

Highly Enantioselective Michael Addition of Cyclic β -Diones to α,β -Unsaturated Enones Catalyzed by Quinine-based Organocatalysts

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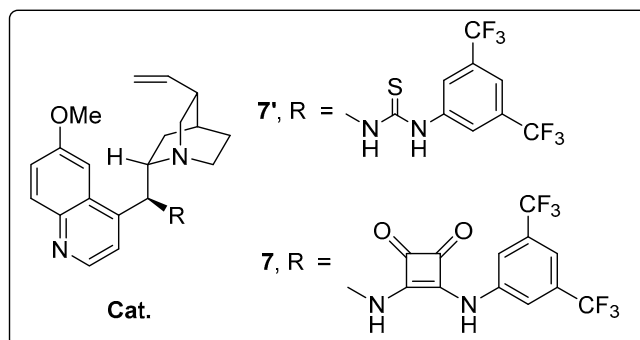
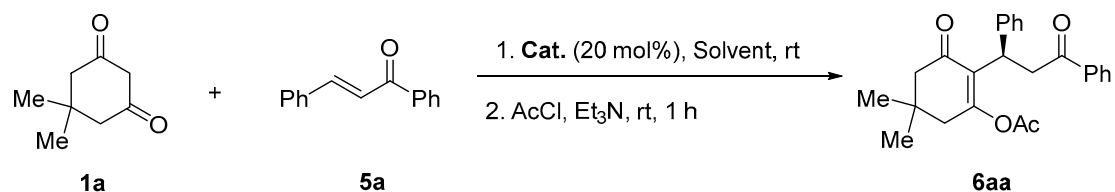
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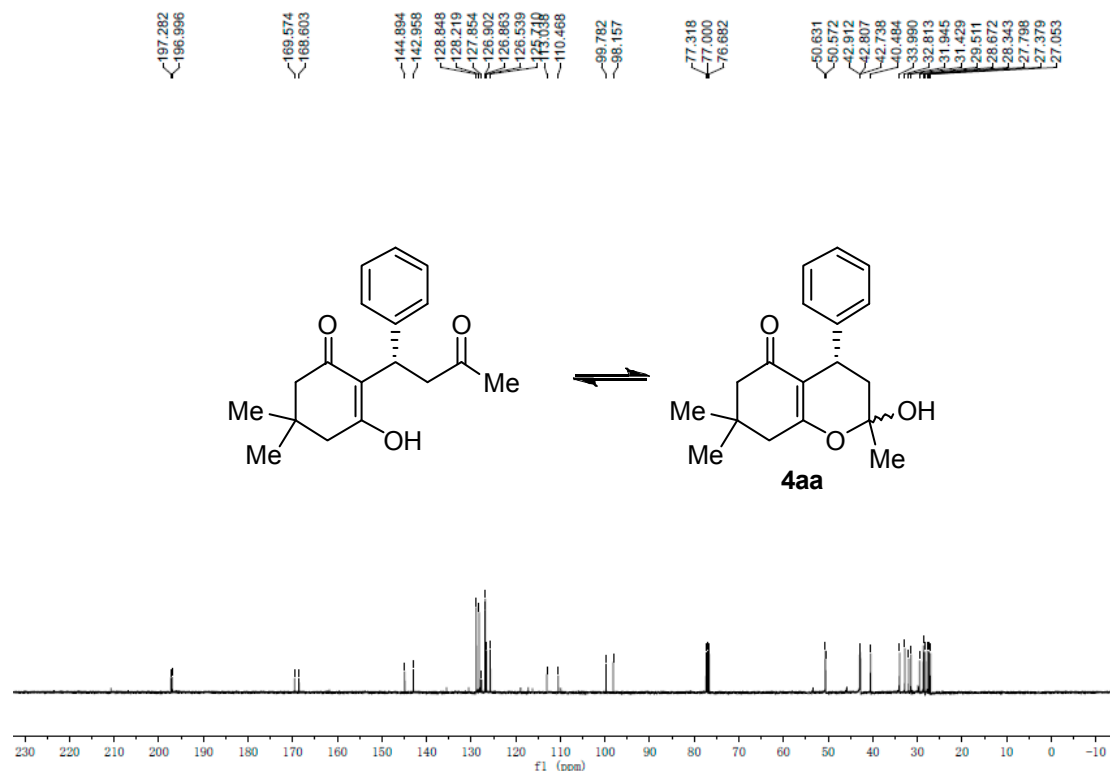
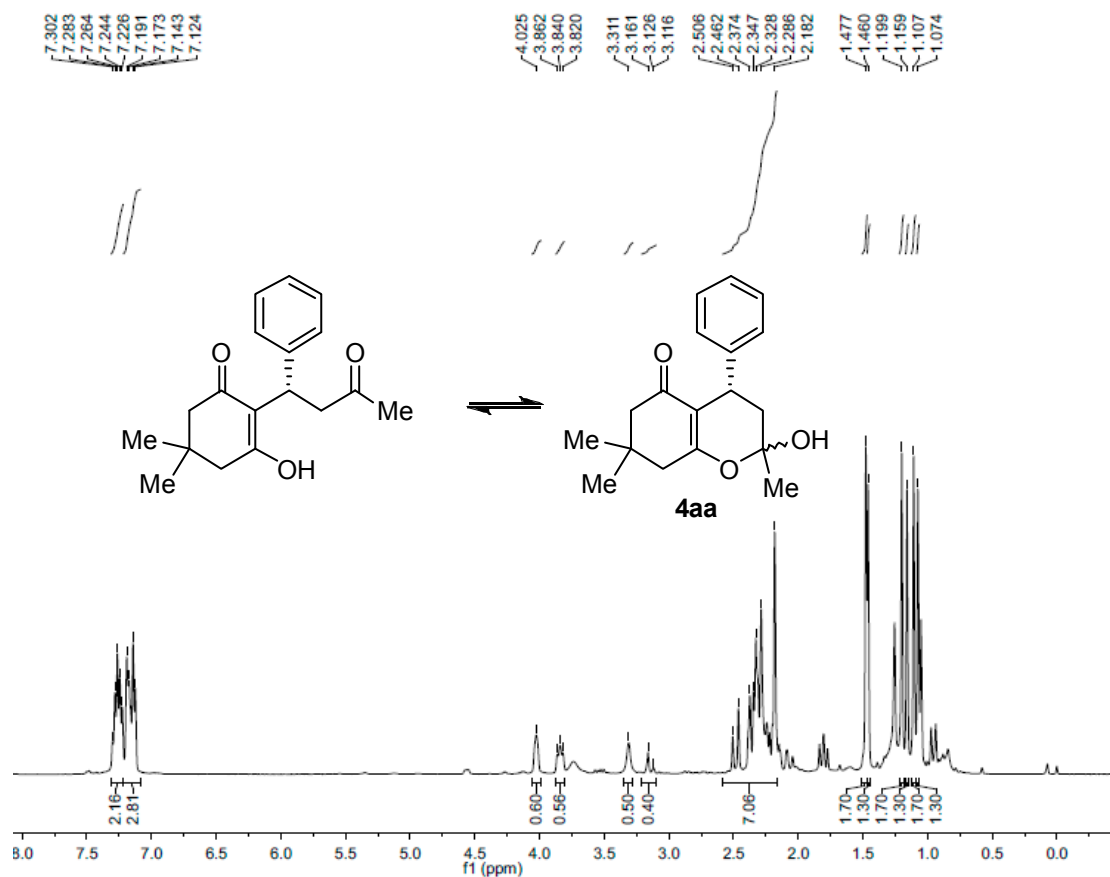
Table 1. Optimization of reaction conditions for Michael addition of dimesone **1a** to chalcone **5a**.^a

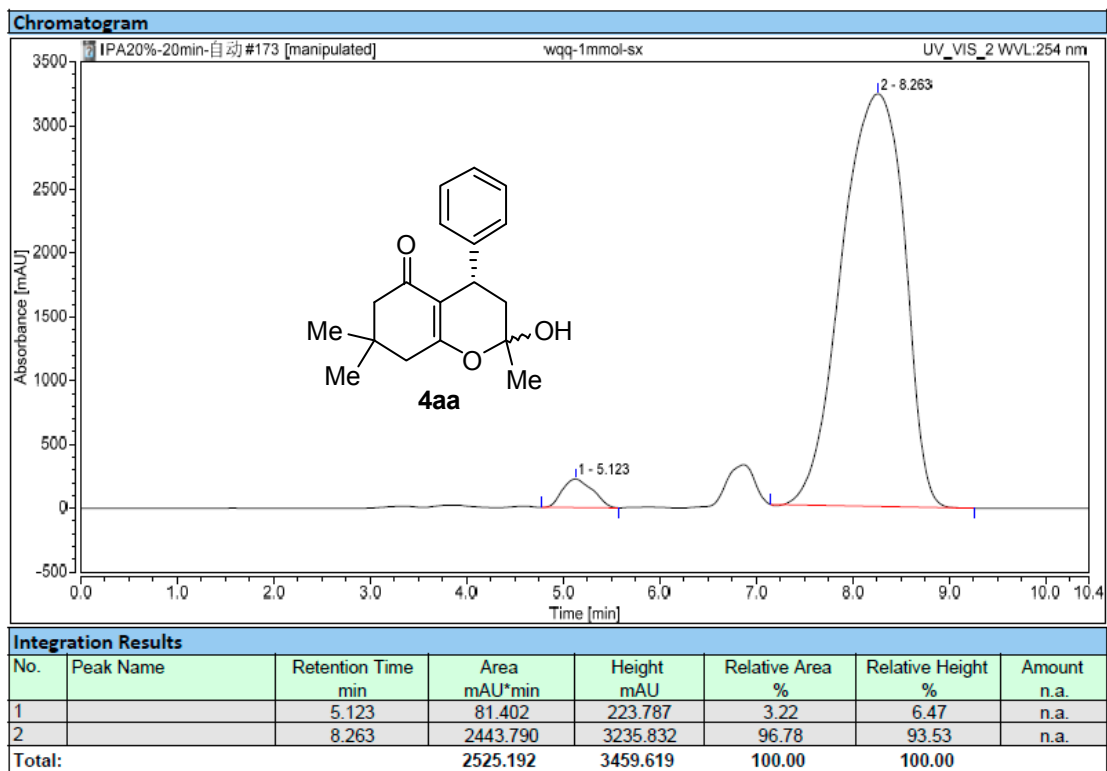
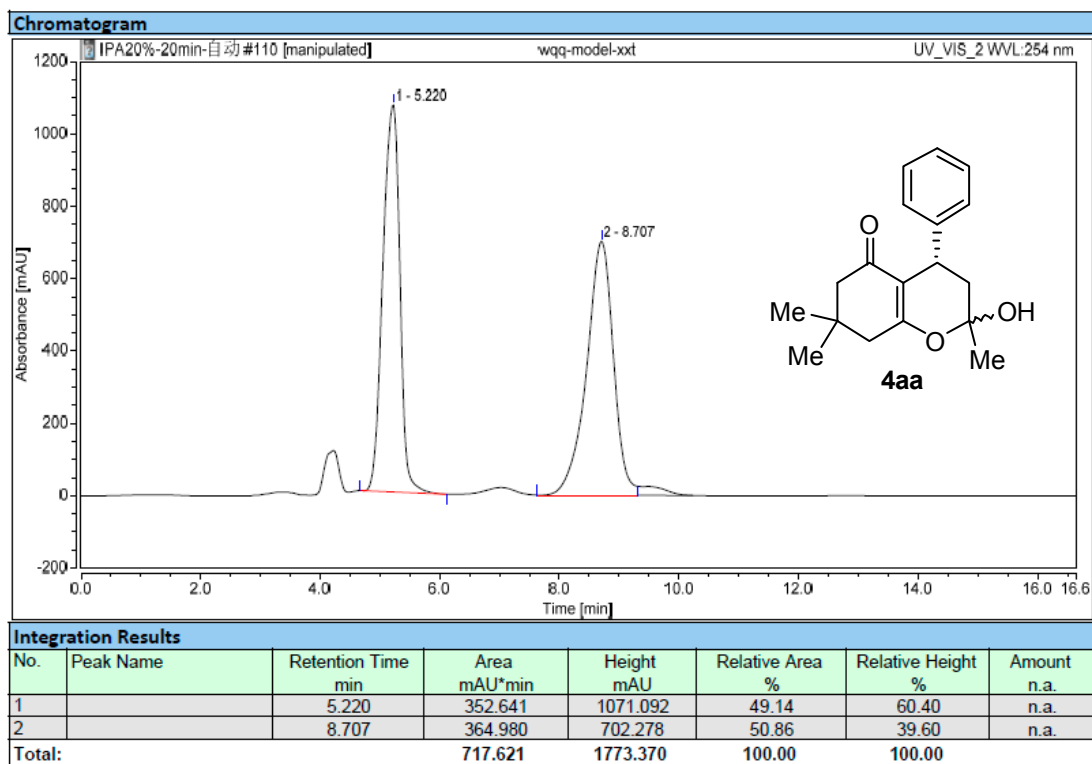


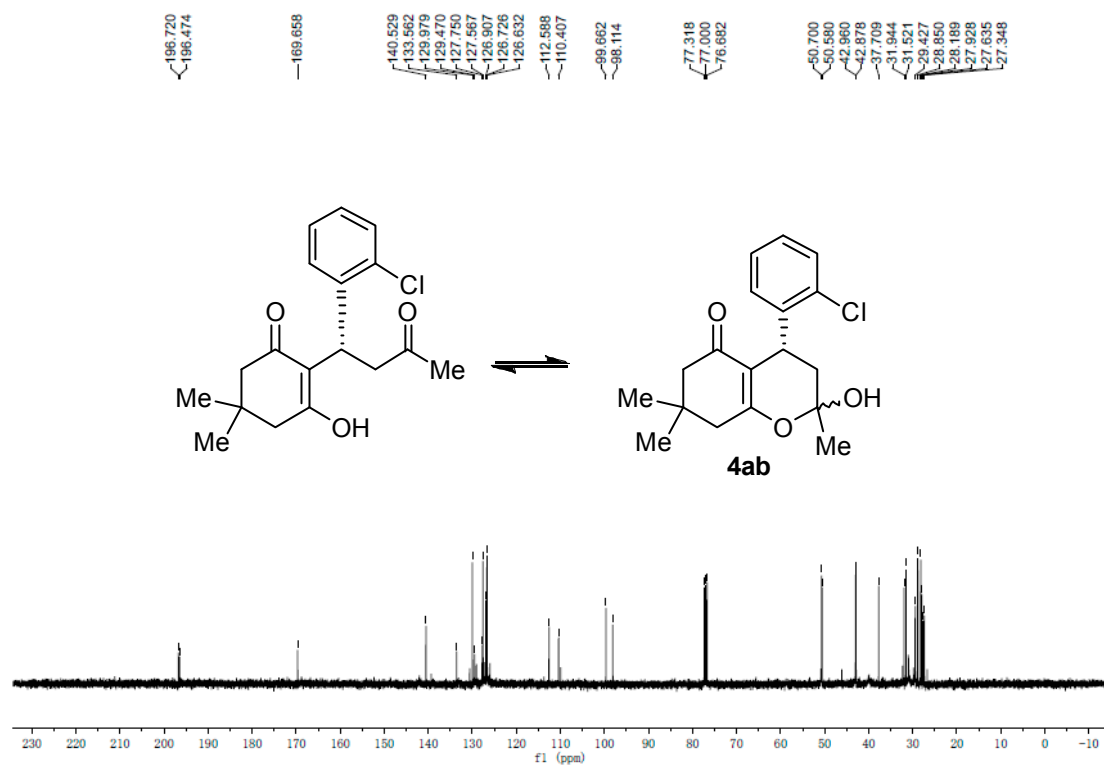
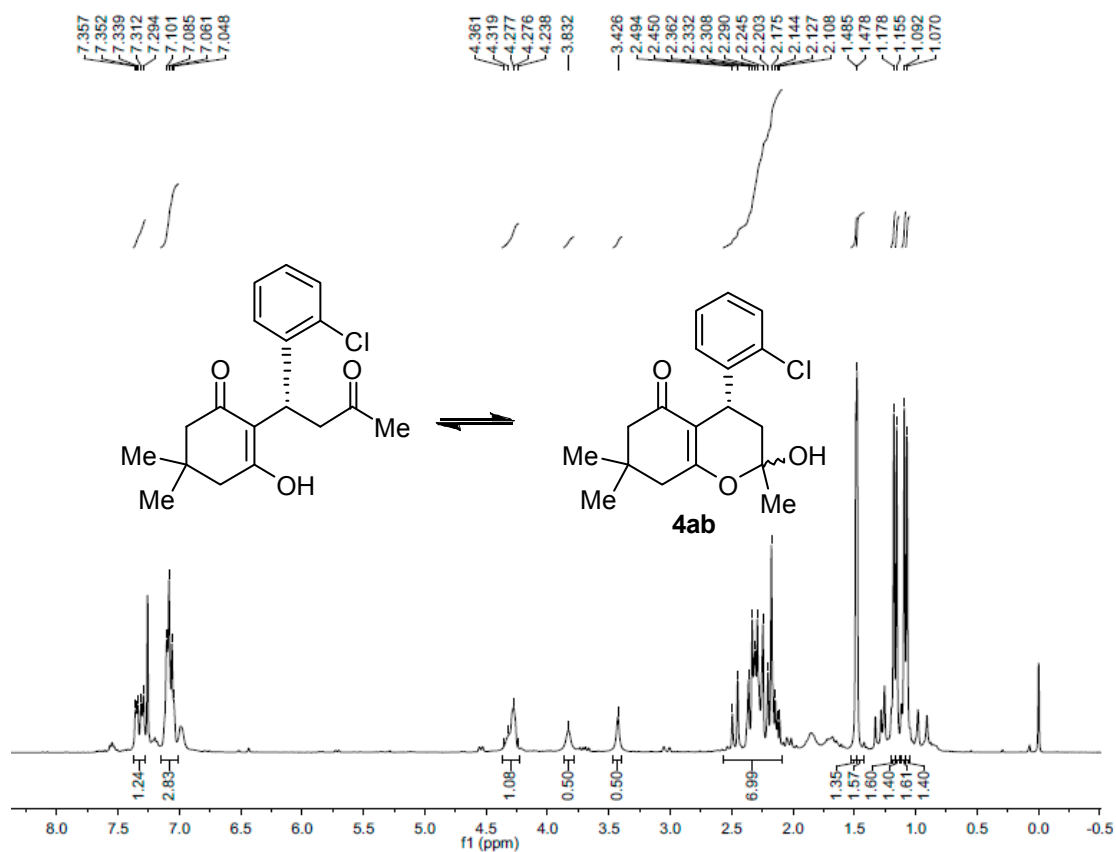
Entry	Cat.	Solvent	Time (h)	Yield (%) ^b	ee (%) ^c
1	7'	toluene	96	96	75
2	7	toluene	96	99	90
3	7	PhCF ₃	168	76	88
4	7	DCM	120	99	92
5	7	DCE	120	92	92
6	7	CHCl₃	120	95	93
7	7	EtOAc	168	87	90

