



Supporting Information

for

Organocatalytic asymmetric Michael/acyl transfer reaction between α -nitroketones and 4-arylidene-pyrrolidine-2,3-diones

Chandrakanta Parida and Subhas Chandra Pan

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Experimental part

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1. General information

Chemicals and solvents were purchased from commercial suppliers and were used as received. ^1H NMR spectra were recorded at 400 MHz, 500MHz, and 600 MHz; ^{13}C NMR spectra were recorded at 100 MHz and 150 MHz. Chemical shifts are reported in parts per million (ppm), and the residual solvent peak was used as an internal reference: proton (chloroform δ 7.260), carbon (chloroform δ 77.23). Multiplicity was indicated as follows: s (singlet), d (doublet), t (triplet), q (quartet), m (multiplet), dd (doublet of doublet), brs (broad singlet). Coupling constants were reported in hertz (Hz). ESI was used for HRMS spectra. Enantiomeric ratios were determined by HPLC analysis performed on Chiral columns using a Daicel Chiralpak IA, IF, ID and AD-H column. For visualizing the products UV light and I_2 were used. Silica gel (60–120 mesh) was used for the column chromatography. Reactions were monitored by TLC on silica gel 60 F254 (0.25 mm).

2. Procedure for the synthesis of 4-arylidene-pyrrolidine-2,3-diones¹

4-Arylidene-pyrrolidine-2,3-diones were prepared according to reported procedures.

3. Procedure for the synthesis of α -nitroketone²

α -Nitroketone was prepared according to reported procedures.

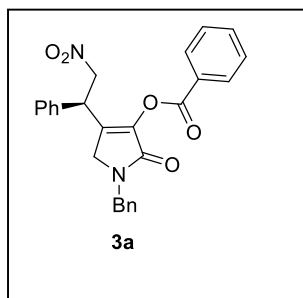
4. General procedure for the synthesis of compounds 3 and 5

In an oven-dried round-bottomed flask, compound **1a** (27.7 mg, 0.1 mmol), **2a** (16.5 mg, 0.1 mmol) and 10 mol % of catalyst **VII** were placed. Then, 0.6 mL 1,2-DCE was added and the reaction mixture was stirred at room temperature for 12 h. The progress of the reaction was monitored by TLC. After completion, the mixture was concentrated and directly purified by column chromatography on silica gel eluting with hexane/ethyl acetate (10–12%) to afford the desired product **3a–w**.

In an oven-dried round-bottomed flask, compound **4a** (19 mg, 0.1 mmol), **2a** (16.5 mg, 0.1 mmol) and 10 mol % of catalyst **VII** were placed. Then, 0.6 mL 1,2-DCE was added and the reaction mixture was stirred at room temperature for 12 h. The progress of the reaction was monitored by TLC. After completion the mixture was concentrated and directly purified by column chromatography on silica gel eluting with DCM to afford the desired product **5a–c**.

5. Characterization of the products

(R)-1-Benzyl-4-(2-nitro-1-phenylethyl)-2-oxo-2,5-dihydro-1H-pyrrol-3-yl benzoate (3a)



Yellow sticky, 80% (35mg) yield. ^1H NMR (400 MHz, CDCl_3) δ 8.21 – 8.15 (m, 2H), 7.70 – 7.64 (m, 1H), 7.53 (t, J = 7.8 Hz, 2H), 7.37 – 7.27 (m, 6H), 7.22 (ddd, J = 7.8, 3.7, 1.6 Hz, 4H), 4.99 (dd, J = 13.5, 8.0 Hz, 1H), 4.78 (dd, J = 13.5, 8.0 Hz, 1H), 4.66 (d, J = 15.1 Hz, 1H), 4.60 (t, J = 7.9 Hz, 1H), 4.52 (d, J = 15.1 Hz, 1H), 3.70 (s, 2H). ^{13}C NMR (100 MHz, CDCl_3) δ 164.44, 163.89, 140.87, 136.49, 136.16, 135.91, 134.56, 130.90, 129.78, 129.12, 128.97, 128.88, 128.26, 128.07, 127.99, 127.86, 77.00, 48.96, 46.99, 42.76.

ESI HRMS: calcd. For $\text{C}_{26}\text{H}_{22}\text{N}_2\text{O}_5$ $[\text{M}+\text{H}]^+$ 443.1601, found 443.1601.

HPLC Analysis: ee 90%, IF column, *n*-hexane/*i*PrOH 70:30, flow rate 1.0 mL/min, λ = 220 nm (t_{major} = 20.9 min, t_{minor} = 23.3 min).

From literature study, the optical rotation of the compound 3a is $[\alpha]_{\text{D}}^{20}$ = 30.69 (c 1.03, CHCl_3 , 25.1 $^\circ\text{C}$).³

This sample was measured on an Autopol I, Serial #35386
Manufactured by Rudolph Research Analytical, Hackettstown, NJ, USA.

Measurement Date : Friday, 12-MAR-2021

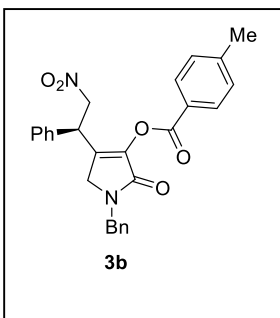
Set Temperature : OFF

Time Delay : Disabled

n	Average		Std.Dev.	% RSD	Maximum		Minimum	
5	-35.00		3.70	-10.57	-31.67		-41.11	
S.No	Sample ID	Time	Result	Scale	OR °Arc	WLG.nm	Lg.mm	Temp.
1	mm acyl1	02:30 PM	-41.11	SR	-0.074	589	100.00	27.5
2	mm acyl1	02:30 PM	-33.89	SR	-0.061	589	100.00	27.5
3	mm acyl1	02:30 PM	-32.78	SR	-0.059	589	100.00	27.5
4	mm acyl1	02:30 PM	-31.67	SR	-0.057	589	100.00	27.5
5	mm acyl1	02:31 PM	-35.56	SR	-0.064	589	100.00	27.5

$[\alpha]_{\text{D}}^{20}$ = -35.00 (c 1.03, CHCl_3 , 27.5 $^\circ\text{C}$)

(R)-1-Benzyl-4-(2-nitro-1-phenylethyl)-2-oxo-2,5-dihydro-1H-pyrrol-3-yl 4-methylbenzoate (3b).



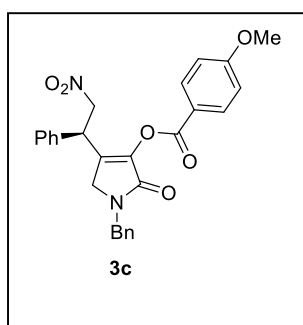
Light orange sticky, 80% (36mg) yield. ^1H NMR (400 MHz, CDCl_3) δ 8.07 (d, J = 8.2 Hz, 2H), 7.41 – 7.26 (m, 8H), 7.26 – 7.15 (m, 4H), 4.98 (dd, J = 13.5, 7.9 Hz, 1H), 4.77 (dd, J = 13.5, 8.0 Hz, 1H), 4.67 (d, J = 15.1 Hz, 1H), 4.57 (t, J = 8.0 Hz, 1H), 4.51 (d, J = 15.1 Hz, 1H), 3.69 (d, J = 3.0 Hz, 2H), 2.46 (s, 3H). ^{13}C NMR (100 MHz, CDCl_3) δ 164.51, 163.95, 145.62, 140.87, 136.51, 136.00, 135.95, 130.98,

129.78, 129.70, 129.11, 128.88, 128.26, 128.06, 127.88, 125.16, 76.91, 48.96, 46.95, 42.81, 22.08.

ESI HRMS: calcd. For $C_{27}H_{24}N_2O_5$ $[M+H]^+$ 457.1758, found 457.1758.

HPLC Analysis: ee 88%, IF column, *n*-hexane/*i*PrOH 70:30, flow rate 1.0 mL/min, λ = 220 nm (t_{major} = 24.6 min, t_{minor} = 26.5 min).

(*R*)-1-Benzyl-4-(2-nitro-1-phenylethyl)-2-oxo-2,5-dihydro-1*H*-pyrrol-3-yl 4-methoxybenzoate (3c).



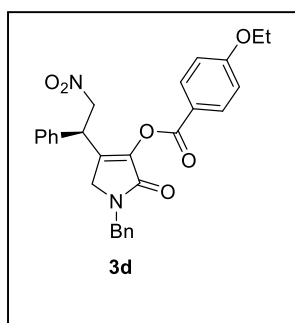
Colourless sticky solid, 82% (38mg) yield. **1H NMR (400 MHz, $CDCl_3$)** δ 8.13 (d, J = 8.9 Hz, 2H), 7.42 – 7.27 (m, 6H), 7.22 (dt, J = 10.5, 4.1 Hz, 4H), 7.04 – 6.96 (m, 2H), 4.99 (dd, J = 13.5, 7.9 Hz, 1H), 4.77 (dd, J = 13.5, 8.0 Hz, 1H), 4.67 (d, J = 15.0 Hz, 1H), 4.57 (t, J = 8.0 Hz, 1H), 4.50 (d, J = 15.1 Hz, 1H), 3.91 (s, 3H), 3.68 (d, J = 3.1 Hz, 2H). **^{13}C NMR (100 MHz, $CDCl_3$)** δ 164.74, 164.61, 163.59, 140.88, 136.51, 135.97, 135.95, 133.15, 129.75, 129.09,

128.85, 128.25, 128.04, 127.89, 120.14, 114.28, 76.91, 55.79, 48.95, 46.93, 42.80.

ESI HRMS: calcd. For $C_{27}H_{24}N_2O_6$ $[M+H]^+$ 473.1707, found 473.1707.

HPLC Analysis: ee 80%, Chiralpak IA column, *n*-hexane/*i*PrOH 80:20, flow rate 1.0 mL/min, λ = 254 nm (t_{major} = 43.5 min, t_{minor} = 47.4 min).

(*R*)-1-Benzyl-4-(2-nitro-1-phenylethyl)-2-oxo-2,5-dihydro-1*H*-pyrrol-3-yl 4-ethoxybenzoate (3d).



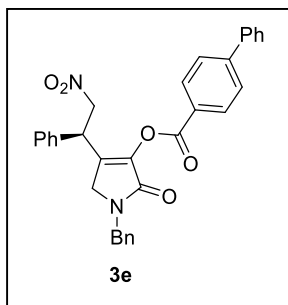
Pale yellow semi solid, 78% (38mg) yield. **1H NMR (400 MHz, $CDCl_3$)** δ 8.12 (d, J = 8.9 Hz, 2H), 7.38 – 7.26 (m, 6H), 7.25 – 7.18 (m, 4H), 6.98 (d, J = 8.9 Hz, 2H), 4.96 (s, 1H), 4.78 (s, 1H), 4.65 (s, 1H), 4.57 (s, 1H), 4.52 (s, 1H), 4.13 (d, J = 7.0 Hz, 2H), 3.68 (d, J = 3.4 Hz, 2H), 1.46 (s, 3H). **^{13}C NMR (100 MHz, $CDCl_3$)** δ 164.64, 164.18, 163.64, 140.90, 136.52, 135.99, 135.93, 133.15, 129.76, 129.09, 128.85, 128.25, 128.04, 127.90, 119.88, 114.70, 76.91, 64.11,

48.95, 46.94, 42.82, 14.85.

ESI HRMS: calcd. For $C_{28}H_{26}N_2O_6$ $[M+H]^+$ 487.1864, found 487.1863.

HPLC Analysis: ee 80%, Chiralpak IA column, *n*-hexane/*i*PrOH 80:20, flow rate 1.0 mL/min, λ = 254 nm (t_{major} = 38.6 min, t_{minor} = 44.5 min).

(R)-1-Benzyl-4-(2-nitro-1-phenylethyl)-2-oxo-2,5-dihydro-1H-pyrrol-3-yl [1,1'-biphenyl]-4-carboxylate (3e)

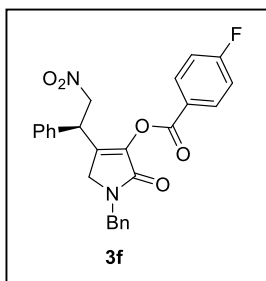


Light yellow sticky solid, 82% (42mg) yield. **¹H NMR (400 MHz, CDCl₃)** δ 8.28 – 8.23 (m, 2H), 7.78 – 7.73 (m, 2H), 7.67 (dd, J = 5.2, 3.3 Hz, 2H), 7.54 – 7.47 (m, 2H), 7.46 – 7.41 (m, 1H), 7.37 – 7.28 (m, 6H), 7.23 (dt, J = 10.8, 4.1 Hz, 4H), 5.01 (dd, J = 13.5, 8.0 Hz, 1H), 4.79 (dd, J = 13.5, 7.9 Hz, 1H), 4.68 (d, J = 15.1 Hz, 1H), 4.61 (t, J = 8.0 Hz, 1H), 4.53 (d, J = 15.1 Hz, 1H), 3.71 (d, J = 2.2 Hz, 2H). **¹³C NMR (100 MHz, CDCl₃)** δ 164.51, 163.82, 147.36, 140.88, 139.94, 136.48, 136.11, 135.90, 131.46, 129.81, 129.23, 129.13, 128.92, 128.68, 128.27, 128.09, 127.89, 127.64, 127.61, 126.58, 77.43, 48.98, 46.98, 42.80.

ESI HRMS: calcd. For C₃₂H₂₆N₂O₅ [M+H]⁺ 519.1914, found 519.1914.

HPLC Analysis: ee 82%, Chiralpak IA column, *n*-hexane/*i*PrOH 80:20, flow rate 1.0 mL/min, λ = 254 nm (*t*_{major} = 45.7 min, *t*_{minor} = 51.5 min).

(R)-1-Benzyl-4-(2-nitro-1-phenylethyl)-2-oxo-2,5-dihydro-1H-pyrrol-3-yl 4-fluorobenzoate (3f)

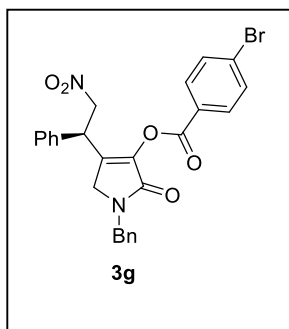


Yellow semi solid, 79% (36mg) yield. **¹H NMR (400 MHz, CDCl₃)** δ 8.26 – 8.12 (m, 2H), 7.38 – 7.27 (m, 6H), 7.26 – 7.14 (m, 6H), 4.97 (dd, J = 13.5, 8.3 Hz, 1H), 4.76 (dd, J = 13.5, 7.6 Hz, 1H), 4.67 (d, J = 15.0 Hz, 1H), 4.61 (d, J = 8.0 Hz, 1H), 4.52 (d, J = 15.1 Hz, 1H), 3.70 (s, 2H). **¹³C NMR (100 MHz, CDCl₃)** ¹³C NMR (101 MHz, CDCl₃) δ 168.12, 165.57, 164.34, 162.92, 140.73, 136.41, 136.20, 135.77, 133.69, 133.59, 129.82, 129.14, 128.94, 128.25, 128.11, 127.84, 124.22, 124.19, 116.40, 116.18, 77.43, 48.94, 46.98, 42.70.

ESI HRMS: calcd. For C₂₆H₂₁FN₂O₅ [M+H]⁺ 461.1507, found 461.1506.

HPLC Analysis: ee 90%, Chiralpak IF column, *n*-hexane/*i*PrOH 80:20, flow rate 1.0 mL/min, λ = 220 nm (*t*_{major} = 39.3 min, *t*_{minor} = 42.7 min).

(R)-1-Benzyl-4-(2-nitro-1-phenylethyl)-2-oxo-2,5-dihydro-1H-pyrrol-3-yl 4-bromobenzoate (3g)

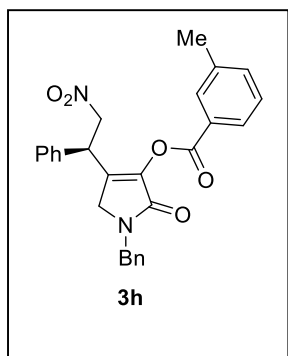


Light yellow sticky solid, 78% (40mg) yield. **¹H NMR (400 MHz, CDCl₃)** δ 8.03 (d, J = 8.6 Hz, 2H), 7.68 (d, J = 8.6 Hz, 2H), 7.38 – 7.26 (m, 6H), 7.21 (d, J = 6.9 Hz, 4H), 4.96 (dd, J = 13.5, 8.4 Hz, 1H), 4.75 (dd, J = 13.5, 7.5 Hz, 1H), 4.66 (d, J = 15.0 Hz, 1H), 4.60 (t, J = 8.0 Hz, 1H), 4.52 (d, J = 15.1 Hz, 1H), 3.70 (s, 2H). **¹³C NMR (100 MHz, CDCl₃)** δ 164.26, 163.23, 140.72, 136.41, 136.27, 135.75, 132.40, 132.30, 130.03, 129.83, 129.15, 128.96, 128.26, 128.12, 127.83, 126.88, 77.43, 48.95, 47.01, 42.69.

ESI HRMS: calcd. For C₂₆H₂₁BrN₂O₅ [M+H]⁺ 521.0707, found 521.0708.

HPLC Analysis: ee 90%, Chiralpak IA column, *n*-hexane/*i*PrOH 80:20, flow rate 1.0 mL/min, λ = 254 nm (*t*_{major} = 43.6 min, *t*_{minor} = 47.9 min).

(R)-1-Benzyl-4-(2-nitro-1-phenylethyl)-2-oxo-2,5-dihydro-1H-pyrrol-3-yl 3-methylbenzoate (3h)

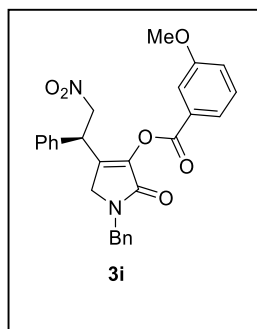


Yellow sticky, 70% (32mg) yield. **¹H NMR (600 MHz, CDCl₃)** δ 8.01 – 7.96 (m, 2H), 7.48 (d, J = 7.4 Hz, 1H), 7.42 (t, J = 7.6 Hz, 1H), 7.36 – 7.27 (m, 6H), 7.24 – 7.19 (m, 4H), 4.99 (dd, J = 13.5, 7.9 Hz, 1H), 4.78 (dd, J = 13.5, 8.1 Hz, 1H), 4.67 (d, J = 15.1 Hz, 1H), 4.58 (t, J = 8.0 Hz, 1H), 4.51 (d, J = 15.1 Hz, 1H), 3.70 (d, J = 5.5 Hz, 2H), 2.45 (s, 3H). **¹³C NMR (150 MHz, CDCl₃)** δ 164.45, 164.10, 140.79, 138.84, 136.46, 136.07, 135.87, 135.38, 131.41, 129.76, 129.09, 128.87, 128.85, 128.24, 128.05, 127.86, 127.78, 76.98, 48.94, 46.93, 42.76, 21.49.

ESI HRMS: calcd. For C₂₇H₂₄N₂O₅ [M+H]⁺ 457.1758, found 457.1757.

HPLC Analysis: ee 72%, Chiralpak IF column, *n*-hexane/*i*PrOH 70:30, flow rate 1.0 mL/min, λ = 220 nm (*t*_{major} = 21.0 min, *t*_{minor} = 23.3 min).

(R)-1-Benzyl-4-(2-nitro-1-phenylethyl)-2-oxo-2,5-dihydro-1H-pyrrol-3-yl 3-methoxybenzoate (3i)

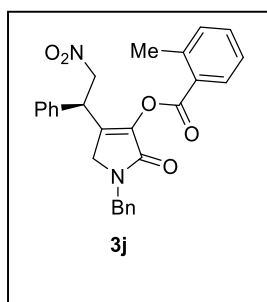


Orange semi solid 72% (34mg) yield. **¹H NMR (600 MHz, CDCl₃)** δ 7.79 (dt, J = 7.6, 1.2 Hz, 1H), 7.68 (dd, J = 2.7, 1.6 Hz, 1H), 7.43 (t, J = 8.0 Hz, 1H), 7.36 – 7.27 (m, 6H), 7.22 (ddd, J = 6.8, 4.6, 2.5 Hz, 5H), 5.00 (dd, J = 13.6, 8.3 Hz, 1H), 4.76 (dd, J = 13.6, 7.7 Hz, 1H), 4.68 (d, J = 15.1 Hz, 1H), 4.58 (t, J = 8.0 Hz, 1H), 4.51 (d, J = 15.1 Hz, 1H), 3.89 (s, 3H), 3.70 (d, J = 4.8 Hz, 2H). **¹³C NMR (150 MHz, CDCl₃)** δ 164.37, 163.79, 159.93, 140.79, 136.43, 136.07, 135.78, 129.98, 129.79, 129.10, 129.06, 128.90, 128.23, 128.06, 127.85, 123.36, 121.52, 114.82, 76.96, 55.76, 48.96, 46.93, 42.76.

ESI HRMS: calcd. For C₂₇H₂₄N₂O₆ [M+H]⁺ 473.1707, found 473.1714.

HPLC Analysis: ee 66%, Chiralpak IA column, *n*-hexane/*i*PrOH 70:30, flow rate 1.0 mL/min, λ = 220 nm (*t*_{major} = 22.4 min, *t*_{minor} = 18.5 min).

(R)-1-Benzyl-4-(2-nitro-1-phenylethyl)-2-oxo-2,5-dihydro-1H-pyrrol-3-yl 2-methylbenzoate (3j)

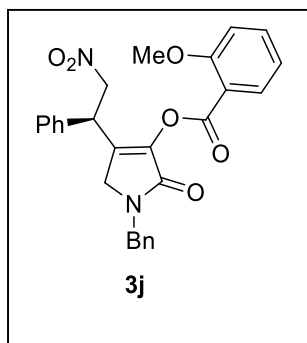


Pale yellow semi solid, 65% (29mg) yield. **¹H NMR (400 MHz, CDCl₃)** δ 8.14 (dd, J = 8.2, 1.5 Hz, 1H), 7.51 (td, J = 7.5, 1.5 Hz, 1H), 7.41 – 7.26 (m, 8H), 7.22 (ddd, J = 7.7, 4.0, 1.6 Hz, 4H), 5.00 (dd, J = 13.4, 7.8 Hz, 1H), 4.79 (dd, J = 13.4, 8.1 Hz, 1H), 4.67 (d, J = 15.1 Hz, 1H), 4.59 (t, J = 7.9 Hz, 1H), 4.53 (d, J = 15.0 Hz, 1H), 3.70 (d, J = 2.0 Hz, 2H), 2.70 (s, 3H). **¹³C NMR (100 MHz, CDCl₃)** δ 164.57, 164.15, 142.43, 140.91, 136.46, 136.00, 135.96, 133.71, 132.25, 131.94, 129.77, 129.12, 128.88, 128.27, 128.08, 127.85, 126.94, 126.31, 77.43, 48.97, 46.98, 42.71, 22.17.

ESI HRMS: calcd. For C₂₇H₂₄N₂O₅ [M+H]⁺ 457.1758, found 457.1757.

HPLC Analysis: ee 68%, Chiralpak ADH column, *n*-hexane/*i*PrOH 80:20, flow rate 1.0 mL/min, λ = 220 nm (*t*_{major} = 15.9 min, *t*_{minor} = 14.9 min).

(R)-1-Benzyl-4-(2-nitro-1-phenylethyl)-2-oxo-2,5-dihydro-1H-pyrrol-3-yl 2-methoxybenzoate (3k)

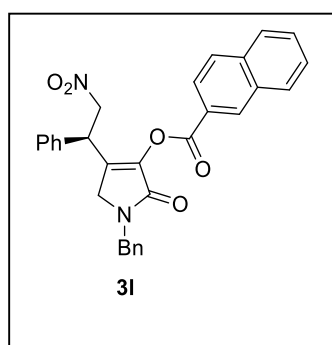


Yellow sticky solid, 68% (32mg) yield. **¹H NMR (400 MHz, CDCl₃)** δ 8.04 (dd, *J* = 7.8, 1.8 Hz, 1H), 7.61 – 7.56 (m, 1H), 7.35 – 7.27 (m, 8H), 7.23 – 7.19 (m, 2H), 7.09 – 7.03 (m, 2H), 5.10 (dd, *J* = 13.5, 6.9 Hz, 1H), 4.94 (dd, *J* = 13.6, 9.0 Hz, 1H), 4.68 (d, *J* = 15.0 Hz, 1H), 4.56 – 4.47 (m, 2H), 3.96 (s, 3H), 3.68 (d, *J* = 10.5 Hz, 2H). **¹³C NMR (100 MHz, CDCl₃)** δ 164.56, 163.34, 160.16, 136.57, 136.31, 135.98, 135.33, 133.27, 129.72, 129.09, 128.83, 128.24, 128.03, 128.00, 120.68, 117.58, 112.26, 77.43, 56.21, 49.10, 46.91, 42.98.

ESI HRMS: calcd. For C₂₇H₂₄N₂O₆ [M+H]⁺ 473.1707, found 473.1711.

HPLC Analysis: ee 70%, Chiralpak ID column, *n*-hexane/*i*PrOH 70:30, flow rate 1.0 mL/min, λ = 220 nm (*t*_{major} = 59.0 min, *t*_{minor} = 72.9 min).

(R)-1-Benzyl-4-(2-nitro-1-phenylethyl)-2-oxo-2,5-dihydro-1H-pyrrol-3-yl 2-naphthoate (3l)

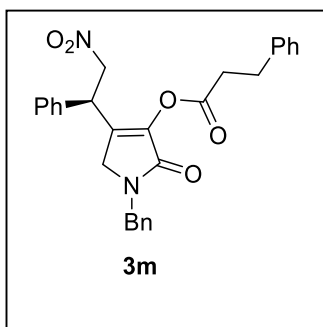


White sticky solid, 75% (37mg) yield. **¹H NMR (600 MHz, CDCl₃)** δ 8.78 (s, 1H), 8.15 (dd, *J* = 8.6, 1.8 Hz, 1H), 8.02 (d, *J* = 8.1 Hz, 1H), 7.97 (d, *J* = 8.6 Hz, 1H), 7.93 (d, *J* = 8.1 Hz, 1H), 7.66 (ddd, *J* = 8.1, 6.8, 1.3 Hz, 1H), 7.60 (ddd, *J* = 8.0, 6.8, 1.2 Hz, 1H), 7.34 (td, *J* = 7.8, 7.3, 1.7 Hz, 4H), 7.30 (dd, *J* = 7.4, 2.0 Hz, 2H), 7.24 (ddd, *J* = 11.1, 6.9, 1.8 Hz, 4H), 5.03 (dd, *J* = 13.6, 8.1 Hz, 1H), 4.79 (dd, *J* = 13.6, 7.9 Hz, 1H), 4.69 (d, *J* = 15.1 Hz, 1H), 4.63 (t, *J* = 8.0 Hz, 1H), 4.53 (d, *J* = 15.1 Hz, 1H), 3.73 (d, *J* = 4.2 Hz, 2H). **¹³C NMR (150 MHz, CDCl₃)** δ 164.49, 164.11, 140.85, 136.45, 136.33, 136.20, 135.84, 133.11, 132.60, 129.90, 129.79, 129.27, 129.12, 128.89, 128.83, 128.26, 128.08, 127.88, 127.21, 125.70, 125.03, 76.98, 48.97, 46.95, 42.77.

ESI HRMS: calcd. For C₃₀H₂₄N₂O₅ [M+H]⁺ 493.1758, found 493.1767.

HPLC Analysis: ee 80%, Chiralpak IF column, *n*-hexane/*i*PrOH 70:30, flow rate 1.0 mL/min, λ = 254 nm (*t*_{major} = 35.9 min, *t*_{minor} = 40.3 min).

(R)-1-Benzyl-4-(2-nitro-1-phenylethyl)-2-oxo-2,5-dihydro-1H-pyrrol-3-yl 3-phenylpropanoate (3m)



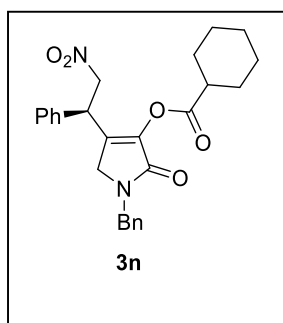
Colourless semi solid, 65% (31mg) yield. ¹H NMR (600 MHz, CDCl₃) δ 7.33 – 7.27 (m, 10H), 7.21 – 7.16 (m, 3H), 7.11 – 7.07 (m, 2H), 4.62 (dtd, J = 21.6, 13.5, 8.0 Hz, 3H), 4.50 – 4.40 (m, 2H), 3.60 (d, J = 8.6 Hz, 2H), 3.09 (t, J = 7.6 Hz, 2H), 3.00 – 2.95 (m, 2H). ¹³C NMR (100 MHz, CDCl₃) δ 170.14, 164.41, 140.40, 139.97, 136.38, 135.85, 135.82, 129.71, 129.11, 128.89, 128.86, 128.59, 128.20, 128.08, 127.81, 126.81, 77.44, 48.85, 46.91,

42.58, 35.47, 30.79.

ESI HRMS: calcd. For C₂₈H₂₆N₂O₅ [M+H]⁺ 479.1914, found 479.1915.

HPLC Analysis: ee 72%, Chiralpak IF column, *n*-hexane/*i*PrOH 80:20, flow rate 1.0 mL/min, λ = 220 nm (*t*_{major} = 37.3 min, *t*_{minor} = 35.4 min).

(R)-1-benzyl-4-(2-nitro-1-phenylethyl)-2-oxo-2,5-dihydro-1H-pyrrol-3-yl cyclohexanecarboxylate (3n)



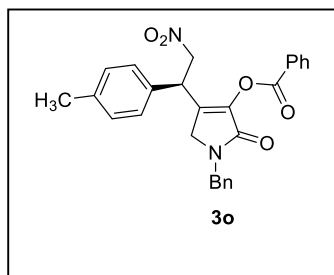
Pale yellow semi solid, 70% (31mg) yield. ¹H NMR (600 MHz, CDCl₃) δ 7.36 – 7.29 (m, 5H), 7.28 – 7.26 (m, 1H), 7.21 – 7.14 (m, 4H), 4.95 – 4.87 (m, 1H), 4.80 – 4.73 (m, 1H), 4.66 – 4.58 (m, 1H), 4.54 – 4.45 (m, 2H), 3.67 – 3.56 (m, 2H), 2.68 – 2.60 (m, 1H), 2.15 – 2.07 (m, 2H), 1.89 – 1.80 (m, 2H), 1.72 – 1.65 (m, 2H), 1.43 – 1.27 (m, 4H). ¹³C NMR (150 MHz, CDCl₃) δ 173.28, 164.47, 140.72, 136.44, 136.00, 135.48, 129.74, 129.08, 128.85, 128.20, 128.03, 127.83, 48.84,

46.88, 42.92, 42.64, 29.05, 25.81, 25.43.

ESI HRMS: calcd. For C₂₆H₂₈N₂O₅ [M+H]⁺ 449.2071, found 449.2072.

HPLC Analysis: ee 72%, Chiralpak IA column, *n*-hexane/*i*PrOH 80/20, flow rate 1.0 mL/min, λ = 220 nm (*t*_{major} = 16.7 min, *t*_{minor} = 15.5 min).

(R)-1-Benzyl-4-(2-nitro-1-(*p*-tolyl)ethyl)-2-oxo-2,5-dihydro-1*H*-pyrrol-3-yl benzoate (3o)



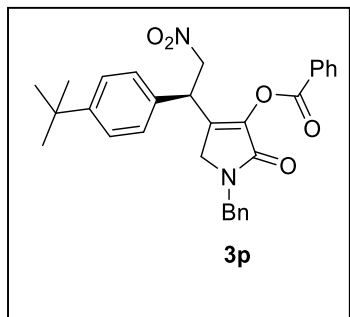
Light yellow semi solid, 83% (38mg) yield. ¹H NMR (600 MHz, CDCl₃) δ 8.17 (dd, J = 8.3, 1.2 Hz, 2H), 7.72 – 7.64 (m, 1H), 7.53 (dd, J = 10.8, 4.8 Hz, 2H), 7.36 – 7.29 (m, 3H), 7.23 – 7.19 (m, 4H), 7.06 – 6.99 (m, 2H), 4.97 (dd, J = 13.4, 7.7 Hz, 1H), 4.77 – 4.65 (m, 2H), 4.59 – 4.49 (m, 2H), 3.69 (d, J = 5.2 Hz, 2H), 1.60 (s, 3H). ¹³C NMR (100 MHz, CDCl₃) δ 164.30, 163.93, 140.90,

136.38, 135.81, 134.69, 131.66, 131.63, 130.90, 129.69, 129.61, 129.14, 129.01, 128.28, 128.13, 127.80, 116.93, 116.71, 77.02, 48.90, 46.98, 42.09.

ESI HRMS: calcd. For C₂₇H₂₄N₂O₅ [M+H]⁺ 457.1758, found 457.1766.

HPLC Analysis: ee 72%, Chiralpak IA column, *n*-hexane/*i*PrOH 80/20, flow rate 1.0 mL/min, λ = 254 nm (*t*_{major} = 24.5 min, *t*_{minor} = 21.4 min).

(R)-1-Benzyl-4-(1-(4-(*tert*-butyl)phenyl)-2-nitroethyl)-2-oxo-2,5-dihydro-1*H*-pyrrol-3-yl benzoate (3p)



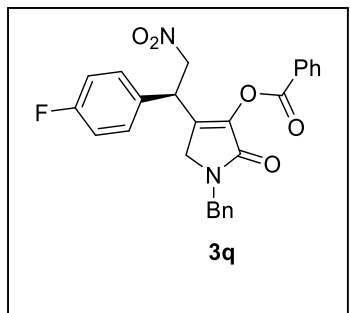
White semi solid, 72% (40mg) yield. ¹H NMR (400 MHz, CDCl₃) δ 8.21 – 8.15 (m, 2H), 7.71 – 7.62 (m, 1H), 7.53 (t, J = 7.8 Hz, 2H), 7.38 – 7.27 (m, 5H), 7.24 – 7.19 (m, 2H), 7.14 (d, J = 8.3 Hz, 2H), 4.97 (dd, J = 13.5, 8.2 Hz, 1H), 4.75 (dd, J = 13.5, 7.7 Hz, 1H), 4.67 (d, J = 15.1 Hz, 1H), 4.55 (dd, J = 19.1, 11.5 Hz, 2H), 3.73 (s, 2H), 1.27 (s, 10H). ¹³C NMR (100 MHz, CDCl₃) δ

164.50, 163.86, 151.91, 140.68, 136.54, 136.42, 134.51, 132.67, 130.89, 129.09, 128.94, 128.27, 128.04, 127.99, 127.51, 126.67, 77.07, 49.00, 46.94, 42.28, 31.38.

ESI HRMS: calcd. For C₃₀H₃₀N₂O₅ [M+H]⁺ 499.2227, found 499.2228.

HPLC Analysis: ee 72%, Chiralpak ADH column, *n*-hexane/*i*PrOH 80:20, flow rate 1.0 mL/min, λ = 254 nm (*t*_{major} = 10.5 min, *t*_{minor} = 11.8 min).

(R)-1-Benzyl-4-(1-(4-fluorophenyl)-2-nitroethyl)-2-oxo-2,5-dihydro-1*H*-pyrrol-3-yl benzoate (3q)



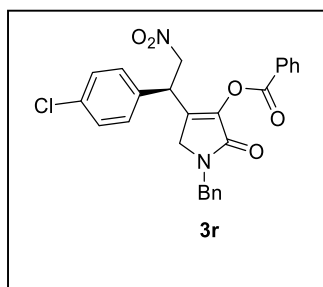
Pale yellow semi solid, 80% (37mg) yield. ¹H NMR (400 MHz, CDCl₃) δ 8.21 – 8.14 (m, 2H), 7.71 – 7.65 (m, 1H), 7.54 (t, J = 7.8 Hz, 2H), 7.38 – 7.27 (m, 3H), 7.25 – 7.17 (m, 4H), 7.10 – 6.96 (m, 2H), 4.97 (dd, J = 13.4, 7.6 Hz, 1H), 4.75 (dd, J = 13.4, 8.3 Hz, 1H), 4.68 (d, J = 15.0 Hz, 1H), 4.57 (t, J = 8.0 Hz, 1H), 4.52

(d, $J = 15.0$ Hz, 1H), 3.75 – 3.63 (m, 2H). **^{13}C NMR (125 MHz, CDCl_3)** δ 164.10, 163.73, 163.67, 161.70, 140.77, 136.21, 135.60, 134.46, 131.51, 131.48, 130.70, 129.49, 129.42, 128.95, 128.81, 128.09, 127.94, 127.68, 116.71, 116.54, 48.71, 46.82, 41.92, 29.71.

ESI HRMS: calcd. For $\text{C}_{26}\text{H}_{21}\text{FN}_2\text{O}_5$ $[\text{M}+\text{H}]^+$ 461.1507, found 461.1513.

HPLC Analysis: ee 84%, Chiralpak IF column, *n*-hexane/*i*PrOH 80:20, flow rate 1.0 mL/min, $\lambda = 254$ nm ($t_{\text{major}} = 33.3$ min, $t_{\text{minor}} = 42.0$ min).

(*R*)-1-Benzyl-4-(1-(4-chlorophenyl)-2-nitroethyl)-2-oxo-2,5-dihydro-1*H*-pyrrol-3-yl benzoate (3r)



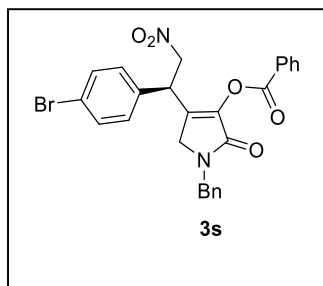
Yellow semi solid, 79% (38mg) yield. **^1H NMR (400 MHz, CDCl_3)** δ 8.16 (dd, $J = 8.2, 1.0$ Hz, 2H), 7.68 (dd, $J = 10.6, 4.3$ Hz, 1H), 7.53 (t, $J = 7.8$ Hz, 2H), 7.37 – 7.28 (m, 5H), 7.25 – 7.14 (m, 4H), 4.96 (dd, $J = 13.5, 7.6$ Hz, 1H), 4.75 (dd, $J = 13.5, 8.3$ Hz, 1H), 4.67 (d, $J = 15.0$ Hz, 1H), 4.60 – 4.49 (m, 2H), 3.69 (d, $J = 4.4$ Hz, 2H). **^{13}C NMR (100 MHz, CDCl_3)** δ 164.26, 163.91, 141.07,

136.35, 135.51, 135.00, 134.71, 134.33, 130.89, 130.00, 129.25, 129.16, 129.02, 128.30, 128.16, 76.79, 48.88, 47.01, 42.15.

ESI HRMS: calcd. For $\text{C}_{26}\text{H}_{21}\text{ClN}_2\text{O}_5$ $[\text{M}+\text{H}]^+$ 477.1212, found 477.1224.

