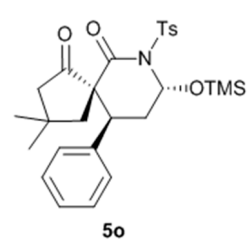
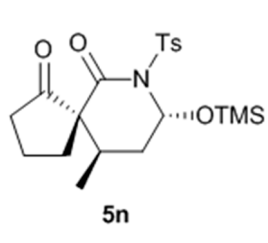
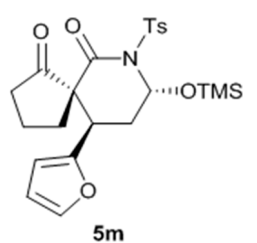
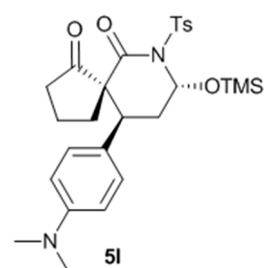
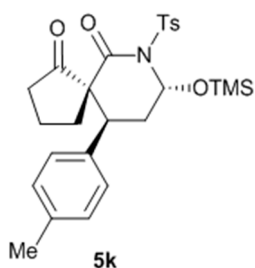
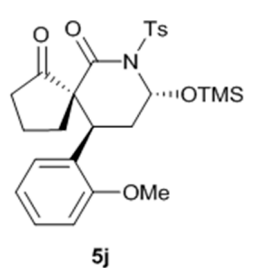
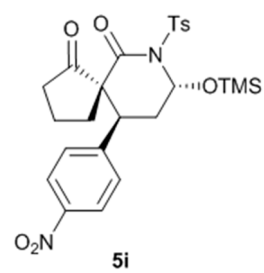
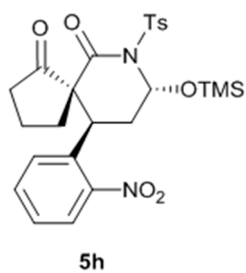
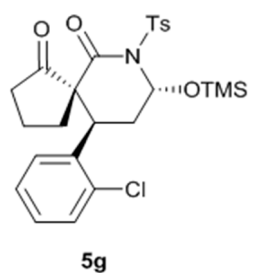
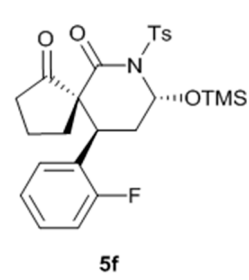
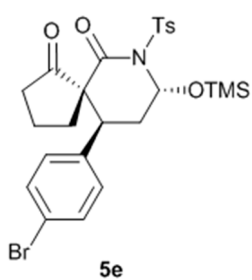
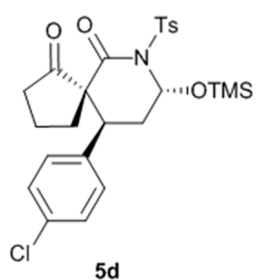
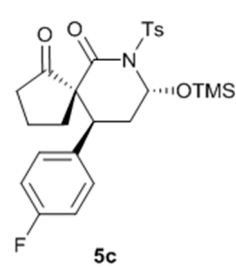
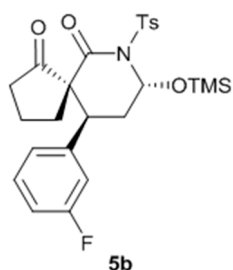
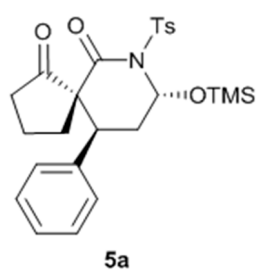


# Supplementary Materials: One-Pot Two-Step Organocatalytic Asymmetric Synthesis of Spirocyclic Piperidones via Wolff Rearrangement–Amidation–Michael–Hemiaminalization Sequence

Yanqing Liu, Liang Ouyang, Ying Tan, Xue Tang, Jingwen Kang, Chunting Wang, Yaning Zhu, Cheng Peng and Wei Huang



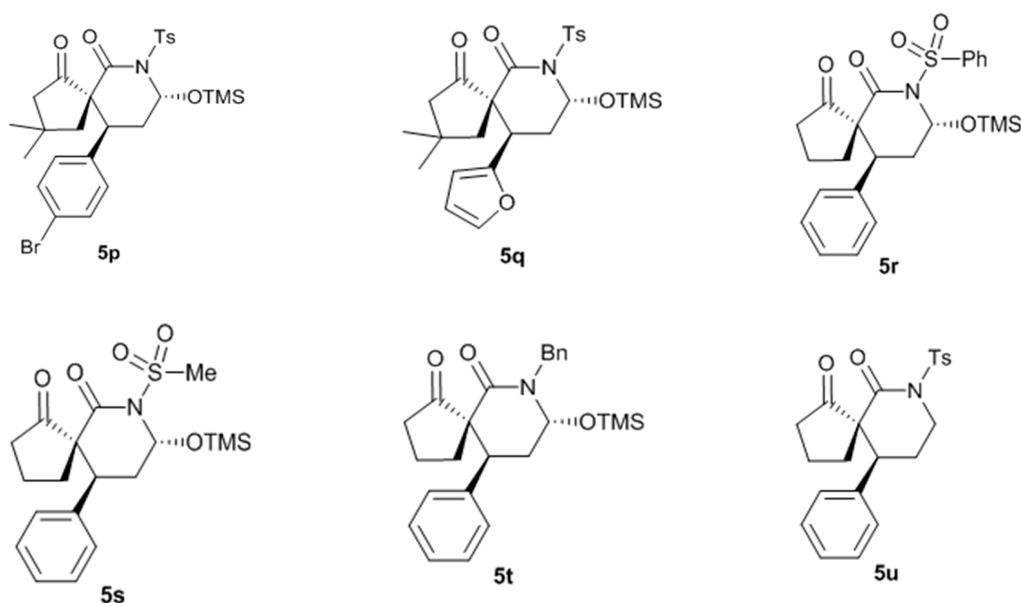


Figure S1. Structure of compounds 5a–5u.

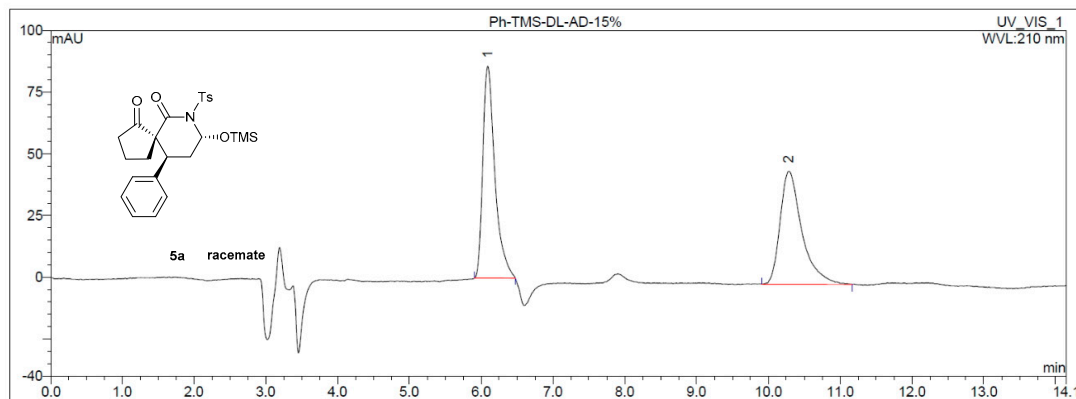
### Crystal Data of 5m

Empirical formula:  $C_{23}H_{29}NO_6SSi$ ; Formula weight: 475.62; Temperature: 296 K; Wavelength: 0.71073 Å; Crystal system: Orthorhombic; Space group: P 21 21 2; Unit cell dimensions:  $a = 11.1118$  Å;  $a = 90^\circ$ ;  $b = 21.4220$  Å;  $b = 90^\circ$ ;  $c = 10.2188$  Å;  $g = 90^\circ$ ; Volume: 2432.5 Å<sup>3</sup>; Z: 4; Density (calculated): 1.299 mg/m<sup>3</sup>; Absorption coefficient: 0.220 mm<sup>-1</sup>;  $F(000)$ : 1008; Crystal size: 0.407 × 0.198 × 0.155 mm<sup>3</sup>; Theta range for data collection: 3.310° to 27.535°; Index ranges:  $-14 \leq h \leq 14$ ,  $-27 \leq k \leq 27$ ,  $-13 \leq l \leq 13$ ; Reflections collected: 50,554; Independent reflections: 5596 [ $R(\text{int}) = 0.0574$ ]; Completeness to theta = 25.242°: 99.7%; Absorption correction: Semi-empirical from equivalents; Max. and min. transmission: 0.966 and 0.914; Refinement method: Full-matrix least-squares on  $F^2$ ; Data/restraints/parameters: 5596/24/293; Goodness-of-fit on  $F^2$ : 1.022; Final  $R$  indices [ $I > 2\sigma(I)$ ]:  $R1 = 0.0445$ ,  $wR2 = 0.0704$ ;  $R$  indices (all data):  $R1 = 0.0744$ ,  $wR2 = 0.0788$ ; Absolute structure parameter: 0.00; Extinction coefficient:  $n/a$ ; Largest diff. peak and hole: 0.198 and  $-0.222$  e<sup>-</sup>Å<sup>-3</sup>.

## HPLC Chromatograms and NMR Spectra

## Peak Analysis Report

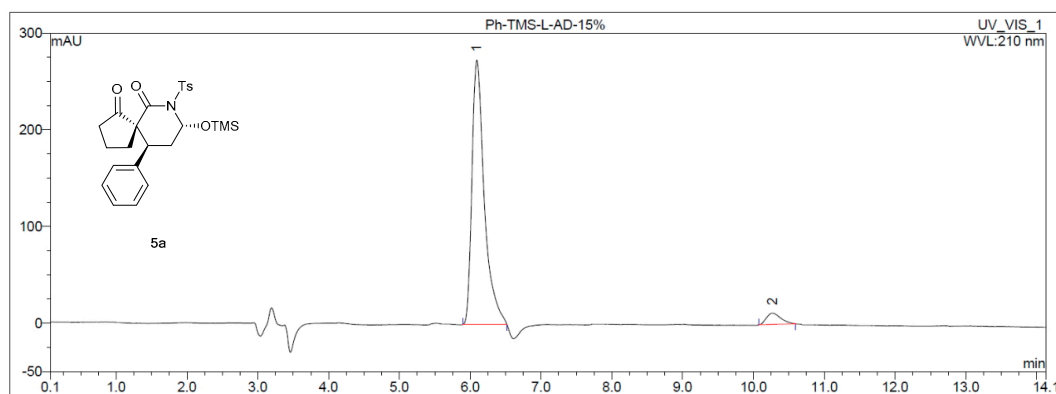
No.	Peak Name	Ret.Time (detected) min	Area mAU*min	Rel.Area %	Height mAU	Amount
1	n.a.	6.09	16.738	50.88	85.814	n.a.
2	n.a.	10.28	16.157	49.12	45.841	n.a.



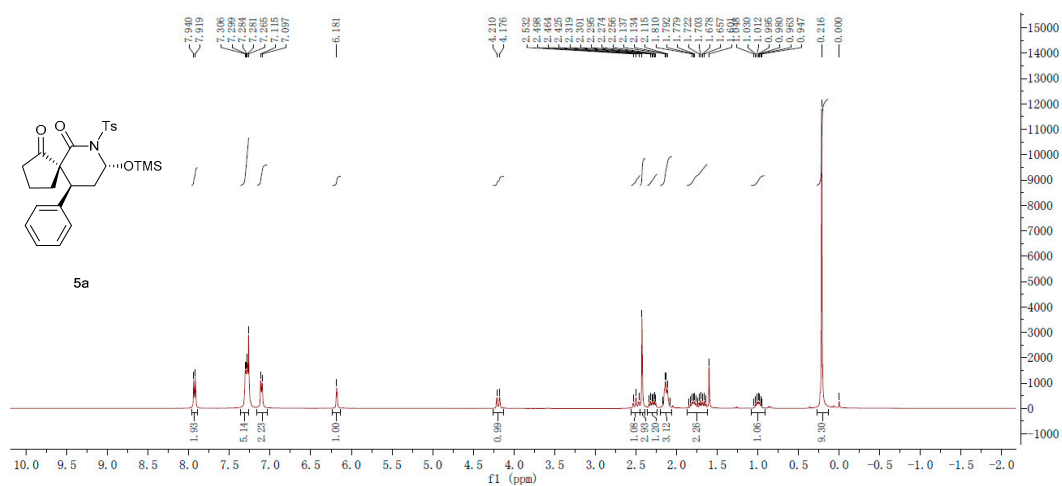
(a)

## Peak Analysis Report

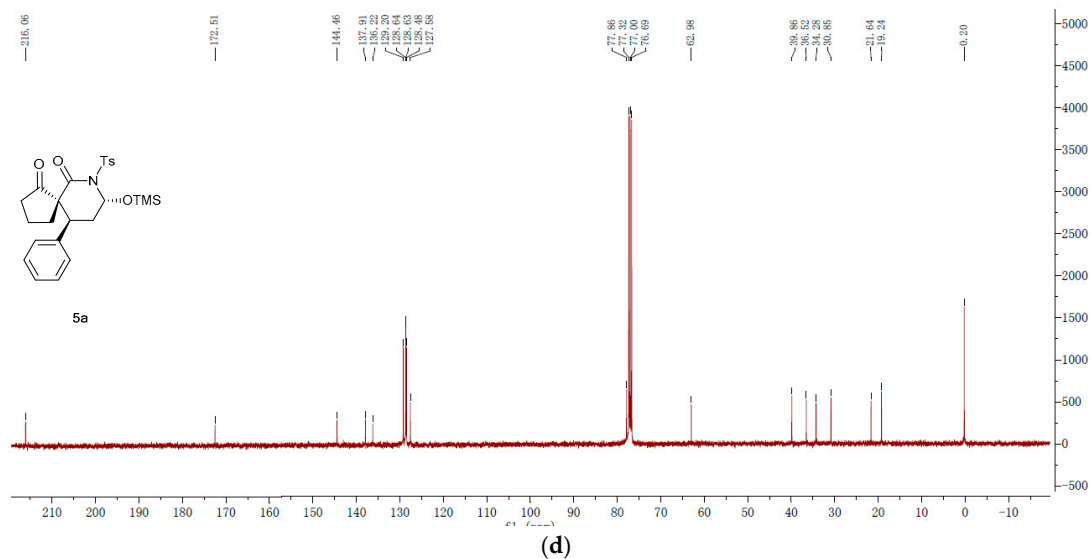
No.	Peak Name	Ret.Time (detected) min	Area mAU*min	Rel.Area %	Height mAU	Amount
1	n.a.	6.09	55.283	95.10	273.460	n.a.
2	n.a.	10.29	2.848	4.90	11.898	n.a.



(b)



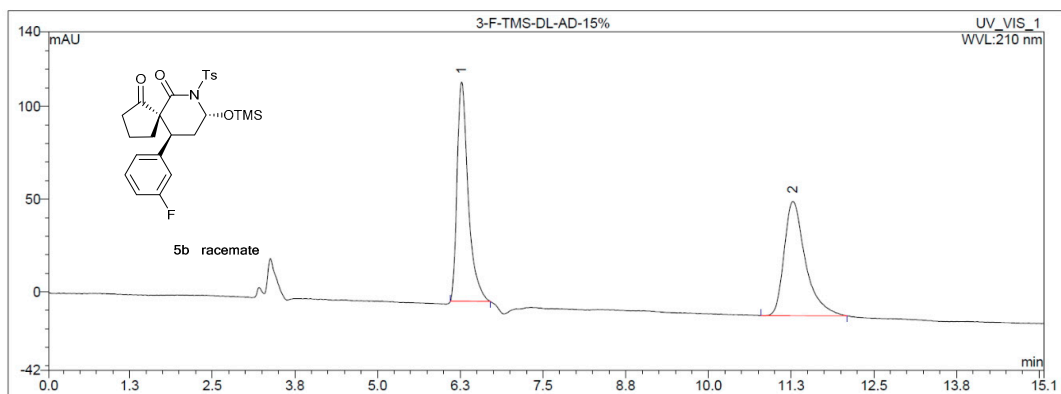
(c)



**Figure S2.** (a) HPLC chromatogram of racemic **5a**; (b) HPLC chromatogram of chiral **5a**; (c) <sup>1</sup>H-NMR spectrum (CDCl<sub>3</sub>, 400 MHz) of **5a**; (d) <sup>13</sup>C-NMR spectrum (CDCl<sub>3</sub>, 100 MHz) of **5a**.

#### Peak Analysis Report

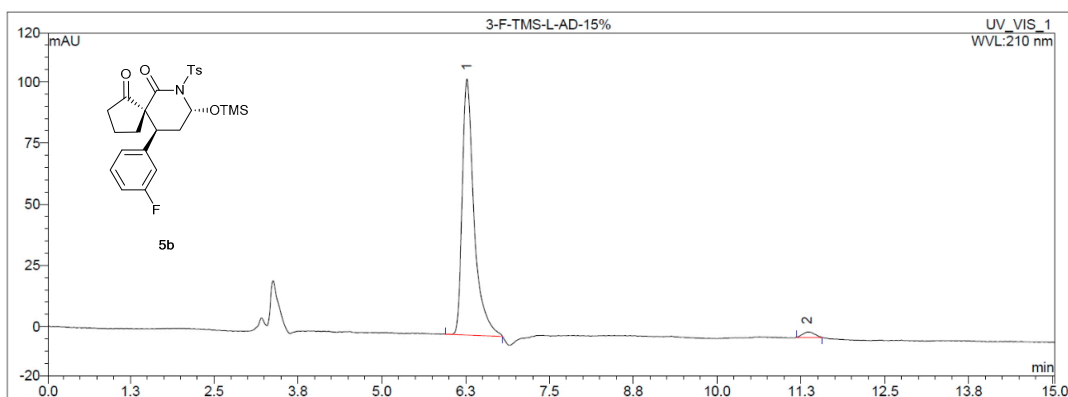
No.	Peak Name	Ret.Time (detected)	Area	Rel.Area	Height	Amount
		min	mAU*min	%	mAU	
1	n.a.	6.27	23.019	50.01	118.203	n.a.
2	n.a.	11.28	23.012	49.99	61.651	n.a.



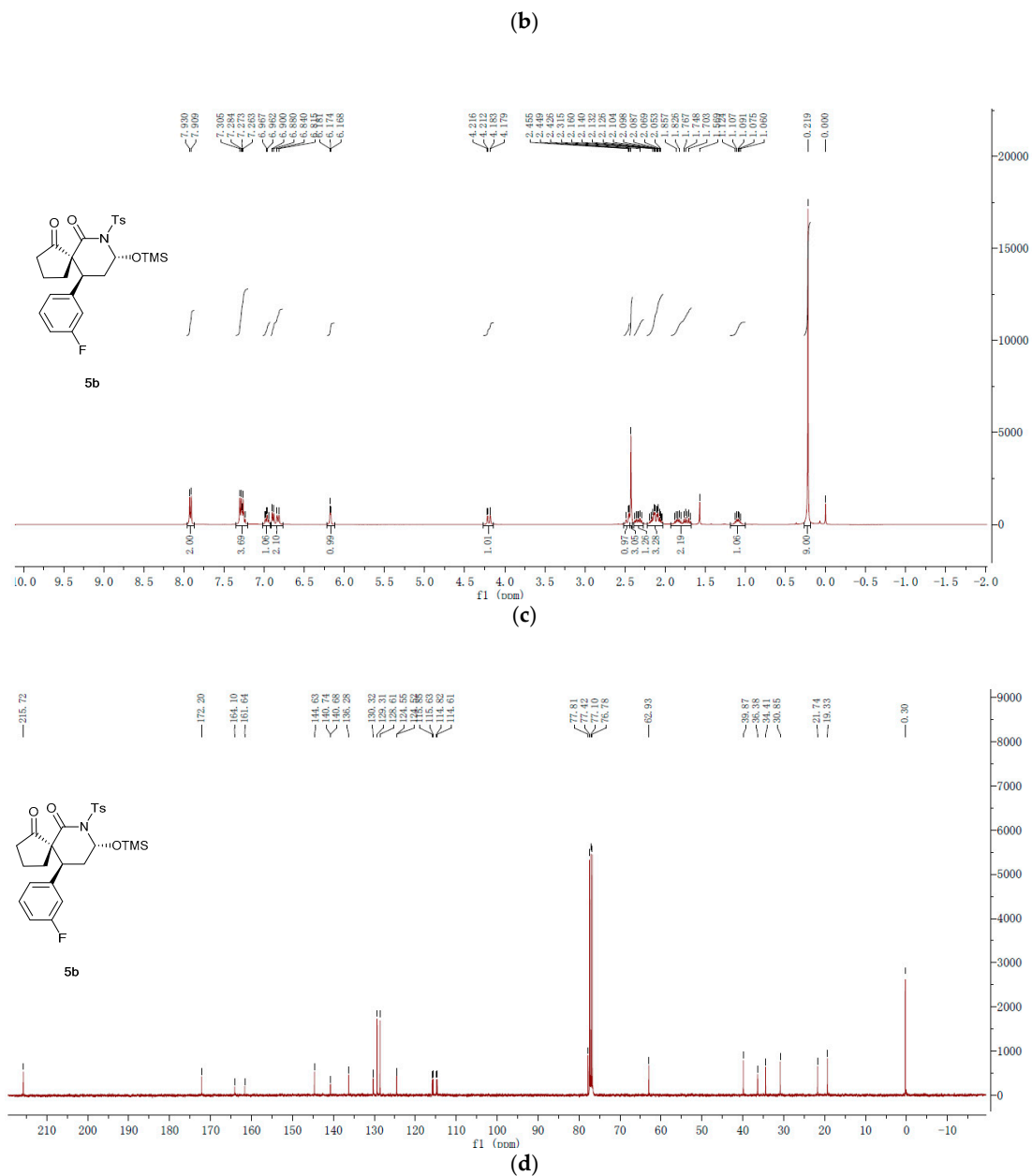
(a)

#### Peak Analysis Report

No.	Peak Name	Ret.Time (detected)	Area	Rel.Area	Height	Amount
		min	mAU*min	%	mAU	
1	n.a.	6.27	21.484	96.45	104.673	n.a.
2	n.a.	11.28	0.791	3.55	5.056	n.a.