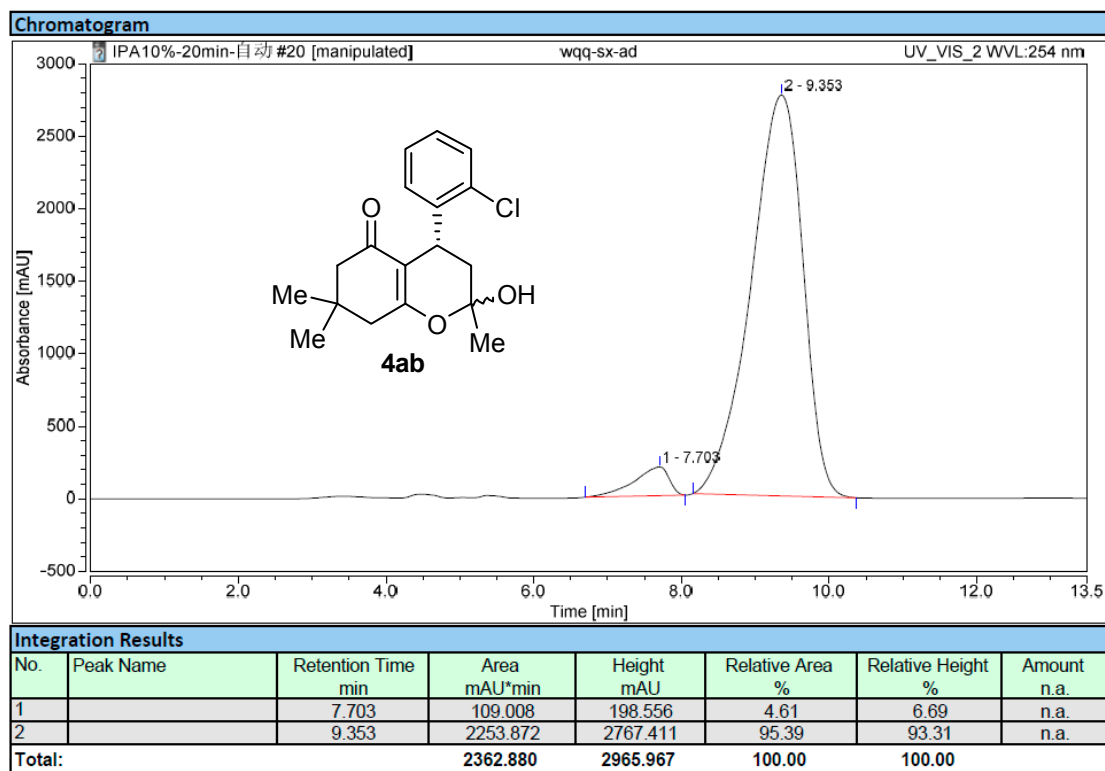
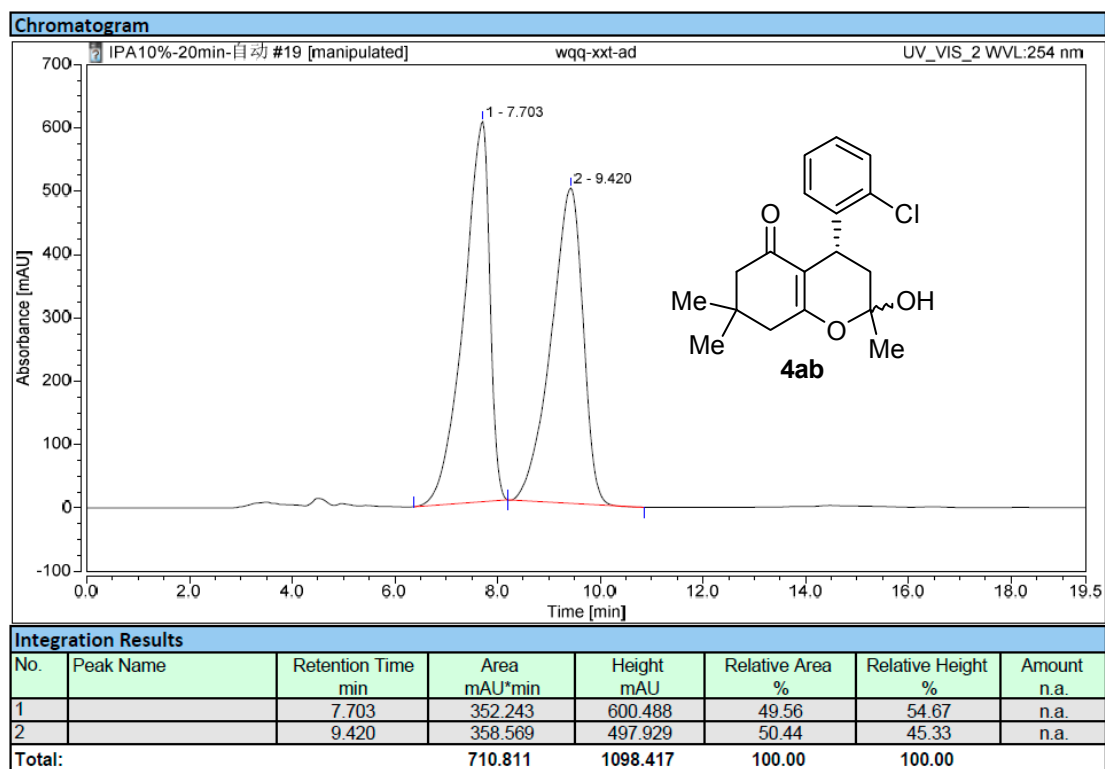
^a Unless otherwise noted, the Michael addition was performed with 0.1 mmol of **1a**, 0.12 mmol of **5a**, 20 mol% of catalyst in 1 mL of solvent at rt. ^b Isolated yield after flash chromatography on silica gel. ^c Determined by HPLC analysis on a chiral stationary phase.

NMR spectra and HPLC chromatograms of products

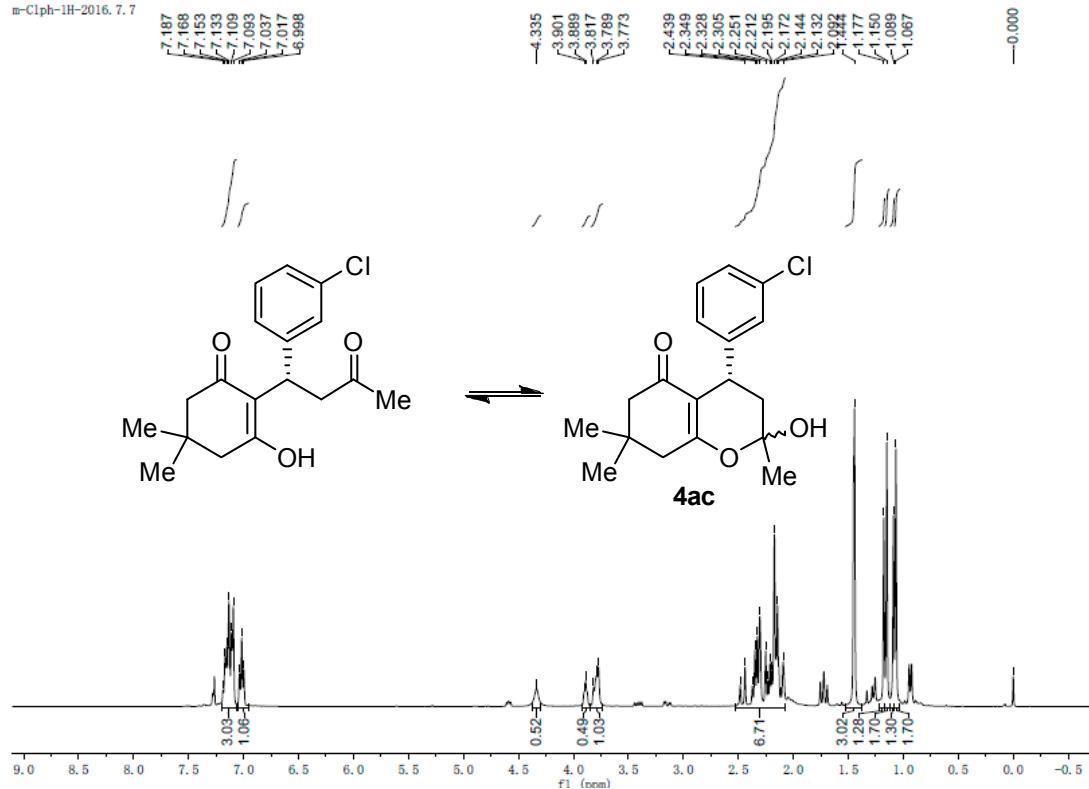




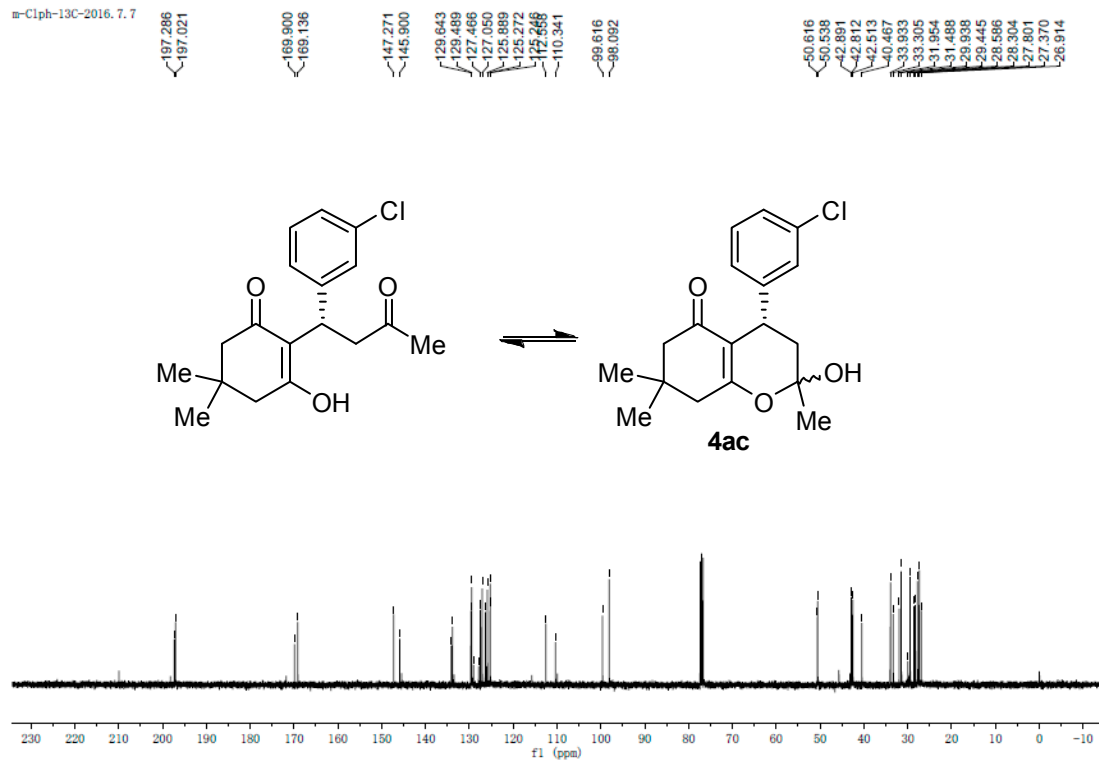


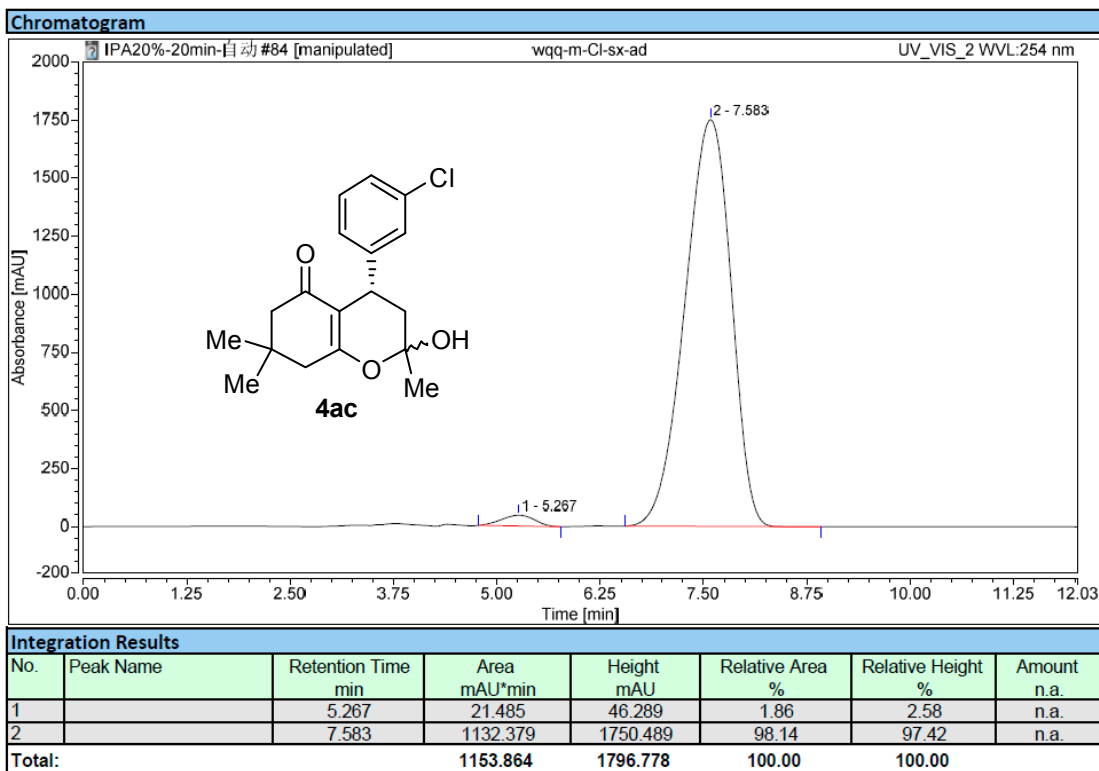
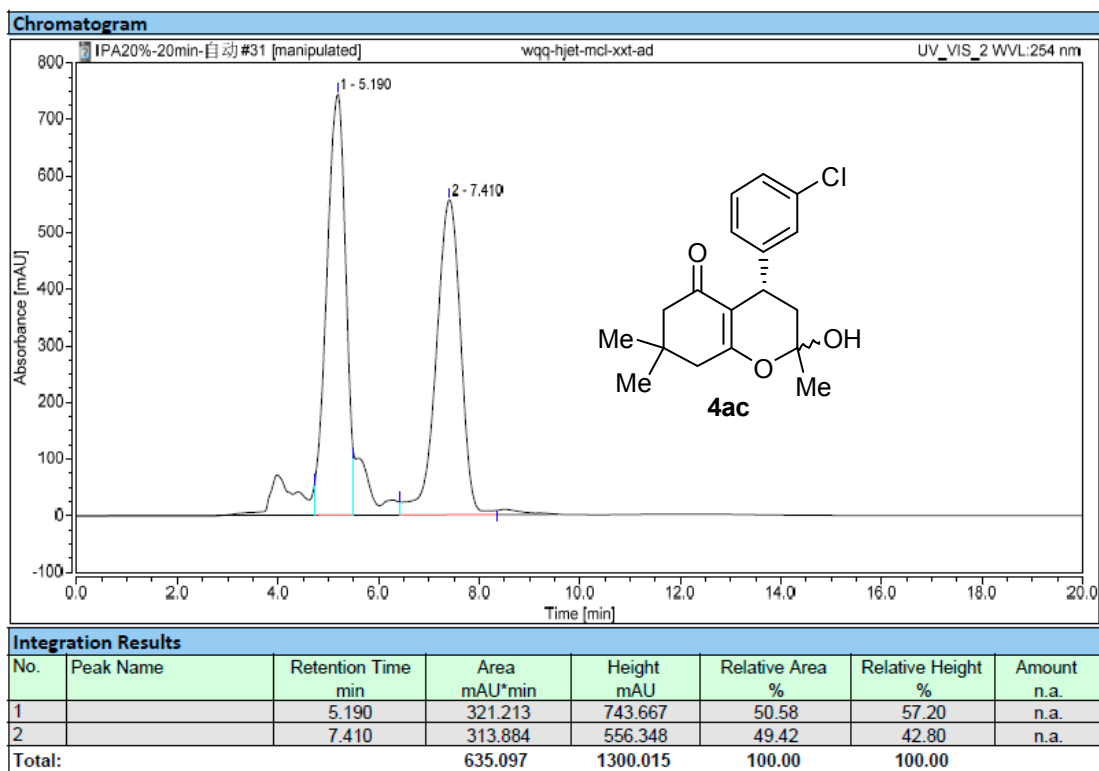


m-Clph-1H-2016, 7.7

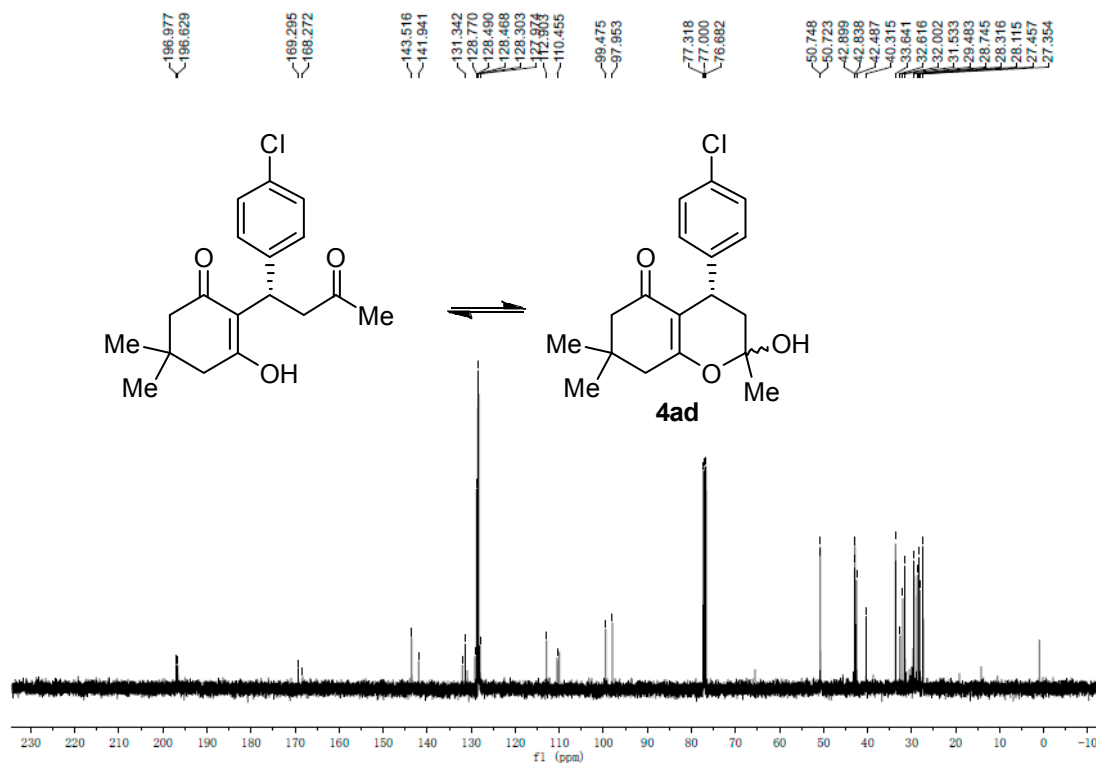
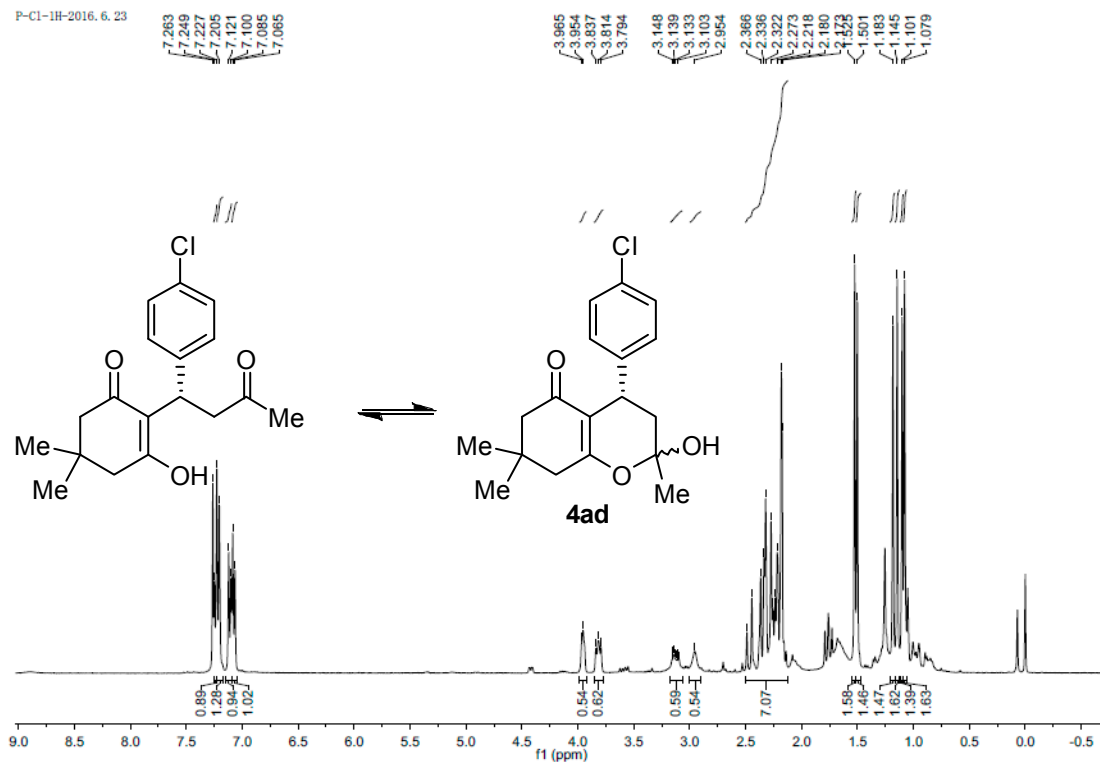


