

## Figures

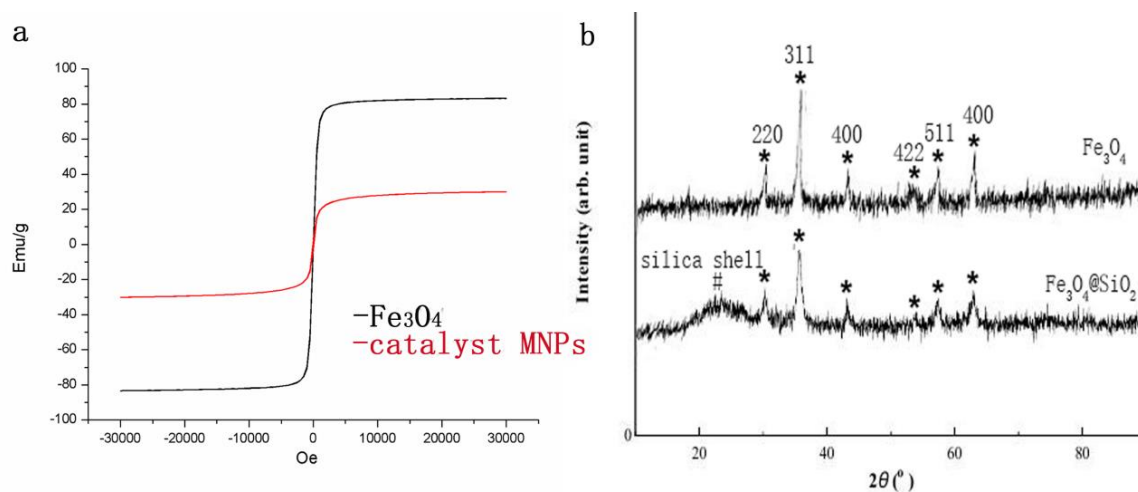


Figure. S1. The magnetic hysteresis loops (a) and XRD of  $\text{Fe}_3\text{O}_4$  MNPs and  $\text{Fe}_3\text{O}_4@\text{SiO}_2$  MNPs(b).

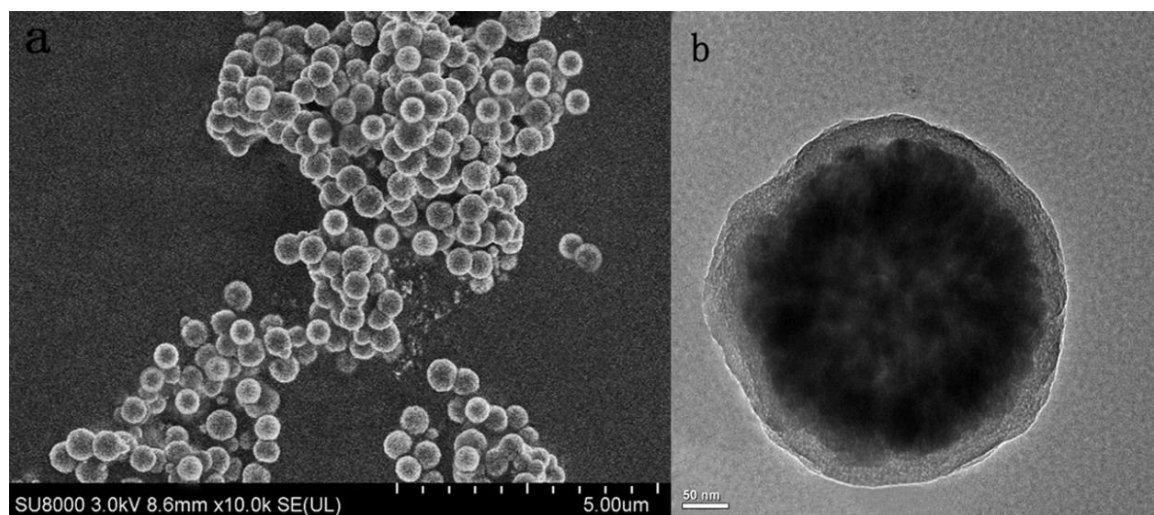


Figure. S2. The SEM (a) and TEM (b) images of catalyst nanoparticles

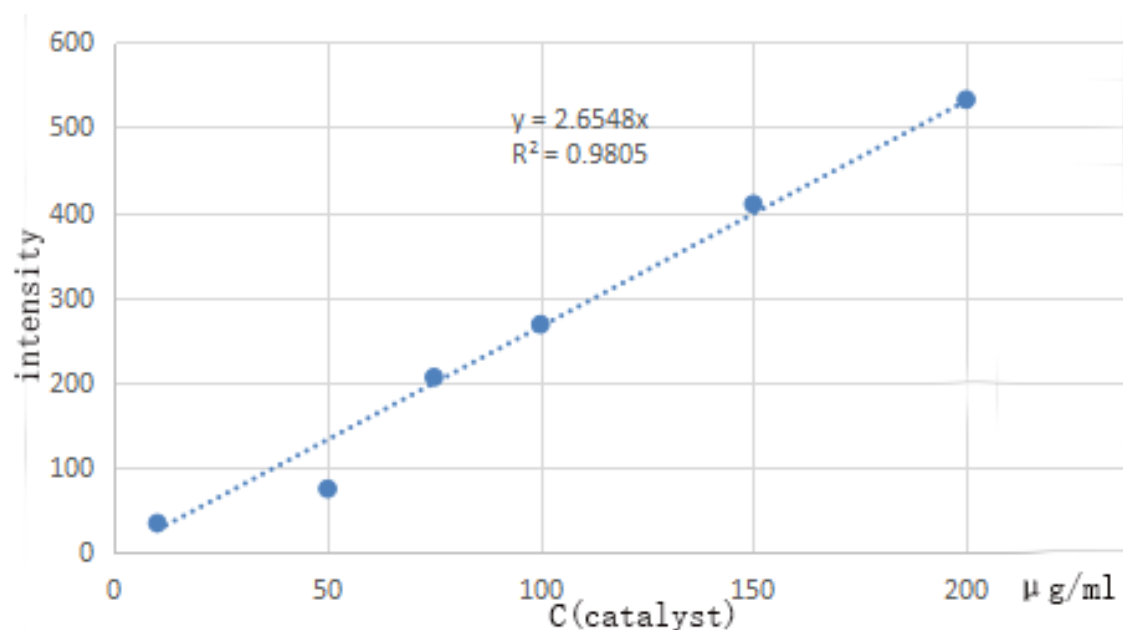


Figure. S3. The quantity measurement of catalyst **a** by RP-HPLC(C18 reverse phase column; grain size:  $5\mu\text{m}$ ; length $\times$ diameter=250 $\times$ 4.6ml; mobile phase: methanol; pressure: 77bar; quantity of flow: 1ml/min; retention time: 4.048min )

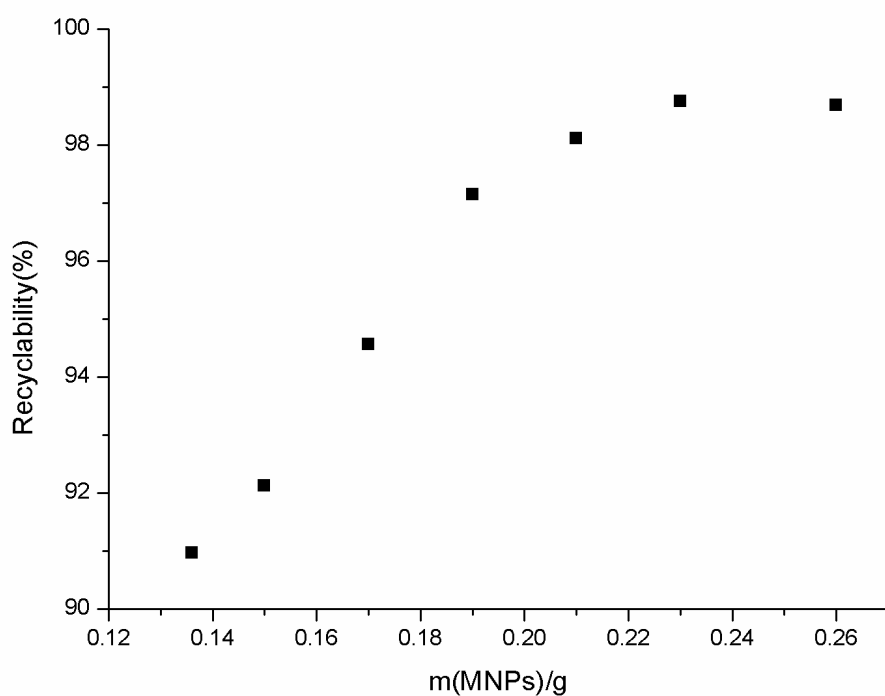


Figure. S4. The recyclability of 10.9mg catalyst **a** using different quantity of MNPs

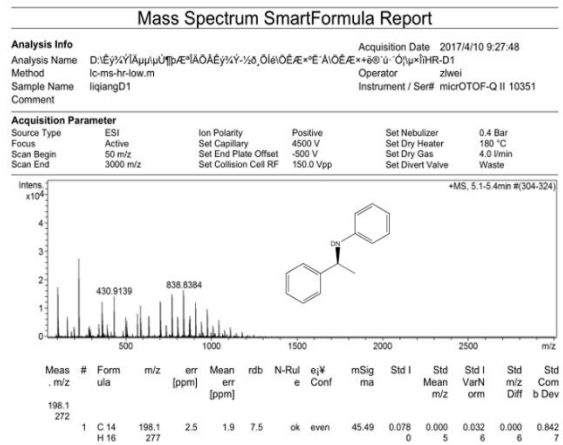


Figure. S5. HR Mass spectra of amine **[2a+H]<sup>+</sup>** and **[D-2a+H]<sup>+</sup>**.

