

Squaramide-catalysed Enantioselective Mannich Reaction of Imines Bearing a heterocycle with malonates

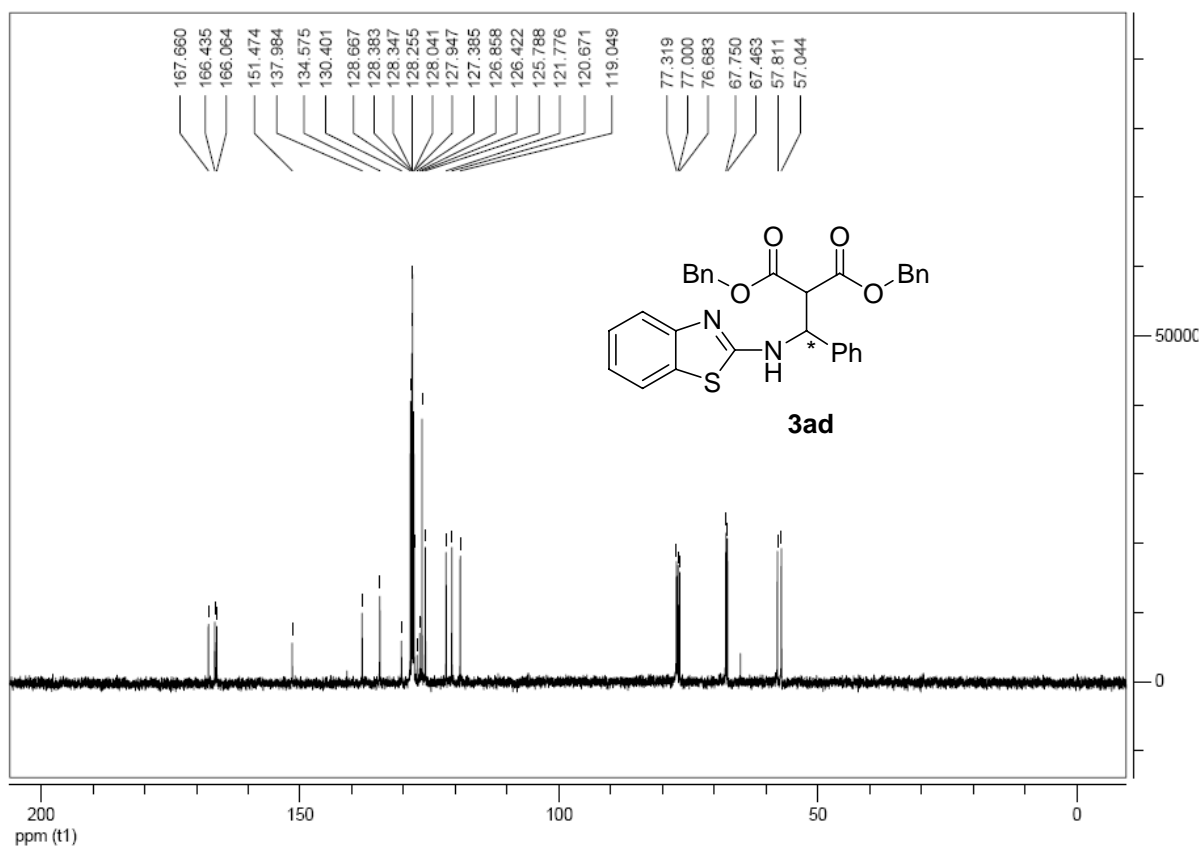
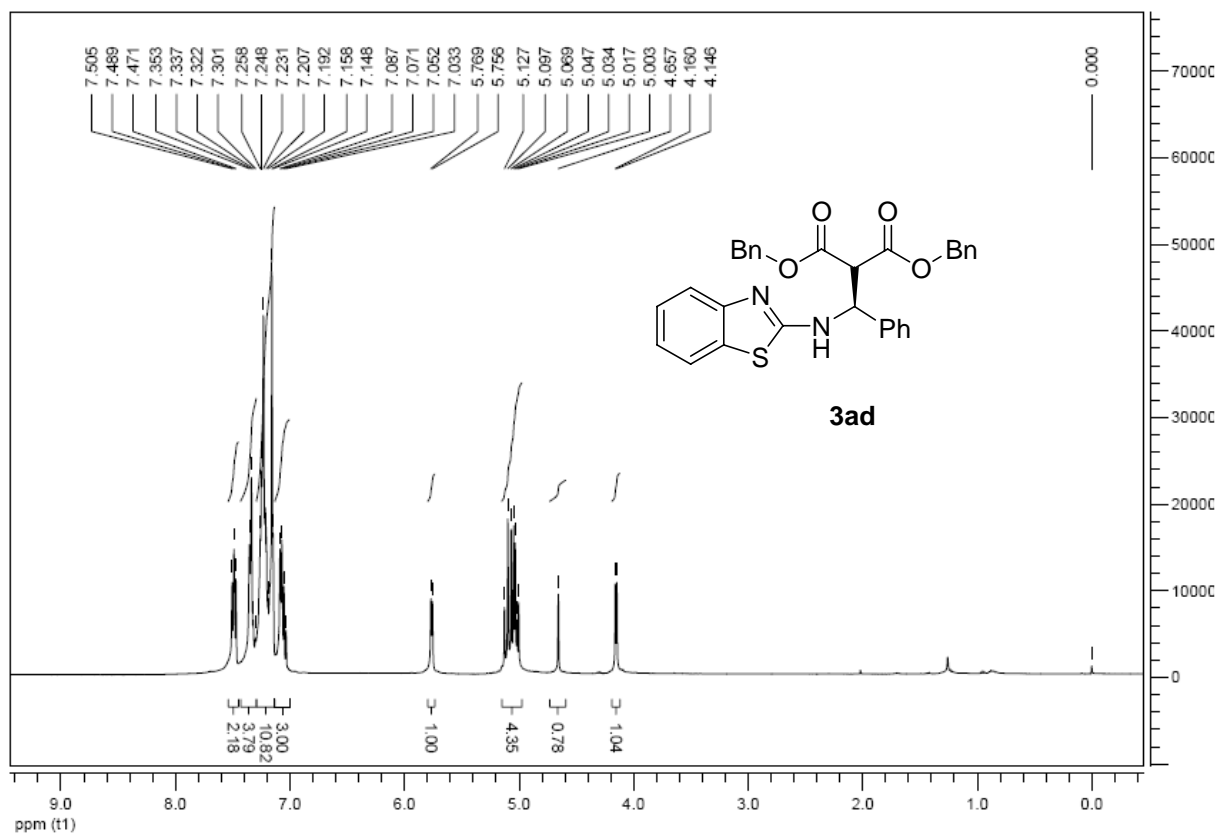
Hai-Xiao He and Da-Ming Du*

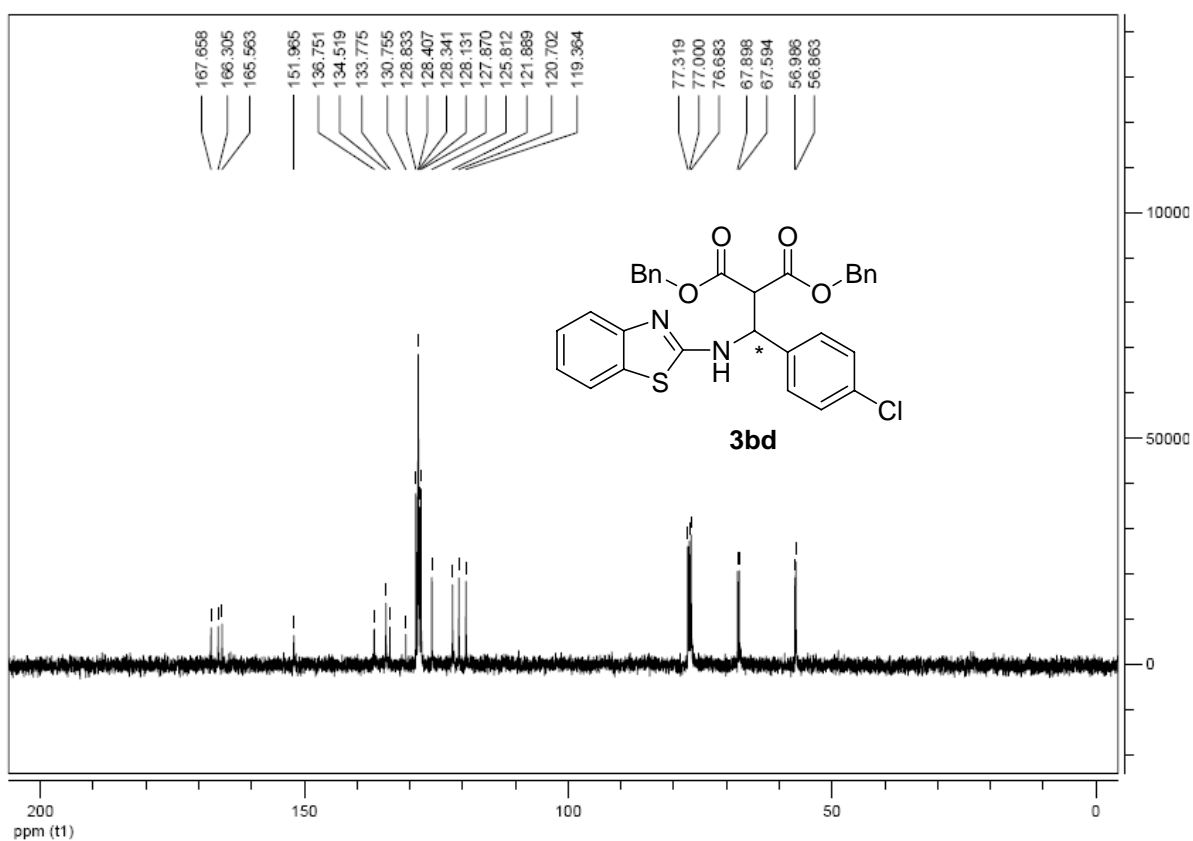
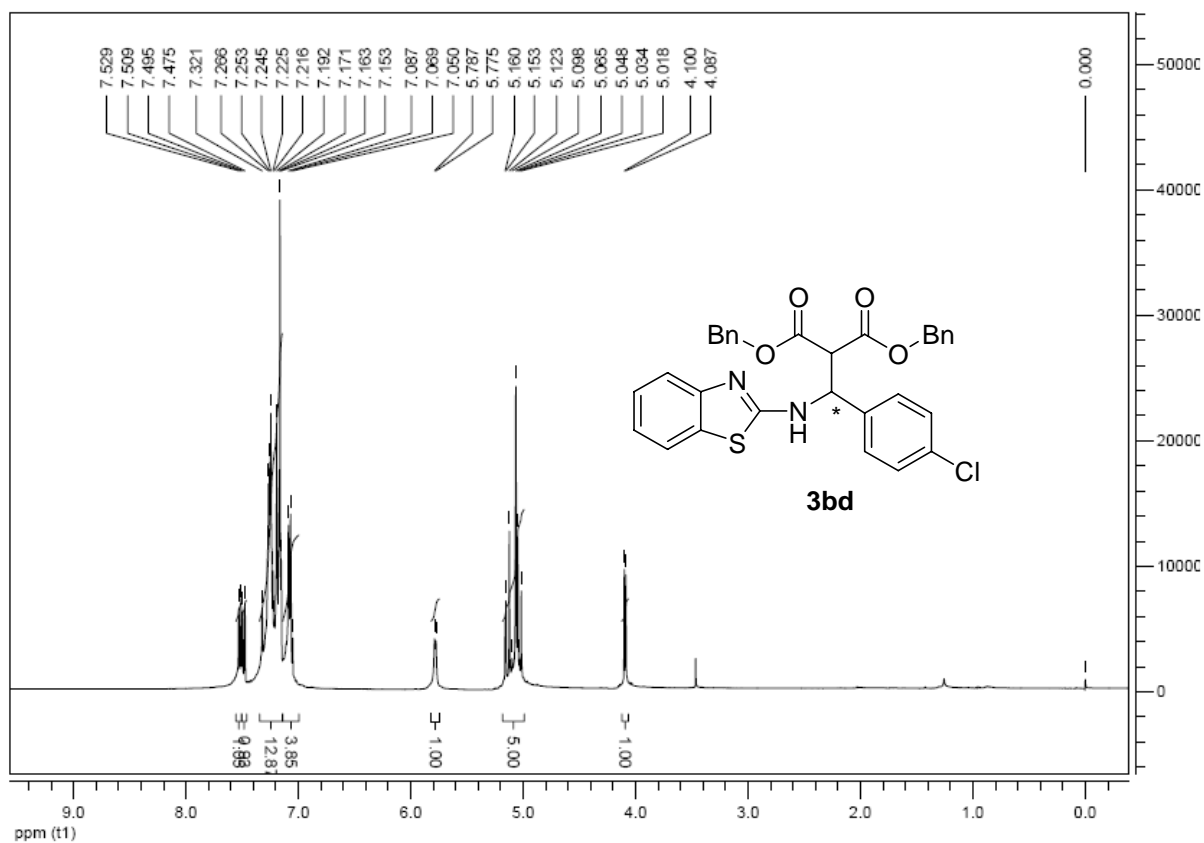
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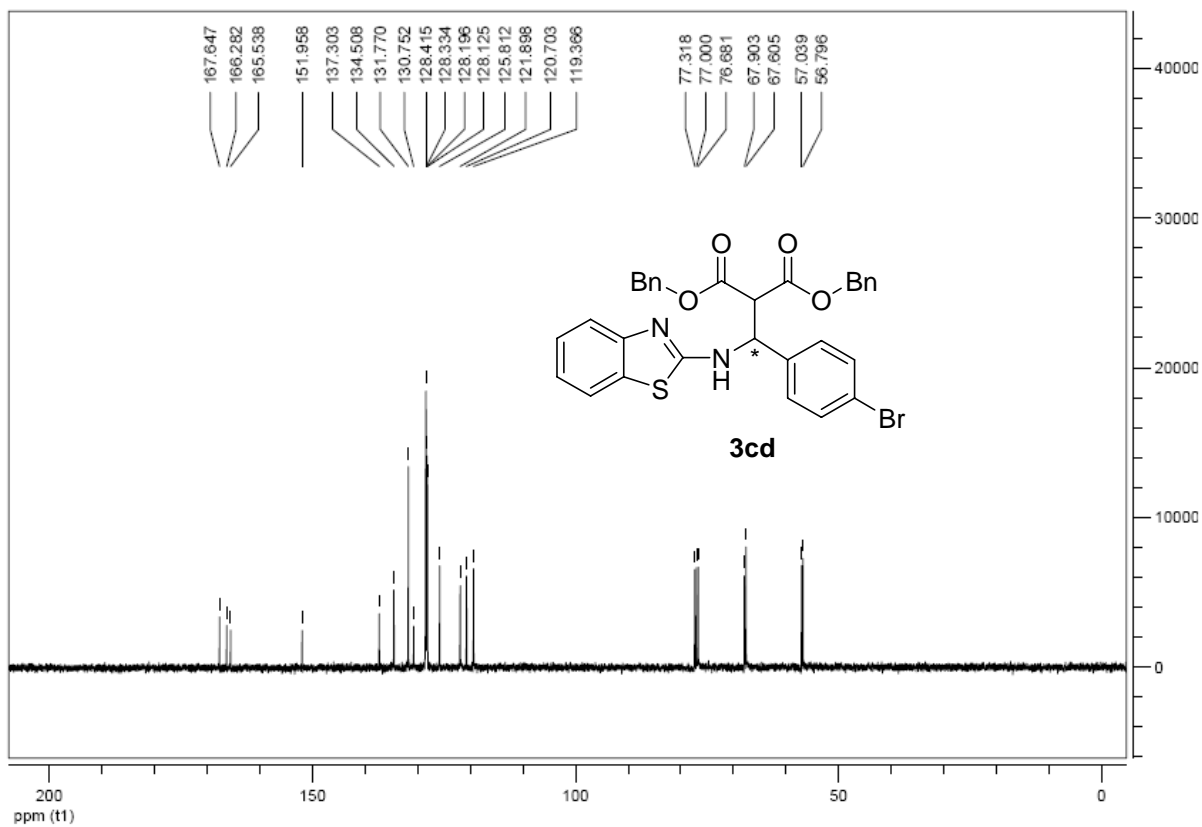
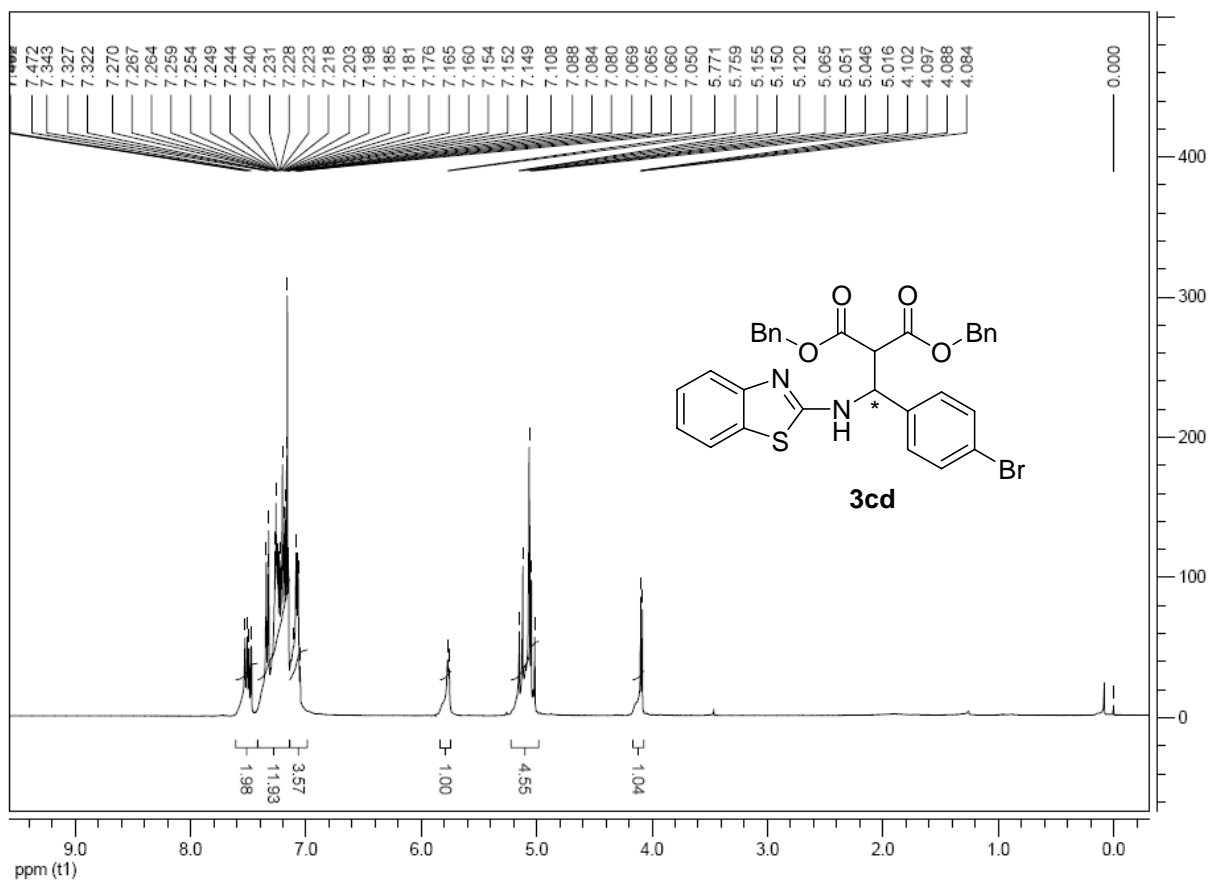
Supporting Information

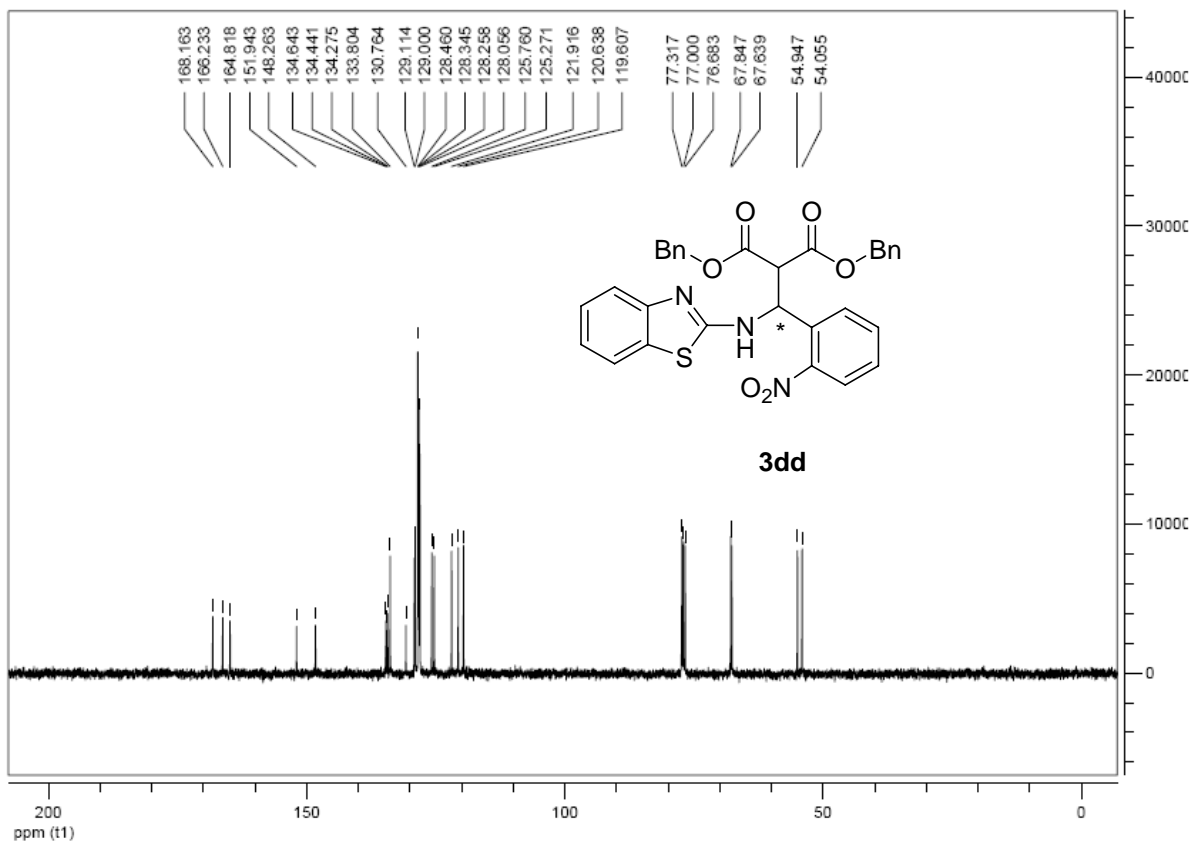
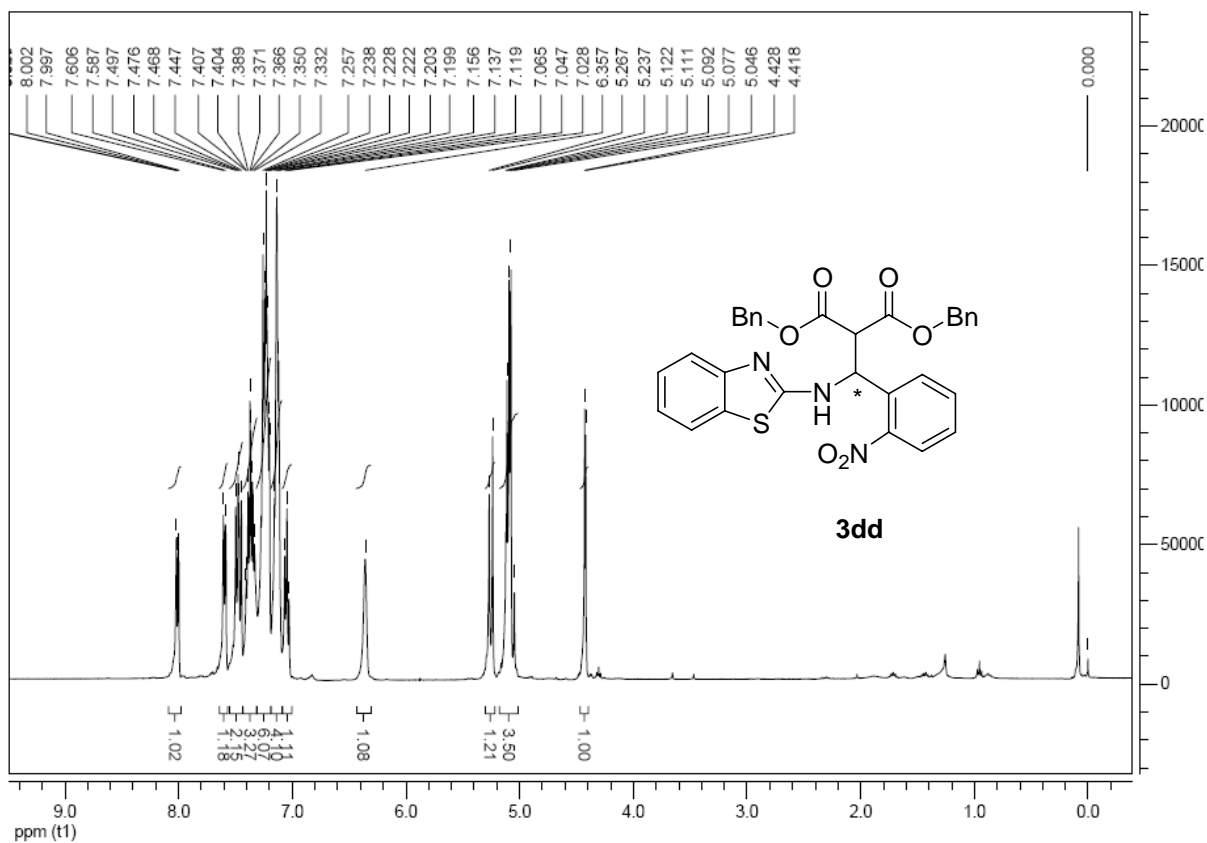
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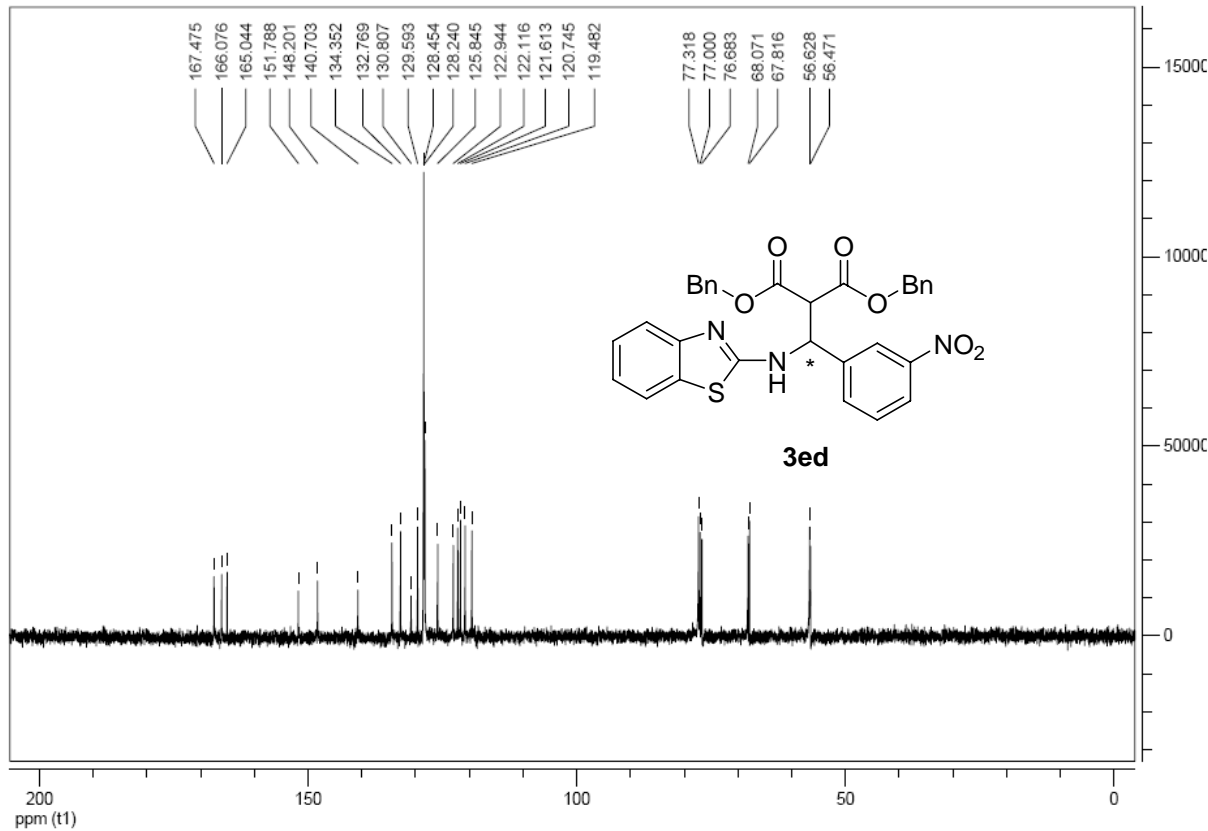
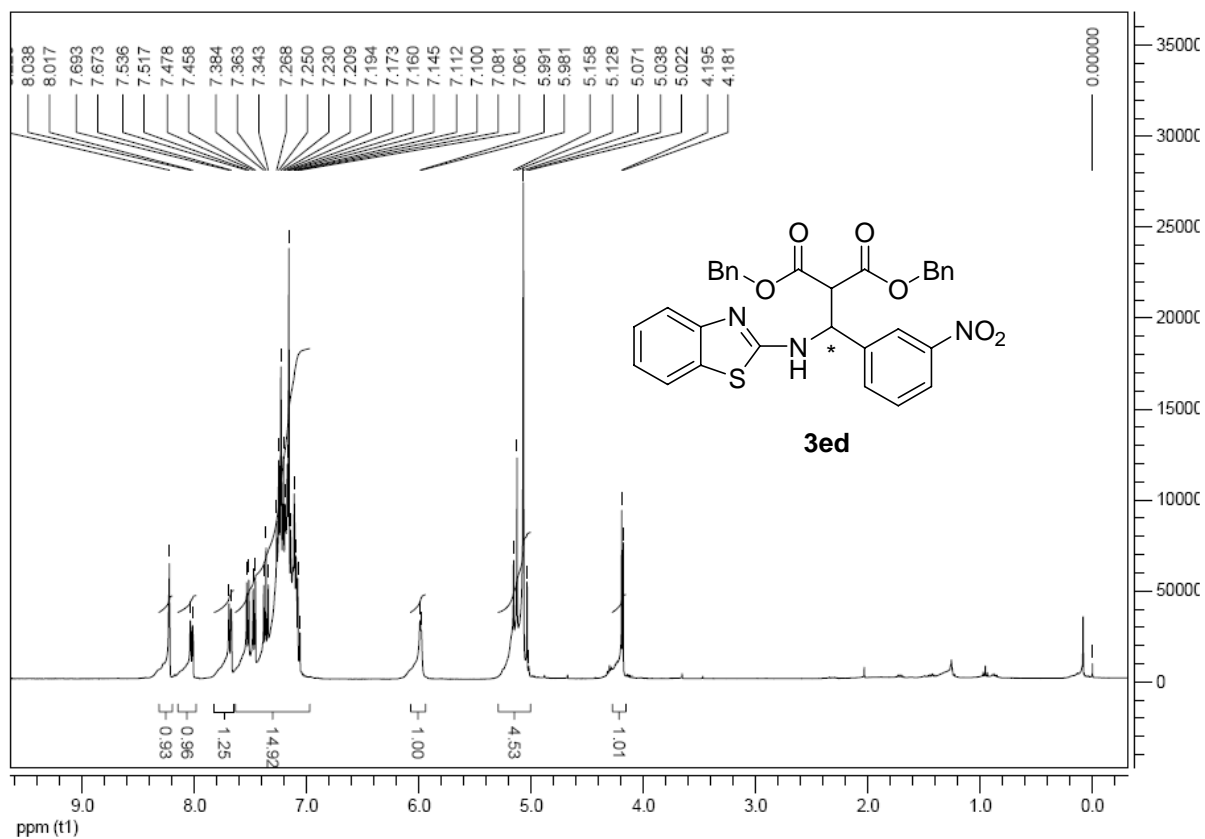
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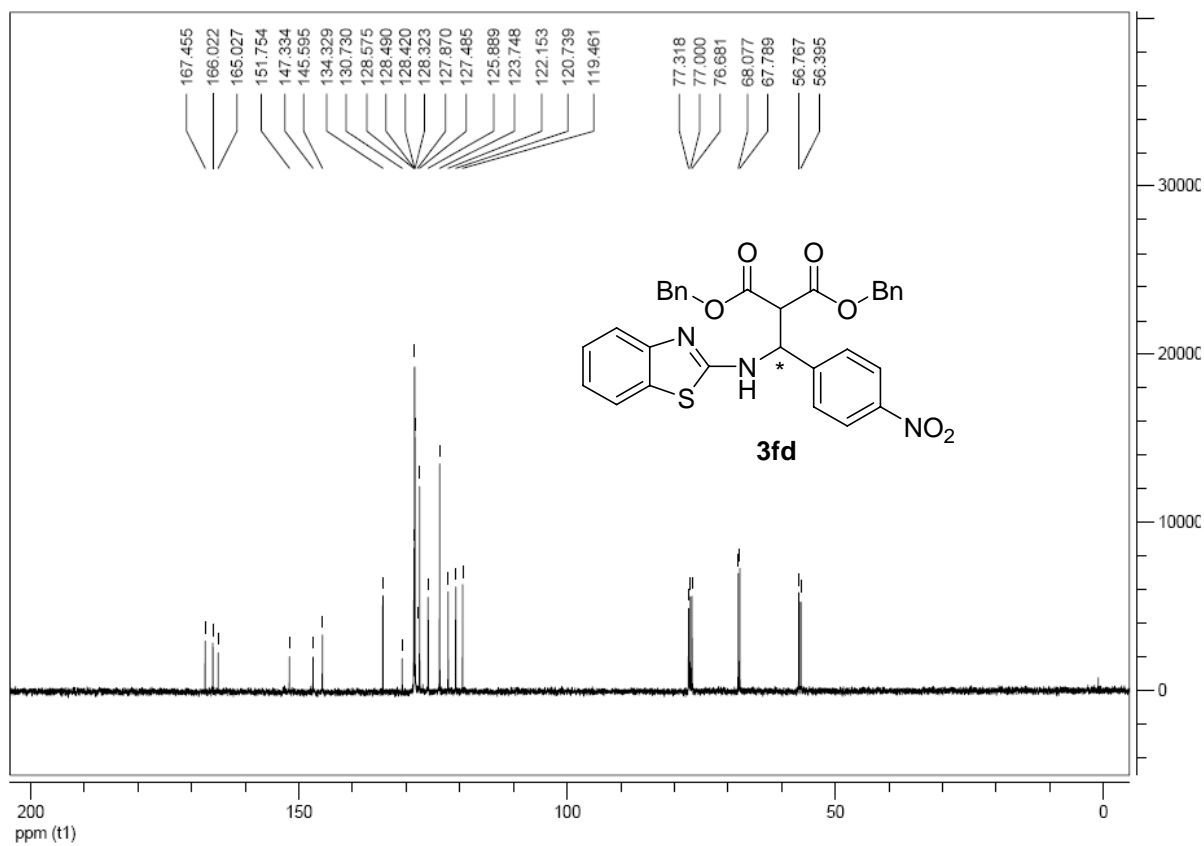
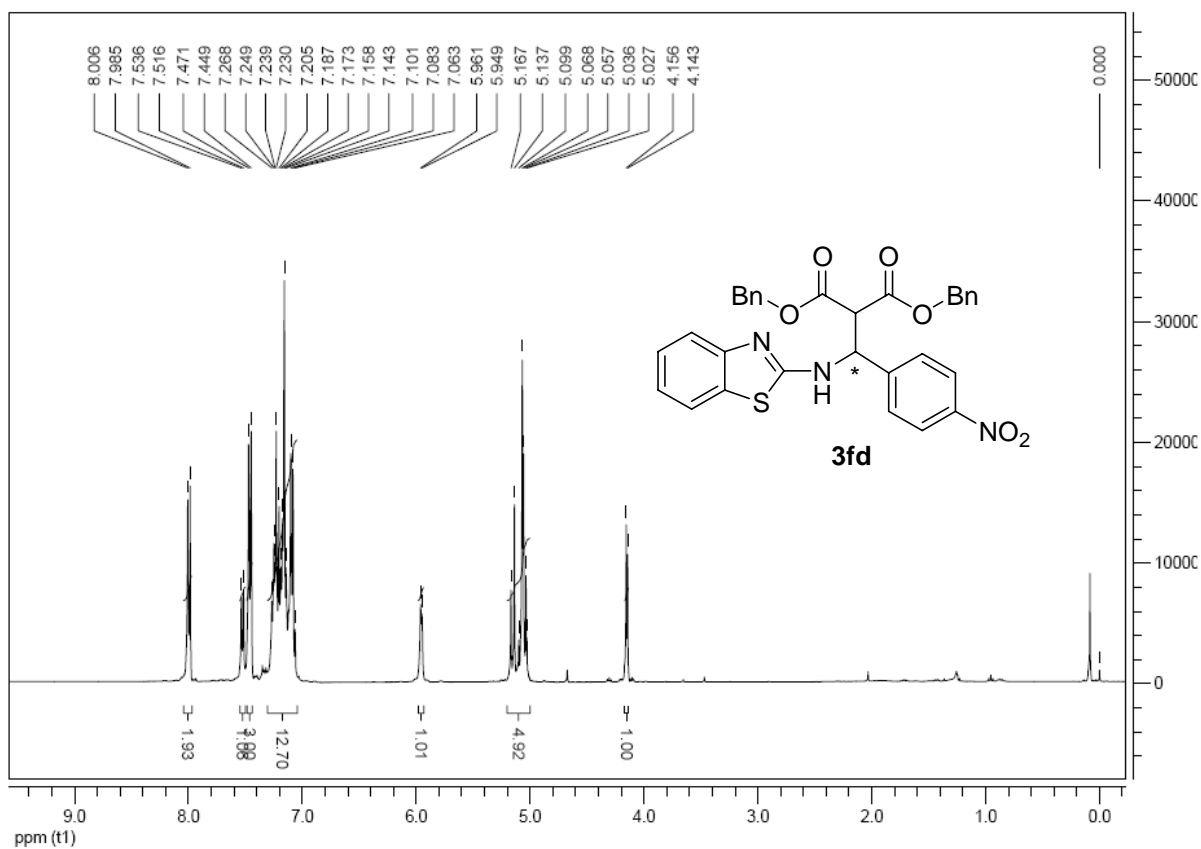