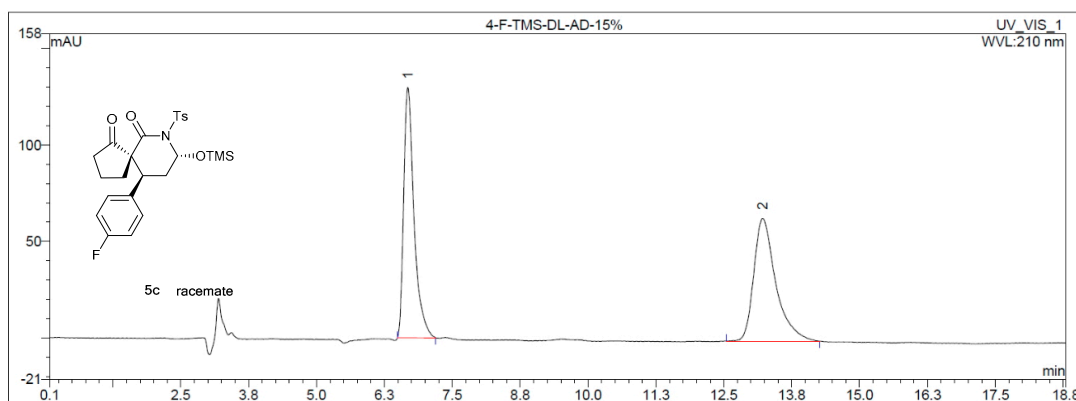






## Peak Analysis Report

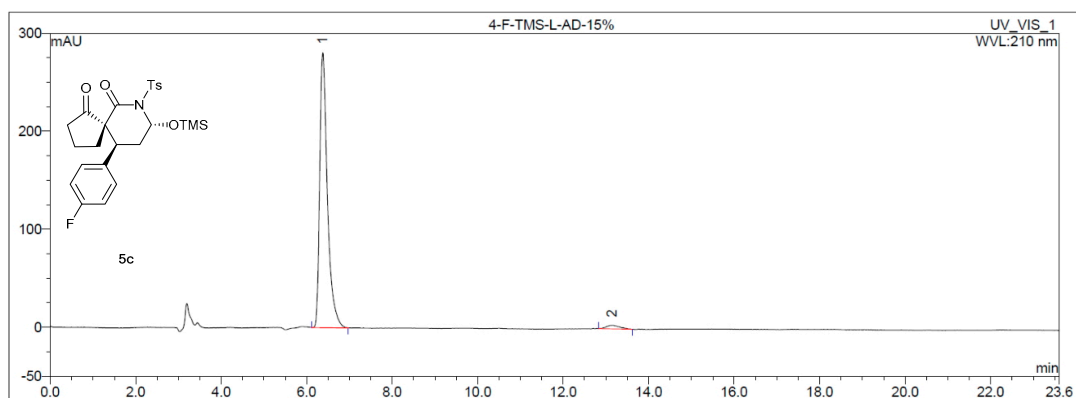
No.	Peak Name	Ret.Time (detected) min	Area mAU*min	Rel.Area %	Height mAU	Amount
1	n.a.	6.68	28.483	48.79	129.763	n.a.
2	n.a.	13.22	29.896	51.21	63.692	n.a.



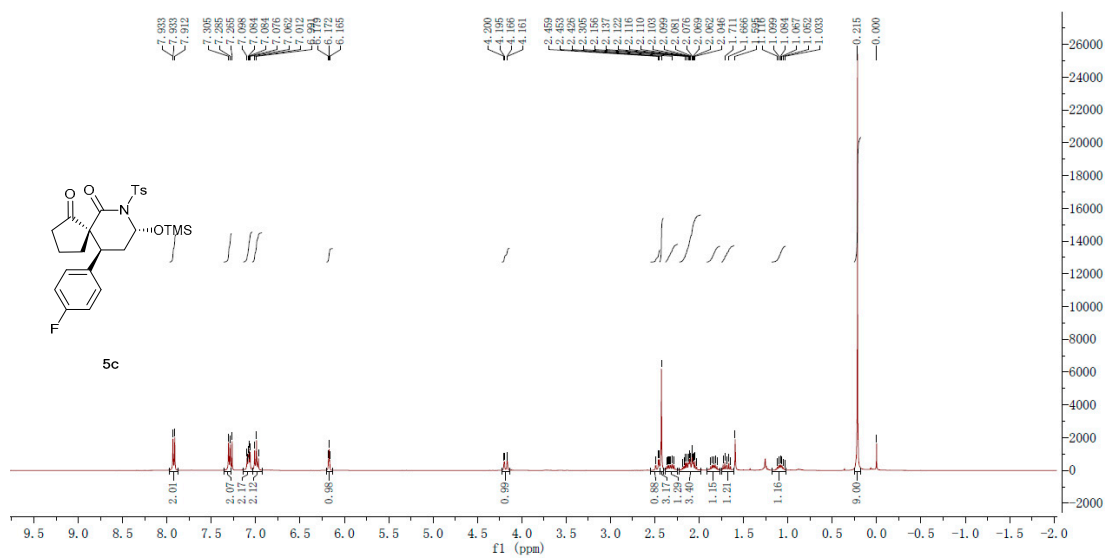
(a)

## Peak Analysis Report

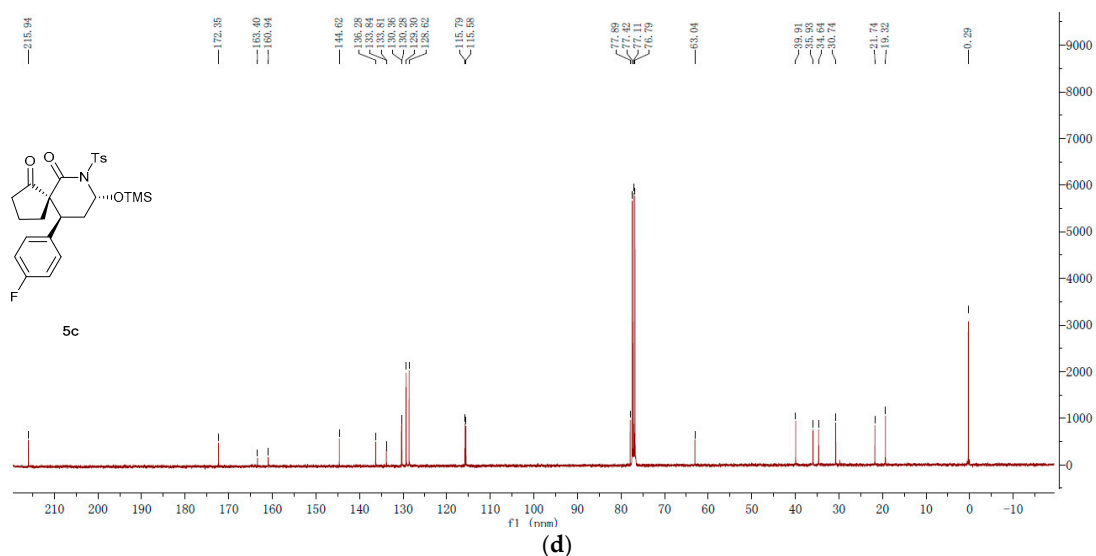
No.	Peak Name	Ret.Time (detected) min	Area mAU*min	Rel.Area %	Height mAU	Amount
1	n.a.	6.38	58.862	96.80	280.651	n.a.
2	n.a.	13.19	1.945	3.20	9.019	n.a.



(b)



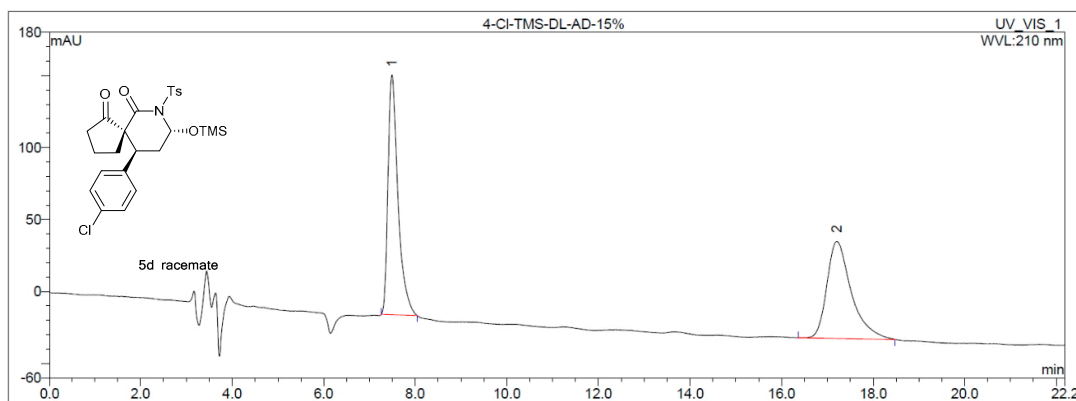
(c)



**Figure S4.** (a) HPLC chromatogram of racemic **5c**; (b) HPLC chromatogram of chiral **5c**; (c)  $^1\text{H-NMR}$  spectrum ( $\text{CDCl}_3$ , 400 MHz) of **5c**; (d)  $^{13}\text{C-NMR}$  spectrum ( $\text{CDCl}_3$ , 100 MHz) of **5c**.

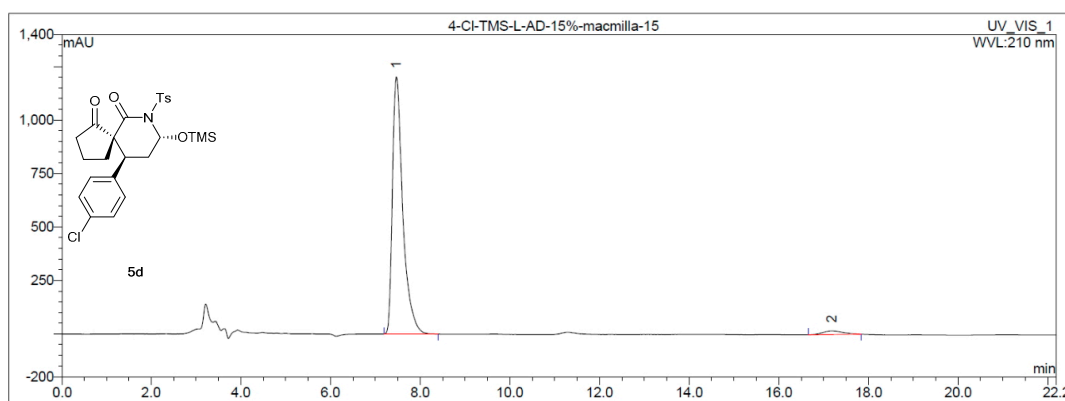
#### Peak Analysis Report

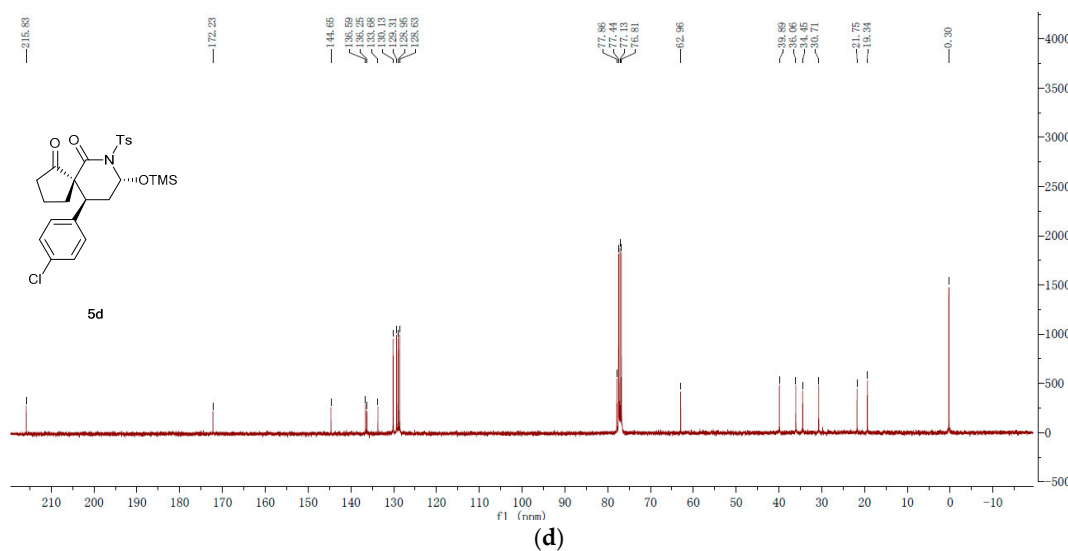
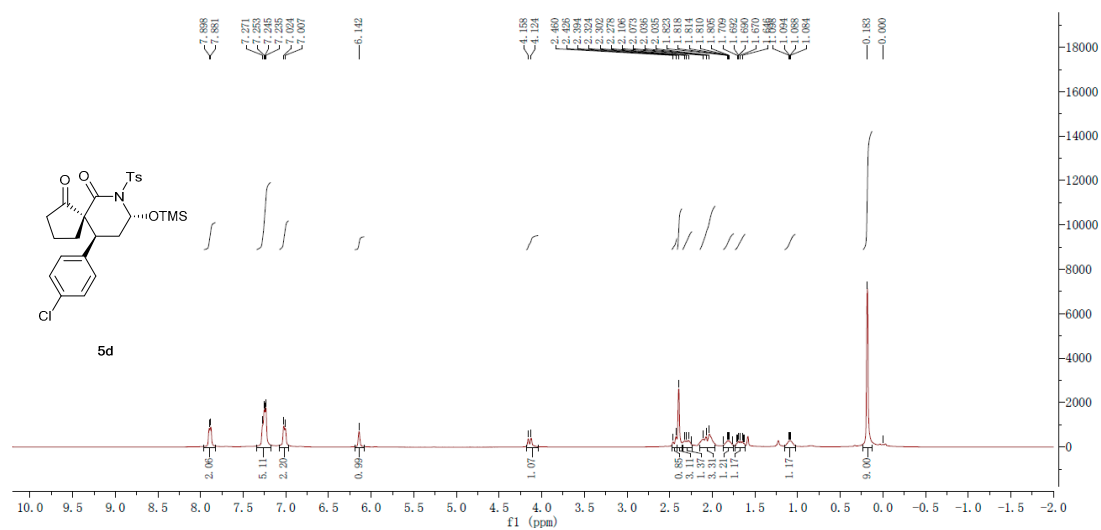
No.	Peak Name	Ret.Time (detected) min	Area mAU*min	Rel.Area %	Height mAU	Amount
1	n.a.	7.49	42.175	50.35	166.793	n.a.
2	n.a.	17.21	41.584	49.65	67.495	n.a.



#### Peak Analysis Report

No.	Peak Name	Ret.time (detected) min	Area mAU*min	Rel.Area %	Height mAU	Amount
1	n.a.	7.47	322.490	97.44	1201.652	n.a.
2	n.a.	17.18	8.461	2.56	16.325	n.a.

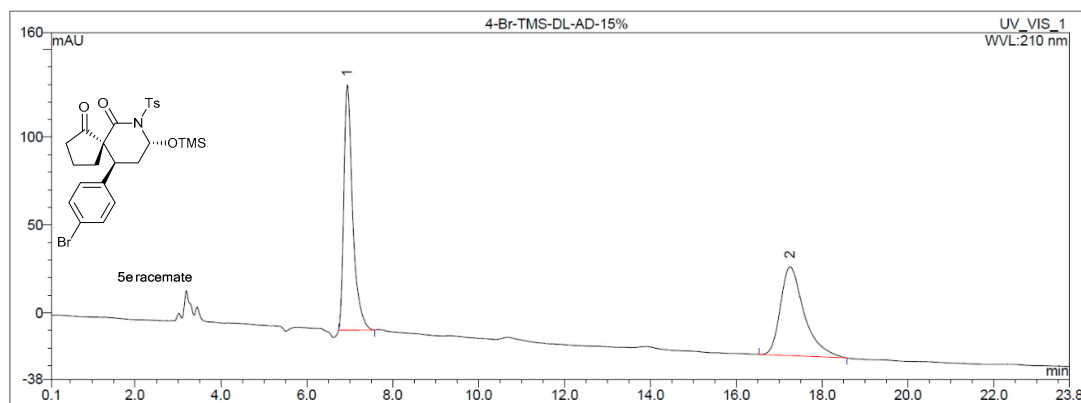




**Figure S5.** (a) HPLC chromatogram of racemic **5d**; (b) HPLC chromatogram of chiral **5d**; (c)  $^1\text{H-NMR}$  spectrum ( $\text{CDCl}_3$ , 400 MHz) of **5d**; (d)  $^{13}\text{C-NMR}$  spectrum ( $\text{CDCl}_3$ , 100 MHz) of **5d**.

#### Peak Analysis Report

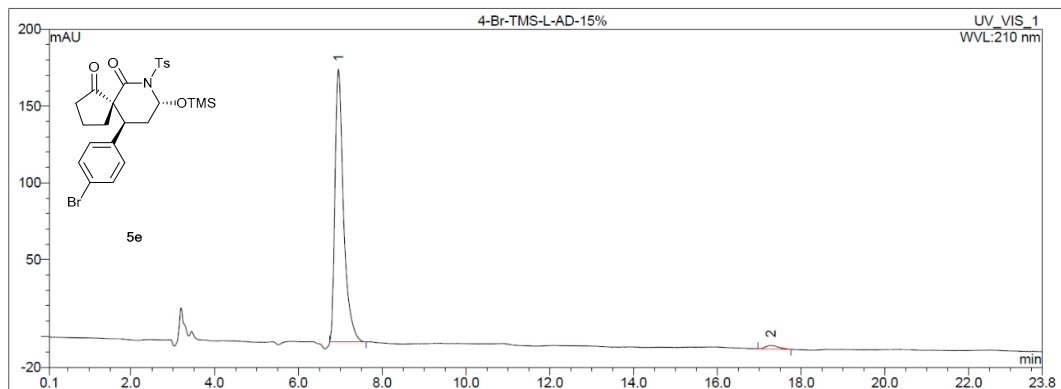
No.	Peak Name	Ret.Time (detected) min	Area mAU*min	Rel.Area %	Height mAU	Amount
1	n.a.	6.94	33.165	50.59	139.214	n.a.
2	n.a.	17.25	32.386	49.41	50.620	n.a.