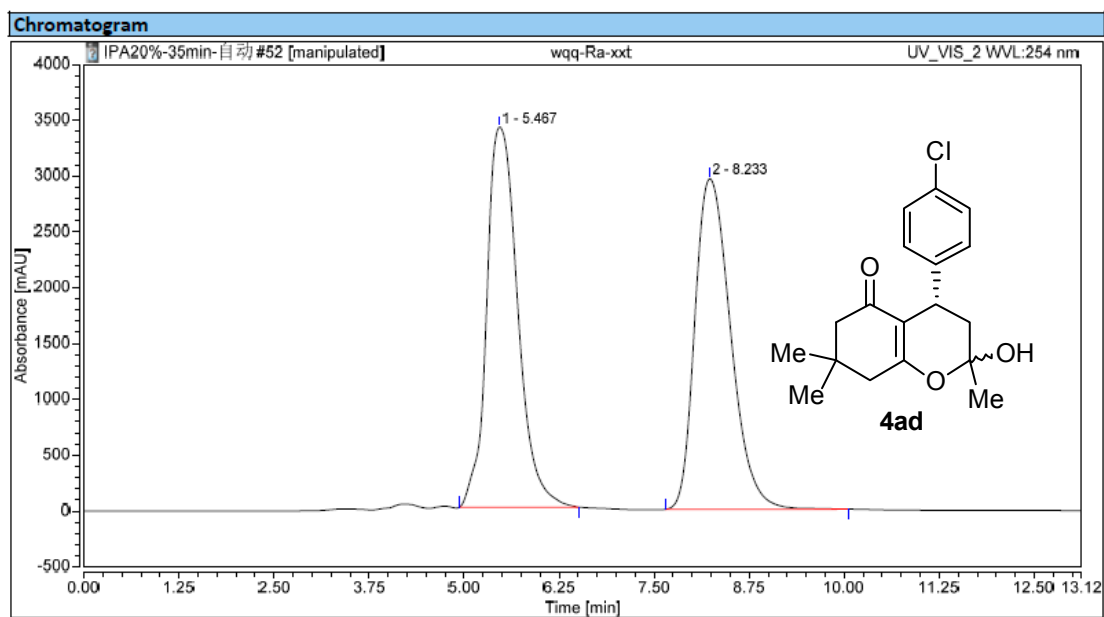
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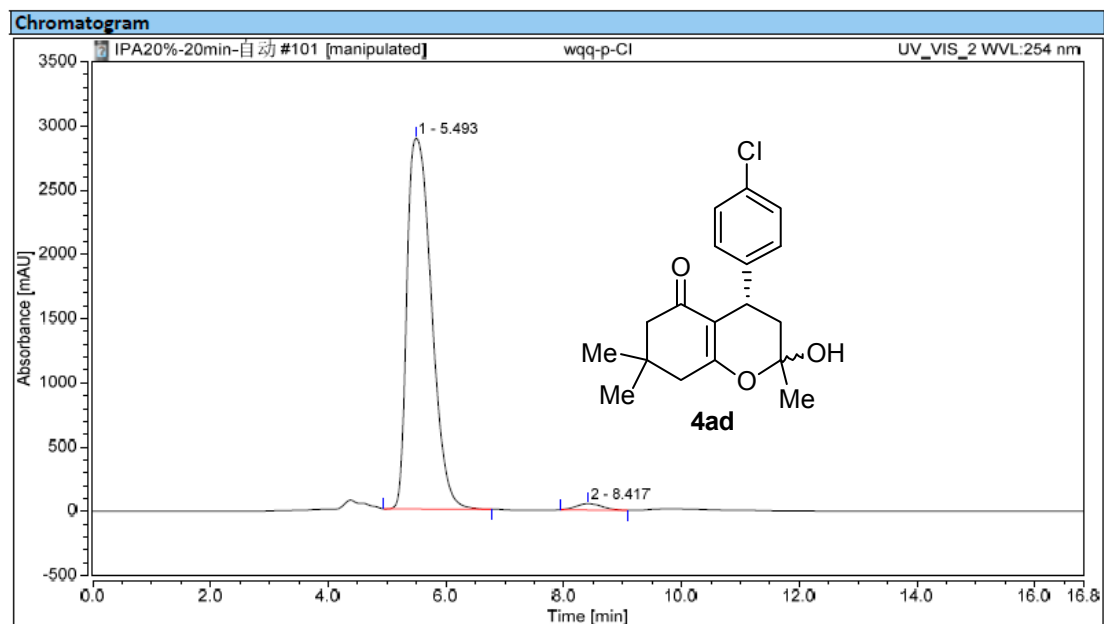


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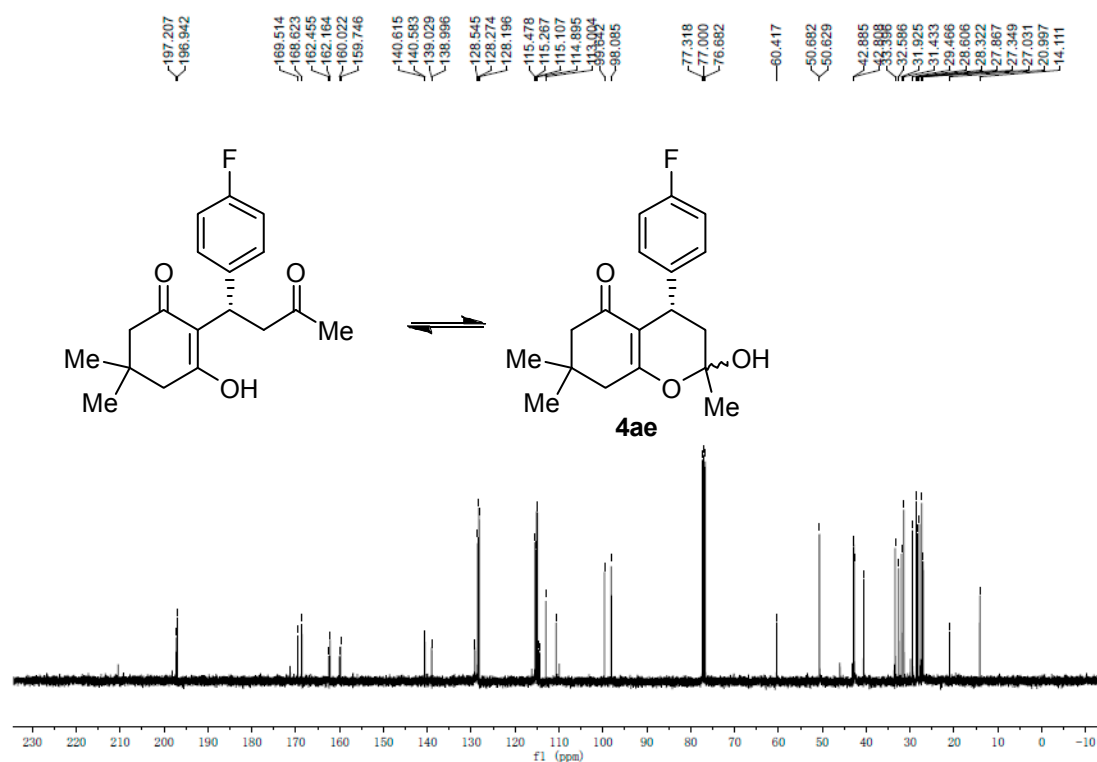
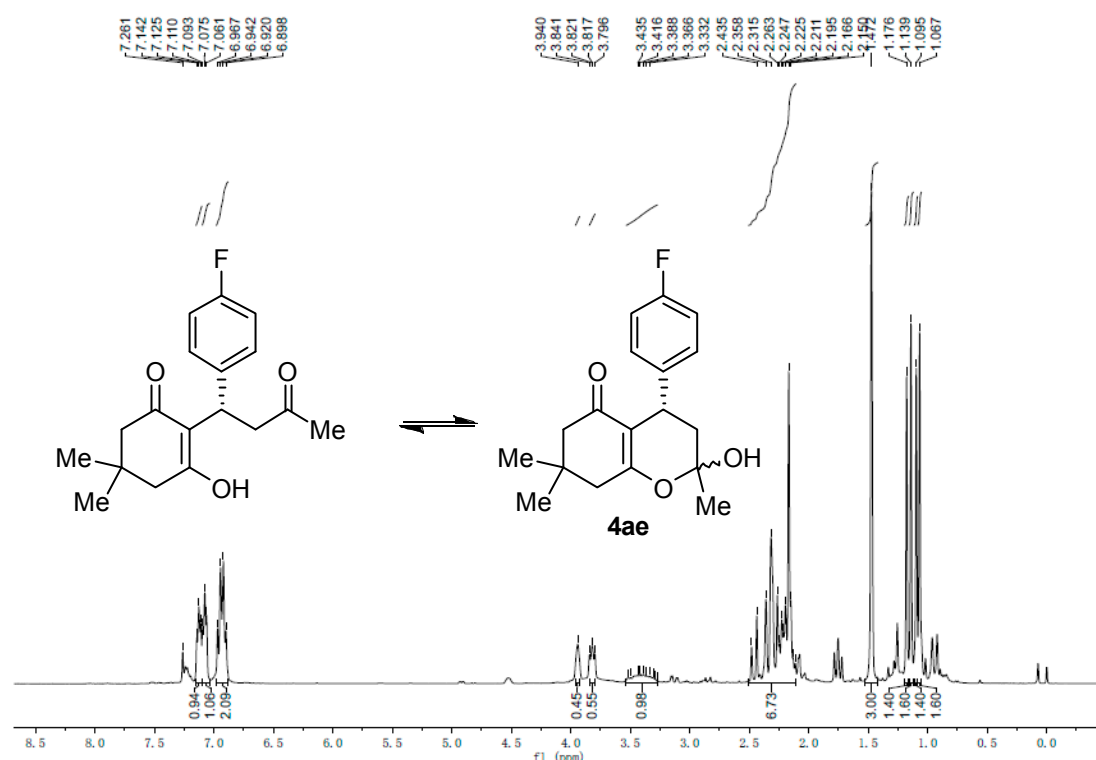


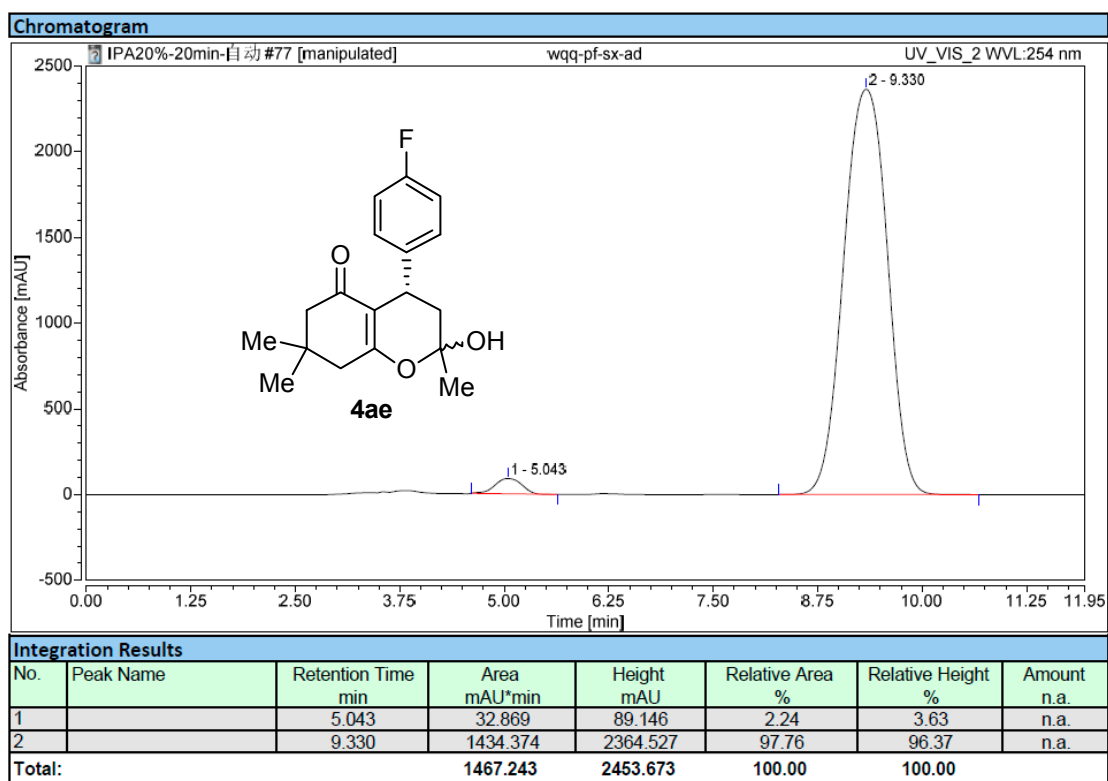
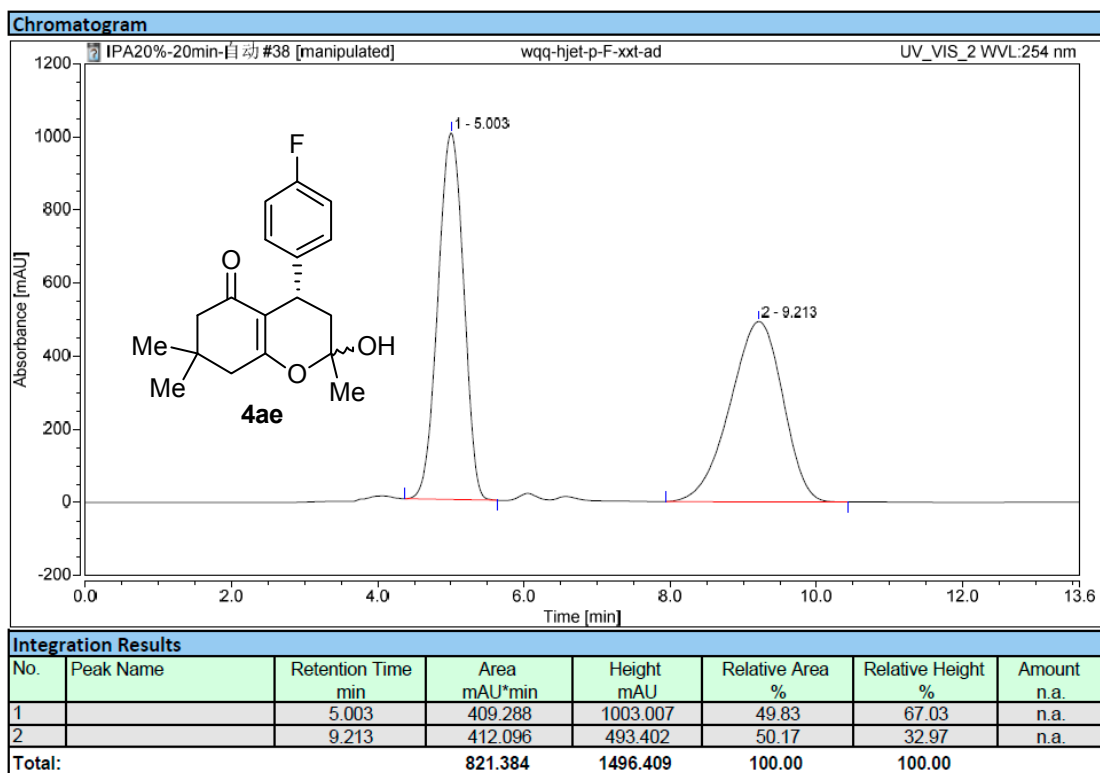