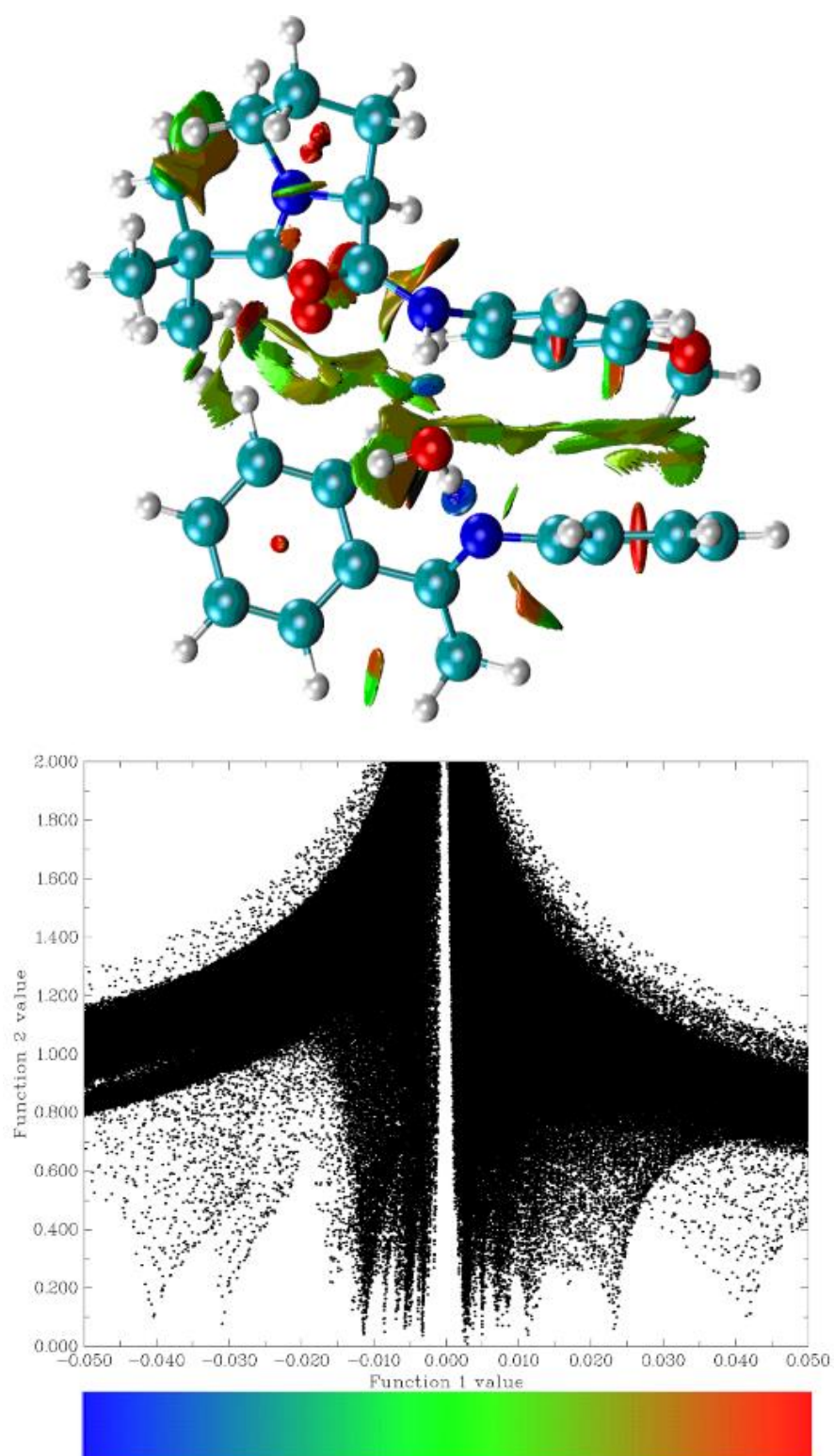


Figure. S6. Model A. the RDG analysis of A by Multiwfn and VMD.

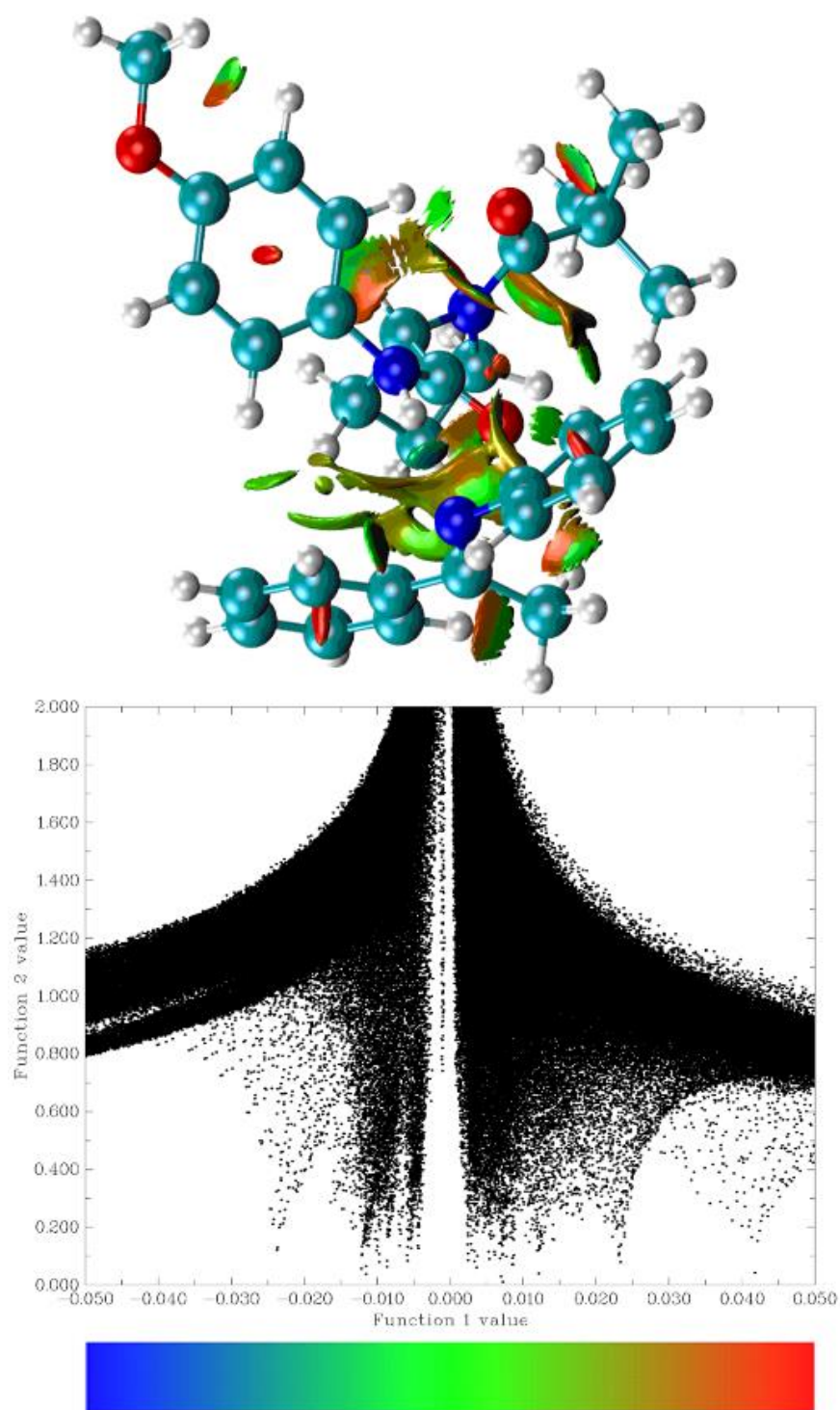


Figure. S7. Model B. the RDG analysis of B by Multiwfn and VMD.

