Supporting Information for

Enantioselective Synthesis of 5-Alkylated thiazolidinones via Palladium-Catalyzed Asymmetric Allylic C−H Alkylations of 1,4-Pentadienes with 5*H*-Thiazol-4-ones

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1. General Information

NMR spectra were recorded on a Brucker-400 MHz spectrometer. Chemical shifts (δ) are given in ppm relative to TMS. The residual solvent signals were used as references and the chemical shifts converted to the TMS scale (CDCl3: δH = 7.26 ppm, δC = 77.16 ppm, DMSO: δH = 2.50 ppm, δC = 39.52 ppm).

The high resolution mass spectra were recorded on a Thermo LTQ Orbitrap XL (ESI+) or a P-SIMS-Gly of Brucker DaltonicsInc (EI+). Infrared spectra were recorded on a Nicolet MX-1E FT-IR spectrometer. Enantiomeric excesses were performed on Waters-Breeze (2487 Dual λ Absorbance Detector and 1525 Binary HPLC Pump, UV detection monitored at 254 nm or 230nm). Chiralpak OD-H, IC, IE and ID columns were purchased from Daicel Chemical Industries, LTD.

The absolute configuration of **3da** was assigned by the X-ray analysis. Optical rotations were determined at 589 nm (sodium D line) by using a Perkin-Elmer-343 polarimeter.

2. Materials:

Starting materials were purchased from commercial suppliers (Aldrich, Acros, TCI, J&K, etc.) and used as supplied unless otherwise stated.

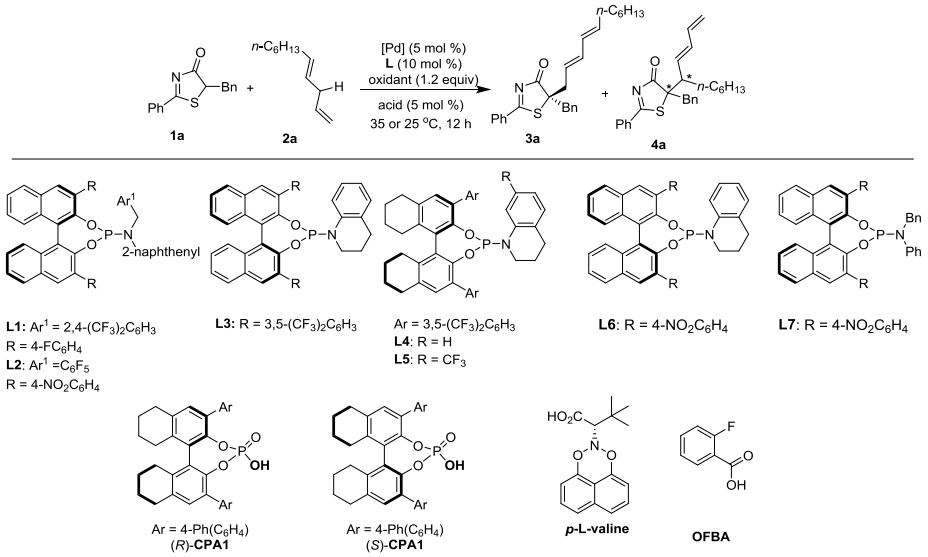
$Pd_2(dba)_3$, Pd (dba)$_2$ and $Pd(OAc)_2$ were purchased from Aldrich.

1, 4-Pentadiene and trans-1, 4-hexadiene were purchased from commercial suppliers (Aldrich and TCI). Other substituted 1, 4-pentadienes were prepared by following the literature report.[1]

5H-thiazol-4-ones were prepared by following the literature report.[2]

All solvents were purified and dried according to standard methods prior to use, unless stated otherwise.

Table S1. Establishment of Optimal Conditions for the Allylic C-H Alkylation Reaction of 1,4-Pentadiene 2a with 5H-thiazol-4-ones 3a

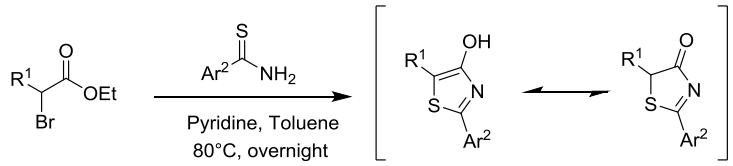


entry	[Pd]	L	acid	yield (%)[b]	3a/4aa [c]	ee (%)[c]
1[d]	$Pd(dba)_2$	**L7**	OFBA	trace	–	–
2	$Pd_2(dba)_3$	PPh_3	OFBA	trace	–	–
3	$Pd_2(dba)_3$	**L1**	OFBA	67	13:1	-6
4	$Pd_2(dba)_3$	**L2**	OFBA	44	15:1	57
5	$Pd_2(dba)_3$	**L3**	OFBA	47	10:1	-58
6	$Pd_2(dba)_3$	**L4**	OFBA	62	18:1	78
7	$Pd_2(dba)_3$	**L5**	OFBA	91	17:1	88
8	$Pd_2(dba)_3$	**L6**	OFBA	26	9:1	5
9 [d]	$Pd_2(dba)_3$	**L5**	OFBA	77	17:1	88
10	$Pd(dba)_2$	**L5**	OFBA	63	18:1	87
11	$Pd(OAc)_2$	**L5**	OFBA	16	–	87
12	$Pd_2(dba)_3$	**L5**	PhCOOH	50	17:1	87
13	$Pd_2(dba)_3$	**L5**	CH_3COOH	92	18:1	86
14	$Pd_2(dba)_3$	**L5**	Ph_2POOH	91	18:1	87
15	$Pd_2(dba)_3$	**L5**	$(PhO)_2POOH$	trace	–	-
16	$Pd_2(dba)_3$	**L5**	*p*-L-valine	68	23:1	86
17	$Pd_2(dba)_3$	**L5**	(*R*)-CPA1	63	14:1	86
18	$Pd_2(dba)_3$	**L5**	(*S*)-CPA1	50	17:1	88
19	$Pd_2(dba)_3$	**L5**	$TsOH•H_2O$	trace	–	–
20	$Pd_2(dba)_3$	**L5**	none	77	6:1	54
21[e]	$Pd_2(dba)_3$	**L5**	OFBA	95	20:1	90

[a]Reaction conditions: Unless indicated otherwise, reactions of **1a** (0.10 mmol), **2a** (0.20 mmol), Pd (0.005 mmol), ligand (0.01 mmol), OFBA (0.005 mmol), and 2,6-DMBQ (0.12 mmol) were carried out in toluene (2 mL) for 12 h. [b]The yields and ratios of **3a**/**4a** were determined by ^{1}H NMR analysis of the crude reaction mixture. [c]The ee value was determined by chiral HPLC analysis. [d]2,5-DMBQ (0.12 mmol) was used instead of 2,6-DMBQ. [e]The reaction was carried out at 25 ℃. 2,5(6)-DMBQ = 2,5(6)-dimethylquinone, OFBA = 2-fluorobenzoic acid, dba = dibenzylidene acetone.

3. Experimental procedures and characterization of new compounds.

Typical procedure for synthesis of 5H-thiazol-4-ones [2]



General procedure A:

Ethyl bromopropionate (3.96 g, 21.9 mmol) was added dropwise to a solution of thiobenzamide (3.00 g, 21.9 mmol) and pyridine (7 mL, 87.5 mmol) in toluene (200 mL) at 23 ℃. The reaction mixture was heated to 80 ℃ for 6 h and allowed to be cooled down to 23 ℃. The solvent was evaporated and the solid was recrystallized from ethanol to afford product (3.3 g, 81%).