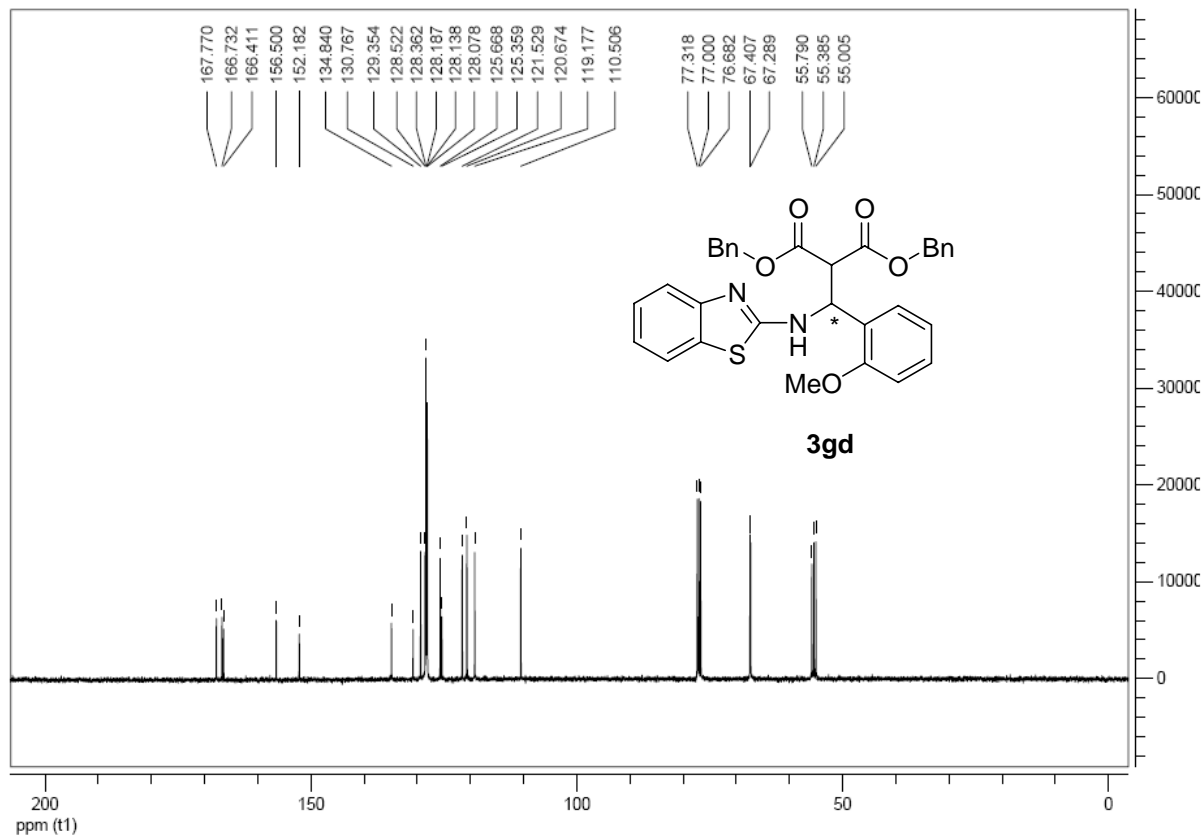
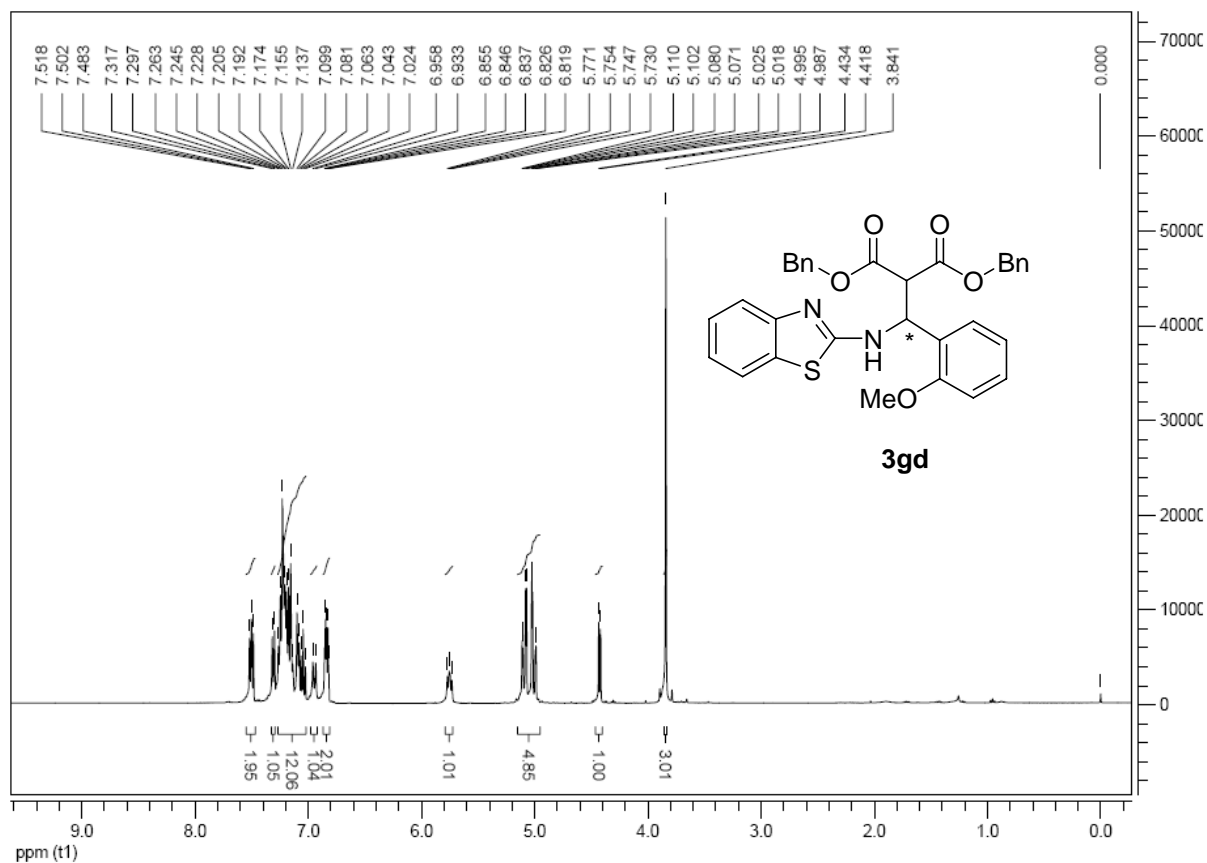


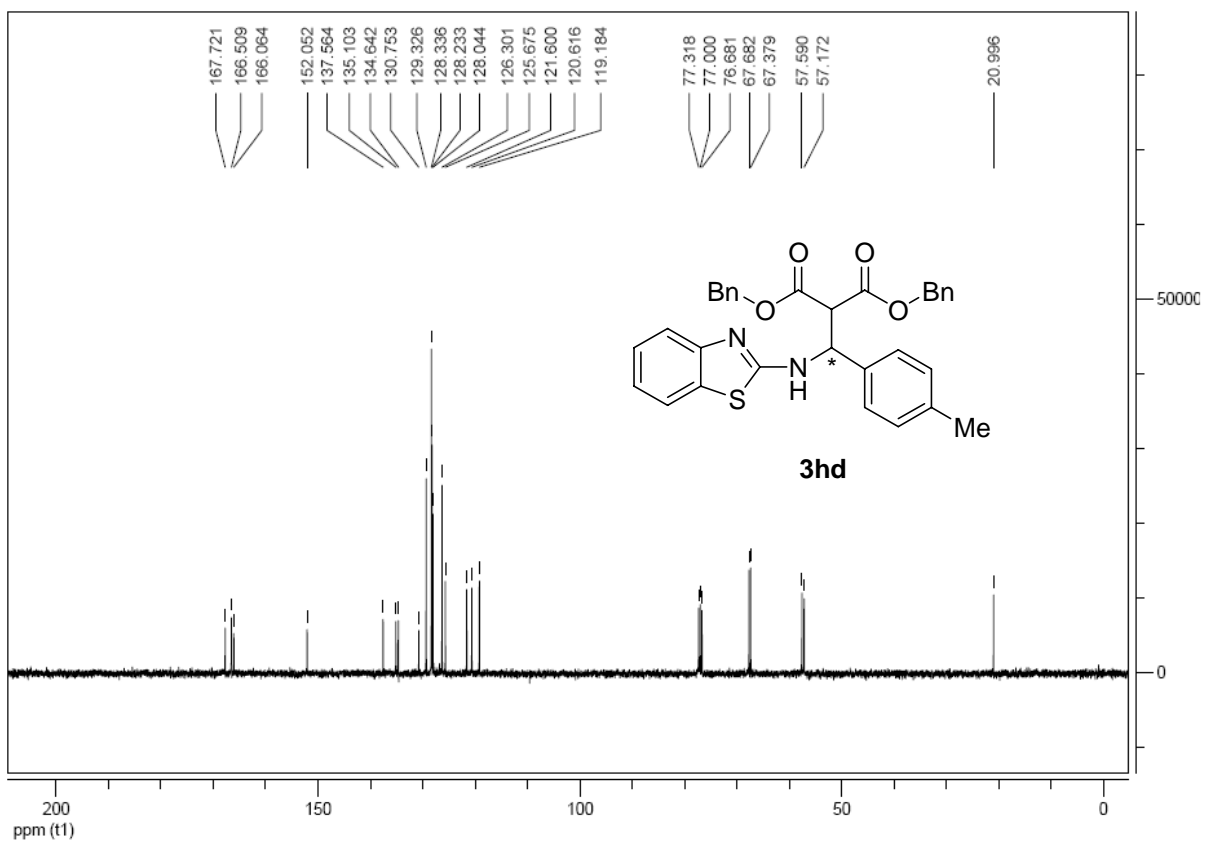
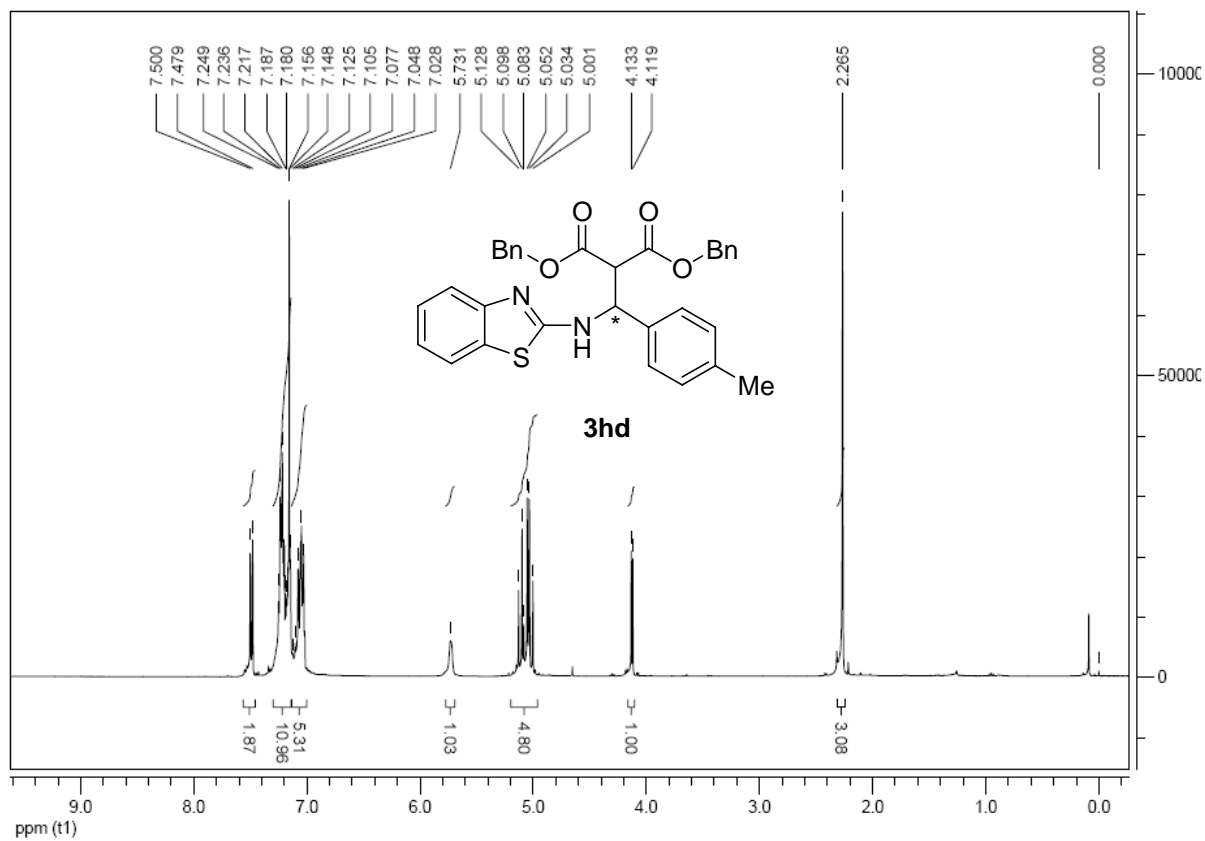


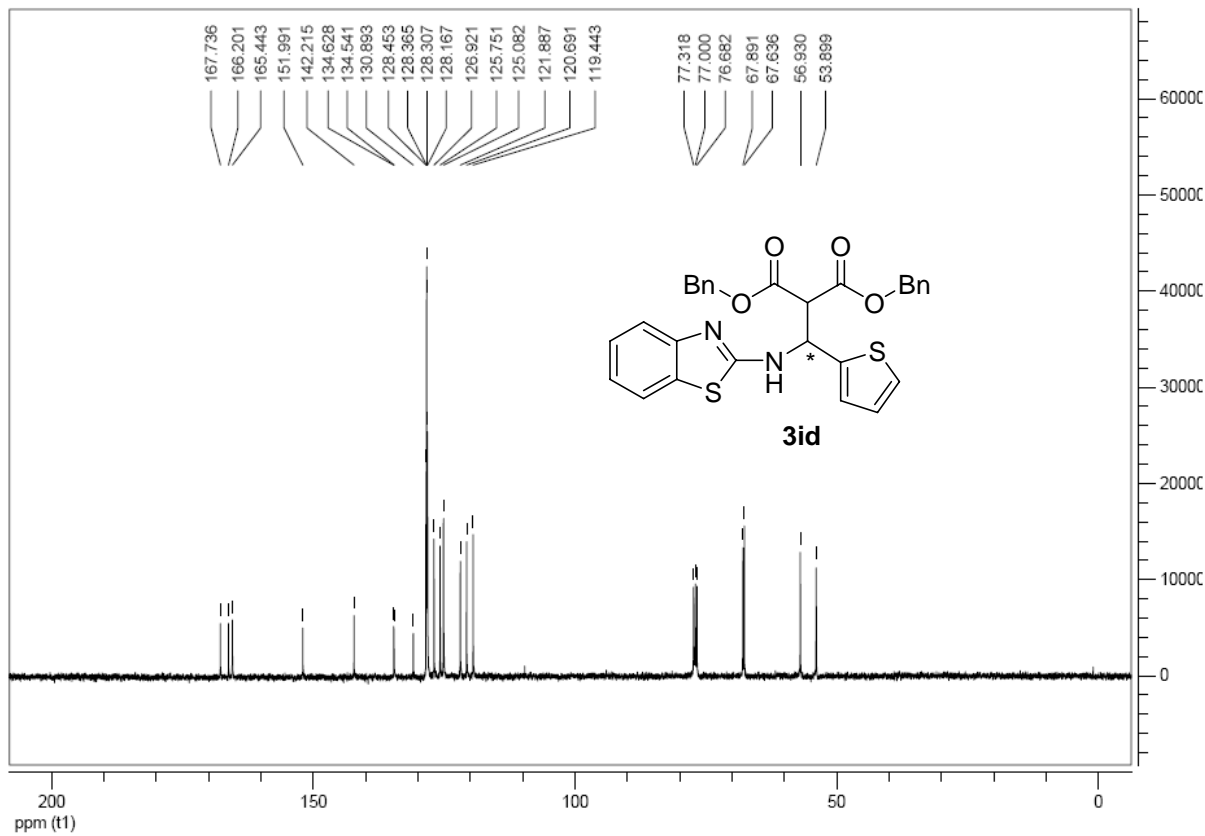
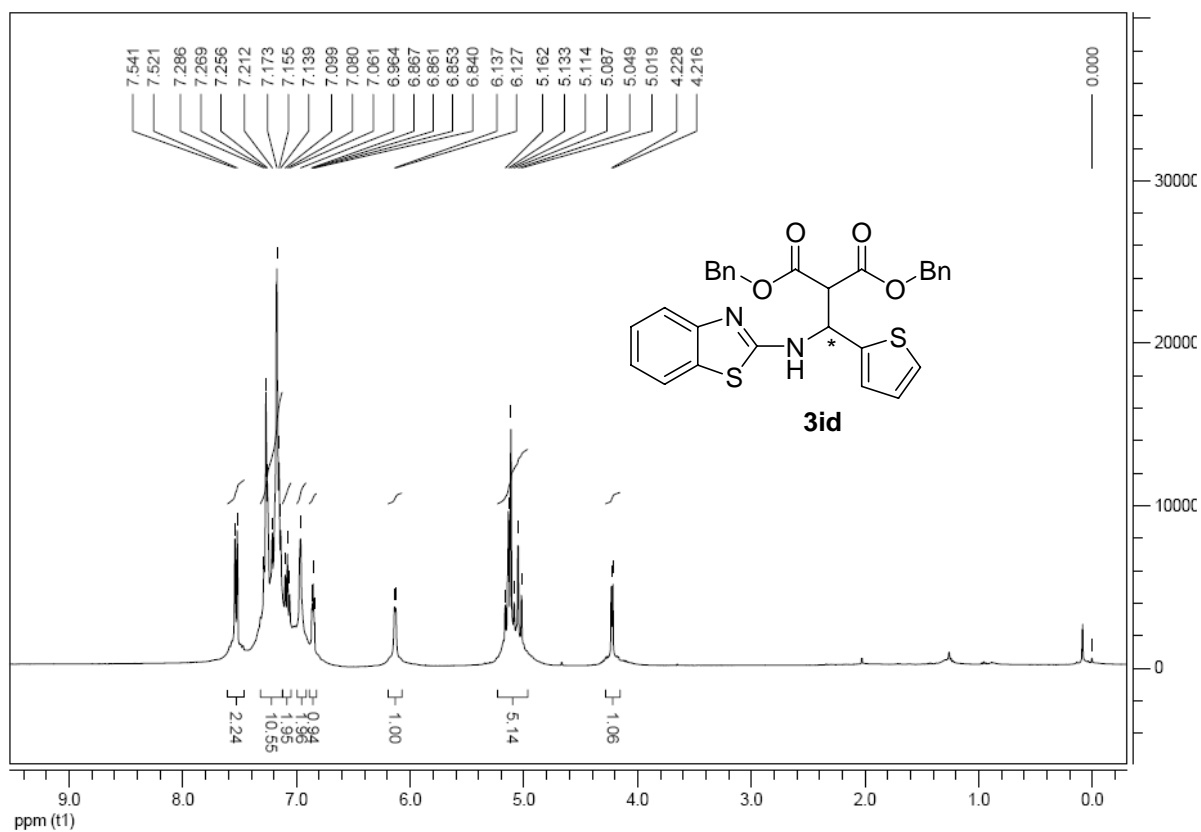


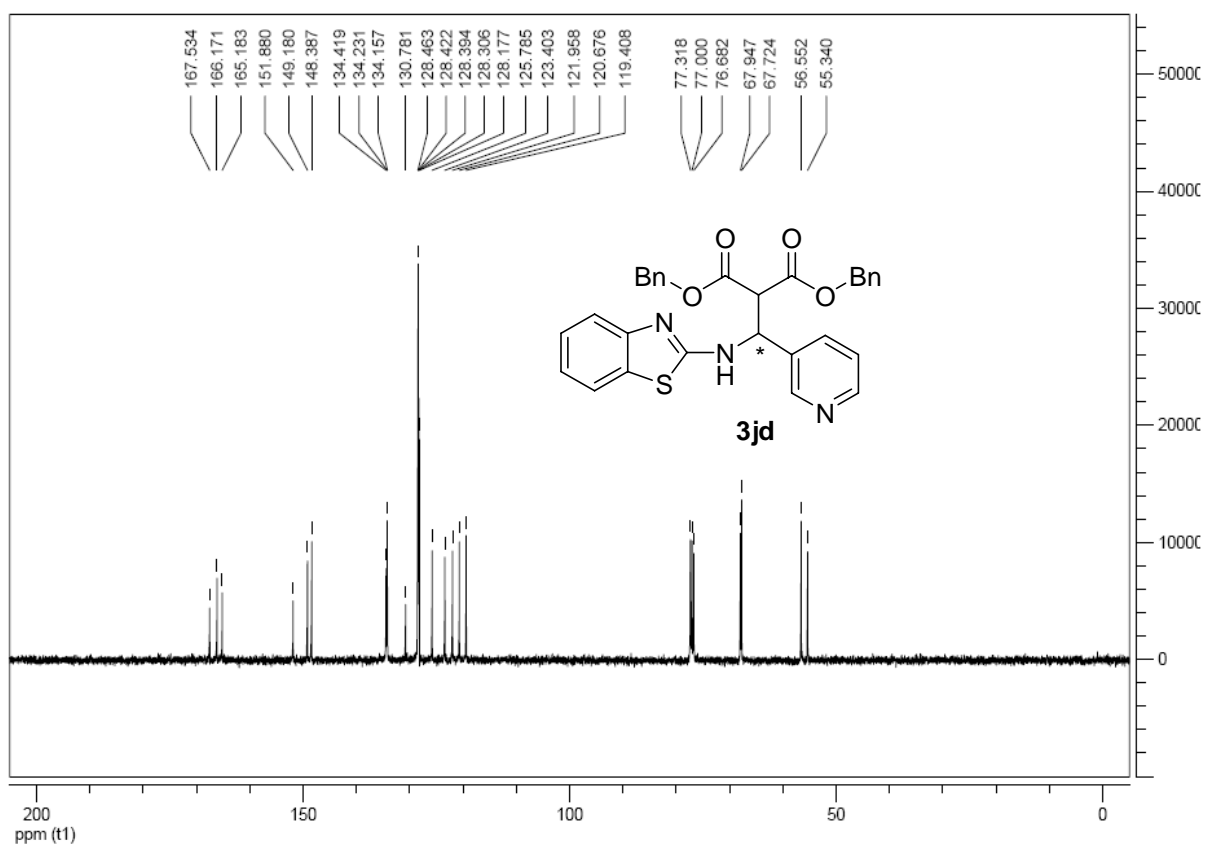
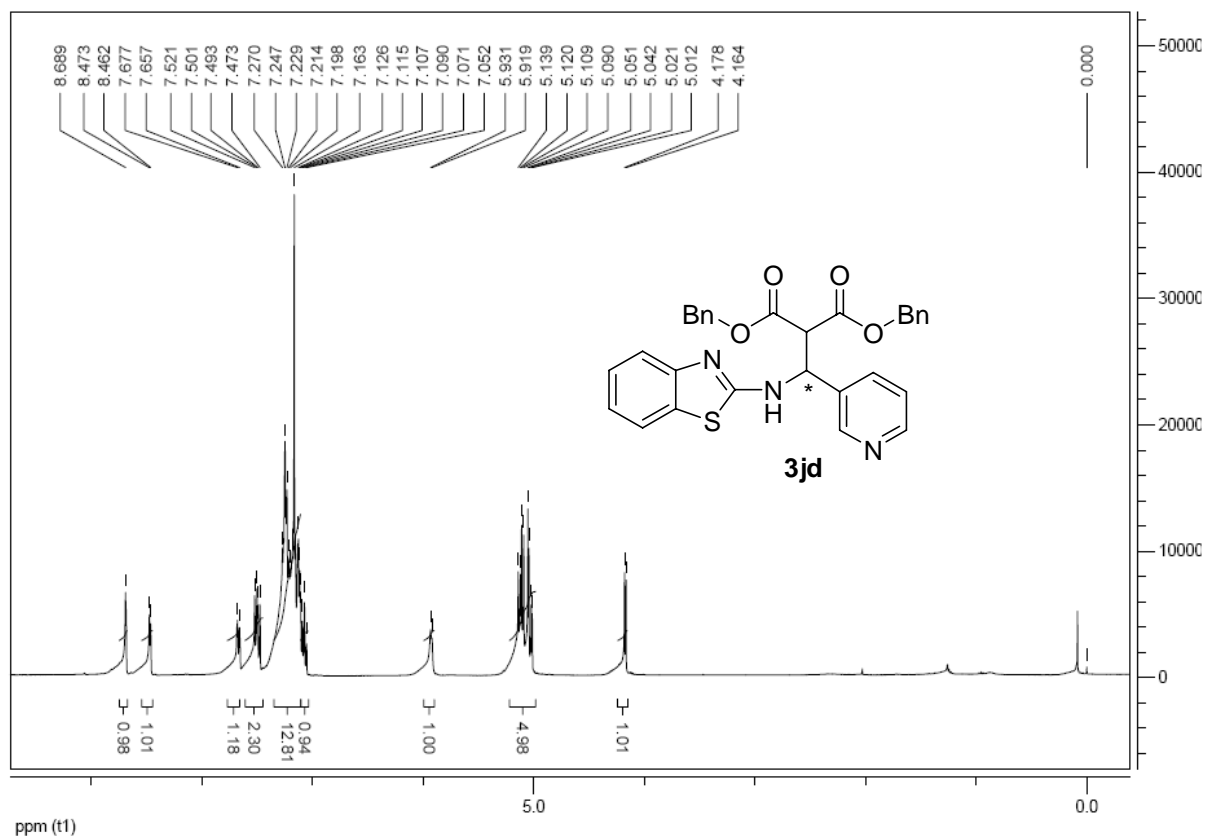


