Supporting Information

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1. General Information

General Methods. ^{1}H NMR spectra were recorded on 400 spectrophotometers. Chemical shifts (δ) are reported in ppm from the resonance of tetramethyl silane as the internal standard (TMS: 0.00 ppm). Data are reported as follows: chemical shift, multiplicity (s = singlet, d = doublet, t = triplet, q = quartet, m = multiplet), coupling constants (Hz) and integration. All NMR spectra were recorded on a Bruker spectrometer at 400 MHz (^{1}H NMR), 100 MHz (^{13}C NMR), 377 MHz (^{19}F NMR). HRMS was recorded on Waters GCT Premier ESI-TOF. Enantiomeric ratio (ee) values were determined by chiral HPLC with chiral AD-H, IE-H, AS-H, AZ-H, IBN-5 columns with hexane and *i*-PrOH as solvents. Optical rotations were measured with a polarimeter. All air- and moisture-sensitive reactions were performed under an atmosphere of Ar in fire dried glassware. The light source used for photo-Wolff rearrangements in this study is purple Kessil lamp, 0-40 W for every light bulb (λmax = 370 nm). The manipulations for palladium-catalyzed reactions were carried out with standard Schlenk techniques under argon. Flash column chromatography was performed using 200-300 mesh silica gel.

Matherials. All the solvents were treated according to standard methods and all chemicals were used without purification. Anhydrous solvent (THF, DCM, MeCN, DMF, DMSO, MeOH and Toluene) were taken from JC-Meyer solvent purification system. Vinyl oxetanes **1a-1j**[1], vinyl oxirane **5a**[2] and diazo compounds **2**[3] were prepared according to the known procedure. Chiral ligands **L1, L7** was commerical available; **L2,**[4] **L3-L6**[5] were synthesized according to previous methods.

References

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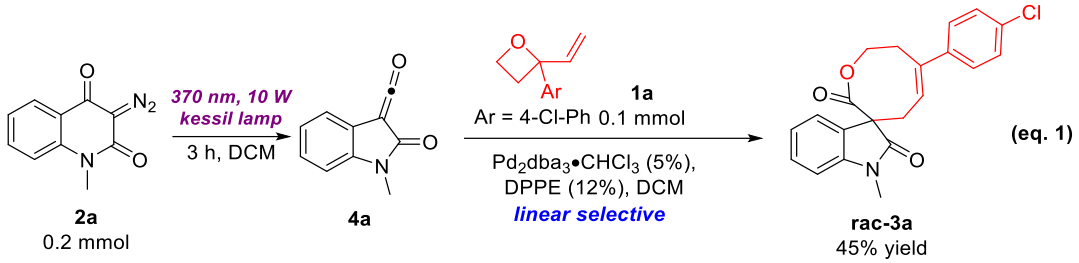
[4] (a) Y. Zhang, X. Zhang and S. Ma, *Nat. Commun.*, 2021, **12**, 2416.

[5] (a) Y. Zheng, T. Qin and W. Zi, *J. Am. Chem. Soc.*, 2021, **143**, 1038; (b) B.-C. Wang, F. Hu, J. Bai, F.-Y. Xiong, P. Chen, J. Li, Y. Tan, Y.-L. Guo, W.-J. Xiao and L.-Q. Lu, *Angew. Chem., Int. Ed.*, 2024, **63**, e202319728; (c) F.-Y. Xiong, S.-R. Pan, B.-C. Wang, Y.-J. Li, J.-W. Shi, W.-J. Xiao and L.-Q. Lu, *Eur. J. Org. Chem.*, 2024, e202401007.

2. Preliminary Exploration

2.1 First trial to form spirooxindoles-fused 8 membered ring products

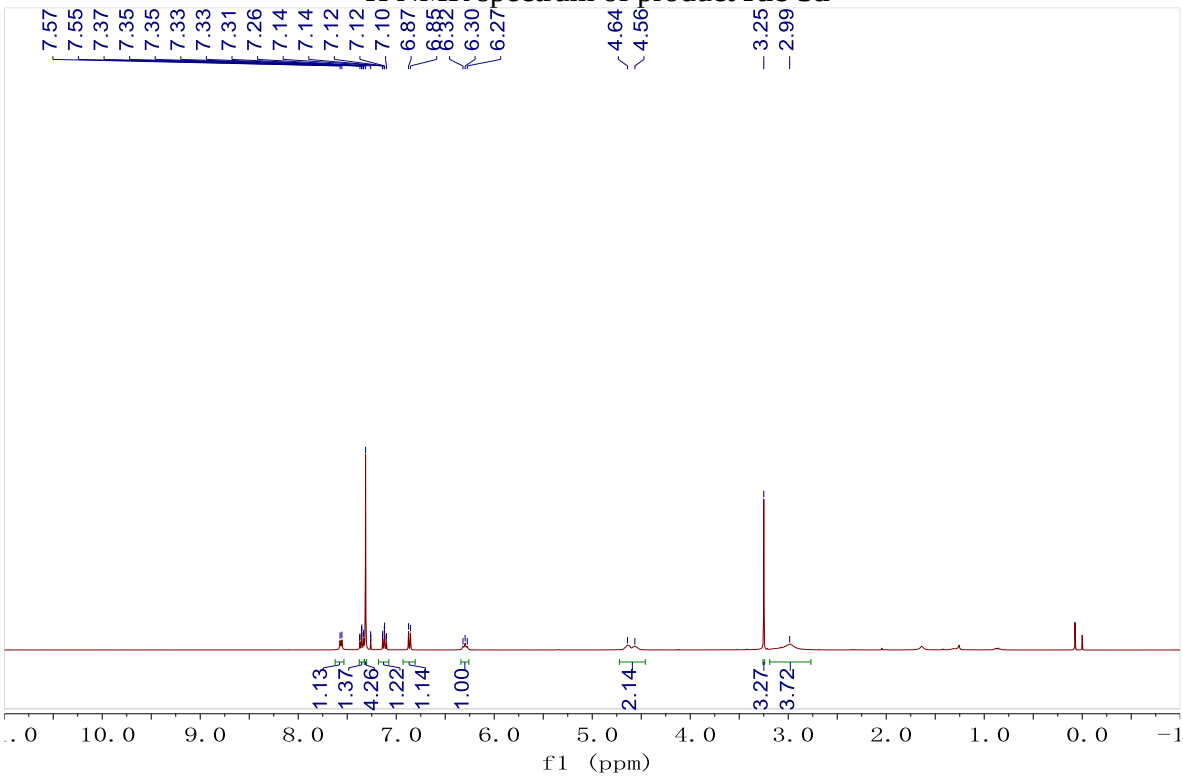


Under argon atmosphere, a flame-dried 10 mL Schlenk tube was charged with 3-diazoquinoline-2,4-diones **2a** (0.2 mmol, 2.0 equiv) and anhydrous DCM (1 mL). The resulting solution was stirred for 3 h at room temperature under the irradiation of 10 W 370 nm kessil lamp. To another a flame-dried 10 mL Schlenk tube was charged with $Pd_2(dba)_3{\cdot}CHCl_3$ (5 mol %), DPPE (12 mol%) and DCM (1 mL) and the resulting solution was stirred for 30 mins at room temperature. After that, the reaction solution in the first Schlenk together with vinyl oxetanes **1a** (0.1 mmol, 1.0 equiv.) and another 1 mL DCM were added to the second one. Then the resulting solution was stirred for 12 h at 27 ^{o}C. Finally, the crude products were purified by flash silica gel chromatography (petrolether/ethyl acetate = 20:3) to give the products **rac-3a** in 45% yield.

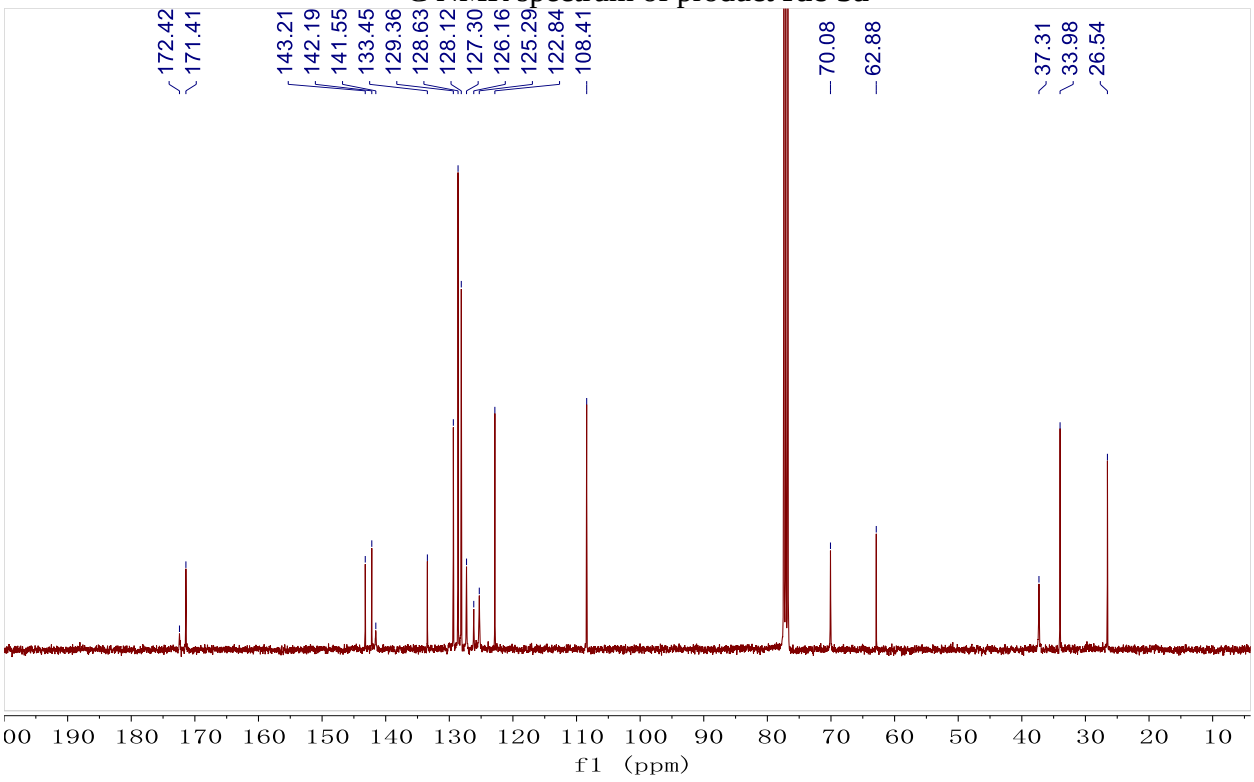
6'-(4-Chlorophenyl)-1-methyl-7',8'-dihydro-2'*H*,4'*H*-spiro[indoline-3,3'-oxocine]-2,2'-dione (rac-3a)

White solid, 45% yield, **^{1}H NMR** (400 MHz, $CDCl_3$) δ (ppm) 7.56 (d, J = 7.5 Hz, 1H), 7.38 - 7.33 (m, 1H), 7.31 (s, 4H), 7.14 -7.12 (m, 1H), 6.86 (d, J = 7.7 Hz, 1H), 6.30 (t, J = 8.8 Hz, 1H), 4.60 (d, J = 30.2 Hz, 2H), 3.25 (s, 3H), 2.99 (s, 4H).; **^{13}C NMR** (100 MHz, $CDCl_3$) δ (ppm) 172.4, 171.4, 143.2, 142.2, 141.6, 133.5, 129.4, 128.6, 128.1, 127.3, 126.2, 125.3, 122.8, 108.4, 70.1, 62.9, 37.3, 34.0, 26.5. HRMS (ESI) for: $C_{21}H_{18}ClNO_3$ $[M+H]^+$: calcd 368.1048, found 368.1049.

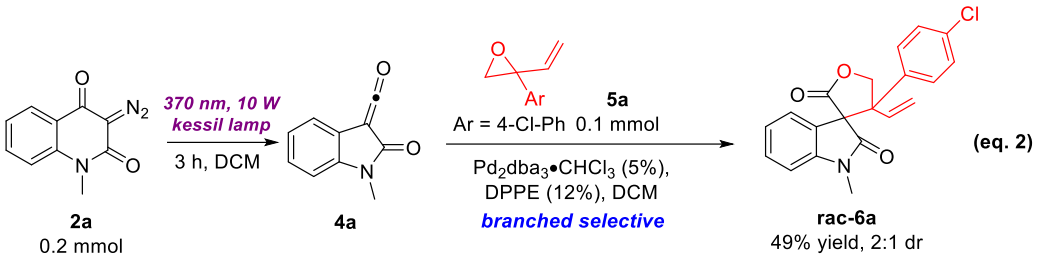
^{1}H NMR spectrum of product **rac-3a**



^{13}C NMR spectrum of product **rac-3a**



2.2 First trial to form spirooxindoles-fused 7 membered ring products

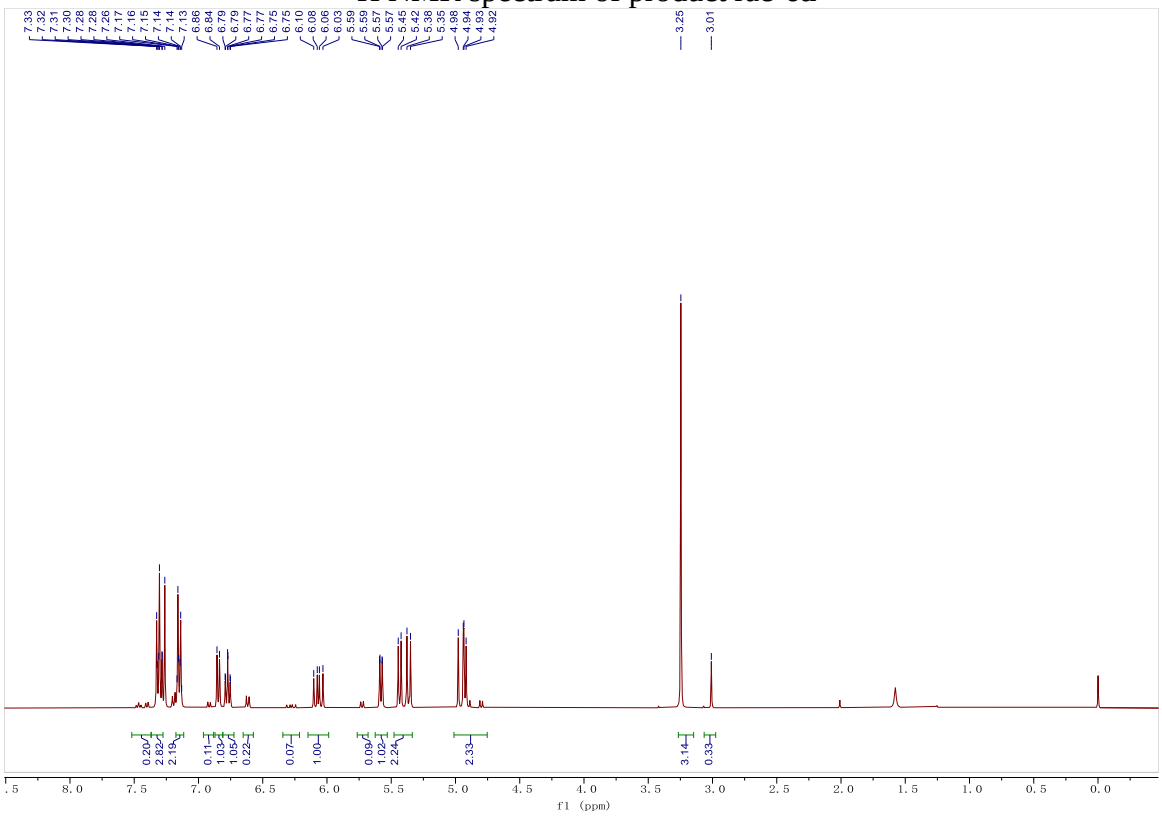


Under argon atmosphere, a flame-dried 10 mL Schlenk tube was charged with 3-diazoquinoline-2,4-diones **2a** (0.2 mmol, 2.0 equiv) and anhydrous DCM (1 mL). The resulting solution was stirred for 3 h at room temperature under the irradiation of 10 W 370 nm kessil lamp. To another a flame-dried 10 mL Schlenk tube was charged with $Pd_2(dba)_3{\cdot}CHCl_3$ (5 mol %), DPPE (12 mol%) and DCM (1 mL) and the resulting solution was stirred for 30 mins at room temperature. After that, the reaction solution in the first Schlenk together with vinyl oxirane **5a** (0.1 mmol, 1.0 equiv.) and another 1 mL DCM were added to the second one. Then the resulting solution was stirred for 12 h at 27 ^{o}C. Finally, the crude products were purified by flash silica gel chromatography (petrolether/ethyl acetate = 20:3) to give the products **rac-6a**. The 2:1 dr value was determined by the ^{1}H NMR analysis from the reaction mixture.

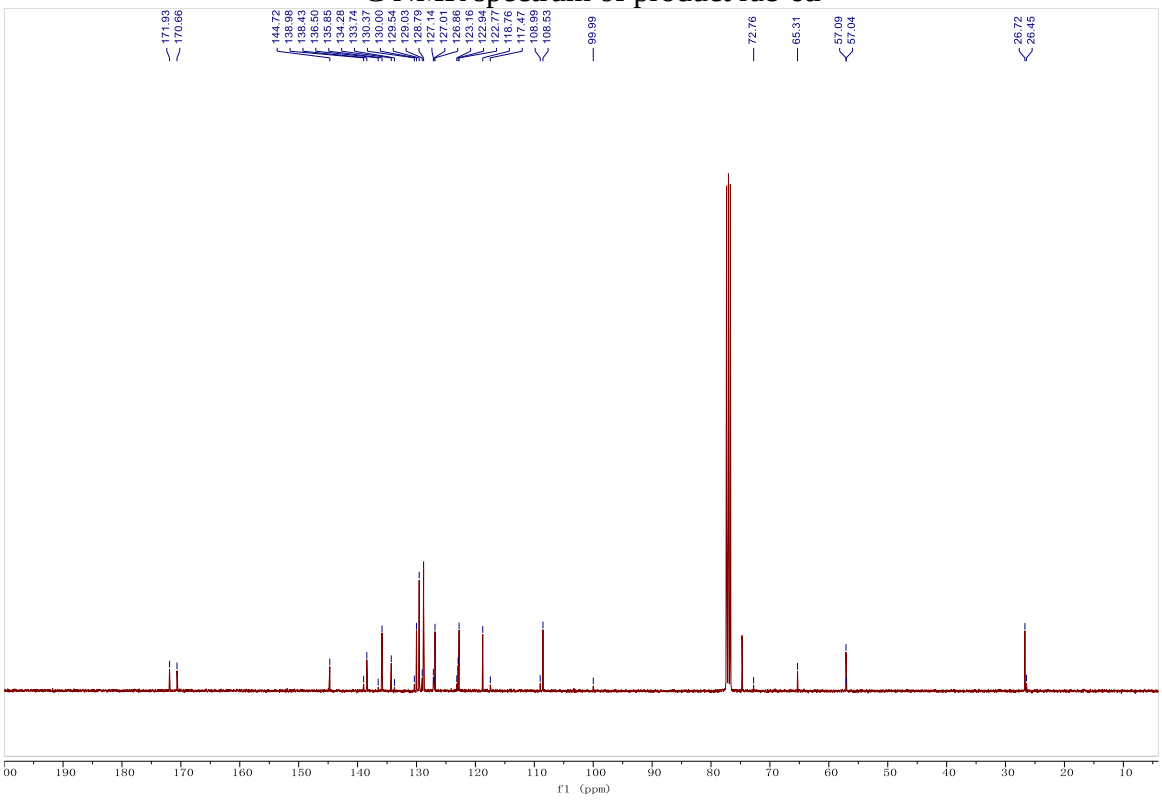
4-(4-Chlorophenyl)-1'-methyl-4-vinyl-4,5-dihydro-2H-spiro[furan-3,3'-indoline]-2,2'-dione (rac-6a)

White solid, 49% yield (10:1 dr after purification). **^{1}H NMR** (400 MHz, $CDCl_3$) δ (ppm) 7.56-7.43 (m, 2H, minor), 7.39-7.23 (m, 3H, major), 7.26-7.08 (m, 2H, major + minor), 6.92 (d, *J* = 7.9 Hz, 1H, minor), 6.85 (d, *J* = 7.8 Hz, 1H, major), 6.75 (d, *J* = 1.1 Hz, 1H, major), 6.62 (d, *J* = 8.6 Hz, 2H, minor), 6.28 (dd, *J* = 17.2, 10.6 Hz, 1H, minor), 6.07 (dd, *J* = 17.6, 11.0 Hz, 1H, major), 5.73 (d, J = 8.2 Hz, 1H, minor), 5.58 (dd, *J* = 7.7, 1.2 Hz, 1H, major), 5.47-5.31 (m, 2H, major + minor), 5.07-4.69 (m, 2H major + minor), 3.25 (s, 3H, major), 3.01 (s, 3H, minor). **^{13}C NMR** (100 MHz, $CDCl_3$) δ (ppm, major + minor) 171.9, 170.7, 144.7, 139.0, 138.4, 136.5, 135.9, 134.3, 133.7, 130.4, 130.0, 129.5, 129.0, 128.8, 127.1, 127.0, 126.9, 123.2, 122.9, 122.8, 118.8, 117.5, 109.0, 108.5, 100.0, 72.8, 65.3, 57.1, 57.0, 26.7, 26.5. HRMS (ESI) for: $C_{20}H_{16}ClNO_3$ $[M+Na]^+$: calcd 376.0711, found 376.0710.

^{1}H NMR spectrum of product rac-**6a**



^{13}C NMR spectrum of product rac-**6a**



2.3 Computational Details

All of the calculations were performed using the Gaussian 16 program.[1] Structures were optimized at the (U)B3LYP level of density functional theory[2] with Grimme's D3(BJ) dispersion correction[3] in gas phase. For optimizations, Ahlrichs's def2SVP basis set was used for all atoms.[4] Frequency calculations have been performed to verify the optimized structures as local minima and to obtain Gibbs free energy at 298 K. To reduce error caused by the breakdown of the harmonic oscillator approximation, Truhlar's quasi-harmonic correction was used to compute molecular entropies by setting all positive frequencies that are less than 100 cm^{-1} to 100 cm^{-1}.[5] The electronic energies were further refined by carrying out single-point energy calculations using (U)B3LYP functional with Grimme's D3(BJ) dispersion correction. The def2TZVP basis set was applied for all atoms.[4] The SMD solvation model with DCM as the solvent was employed to account for solvation effect.[6] The three-dimensional (3D) structures were depicted using CYLview software.

Reference

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Additional Computational Results

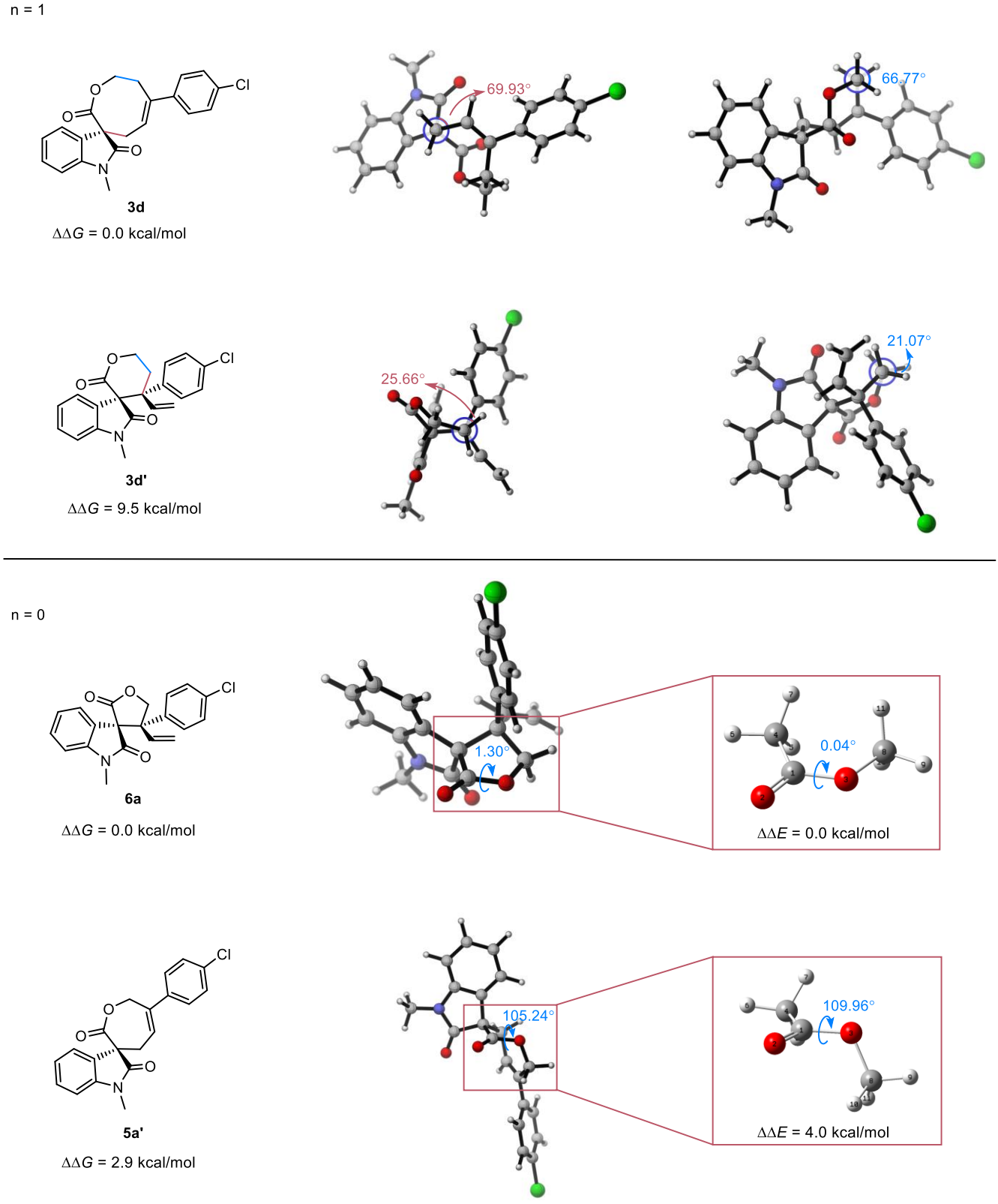

Figure S1 Comparison of thermal stabilities of different products. All energies are given in kcal/mol.

XYZ coordinate

3d'

E = -1552.26492444 G = -1551.965875

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6	0.09200800	3.30777400	-0.65189700
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1	1.91780900	-3.33677200	-0.72427700
1	0.34003900	-4.14245900	-0.96198300
6	0.77772800	-0.58219300	2.06449700
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6	-2.01857400	-1.19944300	-0.47330000
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6	1.07216700	-1.26994700	3.16825100
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3d

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6	3.95248000	-1.55462300	-0.10545800
1	3.40278500	-2.49694200	-0.13834100
6	5.35590000	-1.53819800	-0.03946600
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6	6.04580900	-0.32482500	0.02450000
1	7.13712800	-0.32608200	0.07716400
6	5.36372200	0.90199900	0.02667100
1	5.90751800	1.84622800	0.08109100
6	1.76397000	1.50954600	-0.14262000
6	1.79011100	-0.03615200	-0.17273700
6	1.02717100	-0.60516700	1.02817500
6	-0.34833400	-2.54821900	1.08238800
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1	-0.17846700	-3.57303000	1.44089300
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7	3.07655700	1.94262500	-0.05478000
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5a'

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6	5.19418500	-1.94768100	-0.44707700
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6	5.49718000	0.45847000	-0.15821300
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6	-5.52796300	0.18225200	-0.09205500
6	-4.79821800	0.11791300	1.09721600
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1	-2.87717900	-0.21077600	1.98735700
6	3.88445000	3.08553800	0.16310100
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6a

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1	0.88318400	3.86157500	0.77313700
6	-1.12998300	3.79692200	-0.00598000
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6	-2.67498800	-0.59498300	0.04881300	1	-1.31384100	-2.40641800	-3.66035600
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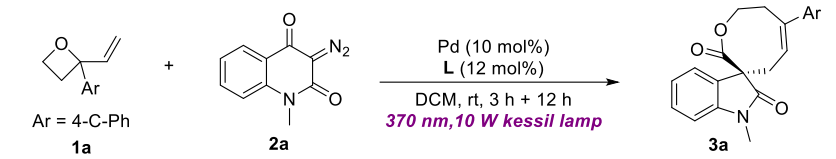
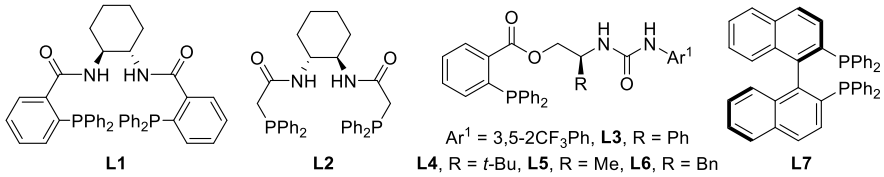
1	-5.00096500	-0.05156000	-0.79966000	1	1.08602100	0.24601500	-2.21885100
1	-4.47259100	1.35731400	-1.77890100	6	3.31840900	-0.76018500	0.78223500
1	-4.99346300	1.59209700	-0.08093200	1	1.65471000	-1.90283900	1.48404800
7	-3.12346600	0.65461800	-0.32339200	6	3.80633400	0.09295600	-0.20884300
8	-3.32477800	-1.61736300	0.04374900	1	3.38870300	1.11155800	-2.06465400
8	-1.14802600	-0.56219400	2.90883700	1	3.95485500	-1.03656100	1.62382900
8	-0.62186100	-2.36836700	1.68427500	17	5.43284700	0.71683000	-0.09556500
6	-0.77735400	-1.40011200	-1.87981500	6	-0.48929900	-2.71113700	0.29626300
1	-1.00191000	-0.41749700	-2.30794900	1	0.36138300	-3.39721800	0.19913500
6	-0.95332400	-2.48654900	-2.63190600	1	-1.41537100	-3.20019100	-0.02970000
1	-0.74968000	-3.49566800	-2.26368800				

3. Details for Condition Optimizations

Table S1: The effect of ligands and Pd source.[a]

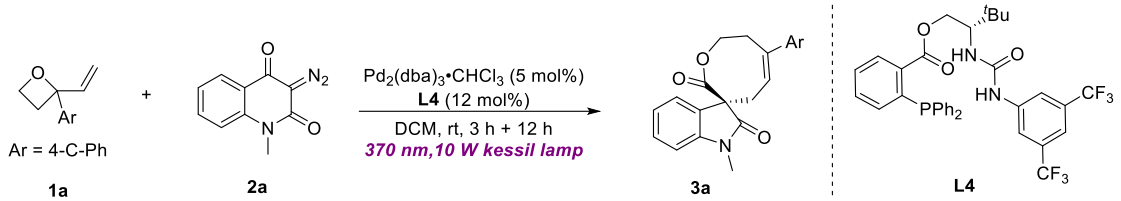




Entry	Ligand	Pd cat.	Yield (%)[b]	ee (%)[c]
1	**L1**	$Pd_2(dba)_3$•$CHCl_3$ (5%)	16%	-60%
2	**L2**	$Pd_2(dba)_3$•$CHCl_3$ (5%)	15%	63%
3	**L3**	$Pd_2(dba)_3$•$CHCl_3$ (5%)	63%	80%
4	**L4**	**$Pd_2(dba)_3$•$CHCl_3$ (5%)**	**75%**	**87%**
5	**L5**	$Pd_2(dba)_3$•$CHCl_3$ (5%)	60%	74%
6	**L6**	$Pd_2(dba)_3$•$CHCl_3$ (5%)	46%	80%
7	**L7**	$Pd_2(dba)_3$•$CHCl_3$ (5%)	29%	31%
13	**L4**	$Pd_2(dba)_3$ (5%)	66%	87%
14	**L4**	$Pd(PPh_3)_4$ (10%)	N.R.	--
14	**L4**	$Pd(PPh_3)_2Cl_2$ (10%)	9%	0%

[a]Unless noted otherwise, reactions were performed with **2a** (0.2 mmol, 2.0 equiv.) in dry DCM (1 mL) was irradiated at rt under 10 W 370 nm kessil lamp for 3 h, the resulting solution **2a-1** together with **1a** (0.1 mmol) in another 1 mL DCM were added to the pre-prepared solution of Pd cat. (10 mol%) and chiral ligand (12 mol%) in dry DCM and stirred at 27 °C for 12 hour. [b]Determined by ^{1}H NMR. [c]Determined by HPLC analysis on a chiral stationary phase. dba: dibenzylideneacetone.

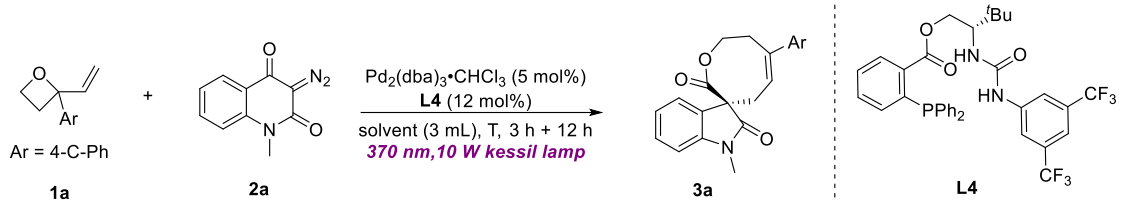
Table S2: The effect of the ratio of **1d** and **2a** and solvent volume[a].



Entry	Ratio of **1d**/**2a**	Volume (mL)	Yield (%)[b]	ee (%)[c]
1	1 : 1	3	36%	89%
2	**1 : 2**	**3**	**75%**	**87%**
3	1 : 3	3	18%	51%
4	2 : 1	3	45%	89%
5	1 : 2	6	31%	86%

[a]Unless noted otherwise, reactions were performed with **2a** (0.2 mmol, 2.0 equiv.) in dry DCM (1 mL) was irradiated at rt under 10 W 370 nm kessil lamp for 3 h, the resulting solution **2a-1** together with **1a** (0.1 mmol) in another 1 mL DCM were added to the pre-prepared solution of Pd cat. (10 mol%) and chiral ligand (12 mol%) in dry DCM and stirred at 27 °C for 12 hour. [b]Determined by ^{1}H NMR. [c]Determined by HPLC analysis on a chiral stationary phase. dba: dibenzylideneacetone.

Table S3: The effect of solvent and temperature.[a]

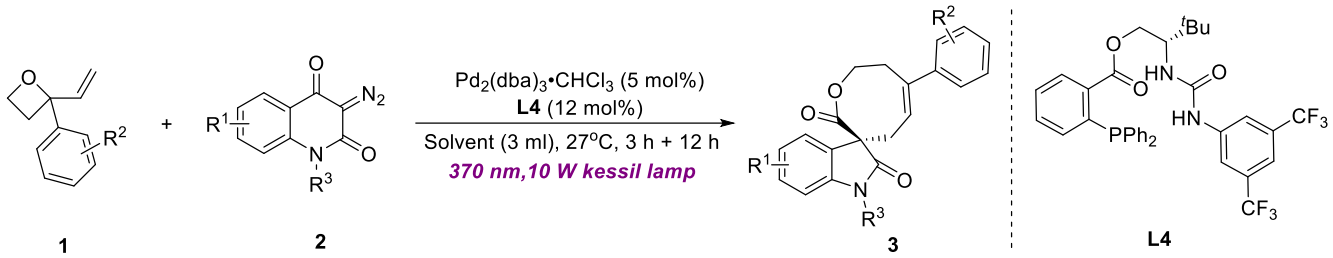


Entry	Solvent (3 mL)	T (°C)	Yield (%)[b]	ee (%)[c]
1	DCM	27	75%	87%
2	DCE	27	31%	84%
3	$CHCl_3$	27	N.R.	--
4	MeCN	27	N.R.	--
5[d]	DCM:DCE (1:2)	27	62%	88%
6[d]	DCM:THF (1:2)	27	16%	86%
7[d]	DCM:Toluene (1:2)	27	34%	77%
8[d]	DCM:MeCN (1:2)	27	61%	94%
9[d]	DCM:MeCN (1.5:1.5)	27	72%	93%
10[d]	DCM:MeCN (2:1)	27	40%	85%
11[d]	DCM:MeCN (1.5:1.5)	35	35%	93%
12[d]	DCM:MeCN (1.5:1.5)	45	14%	93%
12[d]	DCM:PhCN (1.5:1.5)	27	80%	86%
13[e]	**DCM:MeCN:PhCN (1:1:1)**	**27**	**78% (75%)**	**92%**

[a]Unless noted otherwise, reactions were performed with **2a** (0.2 mmol, 2.0 equiv.) in dry DCM (1 mL) was irradiated at rt under 10 W 370 nm kessil lamp for 3 h, the resulting solution **2a-1** together with **1a** (0.1 mmol) in another 1 mL DCM were added to the pre-prepared solution of Pd cat. (10 mol%) and chiral ligand (12 mol%) in dry DCM and stirred at 27 °C for 12 hour. [b]Determined by ^{1}H NMR. [c]Determined by HPLC analysis on a chiral stationary phase. dba: dibenzylideneacetone.[d]Reactions were performed with **2a** (0.2 mmol, 2.0 equiv.) in dry DCM (1 mL) was irradiated at rt under 10 W 370 nm kessil lamp for 3 h, the resulting solution **2a-1** together with **1a** (0.1 mmol) in 1 mL another solvent were added to the pre-prepared solution of Pd cat. (10 mol%) and chiral ligand (12 mol%) in dry solvent and stirred at 27 °C for 12 hours. [d]Reactions were performed with **2a** (0.2 mmol, 2.0 equiv.) in dry DCM (1 mL) was irradiated at rt under 10 W 370 nm kessil lamp for 3 h, the resulting solution **2a-1** together with **1a** (0.1 mmol) in 1 mL PhCN were added to the pre-prepared solution of Pd cat. (10 mol%) and chiral ligand (12 mol%) in dry MeCN and stirred at 27 °C for 12 hours.