3.1 Substrate 1a-1p can be prepared from General procedure A:

5-benzyl-2-phenylthiazol-4-ol (1a)

Faint yellow neat solid. 81% yield. **^{1}H NMR** (400 MHz, DMSO-d^{6}) δ 10.59 (s, 1H), 7.78 (m, 2H), 7.43 (m, 3H), 7.34 – 7.24 (m, 4H), 7.21 (m, 1H), 3.98 (s, 2H). **^{13}C NMR** (101 MHz, DMSO-d^{6}) δ 159.4, 158.6, 140.5, 133.2, 129.5, 129.0, 128.4, 128.1, 126.2, 124.8, 107.5, 29.7. **IR** (KBr): γ 3435, 1589, 1503, 1492, 1454, 1407, 1242, 1148, 1074, 1052, 759, 710, 683 cm^{-1}. **HRMS** (ESI): m/z [M + H] $^{+}$ calcd for [$C_{16}H_{14}NOS$] $^{+}$ requires 268.0791, found 268.0800.

5-(4-fluorobenzyl)-2-phenylthiazol-4-ol (1b)

Yellow neat. 53% yield. **^{1}H NMR** (400 MHz, DMSO-d^{6}) δ 10.62 (s, 1H), 7.78 (m, 2H), 7.43 (m, 3H), 7.32 – 7.25 (m, 1H), 7.12 (m, 2H), 3.98 (s, 2H). **^{13}C NMR** (101 MHz, DMSO-d^{6}) δ 162.0, 159.6, 159.5, 158.6, 136.7, 136.7, 133.2, 129.9, 129.8, 129.6, 129.1, 124.8, 115.2, 115.0. **IR** (KBr): γ 3444, 2916, 1585, 1511, 1435, 1041, 1243, 1150, 1111, 1055, 970, 808, 757, 683 cm^{-1}. **HRMS** (ESI): m/z [M + H] $^{+}$ calcd for [$C_{16}H_{13}FNOS$] $^{+}$ requires 286.0696, found 286.0706.

5-(3-methoxybenzyl)-2-phenylthiazol-4-ol (1c)

Yellow solid. 48% yield. **^{1}H NMR** (400 MHz, DMSO-d^{6}) δ 10.58 (s, 1H), 7.90 – 7.64 (m, 2H), 7.57 – 7.36 (m, 3H), 7.22 (m, 2H), 6.99 – 6.64 (m, 1H), 3.95 (s, 2H), 3.72 (s, 3H). **^{13}C NMR** (101 MHz, DMSO-d^{6}) δ 159.4, 159.3, 158.6, 142.1, 133.3, 129.6, 129.5, 129.1, 124.8, 120.3, 113.9, 111.6, 107.4, 54.9, 29.7. **IR** (KBr): γ 3435, 2930, 2833, 2649, 1585, 1502, 1485, 1471, 1434, 1400, 1314, 1244, 1226, 1186, 1084, 1052, 1038, 791, 781, 763, 746, 732, 685 cm^{-1}. **HRMS** (ESI): m/z [M + H] $^{+}$ calcd for [$C_{17}H_{16}NO_2S$] $^{+}$ requires 298.0896, found 298.0901.

4-((4-hydroxy-2-phenylthiazol-5-yl) methyl) benzonitrile (1d)

Yellow solid. 79% yield. **^{1}H NMR** (400 MHz, DMSO-d^{6}) δ 10.73 (s, 1H), 7.99 – 7.67 (m, 4H), 7.55 – 7.25 (m, 5H), 4.09 (s, 2H). **^{13}C NMR** (101 MHz, DMSO-d^{6}) δ 160.0, 159.0, 146.4, 133.1, 132.4, 129.7, 129.2, 129.1, 124.9, 118.8, 109.1, 105.6, 29.5. **IR** (KBr): γ 3431, 3069, 2652, 2225, 1606, 1585, 1503, 1482, 1439, 1410, 1307, 1240, 1178, 1140, 1043, 765, 758, 684 cm^{-1}. **HRMS** (ESI): m/z [M + H] $^{+}$ calcd for [$C_{17}H_{13}N_2OS$] $^{+}$ requires 293.0743, found 293.0752.

5-(naphthalen-2-ylmethyl)-2-phenylthiazol-4-ol (1e)

Light yellow solid. 75% yield. **^{1}H NMR** (400 MHz, DMSO-d^{6}) δ 10.66 (s, 1H), 7.90 – 7.83 (m, 2H), 7.81 – 7.73 (m, 3H), 7.45 (m, 6H), 4.16 (s, 2H). **^{13}C NMR** (101 MHz, DMSO-d^{6}) δ 159.6, 158.6, 138.2, 133.2, 133.0, 131.7, 129.6, 129.0, 128.0, 127.4, 127.3, 126.9, 126.1, 126.1, 125.5, 124.8, 107.4, 29.9. **IR** (KBr): γ 3436, 3050, 2642, 1713, 1583, 1502, 1482, 1437, 1405, 1286, 1242, 1143, 1052, 823, 758, 683 cm^{-1}. **HRMS** (ESI): m/z [M + H] $^{+}$ calcd for [$C_{20}H_{16}NOS$] $^{+}$ requires 318.0947, found 318.0950.

5-(2-chlorobenzyl)-2-phenylthiazol-4-ol (1f)

Yellow powder. 47% yield. **^{1}H NMR** (400 MHz, DMSO-d^{6}) δ 10.66 (s, 1H), 7.78 (m, 2H), 7.48 – 7.40 (m, 4H), 7.37 (m, 1H), 7.31 (m, 2H), 4.08 (s, 2H). **^{13}C NMR** (101 MHz, DMSO-d^{6}) δ 159.7, 158.9, 137.7, 133.1, 132.6, 130.5, 129.6, 129.3, 129.1, 128.4, 127.4, 124.8, 105.3, 27.7. **IR** (KBr): γ 3437, 1584, 1574, 1503, 1475, 1441, 1415, 1241, 1150, 1054,758, 743, 710, 685 cm^{-1}. **HRMS** (ESI): m/z [M + H] $^{+}$ calcd for [$C_{16}H_{13}ClNOS$] $^{+}$ requires 302.0401, found 302.0411.

5-(3-chlorobenzyl)-2-phenylthiazol-4-ol (1g)

Yellow solid. 63% yield. **^{1}H NMR** (400 MHz, DMSO-d^{6}) δ 10.67 (s, 1H), 7.79 (m, 2H), 7.53 – 7.40 (m, 3H), 7.38 – 7.30 (m, 2H), 7.29 (m, 1H) 7.26 (m, 1H), 4.01 (s, 2H). **^{13}C NMR** (101 MHz, DMSO-d^{6}) δ 159.8, 158.8, 143.1, 133.1, 133.0, 130.3, 129.7, 129.0, 127.9, 126.8, 126.2, 124.8, 106.4, 29.1. **IR** (KBr): γ 3437, 3061, 2660, 1587, 1574, 1503, 1474, 1435, 1407, 1242, 1189, 1148, 1079, 1054, 758, 781, 753, 683 cm^{-1}. **HRMS** (ESI): m/z [M + H] $^{+}$ calcd for [$C_{16}H_{13}ClNOS$] $^{+}$ requires 302.0401, found 302.0410.

5-(4-chlorobenzyl)-2-phenylthiazol-4-ol (1h)

Yellow neat. 56% yield. **^{1}H NMR** (400 MHz, DMSO-d^{6}) δ 10.64 (s, 1H), 7.78 (m, 2H), 7.48 – 7.40 (m, 3H), 7.36 (m, 2H), 7.28 (m, 2H), 3.98 (s, 2H). **^{13}C NMR** (101 MHz, DMSO-d^{6}) δ 159.7, 158.7, 139.6, 133.2, 130.9, 130.0, 129.6, 129.1, 128.4, 124.8, 106.8, 28.9. **IR** (KBr): γ 3435, 2917, 2642, 1587, 1503, 1489, 1458, 1401, 1242, 1199, 1148, 1091, 1045, 823, 810, 756, 683 cm^{-1}. **HRMS** (ESI): m/z [M + H] $^{+}$ calcd for [$C_{16}H_{13}ClNOS$] $^{+}$ requires 302.0401, found 302.0408.