HPLC Analysis: ee 76%, Chiralpak ADH column, *n*-hexane/*i*PrOH 70:30, flow rate 1.0 mL/min, $\lambda = 254$ nm ($t_{\text{major}} = 12.7$ min, $t_{\text{minor}} = 14.8$ min).

(*R*)-1-Benzyl-4-(1-(4-bromophenyl)-2-nitroethyl)-2-oxo-2,5-dihydro-1*H*-pyrrol-3-yl benzoate (3s)



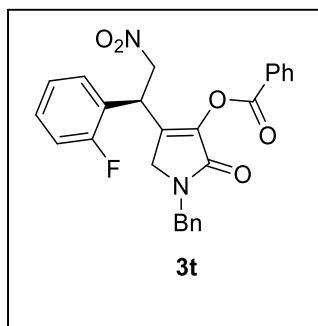
Yellow semi solid, 82% (76mg) yield. **^1H NMR (400 MHz, CDCl_3)** δ 8.20 – 8.13 (m, 2H), 7.68 (t, $J = 7.5$ Hz, 1H), 7.54 (t, $J = 7.8$ Hz, 2H), 7.49 – 7.42 (m, 2H), 7.39 – 7.28 (m, 3H), 7.25 – 7.19 (m, 2H), 7.11 (d, $J = 8.4$ Hz, 2H), 4.96 (dd, $J = 13.5, 7.6$ Hz, 1H), 4.75 (dd, $J = 13.5, 8.3$ Hz, 1H), 4.67 (d, $J = 15.0$ Hz, 1H), 4.59 – 4.49 (m, 2H), 3.69 (d, $J = 4.4$ Hz, 2H). **^{13}C NMR (100 MHz, CDCl_3)** δ 164.24,

163.90, 141.10, 136.34, 135.40, 134.84, 134.72, 132.97, 130.90, 129.55, 129.17, 129.03, 128.30, 128.17, 127.75, 123.10, 76.71, 48.88, 47.00, 42.22.

ESI HRMS: calcd. For $\text{C}_{26}\text{H}_{21}\text{BrN}_2\text{O}_5$ $[\text{M}+\text{H}]^+$ 521.0707, found 521.0726.

HPLC Analysis: ee 76%, Chiralpak ADH column, *n*-hexane/*i*PrOH 80:20, flow rate 1.0 mL/min, $\lambda = 254$ nm ($t_{\text{major}} = 25.6$ min, $t_{\text{minor}} = 21.3$ min).

(S)-1-Benzyl-4-(1-(2-fluorophenyl)-2-nitroethyl)-2-oxo-2,5-dihydro-1H-pyrrol-3-yl benzoate (3t)

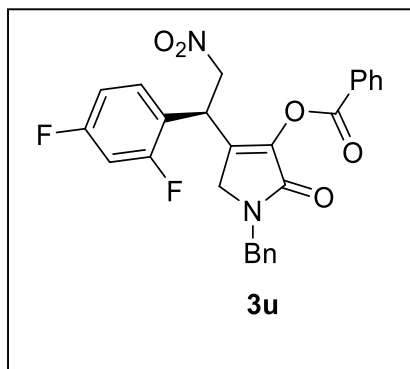


Yellow semi solid, 79% (36mg) yield. **¹H NMR (400 MHz, CDCl₃)** δ 8.15 (dd, J = 8.3, 1.1 Hz, 2H), 7.70 – 7.63 (m, 1H), 7.52 (t, J = 7.8 Hz, 2H), 7.38 – 7.27 (m, 4H), 7.26 – 7.19 (m, 3H), 7.12 – 7.03 (m, 2H), 5.01 (dd, J = 11.4, 6.1 Hz, 1H), 4.91 – 4.80 (m, 2H), 4.67 (d, J = 15.0 Hz, 1H), 4.56 (d, J = 15.0 Hz, 1H), 3.78 (s, 2H). **¹³C NMR (100 MHz, CDCl₃)** δ 164.30, 163.63, 161.82, 159.36, 141.37, 136.44, 134.97, 134.54, 130.87, 130.80, 130.72, 129.62, 129.58, 129.14, 128.93, 128.27, 128.10, 127.90, 125.45, 125.41, 122.78, 122.64, 116.71, 116.49, 75.41, 75.38, 48.95, 46.99, 36.80, 36.77.

ESI HRMS: calcd. For C₂₆H₂₁FN₂O₅ [M+H]⁺ 461.1507, found 461.1516.

HPLC Analysis: ee 86%, Chiralpak ID column, *n*-hexane/*i*PrOH 75:25, flow rate 1.0 mL/min, λ = 254 nm (*t*_{major} = 56.1 min, *t*_{minor} = 68.1 min).

(S)-1-Benzyl-4-(1-(2,4-difluorophenyl)-2-nitroethyl)-2-oxo-2,5-dihydro-1H-pyrrol-3-yl benzoate (3u)



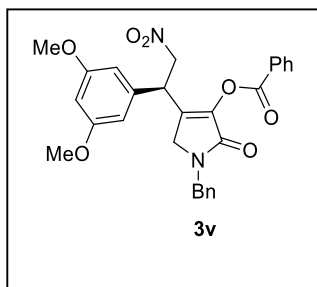
White sticky solid, 78% (37mg) yield. **¹H NMR (400 MHz, CDCl₃)** δ 8.18 – 8.09 (m, 2H), 7.70 – 7.64 (m, 1H), 7.52 (t, J = 7.8 Hz, 2H), 7.39 – 7.28 (m, 3H), 7.26 – 7.18 (m, 3H), 6.88 – 6.78 (m, 2H), 5.02 – 4.93 (m, 1H), 4.82 (dq, J = 15.5, 7.7 Hz, 2H), 4.67 (d, J = 15.0 Hz, 1H), 4.56 (d, J = 15.0 Hz, 1H), 3.77 (d, J = 4.3 Hz, 2H). **¹³C NMR (100 MHz, CDCl₃)** δ 163.96, 163.45, 141.32, 136.16, 134.43, 134.36, 130.65, 130.33, 130.27, 128.96, 128.77, 128.10, 127.95, 127.59,

118.51, 112.65, 112.44, 105.22, 104.96, 104.71, 75.12, 48.69, 46.81, 36.19, 36.17, 29.70.

ESI HRMS: calcd. For C₂₆H₂₀F₂N₂O₅ [M+H]⁺ 479.1413, found 479.1424.

HPLC Analysis: ee 72%, Chiralpak ADH column, *n*-hexane/*i*PrOH 70:30, flow rate 1.0 mL/min, λ = 254 nm (*t*_{major} = 11.4 min, *t*_{minor} = 10.1 min).

(R)-1-Benzyl-4-(1-(3,5-dimethoxyphenyl)-2-nitroethyl)-2-oxo-2,5-dihydro-1H-pyrrol-3-yl benzoate (3v)



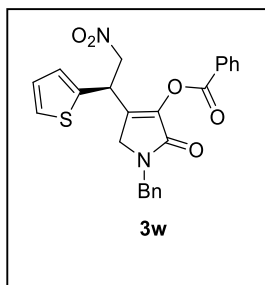
Light yellow semi solid, 80% (40mg) yield. **¹H NMR (600 MHz, CDCl₃)** δ 8.20 – 8.15 (m, 2H), 7.68 (t, J = 7.4 Hz, 1H), 7.53 (t, J = 7.8 Hz, 2H), 7.33 (t, J = 7.2 Hz, 2H), 7.29 (dd, J = 8.5, 6.0 Hz, 1H), 7.22 (d, J = 7.0 Hz, 2H), 6.80 – 6.72 (m, 3H), 4.98 (dd, J = 13.5, 8.1 Hz, 1H), 4.73 (dd, J = 13.5, 7.9 Hz, 1H), 4.68 (d, J = 15.1 Hz, 1H), 4.55 – 4.48 (m, 2H), 3.83 (d, J = 3.0 Hz, 6H), 3.71 (d, J = 4.6

Hz, 2H). **¹³C NMR (150 MHz, CDCl₃)** δ 164.48, 164.07, 149.94, 149.37, 140.63, 136.54, 136.48, 134.63, 130.85, 129.11, 129.00, 128.22, 128.08, 127.90, 119.98, 111.81, 110.71, 77.26, 56.20, 56.11, 49.05, 46.94, 42.55.

ESI HRMS: calcd. For C₂₈H₂₆N₂O₇ [M+H]⁺ 503.1813, found 503.1814.

HPLC Analysis: ee 72%, Chiralpak ADH column, *n*-hexane/*i*PrOH 80:20, flow rate 1.0 mL/min, λ = 254 nm (*t*_{major} = 37.1 min, *t*_{minor} = 32.4 min).

(R)-1-Benzyl-4-(2-nitro-1-(thiophen-2-yl)ethyl)-2-oxo-2,5-dihydro-1H-pyrrol-3-yl benzoate (3w)



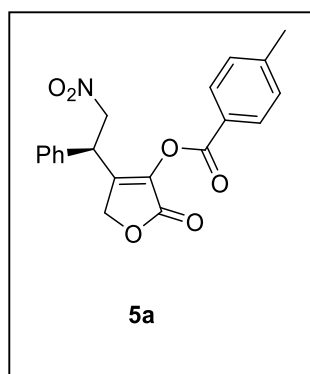
Light brown semi solid, 81% (36mg) yield. **¹H NMR (400 MHz, CDCl₃)** δ 8.24 – 8.14 (m, 2H), 7.67 (dd, J = 10.6, 4.3 Hz, 1H), 7.53 (t, J = 7.8 Hz, 2H), 7.38 – 7.29 (m, 3H), 7.27 – 7.22 (m, 3H), 6.94 (d, J = 3.4 Hz, 2H), 4.98 – 4.91 (m, 2H), 4.85 – 4.79 (m, 1H), 4.63 (d, J = 3.4 Hz, 2H), 3.81 (d, J = 5.0 Hz, 2H). **¹³C NMR (100 MHz, CDCl₃)** δ 164.28, 163.57, 140.87, 137.77, 136.42, 135.52, 134.58, 130.92,

130.38, 129.15, 128.97, 128.66, 128.25, 128.11, 127.90, 127.74, 126.70, 126.31, 77.32, 48.63, 47.00, 37.39.

ESI HRMS: calcd. For C₂₄H₂₀N₂O₅S [M+H]⁺ 449.1166, found 449.1167.

HPLC Analysis: ee 82%, Chiralpak IA column, *n*-hexane/*i*PrOH 80:20, flow rate 1.0 mL/min, λ = 254 nm (*t*_{major} = 34.1 min, *t*_{minor} = 36.9 min).

(R)-4-(2-Nitro-1-phenylethyl)-2-oxo-2,5-dihydrofuran-3-yl 4-methylbenzoate (5b)

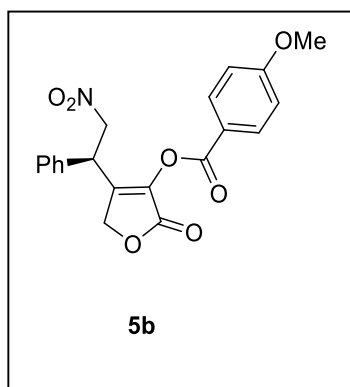


Light yellow semi solid, 82% (30mg) yield. ¹H NMR (500 MHz, CDCl₃) δ 8.03 (d, J = 8.2 Hz, 2H), 7.42 – 7.28 (m, 5H), 7.26 (dd, J = 6.6, 2.1 Hz, 2H), 5.04 (dd, J = 13.8, 8.3 Hz, 1H), 4.83 – 4.79 (m, 1H), 4.75 (s, 1H), 4.70 (d, J = 16.8 Hz, 1H), 4.65 (t, J = 7.9 Hz, 1H), 2.46 (s, 3H). ¹³C NMR (150 MHz, CDCl₃) δ 166.72, 163.37, 146.18, 145.67, 135.90, 134.41, 130.99, 130.07, 129.83, 129.40, 127.88, 124.36, 76.14, 68.64, 42.27, 22.13.

ESI HRMS: calcd. For C₂₀H₁₇NO₆ [M+Na]⁺ 390.0948, found 390.0957.

HPLC Analysis: ee 78%, Chiralpak ADH column, *n*-hexane/*i*PrOH 85:25, flow rate 1.0 mL/min, λ = 200 nm (*t*_{major} = 12.5 min, *t*_{minor} = 13.5 min).

(R)-4-(2-Nitro-1-phenylethyl)-2-oxo-2,5-dihydrofuran-3-yl 4-methoxybenzoate (5c)



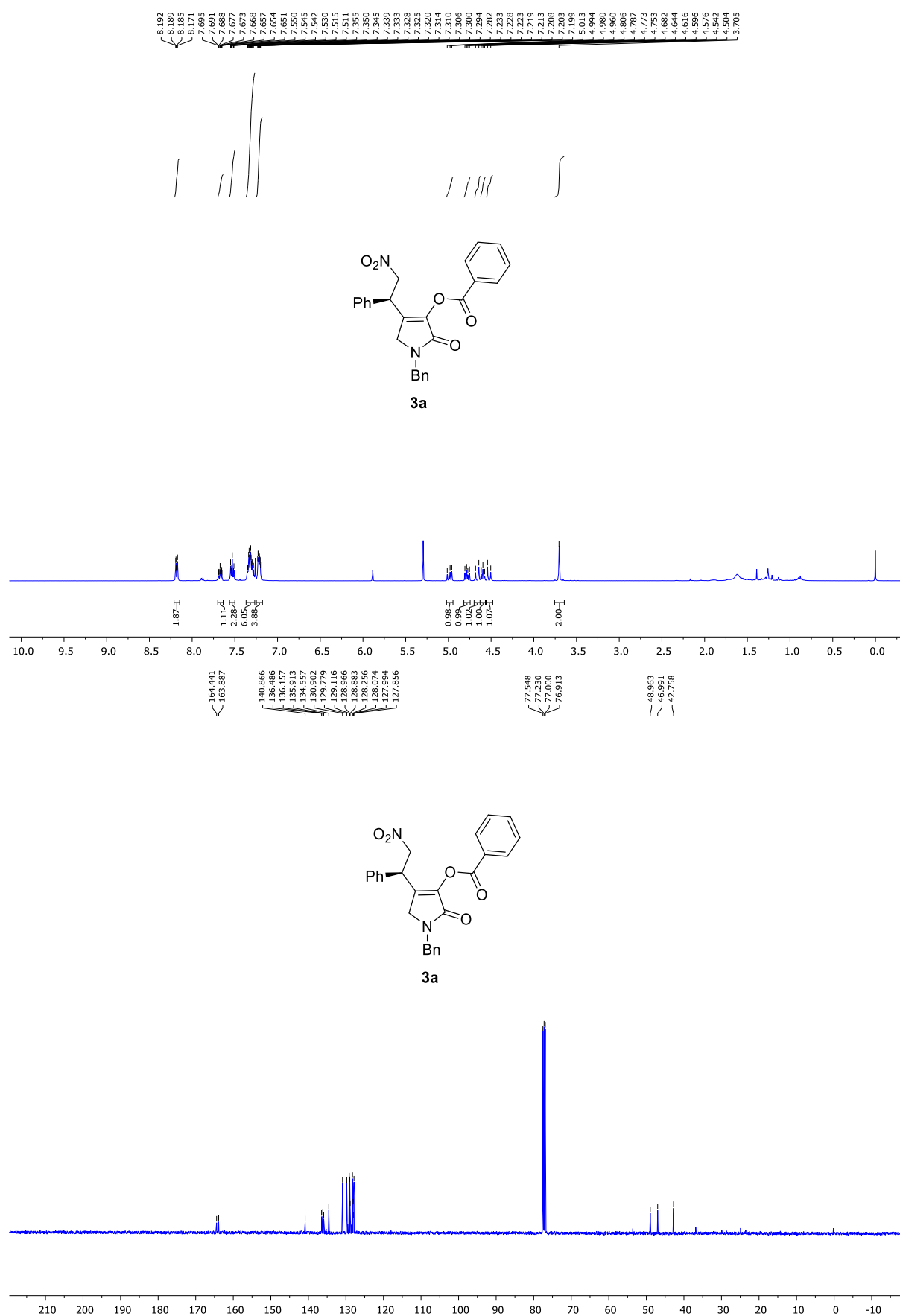
Light yellow semi solid, 85% (33mg) yield. ¹H NMR (500 MHz, CDCl₃) δ 8.02 (d, J = 8.5 Hz, 2H), 7.30 (dd, J = 13.0, 7.0 Hz, 3H), 7.22 – 7.16 (m, 2H), 6.93 (d, J = 8.5 Hz, 2H), 4.97 (dd, J = 13.9, 8.4 Hz, 1H), 4.76 – 4.55 (m, 4H), 3.83 (s, 3H). ¹³C NMR (125 MHz, CDCl₃) δ 166.74, 165.07, 162.99, 145.55, 134.61, 133.22, 130.04, 129.35, 127.90, 119.47, 114.45, 76.21, 68.58, 55.84, 42.32.

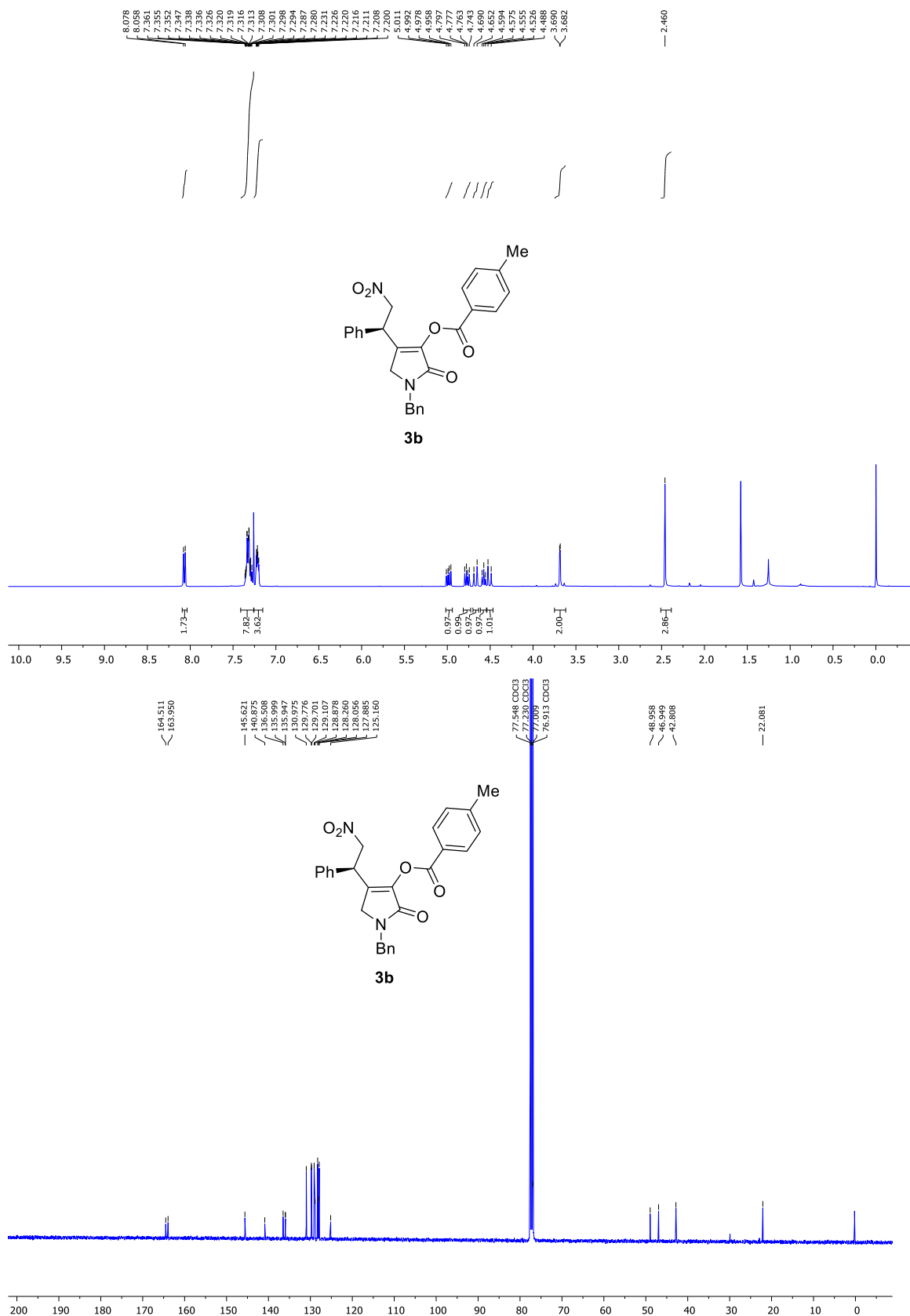
ESI HRMS: calcd. For C₂₀H₁₇NO₇ [M+H]⁺ 384.1078, found

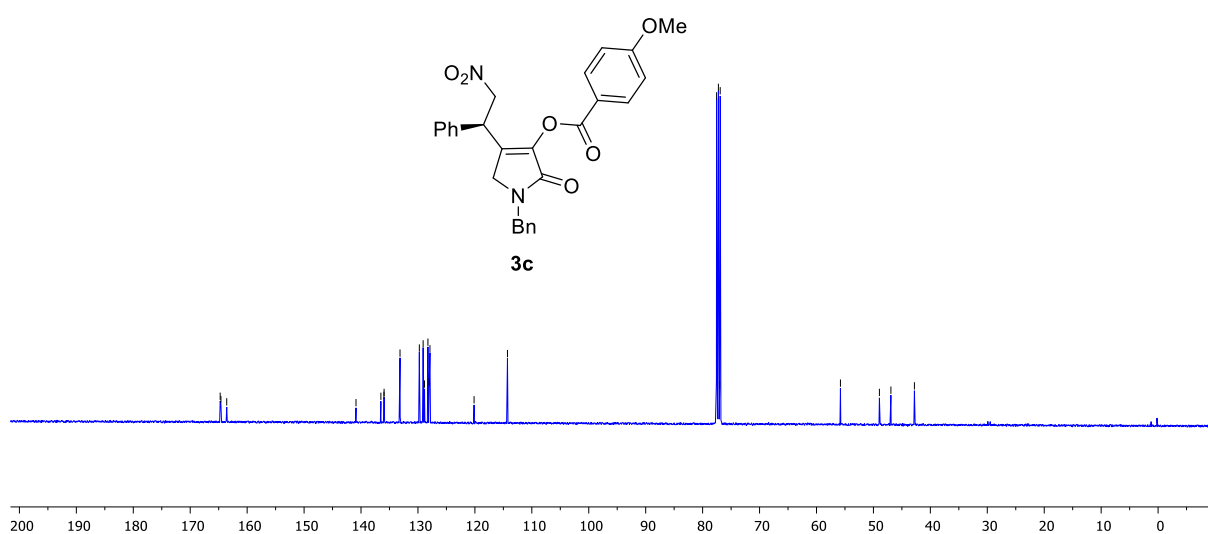
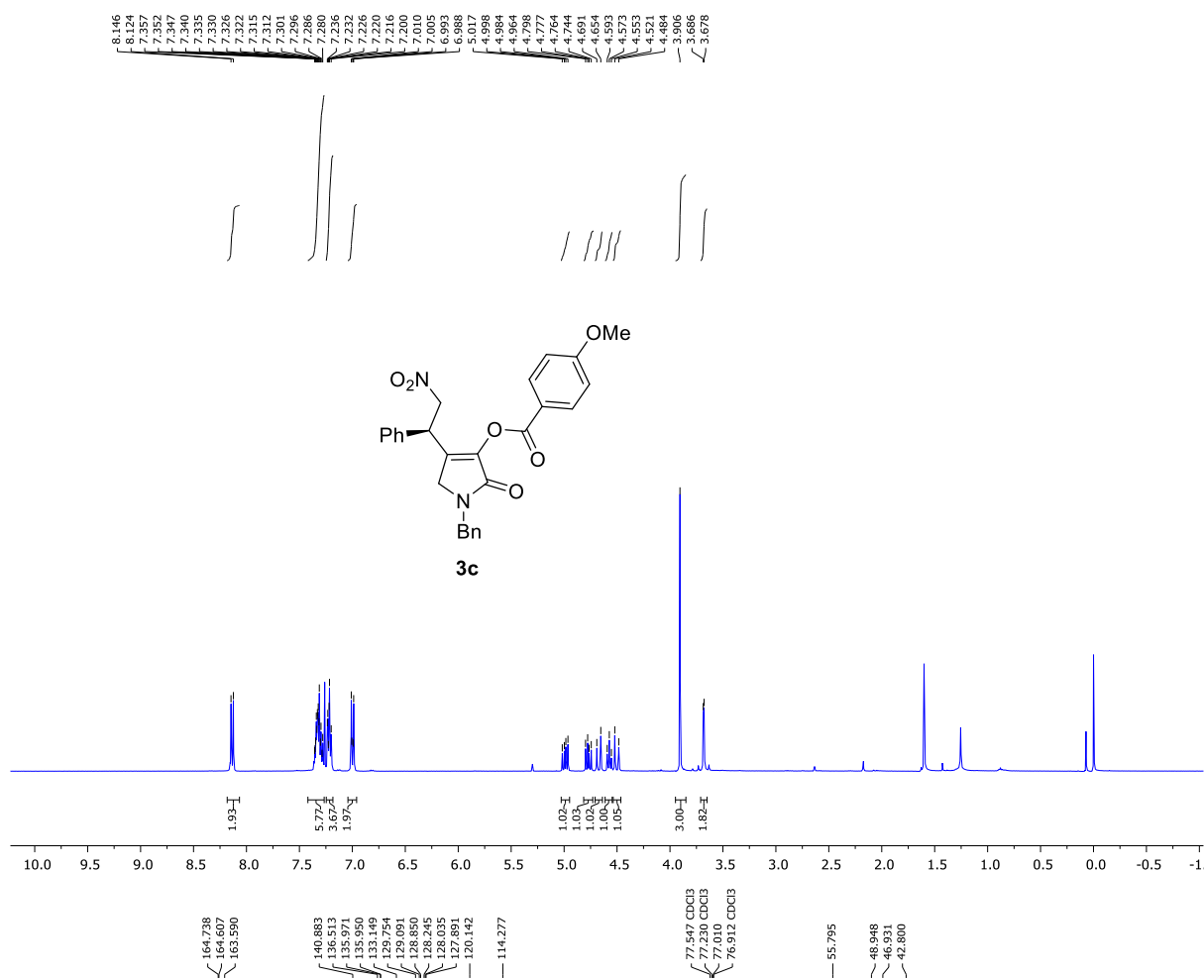
384.1087.

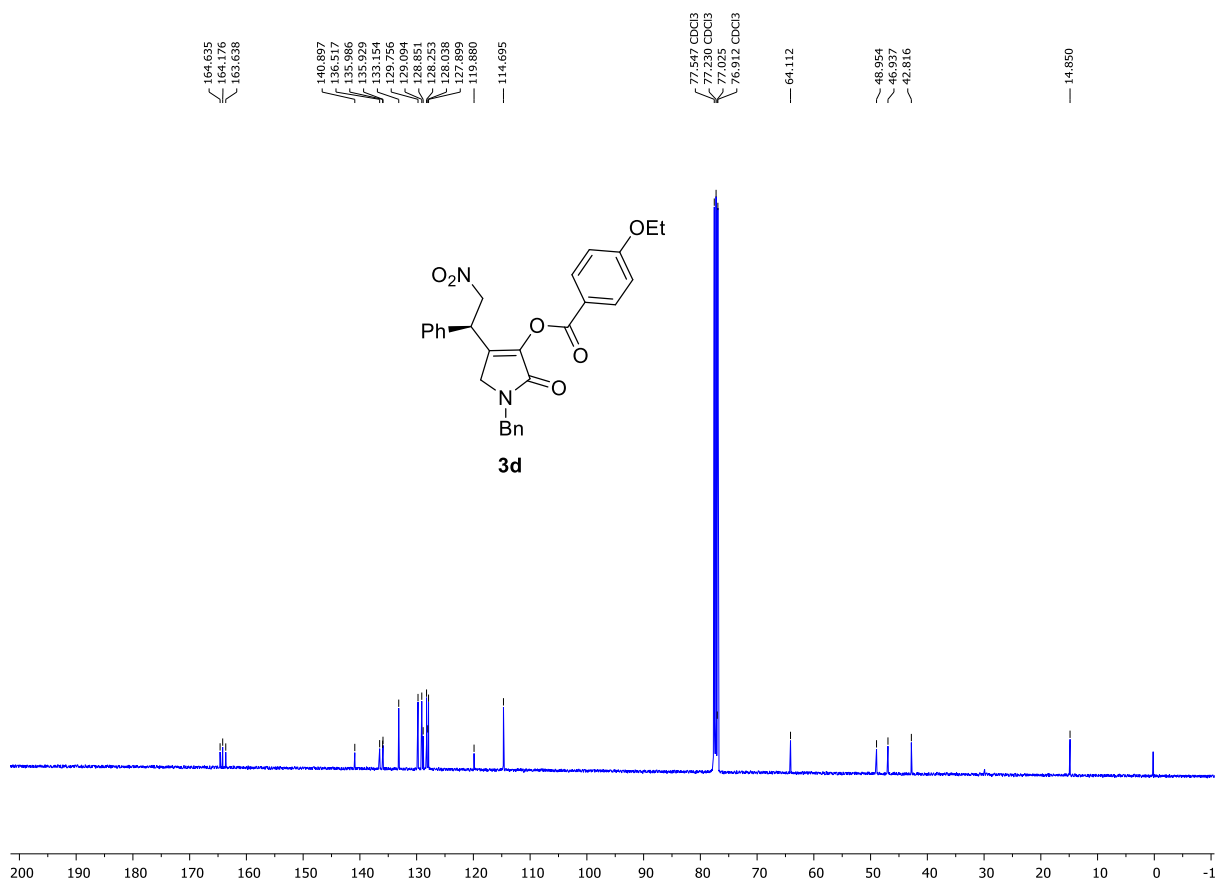
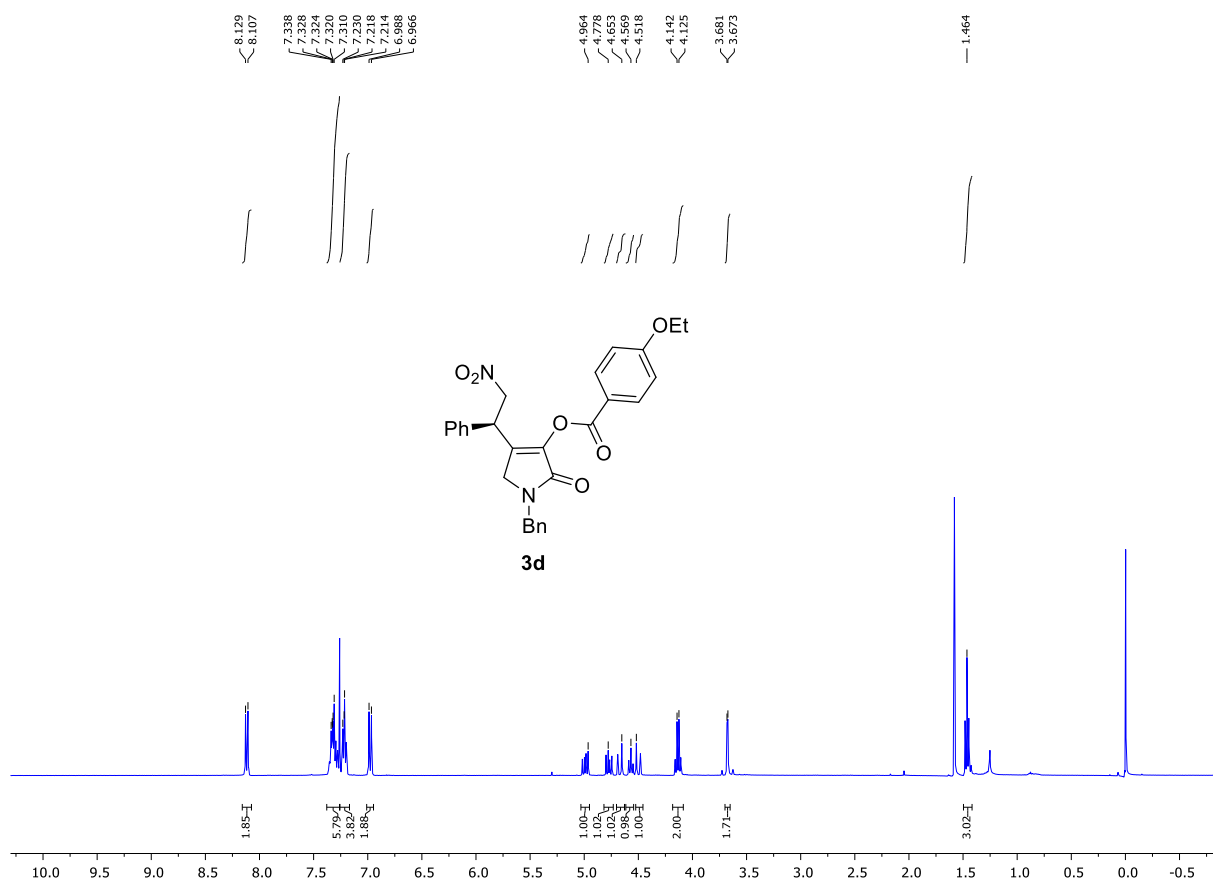
HPLC Analysis: ee 78%, Chiralpak ADH column, *n*-hexane/*i*PrOH 85:15, flow rate 1.0 mL/min, λ = 274 nm (*t*_{major} = 19.1 min, *t*_{minor} = 20.8 min).