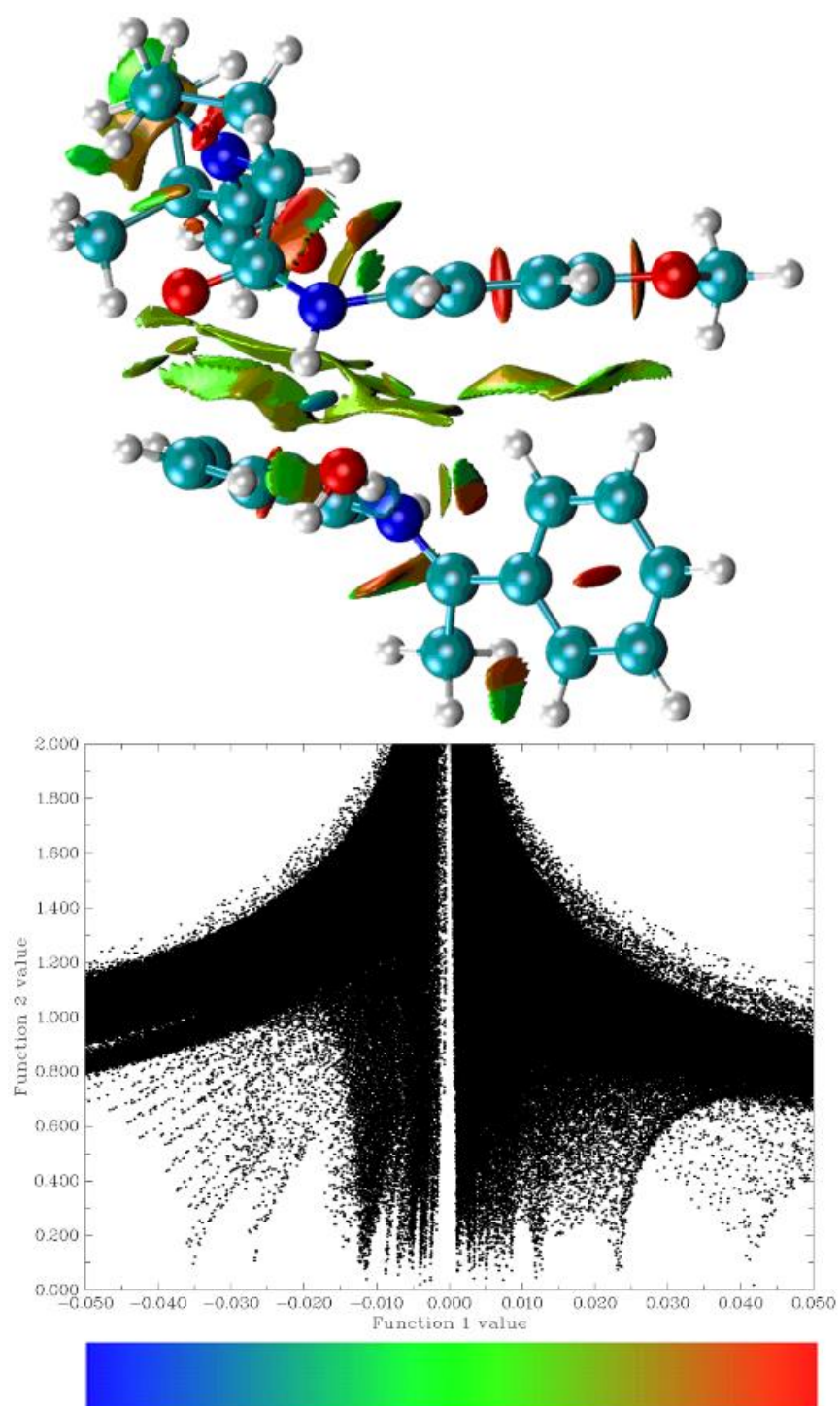


Figure. S8. Model C. the RDG analysis of C by Multiwfn and VMD.



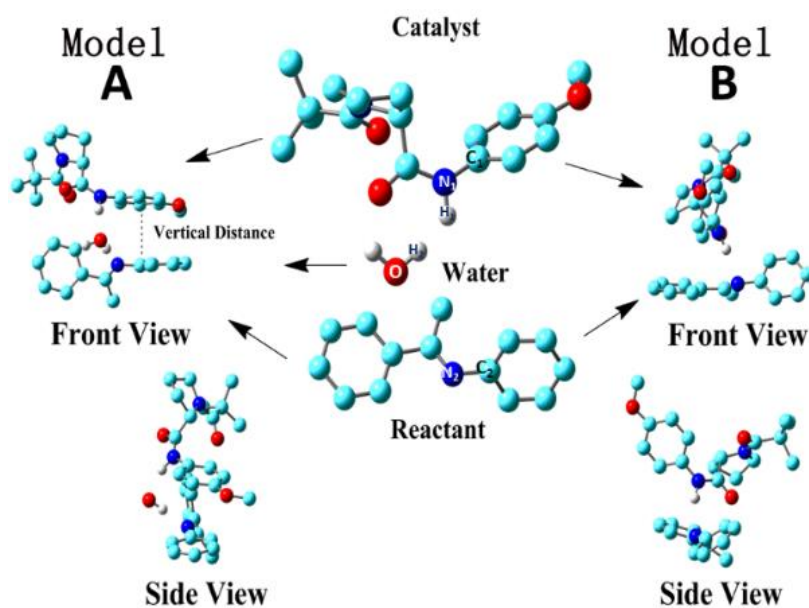
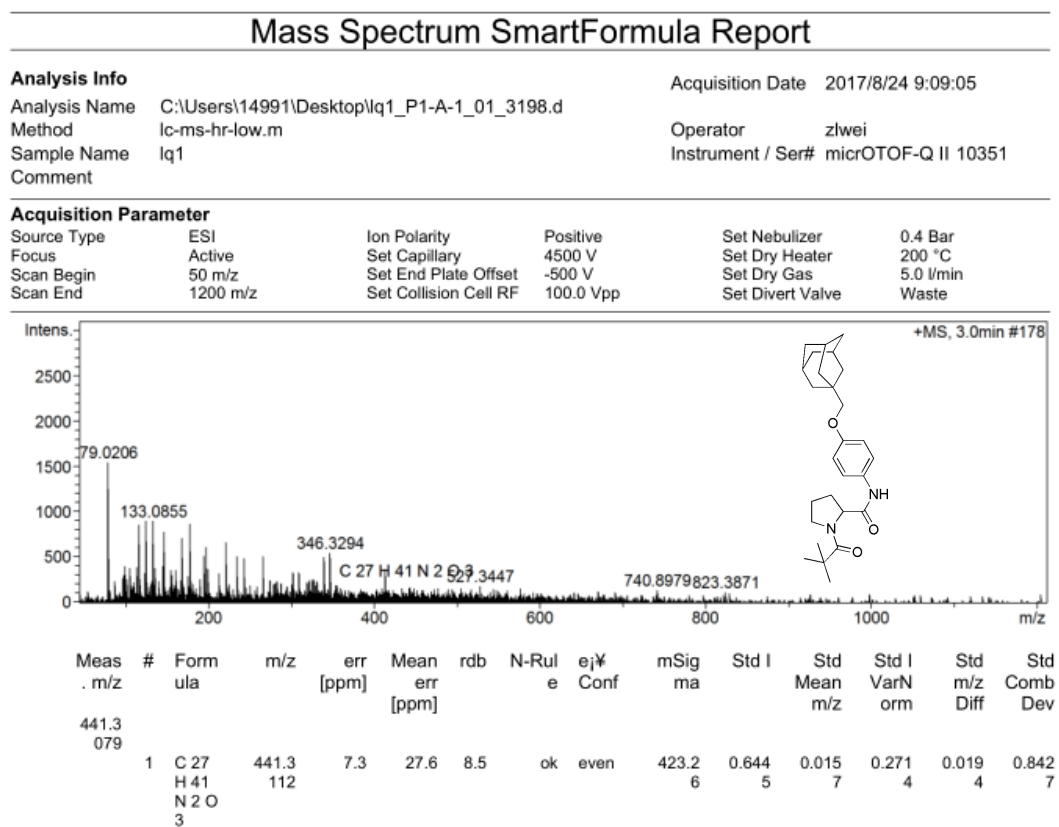


Figure. S9. The optimized geometries of catalyst, water, substrate, model A and B.

#### HRMS spectra



# Mass Spectrum SmartFormula Report

## Analysis Info

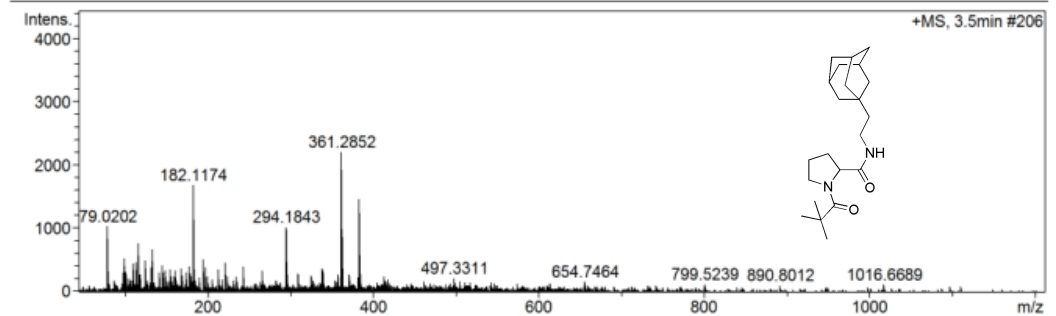
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 Method lc-ms-hr-low.m  
 Sample Name lq2  
 Comment

Acquisition Date 2017/8/24 9:15:30

Operator zlwei  
 Instrument / Ser# microTOF-Q II 10351

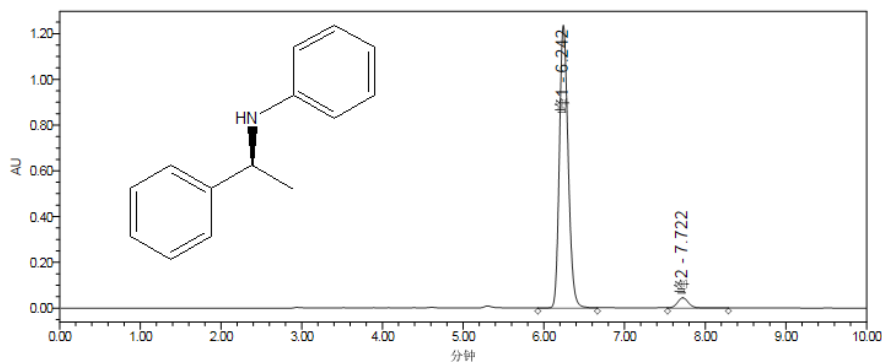
## Acquisition Parameter

Source Type	ESI	Ion Polarity	Positive	Set Nebulizer	0.4 Bar
Focus	Active	Set Capillary	4500 V	Set Dry Heater	200 °C
Scan Begin	50 m/z	Set End Plate Offset	-500 V	Set Dry Gas	5.0 l/min
Scan End	1200 m/z	Set Collision Cell RF	100.0 Vpp	Set Divert Valve	Waste