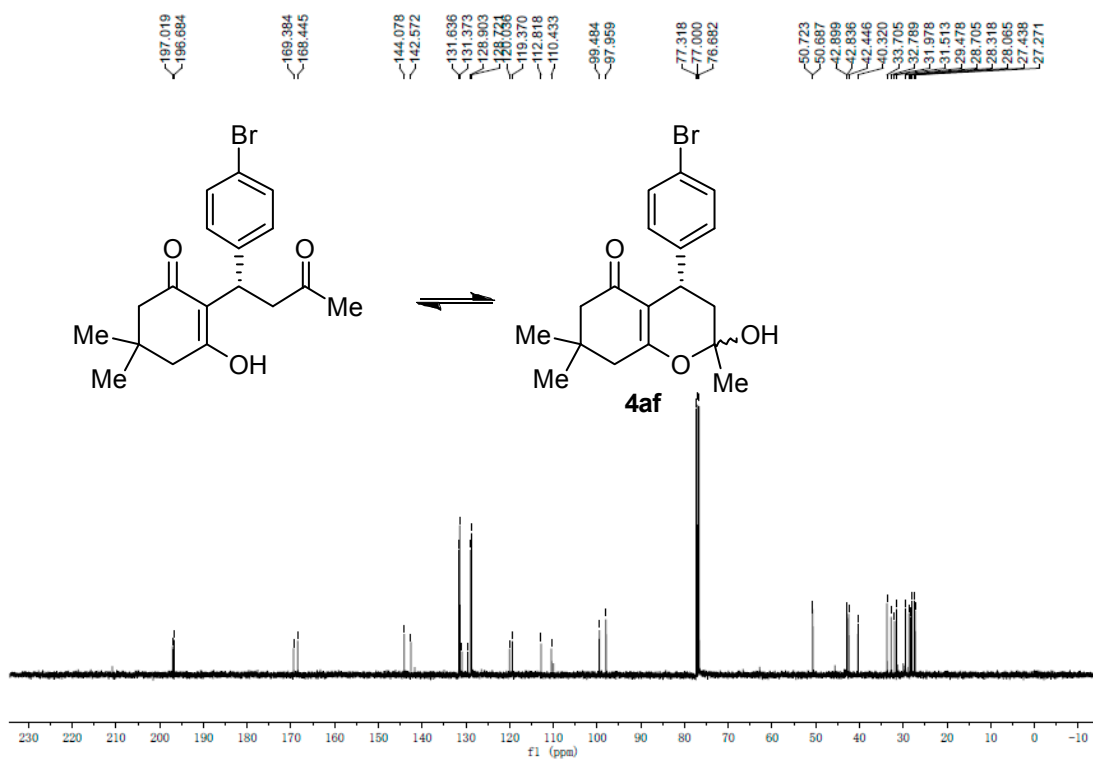
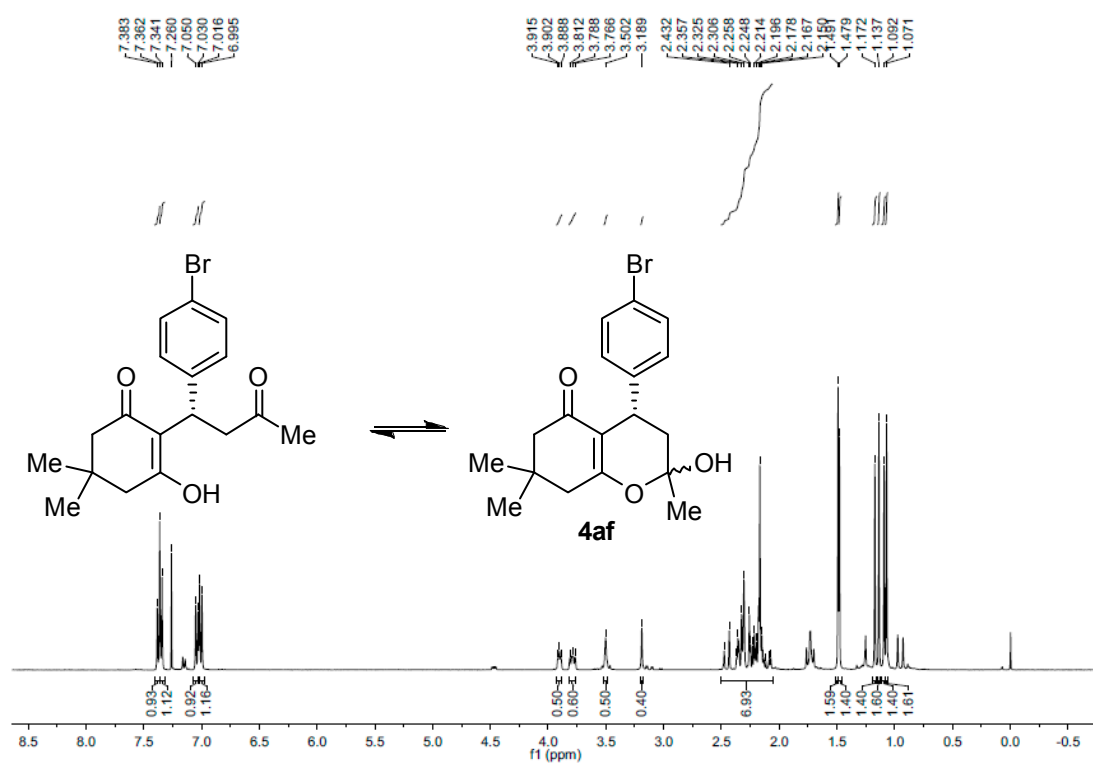
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No.	Peak Name	Retention Time min	Area mAU*min	Height mAU	Relative Area %	Relative Height %	Amount
1		5.467	1613.364	3404.577	50.00	53.49	n.a.
2		8.233	1613.358	2960.608	50.00	46.51	n.a.
Total:			3226.722	6365.185	100.00	100.00	

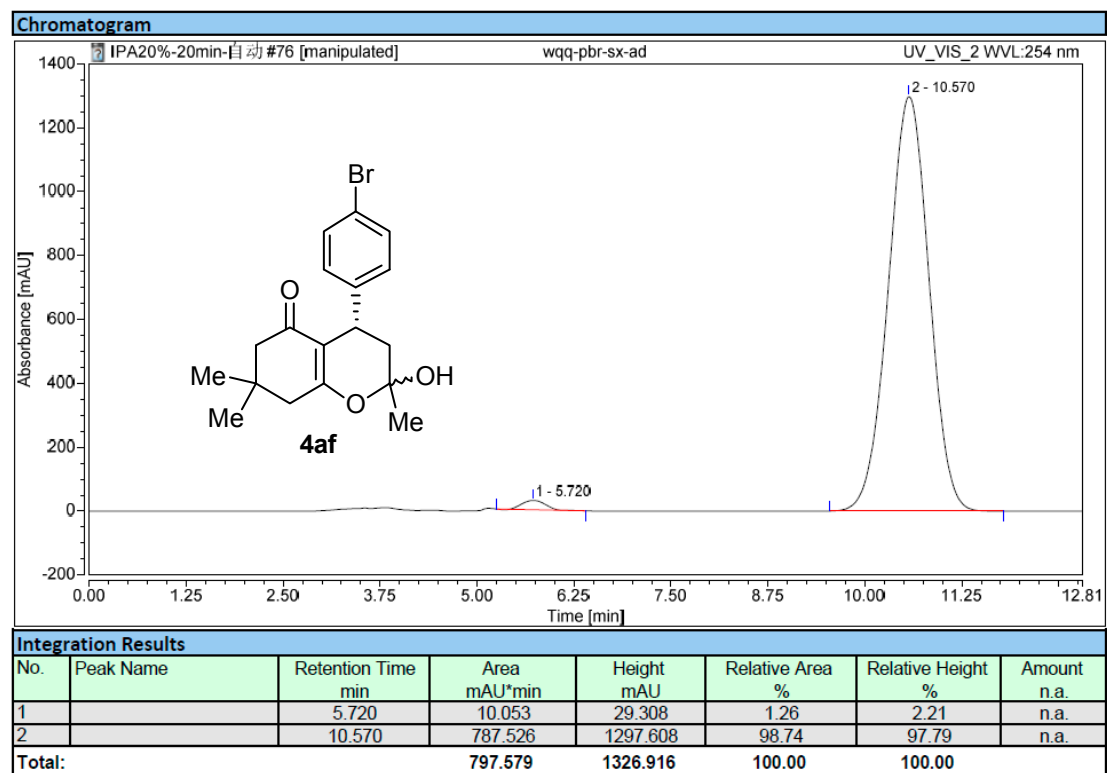
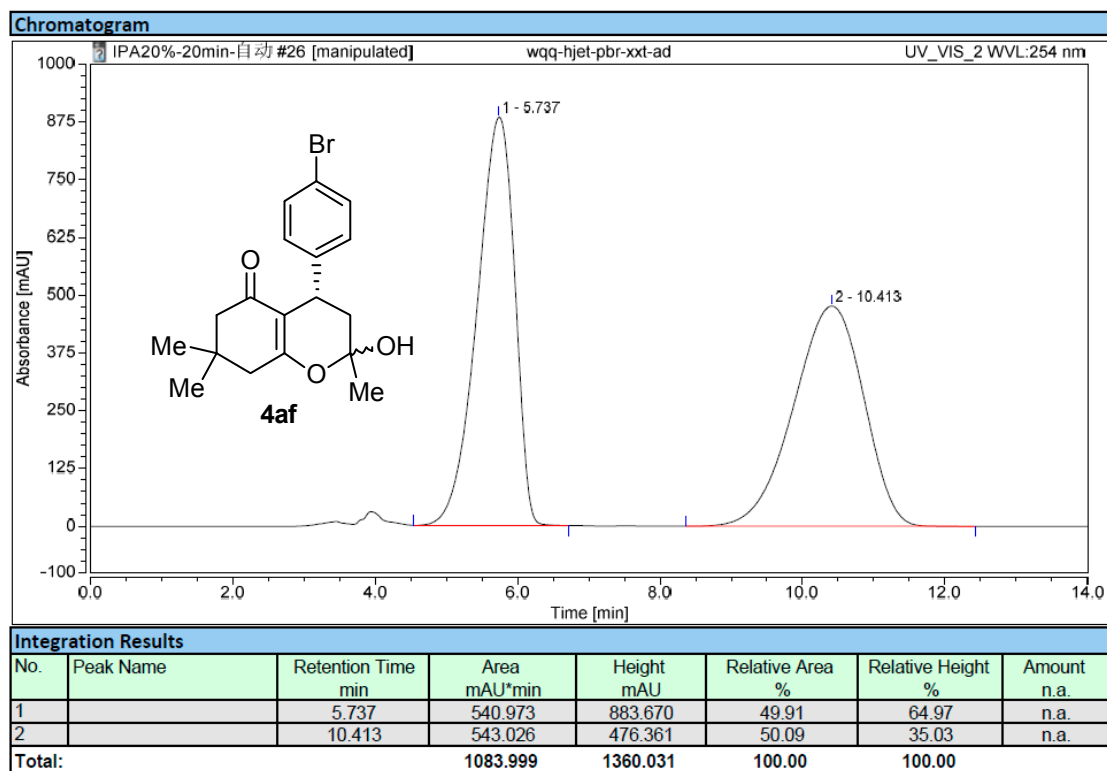


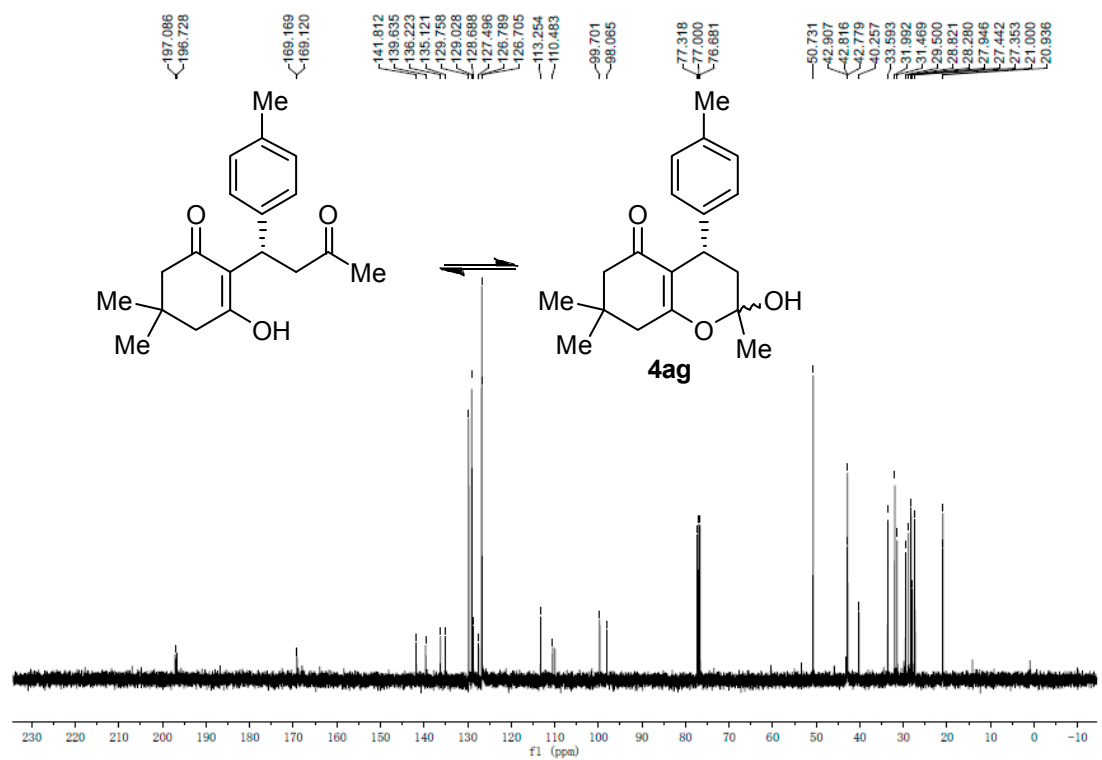
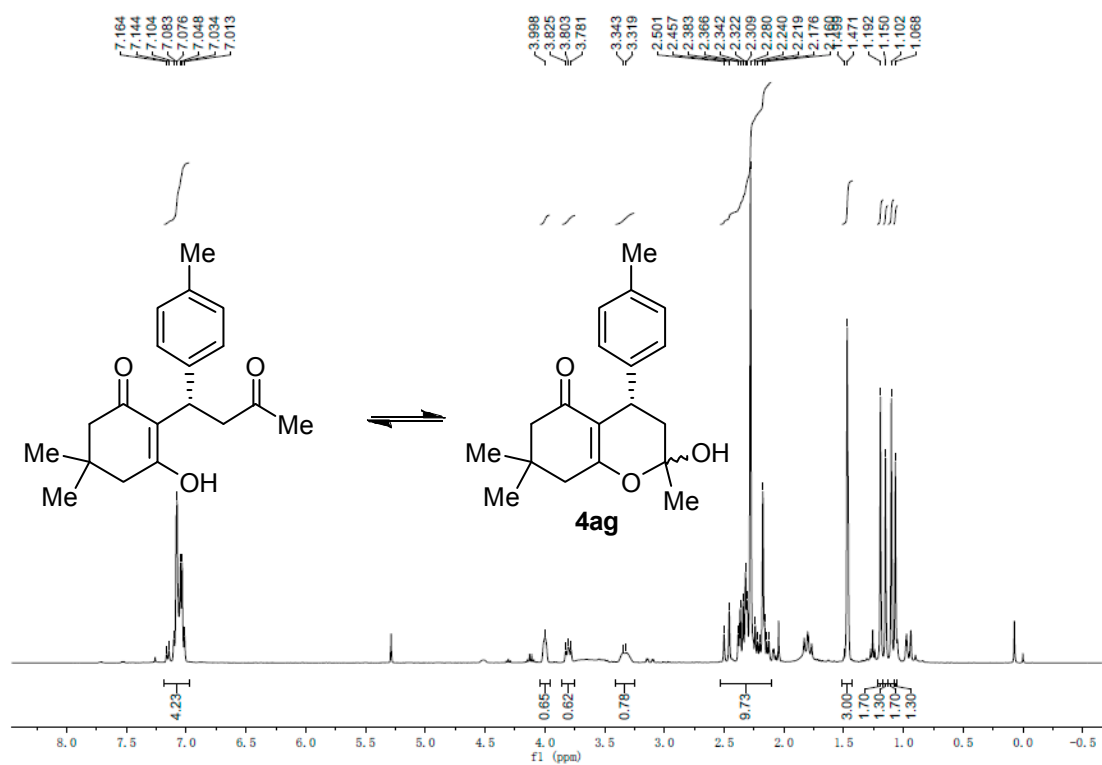
Integration Results							
No.	Peak Name	Retention Time min	Area mAU*min	Height mAU	Relative Area %	Relative Height %	Amount
1		5.493	1389.584	2887.729	98.27	98.35	n.a.
2		8.417	24.408	48.518	1.73	1.65	n.a.
Total:			1413.992	2936.248	100.00	100.00	

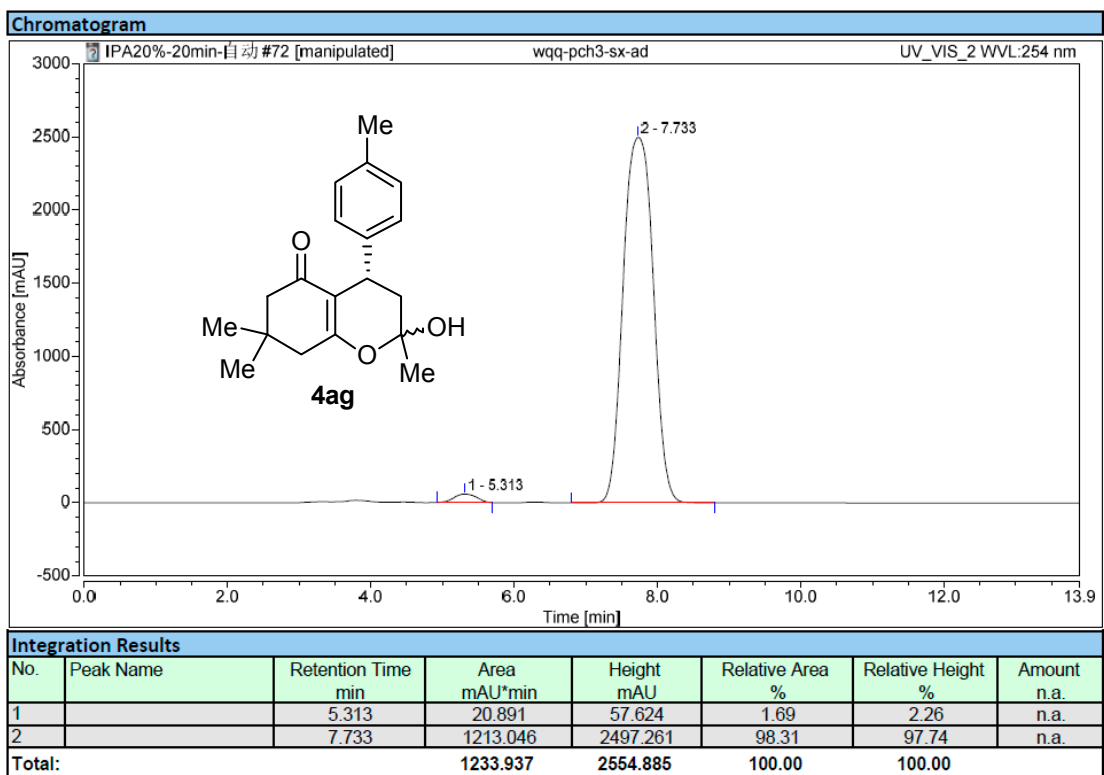
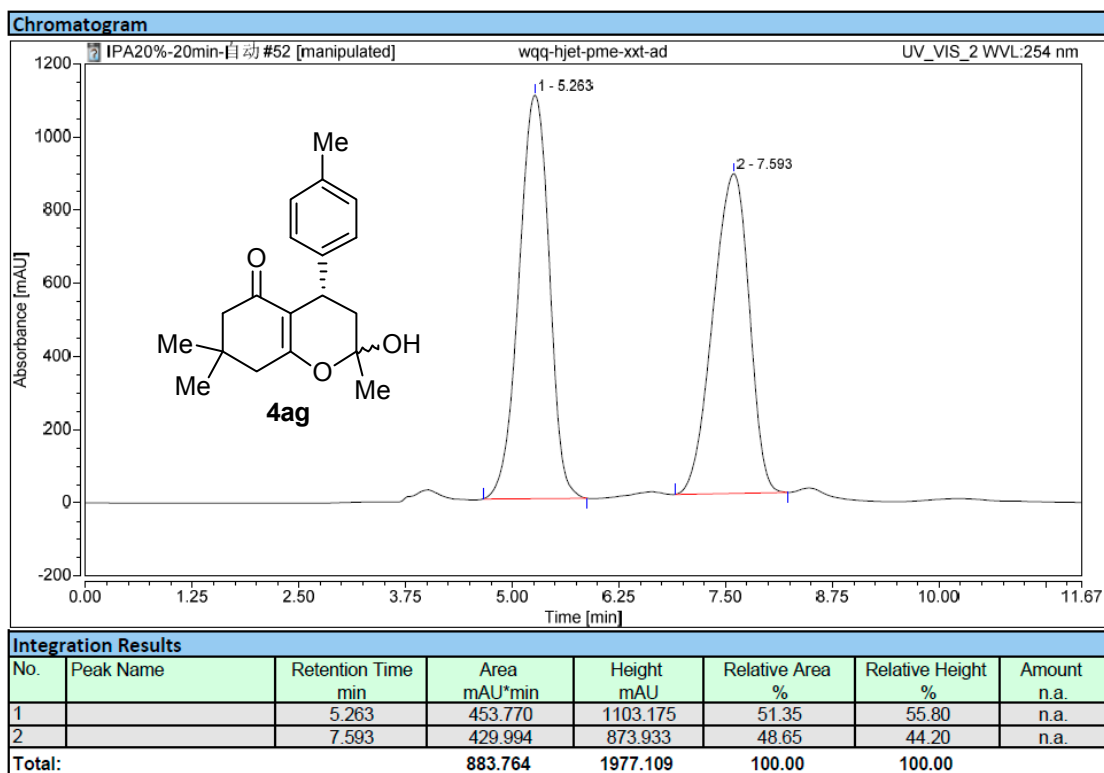