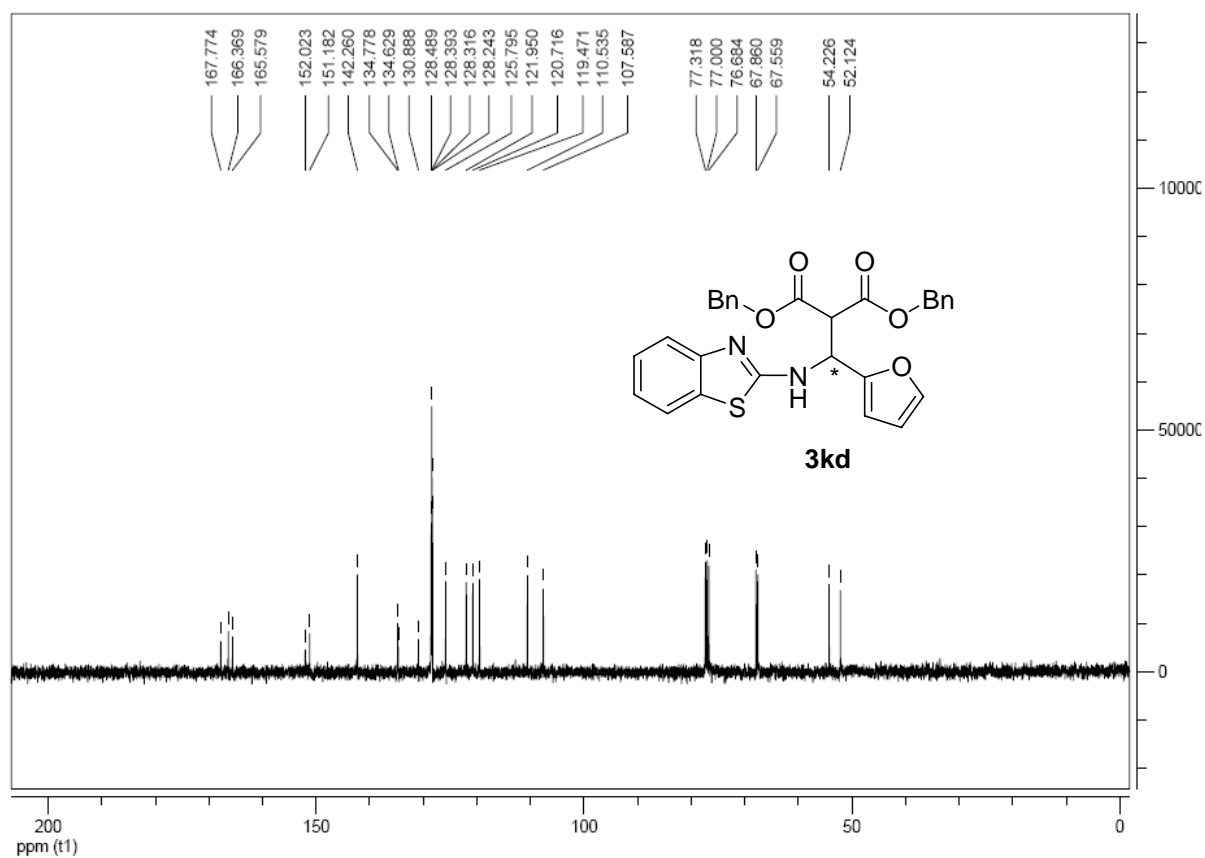
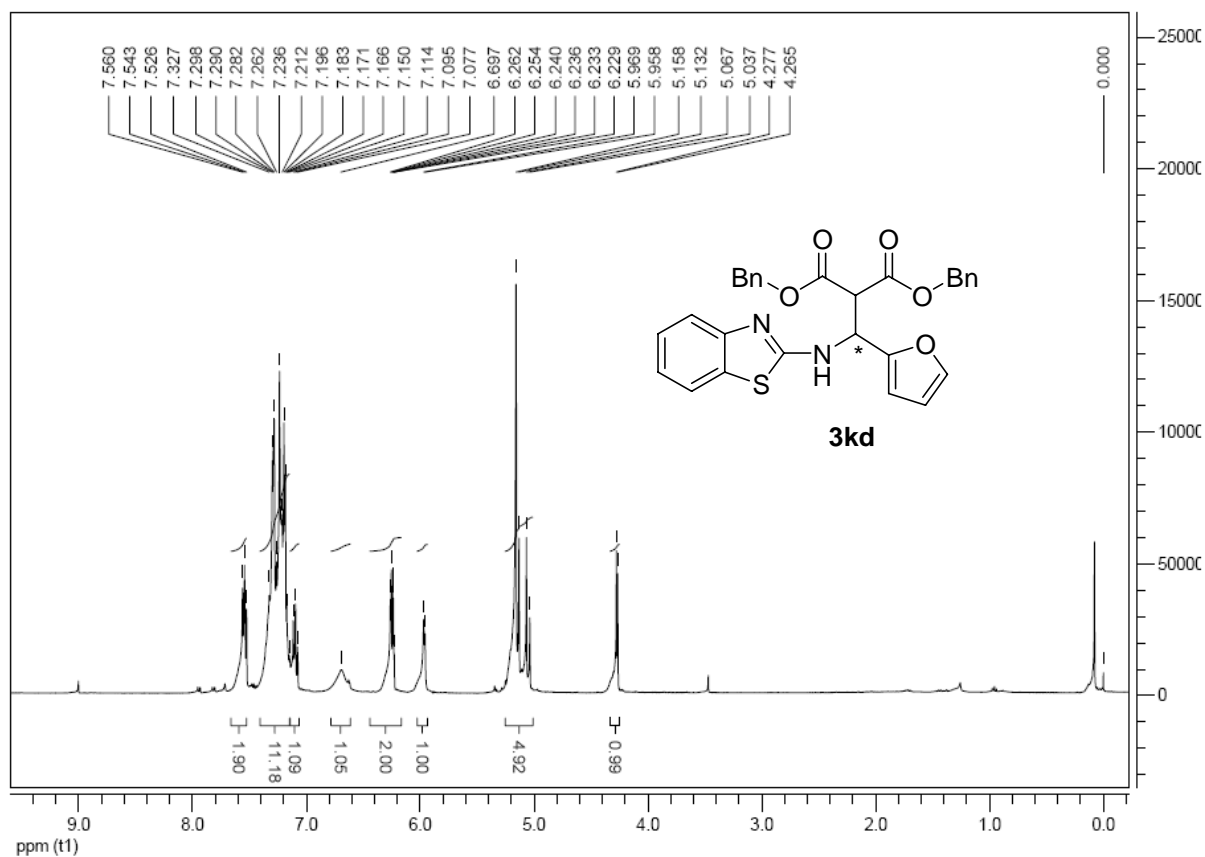


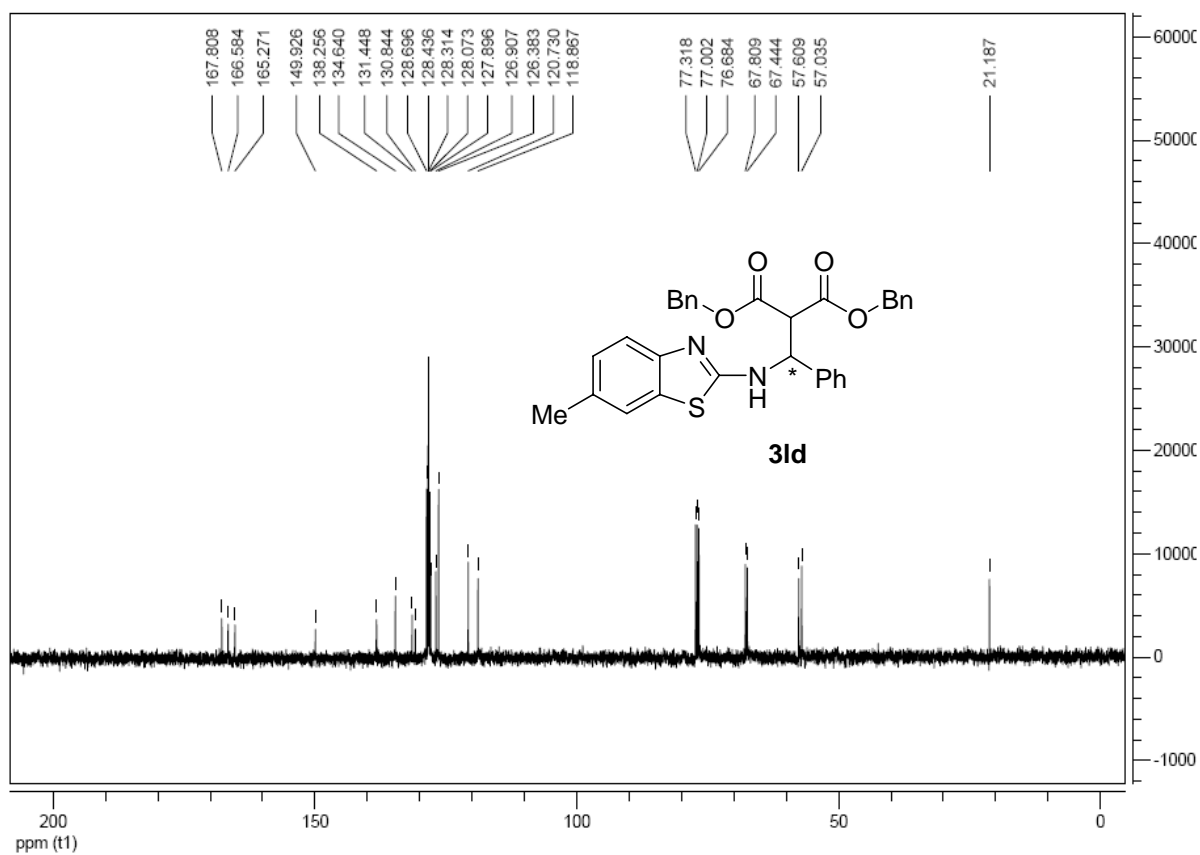
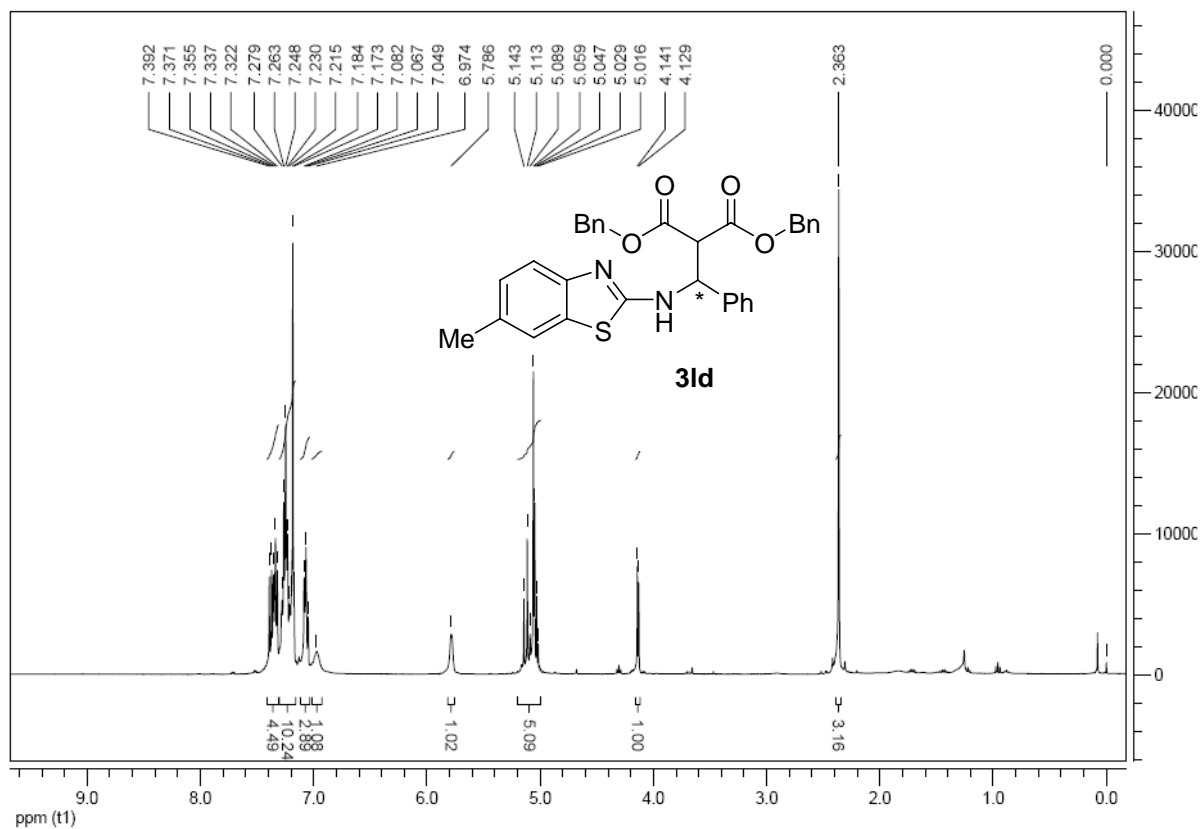


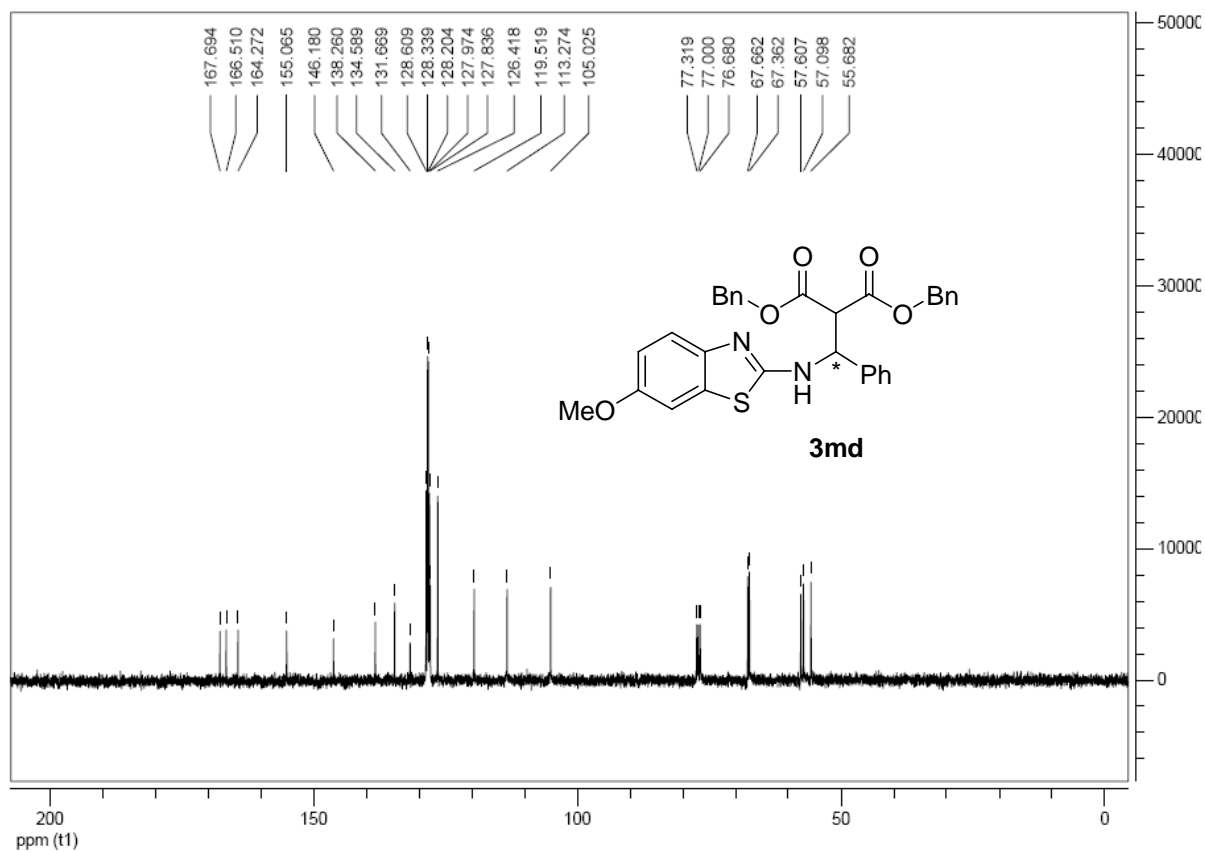
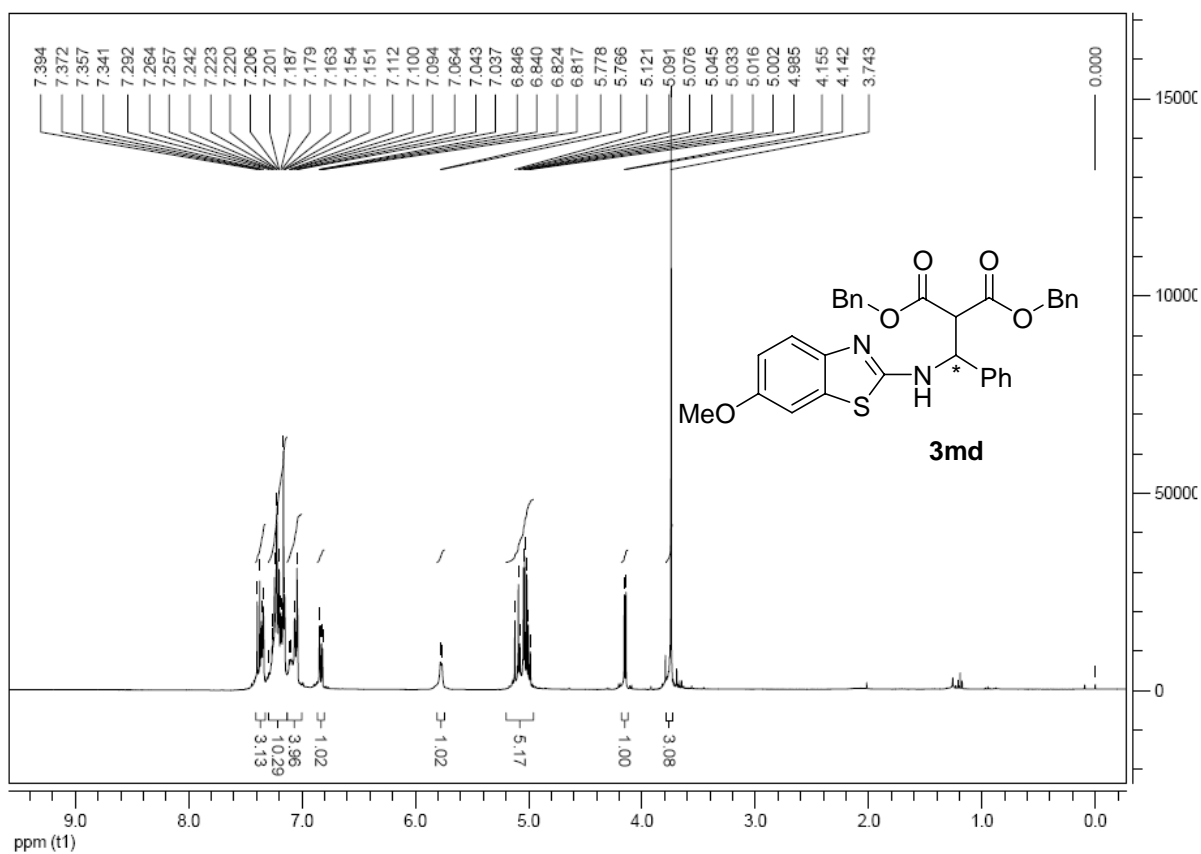


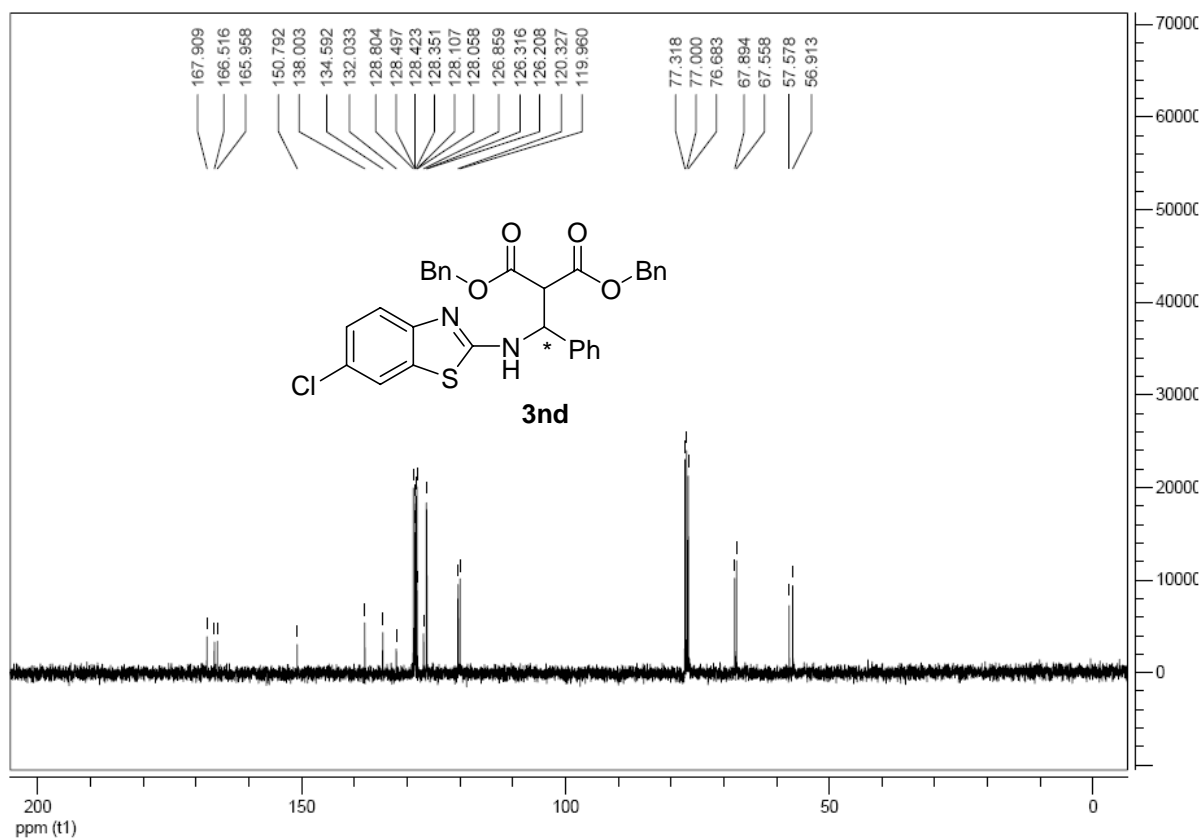
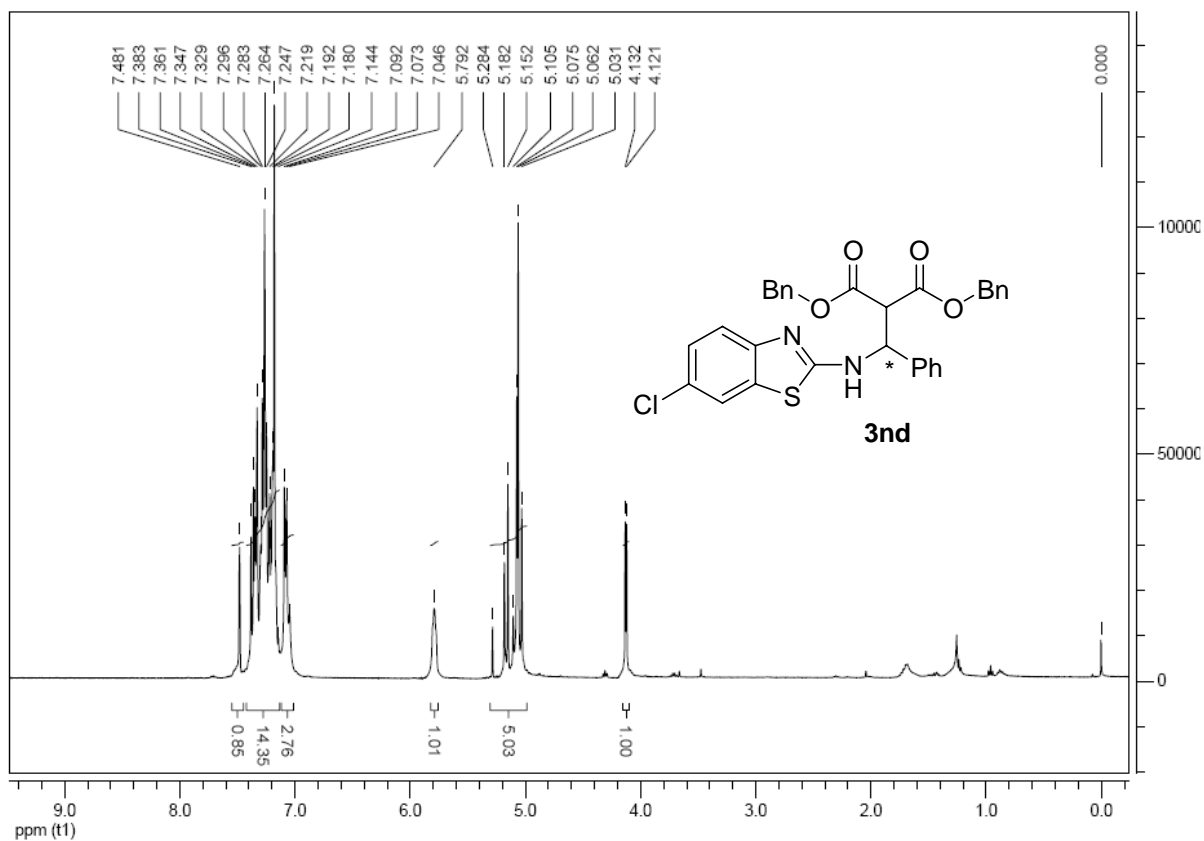


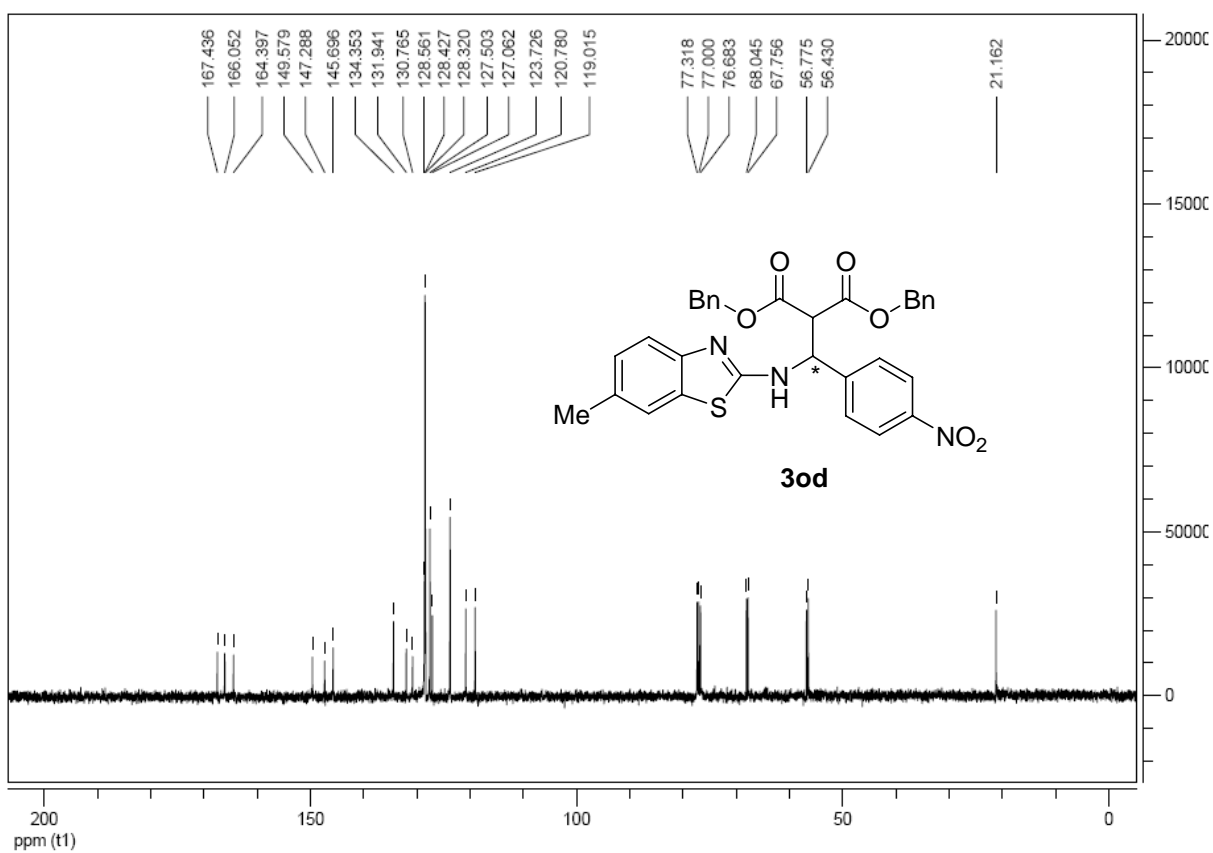
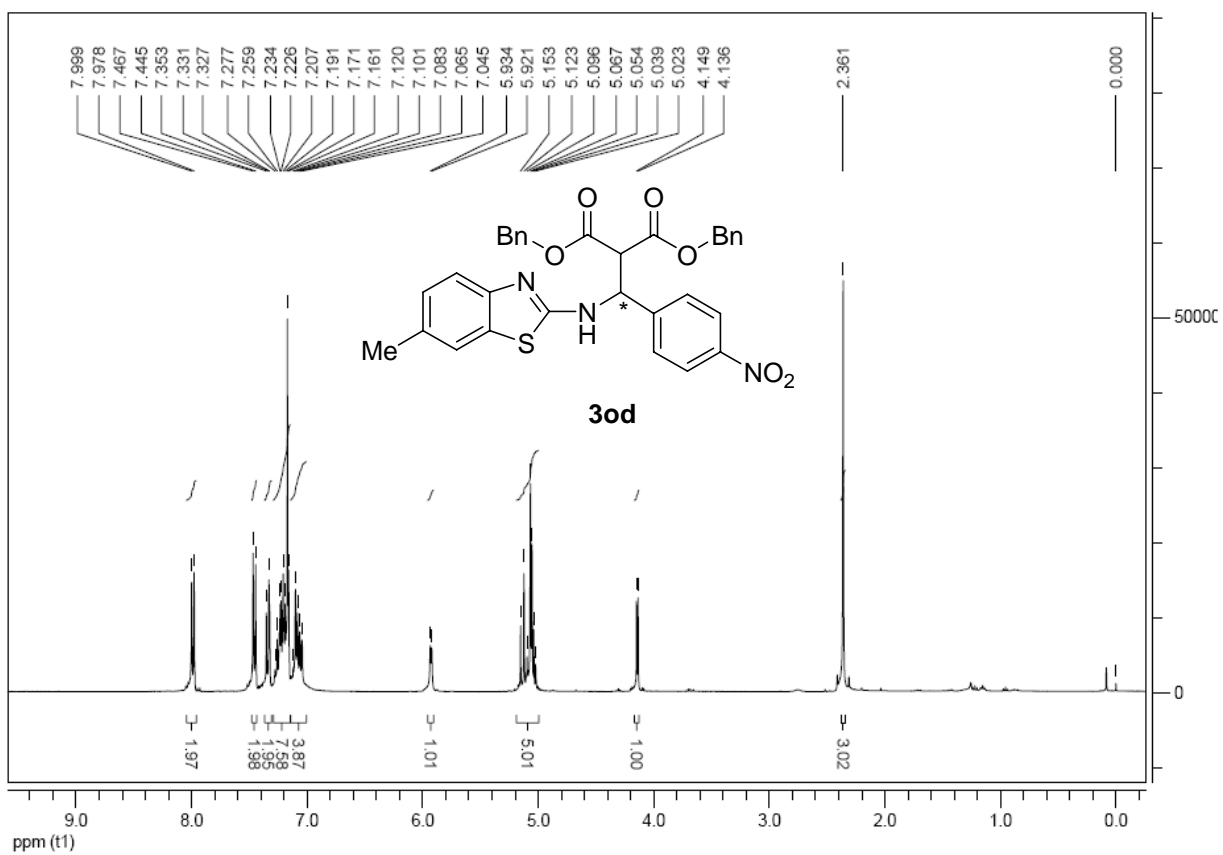


