

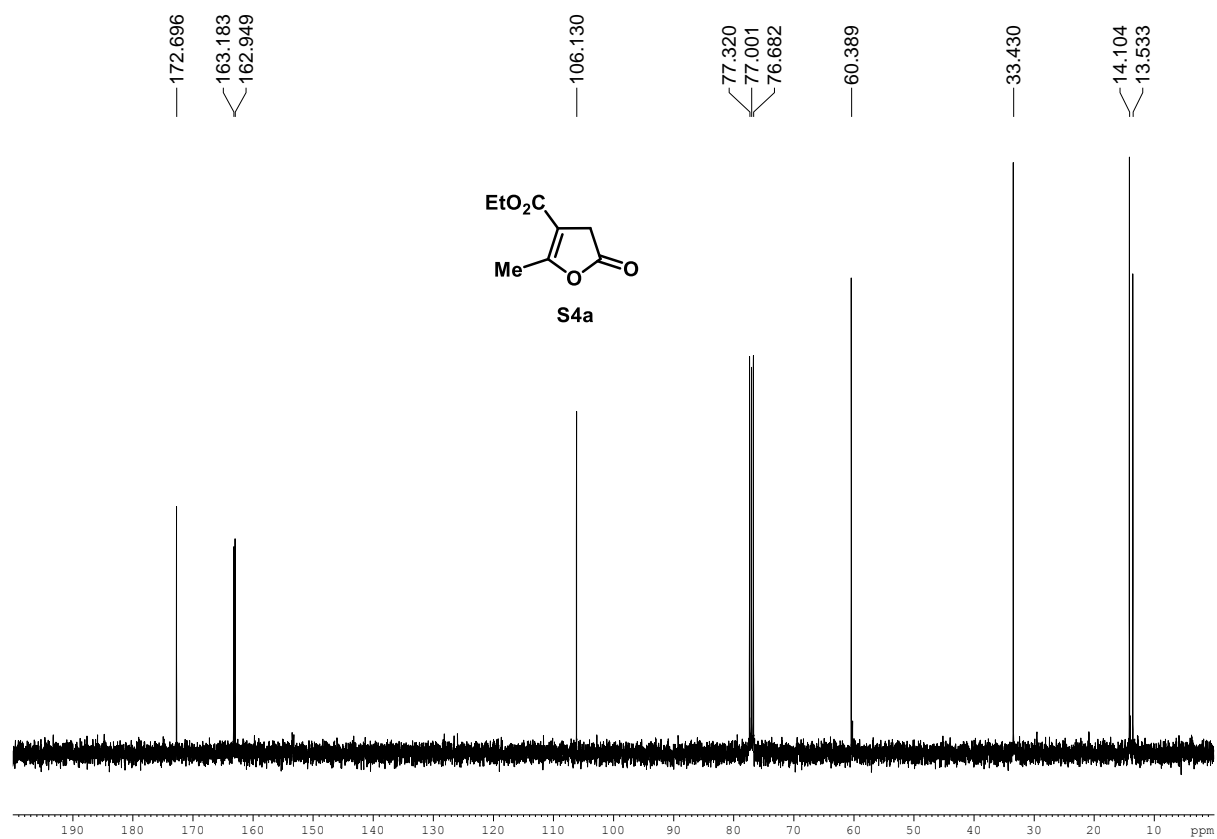
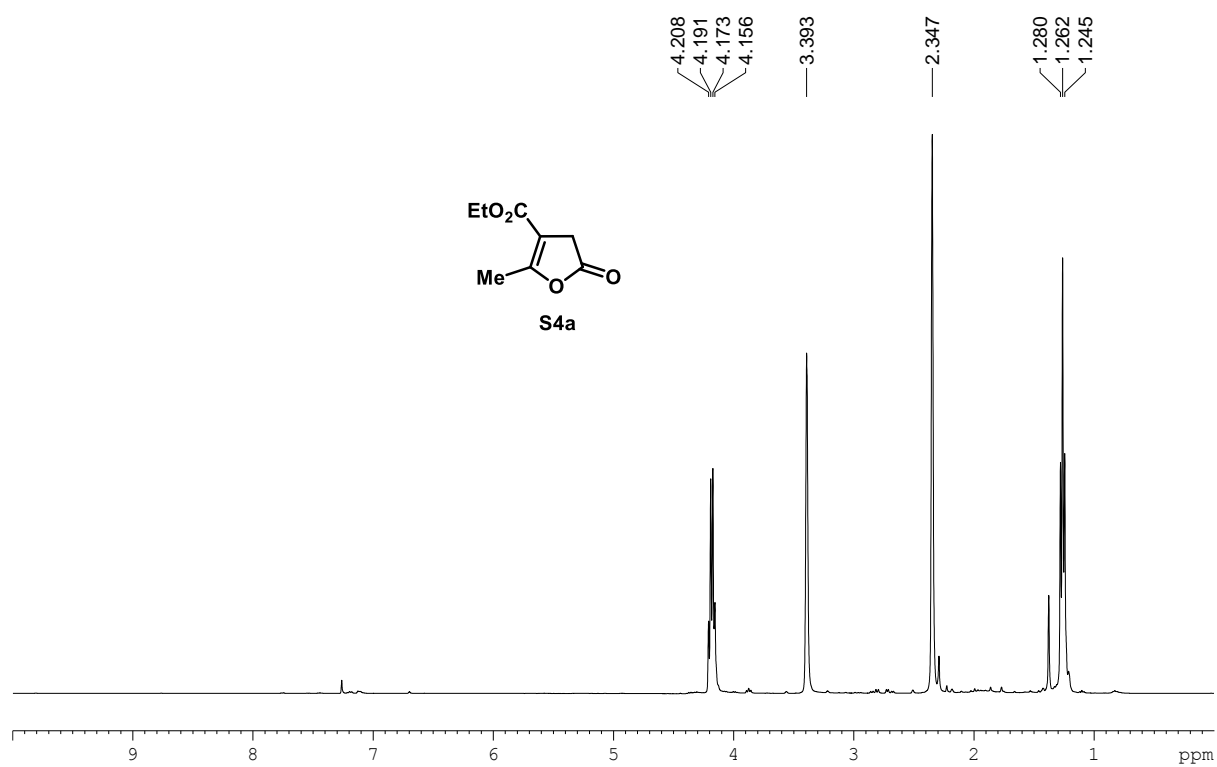
“On water” catalytic enantioselective sulfenylation of deconjugated butyrolactams

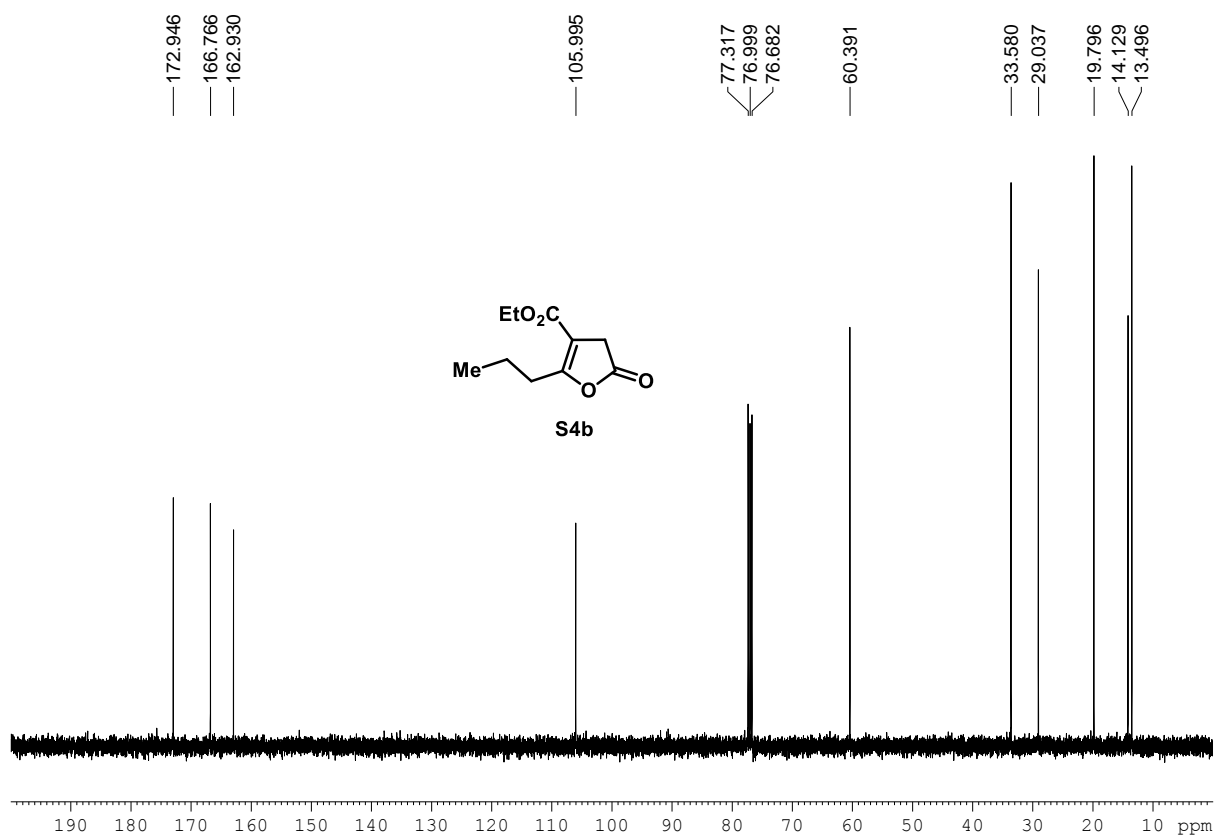
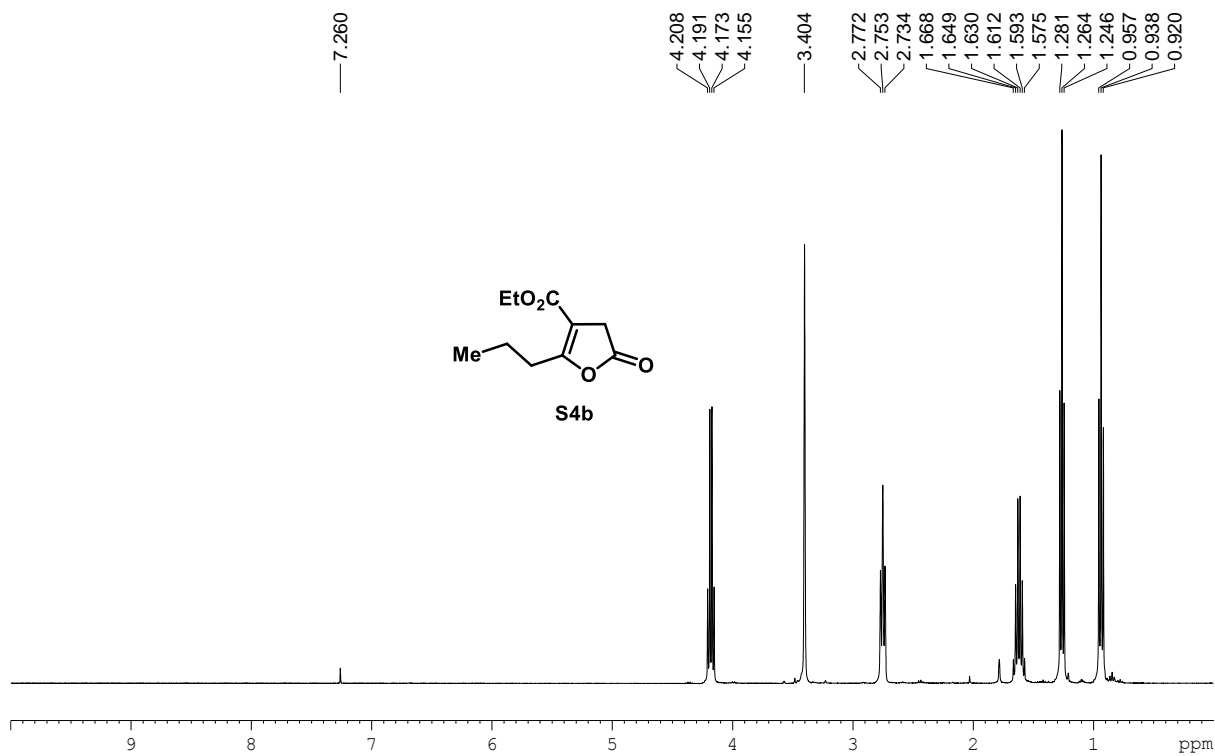
Soumya Jyoti Singha Roy and Santanu Mukherjee*

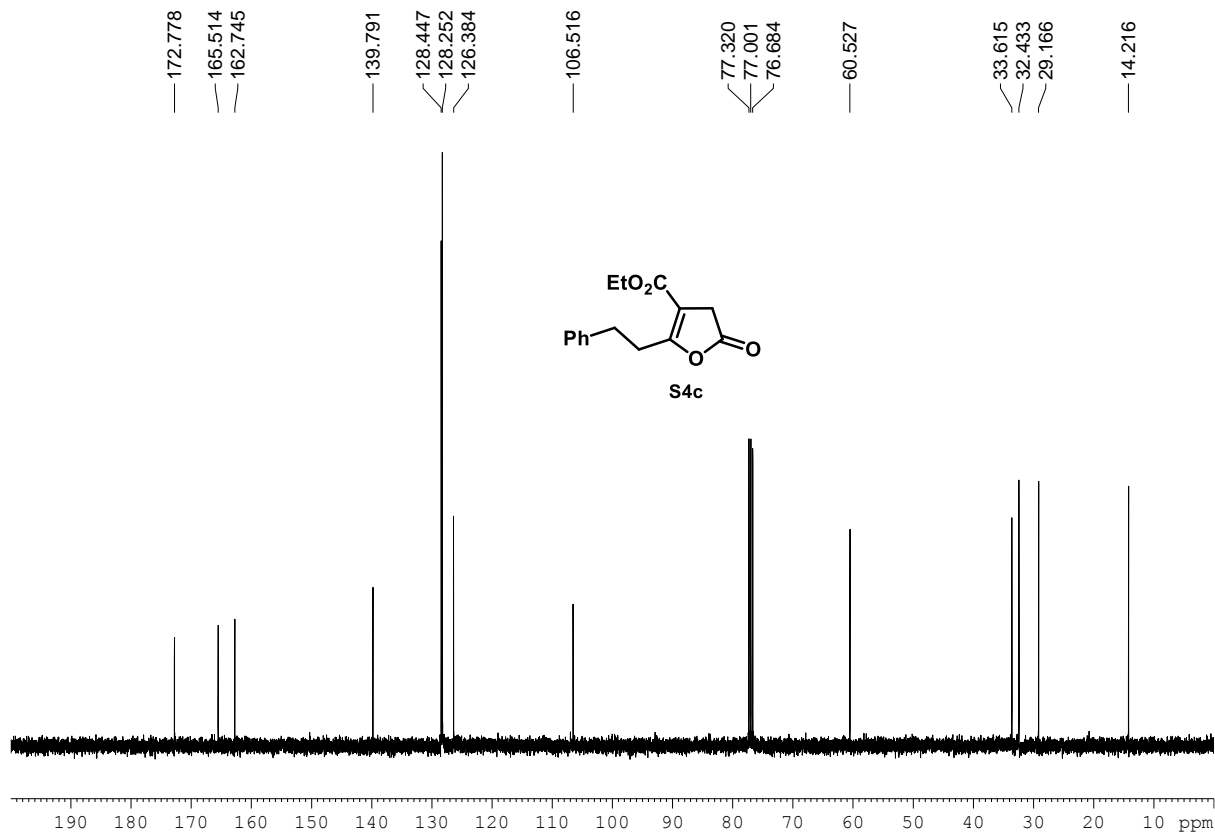
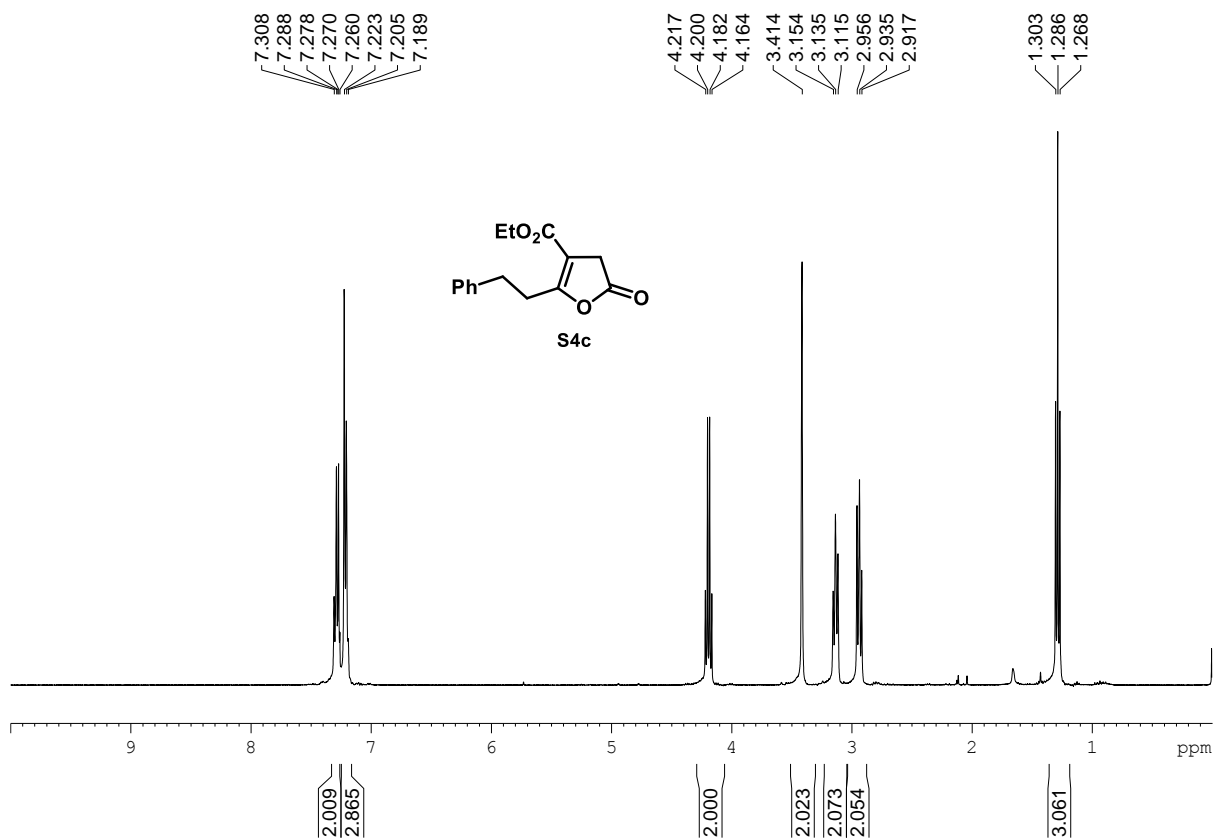
Department of Organic Chemistry, Indian Institute of Science, Bangalore 560 012, INDIA

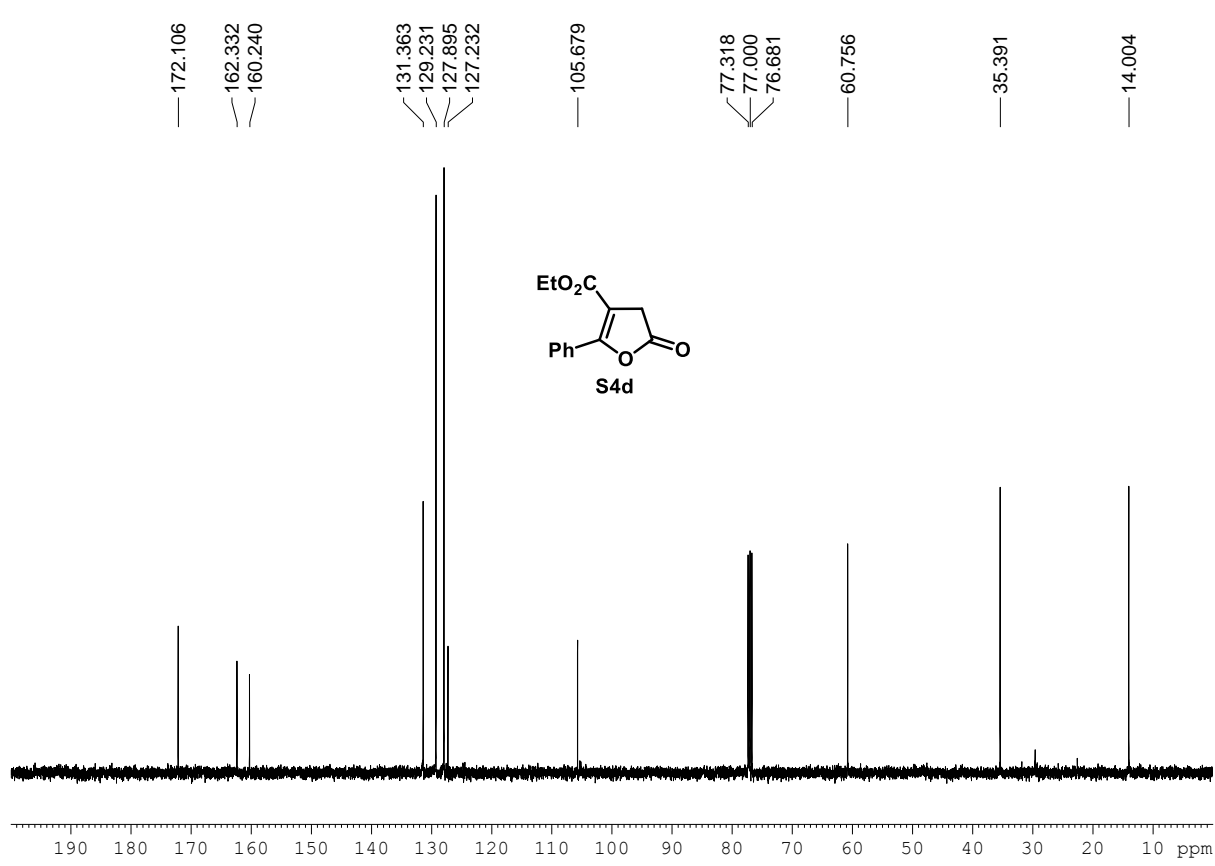
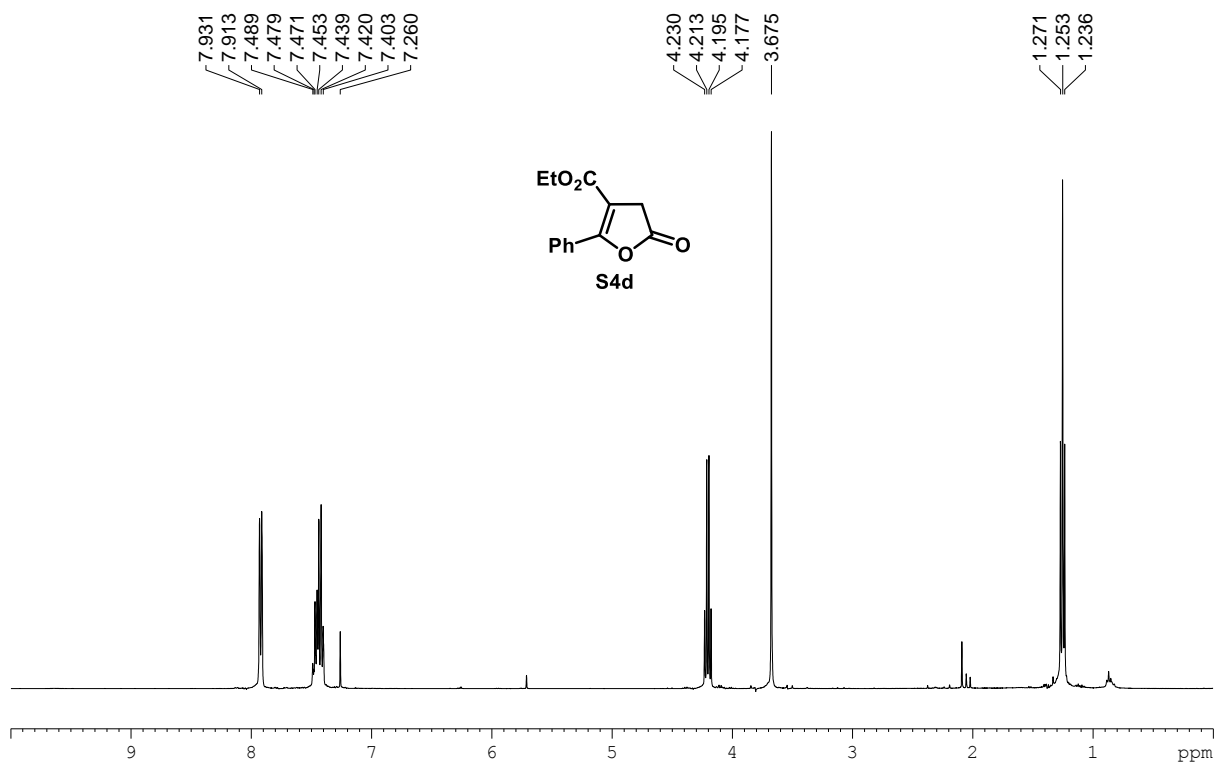
sm@orgchem.iisc.ernet.in

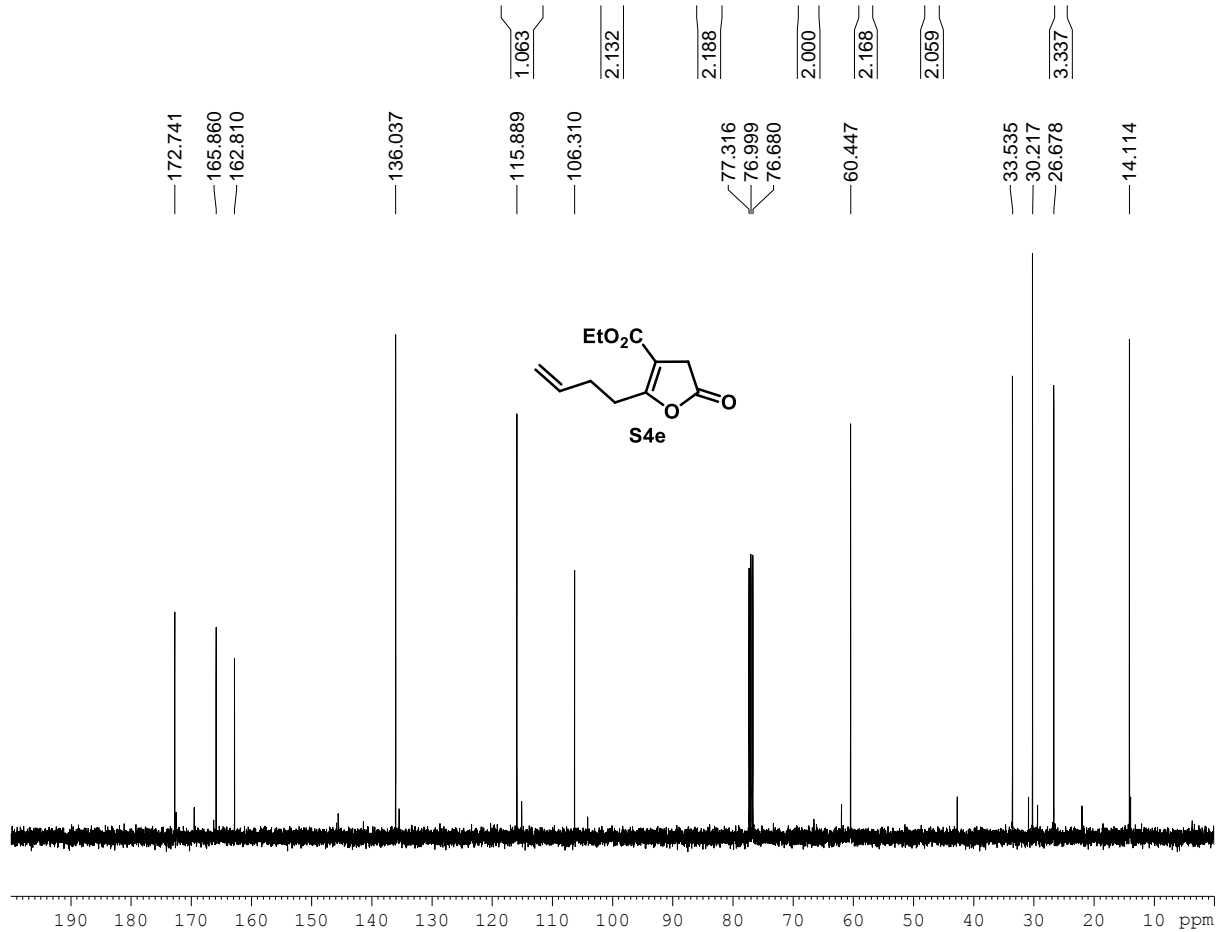
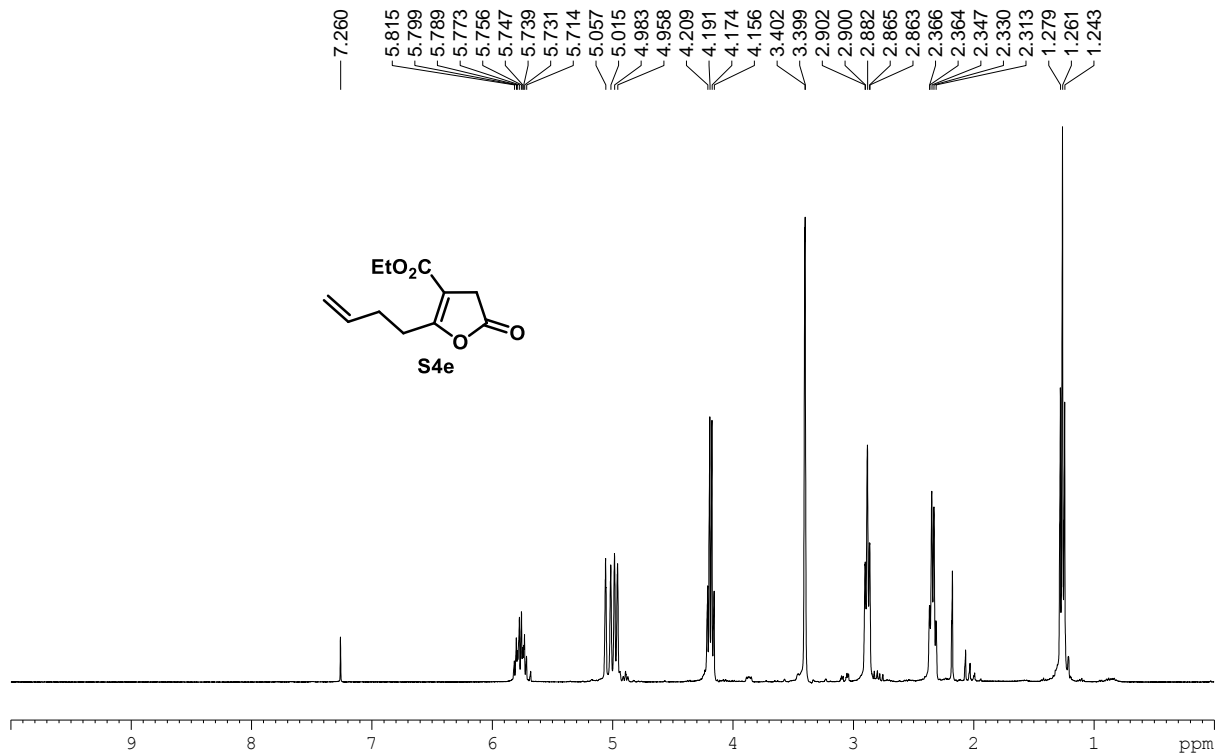
SUPPORTING INFORMATION: PART B

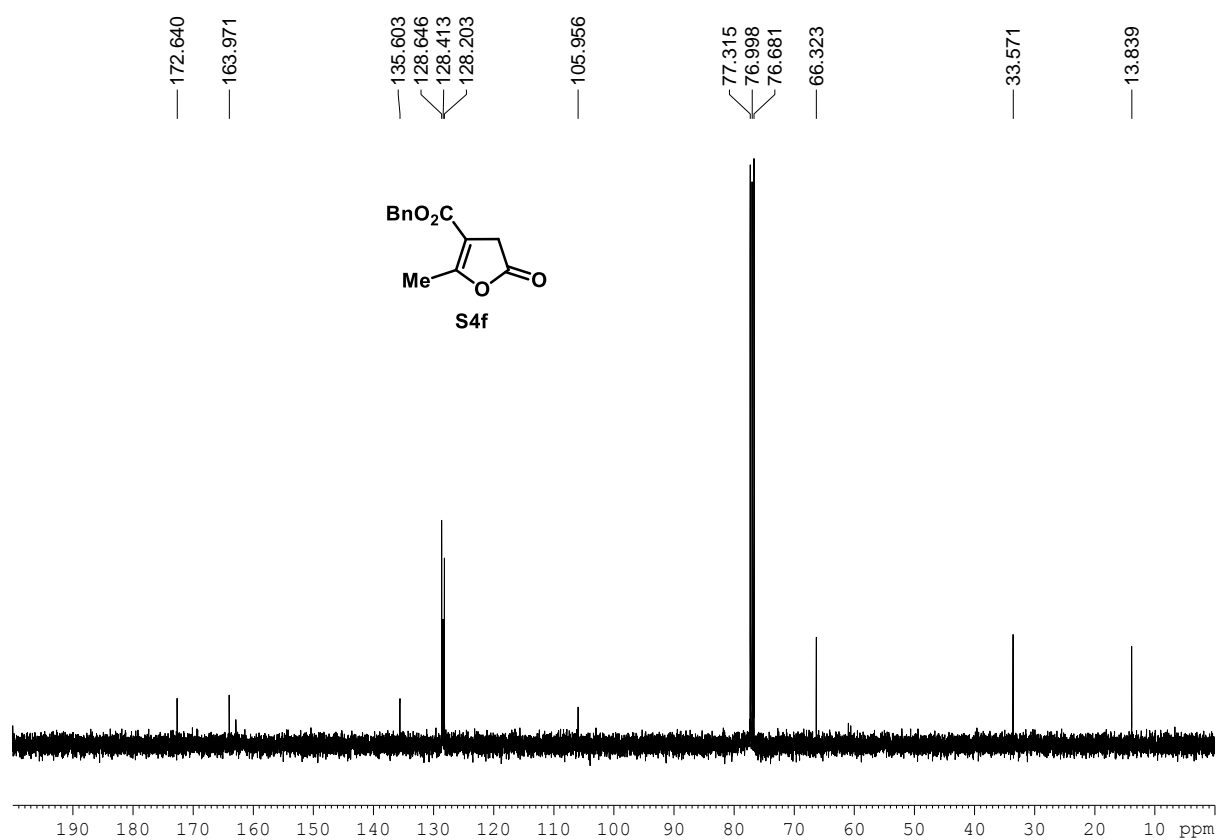
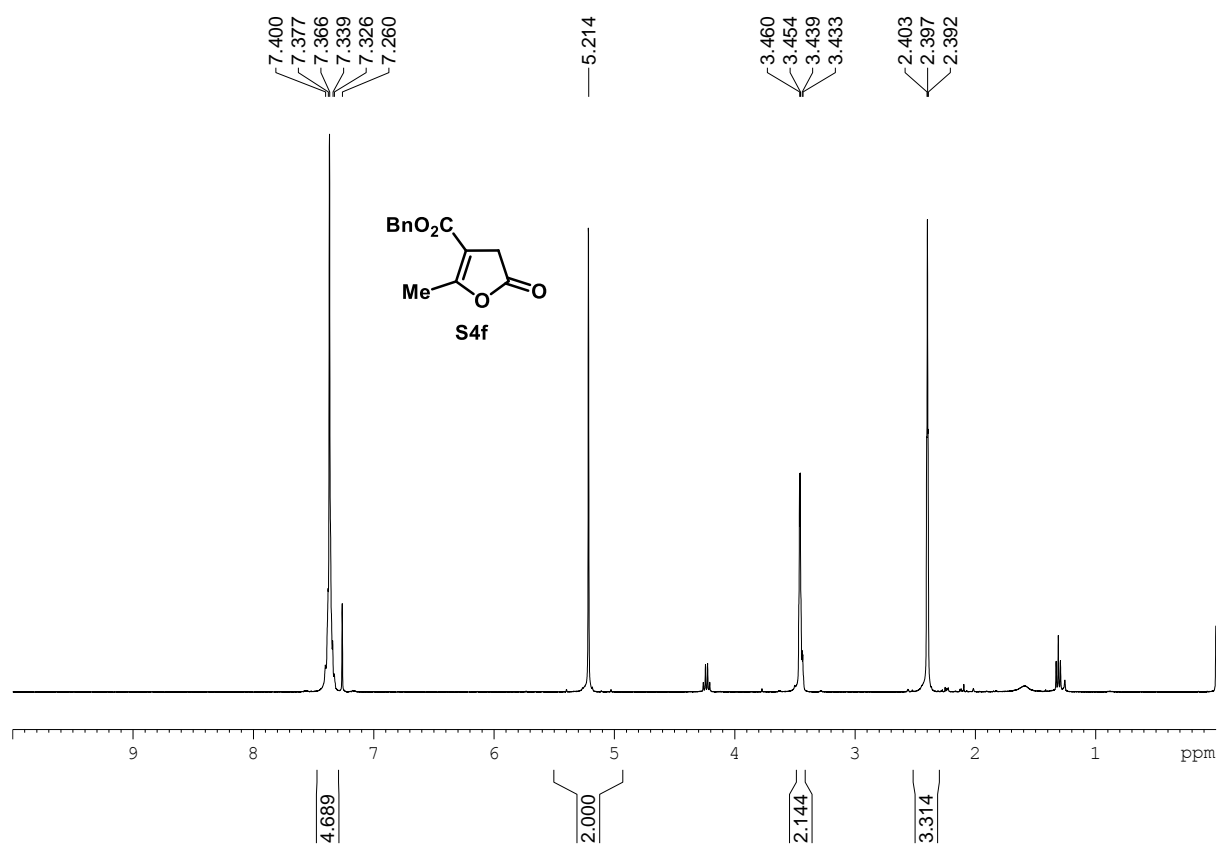


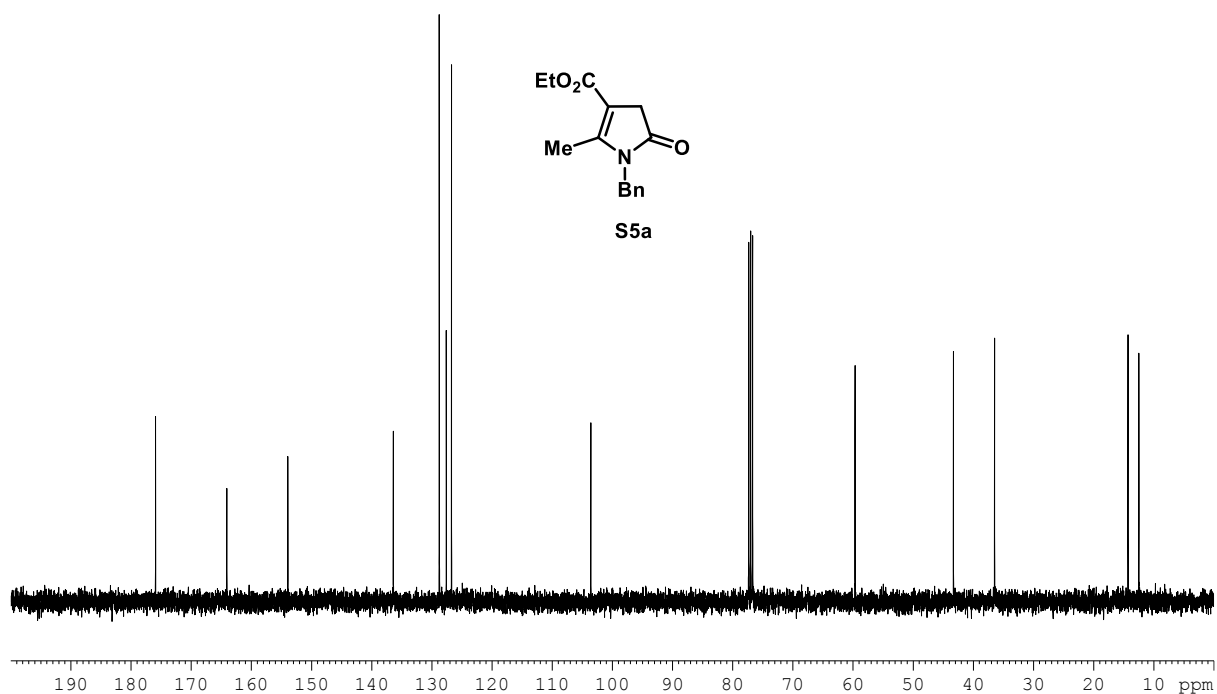
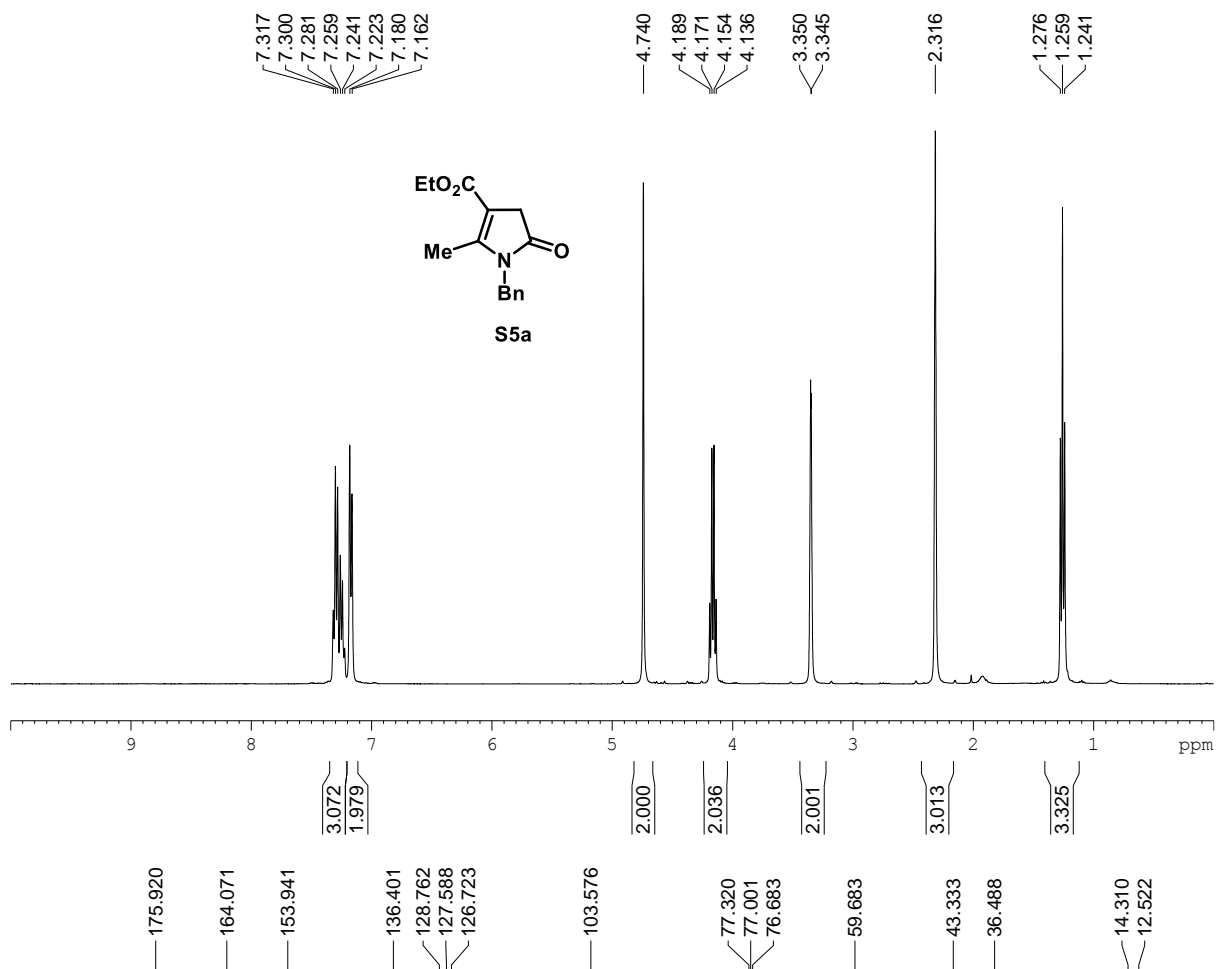


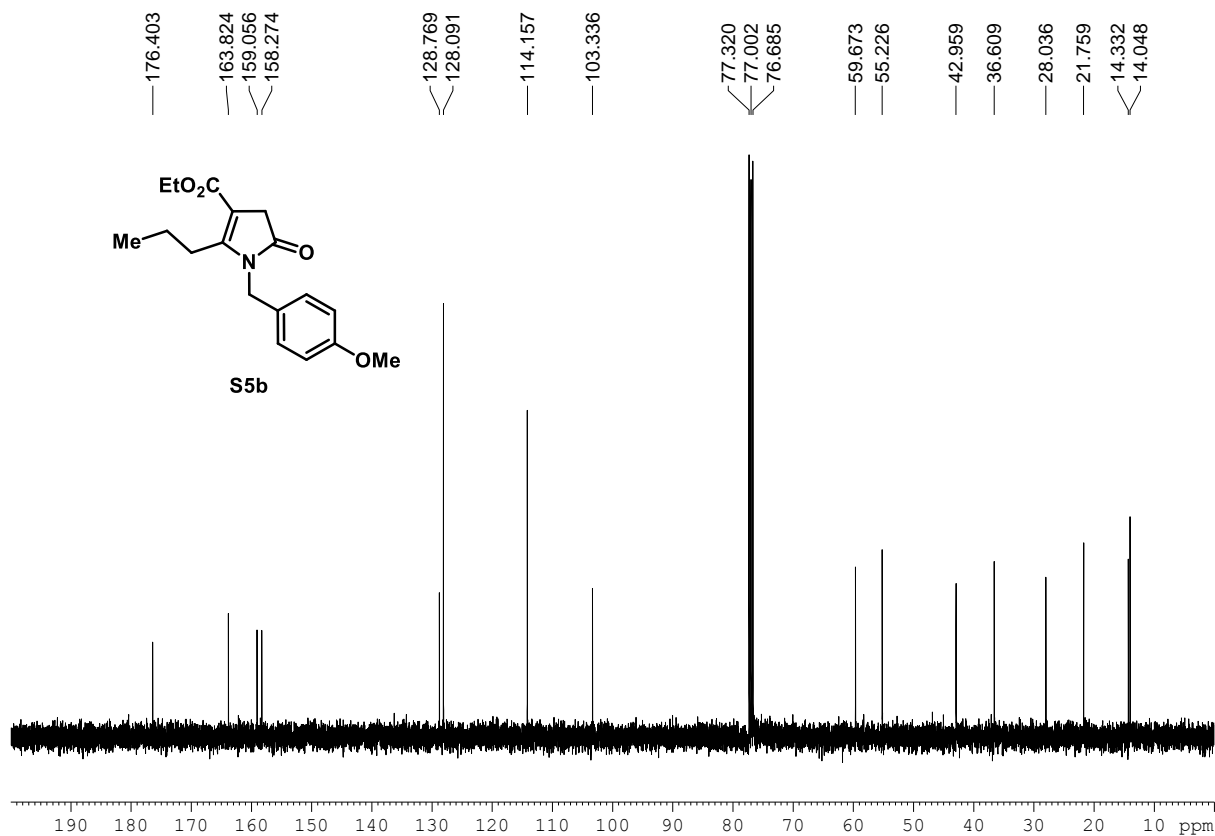
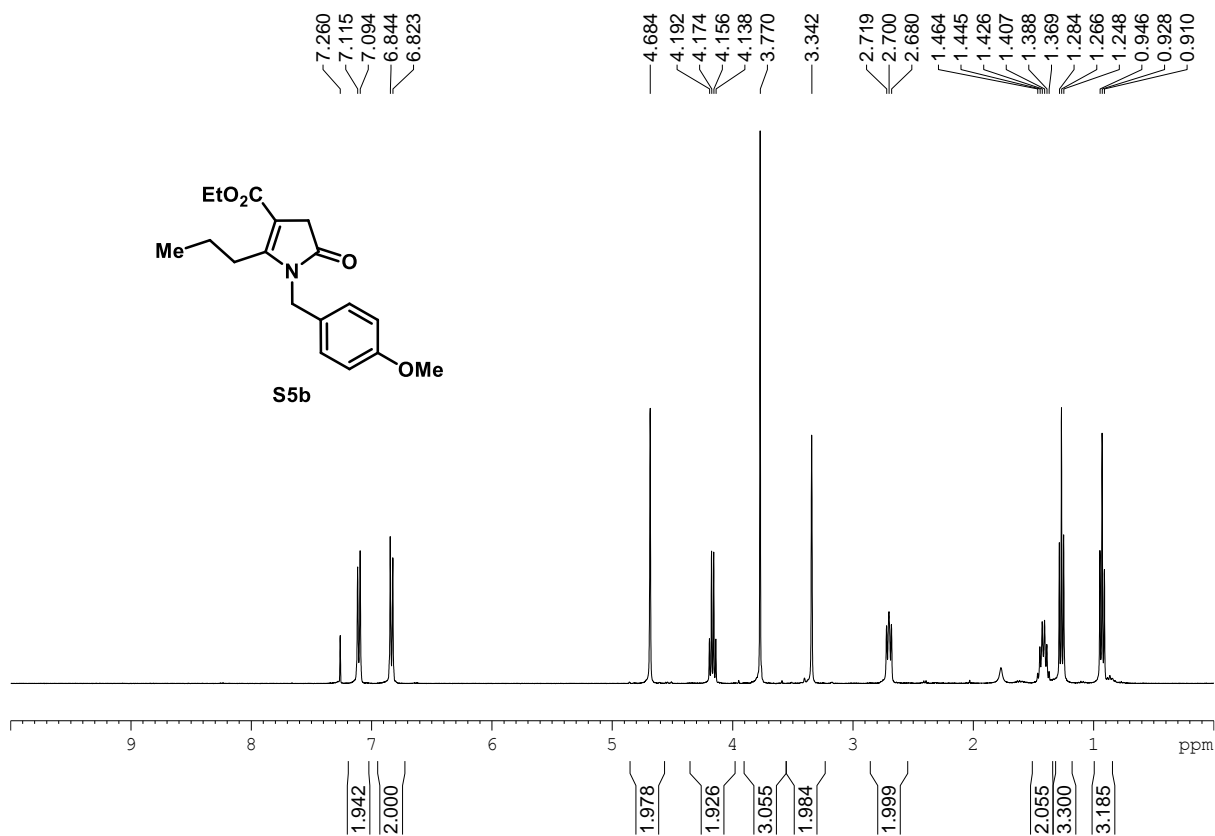


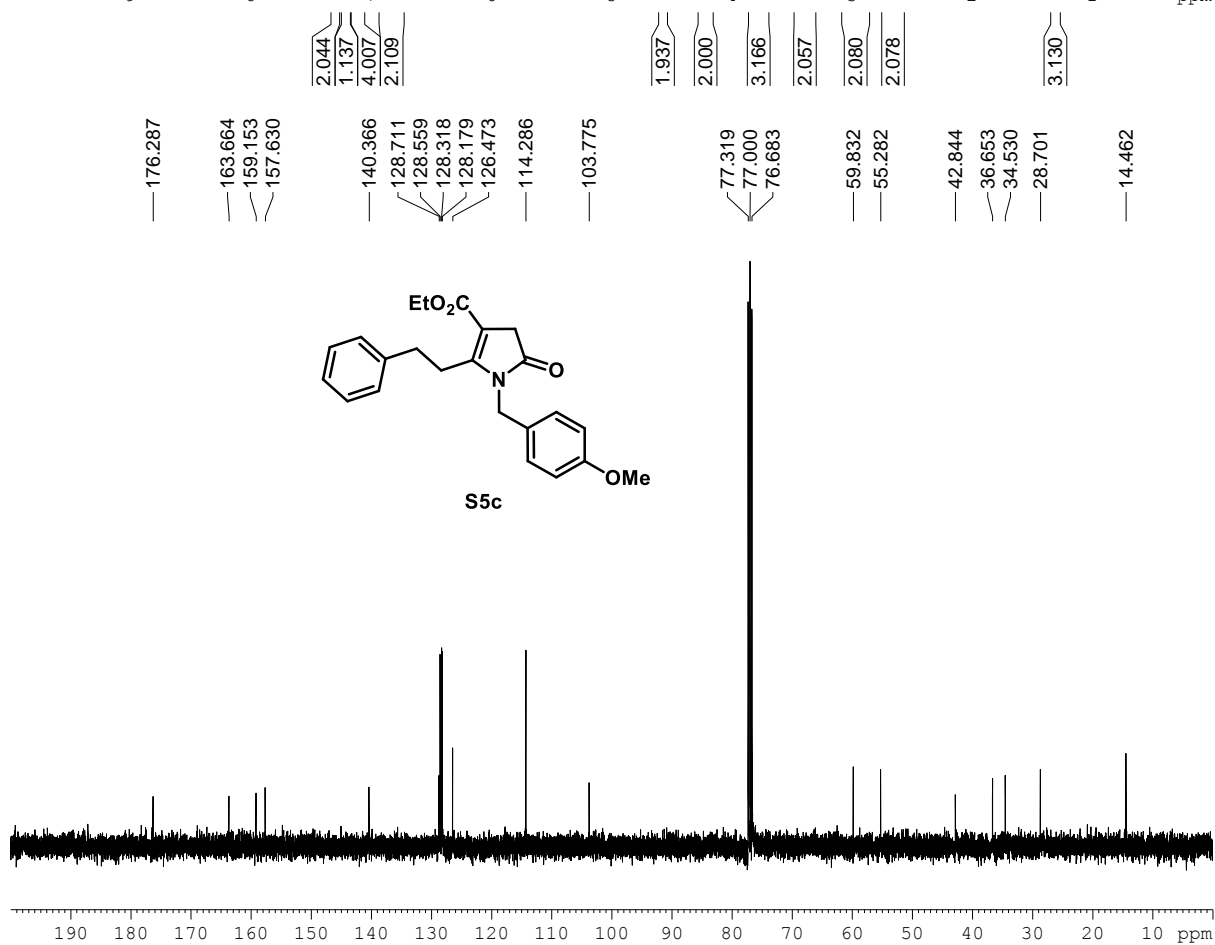
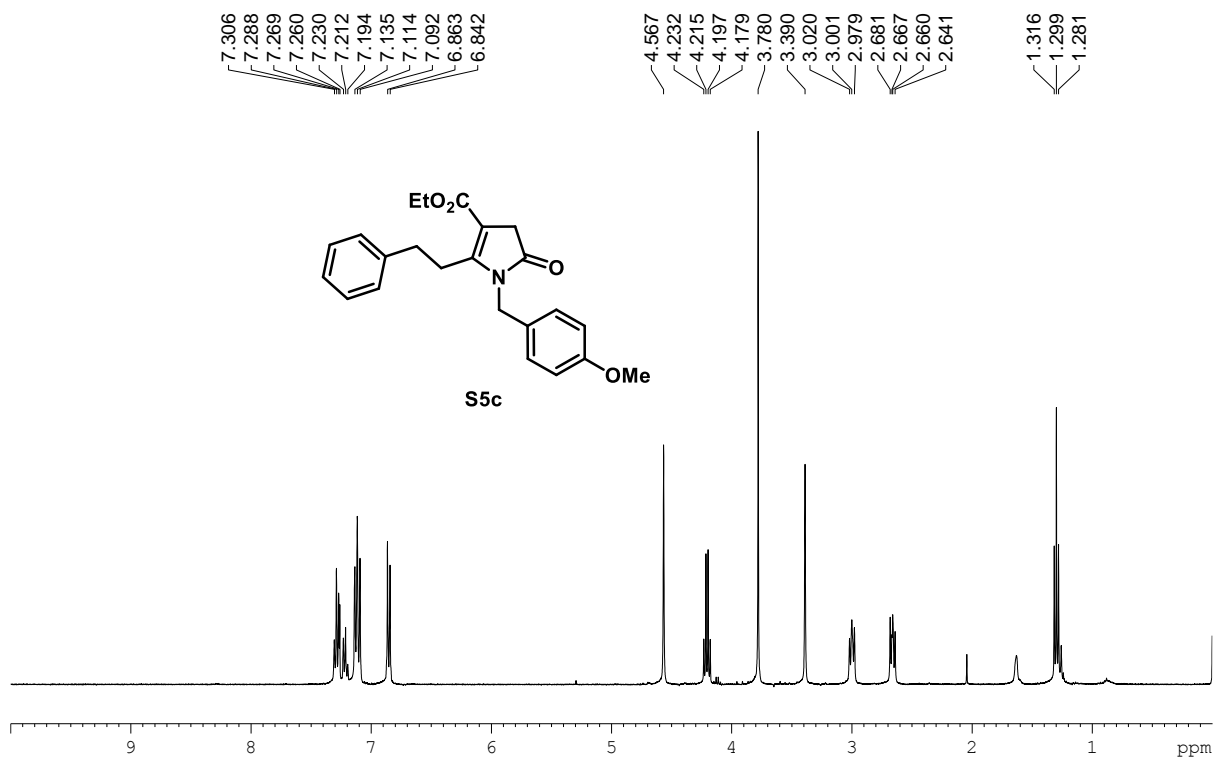


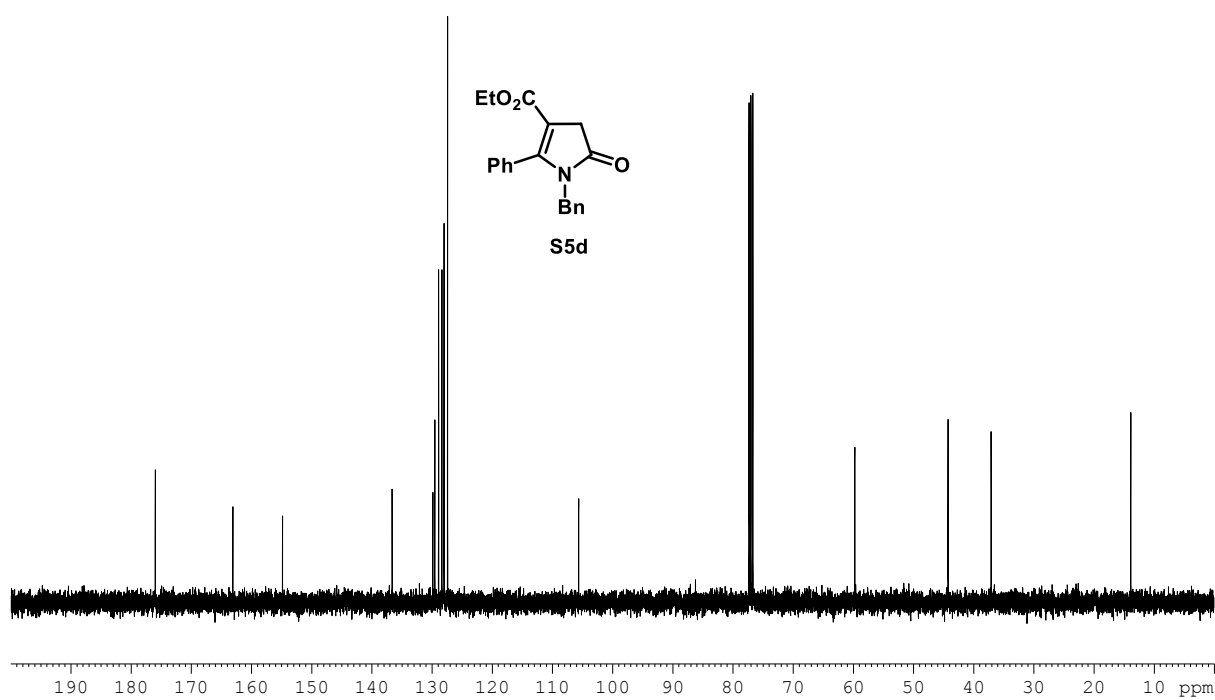
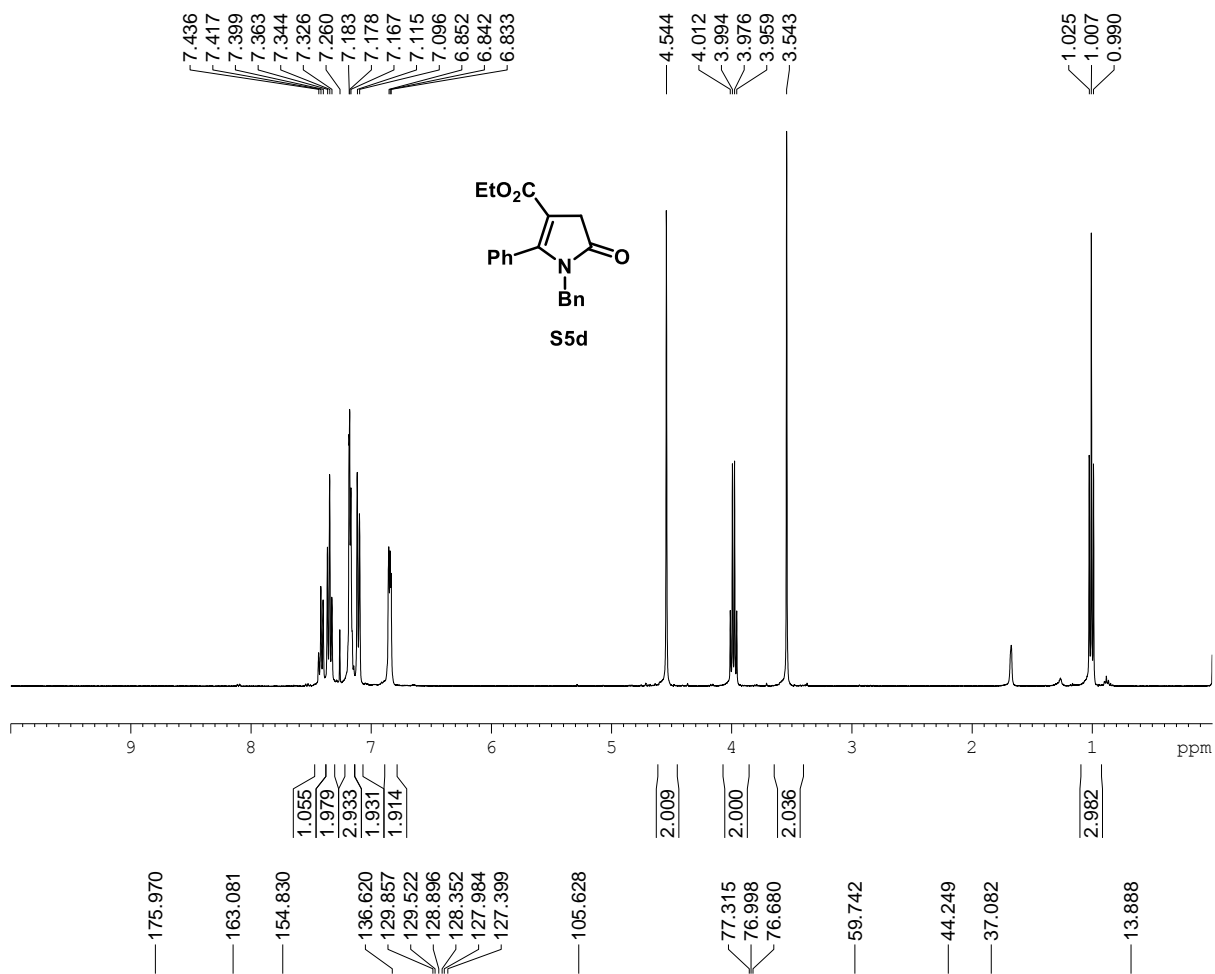


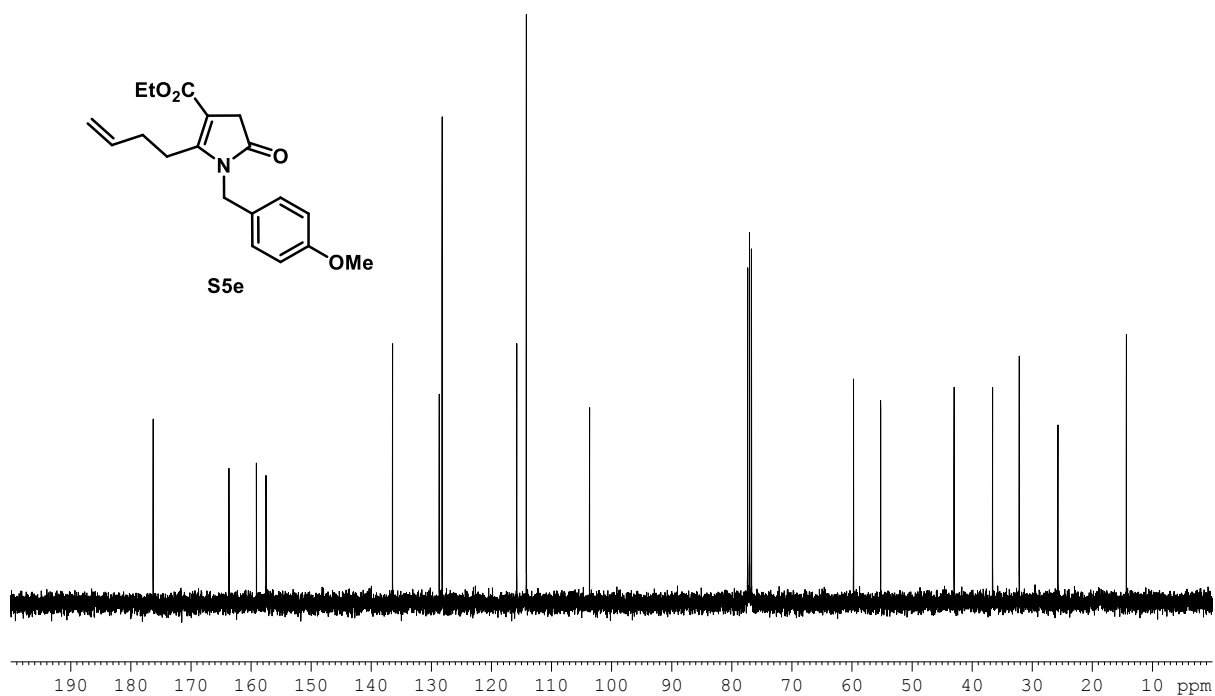
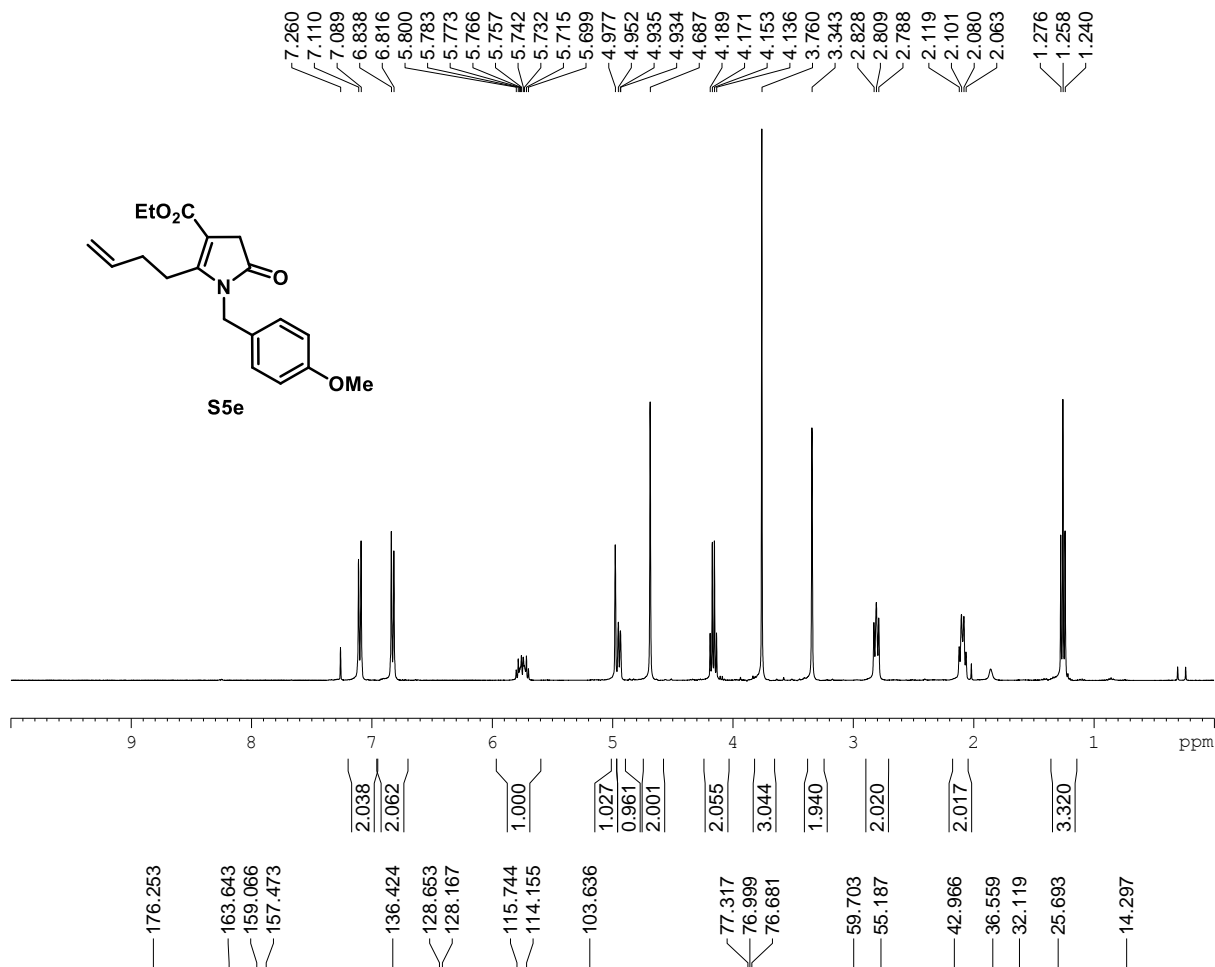


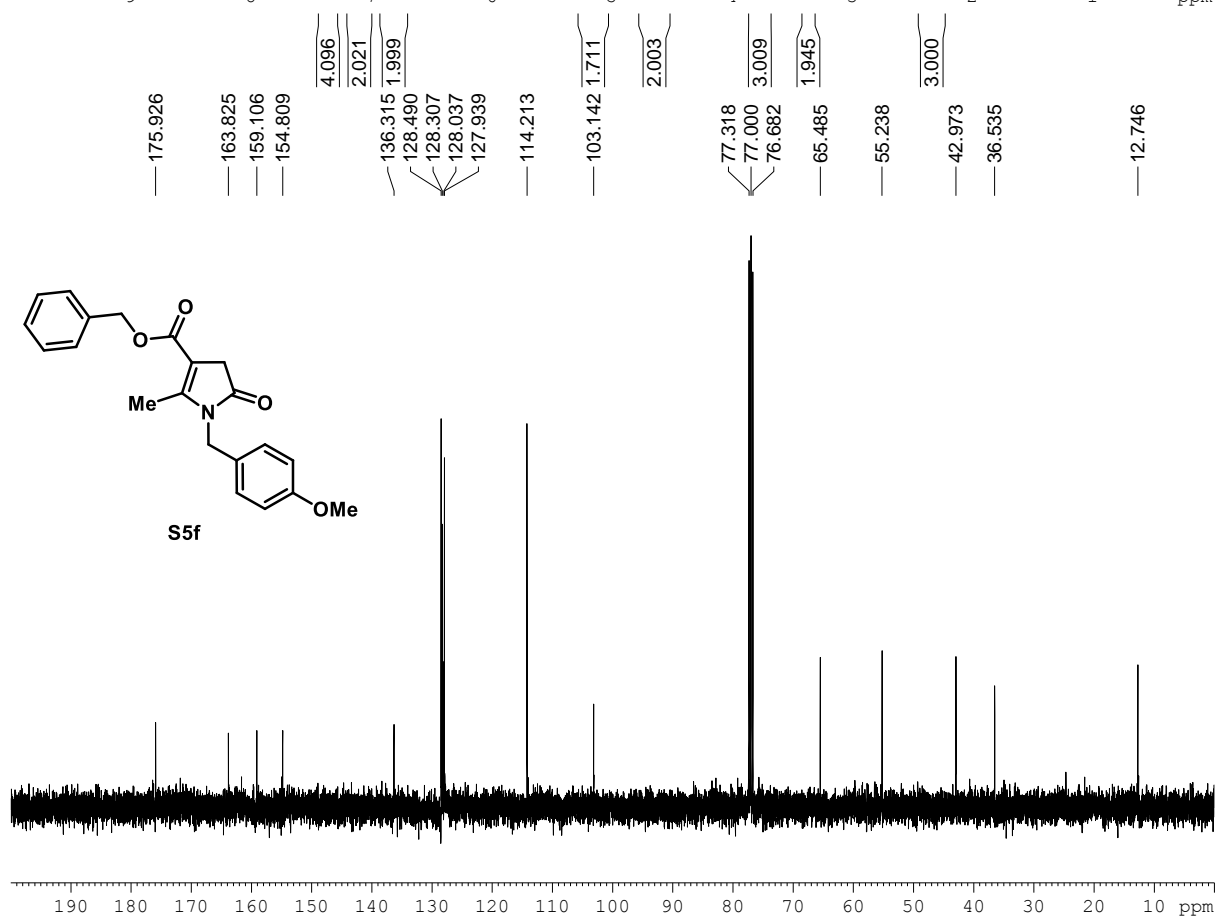
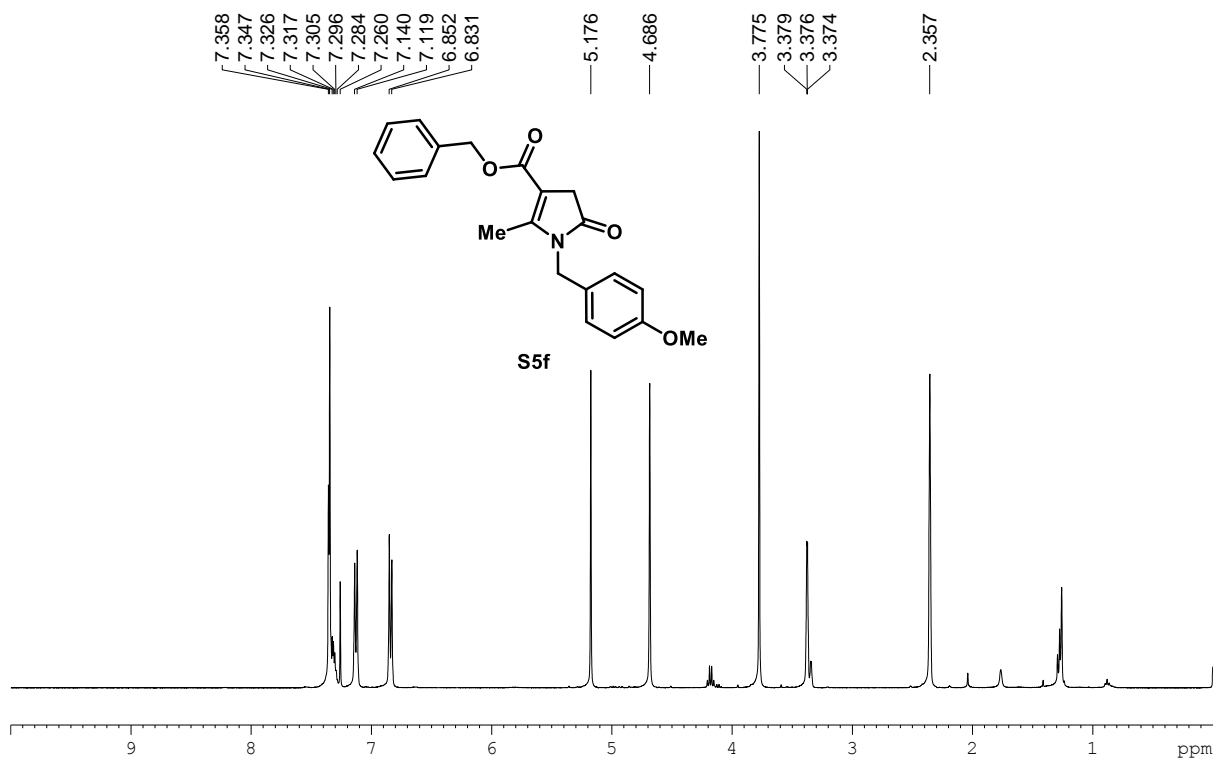


