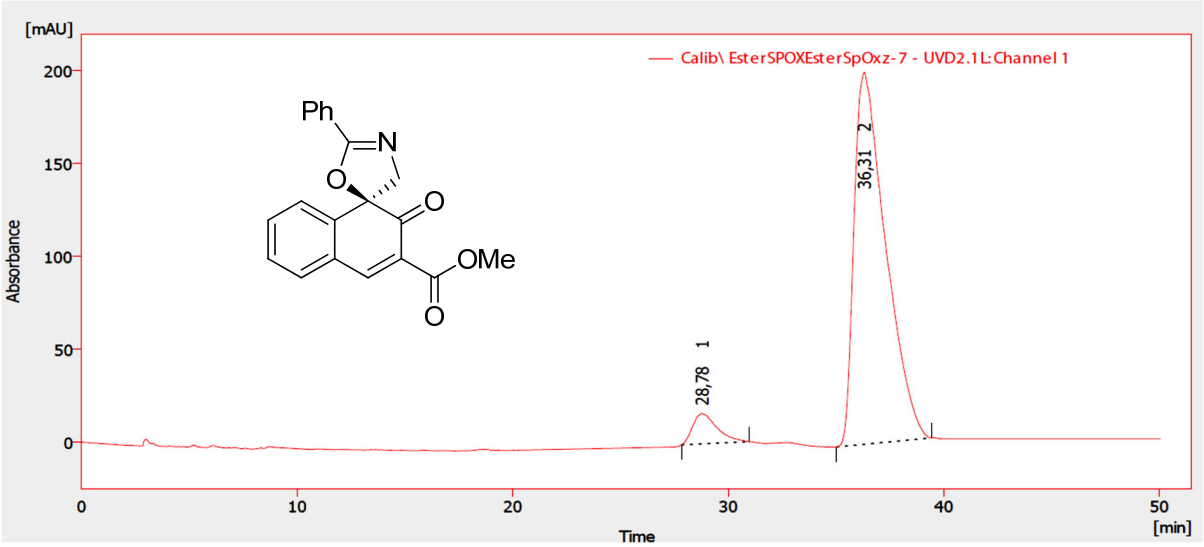


	Reten. Time [min]	Area [mAU.s]	Height [mAU]	Area [%]	Height [%]	W05 [min]	Compound Name
1	19,438	12950,030	548,207	96,6	95,8	0,46	
2	22,204	455,798	24,034	3,4	4,2	0,35	
	Total	13405,828	572,241	100,0	100,0		

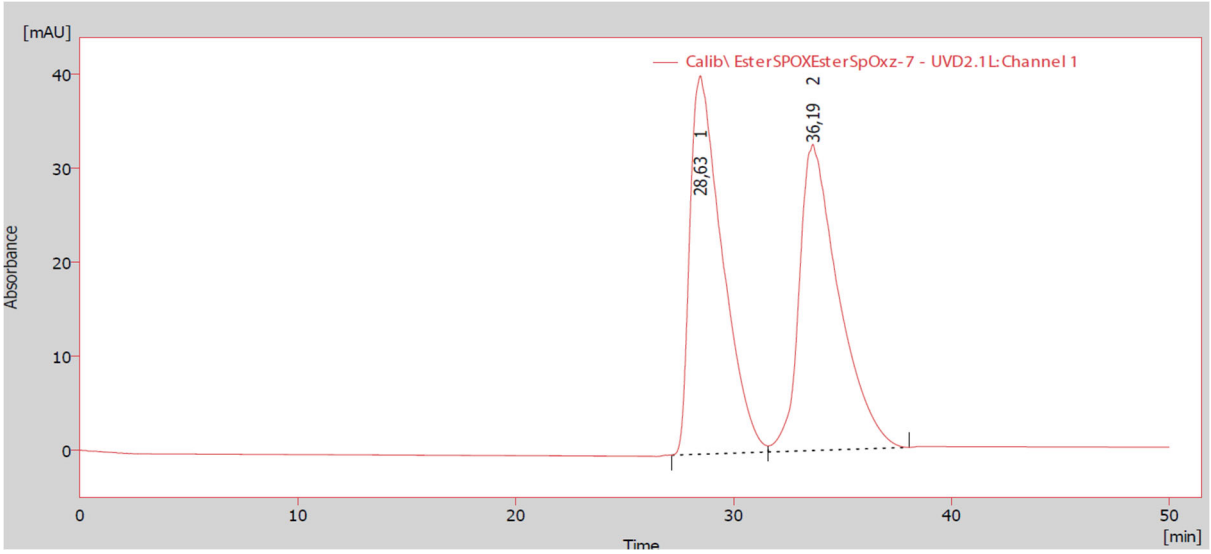


	Reten. Time [min]	Area [mAU.s]	Height [mAU]	Area [%]	Height [%]	W05 [min]	Compound Name
1	19,537	4431,821	174,797	50,7	48,5	0,47	
2	22,377	4309,444	185,610	49,3	51,5	0,41	
	Total	8741,265	360,407	100,0	100,0		

4.5. HPLC Chromatograms of Compound (5e)

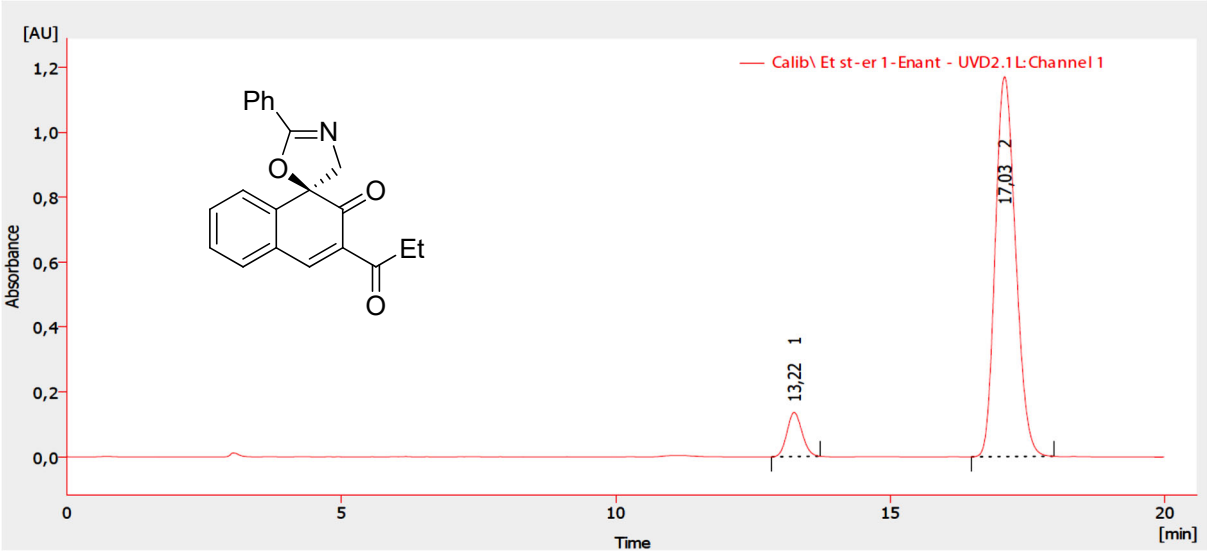


	Reten. Time [min]	Area [mAU.s]	Height [mAU]	Area [%]	Height [%]	W05 [min]	Compound Name
1	28,783	256,94	18,267	5,9	8,3	1,23	
2	36,310	4074,1	201,054	94,1	91,7	1,60	
	Total	4331,07	219,321	100,0	100,0		

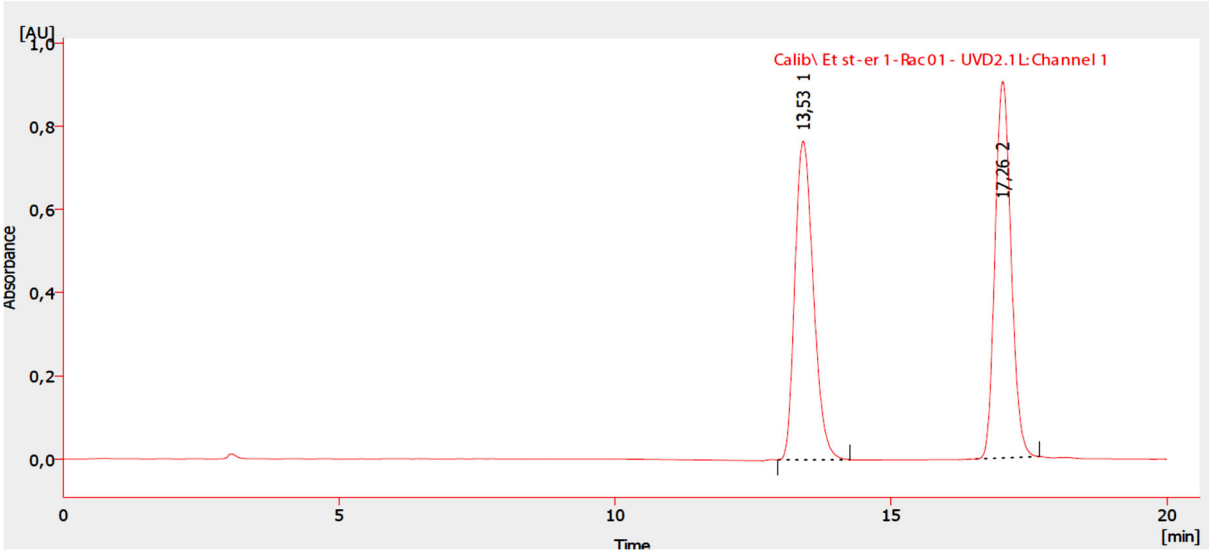


	Reten. Time [min]	Area [mAU.s]	Height [mAU]	Area [%]	Height [%]	W05 [min]	Compound Name
1	28,630	4160,653	40,246	50,2	55,3	1,60	
2	36,193	4130,122	32,570	49,8	44,7	1,87	
	Total	8290,774	72,815	100,0	100,0		