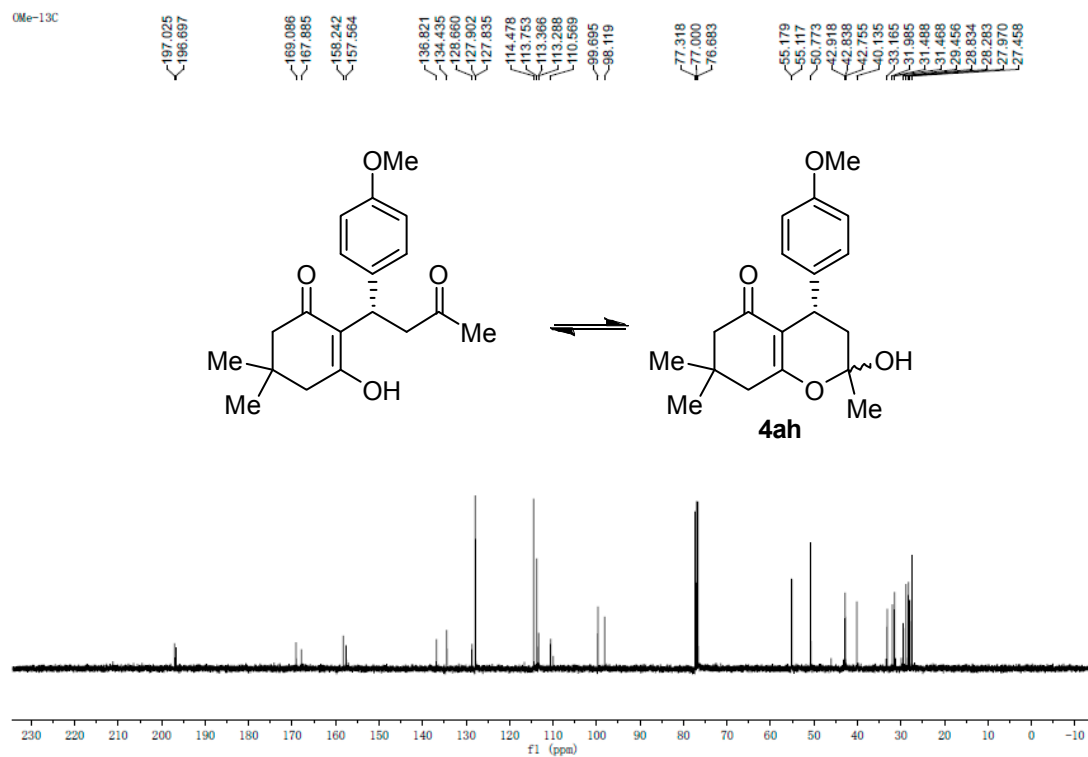
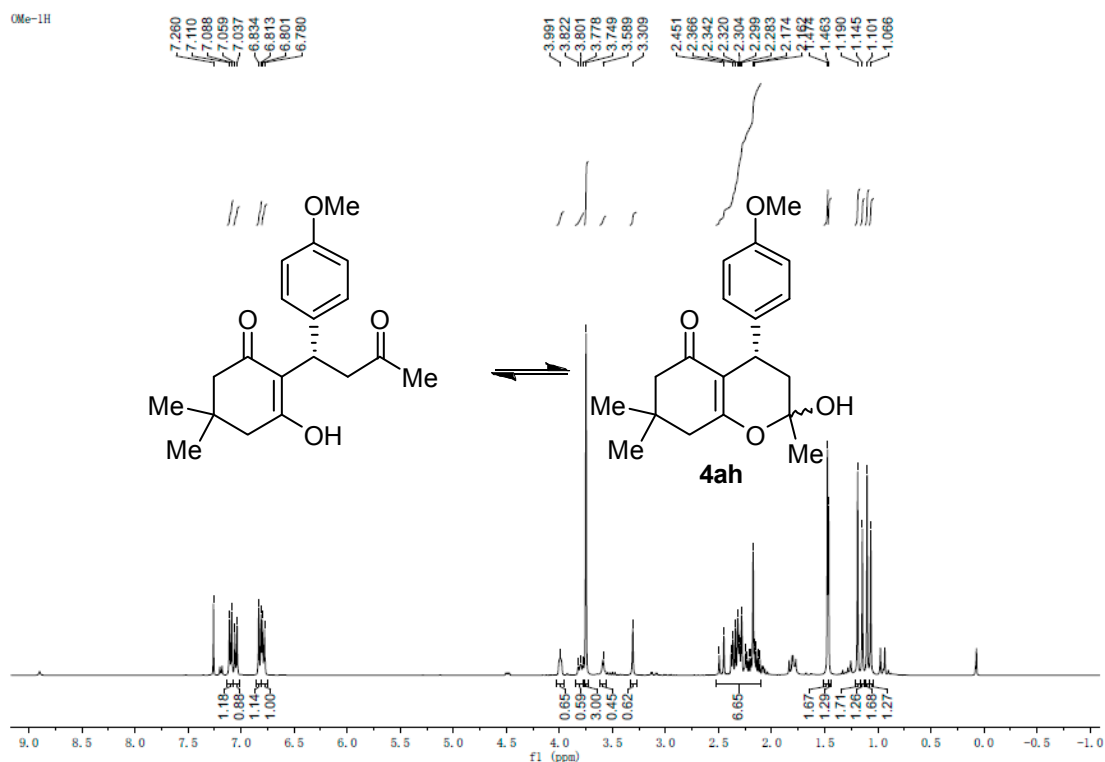


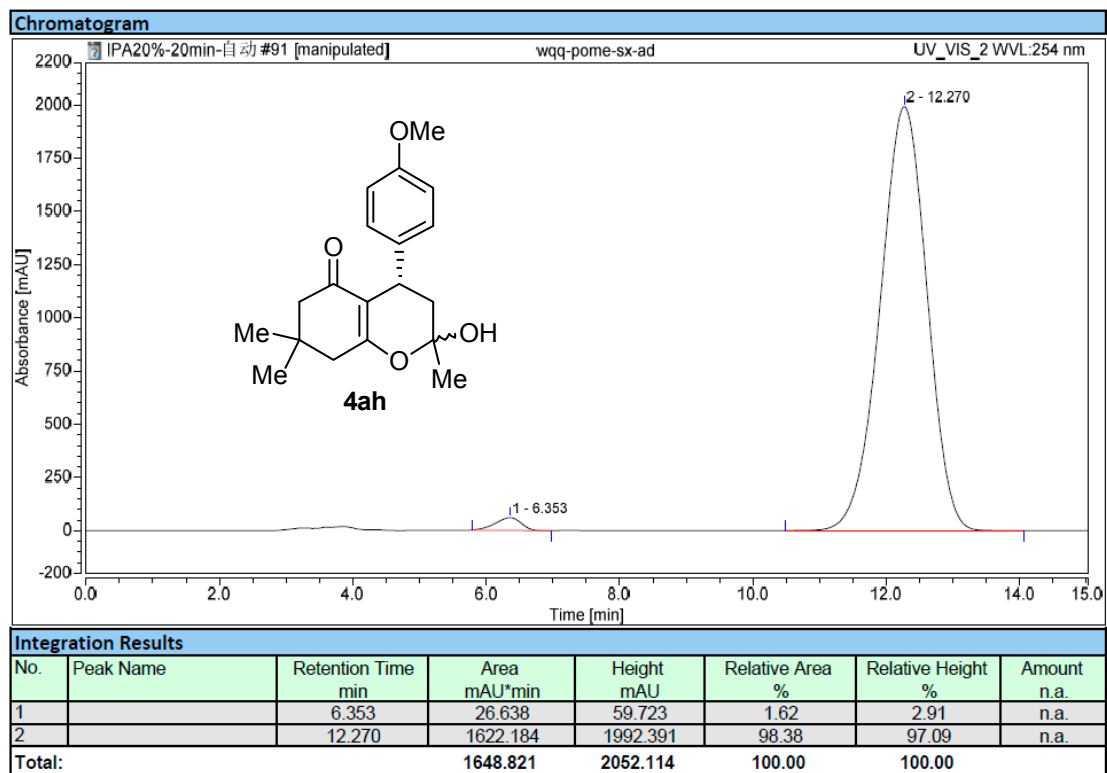
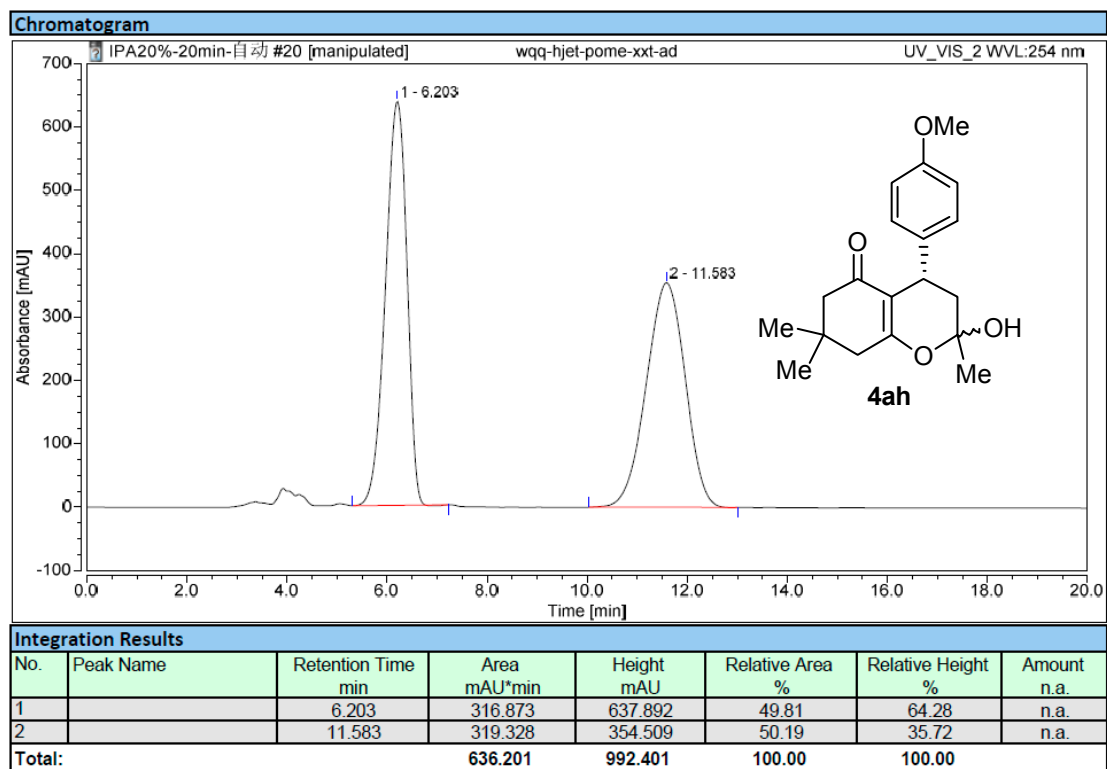


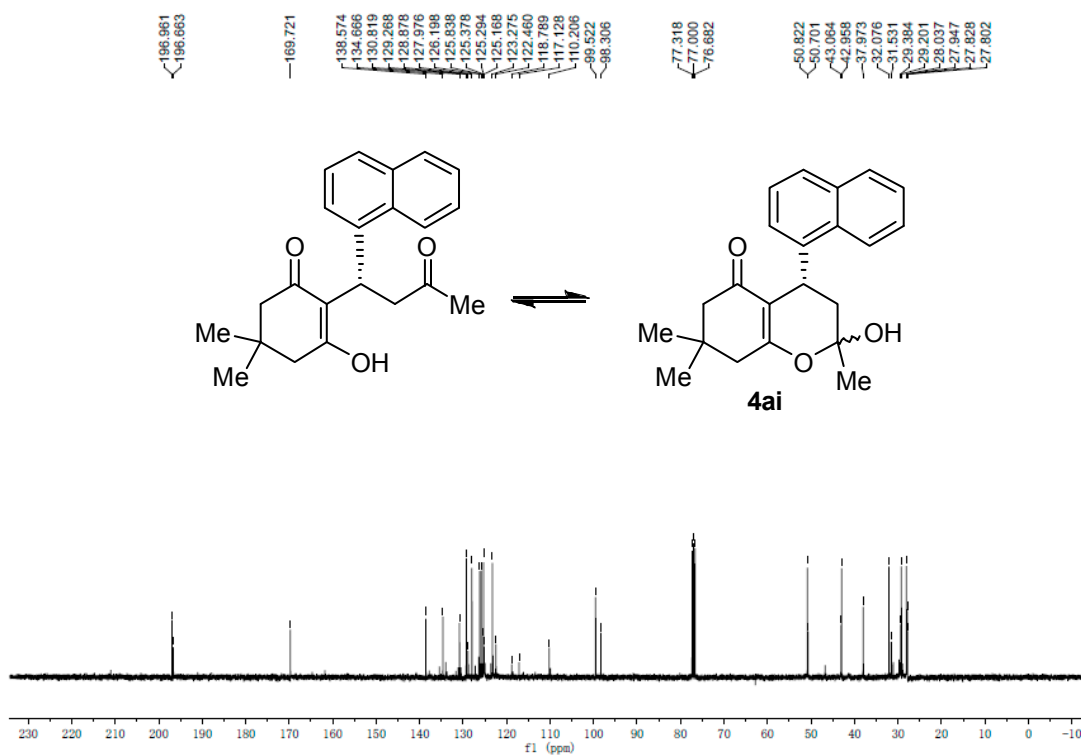
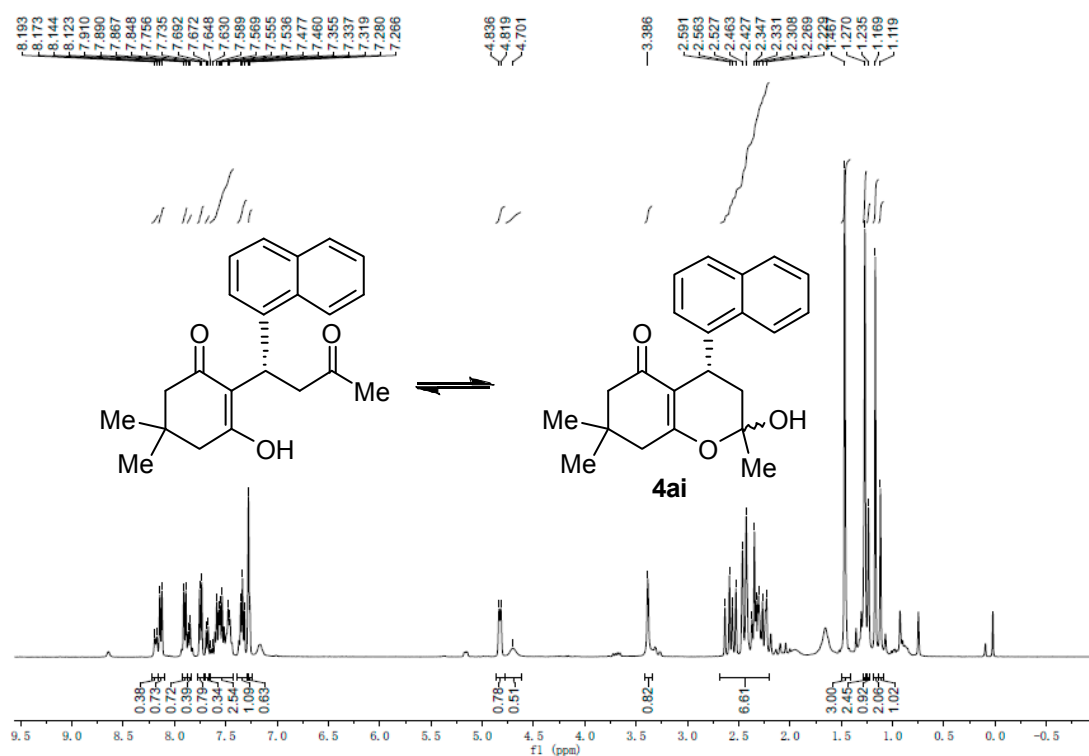


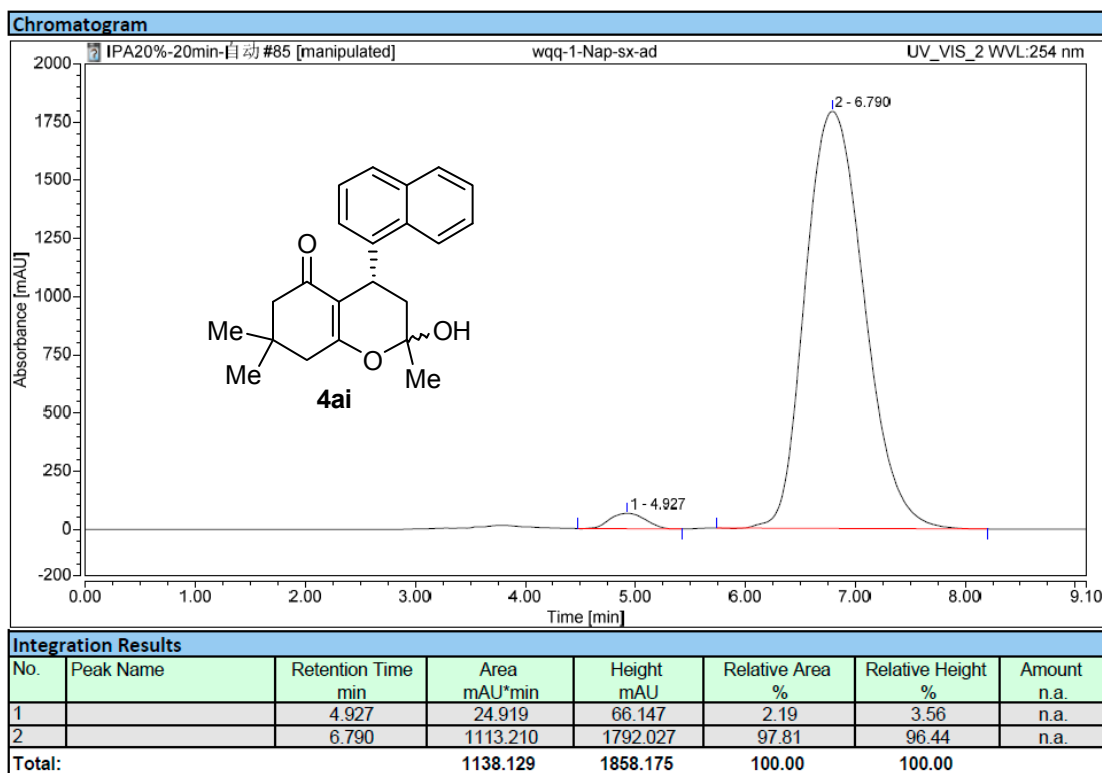
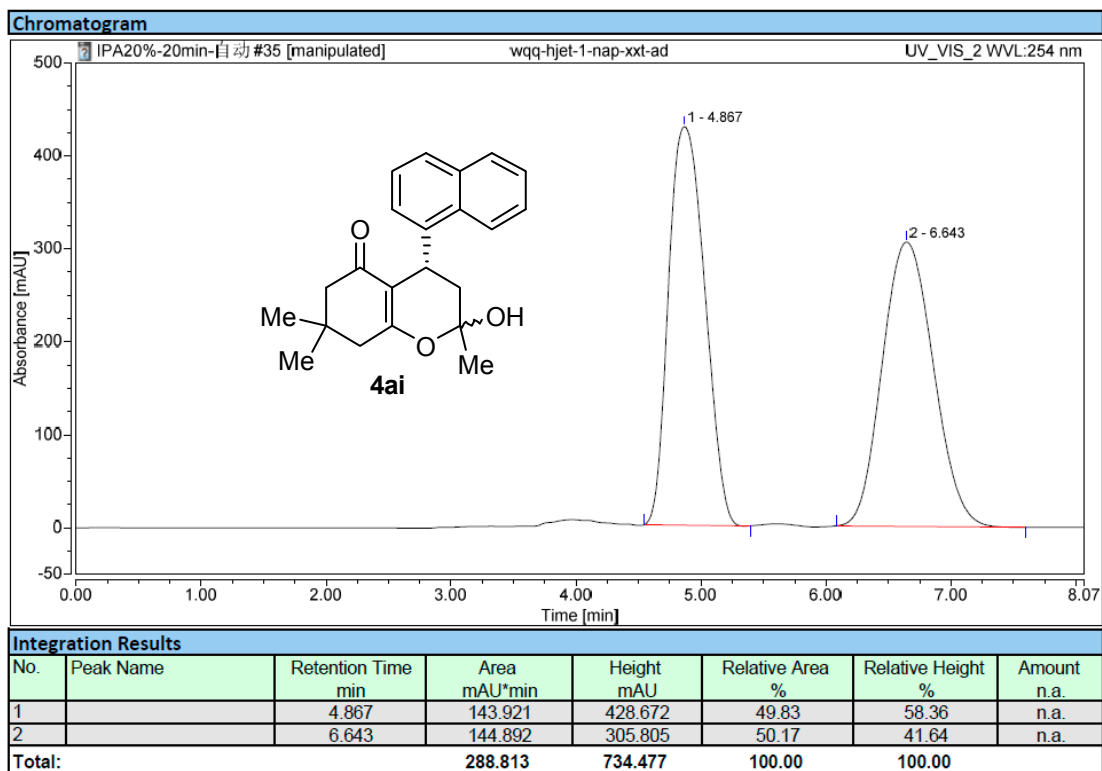