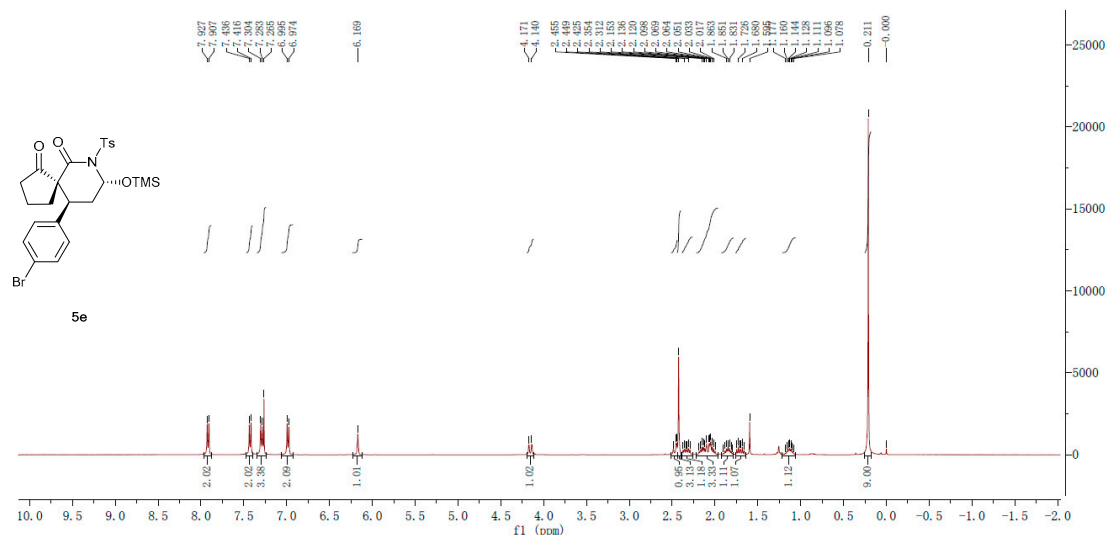
(a)

## Peak Analysis Report

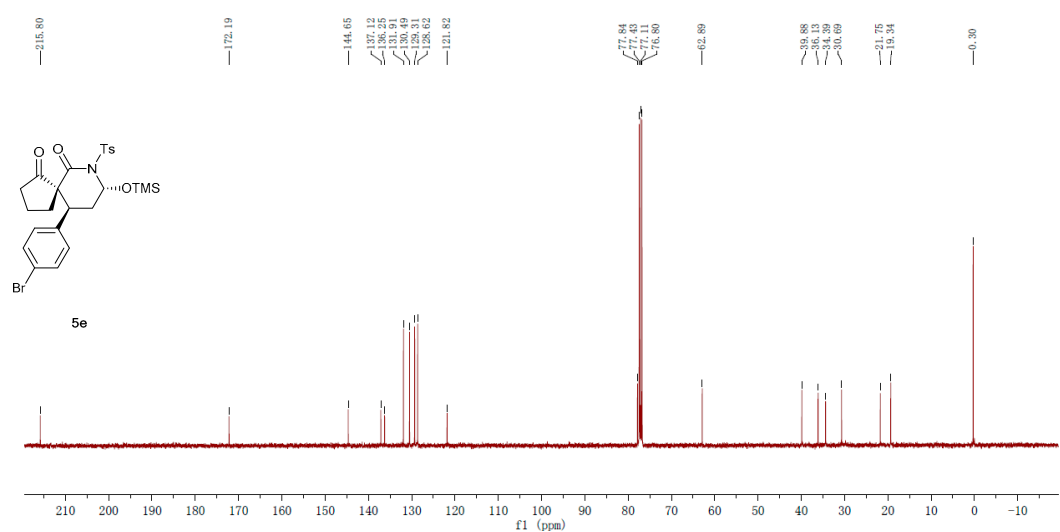
No.	Peak Name	Ret.Time (detected) min	Area mAU*min	Rel.Area %	Height mAU	Amount
1	n.a.	6.96	42.207	98.08	177.584	n.a.
2	n.a.	17.26	0.825	1.92	2.253	n.a.



(b)



(c)

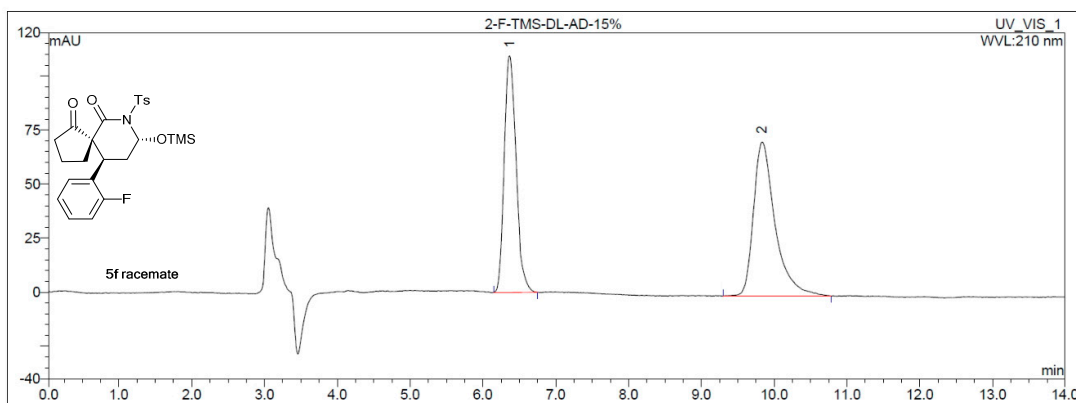


(d)

**Figure S6.** (a) HPLC chromatogram of racemic **5e**; (b) HPLC chromatogram of chiral **5e**; (c)  $^1\text{H-NMR}$  spectrum ( $\text{CDCl}_3$ , 400 MHz) of **5e**; (d)  $^{13}\text{C-NMR}$  spectrum ( $\text{CDCl}_3$ , 100 MHz) of **5e**.

### Peak Analysis Report

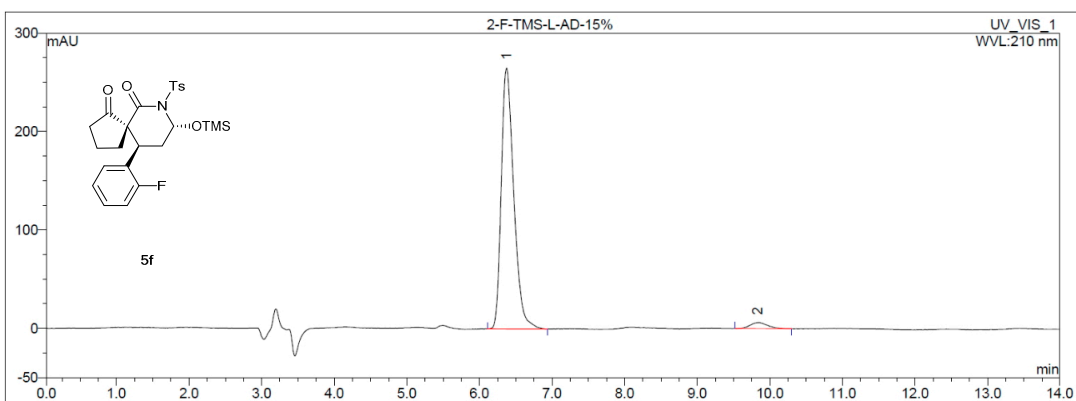
No.	Peak Name	Ret.Time (detected) min	Area mAU*min	Rel.Area %	Height mAU	Amount
1	n.a.	6.37	24.922	50.38	122.367	n.a.
2	n.a.	9.83	24.543	49.62	71.175	n.a.



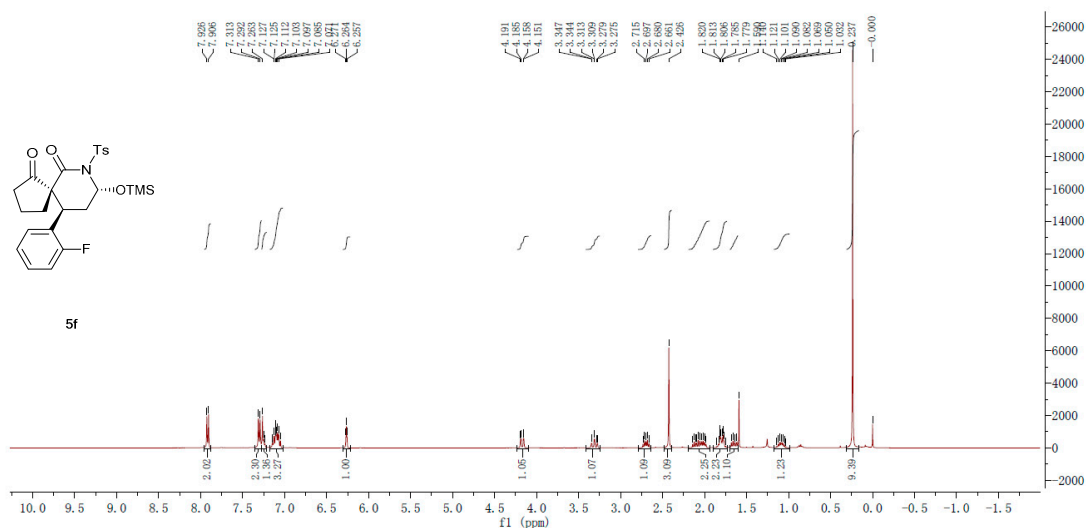
(a)

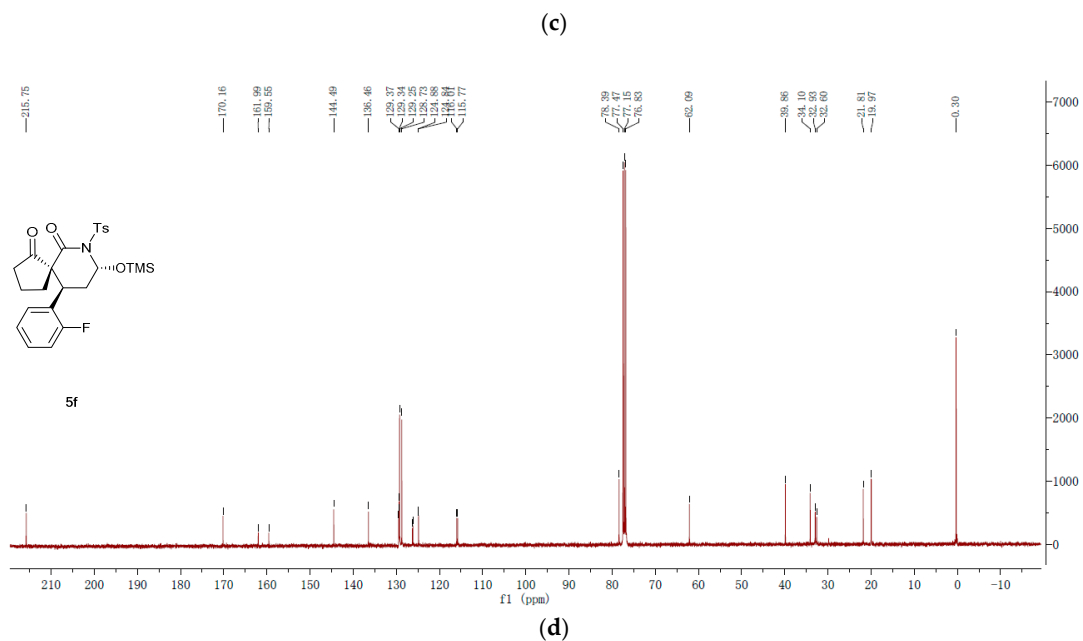
### Peak Analysis Report

No.	Peak Name	Ret.Time (detected) min	Area mAU*min	Rel.Area %	Height mAU	Amount
1	n.a.	6.38	52.956	96.90	265.076	n.a.
2	n.a.	9.83	1.695	3.10	6.025	n.a.



(b)

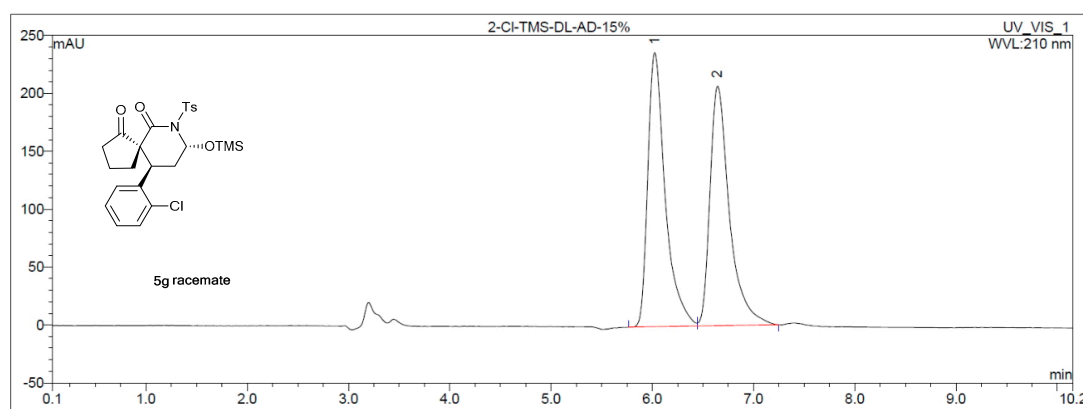




**Figure S7.** (a) HPLC chromatogram of racemic **5f**; (b) HPLC chromatogram of chiral **5f**; (c) <sup>1</sup>H-NMR spectrum (CDCl<sub>3</sub>, 400 MHz) of **5f**; (d) <sup>13</sup>C-NMR spectrum (CDCl<sub>3</sub>, 100 MHz) of **5f**.

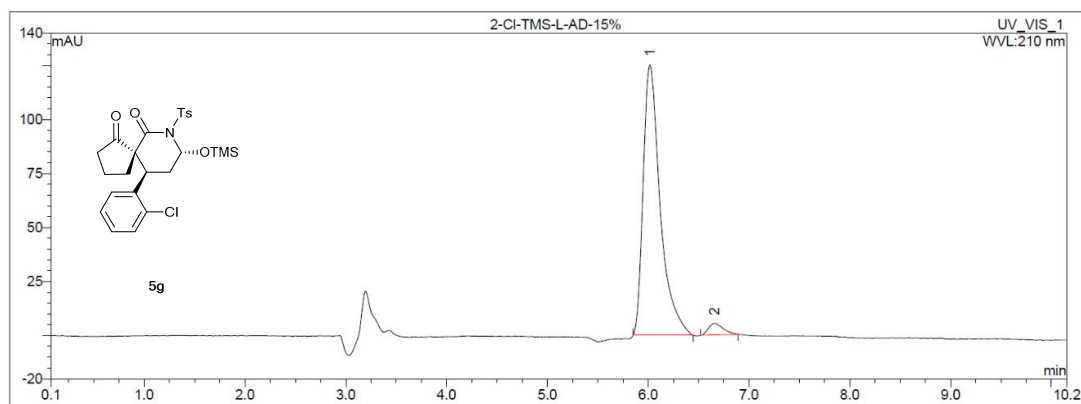
#### Peak Analysis Report

No.	Peak Name	Ret.Time (detected) min	Area mAU*min	Rel.Area %	Height mAU	Amount
1	n.a.	6.03	47.205	50.62	236.847	n.a.
2	n.a.	6.64	46.044	49.38	206.802	n.a.

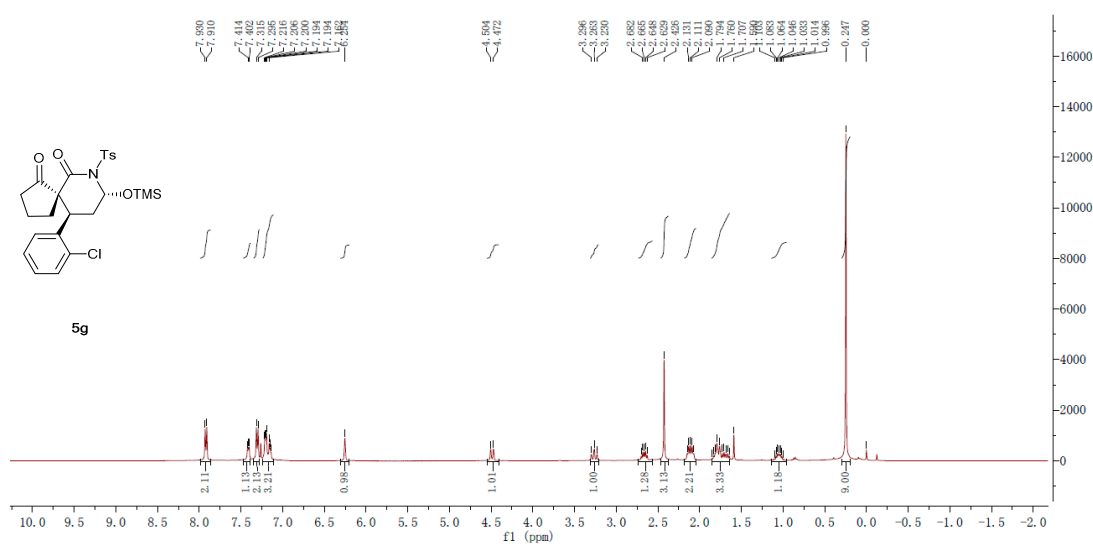


## Peak Analysis Report

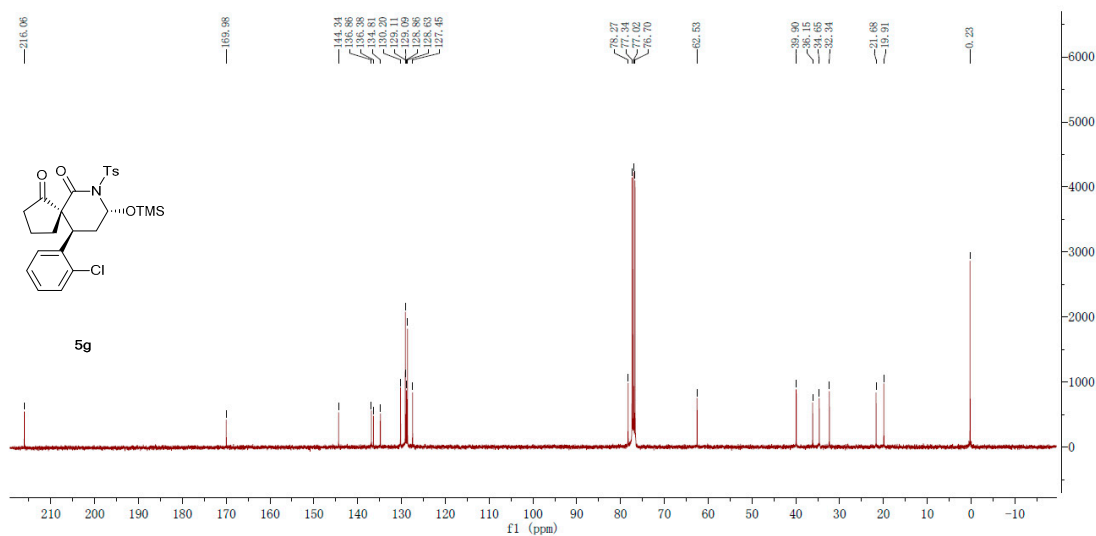
No.	Peak Name	Ret.Time (detected) min	Area mAU*min	Rel.Area %	Height mAU	Amount
1	n.a.	6.02	24.451	95.49	125.077	n.a.
2	n.a.	6.63	1.154	4.51	7.587	n.a.



(b)



(c)



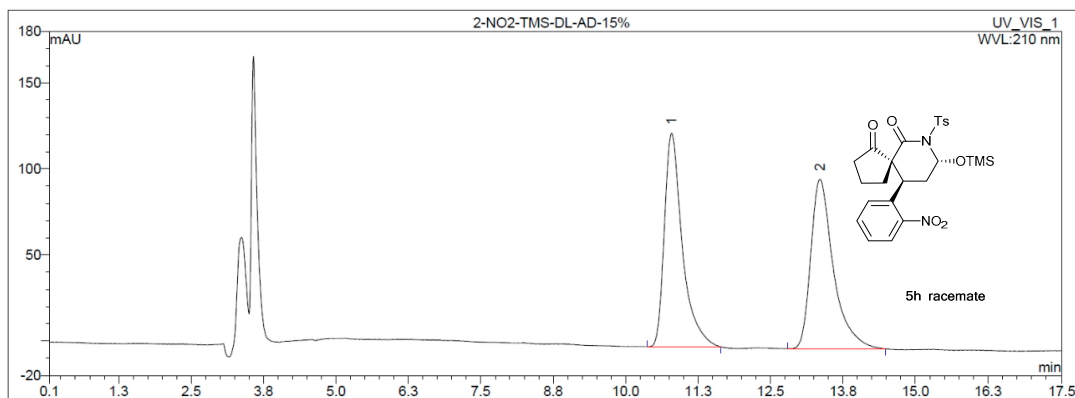
(d)

**Figure S8.** (a) HPLC chromatogram of racemic **5g**; (b) HPLC chromatogram of chiral **5g**; (c)  $^1\text{H-NMR}$  spectrum ( $\text{CDCl}_3$ , 400 MHz) of **5g**; (d)  $^{13}\text{C-NMR}$  spectrum ( $\text{CDCl}_3$ , 100 MHz) of **5g**.