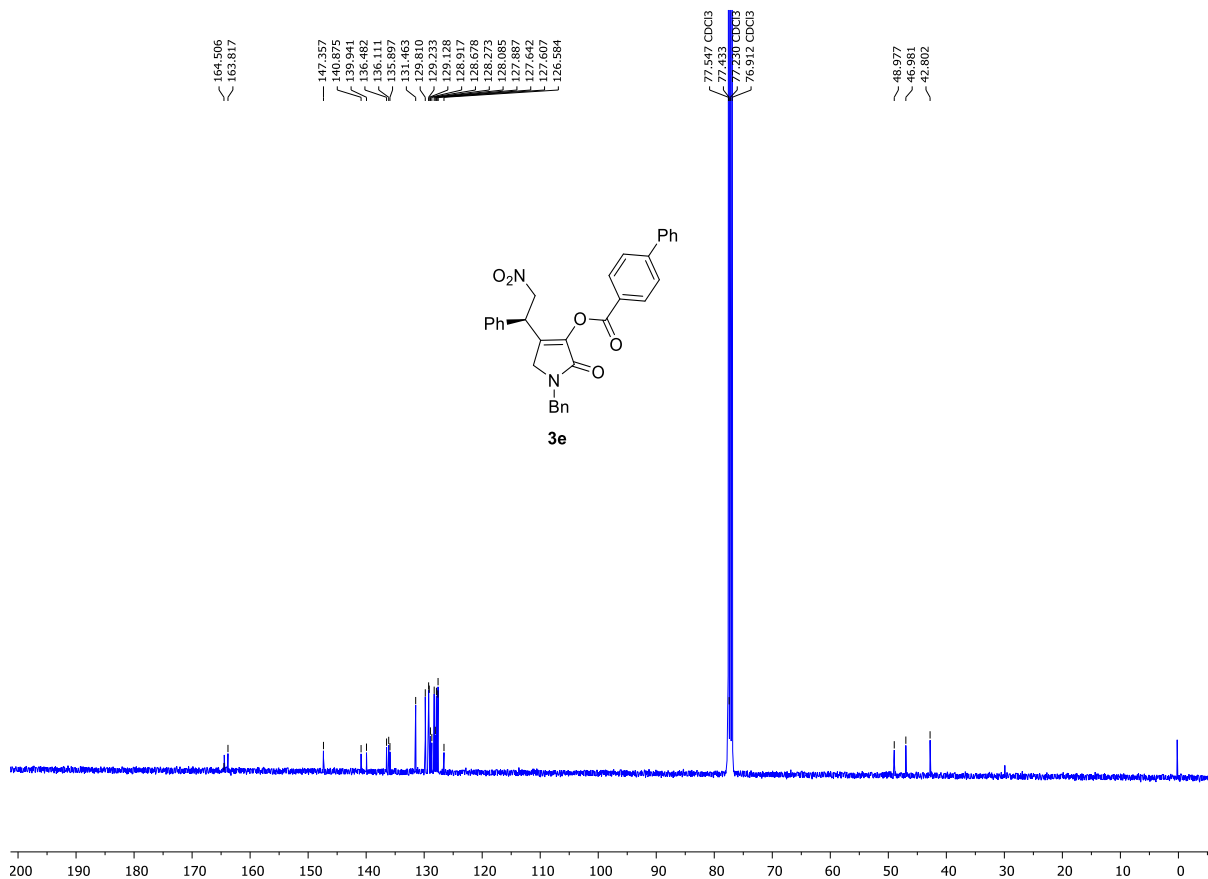
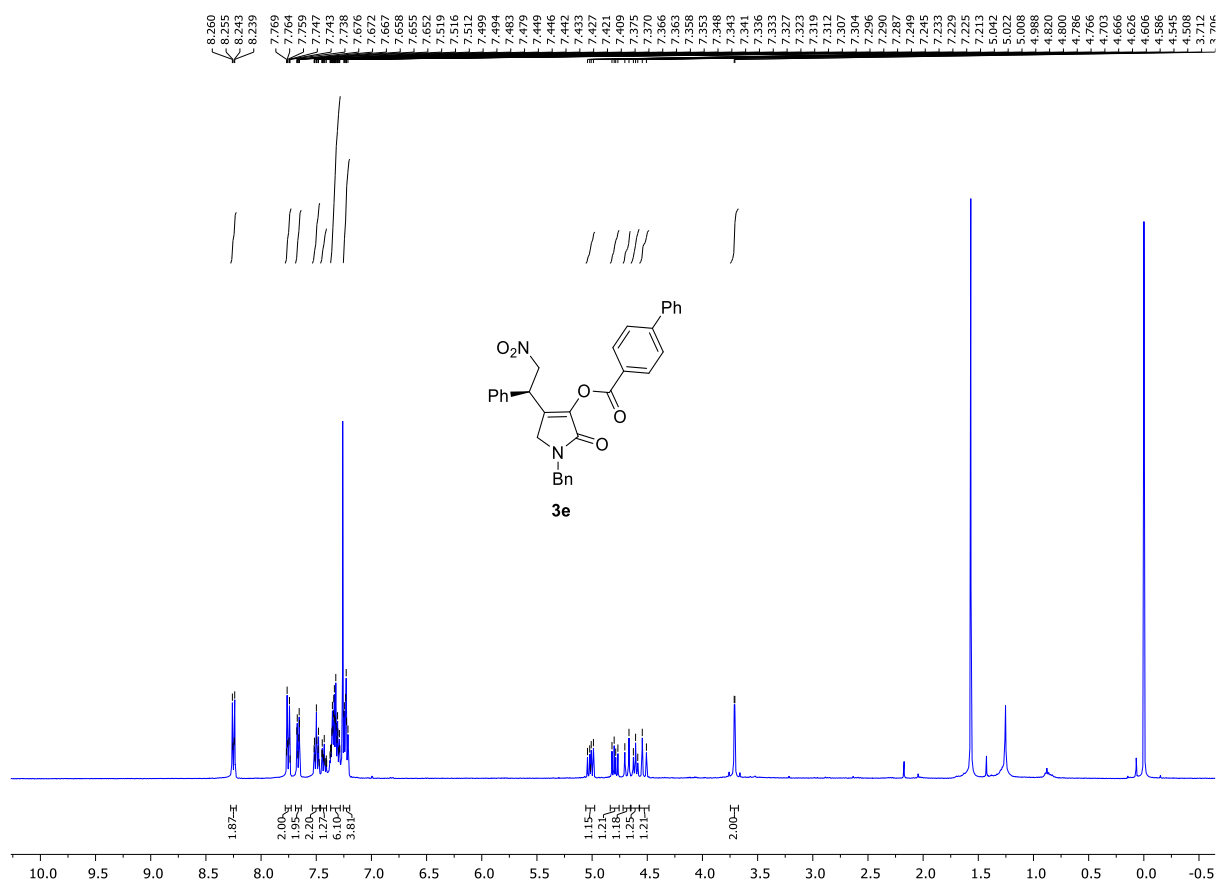
6. NMR spectra of the products

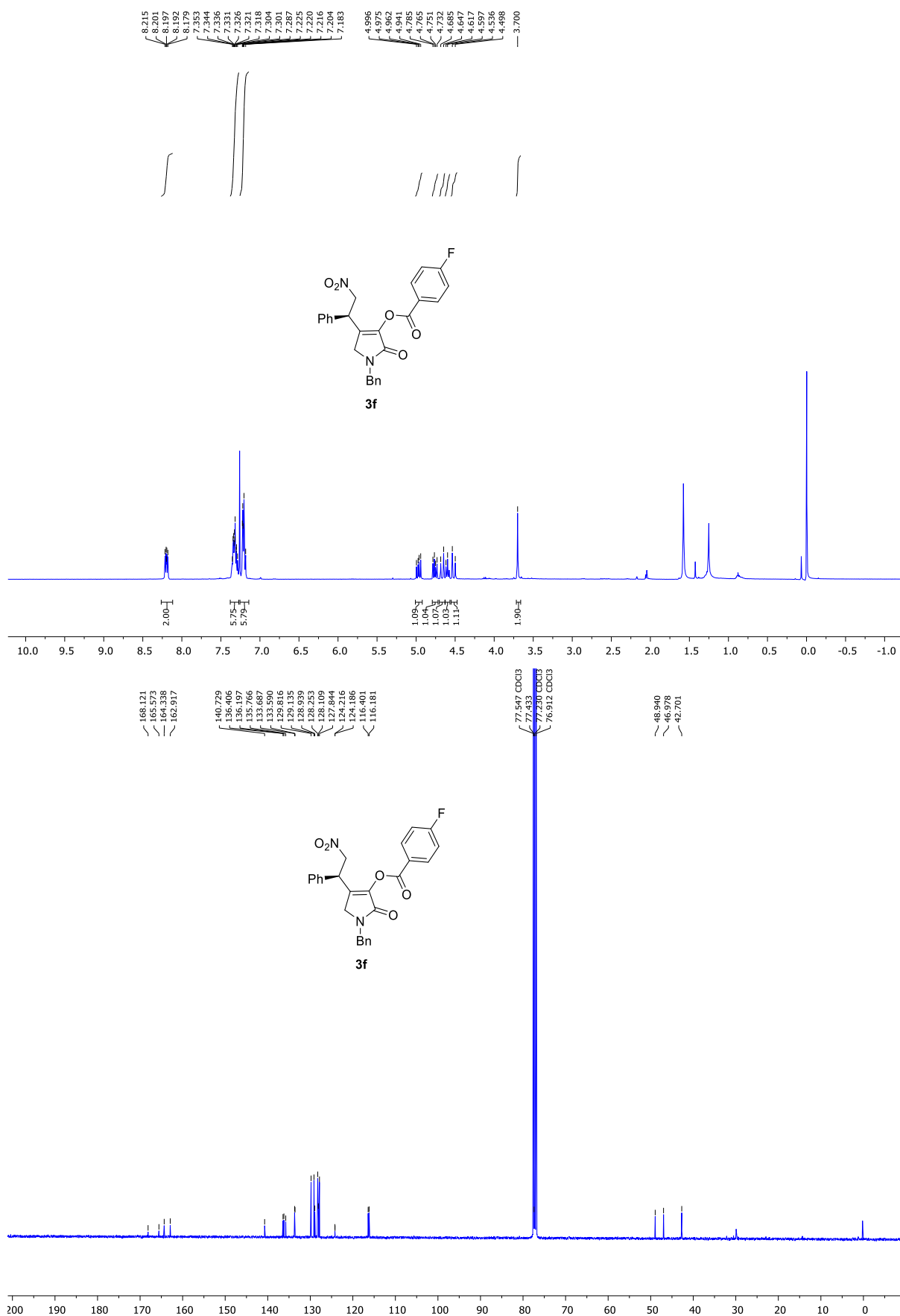


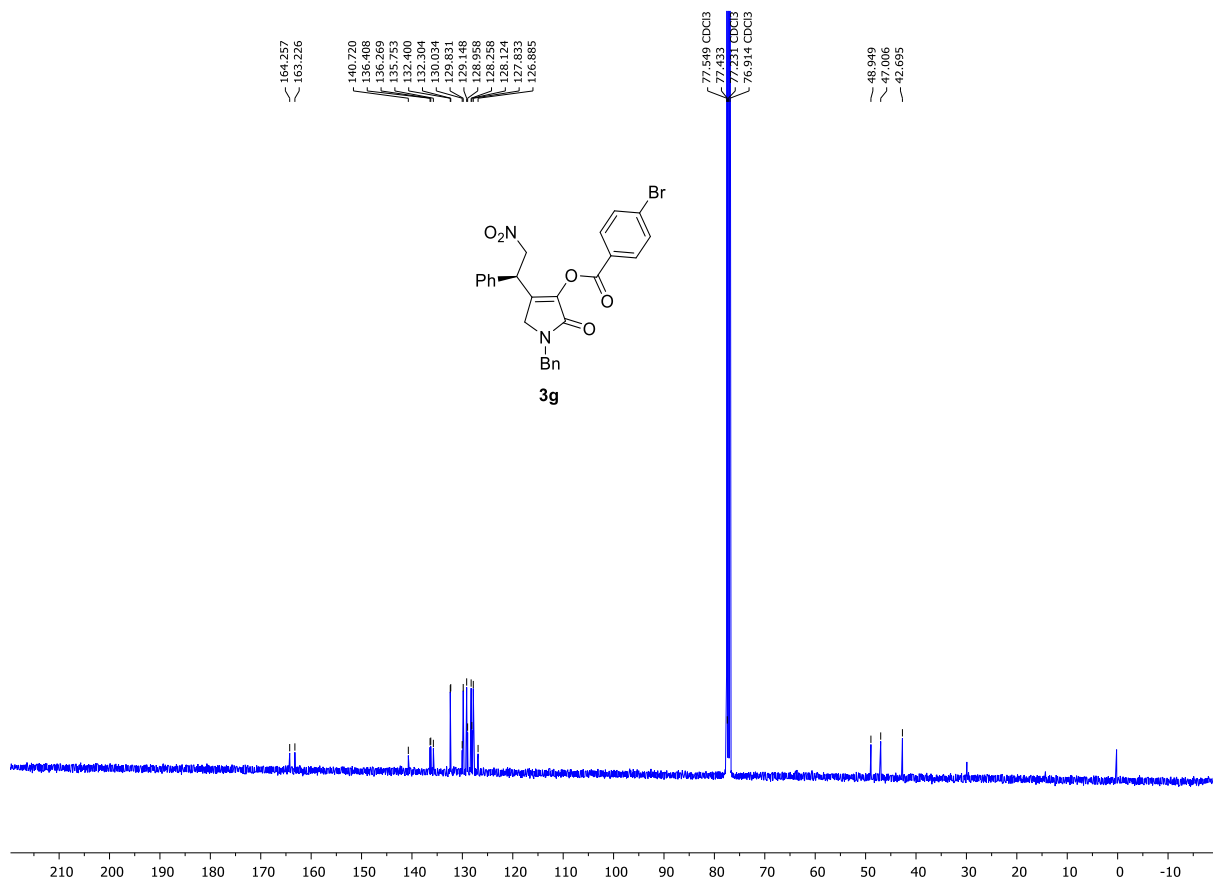
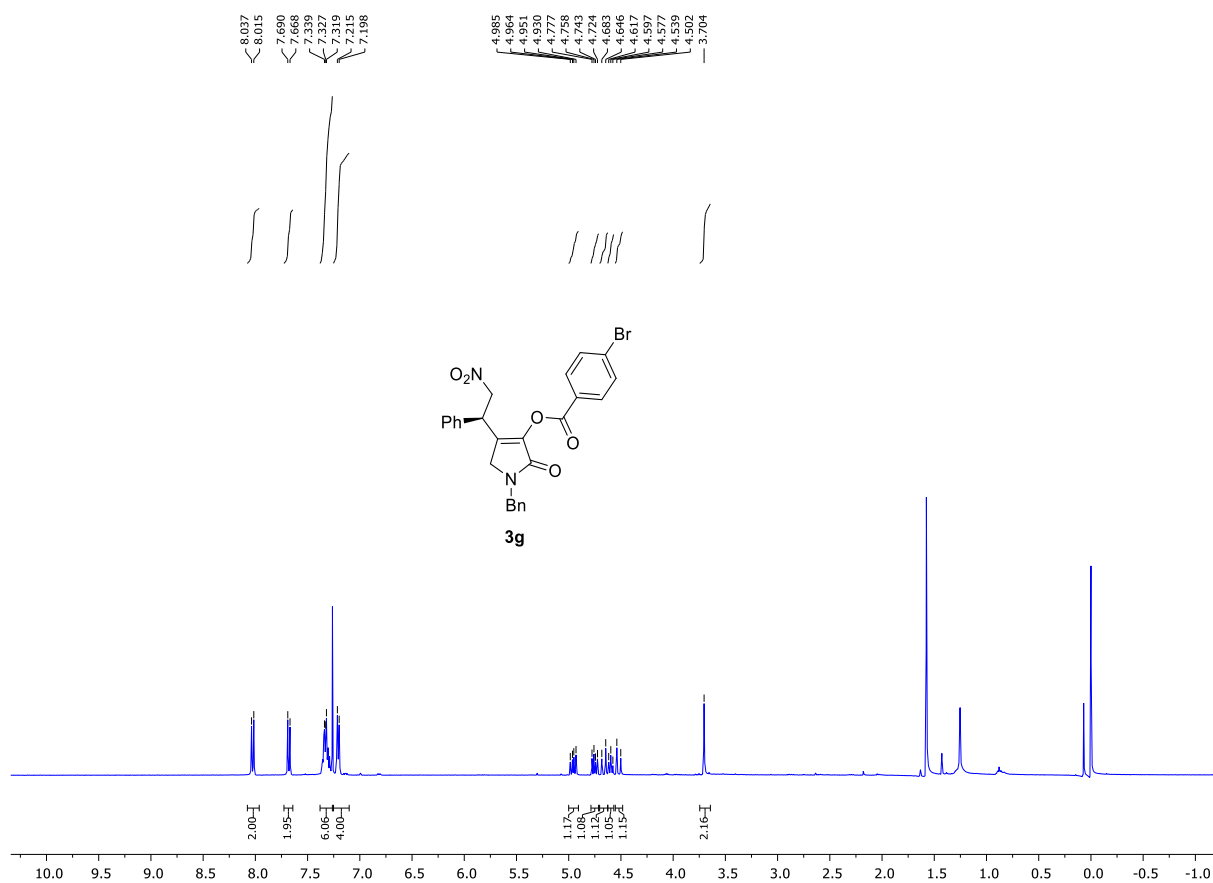


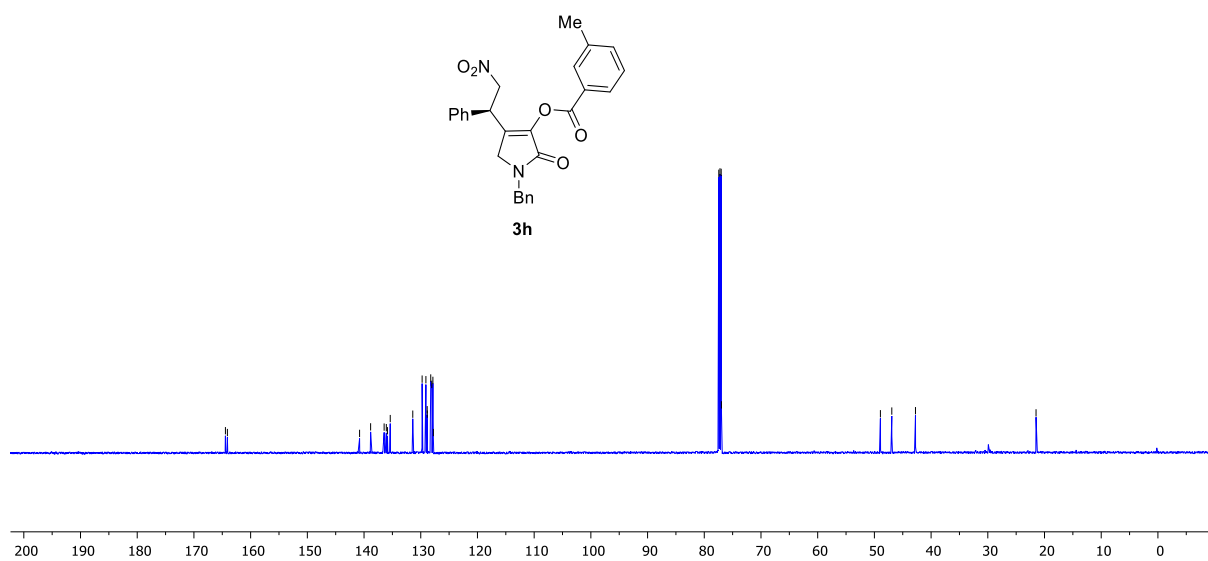
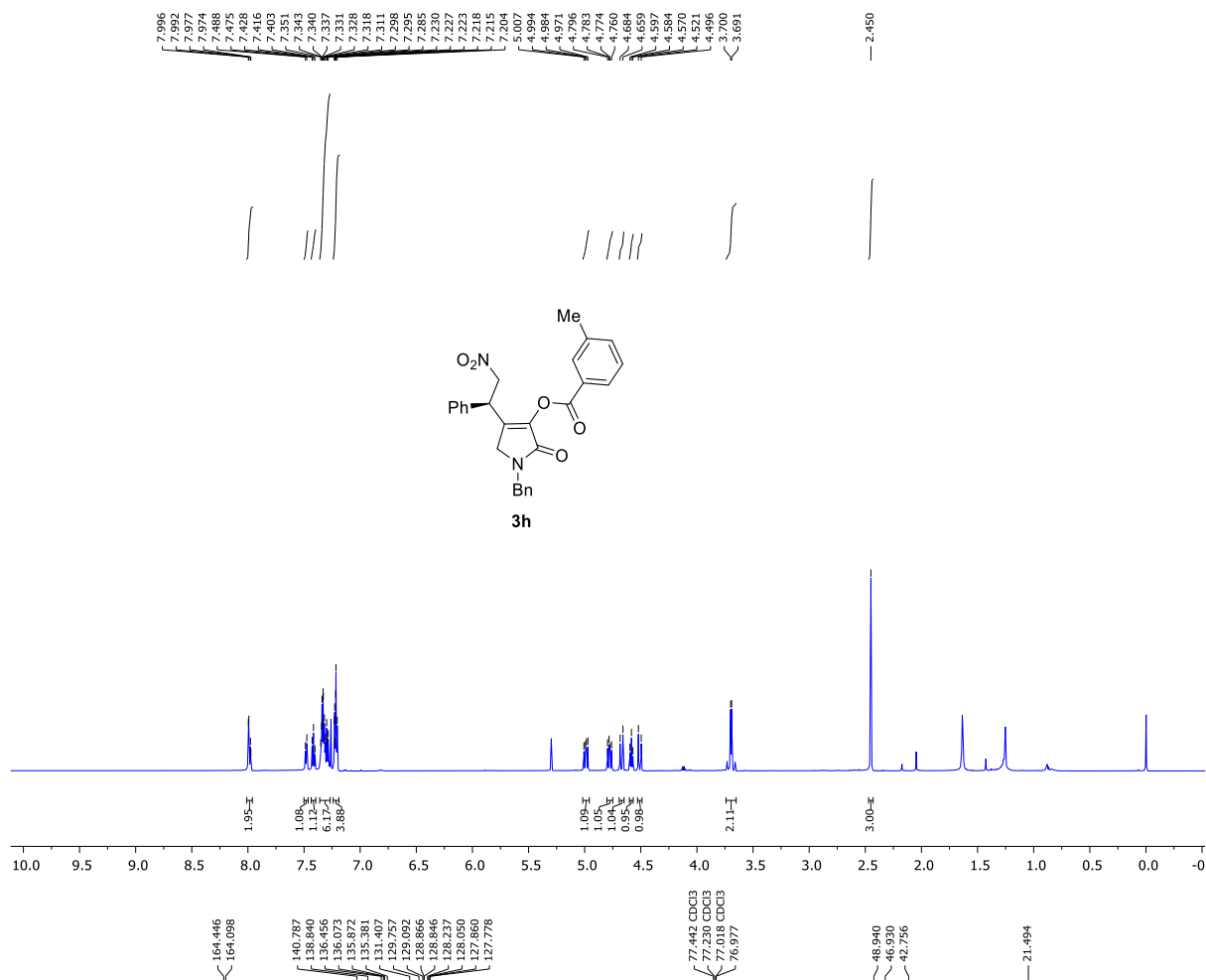


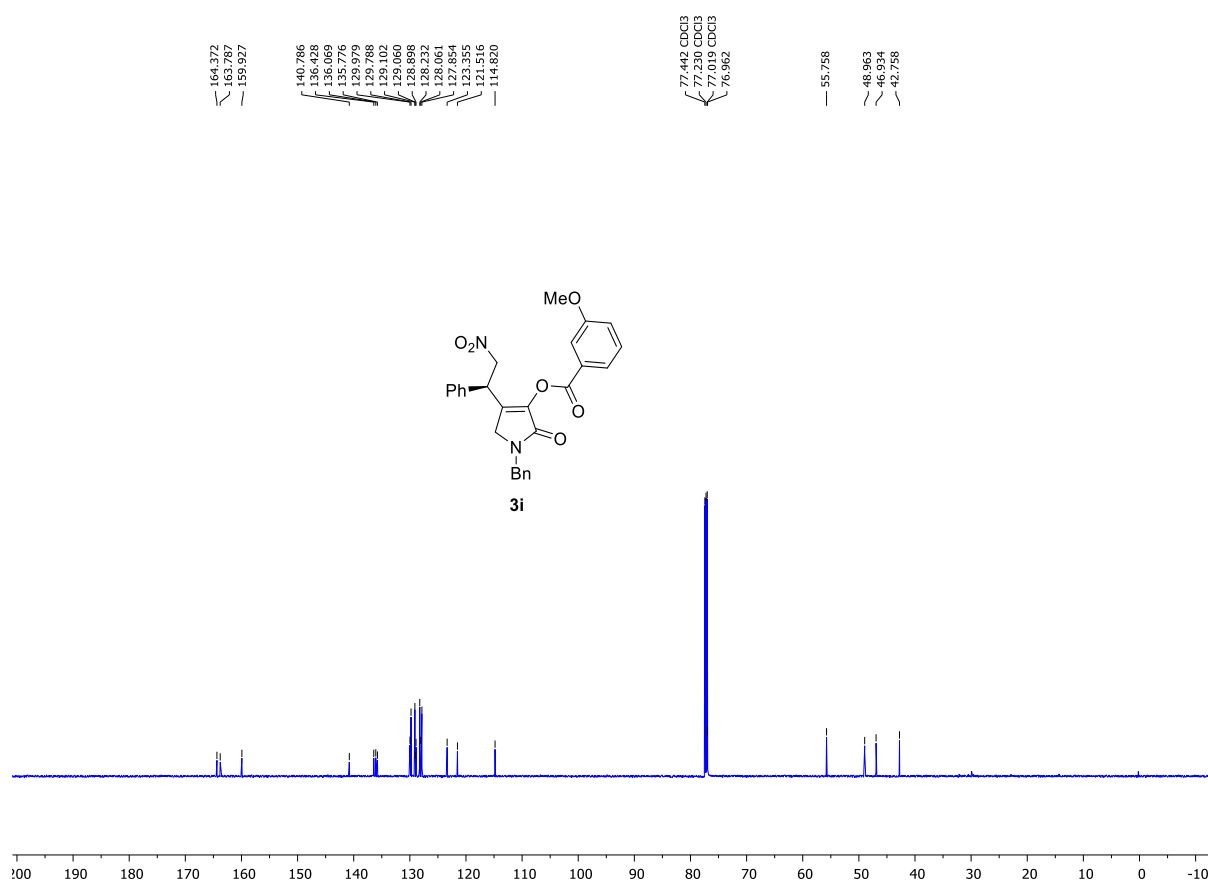
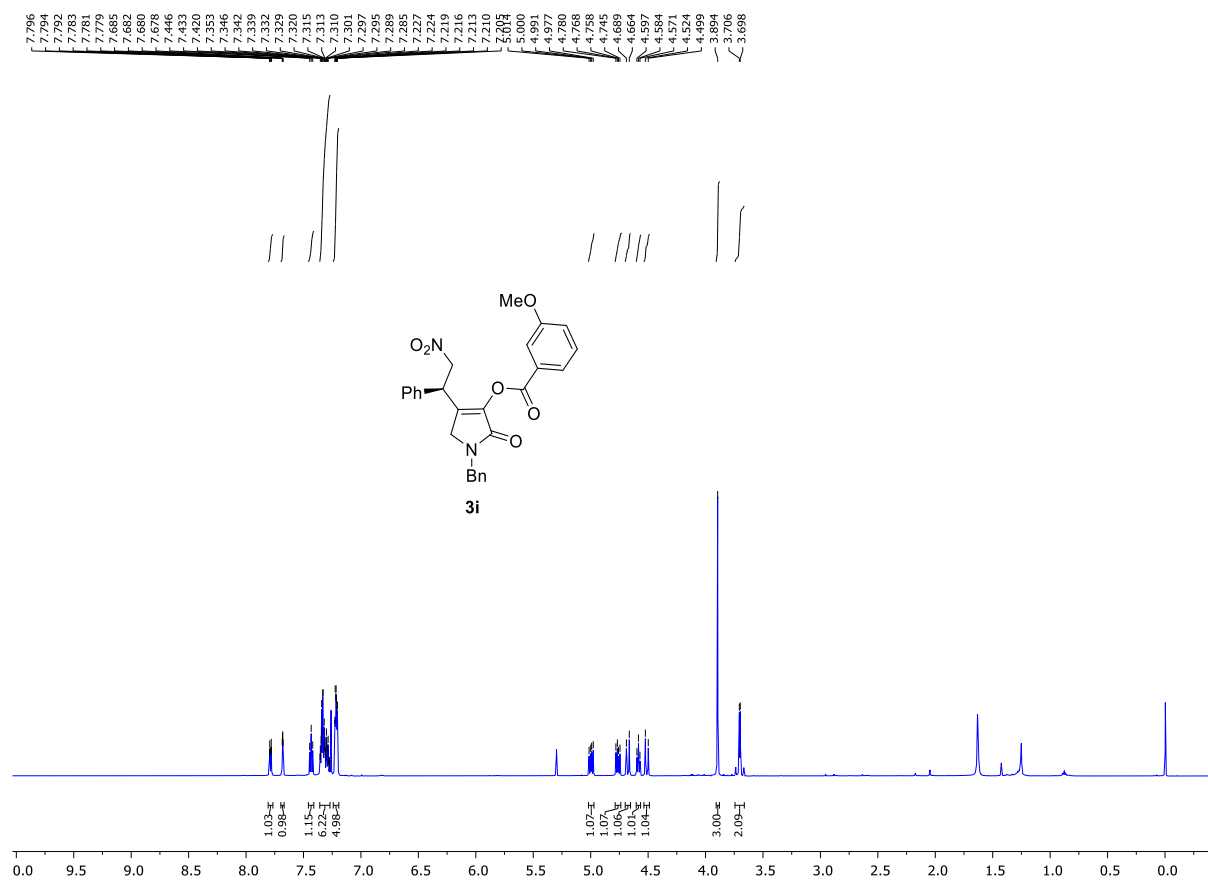


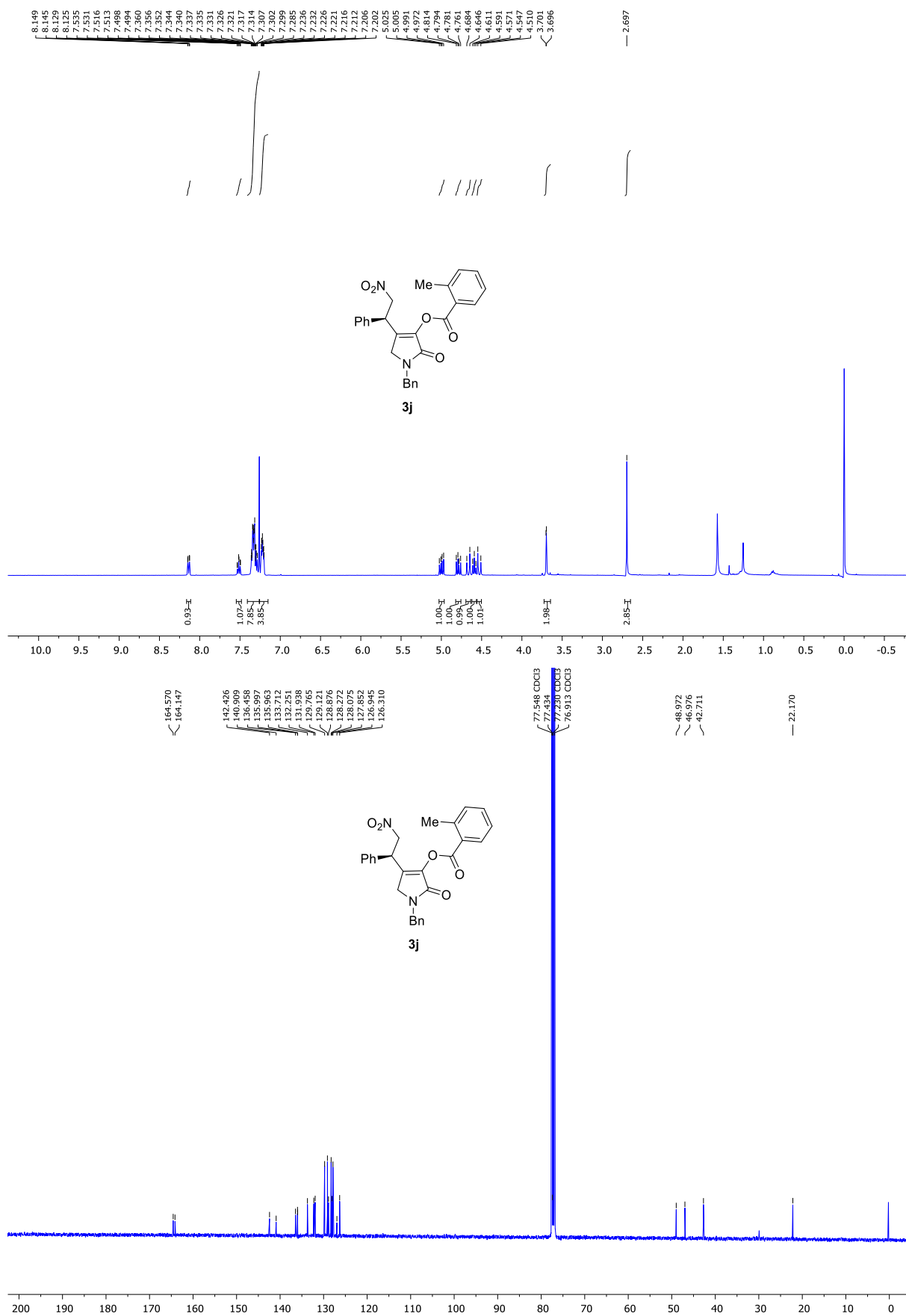


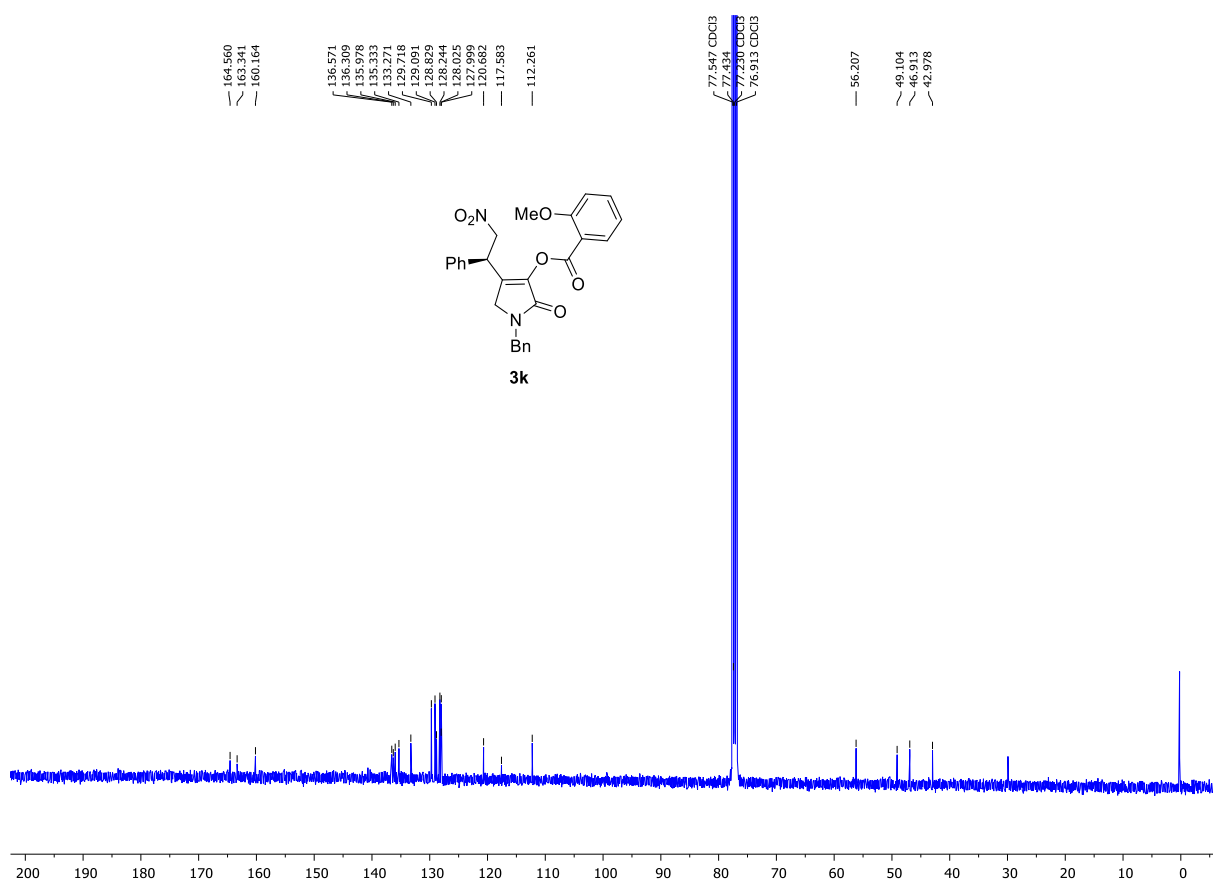
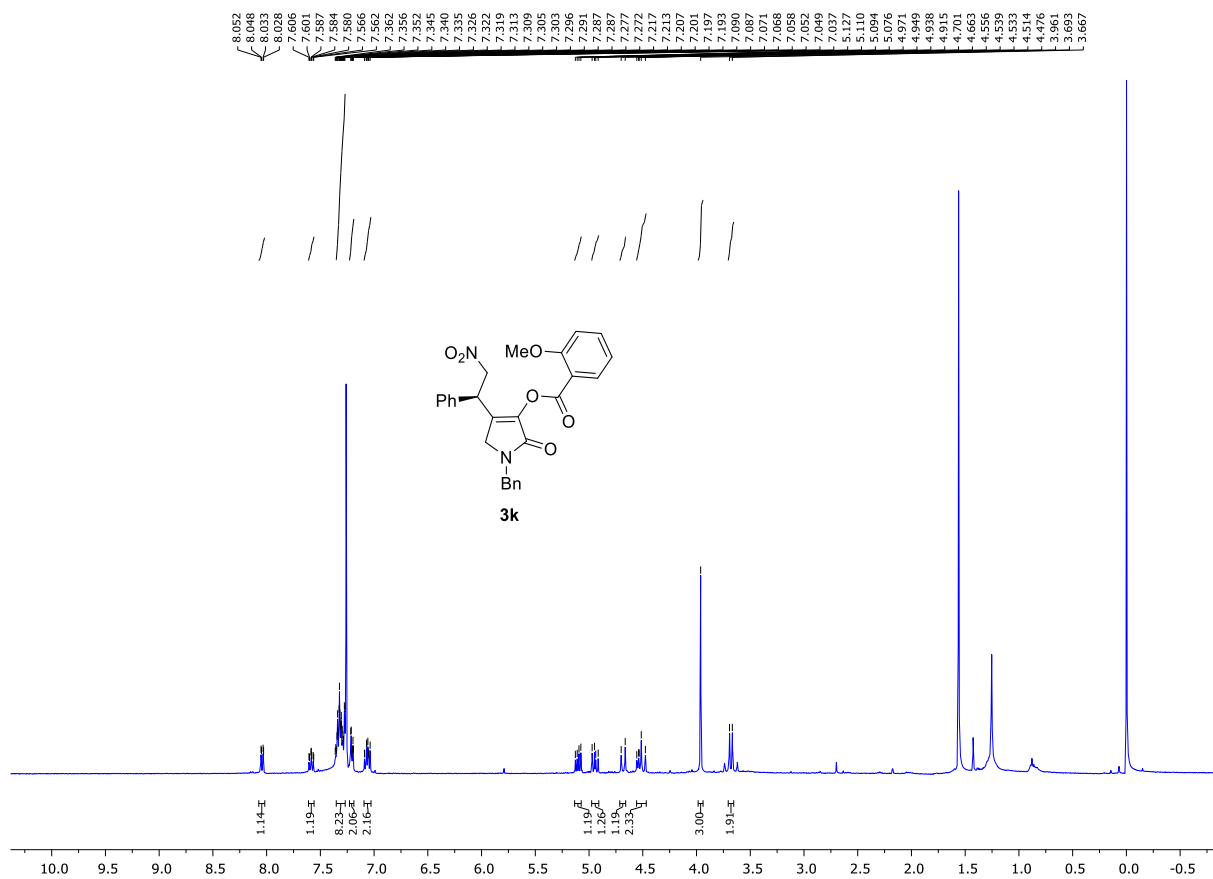


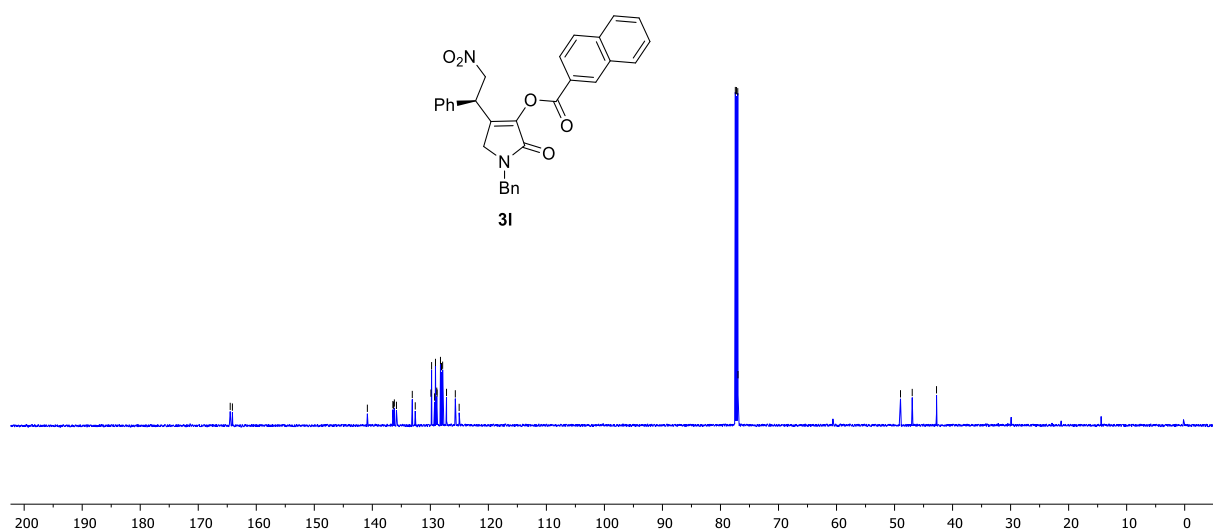
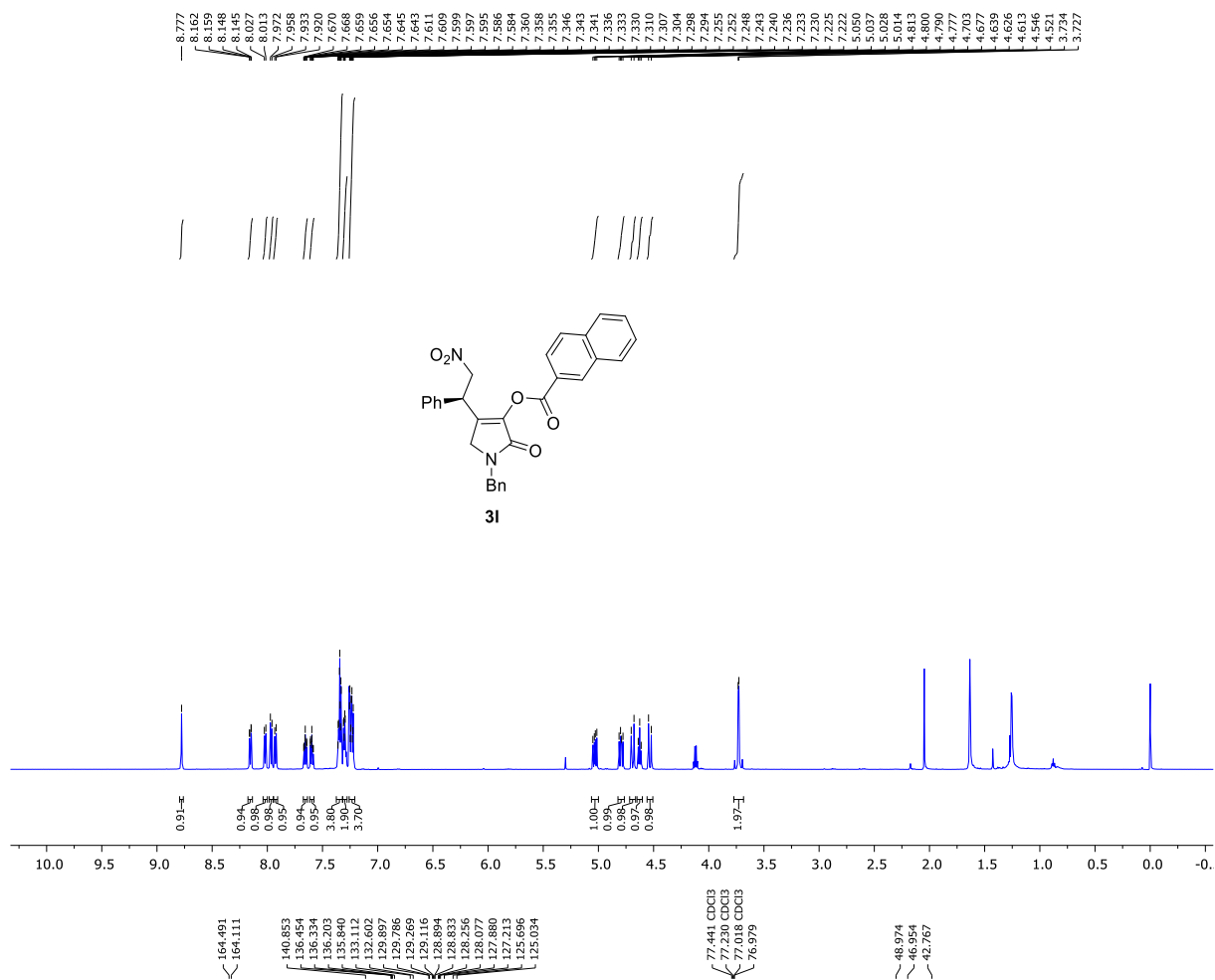


