

Supporting Information

Stereodivergent Propargylic Alkylation of Enals via Cooperative NHC and Copper Catalysis

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1. General Information

General data:

NMR spectra were recorded on Bruker-400 MHz spectrometer or Bruker-500 MHz spectrometer. Chemical shifts (δ) are given in ppm relative to TMS. The residual solvent signals were used as references and the chemical shifts converted to the TMS scale (CDCl_3 : $\delta\text{H} = 7.26$ ppm, $\delta\text{C} = 77.16$ ppm).

The high resolution mass spectra were recorded on a Thermo LTQ Orbitrap XL (ESI+) or a P-SIMS-Gly of Bruker Daltonics Inc (EI+).

Infrared spectra were recorded on a Nicolet MX-1E FT-IR spectrometer.

Enantiomeric excesses were measured on Waters-Alliance (2998. Photodiode Array Detector, UV detection monitored at 220 nm or 230 nm or 254 nm or 270 nm). Chiralpak IA, IC, IE and IG columns were purchased from Daicel Chemical Industries, LTD.

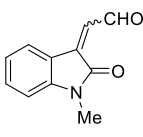
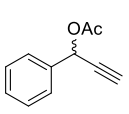
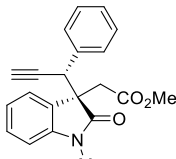
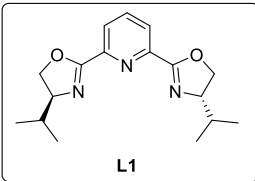
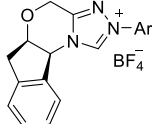
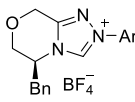
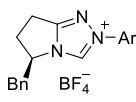
Optical rotations were measured at 589 nm (sodium D line) by using a Perkin-Elmer 343 polarimeter.

Materials:

All starting materials, reagents and solvents were purchased from commercial suppliers (Aldrich, Alfa, TCI, Daicel, etc.) and used as supplied unless otherwise stated. The isatin-derived enals **1**^[1,2], propargylic acetates **2**^[3,4] and NHC precatalysts **4**^[5,6] were synthesized in accordance with the procedures in literatures. Tetrahydrofuran and toluene were dried over Na and distilled prior to use.

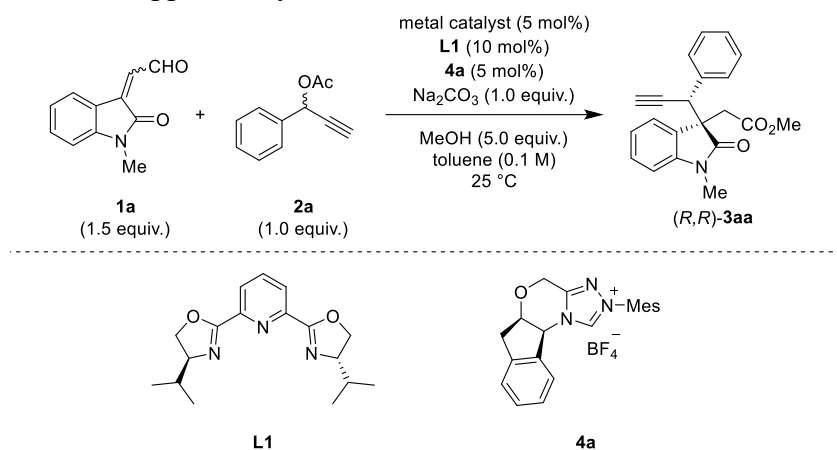
2. Details for Condition Optimization

Table S1. Effect of NHC precatalyst on the reaction^a

 1a (1.5 equiv.) +  2a (1.0 equiv.) $\text{Cu}(\text{CH}_3\text{CN})_4\text{PF}_6$ (5 mol%) L1 (10 mol%) 4 (5 mol%) Na_2CO_3 (1.0 equiv.) MeOH (5.0 equiv.) toluene (0.1 M) 25 °C  (R,R)-3aa  L1				
 4a: Ar = Mes 4b: Ar = Ph  4c: Ar = Mes 4d: Ar = C₆F₅  4e: Ar = Ph 4f: Ar = C₆F₅				
entry	4	yield (%)	d.r.	e.e. (%)
1	4a	70	93:7	96
2	4b	20	87:13	94
3	4c	76	92:8	92
4	4d	74	67:33	29
5	4e	22	71:29	59
6	4f	83	50:50	18

^aUnless noted, reaction conditions: $\text{Cu}(\text{CH}_3\text{CN})_4\text{PF}_6$ (5 mol%) and pyridine bisoxazoline ligand **L1** (10 mol%) were stirred in toluene (0.5 mL) at 25 °C for 1 h under N₂, then NHC precatalyst **4** (5 mol%), **1a** (0.15 mmol), **2a** (0.1 mmol), MeOH (0.5 mmol), Na_2CO_3 (0.1 mmol) and toluene (0.5 mL) were added to the reaction mixture and stirred at 25 °C for 12 h under N₂. The yield and diastereomeric ratio (d.r.) were determined by ¹H NMR spectroscopy. The enantiomeric excess (e.e.) was determined by HPLC.

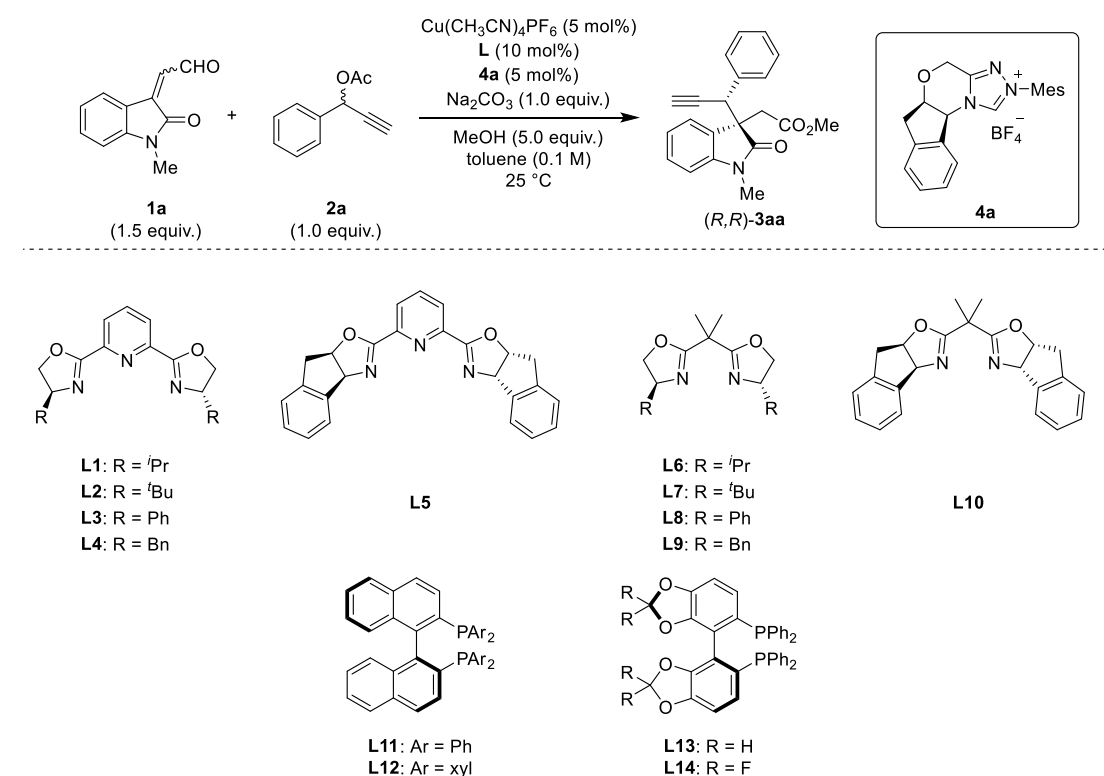
Table S2. Effect of copper catalyst on the reaction^a



entry	metal catalyst	yield (%)	d.r.	e.e. (%)
1	Cu(CH ₃ CN) ₄ PF ₆	70	93:7	96
2	Cu(CH ₃ CN) ₄ BF ₄	32	75:25	88
3	CuI	<5	-	-
4	Cu(OTf) ₂	52	88:12	94
5	Cu(OAc) ₂	43	67:33	88

^aUnless noted, reaction conditions: copper catalyst (5 mol%) and pyridine bisoxazoline ligand **L1** (10 mol%) were stirred in toluene (0.5 mL) at 25 °C for 1 h under N₂, then NHC precatalyst **4a** (5 mol%), **1a** (0.15 mmol), **2a** (0.1 mmol), MeOH (0.5 mmol), Na₂CO₃ (0.1 mmol) and toluene (0.5 mL) were added to the reaction mixture and stirred at 25 °C for 12 h under N₂. The yield and diastereomeric ratio (d.r.) were determined by ¹H NMR spectroscopy. The enantiomeric excess (e.e.) was determined by HPLC. n.d. = not detected.

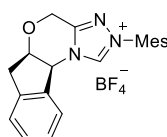
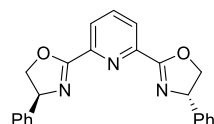
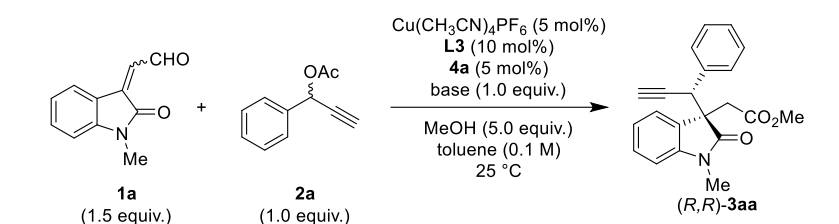
Table S3. Effect of ligand on the reaction^a



entry	L	yield (%)	d.r.	e.e. (%)
1	L1	70	93:7	96
2	L2	42	60:40	73
3	L3	51	>95:5	99
4	L4	39	81:19	87
5	L5	16	78:22	-
6	L6	<5	-	-
7	L7	<5	-	-
8	L8	15	78:22	90
9	L9	41	85:15	97
10	L10	15	84:16	94
11	L11	<5	-	-
12	L12	<5	-	-
13	L13	<5	-	-
14	L14	<5	-	-

^aUnless noted, reaction conditions: Cu(CH₃CN)₄PF₆ (5 mol%) and ligand L (10 mol%) were stirred in toluene (0.5 mL) at 25 °C for 1 h under N₂, then NHC precatalyst 4a (5 mol%), 1a (0.15 mmol), 2a (0.1 mmol), MeOH (0.5 mmol), Na₂CO₃ (0.1 mmol) and toluene (0.5 mL) were added to the reaction mixture and stirred at 25 °C for 12 h under N₂. The yield and diastereomeric ratio (d.r.) were determined by ¹H NMR spectroscopy. The enantiomeric excess (e.e.) was determined by HPLC.

Table S4. Effect of base on the reaction^a



entry	base	yield (%)	d.r.	e.e. (%)
1	Na_2CO_3	51	>95:5	99
2	K_2CO_3	<5	-	-
3	Cs_2CO_3	n.d.	-	-
4	NaOAc	11	92:8	-
5	NaHCO_3	9	95:5	-
6	$i\text{Pr}_2\text{NEt}$	51	93:7	96
7	NEt_3	60	95:5	98
8	DMAP	16	73:27	-
9	DABCO	30	80:20	98
10	TMEDA	44	86:14	95

^aUnless noted, reaction conditions: $\text{Cu}(\text{CH}_3\text{CN})_4\text{PF}_6$ (5 mol%) and pyridine bisoxazoline ligand **L3** (10 mol%) were stirred in toluene (0.5 mL) at 25 °C for 1 h under N_2 , then NHC precatalyst **4a** (5 mol%), **1a** (0.15 mmol), **2a** (0.1 mmol), MeOH (0.5 mmol), base (0.1 mmol) and toluene (0.5 mL) were added to the reaction mixture and stirred at 25 °C for 12 h under N_2 . The yield and diastereomeric ratio (d.r.) were determined by ^1H NMR spectroscopy. The enantiomeric excess (e.e.) was determined by HPLC. DMAP = 4-dimethylaminopyridine; DABCO = triethylene diamine; TMEDA = *N,N,N',N'*-tetramethylethylenediamine.

Table S5. Effect of temperature on the reaction^a

Reaction scheme showing the conversion of **1a** (1.5 equiv.) and **2a** (1.0 equiv.) to **(R,R)-3aa** using $\text{Cu}(\text{CH}_3\text{CN})_4\text{PF}_6$ (5 mol%), **L3** (10 mol%), **4a** (5 mol%), Na_2CO_3 (1.0 equiv.), MeOH (5.0 equiv.), THF (0.1 M), and T °C.

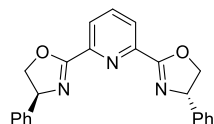
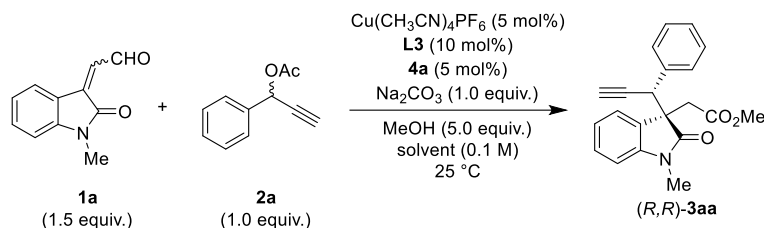
L3

4a

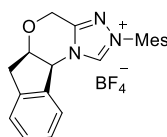
entry	T (°C)	yield (%)	d.r.	e.e. (%)
1	40	65	>95:5	99
2	30	66	>95:5	99
3	25	79	>95:5	>99
4 ^b	10	64	>95:5	99
5 ^b	0	32	>95:5	99

^aUnless noted, reaction conditions: $\text{Cu}(\text{CH}_3\text{CN})_4\text{PF}_6$ (5 mol%) and pyridine bisoxazoline ligand **L3** (10 mol%) were stirred in THF (0.5 mL) at 25 °C for 1 h under N_2 , then NHC precatalyst **4a** (5 mol%), **1a** (0.15 mmol), **2a** (0.1 mmol), MeOH (0.5 mmol), Na_2CO_3 (0.1 mmol) and THF (0.5 mL) were added to the reaction mixture and stirred at T °C for 12 h under N_2 . The yield and diastereomeric ratio (d.r.) were determined by ^1H NMR spectroscopy. The enantiomeric excess (e.e.) was determined by HPLC. ^bFor 3 days.

Table S6. Effect of solvent on the reaction^a



L3

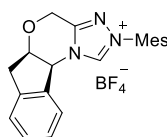
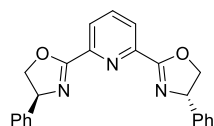
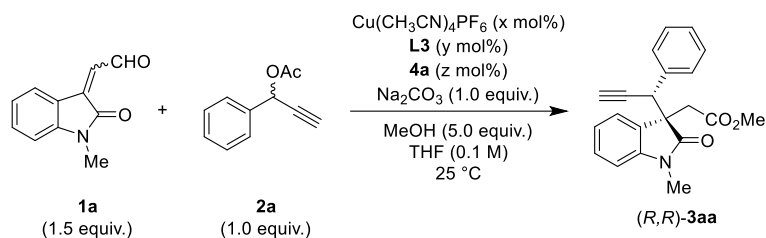


4a

entry	solvent	yield (%)	d.r.	e.e. (%)
1	toluene	51	>95:5	99
2	DCM	47	>95:5	99
3	THF	79	>95:5	>99
4	DCE	45	>95:5	98
5	DMSO	n.d.	-	-
6	MeOH	22	73:27	84
7	EtOAc	40	>95:5	99
8	CH_3CN	53	80:20	48
9	1,4-dioxane	57	>95:5	99

^aUnless noted, reaction conditions: $\text{Cu}(\text{CH}_3\text{CN})_4\text{PF}_6$ (5 mol%) and pyridine bisoxazoline ligand **L3** (10 mol%) were stirred in solvent (0.5 mL) at 25 °C for 1 h under N_2 , then NHC precatalyst **4a** (5 mol%), **1a** (0.15 mmol), **2a** (0.1 mmol), MeOH (0.5 mmol), Na_2CO_3 (0.1 mmol) and solvent (0.5 mL) were added to the reaction mixture and stirred at 25 °C for 12 h under N_2 . The yield and diastereomeric ratio (d.r.) were determined by ^1H NMR spectroscopy. The enantiomeric excess (e.e.) was determined by HPLC. DCM = dichloromethane; DCE = 1,2-dichloroethane; THF = tetrahydrofuran; DMSO = dimethyl sulfoxide.

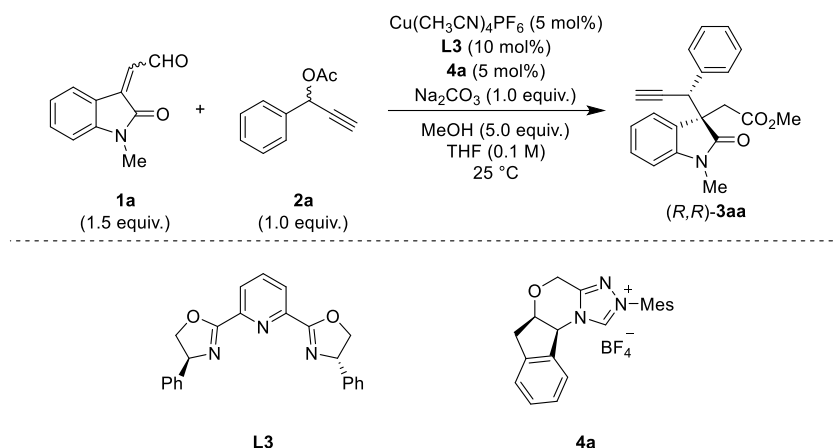
Table S7. Effect of Cu/Ligand/NHC ratio on the reaction^a



entry	x	y	z	yield (%)	d.r.	e.e. (%)
1	5	5	5	64	>95:5	>99
2	5	10	5	79	>95:5	>99
3	10	20	5	73	>95:5	>99
4	20	40	5	63	>95:5	>99
5	30	60	5	62	>95:5	>99
6	50	100	5	50	>95:5	>99

^aUnless noted, reaction conditions: $\text{Cu}(\text{CH}_3\text{CN})_4\text{PF}_6$ (x mol%) and pyridine bisoxazoline ligand **L3** (y mol%) were stirred in THF (0.5 mL) at 25 °C for 1 h under N_2 , then NHC precatalyst **4a** (z mol%), **1a** (0.15 mmol), **2a** (0.1 mmol), MeOH (0.5 mmol), Na_2CO_3 (0.1 mmol) and THF (0.5 mL) were added to the reaction mixture and stirred at 25 °C for 12 h under N_2 . The yield and diastereomeric ratio (d.r.) were determined by ^1H NMR spectroscopy. The enantiomeric excess (e.e.) was determined by HPLC.

3. Gram Scale Reaction



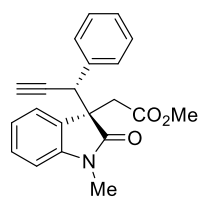
To a flame-dried and N_2 -purged Schlenk tube were added $\text{Cu}(\text{CH}_3\text{CN})_4\text{PF}_6$ (0.2 mmol, 74.5 mg) and pyridine bisoxazoline ligand **L3** (0.4 mmol, 147.8 mg). The vial was sealed, purged and backfilled with N_2 three times before adding THF (20.0 mL) at 25 °C. The resulting solution was stirred at 25 °C for 1 hour. Then, isatin-derived enal **1a** (6.0 mmol, 1123.2 mg), NHC precatalyst **4a** (0.2 mmol, 83.8 mg), Na_2CO_3 (4.0 mmol, 424.0 mg), MeOH (20.0 mmol, 800 μL) and a solution of propargylic acetate **2a** (4.0 mmol, 696.8 mg) in THF (20.0 mL) were added. The resulting solution was stirred at 25 °C for 12 hours and then quenched with saturated NH_4Cl aqueous solution (10.0 mL). The resulting solution was extracted with ethyl acetate (15.0 mL x 3). The combined organic layers were dried over Na_2SO_4 , filtered and concentrated in vacuo. The diastereomeric ratio was determined by ^1H NMR analysis of the crude reaction mixture. The residue was purified by column chromatography on silica gel (petroleum ether: ethyl acetate = 5:1-2:1) to afford desired products **(R,R)-3aa** (1152.5 mg, 75% yield, > 95:5 d.r., >99% e.e.).

4. General Procedure

To a flame-dried and N₂-purged Schlenk tube were added Cu(CH₃CN)₄PF₆ (0.005 mmol, 5 mol%) and pyridine bisoxazoline ligand **L3** (or *ent*-**L3**) (0.01 mmol, 10 mol%). The vial was sealed, purged and backfilled with N₂ three times before adding THF (0.5 mL) at 25 °C. The resulting solution was stirred at 25 °C for 1 hour. Then, isatin-derived enal **1** (0.15 mmol), NHC precatalyst **4a** (or *ent*-**4a**) (0.005 mmol, 5 mol%), Na₂CO₃ (0.1 mmol), MeOH (0.5 mmol) and a solution of propargylic acetate **2** (0.1 mmol) in THF (0.5 mL) were added. The resulting solution was stirred at 25 °C for 12 hours and then quenched with saturated NH₄Cl aqueous solution (1.0 mL). The resulting solution was extracted with ethyl acetate (5.0 mL x 3). The combined organic layers were dried over Na₂SO₄, filtered and concentrated in vacuo. The diastereomeric ratio was determined by ¹H NMR analysis of the crude reaction mixture. The residue was purified by column chromatography on silica gel (petroleum ether: ethyl acetate = 5:1-2:1) to afford the desired product **3**

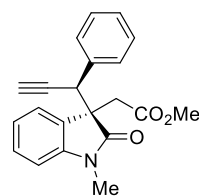
5. Characterization Data of Products

Methyl 2-((*R*)-1-methyl-2-oxo-3-((*R*)-1-phenylprop-2-yn-1-yl)indolin-3-yl)acetate ((*R,R*)-3aa)



White solid; 77% yield; >95:5 d.r.; ^1H NMR (400 MHz, CDCl_3) δ 7.30 – 7.18 (m, 4H), 7.15 – 7.11 (m, 2H), 6.97 (td, $J = 7.5, 1.0$ Hz, 1H), 6.85 (dd, $J = 7.4, 1.3$ Hz, 1H), 6.71 (d, $J = 7.7$ Hz, 1H), 4.16 (d, $J = 2.6$ Hz, 1H), 3.42 (s, 3H), 3.28 (d, $J = 16.5$ Hz, 1H), 3.12 (s, 3H), 2.89 (d, $J = 16.5$ Hz, 1H), 2.20 (d, $J = 2.6$ Hz, 1H). ^{13}C NMR (126 MHz, CDCl_3) δ 177.35, 170.12, 145.12, 134.93, 129.86, 128.90, 128.24, 128.04, 127.90, 124.13, 121.78, 107.87, 80.99, 73.21, 53.09, 51.82, 44.95, 39.18, 26.26. IR (KBr, cm^{-1}) γ 3291, 3058, 3029, 2952, 2925, 2853, 1715, 1613, 1494, 1471, 1377, 1354, 1262, 1198, 1176, 1091, 1028, 752, 702, 543, 489. HRMS (ESI) m/z ($\text{M}+\text{Na}$) $^+$: calculated for $(\text{C}_{21}\text{H}_{19}\text{NO}_3\text{Na})^+$: 356.1257, found: 356.1270; $[\alpha]^{20}_{\text{D}} = +37.4$ ($c = 0.50$, CHCl_3); The product was analyzed by HPLC to determine the enantiomeric excess: >99% e.e. (CHIRALPAK IG, hexane/*i*-PrOH = 70/30, flow rate: 1.0 mL/min, $T = 30^\circ\text{C}$, 230 nm), t_{R} (major) = 11.26 min, t_{R} (minor) = 16.01 min.

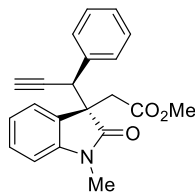
Methyl 2-((*R*)-1-methyl-2-oxo-3-((*S*)-1-phenylprop-2-yn-1-yl)indolin-3-yl)acetate ((*R,S*)-3aa)



White solid; 55% yield; 91:9 d.r.; ^1H NMR (500 MHz, CDCl_3) δ 7.64 (dd, $J = 7.5, 1.3$ Hz, 1H), 7.21 (td, $J = 7.8, 1.3$ Hz, 1H), 7.10 – 7.02 (m, 2H), 7.01 – 6.95 (m, 2H), 6.86 – 6.81 (m, 2H), 6.48 – 6.43 (m, 1H), 4.13 (d, $J = 2.6$ Hz, 1H), 3.58 (d, $J = 16.6$ Hz, 1H), 3.45 (s, 3H), 3.28 (d, $J = 16.7$ Hz, 1H), 2.77 (s, 3H), 2.51 (d, $J = 2.6$ Hz, 1H). ^{13}C NMR (126 MHz, CDCl_3) δ 176.99, 170.27, 144.44, 134.47, 128.92, 128.75, 127.80, 127.67, 127.34, 123.88, 122.03, 107.70, 82.30, 74.24, 53.59, 51.84, 45.05, 39.69, 25.91. IR (KBr, cm^{-1}) γ 3289, 3058, 3031, 2924, 2853, 1742, 1713, 1613, 1494, 1471, 1377, 1355, 1255, 1199, 1177, 1092, 1028, 752, 699, 683, 543, 487. HRMS (ESI) m/z ($\text{M}+\text{Na}$) $^+$: calculated for $(\text{C}_{21}\text{H}_{19}\text{NO}_3\text{Na})^+$: 356.1257, found: 356.1257; $[\alpha]^{20}_{\text{D}} = -51.2$ ($c = 0.59$, CHCl_3); The product was analyzed by HPLC to determine the enantiomeric excess: 99% e.e. (CHIRALPAK IG, hexane/*i*-PrOH = 70/30, flow rate: 1.0 mL/min, $T = 30^\circ\text{C}$, 270

nm), t_R (major) = 8.74 min, t_R (minor) = 10.81 min.

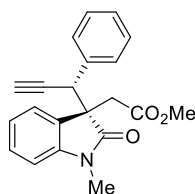
Methyl 2-((*S*)-1-methyl-2-oxo-3-((*S*)-1-phenylprop-2-yn-1-yl)indolin-3-yl)acetate ((*S,S*)-3aa)



White solid; 74% yield; >95:5 d.r.; Spectral data were in agreement with those of the enantiomer reported above. **HRMS** (ESI) m/z ($M+Na$)⁺: calculated for (C₂₁H₁₉NO₃Na)⁺: 356.1257, found: 356.1255; $[\alpha]^{20}_D = -40.1$ ($c = 0.48$, CHCl₃); The product was analyzed by HPLC

to determine the enantiomeric excess: >99% e.e. (CHIRALPAK IG, hexane/*i*-PrOH = 70/30, flow rate: 1.0 mL/min, T = 30 °C, 230 nm), t_R (minor) = 11.46 min, t_R (major) = 15.42 min.

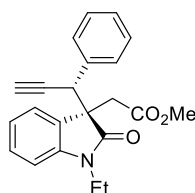
Methyl 2-((*S*)-1-methyl-2-oxo-3-((*R*)-1-phenylprop-2-yn-1-yl)indolin-3-yl)acetate ((*S,R*)-3aa)



White solid; 60% yield; 92:8 d.r.; Spectral data were in agreement with those of the enantiomer reported above. **HRMS** (ESI) m/z ($M+Na$)⁺: calculated for (C₂₁H₁₉NO₃Na)⁺: 356.1257, found: 356.1263; $[\alpha]^{20}_D = +53.7$ ($c = 0.25$, CHCl₃); The product was analyzed by HPLC

to determine the enantiomeric excess: 99% e.e. (CHIRALPAK IG, hexane/*i*-PrOH = 70/30, flow rate: 1.0 mL/min, T = 30 °C, 270 nm), t_R (minor) = 9.30 min, t_R (major) = 10.79 min.

Methyl 2-((*R*)-1-ethyl-2-oxo-3-((*R*)-1-phenylprop-2-yn-1-yl)indolin-3-yl)acetate ((*R,R*)-3ba)

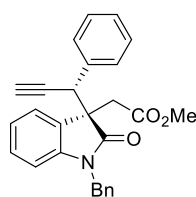


Yellow solid; 79% yield; >95:5 d.r.; **¹H NMR (500 MHz, CDCl₃)** δ 7.27 – 7.24 (m, 1H), 7.24 – 7.18 (m, 3H), 7.17 – 7.11 (m, 2H), 6.97 (td, $J = 7.5, 1.0$ Hz, 1H), 6.90 (dd, $J = 7.5, 1.4$ Hz, 1H), 6.73 (d, $J = 7.8$ Hz, 1H), 4.18 (d, $J = 2.6$ Hz, 1H), 3.78 (dq, $J = 14.5, 7.3$ Hz, 1H),

3.59 (dq, $J = 14.3, 7.2$ Hz, 1H), 3.40 (s, 3H), 3.27 (d, $J = 16.4$ Hz, 1H), 2.90 (d, $J = 16.4$ Hz, 1H), 2.21 (d, $J = 2.6$ Hz, 1H), 1.11 (t, $J = 7.2$ Hz, 3H). **¹³C NMR (126 MHz, CDCl₃)** δ 176.75, 170.06, 144.22, 134.96, 129.93, 128.82, 128.52, 127.97, 127.92, 124.36, 121.57, 107.97, 81.08, 73.41, 52.66, 51.71, 44.85, 39.45, 34.71, 12.18. **IR** (KBr, cm⁻¹)

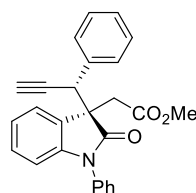
γ 3299, 2961, 2926, 2853, 1712, 1612, 1489, 1467, 1369, 1261, 1201, 1174, 1135, 1098, 1022, 799, 753, 700. **HRMS** (ESI) m/z ($M+Na$)⁺: calculated for (C₂₂H₂₁NO₃Na)⁺: 370.1414, found: 370.1417; $[\alpha]^{20}_D = +35.7$ ($c = 0.53$, CHCl₃); The product was analyzed by HPLC to determine the enantiomeric excess: >99% e.e. (CHIRALPAK IG, hexane/*i*-PrOH = 70/30, flow rate: 1.0 mL/min, T = 30 °C, 254 nm), t_R (major) = 10.57 min, t_R (minor) = 16.33 min.

Methyl 2-((*R*)-1-benzyl-2-oxo-3-((*R*)-1-phenylprop-2-yn-1-yl)indolin-3-yl)acetate ((*R,R*)-3ca)



Yellow solid; 81% yield; >95:5 d.r.; **¹H NMR (500 MHz, CDCl₃)** δ 7.32 – 7.11 (m, 11H), 6.99 – 6.91 (m, 2H), 6.58 (d, $J = 7.8$ Hz, 1H), 4.88 (d, $J = 15.8$ Hz, 1H), 4.77 (d, $J = 15.8$ Hz, 1H), 4.25 (d, $J = 2.7$ Hz, 1H), 3.39 (s, 3H), 3.36 (d, $J = 16.4$ Hz, 1H), 2.96 (d, $J = 16.4$ Hz, 1H), 2.18 (d, $J = 2.6$ Hz, 1H). **¹³C NMR (126 MHz, CDCl₃)** δ 177.37, 170.03, 144.39, 135.91, 135.00, 129.96, 128.81, 128.62, 128.33, 128.05, 128.03, 127.66, 127.46, 124.18, 121.88, 109.09, 81.19, 73.64, 52.89, 51.78, 44.92, 44.31, 39.88. **IR** (KBr, cm⁻¹) γ 3297, 3029, 2954, 2924, 1715, 1613, 1488, 1467, 1454, 1355, 1261, 1197, 1080, 1173, 1014, 800, 753, 699. **HRMS** (ESI) m/z ($M+Na$)⁺: calculated for (C₂₇H₂₃NO₃Na)⁺: 432.1570, found: 432.1577; $[\alpha]^{20}_D = +29.9$ ($c = 0.60$, CHCl₃); The product was analyzed by HPLC to determine the enantiomeric excess: >99% e.e. (CHIRALPAK IG, hexane/*i*-PrOH = 70/30, flow rate: 1.0 mL/min, T = 30 °C, 254 nm), t_R (major) = 18.93 min, t_R (minor) = 25.23 min.

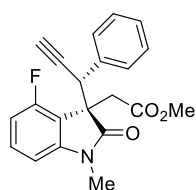
Methyl 2-((*R*)-2-oxo-1-phenyl-3-((*R*)-1-phenylprop-2-yn-1-yl)indolin-3-yl)acetate ((*R,R*)-3da)



Yellow solid; 73% yield; >95:5 d.r.; **¹H NMR (500 MHz, CDCl₃)** δ 7.48 (t, $J = 7.8$ Hz, 2H), 7.41 – 7.36 (m, 1H), 7.32 – 7.22 (m, 5H), 7.21 – 7.14 (m, 3H), 7.01 (td, $J = 7.5, 1.0$ Hz, 1H), 6.93 (dd, $J = 7.5, 1.3$ Hz, 1H), 6.64 (d, $J = 7.8$ Hz, 1H), 4.24 (d, $J = 2.6$ Hz, 1H), 3.47 (s, 3H), 3.46 (d, $J = 16.7$ Hz, 1H), 2.98 (d, $J = 16.6$ Hz, 1H), 2.31 (d, $J = 2.6$ Hz, 1H). **¹³C NMR (126 MHz, CDCl₃)** δ 176.65, 170.10, 145.28, 134.87, 134.69, 129.96, 129.60, 128.79, 128.13, 128.10, 128.02, 126.75, 124.20, 122.20, 109.11, 81.00, 77.36, 73.67,

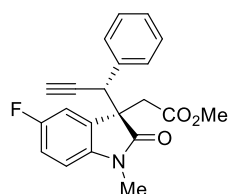
53.00, 51.88, 45.31, 39.83. **IR** (KBr, cm^{-1}) γ 3301, 3011, 2954, 2923, 2853, 1723, 1611, 1595, 1503, 1465, 1377, 1261, 1200, 1174, 1114, 1027, 800, 752, 700, 594. **HRMS** (ESI) m/z ($M+\text{Na}$) $^{+}$: calculated for $(\text{C}_{26}\text{H}_{21}\text{NO}_3\text{Na})^{+}$: 418.1414, found: 418.1425; $[\alpha]^{20}_{\text{D}} = +1.9$ ($c = 0.55$, CHCl_3); The product was analyzed by HPLC to determine the enantiomeric excess: >99% e.e. (CHIRALPAK IE, hexane/*i*-PrOH = 70/30, flow rate: 1.0 mL/min, $T = 30\text{ }^{\circ}\text{C}$, 254 nm), t_{R} (major) = 16.91 min, t_{R} (minor) = 32.05 min.

Methyl 2-((*R*)-4-fluoro-1-methyl-2-oxo-3-((*R*)-1-phenylprop-2-yn-1-yl)indolin-3-yl)acetate ((*R,R*)-3ea)



Yellow solid; 60% yield; >95:5 d.r.; **^1H NMR (400 MHz, CDCl_3)** δ 7.19 – 7.01 (m, 6H), 6.67 (ddd, $J = 9.3, 8.4, 0.7$ Hz, 1H), 6.30 (dd, $J = 7.8, 0.7$ Hz, 1H), 4.21 (d, $J = 2.7$ Hz, 1H), 3.74 (d, $J = 17.0$ Hz, 1H), 3.48 (s, 3H), 3.27 (d, $J = 17.0$ Hz, 1H), 2.94 (s, 3H), 2.45 (d, $J = 2.6$ Hz, 1H). **^{13}C NMR (101 MHz, CDCl_3)** δ 175.59, 170.45, 158.75 (d, $J = 245.6$ Hz), 146.53 (d, $J = 9.6$ Hz), 134.90, 130.67 (d, $J = 8.8$ Hz), 128.67, 127.87, 127.66, 114.30 (d, $J = 18.8$ Hz), 109.63 (d, $J = 20.8$ Hz), 103.98 (d, $J = 2.9$ Hz), 80.56, 74.41, 53.27 (d, $J = 3.0$ Hz), 51.93, 43.82, 38.50, 26.43. **^{19}F NMR (376 MHz, CDCl_3)** δ -120.06. **IR** (KBr, cm^{-1}) γ 3293, 2921, 2851, 1723, 1629, 1477, 1455, 1358, 1260, 1235, 1200, 1147, 1050, 776, 701, 577, 542. **HRMS** (ESI) m/z ($M+\text{Na}$) $^{+}$: calculated for $(\text{C}_{21}\text{H}_{18}\text{FNO}_3\text{Na})^{+}$: 374.1163, found: 374.1171; $[\alpha]^{20}_{\text{D}} = +70.7$ ($c = 0.39$, CHCl_3); The product was analyzed by HPLC to determine the enantiomeric excess: 99% e.e. (CHIRALPAK IG, hexane/*i*-PrOH = 70/30, flow rate: 1.0 mL/min, $T = 30\text{ }^{\circ}\text{C}$, 254 nm), t_{R} (major) = 8.00 min, t_{R} (minor) = 9.23 min.

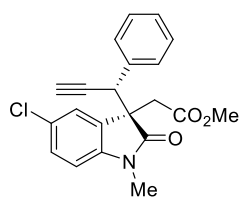
Methyl 2-((*R*)-5-fluoro-1-methyl-2-oxo-3-((*R*)-1-phenylprop-2-yn-1-yl)indolin-3-yl)acetate ((*R,R*)-3fa)



White solid; 50% yield; >95:5 d.r.; **^1H NMR (400 MHz, CDCl_3)** δ 7.32 – 7.23 (m, 3H), 7.19 – 7.13 (m, 2H), 6.97 (ddd, $J = 9.3, 8.5, 2.6$ Hz, 1H), 6.65 (dd, $J = 8.5, 4.2$ Hz, 1H), 6.61 (dd, $J = 8.1, 2.6$ Hz, 1H), 4.15 (d, $J = 2.6$ Hz, 1H), 3.45 (s, 3H), 3.27 (d, $J = 16.9$ Hz, 1H), 3.12 (s, 3H), 2.85 (d, $J = 16.8$ Hz, 1H), 2.20 (d, $J = 2.6$ Hz, 1H). **^{13}C NMR (126**

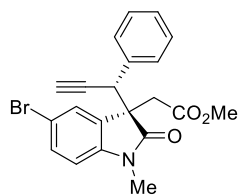
MHz, CDCl₃) δ 177.14, 169.96, 158.60 (d, $J = 239.9$ Hz), 141.18, 134.54, 129.88 (d, $J = 8.3$ Hz), 129.80, 128.29, 128.10, 115.04 (d, $J = 23.3$ Hz), 112.42 (d, $J = 25.2$ Hz), 108.24 (d, $J = 8.2$ Hz), 80.59, 73.41, 53.38 (d, $J = 1.9$ Hz), 51.97, 44.84, 39.04, 26.45. **¹⁹F NMR (471 MHz, CDCl₃)** δ -121.05. **IR** (KBr, cm⁻¹) γ 3303, 3009, 2956, 2922, 2852, 1715, 1659, 1625, 1496, 1469, 1359, 1262, 1200, 1177, 1111, 1023, 811, 755, 701, 664, 561. **HRMS** (ESI) m/z (M+Na)⁺: calculated for (C₂₁H₁₈FNO₃Na)⁺: 374.1163, found: 374.1179; $[\alpha]^{20}_D = +29.6$ ($c = 0.22$, CHCl₃); The product was analyzed by HPLC to determine the enantiomeric excess: >99% e.e. (CHIRALPAK IG, hexane/*i*-PrOH = 70/30, flow rate: 1.0 mL/min, T = 30 °C, 254 nm), t_R (major) = 9.99 min, t_R (minor) = 18.36 min.

Methyl 2-((*R*)-5-chloro-1-methyl-2-oxo-3-((*R*)-1-phenylprop-2-yn-1-yl)indolin-3-yl)acetate ((*R,R*)-3ga)



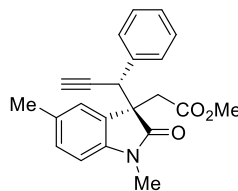
Yellow oil; 84% yield; >95:5 d.r.; **¹H NMR (500 MHz, CDCl₃)** δ 7.30 – 7.21 (m, 4H), 7.18 – 7.12 (m, 2H), 6.79 (d, $J = 2.1$ Hz, 1H), 6.65 (d, $J = 8.3$ Hz, 1H), 4.13 (d, $J = 2.6$ Hz, 1H), 3.46 (s, 3H), 3.28 (d, $J = 16.9$ Hz, 1H), 3.12 (s, 3H), 2.85 (d, $J = 17.0$ Hz, 1H), 2.21 (d, $J = 2.6$ Hz, 1H). **¹³C NMR (126 MHz, CDCl₃)** δ 177.01, 169.91, 143.80, 134.43, 130.00, 129.80, 128.77, 128.33, 128.07, 127.04, 124.56, 108.74, 80.52, 73.47, 53.15, 51.98, 44.85, 38.97, 26.40. **IR** (KBr, cm⁻¹) γ 3296, 3029, 2957, 2925, 1717, 1610, 1492, 1454, 1358, 1261, 1201, 1177, 1100, 1023, 809, 750, 702. **HRMS** (ESI) m/z (M+Na)⁺: calculated for (C₂₁H₁₈ClNO₃Na)⁺: 390.0867, found: 390.0874; $[\alpha]^{20}_D = +70.4$ ($c = 0.58$, CHCl₃); The product was analyzed by HPLC to determine the enantiomeric excess: >99% e.e. (CHIRALPAK IG, hexane/*i*-PrOH = 70/30, flow rate: 1.0 mL/min, T = 30 °C, 254nm), t_R (major) = 9.18 min, t_R (minor) = 15.87 min.

Methyl 2-((*R*)-5-bromo-1-methyl-2-oxo-3-((*R*)-1-phenylprop-2-yn-1-yl)indolin-3-yl)acetate ((*R,R*)-3ha)



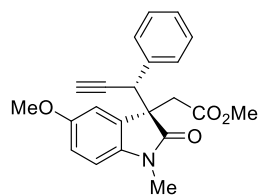
Yellow oil; 81% yield; >95:5 d.r.; ^1H NMR (500 MHz, CDCl_3) δ 7.39 (dd, $J = 8.2, 2.0$ Hz, 1H), 7.30 – 7.24 (m, 3H), 7.17 – 7.11 (m, 2H), 6.91 (d, $J = 2.0$ Hz, 1H), 6.61 (d, $J = 8.3$ Hz, 1H), 4.12 (d, $J = 2.6$ Hz, 1H), 3.46 (s, 3H), 3.28 (d, $J = 17.0$ Hz, 1H), 3.11 (s, 3H), 2.84 (d, $J = 17.0$ Hz, 1H), 2.20 (d, $J = 2.5$ Hz, 1H). ^{13}C NMR (126 MHz, CDCl_3) δ 176.93, 169.89, 144.27, 134.38, 131.65, 130.34, 129.80, 128.34, 128.06, 127.26, 114.29, 109.26, 80.48, 73.47, 53.08, 51.99, 44.86, 38.95, 26.37. IR (KBr, cm^{-1}) γ 3296, 3028, 2952, 2925, 2853, 1715, 1608, 1491, 1366, 1204, 1177, 1099, 1024, 809, 750, 702. HRMS (ESI) m/z ($\text{M}+\text{Na}$) $^+$: calculated for $(\text{C}_{21}\text{H}_{18}\text{BrNO}_3\text{Na})^+$: 434.0362, found: 434.0368; $[\alpha]^{20}_{\text{D}} = +76.0$ ($c = 0.60$, CHCl_3); The product was analyzed by HPLC to determine the enantiomeric excess: >99% e.e. (CHIRALPAK IG, hexane/*i*-PrOH = 70/30, flow rate: 1.0 mL/min, $T = 30$ °C, 254 nm), t_{R} (major) = 9.52 min, t_{R} (minor) = 14.99 min.

Methyl 2-((*R*)-1,5-dimethyl-2-oxo-3-((*R*)-1-phenylprop-2-yn-1-yl)indolin-3-yl)acetate ((*R,R*)-3ia)



Yellow oil; 79% yield; >95:5 d.r.; ^1H NMR (500 MHz, CDCl_3) δ 7.27 – 7.20 (m, 3H), 7.16 – 7.12 (m, 2H), 7.07 – 7.03 (m, 1H), 6.63 (d, $J = 1.7$ Hz, 1H), 6.61 (d, $J = 7.9$ Hz, 1H), 4.15 (d, $J = 2.6$ Hz, 1H), 3.43 (s, 3H), 3.27 (d, $J = 16.7$ Hz, 1H), 3.10 (s, 3H), 2.86 (d, $J = 16.7$ Hz, 1H), 2.28 (s, 3H), 2.19 (d, $J = 2.6$ Hz, 1H). ^{13}C NMR (126 MHz, CDCl_3) δ 177.29, 170.13, 142.71, 134.92, 131.10, 129.89, 129.09, 128.09, 128.01, 127.80, 125.02, 107.51, 81.03, 73.08, 53.03, 51.84, 44.87, 39.09, 26.27, 21.31. IR (KBr, cm^{-1}) γ 3288, 3028, 2923, 1740, 1715, 1621, 1603, 1501, 1454, 1358, 1199, 1175, 1096, 1032, 809, 754, 702, 661. HRMS (ESI) m/z ($\text{M}+\text{Na}$) $^+$: calculated for $(\text{C}_{22}\text{H}_{21}\text{NO}_3\text{Na})^+$: 370.1414, found: 370.1417; $[\alpha]^{20}_{\text{D}} = +69.5$ ($c = 0.52$, CHCl_3); The product was analyzed by HPLC to determine the enantiomeric excess: 99% e.e. (CHIRALPAK IG, hexane/*i*-PrOH = 70/30, flow rate: 1.0 mL/min, $T = 30$ °C, 254 nm), t_{R} (major) = 10.19 min, t_{R} (minor) = 16.93 min.

Methyl 2-((*R*)-5-methoxy-1-methyl-2-oxo-3-((*R*)-1-phenylprop-2-yn-1-yl)indolin-3-yl)acetate ((*R,R*)-3ja)

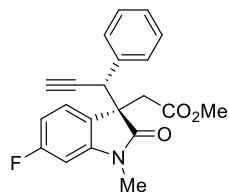


Yellow oil; 69% yield; >95:5 d.r.; ¹H NMR (500 MHz, CDCl₃)

δ 7.29 – 7.22 (m, 3H), 7.17 (dd, *J* = 6.3, 2.7 Hz, 2H), 6.78 (dd, *J* = 8.5, 2.5 Hz, 1H), 6.62 (d, *J* = 8.4 Hz, 1H), 6.45 (d, *J* = 2.5 Hz, 1H), 4.16 (d, *J* = 2.5 Hz, 1H), 3.72 (s, 3H), 3.43 (s, 3H), 3.25 (d,

J = 16.6 Hz, 1H), 3.10 (s, 3H), 2.84 (d, *J* = 16.6 Hz, 1H), 2.19 (d, *J* = 2.5 Hz, 1H). ¹³C NMR (126 MHz, CDCl₃) δ 177.05, 170.03, 155.25, 138.77, 134.90, 129.95, 129.48, 128.11, 127.90, 113.14, 111.78, 108.08, 80.97, 73.14, 55.83, 53.39, 51.83, 44.88, 39.16, 26.35. IR (KBr, cm⁻¹) γ 3288, 3004, 2924, 2852, 1739, 1709, 1601, 1498, 1367, 1288, 1234, 1201, 1175, 1115, 1033, 888, 807, 753, 701. HRMS (ESI) *m/z* (M+Na)⁺: calculated for (C₂₂H₂₁NO₄Na)⁺: 386.1363, found: 386.1369; [α]²⁰_D = +5.0 (*c* = 0.43, CHCl₃); The product was analyzed by HPLC to determine the enantiomeric excess: >99% e.e. (CHIRALPAK IA, hexane/*i*-PrOH = 85/15, flow rate: 1.0 mL/min, T = 30 °C, 254 nm), *t*_R (minor) = 12.89 min, *t*_R (major) = 13.84 min.

Methyl 2-((*R*)-6-fluoro-1-methyl-2-oxo-3-((*R*)-1-phenylprop-2-yn-1-yl)indolin-3-yl)acetate ((*R,R*)-3ka)



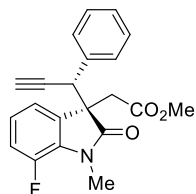
White solid; 88% yield; >95:5 d.r.; ¹H NMR (400 MHz, CDCl₃) δ

7.29 – 7.22 (m, 3H), 7.16 – 7.11 (m, 2H), 6.74 (dd, *J* = 8.2, 5.4 Hz, 1H), 6.64 (ddd, *J* = 9.4, 8.2, 2.3 Hz, 1H), 6.47 (dd, *J* = 8.9, 2.3 Hz, 1H), 4.12 (d, *J* = 2.6 Hz, 1H), 3.43 (s, 3H), 3.26 (d, *J* = 16.7 Hz,

1H), 3.12 (s, 3H), 2.84 (d, *J* = 16.7 Hz, 1H), 2.20 (d, *J* = 2.6 Hz, 1H). ¹³C NMR (101 MHz, CDCl₃) δ 177.78, 170.02, 163.52 (d, *J* = 245.4 Hz), 146.74 (d, *J* = 11.7 Hz), 134.66, 129.81, 128.20, 128.02, 125.11 (d, *J* = 9.9 Hz), 123.44 (d, *J* = 2.9 Hz), 107.78 (d, *J* = 22.4 Hz), 96.80 (d, *J* = 27.5 Hz), 80.71, 73.30, 52.72, 51.91, 44.90, 39.13, 26.40. ¹⁹F NMR (376 MHz, CDCl₃) δ -111.19. IR (KBr, cm⁻¹) γ 3301, 3029, 2953, 2926, 2853, 1723, 1615, 1504, 1454, 1382, 1198, 1178, 1085, 837, 755, 702. HRMS (ESI) *m/z* (M+Na)⁺: calculated for (C₂₁H₁₈FNO₃Na)⁺: 374.1163, found: 374.1171; [α]²⁰_D = +31.5 (*c* = 0.49, CHCl₃); The product was analyzed by HPLC to determine the enantiomeric excess: >99% e.e. (CHIRALPAK IG, hexane/*i*-PrOH = 70/30, flow rate:

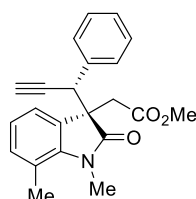
1.0 mL/min, T = 30 °C, 254 nm), t_R (major) = 9.35 min, t_R (minor) = 13.58 min.

Methyl 2-((*R*)-7-fluoro-1-methyl-2-oxo-3-((*R*)-1-phenylprop-2-yn-1-yl)indolin-3-yl)acetate ((*R,R*)-3la)



White solid; 78% yield; >95:5 d.r.; ^1H NMR (400 MHz, CDCl_3) δ 7.31 – 7.20 (m, 3H), 7.14 – 7.08 (m, 2H), 6.98 (ddd, J = 11.5, 8.4, 1.1 Hz, 1H), 6.89 (ddd, J = 8.4, 7.4, 4.5 Hz, 1H), 6.60 (dd, J = 7.3, 1.1 Hz, 1H), 4.11 (d, J = 2.6 Hz, 1H), 3.44 (s, 3H), 3.33 (d, J = 2.7 Hz, 3H), 3.32 (d, J = 16.8 Hz, 1H), 2.86 (d, J = 16.8 Hz, 1H), 2.25 (d, J = 2.6 Hz, 1H). ^{13}C NMR (101 MHz, CDCl_3) δ 177.05, 169.97, 147.60 (d, J = 243.3 Hz), 134.49, 131.71 (d, J = 8.2 Hz), 131.25 (d, J = 3.6 Hz), 129.78, 128.23, 127.97, 122.24 (d, J = 6.3 Hz), 119.84 (d, J = 3.2 Hz), 116.93 (d, J = 19.4 Hz), 80.57, 73.51, 53.37 (d, J = 2.0 Hz), 51.93, 45.13, 39.28, 28.72 (d, J = 5.9 Hz). ^{19}F NMR (376 MHz, CDCl_3) δ -136.67. IR (KBr, cm^{-1}) γ 3300, 3030, 2924, 2853, 1720, 1631, 1598, 1484, 1454, 1437, 1374, 1240, 1200, 1116, 1057, 925, 778, 733, 702. HRMS (ESI) m/z ($\text{M}+\text{Na}$) $^+$: calculated for $(\text{C}_{21}\text{H}_{18}\text{FNO}_3\text{Na})^+$: 374.1163, found: 374.1171; $[\alpha]_D^{20}$ = +51.2 (c = 0.44, CHCl_3); The product was analyzed by HPLC to determine the enantiomeric excess: >99% e.e. (CHIRALPAK IG, hexane/*i*-PrOH = 70/30, flow rate: 1.0 mL/min, T = 30 °C, 254 nm), t_R (major) = 8.38 min, t_R (minor) = 10.36 min.

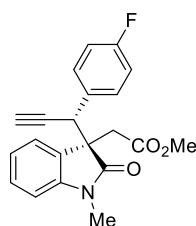
Methyl 2-((*R*)-1,7-dimethyl-2-oxo-3-((*R*)-1-phenylprop-2-yn-1-yl)indolin-3-yl)acetate ((*R,R*)-3ma)



White solid; 43% yield; >95:5 d.r.; ^1H NMR (500 MHz, CDCl_3) δ 7.25 – 7.18 (m, 3H), 7.11 – 7.05 (m, 2H), 6.97 (d, J = 7.2 Hz, 1H), 6.85 (t, J = 7.6 Hz, 1H), 6.67 (dd, J = 7.4, 1.3 Hz, 1H), 4.10 (d, J = 2.6 Hz, 1H), 3.44 (s, 3H), 3.36 (s, 3H), 3.33 (d, J = 16.7 Hz, 1H), 2.87 (d, J = 16.7 Hz, 1H), 2.45 (s, 3H), 2.25 (d, J = 2.6 Hz, 1H). ^{13}C NMR (126 MHz, CDCl_3) δ 178.01, 170.22, 142.85, 134.84, 132.58, 129.80, 128.81, 127.95, 127.74, 121.76, 121.65, 119.44, 81.07, 73.29, 52.43, 51.84, 45.40, 39.26, 29.64, 19.15. IR (KBr, cm^{-1}) γ 3360, 3303, 2922, 2852, 1742, 1712, 1632, 1601, 1455, 1369, 1262, 1198, 1114, 1077, 747, 701, 666. HRMS (ESI) m/z ($\text{M}+\text{Na}$) $^+$: calculated for $(\text{C}_{21}\text{H}_{21}\text{NO}_3\text{Na})^+$: 370.1414,

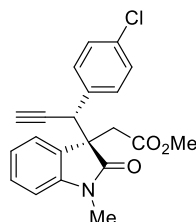
found: 370.1421; $[\alpha]^{20}_{\text{D}} = +9.7$ ($c = 0.09$, CHCl_3); The product was analyzed by HPLC to determine the enantiomeric excess: >99% e.e. (CHIRALPAK IG, hexane/*i*-PrOH = 70/30, flow rate: 1.0 mL/min, $T = 30\text{ }^\circ\text{C}$, 230 nm), t_{R} (major) = 10.71 min, t_{R} (minor) = 14.86 min.

Methyl 2-((*R*)-3-((*R*)-1-(4-fluorophenyl)prop-2-yn-1-yl)-1-methyl-2-oxoindolin-3-yl)acetate ((*R,R*)-3ab)



White solid; 76% yield; >95:5 d.r.; $^1\text{H NMR}$ (500 MHz, CDCl_3) δ 7.29 – 7.22 (m, 1H), 7.10 – 7.03 (m, 2H), 6.99 (td, $J = 7.5, 1.0$ Hz, 1H), 6.92 (dd, $J = 7.4, 1.3$ Hz, 1H), 6.90 – 6.85 (m, 2H), 6.69 (d, $J = 7.7$ Hz, 1H), 4.16 (d, $J = 2.6$ Hz, 1H), 3.44 (s, 3H), 3.29 (d, $J = 16.7$ Hz, 1H), 3.08 (s, 3H), 2.93 (d, $J = 16.6$ Hz, 1H), 2.27 (d, $J = 2.6$ Hz, 1H). $^{13}\text{C NMR}$ (126 MHz, CDCl_3) δ 176.88, 170.10, 162.47 (d, $J = 247.0$ Hz), 144.95, 131.30 (d, $J = 8.1$ Hz), 130.74 (d, $J = 3.2$ Hz), 129.02, 128.26, 123.84, 121.93, 114.71 (d, $J = 21.6$ Hz), 107.99, 80.81, 73.71, 53.00, 51.85, 44.16, 39.10, 26.21. $^{19}\text{F NMR}$ (471 MHz, CDCl_3) δ -114.28. **IR** (KBr, cm^{-1}) γ 3299, 3010, 2953, 2925, 2853, 1715, 1612, 1508, 1494, 1470, 1377, 1353, 1224, 1176, 1160, 1091, 827, 753, 568, 543. **HRMS** (ESI) m/z ($\text{M}+\text{Na}^+$): calculated for $(\text{C}_{21}\text{H}_{18}\text{FNO}_3\text{Na})^+$: 374.1163, found: 374.1172; $[\alpha]^{20}_{\text{D}} = +44.7$ ($c = 0.54$, CHCl_3); The product was analyzed by HPLC to determine the enantiomeric excess: >99% e.e. (CHIRALPAK IG, hexane/*i*-PrOH = 70/30, flow rate: 1.0 mL/min, $T = 30\text{ }^\circ\text{C}$, 254 nm), t_{R} (major) = 10.21 min, t_{R} (minor) = 12.80 min.

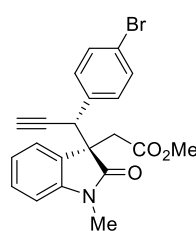
Methyl 2-((*R*)-3-((*R*)-1-(4-chlorophenyl)prop-2-yn-1-yl)-1-methyl-2-oxoindolin-3-yl)acetate ((*R,R*)-3ac)



Yellow oil; 74% yield; >95:5 d.r.; $^1\text{H NMR}$ (400 MHz, CDCl_3) δ 7.30 – 7.23 (m, 1H), 7.20 – 7.14 (m, 2H), 7.06 – 7.02 (m, 2H), 6.99 (td, $J = 7.5, 1.0$ Hz, 1H), 6.93 – 6.88 (m, 1H), 6.71 (dt, $J = 7.8, 0.8$ Hz, 1H), 4.15 (d, $J = 2.6$ Hz, 1H), 3.44 (s, 3H), 3.28 (d, $J = 16.6$ Hz, 1H), 3.09 (s, 3H), 2.91 (d, $J = 16.5$ Hz, 1H), 2.26 (d, $J = 2.6$ Hz, 1H). $^{13}\text{C NMR}$ (101 MHz, CDCl_3) δ 176.85, 170.04, 144.91, 133.93, 133.49, 131.02, 129.08, 128.04, 127.98, 123.84, 121.95, 108.06, 80.49, 73.76, 52.87, 51.90, 44.22, 39.05, 26.25. **IR** (KBr, cm^{-1})

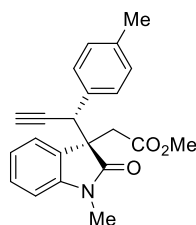
¹) γ 3298, 3055, 3011, 2952, 2925, 2853, 1715, 1613, 1493, 1470, 1377, 1352, 1198, 1175, 1091, 1016, 819, 753, 651, 592, 543, 491. **HRMS** (ESI) m/z ($M+Na$)⁺: calculated for (C₂₁H₁₈ClNO₃Na)⁺: 390.0867, found: 390.0870; [α]²⁰_D = +36.4 (c = 0.50, CHCl₃); The product was analyzed by HPLC to determine the enantiomeric excess: >99% e.e. (CHIRALPAK IG, hexane/*i*-PrOH = 70/30, flow rate: 1.0 mL/min, T = 30 °C, 230 nm), t_R (major) = 10.60 min, t_R (minor) = 13.93 min.

Methyl 2-((*R*)-3-((*R*)-1-(4-bromophenyl)prop-2-yn-1-yl)-1-methyl-2-oxoindolin-3-yl)acetate ((*R,R*)-3ad)



Yellow oil; 74% yield; >95:5 d.r.; **¹H NMR (400 MHz, CDCl₃)** δ 7.36 – 7.30 (m, 2H), 7.29 – 7.23 (m, 1H), 7.02 – 6.95 (m, 3H), 6.93 – 6.87 (m, 1H), 6.71 (dt, J = 7.8, 0.7 Hz, 1H), 4.14 (d, J = 2.6 Hz, 1H), 3.44 (s, 3H), 3.27 (d, J = 16.5 Hz, 1H), 3.09 (s, 3H), 2.91 (d, J = 16.6 Hz, 1H), 2.25 (d, J = 2.6 Hz, 1H). **¹³C NMR (101 MHz, CDCl₃)** δ 176.85, 170.02, 144.91, 134.02, 131.37, 130.95, 129.09, 128.01, 123.85, 122.15, 121.95, 108.08, 80.42, 73.75, 52.80, 51.90, 44.28, 39.04, 26.26. **IR** (KBr, cm⁻¹) γ 3295, 3011, 2952, 2925, 2853, 1715, 1613, 1488, 1470, 1377, 1352, 1199, 1175, 1091, 1012, 816, 753, 643, 543. **HRMS** (ESI) m/z ($M+Na$)⁺: calculated for (C₂₁H₁₈BrNO₃Na)⁺: 434.0362, found: 434.0364; [α]²⁰_D = +28.3 (c = 0.54, CHCl₃); The product was analyzed by HPLC to determine the enantiomeric excess: >99% e.e. (CHIRALPAK IG, hexane/*i*-PrOH = 70/30, flow rate: 1.0 mL/min, T = 30 °C, 230 nm), t_R (major) = 11.44 min, t_R (minor) = 13.93 min.

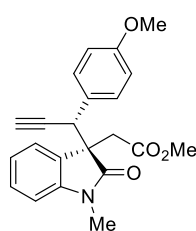
Methyl 2-((*R*)-1-methyl-2-oxo-3-((*R*)-1-(*p*-tolyl)prop-2-yn-1-yl)indolin-3-yl)acetate ((*R,R*)-3ae)



White solid; 75% yield; >95:5 d.r.; **¹H NMR (500 MHz, CDCl₃)** δ 7.29 – 7.24 (m, 1H), 7.04 (m, 4H), 6.96 (td, J = 7.5, 1.1 Hz, 1H), 6.82 (dd, J = 7.5, 1.2 Hz, 1H), 6.74 (d, J = 7.8 Hz, 1H), 4.12 (d, J = 2.6 Hz, 1H), 3.40 (s, 3H), 3.24 (d, J = 16.5 Hz, 1H), 3.15 (s, 3H), 2.86 (d, J = 16.6 Hz, 1H), 2.31 (s, 3H), 2.15 (d, J = 2.5 Hz, 1H). **¹³C NMR (126 MHz, CDCl₃)** δ 177.57, 170.09, 145.20, 137.79, 131.90, 129.80, 128.82, 128.63, 128.25, 124.23, 121.68, 107.84, 81.18, 72.88, 53.11, 51.77, 44.56, 39.20, 26.29, 21.19. **IR** (KBr, cm⁻¹)

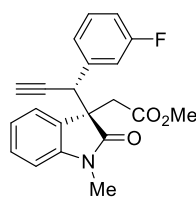
γ 3290, 3009, 2952, 2924, 2854, 1715, 1613, 1496, 1470, 1377, 1352, 1261, 1197, 1175, 1091, 1022, 811, 753, 667, 642, 543. **HRMS** (ESI) m/z ($M+Na$)⁺: calculated for (C₂₂H₂₁NO₃Na)⁺: 370.1414, found: 370.1418; $[\alpha]^{20}_D = +16.1$ ($c = 0.50$, CHCl₃); The product was analyzed by HPLC to determine the enantiomeric excess: 99% e.e. (CHIRALPAK IA, hexane/*i*-PrOH = 70/30, flow rate: 1.0 mL/min, T = 30 °C, 254 nm), t_R (minor) = 5.96 min, t_R (major) = 7.44 min.

Methyl 2-((*R*)-3-((*R*)-1-(4-methoxyphenyl)prop-2-yn-1-yl)-1-methyl-2-oxoindolin-3-yl)acetate ((*R,R*)-3af)



White solid; 76% yield; >95:5 d.r.; **¹H NMR (500 MHz, CDCl₃)** δ 7.29 – 7.23 (m, 1H), 7.05 (d, $J = 8.8$ Hz, 2H), 6.97 (td, $J = 7.5$, 1.1 Hz, 1H), 6.85 (dd, $J = 7.4$, 1.3 Hz, 1H), 6.76 (d, $J = 8.7$ Hz, 2H), 6.73 (d, $J = 7.8$ Hz, 1H), 4.11 (d, $J = 2.6$ Hz, 1H), 3.78 (s, 3H), 3.41 (s, 3H), 3.25 (d, $J = 16.5$ Hz, 1H), 3.13 (s, 3H), 2.87 (d, $J = 16.5$ Hz, 1H), 2.18 (d, $J = 2.6$ Hz, 1H). **¹³C NMR (126 MHz, CDCl₃)** δ 177.46, 170.13, 159.37, 145.15, 130.93, 128.83, 128.33, 126.94, 124.12, 121.73, 113.28, 107.88, 81.24, 73.01, 55.38, 53.22, 51.78, 44.17, 39.19, 26.28. **IR** (KBr, cm⁻¹) γ 3288, 3005, 2954, 2926, 2852, 1715, 1612, 1511, 1494, 1170, 1377, 1353, 1257, 1177, 1031, 825, 753, 667, 543. **HRMS** (ESI) m/z ($M+Na$)⁺: calculated for (C₂₂H₂₁NO₄Na)⁺: 386.1363, found: 386.1376; $[\alpha]^{20}_D = +15.5$ ($c = 0.50$, CHCl₃); The product was analyzed by HPLC to determine the enantiomeric excess: >99% e.e. (CHIRALPAK IG, hexane/*i*-PrOH = 70/30, flow rate: 1.0 mL/min, T = 30 °C, 254 nm), t_R (major) = 16.39 min, t_R (minor) = 18.68 min.

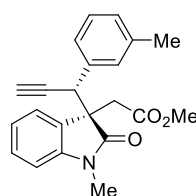
Methyl 2-((*R*)-3-((*R*)-1-(3-fluorophenyl)prop-2-yn-1-yl)-1-methyl-2-oxoindolin-3-yl)acetate ((*R,R*)-3ag)



White solid; 77% yield; >95:5 d.r.; **¹H NMR (500 MHz, CDCl₃)** δ 7.30 – 7.24 (m, 1H), 7.17 (td, $J = 7.9$, 6.1 Hz, 1H), 6.99 (t, $J = 7.5$ Hz, 1H), 6.97 – 6.93 (m, 1H), 6.91 (d, $J = 7.7$ Hz, 2H), 6.85 (dd, $J = 10.0$, 2.3 Hz, 1H), 6.71 (d, $J = 7.8$ Hz, 1H), 4.18 (d, $J = 2.6$ Hz, 1H), 3.44 (s, 3H), 3.27 (d, $J = 16.5$ Hz, 1H), 3.10 (s, 3H), 2.92 (d, $J = 16.5$ Hz, 1H), 2.25 (d, $J = 2.4$ Hz, 1H). **¹³C NMR (126 MHz, CDCl₃)** δ 176.89, 170.02, 162.25 (d, $J = 246.2$ Hz),

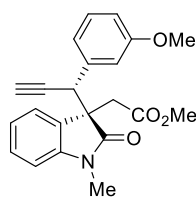
145.01, 137.53 (d, $J = 7.3$ Hz), 129.24 (d, $J = 8.2$ Hz), 129.10, 128.08, 125.53 (d, $J = 3.1$ Hz), 123.94, 121.98, 116.78 (d, $J = 22.5$ Hz), 114.98 (d, $J = 21.1$ Hz), 108.00, 80.41, 73.75, 52.93, 51.86, 44.55 (d, $J = 1.9$ Hz), 39.09, 26.26. **^{19}F NMR (471 MHz, CDCl_3)** δ -113.14. **IR** (KBr, cm^{-1}) γ 3299, 3016, 2953, 2925, 2853, 1715, 1613, 1589, 1493, 1470, 1377, 1352, 1261, 1205, 1177, 1131, 1090, 1027, 764, 754, 693, 650, 542. **HRMS** (ESI) m/z ($\text{M}+\text{Na}$) $^+$: calculated for $(\text{C}_{21}\text{H}_{18}\text{FNO}_3\text{Na})^+$: 374.1163, found: 374.1172; $[\alpha]^{20}_{\text{D}} = +37.8$ ($c = 0.59$, CHCl_3); The product was analyzed by HPLC to determine the enantiomeric excess: >99% e.e. (CHIRALPAK IG, hexane/*i*-PrOH = 70/30, flow rate: 1.0 mL/min, $T = 30$ °C, 254 nm), t_{R} (major) = 9.87 min, t_{R} (minor) = 13.97 min.

Methyl 2-((*R*)-1-methyl-2-oxo-3-((*R*)-1-(*m*-tolyl)prop-2-yn-1-yl)indolin-3-yl)acetate ((*R,R*)-3ah)



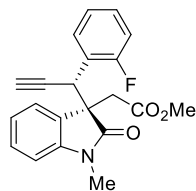
White solid; 66% yield; >95:5 d.r.; **^1H NMR (500 MHz, CDCl_3)** δ 7.29 – 7.23 (m, 1H), 7.12 (t, $J = 7.5$ Hz, 1H), 7.06 (d, $J = 7.6$ Hz, 1H), 6.99 – 6.91 (m, 3H), 6.83 (dd, $J = 7.4, 1.3$ Hz, 1H), 6.73 (d, $J = 7.8$ Hz, 1H), 4.12 (d, $J = 2.5$ Hz, 1H), 3.41 (s, 3H), 3.26 (d, $J = 16.5$ Hz, 1H), 3.13 (s, 3H), 2.87 (d, $J = 16.5$ Hz, 1H), 2.28 (s, 3H), 2.17 (d, $J = 2.4$ Hz, 1H). **^{13}C NMR (126 MHz, CDCl_3)** δ 177.47, 170.11, 145.20, 137.55, 134.81, 130.56, 128.84, 128.74, 128.25, 127.77, 127.01, 124.24, 121.64, 107.81, 81.08, 73.03, 53.10, 51.78, 44.89, 39.17, 26.25, 21.42. **IR** (KBr, cm^{-1}) γ 3289, 3021, 2952, 2924, 2853, 1715, 1613, 1494, 1470, 1377, 1353, 1261, 1203, 1176, 1091, 795, 755, 701, 543, 487. **HRMS** (ESI) m/z ($\text{M}+\text{Na}$) $^+$: calculated for $(\text{C}_{22}\text{H}_{21}\text{NO}_3\text{Na})^+$: 370.1414, found: 370.1419; $[\alpha]^{20}_{\text{D}} = +36.7$ ($c = 0.44$, CHCl_3); The product was analyzed by HPLC to determine the enantiomeric excess: >99% e.e. (CHIRALPAK IG, hexane/*i*-PrOH = 85/15, flow rate: 1.0 mL/min, $T = 30$ °C, 254 nm), t_{R} (major) = 17.39 min, t_{R} (minor) = 27.59 min.

Methyl 2-((*R*)-3-((*R*)-1-(3-methoxyphenyl)prop-2-yn-1-yl)-1-methyl-2-oxoindolin-3-yl)acetate ((*R,R*)-3ai)



White solid; 75% yield; >95:5 d.r.; ^1H NMR (500 MHz, CDCl_3) δ 7.29 – 7.23 (m, 1H), 7.15 (t, J = 7.9 Hz, 1H), 6.98 (t, J = 7.5 Hz, 1H), 6.89 (d, J = 7.4 Hz, 1H), 6.81 – 6.76 (m, 2H), 6.73 (d, J = 7.8 Hz, 1H), 6.63 (d, J = 2.1 Hz, 1H), 4.14 (d, J = 2.5 Hz, 1H), 3.69 (s, 3H), 3.42 (s, 3H), 3.25 (d, J = 16.5 Hz, 1H), 3.12 (s, 3H), 2.90 (d, J = 16.5 Hz, 1H), 2.19 (d, J = 2.5 Hz, 1H). ^{13}C NMR (126 MHz, CDCl_3) δ 177.35, 170.11, 159.08, 145.21, 136.41, 128.93, 128.86, 128.27, 124.23, 122.30, 121.68, 115.17, 114.03, 107.88, 80.89, 73.24, 55.32, 53.08, 51.79, 44.96, 39.17, 26.27. IR (KBr, cm^{-1}) γ 3286, 2962, 2853, 1712, 1610, 1469, 1434, 1376, 1350, 1261, 1090, 1025, 865, 797, 754, 697, 542, 487. HRMS (ESI) m/z ($\text{M}+\text{Na}$) $^+$: calculated for $(\text{C}_{22}\text{H}_{21}\text{NO}_4\text{Na})^+$: 386.1363, found: 386.1372; $[\alpha]^{20}_{\text{D}} = +34.7$ (c = 0.58, CHCl_3); The product was analyzed by HPLC to determine the enantiomeric excess: >99% e.e. (CHIRALPAK IG, hexane/*i*-PrOH = 70/30, flow rate: 1.0 mL/min, T = 30 °C, 254 nm), t_{R} (major) = 14.03 min, t_{R} (minor) = 20.86 min.