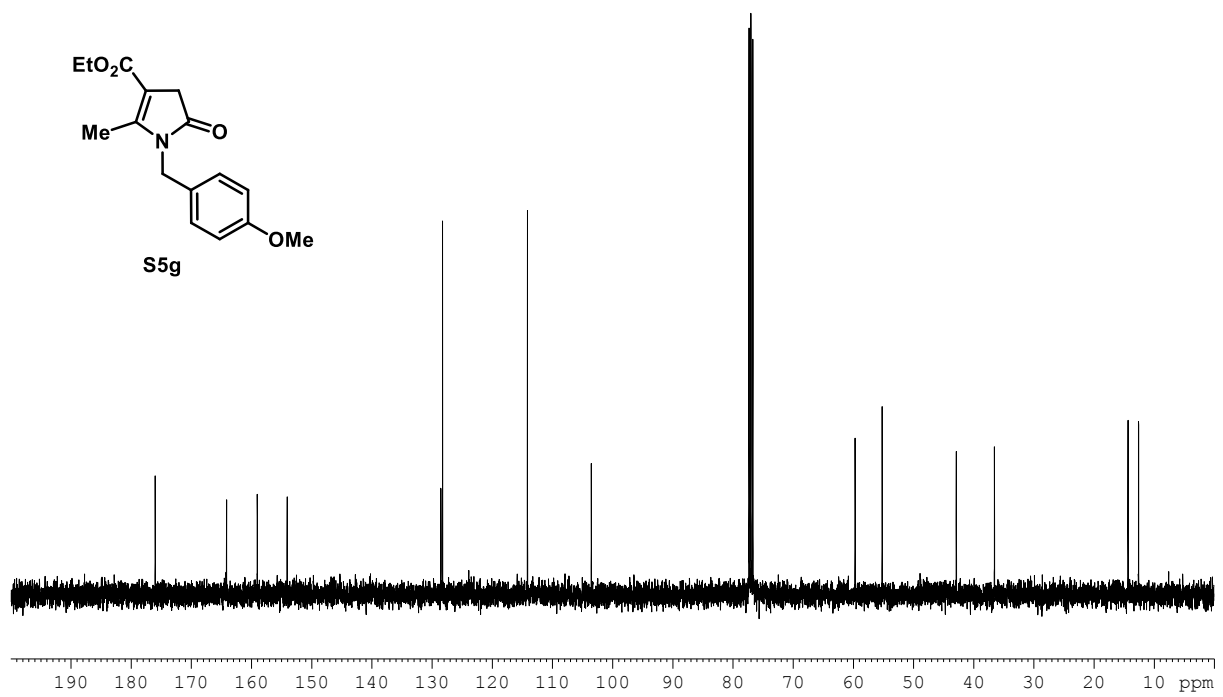
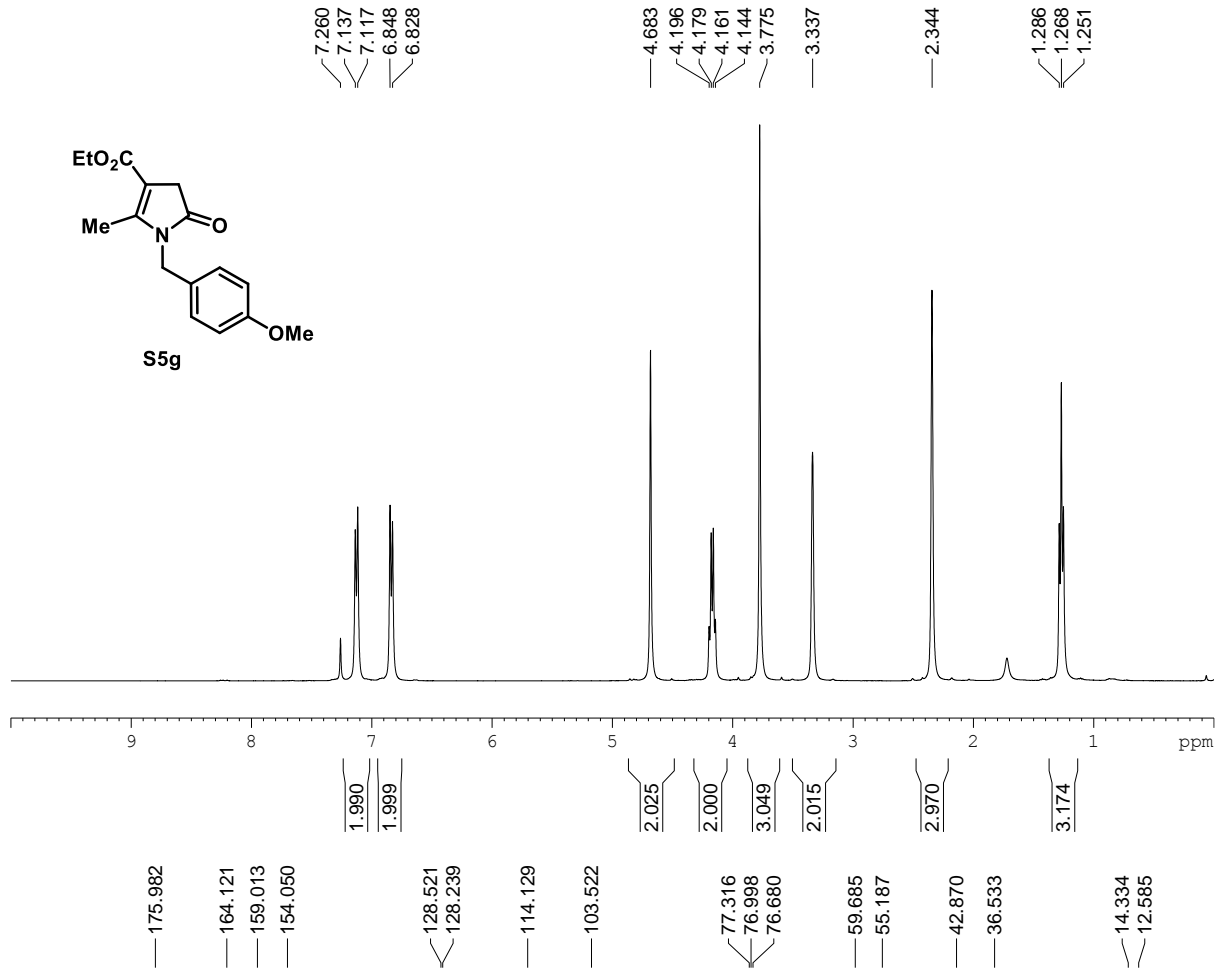


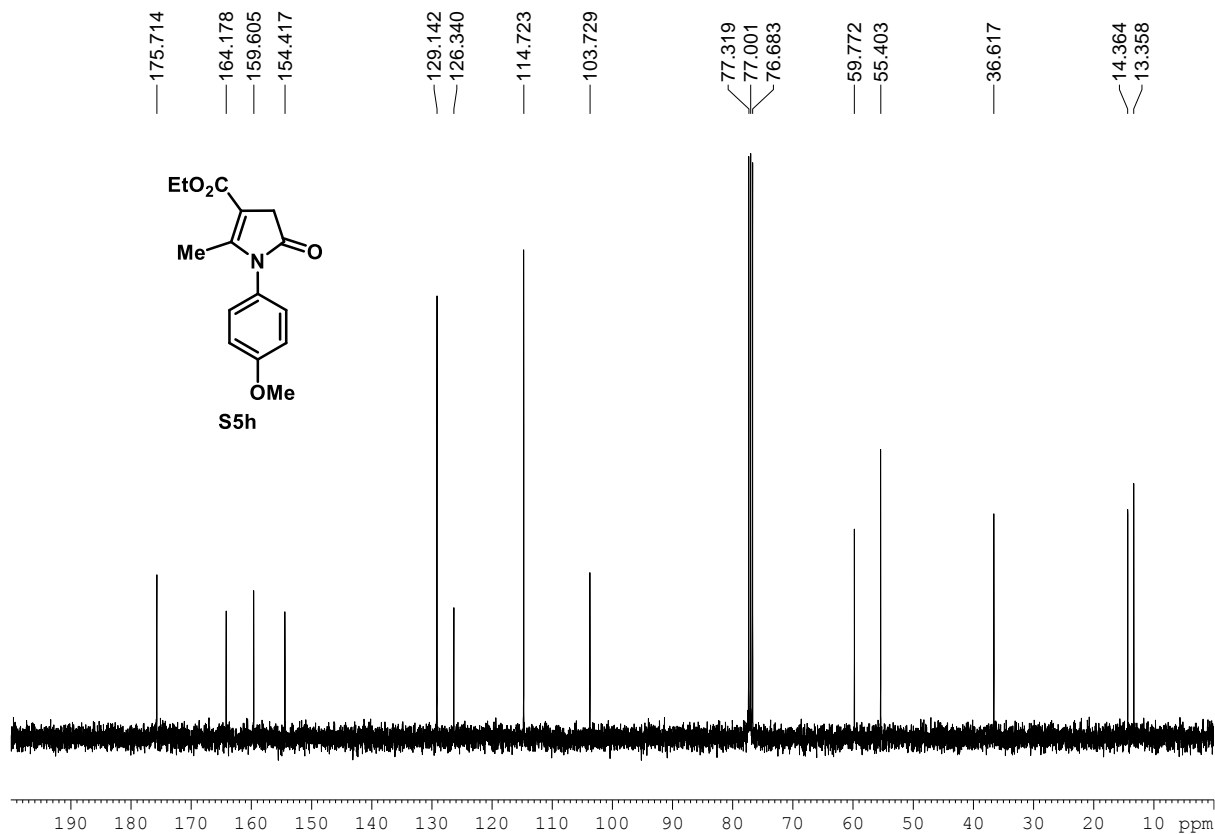
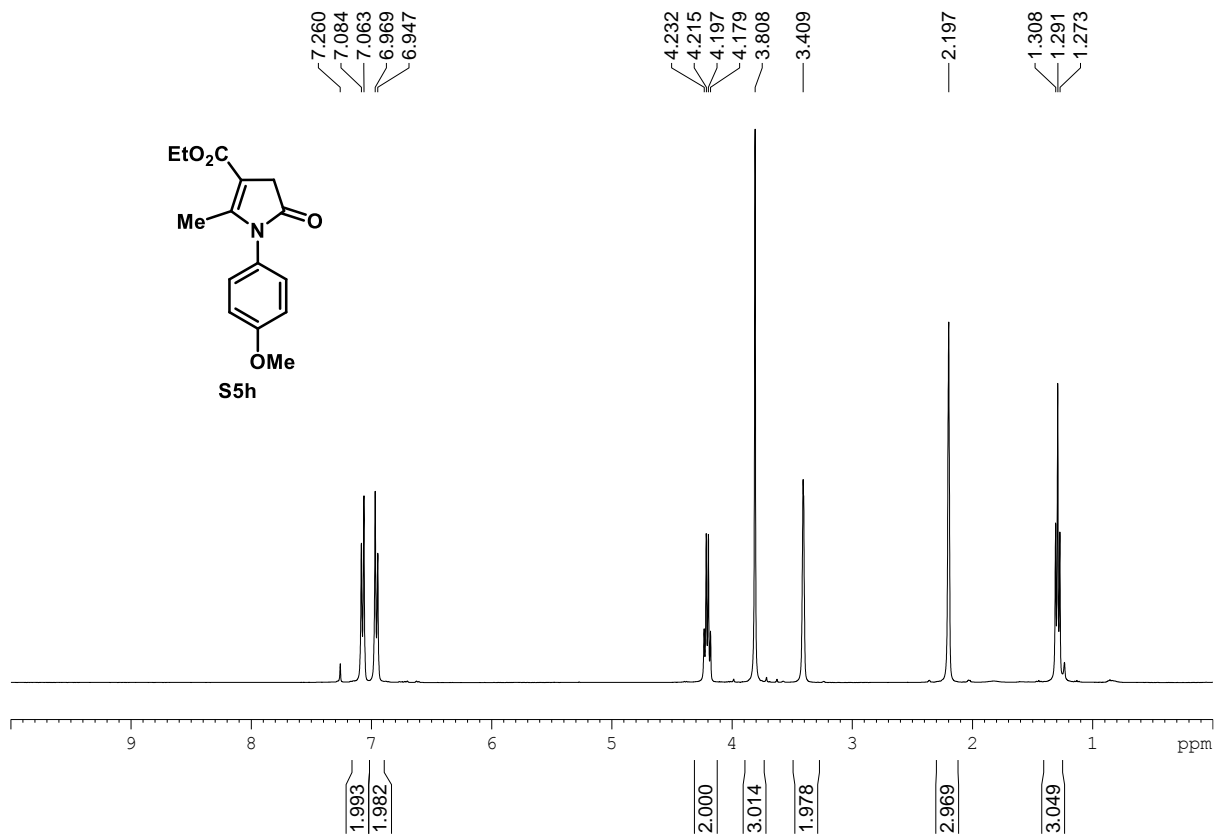


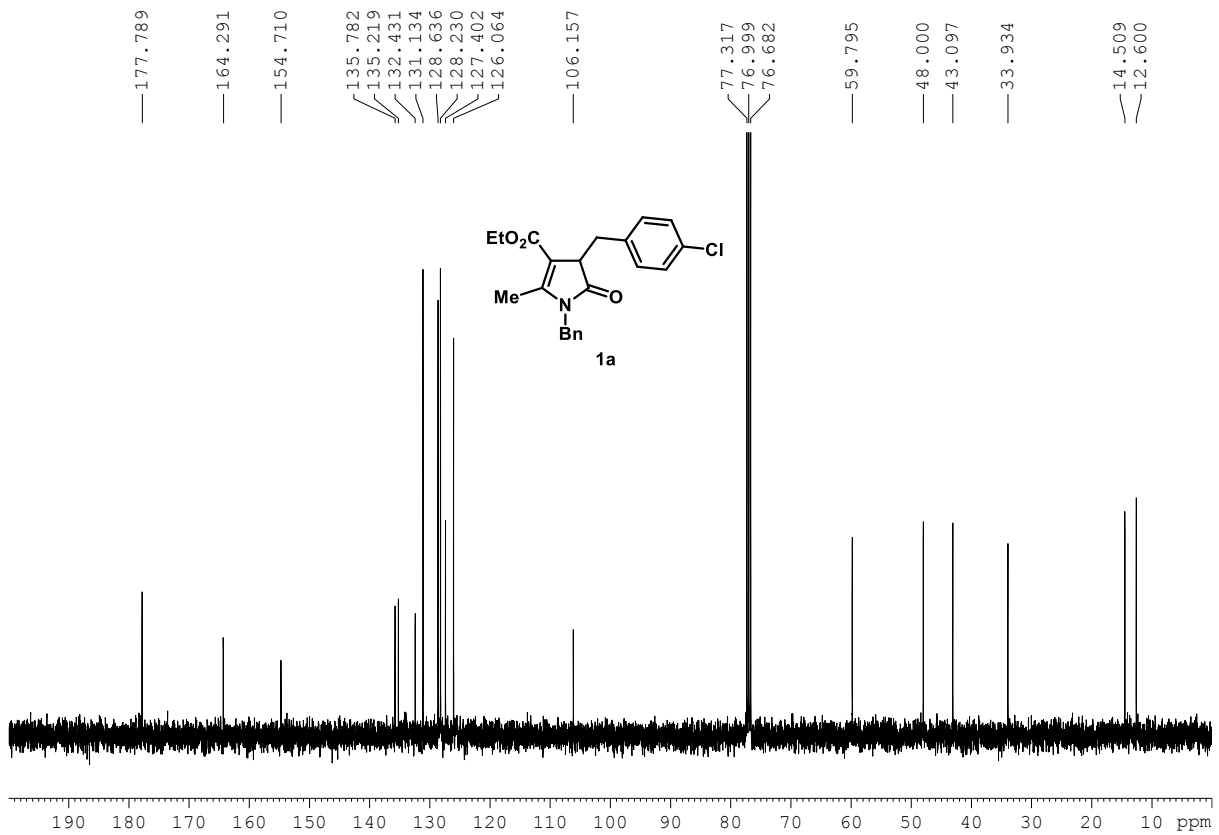
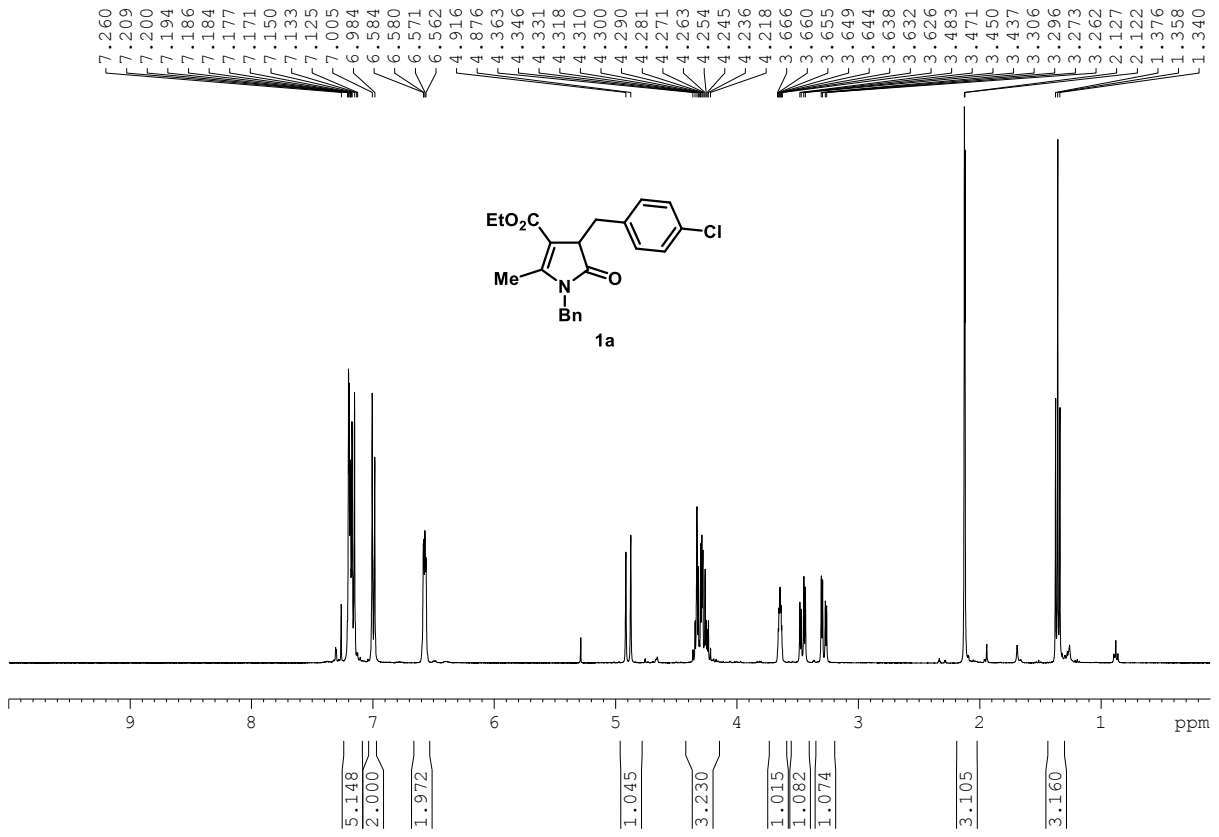


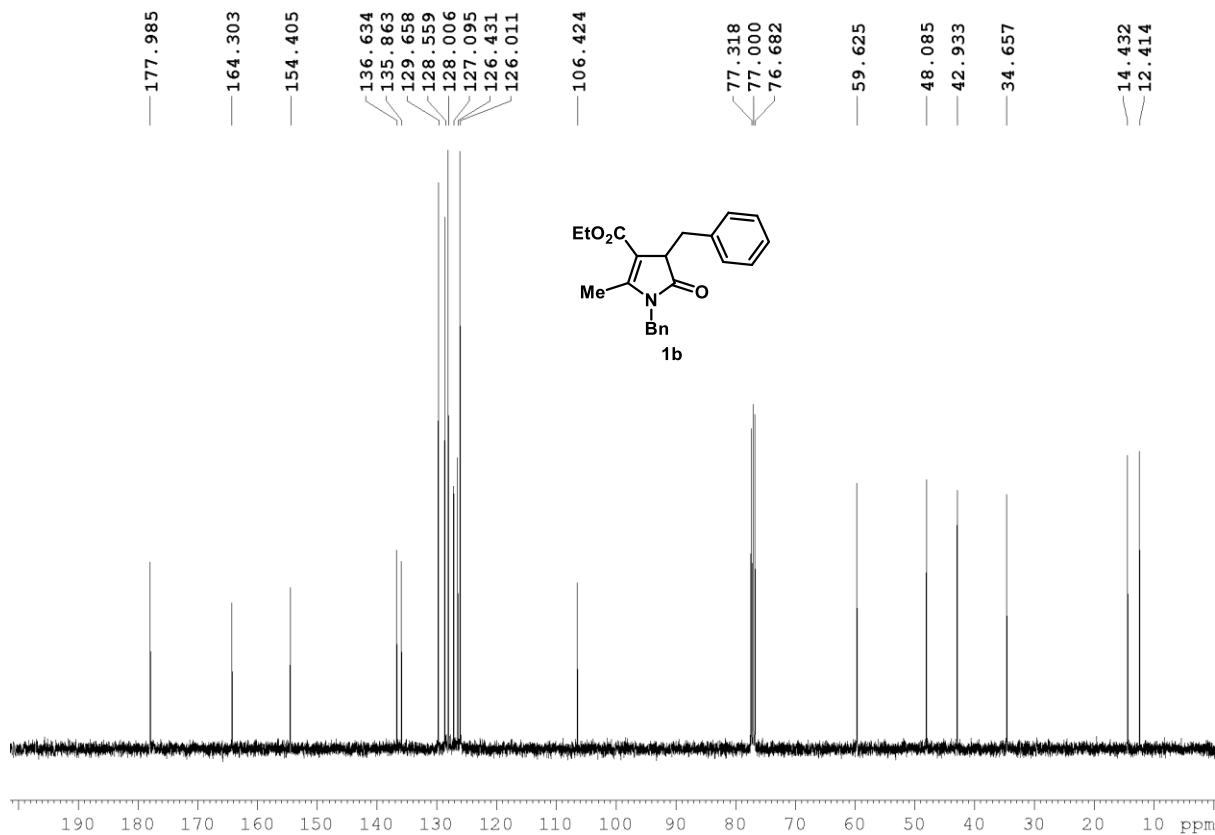
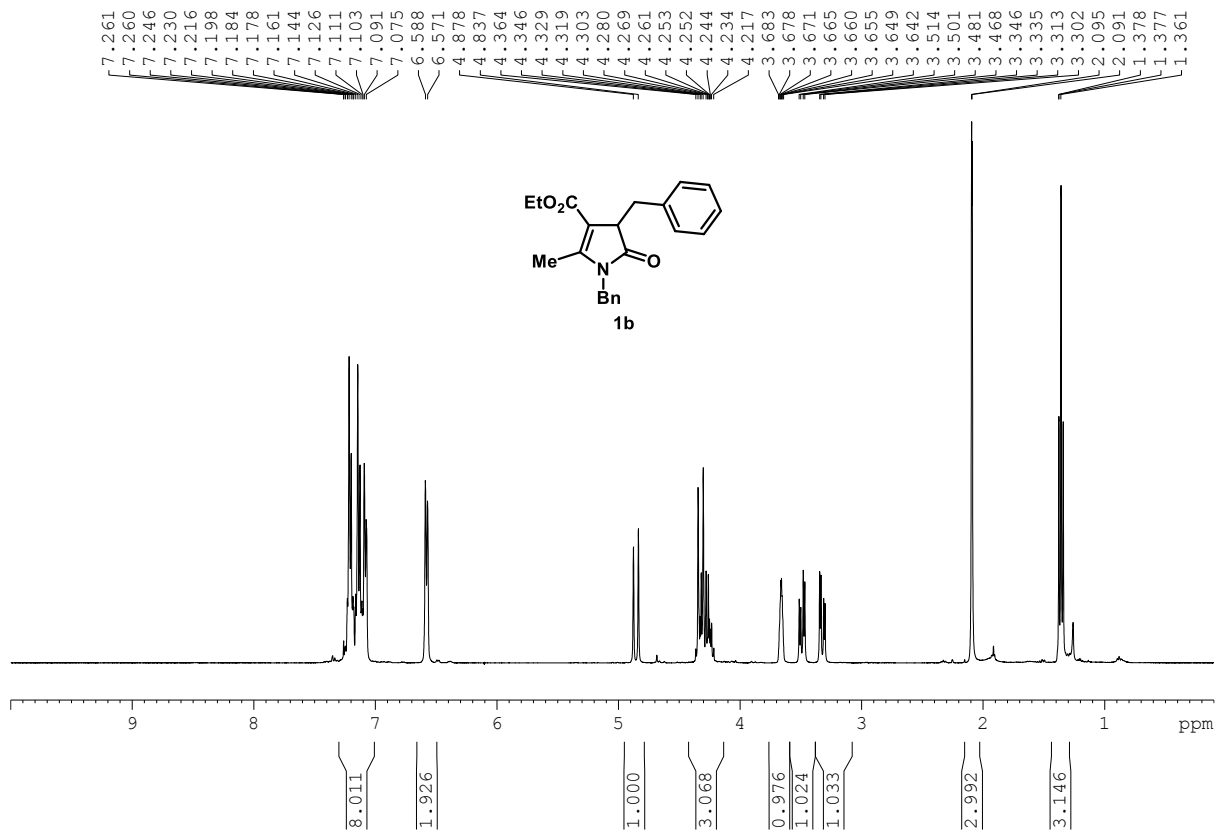


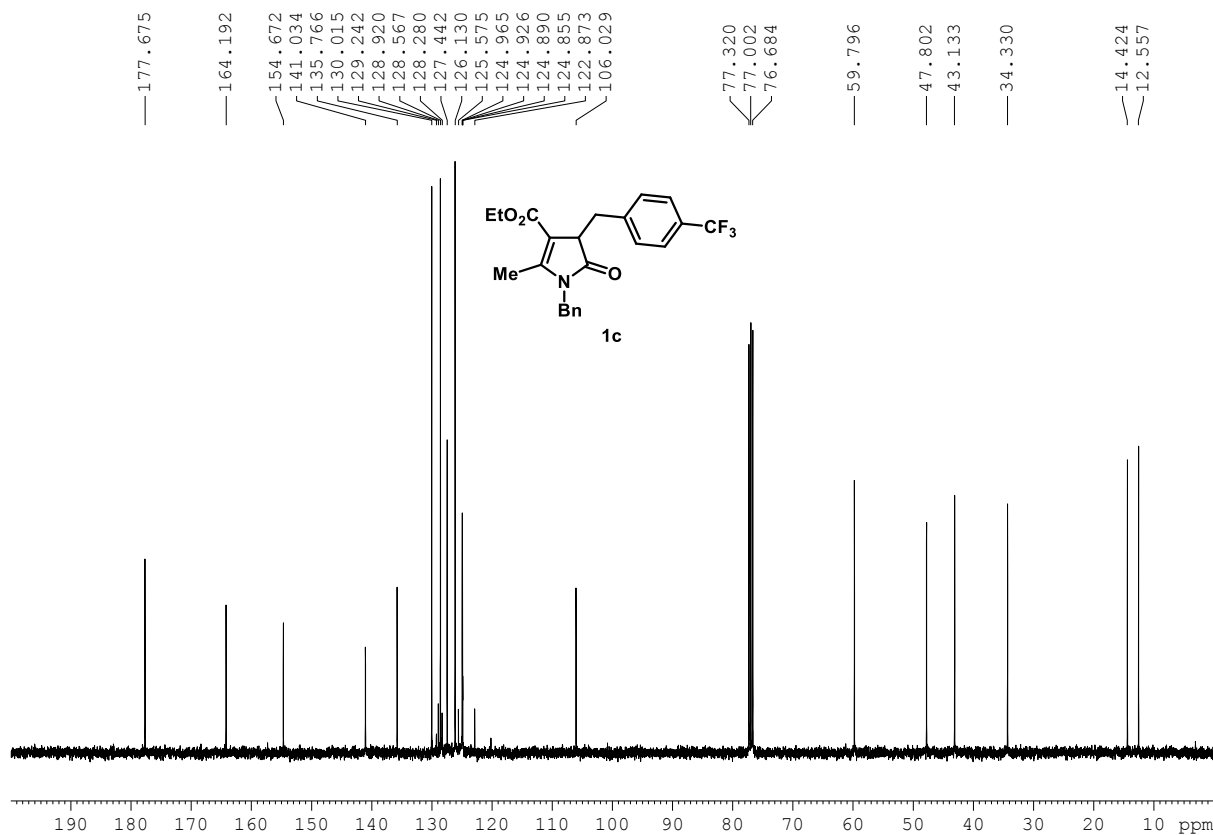
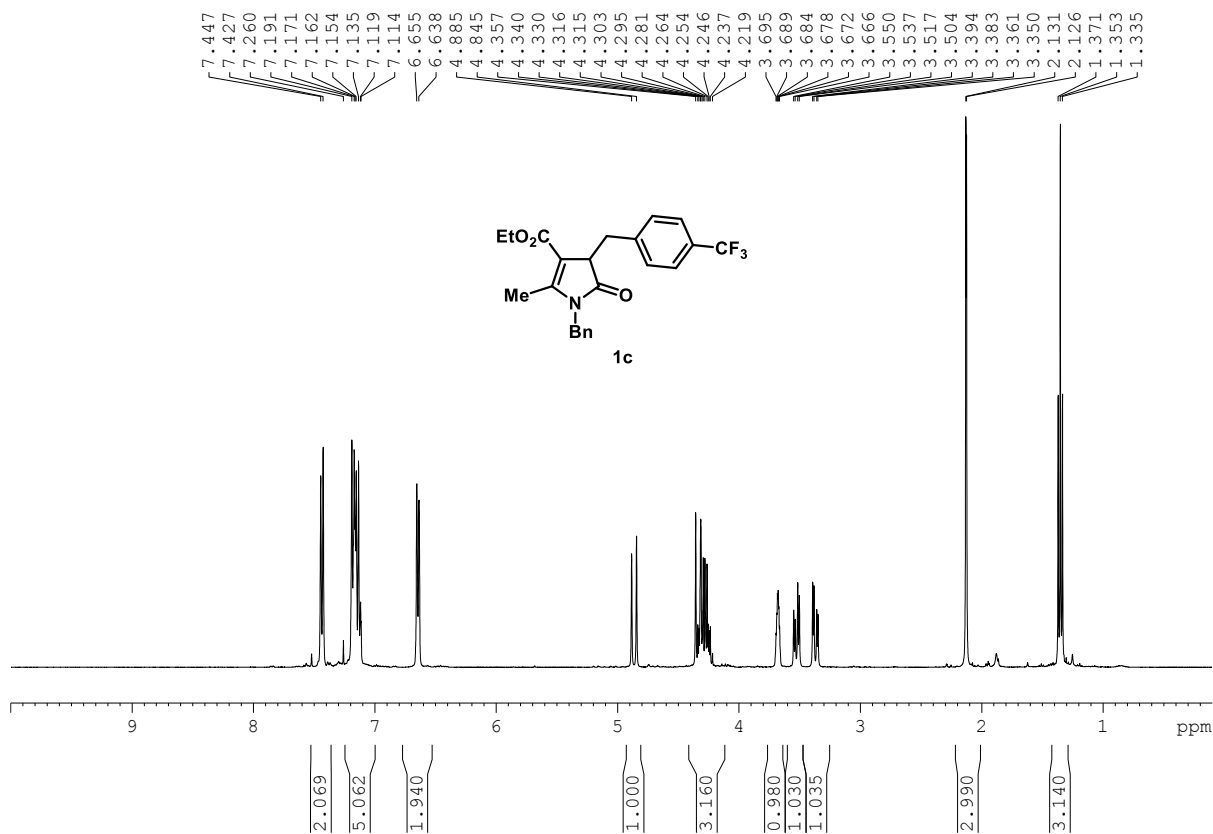


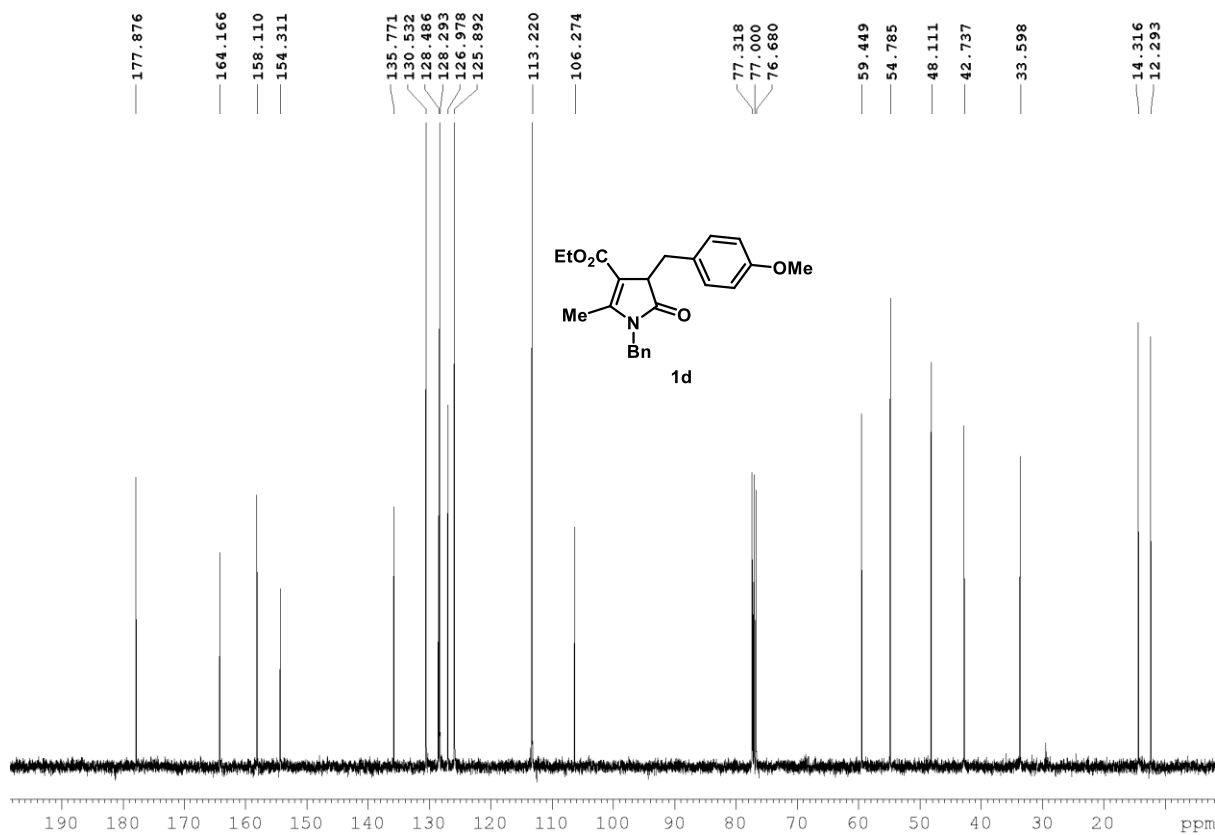
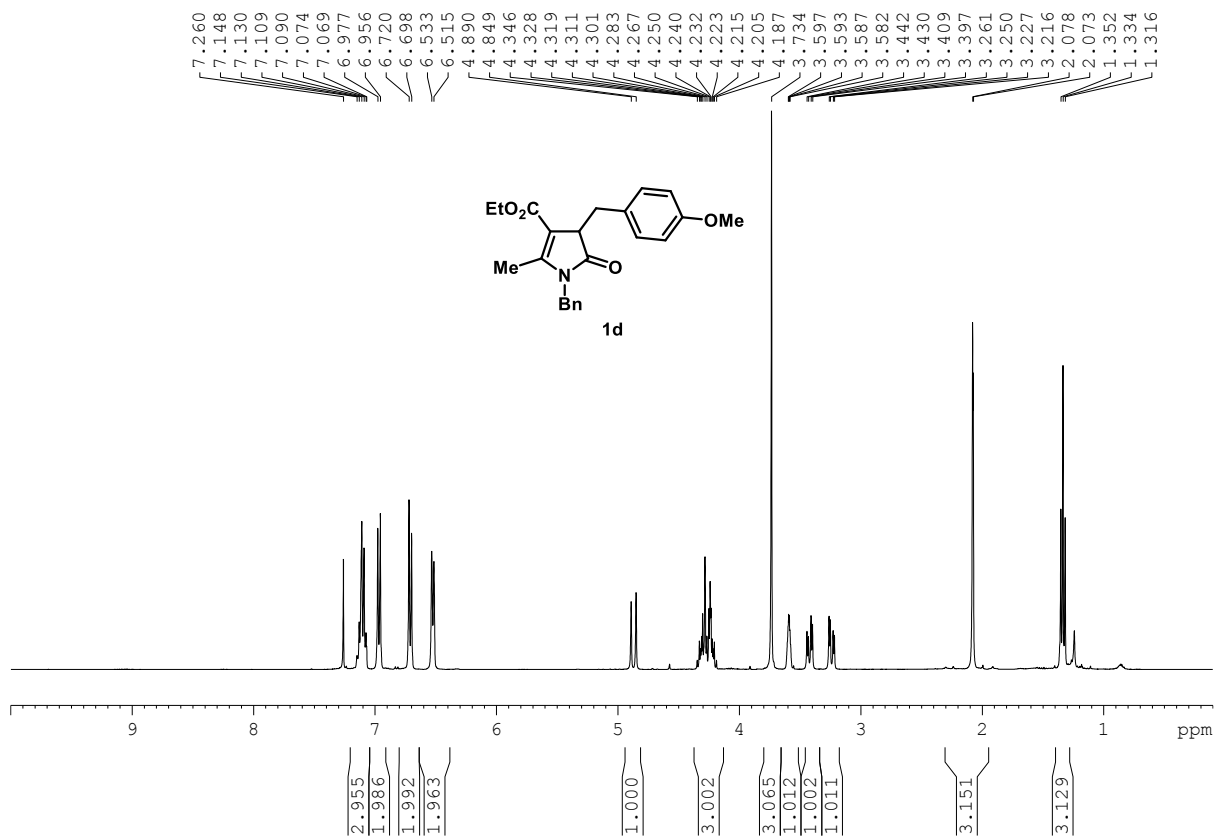


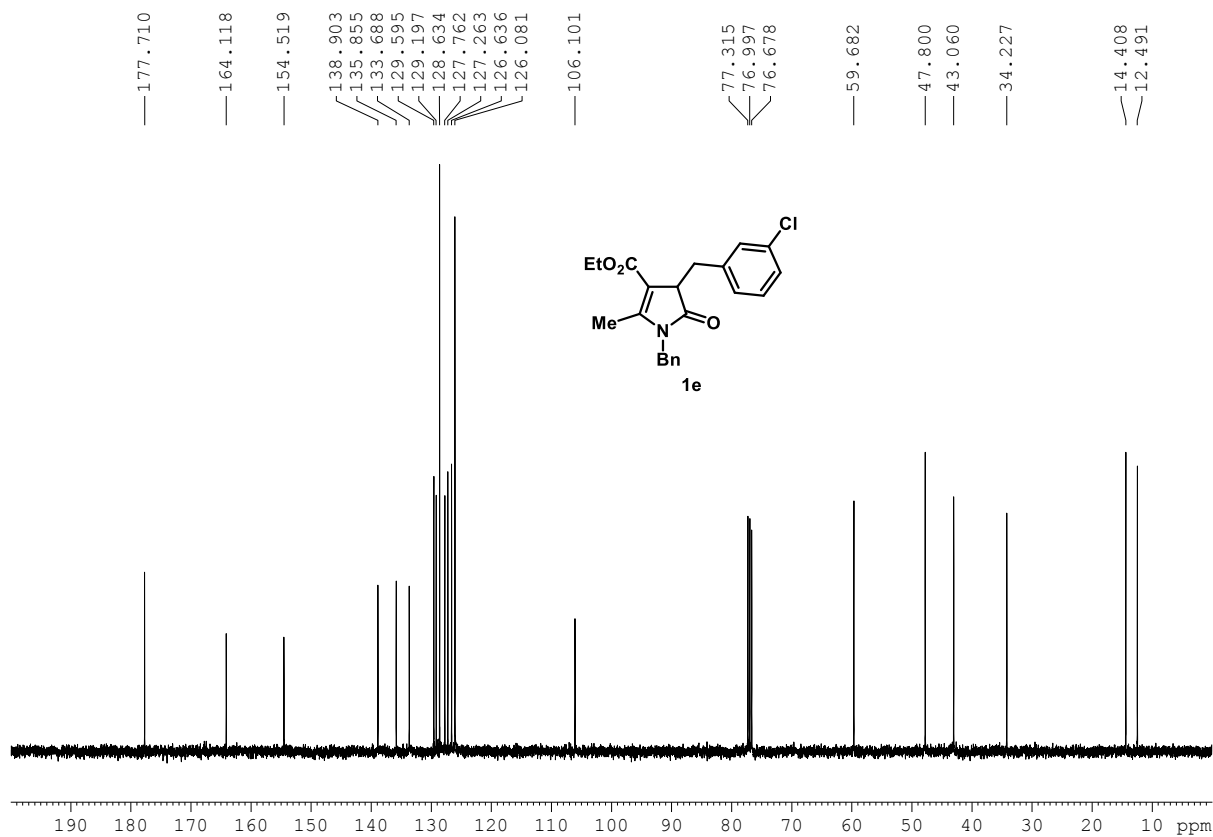
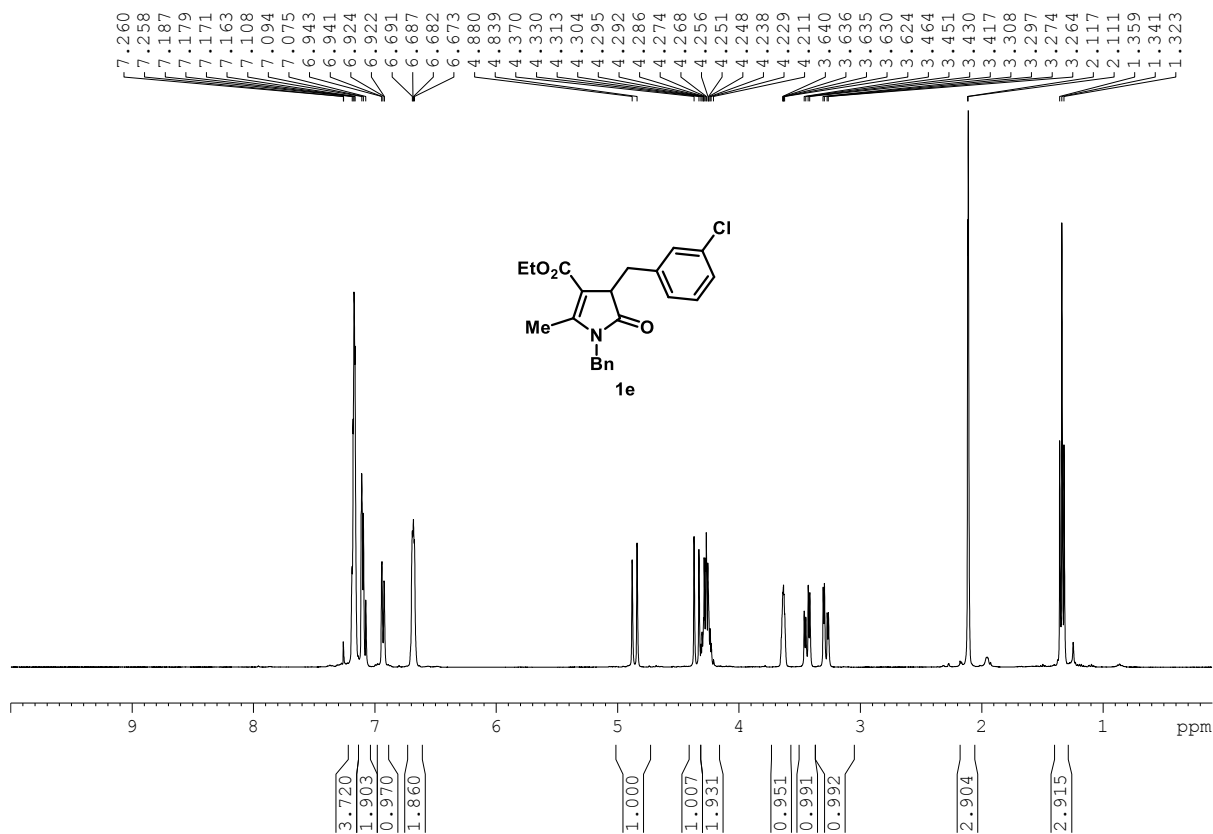


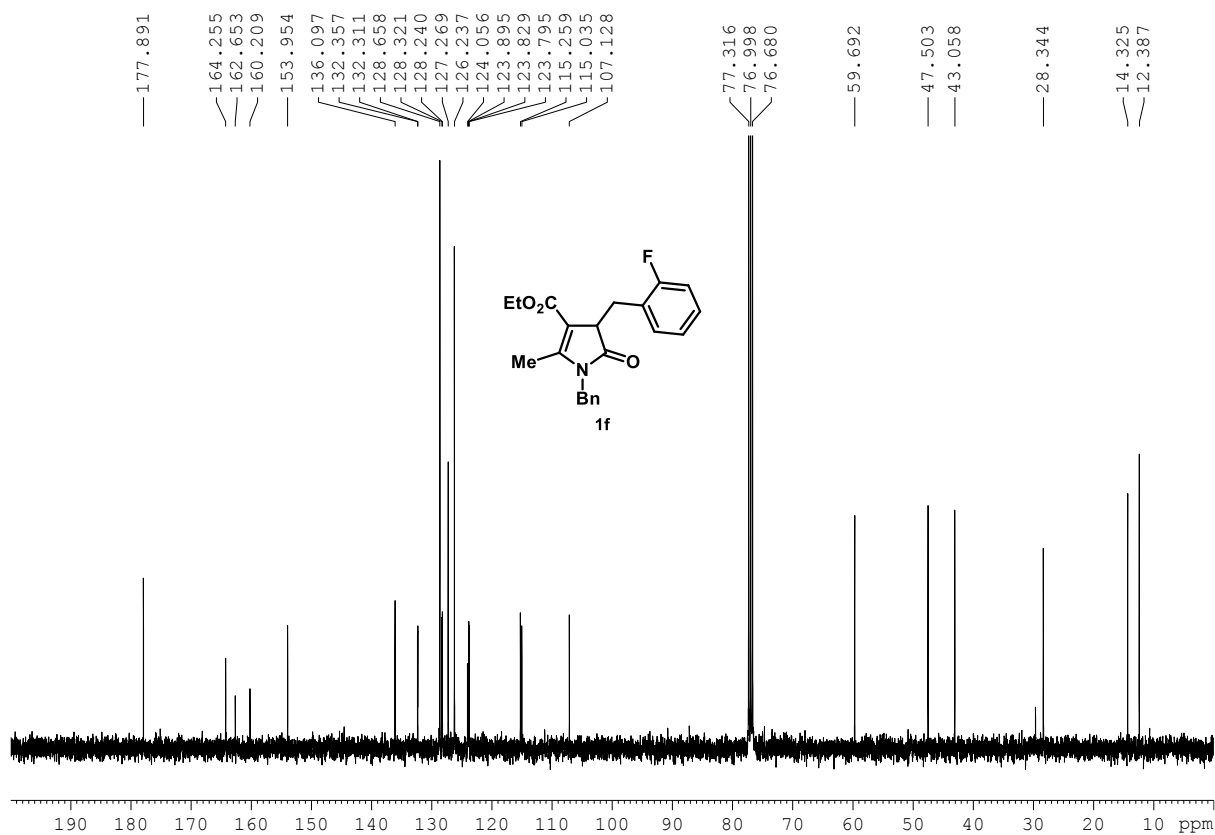
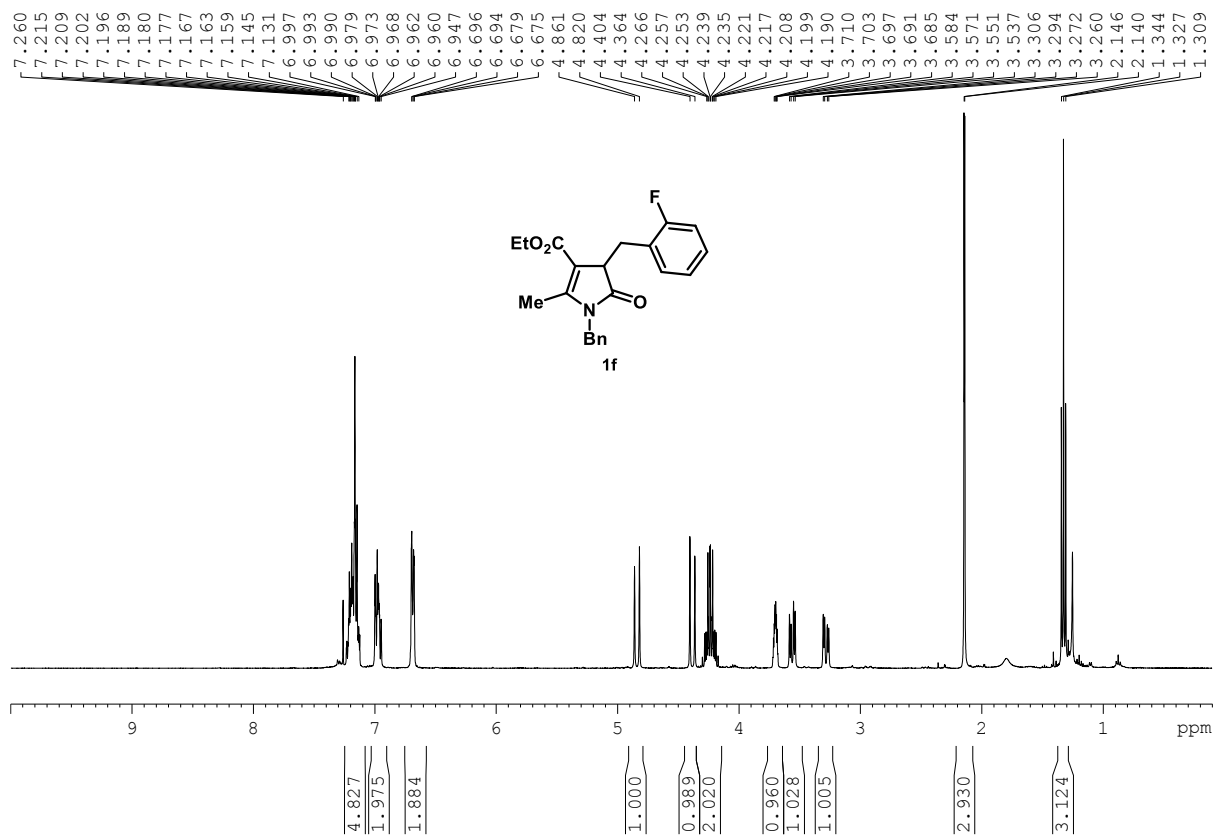


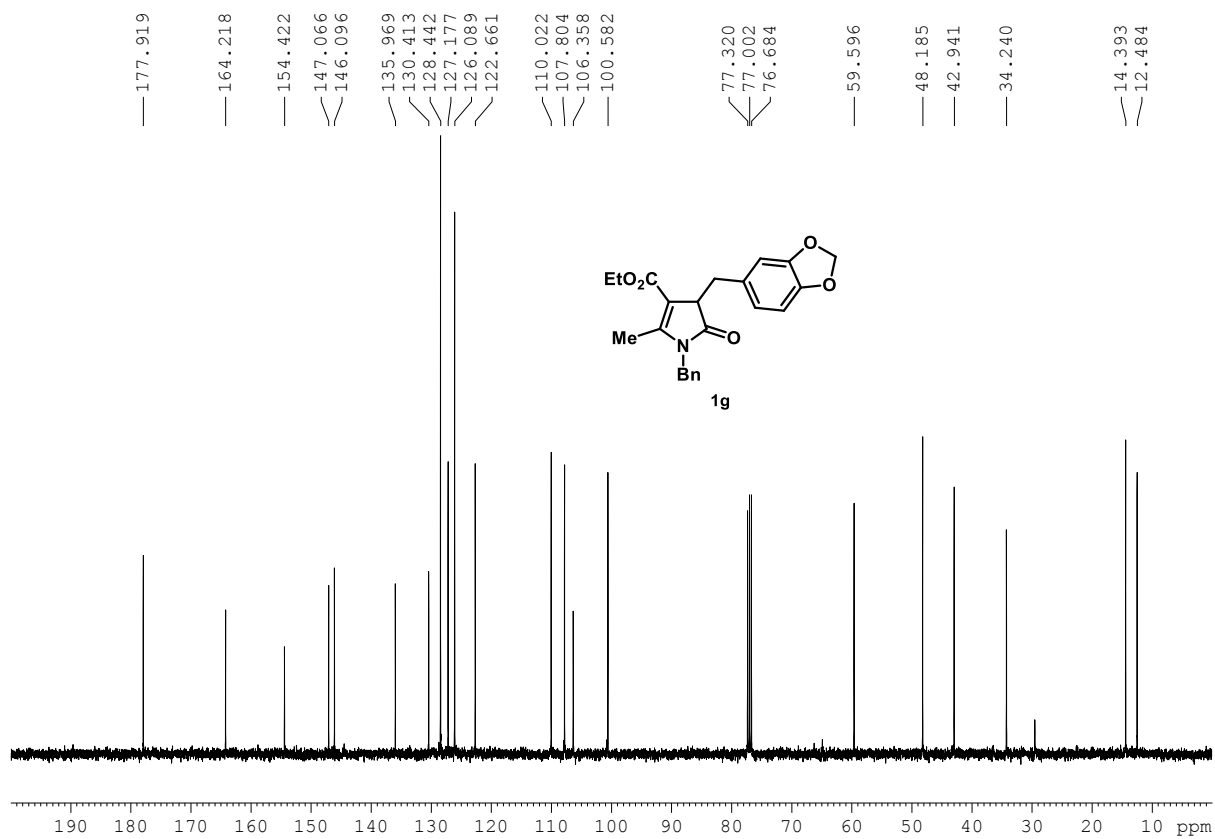
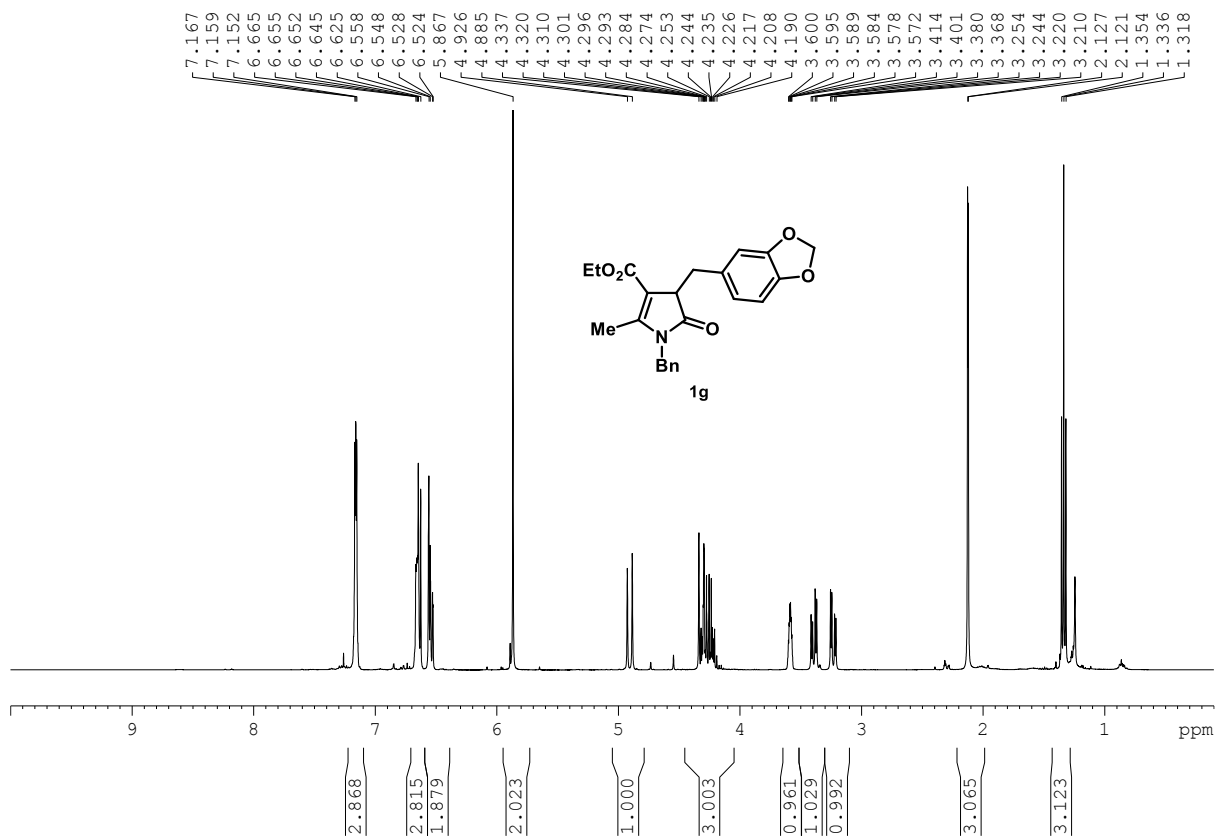


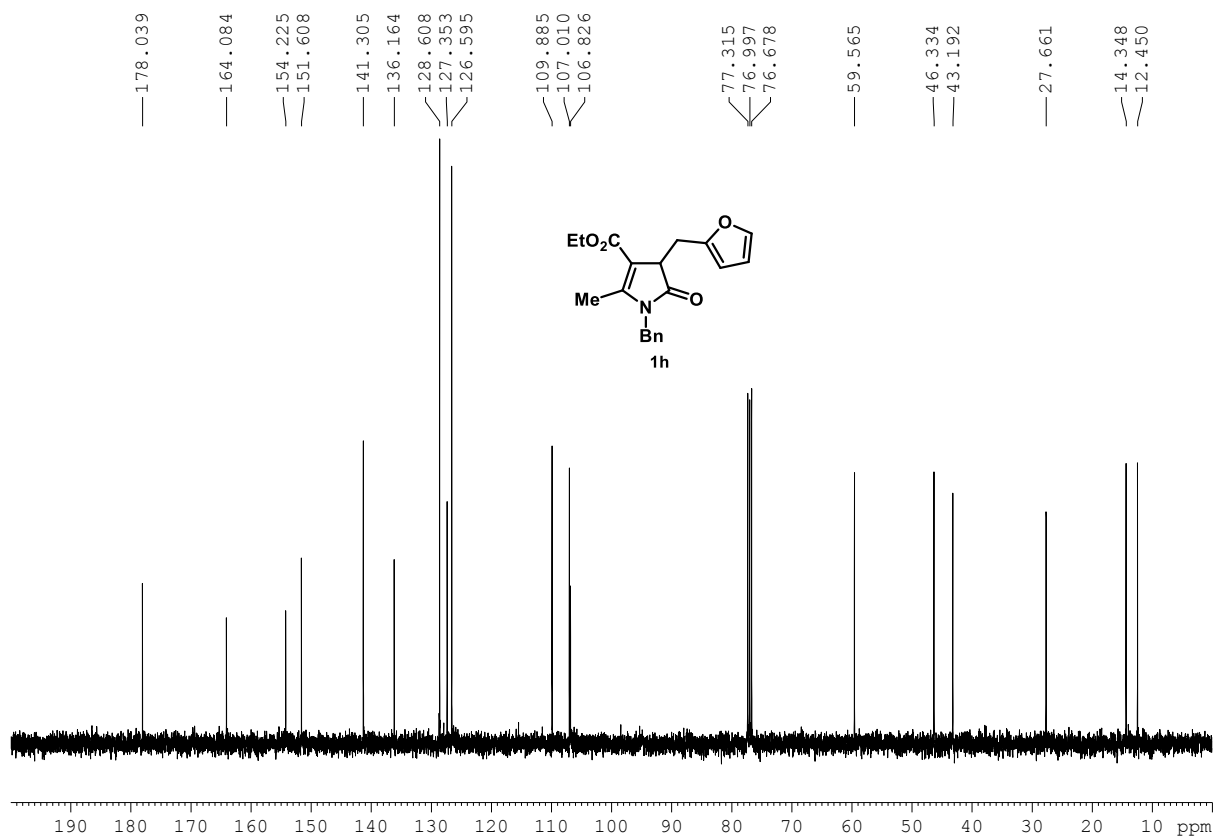
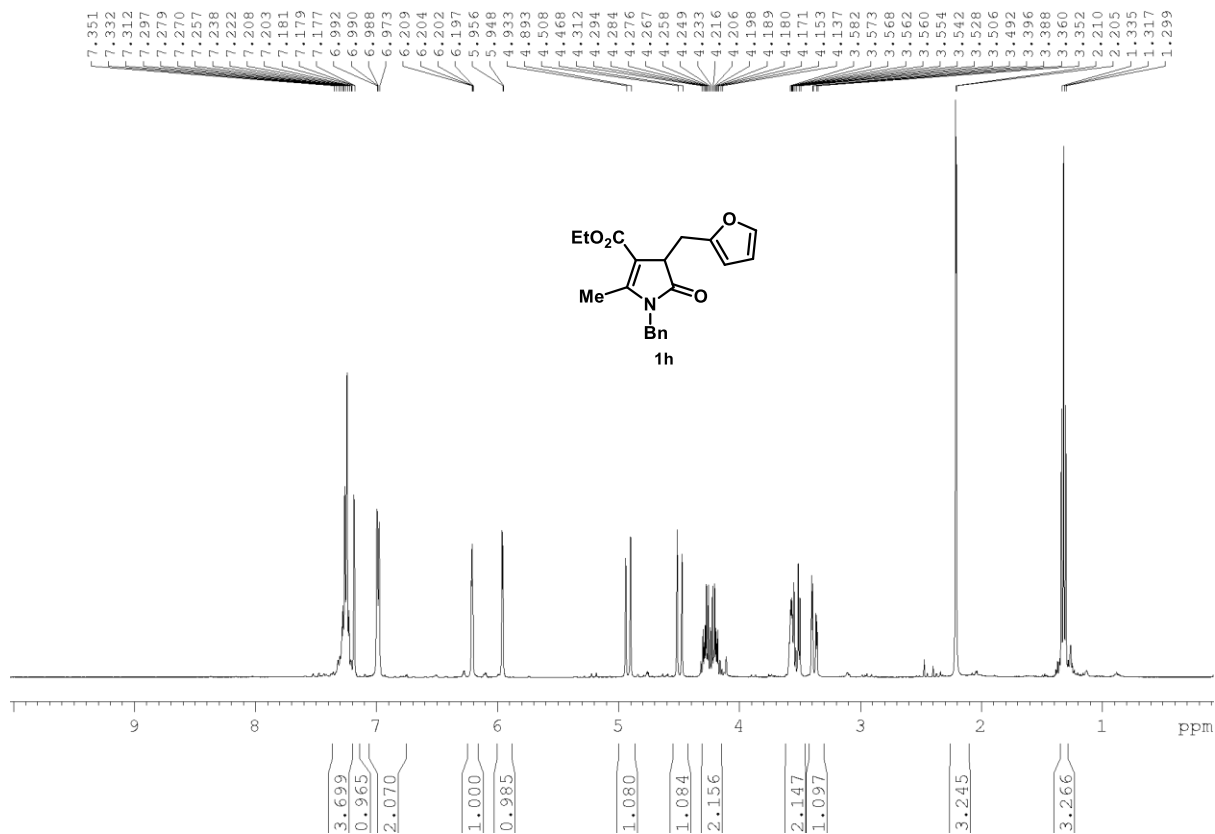


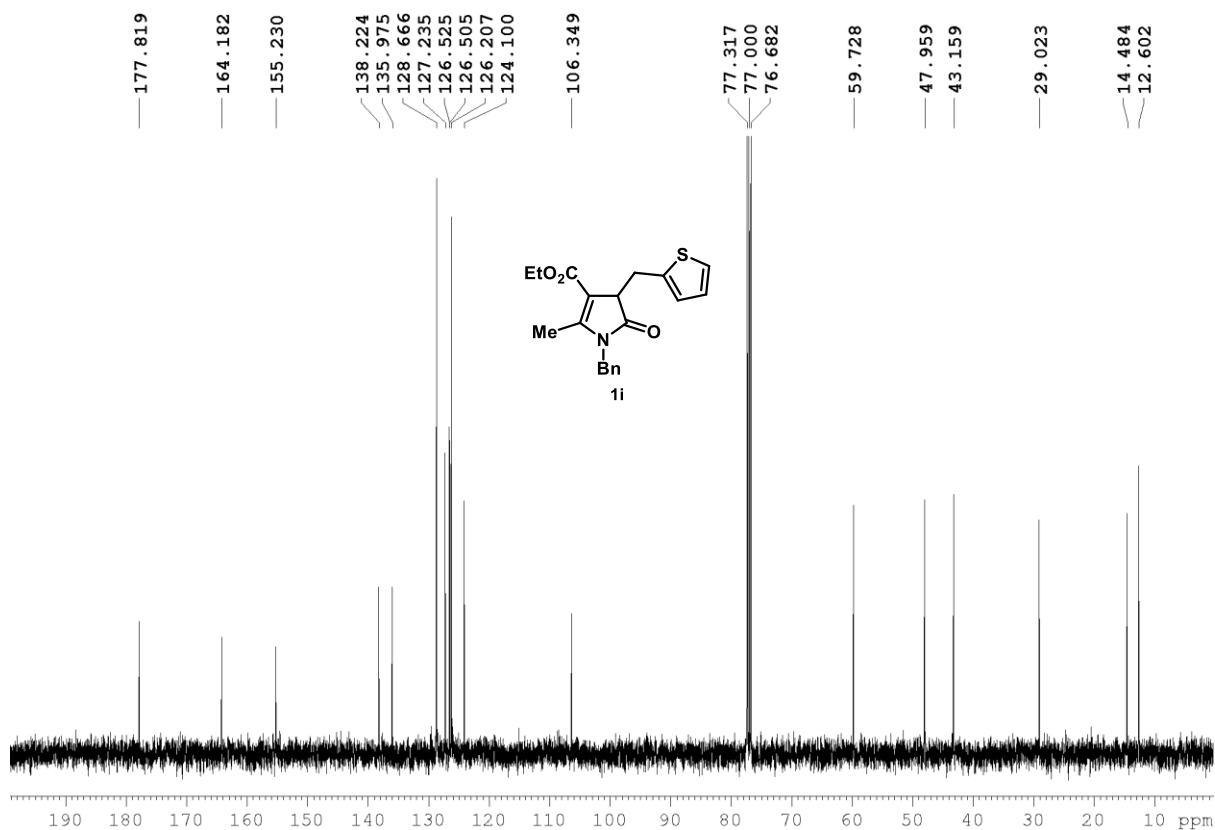
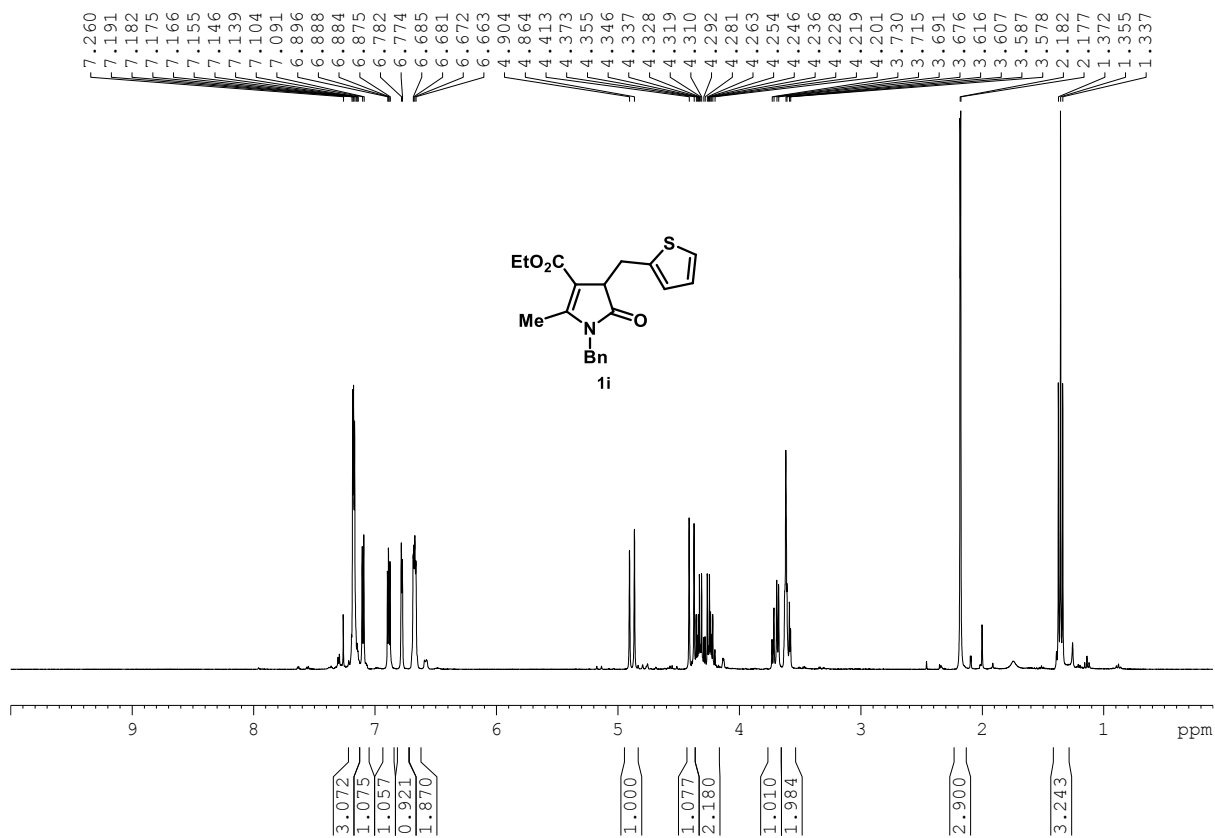


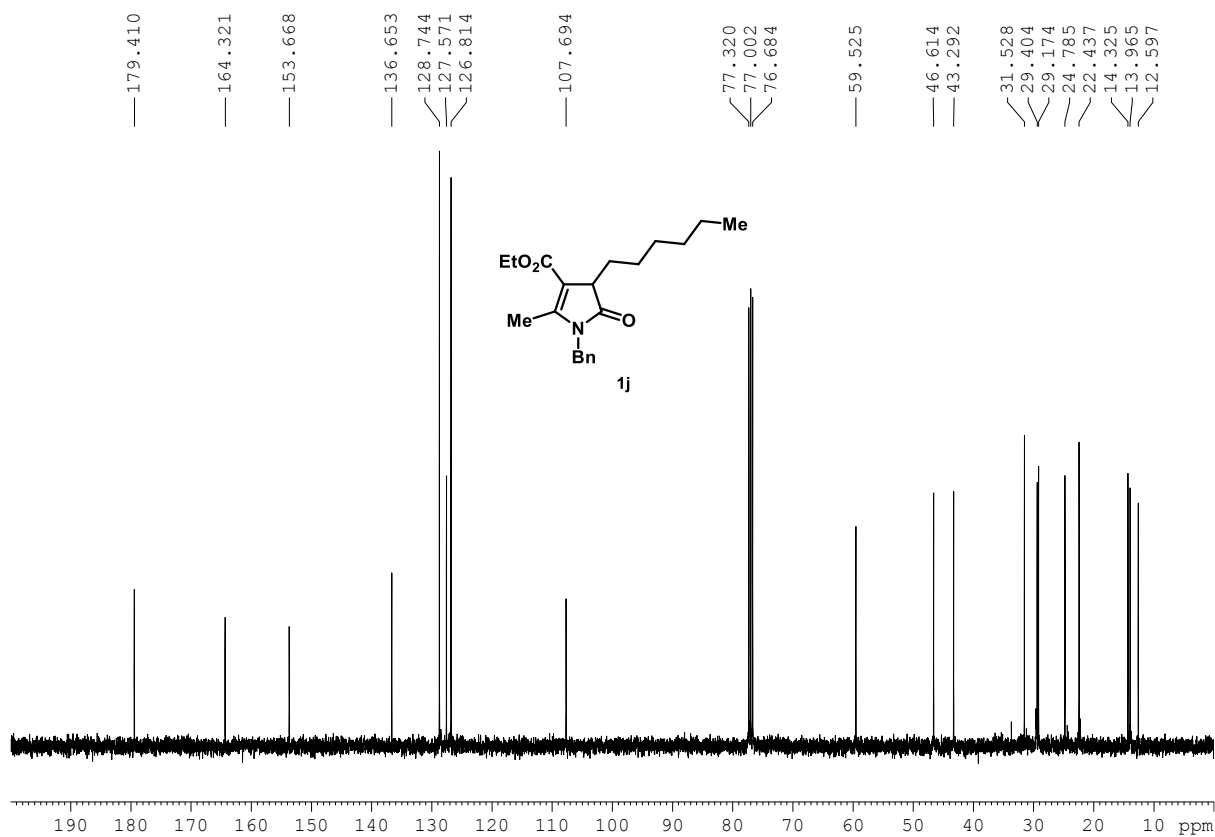
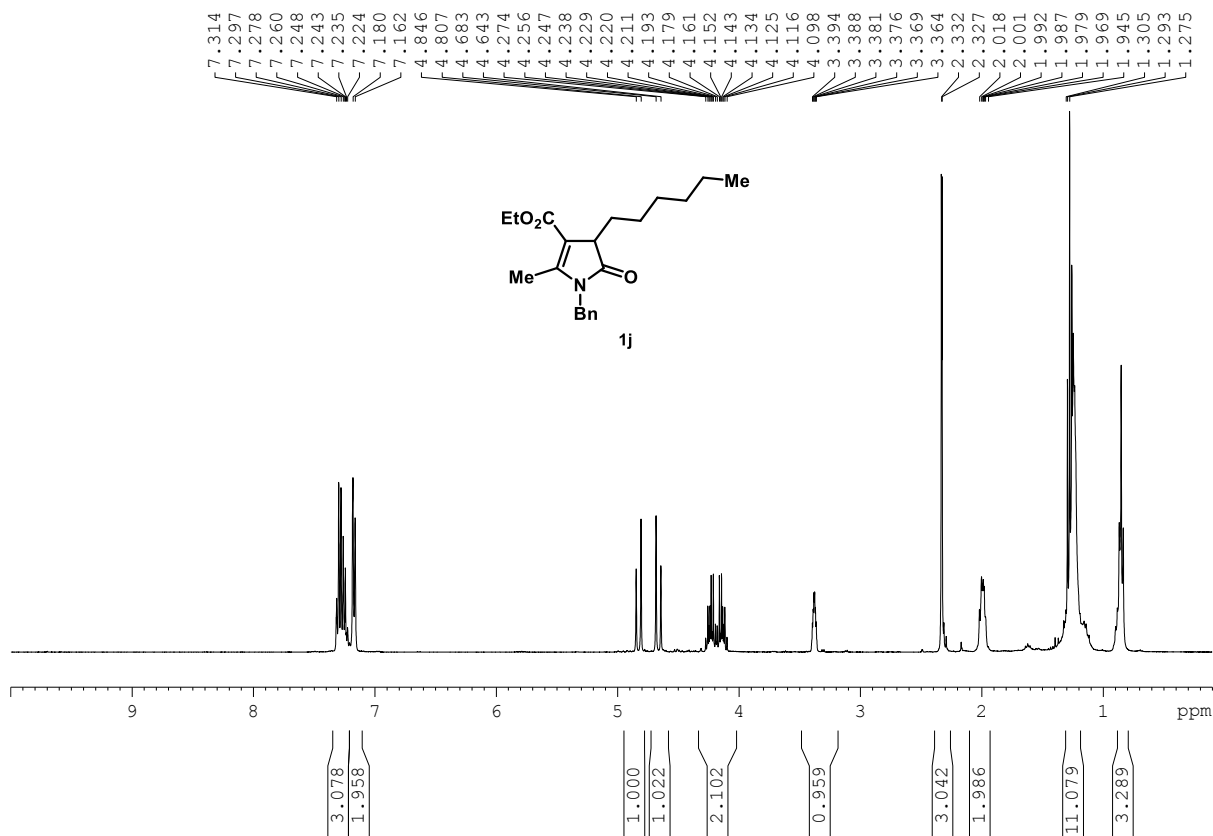


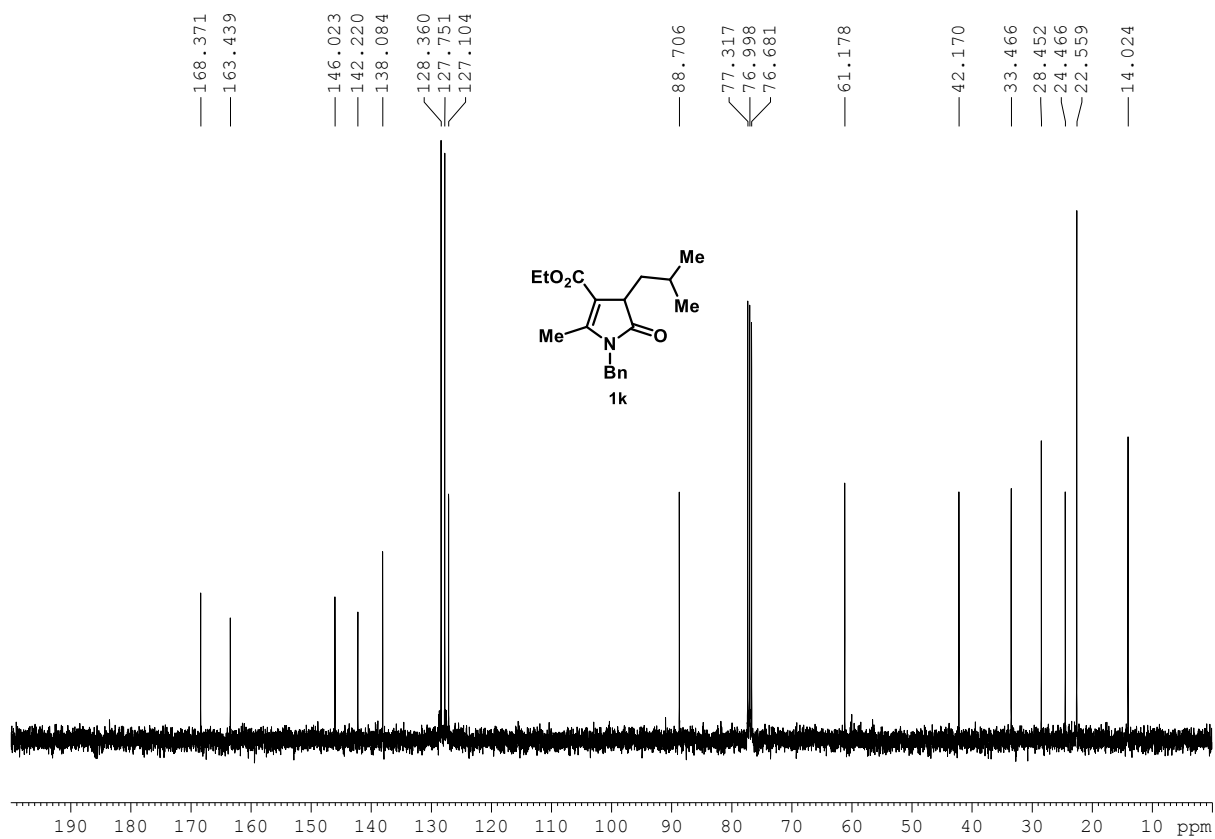
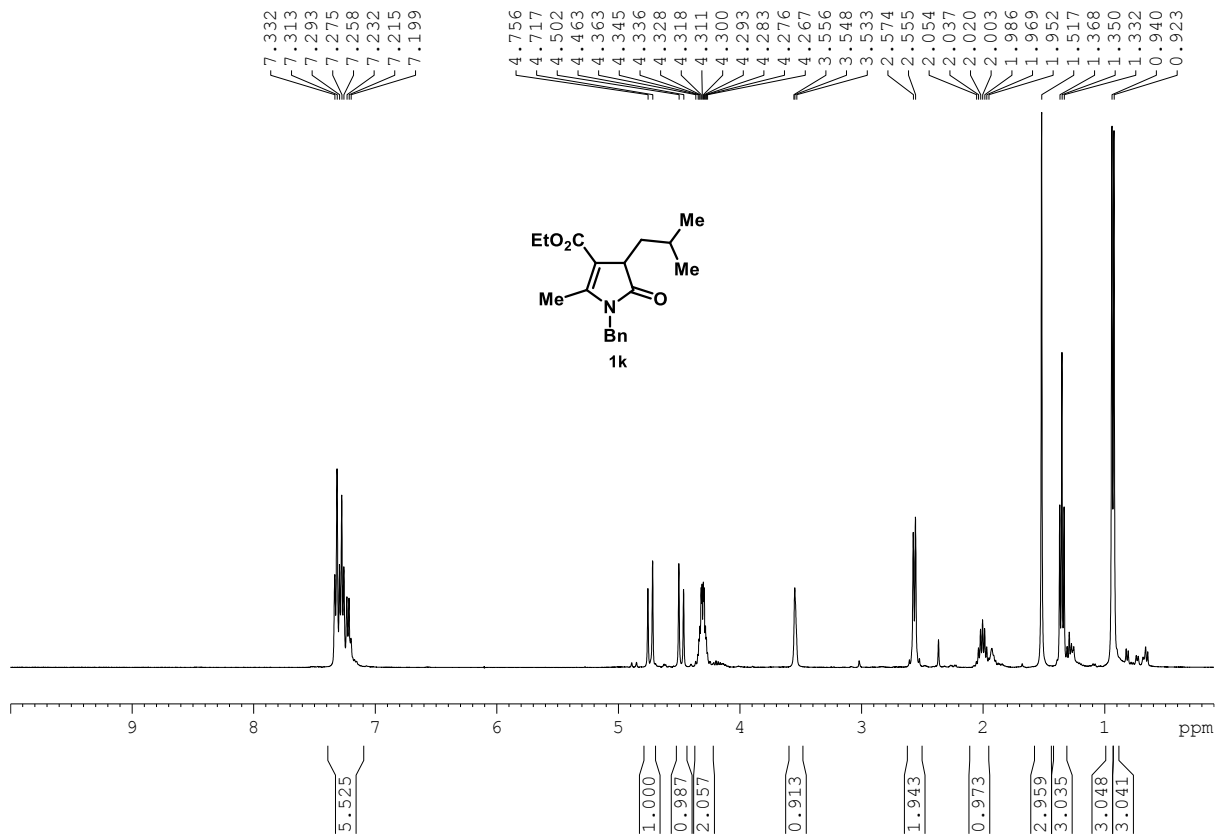