## Peak Analysis Report

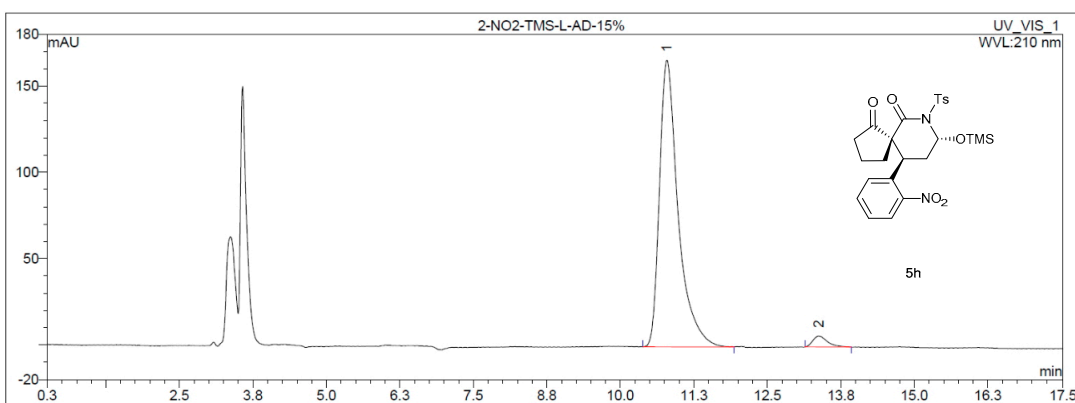
No.	Peak Name	Ret.Time (detected) min	Area mAU*min	Rel.Area %	Height mAU	Amount
1	n.a.	10.79	44.627	49.98	124.083	n.a.
2	n.a.	13.36	44.661	50.02	98.507	n.a.



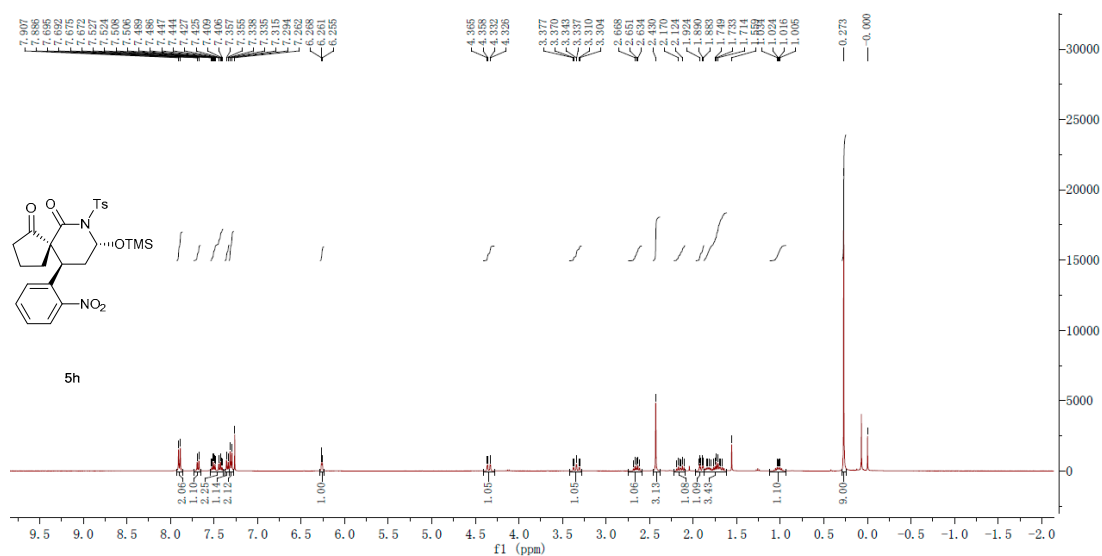
(a)

## Peak Analysis Report

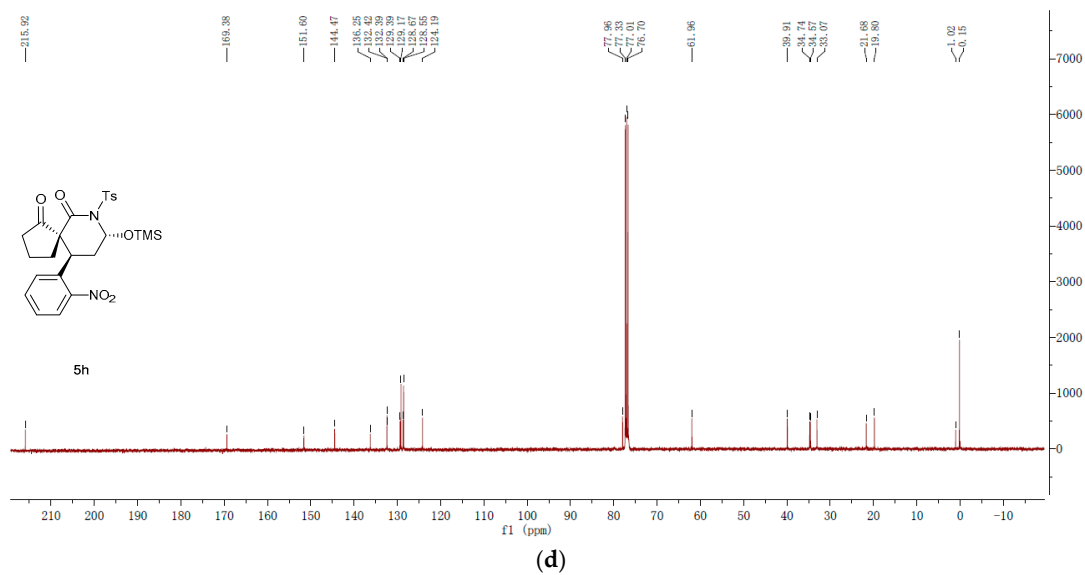
No.	Peak Name	Ret.Time (detected) min	Area mAU*min	Rel.Area %	Height mAU	Amount
1	n.a.	10.79	61.185	96.36	166.004	n.a.
2	n.a.	13.35	2.311	3.64	19.339	n.a.



(b)



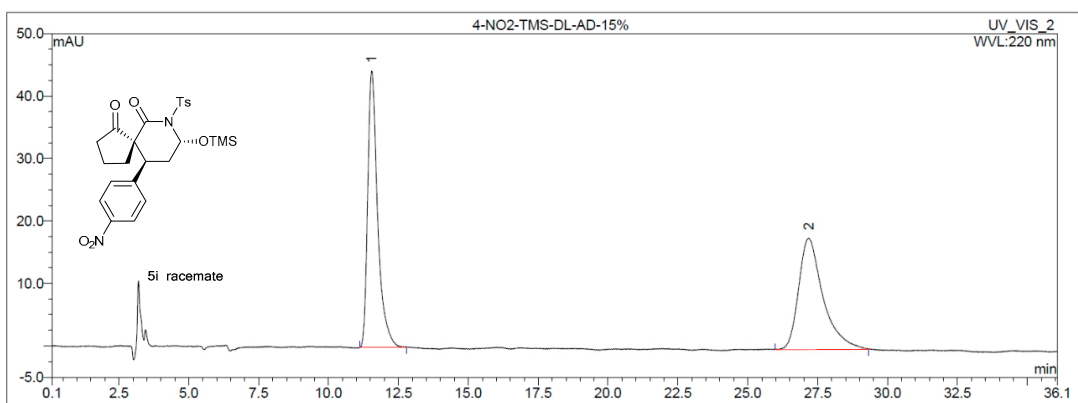
(c)



**Figure S9.** (a) HPLC chromatogram of racemic **5h**; (b) HPLC chromatogram of chiral **5h**; (c)  $^1\text{H-NMR}$  spectrum ( $\text{CDCl}_3$ , 400 MHz) of **5h**; (d)  $^{13}\text{C-NMR}$  spectrum ( $\text{CDCl}_3$ , 100 MHz) of **5h**.

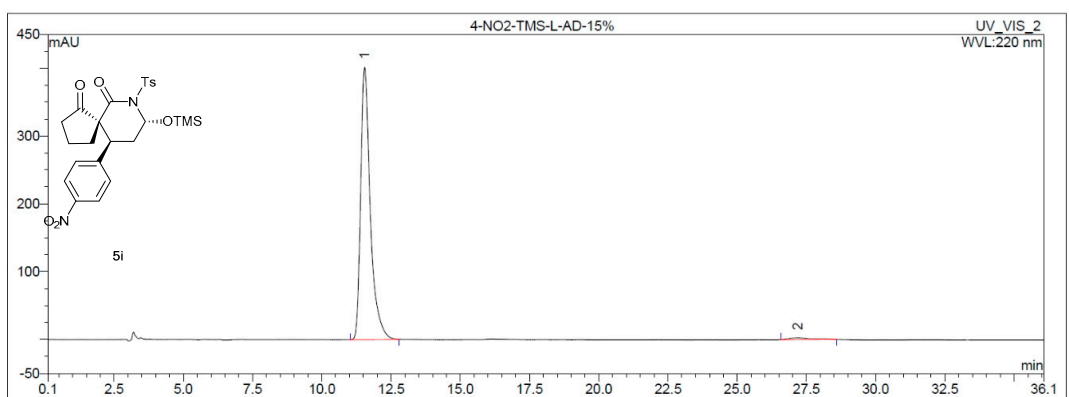
#### Peak Analysis Report

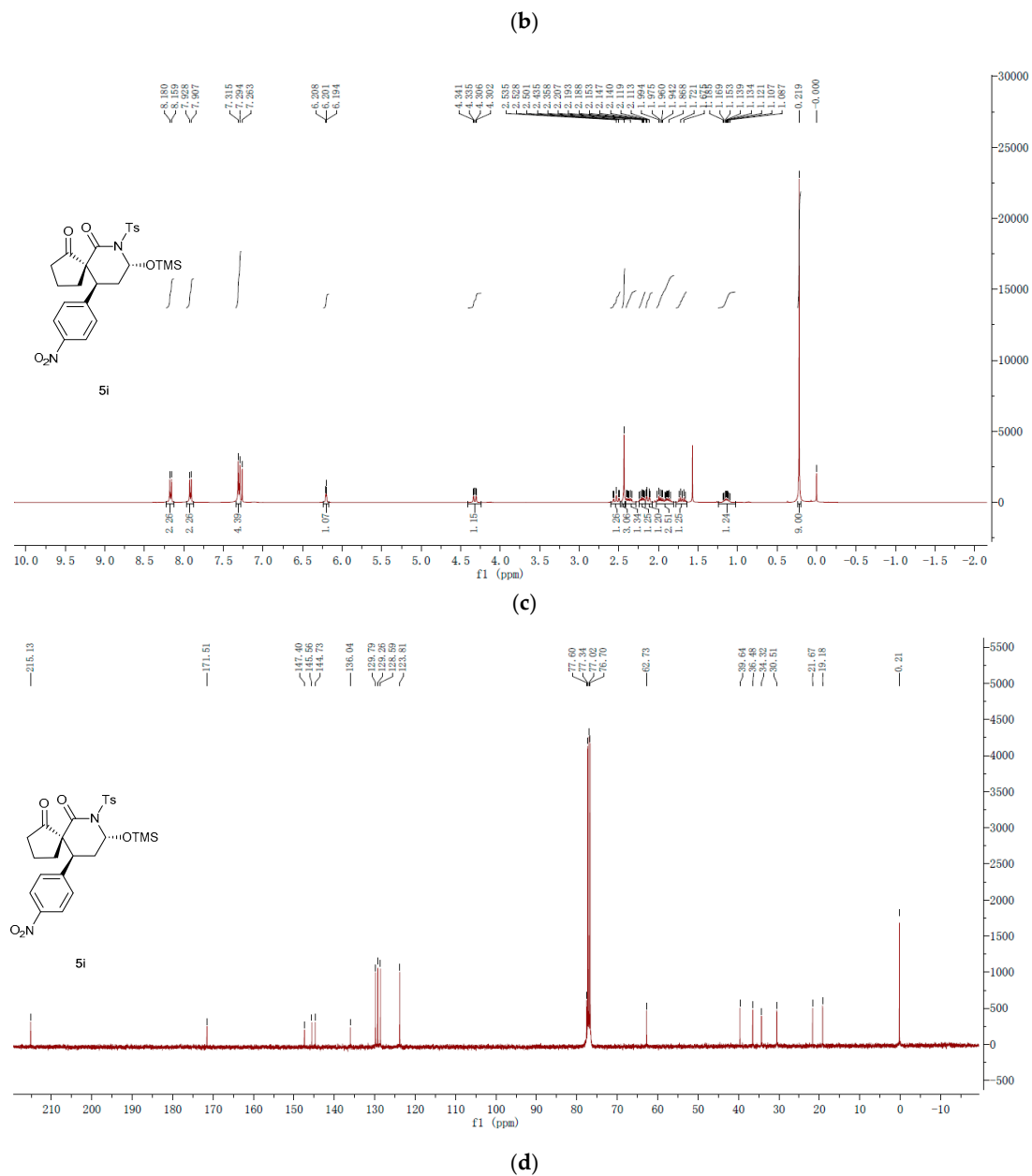
No.	Peak Name	Ret.Time (detected) min	Area mAU*min	Rel.Area %	Height mAU	Amount
1	n.a.	11.54	18.236	50.28	44.241	n.a.
2	n.a.	27.19	18.030	49.72	17.854	n.a.



#### Peak Analysis Report

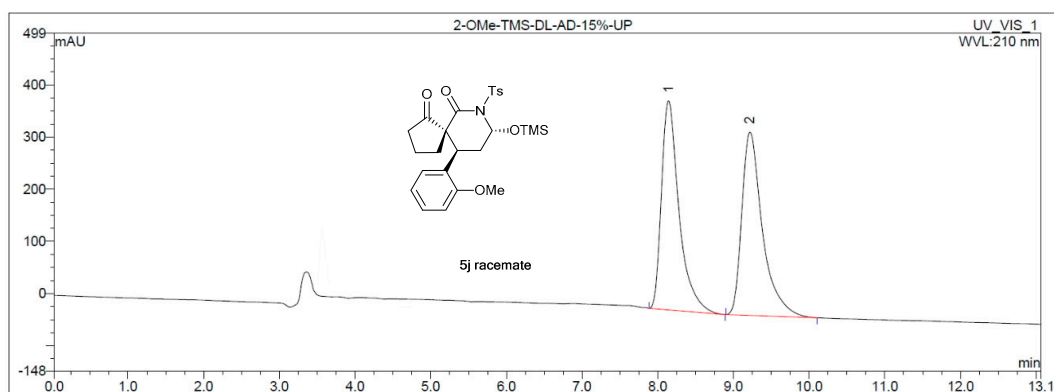
No.	Peak Name	Ret.Time (detected) min	Area mAU*min	Rel.Area %	Height mAU	Amount
1	n.a.	11.54	162.221	98.65	401.441	n.a.
2	n.a.	27.19	2.219	1.35	2.447	n.a.





## Peak Analysis Report

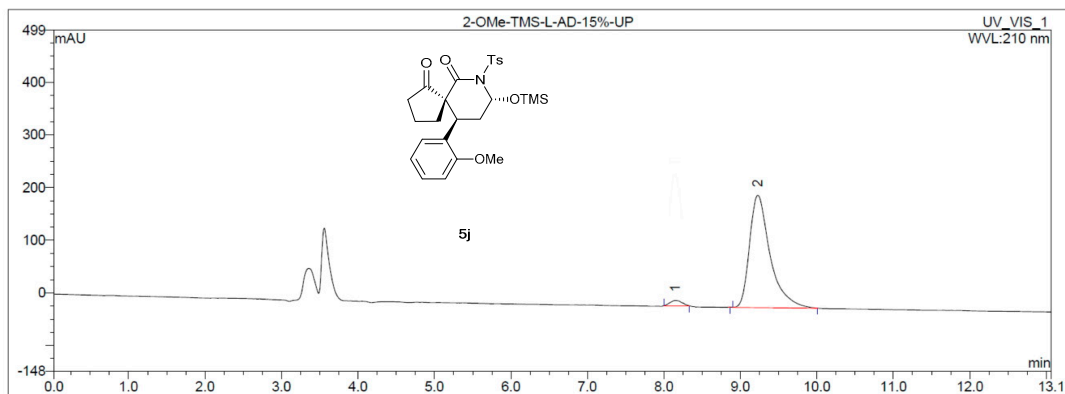
No.	Peak Name	Ret.Time (detected)	Area	Rel.Area	Height	Amount
		min	mAU*min	%	mAU	
1	n.a.	8.14	107.521	49.25	401.190	n.a.
2	n.a.	9.22	110.799	50.75	351.608	n.a.



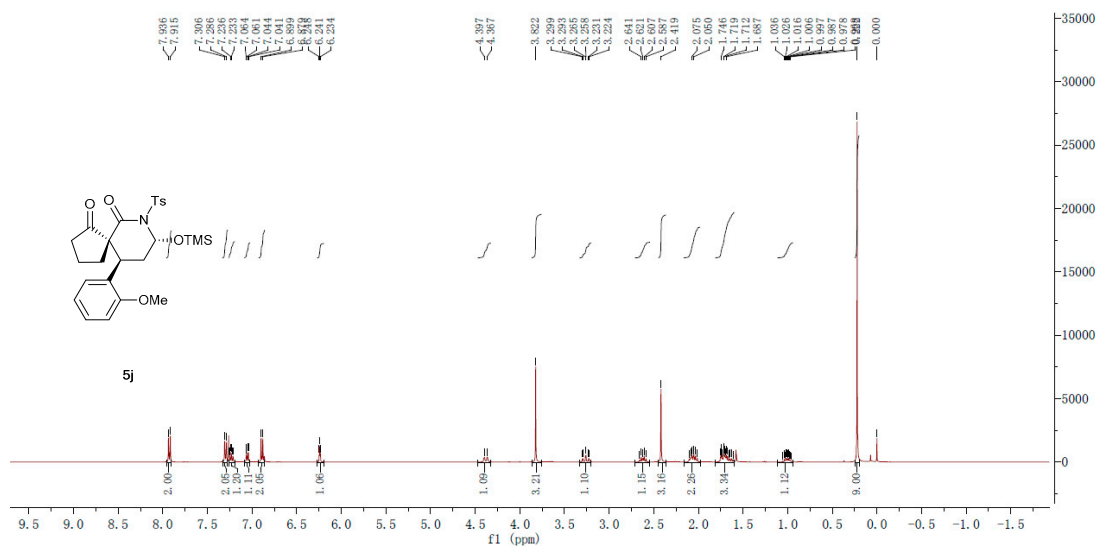
(a)

## Peak Analysis Report

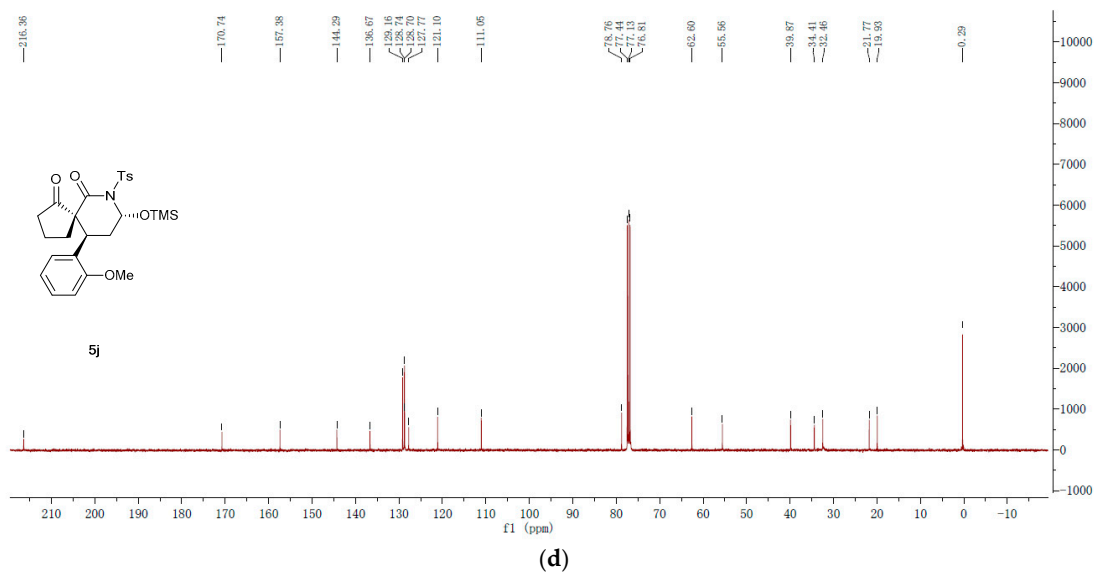
No.	Peak Name	Ret.Time (detected)	Area	Rel.Area	Height	Amount
		min	mAU*min	%	mAU	
1	n.a.	8.14	3.277	4.69	32.787	n.a.
2	n.a.	9.23	66.523	95.31	213.385	n.a.