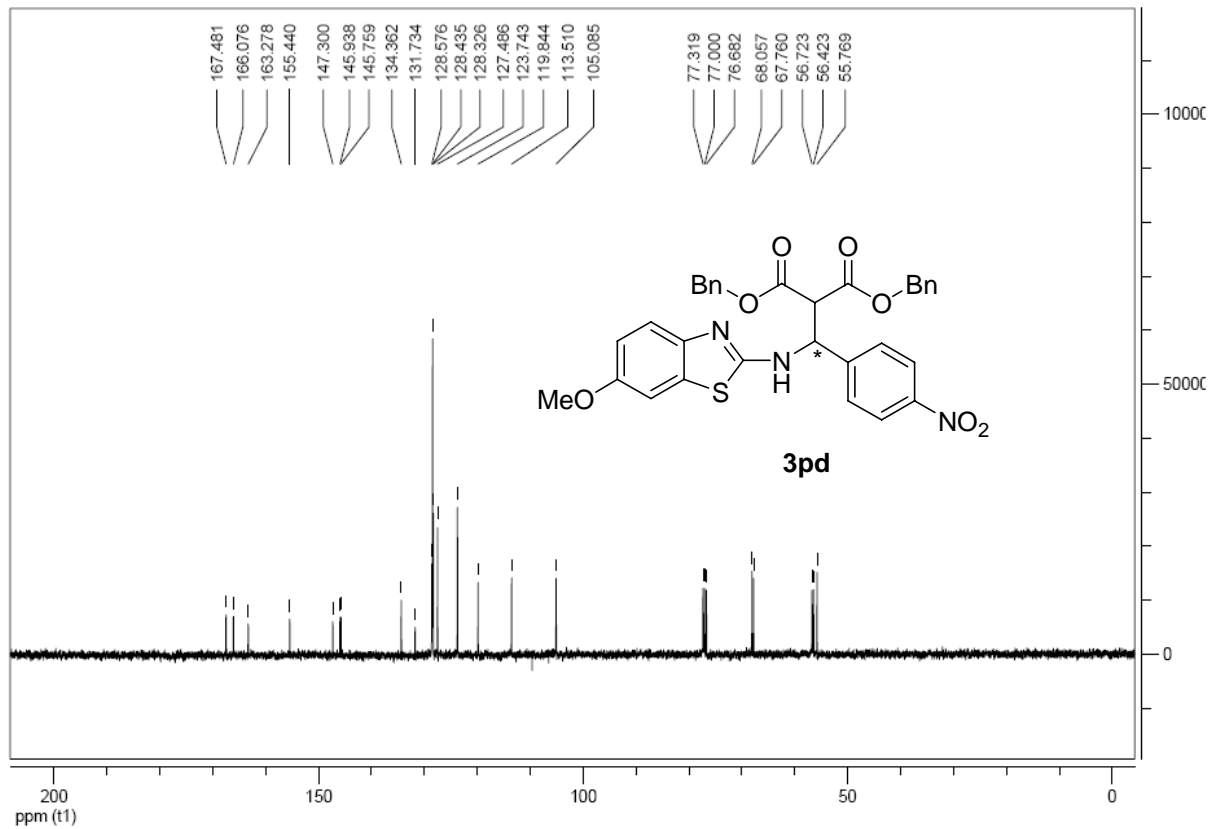
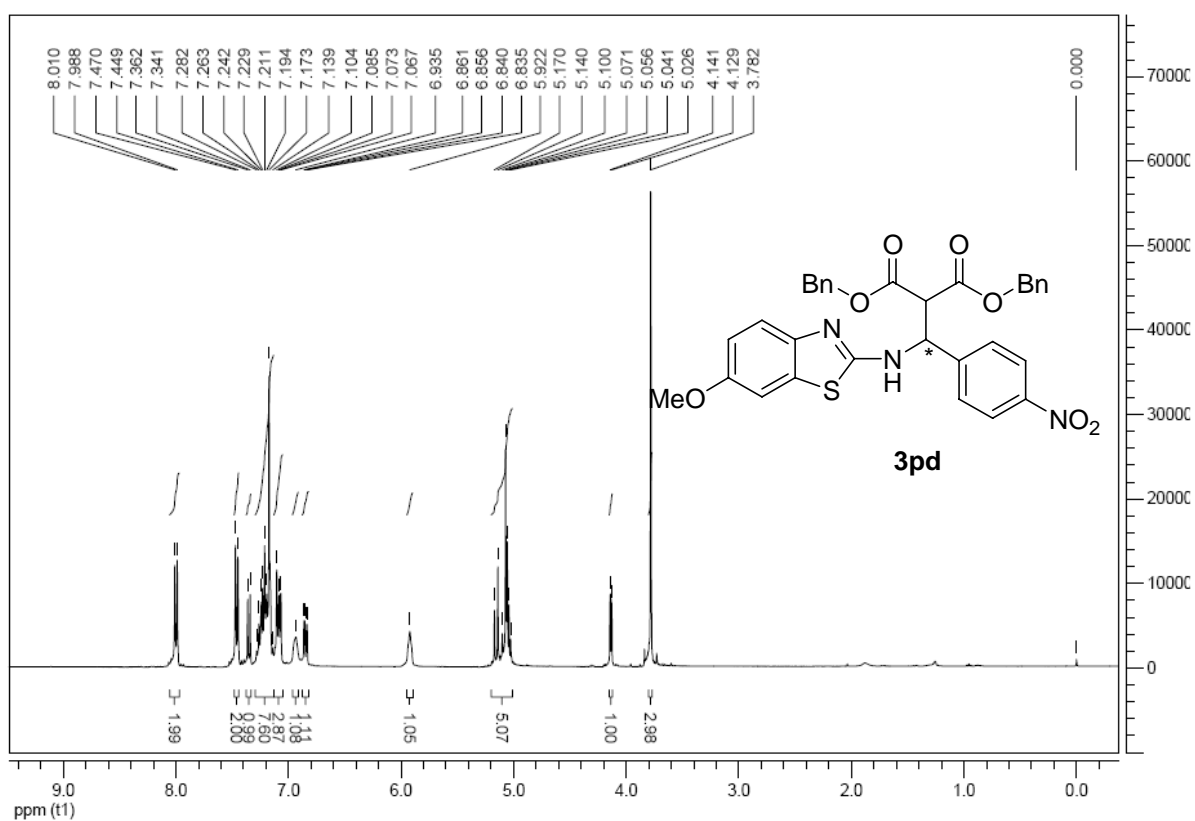


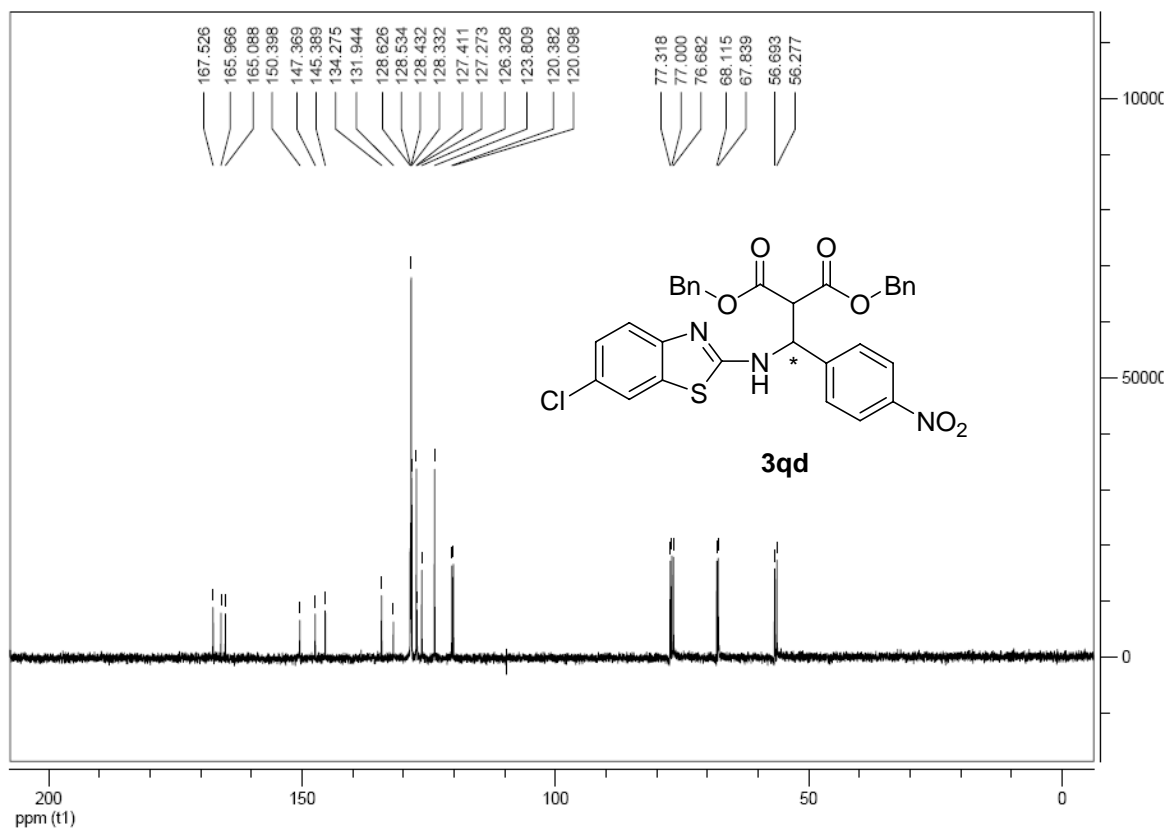
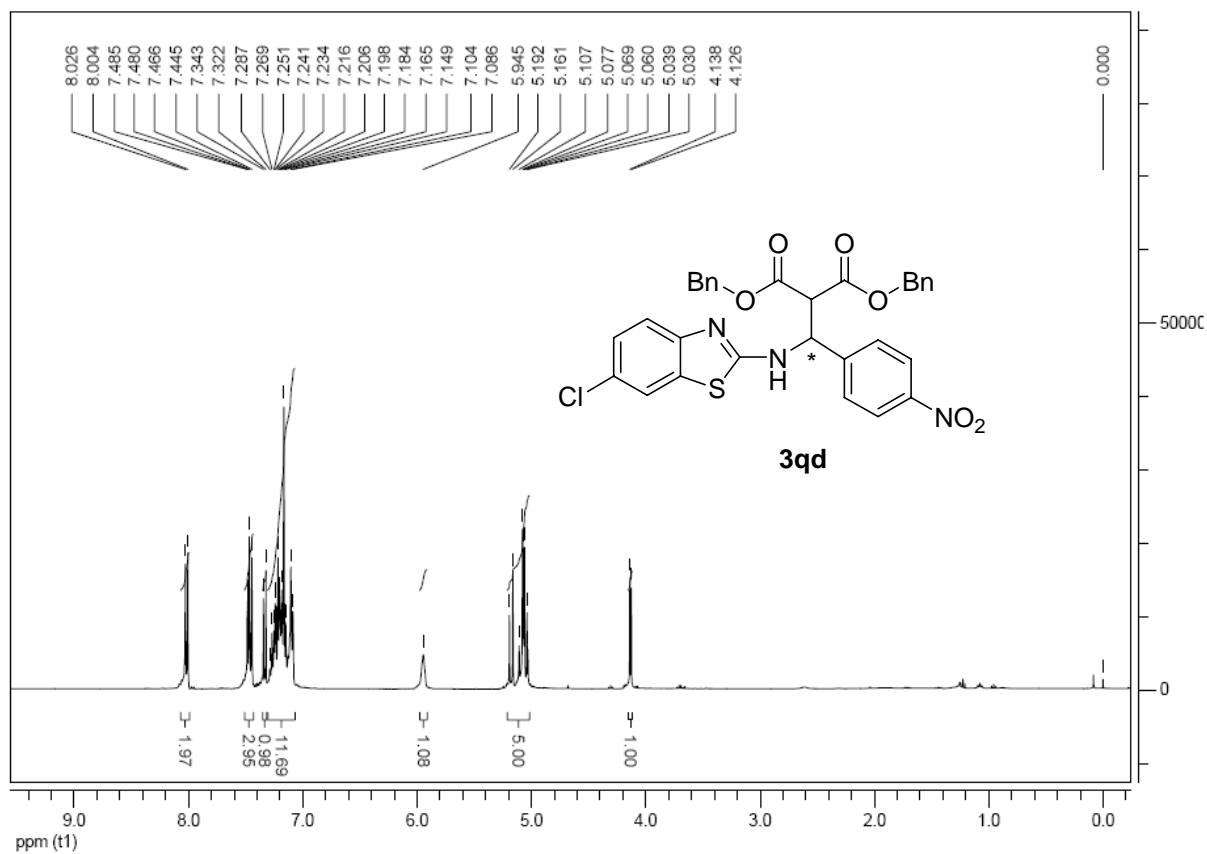


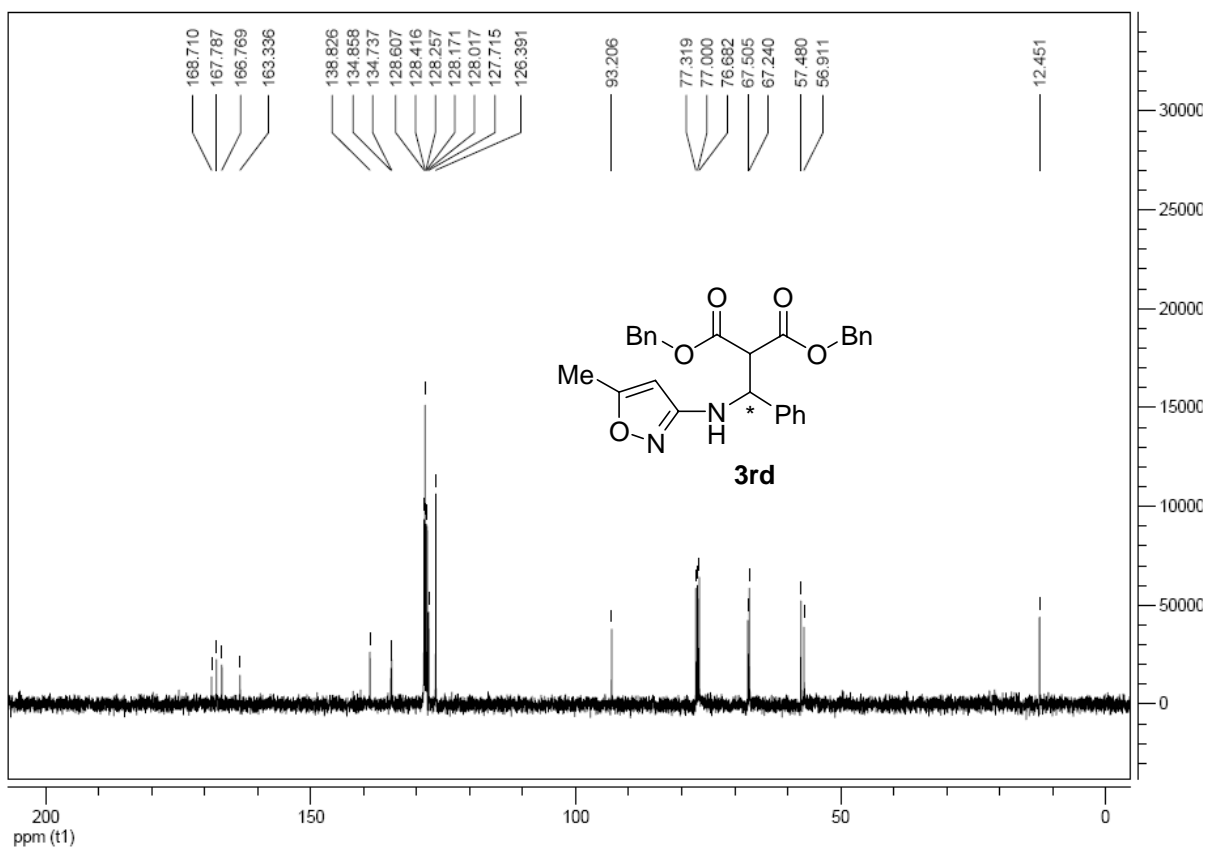
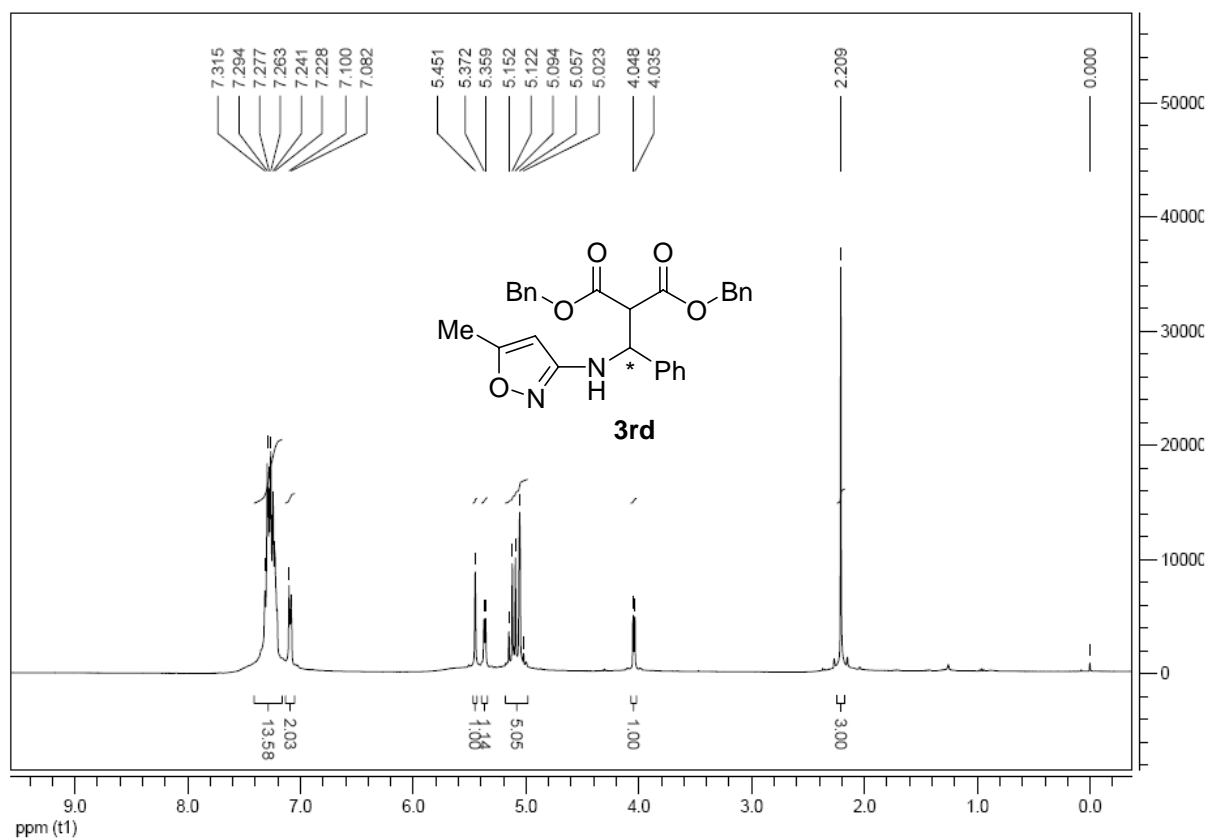


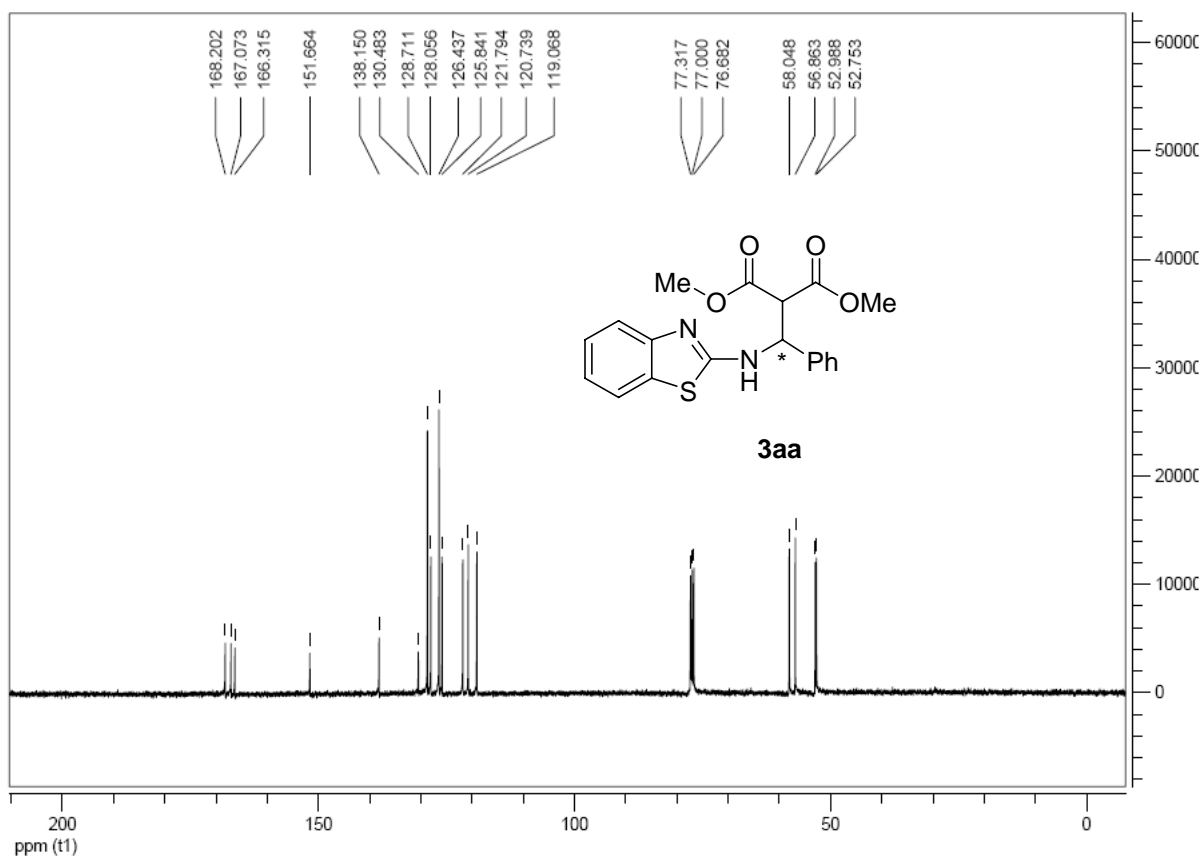
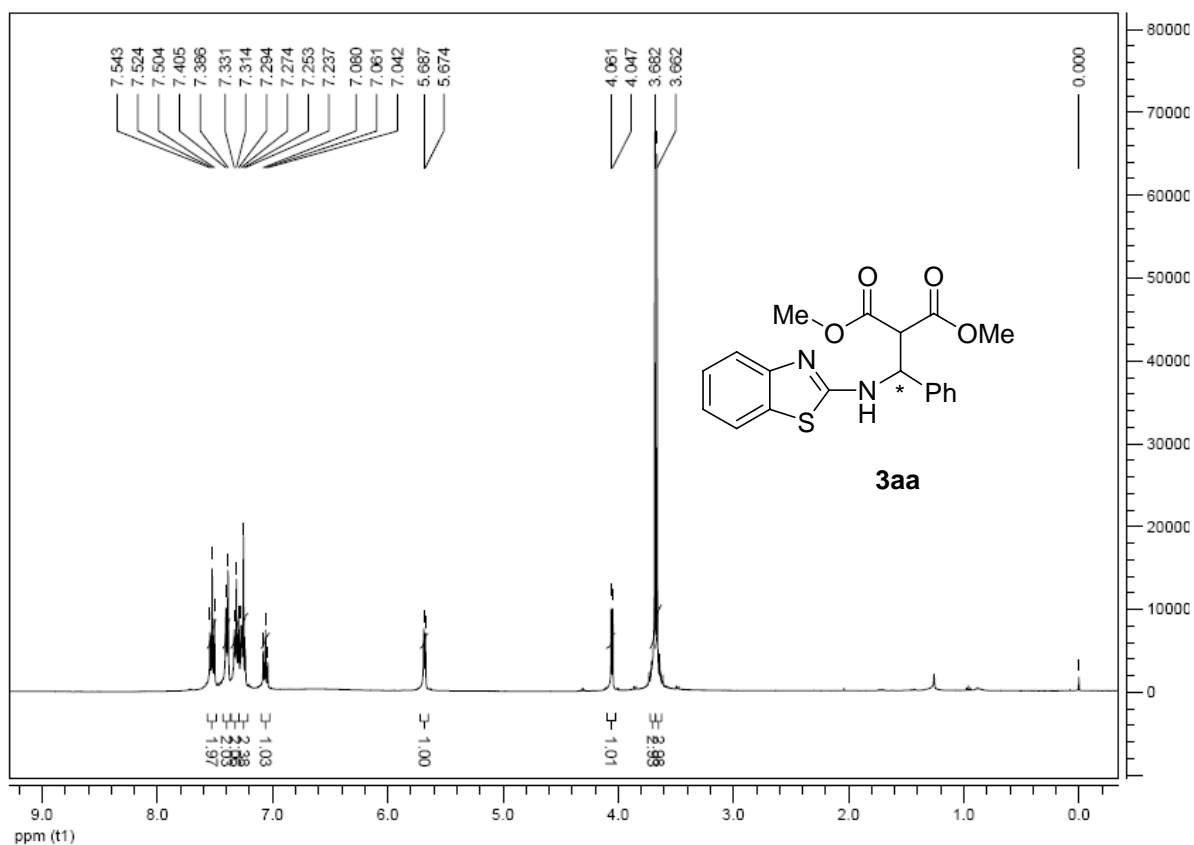


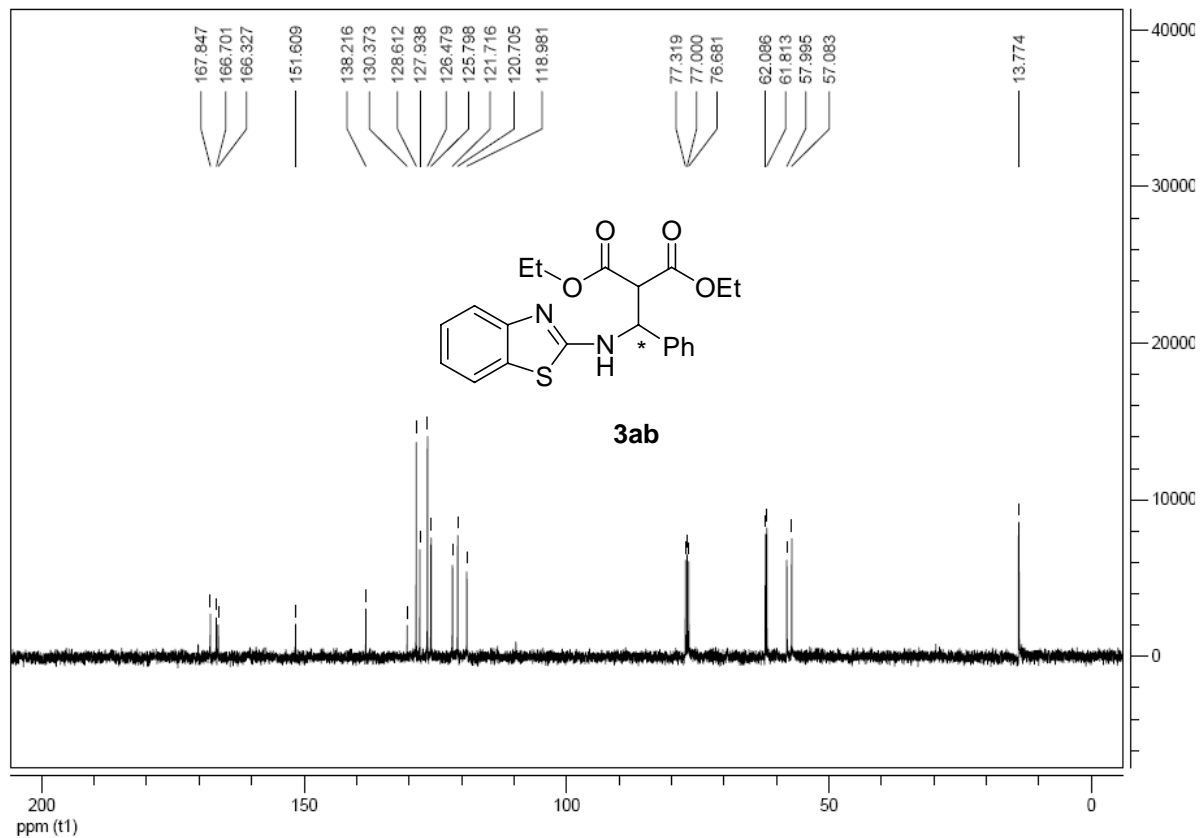
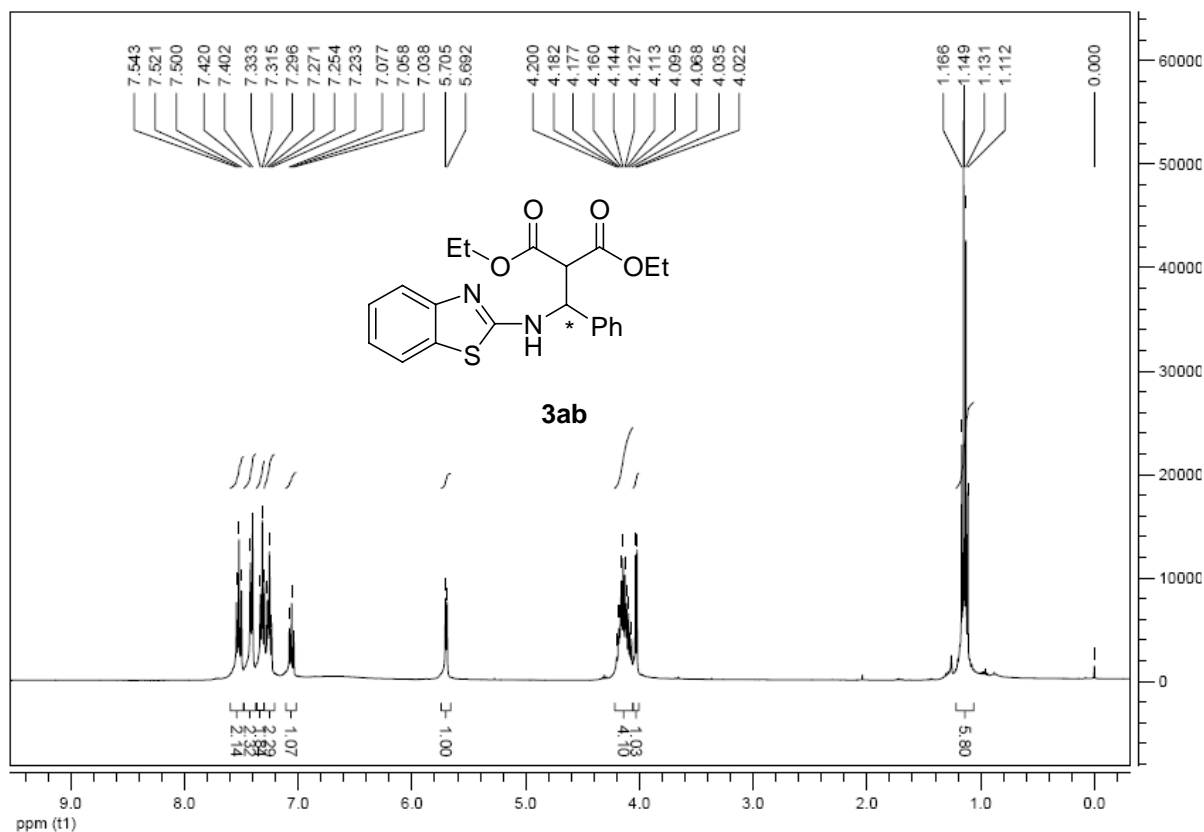