4. General Procedures and Characterization of Products

4.1 General procedures for the preparation of lactones products

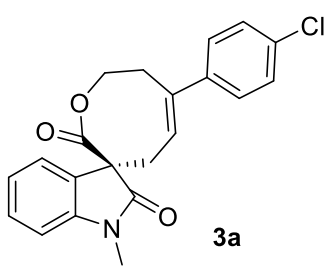


General procedure A *(DCM:MeCN:PhCN = 1:1:1, 3 mL)* : Under argon atmosphere, a flame-dried 10 mL Schlenk tube was charged with 3-diazoquinoline-2,4-diones **2** (0.2 mmol, 2.0 equiv) and anhydrous DCM (1 mL). The resulting solution was stirred for 3 h at room temperature under the irradiation of 10 W 370 nm kessil lamp. To another a flame-dried 10 mL Schlenk tube was charged with $Pd_2(dba)_3 \cdot CHCl_3$ (5 mol %), chiral ligand **L4** (12 mol%) and MeCN (1 mL) and the resulting solution was stirred for 30 mins at room temperature. After that, the reaction solution in the first Schlenk together with vinyl oxetanes **1** (0.1 mmol, 1.0 equiv.) and 1 mL PhCN were added to the second one. Then the resulting solution was stirred for 12 h at 27 ^{o}C. Finally, the crude products were purified by flash silica gel chromatography (petrolether/ethyl acetate = 20:3) to give the products **3**. All the ee values were determined by chiral HPLC analysis of purified products. The racemic poroducts were synthesized using racemic **L3** as ligand.

General procedure B *(DCM = 3 mL)* : Under argon atmosphere, a flame-dried 10 mL Schlenk tube was charged with 3-diazoquinoline-2,4-diones **2** (0.2 mmol, 2.0 equiv) and anhydrous DCM (1 mL). The resulting solution was stirred for 3 h at room temperature under the irradiation of 10 W 370 nm kessil lamp. To another a flame-dried 10 mL Schlenk tube was charged with $Pd_2(dba)_3 \cdot CHCl_3$ (5 mol %), chiral ligand **L4** (12 mol%) and DCM (1 mL) and the resulting solution was stirred for 30 mins at room temperature. After that, the reaction solution in the first Schlenk together with vinyl oxetanes **1** (0.1 mmol, 1.0 equiv.) and another 1 mL DCM were added to the second one. Then the resulting solution was stirred for 12 h at 35 ^{o}C. Substrate **1b** was performed with **2a** at 27 ^{o}C to improve the ee value of **3b**. Finally, the crude products were purified by flash silica gel chromatography (petrolether/ethyl acetate = 20:3) to give the products **3**. All the ee values were determined by chiral HPLC analysis of purified products. The racemic poroducts were synthesized using racemic **L3** as ligand.

4.2 Characteration of tetrahydrofurans products

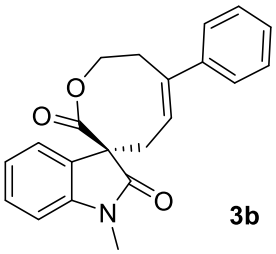
(*R*,*E*)-6'-(4-chlorophenyl)-1-methyl-7',8'-dihydro-2'*H*,4'*H*-spiro[indoline-3,3'-oxocine]-2,2'-dione (3a)



3a

General procedure A: White solid, 72% yield, 92% ee, $[\alpha]_D^{25}$ = 73.93 (*c* = 1.00 in $CHCl_3$); The ee value was determined by HPLC analysis (Chiralpak AD column, hexane/*i*-PrOH, 85:15 v/v, flow rate 1.0 mL/min, λ = 254 nm, 25 °C), t_R (major) = 31.69 min, t_R (minor) = 17.14 min. **^{1}H NMR** (400 MHz, $CDCl_3$) δ (ppm) 7.56 (d, *J* = 7.5 Hz, 1H), 7.38 - 7.33 (m, 1H), 7.31 (s, 4H), 7.14 -7.12 (m, 1H), 6.86 (d, *J* = 7.7 Hz, 1H), 6.30 (t, *J* = 8.8 Hz, 1H), 4.60 (d, *J* = 30.2 Hz, 2H), 3.25 (s, 3H), 2.99 (s, 4H).; **^{13}C NMR** (100 MHz, $CDCl_3$) δ (ppm) 172.4, 171.4, 143.2, 142.2, 141.6, 133.5, 129.4, 128.6, 128.1, 127.3, 126.2, 125.3, 122.8, 108.4, 70.1, 62.9, 37.3, 34.0, 26.5. HRMS (ESI) for: $C_{21}H_{18}ClNO_3$ $[M+H]^+$: calcd 368.1048, found 368.1049.

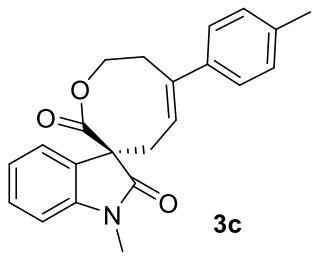
(*R*,*E*)-1-methyl-6'-phenyl-7',8'-dihydro-2'*H*,4'*H*-spiro[indoline-3,3'-oxocine]-2,2'-dione (3b)



3b

General procedure B: White solid, 68% yield, 90% ee, $[\alpha]_D^{25}$ = 49.93 (*c* = 1.00 in $CHCl_3$); The ee value was determined by HPLC analysis (Chiralpak AD column, hexane/*i*-PrOH, 90:10 v/v, flow rate 1.0 mL/min, λ = 254 nm, 25 °C), t_R (major) = 38.05 min, t_R (minor) = 16.45 min; **^{1}H NMR** (400 MHz, $CDCl_3$) δ (ppm) 7.58 (d, *J* = 7.4 Hz, 1H), 7.44 - 7.28 (m, 6H), 7.12 (t, *J* = 7.6 Hz, 1H), 6.86 (d, *J* = 7.8 Hz, 1H), 6.29 (t, *J* = 8.8 Hz, 1H), 4.63 (s, 2H), 3.25 (d, *J* = 1.1 Hz, 3H), 3.09 (s, 2H), 2.95 (s, 2H).; **^{13}C NMR** (100 MHz, $CDCl_3$) δ (ppm) 172.4, 171.4, 143.8, 143.2, 142.8, 129.3, 128.5, 127.5, 126.7, 126.6, 125.5, 122.8, 108.3, 70.2, 62.9, 37.5, 34.1, 26.5.HRMS (ESI) for: $C_{21}H_{19}NO_3$ $[M+H]^+$: calcd 334.1438, found 334.1433.

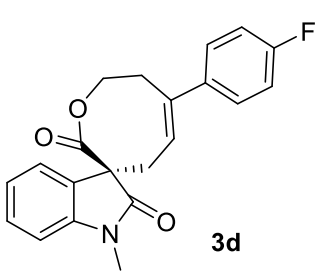
(*R*,*E*)-1-methyl-6'-(*p*-tolyl)-7',8'-dihydro-2'*H*,4'*H*-spiro[indoline-3,3'-oxocine]-2,2'-dione (3c)



3c

General procedure A: White solid, 63% yield, 95% ee, $[\alpha]_D^{25}$ = 55.93 (*c* = 1.00 in $CHCl_3$); The ee value was determined by HPLC analysis (Chiralpak AD column, hexane/*i*-PrOH, 85:15 v/v, flow rate 1.0 mL/min, λ = 254 nm, 25 °C), t_R (major) = 40.83 min, t_R (minor) = 15.09 min.**^{1}H NMR** (400 MHz, $CDCl_3$) δ (ppm) 7.57 (d, *J* = 7.4 Hz, 1H), 7.34 (t, *J* = 7.8 Hz, 1H), 7.28 (d, *J* = 7.7 Hz, 2H), 7.21 - 7.05 (m, 3H), 6.86 (d, *J* = 7.8 Hz, 1H), 6.26 (t, *J* = 8.8 Hz, 1H), 4.61 (s, 2H), 3.24 (d, *J* = 1.6 Hz, 3H), 3.07 (s, 2H), 2.92 (s, 2H), 2.36 (s,3H).; **^{13}C NMR** (100 MHz, $CDCl_3$) δ (ppm) 172.2, 171.3, 1431, 142.5, 140.8, 137.2, 129.1, 129.1, 126.0, 126.3, 125.6, 125.4, 122.7, 108.2, 62.8, 37.4, 33.9, 26.5, 21.1.; HRMS (ESI) for: $C_{22}H_{21}NO_3$ $[M+H]^+$: calcd 348.1594, found 348.1598.

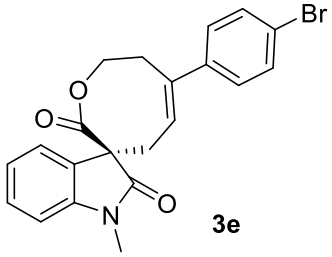
(*R*,*E*)-6'-(4-fluorophenyl)-1-methyl-7',8'-dihydro-2'*H*,4'*H*-spiro[indoline-3,3'-oxocine]-2,2'-dione (3d)



3d

General procedure A: White solid, 74% yield, 93% ee, $[\alpha]_D^{25}$ = 57.27 (*c* = 1.00 in $CHCl_3$); The ee value was determined by HPLC analysis (Chiralpak AD column, hexane/*i*-PrOH, 90:10 v/v, flow rate 1.0 mL/min, λ = 254 nm, 25 °C), t_R (major) = 42.43 min, t_R (minor) = 22.31 min. **^{1}H NMR** (400 MHz, $CDCl_3$) *δ* (ppm) 7.58 (d, J = 7.5 Hz, 1H), 7.44 - 7.32 (m, 3H), 7.26 (d, *J* = 1.6 Hz, 1H), 7.13 (t, *J* = 7.7 Hz, 2H), 7.08 - 7.00 (m, 1H), 6.87 (d, J = 7.8 Hz, 1H), 6.26 (s, 1H), 4.60 (d, J = 25.7 Hz, 2H), 3.25 (t, *J* = 1.6 Hz, 3H), 2.98 (s, 4H). **^{13}C NMR** (100 MHz, $CDCl_3$) *δ* (ppm) 171.4, 170.2, 163.6, 161.1, 143.2, 139.8(0), 139.7(7), 129.3, 128.41 (d, *J* = 8.0 Hz), 126.7, 126.2, 125.3, 122.8, 115.29 (d, *J* = 21.4 Hz), 108.4, 70.18, 62.9, 37.3, 34.2, 26.5. **^{19}F NMR** (377 MHz, $CDCl_3$) δ (ppm) -115.1. HRMS (ESI) for: $C_{21}H_{18}FNO_3$ $[M+H]^+$: calcd 352.1343, found 352.1336.

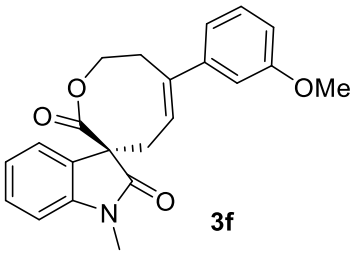
(*R*,*E*)-6'-(4-bromophenyl)-1-methyl-7',8'-dihydro-2'*H*,4'*H*-spiro[indoline-3,3'-oxocine]-2,2'-dione (3e)



3e

General procedure A: White solid, 53% yield, 90% ee, $[\alpha]_D^{25}$ = 41.83 (*c* = 1.00 in $CHCl_3$); The ee value was determined by HPLC analysis (Chiralpak AD column, hexane/*i*-PrOH, 85:15 v/v, flow rate 1.0 mL/min, λ = 254 nm, 25 °C), t_R (major) = 35.04 min, t_R (minor) = 18.77 min. **^{1}H NMR** (400 MHz, $CDCl_3$) *δ* (ppm) 7.56 (d, *J* = 7.5 Hz, 1H), 7.50 - 7.44 (m, 2H), 7.37 - 7.33 (m, 1H), 7.29 - 7.23 (m, 2H), 7.12 (t, *J* = 7.6 Hz, 1H), 6.86 (d, *J* = 7.8 Hz, 1H), 6.30 (t, *J* = 8.8 Hz, 1H), 4.60 (d, *J* = 28.4 Hz, 2H), 3.25 (s, 3H), 2.98 (s, 4H).; **^{13}C NMR** (100 MHz, $CDCl_3$) *δ* (ppm) 172.3, 171.4, 143.2, 142.7, 141.6, 131.6, 129.4, 128.4, 127.4, 126.2, 125.3, 122.8, 121.6, 108.4, 70.2, 62.9, 37.3, 33.9, 26.5. HRMS (ESI) for: $C_{21}H_{18}BrNO_3$ $[M+H]^+$: calcd 412.0534, found 412.0538.

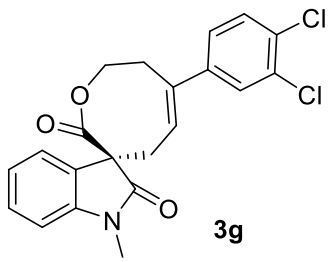
(*R*,*E*)-6'-(3-methoxyphenyl)-1-methyl-7',8'-dihydro-2'*H*,4'*H*-spiro[indoline-3,3'-oxocine]-2,2'-dione (3f)



3f

General procedure A: White solid, 86% yield, 93% ee, $[\alpha]_D^{25}$ = 53.90 (*c* = 1.00 in $CHCl_3$); TThe ee value was determined by HPLC analysis (Chiralpak AD column, hexane/*i*-PrOH, 90:10 v/v, flow rate 1.0 mL/min, λ = 254 nm, 25 °C), t_R (major) = 81.58 min, t_R (minor) = 27.62 min. **^{1}H NMR** (400 MHz, $CDCl_3$) *δ* (ppm) 7.57 (d, *J* = 7.4 Hz, 1H), 7.37 - 7.32 (m, 1H), 7.27 (t, *J* = 7.9 Hz, 1H), 7.13 - 7.09 (m, 1H), 7.00 - 6.95 (m, 1H), 6.91 (t, *J* = 2.1 Hz, 1H), 6.88 - 6.80 (m, 2H), 6.30 (t, *J* = 8.8 Hz, 1H), 4.63 (s, 2H), 3.84 (s, 3H), 3.24 (s, 3H), 3.10 (s, 2H), 2.92 (s, 1H). **^{13}C NMR** (100 MHz, $CDCl_3$) *δ* (ppm) 172.3, 171.4, 159.6, 145.3, 143.2, 142.7, 129.5, 129.2, 126.6, 126.4, 125.5, 122.8, 119.3, 112.8, 112.6, 108.3, 70.2, 62.9, 55.3, 37.5, 34.1, 26.5. HRMS (ESI) for: $C_{22}H_{21}NO_4$ $[M+Ha]^+$: calcd 364.1543, found 364.1539.

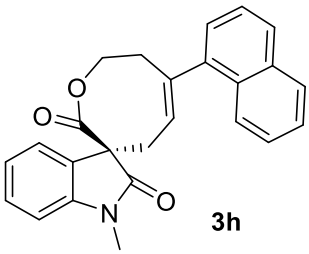
(*R*,*E*)-6'-(3,4-dichlorophenyl)-1-methyl-7',8'-dihydro-2'*H*,4'H-spiro[indoline-3,3'-oxocine]-2,2'-dione (3g)



3g

General procedure A: White solid, 78% yield, 80% ee, $[\alpha]_D^{25}$ = 52.03 (*c* = 1.00 in $CHCl_3$); The ee value was determined by HPLC analysis (Chiralpak AD column, hexane/*i*-PrOH, 90:10 v/v, flow rate 1.0 mL/min, λ = 254 nm, 25 °C), t_R (major) = 37.12 min, t_R (minor) = 20.68 min; **^{1}H NMR** (400 MHz, $CDCl_3$) *δ* (ppm) 7.55 (d, *J* = 7.5 Hz, 1H), 7.44 (d, *J* = 2.1 Hz, 1H), 7.41 (d, *J* = 8.4 Hz, 1H), 7.35 (t, *J* = 7.8 Hz, 1H), 7.22 (dd, *J* = 8.3, 2.2 Hz, 1H), 7.12 (t, *J* = 7.6 Hz, 1H), 6.87 (d, *J* = 7.8 Hz, 1H), 6.34 (t, *J* = 8.7 Hz, 1H), 4.61 (d, *J* = 40.9 Hz, 2H), 3.25 (s, 3H), 2.97 (s, 4H).; **^{13}C NMR** (100 MHz, $CDCl_3$) *δ* (ppm) 172.4, 171.3, 143.7, 143.2, 140.5, 132.5, 131.6, 130.4, 129.4, 128.5, 126.3, 126.0, 125.2, 122.9, 108.4, 69.9, 62.9, 37.2, 33.8, 26.5. HRMS (ESI) for: $C_{21}H_{17}Cl_2NO_3$ $[M+H]^+$: calcd 402.0658, found 402.0651.

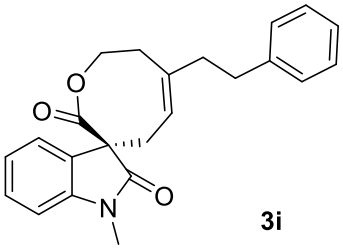
(*R*,*E*)-1-methyl-6'-(naphthalen-1-yl)-7',8'-dihydro-2'*H*,4'*H*-spiro[indoline-3,3'-oxocine]-2,2'-dione (3h)



3h

General procedure A: White solid, 60% yield, 93% ee, $[\alpha]_D^{25}$ = 46.03 (*c* = 1.00 in $CHCl_3$); The ee value was determined by HPLC analysis (Chiralpak OD column, hexane/*i*-PrOH, 90:10 v/v, flow rate 0.7 mL/min, λ = 254 nm, 25 °C), t_R (major) = 48.73 min, t_R (minor) = 58.51 min. **^{1}H NMR** (400 MHz, $CDCl_3$) *δ* (ppm) 7.96 - 7.84 (m, 4H), 7.65 (d, *J* = 7.4 Hz, 1H), 7.59 - 7.46 (m, 3H), 7.43 - 7.34 (m, 1H), 7.16 (t, *J* = 7.3 Hz, 1H), 6.90 (d, *J* = 7.8 Hz, 1H), 6.47 (t, *J* = 8.8 Hz, 1H), 4.73 (s, 2H), 3.30 (s, 3H), 3.22 (s, 2H), 3.11 (s, 2H).; **^{13}C NMR** (100 MHz, $CDCl_3$) *δ* (ppm) 172.4, 171.5, 143.2, 142.7, 141.1, 133.4, 132.7, 129.3, 128.2, 128.2, 127.6, 127.1, 126.4, 126.0, 125.5, 125.3, 125.1, 122.8, 108.4, 70.3, 63.0, 37.6, 34.1, 26.6. HRMS (ESI) for: $C_{25}H_{21}NO_3$ $[M+H]^+$: calcd 384.1594, found 384.1596.

(*R*,*Z*)-1-methyl-6'-phenethyl-7',8'-dihydro-2'*H*,4'*H*-spiro[indoline-3,3'-oxocine]-2,2'-dione (3i)

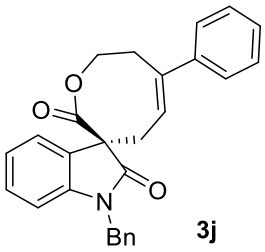


3i

General procedure A: White solid, 77% yield, 90% ee, $[\alpha]_D^{25}$ = 50.03 (*c* = 1.00 in $CHCl_3$); The ee value was determined by HPLC analysis (Chiralpak AD column, hexane/*i*-PrOH, 90:10 v/v, flow rate 1.0 mL/min, λ = 254 nm, 25 °C), t_R (major) = 23.13 min, t_R (minor) = 17.07 min. **^{1}H NMR** (400 MHz, $CDCl_3$) *δ* (ppm) 7.40 (d, *J* = 7.3 Hz, 1H), 7.37 - 7.27 (m, 3H), 7.24 - 7.18 (m, 3H), 7.10 - 7.06 (m, 1H), 6.87 - 6.81 (m, 1H), 5.84 (t, *J* = 8.6 Hz, 1H), 4.55 (s, 2H), 3.22 (s, 3H), 3.12 - 2.26 (m, 8H). **^{13}C NMR** (100 MHz, $CDCl_3$) *δ* (ppm) 172.3, 171.5, 143.0, 142.3, 141.4, 129.0, 128.4, 128.3, 126.6, 125.9, 125.5, 122.9, 122.6, 108.2, 70.0, 62.9, 41.9, 37.0, 34.5, 33.6, 26.4. HRMS (ESI) for: $C_{23}H_{23}NO_3$ $[M+H]^+$: calcd 362.1751, found 362.1755.

(*R*,*E*)-1-benzyl-6'-phenyl-7',8'-dihydro-2'*H*,4'*H*-spiro[indoline-3,3'-oxocine]-2,2'-dione (3j)

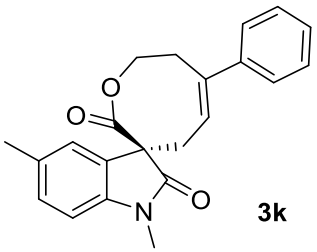
General procedure A: White solid, 81% yield, 94% ee, $[\alpha]_D^{25}$ = 56.37 (*c* = 1.00 in $CHCl_3$); The ee value was determined by HPLC analysis (Chiralpak AS column, hexane/*i*-PrOH, 90:10 v/v, flow rate 1.0 mL/min, λ = 254 nm, 25 °C), t_R (major) = 28.16 min, t_R (minor) = 22.62 min; **^{1}H NMR** (400 MHz, $CDCl_3$) *δ* (ppm) 7.59 (d, *J* = 7.4 Hz, 1H), 7.42 - 7.33 (m, 4H), 7.33 - 7.19 (m, 7H), 7.12 - 7.03 (m, 1H), 6.74 (d, *J* = 7.8 Hz, 1H), 6.34 (t, *J* = 8.6



3j

Hz, 1H), 4.95 (d, *J* = 1.6 Hz, 2H), 4.64 (d, *J* = 21.6 Hz, 2H), 3.02 (s, 4H).; **^{13}C NMR** (100 MHz, $CDCl_3$) δ (ppm) 172.5, 171.4, 143.7, 142.2, 135.5, 129.1, 128.8, 128.4, 127.7, 127.5, 127.3, 126.7, 126.5, 126.2, 125.4, 122.7, 109.3, 70.3, 62.9, 43.9, 37.5, 34.0. HRMS (ESI) for: $C_{27}H_{23}NO_3$ $[M+H]^+$: calcd 410.1751, found 410.1743.

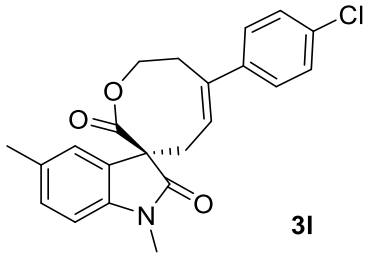
(*R*,*E*)-1,5-dimethyl-6'-phenyl-7',8'-dihydro-2'*H*,4'*H*-spiro[indoline-3,3'-oxocine]-2,2'-dione (3k)



3k

General procedure B: White solid, 72% yield, 81% ee, $[\alpha]_D^{25}$ = 45.17 (*c* = 1.00 in $CHCl_3$); The ee value was determined by HPLC analysis (Chiralpak AD column, hexane/*i*-PrOH, 90:10 v/v, flow rate 1.0 mL/min, λ = 254 nm, 25 °C), t_R (major) = 47.58 min, t_R (minor) = 20.08 min; **^{1}H NMR** (400 MHz, $CDCl_3$) δ (ppm) 7.43 - 7.33 (m, 5H), 7.29 (t, *J* = 7.0 Hz, 1H), 7.14 (d, *J* = 7.9 Hz, 1H), 6.75 (d, *J* = 7.8 Hz, 1H), 6.31 (t, *J* = 8.8 Hz, 1H), 4.64 (s, 2H), 3.23 (s, 3H), 3.02 (s, 4H), 2.38 (s, 3H); **^{13}C NMR** (100 MHz, $CDCl_3$) δ (ppm) 172.4, 171.6, 143.9, 142.6, 140.8, 132.4, 129.5, 128.5, 127.5, 126.8, 126.7, 126.4, 126.1, 108.1, 70.3, 63.0, 37.4, 34.1, 26.6, 21.3. HRMS (ESI) for: $C_{22}H_{21}NO_3$ $[M+H]^+$: calcd 348.1594, found 348.1589.

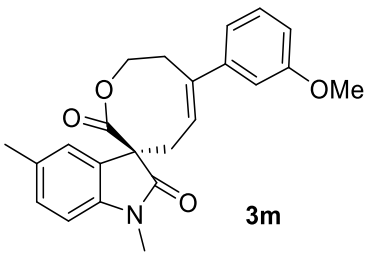
(*R*,*E*)-6'-(4-chlorophenyl)-1,5-dimethyl-7',8'-dihydro-2'*H*,4'*H*-spiro[indoline-3,3'-oxocine]-2,2'-dione (3l)



3l

General procedure B: White solid, 48% yield, 89% ee, $[\alpha]_D^{25}$ = 43.07 (*c* = 1.00 in $CHCl_3$); The ee value was determined by HPLC analysis (Chiralpak AD column, hexane/*i*-PrOH, 90:10 v/v, flow rate 1.0 mL/min, λ = 254 nm, 25 °C), t_R (major) = 36.42 min, t_R (minor) = 19.72 min; **^{1}H NMR** (400 MHz, $CDCl_3$) δ (ppm) 7.30 (s, 1H), 7.24 (s, 4H), 7.14 - 7.02 (m, 1H), 6.68 (d, *J* = 7.9 Hz, 1H), 6.24 (t, *J* = 8.7 Hz, 1H), 4.53 (d, *J* = 39.9 Hz, 2H), 3.15 (s, 3H), 2.92 (s, 4H), 2.30 (s, 3H).; **^{13}C NMR** (100 MHz, $CDCl_3$) δ (ppm) 172.5, 171.5, 142.2, 141.4, 140.8, 133.4, 132.4, 129.6, 128.6, 128.2, 127.5, 126.1, 125.9, 108.1, 70.1, 63.0, 37.38, 34.0, 26.5, 21.3. HRMS (ESI) for: $C_{22}H_{20}ClNO_3$ $[M+H]^+$: calcd 382.1204, found 382.1203.

(*R*,*E*)-6'-(3-methoxyphenyl)-1,5-dimethyl-7',8'-dihydro-2'*H*,4'*H*-spiro[indoline-3,3'-oxocine]-2,2'-dione (3m)

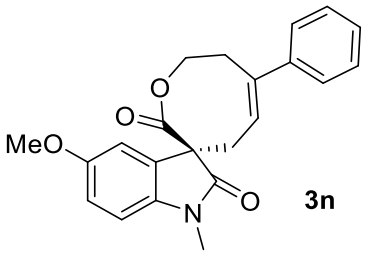


3m

General procedure B: White solid, 90% yield, 84% ee, $[\alpha]_D^{25}$ = 83.47 (*c* = 1.00 in $CHCl_3$); The ee value was determined by HPLC analysis (Chiralpak AD column, hexane/*i*-PrOH, 90:10 v/v, flow rate 1.0 mL/min, λ = 210 nm, 25 °C), t_R (major) = 63.23 min, t_R (minor) = 33.73 min; **^{1}H NMR** (400 MHz, $CDCl_3$) δ (ppm) 7.40 - 7.32 (m, 4H), 7.32 - 7.27 (m, 1H), 7.21 (d, *J* = 2.6 Hz, 1H), 6.87 (dd, *J* = 8.5, 2.6 Hz, 1H), 6.76 (d, *J* = 8.5 Hz, 1H), 6.29 (t, *J* = 8.5 Hz, 1H), 4.63 (s, 2H), 3.82 (s, 3H), 3.23 (s, 3H), 3.05 (s, 4H).; **^{13}C NMR** (100 MHz, $CDCl_3$) δ (ppm) 172.1, 171.4, 156.0, 143.8,

142.8, 136.8, 128.5, 127.5, 126.7, 126.5, 113.3, 113.2, 108.5, 70.3, 63.2, 56.0, 37.5, 34.1, 26.6.. HRMS (ESI) for: $C_{22}H_{21}NO_4$ $[M+H]^+$: calcd 364.1543, found 364.1535.

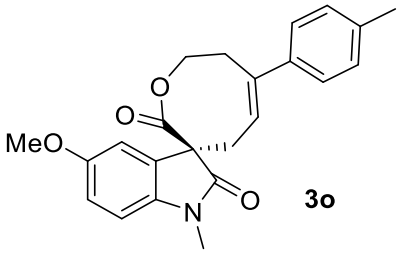
(*R*,*E*)-5-Methoxy-1-methyl-6'-phenyl-7',8'-dihydro-2'*H*,4'*H*-spiro[indoline-3,3'-oxocine]-2,2'-dione (3n)



3n

General procedure B: White solid, 88% yield, 86% ee, $[\alpha]_D^{25}$ = 38.87 (*c* = 1.00 in $CHCl_3$); The ee value was determined by HPLC analysis (Chiralpak IBN-5 column, hexane/*i*-PrOH, 90:10 v/v, flow rate 1.0 mL/min, λ = 210 nm, 25 °C), t_R (major) = 28.66 min, t_R (minor) = 46.63 min; **^{1}H NMR** (400 MHz, $CDCl_3$) *δ* (ppm) 7.44 - 7.32 (m, 4H), 7.32 - 7.27 (m, 1H), 7.21 (d, *J* = 2.6 Hz, 1H), 6.87 (dd, *J* = 8.5, 2.6 Hz, 1H), 6.76 (d, *J* = 8.5 Hz, 1H), 6.29 (t, *J* = 8.5 Hz, 1H), 4.63 (s, 2H), 3.82 (s, 3H), 3.23 (s, 3H), 3.05 (s, 4H); **^{13}C NMR** (100 MHz, $CDCl_3$) *δ* (ppm) 172.1, 171.4, 156.0, 143.8, 142.8, 136.8, 128.5, 127.5, 126.7, 126.5, 113.3, 113.2, 108.5, 70.3, 63.2, 56.0, 37.5, 34.1, 26.6. HRMS (ESI) for: $C_{23}H_{23}NO_4$ $[M+H]^+$: calcd 364.1543, found 364.1535.

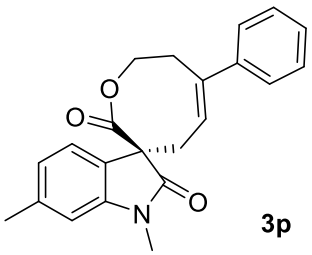
(*R*,*E*)-5-methoxy-1-methyl-6'-(p-tolyl)-7',8'-dihydro-2'*H*,4'*H*-spiro[indoline-3,3'-oxocine]-2,2'-dione (3o)



3o

General procedure B: White solid, 85% yield, 69% ee, $[\alpha]_D^{25}$ = 51.63 (*c* = 1.00 in $CHCl_3$); The ee value was determined by HPLC analysis (Chiralpak AD column, hexane/*i*-PrOH, 90:10 v/v, flow rate 1.0 mL/min, λ = 254 nm, 25 °C), t_R (major) = 76.43 min, t_R (minor) = 29.74 min; **^{1}H NMR** (400 MHz, $CDCl_3$) *δ* (ppm) 7.34 - 7.23 (m, 2H), 7.21 (d, *J* = 2.5 Hz, 1H), 7.16 (d, *J* = 7.9 Hz, 2H), 6.87 (dd, *J* = 8.5, 2.6 Hz, 1H), 6.76 (d, *J* = 8.5 Hz, 1H), 6.26 (t, *J* = 8.8 Hz, 1H), 4.61 (s, 2H), 3.82 (s, 3H), 3.22 (s, 3H), 3.00 (d, *J* = 37.8 Hz, 4H), 2.36 (s, 3H).; **^{13}C NMR** (100 MHz, $CDCl_3$) *δ* (ppm) 172.0, 171.3, 156.0, 142.7, 140.8, 137.3, 136.7, 129.2, 127.7, 126.6, 125.7, 113.3, 113.2, 108.5, 70.3, 63.2, 56.0, 37.5, 34.0, 26.6, 21.2. HRMS (ESI) for: $C_{23}H_{23}NO_4$ $[M+H]^+$: calcd 378.1700, found 378.1696.

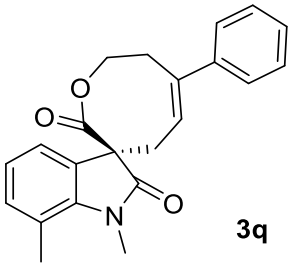
(*R*,*E*)-1,6-dimethyl-6'-phenyl-7',8'-dihydro-2'*H*,4'*H*-spiro[indoline-3,3'-oxocine]-2,2'-dione (3p)



3p

General procedure B: White solid, 54% yield, 86% ee, $[\alpha]_D^{25}$ = 24.50 (*c* = 1.00 in $CHCl_3$); The ee value was determined by HPLC analysis (Chiralpak AD column, hexane/*i*-PrOH, 90:10 v/v, flow rate 1.0 mL/min, λ = 254 nm, 25 °C), t_R (major) = 52.48 min, t_R (minor) = 19.27 min; **^{1}H NMR** (400 MHz, $CDCl_3$) *δ* (ppm) 7.45 (d, *J* = 7.6 Hz, 1H), 7.41 - 7.33 (m, 4H), 7.32 - 7.27 (m, 1H), 7.07 - 6.91 (m, 1H), 6.69 (d, *J* = 1.4 Hz, 1H), 6.28 (s, 1H), 4.62 (s, 2H), 3.23 (s, 3H), 3.01 (d, *J* = 59.9 Hz, 4H), 2.40 (s, 3H).; **^{13}C NMR** (100 MHz, $CDCl_3$) *δ* (ppm) 172.7, 171.6, 143.8, 143.3, 142.6, 139.6, 128.5, 127.5, 126.7(3), 126.6(6), 125.2, 123.5, 123.3, 109.3, 70.2, 62.8, 37.5, 34.1, 26.5, 21.9. HRMS (ESI) for: $C_{22}H_{21}NO_3$ $[M+H]^+$: calcd 348.1594, found 348.1598.

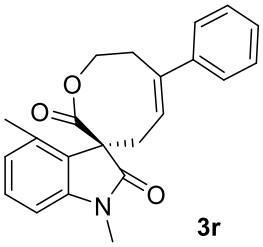
(*R*,*E*)-1,7-dimethyl-6'-phenyl-7',8'-dihydro-2'*H*,4'*H*-spiro[indoline-3,3'-oxocine]-2,2'-dione (3q)



3q

General procedure B: White solid, 49% yield, 66% ee, $[\alpha]_D^{25}$ = 22.73 (*c* = 1.00 in $CHCl_3$); The ee value was determined by HPLC analysis (Chiralpak AD column, hexane/*i*-PrOH, 90:10 v/v, flow rate 1.0 mL/min, λ = 254 nm, 25 °C), t_R (major) = 46.44 min, t_R (minor) = 17.37 min. **^{1}H NMR** (400 MHz, $CDCl_3$) *δ* (ppm) 7.51 - 7.36 (m, 4H), 7.35 - 7.27 (m, 1H), 7.11 (d, *J* = 7.7 Hz, 1H), 7.03 (t, *J* = 7.6 Hz, 1H), 6.33 (t, *J* = 8.8 Hz, 1H), 4.66 (s, 2H), 3.57 (s, 3H), 3.23 - 2.86 (m, 4H), 2.62 (s, 3H).; **^{13}C NMR** (100 MHz, $CDCl_3$) *δ* (ppm) 173.2, 171.6, 143.9, 142.7, 141.0, 133.0, 128.5, 127.5, 126.8, 126.8, 123.4, 122.6, 119.9, 70.4, 62.4, 37.7, 34.1, 29.9, 19.2. HRMS (ESI) for: $C_{22}H_{21}NO_3$ $[M+H]^+$: calcd 348.1594, found 348.1587.

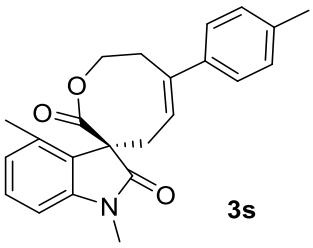
(*R*,*E*)-1,4-dimethyl-6'-phenyl-7',8'-dihydro-2'*H*,4'*H*-spiro[indoline-3,3'-oxocine]-2,2'-dione (3r)



3r

General procedure B: White solid, 50% yield, 97% ee, $[\alpha]_D^{25}$ = 9.13 (*c* = 1.00 in $CHCl_3$); The ee value was determined by HPLC analysis (Chiralpak AD column, hexane/*i*-PrOH, 90:10 v/v, flow rate 1.0 mL/min, λ = 254 nm, 25 °C), t_R (major) = 50.47 min, t_R (minor) = 18.42 min. **^{1}H NMR** (400 MHz, $CDCl_3$) *δ* (ppm) 7.42 - 7.38 (m, 2H), 7.36 - 7.31 (m, 2H), 7.30 - 7.27 (m, 1H), 7.25 - 7.20 (m, 1H), 6.91 - 6.89 (m, 1H), 6.70 (d, *J* = 7.7 Hz, 1H), 6.41 (t, *J* = 8.7 Hz, 1H), 4.72 - 4.64 (m, 1H), 4.55 - 4.52 (m, 1H), 3.40 (d, *J* = 11.3 Hz, 1H), 3.24 (s, 3H), 3.15 - 3.05 (m, 1H), 3.03 - 2.85 (m, 2H), 2.57 (s, 3H).; **^{13}C NMR** (100 MHz, $CDCl_3$) 173.0, 172.1, 144.1, 144.0, 141.3, 136.7, 129.0, 128.4, 128.1, 127.3, 126.7, 126.4, 123.7, 106.1, 70.6, 64.7, 34.4, 34.3, 26.6, 20.6. HRMS (ESI) for: $C_{22}H_{21}NO_3$ $[M+H]^+$: calcd 348.1594, found 348.1589.

(*R*,*E*)-1,4-dimethyl-6'-(p-tolyl)-7',8'-dihydro-2'*H*,4'*H*-spiro[indoline-3,3'-oxocine]-2,2'-dione (3s)

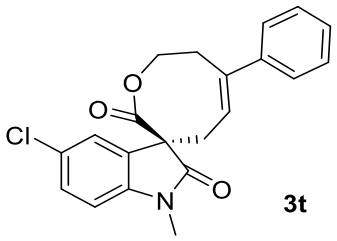


3s

General procedure B: White solid, 42% yield, 98% ee, $[\alpha]_D^{25}$ = 28.20 (*c* = 1.00 in $CHCl_3$); The ee value was determined by HPLC analysis (Chiralpak AD column, hexane/*i*-PrOH, 90:10 v/v, flow rate 1.0 mL/min, λ = 254 nm, 25 °C), t_R (major) = 48.28 min, t_R (minor) = 19.60 min. **^{1}H NMR** (400 MHz, $CDCl_3$) *δ* (ppm) 7.34 (d, *J* = 1.6 Hz, 2H), 7.31 - 7.24 (m, 1H), 7.18 (d, *J* = 7.9 Hz, 2H), 6.94 (d, *J* = 7.8 Hz, 1H), 6.73 (d, *J* = 7.7 Hz, 1H), 6.41 (t, *J* = 8.7 Hz, 1H), 4.71 - 4.65 (m, 1H), 4.60 - 4.55 (m, *J* = 10.8, 5.5, 3.1 Hz, 1H), 3.43 - 3.34 (m, 1H), 3.28 (s, 3H), 3.15 - 3.06 (m, 1H), 3.03 - 2.90 (m, 2H), 2.60 (s, 3H), 2.39 (s, 3H); **^{13}C NMR** (100 MHz, $CDCl_3$) *δ* (ppm) 173.0, 172.0, 144.1, 141.2, 141.1, 137.1, 136.8, 129.1, 129.0, 127.3, 126.6, 126.4, 123.8, 106.1, 70.6, 64.8, 3456, 34.3, 26.6, 21.2, 20.7. HRMS (ESI) for: $C_{23}H_{23}NO_3$ $[M+H]^+$: calcd 362.1751, found 362.1750.