4.6. HPLC Chromatograms of Compound (5f)

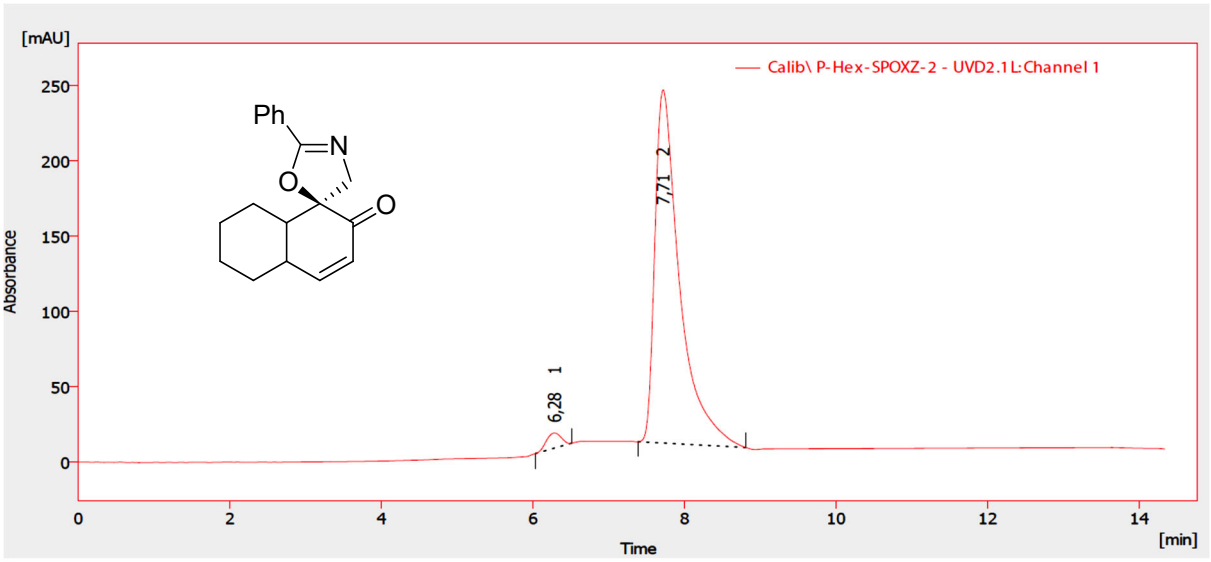


	Reten. Time [min]	Area [mAU.s]	Height [mAU]	Area [%]	Height [%]	W05 [min]	Compound Name
1	13,221	2328,065	135,243	8,1	10,3	0,30	
2	17,033	26413,482	1177,799	91,9	89,7	0,41	
	Total	28741,547	1313,042	100,0	100,0		

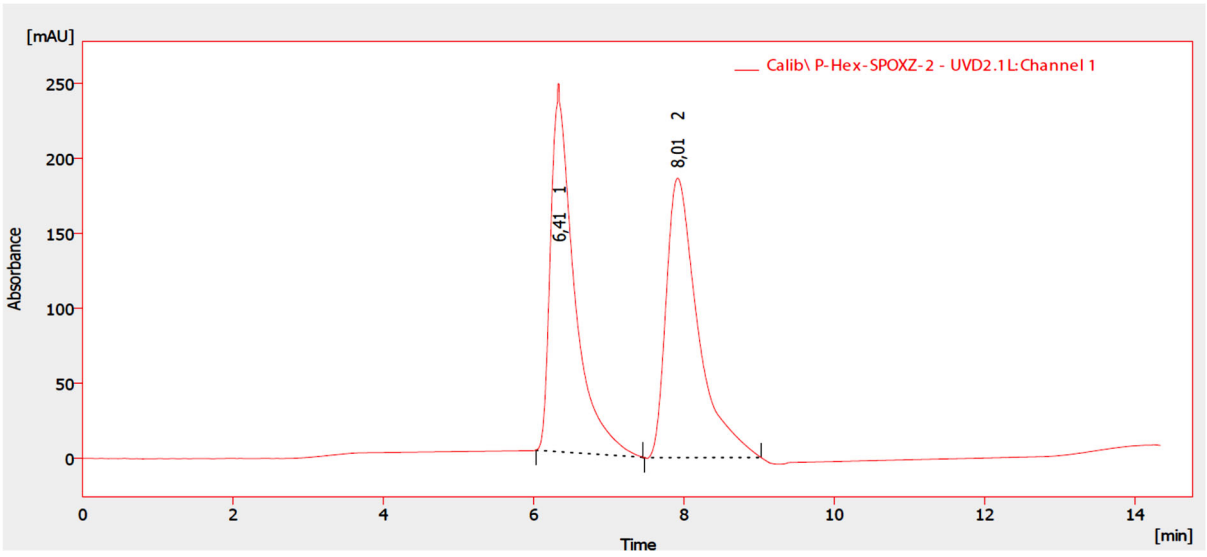


	Reten. Time [min]	Area [mAU.s]	Height [mAU]	Area [%]	Height [%]	W05 [min]	Compound Name
1	13,527	9734,285	909,065	49,1	48,2	0,31	
2	17,258	10091,142	976,963	50,9	51,8	0,40	
	Total	19825,427	1886,028	100,0	100,0		

4.7. HPLC Chromatograms of compound (5g)

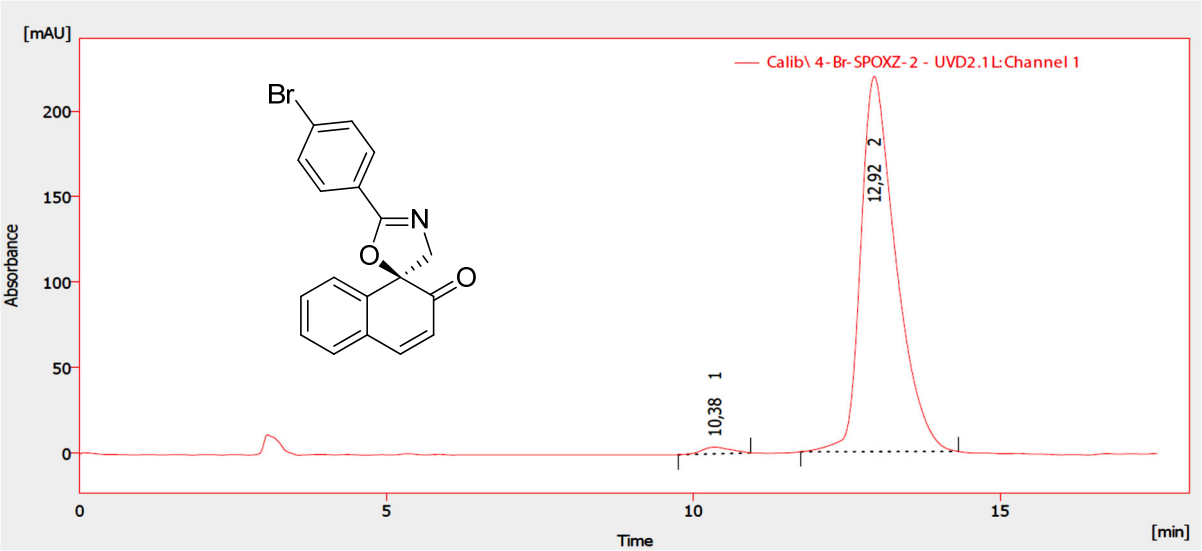


	Reten. Time [min]	Area [mAU.s]	Height [mAU]	Area [%]	Height [%]	W05 [min]	Compound Name
1	6,283	136,279	10,020	2,5	4,1	0,24	
2	7,713	5317,273	234,586	97,5	95,9	0,32	
	Total	5453,552	244,606	100,0	100,0		

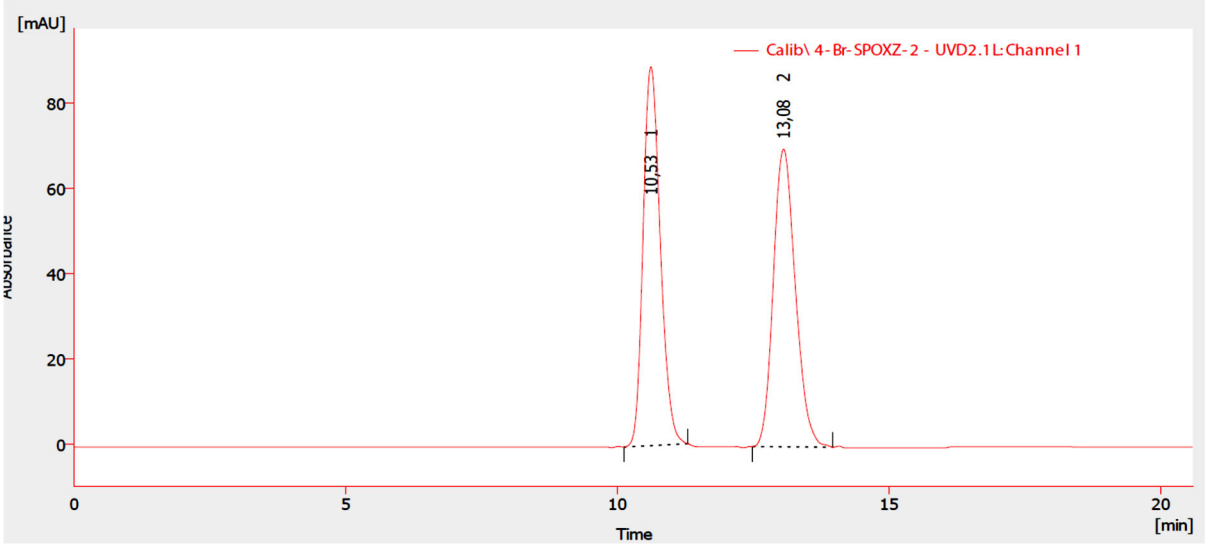


	Reten. Time [min]	Area [mAU.s]	Height [mAU]	Area [%]	Height [%]	W05 [min]	Compound Name
1	6,413	5320,597	234,381	49,0	55,5	0,32	
2	8,011	5548,439	187,389	51,0	44,5	0,43	
	Total	10869,036	421,770	100,0	100,0		

4.8. HPLC Chromatograms of compound (5h)

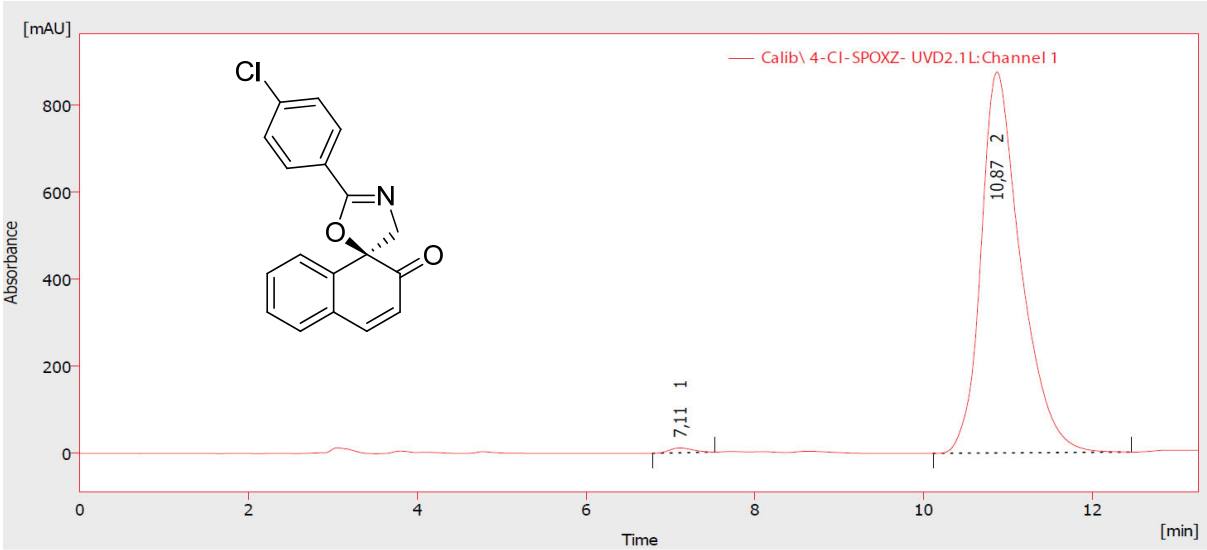


	Reten. Time [min]	Area [mAU.s]	Height [mAU]	Area [%]	Height [%]	W05 [min]	Compound Name
1	10,381	128,611	3,967	1,4	1,8	0,56	
2	12,918	8776,824	219,861	98,6	98,2	0,60	
	Total	8905,435	223,827	100,0	100,0		

