

Supporting Information

Asymmetric synthesis of trifluoromethyl-substituted 3,3'-pyrrolidinyl-dispirooxindoles through organocatalytic 1,3-dipolar cycloaddition reactions

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Crystallographic Data Collection and Refinement

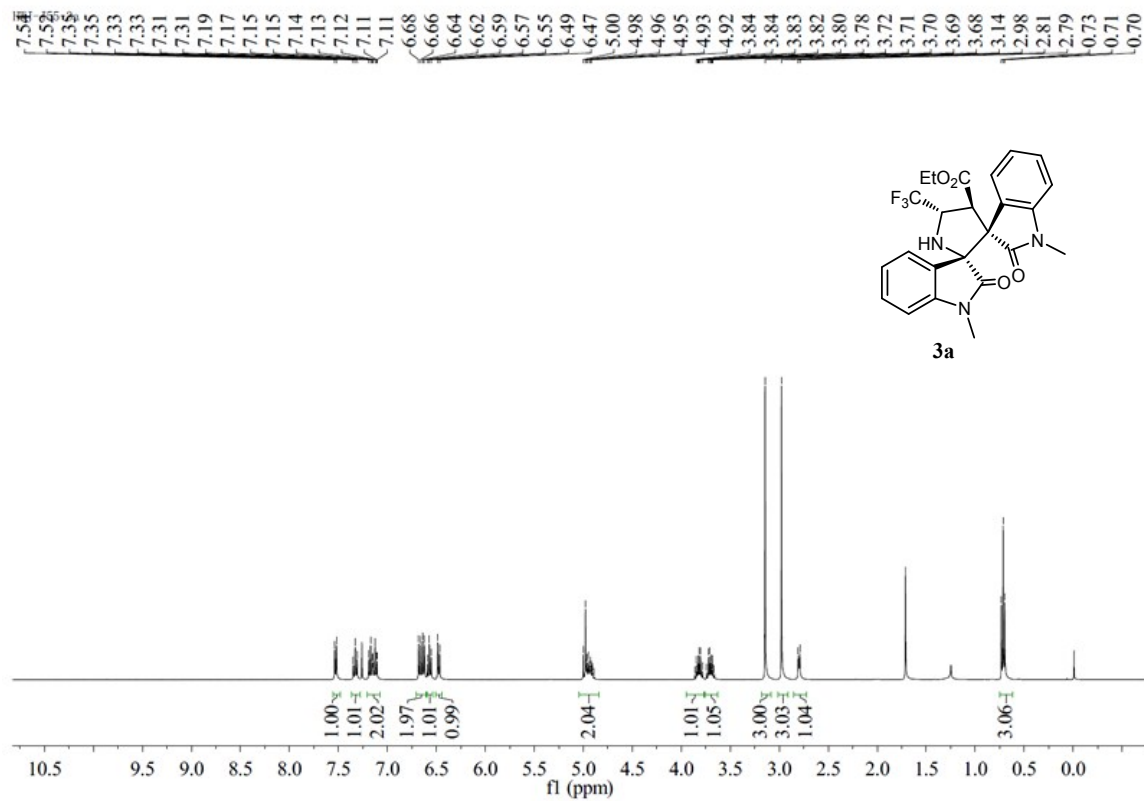
The diffraction data of **3f** were collected on an Agilent Technology Super Nova Dual Atlas CCD diffractometer, equipped with monochromated Cu K α radiation ($\lambda = 1.54184 \text{ \AA}$) at 293 K. The intensity data were corrected for Lorentz and polarization effects (SAINT), and empirical absorption corrections based on equivalent reflections were applied (SADABS).¹ The structure was solved by direct methods and refined by the full-matrix least-squares method on F² with SHELXTL program package.² All nonhydrogen atoms were refined with anisotropic displacement parameters. The hydrogen atoms were calculated and refined as a riding model. The hydrogen atoms of coordinated water molecules were located from difference maps. The CCDC reference number 1477406, contains the supplementary crystallographic data for this paper. These data can be obtained free of charge from The Cambridge Crystallographic Data Centre via www.ccdc.cam.ac.uk/data_request/cif.

1 G. M. Sheldrick, SADABS, Program for Empirical Absorption Correction of Area Detector Data; University of Göttingen: Göttingen, Germany, 1996.

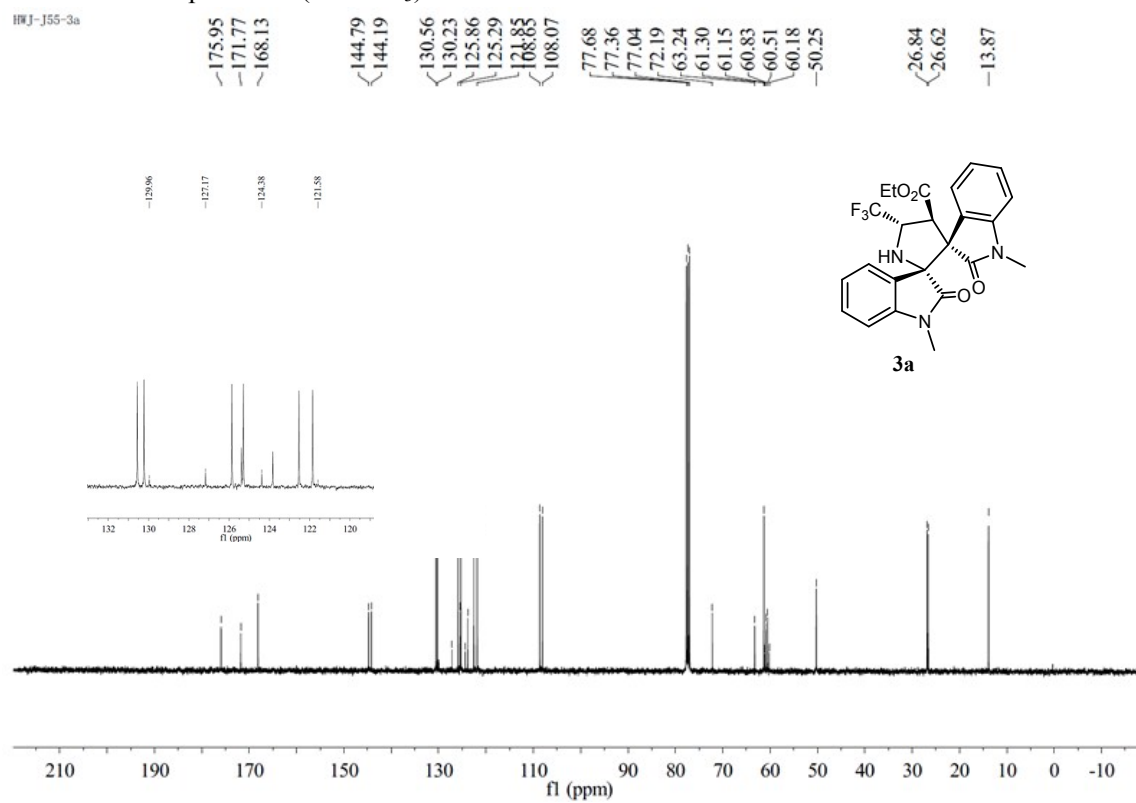
2 G. M. Sheldrick, SHELXL97 and SHELXTL Software Reference Manual, version 5.11 Brucker AXSmInc.L Madison, WI, 1997.

Copies of NMR spectra of compounds

¹HNMR of compound **3a** (in CDCl₃)

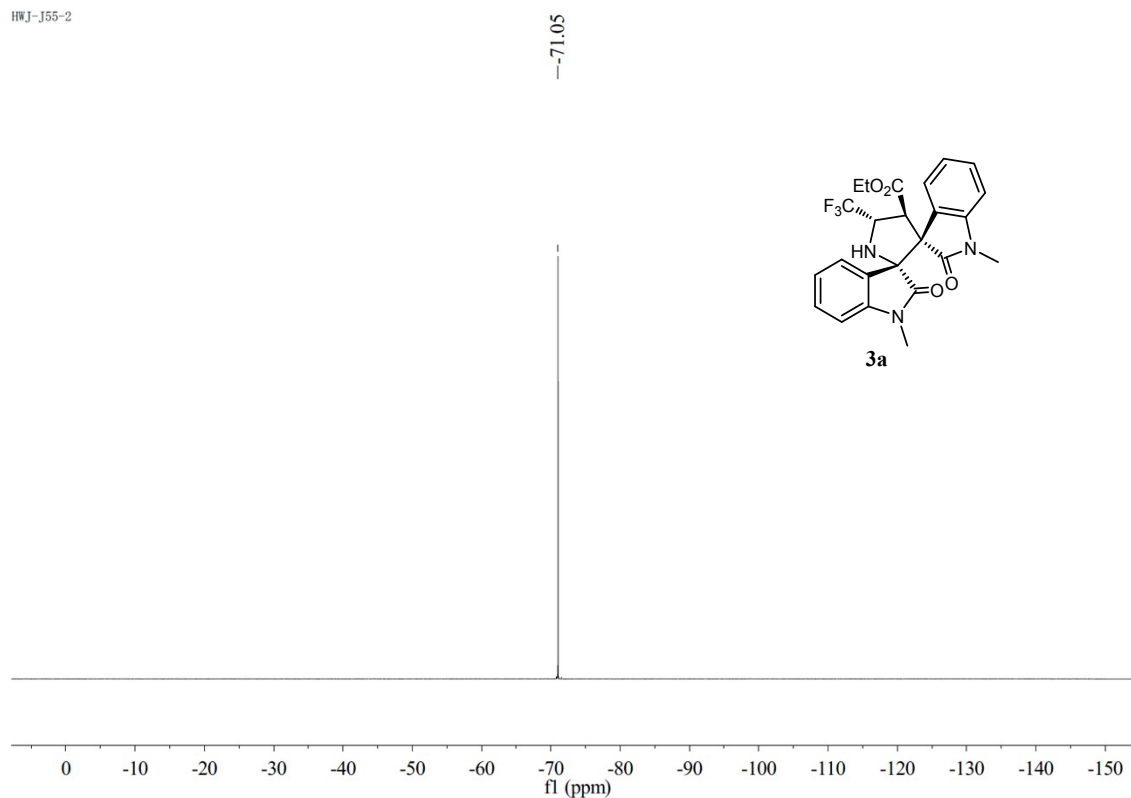


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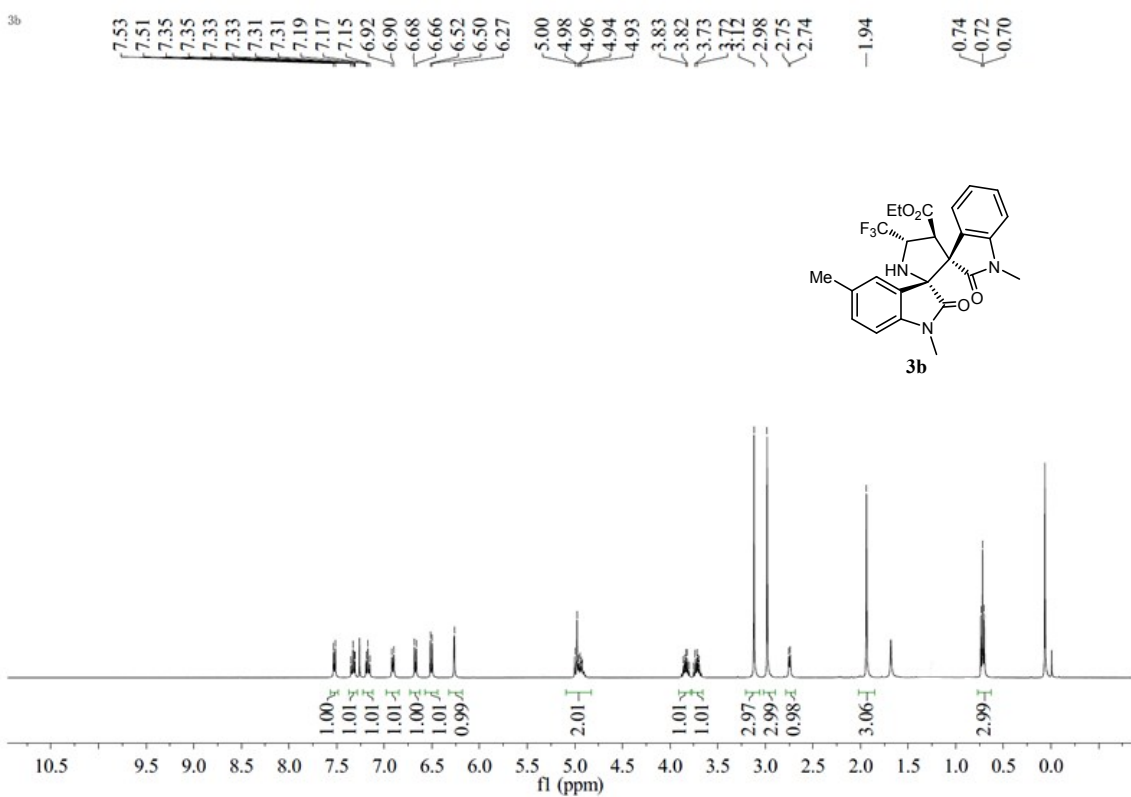


¹⁹F NMR of compound **3a** (in CDCl₃)

HWJ-J55-2

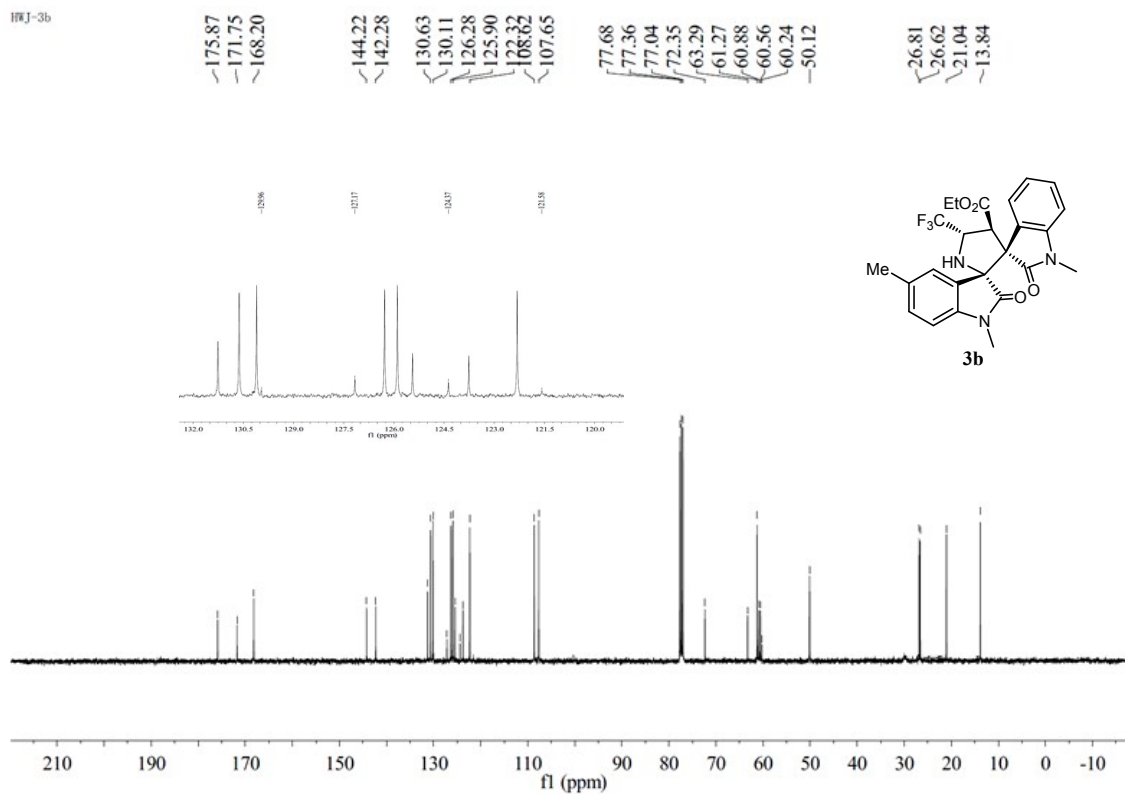


¹H NMR of compound **3b** (in CDCl₃)



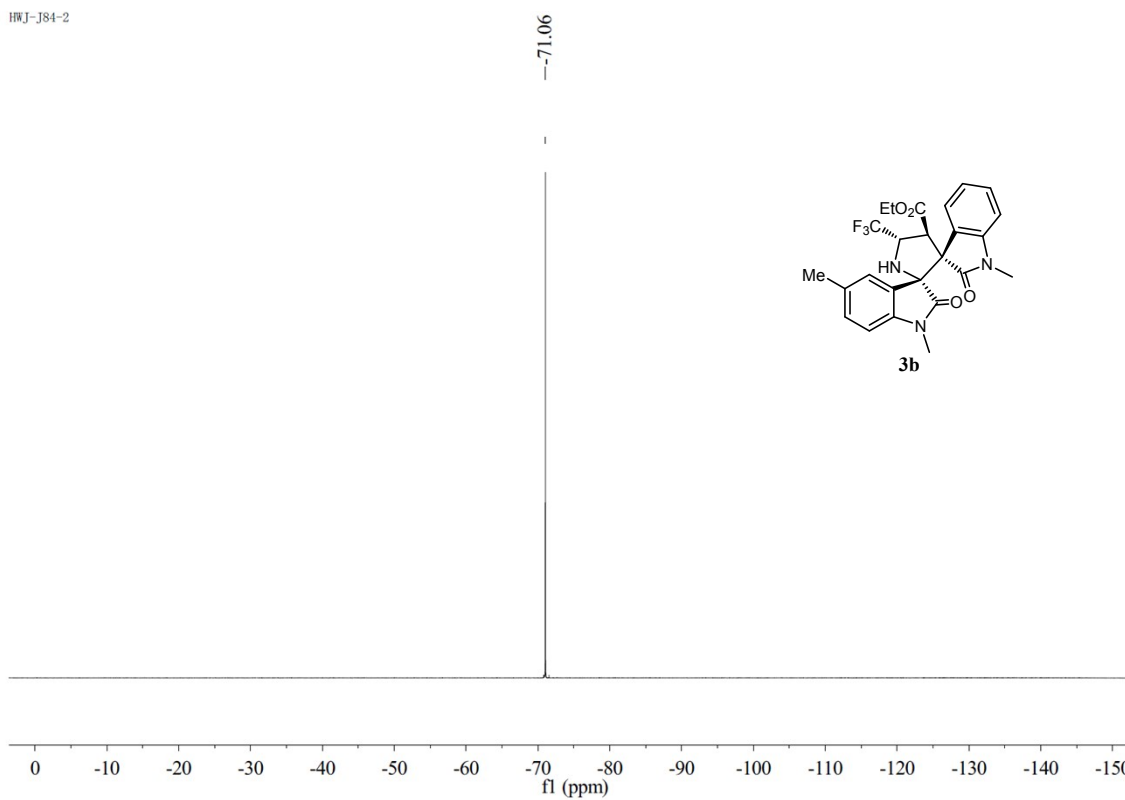
¹³CNMR of compound **3b** (in CDCl₃)

HWJ-3b

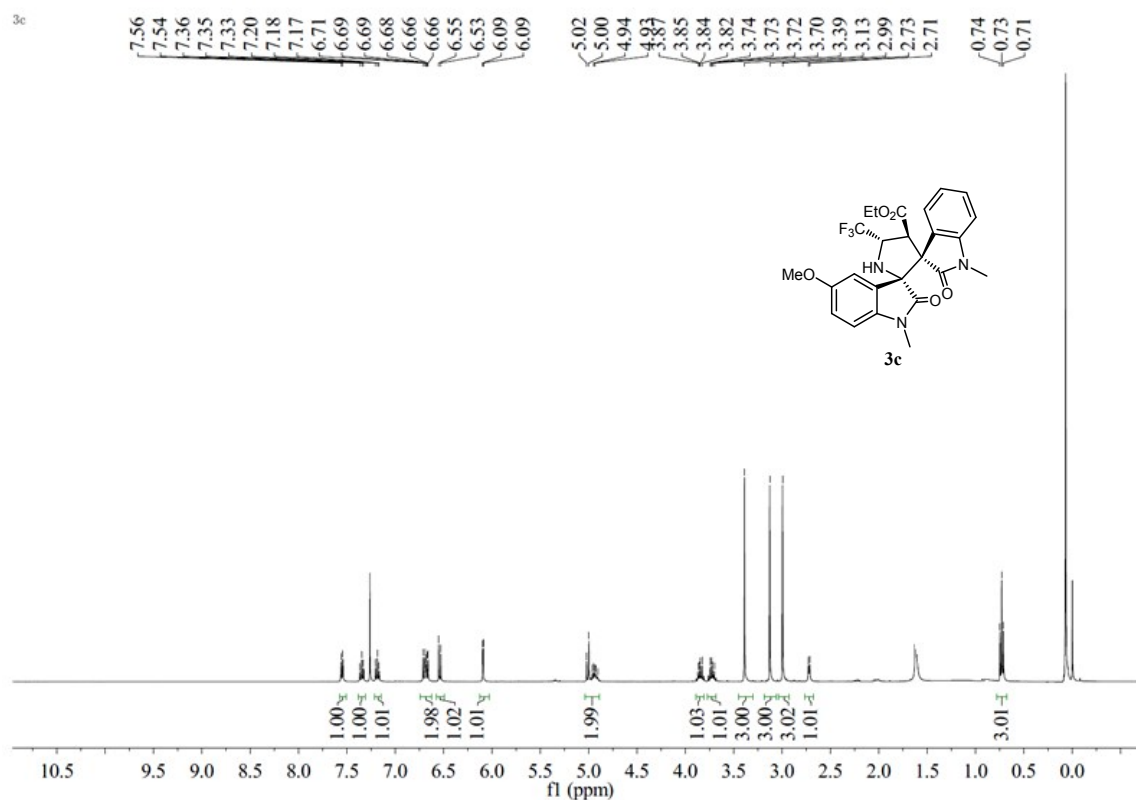


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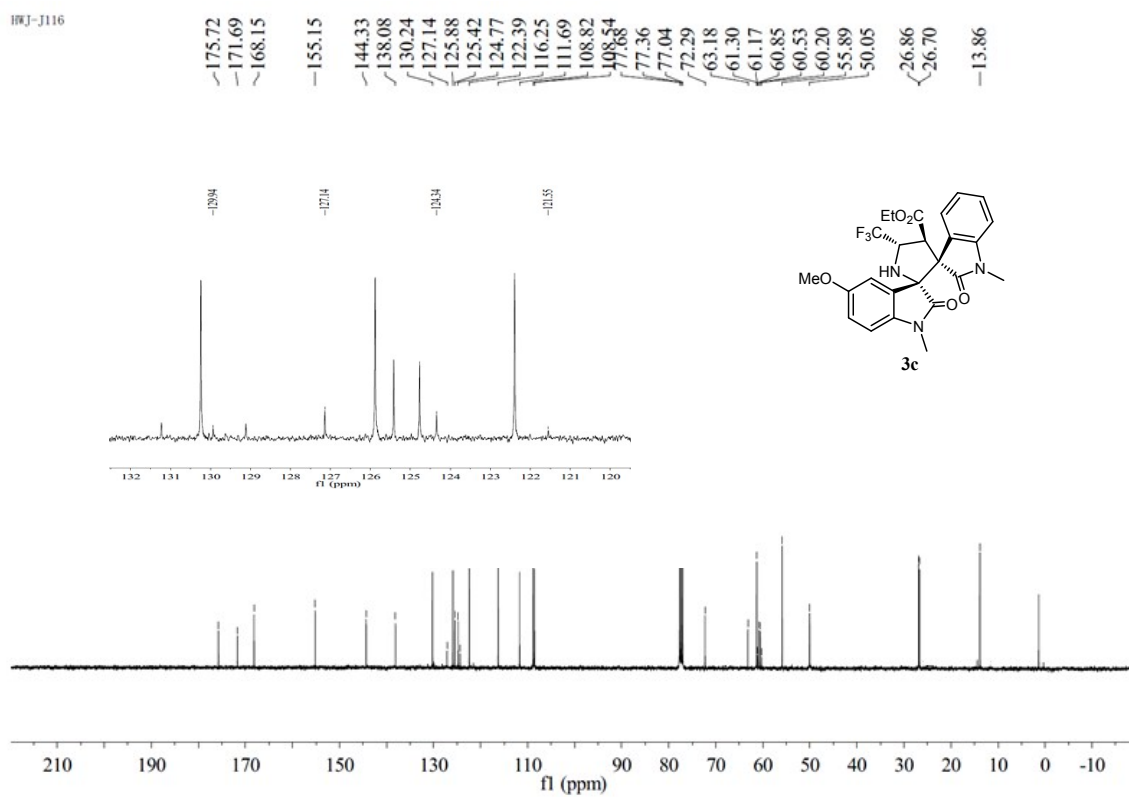
HWJ-384-2



¹H NMR of compound **3c** (in CDCl₃)

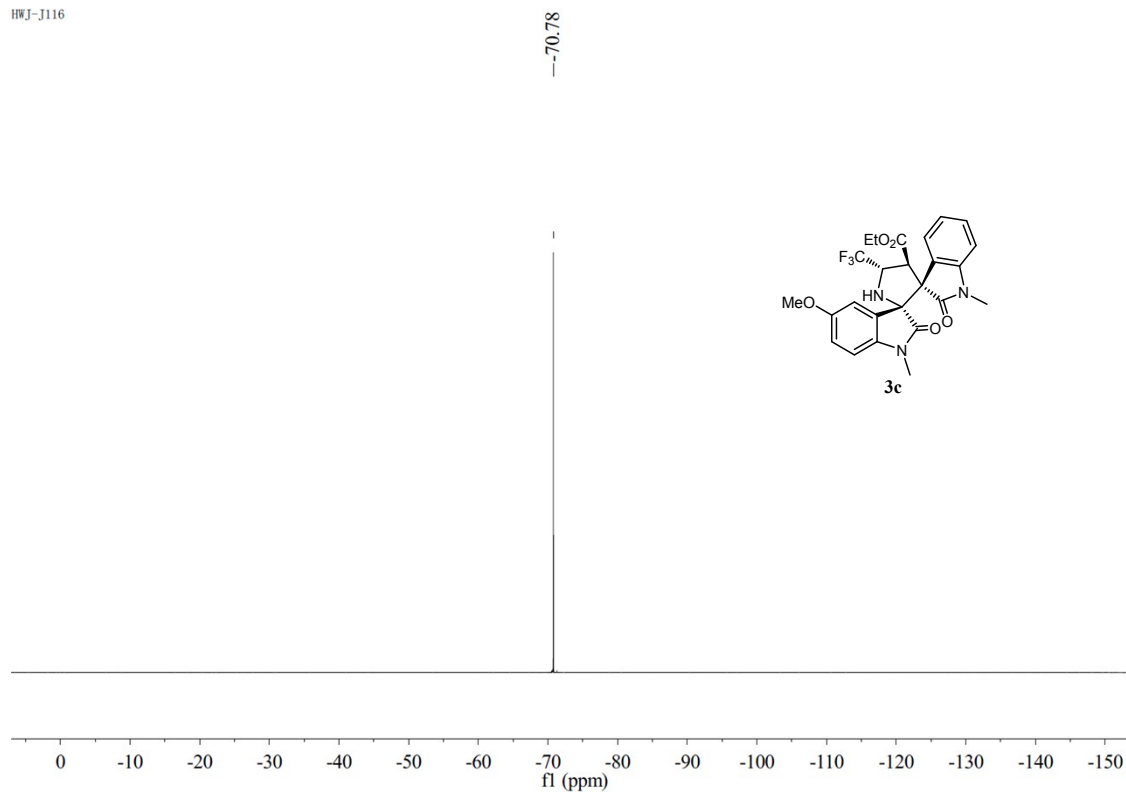


¹³C NMR of compound **3c** (in CDCl₃)