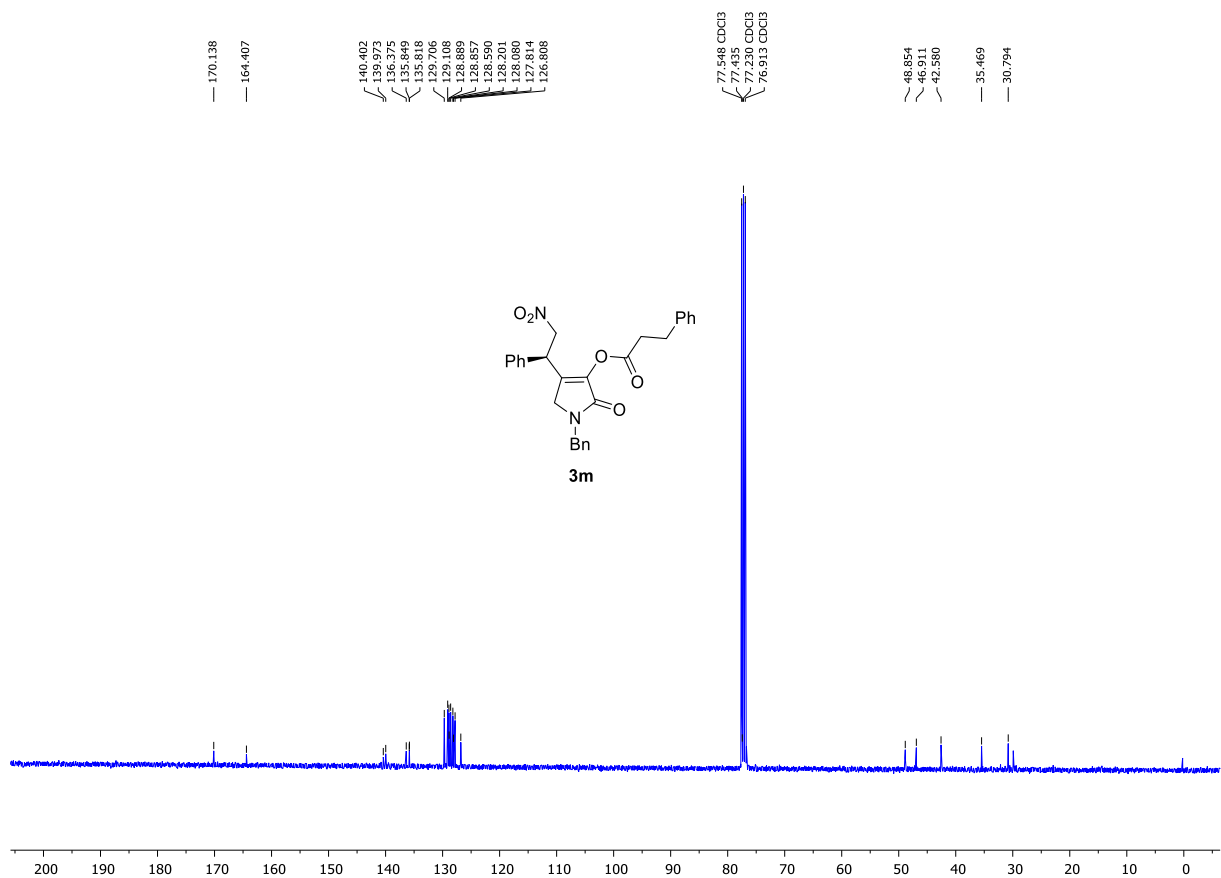
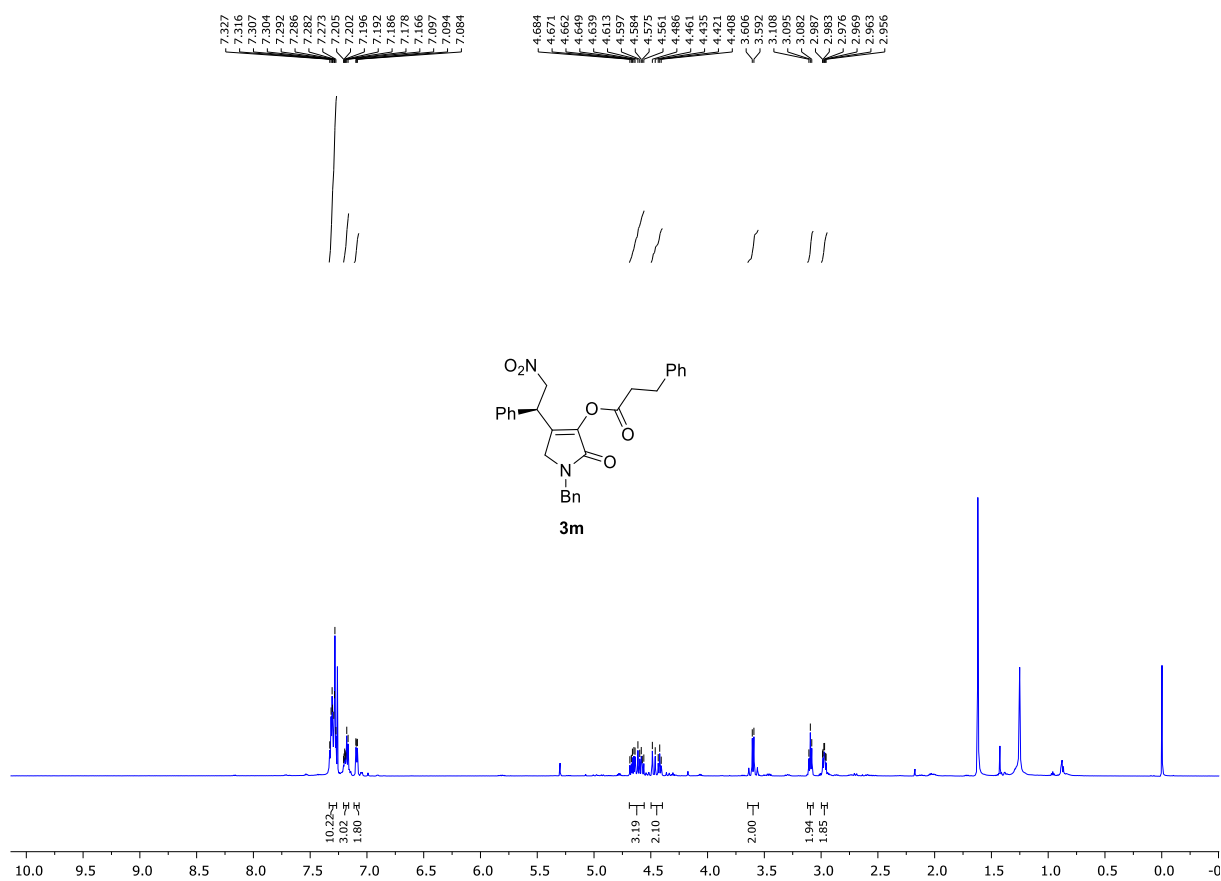


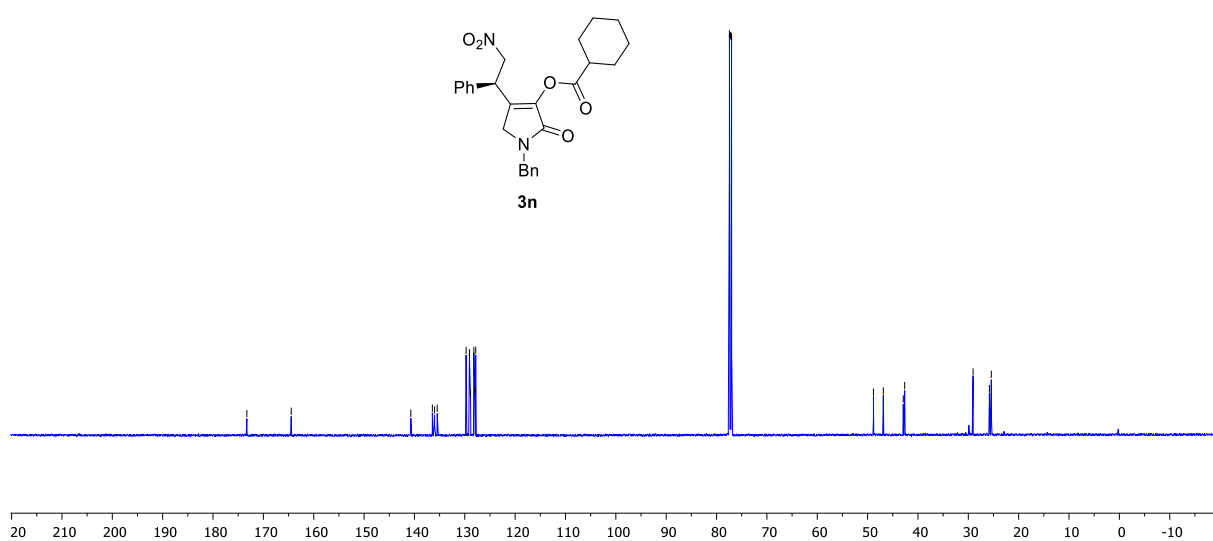
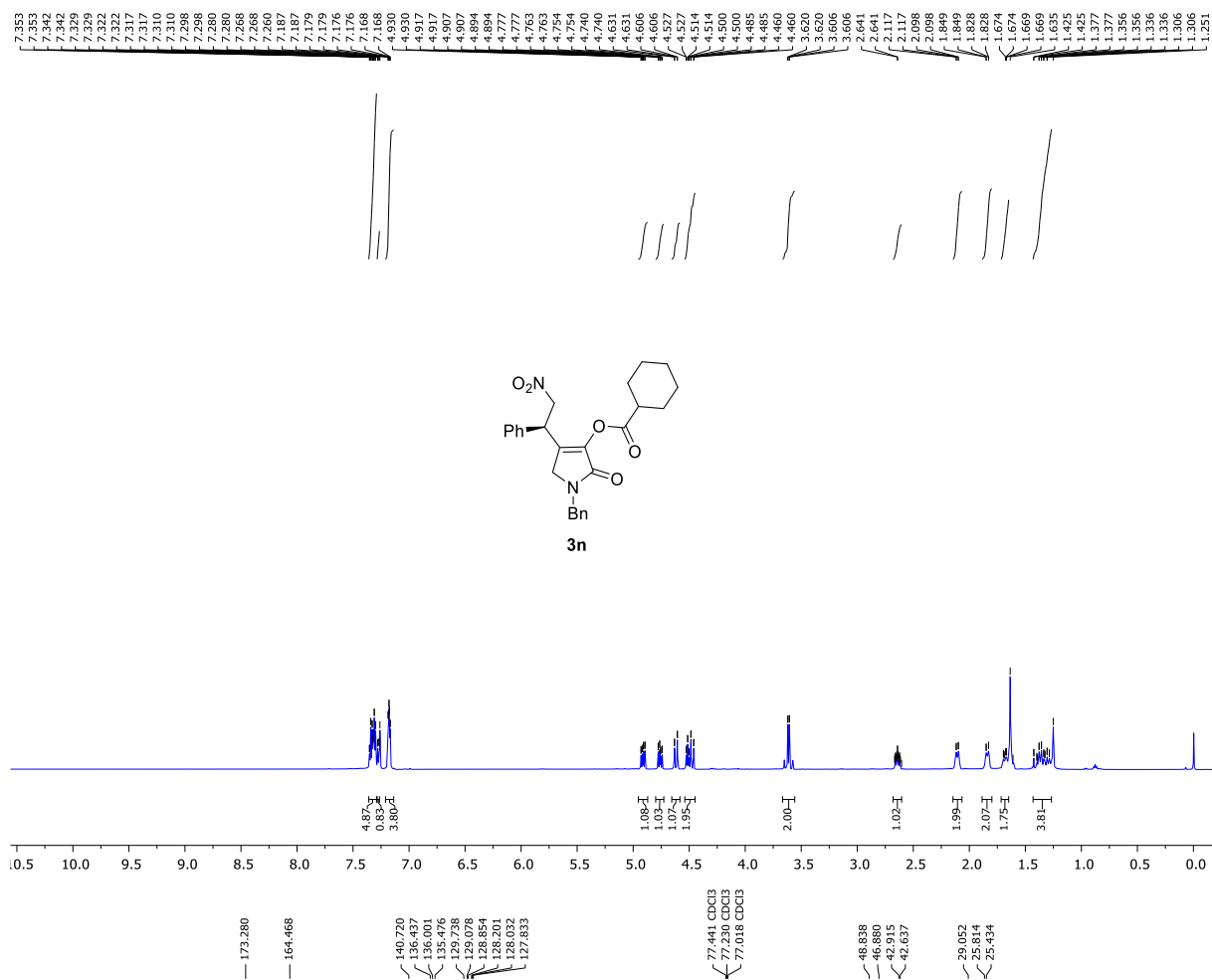


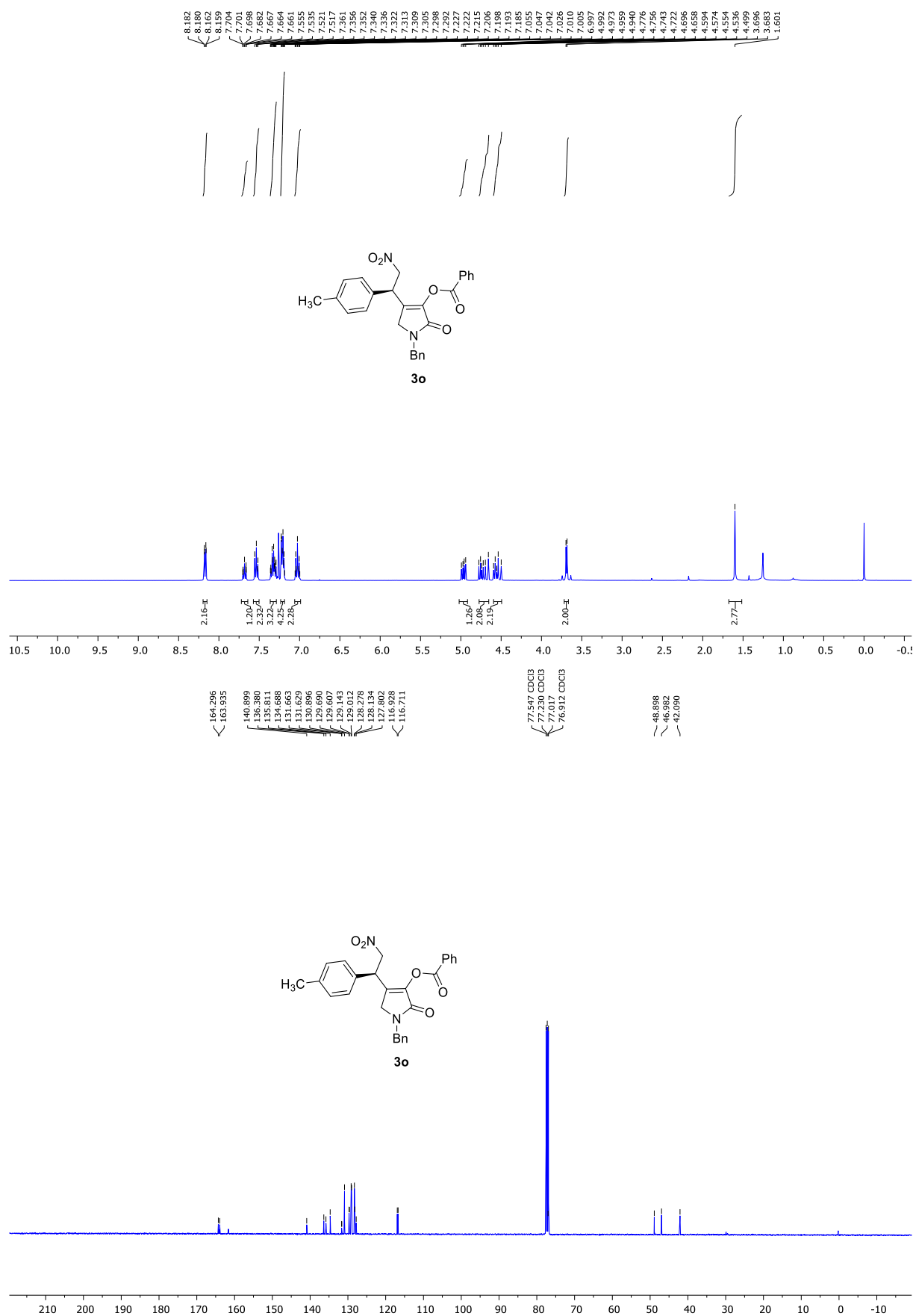


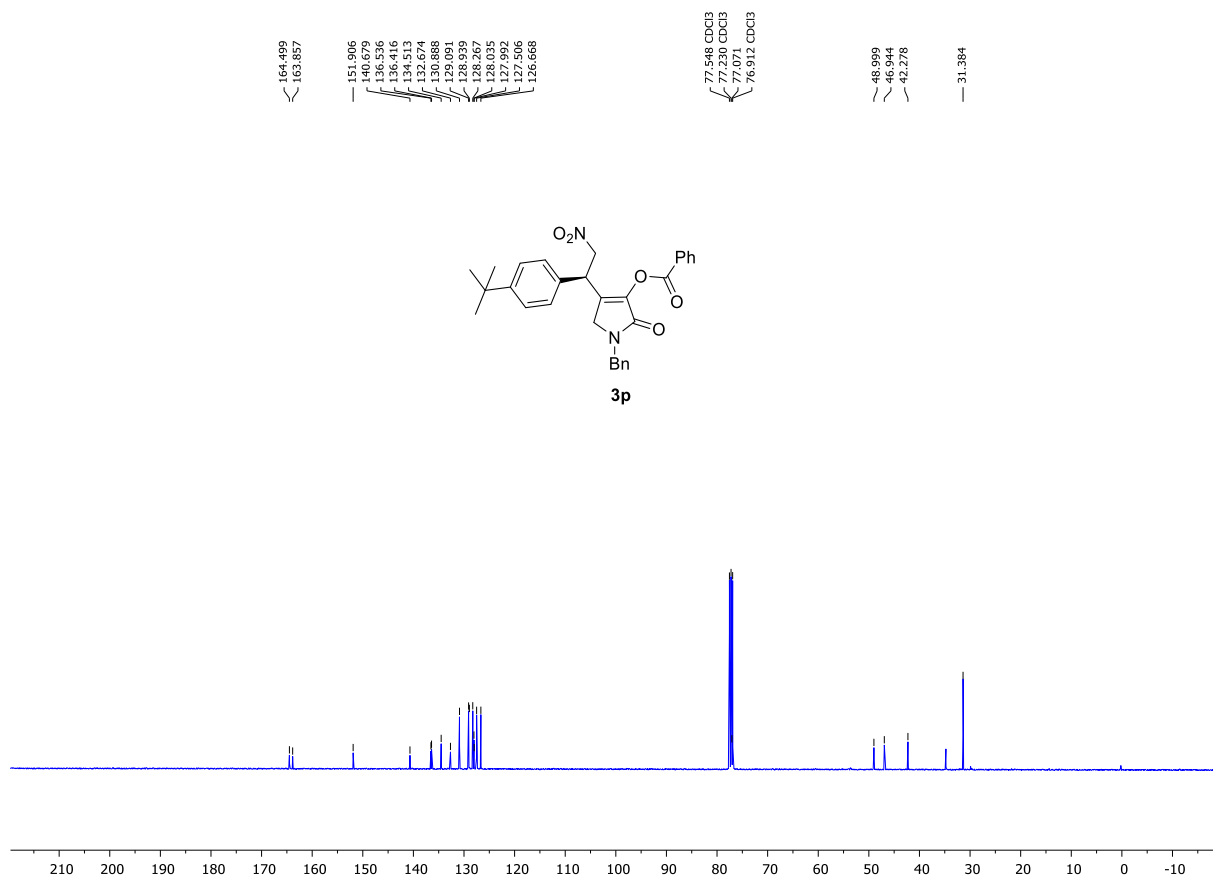
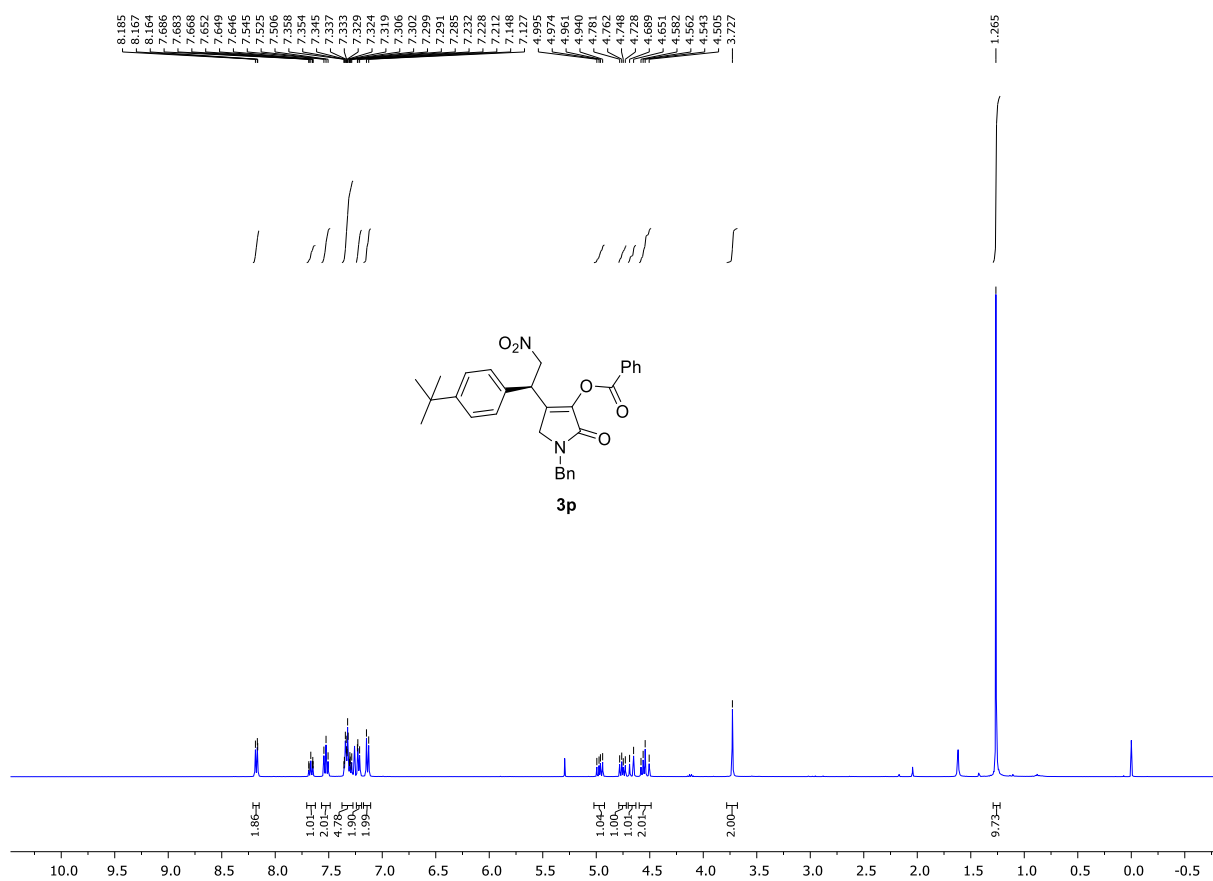


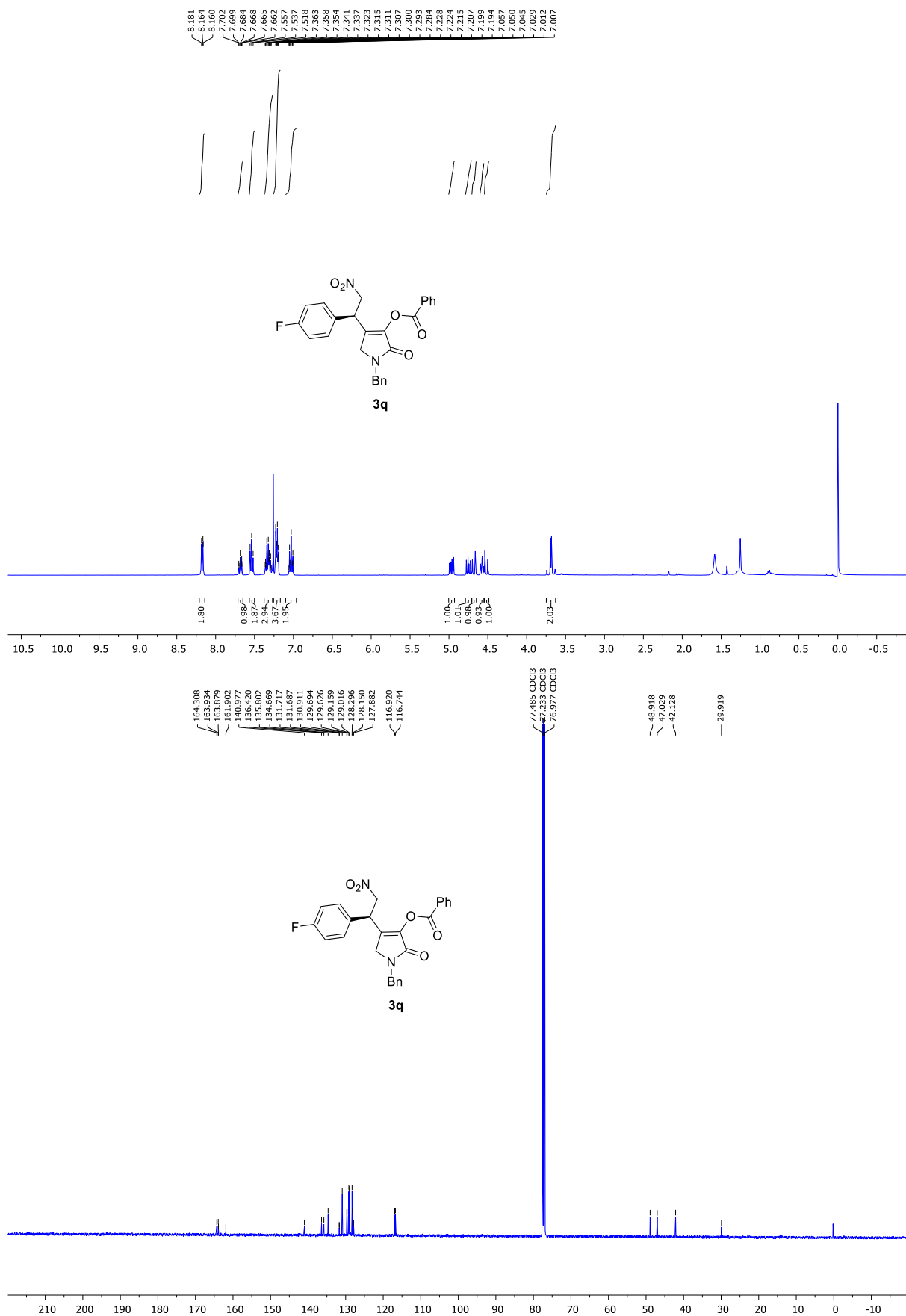


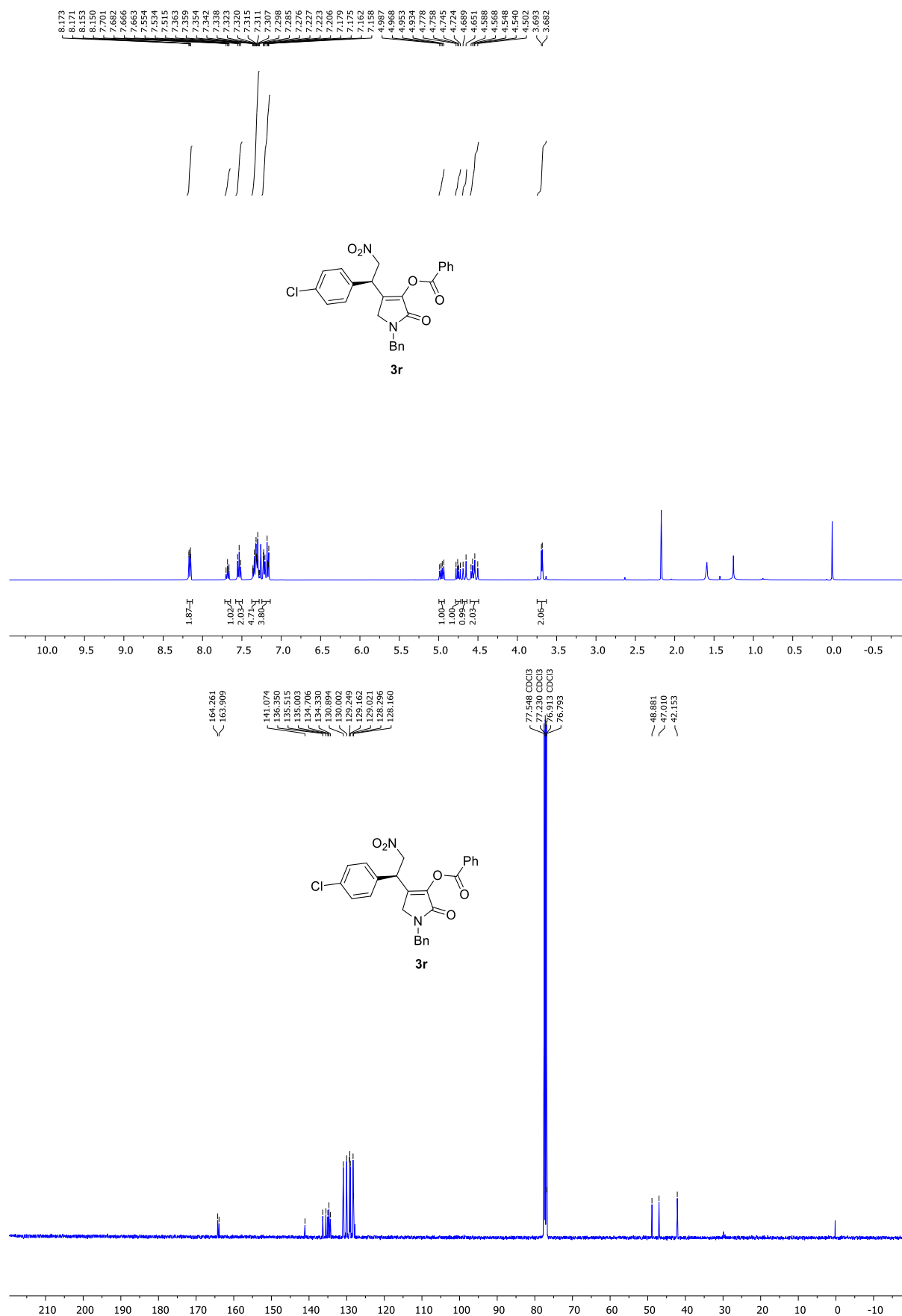


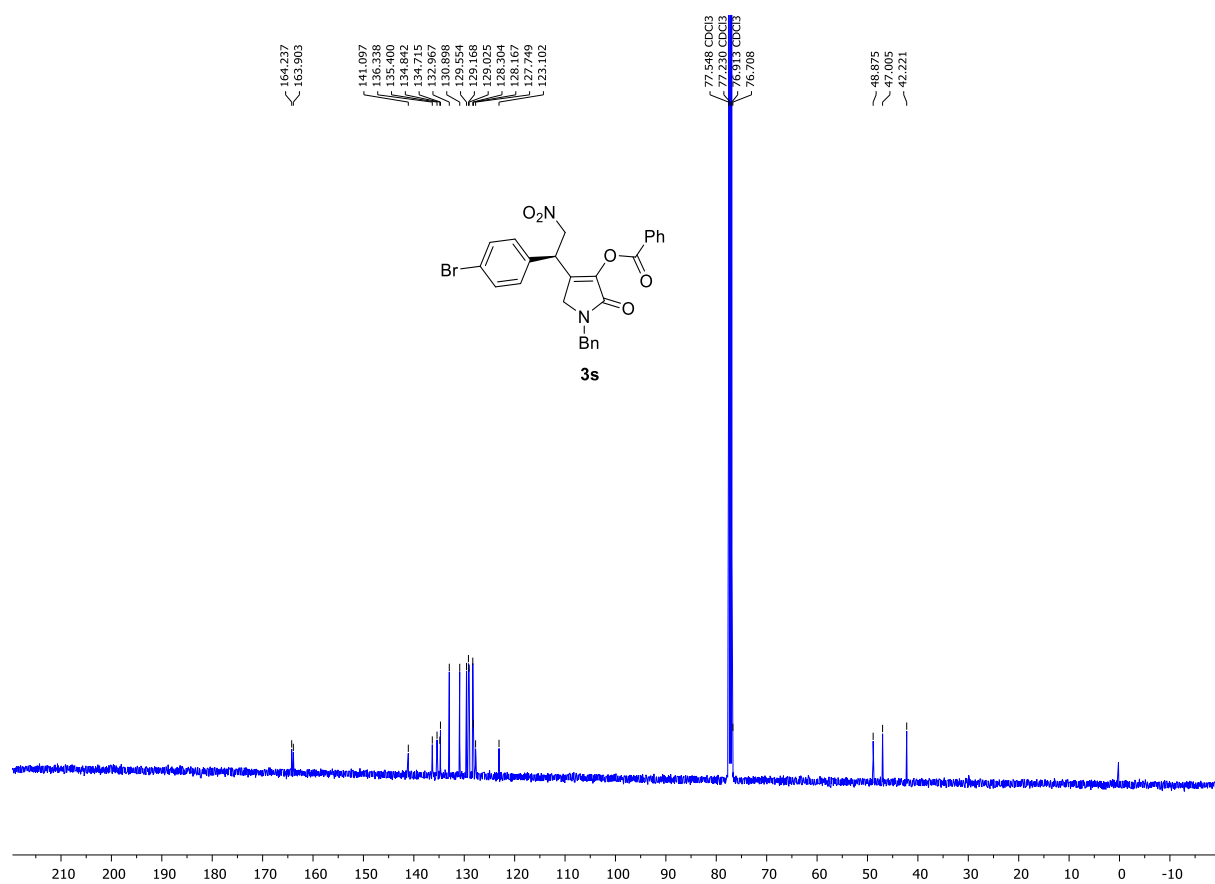
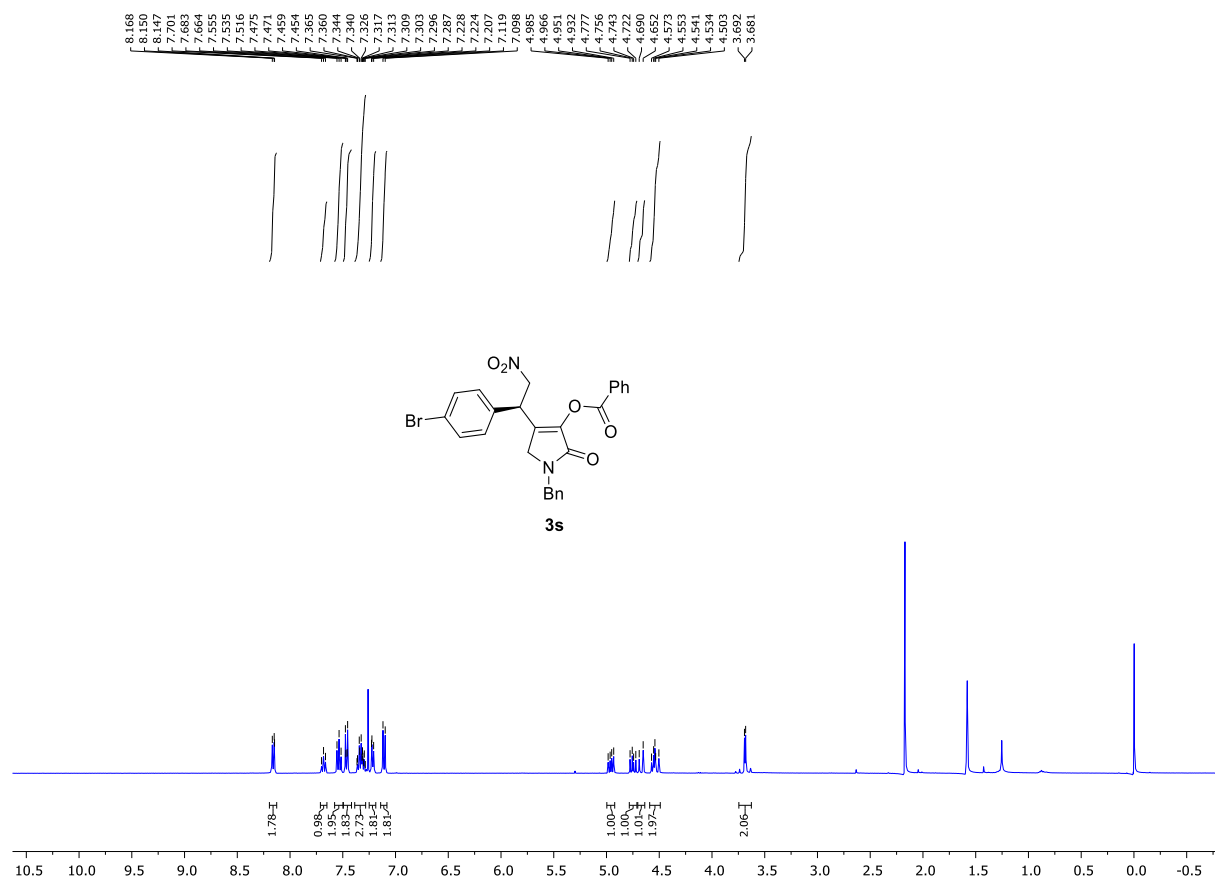