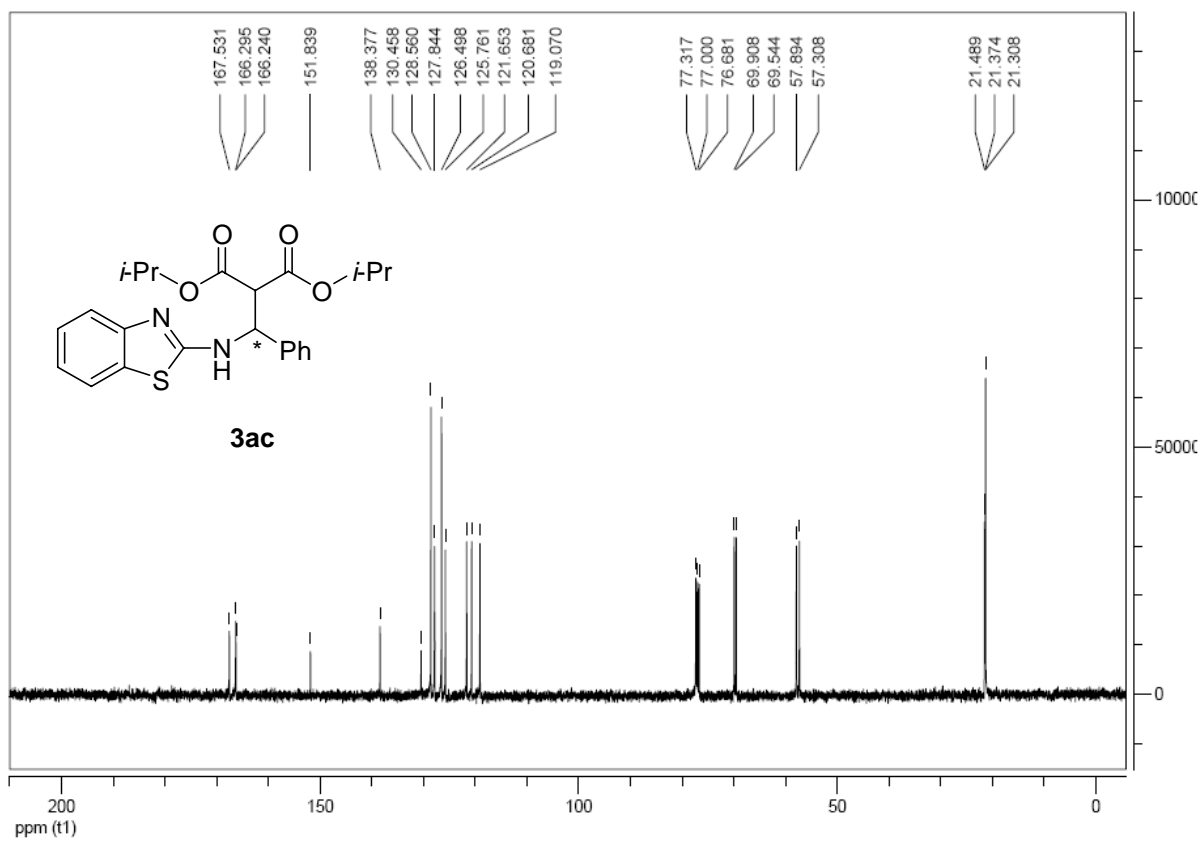
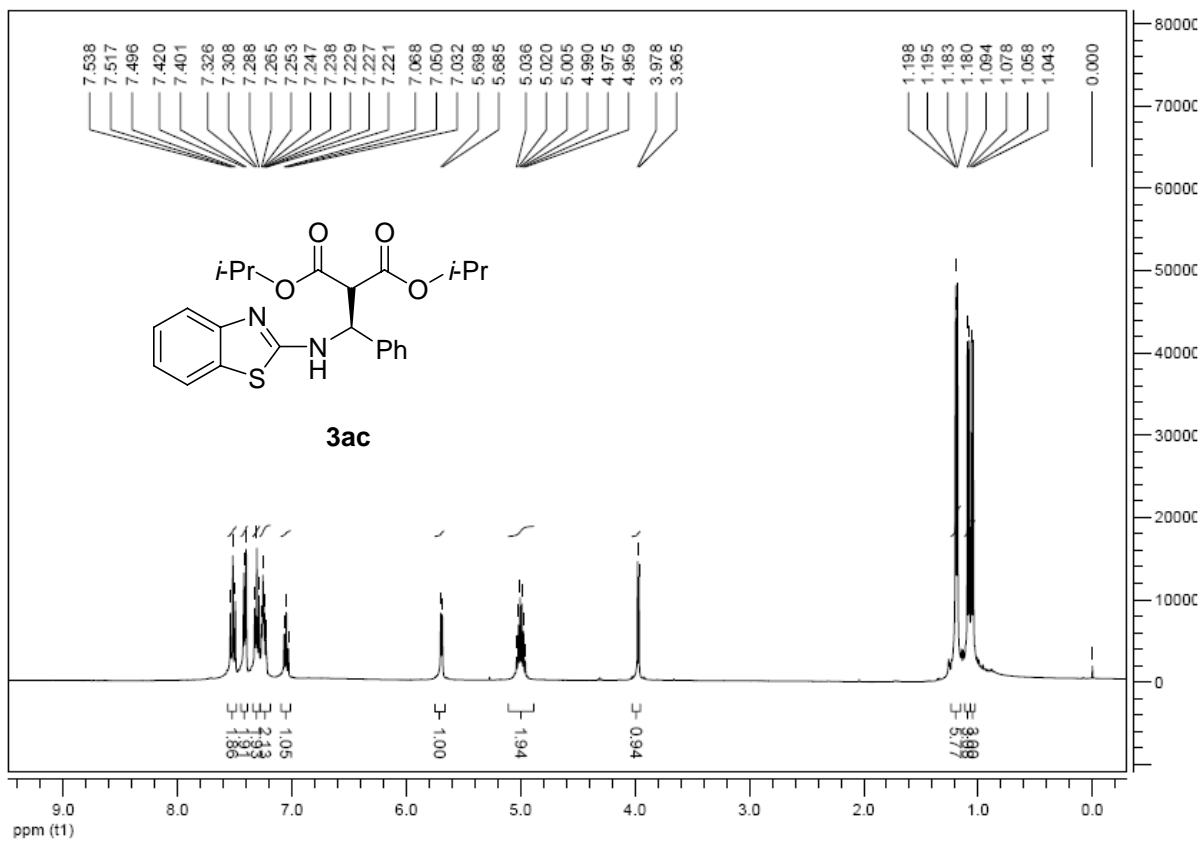


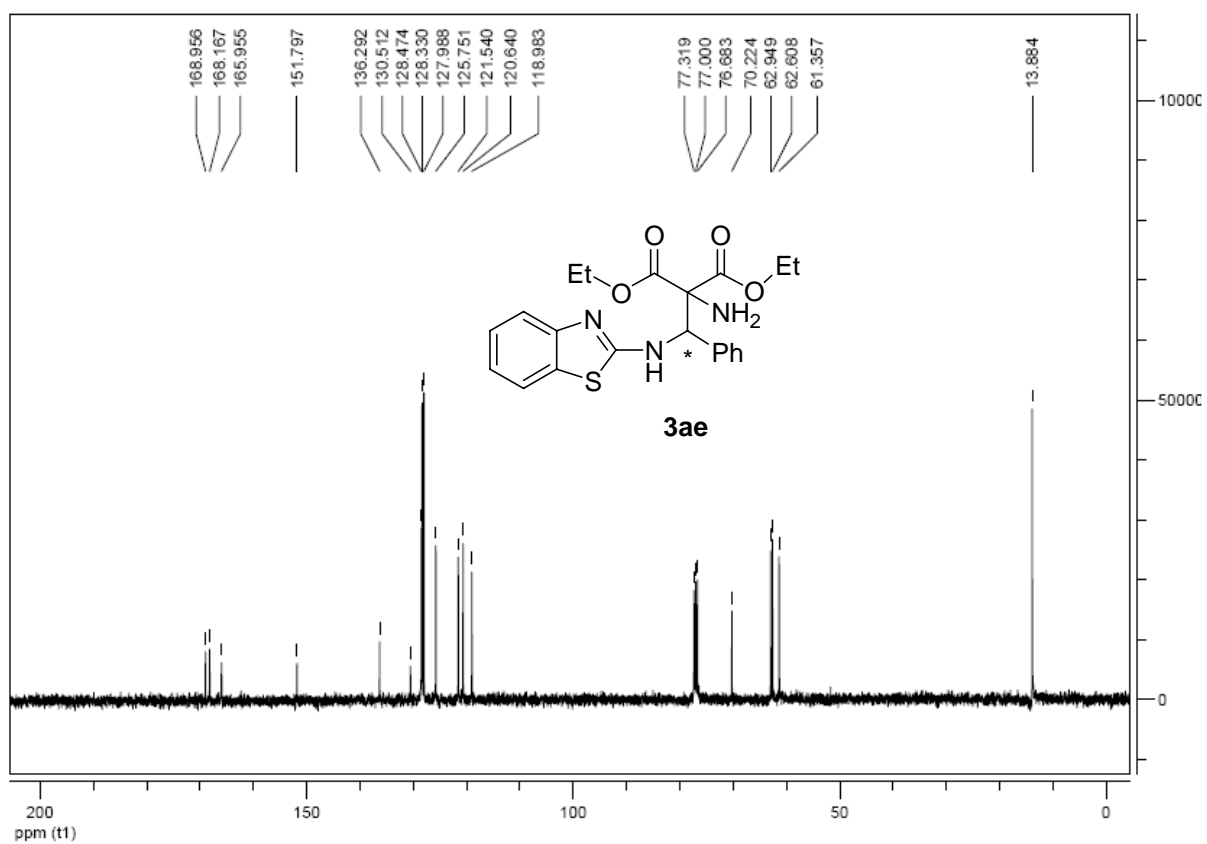
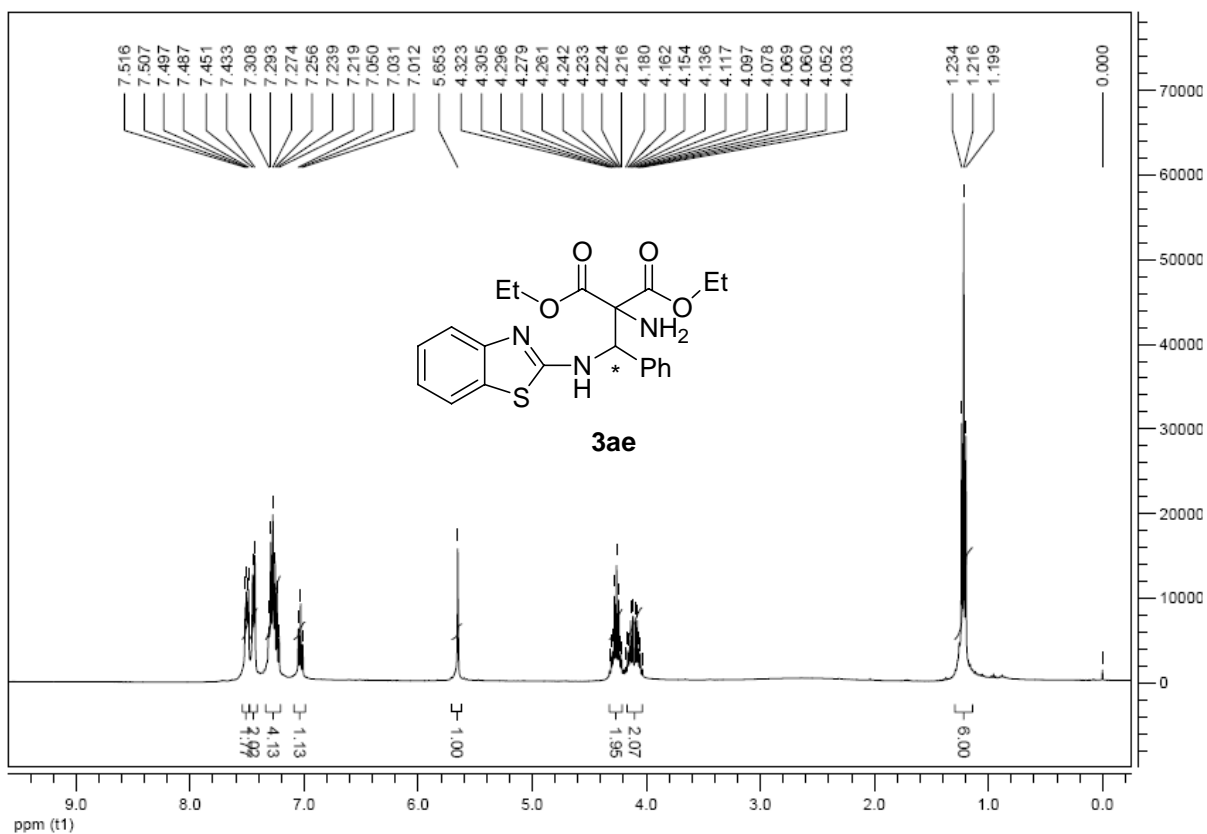


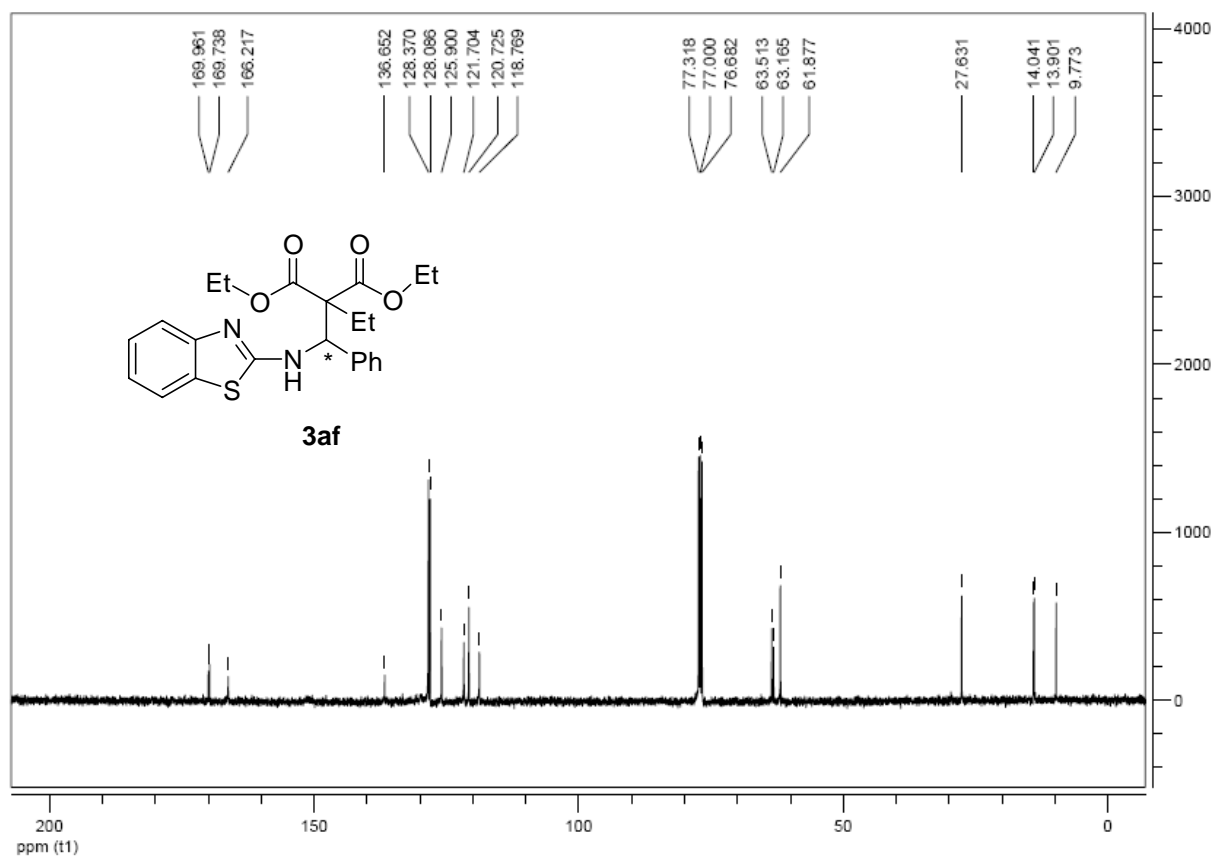
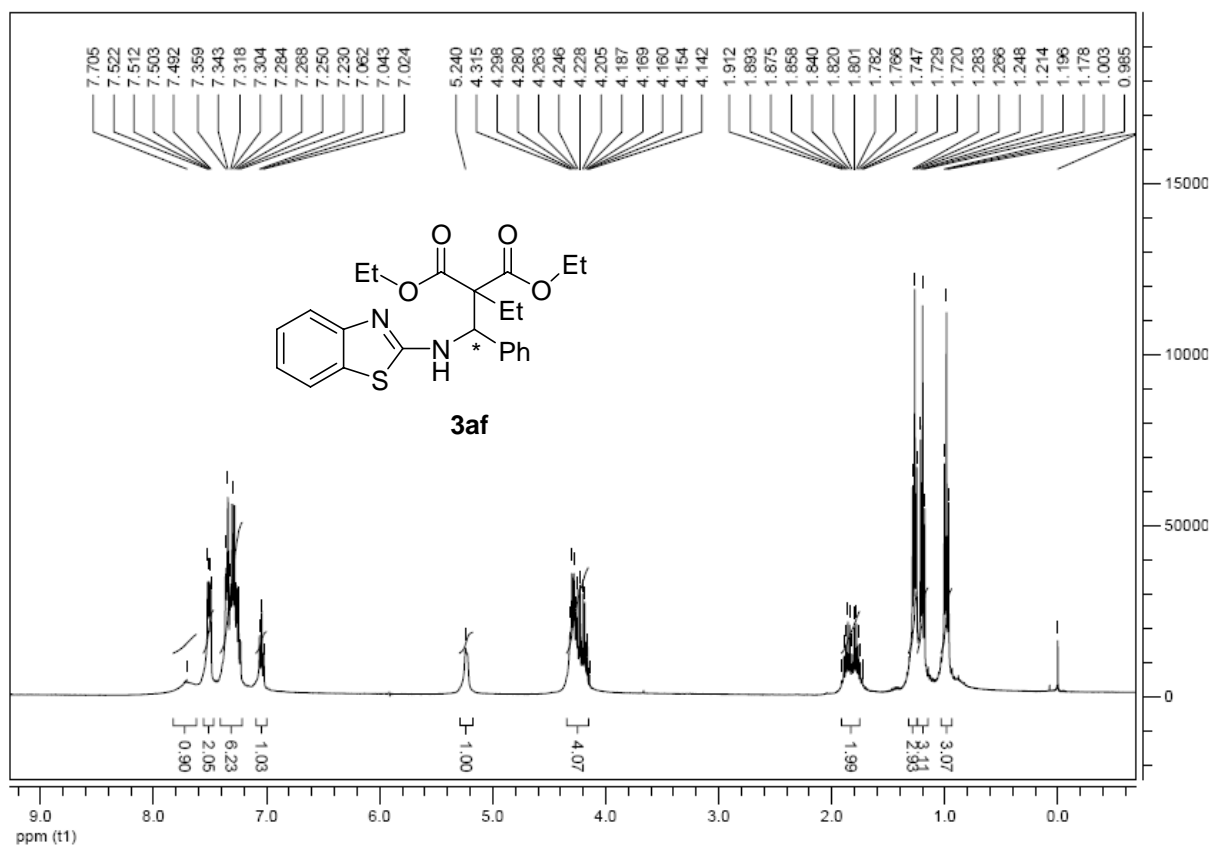


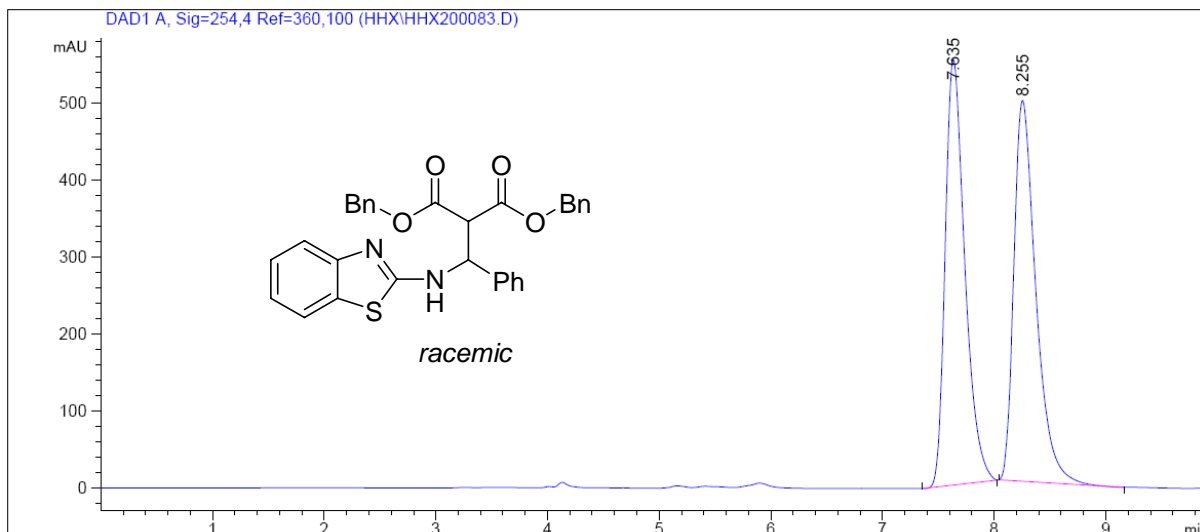




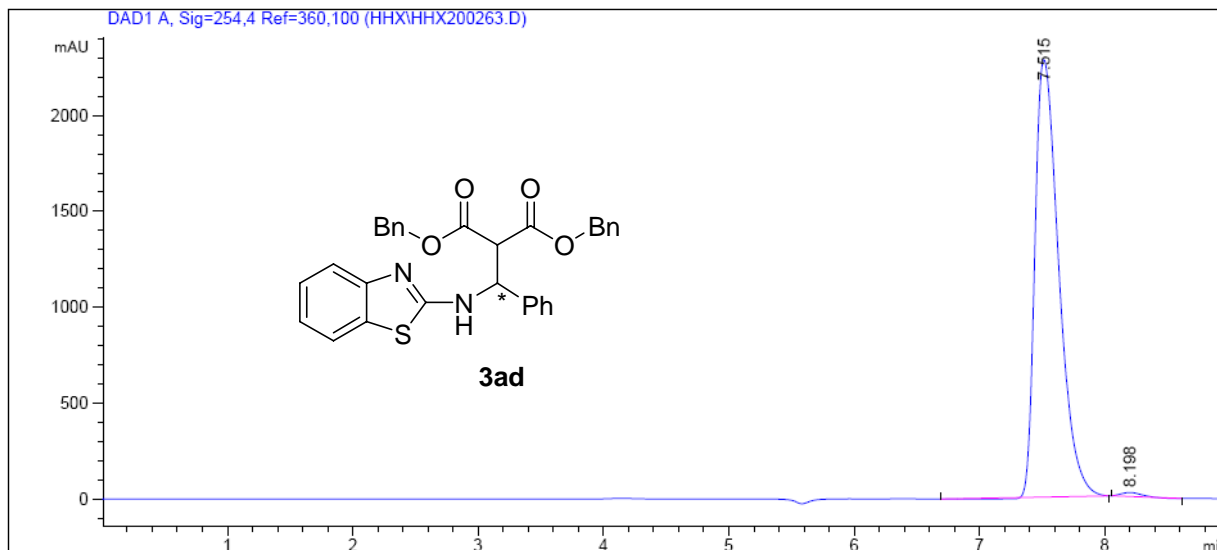




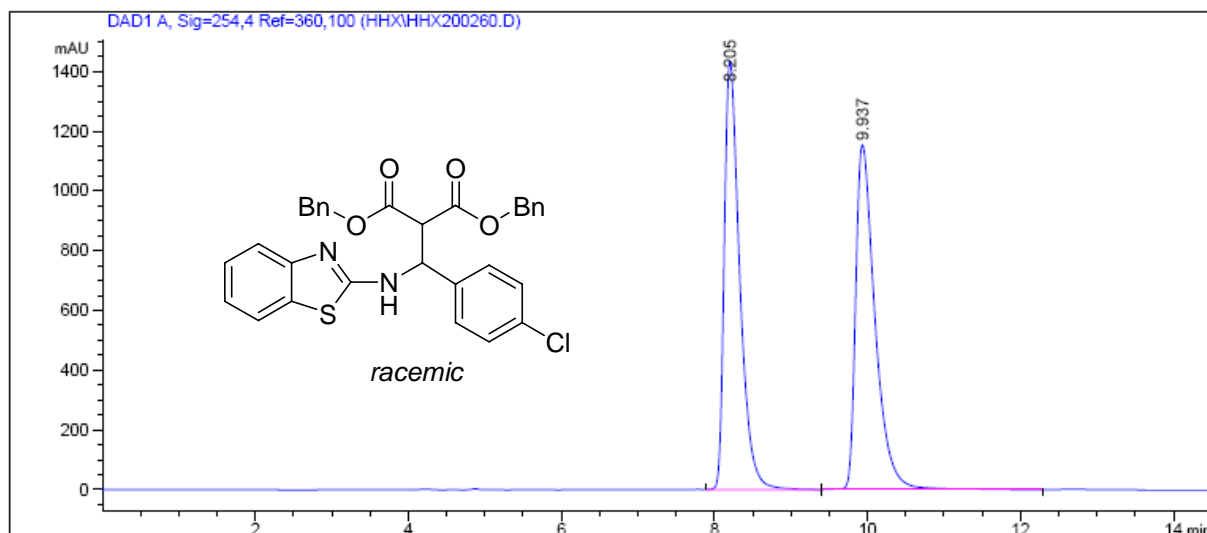




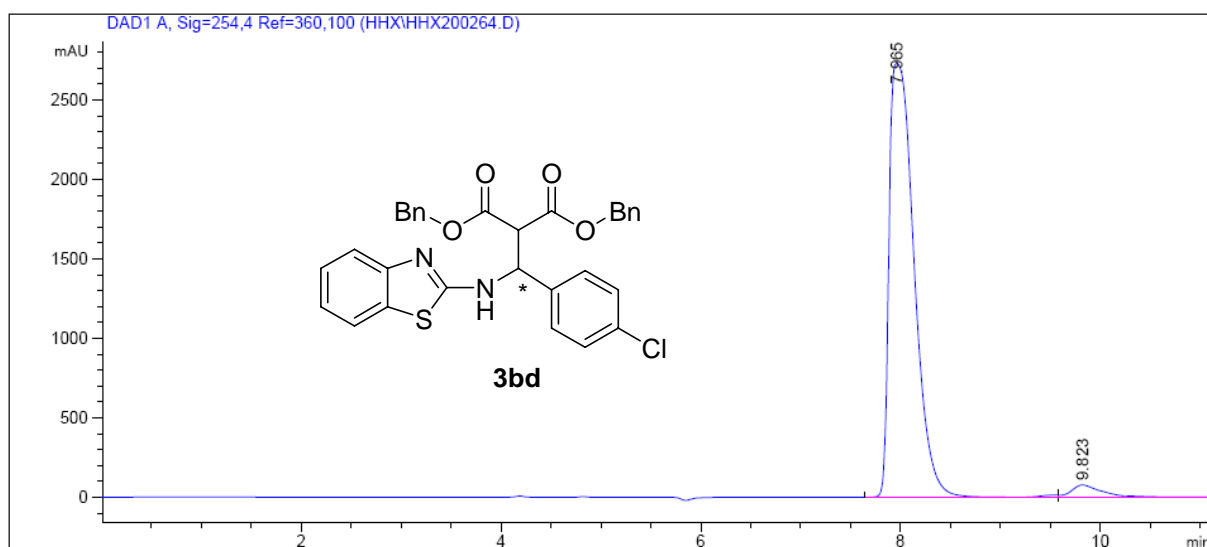
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2	8.255	BV	0.2074	6753.60156	494.24542	50.0556



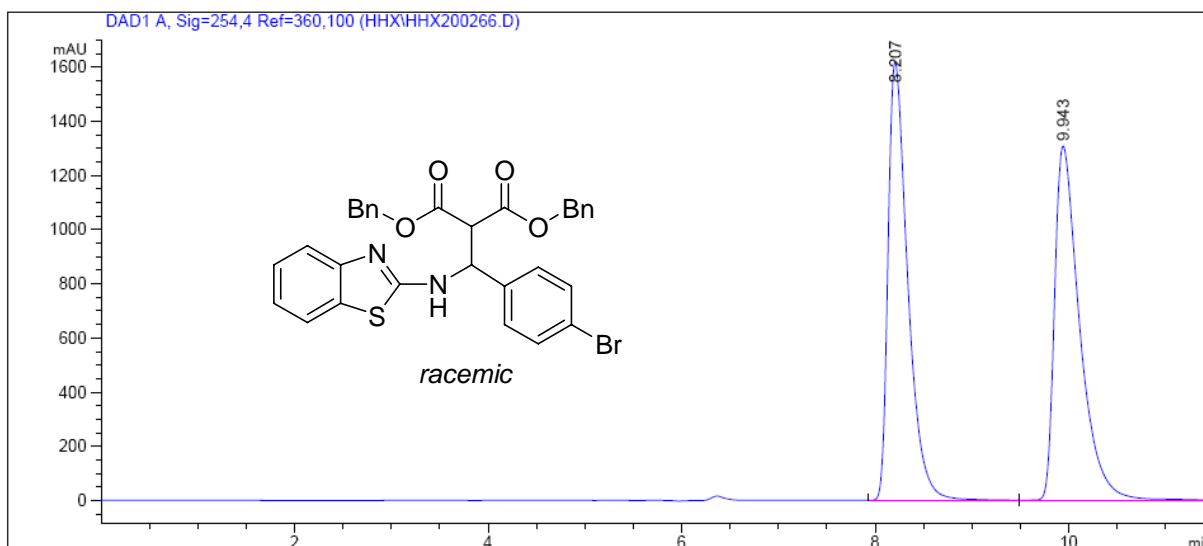
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1	7.515	BB S	0.2013	2.99484e4	2279.19775	99.2651
2	8.198	BB	0.1722	221.71843	20.83321	0.7349



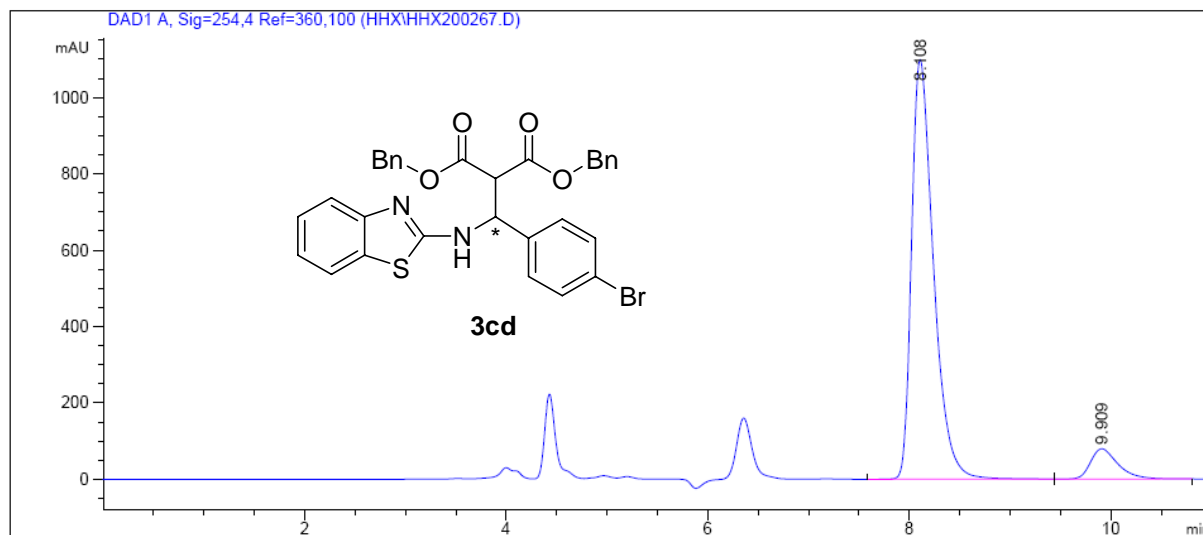
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1	8.205	BV	0.2116	2.01021e4	1433.32739	49.7311
2	9.937	VB S	0.2655	2.03195e4	1153.31311	50.2689