5-(3-methylbenzyl)-2-phenylthiazol-4-ol (1i)

Yellow solid.65% yield. **^{1}H NMR** (400 MHz, DMSO-d^{6}) δ 10.57 (s, 1H), 7.88 – 7.73 (m, 2H), 7.55 – 7.36 (m, 3H), 7.18 (m, 1H), 7.03 (m, 3H), 3.94 (s, 3H) 2.26 (s, 2H). **^{13}C NMR** (101 MHz, DMSO-d^{6}) δ 159.4, 158.5, 140.5, 137.5, 133.3, 129.6, 129.0, 128.7, 128.3, 126.9, 125.2, 124.8, 107.6, 29.6, 20.9. **IR** (KBr): γ 3434, 2926, 1585, 1503, 1437, 1402, 1242, 1155, 1058, 975, 755, 681 cm^{-1}. **HRMS** (ESI): m/z [M + H] $^{+}$ calcd for [$C_{17}H_{16}NOS$] $^{+}$ requires 282.0947, found 282.0958.

5-(2-methylbenzyl)-2-phenylthiazol-4-ol (1j)

Yellow solid. 71% yield. **^{1}H NMR** (400 MHz, DMSO-d^{6}) δ 10.59 (s, 1H), 7.84 – 7.70 (m, 2H), 7.51 – 7.33 (m, 2H), 7.26 – 7.03 (m, 4H), 3.95 (s, 2H), 2.28 (s, 3H). **^{13}C NMR** (101 MHz, DMSO-d^{6}) δ 159.4, 158.3, 138.7, 135.6, 133.2, 130.1, 129.5, 129.0, 128.6, 126.5, 126.0, 124.8, 107.2, 27.7, 18.8. **IR** (KBr): γ 3438, 2285, 1587, 1420, 1241, 1147, 1111, 1052 cm^{-1}. **HRMS** (ESI): m/z [M + H] $^{+}$ calcd for [$C_{17}H_{16}NOS$] $^{+}$ requires 282.0947, found 282.0949.

5-(4-methylbenzyl)-2-phenylthiazol-4-ol (1k)

Yellow solid. 72% yield. **^{1}H NMR** (400 MHz, DMSO-d^{6}) δ 10.55 (s, 1H), 7.80 – 7.74 (m, 2H), 7.47 – 7.39 (m, 3H), 7.12 (q, *J* = 8.0 Hz, 4H), 3.94 (s, 2H), 2.25 (s, 3H). **^{13}C NMR** (101 MHz, DMSO-d^{6}) δ 159.3, 158.4, 137.5, 135.2, 133.3, 129.5, 129.0, 129.0, 128.0, 124.8, 107.9, 29.3, 20.5. **IR** (KBr): γ 3444, 2916, 1585, 1511, 1435, 1401, 1243, 1150, 1111, 1055, 970, 808, 757, 683 cm^{-1}. **HRMS** (ESI): m/z [M + H] $^{+}$ calcd for [$C_{17}H_{16}NOS$] $^{+}$ requires 282.0947, found 282.0955.

5-(2-bromobenzyl)-2-phenylthiazol-4-ol (1l)

Yellow solid. 76% yield. **^{1}H NMR** (400 MHz, DMSO-d^{6}) δ 10.67 (s, 1H), 7.78 (m, 2H), 7.62 (m, 1H), 7.47 – 7.40 (m, 3H), 7.38 – 7.34 (m, 2H), 7.23 – 7.16 (m, 1H), 4.08 (s, 2H). **^{13}C NMR** (101 MHz, DMSO-d^{6}) δ 159.7, 158.9, 139.4, 133.1, 132.6, 130.5, 129.6, 129.0, 128.6, 128.0, 124.8, 123.3, 105.4, 30.3. **IR** (KBr): γ 3435, 2361, 1571, 1500, 1475, 1396, 1238, 1144, 1070, 1042, 764, 688 cm^{-1}. **HRMS** (ESI): m/z [M + H] $^{+}$ calcd for [$C_{16}H_{13}BrNOS$] $^{+}$ requires 345.9896, found 345.9905.

5-(3-bromobenzyl)-2-phenylthiazol-4-ol (1m)

Yellow solid. 59% yield. **^{1}H NMR** (400 MHz, DMSO-d^{6}) δ 10.67 (s, 1H), 7.79 (m, 2H), 7.48 – 7.38 (m, 5H), 7.27 (m, 2H), 4.00 (s, 2H). **^{13}C NMR** (101 MHz, DMSO-d^{6}) δ 159.8, 158.8, 143.4, 133.2, 130.8, 130.6, 129.7, 129.1, 129.0, 127.2, 124.8, 121.6, 106.4,

29.1. **IR** (KBr): γ 3435, 2361, 1571, 1500, 1475, 1396, 1238, 1144, 1070, 1042, 764, 688 cm^{-1}. **HRMS** (ESI): m/z [M + H] $^+$ calcd for $[C_{16}H_{13}BrNOS]^+$ requires 345.9896, found 345.9901.

5-(4-bromobenzyl)-2-phenylthiazol-4-ol (1n)

Yellow solid. 63% yield. **^{1}H NMR** (400 MHz, DMSO-d^6) ^{1}H NMR (400 MHz, DMSO) δ 10.64 (s, 1H), 7.78 (m, 2H), 7.49 (m, 2H), 7.47 – 7.40 (m, 3H), 7.22 (m, 2H), 3.96 (s, 2H). **^{13}C NMR** (101 MHz, DMSO-d^6) **^{13}C NMR** (101 MHz, DMSO) δ 159.7, 158.7, 140.0, 133.2, 131.3, 130.4, 129.6, 129.1, 124.8, 119.3, 106.7, 29.0. **IR** (KBr): γ 3442, 2360, 2341, 1584, 1441, 1419, 11149, 1041 cm^{-1}. **HRMS** (ESI): m/z [M + H] $^+$ calcd for $[C_{16}H_{13}BrNOS]^+$ requires 345.9896, found 345.9899.

5-methyl-2-phenylthiazol-4-ol (1o)

Yellow neat crystal. 81% yield. **^{1}H NMR** (400 MHz, DMSO-d^6) δ 10.30 (s, 1H), 7.78 (m, 2H), 7.64 – 7.28 (m, 4H), 2.21 (s, 3H). **^{13}C NMR** (101 MHz, DMSO-d^6) δ 158.7, 158.2, 133.3, 129.4, 129.1, 124.7, 102.5, 9.1. **IR** (KBr): γ 3438, 1585, 1500, 1457, 1401, 1374, 1235, 1125, 1000, 981, 761, 683 cm^{-1}. **HRMS** (ESI): m/z [M + H] $^+$ calcd for $[C_{10}H_{10}NOS]^+$ requires 192.0478, found 192.0485.

3.2 Substrate 5a-5f can also be prepared from General procedure ：

2,5-diphenylthiazol-4-ol (5a)

Yellow neat. 83% yield. **^{1}H NMR** (400 MHz, DMSO-d^6) δ 11.59 (s, 1H), 7.90 (dt, *J* = 4.0, 2.2 Hz, 2H), 7.81 – 7.68 (m, 2H), 7.58 – 7.45 (m, 3H), 7.45 – 7.35 (m, 2H), 7.28 – 7.12 (m, 1H). **^{13}C NMR** (101 MHz, DMSO-d^6) δ 159.6, 158.4, 132.9, 131.7, 130.2, 129.2, 128.8, 126.0, 125.8, 125.1, 107.5. **IR** (KBr): γ 2919, 2569, 1571, 1489, 1455, 1420, 1332, 1047, 774, 758, 686 cm^{-1}.**HRMS** (ESI): m/z [M + H] $^+$ calcd for $[C_{15}H_{12}NOS]^+$ requires 254.0640, found 254.0636.