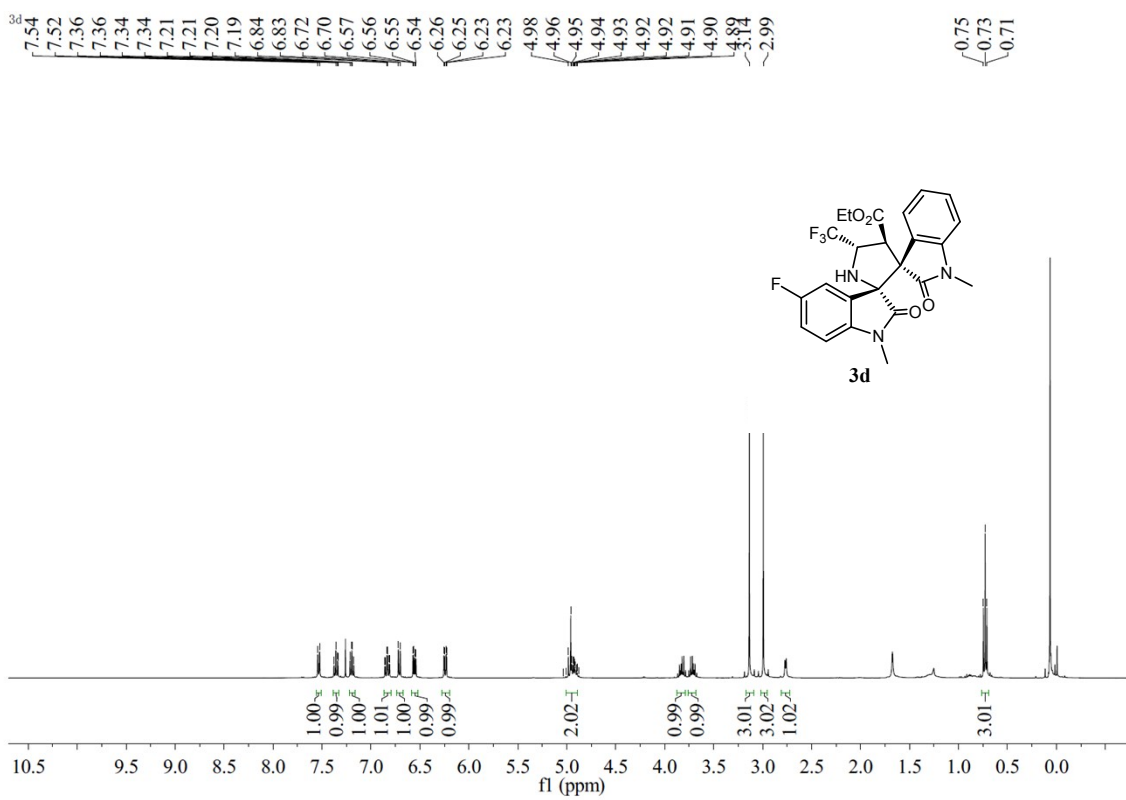


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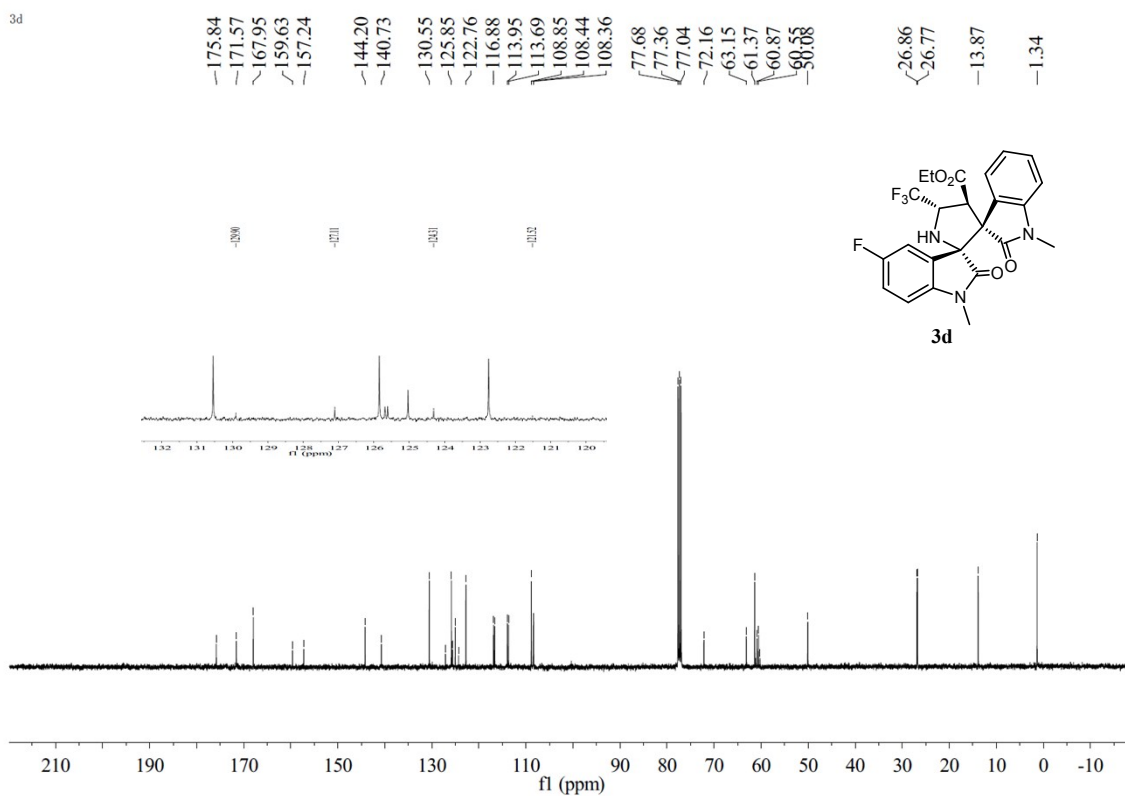
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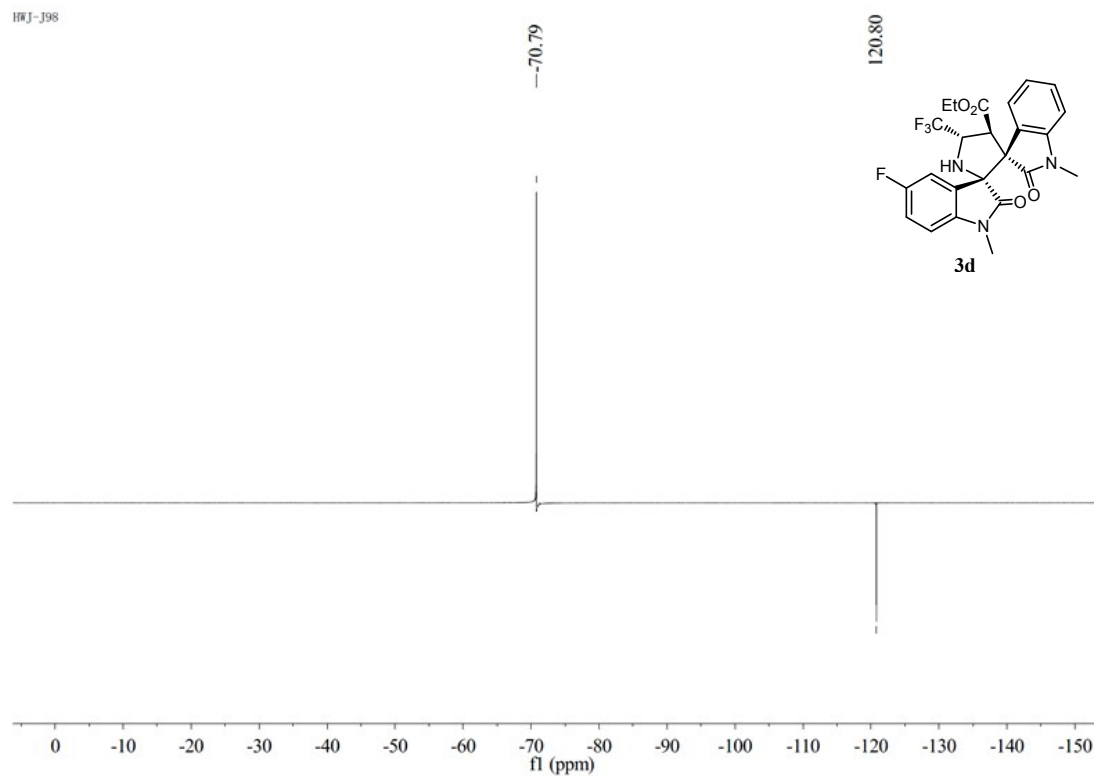
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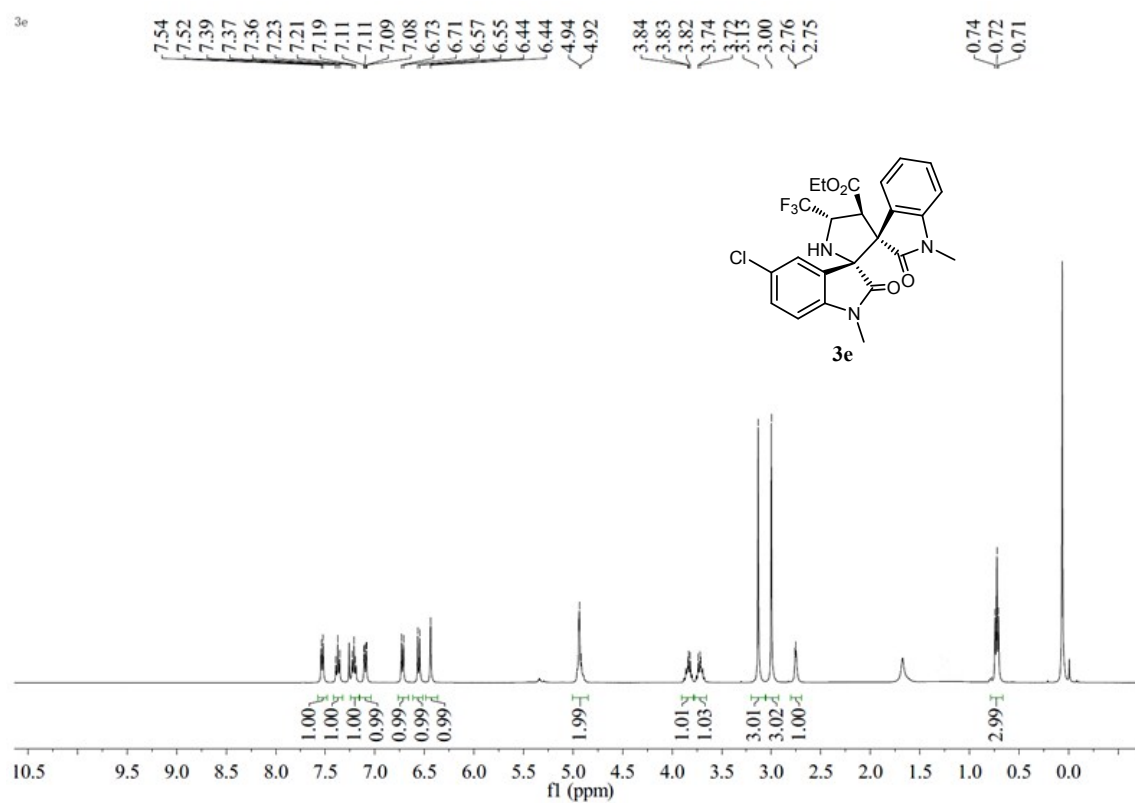
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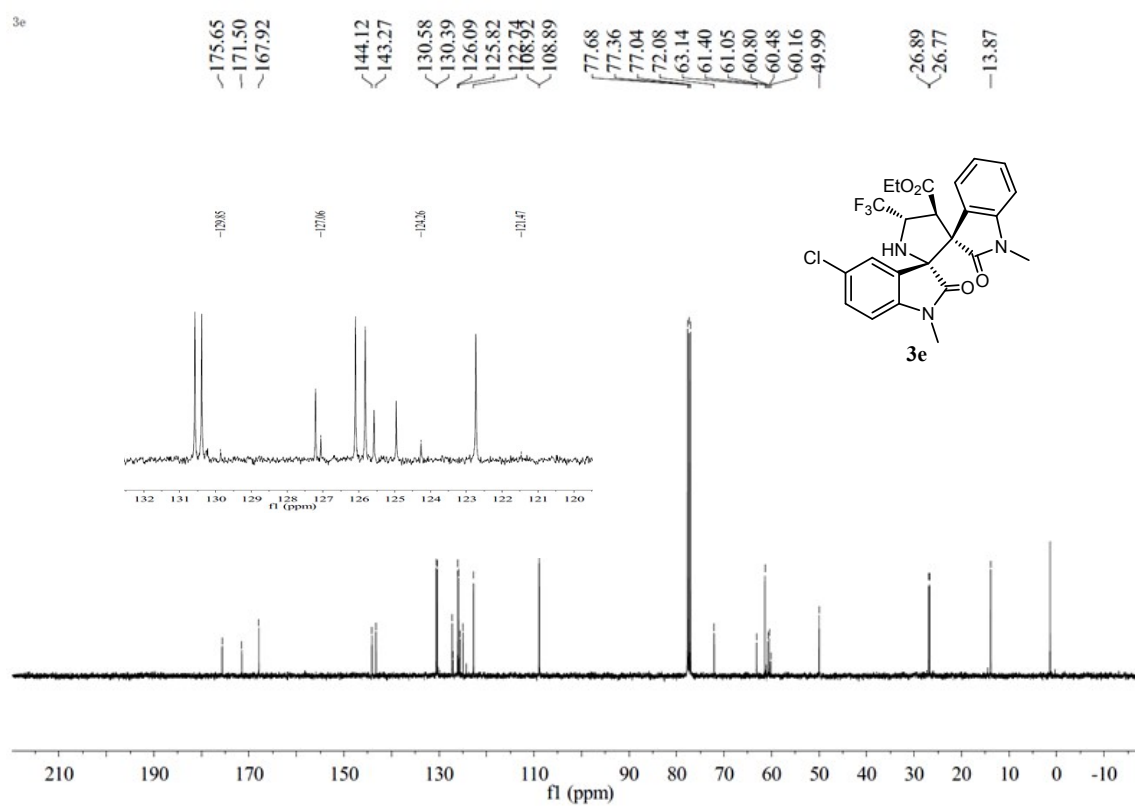
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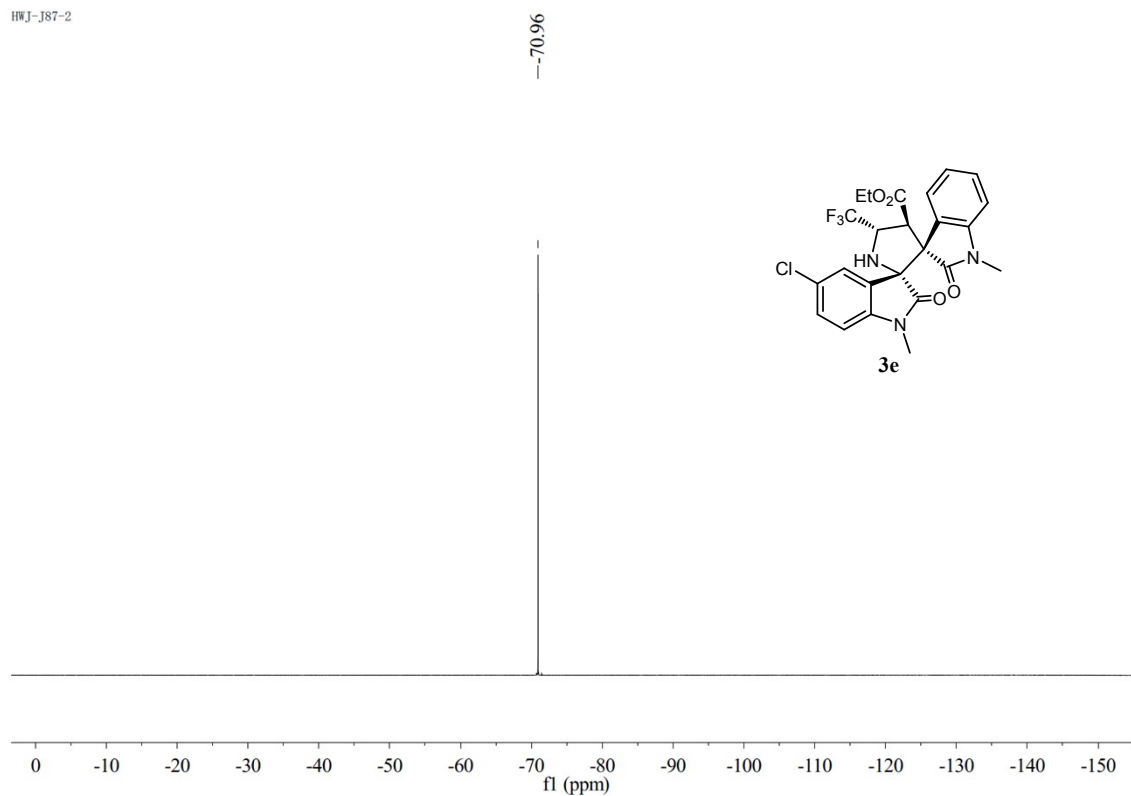


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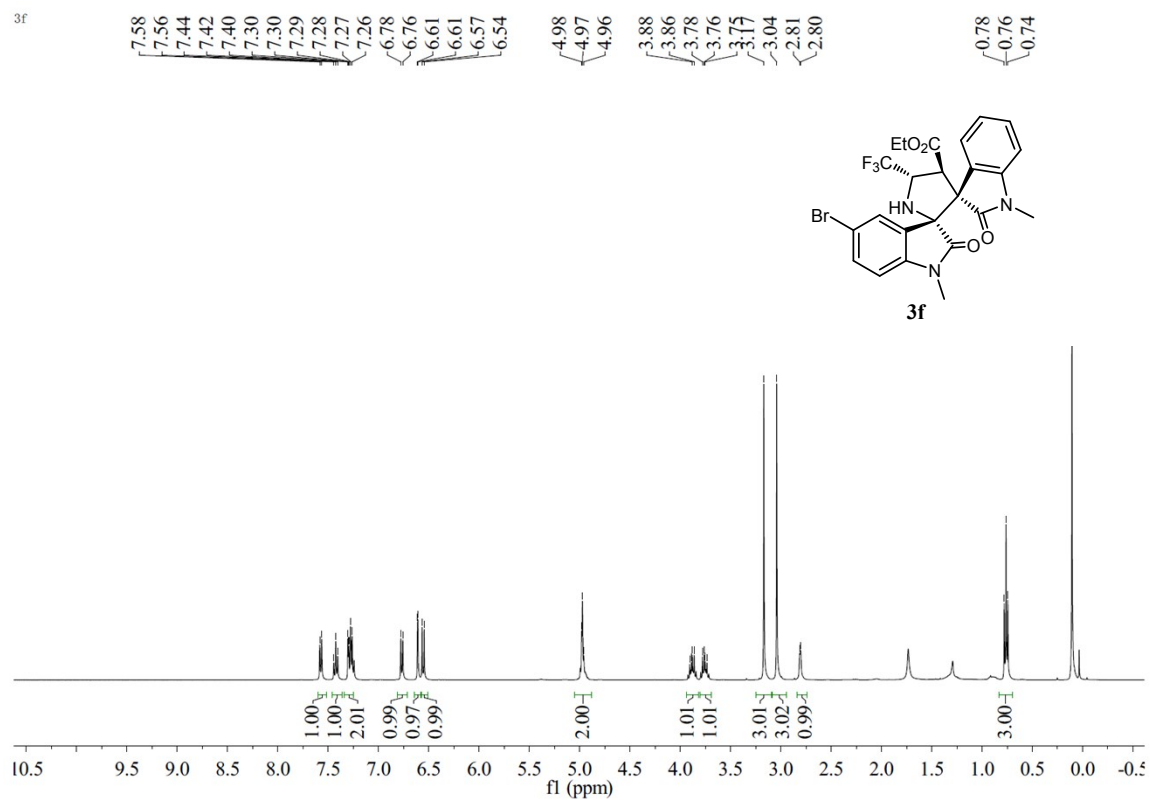
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HWJ-J87-2

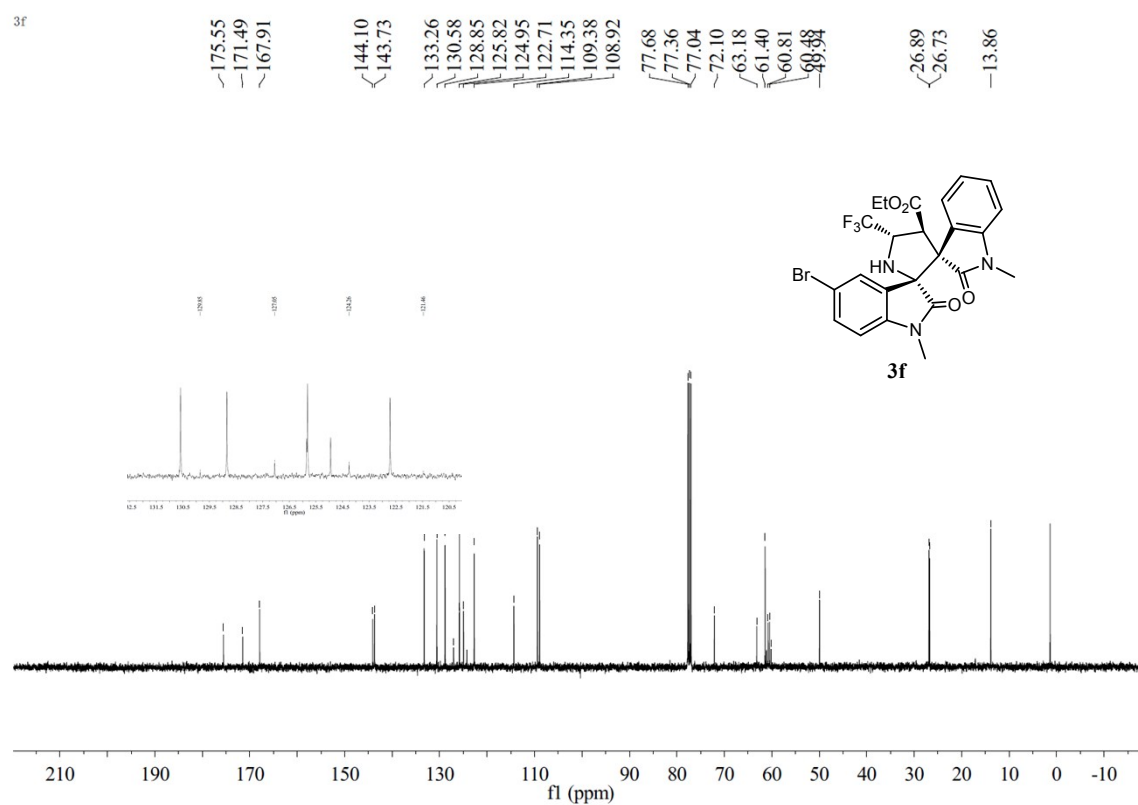


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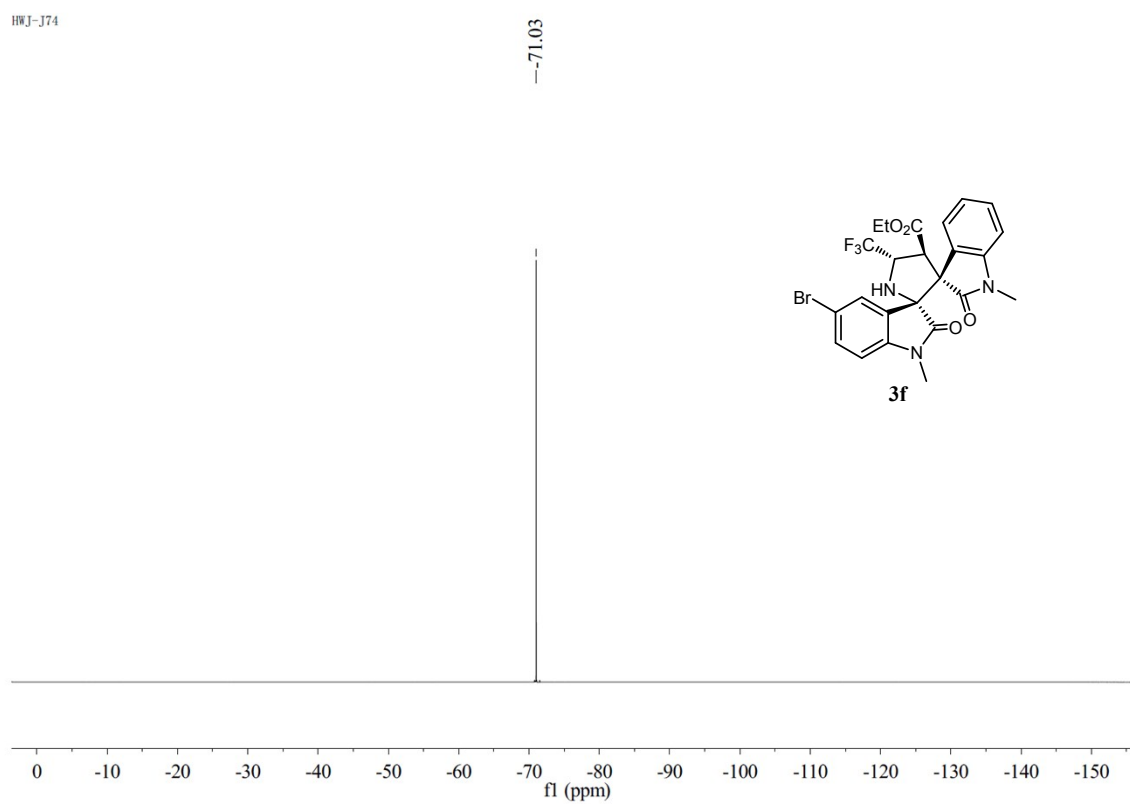
3f



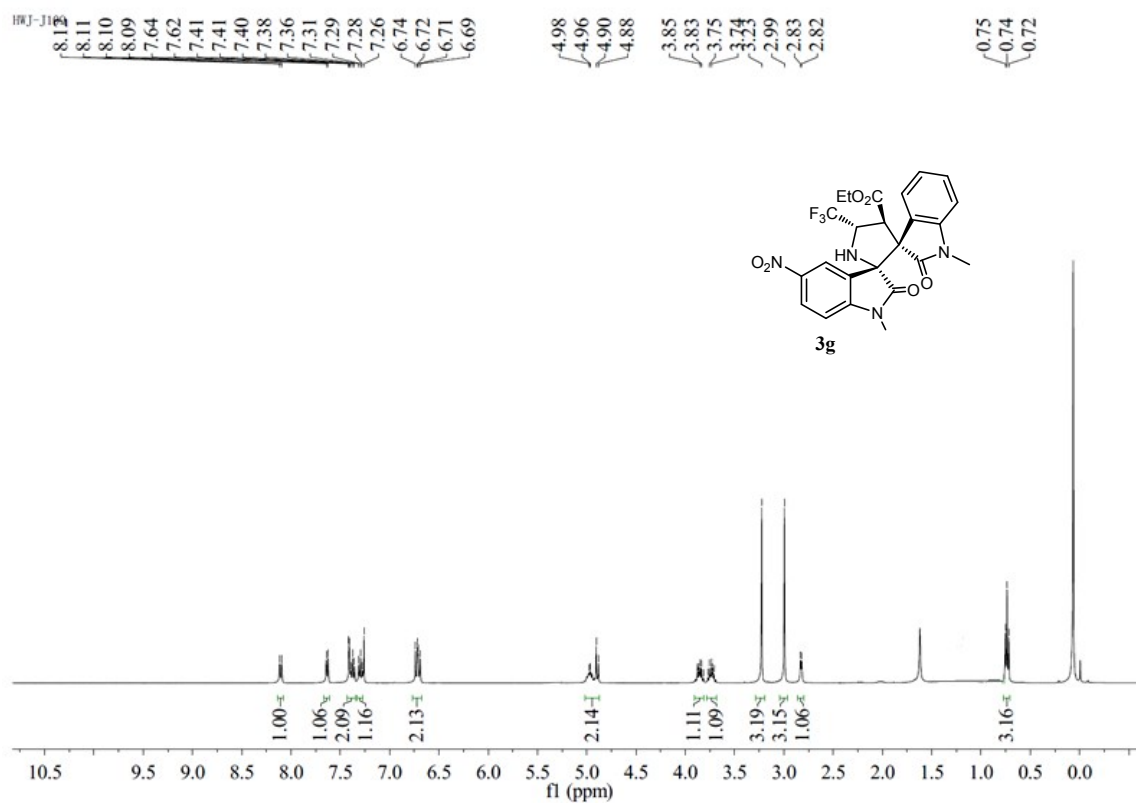
¹³CNMR of compound **3f** (in CDCl₃)



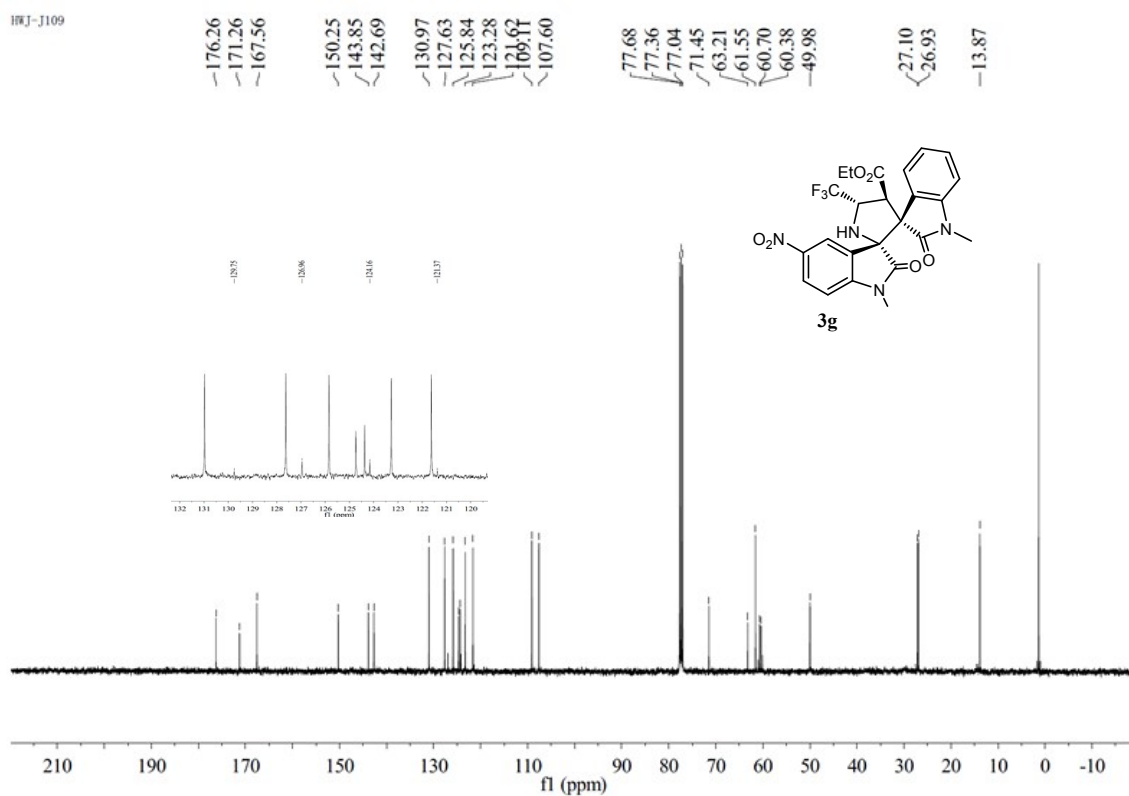
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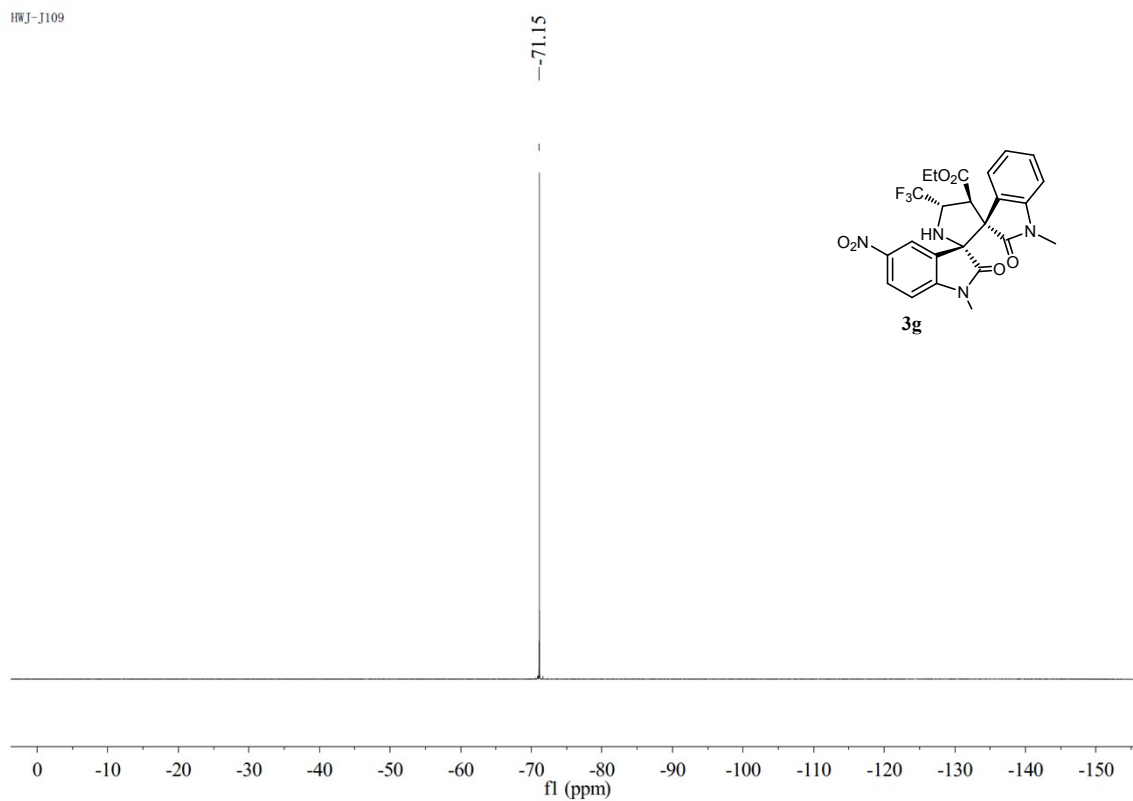


¹³C NMR of compound **3g** (in CDCl₃)



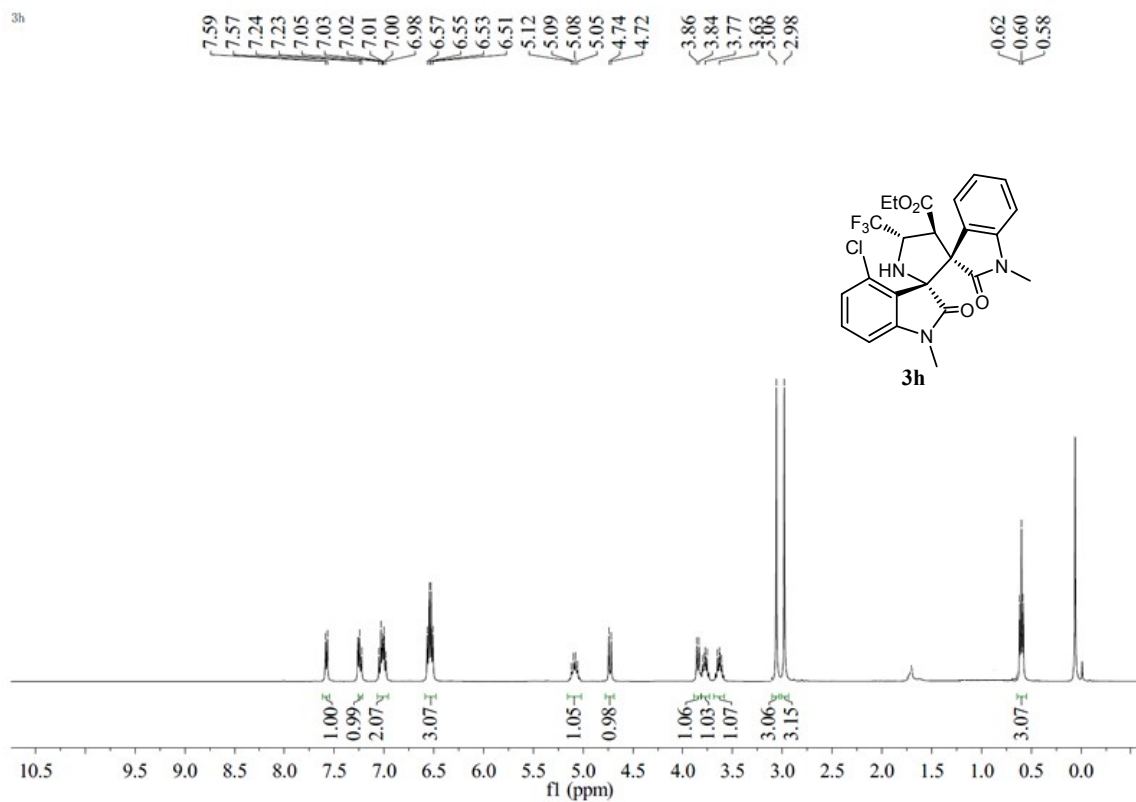
¹⁹F NMR of compound **3g** (in CDCl₃)

HWJ-1109



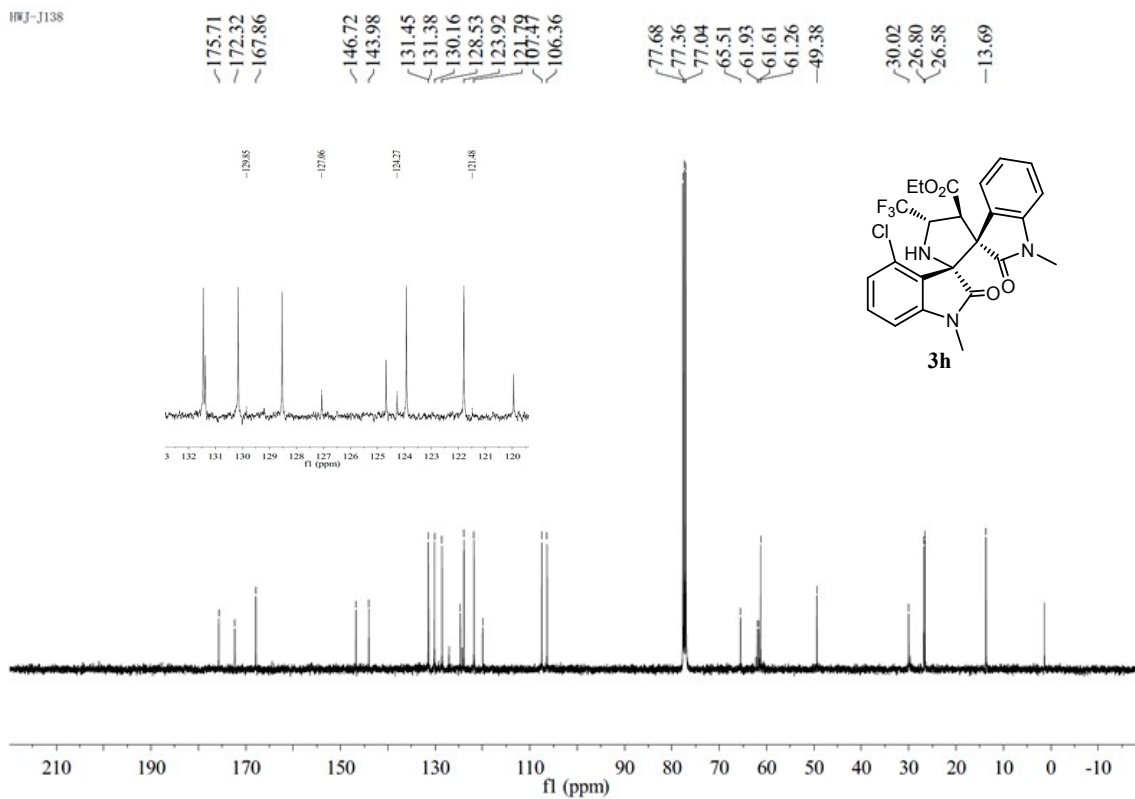
¹H NMR of compound **3h** (in CDCl₃)

3h



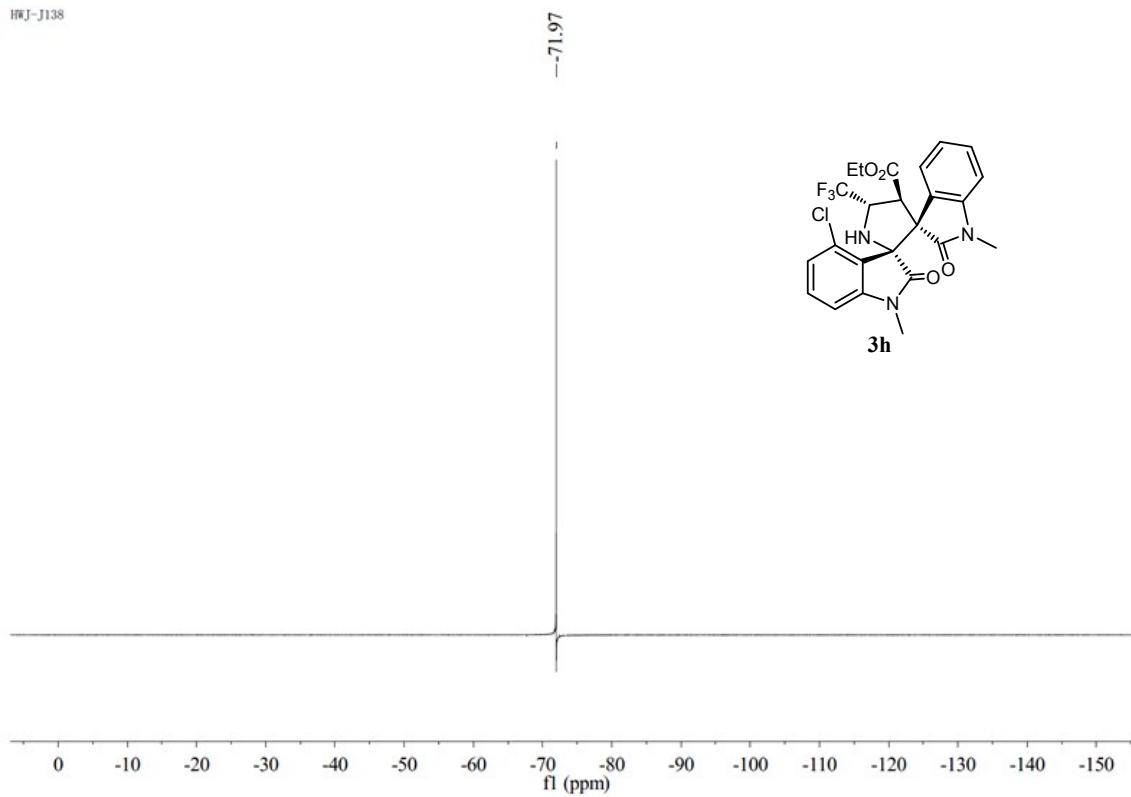
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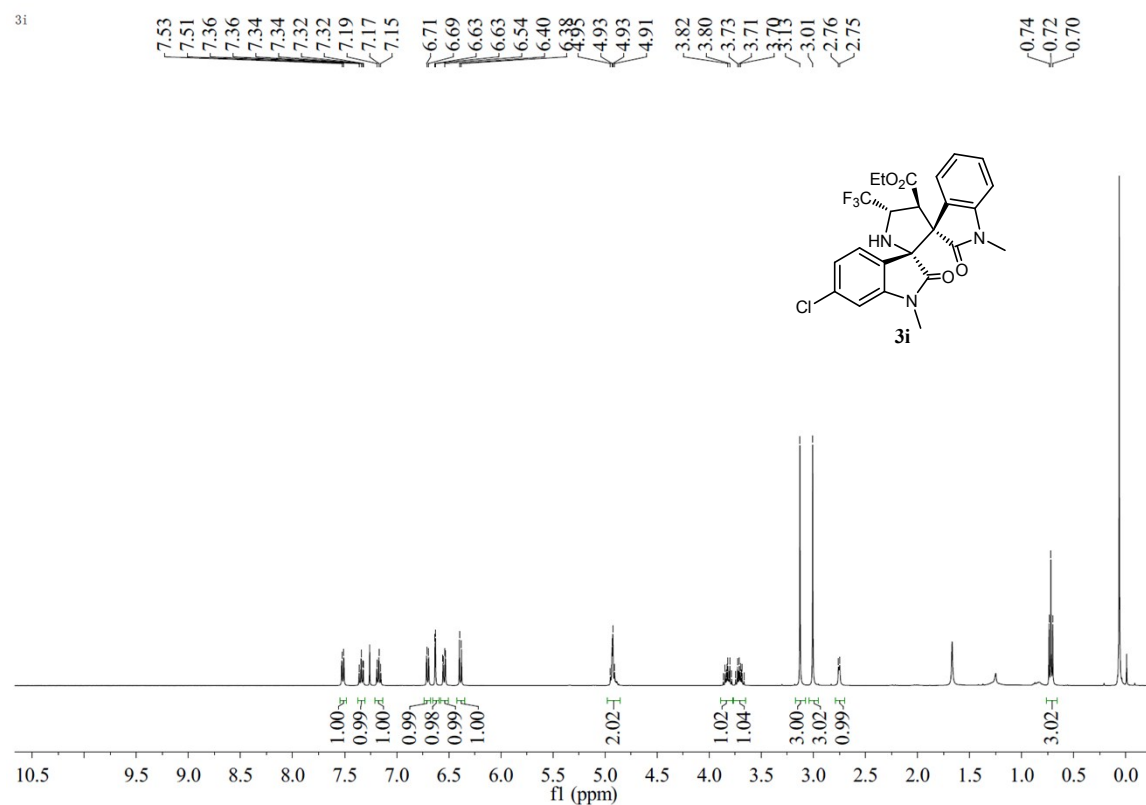


¹⁹FNMR of compound **3h** (in CDCl₃)