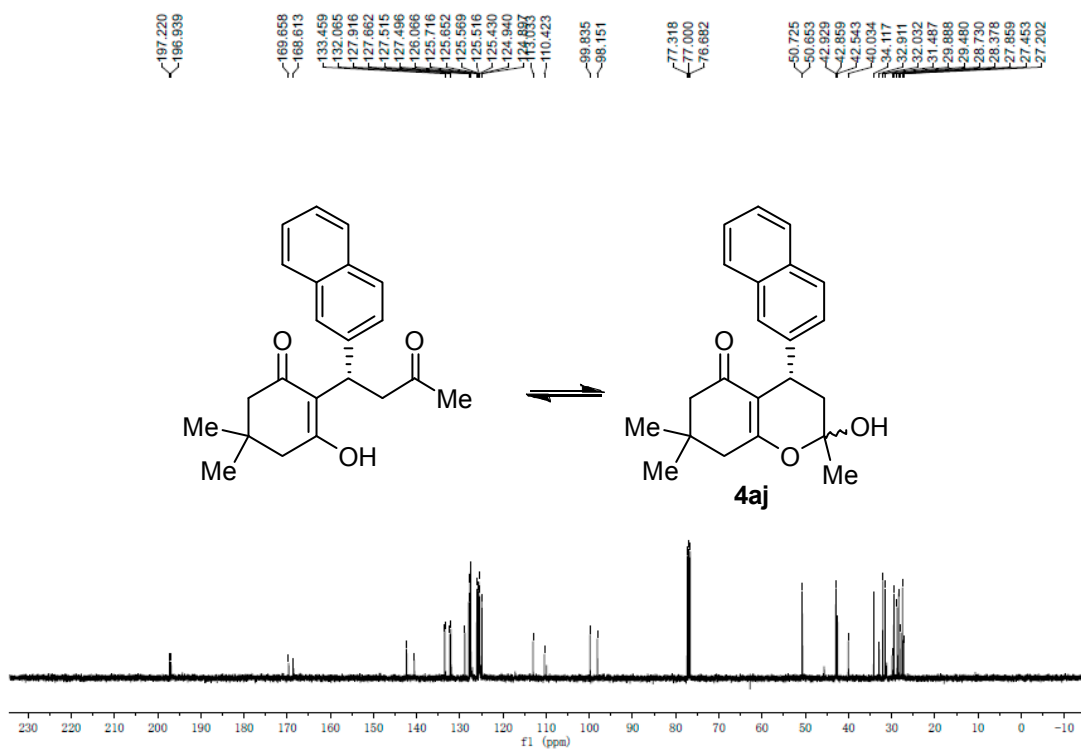
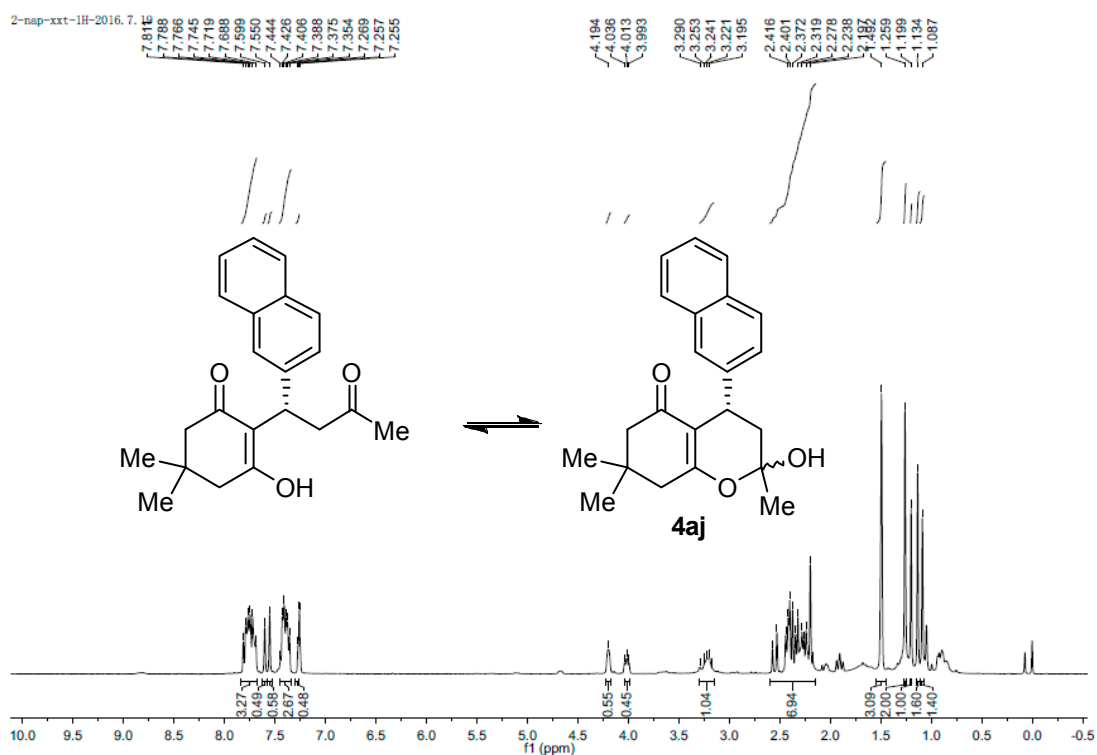


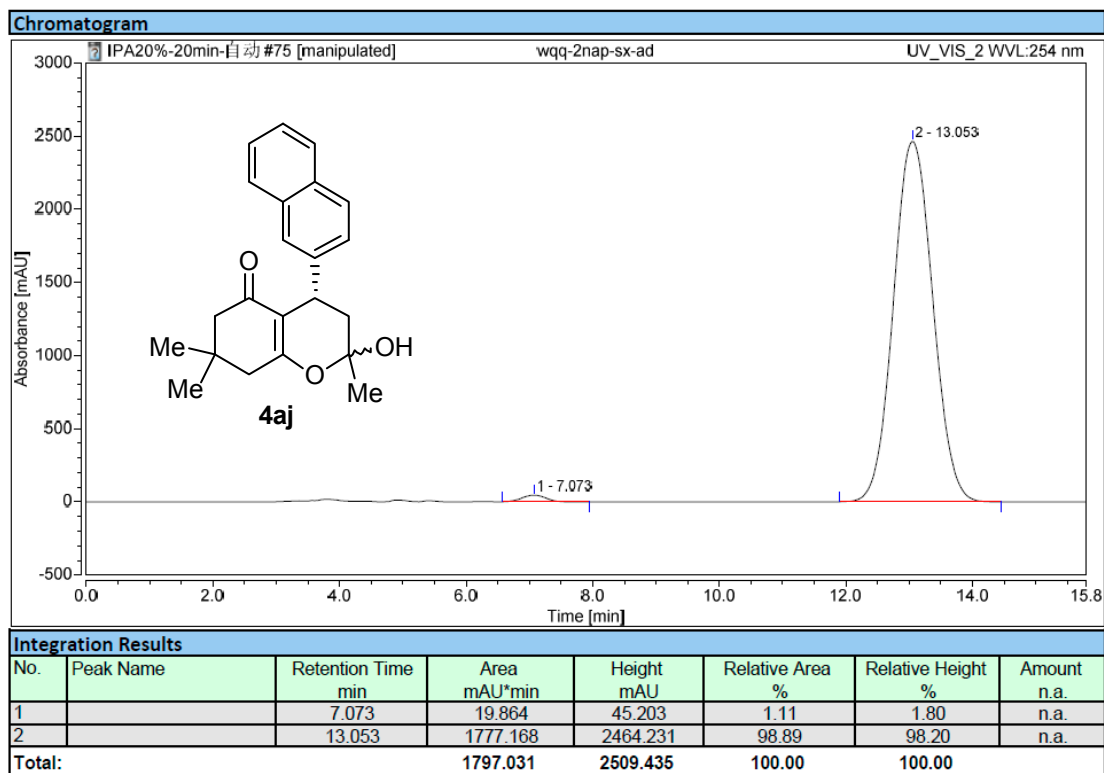
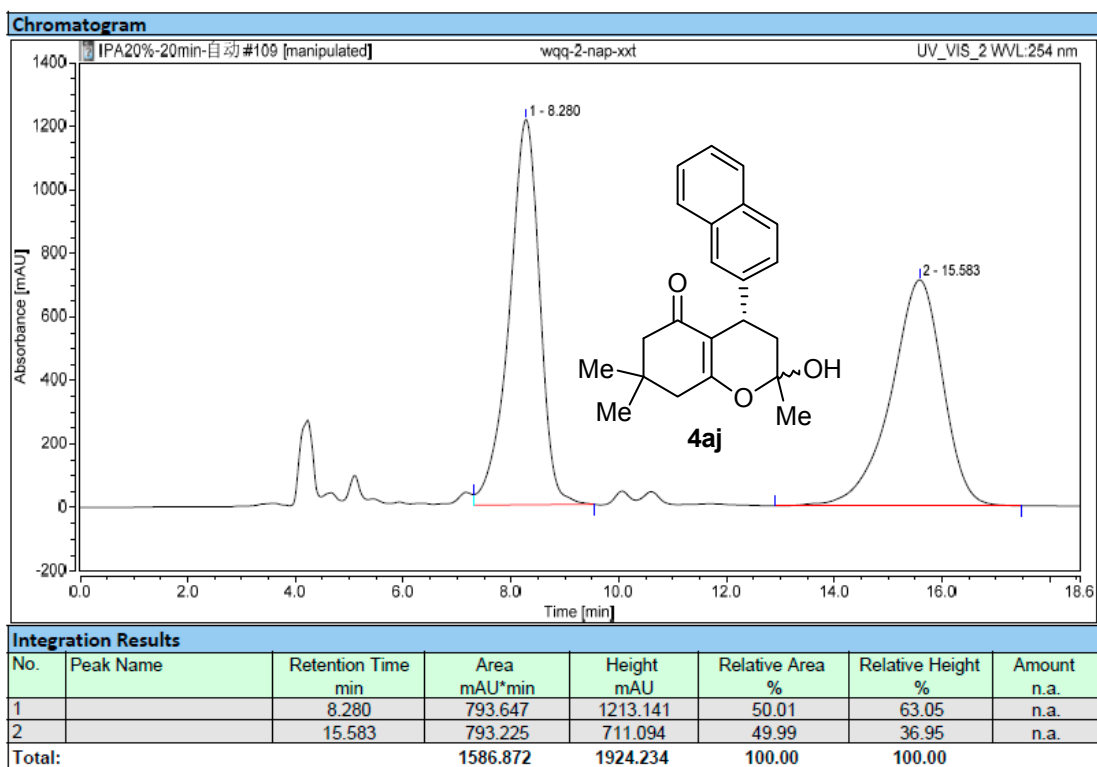