5-phenyl-2-(m-tolyl) thiazol-4-ol (5b)

Orange neat. 90% yield. **^{1}H NMR** (400 MHz, DMSO-d^6) δ 11.60 (s, 1H), 7.72 (t, *J* = 11.7 Hz, 4H), 7.40 (t, *J* = 7.4 Hz, 3H), 7.30 (d, *J* = 7.5 Hz, 1H), 7.22 (t, *J* = 7.3 Hz, 1H). **^{13}C NMR** (101 MHz, DMSO-d^6) δ 160.2, 158.8, 139.0, 133.3, 132.2, 131.3, 129.6, 129.2, 126.5, 126.3, 126.1, 122.8, 107.8, 21.4. **IR** (KBr): γ 3085, 3058, 2963, 2924, 2854, 1717, 1602, 1586, 1514, 1477, 1445, 1376, 1266, 1181, 1152, 1090, 1004, 953, 907, 796, 759, 693 cm^{-1}. **HRMS** (ESI): m/z [M + H] $^+$ calcd for $[C_{16}H_{14}NOS]^+$ requires 268.0796, found 268.0789.

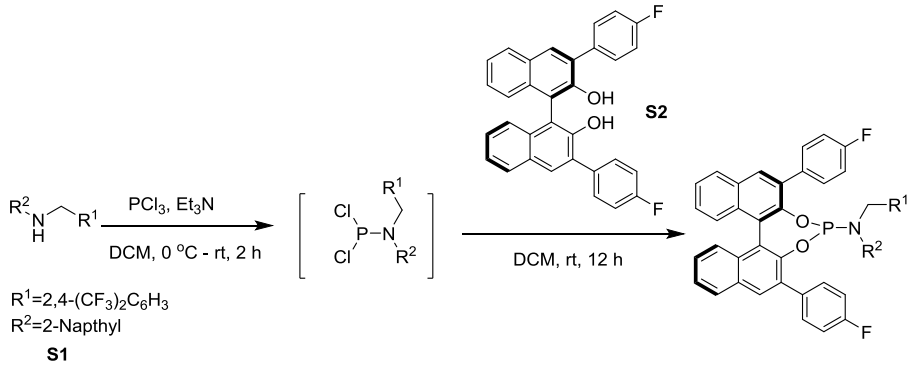
2-(4-bromophenyl)-5-phenylthiazol-4-ol (5c)

Yellow neat. 85% yield. **^{1}H NMR** (400 MHz, DMSO-d^6) δ 11.64 (s, 1H), 7.82 (d, *J* = 8.6 Hz, 2H), 7.72 (t, *J* = 8.6 Hz, 4H), 7.41 (t, *J* = 7.8 Hz, 2H), 7.24 (t, *J* = 7.4 Hz, 1H). **^{13}C NMR** (101 MHz, DMSO-d^6) δ 158.5, 158.2, 132.2, 132.0, 131.5, 128.8, 127.0, 126.2, 125.9, 123.3, 108.1. **IR** (KBr): γ 3060, 3038, 2966, 2926, 2854, 1716, 1651, 1596, 1521, 1494, 1445, 1410, 1376, 1298, 1256, 1154, 1101, 1035, 1007, 947, 908, 843, 810, 763, 736, 697 cm^{-1}. **HRMS** (ESI): m/z [M + H] $^+$ calcd for $[C_{15}H_{11}BrNOS]^+$ requires 331.9745, found 331.9744.

2-(4-fluorophenyl)-5-phenylthiazol-4-ol (5d)

Yellow neat. 85% yield. **^{1}H NMR** (400 MHz, DMSO-d^6) δ 11.60 (s, 1H), 8.10 – 7.89 (m, 2H), 7.86 – 7.69 (m, 2H), 7.37 (ddd, *J* = 15.6, 12.2, 4.8 Hz, 4H), 7.23 (t, *J* = 7.4 Hz, 1H). **^{13}C NMR** (101 MHz, DMSO-d^6) δ 164.3, 161.8, 158.4 (d, *J* = 9.1 Hz), 131.69, 129.5 (d, *J* = 3.1 Hz), 128.7, 127.49(d, *J* = 8.7 Hz), 126.08, 125.8, 116.3 (d, *J* = 22.3 Hz), 107.62. **IR** (KBr): γ 3086, 3057, 2961, 1720, 1586, 1567, 1514, 1477, 1398, 1376, 1304, 1255, 1154, 1106, 1069, 1035, 1010, 947, 906, 834, 762, 696 cm^{-1}. **HRMS** (ESI): m/z [M + H] $^+$ calcd for $[C_{15}H_{11}FNOS]^+$ requires 272.0545, found 272.0544.

3.3 Chiral Ligand Preparation General procedure:

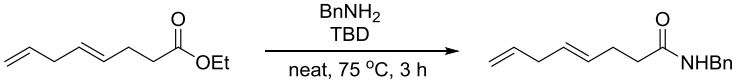


To a stirred solution of Et_3N (0.21 mL, 1.52 mmol, 8.0 equiv) and PCl_3 (0.15 mL（2M in CH_2Cl_2）, 0.29 mmol, 1.5 equiv) in DCM (2 mL, dried over CaH_2) at 0 °C was slowly added amine S1(0.29 mmol, 1.5 equiv) and the mixture was stirred at room temperature for 2 h. After the mixture was cooled down to 0 °C, S2 (100 mg, 0.19 mmol, 1.0 equiv) was added as solid in one portion. The mixture was further stirred at room temperature for 12 h. The mixture was concentrated in vacuo and the residue was purified by flash chromatography (SiO_2, light petroleum/dichloromethane) to provide the product **L1**.

N-(2,4-bis(trifluoromethyl)benzyl)-2,6-bis(4-fluorophenyl)-N-(naphthalen-2-yl)dinaphtho[2,1-d:1',2'-f][1,3,2]dioxaphosphepin-4-amine (L1)

White neat solid. Yield: 90 %, 149.0 mg. **^{1}H NMR** (400 MHz, $CDCl_3$) δ 8.12 (s, 1H), 8.04 – 7.94 (m, 3H), 7.80 – 7.73 (m, 2H), 7.68 – 7.60 (m, 2H), 7.60 – 7.53 (m, 3H), 7.52 – 7.43 (m, 5H), 7.37 (ddd, *J* = 9.7, 7.2, 4.8 Hz, 4H), 7.34 – 7.27 (m, 2H), 7.24 – 7.16 (m, 2H), 7.01 (dd, *J* = 14.7, 6.0 Hz, 2H), 6.59 (s, 1H), 6.50 (dd, *J* = 8.8, 1.4 Hz, 1H), 4.40 (d, *J* = 17.7 Hz, 1H), 4.26 (d, *J* = 17.5 Hz, 1H). **^{13}C NMR** (101 MHz, $CDCl_3$) δ 163.8, 161.3, 146.5, 146.0, 143.0, 141.7, 141.2, 140.1, 136.8, 133.6, 133.4, 133.1, 132.4, 132.3, 132.1, 131.8, 131.3, 131.1, 130.6, 130.5, 130.3, 129.2, 128.7, 128.5, 128.4, 127.3, 127.2, 126.9, 126.7, 126.5, 126.4, 126.4, 125.7, 125.5, 125.1, 123.8, 121.8, 121.7, 121.1, 119.4, 119.3, 116.7, 115.5, 115.3, 115.1, 114.9, 113.8, 99.9, 46.0. **^{31}P NMR** (162 MHz, CDCl3) 135.85. **^{19}F NMR** (376 MHz, CDCl3) -61.42, -62.79, -114.27 (ddd), -114.51 (m). **IR** (KBr): γ 2389, 1771, 1629, 1506, 1344, 1265, 1130, 1052, 1015, 808, 753, 668, 511, 436, 418 cm^{-1}. **HRMS** (ESI): m/z $[M + H]^+$ calcd for $[C_{51}H_{31}F_8NO_2P]^+$ requires 872.1965, found 872.1970.

(E)-N-benzylocta-4, 7-dienamide



2m **2n**

To the mixture of **2m** (537 mg, 3.20 mmol) and benzylamine (411 mg, 3.84 mmol) was added TBD (1,5,7-Triazabicyclo[4.4.0]dec-5-ene) (134 mg, 0.96 mmol) at room temperature. The mixture was stirred at 75℃ for 3 h. Then the reaction mixture was cooled down to room tempeture and diluted with ether, washed with HCl (2 M), then extracted with ether (30 mL×3). The combined organic layers were dried over anhydrous Na_2SO_4. The mixture was filtered and concentrated in vacuo. The residue was purified by column chromatography on silica column.