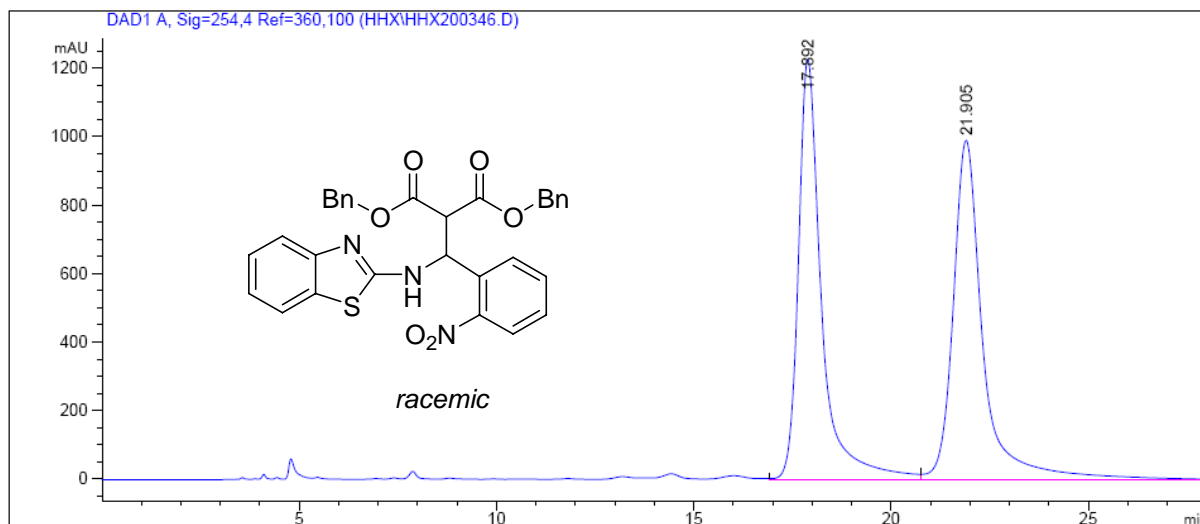
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1	7.965	BV S	0.2706	4.74011e4	2728.45679	96.4102
2	9.823	VBAS	0.3199	1764.94116	78.03716	3.5898



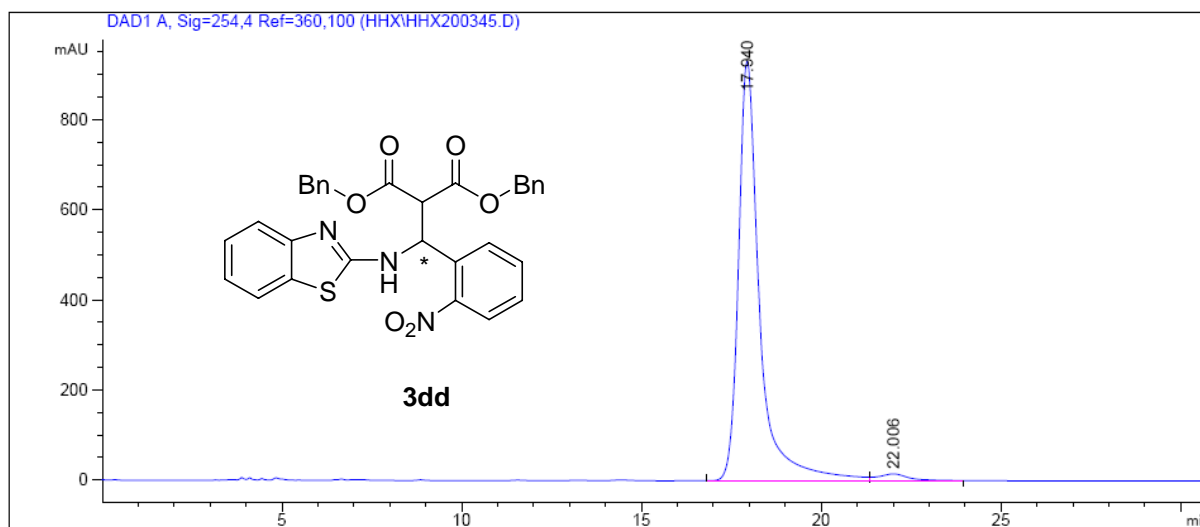
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1	8.207	BV S	0.2129	2.28859e4	1619.40027	49.2205
2	9.943	VBAS	0.2705	2.36108e4	1308.69360	50.7795



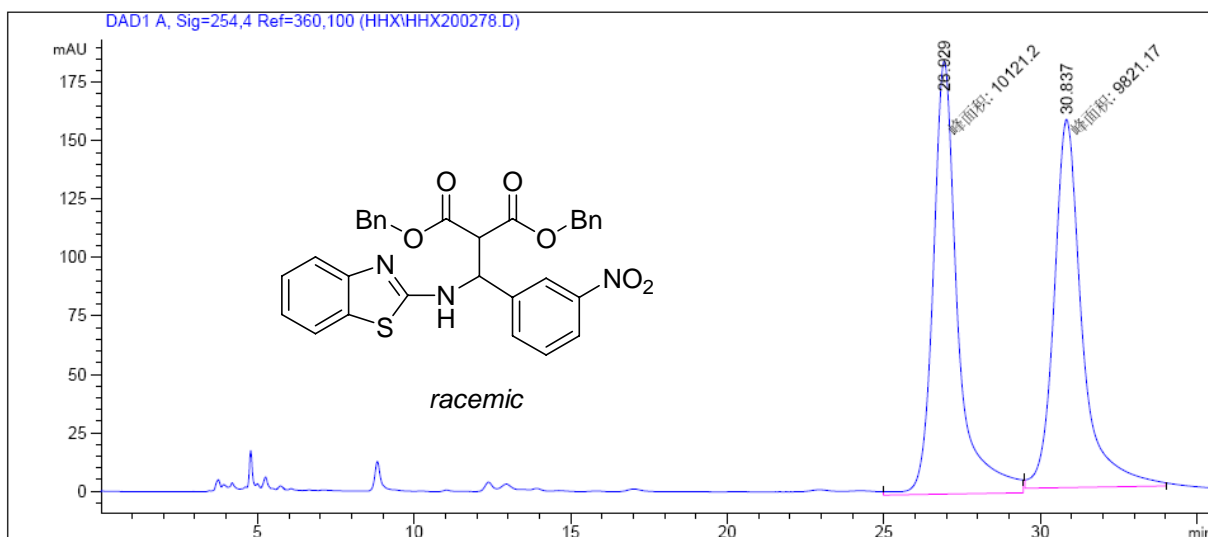
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1	8.108	BV S	0.2283	1.65883e4	1097.63232	91.7161
2	9.909	VB S	0.2847	1498.28430	79.19464	8.2839



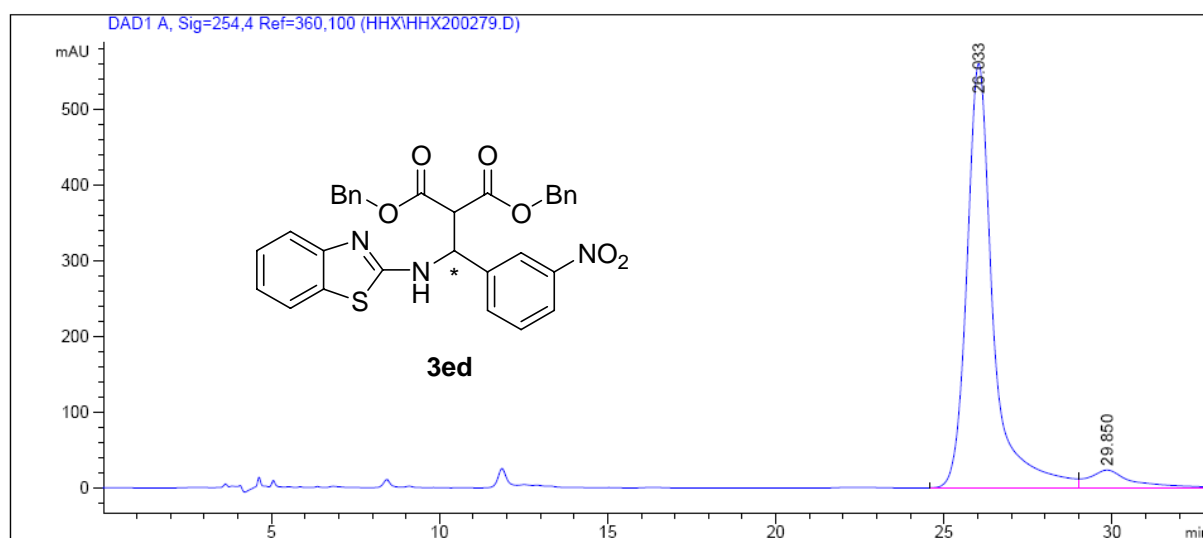
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1	17.892	VV	0.6014	5.01679e4	1226.09375	49.0985
2	21.905	VBA	0.7726	5.20101e4	990.44806	50.9015



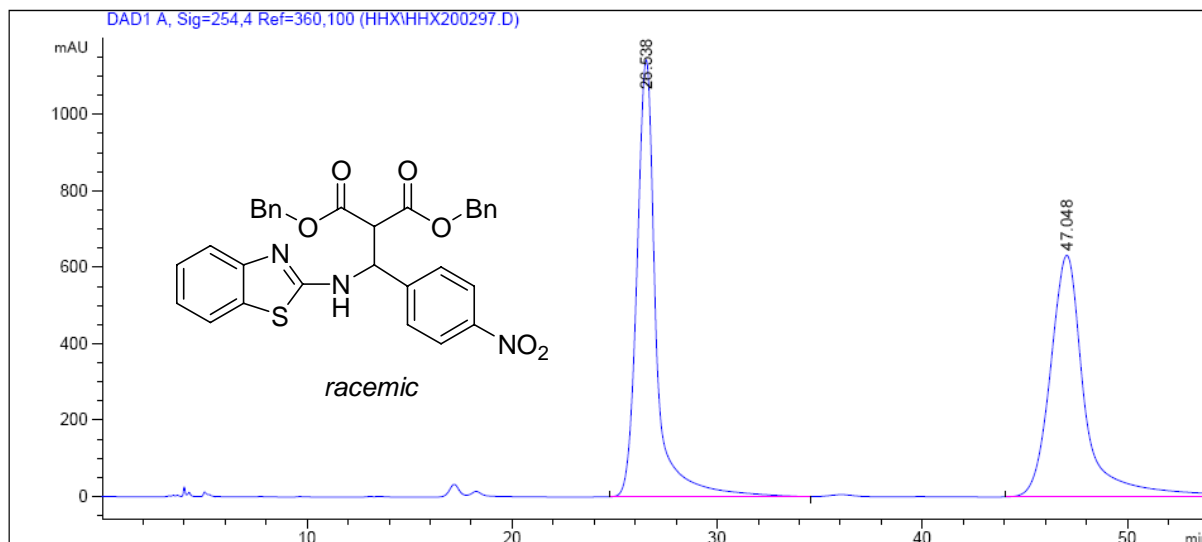
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2	22.006	VB	0.8522	902.84485	15.12914	2.3128



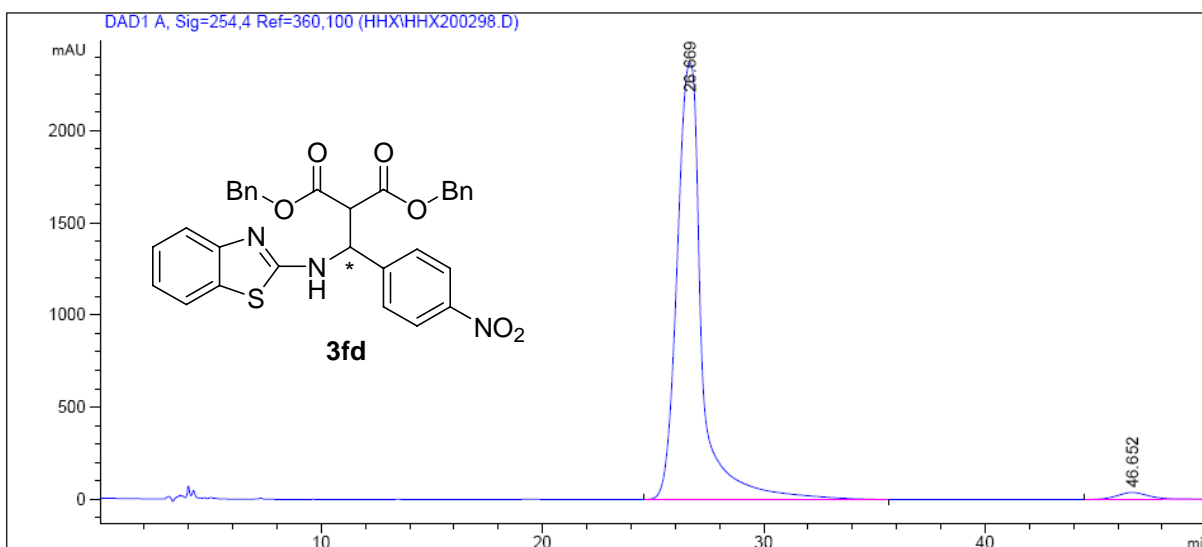
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1	26.929	MM	0.9109	1.01212e4	185.18739	50.7521
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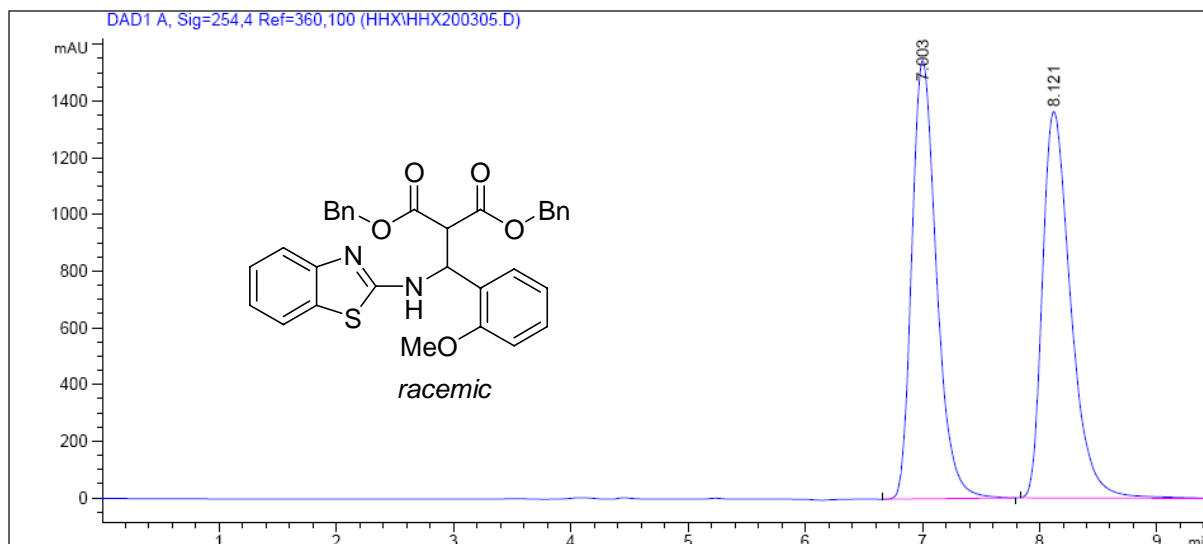
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2	29.850	VBA	1.2424	2136.40576	23.63957	6.5544



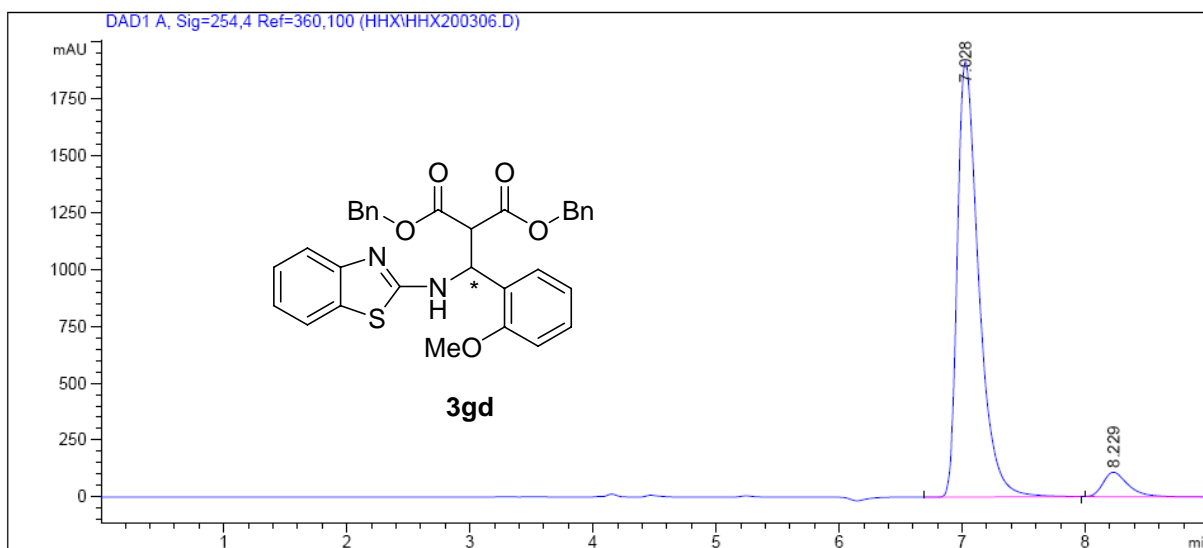
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1	26.538	BB	0.9783	7.47379e4	1143.77820	50.4495
2	47.048	BBA	1.7264	7.34061e4	632.32666	49.5505



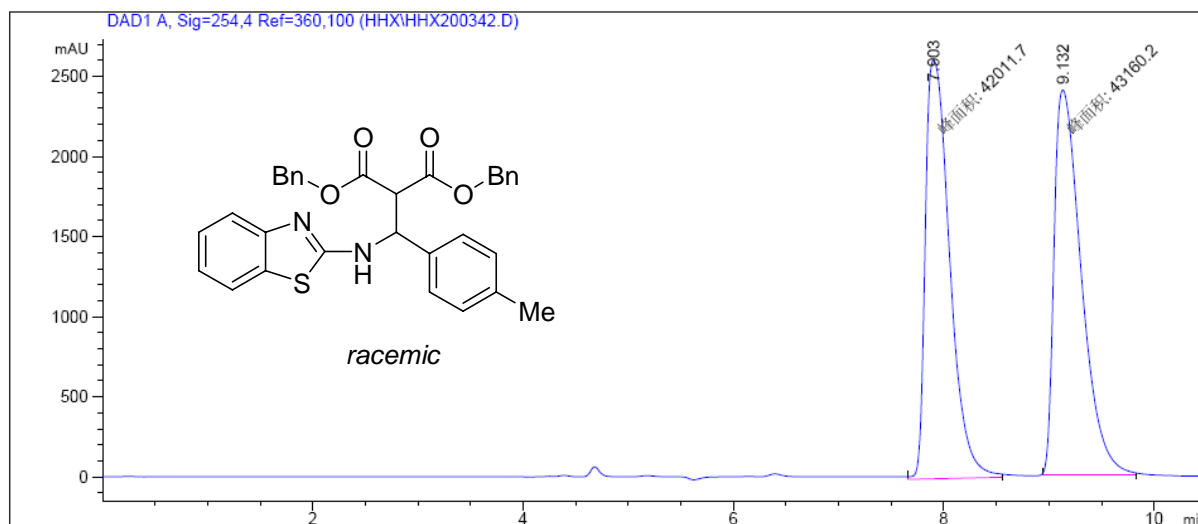
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1	26.669	BB	1.1767	1.83789e5	2370.08423	97.9838
2	46.652	BB	1.5382	3781.86597	37.32044	2.0162



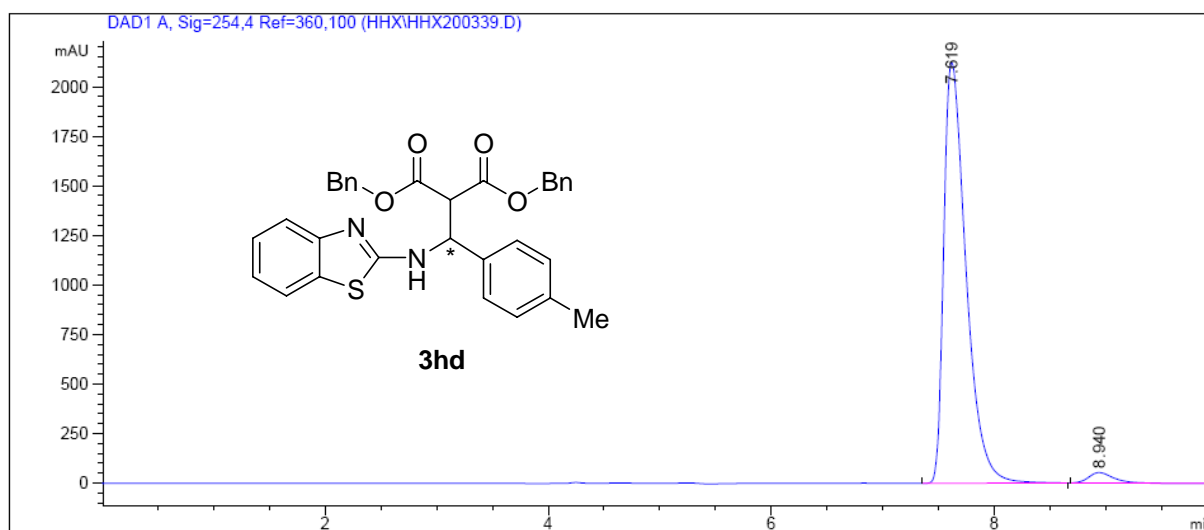
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1	7.003	BB S	0.2266	2.25839e4	1544.16003	49.7135
2	8.121	BBA	0.2556	2.28442e4	1362.29297	50.2865



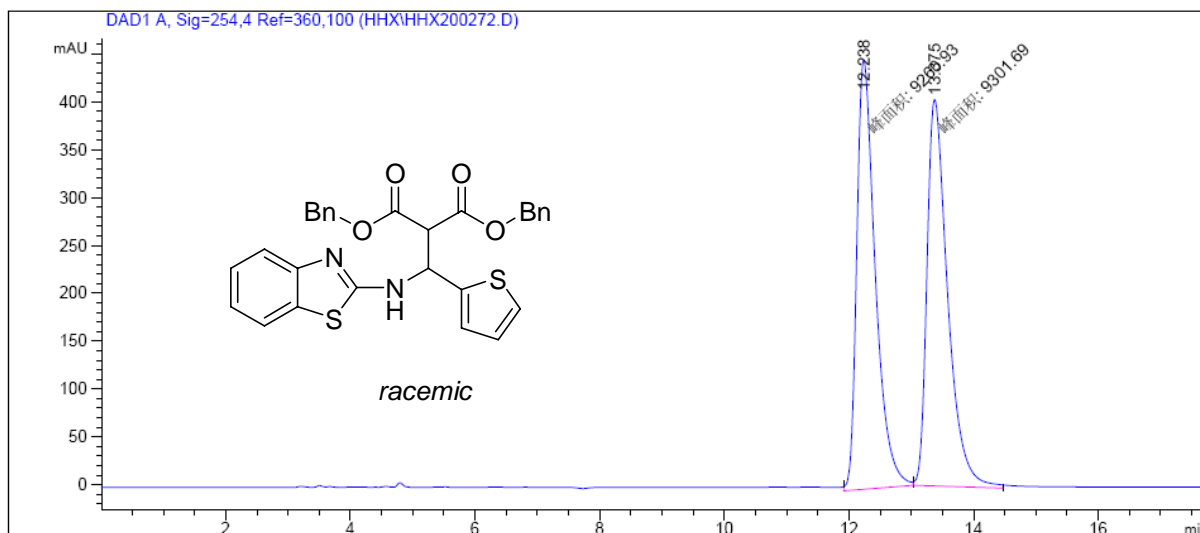
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1	7.028	BB S	0.1851	2.30929e4	1909.28894	93.8110
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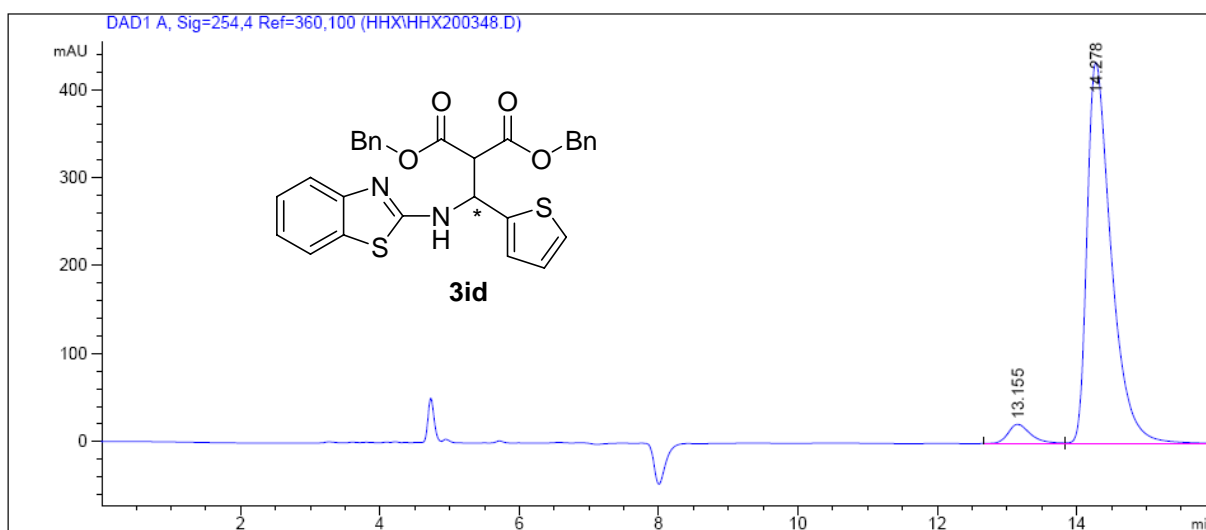
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1	7.903	MM	0.2679	4.20117e4	2613.58667	49.3257
2	9.132	MM	0.2990	4.31602e4	2405.57715	50.6743



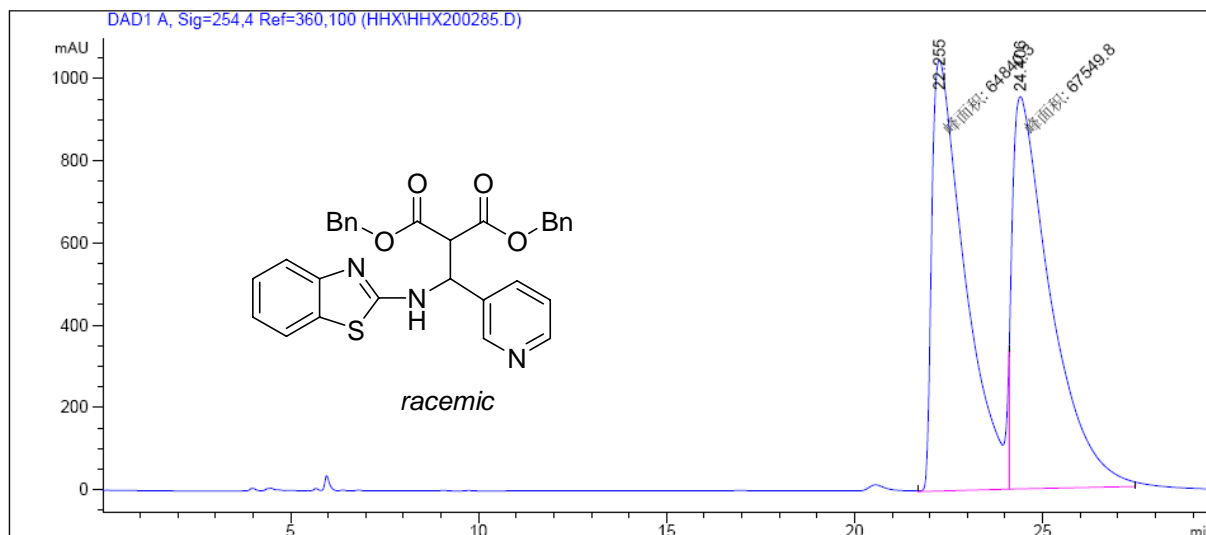
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1	7.619	BB S	0.2098	2.94204e4	2120.82056	97.2944
2	8.940	BBAS	0.2370	818.14935	52.74548	2.7056



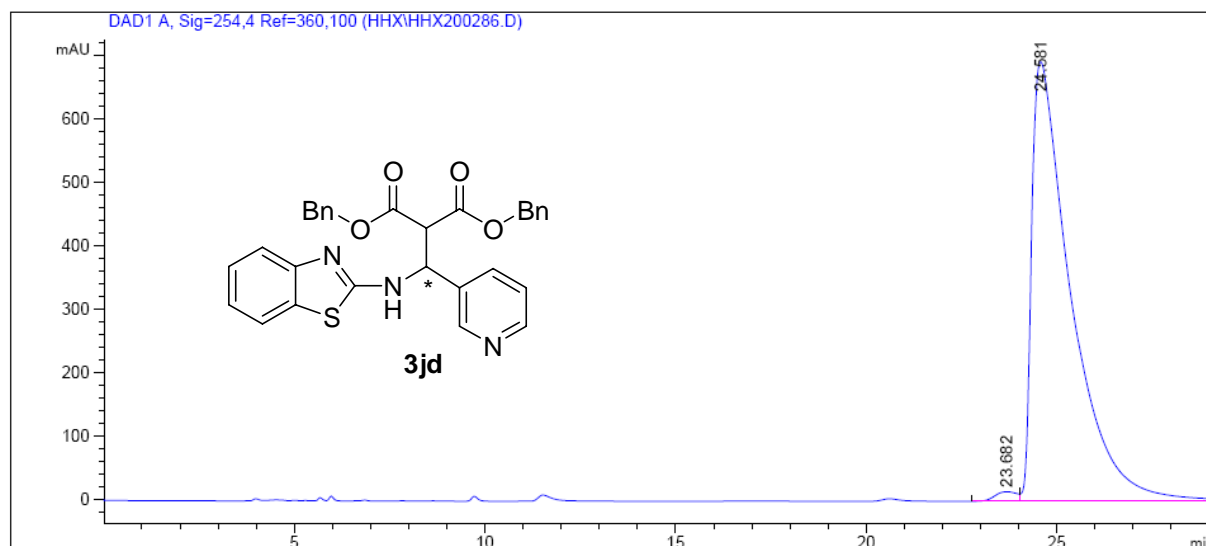
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1	12.238	MM	0.3441	9260.92871	448.59100	49.8902
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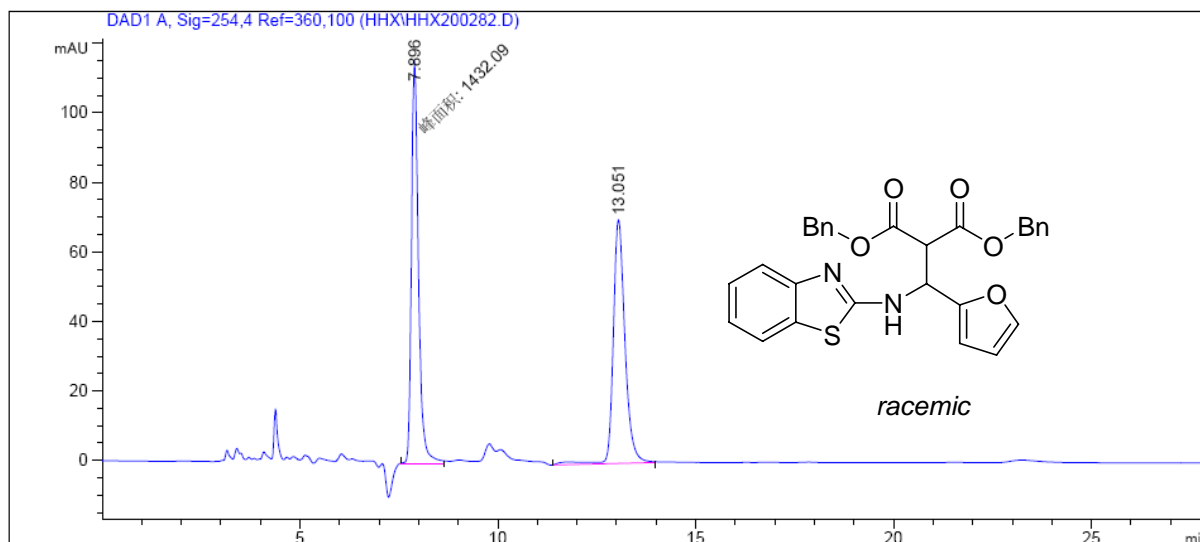
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1	13.155	BV	0.3398	494.81833	21.88069	4.5213
2	14.278	VBA	0.3618	1.04493e4	432.58932	95.4787