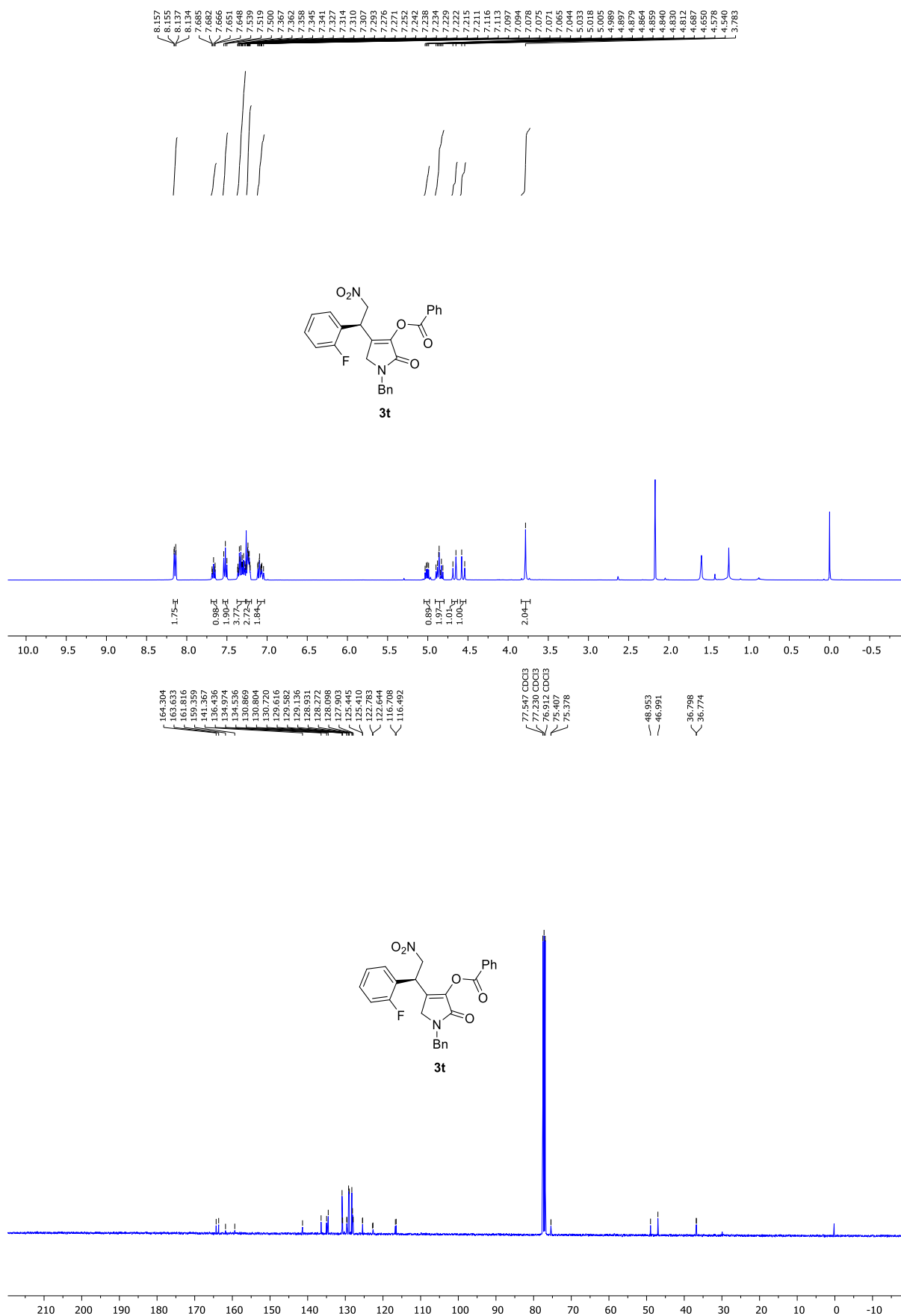


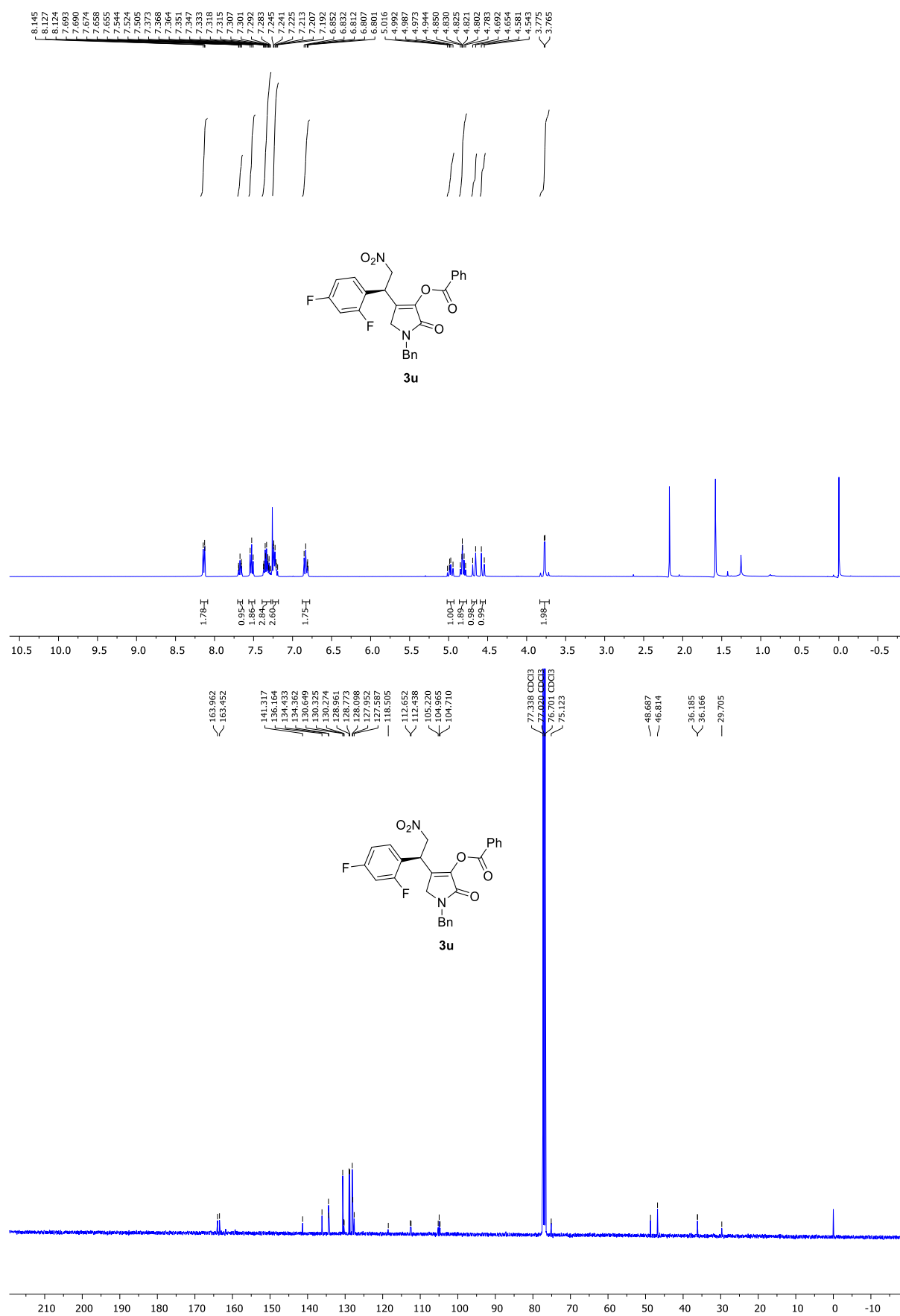


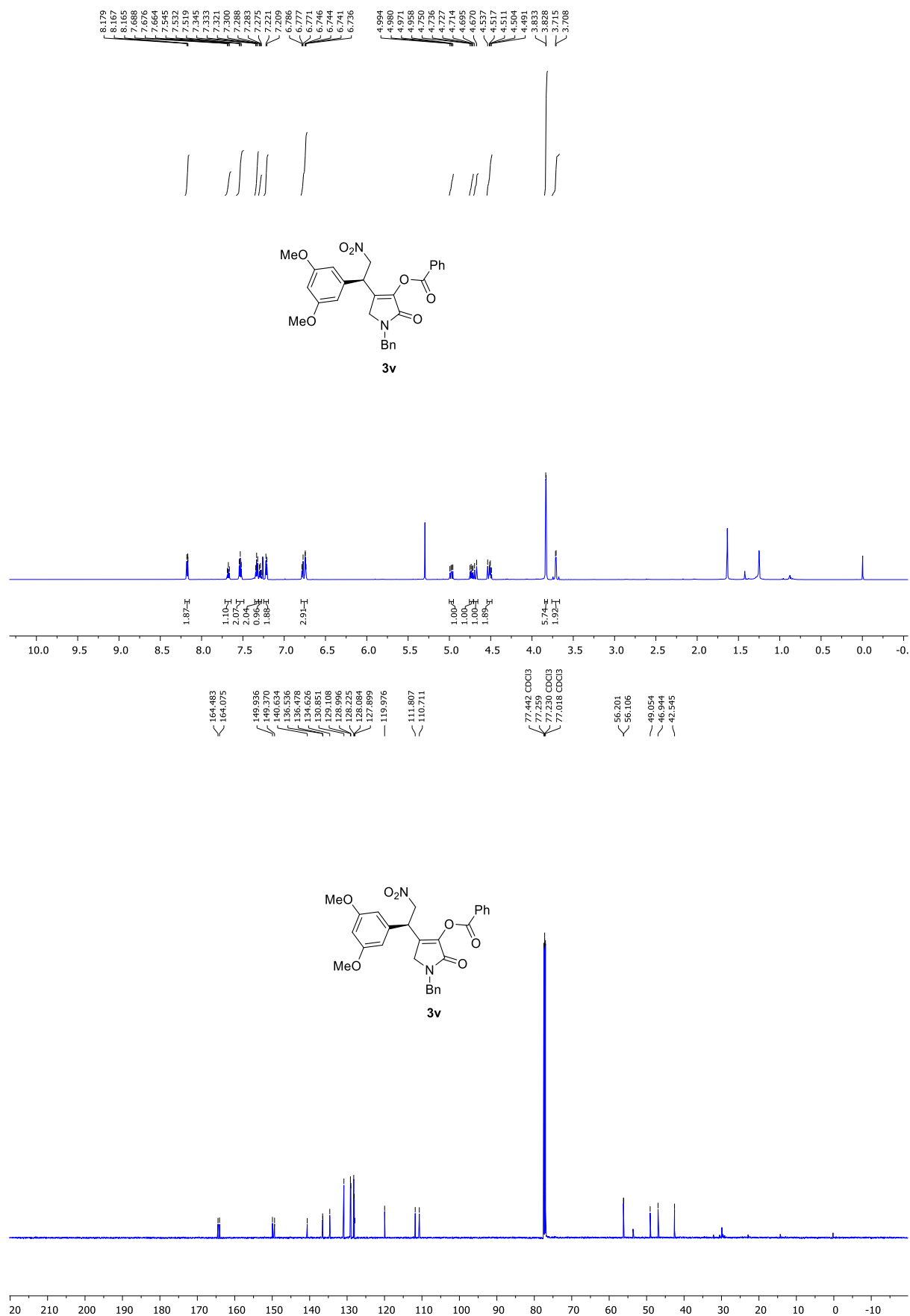


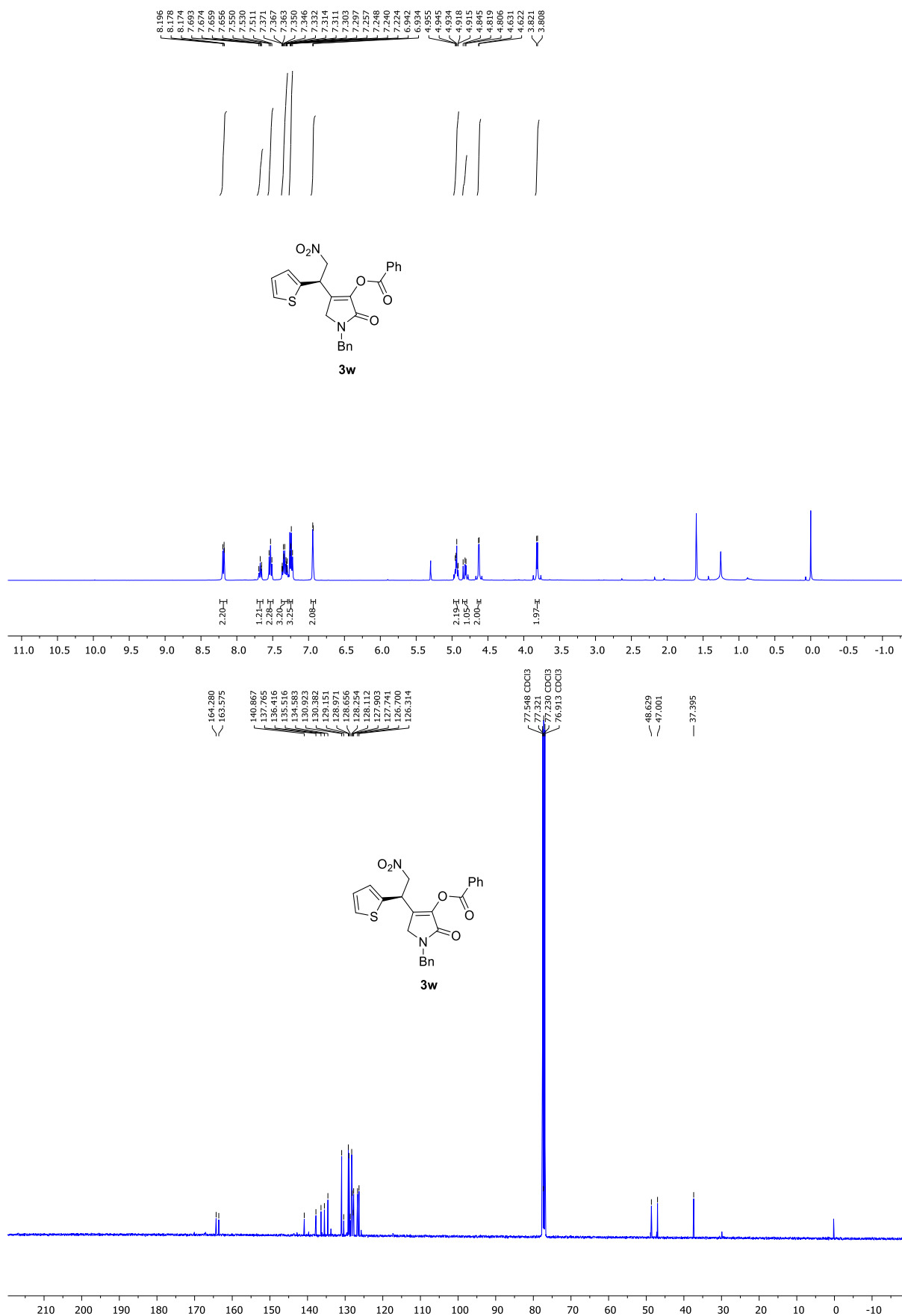


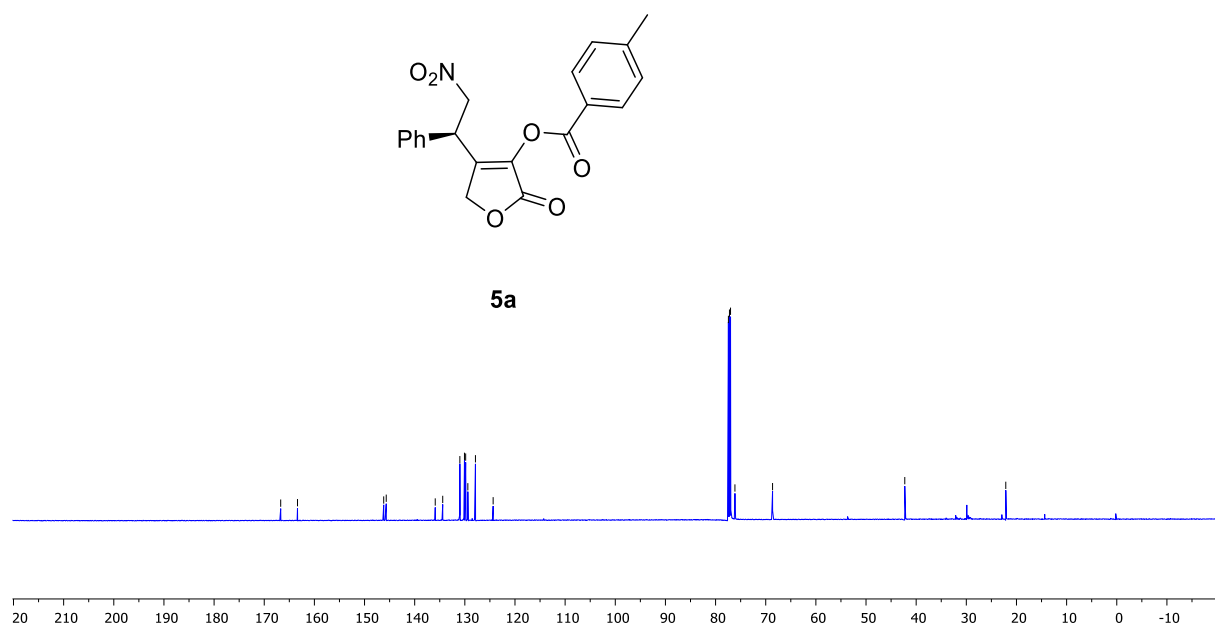
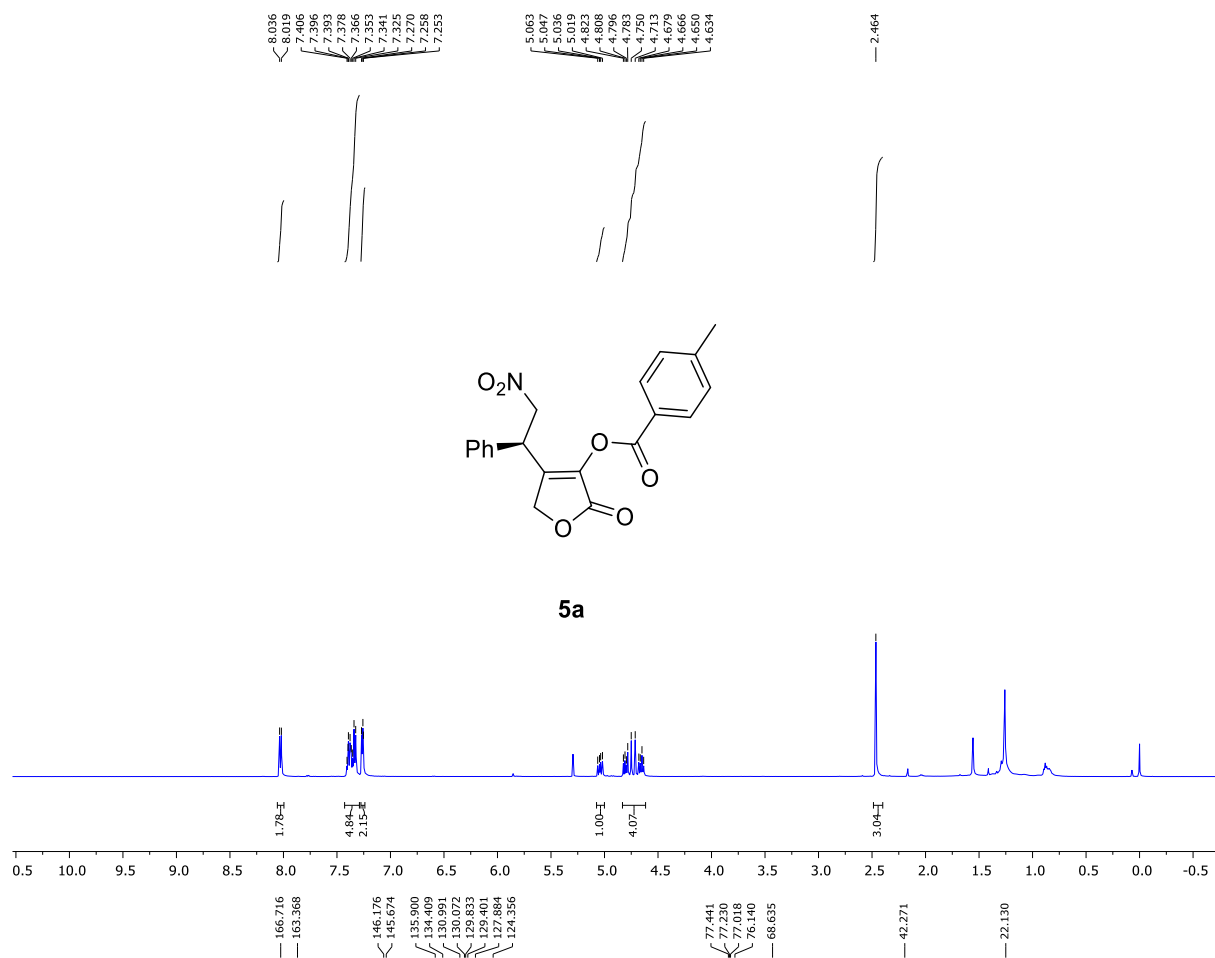


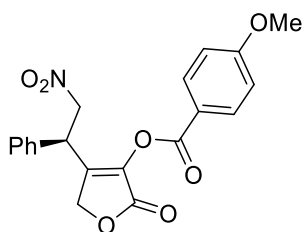
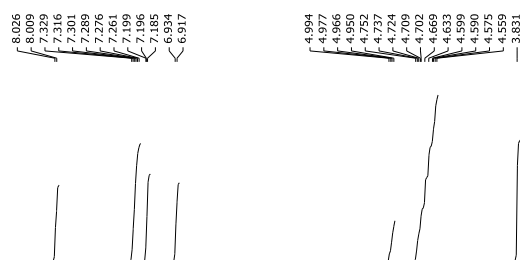




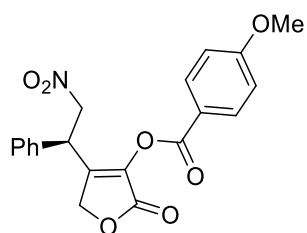
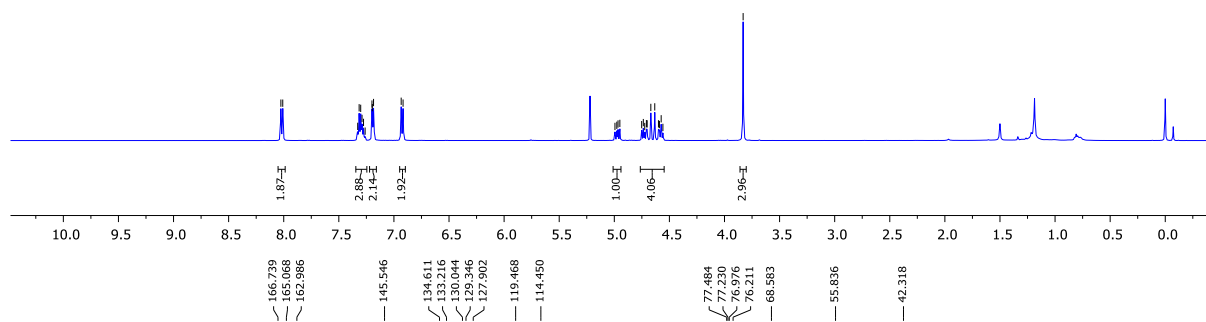




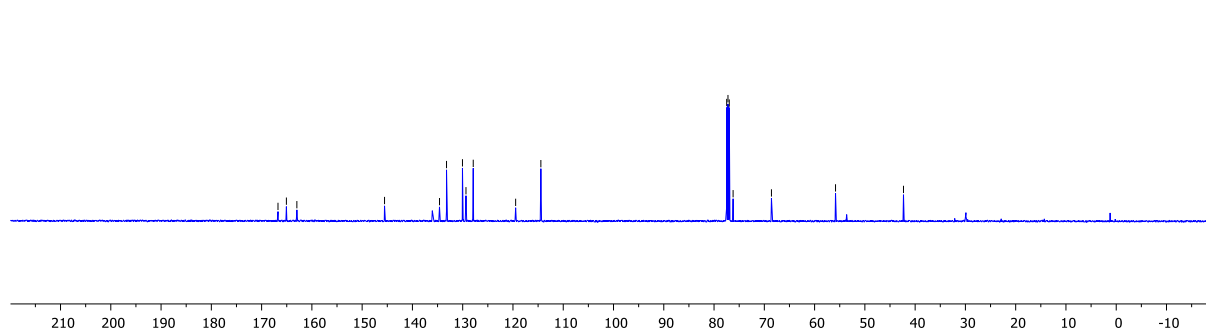




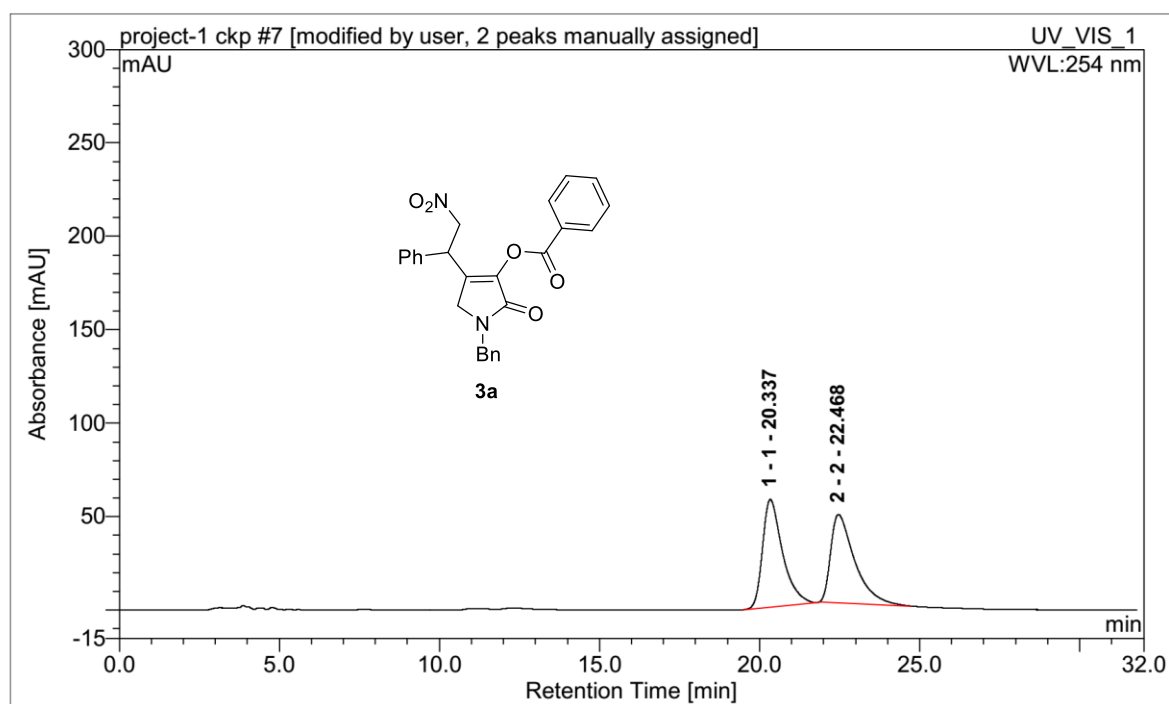
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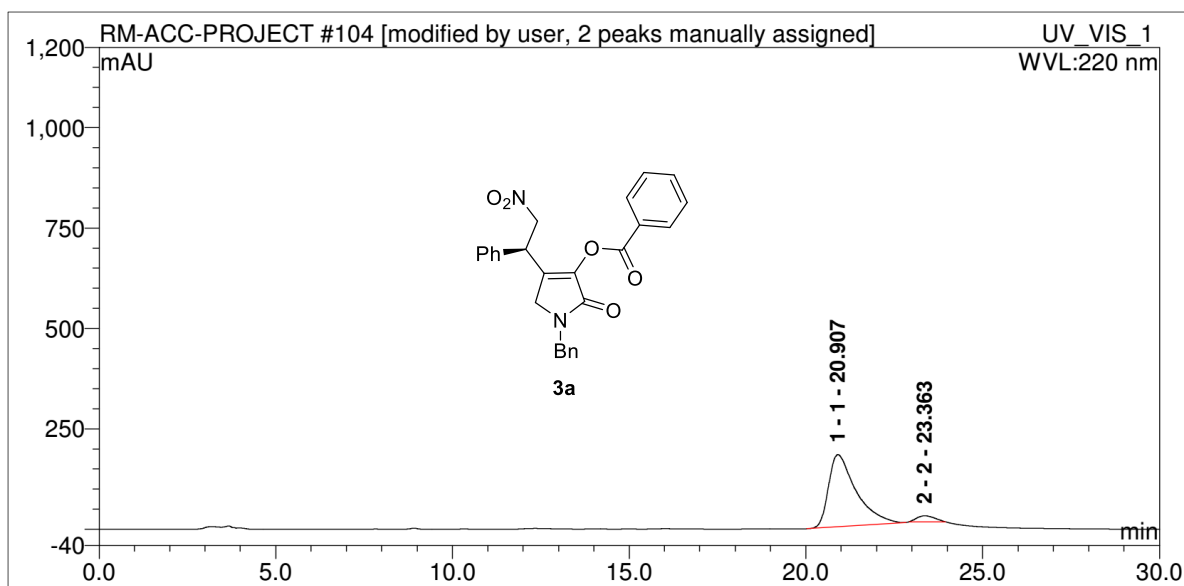
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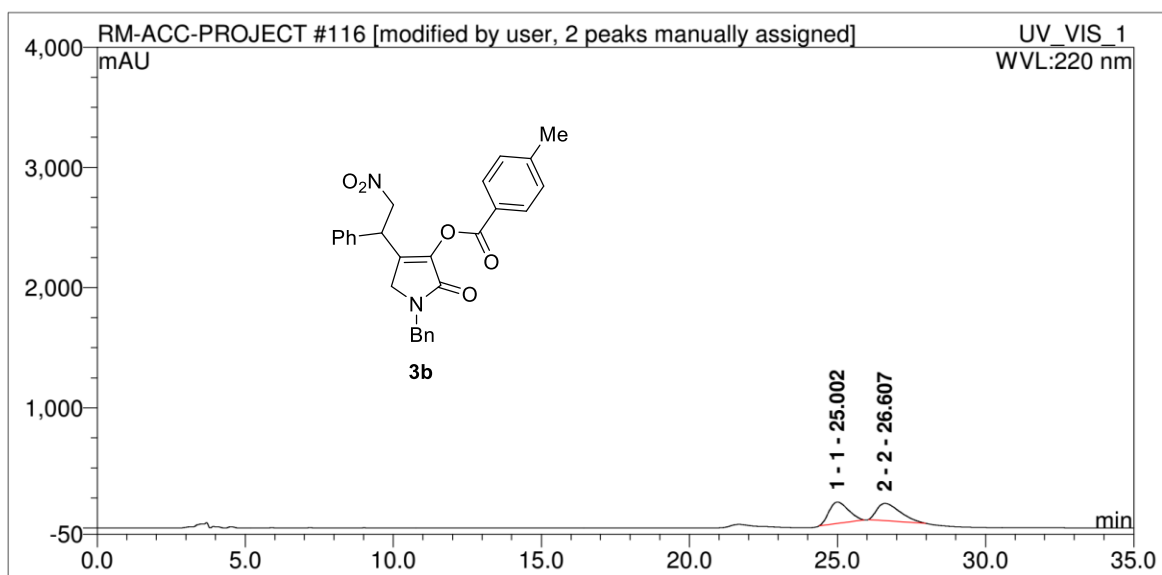
7. HPLC spectra of the products



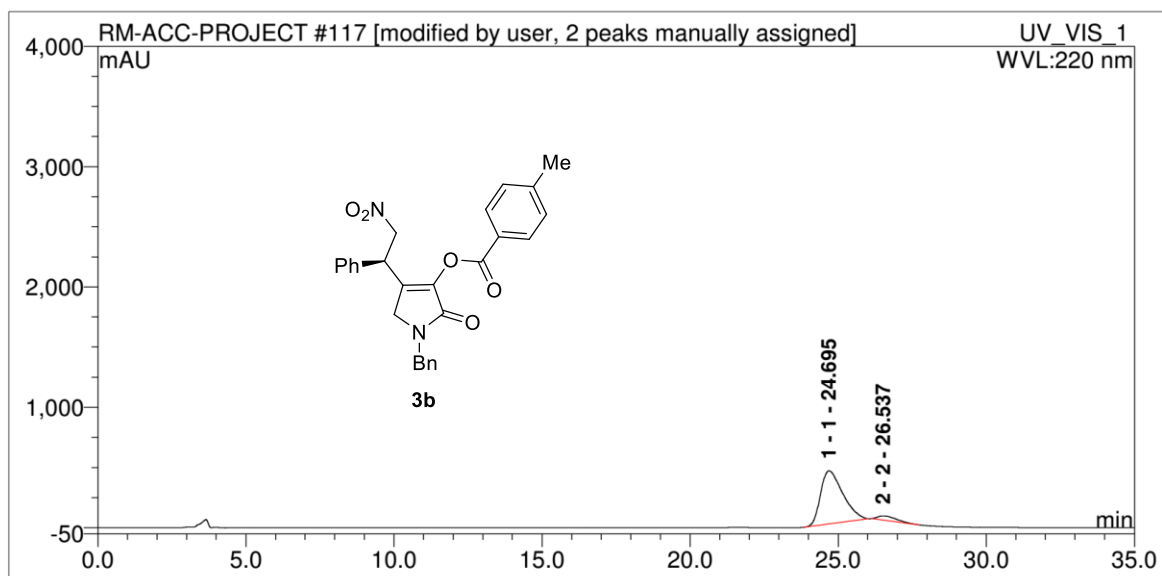
No.	Peak Name	Ret.Time (detected) min	Area mAU*min	Rel.Area(ident.) %	Height mAU	Amount
1 1		20.34	41.85811	50.38787979	57.64804	n.a.
2 2		22.47	41.214	49.61212021	47.394	n.a.



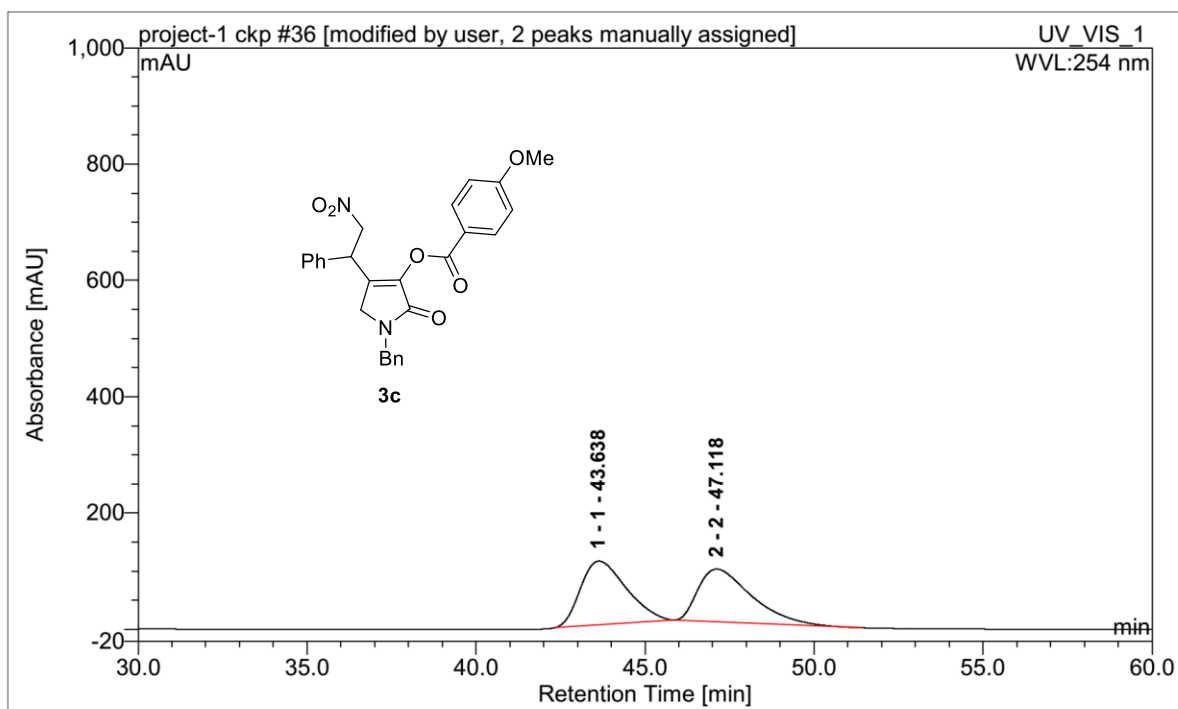
No.	Peak Name	Ret.Time (detected) min	Area mAU*min	Rel.Area(ident.) %	Height mAU	Amount
1 1		20.91	161.7176	94.83129978	179.7468	n.a.
2 2		23.36	8.814	5.168700222	14.981	n.a.