White solid. Yield: 65%. **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.31 – 7.11 (m, 5H), 5.97 (s, 1H), 5.76 – 5.61 (m, 1H), 5.46 – 5.28 (m, 2H), 4.97 – 4.84 (m, 2H), 4.32 (d, *J* = 5.7 Hz, 2H), 2.64 (t, *J* = 5.6 Hz, 2H), 2.31 – 2.23 (m, 2H), 2.23 – 2.15 (m, 2H). **^{13}C NMR** (101 MHz, $CDCl_3$) δ 172.44, 138.45, 136.99, 129.65, 129.30, 128.73, 127.85, 127.52, 115.18, 43.60, 36.68, 36.48, 28.64. **HRMS** (ESI) m/z $(M+H)^+$ calculated for $C_{15}H_{19}NO$: 230.1539, observed: 230.1549.

1. General experimental procedures for the control experiment of 1,4-pentadienes with 5H-thiazol-4-ones

To a flame-dried and Ar-purged Schlenk tube (10 mL) were added 5H-Thiazol-4-ones (0.10 mmol), $Pd_2(dba)_3$ (0.0025 mmol), phosphoramidite **L5** (0.01 mmol), OFBA (0.005 mmol), 2,6-DMBQ (0.12 mmol) and a stirring bar. The schlenk tube was then

evacuated and filled with argon . This cycle was repeated three times and followed by the addition of toluene (2 mL) and 1, 4-pentadienes (0.20 mmol) via a syringe. The mixture was stirred at 25 ℃ for 72 h. The reaction mixture was purified by column chromatography on silica gel (petroleum/ethyl acetate = 20/1) to provide product **3**.

(*R*)-5-benzyl-2-phenyl-5-((*2E, 4E*)-undeca-2, 4-dien-1-yl) thiazol-4(5H)-one (3aa)

Colorless oil. Yield: 95 %, 39.6 mg; l/b: 20:1. Enantiomeric excess: 90%, determined by HPLC (CHIRALPAK IC, hexane/isopropanol = 97/3, flow rate 1.0 mL/min, T = 30 ℃, 254 nm): t_R= 23.143 min (minor), t_R= 27.210 min (major). $[\alpha]_D^{20}$ = -34.1 (c 0.26, $CHCl_3$). **^{1}H NMR** (400 MHz, $CDCl_3$) δ 8.02 (d, *J* = 7.5 Hz, 2H), 7.61 (t, *J* = 7.4 Hz, 1H), 7.45 (t, *J* = 7.8 Hz, 2H), 7.23 (d, *J* = 4.2 Hz, 4H), 7.21 – 7.15 (m, 1H), 6.12 (dd, *J* = 15.0, 10.4 Hz, 1H), 5.90 (dd, *J* = 15.0, 10.5 Hz, 1H), 5.67 – 5.57 (m, 1H), 5.41 (dt, *J* = 14.9, 7.4 Hz, 1H), 3.32 (d, *J* = 13.8 Hz, 1H), 3.23 (d, *J* = 13.8 Hz, 1H), 2.83 (dd, *J* = 14.1, 7.0 Hz, 1H), 2.72 (dd, *J* = 14.2, 7.8 Hz, 1H), 2.00 (q, *J* = 7.0 Hz, 2H), 1.38 – 1.14 (m, 8H), 0.86 (t, *J* = 6.7 Hz, 3H). **^{13}C NMR** (101 MHz, $CDCl_3$) δ 195.2, 194.8, 136.1, 135.4, 134.8, 132.3 130.4, 129.4, 128.9, 128.8, 128.2, 127.3, 123.3, 70.9, 44.3, 41.8, 32.6, 31.6, 29.1, 28.8, 22.6, 14.0. **IR** (KBr): γ 2959, 2925, 2854, 1598, 1720, 1513, 1484, 1446, 1261, 1165, 1093, 1028, 989, 800, 771, 700, 686 cm^{-1}. **HRMS** (ESI): m/z [M + H] $^+$ calcd for $[C_{27}H_{32}NOS]^+$ requires 418.2199, found 418.2205. The absolute configuration was assigned tentatively by analogy.

(*R*)-5-(4-fluorobenzyl)-2-phenyl-5-((*2E, 4E*)-undeca-2, 4-dien-1-yl) thiazol-4(5H)-one (3ba)

Colorless oil. Yield: 56 %, 24.4 mg; l/b: 38:1. Enantiomeric excess: 86%, determined by HPLC (CHIRALPAK IC, hexane/isopropanol = 90/10, flow rate 1.0 mL/min, T = 30 ℃, 254 nm): t_R= 10.509 min (minor), t_R= 11.409 min (major). $[\alpha]_D^{20}$ = -19.7 (c 0.06, $CHCl_3$). **^{1}H NMR** (400 MHz, $CDCl_3$) δ 8.00 (d, *J* = 8.0 Hz, 2H), 7.62 (t, *J* = 7.3 Hz, 1H), 7.46 (t, *J* = 7.7 Hz, 2H), 7.18 (dd, *J* = 8.1, 5.6 Hz, 2H), 6.90 (t, *J* = 8.5 Hz, 2H), 6.14 (dd, *J* = 14.9, 10.4 Hz, 1H), 5.91 (dd, *J* = 15.1, 10.4 Hz, 1H), 5.68 – 5.59 (m, 1H), 5.42 (dt, *J* = 14.9, 7.3 Hz, 1H), 3.30 (d, *J* = 13.9 Hz, 1H), 3.19 (d, *J* = 13.9 Hz, 1H), 2.77 (ddd, *J* = 33.8, 14.1, 7.4 Hz, 2H), 2.01 (q, *J* = 7.1 Hz, 2H), 1.35 – 1.17 (m, 8H), 0.86 (t, *J* = 6.6 Hz, 3H). **^{13}C NMR** (101 MHz, $CDCl_3$) δ 195.2, 194.6, 136.2, 135.6, 134.9, 132.1, 132.0, 131.9, 130.9, 129.3, 128.9, 128.8, 123.3, 115.2, 114.9, 43.2, 42.0, 32.6, 31.7, 29.1, 28.8, 22.6, 14.1. **IR** (KBr) γ3448, 2924, 2854, 1720, 1509, 1484, 1446, 1260, 1158, 1026, 800, 686 cm^{-1}. **HRMS** (ESI): m/z [M + H] $^+$ calcd for [C27H31FNOS] $^+$ requires 436.2105, found 436.2110. The absolute configuration was assigned tentatively by analogy.

(*R*)-5-(3-methylbenzyl)-2-phenyl-5-((*2E, 4E*)-undeca-2, 4-dien-1-yl) thiazol-4(5H)-one (3ca)

Colorless oil. Yield: 91 %, 40.7 mg; l/b: 17:1. Enantiomeric excess: 84%, determined by HPLC (CHIRALPAK IC, hexane/isopropanol = 90/10, flow rate 1.0 mL/min, T = 30 ℃, 254 nm): t_R= 16.297 min (minor), t_R= 18.723 min (major). $[\alpha]_D^{20}$ = -33.4 (c 0.27, $CHCl_3$). **^{1}H NMR** (400 MHz, $CDCl_3$) δ 8.04 (d, *J* = 7.3 Hz, 2H), 7.62 (t, *J* = 7.4 Hz, 1H), 7.46 (t, *J* = 7.8 Hz, 2H), 7.15 (t, *J* = 7.9 Hz, 1H), 6.86 – 6.70 (m, 3H), 6.12 (dd, *J* = 15.0, 10.4 Hz, 1H), 5.89 (dd, *J* = 15.1, 10.4 Hz, 1H), 5.68 – 5.56 (m, 1H), 5.40 (dt, *J* = 14.9, 7.4 Hz, 1H), 3.75 (s, 3H), 3.25 (dd, *J* = 31.8, 13.8 Hz, 2H), 2.81 (dd, *J* = 14.2, 7.0 Hz, 1H), 2.70 (dd, *J* = 14.1, 7.8 Hz, 1H), 2.00 (q, *J* = 7.0 Hz, 2H), 1.32 – 1.12 (m, 8H), 0.92 – 0.76 (m, 3H). **^{13}C NMR** (101 MHz, $CDCl_3$) δ 195.3, 194.8, 159.3, 137.0, 136.1, 135.4, 134.8, 132.2, 129.3, 129.2, 128.9, 128.8, 123.2, 122.7, 116.0, 112.8, 70.8, 55.2, 44.3, 41.8, 32.5, 31.6, 29.1, 28.8, 22.5, 14.0. **IR** (KBr) γ 2958, 2926, 2854, 1725, 1514, 1486, 1447, 1263, 1155, 1120, 1073, 1040 cm^{-1}. **HRMS** (ESI): m/z [M + H] $^+$ calcd for $[C_{28}H_{34}NO_2S]^+$ requires 448.2305, found 448.2314. The absolute configuration was assigned tentatively by analogy.