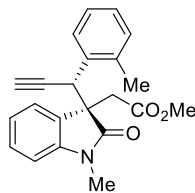
Methyl 2-((*R*)-3-((*S*)-1-(2-fluorophenyl)prop-2-yn-1-yl)-1-methyl-2-oxoindolin-3-yl)acetate ((*R,S*)-3aj)



White solid; 60% yield; >95:5 d.r.; ^1H NMR (500 MHz, CDCl_3) δ 7.35 (td, J = 7.6, 1.7 Hz, 1H), 7.27 (q, J = 5.9, 4.3 Hz, 2H), 7.10 (t, J = 7.6 Hz, 1H), 7.00 – 6.93 (m, 2H), 6.86 (d, J = 7.4 Hz, 1H), 6.76 (d, J = 7.8 Hz, 1H), 4.59 (d, J = 2.6 Hz, 1H), 3.37 (d, J = 17.5 Hz, 4H), 3.21 (s, 3H), 2.85 (d, J = 16.6 Hz, 1H), 2.12 (d, J = 2.5 Hz, 1H). ^{13}C NMR (126 MHz, CDCl_3) δ 177.27, 170.06, 160.17 (d, J = 247.3 Hz), 145.09, 131.71 (d, J = 3.0 Hz), 129.98 (d, J = 8.3 Hz), 128.98, 127.78, 124.35, 123.85 (d, J = 3.7 Hz), 122.63 (d, J = 13.8 Hz), 121.70, 115.23 (d, J = 22.7 Hz), 107.78, 80.49, 72.49, 53.08, 51.78, 38.43 (d, J = 2.5 Hz), 36.90 (d, J = 2.8 Hz), 26.39. ^{19}F NMR (471 MHz, CDCl_3) δ -115.00. IR (KBr, cm^{-1}) γ 3269, 3056, 3011, 2924, 2853, 1715, 1613, 1613, 1491, 1470, 1377, 1352, 1198, 1094, 1029, 802, 754, 677. HRMS (ESI) m/z ($\text{M}+\text{Na}$) $^+$: calculated for $(\text{C}_{21}\text{H}_{18}\text{FNO}_3\text{Na})^+$: 374.1163, found: 374.1171; $[\alpha]^{20}_{\text{D}} = +8.2$ (c = 0.33, CHCl_3); The product was analyzed by HPLC to determine the enantiomeric excess: >99% e.e. (CHIRALPAK IC, hexane/*i*-PrOH = 70/30, flow rate: 1.0 mL/min, T = 30 °C, 254 nm),

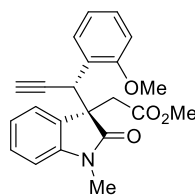
t_R (major) = 10.49 min, t_R (minor) = 13.34 min.

Methyl 2-((*R*)-1-methyl-2-oxo-3-((*R*)-1-(*o*-tolyl)prop-2-yn-1-yl)indolin-3-yl)acetate ((*R,R*)-3ak)



White solid; 52% yield; >95:5 d.r.; $^1\text{H NMR}$ (500 MHz, CDCl_3) δ 7.39 – 7.34 (m, 1H), 7.30 – 7.24 (m, 1H), 7.18 – 7.14 (m, 2H), 7.11 – 7.07 (m, 1H), 7.02 (dd, J = 7.4, 1.5 Hz, 1H), 6.97 (dd, J = 8.0, 6.8 Hz, 1H), 6.78 (d, J = 7.8 Hz, 1H), 4.46 (d, J = 2.6 Hz, 1H), 3.36 (s, 3H), 3.27 (d, J = 16.3 Hz, 1H), 3.21 (s, 3H), 2.85 (d, J = 16.2 Hz, 1H), 2.30 (s, 3H), 2.11 (d, J = 2.4 Hz, 1H). $^{13}\text{C NMR}$ (126 MHz, CDCl_3) δ 177.77, 170.09, 145.11, 136.42, 133.94, 130.63, 130.46, 128.96, 128.28, 128.03, 125.73, 124.81, 121.54, 107.82, 82.08, 72.21, 53.71, 51.75, 40.06, 38.21, 26.40, 20.29. **IR** (KBr, cm^{-1}) γ 3289, 3054, 3020, 2925, 2853, 1715, 1612, 1493, 1470, 1436, 1377, 1351, 1262, 1197, 1175, 1090, 1028, 894, 753, 543, 488. **HRMS** (ESI) m/z ($\text{M}+\text{Na}$) $^+$: calculated for $(\text{C}_{22}\text{H}_{21}\text{NO}_3\text{Na})^+$: 370.1414, found: 370.1419; $[\alpha]^{20}_{\text{D}} = -7.2$ (c = 0.34, CHCl_3); The product was analyzed by HPLC to determine the enantiomeric excess: 97% e.e. (CHIRALPAK IA, hexane/*i*-PrOH = 90/10, flow rate: 1.0 mL/min, T = 30 °C, 254 nm), t_R (major) = 10.46 min, t_R (minor) = 11.57 min.

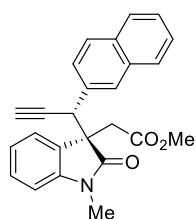
Methyl 2-((*R*)-3-((*R*)-1-(2-methoxyphenyl)prop-2-yn-1-yl)-1-methyl-2-oxoindolin-3-yl)acetate ((*R,R*)-3al)



White solid; 48% yield; >95:5 d.r.; $^1\text{H NMR}$ (500 MHz, CDCl_3) δ 7.30 – 7.23 (m, 3H), 6.93 (q, J = 7.6 Hz, 2H), 6.84 (d, J = 7.4 Hz, 1H), 6.79 (dd, J = 16.6, 8.0 Hz, 2H), 4.81 (d, J = 2.6 Hz, 1H), 3.79 (s, 3H), 3.40 (d, J = 16.7 Hz, 1H), 3.35 (s, 3H), 3.23 (s, 3H), 2.74 (d, J = 16.7 Hz, 1H), 2.02 (d, J = 2.6 Hz, 1H). $^{13}\text{C NMR}$ (126 MHz, CDCl_3) δ 177.99, 170.45, 156.78, 145.26, 131.42, 129.38, 128.66, 128.27, 124.67, 123.79, 121.27, 120.18, 110.39, 107.58, 81.92, 71.49, 55.33, 53.54, 51.64, 38.26, 36.51, 26.38. **IR** (KBr, cm^{-1}) γ 3290, 2961, 2924, 2853, 1713, 1612, 1493, 1469, 1176, 1351, 1261, 1091, 1026, 799, 752, 665, 607, 542, 490. **HRMS** (ESI) m/z ($\text{M}+\text{Na}$) $^+$: calculated for $(\text{C}_{22}\text{H}_{21}\text{NO}_4\text{Na})^+$: 386.1363, found: 386.1374; $[\alpha]^{20}_{\text{D}} = -27.1$ (c = 0.31, CHCl_3); The product was analyzed

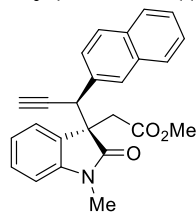
by HPLC to determine the enantiomeric excess: 98% e.e. (CHIRALPAK IA, hexane/*i*-PrOH = 70/30, flow rate: 1.0 mL/min, T = 30 °C, 230 nm), t_R (major) = 4.94 min, t_R (minor) = 5.71 min.

Methyl 2-((*R*)-1-methyl-3-((*R*)-1-(naphthalen-2-yl)prop-2-yn-1-yl)-2-oxoindolin-3-yl)acetate ((*R,R*)-3am)



White solid; 87% yield; >95:5 d.r.; ^1H NMR (500 MHz, CDCl_3) δ 7.82 – 7.78 (m, 1H), 7.77 – 7.73 (m, 1H), 7.71 (d, J = 8.5 Hz, 1H), 7.61 (d, J = 1.8 Hz, 1H), 7.49 – 7.43 (m, 2H), 7.32 – 7.21 (m, 2H), 6.97 (t, J = 7.5 Hz, 1H), 6.86 (d, J = 7.4 Hz, 1H), 6.69 (d, J = 7.8 Hz, 1H), 4.35 (d, J = 2.6 Hz, 1H), 3.41 (s, 3H), 3.34 (d, J = 16.5 Hz, 1H), 3.11 (s, 3H), 2.93 (d, J = 16.5 Hz, 1H), 2.25 (d, J = 2.5 Hz, 1H). ^{13}C NMR (126 MHz, CDCl_3) δ 177.39, 170.06, 145.16, 132.95, 132.85, 132.46, 129.13, 128.94, 128.20, 128.08, 127.64, 127.58, 127.40, 126.36, 126.29, 124.24, 121.76, 107.93, 80.99, 73.38, 53.28, 51.79, 45.05, 39.25, 26.28. IR (KBr, cm^{-1}) γ 3292, 3056, 3012, 2952, 2925, 2853, 1715, 1613, 1494, 1470, 1436, 1376, 1352, 1201, 1176, 1090, 1018, 818, 751, 654, 543, 480. HRMS (ESI) m/z ($\text{M}+\text{Na}$) $^+$: calculated for $(\text{C}_{25}\text{H}_{21}\text{NO}_3\text{Na})^+$: 406.1414, found: 406.1420; $[\alpha]_D^{20}$ = +2.6 (c = 0.49, CHCl_3); The product was analyzed by HPLC to determine the enantiomeric excess: >99% e.e. (CHIRALPAK IG, hexane/*i*-PrOH = 70/30, flow rate: 1.0 mL/min, T = 30 °C, 254 nm), t_R (major) = 15.75 min, t_R (minor) = 22.76 min.

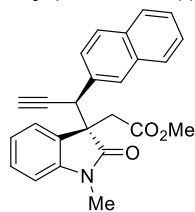
Methyl 2-((*R*)-1-methyl-3-((*S*)-1-(naphthalen-2-yl)prop-2-yn-1-yl)-2-oxoindolin-3-yl)acetate ((*R,S*)-3am)



White solid; 67% yield; 95:5 d.r.; ^1H NMR (500 MHz, CDCl_3) δ 7.71 (dd, J = 7.3, 1.3 Hz, 1H), 7.68 – 7.65 (m, 1H), 7.59 (dd, J = 7.1, 2.3 Hz, 1H), 7.44 (d, J = 8.6 Hz, 1H), 7.40 – 7.35 (m, 2H), 7.34 (d, J = 1.9 Hz, 1H), 7.17 (td, J = 7.7, 1.3 Hz, 1H), 7.09 (td, J = 7.5, 1.0 Hz, 1H), 6.94 (dd, J = 8.6, 1.9 Hz, 1H), 6.37 – 6.32 (m, 1H), 4.31 (d, J = 2.6 Hz, 1H), 3.63 (d, J = 16.7 Hz, 1H), 3.46 (s, 3H), 3.34 (d, J = 16.7 Hz, 1H), 2.66 (s, 3H), 2.57 (d, J = 2.6 Hz, 1H). ^{13}C NMR (126 MHz, CDCl_3) δ 177.02, 170.25, 144.41, 132.68, 132.03, 128.97, 128.09, 128.03, 127.80, 127.42, 126.73, 126.51, 126.01, 125.85, 123.89,

122.05, 107.81, 82.31, 74.47, 53.63, 51.85, 45.13, 39.78, 25.91. **IR** (KBr, cm^{-1}) γ 3293, 3056, 3012, 2960, 2923, 2852, 1740, 1712, 1613, 1494, 1470, 1377, 1353, 1261, 1200, 1177, 1092, 1027, 859, 816, 752, 682, 543, 479. **HRMS** (ESI) m/z ($M+\text{Na}$) $^{+}$: calculated for $(\text{C}_{25}\text{H}_{21}\text{NO}_3\text{Na})^{+}$: 406.1414, found: 406.1413; $[\alpha]^{20}_{\text{D}} = +23.7$ ($c = 0.43$, CHCl_3); The product was analyzed by HPLC to determine the enantiomeric excess: 99% e.e. (CHIRALPAK IG, hexane/*i*-PrOH = 70/30, flow rate: 1.0 mL/min, $T = 30\text{ }^{\circ}\text{C}$, 254 nm), t_{R} (major) = 11.34 min, t_{R} (minor) = 13.08 min.

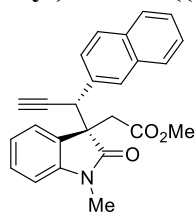
Methyl 2-((*S*)-1-methyl-3-((*S*)-1-(naphthalen-2-yl)prop-2-yn-1-yl)-2-oxoindolin-3-yl)acetate ((*S,S*)-3am)



White solid; 87% yield; >95:5 d.r.; Spectral data were in agreement with those of the enantiomer reported above. **HRMS** (ESI) m/z ($M+\text{Na}$) $^{+}$: calculated for $(\text{C}_{25}\text{H}_{21}\text{NO}_3\text{Na})^{+}$: 406.1414, found: 406.1418; $[\alpha]^{20}_{\text{D}} = -3.9$ ($c = 0.55$, CHCl_3); The product was analyzed by HPLC

to determine the enantiomeric excess: >99% e.e. (CHIRALPAK IG, hexane/*i*-PrOH = 70/30, flow rate: 1.0 mL/min, $T = 30\text{ }^{\circ}\text{C}$, 254 nm), t_{R} (minor) = 15.83 min, t_{R} (major) = 21.04 min.

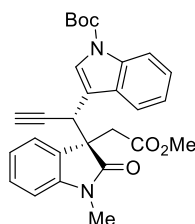
Methyl 2-((*S*)-1-methyl-3-((*R*)-1-(naphthalen-2-yl)prop-2-yn-1-yl)-2-oxoindolin-3-yl)acetate ((*S,R*)-3am)



White solid; 63% yield; 95:5 d.r.; Spectral data were in agreement with those of the enantiomer reported above. **HRMS** (ESI) m/z ($M+\text{Na}$) $^{+}$: calculated for $(\text{C}_{25}\text{H}_{21}\text{NO}_3\text{Na})^{+}$: 406.1414, found: 406.1422; $[\alpha]^{20}_{\text{D}} = -29.3$ ($c = 0.42$, CHCl_3); The product was analyzed by HPLC to

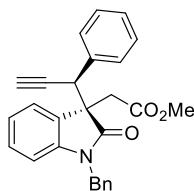
determine the enantiomeric excess: 99% e.e. (CHIRALPAK IG, hexane/*i*-PrOH = 70/30, flow rate: 1.0 mL/min, $T = 30\text{ }^{\circ}\text{C}$, 254 nm), t_{R} (minor) = 11.36 min, t_{R} (major) = 12.99 min.

***tert*-Butyl 3-((*R*)-1-((*R*)-3-(2-methoxy-2-oxoethyl)-1-methyl-2-oxoindolin-3-yl)prop-2-yn-1-yl)-1*H*-indole-1-carboxylate ((*R,R*)-3an)**



Yellow oil; 66% yield; >95:5 d.r.; **¹H NMR (500 MHz, CDCl₃)** δ 8.12 (d, *J* = 8.3 Hz, 1H), 7.55 (d, *J* = 7.9 Hz, 1H), 7.38 (s, 1H), 7.32 – 7.27 (m, 2H), 7.23 – 7.15 (m, 1H), 6.95 (q, *J* = 4.1, 3.5 Hz, 2H), 6.79 (d, *J* = 7.8 Hz, 1H), 4.44 (d, *J* = 2.7 Hz, 1H), 3.38 (s, 3H), 3.27 (d, *J* = 16.4 Hz, 1H), 3.18 (s, 3H), 2.93 (d, *J* = 16.4 Hz, 1H), 2.11 (d, *J* = 2.6 Hz, 1H), 1.67 (s, 9H). **¹³C NMR (126 MHz, CDCl₃)** δ 177.68, 170.02, 149.51, 145.32, 135.21, 129.54, 129.02, 128.46, 126.48, 124.66, 124.22, 122.66, 121.76, 120.19, 115.26, 114.97, 107.90, 84.14, 80.48, 72.12, 53.33, 51.77, 39.05, 36.47, 28.32, 26.37. **IR** (KBr, cm⁻¹) γ 3304, 3054, 3008, 2929, 2854, 1732, 1613, 1564, 1494, 1470, 1452, 1359, 1308, 1255, 1156, 1084, 1020, 854, 750, 666, 543, 487. **HRMS** (ESI) *m/z* (M+Na)⁺: calculated for (C₂₈H₂₈N₂O₅Na)⁺: 495.1890, found: 495.1894; [α]²⁰_D = +50.8 (*c* = 0.55, CHCl₃); The product was analyzed by HPLC to determine the enantiomeric excess: 99% e.e. (CHIRALPAK IG, hexane/*i*-PrOH = 70/30, flow rate: 1.0 mL/min, T = 30 °C, 254 nm), *t*_R (major) = 9.31 min, *t*_R (minor) = 22.57 min.

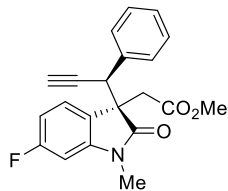
Methyl 2-((*R*)-1-benzyl-2-oxo-3-((*S*)-1-phenylprop-2-yn-1-yl)indolin-3-yl)acetate ((*R,S*)-3ca)



Yellow solid; 62% yield; >95:5 d.r.; **¹H NMR (400 MHz, CDCl₃)** δ 7.74 (dd, *J* = 7.1, 1.5 Hz, 1H), 7.21 – 7.11 (m, 4H), 7.11 – 7.01 (m, 4H), 6.93 – 6.89 (m, 2H), 6.67 (dd, *J* = 7.4, 2.1 Hz, 2H), 6.30 (dd, *J* = 7.4, 1.3 Hz, 1H), 4.65 (d, *J* = 16.1 Hz, 1H), 4.49 (d, *J* = 16.1 Hz, 1H), 4.21 (d, *J* = 2.6 Hz, 1H), 3.65 (d, *J* = 16.4 Hz, 1H), 3.42 (s, 3H), 3.33 (d, *J* = 16.4 Hz, 1H), 2.53 (d, *J* = 2.6 Hz, 1H). **¹³C NMR (101 MHz, CDCl₃)** δ 177.16, 170.06, 144.00, 135.46, 134.94, 129.20, 128.92, 128.60, 127.92, 127.81, 127.72, 127.17, 126.79, 124.14, 122.16, 109.16, 82.60, 74.19, 53.40, 51.82, 45.02, 44.03, 40.73. **IR** (KBr, cm⁻¹) γ 3290, 3060, 3030, 2923, 2853, 1741, 1716, 1613, 1488, 1467, 1455, 1355, 1262, 1198, 1175, 1101, 1079, 1013, 800, 753, 697, 651, 552. **HRMS** (ESI) *m/z* (M+Na)⁺: calculated for (C₂₇H₂₃NO₃Na)⁺: 432.1570, found: 432.1574; [α]²⁰_D = -11.1 (*c* = 0.53, CHCl₃); The product was analyzed by HPLC to determine the enantiomeric excess: >99% e.e. (CHIRALPAK IE, hexane/*i*-PrOH = 70/30, flow rate: 1.0 mL/min, T

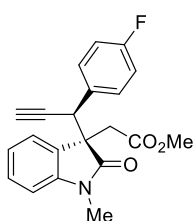
= 30 °C, 254 nm), t_R (major) = 9.57 min, t_R (minor) = 12.03 min.

Methyl 2-((*R*)-6-fluoro-1-methyl-2-oxo-3-((*S*)-1-phenylprop-2-yn-1-yl)indolin-3-yl)acetate ((*R,S*)-3ka)



White solid; 56% yield; 91:9 d.r.; ^1H NMR (500 MHz, CDCl_3) δ 7.57 (dd, J = 8.2, 5.4 Hz, 1H), 7.12 – 7.06 (m, 1H), 7.05 – 6.98 (m, 2H), 6.87 – 6.82 (m, 2H), 6.74 (ddd, J = 9.5, 8.2, 2.4 Hz, 1H), 6.21 (dd, J = 8.9, 2.3 Hz, 1H), 4.10 (d, J = 2.7 Hz, 1H), 3.56 (d, J = 16.8 Hz, 1H), 3.47 (s, 3H), 3.27 (d, J = 16.8 Hz, 1H), 2.75 (s, 3H), 2.52 (d, J = 2.6 Hz, 1H). ^{13}C NMR (126 MHz, CDCl_3) δ 177.34, 170.21, 163.67 (d, J = 245.3 Hz), 146.04, (d, J = 11.8 Hz), 134.22, 128.69, 127.84, 127.49, 124.86, 123.17 (d, J = 3.1 Hz), 108.15, 96.63 (d, J = 27.6 Hz), 82.09, 74.43, 53.27, 51.91, 45.02, 39.71, 26.03. ^{19}F NMR (471 MHz, CDCl_3) δ -111.24. IR (KBr, cm^{-1}) γ 3297, 3063, 3031, 2956, 2923, 2853, 1721, 1615, 1504, 1437, 1380, 1261, 1246, 1198, 1177, 1086, 1024, 972, 936, 834, 797, 758, 699, 544. HRMS (ESI) m/z ($\text{M}+\text{Na}$) $^+$: calculated for $(\text{C}_{21}\text{H}_{18}\text{FNO}_3\text{Na})^+$: 374.1163, found: 374.1172; $[\alpha]^{20}_{\text{D}}$ = -46.8 (c = 0.44, CHCl_3); The product was analyzed by HPLC to determine the enantiomeric excess: 99% e.e. (CHIRALPAK IG, hexane/*i*-PrOH = 90/10, flow rate: 1.0 mL/min, T = 30 °C, 254 nm), t_R (major) = 12.91 min, t_R (minor) = 14.82 min.

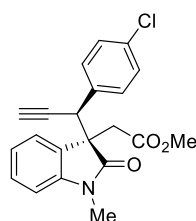
Methyl 2-((*R*)-3-((*S*)-1-(4-fluorophenyl)prop-2-yn-1-yl)-1-methyl-2-oxoindolin-3-yl)acetate ((*R,S*)-3ab)



White solid; 64% yield; 95:5 d.r.; ^1H NMR (400 MHz, CDCl_3) δ 7.63 (dd, J = 7.4, 1.3 Hz, 1H), 7.22 (td, J = 7.7, 1.3 Hz, 1H), 7.06 (td, J = 7.5, 1.0 Hz, 1H), 6.81 (dd, J = 8.7, 5.4 Hz, 2H), 6.67 (t, J = 8.7 Hz, 2H), 6.49 (d, J = 7.8 Hz, 1H), 4.12 (d, J = 2.7 Hz, 1H), 3.56 (d, J = 16.6 Hz, 1H), 3.44 (s, 3H), 3.26 (d, J = 16.7 Hz, 1H), 2.81 (s, 3H), 2.53 (d, J = 2.7 Hz, 1H). ^{13}C NMR (101 MHz, CDCl_3) δ 176.80, 170.04, 162.15 (d, J = 246.4 Hz), 144.25, 130.28 (d, J = 8.1 Hz), 130.21 (d, J = 3.2 Hz), 128.95, 127.43, 123.74, 122.02, 114.10 (d, J = 21.4 Hz), 107.73, 81.94, 74.38, 53.44, 51.74, 44.11, 39.56, 25.85. ^{19}F NMR (376 MHz, CDCl_3) δ -114.68. IR (KBr, cm^{-1}) γ 3299, 3012, 2922, 2852, 1741, 1710, 1612, 1508, 1469, 1376, 1354, 1224, 1177, 1160, 1093, 1028, 839, 753, 681, 567, 542. HRMS

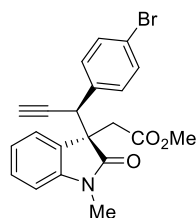
(ESI) m/z ($M+Na$)⁺: calculated for (C₂₁H₁₈FNO₃Na)⁺: 374.1163, found: 374.1168; $[\alpha]^{20}_D = -52.7$ ($c = 0.38$, CHCl₃); The product was analyzed by HPLC to determine the enantiomeric excess: >99% e.e. (CHIRALPAK IG, hexane/*i*-PrOH = 70/30, flow rate: 1.0 mL/min, T = 30 °C, 254 nm), t_R (major) = 6.49 min, t_R (minor) = 7.17 min.

Methyl 2-((*R*)-3-((*S*)-1-(4-chlorophenyl)prop-2-yn-1-yl)-1-methyl-2-oxoindolin-3-yl)acetate ((*R,S*)-3ac)



Yellow oil; 51% yield; >95:5 d.r.; ¹H NMR (500 MHz, CDCl₃) δ 7.62 (d, $J = 7.4$ Hz, 1H), 7.23 (td, $J = 7.7$, 1.3 Hz, 1H), 7.06 (t, $J = 7.5$ Hz, 1H), 6.99 – 6.93 (m, 2H), 6.82 – 6.75 (m, 2H), 6.51 (d, $J = 7.8$ Hz, 1H), 4.11 (d, $J = 2.6$ Hz, 1H), 3.55 (d, $J = 16.7$ Hz, 1H), 3.44 (s, 3H), 3.26 (d, $J = 16.7$ Hz, 1H), 2.83 (s, 3H), 2.52 (d, $J = 2.5$ Hz, 1H). ¹³C NMR (126 MHz, CDCl₃) δ 176.84, 170.11, 144.37, 133.62, 133.15, 130.14, 129.15, 127.53, 127.44, 123.87, 122.18, 107.96, 81.82, 74.60, 53.47, 51.87, 44.35, 39.76, 26.02. IR (KBr, cm⁻¹) γ 3294, 3055, 2953, 2925, 2853, 1742, 1713, 1613, 1493, 1470, 1376, 1352, 1260, 1199, 1177, 1092, 1016, 832, 753, 678, 542, 468. HRMS (ESI) m/z ($M+Na$)⁺: calculated for (C₂₁H₁₈ClNO₃Na)⁺: 390.0867, found: 390.0875; $[\alpha]^{20}_D = -20.9$ ($c = 0.34$, CHCl₃); The product was analyzed by HPLC to determine the enantiomeric excess: 99% e.e. (CHIRALPAK IG, hexane/*i*-PrOH = 70/30, flow rate: 1.0 mL/min, T = 30 °C, 230 nm), t_R (major) = 6.98 min, t_R (minor) = 7.85 min.

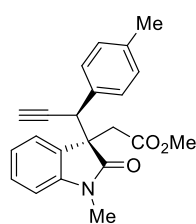
Methyl 2-((*R*)-3-((*S*)-1-(4-bromophenyl)prop-2-yn-1-yl)-1-methyl-2-oxoindolin-3-yl)acetate ((*R,S*)-3ad)



Yellow oil; 50% yield; >95:5 d.r.; ¹H NMR (500 MHz, CDCl₃) δ 7.62 (d, $J = 7.4$ Hz, 1H), 7.23 (td, $J = 7.8$, 1.3 Hz, 1H), 7.11 (d, $J = 8.5$ Hz, 2H), 7.06 (t, $J = 7.5$ Hz, 1H), 6.74 – 6.69 (m, 2H), 6.52 (d, $J = 7.8$ Hz, 1H), 4.09 (d, $J = 2.6$ Hz, 1H), 3.55 (d, $J = 16.6$ Hz, 1H), 3.44 (s, 3H), 3.25 (d, $J = 16.7$ Hz, 1H), 2.83 (s, 3H), 2.52 (d, $J = 2.5$ Hz, 1H). ¹³C NMR (126 MHz, CDCl₃) δ 176.82, 170.09, 144.37, 133.68, 131.39, 130.49, 129.16, 127.41, 123.87, 122.19, 121.84, 107.99, 81.75, 74.61, 53.40, 51.87, 44.41, 39.77, 26.03. IR (KBr, cm⁻¹) γ 3293, 3055, 3009, 2953, 2924, 2853, 1742, 1712, 1613, 1489, 1470, 1376, 1352,

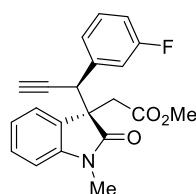
1260, 1200, 1177, 1192, 1073, 1012, 810, 753, 667, 542. **HRMS** (ESI) m/z ($M+Na$)⁺: calculated for (C₂₁H₁₈BrNO₃Na)⁺: 434.0362, found: 434.0367; [α]_D²⁰ = -9.5 (c = 0.40, CHCl₃); The product was analyzed by HPLC to determine the enantiomeric excess: >99% e.e. (CHIRALPAK IG, hexane/*i*-PrOH = 70/30, flow rate: 1.0 mL/min, T = 30 °C, 230 nm), t_R (major) = 7.30 min, t_R (minor) = 8.49 min.

Methyl 2-((*R*)-1-methyl-2-oxo-3-((*S*)-1-(*p*-tolyl)prop-2-yn-1-yl)indolin-3-yl)acetate ((*R,S*)-3ae)



White solid; 50% yield; 92:8 d.r.; **¹H NMR (500 MHz, CDCl₃)** δ 7.63 (dd, J = 7.3, 1.2 Hz, 1H), 7.21 (td, J = 7.7, 1.3 Hz, 1H), 7.05 (td, J = 7.5, 1.0 Hz, 1H), 6.79 (d, J = 8.0 Hz, 2H), 6.74 – 6.69 (m, 2H), 6.48 (d, J = 7.7 Hz, 1H), 4.09 (d, J = 2.6 Hz, 1H), 3.56 (d, J = 16.7 Hz, 1H), 3.44 (s, 3H), 3.26 (d, J = 16.7 Hz, 1H), 2.80 (s, 3H), 2.49 (d, J = 2.6 Hz, 1H), 2.17 (s, 3H). **¹³C NMR (126 MHz, CDCl₃)** δ 177.07, 170.30, 144.50, 137.26, 131.47, 128.84, 128.60, 128.06, 127.94, 123.87, 121.97, 107.72, 82.54, 74.04, 53.52, 51.81, 44.68, 39.77, 25.96, 21.11. **IR** (KBr, cm⁻¹) γ 3287, 3055, 3009, 2922, 2852, 1743, 1714, 1613, 1512, 1494, 1470, 1437, 1377, 1354, 1259, 1199, 1177, 1093, 1023, 811, 753, 682, 543. **HRMS** (ESI) m/z ($M+Na$)⁺: calculated for (C₂₂H₂₁NO₃Na)⁺: 370.1414, found: 370.1421; [α]_D²⁰ = -27.5 (c = 0.33, CHCl₃); The product was analyzed by HPLC to determine the enantiomeric excess: 99% e.e. (CHIRALPAK IG, hexane/*i*-PrOH = 70/30, flow rate: 1.0 mL/min, T = 30 °C, 254 nm), t_R (major) = 7.30 min, t_R (minor) = 9.21 min.

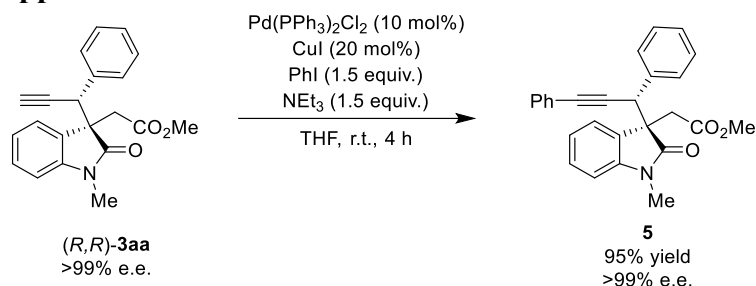
Methyl 2-((*R*)-3-((*S*)-1-(3-fluorophenyl)prop-2-yn-1-yl)-1-methyl-2-oxoindolin-3-yl)acetate ((*R,S*)-3ag)



White solid; 50% yield; 94:6 d.r.; **¹H NMR (400 MHz, CDCl₃)** δ 7.62 (dd, J = 7.5, 1.3 Hz, 1H), 7.23 (td, J = 7.8, 1.3 Hz, 1H), 7.07 (td, J = 7.5, 1.0 Hz, 1H), 6.98 (td, J = 8.0, 6.0 Hz, 1H), 6.77 (tdd, J = 8.4, 2.6, 1.0 Hz, 1H), 6.70 (dt, J = 7.7, 1.3 Hz, 1H), 6.56 – 6.47 (m, 2H), 4.13 (d, J = 2.6 Hz, 1H), 3.56 (d, J = 16.6 Hz, 1H), 3.45 (s, 3H), 3.26 (d, J = 16.6 Hz, 1H), 2.82 (s, 3H), 2.54 (d, J = 2.6 Hz, 1H). **¹³C NMR (101 MHz, CDCl₃)** δ 176.80, 170.11, 161.91 (d, J = 245.4 Hz), 144.35, 137.07 (d, J = 7.6 Hz), 129.17, 128.69 (d, J = 8.1 Hz),

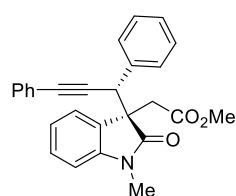
127.46, 124.65 (d, $J = 2.9$ Hz), 123.82, 122.23, 115.69 (d, $J = 22.7$ Hz), 114.63 (d, $J = 21.2$ Hz), 107.84, 81.67, 74.68, 53.47, 51.87, 44.60 (d, $J = 1.9$ Hz), 39.71, 25.98. **^{19}F NMR (376 MHz, CDCl_3)** δ -113.89. **IR** (KBr, cm^{-1}) γ 3299, 3057, 3010, 2922, 2852, 1741, 1713, 1614, 1589, 1494, 1471, 1450, 1377, 1355, 1263, 1204, 1178, 1135, 1092, 872, 753, 691, 542, 522. **HRMS** (ESI) m/z ($\text{M}+\text{Na}$) $^{+}$: calculated for $(\text{C}_{21}\text{H}_{18}\text{FNO}_3\text{Na})^{+}$: 374.1163, found: 374.1172; $[\alpha]^{20}_{\text{D}} = -55.7$ ($c = 0.34$, CHCl_3); The product was analyzed by HPLC to determine the enantiomeric excess: 99% e.e. (CHIRALPAK IG, hexane/*i*-PrOH = 70/30, flow rate: 1.0 mL/min, $T = 30$ °C, 254 nm), t_{R} (major) = 7.09 min, t_{R} (minor) = 7.70 min.

6. Synthetic Applications



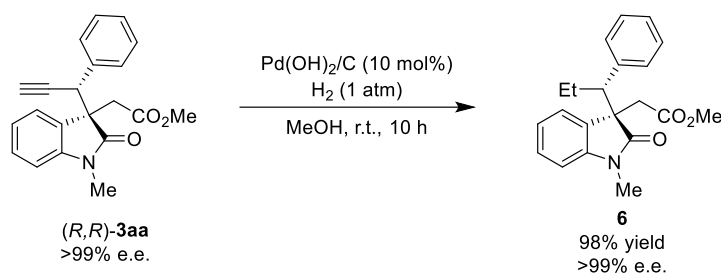
To a flame-dried and N_2 -purged Schlenk tube were added (*R,R*)-**3aa** (38.4 mg, 0.10 mmol, 1.0 equiv.), $\text{Pd(PPh}_3)_2\text{Cl}_2$ (7.0 mg, 0.01 mmol, 10 mol%), and CuI (3.8 mg, 0.02 mmol, 20 mol%). The vial was then sealed, purged and backfilled with N_2 three times before adding NEt_3 (21 μL , 0.15 mmol, 1.5 equiv.), PhI (17 μL , 0.15 mmol, 1.5 equiv.) and THF (1.0 mL) at room temperature. The resulting mixture was stirred at room temperature under nitrogen atmosphere for 4 hours. After concentrated under reduced pressure, the residue was purified by column chromatography on silica gel to give **5** (39.0 mg, 95% yield, >99% e.e.).

Methyl 2-((*R*)-3-((*S*)-1,3-diphenylprop-2-yn-1-yl)-1-methyl-2-oxoindolin-3-yl) acetate (**5**)



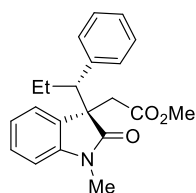
Colorless oil; 95% yield; $^1\text{H NMR}$ (500 MHz, CDCl_3) δ 7.31 – 7.18 (m, 11H), 6.98 (t, $J = 7.5$ Hz, 1H), 6.84 – 6.81 (m, 1H), 6.77 (d, $J = 7.8$ Hz, 1H), 4.33 (s, 1H), 3.41 (s, 3H), 3.31 (d, $J = 16.5$ Hz, 1H), 3.15 (s, 3H), 2.88 (d, $J = 16.5$ Hz, 1H). $^{13}\text{C NMR}$ (126

MHz, CDCl_3) δ 177.77, 170.13, 145.26, 135.53, 131.70, 130.07, 128.86, 128.43, 128.23, 128.13, 128.03, 127.96, 124.23, 123.13, 121.71, 107.77, 86.62, 85.16, 53.63, 51.78, 45.87, 39.14, 26.38. **IR** (KBr, cm^{-1}) γ 3058, 3029, 2954, 2926, 2854, 1741, 1716, 1613, 1492, 1470, 1377, 1353, 1261, 1198, 1175, 1081, 1028, 801, 756, 700, 605, 543. **HRMS** (ESI) m/z ($\text{M}+\text{Na}$) $^+$: calculated for $(\text{C}_{27}\text{H}_{23}\text{NO}_3\text{Na})^+$: 432.1570, found: 432.1569; $[\alpha]^{20}_{\text{D}} = +131.3$ ($c = 0.72$, CHCl_3); The product was analyzed by HPLC to determine the enantiomeric excess: >99% e.e. (CHIRALPAK IA, hexane/*i*-PrOH = 70/30, flow rate: 1.0 mL/min, $T = 30$ $^\circ\text{C}$, 254 nm), t_{R} (minor) = 6.77 min, t_{R} (major) = 7.78 min.



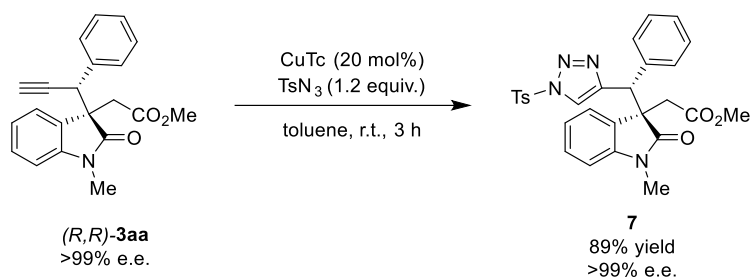
To a stirring solution of (*R,R*)-**3aa** (38.4 mg, 0.10 mmol, 1.0 equiv.) in MeOH (5.0 mL) was slowly added palladium hydroxide-onactivated charcoal (10%; 20.0 mg) at room temperature. The resulting mixture was stirred at room temperature in an atmosphere of hydrogen gas for 6 hours. The mixture was filtered and concentrated under reduced pressure. The residue was purified by column chromatography on silica gel to give **6** (37.5 mg, 98% yield, >99% e.e.).

Methyl 2-((*R*)-1-methyl-2-oxo-3-((*R*)-1-phenylpropyl)indolin-3-yl)acetate (6**)**



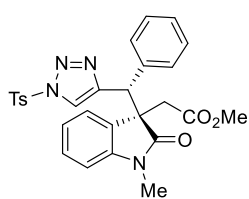
colorless oil; 98% yield; ^1H NMR (500 MHz, CDCl_3) δ 7.31 – 7.21 (m, 4H), 7.09 (d, J = 6.5 Hz, 2H), 6.96 (t, J = 7.5 Hz, 1H), 6.88 (dd, J = 7.3, 1.2 Hz, 1H), 6.77 (d, J = 7.8 Hz, 1H), 3.33 (s, 3H), 3.23 (s, 3H), 3.11 (d, J = 16.3 Hz, 1H), 3.01 (dd, J = 12.1, 3.6 Hz, 1H), 2.62 (d, J =

16.3 Hz, 1H), 1.55 (dq, J = 14.6, 7.3, 3.5 Hz, 1H), 1.45 (ddq, J = 14.2, 12.1, 7.2 Hz, 1H), 0.59 (t, J = 7.3 Hz, 3H). ^{13}C NMR (126 MHz, CDCl_3) δ 179.73, 170.41, 144.94, 138.20, 130.19, 129.50, 128.33, 127.96, 127.28, 124.45, 121.69, 107.81, 54.50, 53.45, 51.57, 40.69, 26.36, 21.17, 12.12. IR (KBr, cm^{-1}) γ 3057, 3027, 2962, 2932, 2875, 1743, 1712, 1612, 1493, 1469, 1377, 1350, 1252, 1197, 1176, 1126, 1094, 1027, 755, 702, 679, 603, 543, 488. $[\alpha]^{20}_{\text{D}}$ = -11.2 (c = 0.73, CHCl_3); HRMS (ESI) m/z ($\text{M}+\text{Na}$) $^+$: calculated for $(\text{C}_{21}\text{H}_{23}\text{NO}_3\text{Na})^+$: 360.1570, found: 360.1569; The product was analyzed by HPLC to determine the enantiomeric excess: >99% e.e. (CHIRALPAK IG, hexane/*i*-PrOH = 70/30, flow rate: 1.0 mL/min, T = 30 $^\circ\text{C}$, 254 nm), t_{R} (minor) = 7.32 min, t_{R} (major) = 9.08 min.

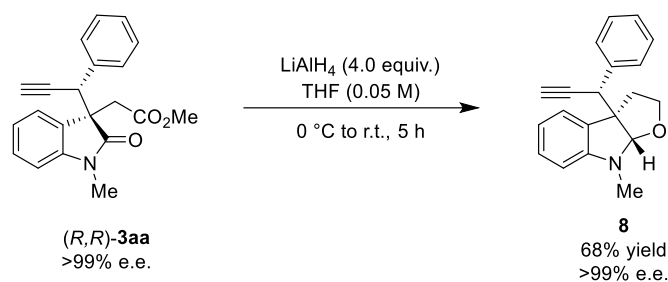


To a flame-dried and N₂-purged Schlenk tube were added (*R,R*)-**3aa** (38.4 mg, 0.10 mmol, 1.0 equiv.) and CuTc (3.8 mg, 0.02 mmol, 20 mol%). The vial was then sealed, purged and backfilled with N₂ three times before adding TsN₃ (23.7 mg, 0.12 mmol, 1.2 equiv.) and toluene (1.0 mL) at room temperature. The resulting mixture was stirred at room temperature under nitrogen atmosphere for 3 hours. After concentrated under reduced pressure, the residue was purified by column chromatography on silica gel to give **7** (47.0 mg, 89% yield, >99% e.e.).

Methyl 2-((*R*)-1-methyl-2-oxo-3-((*R*)-phenyl(1-tosyl-1*H*-1,2,3-triazol-4-yl)methyl)indolin-3-yl)acetate (7**)**

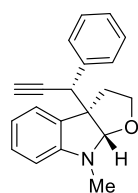


White solid; 89% yield; ¹H NMR (500 MHz, CDCl₃) δ 8.29 (s, 1H), 7.96 (d, *J* = 8.5 Hz, 2H), 7.36 (d, *J* = 8.1 Hz, 2H), 7.22 (td, *J* = 7.7, 1.3 Hz, 1H), 7.17 (d, *J* = 7.3 Hz, 1H), 7.15 – 7.06 (m, 5H), 7.03 (t, *J* = 7.5 Hz, 1H), 6.53 (d, *J* = 7.8 Hz, 1H), 4.74 (s, 1H), 3.34 (s, 3H), 2.99 (d, *J* = 16.4 Hz, 1H), 2.87 (s, 3H), 2.82 (d, *J* = 16.5 Hz, 1H), 2.43 (s, 3H). ¹³C NMR (126 MHz, CDCl₃) δ 177.74, 169.95, 147.31, 145.30, 144.35, 135.70, 133.22, 130.50, 129.73, 129.13, 128.97, 128.79, 127.96, 127.67, 123.75, 122.82, 122.32, 107.95, 52.92, 51.75, 50.76, 39.94, 25.98, 21.91. IR (KBr, cm⁻¹) γ 3012, 2926, 2854, 1741, 1707, 1613, 1496, 1471, 1381, 1356, 1202, 1174, 1122, 1033, 1009, 816, 753, 702, 682, 568, 490. HRMS (ESI) *m/z* (M+H)⁺: calculated for (C₂₈H₂₇N₄O₅S)⁺: 531.1697, found: 531.1707; [α]_D²⁰ = +77.8 (*c* = 0.73, CHCl₃); The product was analyzed by HPLC to determine the enantiomeric excess: >99% e.e. (CHIRALPAK IA, hexane/*i*-PrOH = 70/30, flow rate: 1.0 mL/min, T = 30 °C, 230 nm), *t*_R (minor) = 9.92 min, *t*_R (major) = 11.81 min.

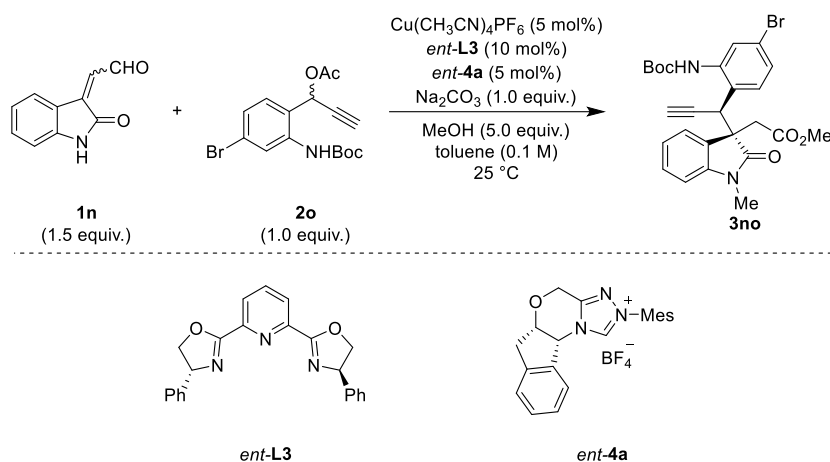


Under nitrogen atmosphere, a solution of LiAlH_4 (15.2 mg, 0.4 mmol, 4.0 equiv.) in anhydrous THF (1.0 ml) was added dropwise to a solution of $(R,R)\text{-3aa}$ (38.4 mg, 0.10 mmol, 1.0 equiv.) in anhydrous THF (1.0 mL) at 0 °C. The resulting mixture was stirred at room temperature under nitrogen atmosphere for 5 hours. The reaction mixture was quenched with $\text{Na}_2\text{SO}_4 \cdot 10\text{H}_2\text{O}$, filtered and extracted with ethyl acetate (10.0 mL x 3). The combined organic layers were dried over Na_2SO_4 , filtered and concentrated in vacuo. The residue was purified by column chromatography on silica gel to give **8** (19.6 mg, 68% yield, >99% e.e.).

(3a*R*,8a*S*)-8-methyl-3a-((*R*)-1-phenylprop-2-yn-1-yl)-3,3a,8,8a-tetrahydro-2*H*-furo[2,3-*b*]indole (8**)**

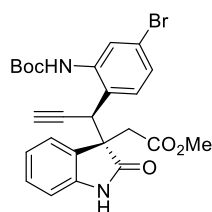


White solid; 68% yield; $^1\text{H NMR}$ (500 MHz, CDCl_3) δ 7.21 (tt, $J = 7.4$, 3.1 Hz, 5H), 7.07 (td, $J = 7.6$, 1.3 Hz, 1H), 6.96 (dd, $J = 7.3$, 1.3 Hz, 1H), 6.63 (td, $J = 7.4$, 0.9 Hz, 1H), 6.23 (d, $J = 7.8$ Hz, 1H), 5.35 (s, 1H), 4.08 (d, $J = 2.6$ Hz, 1H), 3.96 (ddd, $J = 8.5$, 7.2, 1.2 Hz, 1H), 3.42 (ddd, $J = 11.3$, 8.5, 4.7 Hz, 1H), 2.78 (s, 3H), 2.65 (td, $J = 11.5$, 7.3 Hz, 1H), 2.34 (d, $J = 2.5$ Hz, 1H), 2.17 – 2.10 (m, 1H). $^{13}\text{C NMR}$ (126 MHz, CDCl_3) δ 151.85, 137.00, 130.05, 129.21, 128.93, 127.81, 127.45, 124.34, 116.94, 105.29, 101.21, 83.53, 72.70, 67.48, 60.66, 44.38, 38.32, 31.12. **IR** (KBr, cm^{-1}) γ 3290, 3054, 3029, 2924, 2870, 1659, 1607, 1495, 1453, 1390, 1303, 1262, 1220, 1156, 1108, 1011, 931, 913, 799, 750, 702, 648, 601. **HRMS** (ESI) m/z ($\text{M}+\text{H}^+$): calculated for $(\text{C}_{20}\text{H}_{20}\text{NO})^+$: 290.1539, found: 290.1538; $[\alpha]_D^{20} = -141.2$ ($c = 0.38$, CHCl_3); The product was analyzed by HPLC to determine the enantiomeric excess: >99% e.e. (CHIRALPAK IG, hexane/*i*-PrOH = 80/20, flow rate: 1.0 mL/min, $T = 30$ °C, 254 nm), t_R (major) = 4.38 min, t_R (major) = 4.74 min.



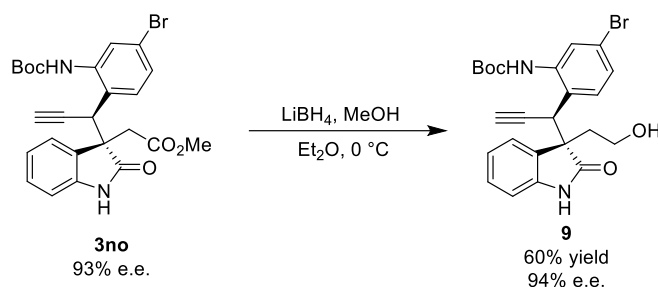
To a flame-dried and N_2 -purged Schlenk tube were added $\text{Cu}(\text{CH}_3\text{CN})_4\text{PF}_6$ (0.15 mmol, 55.9 mg) and pyridine bisoxazoline ligand *ent-L3* (0.3 mmol, 110.9 mg). The vial was sealed, purged and backfilled with N_2 three times before adding toluene (15.0 mL) at $25\text{ }^\circ\text{C}$. The resulting solution was stirred at $25\text{ }^\circ\text{C}$ for 1 hour. Then, isatin-derived enal **1n** (4.5 mmol, 779.3 mg), NHC precatalyst **4a** (0.15 mmol, 62.9 mg) Na_2CO_3 (3.0 mmol, 318.0 mg), MeOH (15.0 mmol, 600 μL) and a solution of propargylic acetate **2o** (3.0 mmol, 1104.7 mg) in toluene (15.0 mL) were added. The resulting solution was stirred at $25\text{ }^\circ\text{C}$ for 12 hours and then quenched with saturated NH_4Cl aqueous solution (10.0 mL). The resulting solution was extracted with ethyl acetate (15.0 mL x 3). The combined organic layers were dried over Na_2SO_4 , filtered and concentrated in vacuo. The diastereomeric ratio was determined by ^1H NMR analysis of the crude reaction mixture. The residue was purified by column chromatography on silica gel (petroleum ether: ethyl acetate = 3:1-2:1) to afford desired products **3no** (0.94 g, 82:18 d.r., 93% e.e.).

Methyl 2-((*S*)-3-((*S*)-1-(4-bromo-2-((*tert*-butoxycarbonyl)amino)phenyl)prop-2-yn-1-yl)-2-oxoindolin-3-yl)acetate (3no**)**



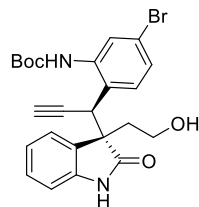
White solid; 61% yield; 82:18 d.r.; ^1H NMR (500 MHz, CDCl_3) δ 8.35 (s, 1H), 7.78 (s, 1H), 7.20 (td, $J = 7.7, 1.3$ Hz, 1H), 7.09 (m, 3H), 6.98 (td, $J = 7.5, 1.0$ Hz, 2H), 6.80 (d, $J = 7.8$ Hz, 1H), 4.38 (d, $J = 2.6$ Hz, 1H), 3.44 (s, 3H), 3.28 (d, $J = 16.5$ Hz, 1H), 2.99 (d, $J = 16.4$ Hz, 1H), 2.38 (d, $J = 2.6$ Hz, 1H), 1.48 (s, 9H). ^{13}C NMR (126 MHz, CDCl_3) δ 179.15, 170.06, 153.02, 141.90, 137.72, 133.00, 129.22, 128.46, 127.07, 124.30, 122.36,

122.12, 110.13, 80.90, 80.04, 74.50, 53.38, 51.81, 40.18, 38.65, 28.29. **IR** (KBr, cm^{-1}) γ 3299, 2964, 2928, 1716, 1621, 1575, 1506, 1472, 1438, 1367, 1261, 1235, 1158, 1051, 1024, 870, 804, 755, 666, 580, 492. **HRMS** (ESI) m/z ($M+\text{Na}$) $^{+}$: calculated for $(\text{C}_{25}\text{H}_{25}\text{BrN}_2\text{O}_5\text{Na})^{+}$: 535.0833, found: 535.0844; $[\alpha]^{20}_{\text{D}} = -31.2$ ($c = 0.87$, CHCl_3); The product was analyzed by HPLC to determine the enantiomeric excess: 93% e.e. (CHIRALPAK IA, hexane/*i*-PrOH = 85/15, flow rate: 1.0 mL/min, $T = 30\text{ }^{\circ}\text{C}$, 254 nm), t_{R} (major) = 13.58 min, t_{R} (minor) = 16.16 min.



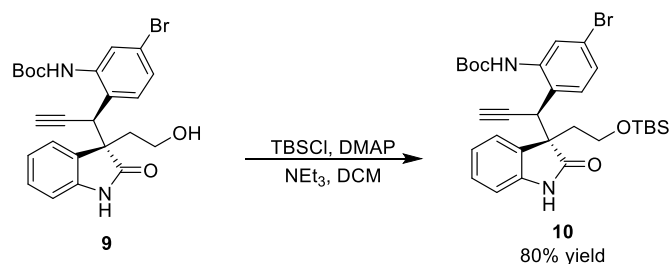
A flame-dried Schlenk tube equipped with a magnetic stir bar was charged with **3no** (51.3 mg, 93% e.e., 0.1 mmol, 1.0 equiv.), and 2.0 mL of Et_2O was added to the Schlenk tube under argon. After cooling down to $0\text{ }^{\circ}\text{C}$, LiBH_4 (21.8 mg, 1.0 mmol, 10.0 equiv) and methanol (40 μL , 1.0 mmol, 10.0 equiv) were added subsequently. The mixture was stirred at $0\text{ }^{\circ}\text{C}$ until the starting materials were consumed (monitoring by TLC). The reaction mixture was quenched with water (5.0 mL). The resulting solution was extracted with ethyl acetate (5.0 mL x 3). The combined organic layers were dried over Na_2SO_4 , filtered and concentrated in vacuo. The crude material was purified by column chromatography to afford compound **9** (29.1 mg, 60% yield, 94% e.e.).

***tert*-Butyl (5-bromo-2-((*S*)-1-((*S*)-3-(2-hydroxyethyl)-2-oxoindolin-3-yl)prop-2-yn-1-yl)phenyl)carbamate (**9**)**



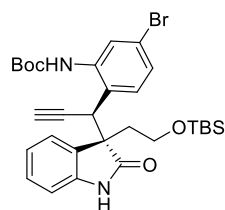
White solid; 60% yield; **^1H NMR (500 MHz, CDCl_3)** δ 8.84 (s, 1H), 7.75 (br, 1H), 7.24 – 7.05 (m, 3H), 6.97 (t, $J = 7.6\text{ Hz}$, 1H), 6.84 (d, $J = 7.5\text{ Hz}$, 1H), 6.76 (d, $J = 7.8\text{ Hz}$, 1H), 4.41 (s, 1H), 3.38 (m, $J = 11.8$, 7.1, 3.7 Hz, 1H), 3.13 (s, 1H), 2.54 (m, $J = 7.2\text{ Hz}$, 1H), 2.15 (s, 1H), 1.90 (m, $J = 14.5$, 4.5 Hz, 1H), 1.46 (s, 9H). **^{13}C NMR (101 MHz, CDCl_3)** δ 181.20, 142.07, 138.22, 133.30, 128.91, 128.34, 127.22, 125.35, 110.39, 81.23, 80.96, 59.12, 55.60, 40.46, 36.91, 28.43. **IR** (KBr, cm^{-1}) γ 3298, 2927, 2854, 1713, 1621, 1592, 1576,

1514, 1471, 1408, 1392, 1368, 1235, 1158, 1050, 1021, 870, 804, 754, 665, 575, 493. **HRMS** (ESI) m/z ($M+Na$)⁺: calculated for (C₂₄H₂₅BrN₂O₄Na)⁺: 504.0890, found: 507.0897; $[\alpha]^{20}_D = -6.7$ ($c = 0.65$, CHCl₃); The product was analyzed by HPLC to determine the enantiomeric excess: 94% e.e. (CHIRALPAK IA, hexane/*i*-PrOH = 70/30, flow rate: 1.0 mL/min, T = 30 °C, 254 nm), t_R (major) = 4.44 min, t_R (minor) = 5.90 min.



To a flame-dried and N₂-purged Schlenk tube were added **9** (48.5 mg, 94% e.e., 0.10 mmol, 1.0 equiv.), DMAP (1.2 mg, 0.01 mmol, 10 mol%) and TBSCl (45.2 mg, 0.3 mmol, 3.0 equiv.). The vial was then sealed, purged and backfilled with N₂ three times before adding NEt₃ (42 μL, 0.3 mmol, 3.0 equiv.) and DCM (2.0 mL) at room temperature. The resulting mixture was stirred at room temperature under nitrogen atmosphere until the reaction completed (monitoring by TLC). After concentrated under reduced pressure, the residue was purified by column chromatography on silica gel to give **10** (48.0 mg, 80% yield).

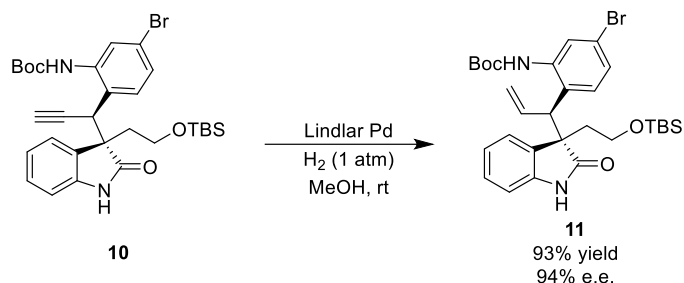
***tert*-Butyl (5-bromo-2-((*S*)-1-((*S*)-3-(2-((*tert*-butyldimethylsilyl)oxy)ethyl)-2-oxoindolin-3-yl)prop-2-yn-1-yl)phenyl)carbamate (**10**)**



White solid; 80% yield; ¹H NMR (400 MHz, CDCl₃) δ 8.46 (s, 1H), 7.89 (s, 1H), 7.21 (td, $J = 7.7, 1.3$ Hz, 1H), 7.16 – 7.01 (m, 2H), 6.98 (td, $J = 7.5, 1.1$ Hz, 1H), 6.91 (d, $J = 7.4$ Hz, 1H), 6.84 (dt, $J = 7.7, 0.8$ Hz, 1H), 4.26 (d, $J = 2.7$ Hz, 1H), 3.27 (qdd, $J = 10.2, 7.7, 5.2$ Hz, 2H), 2.50 (dt, $J = 13.4, 7.8$ Hz, 1H), 2.25 (d, $J = 2.5$ Hz, 1H), 2.00 (ddd, $J = 13.4, 6.0, 4.3$ Hz, 1H), 1.47 (s, 9H), 0.74 (s, 9H), -0.19 (s, 3H), -0.21 (s, 3H). ¹³C NMR (101 MHz, CDCl₃) δ 180.29, 152.89, 141.89, 138.03, 133.46, 128.90, 128.10, 126.69, 125.32, 122.38, 122.07, 110.14, 80.89, 80.60, 74.25, 59.41, 55.19, 36.97, 28.44, 25.92, 18.29, -5.70, -5.72. IR (KBr, cm⁻¹) γ 3303, 2955, 2928, 2856, 1712, 1619, 1592, 1577,

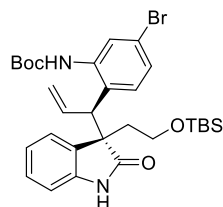
1509, 1473, 1408, 1382, 1368, 1340, 1250, 1158, 1110, 1051, 1022, 853, 754, 663, 491.

HRMS (ESI) m/z ($M+Na$)⁺: calculated for (C₃₀H₃₉BrN₂O₄SiNa)⁺: 621.1755, found: 621.1763; [α]²⁰_D = -11.5 (c = 0.62, CHCl₃).



To a stirring solution of **10** (60.0 mg, 0.10 mmol, 1.0 equiv.) in MeOH (5.0 mL) was slowly added Lindlar Pd (5%, 20.0 mg) at room temperature. The resulting mixture was stirred at room temperature in an atmosphere of hydrogen gas until the reaction completed (monitoring by TLC). The mixture was filtered and concentrated under reduced pressure. The residue was purified by column chromatography on silica gel to give **11** (56.0 mg, 93% yield, 94% e.e.).

***tert*-Butyl (5-bromo-2-((*S*)-1-((*S*)-3-(2-((*tert*-butyldimethylsilyl)oxy)ethyl)-2-oxoindolin-3-yl)allyl)phenyl)carbamate (**11**)**



White solid; 93% yield; ¹H NMR (500 MHz, CDCl₃) δ 7.87 (s, 1H), 7.69 (s, 1H), 7.18 (td, J = 7.5, 1.6 Hz, 1H), 7.11 (dd, J = 8.5, 2.2 Hz, 1H), 7.06 – 6.93 (m, 3H), 6.74 (d, J = 7.7 Hz, 1H), 6.31 (s, 1H), 6.16 (dt, J = 17.8, 9.6 Hz, 1H), 5.15 (dd, J = 16.8, 1.6 Hz, 1H), 5.09 (dd, J = 10.0, 1.5 Hz, 1H), 3.85 (d, J = 9.4 Hz, 1H), 3.32 – 3.18 (m, 2H), 2.44 (dt, J = 13.6, 7.9 Hz, 1H), 1.88 (ddd, J = 13.6, 6.2, 4.1 Hz, 1H), 1.53 (s, 9H), 0.74 (s, 9H), -0.18 (s, 3H), -0.22 (s, 3H). ¹³C NMR (126 MHz, CDCl₃) δ 180.74, 153.22, 141.38, 136.95, 134.98, 131.01, 129.43, 128.65, 127.41, 124.65, 121.96, 120.97, 118.80, 109.92, 81.00, 59.41, 55.21, 51.11, 37.75, 28.51, 25.92, 18.29, -5.69. **IR** (KBr, cm⁻¹) γ 2956, 2927, 2855, 1707, 1619, 1592, 1572, 1509, 1472, 1367, 1258, 1159, 1090, 1050, 1022, 923, 836, 806, 776, 755, 666, 492. [α]²⁰_D = +44.6 (c = 0.26, CHCl₃); **HRMS** (ESI) m/z ($M+Na$)⁺: calculated for (C₃₀H₄₁BrN₂O₄SiNa)⁺: 623.1911, found: 623.1927; The product was analyzed by HPLC to determine the enantiomeric excess: 94% e.e.

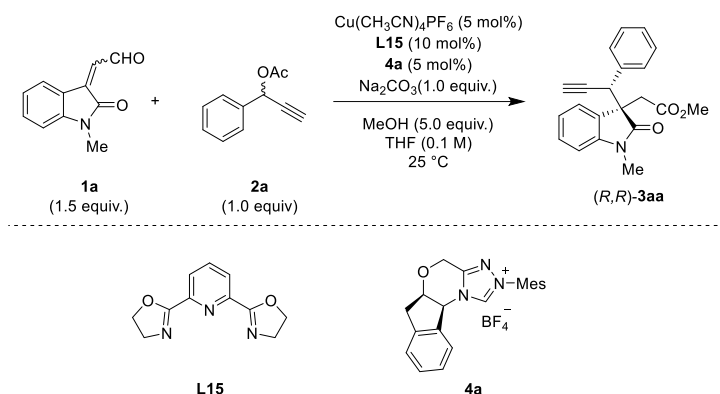
(CHIRALPAK IA, hexane/*i*-PrOH = 98/2, flow rate: 1.0 mL/min, T = 30 °C, 220 nm),
 t_R (minor) = 23.47 min, t_R (major) = 32.21 min.

7. Nonlinear Effect Studies

The non-linear effect study were conducted by building a relationship between the e.e. value of the NHC precatalyst **4a** and that of the product (*R,R*)-**3aa**. The specified e.e. values of NHC precatalyst **4a** was made by mixing certain amounts of optically pure NHC precatalyst **4a** with optically pure NHC precatalyst *ent*-**4a**. Six reactions containing NHC precatalyst of racemic, 21%, 34%, 60%, 80%, and 99% optical purity were run in parallel.

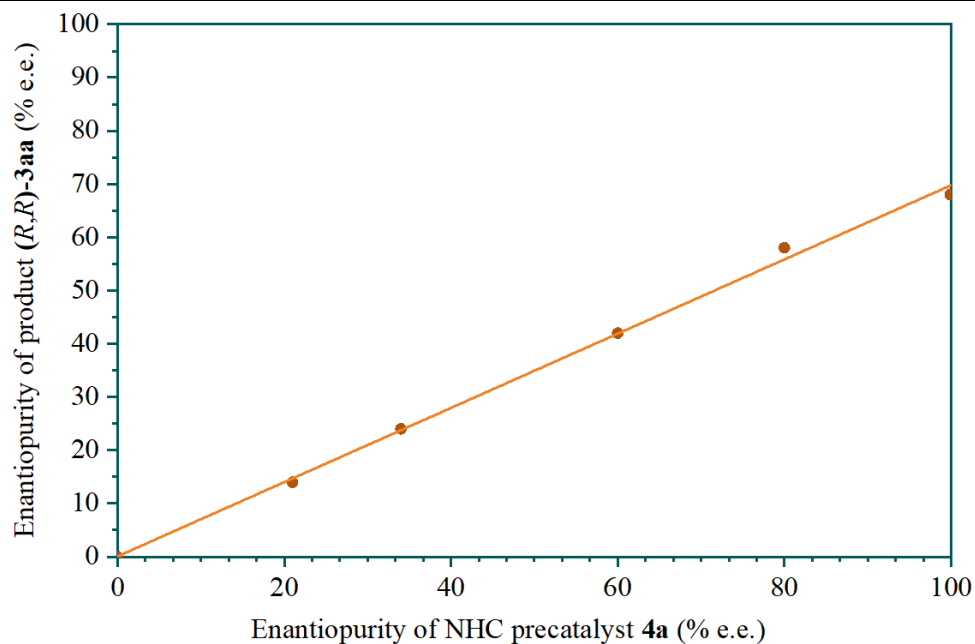
To a flame-dried and N₂-purged Schlenk tube were added Cu(CH₃CN)₄PF₆ (0.005 mmol, 5 mol%) and pyridine bisoxazoline ligand **L15** (0.01 mmol, 10 mol%). The vial was sealed, purged and backfilled with N₂ three times before adding THF (0.5 mL) at 25 °C. The resulting solution was stirred at 25 °C for 1 hour. Then, isatin-derived enal **1a** (0.15 mmol), NHC precatalyst **4a** with different e.e. values (0.005 mmol, 5 mol%), Na₂CO₃ (0.1 mmol), MeOH (0.5 mmol) and propargylic acetate **2a** (0.1 mmol) in THF (0.5 mL) were added. The resulting solution was stirred at 25 °C for 12 hours and then quenched with saturated aqueous NH₄Cl solution (5.0 mL). The resulting solution was extracted with ethyl acetate (5.0 mL x 3). The combined organic layers were dried over Na₂SO₄, filtered and concentrated in vacuo. The diastereomeric ratio was determined by ¹H NMR analysis of the crude reaction mixture. The residue was purified by column chromatography on silica gel (petroleum ether: ethyl acetate = 5:1-2:1) to afford desired products (*R,R*)-**3aa**. The product was analyzed by HPLC (CHIRALPAK IG, hexane/*i*-PrOH = 70/30, flow rate: 1.0 mL/min, T = 30 °C, 230 nm), t_R (major) = 11.26 min, t_R (minor) = 16.01 min. A graph of e.e. of product vs. e.e. of catalyst was then plotted.

Table S8. Nonlinear experiments



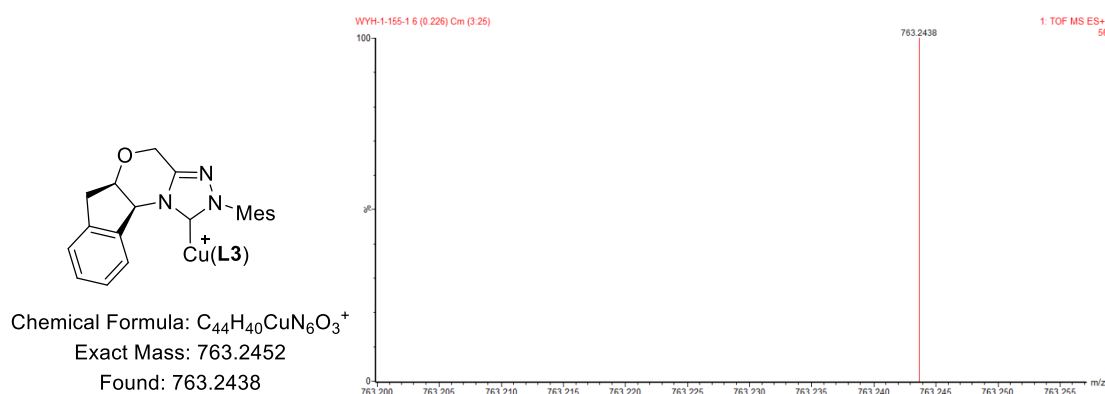
entry ^a	e.e. of NHC precatalyst 4a (%)	yield (%)	d.r.	e.e. of (R,R)-3aa (%)
1	0	70	82:18	0
2	21	73	82:18	14
3	34	72	82:18	24
4	60	74	81:19	42
5	80	74	81:19	58
6	99	71	80:20	68

^aUnless noted, reaction conditions: $\text{Cu}(\text{CH}_3\text{CN})_4\text{PF}_6$ (5 mol%), pyridine bisoxazoline ligand **L15** (10 mol%) were stirred in THF (0.5 mL) at 25 °C for 1 h under N_2 , then NHC precatalyst **4a** (5 mol%), **1a** (0.15 mmol), **2a** (0.1 mmol), MeOH (0.5 mmol), Na_2CO_3 (0.1 mmol) and THF (0.5 mL) were added to the reaction mixture and stirred at 25 °C for 12 h under N_2 . The yield and diastereomeric ratio (d.r.) were determined by ^1H NMR spectroscopy. The enantiomeric excess (e.e.) was determined by HPLC.



8. ESI-MS analysis

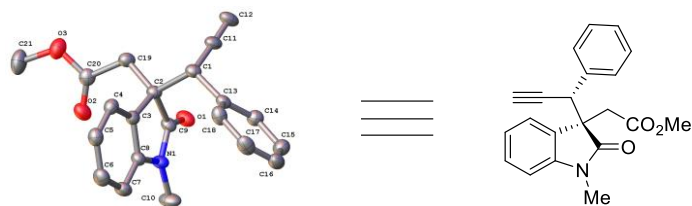
HRMS analysis of $\text{Cu}^{\text{I}}(\text{L3})(\text{4a})^+$



To a flame-dried and N_2 -purged Schlenk tube were added $\text{Cu}(\text{CH}_3\text{CN})_4\text{PF}_6$ (0.005 mmol, 5 mol%) and pyridine bisoxazoline ligand **L3** (0.01 mmol, 10 mol%). The vial was sealed, purged and backfilled with N_2 three times before adding THF (0.5 mL) at 25 °C. The resulting solution was stirred at 25 °C for 1 hour. Then, isatin-derived enal **1a** (0.15 mmol), NHC precatalyst **4a** (0.005 mmol, 5 mol%), Na_2CO_3 (0.1 mmol), MeOH (0.5 mmol) and a solution of propargylic acetate **2a** (0.1 mmol) in THF (0.5 mL) were added. The resulting solution was stirred at 25 °C for 1 hour. HRMS analysis of the reaction mixture showed the presence of $\text{Cu}^{\text{I}}(\text{L3})(\text{4a})^+$.