(*R*,*E*)-5-chloro-1-methyl-6'-phenyl-7',8'-dihydro-2'*H*,4'*H*-spiro[indoline-3,3'-oxocine]-2,2'-dione (3t)

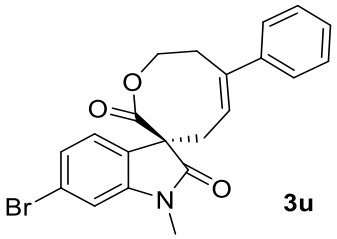
General procedure B: White solid, 66% yield, 6% ee, $[\alpha]_D^{25}$ = 2.30 (*c* = 1.00 in $CHCl_3$); The ee value was determined by HPLC analysis (Chiralpak IBN-5 column, hexane/*i*-PrOH, 90:10 v/v, flow rate 1.0 mL/min, λ = 254 nm, 25 °C), t_R (major) = 32.75 min, t_R (minor) = 28.27 min. **^{1}H NMR** (400 MHz, $CDCl_3$) *δ* (ppm) 7.67-7.52



3t

(m, 1H), 7.46-7.28 (m, 6H), 6.79 (d, J = 8.3 Hz, 1H), 6.26 (t, J = 8.4 Hz, 1H), 4.64 (s, 2H), 3.24 (s, 3H), 3.02 (s, 4H).; **^{13}C NMR** (100 MHz, $CDCl_3$) δ (ppm) 171.9, 170.7, 143.6, 143.1, 141.7, 129.2, 128.5, 128.1, 127.8, 127.6, 126.7, 125.9, 109.2, 70.4, 62.9, 37.4, 34.0, 26.6. HRMS (ESI) for: $C_{21}H_{18}ClNO_3$ $[M+Na]^+$: calcd 390.0867, found 390.0869.

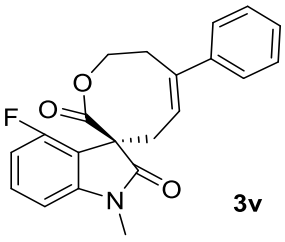
(*R*,*E*)-5-chloro-1-methyl-6'-phenyl-7',8'-dihydro-2'*H*,4'*H*-spiro[indoline-3,3'-oxocine]-2,2'-dione (3u)



3u

General procedure B: White solid, 63% yield, 2% ee, $[\alpha]_D^{25}$ = 1.20 (*c* = 1.00 in $CHCl_3$); The ee value was determined by HPLC analysis (Chiralpak IBN-5 column, hexane/*i*-PrOH, 90:10 v/v, flow rate 1.0 mL/min, λ = 254 nm, 25 °C), t_R (major) = 26.99 min, t_R (minor) = 30.89 min. **^{1}H NMR** (400 MHz, $CDCl_3$) δ (ppm) 7.44 (d, J = 8.0 Hz, 1H), 7.38 (d, J = 4.3 Hz, 4H), 7.33 (dt, J = 8.8, 4.4 Hz, 1H), 7.26 (d, J = 1.7 Hz, 1H), 7.04 (d, J = 1.6 Hz, 1H), 6.25 (s, 1H), 4.65 (s, 2H), 3.25 (s, 3H), 3.04 (d, J = 64.9 Hz, 4H).; **^{13}C NMR** (100 MHz, $CDCl_3$) δ (ppm) 172.1, 170.8, 144.5, 143.6, 143.1, 128.5, 127.6, 126.8, 126.6, 127.0, 125.6, 125.2, 123.0, 111.8, 70.3, 62.6, 37.4, 34.0, 26.6. HRMS (ESI) for: $C_{21}H_{18}BrNO_3$ $[M+Na]^+$: calcd 434.0361, found 434.0362.

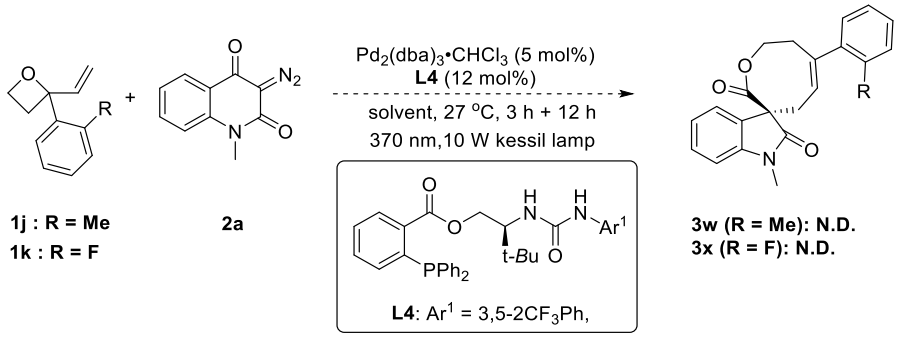
(*R*,*E*)-4-fluoro-1-methyl-6'-phenyl-7',8'-dihydro-2'*H*,4'*H*-spiro[indoline-3,3'-oxocine]-2,2'-dione (3v)



3v

General procedure B: White solid, 58% yield, 70% ee, $[\alpha]_D^{25}$ = 25.20 (*c* = 1.00 in $CHCl_3$); The ee value was determined by HPLC analysis (Chiralpak AD column, hexane/*i*-PrOH, 90:10 v/v, flow rate 1.0 mL/min, λ = 254 nm, 25 °C), t_R (major) = 28.68 min, t_R (minor) = 15.78 min. **^{1}H NMR** (400 MHz, $CDCl_3$) δ (ppm) 7.45 - 7.17 (m, 6H), 6.88 - 6.83 (m, 1H), 6.68 (dd, *J* = 7.8, 0.8 Hz, 1H), 6.28 - 6.22 (m, 1H), 4.67 (t, *J* = 10.4 Hz, 1H), 4.49 - 4.44 (m, 1H), 3.65 - 3.25 (m, 2H), 3.25 (s, 3H), 2.81 (d, *J* = 15.4 Hz, 2H).; **^{13}C NMR** (100 MHz, $CDCl_3$) δ (ppm) 171.2, 169.9, 160.7, 158.2, 145.4 (d, J = 8.9 Hz), 144.1, 142.4, 142.4, 131.1 (d, *J* = 9.0 Hz), 128.4, 127.3, 127.1, 127.1, 126.9, 126.9, 111.2 (d, *J* = 22.4 Hz), 104.5, 104.4, 69.9, 63.3(3), 63.2(9), 34.1, 27.1. **^{19}F NMR** (377 MHz, $CDCl_3$) δ (ppm) -62.9.HRMS (ESI) for: $C_{21}H_{18}FNO_3$ $[M+H]^+$: calcd 352.1343, found 352.1337.

Unsuccessful results:

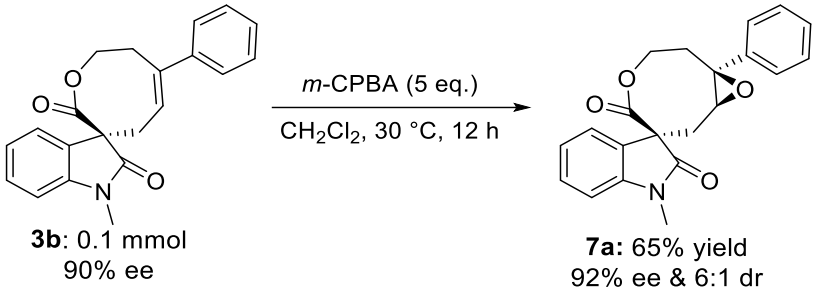


1j : R = Me
1k : R = F

2a

3w (R = Me): N.D.
3x (R = F): N.D.

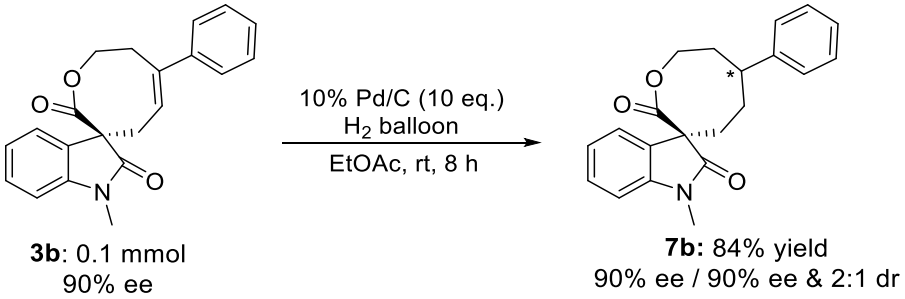
5. Synthetic Transformations



Under argon atmosphere, a flame-dried 10 mL Schlenk tube was charged with **3b** (0.1 mmol) anhydrous DCM (1.5 mL), then *m*-CPBA (5.0 eq) was added, the mixture was stired at 30 ℃ for 12 hours. The solution was quenched with sodium thiosulfate, extracted with ethyl acetate, dried over anhydrous sodium sulfate, purified by chromatography on silica gel (petroleum ether/ EtOAc = 10/1) to afford the desired product **7a** as white solide with 65% yield.

(3*R*)-1'-methyl-8-phenyl-5,9-dioxaspiro[bicyclo[6.1.0]nonane-3,3'-indoline]-2',4-dione (7a)

White solide, 65% yield, 92% ee, 6:1 dr. **^{1}H NMR** (400 MHz, $CDCl_3$) δ (ppm, major + minor) 7.57 - 7.53 (m, 3H), 7.44 - 7.28 (m, 4H), 7.12 (td, *J* = 7.6, 1.0 Hz, 1H), 6.88 (d, *J* = 7.8 Hz, 1H), 4.88 (t, *J* = 12.2 Hz, 1H), 4.28-4,24 (m, 1H), 4.07 (dd, *J* = 10.7, 4.5 Hz, 1H), 3.28 (s, 3H), 2.58 (dd, *J* = 13.4, 4.4 Hz, 2H), 2.51 - 2.25 (m, 2H).. **^{13}C NMR** (100 MHz, $CDCl_3$) δ (ppm, major + minor) 173.3, 172.2, 143.5, 140.4, 129.6, 129.6, 128.6, 128.5, 128.2(2), 128.1(7), 127.6, 127.5, 125.2, 125.1, 124.5, 123.1, 109.4, 108.0, 66.1, 62.8, 57.7, 57.3, 57.1, 38.3, 37.5, 26.6, 26.5. HRMS (ESI) for: $C_{21}H_{19}NO_4$ [M+H]+: calcd 372.1207, found 372.1206. $[\alpha]_D^{25}$ = -22.3 (*c* = 1.00, $CHCl_3$); The dr value was determined by the ^{1}H NMR analysis of the chiral reaction mixture; The ee value was determined by HPLC analysis (IE-H, hexane/*i*-PrOH = 80/20, detector: 254 nm, flow rate: 1.0 mL/min), t_R (major) = 28.35 min, t_R (minor) = 41.49 min.



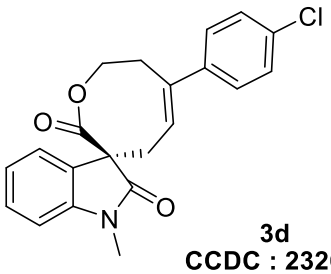
Under argon atmosphere, a flame-dried 10 mL Schlenk tube was charged with compound **3b** (0.1 mmol, 1.0 equiv.), 10% Pd/C (1.0 mmol, 10 equiv.), EtOAc (1.0 mL) and a stir bar was added. The resulting solution was stirred at room temperature under H_2 (1 atm). Then the reaction mixture was filtered through a short pad of silica with EtOAc and concentrated under reduced pressure. The crude

product was purified by flash column chromatography on silica (petrol ether/EtOAc = 25/1 to 10/1) to obtain hydrogenated product **7b.**

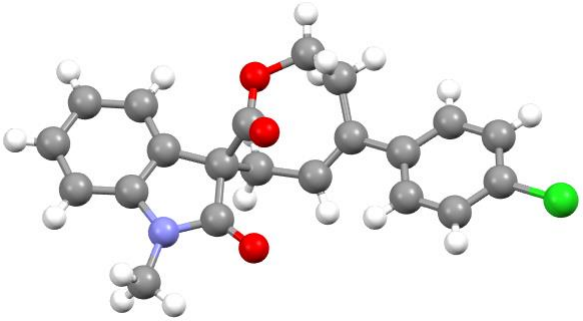
(3*R*)-1-methyl-6'-phenylspiro[indoline-3,3'-oxocane]-2,2'-dione (7b)

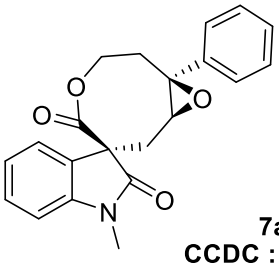
White solide, 84% yield, 90% ee/ 90% ee, 2:1 dr. **7b-1 (major): ^{1}H NMR** (400 MHz, $CDCl_3$) δ (ppm) 7.59 (dd, *J* = 7.5, 1.2 Hz, 1H), 7.40 - 7.24 (m, 3H), 7.22 - 7.17 (m, 3H), 7.12 (td, *J* = 7.6, 1.0 Hz, 1H), 6.84 (d, *J* = 7.8 Hz, 1H), 4.72 (dd, J = 10.9, 5.8 Hz, 1H), 4.38 (ddd, J = 12.3, 10.8, 4.4 Hz, 1H), 3.23 (s, 3H), 2.77 (d, J = 9.7 Hz, 1H), 2.67 (dd, *J* = 15.7, 9.1 Hz, 2H), 2.53 - 2.39 (m, 1H), 2.34 - 2.19 (m, 1H), 2.12 - 1.97 (m, 1H), 1.86 (dd, *J* = 14.6, 4.4 Hz, 1H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ (ppm) 174.0, 172.2, 149.9, 143.2, 129.1, 128.8, 127.4, 126.3, 126.0, 124.6, 122.8, 108.2, 67.3, 57.2, 45.6, 40.6, 38.2, 33.0, 26.4. HRMS (ESI) for: $C_{21}H_{21}NO_3$ [M+H]+: calcd 358.1414, found 358.1414 $[\alpha]_D^{25}$ = -10.27 (*c* = 1.00, $CHCl_3$); The dr value was determined by the ^{1}H NMR analysis of the chiral reaction mixture; The ee value was determined by HPLC analysis (IE-H, hexane/*i*-PrOH = 80/20, detector: 254 nm, flow rate: 1.0 mL/min), t_R (major) = 29.98 min, t_R (minor) = 24.25 min. **7b-2 (minor): ^{1}H NMR** (400 MHz, $CDCl_3$) δ (ppm) 7.68 (dd, *J* = 7.5, 1.2 Hz, 1H), 7.44 - 7.27 (m, 3H), 7.20 (d, *J* = 7.4 Hz, 3H), 7.14 (td, *J* = 7.6, 1.0 Hz, 1H), 6.87 (d, *J* = 7.8 Hz, 1H), 4.71 (td, *J* = 11.7, 4.0 Hz, 1H), 4.63 - 4.48 (m, 1H), 3.25 (s, 3H), 3.00 - 2.84 (m, 1H), 2.72 - 2.43 (m, 2H), 2.34 - 2.10 (m, 3H), 1.95 (dd, *J* = 14.6, 4.0 Hz, 1H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ (ppm) 173.0, 171.9, 149.4, 143.1, 129.0, 128.8, 128.1, 126.38, 126.3, 126.1, 125.4, 122.7, 108.4, 67.9, 58.2, 44.1, 40.4, 38.4, 34.3, 26.6. HRMS (ESI) for: $C_{21}H_{21}NO_4$ [M+H]+: calcd 358.1414, found 358.1407. $[\alpha]_D^{25}$ = -2.13 (*c* = 1.00, $CHCl_3$); The dr value was determined by the ^{1}H NMR analysis of the chiral reaction mixture; The ee value was determined by HPLC analysis (IE-H, hexane/*i*-PrOH = 80/20, detector: 254 nm, flow rate: 1.0 mL/min), t_R (major) = 33.03 min, t_R (minor) = 28.51 min.

6. X-Ray Structure of Product 3d

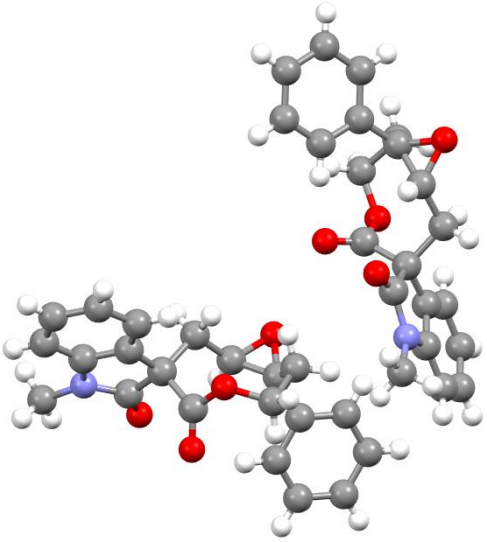


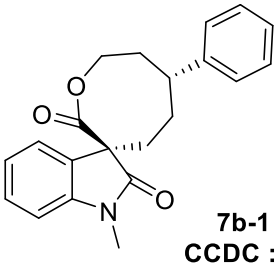
3d
CCDC : 2326905



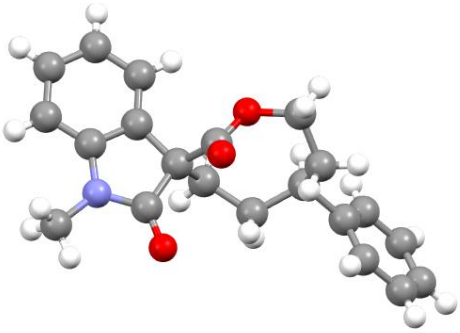


7a
CCDC : 2433138

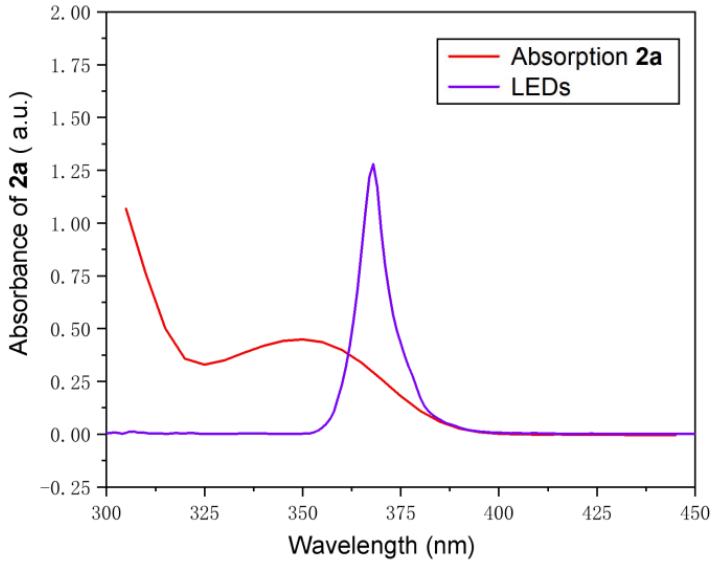




7b-1 (major)
CCDC : 2433137



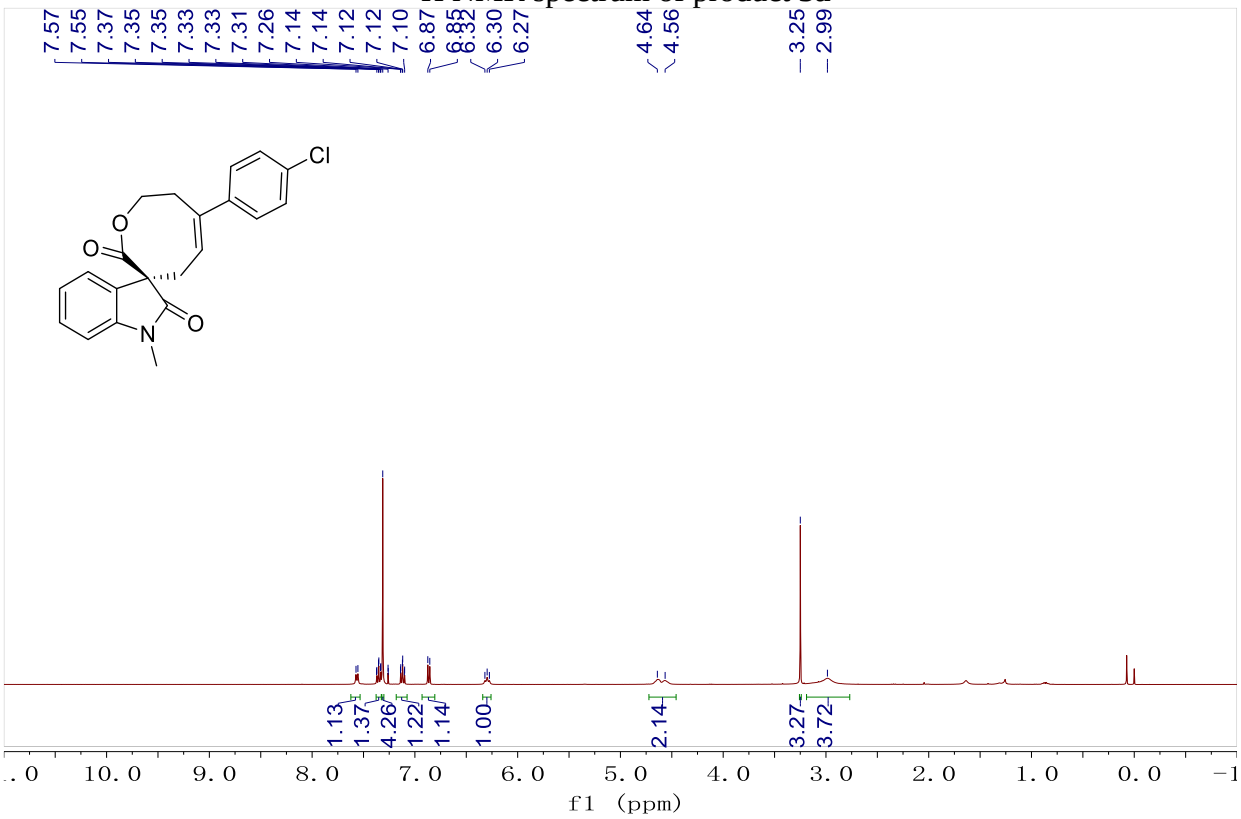
7. Absorption Spectrum of Diazo 2a and Emission Spectroscopy of LEDs



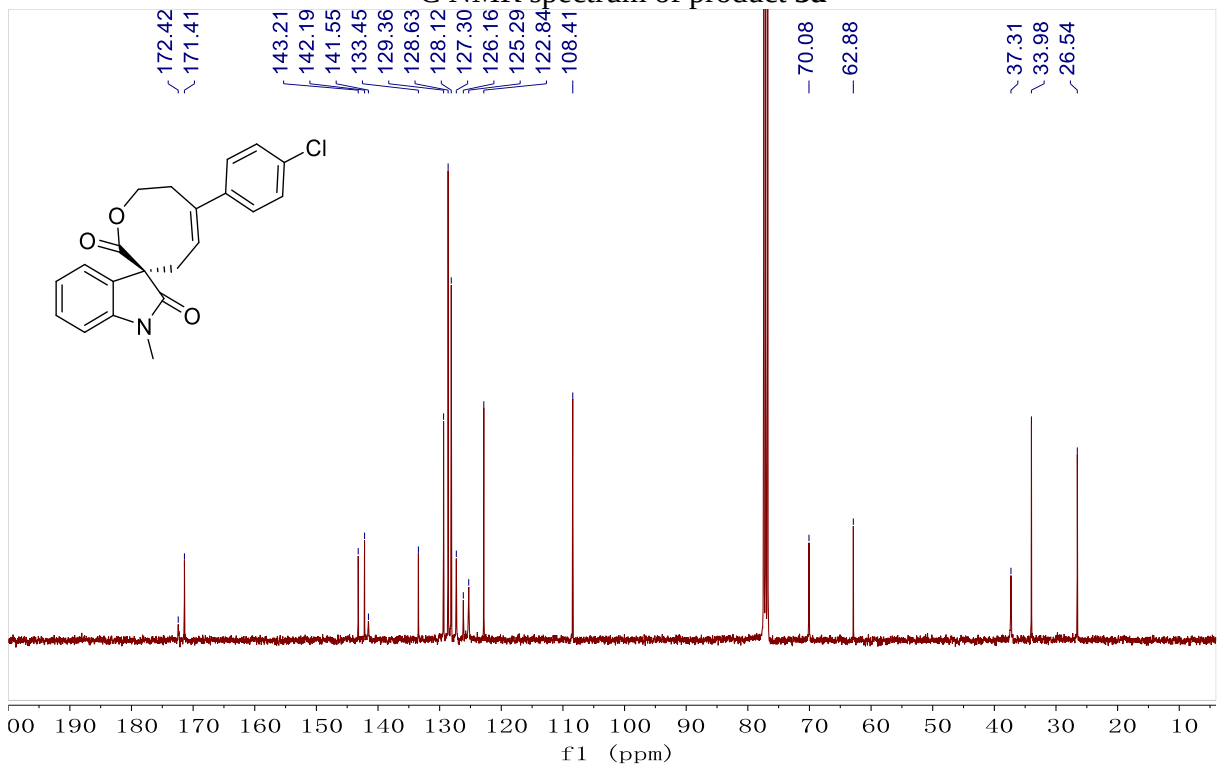
UV/Vis: Measurements were made on an Agilent G9800A Spectro Fluorophotometer.