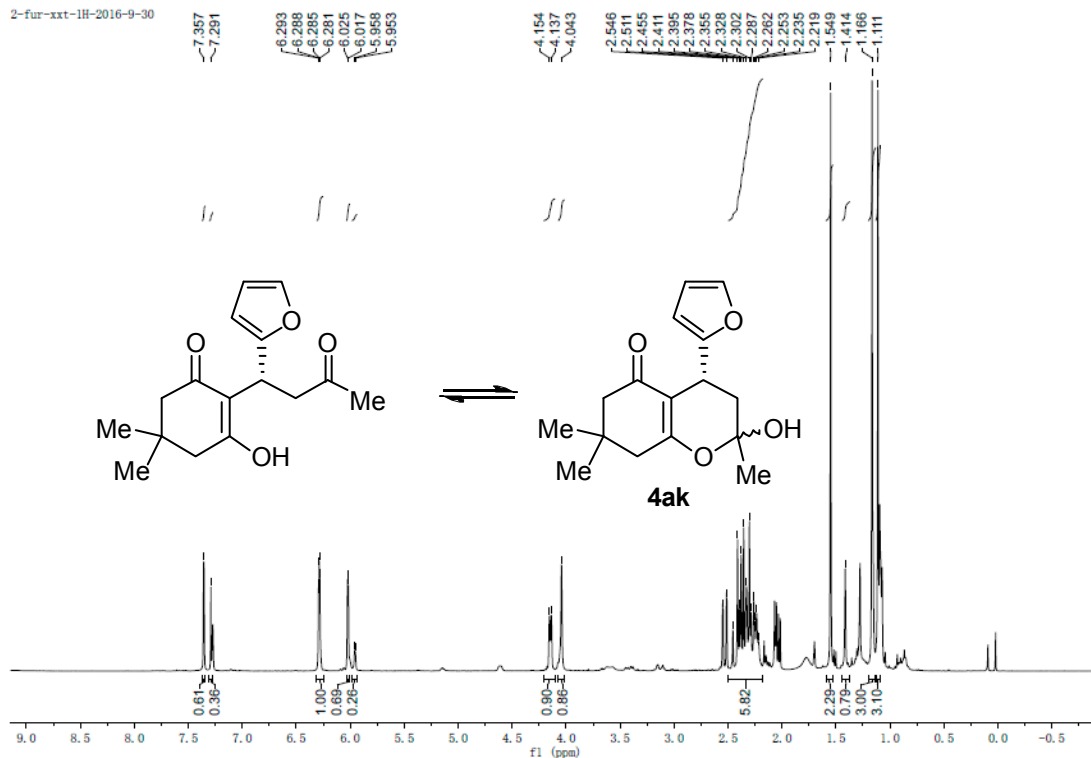




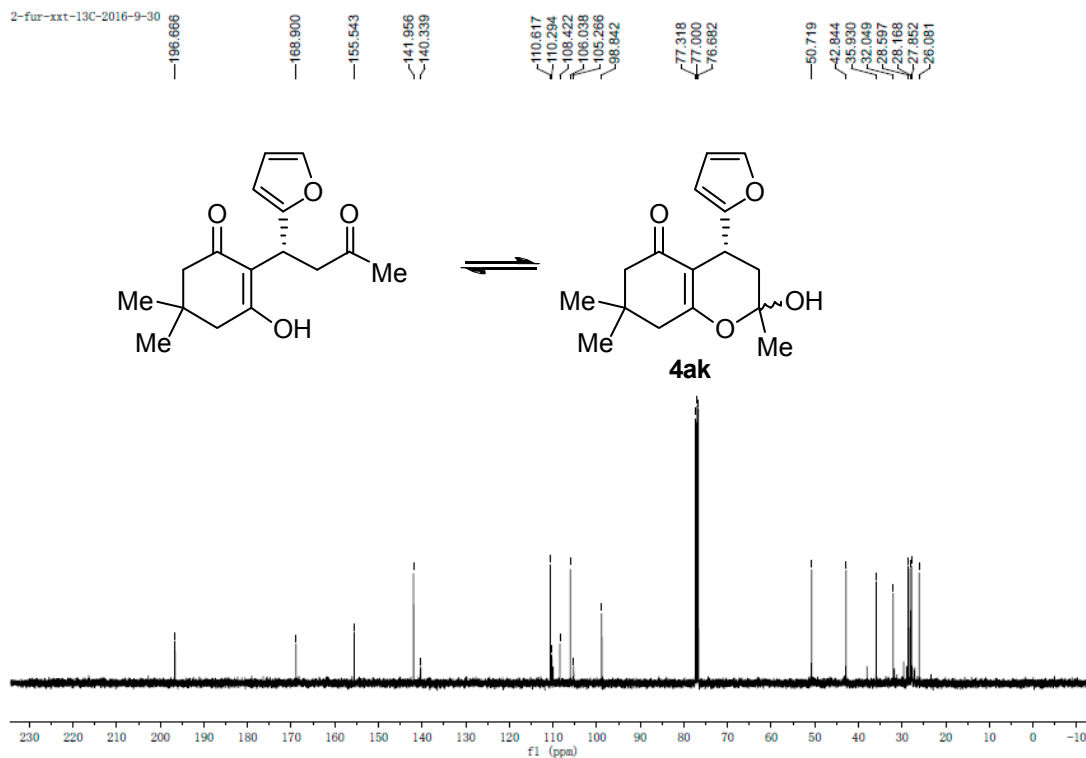


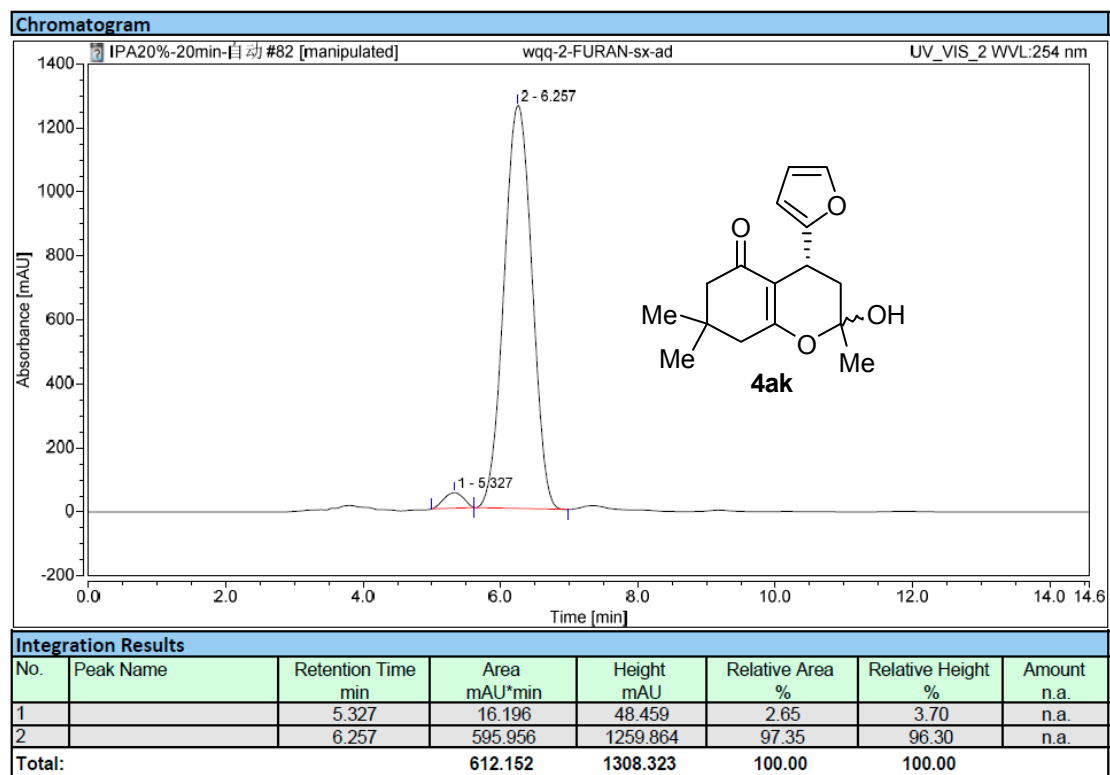
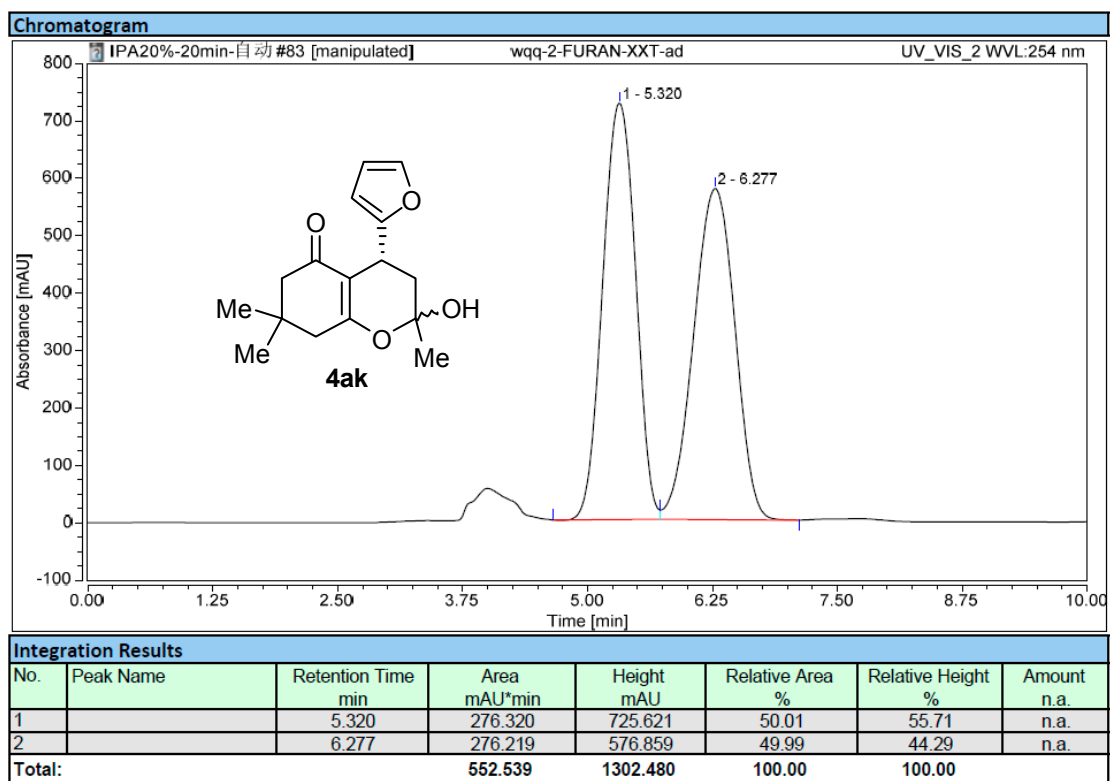


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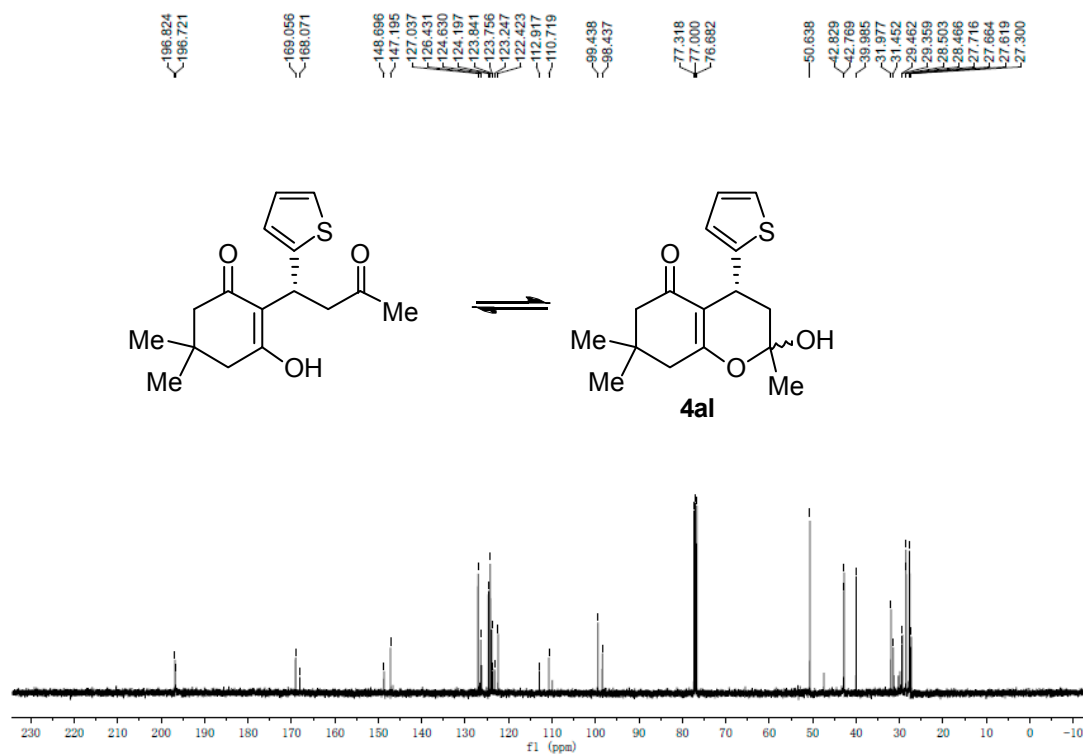
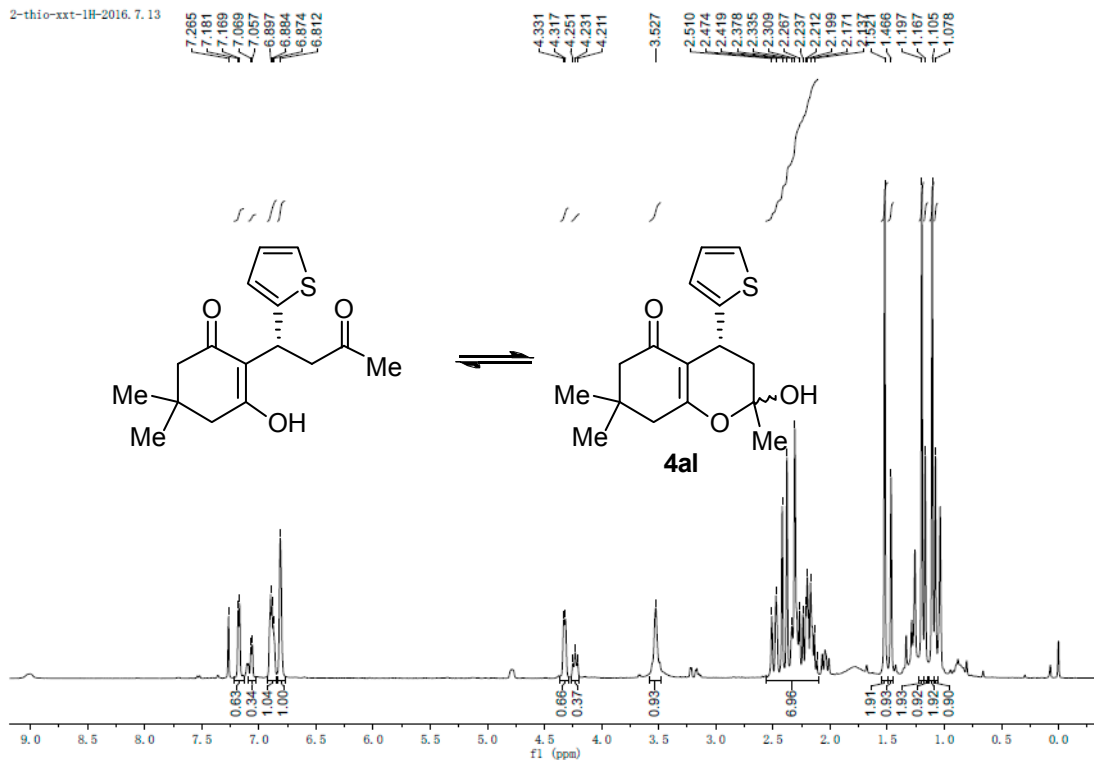


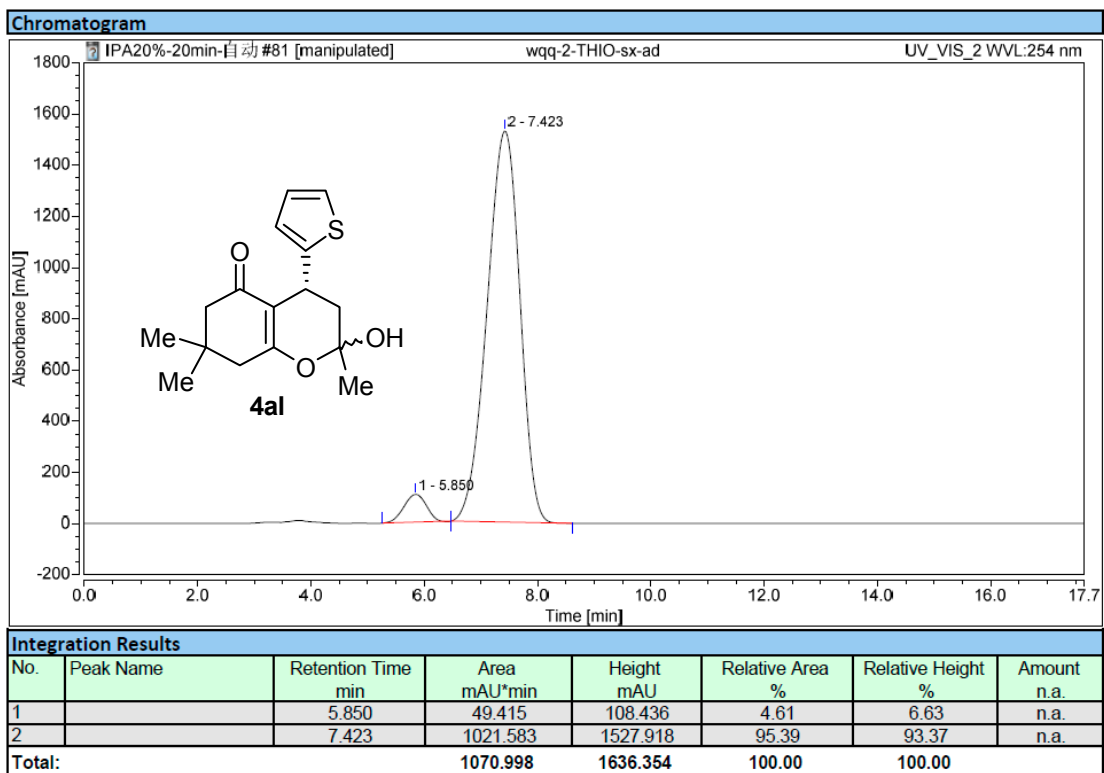
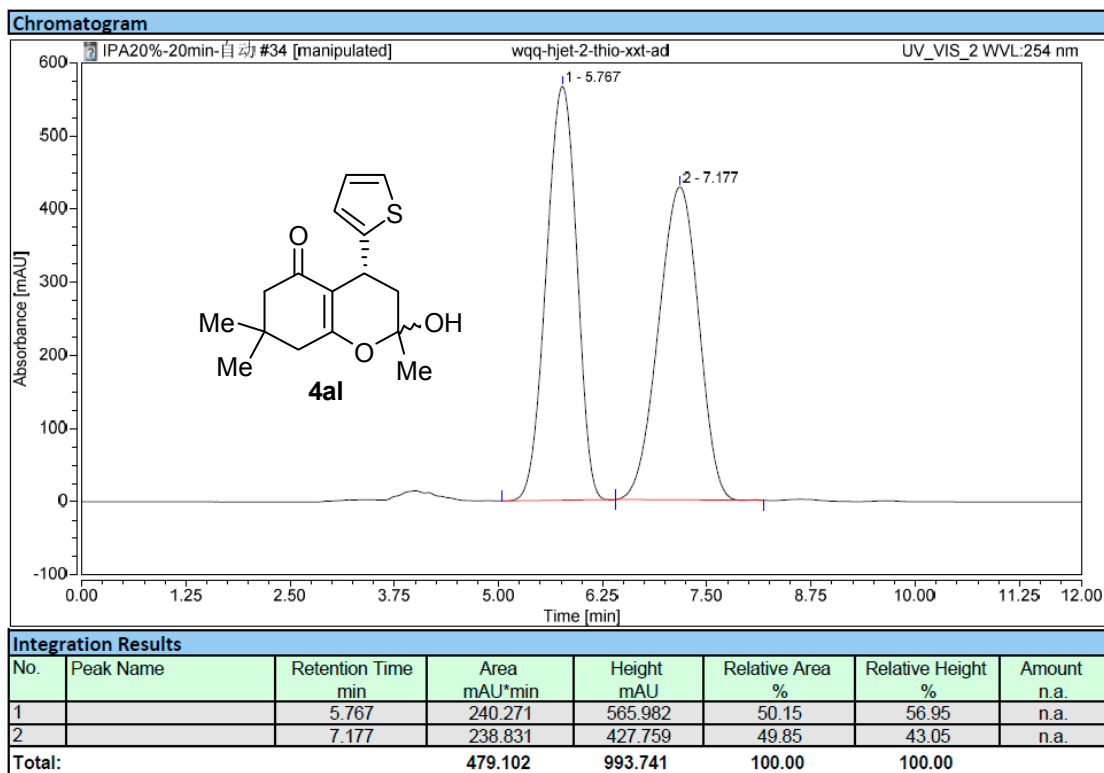
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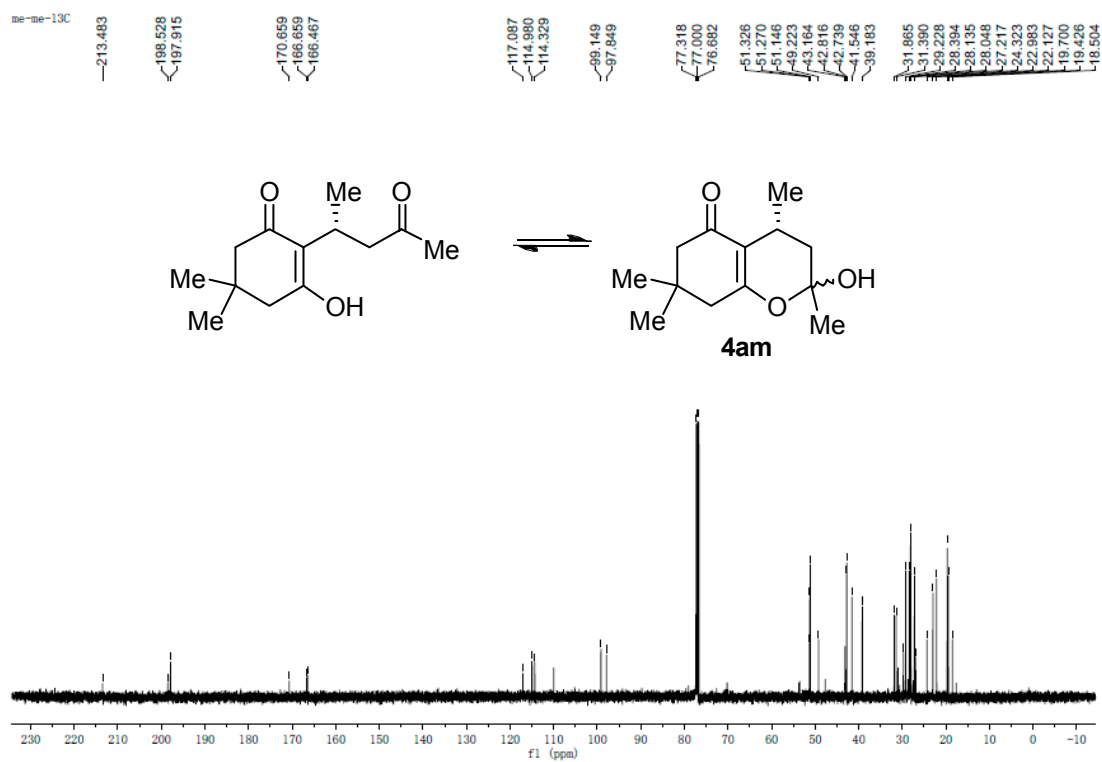
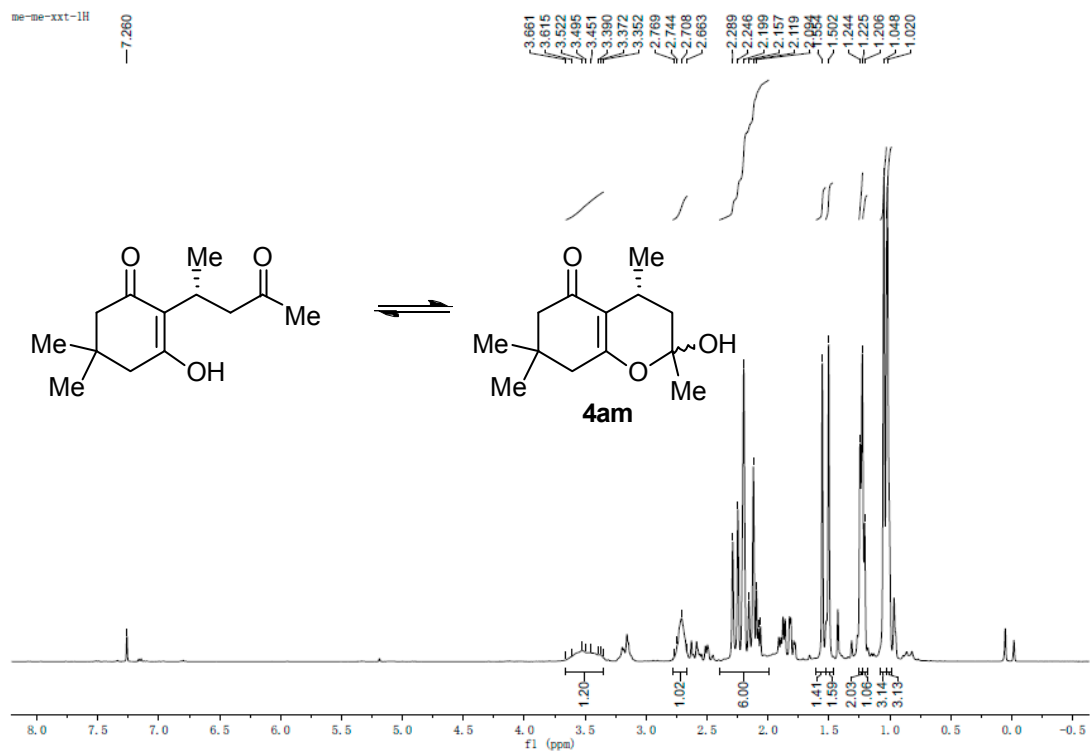