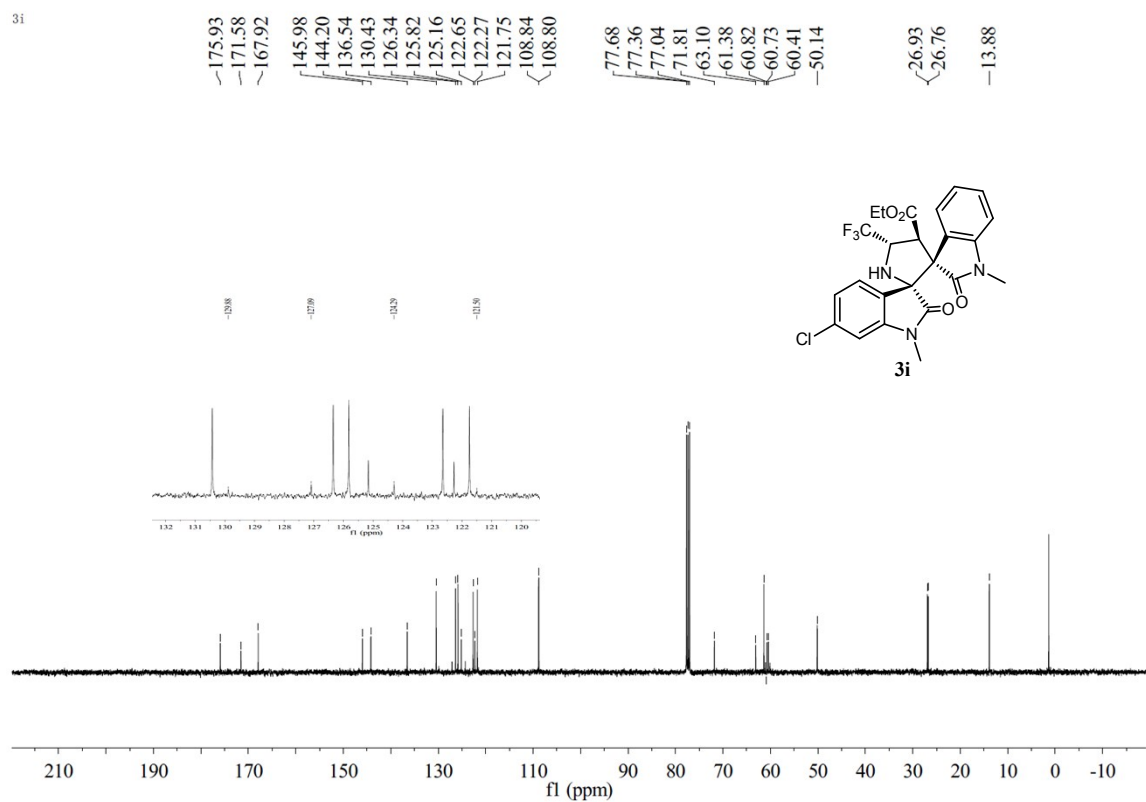
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¹H NMR of compound **3i** (in CDCl₃)

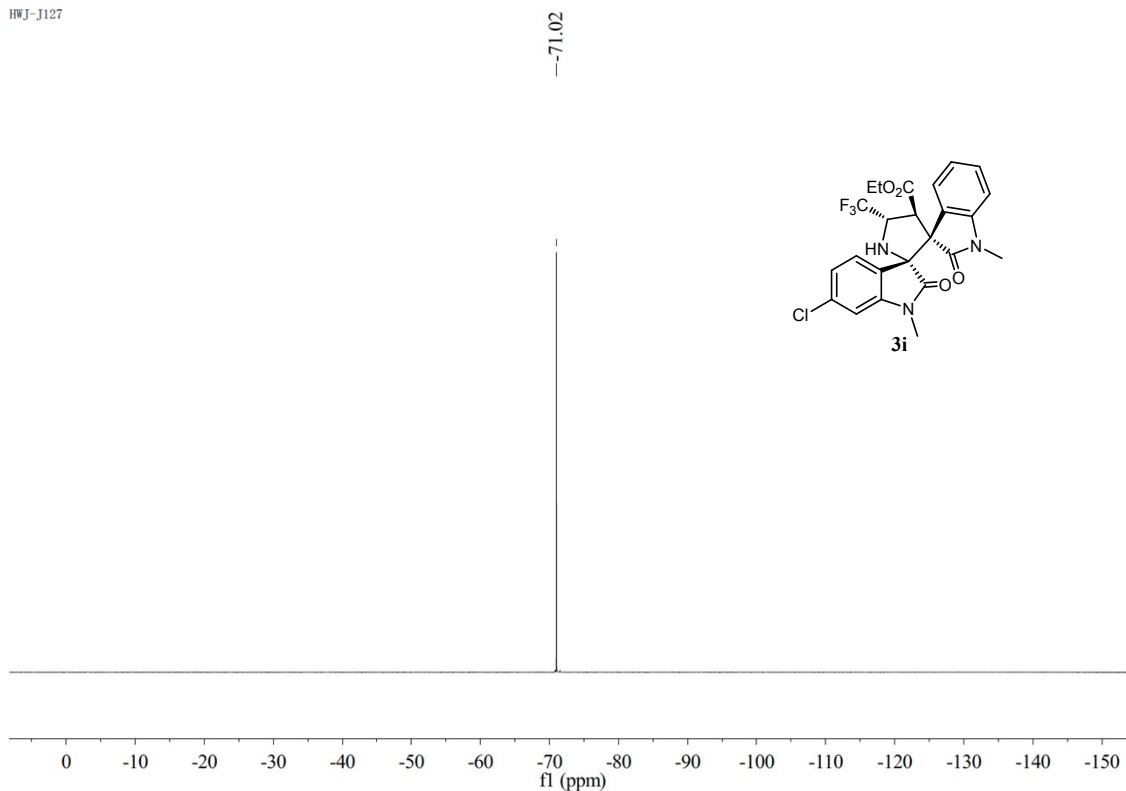


¹³C NMR of compound **3i** (in CDCl₃)

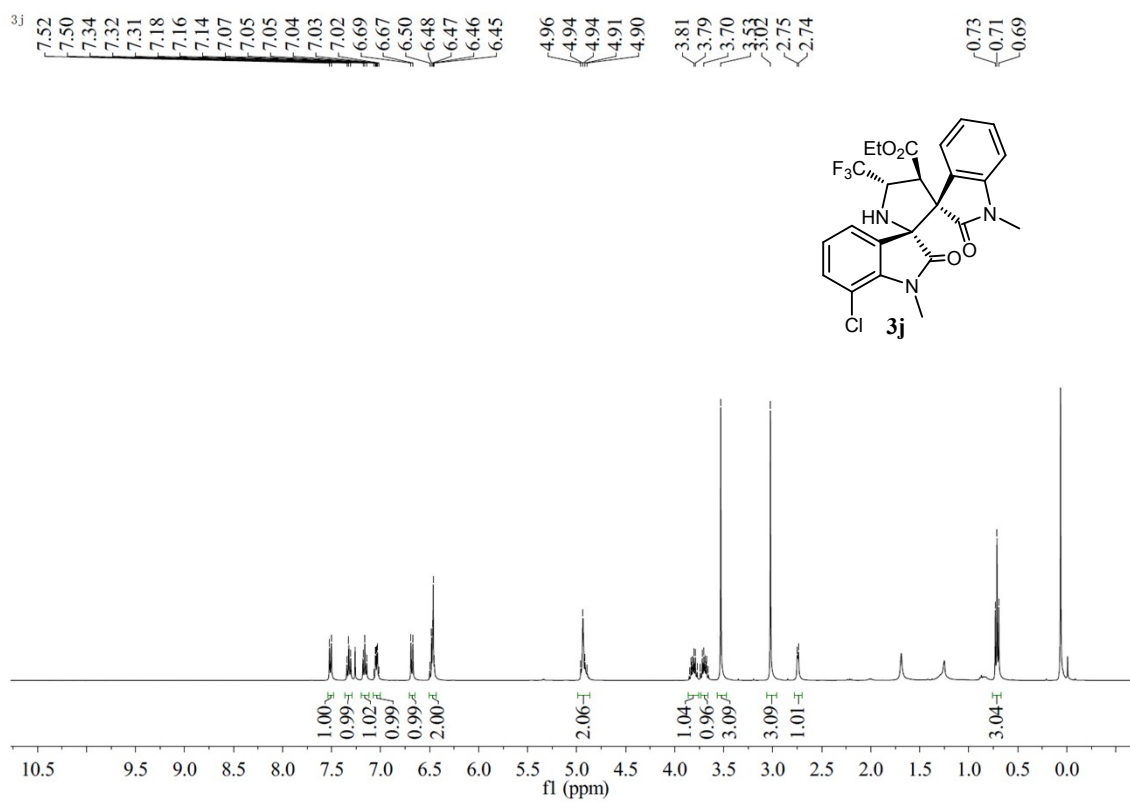


^{19}F NMR of compound **3i** (in CDCl_3)

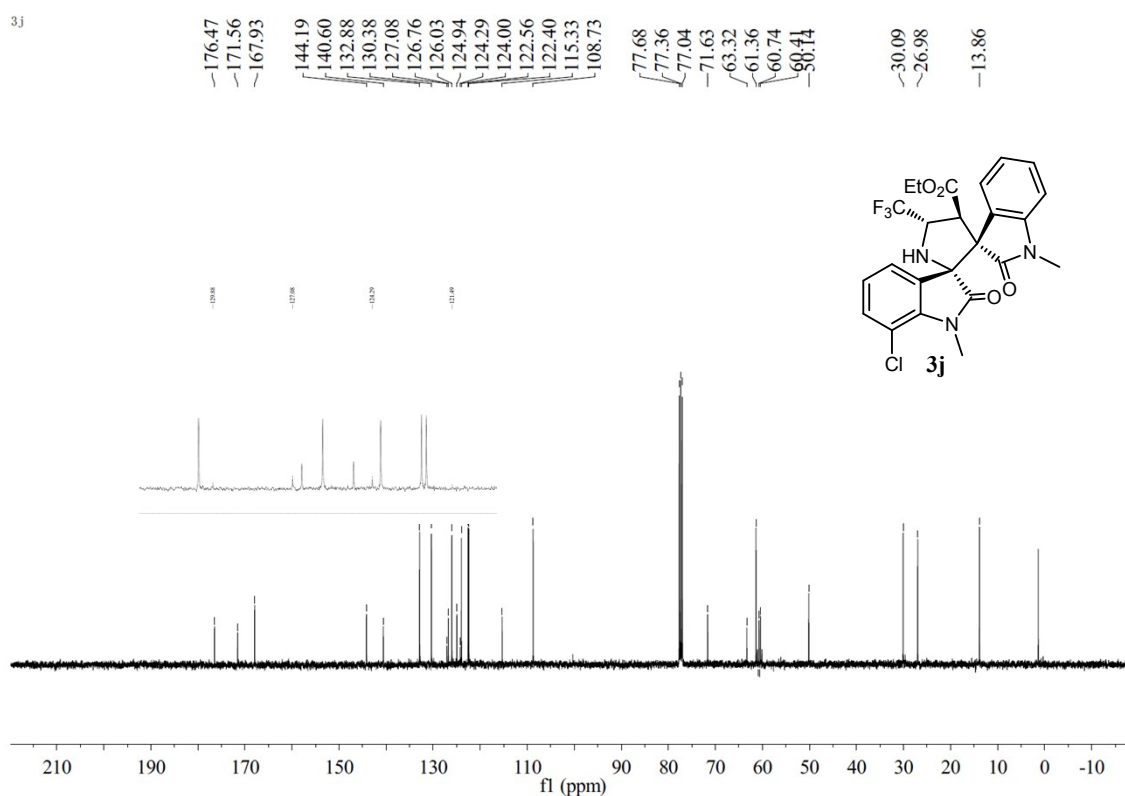
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^1H NMR of compound **3j** (in CDCl_3)

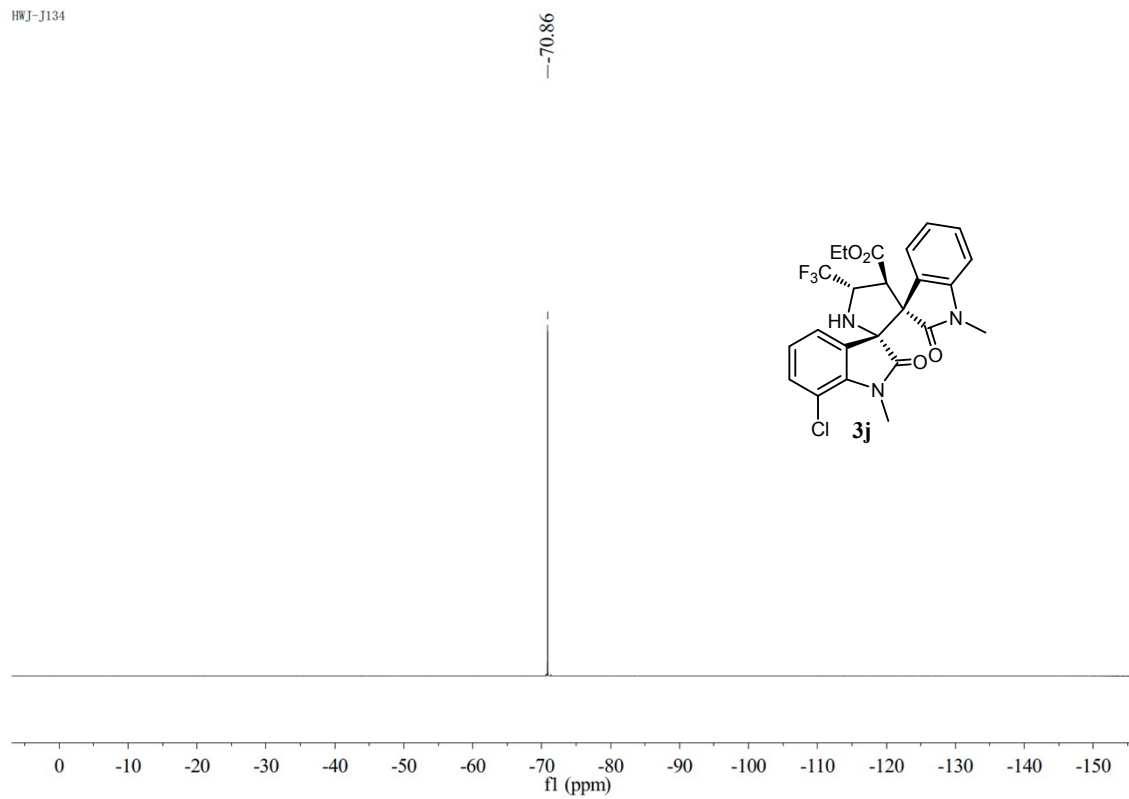


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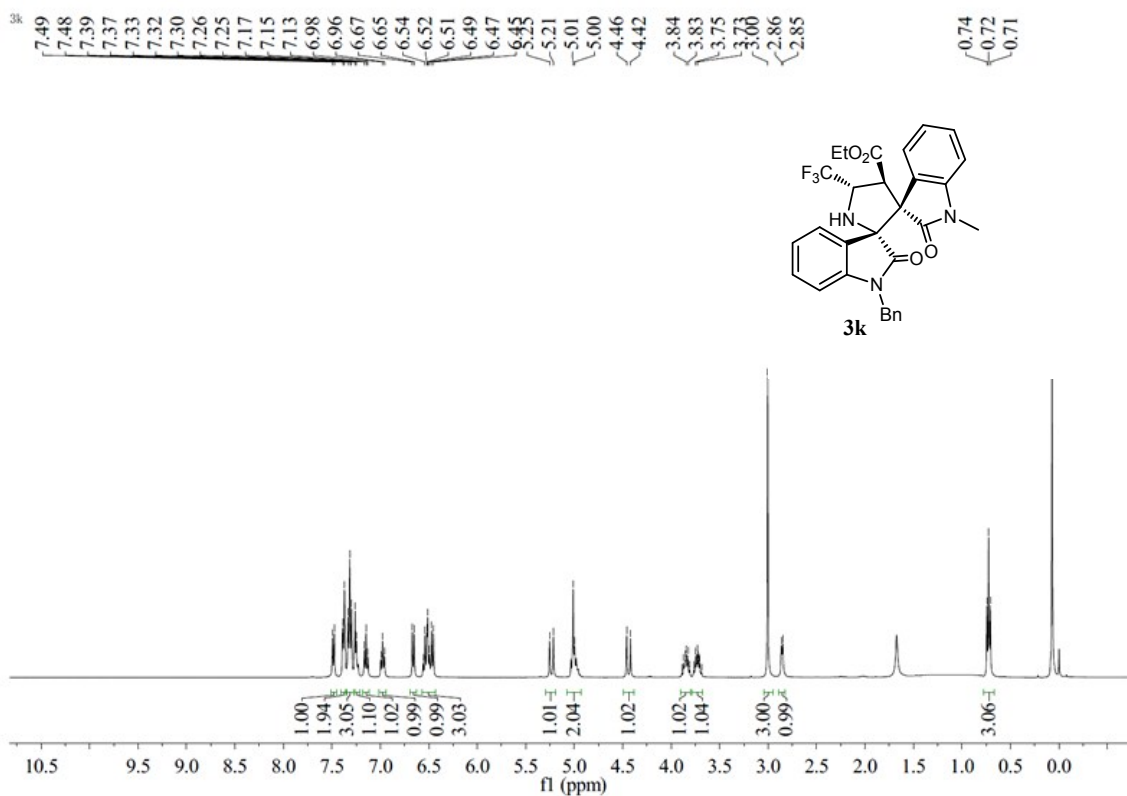


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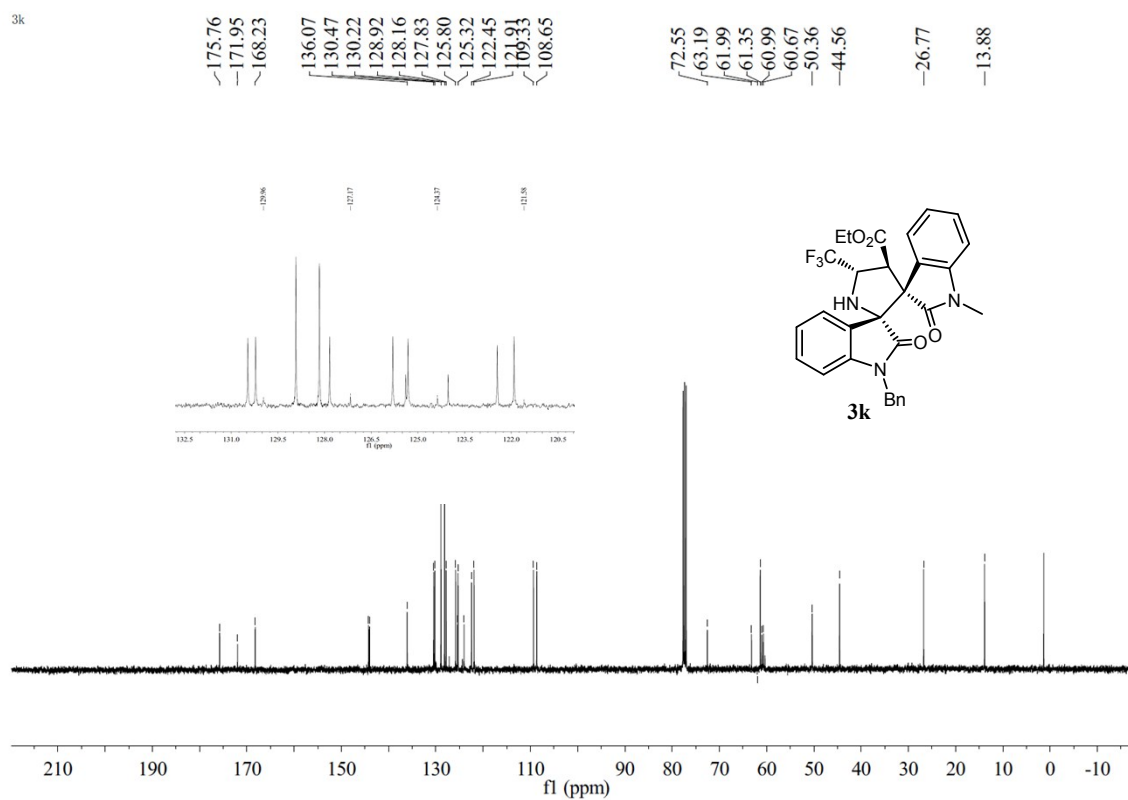
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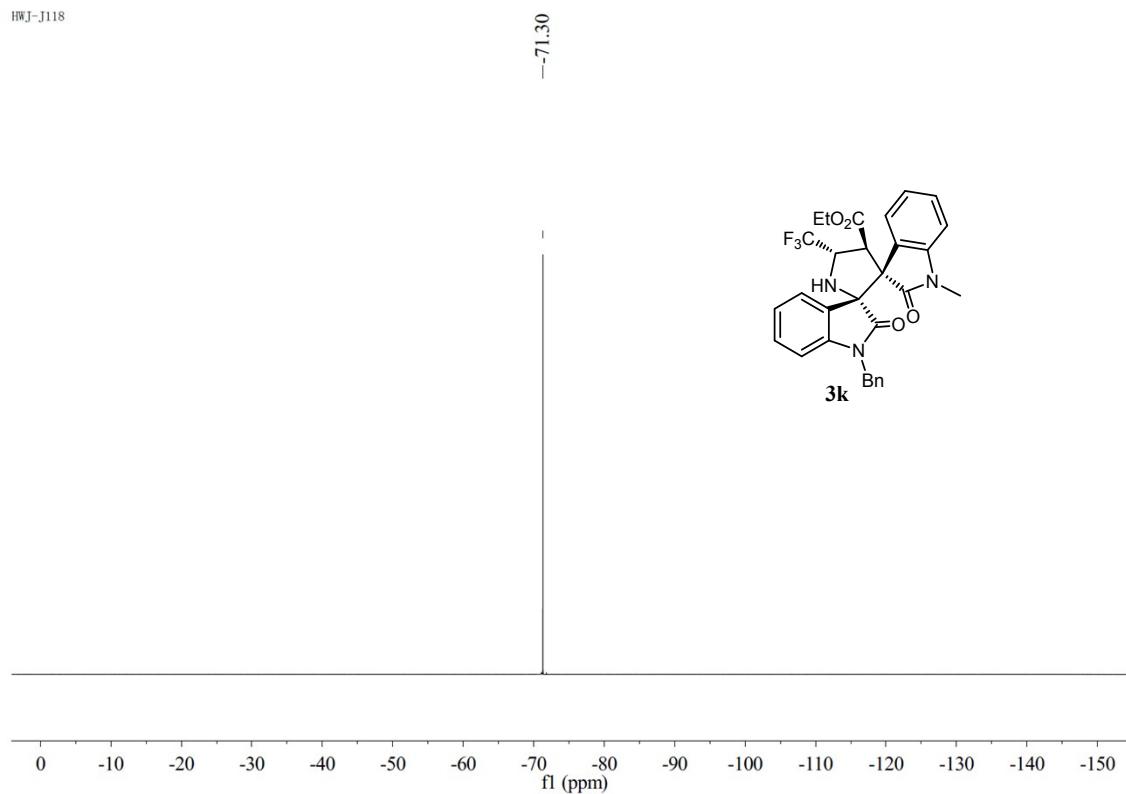


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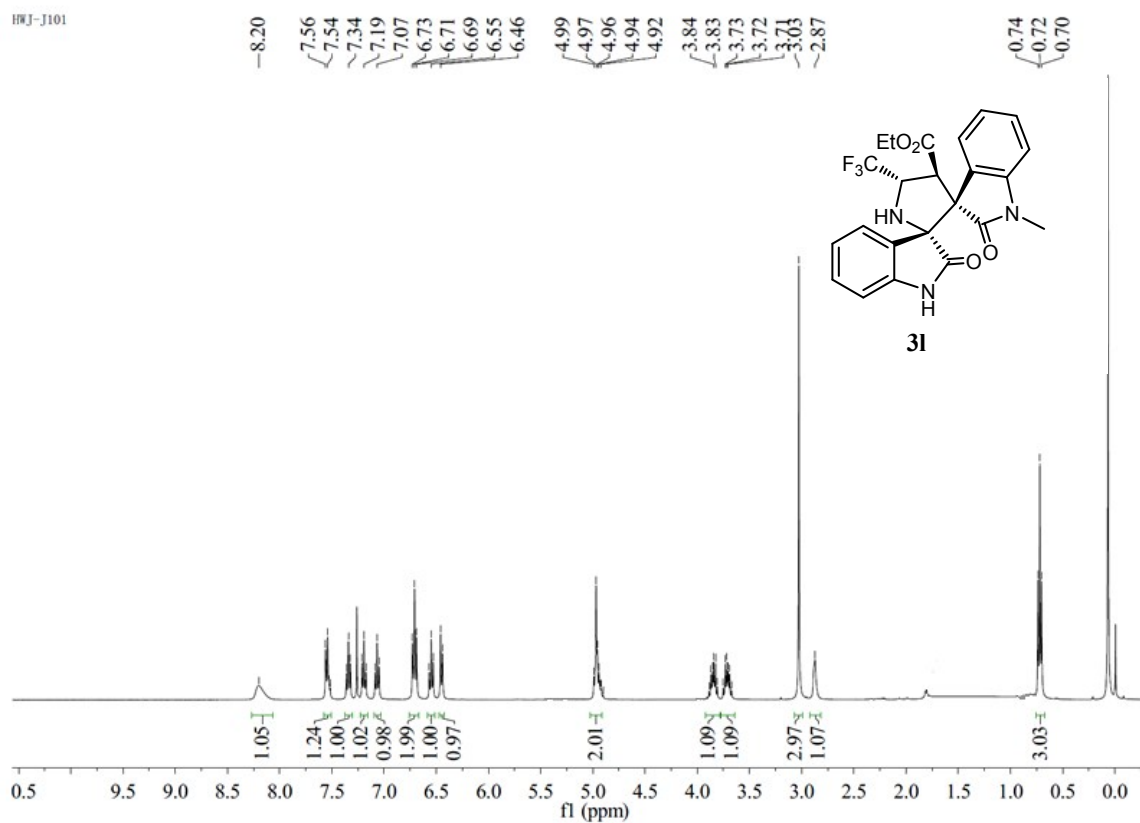
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HWJ-J118



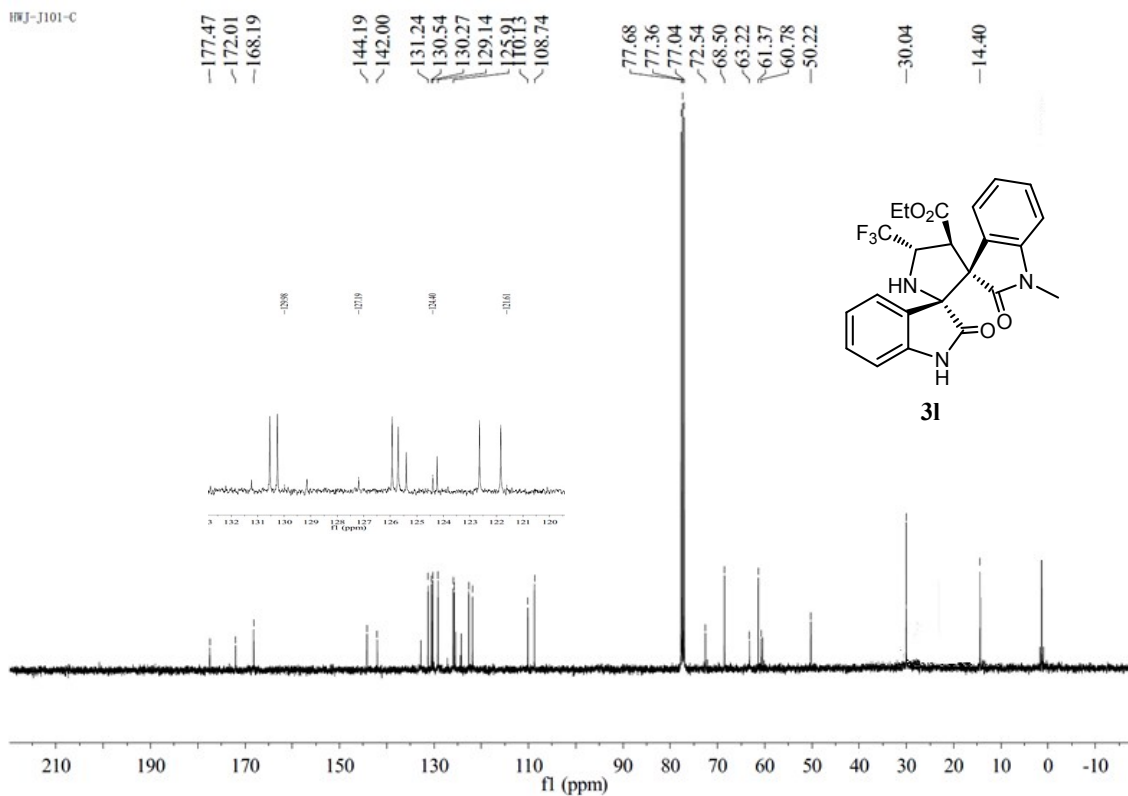
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HWJ-J101



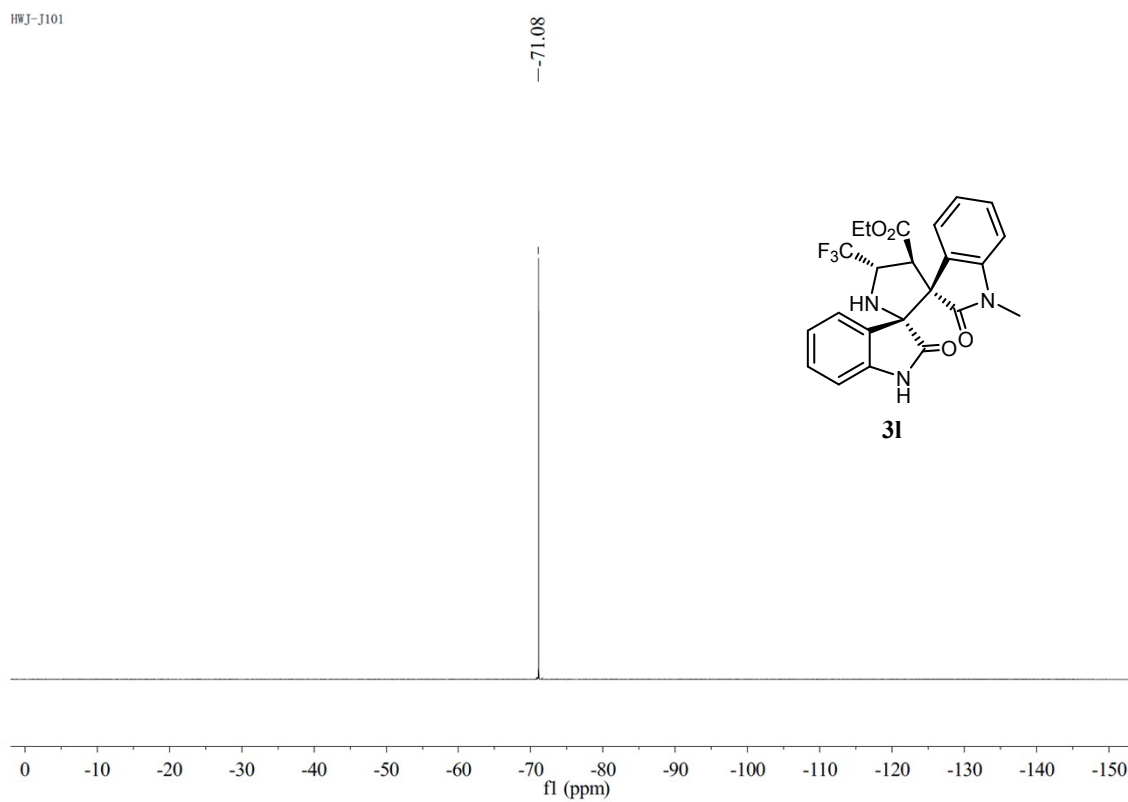
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HWJ-J101-C

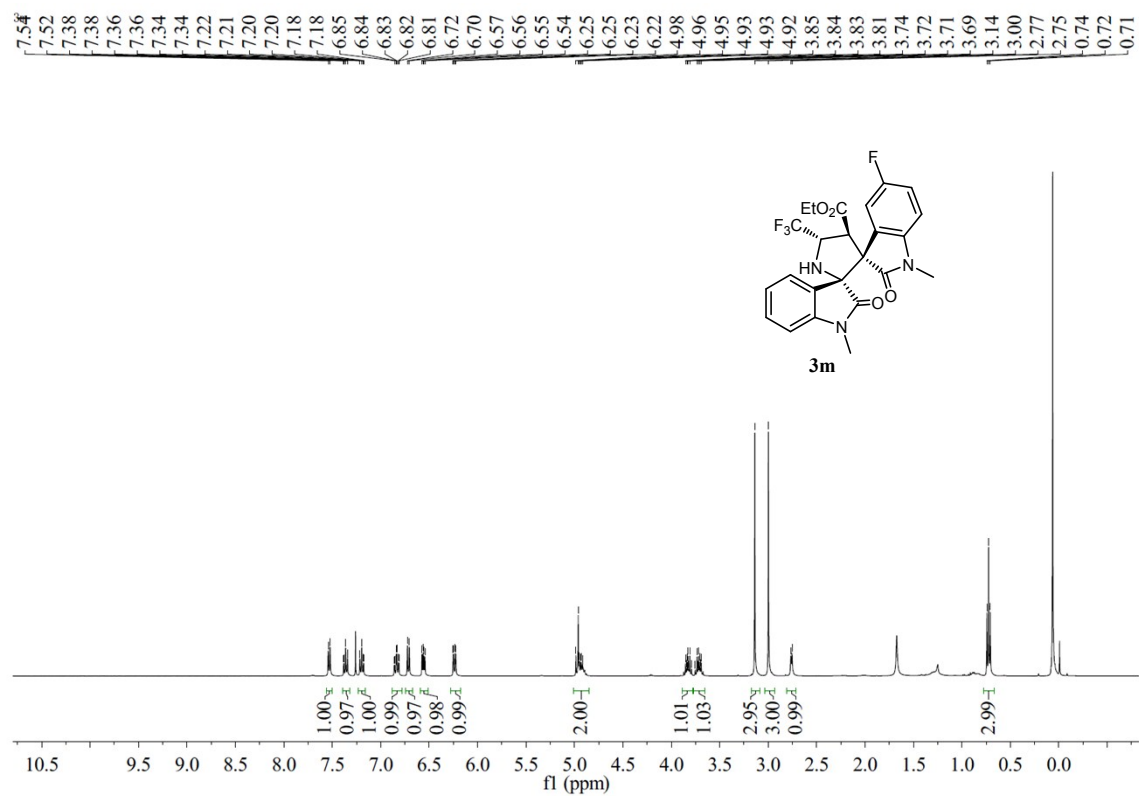


¹⁹FNMR of compound **31** (in CDCl₃)

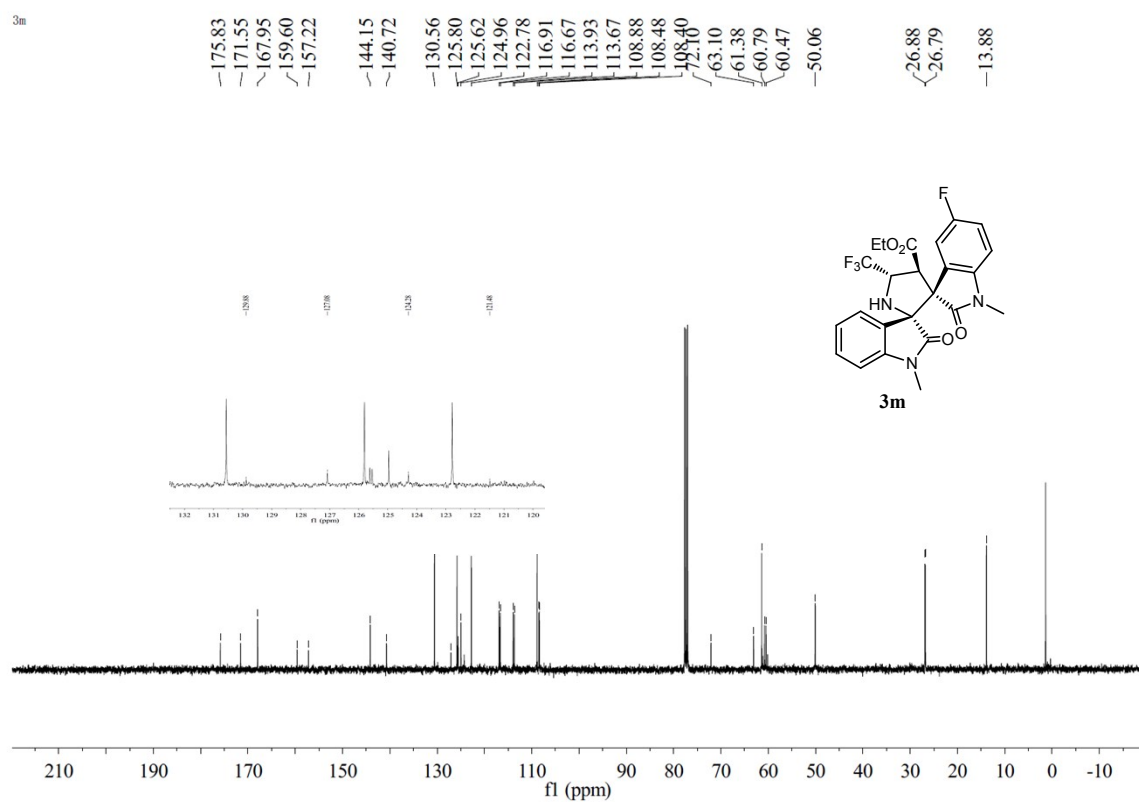
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¹H NMR of compound **3m** (in CDCl₃)