8. Copies of NMR Spectra of Products

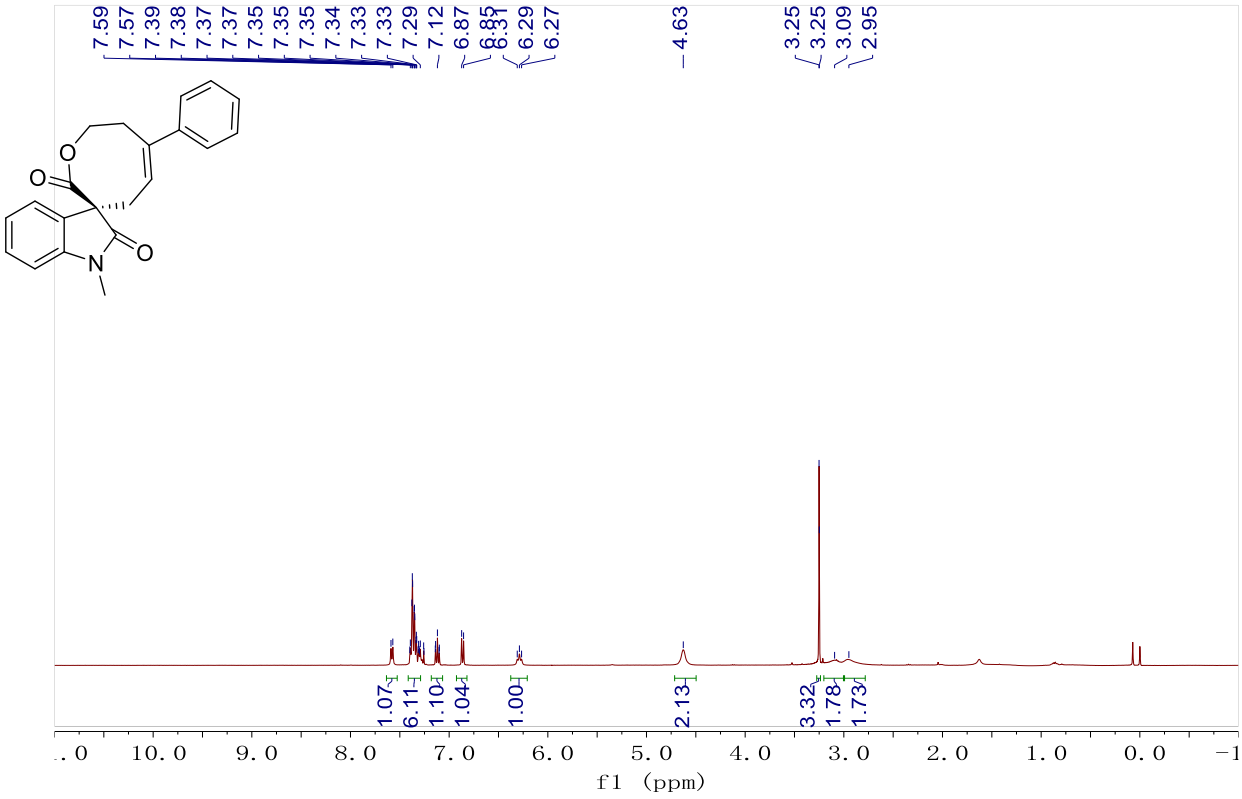
^{1}H NMR spectrum of product **3a**



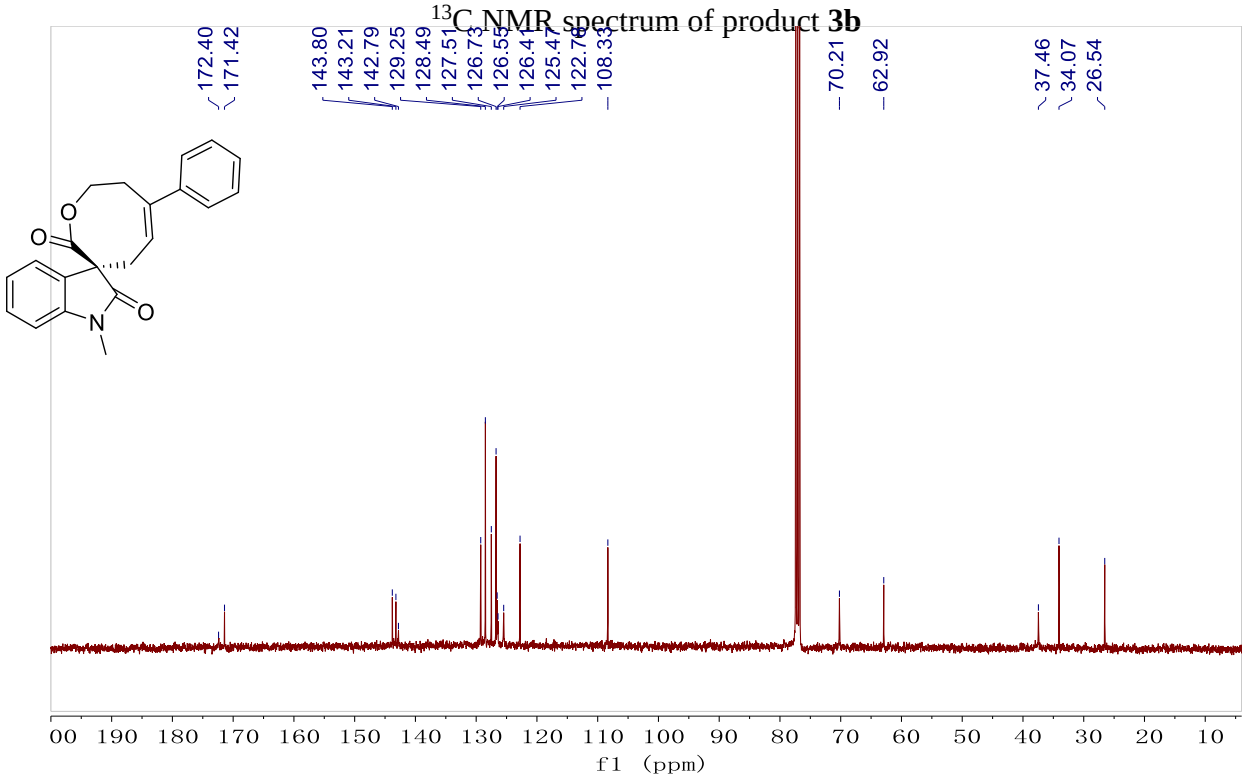
^{13}C NMR spectrum of product **3a**



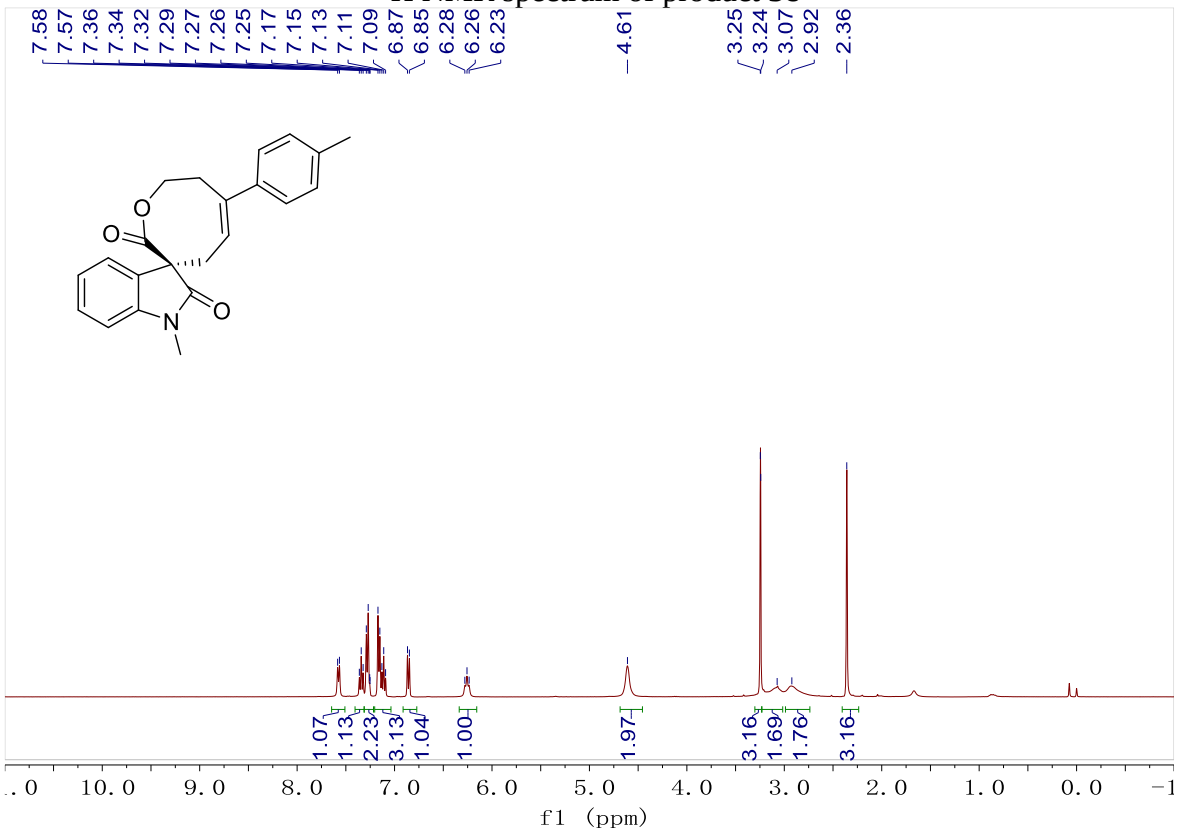
^{1}H NMR spectrum of product **3b**



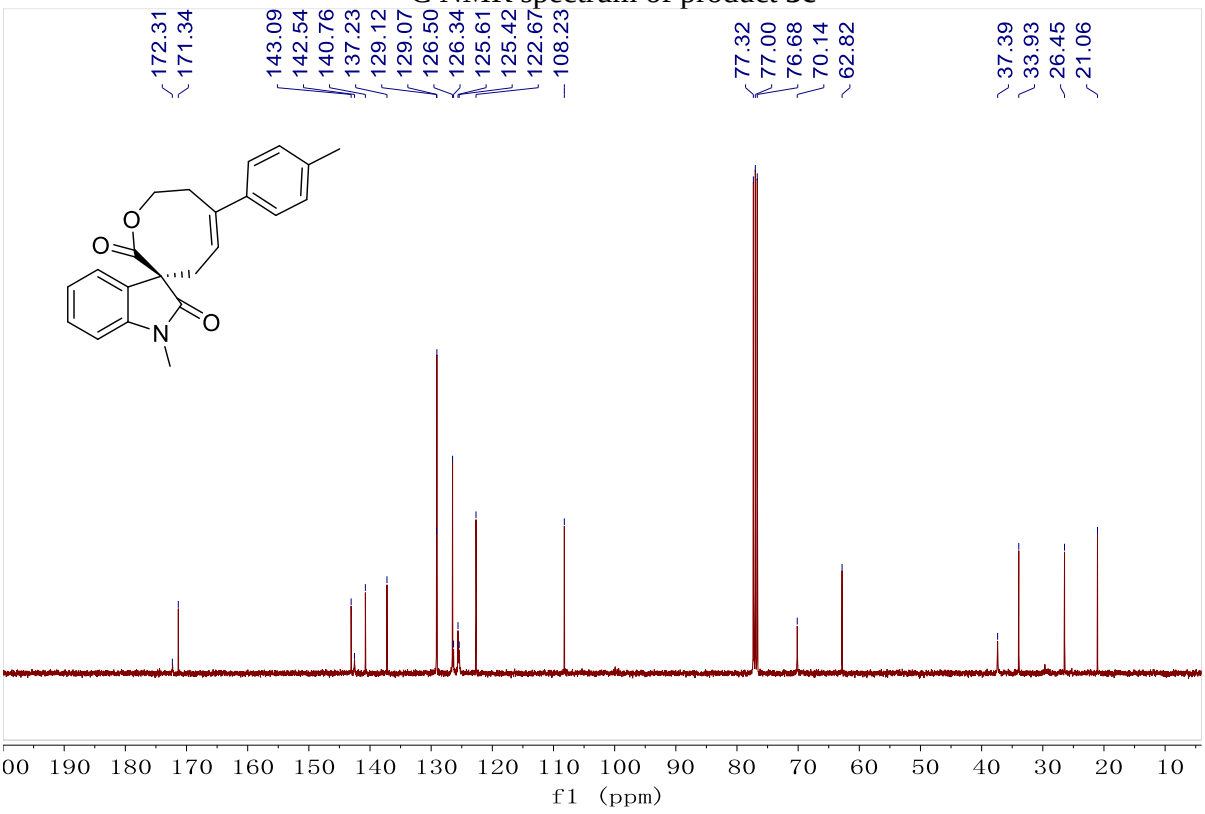
^{13}C NMR spectrum of product **3b**



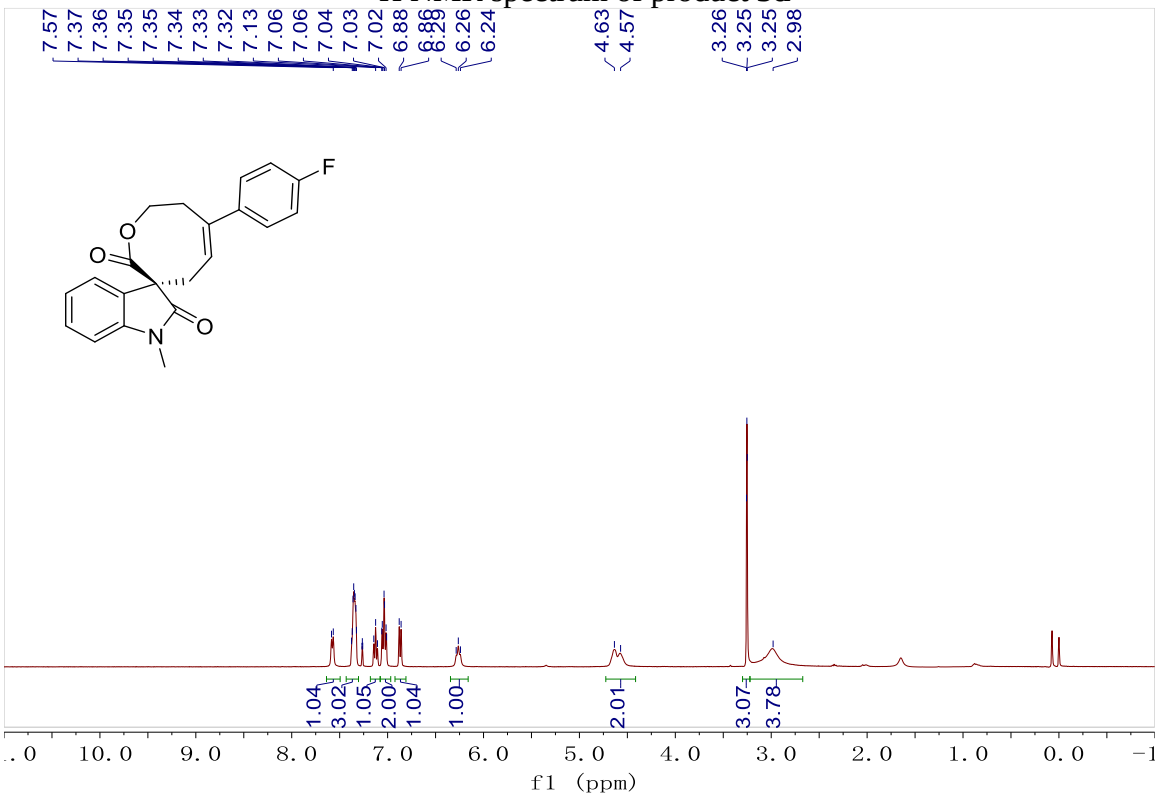
^{1}H NMR spectrum of product **3c**



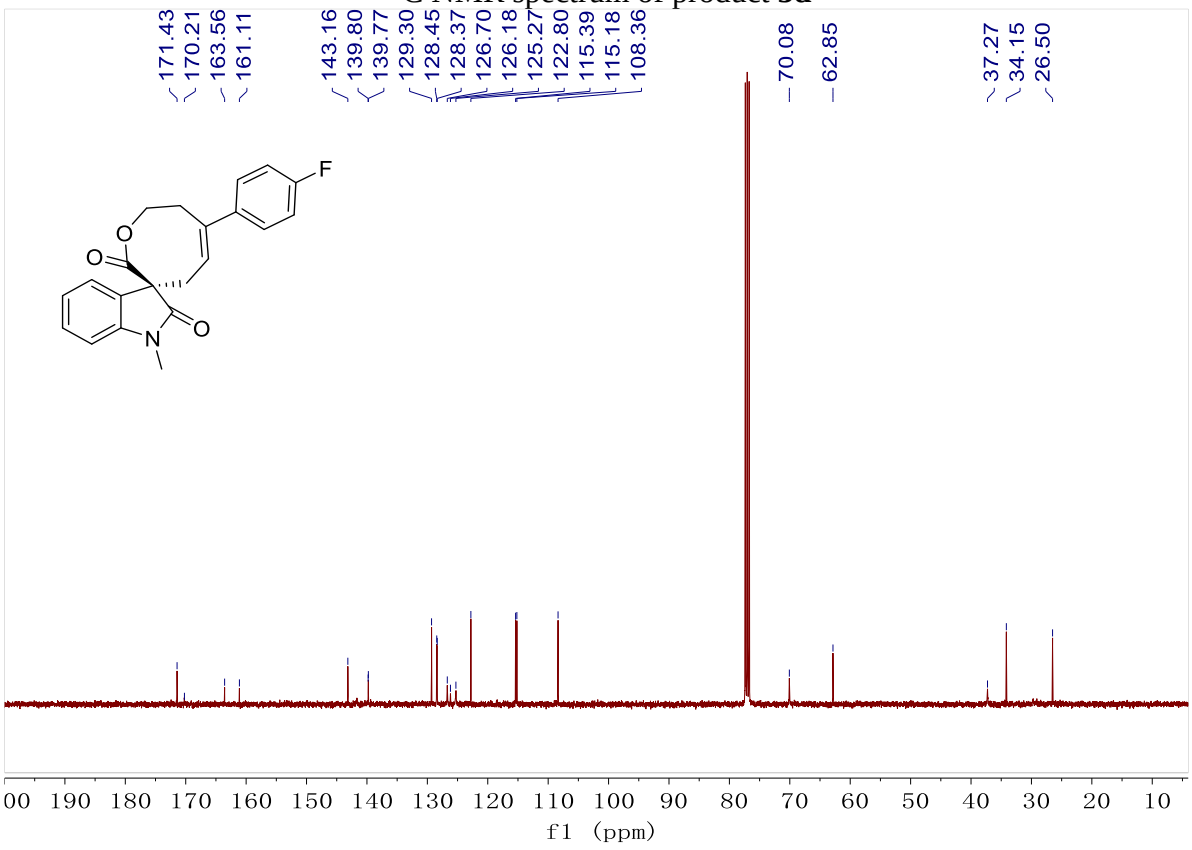
^{13}C NMR spectrum of product **3c**



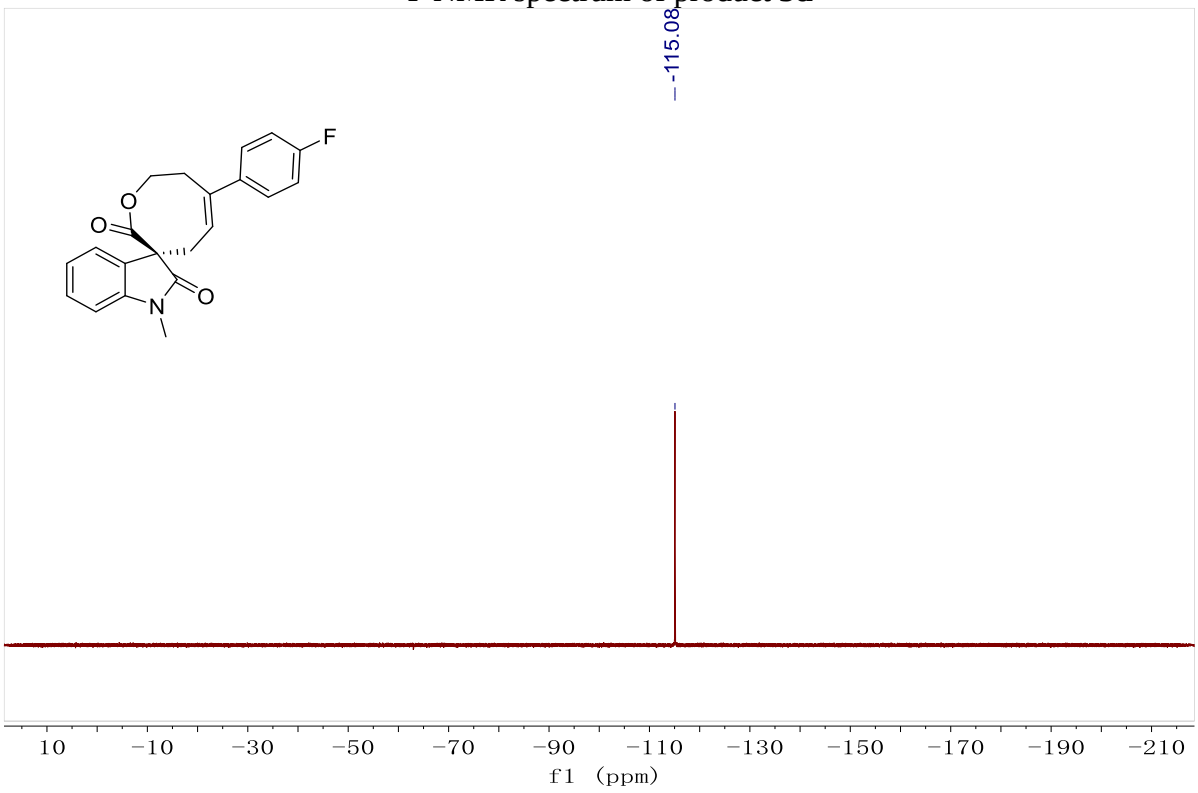
^{1}H NMR spectrum of product **3d**



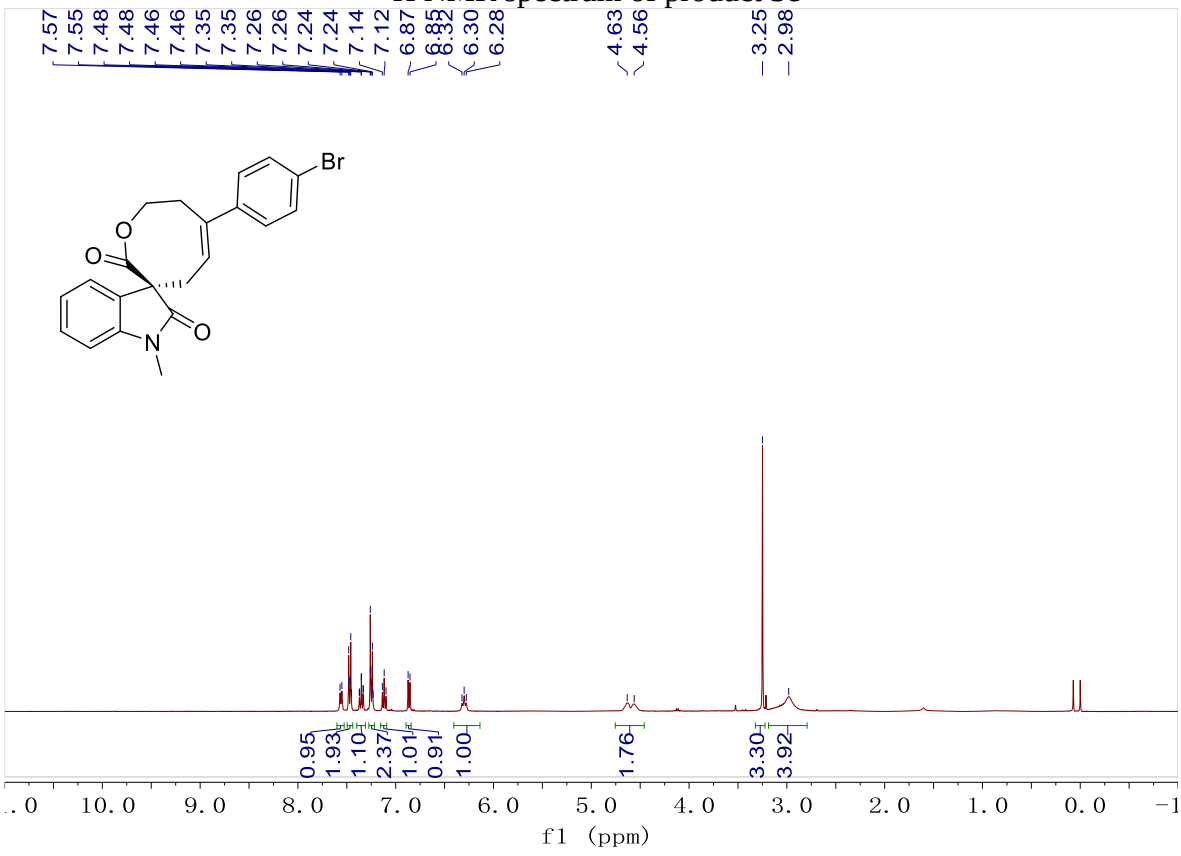
^{13}C NMR spectrum of product **3d**



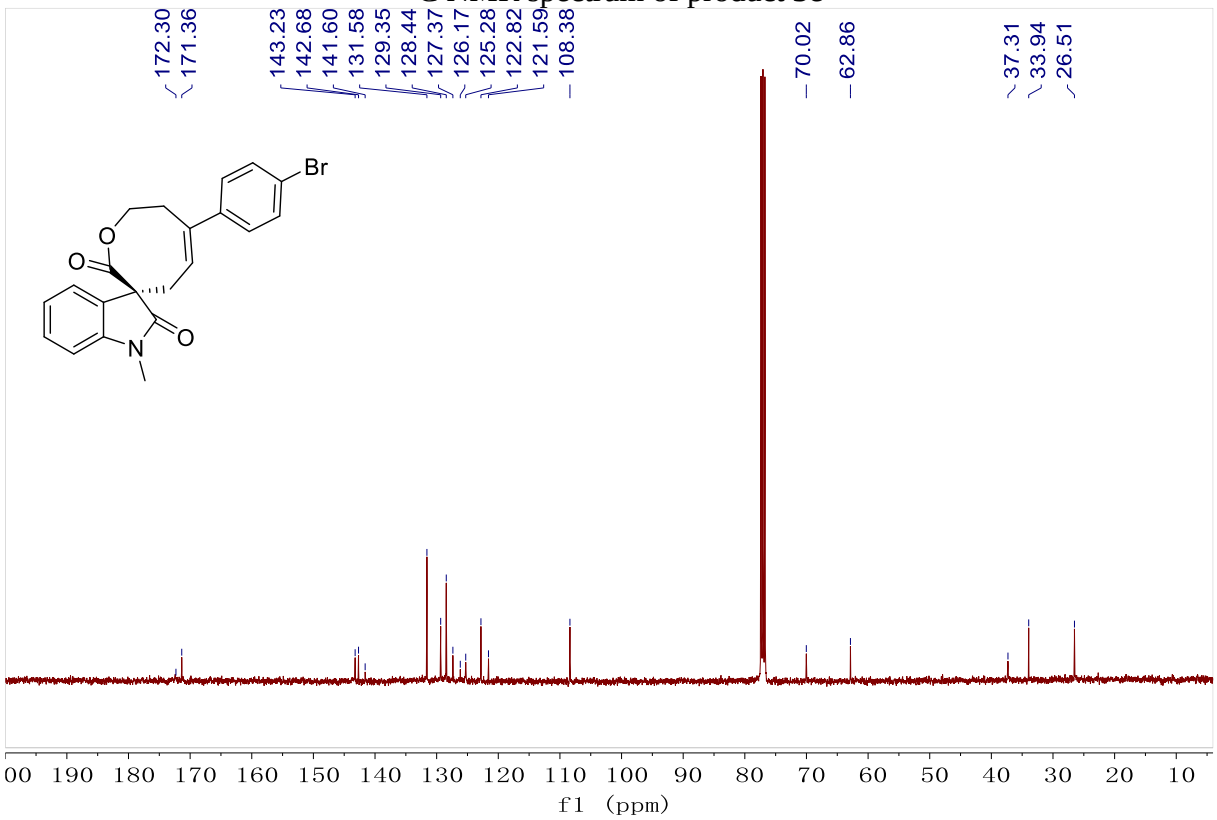
^{19}F NMR spectrum of product **3d**



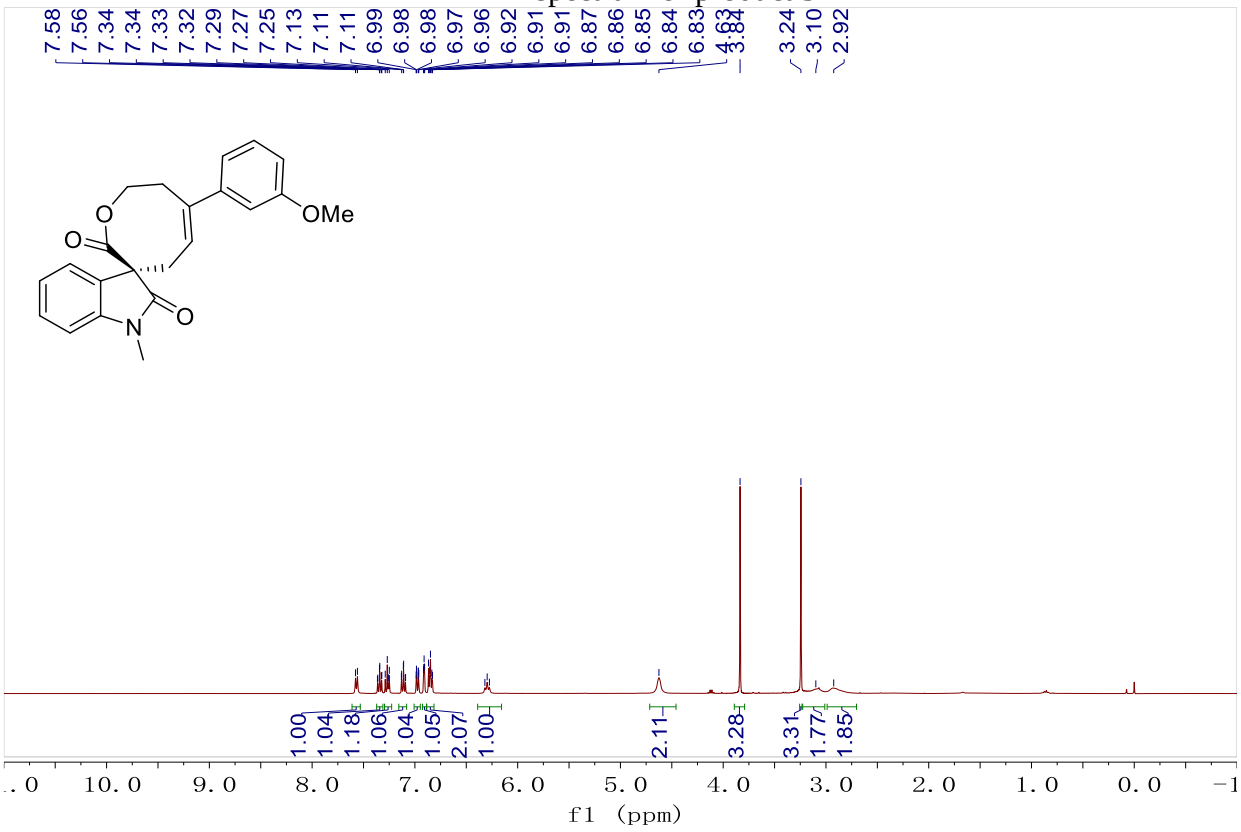
^{1}H NMR spectrum of product **3e**



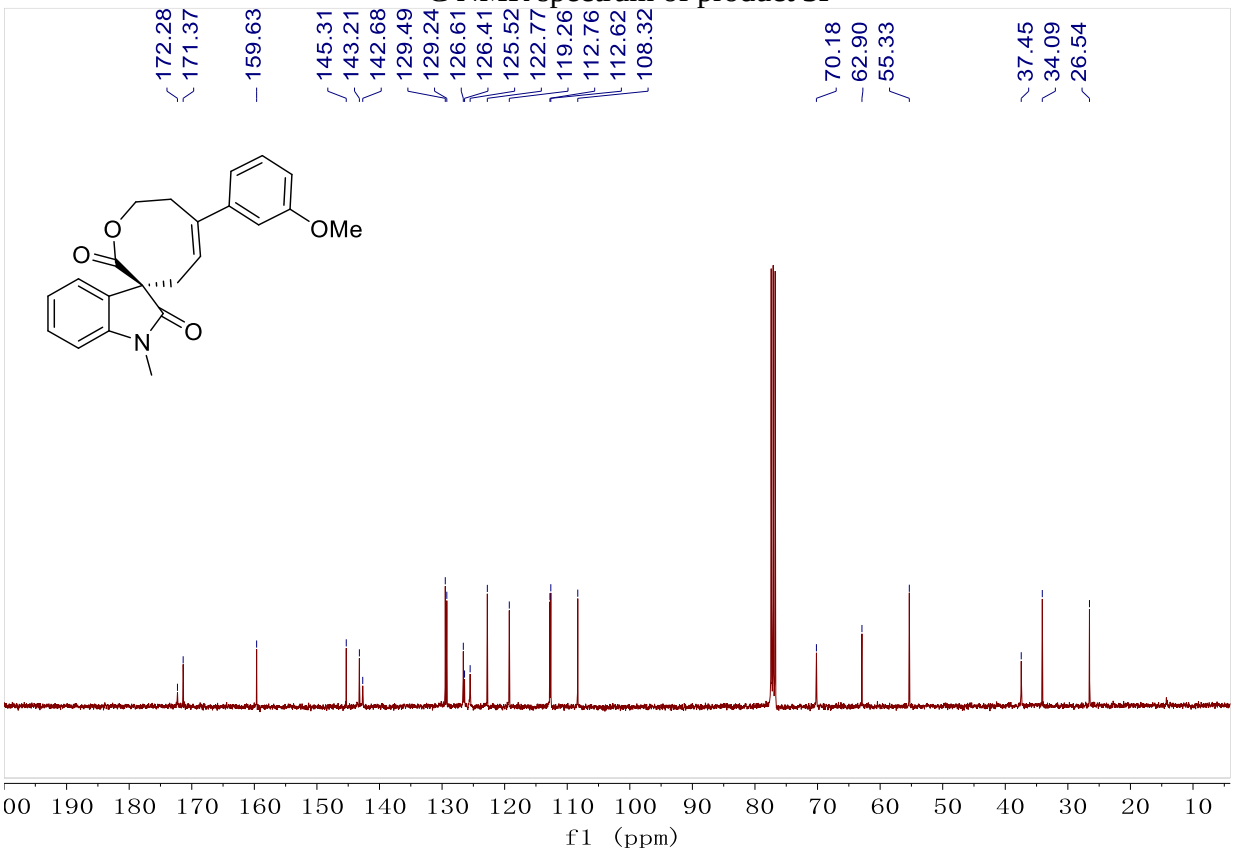