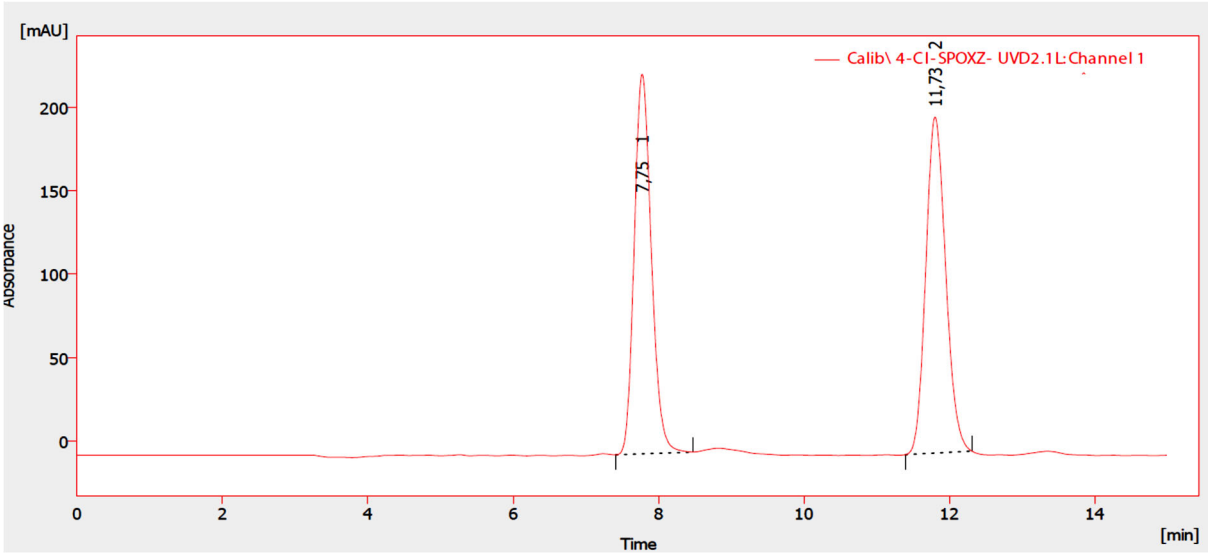


	Reten. Time [min]	Area [mAU.s]	Height [mAU]	Area [%]	Height [%]	W05 [min]	Compound Name
1	10,527	2054,644	89,868	49,8	56,0	0,32	
2	13,082	2071,147	70,610	50,2	44,0	0,43	
	Total	4125,791	160,478	100,0	100,0		

4.9. HPLC Chromatograms of compound (5i)

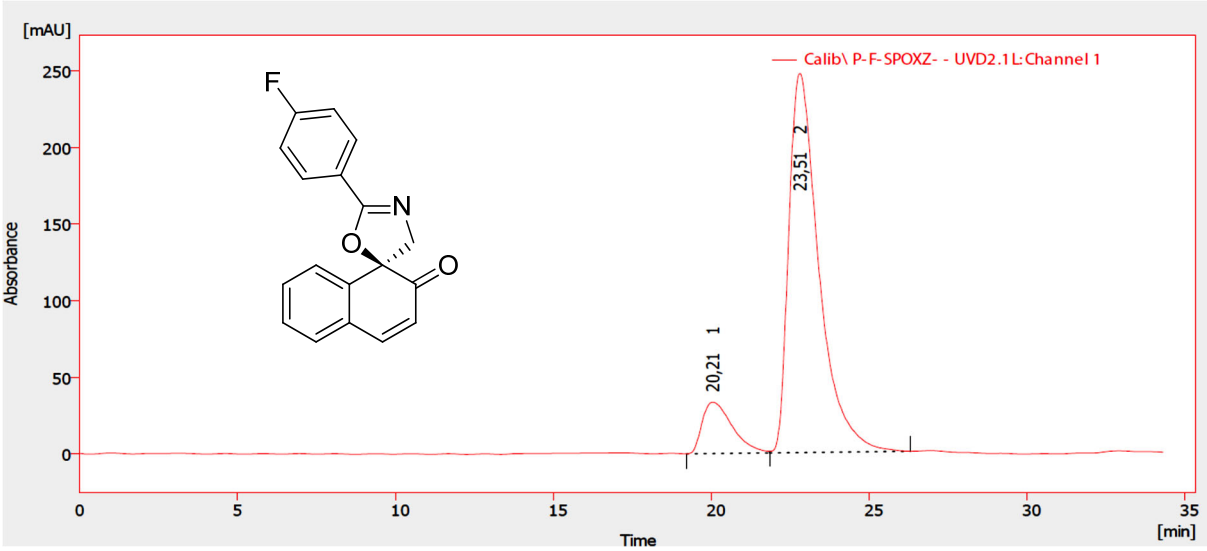


	Reten. Time [min]	Area [mAU.s]	Height [mAU]	Area [%]	Height [%]	W05 [min]	Compound Name
1	7,113	404,915	11,287	1,4	1,3	0,32	
2	10,870	28517,580	874,663	98,6	98,7	0,48	
	Total	28922,495	885,950	100,0	100,0		

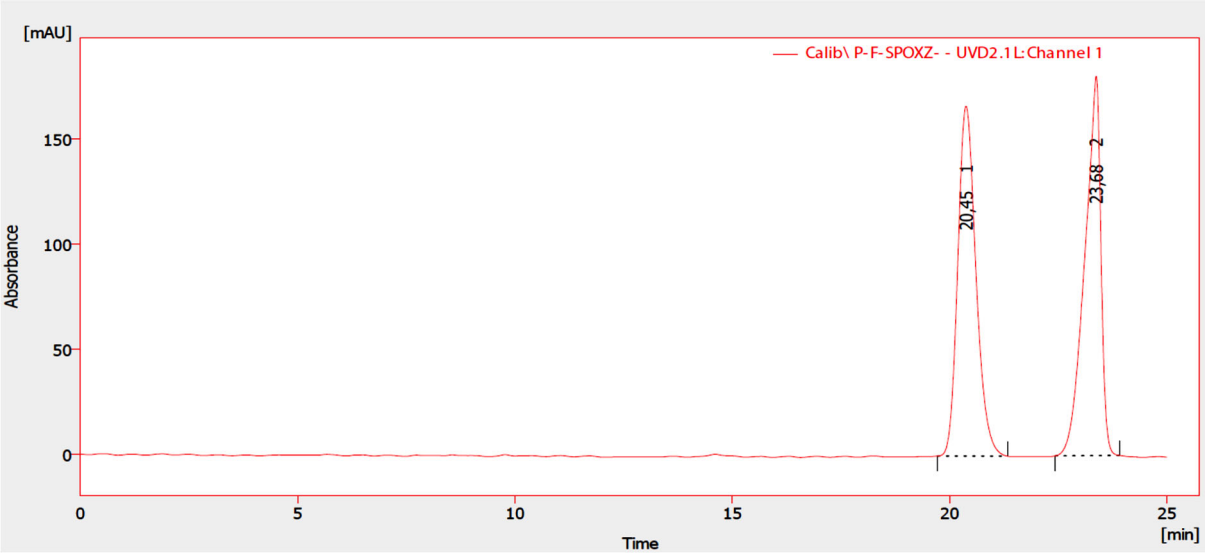


	Reten. Time [min]	Area [mAU.s]	Height [mAU]	Area [%]	Height [%]	W05 [min]	Compound Name
1	7,753	3680,792	227,292	49,2	53,1	0,25	
2	11,727	3800,493	201,152	50,8	46,9	0,30	
	Total	7481,285	428,445	100,0	100,0		

4.10. HPLC Chromatograms of compound (5j)

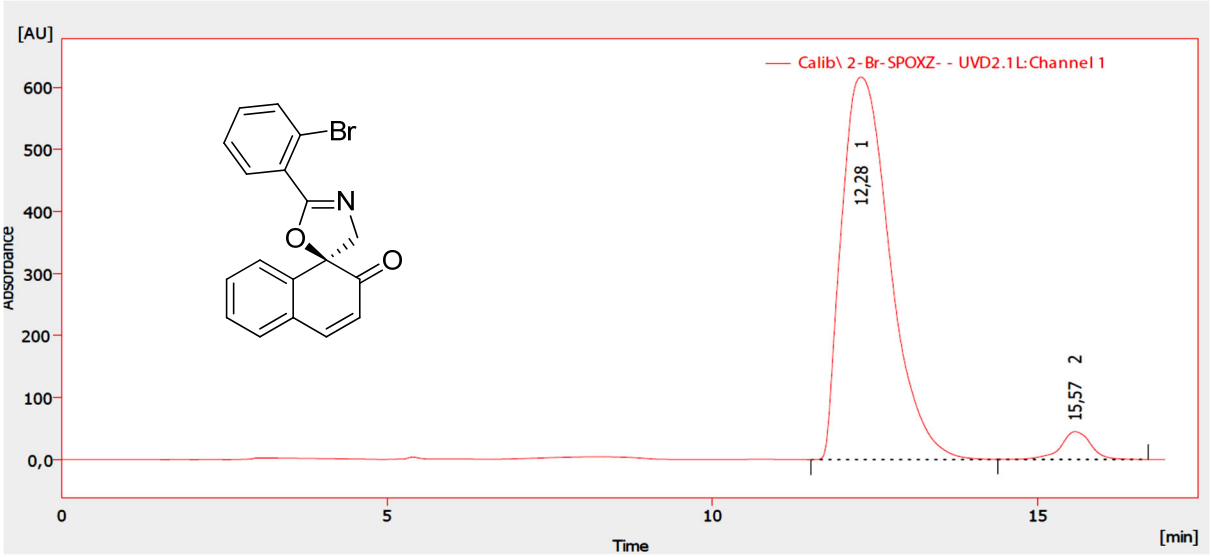


	Reten. Time [min]	Area [mAU.s]	Height [mAU]	Area [%]	Height [%]	W05 [min]	Compound Name
1	20,210	444,816	33,485	11,9	11,9	0,31	
2	23,513	3283,540	247,311	88,1	88,1	0,30	
	Total	3728,356	280,796	100,0	100,0		