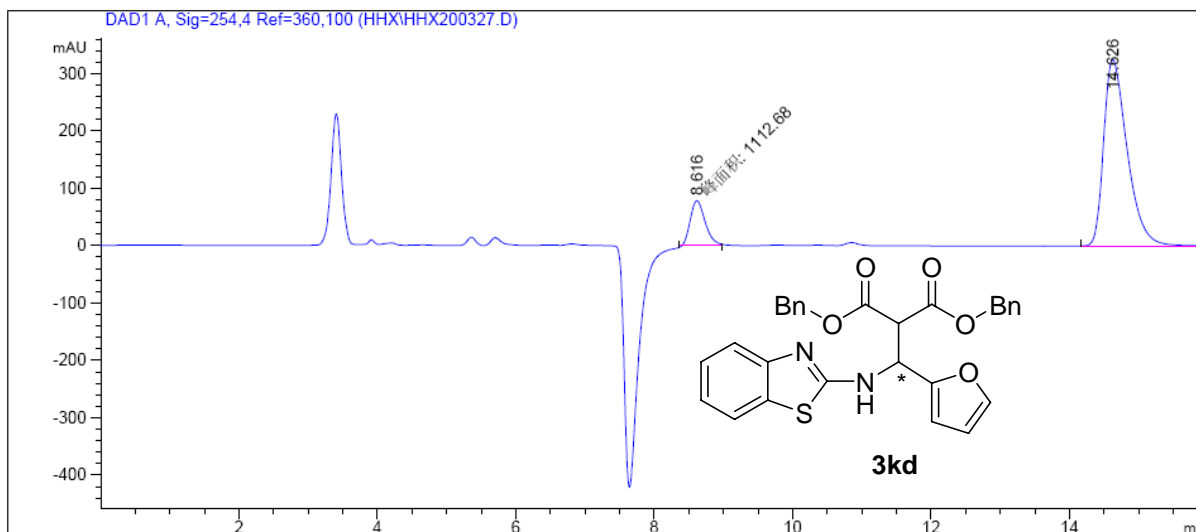
Peak #	RetTime [min]	Type	Width [min]	Area [mAU*s]	Height [mAU]	Area %
1	22.255	MM	1.0299	6.48403e4	1049.31458	48.9767
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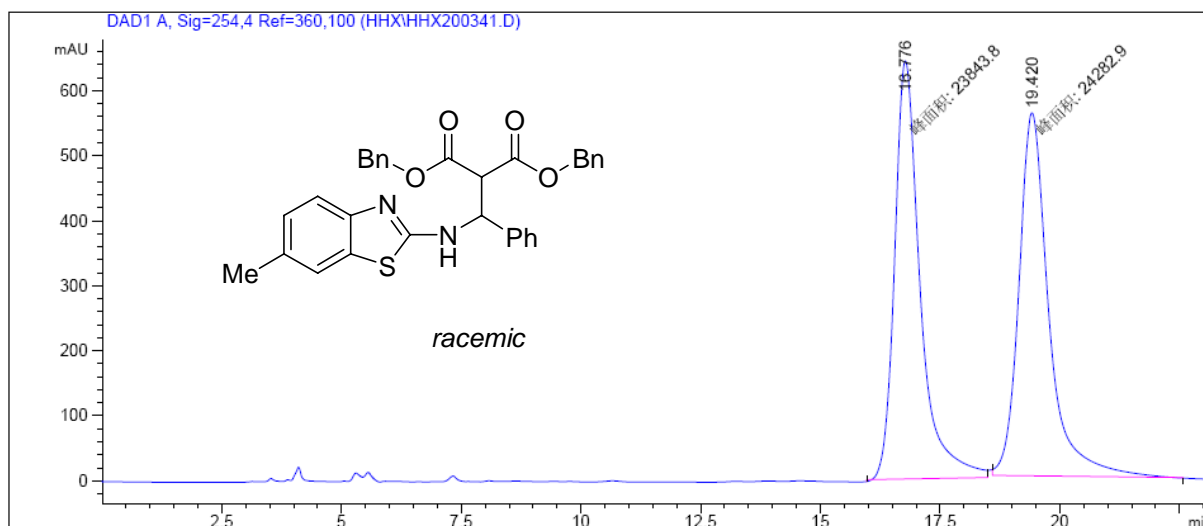
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2	24.581	VBA	1.0285	4.93961e4	692.27606	98.8393



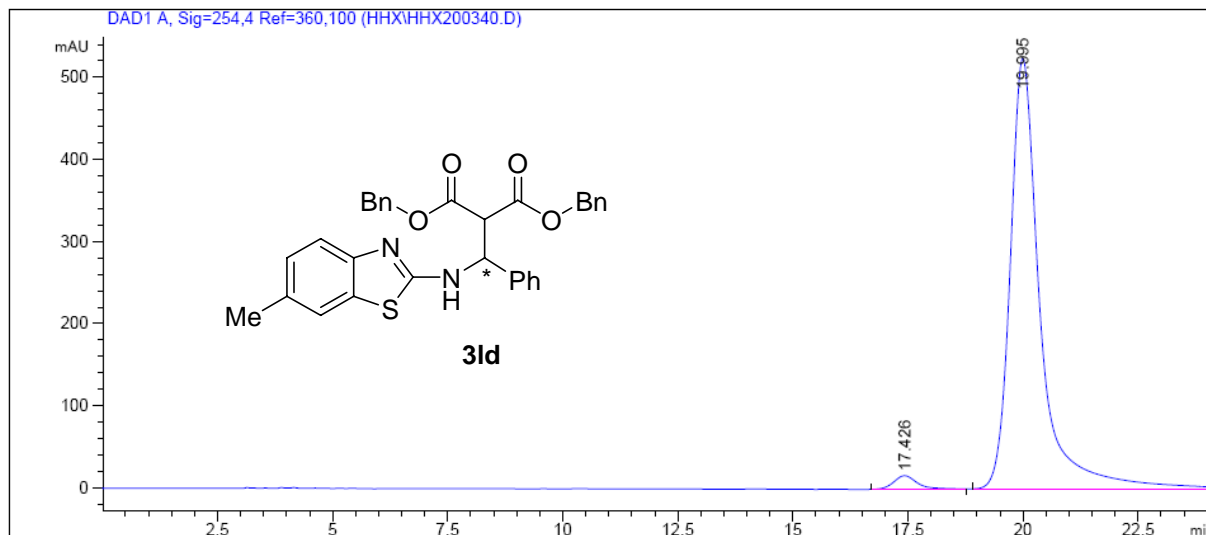
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1	7.896	MM	0.2057	1432.09473	116.05473	49.6613
2	13.051	BB	0.3136	1451.62988	70.08478	50.3387



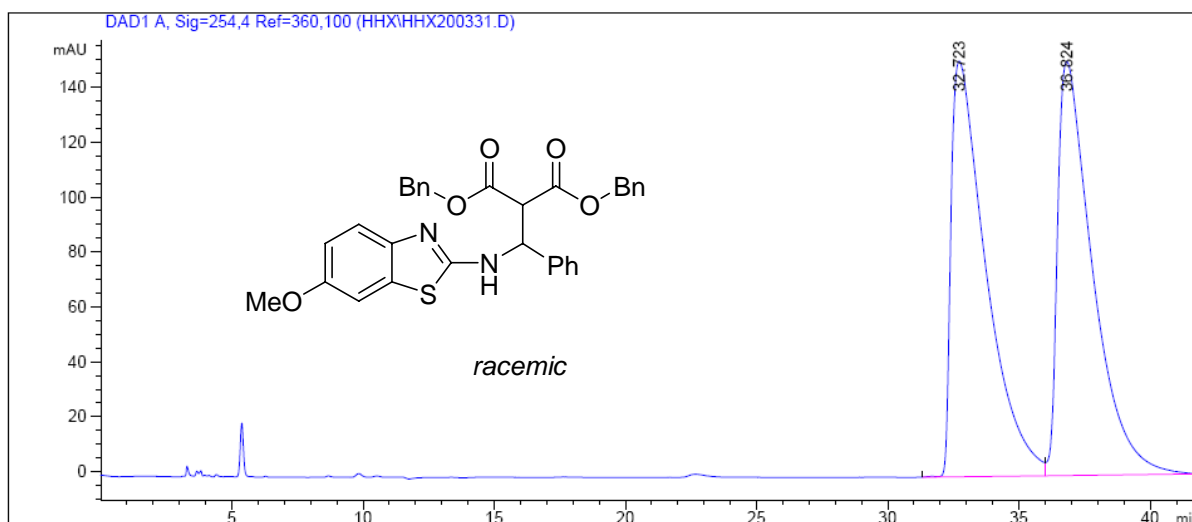
Peak #	RetTime [min]	Type	Width [min]	Area [mAU*s]	Height [mAU]	Area %
1	8.616	MM	0.2417	1112.68188	76.74071	12.6514
2	14.626	BBA	0.3598	7682.27783	325.01221	87.3486



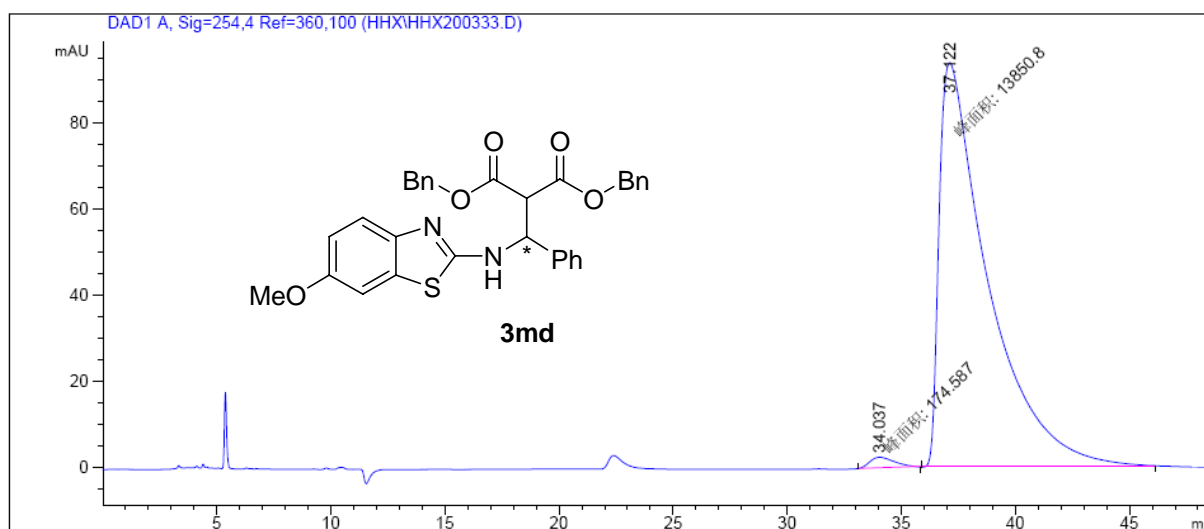
Peak #	RetTime [min]	Type	Width [min]	Area [mAU*s]	Height [mAU]	Area %
1	16.776	MM	0.6177	2.38438e4	643.31512	49.5439
2	19.420	MM	0.7247	2.42829e4	558.42529	50.4561



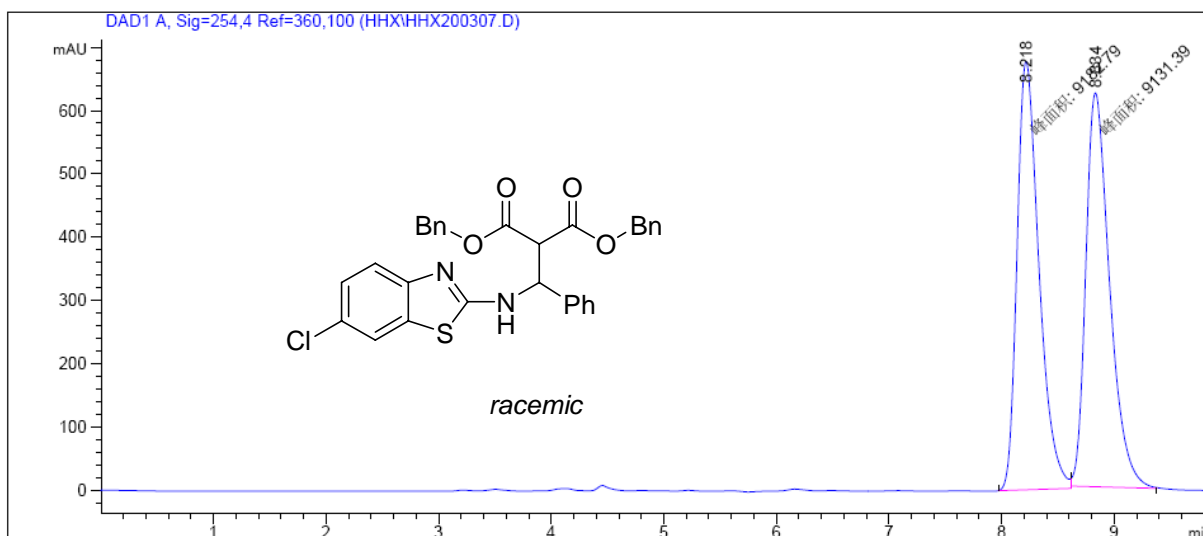
Peak #	RetTime [min]	Type	Width [min]	Area [mAU*s]	Height [mAU]	Area %
1	17.426	BB	0.5557	618.21655	16.70709	2.5093
2	19.995	BBA	0.6740	2.40192e4	524.77472	97.4907



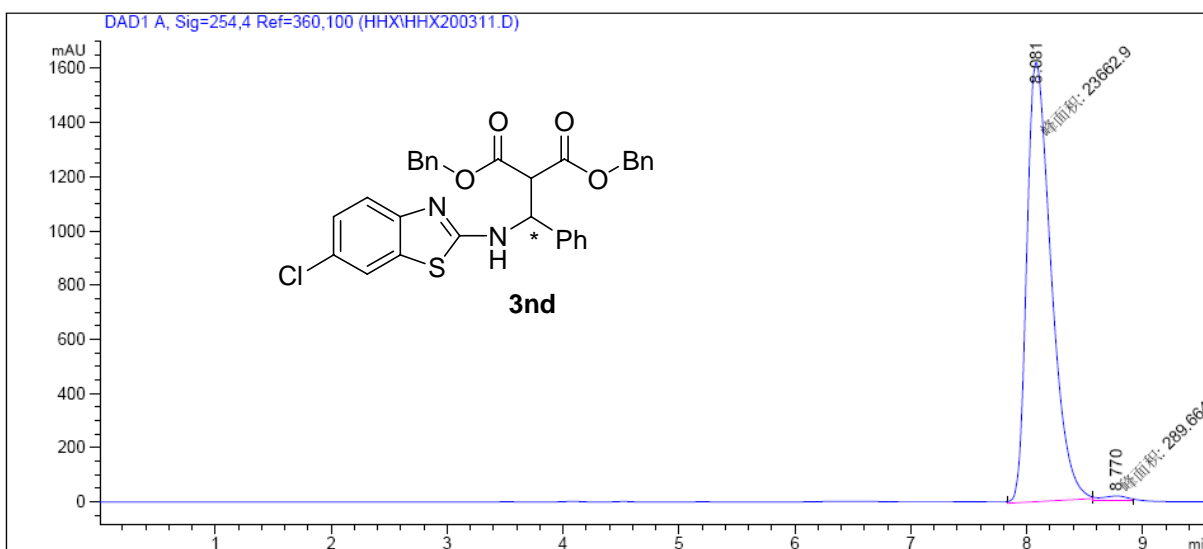
Peak #	RetTime [min]	Type	Width [min]	Area [mAU*s]	Height [mAU]	Area %
1	32.723	BV	1.3235	1.39566e4	151.39223	49.9356
2	36.824	VB	1.3231	1.39926e4	150.72505	50.0644



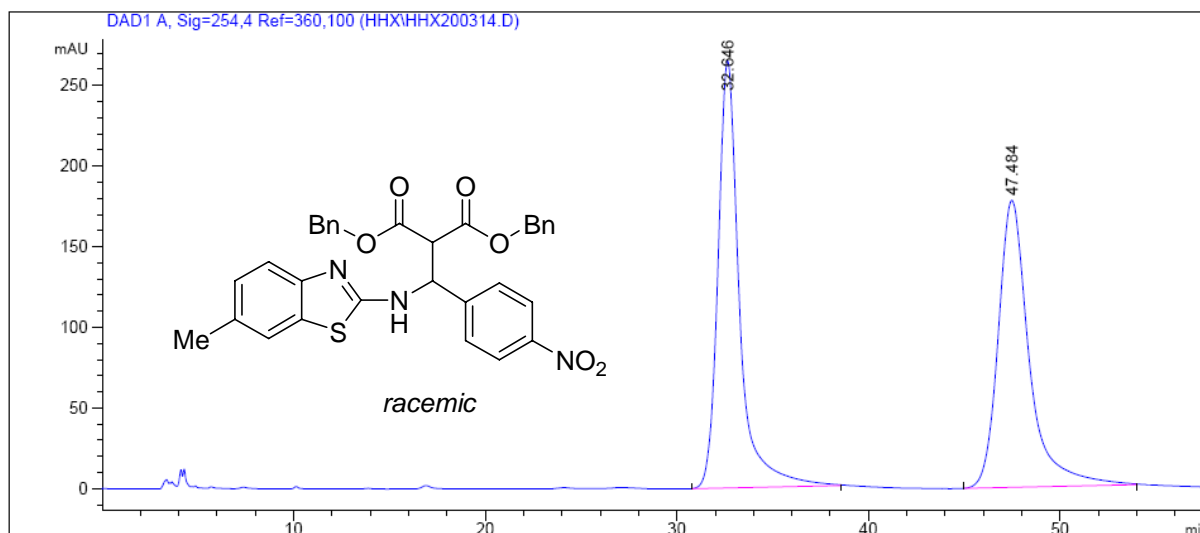
Peak #	RetTime [min]	Type	Width [min]	Area [mAU*s]	Height [mAU]	Area %
1	34.037	MM	1.2043	174.58746	2.41617	1.2448
2	37.122	MM	2.4625	1.38508e4	93.74534	98.7552



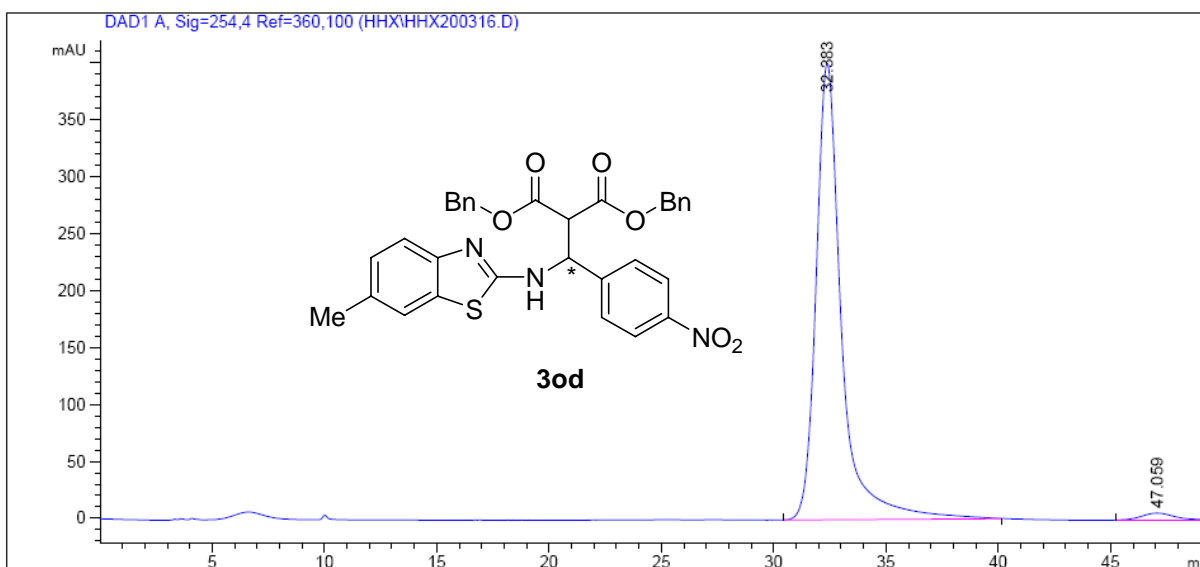
Peak #	RetTime [min]	Type	Width [min]	Area [mAU*s]	Height [mAU]	Area %
1	8.218	MM	0.2256	9182.78906	678.28656	50.1403
2	8.834	MM	0.2443	9131.38770	623.03265	49.8597



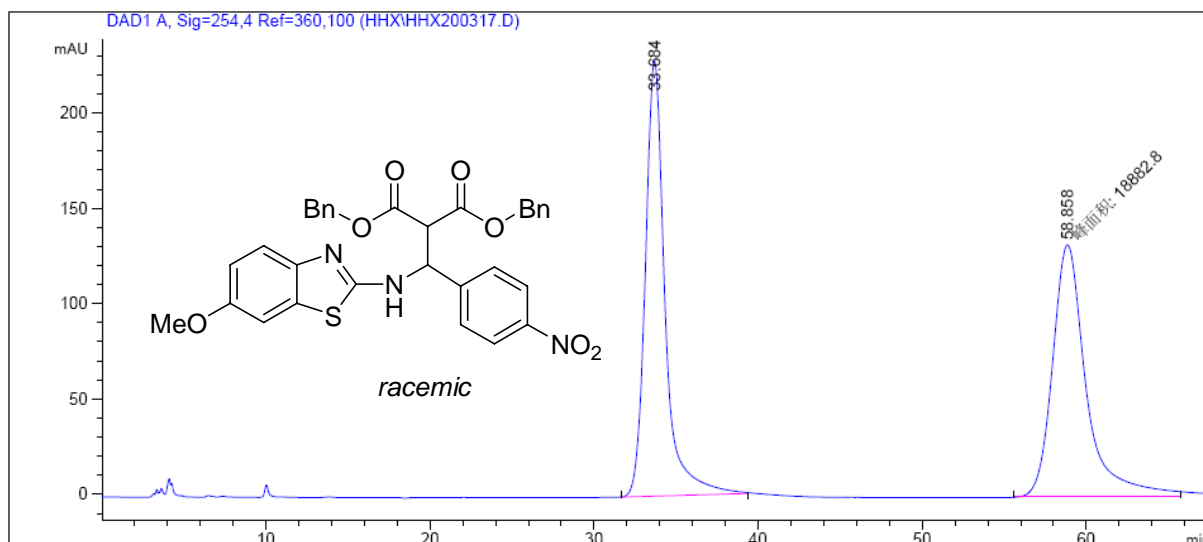
Peak #	RetTime [min]	Type	Width [min]	Area [mAU*s]	Height [mAU]	Area %
1	8.081	MM	0.2432	2.36629e4	1621.60645	98.7907
2	8.770	MM	0.2644	289.66379	18.25688	1.2093



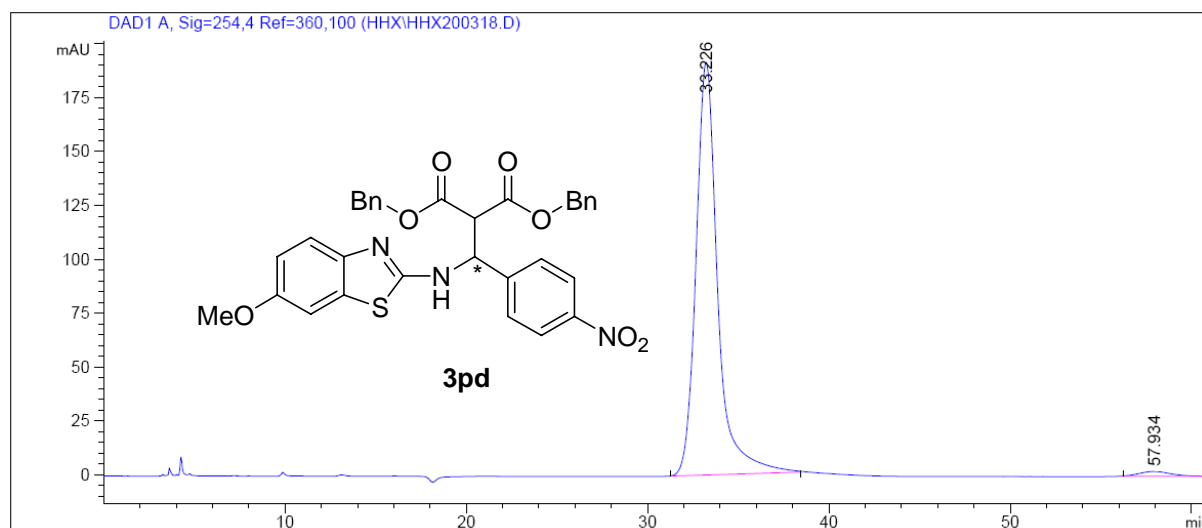
Peak #	RetTime [min]	Type	Width [min]	Area [mAU*s]	Height [mAU]	Area %
1	32.646	BB	1.1600	2.07014e4	264.83527	50.7521
2	47.484	BB	1.6770	2.00879e4	177.94852	49.2479



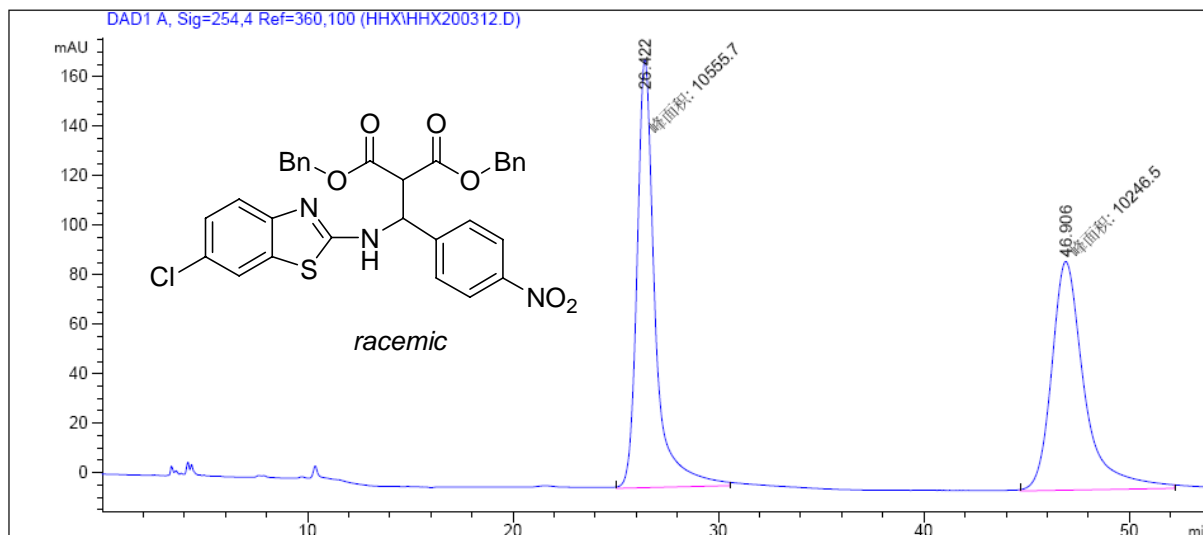
Peak #	RetTime [min]	Type	Width [min]	Area [mAU*s]	Height [mAU]	Area %
1	32.383	BB	1.1769	3.15822e4	400.12723	98.0224
2	47.059	BBA	1.4265	637.18219	6.16145	1.9776



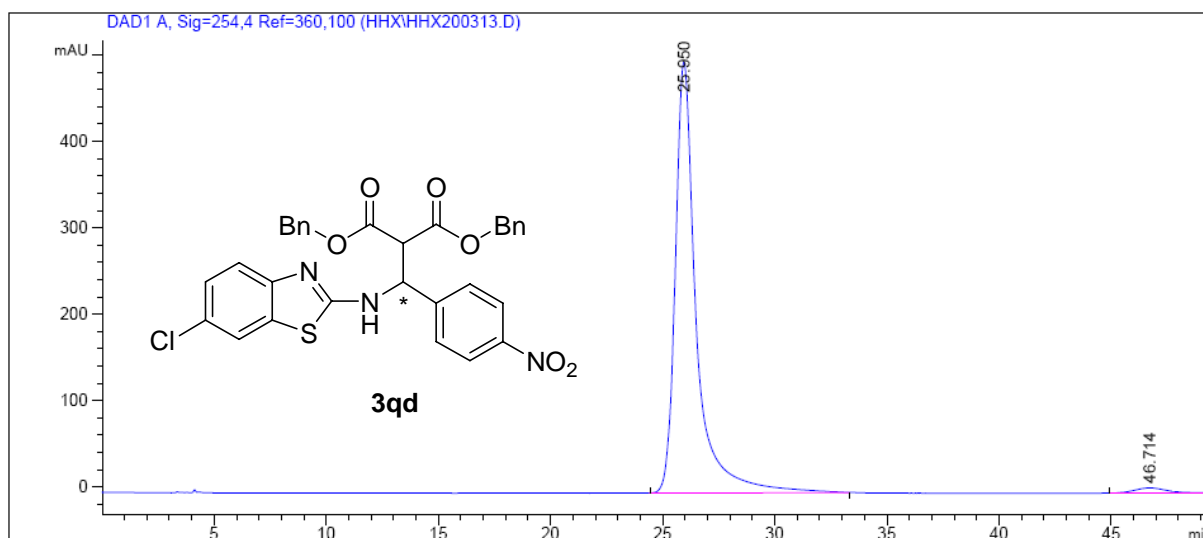
Peak #	RetTime [min]	Type	Width [min]	Area [mAU*s]	Height [mAU]	Area %
1	33.684	BB	1.2496	1.90312e4	228.06212	50.1958
2	58.858	MM	2.3823	1.88828e4	132.10611	49.8042