^{13}C NMR spectrum of product **3e**



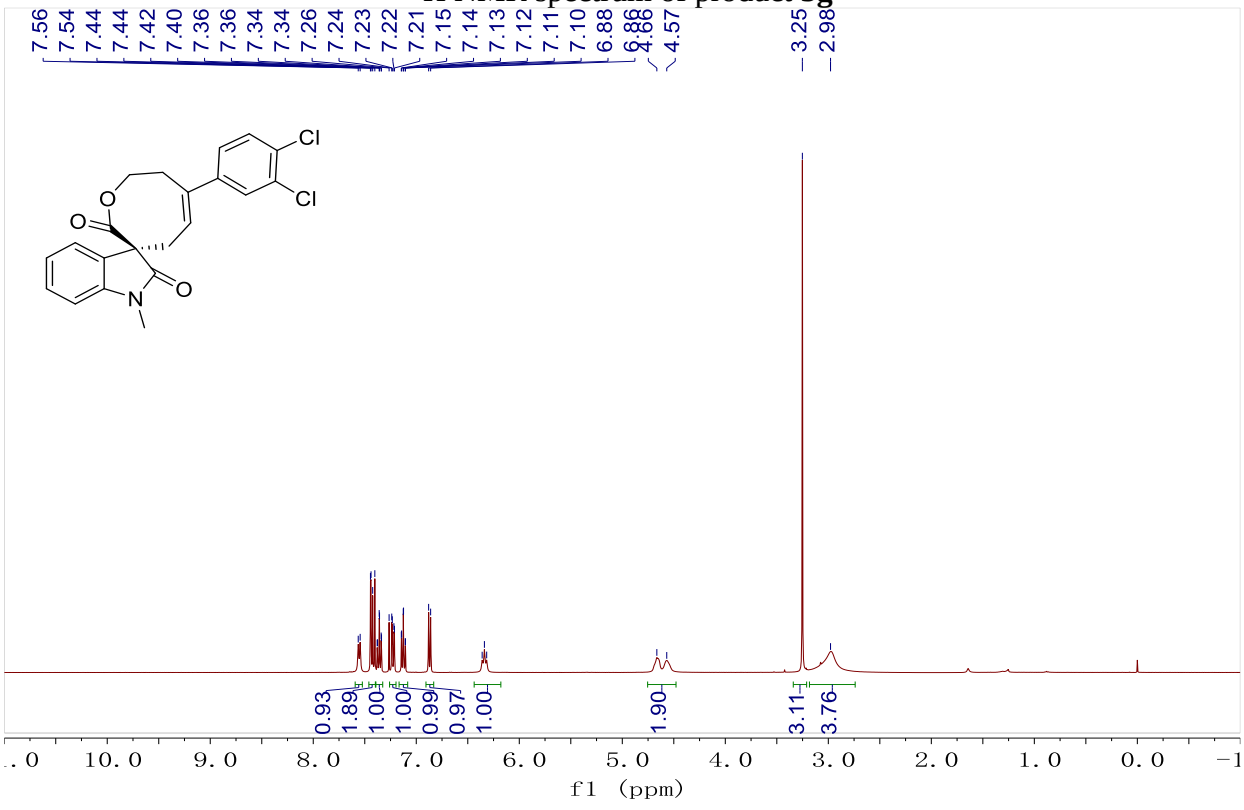
^{1}H NMR spectrum of product **3f**



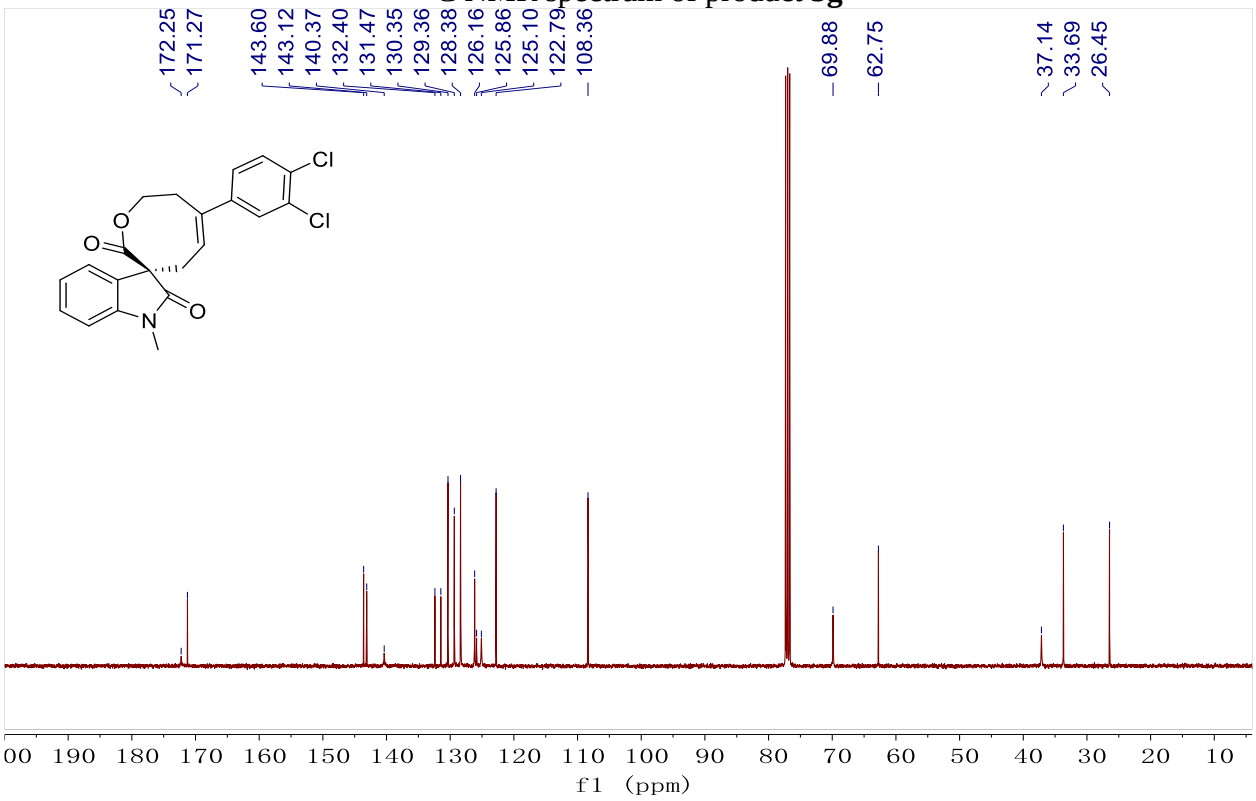
^{13}C NMR spectrum of product **3f**



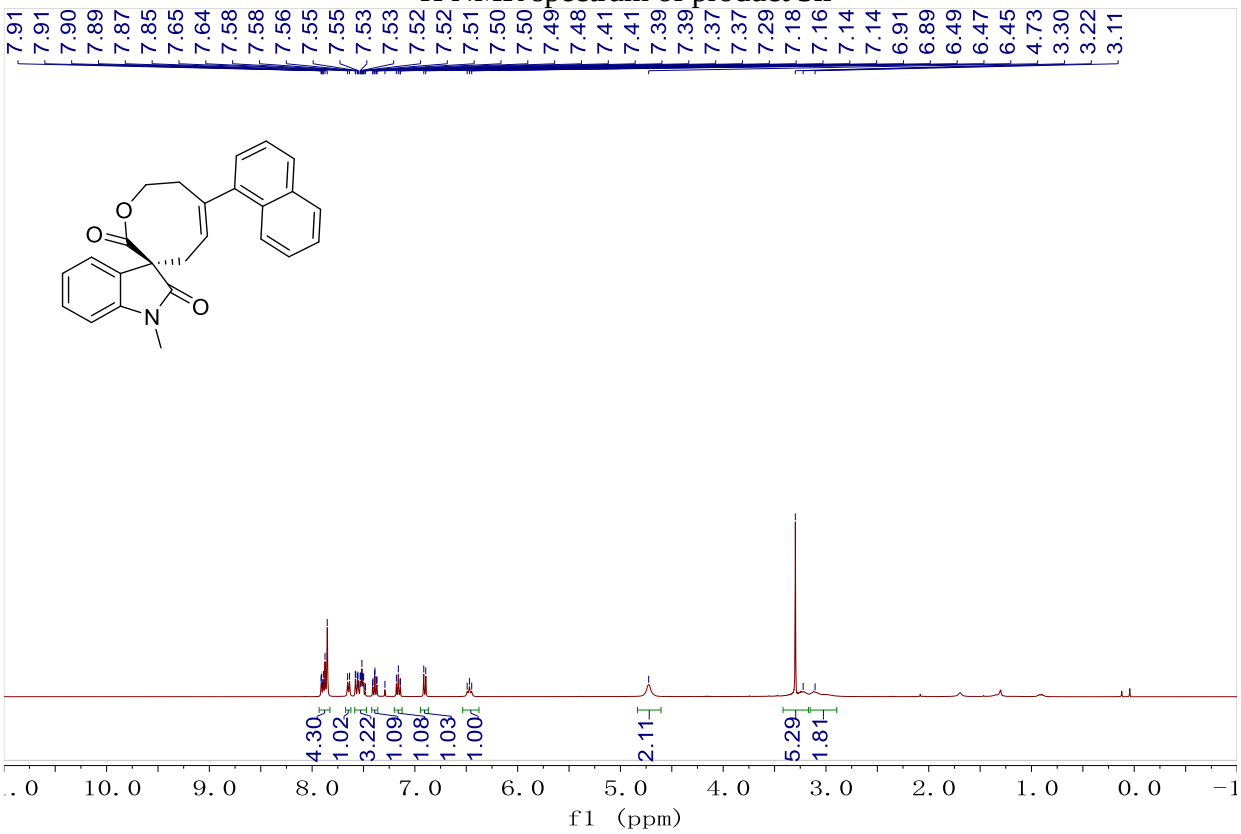
^{1}H NMR spectrum of product **3g**



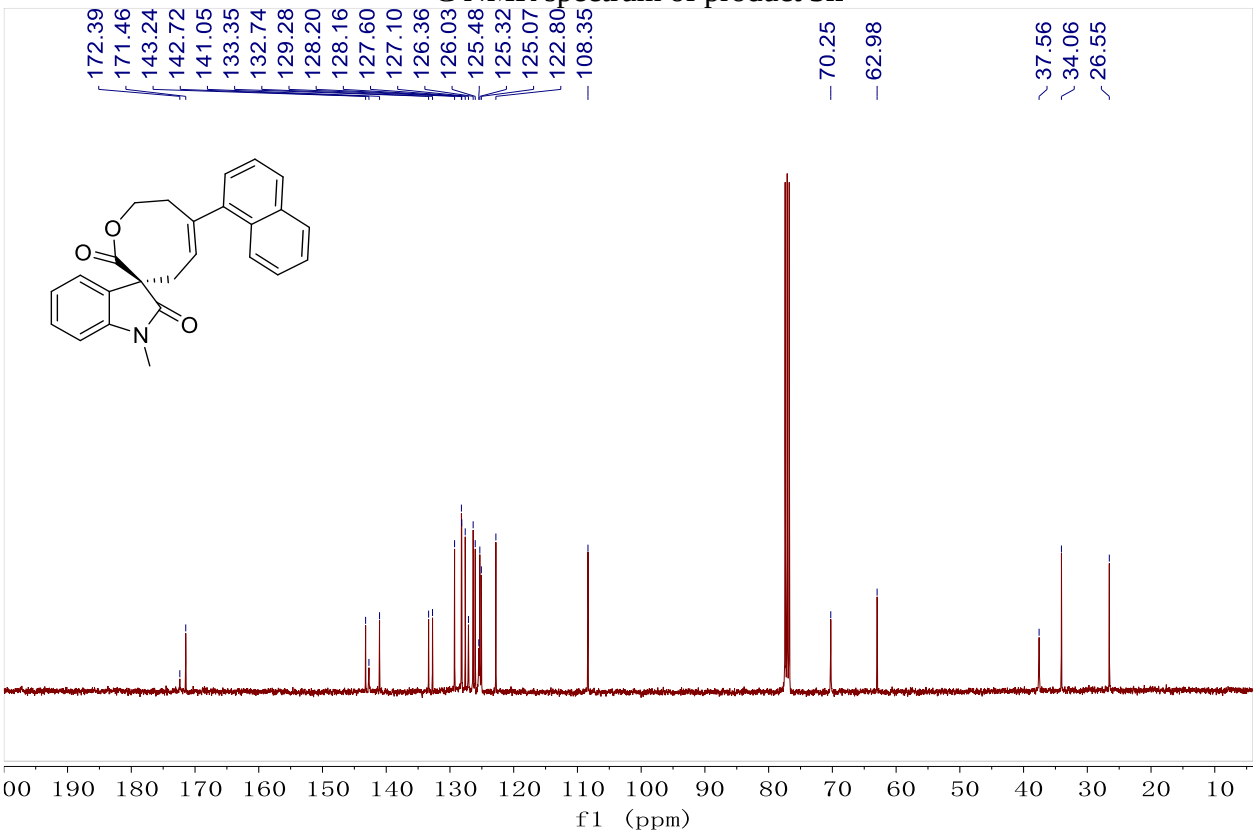
^{13}C NMR spectrum of product **3g**



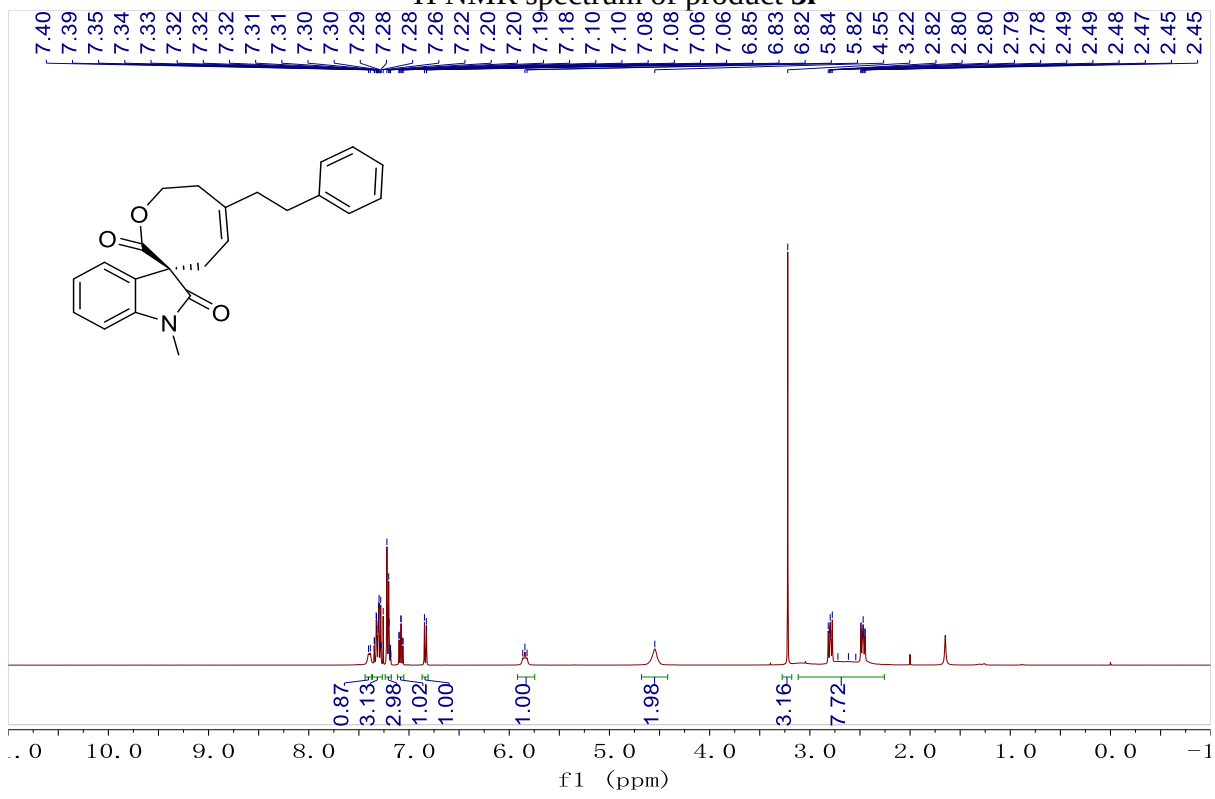
^{1}H NMR spectrum of product **3h**



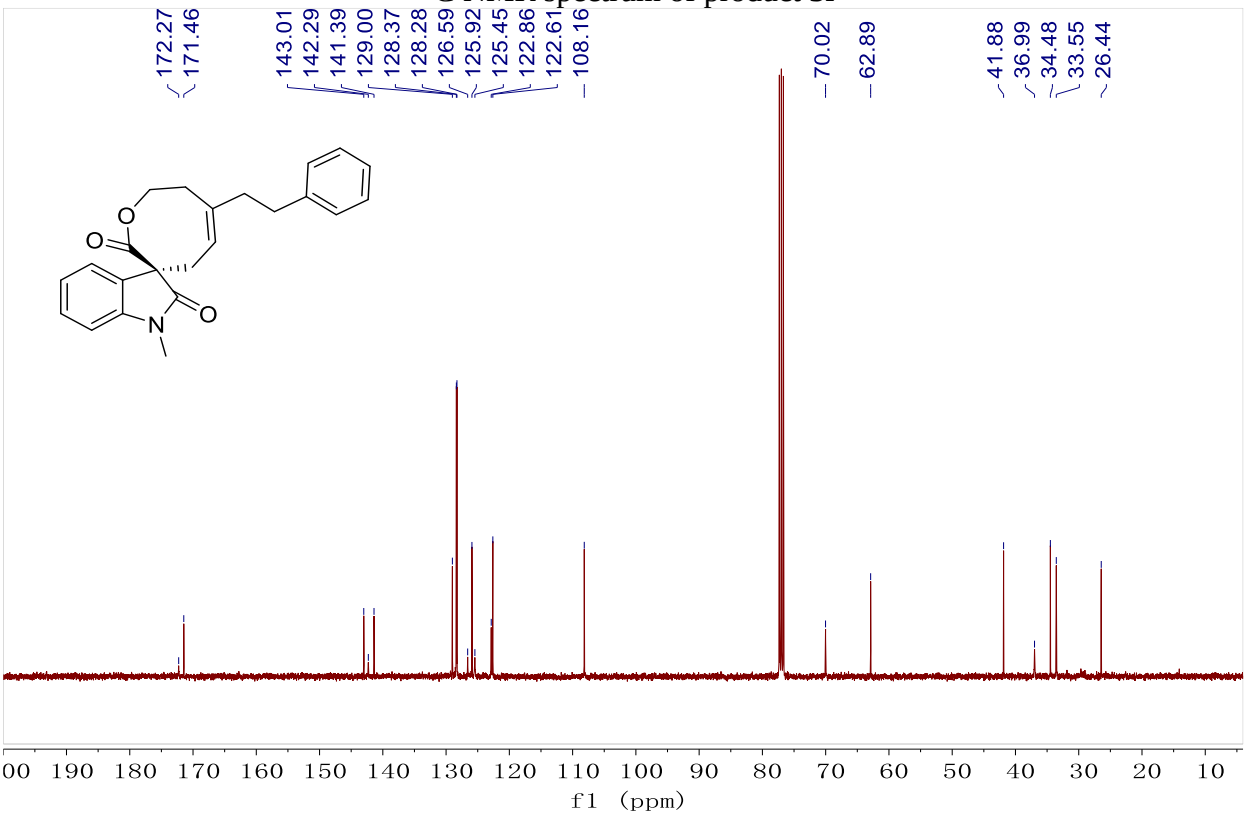
^{13}C NMR spectrum of product **3h**



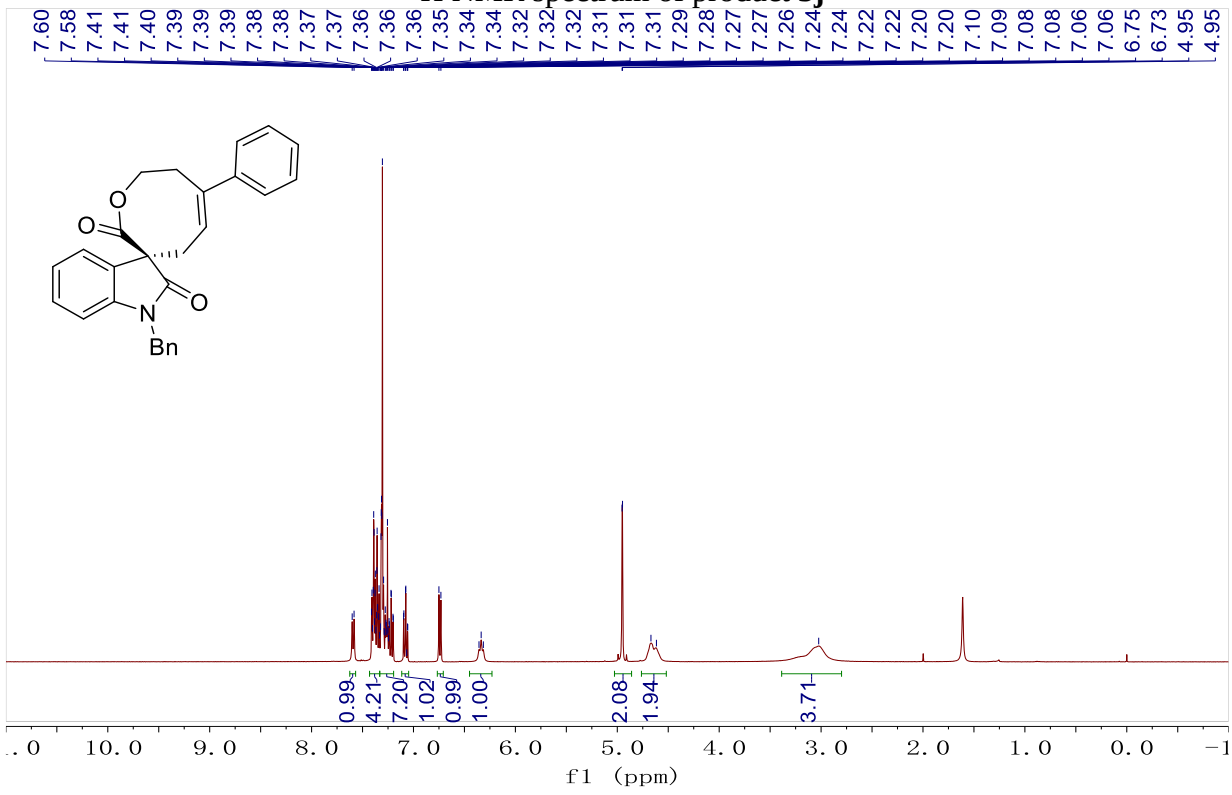
^{1}H NMR spectrum of product **3i**



^{13}C NMR spectrum of product **3i**



^{1}H NMR spectrum of product **3j**



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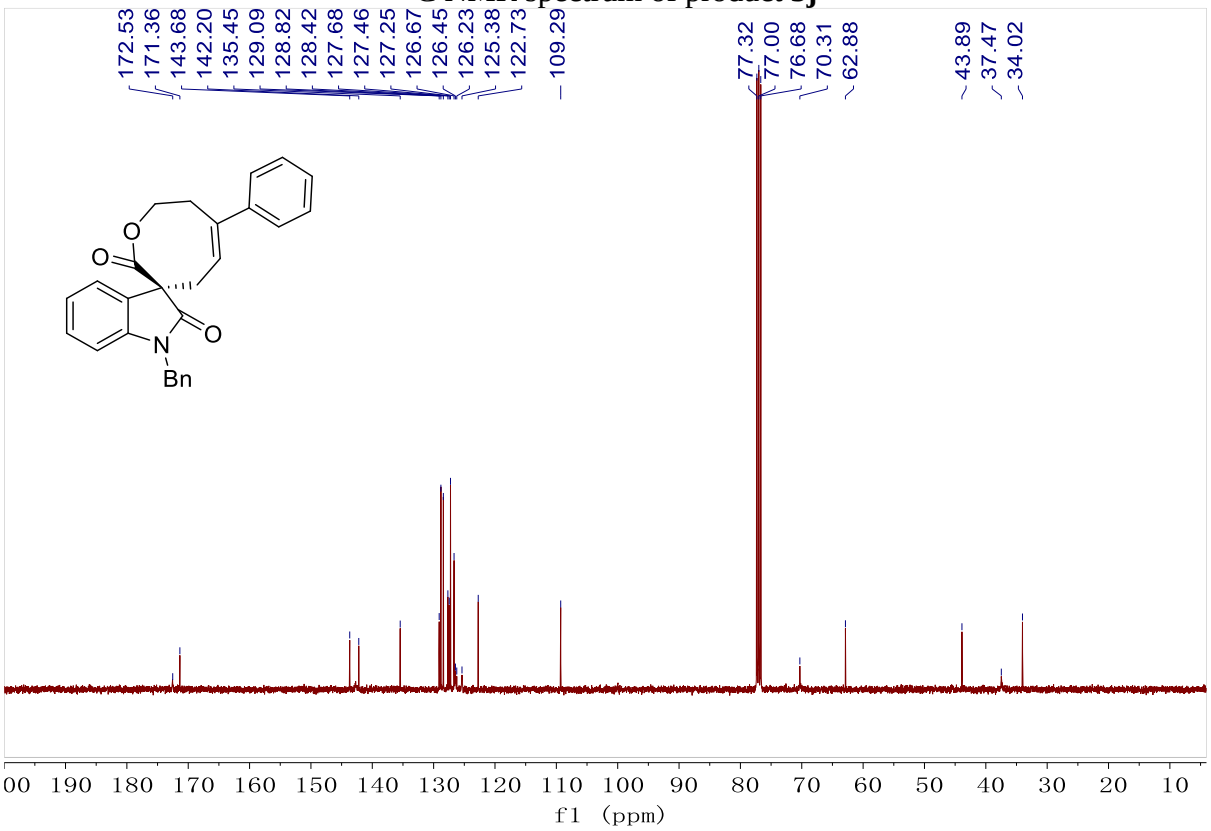
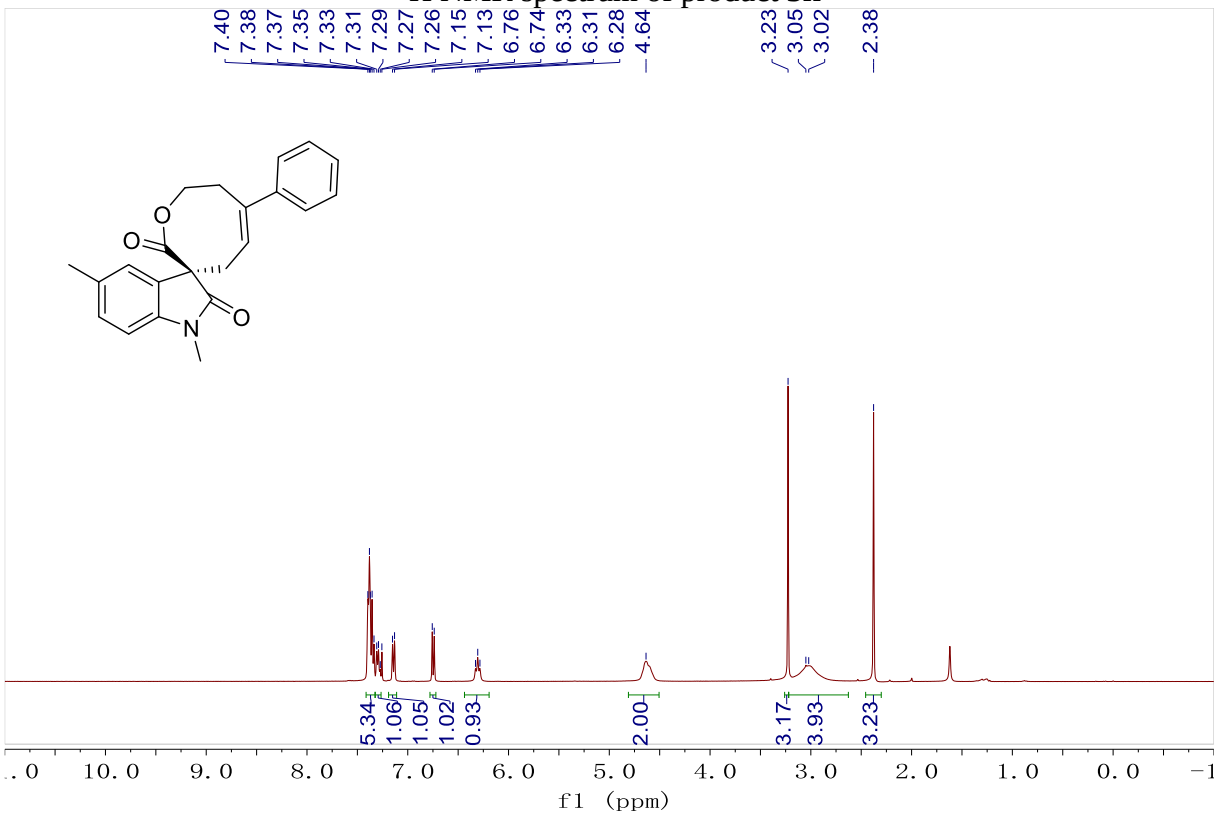
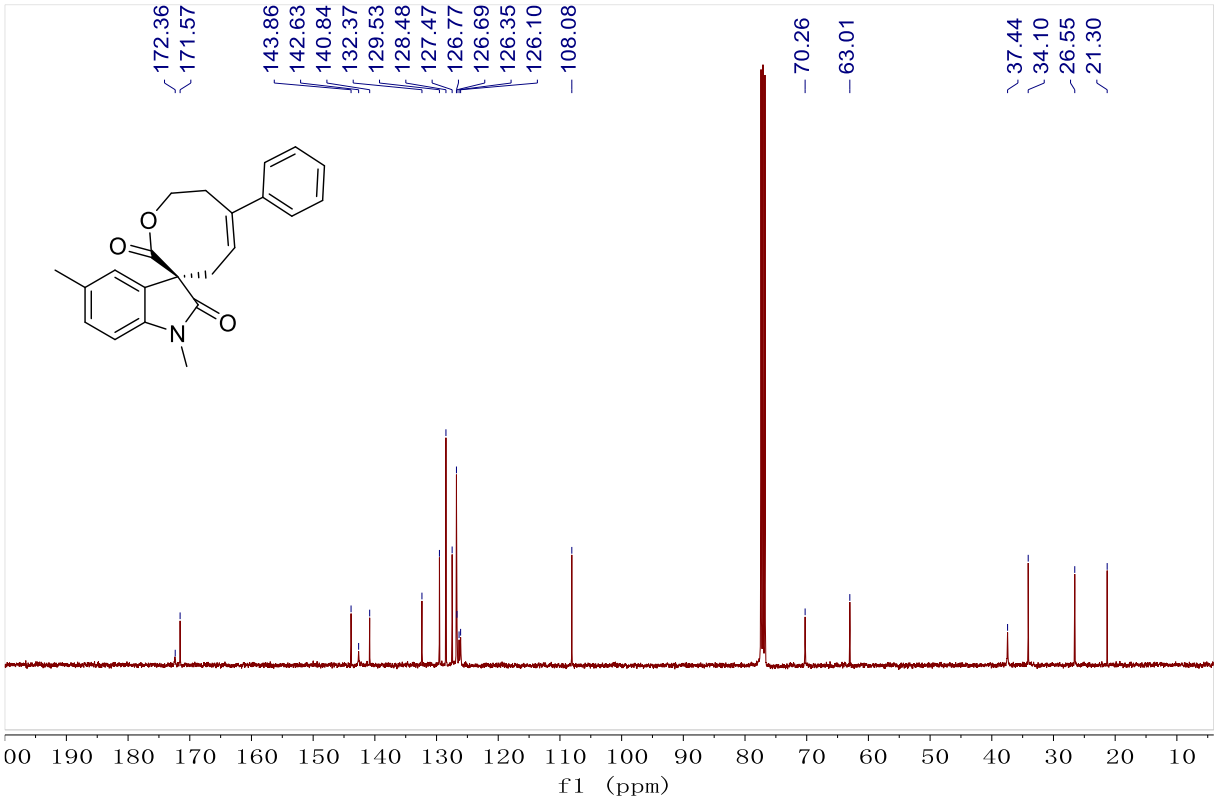