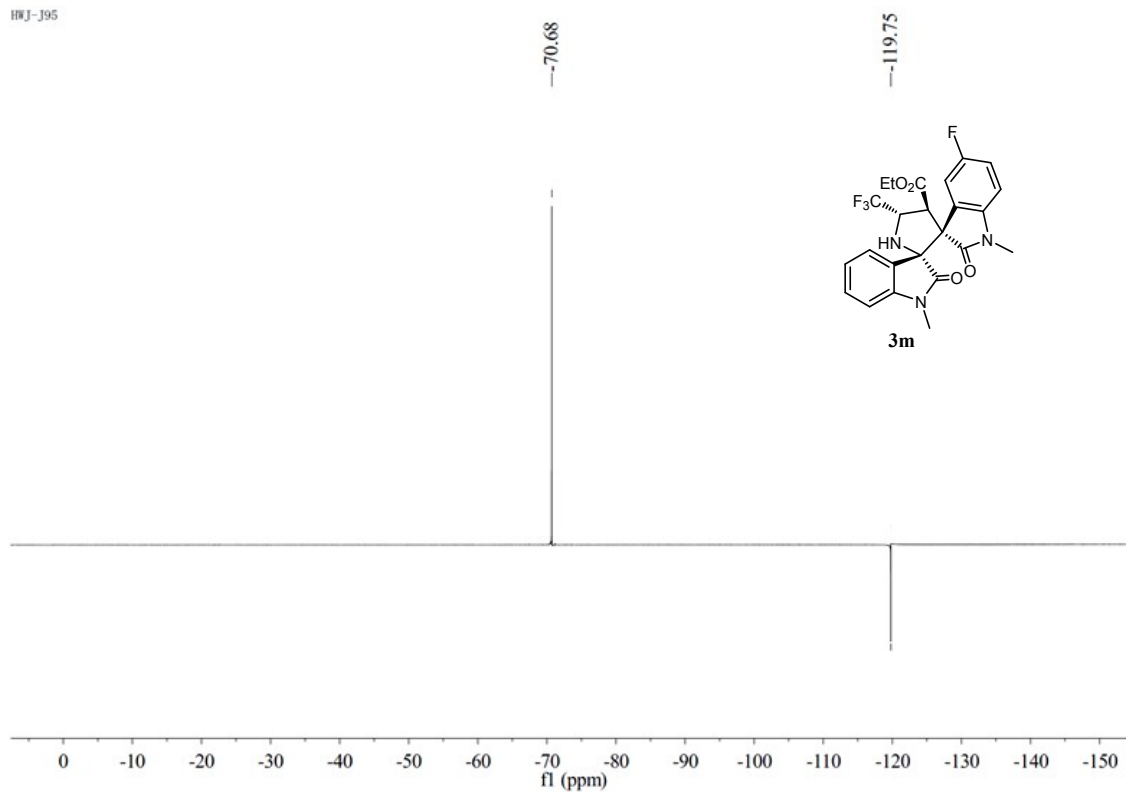


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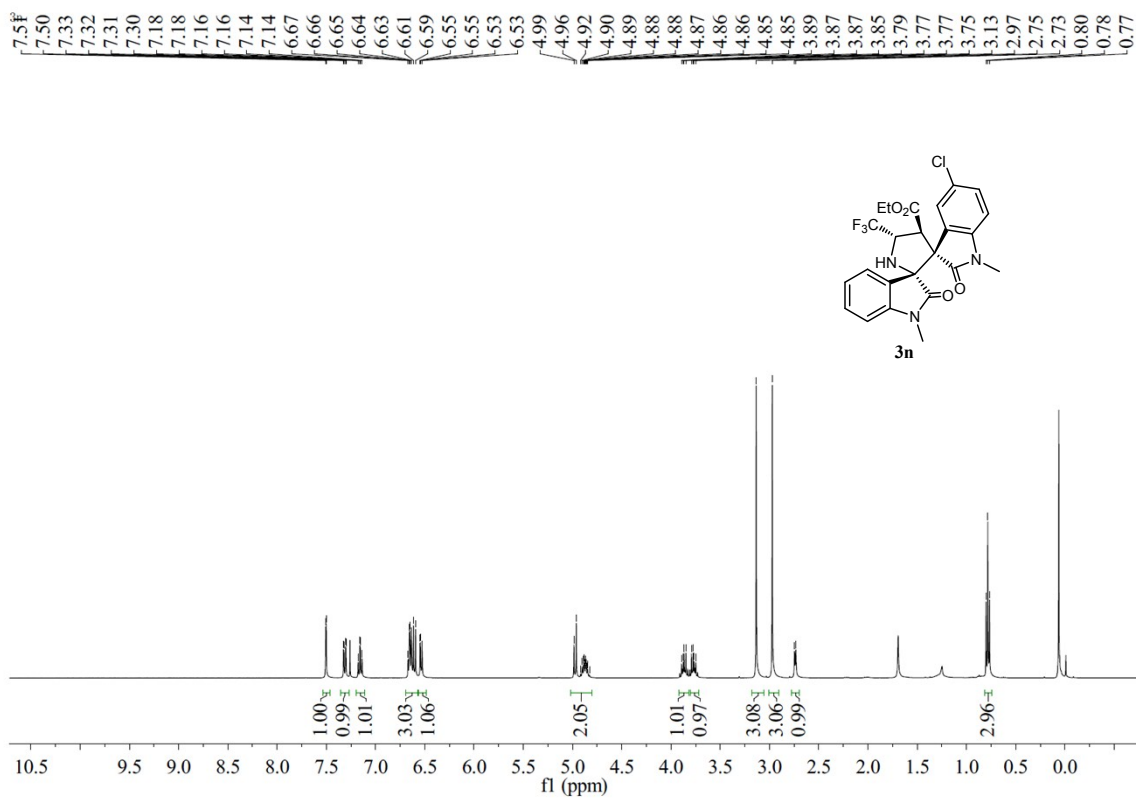


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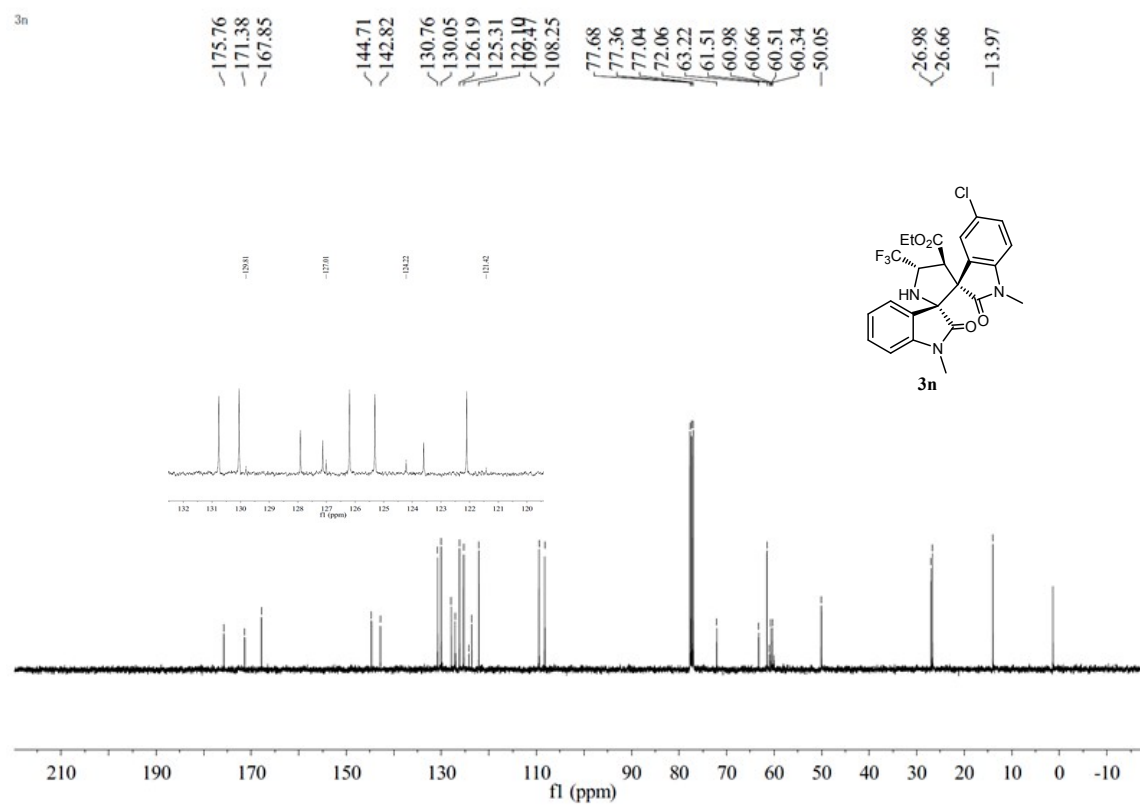
HWJ-395



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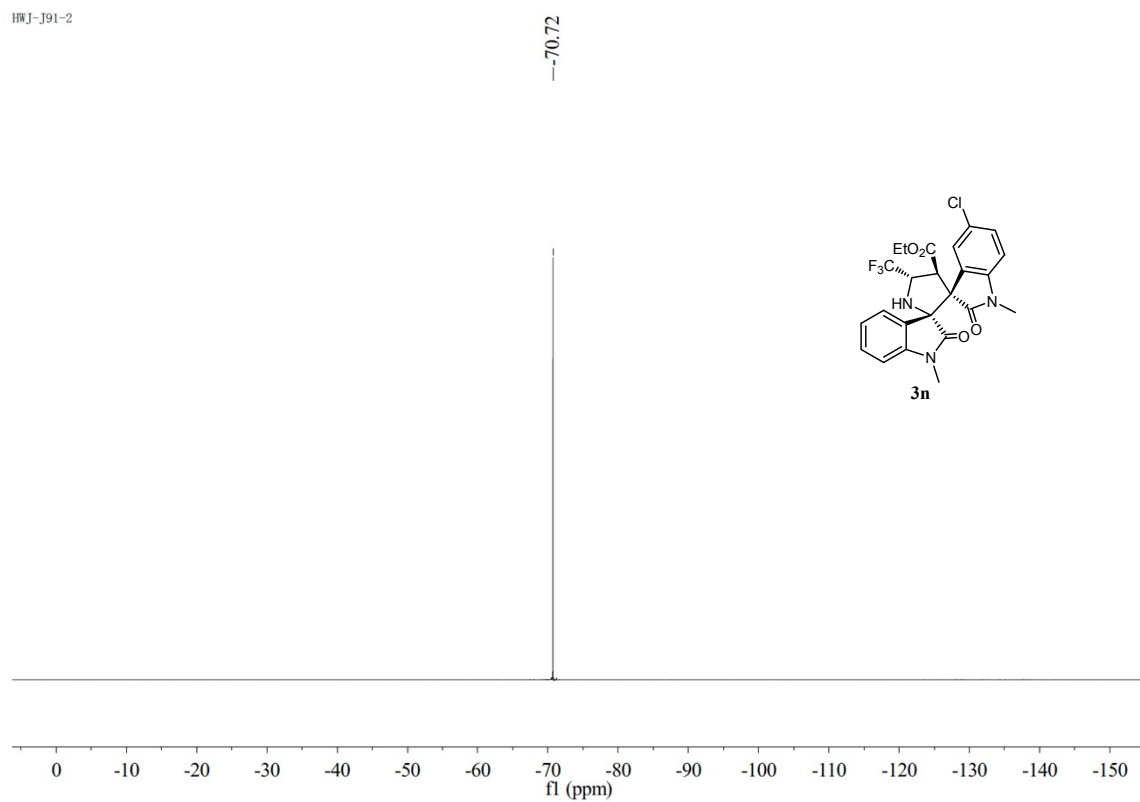


¹³CNMR of compound **3n** (in CDCl₃)

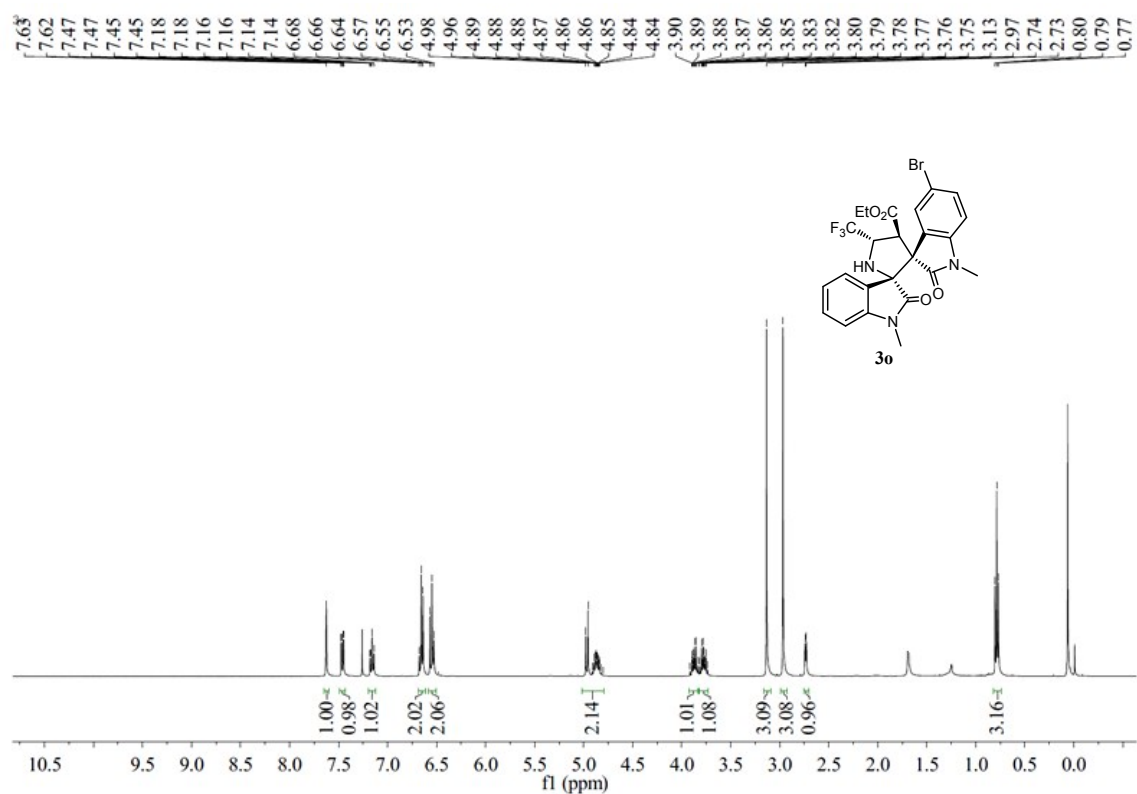


¹⁹FNMR of compound **3n** (in CDCl₃)

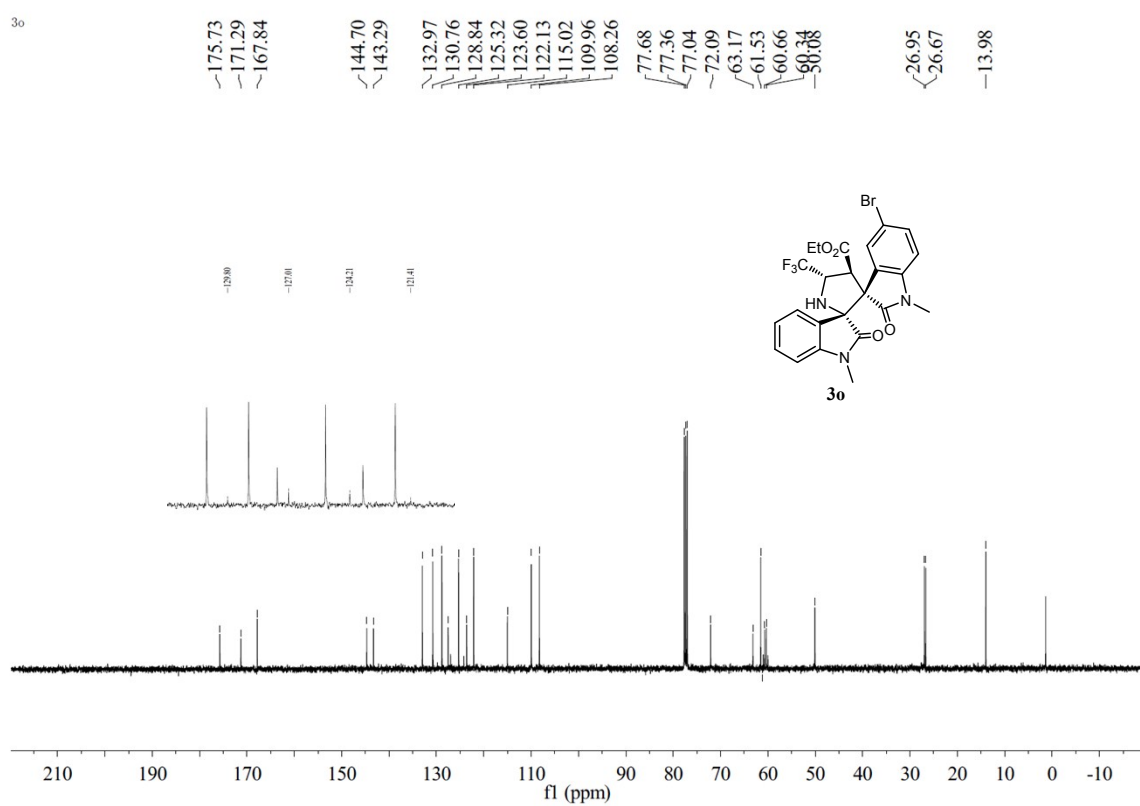
HWJ-191-2



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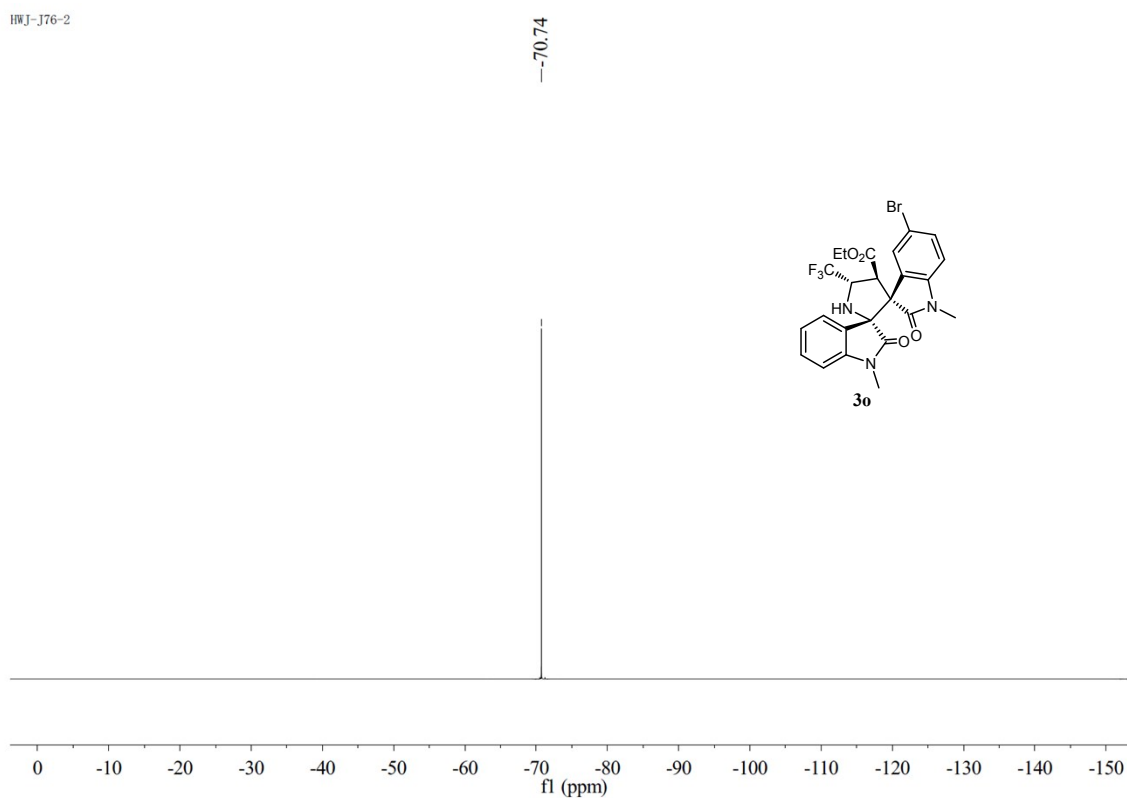


¹³C NMR of compound **3o** (in CDCl₃)



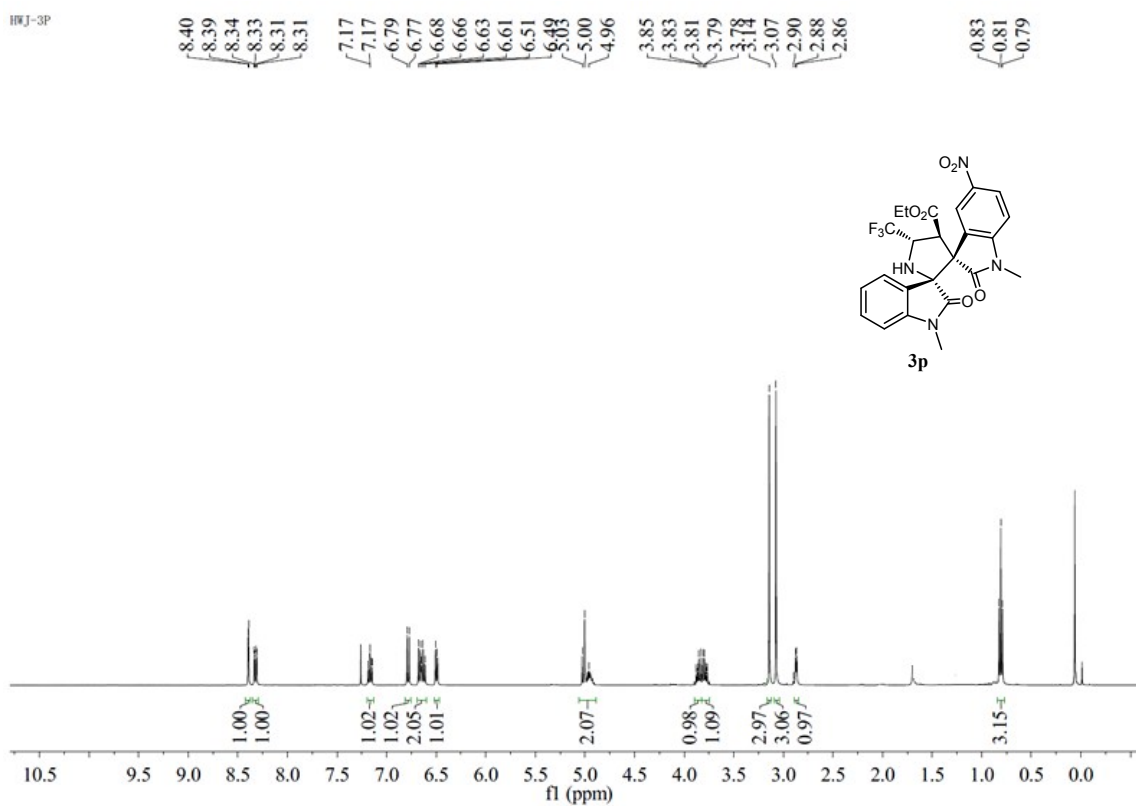
¹⁹F NMR of compound **3o** (in CDCl₃)

HWJ-J76-2

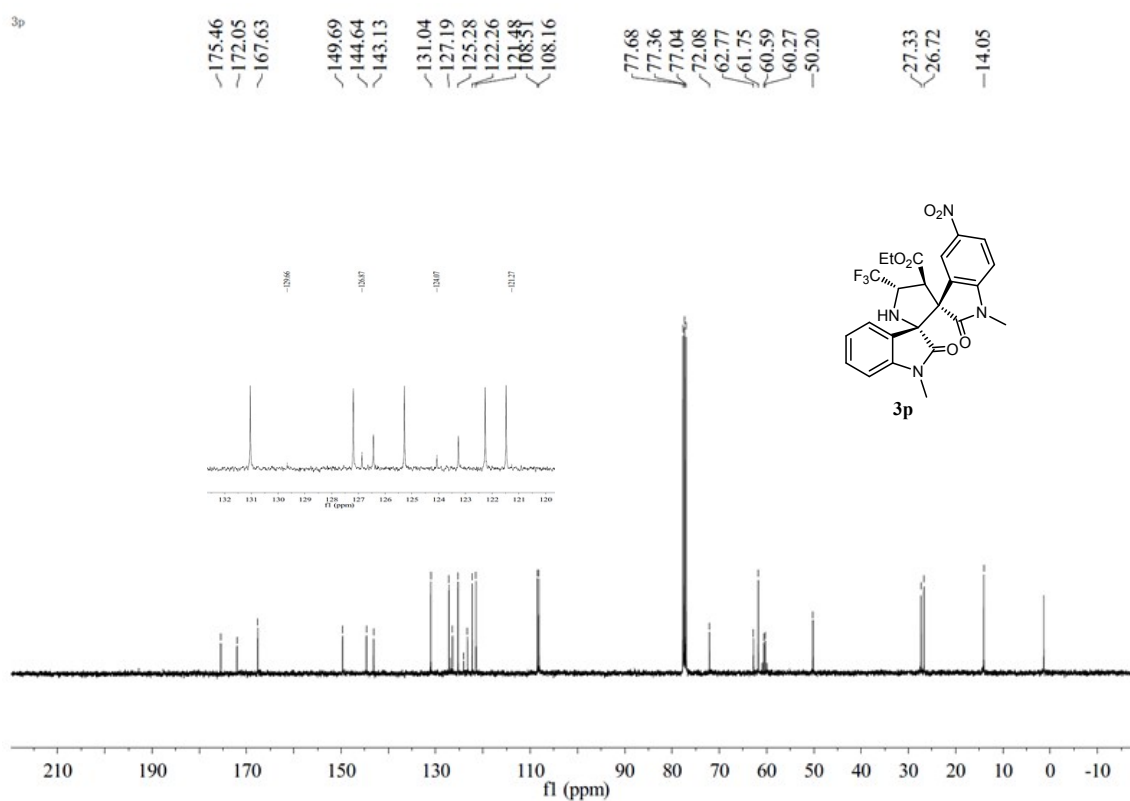


¹H NMR of compound **3p** (in CDCl₃)

HWJ-3P

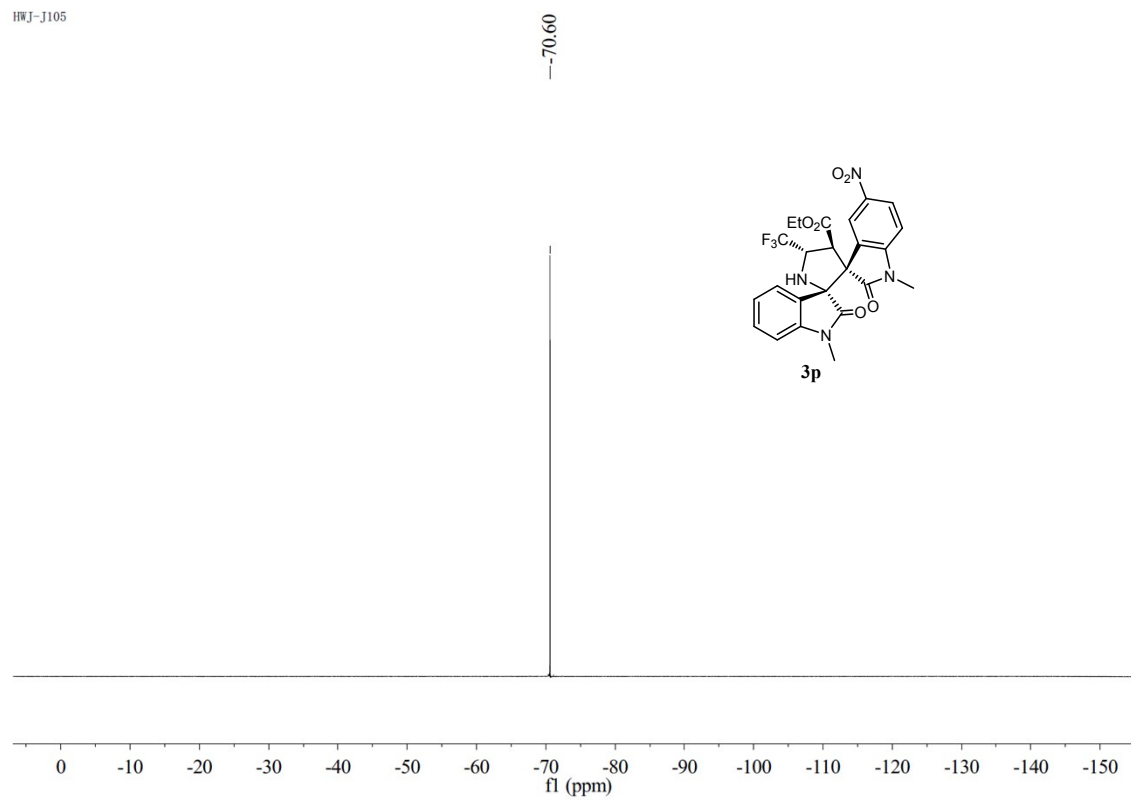


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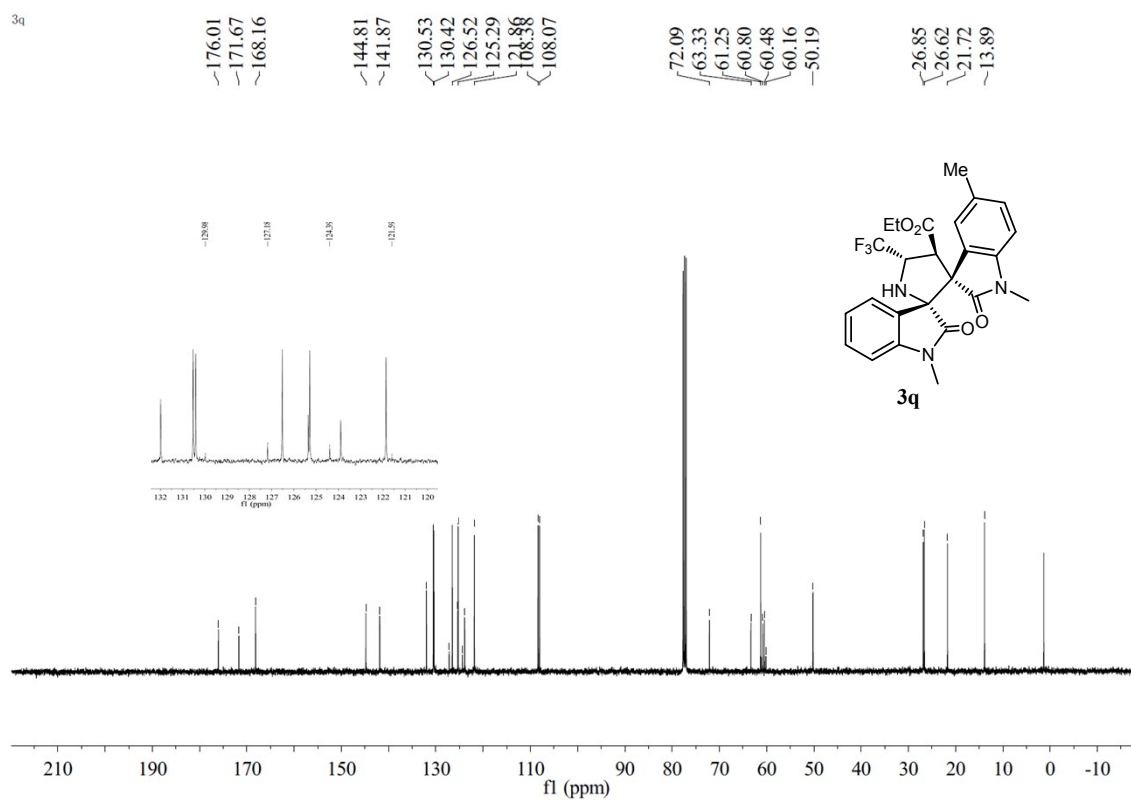
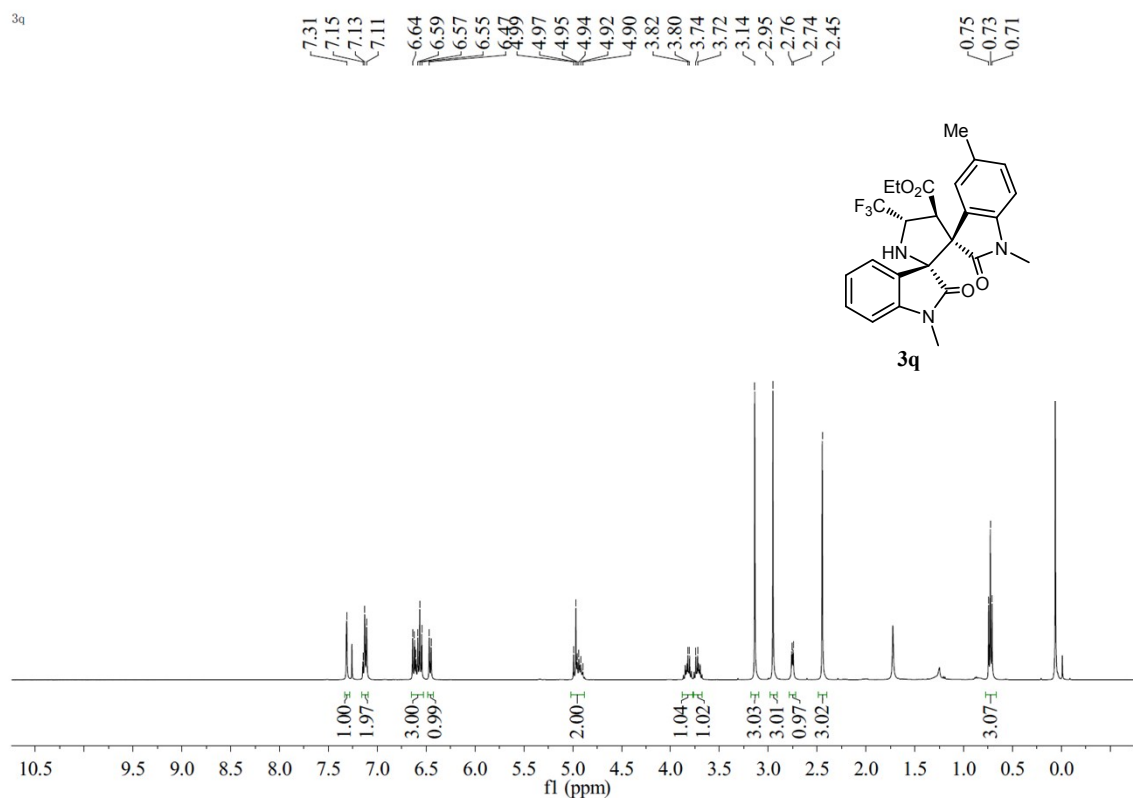


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HWJ-1105

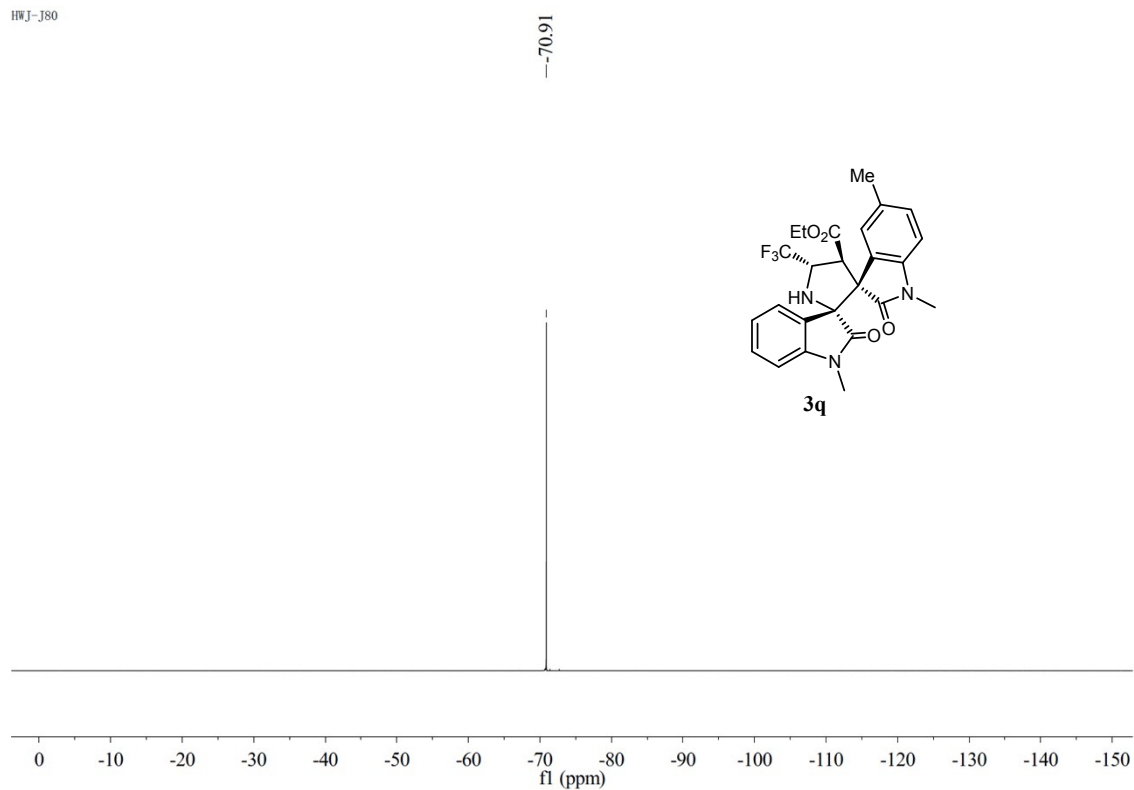


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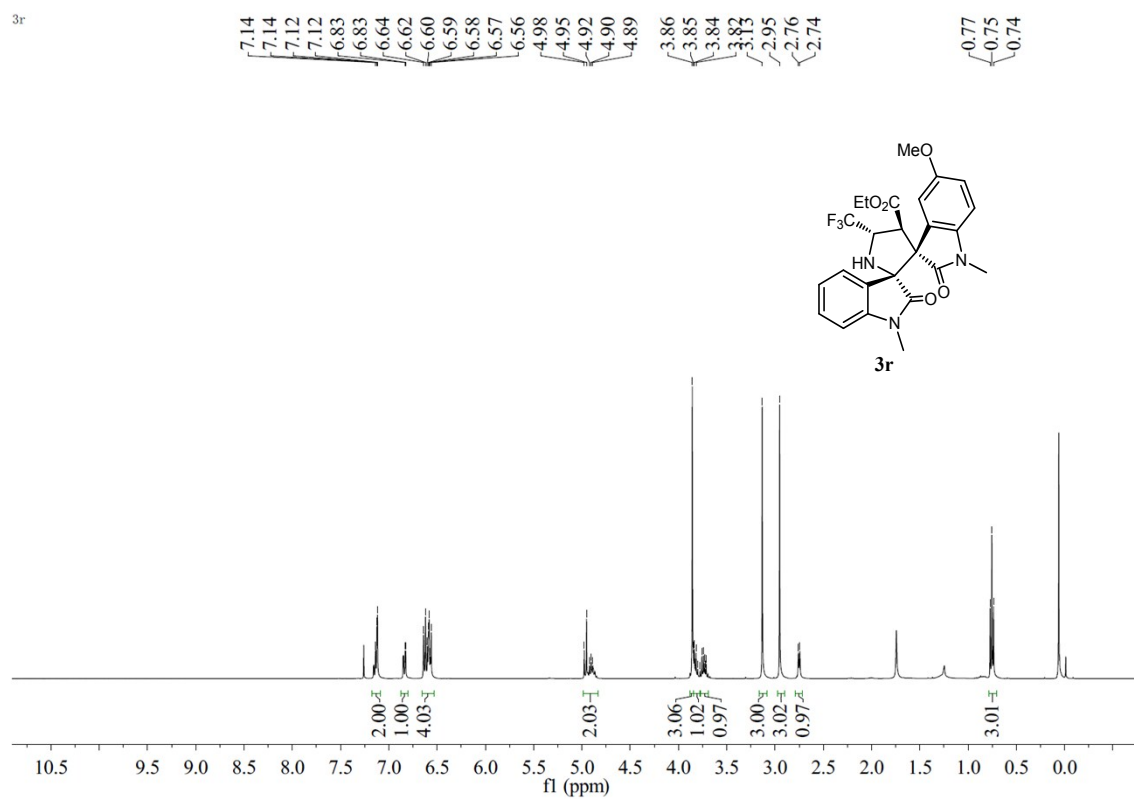
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HWJ-380