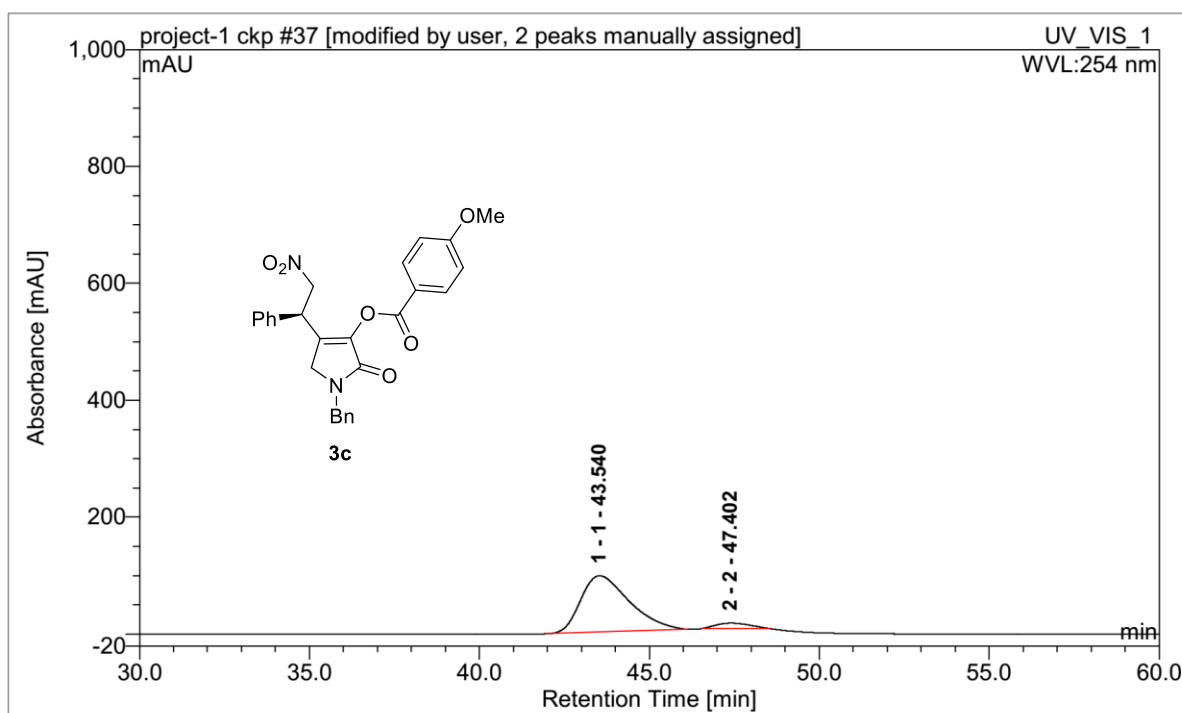
No.	Peak Name	Ret.Time (detected) min	Area mAU*min	Rel.Area(ident.) %	Height mAU	Amount
1	1	25.00	134.1507	50.49742646	177.5183	n.a.
2	2	26.61	131.508	49.50257354	143.190	n.a.



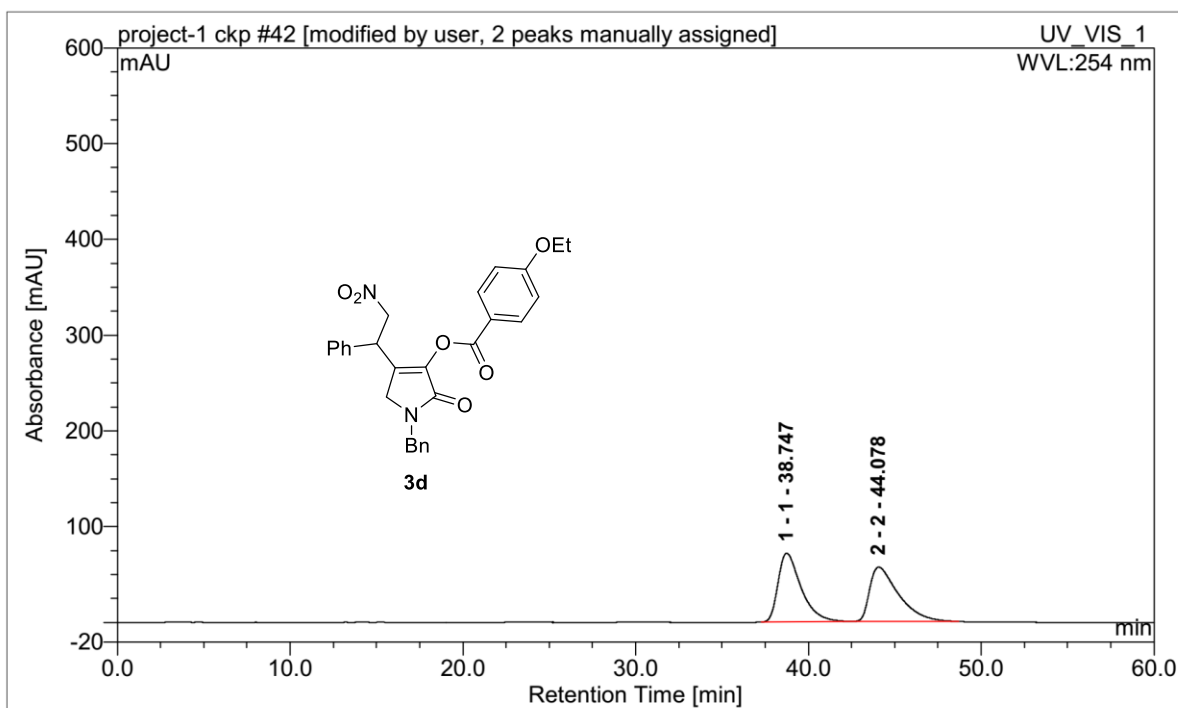
No.	Peak Name	Ret.Time (detected) min	Area mAU*min	Rel.Area(ident.) %	Height mAU	Amount
1	1	24.70	384.0506	93.66713089	440.6287	n.a.
2	2	26.54	25.966	6.332869113	34.231	n.a.



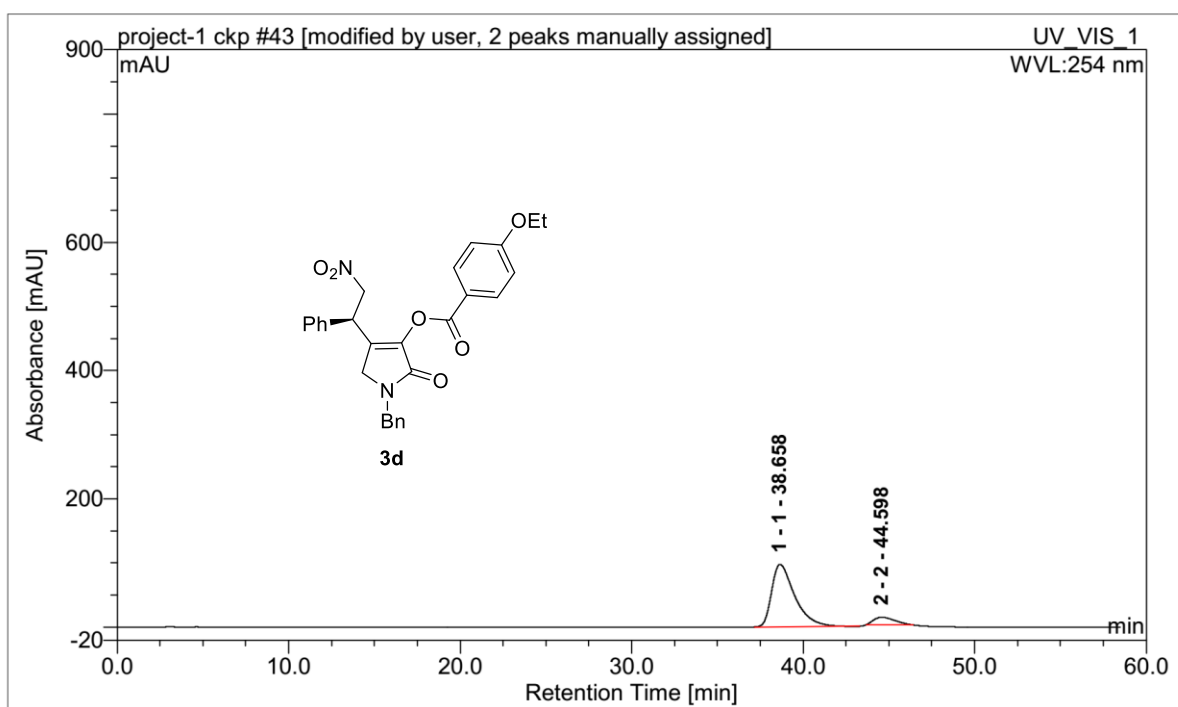
No.	Peak Name	Ret.Time (detected) min	Area mAU*min	Rel.Area(ident.) %	Height mAU	Amount
1	1	43.64	170.4751	50.71063113	109.3246	n.a.
2	2	47.12	165.697	49.28936887	90.290	n.a.



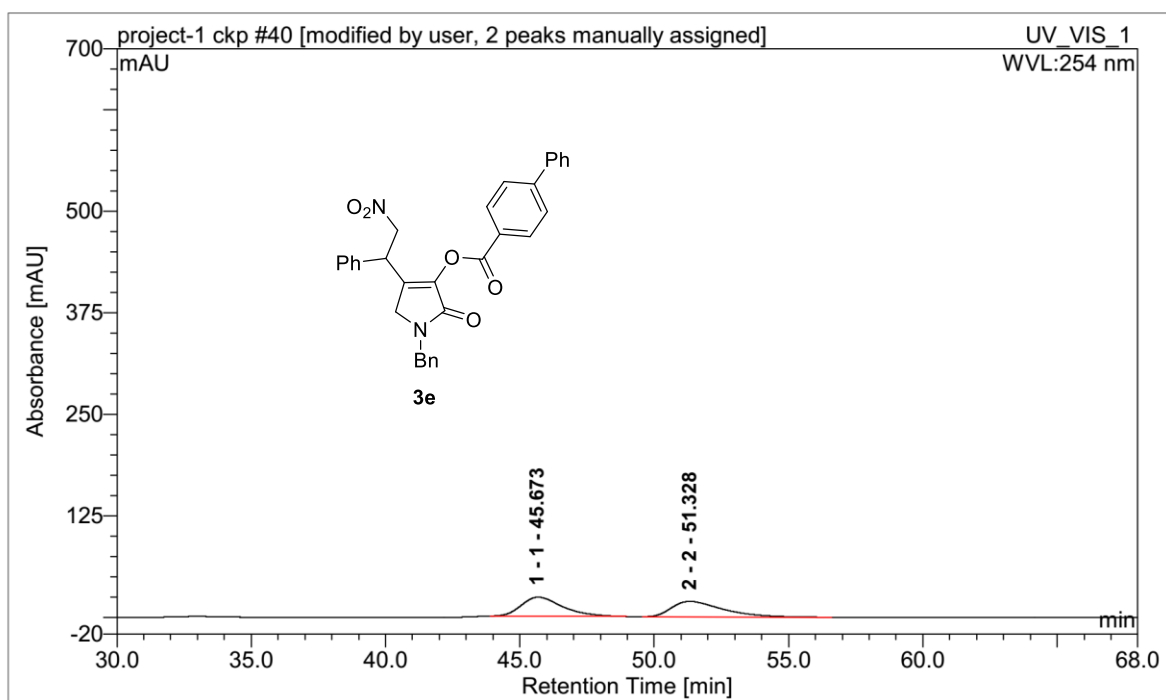
No.	Peak Name	Ret.Time (detected) min	Area mAU*min	Rel.Area(ident.) %	Height mAU	Amount
1	1	43.54	159.3508	93.55762674	96.30458	n.a.
2	2	47.40	10.973	6.442373257	9.368	n.a.



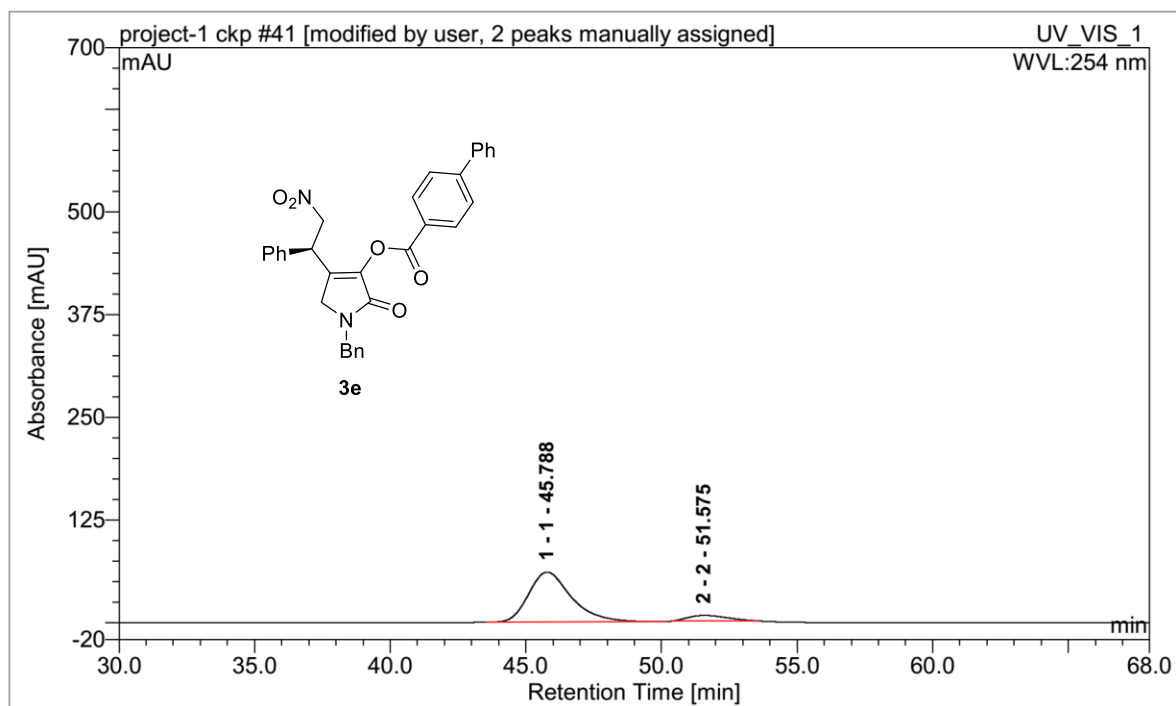
No.	Peak Name	Ret.Time (detected) min	Area mAU*min	Rel.Area(ident.) %	Height mAU	Amount
1 1		38.75	110.3236	50.23289711	71.69794	n.a.
2 2		44.08	109.301	49.76710289	56.554	n.a.



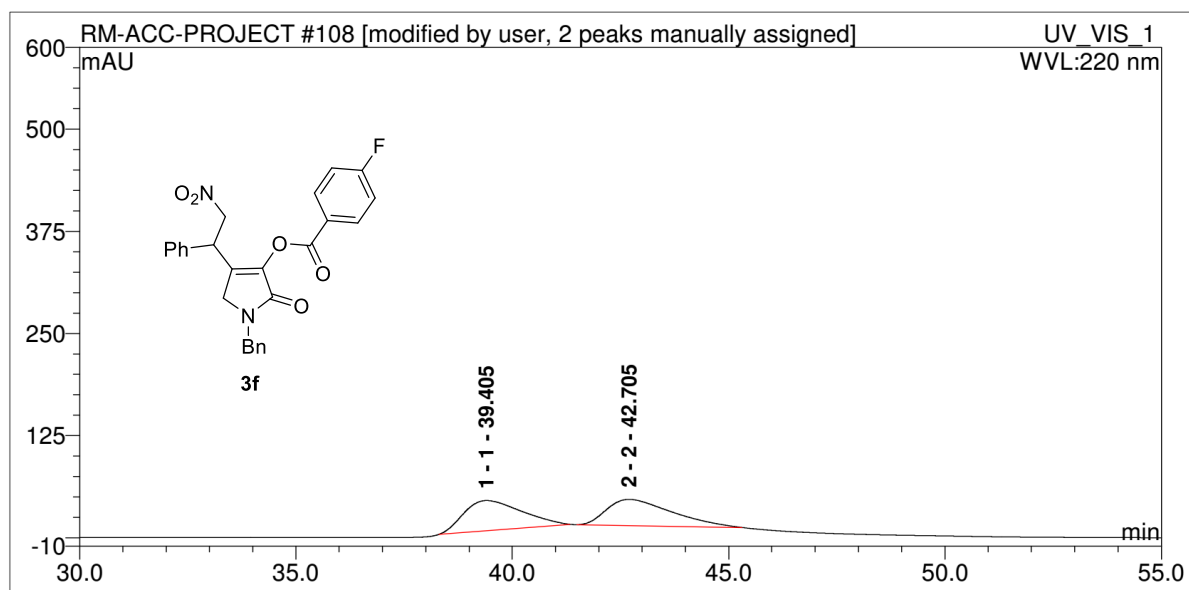
No.	Peak Name	Ret.Time (detected) min	Area mAU*min	Rel.Area(ident.) %	Height mAU	Amount
1 1		38.66	151.6129	89.74085595	97.43533	n.a.
2 2		44.60	17.332	10.25914405	11.910	n.a.



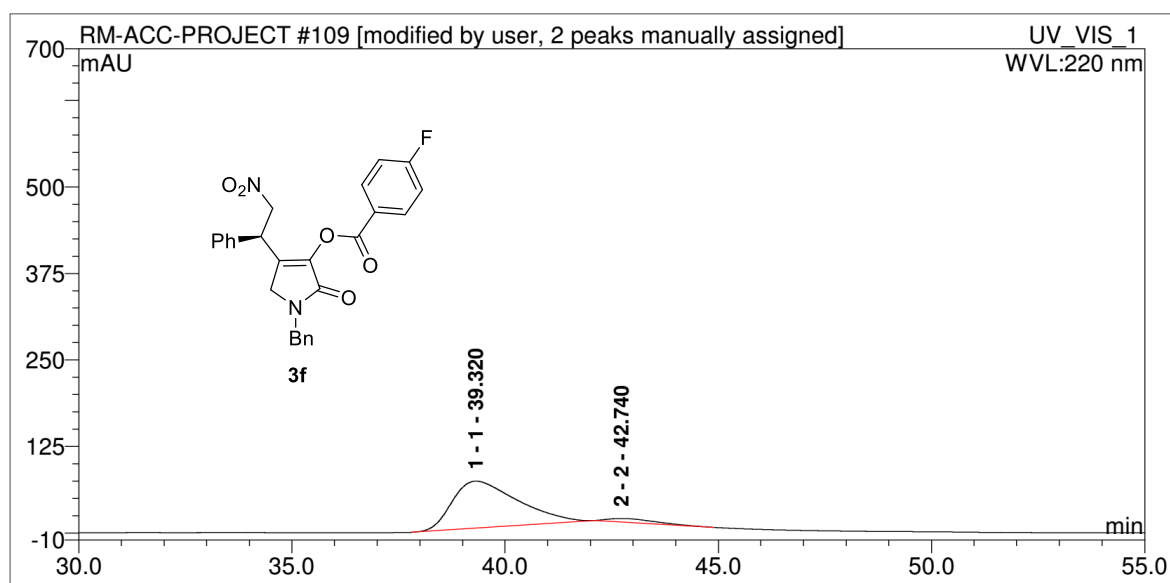
No.	Peak Name	Ret.Time (detected) min	Area mAU*min	Rel.Area(ident.) %	Height mAU	Amount
1 1		45.67	42.00401	49.96577891	23.43344	n.a.
2 2		51.33	42.062	50.03422109	19.054	n.a.



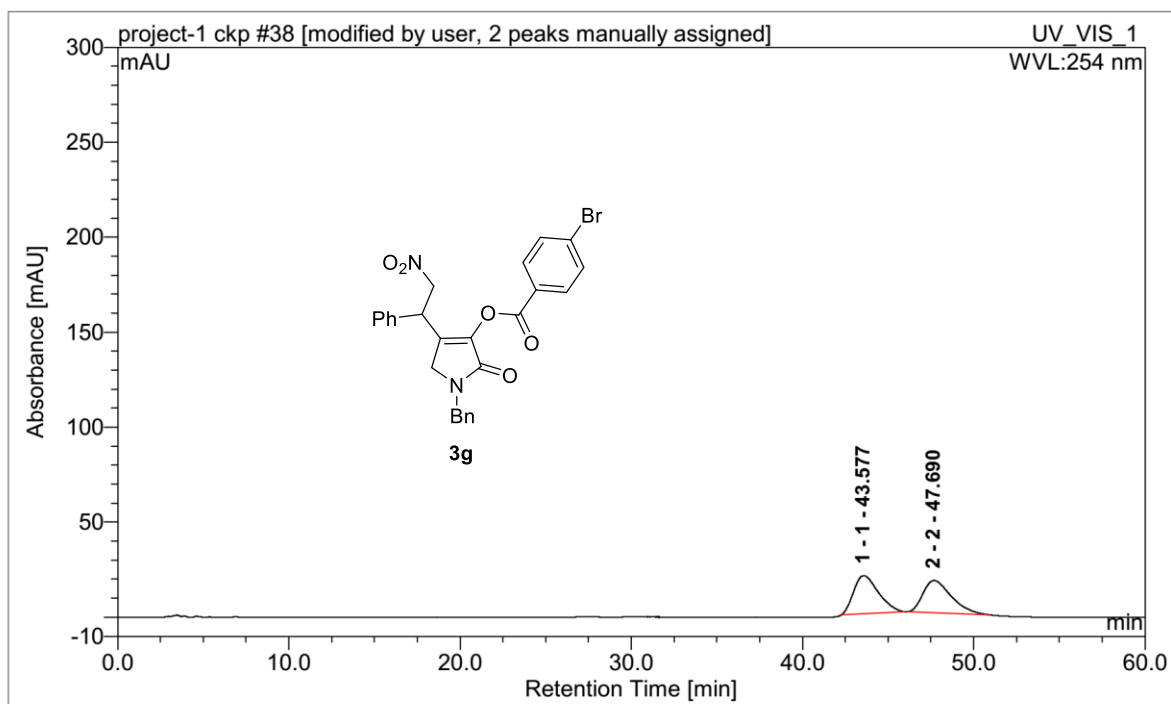
No.	Peak Name	Ret.Time (detected) min	Area mAU*min	Rel.Area(ident.) %	Height mAU	Amount
1 1		45.79	110.8823	90.50385156	60.79811	n.a.
2 2		51.58	11.634	9.496148443	6.870	n.a.



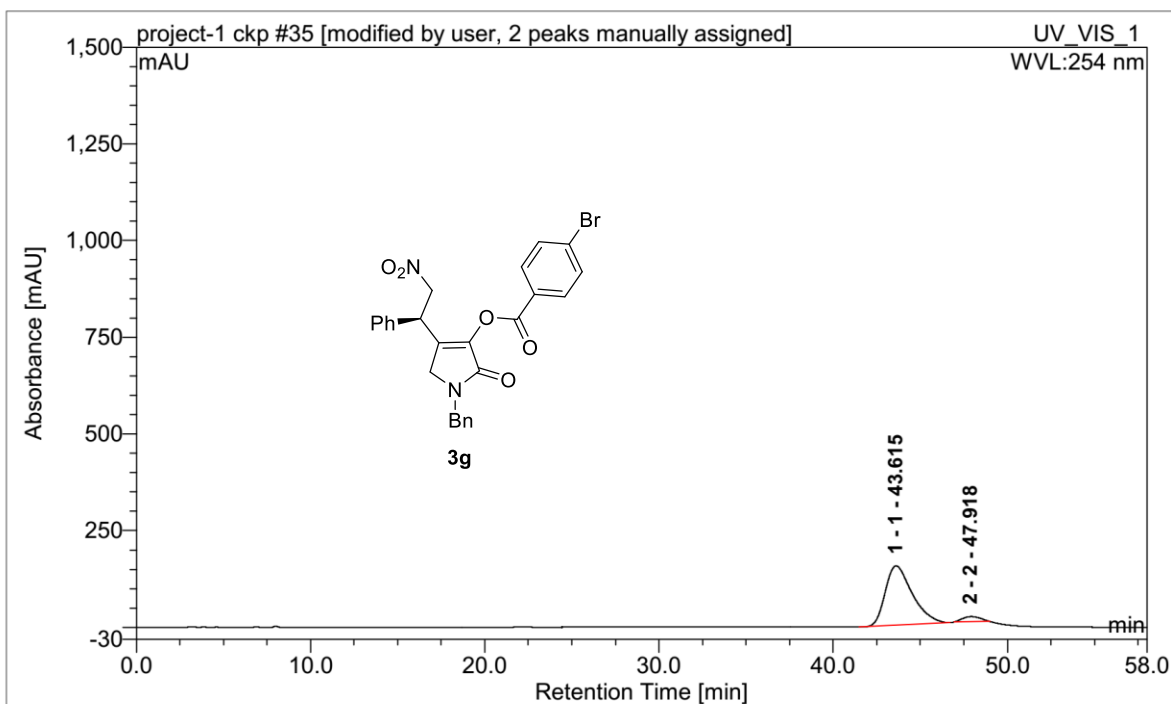
No.	Peak Name	Ret.Time (detected) min	Area mAU*min	Rel.Area(ident.) %	Height mAU	Amount
1 1		39.41	57.21393	50.46393603	36.941	n.a.
2 2		42.71	56.162	49.53606397	32.017	n.a.



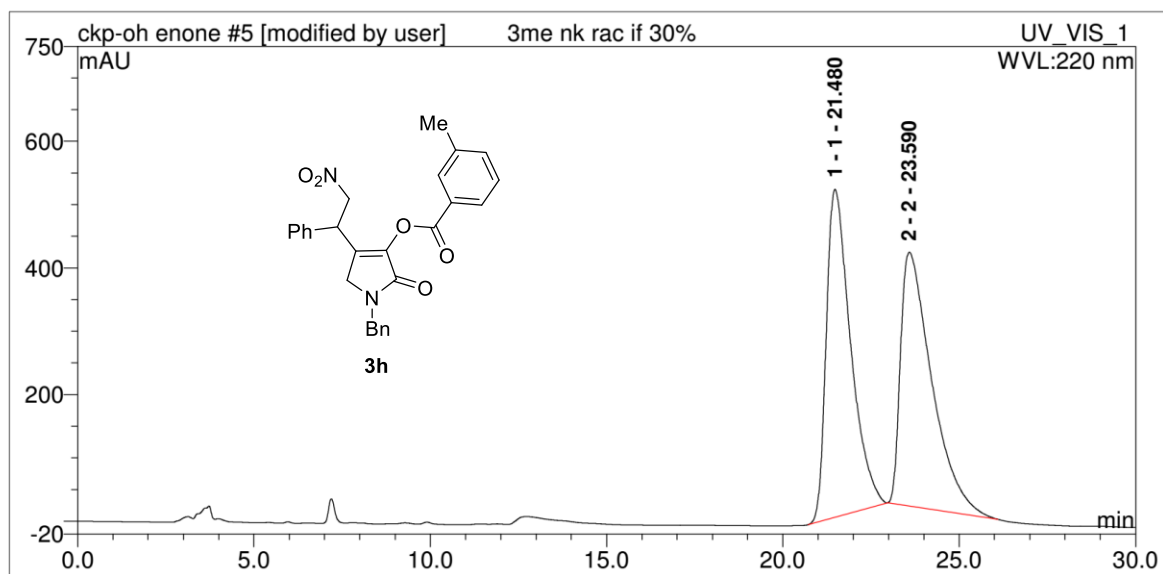
No.	Peak Name	Ret.Time (detected) min	Area mAU*min	Rel.Area(ident.) %	Height mAU	Amount
1 1		39.32	119.8521	94.53301927	67.85756	n.a.
2 2		42.74	6.931	5.466980731	5.153	n.a.



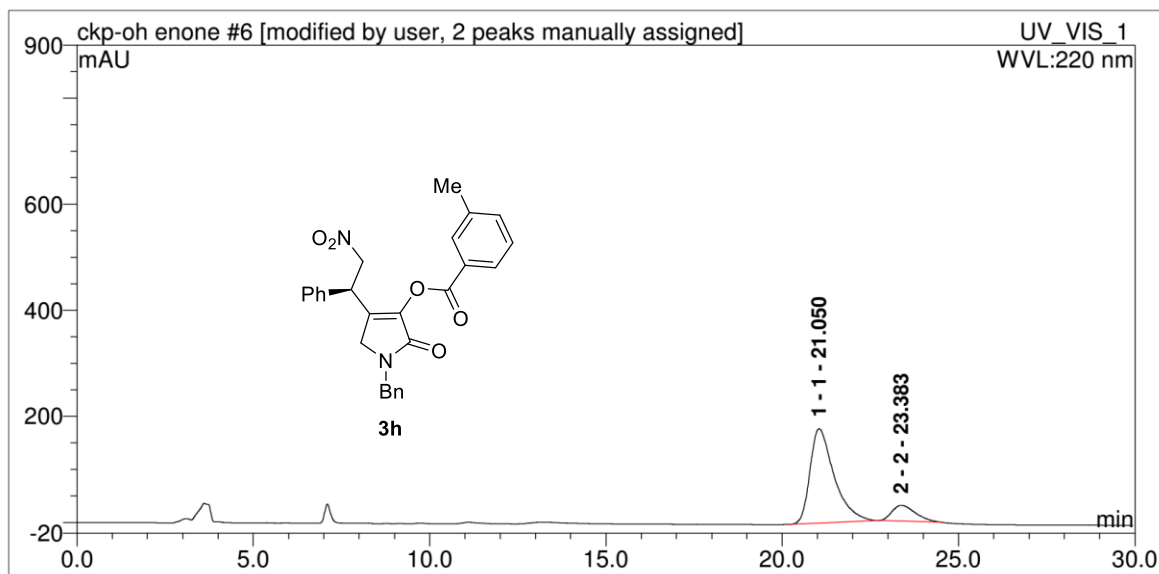
No.	Peak Name	Ret.Time (detected) min	Area mAU*min	Rel.Area(ident.) %	Height mAU	Amount
1	1	43.58	33.53818	50.82017884	20.08853	n.a.
2	2	47.69	32.456	49.17982116	16.978	n.a.



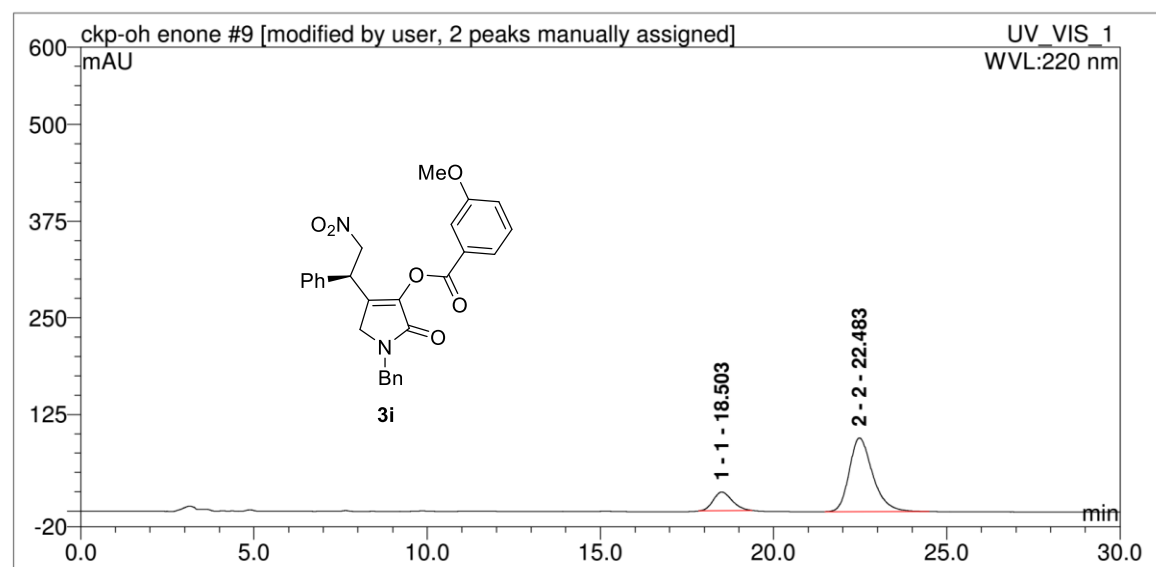
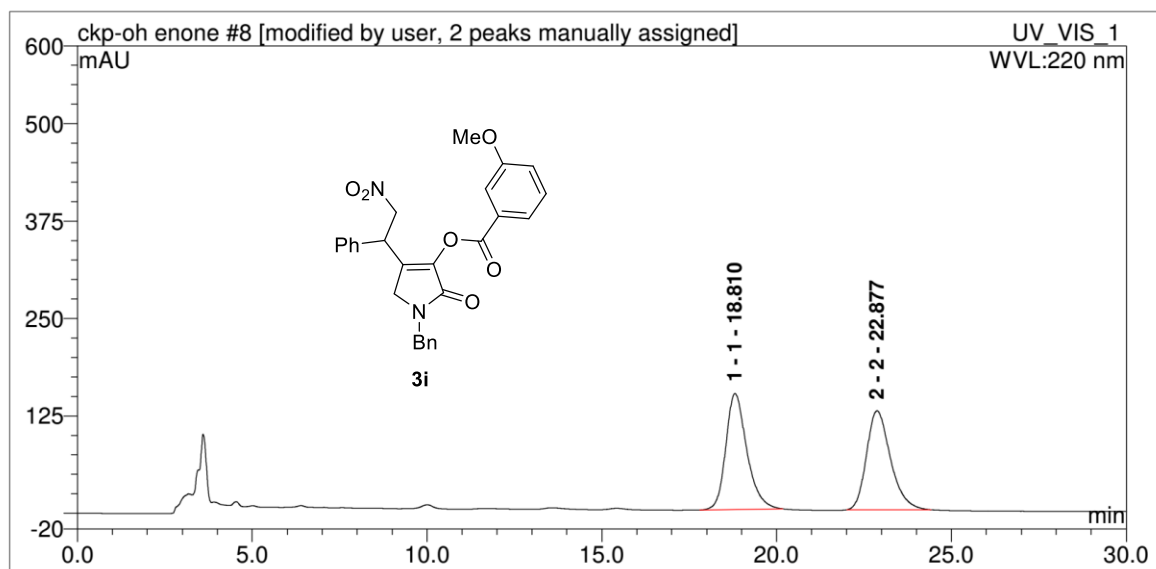
No.	Peak Name	Ret.Time (detected) min	Area mAU*min	Rel.Area(ident.) %	Height mAU	Amount
1	1	43.62	275.2487	94.52827747	153.6061	n.a.
2	2	47.92	15.933	5.47172253	13.348	n.a.

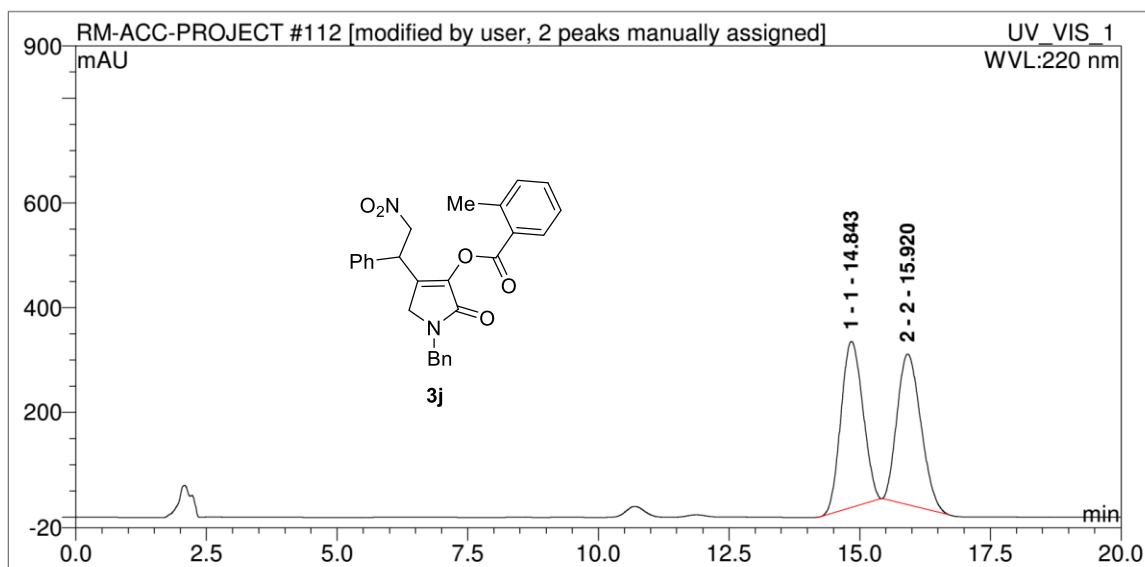


No.	Peak Name	Ret.Time (detected) min	Area mAU*min	Rel.Area(ident.) %	Height mAU	Amount
1	1	21.48	414.3443	50.20578505	518.0697	n.a.
2	2	23.59	410.948	49.79421495	400.873	n.a.

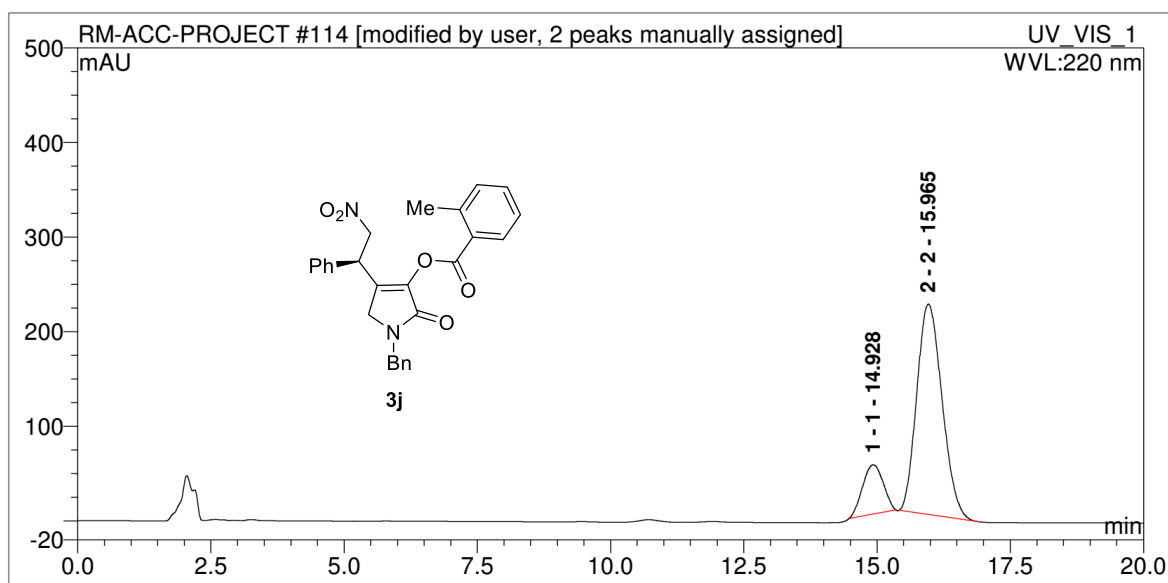


No.	Peak Name	Ret.Time (detected) min	Area mAU*min	Rel.Area(ident.) %	Height mAU	Amount
1	1	21.05	140.9552	86.09649053	177.7406	n.a.
2	2	23.38	22.763	13.90350947	29.591	n.a.