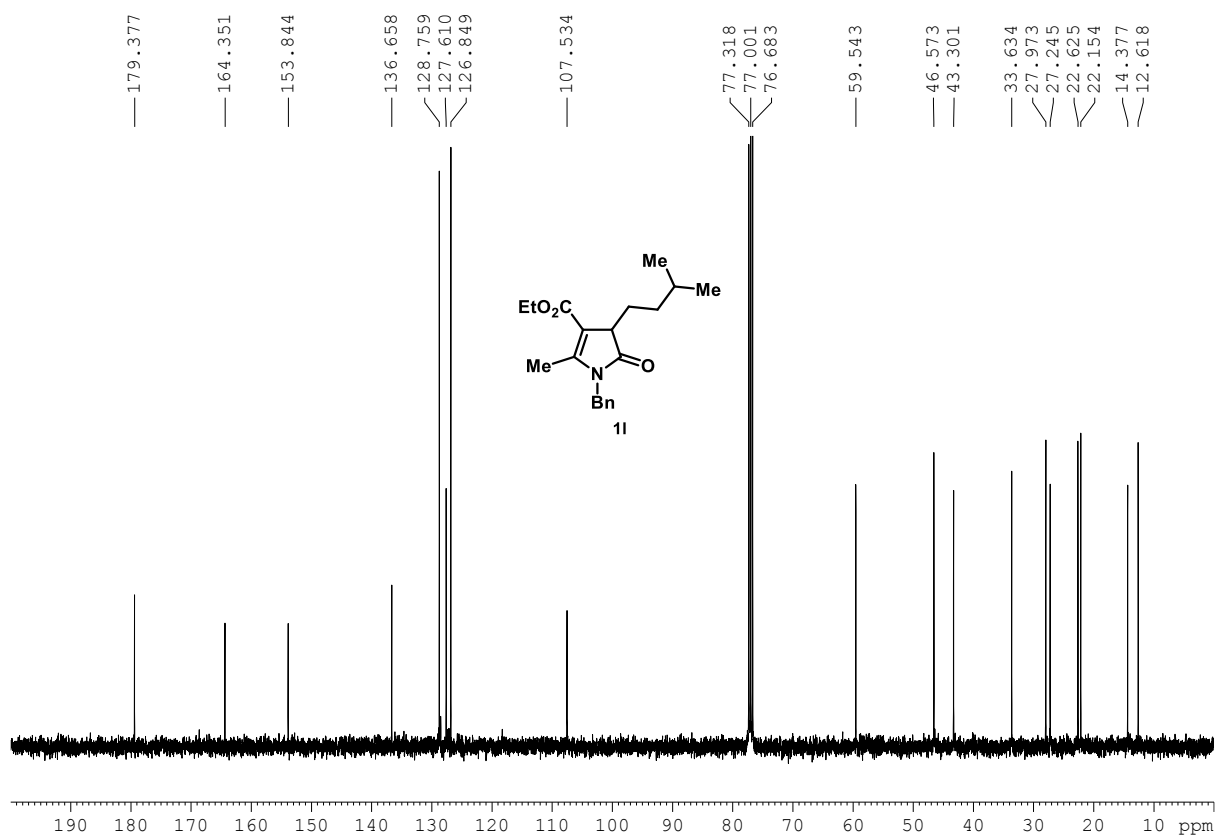
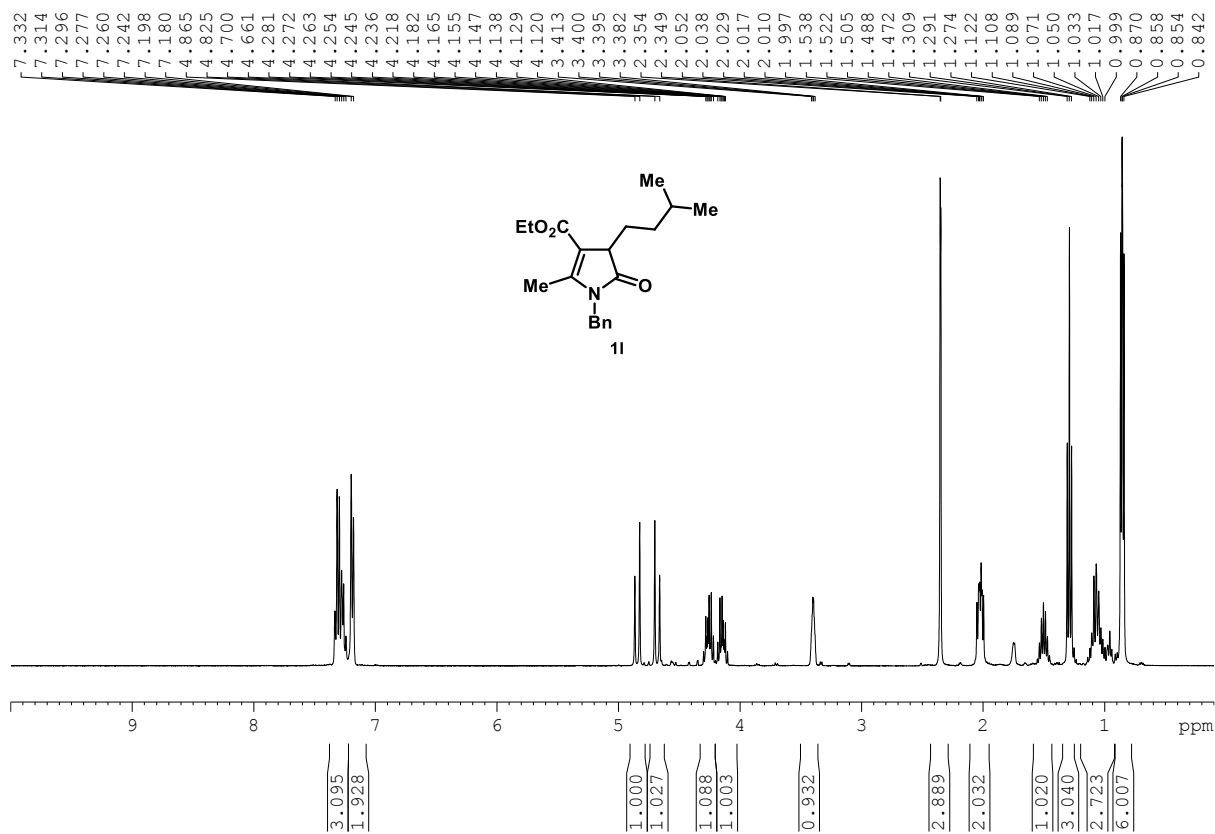


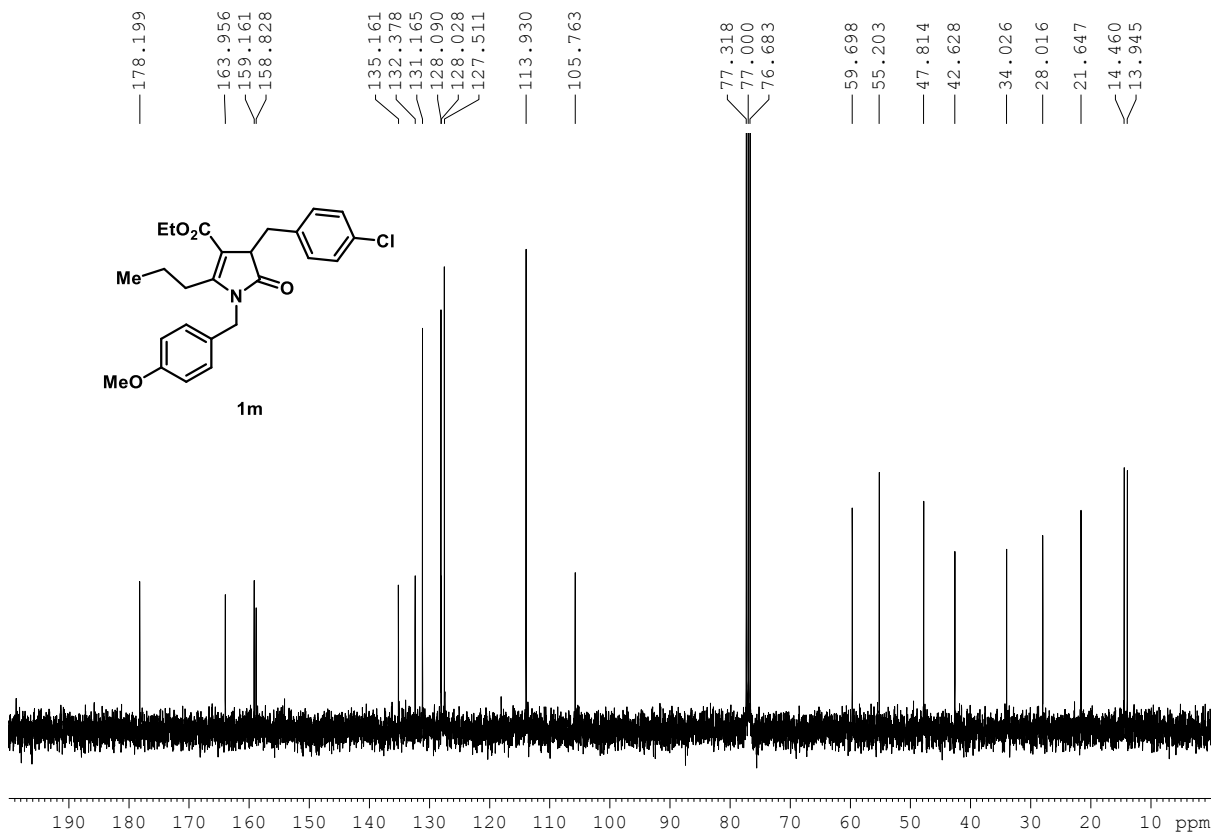
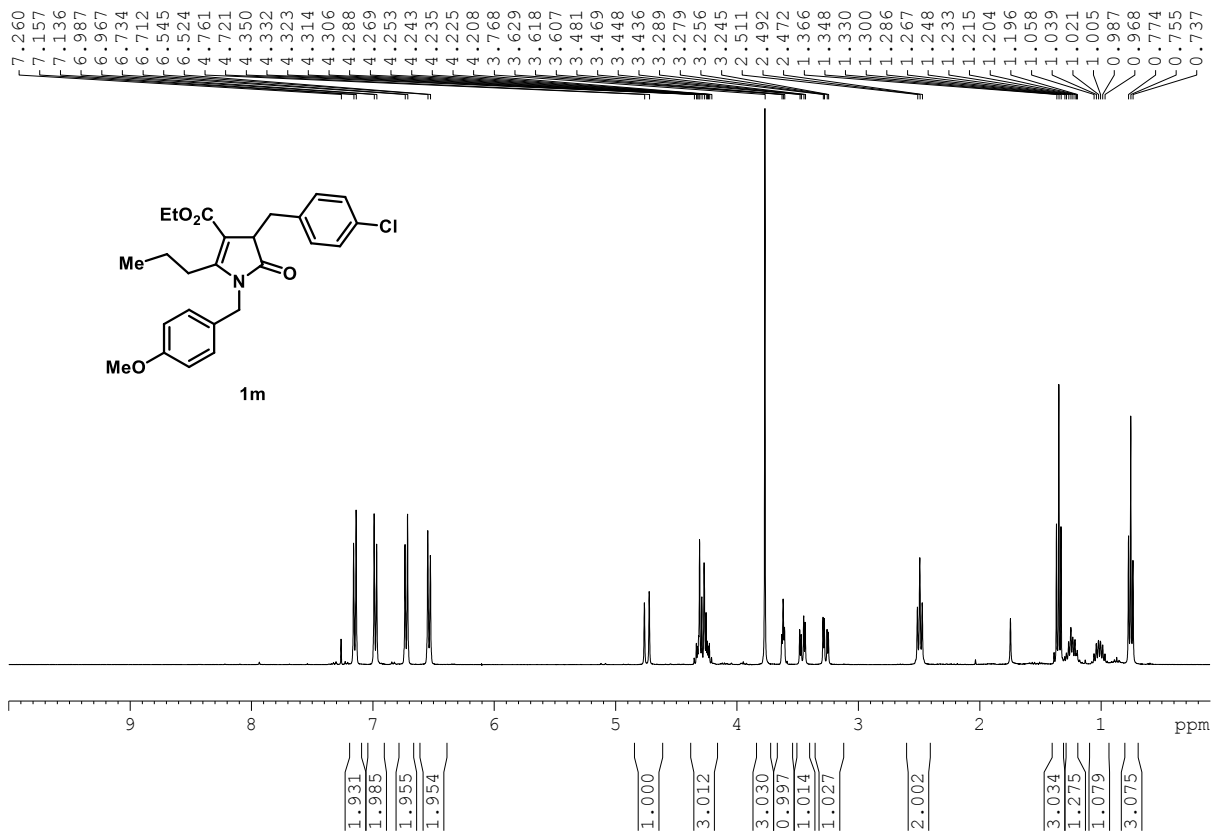


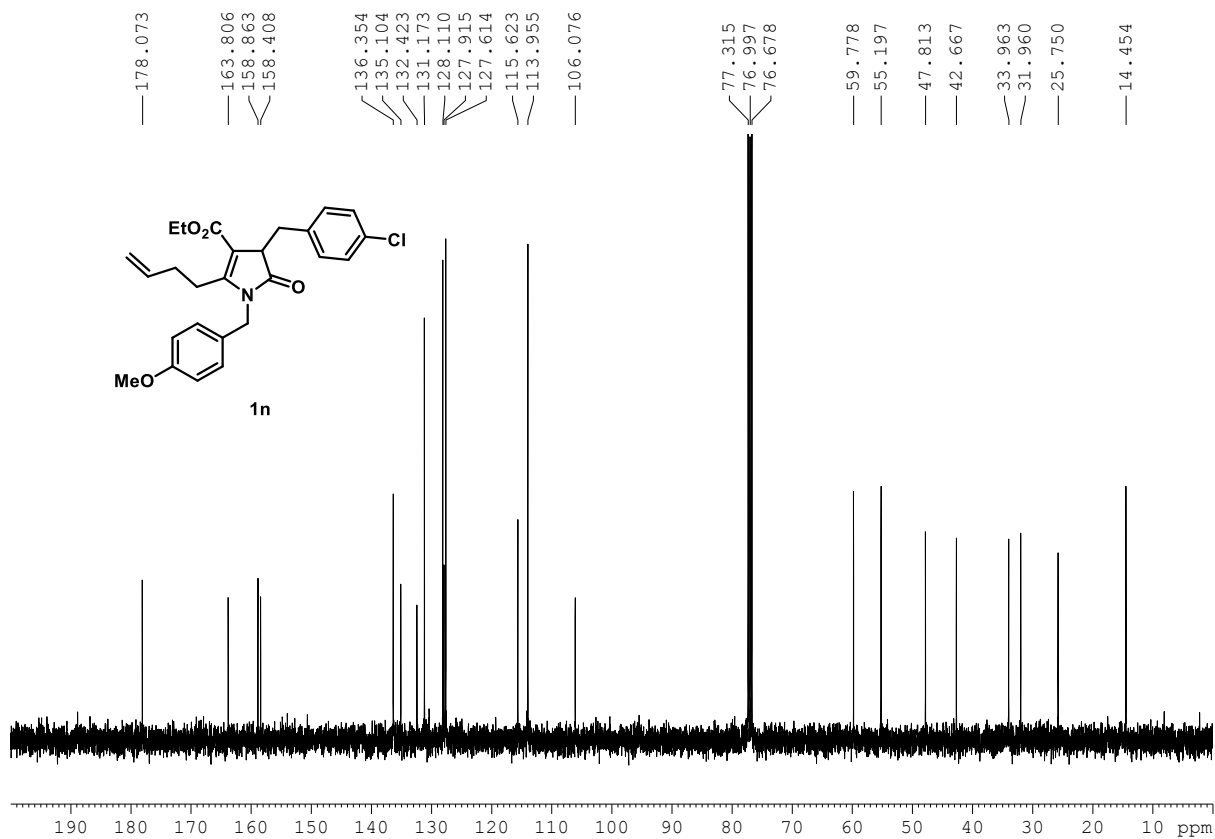
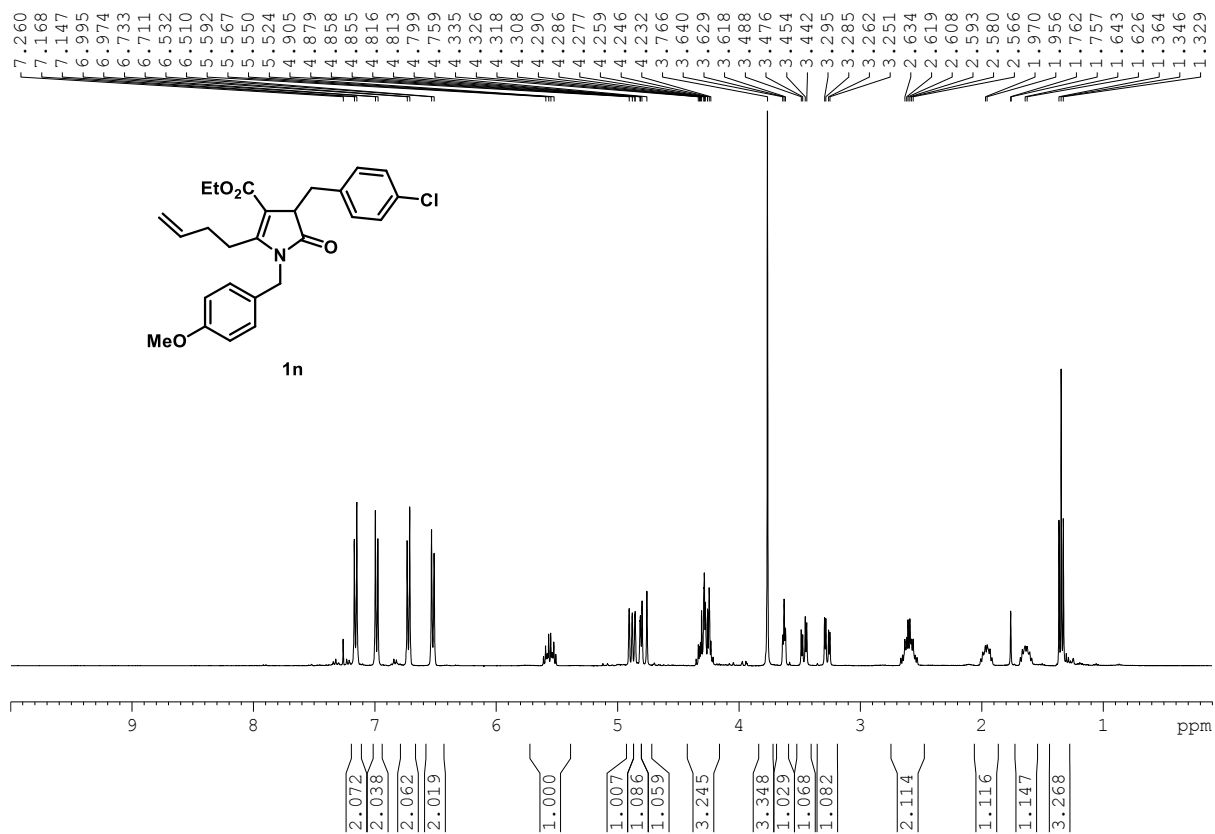


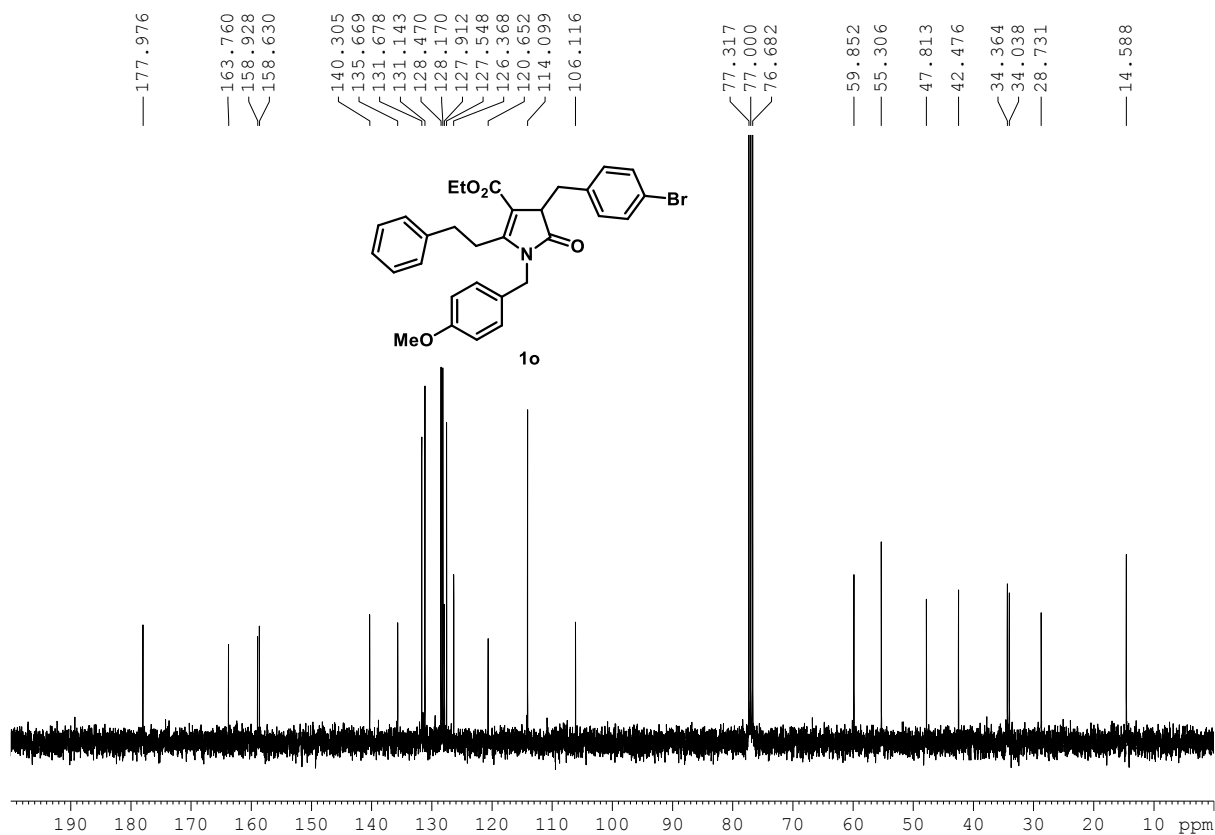
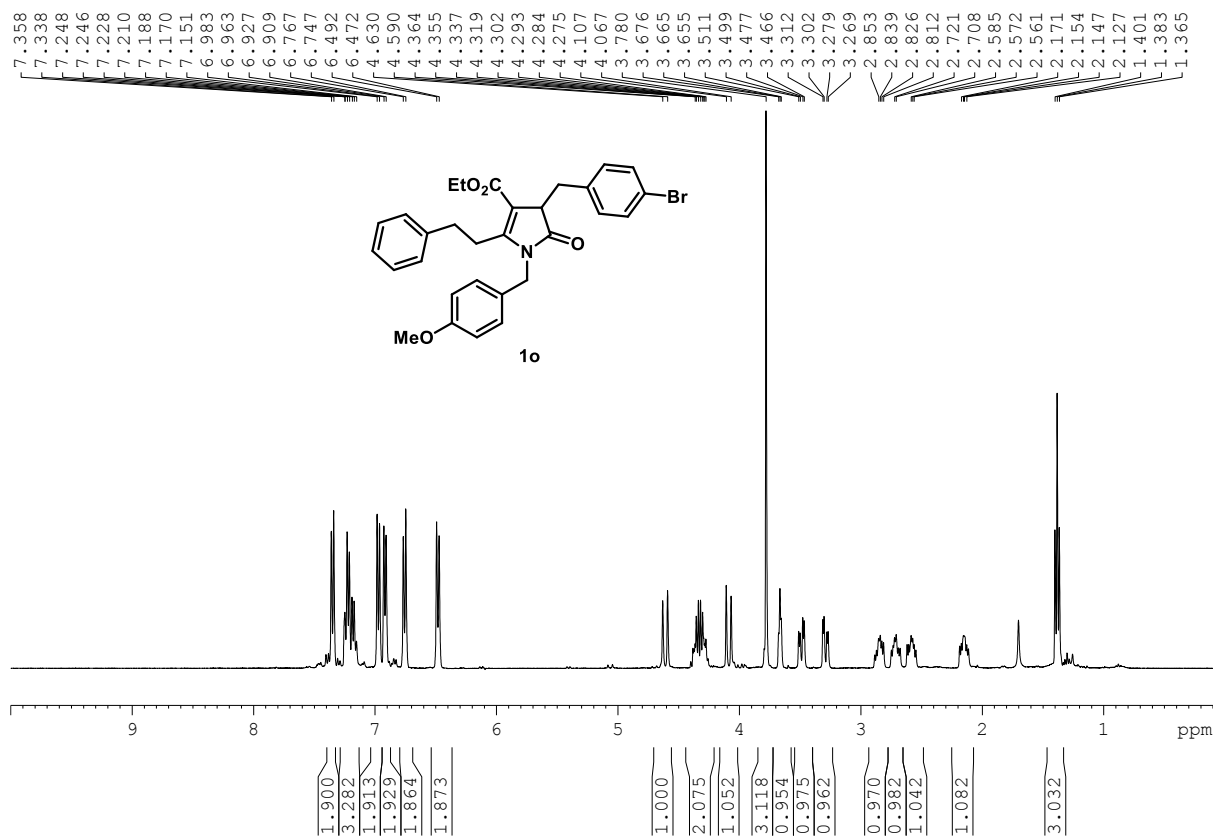


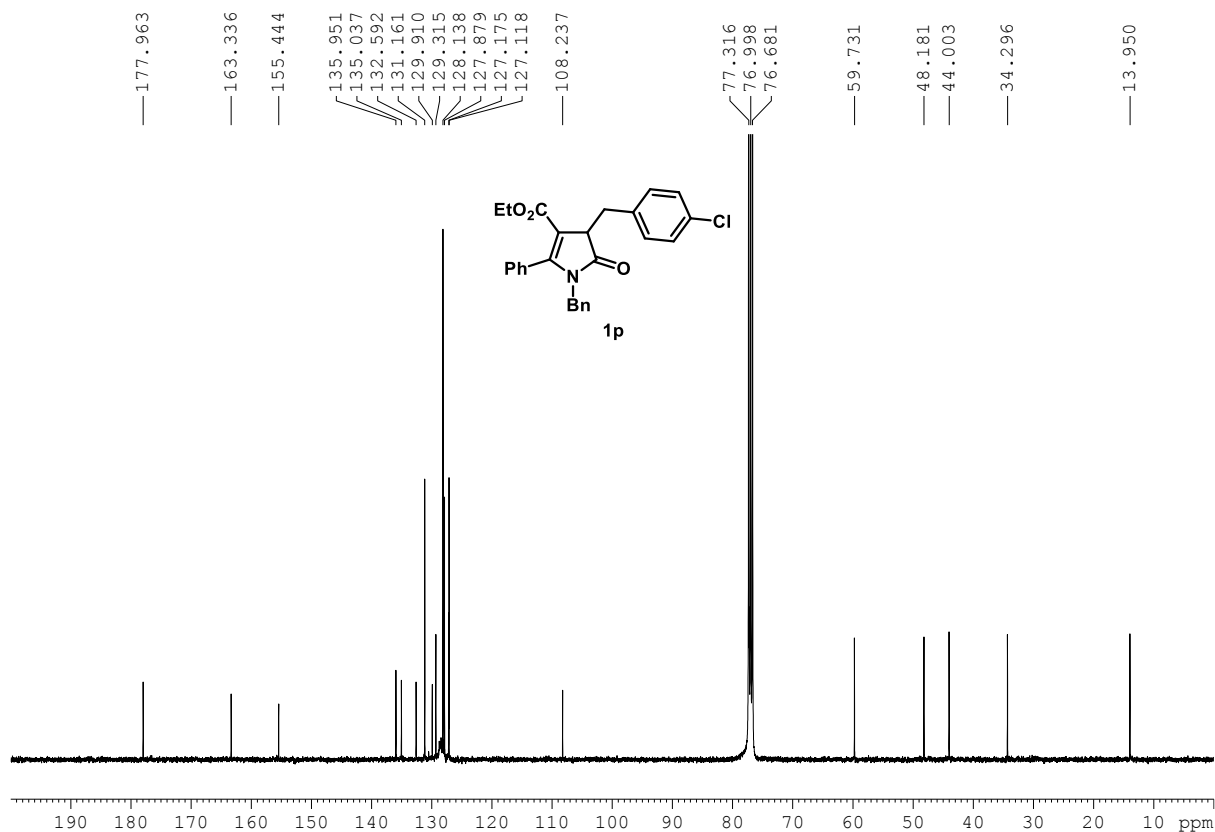
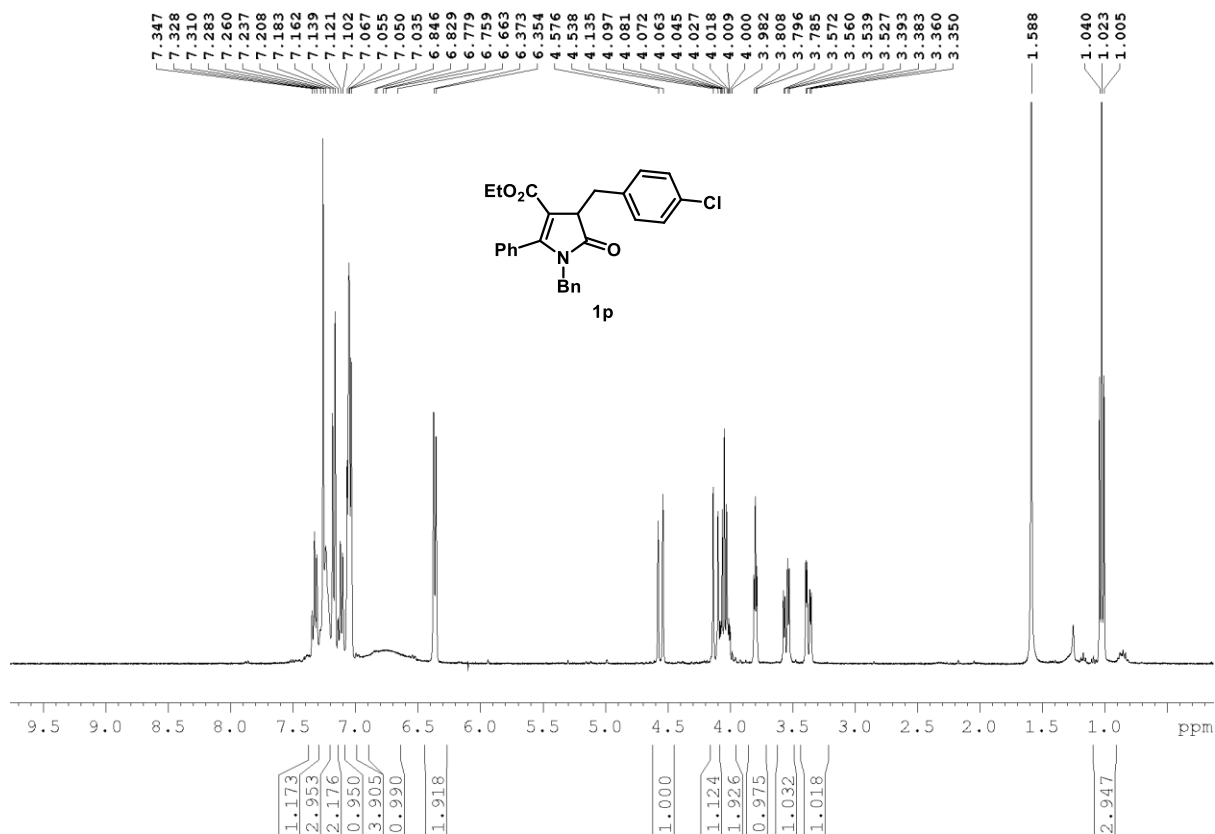


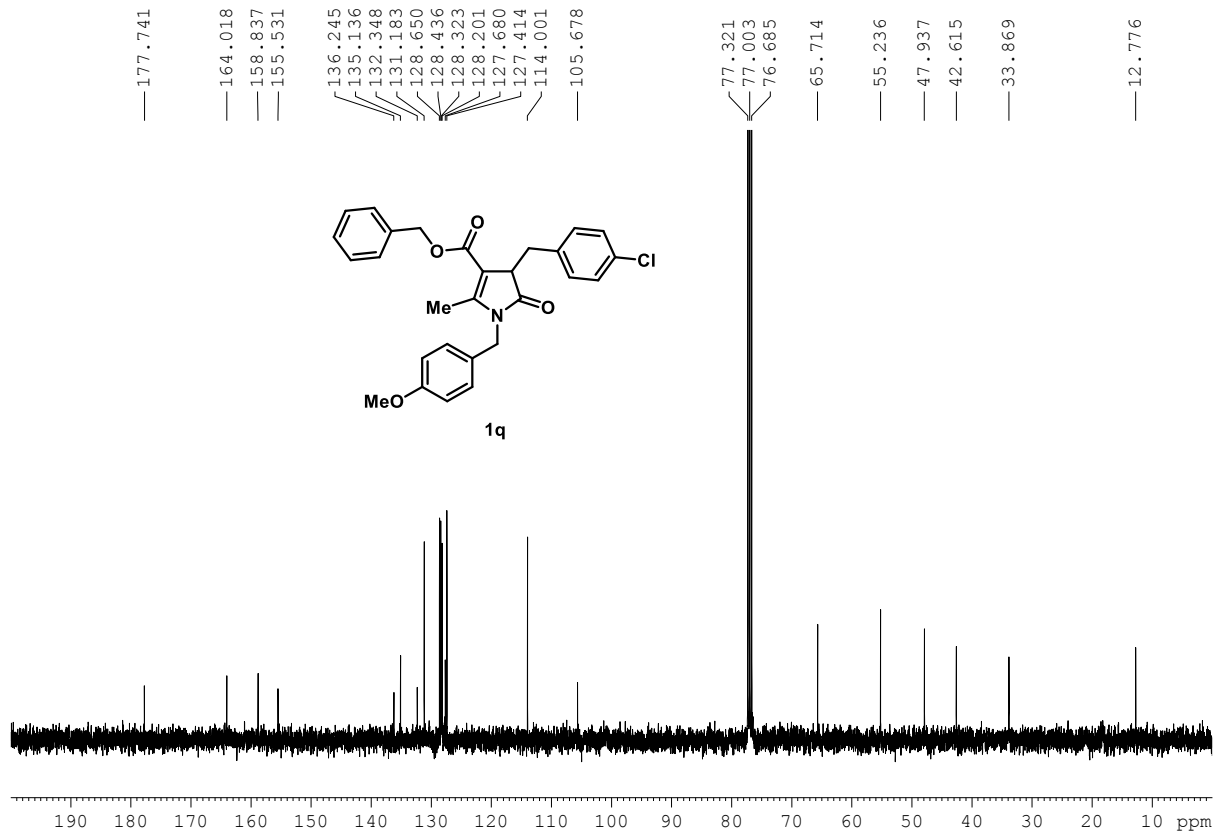
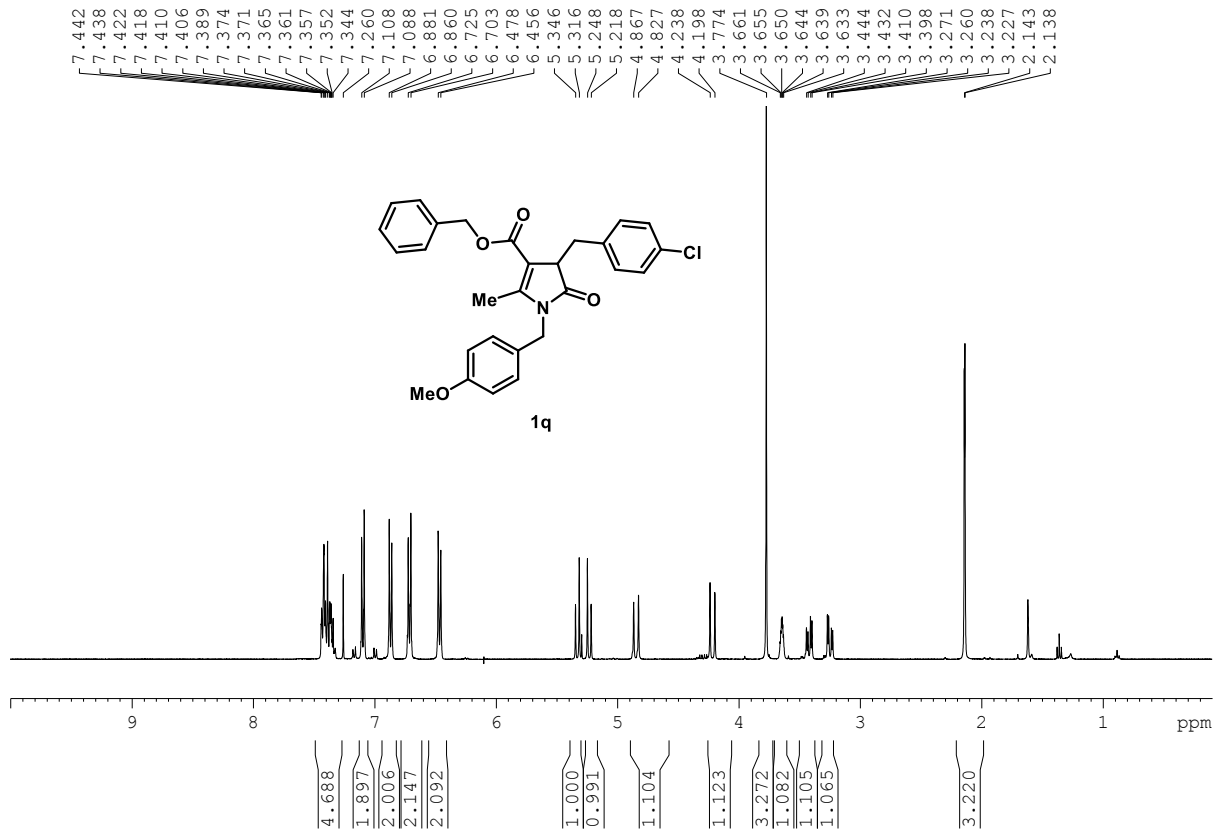


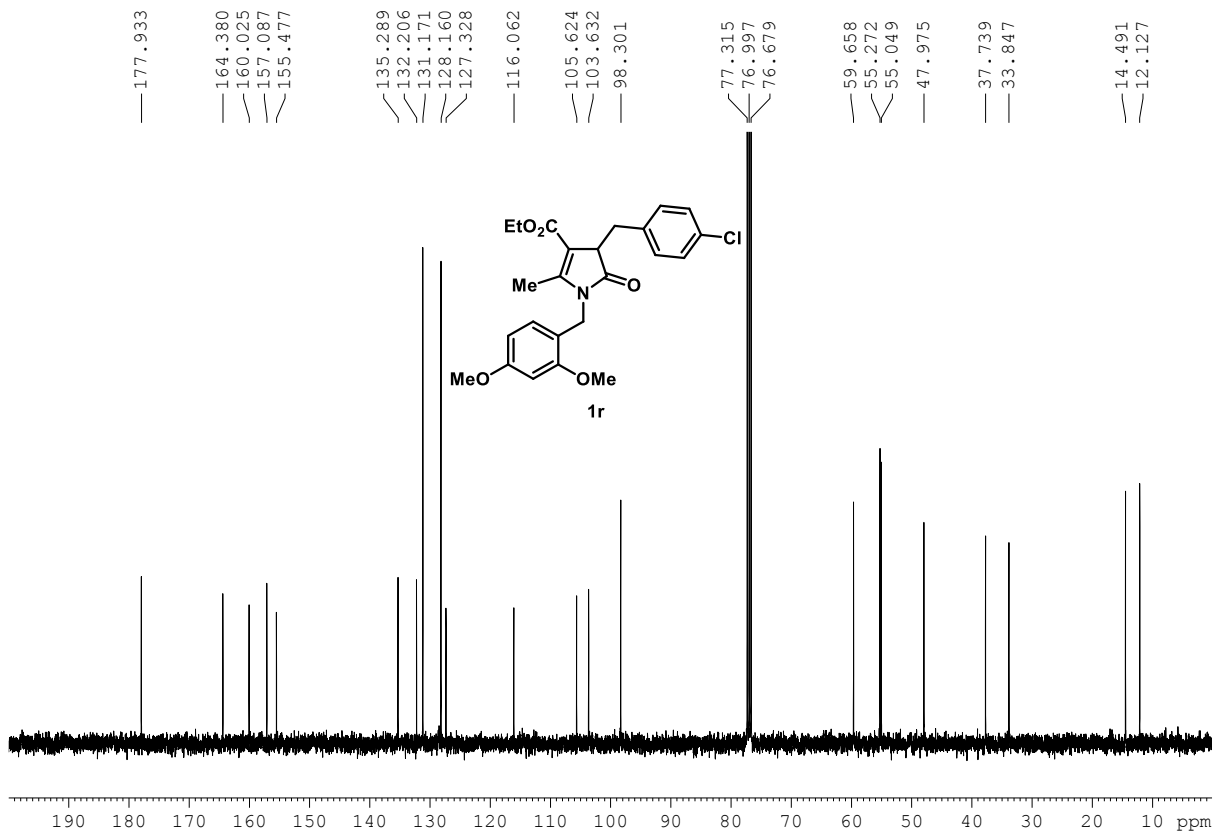
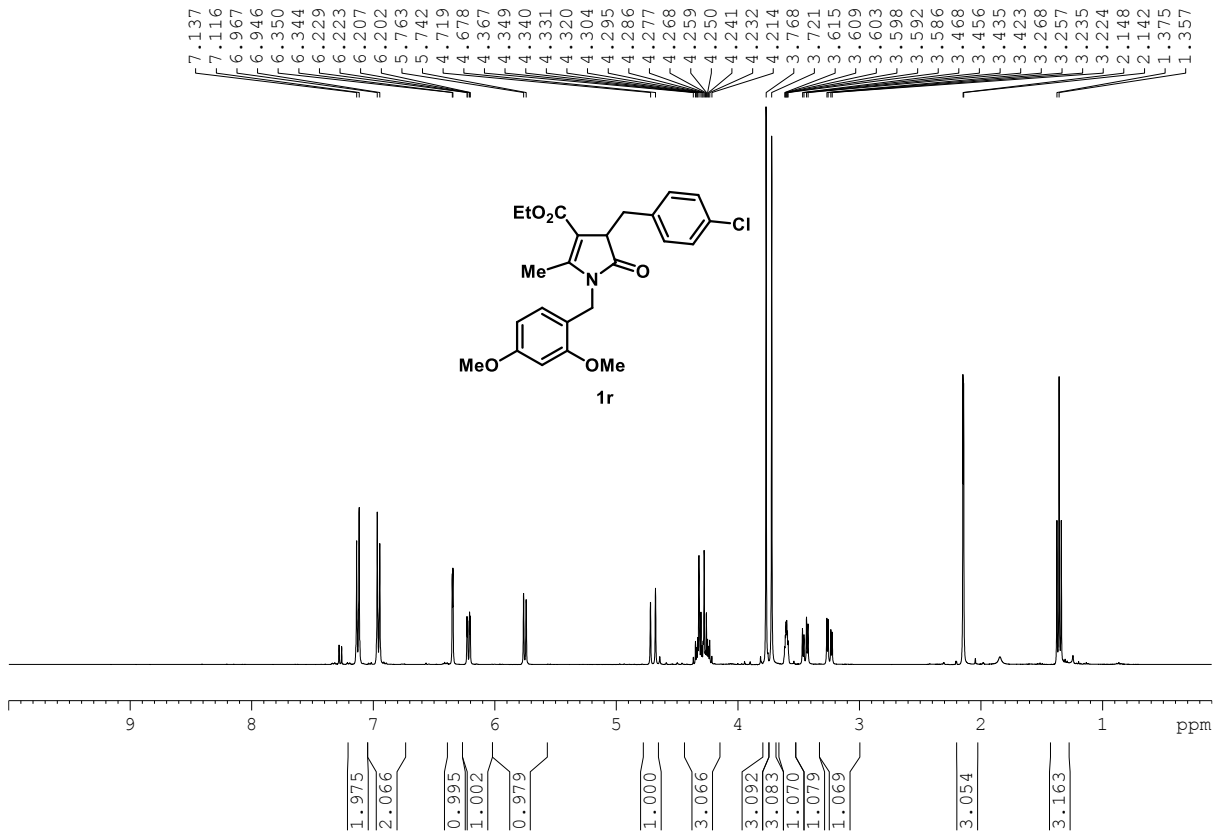


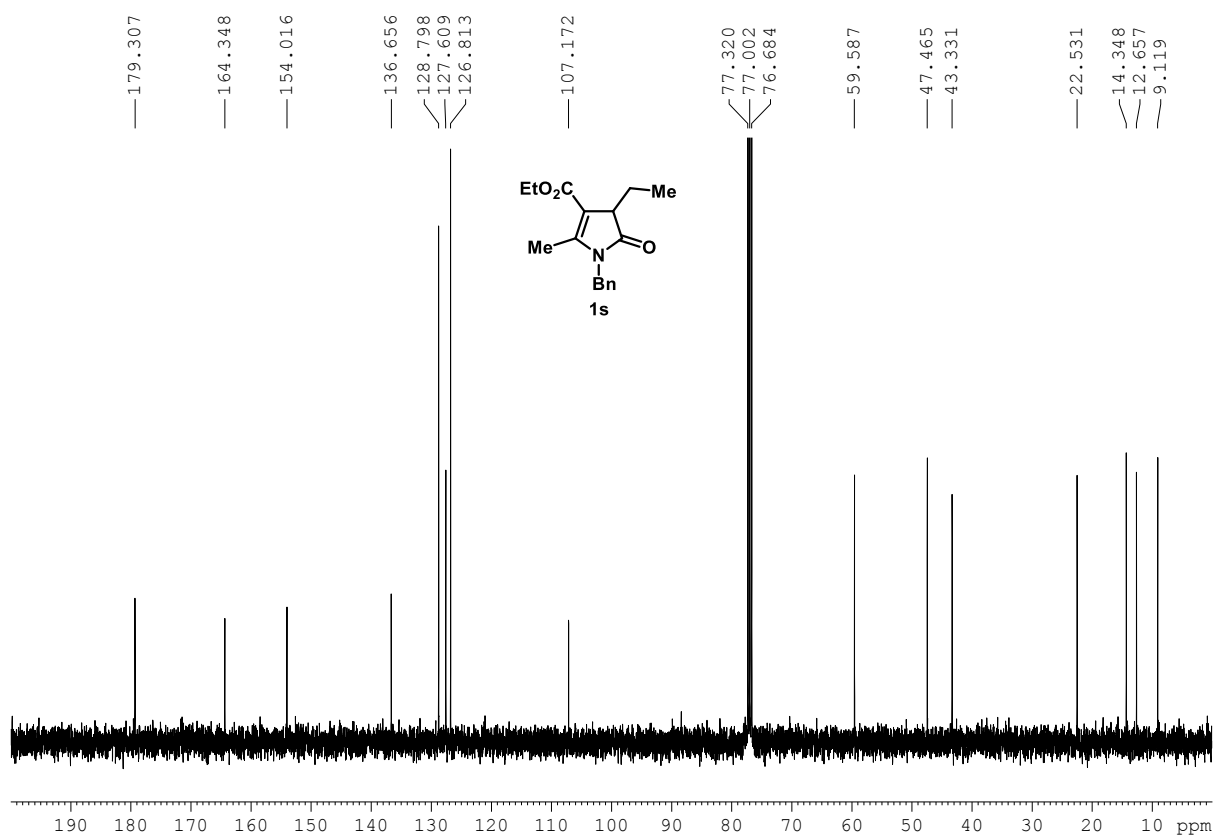
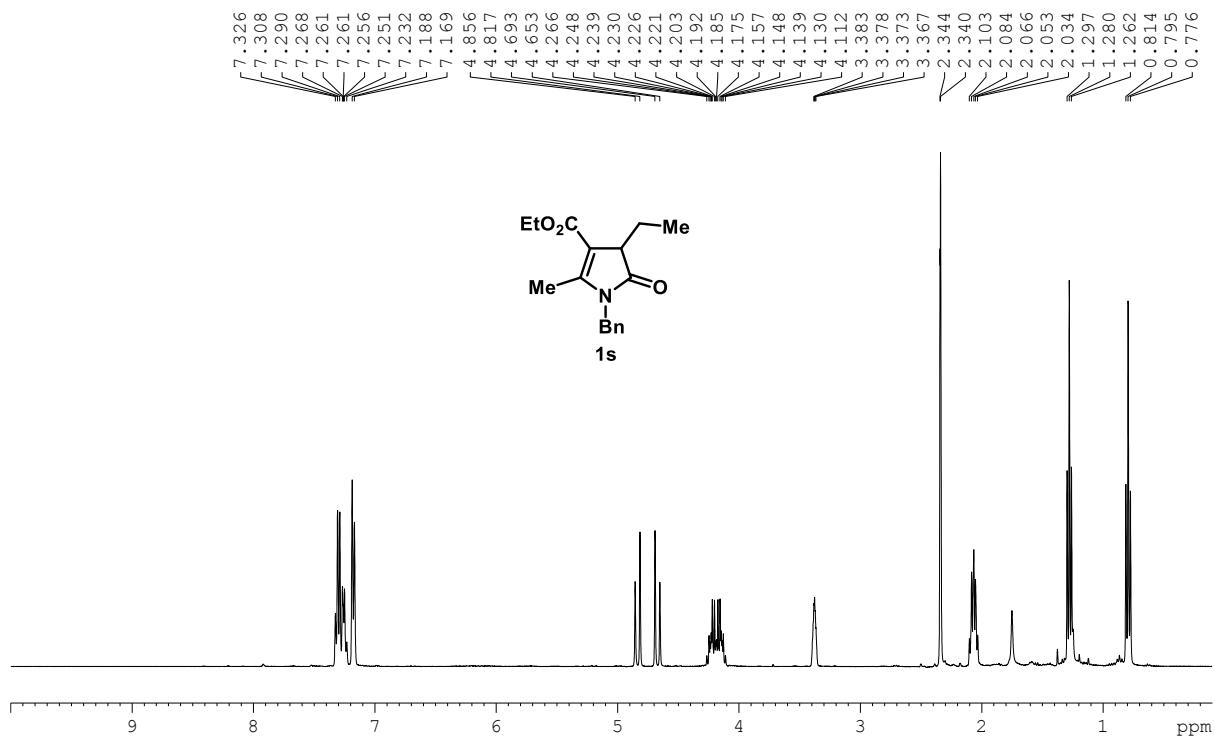


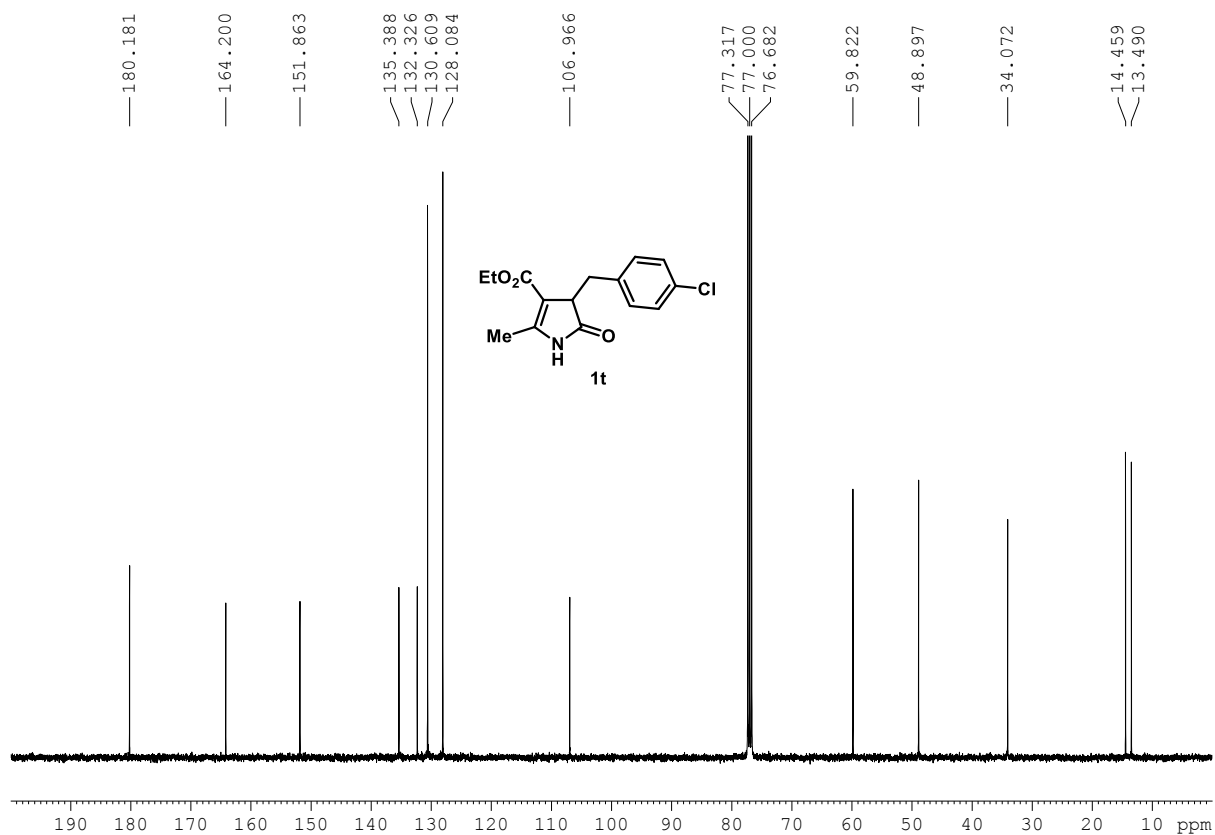
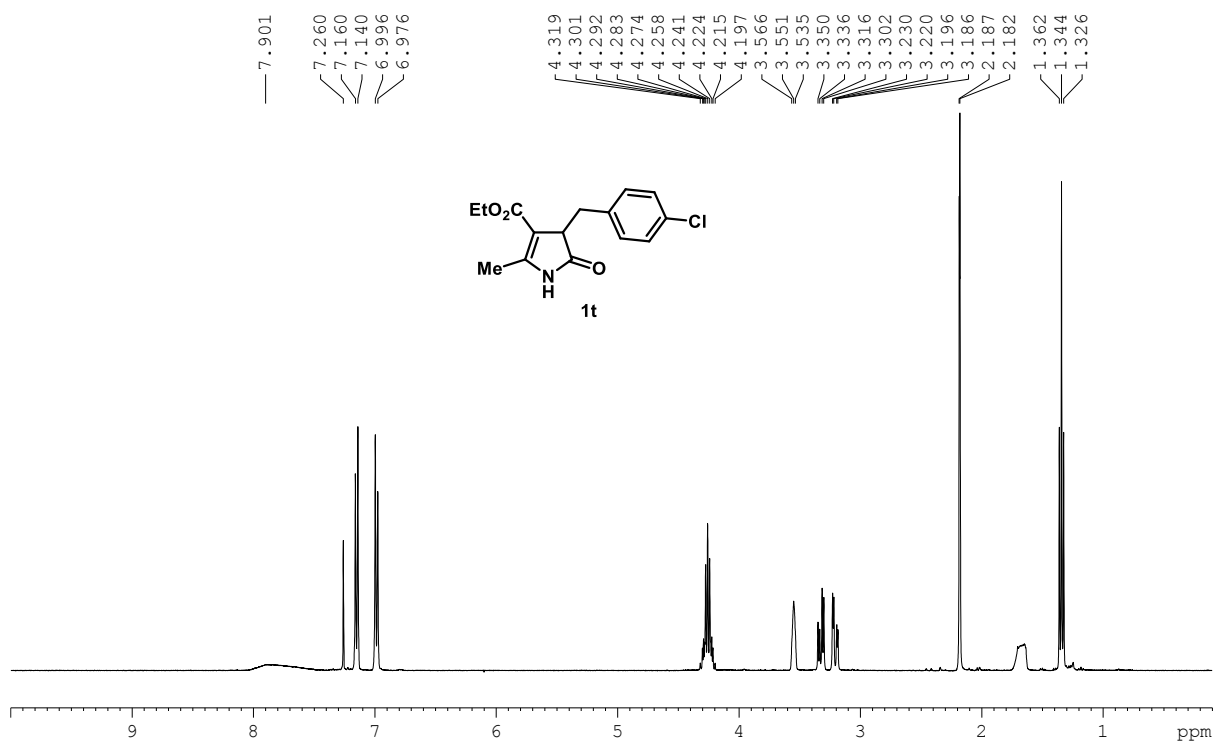


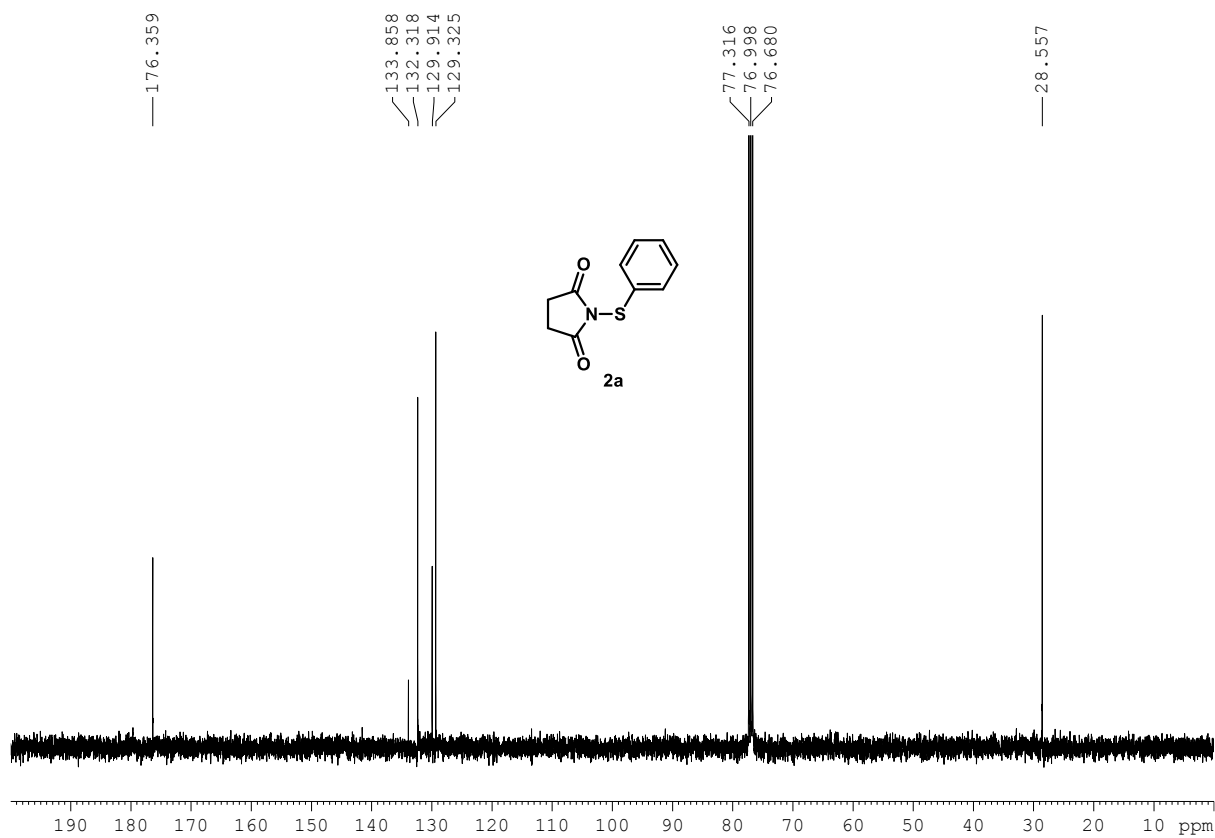
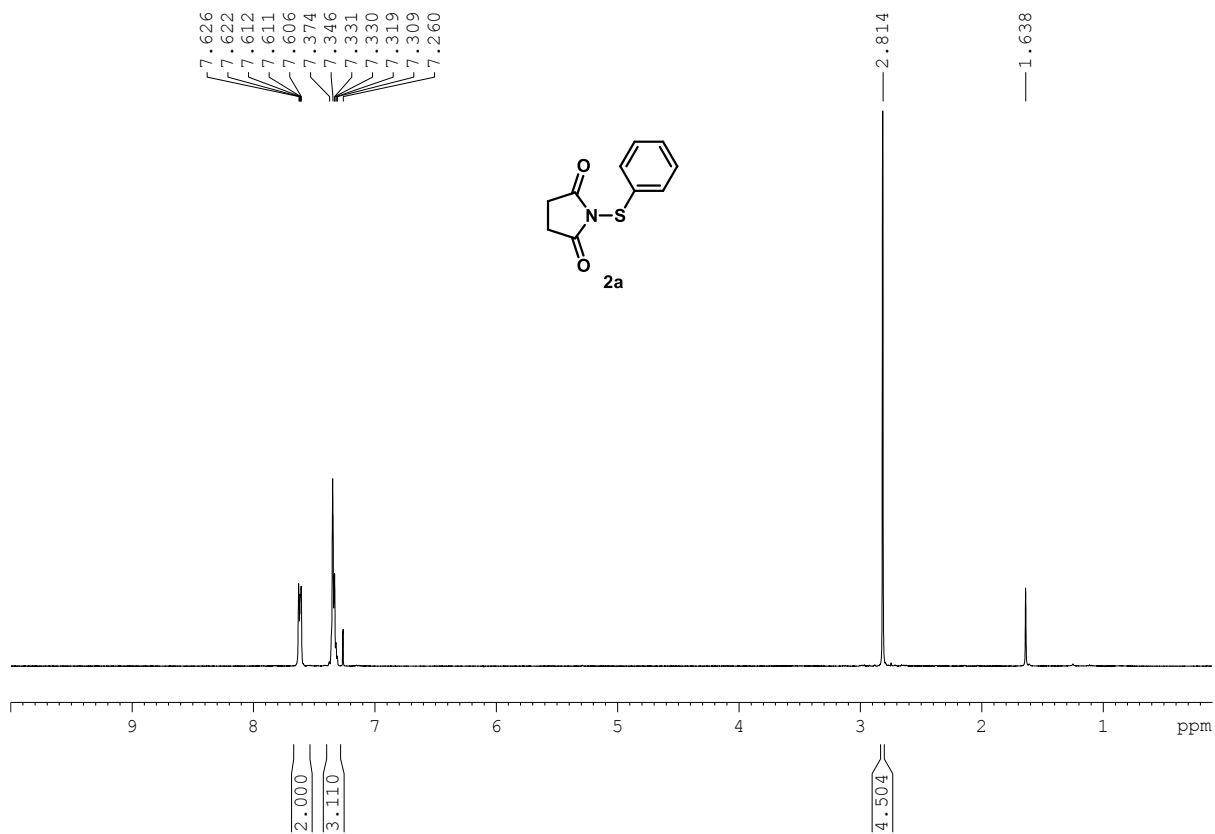


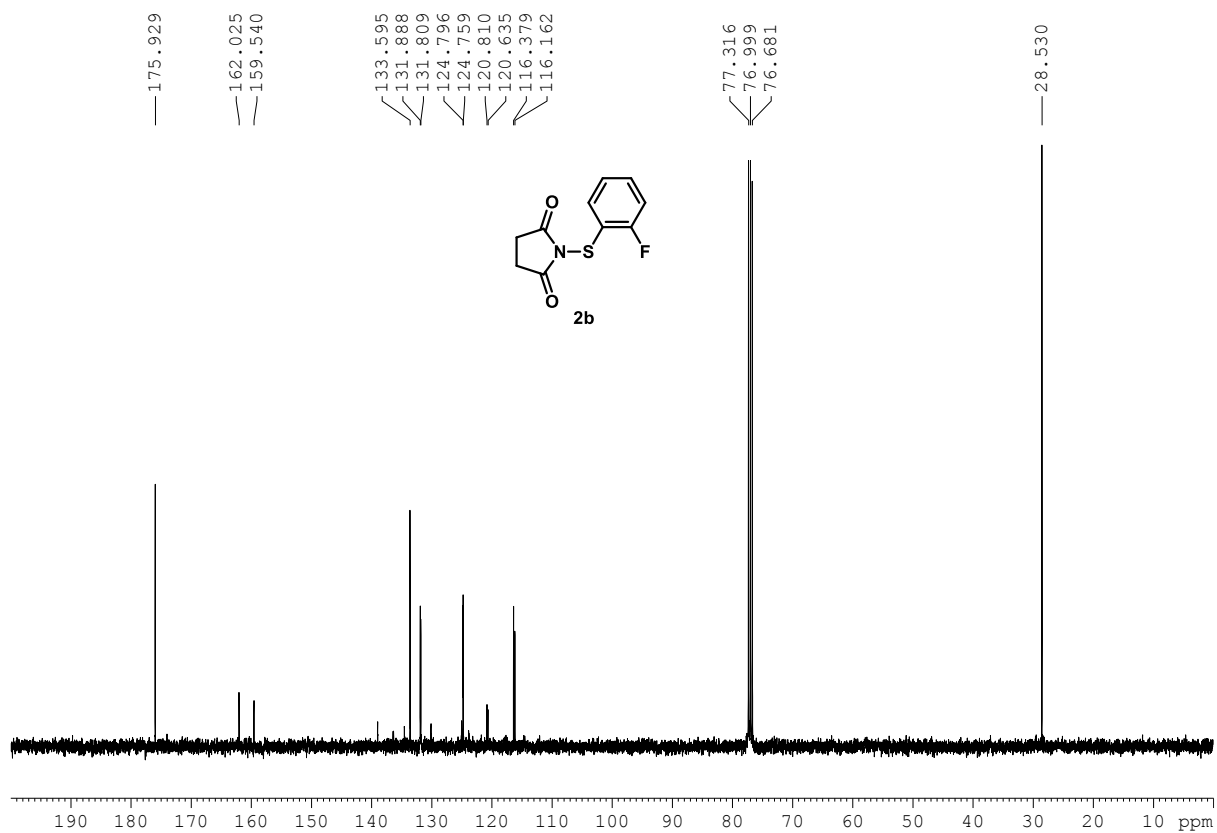
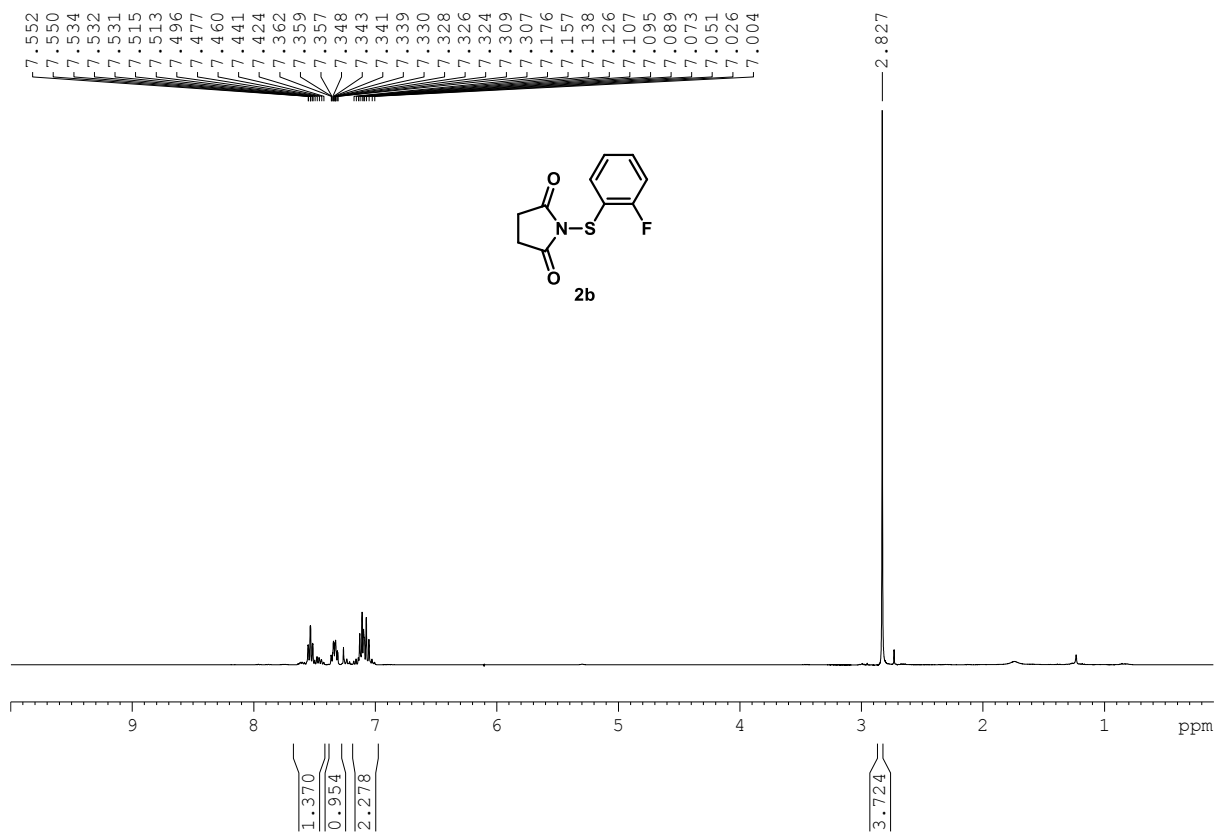


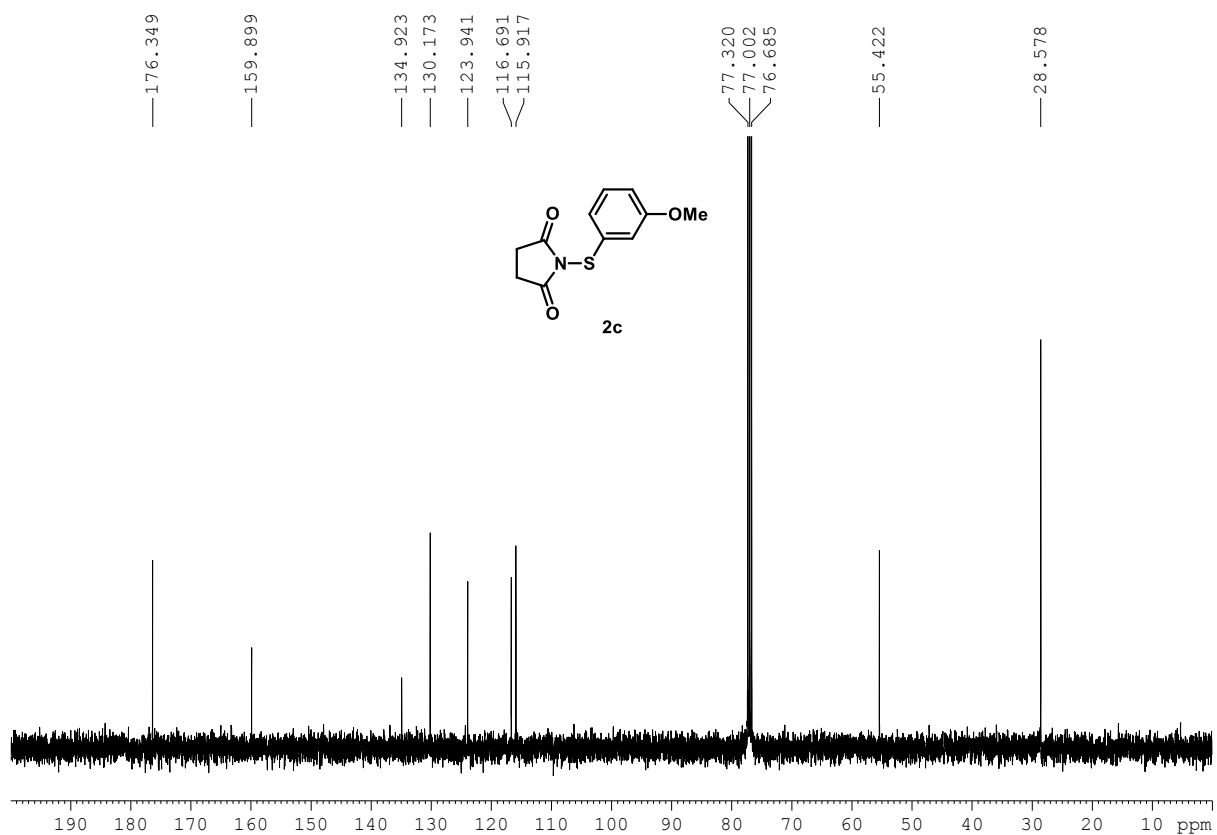
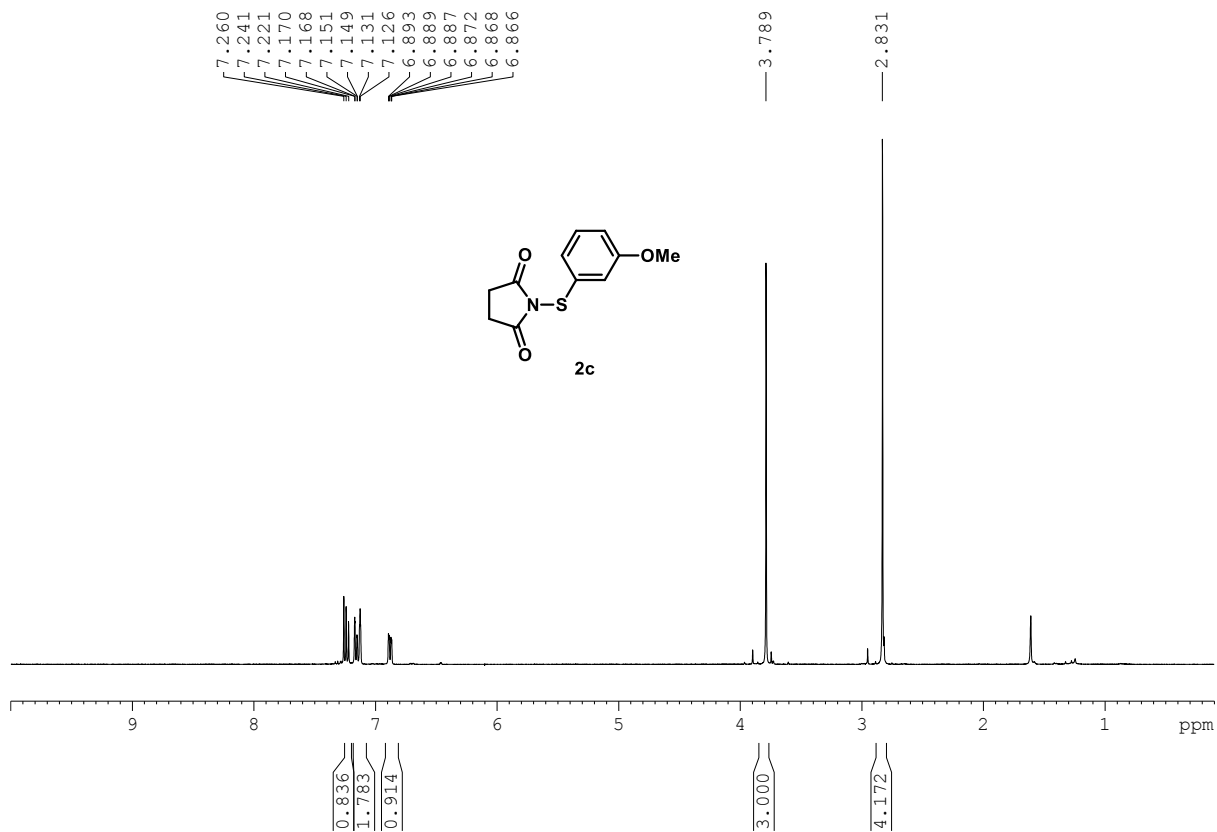