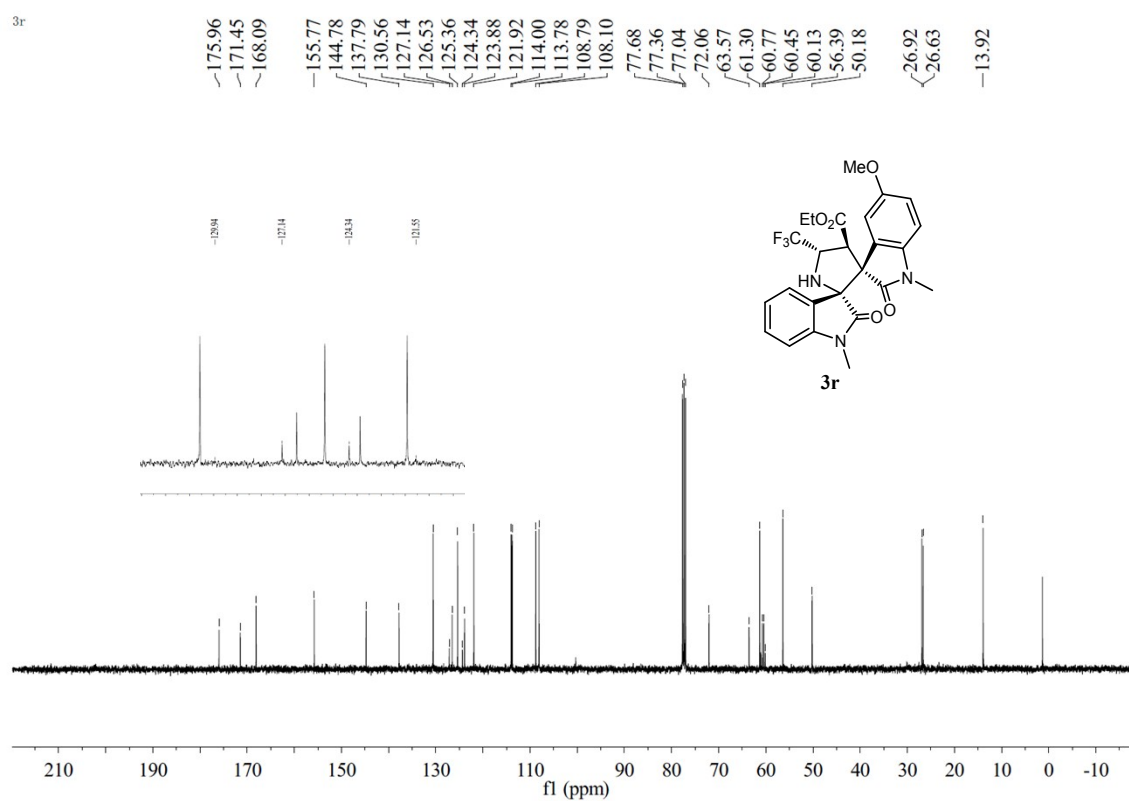


¹H NMR of compound **3r** (in CDCl₃)

3r

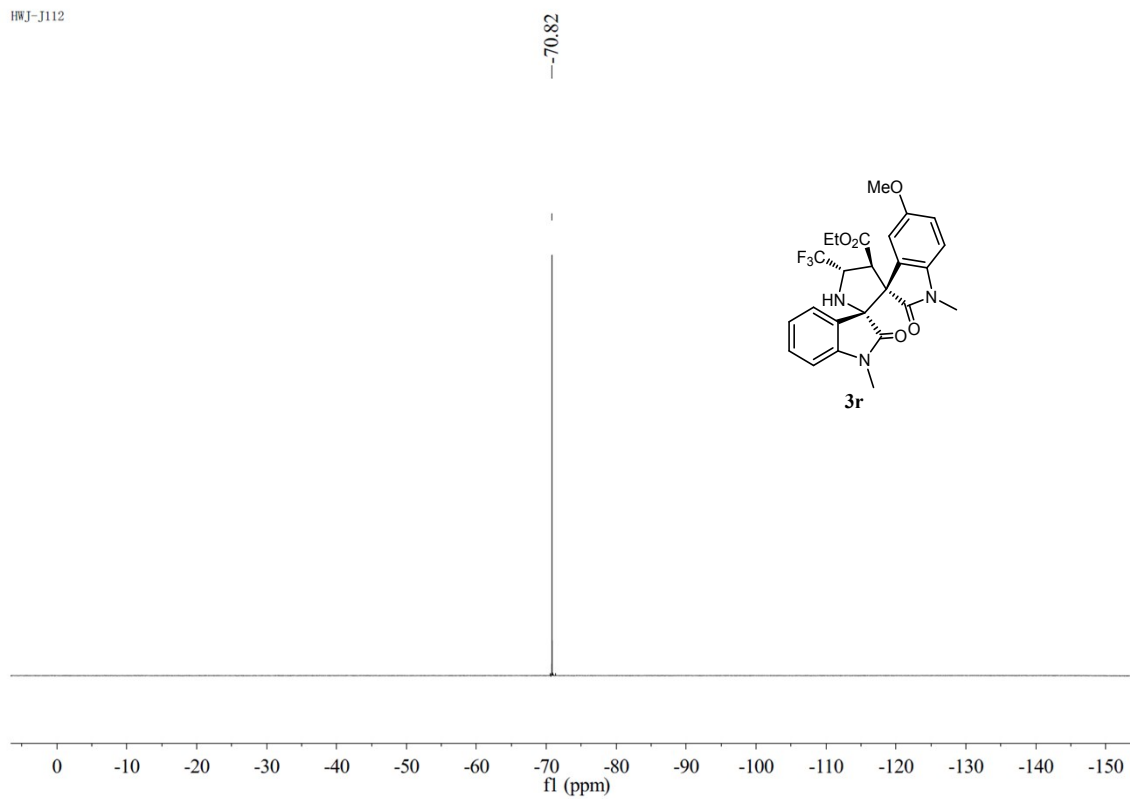


¹³CNMR of compound **3r** (in CDCl₃)



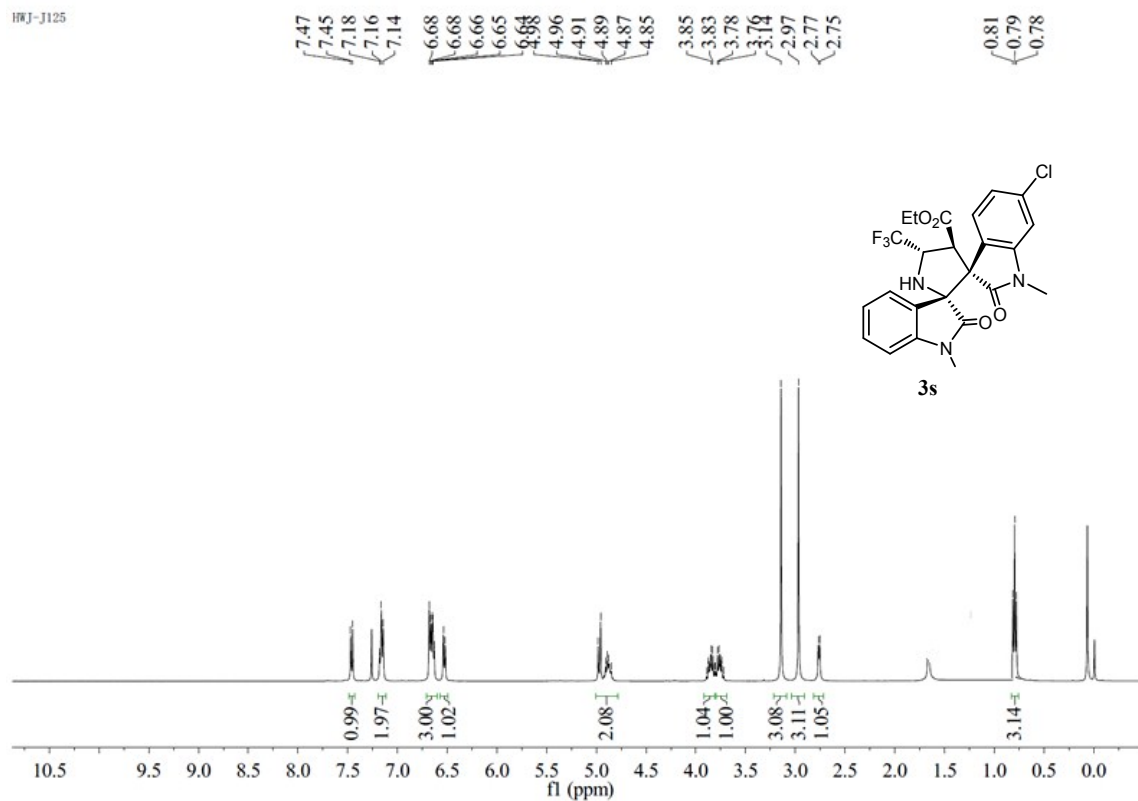
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HWJ-1112



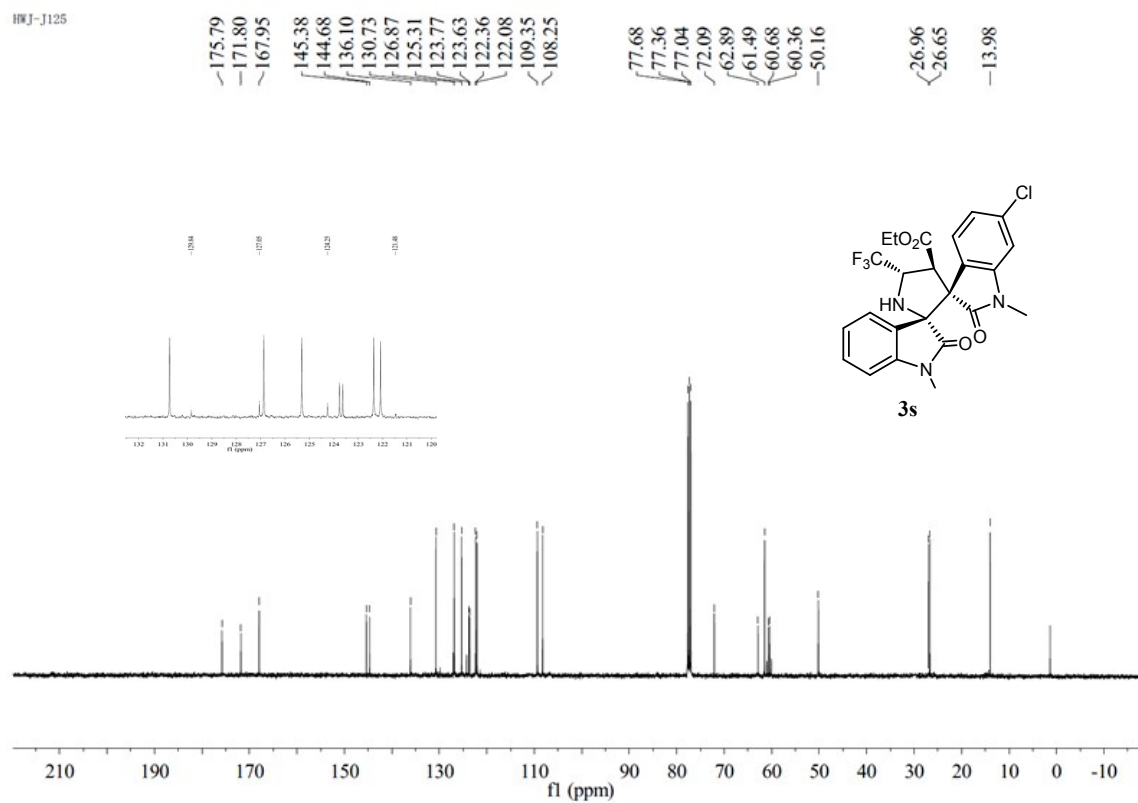
¹HNMR of compound **3s** (in CDCl₃)

HWJ-1125



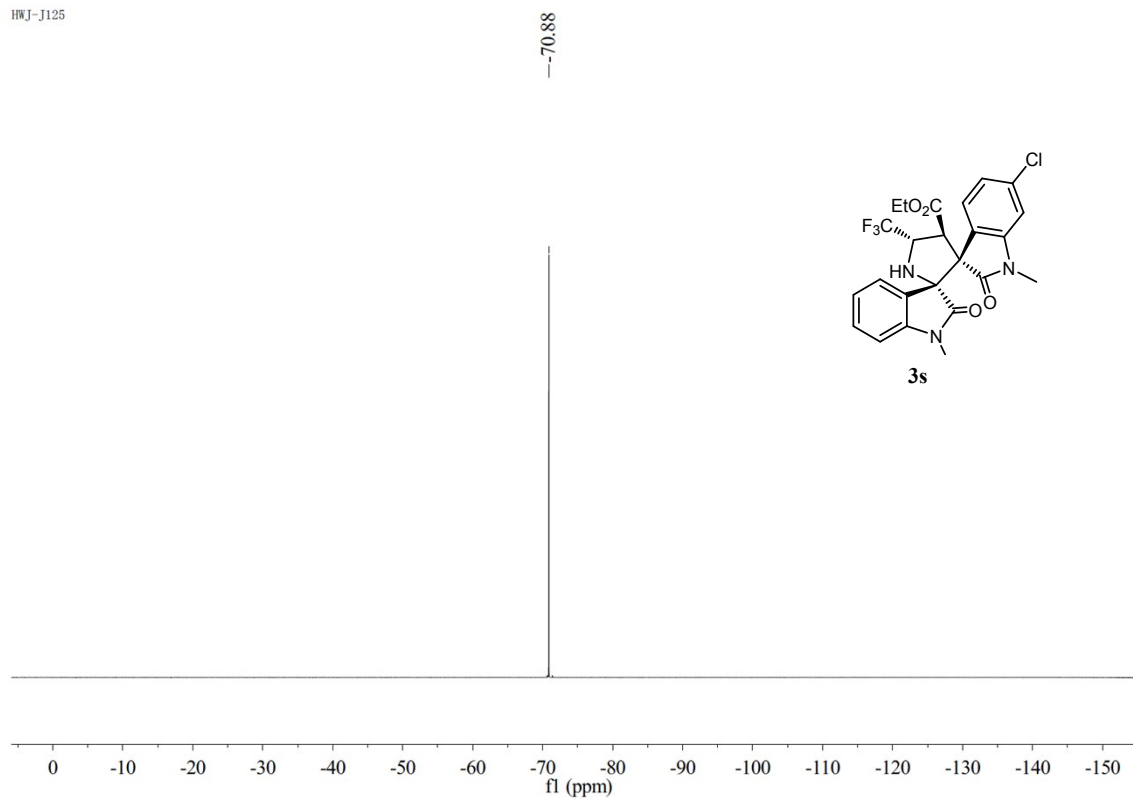
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HWJ-1125



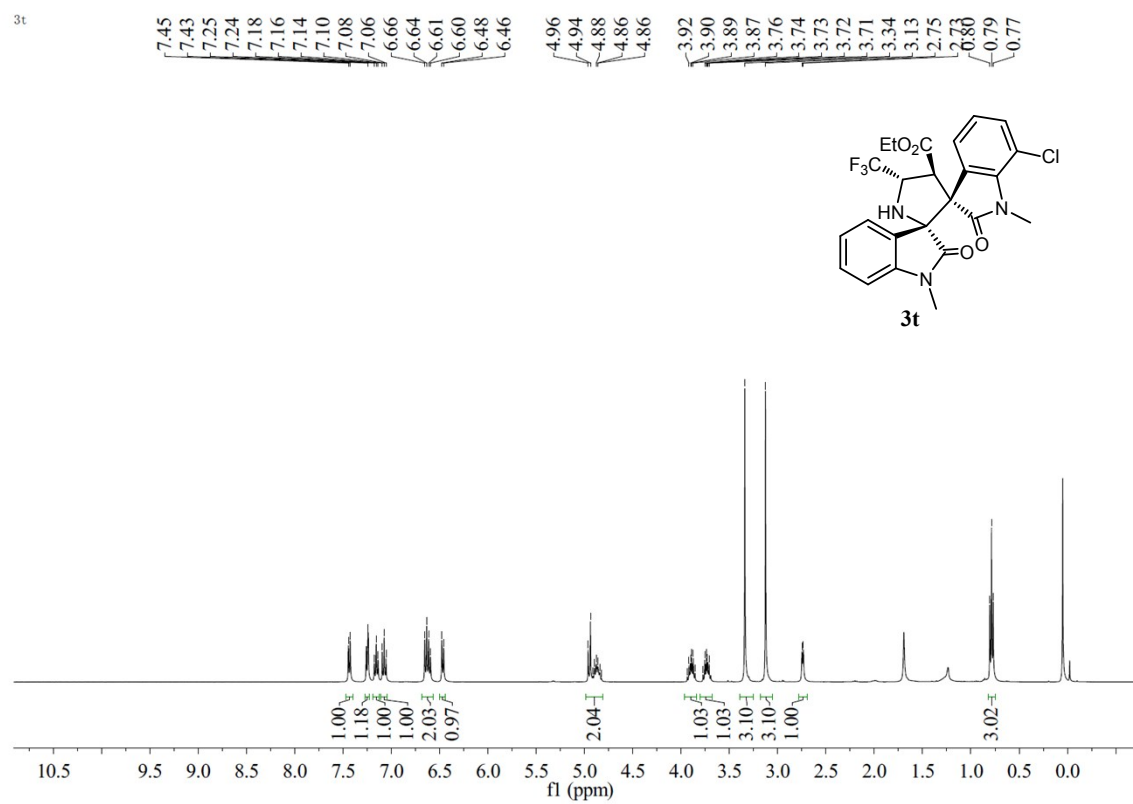
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HWJ-J125



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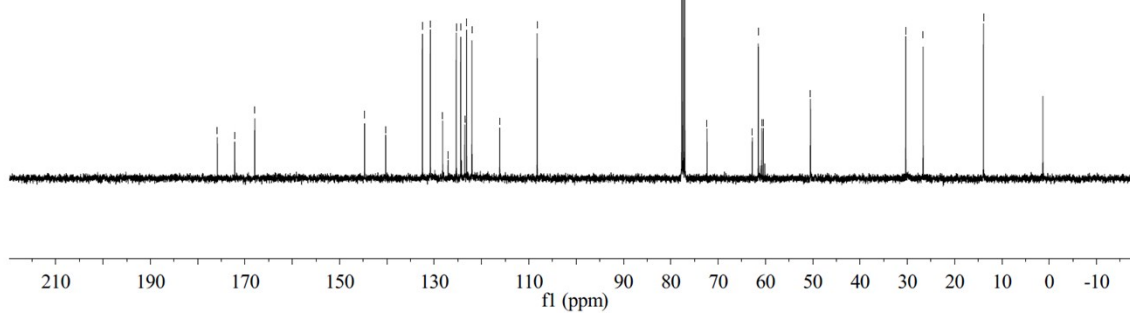
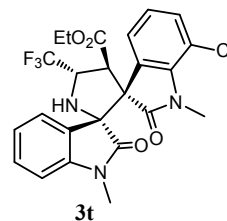
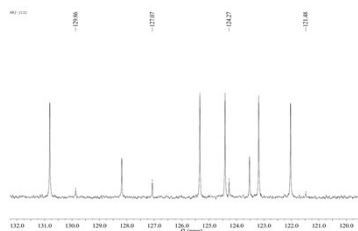
3t



¹³CNMR of compound **3t** (in CDCl₃)

3t

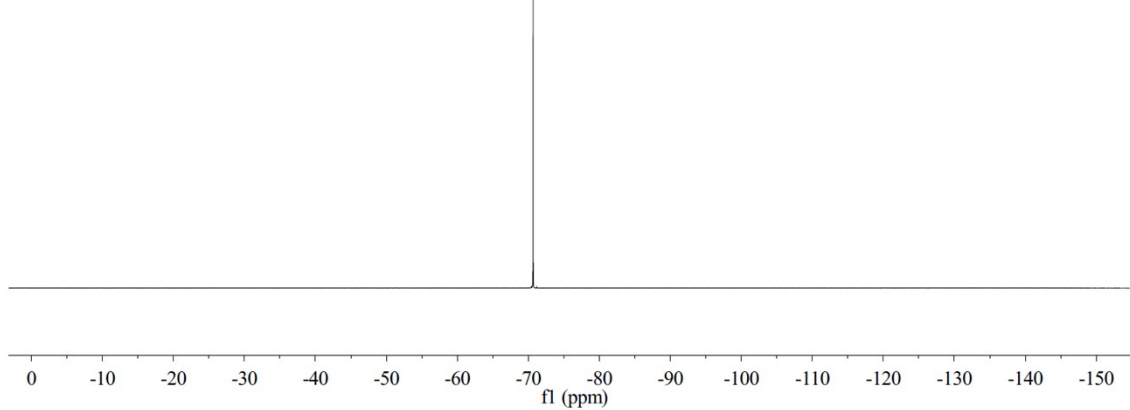
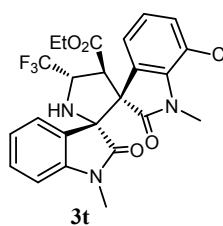
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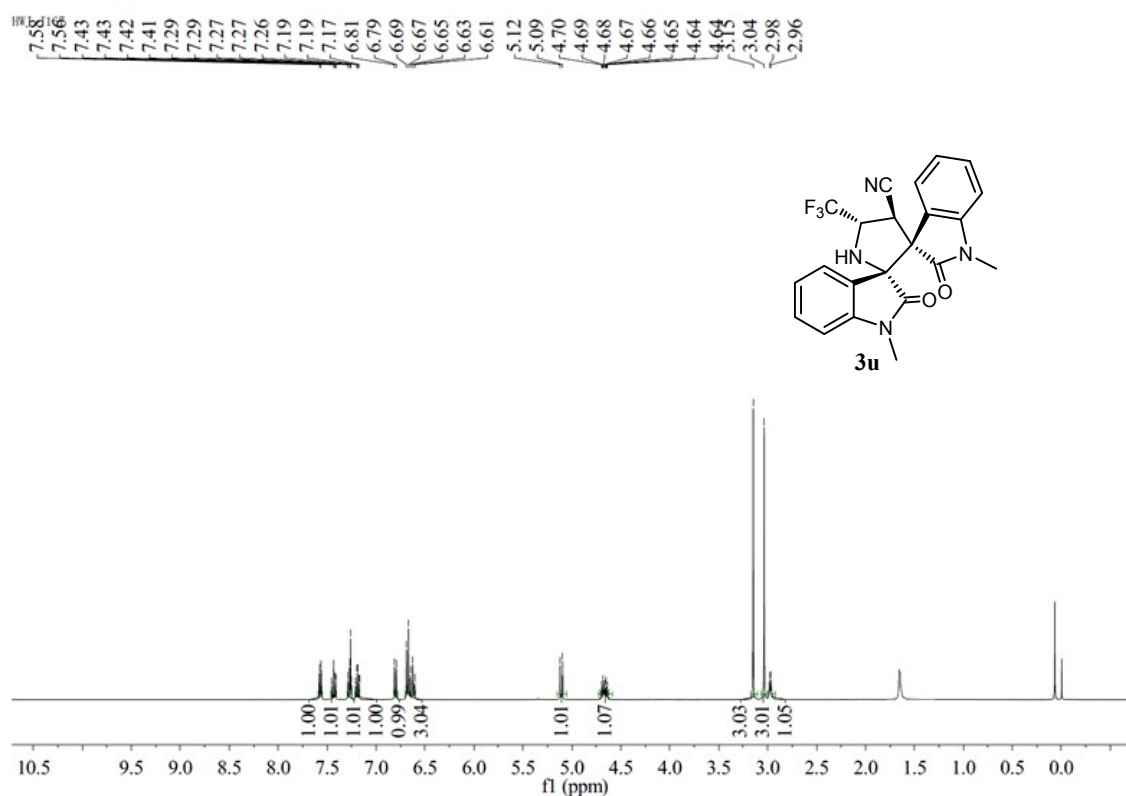
¹⁹FNMR of compound **3t** (in CDCl₃)

HWJ-1132

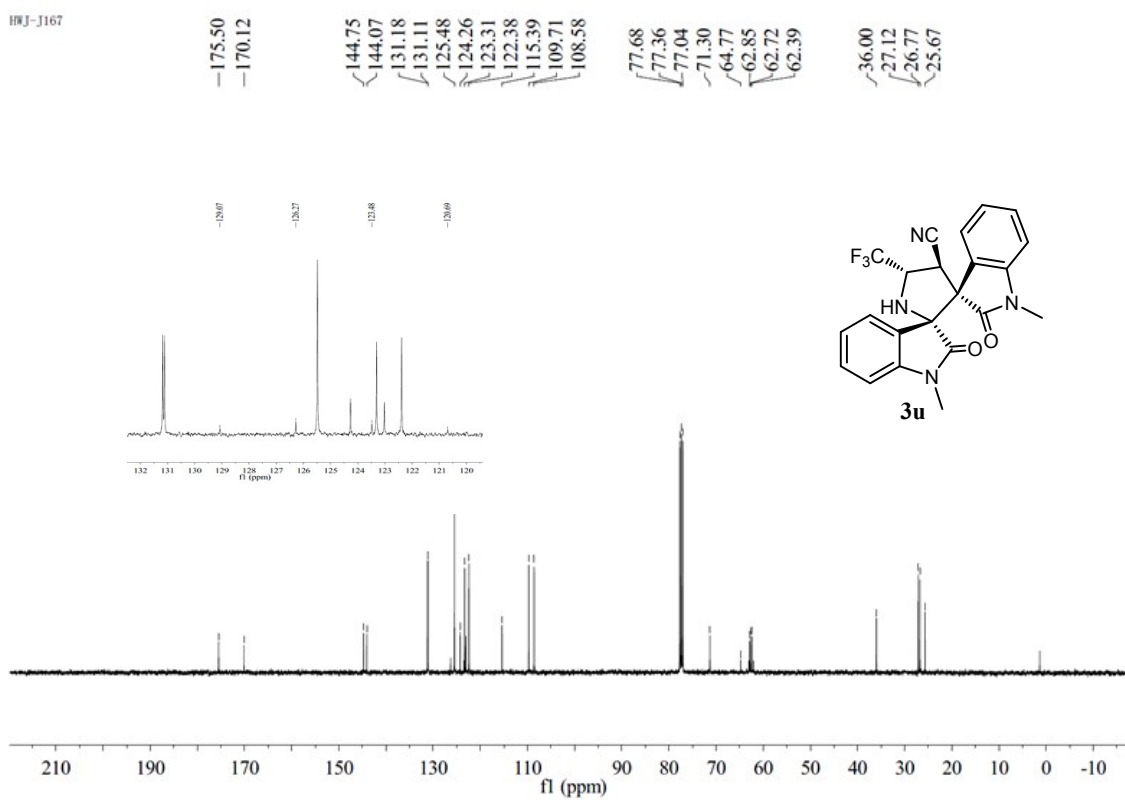
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¹HNMR of compound **3u** (in CDCl₃)

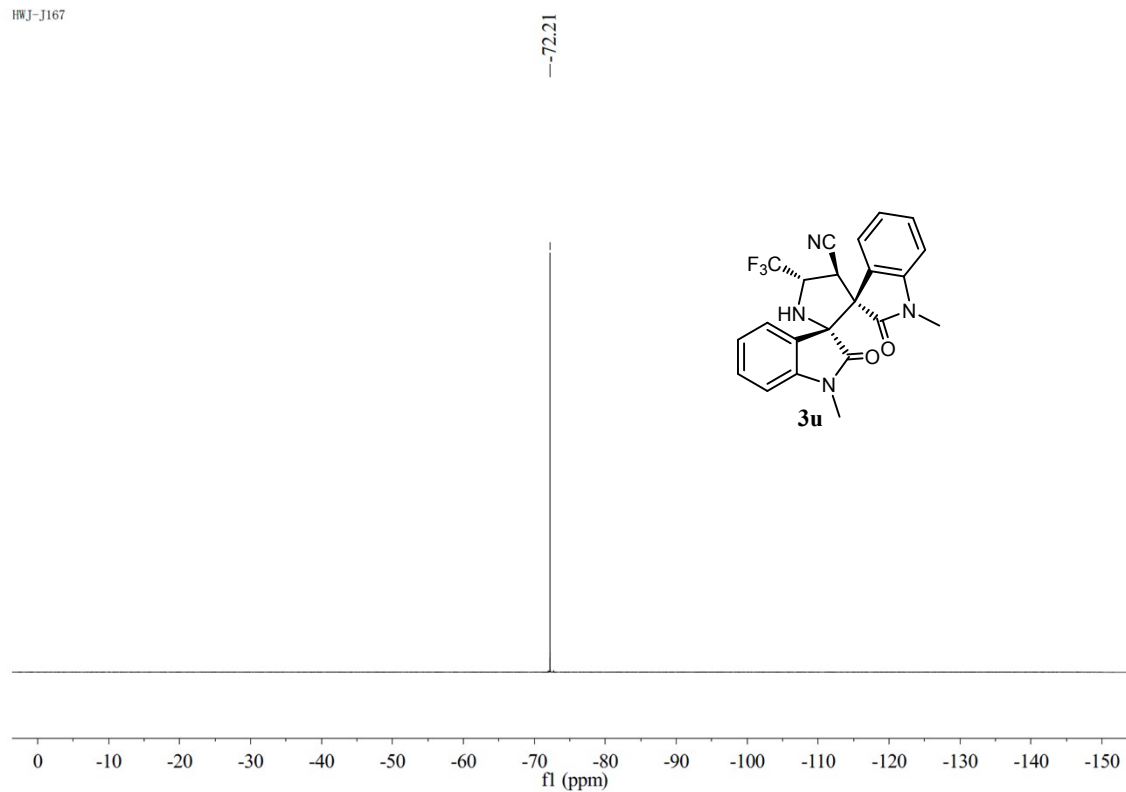


¹³CNMR of compound **3u** (in CDCl₃)



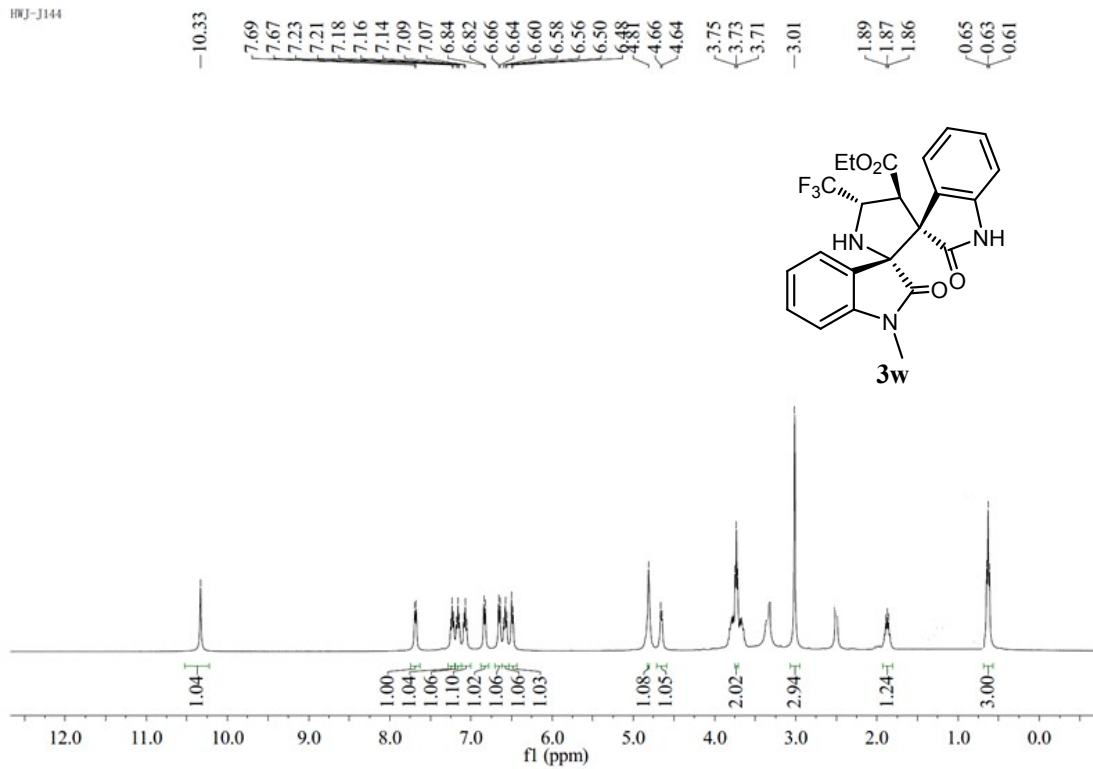
^{19}F NMR of compound **3u** (in CDCl_3)

HWJ-1167

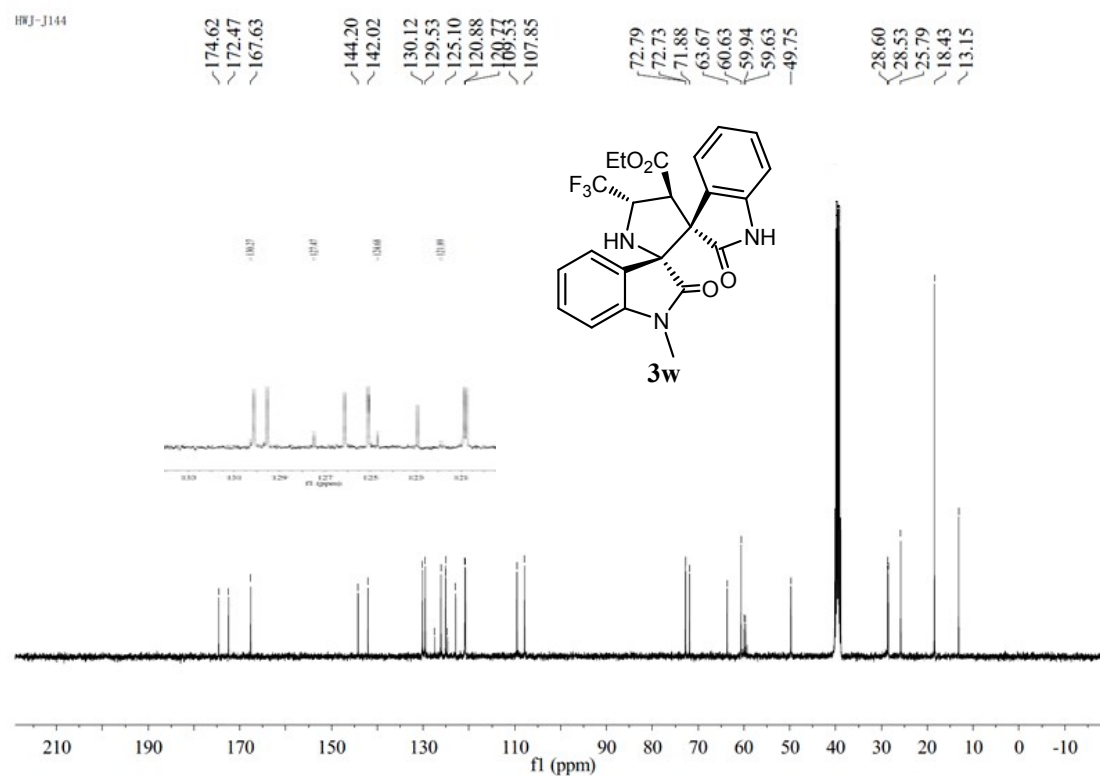


^1H NMR of compound **3w** (in $\text{DMSO-}d_6$)