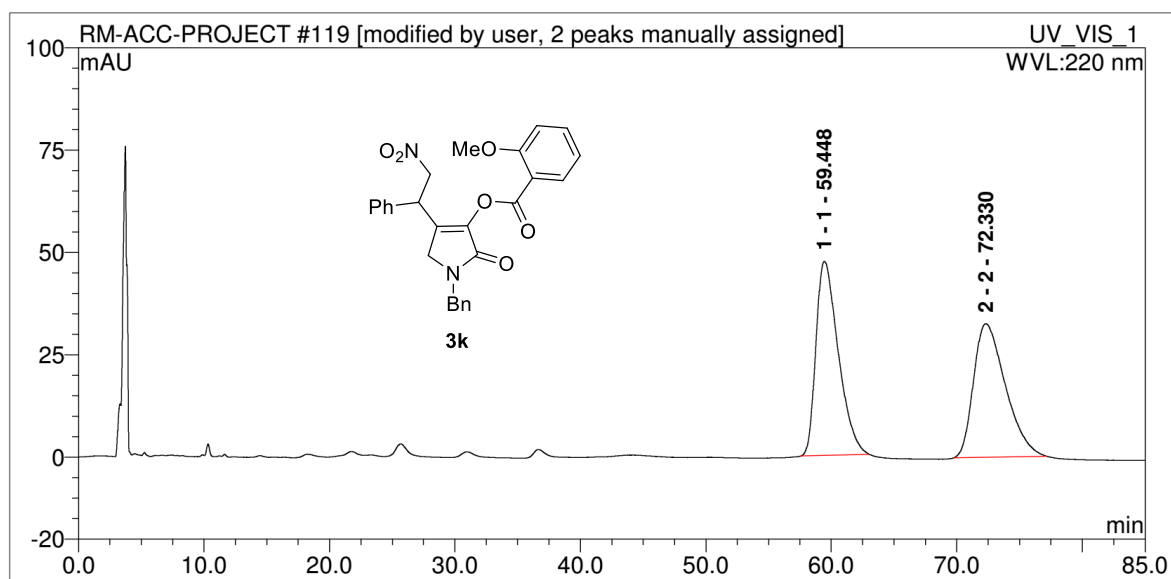




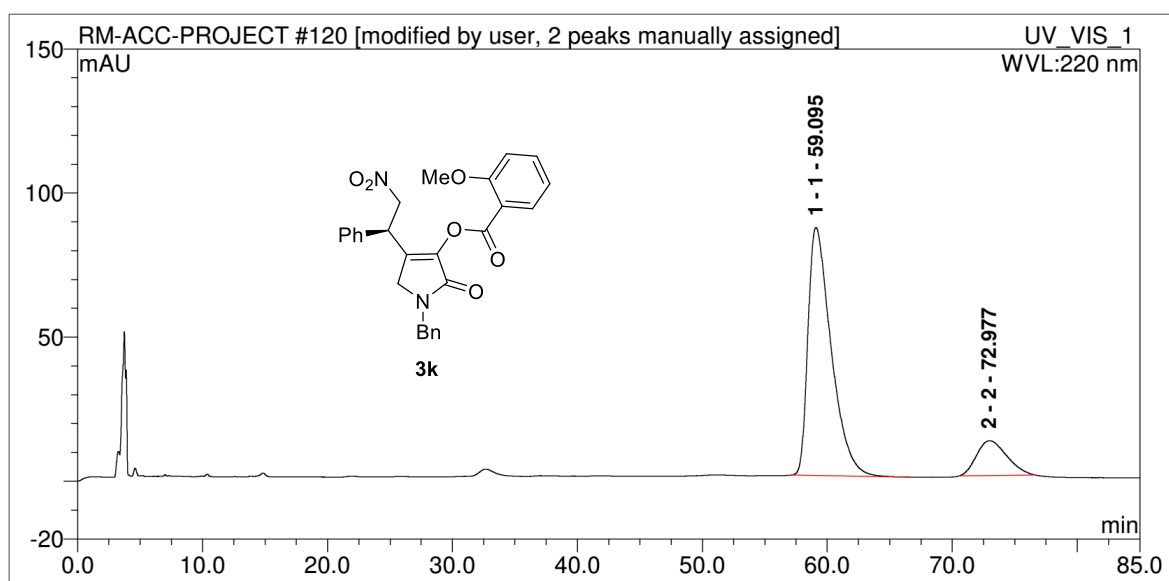
No.	Peak Name	Ret.Time (detected) min	Area mAU*min	Rel.Area(ident.) %	Height mAU	Amount
1	1	14.84	154.1613	50.35579852	316.8359	n.a.
2	2	15.92	151.983	49.64420148	287.411	n.a.



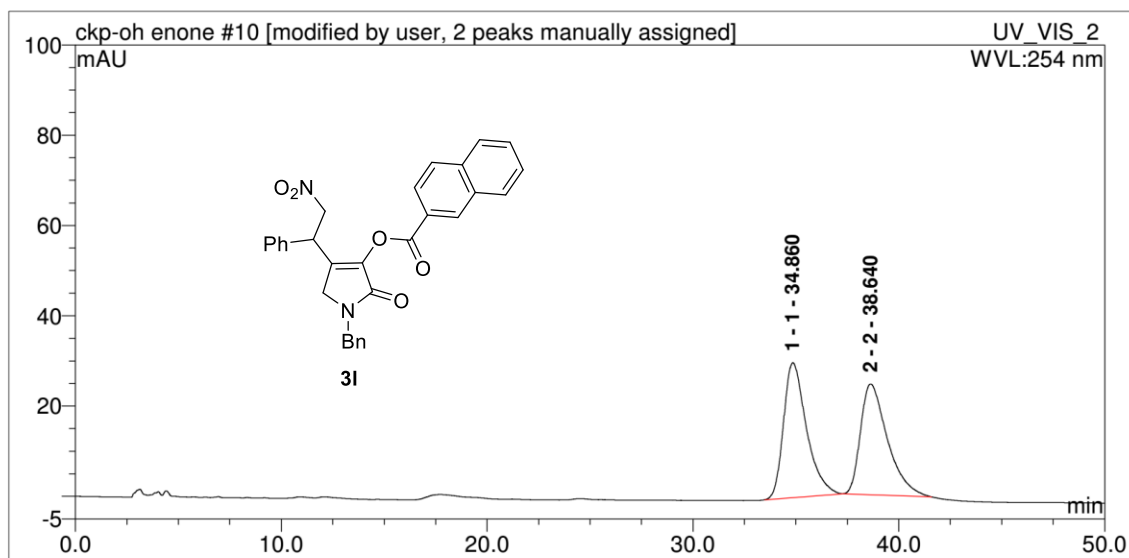
No.	Peak Name	Ret.Time (detected) min	Area mAU*min	Rel.Area(ident.) %	Height mAU	Amount
1	1	14.93	23.30586	16.01132578	52.02937	n.a.
2	2	15.97	122.253	83.98867422	222.411	n.a.



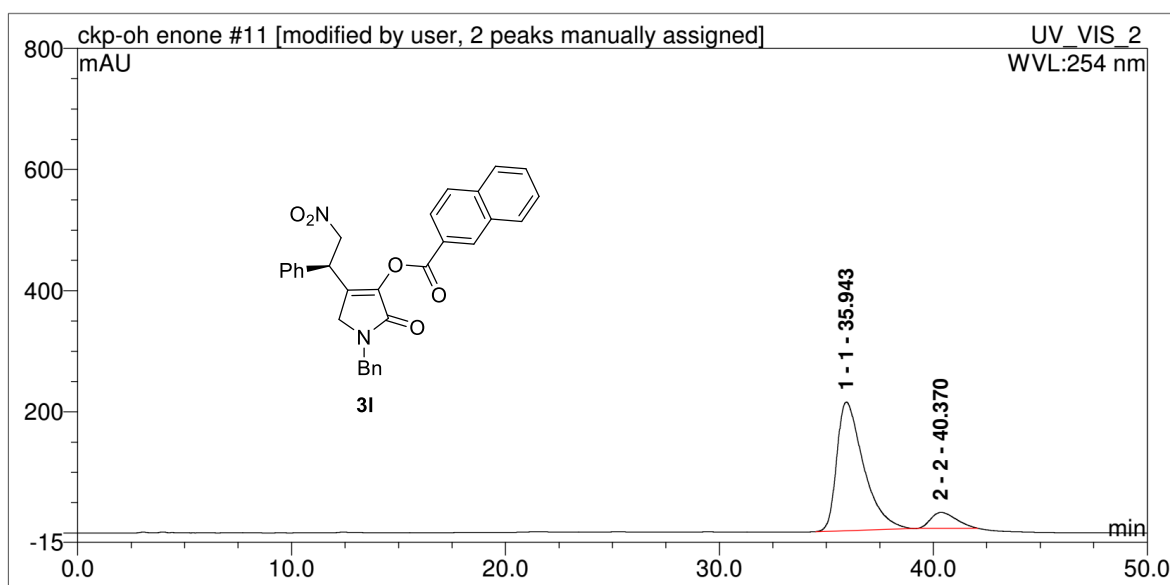
No.	Peak Name	Ret.Time (detected) min	Area mAU*min	Rel.Area(ident.) %	Height mAU	Amount
1	1	59.45	97.71814	50.42766045	47.38599	n.a.
2	2	72.33	96.061	49.57233955	32.610	n.a.



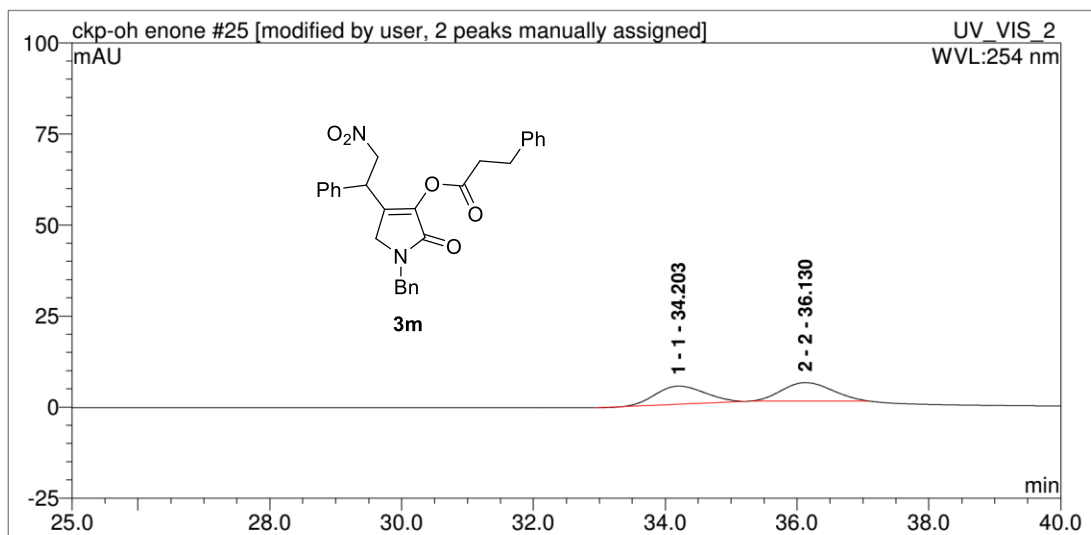
No.	Peak Name	Ret.Time (detected) min	Area mAU*min	Rel.Area(ident.) %	Height mAU	Amount
1	1	59.10	184.8975	84.49419517	86.0416	n.a.
2	2	72.98	33.931	15.50580483	12.084	n.a.



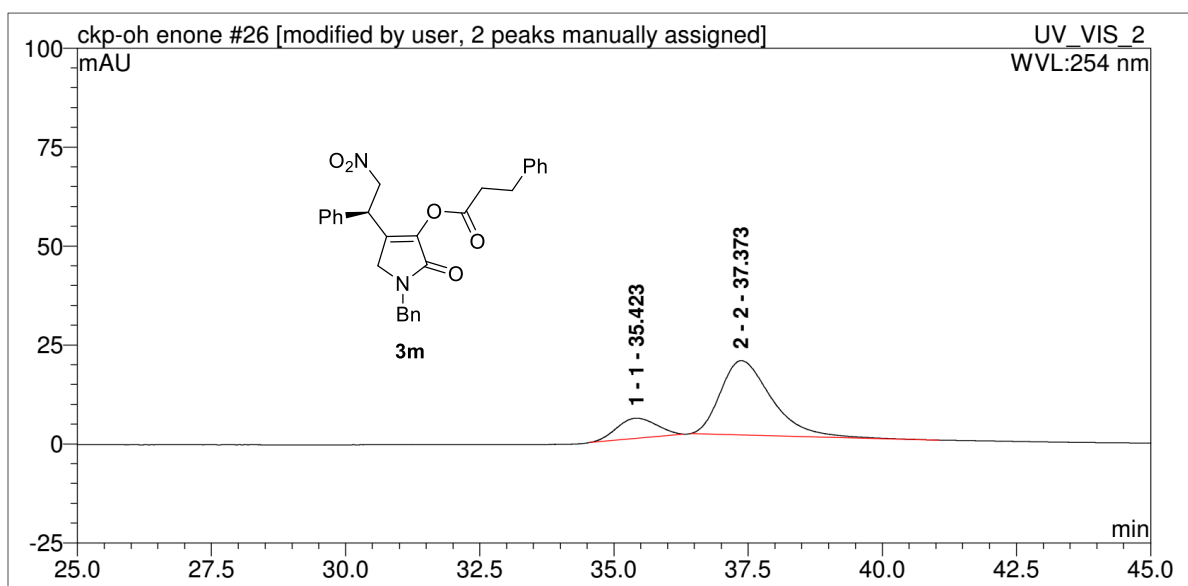
No.	Peak Name	Ret.Time (detected) min	Area mAU*min	Rel.Area(ident.) %	Height mAU	Amount
1	1	34.86	38.71484	50.95594947	29.89739	n.a.
2	2	38.64	37.262	49.04405053	24.533	n.a.



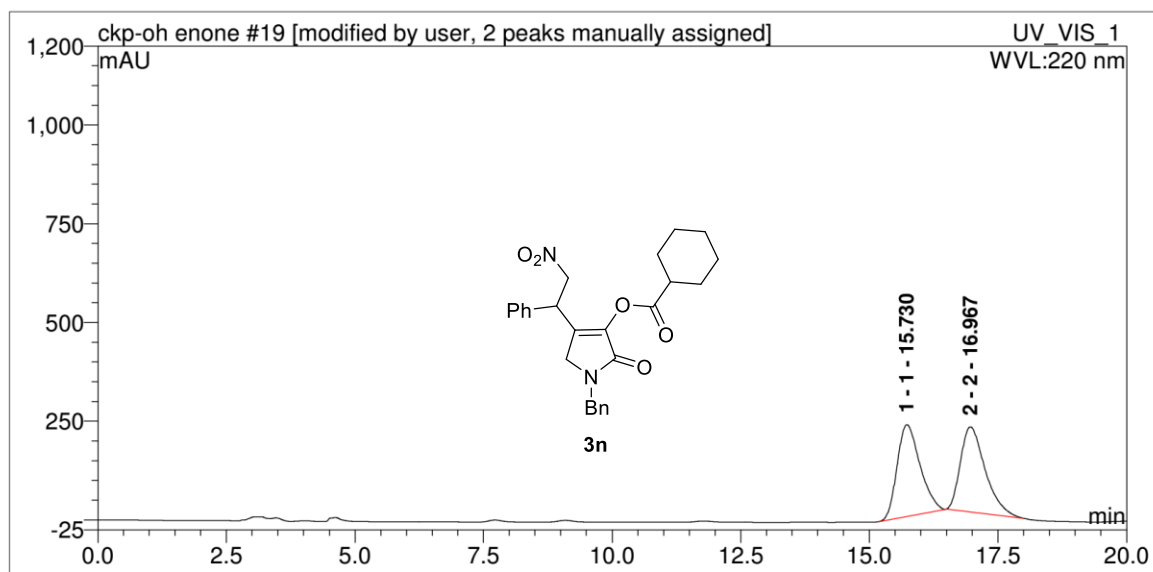
No.	Peak Name	Ret.Time (detected) min	Area mAU*min	Rel.Area(ident.) %	Height mAU	Amount
1	1	35.94	308.0256	89.59628812	212.0375	n.a.
2	2	40.37	35.767	10.40371188	26.049	n.a.



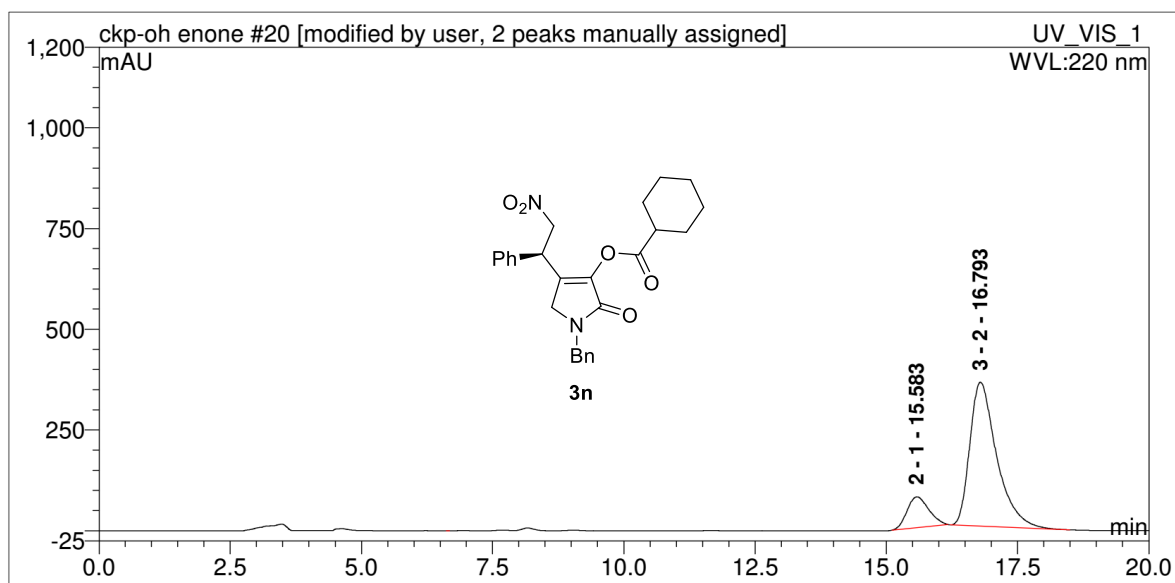
No.	Peak Name	Ret.Time (detected) min	Area mAU*min	Rel.Area(ident.) %	Height mAU	Amount
1 1		34.20	4.301127	48.88141027	4.97301	n.a.
2 2		36.13	4.498	51.11858973	5.077	n.a.



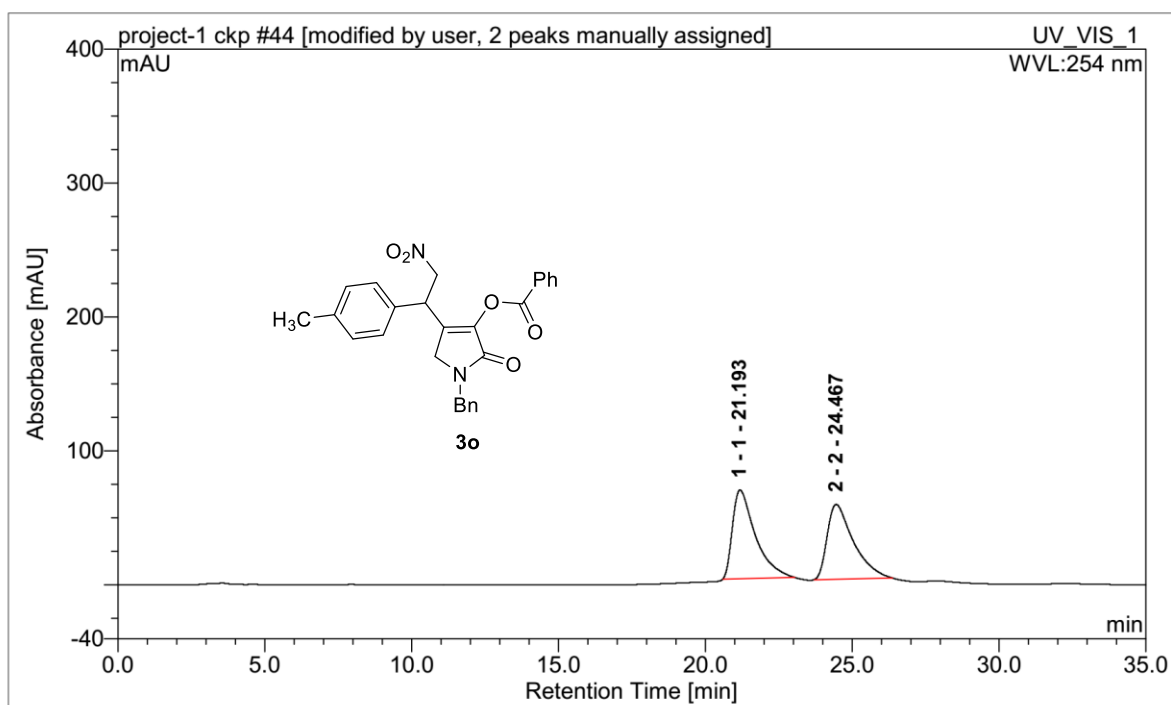
No.	Peak Name	Ret.Time (detected) min	Area mAU*min	Rel.Area(ident.) %	Height mAU	Amount
1 1		35.42	4.353664	17.34777353	5.06511	n.a.
2 2		37.37	20.743	82.65222647	18.790	n.a.



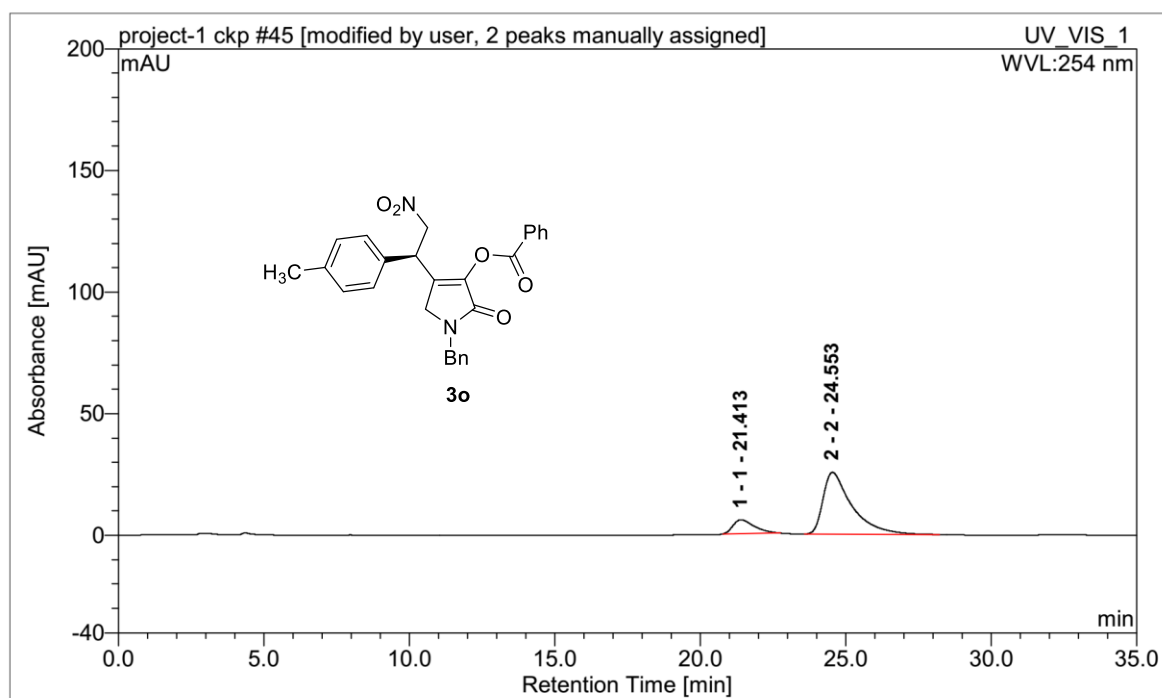
No.	Peak Name	Ret.Time (detected) min	Area mAU*min	Rel.Area(ident.) %	Height mAU	Amount
1 1		15.73	119.8505	49.94137103	232.0696	n.a.
2 2		16.97	120.132	50.05862897	215.356	n.a.



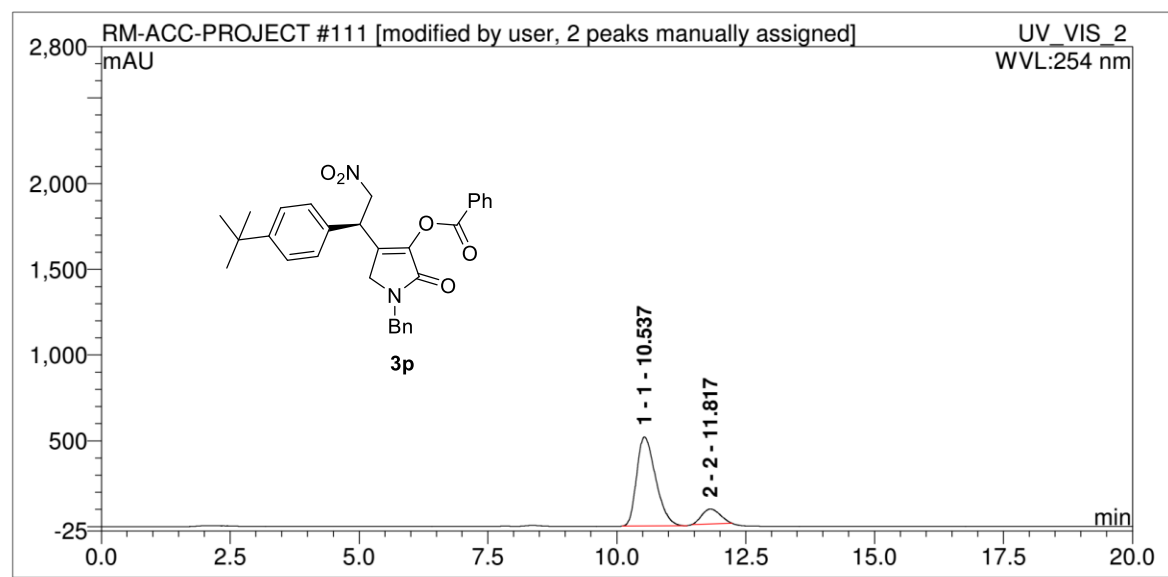
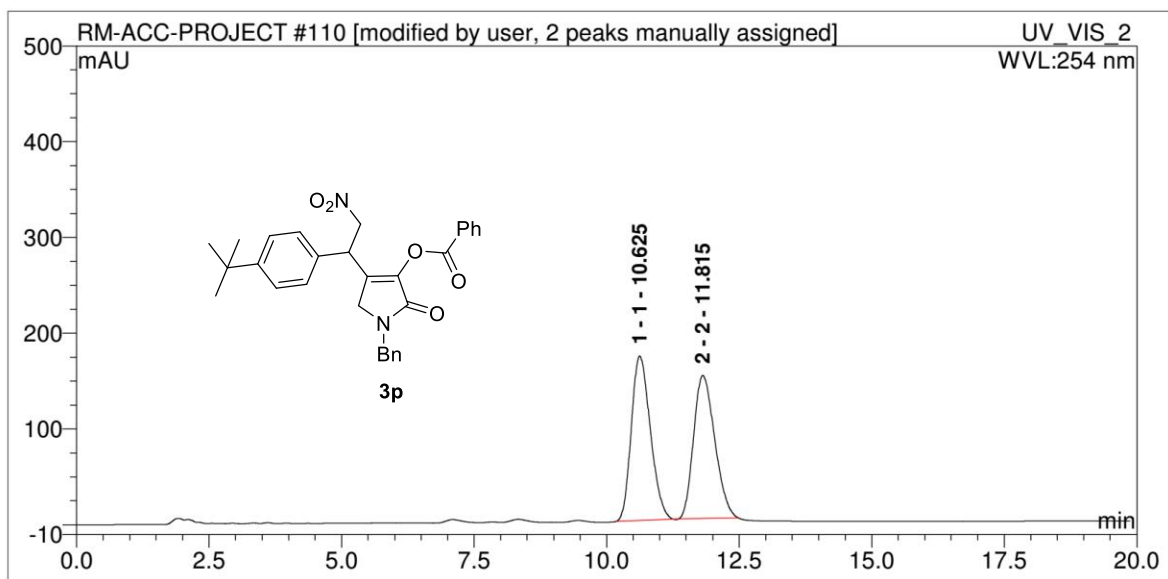
No.	Peak Name	Ret.Time (detected) min	Area mAU*min	Rel.Area(ident.) %	Height mAU	Amount
2 1		15.58	36.74058	14.74907585	76.5934	n.a.
3 2		16.79	212.364	85.25092415	357.231	n.a.

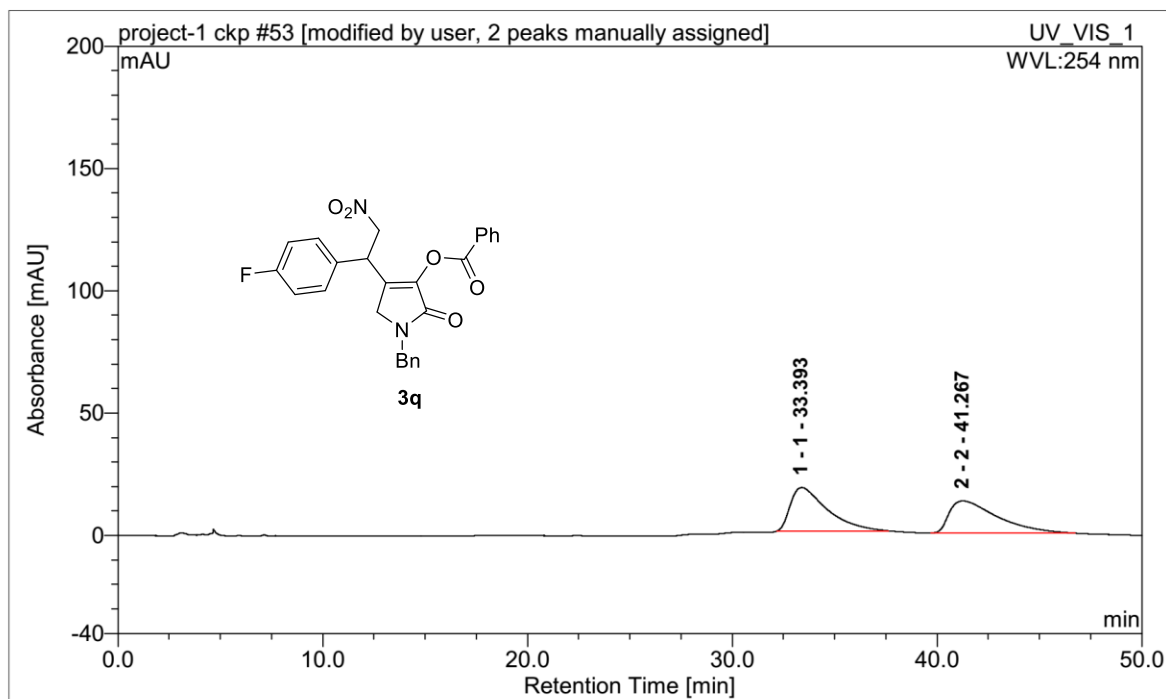


No.	Peak Name	Ret.Time (detected) min	Area mAU*min	Rel.Area(ident.) %	Height mAU	Amount
1 1		21.19	59.658	50.73121424	66.10262	n.a.
2 2		24.47	57.938	49.26878576	55.881	n.a.

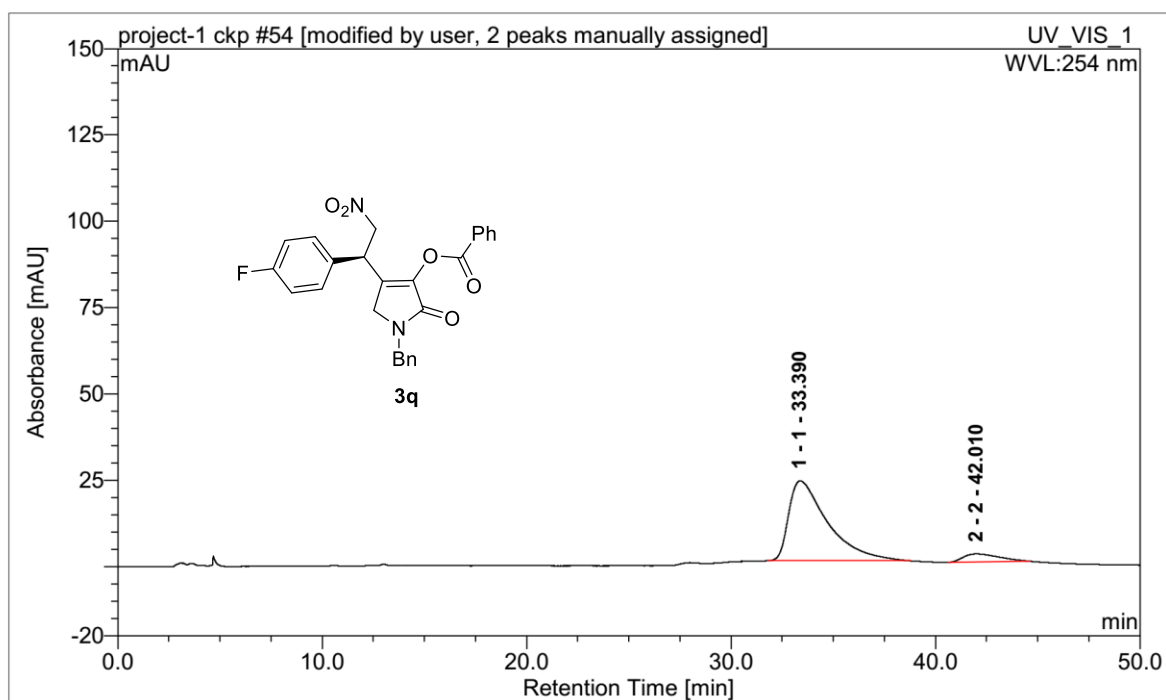


No.	Peak Name	Ret.Time (detected) min	Area mAU*min	Rel.Area(ident.) %	Height mAU	Amount
1 1		21.41	4.852714	14.22543367	5.73675	n.a.
2 2		24.55	29.260	85.77456633	25.409	n.a.

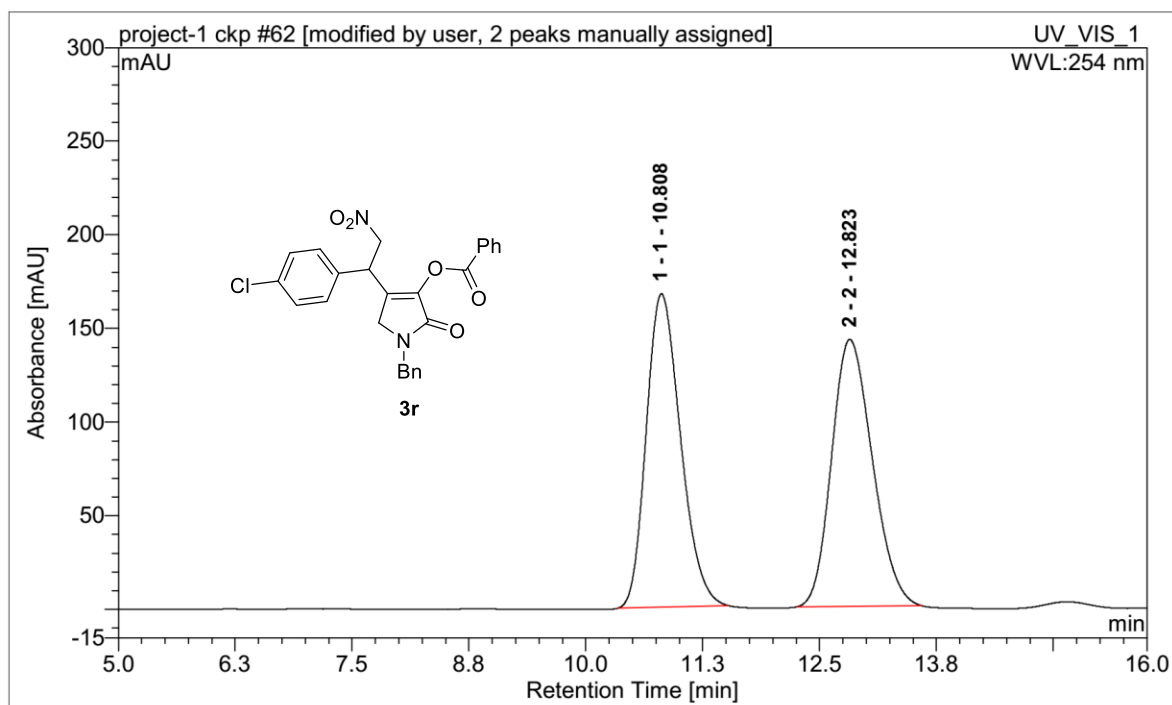




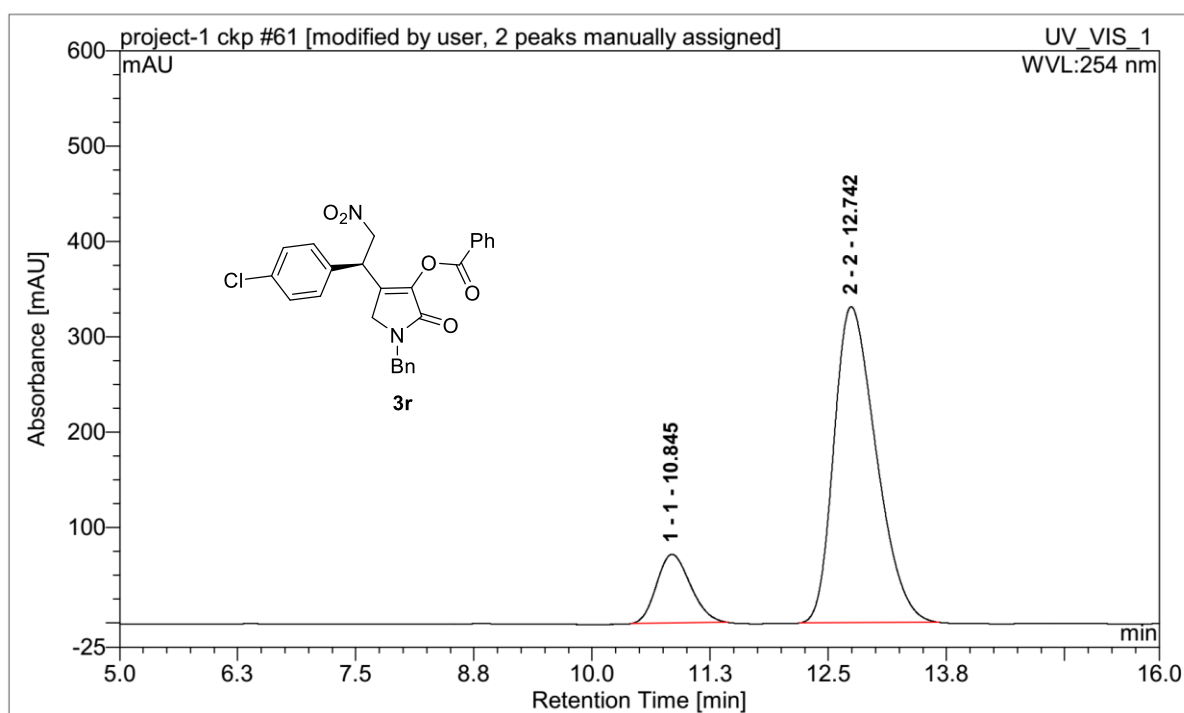
No.	Peak Name	Ret.Time (detected) min	Area mAU*min	Rel.Area(ident.) %	Height mAU	Amount
1 1		33.39	37.02522	50.80098629	17.79302	n.a.
2 2		41.27	35.858	49.19901371	13.123	n.a.