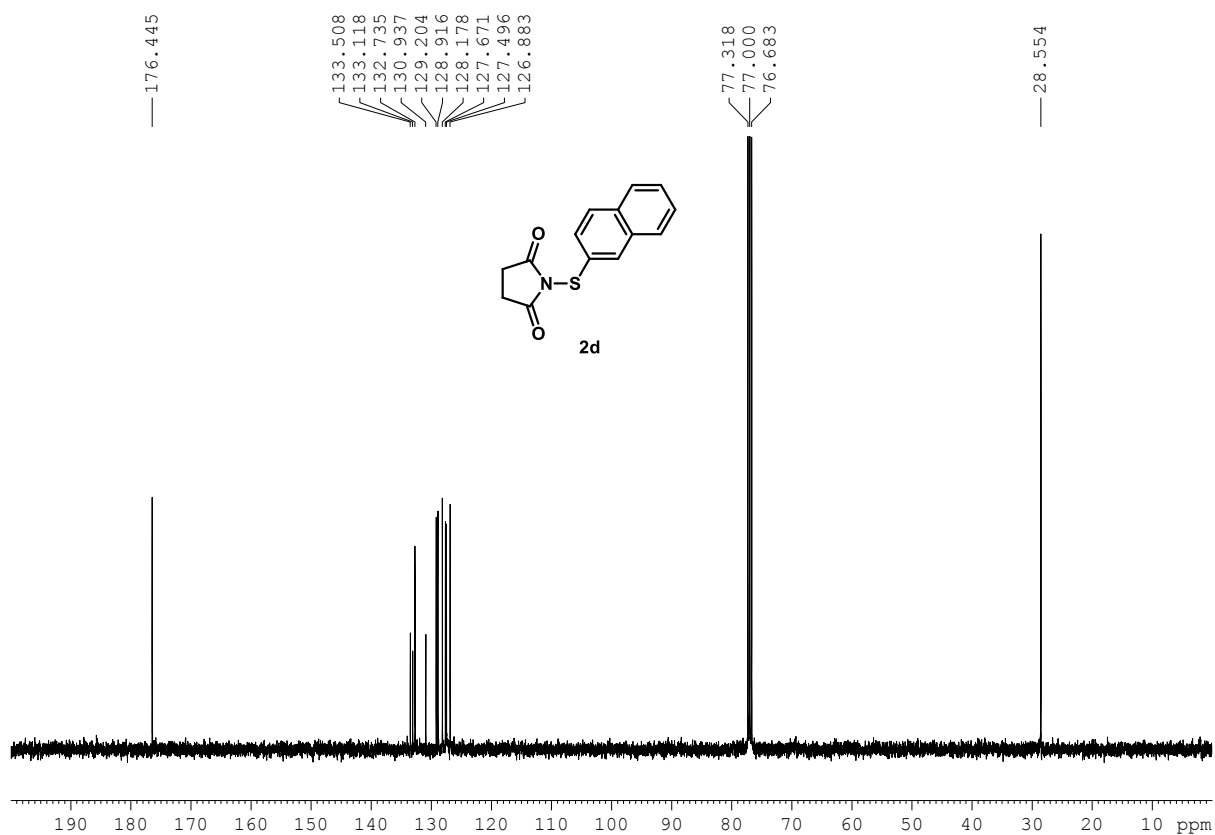
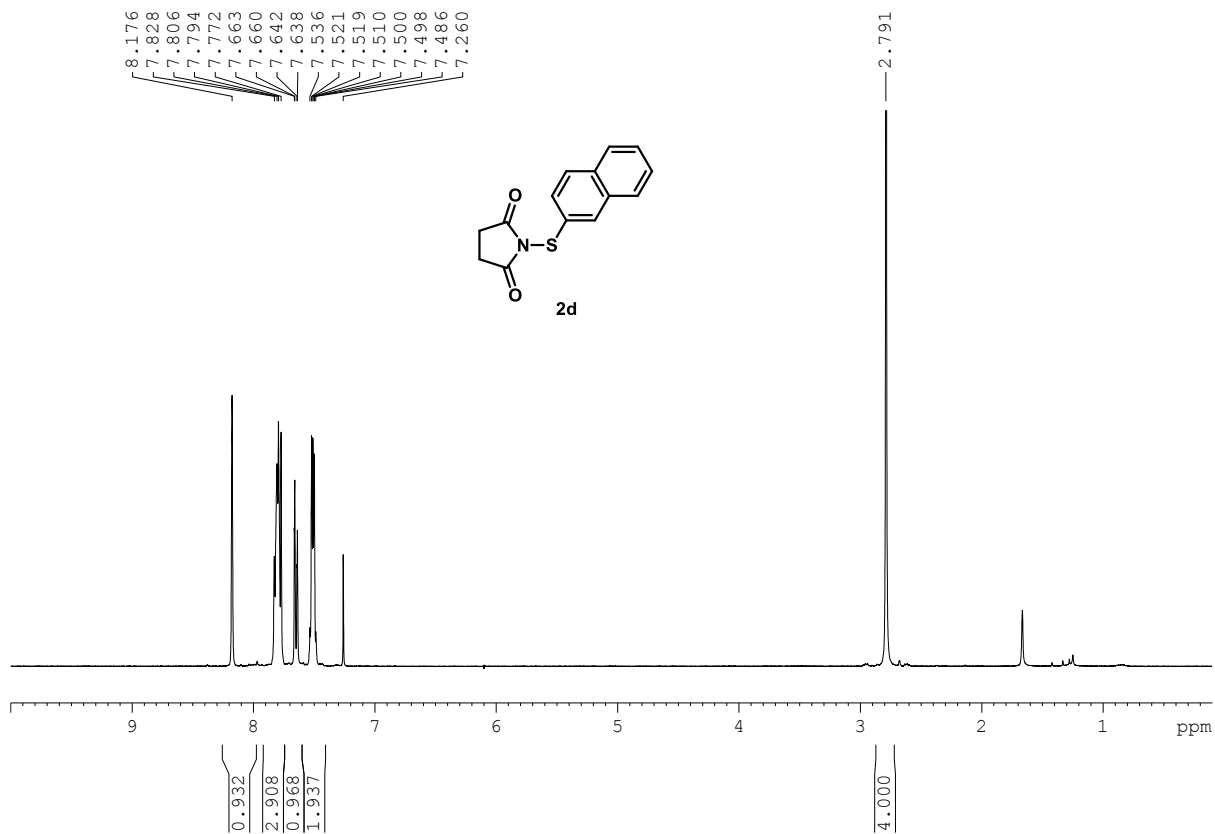


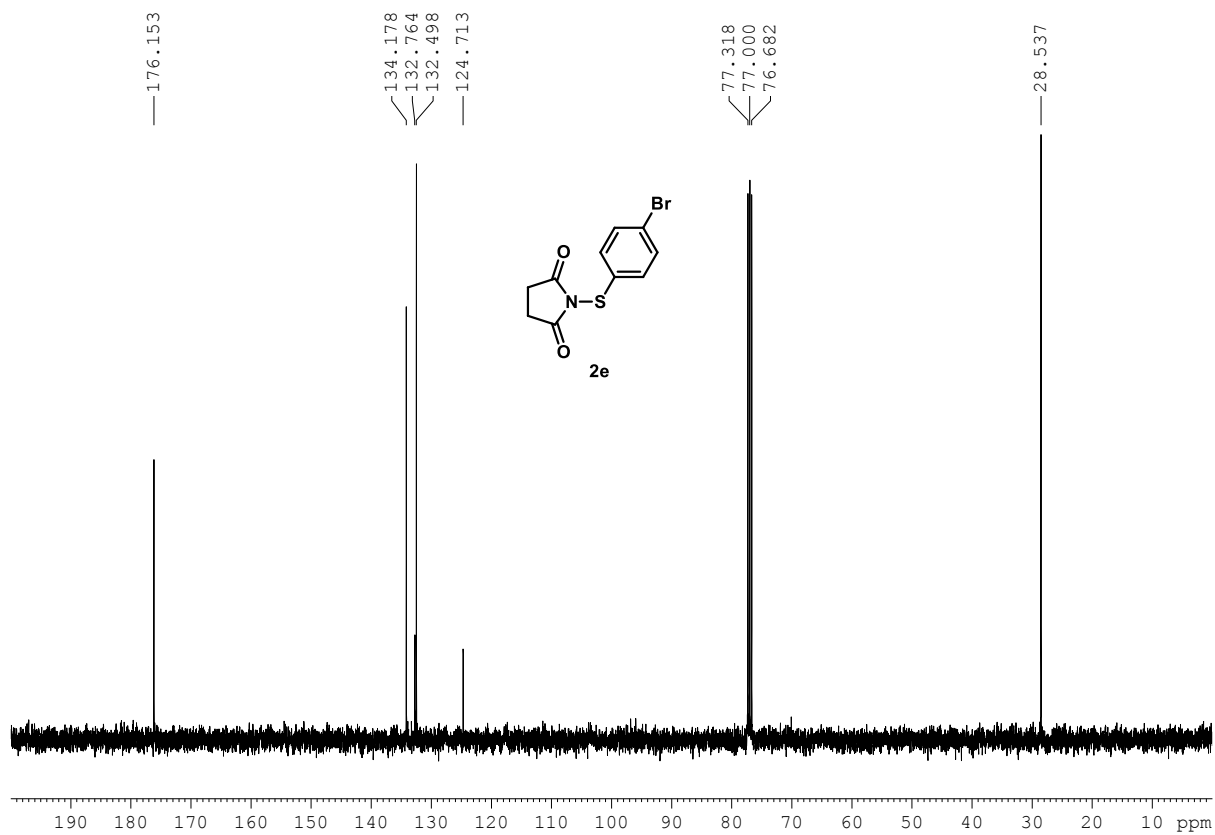
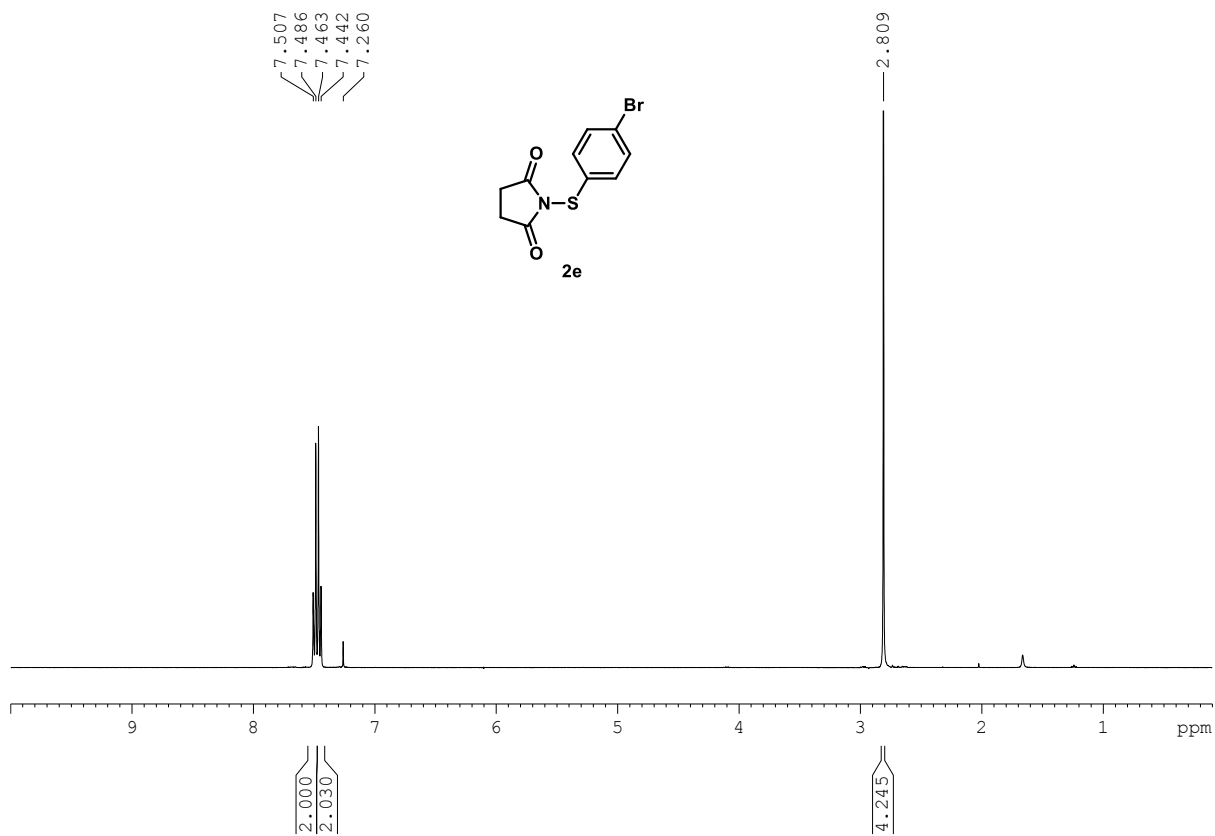


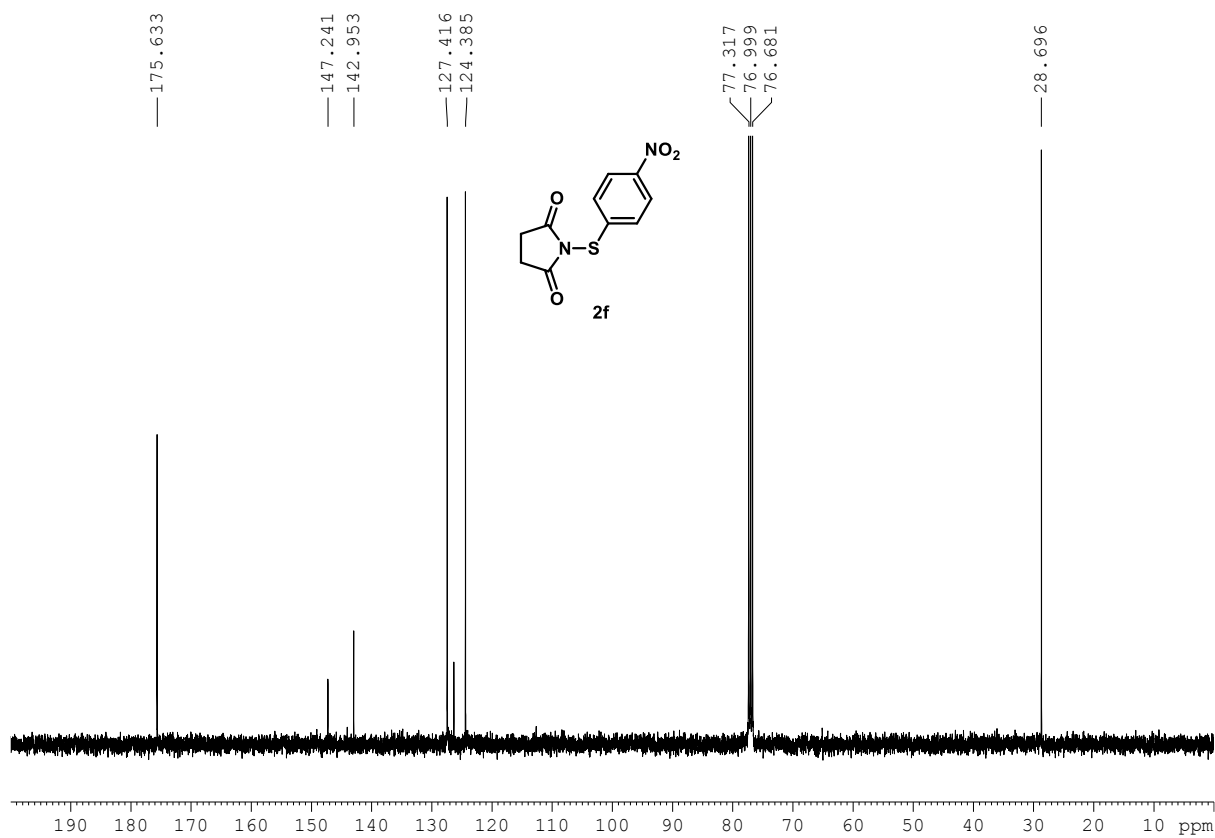
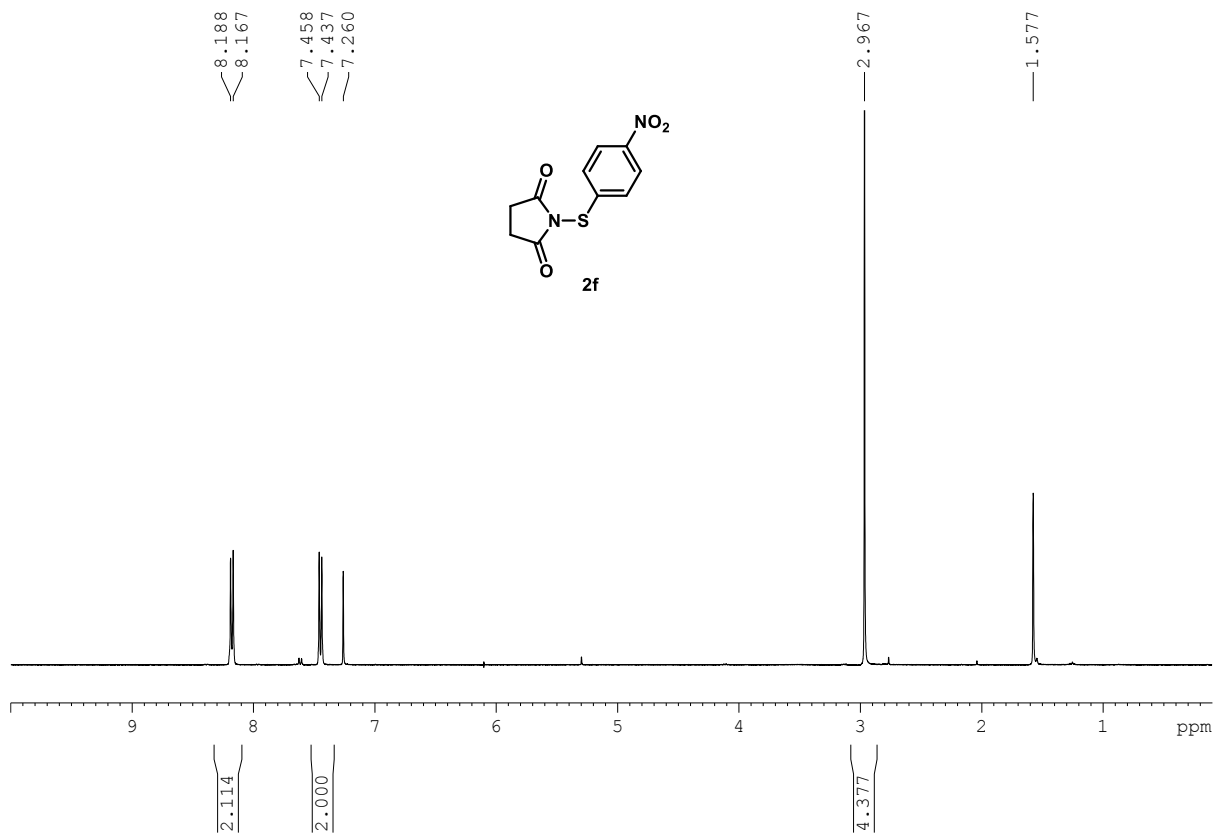


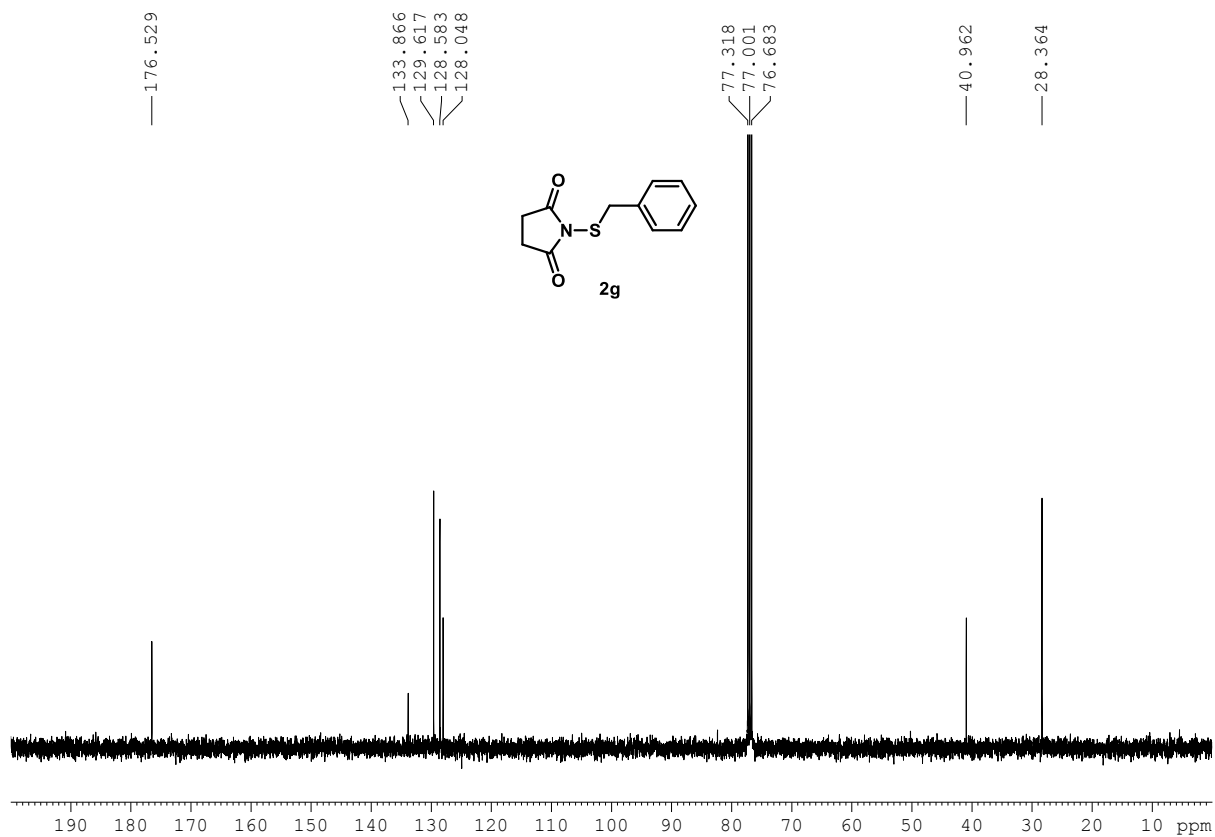
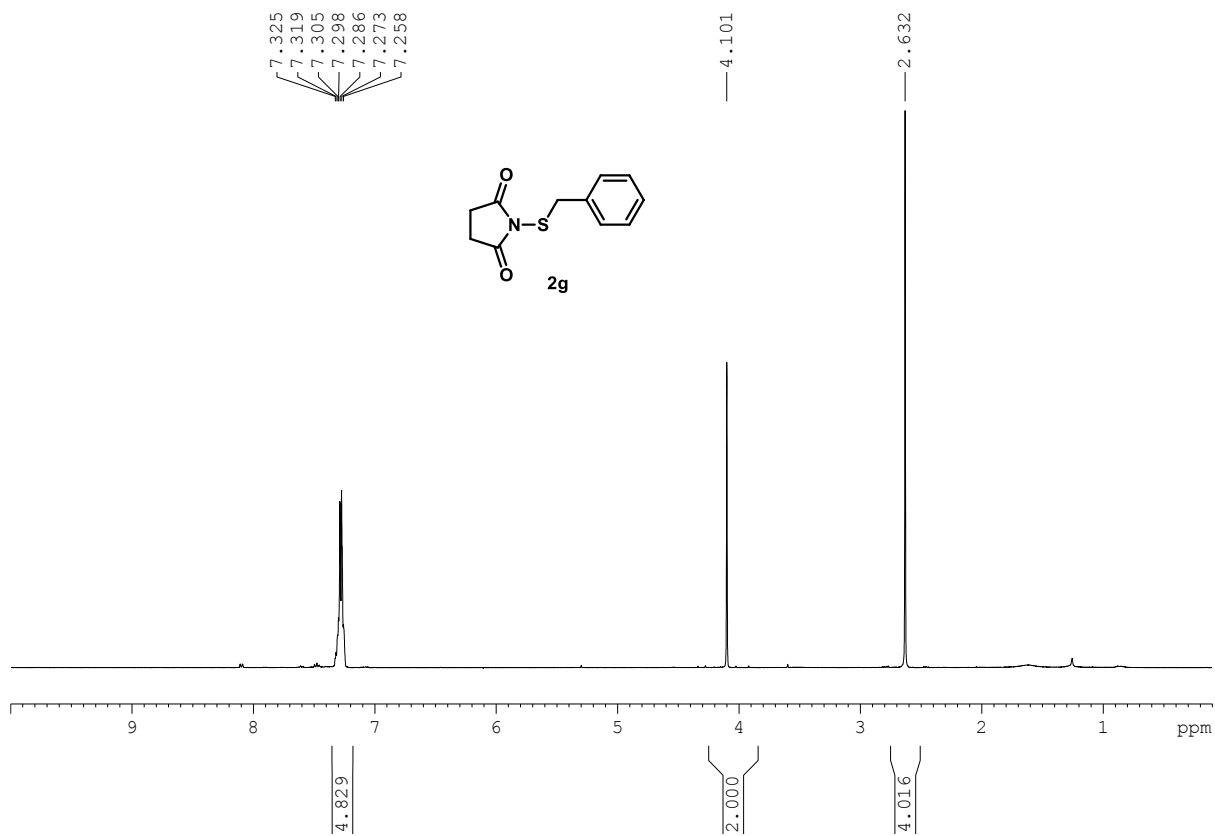


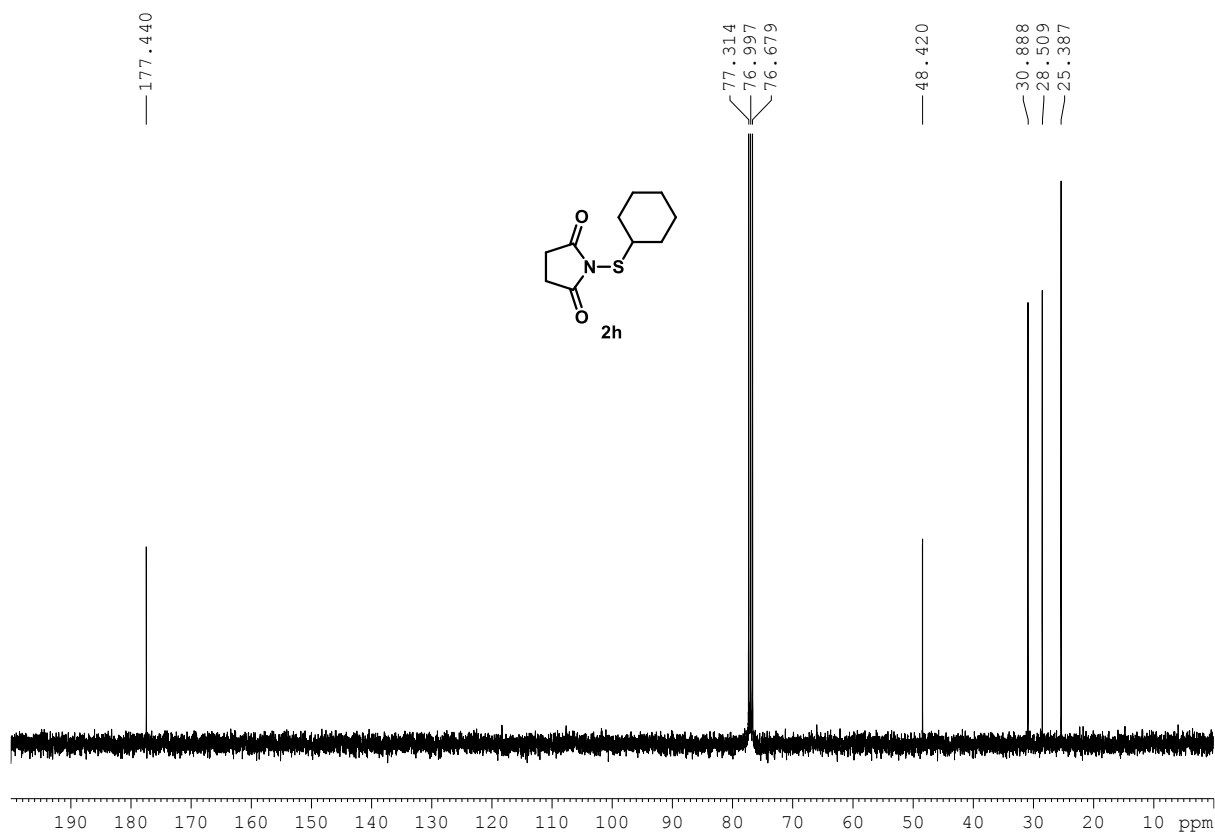
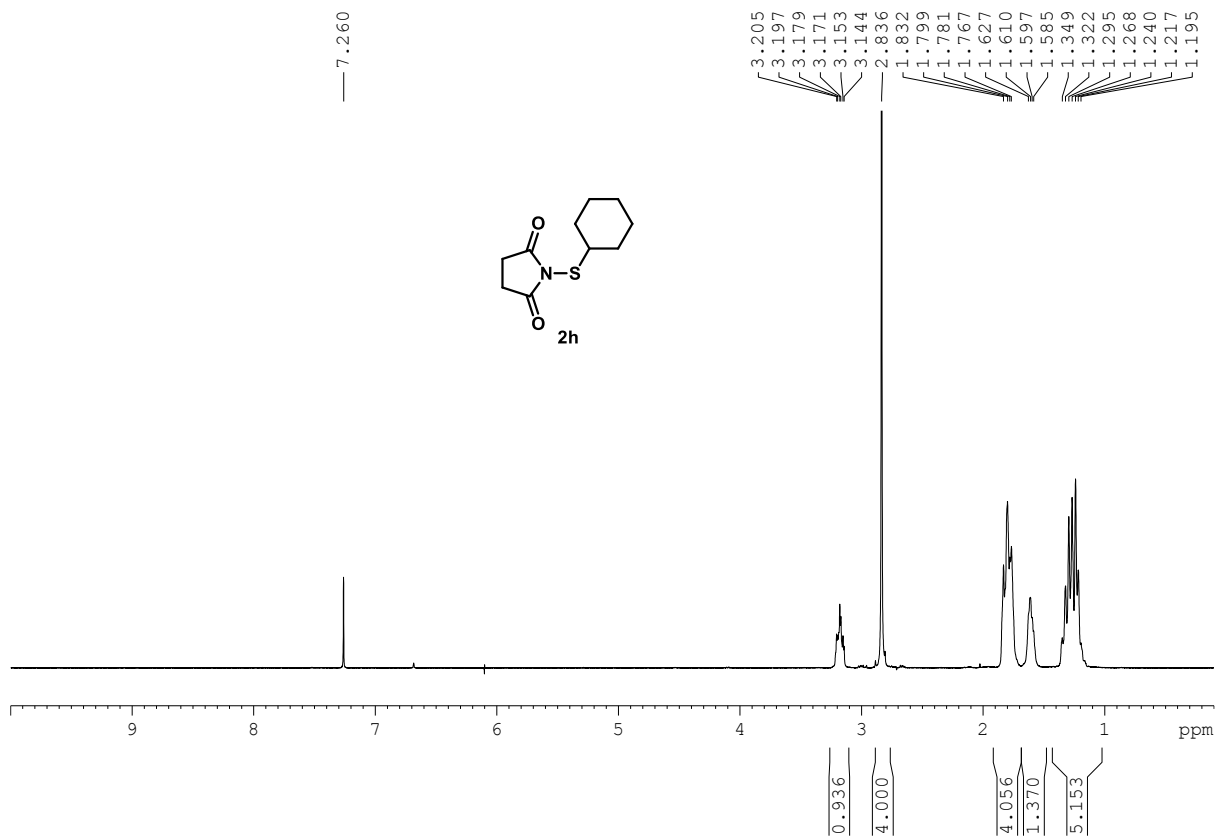


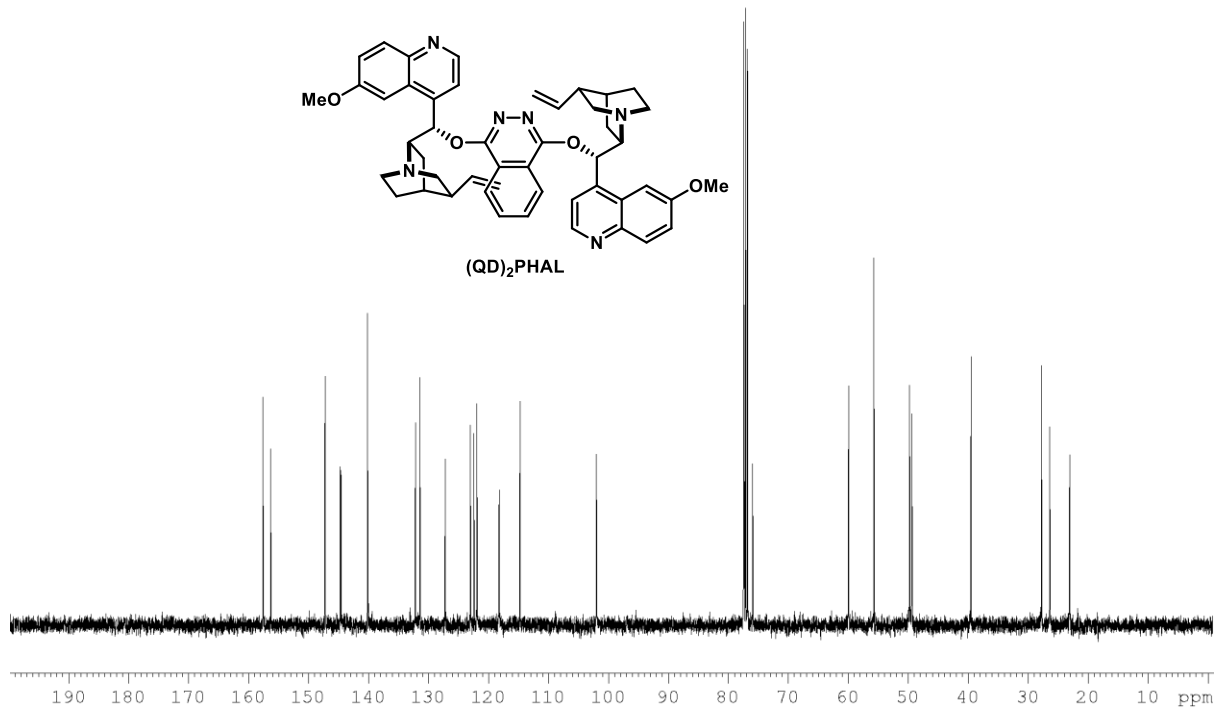
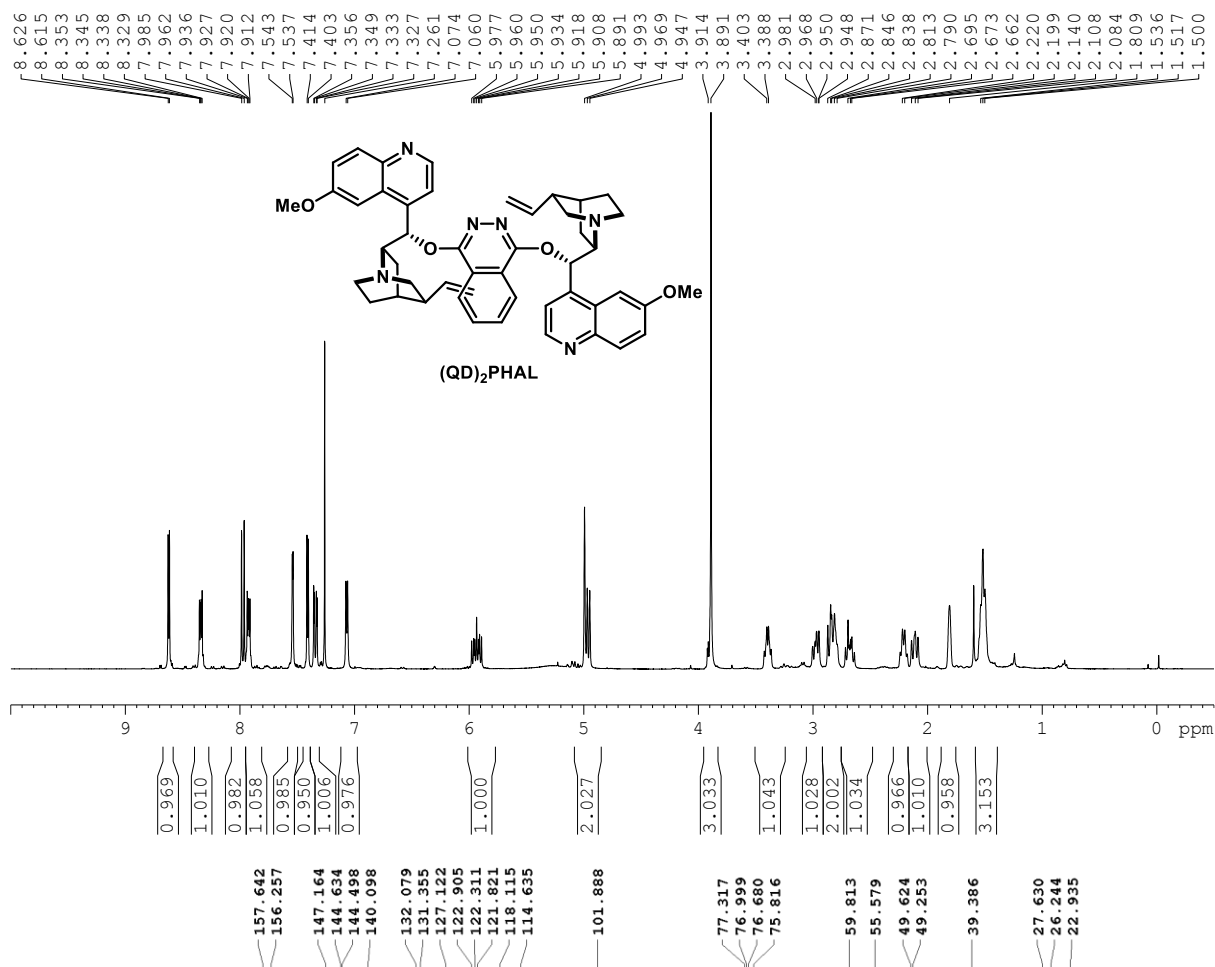


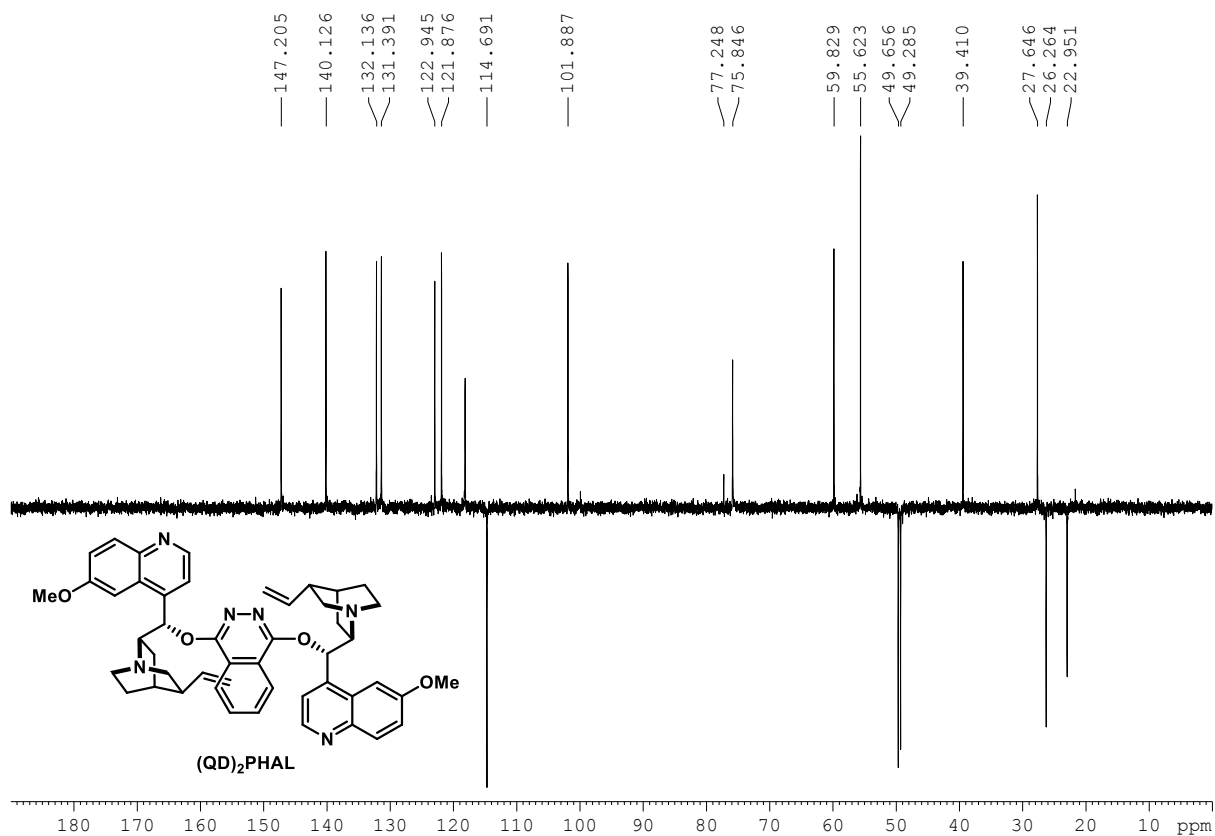


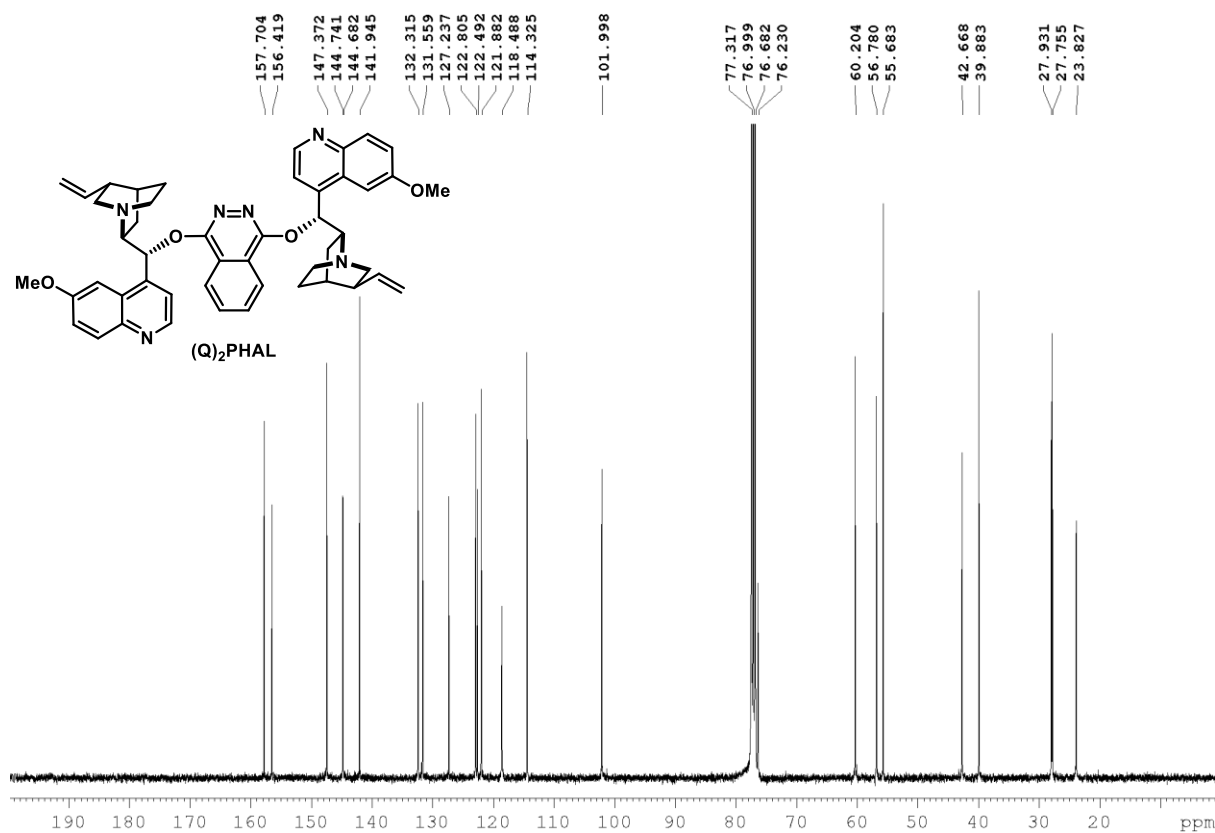
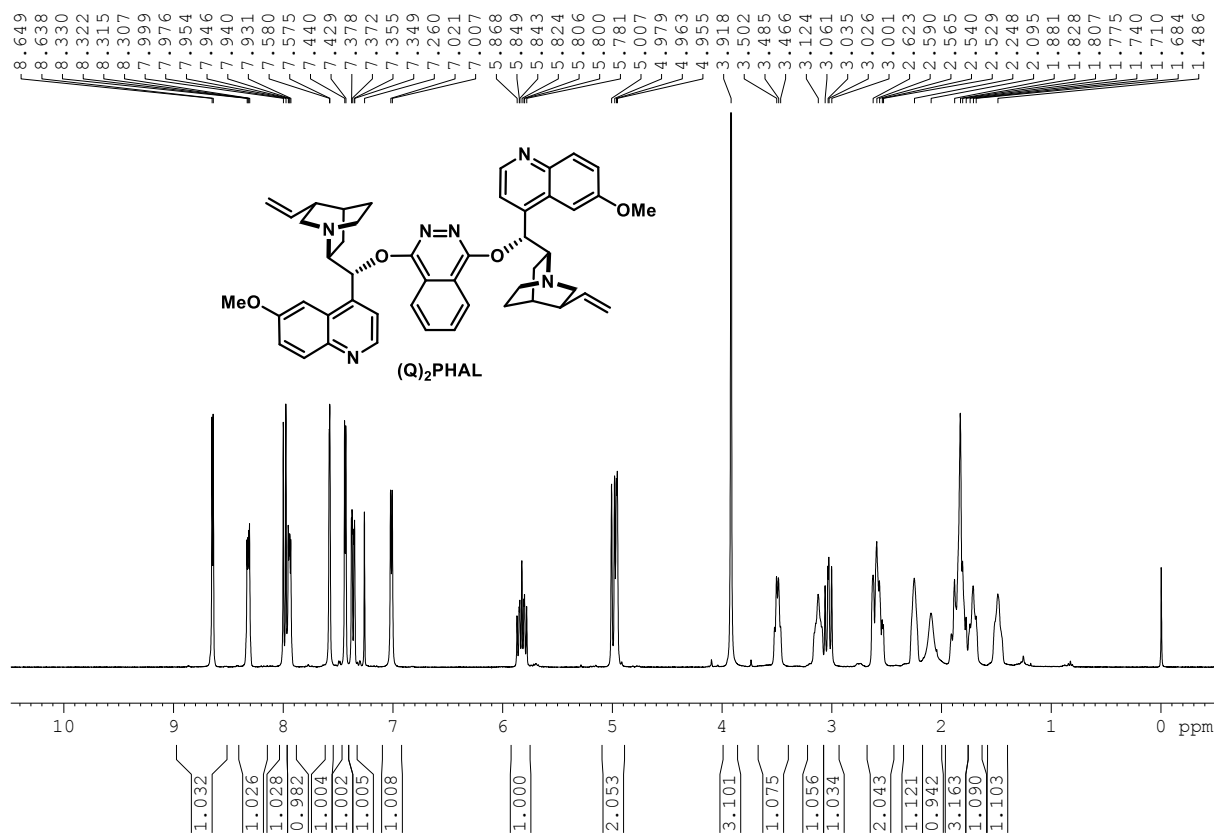


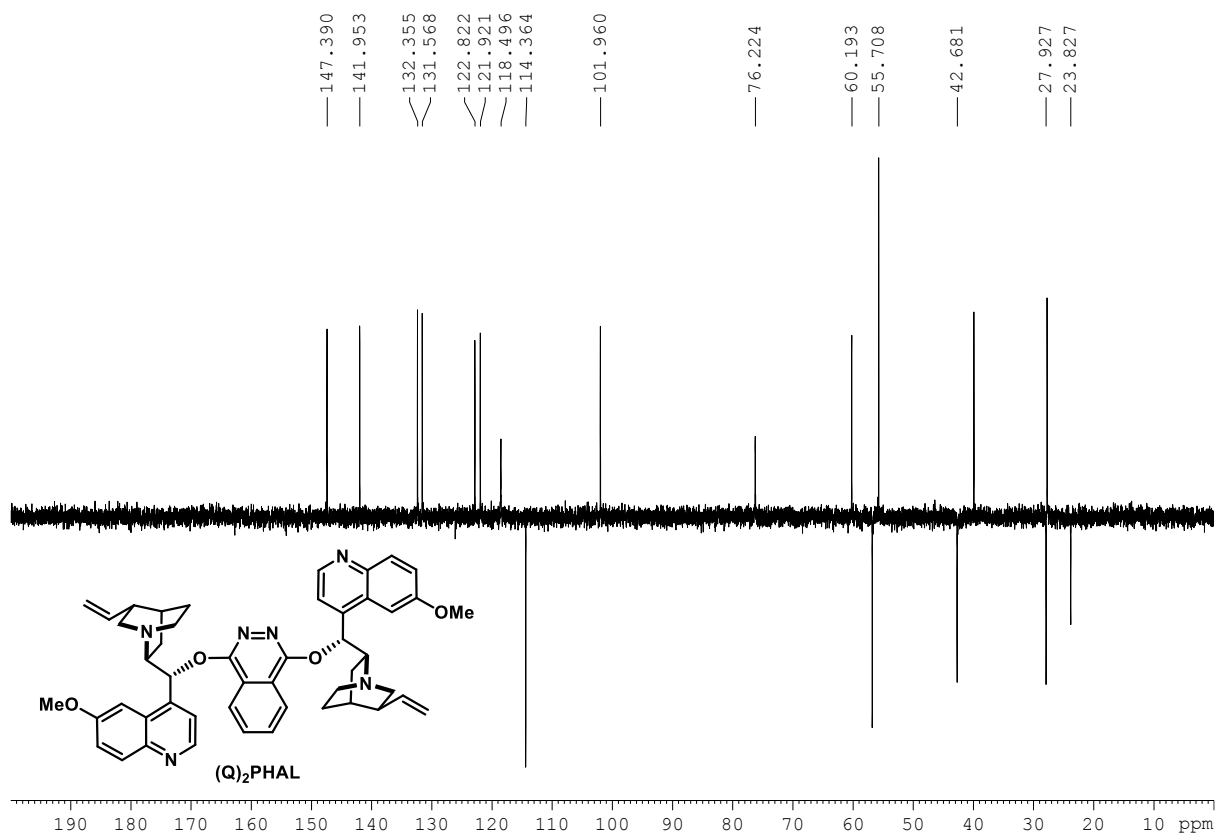


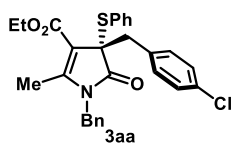
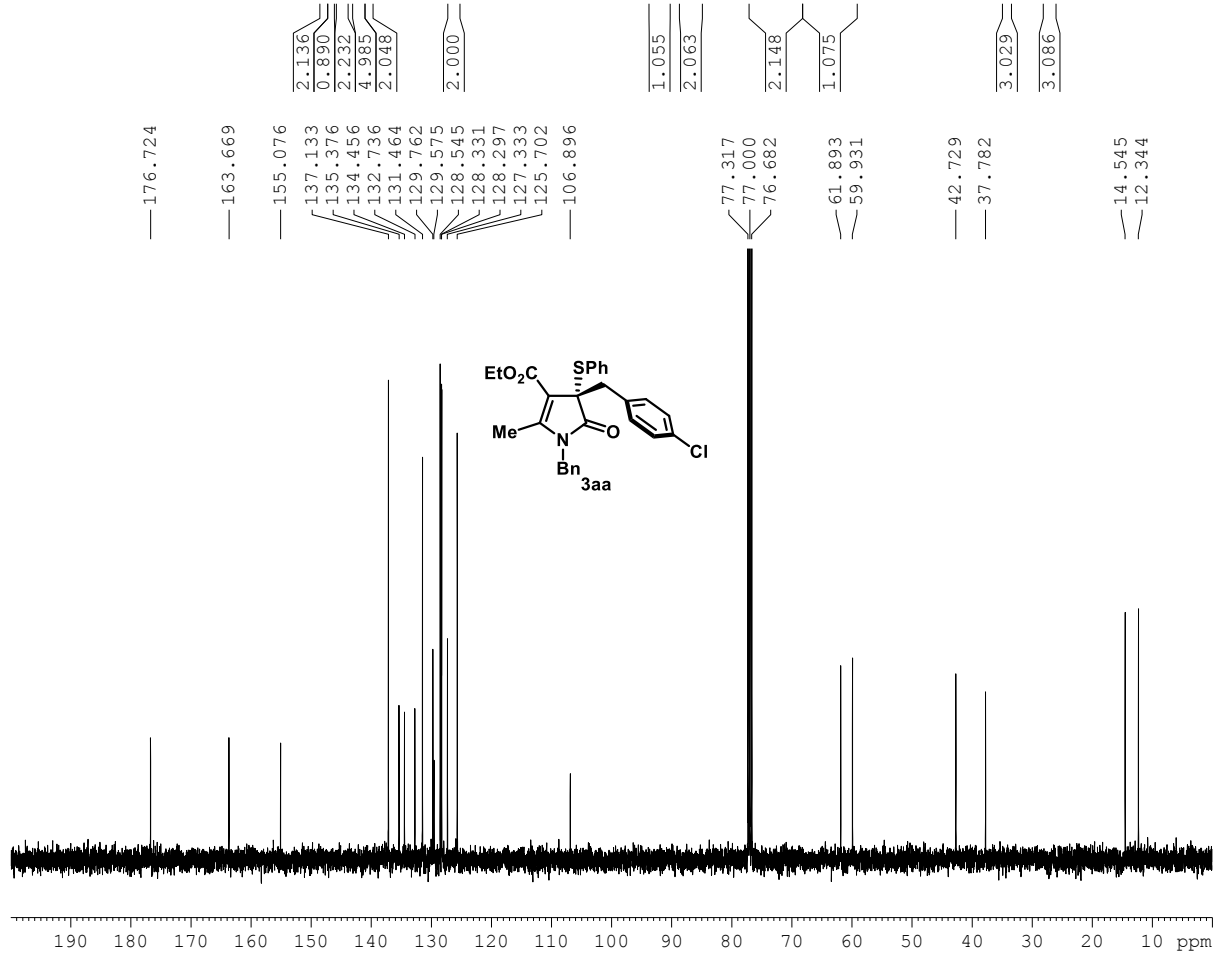
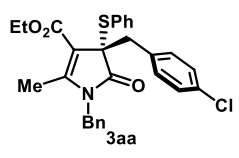
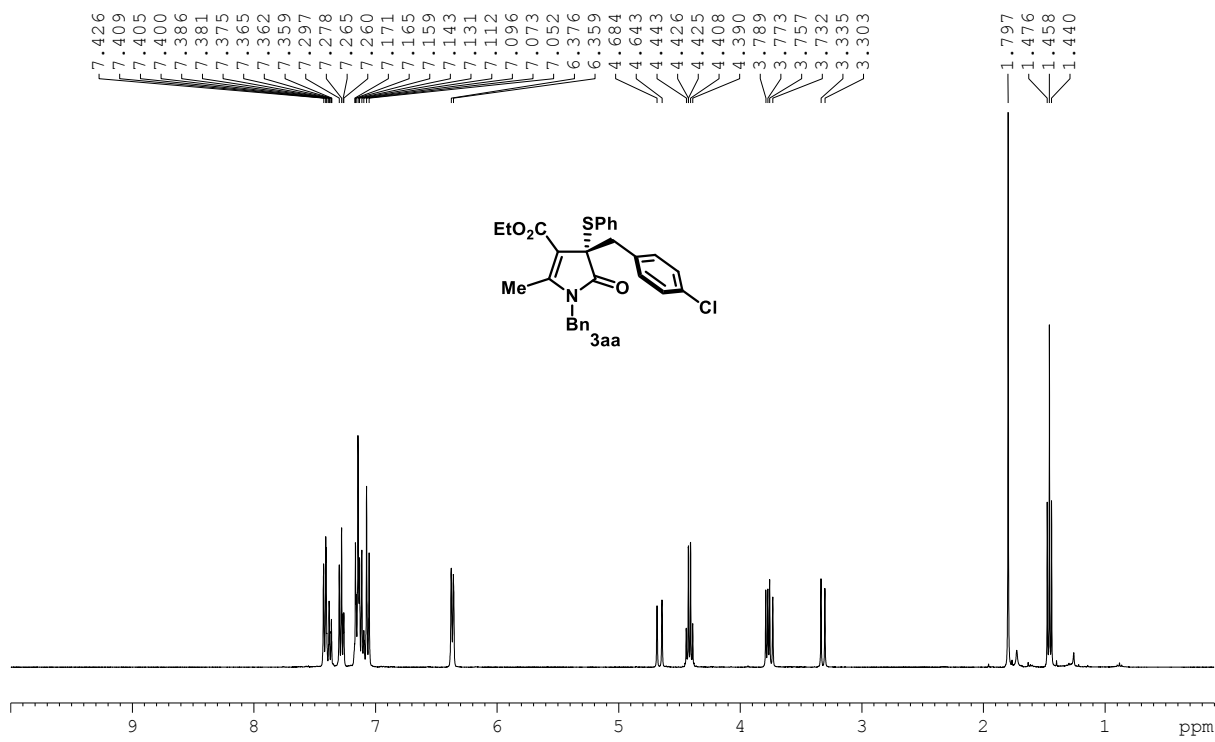


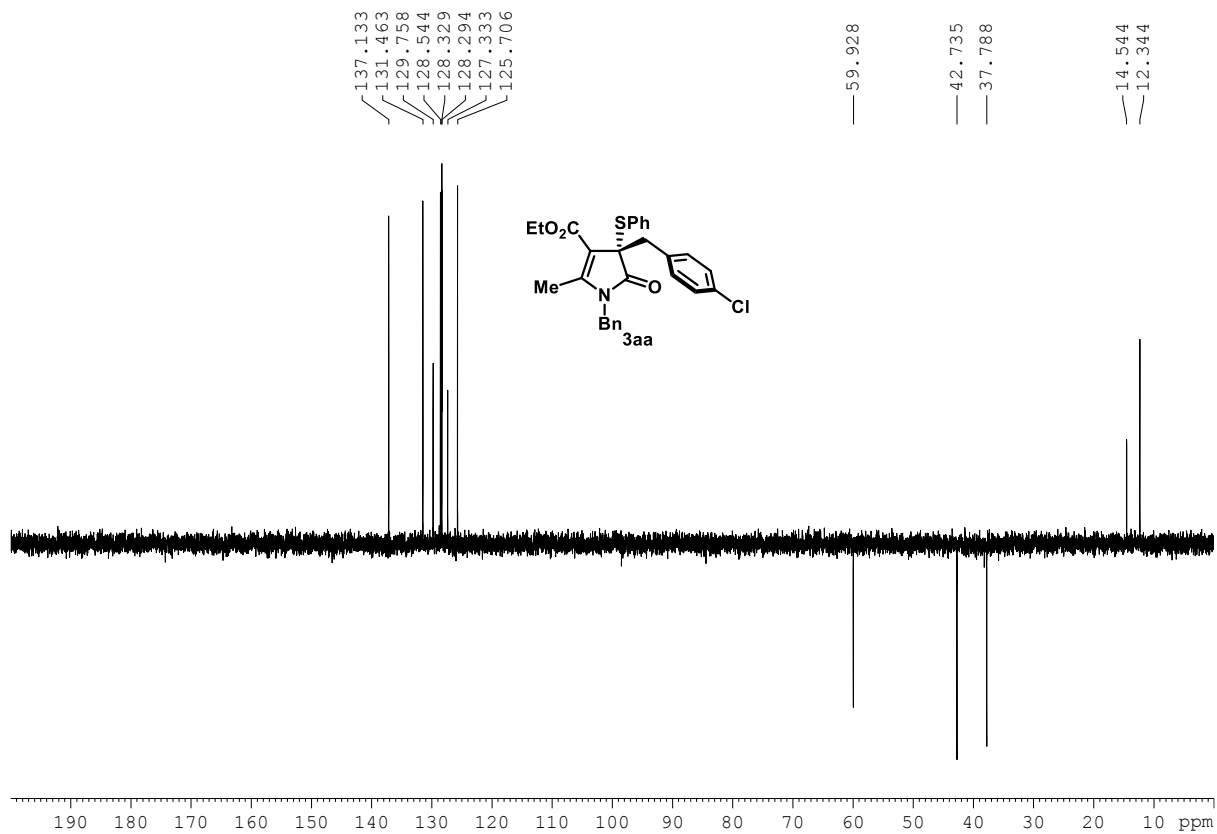


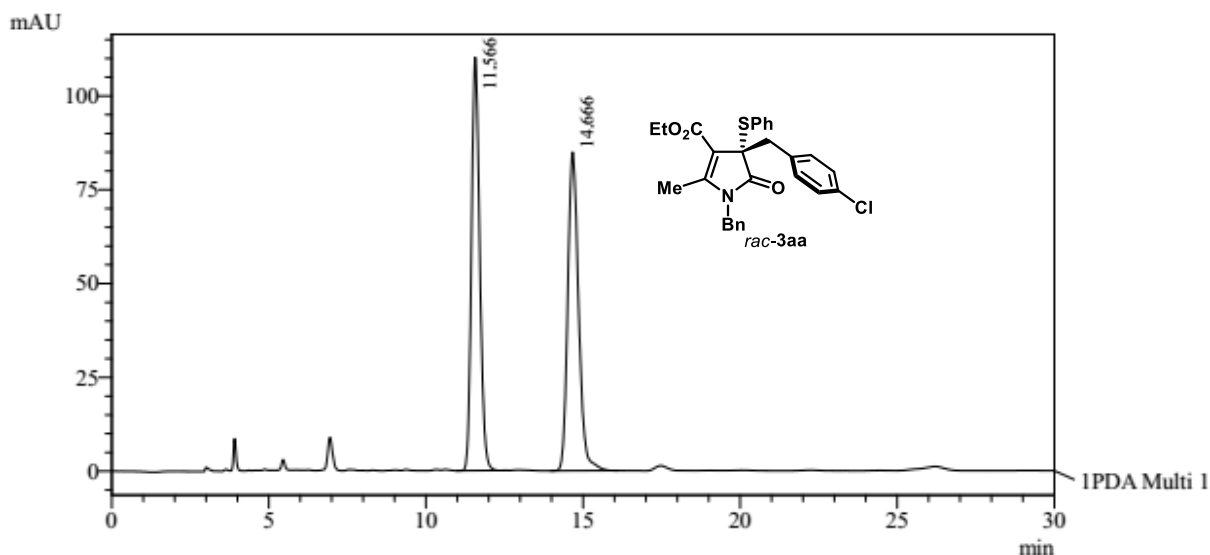












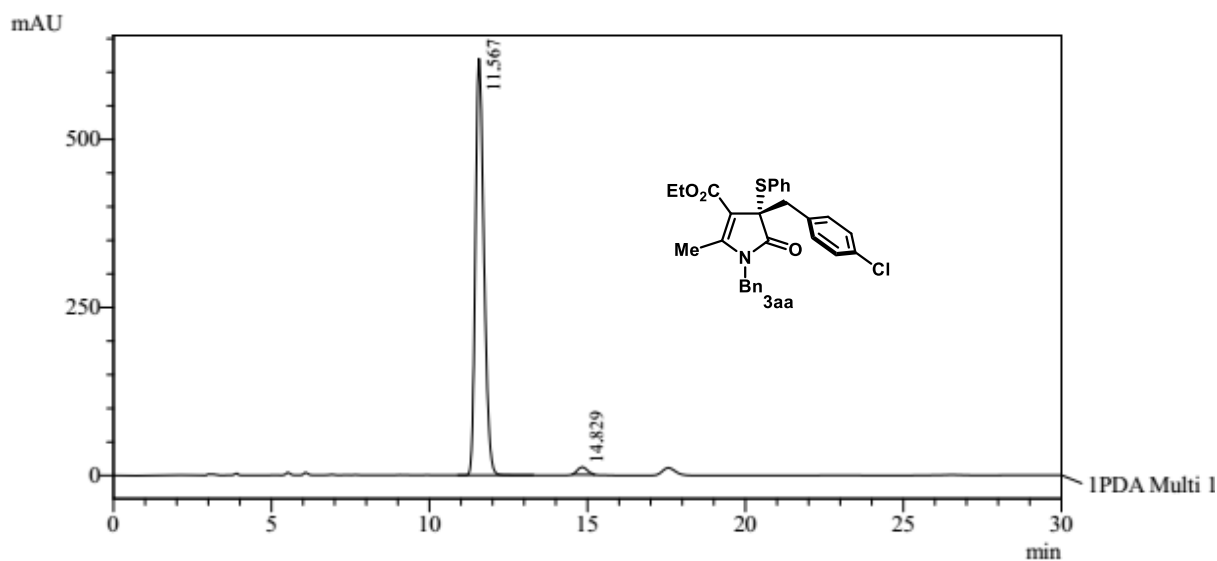
1 PDA Multi 1 / 254nm 4nm

PeakTable

PDA Ch1 254nm 4nm

| Peak# | Ret. Time | Area | Area % |
|-------|-----------|---------|---------|
| 1 | 11.566 | 2004525 | 49.558 |
| 2 | 14.666 | 2040305 | 50.442 |
| Total | | 4044831 | 100.000 |

Daicel Chiralpak AD-H column, 254 nm, *n*-Hexane/EtOH = 90:10, 1.0 mL min⁻¹, 20 °C



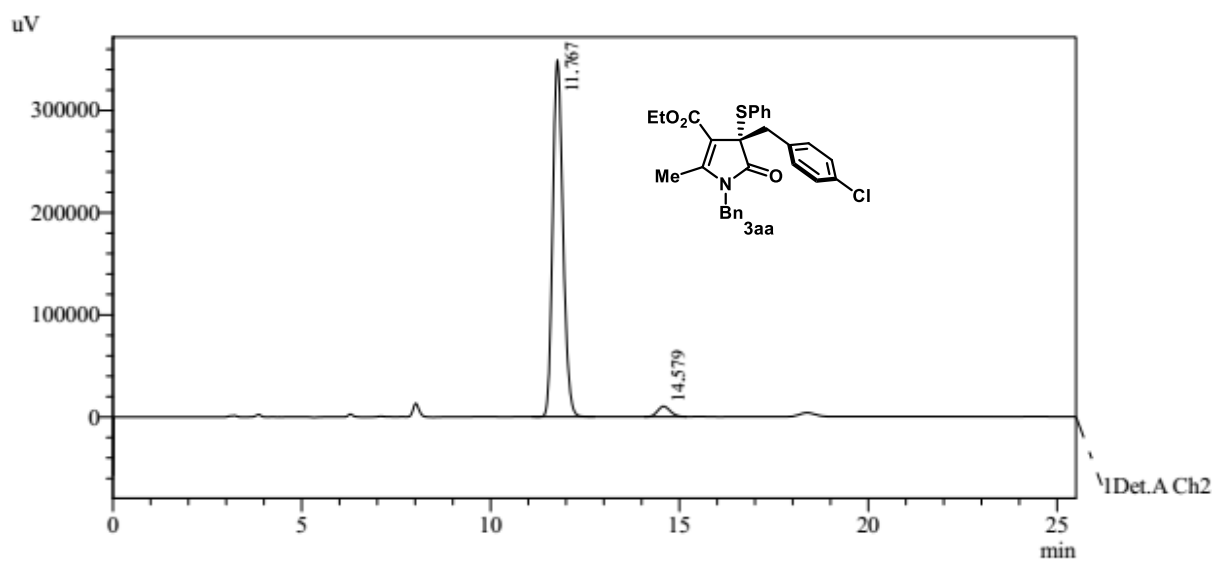
1 PDA Multi 1 / 254nm 4nm

PeakTable

PDA Ch1 254nm 4nm

| Peak# | Ret. Time | Area | Area % |
|-------|-----------|----------|---------|
| 1 | 11.567 | 11633847 | 97.976 |
| 2 | 14.829 | 240287 | 2.024 |
| Total | | 11874134 | 100.000 |

HPLC chromatogram of **3aa** obtained from mmol scale reaction in water:

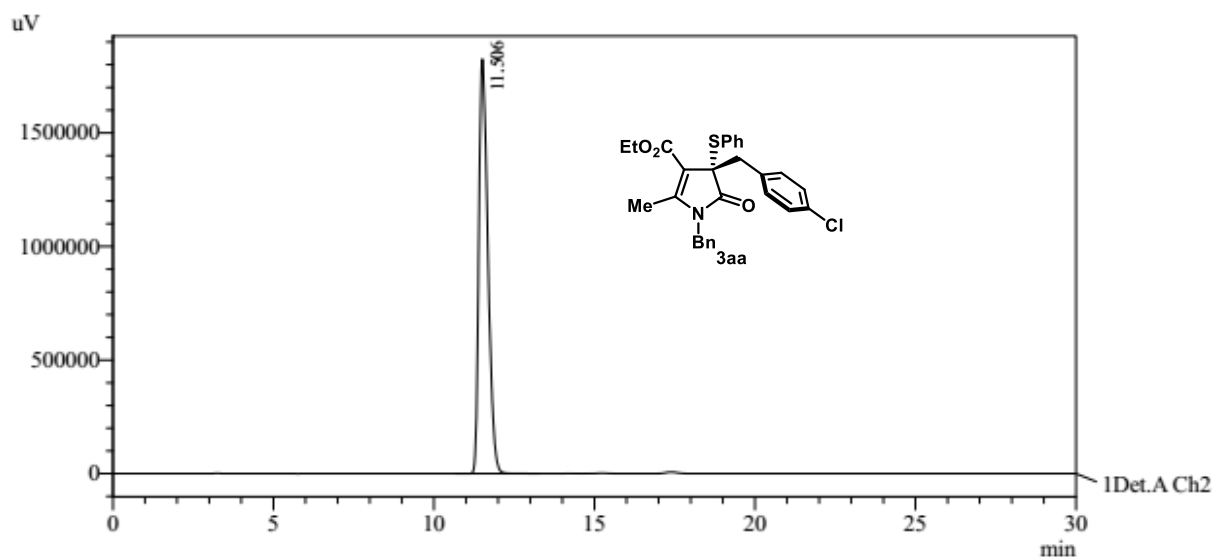


PeakTable

Detector A Ch2 254nm

| Peak# | Ret. Time | Area | Area % |
|-------|-----------|---------|---------|
| 1 | 11.767 | 6599360 | 96.526 |
| 2 | 14.579 | 237489 | 3.474 |
| Total | | 6836850 | 100.000 |

HPLC chromatogram of recrystallized **3aa**:

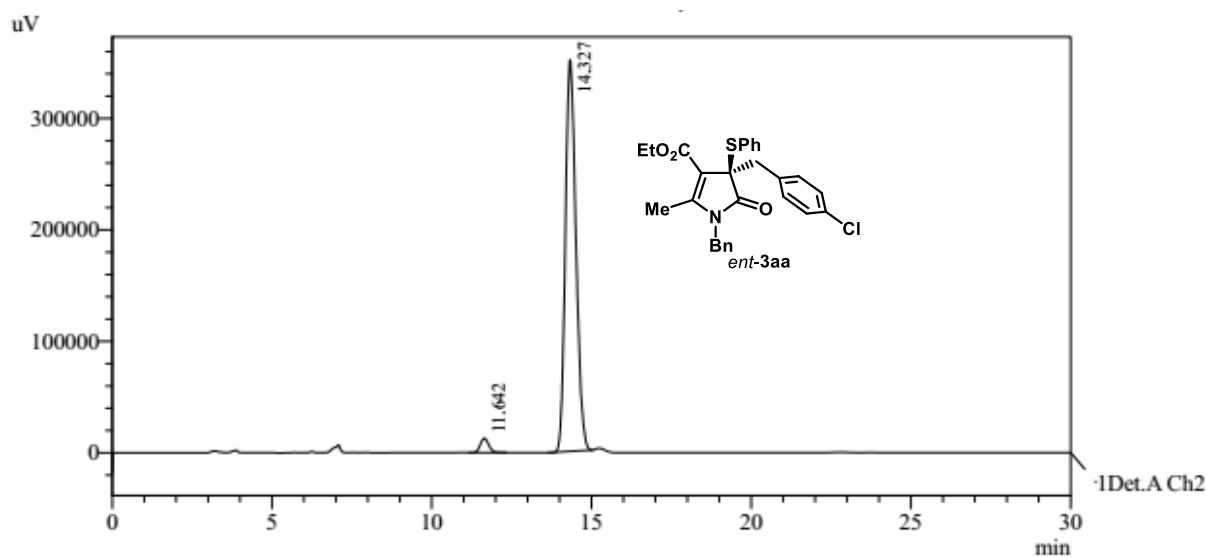


PeakTable

Detector A Ch2 254nm

| Peak# | Ret. Time | Area | Area % |
|-------|-----------|----------|---------|
| 1 | 11.506 | 35692555 | 100.000 |
| Total | | 35692555 | 100.000 |

HPLC chromatogram of *ent*-**3aa**:

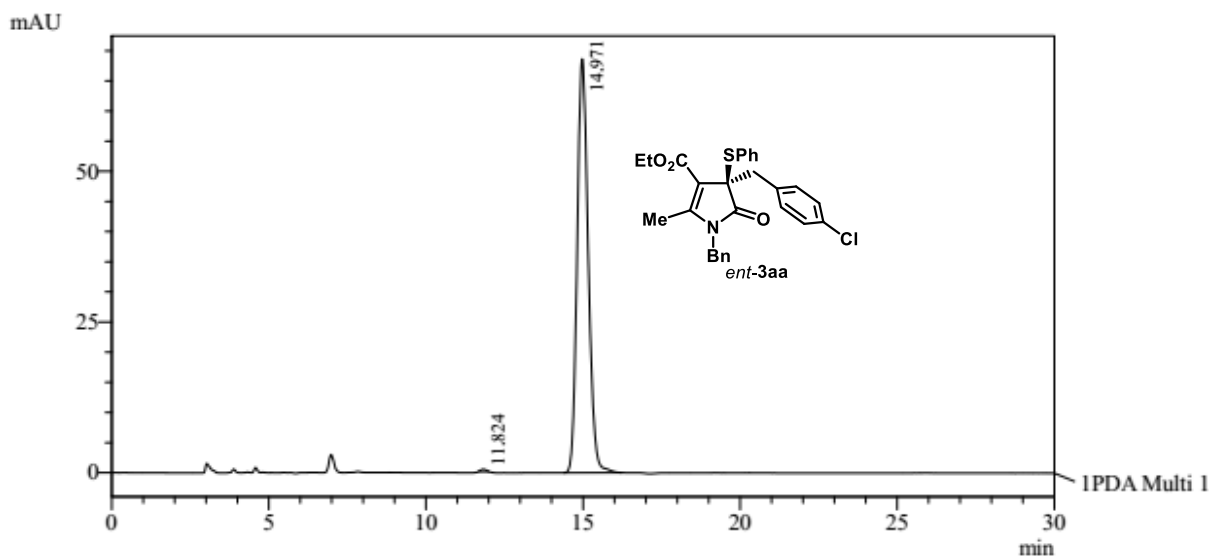


PeakTable

Detector A Ch2 254nm

| Peak# | Ret. Time | Area | Area % |
|-------|-----------|---------|---------|
| 1 | 11.642 | 235616 | 2.838 |
| 2 | 14.327 | 8066696 | 97.162 |
| Total | | 8302311 | 100.000 |

HPLC chromatogram of recrystallized *ent*-**3aa**:

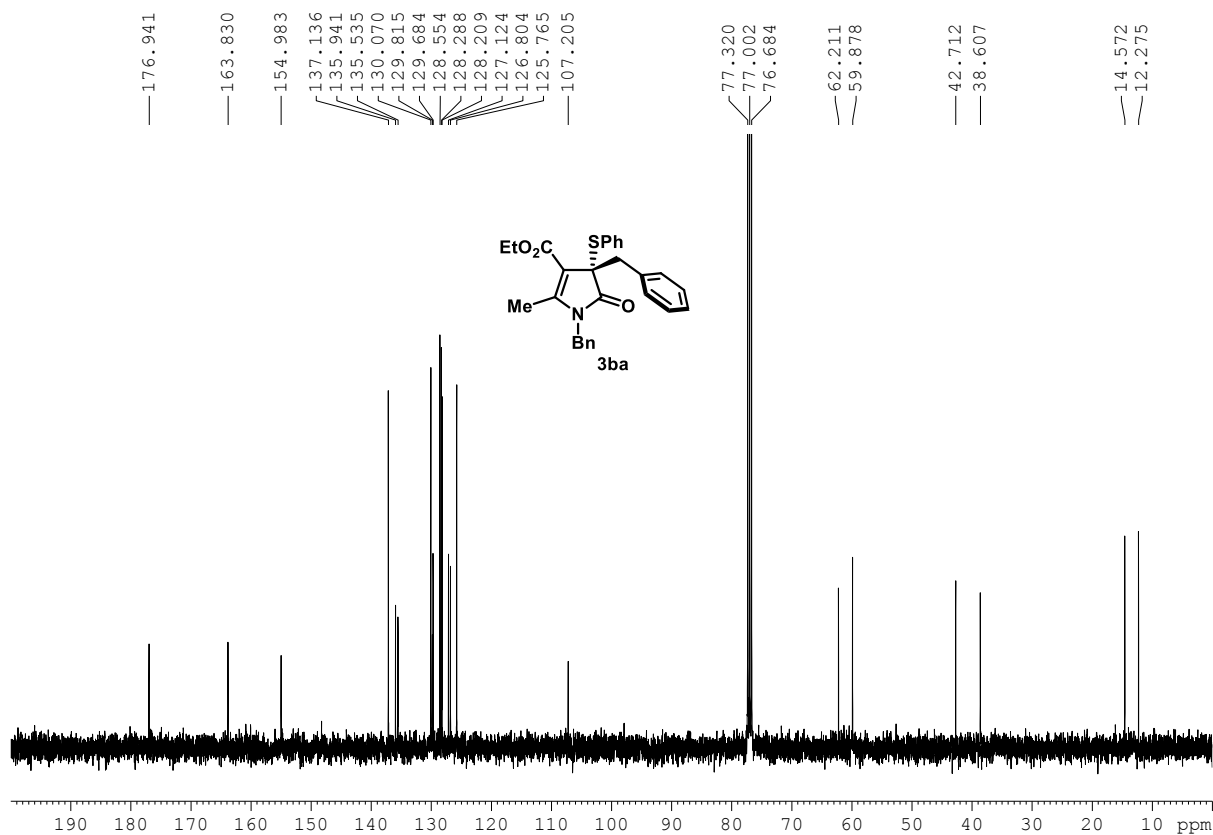
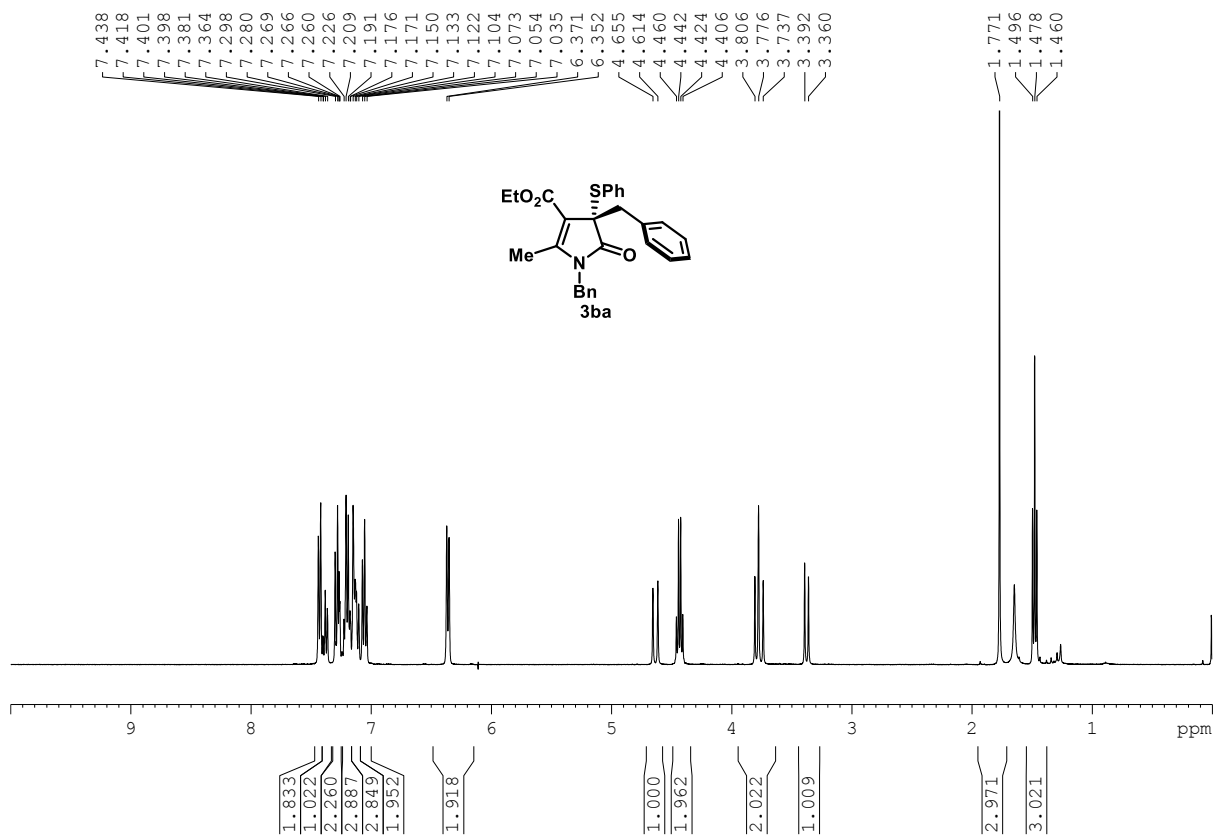