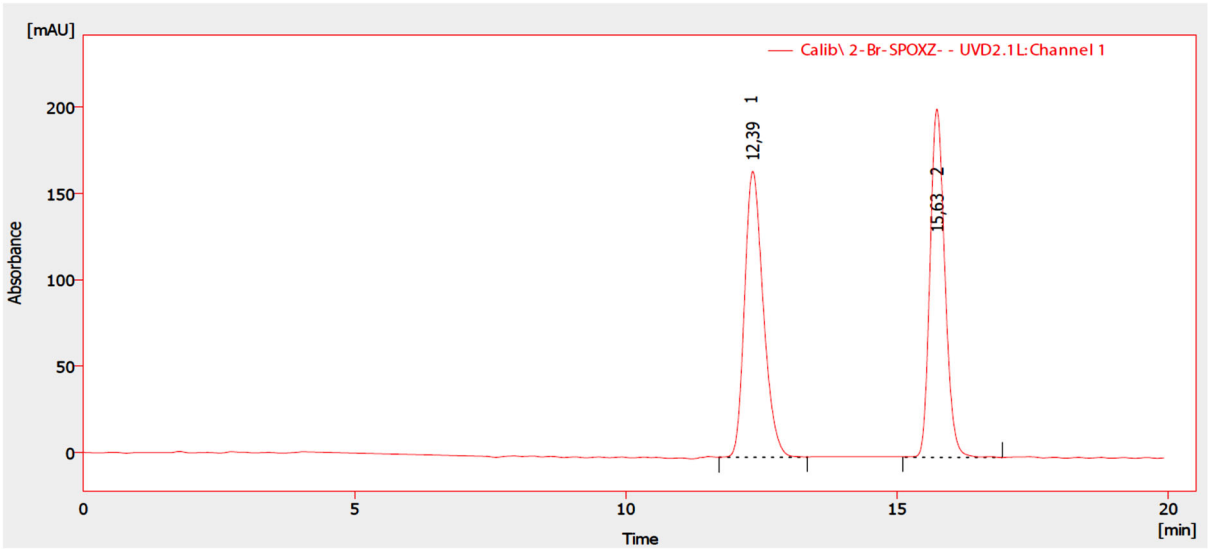


	Reten. Time [min]	Area [mAU.s]	Height [mAU]	Area [%]	Height [%]	W05 [min]	Compound Name
1	20,452	4682,379	165,231	50,7	48,0	0,46	
2	23,677	4553,083	179,001	49,3	52,0	0,42	
	Total	9235,462	344,232	100,0	100,0		

4.11. HPLC Chromatograms of compound(5k)

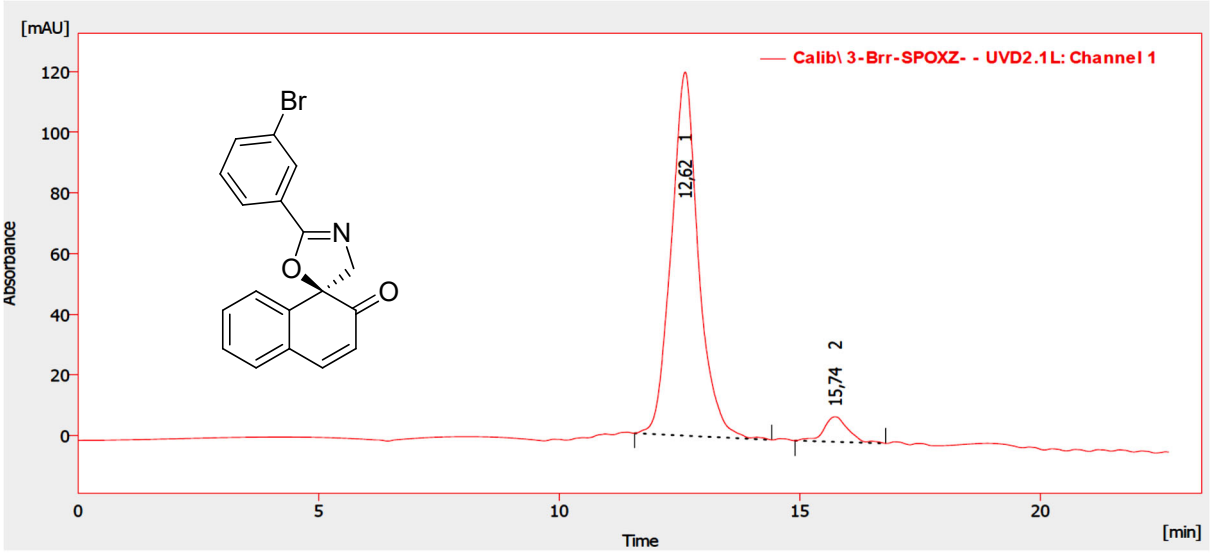


	Reten. Time [min]	Area [mAU.s]	Height [mAU]	Area [%]	Height [%]	W05 [min]	Compound Name
1	12,281	11199,251	683,214	95,6	93,2	0,81	
2	15,570	515,447	54,703	4,4	6,8	0,47	
	Total	11714,698	737,917	100,0	100,0		

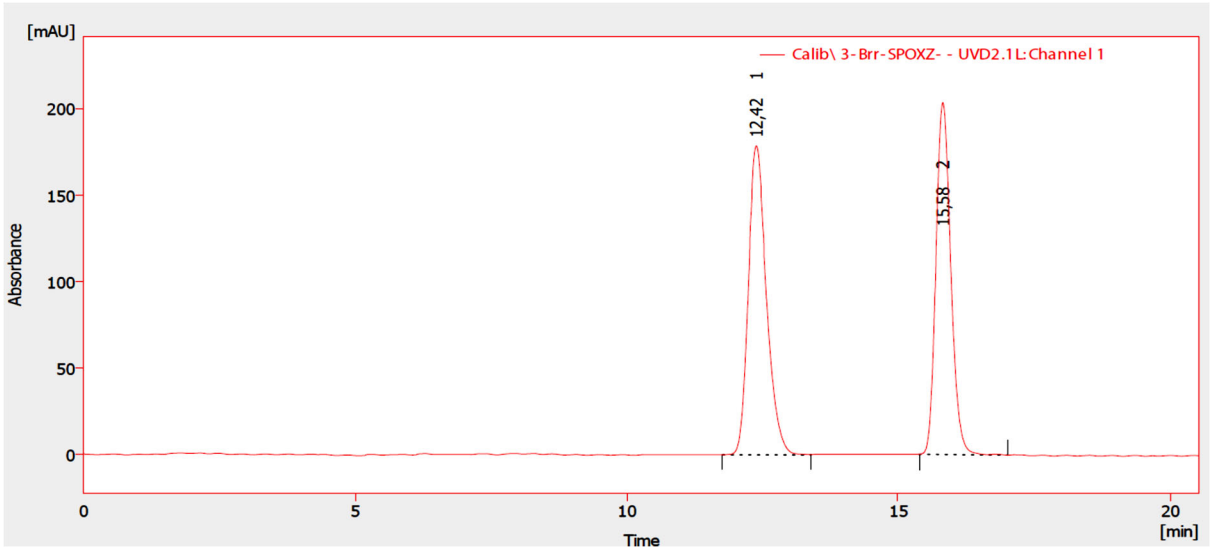


	Reten. Time [min]	Area [mAU.s]	Height [mAU]	Area [%]	Height [%]	W05 [min]	Compound Name
1	12,387	4068,952	162,602	50,6	44,9	0,34	
2	15,631	3972,455	204,641	49,4	55,1	0,29	
	Total	8041,407	367,243	100,0	100,0		

4.12. HPLC Chromatograms of compound (5l)

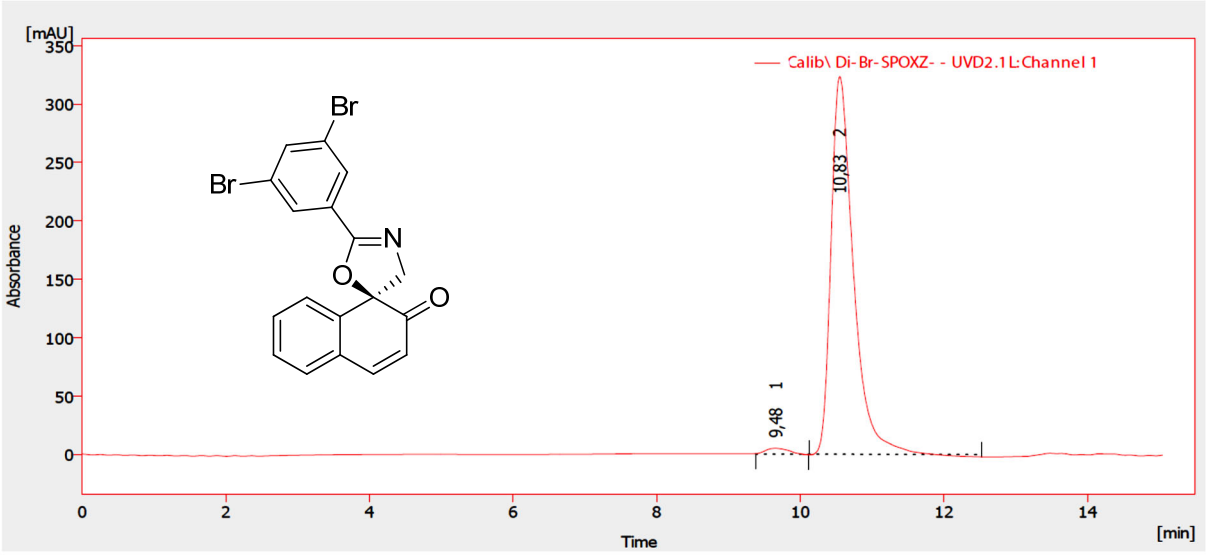


	Reten. Time [min]	Area [mAU.s]	Height [mAU]	Area [%]	Height [%]	W05 [min]	Compound Name
1	12,620	4708,612	119,867	94,1	93,5	0,57	
2	15,740	293,988	8,281	5,9	6,5	0,51	
	Total	5002,599	128,147	100,0	100,0		