(b)



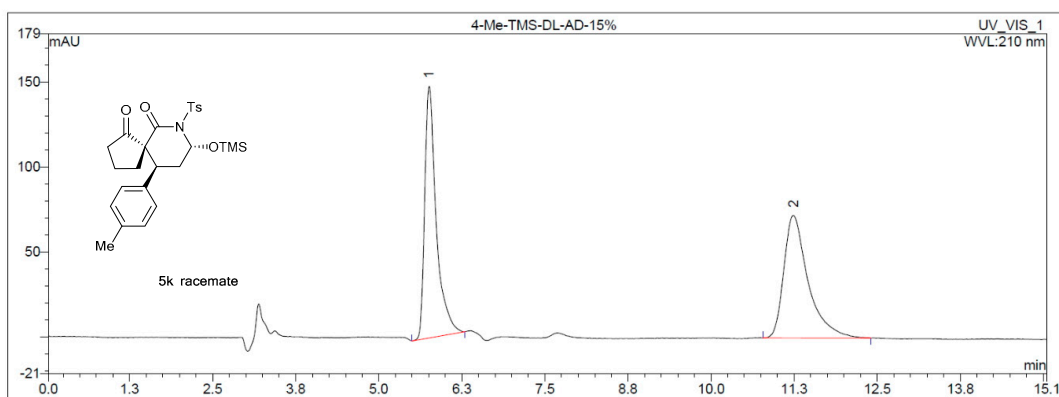
(c)



**Figure S11.** (a) HPLC chromatogram of racemic **5j**; (b) HPLC chromatogram of chiral **5j**; (c)  $^1\text{H-NMR}$  spectrum ( $\text{CDCl}_3$ , 400 MHz) of **5j**; (d)  $^{13}\text{C-NMR}$  spectrum ( $\text{CDCl}_3$ , 100 MHz) of **5j**.

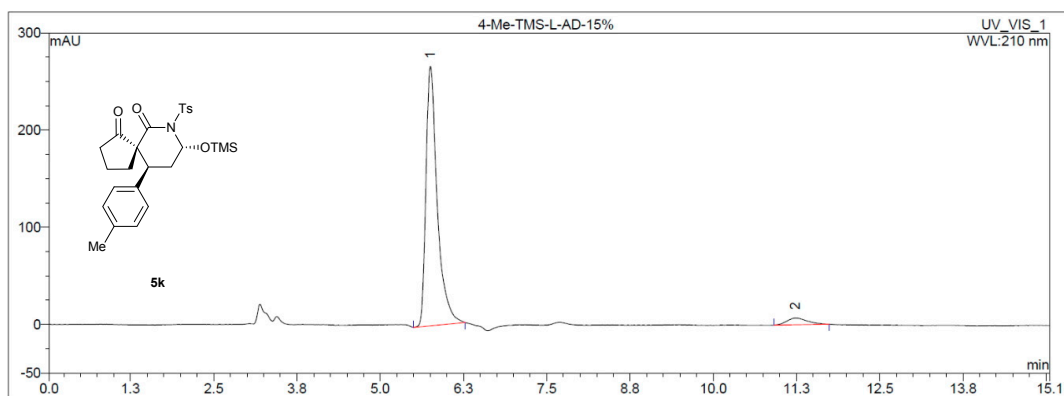
#### Peak Analysis Report

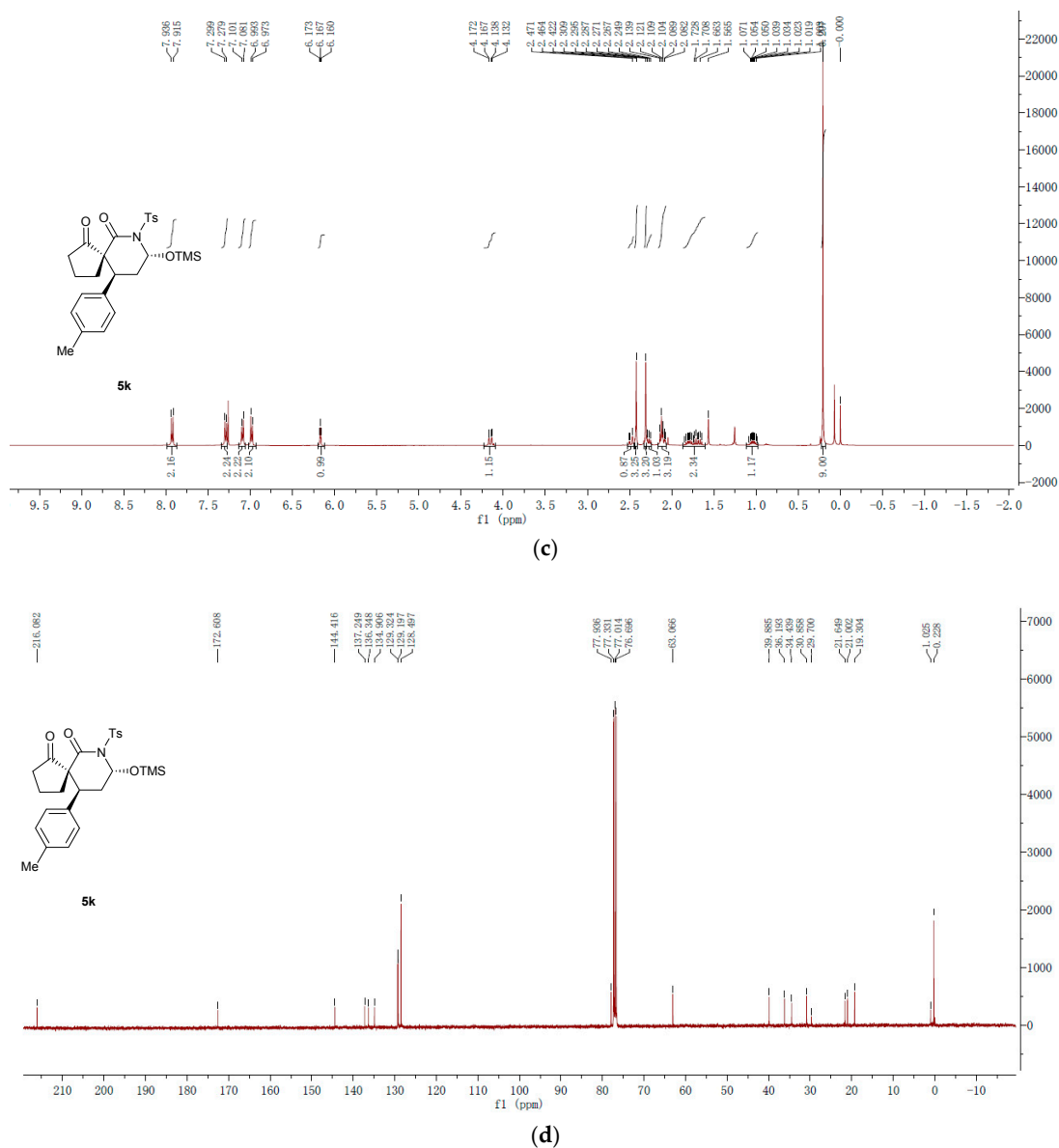
No.	Peak Name	Ret.Time (detected)	Area	Rel.Area	Height	Amount
		min	mAU*min	%	mAU	
1	n.a.	5.76	29.726	49.27	148.168	n.a.
2	n.a.	11.24	30.608	50.73	72.134	n.a.



#### Peak Analysis Report

No.	Peak Name	Ret.Time (detected)	Area	Rel.Area	Height	Amount
		min	mAU*min	%	mAU	
1	n.a.	5.75	52.582	95.46	266.899	n.a.
2	n.a.	11.23	2.502	4.54	6.954	n.a.

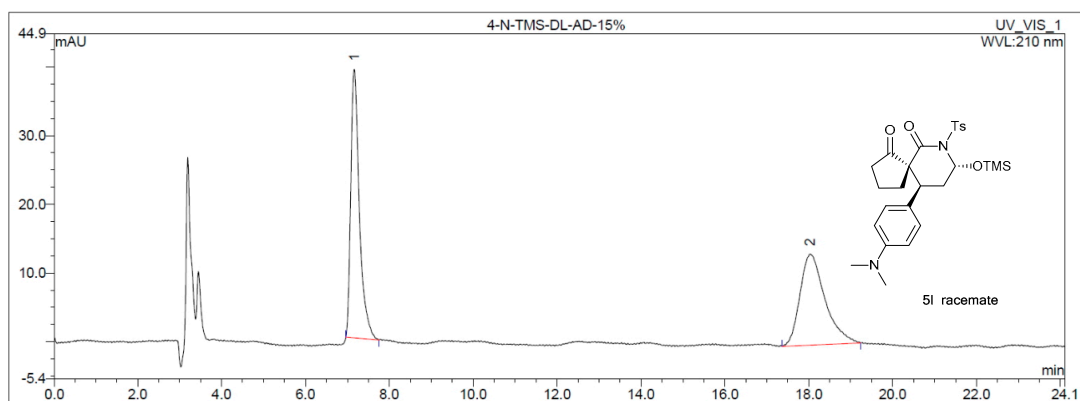




**Figure S12.** (a) HPLC chromatogram of racemic 5k; (b) HPLC chromatogram of chiral 5k; (c) <sup>1</sup>H-NMR spectrum (CDCl<sub>3</sub>, 400 MHz) of 5k; (d) <sup>13</sup>C-NMR spectrum (CDCl<sub>3</sub>, 100 MHz) of 5k.

#### Peak Analysis Report

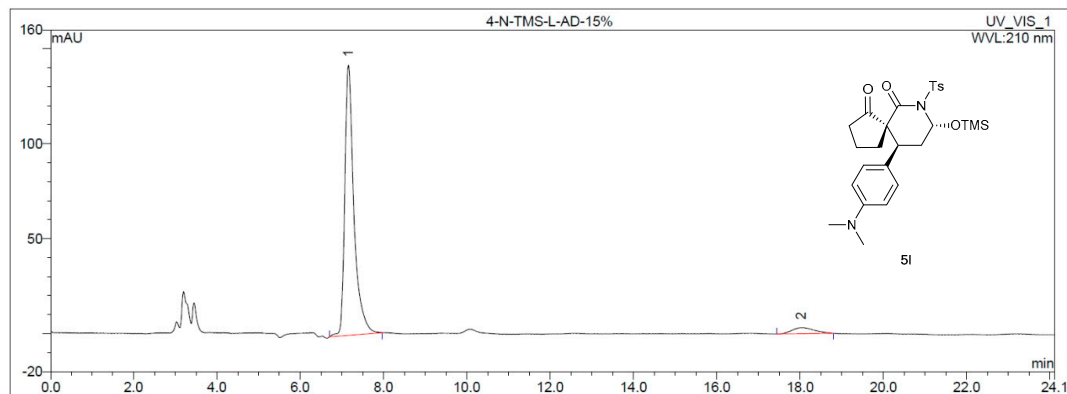
No.	Peak Name	Ret. Time (detected)		Area	Rel. Area	Height	Amount
		min	min				
1	n.a.	7.17	9.281	50.34	39.096	n.a.	
2	n.a.	18.03	9.157	49.66	13.284	n.a.	



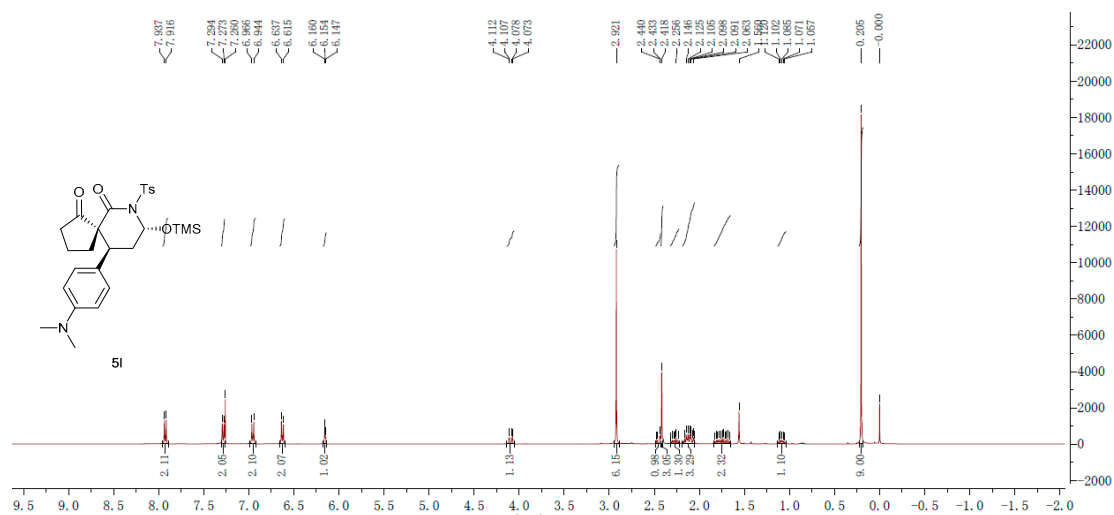
(a)

## Peak Analysis Report

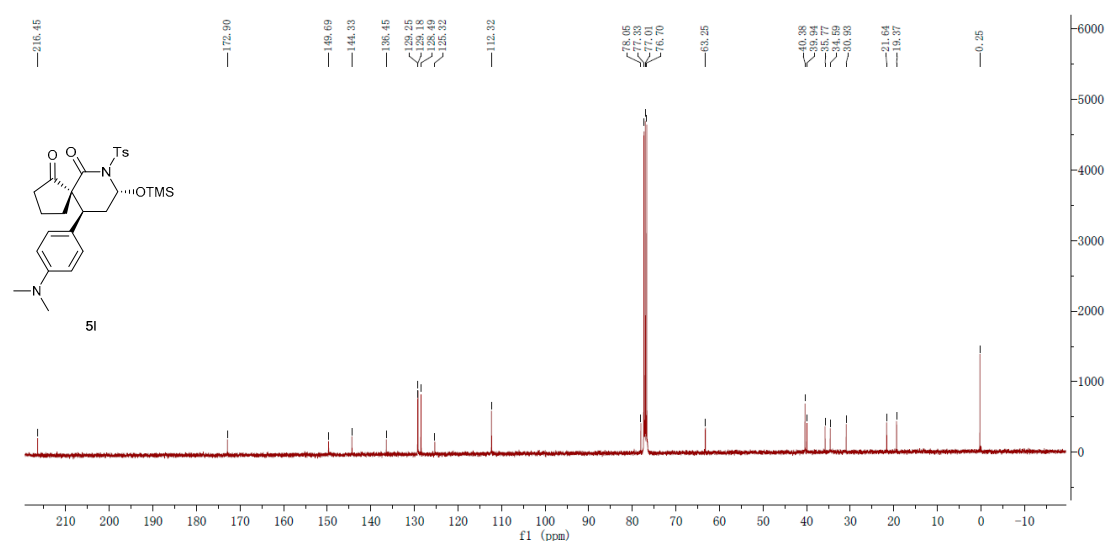
No.	Peak Name	Ret. Time (detected) min	Area mAU*min	Rel. Area %	Height mAU	Amount
1	n.a.	7.16	36.269	94.94	142.330	n.a.
2	n.a.	18.03	1.932	5.06	3.192	n.a.



(b)



(c)

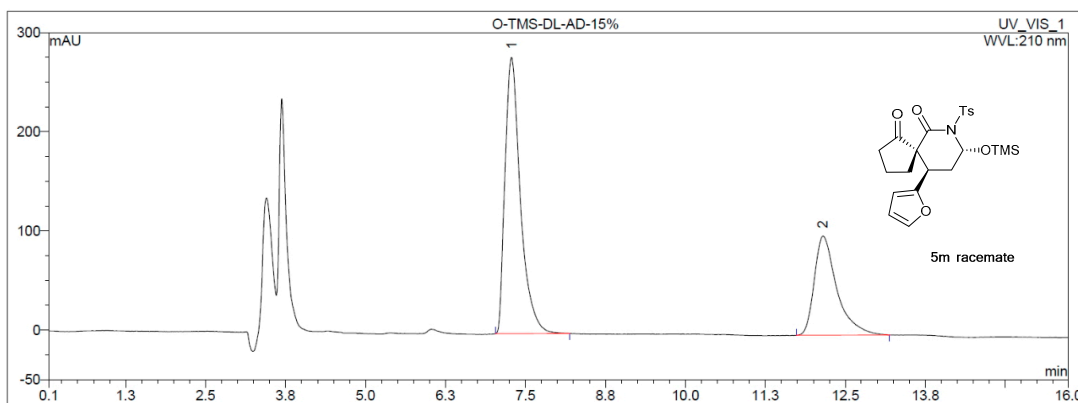


(d)

**Figure S13.** (a) HPLC chromatogram of racemic **5l**; (b) HPLC chromatogram of chiral **5l**; (c) <sup>1</sup>H-NMR spectrum (CDCl<sub>3</sub>, 400 MHz) of **5l**; (d) <sup>13</sup>C-NMR spectrum (CDCl<sub>3</sub>, 100 MHz) of **5l**.

#### Peak Analysis Report

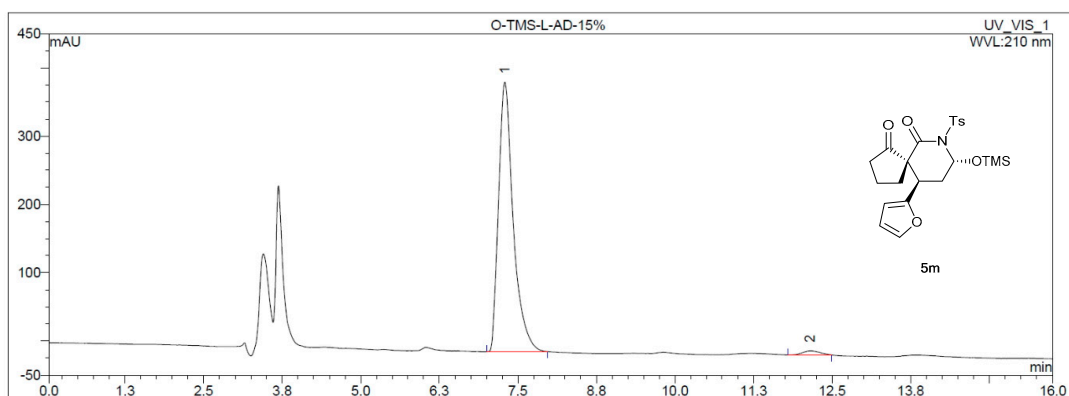
No.	Peak Name	Ret.Time (detected) min	Area mAU*min	Rel.Area %	Height mAU	Amount
1	n.a.	7.28	42.031	50.65	209.085	n.a.
2	n.a.	12.15	40.948	49.35	99.987	n.a.



(a)

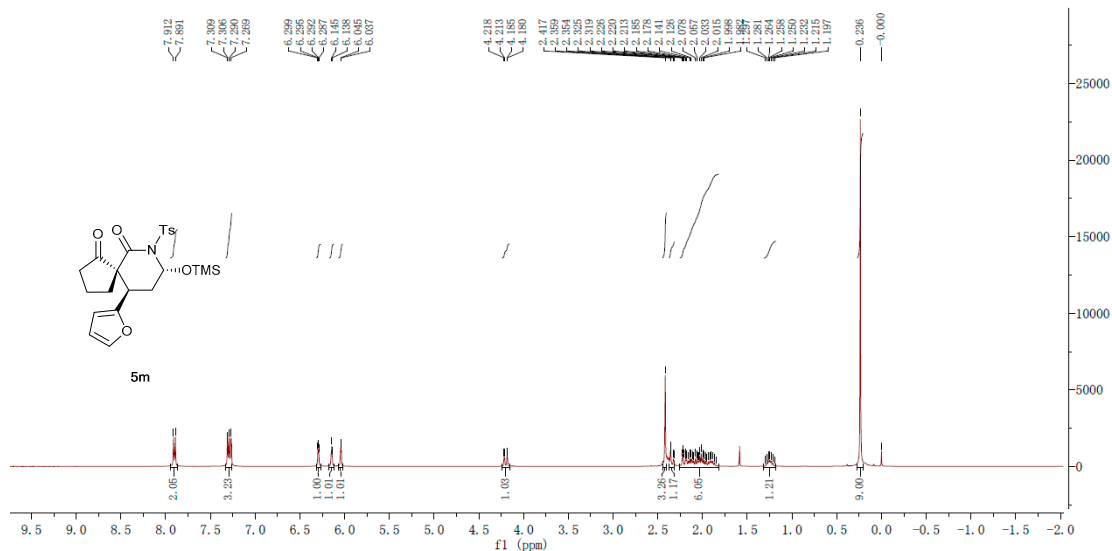
#### Peak Analysis Report

No.	Peak Name	Ret.Time (detected) min	Area mAU*min	Rel.Area %	Height mAU	Amount
1	n.a.	7.29	106.729	98.20	394.759	n.a.
2	n.a.	12.15	1.951	1.80	6.098	n.a.