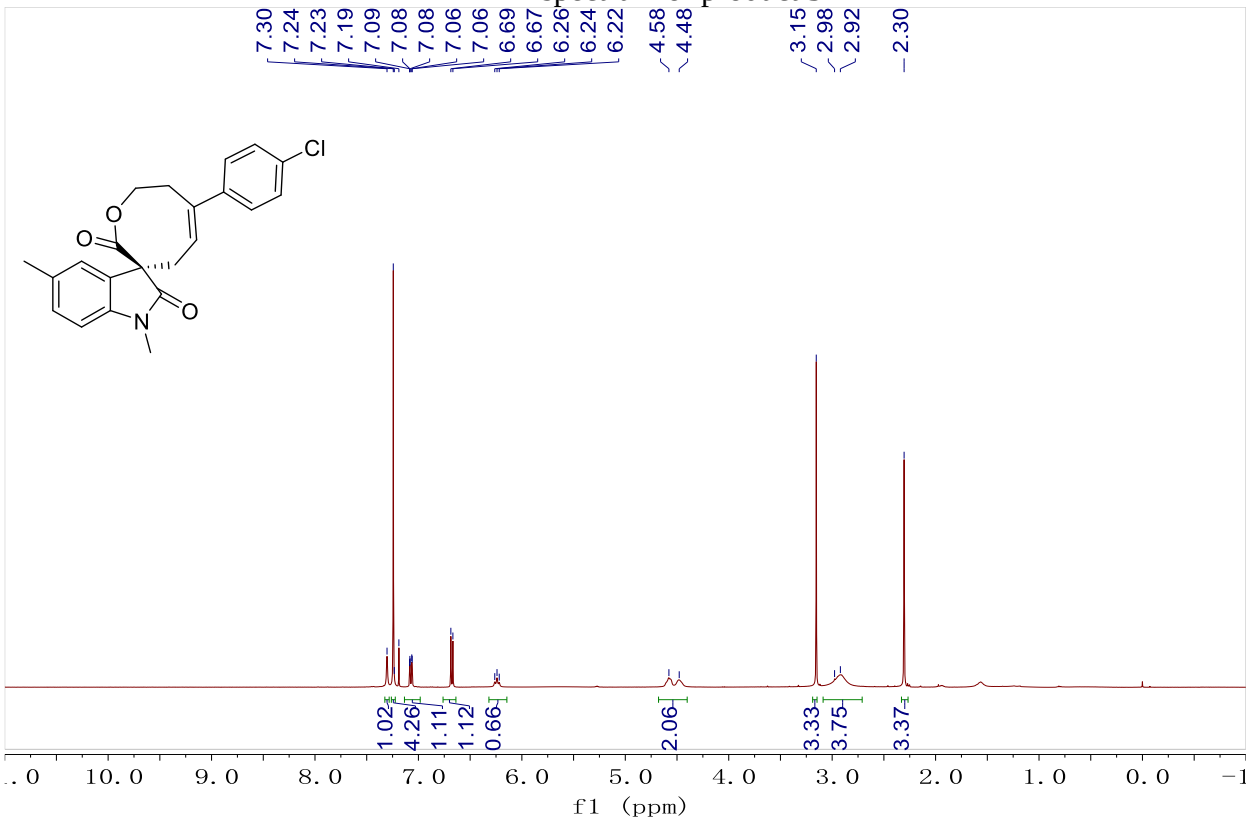
^{1}H NMR spectrum of product **3k**



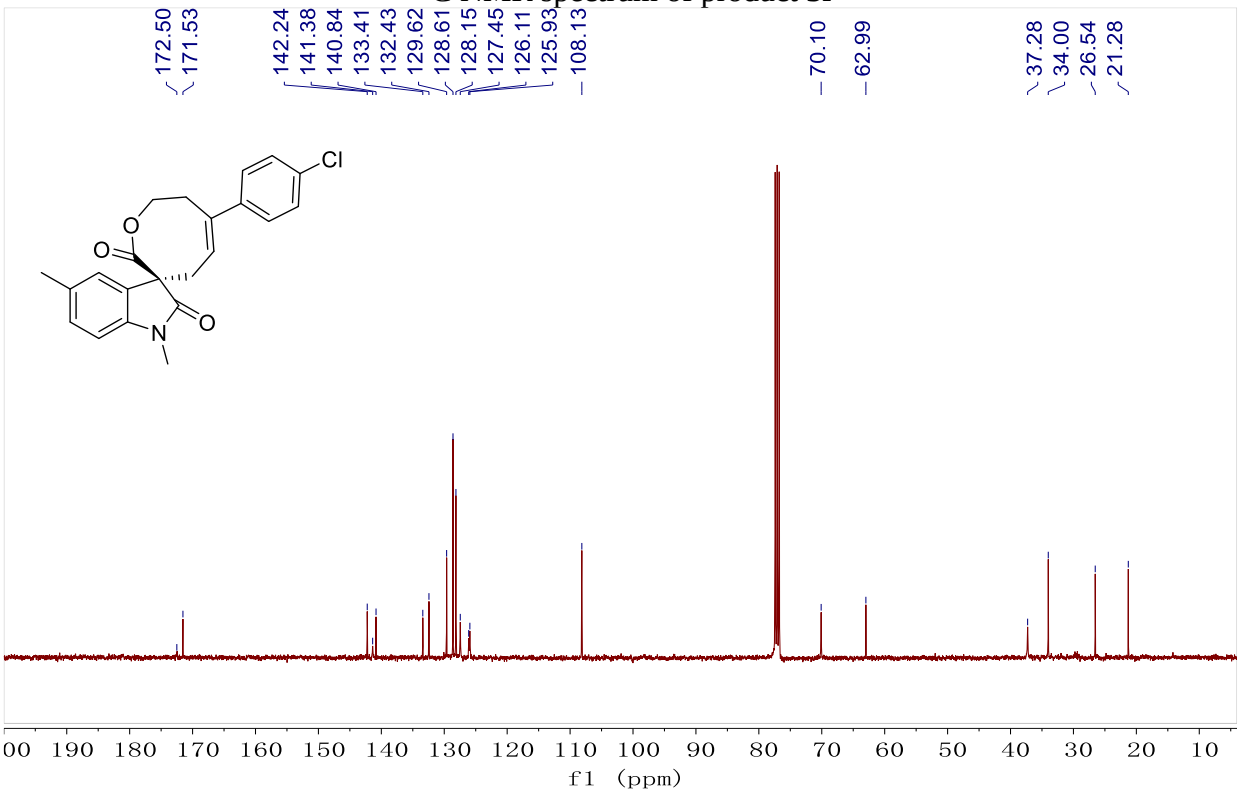
^{13}C NMR spectrum of product **3k**



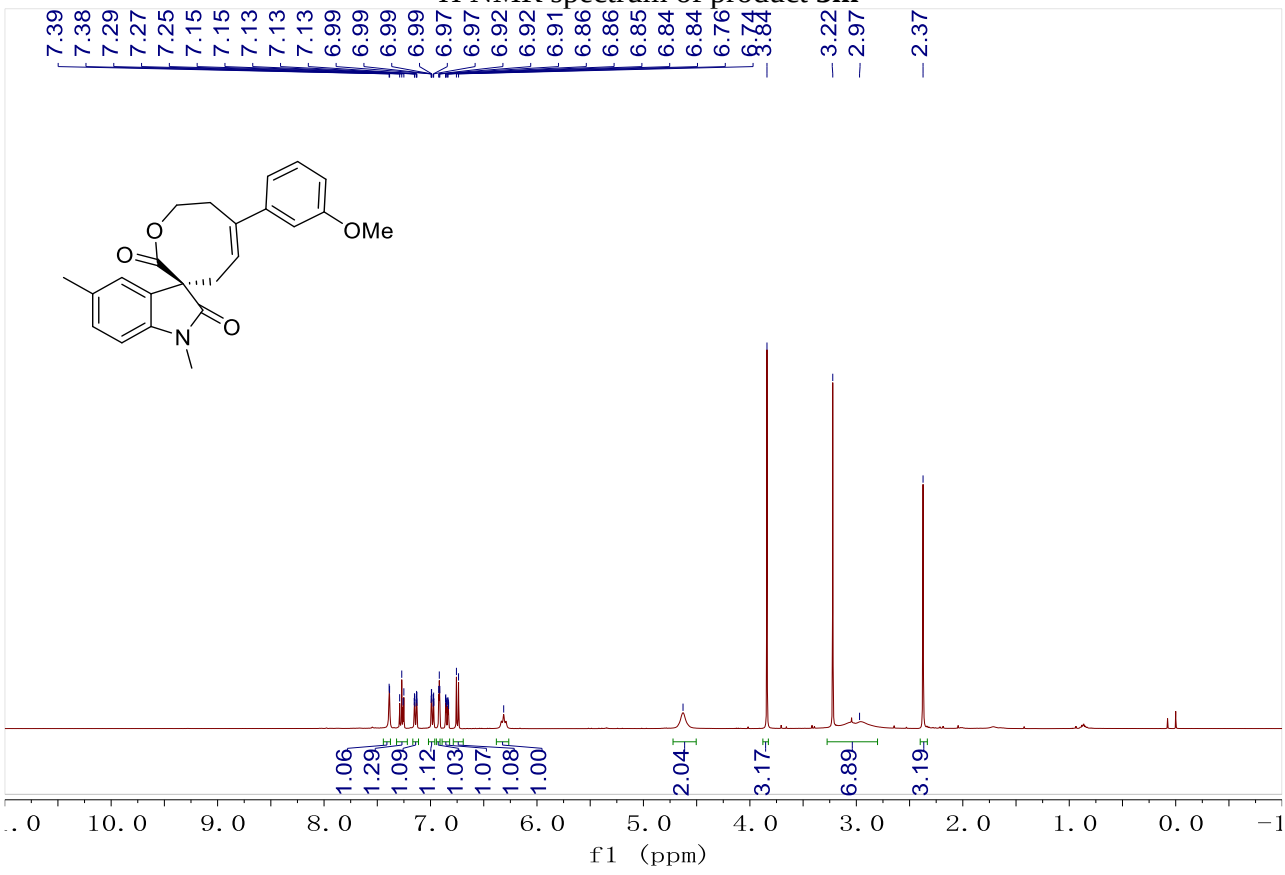
^{1}H NMR spectrum of product **3l**



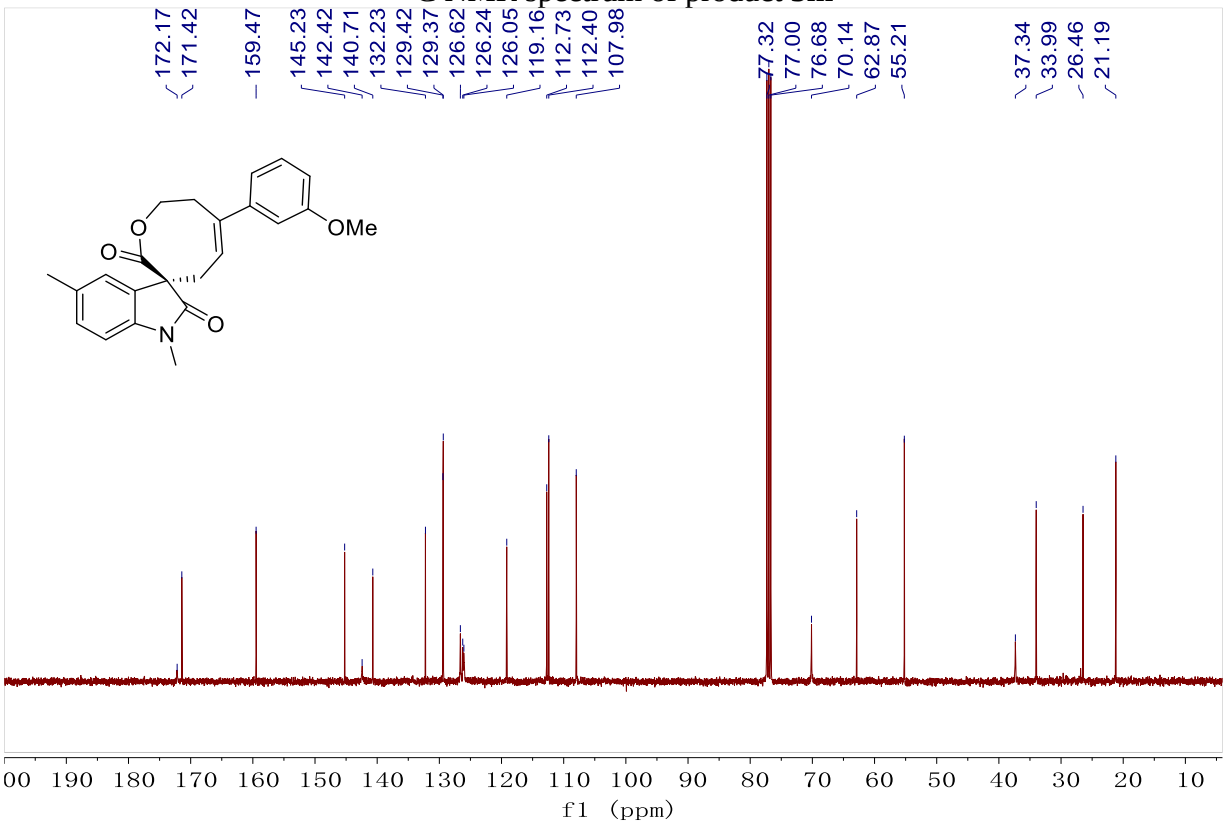
^{13}C NMR spectrum of product **3l**



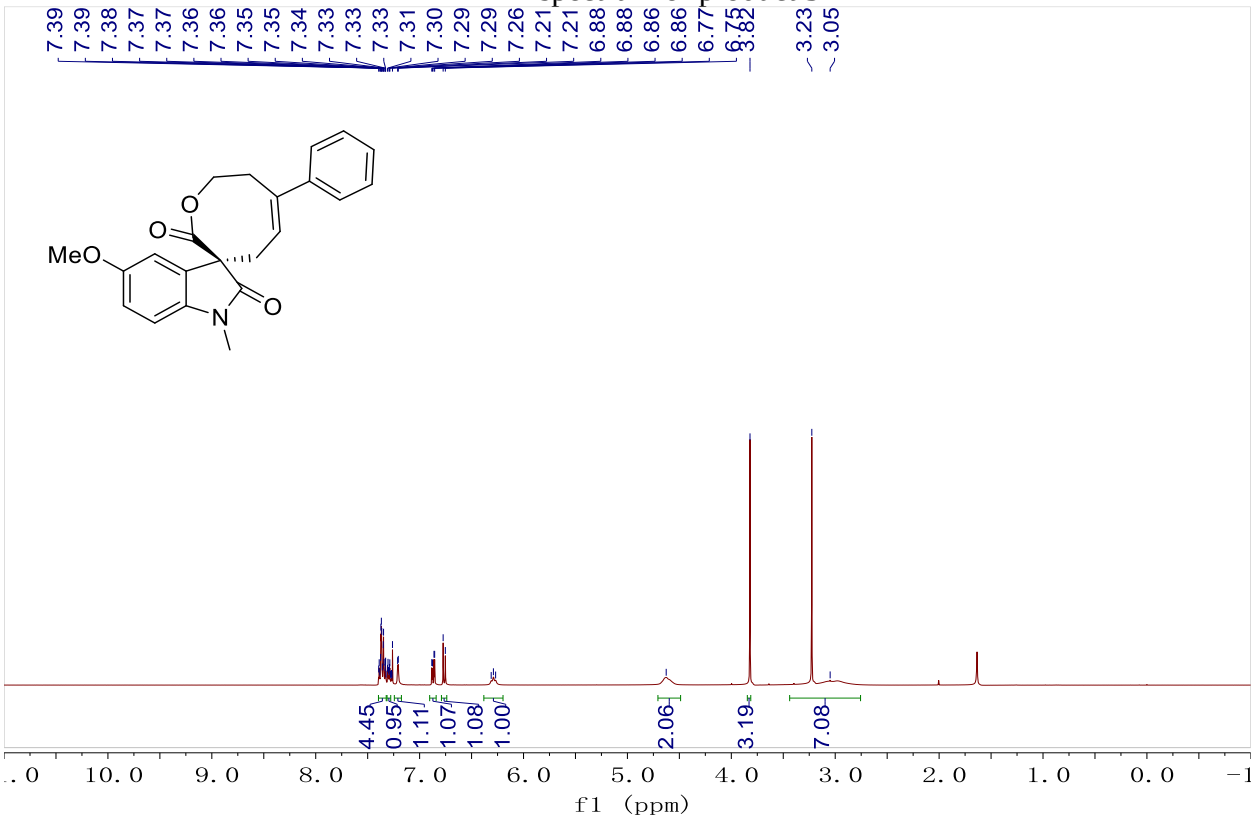
^{1}H NMR spectrum of product **3m**



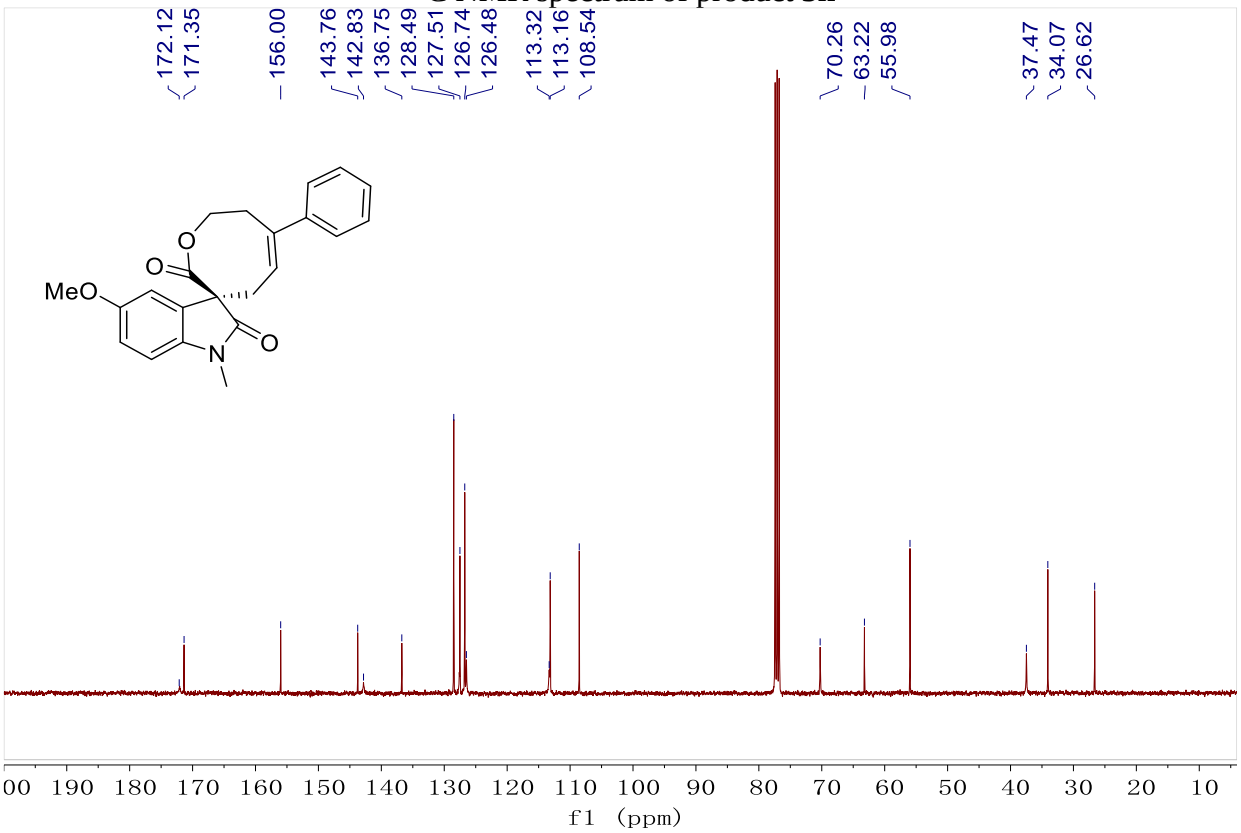
^{13}C NMR spectrum of product **3m**



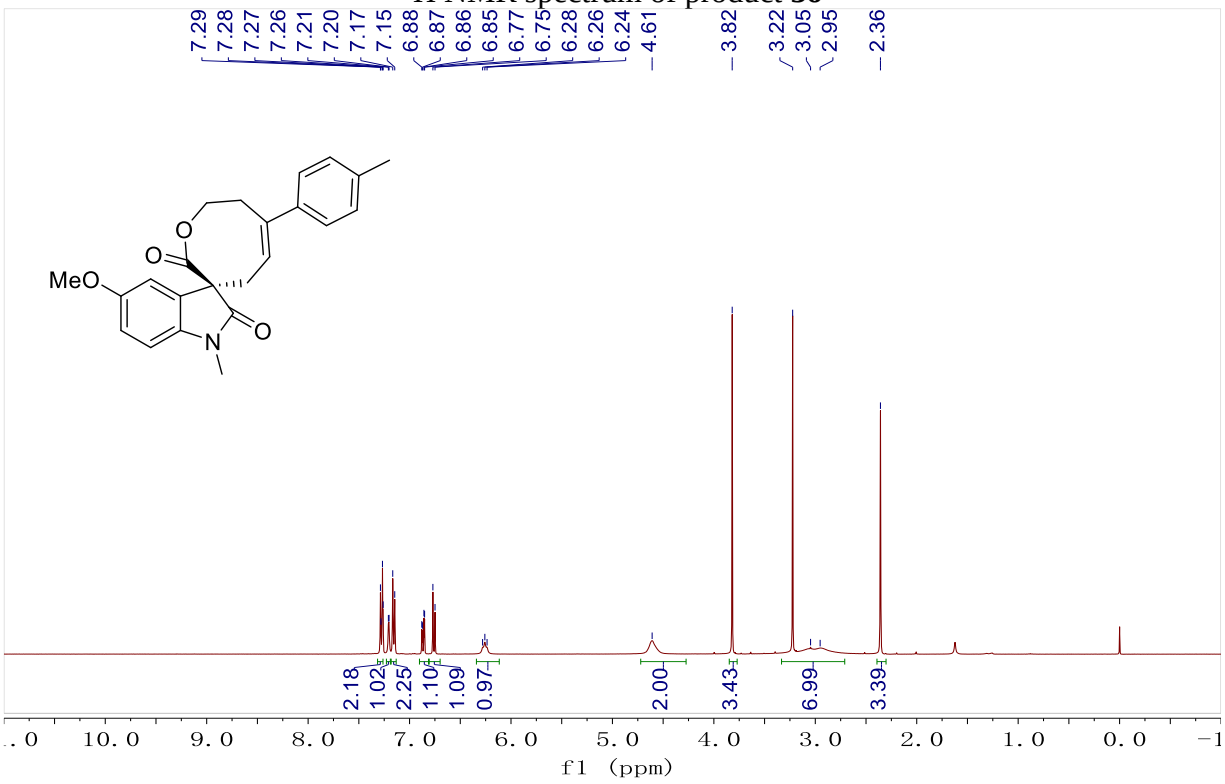
^{1}H NMR spectrum of product **3n**



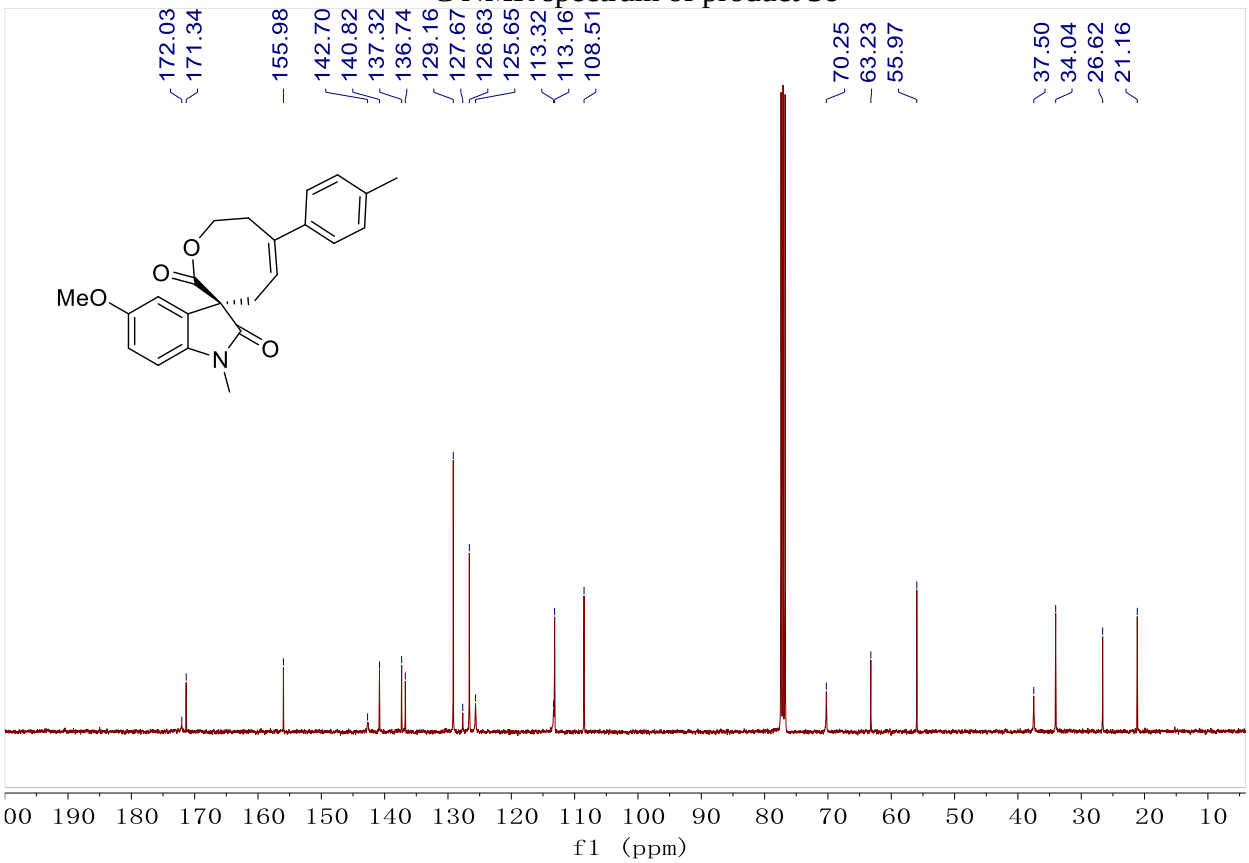
^{13}C NMR spectrum of product **3n**



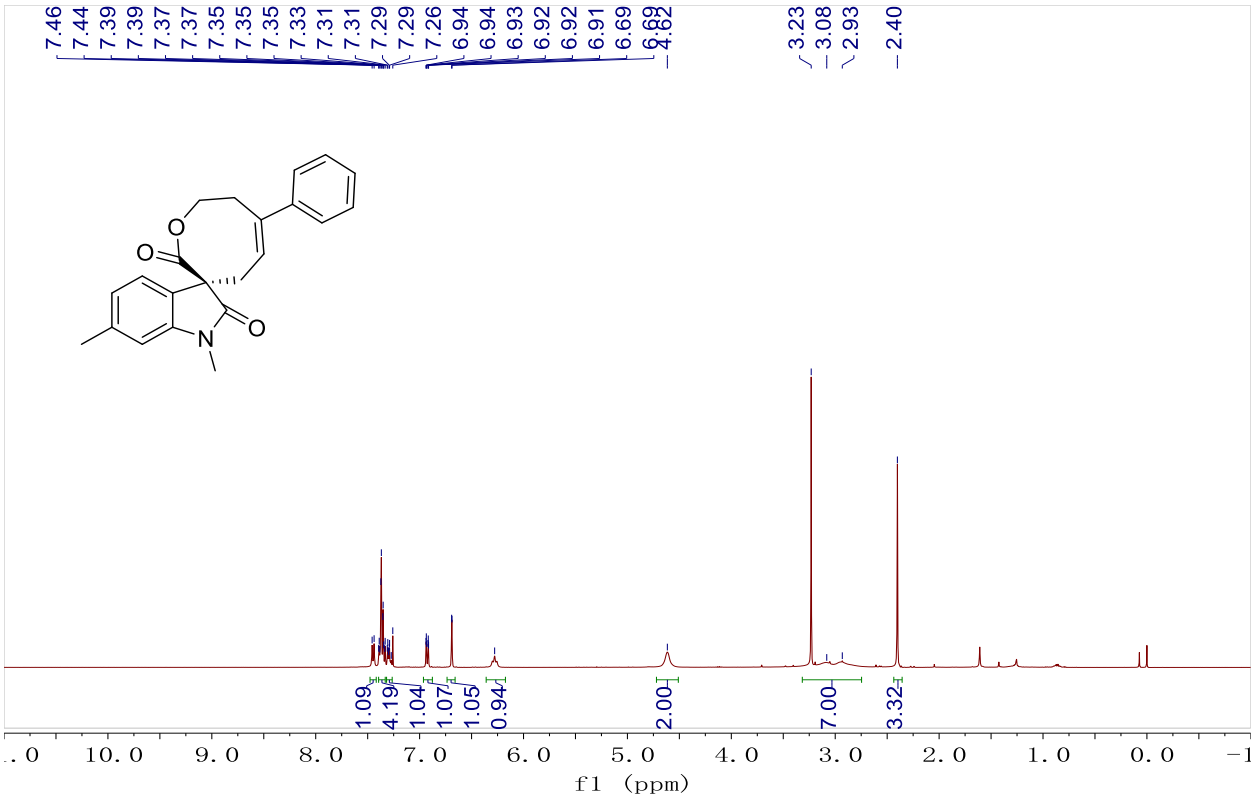
^{1}H NMR spectrum of product **3o**



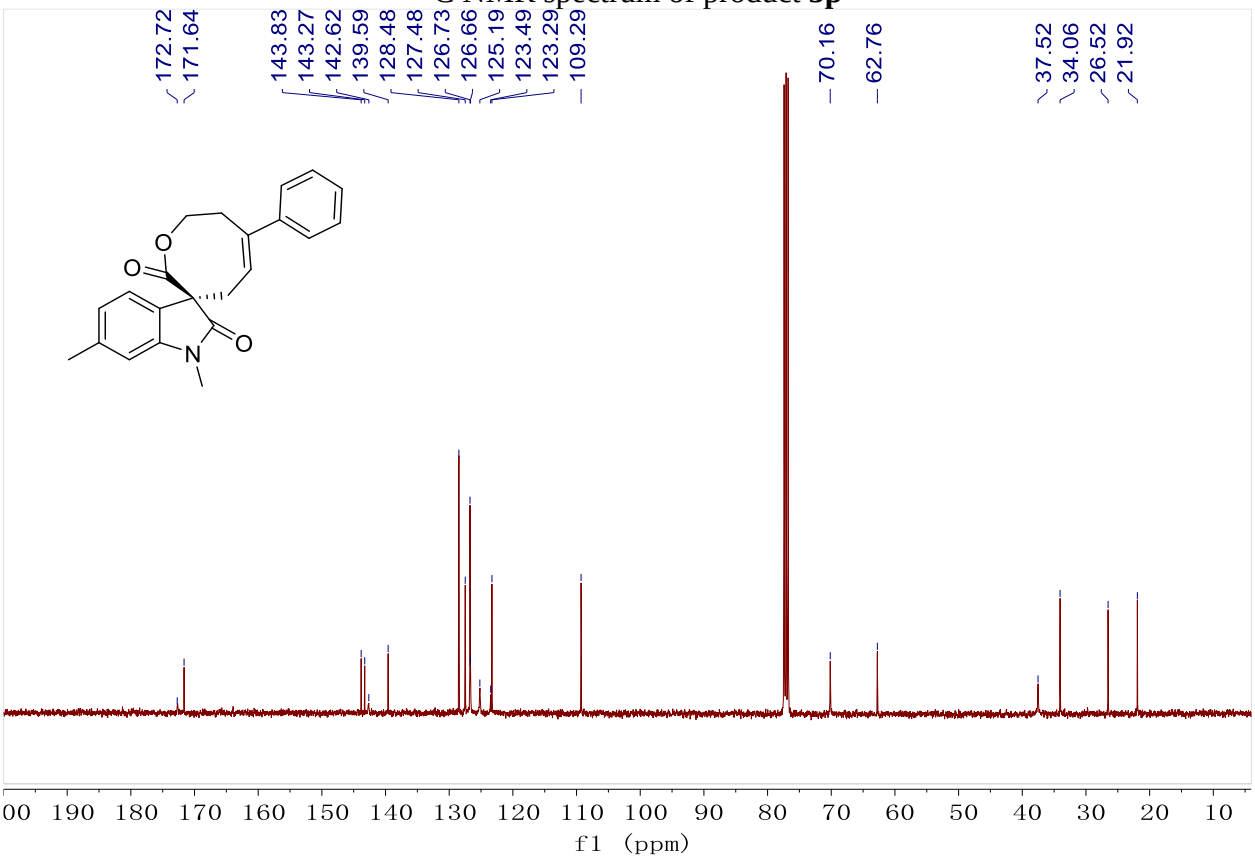
^{13}C NMR spectrum of product **3o**



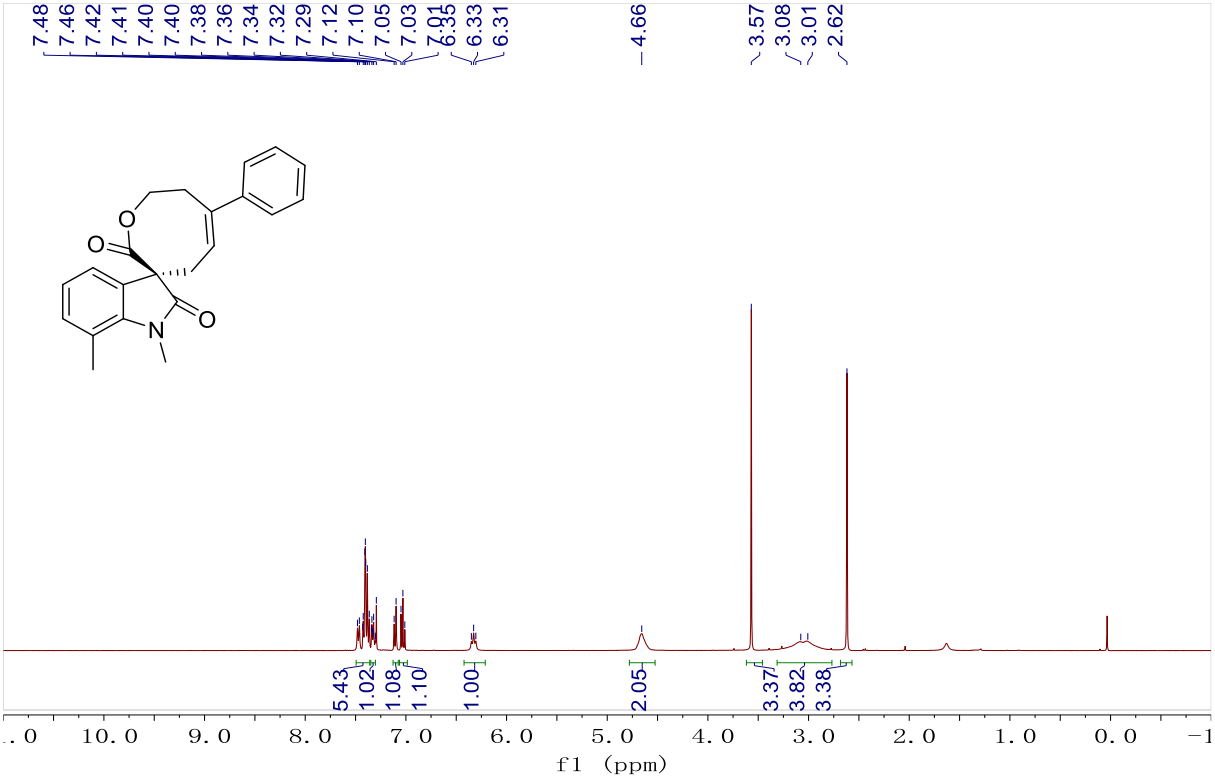
^{1}H NMR spectrum of product **3p**



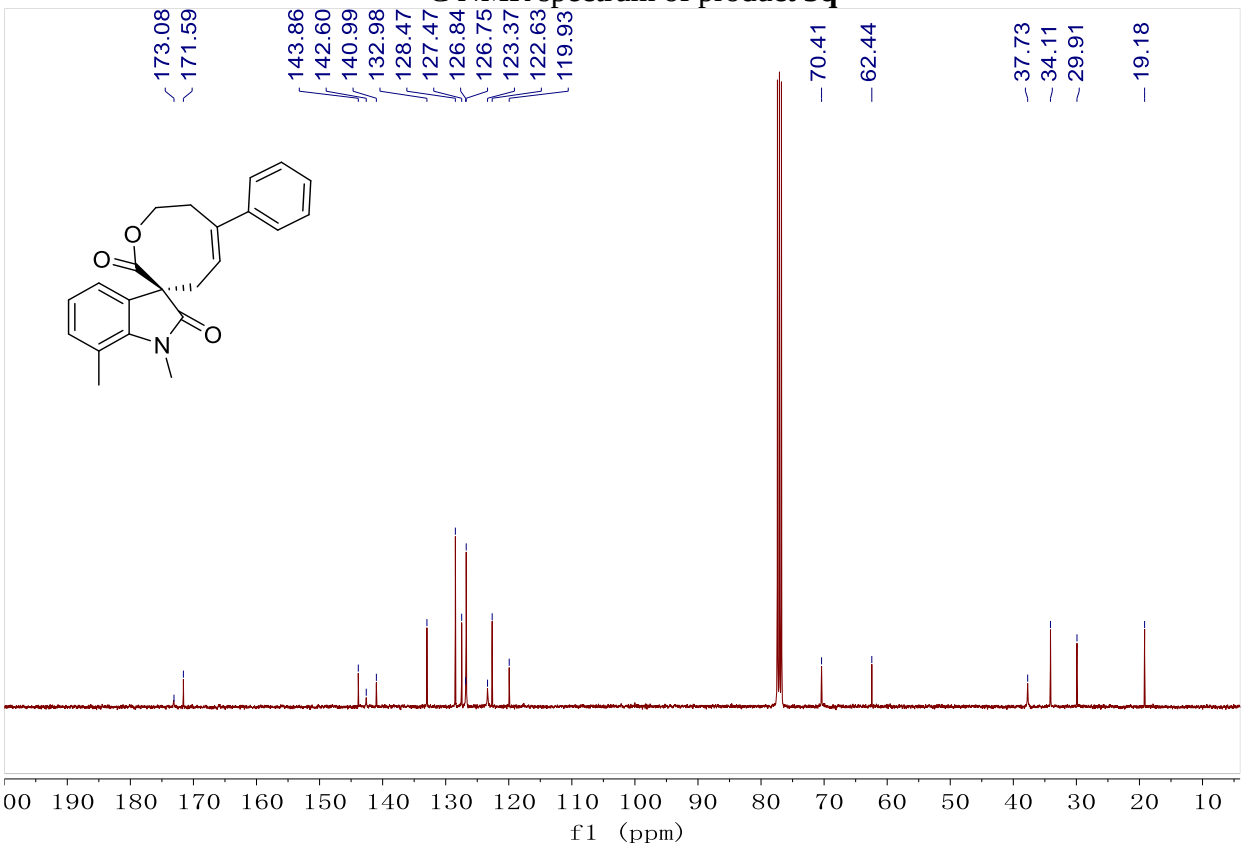
^{13}C NMR spectrum of product **3p**



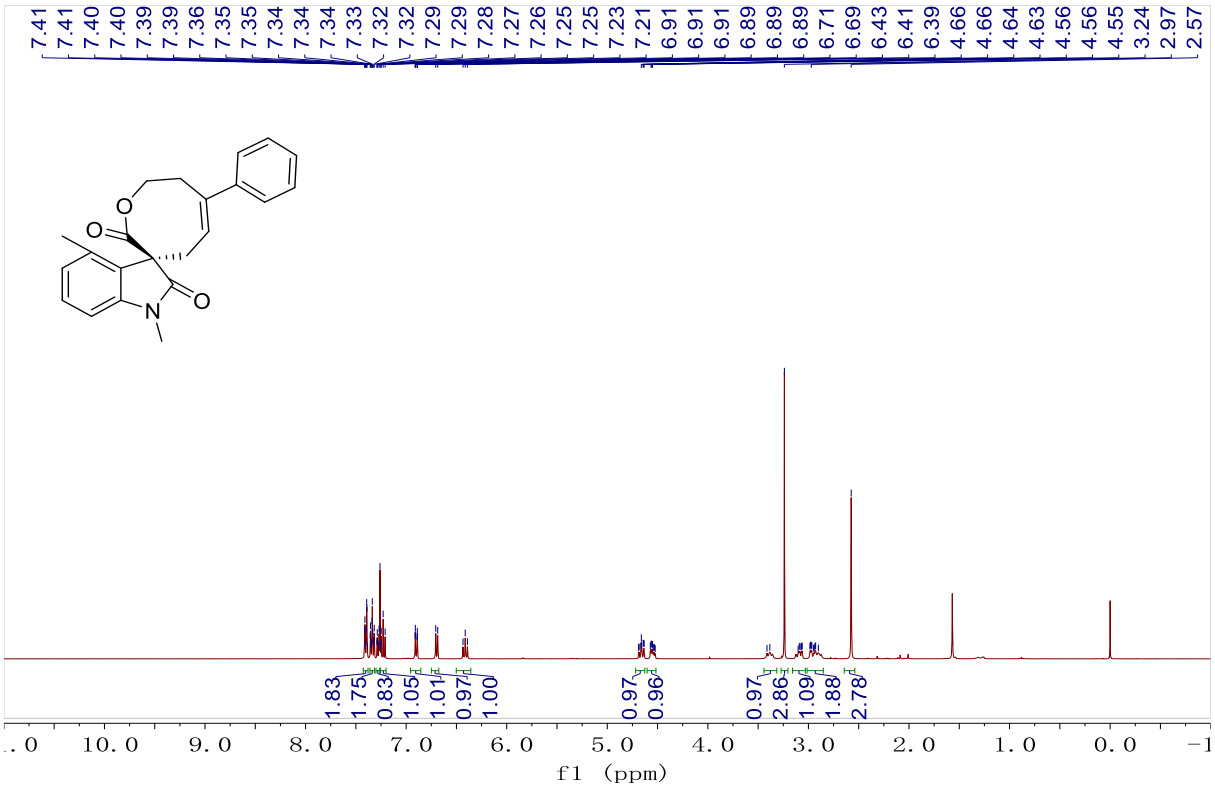
^{1}H NMR spectrum of product **3q**



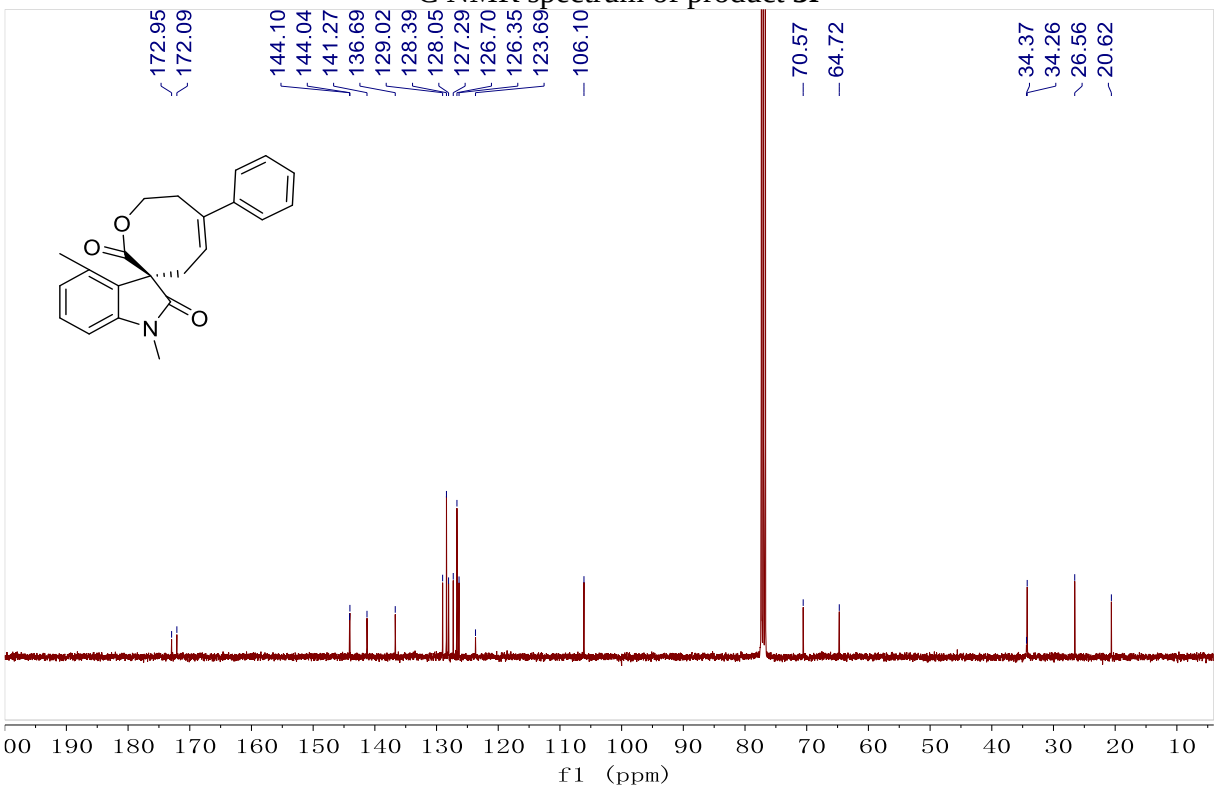
^{13}C NMR spectrum of product **3q**



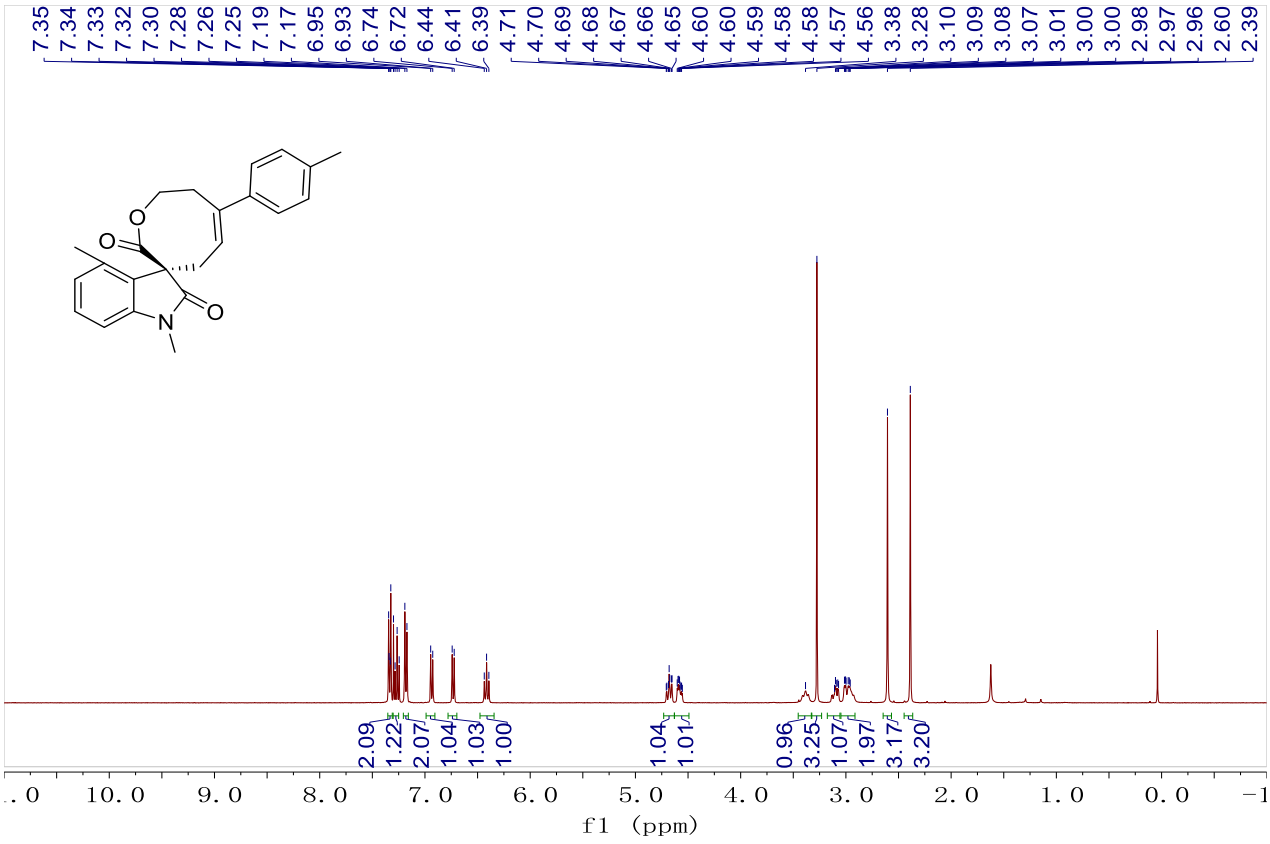
^{1}H NMR spectrum of product **3r**



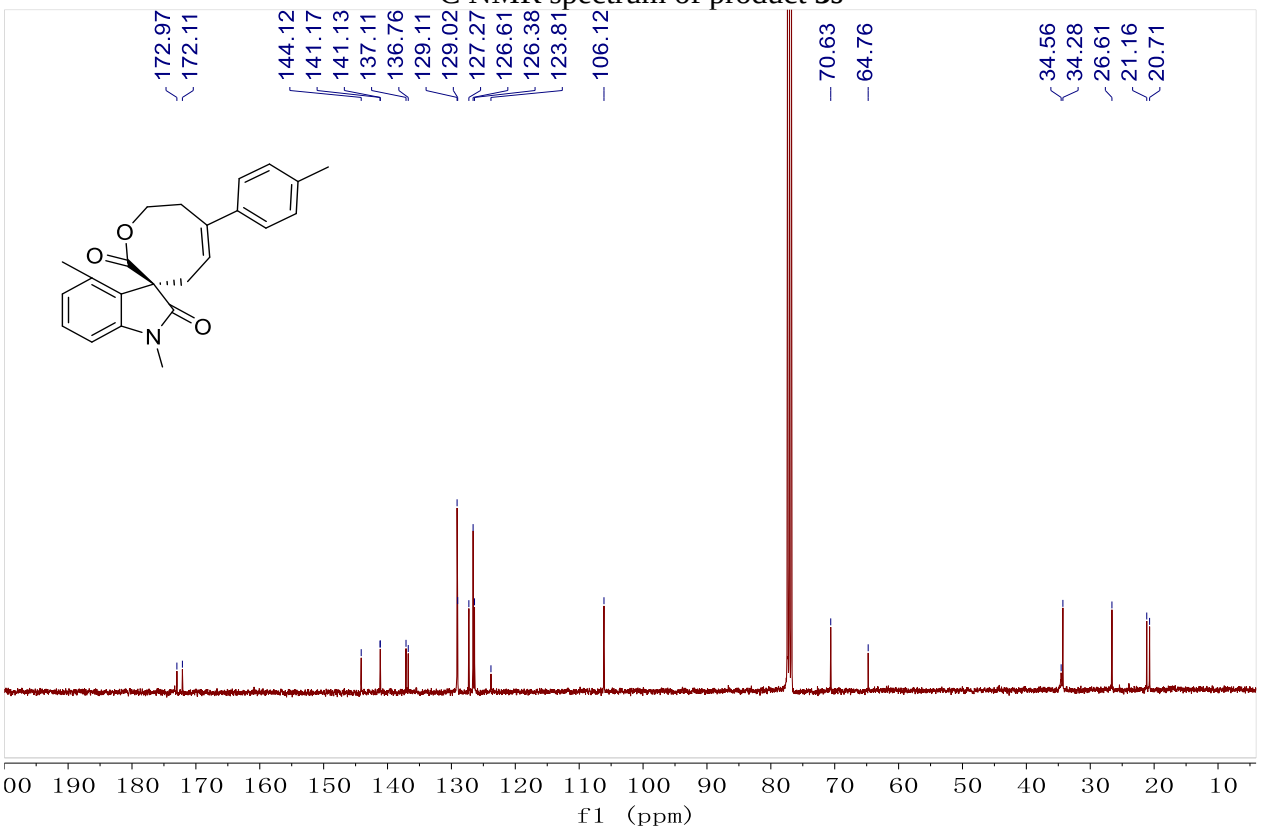
^{13}C NMR spectrum of product **3r**



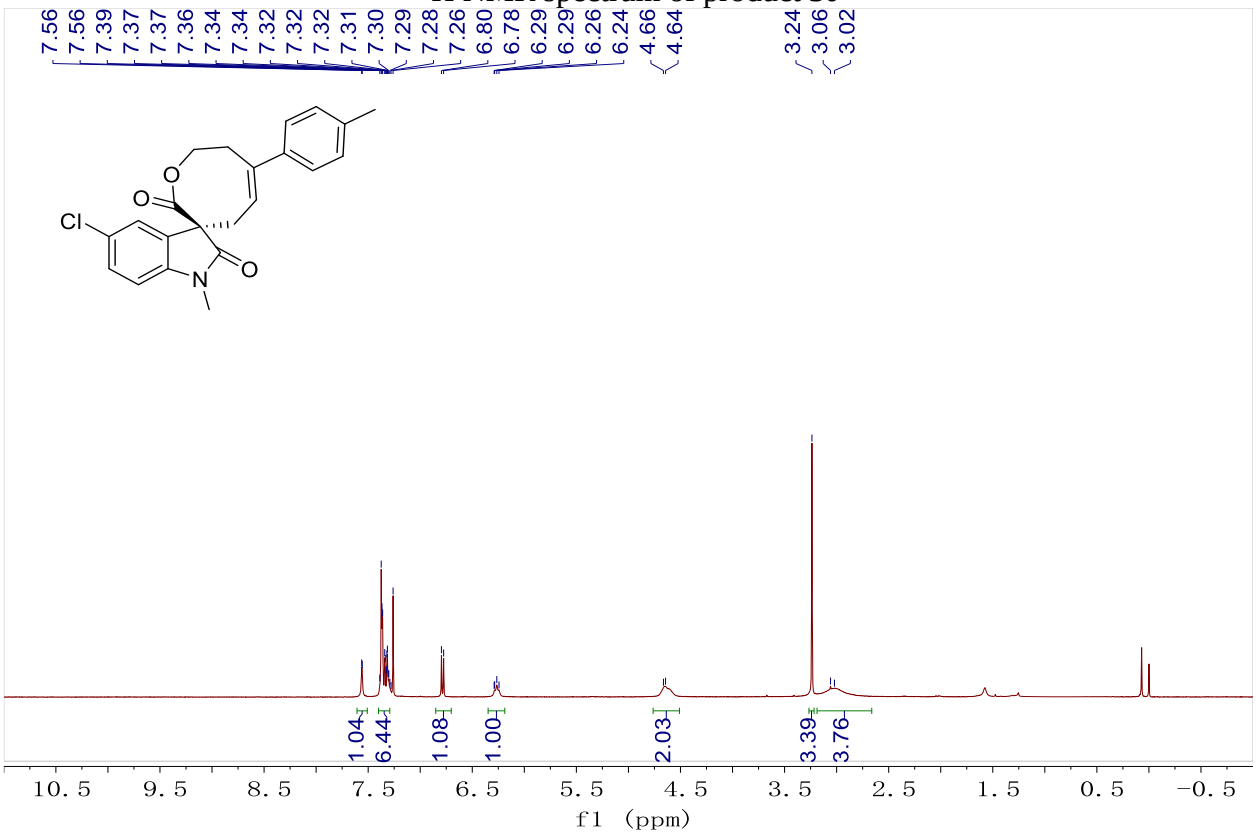
^{1}H NMR spectrum of product **3s**



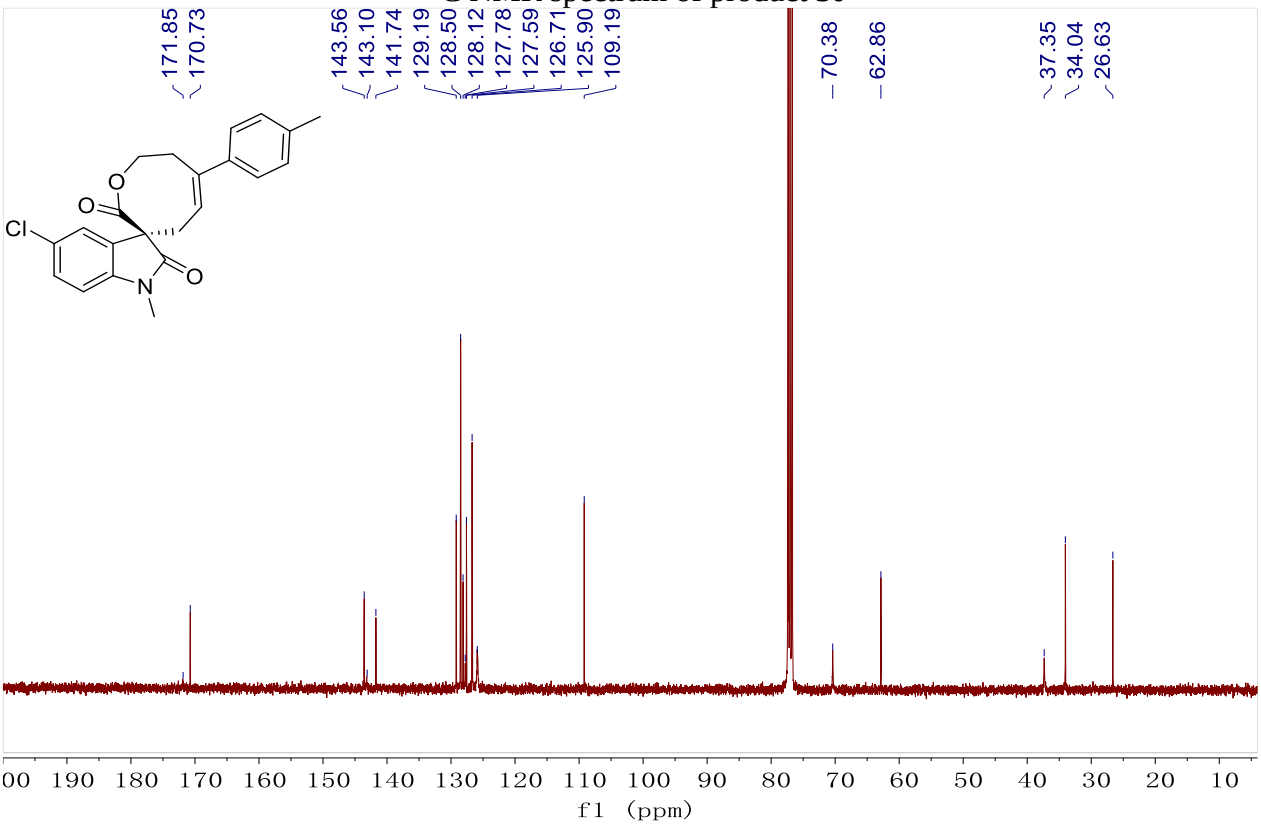
^{13}C NMR spectrum of product **3s**



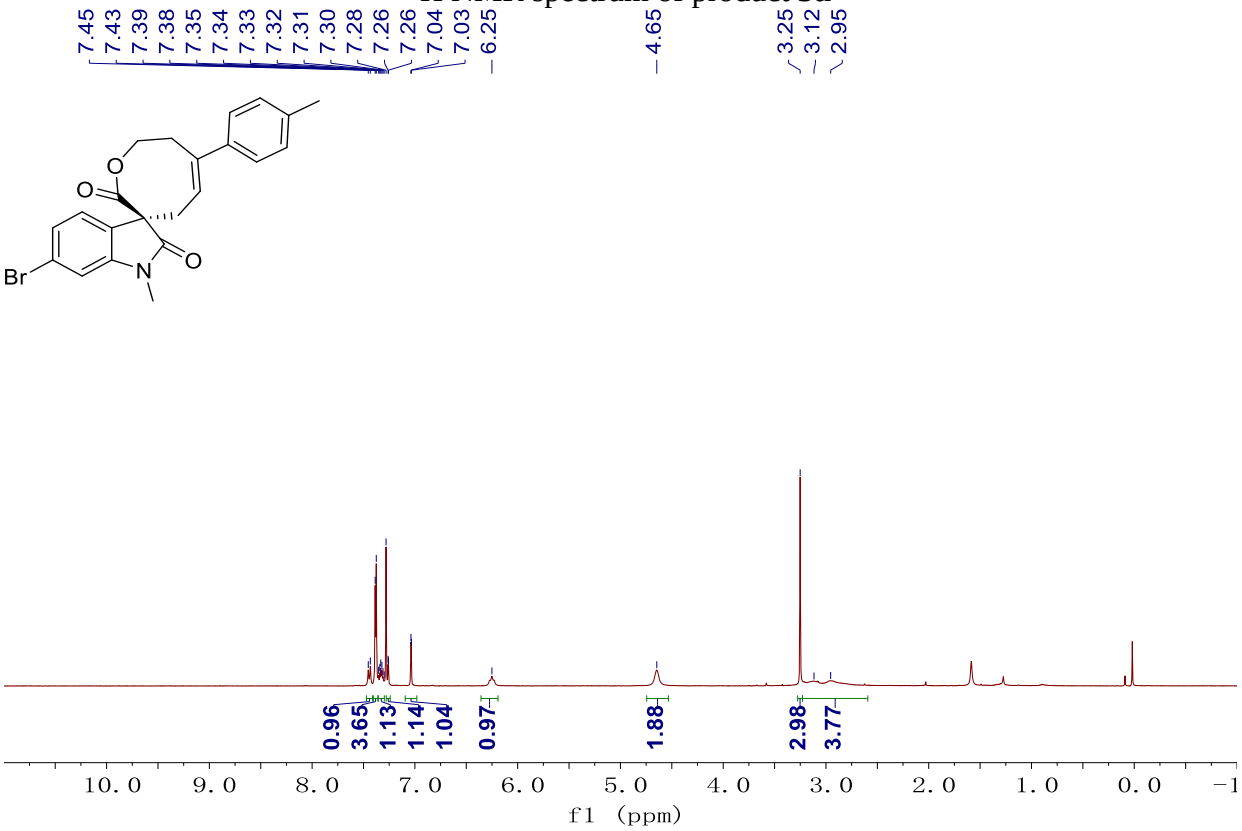
^{1}H NMR spectrum of product **3t**



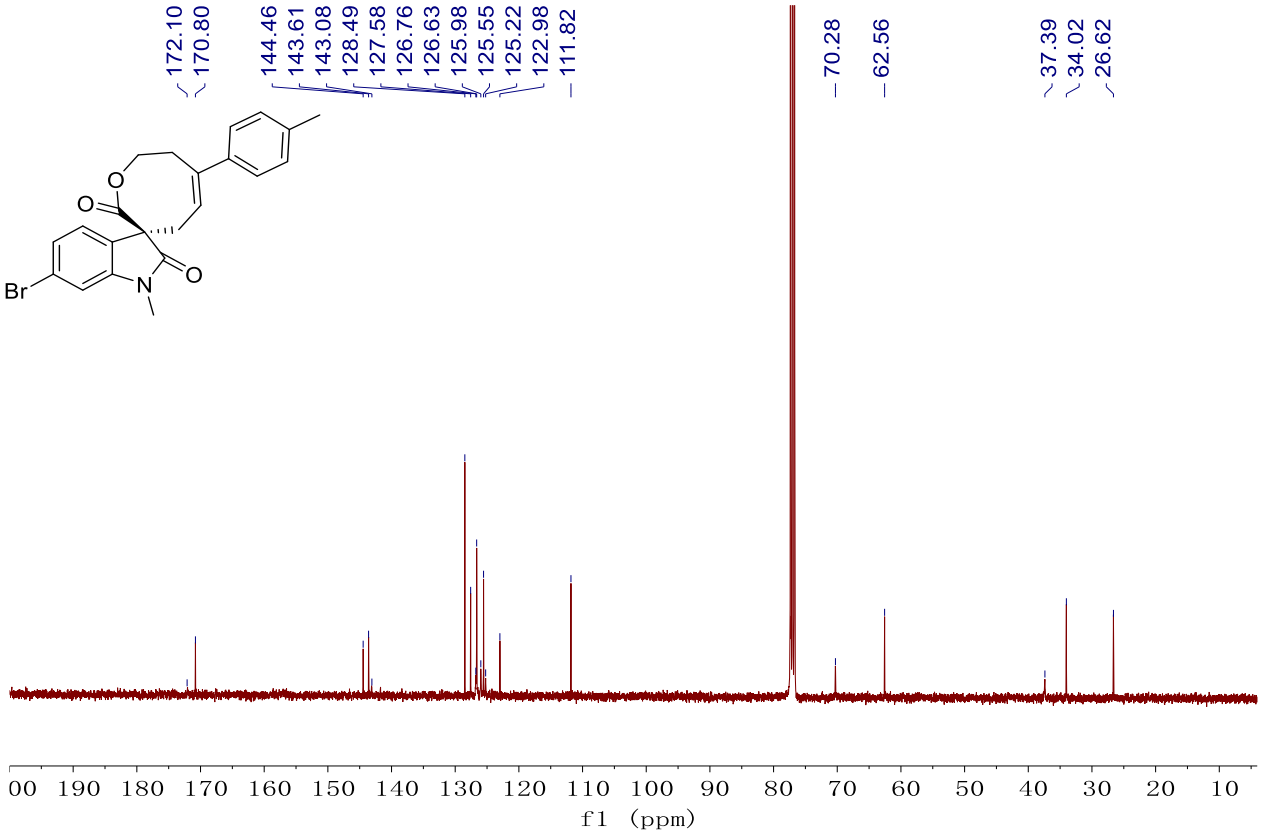
^{13}C NMR spectrum of product **3t**



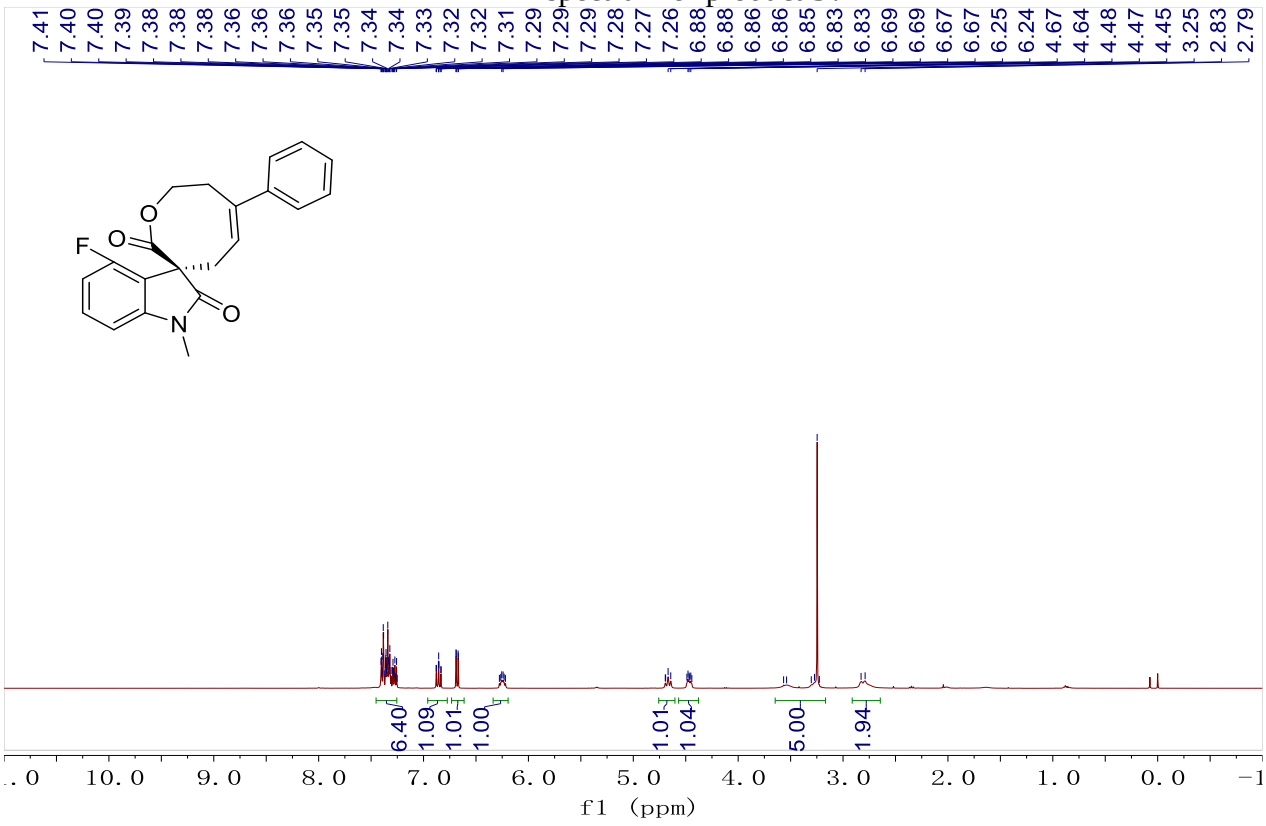