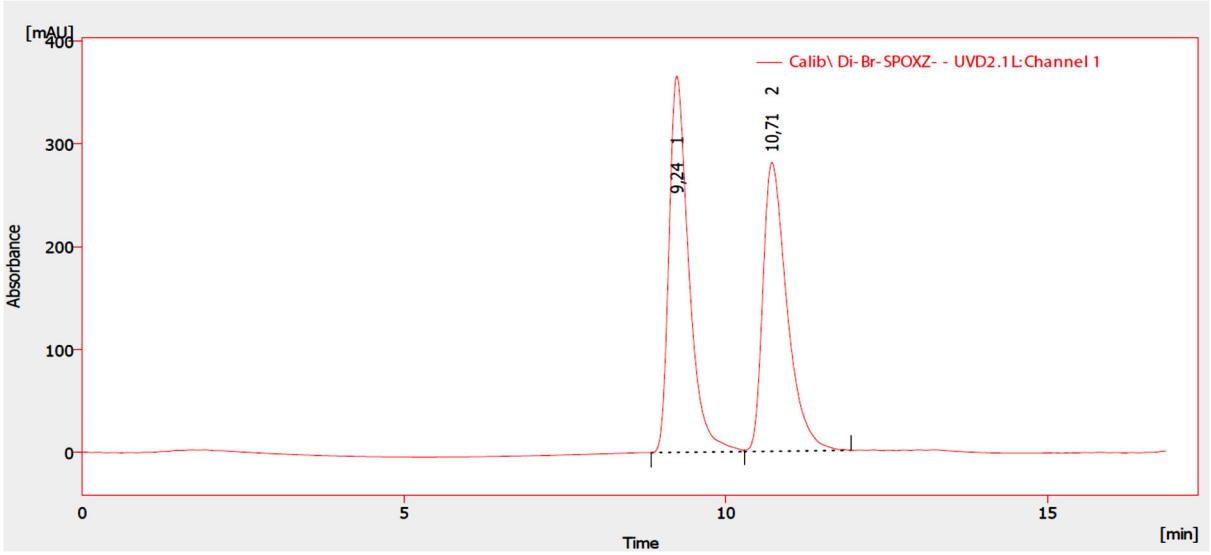


	Reten. Time [min]	Area [mAU.s]	Height [mAU]	Area [%]	Height [%]	W05 [min]	Compound Name
1	12,420	4267,242	183,678	50,6	48,2	0,33	
2	15,578	4166,042	197,397	49,4	51,8	0,30	
	Total	8433,284	381,075	100,0	100,0		

4.13. HPLC Chromatograms of compound (5m)

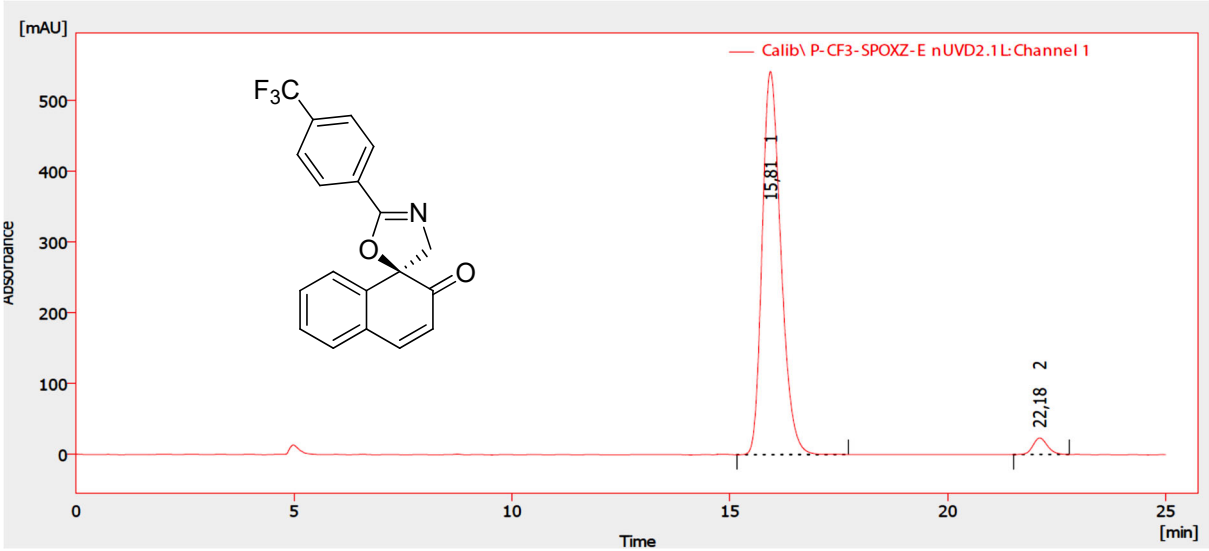


	Reten. Time [min]	Area [mAU.s]	Height [mAU]	Area [%]	Height [%]	W05 [min]	Compound Name
1	9,430	447,184	5,686	5,9	1,7	0,15	
2	10,831	7139,793	324,178	94,1	98,3	0,32	
	Total	7586,977	329,864	100,0	100,0		

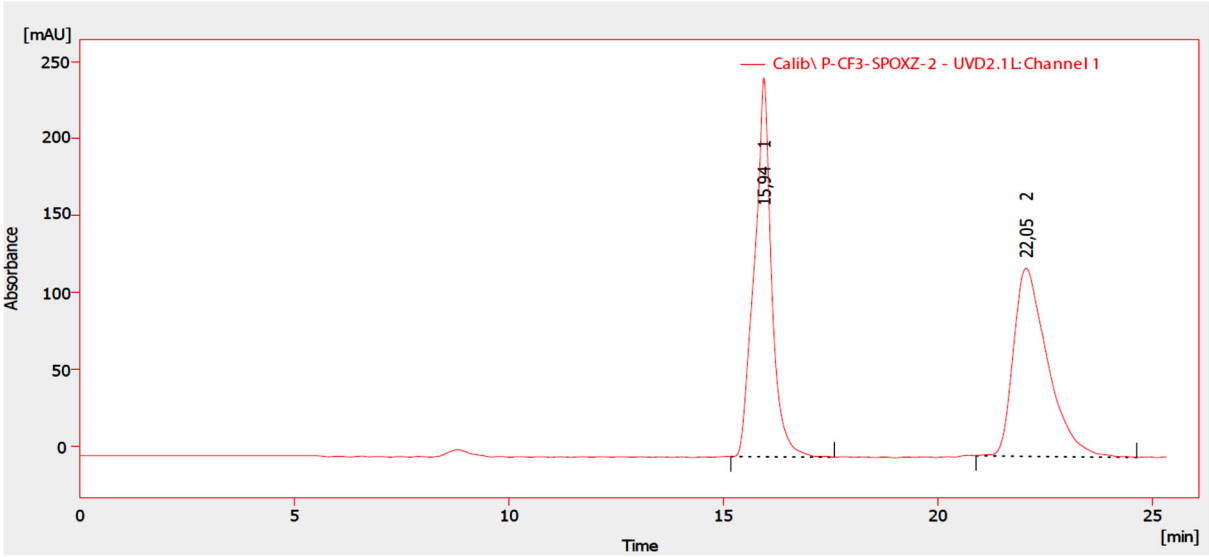


	Reten. Time [min]	Area [mAU.s]	Height [mAU]	Area [%]	Height [%]	W05 [min]	Compound Name
1	9,240	7688,476	366,351	50,6	56,6	0,32	
2	10,713	7536,530	281,128	49,4	43,4	0,39	
	Total	15225,006	647,479	100,0	100,0		

4.14. HPLC Chromatograms of compound (5n)

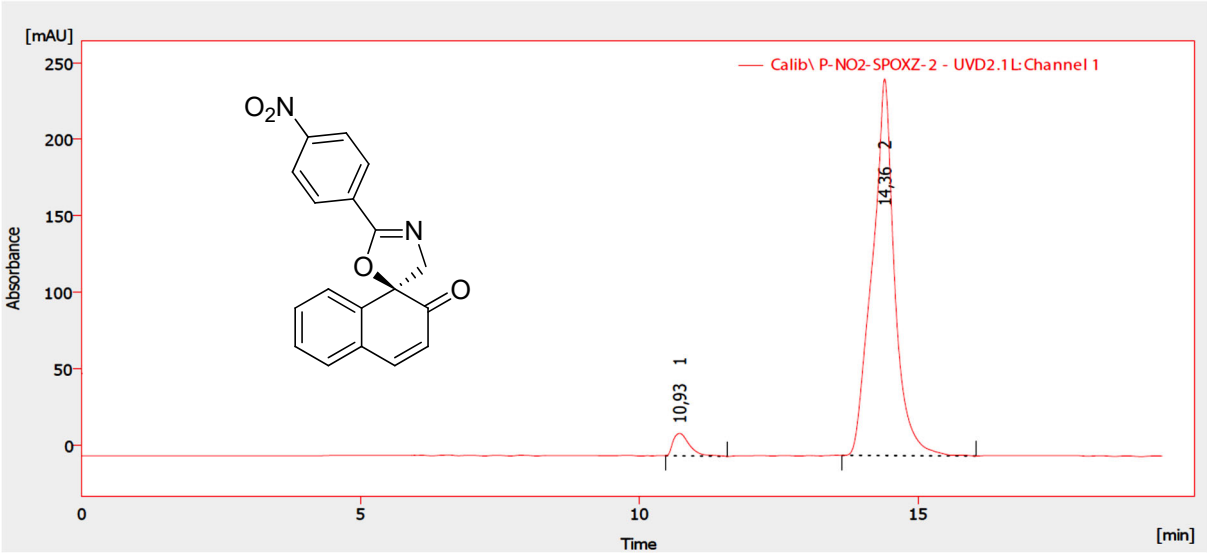


	Reten. Time [min]	Area [mAU.s]	Height [mAU]	Area [%]	Height [%]	W05 [min]	Compound Name
1	15,813	16135,837	540,961	96,8	95,9	0,46	
2	22,182	539,911	23,380	3,2	4,1	0,35	
	Total	16675,748	564,341	100,0	100,0		