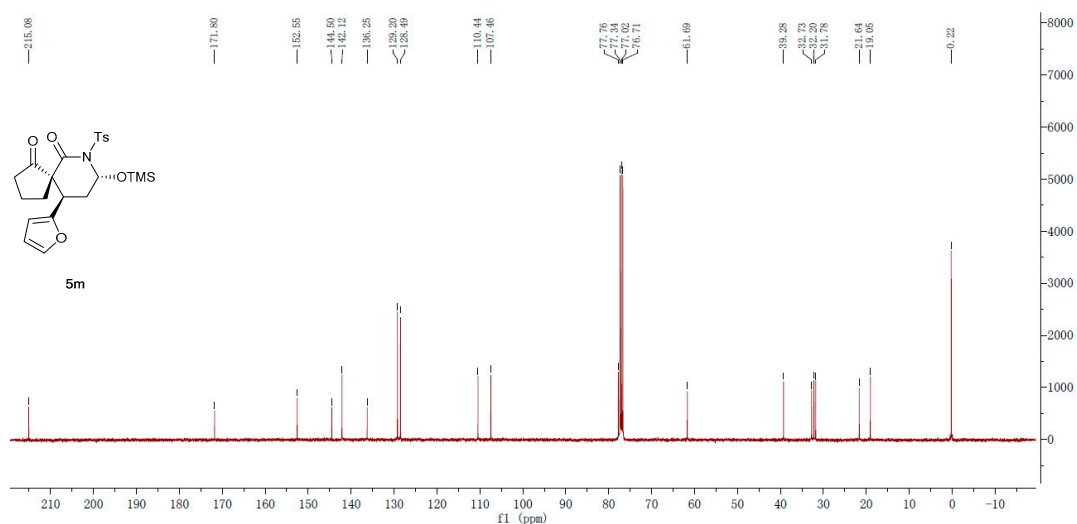


(b)





(c)

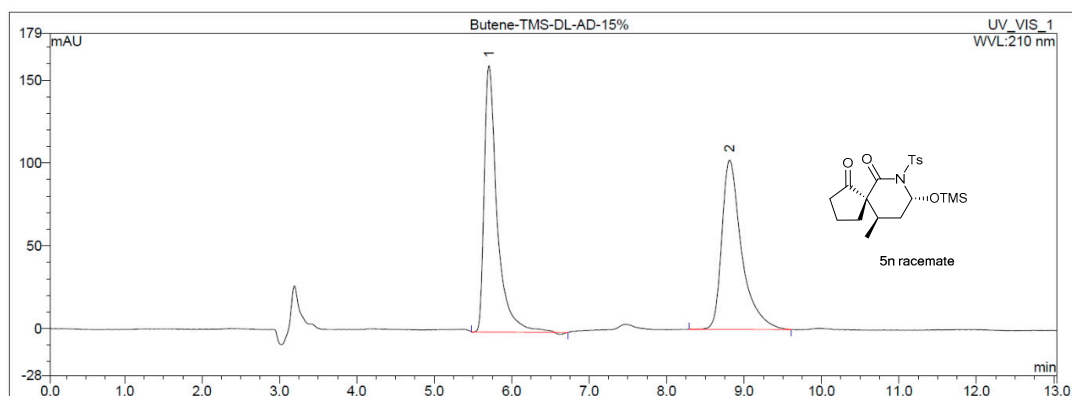


(d)

**Figure S14.** (a) HPLC chromatogram of racemic **5m**; (b) HPLC chromatogram of chiral **5m**; (c) <sup>1</sup>H-NMR spectrum (CDCl<sub>3</sub>, 400 MHz) of **5m**; (d) <sup>13</sup>C-NMR spectrum (CDCl<sub>3</sub>, 100 MHz) of **5m**.

#### Peak Analysis Report

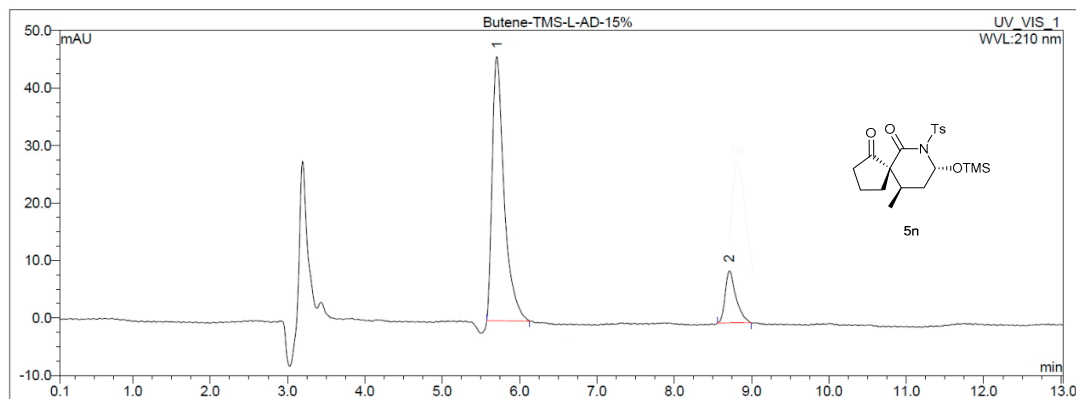
No.	Peak Name	Ret.Time (detected) min	Area mAU*min	Rel.Area %	Height mAU	Amount
1	n.a.	5.71	31.064	50.51	161.036	n.a.
2	n.a.	8.82	30.440	49.49	102.262	n.a.



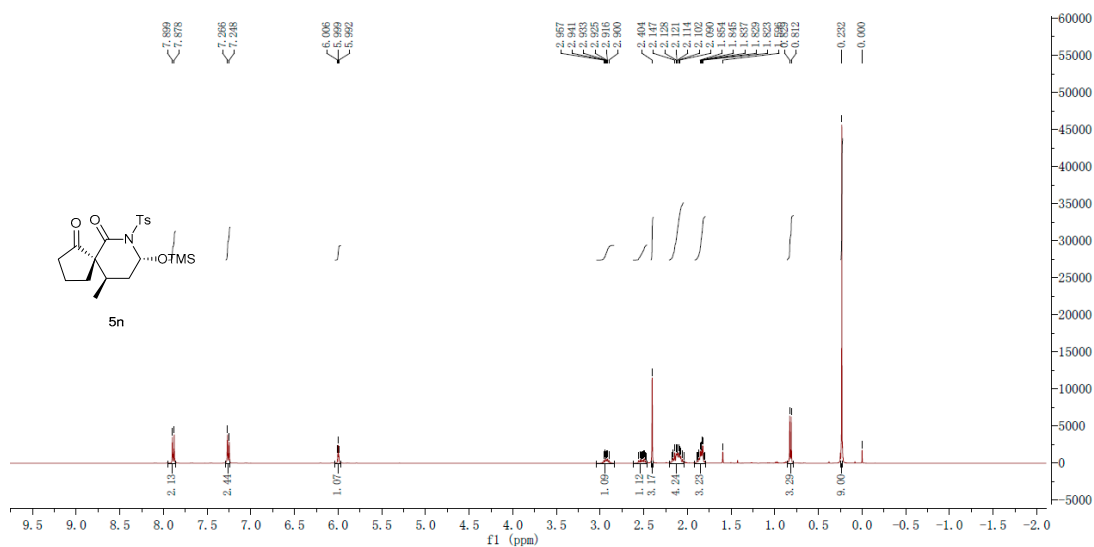
(a)

## Peak Analysis Report

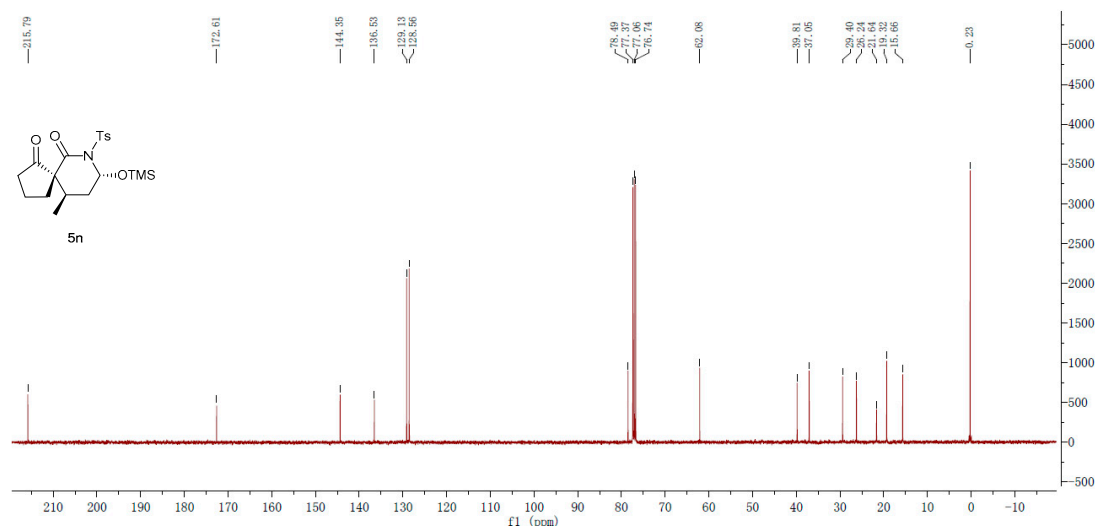
No.	Peak Name	Ret.Time (detected) min	Area mAU*min	Rel.Area %	Height mAU	Amount
1	n.a.	5.71	8.255	75.04	46.000	n.a.
2	n.a.	8.82	2.746	24.96	16.414	n.a.



(b)



(c)

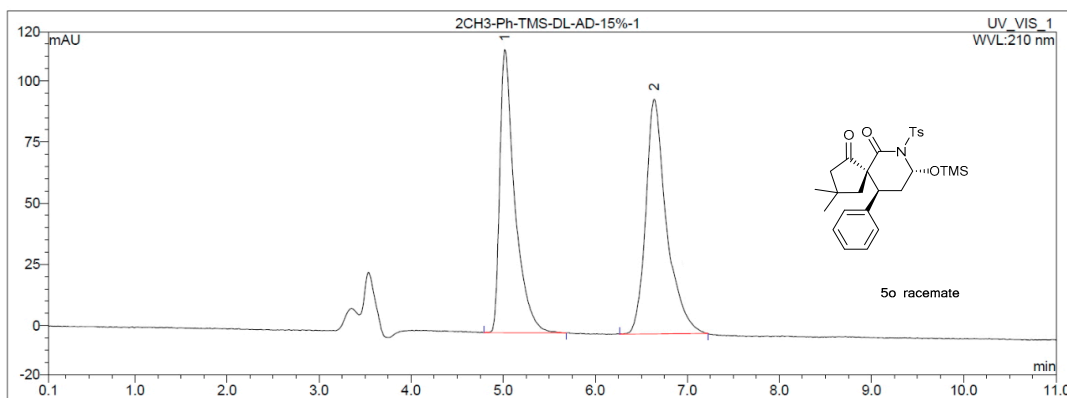


(d)

**Figure S15.** (a) HPLC chromatogram of racemic **5n**; (b) HPLC chromatogram of chiral **5n**; (c)  $^1\text{H}$ -NMR spectrum ( $\text{CDCl}_3$ , 400 MHz) of **5n**; (d)  $^{13}\text{C}$ -NMR spectrum ( $\text{CDCl}_3$ , 100 MHz) of **5n**.

#### Peak Analysis Report

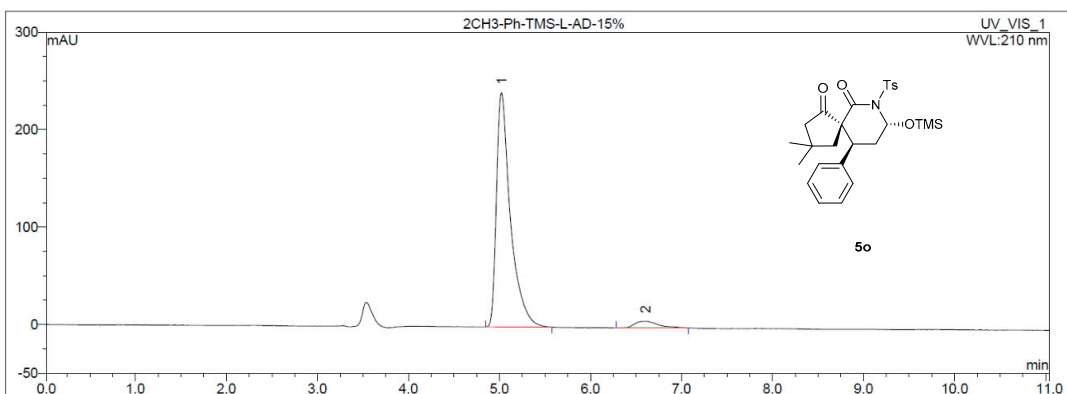
No.	Peak Name	Ret.Time (detected) min	Area mAU*min	Rel.Area %	Height mAU	Amount
1	n.a.	5.02	21.856	49.12	115.710	n.a.
2	n.a.	6.64	22.636	50.88	87.250	n.a.



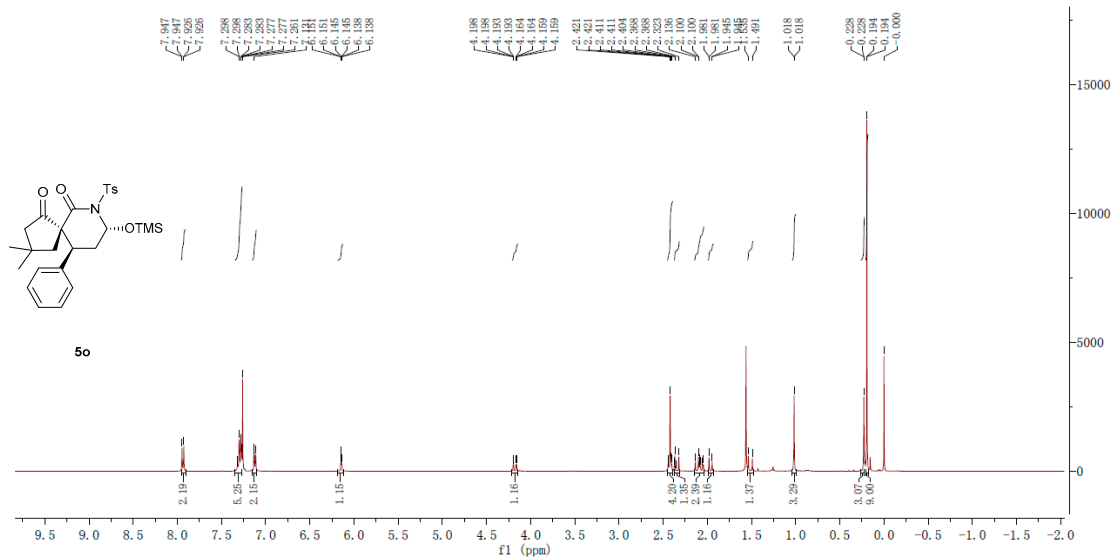
(a)

#### Peak Analysis Report

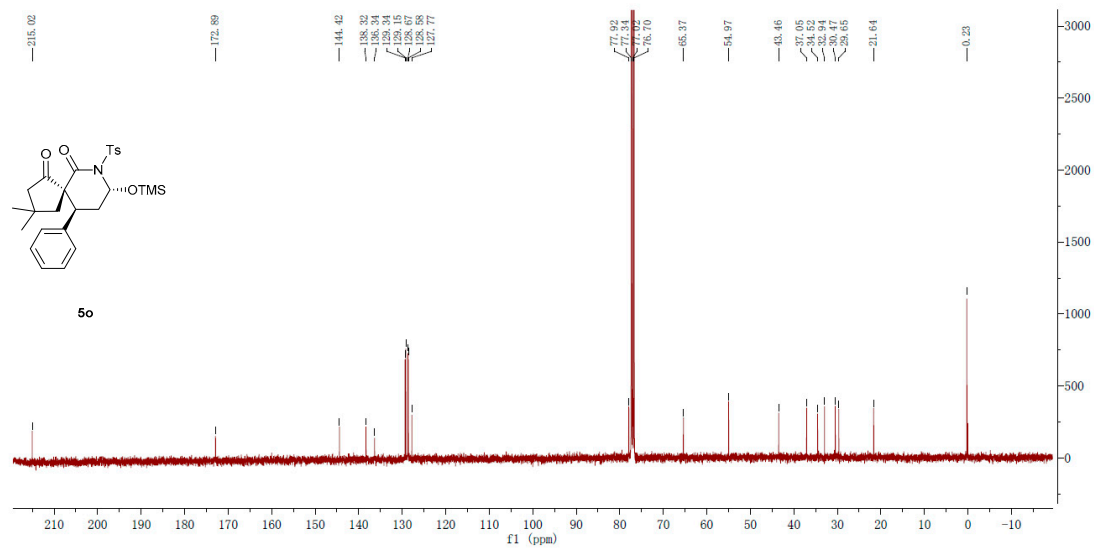
No.	Peak Name	Ret.Time (detected) min	Area mAU*min	Rel.Area %	Height mAU	Amount
1	n.a.	5.03	42.793	95.35	240.558	n.a.
2	n.a.	6.61	2.086	4.65	6.901	n.a.



(b)



(c)

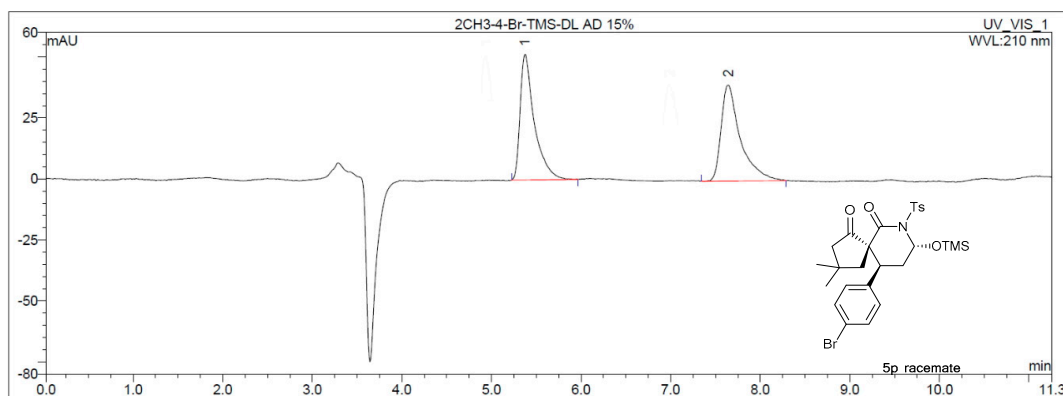


(d)

**Figure S16.** (a) HPLC chromatogram of racemic **5o**; (b) HPLC chromatogram of chiral **5o**; (c)  $^1\text{H-NMR}$  spectrum (CDCl<sub>3</sub>, 400 MHz) of **5o**; (d)  $^{13}\text{C-NMR}$  spectrum (CDCl<sub>3</sub>, 100 MHz) of **5o**.

## Peak Analysis Report

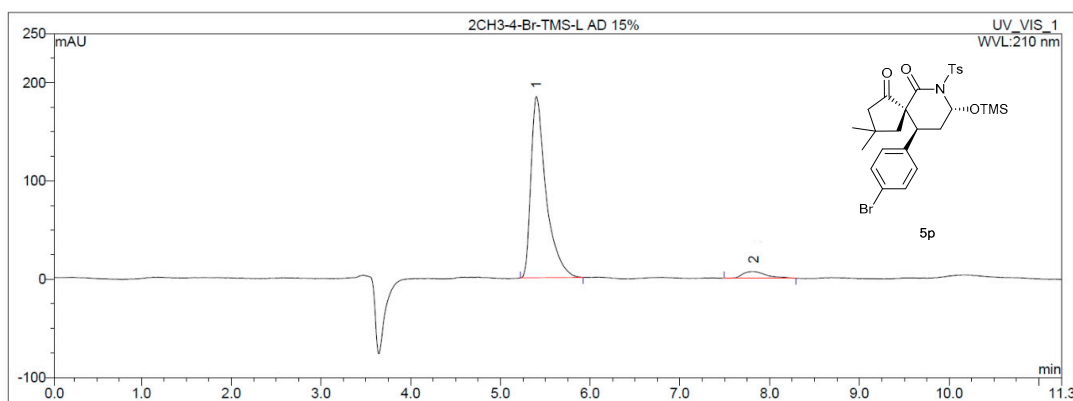
No.	Peak Name	Ret.Time (detected)	Area	Rel.Area	Height	Amount
		min	mAU*min	%	mAU	
1	n.a.	5.40	9.456	49.21	51.561	n.a.
2	n.a.	7.89	9.758	50.79	39.391	n.a.