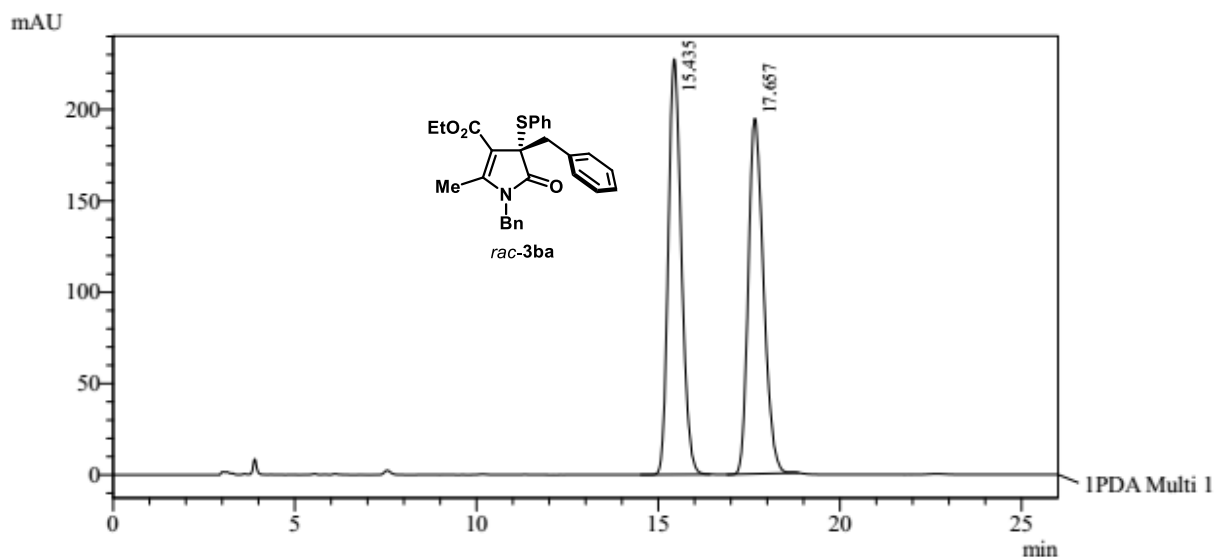
1 PDA Multi 1 / 254nm 4nm

PeakTable

PDA Ch1 254nm 4nm

| Peak# | Ret. Time | Area | Area % |
|-------|-----------|---------|---------|
| 1 | 11.824 | 4380 | 0.260 |
| 2 | 14.971 | 1678108 | 99.740 |
| Total | | 1682488 | 100.000 |





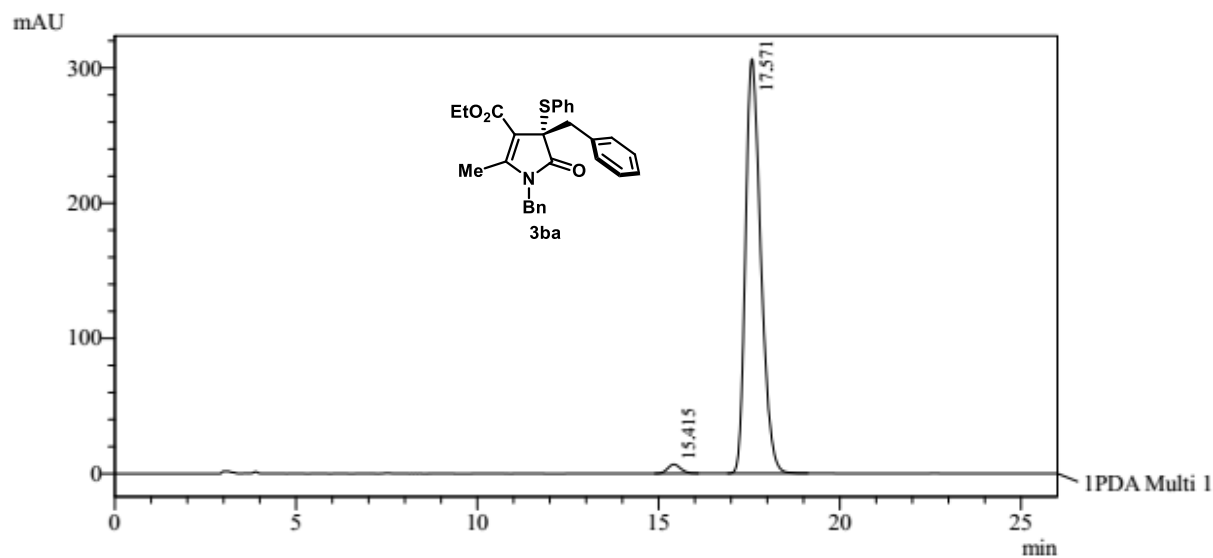
1 PDA Multi 1 / 240nm 4nm

PeakTable

PDA Ch1 240nm 4nm

| Peak# | Ret. Time | Area | Area % |
|-------|-----------|----------|---------|
| 1 | 15.435 | 5707664 | 50.141 |
| 2 | 17.657 | 5675574 | 49.859 |
| Total | | 11383237 | 100.000 |

Daicel Chiralpak AD-H column, 240 nm, *n*-Hexane/IPA = 90:10, 1.0 mL min⁻¹, 20 °C

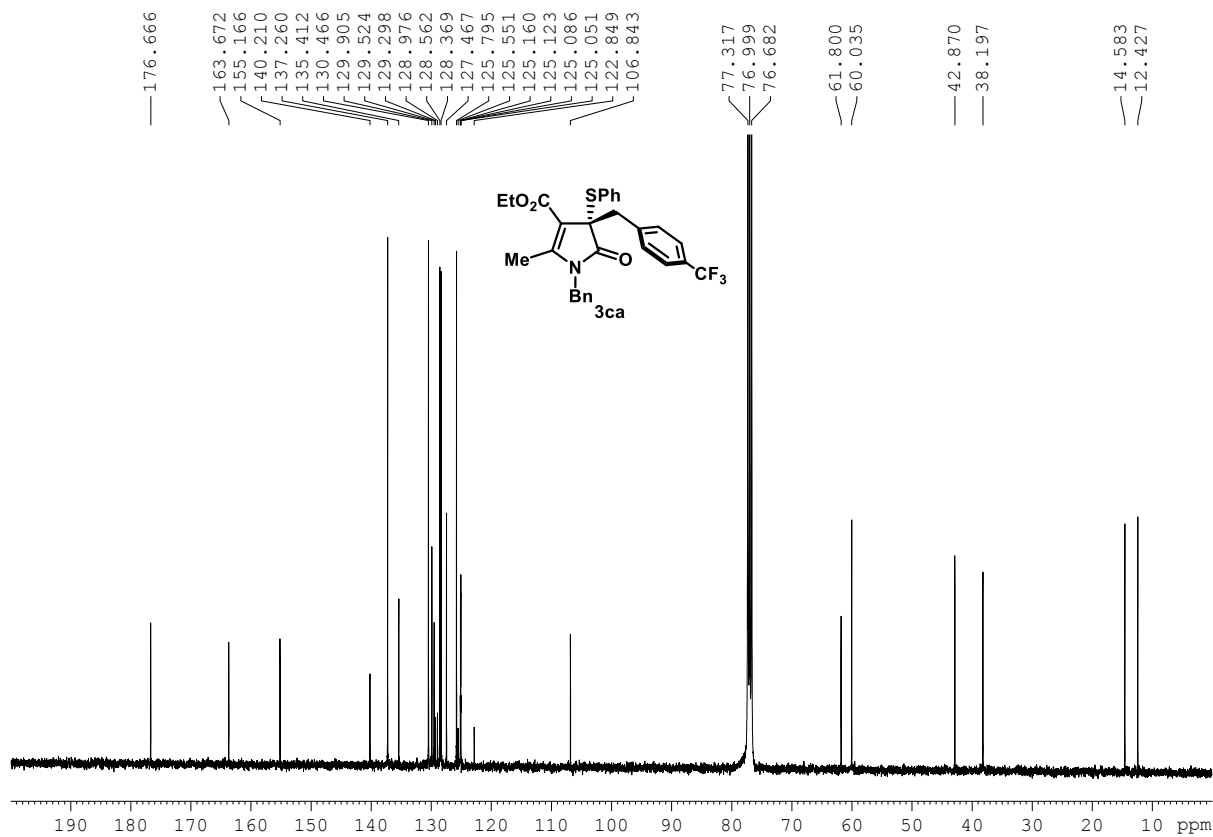
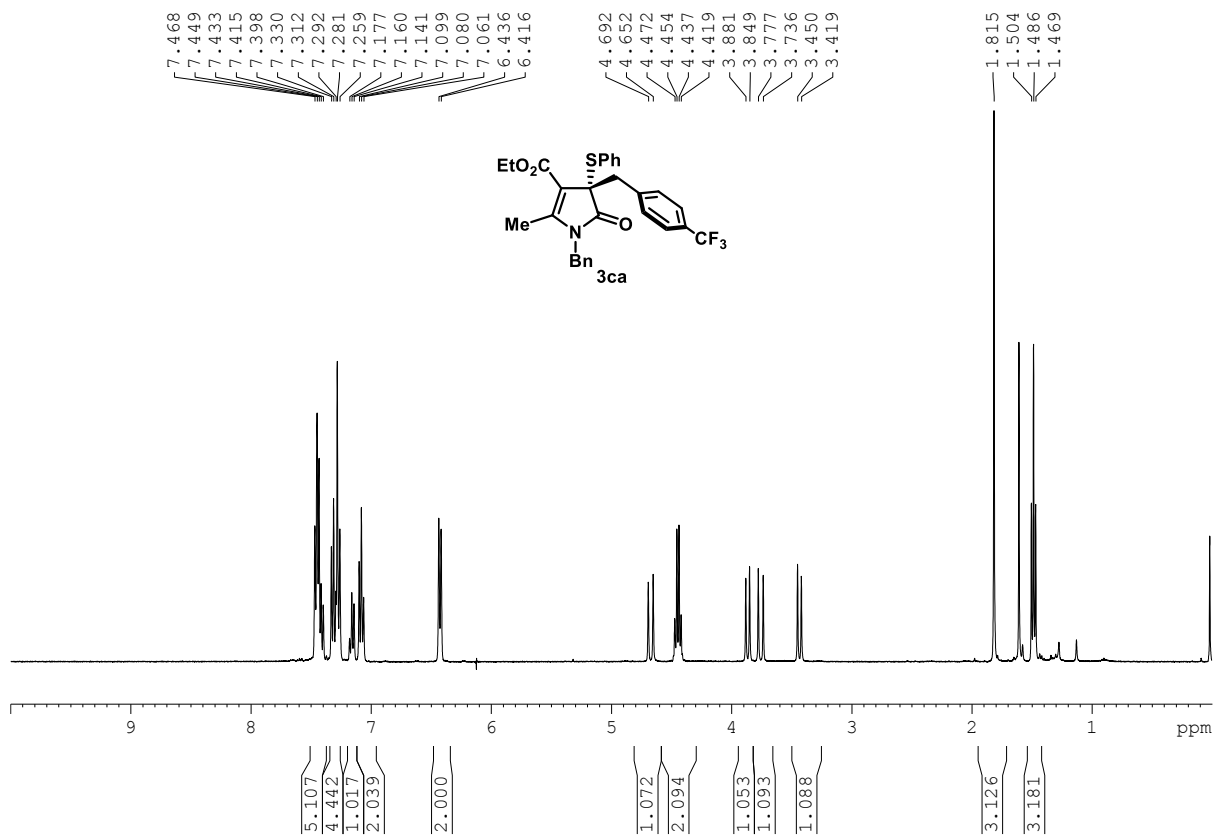


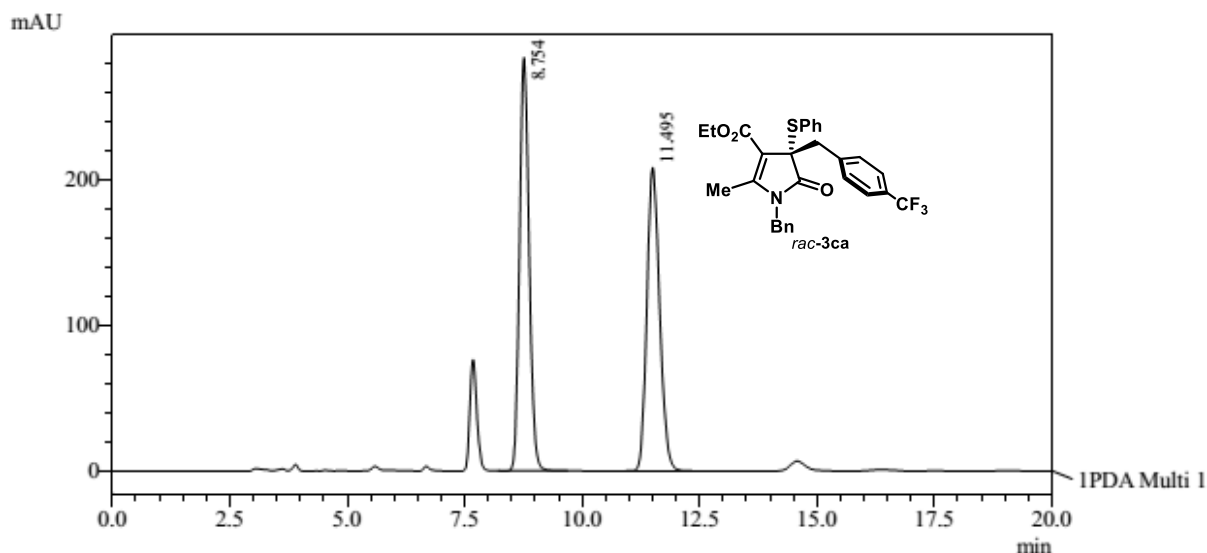
1 PDA Multi 1 / 240nm 4nm

PeakTable

PDA Ch1 240nm 4nm

| Peak# | Ret. Time | Area | Area % |
|-------|-----------|---------|---------|
| 1 | 15.415 | 165152 | 1.801 |
| 2 | 17.571 | 9006920 | 98.199 |
| Total | | 9172072 | 100.000 |



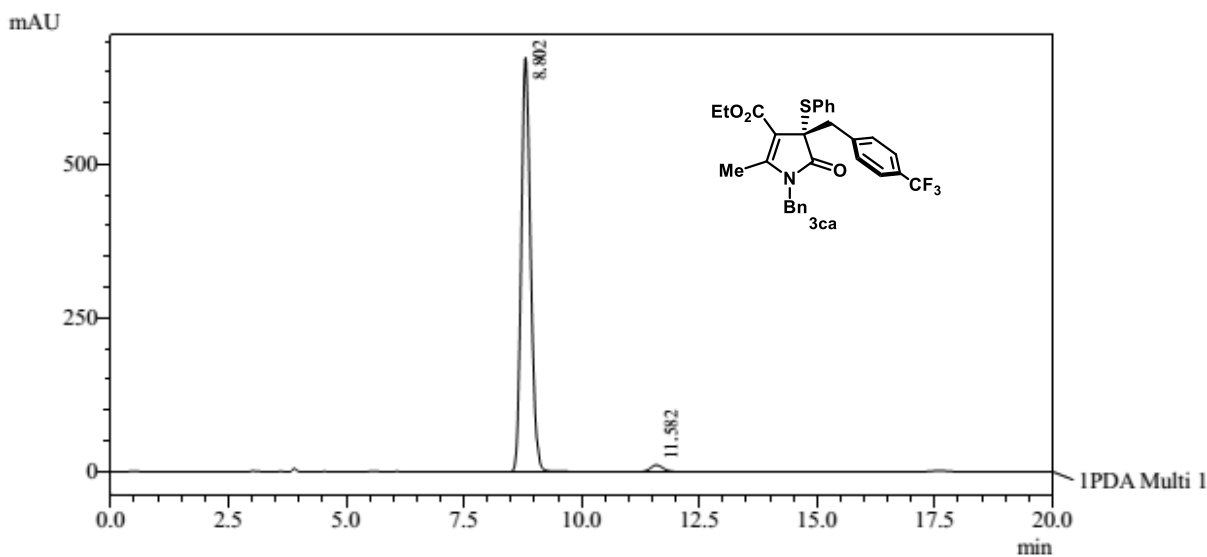


PeakTable

PDA Ch1 240nm 4nm

| Peak# | Ret. Time | Area | Area % |
|-------|-----------|---------|---------|
| 1 | 8.754 | 4013260 | 50.603 |
| 2 | 11.495 | 3917579 | 49.397 |
| Total | | 7930840 | 100.000 |

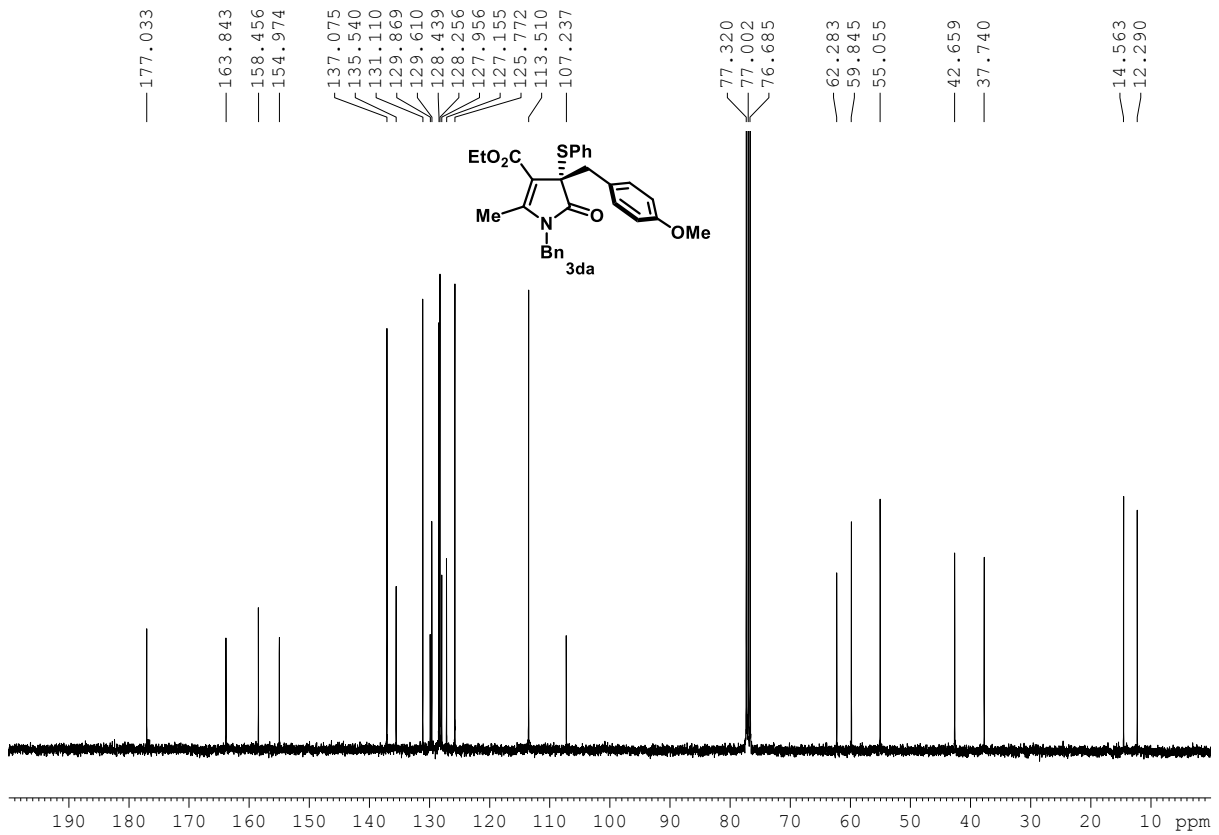
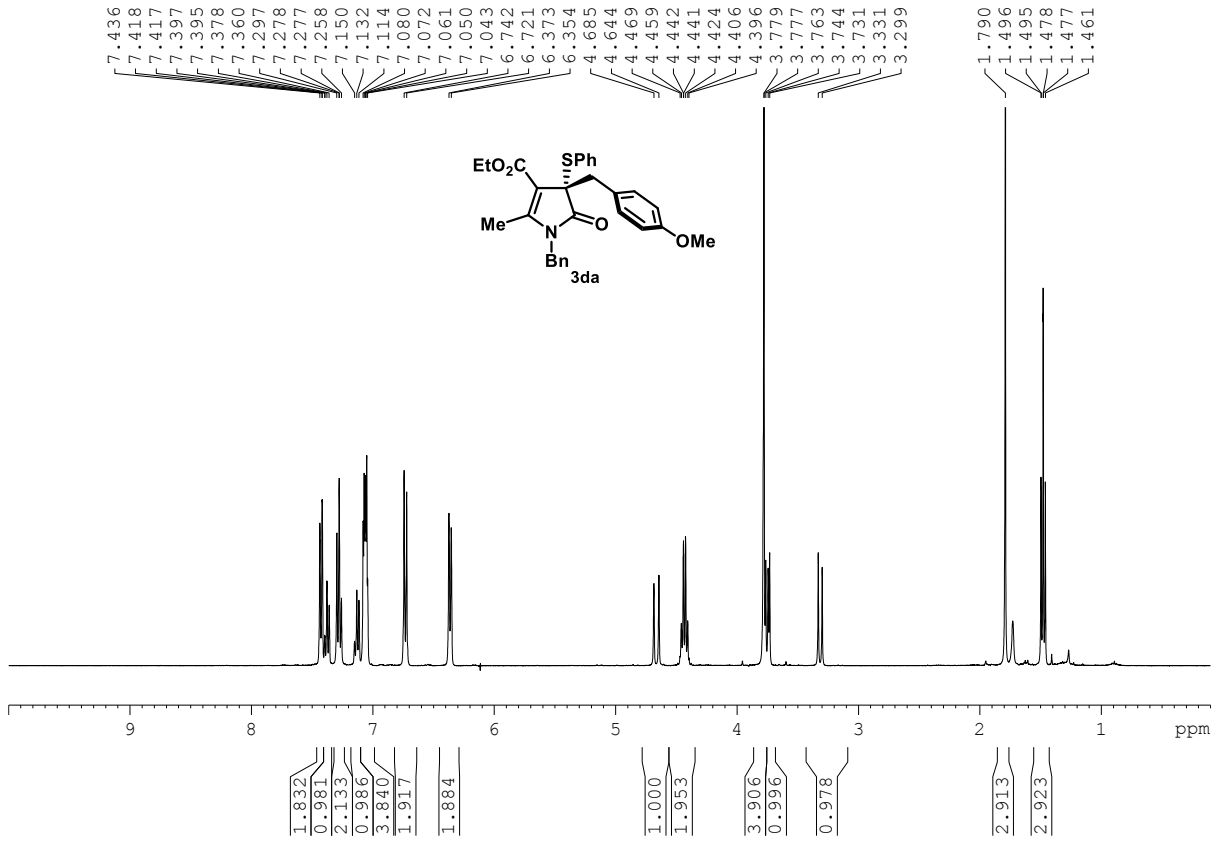
Daicel Chiralpak AD-H column, 240 nm, *n*-Hexane/IPA = 90:10, 1.0 mL min⁻¹, 20 °C

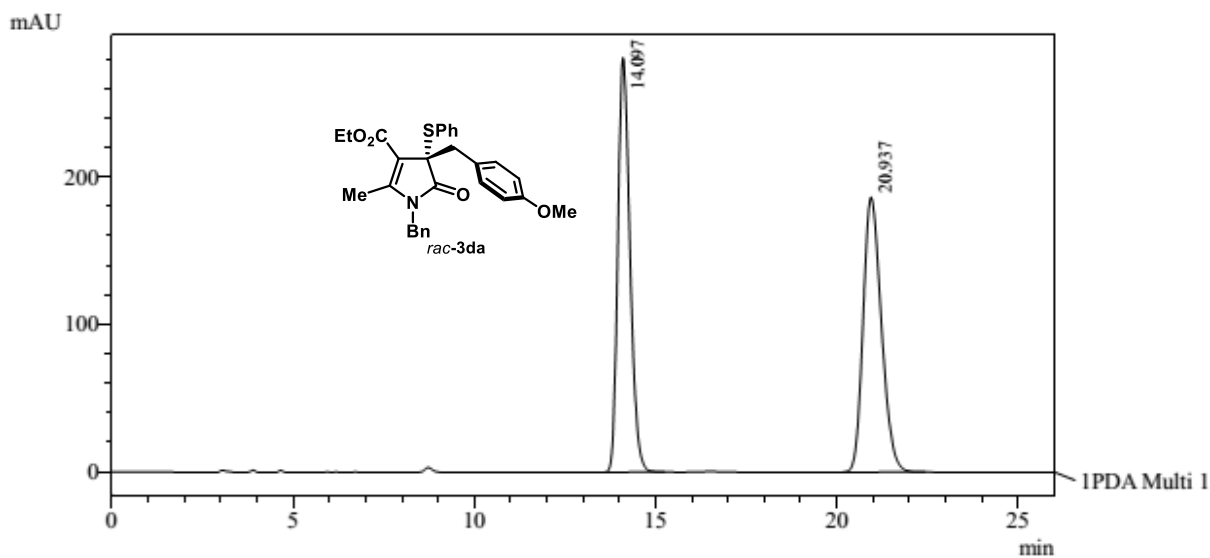


PeakTable

PDA Ch1 240nm 4nm

| Peak# | Ret. Time | Area | Area % |
|-------|-----------|---------|---------|
| 1 | 8.802 | 9336469 | 97.854 |
| 2 | 11.582 | 204799 | 2.146 |
| Total | | 9541268 | 100.000 |





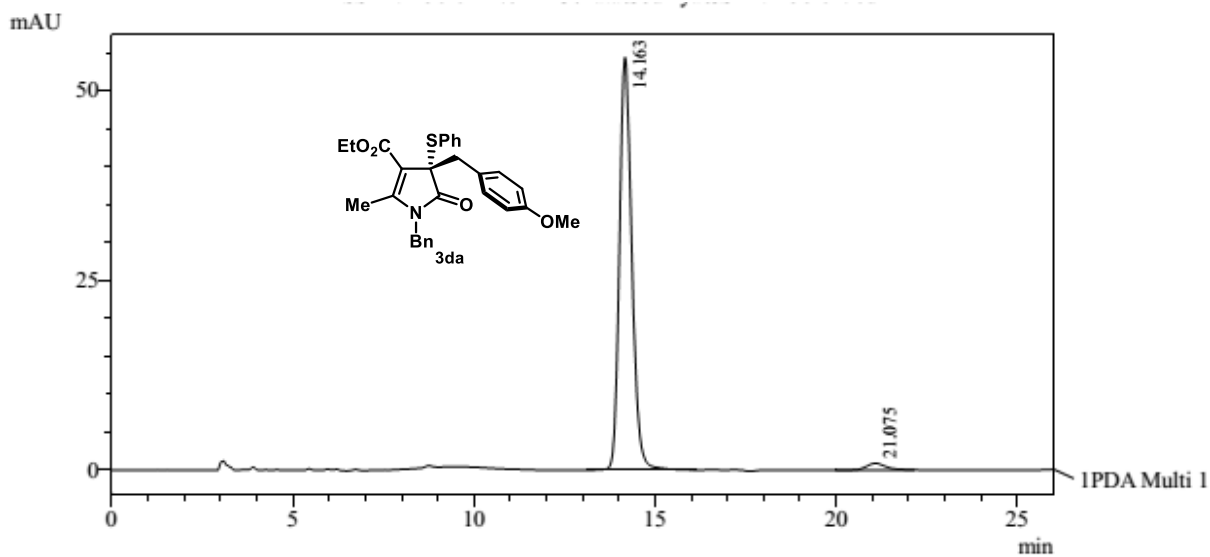
1 PDA Multi 1 / 254nm 4nm

PeakTable

PDA Ch1 254nm 4nm

| Peak# | Ret. Time | Area | Area % |
|-------|-----------|----------|---------|
| 1 | 14.097 | 6522232 | 49.996 |
| 2 | 20.937 | 6523164 | 50.004 |
| Total | | 13045396 | 100.000 |

Daicel Chiralpak AD-H column, 254 nm, *n*-Hexane/IPA = 90:10, 1.0 mL min⁻¹, 20 °C

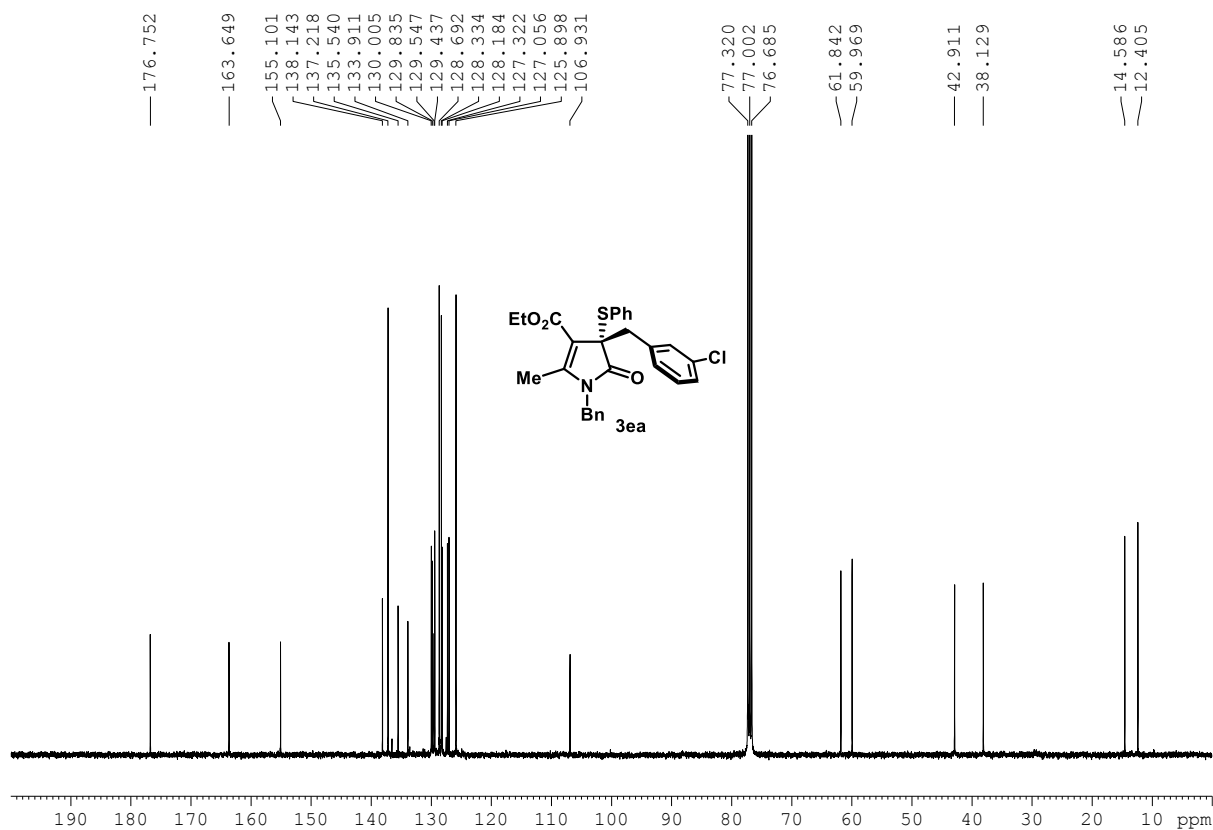
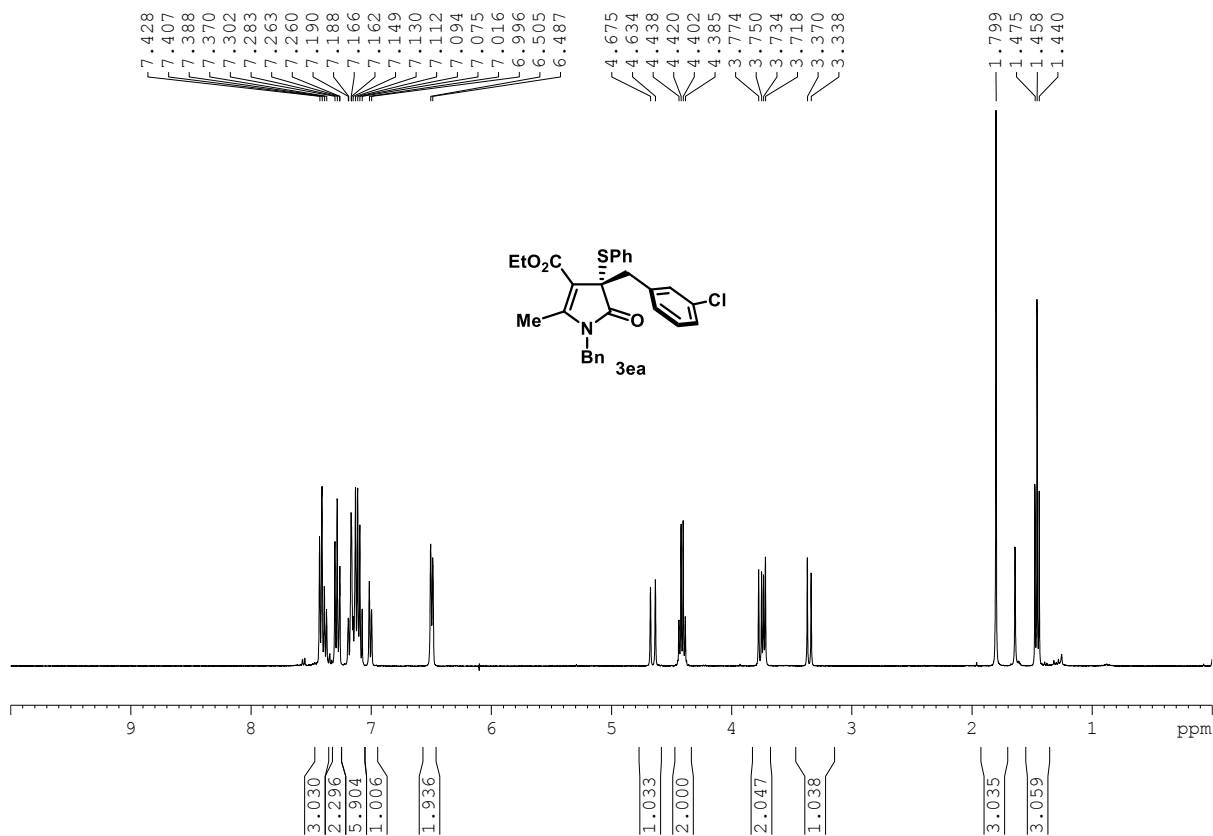


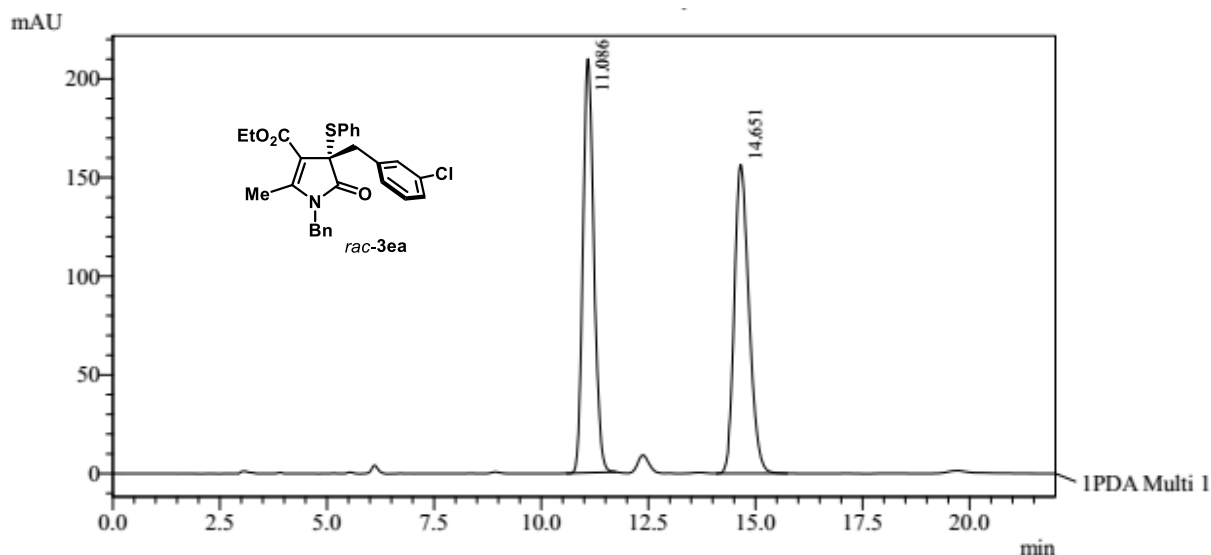
1 PDA Multi 1 / 254nm 4nm

PeakTable

PDA Ch1 254nm 4nm

| Peak# | Ret. Time | Area | Area % |
|-------|-----------|---------|---------|
| 1 | 14.163 | 1295133 | 97.590 |
| 2 | 21.075 | 31984 | 2.410 |
| Total | | 1327116 | 100.000 |





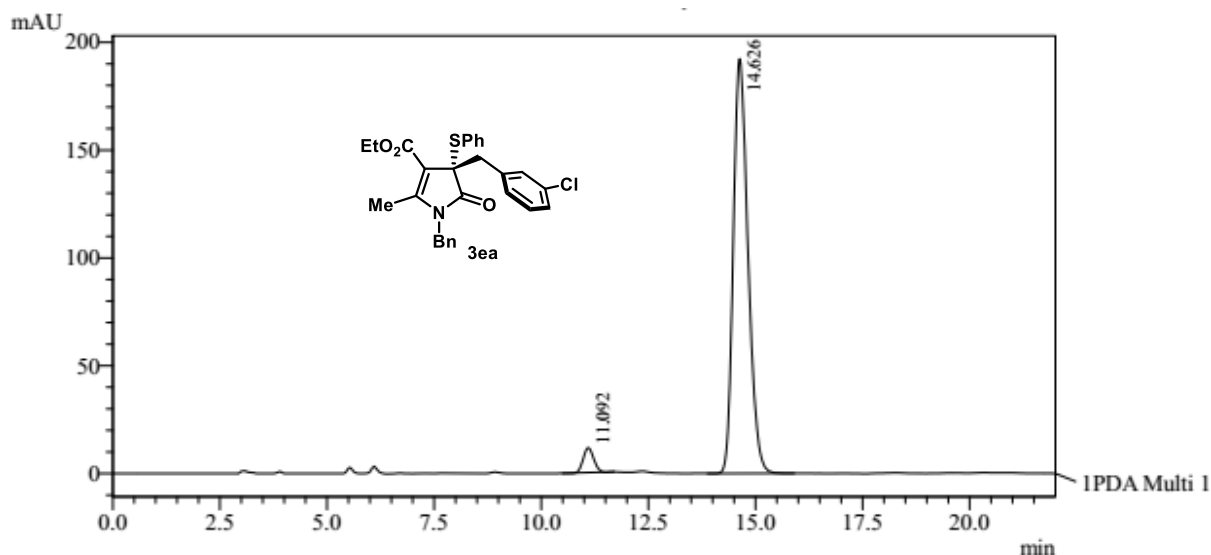
1 PDA Multi 1 / 254nm 4nm

PeakTable

PDA Ch1 254nm 4nm

| Peak# | Ret. Time | Area | Area % |
|-------|-----------|---------|---------|
| 1 | 11.086 | 3710080 | 49.797 |
| 2 | 14.651 | 3740362 | 50.203 |
| Total | | 7450443 | 100.000 |

Daicel Chiralpak AD-H column, 254 nm, *n*-Hexane/EtOH = 90:10, 1.0 mL min⁻¹, 20 °C

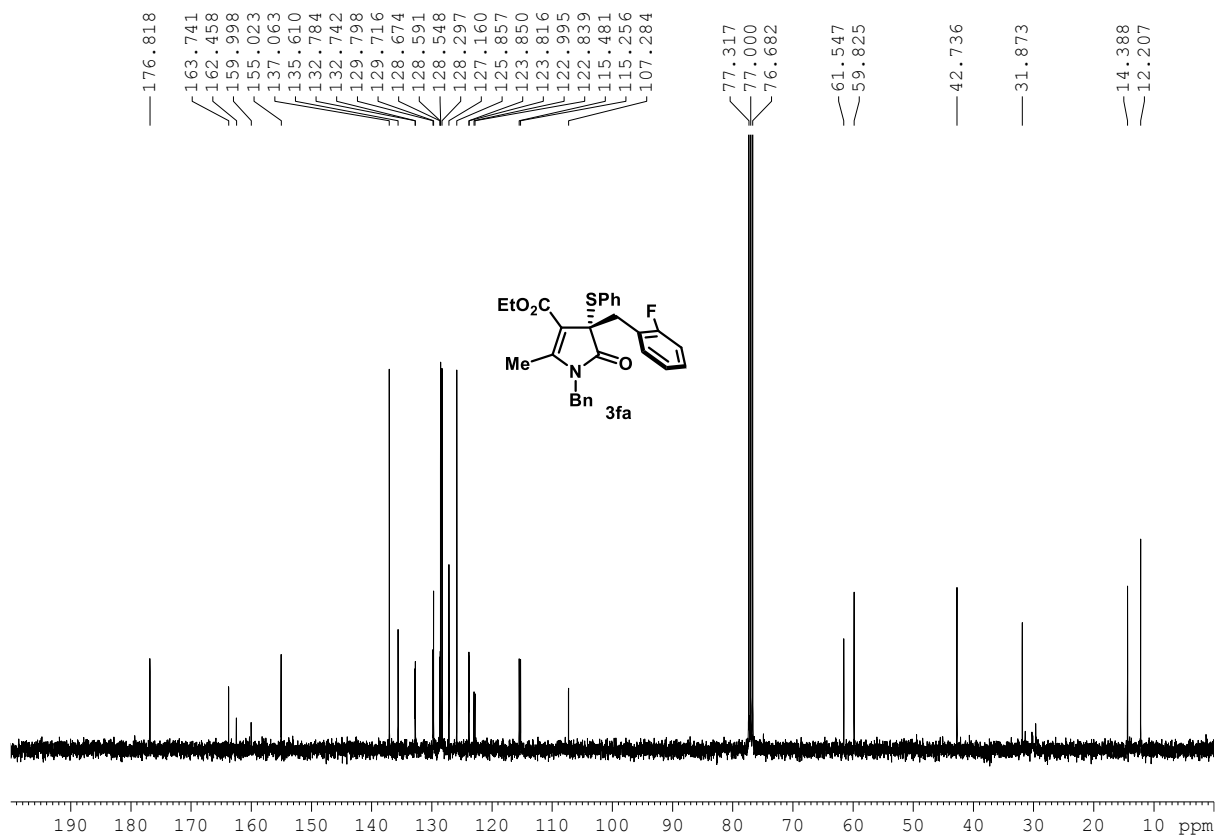
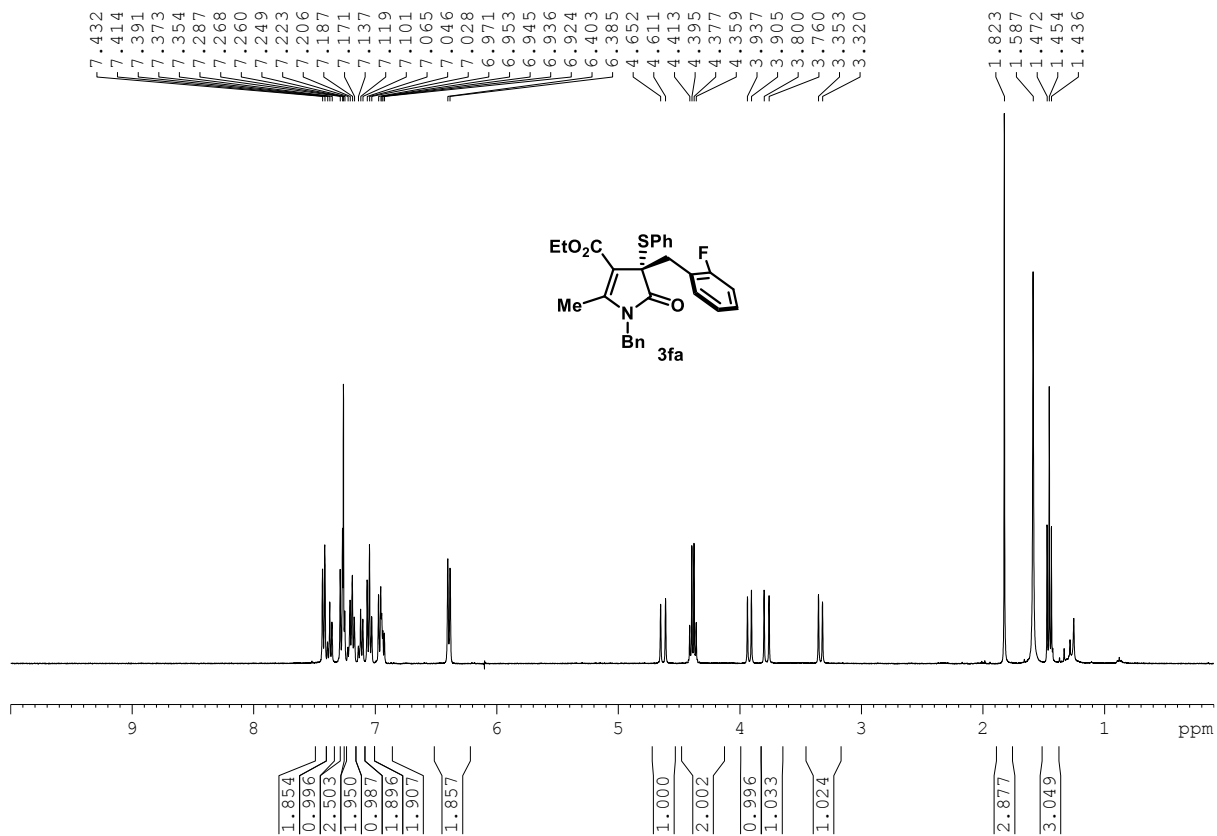


1 PDA Multi 1 / 254nm 4nm

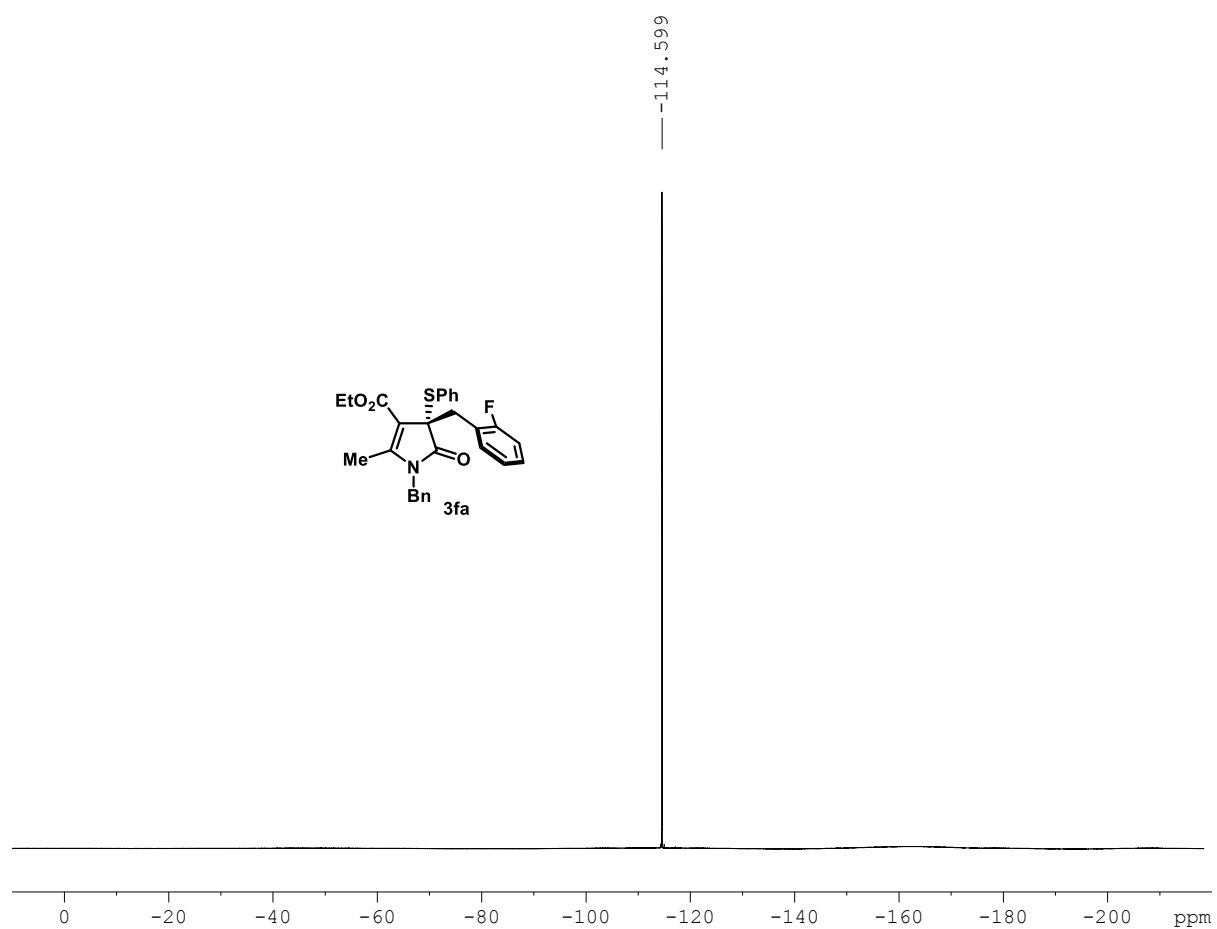
PeakTable

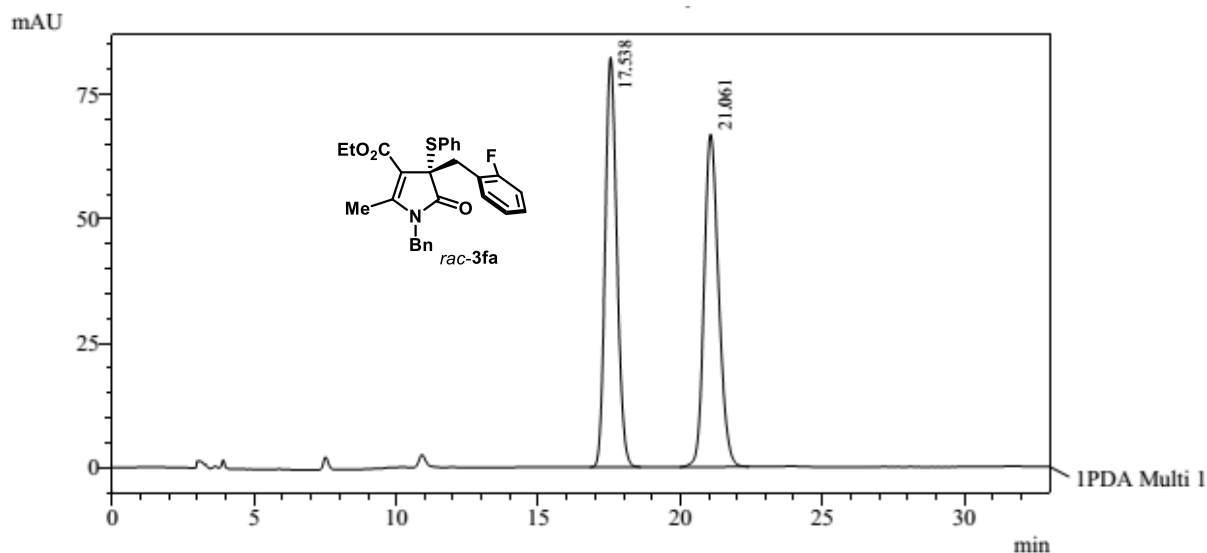
PDA Ch1 254nm 4nm

| Peak# | Ret. Time | Area | Area % |
|-------|-----------|---------|---------|
| 1 | 11.092 | 192651 | 4.022 |
| 2 | 14.626 | 4597279 | 95.978 |
| Total | | 4789930 | 100.000 |



Proton decoupled ^{19}F NMR spectra of **3fa**





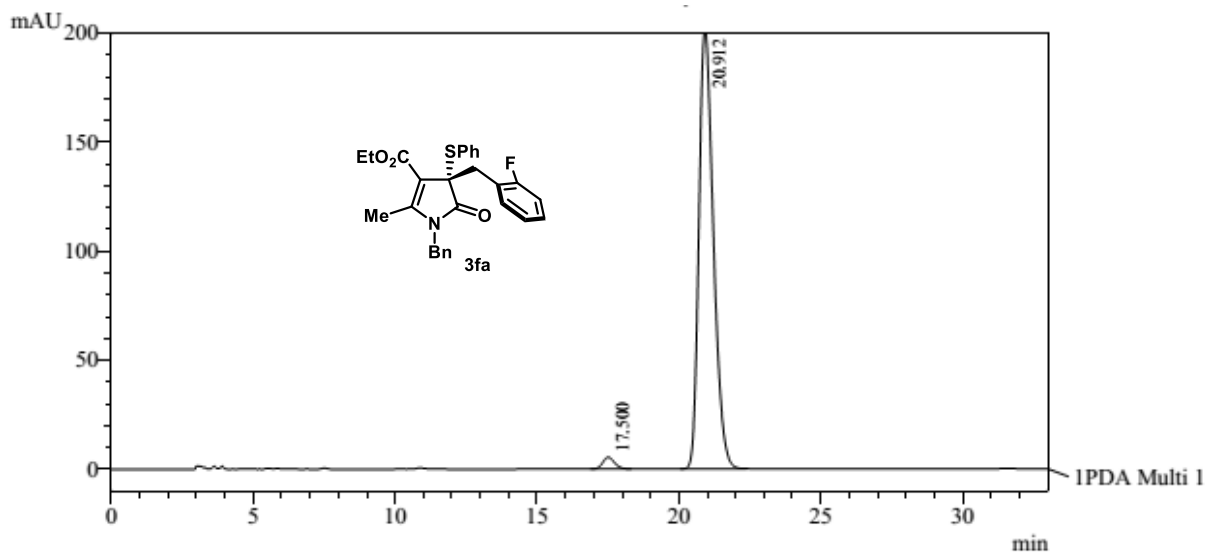
1 PDA Multi 1 / 240nm 4nm

PeakTable

PDA Ch1 240nm 4nm

| Peak# | Ret. Time | Area | Area % |
|-------|-----------|---------|---------|
| 1 | 17.538 | 2357416 | 49.785 |
| 2 | 21.061 | 2377799 | 50.215 |
| Total | | 4735215 | 100.000 |

Daicel Chiralpak AD-H column, 240 nm, *n*-Hexane /IPA = 90:10, 1.0 mL min⁻¹, 20 °C

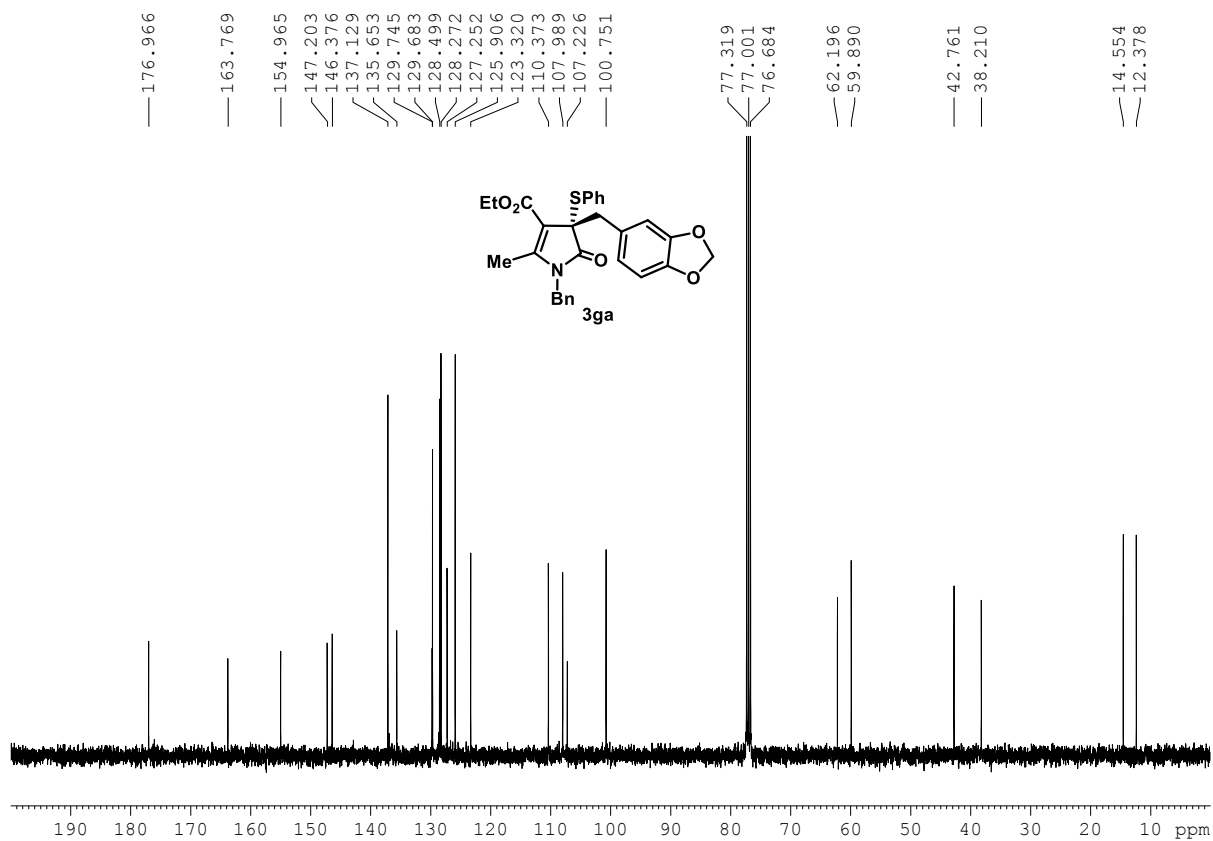
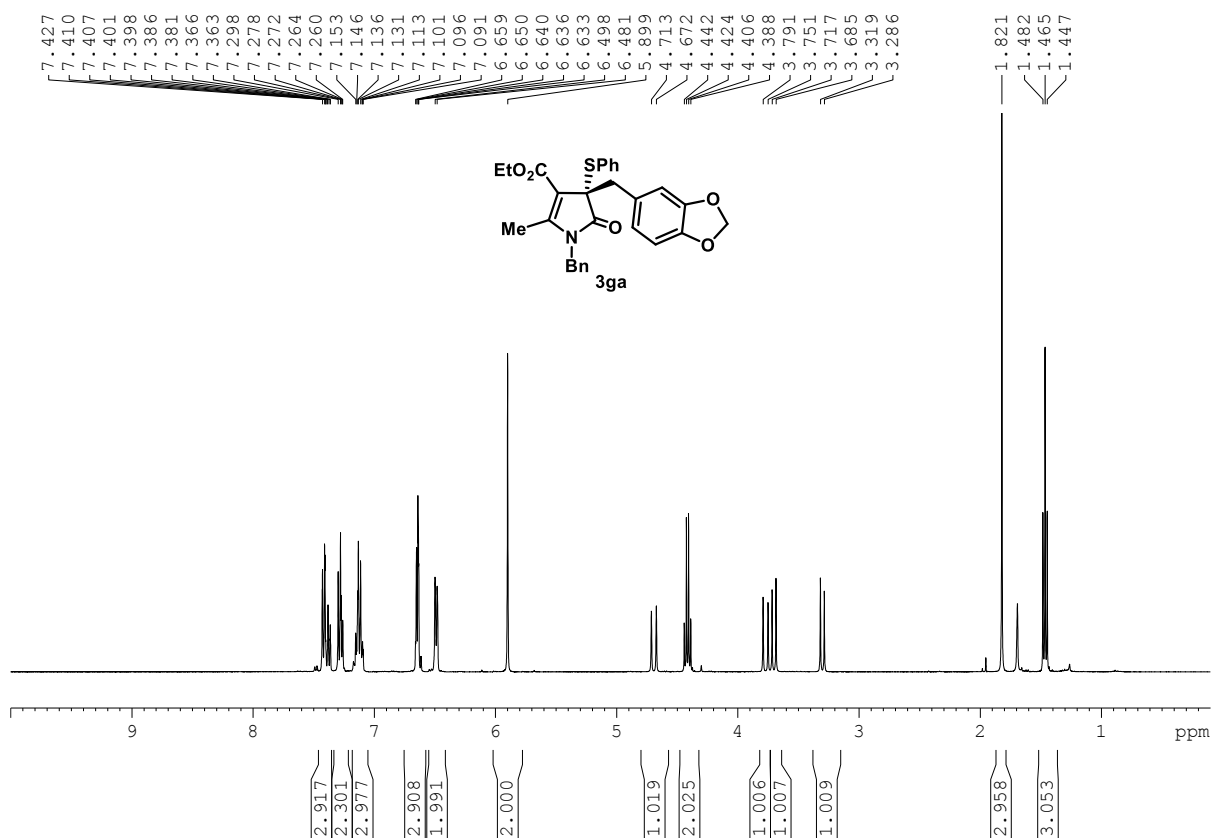


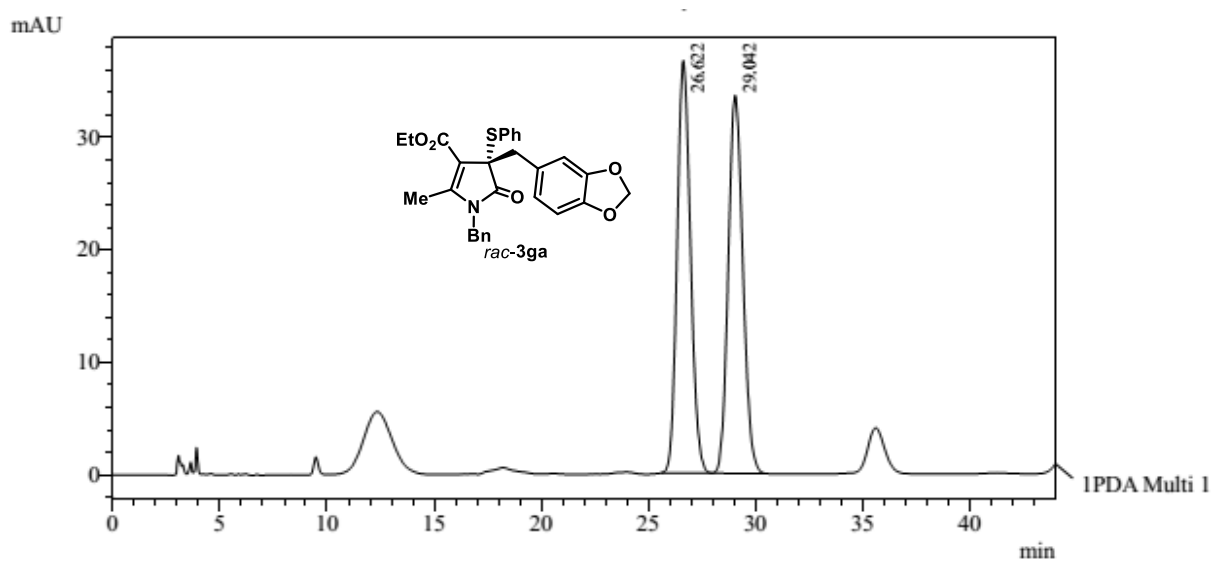
1 PDA Multi 1 / 240nm 4nm

PeakTable

PDA Ch1 240nm 4nm

| Peak# | Ret. Time | Area | Area % |
|-------|-----------|---------|---------|
| 1 | 17.500 | 158906 | 2.171 |
| 2 | 20.912 | 7160237 | 97.829 |
| Total | | 7319143 | 100.000 |





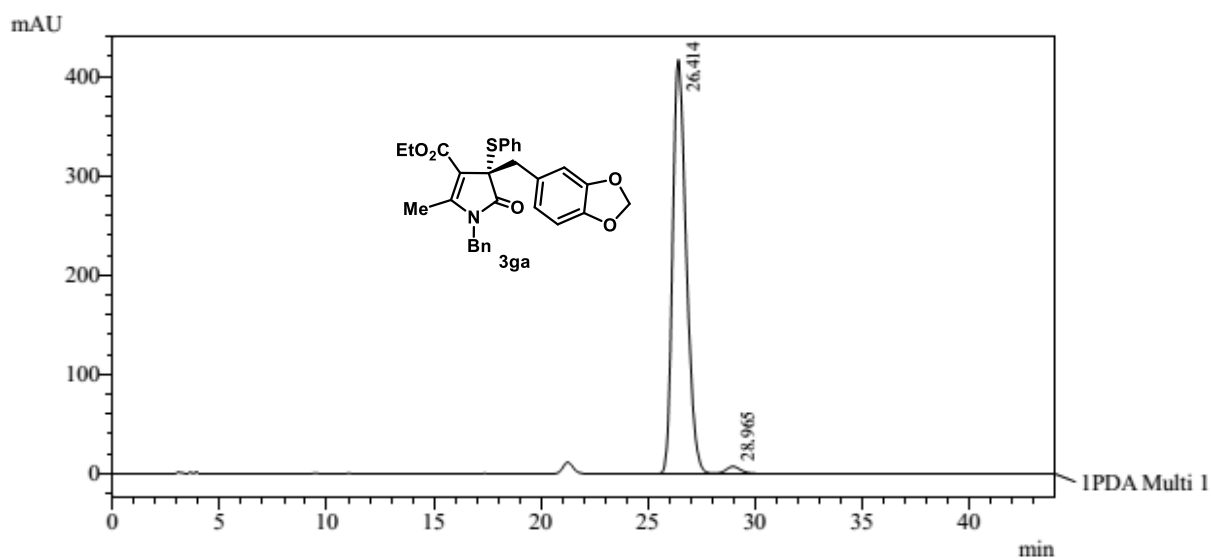
1 PDA Multi 1 / 240nm 4nm

PeakTable

PDA Ch1 240nm 4nm

| Peak# | Ret. Time | Area | Area % |
|-------|-----------|---------|---------|
| 1 | 26.622 | 1589939 | 50.025 |
| 2 | 29.042 | 1588372 | 49.975 |
| Total | | 3178312 | 100.000 |

Daicel Chiralpak AD-H column, 240 nm, *n*-Hexane/IPA = 90:10, 1.0 mL min⁻¹, 20 °C

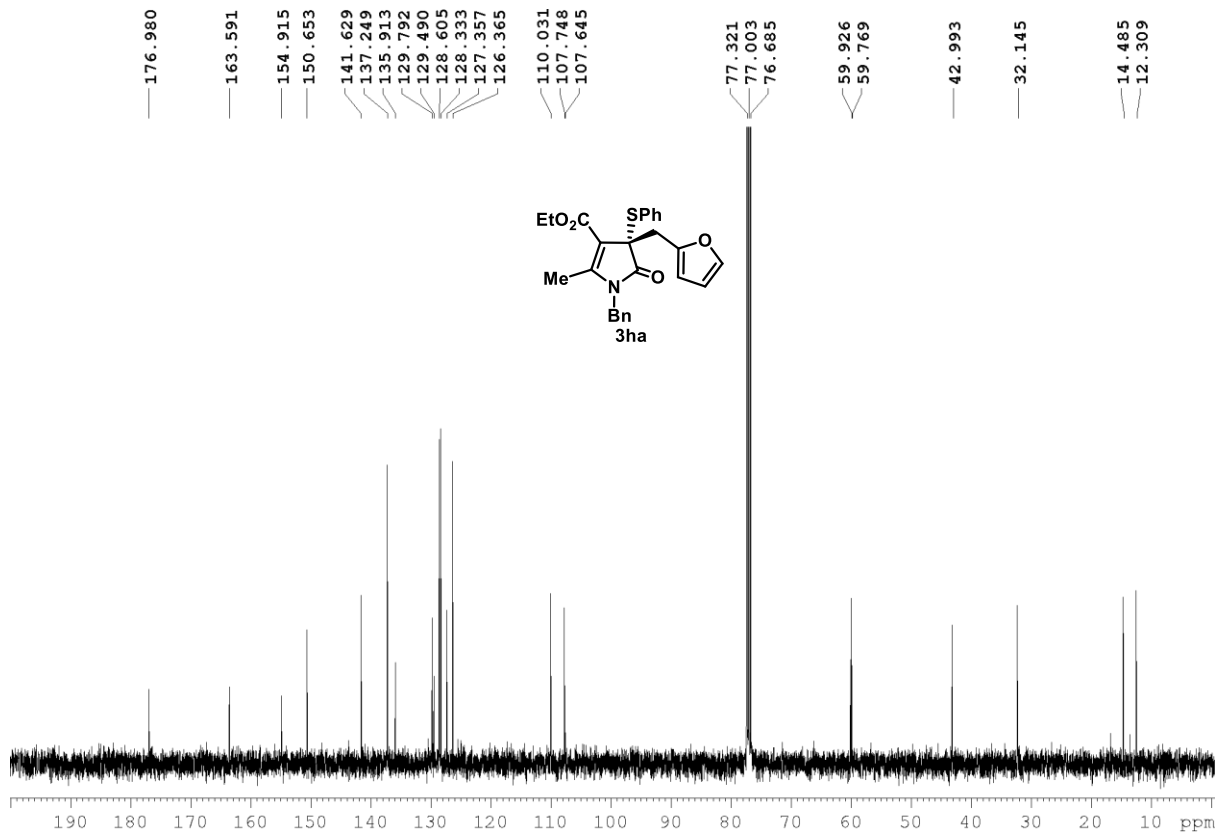
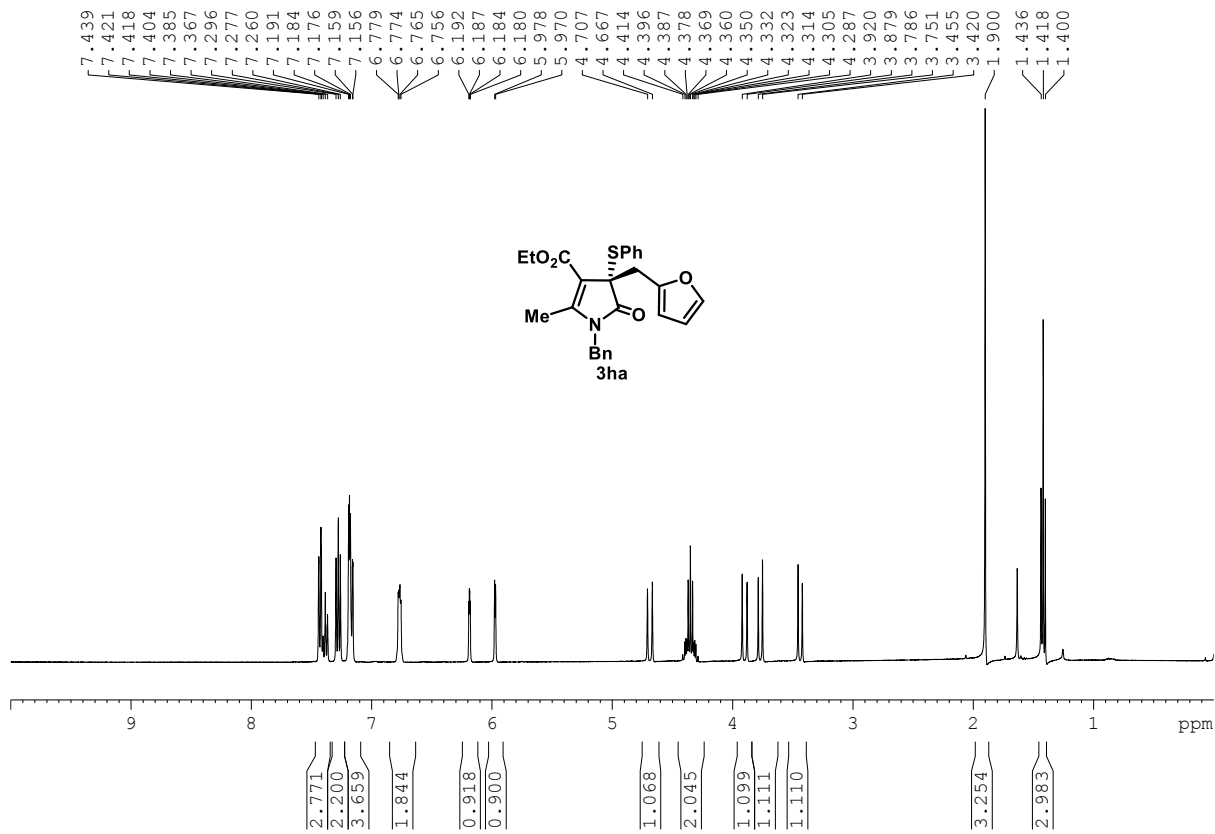


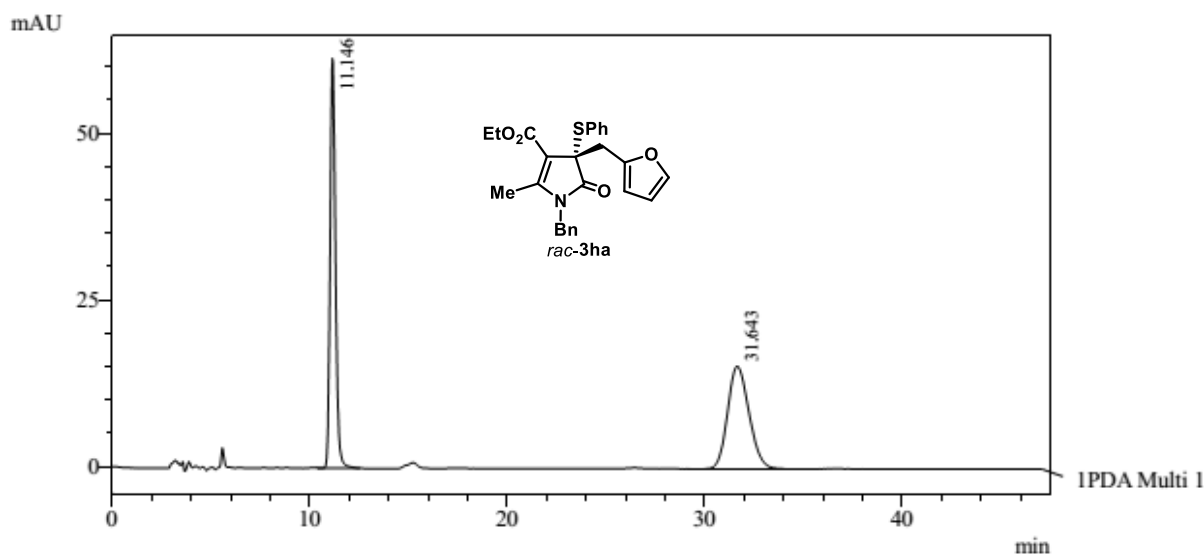
1 PDA Multi 1 / 240nm 4nm

PeakTable

PDA Ch1 240nm 4nm

| Peak# | Ret. Time | Area | Area % |
|-------|-----------|----------|---------|
| 1 | 26.414 | 18421918 | 98.170 |
| 2 | 28.965 | 343364 | 1.830 |
| Total | | 18765282 | 100.000 |





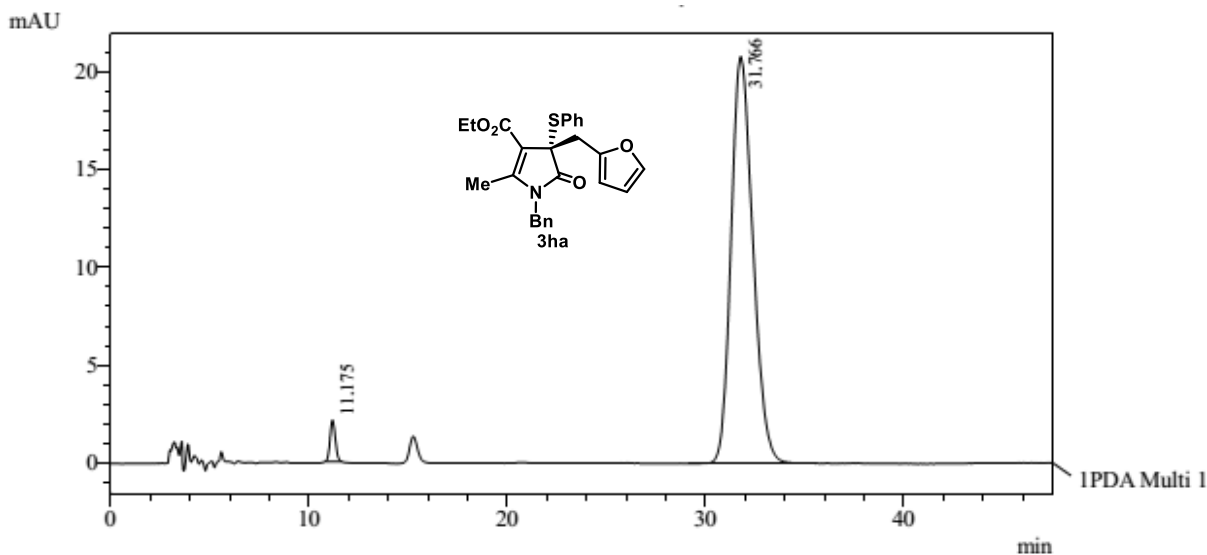
1 PDA Multi 1 / 240nm 4nm

PeakTable

PDA Ch1 240nm 4nm

| Peak# | Ret. Time | Area | Area % |
|-------|-----------|---------|---------|
| 1 | 11.146 | 1169859 | 50.212 |
| 2 | 31.643 | 1159999 | 49.788 |
| Total | | 2329858 | 100.000 |