4-(((*R*)-4-oxo-2-phenyl-5-((*2E, 4E*)-undeca-2, 4-dien-1-yl)-4, 5-dihydrothiazol-5-yl) methyl) Benzonitrile (3da)

Colorless oil. Yield: 93 %, 41.1 mg; l/b: 23:1. Enantiomeric excess: 93%, determined by HPLC (CHIRALPAK IC, hexane/isopropanol = 70/30, flow rate 1.0 mL/min, T = 30 ℃, 254 nm): t_R= 15.749 min (major), t_R= 18.413 min (minor). $[\alpha]_D^{20}$ = -20.0 (c 0.28, $CHCl_3$). **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.98 (d, *J* = 7.7 Hz, 2H), 7.64 (t, *J* = 7.4 Hz, 1H), 7.47 (dd, *J* = 17.6, 8.0 Hz, 4H), 7.32 (d, *J* = 8.0 Hz, 2H), 6.16 (dd, *J* = 14.9, 10.5 Hz, 1H), 5.93 (dd, *J* = 15.0, 10.5 Hz, 1H), 5.71 – 5.60 (m, 1H), 5.44 (dt, *J* = 14.9, 7.4 Hz, 1H), 3.40 (d, *J* = 13.7 Hz, 1H), 3.26 (d, *J* = 13.7 Hz, 1H), 2.79 (qd, *J* = 14.1, 7.5 Hz, 2H), 2.02 (q, *J* = 7.0 Hz, 2H), 1.38 – 1.18 (m, 8H), 0.86 (t, *J* = 6.5 Hz, 3H). **^{13}C NMR** (101 MHz, $CDCl_3$) δ 194.0, 193.1, 139.6, 135.5, 134.9, 134.2, 130.9, 130.8, 130.1, 128.1, 127.9, 127.8, 121.8, 117.6, 110.3, 69.2, 42.6, 41.4, 31.5, 30.6, 28.0, 27.8, 21.5, 13.0. **IR** (KBr) γ 3451, 2958, 2924, 2854, 1720,

1512, 1485, 1446, 1261, 1165, 1024, 991, 801, 773, 686 cm^{-1} **HRMS** (ESI): m/z [M + H] $^+$ calcd for $[C_{28}H_{31}N_2OS]^+$ requires 443.2152, found 443.2157. The absolute configuration was assigned tentatively by analogy.

(*R*)-5-(naphthalen-2-ylmethyl)-2-phenyl-5-((*2E, 4E*)-undeca-2, 4-dien-1-yl) thiazol-4(5H)-one (3ea)

Colorless oil. Yield: 37 %, 17.3 mg; l/b: 14:1. Enantiomeric excess: 90%, determined by HPLC (CHIRALPAK IC, hexane/isopropanol = 99/1, flow rate 1.0 mL/min, T = 30 ℃, 254 nm): t_R= 75.695 min (minor), t_R= 80.225 min (major). $[\alpha]_D^{20}$ = -22.0 (c 0.25, $CHCl_3$). **^{1}H NMR** (400 MHz, $CDCl_3$) δ 8.01 (d, *J* = 7.4 Hz, 2H), 7.81 – 7.74 (m, 2H), 7.74 – 7.69 (m, 2H), 7.59 (t, *J* = 7.4 Hz, 1H), 7.47 – 7.39 (m, 4H), 7.36 (d, *J* = 8.5 Hz, 1H), 6.13 (dd, *J* = 14.9, 10.4 Hz, 1H), 5.91 (dd, *J* = 15.1, 10.4 Hz, 1H), 5.72 – 5.55 (m, 1H), 5.43 (dt, *J* = 14.9, 7.4 Hz, 1H), 3.50 (d, *J* = 13.9 Hz, 1H), 3.41 (d, *J* = 13.8 Hz, 1H), 2.88 (dd, *J* = 14.1, 7.0 Hz, 1H), 2.75 (dd, *J* = 14.1, 7.8 Hz, 1H), 2.01 (q, *J* = 7.0 Hz, 2H), 1.40 – 1.16 (m, 8H), 0.86 (t, *J* = 6.7 Hz, 3H). **^{13}C NMR** (101 MHz, $CDCl_3$) δ 195.2, 194.8, 136.2, 135.4, 134.8, 133.2, 133.1, 132.5, 132.2, 129.3, 128.8, 128.3, 127.8, 127.8, 127.5, 126.0, 125.8, 123.2, 71.0, 44.3, 42.1, 32.6 31.7, 29.1, 28.8, 22.6, 14.0. **IR** (KBr) γ 3462, 2958, 2924, 2854, 1719, 1510, 1484, 1445, 1260, 1151, 1096, 1027, 990, 817, 771, 685 cm^{-1}. **HRMS** (ESI): m/z [M + H] $^+$ calcd for $[C_{31}H_{34}NOS]^+$ requires 468.2356, found 468.2366. The absolute configuration was assigned tentatively by analogy.

(*R*)-5-(2-chlorobenzyl)-2-phenyl-5-((*2E, 4E*)-undeca-2, 4-dien-1-yl) thiazol-4(5H)-one (3fa)

Colorless oil. Yield: 89 %, 30.4 mg; l/b: 13:1. Enantiomeric excess: 89%, determined by HPLC (CHIRALPAK IC, hexane/isopropanol = 90/10, flow rate 1.0 mL/min, T = 30 ℃, 254 nm): t_R= 9.268 min (minor), t_R= 11.156 min (major). $[\alpha]_D^{20}$ = +41.7 (c 0.51, $CHCl_3$). **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.98 (dd, *J* = 9.1, 8.0 Hz, 2H), 7.60 (dd, *J* = 13.3, 5.9 Hz, 1H), 7.42 (q, *J* = 8.2 Hz, 2H), 7.29 (dd, *J* = 5.4, 3.8 Hz, 1H), 7.25 – 7.22 (m, 1H), 7.12 – 7.07 (m, 2H), 6.17 (dd, *J* = 14.9, 10.4 Hz, 1H), 5.92 (dd, *J* = 15.1, 10.4 Hz, 1H), 5.69 – 5.58 (m, 1H), 5.46 (dt, *J* = 14.9, 7.4 Hz, 1H), 3.70 (d, *J* = 14.0 Hz, 1H), 3.39 (t, *J* = 12.4 Hz, 1H), 2.86 (dd, *J* = 14.1, 7.0 Hz, 1H), 2.78 (dd, *J* = 14.1, 7.8 Hz, 1H), 2.01 (q, *J* = 7.0 Hz, 2H), 1.38 – 1.17 (m, 8H), 0.86 (t, *J* = 6.7 Hz, 3H). **^{13}C NMR** (101 MHz, $CDCl_3$) δ 196.1, 195.1, 136.3, 135.5, 135.2, 134.8, 133.8, 132.2, 131.5, 129.5, 129.3, 128.8, 128.8, 128.7, 127.0, 123.2, 70.8, 42.7, 39.9, 32.6, 31.7, 29.1, 28.8, 22.6, 14.1. **IR** (KBr): γ 2957, 2925, 2854, 1720, 1597, 1511, 1484, 1445, 1314, 1261, 1155, 1094, 1054, 1039, 1027, 988, 800, 770, 754, 685 cm^{-1}. **HRMS** (ESI): m/z [M + H] $^+$ calcd for $[C_{27}H_{31}ClNOS]^+$ requires 342.1886, found 342.1892. The absolute configuration was assigned tentatively by analogy.