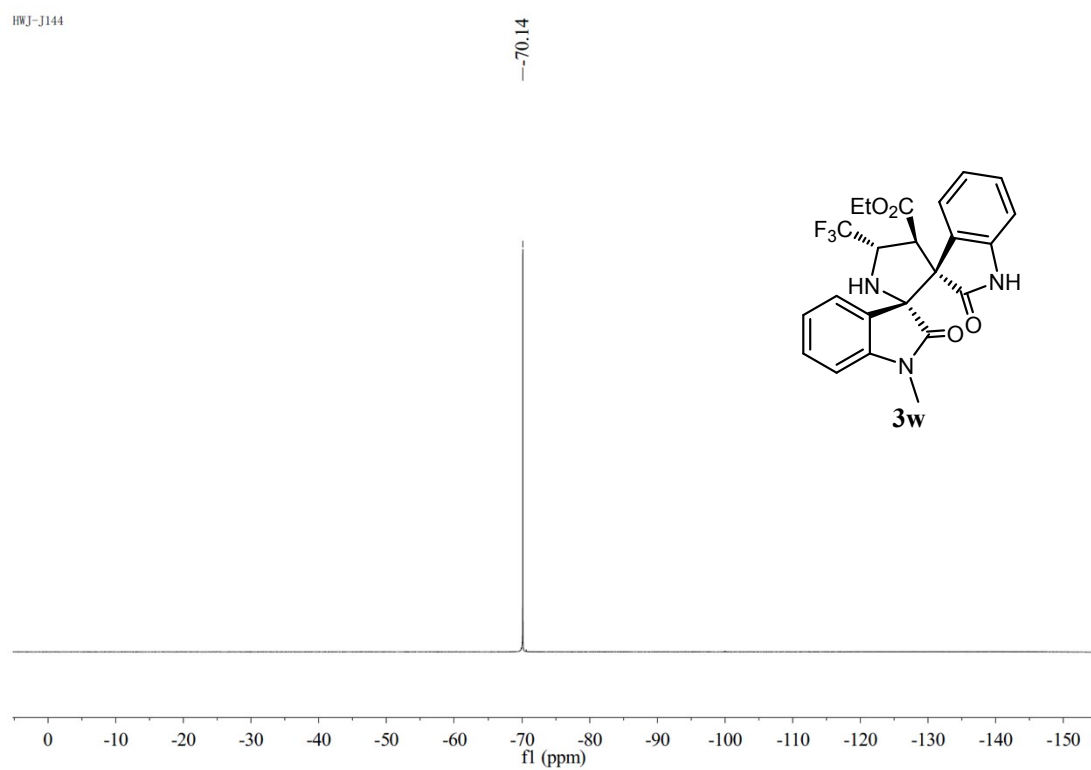
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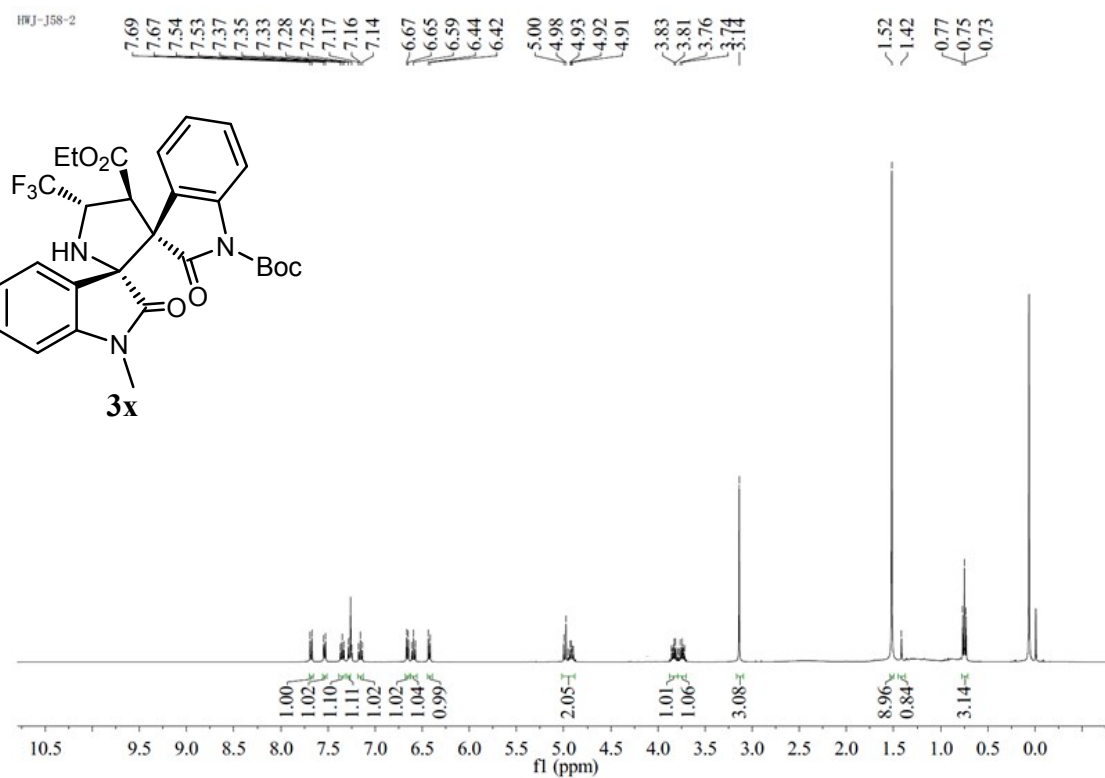
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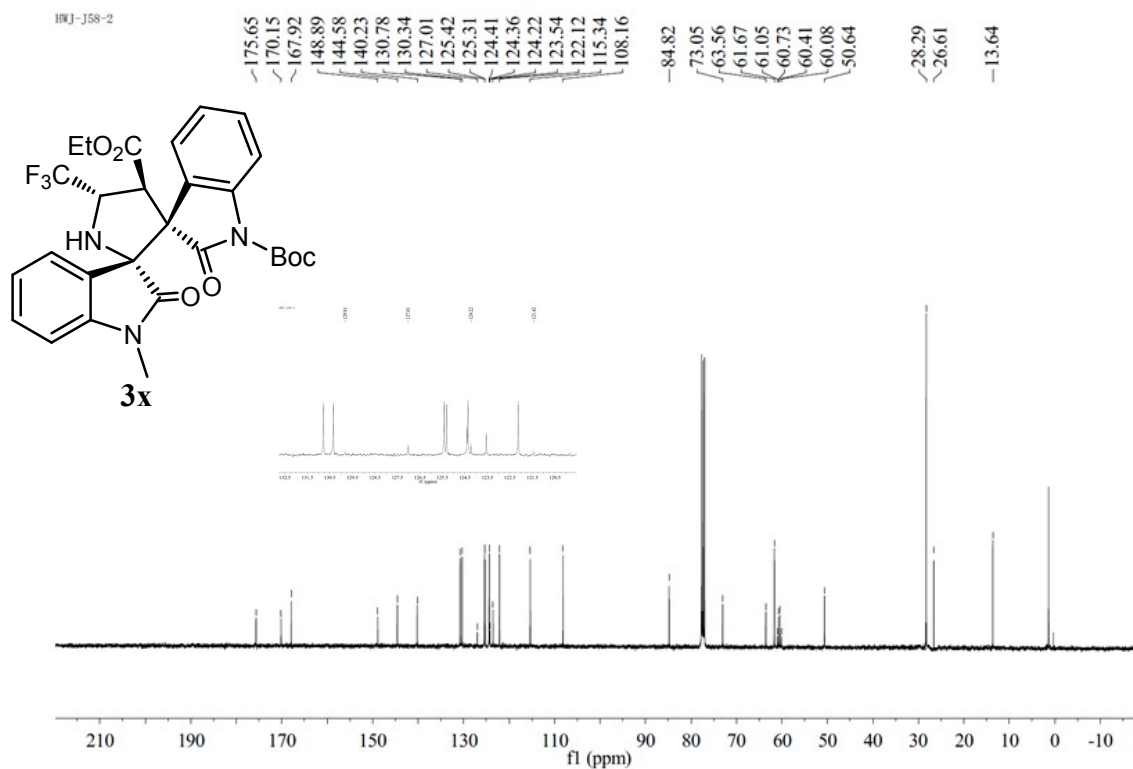
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¹HNMR of compound **3x** (in CDCl₃)

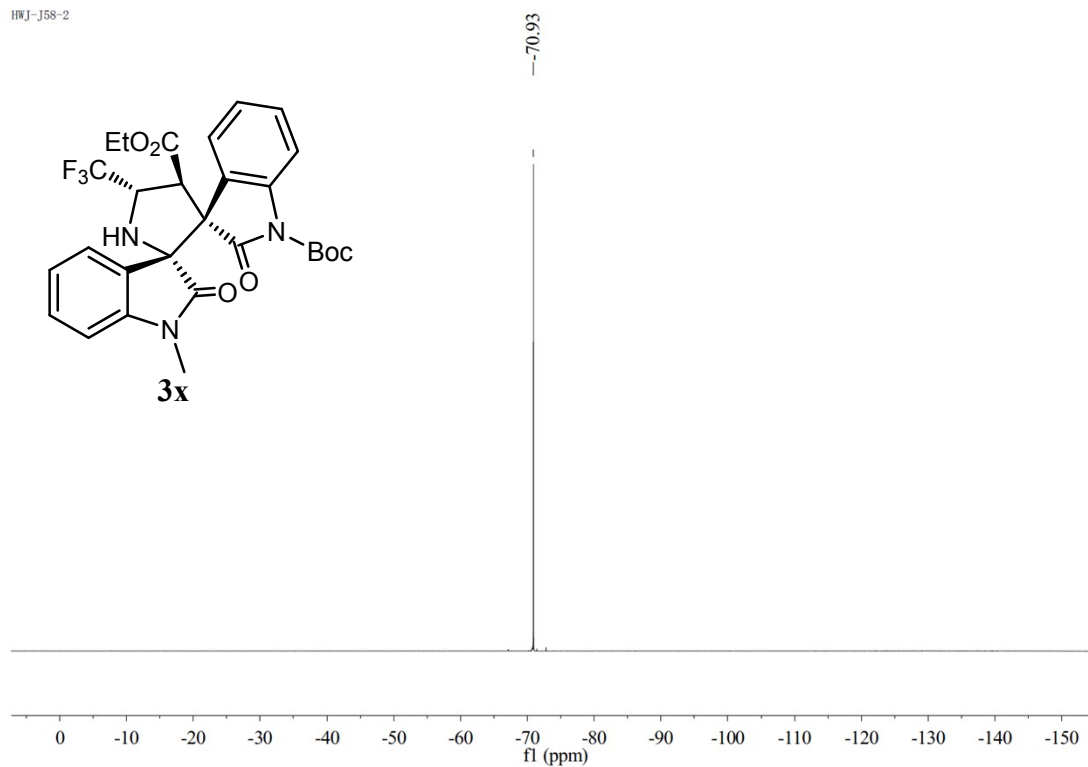


¹³CNMR of compound **3x** (in CDCl₃)

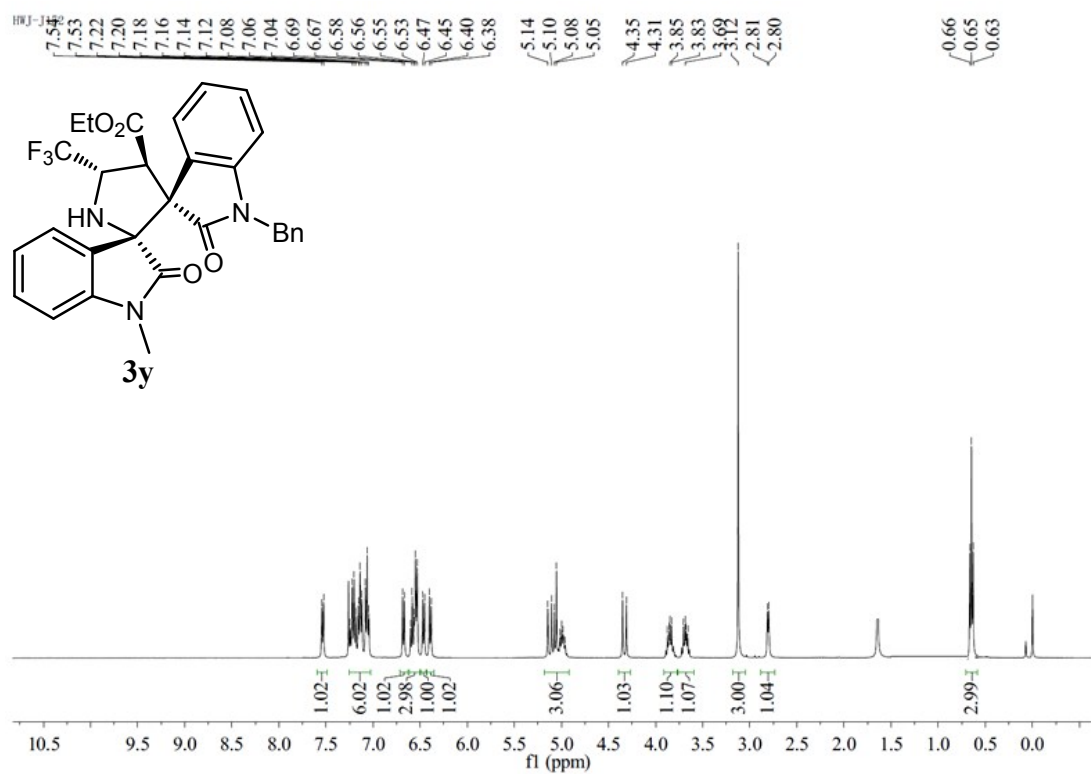


¹⁹F NMR of compound **3x** (in CDCl₃)

HWJ-158-2

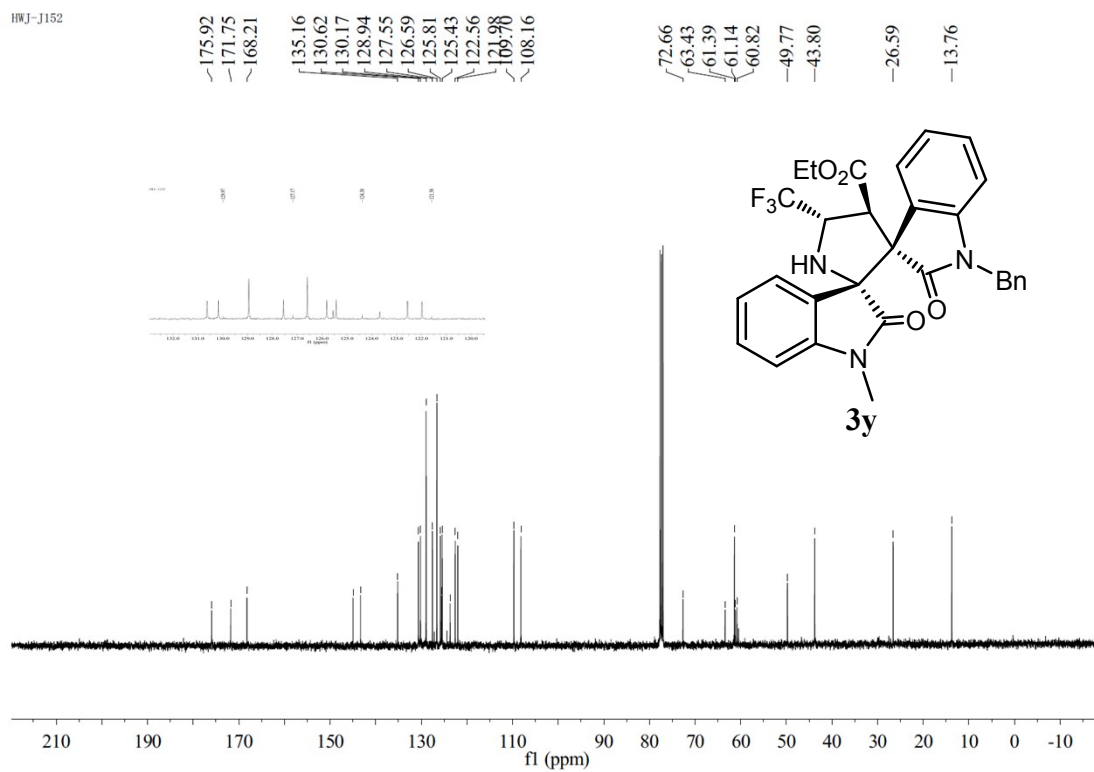


¹H NMR of compound **3y** (in CDCl₃)



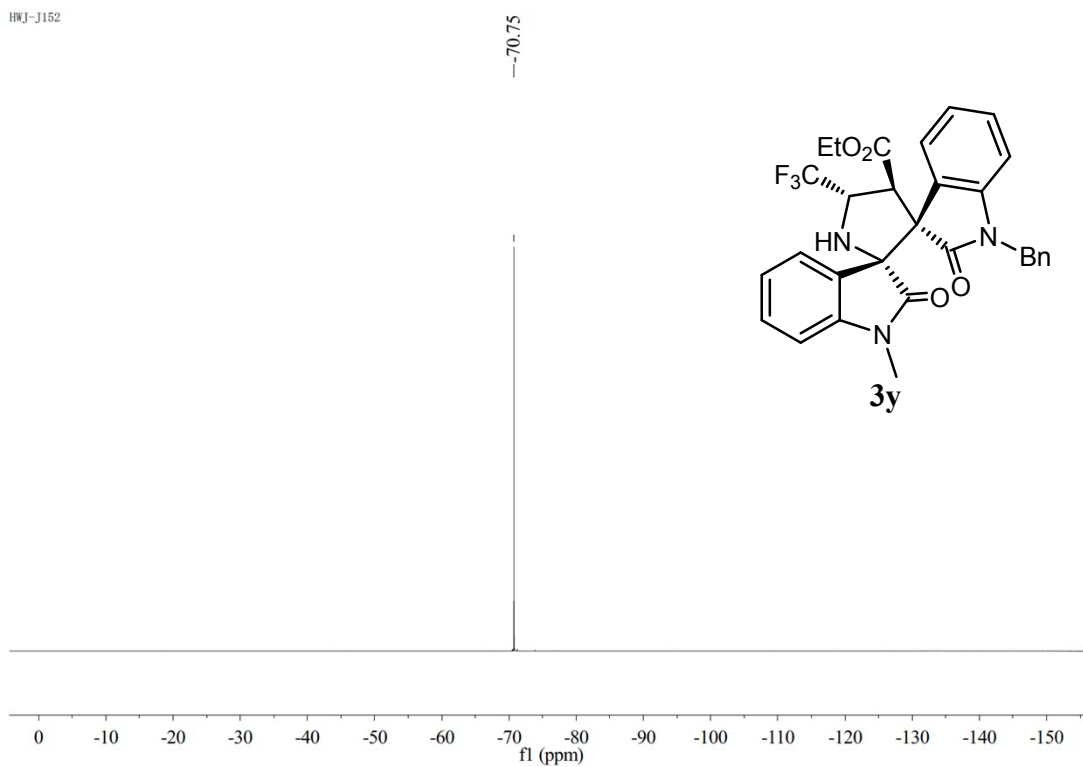
¹³CNMR of compound **3y** (in CDCl₃)

HWJ-J152

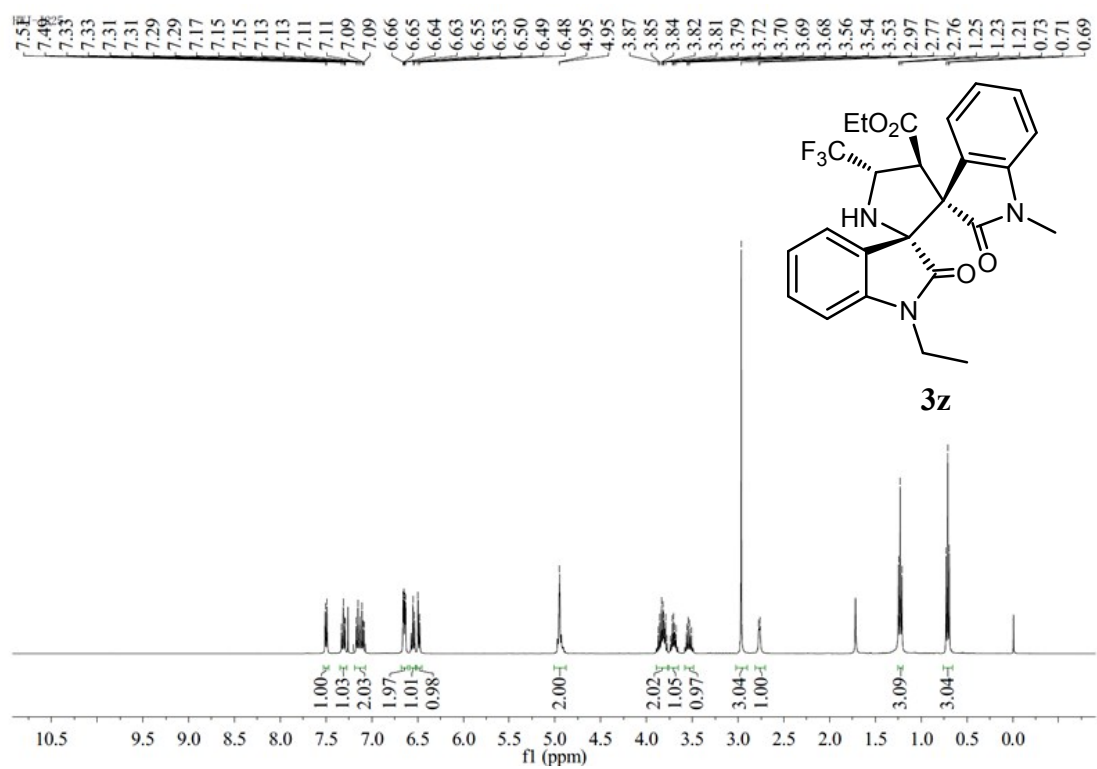


¹⁹F NMR of compound **3y** (in CDCl₃)

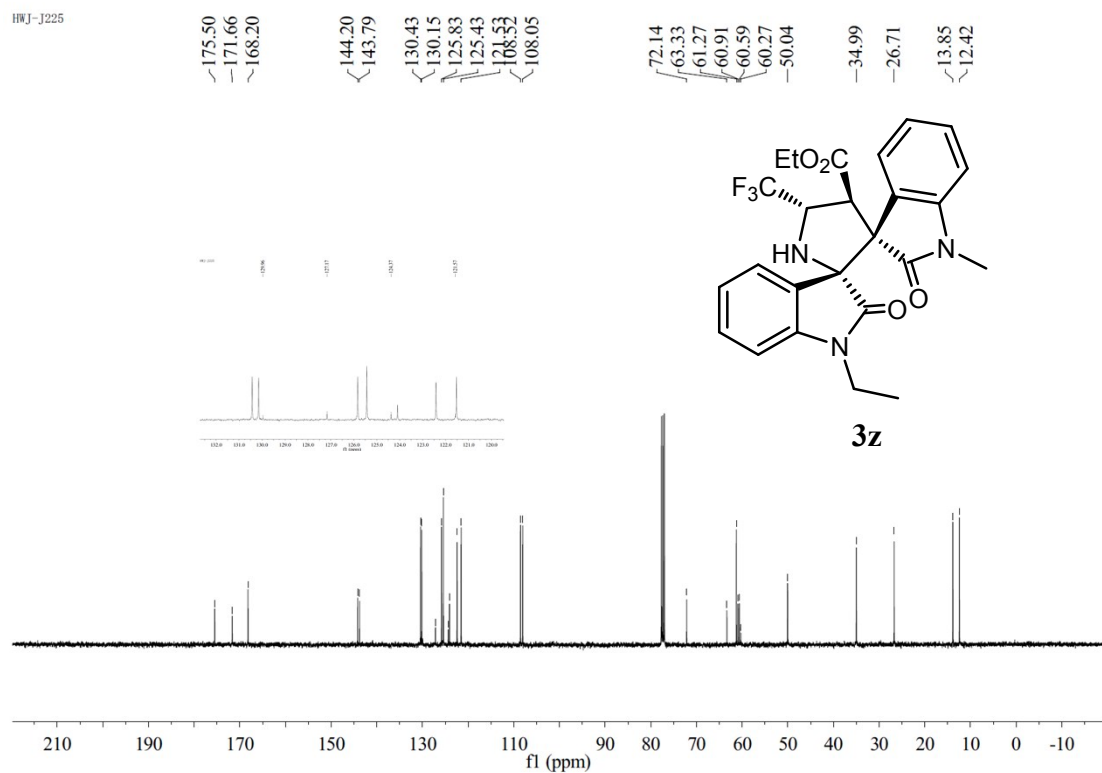
HWJ-J152



¹HNMR of compound **3z** (in CDCl₃)

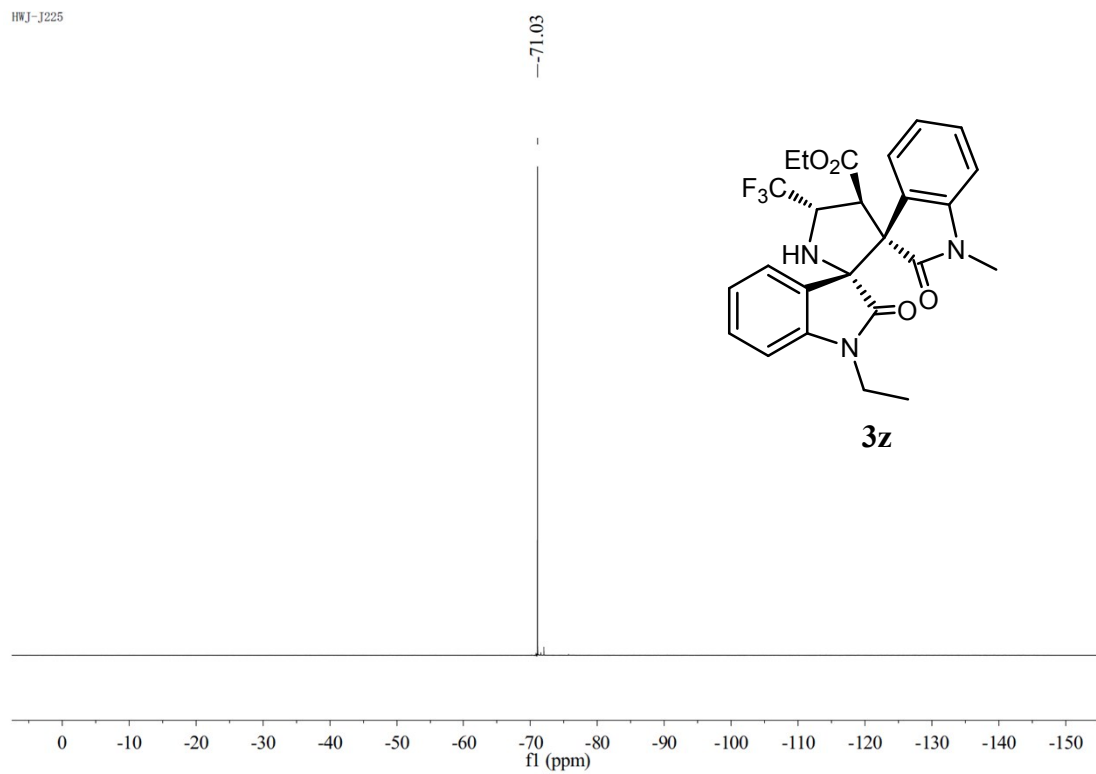


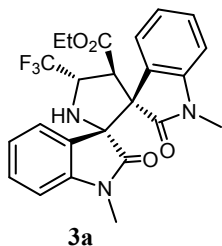
¹³CNMR of compound **3z** (in CDCl₃)



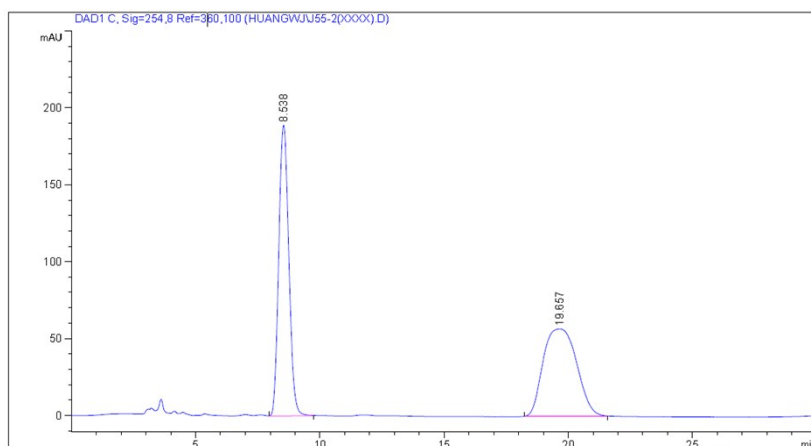
^{19}F NMR of compound **3z** (in CDCl_3)

HWJ-1225





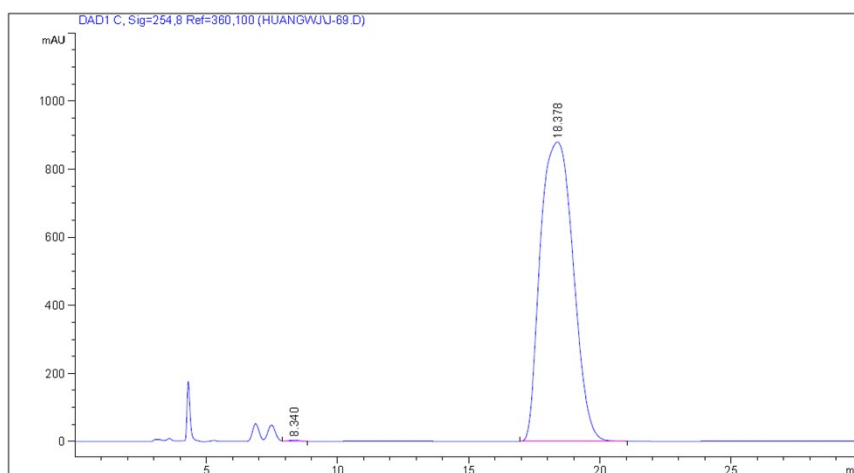
HPLC spectrum of the racemate



信号 1: DAD1 C, Sig=254,8 Ref=360,100

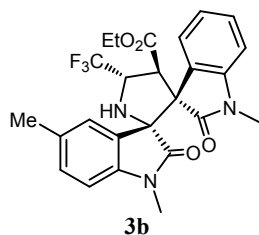
峰 #	保留时间 [min]	类型	峰宽 [min]	峰面积 [mAU*s]	峰高 [mAU]	峰面积 %
1	8.538	MM R	0.4683	5309.21973	188.96945	49.9174
2	19.657	MM R	1.5626	5326.79248	56.81425	50.0826

HPLC spectrum of the chiral compound

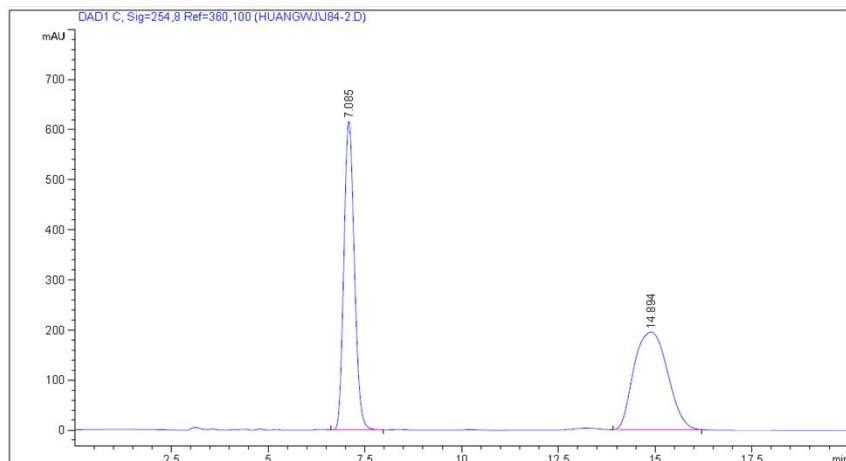


信号 1: DAD1 C, Sig=254,8 Ref=360,100

峰 #	保留时间 [min]	类型	峰宽 [min]	峰面积 [mAU*s]	峰高 [mAU]	峰面积 %
1	8.340	MM R	0.4165	85.53349	3.42280	0.1116
2	18.378	MM R	1.4510	7.65665e4	879.44171	99.8884



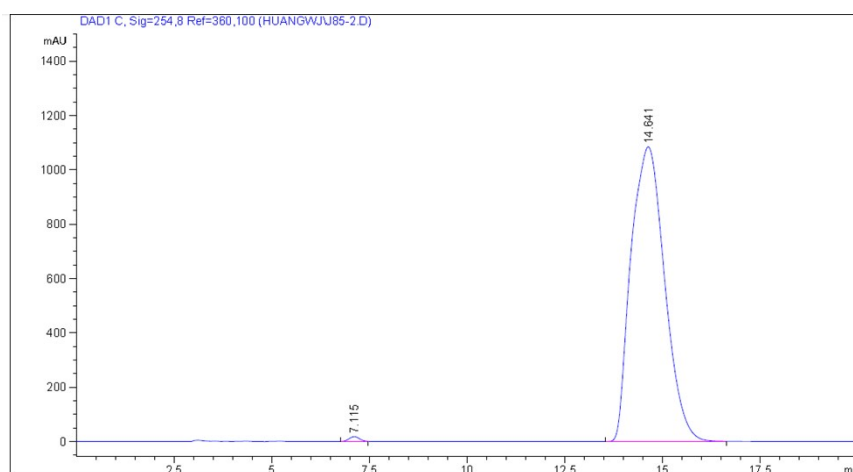
HPLC spectrum of the racemate



信号 1: DAD1 C, Sig=254,8 Ref=360,100

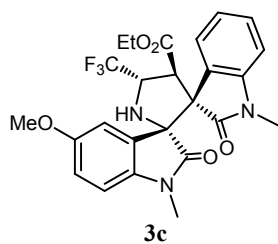
峰 #	保留时间 [min]	类型	峰宽 [min]	峰面积 [mAU*s]	峰高 [mAU]	峰面积 %
1	7.085	MM R	0.3145	1.16272e4	616.24768	49.6296
2	14.894	MM R	1.0098	1.18008e4	194.76698	50.3704

HPLC spectrum of the chiral compound

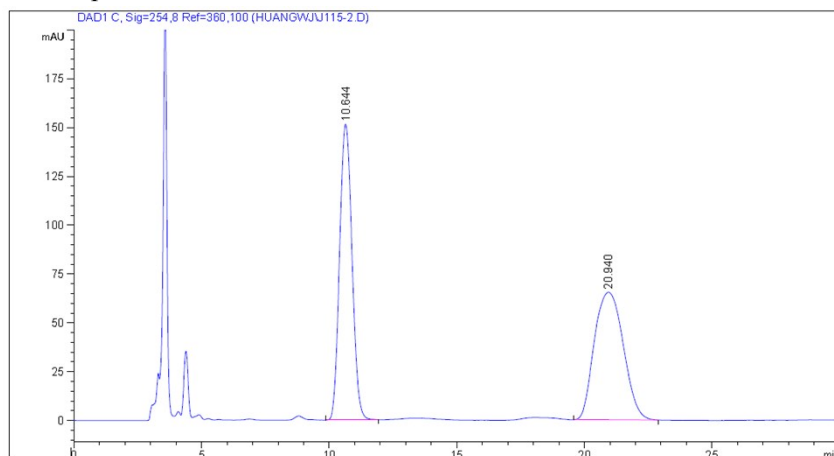


信号 1: DAD1 C, Sig=254,8 Ref=360,100

峰 #	保留时间 [min]	类型	峰宽 [min]	峰面积 [mAU*s]	峰高 [mAU]	峰面积 %
1	7.115	MM R	0.3052	321.78815	17.57064	0.4945
2	14.641	MM R	0.9959	6.47490e4	1083.62146	99.5055



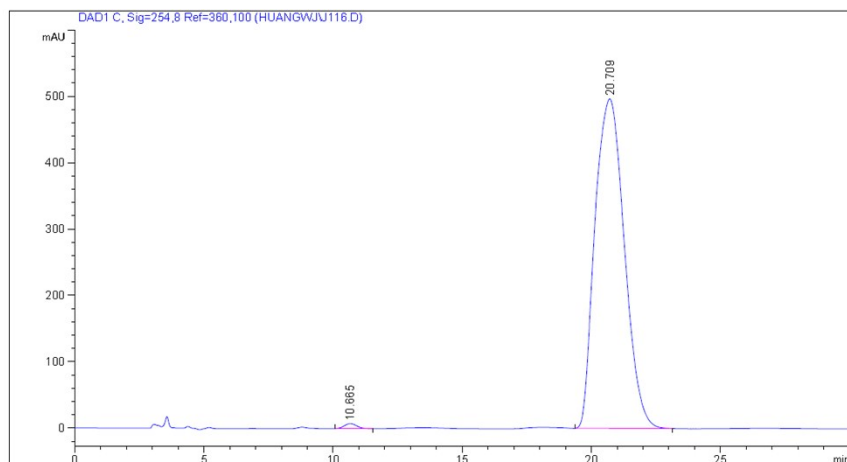
HPLC spectrum of the racemate



信号 1: DAD1 C, Sig=254,8 Ref=360,100

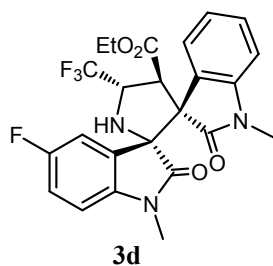
峰 #	保留时间 [min]	类型	峰宽 [min]	峰面积 [mAU*s]	峰高 [mAU]	峰面积 %
1	10.644	MM R	0.5619	5103.17383	151.36838	49.7330
2	20.940	MM R	1.3171	5157.96240	65.26832	50.2670