Daicel Chiralpak AD-H column, 240 nm, *n*-Hexane/EtOH = 75:25, 1.0 mL min⁻¹, 20 °C

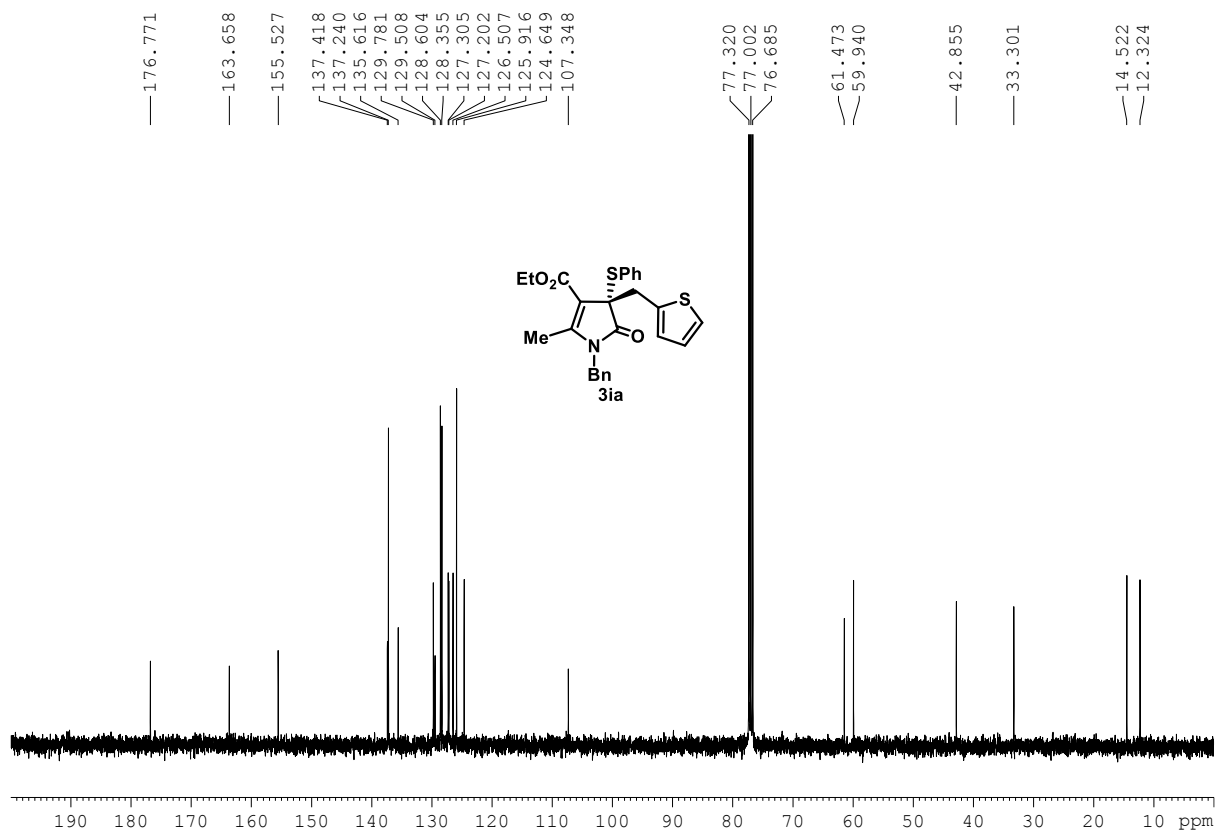
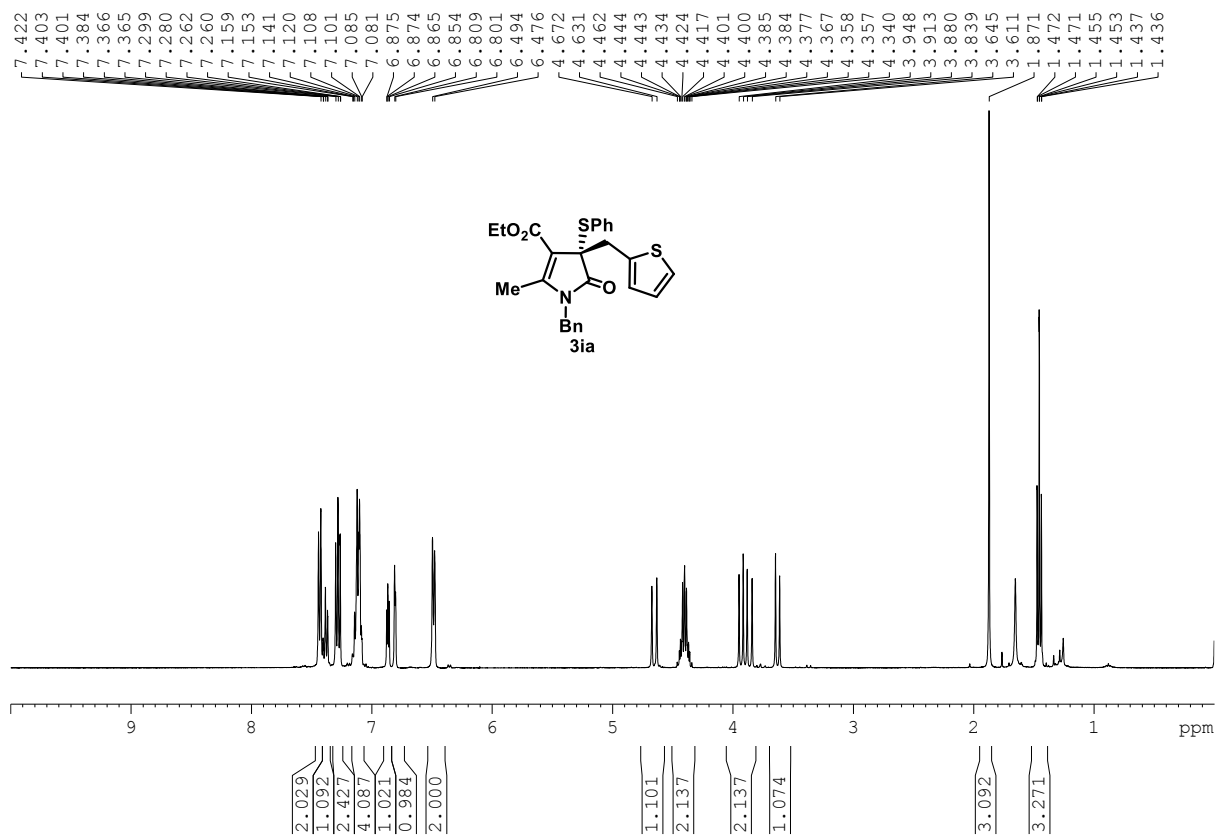


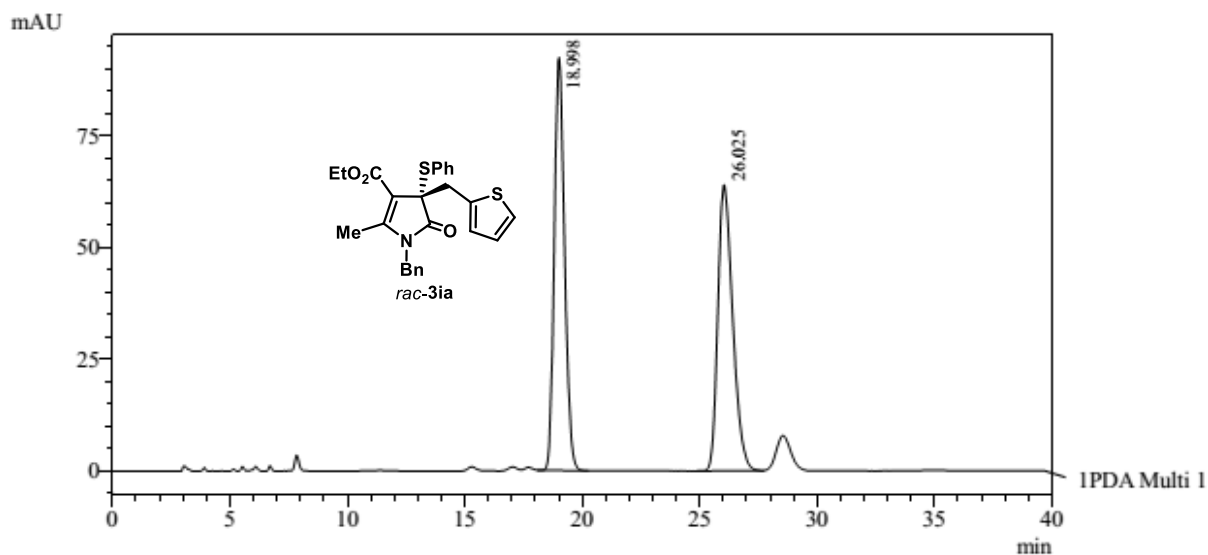
1 PDA Multi 1 / 240nm 4nm

PeakTable

PDA Ch1 240nm 4nm

| Peak# | Ret. Time | Area | Area % |
|-------|-----------|---------|---------|
| 1 | 11.175 | 39059 | 2.407 |
| 2 | 31.766 | 1583663 | 97.593 |
| Total | | 1622722 | 100.000 |





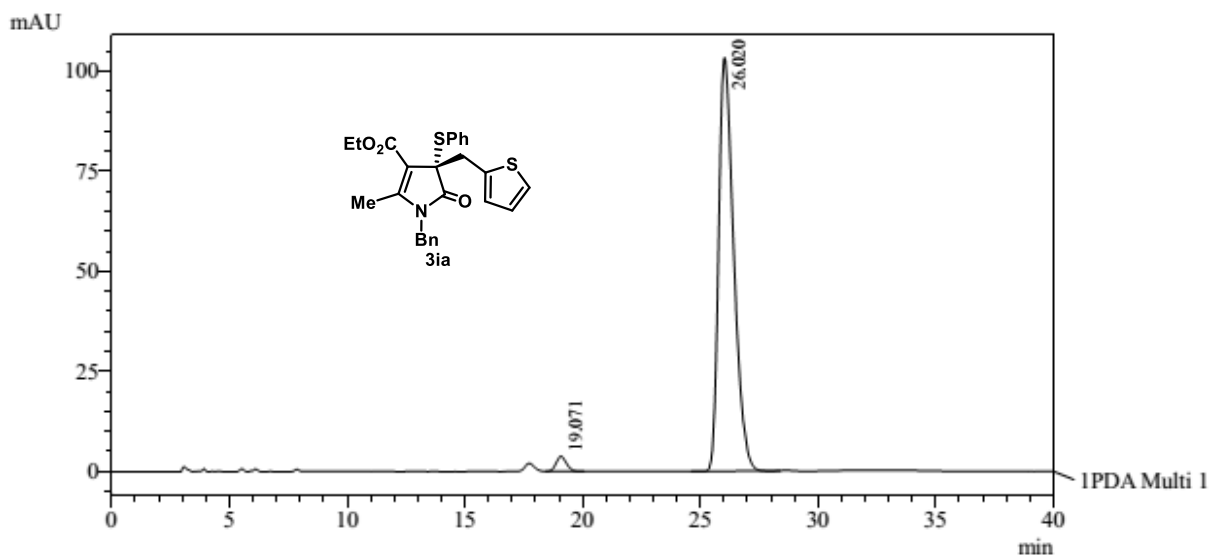
1 PDA Multi 1 / 254nm 4nm

PeakTable

PDA Ch1 254nm 4nm

| Peak# | Ret. Time | Area | Area % |
|-------|-----------|---------|---------|
| 1 | 18.998 | 2816017 | 50.018 |
| 2 | 26.025 | 2813983 | 49.982 |
| Total | | 5630000 | 100.000 |

Daicel Chiralpak AD-H column, 254 nm, *n*-Hexane/IPA = 90:10, 1.0 mL min⁻¹, 20 °C

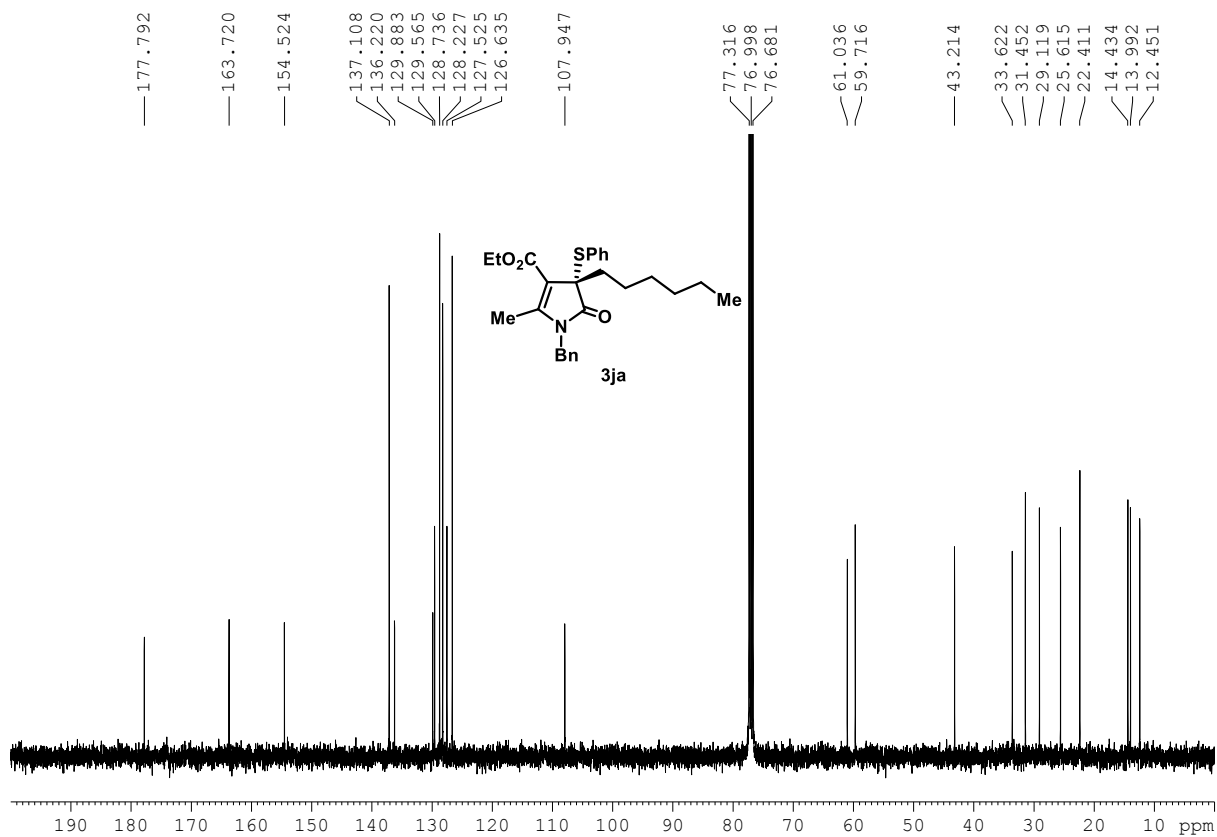
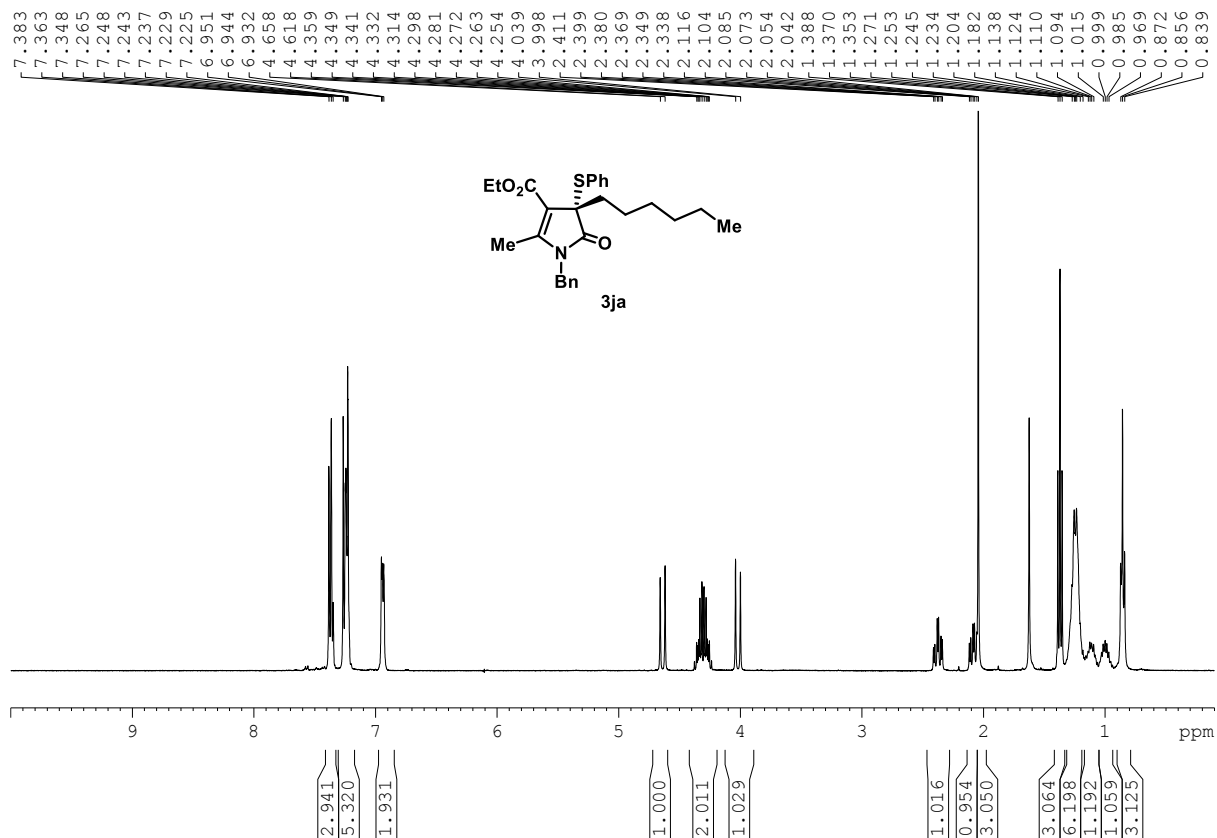


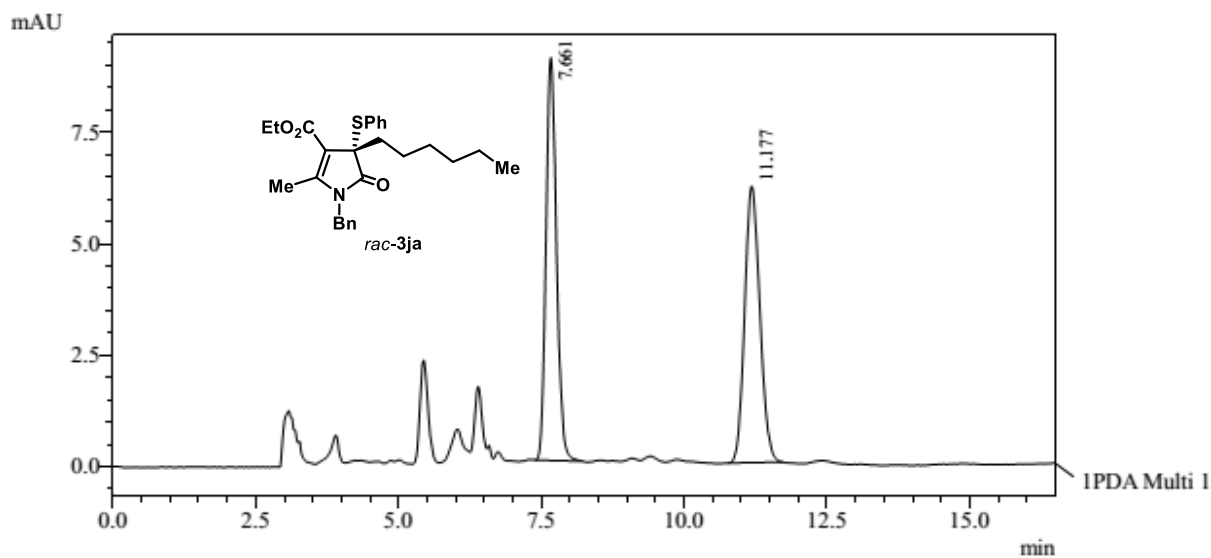
1 PDA Multi 1 / 254nm 4nm

PeakTable

PDA Ch1 254nm 4nm

| Peak# | Ret. Time | Area | Area % |
|-------|-----------|---------|---------|
| 1 | 19.071 | 113275 | 2.408 |
| 2 | 26.020 | 4591134 | 97.592 |
| Total | | 4704409 | 100.000 |





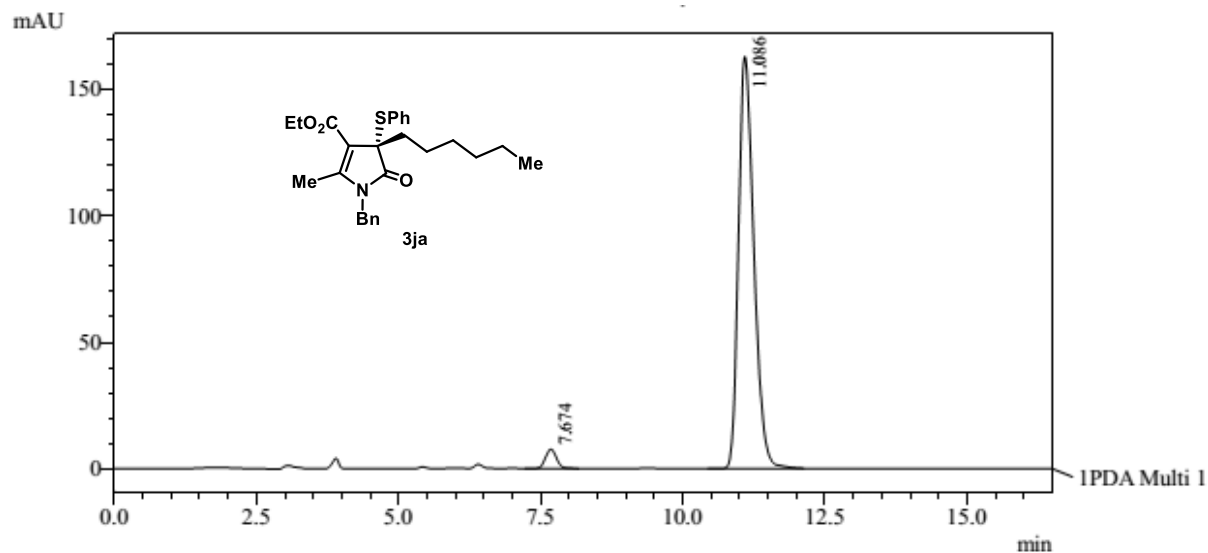
1 PDA Multi 1 / 254nm 4nm

PeakTable

PDA Ch1 254nm 4nm

| Peak# | Ret. Time | Area | Area % |
|-------|-----------|--------|---------|
| 1 | 7.661 | 114777 | 49.966 |
| 2 | 11.177 | 114935 | 50.034 |
| Total | | 229712 | 100.000 |

Daicel Chiralpak AD-H column, 254 nm, *n*-Hexane/IPA = 90:10, 1.0 mL min⁻¹, 20 °C

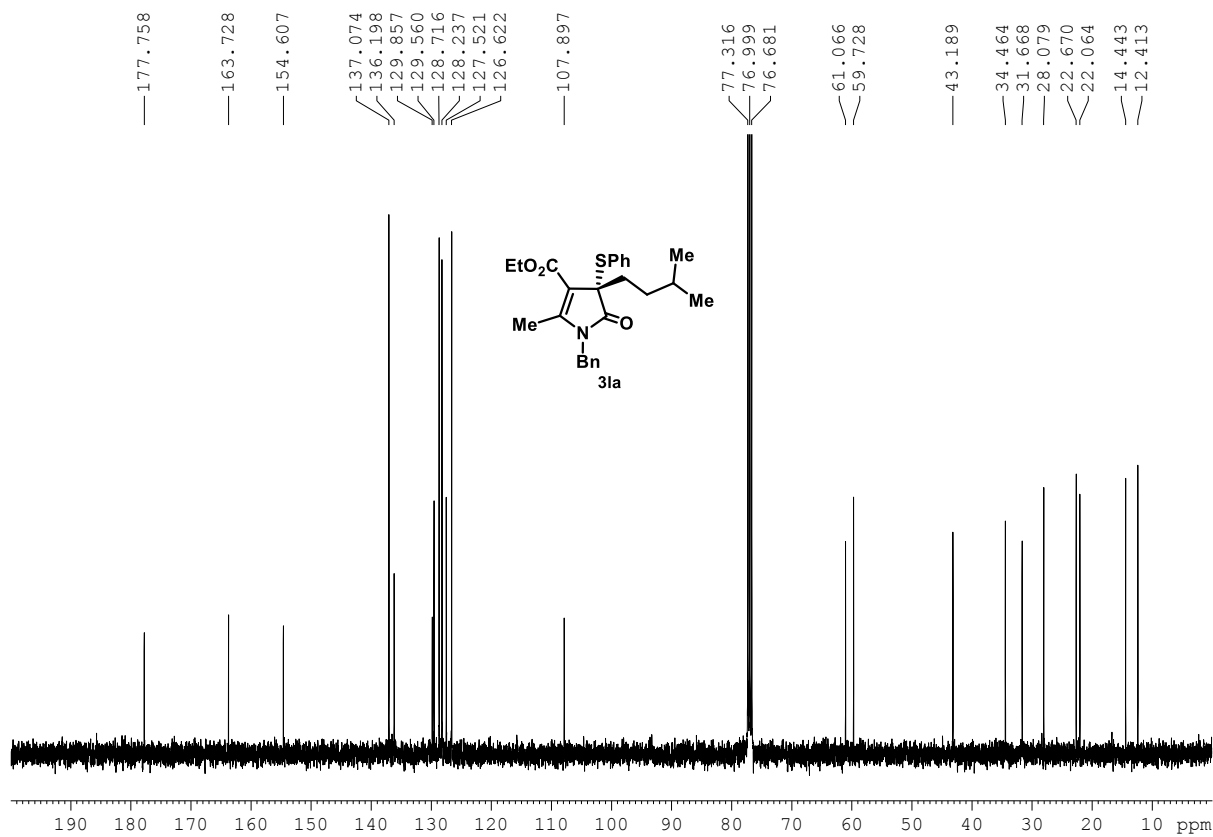
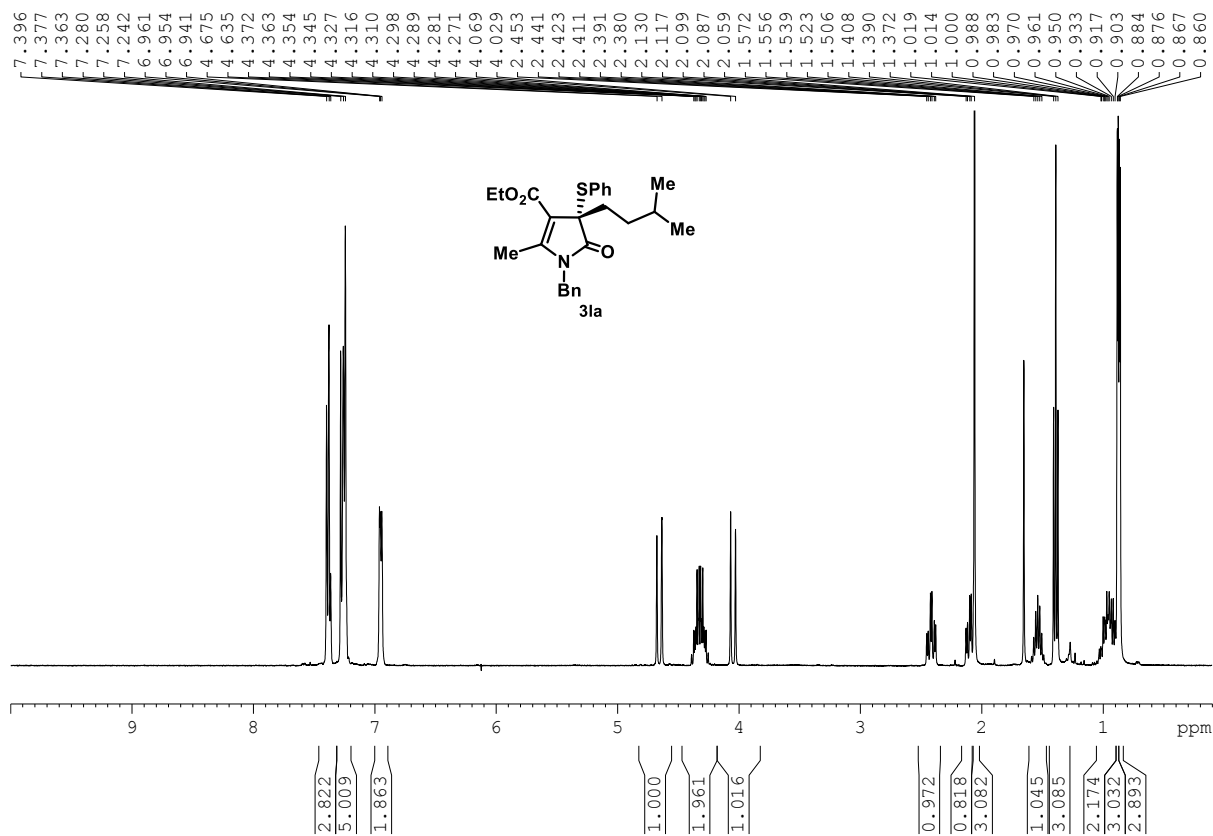


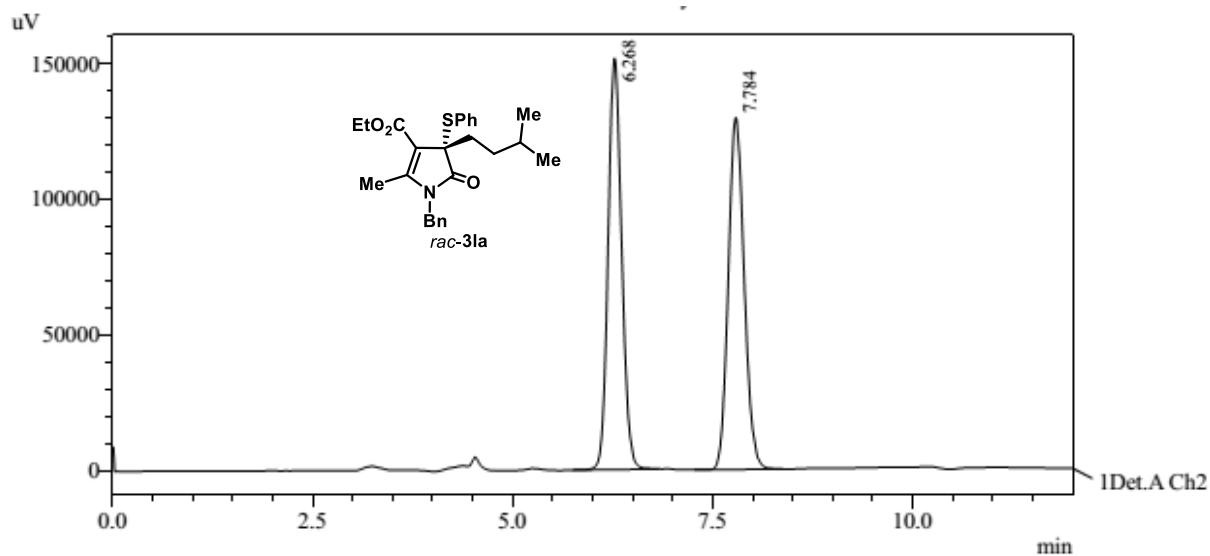
1 PDA Multi 1 / 254nm 4nm

PeakTable

PDA Ch1 254nm 4nm

| Peak# | Ret. Time | Area | Area % |
|-------|-----------|---------|---------|
| 1 | 7.674 | 102848 | 3.238 |
| 2 | 11.086 | 3073383 | 96.762 |
| Total | | 3176231 | 100.000 |



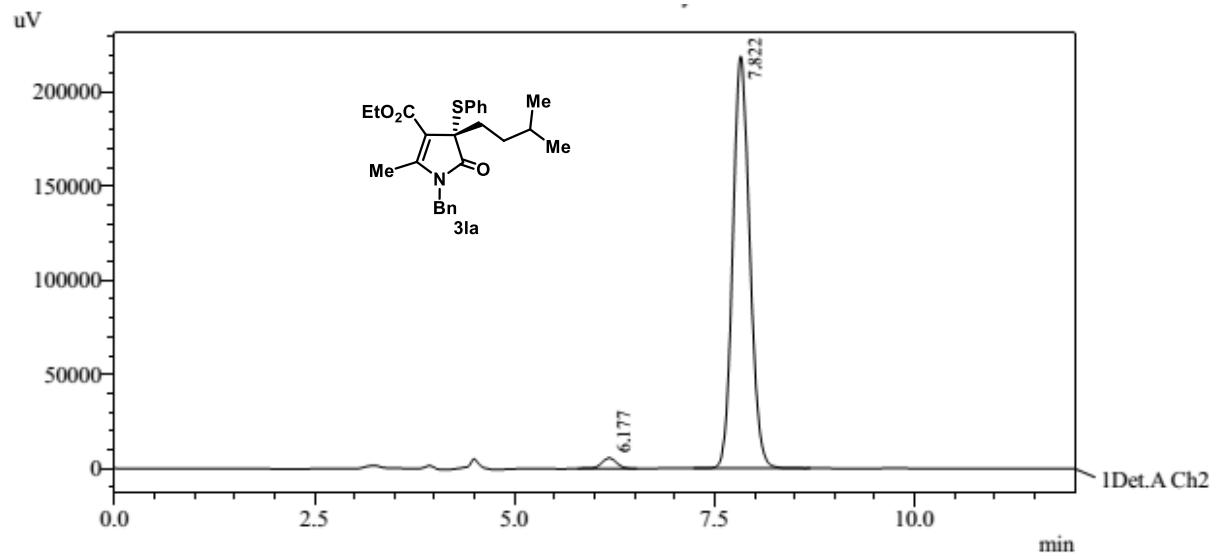


PeakTable

Detector A Ch2 254nm

| Peak# | Ret. Time | Area | Area % |
|-------|-----------|---------|---------|
| 1 | 6.268 | 1791085 | 49.949 |
| 2 | 7.784 | 1794755 | 50.051 |
| Total | | 3585840 | 100.000 |

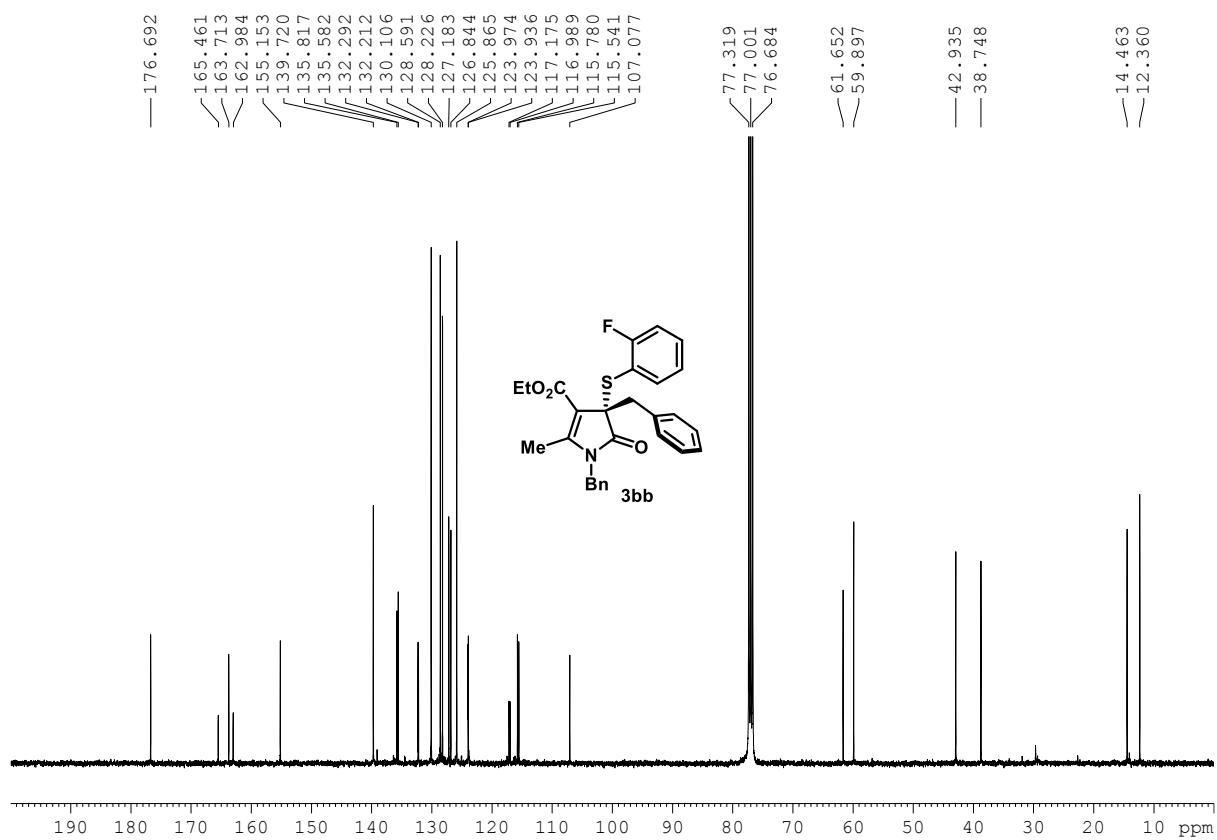
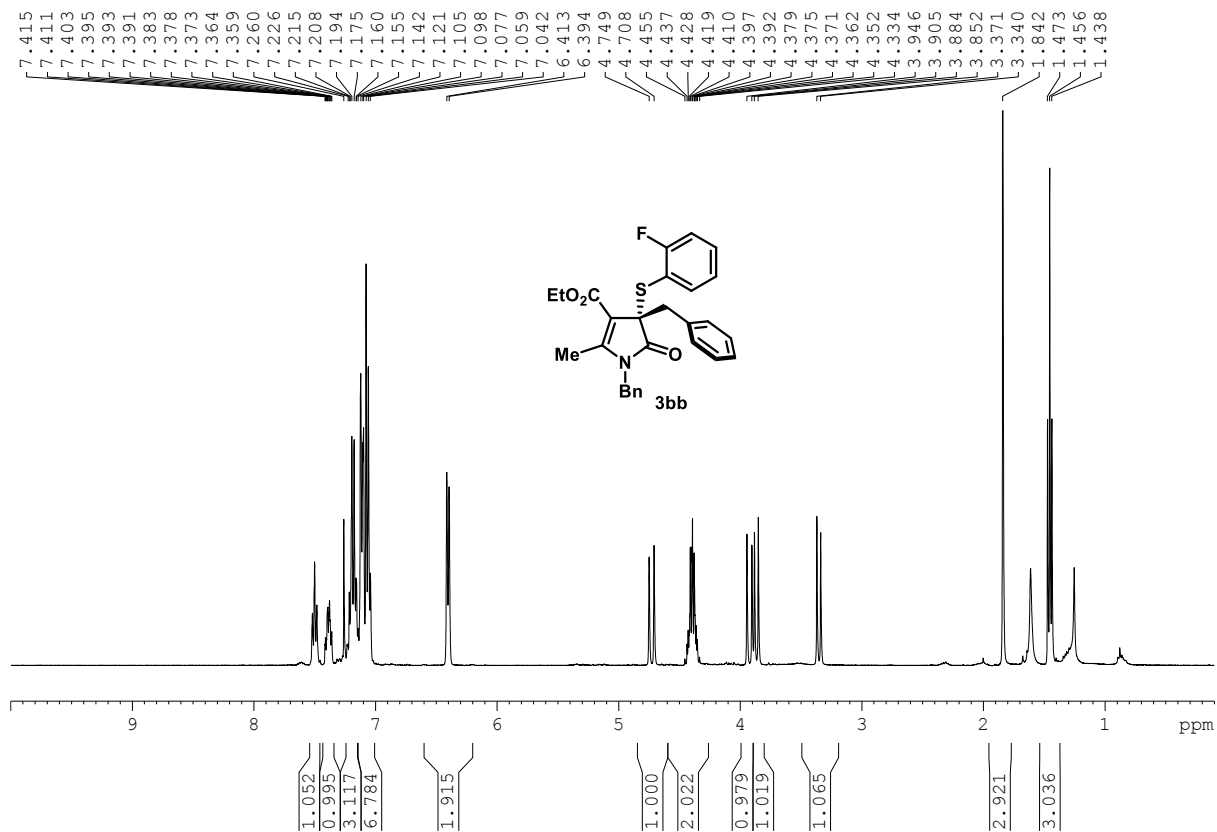
Daicel Chiralpak AD-H column, 254 nm, *n*-Hexane/EtOH = 90:10, 1.0 mL min⁻¹, 20 °C

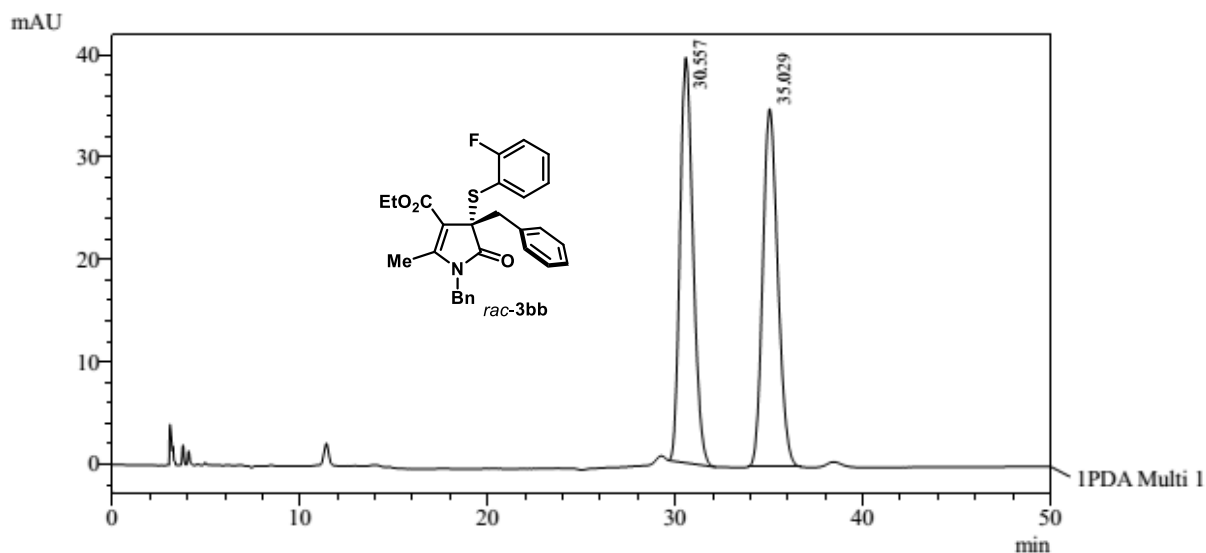


PeakTable

Detector A Ch2 254nm

| Peak# | Ret. Time | Area | Area % |
|-------|-----------|---------|---------|
| 1 | 6.177 | 73965 | 2.239 |
| 2 | 7.822 | 3229485 | 97.761 |
| Total | | 3303450 | 100.000 |





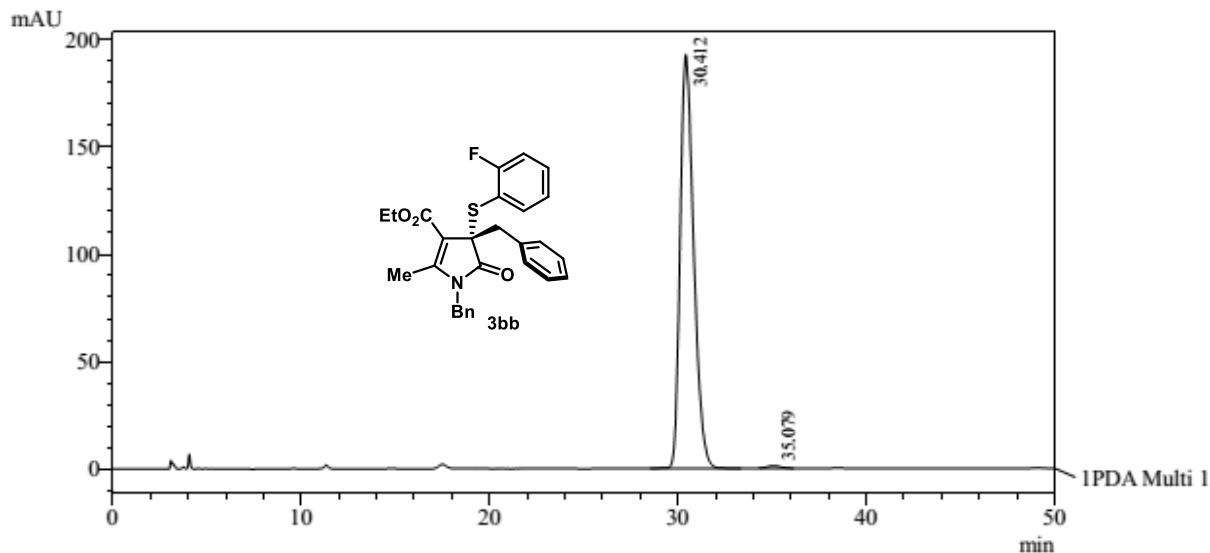
1 PDA Multi 1 / 240nm 4nm

PeakTable

PDA Ch1 240nm 4nm

| Peak# | Ret. Time | Area | Area % |
|-------|-----------|---------|---------|
| 1 | 30.557 | 1913679 | 49.464 |
| 2 | 35.029 | 1955120 | 50.536 |
| Total | | 3868799 | 100.000 |

Daicel Chiralpak AD-H column, 240 nm: *n*-Hexane/IPA = 95:05, 1.0 mL min⁻¹, 20 °C

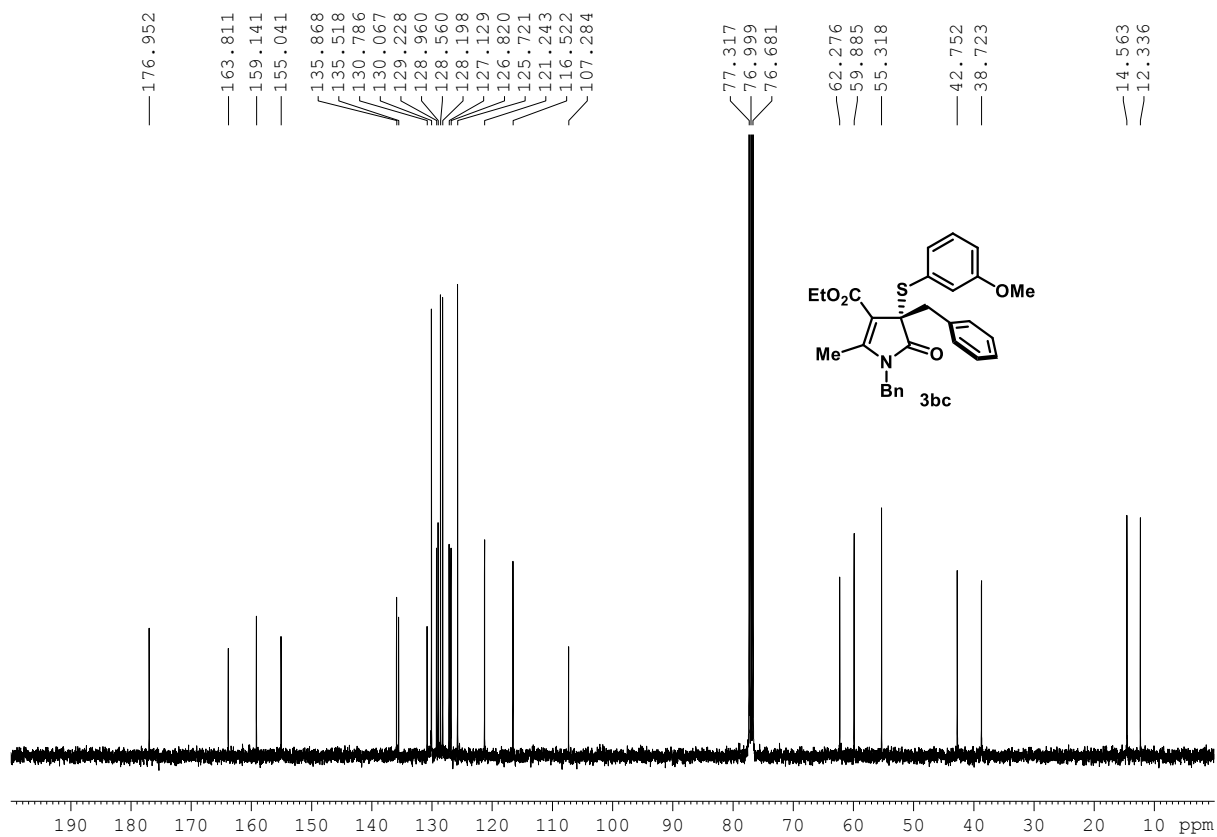
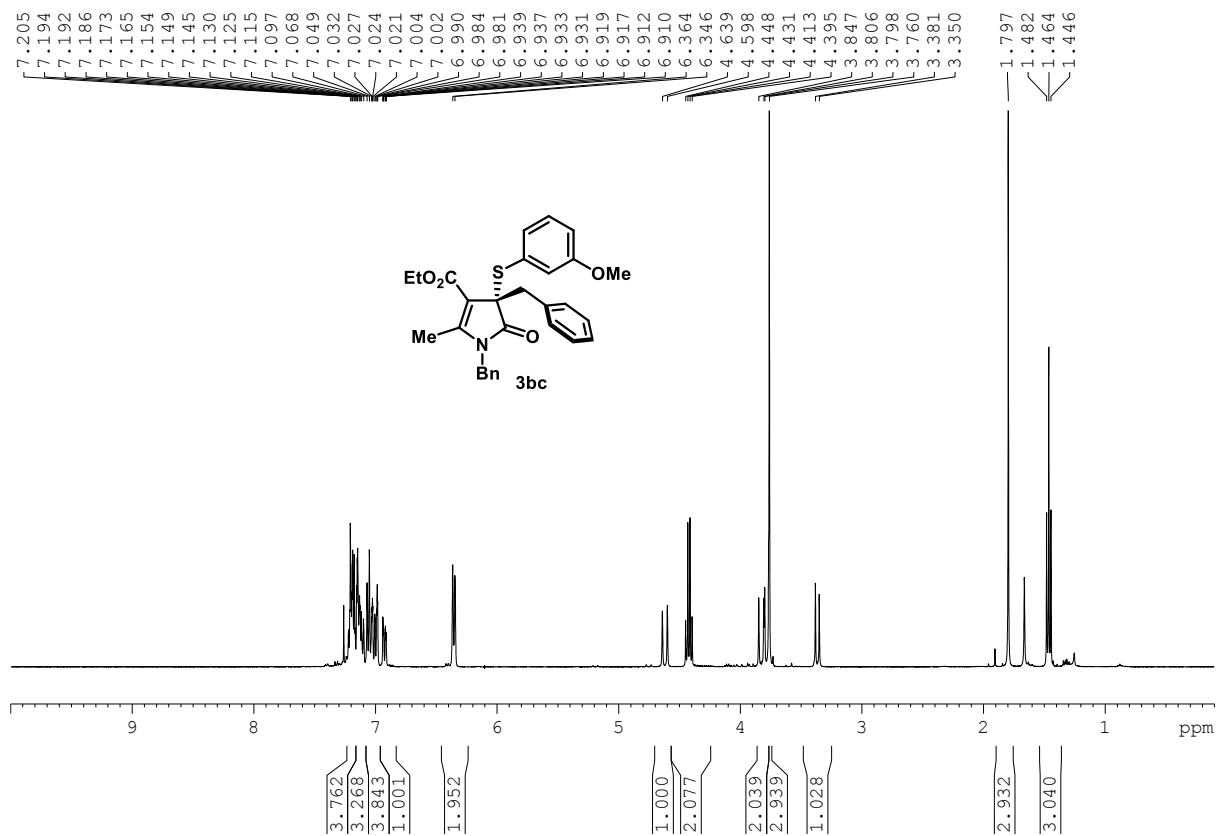


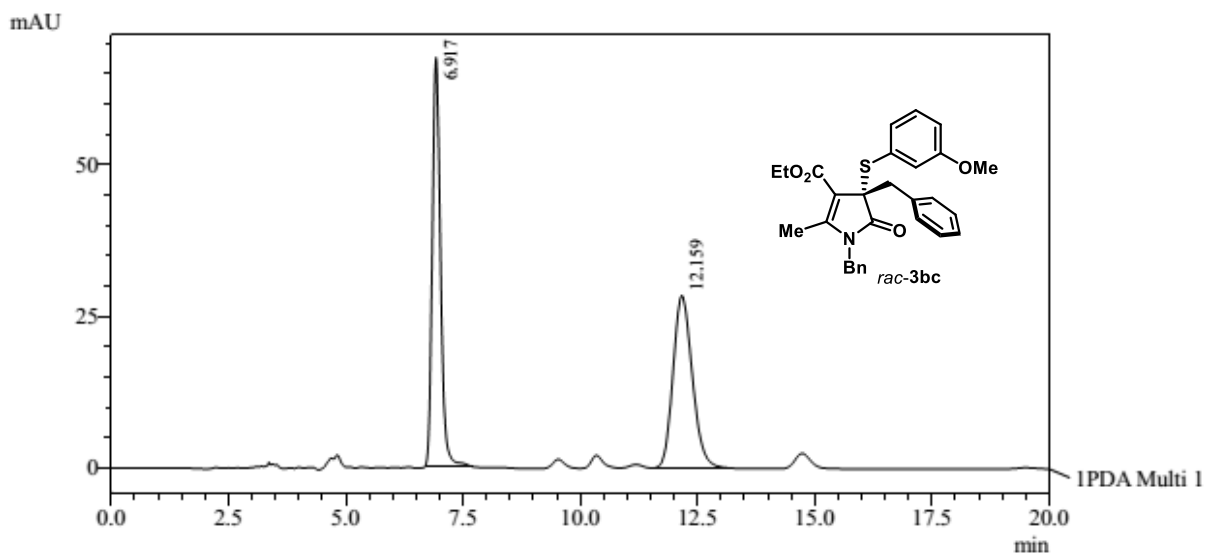
1 PDA Multi 1 / 240nm 4nm

PeakTable

PDA Ch1 240nm 4nm

| Peak# | Ret. Time | Area | Area % |
|-------|-----------|---------|---------|
| 1 | 30.412 | 9630084 | 99.458 |
| 2 | 35.079 | 52434 | 0.542 |
| Total | | 9682518 | 100.000 |



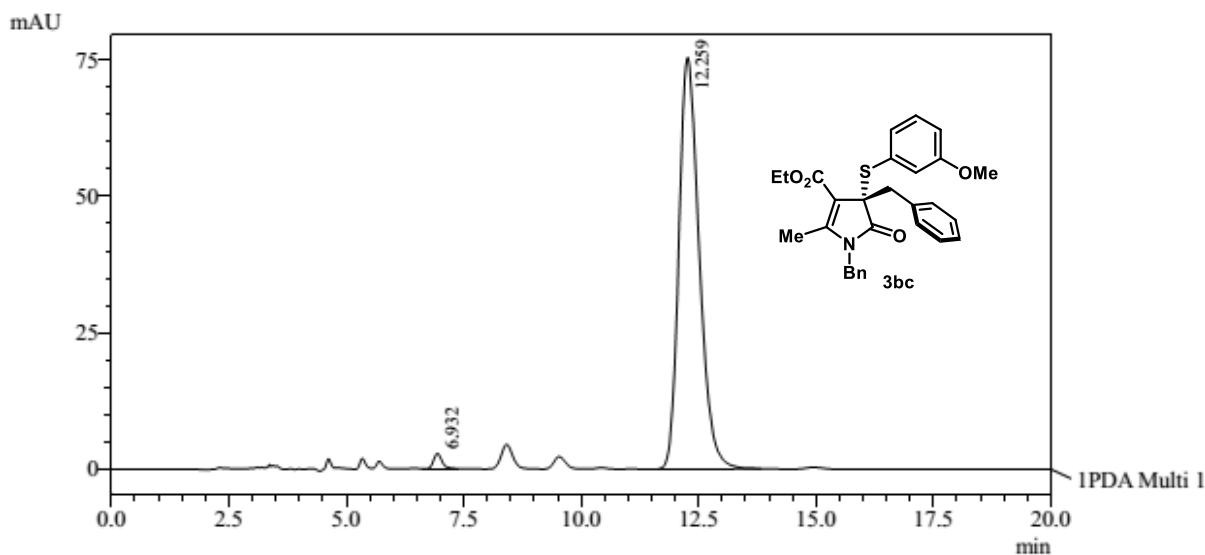


PeakTable

PDA Ch1 254nm 4nm

| Peak# | Ret. Time | Area | Area % |
|-------|-----------|---------|---------|
| 1 | 6.917 | 815531 | 50.098 |
| 2 | 12.159 | 812357 | 49.902 |
| Total | | 1627888 | 100.000 |

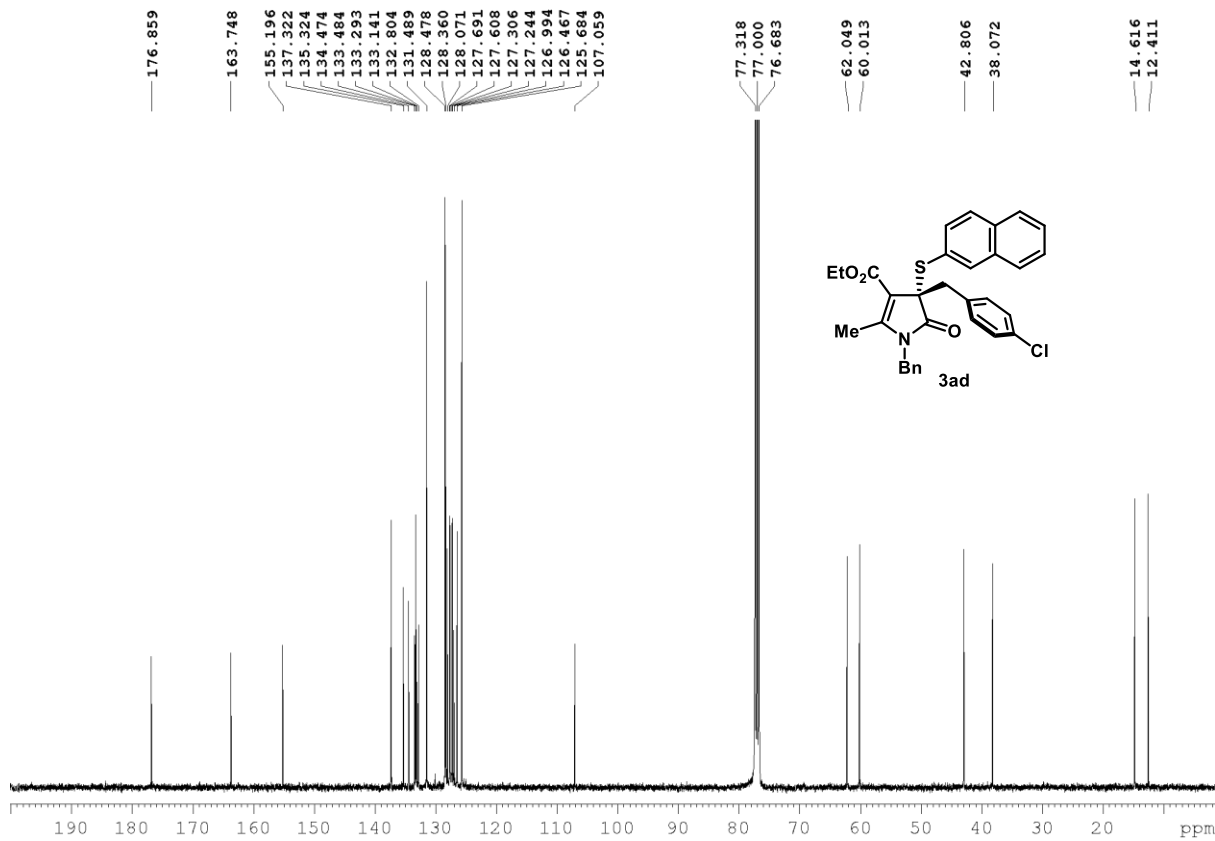
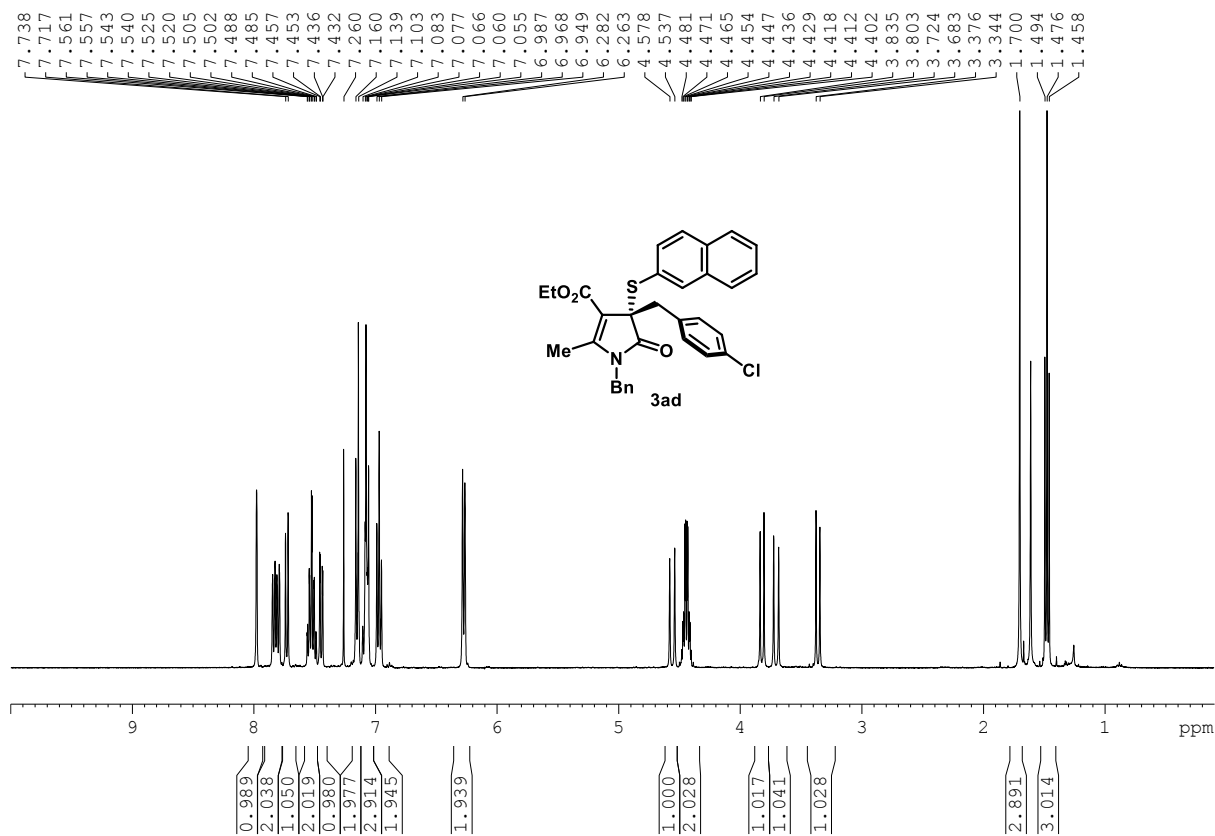
Daicel Chiralpak AD-H column, 254 nm, *n*-Hexane/EtOH = 60:40, 1.0 mL min⁻¹, 20 °C

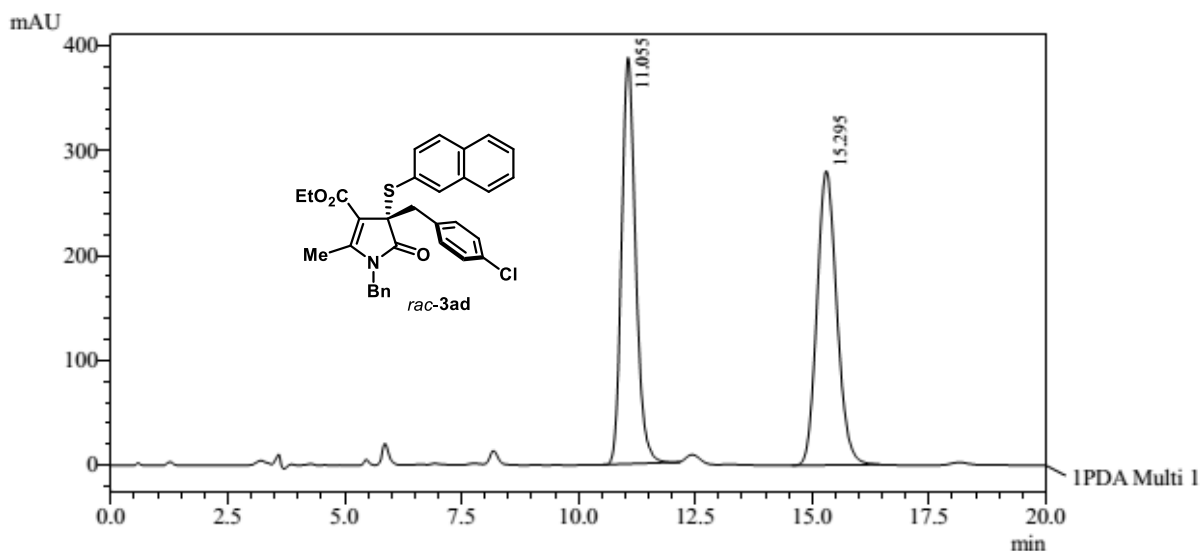


PeakTable

PDA Ch1 254nm 4nm

| Peak# | Ret. Time | Area | Area % |
|-------|-----------|---------|---------|
| 1 | 6.932 | 34605 | 1.501 |
| 2 | 12.259 | 2270551 | 98.499 |
| Total | | 2305156 | 100.000 |





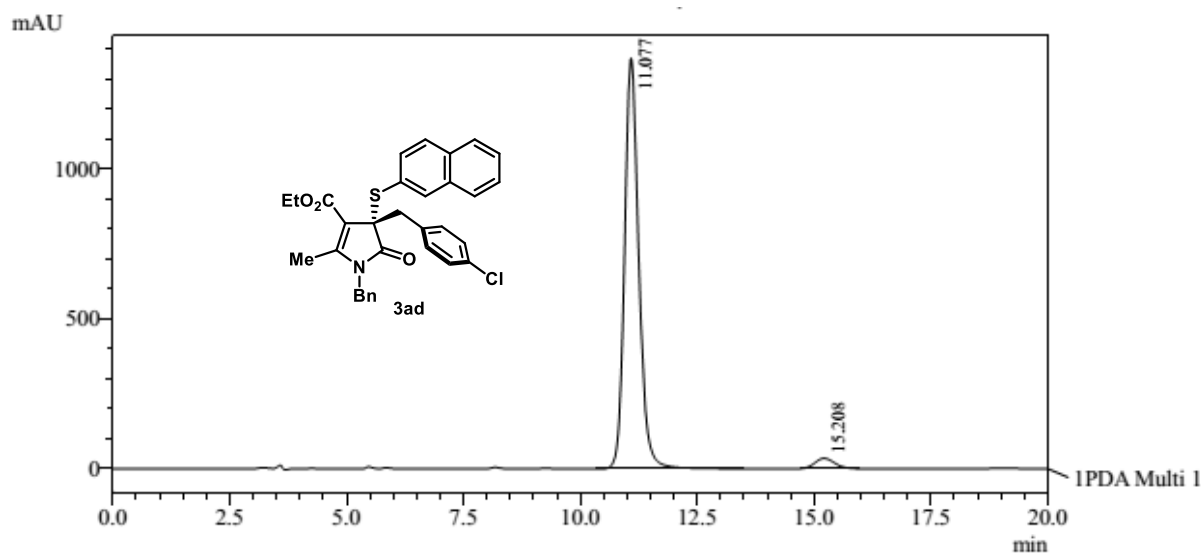
1 PDA Multi 1 / 220nm 4nm

PeakTable

PDA Ch1 220nm 4nm

| Peak# | Ret. Time | Area | Area % |
|-------|-----------|----------|---------|
| 1 | 11.055 | 8060723 | 49.312 |
| 2 | 15.295 | 8285749 | 50.688 |
| Total | | 16346473 | 100.000 |

Daicel Chiralpak AD-H column, 220 nm, *n*-Hexane/EtOH = 75:25, 1.0 mL min⁻¹, 20 °C

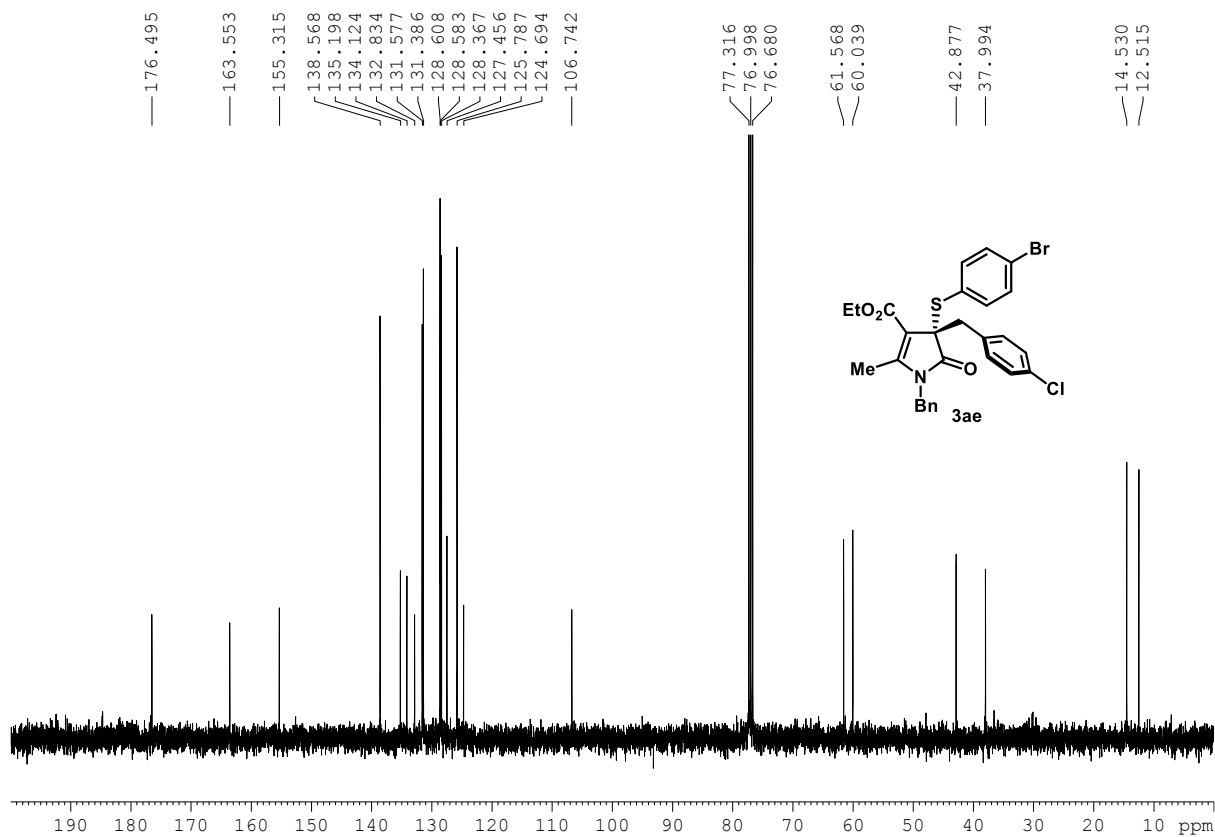
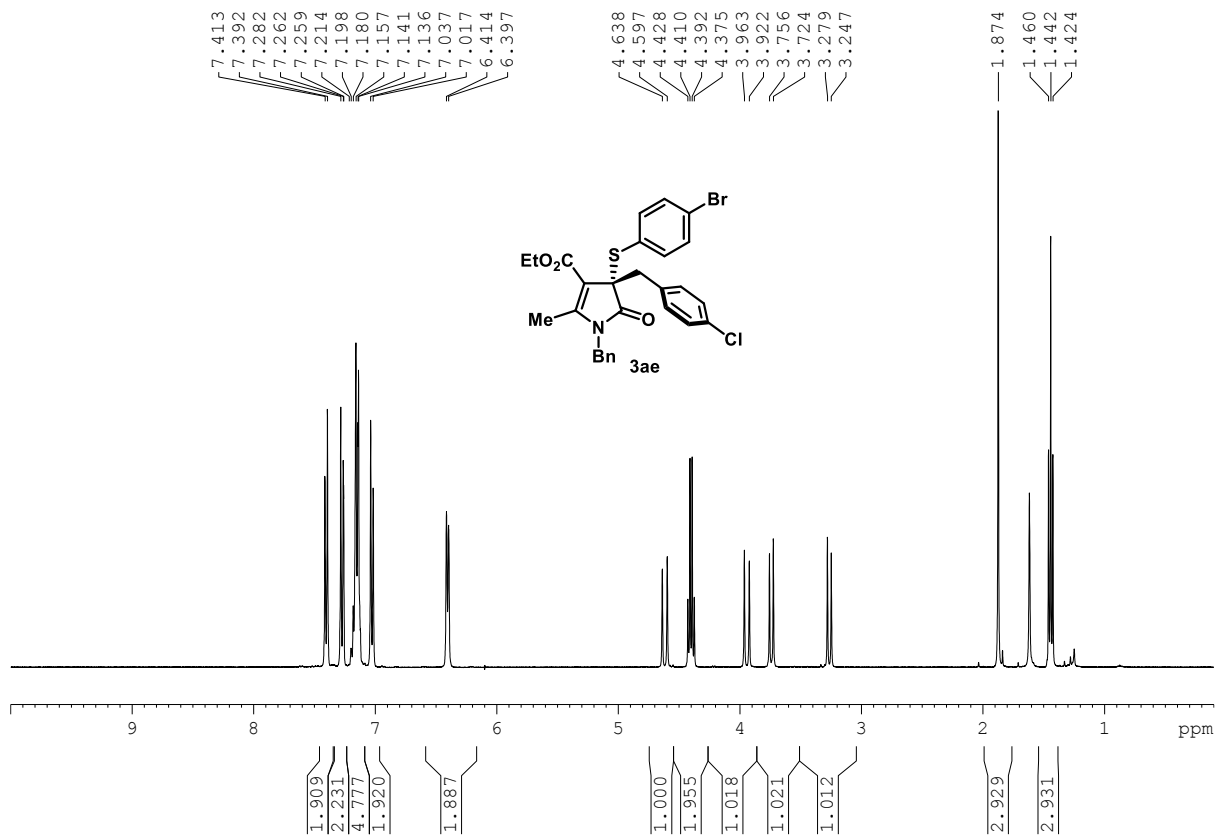


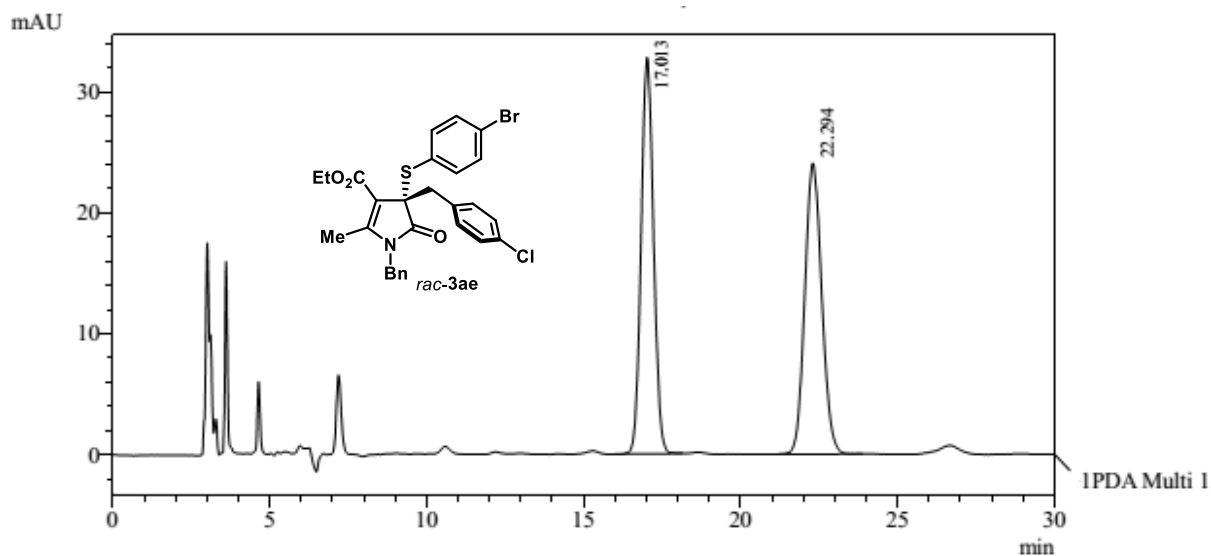
1 PDA Multi 1 / 220nm 4nm

PeakTable

PDA Ch1 220nm 4nm

| Peak# | Ret. Time | Area | Area % |
|-------|-----------|----------|---------|
| 1 | 11.077 | 28996409 | 96.657 |
| 2 | 15.208 | 1002966 | 3.343 |
| Total | | 29999375 | 100.000 |





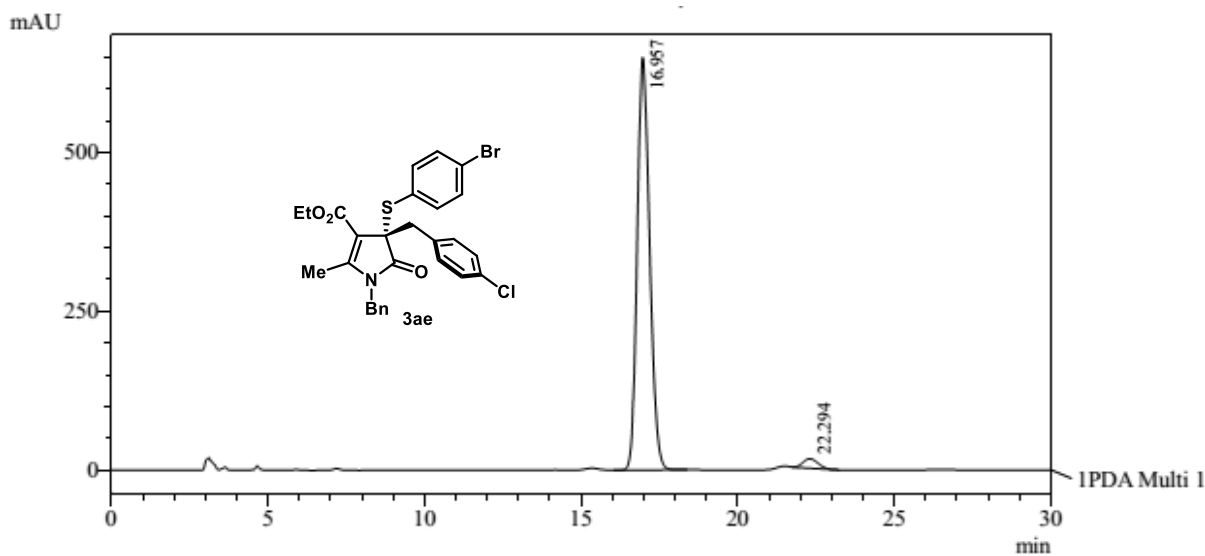
1 PDA Multi 1 / 210nm 4nm

PeakTable

PDA Ch1 210nm 4nm

| Peak# | Ret. Time | Area | Area % |
|-------|-----------|---------|---------|
| 1 | 17.013 | 900038 | 49.916 |
| 2 | 22.294 | 903062 | 50.084 |
| Total | | 1803100 | 100.000 |