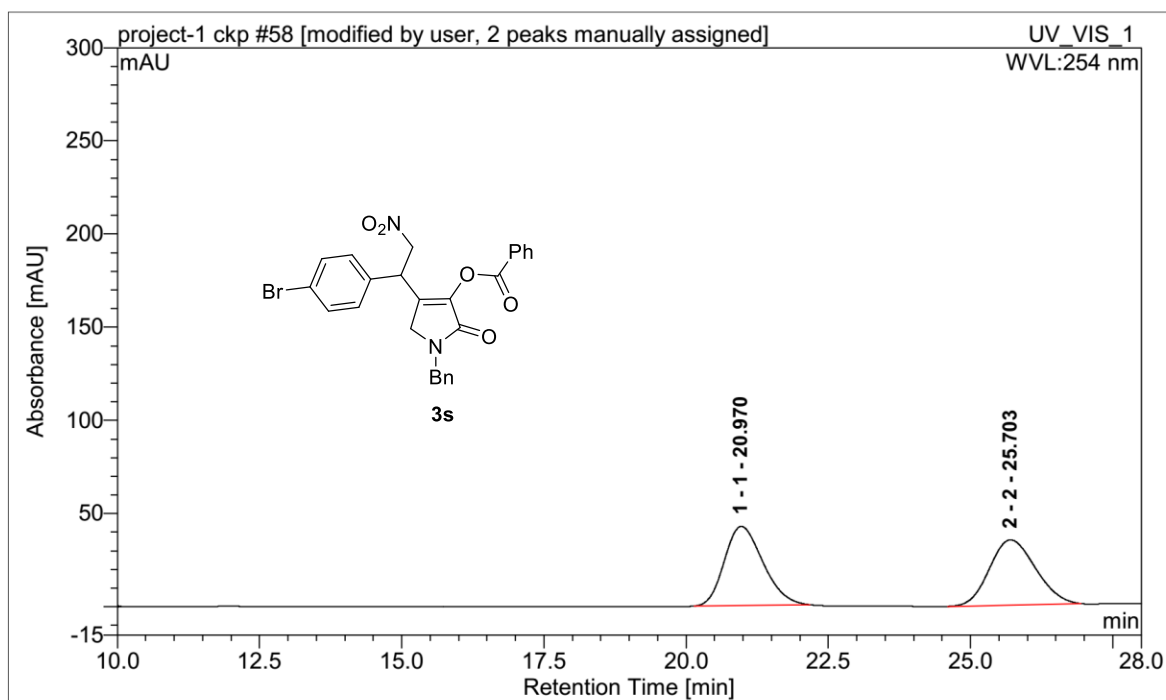
No.	Peak Name	Ret.Time (detected) min	Area mAU*min	Rel.Area(ident.) %	Height mAU	Amount
1 1		33.39	51.21042	91.49628513	23.13561	n.a.
2 2		42.01	4.760	8.503714867	2.337	n.a.



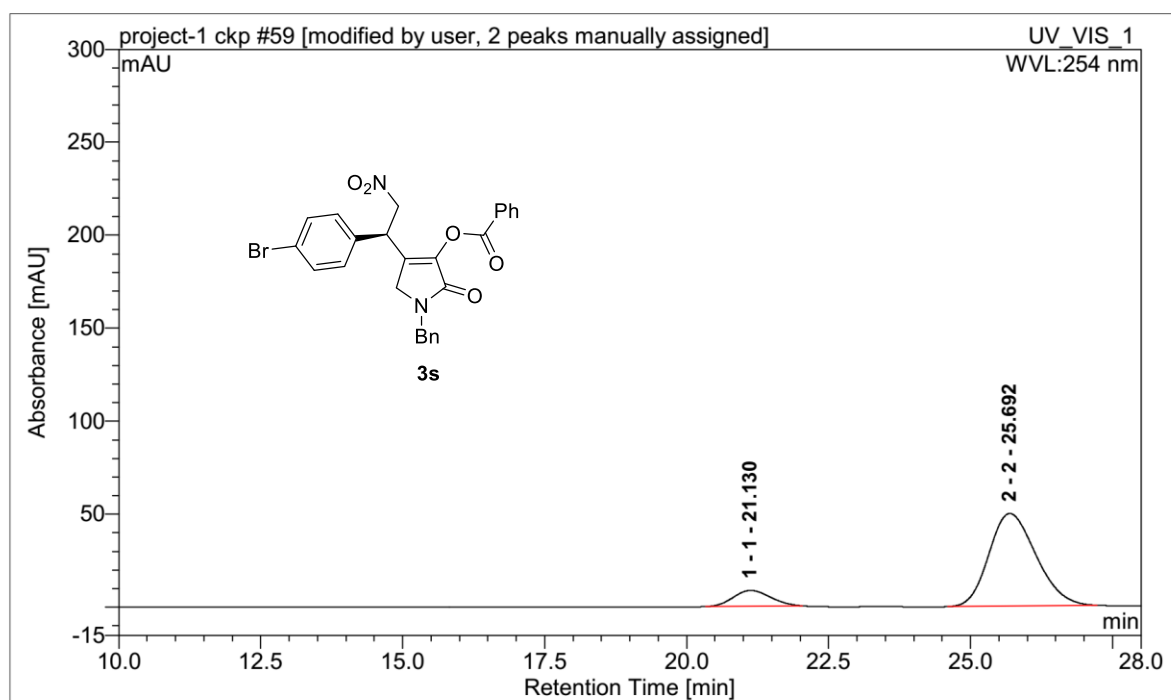
No.	Peak Name	Ret.Time (detected) min	Area mAU*min	Rel.Area(ident.) %	Height mAU	Amount
1	1	10.81	71.01245	49.72081463	167.281	n.a.
2	2	12.82	71.810	50.27918537	142.475	n.a.



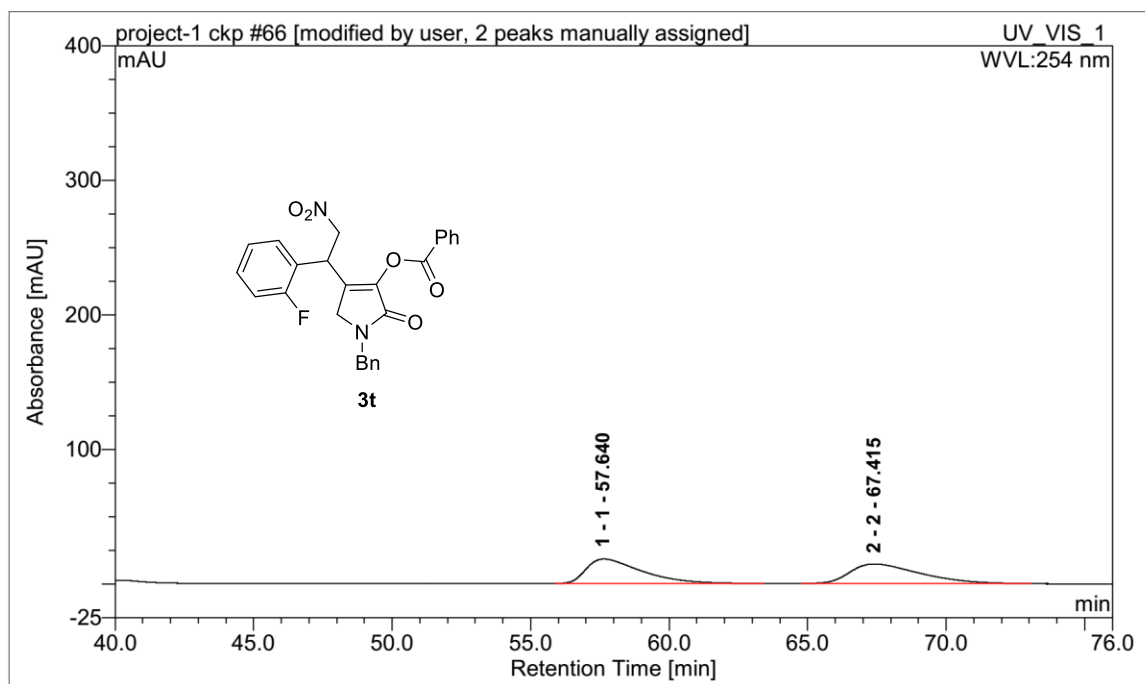
No.	Peak Name	Ret.Time (detected) min	Area mAU*min	Rel.Area(ident.) %	Height mAU	Amount
1	1	10.85	29.90189	14.84916038	72.00904	n.a.
2	2	12.74	171.469	85.15083962	331.303	n.a.



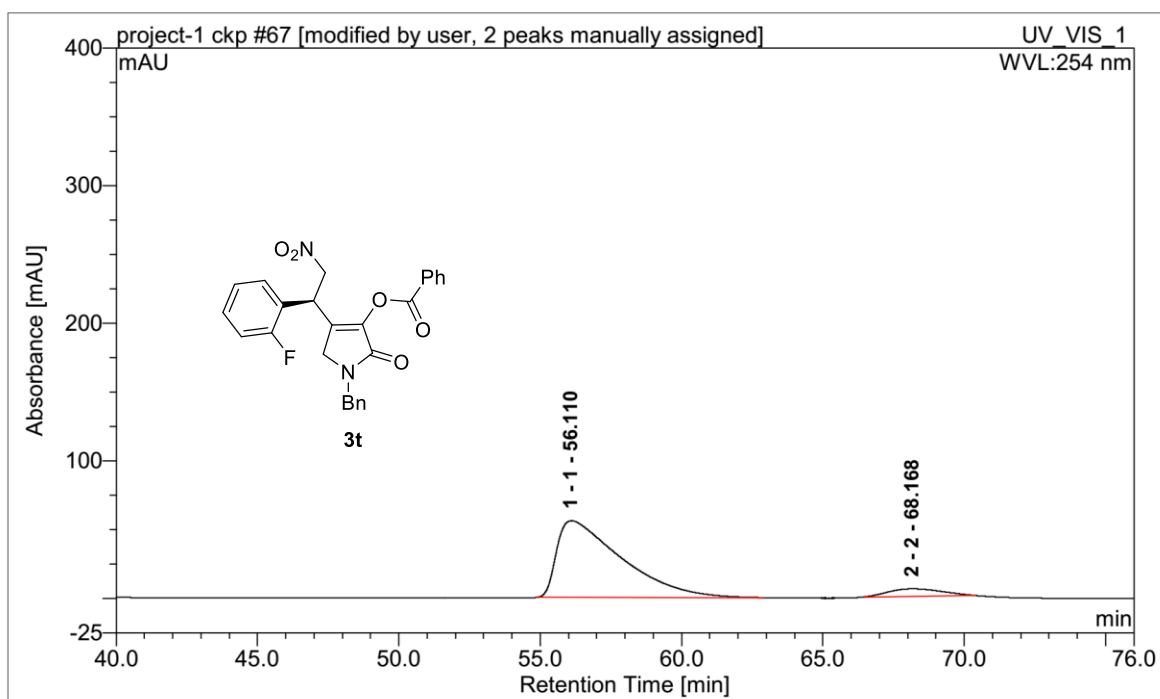
No.	Peak Name	Ret.Time (detected) min	Area mAU*min	Rel.Area(ident.) %	Height mAU	Amount
1	1	20.97	33.38294	50.47388693	42.41479	n.a.
2	2	25.70	32.756	49.52611307	34.960	n.a.



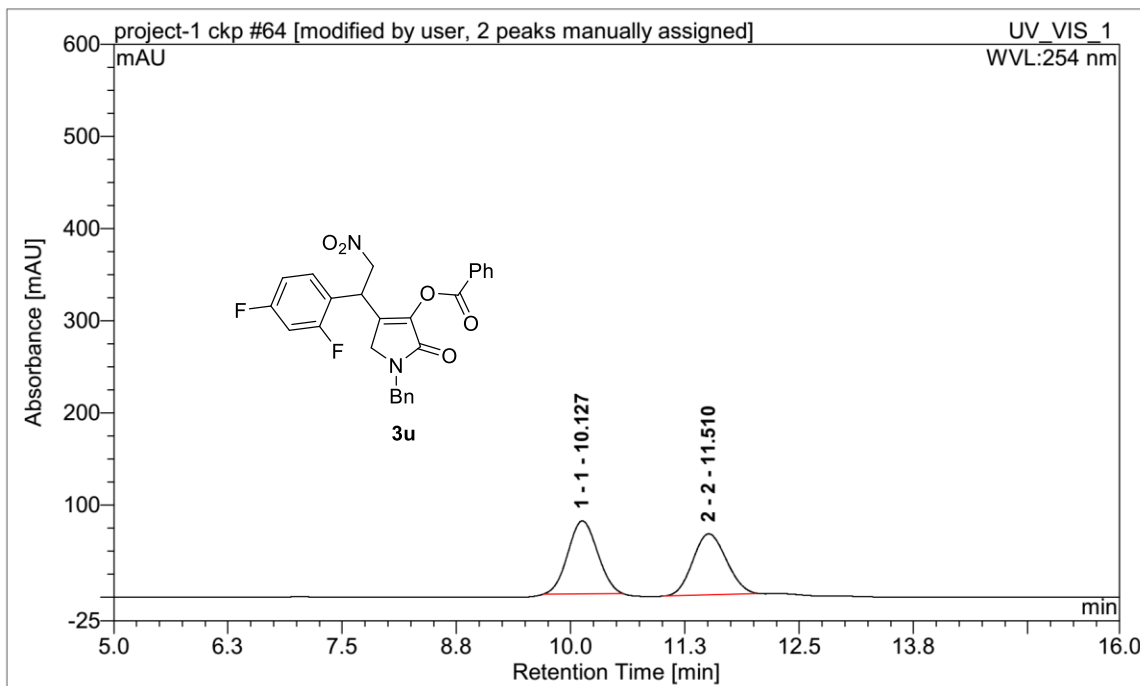
No.	Peak Name	Ret.Time (detected) min	Area mAU*min	Rel.Area(ident.) %	Height mAU	Amount
1	1	21.13	6.446094	11.86378467	8.49178	n.a.
2	2	25.69	47.888	88.13621533	49.821	n.a.



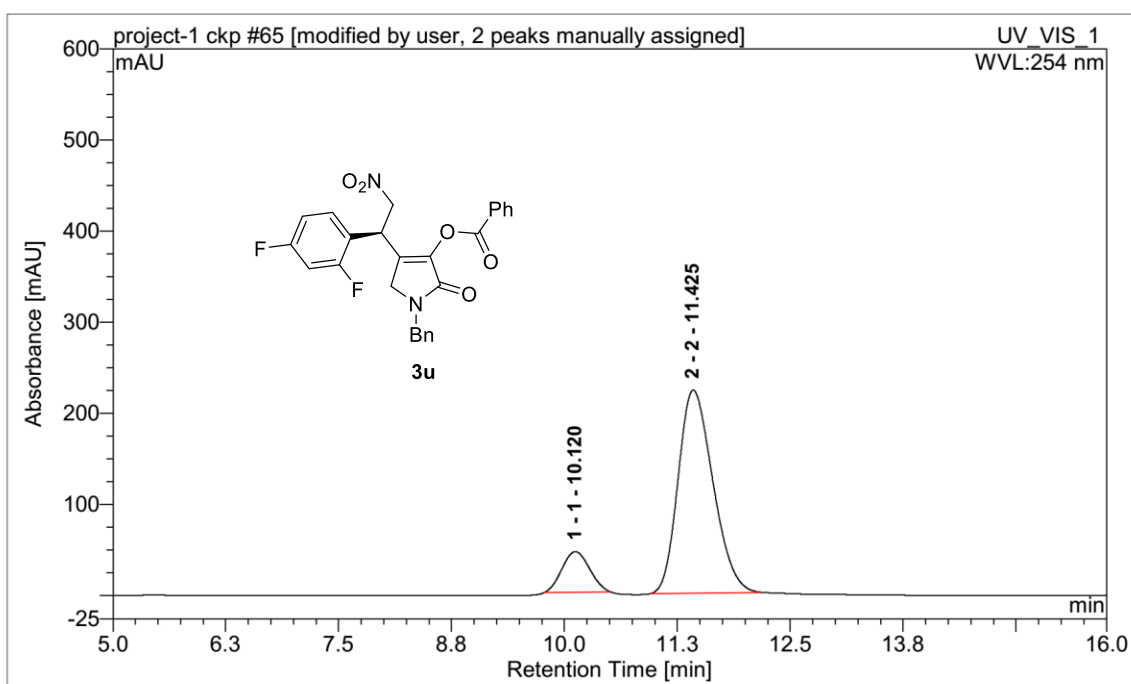
No.	Peak Name	Ret.Time (detected) min	Area mAU*min	Rel.Area(ident.) %	Height mAU	Amount
1	1	57.64	42.78868	50.11148574	18.26297	n.a.
2	2	67.42	42.598	49.88851426	14.589	n.a.



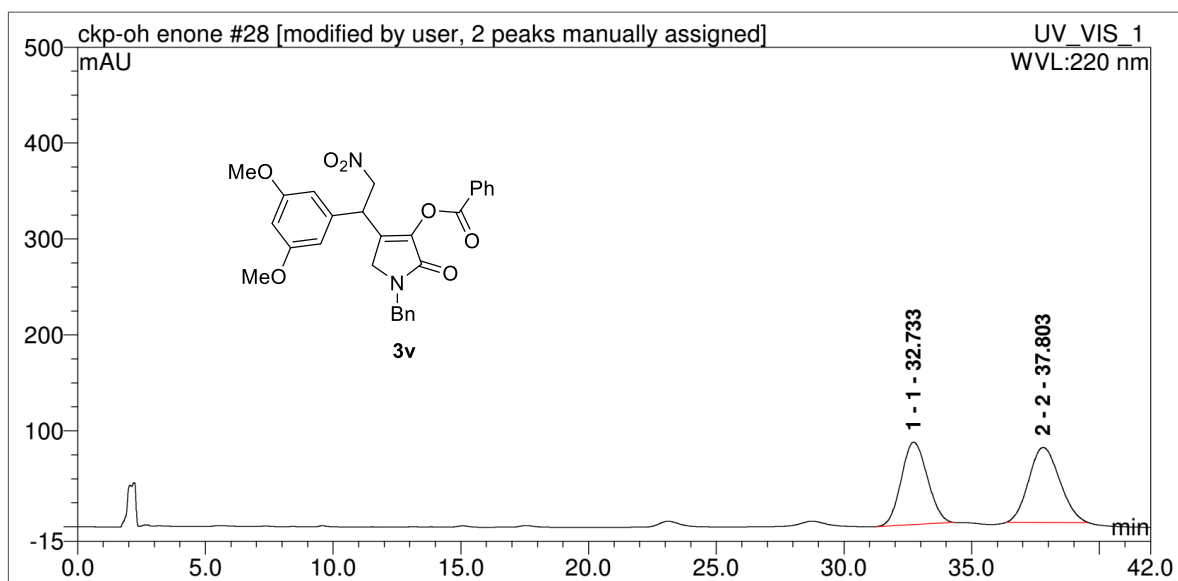
No.	Peak Name	Ret.Time (detected) min	Area mAU*min	Rel.Area(ident.) %	Height mAU	Amount
1	1	56.11	147.7052	92.5039058	55.76729	n.a.
2	2	68.17	11.969	7.496094196	5.467	n.a.



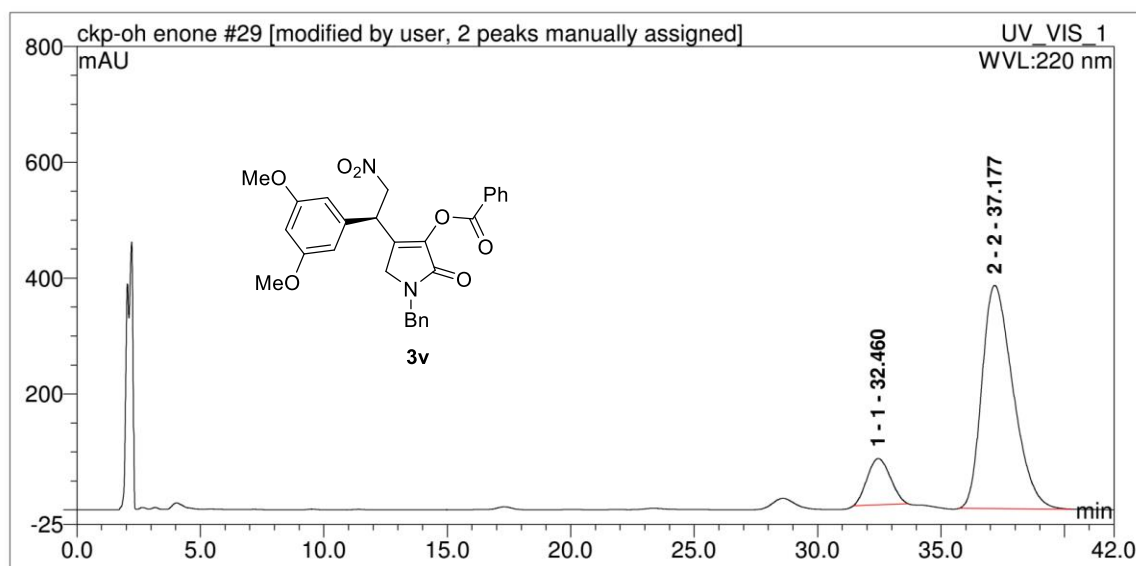
No.	Peak Name	Ret.Time (detected) min	Area mAU*min	Rel.Area(ident.) %	Height mAU	Amount
1	1	10.13	29.83827	51.55143988	79.08016	n.a.
2	2	11.51	28.042	48.44856012	66.056	n.a.



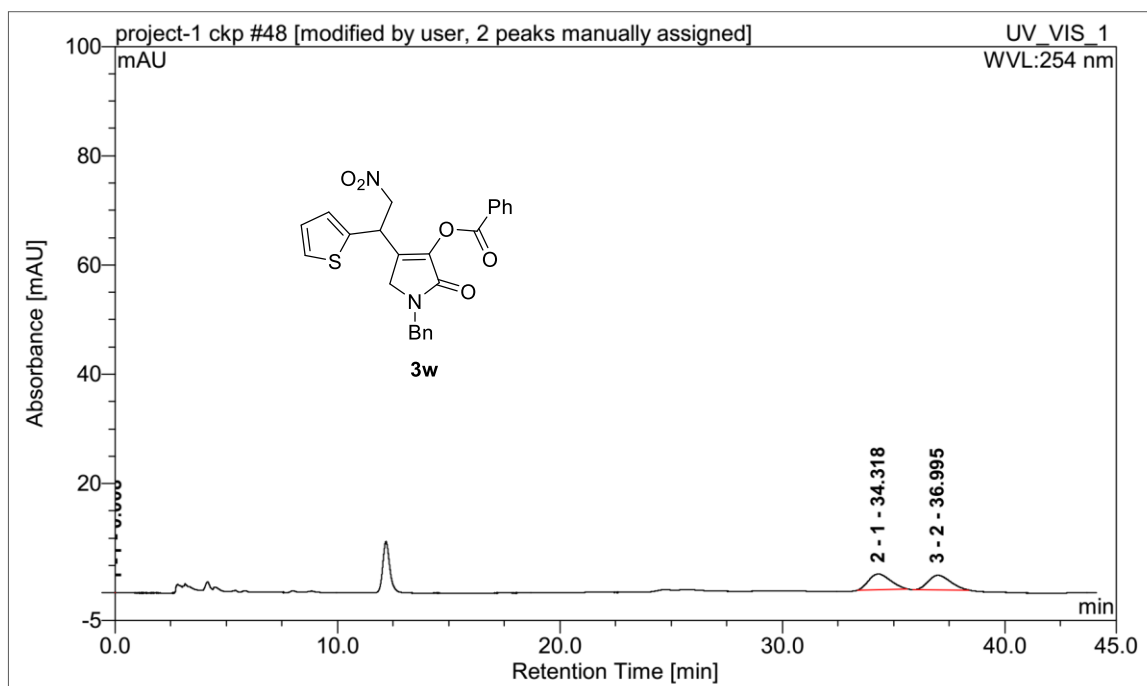
No.	Peak Name	Ret.Time (detected) min	Area mAU*min	Rel.Area(ident.) %	Height mAU	Amount
1	1	10.12	15.70124	13.6428715	44.45621	n.a.
2	2	11.43	99.386	86.3571285	222.589	n.a.



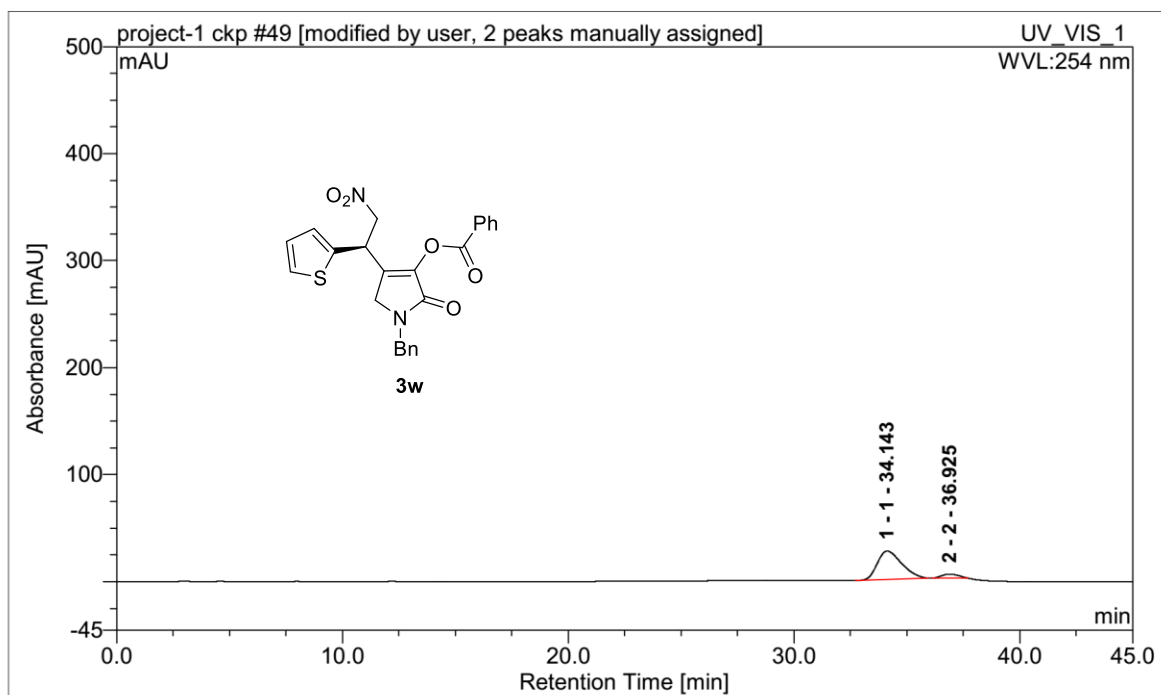
No.	Peak Name	Ret.Time (detected) min	Area mAU*min	Rel.Area(ident.) %	Height mAU	Amount
1	1	32.73	101.7329	48.11551612	85.81185	n.a.
2	2	37.80	109.702	51.88448388	78.151	n.a.



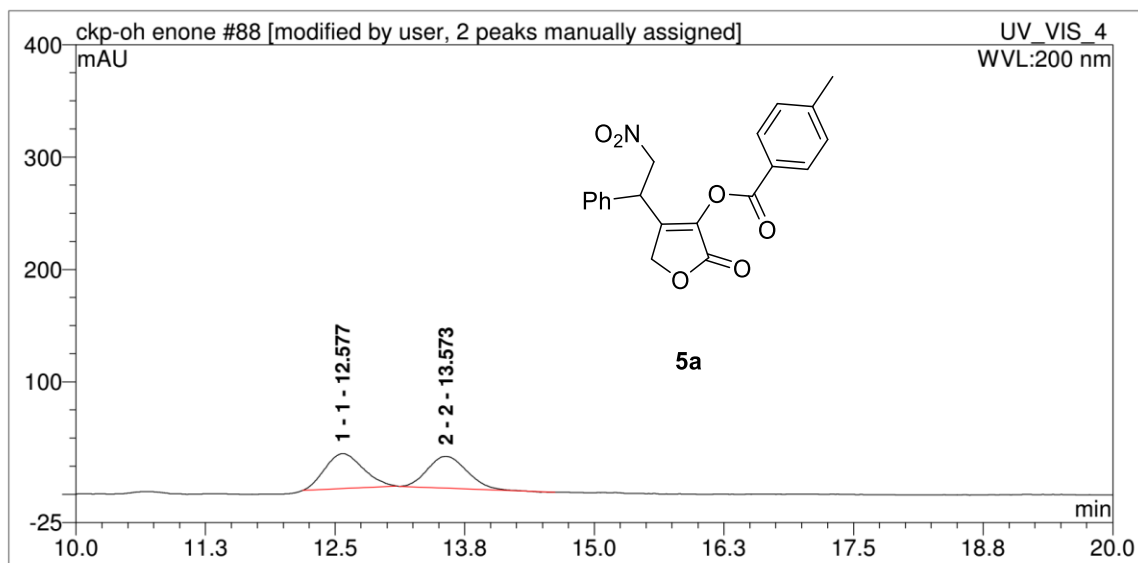
No.	Peak Name	Ret.Time (detected) min	Area mAU*min	Rel.Area(ident.) %	Height mAU	Amount
1	1	32.46	86.86257	13.3890642	79.82599	n.a.
2	2	37.18	561.895	86.6109358	385.027	n.a.



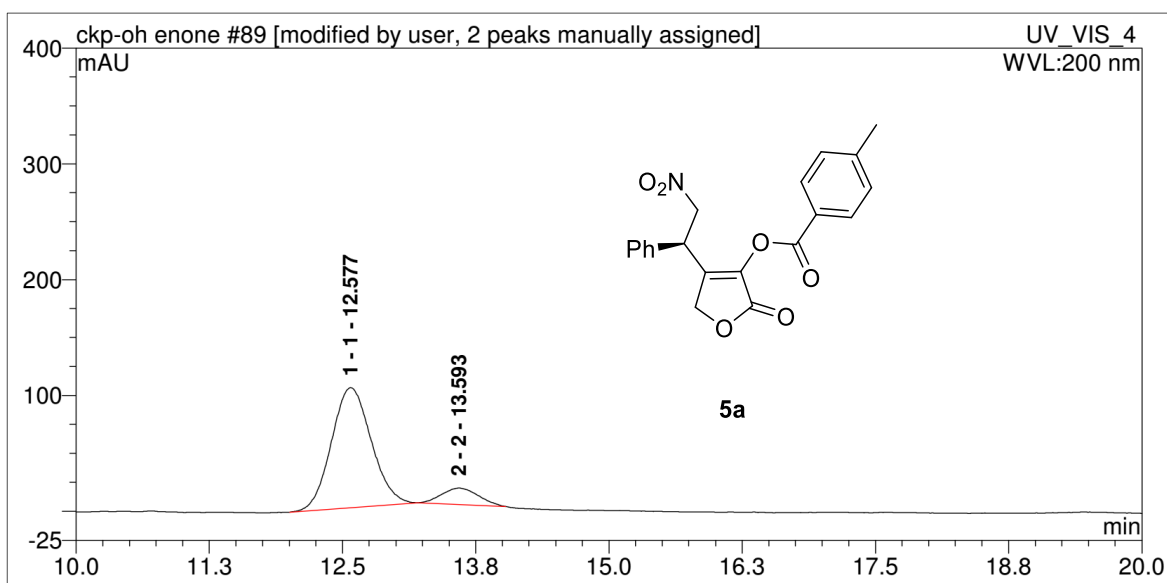
No.	Peak Name	Ret.Time (detected) min	Area mAU*min	Rel.Area(ident.) %	Height mAU	Amount
2 1		34.32	3.167195	50.6866617	2.82844	n.a.
3 2		37.00	3.081	49.31293107	2.667	n.a.



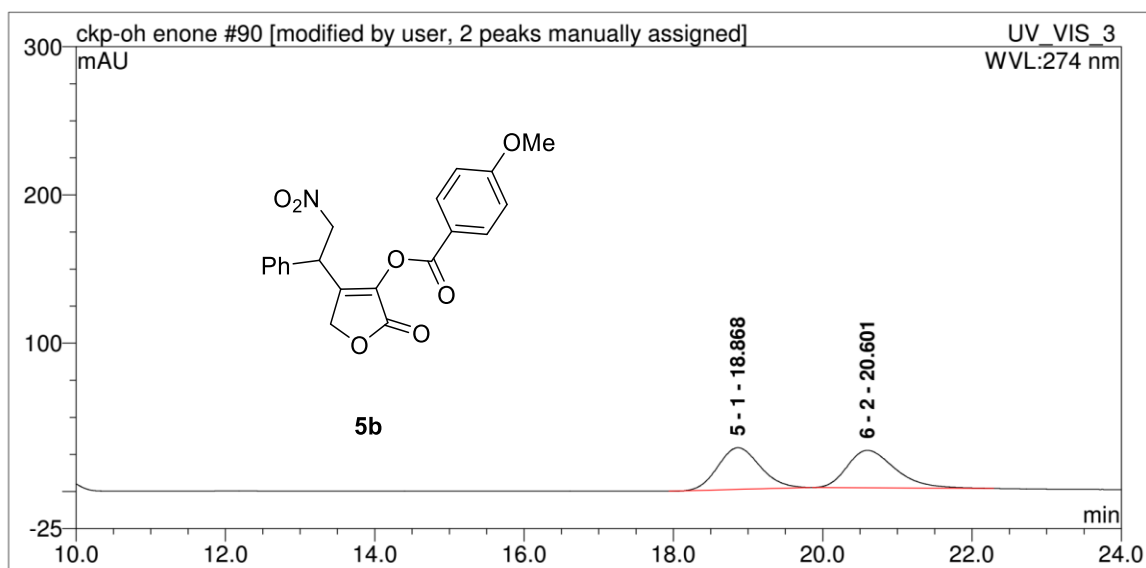
No.	Peak Name	Ret.Time (detected) min	Area mAU*min	Rel.Area(ident.) %	Height mAU	Amount
1 1		34.14	33.43863	90.59762485	26.51936	n.a.
2 2		36.93	3.470	9.402375147	3.852	n.a.



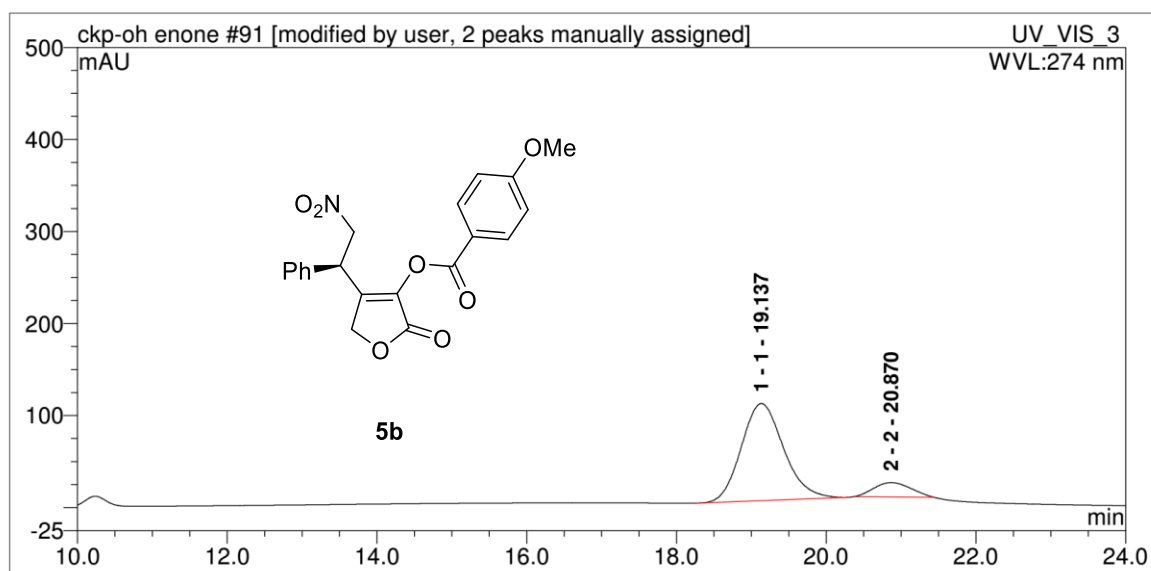
No.	Peak Name	Ret.Time (detected) min	Area mAU*min	Rel.Area(ident.) %	Height mAU	Amount
1 1		12.58	13.26235	51.51301704	31.1916	n.a.
2 2		13.57	12.483	48.48698296	28.325	n.a.



No.	Peak Name	Ret.Time (detected) min	Area mAU*min	Rel.Area(ident.) %	Height mAU	Amount
1 1		12.58	44.85525	88.81662632	103.6058	n.a.
2 2		13.59	5.648	11.18337368	14.185	n.a.



No.	Peak Name	Ret.Time (detected) min	Area mAU*min	Rel.Area(ident.) %	Height mAU	Amount
5 1		18.87	18.42876	49.46542198	28.12987	n.a.
6 2		20.60	18.827	50.53457802	25.268	n.a.



No.	Peak Name	Ret.Time (detected) min	Area mAU*min	Rel.Area(ident.) %	Height mAU	Amount
1 1		19.14	69.07896	88.55887293	105.4466	n.a.
2 2		20.87	8.924	11.44112707	15.558	n.a.

8. References

1. Fofana, M.; Dudognon, Y.; Bertrand, L.; Constantieux, T.; Rodriguez, J.; Ndiaye, I.; Bonne, D.; Bugaut, X. *Eur. J. Org. Chem.* **2020**, 3486–3490.
2. Maity, R.; Gharui, C.; Sil, A. K.; Pan, S. C. *Org. Lett.* **2017**, 19, 662–665