HPLC spectrum of the chiral compound

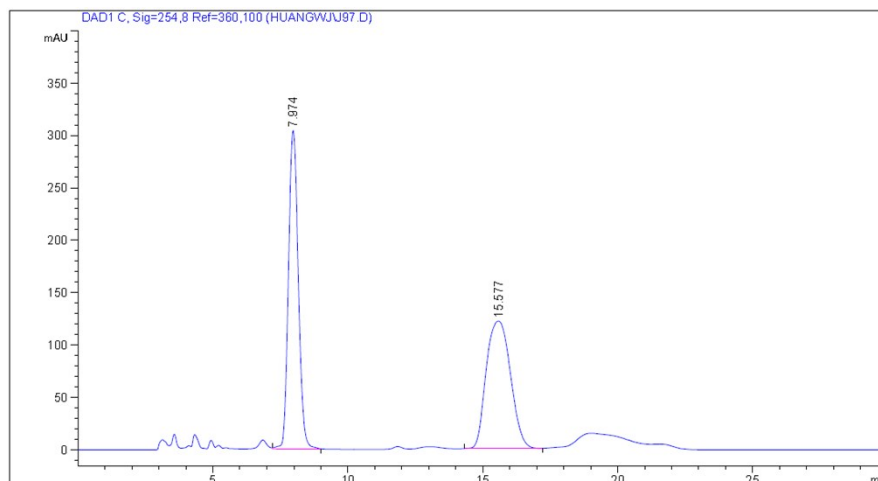


信号 1: DAD1 C, Sig=254,8 Ref=360,100

峰 #	保留时间 [min]	类型	峰宽 [min]	峰面积 [mAU*s]	峰高 [mAU]	峰面积 %
1	10.665	BB	0.5100	248.69629	7.47774	0.6289
2	20.709	BB	1.2844	3.92990e4	497.03833	99.3711



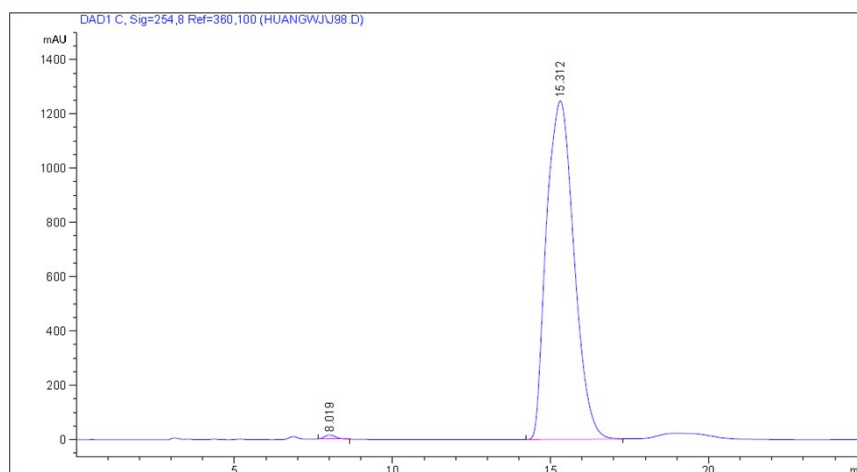
HPLC spectrum of the racemate



信号 1: DAD1 C, Sig=254,8 Ref=360,100

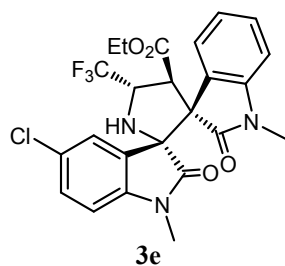
峰 #	保留时间 [min]	类型	峰宽 [min]	峰面积 [mAU*s]	峰高 [mAU]	峰面积 %
1	7.974	VB	0.3963	7668.66797	303.96692	50.1844
2	15.577	MM R	1.0426	7612.31592	121.68826	49.8156

HPLC spectrum of the chiral compound

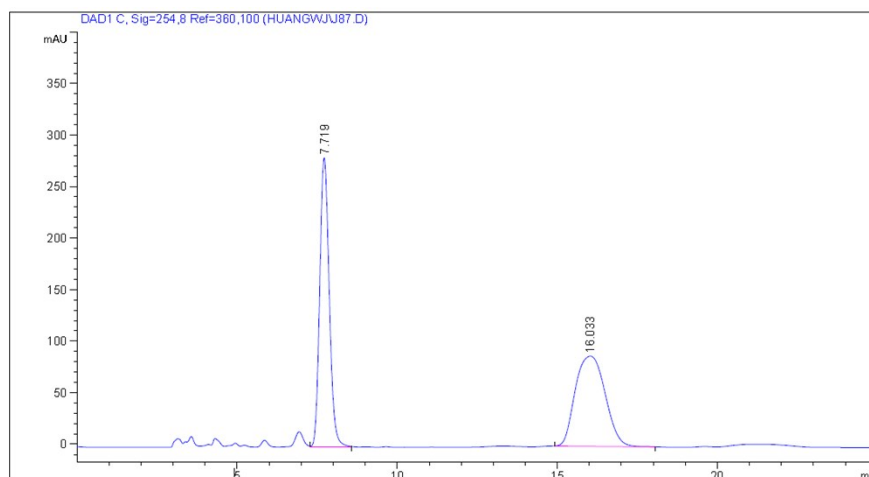


信号 1: DAD1 C, Sig=254,8 Ref=360,100

峰 #	保留时间 [min]	类型	峰宽 [min]	峰面积 [mAU*s]	峰高 [mAU]	峰面积 %
1	8.019	MM R	0.4151	369.19818	14.82296	0.4872
2	15.312	MM R	1.0082	7.54132e4	1246.62390	99.5128



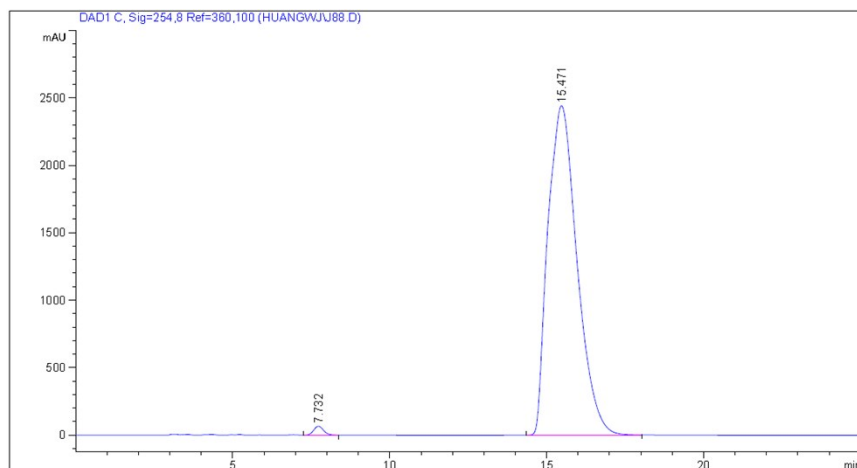
HPLC spectrum of the racemate



信号 1: DAD1 C, Sig=254,8 Ref=360,100

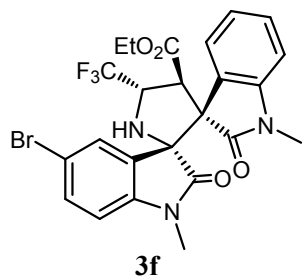
峰 #	保留时间 [min]	类型	峰宽 [min]	峰面积 [mAU*s]	峰高 [mAU]	峰面积 %
1	7.719	VB	0.3203	5775.85205	280.41901	50.4246
2	16.033	BB	1.0609	5678.58154	87.52362	49.5754

HPLC spectrum of the chiral compound

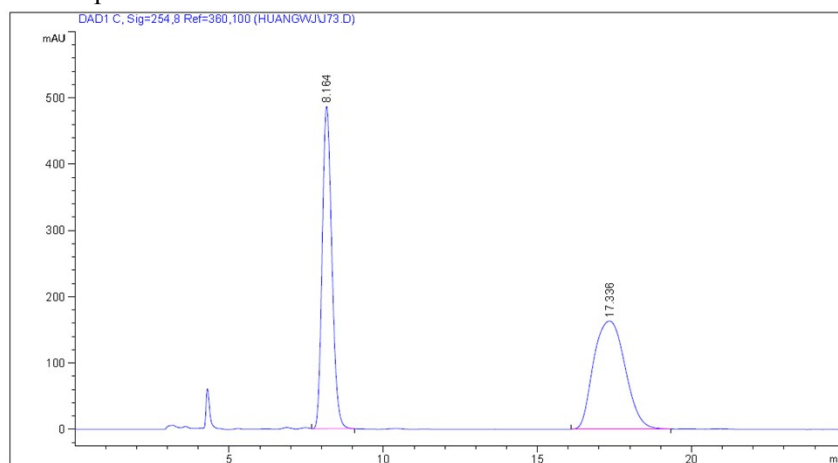


信号 1: DAD1 C, Sig=254,8 Ref=360,100

峰 #	保留时间 [min]	类型	峰宽 [min]	峰面积 [mAU*s]	峰高 [mAU]	峰面积 %
1	7.732	VB	0.3392	1422.46228	65.54408	0.8975
2	15.471	MM R	1.0723	1.57069e5	2441.31958	99.1025



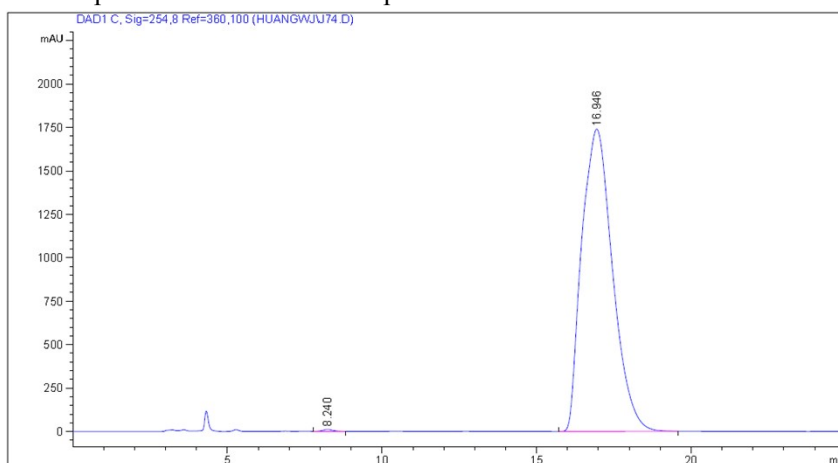
HPLC spectrum of the racemate



信号 1: DAD1 C, Sig=254,8 Ref=360,100

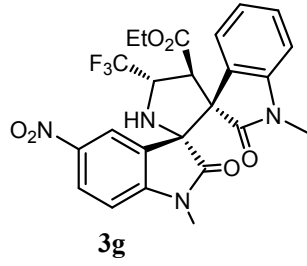
峰 #	保留时间 [min]	类型	峰宽 [min]	峰面积 [mAU*s]	峰高 [mAU]	峰面积 %
1	8.164	MM R	0.3626	1.05821e4	486.40851	47.7049
2	17.336	MM R	1.1847	1.16002e4	163.18974	52.2951

HPLC spectrum of the chiral compound

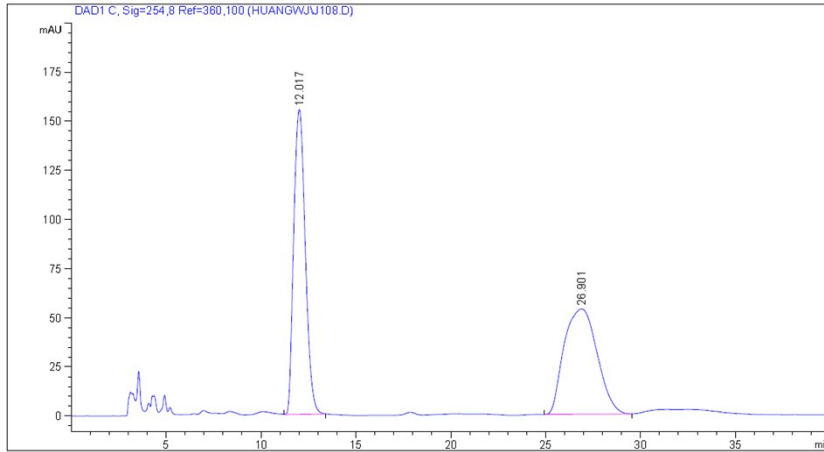


信号 1: DAD1 C, Sig=254,8 Ref=360,100

峰 #	保留时间 [min]	类型	峰宽 [min]	峰面积 [mAU*s]	峰高 [mAU]	峰面积 %
1	8.240	MM R	0.3718	252.86552	11.33370	0.2092
2	16.946	MM R	1.1554	1.20614e5	1739.86572	99.7908



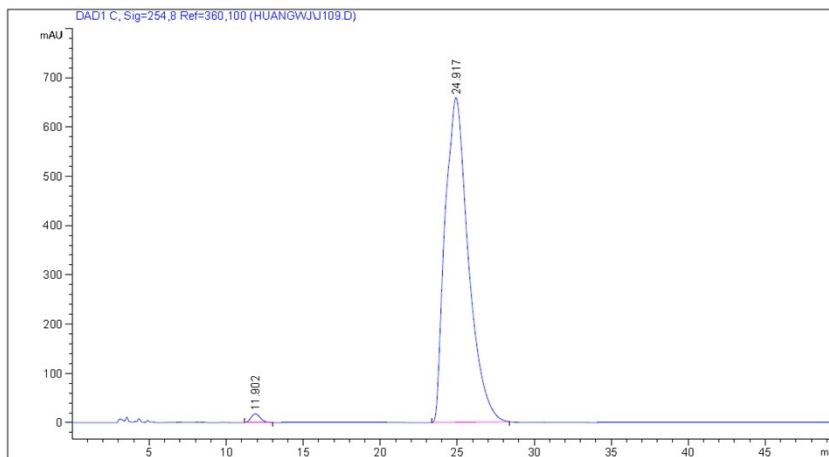
HPLC spectrum of the racemate



信号 1: DAD1 C, Sig=254,8 Ref=360,100

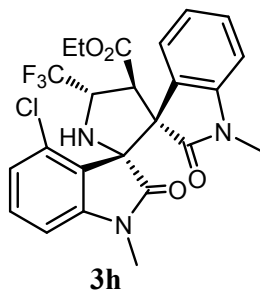
峰 #	保留时间 [min]	类型	峰宽 [min]	峰面积 [mAU*s]	峰高 [mAU]	峰面积 %
1	12.017	MM R	0.7058	6568.64111	155.12086	50.3454
2	26.901	MM R	2.0156	6478.50928	53.57096	49.6546

HPLC spectrum of the chiral compound

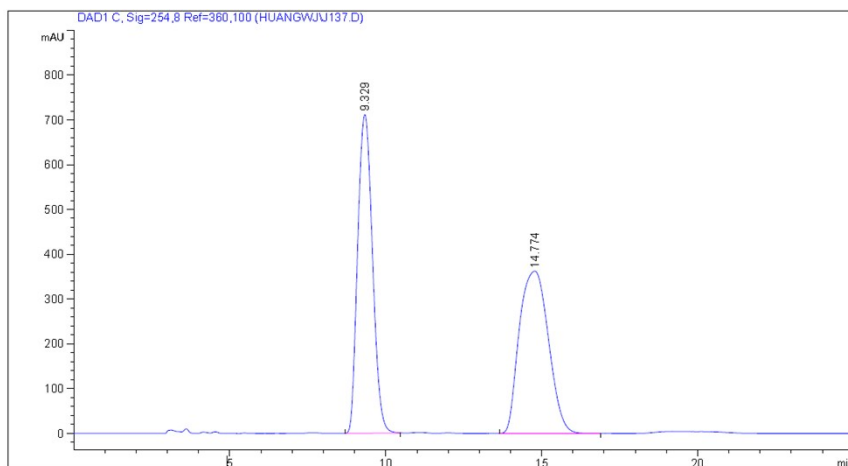


信号 1: DAD1 C, Sig=254,8 Ref=360,100

峰 #	保留时间 [min]	类型	峰宽 [min]	峰面积 [mAU*s]	峰高 [mAU]	峰面积 %
1	11.902	BB	0.6494	728.95032	17.52008	1.0419
2	24.817	BB	1.3897	6.92349e4	658.99713	98.9581



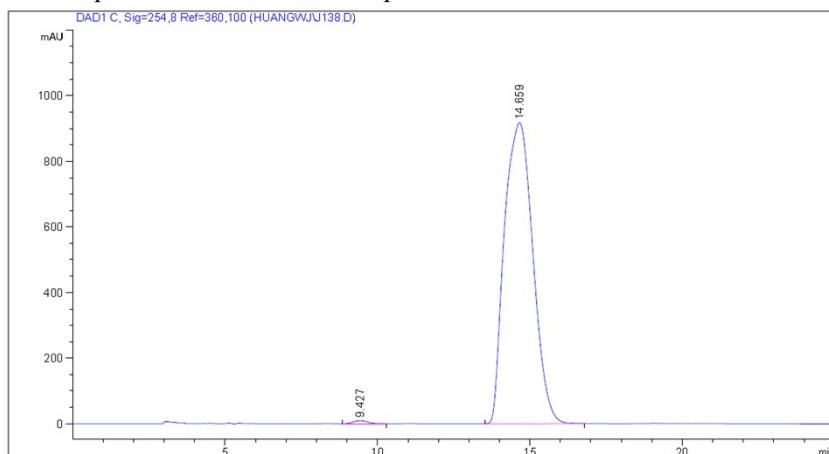
HPLC spectrum of the racemate



信号 1: DAD1 C, Sig=254,8 Ref=360,100

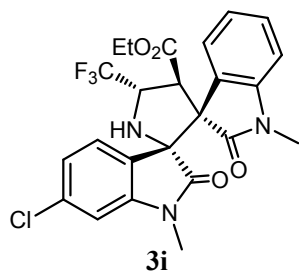
峰 #	保留时间 [min]	类型	峰宽 [min]	峰面积 [mAU*s]	峰高 [mAU]	峰面积 %
1	9.329	BB	0.5304	2.34431e4	711.51349	49.8587
2	14.774	BB	1.0768	2.35760e4	362.49066	50.1413

HPLC spectrum of the chiral compound

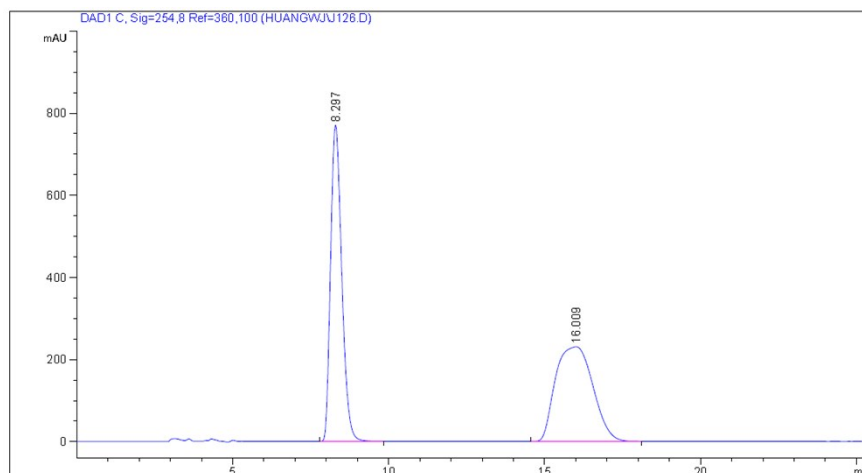


信号 1: DAD1 C, Sig=254,8 Ref=360,100

峰 #	保留时间 [min]	类型	峰宽 [min]	峰面积 [mAU*s]	峰高 [mAU]	峰面积 %
1	9.427	BB	0.5107	303.71350	9.30774	0.5080
2	14.659	BB	1.0767	5.94766e4	917.04895	99.4920



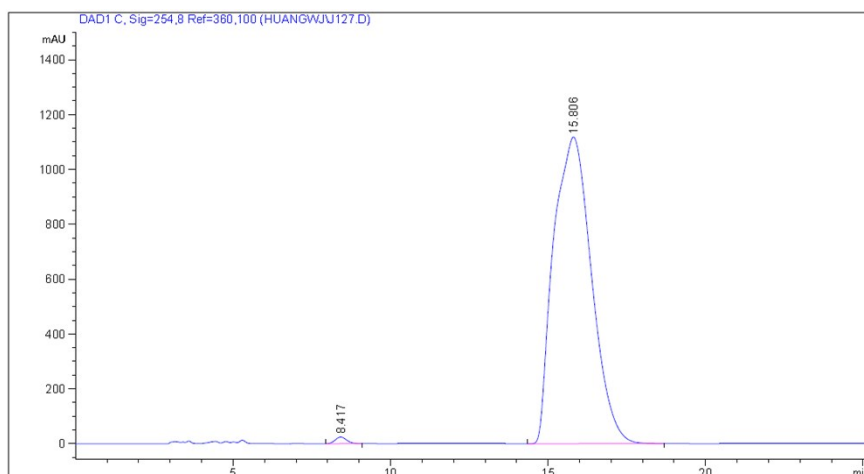
HPLC spectrum of the racemate



信号 1: DAD1 C, Sig=254,8 Ref=360,100

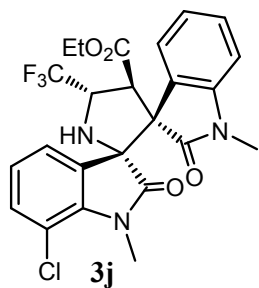
峰 #	保留时间 [min]	类型	峰宽 [min]	峰面积 [mAU*s]	峰高 [mAU]	峰面积 %
1	8.297	MM R	0.4146	1.91669e4	770.44446	49.9430
2	16.009	MM R	1.3869	1.92107e4	230.86606	50.0570

HPLC spectrum of the chiral compound

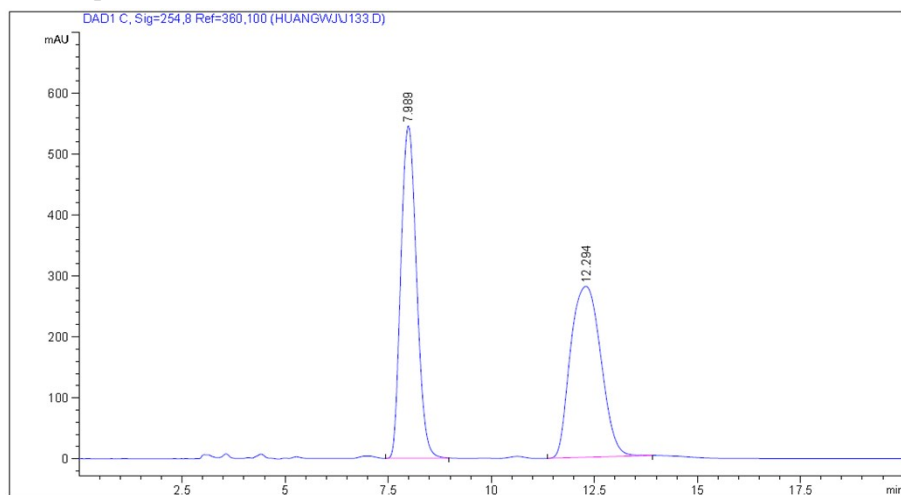


信号 1: DAD1 C, Sig=254,8 Ref=360,100

峰 #	保留时间 [min]	类型	峰宽 [min]	峰面积 [mAU*s]	峰高 [mAU]	峰面积 %
1	8.417	BB	0.3921	604.45355	24.14166	0.6420
2	15.806	MM R	1.3944	9.35501e4	1118.15735	99.3580



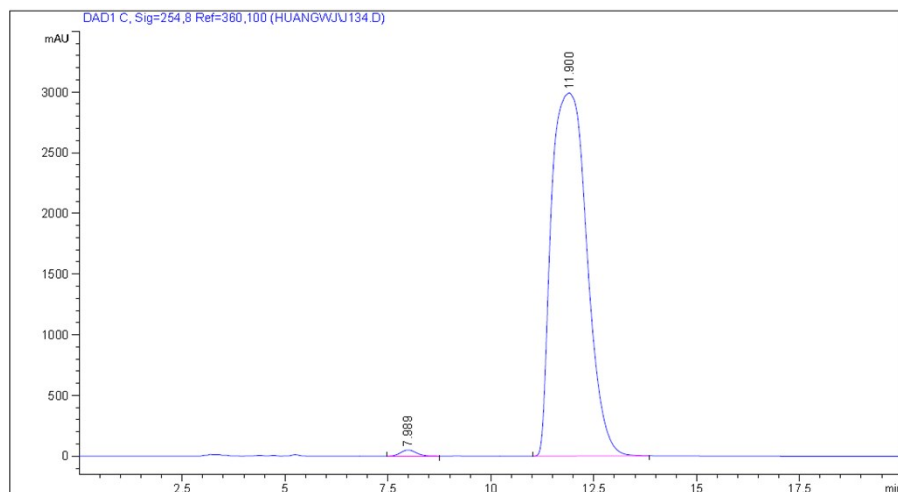
HPLC spectrum of the racemate



信号 1: DAD1 C, Sig=254,8 Ref=360,100

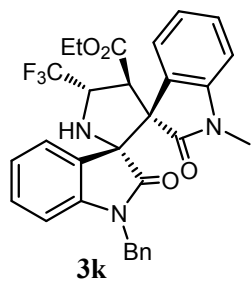
峰 #	保留时间 [min]	类型	峰宽 [min]	峰面积 [mAU*s]	峰高 [mAU]	峰面积 %
1	7.989	VB	0.4223	1.44143e4	545.38428	50.0045
2	12.294	BB	0.8411	1.44117e4	280.66589	49.9955

HPLC spectrum of the chiral compound

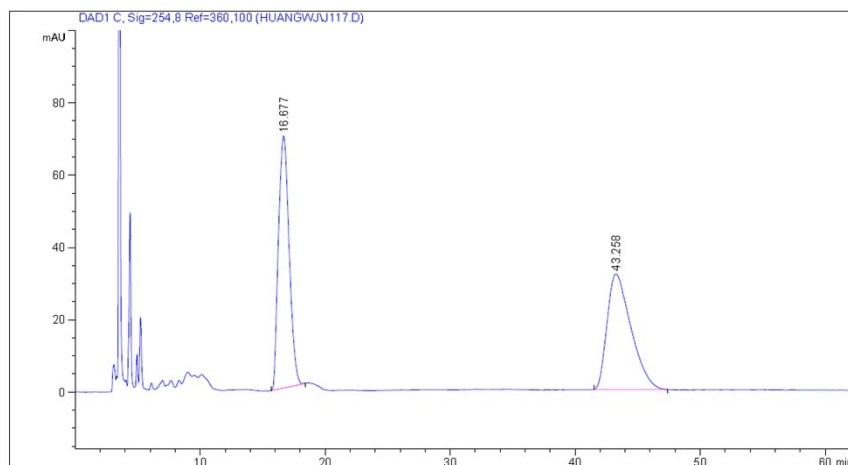


信号 1: DAD1 C, Sig=254,8 Ref=360,100

峰 #	保留时间 [min]	类型	峰宽 [min]	峰面积 [mAU*s]	峰高 [mAU]	峰面积 %
1	7.989	BB	0.4177	1281.81702	48.91203	0.7124
2	11.900	BB	0.7249	1.78654e5	2990.94165	99.2876



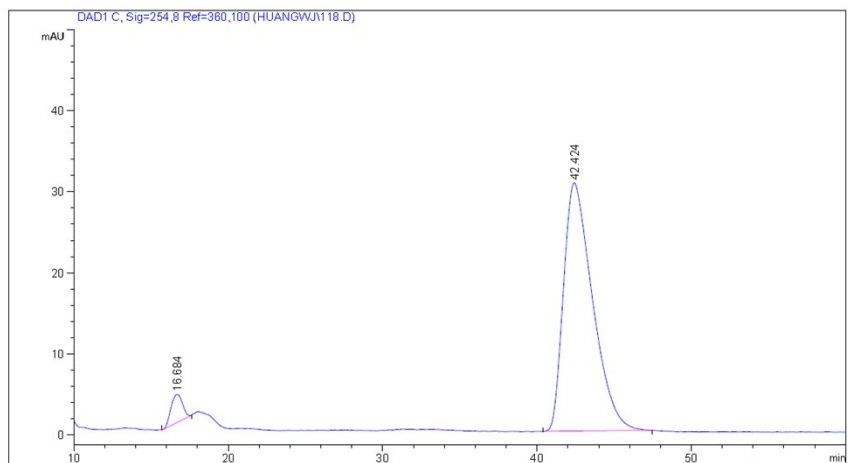
HPLC spectrum of the racemate



信号 1: DAD1 C, Sig=254,8 Ref=360,100

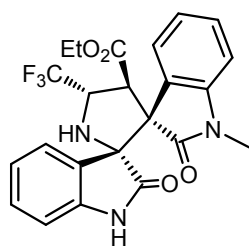
峰 #	保留时间 [min]	类型	峰宽 [min]	峰面积 [mAU*s]	峰高 [mAU]	峰面积 %
1	16.677	BB	0.9505	4135.96826	69.68187	49.3694
2	43.258	MM R	2.2121	4241.63477	31.95794	50.6306

HPLC spectrum of the chiral compound



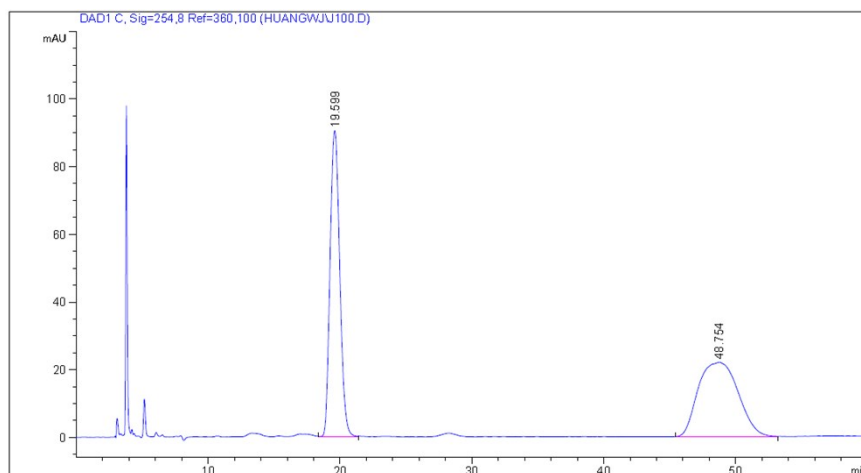
信号 1: DAD1 C, Sig=254,8 Ref=360,100

峰 #	保留时间 [min]	类型	峰宽 [min]	峰面积 [mAU*s]	峰高 [mAU]	峰面积 %
1	16.684	MM R	0.8617	179.86168	3.47862	4.3041
2	42.424	MM R	2.1769	3998.96362	30.61734	95.6959



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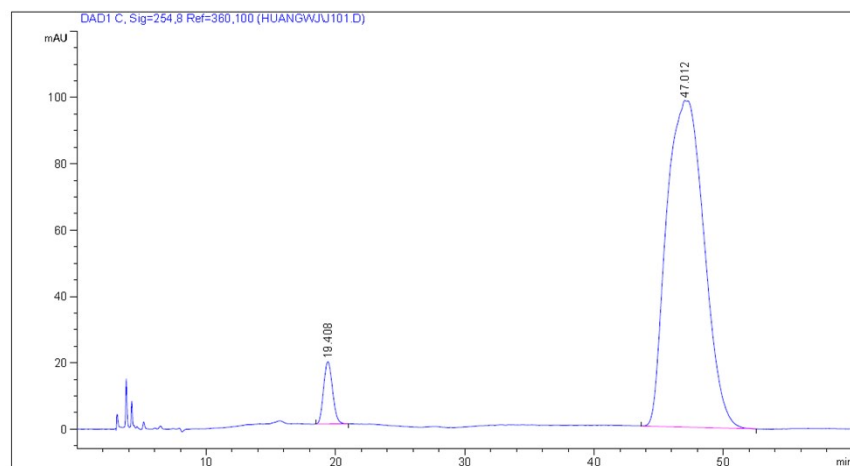
HPLC spectrum of the racemate



信号 1: DAD1 C, Sig=254,8 Ref=360,100

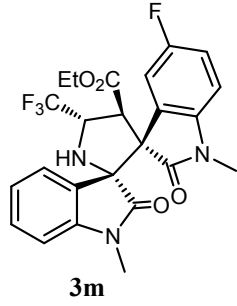
峰 #	保留时间 [min]	类型	峰宽 [min]	峰面积 [mAU*s]	峰高 [mAU]	峰面积 %
1	19.599	MM R	0.8477	4598.75488	90.41846	49.7632
2	48.754	MM R	3.5111	4642.51514	22.03755	50.2368

HPLC spectrum of the chiral compound

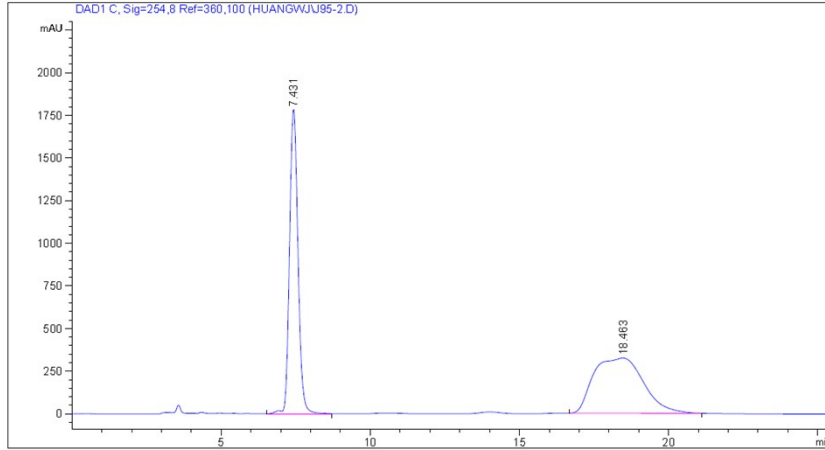


信号 1: DAD1 C, Sig=254,8 Ref=360,100

峰 #	保留时间 [min]	类型	峰宽 [min]	峰面积 [mAU*s]	峰高 [mAU]	峰面积 %
1	19.408	MM R	0.8021	904.15533	18.78614	4.3638
2	47.012	MM R	3.3527	1.98151e4	98.50256	95.6362



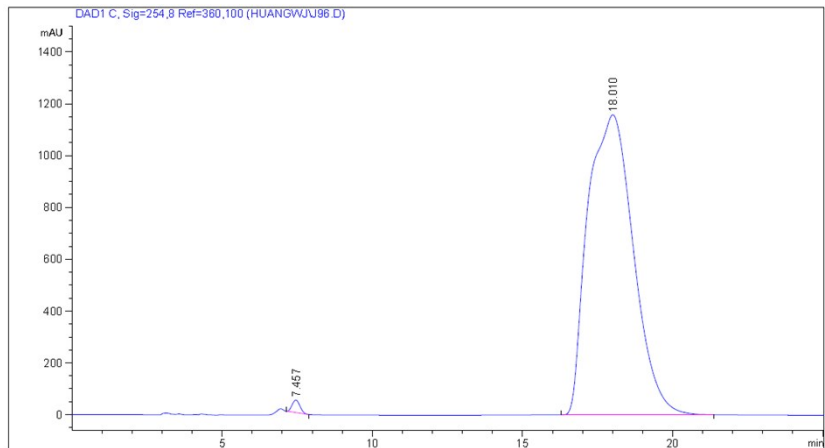
HPLC spectrum of the racemate



信号 1: DAD1 C, Sig=254,8 Ref=360,100

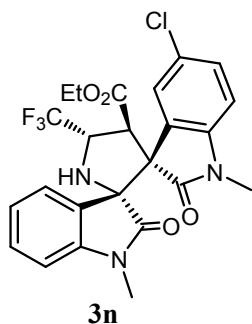
峰 #	保留时间 [min]	类型	峰宽 [min]	峰面积 [mAU*s]	峰高 [mAU]	峰面积 %
1	7.431	MM R	0.3289	3.51919e4	1783.17883	48.3451
2	18.463	MM R	1.9354	3.76012e4	323.80469	51.6549