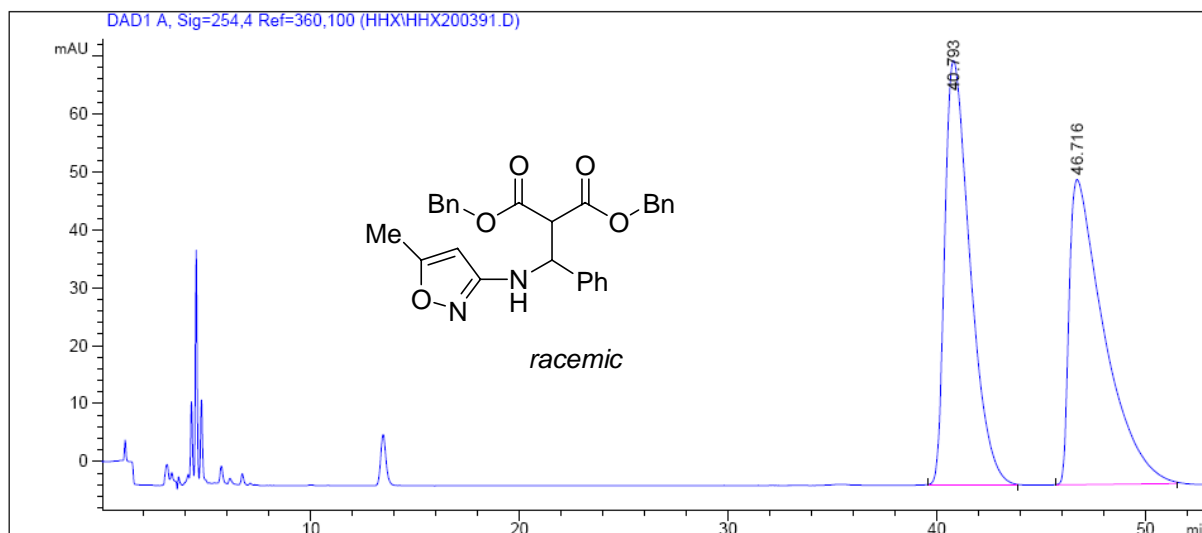
Peak #	RetTime [min]	Type	Width [min]	Area [mAU*s]	Height [mAU]	Area %
1	33.226	BB	1.2449	1.59022e4	191.48616	98.3614
2	57.934	BB	1.4038	264.91986	2.23352	1.6386



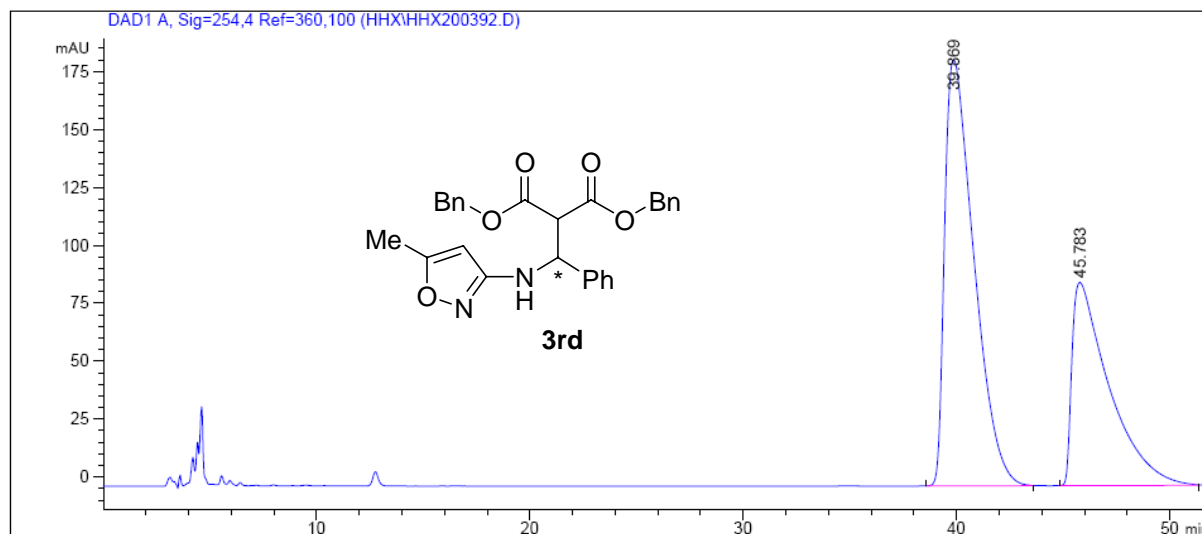
Peak #	RetTime [min]	Type	Width [min]	Area [mAU*s]	Height [mAU]	Area %
1	26.422	MM	1.0164	1.05557e4	173.09103	50.7430
2	46.906	MM	1.8479	1.02465e4	92.41788	49.2570



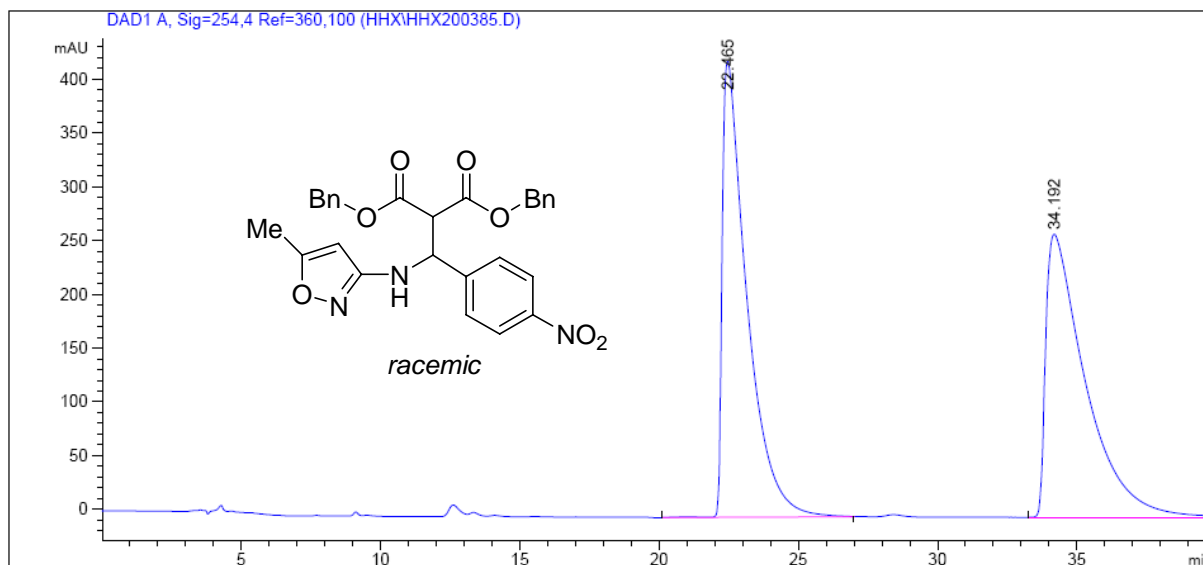
Peak #	RetTime [min]	Type	Width [min]	Area [mAU*s]	Height [mAU]	Area %
1	25.950	BB	0.9589	3.26008e4	498.56863	98.2358
2	46.714	BB	1.2720	585.45605	5.92932	1.7642



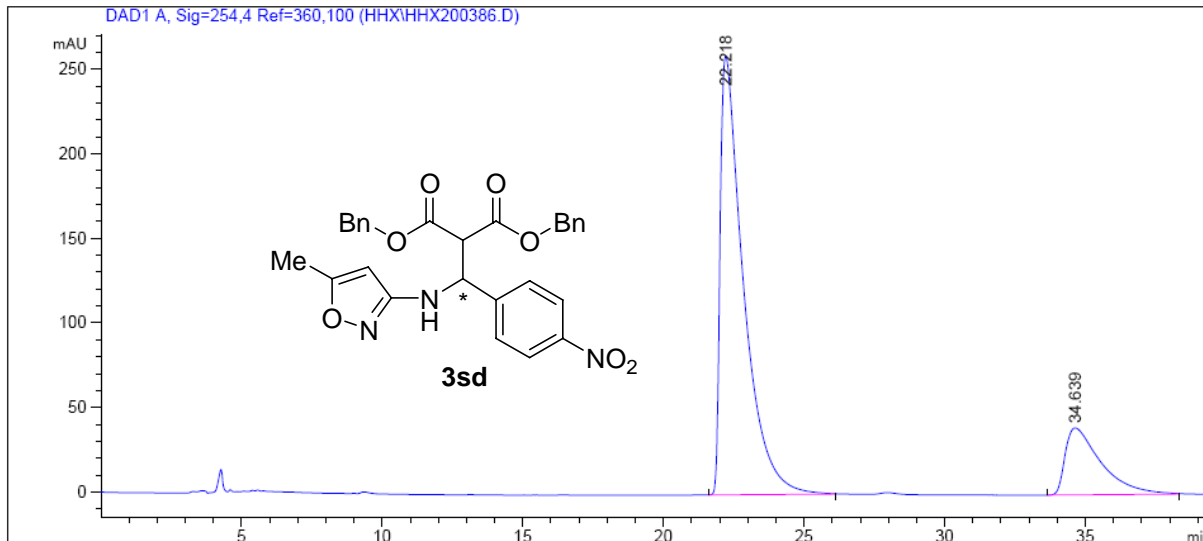
Peak #	RetTime [min]	Type	Width [min]	Area [mAU*s]	Height [mAU]	Area %
1	40.793	BB	1.2744	6165.91455	73.22169	50.1744
2	46.716	BB	1.6329	6123.04736	52.64553	49.8256



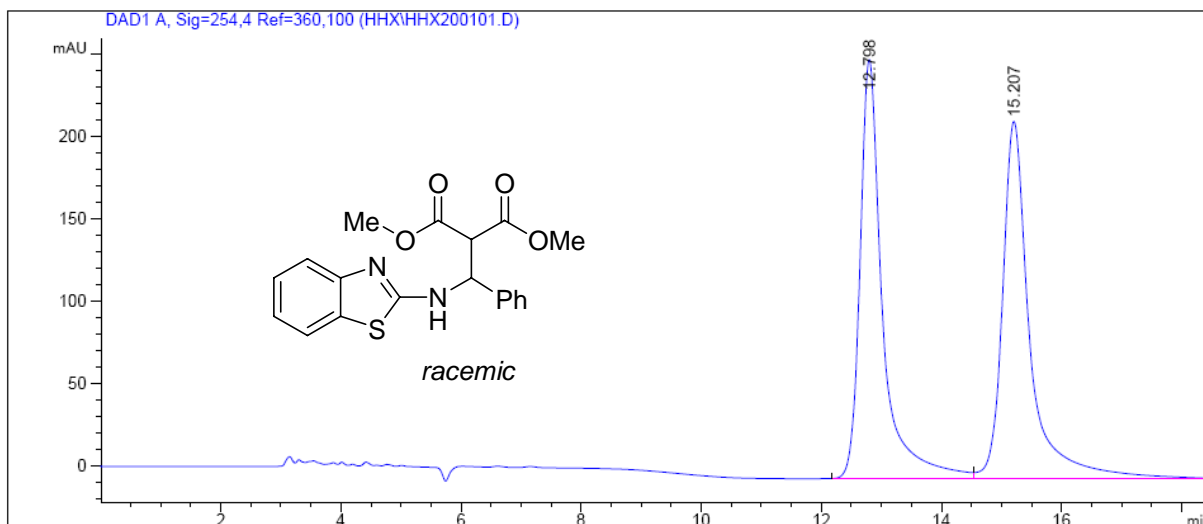
Peak #	RetTime [min]	Type	Width [min]	Area [mAU*s]	Height [mAU]	Area %
1	39.869	BB	1.4681	1.75195e4	183.79494	62.3243
2	45.783	BB	1.6894	1.05907e4	87.67013	37.6757



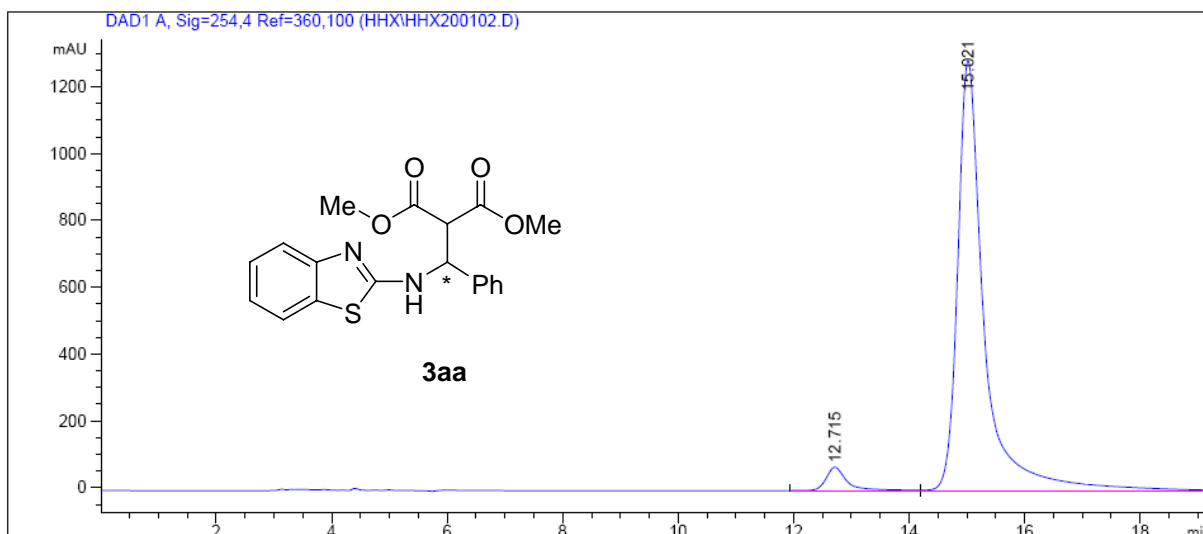
Peak #	RetTime [min]	Type	Width [min]	Area [mAU*s]	Height [mAU]	Area %
1	22.465	BB	0.8931	2.60541e4	423.87738	50.0479
2	34.192	BBA	1.4207	2.60041e4	263.19443	49.9521



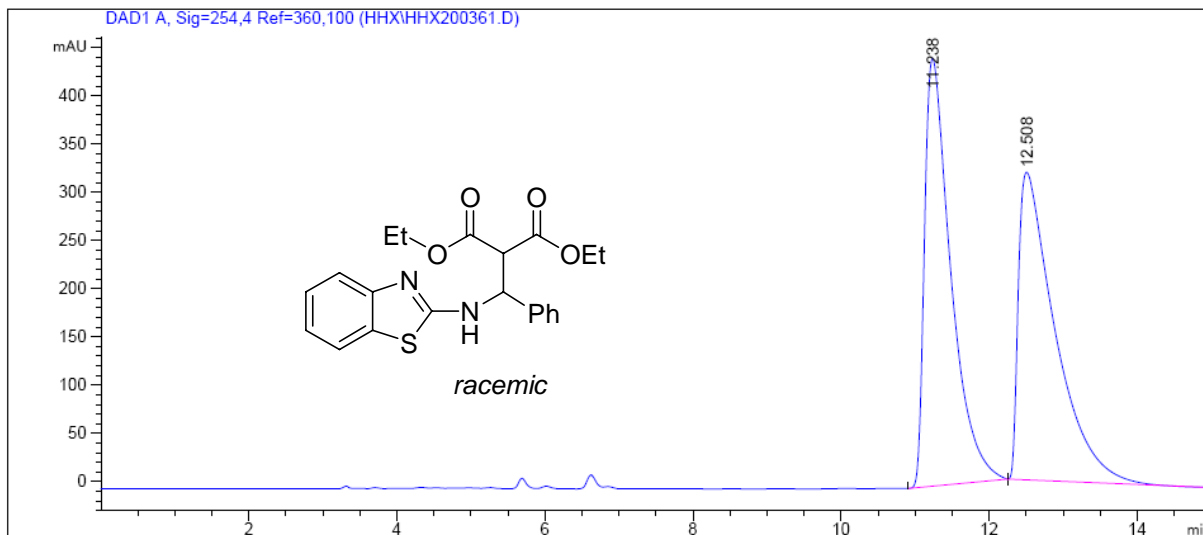
Peak #	RetTime [min]	Type	Width [min]	Area [mAU*s]	Height [mAU]	Area %
1	22.218	BB	0.8304	1.48998e4	259.27783	80.9859
2	34.639	BB	1.3085	3498.21851	39.52939	19.0141



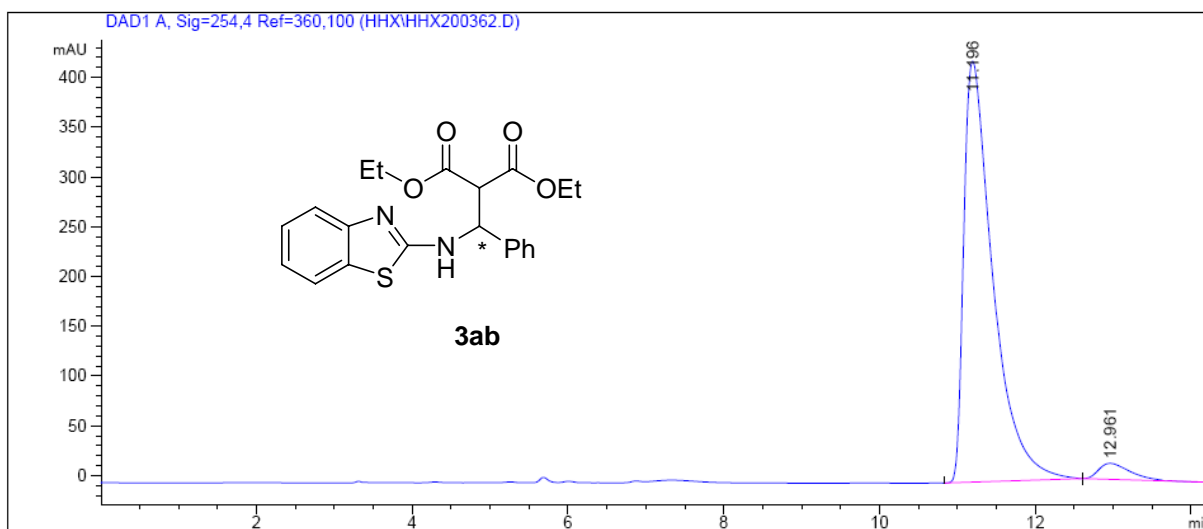
Peak #	RetTime [min]	Type	Width [min]	Area [mAU*s]	Height [mAU]	Area %
1	12.798	BV	0.3805	6641.60889	254.49521	49.0735
2	15.207	VBA	0.4626	6892.40527	216.95569	50.9265



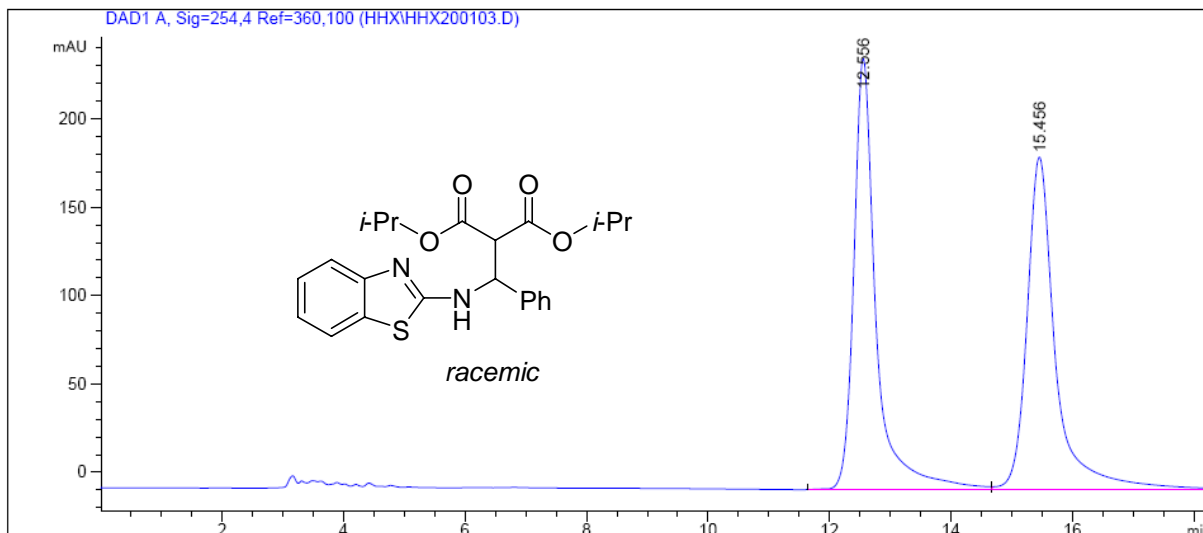
Peak #	RetTime [min]	Type	Width [min]	Area [mAU*s]	Height [mAU]	Area %
1	12.715	BV	0.3788	1817.27551	70.02228	4.2137
2	15.021	VBA	0.4709	4.13110e4	1285.62329	95.7863



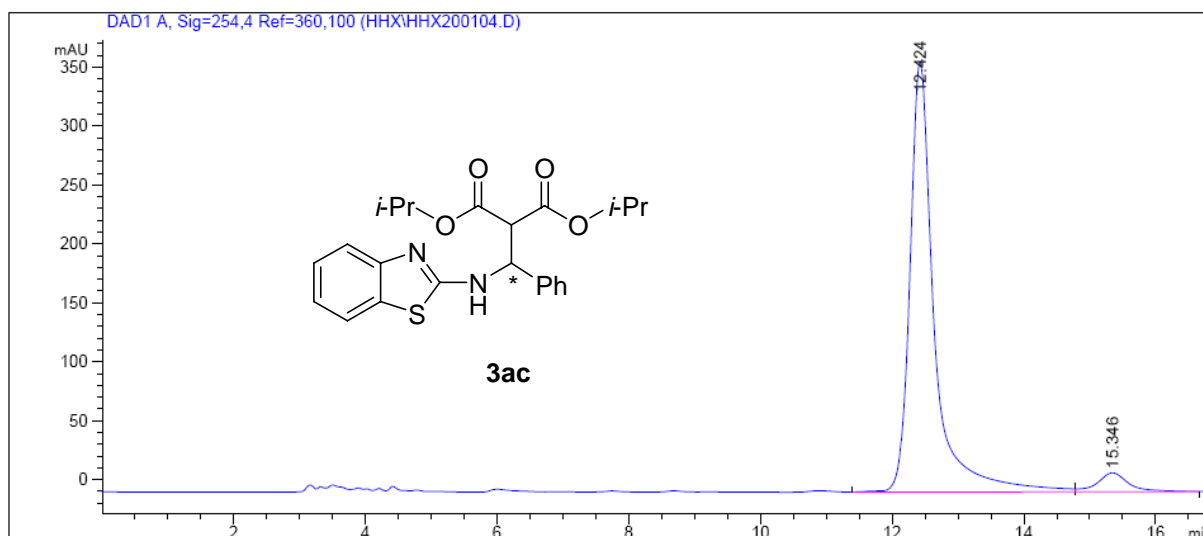
Peak #	RetTime [min]	Type	Width [min]	Area [mAU*s]	Height [mAU]	Area %
1	11.238	BB	0.3671	1.09164e4	443.61301	50.0083
2	12.508	BBA	0.4952	1.09127e4	318.94205	49.9917



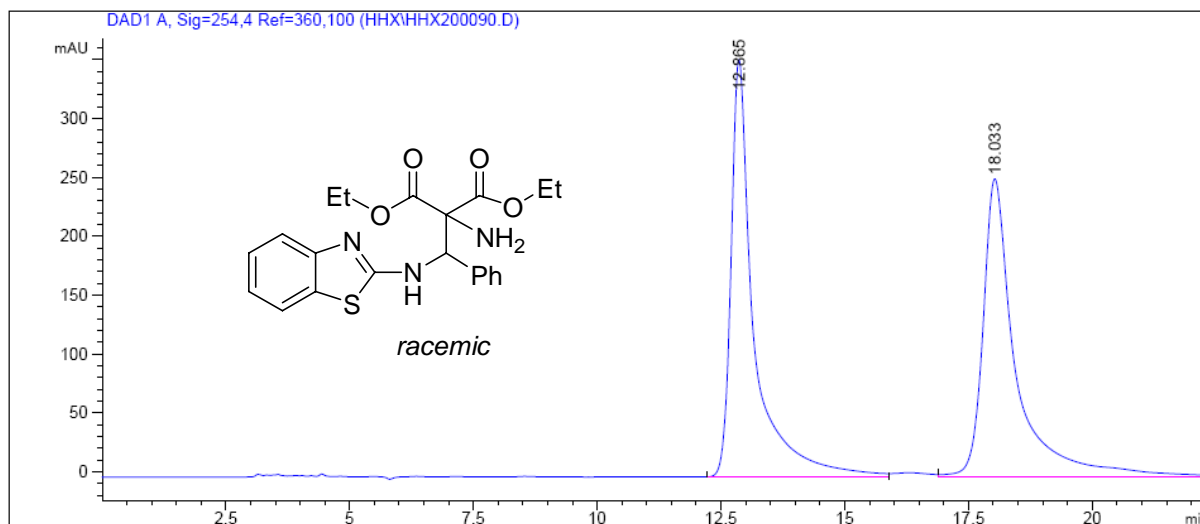
Peak #	RetTime [min]	Type	Width [min]	Area [mAU*s]	Height [mAU]	Area %
1	11.196	BB	0.3866	1.09626e4	422.67914	96.0652
2	12.961	BBA	0.4311	449.02377	16.01732	3.9348



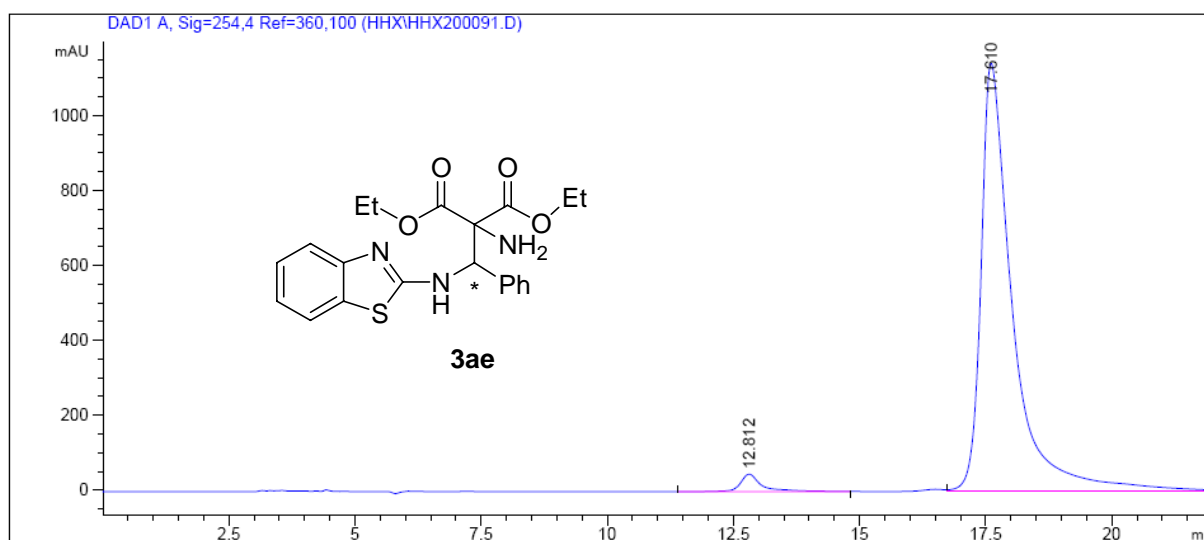
Peak #	RetTime [min]	Type	Width [min]	Area [mAU*s]	Height [mAU]	Area %
1	12.556	BV	0.3743	6233.04883	243.81277	50.2843
2	15.456	VBA	0.4782	6162.56641	188.11639	49.7157



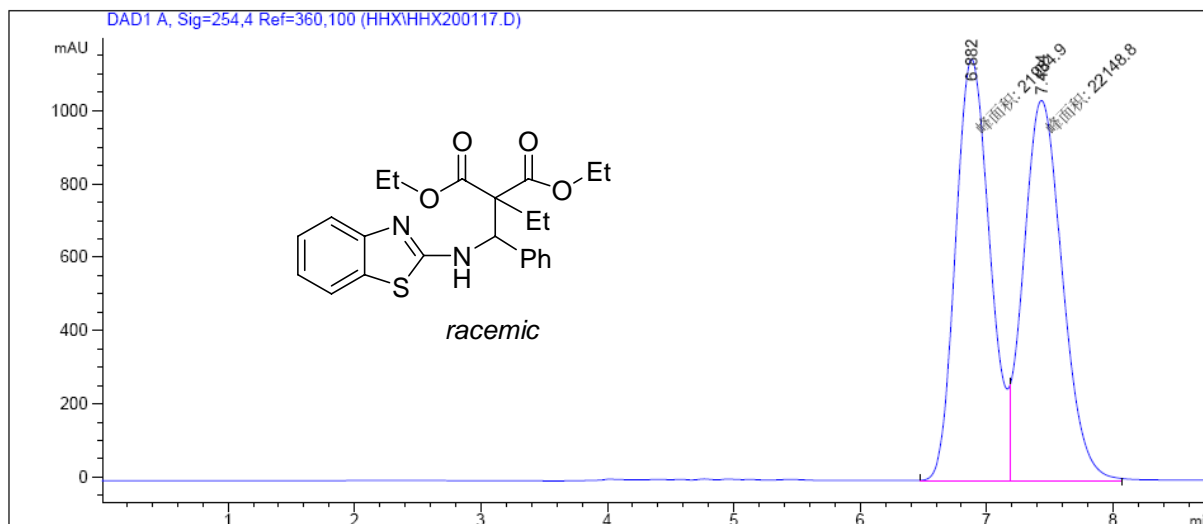
Peak #	RetTime [min]	Type	Width [min]	Area [mAU*s]	Height [mAU]	Area %
1	12.424	VV	0.3763	9396.74023	365.11203	94.6810
2	15.346	VB	0.4848	527.89600	16.00393	5.3190



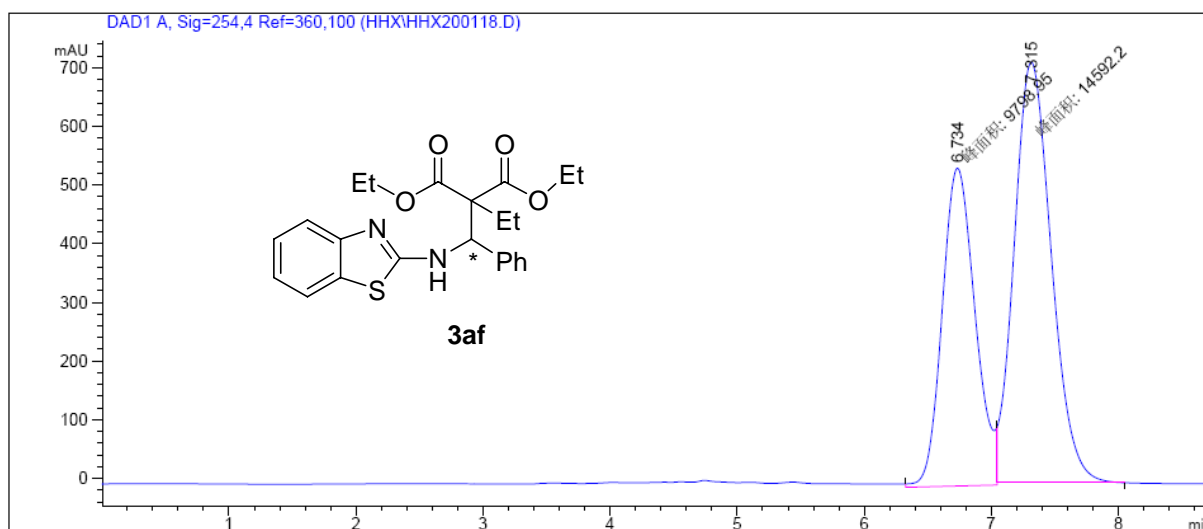
Peak #	RetTime [min]	Type	Width [min]	Area [mAU*s]	Height [mAU]	Area %
1	12.865	BV	0.4583	1.14893e4	354.32678	49.3377
2	18.033	VBA	0.6597	1.17977e4	253.14731	50.6623



Peak #	RetTime [min]	Type	Width [min]	Area [mAU*s]	Height [mAU]	Area %
1	12.812	BB	0.4327	1411.81824	46.69998	2.7385
2	17.610	VBA	0.6319	5.01420e4	1142.76855	97.2615



Peak #	RetTime [min]	Type	Width [min]	Area [mAU*s]	Height [mAU]	Area %
1	6.882	MM	0.3180	2.19849e4	1152.26453	49.8143
2	7.434	MM	0.3550	2.21488e4	1039.84937	50.1857



Peak #	RetTime [min]	Type	Width [min]	Area [mAU*s]	Height [mAU]	Area %
1	6.734	MM	0.3013	9798.94727	542.06250	40.1742
2	7.315	MM	0.3391	1.45922e4	717.26166	59.8258