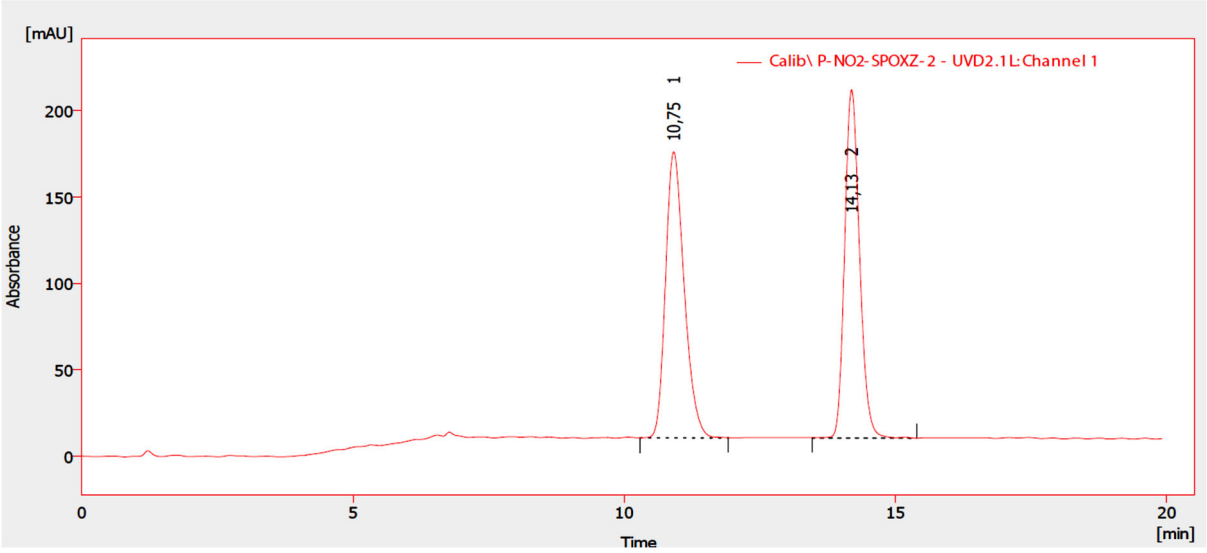


	Reten. Time [min]	Area [mAU.s]	Height [mAU]	Area [%]	Height [%]	W05 [min]	Compound Name
1	15,940	6853,907	246,387	50,3	66,8	0,40	
2	22,053	6783,854	122,254	49,7	33,2	0,84	
	Total	13637,761	368,642	100,0	100,0		

4.15. HPLC Chromatograms of compound (5o)

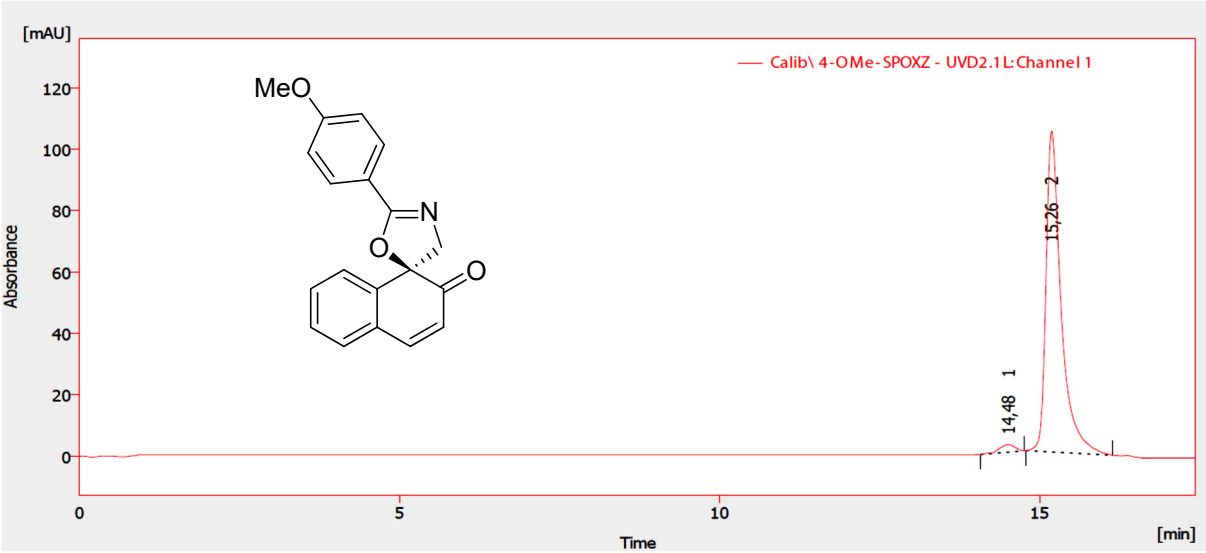


	Reten. Time [min]	Area [mAU.s]	Height [mAU]	Area [%]	Height [%]	W05 [min]	Compound Name
1	10,933	312,135	14,897	4,6	5,6	0,31	
2	14,362	6473,403	251,123	95,4	94,4	0,40	
	Total	6785,538	266,020	100,0	100,0		

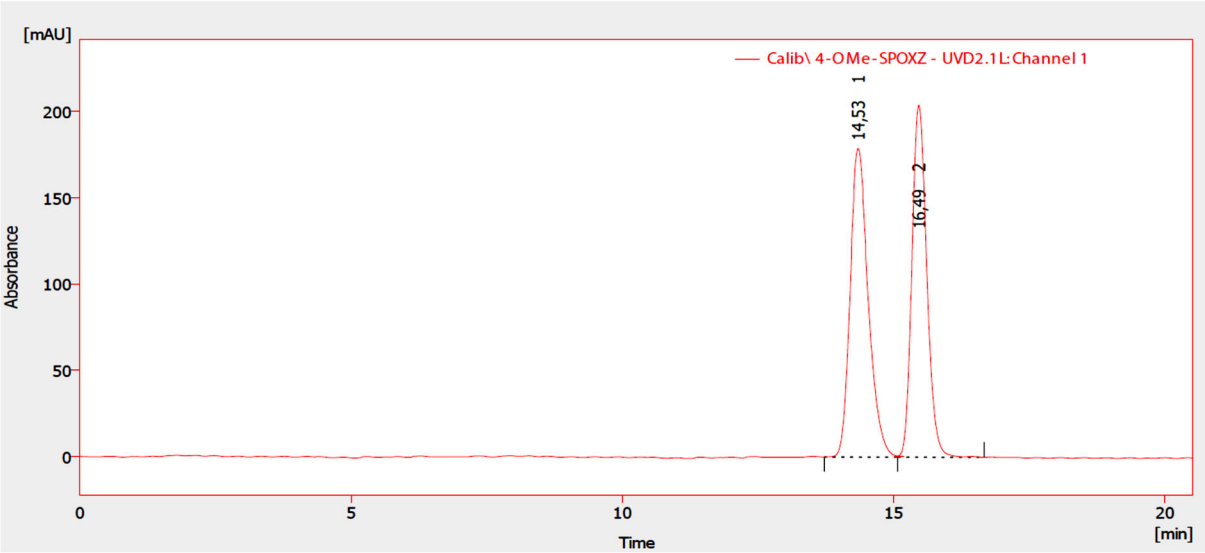


	Reten. Time [min]	Area [mAU.s]	Height [mAU]	Area [%]	Height [%]	W05 [min]	Compound Name
1	10,747	2880,843	175,341	50,4	46,2	0,34	
2	14,132	2835,115	204,186	49,6	53,8	0,29	
	Total	5715,958	379,527	100,0	100,0		

4.16. HPLC Chromatograms of compound (5p)

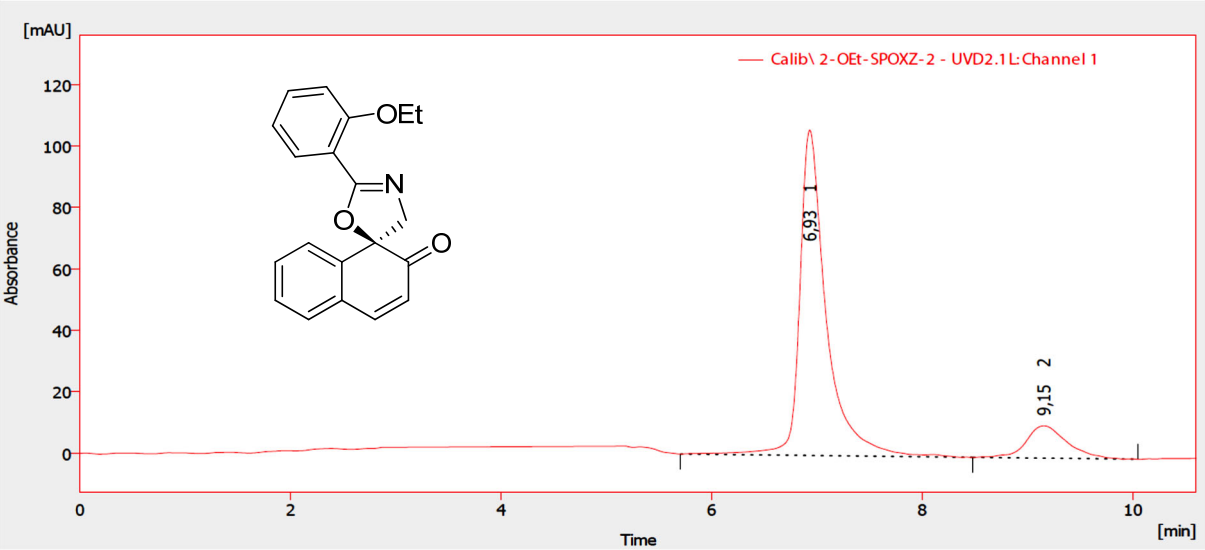


	Reten. Time [min]	Area [mAU.s]	Height [mAU]	Area [%]	Height [%]	W05 [min]	Compound Name
1	14,479	41,326	2,457	2,3	2,3	0,28	
2	15,263	1720,084	104,526	97,7	97,7	0,23	
	Total	1761,411	106,982	100,0	100,0		

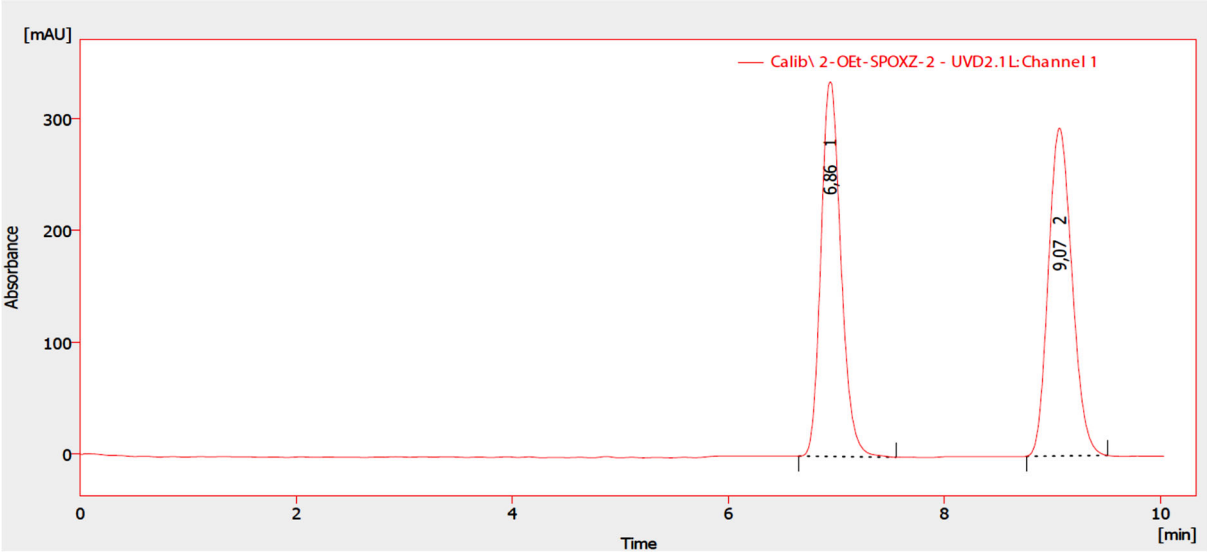


	Reten. Time [min]	Area [mAU.s]	Height [mAU]	Area [%]	Height [%]	W05 [min]	Compound Name
1	14,527	4156,360	185,038	50,5	47,9	0,35	
2	16,487	4074,055	201,263	49,5	52,1	0,31	
	Total	8230,415	386,301	100,0	100,0		