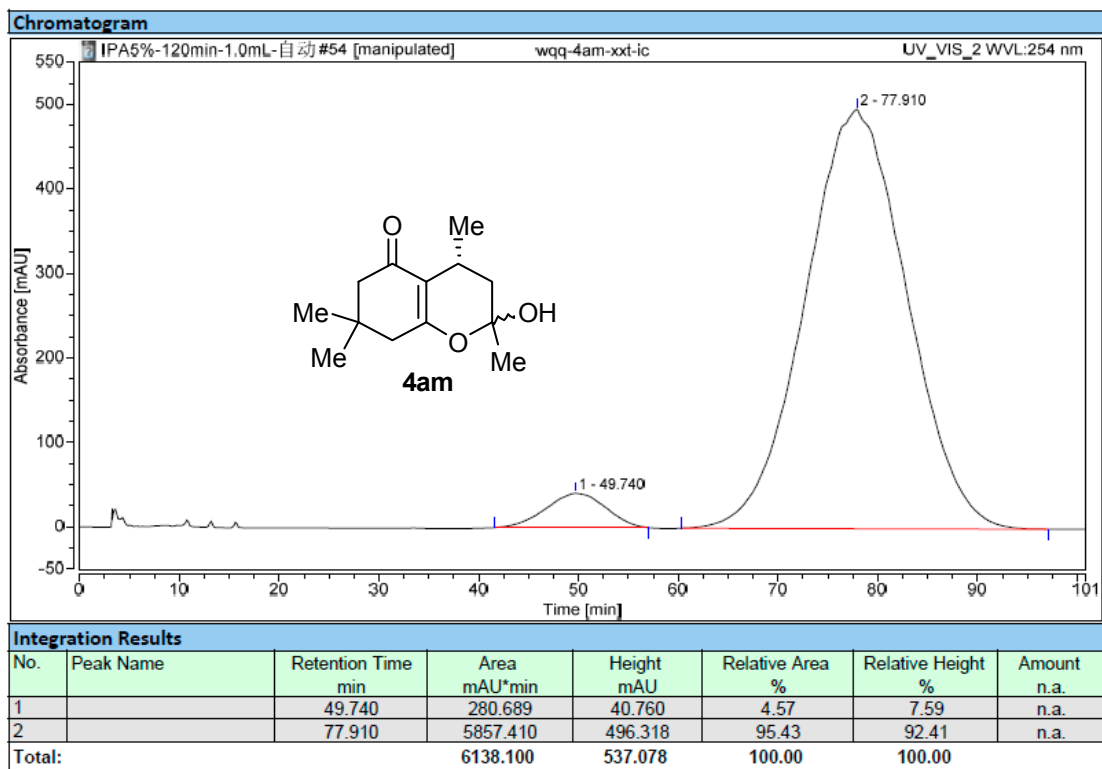
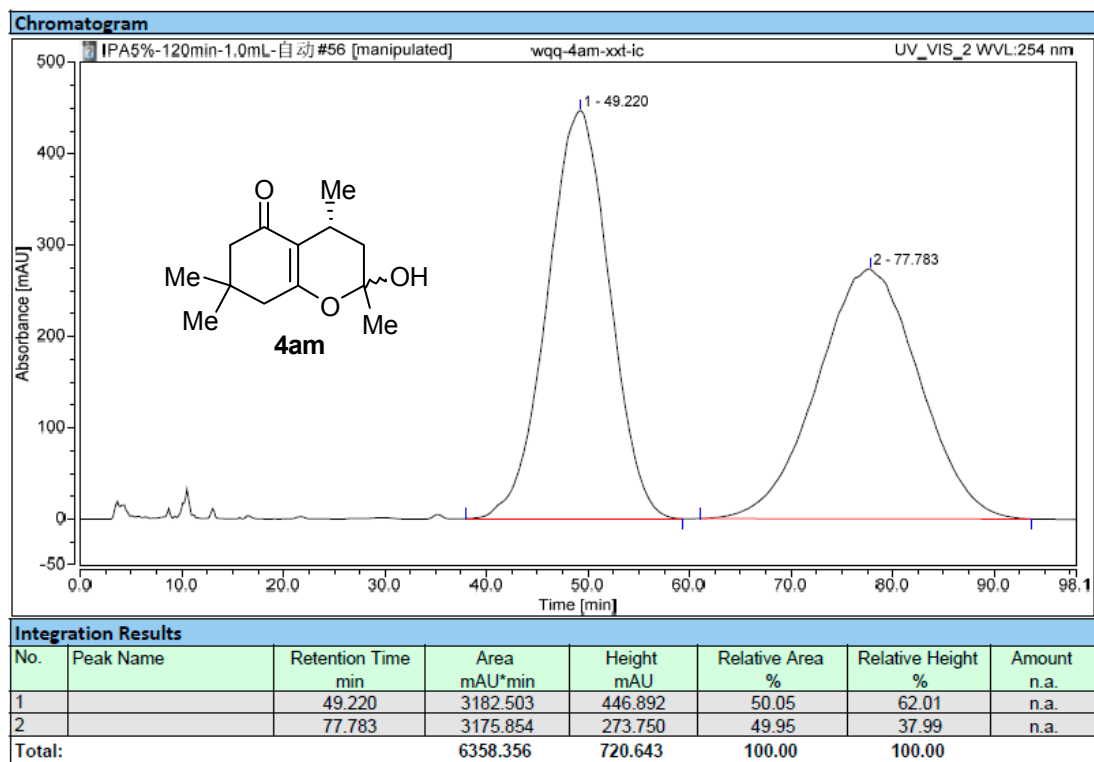


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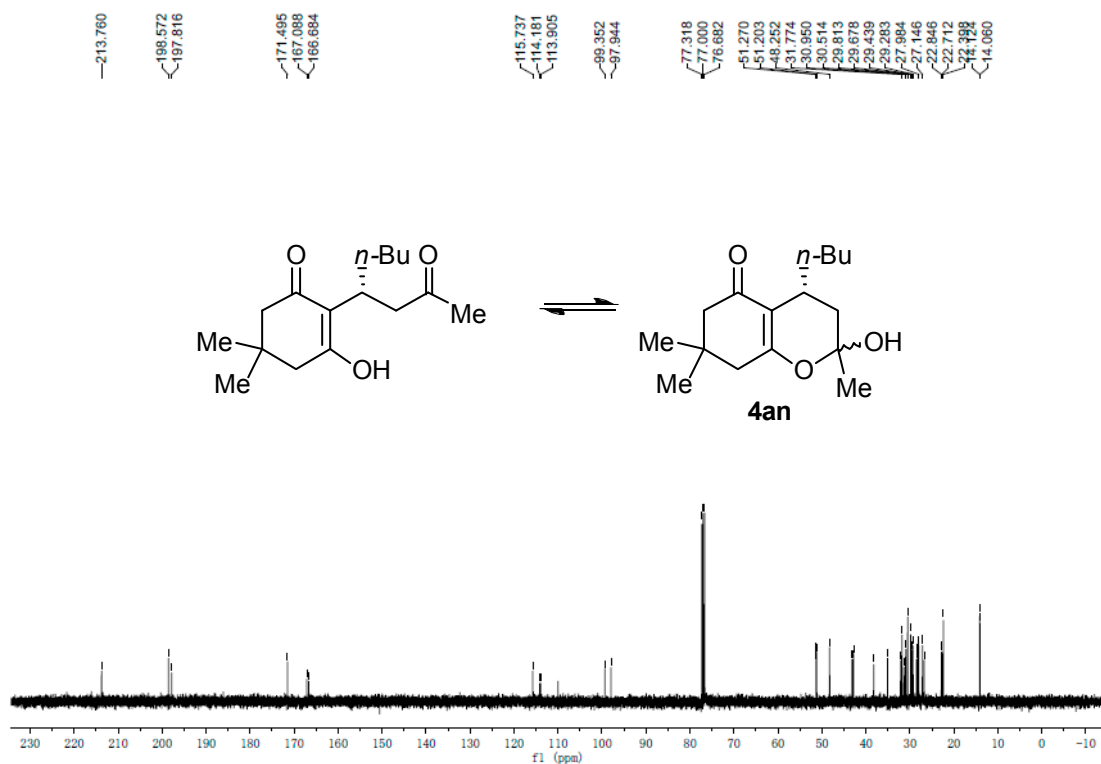
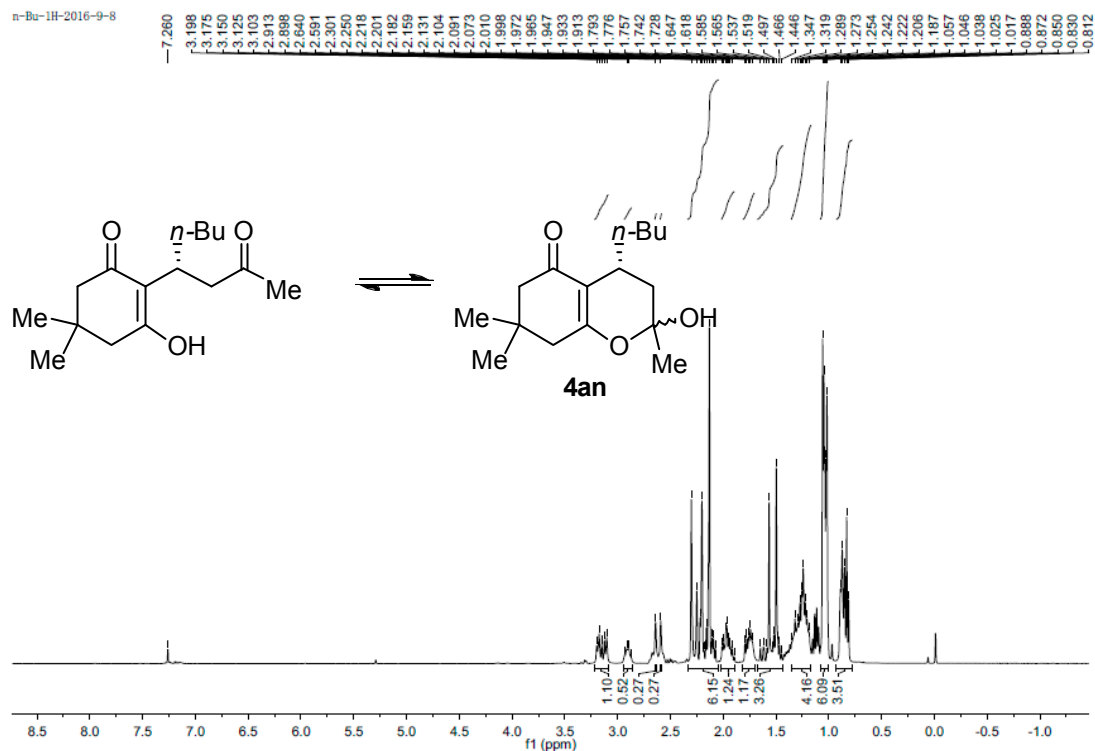


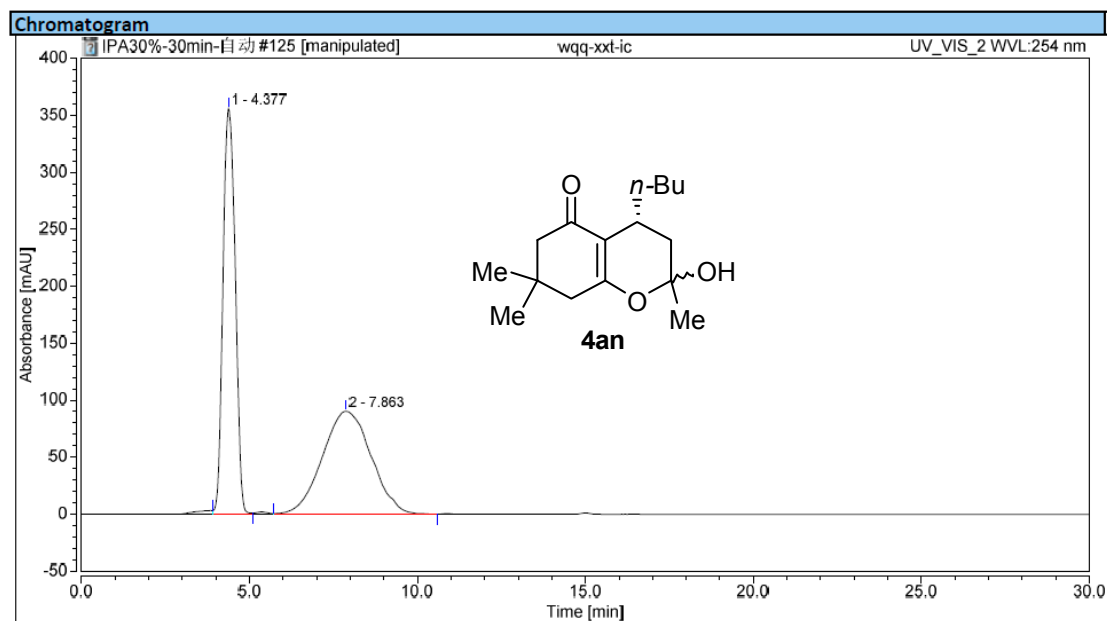




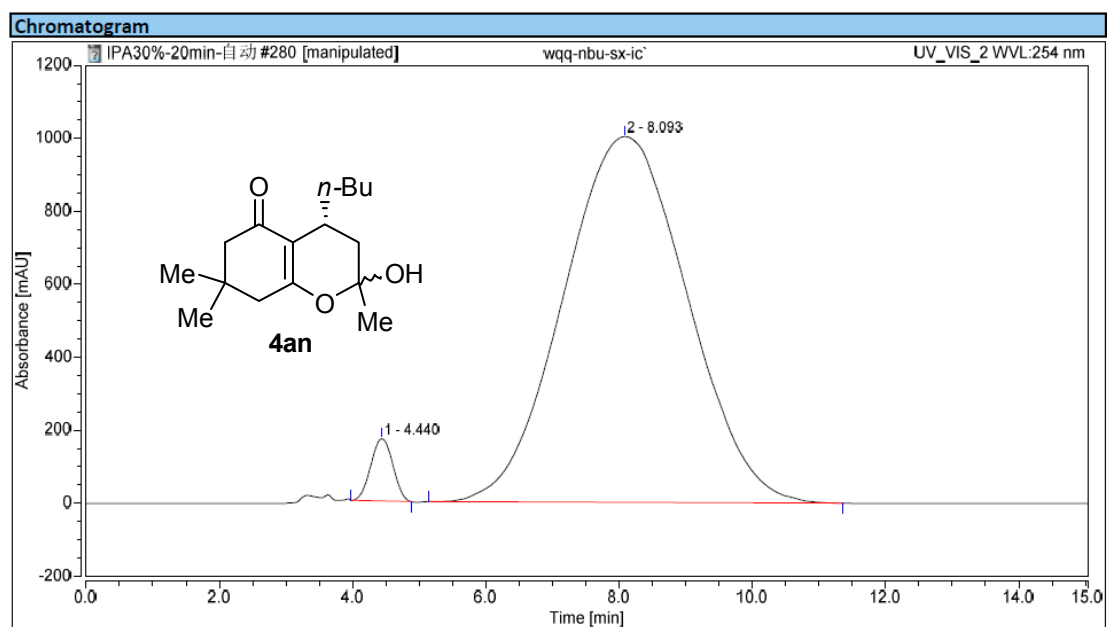


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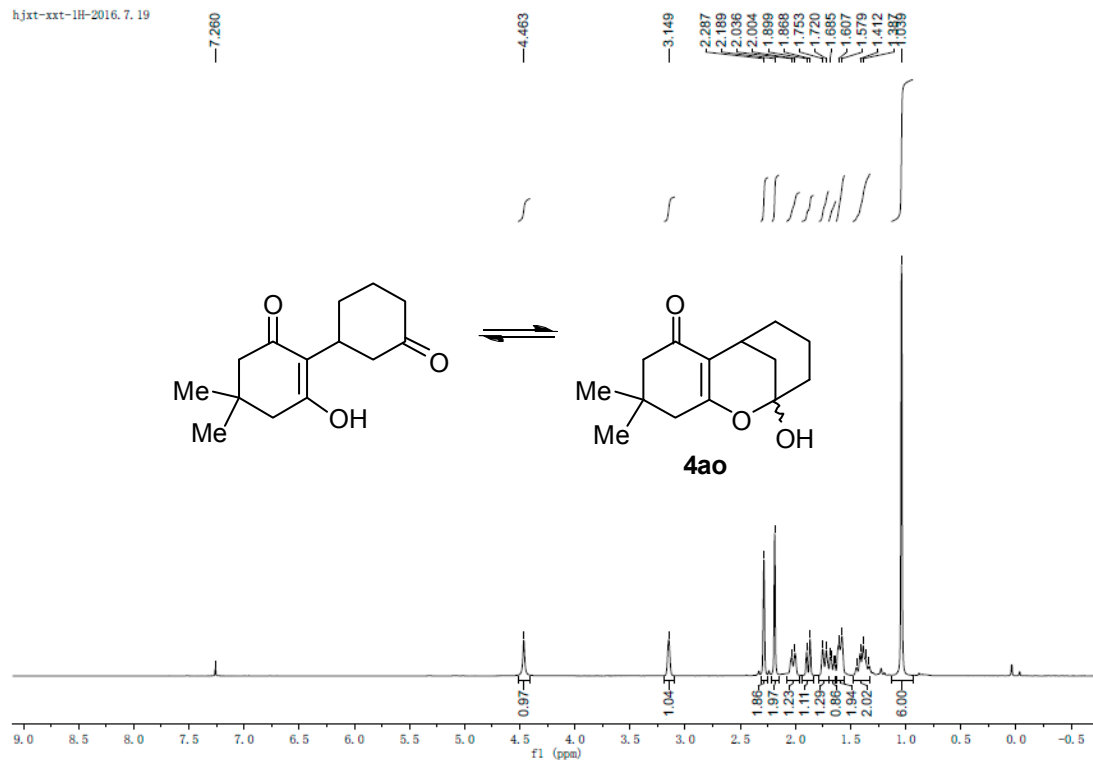


Integration Results							
No.	Peak Name	Retention Time min	Area mAU*min	Height mAU	Relative Area %	Relative Height %	Amount n.a.
1		4.377	150.702	356.188	49.75	79.77	n.a.
2		7.863	152.209	90.305	50.25	20.23	n.a.
Total:			302.910	446.493	100.00	100.00	



Integration Results							
No.	Peak Name	Retention Time min	Area mAU*min	Height mAU	Relative Area %	Relative Height %	Amount n.a.
1		4.440	65.412	170.567	2.94	14.54	n.a.
2		8.093	2155.779	1002.202	97.06	85.46	n.a.
Total:			2221.191	1172.769	100.00	100.00	

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