HPLC spectrum of the chiral compound

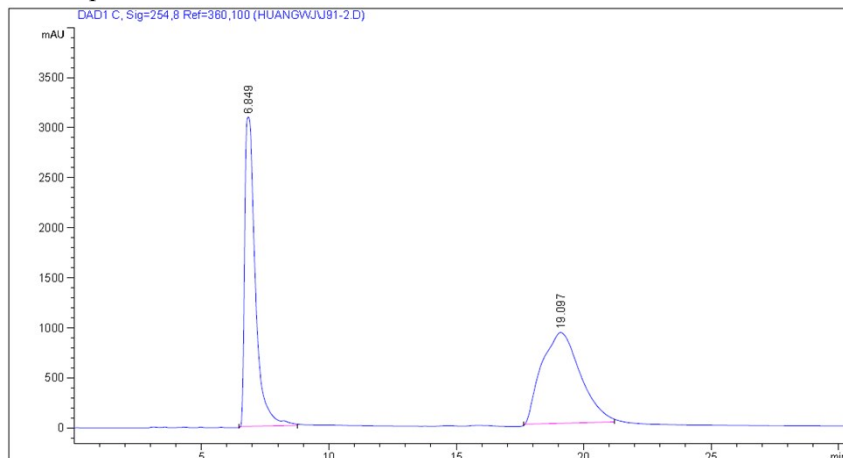


信号 1: DAD1 C, Sig=254,8 Ref=360,100

峰 #	保留时间 [min]	类型	峰宽 [min]	峰面积 [mAU*s]	峰高 [mAU]	峰面积 %
1	7.457	MM R	0.3010	867.03857	48.01016	0.7067
2	18.010	MM R	1.7538	1.21814e5	1157.61731	99.2933



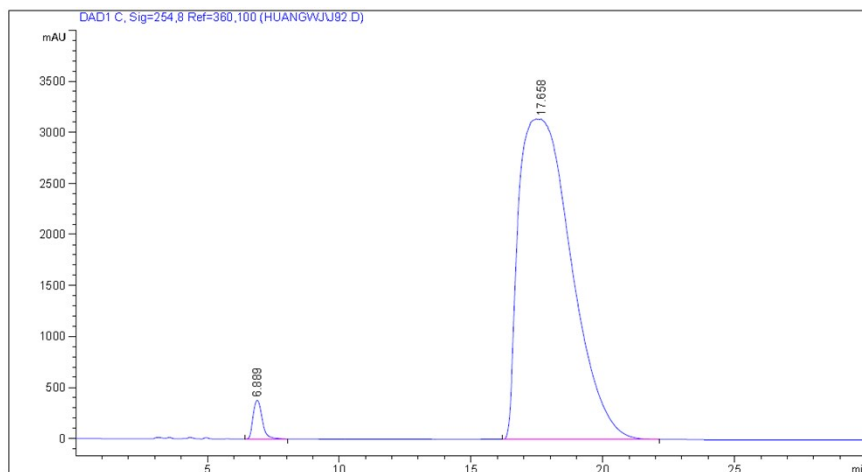
HPLC spectrum of the racemate



信号 1: DAD1 C, Sig=254,8 Ref=360,100

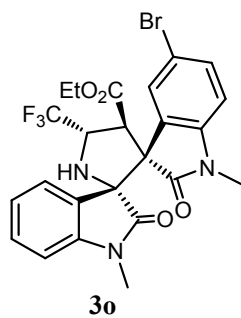
峰 #	保留时间 [min]	类型	峰宽 [min]	峰面积 [mAU*s]	峰高 [mAU]	峰面积 %
1	6.849	MM R	0.4848	8.99000e4	3090.54297	48.3649
2	19.097	MM R	1.7624	9.59787e4	907.65881	51.6351

HPLC spectrum of the chiral compound

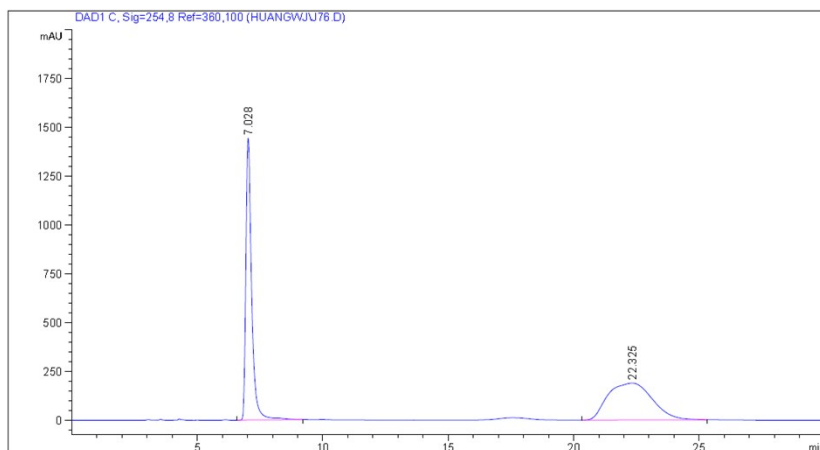


信号 1: DAD1 C, Sig=254,8 Ref=360,100

峰 #	保留时间 [min]	类型	峰宽 [min]	峰面积 [mAU*s]	峰高 [mAU]	峰面积 %
1	6.889	MM R	0.3990	9048.07031	377.98282	2.0386
2	17.656	MM R	2.3084	4.34793e5	3139.17114	97.9614



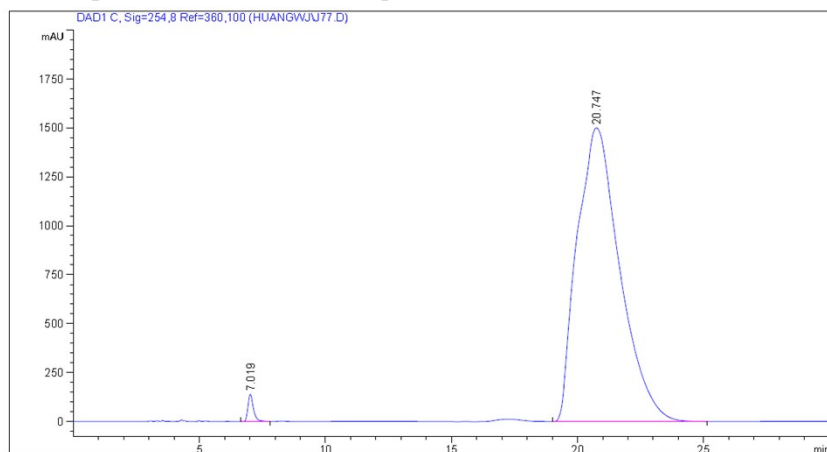
HPLC spectrum of the racemate



信号 1: DAD1 C, Sig=254,8 Ref=360,100

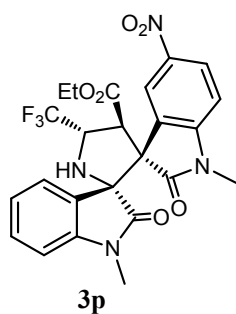
峰 #	保留时间 [min]	类型	峰宽 [min]	峰面积 [mAU*s]	峰高 [mAU]	峰面积 %
1	7.028	MM R	0.2681	2.32118e4	1443.17029	50.0749
2	22.325	MM R	2.0402	2.31423e4	189.04915	49.9251

HPLC spectrum of the chiral compound

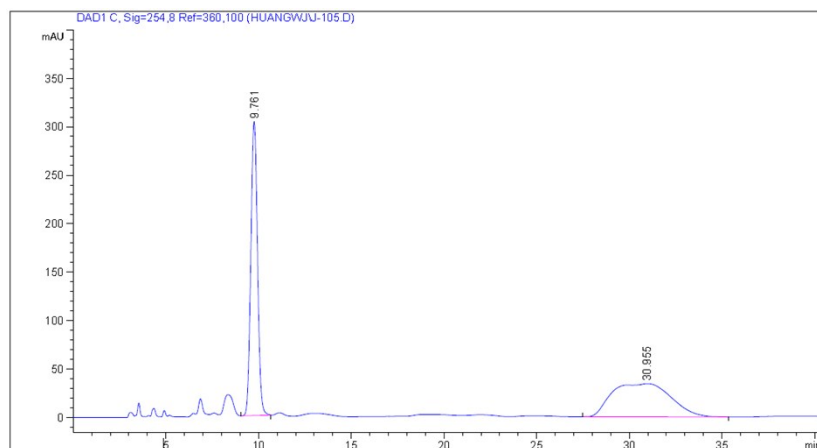


信号 1: DAD1 C, Sig=254,8 Ref=360,100

峰 #	保留时间 [min]	类型	峰宽 [min]	峰面积 [mAU*s]	峰高 [mAU]	峰面积 %
1	7.018	MM R	0.2538	2125.08105	139.54082	1.1920
2	20.747	MM R	1.9575	1.76151e5	1499.79053	98.8080



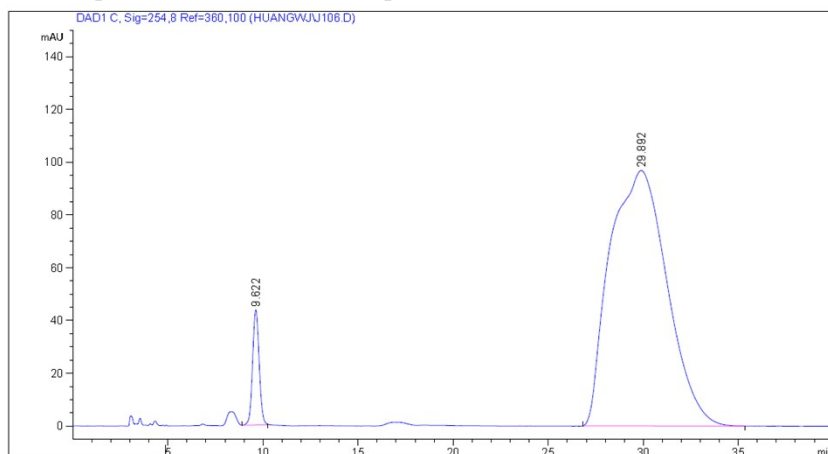
HPLC spectrum of the racemate



信号 1: DAD1 C, Sig=254,8 Ref=360,100

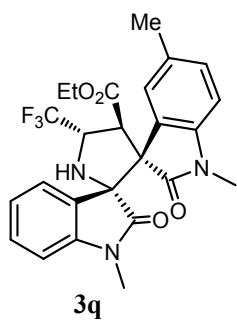
峰 #	保留时间 [min]	类型	峰宽 [min]	峰面积 [mAU*s]	峰高 [mAU]	峰面积 %
1	9.761	MM R	0.4159	7568.48486	303.31833	49.8726
2	30.955	MM R	3.7064	7607.15039	34.20712	50.1274

HPLC spectrum of the chiral compound

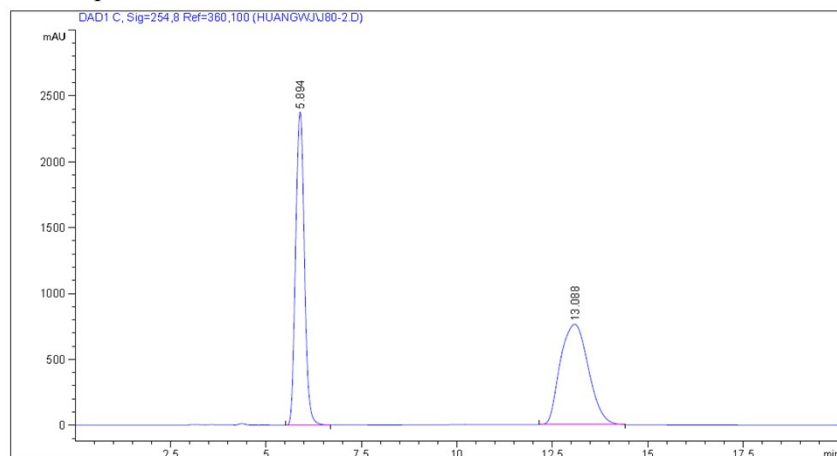


信号 1: DAD1 C, Sig=254,8 Ref=360,100

峰 #	保留时间 [min]	类型	峰宽 [min]	峰面积 [mAU*s]	峰高 [mAU]	峰面积 %
1	9.622	VB	0.3750	1052.23535	43.68041	4.9391
2	29.892	BB	2.5030	2.02521e4	96.87396	95.0609



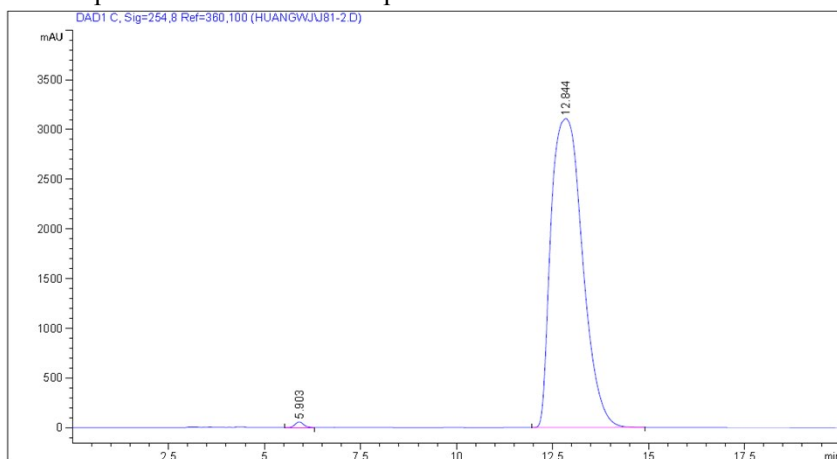
HPLC spectrum of the racemate



信号 1: DAD1 C, Sig=254,8 Ref=360,100

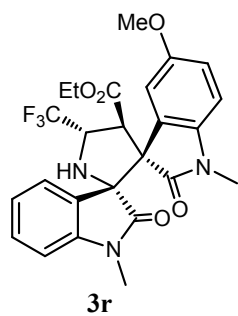
峰 #	保留时间 [min]	类型	峰宽 [min]	峰面积 [mAU*s]	峰高 [mAU]	峰面积 %
1	5.894	BB	0.2522	3.79483e4	2377.86670	49.4809
2	13.088	MM R	0.8487	3.87445e4	760.82214	50.5191

HPLC spectrum of the chiral compound

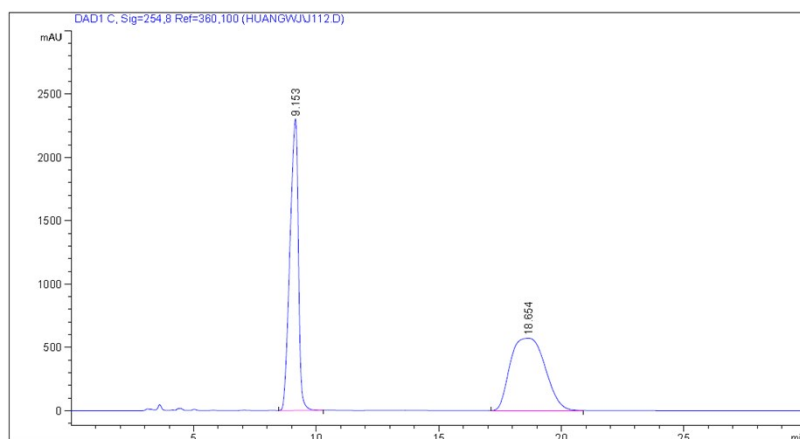


信号 1: DAD1 C, Sig=254,8 Ref=360,100

峰 #	保留时间 [min]	类型	峰宽 [min]	峰面积 [mAU*s]	峰高 [mAU]	峰面积 %
1	5.903	MM R	0.2584	872.44562	56.27165	0.4906
2	12.844	MM R	0.9483	1.76955e5	3110.16992	99.5094



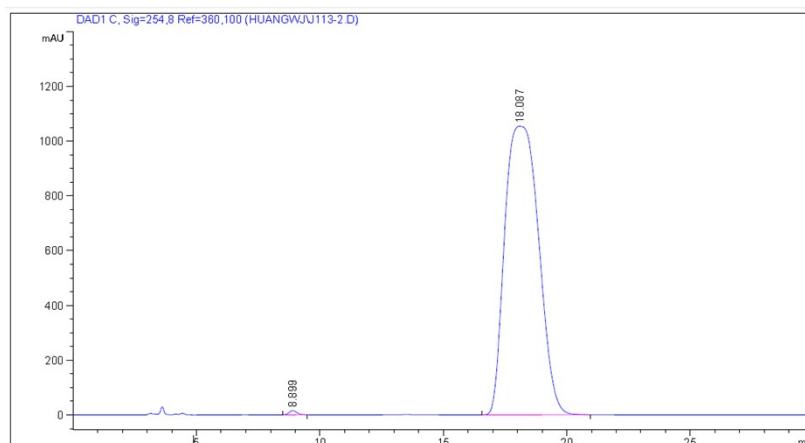
HPLC spectrum of the racemate



信号 1: DAD1 C, Sig=254,8 Ref=360,100

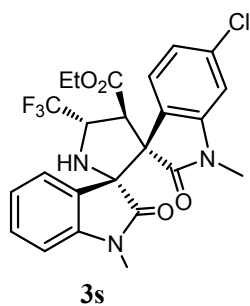
峰 #	保留时间 [min]	类型	峰宽 [min]	峰面积 [mAU*s]	峰高 [mAU]	峰面积 %
1	9.153	MM R	0.3973	5.48918e4	2302.63135	49.3722
2	18.654	MM R	1.6437	5.62877e4	570.75543	50.6278

HPLC spectrum of the chiral compound

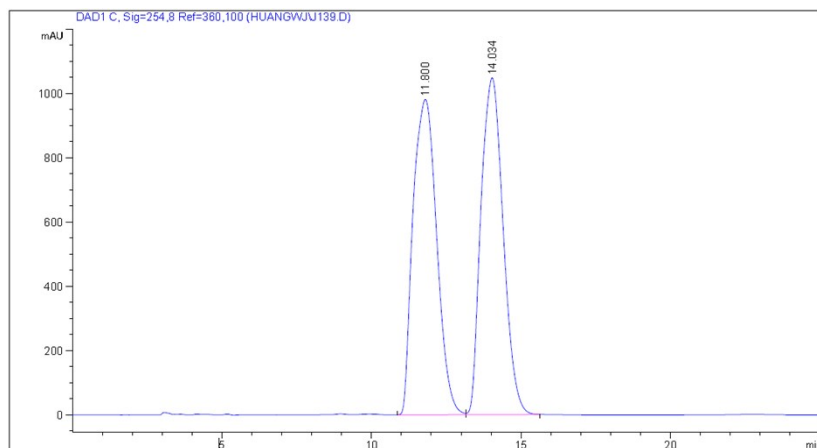


信号 1: DAD1 C, Sig=254,8 Ref=360,100

峰 #	保留时间 [min]	类型	峰宽 [min]	峰面积 [mAU*s]	峰高 [mAU]	峰面积 %
1	8.899	BB	0.3322	336.08972	15.54982	0.3326
2	18.087	MM R	1.5925	1.00721e5	1054.11340	99.6674



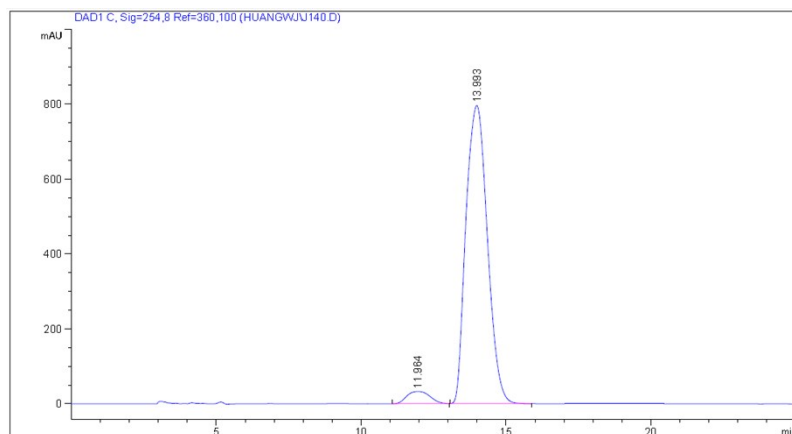
HPLC spectrum of the racemate



信号 1: DAD1 C, Sig=254,8 Ref=360,100

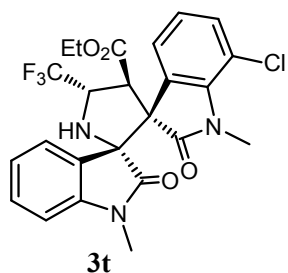
峰 #	保留时间 [min]	类型	峰宽 [min]	峰面积 [mAU*s]	峰高 [mAU]	峰面积 %
1	11.800	BV	0.9043	5.40107e4	981.01025	49.9950
2	14.034	VB	0.8394	5.40216e4	1047.98926	50.0050

HPLC spectrum of the chiral compound

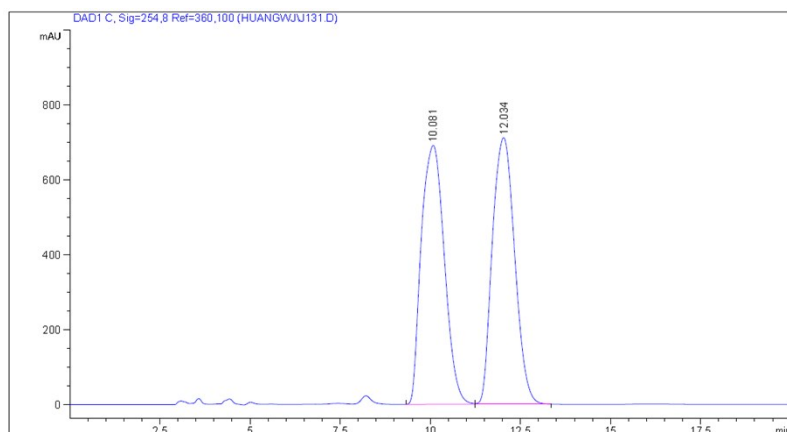


信号 1: DAD1 C, Sig=254,8 Ref=360,100

峰 #	保留时间 [min]	类型	峰宽 [min]	峰面积 [mAU*s]	峰高 [mAU]	峰面积 %
1	11.964	BV	0.9060	1792.95618	32.58436	4.1980
2	13.993	MM R	0.8566	4.09163e4	796.08844	95.8020



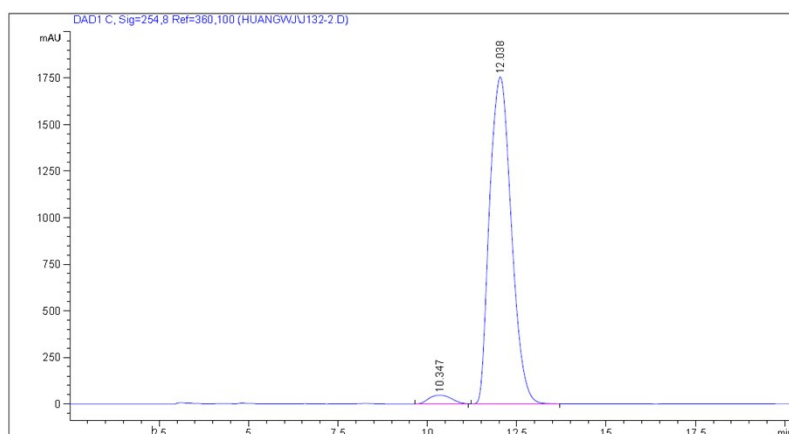
HPLC spectrum of the racemate



信号 1: DAD1 C, Sig=254,8 Ref=360,100

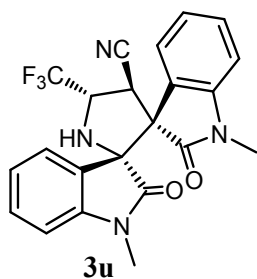
峰 #	保留时间 [min]	类型	峰宽 [min]	峰面积 [mAU*s]	峰高 [mAU]	峰面积 %
1	10.081	BV	0.7311	3.07520e4	691.18530	50.0790
2	12.034	VB	0.6986	3.06550e4	711.55353	49.9210

HPLC spectrum of the chiral compound

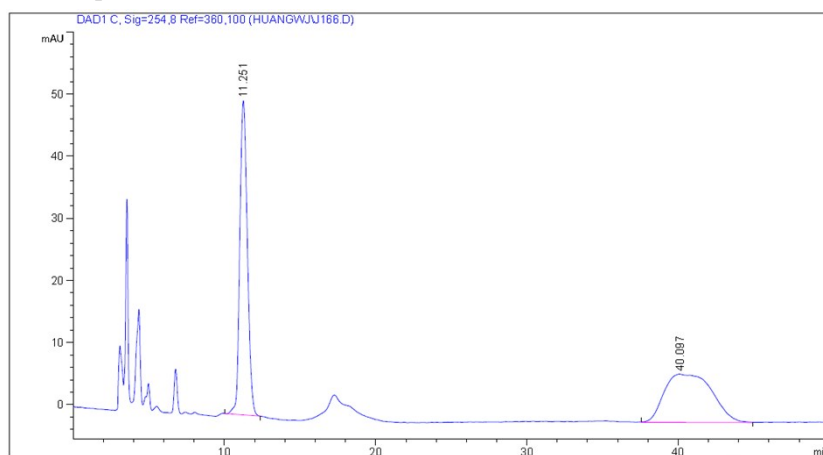


信号 1: DAD1 C, Sig=254,8 Ref=360,100

峰 #	保留时间 [min]	类型	峰宽 [min]	峰面积 [mAU*s]	峰高 [mAU]	峰面积 %
1	10.347	MM R	0.7370	2005.96948	45.36306	2.6380
2	12.038	MM R	0.7030	7.40354e4	1755.22644	97.3620



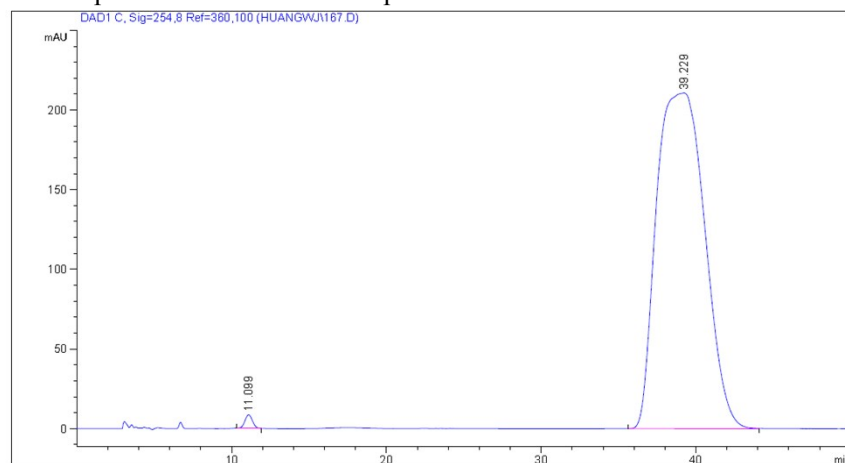
HPLC spectrum of the racemate



信号 1: DAD1 C, Sig=254,8 Ref=360,100

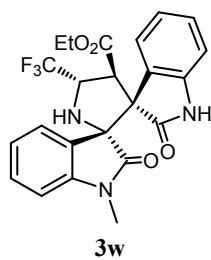
峰 #	保留时间 [min]	类型	峰宽 [min]	峰面积 [mAU*s]	峰高 [mAU]	峰面积 %
1	11.251	MM R	0.5794	1758.96936	50.59707	50.6810
2	40.097	MM R	3.6566	1711.70129	7.80196	49.3190

HPLC spectrum of the chiral compound

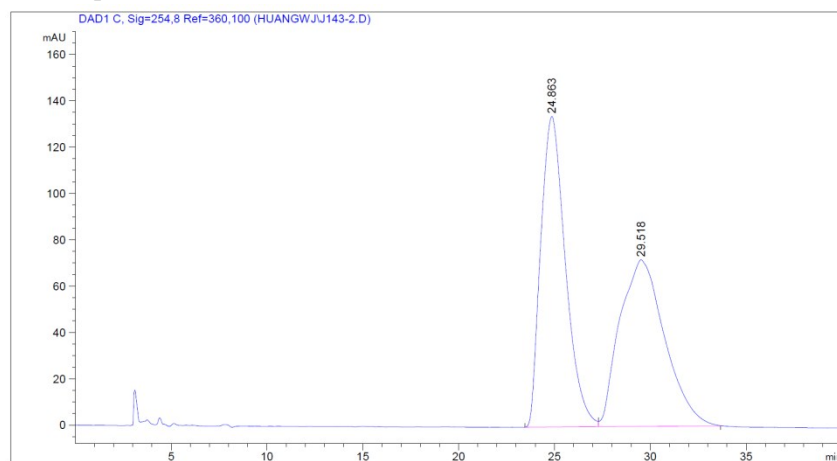


信号 1: DAD1 C, Sig=254,8 Ref=360,100

峰 #	保留时间 [min]	类型	峰宽 [min]	峰面积 [mAU*s]	峰高 [mAU]	峰面积 %
1	11.089	MM R	0.5454	271.36548	8.29242	0.5904
2	39.229	MM R	3.6124	4.56878e4	210.79395	99.4096



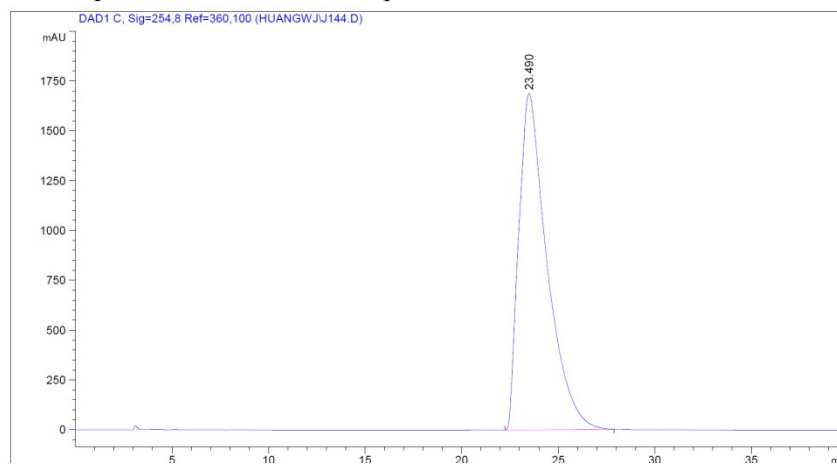
HPLC spectrum of the racemate



信号 1: DAD1 C, Sig=254,8 Ref=360,100

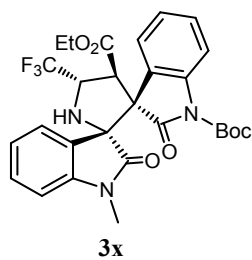
峰 #	保留时间 [min]	类型	峰宽 [min]	峰面积 [mAU*s]	峰高 [mAU]	峰面积 %
1	24.863	BV	1.4250	1.20104e4	134.09096	50.6277
2	29.518	VB	1.9986	1.17126e4	71.97079	49.3723

HPLC spectrum of the chiral compound

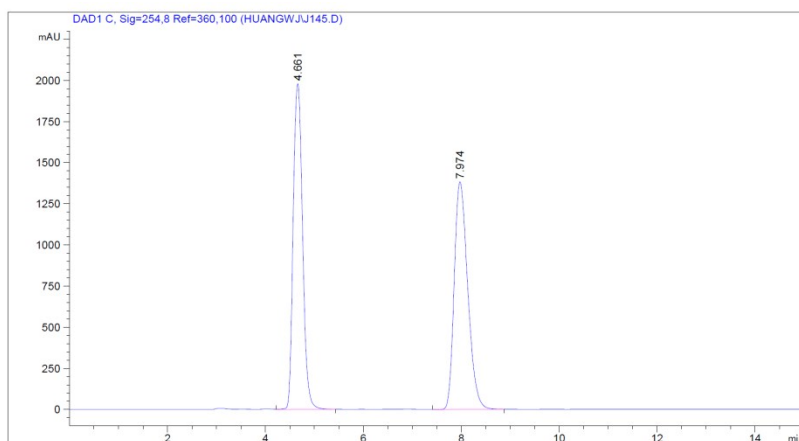


信号 1: DAD1 C, Sig=254,8 Ref=360,100

峰 #	保留时间 [min]	类型	峰宽 [min]	峰面积 [mAU*s]	峰高 [mAU]	峰面积 %
1	23.490	BB	1.3954	1.71044e5	1689.09656	100.0000



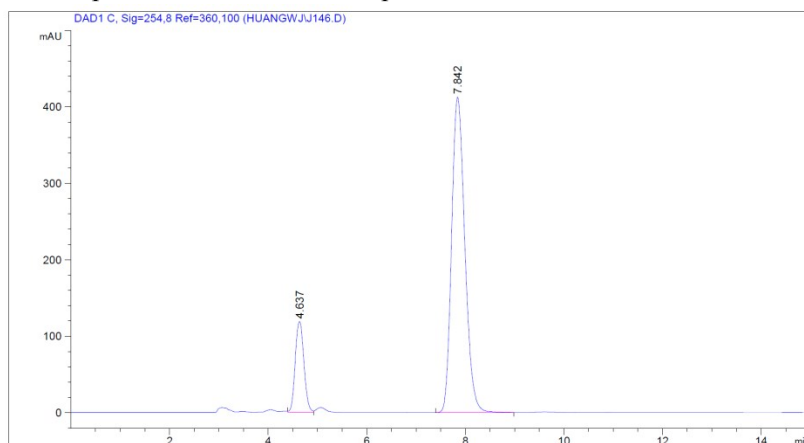
HPLC spectrum of the racemate



信号 1: DAD1 C, Sig=254,8 Ref=360,100

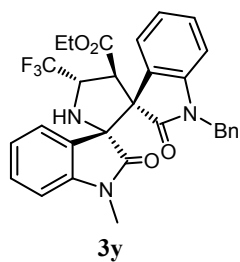
峰 #	保留时间 [min]	类型	峰宽 [min]	峰面积 [mAU*s]	峰高 [mAU]	峰面积 %
1	4.661	VB	0.2131	2.63067e4	1979.01208	49.8136
2	7.974	VB	0.2975	2.65036e4	1383.26001	50.1864

HPLC spectrum of the chiral compound

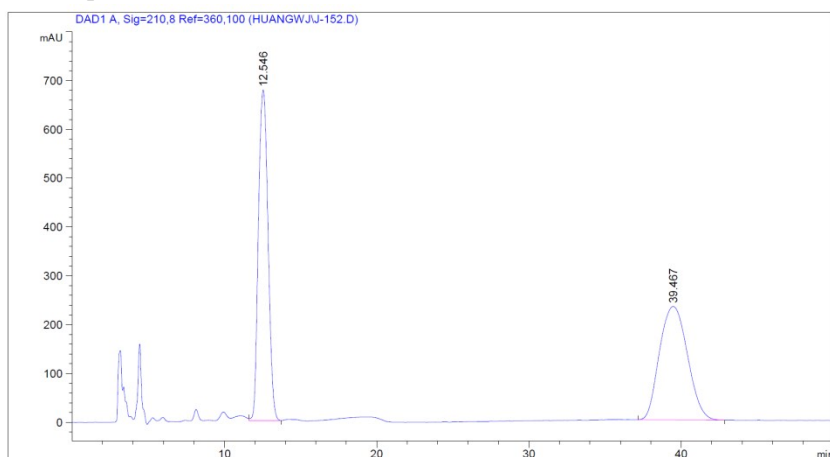


信号 1: DAD1 C, Sig=254,8 Ref=360,100

峰 #	保留时间 [min]	类型	峰宽 [min]	峰面积 [mAU*s]	峰高 [mAU]	峰面积 %
1	4.637	VV	0.1947	1450.50427	118.61431	15.8845
2	7.842	MM R	0.3102	7681.05664	412.65204	84.1155



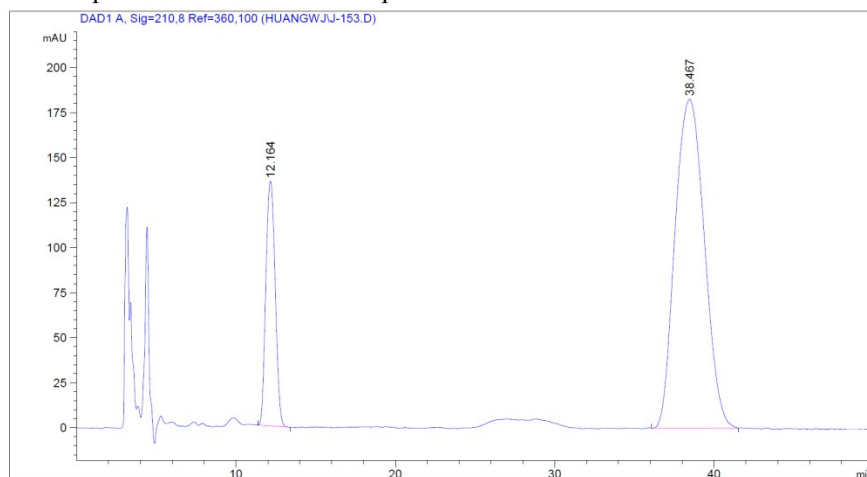
HPLC spectrum of the racemate



信号 1: DAD1 A, Sig=210,8 Ref=360,100

峰 #	保留时间 [min]	类型	峰宽 [min]	峰面积 [mAU*s]	峰高 [mAU]	峰面积 %
1	12.546	VV	0.7139	2.97079e4	677.13586	50.0574
2	39.467	BB	1.9611	2.96398e4	232.21999	49.9426

HPLC spectrum of the chiral compound



信号 1: DAD1 A, Sig=210,8 Ref=360,100

峰 #	保留时间 [min]	类型	峰宽 [min]	峰面积 [mAU*s]	峰高 [mAU]	峰面积 %
1	12.164	BB	0.6619	5520.76855	135.91388	19.1328
2	38.467	MM R	2.1285	2.33343e4	182.71152	80.8672