Meas. #	Formula	m/z	err [ppm]	Mean err [ppm]	rdB	N-Rule	ej% Conf	mSig	Std I	Std Mean m/z	Std I VarNorm	Std m/z Diff	Std Comb Dev
361.2													
852													
1	C <sub>22</sub> H <sub>37</sub> N <sub>2</sub> O <sub>2</sub>	361.2850	-0.5	5.8	5.5	ok	even	112.60	0.1510	0.0060	0.0631	0.0041	0.8427

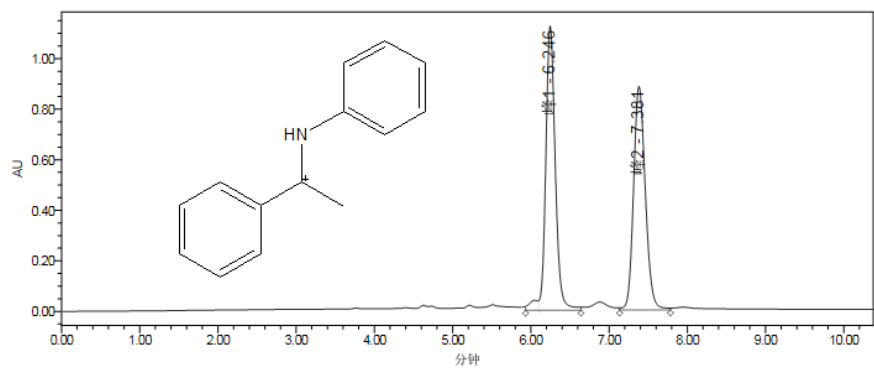
## HPLC



Channel: W2489 ChA; Channel Desc.: W2489 ChA 254nm; Processing Method: lq1

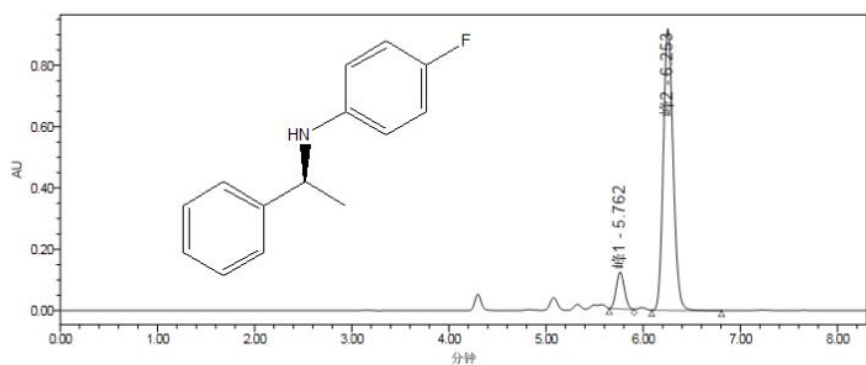
	Channel Description	Peak Name	RT (min)	Area (mV*sec)	% Area	Height (mV)
1	W2489 ChA 254nm	峰1	6.242	9362910	95.61	1236048
2	W2489 ChA 254nm	峰2	7.722	429830	4.39	44763





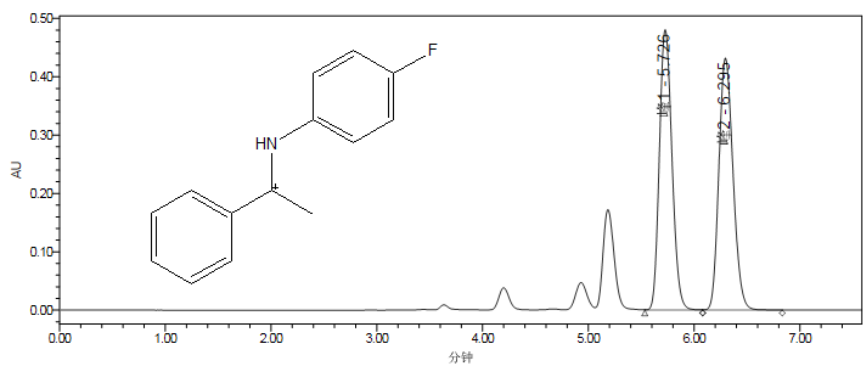
Channel: W2489 ChA; Channel Desc.: W2489 ChA 254nm; Processing Method: LIQIANG

	Channel Description	Peak Name	RT (min)	Area (msec)	% Area	Height (msec)
1	W2489 ChA 254nm	峰1	6.246	9386594	50.41	1123917
2	W2489 ChA 254nm	峰2	7.381	9235048	49.59	884396



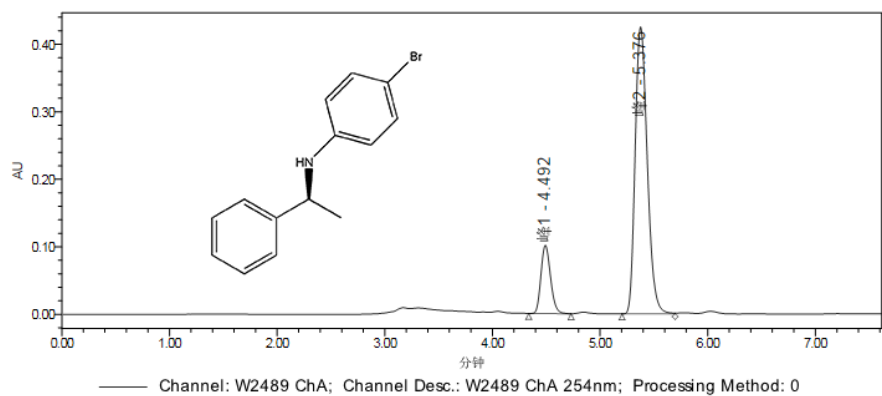
Channel: W2489 ChA; Channel Desc.: W2489 ChA 254nm; Processing Method: 0

	Channel Description	Peak Name	RT (min)	Area (msec)	% Area	Height (msec)
1	W2489 ChA 254nm	峰1	5.762	702719	9.80	119171
2	W2489 ChA 254nm	峰2	6.253	6465106	90.20	917791

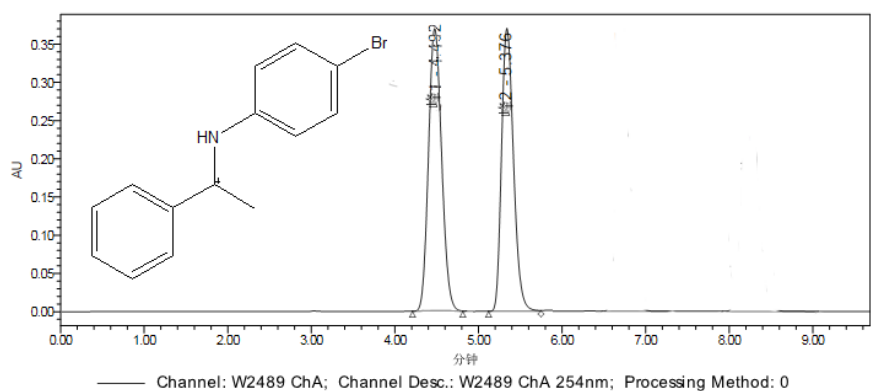


Channel: W2489 ChA; Channel Desc.: W2489 ChA 254nm; Processing Method: 0

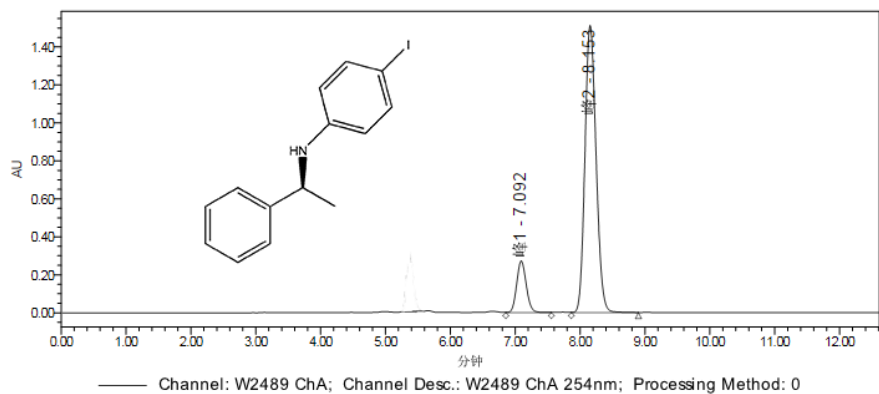
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1	W2489 ChA 254nm	峰1	5.726	3951884	49.63	479903
2	W2489 ChA 254nm	峰2	6.295	4010403	50.37	431559