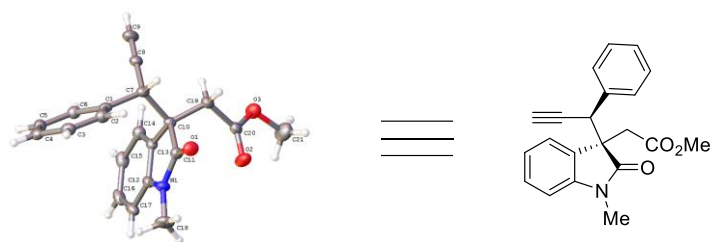
9. X-ray Single Crystal Data

(*R,R*)-3aa



Empirical formula	C ₂₁ H ₁₉ NO ₃
Formula weight	333.37
Temperature/K	192.99
Wavelength/Å	1.34139
Crystal system	Hexagonal
Space group	P6 ₁
a/Å	9.47499(10)
b/Å	9.47499(10)
c/Å	70.0389(7)
α/°	90
β/°	90
γ/°	120
Volume/Å ³	5445.37(13)
Z	12
ρ _{calc} Mg/m ³	1.220
μ/mm ⁻¹	0.423
F(000)	2112
Crystal size/mm ³	0.08 x 0.05 x 0.03
2θ range for data collection/°	3.294 to 54.891
Index ranges	-10 ≤ h ≤ 11, -11 ≤ k ≤ 9, -85 ≤ l ≤ 85
Reflections collected	79418
Independent reflections	6910 [R(int) = 0.0377]
Data/restraints/parameters	6910 / 1 / 455
Goodness-of-fit on F ²	1.031
Final R indexes [I ≥ 2σ (I)]	R ₁ = 0.0332, wR ₂ = 0.0790
Final R indexes [all data]	R ₁ = 0.0398, wR ₂ = 0.0840
Largest diff. peak/hole / e Å ⁻³	0.187 and -0.200
Absolute structure parameter	0.13(6)

(*R,S*)-3aa



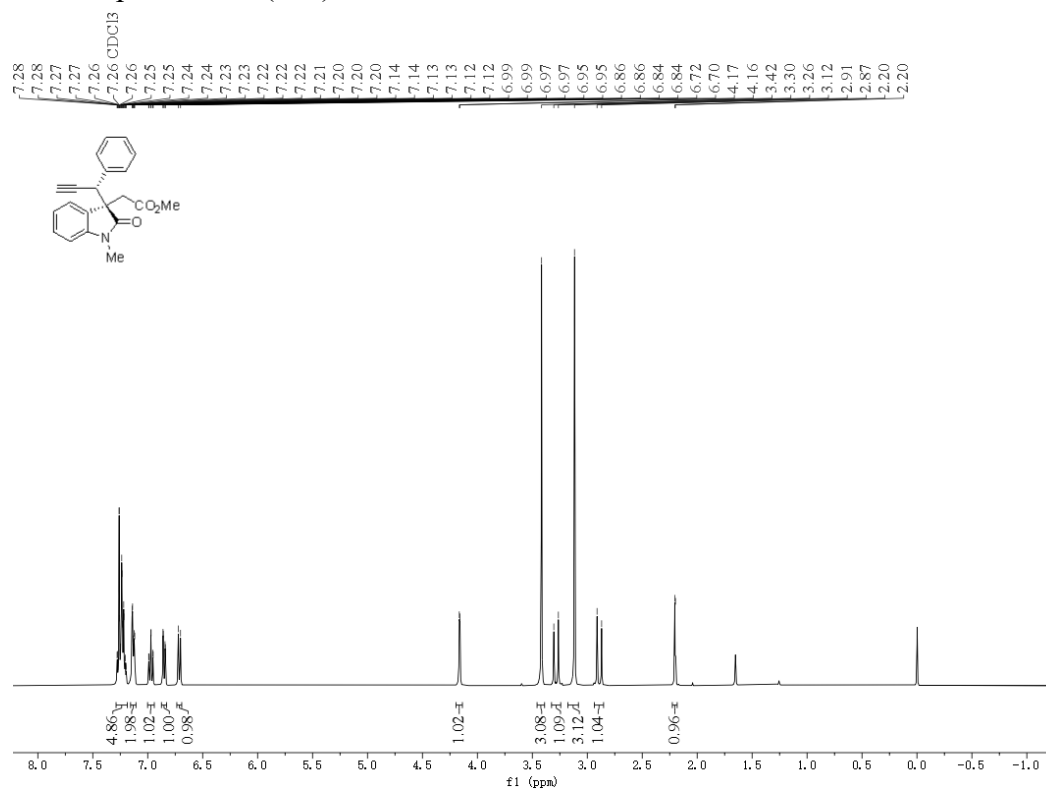
Empirical formula	C ₂₁ H ₁₉ NO ₃
Formula weight	333.37
Temperature/K	173.0
Wavelength/Å	1.34139
Crystal system	Monoclinic
Space group	P1 21 1
a/Å	8.81790(10)
b/Å	9.00430(10)
c/Å	22.8050(3)
α /°	90
β /°	97.2030
γ /°	90
Volume/Å ³	1796.40(13)
Z	4
ρ_{calc} Mg/m ³	1.233
μ /mm ⁻¹	0.427
F(000)	704
Crystal size/mm ³	0.07 x 0.06 x 0.05
2 Θ range for data collection/°	3.399 to 54.939
Index ranges	-10 ≤ h ≤ 10, -10 ≤ k ≤ 10, -26 ≤ l ≤ 27
Reflections collected	27020
Independent reflections	6758 [R(int) = 0.0310]
Data/restraints/parameters	6758 / 1 / 455
Goodness-of-fit on F ²	1.084
Final R indexes [I ≥ 2σ (I)]	R ₁ = 0.0322, wR ₂ = 0.0834
Final R indexes [all data]	R ₁ = 0.0341, wR ₂ = 0.0852
Largest diff. peak/hole / e Å ⁻³	0.181 and -0.131
Absolute structure parameter	0.04(6)

10. References

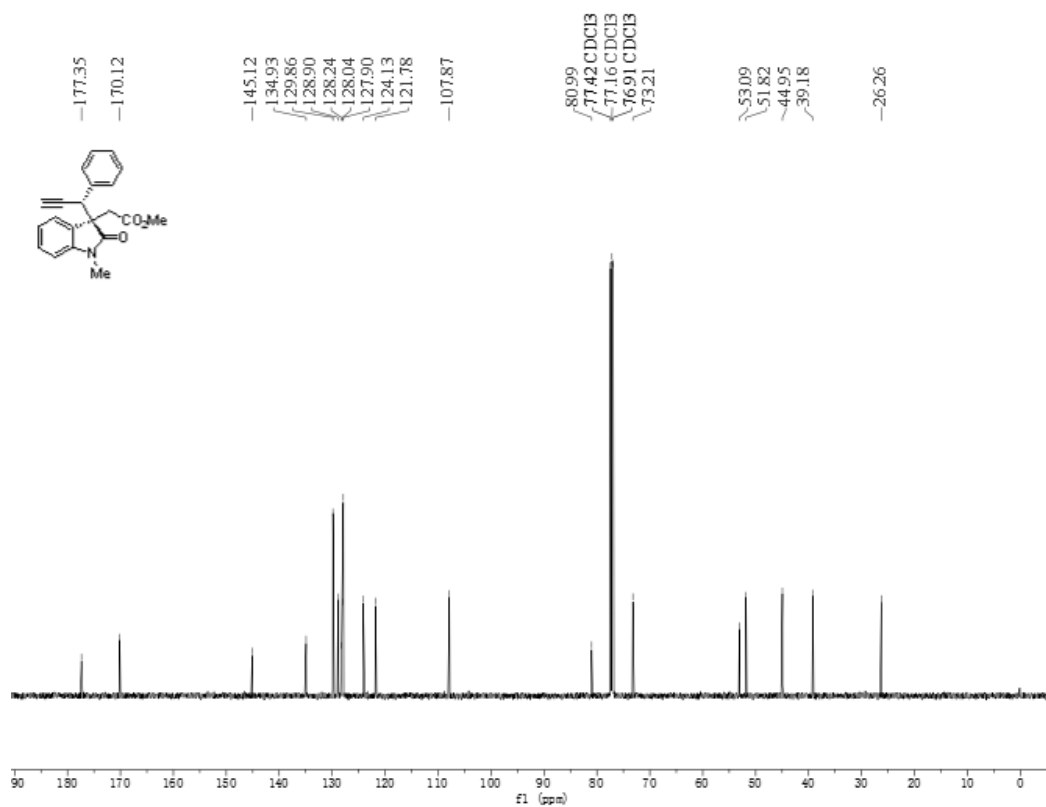
- [1] Liu, R. & Zhang, J. *Chem. Eur. J.* **19**, 7319-7323 (2013)
- [2] Mukaiyama, T., Ogata, K., Sato, I. & Hayashi, Y. *Chem. Eur. J.* **20**, 13583-13588 (2014)
- [3] Nayan, G., Sanatan, N. & Akhila, K. S. *J. Org. Chem.* **76**, 500-511 (2011)
- [4] Hattori, G., Matsuzawa, H., Miyake, Y. & Nishibayashi, Y. *Angew. Chem., Int. Ed.* **47**, 3781-3783 (2008)
- [5] Kerr, M. S., Read de Alaniz, J. & Rovis, T. *J. Org. Chem.* **70**, 5725-5728 (2005)
- [6] Thai, K., Langdon, S. M., Bilodeau, F. & Gravel, M. *Org. Lett.* **15**, 2214-2217 (2013)

11. NMR Spectra of Products

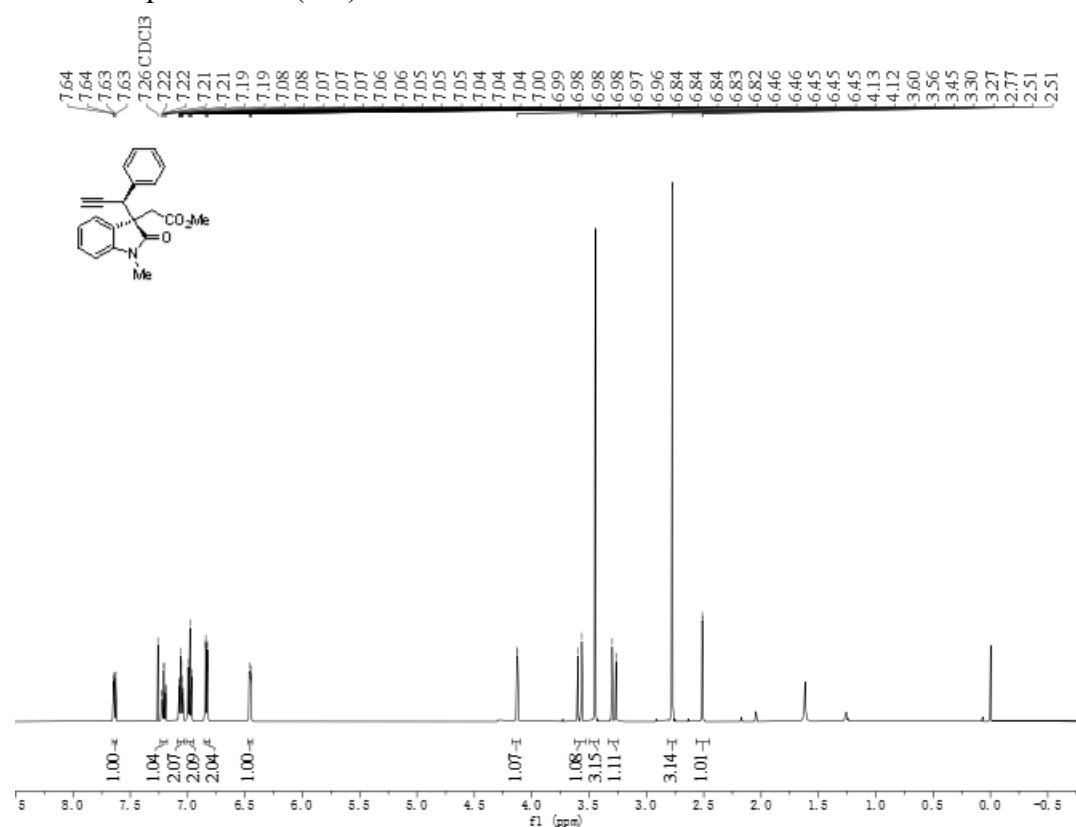
^1H NMR spectrum of (*R,R*)-**3aa**



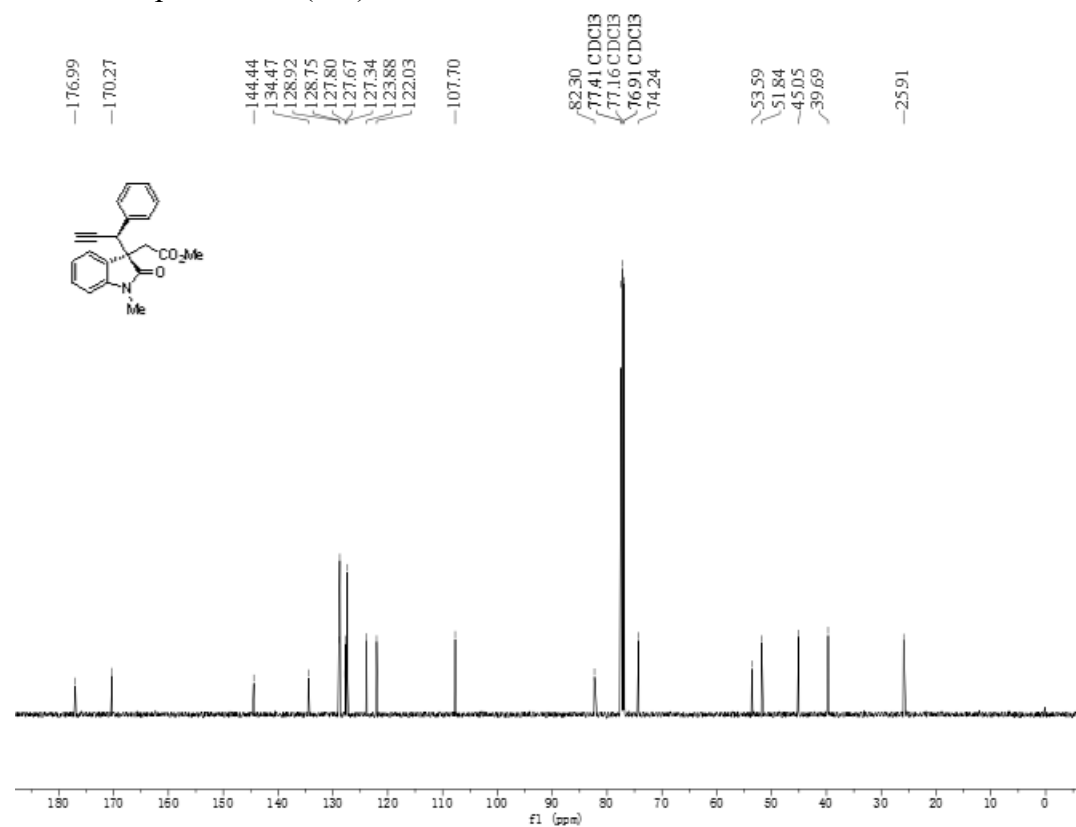
^{13}C NMR spectrum of (*R,R*)-**3aa**



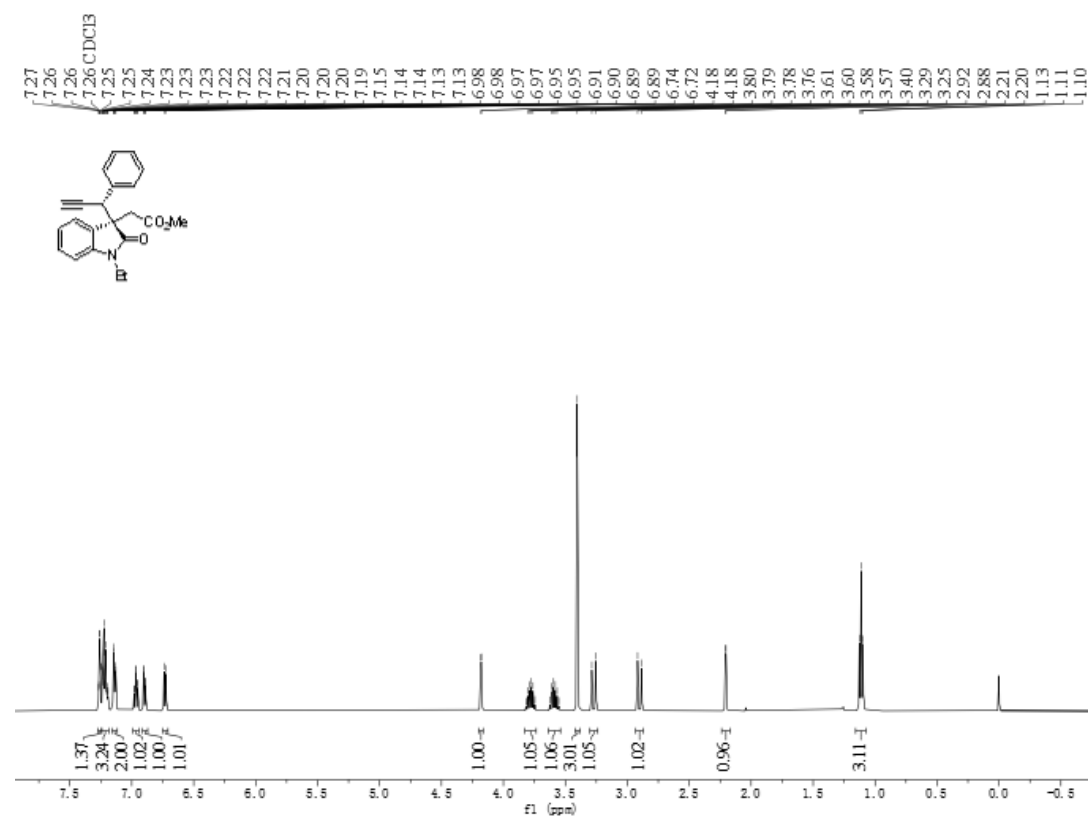
^1H NMR spectrum of (*R,S*)-**3aa**



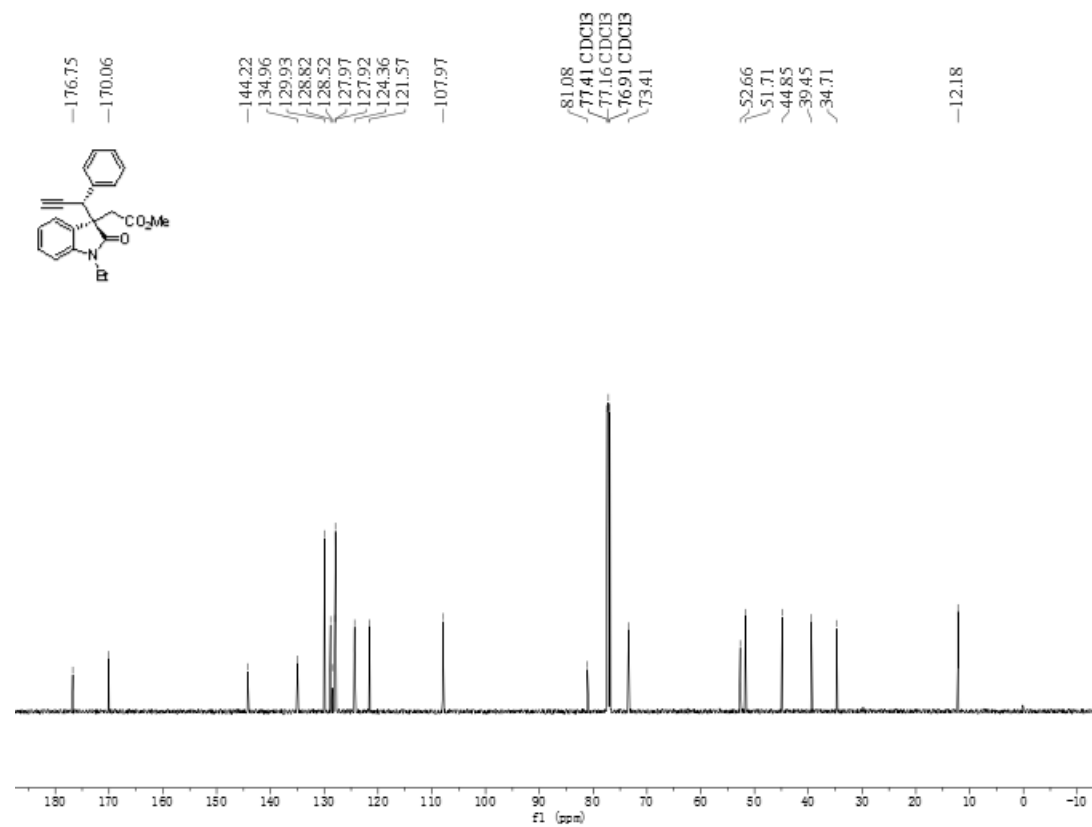
^{13}C NMR spectrum of (*R,S*)-**3aa**



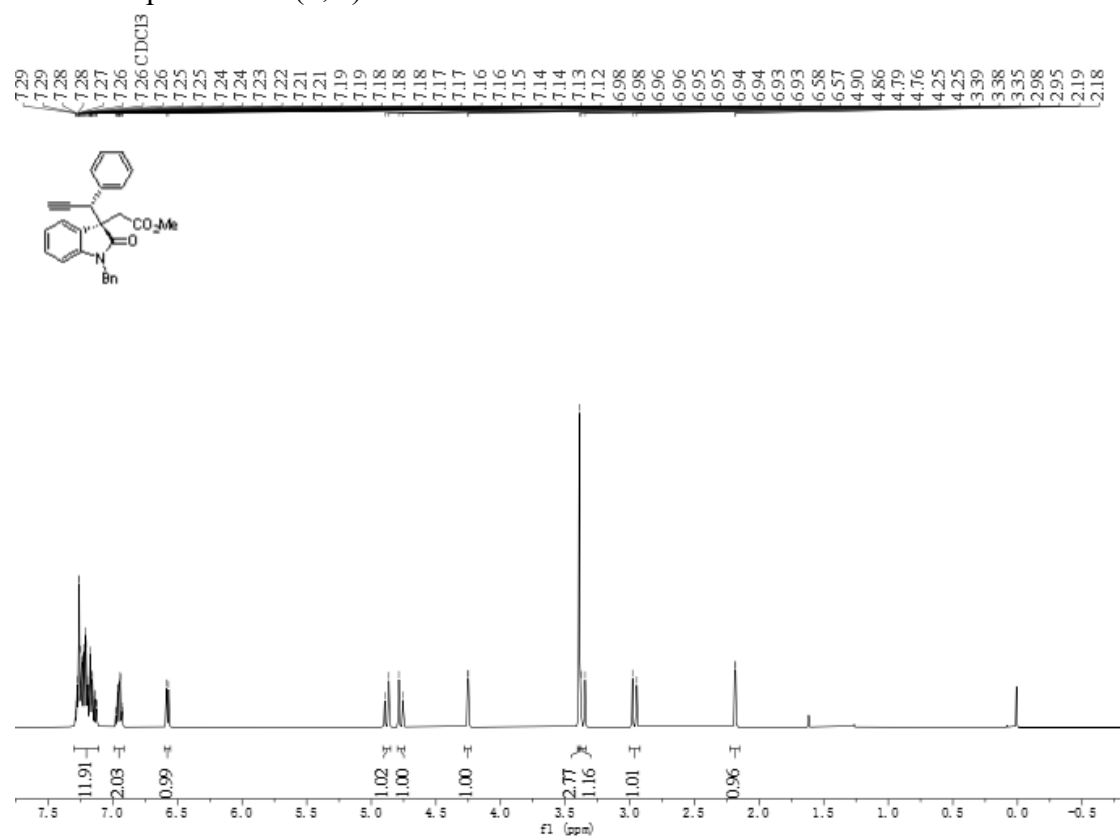
^1H NMR spectrum of (*R,R*)-**3ba**



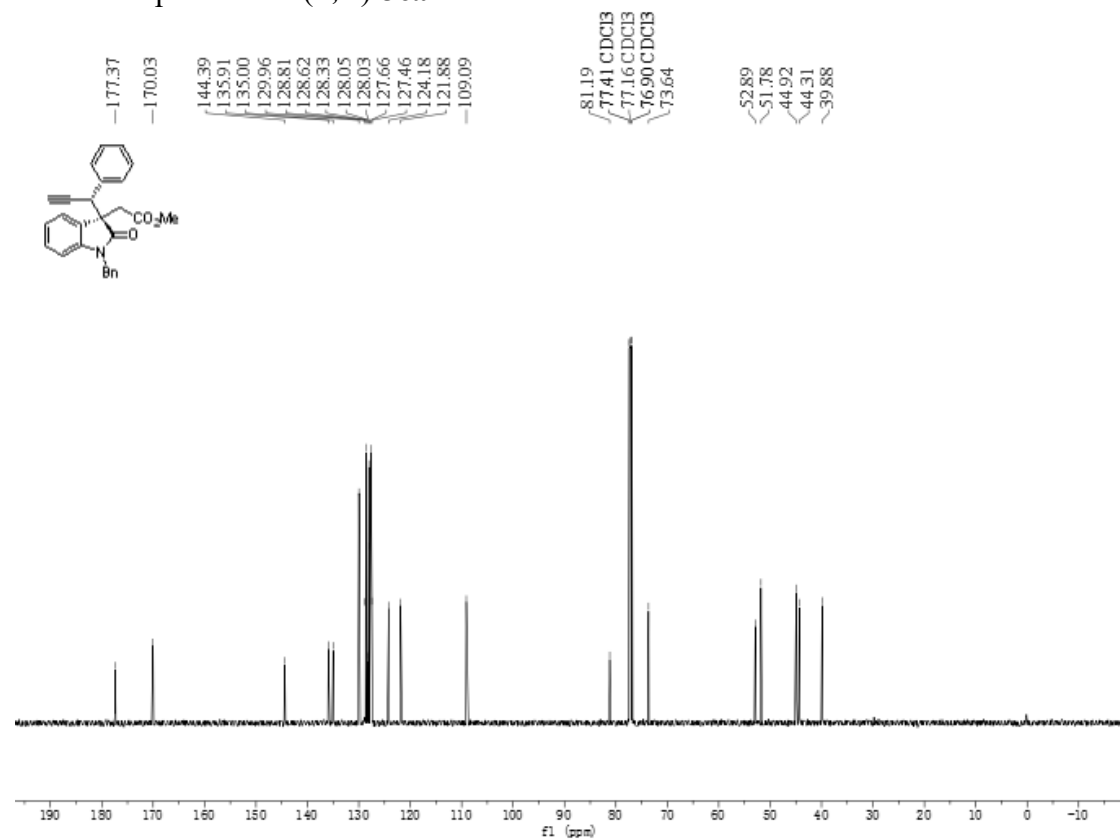
^{13}C NMR spectrum of (*R,R*)-**3ba**



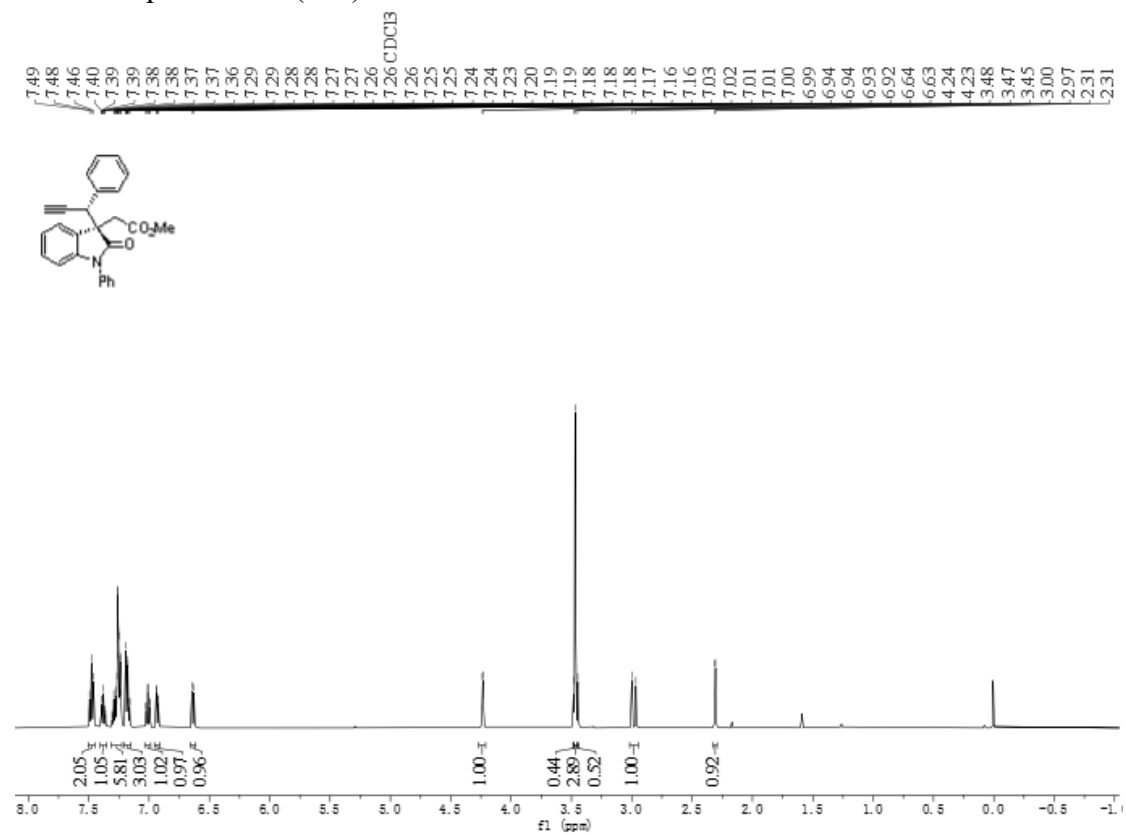
^1H NMR spectrum of (*R,R*)-**3ca**



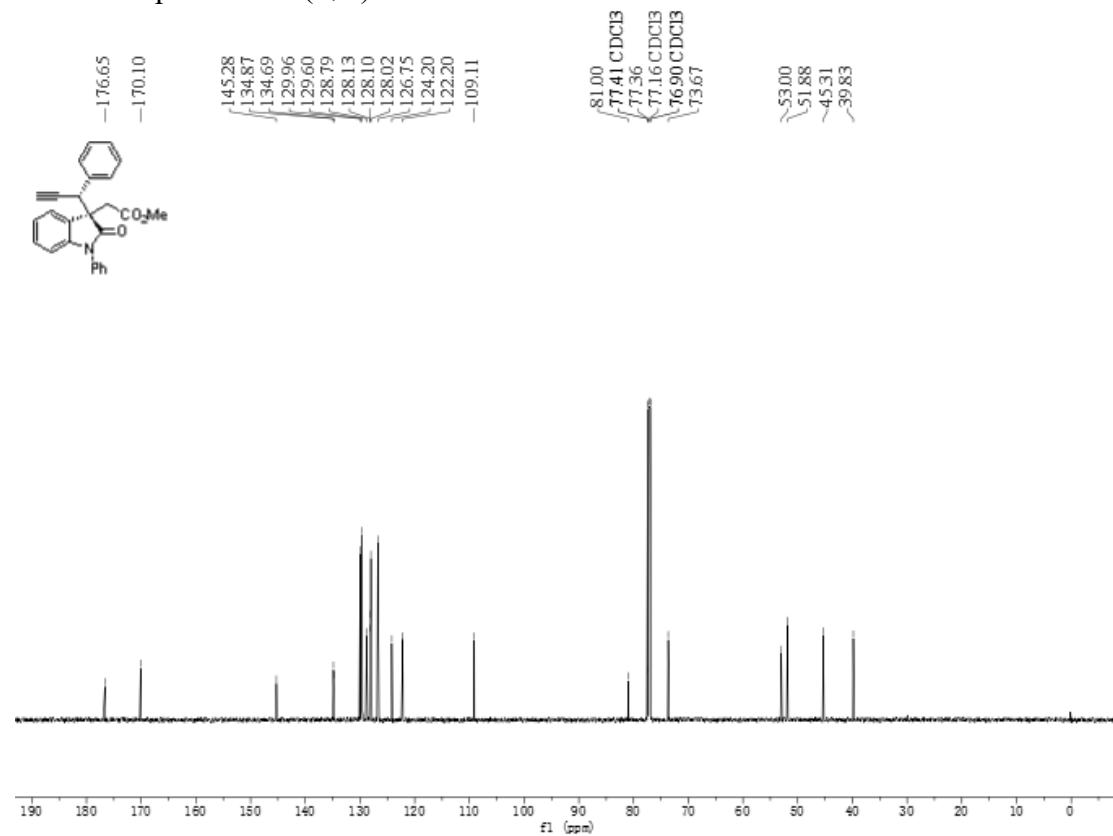
^{13}C NMR spectrum of (*R,R*)-**3ca**



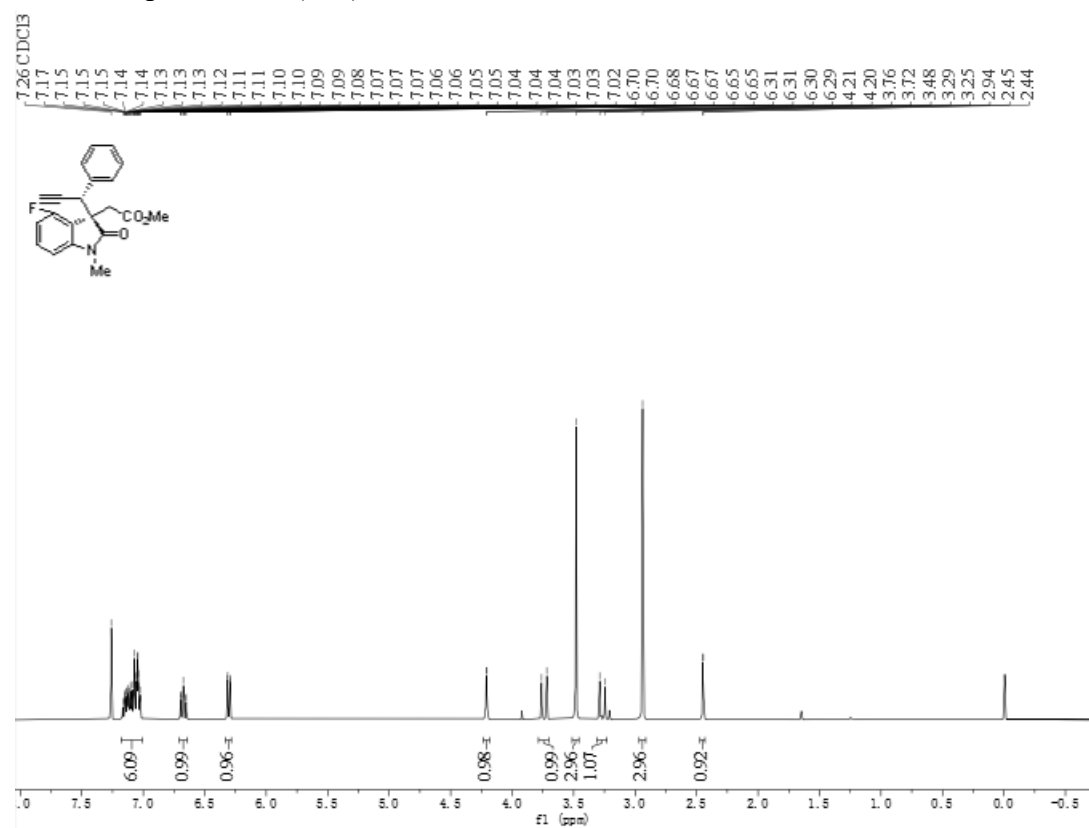
¹H NMR spectrum of (*R,R*)-**3da**



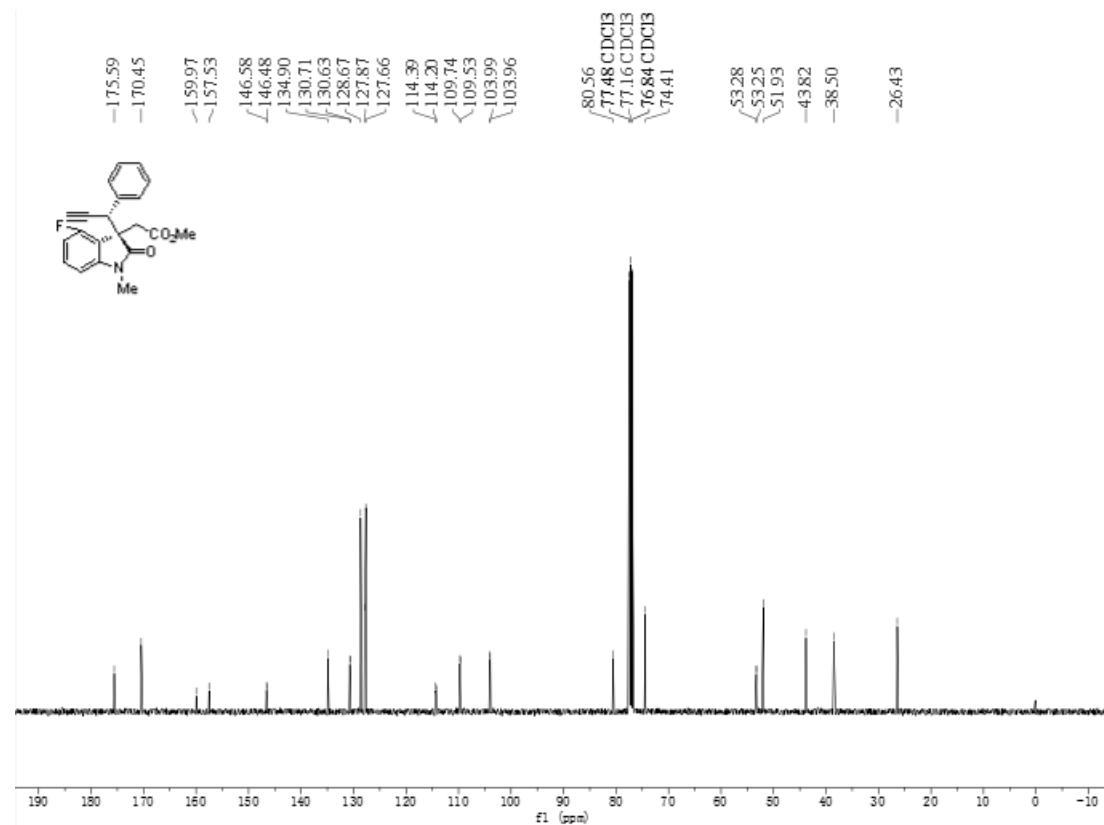
¹³C NMR spectrum of (*R,R*)-**3da**



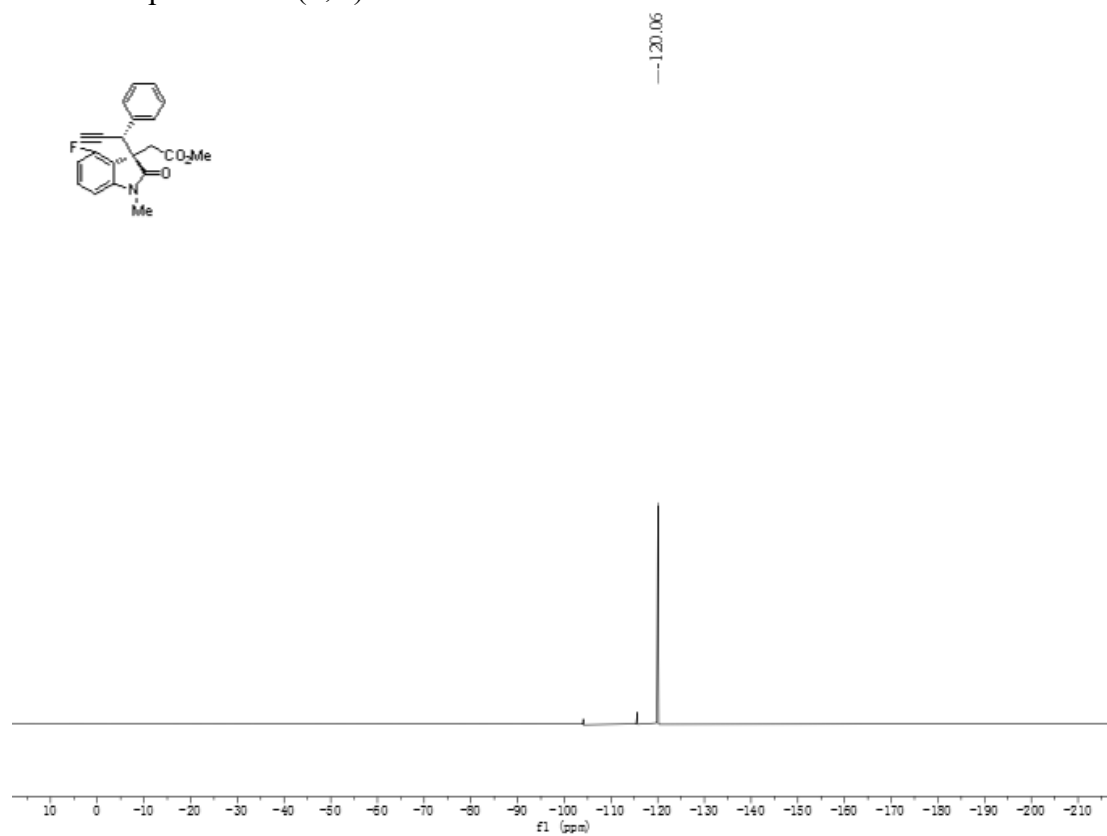
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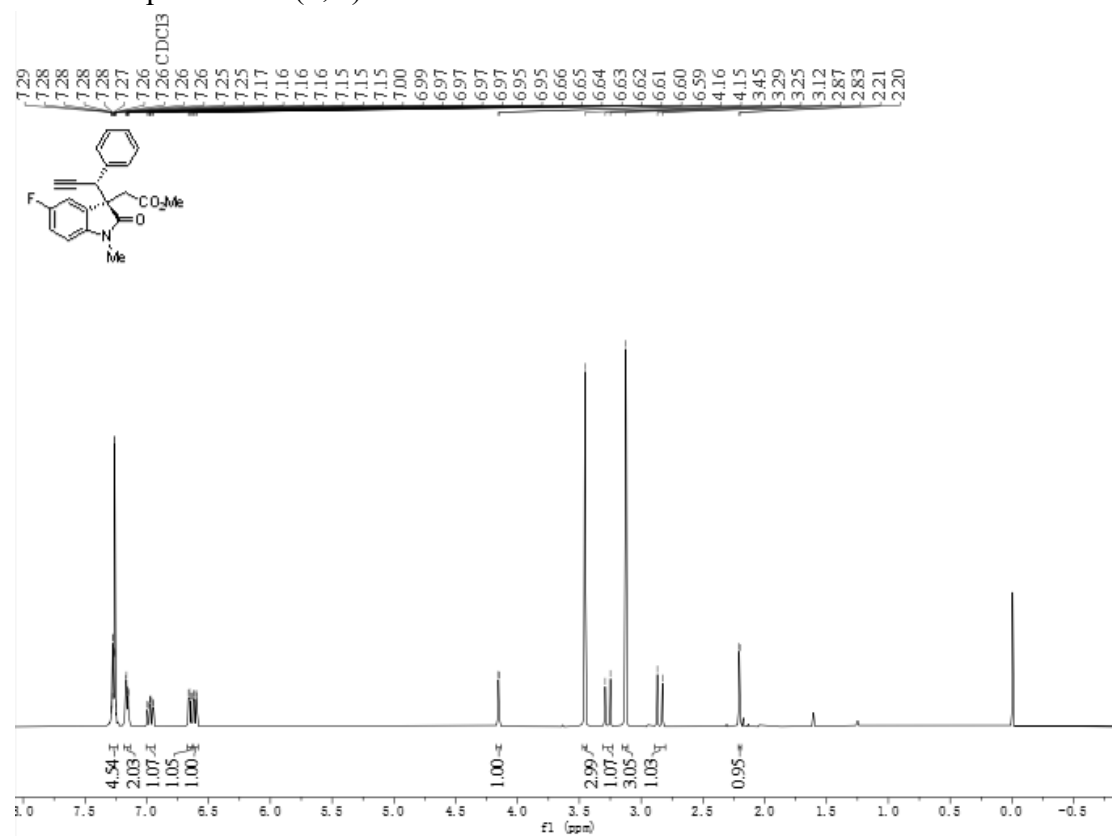
^{13}C NMR spectrum of (*R,R*)-**3ea**



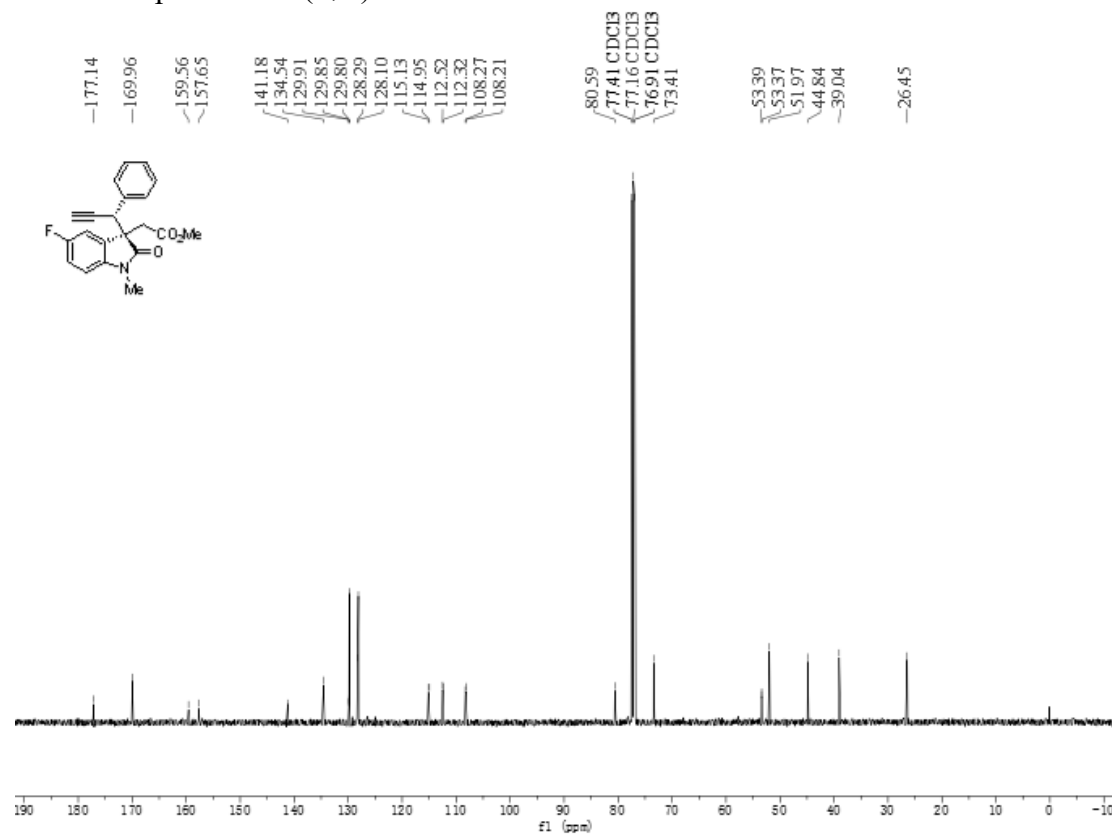
^{19}F NMR spectrum of (*R,R*)-**3ea**



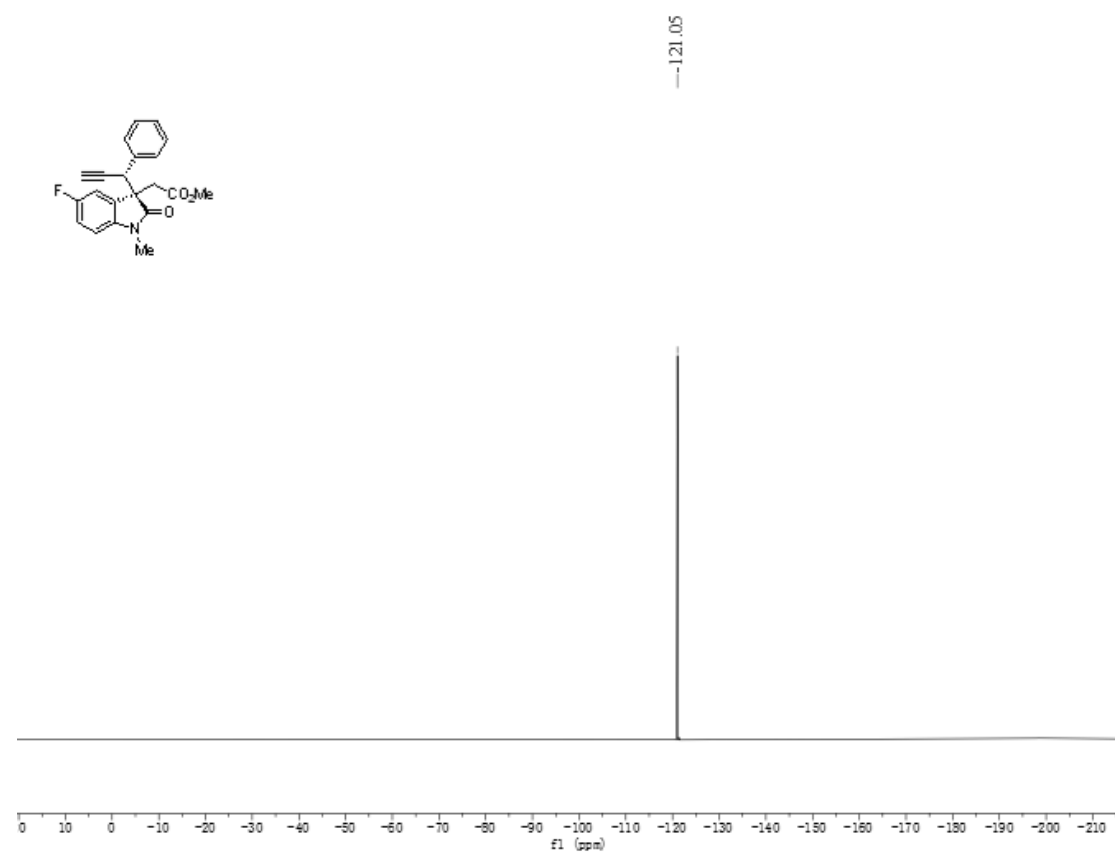
¹H NMR spectrum of (*R,R*)-**3fa**



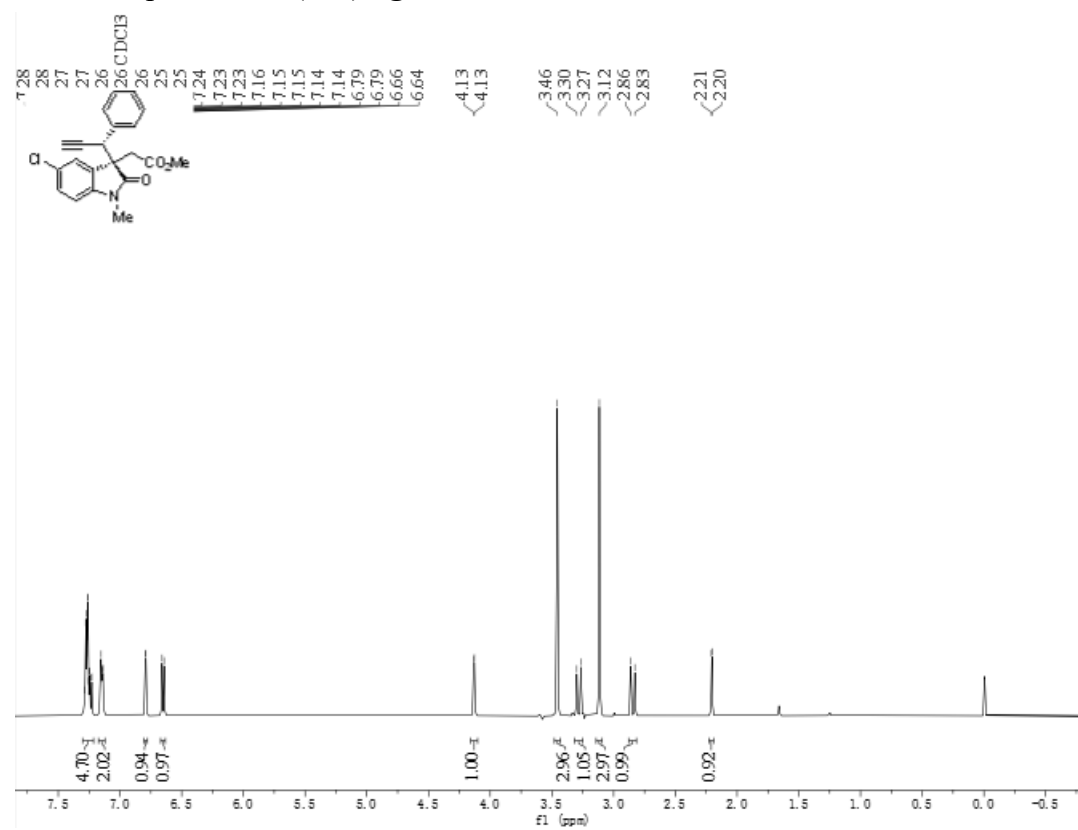
¹³C NMR spectrum of (*R,R*)-**3fa**



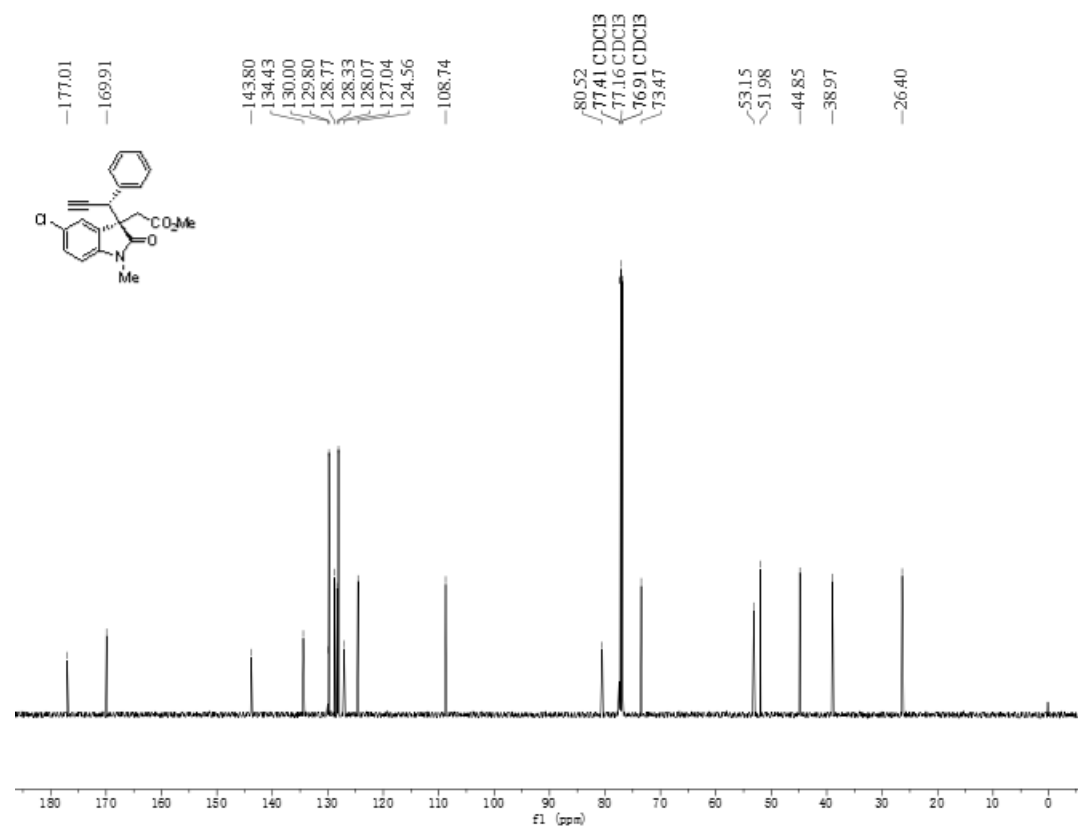
^{19}F NMR spectrum of (*R,R*)-**3fa**



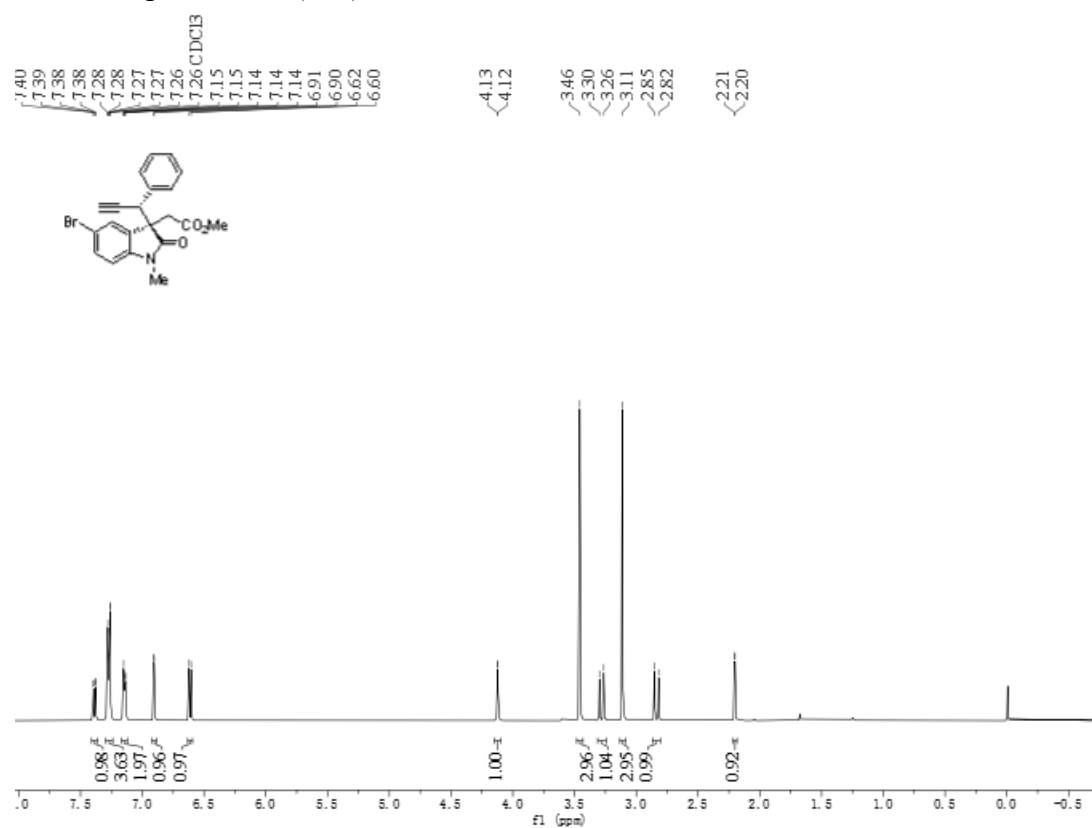
¹H NMR spectrum of (*R,R*)-**3ga**



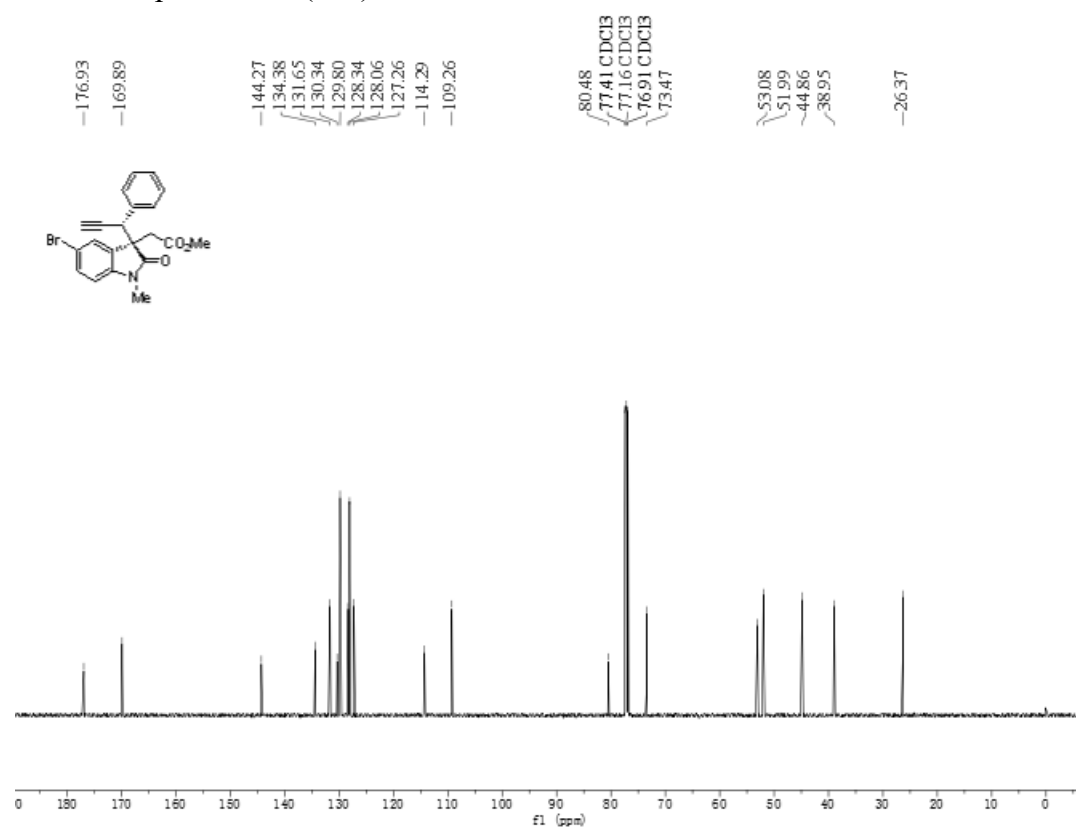
¹³C NMR spectrum of (*R,R*)-**3ga**



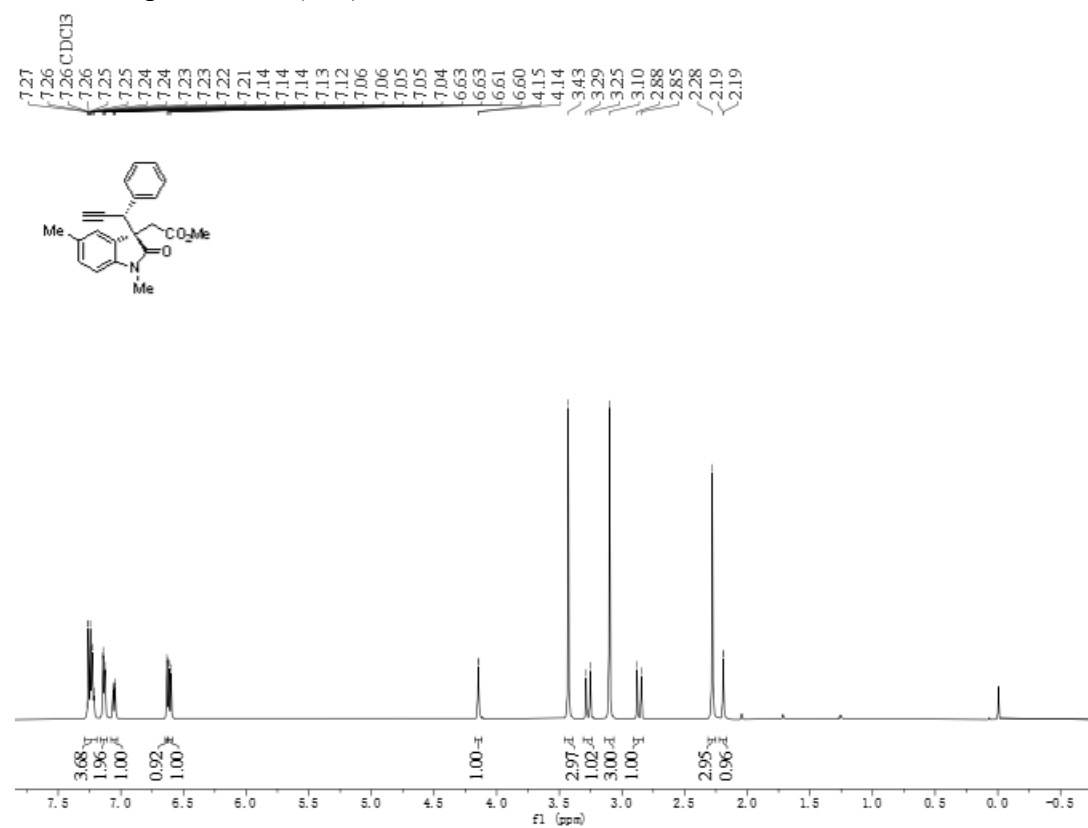
¹H NMR spectrum of (*R,R*)-**3ha**



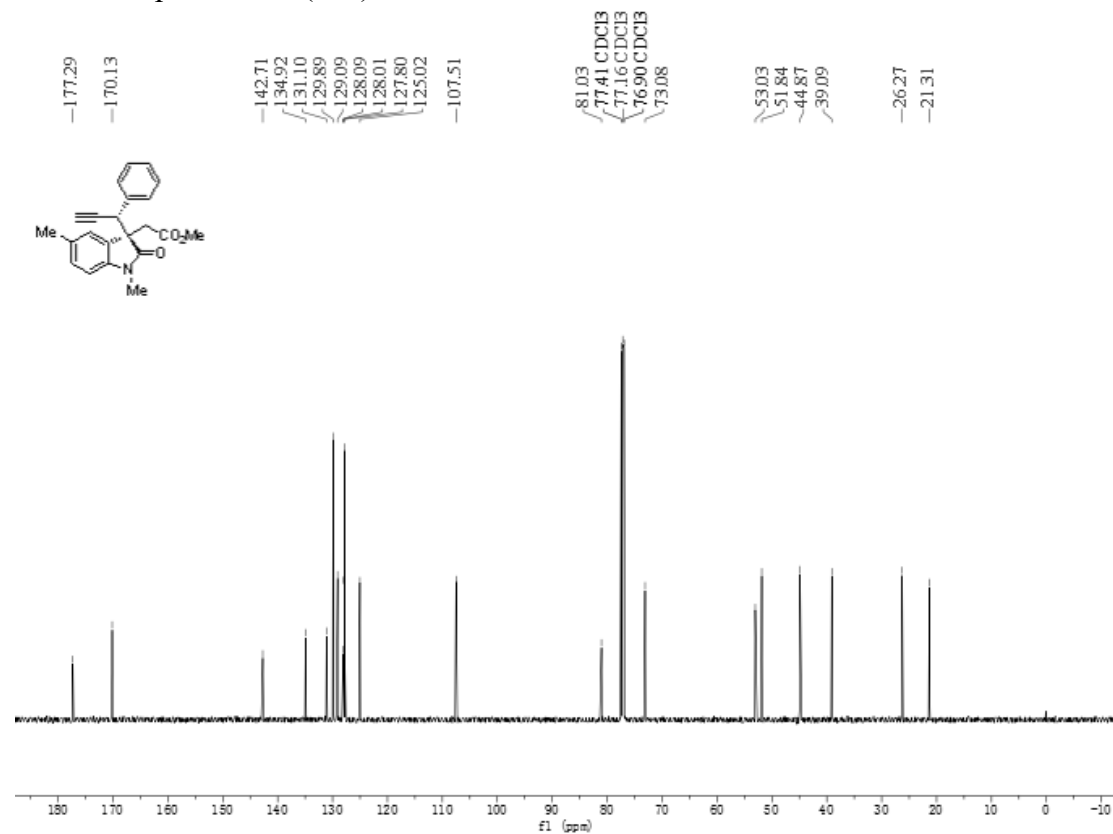
¹³C NMR spectrum of (*R,R*)-**3ha**



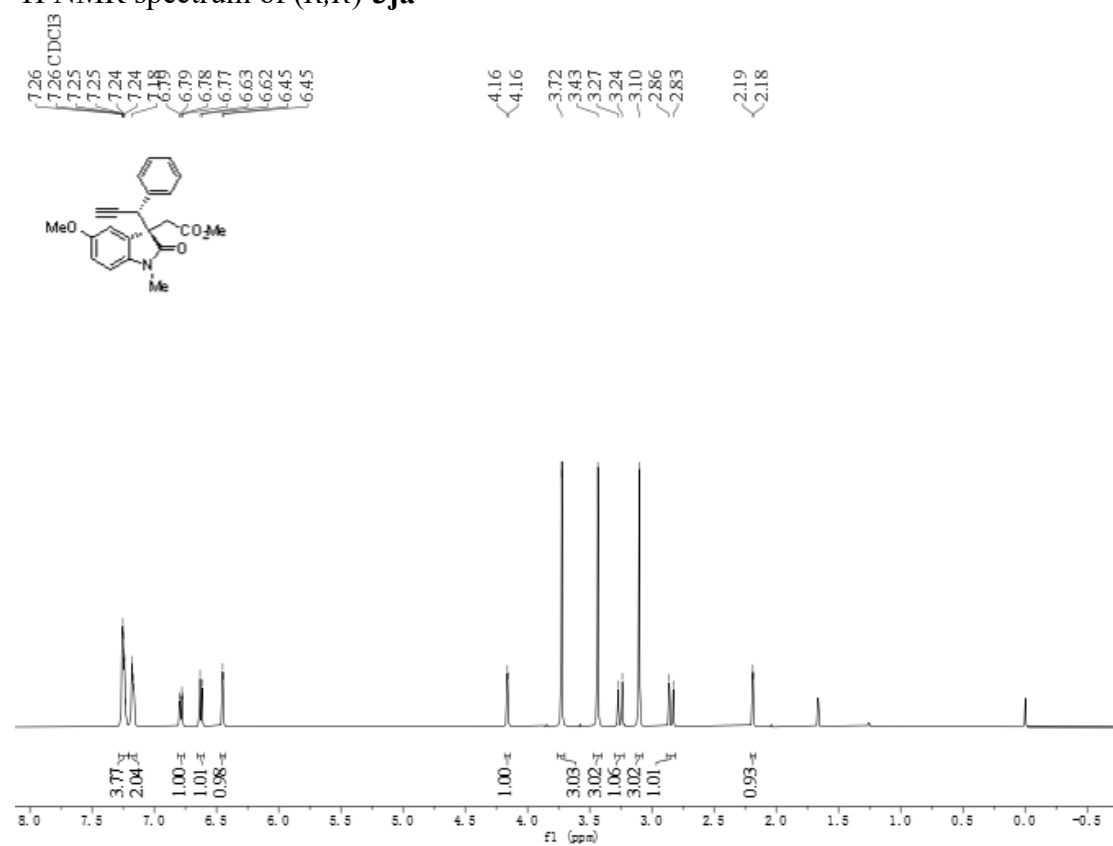
¹H NMR spectrum of (*R,R*)-**3ia**



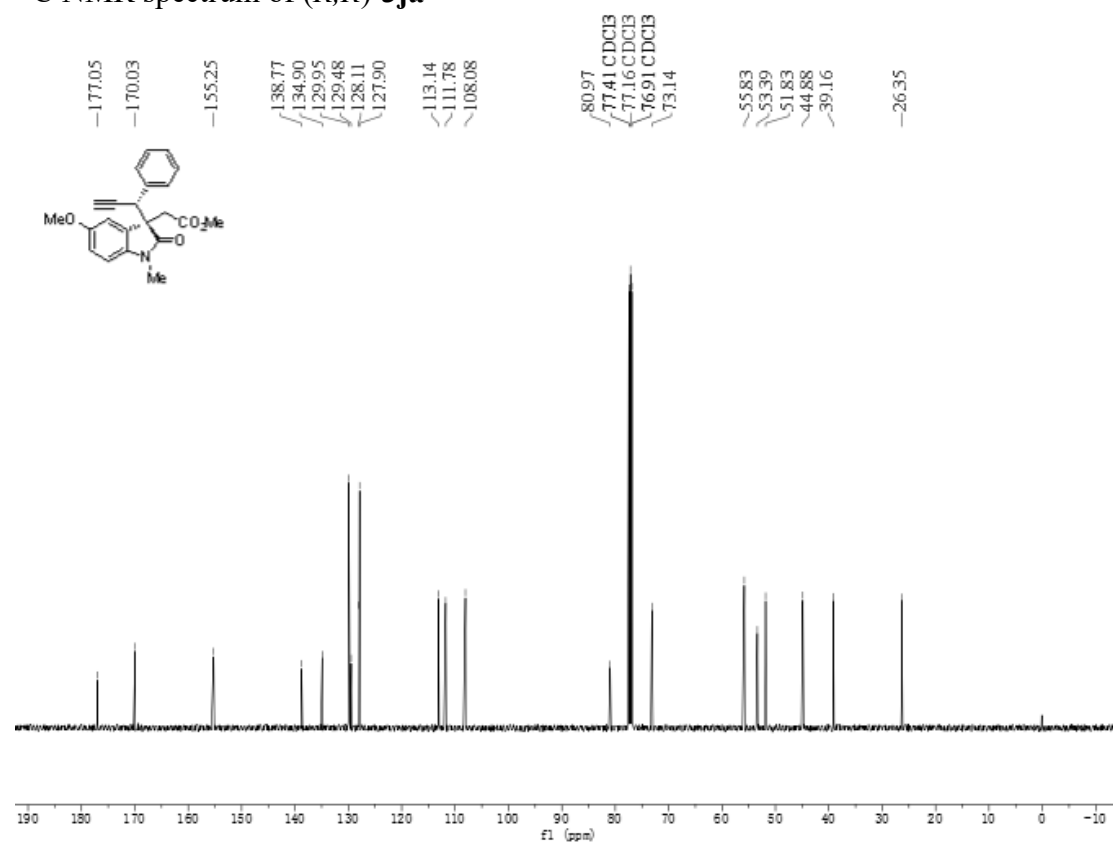
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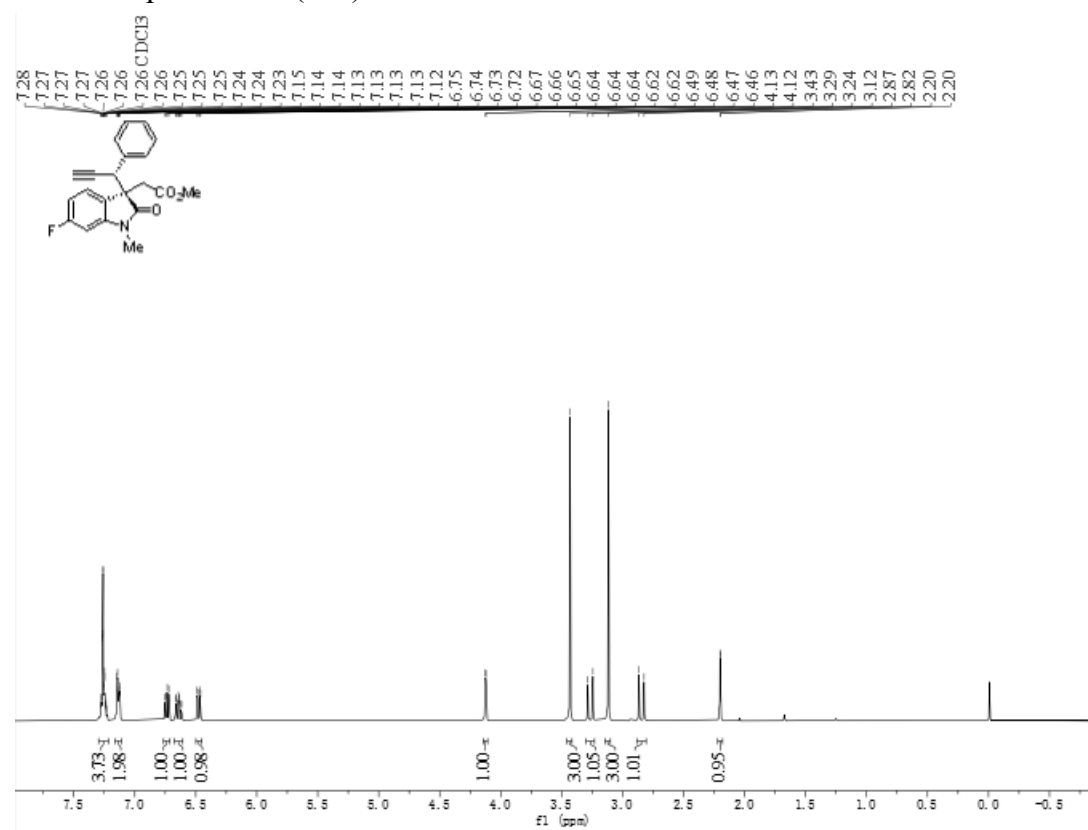
^1H NMR spectrum of (*R,R*)-**3ja**