(*R*)-5-(3-chlorobenzyl)-2-phenyl-5-((*2E, 4E*)-undeca-2, 4-dien-1-yl) thiazol-4(5H)-one (3ga)

Colorless oil. Yield: 90 %, 40.6 mg; l/b: 12:1. Enantiomeric excess: 91%, determined by HPLC (CHIRALPAK IC, hexane/isopropanol = 97/3, flow rate 0.5 mL/min, T = 30 ℃, 254 nm): t_R= 42.023 min (minor), t_R= 43.785 min (major). $[\alpha]_D^{20}$ = -20.1 (c 0.39, $CHCl_3$). **^{1}H NMR** (400 MHz, $CDCl_3$) δ 8.06 – 7.97 (m, 2H), 7.63 (t, *J* = 7.4 Hz, 1H), 7.45 (dd, *J* = 16.3, 8.7 Hz, 2H), 7.22 (s, 1H), 7.19 – 7.14 (m, 2H), 7.14 – 7.07 (m, 1H), 6.13 (dd, *J* = 14.9, 10.4 Hz, 1H), 5.90 (dt, *J* = 17.8, 8.9 Hz, 1H), 5.70 – 5.55 (m, 1H), 5.46 – 5.34 (m, 1H), 3.30 (d, *J* = 13.9 Hz, 1H), 3.20 (d, *J* = 13.8 Hz, 1H), 2.81 (dd, *J* = 14.1, 7.0 Hz, 1H), 2.71 (dd, *J* = 14.1, 7.8 Hz, 1H), 2.01 (q, *J* = 7.1 Hz, 2H), 1.39 – 1.15 (m, 8H), 0.86 (t, *J* = 6.7 Hz, 3H). **^{13}C NMR** (101 MHz, $CDCl_3$) δ 195.2, 194.4, 137.3, 136.3, 135.6, 135.0, 133.9, 132.1, 130.5, 129.5, 129.3 128.9, 128.86 128.5, 127.6 123.0, 70.5, 43.6, 42.0, 32.6, 31.7, 29.1, 28.8, 22.6, 14.1. **IR** (KBr) γ 3441, 2958, 2924, 2853, 1719, 1597, 1511, 1484, 1445, 1315, 1260, 1164，1081，1027，989，796，771，685 cm^{-1}. **HRMS** (ESI): m/z [M + H] $^+$ calcd for $[C_{27}H_{31}ClNOS]^+$ requires 452.1809, found 452.1815. The absolute configuration was assigned tentatively by analogy.

(*R*)-5-(4-chlorobenzyl)-2-phenyl-5-((*2E, 4E*)-undeca-2, 4-dien-1-yl) thiazol-4(5H)-one (3ha)

Colorless solid. Yield: 87 %, 39.3 mg; l/b: 12:1. Enantiomeric excess: 87%, determined by HPLC (CHIRALPAK IC, hexane/alchol = 97/3, flow rate 1.0 mL/min, T = 30 ℃, 254 nm): t_R= 11.937 min (minor), t_R= 12.715 min (major). $[\alpha]_D^{20}$ = -20.2 (c 0.17, $CHCl_3$). **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.94 (d, *J* = 7.5 Hz, 2H), 7.56 (t, *J* = 7.4 Hz, 1H), 7.39 (t, *J* = 7.7 Hz, 2H), 7.10 (q, *J* = 8.5 Hz, 4H), 6.07 (dd, *J* = 15.0, 10.4 Hz, 1H), 5.84 (dd, *J* = 15.1, 10.4 Hz, 1H), 5.61 – 5.50 (m, 1H), 5.35 (dt, *J* = 14.9, 7.3 Hz, 1H), 3.23 (d, *J* = 13.9 Hz, 1H), 3.12 (d, *J* = 13.8 Hz, 1H), 2.74 (dd, *J* = 14.2, 6.9 Hz, 1H), 2.65 (dd, *J* = 14.1, 7.8 Hz, 1H), 1.94 (q, *J* = 7.1 Hz, 1H), 1.30 –

1.10 (m, 8H), 0.79 (t, *J* = 6.7 Hz, 3H). **^{13}C NMR** (101 MHz, $CDCl_3$) δ 195.2, 194.5, 136.3, 135.6, 135.0, 133.8, 133.3, 132.1, 131.7, 129.3, 128.9, 128.8, 128.4, 123.1, 70.7, 43.3, 42.1, 32.6, 31.7, 29.1, 28.8, 22.6, 14.9. **IR** (KBr): γ 2956, 2925, 2854, 1720, 1513, 1485, 1446, 1260, 1164, 1094, 1016, 989, 801, 771, 771，685 cm^{-1}. **HRMS** (ESI): m/z $[M + H]^+$ calcd for $[C_{27}H_{31}ClNOS]^+$ requires 452.1809, found 452.1818.

(*R*)-5-(3-methylbenzyl)-2-phenyl-5-((*2E, 4E*)-undeca-2, 4-dien-1-yl) thiazol-4(5H)-one (3ia)

Colorless oil. Yield: 43 %, 18.5 mg; l/b: 10:1. Enantiomeric excess: 85%, (3ad) determined by HPLC (CHIRALPAK IC, hexane/isopropanol = 90/10, flow rate 1.0 mL/min, T = 30 ℃, 254 nm): t_R= 11.298 min (minor), t_R= 13.384 min (major). $[\alpha]_D^{20}$ = -60.1 (c 0.48, $CHCl_3$). **^{1}H NMR** (400 MHz, $CDCl_3$) δ 8.07 – 8.01 (m, 2H), 7.65 – 7.58 (m, 1H), 7.50 – 7.42 (m, 2H), 7.16 – 7.09 (m, 1H), 7.08 – 6.97 (m, 3H), 6.11 (dd, *J* = 15.0, 10.4 Hz, 1H), 5.88 (dt, *J* = 18.5, 9.3 Hz, 1H), 5.67 – 5.51 (m, 1H), 5.40 (dt, *J* = 14.9, 7.4 Hz, 1H), 3.23 (q, *J* = 13.8 Hz, 2H), 2.81 (dd, *J* = 14.2, 7.0 Hz, 1H), 2.70 (dd, *J* = 14.2, 7.8 Hz, 1H), 2.28 (s, 3H), 2.00 (q, *J* = 6.9 Hz, 2H), 1.35 – 1.17 (m, 8H), 0.87 (dt, *J* = 9.9, 4.6 Hz, 3H). **^{13}C NMR** (101 MHz, $CDCl_3$) δ 195.2, 194.8, 137.8, 136.0, 135.4, 135.3, 134.7, 132.3, 131.1, 129.4, 128.8, 128.8, 128.1, 128.0, 127.4, 123.3, 70.9, 44.3, 41.7, 32.5, 31.6, 29.1, 28.8, 22.5, 21.3, 14.0. **IR** (KBr) γ 3440, 3019, 2958, 2924, 2854, 1720, 1598, 1512, 1485, 1446, 1314, 1260, 1154, 1096, 1027, 989, 771, 701, 686 cm^{-1} **HRMS** (ESI): m/z $[M + H]^+$ calcd for $[C_{28}H_{34}NOS]^+$ requires 432.2356, found 432.2362. The absolute configuration was assigned tentatively by analogy.