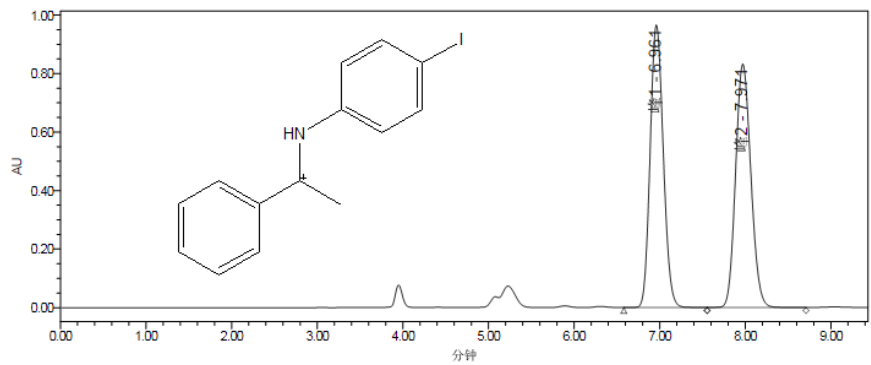
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1	W2489 ChA 254nm	峰1	4.492	627061	15.89	100999
2	W2489 ChA 254nm	峰2	5.376	3318898	84.11	424666



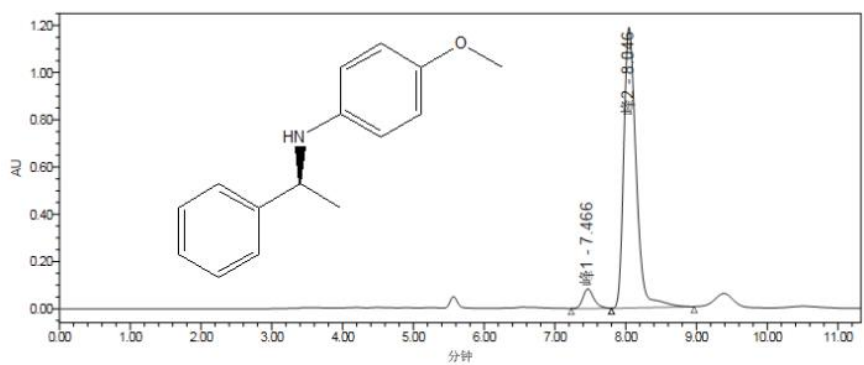
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1	W2489 ChA 254nm	峰1	4.492	3807819	49.93	300043
2	W2489 ChA 254nm	峰2	5.376	3817806	50.07	297054



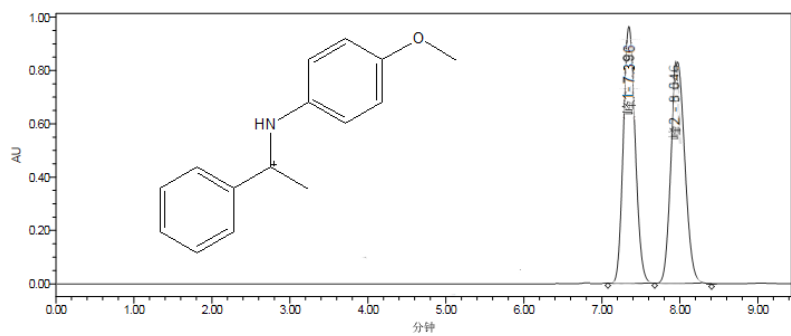
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1	W2489 ChA 254nm	峰1	7.092	2788118	13.42	271343
2	W2489 ChA 254nm	峰2	8.153	17990333	86.58	1510941



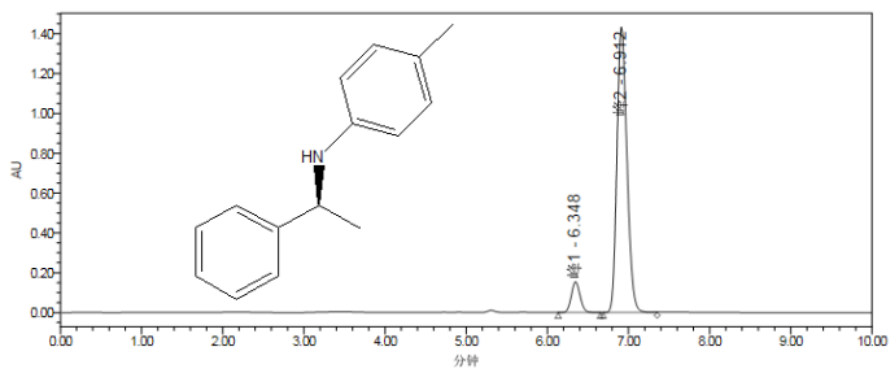
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1	W2489 ChA 254nm	峰1	6.961	10303897	49.95	965560
2	W2489 ChA 254nm	峰2	7.971	10324388	50.05	831712



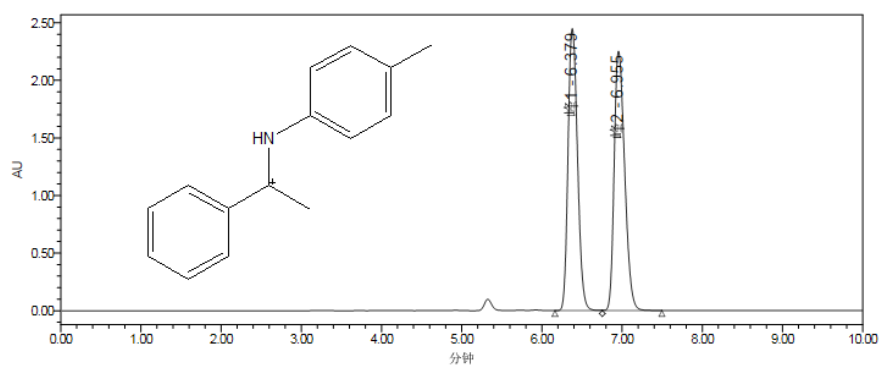
	Channel Description	Peak Name	RT (min)	Area (峰*sec)	% Area	Height (峰)
1	W2489 ChA 254nm	峰1	7.466	900862	5.88	82697
2	W2489 ChA 254nm	峰2	8.046	14410613	94.12	1187363



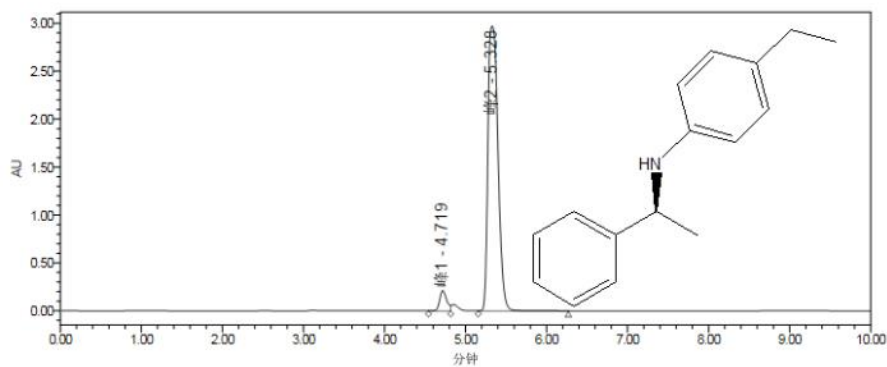
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1	W2489 ChA 254nm	峰1	7.396	938659	50.41	112391
2	W2489 ChA 254nm	峰2	8.046	923504	49.59	88439



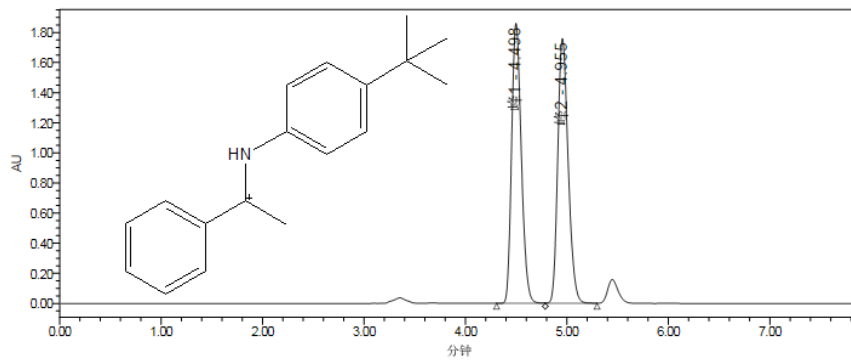
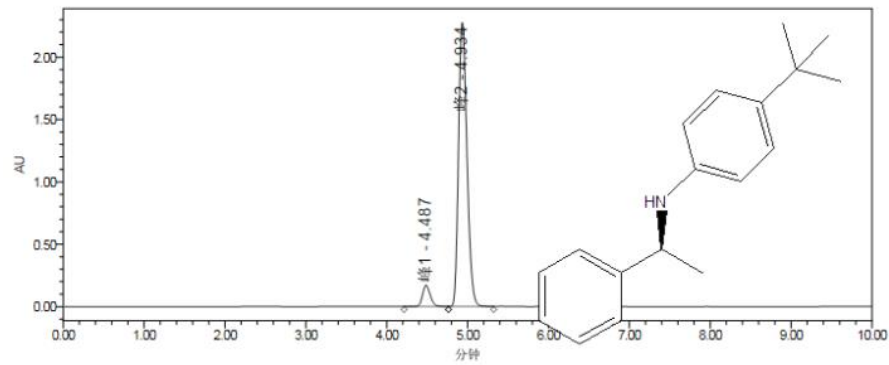
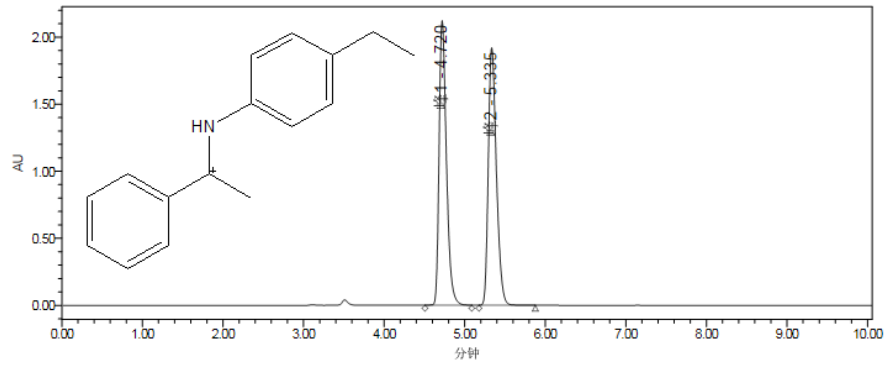
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1	W2489 ChA 254nm	峰1	6.348	1163202	8.66	153830
2	W2489 ChA 254nm	峰2	6.912	12269310	91.34	1431209