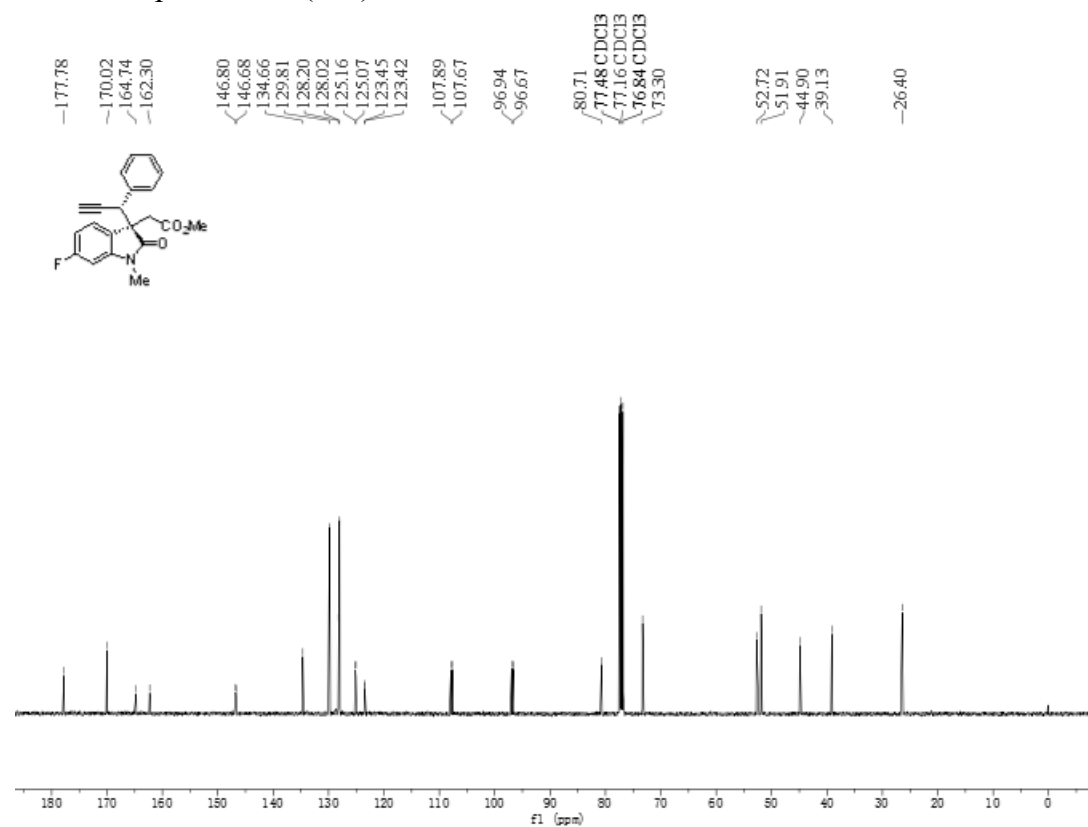
^{13}C NMR spectrum of (*R,R*)-**3ja**



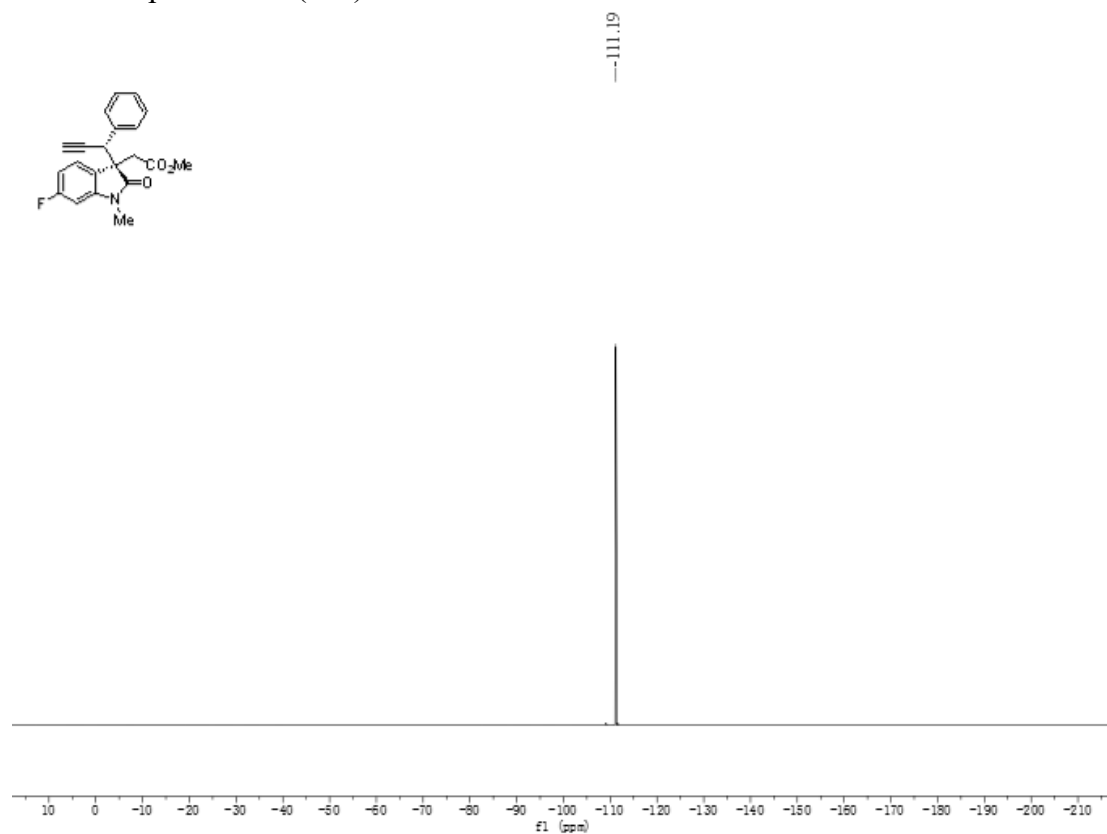
¹H NMR spectrum of (*R,R*)-**3ka**



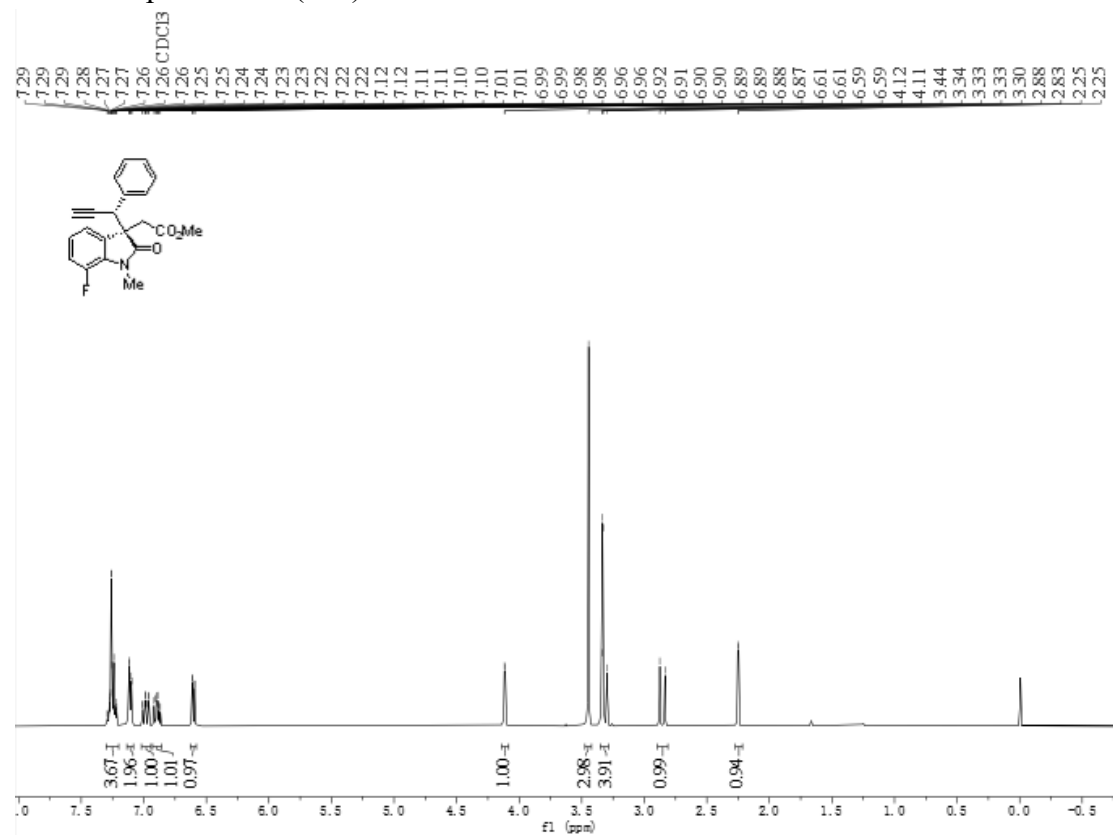
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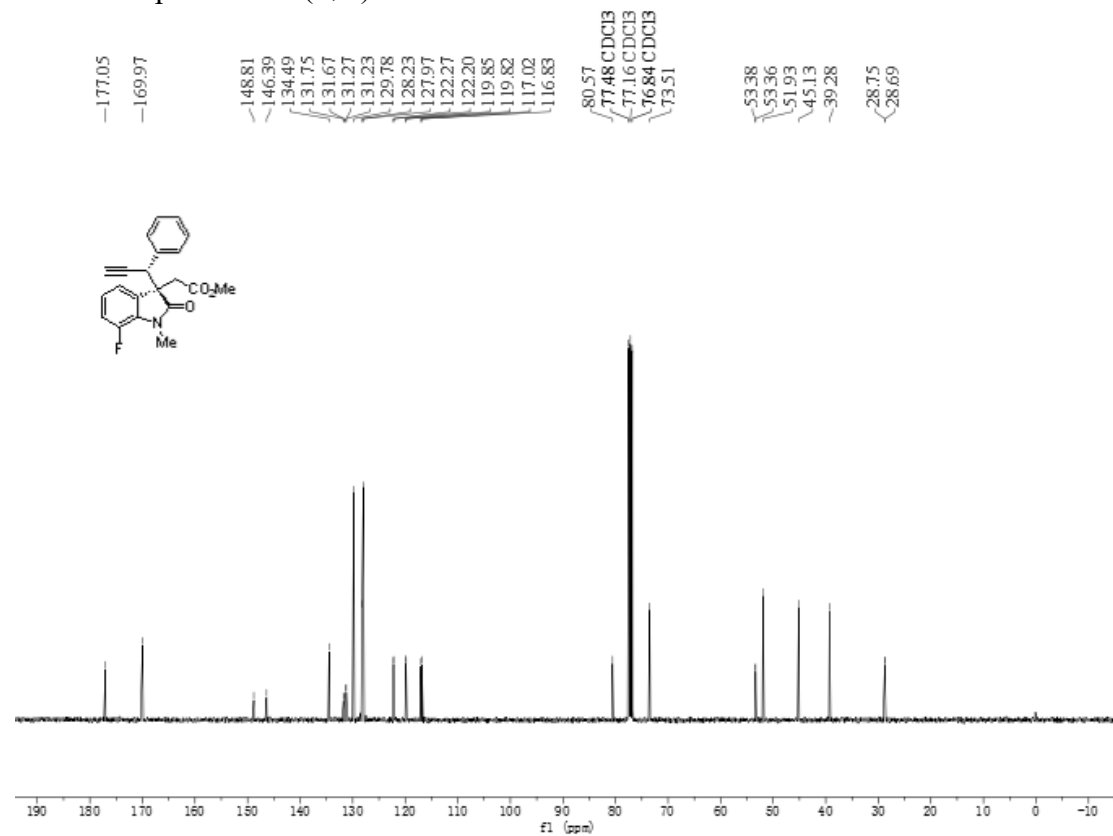
^{19}F NMR spectrum of (*R,R*)-**3ka**



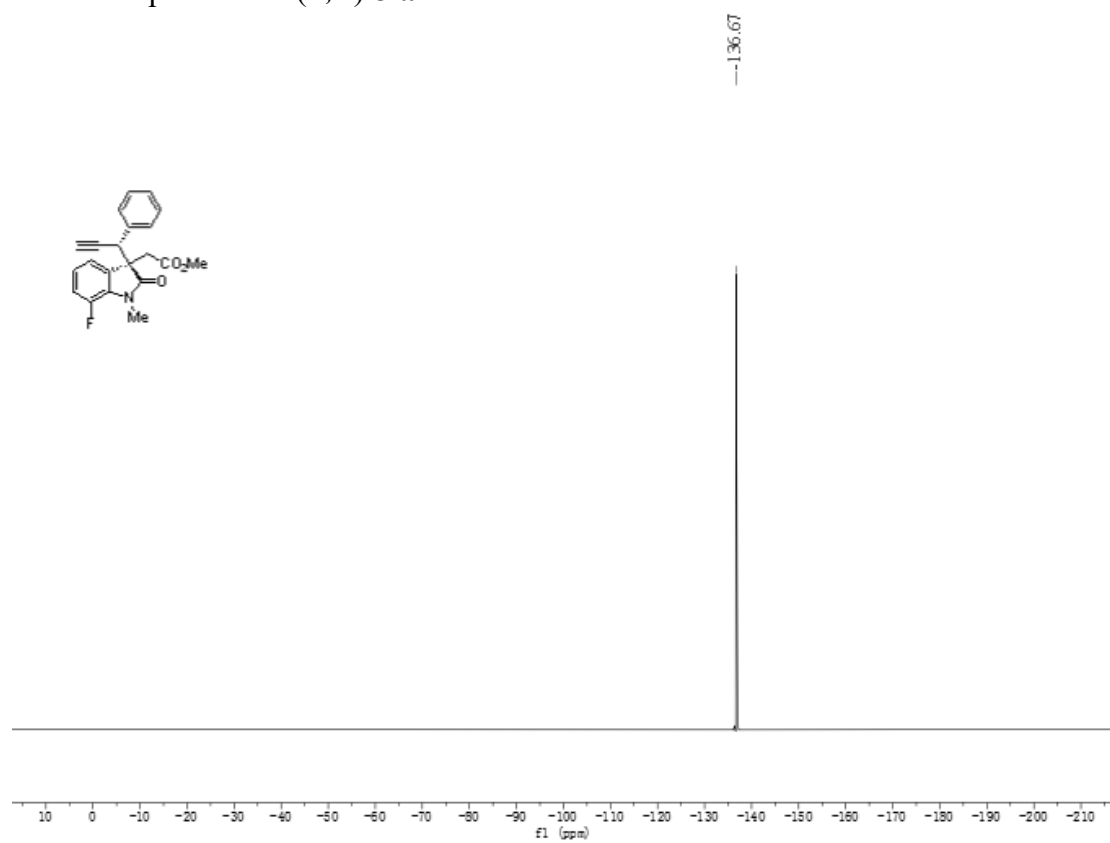
^1H NMR spectrum of (*R,R*)-**3la**



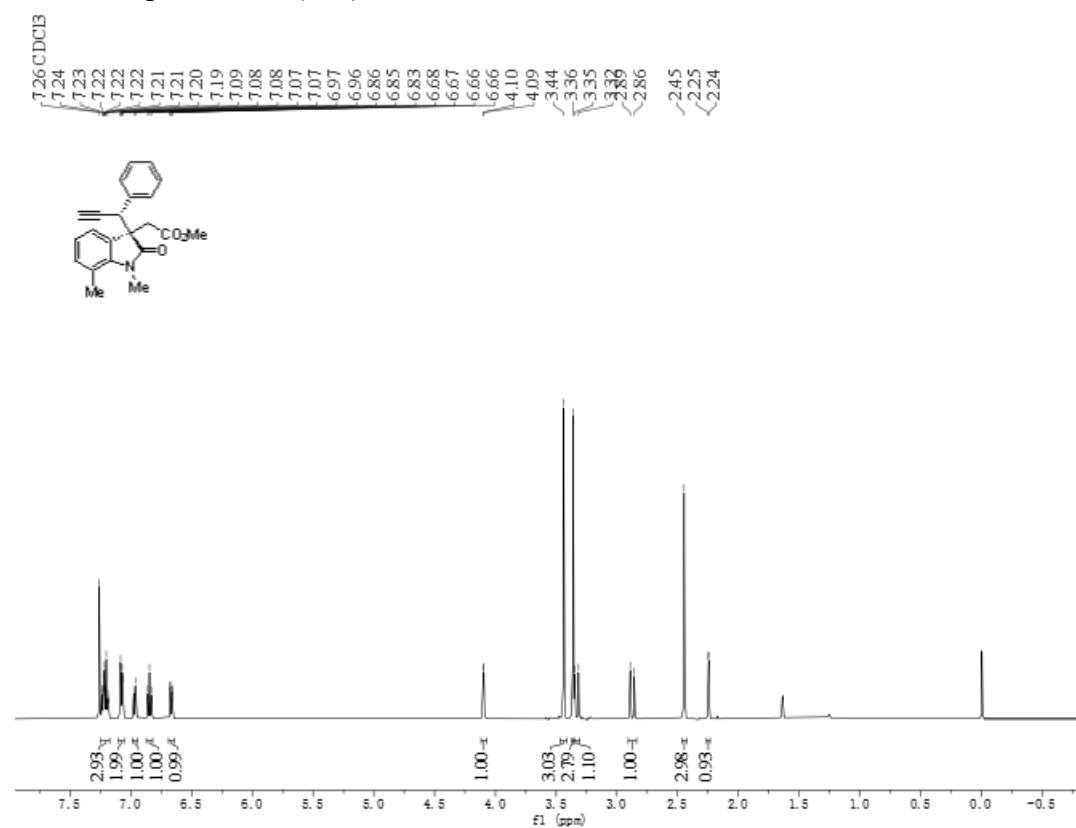
^{13}C NMR spectrum of (*R,R*)-**3la**



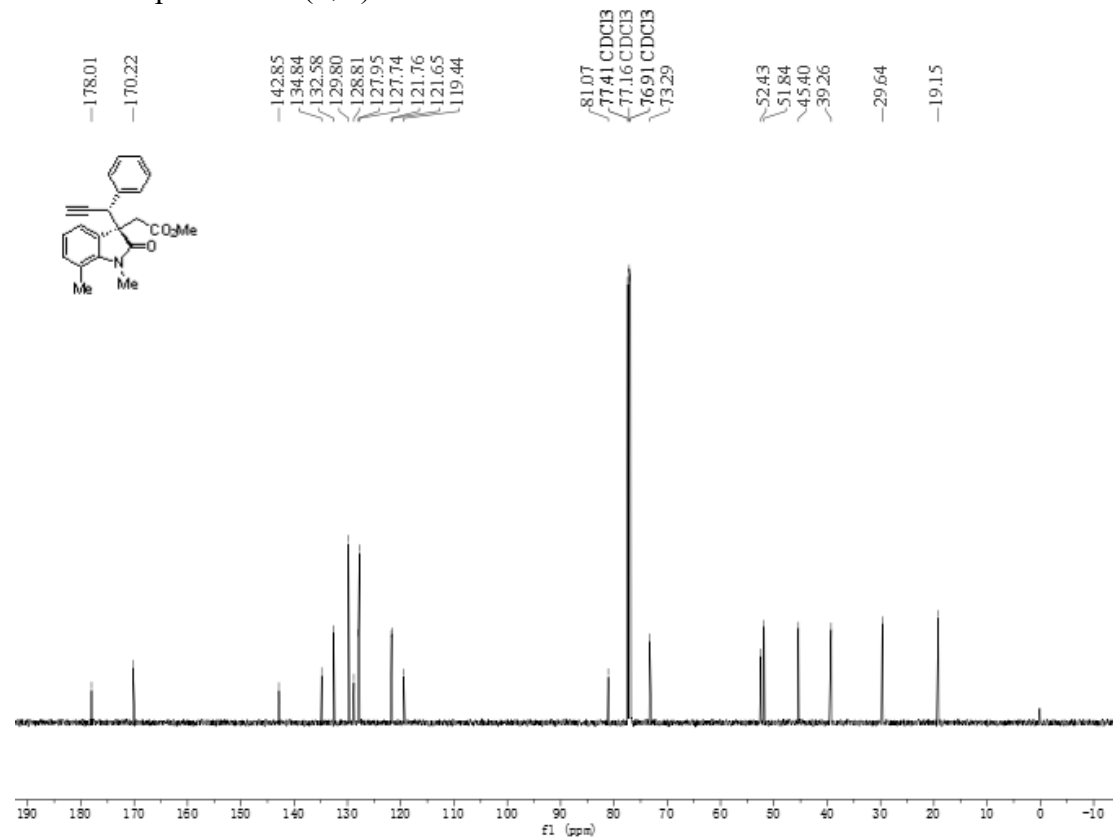
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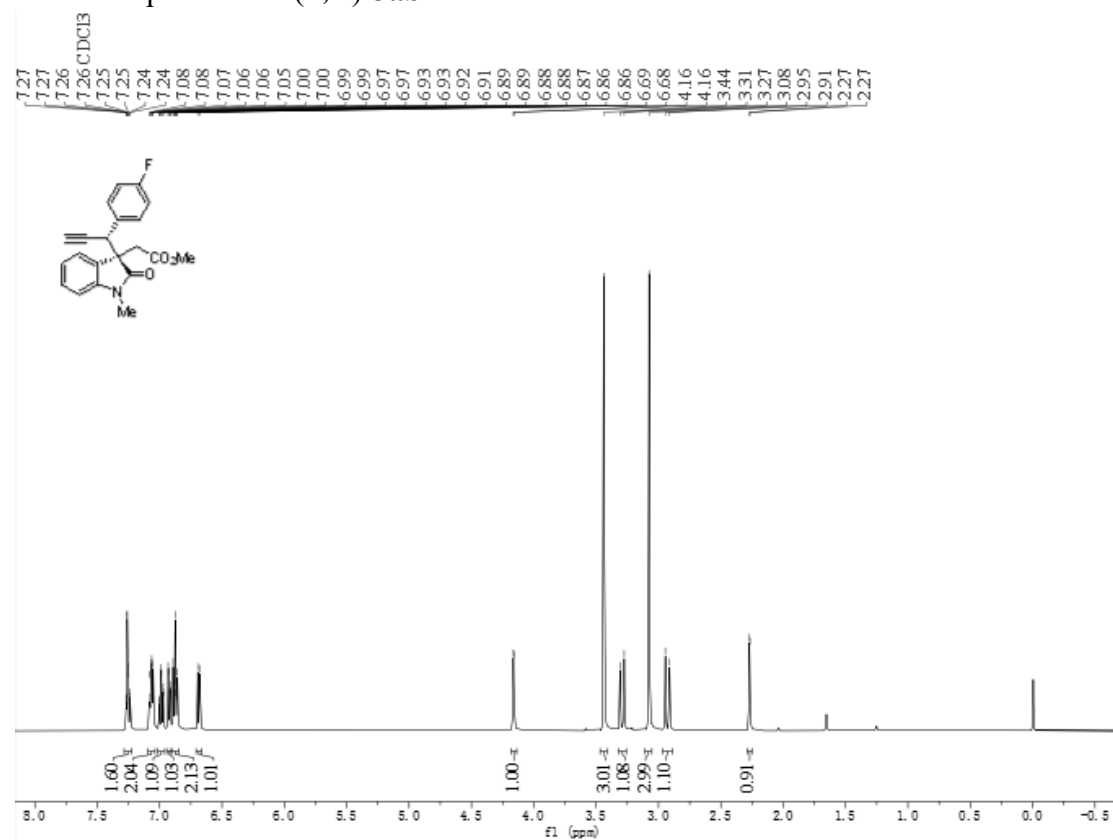
^1H NMR spectrum of (*R,R*)-**3ma**