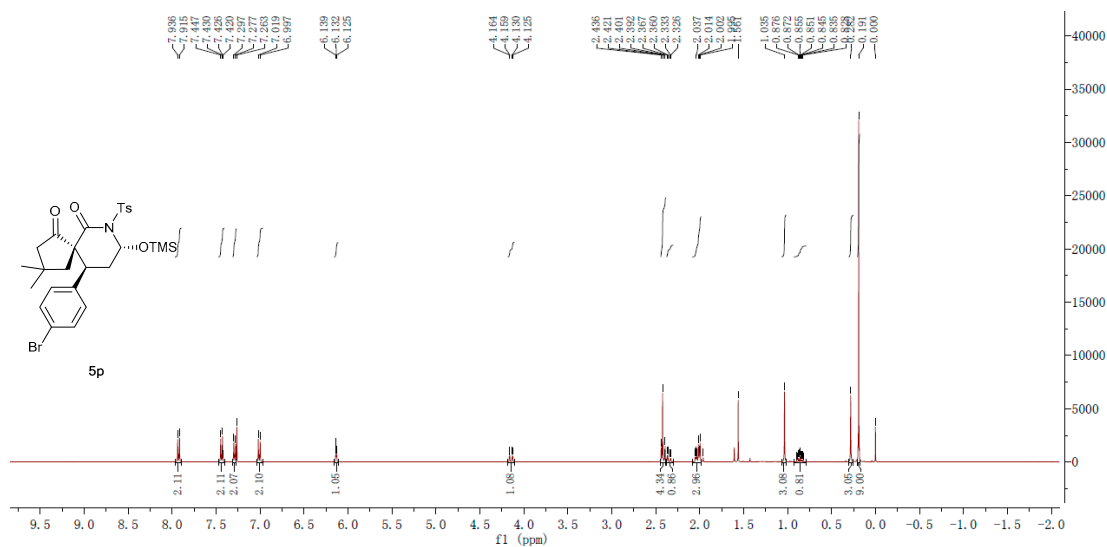
(a)

## Peak Analysis Report

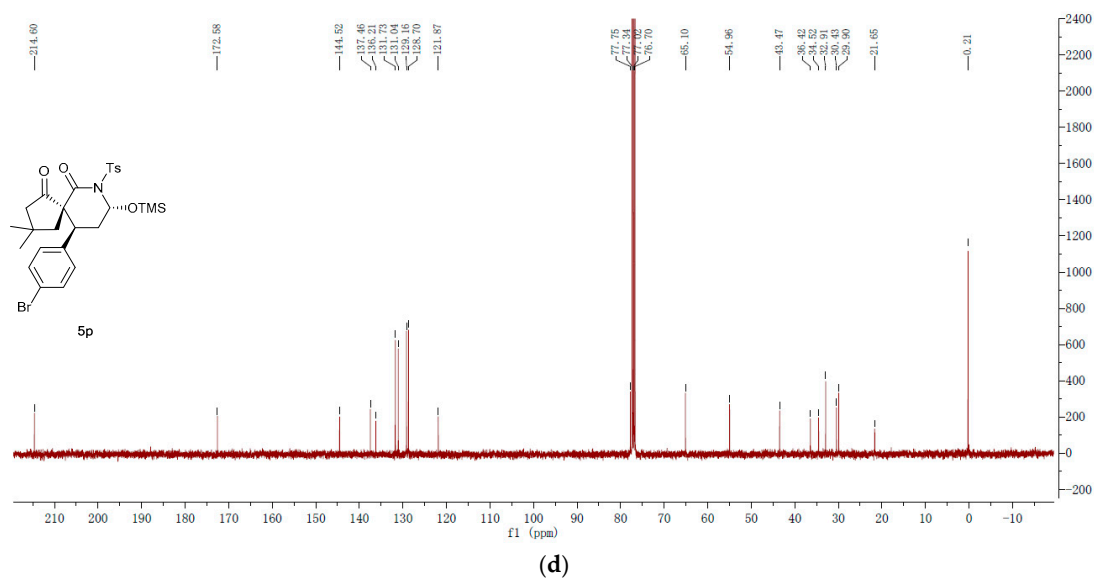
No.	Peak Name	Ret.Time (detected)	Area	Rel.Area	Height	Amount
		min	mAU*min	%	mAU	
1	n.a.	5.40	36.065	95.39	184.558	n.a.
2	n.a.	7.86	1.742	4.61	9.974	n.a.



(b)



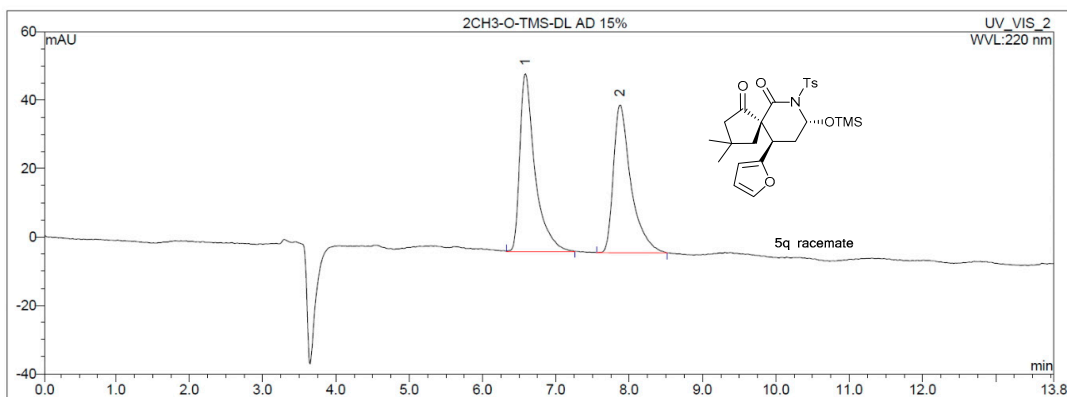
(c)



**Figure S17.** (a) HPLC chromatogram of racemic **5p**; (b) HPLC chromatogram of chiral **5p**; (c)  $^1\text{H}$ -NMR spectrum ( $\text{CDCl}_3$ , 400 MHz) of **5p**; (d)  $^{13}\text{C}$ -NMR spectrum ( $\text{CDCl}_3$ , 100 MHz) of **5p**.

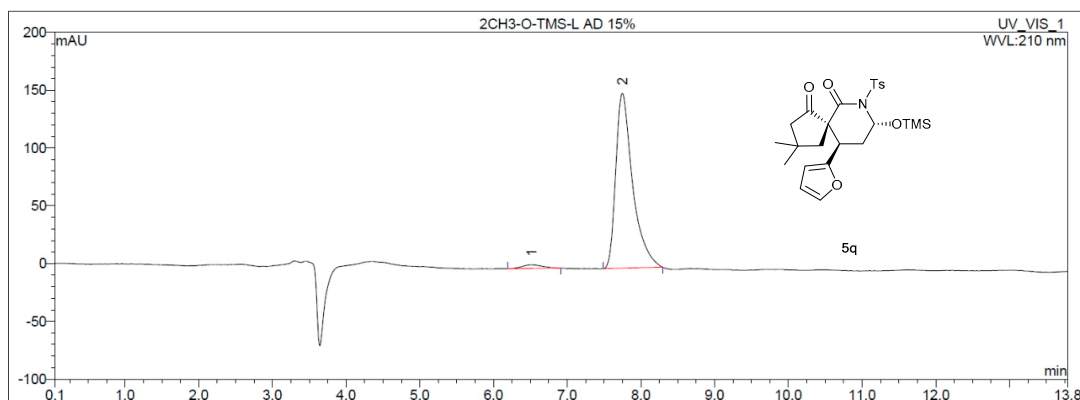
#### Peak Analysis Report

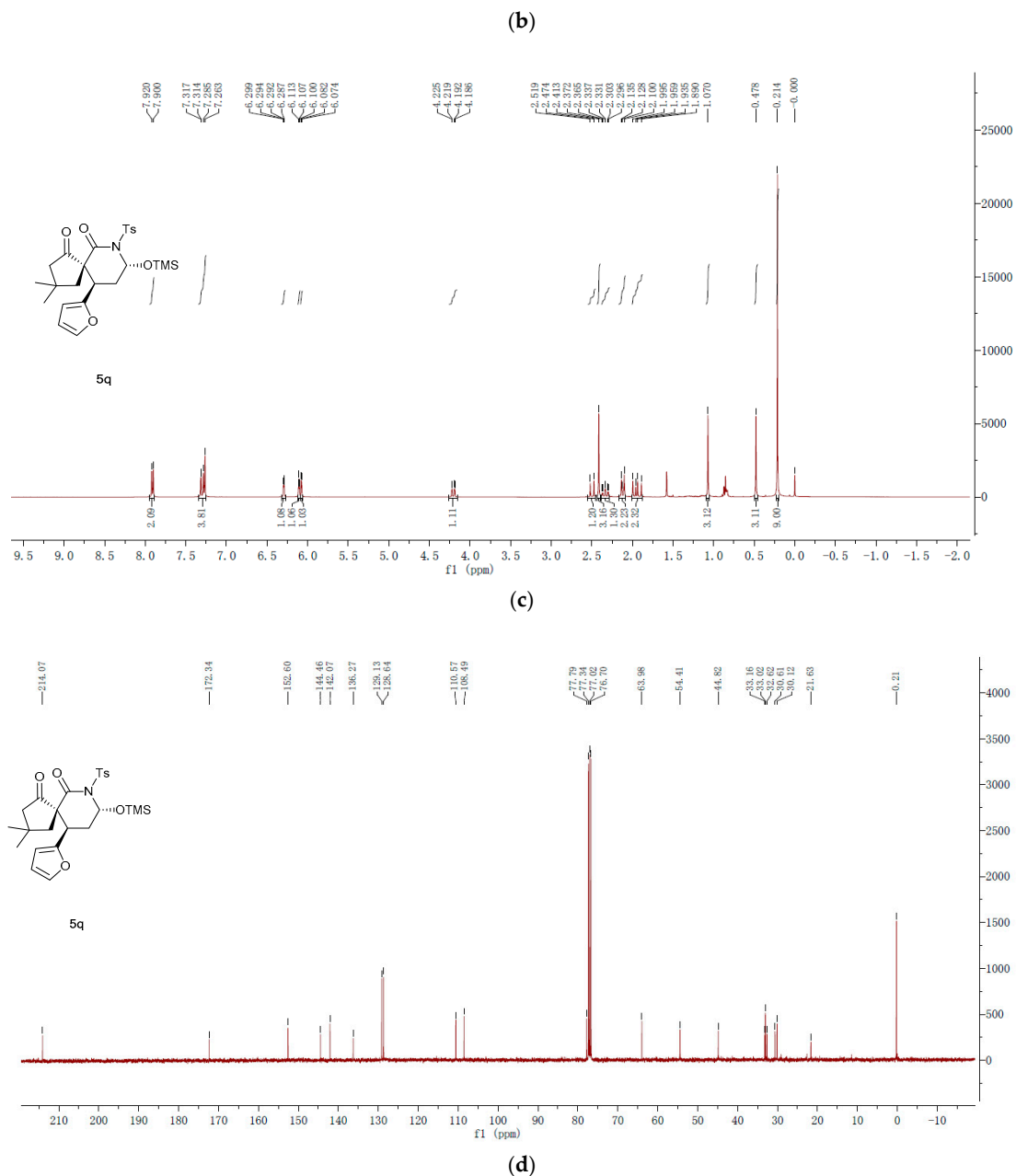
No.	Peak Name	Ret.Time (detected) min	Area mAU*min	Rel.Area %	Height mAU	Amount
1	n.a.	6.58	12.413	50.86	51.907	n.a.
2	n.a.	7.88	11.993	49.14	43.213	n.a.



#### Peak Analysis Report

No.	Peak Name	Ret.Time (detected) min	Area mAU*min	Rel.Area %	Height mAU	Amount
1	n.a.	6.50	1.083	2.63	7.489	n.a.
2	n.a.	7.75	40.104	97.37	151.249	n.a.

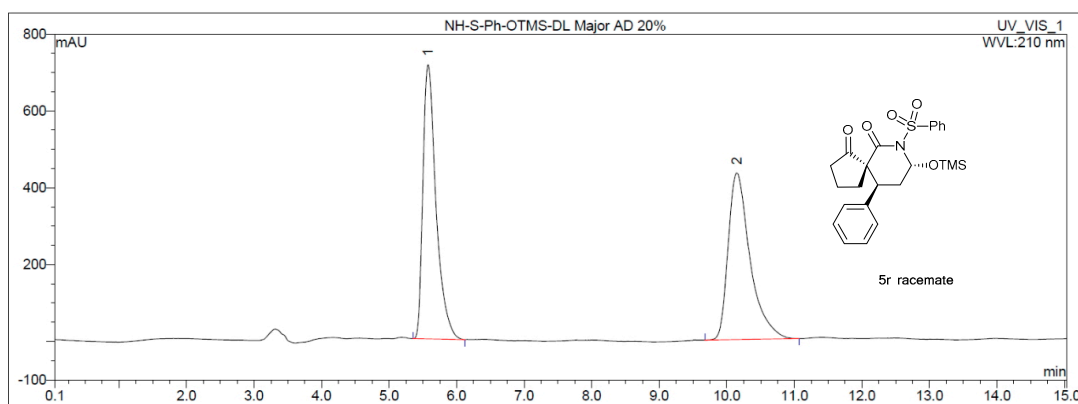




**Figure S18.** (a) HPLC chromatogram of racemic **5q**; (b) HPLC chromatogram of chiral **5q**; (c) <sup>1</sup>H-NMR spectrum (CDCl<sub>3</sub>, 400 MHz) of **5q**; (d) <sup>13</sup>C-NMR spectrum (CDCl<sub>3</sub>, 100 MHz) of **5q**.

## Peak Analysis Report

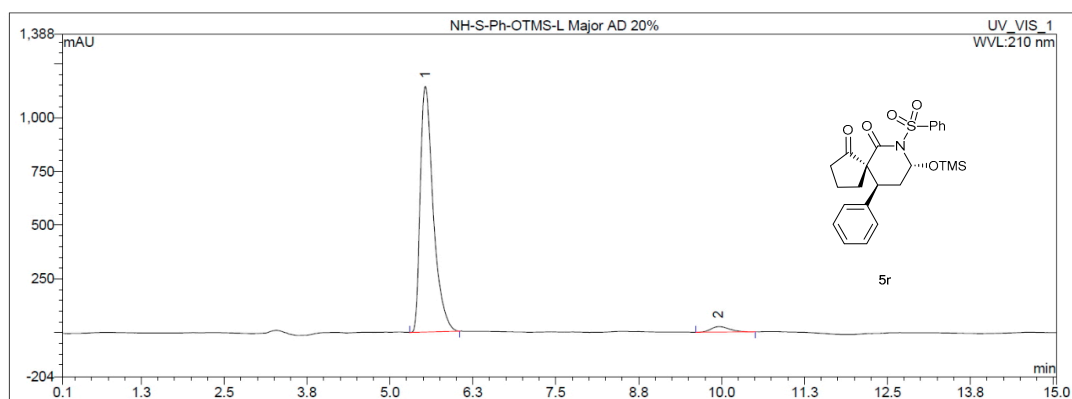
No.	Peak Name	Ret.Time (detected)	Area	Rel.Area	Height	Amount
		min	mAU*min	%	mAU	
1	n.a.	5.58	160.838	49.66	714.518	n.a.
2	n.a.	10.15	163.036	50.34	433.719	n.a.



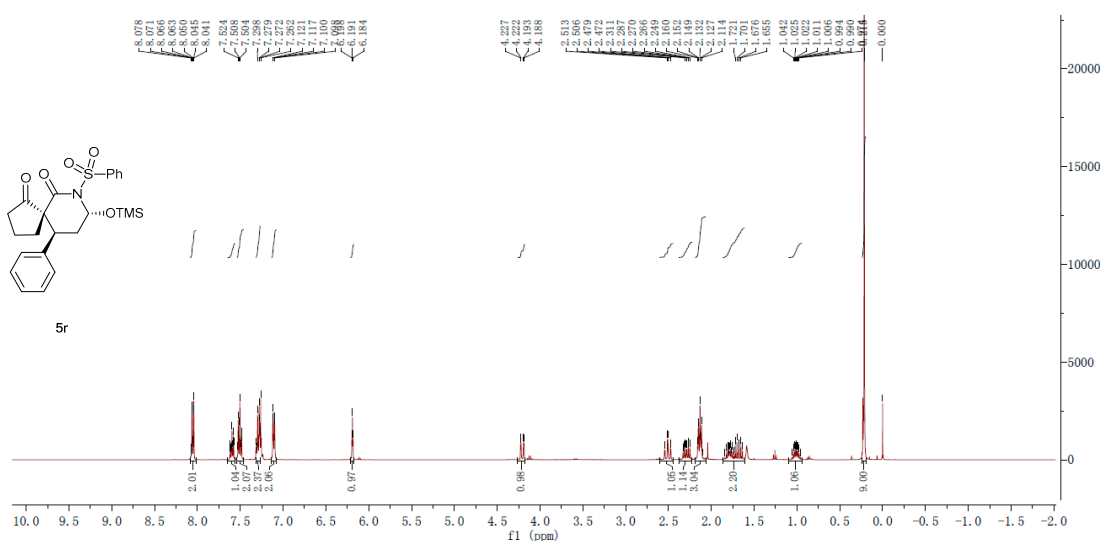
(a)

## Peak Analysis Report

No.	Peak Name	Ret.Time (detected)	Area	Rel.Area	Height	Amount
		min	mAU*min	%	mAU	
1	n.a.	5.53	259.250	96.89	1141.990	n.a.
2	n.a.	9.95	8.311	3.11	25.827	n.a.

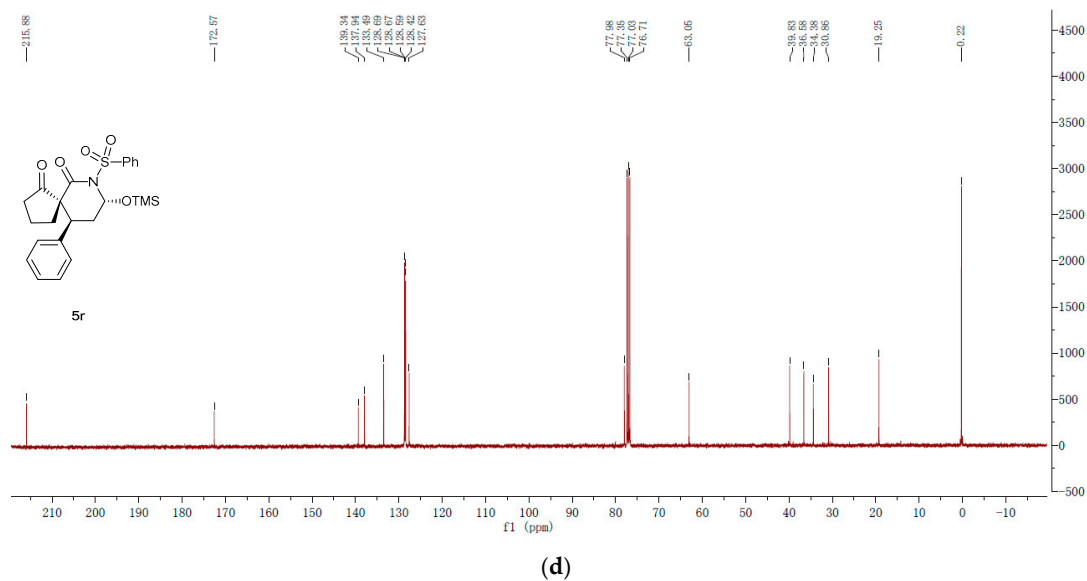


(b)



(c)

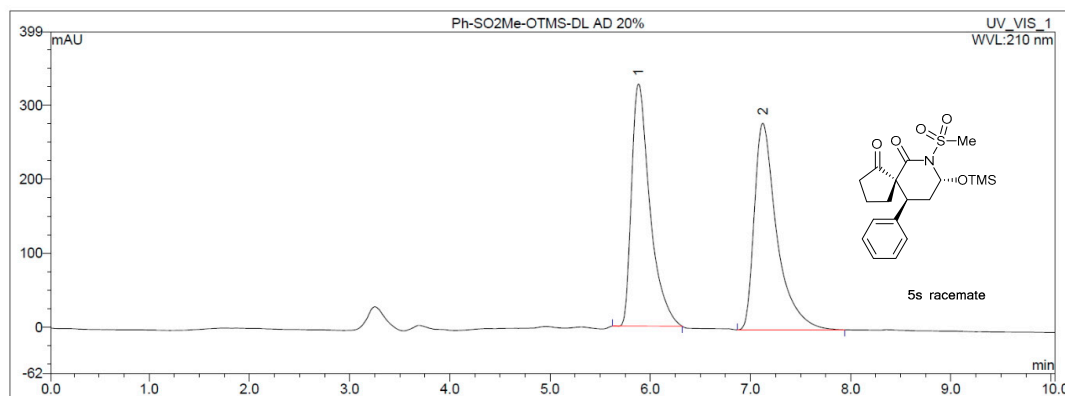




**Figure S19.** (a) HPLC chromatogram of racemic **5r**; (b) HPLC chromatogram of chiral **5r**; (c)  $^1\text{H-NMR}$  spectrum ( $\text{CDCl}_3$ , 400 MHz) of **5r**; (d)  $^{13}\text{C-NMR}$  spectrum ( $\text{CDCl}_3$ , 100 MHz) of **5r**.