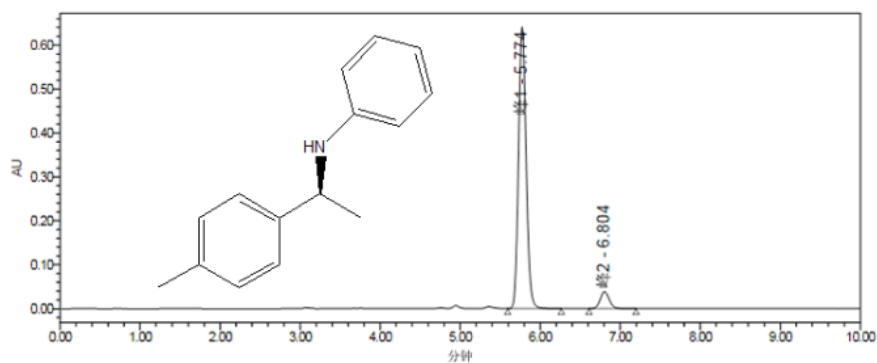


	Channel Description	Peak Name	RT (min)	Area (msec)	% Area	Height (msec)
1	W2489 ChA 254nm	峰1	6.379	20070337	49.56	2446473
2	W2489 ChA 254nm	峰2	6.955	20429499	50.44	2250852

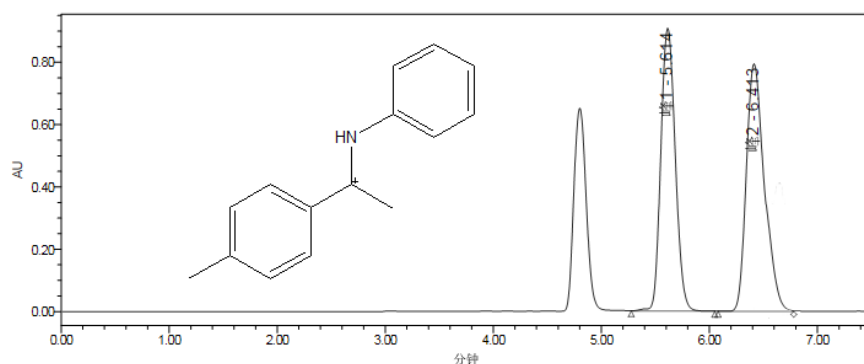


	Channel Description	Peak Name	RT (min)	Area (msec)	% Area	Height (msec)
1	W2489 ChA 254nm	峰1	4.719	1269893	4.73	210794
2	W2489 ChA 254nm	峰2	5.328	25551167	95.27	2968194

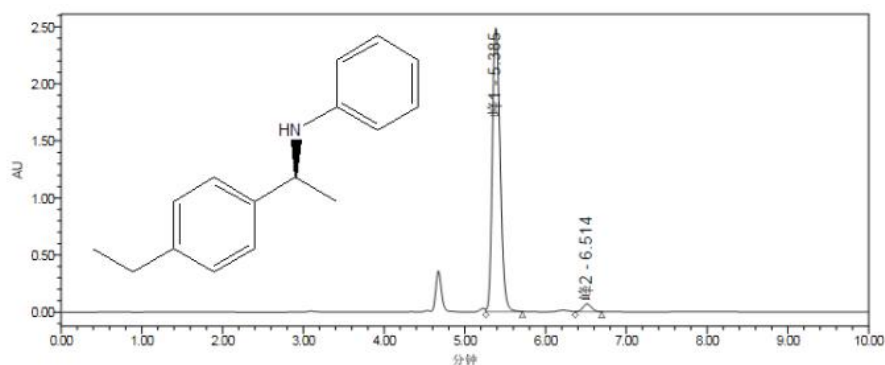




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1	W2489 ChA 254nm	峰1	5.774	4208577	93.29	640161
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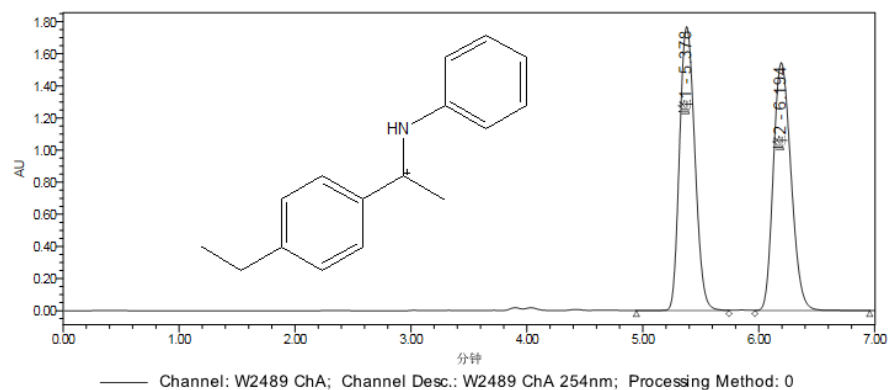


	Channel Description	Peak Name	RT (min)	Area (mV*sec)	% Area	Height (mV)
1	W2489 ChA 254nm	峰1	5.614	8442368	50.23	907442
2	W2489 ChA 254nm	峰2	6.413	8365412	49.77	793831

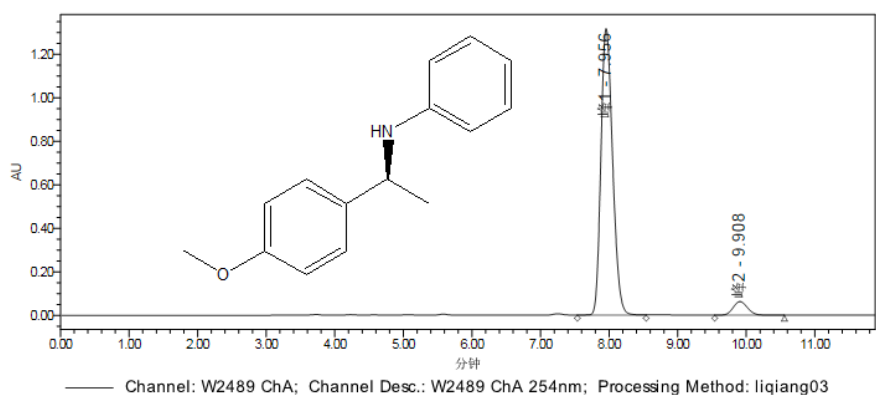


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1	W2489 ChA 254nm	峰1	5.385	16819132	97.09	2483304
2	W2489 ChA 254nm	峰2	6.514	504990	2.91	67790

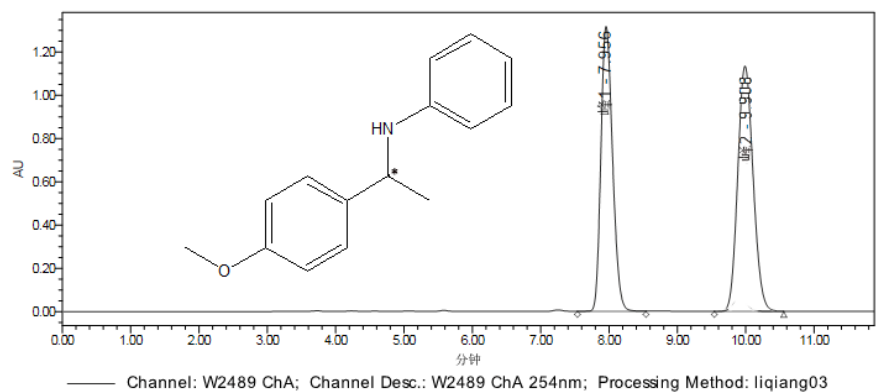




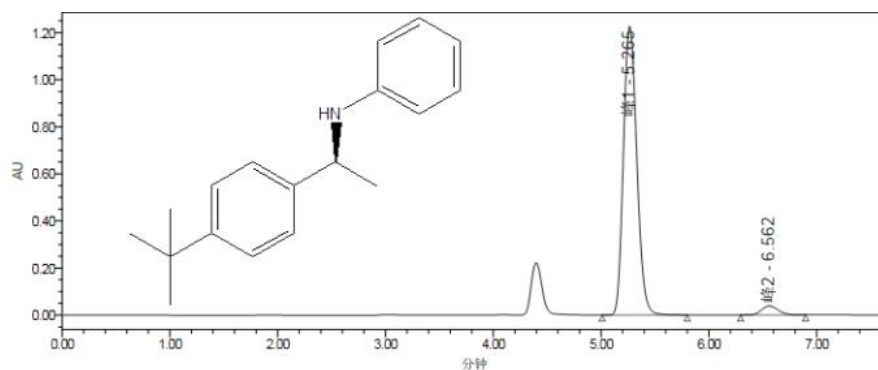
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1	W2489 ChA 254nm	峰1	5.378	16253069	49.72	1767443
2	W2489 ChA 254nm	峰2	6.194	16438263	50.28	1544012