^{1}H NMR spectrum of product **3u**



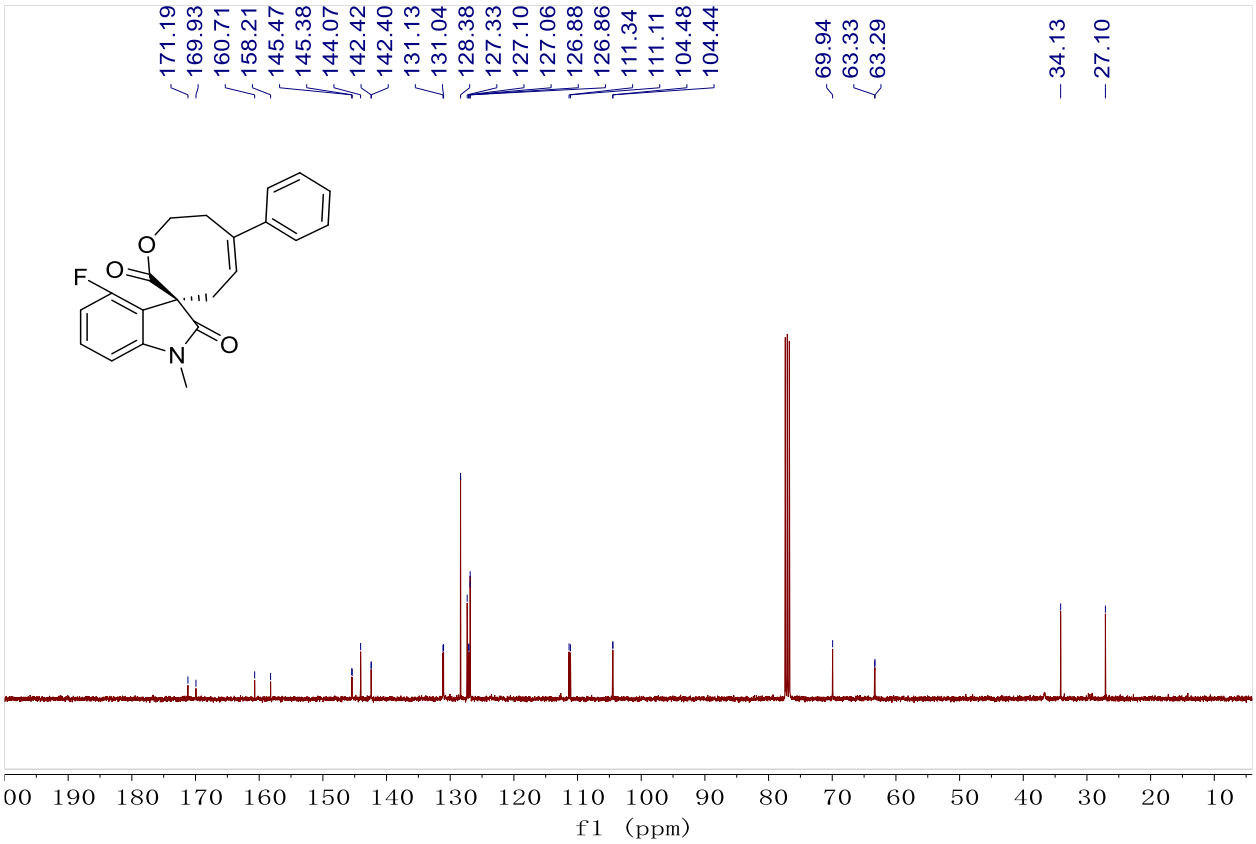
^{13}C NMR spectrum of product **3u**



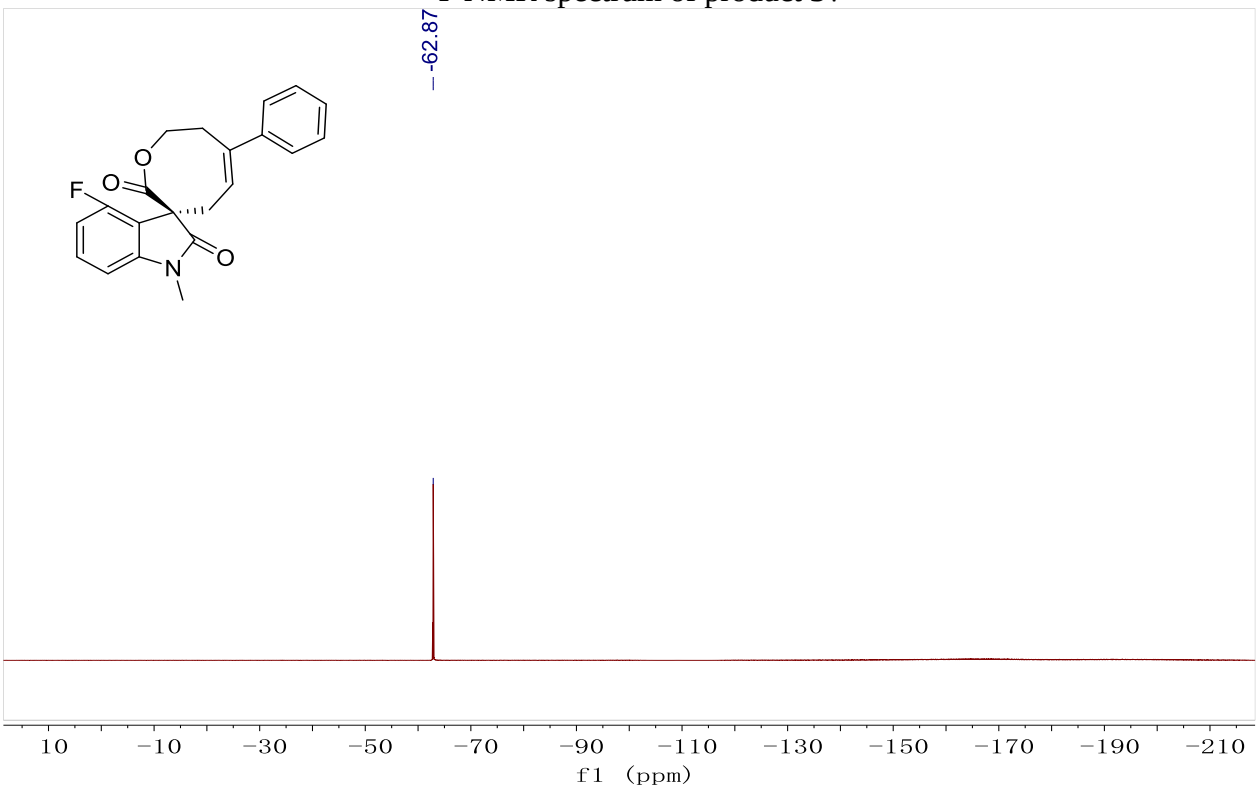
^{1}H NMR spectrum of product **3v**



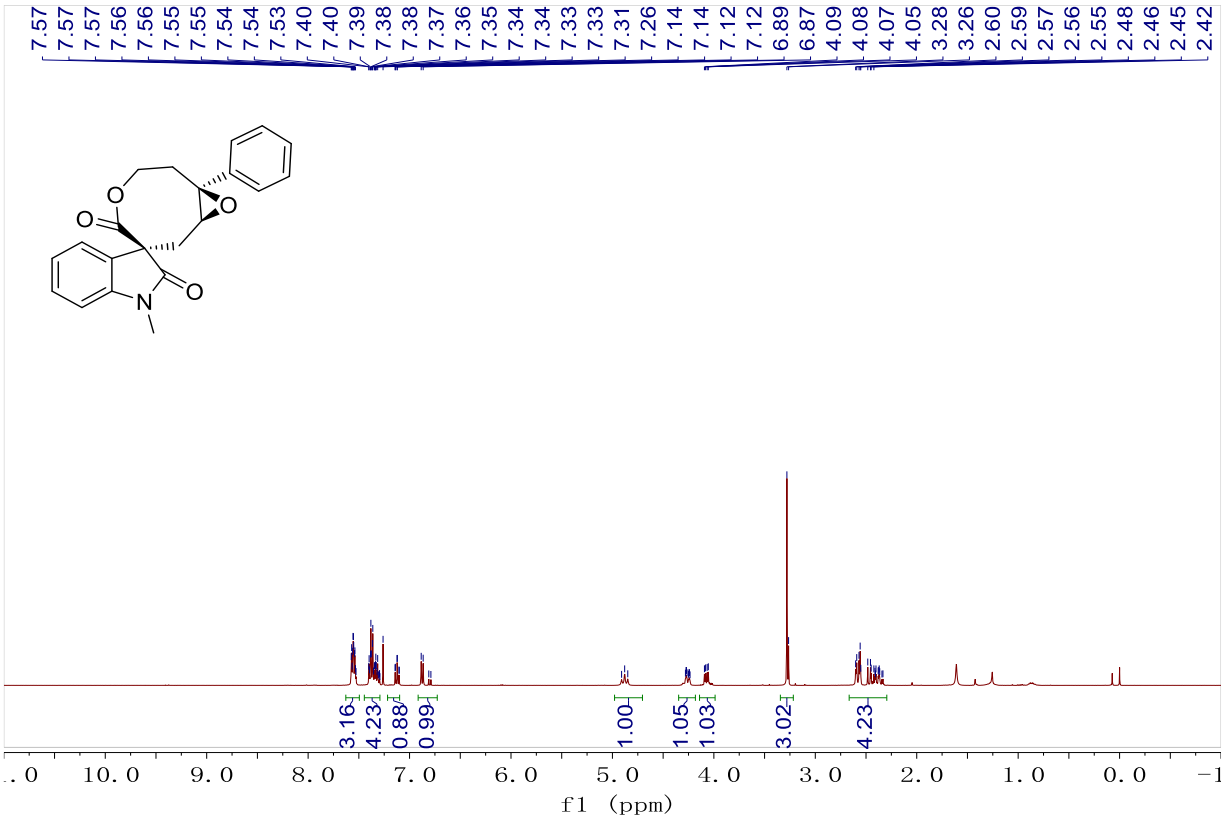
^{13}C NMR spectrum of product **3v**



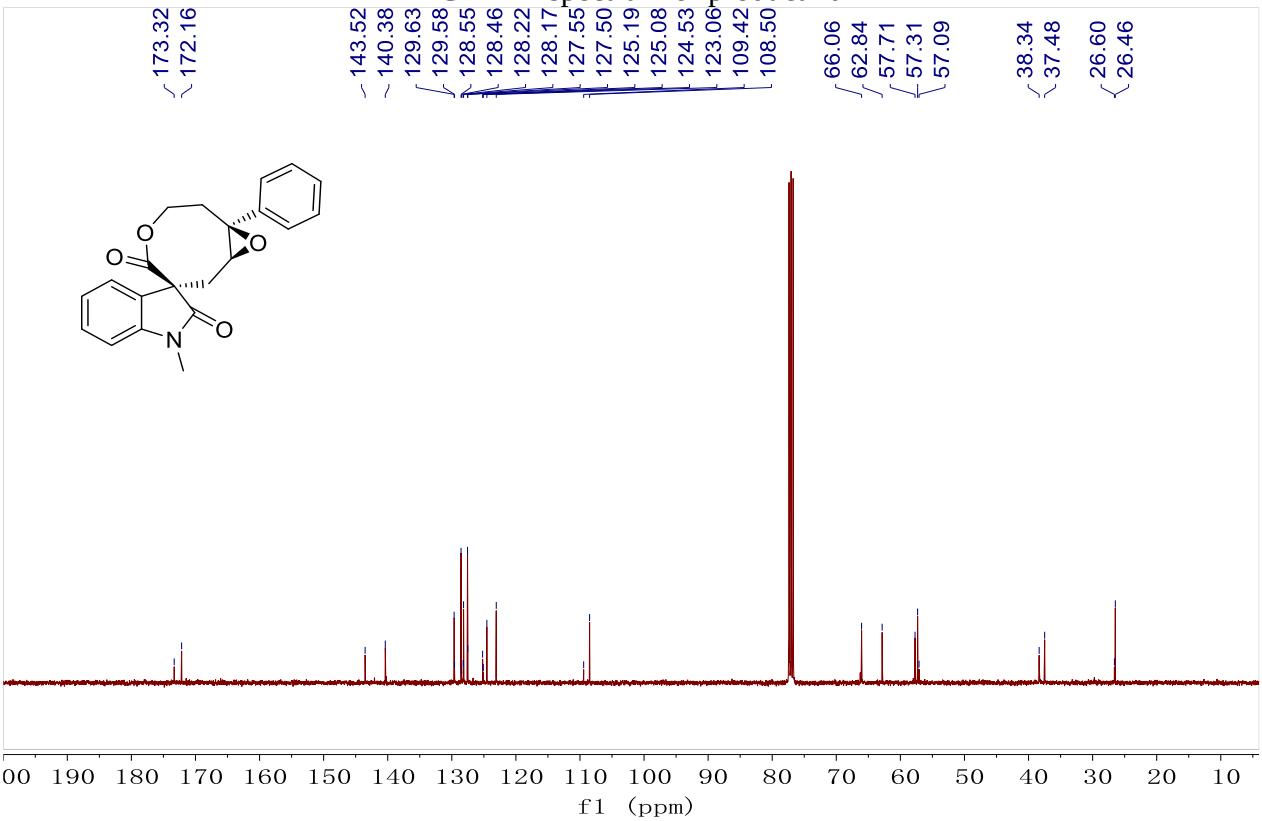
^{19}F NMR spectrum of product **3v**



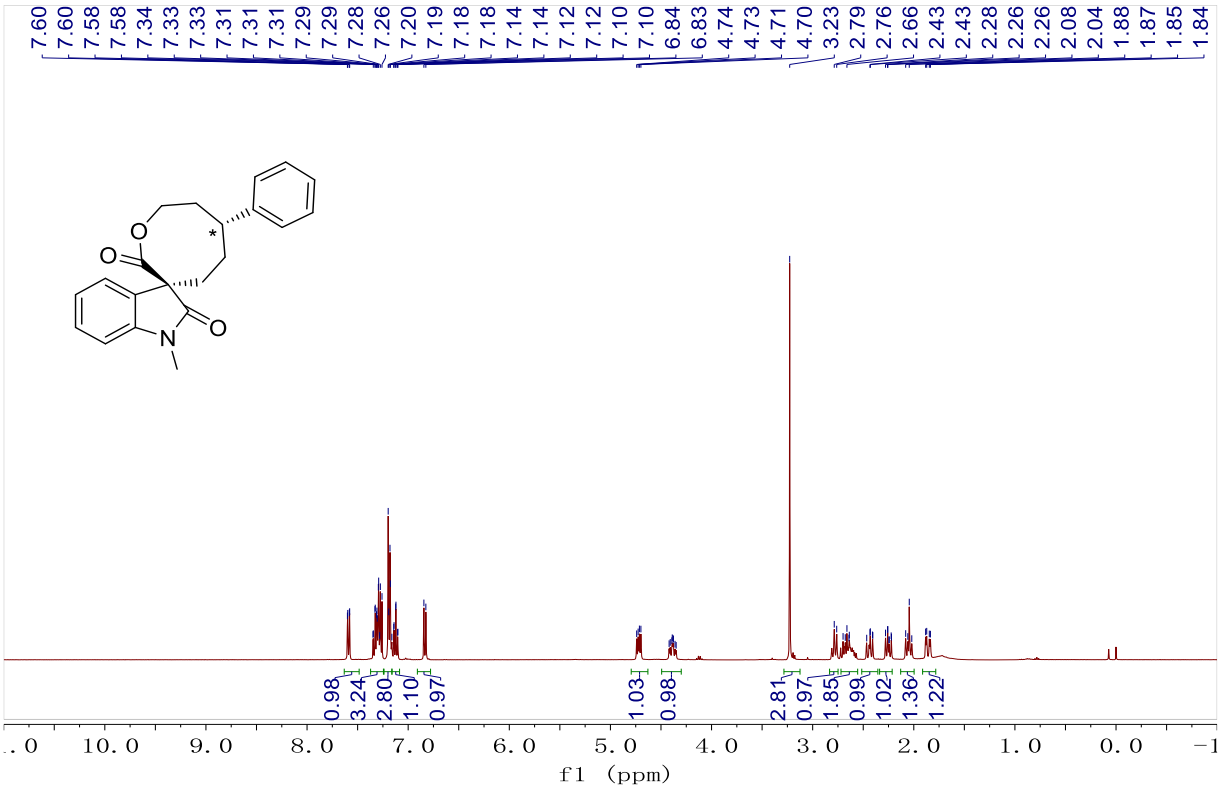
^{1}H NMR spectrum of product **7a**



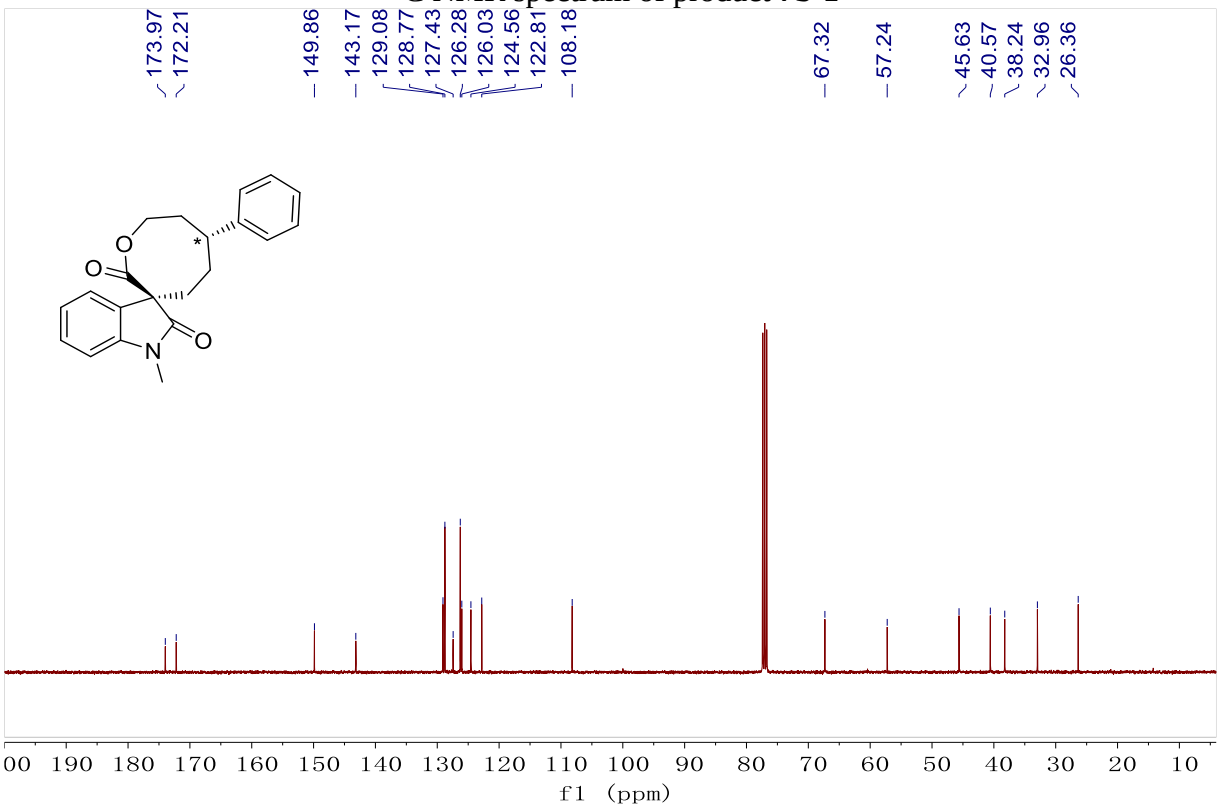
^{13}C NMR spectrum of product **7a**



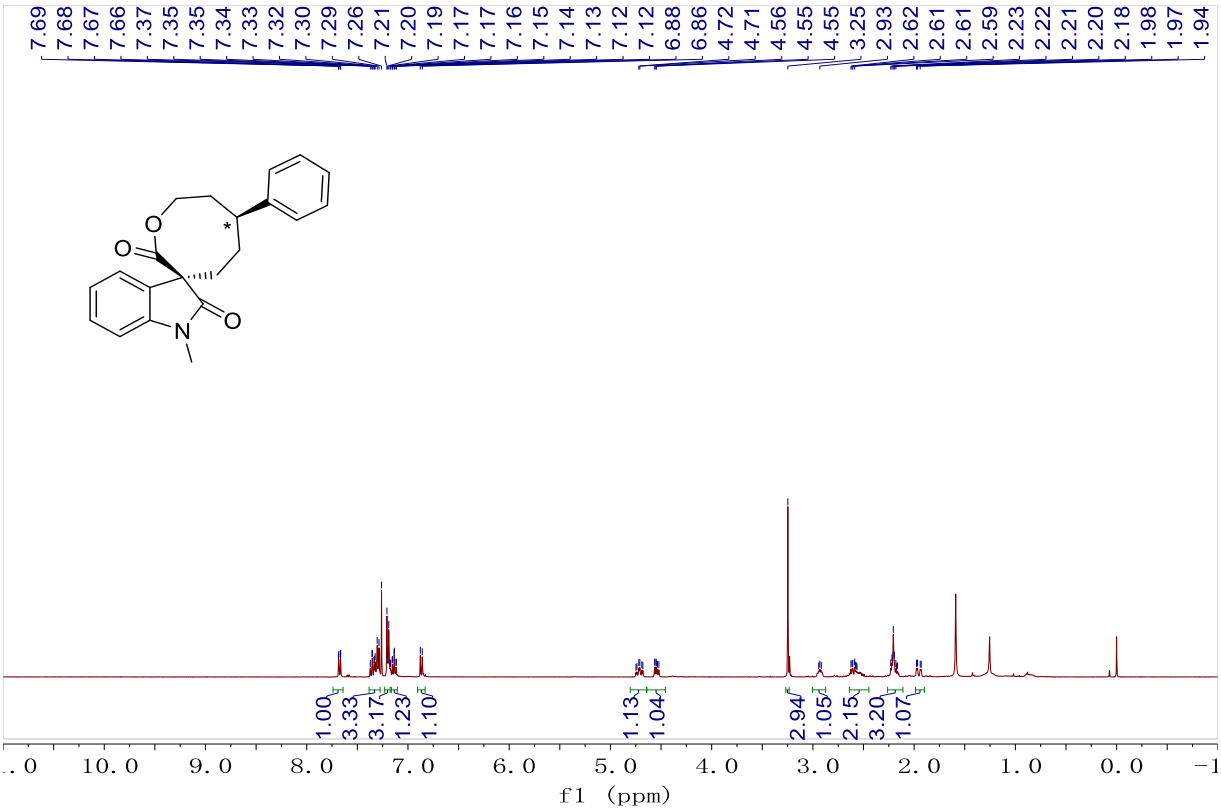
^{1}H NMR spectrum of product **7b-1**



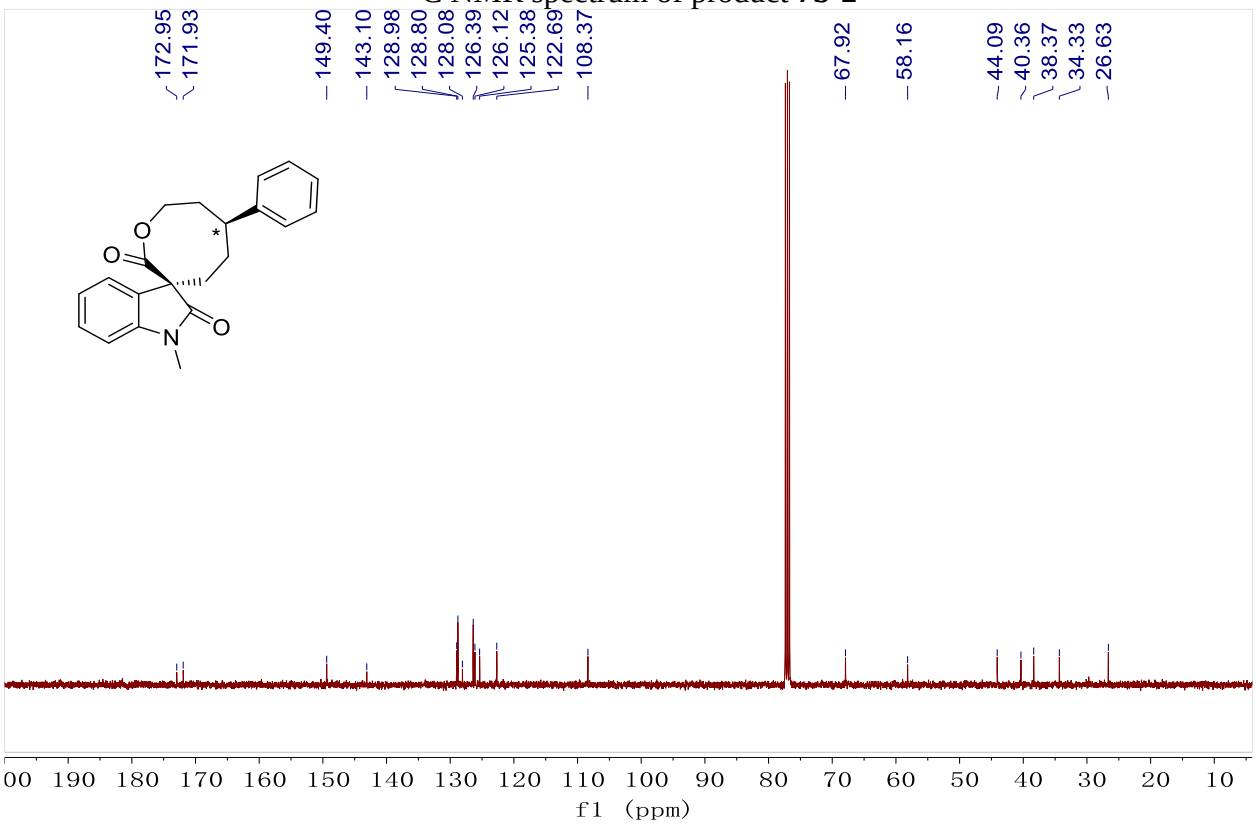
^{13}C NMR spectrum of product **7b-1**



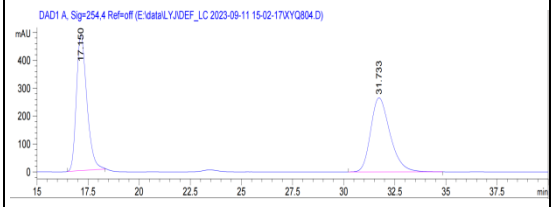
^{1}H NMR spectrum of product **7b-2**

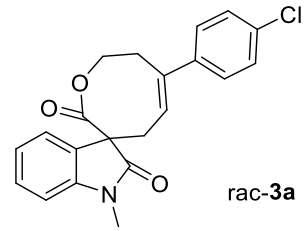


^{13}C NMR spectrum of product **7b-2**



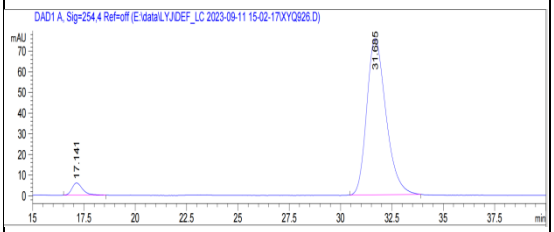
8. Copies of HPLC Data of Products

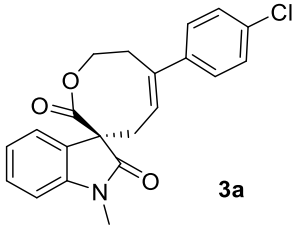




rac-**3a**

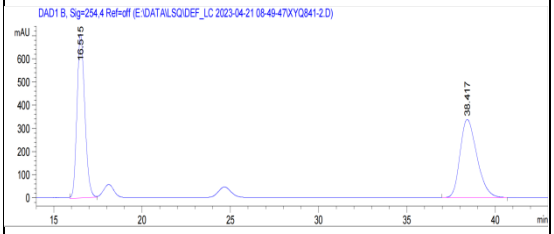
Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	17.150	MM	0.5912	1.73189e4	488.21744	49.7438
2	31.733	BB	0.9975	1.74973e4	265.28867	50.2562

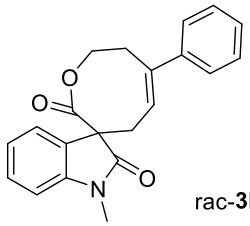




3a

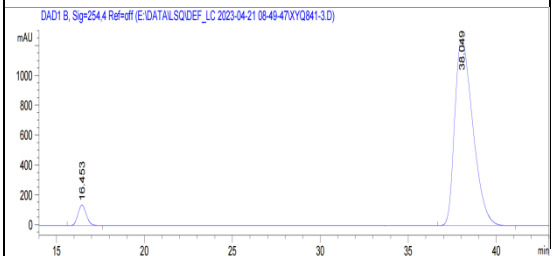
Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	17.141	BB	0.4845	216.54292	5.95081	4.2114
2	31.685	BB	0.9750	4925.28271	75.70649	95.7886

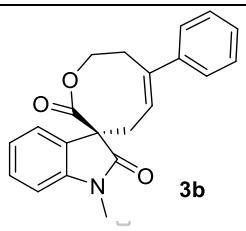




rac-**3b**

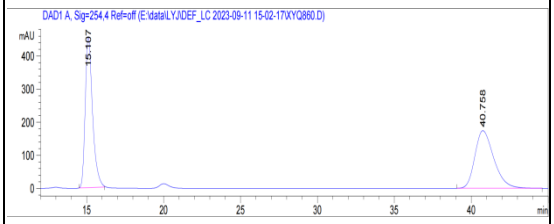
Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	16.515	MM	0.5130	2.18158e4	708.78998	49.3667
2	38.417	BB	0.9941	2.23756e4	337.21619	50.6333