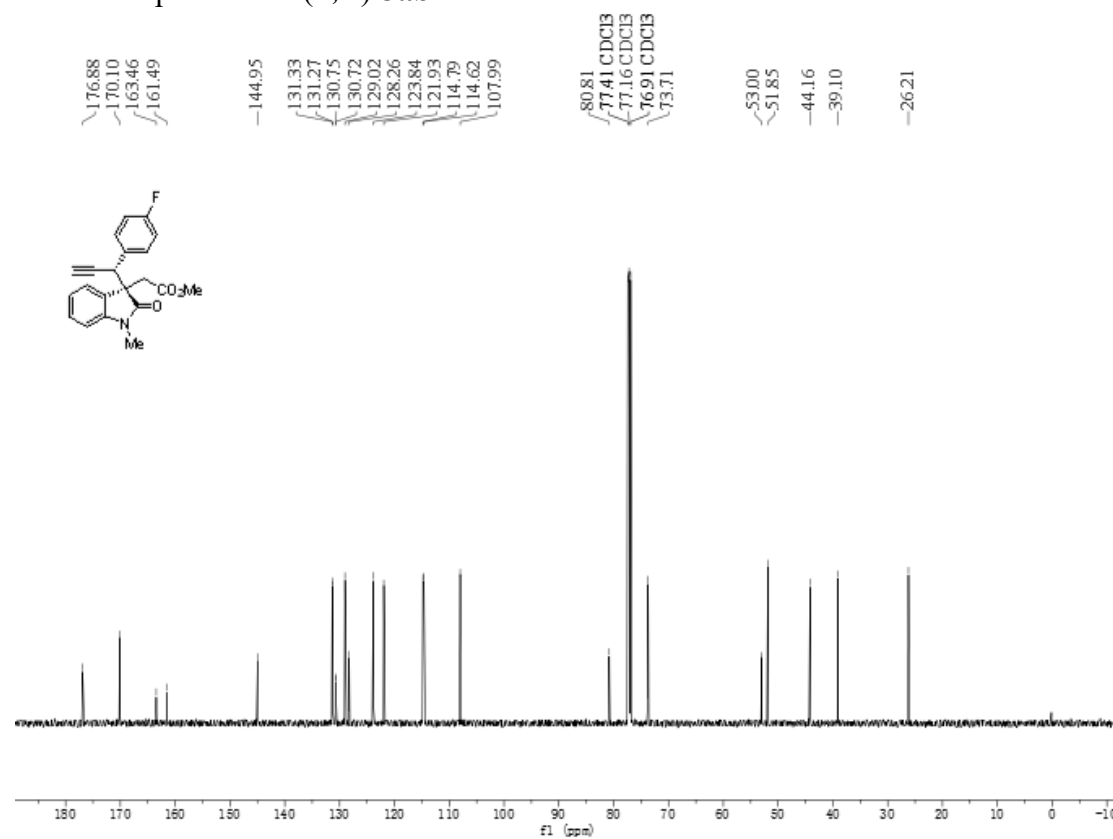
^{13}C NMR spectrum of (*R,R*)-**3ma**



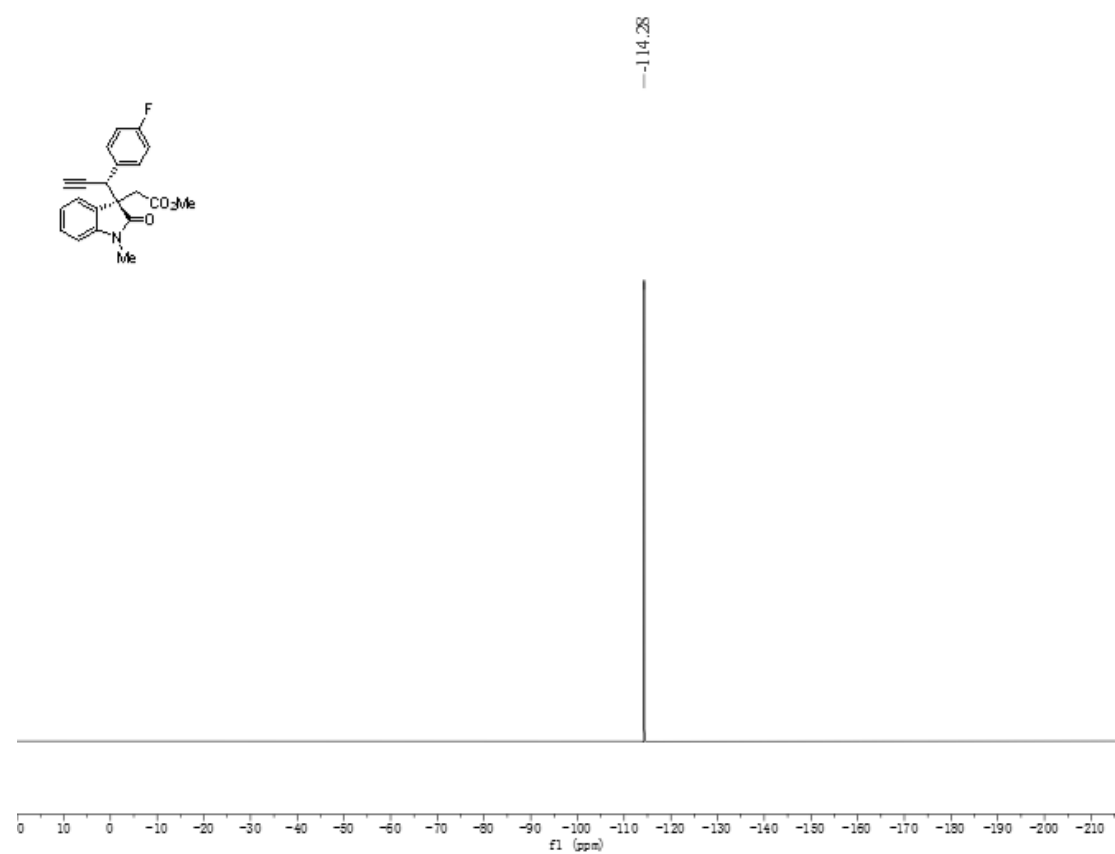
^1H NMR spectrum of (*R,R*)-**3ab**



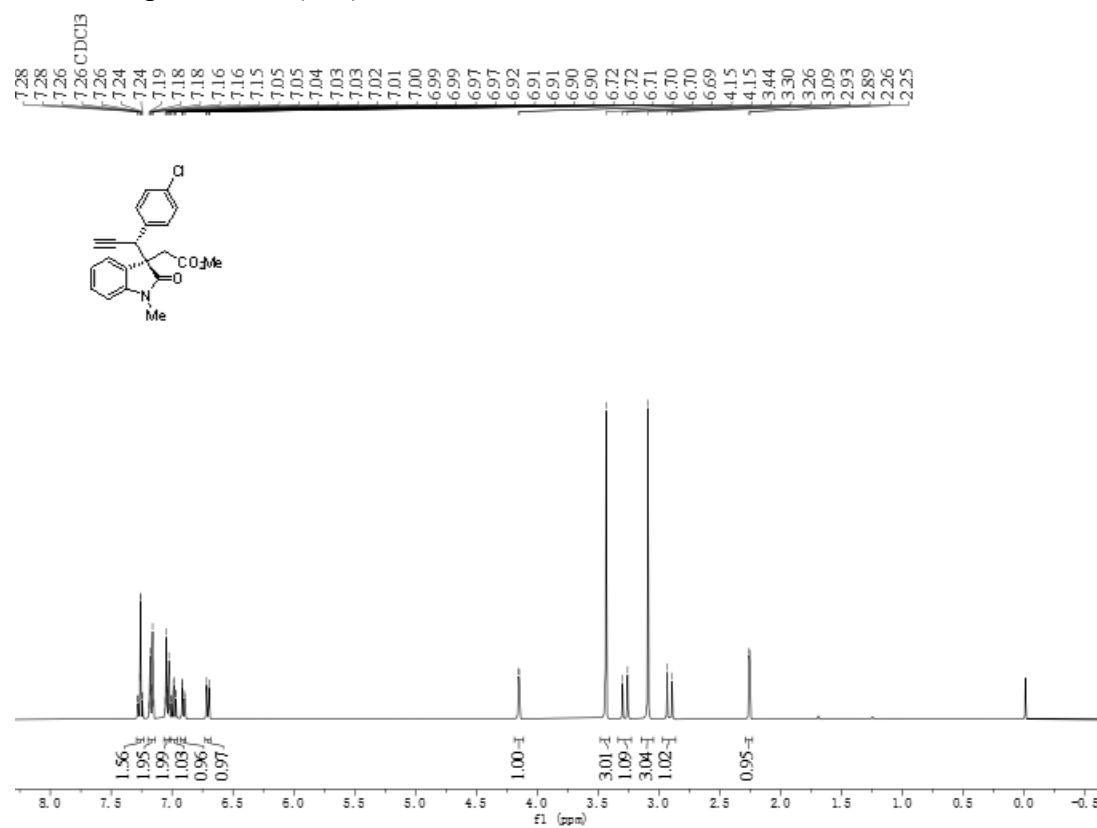
^{13}C NMR spectrum of (*R,R*)-**3ab**



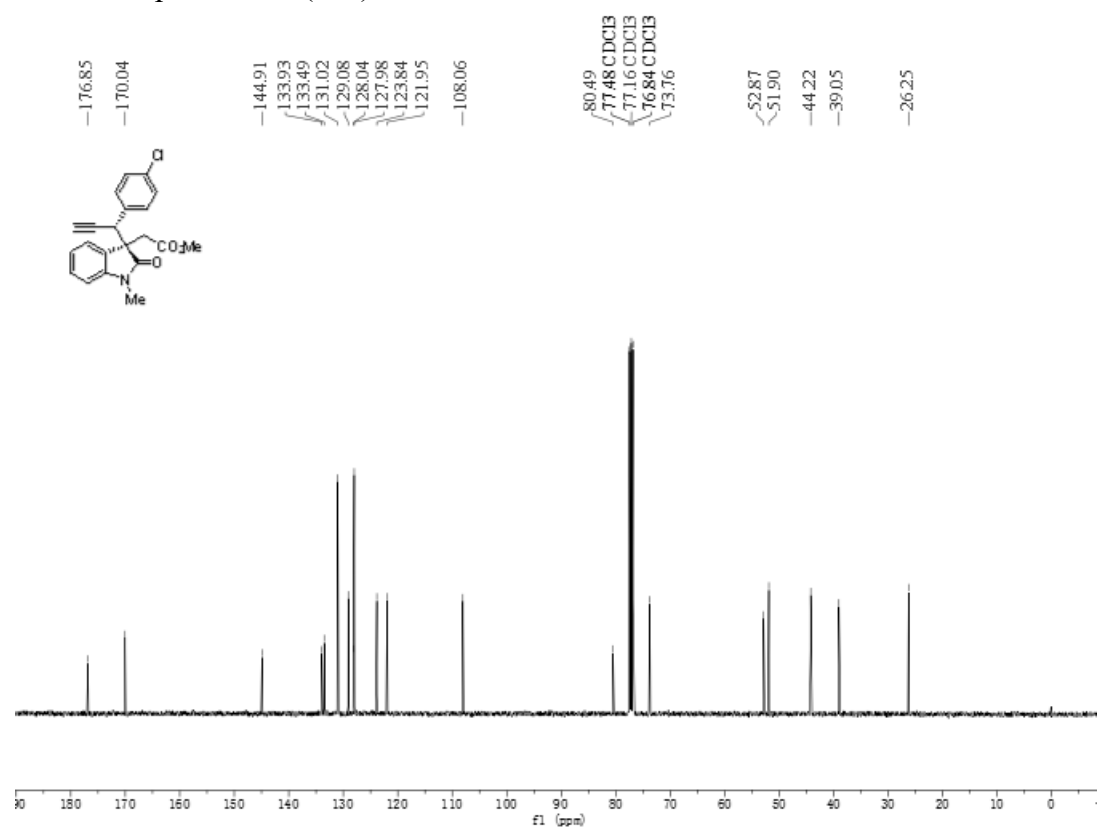
^{19}F NMR spectrum of (*R,R*)-**3ab**



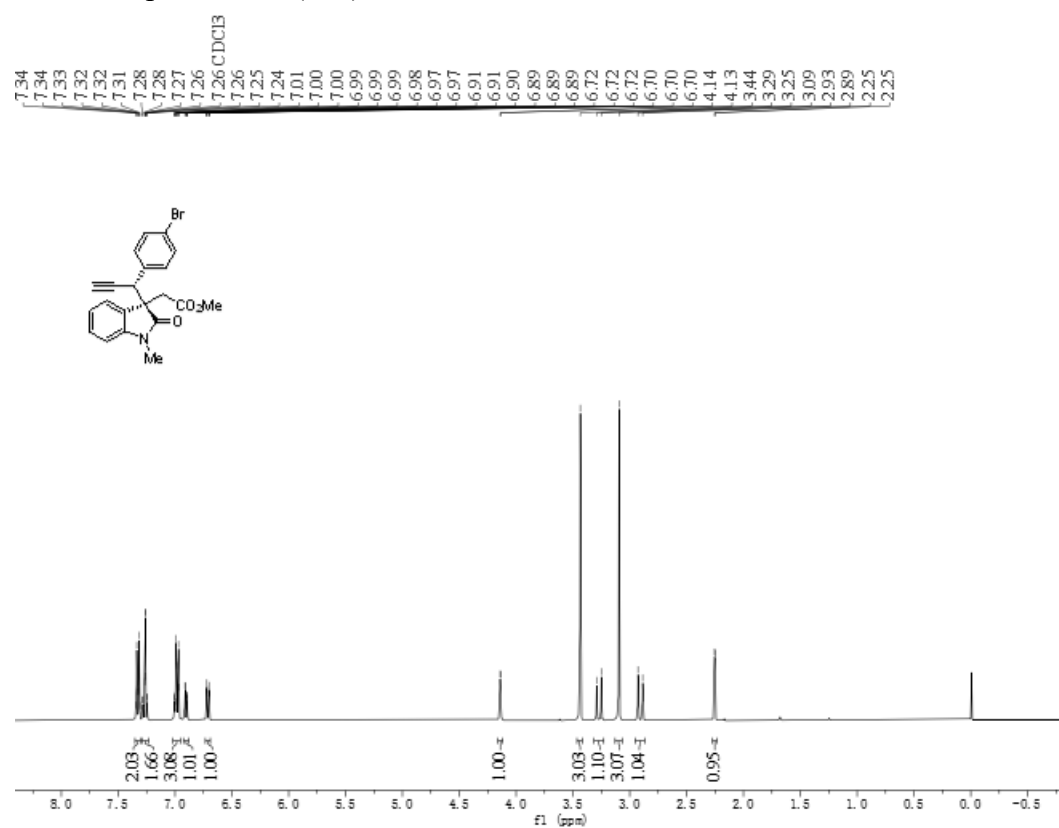
^1H NMR spectrum of (*R,R*)-**3ac**



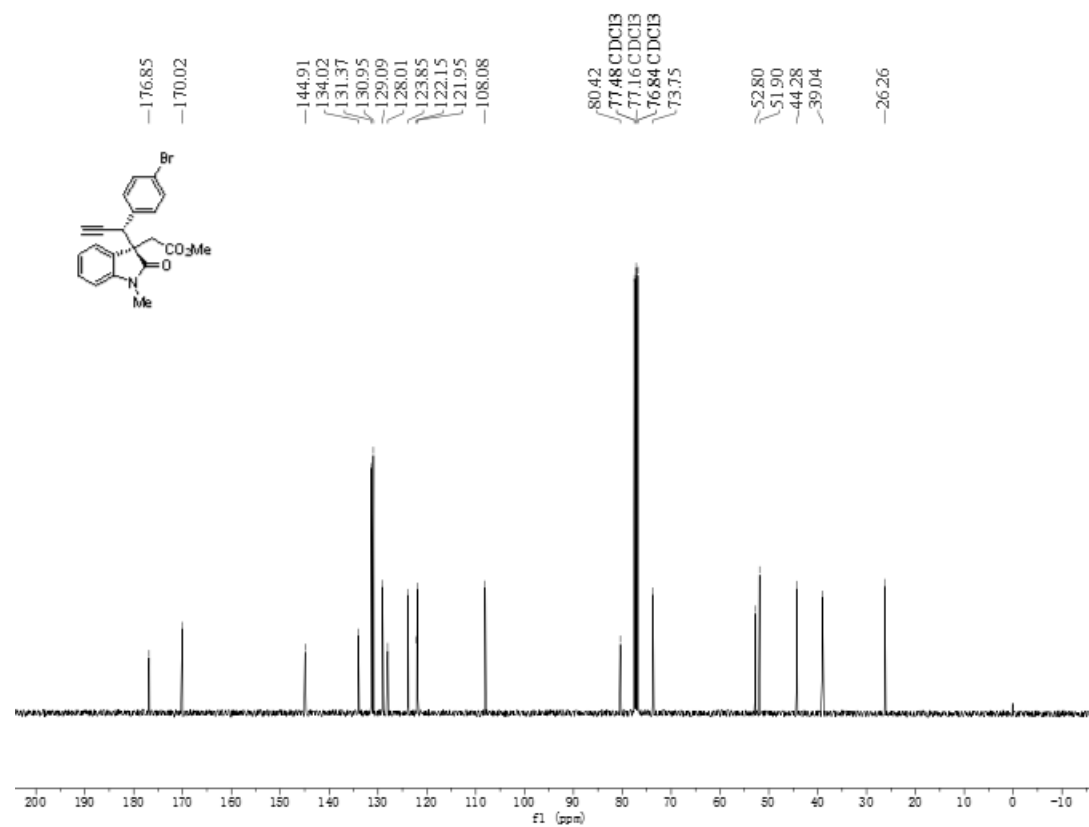
^{13}C NMR spectrum of (*R,R*)-**3ac**



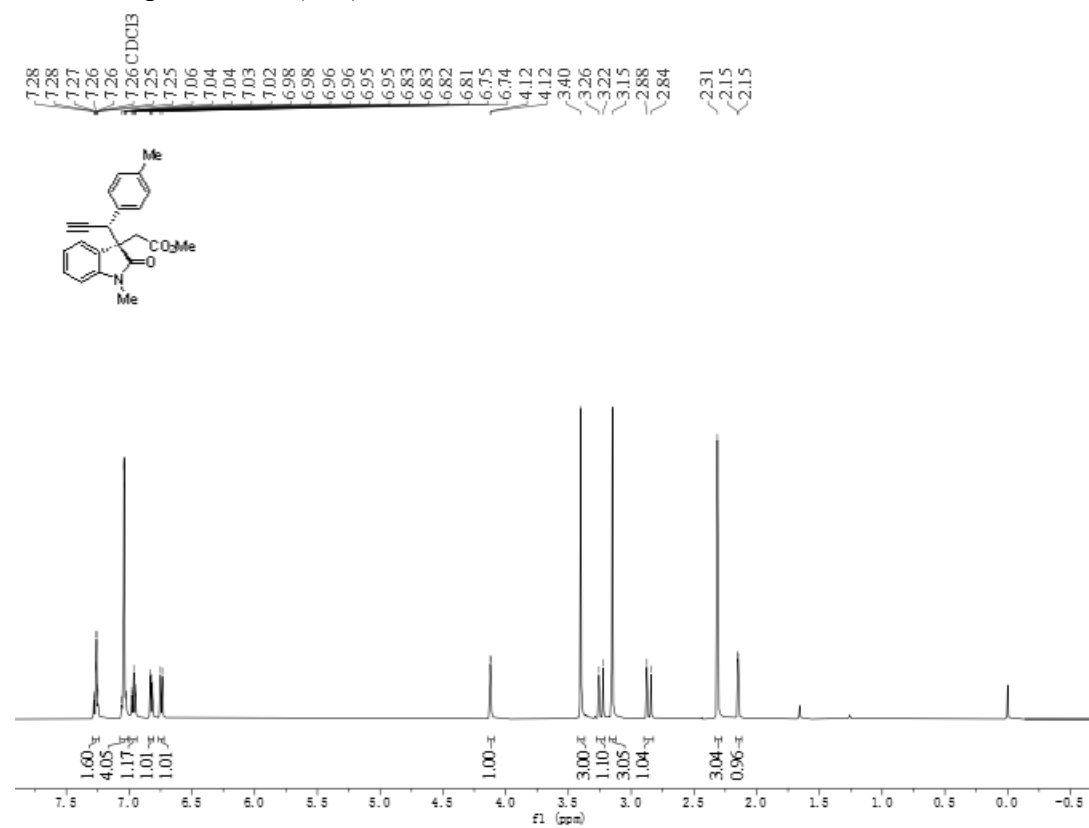
^1H NMR spectrum of (*R,R*)-**3ad**



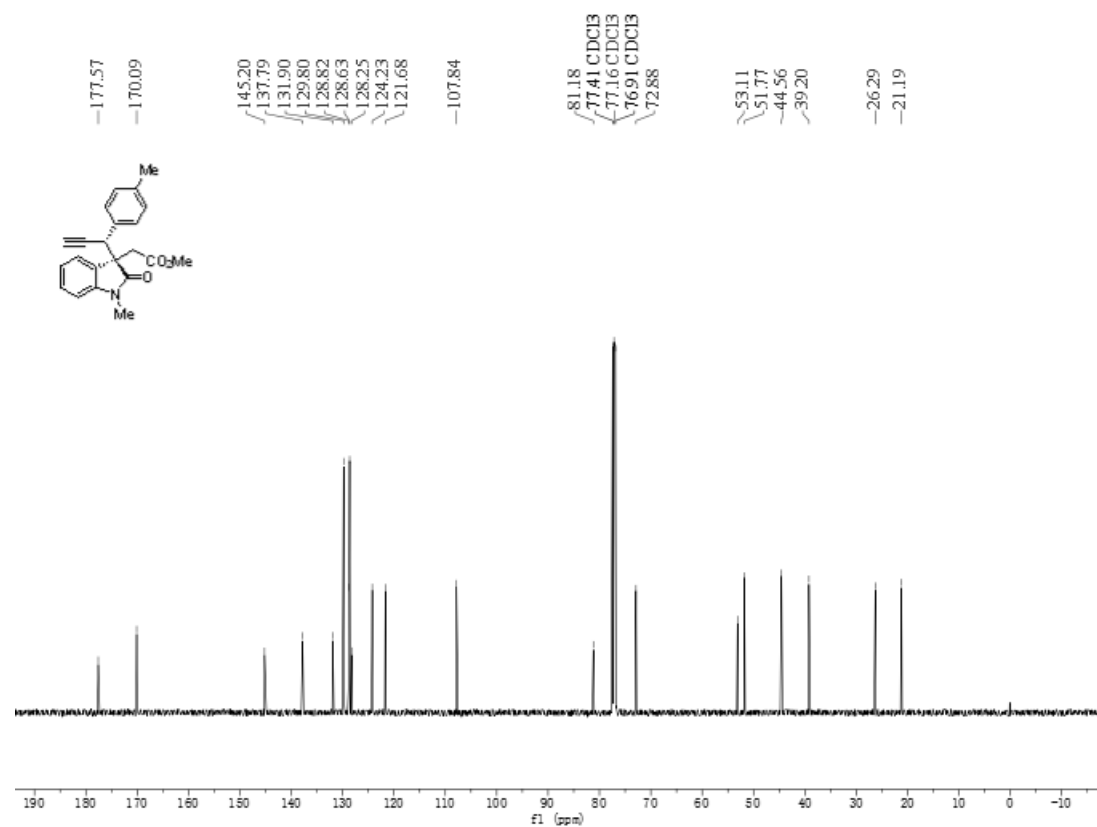
^{13}C NMR spectrum of (*R,R*)-**3ad**



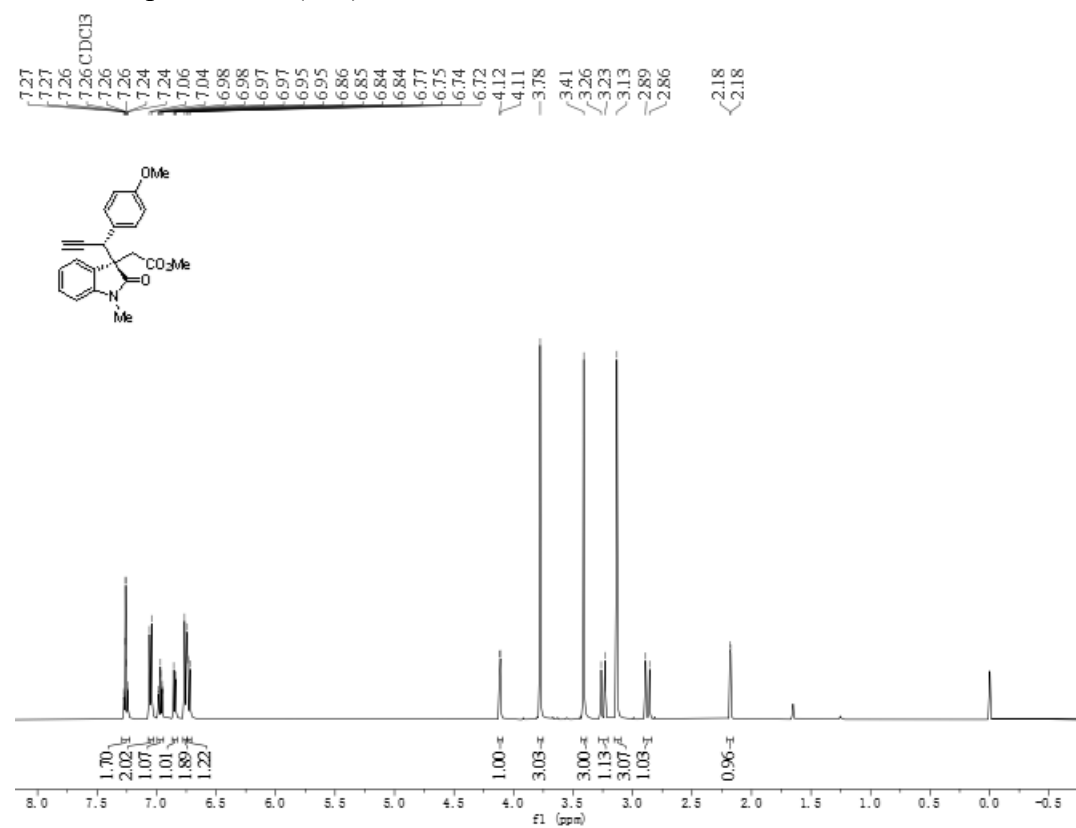
^1H NMR spectrum of (*R,R*)-**3ae**



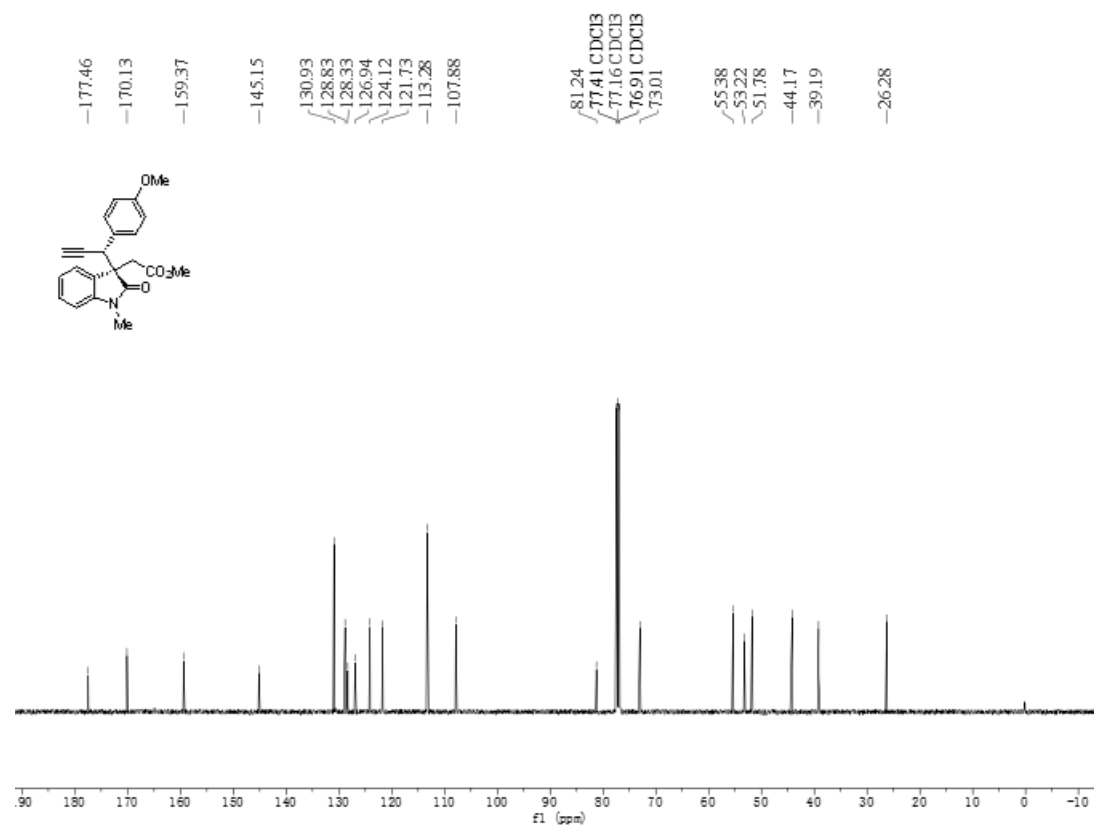
^{13}C NMR spectrum of (*R,R*)-**3ae**



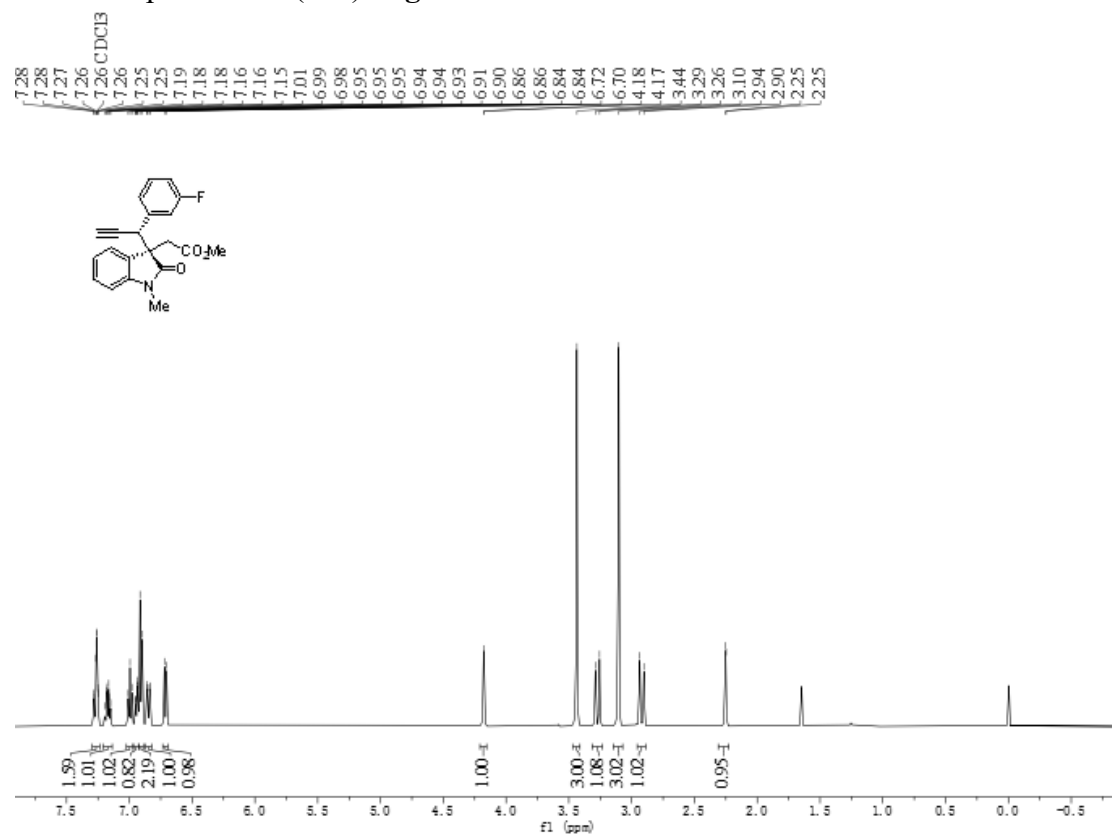
¹H NMR spectrum of (*R,R*)-**3af**



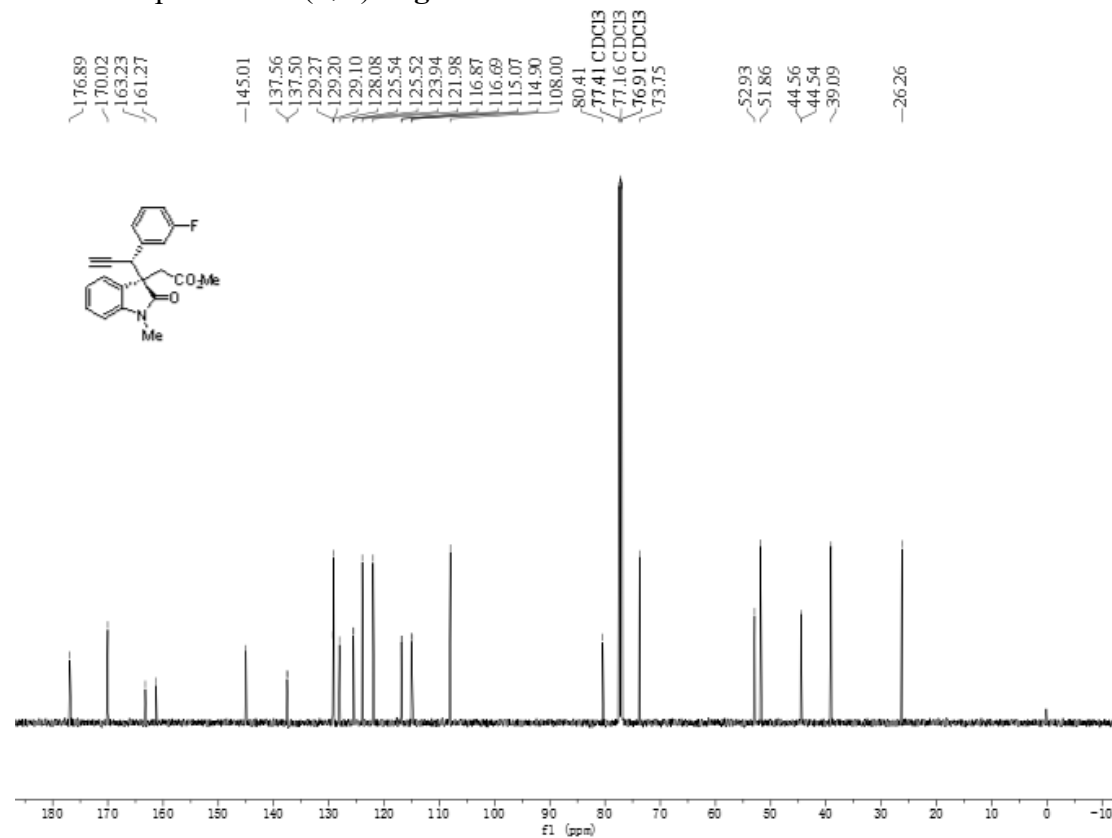
¹³C NMR spectrum of (*R,R*)-**3af**



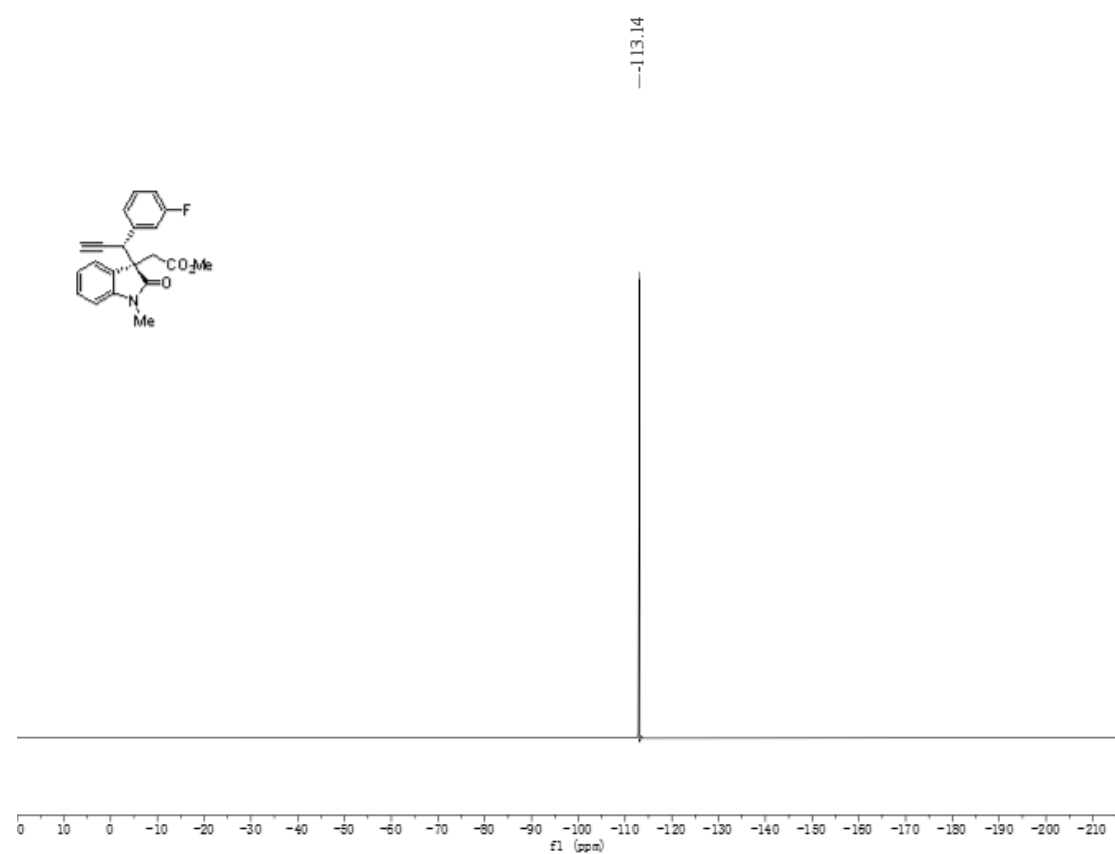
^1H NMR spectrum of (*R,R*)-**3ag**



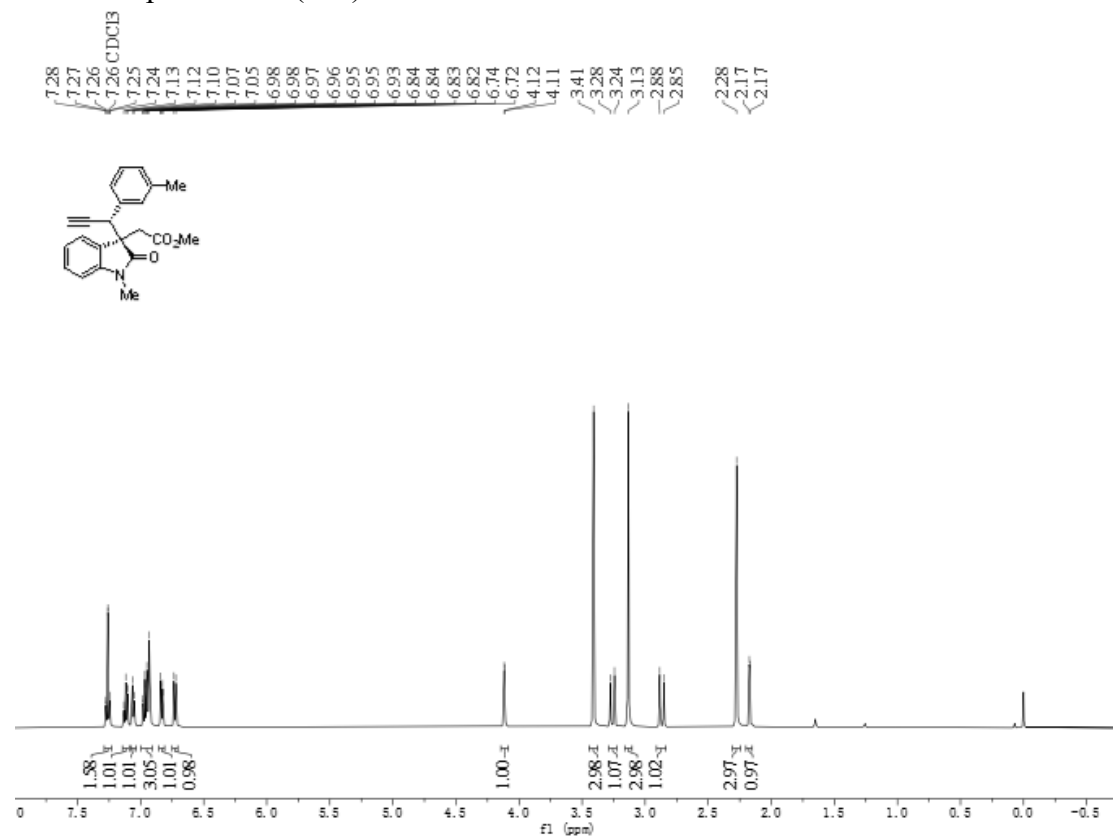
^{13}C NMR spectrum of (*R,R*)-**3ag**



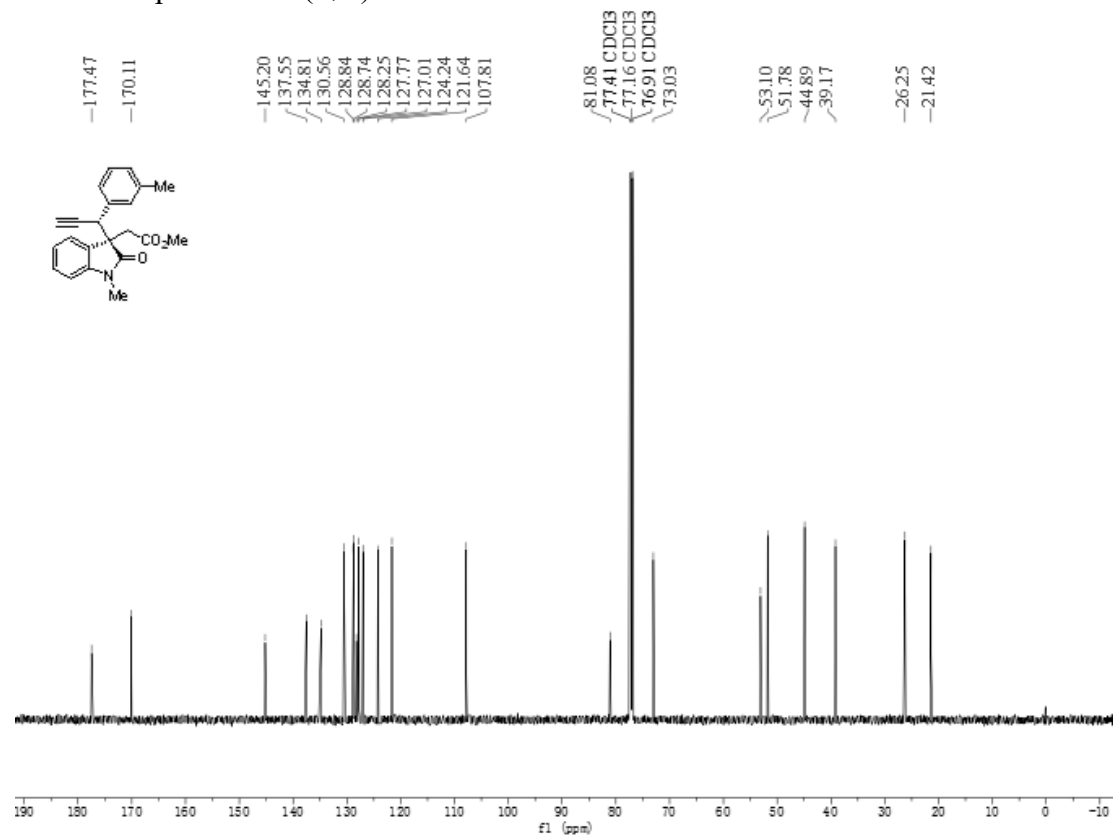
^{19}F NMR spectrum of (*R,R*)-**3ag**



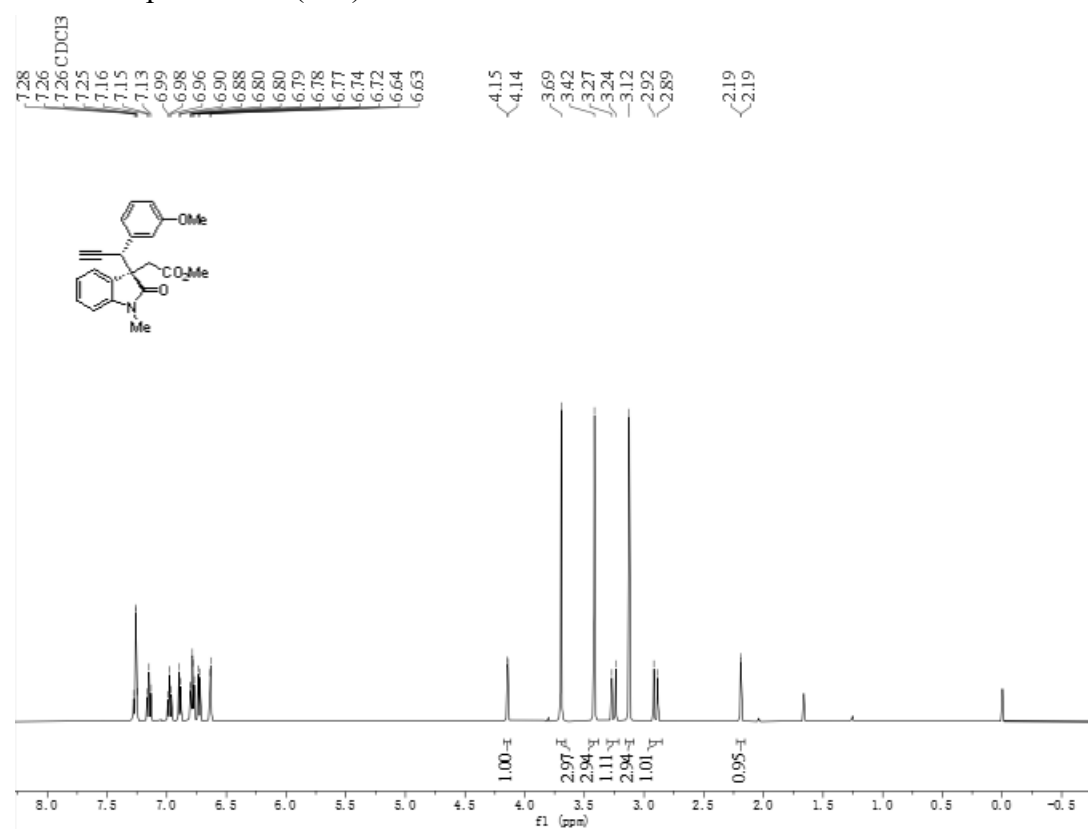
^1H NMR spectrum of (*R,R*)-**3ah**



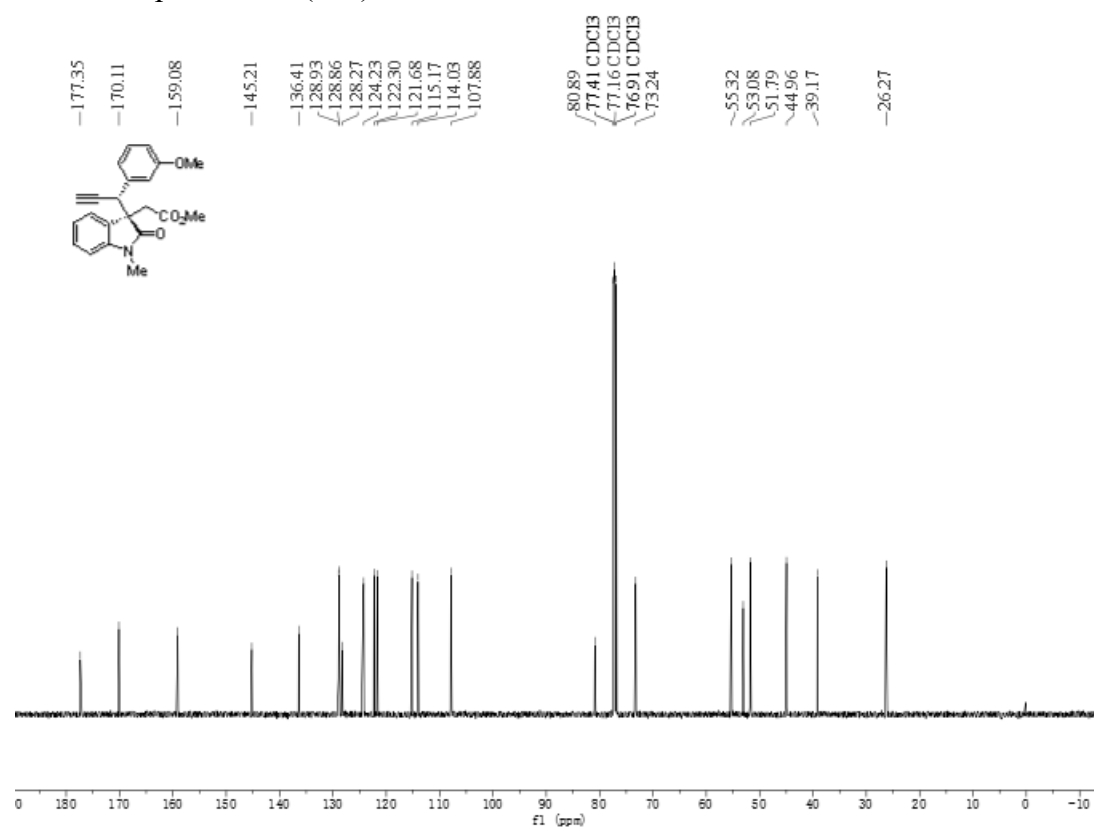
^{13}C NMR spectrum of (*R,R*)-**3ah**



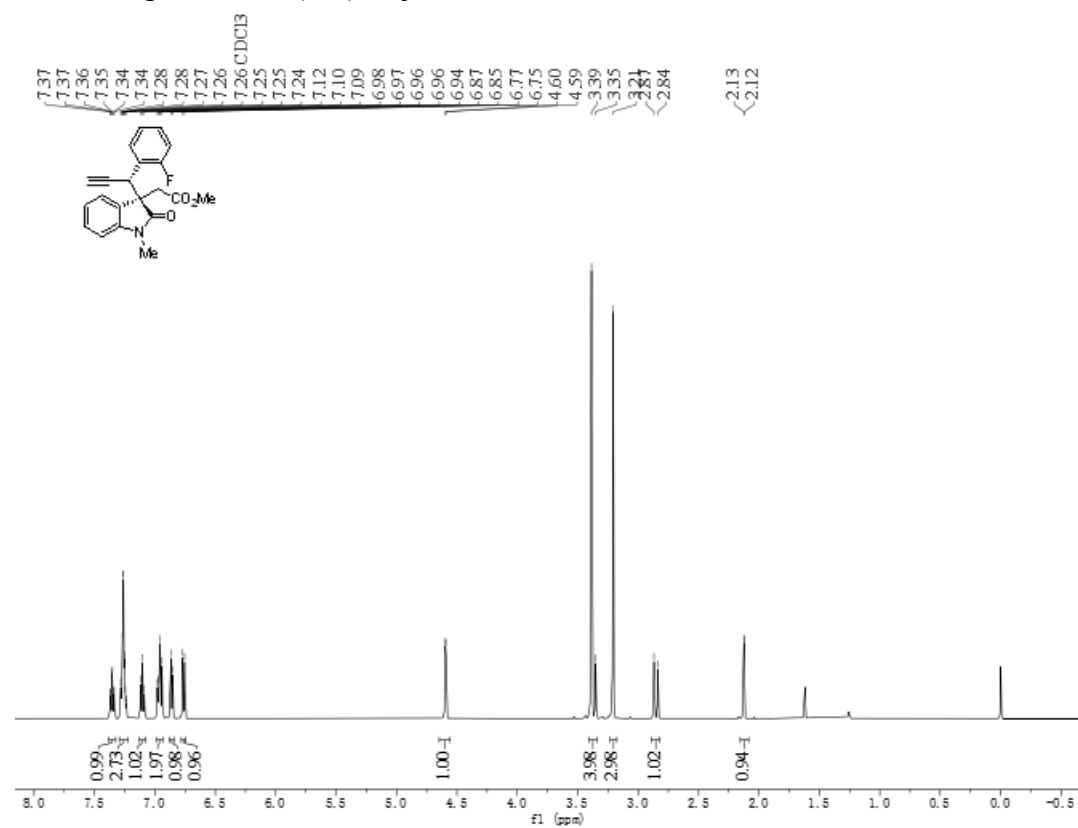
^1H NMR spectrum of (*R,R*)-**3ai**



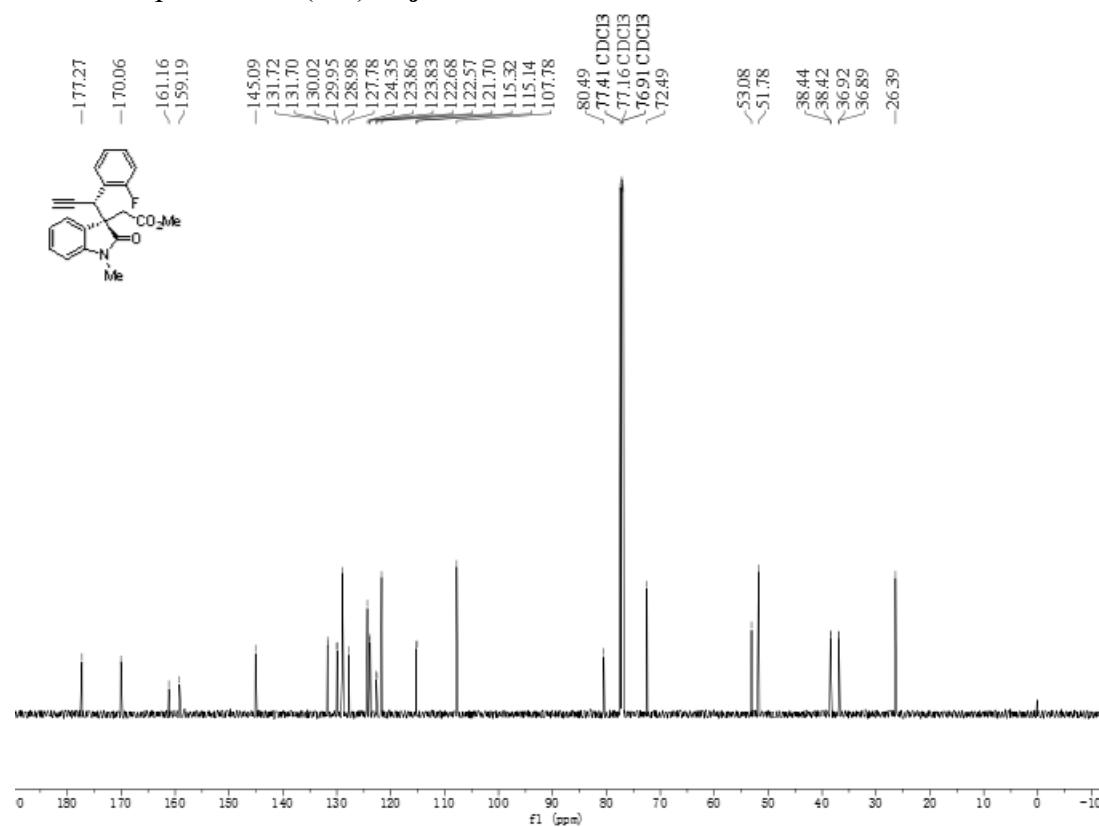
^{13}C NMR spectrum of (*R,R*)-**3ai**



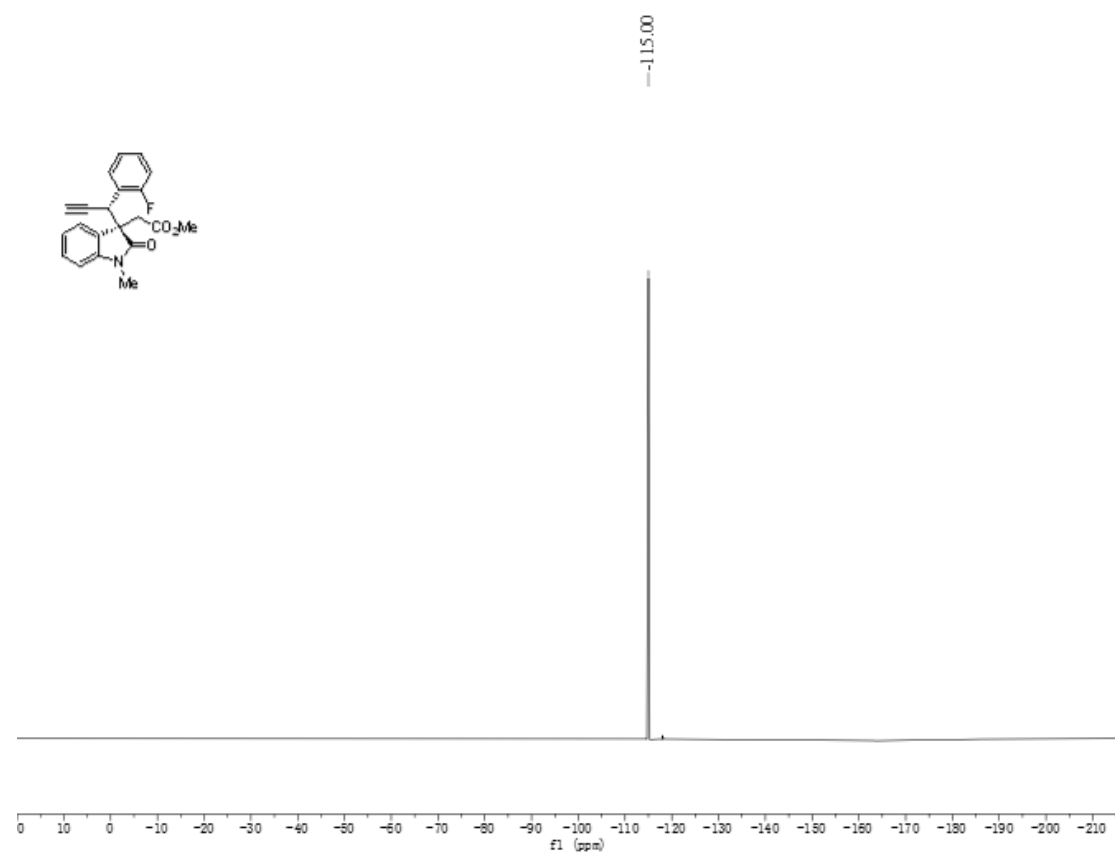
¹H NMR spectrum of (*R,S*)-**3aj**



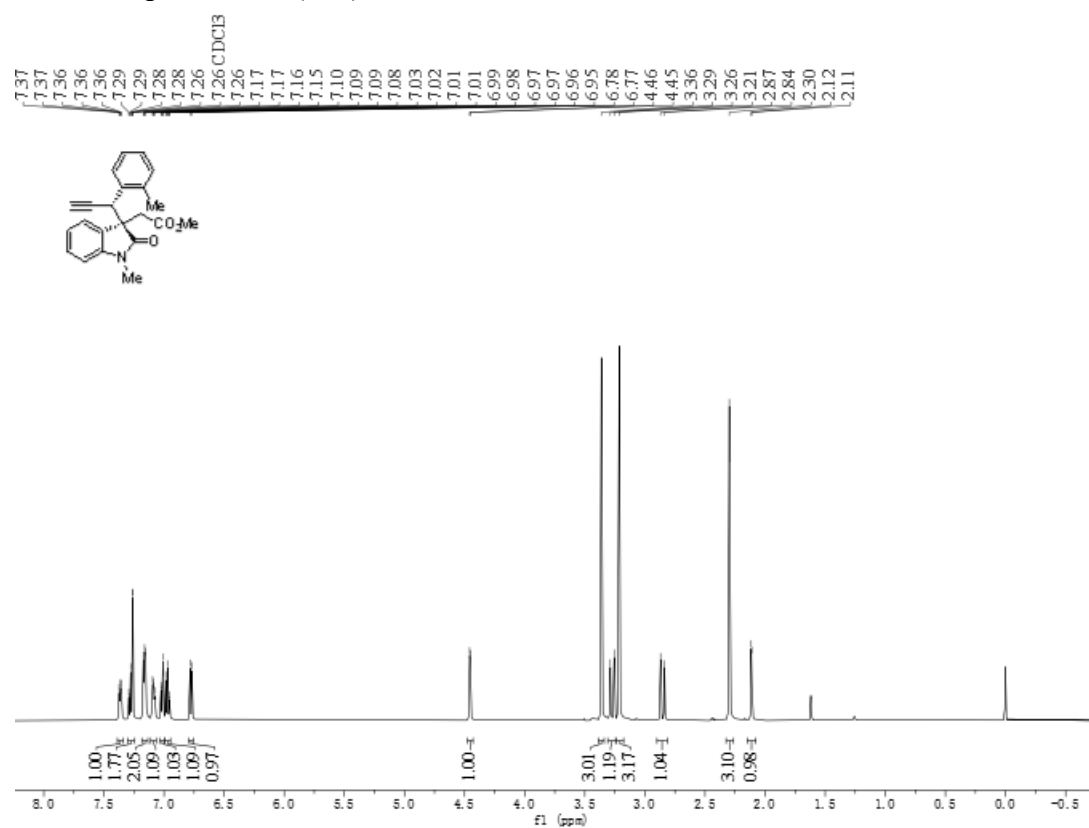
¹³C NMR spectrum of (*R,S*)-**3aj**



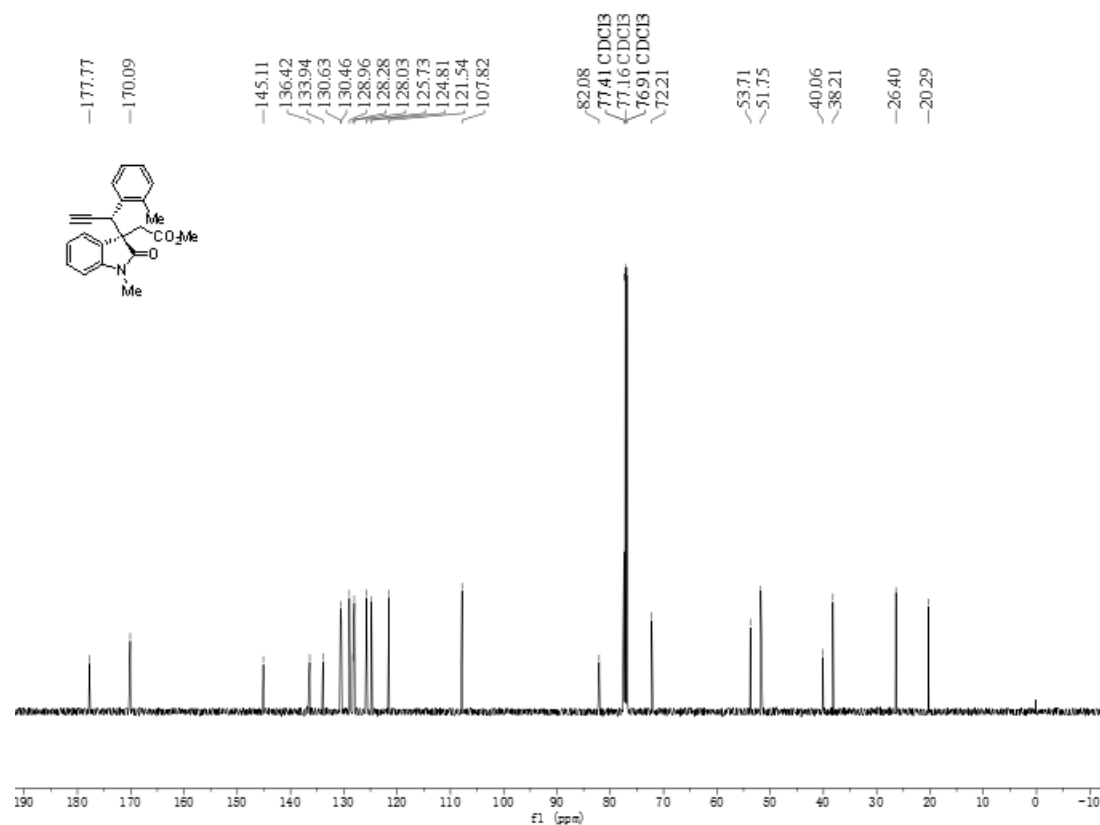
^{19}F NMR spectrum of (*R,S*)-**3aj**



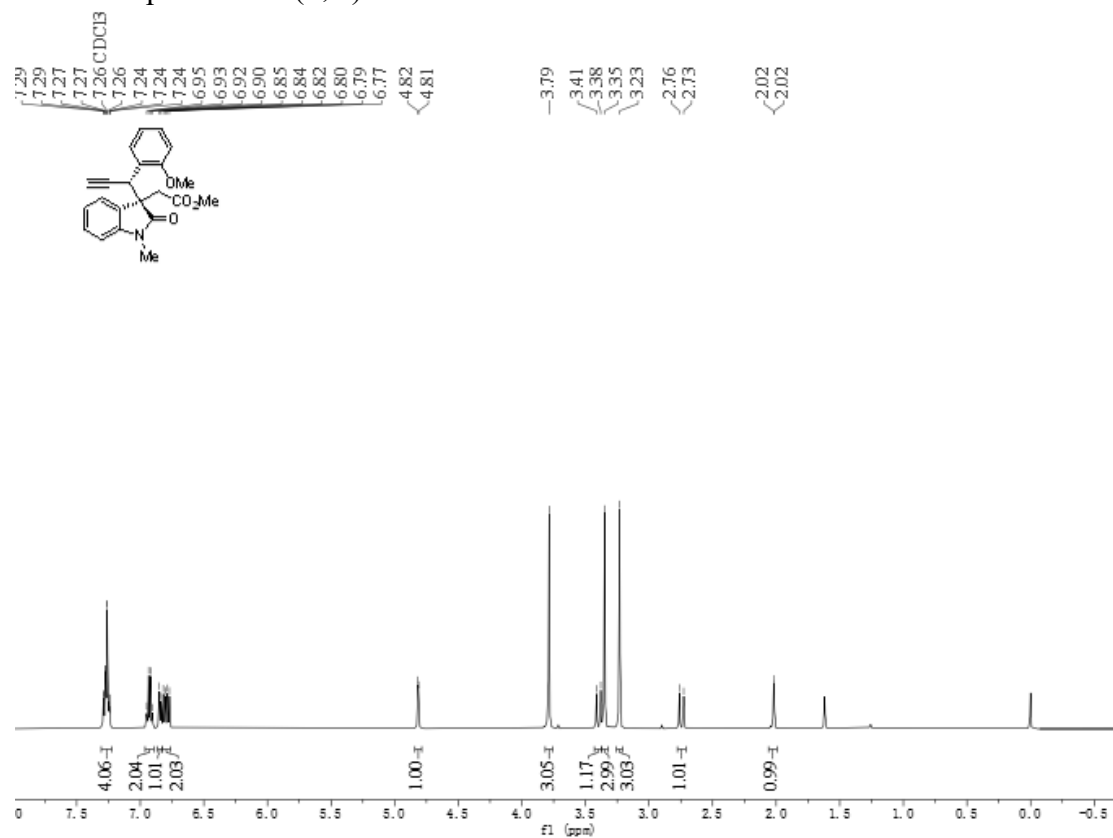
¹H NMR spectrum of (*R,R*)-**3ak**



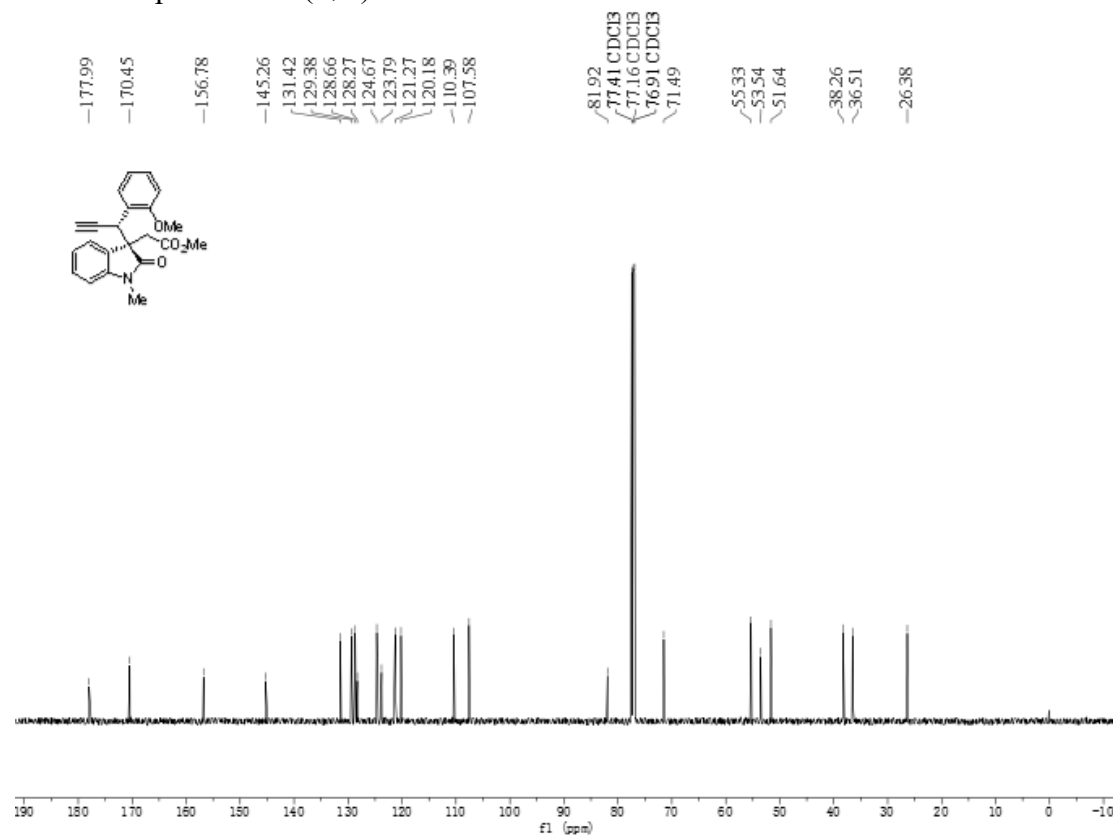
¹³C NMR spectrum of (*R,R*)-**3ak**



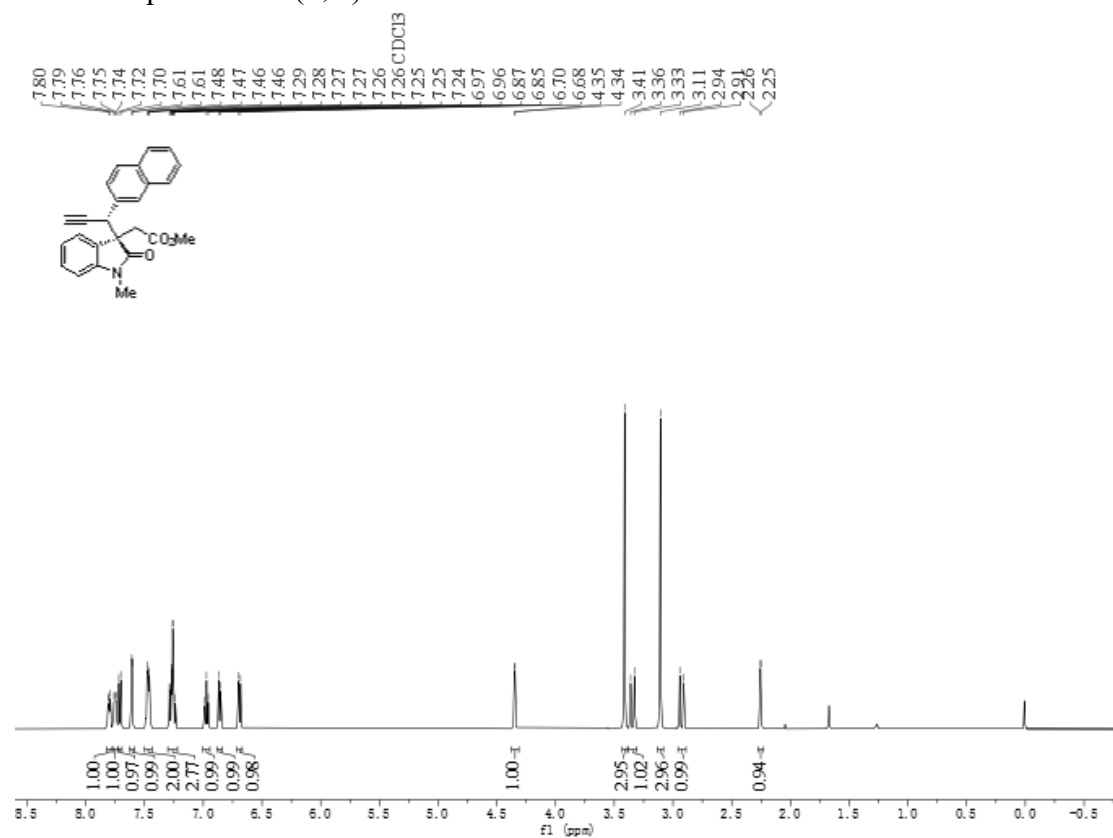
^1H NMR spectrum of (*R,R*)-**3al**



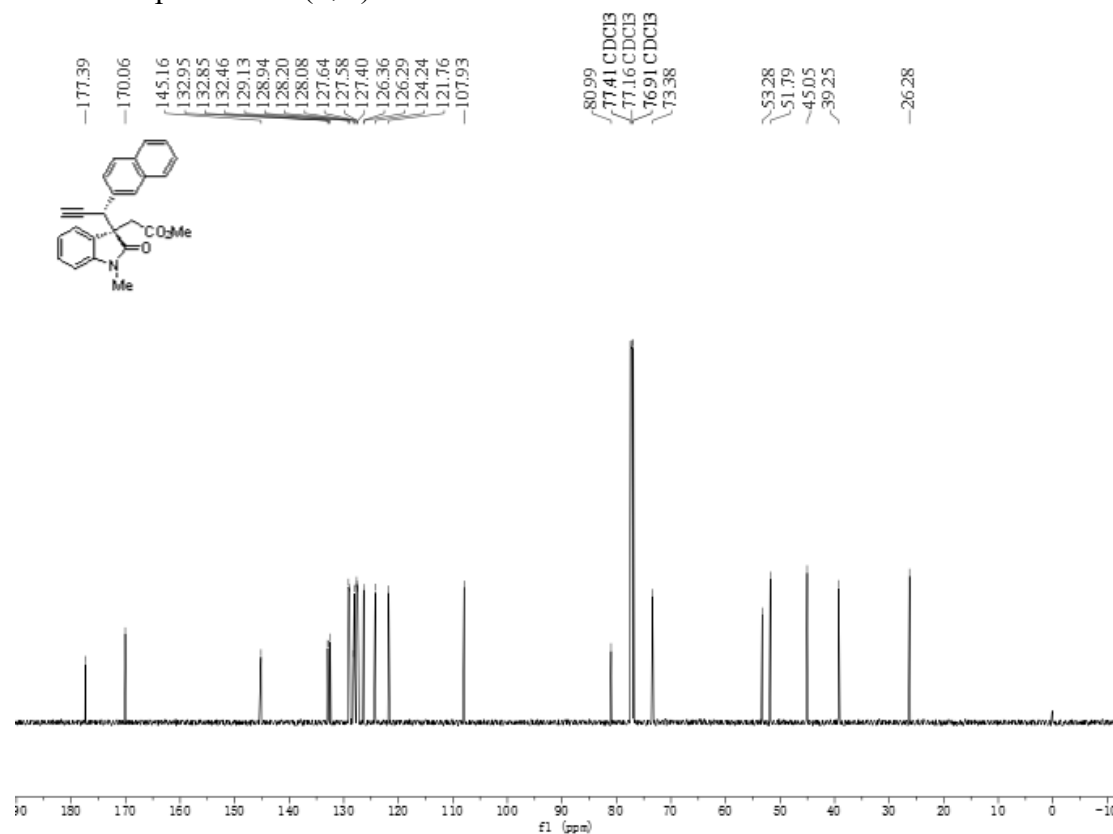
^{13}C NMR spectrum of (*R,R*)-**3al**



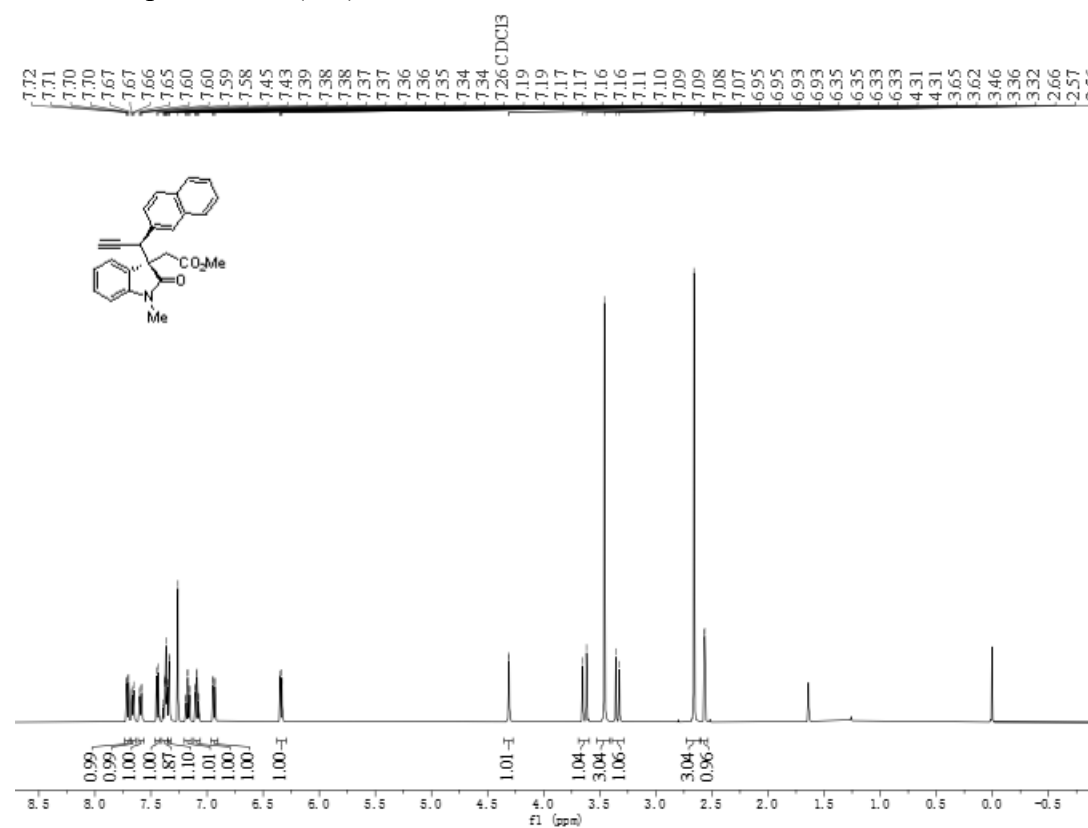
¹H NMR spectrum of (*R,R*)-**3am**



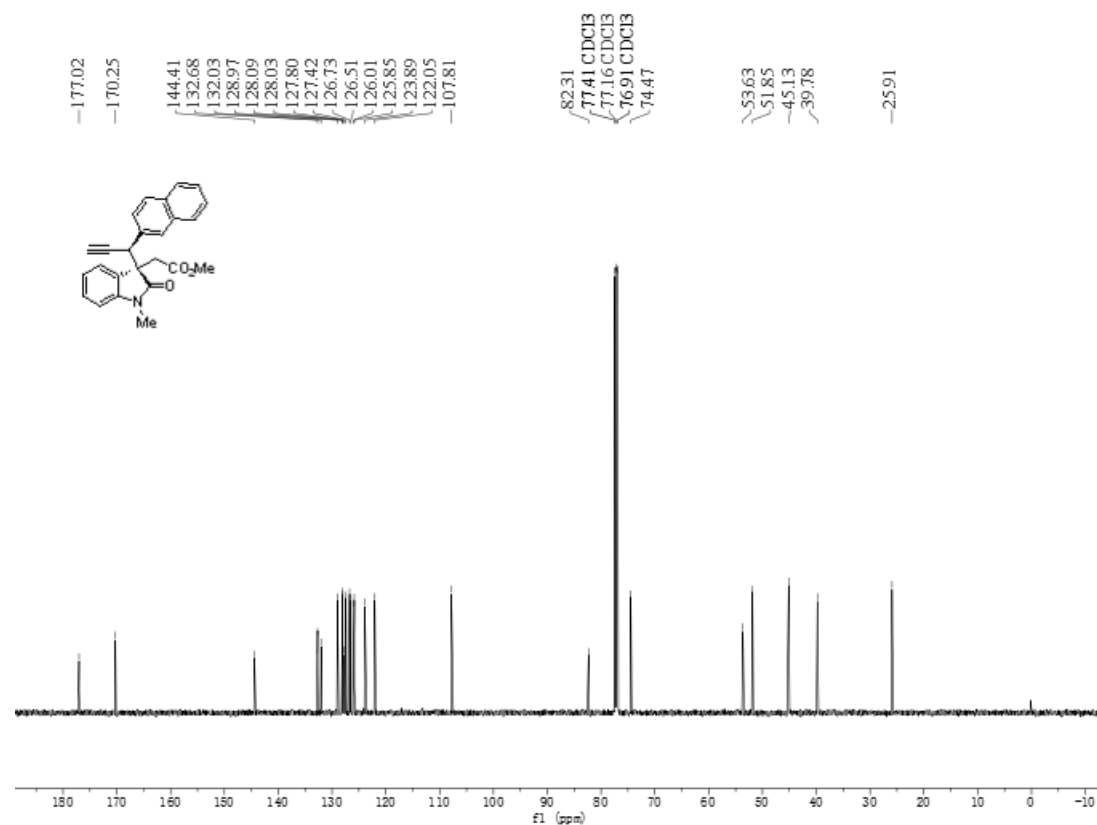
¹³C NMR spectrum of (*R,R*)-**3am**



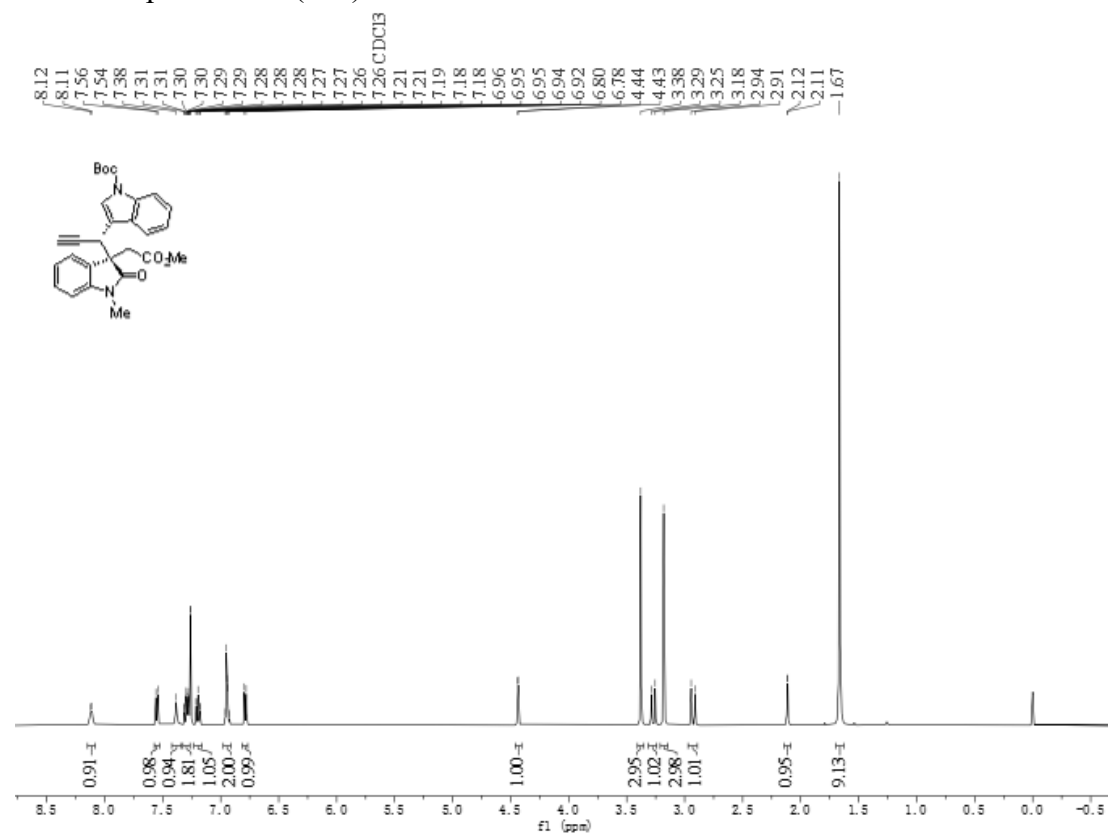
^1H NMR spectrum of (*R,S*)-**3am**



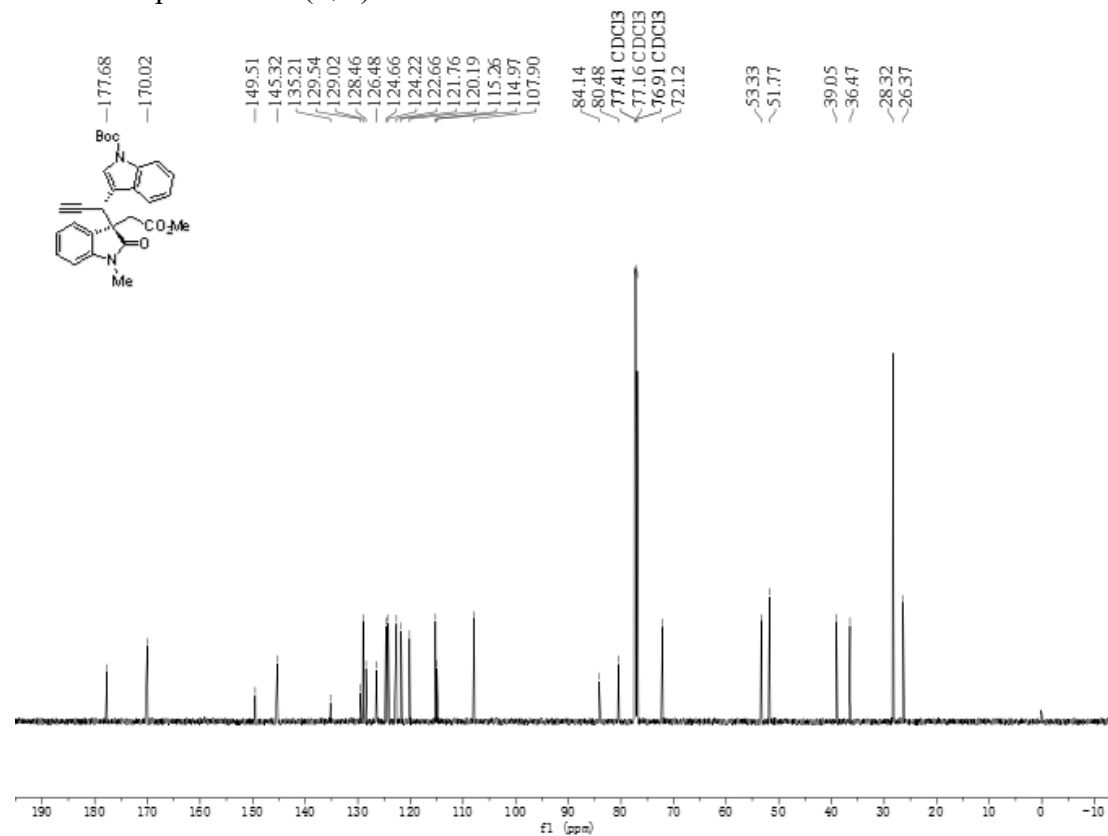
^{13}C NMR spectrum of (*R,S*)-**3am**



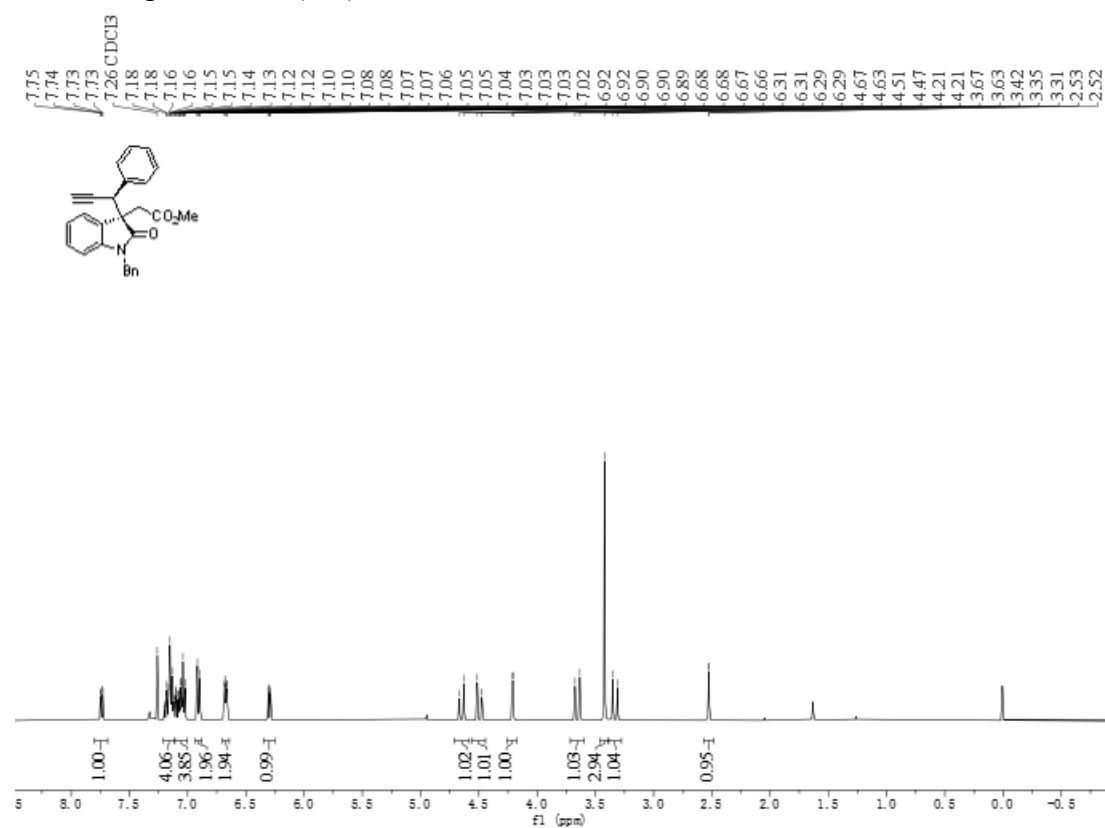
¹H NMR spectrum of (*R,R*)-**3ao**



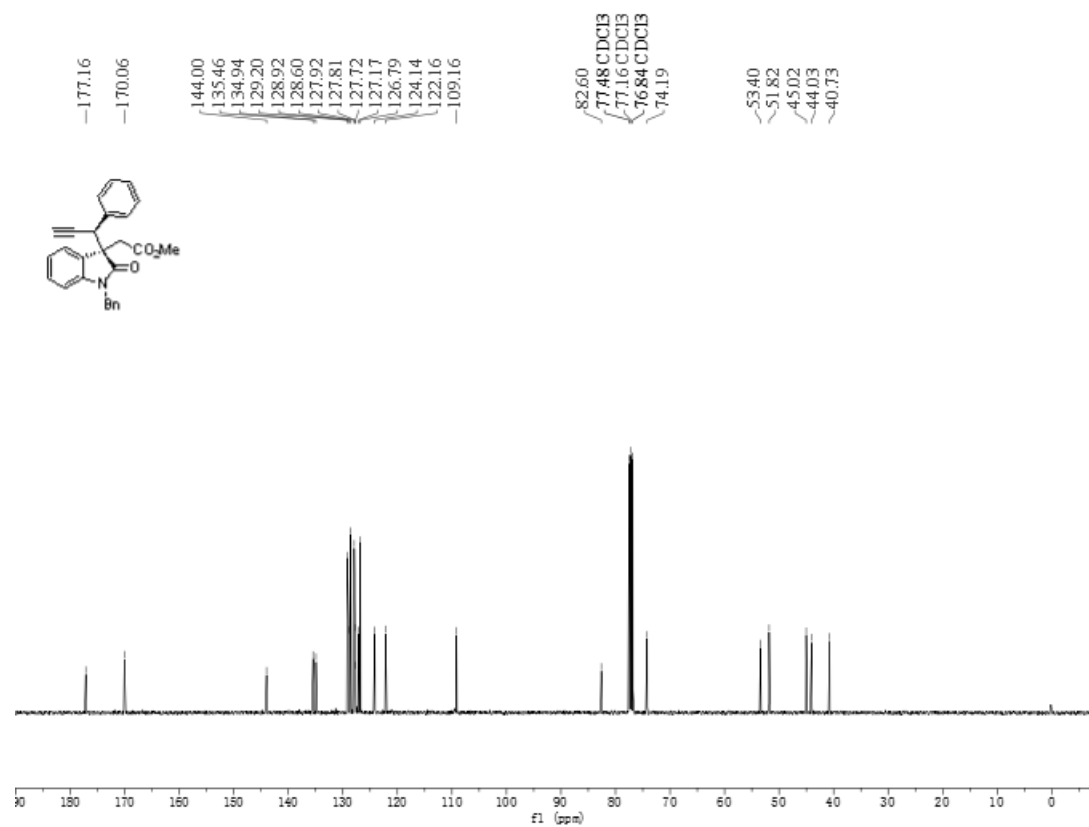
¹³C NMR spectrum of (*R,R*)-**3ao**



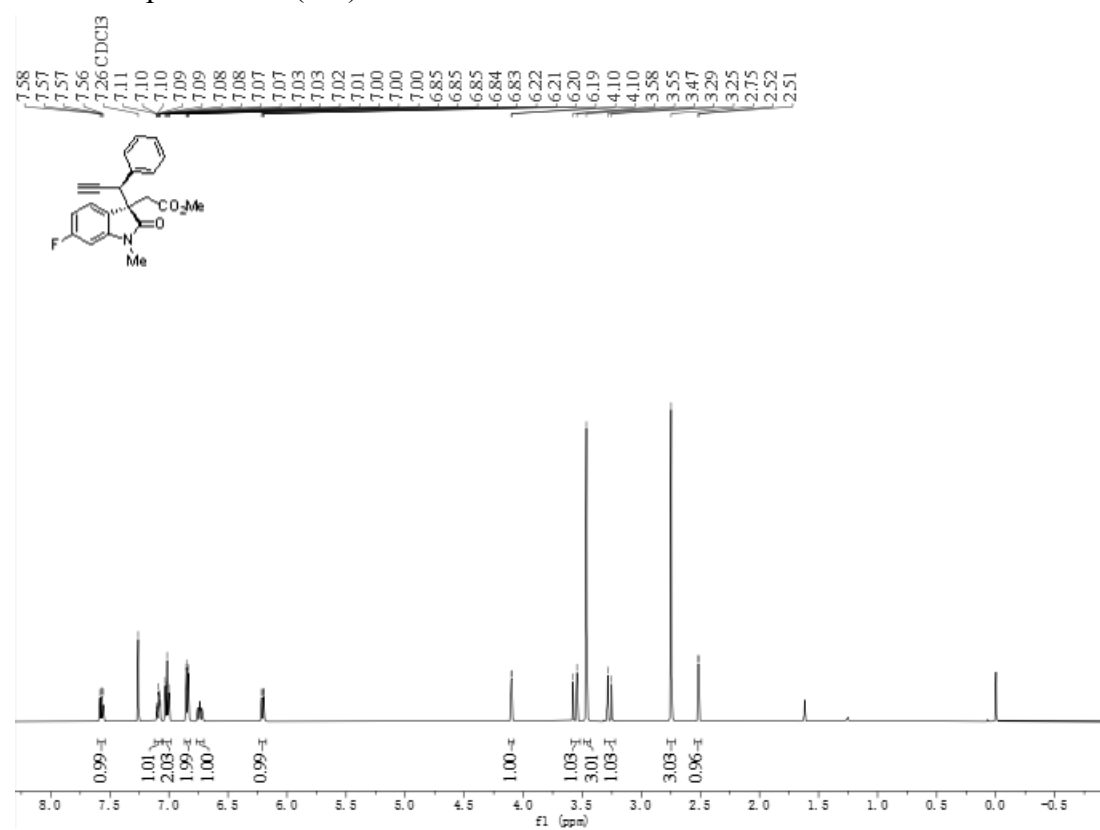
^1H NMR spectrum of (*R,S*)-**3da**



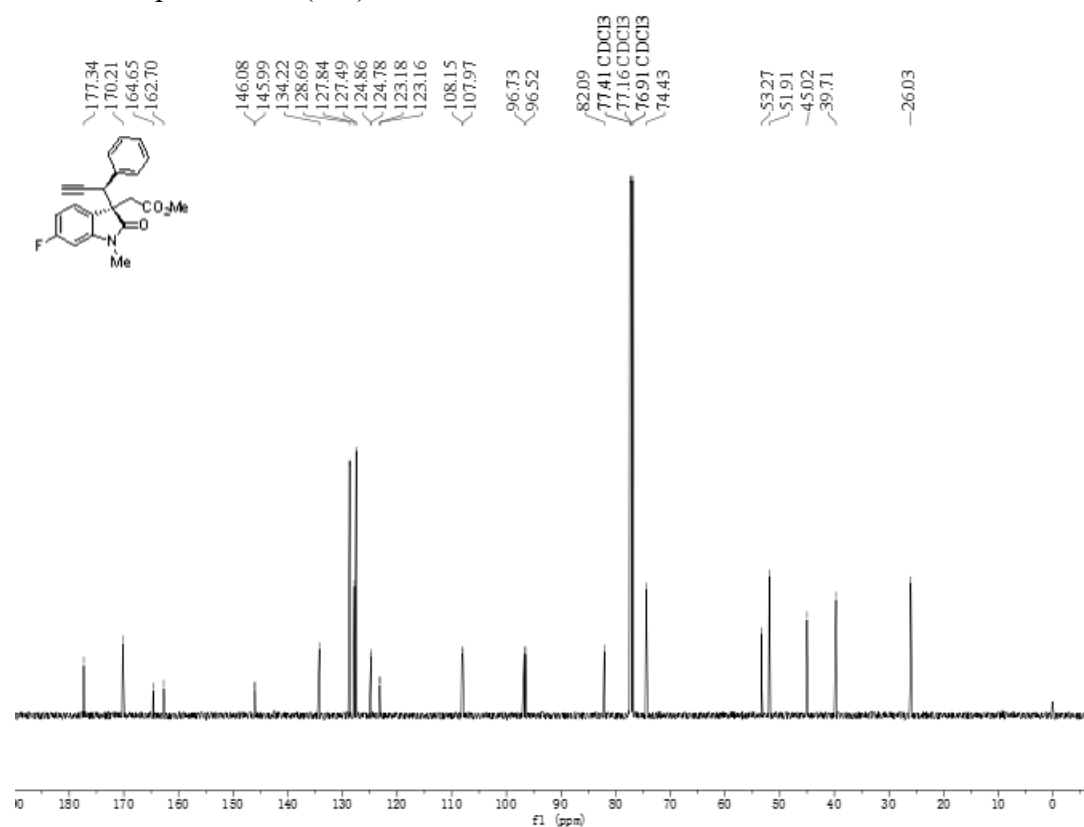
^{13}C NMR spectrum of (*R,S*)-**3da**



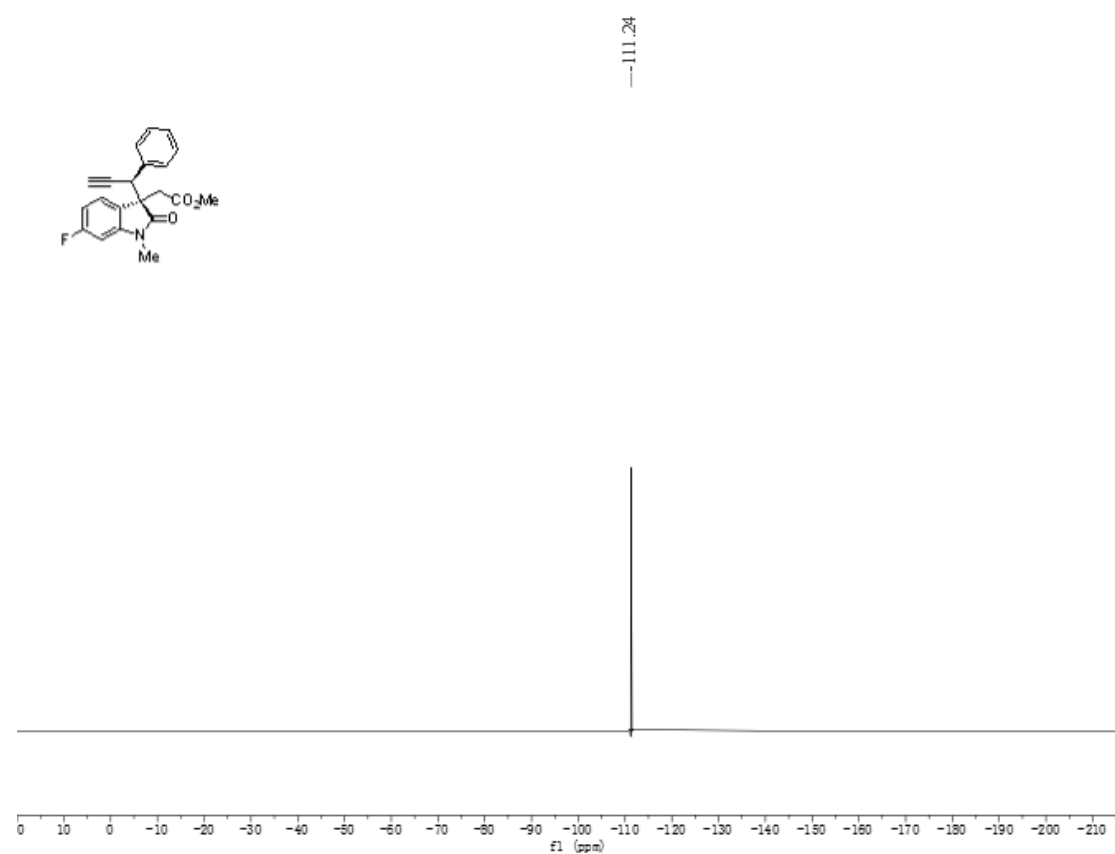
¹H NMR spectrum of (*R,S*)-**3ka**



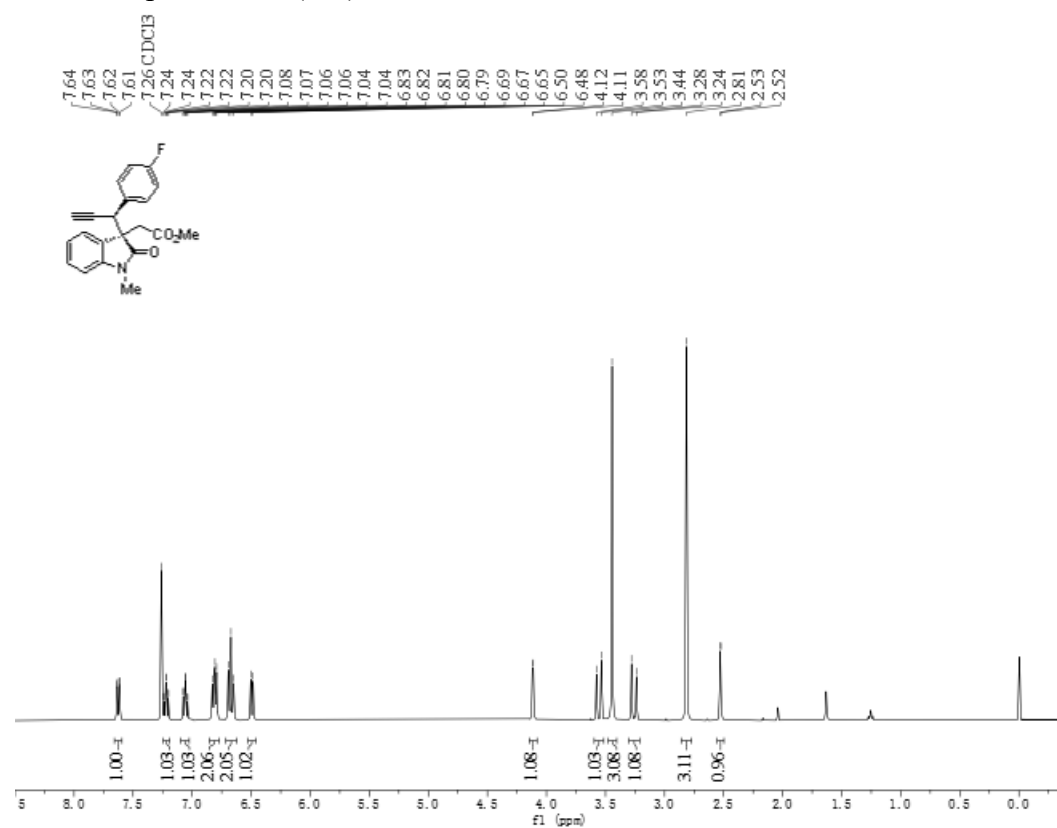
¹³C NMR spectrum of (*R,S*)-**3ka**



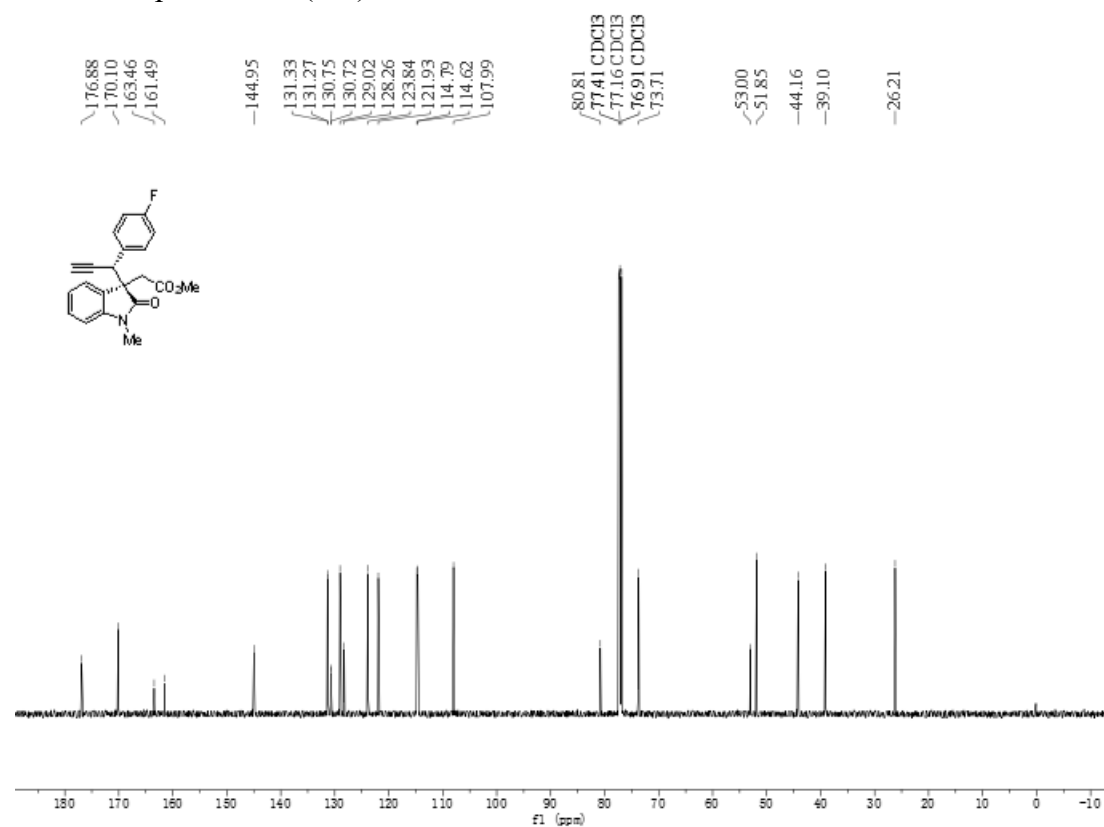
^{19}F NMR spectrum of (*R,S*)-**3ka**



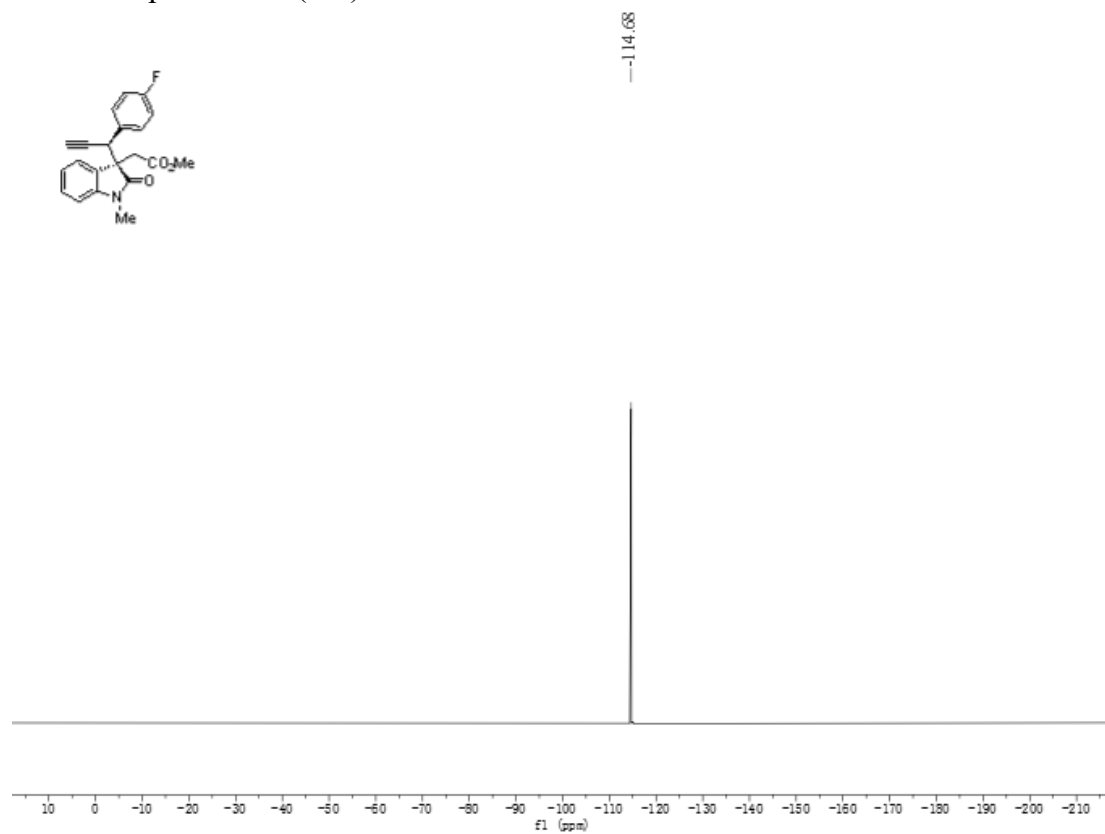
¹H NMR spectrum of (*R,S*)-**3ab**



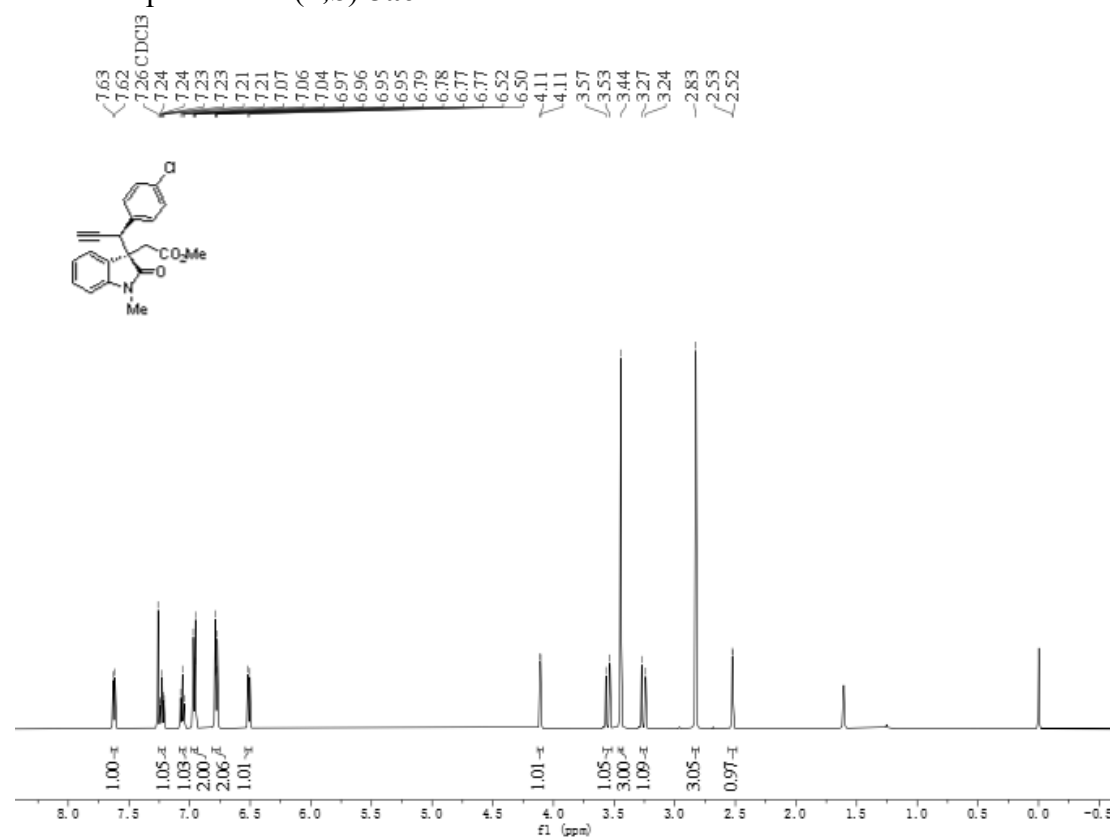
¹³C NMR spectrum of (*R,S*)-**3ab**



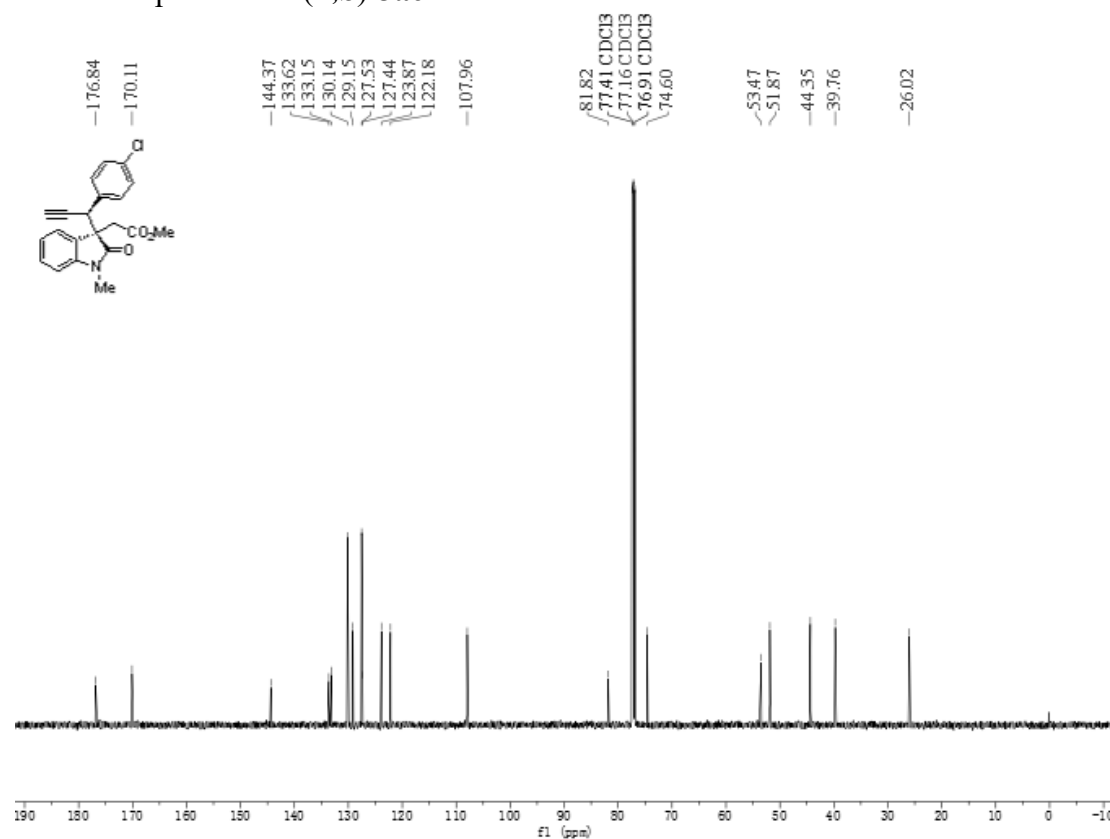
^{19}F NMR spectrum of (*R,S*)-**3ab**



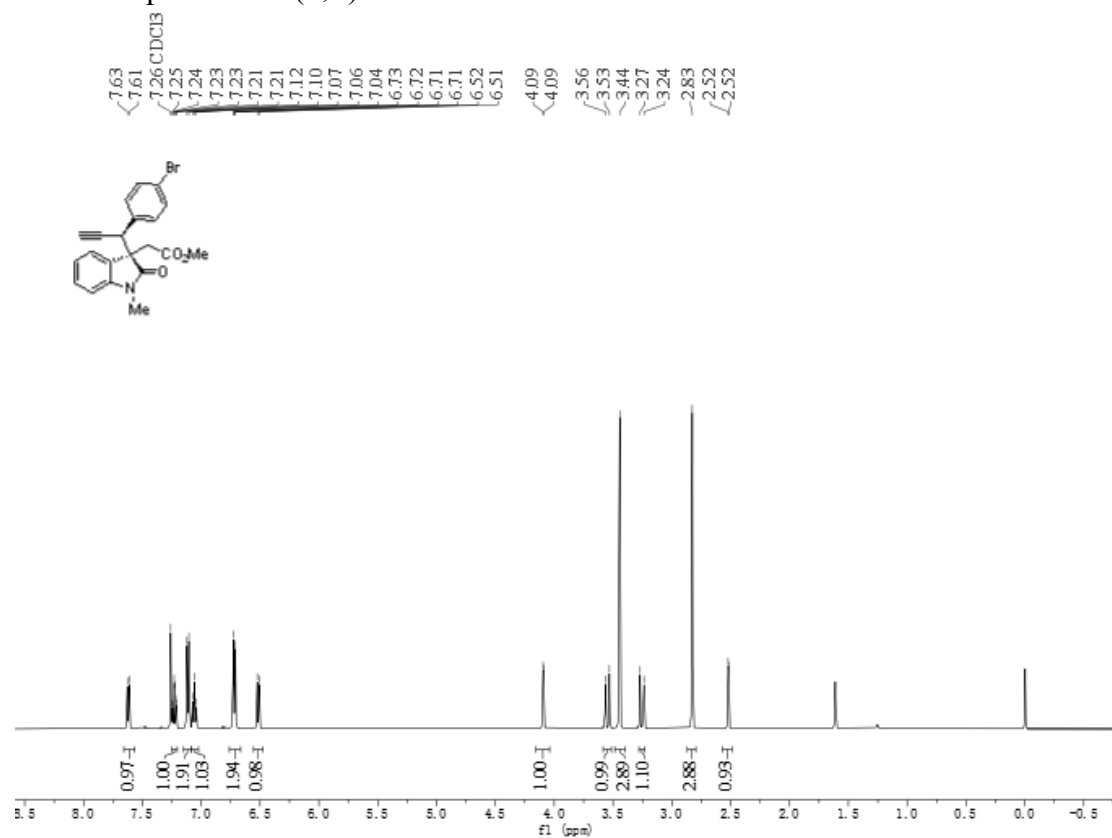
¹H NMR spectrum of (*R,S*)-**3ac**



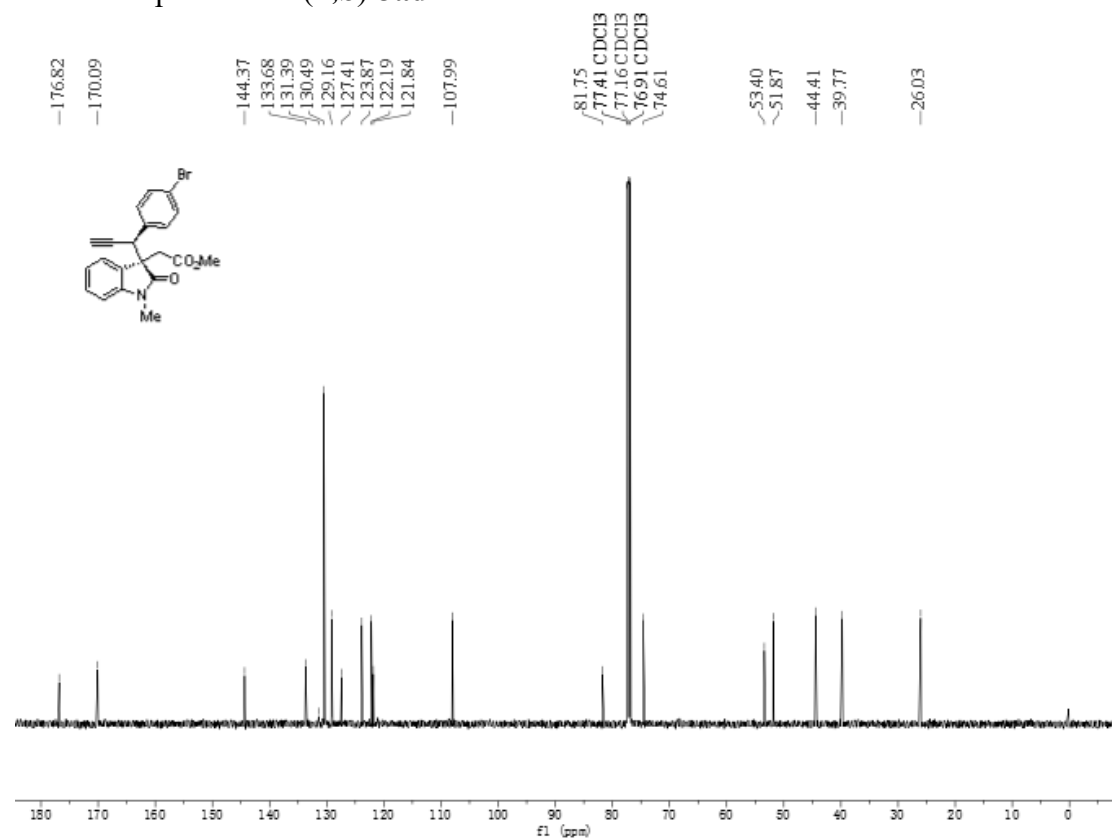
¹³C NMR spectrum of (*R,S*)-**3ac**



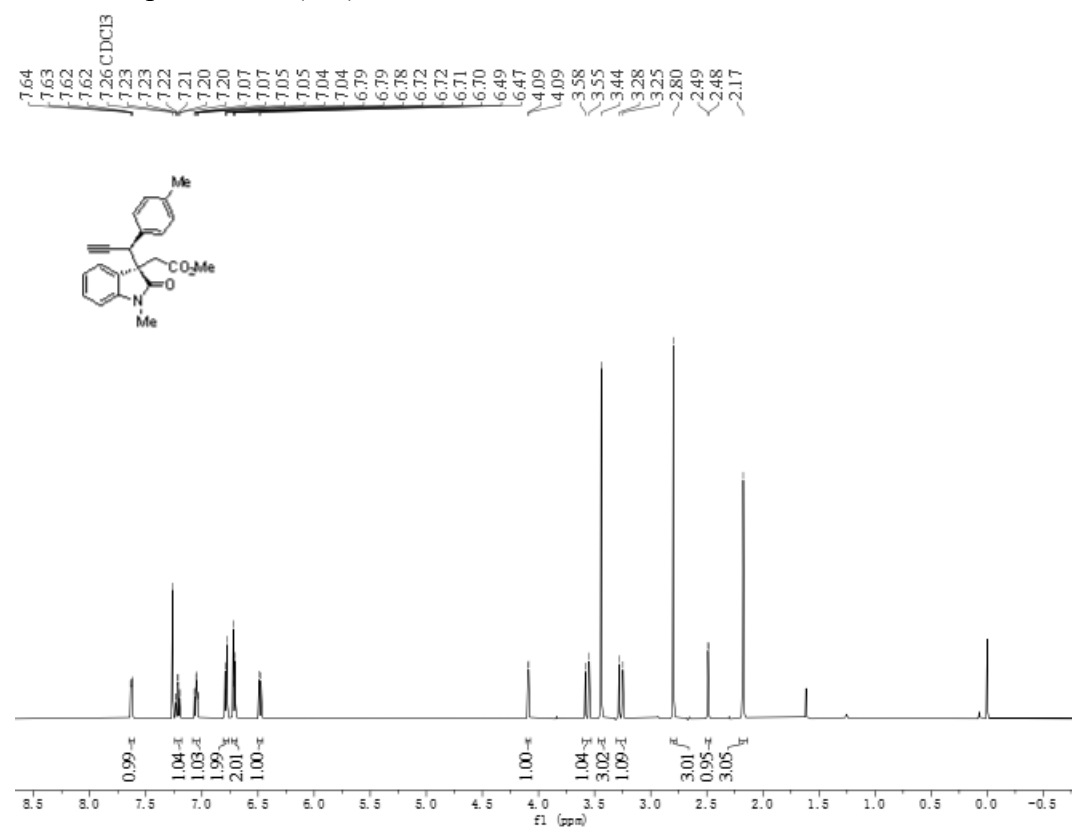
¹H NMR spectrum of (*R,S*)-**3ad**



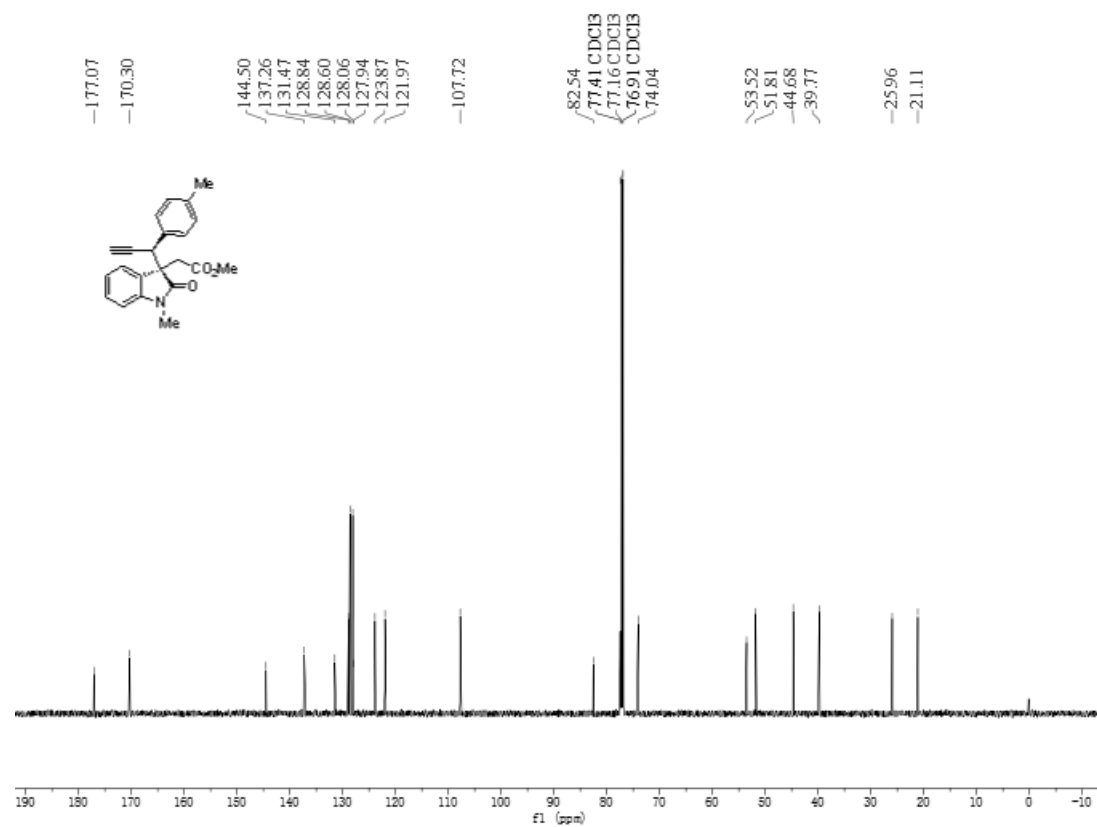
¹³C NMR spectrum of (*R,S*)-**3ad**



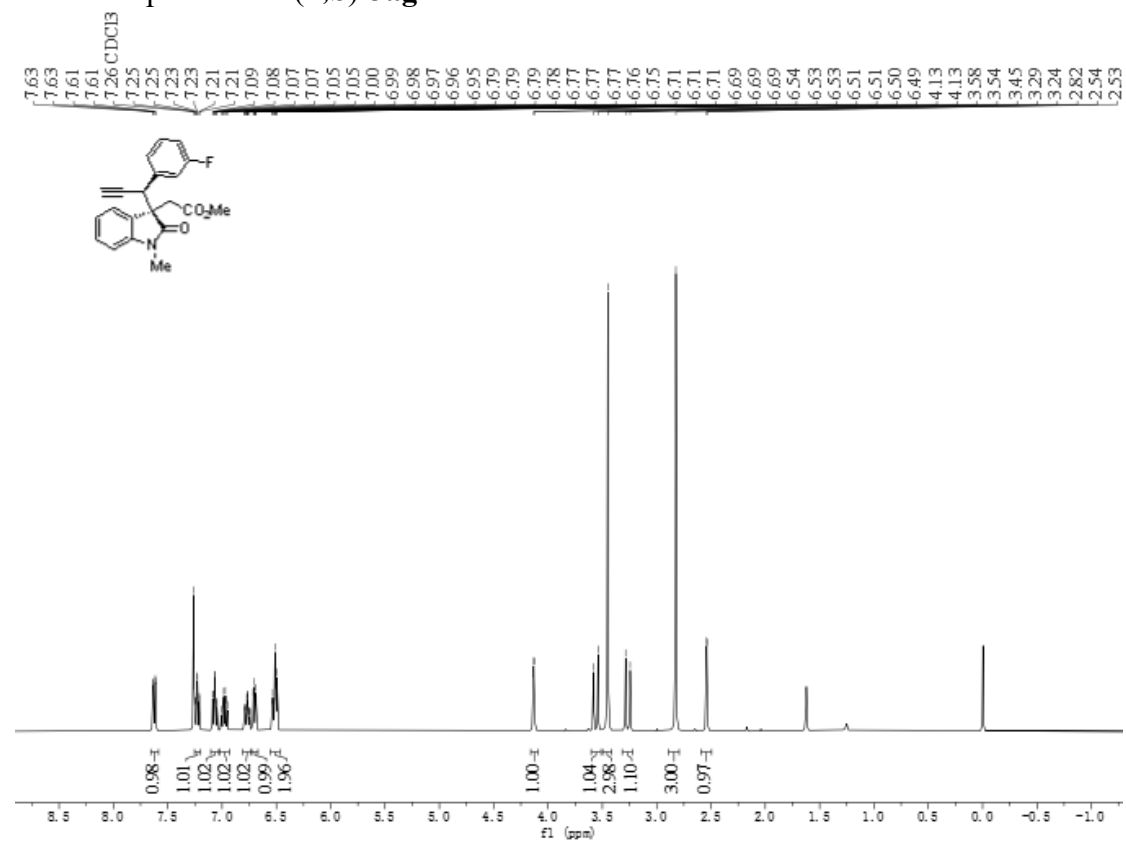
^1H NMR spectrum of (*R,S*)-**3ae**



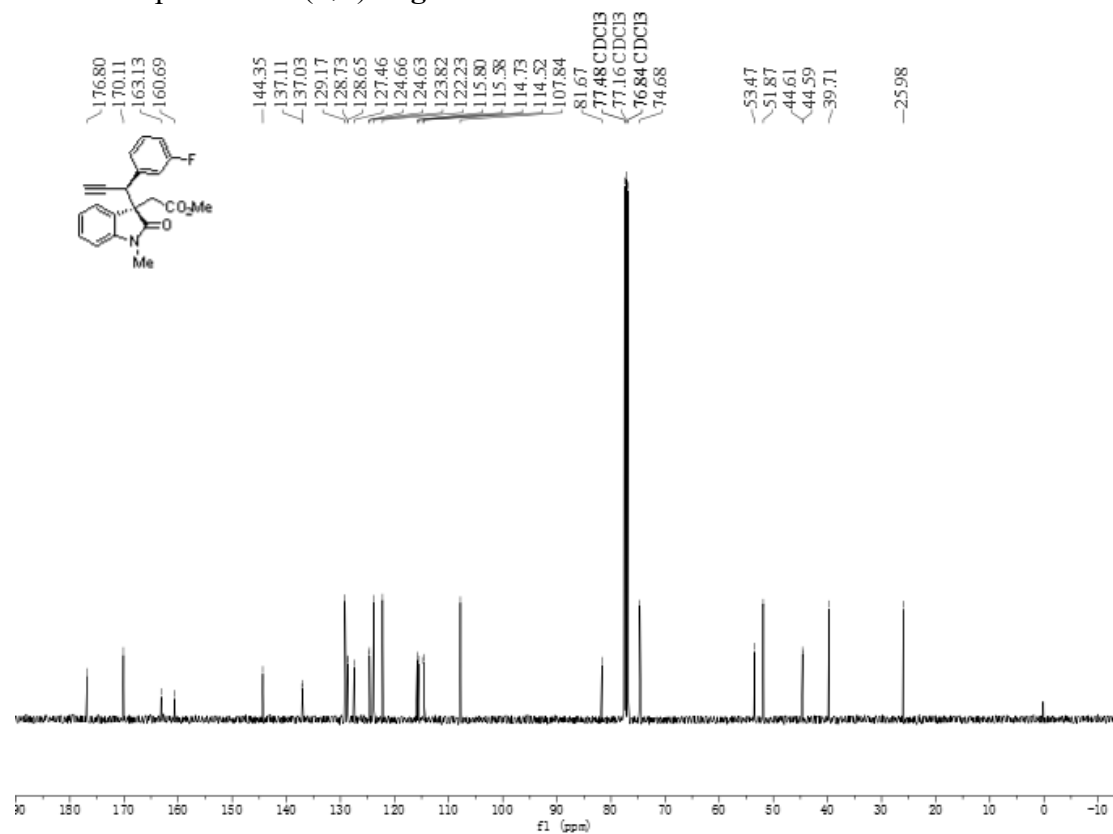
^{13}C NMR spectrum of (*R,S*)-**3ae**



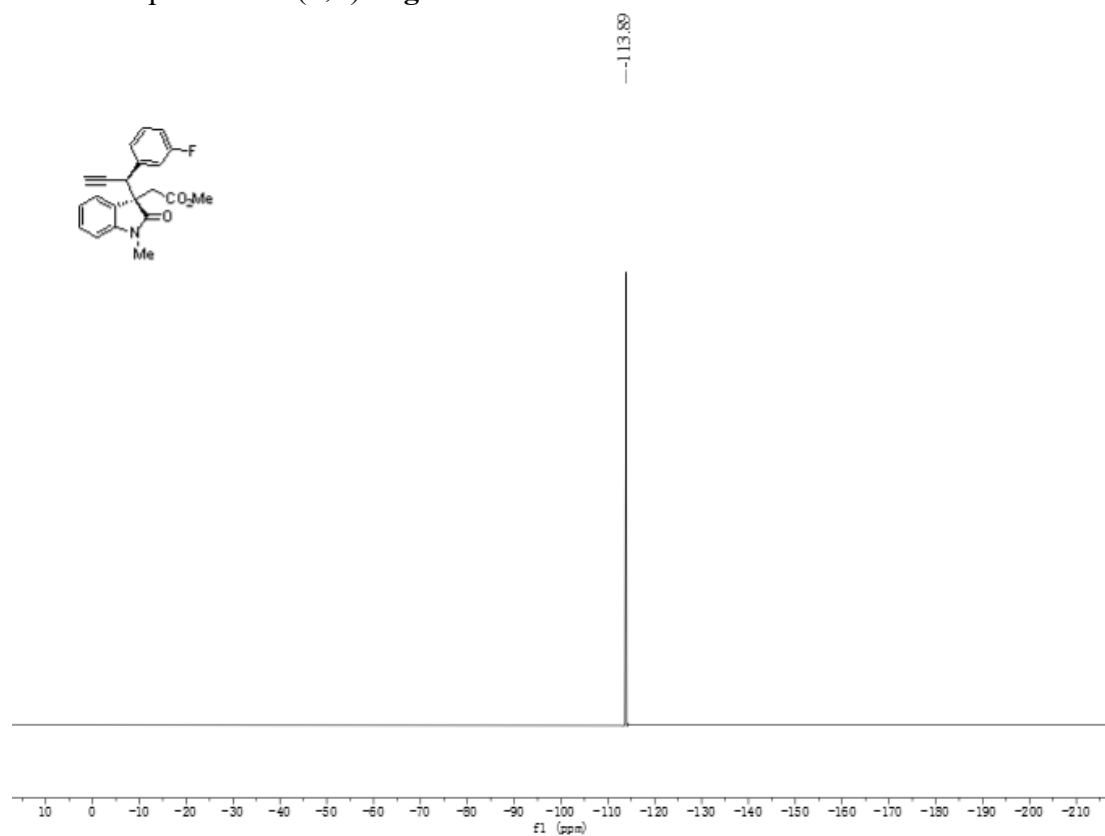
¹H NMR spectrum of (*R,S*)-**3ag**



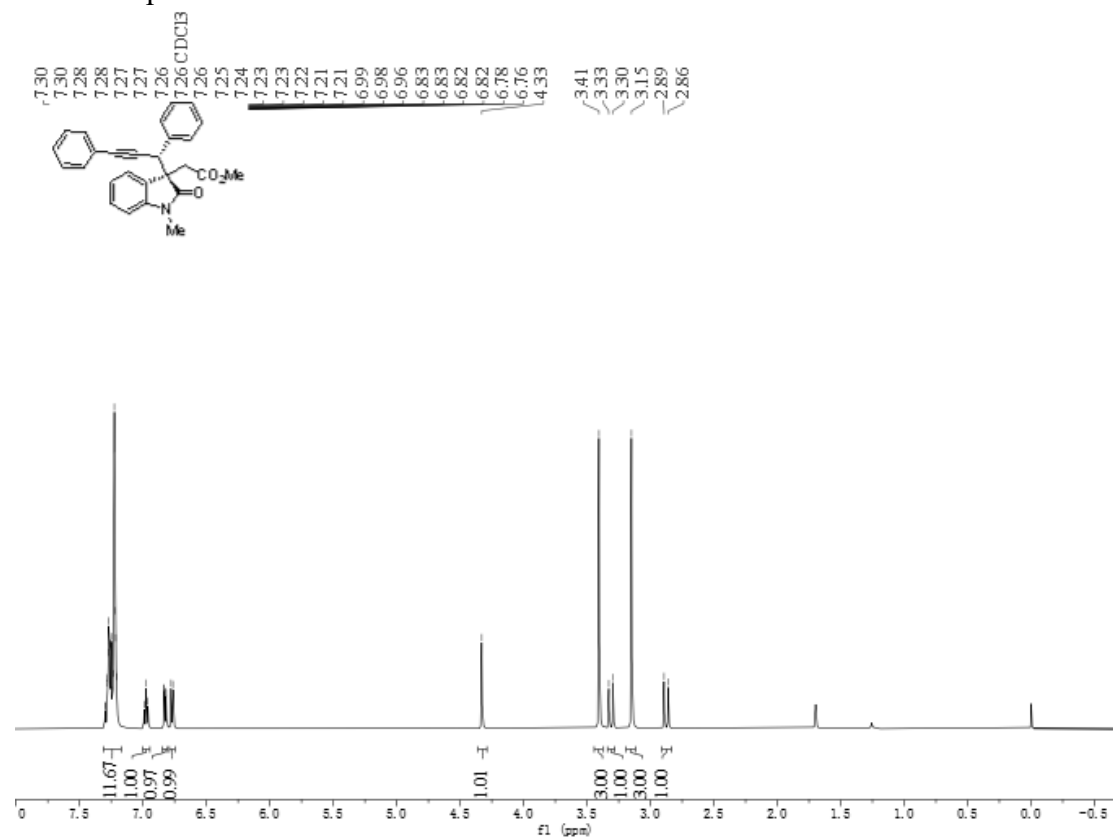
¹³C NMR spectrum of (*R,S*)-**3ag**



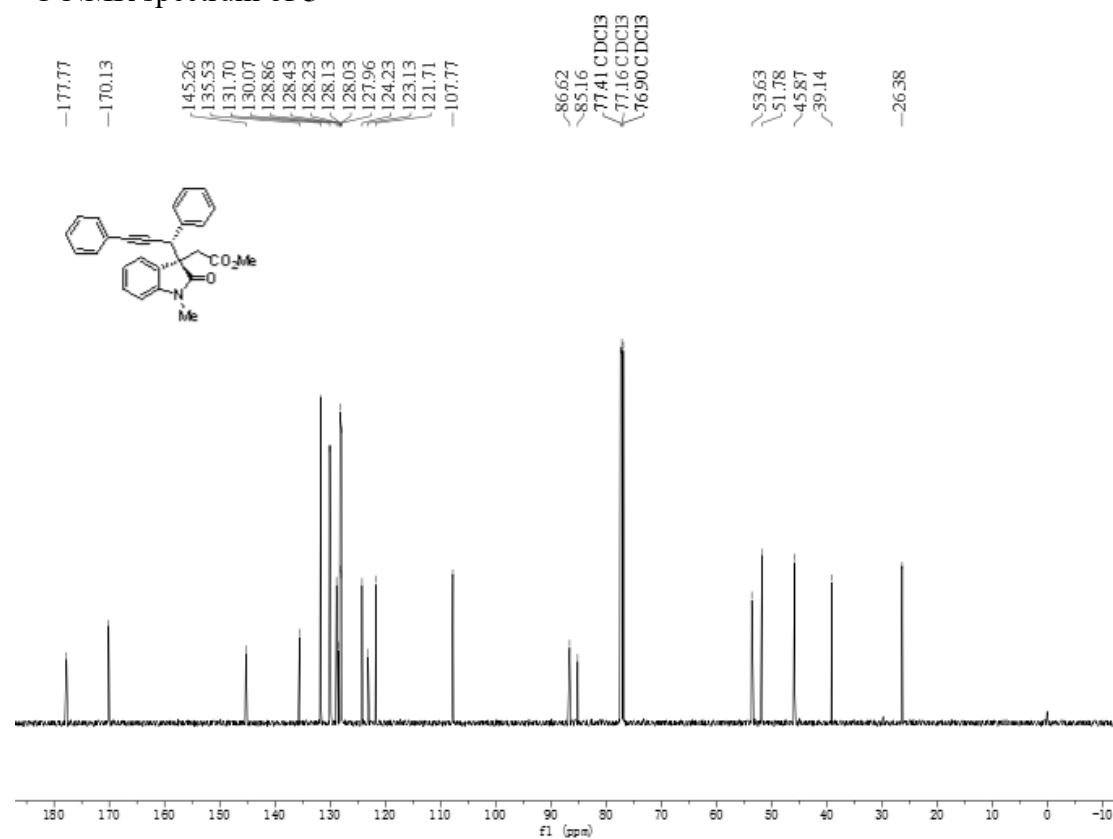
^{19}F NMR spectrum of (*R,S*)-**3ag**



¹H NMR spectrum of **5**



¹³C NMR spectrum of **5**



CCOC(=O)[C@H](Cc1ccccc1)[C@@H](Cc2ccccc2)N(C)c3ccccc3

7.29, 7.29, 7.28, 7.28, 7.27, 7.26, 7.26, 7.26, 7.25, 7.24, 7.24, 7.23, 7.23, 7.10, 7.08, 6.98, 6.96, 6.95, 6.89, 6.89, 6.87, 6.87, 6.78, 6.76, 3.33, 3.32, 3.32, 3.13, 3.09, 3.03, 3.02, 3.00, 2.99, 2.64, 2.61, 1.57, 1.56, 1.56, 1.55, 1.54, 1.54, 1.53, 1.52, 1.48, 1.47, 1.46, 1.45, 1.44, 1.44, 1.44, 1.43, 1.42, 0.60, 0.59, 0.57

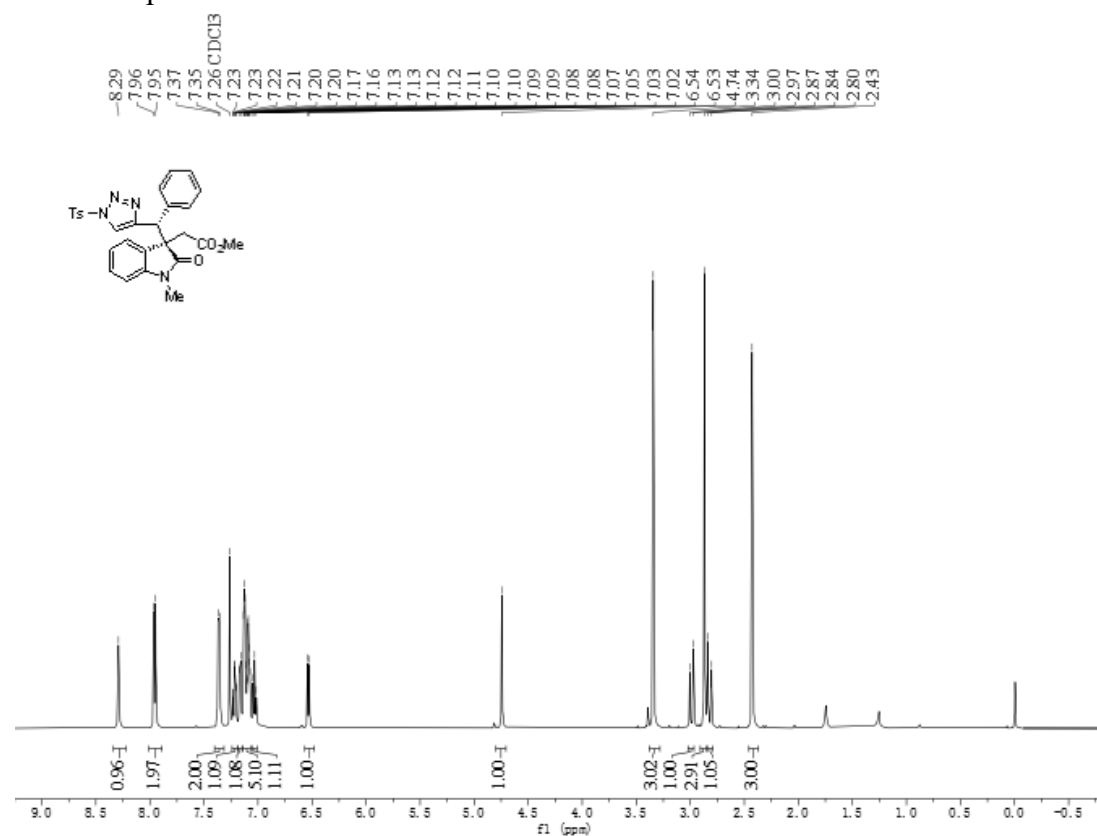
4.31, 2.00, 1.00, 0.99, 0.99, 3.02, 3.01, 1.02, 1.01, 1.01, 1.00, 1.05, 3.03

f1 (ppm)

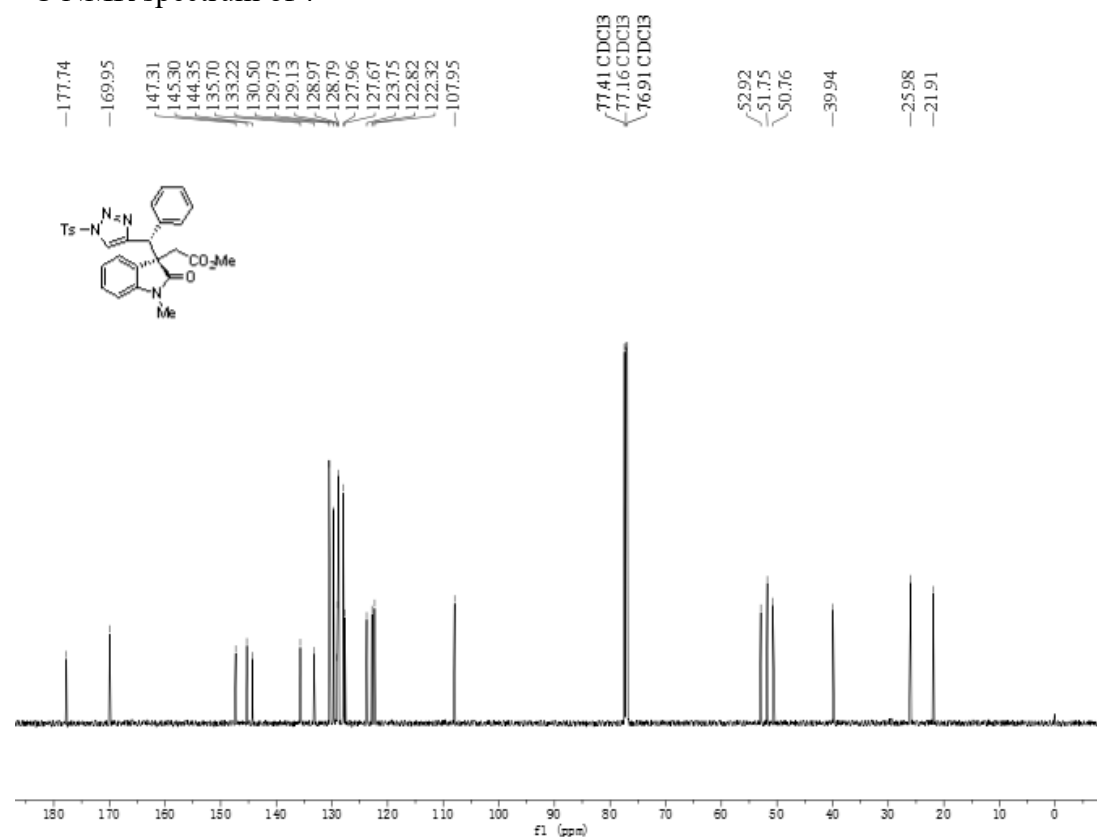
CC(=O)N1c2ccccc2[C@H]1[C@@H](C)C(=O)O[C@H](C)C1=CC=CC=C1

179.73
 170.41
 144.94
 138.20
 130.19
 129.50
 128.33
 127.96
 127.28
 124.45
 121.69
 107.81
 77.42 CDCl₃
 77.16 CDCl₃
 76.91 CDCl₃
 54.50
 53.45
 51.57
 40.69
 26.36
 21.17
 12.12

¹H NMR spectrum of **7**



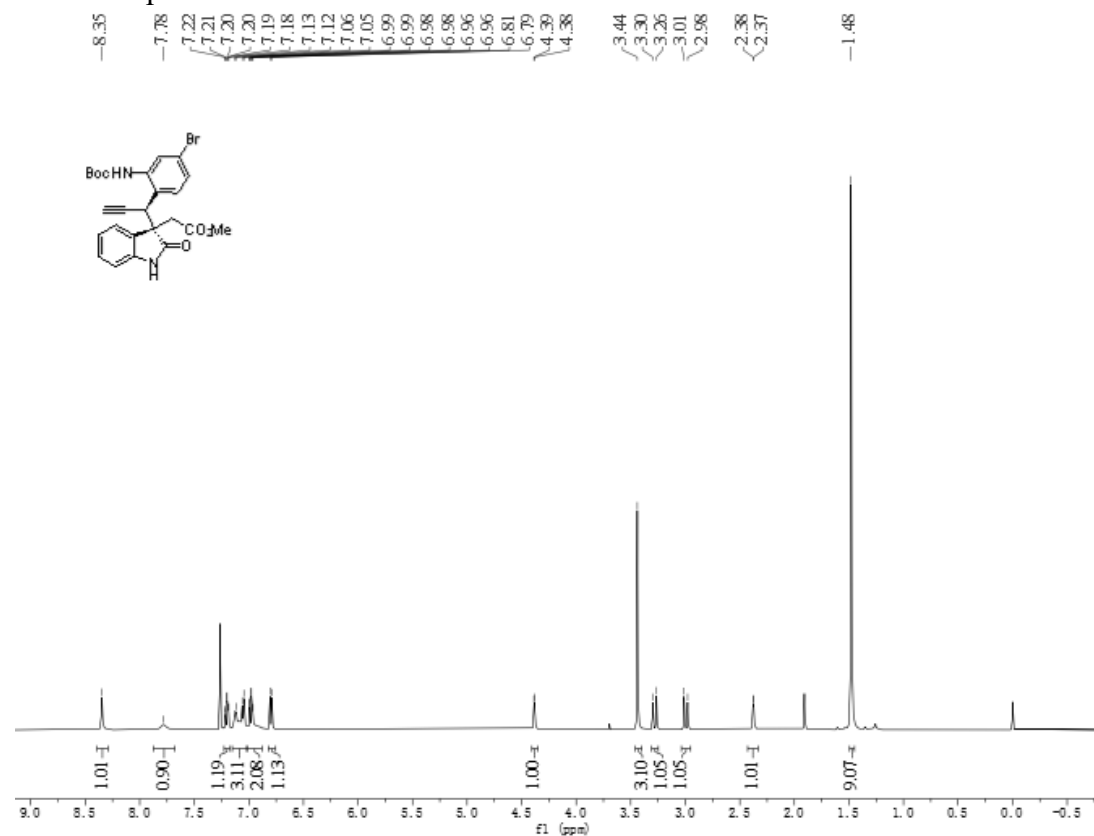
¹³C NMR spectrum of **7**



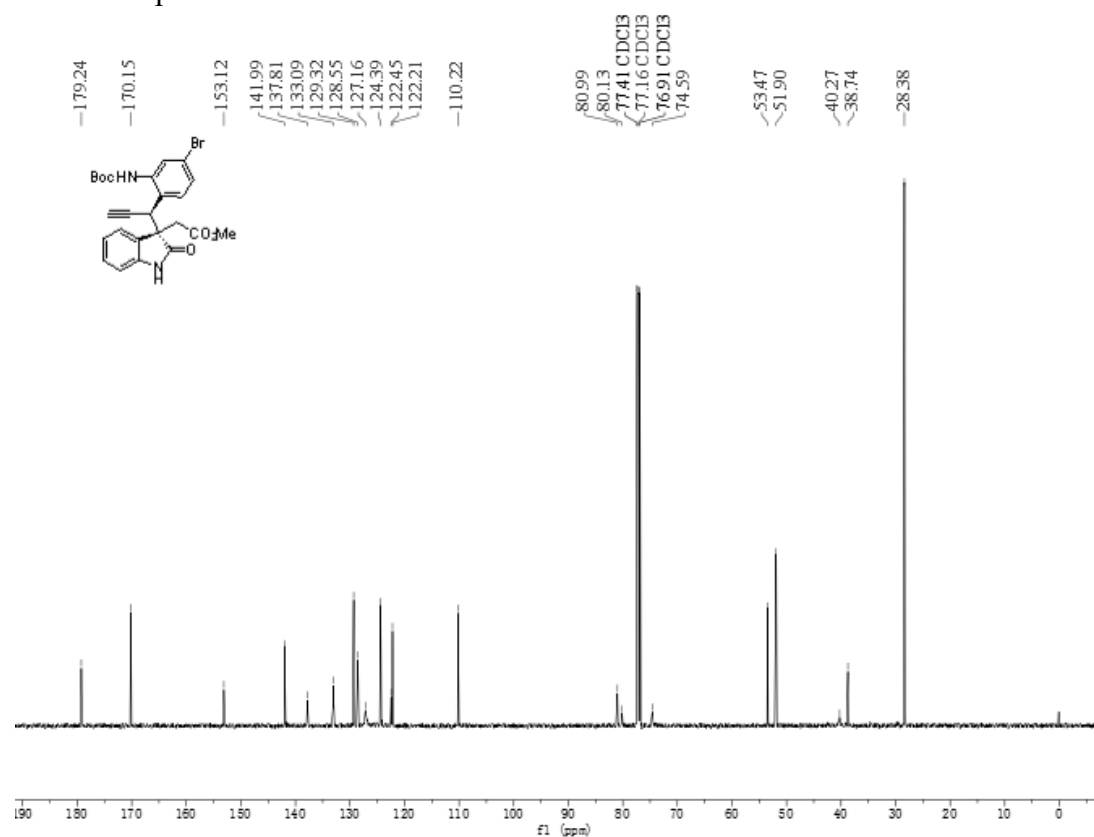
Chemical structure of compound 10: C#CC1(Cc2ccccc2)N(C)c3ccccc13

¹³C NMR spectrum (CDCl₃) of compound 10. The spectrum shows peaks at the following chemical shifts (ppm): 151.85, 137.00, 130.05, 129.21, 128.93, 127.81, 127.45, 124.34, 116.94, 105.29, 101.21, 83.53, 77.41 CDCl₃, 77.16 CDCl₃, 76.91 CDCl₃, 72.70, 67.48, 60.66, 44.38, 38.32, and 31.12.

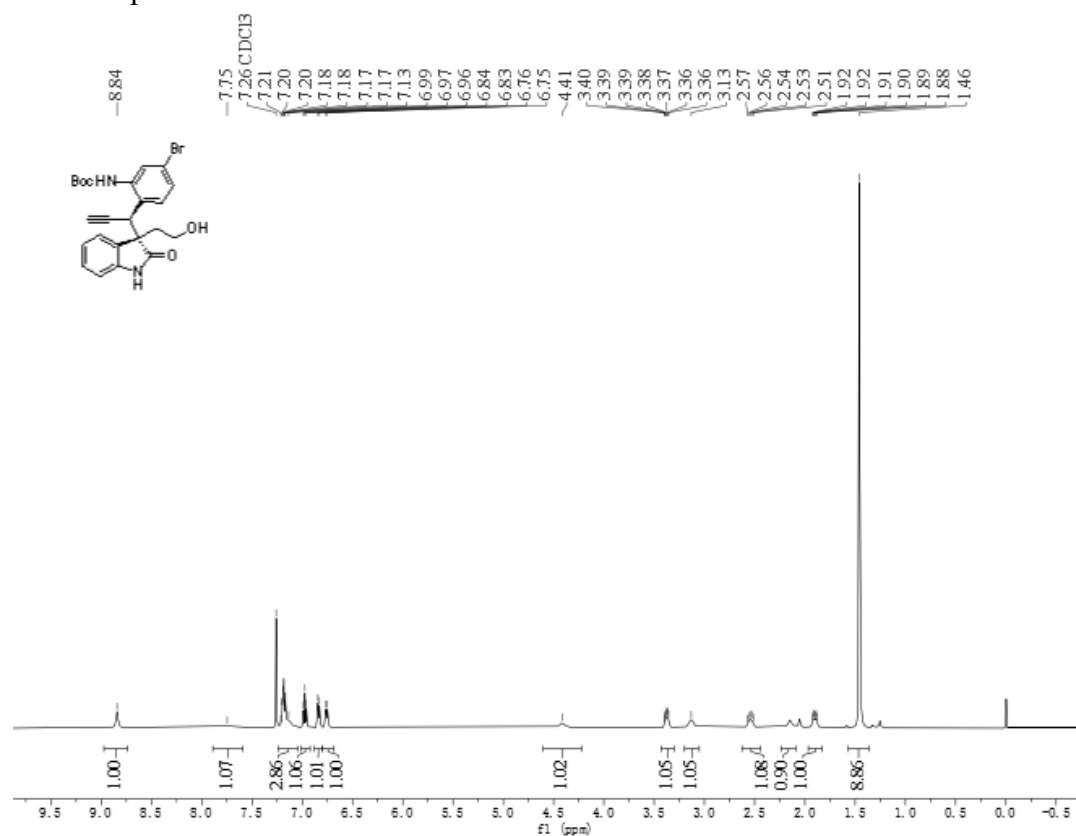
¹H NMR spectrum of **3no**



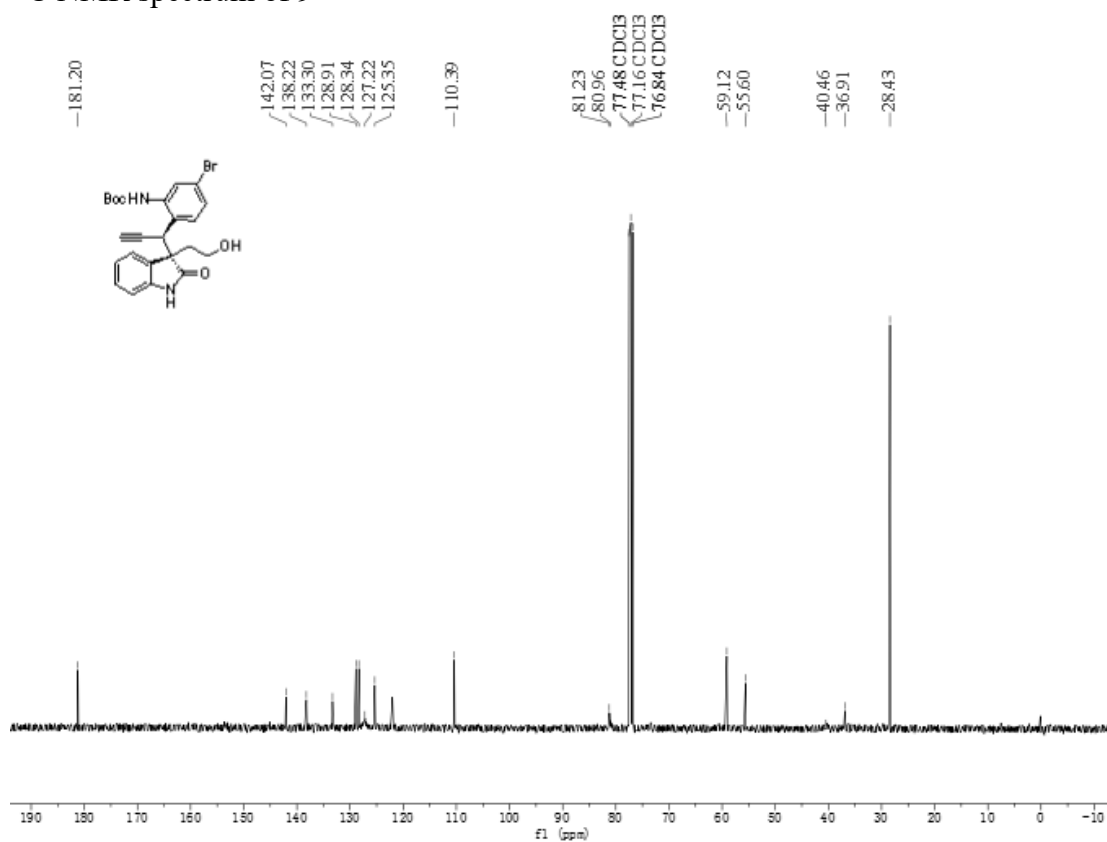
¹³C NMR spectrum of **3no**



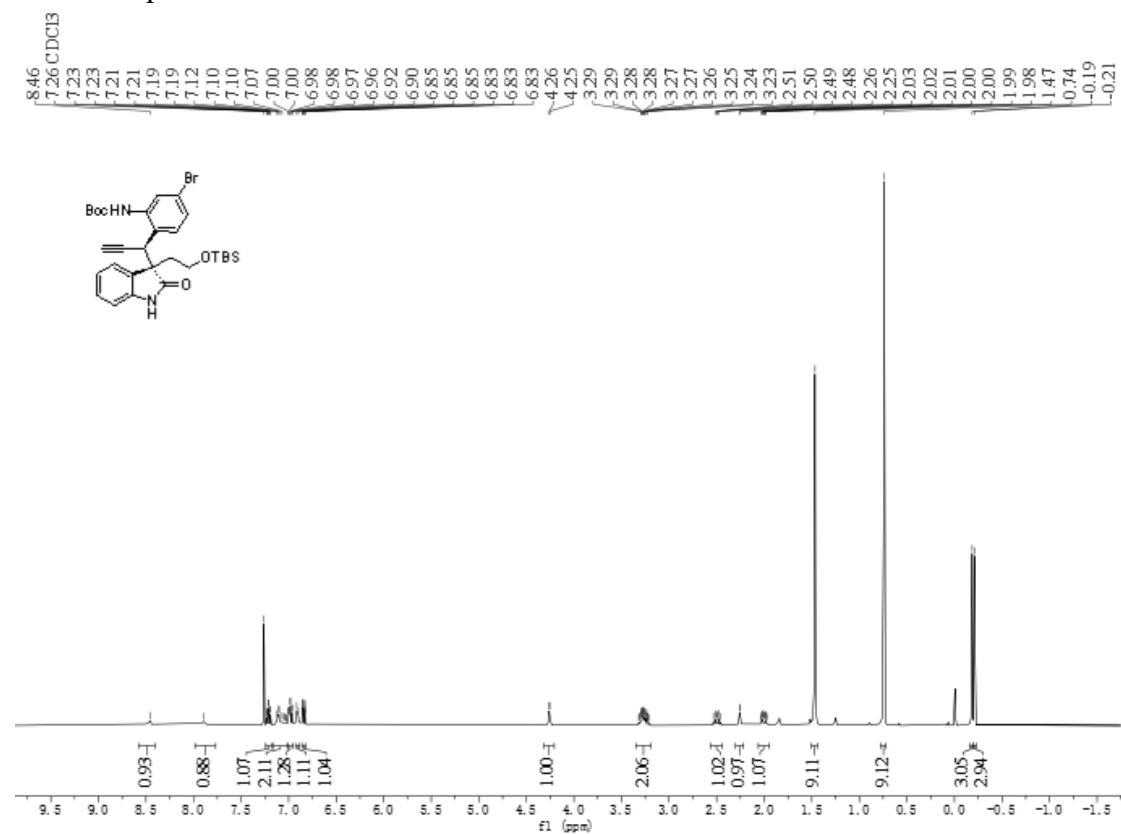
¹H NMR spectrum of **9**



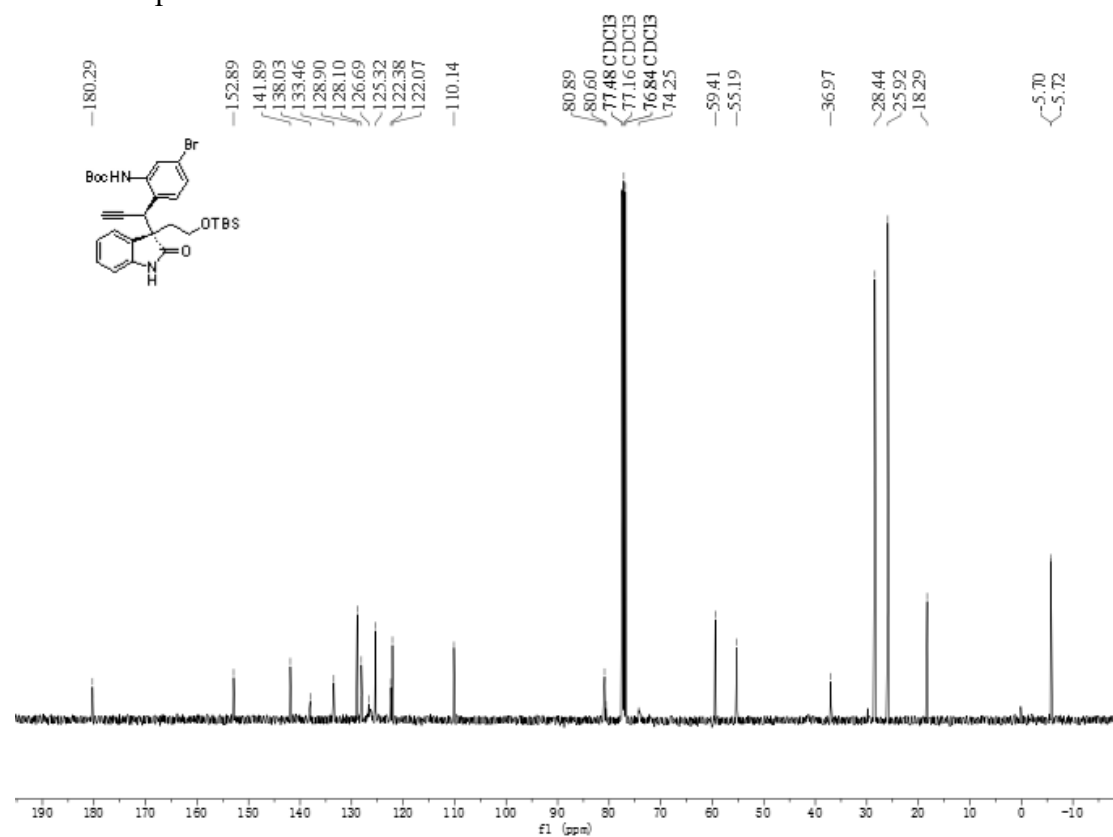
¹³C NMR spectrum of **9**



^1H NMR spectrum of **10**



^{13}C NMR spectrum of **10**



Chemical structure of compound 10 is shown above the spectrum. The spectrum displays peaks corresponding to the structure, with integration values provided below the baseline.

Chemical Shift (ppm)	Integration
7.18	0.95
7.12	0.89
7.04	1.00
6.98	0.97
6.92	2.83
6.86	0.95
6.80	0.89
6.74	1.00
6.68	0.93
6.62	0.90
6.56	1.00
6.50	1.99
6.44	1.02
6.38	1.02
6.32	8.95
6.26	8.93
6.20	2.77
6.14	2.86

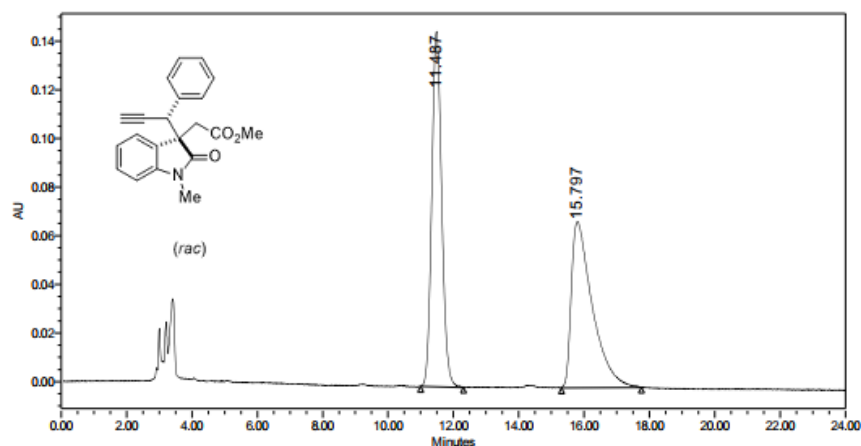
Chemical structure of compound 10 is shown above the ¹³C NMR spectrum. The structure is a complex molecule featuring a benzimidazole core, a Boc-protected amine, a bromophenyl group, and a silyl ether. The ¹³C NMR spectrum (CDCl₃) displays peaks corresponding to the structure, with the following chemical shifts (ppm) labeled above the spectrum:

180.74, 153.22, 141.38, 136.95, 134.98, 131.01, 129.43, 128.65, 127.41, 124.65, 121.96, 120.97, 118.80, 109.92, 81.00, 77.41 CDCl₃, 77.16 CDCl₃, 76.91 CDCl₃, 59.41, 55.21, 51.11, 37.75, 28.51, 25.92, 18.29, -5.69.

12. HPLC of Products

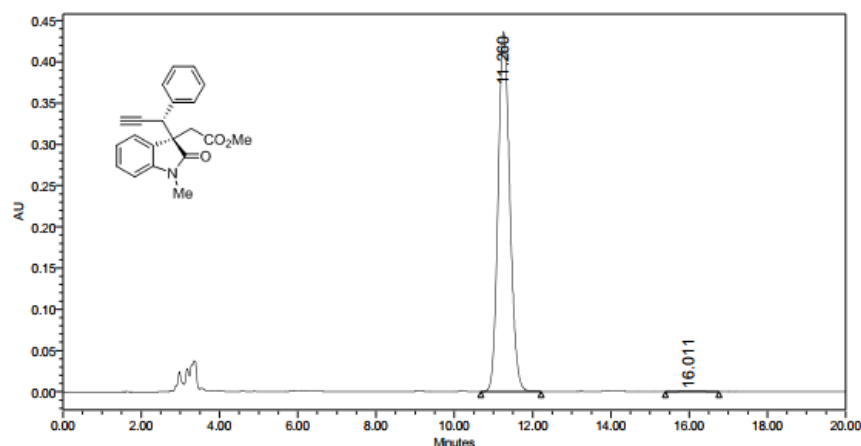
(*R,R*)-3aa

SAMPLE INFORMATION			
Sample Name:	wyh-1-167-1-rac-IG-30%-1ml/min	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	wyh16713
Vial:	51	Acq. Method Set:	30% 1ml
Injection #:	1	Processing Method:	1
Injection Volume:	10.00 ul	Channel Name:	230.0nm
Run Time:	24.0 Minutes	Proc. Chnl. Descr.:	2998 PDA 230.0 nm (2998)
Date Acquired:	7/13/2021 5:55:33 PM CST		
Date Processed:	7/13/2021 7:36:08 PM CST		



	RT	Area	% Area	Height
1	11.487	3089227	50.37	145990
2	15.797	3043361	49.63	68143

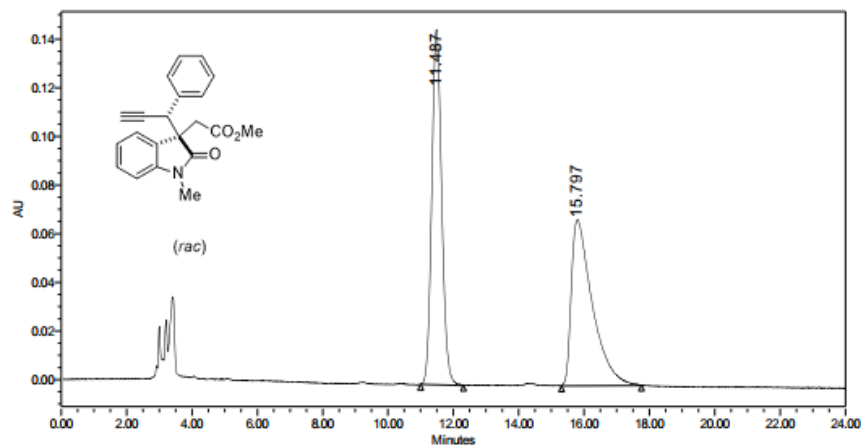
SAMPLE INFORMATION			
Sample Name:	wyh-1-75-1-asy-IG-30%-1ml/min	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	wyh1751
Vial:	32	Acq. Method Set:	30% 1ml
Injection #:	1	Processing Method:	1
Injection Volume:	10.00 ul	Channel Name:	230.0nm
Run Time:	20.0 Minutes	Proc. Chnl. Descr.:	2998 PDA 230.0 nm (2998)
Date Acquired:	1/5/2021 4:02:00 PM CST		
Date Processed:	7/14/2021 8:11:35 PM CST		



	RT	Area	% Area	Height
1	11.260	9107741	99.75	436059
2	16.011	22534	0.25	553

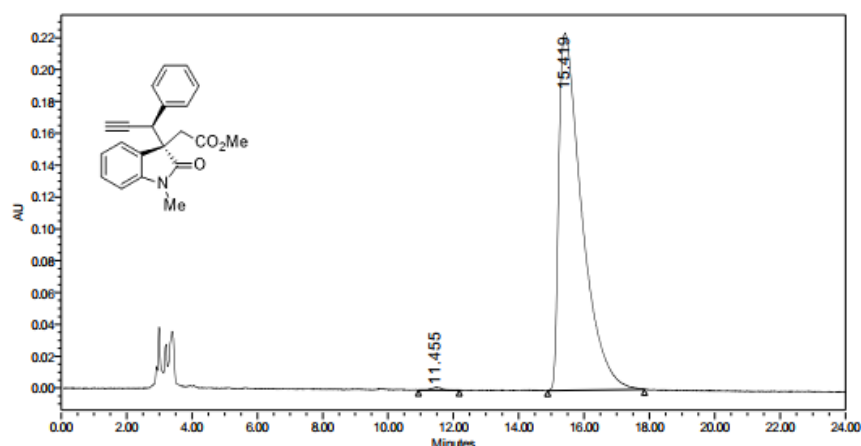
(S,S)-3aa

SAMPLE INFORMATION			
Sample Name:	wyh-1-167-1-rac-IG-30%-1ml/min	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	wyh16713
Vial:	51	Acq. Method Set:	30% 1ml
Injection #:	1	Processing Method:	1
Injection Volume:	10.00 ul	Channel Name:	230.0nm
Run Time:	24.0 Minutes	Proc. Chnl. Descr.:	2998 PDA 230.0 nm (2998)
Date Acquired:	7/13/2021 5:55:33 PM CST		
Date Processed:	7/13/2021 7:36:08 PM CST		



	RT	Area	% Area	Height
1	11.487	3089227	50.37	145990
2	15.797	3043361	49.63	68143

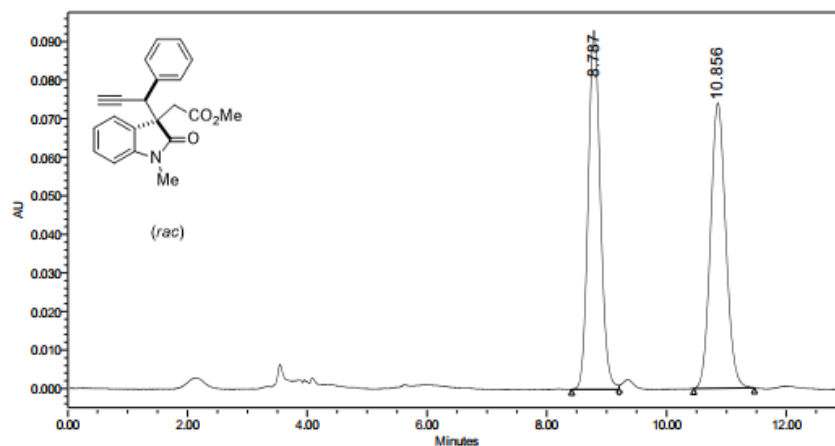
SAMPLE INFORMATION			
Sample Name:	Unknown	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	wyh16713
Vial:	53	Acq. Method Set:	30% 1ml
Injection #:	1	Processing Method:	1
Injection Volume:	10.00 ul	Channel Name:	230.0nm
Run Time:	24.0 Minutes	Proc. Chnl. Descr.:	2998 PDA 230.0 nm (2998)
Date Acquired:	7/13/2021 6:44:55 PM CST		
Date Processed:	7/13/2021 7:37:15 PM CST		



	RT	Area	% Area	Height
1	11.455	40971	0.37	1824
2	15.419	11001117	99.63	224374

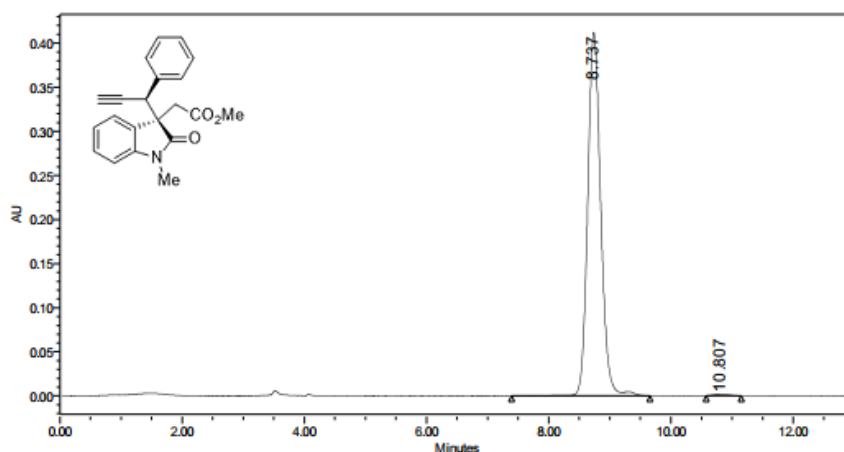
(*R,S*)-3aa

SAMPLE INFORMATION			
Sample Name:	Unknown	Acquired By:	System
Sample Type:	12	Sample Set Name:	wyh182up
Vial:	1	Acq. Method Set:	30% 1ml
Injection #:	10.00 ul	Processing Method:	1
Injection Volume:	13.0 Minutes	Channel Name:	270.0nm
Run Time:		Proc. Chnl. Descr.:	2998 PDA 270.0 nm (2998)
Date Acquired:	3/6/2021 1:01:37 PM CST		
Date Processed:	3/6/2021 2:41:06 PM CST		



	RT	Area	% Area	Height
1	8.787	1318498	50.20	93123
2	10.856	1307970	49.80	74057

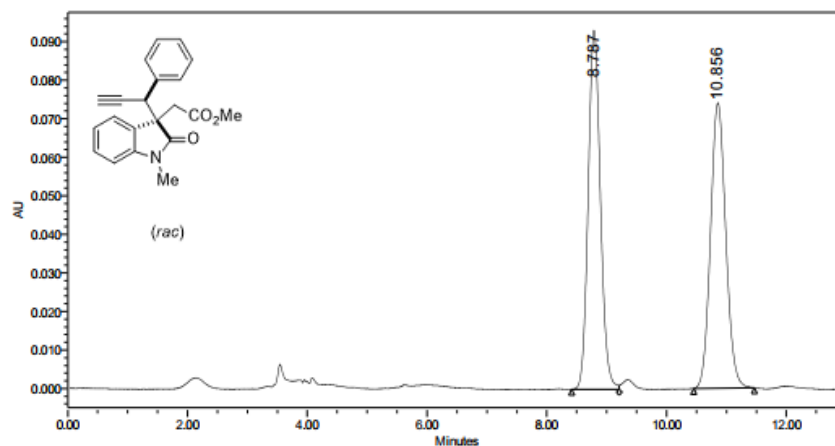
SAMPLE INFORMATION			
Sample Name:	wyh-1-82-1-asy-IG-30%-1ml/min	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	wyh182up
Vial:	13	Acq. Method Set:	30% 1ml
Injection #:	1	Processing Method:	1
Injection Volume:	10.00 ul	Channel Name:	270.0nm
Run Time:	13.0 Minutes	Proc. Chnl. Descr.:	2998 PDA 270.0 nm (2998)
Date Acquired:	3/6/2021 1:20:26 PM CST		
Date Processed:	3/6/2021 2:43:32 PM CST		



	RT	Area	% Area	Height
1	8.737	6079519	99.57	411878
2	10.807	26183	0.43	1625

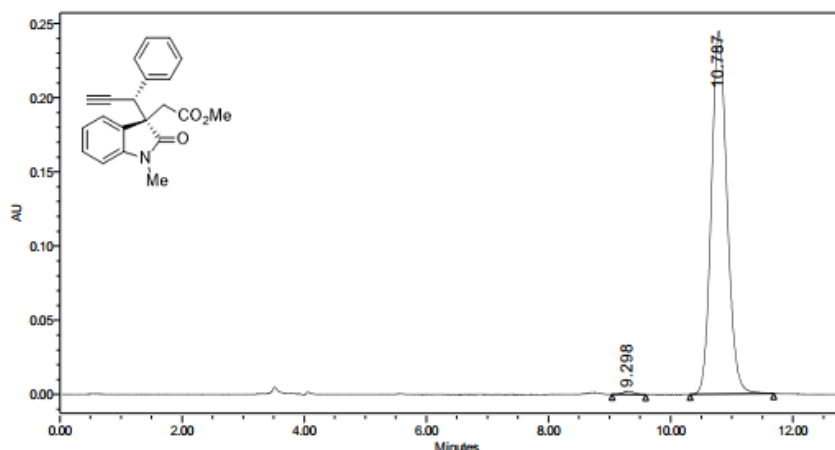
(*S,R*)-3aa

SAMPLE INFORMATION			
Sample Name:	Unknown	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	wyh182up
Vial:	12	Acq. Method Set:	30% 1ml
Injection #:	1	Processing Method:	1
Injection Volume:	10.00 ul	Channel Name:	270.0nm
Run Time:	13.0 Minutes	Proc. Chnl. Descr.:	2998 PDA 270.0 nm (2998)
Date Acquired:	3/6/2021 1:01:37 PM CST		
Date Processed:	3/6/2021 2:41:06 PM CST		



	RT	Area	% Area	Height
1	8.787	1318498	50.20	93123
2	10.856	1307970	49.80	74057

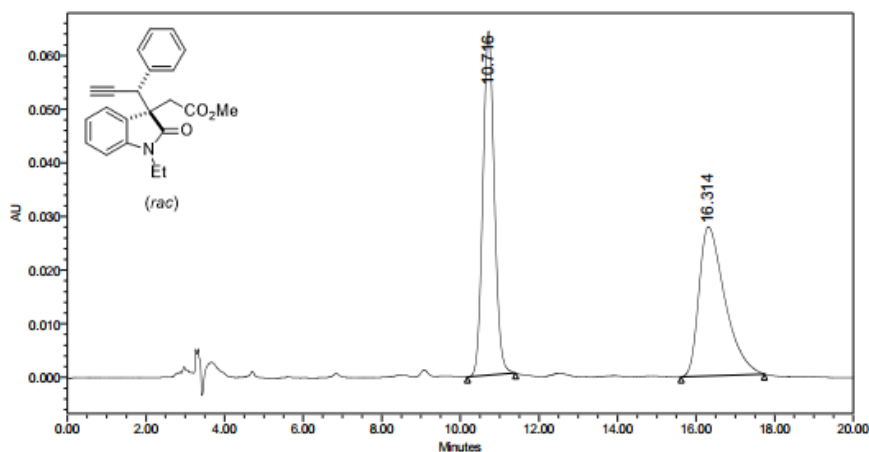
SAMPLE INFORMATION			
Sample Name:	wyh-1-82-2-asy-IG-30%-1ml/min	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	wyh182up
Vial:	14	Acq. Method Set:	30% 1ml
Injection #:	1	Processing Method:	1
Injection Volume:	10.00 ul	Channel Name:	270.0nm
Run Time:	13.0 Minutes	Proc. Chnl. Descr.:	2998 PDA 270.0 nm (2998)
Date Acquired:	3/6/2021 1:39:19 PM CST		
Date Processed:	3/6/2021 2:43:00 PM CST		



	RT	Area	% Area	Height
1	9.298	27777	0.63	2335
2	10.787	4386613	99.37	244641

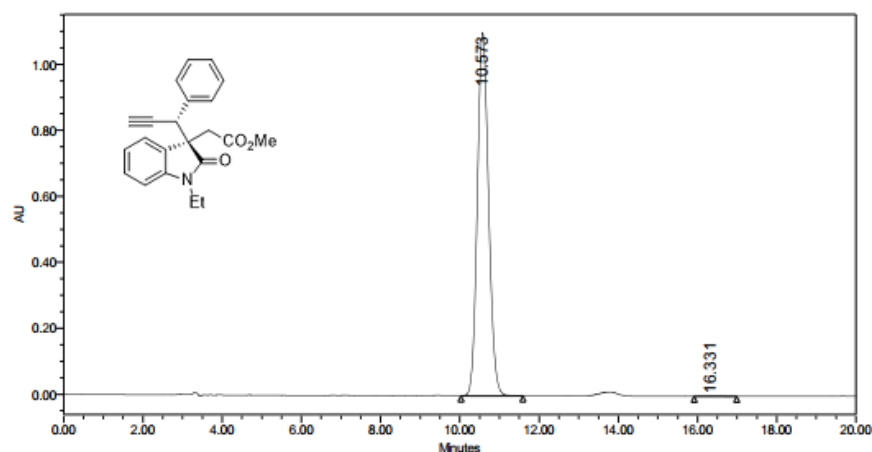
(*R,R*)-3ba

SAMPLE INFORMATION			
Sample Name:	wyh-1-74-1-d-IG-30%-1ml/min	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	wyh174
Vial:	32	Acq. Method Set:	30% 1ml
Injection #:	1	Processing Method:	1
Injection Volume:	10.00 ul	Channel Name:	254.0nm
Run Time:	20.0 Minutes	Proc. Chnl. Descr.:	2998 PDA 254.0 nm (2998)
Date Acquired:	12/25/2020 1:26:58 PM CST		
Date Processed:	12/30/2020 3:37:34 PM CST		



	RT	Area	% Area	Height
1	10.716	1294232	50.37	64133
2	16.314	1275325	49.63	27833

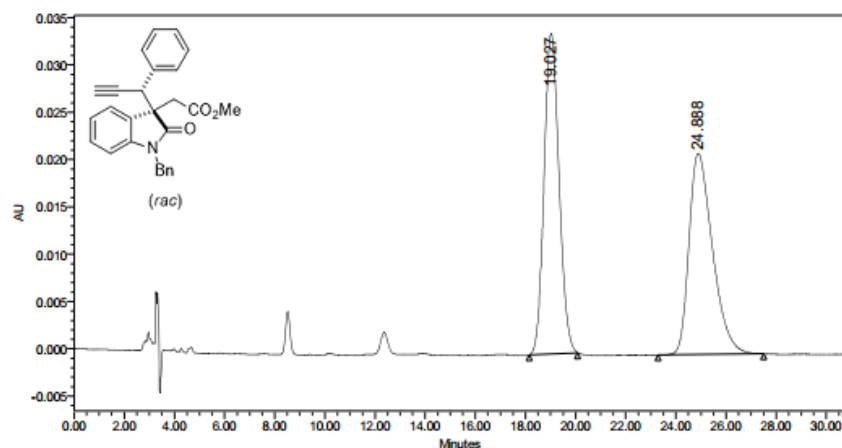
SAMPLE INFORMATION			
Sample Name:	wyh-1-74-1-asy-IG-30%-1ml/min	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	wyh174
Vial:	41	Acq. Method Set:	30% 1ml
Injection #:	1	Processing Method:	1
Injection Volume:	10.00 ul	Channel Name:	254.0nm
Run Time:	20.0 Minutes	Proc. Chnl. Descr.:	2998 PDA 254.0 nm (2998)
Date Acquired:	12/24/2020 11:13:25 AM CST		
Date Processed:	12/30/2020 3:38:05 PM CST		



	RT	Area	% Area	Height
1	10.573	21835641	99.91	1100912
2	16.331	20046	0.09	533

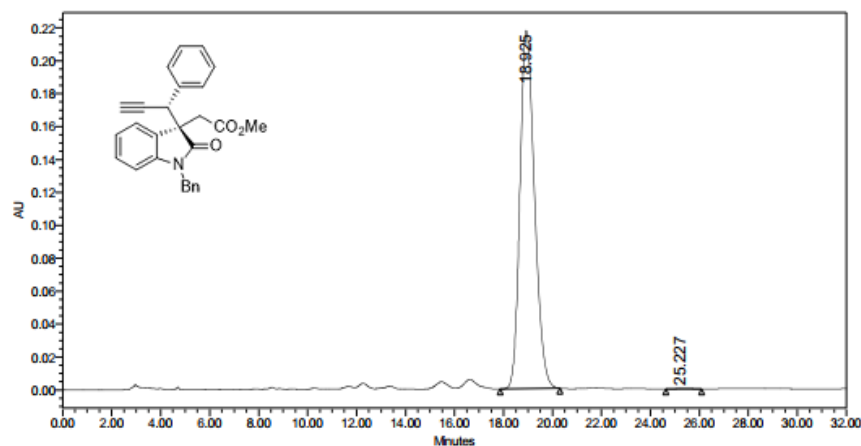
(*R,R*)-3ca

SAMPLE INFORMATION			
Sample Name:	wyh-1-74-3-rac-d-IG-30%-1ml/min	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	wyh1743
Vial:	8	Acq. Method Set:	30% 1ml
Injection #:	1	Processing Method:	1
Injection Volume:	10.00 ul	Channel Name:	254.0nm
Run Time:	32.0 Minutes	Proc. Chnl. Descr.:	2998 PDA 254.0 nm (2998)
Date Acquired:	12/31/2020 4:12:33 PM CST		
Date Processed:	12/31/2020 5:11:54 PM CST		



	RT	Area	% Area	Height
1	19.027	1398690	50.38	33886
2	24.888	1377494	49.62	21262

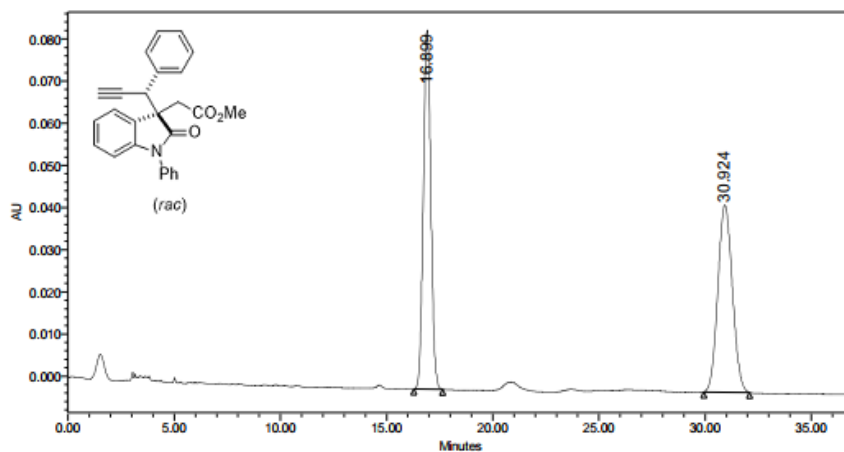
SAMPLE INFORMATION			
Sample Name:	wyh-1-74-3-asy-IG-30%-1ml/min	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	wyh1743
Vial:	9	Acq. Method Set:	30% 1ml
Injection #:	1	Processing Method:	1
Injection Volume:	10.00 ul	Channel Name:	254.0nm
Run Time:	32.0 Minutes	Proc. Chnl. Descr.:	2998 PDA 254.0 nm (2998)
Date Acquired:	12/31/2020 4:44:51 PM CST		
Date Processed:	1/1/2021 5:07:10 PM CST		