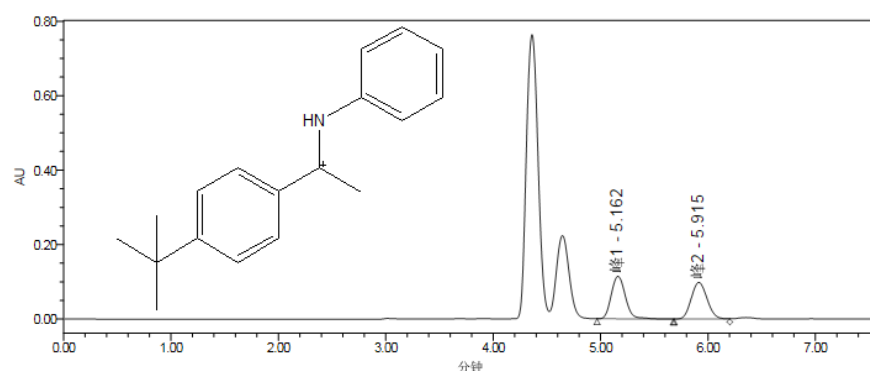
	Channel Description	Peak Name	RT (min)	Area (msec)	% Area	Height (msec)
1	W2489 ChA 254nm	峰1	7.956	15615141	94.45	1316899
2	W2489 ChA 254nm	峰2	9.908	917732	5.55	62723



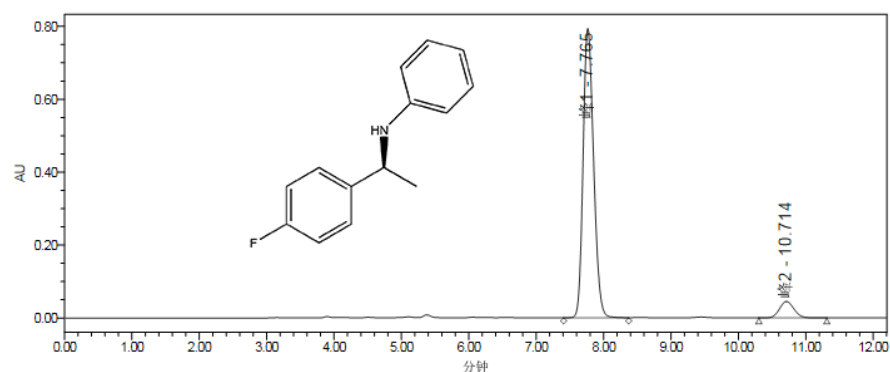
	Channel Description	Peak Name	RT (min)	Area (msec)	% Area	Height (msec)
1	W2489 ChA 254nm	峰1	7.956	9386594	50.41	1123917
2	W2489 ChA 254nm	峰2	9.908	9235048	49.59	884396



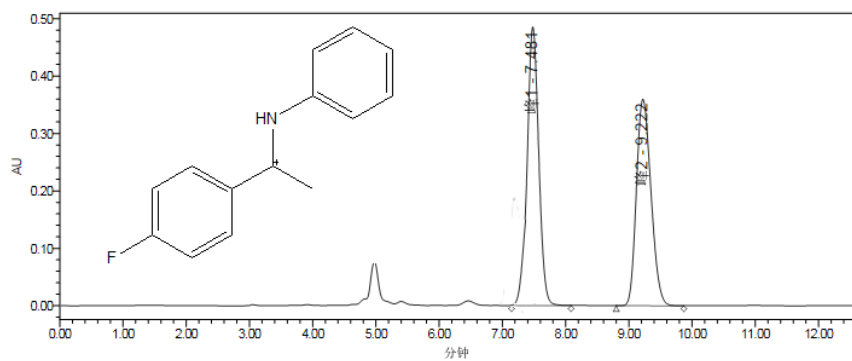
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1	W2489 ChA 254nm	峰1	5.265	10580802	96.31	1224932
2	W2489 ChA 254nm	峰2	6.562	405051	3.69	37913



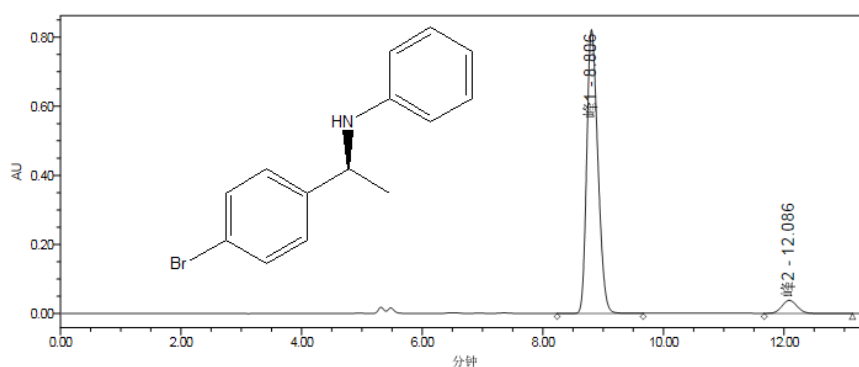
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1	W2489 ChA 254nm	峰1	5.162	1036118	50.87	113868
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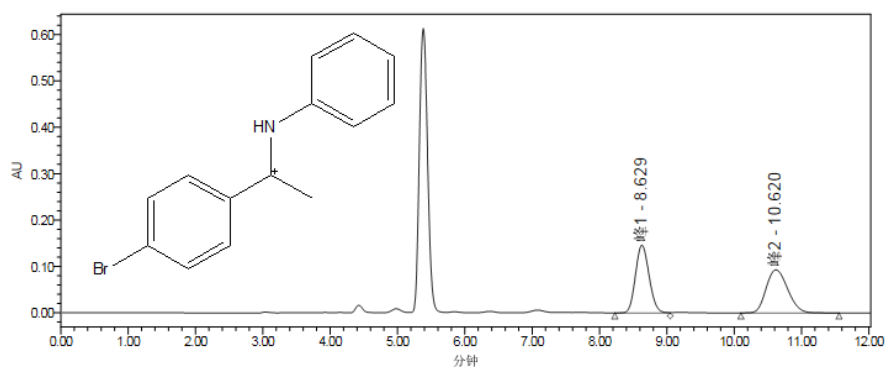
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1	W2489 ChA 254nm	峰1	7.765	8611183	92.79	793297
2	W2489 ChA 254nm	峰2	10.714	669493	7.21	45015



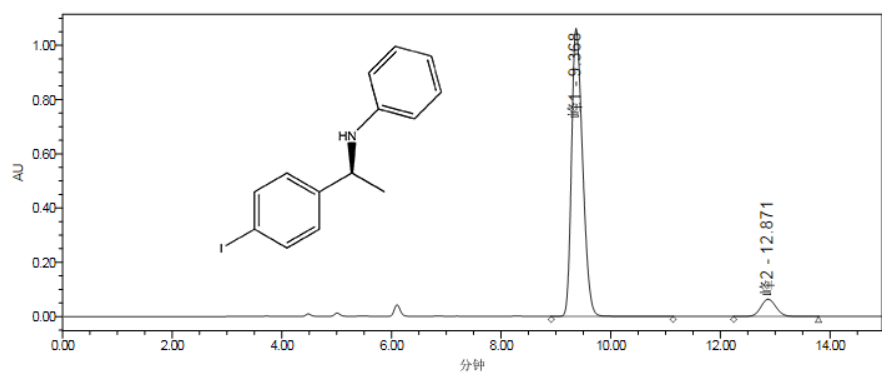
	Channel Description	Peak Name	RT (min)	Area (mV*sec)	% Area	Height (mV)
1	W2489 ChA 254nm	峰1	7.481	6027361	51.18	484857
2	W2489 ChA 254nm	峰2	9.222	5750160	48.82	359497



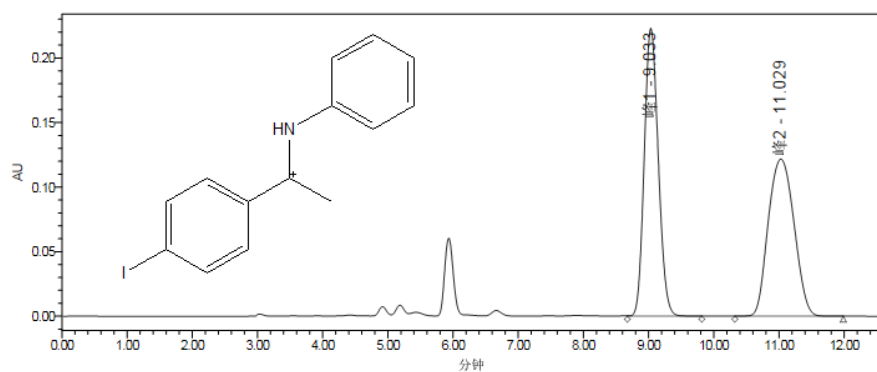
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1	W2489 ChA 254nm	峰1	8.806	10540583	93.94	821422
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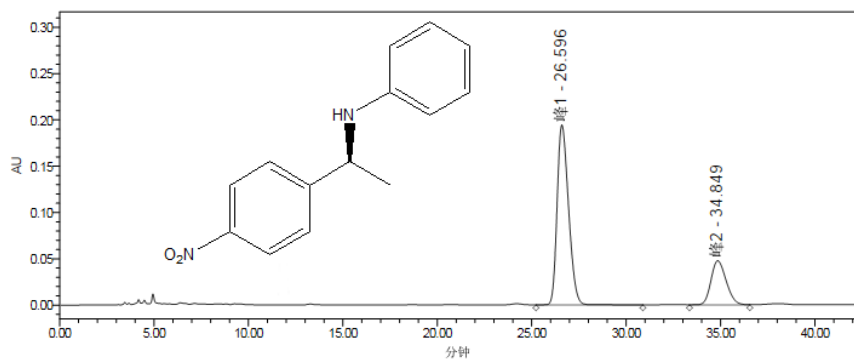
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1	W2489 ChA 254nm	峰1	8.629	2046108	50.00	145922
2	W2489 ChA 254nm	峰2	10.620	2045971	50.00	92698