Daicel Chiralpak AD-H column, 210 nm, *n*-Hexane/IPA = 90:10, 1.0 mL min⁻¹, 20 °C

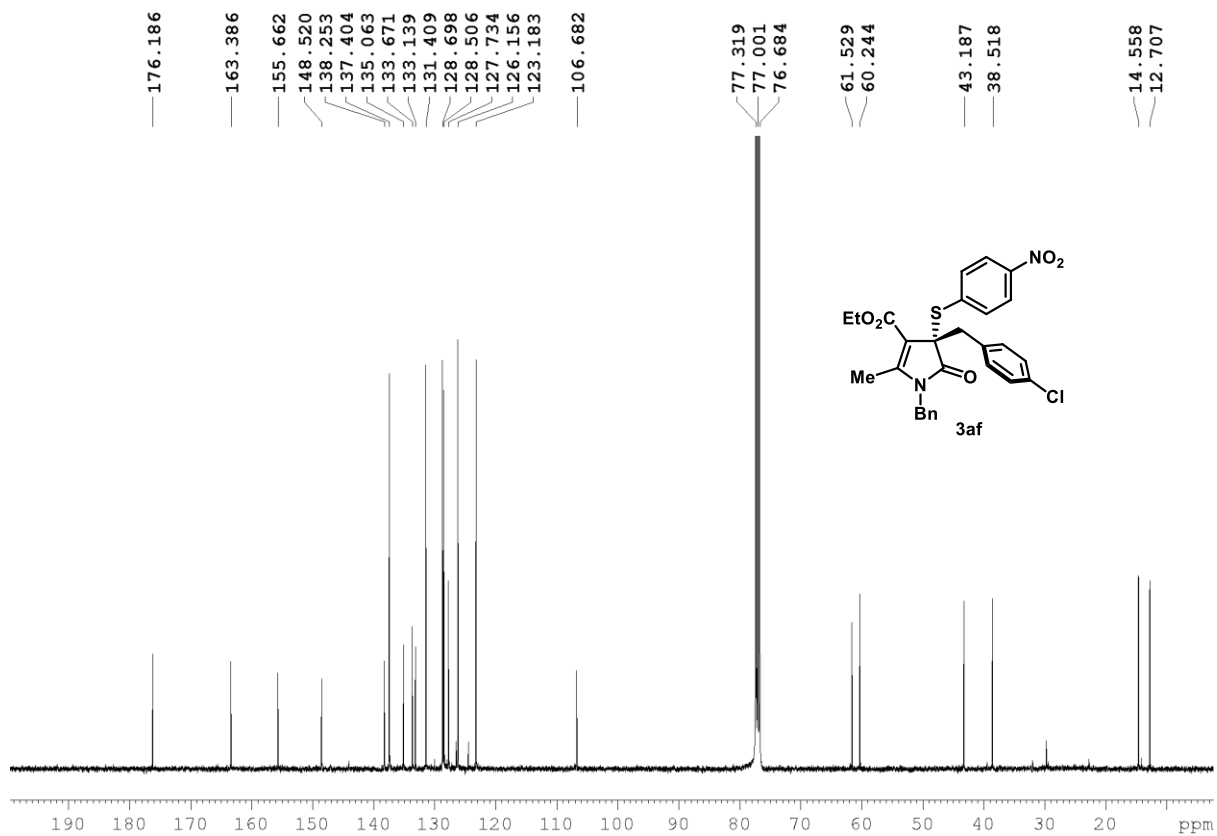
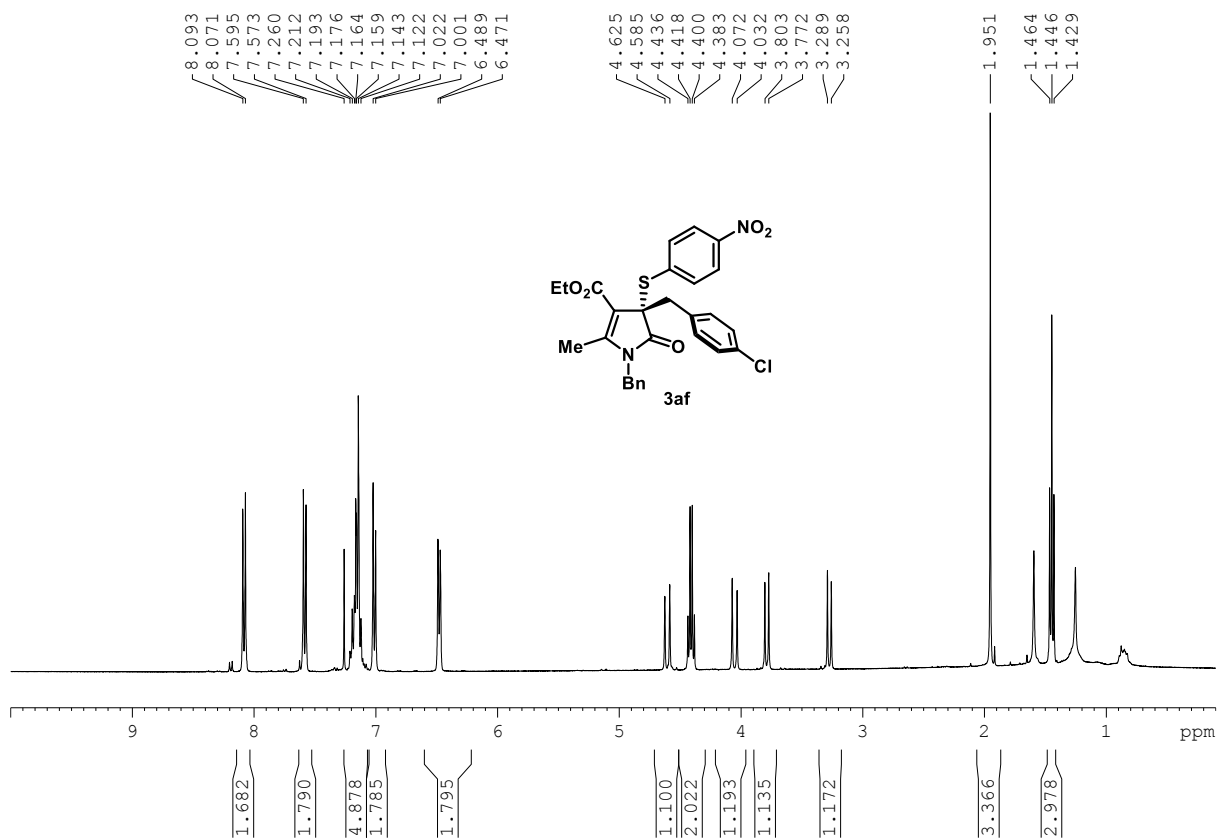


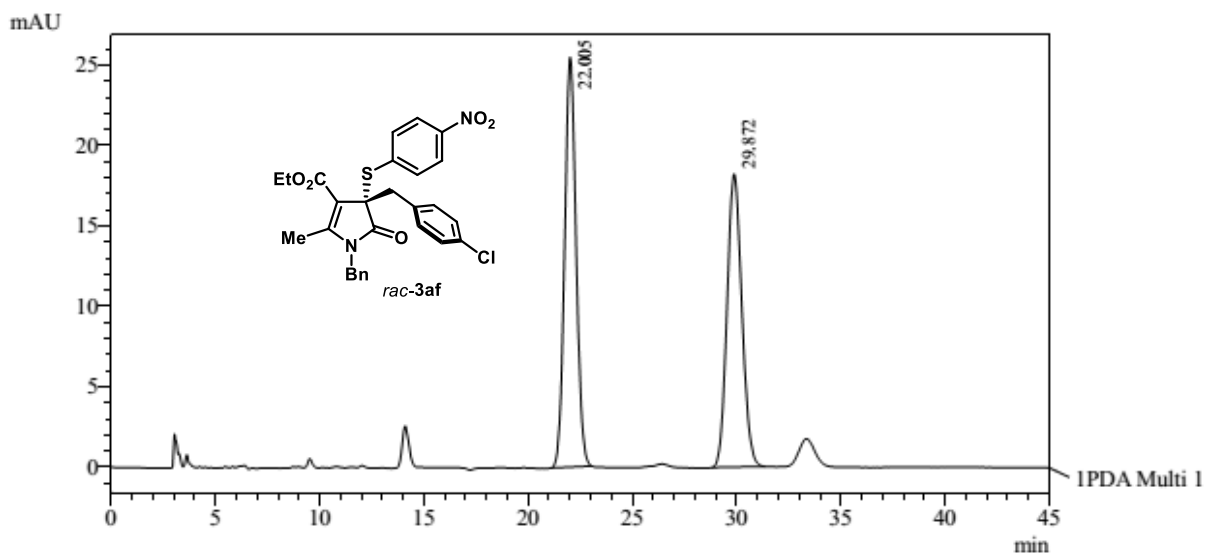
1 PDA Multi 1 / 210nm 4nm

PeakTable

PDA Ch1 210nm 4nm

| Peak# | Ret. Time | Area | Area % |
|-------|-----------|----------|---------|
| 1 | 16.957 | 18006337 | 97.346 |
| 2 | 22.294 | 491005 | 2.654 |
| Total | | 18497342 | 100.000 |





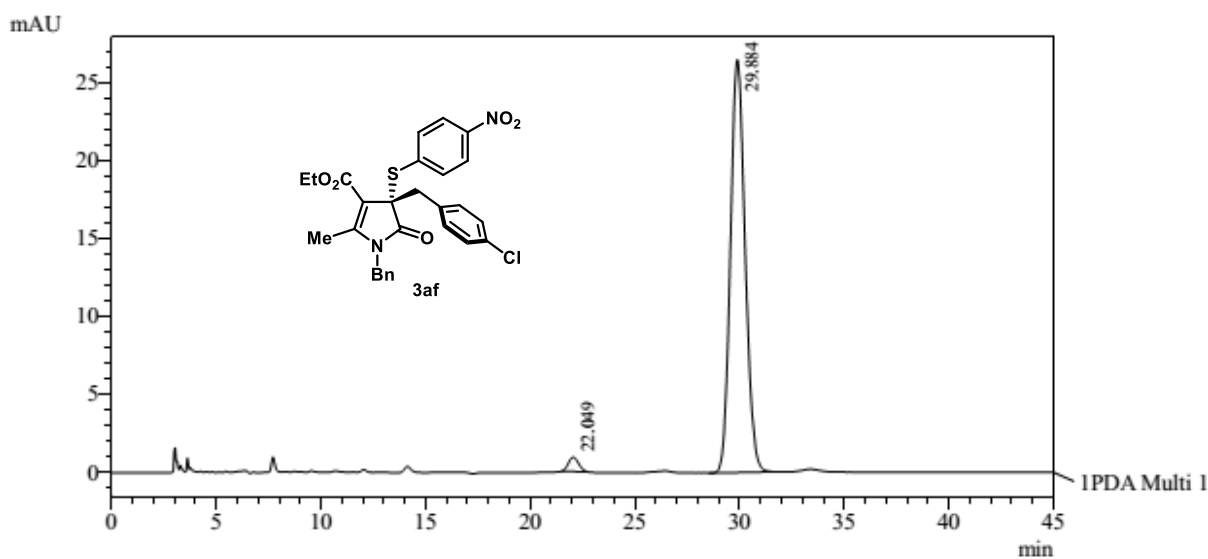
1 PDA Multi 1 / 240nm 4nm

PeakTable

PDA Ch1 240nm 4nm

| Peak# | Ret. Time | Area | Area % |
|-------|-----------|---------|---------|
| 1 | 22.005 | 965378 | 51.808 |
| 2 | 29.872 | 897998 | 48.192 |
| Total | | 1863376 | 100.000 |

Daicel Chiralpak AD-H column, 240 nm, *n*-Hexane/IPA = 90:10, 1.0 mL min⁻¹, 20 °C

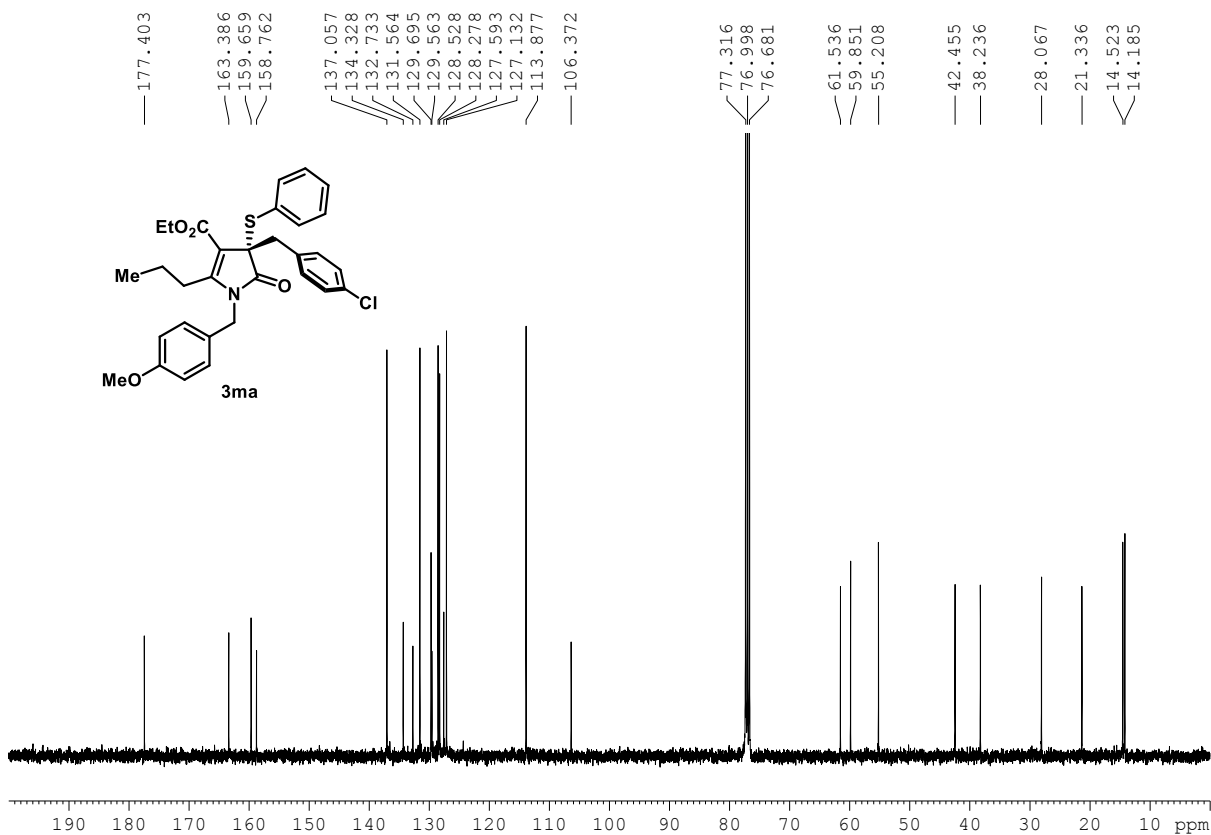
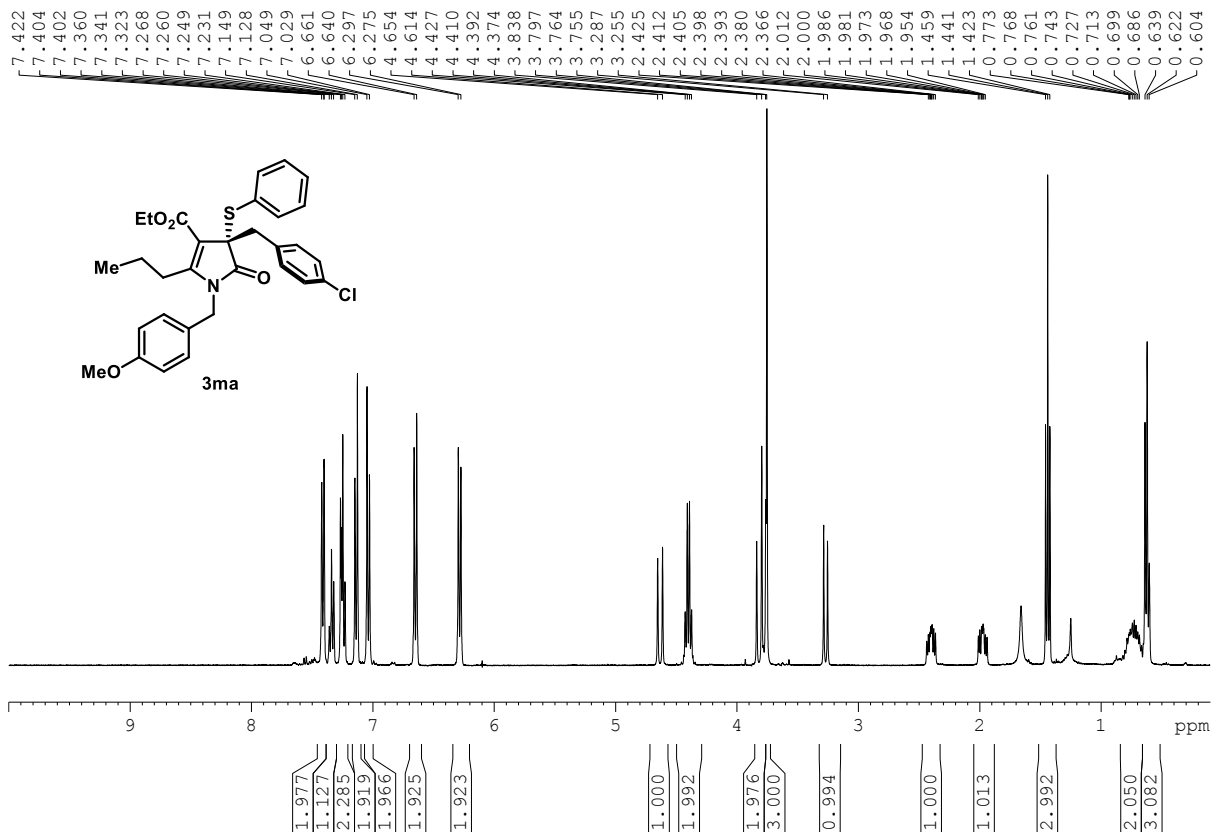


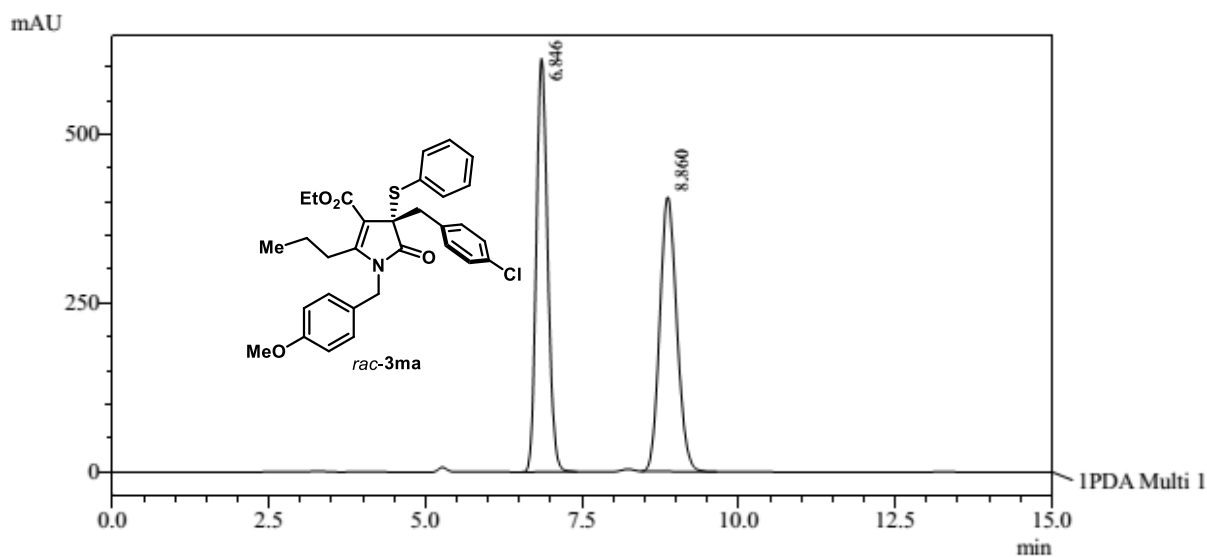
1 PDA Multi 1 / 240nm 4nm

PeakTable

PDA Ch1 240nm 4nm

| Peak# | Ret. Time | Area | Area % |
|-------|-----------|---------|---------|
| 1 | 22.049 | 30990 | 2.343 |
| 2 | 29.884 | 1291518 | 97.657 |
| Total | | 1322508 | 100.000 |



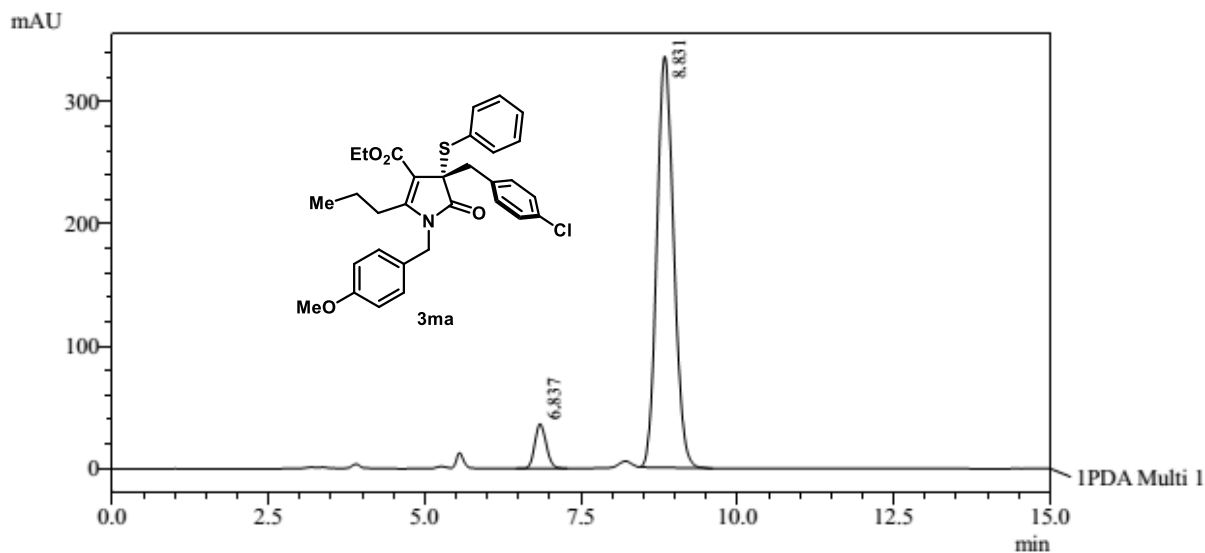


PeakTable

PDA Ch1 240nm 4nm

| Peak# | Ret. Time | Area | Area % |
|-------|-----------|----------|---------|
| 1 | 6.846 | 7726937 | 50.086 |
| 2 | 8.860 | 7700489 | 49.914 |
| Total | | 15427427 | 100.000 |

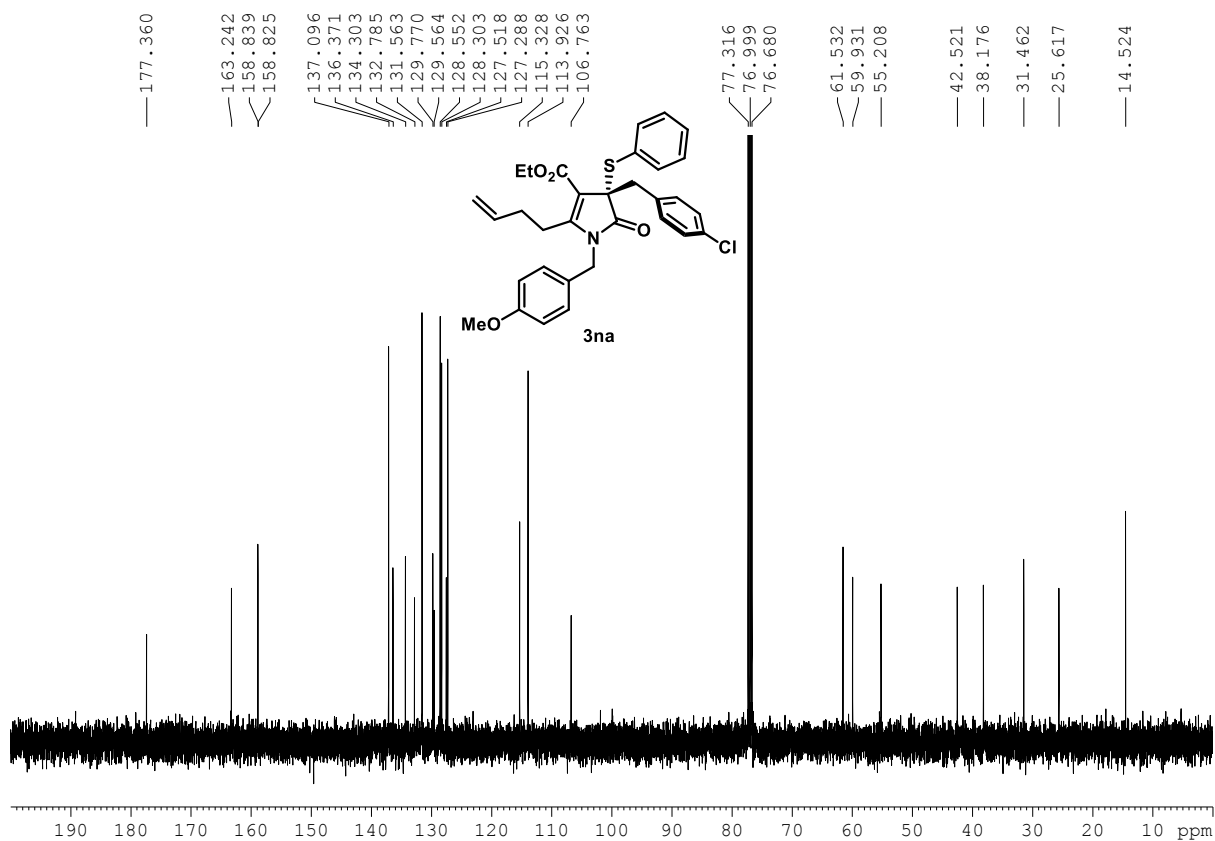
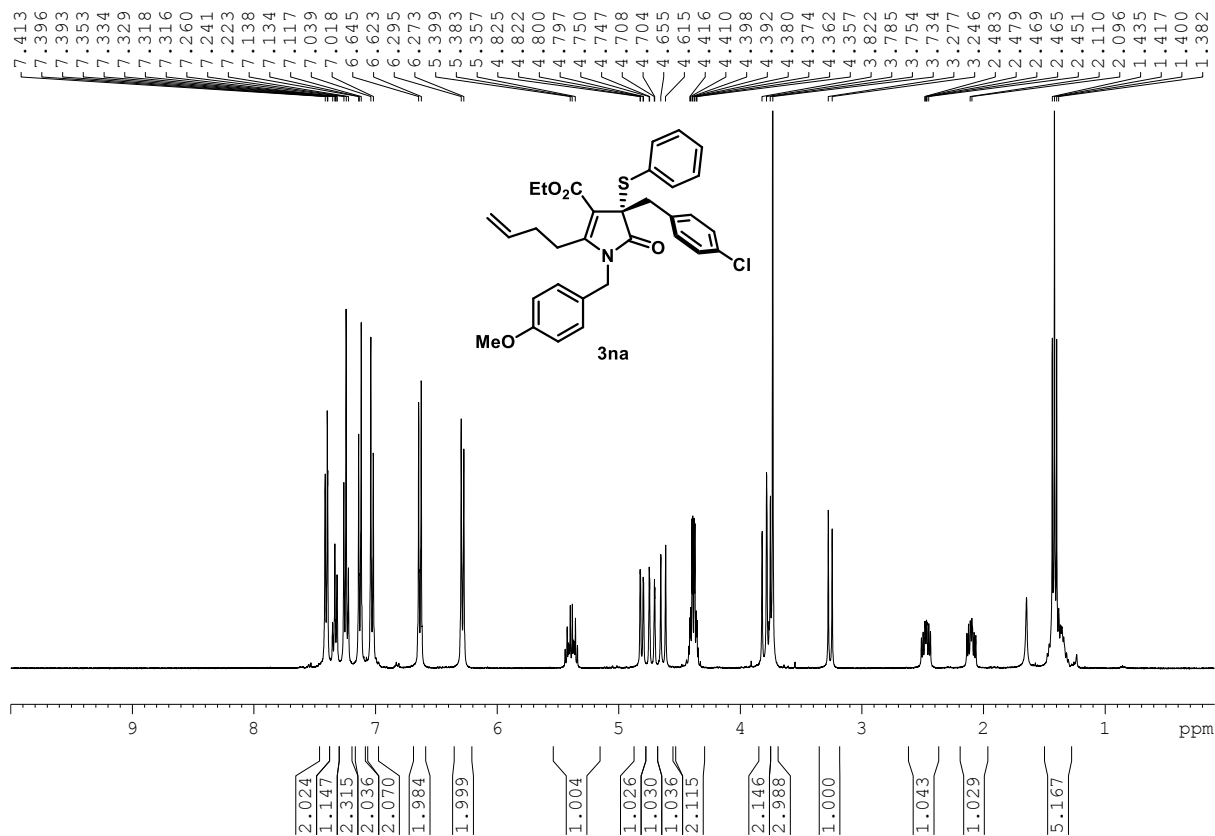
Daicel Chiralpak AD-H column, 240 nm, *n*-Hexane/EtOH = 70:30, 1.0 mL min⁻¹, 20 °C

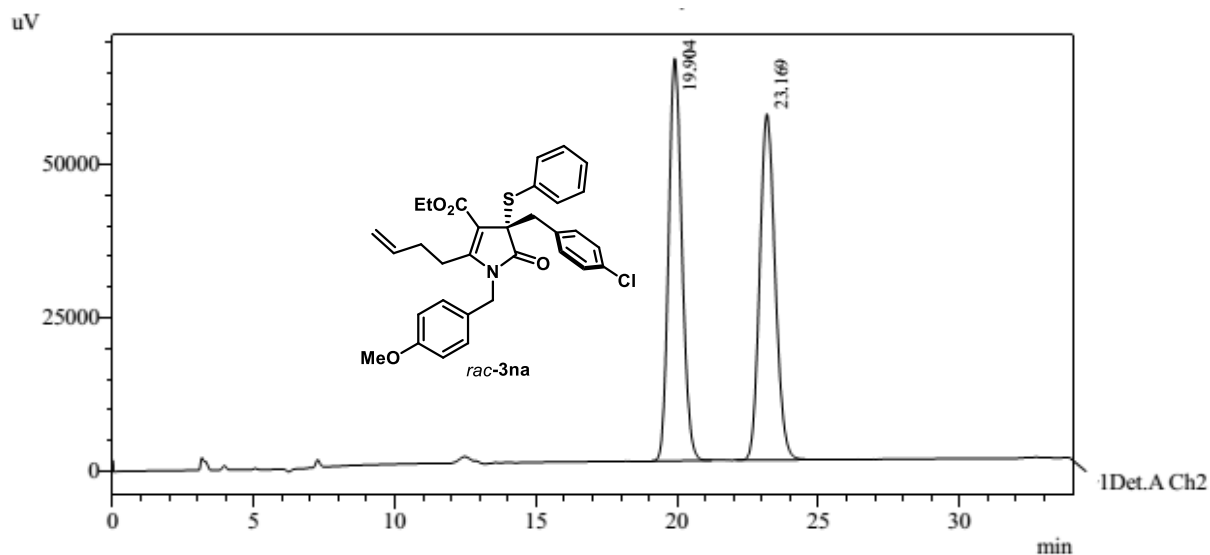


PeakTable

PDA Ch1 240nm 4nm

| Peak# | Ret. Time | Area | Area % |
|-------|-----------|---------|---------|
| 1 | 6.837 | 462266 | 6.816 |
| 2 | 8.831 | 6319509 | 93.184 |
| Total | | 6781775 | 100.000 |



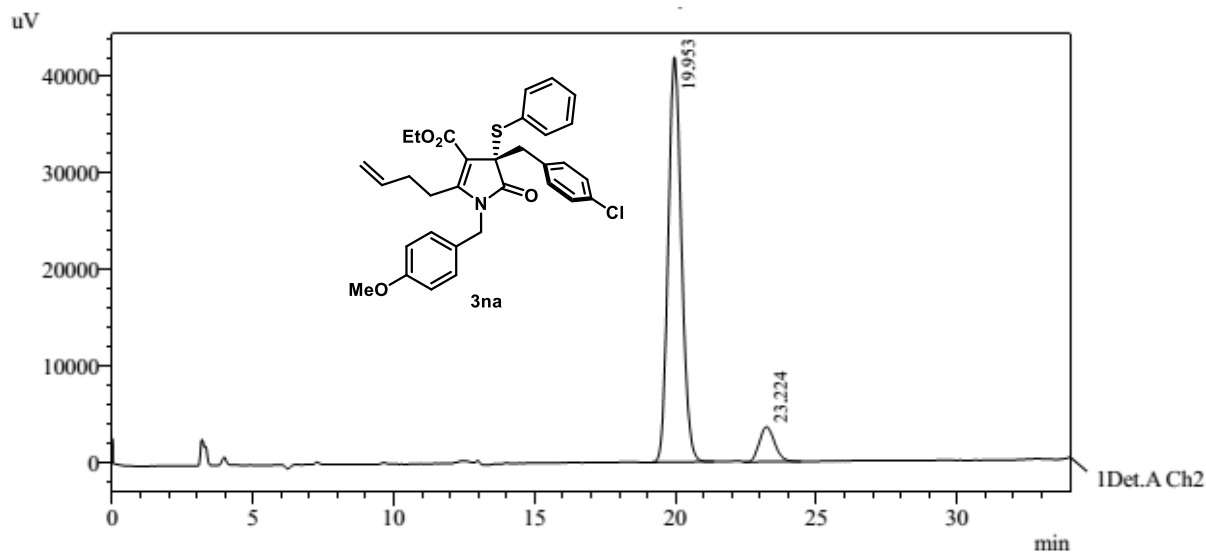


PeakTable

Detector A Ch2 254nm

| Peak# | Ret. Time | Area | Area % |
|-------|-----------|---------|---------|
| 1 | 19.904 | 2147629 | 50.024 |
| 2 | 23.169 | 2145601 | 49.976 |
| Total | | 4293230 | 100.000 |

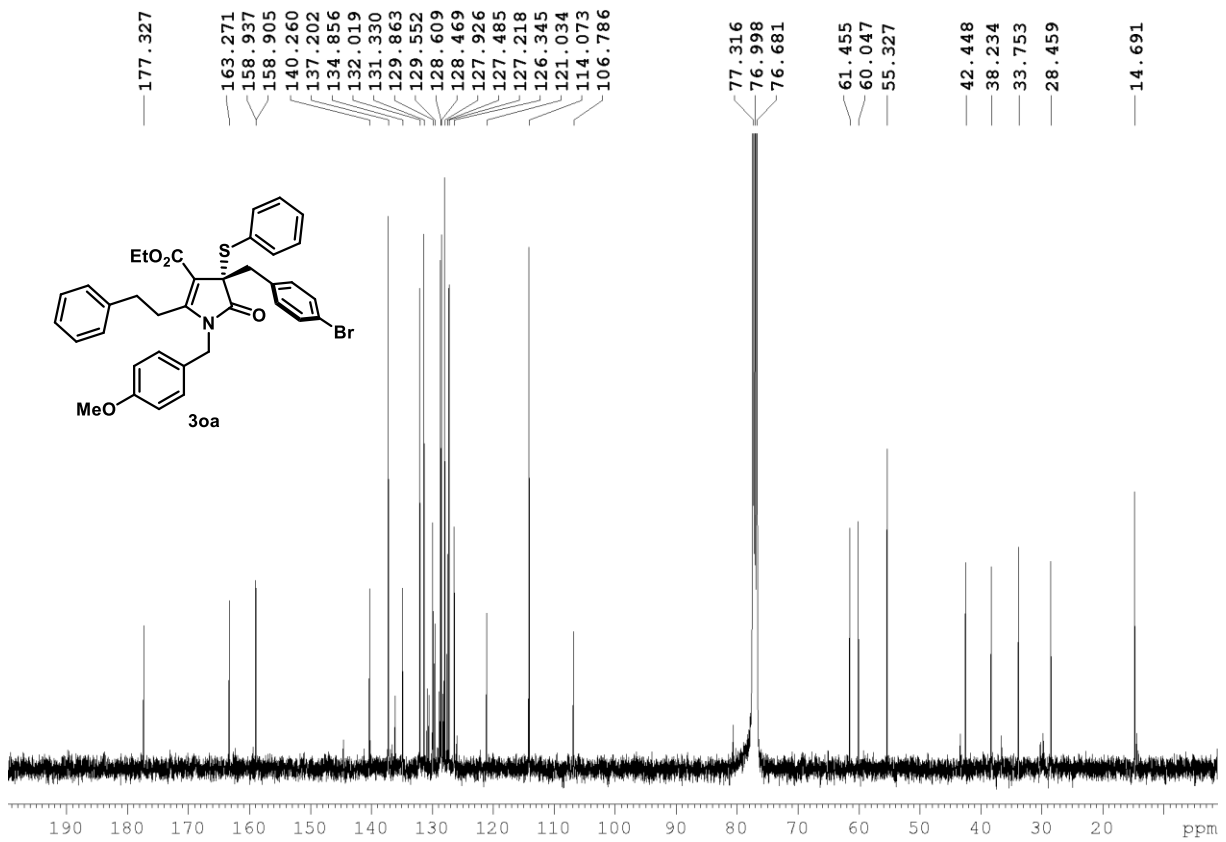
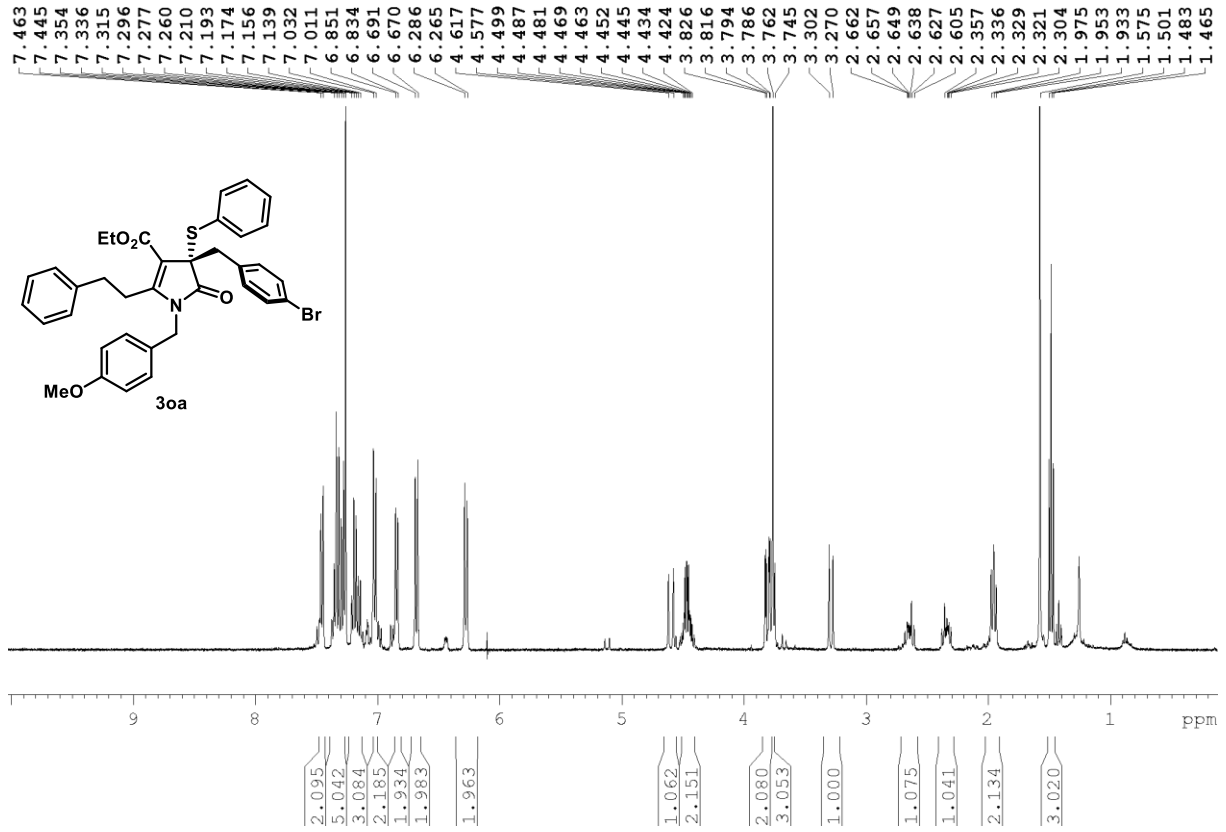
Daicel Chiralpak AD-H column, 254 nm, *n*-Hexane/IPA = 95:05, 1.0 mL min⁻¹, 20 °C

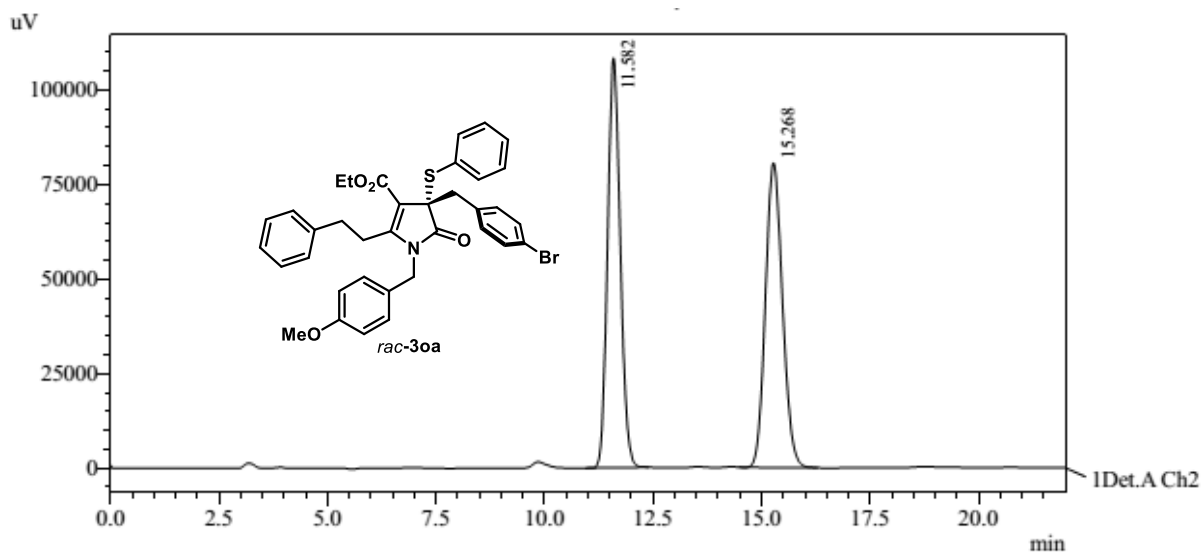


PeakTable

Detector A Ch2 254nm

| Peak# | Ret. Time | Area | Area % |
|-------|-----------|---------|---------|
| 1 | 19.953 | 1375629 | 91.060 |
| 2 | 23.224 | 135057 | 8.940 |
| Total | | 1510686 | 100.000 |



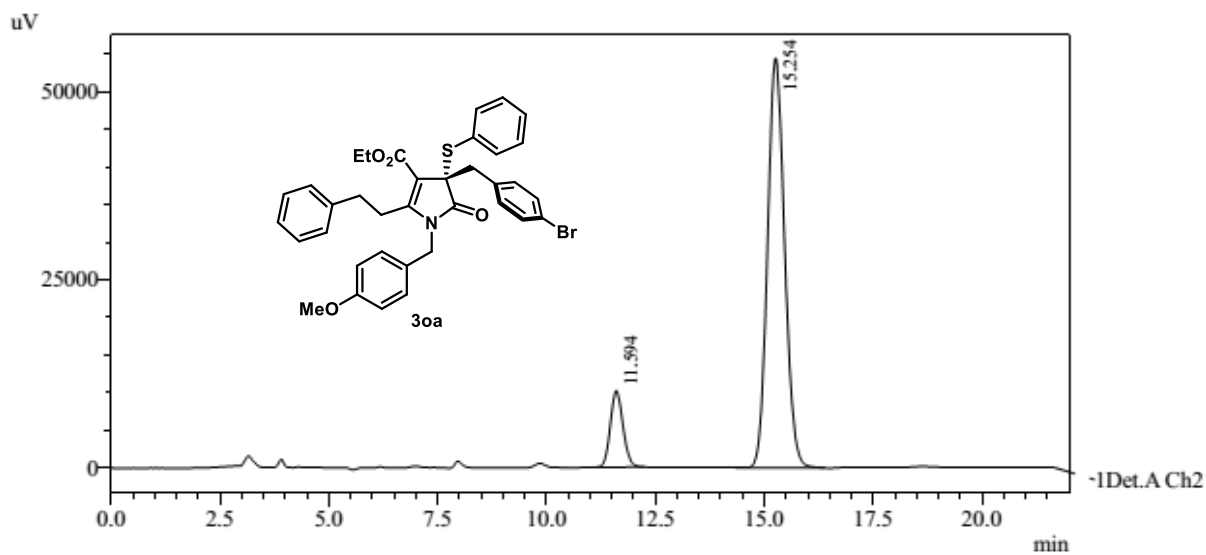


PeakTable

Detector A Ch2 254nm

| Peak# | Ret. Time | Area | Area % |
|-------|-----------|---------|---------|
| 1 | 11.582 | 2204047 | 49.981 |
| 2 | 15.268 | 2205721 | 50.019 |
| Total | | 4409768 | 100.000 |

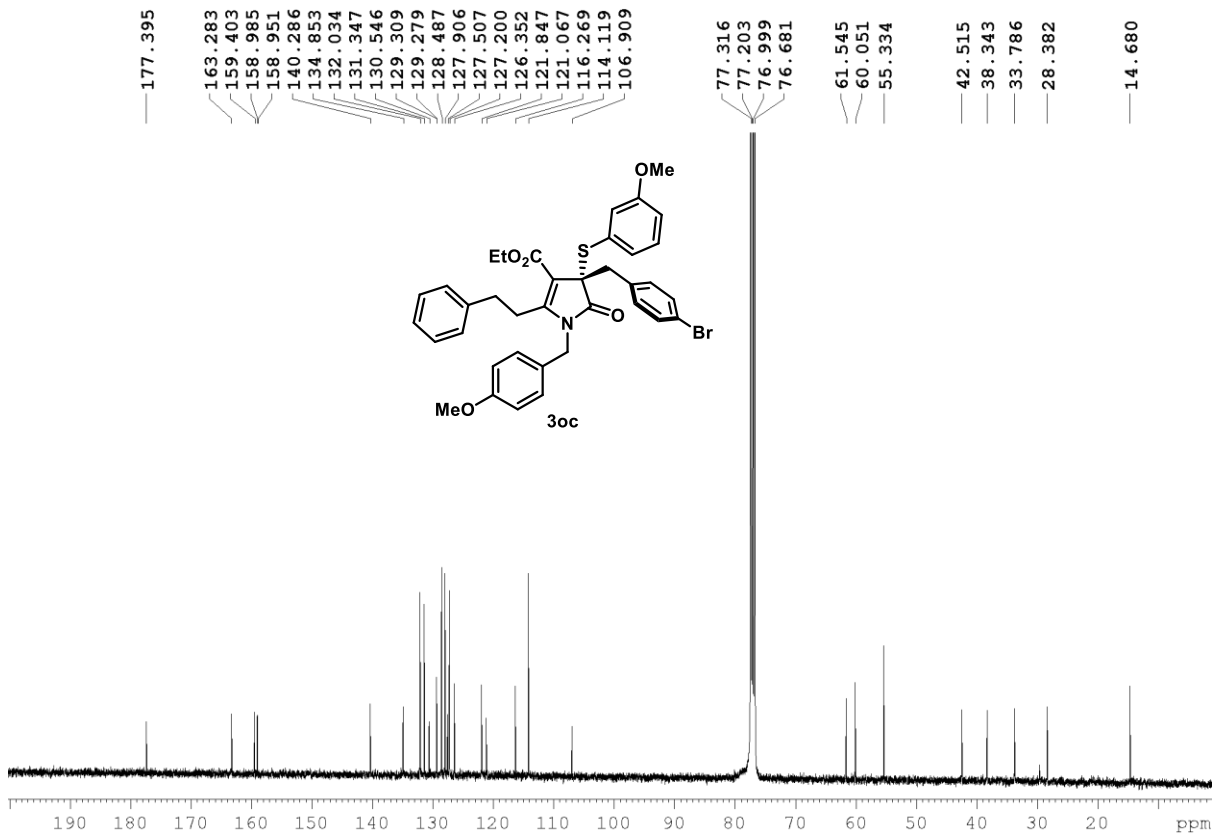
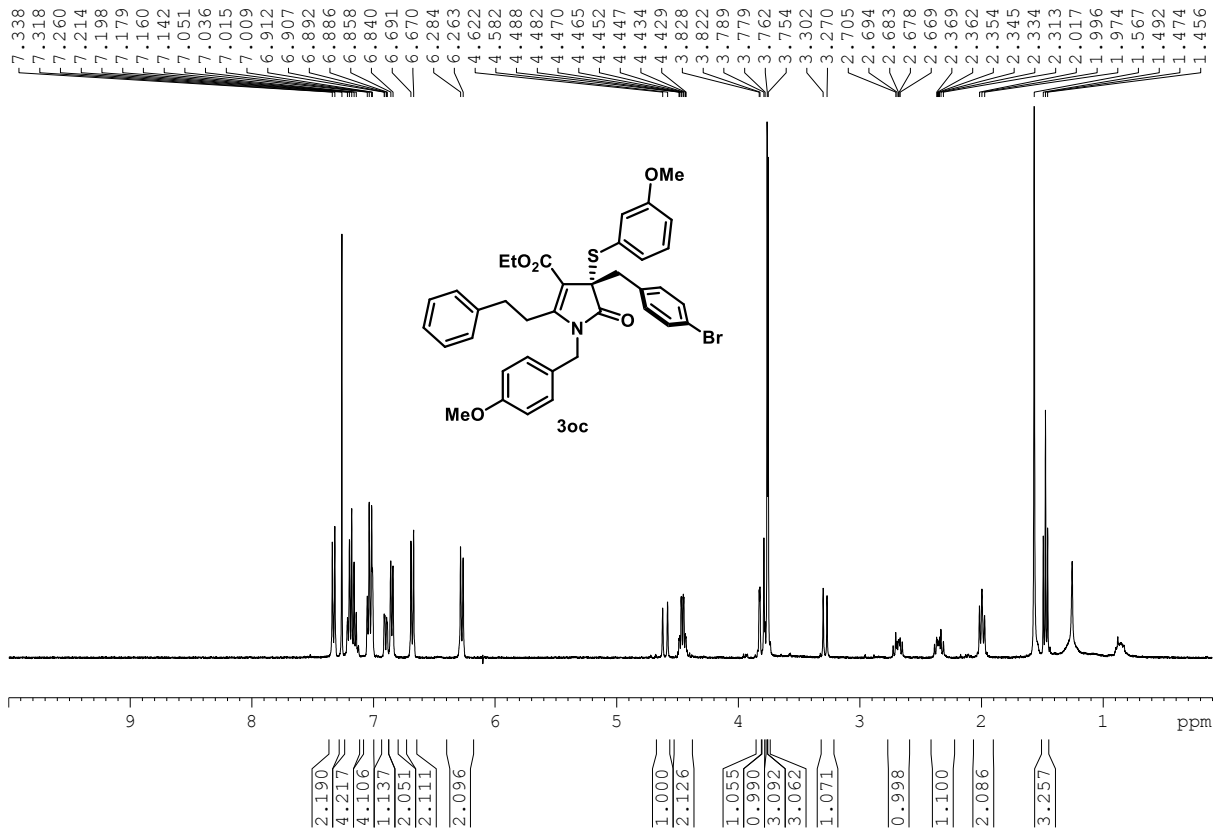
Daicel Chiralpak AD-H column, 254 nm, *n*-Hexane/IPA = 90:10, 1.0 mL min⁻¹, 20 °C

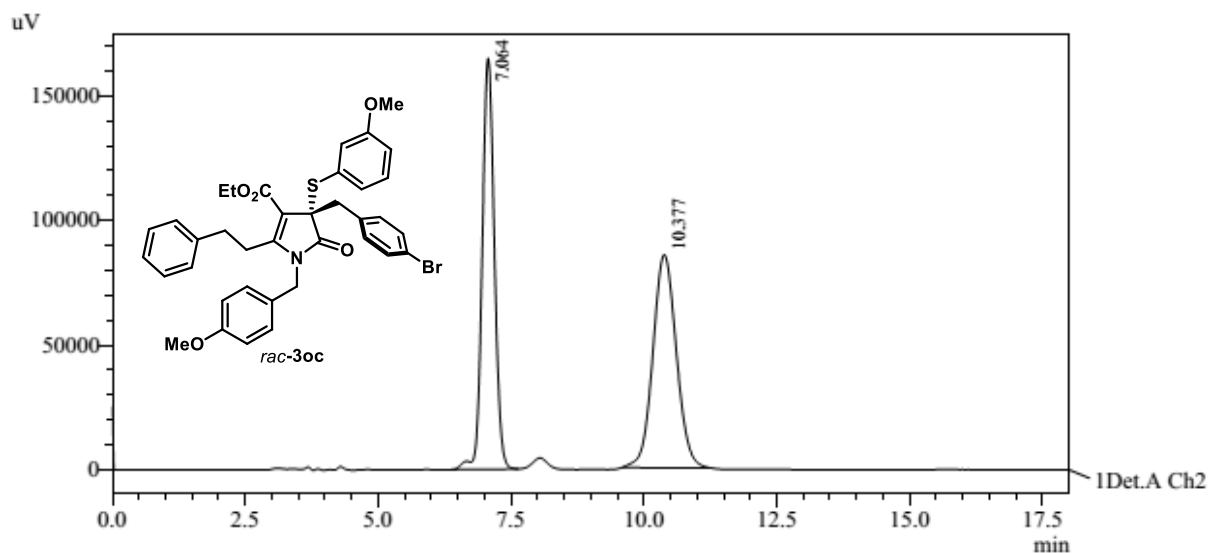


PeakTable

Detector A Ch2 254nm

| Peak# | Ret. Time | Area | Area % |
|-------|-----------|---------|---------|
| 1 | 11.594 | 203932 | 12.096 |
| 2 | 15.254 | 1481999 | 87.904 |
| Total | | 1685930 | 100.000 |



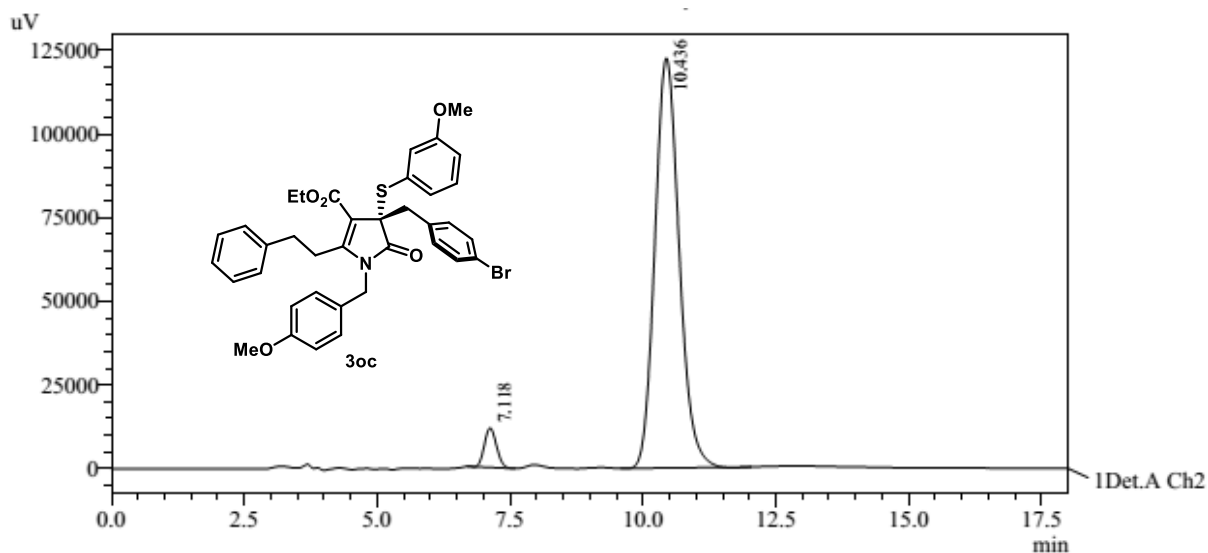


PeakTable

Detector A Ch2 254nm

| Peak# | Ret. Time | Area | Area % |
|-------|-----------|---------|---------|
| 1 | 7.064 | 2616552 | 49.901 |
| 2 | 10.377 | 2626981 | 50.099 |
| Total | | 5243533 | 100.000 |

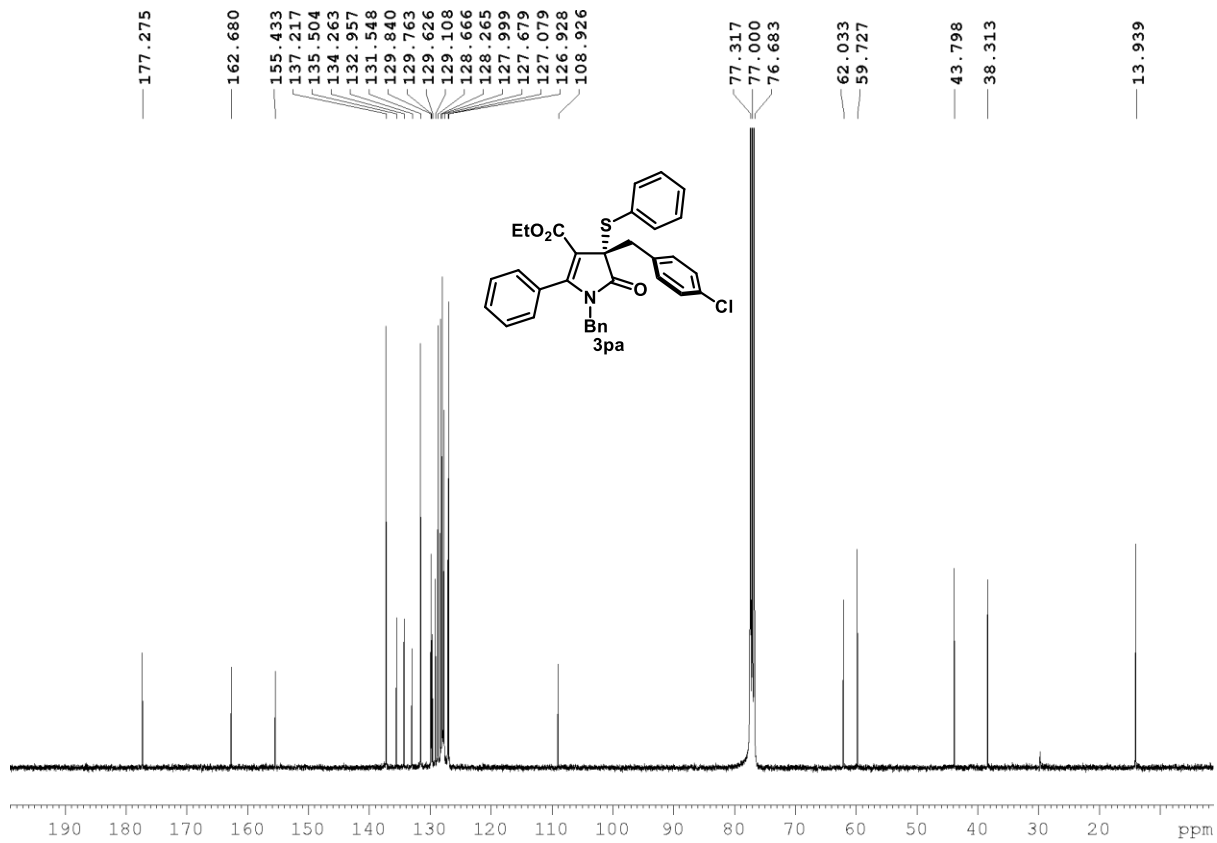
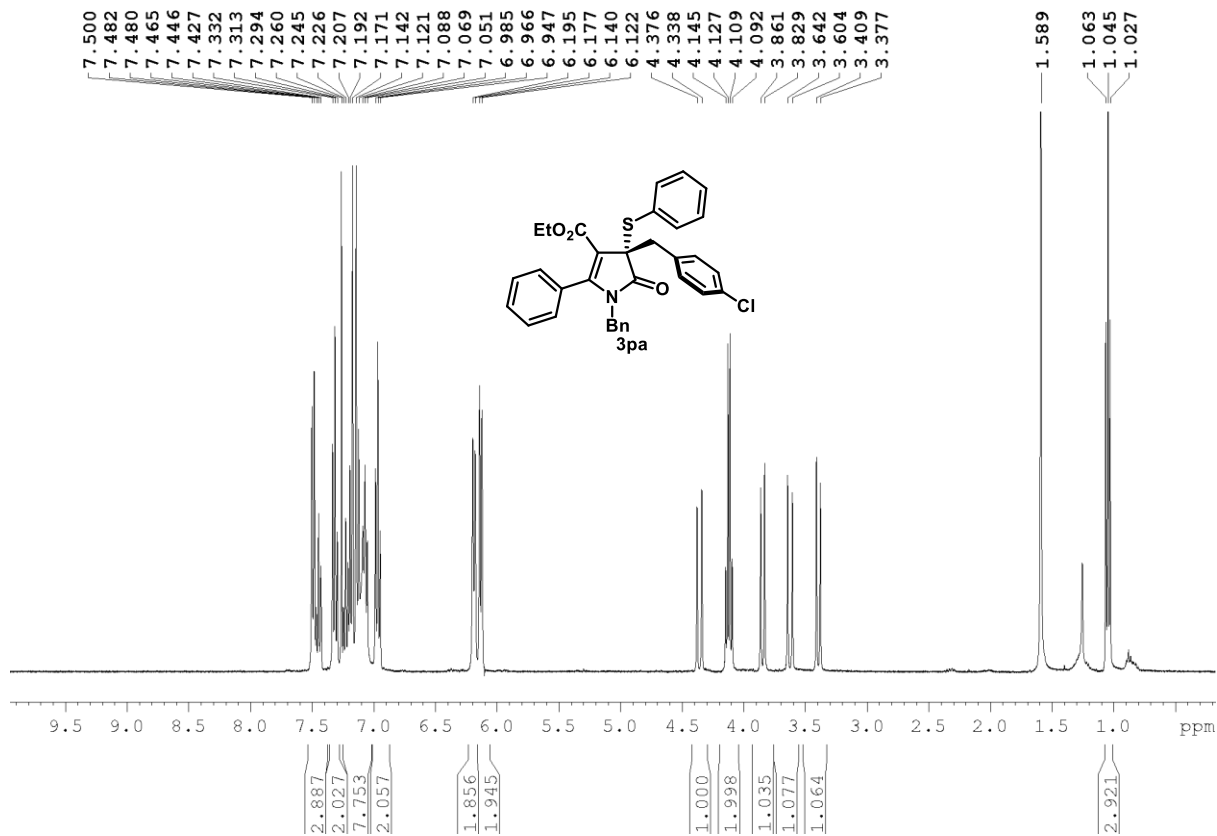
Daicel Chiralpak AD-H column, 254 nm, *n*-Hexane/EtOH = 75:25, 1.0 mL min⁻¹, 20 °C

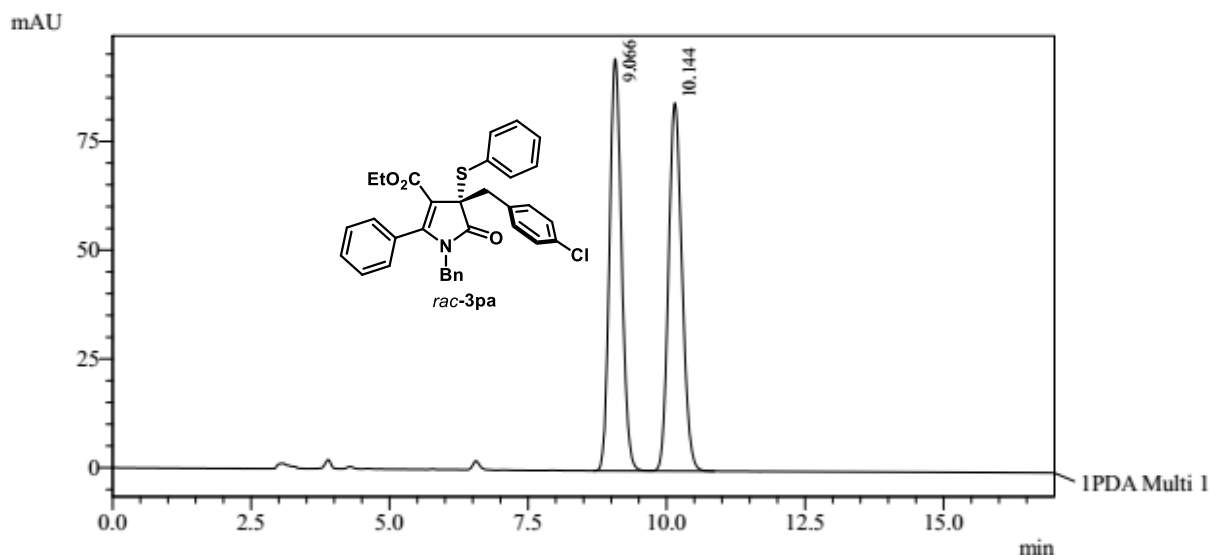


PeakTable

Detector A Ch2 254nm

| Peak# | Ret. Time | Area | Area % |
|-------|-----------|---------|---------|
| 1 | 7.118 | 187137 | 4.597 |
| 2 | 10.436 | 3883693 | 95.403 |
| Total | | 4070830 | 100.000 |





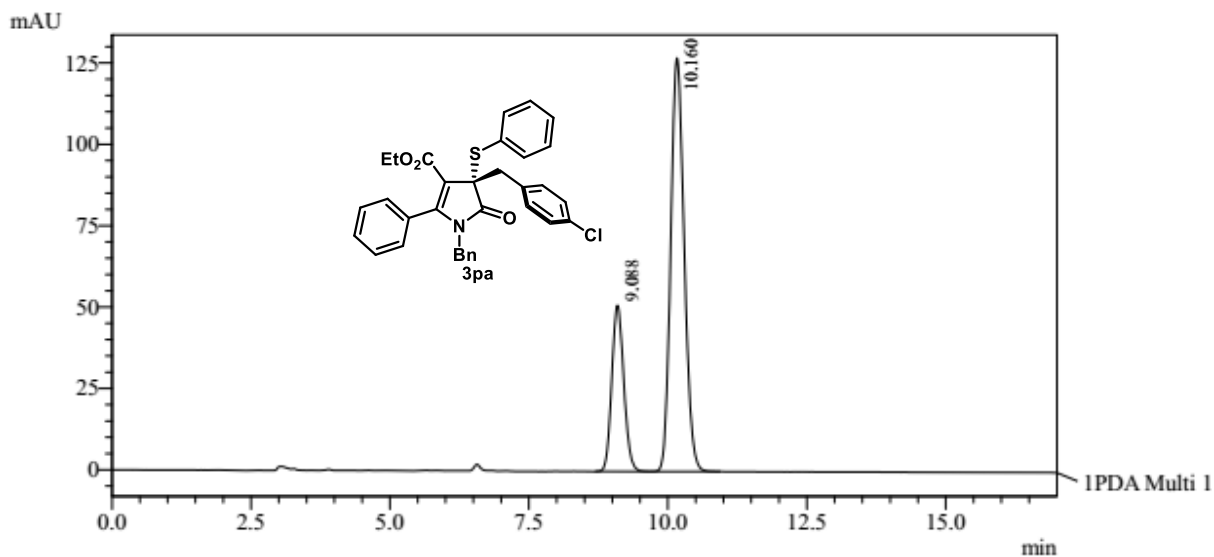
1 PDA Multi 1 / 254nm 4nm

PeakTable

PDA Ch1 254nm 4nm

| Peak# | Ret. Time | Area | Area % |
|-------|-----------|---------|---------|
| 1 | 9.066 | 1429409 | 50.025 |
| 2 | 10.144 | 1428004 | 49.975 |
| Total | | 2857414 | 100.000 |

Daicel Chiralpak AD-H column, 254 nm, *n*-Hexane/IPA = 90:10, 1.0 mL min⁻¹, 20 °C

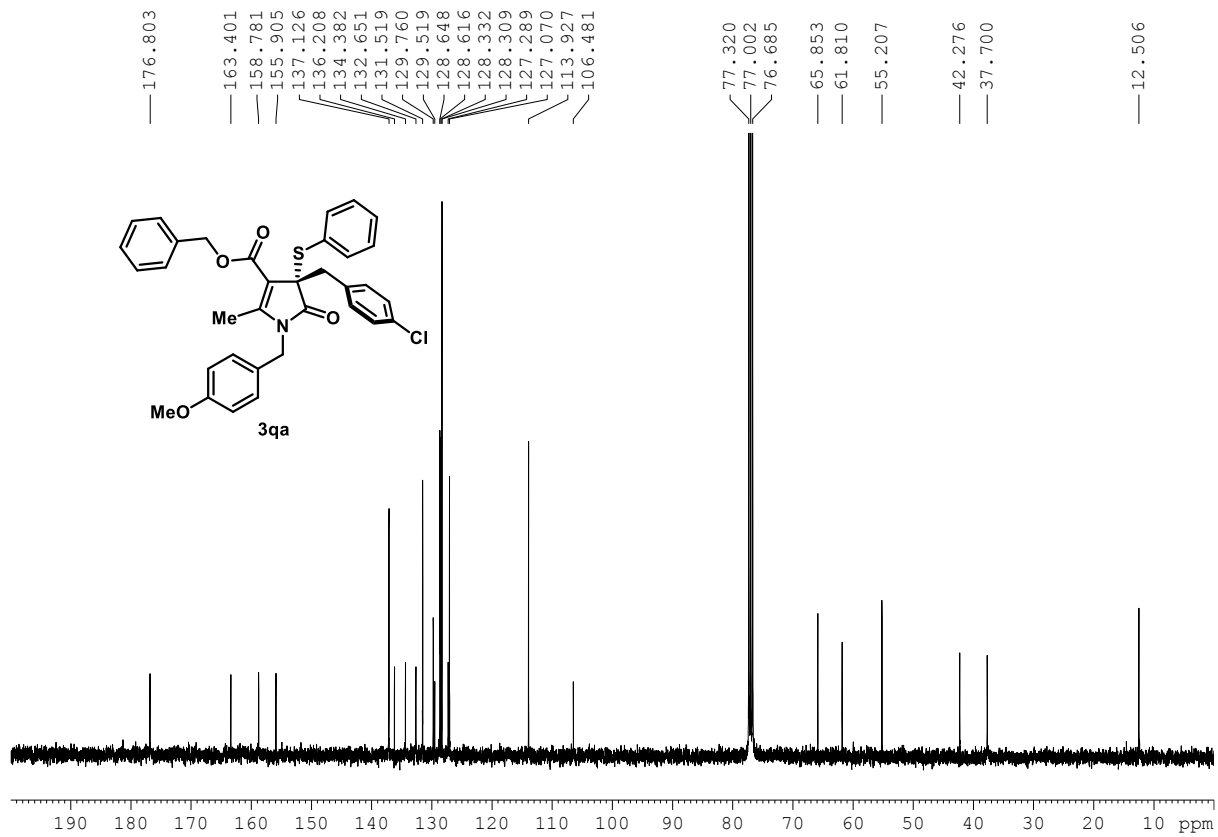
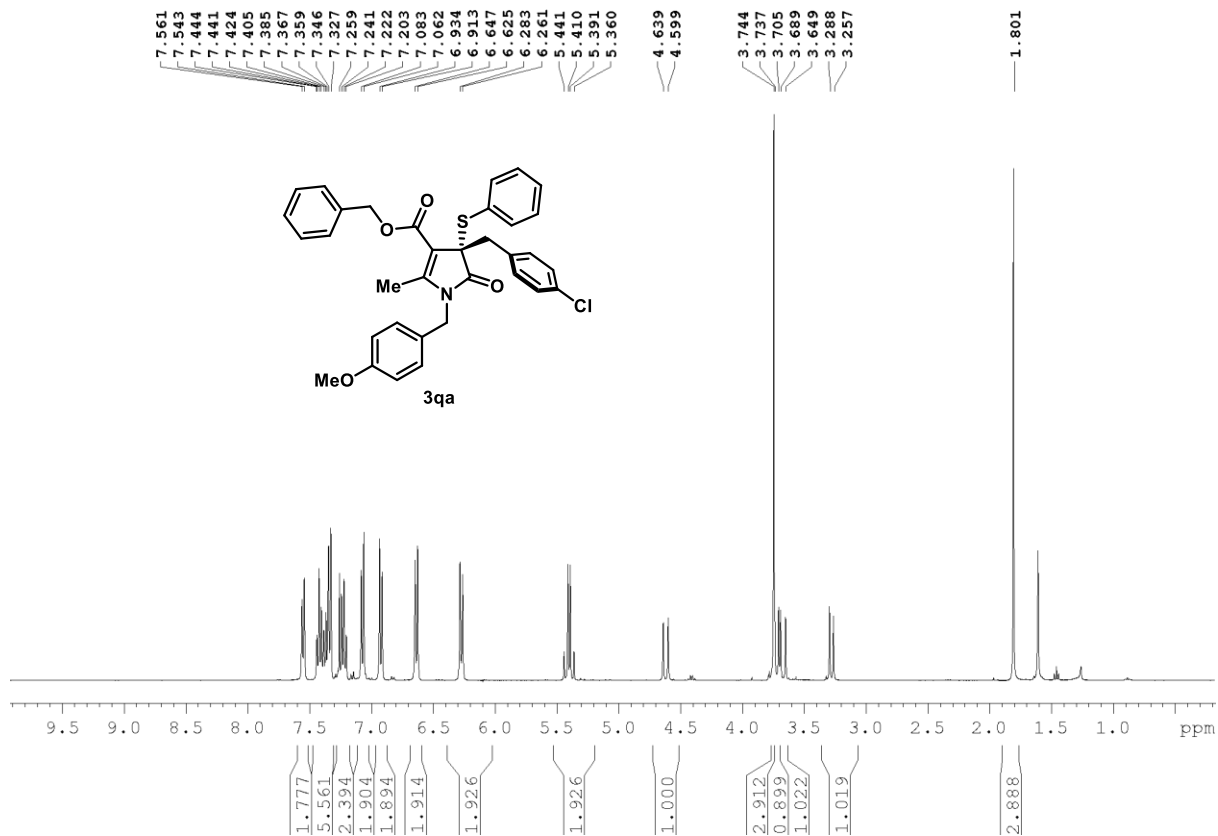


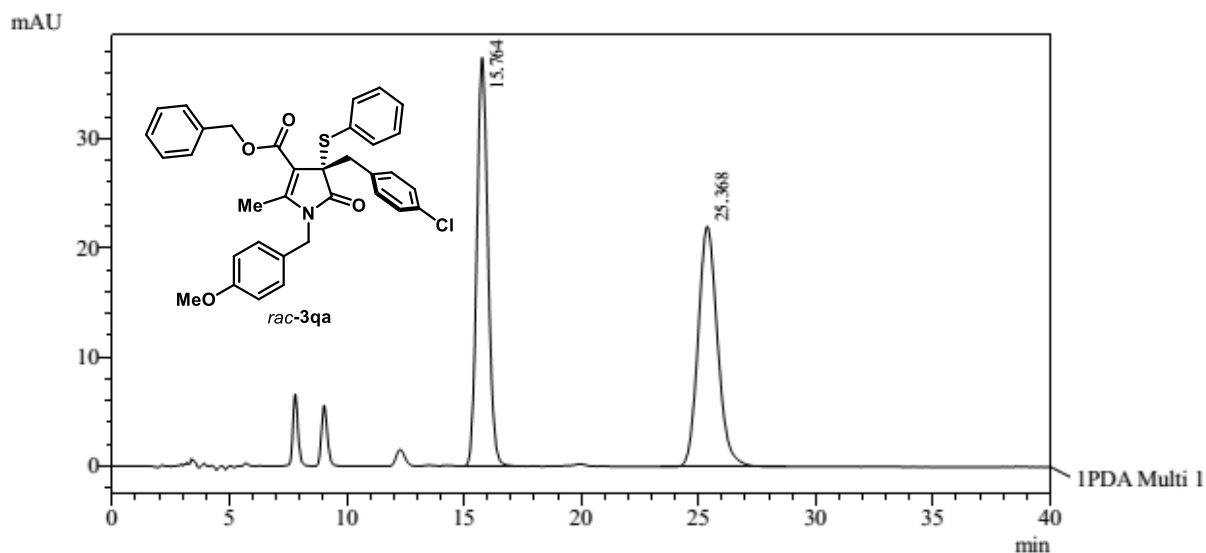
1 PDA Multi 1 / 254nm 4nm

PeakTable

PDA Ch1 254nm 4nm

| Peak# | Ret. Time | Area | Area % |
|-------|-----------|---------|---------|
| 1 | 9.088 | 768783 | 26.410 |
| 2 | 10.160 | 2142128 | 73.590 |
| Total | | 2910911 | 100.000 |