4.17. HPLC Chromatograms of compound (5q)

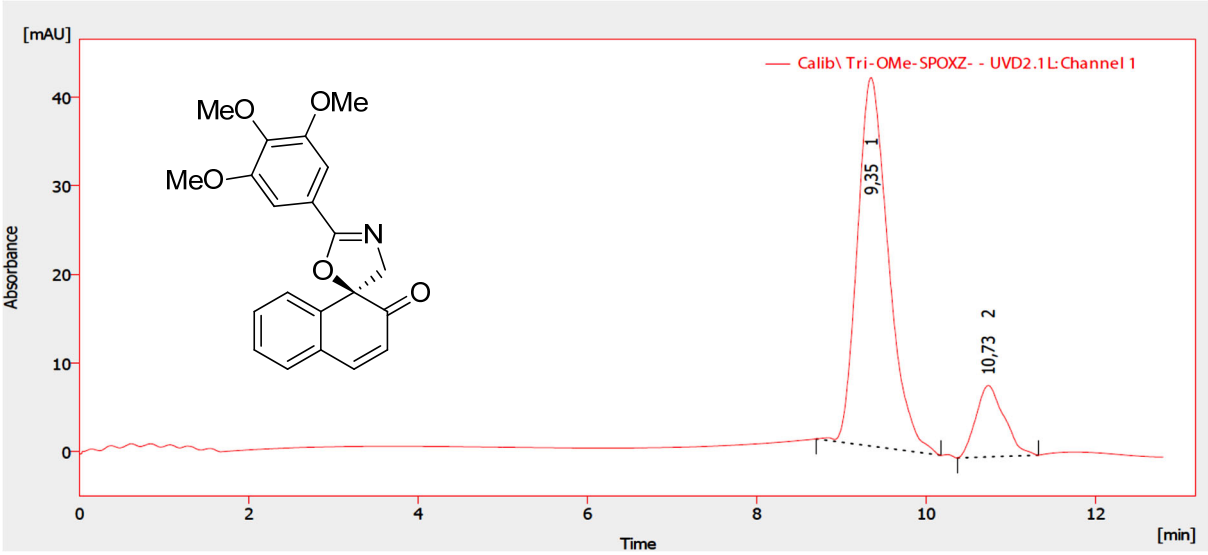


	Reten. Time [min]	Area [mAU.s]	Height [mAU]	Area [%]	Height [%]	W05 [min]	Compound Name
1	6,930	1866,073	105,956	86,6	91,0	0,23	
2	9,153	287,944	10,514	13,4	9,0	0,40	
	Total	2154,017	116,470	100,0	100,0		

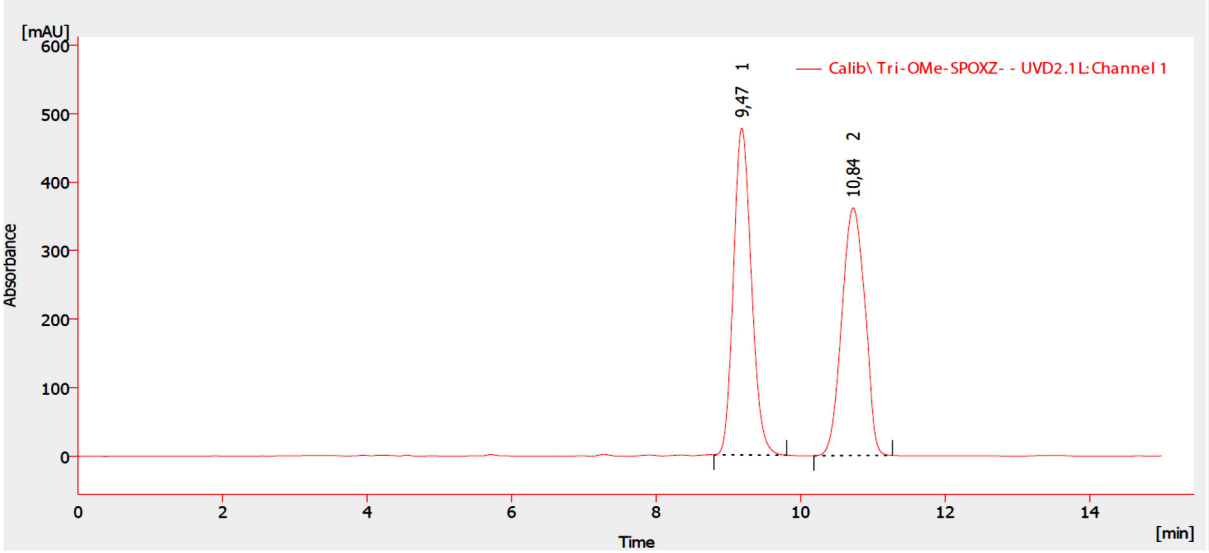


	Reten. Time [min]	Area [mAU.s]	Height [mAU]	Area [%]	Height [%]	W05 [min]	Compound Name
1	6,861	3718,137	334,107	49,3	52,8	0,18	
2	9,067	3823,723	297,682	50,7	47,2	0,25	
	Total	7541,860	631,789	100,0	100,0		

4.18. HPLC Chromatograms of compound (5r)

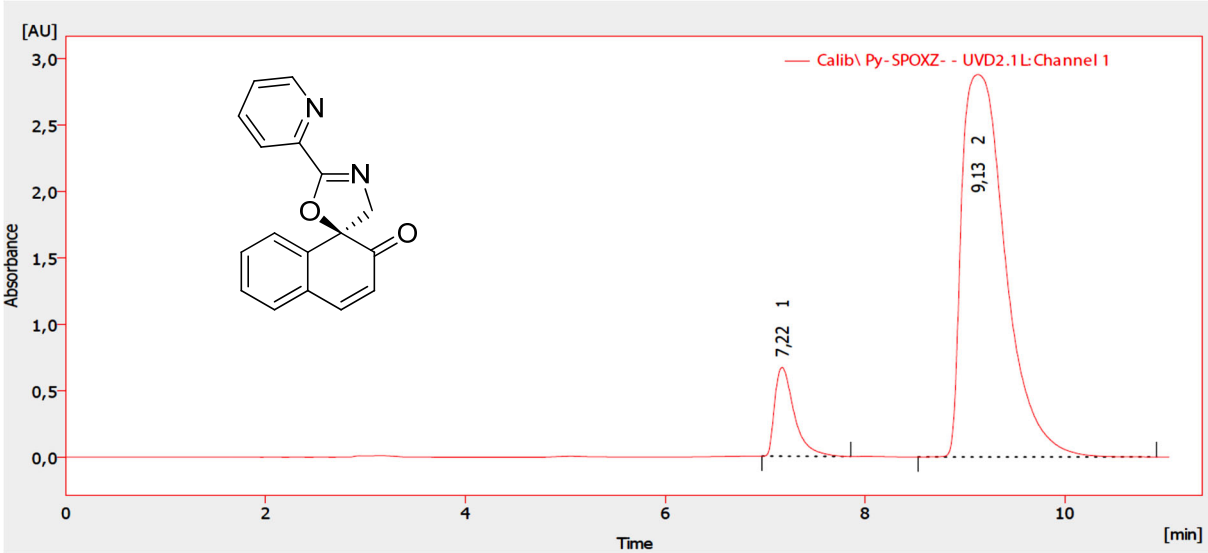


	Reten. Time [min]	Area [mAU.s]	Height [mAU]	Area [%]	Height [%]	W05 [min]	Compound Name
1	9,347	1060,707	41,624	85,0	83,8	0,39	
2	10,730	187,785	8,062	15,0	16,2	0,38	
	Total	1248,491	49,686	100,0	100,0		

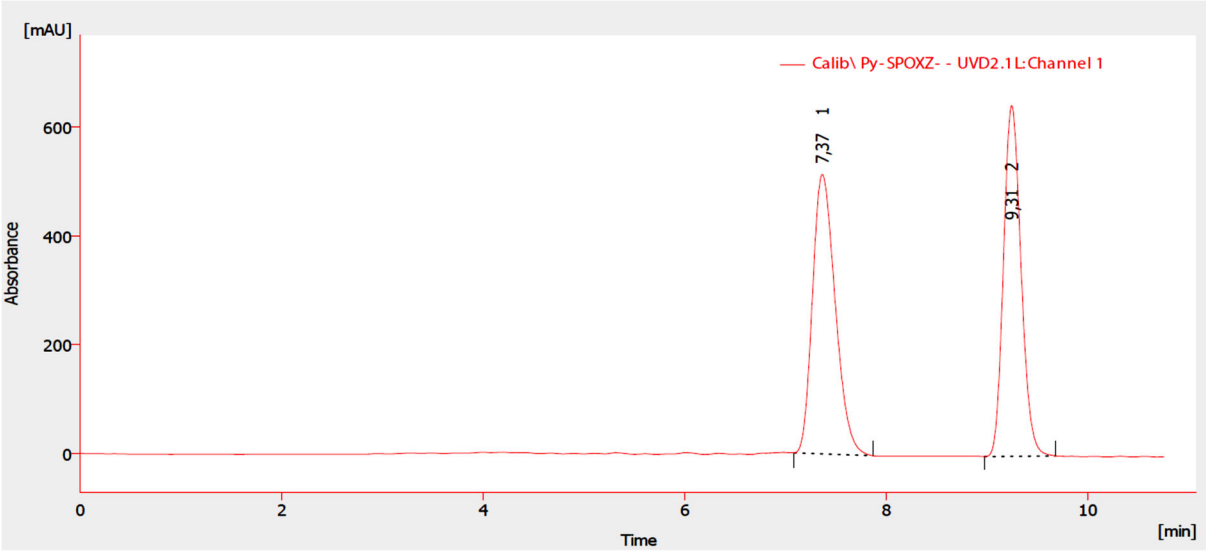


	Reten. Time [min]	Area [mAU.s]	Height [mAU]	Area [%]	Height [%]	W05 [min]	Compound Name
1	9,468	6877,854	487,259	50,1	54,6	0,28	
2	10,841	6850,397	406,156	49,9	45,4	0,39	
	Total	13728,251	892,415	100,0	100,0		