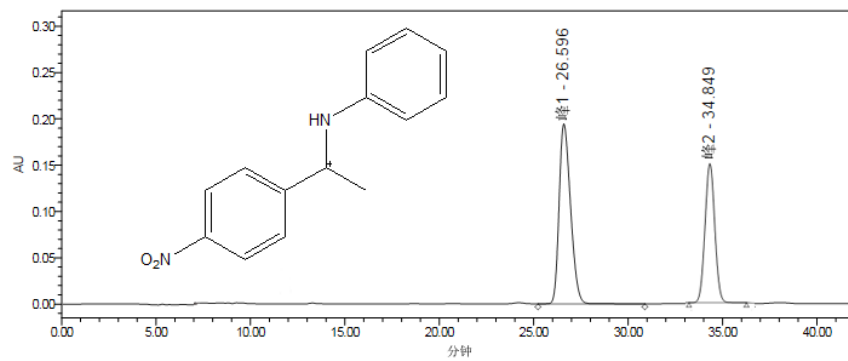
	Channel Description	Peak Name	RT (min)	Area (峰*sec)	% Area	Height (峰)
1	W2489 ChA 254nm	峰1	9.368	14877768	92.44	1061310
2	W2489 ChA 254nm	峰2	12.871	1216198	7.56	63454



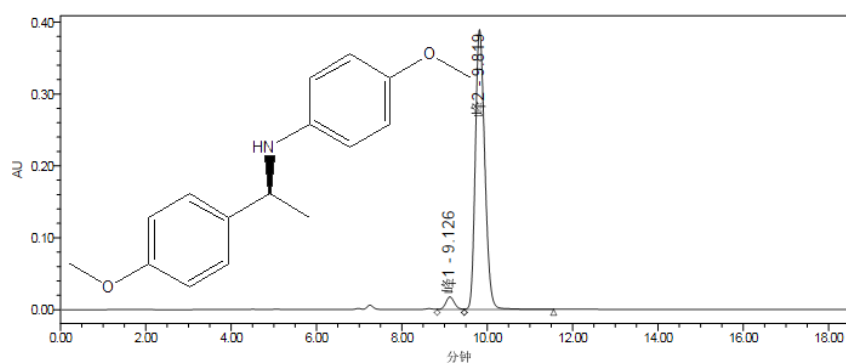
	Channel Description	Peak Name	RT (min)	Area (峰*sec)	% Area	Height (峰)
1	W2489 ChA 254nm	峰1	9.033	3328526	49.88	222803
2	W2489 ChA 254nm	峰2	11.029	3343951	50.12	121658



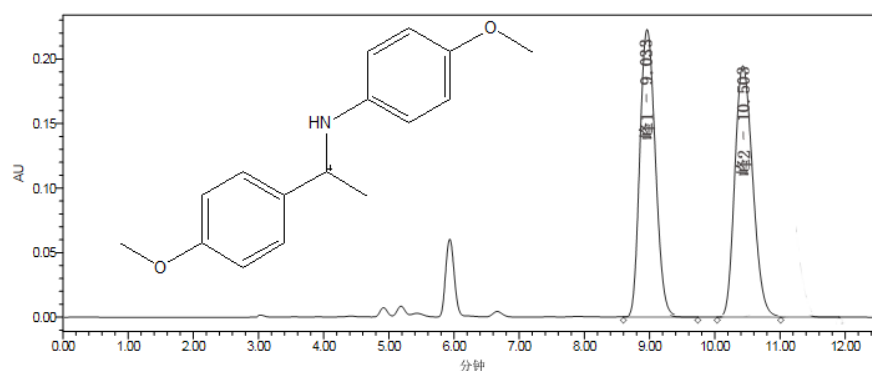
	Channel Description	Peak Name	RT (min)	Area (峰*sec)	% Area	Height (峰)
1	W2489 ChA 254nm	峰1	26.596	8160778	75.44	194285
2	W2489 ChA 254nm	峰2	34.849	2656709	24.56	47605



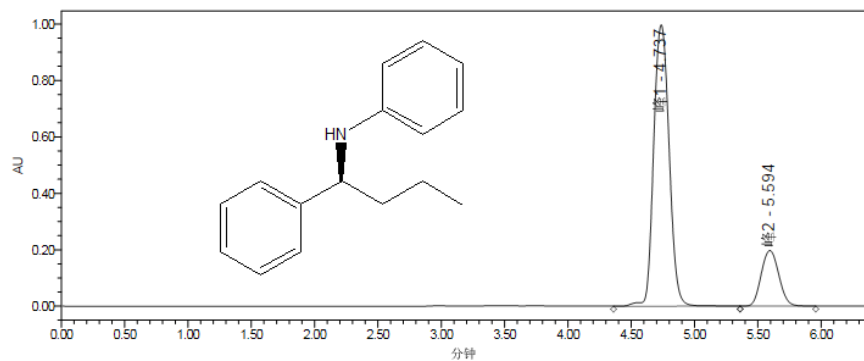
	Channel Description	Peak Name	RT (min)	Area (mm <sup>2</sup> sec)	% Area	Height (mm)
1	W2489 ChA 254nm	峰1	26.596	8160778	49.90	194285
2	W2489 ChA 254nm	峰2	34.849	2656709	50.10	147605



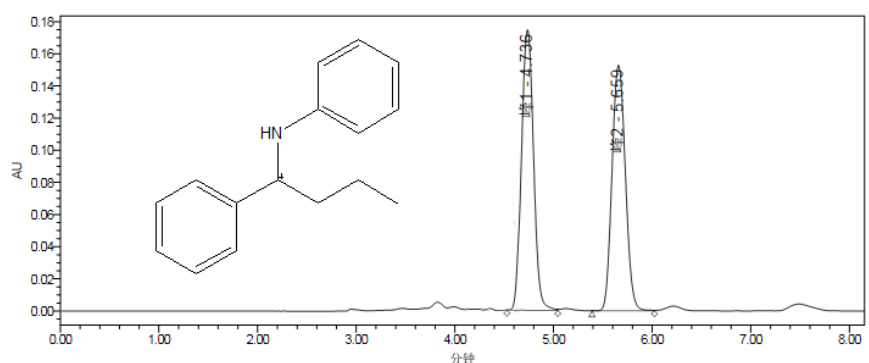
	Channel Description	Peak Name	RT (min)	Area (mm <sup>2</sup> sec)	% Area	Height (mm)
1	W2489 ChA 254nm	峰1	9.126	246387	3.96	17438
2	W2489 ChA 254nm	峰2	9.819	5975373	96.04	389090



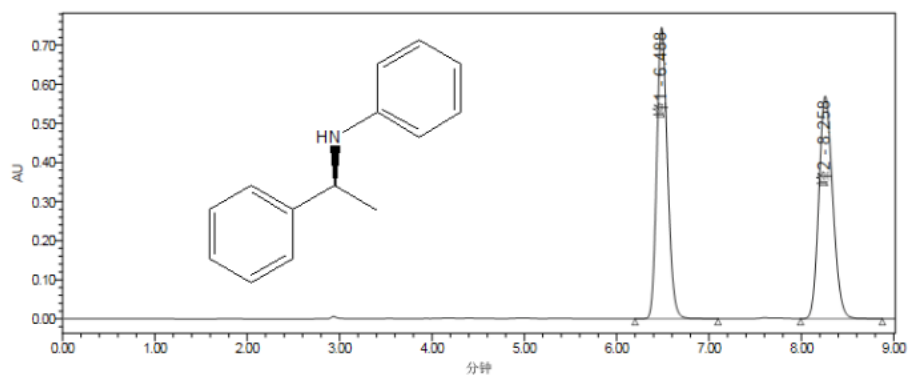
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1	W2489 ChA 254nm	峰1	9.033	3328526	49.88	222803
2	W2489 ChA 254nm	峰2	10.503	3343951	50.12	121658



	Channel Description	Peak Name	RT (min)	Area (AU*sec)	% Area	Height (AU)
1	W2489 ChA 254nm	峰1	4.737	8461252	81.61	996454
2	W2489 ChA 254nm	峰2	5.594	1907149	18.39	196964



	Channel Description	Peak Name	RT (min)	Area (AU*sec)	% Area	Height (AU)
1	W2489 ChA 254nm	峰1	4.736	1461437	50.38	174331
2	W2489 ChA 254nm	峰2	5.659	1439479	49.62	152656



	Channel Description	Peak Name	RT (min)	Area (AU*sec)	% Area	Height (AU)
1	W2489 ChA 254nm	峰1	6.488	5987923	50.00	744618
2	W2489 ChA 254nm	峰2	8.258	5986924	50.00	569117

NMR