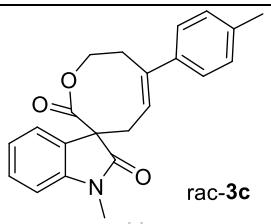




3b

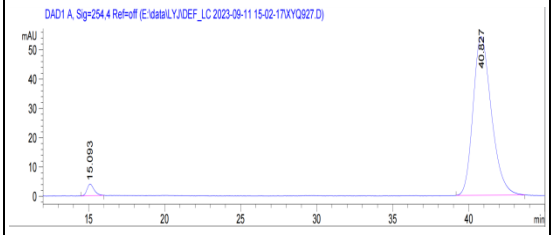
Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	16.453	BB	0.5124	4609.94922	138.48451	4.9131
2	38.049	BB	1.0579	8.92199e4	1245.21301	95.0869

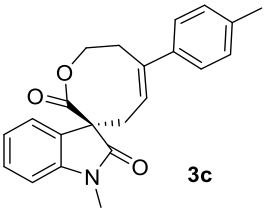




rac-**3c**

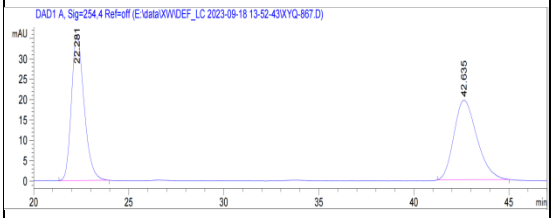
Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	15.107	MM	0.5457	1.49361e4	456.20923	50.0859
2	40.758	BB	1.2341	1.48848e4	173.99136	49.9141

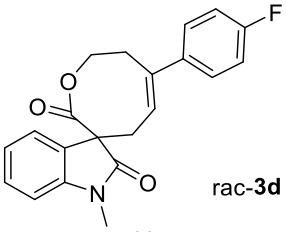




3c

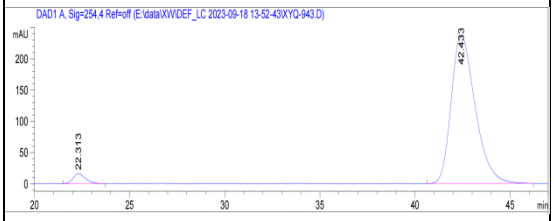
Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	15.093	BB	0.4076	125.99081	3.93410	2.7007
2	40.827	BB	1.0793	4539.20898	54.18573	97.2993

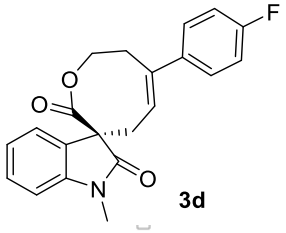




rac-**3d**

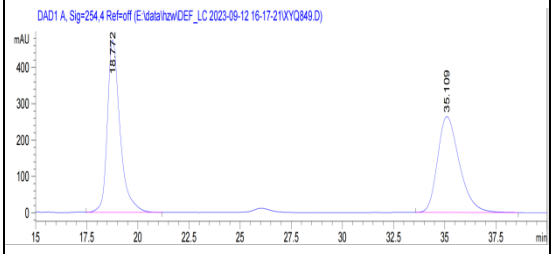
Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	22.281	BB	0.6783	1659.96240	35.84652	50.2565
2	42.635	BB	0.9983	1643.01685	19.47411	49.7435

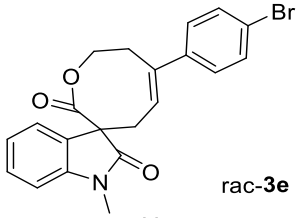




3d

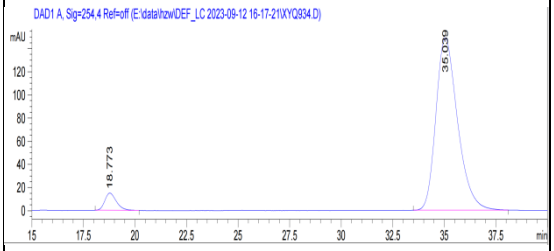
Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	22.313	BB	0.5804	722.19031	15.94422	3.3597
2	42.433	BB	1.2654	2.07733e4	237.74561	96.6403

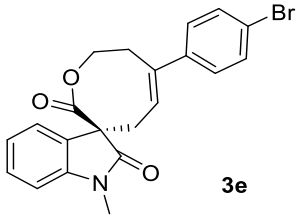




rac-**3e**

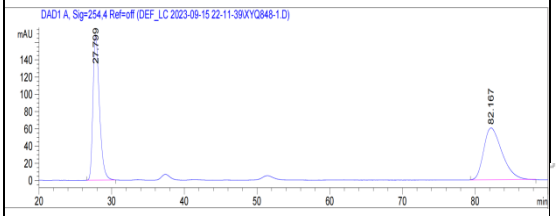
Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	18.772	BB	0.6424	2.03312e4	474.05005	50.9942
2	35.109	BB	1.1134	1.95385e4	263.39664	49.0058

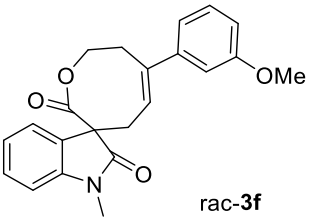




3e

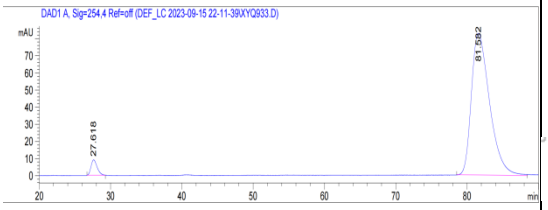
Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	18.773	BB	0.5454	579.89594	14.85593	5.0665
2	35.039	BB	1.0682	1.08657e4	148.75154	94.9335

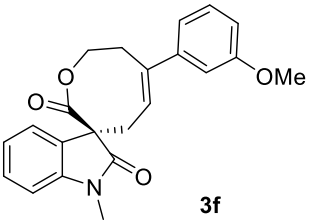




rac-**3f**

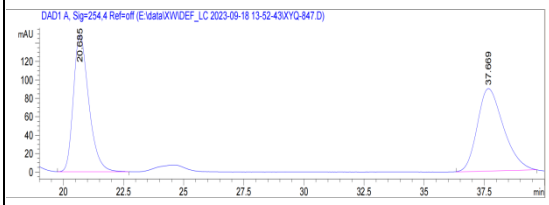
Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	27.799	BB	0.9149	1.04136e4	168.53546	49.6476
2	82.167	MM	2.9253	1.05615e4	60.17286	50.3524

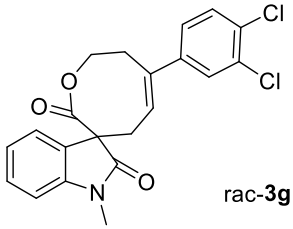




3f

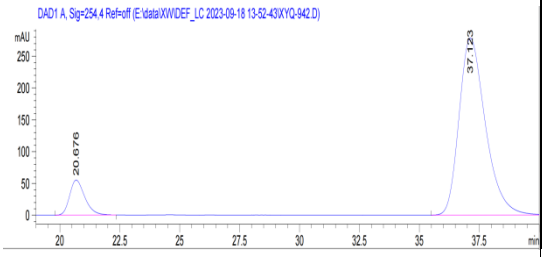
Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	27.618	BB	0.7021	534.30817	9.00694	3.5293
2	81.582	MM	2.9436	1.46048e4	82.69210	96.4707

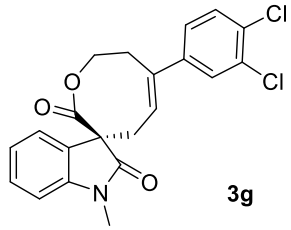




rac-**3g**

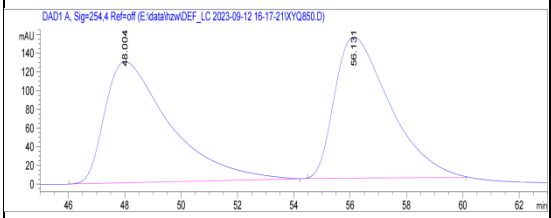
Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	20.685	BB	0.6766	6605.03125	148.58444	49.3091
2	37.669	MM	1.2639	6790.12646	89.54021	50.6909

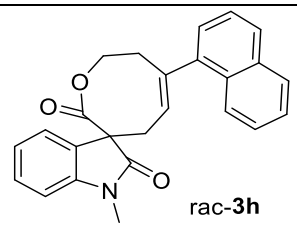




3g

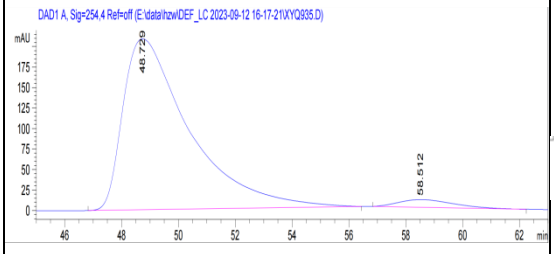
Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	20.676	BB	0.6626	2416.49731	55.00141	10.2059
2	37.123	BB	1.1459	2.12610e4	278.10129	89.7941

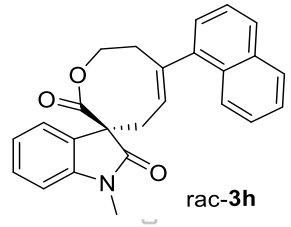




rac-**3h**

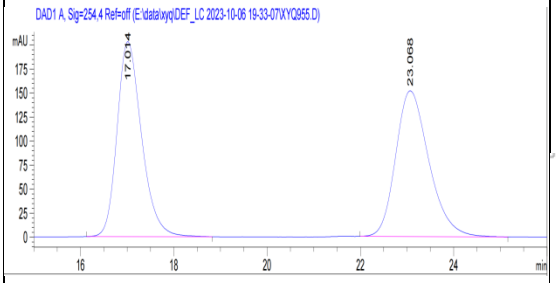
Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	48.004	BB	1.9580	2.06489e4	129.23811	50.0984
2	56.131	MM	2.2703	2.05678e4	150.99478	49.9016

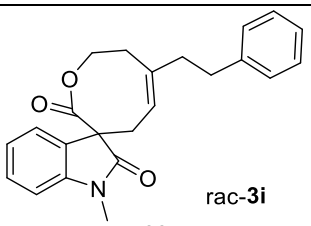




rac-**3h**

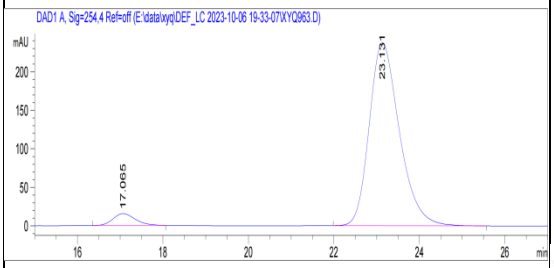
Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	48.729	BB	2.1294	3.38108e4	208.55156	96.4380
2	58.512	BB	1.5654	1248.82776	9.39147	3.5620

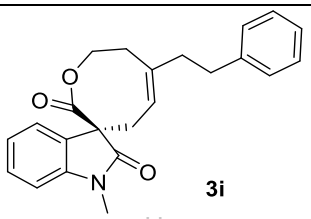




rac-**3i**

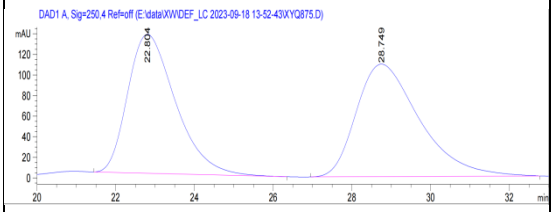
Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	17.014	BB	0.5565	7418.59668	202.94774	49.6752
2	23.068	BB	0.7639	7515.60645	151.72618	50.3248

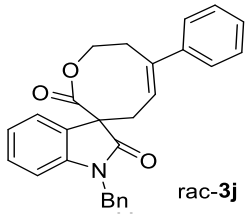




3i

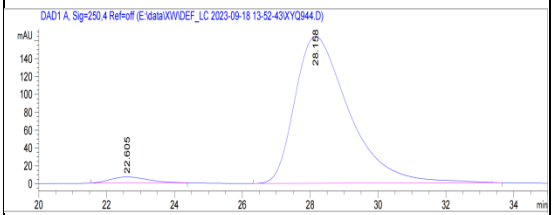
Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	17.065	BB	0.5307	553.71265	15.35464	4.5507
2	23.131	BB	0.7475	1.16139e4	237.10292	95.4493

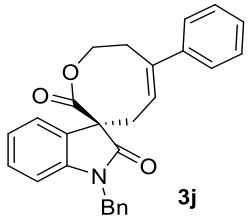




rac-**3j**

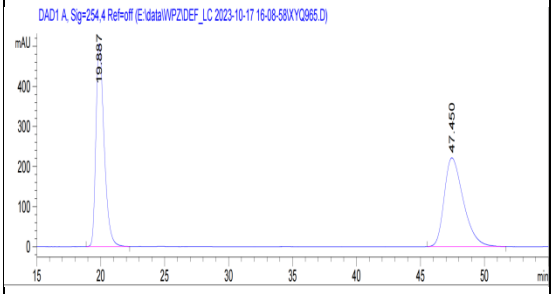
Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	22.806	MM	1.4200	1.09848e4	128.92542	49.0575
2	28.742	MM	1.8410	1.14068e4	103.26434	50.9425

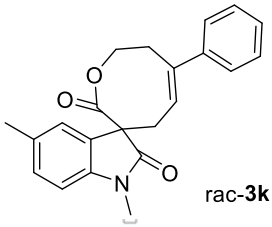




3j

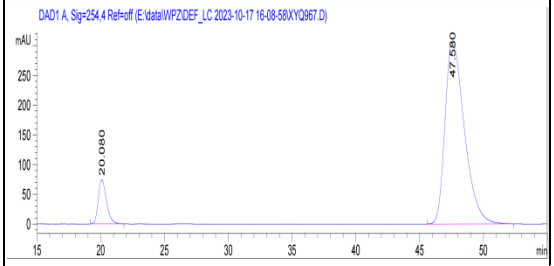
Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	22.619	BB	0.9346	527.85205	6.67478	2.9622
2	28.157	BB	1.5408	1.72914e4	156.04570	97.0378

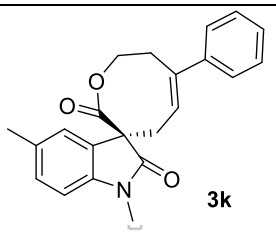




rac-**3k**

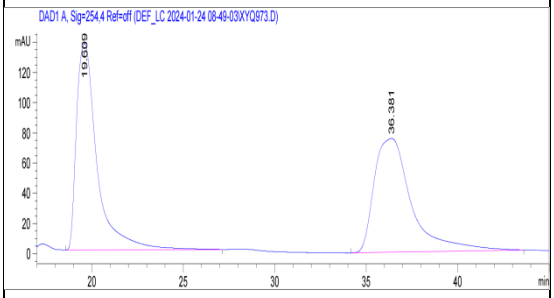
Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	19.887	BB	0.6799	2.25637e4	506.29102	49.5748
2	47.450	BB	1.3935	2.29508e4	221.37144	50.4252

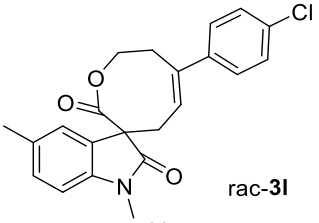




3k

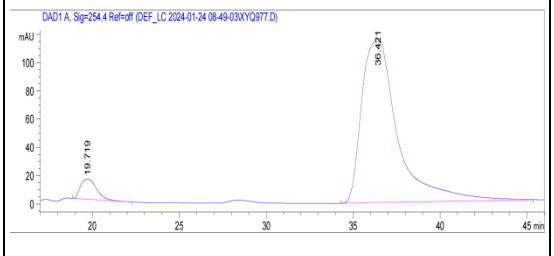
Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	20.080	BB	0.6638	3338.88770	74.65105	9.3548
2	47.580	BB	1.4978	3.23530e4	307.93497	90.6452

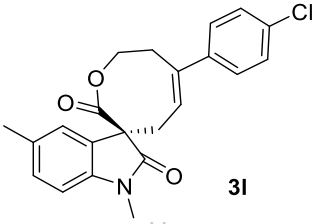




rac-**3l**

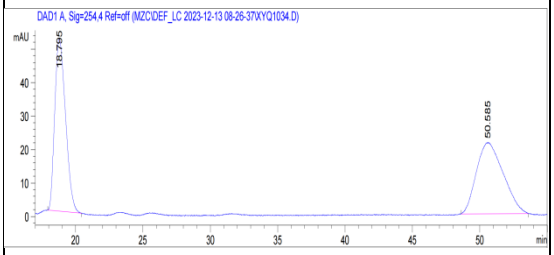
Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	19.609	BB	1.1864	1.06866e4	136.64055	49.9032
2	36.381	BB	1.8562	1.07280e4	75.38741	50.0968

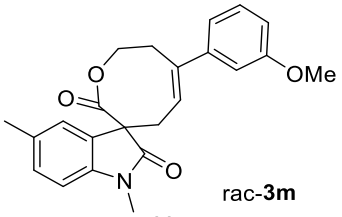




3l

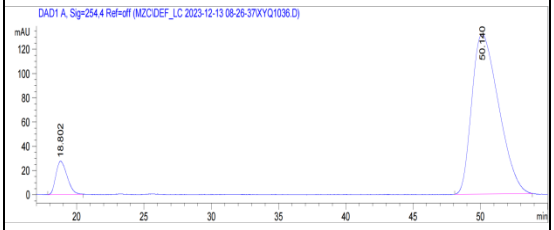
Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	19.719	BB	0.8886	942.10760	14.48834	5.3677
2	36.421	MM	2.3868	1.66092e4	115.97890	94.6323

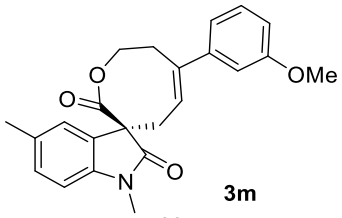




rac-**3m**

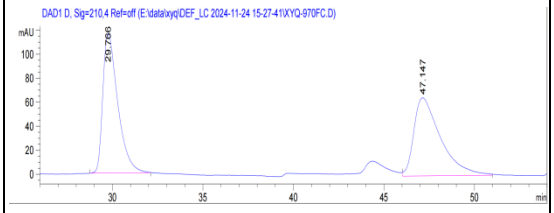
Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	18.795	BB	0.7000	2867.32983	51.46663	49.3631
2	50.585	BB	1.6161	2941.31689	21.33880	50.6369

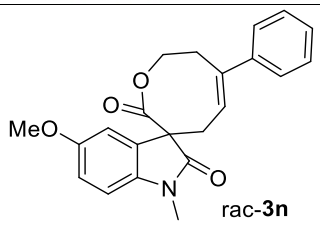




3m

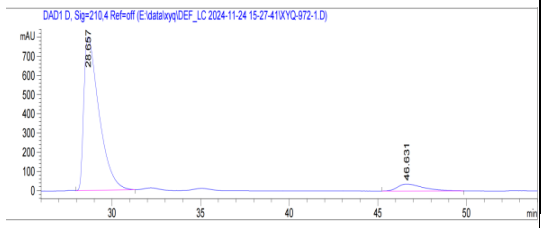
Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	18.802	BB	0.6901	1582.37292	27.54867	7.9605
2	50.140	BB	1.6265	1.82955e4	132.04427	92.0395

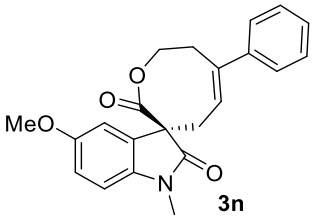




rac-**3n**

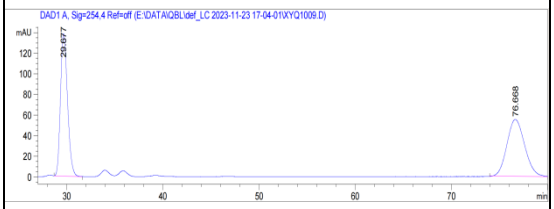
Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	29.766	BB	0.8065	6643.58838	116.28548	49.8763
2	47.147	MM	1.7123	6676.53027	64.98584	50.1237

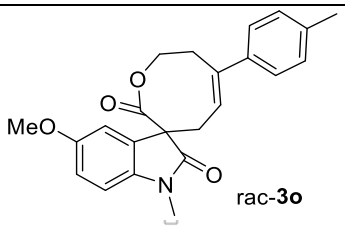




3n

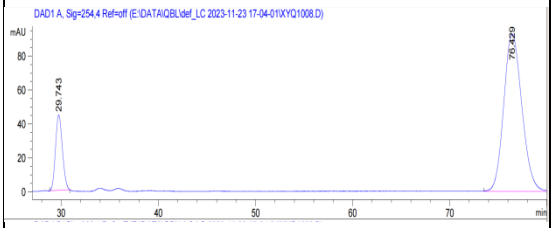
Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	28.657	BB	0.8482	4.75986e4	799.98163	93.1332
2	46.631	BB	1.1818	3509.47363	35.54667	6.8668

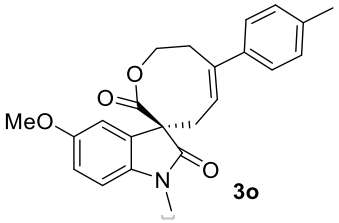




rac-**3o**

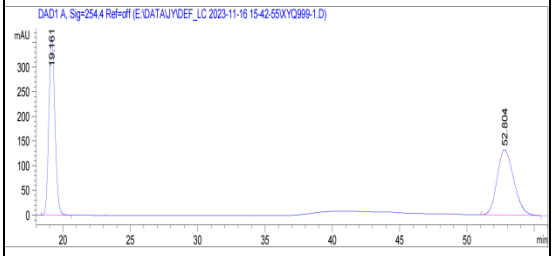
Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	29.677	BB	0.7631	6992.95801	138.03110	50.0100
2	76.668	MM	2.1191	6990.15576	54.97674	49.9900

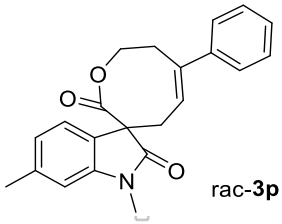




3o

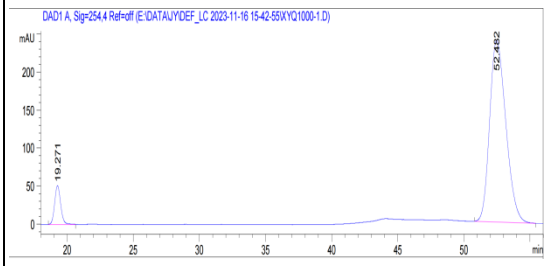
Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	29.743	MM	0.8220	2195.46558	44.51298	15.4571
2	76.429	MM	2.1576	1.20082e4	92.75930	84.5429

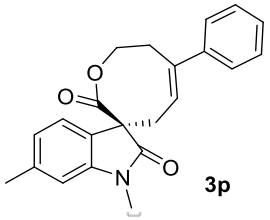




rac-**3p**

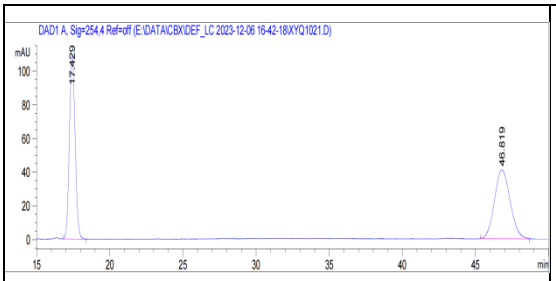
Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	19.161	BB	0.4849	1.12953e4	361.09793	49.8827
2	52.804	BB	1.0994	1.13484e4	132.47250	50.1173

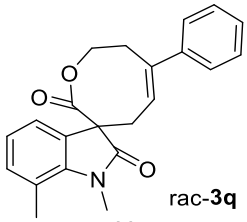




3p

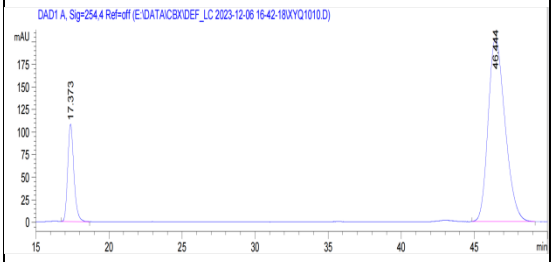
Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	19.271	BB	0.4809	1599.26184	50.85265	7.2945
2	52.482	BB	1.1922	2.03249e4	238.99913	92.7055

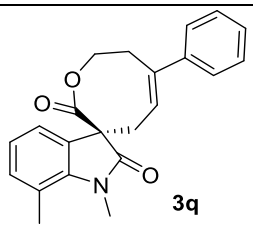




rac-**3q**

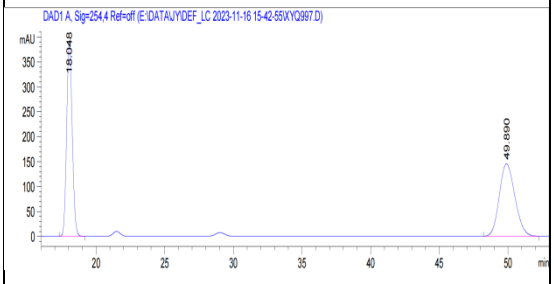
Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	17.429	BB	0.4261	2984.07471	109.44083	49.6187
2	46.819	BB	0.8741	3029.94214	40.72008	50.3813

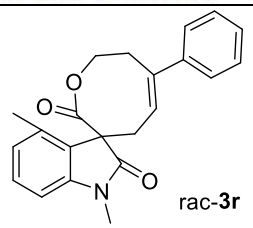




3q

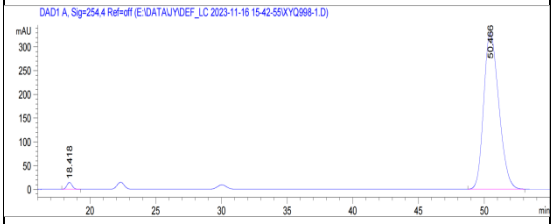
Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	17.373	BB	0.4519	3160.23950	107.84155	16.2556
2	46.444	BB	1.0252	1.62807e4	202.67039	83.7444

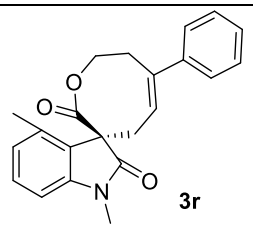




rac-**3r**

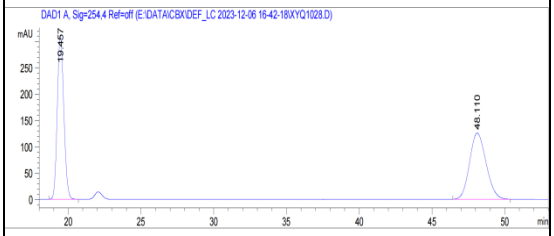
Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	18.048	BB	0.4410	1.10906e4	390.85147	49.1566
2	49.890	BB	1.1170	1.14711e4	145.30930	50.8434

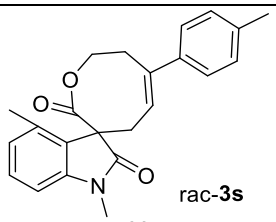




3r

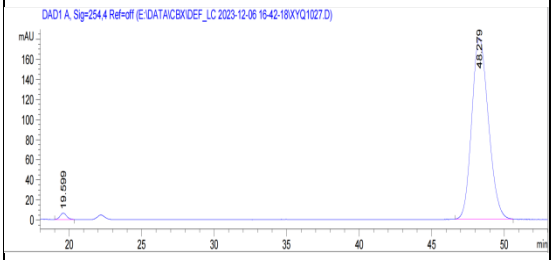
Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	18.418	BB	0.4024	408.89273	14.43874	1.5278
2	50.466	BB	1.2208	2.63552e4	329.64502	98.4722

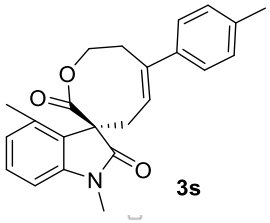




rac-**3s**

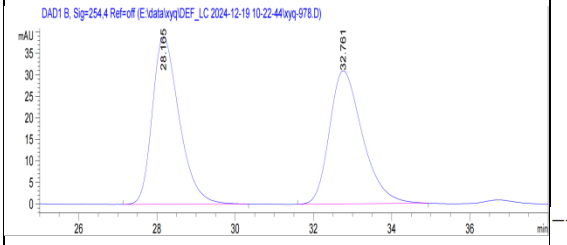
Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	19.457	BB	0.4796	9679.35938	310.58566	49.4169
2	48.110	BB	0.9508	9907.77148	125.53544	50.5831

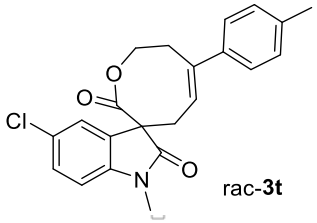




3s

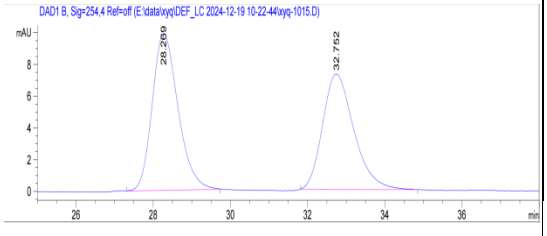
Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	19.599	BB	0.3788	195.88797	6.33406	1.3474
2	48.279	BB	1.0777	1.43423e4	179.97627	98.6526

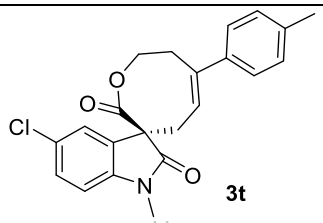




rac-**3t**

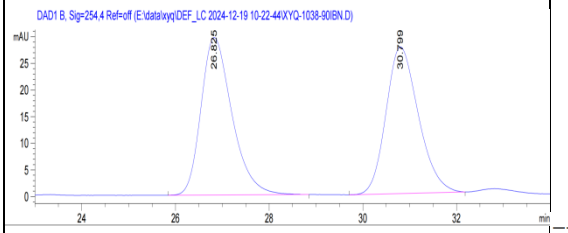
Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	28.165	BB	0.7071	1861.38806	38.98224	50.5533
2	32.761	BB	0.8773	1820.64441	30.99511	49.4467

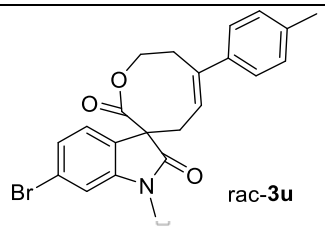




3t

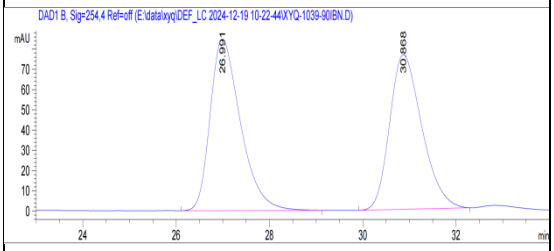
Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	28.269	BB	0.6543	458.11081	9.89147	52.8514
2	32.752	BB	0.7390	408.67957	7.25726	47.1486

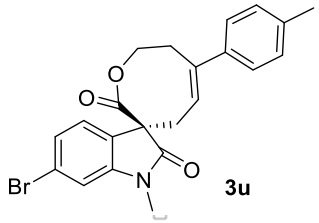




rac-**3u**

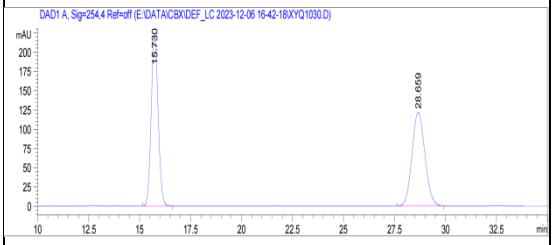
Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	26.825	BB	0.6861	1358.62317	29.56631	50.6550
2	30.799	BB	0.7111	1323.48889	27.51721	49.3450

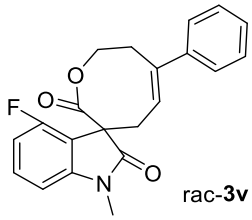




3u

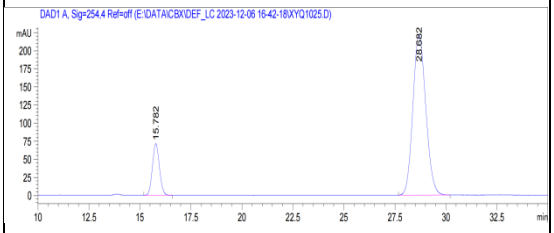
Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	26.991	BB	0.6864	3814.70898	84.54570	51.0302
2	30.868	BB	0.7354	3660.68823	76.34483	48.9698

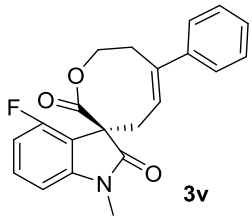




rac-**3v**

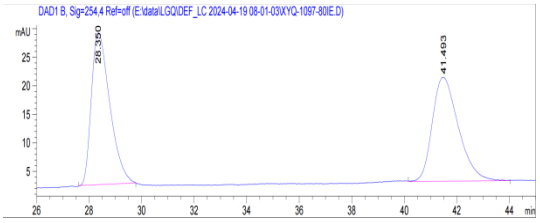
Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	15.730	BB	0.3716	5272.43359	220.01128	49.6169
2	28.659	BB	0.6866	5353.86279	121.38865	50.3831

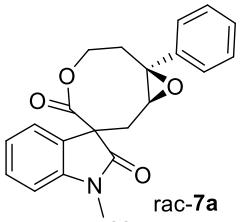




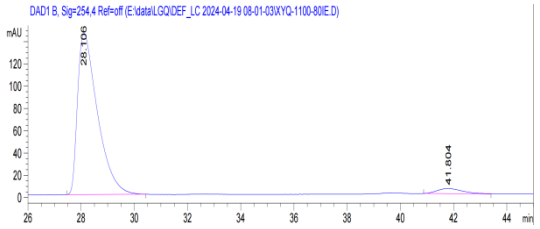
3v

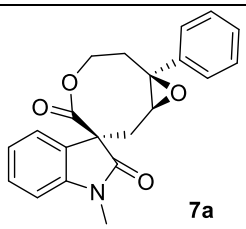
Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	15.782	BB	0.3698	1708.84583	71.26187	14.9214
2	28.682	BB	0.6800	9743.50586	221.13631	85.0786



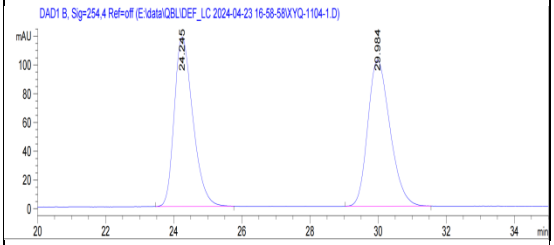


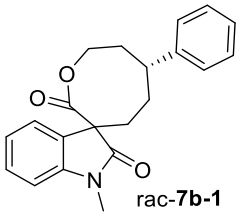
Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	28.350	MM	0.8127	1297.72986	26.61208	50.7967
2	41.493	MM	1.1512	1257.02136	18.19948	49.2033



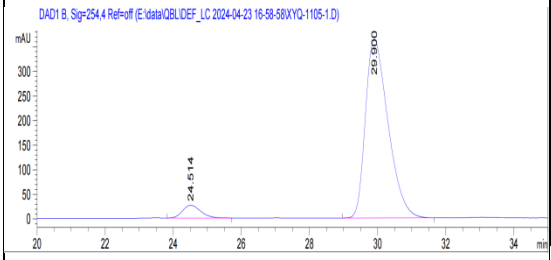


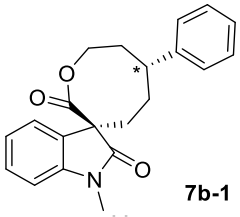
Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	28.106	BB	0.7686	7512.74756	144.49339	96.1930
2	41.804	MM	1.0980	297.32849	4.51333	3.8070



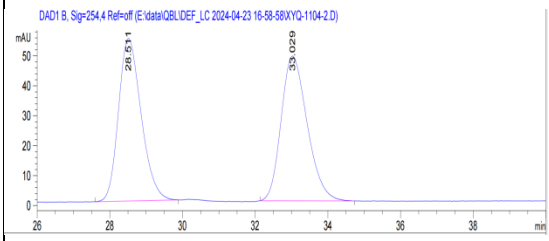


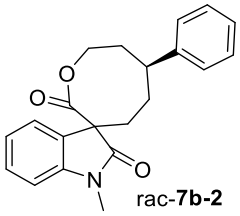
Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	24.245	BB	0.5854	4454.48047	117.73430	49.2096
2	29.984	BB	0.6921	4597.57861	101.56622	50.7904





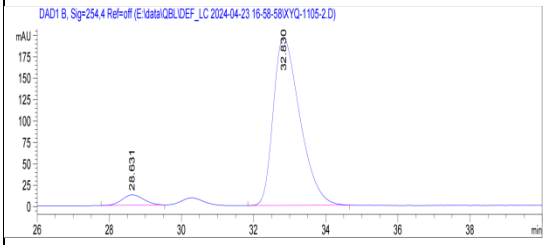
Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	24.514	BB	0.5254	961.05157	26.11386	5.4242
2	29.900	BB	0.7061	1.67568e4	363.31406	94.5758

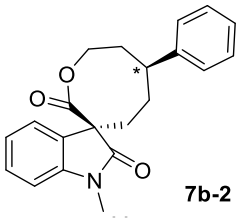




rac-**7b-2**

Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	28.511	BB	0.6386	2347.44360	54.27357	49.3954
2	33.029	BB	0.6984	2404.90479	48.34358	50.6046





7b-2

Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	28.631	BB	0.5100	500.90247	12.12512	4.7528
2	32.830	BB	0.7605	1.00383e4	196.34486	95.2472