	RT	Area	% Area	Height
1	18.925	8999172	99.94	217624
2	25.227	4996	0.06	109

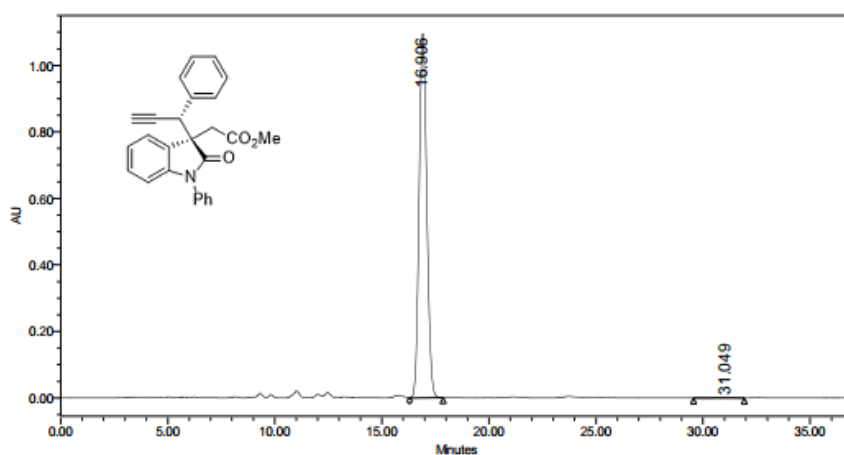
(R,R)-3da

SAMPLE INFORMATION			
Sample Name:	wyh-1-74-2-rac-d-IE-30%-1ml/min	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	wyh1742
Vial:	43	Acq. Method Set:	30% 1ml
Injection #:	1	Processing Method:	1
Injection Volume:	10.00 ul	Channel Name:	254.0nm
Run Time:	37.0 Minutes	Proc. Chnl. Descr.:	2998 PDA 254.0 nm (2998)
Date Acquired:	12/30/2020 8:43:58 PM CST		
Date Processed:	12/30/2020 10:07:48 PM CST		



	RT	Area	% Area	Height
1	16.899	2110483	49.99	85122
2	30.924	2110915	50.01	44390

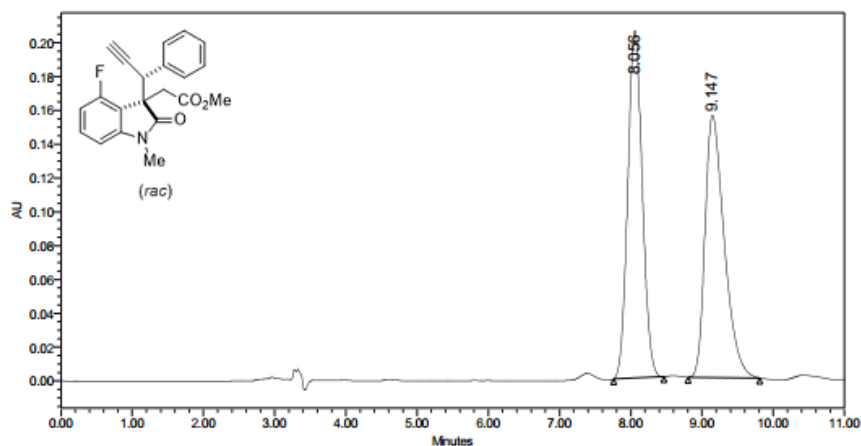
SAMPLE INFORMATION			
Sample Name:	wyh-1-74-2-asy-IE-30%-1ml/min	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	wyh1742
Vial:	44	Acq. Method Set:	30% 1ml
Injection #:	1	Processing Method:	1
Injection Volume:	10.00 ul	Channel Name:	254.0nm
Run Time:	37.0 Minutes	Proc. Chnl. Descr.:	2998 PDA 254.0 nm (2998)
Date Acquired:	12/30/2020 9:21:42 PM CST		
Date Processed:	12/30/2020 10:08:48 PM CST		



	RT	Area	% Area	Height
1	16.906	27421176	99.75	1095000
2	31.049	68443	0.25	1349

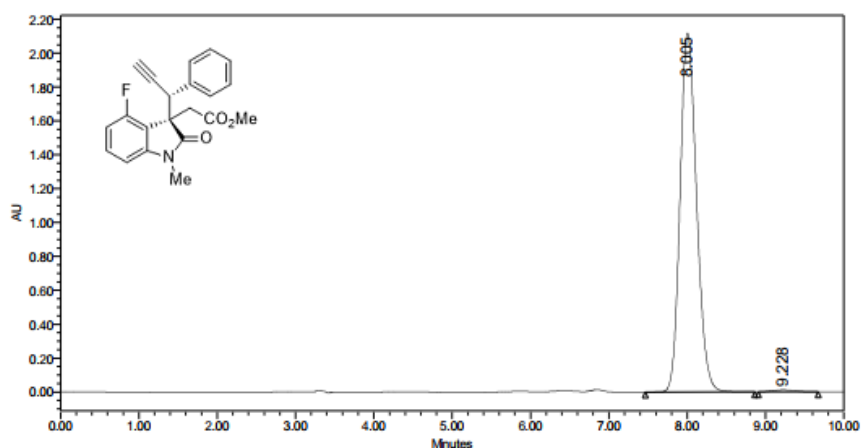
(*R,R*)-3ea

SAMPLE INFORMATION			
Sample Name:	wyh-1-76-1-rac-d-IG-30%-1ml/min	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	wyh_1_76_123
Vial:	91	Acq. Method Set:	30% 1ml
Injection #:	1	Processing Method:	1
Injection Volume:	10.00 ul	Channel Name:	254.0nm
Run Time:	11.0 Minutes	Proc. Chnl. Descr.:	2998 PDA 254.0 nm (2998)
Date Acquired:	1/1/2021 4:33:24 PM CST		
Date Processed:	1/1/2021 5:10:03 PM CST		



	RT	Area	% Area	Height
1	8.056	2896300	49.99	205215
2	9.147	2896903	50.01	154854

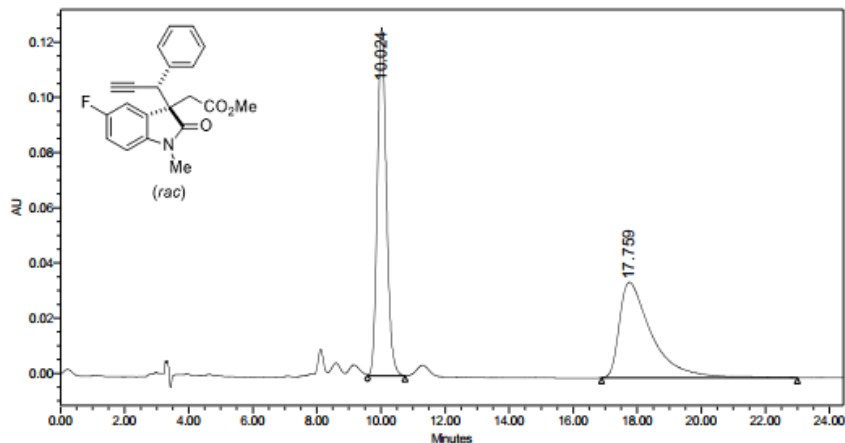
SAMPLE INFORMATION			
Sample Name:	wyh-1-76-1-asy-IG-30%-1ml/min	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	
Vial:	92	Acq. Method Set:	30% 1ml
Injection #:	1	Processing Method:	1
Injection Volume:	10.00 ul	Channel Name:	254.0nm
Run Time:	10.0 Minutes	Proc. Chnl. Descr.:	2998 PDA 254.0 nm (2998)
Date Acquired:	1/1/2021 9:23:37 PM CST		
Date Processed:	1/1/2021 9:34:28 PM CST		



	RT	Area	% Area	Height
1	8.005	30960952	99.30	2117349
2	9.228	217384	0.70	11289

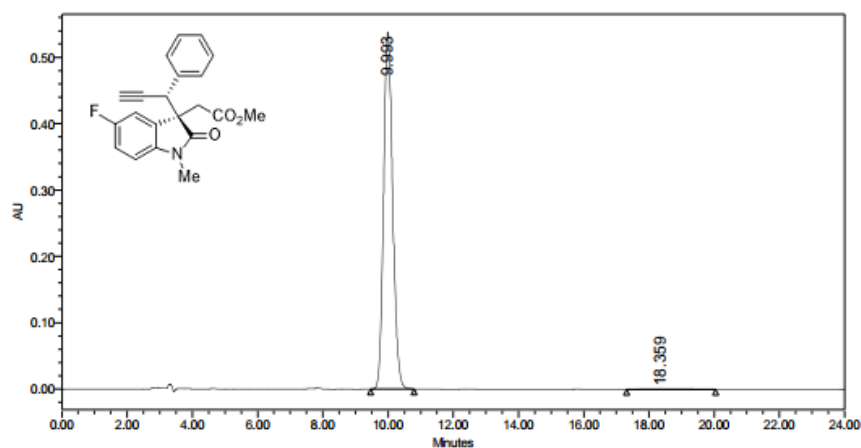
(R,R)-3fa

SAMPLE INFORMATION			
Sample Name:	wyh-1-76-6-rac-d-IG-30%-1ml/min	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	
Vial:	10	Acq. Method Set:	30% 1ml
Injection #:	1	Processing Method:	1
Injection Volume:	10.00 ul	Channel Name:	254.0nm
Run Time:	40.0 Minutes	Proc. Chnl. Descr.:	2998 PDA 254.0 nm (2998)
Date Acquired:	1/6/2021 2:48:50 PM CST		
Date Processed:	1/6/2021 8:00:35 PM CST		



	RT	Area	% Area	Height
1	10.024	2472165	50.77	126221
2	17.759	2396769	49.23	34582

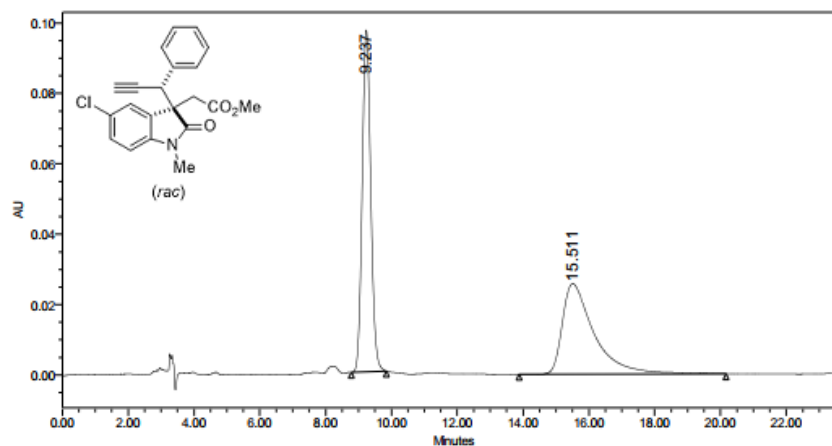
SAMPLE INFORMATION			
Sample Name:	wyh-1-76-6-asy-IG-30%-1ml/min	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	wyh17667
Vial:	28	Acq. Method Set:	30% 1ml
Injection #:	1	Processing Method:	1
Injection Volume:	10.00 ul	Channel Name:	254.0nm
Run Time:	24.0 Minutes	Proc. Chnl. Descr.:	2998 PDA 254.0 nm (2998)
Date Acquired:	1/6/2021 7:07:41 PM CST		
Date Processed:	1/6/2021 7:59:54 PM CST		



	RT	Area	% Area	Height
1	9.993	10311953	99.65	537791
2	18.359	36149	0.35	490

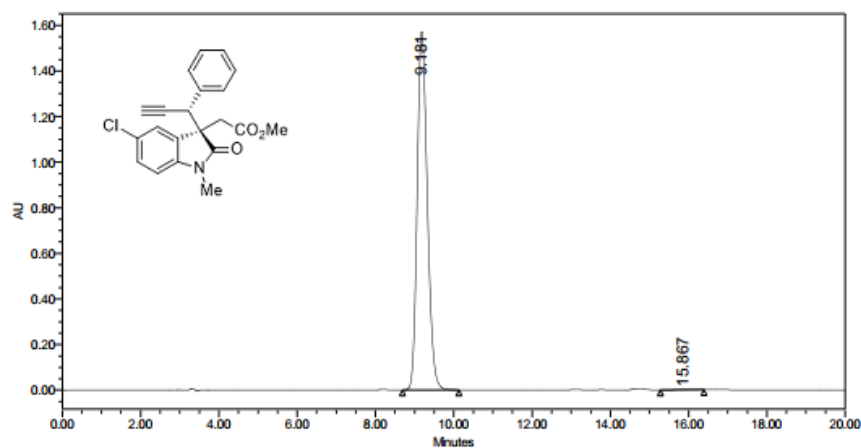
(*R,R*)-3ga

SAMPLE INFORMATION			
Sample Name:	wyh-1-76-7-rac-d-IG-30%-1ml/min	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	
Vial:	11	Acq. Method Set:	30% 1ml
Injection #:	1	Processing Method:	1
Injection Volume:	10.00 ul	Channel Name:	254.0nm@1
Run Time:	40.0 Minutes	Proc. Chnl. Descr.:	2998 PDA 254.0 nm (2998)
Date Acquired:	1/6/2021 3:14:08 PM CST		
Date Processed:	1/6/2021 3:40:22 PM CST		



	RT	Area	% Area	Height
1	9.237	1759930	50.68	97015
2	15.511	1713005	49.32	25701

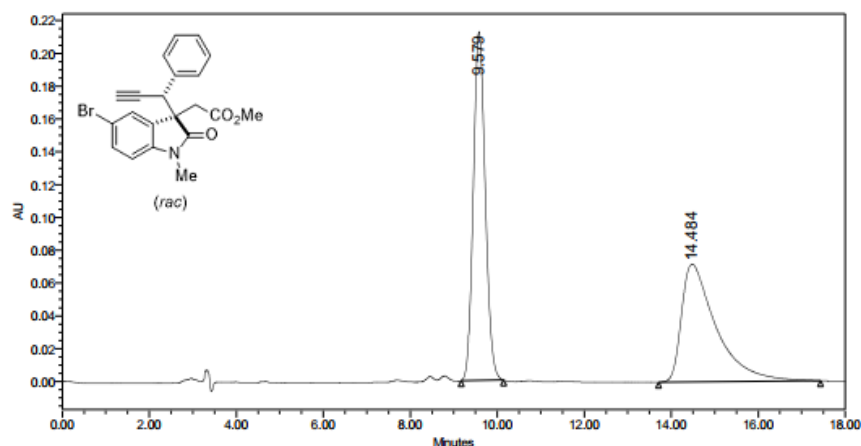
SAMPLE INFORMATION			
Sample Name:	wyh-1-76-7-asy-IG-30%-1ml/min	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	wyh17667
Vial:	29	Acq. Method Set:	30% 1ml
Injection #:	1	Processing Method:	1
Injection Volume:	10.00 ul	Channel Name:	254.0nm
Run Time:	20.0 Minutes	Proc. Chnl. Descr.:	2998 PDA 254.0 nm (2998)
Date Acquired:	1/6/2021 7:32:23 PM CST		
Date Processed:	1/6/2021 7:57:01 PM CST		



	RT	Area	% Area	Height
1	9.181	28351847	99.88	1570425
2	15.867	33145	0.12	914

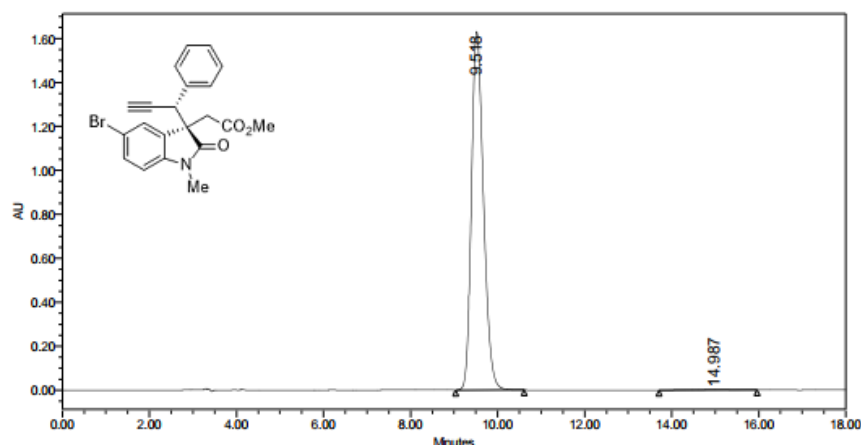
(R,R)-3ha

SAMPLE INFORMATION			
Sample Name:	wyh-1-76-2-rac-d-IG-30%-1ml/min	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	wyh_1_76_123
Vial:	93	Acq. Method Set:	30% 1ml
Injection #:	1	Processing Method:	1
Injection Volume:	10.00 ul	Channel Name:	254.0nm@1
Run Time:	18.0 Minutes	Proc. Chnl. Descr.:	2998 PDA 254.0 nm (2998)
Date Acquired:	1/1/2021 5:02:01 PM CST		
Date Processed:	1/1/2021 9:27:07 PM CST		



	RT	Area	% Area	Height
1	9.579	4062612	50.72	212415
2	14.484	3946988	49.28	71766

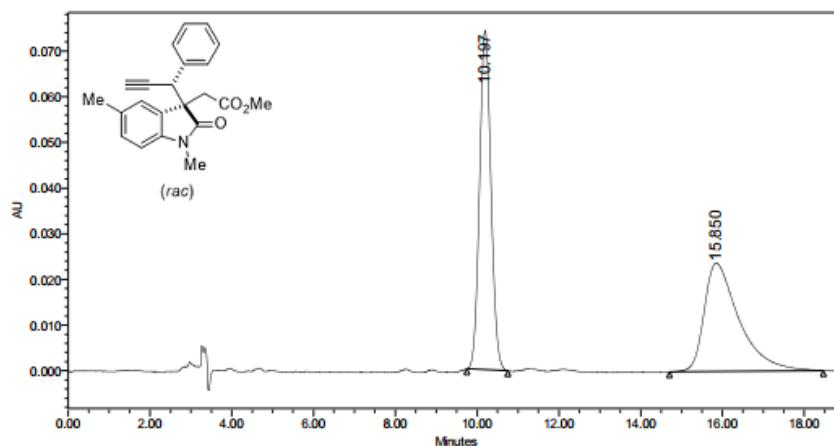
SAMPLE INFORMATION			
Sample Name:	wyh-1-76-2-asy-IG-30%-1ml/min	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	wyh_1_76_123
Vial:	94	Acq. Method Set:	30% 1ml
Injection #:	1	Processing Method:	1
Injection Volume:	10.00 ul	Channel Name:	254.0nm@1
Run Time:	18.0 Minutes	Proc. Chnl. Descr.:	2998 PDA 254.0 nm (2998)
Date Acquired:	1/1/2021 5:20:46 PM CST		
Date Processed:	1/1/2021 9:28:50 PM CST		



	RT	Area	% Area	Height
1	9.518	31432586	99.62	1629903
2	14.987	119882	0.38	2038

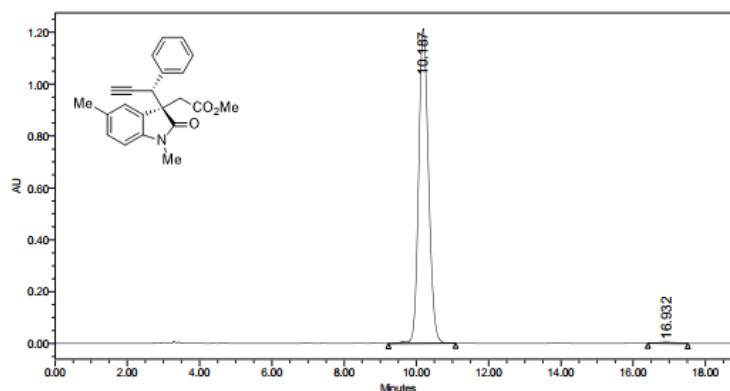
(*R,R*)-3ia

SAMPLE INFORMATION			
Sample Name:	wyh-1-76-3-rac-d-IG-30%-1ml/min	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	itmustbefinal
Vial:	40	Acq. Method Set:	30% 1ml
Injection #:	1	Processing Method:	1
Injection Volume:	10.00 ul	Channel Name:	254.0nm
Run Time:	19.0 Minutes	Proc. Chnl. Descr.:	2998 PDA 254.0 nm (2998)
Date Acquired:	1/4/2021 5:50:14 PM CST		
Date Processed:	1/4/2021 6:50:30 PM CST		



	RT	Area	% Area	Height
1	10.197	1432801	50.45	74221
2	15.850	1407517	49.55	23716

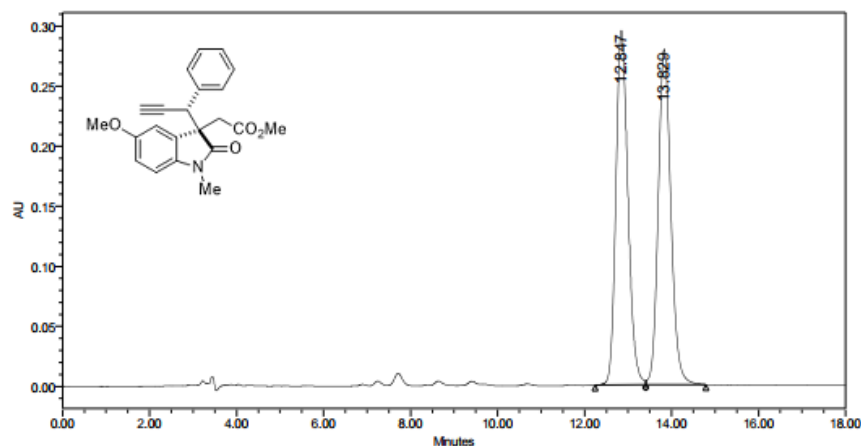
SAMPLE INFORMATION			
Sample Name:	wyh-1-76-3-asy-IG-30%-1ml/min	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	itmustbefinal
Vial:	41	Acq. Method Set:	30% 1ml
Injection #:	1	Processing Method:	1
Injection Volume:	10.00 ul	Channel Name:	254.0nm
Run Time:	19.0 Minutes	Proc. Chnl. Descr.:	2998 PDA 254.0 nm (2998)
Date Acquired:	1/4/2021 6:09:57 PM CST		
Date Processed:	7/12/2021 4:45:43 PM CST		



	RT	Area	% Area	Height
1	10.187	23141433	99.48	1213865
2	16.932	119855	0.52	4052

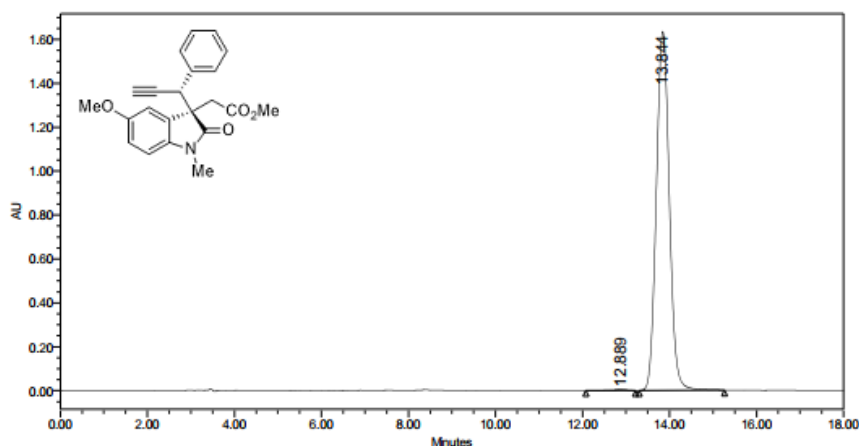
(*R,R*)-3ja

SAMPLE INFORMATION			
Sample Name:	wyh-1-76-9-rac-d-IA-15%-1ml/min	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	wyh1769
Vial:	92	Acq. Method Set:	15% 1ml
Injection #:	1	Processing Method:	1
Injection Volume:	10.00 ul	Channel Name:	254.0nm
Run Time:	18.0 Minutes	Proc. Chnl. Descr.:	2998 PDA 254.0 nm (2998)
Date Acquired:	1/29/2021 2:49:53 PM CST		
Date Processed:	1/29/2021 3:30:06 PM CST		



	RT	Area	% Area	Height
1	12.847	5674250	49.93	295158
2	13.829	5689212	50.07	279436

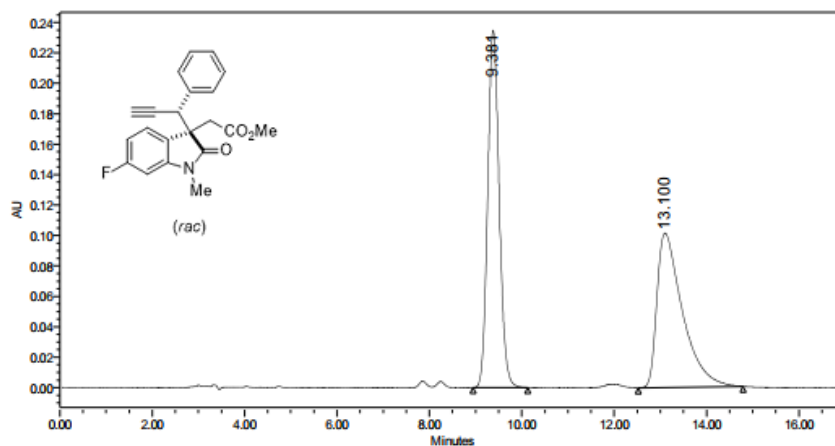
SAMPLE INFORMATION			
Sample Name:	wyh-1-76-9-asy-IA-15%-1ml/min	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	wyh1769
Vial:	93	Acq. Method Set:	15% 1ml
Injection #:	1	Processing Method:	1
Injection Volume:	10.00 ul	Channel Name:	254.0nm
Run Time:	18.0 Minutes	Proc. Chnl. Descr.:	2998 PDA 254.0 nm (2998)
Date Acquired:	1/29/2021 3:08:35 PM CST		
Date Processed:	1/29/2021 3:32:12 PM CST		



	RT	Area	% Area	Height
1	12.889	108058	0.32	5399
2	13.844	34016725	99.68	1633558

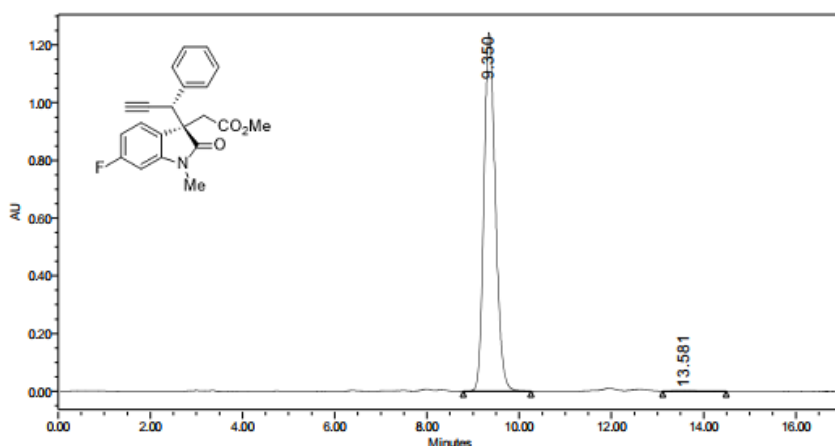
(*R,R*)-3ka

SAMPLE INFORMATION			
Sample Name:	wyh-1-167-3-rac-IG-30%-1ml/min	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	wyh16713
Vial:	54	Acq. Method Set:	30% 1ml
Injection #:	1	Processing Method:	1
Injection Volume:	10.00 ul	Channel Name:	254.0nm@1
Run Time:	17.0 Minutes	Proc. Chnl. Descr.:	2998 PDA 254.0 nm (2998)
Date Acquired:	7/13/2021 7:09:37 PM CST		
Date Processed:	7/13/2021 7:46:30 PM CST		



	RT	Area	% Area	Height
1	9.381	4025654	50.72	234855
2	13.100	3911431	49.28	101478

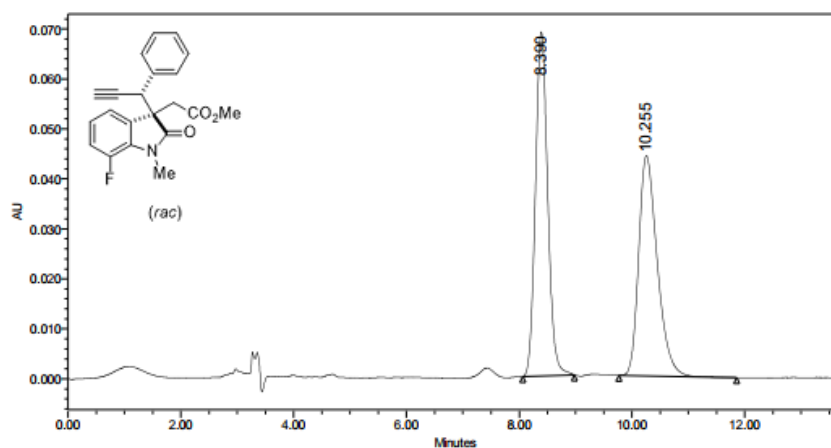
SAMPLE INFORMATION			
Sample Name:	wyh-1-167-3-asy-IG-30%-1ml/min	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	wyh16713
Vial:	55	Acq. Method Set:	30% 1ml
Injection #:	1	Processing Method:	1
Injection Volume:	10.00 ul	Channel Name:	254.0nm@1
Run Time:	17.0 Minutes	Proc. Chnl. Descr.:	2998 PDA 254.0 nm (2998)
Date Acquired:	7/13/2021 7:27:19 PM CST		
Date Processed:	7/13/2021 7:47:11 PM CST		



	RT	Area	% Area	Height
1	9.350	21321429	99.81	1242968
2	13.581	41080	0.19	1206

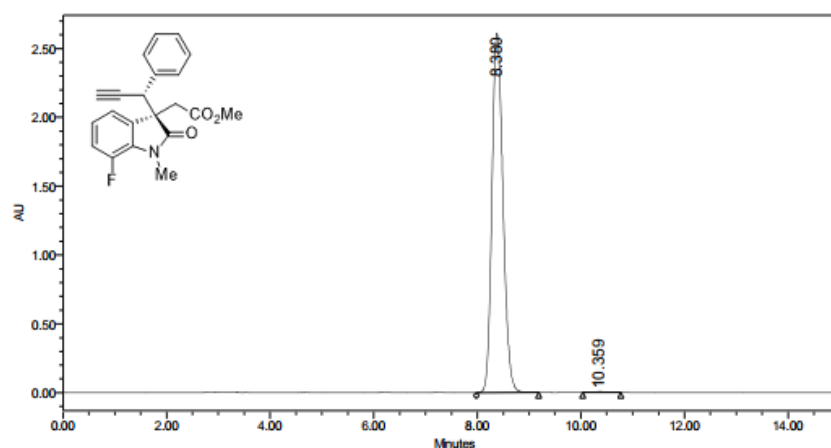
(R,R)-3la

SAMPLE INFORMATION			
Sample Name:	wyh-1-76-5-rac-d-IG-30%-1ml/min	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	
Vial:	94	Acq. Method Set:	30% 1ml
Injection #:	1	Processing Method:	1
Injection Volume:	10.00 ul	Channel Name:	254.0nm
Run Time:	40.0 Minutes	Proc. Chnl. Descr.:	2998 PDA 254.0 nm (2998)
Date Acquired:	1/3/2021 4:00:18 PM CST		
Date Processed:	1/3/2021 4:15:48 PM CST		



	RT	Area	% Area	Height
1	8.390	1040207	50.86	68815
2	10.255	1005115	49.14	44068

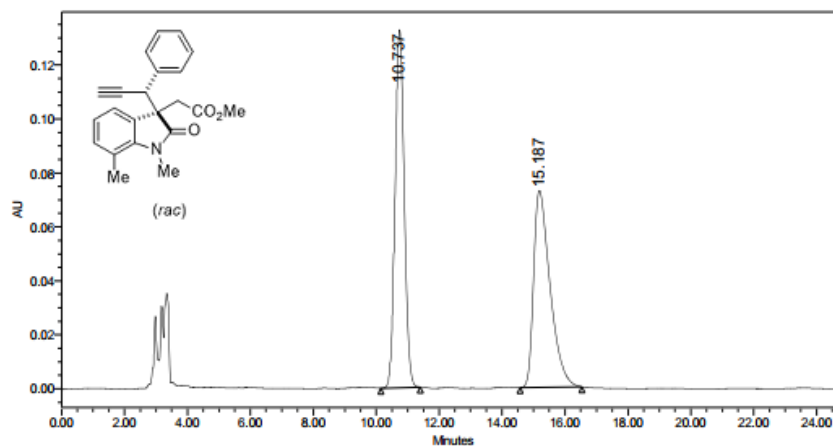
SAMPLE INFORMATION			
Sample Name:	wyh-1-76-5-asy-IG-30%-1ml/min	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	
Vial:	95	Acq. Method Set:	30% 1ml
Injection #:	1	Processing Method:	1
Injection Volume:	10.00 ul	Channel Name:	254.0nm
Run Time:	40.0 Minutes	Proc. Chnl. Descr.:	2998 PDA 254.0 nm (2998)
Date Acquired:	1/3/2021 4:15:06 PM CST		
Date Processed:	1/3/2021 4:31:28 PM CST		



	RT	Area	% Area	Height
1	8.380	38698850	99.76	2610008
2	10.359	91211	0.24	4878

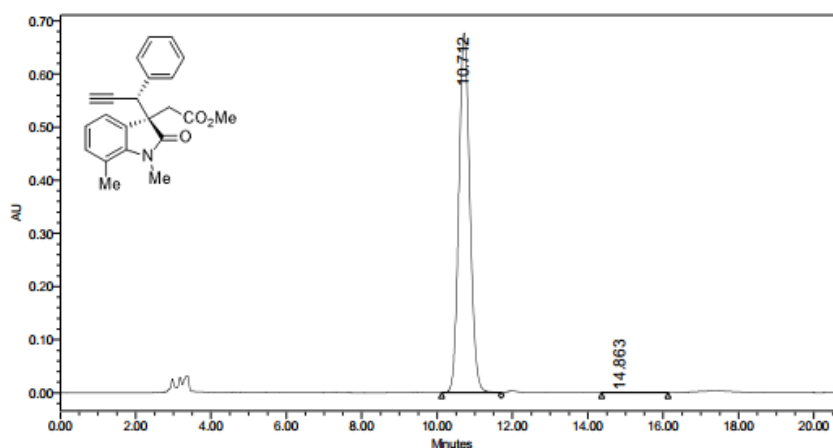
(*R,R*)-3ma

SAMPLE INFORMATION			
Sample Name:	wyh-1-76-8-rac-d-IG-30%-1ml/min	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	
Vial:	12	Acq. Method Set:	30% 1ml
Injection #:	1	Processing Method:	1
Injection Volume:	10.00 ul	Channel Name:	230.0nm
Run Time:	40.0 Minutes	Proc. Chnl. Descr.:	2998 PDA 230.0 nm (2998)
Date Acquired:	1/6/2021 3:38:51 PM CST		
Date Processed:	1/6/2021 8:17:31 PM CST		



	RT	Area	% Area	Height
1	10.737	2664485	50.05	132562
2	15.187	2659201	49.95	72991

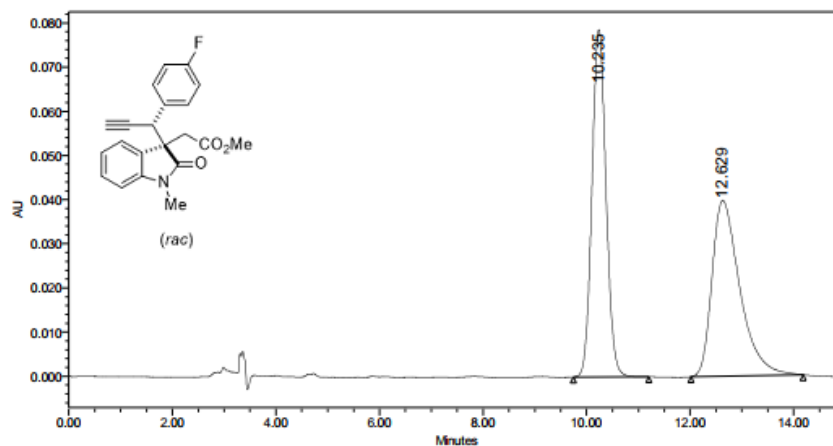
SAMPLE INFORMATION			
Sample Name:	wyh-1-76-8-asy-IG-30%-1ml/min	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	
Vial:	59	Acq. Method Set:	30% 1ml
Injection #:	1	Processing Method:	1
Injection Volume:	10.00 ul	Channel Name:	230.0nm
Run Time:	40.0 Minutes	Proc. Chnl. Descr.:	2998 PDA 230.0 nm (2998)
Date Acquired:	1/6/2021 7:55:34 PM CST		
Date Processed:	1/6/2021 8:18:38 PM CST		



	RT	Area	% Area	Height
1	10.712	13756777	99.77	676506
2	14.863	31147	0.23	807

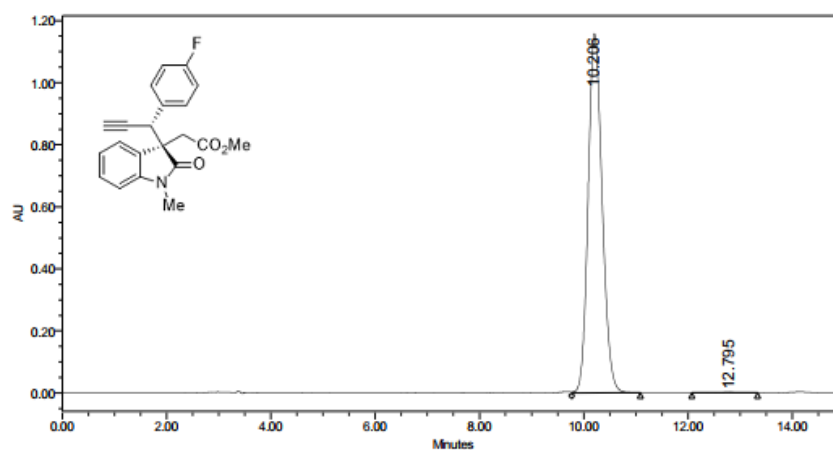
(R,R)-3ab

SAMPLE INFORMATION			
Sample Name:	wyh-1-78-3-rac-d-IG-30%-1ml/min	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	wyh1783
Vial:	57	Acq. Method Set:	30% 1ml
Injection #:	1	Processing Method:	1
Injection Volume:	10.00 ul	Channel Name:	254.0nm
Run Time:	15.0 Minutes	Proc. Chnl. Descr.:	2998 PDA 254.0 nm (2998)
Date Acquired:	1/16/2021 7:33:56 PM CST		
Date Processed:	1/16/2021 8:07:41 PM CST		



	RT	Area	% Area	Height
1	10.235	1488308	49.96	78611
2	12.629	1490860	50.04	39788

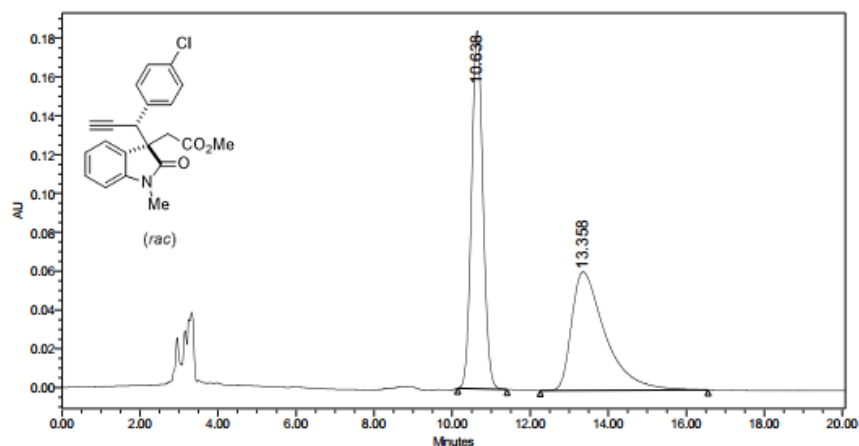
SAMPLE INFORMATION			
Sample Name:	wyh-1-78-3-asy-IG-30%-1ml/min	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	wyh1783
Vial:	58	Acq. Method Set:	30% 1ml
Injection #:	1	Processing Method:	1
Injection Volume:	10.00 ul	Channel Name:	254.0nm
Run Time:	15.0 Minutes	Proc. Chnl. Descr.:	2998 PDA 254.0 nm (2998)
Date Acquired:	1/16/2021 7:49:39 PM CST		
Date Processed:	1/16/2021 8:08:22 PM CST		



	RT	Area	% Area	Height
1	10.206	21680665	99.84	1157434
2	12.795	34892	0.16	1011

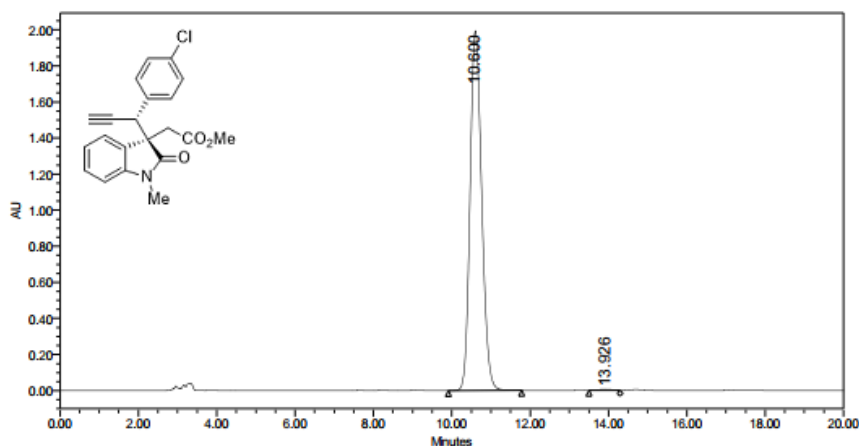
(*R,R*)-3ac

SAMPLE INFORMATION			
Sample Name:	wyh-1-78-1-rac-d-IG-30%-1ml/min	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	wyh1781
Vial:	77	Acq. Method Set:	30% 1ml
Injection #:	1	Processing Method:	1
Injection Volume:	10.00 ul	Channel Name:	230.0nm
Run Time:	40.0 Minutes	Proc. Chnl. Descr.:	2998 PDA 230.0 nm (2998)
Date Acquired:	1/8/2021 9:41:54 AM CST		
Date Processed:	1/8/2021 11:07:37 AM CST		



	RT	Area	% Area	Height
1	10.638	3755736	50.78	184290
2	13.358	3639639	49.22	61008

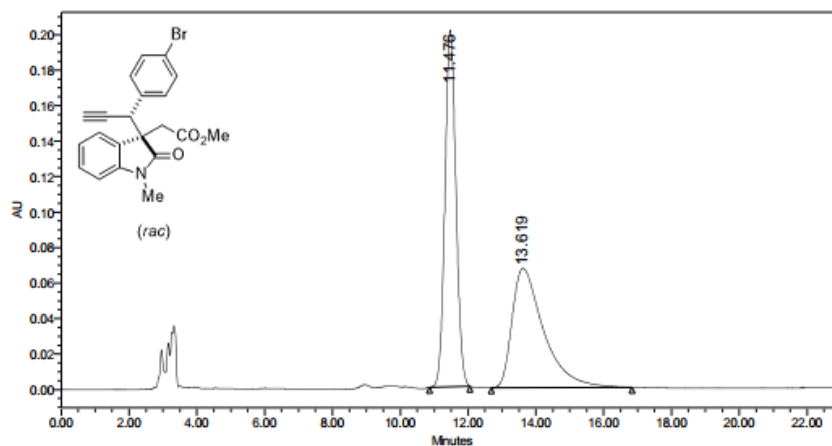
SAMPLE INFORMATION			
Sample Name:	wyh-1-78-1-asy-IG-30%-1ml/min	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	wyh17812
Vial:	78	Acq. Method Set:	30% 1ml
Injection #:	1	Processing Method:	1
Injection Volume:	10.00 ul	Channel Name:	230.0nm
Run Time:	20.0 Minutes	Proc. Chnl. Descr.:	2998 PDA 230.0 nm (2998)
Date Acquired:	1/8/2021 10:28:22 AM CST		
Date Processed:	1/8/2021 11:06:44 AM CST		



	RT	Area	% Area	Height
1	10.600	41249361	99.70	1992212
2	13.926	122091	0.30	5613

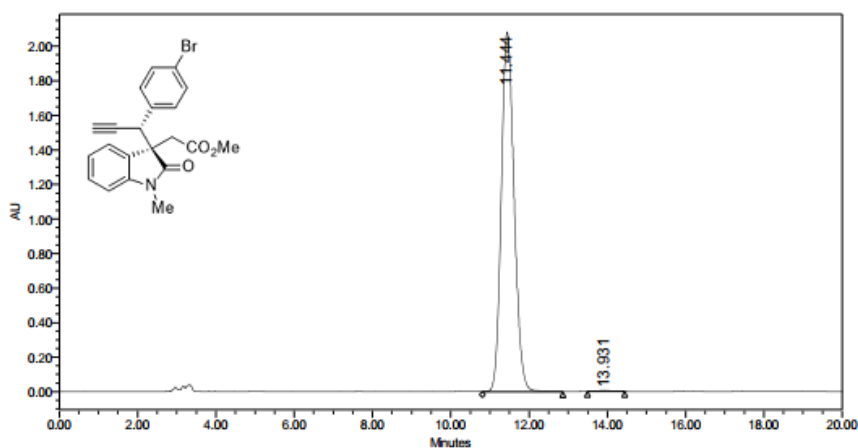
(R,R)-3ad

SAMPLE INFORMATION			
Sample Name:	wyh-1-78-2-rac-d-IG-30%-1ml/min	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	
Vial:	79	Acq. Method Set:	30% 1ml
Injection #:	1	Processing Method:	1
Injection Volume:	10.00 ul	Channel Name:	230.0nm
Run Time:	40.0 Minutes	Proc. Chnl. Descr.:	2998 PDA 230.0 nm (2998)
Date Acquired:	1/8/2021 10:03:30 AM CST		
Date Processed:	1/8/2021 11:10:59 AM CST		



	RT	Area	% Area	Height
1	11.476	4476860	50.75	200959
2	13.619	4344056	49.25	67375

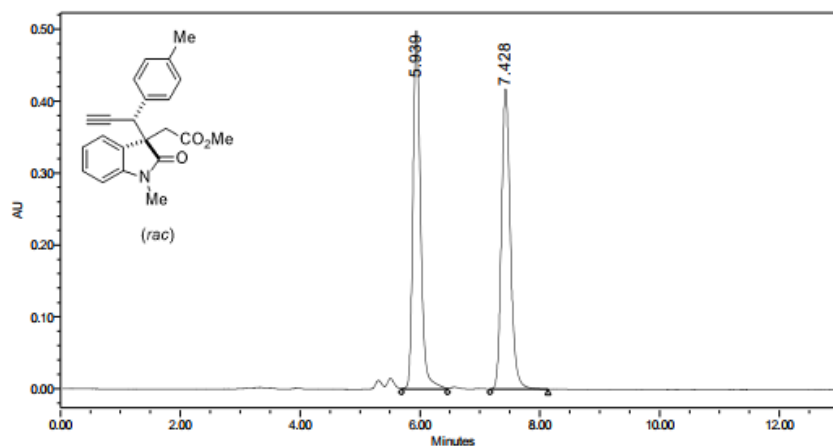
SAMPLE INFORMATION			
Sample Name:	wyh-1-78-2-asy-IG-30%-1ml/min	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	wyh17812
Vial:	80	Acq. Method Set:	30% 1ml
Injection #:	1	Processing Method:	1
Injection Volume:	10.00 ul	Channel Name:	230.0nm
Run Time:	20.0 Minutes	Proc. Chnl. Descr.:	2998 PDA 230.0 nm (2998)
Date Acquired:	1/8/2021 10:49:04 AM CST		
Date Processed:	1/8/2021 11:11:15 AM CST		



	RT	Area	% Area	Height
1	11.444	47026853	99.74	2080336
2	13.931	123600	0.26	5846

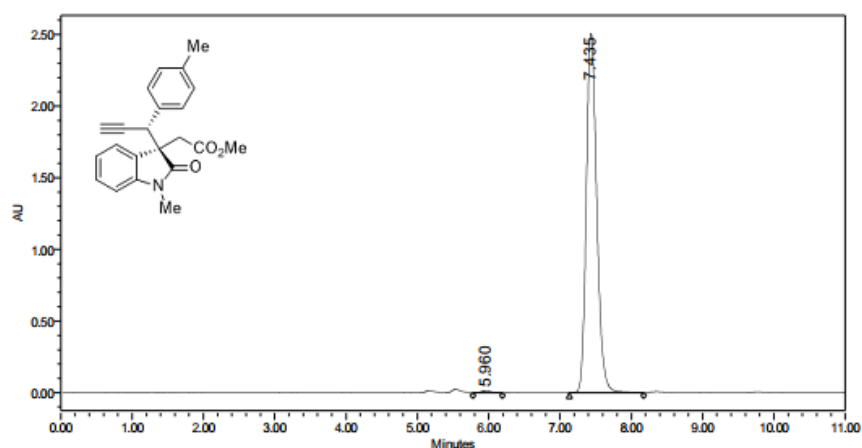
(*R,R*)-3ac

SAMPLE INFORMATION			
Sample Name:	Unknown	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	wyh1784racdown
Vial:	49	Acq. Method Set:	30% 1ml
Injection #:	1	Processing Method:	1
Injection Volume:	10.00 ul	Channel Name:	254.0nm
Run Time:	60.0 Minutes	Proc. Chnl. Descr.:	2998 PDA 254.0 nm (2998)
Date Acquired:	1/17/2021 5:20:35 PM CST		
Date Processed:	1/17/2021 6:03:35 PM CST		



	RT	Area	% Area	Height
1	5.939	4396267	50.48	497966
2	7.428	4313244	49.52	417090

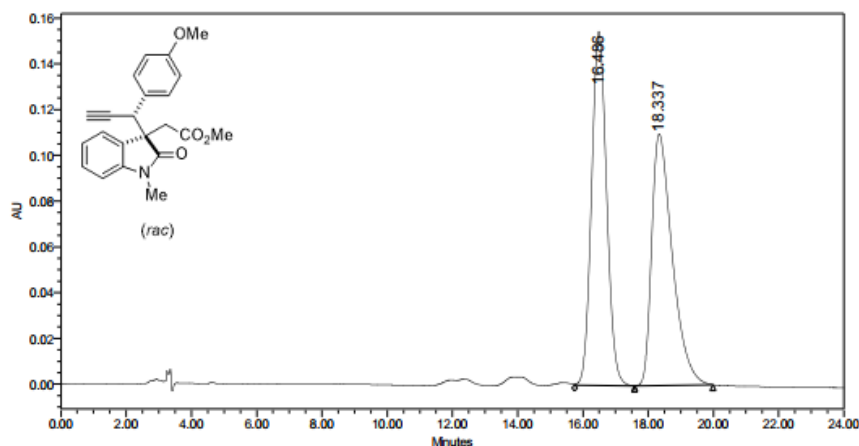
SAMPLE INFORMATION			
Sample Name:	wyh-1-78-4-asy-1A-30%-1ml/min	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	
Vial:	50	Acq. Method Set:	30% 1ml
Injection #:	1	Processing Method:	1
Injection Volume:	10.00 ul	Channel Name:	254.0nm
Run Time:	11.0 Minutes	Proc. Chnl. Descr.:	2998 PDA 254.0 nm (2998)
Date Acquired:	1/17/2021 5:51:33 PM CST		
Date Processed:	1/17/2021 6:04:02 PM CST		



	RT	Area	% Area	Height
1	5.960	111198	0.43	13336
2	7.435	25470899	99.57	2507009

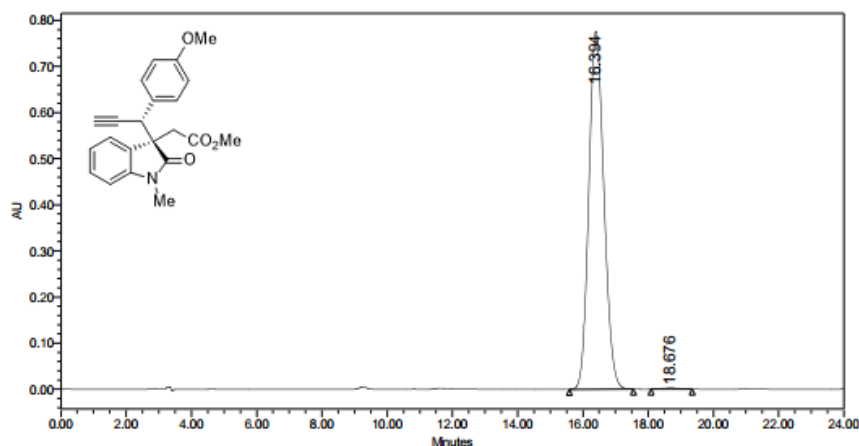
(R,R)-3af

SAMPLE INFORMATION			
Sample Name:	wyh-1-78-5-rac-d-IG-30%-1ml/min	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	wyh_1_78_5
Vial:	19	Acq. Method Set:	30% 1ml
Injection #:	1	Processing Method:	1
Injection Volume:	10.00 ul	Channel Name:	254.0nm
Run Time:	24.0 Minutes	Proc. Chnl. Descr.:	2998 PDA 254.0 nm (2998)
Date Acquired:	1/15/2021 1:03:31 PM CST		
Date Processed:	1/15/2021 2:17:55 PM CST		



	RT	Area	% Area	Height
1	16.486	4992718	50.65	154628
2	18.337	4864342	49.35	109942

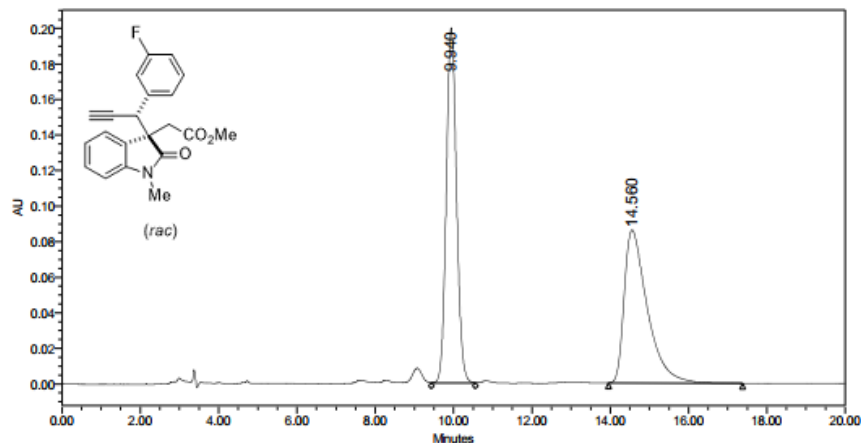
SAMPLE INFORMATION			
Sample Name:	wyh-1-78-5-asy-IG-30%-1ml/min	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	wyh_1_78_5
Vial:	20	Acq. Method Set:	30% 1ml
Injection #:	1	Processing Method:	1
Injection Volume:	10.00 ul	Channel Name:	254.0nm
Run Time:	24.0 Minutes	Proc. Chnl. Descr.:	2998 PDA 254.0 nm (2998)
Date Acquired:	1/15/2021 1:28:15 PM CST		
Date Processed:	1/15/2021 2:18:12 PM CST		



	RT	Area	% Area	Height
1	16.394	25084232	99.61	776259
2	18.676	99206	0.39	2505

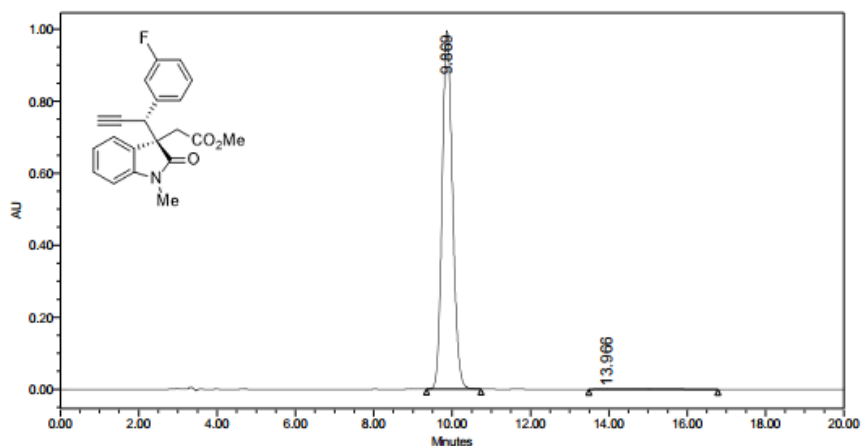
(*R,R*)-3ag

SAMPLE INFORMATION			
Sample Name:	wyh-1-78-9-rac-d-IG-30%-1ml/min	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	wyh2021123
Vial:	8	Acq. Method Set:	30% 1ml
Injection #:	1	Processing Method:	1
Injection Volume:	10.00 ul	Channel Name:	254.0nm
Run Time:	20.0 Minutes	Proc. Chnl. Descr.:	2998 PDA 254.0 nm (2998)
Date Acquired:	1/23/2021 10:33:21 AM CST		
Date Processed:	1/24/2021 9:45:25 PM CST		



	RT	Area	% Area	Height
1	9.940	3578794	50.46	199591
2	14.560	3513676	49.54	86076

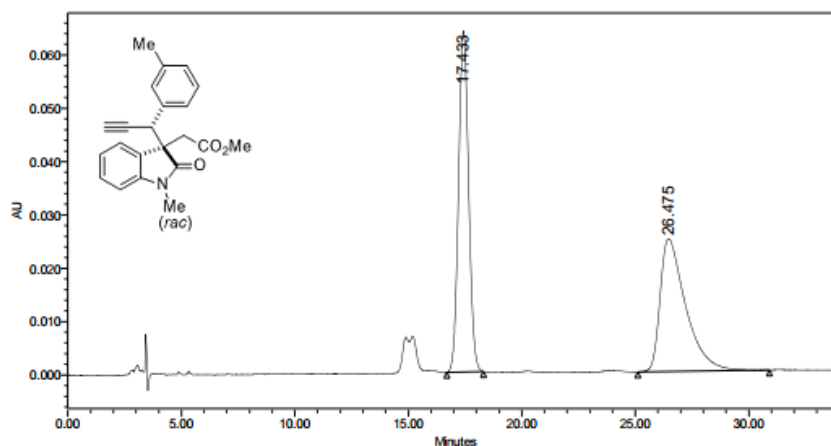
SAMPLE INFORMATION			
Sample Name:	wyh-1-78-9-asy-IG-30%-1ml/min	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	wyh1789
Vial:	5	Acq. Method Set:	30% 1ml
Injection #:	1	Processing Method:	1
Injection Volume:	10.00 ul	Channel Name:	254.0nm
Run Time:	20.0 Minutes	Proc. Chnl. Descr.:	2998 PDA 254.0 nm (2998)
Date Acquired:	1/24/2021 9:27:23 PM CST		
Date Processed:	1/24/2021 9:48:10 PM CST		



	RT	Area	% Area	Height
1	9.869	18185456	99.65	994770
2	13.966	62965	0.35	725

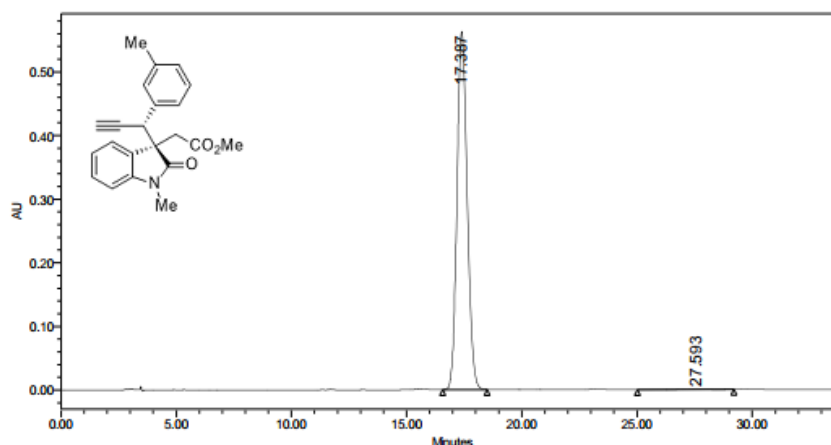
(*R,R*)-3ah

SAMPLE INFORMATION			
Sample Name:	wyh-1-78-6-rac-d-IG-15%-1ml/min	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	
Vial:	88	Acq. Method Set:	15% 1ml
Injection #:	1	Processing Method:	1
Injection Volume:	10.00 ul	Channel Name:	254.0nm
Run Time:	100.0 Minutes	Proc. Chnl. Descr.:	2998 PDA 254.0 nm (2998)
Date Acquired:	1/16/2021 8:14:32 PM CST		
Date Processed:	1/16/2021 9:24:36 PM CST		



	RT	Area	% Area	Height
1	17.433	1962375	50.28	63918
2	26.475	1940503	49.72	24919

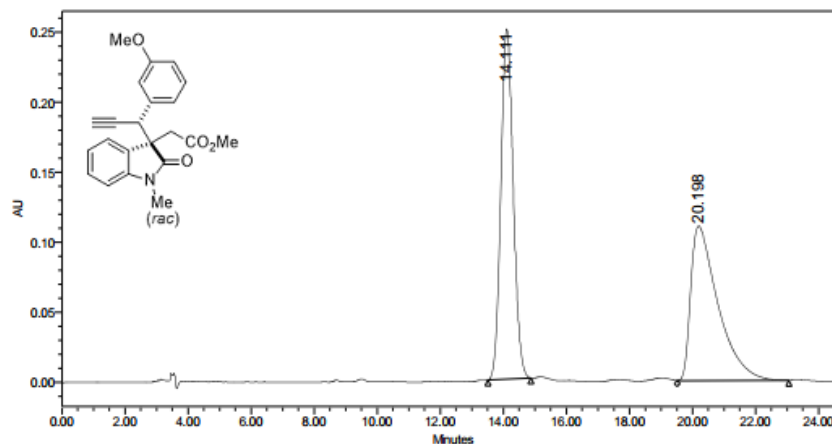
SAMPLE INFORMATION			
Sample Name:	wyh-1-78-6-asy-IG-15%-1ml/min	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	
Vial:	89	Acq. Method Set:	15% 1ml
Injection #:	1	Processing Method:	1
Injection Volume:	10.00 ul	Channel Name:	254.0nm
Run Time:	34.0 Minutes	Proc. Chnl. Descr.:	2998 PDA 254.0 nm (2998)
Date Acquired:	1/16/2021 8:49:48 PM CST		
Date Processed:	1/16/2021 9:25:43 PM CST		



	RT	Area	% Area	Height
1	17.387	17235743	99.76	562416
2	27.593	41009	0.24	673

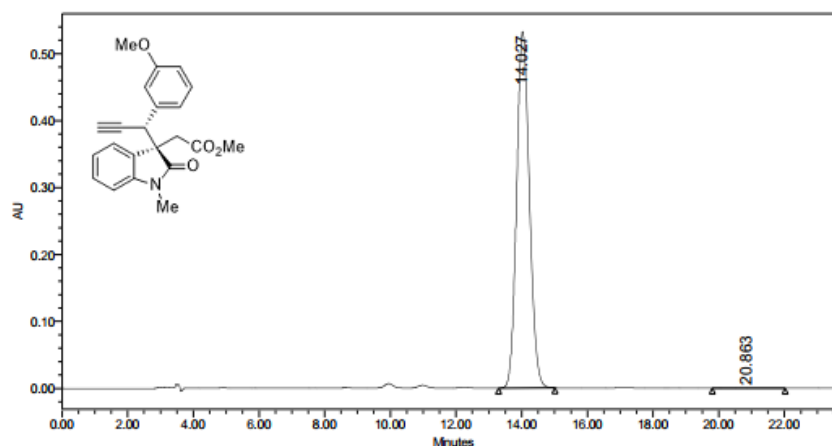
(*R,R*)-3ai

SAMPLE INFORMATION			
Sample Name:	wyh-1-78-10-rac-d-IG-30%-1ml/min	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	wyh17810racdown
Vial:	3	Acq. Method Set:	30% 1ml
Injection #:	1	Processing Method:	1
Injection Volume:	10.00 ul	Channel Name:	254.0nm
Run Time:	60.0 Minutes	Proc. Chnl. Descr.:	2998 PDA 254.0 nm (2998)
Date Acquired:	1/21/2021 9:58:55 AM CST		
Date Processed:	1/21/2021 11:00:38 AM CST		



	RT	Area	% Area	Height
1	14.111	6763591	50.70	249968
2	20.198	6576263	49.30	110259

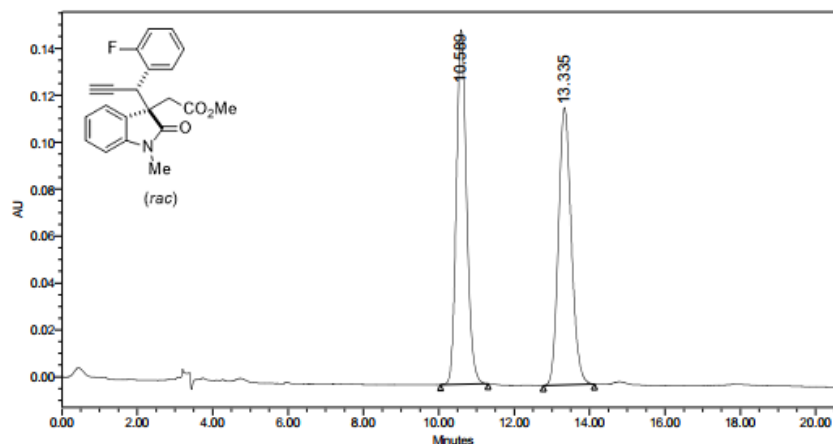
SAMPLE INFORMATION			
Sample Name:	wyh-1-78-10-asy-IG-30%-1ml/min	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	
Vial:	5	Acq. Method Set:	30% 1ml
Injection #:	1	Processing Method:	1
Injection Volume:	10.00 ul	Channel Name:	254.0nm@1
Run Time:	25.0 Minutes	Proc. Chnl. Descr.:	2998 PDA 254.0 nm (2998)
Date Acquired:	1/21/2021 10:29:34 AM CST		
Date Processed:	1/21/2021 11:01:07 AM CST		



	RT	Area	% Area	Height
1	14.027	14326966	99.86	532379
2	20.863	19388	0.14	321

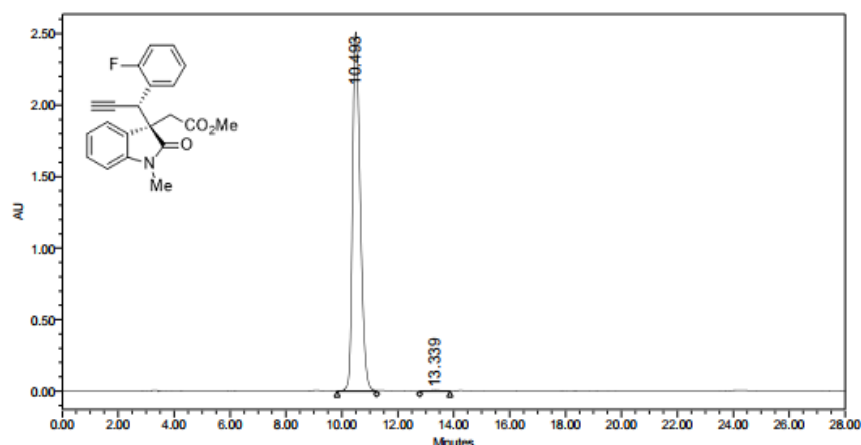
(*R,R*)-3aj

SAMPLE INFORMATION			
Sample Name:	wyh-1-78-11-rac-d-IC-30%-1ml/min	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	
Vial:	24	Acq. Method Set:	30% 1ml
Injection #:	1	Processing Method:	1
Injection Volume:	10.00 ul	Channel Name:	254.0nm
Run Time:	60.0 Minutes	Proc. Chnl. Descr.:	2998 PDA 254.0 nm (2998)
Date Acquired:	1/22/2021 6:54:16 PM CST		
Date Processed:	1/22/2021 7:15:27 PM CST		



	RT	Area	% Area	Height
1	10.589	2829050	50.36	150997
2	13.335	2788973	49.64	118080

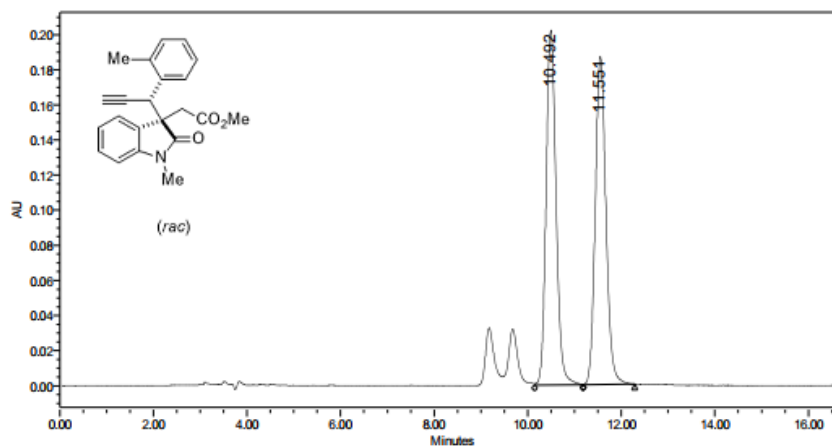
SAMPLE INFORMATION			
Sample Name:	wyh-1-78-11-asy-IC-30%-1ml/min	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	wyh17811asy
Vial:	4	Acq. Method Set:	30% 1ml
Injection #:	1	Processing Method:	1
Injection Volume:	10.00 ul	Channel Name:	254.0nm
Run Time:	28.0 Minutes	Proc. Chnl. Descr.:	2998 PDA 254.0 nm (2998)
Date Acquired:	1/22/2021 11:51:48 AM CST		
Date Processed:	1/22/2021 7:15:48 PM CST		



	RT	Area	% Area	Height
1	10.493	48496476	99.76	2511254
2	13.339	117048	0.24	4801

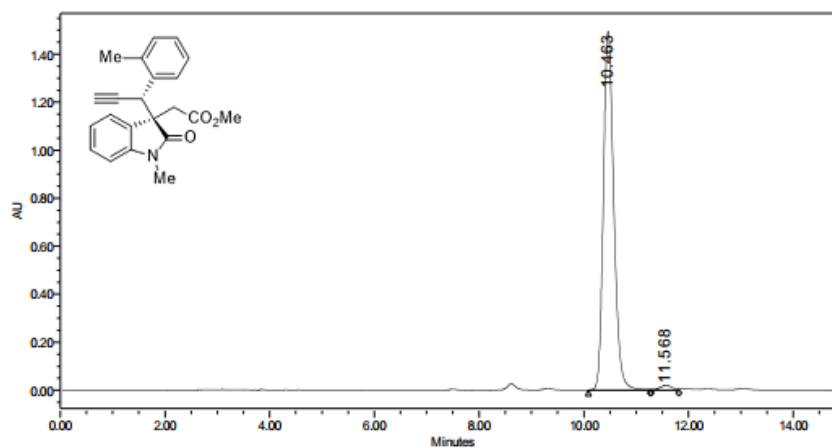
(R,R)-3ak

SAMPLE INFORMATION			
Sample Name:	Unknown	Acquired By:	System
Sample Type:	51	Sample Set Name:	wyh1787racdown
Vial:	1	Acq. Method Set:	10% 1ml
Injection #:	1	Processing Method:	1
Injection Volume:	10.00 ul	Channel Name:	254.0nm
Run Time:	60.0 Minutes	Proc. Chnl. Descr.:	2998 PDA 254.0 nm (2998)
Date Acquired:	1/17/2021 7:01:54 PM CST		
Date Processed:	1/17/2021 7:39:47 PM CST		



	RT	Area	% Area	Height
1	10.492	2942377	50.14	201948
2	11.551	2926496	49.86	186821

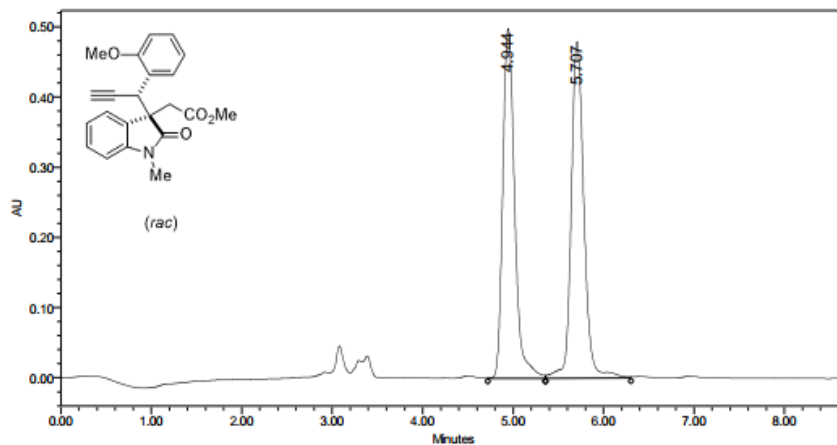
SAMPLE INFORMATION			
Sample Name:	wyh-1-78-7-asy-1A-10%-1ml/min	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	wyh1787
Vial:	52	Acq. Method Set:	10% 1ml
Injection #:	1	Processing Method:	1
Injection Volume:	10.00 ul	Channel Name:	254.0nm
Run Time:	15.0 Minutes	Proc. Chnl. Descr.:	2998 PDA 254.0 nm (2998)
Date Acquired:	1/17/2021 7:20:58 PM CST		
Date Processed:	1/17/2021 7:39:57 PM CST		