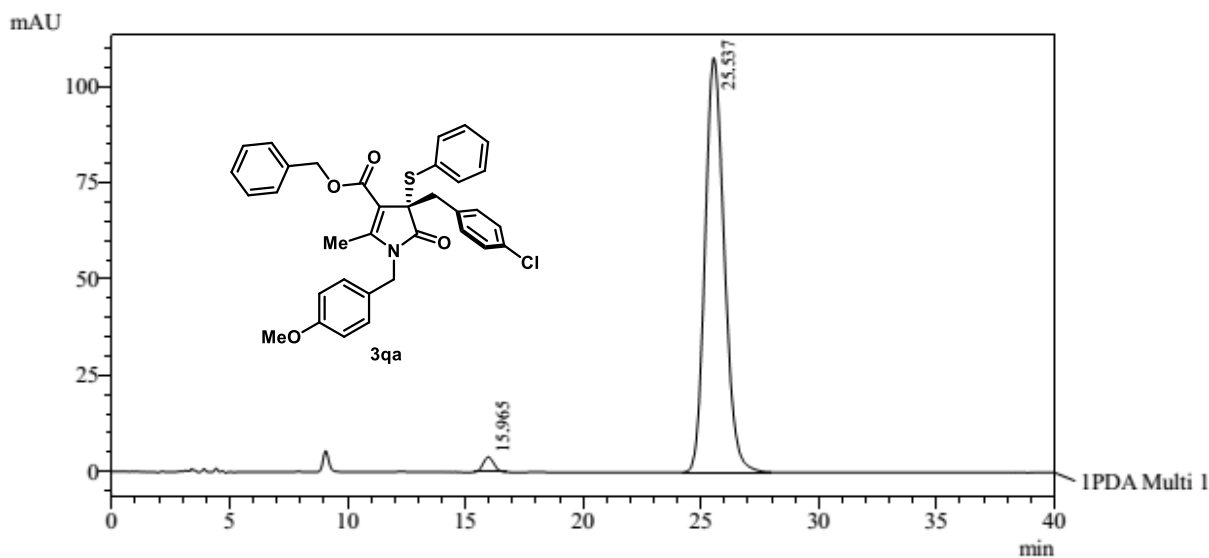
1 PDA Multi 1 / 254nm 4nm

PeakTable

PDA Ch1 254nm 4nm

| Peak# | Ret. Time | Area | Area % |
|-------|-----------|---------|---------|
| 1 | 15.764 | 1228516 | 49.305 |
| 2 | 25.368 | 1263138 | 50.695 |
| Total | | 2491655 | 100.000 |

Daicel Chiralpak AD-H column, 254 nm, *n*-Hexane/EtOH = 60:40, 1.0 mL min⁻¹, 20 °C

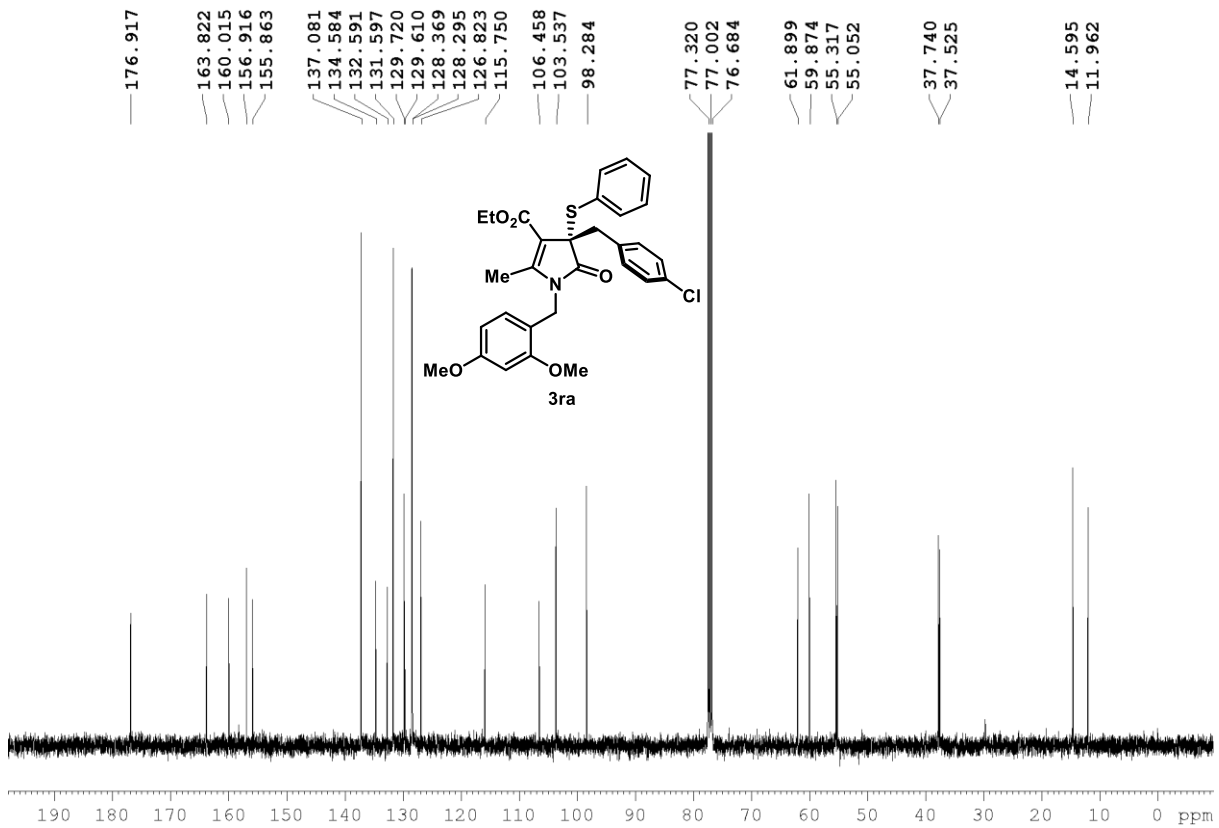
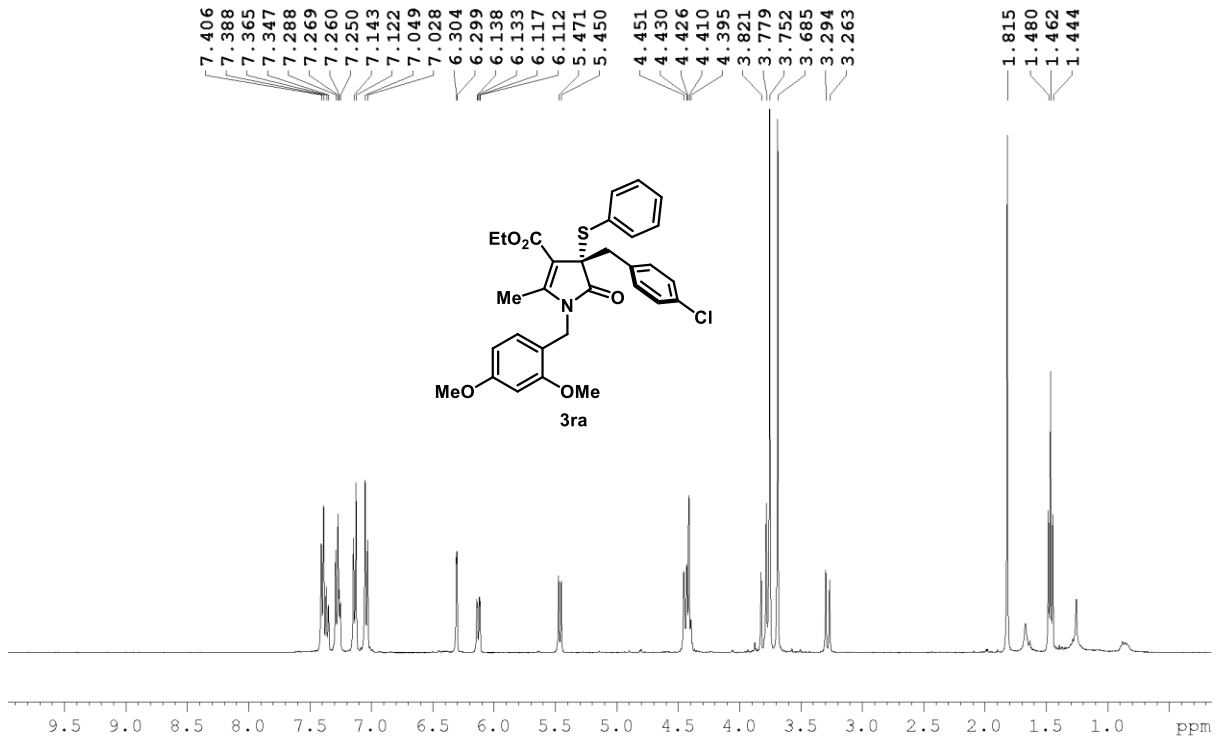


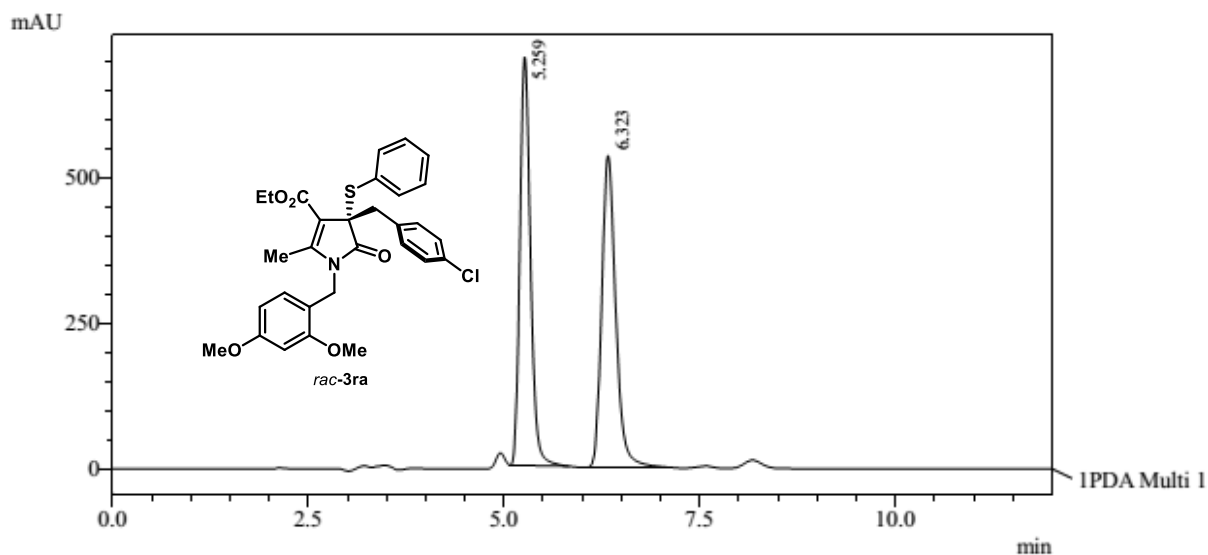
1 PDA Multi 1 / 254nm 4nm

PeakTable

PDA Ch1 254nm 4nm

| Peak# | Ret. Time | Area | Area % |
|-------|-----------|---------|---------|
| 1 | 15.965 | 126269 | 2.033 |
| 2 | 25.537 | 6083194 | 97.967 |
| Total | | 6209463 | 100.000 |



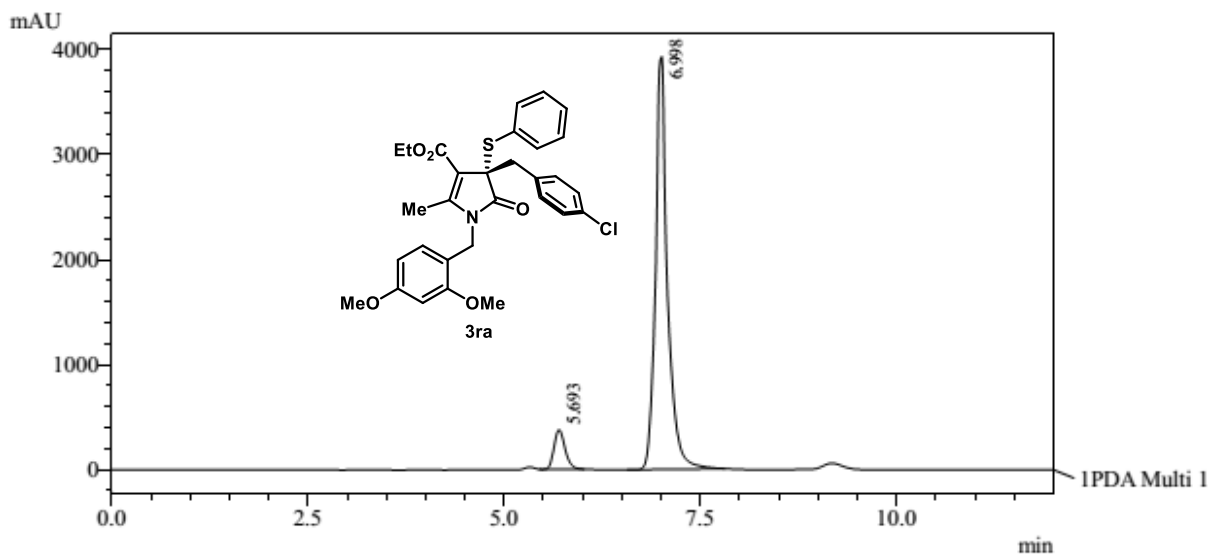


PeakTable

PDA Ch1 220nm 4nm

| Peak# | Ret. Time | Area | Area % |
|-------|-----------|----------|---------|
| 1 | 5.259 | 6588024 | 49.740 |
| 2 | 6.323 | 6657026 | 50.260 |
| Total | | 13245049 | 100.000 |

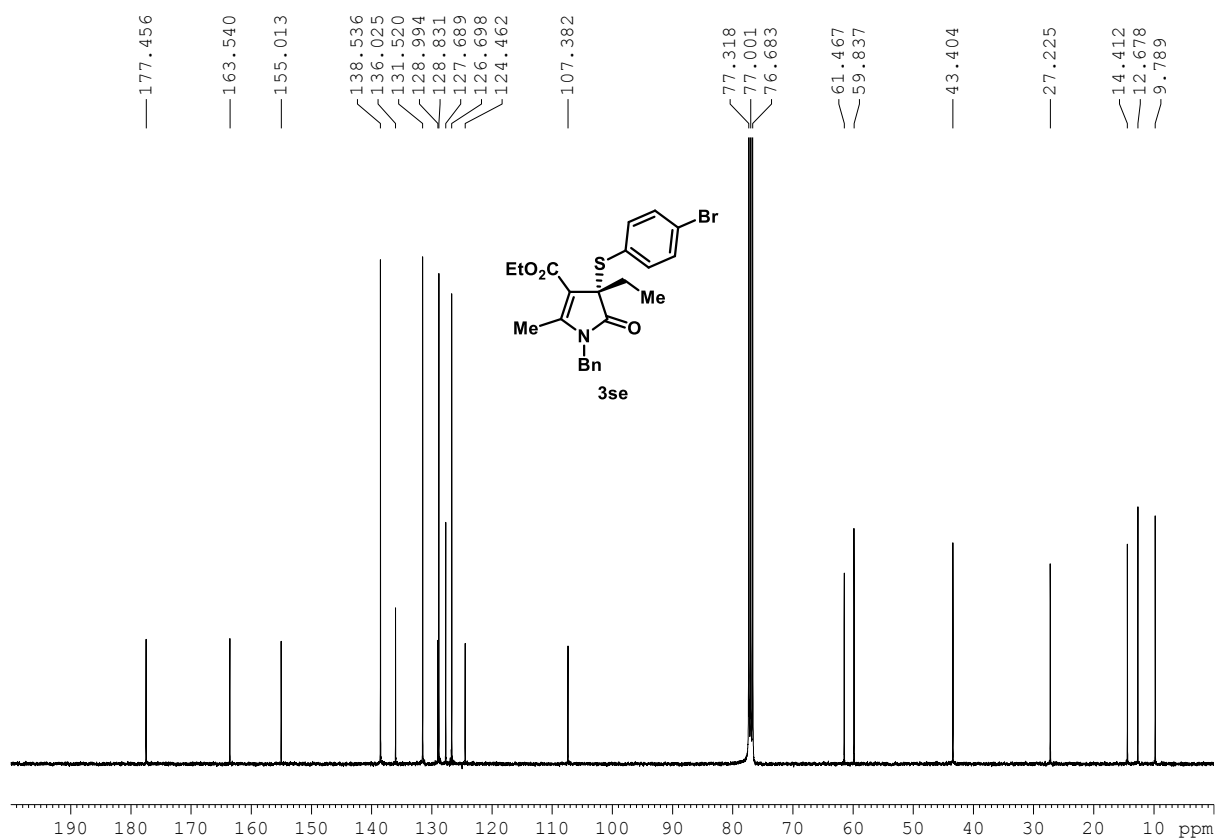
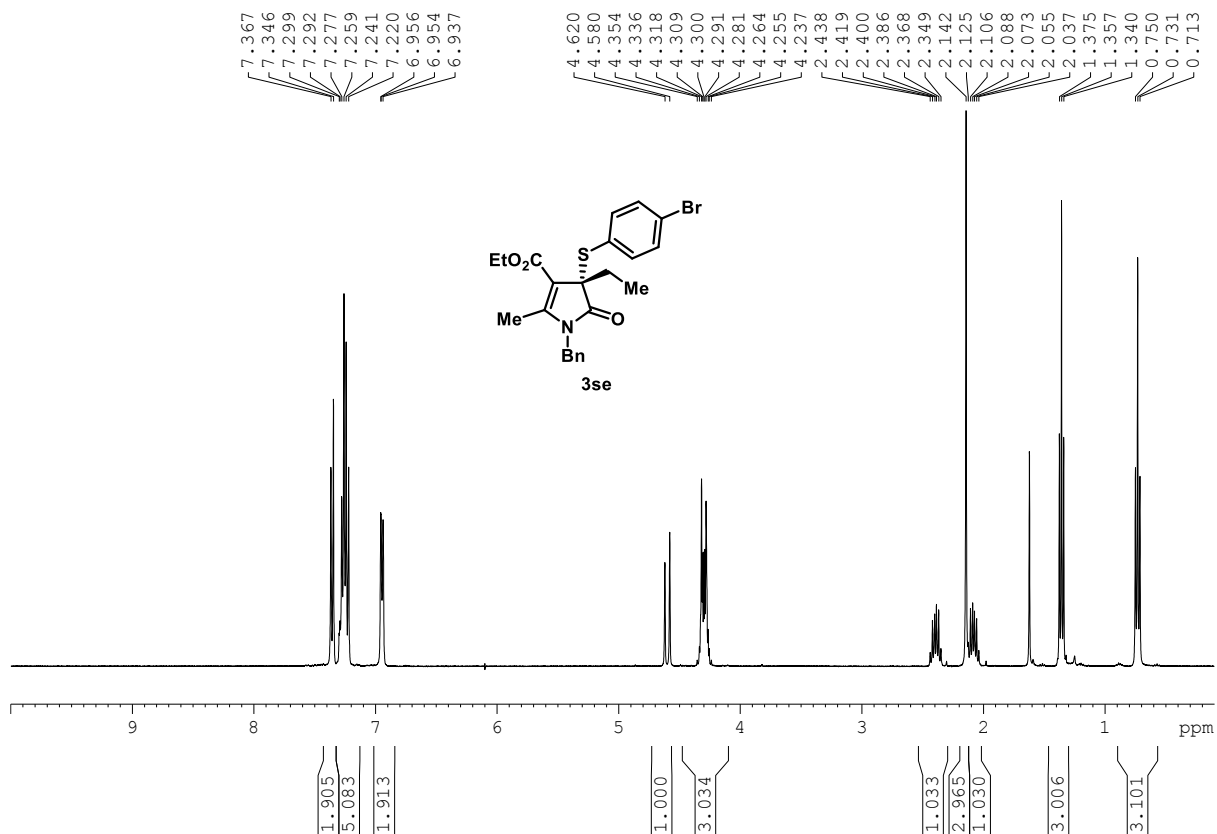
Daicel Chiralpak AD-H column, 220 nm, *n*-Hexane/EtOH = 70:30, 1.0 mL min⁻¹, 20 °C

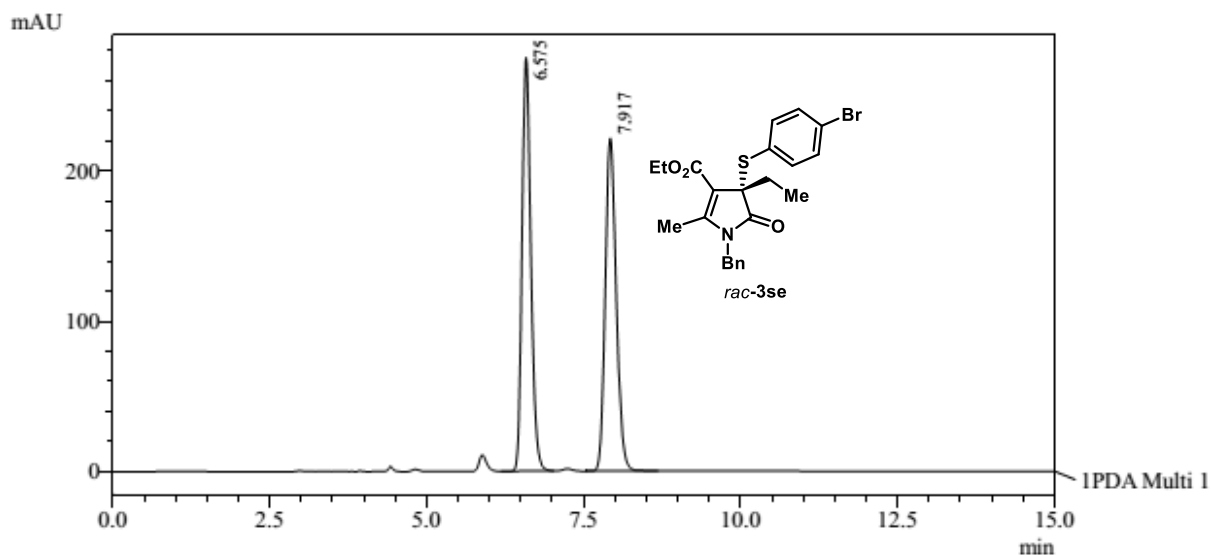


PeakTable

PDA Ch1 220nm 4nm

| Peak# | Ret. Time | Area | Area % |
|-------|-----------|----------|---------|
| 1 | 5.693 | 3650162 | 8.050 |
| 2 | 6.998 | 41694337 | 91.950 |
| Total | | 45344500 | 100.000 |





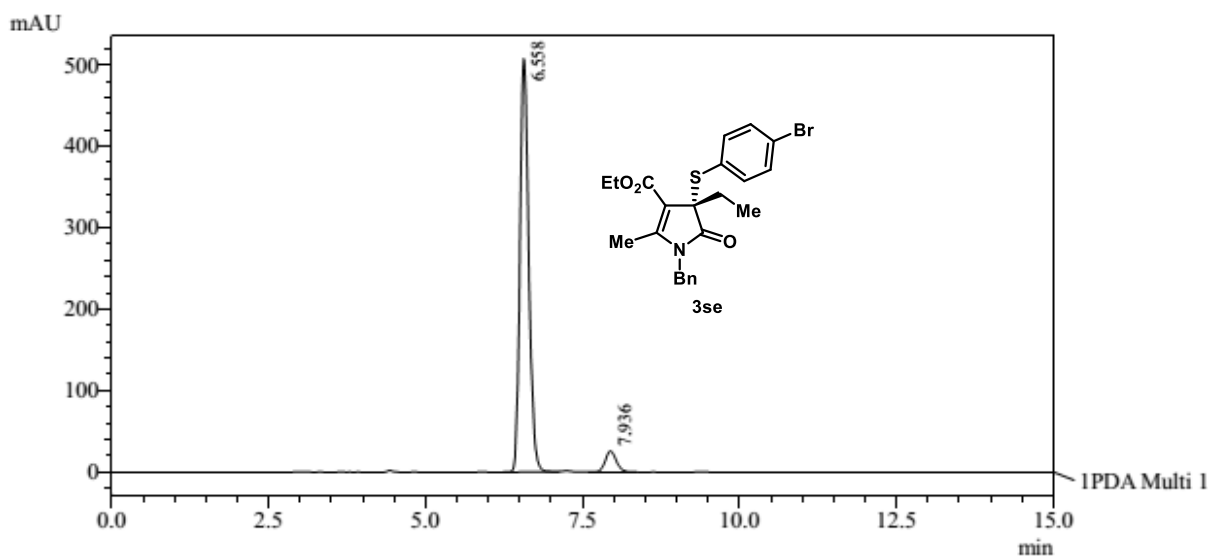
1 PDA Multi 1 / 254nm 4nm

PeakTable

PDA Ch1 254nm 4nm

| Peak# | Ret. Time | Area | Area % |
|-------|-----------|---------|---------|
| 1 | 6.575 | 2693203 | 50.068 |
| 2 | 7.917 | 2685852 | 49.932 |
| Total | | 5379055 | 100.000 |

Daicel Chiralpak AD-H column, 254 nm, *n*-Hexane/EtOH = 80:20, 1.0 mL min⁻¹, 20 °C

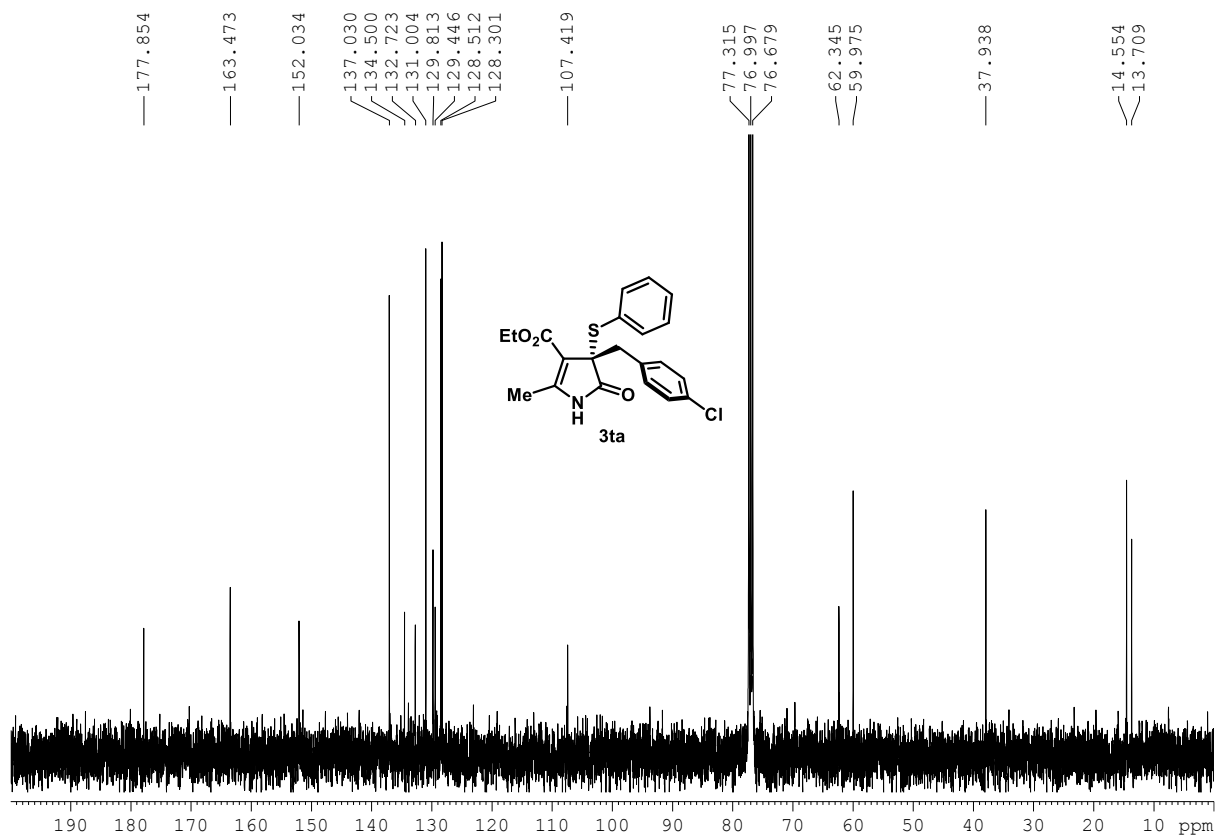
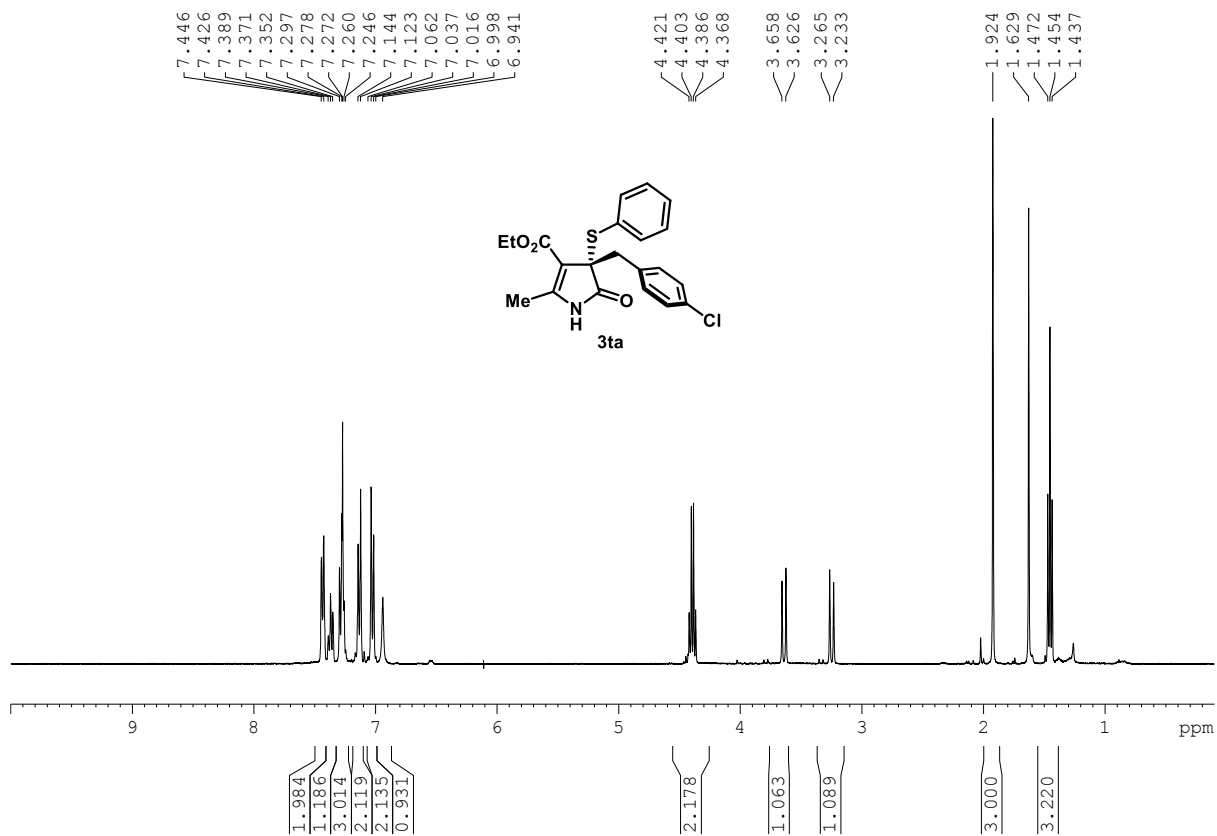


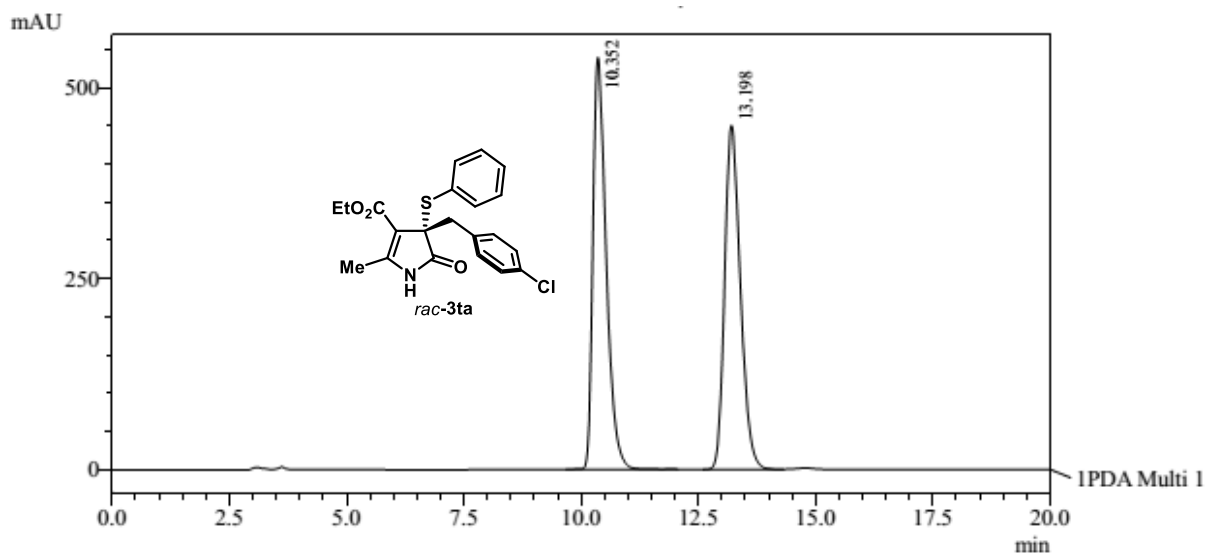
1 PDA Multi 1 / 254nm 4nm

PeakTable

PDA Ch1 254nm 4nm

| Peak# | Ret. Time | Area | Area % |
|-------|-----------|---------|---------|
| 1 | 6.558 | 4921134 | 93.973 |
| 2 | 7.936 | 315623 | 6.027 |
| Total | | 5236757 | 100.000 |





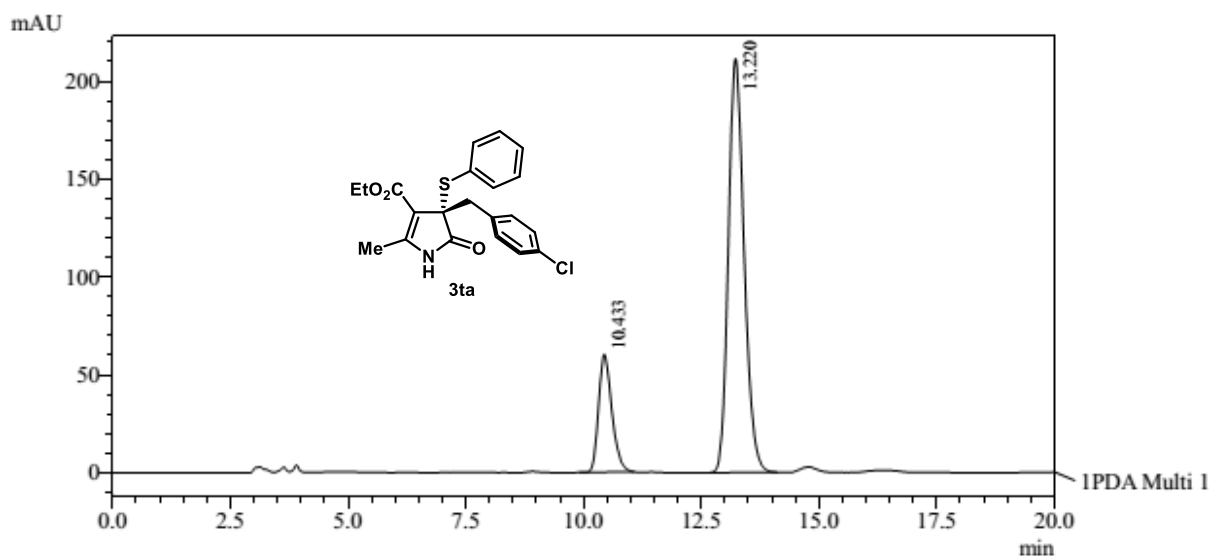
1 PDA Multi 1 / 230nm 4nm

PeakTable

PDA Ch1 230nm 4nm

| Peak# | Ret. Time | Area | Area % |
|-------|-----------|----------|---------|
| 1 | 10.352 | 10581471 | 50.257 |
| 2 | 13.198 | 10473143 | 49.743 |
| Total | | 21054614 | 100.000 |

Daicel Chiralpak AD-H column, 230 nm, *n*-Hexane/IPA = 90:10, 1.0 mL min⁻¹, 20 °C

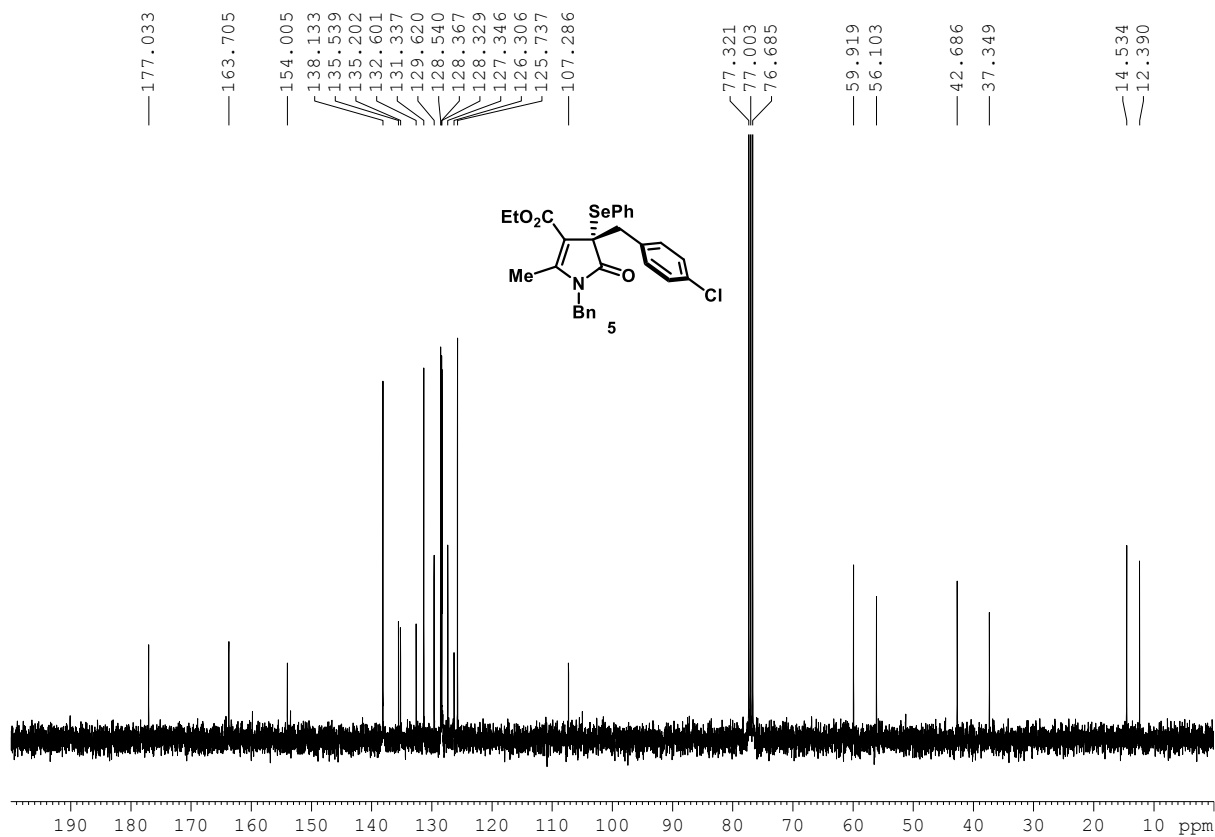
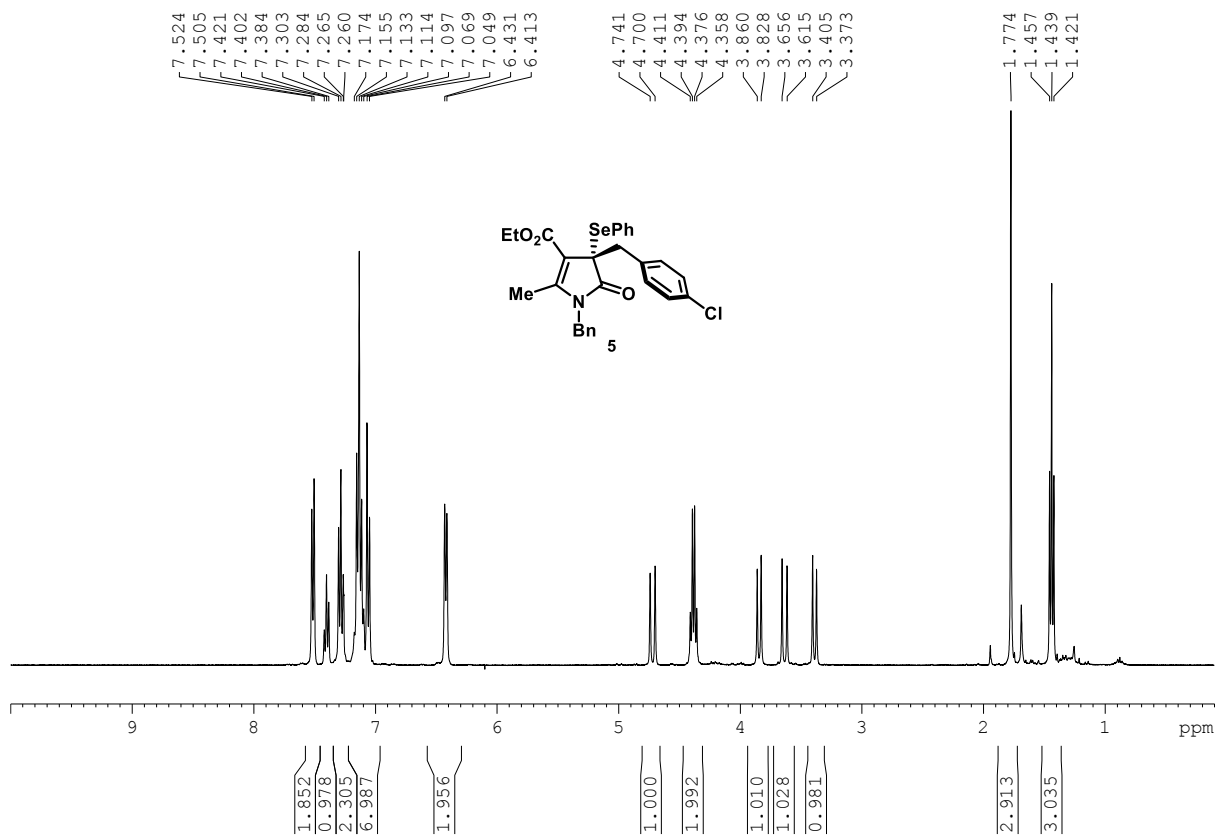


1 PDA Multi 1 / 230nm 4nm

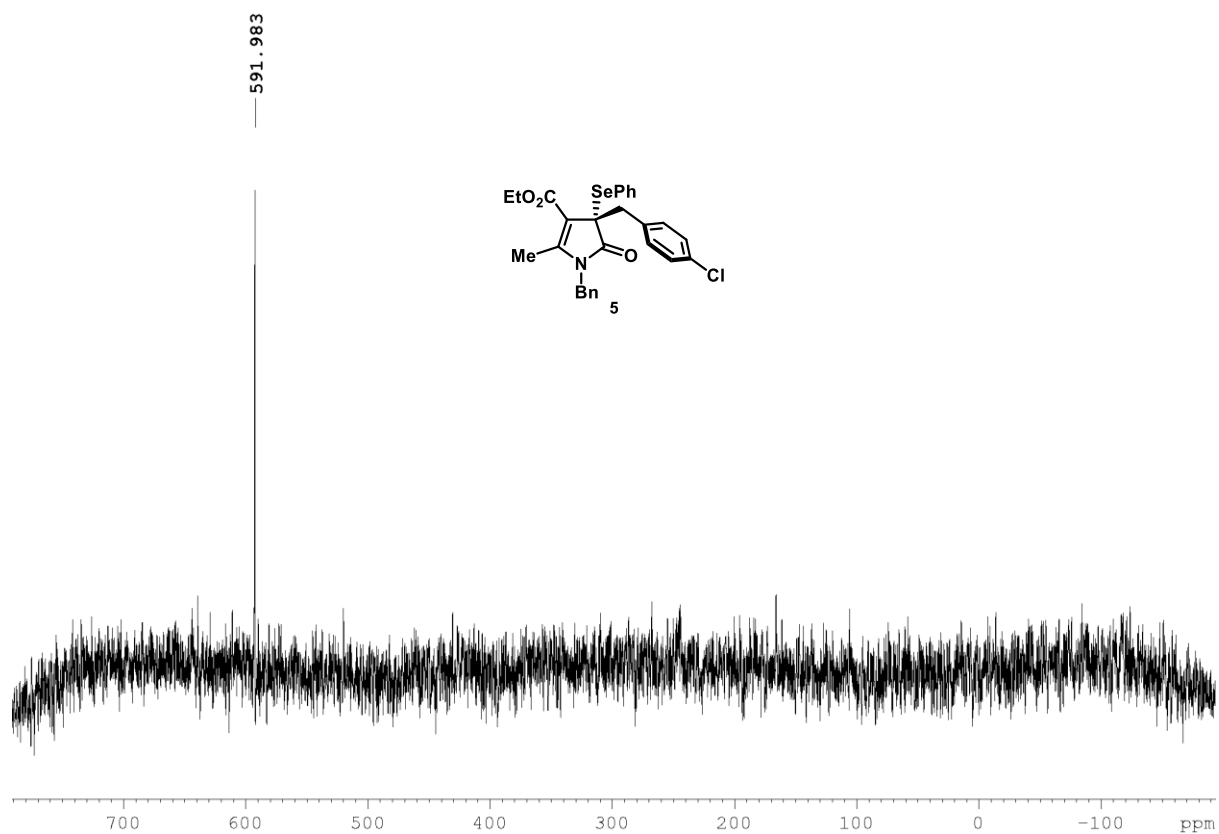
PeakTable

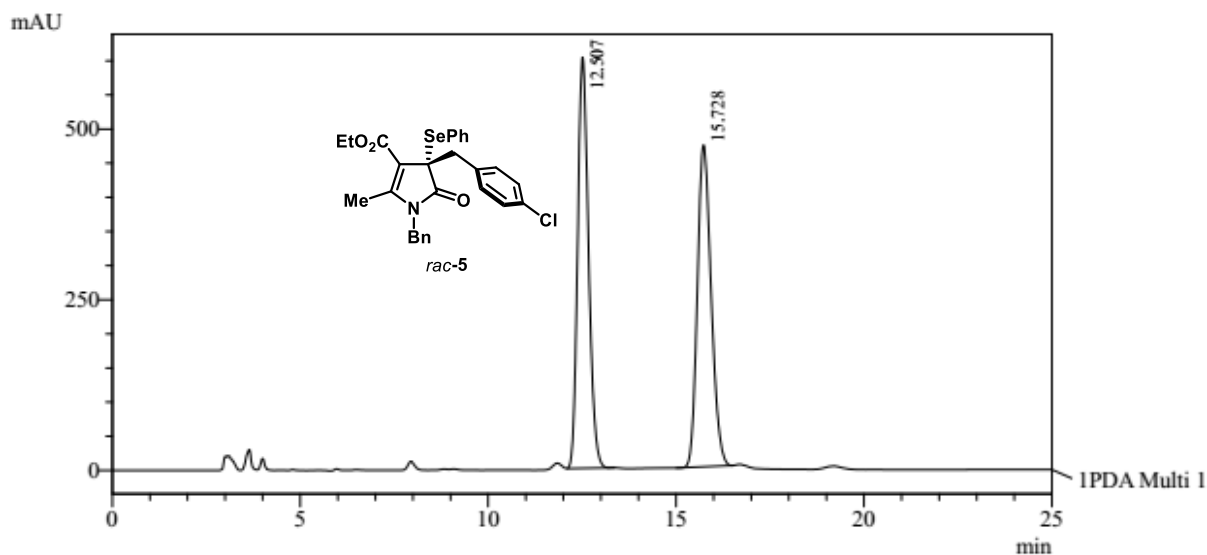
PDA Ch1 230nm 4nm

| Peak# | Ret. Time | Area | Area % |
|-------|-----------|---------|---------|
| 1 | 10.433 | 1178431 | 19.350 |
| 2 | 13.220 | 4911657 | 80.650 |
| Total | | 6090087 | 100.000 |



Proton decoupled ^{77}Se NMR spectra of **5**:





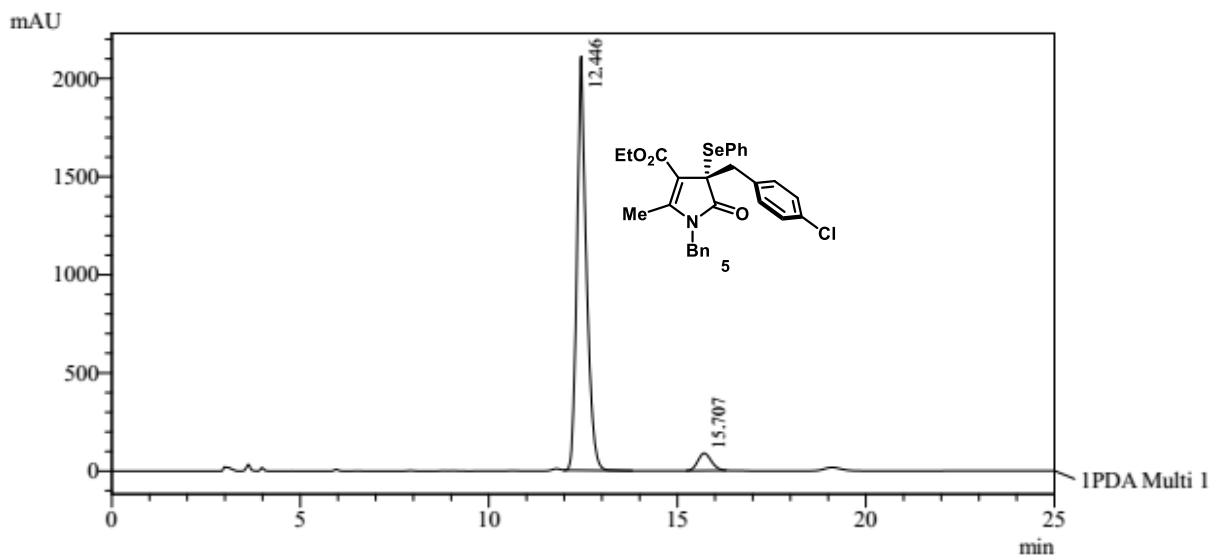
1 PDA Multi 1 / 210nm 4nm

PeakTable

PDA Ch1 210nm 4nm

| Peak# | Ret. Time | Area | Area % |
|-------|-----------|----------|---------|
| 1 | 12.507 | 12066696 | 50.170 |
| 2 | 15.728 | 11984704 | 49.830 |
| Total | | 24051401 | 100.000 |

Daicel Chiralpak AD-H column, 210 nm, *n*-Hexane/IPA = 90:10, 1.0 mL min⁻¹, 20 °C

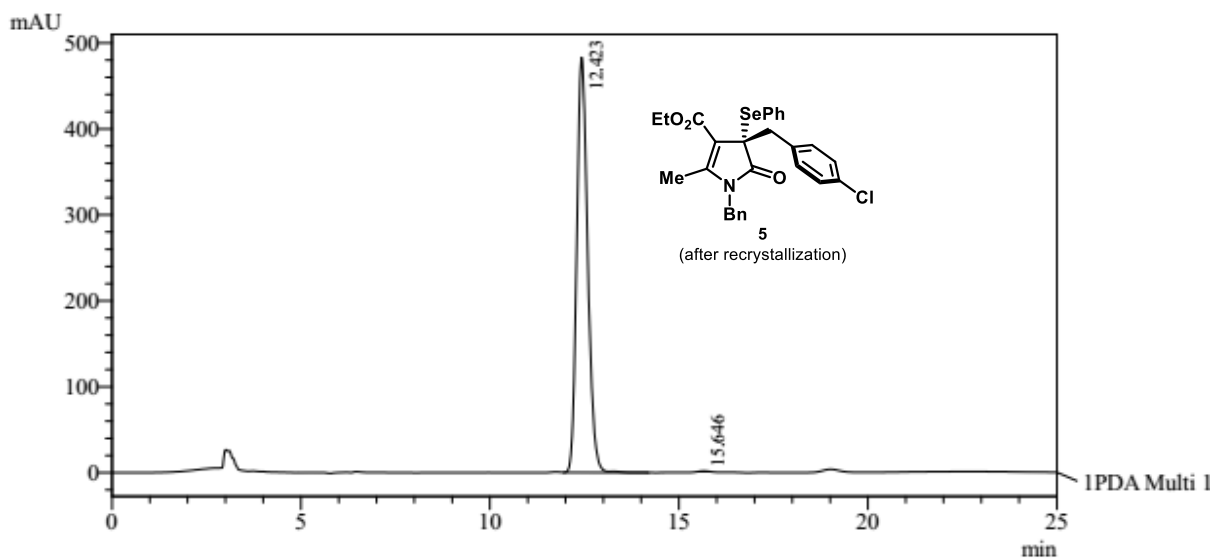


1 PDA Multi 1 / 210nm 4nm

PeakTable

PDA Ch1 210nm 4nm

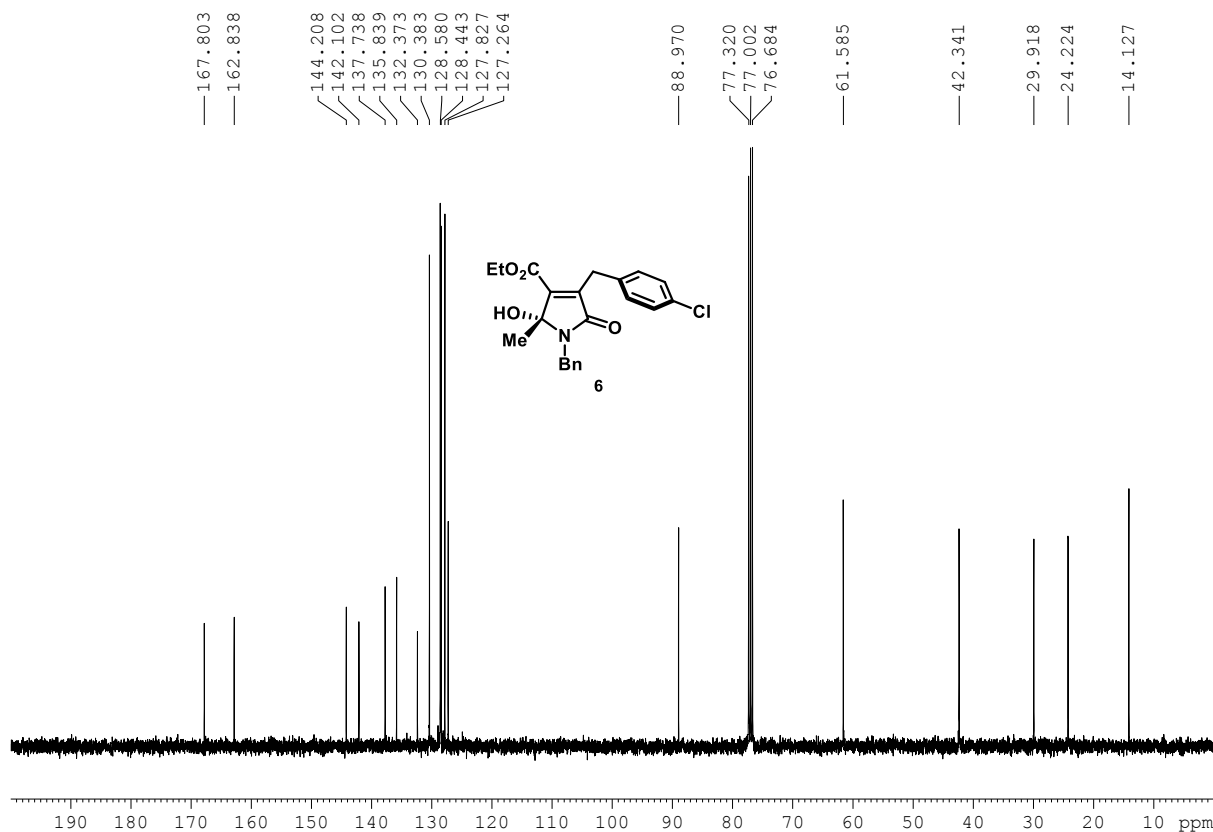
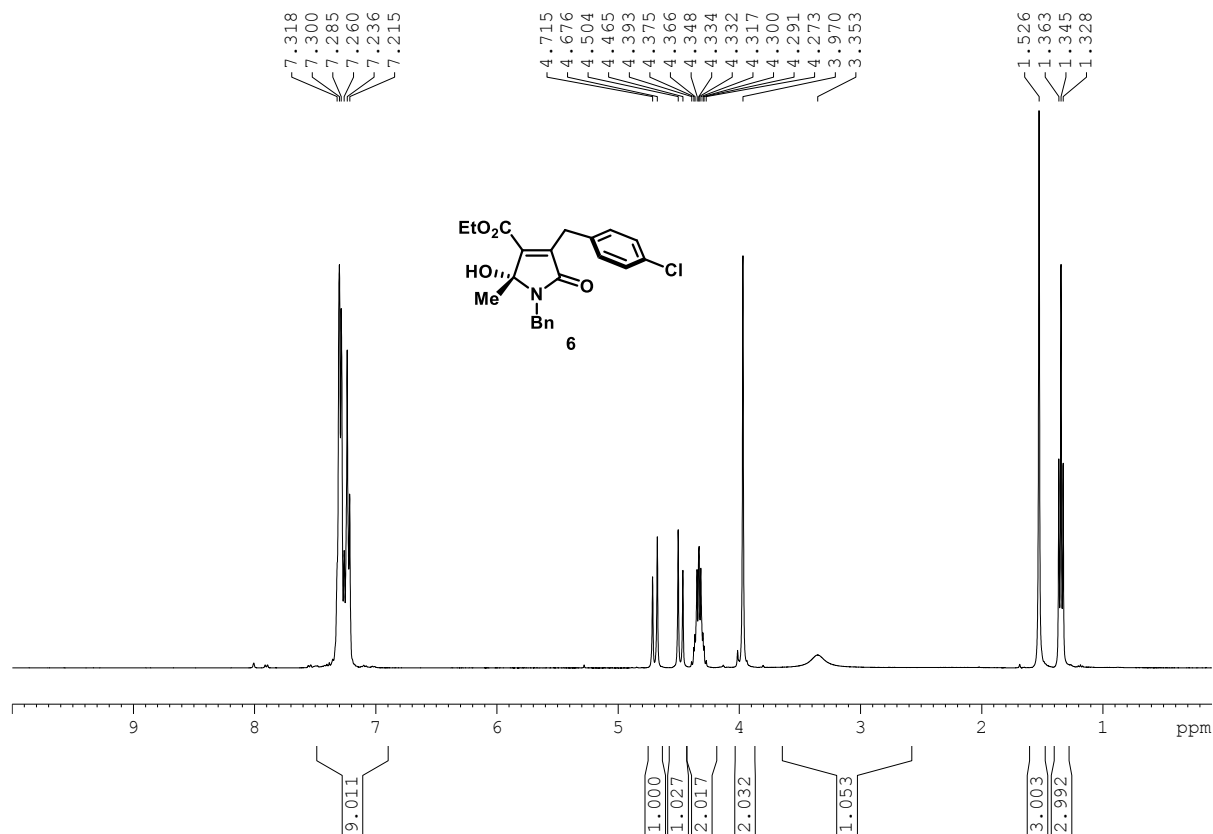
| Peak# | Ret. Time | Area | Area % |
|-------|-----------|----------|---------|
| 1 | 12.446 | 36242982 | 94.325 |
| 2 | 15.707 | 2180352 | 5.675 |
| Total | | 38423333 | 100.000 |

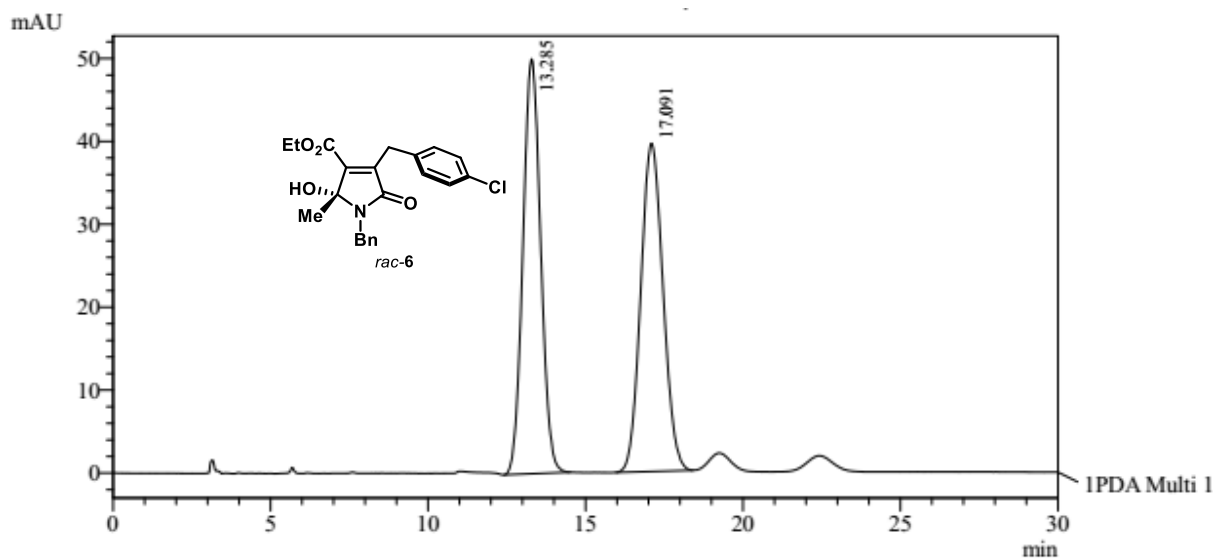


PeakTable

PDA Ch1 210nm 4nm

| Peak# | Ret. Time | Area | Area % |
|-------|-----------|---------|---------|
| 1 | 12.423 | 9721398 | 99.934 |
| 2 | 15.646 | 6385 | 0.066 |
| Total | | 9727783 | 100.000 |





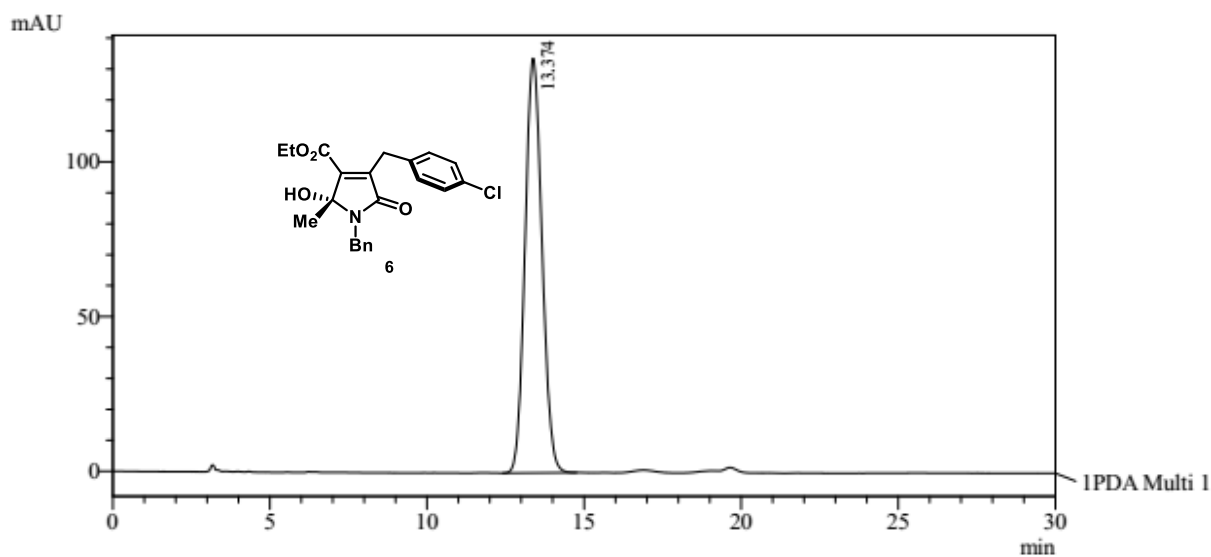
1 PDA Multi 1 / 254nm 4nm

PeakTable

PDA Ch1 254nm 4nm

| Peak# | Ret. Time | Area | Area % |
|-------|-----------|---------|---------|
| 1 | 13.285 | 1954137 | 50.135 |
| 2 | 17.091 | 1943645 | 49.865 |
| Total | | 3897783 | 100.000 |

Daicel Chiralpak AS-H column, 254 nm, *n*-Hexane/IPA = 93:7, 1.0 mL min⁻¹, 20 °C

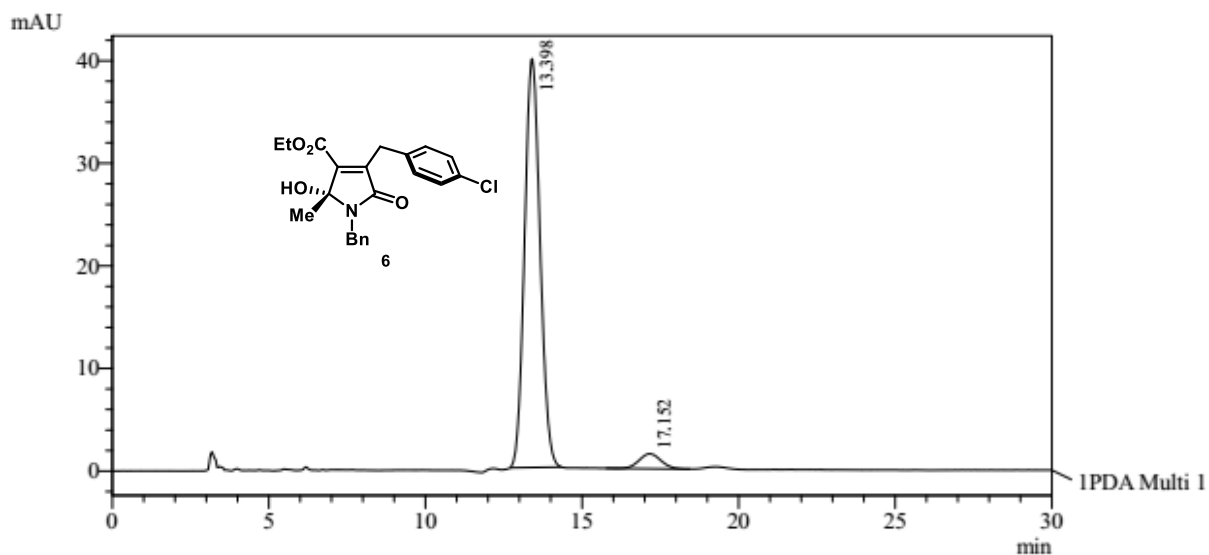


1 PDA Multi 1 / 254nm 4nm

PeakTable

PDA Ch1 254nm 4nm

| Peak# | Ret. Time | Area | Area % |
|-------|-----------|---------|---------|
| 1 | 13.374 | 5041705 | 100.000 |
| Total | | 5041705 | 100.000 |

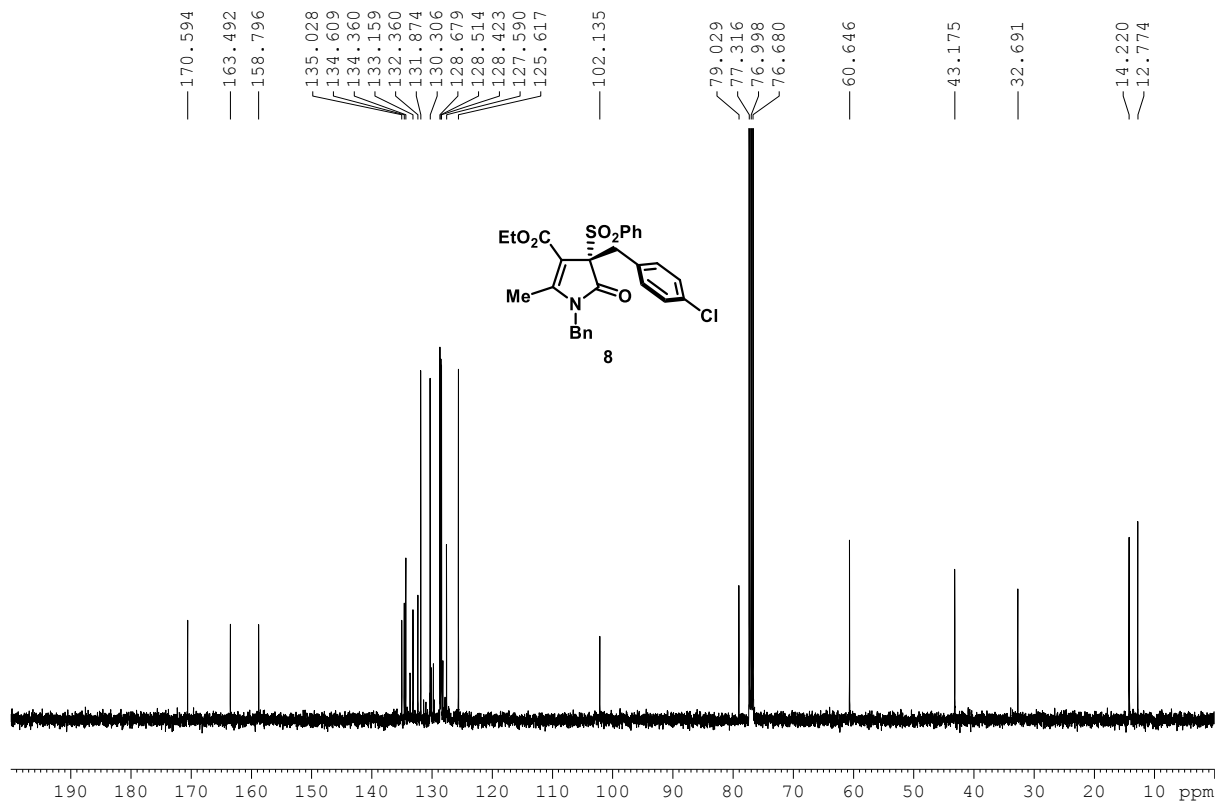
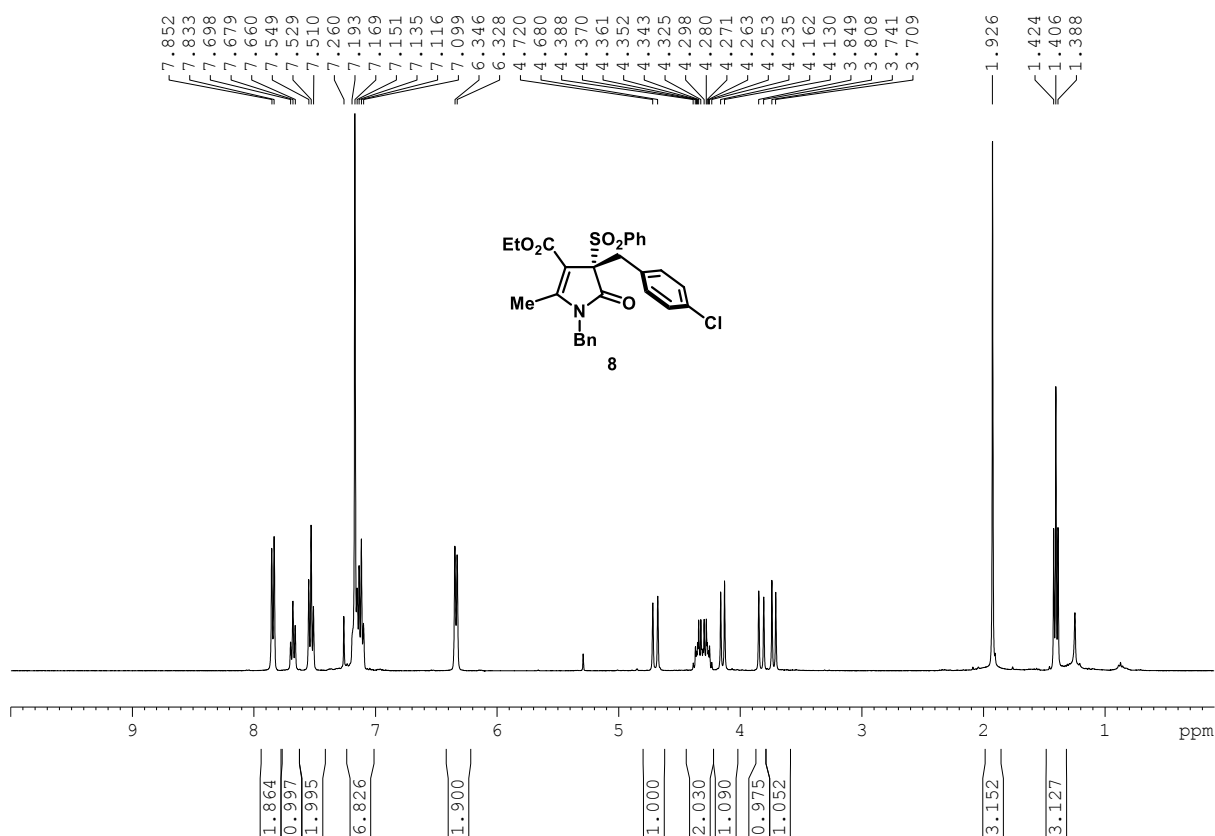


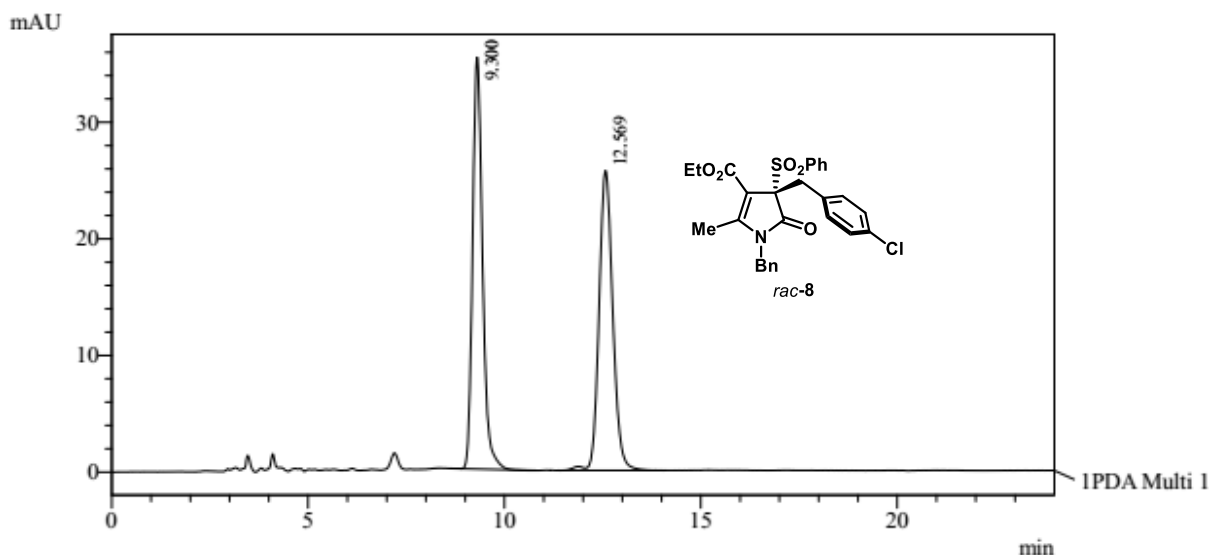
1 PDA Multi 1 / 254nm 4nm

PeakTable

PDA Ch1 254nm 4nm

| Peak# | Ret. Time | Area | Area % |
|-------|-----------|---------|---------|
| 1 | 13.398 | 1372857 | 95.149 |
| 2 | 17.152 | 69994 | 4.851 |
| Total | | 1442852 | 100.000 |





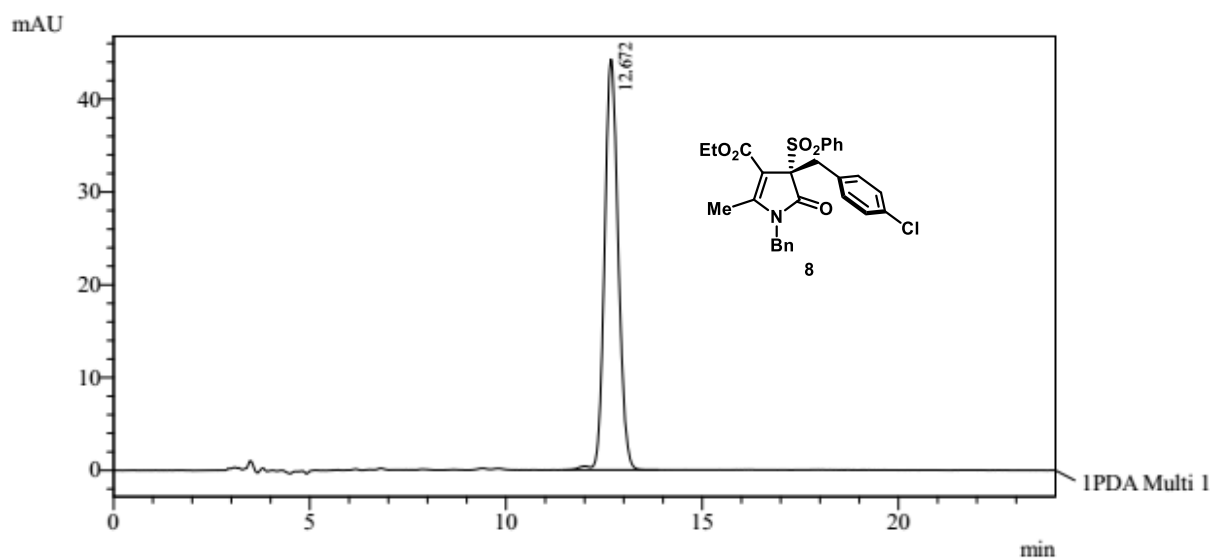
1 PDA Multi 1 / 254nm 4nm

PeakTable

PDA Ch1 254nm 4nm

| Peak# | Ret. Time | Area | Area % |
|-------|-----------|---------|---------|
| 1 | 9.300 | 621513 | 49.764 |
| 2 | 12.569 | 627398 | 50.236 |
| Total | | 1248910 | 100.000 |

Daicel Chiralpak AD-H column, 254 nm, *n*-Hexane/EtOH = 65:35, 1.0 mL min⁻¹, 20 °C



1 PDA Multi 1 / 254nm 4nm

PeakTable

PDA Ch1 254nm 4nm

| Peak# | Ret. Time | Area | Area % |
|-------|-----------|---------|---------|
| 1 | 12.672 | 1068941 | 100.000 |
| Total | | 1068941 | 100.000 |