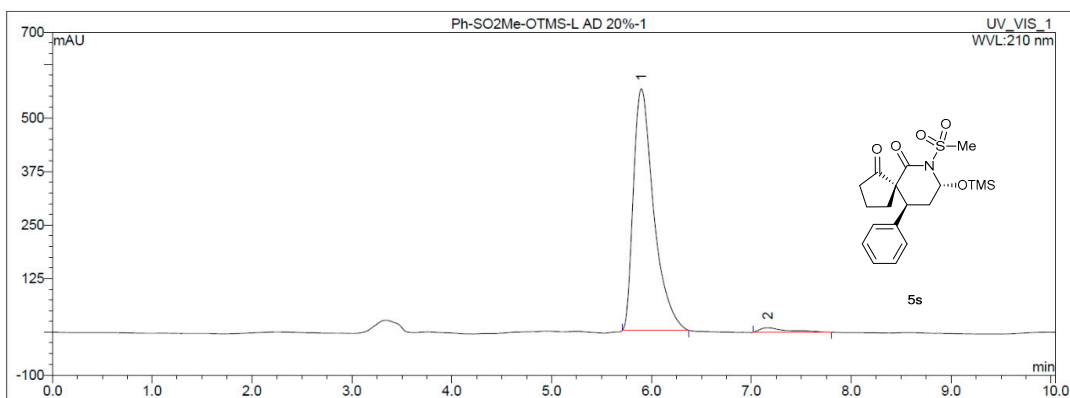
#### Peak Analysis Report

No.	Peak Name	Ret.Time (detected) min	Area mAU*min	Rel.Area %	Height mAU	Amount
1	n.a.	5.88	69.662	48.92	326.868	n.a.
2	n.a.	7.13	72.747	51.08	279.134	n.a.

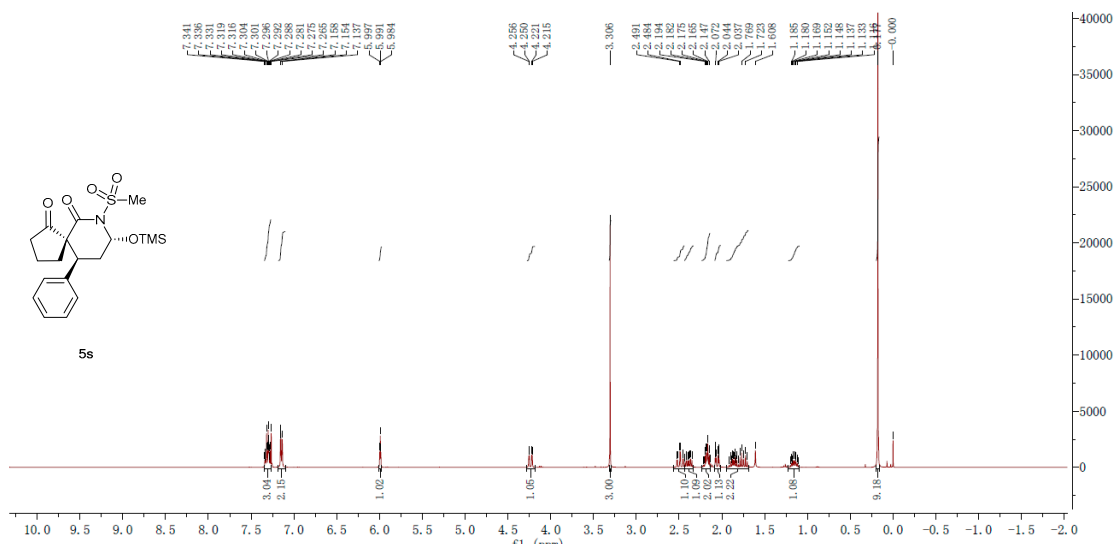


Peak Analysis Report

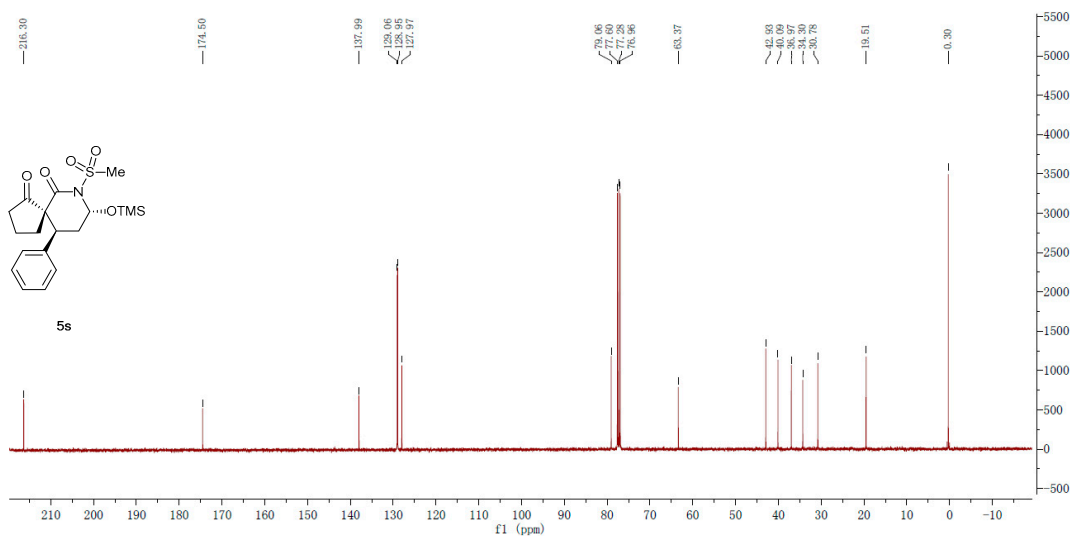
No.	Peak Name	Ret.Time (detected) min	Area mAU*min	Rel.Area %	Height mAU	Amount
1	n.a.	5.90	132.947	97.44	564.053	n.a.
2	n.a.	7.17	3.486	2.56	10.534	n.a.



(b)



(c)

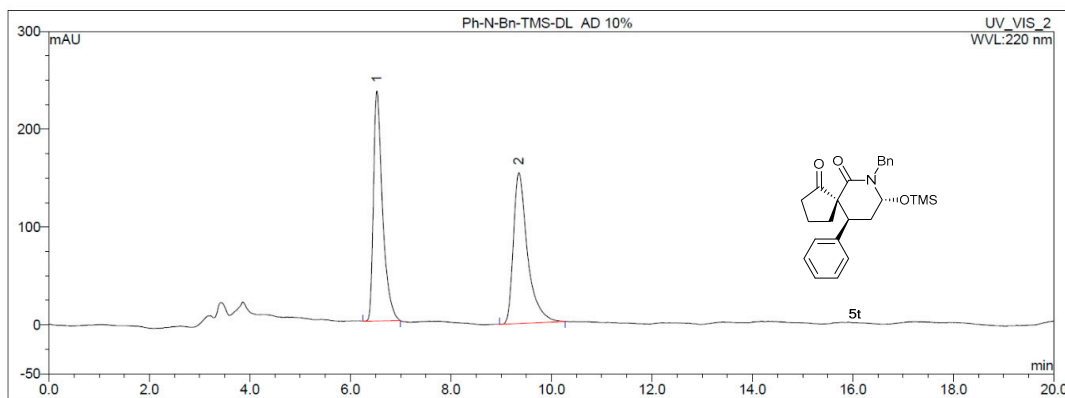


(d)

**Figure S20.** (a) HPLC chromatogram of racemic **5s**; (b) HPLC chromatogram of chiral **5s**; (c) <sup>1</sup>H-NMR spectrum (CDCl<sub>3</sub>, 400 MHz) of **5s**; (d) <sup>13</sup>C-NMR spectrum (CDCl<sub>3</sub>, 100 MHz) of **5s**.

### Peak Analysis Report

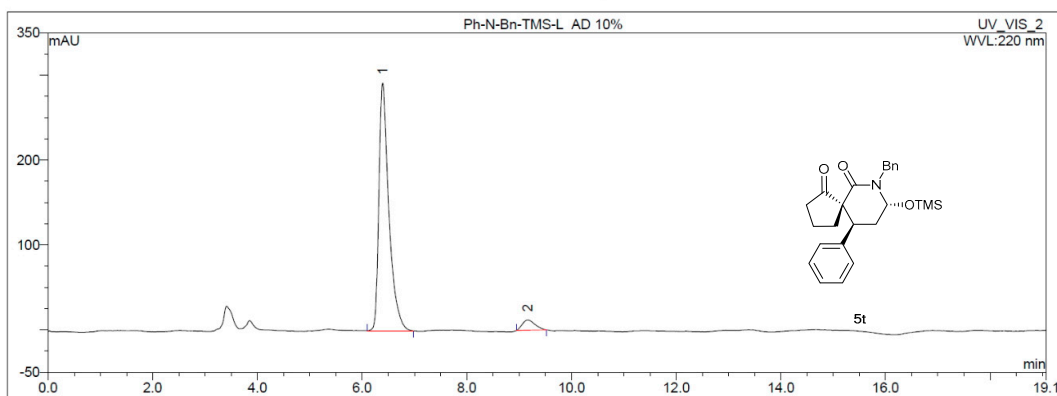
No.	Peak Name	Ret.Time (detected)	Area	Rel.Area	Height	Amount
		min	mAU*min	%	mAU	
1	n.a.	6.53	49.183	49.53	235.425	n.a.
2	n.a.	9.35	50.114	50.47	154.154	n.a.



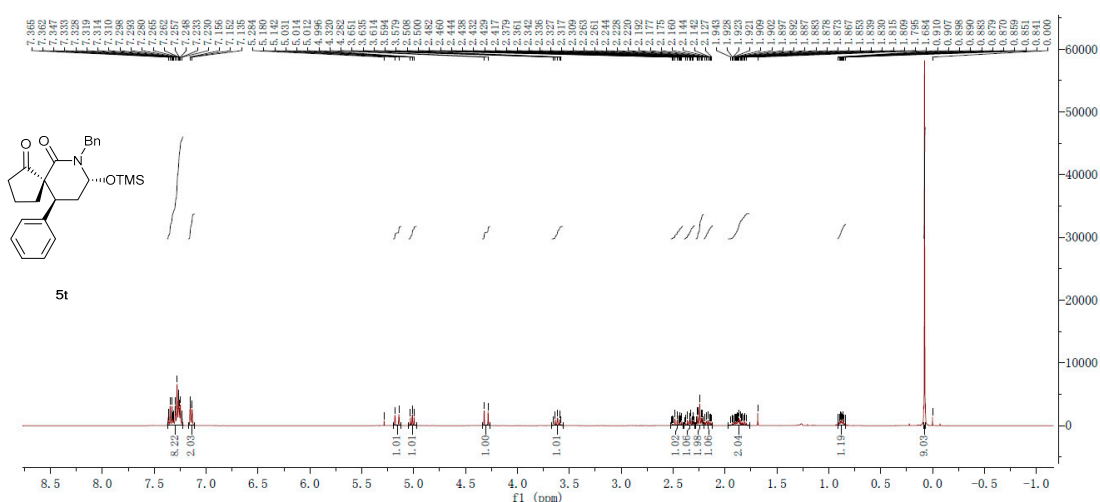
(a)

### Peak Analysis Report

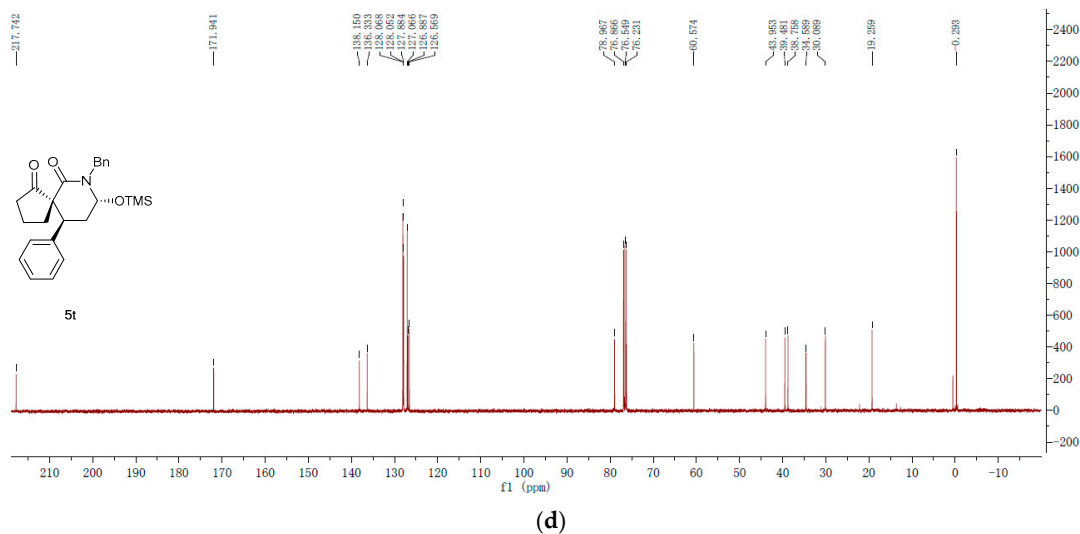
No.	Peak Name	Ret.Time (detected)	Area	Rel.Area	Height	Amount
		min	mAU*min	%	mAU	
1	n.a.	6.39	64.507	94.92	292.006	n.a.
2	n.a.	9.17	3.453	5.08	20.971	n.a.



(b)



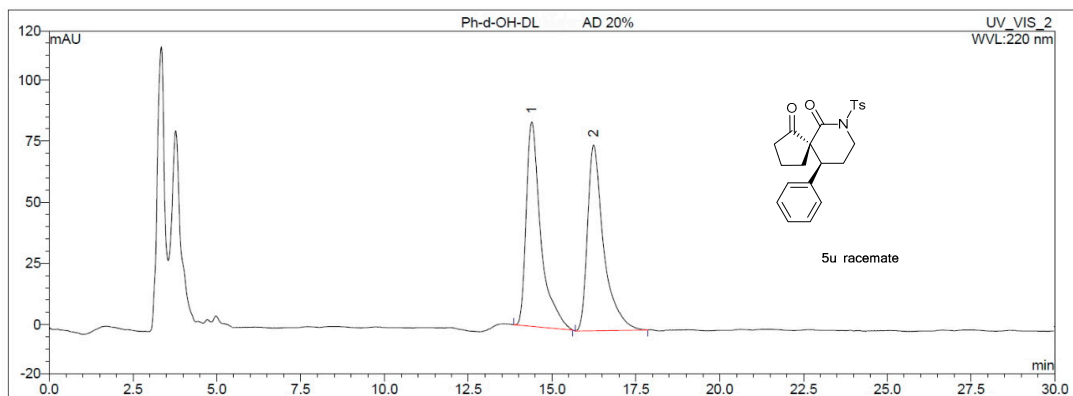
(c)



**Figure S21.** (a) HPLC chromatogram of racemic **5t**; (b) HPLC chromatogram of chiral **5t**; (c)  $^1\text{H-NMR}$  spectrum ( $\text{CDCl}_3$ , 400 MHz) of **5t**; (d)  $^{13}\text{C-NMR}$  spectrum ( $\text{CDCl}_3$ , 100 MHz) of **5t**.

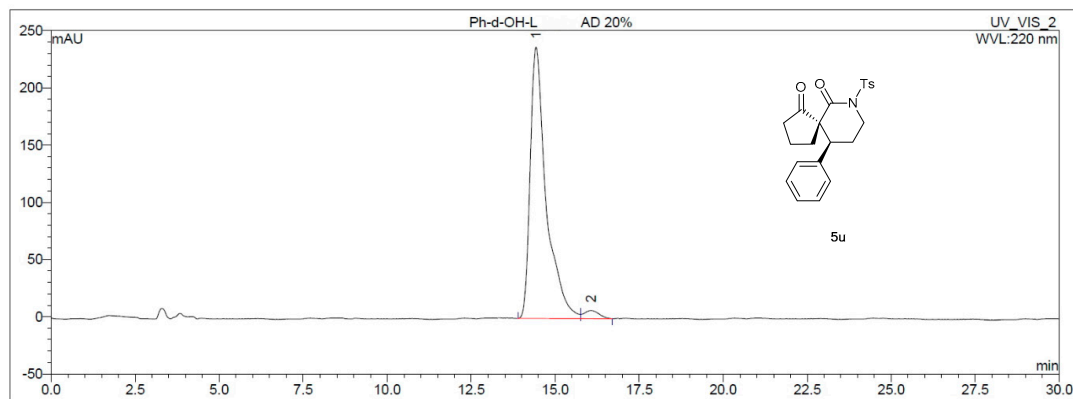
#### Peak Analysis Report

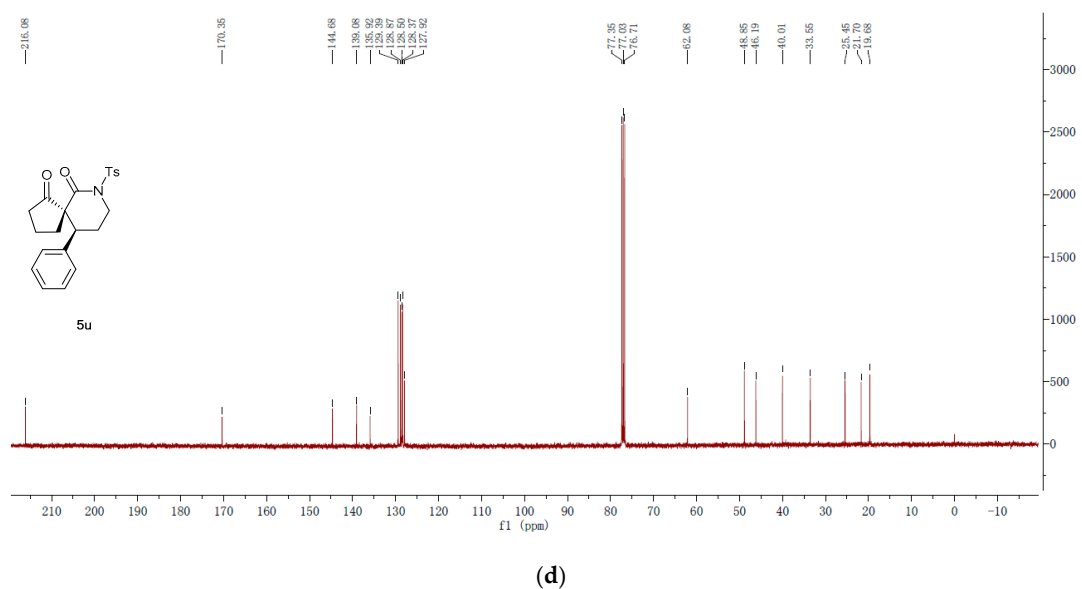
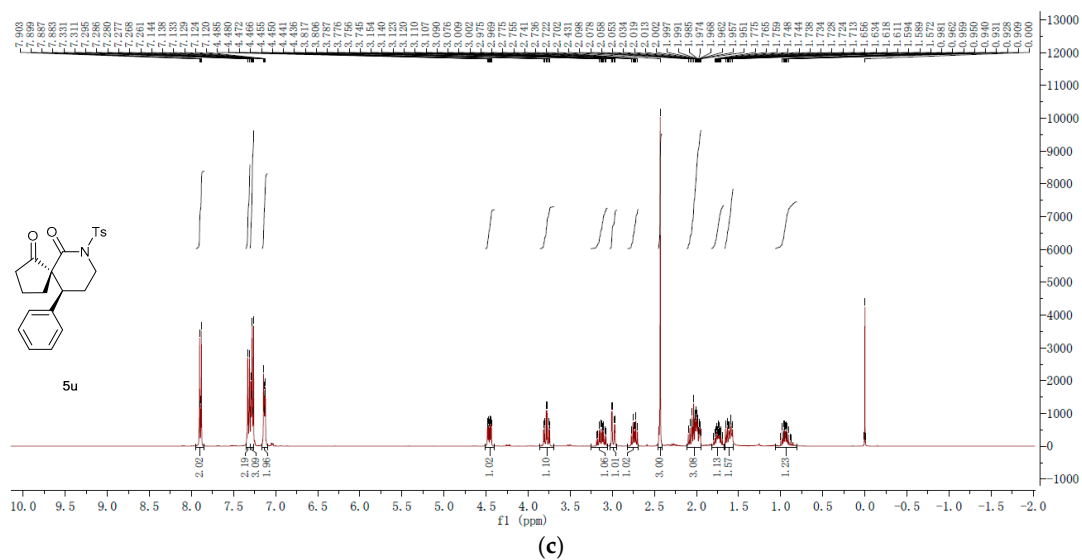
No.	Peak Name	Ret.Time (detected) min	Area mAU*min	Rel.Area %	Height mAU	Amount
1	n.a.	14.39	42.188	49.79	83.583	n.a.
2	n.a.	16.23	42.537	50.21	75.880	n.a.



#### Peak Analysis Report

No.	Peak Name	Ret.Time (detected) min	Area mAU*min	Rel.Area %	Height mAU	Amount
1	n.a.	14.43	140.816	97.49	237.120	n.a.
2	n.a.	16.23	3.628	2.51	7.103	n.a.





**Figure S22.** (a) HPLC chromatogram of racemic **5u**; (b) HPLC chromatogram of chiral **5u**; (c)  $^1\text{H-NMR}$  spectrum ( $\text{CDCl}_3$ , 400 MHz) of **5u**; (d)  $^{13}\text{C-NMR}$  spectrum ( $\text{CDCl}_3$ , 100 MHz) of **5u**.