	RT	Area	% Area	Height
1	10.463	20680670	98.49	1494485
2	11.568	316564	1.51	19925

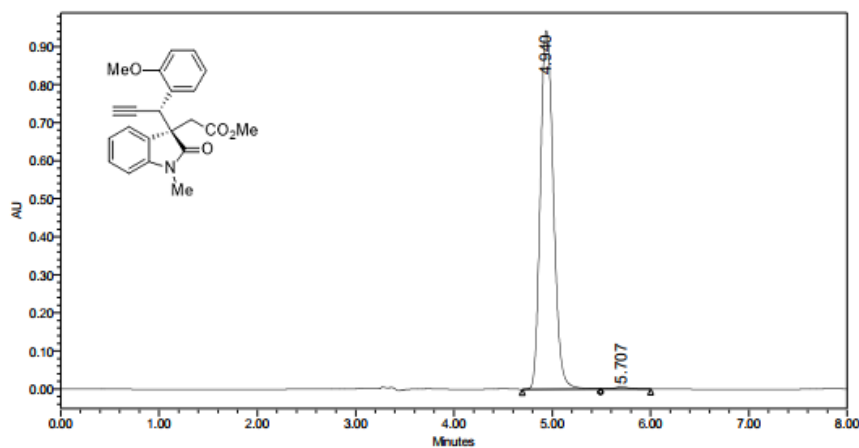
(R,R)-3al

SAMPLE INFORMATION			
Sample Name:	wyh-1-78-12-rac-d-IA-30%-1ml/min	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	
Vial:	68	Acq. Method Set:	30% 1ml
Injection #:	1	Processing Method:	1
Injection Volume:	10.00 ul	Channel Name:	230.0nm
Run Time:	30.0 Minutes	Proc. Chnl. Descr.:	2998 PDA 230.0 nm (2998)
Date Acquired:	1/24/2021 8:44:31 PM CST		
Date Processed:	1/24/2021 8:55:51 PM CST		



	RT	Area	% Area	Height
1	4.944	4541874	49.33	498260
2	5.707	4665923	50.67	479562

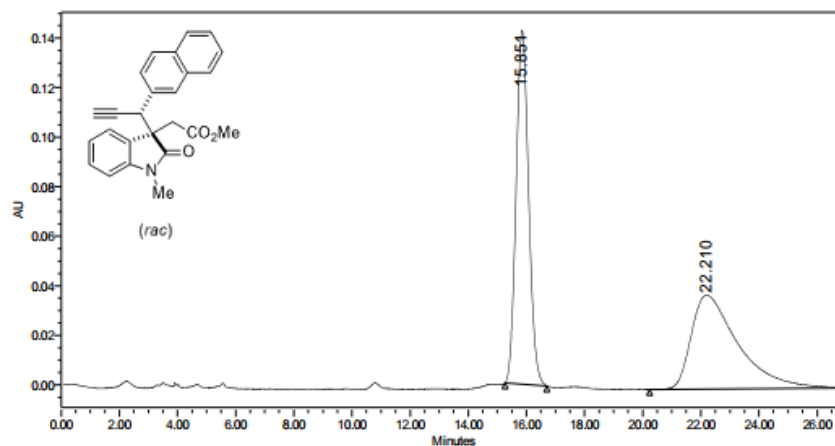
SAMPLE INFORMATION			
Sample Name:	wyh-1-78-12-asy-IA-30%-1ml/min	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	wyh17812
Vial:	60	Acq. Method Set:	30% 1ml
Injection #:	1	Processing Method:	1
Injection Volume:	10.00 ul	Channel Name:	254.0nm
Run Time:	8.0 Minutes	Proc. Chnl. Descr.:	2998 PDA 254.0 nm (2998)
Date Acquired:	1/25/2021 4:31:58 PM CST		
Date Processed:	1/25/2021 4:43:43 PM CST		



	RT	Area	% Area	Height
1	4.940	8726516	99.29	942020
2	5.707	62633	0.71	5387

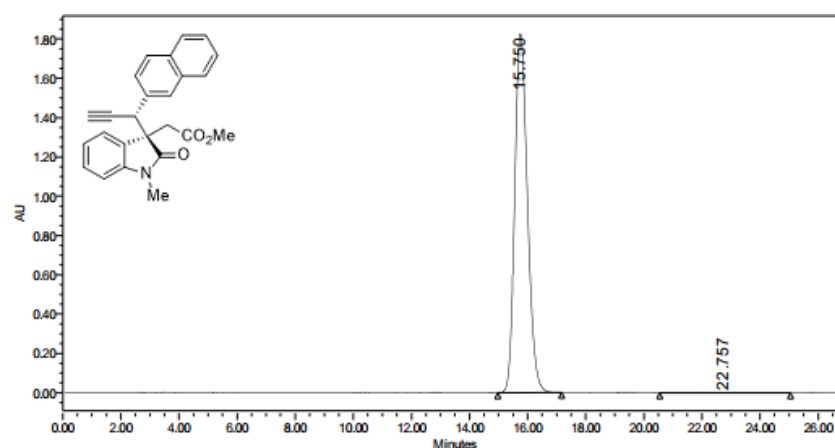
(R,R)-3am

SAMPLE INFORMATION			
Sample Name:	Unknown	Acquired By:	System
Sample Type:	9	Sample Set Name:	wyhsgygt
Vial:	1	Acq. Method Set:	30% 1ml
Injection #:	1	Processing Method:	1
Injection Volume:	10.00 ul	Channel Name:	254.0nm
Run Time:	27.0 Minutes	Proc. Chnl. Descr.:	2998 PDA 254.0 nm (2998)
Date Acquired:	3/6/2021 12:59:18 AM CST		
Date Processed:	3/6/2021 8:54:21 AM CST		



	RT	Area	% Area	Height
1	15.851	4293469	50.51	142803
2	22.210	4206939	49.49	37815

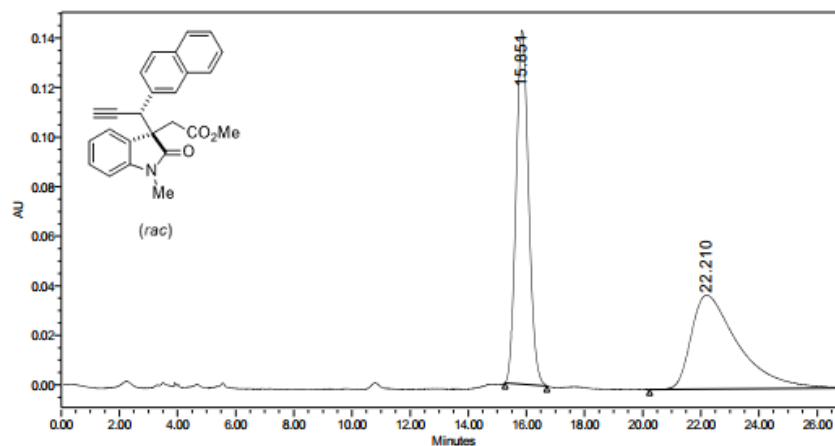
SAMPLE INFORMATION			
Sample Name:	wyh-1-78-13-asy-IG-30%-1ml/min	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	wyhsgygt
Vial:	10	Acq. Method Set:	30% 1ml
Injection #:	1	Processing Method:	1
Injection Volume:	10.00 ul	Channel Name:	254.0nm
Run Time:	27.0 Minutes	Proc. Chnl. Descr.:	2998 PDA 254.0 nm (2998)
Date Acquired:	3/6/2021 1:26:58 AM CST		
Date Processed:	3/6/2021 9:00:32 AM CST		



	RT	Area	% Area	Height
1	15.750	55916784	99.73	1825723
2	22.757	153174	0.27	1338

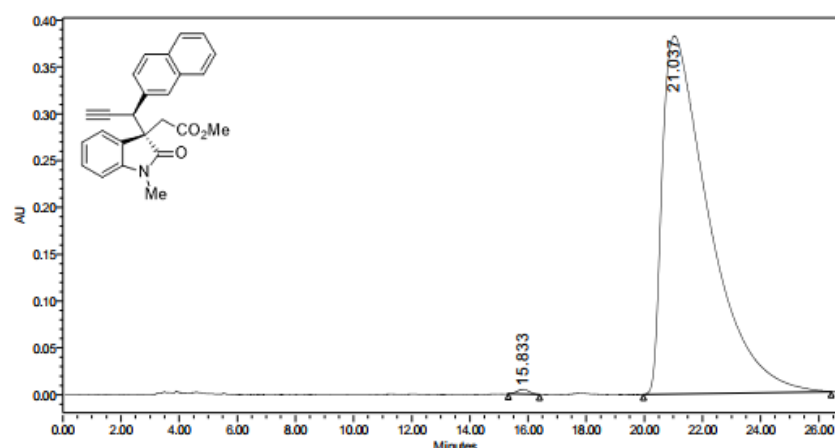
(S,S)-3am

SAMPLE INFORMATION			
Sample Name:	Unknown	Acquired By:	System
Sample Type:	9	Sample Set Name:	wyhsygt
Vial:	1	Acq. Method Set:	30% 1ml
Injection #:	1	Processing Method:	1
Injection Volume:	10.00 ul	Channel Name:	254.0nm
Run Time:	27.0 Minutes	Proc. Chnl. Descr.:	2998 PDA 254.0 nm (2998)
Date Acquired:	3/6/2021 12:59:18 AM CST		
Date Processed:	3/6/2021 8:54:21 AM CST		



	RT	Area	% Area	Height
1	15.851	4293469	50.51	142803
2	22.210	4206939	49.49	37815

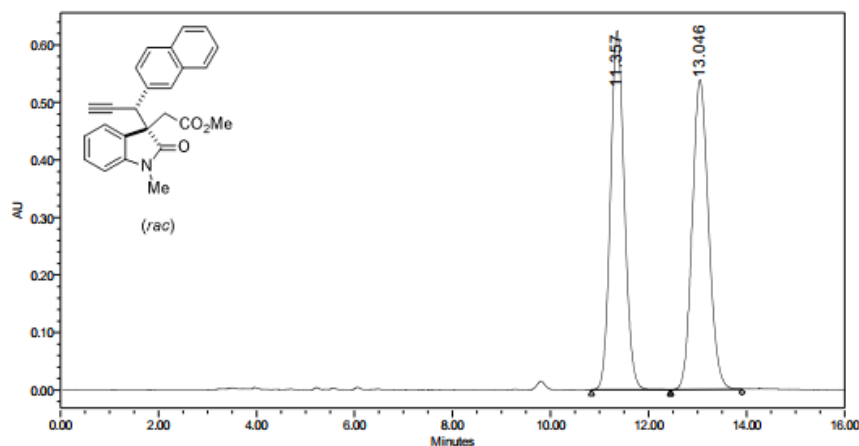
SAMPLE INFORMATION			
Sample Name:	wyh-1-81-2-asy-IG-30%-1ml/min	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	wyhsygt
Vial:	11	Acq. Method Set:	30% 1ml
Injection #:	1	Processing Method:	1
Injection Volume:	10.00 ul	Channel Name:	254.0nm
Run Time:	27.0 Minutes	Proc. Chnl. Descr.:	2998 PDA 254.0 nm (2998)
Date Acquired:	3/6/2021 1:54:38 AM CST		
Date Processed:	3/6/2021 9:00:16 AM CST		



	RT	Area	% Area	Height
1	15.833	149575	0.35	5216
2	21.037	42630567	99.65	382487

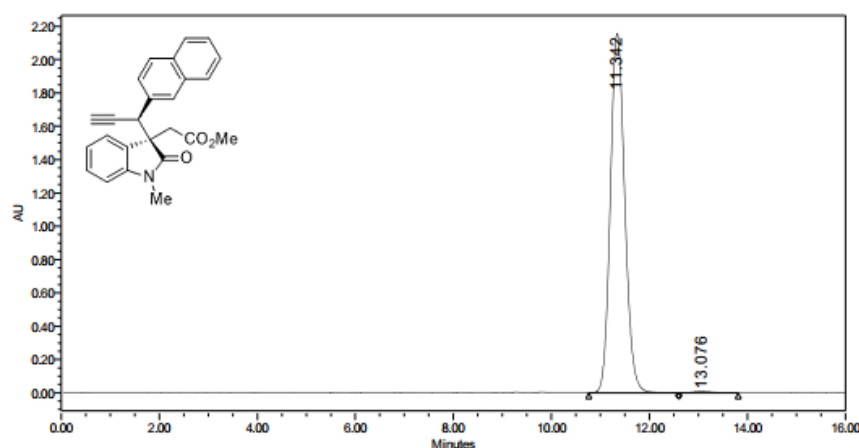
(*R,S*)-3am

SAMPLE INFORMATION			
Sample Name:	Unknown	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	wyh1797
Vial:	6	Acq. Method Set:	30% 1ml
Injection #:	1	Processing Method:	1
Injection Volume:	10.00 ul	Channel Name:	254.0nm
Run Time:	16.0 Minutes	Proc. Chnl. Descr.:	2998 PDA 254.0 nm (2998)
Date Acquired:	3/6/2021 10:18:15 AM CST		
Date Processed:	3/6/2021 11:10:53 AM CST		



	RT	Area	% Area	Height
1	11.357	12358270	49.81	624155
2	13.046	12453815	50.19	538474

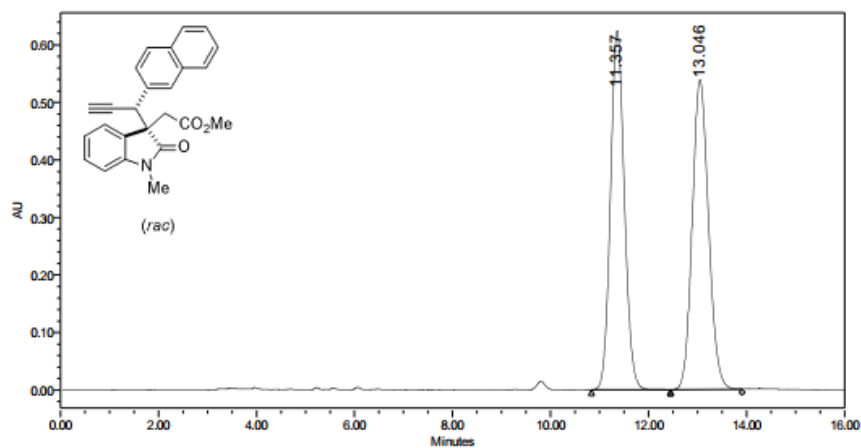
SAMPLE INFORMATION			
Sample Name:	wyh-1-79-7-asy-IG-30%-1ml/min	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	wyh1797asy
Vial:	7	Acq. Method Set:	30% 1ml
Injection #:	1	Processing Method:	1
Injection Volume:	10.00 ul	Channel Name:	254.0nm
Run Time:	16.0 Minutes	Proc. Chnl. Descr.:	2998 PDA 254.0 nm (2998)
Date Acquired:	3/6/2021 11:20:24 AM CST		
Date Processed:	3/6/2021 11:37:21 AM CST		



	RT	Area	% Area	Height
1	11.342	44389796	99.54	2156068
2	13.076	204593	0.46	7815

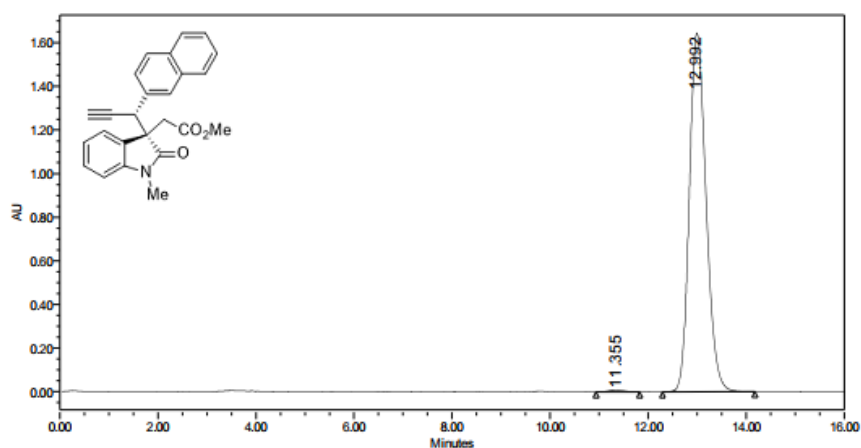
(*S,R*)-3am

SAMPLE INFORMATION			
Sample Name:	Unknown	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	wyh1797
Vial:	6	Acq. Method Set:	30% 1ml
Injection #:	1	Processing Method:	1
Injection Volume:	10.00 ul	Channel Name:	254.0nm
Run Time:	16.0 Minutes	Proc. Chnl. Descr.:	2998 PDA 254.0 nm (2998)
Date Acquired:	3/6/2021 10:18:15 AM CST		
Date Processed:	3/6/2021 11:10:53 AM CST		



	RT	Area	% Area	Height
1	11.357	12358270	49.81	624155
2	13.046	12453815	50.19	538474

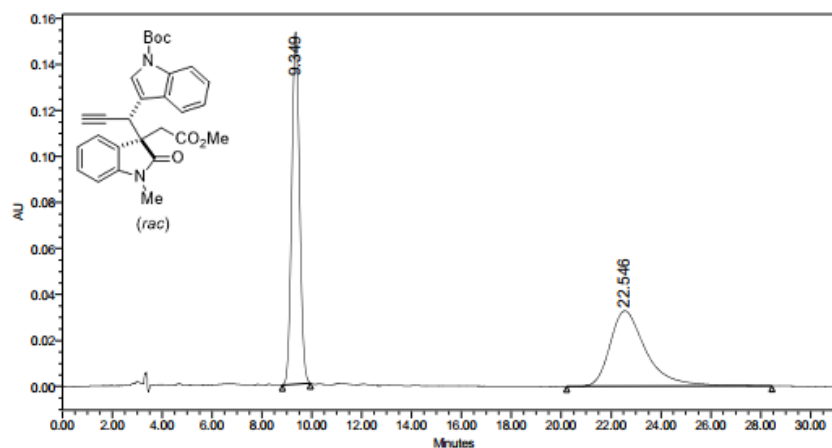
SAMPLE INFORMATION			
Sample Name:	wyh-1-81-1-asy-IG-30%-1ml/min	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	wyh1797
Vial:	8	Acq. Method Set:	30% 1ml
Injection #:	1	Processing Method:	1
Injection Volume:	10.00 ul	Channel Name:	254.0nm@1
Run Time:	16.0 Minutes	Proc. Chnl. Descr.:	2998 PDA 254.0 nm (2998)
Date Acquired:	3/6/2021 10:51:34 AM CST		
Date Processed:	3/6/2021 11:10:41 AM CST		



	RT	Area	% Area	Height
1	11.355	167580	0.43	8336
2	12.992	38868789	99.57	1644916

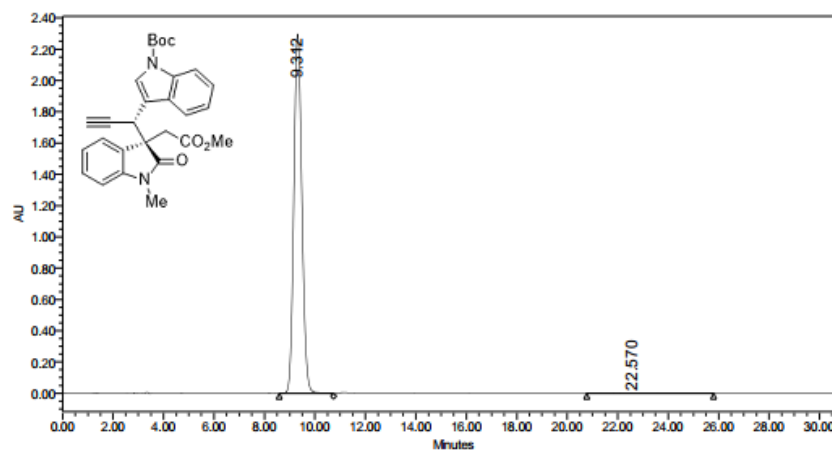
(*R,R*)-3an

SAMPLE INFORMATION			
Sample Name:	wyh-1-78-8-rac-d-IG-30%-1ml/min	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	wyh1788racdown
Vial:	112	Acq. Method Set:	30% 1ml
Injection #:	1	Processing Method:	1
Injection Volume:	10.00 ul	Channel Name:	254.0nm
Run Time:	60.0 Minutes	Proc. Chnl. Descr.:	2998 PDA 254.0 nm (2998)
Date Acquired:	1/16/2021 9:35:08 PM CST		
Date Processed:	1/16/2021 10:07:39 PM CST		



	RT	Area	% Area	Height
1	9.349	3357364	50.65	152974
2	22.546	3271077	49.35	32767

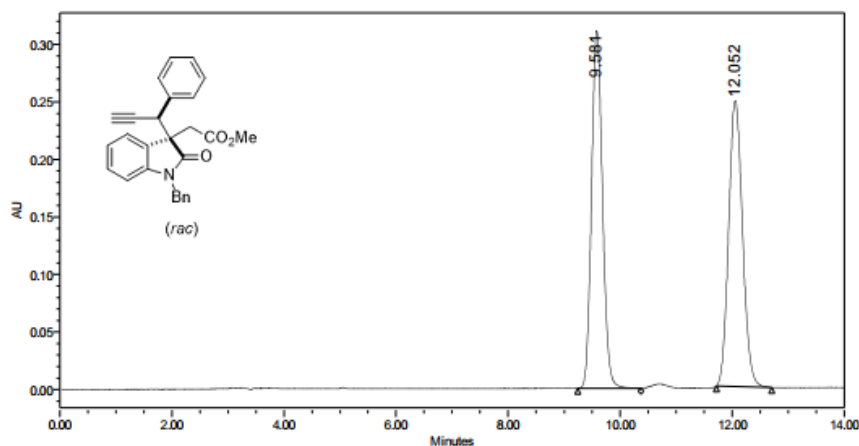
SAMPLE INFORMATION			
Sample Name:	wyh-1-78-8-asy-IG-30%-1ml/min	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	
Vial:	113	Acq. Method Set:	30% 1ml
Injection #:	1	Processing Method:	1
Injection Volume:	10.00 ul	Channel Name:	254.0nm
Run Time:	31.0 Minutes	Proc. Chnl. Descr.:	2998 PDA 254.0 nm (2998)
Date Acquired:	1/16/2021 10:07:49 PM CST		
Date Processed:	1/16/2021 10:42:50 PM CST		



	RT	Area	% Area	Height
1	9.312	51242671	99.54	2295437
2	22.570	237176	0.46	2396

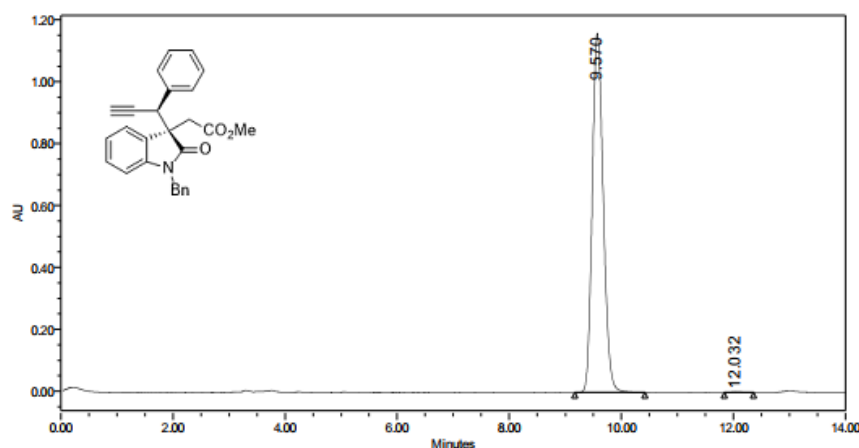
(*R,S*)-3ca

SAMPLE INFORMATION			
Sample Name:	wyh-1-167-2-rac-IE-30%-1ml/min	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	wyh11672
Vial:	61	Acq. Method Set:	30% 1ml
Injection #:	1	Processing Method:	1
Injection Volume:	10.00 ul	Channel Name:	254.0nm
Run Time:	14.0 Minutes	Proc. Chnl. Descr.:	2998 PDA 254.0 nm (2998)
Date Acquired:	7/13/2021 5:11:20 PM CST		
Date Processed:	7/13/2021 7:38:39 PM CST		



	RT	Area	% Area	Height
1	9.581	4188053	49.66	310632
2	12.052	4245610	50.34	248490

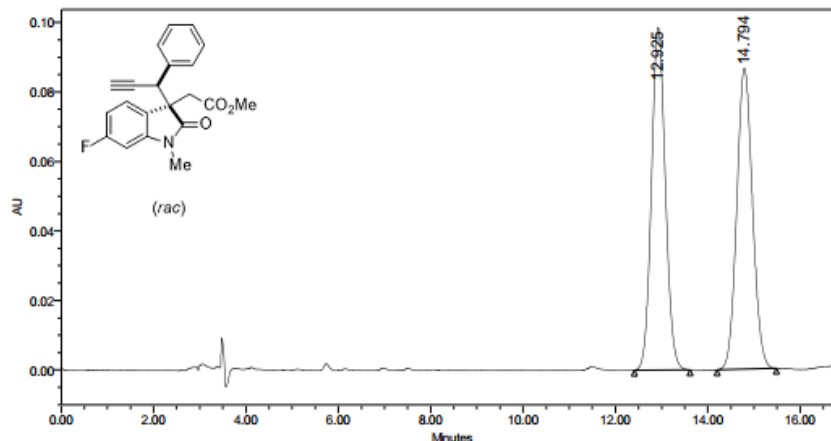
SAMPLE INFORMATION			
Sample Name:	wyh-1-167-2-asy-IE-30%-1ml/min	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	wyh11672
Vial:	62	Acq. Method Set:	30% 1ml
Injection #:	1	Processing Method:	1
Injection Volume:	10.00 ul	Channel Name:	254.0nm
Run Time:	14.0 Minutes	Proc. Chnl. Descr.:	2998 PDA 254.0 nm (2998)
Date Acquired:	7/13/2021 5:26:15 PM CST		
Date Processed:	7/13/2021 7:39:57 PM CST		



	RT	Area	% Area	Height
1	9.570	15667461	99.91	1159870
2	12.032	14575	0.09	942

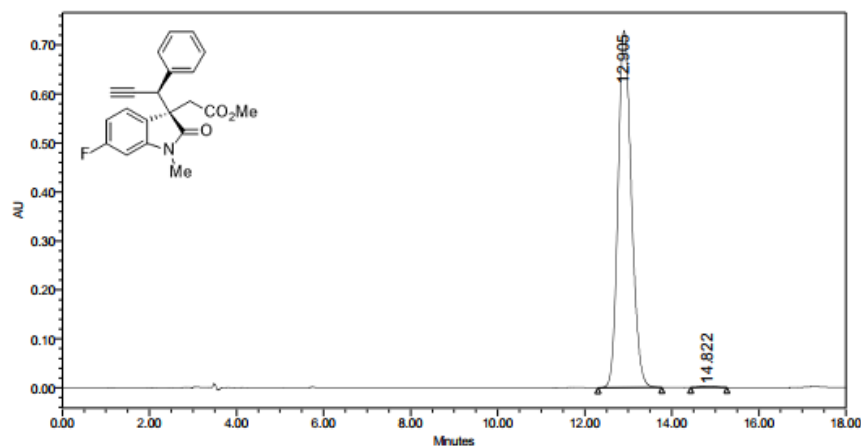
(R,S)-3ka

SAMPLE INFORMATION			
Sample Name:	wyh-1-79-11-rac-u-IG-10%-1ml/min	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	wyh17911
Vial:	1	Acq. Method Set:	10% 1ml
Injection #:	1	Processing Method:	1
Injection Volume:	10.00 ul	Channel Name:	254.0nm
Run Time:	30.0 Minutes	Proc. Chnl. Descr.:	2998 PDA 254.0 nm (2998)
Date Acquired:	3/4/2021 5:45:05 PM CST		
Date Processed:	3/4/2021 7:19:15 PM CST		



	RT	Area	% Area	Height
1	12.925	2070808	50.19	98570
2	14.794	2054934	49.81	86600

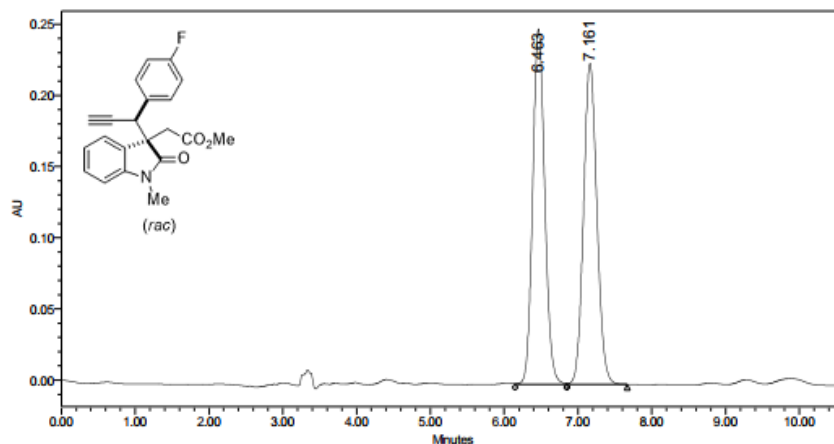
SAMPLE INFORMATION			
Sample Name:	wyh-1-79-11-asy-IG-10%-1ml/min	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	wyh17911asy
Vial:	2	Acq. Method Set:	10% 1ml
Injection #:	1	Processing Method:	1
Injection Volume:	10.00 ul	Channel Name:	254.0nm
Run Time:	18.0 Minutes	Proc. Chnl. Descr.:	2998 PDA 254.0 nm (2998)
Date Acquired:	3/4/2021 6:14:47 PM CST		
Date Processed:	3/4/2021 7:19:00 PM CST		



	RT	Area	% Area	Height
1	12.905	15538888	99.57	729031
2	14.822	67286	0.43	3007

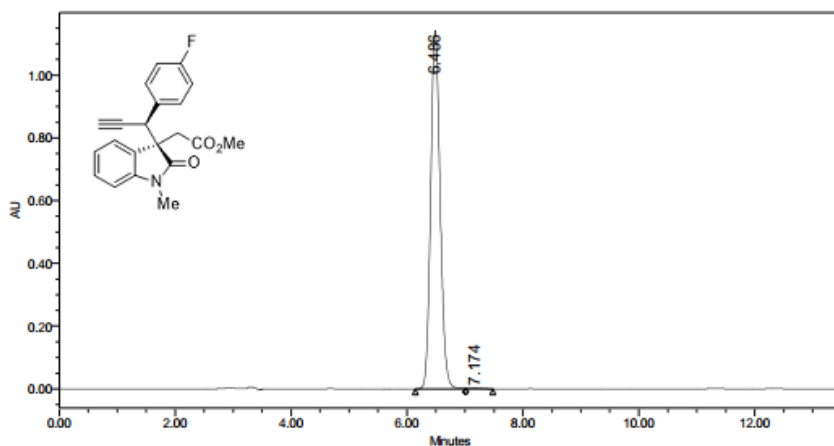
(R,S)-3ab

SAMPLE INFORMATION			
Sample Name:	wyh-1-79-5-rac-u-IG-30%-1ml/min	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	
Vial:	49	Acq. Method Set:	30% 1ml
Injection #:	1	Processing Method:	1
Injection Volume:	10.00 ul	Channel Name:	254.0nm
Run Time:	30.0 Minutes	Proc. Chnl. Descr.:	2998 PDA 254.0 nm (2998)
Date Acquired:	2/4/2021 12:54:31 PM CST		
Date Processed:	2/4/2021 1:05:26 PM CST		



	RT	Area	% Area	Height
1	6.463	2844874	50.07	249568
2	7.161	2836586	49.93	225363

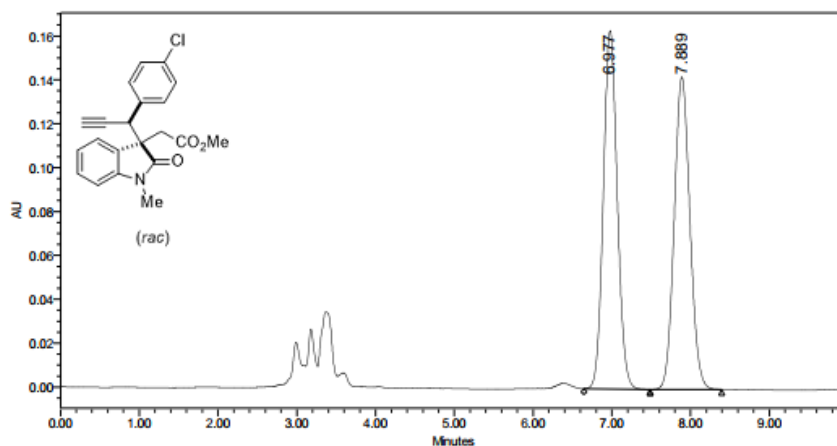
SAMPLE INFORMATION			
Sample Name:	wyh-1-79-5-asy-IG-30%-1ml/min	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	
Vial:	50	Acq. Method Set:	30% 1ml
Injection #:	1	Processing Method:	1
Injection Volume:	10.00 ul	Channel Name:	254.0nm
Run Time:	30.0 Minutes	Proc. Chnl. Descr.:	2998 PDA 254.0 nm (2998)
Date Acquired:	2/4/2021 11:40:57 AM CST		
Date Processed:	2/4/2021 1:01:56 PM CST		



	RT	Area	% Area	Height
1	6.486	12936766	99.71	1141676
2	7.174	37169	0.29	2530

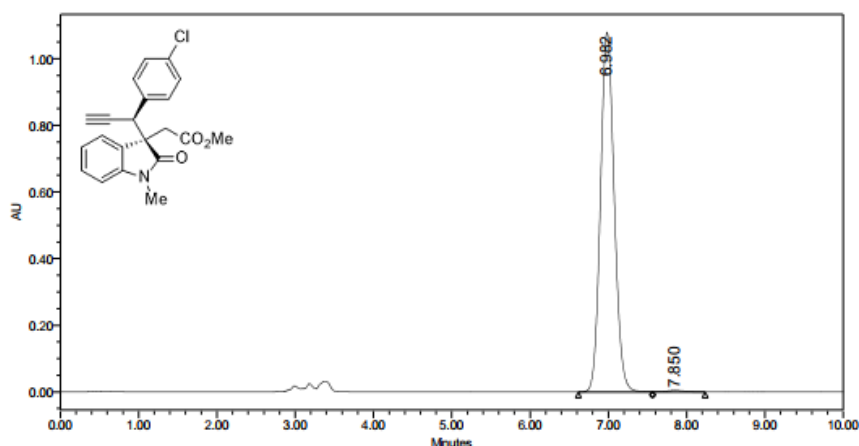
(*R,S*)-3ac

SAMPLE INFORMATION			
Sample Name:	LS-2-4-1-rac-up-IG-30%-1ml/min	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	LS_2_4
Vial:	7	Acq. Method Set:	30% 1ml
Injection #:	1	Processing Method:	1
Injection Volume:	10.00 ul	Channel Name:	230.0nm
Run Time:	20.0 Minutes	Proc. Chnl. Descr.:	2998 PDA 230.0 nm (2998)
Date Acquired:	3/14/2021 9:17:59 PM CST		
Date Processed:	5/7/2021 5:52:53 PM CST		



	RT	Area	% Area	Height
1	6.977	1997021	50.28	163296
2	7.889	1974968	49.72	142436

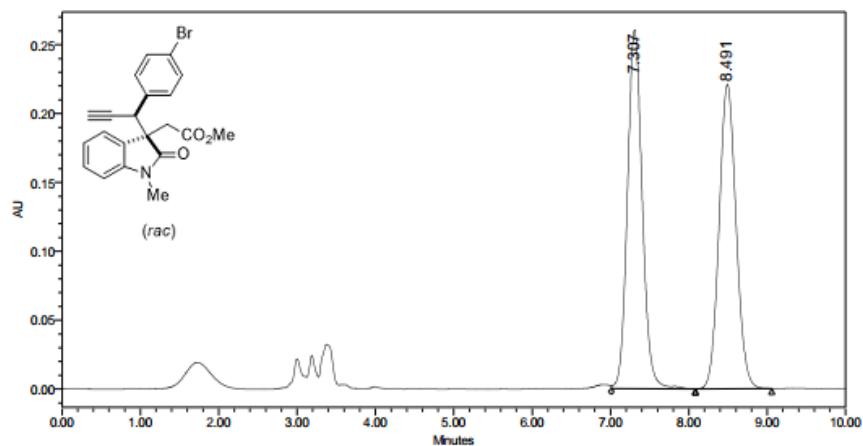
SAMPLE INFORMATION			
Sample Name:	LS-2-4-1-asy-IG-30%-1ml/min	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	LS_2_4
Vial:	8	Acq. Method Set:	30% 1ml
Injection #:	1	Processing Method:	1
Injection Volume:	10.00 ul	Channel Name:	230.0nm
Run Time:	10.0 Minutes	Proc. Chnl. Descr.:	2998 PDA 230.0 nm (2998)
Date Acquired:	3/14/2021 9:29:07 PM CST		
Date Processed:	5/7/2021 5:52:42 PM CST		



	RT	Area	% Area	Height
1	6.982	13264165	99.41	1079165
2	7.850	78258	0.59	4800

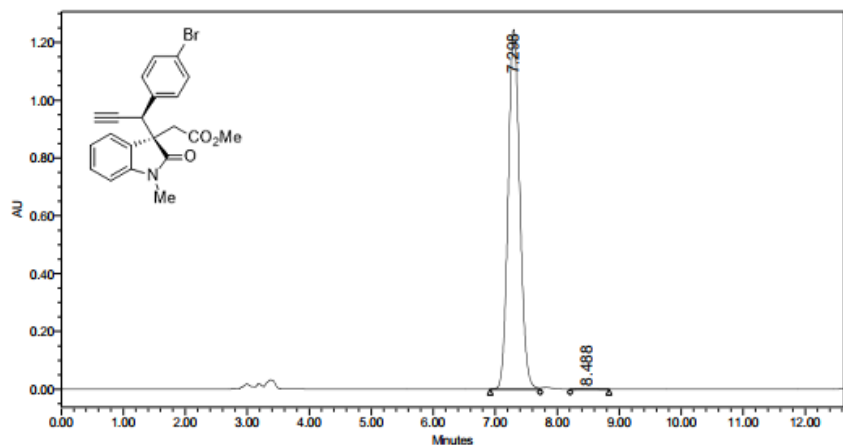
(*R,S*)-3ad

SAMPLE INFORMATION			
Sample Name:	LS-2-4-2-rac-up-IG-30%-1ml/min	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	LS24
Vial:	9	Acq. Method Set:	30% 1ml
Injection #:	1	Processing Method:	1
Injection Volume:	10.00 ul	Channel Name:	230.0nm
Run Time:	10.0 Minutes	Proc. Chnl. Descr.:	2998 PDA 230.0 nm (2998)
Date Acquired:	3/14/2021 10:15:08 PM CST		
Date Processed:	5/7/2021 5:52:08 PM CST		



	RT	Area	% Area	Height
1	7.307	3410831	50.49	260433
2	8.491	3344450	49.51	220935

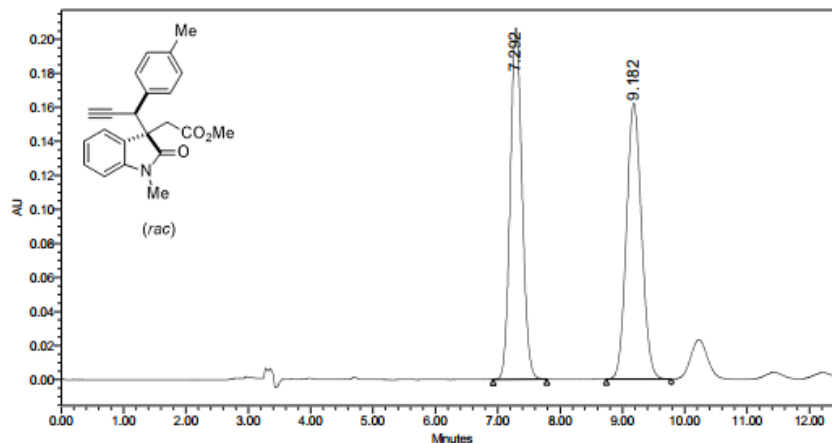
SAMPLE INFORMATION			
Sample Name:	LS-2-4-2-asy-IG-30%-1ml/min	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	LS_2_4
Vial:	10	Acq. Method Set:	30% 1ml
Injection #:	1	Processing Method:	1
Injection Volume:	10.00 ul	Channel Name:	230.0nm
Run Time:	20.0 Minutes	Proc. Chnl. Descr.:	2998 PDA 230.0 nm (2998)
Date Acquired:	3/14/2021 10:00:32 PM CST		
Date Processed:	5/7/2021 5:51:54 PM CST		



	RT	Area	% Area	Height
1	7.298	16148747	99.76	1243849
2	8.488	38956	0.24	2485

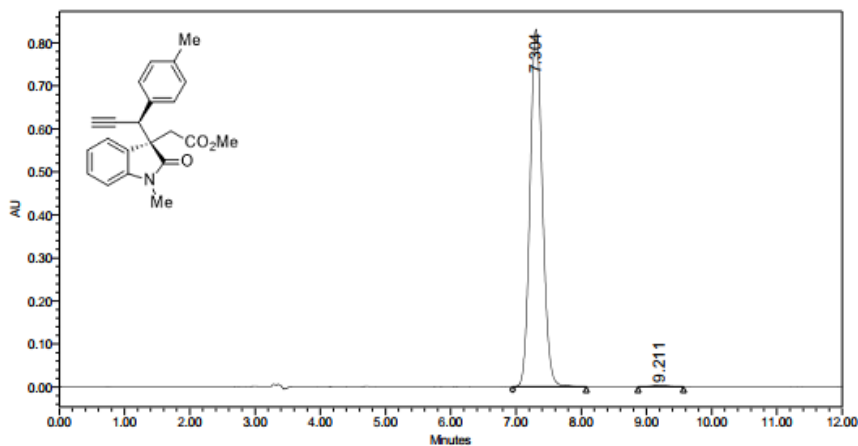
(*R,S*)-3ae

SAMPLE INFORMATION			
Sample Name:	wyh-1-79-12-rac-up	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	wyh17912racup
Vial:	1	Acq. Method Set:	30% 1ml
Injection #:	1	Processing Method:	1
Injection Volume:	10.00 ul	Channel Name:	254.0nm
Run Time:	20.0 Minutes	Proc. Chnl. Descr.:	2998 PDA 254.0 nm (2998)
Date Acquired:	3/4/2021 9:56:50 AM CST		
Date Processed:	3/4/2021 10:34:53 AM CST		



	RT	Area	% Area	Height
1	7.292	2707073	49.92	206422
2	9.182	2715675	50.08	162068

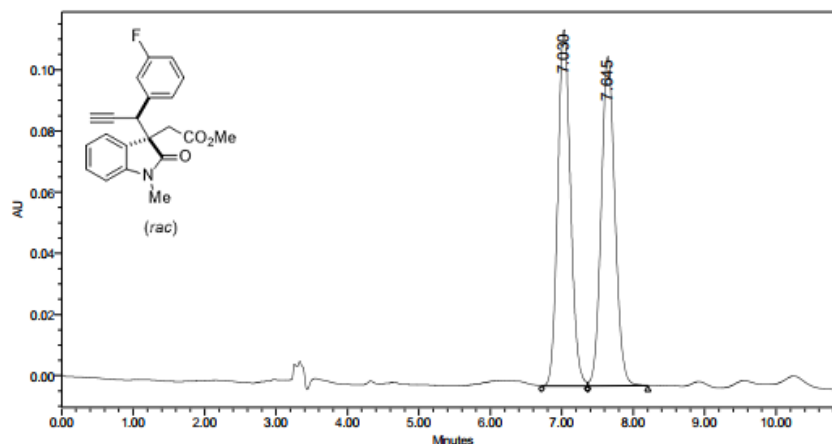
SAMPLE INFORMATION			
Sample Name:	wyh-1-79-12-asy-IG-30%-1ml/min	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	wyh17912asy
Vial:	2	Acq. Method Set:	30% 1ml
Injection #:	1	Processing Method:	1
Injection Volume:	10.00 ul	Channel Name:	254.0nm
Run Time:	12.0 Minutes	Proc. Chnl. Descr.:	2998 PDA 254.0 nm (2998)
Date Acquired:	3/4/2021 10:16:43 AM CST		
Date Processed:	3/4/2021 10:34:27 AM CST		



	RT	Area	% Area	Height
1	7.304	11015778	99.47	830903
2	9.211	58365	0.53	3522

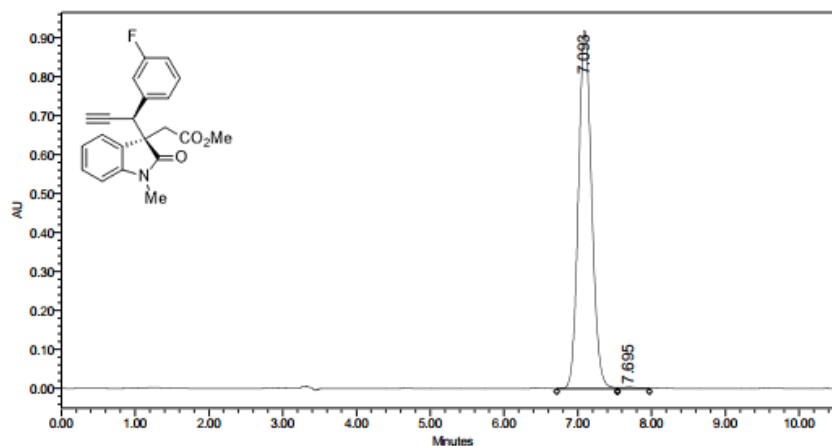
(*R,S*)-3ag

SAMPLE INFORMATION			
Sample Name:	wyh-1-79-6-rac-u-IG-30%-1ml/min	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	
Vial:	49	Acq. Method Set:	30% 1ml
Injection #:	1	Processing Method:	1
Injection Volume:	10.00 ul	Channel Name:	254.0nm
Run Time:	30.0 Minutes	Proc. Chnl. Descr.:	2998 PDA 254.0 nm (2998)
Date Acquired:	2/4/2021 10:41:57 AM CST		
Date Processed:	2/4/2021 11:03:11 AM CST		



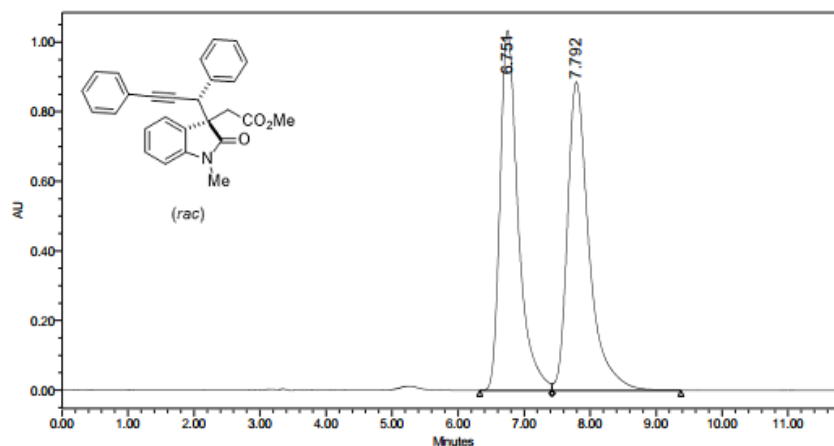
	RT	Area	% Area	Height
1	7.030	1443398	49.98	116353
2	7.645	1444832	50.02	107652

SAMPLE INFORMATION			
Sample Name:	wyh-1-79-6-asy-IG-30%-1ml/min	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	
Vial:	50	Acq. Method Set:	30% 1ml
Injection #:	1	Processing Method:	1
Injection Volume:	10.00 ul	Channel Name:	254.0nm
Run Time:	30.0 Minutes	Proc. Chnl. Descr.:	2998 PDA 254.0 nm (2998)
Date Acquired:	2/4/2021 10:53:49 AM CST		
Date Processed:	2/4/2021 11:05:05 AM CST		



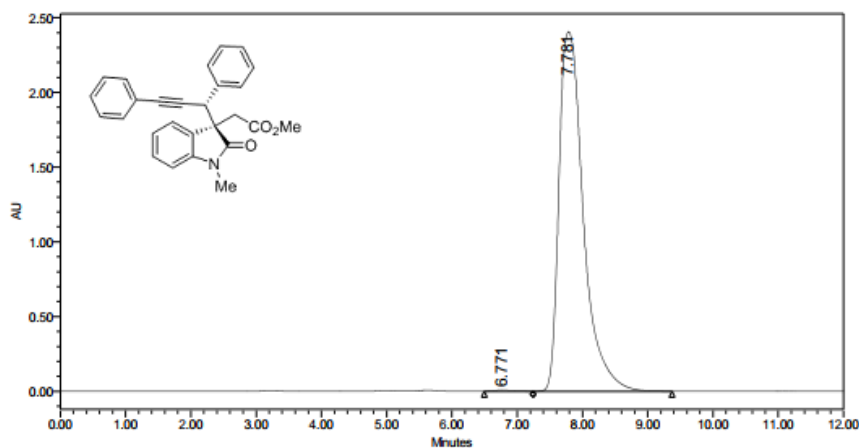
	RT	Area	% Area	Height
1	7.093	11429689	99.50	919256
2	7.695	57547	0.50	3488

SAMPLE INFORMATION			
Sample Name:	wyh-1-158-rac-IA-30%-1ml/min	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	wyh158rac
Vial:	22	Acq. Method Set:	30% 1ml
Injection #:	1	Processing Method:	1
Injection Volume:	10.00 ul	Channel Name:	254.0nm
Run Time:	50.0 Minutes	Proc. Chnl. Descr.:	2998 PDA 254.0 nm (2998)
Date Acquired:	6/25/2021 4:53:09 PM CST		
Date Processed:	6/27/2021 3:47:20 PM CST		



	RT	Area	% Area	Height
1	6.751	19650870	49.55	1033599
2	7.792	20005071	50.45	885851

SAMPLE INFORMATION			
Sample Name:	wyh-1-158-asy-IA-30%-1ml/min	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	111
Vial:	23	Acq. Method Set:	30% 1ml
Injection #:	1	Processing Method:	1
Injection Volume:	10.00 ul	Channel Name:	254.0nm
Run Time:	12.0 Minutes	Proc. Chnl. Descr.:	2998 PDA 254.0 nm (2998)
Date Acquired:	6/25/2021 5:06:46 PM CST		
Date Processed:	6/27/2021 3:47:35 PM CST		

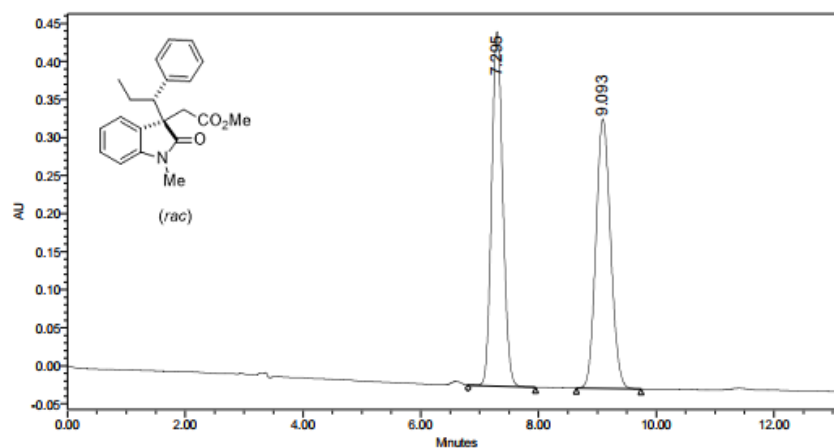


	RT	Area	% Area	Height
1	6.771	123337	0.20	6518
2	7.781	62173725	99.80	2404716

SAMPLE INFORMATION

Sample Name: wyh-1-159-rac-IG-30%-1ml/min
 Sample Type: Unknown
 Vial: 25
 Injection #: 1
 Injection Volume: 10.00 ul
 Run Time: 30.0 Minutes
 Date Acquired: 6/27/2021 3:16:43 PM CST
 Date Processed: 6/27/2021 3:54:33 PM CST

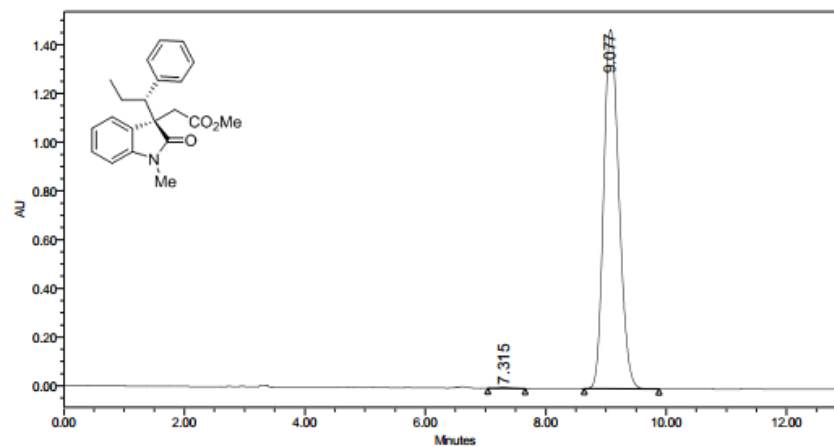
Acquired By: System
 Sample Set Name: wyh1159rac
 Acq. Method Set: 30% 1ml
 Processing Method: 1
 Channel Name: 254.0nm@1
 Proc. Chnl. Descr.: 2998 PDA 254.0 nm (2998)



SAMPLE INFORMATION

Sample Name: wyh-1-159-asy-IG-30%-1ml/min
 Sample Type: Unknown
 Vial: 26
 Injection #: 1
 Injection Volume: 10.00 ul
 Run Time: 13.0 Minutes
 Date Acquired: 6/27/2021 3:31:27 PM CST
 Date Processed: 6/27/2021 3:54:56 PM CST

Acquired By: System
 Sample Set Name: wyh1159asy
 Acq. Method Set: 30% 1ml
 Processing Method: 1
 Channel Name: 254.0nm
 Proc. Chnl. Descr.: 2998 PDA 254.0 nm (2998)

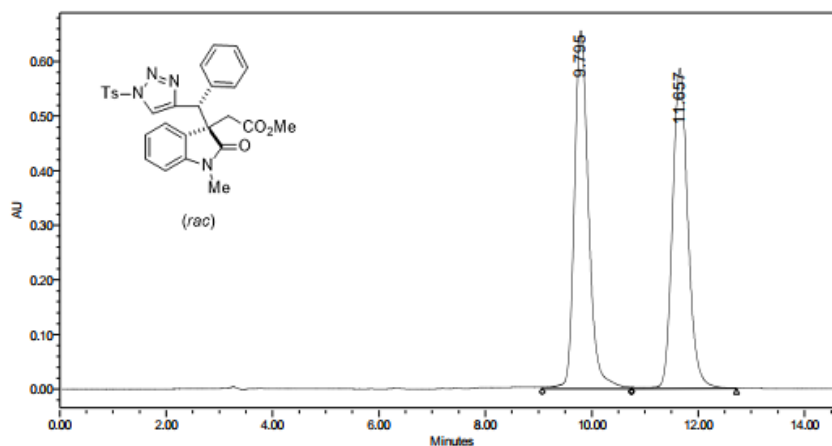


SAMPLE INFORMATION

Sample Name: wyh-1-157-rac-IA-30%-1ml/min
 Sample Type: Unknown
 Vial: 21
 Injection #: 1
 Injection Volume: 10.00 ul
 Run Time: 25.0 Minutes

Acquired By: System
 Sample Set Name: wyh1157rac
 Acq. Method Set: 30% 1ml
 Processing Method: 1
 Channel Name: 254.0nm
 Proc. Chnl. Descr.: 2998 PDA 254.0 nm (2998)

Date Acquired: 7/13/2021 9:48:40 PM CST
 Date Processed: 7/14/2021 9:33:13 AM CST



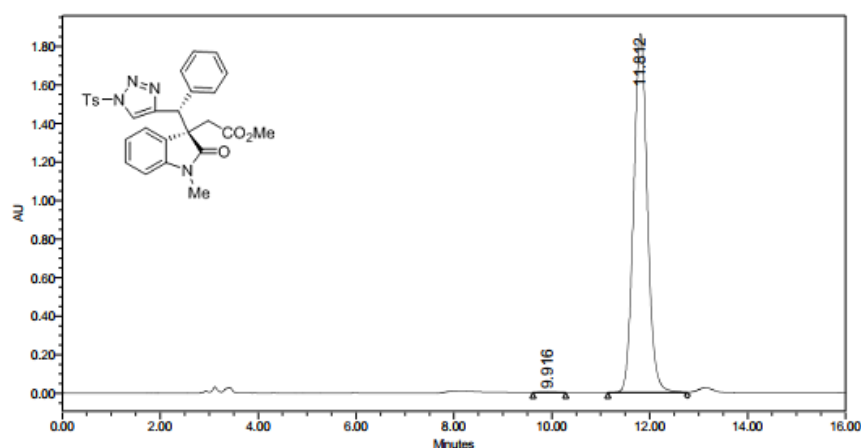
	RT	Area	% Area	Height
1	9.795	12140674	50.79	655366
2	11.657	11764158	49.21	586102

SAMPLE INFORMATION

Sample Name: wyh-1-157-asy-IA-30%-1ml/min
 Sample Type: Unknown
 Vial: 19
 Injection #: 1
 Injection Volume: 10.00 ul
 Run Time: 16.0 Minutes

Acquired By: System
 Sample Set Name: wyh157asy
 Acq. Method Set: 30% 1ml
 Processing Method: 1
 Channel Name: 230.0nm
 Proc. Chnl. Descr.: 2998 PDA 230.0 nm (2998)

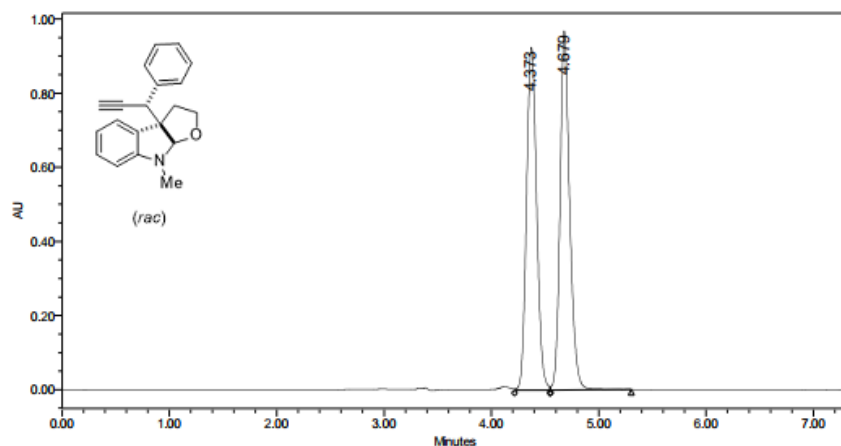
Date Acquired: 6/25/2021 10:18:48 PM CST
 Date Processed: 7/6/2021 9:50:16 AM CST



	RT	Area	% Area	Height
1	9.916	39194	0.11	2247
2	11.812	36035727	99.89	1861785

SAMPLE INFORMATION

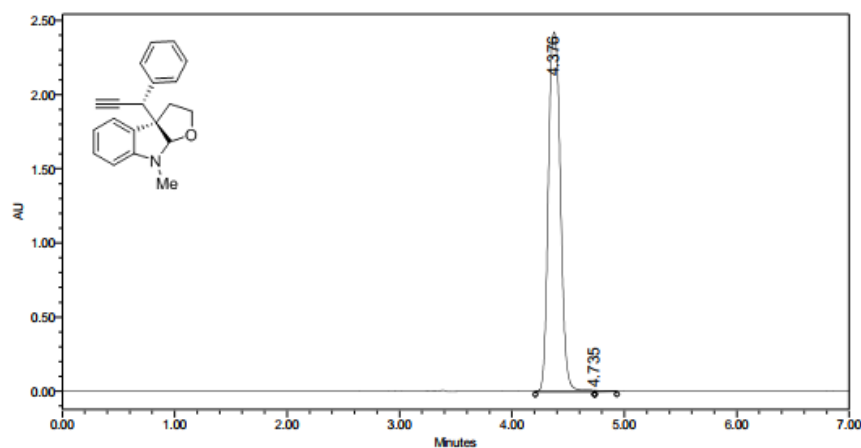
Sample Name:	wyh-1-160-rac-IG-20%-1ml/min	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	wyh1160rac
Vial:	31	Acq. Method Set:	20% 1ml
Injection #:	1	Processing Method:	1
Injection Volume:	10.00 ul	Channel Name:	254.0nm
Run Time:	20.0 Minutes	Proc. Chnl. Descr.:	2998 PDA 254.0 nm (2998)
Date Acquired: 6/30/2021 7:32:35 PM CST			
Date Processed: 7/1/2021 11:25:32 PM CST			



	RT	Area	% Area	Height
1	4.373	6065317	50.01	924829
2	4.679	6063342	49.99	968126

SAMPLE INFORMATION

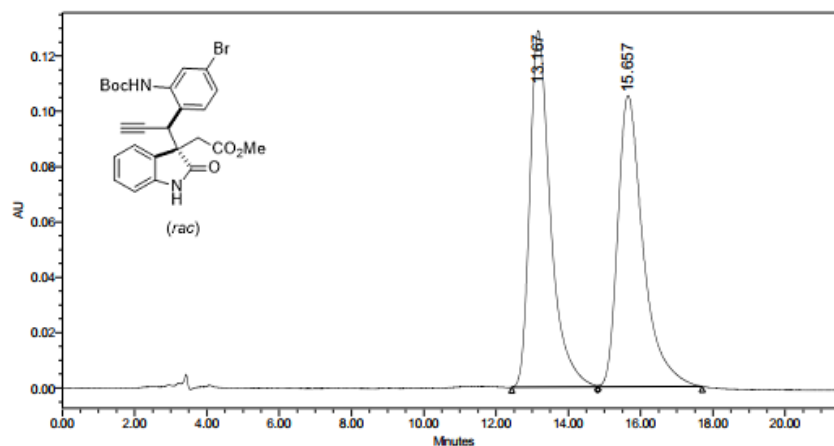
Sample Name:	wyh-1-160-asy-IG-20%-1ml/min	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	111
Vial:	32	Acq. Method Set:	20% 1ml
Injection #:	1	Processing Method:	1
Injection Volume:	10.00 ul	Channel Name:	254.0nm
Run Time:	7.0 Minutes	Proc. Chnl. Descr.:	2998 PDA 254.0 nm (2998)
Date Acquired: 6/30/2021 7:42:11 PM CST			
Date Processed: 7/1/2021 11:25:53 PM CST			



	RT	Area	% Area	Height
1	4.376	18114156	99.83	2421172
2	4.735	31604	0.17	6167

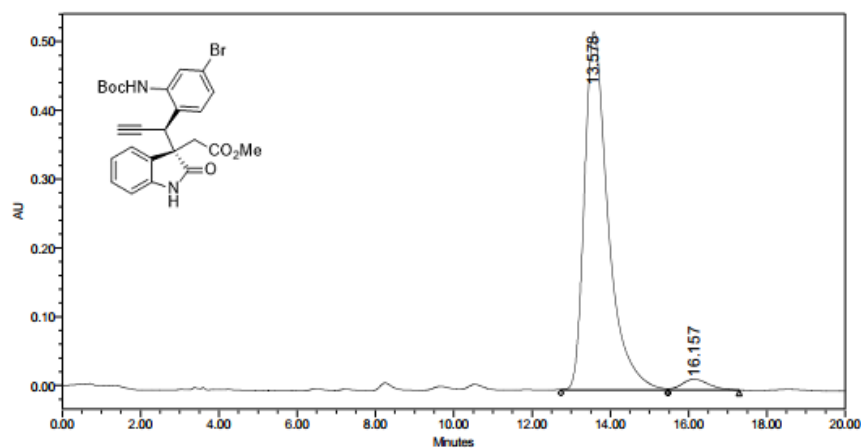
3no

SAMPLE INFORMATION			
Sample Name:	wyh-1-139-4-rac-d-IA-15%-1ml/min	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	
Vial:	20	Acq. Method Set:	15% 1ml
Injection #:	1	Processing Method:	1
Injection Volume:	10.00 ul	Channel Name:	254.0nm
Run Time:	60.0 Minutes	Proc. Chnl. Descr.:	2998 PDA 254.0 nm (2998)
Date Acquired:	6/4/2021 10:54:29 AM CST		
Date Processed:	7/6/2021 9:36:51 AM CST		



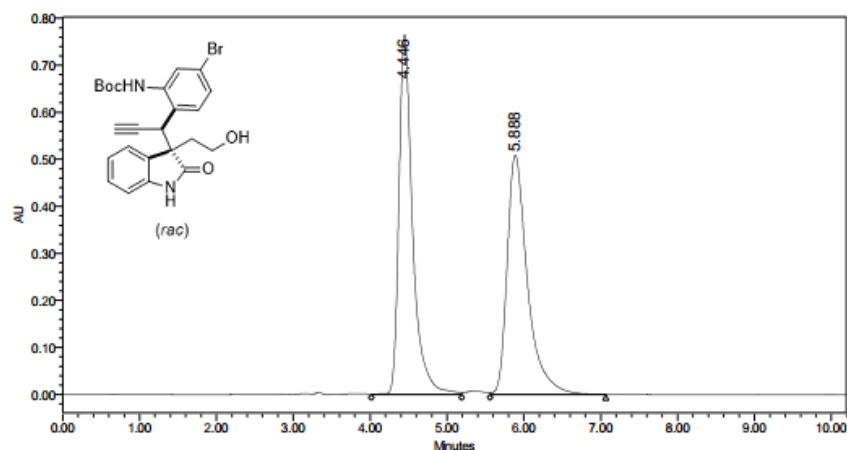
	RT	Area	% Area	Height
1	13.167	5158517	50.20	128896
2	15.657	5117450	49.80	105353

SAMPLE INFORMATION			
Sample Name:	wyh-1-big-IA-15%-1ml/min	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	
Vial:	27	Acq. Method Set:	15% 1ml
Injection #:	1	Processing Method:	1
Injection Volume:	10.00 ul	Channel Name:	254.0nm
Run Time:	20.0 Minutes	Proc. Chnl. Descr.:	2998 PDA 254.0 nm (2998)
Date Acquired:	6/17/2021 7:22:08 PM CST		
Date Processed:	7/6/2021 9:36:30 AM CST		



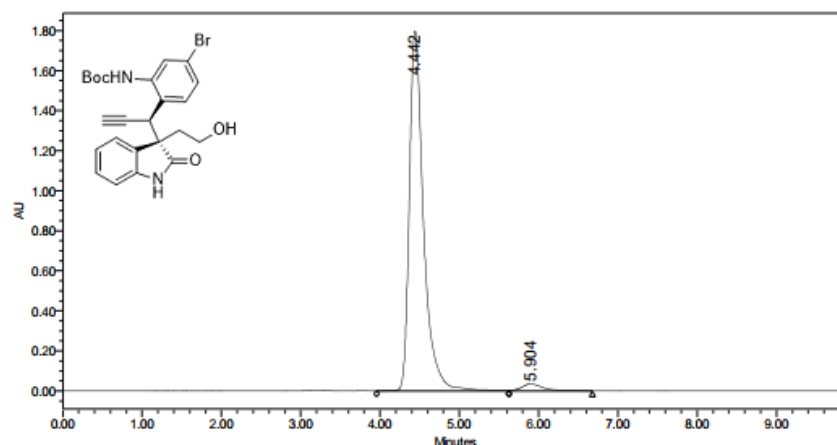
	RT	Area	% Area	Height
1	13.578	21938551	96.68	520679
2	16.157	753318	3.32	15868

SAMPLE INFORMATION			
Sample Name:	wyh-1-OH-rac-IA-30%-1ml/min	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	
Vial:	32	Acq. Method Set:	30% 1ml
Injection #:	1	Processing Method:	1
Injection Volume:	10.00 ul	Channel Name:	254.0nm
Run Time:	60.0 Minutes	Proc. Chnl. Descr.:	2998 PDA 254.0 nm (2998)
Date Acquired:	6/23/2021 2:22:06 PM CST		
Date Processed:	7/6/2021 9:23:24 AM CST		



	RT	Area	% Area	Height
1	4.446	9489244	50.42	764717
2	5.888	9331807	49.58	509137

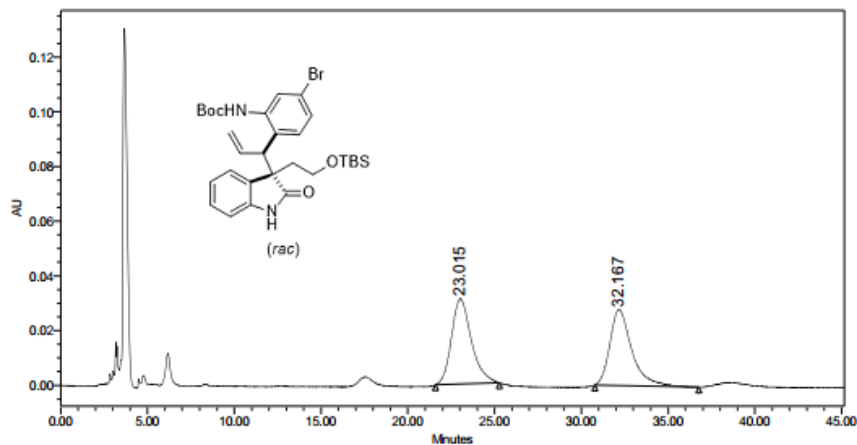
SAMPLE INFORMATION			
Sample Name:	wyh-1-OH-asy-IA-30%-1ml/min	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	
Vial:	33	Acq. Method Set:	30% 1ml
Injection #:	1	Processing Method:	1
Injection Volume:	10.00 ul	Channel Name:	254.0nm
Run Time:	60.0 Minutes	Proc. Chnl. Descr.:	2998 PDA 254.0 nm (2998)
Date Acquired:	6/23/2021 2:33:11 PM CST		
Date Processed:	7/6/2021 9:23:12 AM CST		



	RT	Area	% Area	Height
1	4.442	22415861	97.23	1797071
2	5.904	638986	2.77	34421

SAMPLE INFORMATION

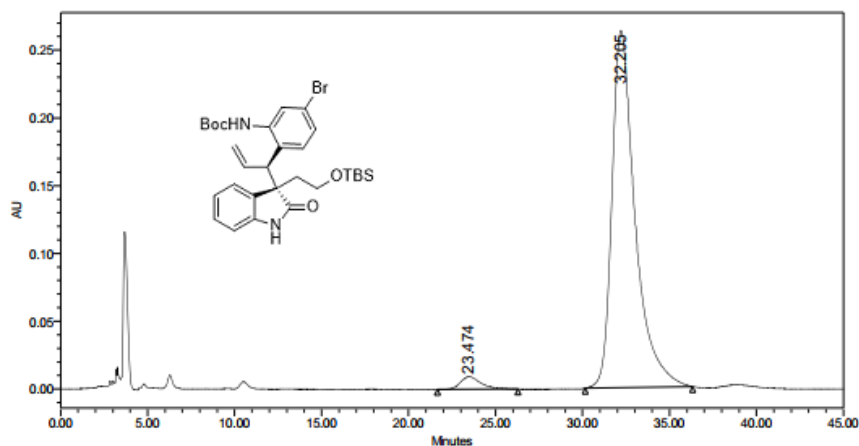
Sample Name:	wyh-1-tp-rac-IA-2%-1ml/min	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	wyh1tpac
Vial:	5	Acq. Method Set:	2% 1ml
Injection #:	1	Processing Method:	1
Injection Volume:	10.00 ul	Channel Name:	220.0nm
Run Time:	80.0 Minutes	Proc. Chnl. Descr.:	2998 PDA 220.0 nm (2998)
Date Acquired:	6/26/2021 2:53:18 PM CST		
Date Processed:	7/14/2021 2:48:50 PM CST		



	RT	Area	% Area	Height
1	23.015	2490961	50.61	31199
2	32.167	2431204	49.39	27726

SAMPLE INFORMATION

Sample Name:	wyh-1-tp-asy-IA-2%-1ml/min	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	wyh1tpasy
Vial:	6	Acq. Method Set:	2% 1ml
Injection #:	1	Processing Method:	1
Injection Volume:	10.00 ul	Channel Name:	220.0nm
Run Time:	45.0 Minutes	Proc. Chnl. Descr.:	2998 PDA 220.0 nm (2998)
Date Acquired:	6/26/2021 3:45:24 PM CST		
Date Processed:	7/14/2021 5:12:01 PM CST		



	RT	Area	% Area	Height
1	23.474	762704	3.04	9274
2	32.205	24358883	96.96	263412