4.19. HPLC Chromatograms of compound (5s)

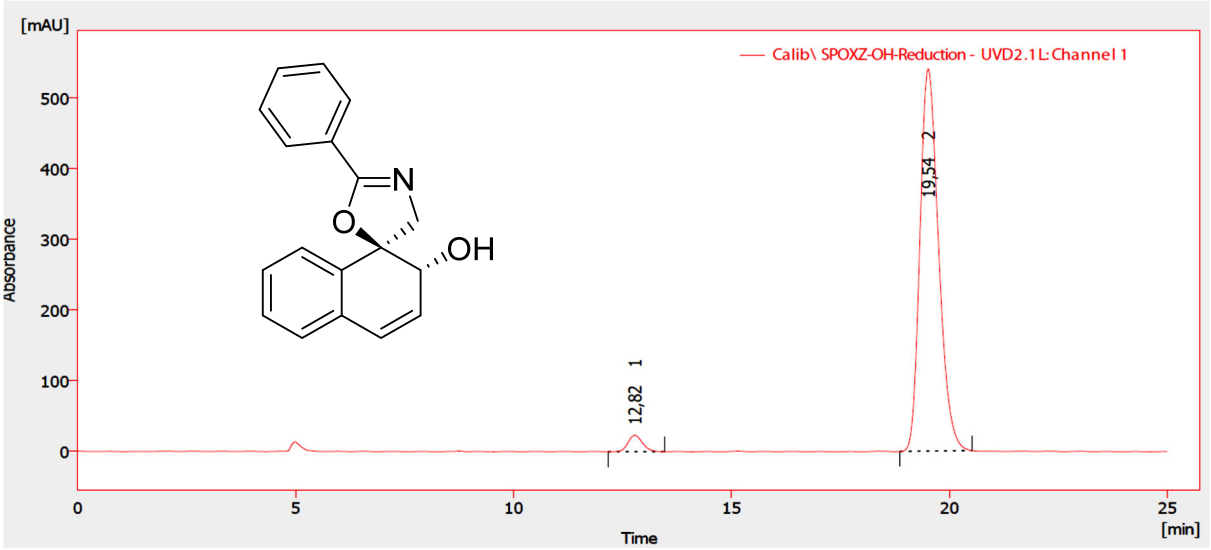


	Reten. Time [min]	Area [mAU.s]	Height [mAU]	Area [%]	Height [%]	W05 [min]	Compound Name
1	7,223	9106,941	668,811	9,4	18,9	0,21	
2	9,130	87600,422	2878,629	90,6	81,1	0,47	
	Total	96707,363	3547,440	100,0	100,0		



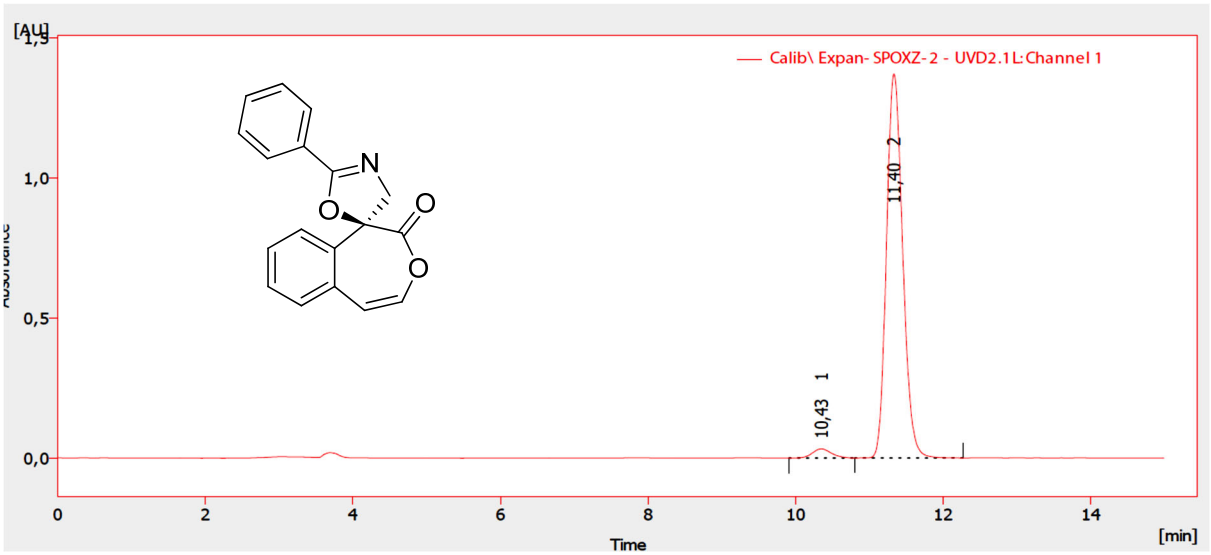
	Reten. Time [min]	Area [mAU.s]	Height [mAU]	Area [%]	Height [%]	W05 [min]	Compound Name
1	7,371	6443,097	522,567	50,5	45,1	0,25	
2	9,314	6315,511	636,118	49,5	54,9	0,19	
	Total	12758,608	1158,685	100,0	100,0		

4.20. HPLC Chromatograms of compound (7)



	Reten. Time [min]	Area [mAU.s]	Height [mAU]	Area [%]	Height [%]	W05 [min]	Compound Name
1	12,817	494,767	22,274	2,7	3,9	0,35	
2	19,541	17829,946	519,249	97,3	96,1	0,46	
	Total	18324,713	571,140	100,0	100,0		

4.21. HPLC Chromatograms of compound (8)



	Reten. Time [min]	Area [mAU.s]	Height [mAU]	Area [%]	Height [%]	W05 [min]	Compound Name
1	10,427	404,009	35,294	2,2	2,5	0,29	
2	11,410	17960,018	1376,457	97,8	97,5	0,22	
	Total	18364,027	1411,751	100,0	100,0		

5. Computational Studies

5.1. Computational Details

All quantum chemical calculations were performed with Gaussian 09.[7] Geometries were optimized with B3LYPmethod and 6-31++G** basis set. Minimum structures were confirmed by the absence of imaginary frequencies in the harmonic frequency calculation. Calculations were done in chloroform applying polarizable continuum solvation model (PCM). The CD-spectrum to confirm the absolute configuration of the spirooxazoline (*S*)-**5a** was calculated with TDDFT on a B3LYB/6-31++G** level of theory.

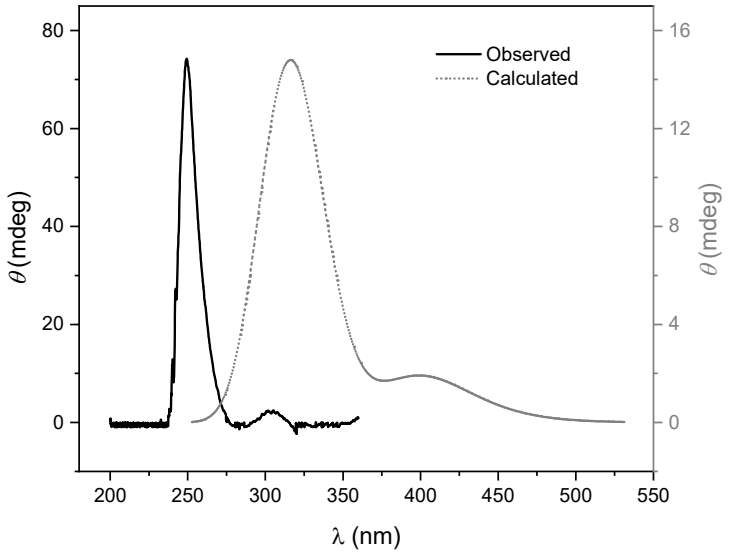


Figure S-1. Calculated and observed CD Spectra of compound **5a**.

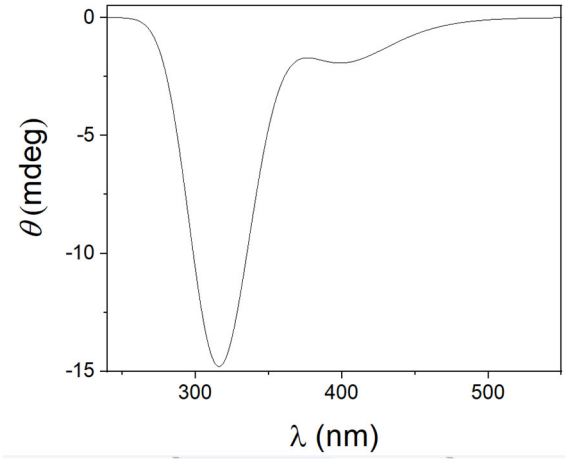


Figure S-2 Calculated CD Spectrum of (*R*) enantiomer of compound **5a**.

a. Calculated Coordinates of the Optimized Structure

Compound 5a

Center Number	Atomic Number	Atomic Type	Coordinates (Angstroms) X	Y	Z
1	6	0	-2.573730	2.802130	0.095600
2	6	0	-1.585580	1.813160	0.152620
3	6	0	-3.915020	2.449111	-0.084040
4	6	0	-4.261030	1.105771	-0.222540
5	6	0	-3.274730	0.104670	-0.182080
6	6	0	-1.923990	0.465100	0.020340
7	1	0	-0.547310	2.097590	0.294330
8	1	0	-2.293340	3.847280	0.193570
9	1	0	-4.683370	3.216101	-0.121540
10	1	0	-5.299200	0.821051	-0.375680
11	6	0	-0.880090	-0.621170	0.172630
12	6	0	-1.277560	-1.989090	-0.417120
13	6	0	-2.707030	-2.280570	-0.511060
14	6	0	-3.626940	-1.292920	-0.398780
15	1	0	-2.988340	-3.303350	-0.743850
16	1	0	-4.683100	-1.525749	-0.521150
17	8	0	0.368770	-0.205740	-0.418850
18	6	0	-0.471020	-0.854360	1.694130
19	7	0	0.965990	-0.618240	1.727300
20	1	0	-0.697170	-1.872130	2.028810
21	1	0	-0.992580	-0.156190	2.357330
22	6	0	1.336070	-0.279530	0.551490

23	6	0	2.702460	0.065490	0.126990
24	6	0	3.740330	0.072880	1.074690
25	6	0	2.981430	0.388110	-1.210560
26	6	0	4.284060	0.716420	-1.593040
27	6	0	5.038020	0.401240	0.687260
28	6	0	5.313370	0.724620	-0.647420
29	1	0	3.517410	-0.180340	2.106120
30	1	0	5.835980	0.404840	1.424900
31	1	0	6.326330	0.979950	-0.947490
32	1	0	2.183020	0.377300	-1.944730
33	1	0	4.493640	0.963670	-2.630210
34	8	0	-0.409770	-2.805350	-0.714420

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6. References

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