(*R*)-5-(2-methylbenzyl)-2-phenyl-5-((*2E, 4E*)-undeca-2, 4-dien-1-yl) thiazol-4(5H)-one (3ja)

Colorless oil. Yield: 52 %, 22.4 mg; l/b: 19:1. Enantiomeric excess: 86%, determined by HPLC (CHIRALPAK IC, hexane/isopropanol = 97/3, flow rate 1.0 mL/min, T = 30 ℃, 254 nm): t_R= 23.972 min (minor), t_R=34.278 min (major). $[\alpha]_D^{20}$ = -2.2 (c 0.27, $CHCl_3$). **^{1}H NMR** (400 MHz, $CDCl_3$) δ 8.00 (dd, *J* = 8.3, 1.1 Hz, 2H), 7.66 – 7.56 (m, 1H), 7.43 (dd, *J* = 15.3, 7.6 Hz, 2H), 7.18 (dd, *J* = 8.0, 6.2 Hz, 1H), 7.12 – 7.00 (m, 3H), 6.15 (dd, *J* = 15.0, 10.3 Hz, 1H), 5.91 (dd, *J* = 14.1, 9.4 Hz, 1H), 5.67 – 5.57 (m, 1H), 5.42 (dt, *J* = 14.9, 7.4 Hz, 1H), 3.36 (q, *J* = 14.2 Hz, 2H), 2.84 (dd, *J* = 14.1, 6.9 Hz, 1H), 2.76 (dd, *J* = 14.1, 7.9 Hz, 1H), 2.35 (s, 3H), 2.01 (q, *J* = 7.0 Hz, 2H), 1.38 – 1.15 (m, 8H), 0.97 – 0.77 (m, 3H). **^{13}C NMR** (101 MHz, $CDCl_3$) δ 195.5, 195.3, 137.0, 136.2, 135.4, 134.8, 134.2, 132.2, 130.5, 130.3, 129.3, 128.8, 128.7, 127.3, 126.0, 123.4, 71.3, 42.2, 40.1, 32.5, 31.6, 29.1, 28.8, 22.6, 20.4, 14.0. **IR** (KBr) γ 2955, 2925, 1719, 1512, 1485, 1446, 1249, 1164, 988, 988, 770, 685 cm^{-1}. **HRMS** (ESI): m/z $[M + H]^+$ calcd for $[C_{28}H_{34}NOS]^+$ requires 432.2356, found 432.2362. The absolute configuration was assigned tentatively by analogy.

(*R*)-5-(4-methylbenzyl)-2-phenyl-5-((*2E, 4E*)-undeca-2, 4-dien-1-yl) thiazol-4(5H)-one (3ka)

Colorless oil. Yield: 66 %, 28.5 mg; l/b: 11:1. Enantiomeric excess: 87%, determined by HPLC (CHIRALPAK IC, hexane/isopropanol = 90/10, flow rate 0.5 mL/min, T = 30 ℃, 254 nm): t_R= 24.565 min (minor), t_R= 26.558 min (major). $[\alpha]_D^{20}$ = -24.6 (c 0.31, $CHCl_3$). **^{1}H NMR** (400 MHz, $CDCl_3$) δ 8.08 – 7.99 (m, 2H), 7.66 – 7.56 (m, 1H), 7.46 (t, *J* = 7.8 Hz, 2H), 7.10 (t, *J* = 10.0 Hz, 2H), 7.04 (t, *J* = 10.0 Hz, 2H), 6.11 (dd, *J* = 15.0, 10.4 Hz, 1H), 5.89 (dd, *J* = 15.1, 10.4 Hz, 1H), 5.65 – 5.55 (m, 1H), 5.40 (dt, *J* = 14.9, 7.4 Hz, 1H), 3.23 (dd, *J* = 32.7, 13.9 Hz, 2H), 2.81 (dd, *J* = 14.2, 7.0 Hz, 1H), 2.70 (dd, *J* = 14.1, 7.8 Hz, 1H), 2.26 (s, 3H), 2.00 (q, *J* = 7.0 Hz, 2H), 1.36 – 1.18 (m, 8H), 0.90 – 0.81 (m, 3H). **^{13}C NMR** (101 MHz, $CDCl_3$) δ 195.2, 194.8, 136.9, 136.0, 135.3, 134.7, 132.3, 130.2, 129.4, 128.9, 128.8, 128.8, 123.4, 71.1, 43.9, 41.7, 32.5, 31.6, 29.1, 28.8, 22.5, 21.0, 14.0. **IR** (KBr) γ 2957, 2924, 2853, 1720, 1513, 1484, 1446, 1261, 1096, 1026, 989, 805, 686 cm^{-1}. **HRMS** (ESI): m/z $[M + H]^+$ calcd for $[C_{28}H_{34}NOS]^+$ requires 432.2356, found 432.2361. The absolute configuration was assigned tentatively by analogy.

(*R*)-5-(2-bromobenzyl)-2-phenyl-5-((*2E, 4E*)-undeca-2, 4-dien-1-yl) thiazol-4(5H)-one (3la)

Colorless oil. Yield: 66 %, 32.7 mg; l/b: 13:1. Enantiomeric excess: 88%, determined by HPLC (CHIRALPAK IC, hexane/isopropanol = 97/3, flow rate 1.0 mL/min, T = 30 ℃, 254 nm): t_R= 17.715 min (minor), t_R= 22.299 min (major). $[\alpha]_D^{20}$ = +11.1 (c 0.04, $CHCl_3$). **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.99 (d, *J* = 8.0 Hz, 2H), 7.59 (t, *J* = 7.5 Hz, 1H), 7.50 – 7.39 (m, 3H), 7.24 (d, *J* = 7.6 Hz, 1H), 7.16 – 7.08 (m, 1H), 6.99 (dd, *J* = 16.4, 8.7 Hz, 1H), 6.18 (dd, *J* = 15.0, 10.4 Hz, 1H), 5.92 (dt, *J* = 27.6, 13.8 Hz, 1H), 5.71 – 5.59 (m, 1H), 5.53 – 5.41 (m, 1H), 3.69 (d, *J* = 14.0 Hz, 1H), 3.46 (d, *J* = 14.0 Hz, 1H), 2.93 – 2.72 (m, 2H), 2.02 (q, *J* =

7.0 Hz, 2H), 1.38 – 1.17 (m, 8H), 0.86 (t, *J* = 6.7 Hz, 3H). **^{13}C NMR** (101 MHz, $CDCl_3$) δ 196.2, 195.1, 136.3, 135.6, 135.5, 134.8, 132.7, 132.1, 131.3, 129.3, 128.9, 128.8, 128.8, 127.6, 12. 6.4, 123.2, 70.8, 42.8, 42.4, 32.6, 31.7, 29.1, 28.8, 22.6, 14.1. **IR** (KBr) γ 2957, 2924, 2853, 1720, 1597, 1511, 1484, 1445, 1314, 1251, 1155, 1095, 1027, 988, 800, 770, 753, 685 cm^{-1}. **HRMS** (ESI): m/z [M + H] $^+$ calcd for $[C_{27}H_{31}BrNOS]^+$ requires 496.1304, found 496.1320. The absolute configuration was assigned tentatively by analogy.

(*R*)-5-(3-bromobenzyl)-2-phenyl-5-((*2E, 4E*)-undeca-2, 4-dien-1-yl) thiazol-4(5H)-one (3ma)

Colorless oil. Yield: 89 %, 44.2 mg; l/b: 15:1. Enantiomeric excess: 89%, determined by HPLC (CHIRALPAK IC, hexane/isopropanol = 99/1, flow rate 1.0 mL/min, T = 30 ℃, 254 nm): t_R= 54.043 min (minor), t_R= 56.947 min (major). $[\alpha]_D^{20}$ = -9.3 (c 0.46, $CHCl_3$). **^{1}H NMR** (400 MHz, $CDCl_3$) δ 8.08 – 7.96 (m, 2H), 7.67 – 7.59 (m, 1H), 7.51 – 7.43 (m, 2H), 7.38 (t, *J* = 1.7 Hz, 1H), 7.34 – 7.29 (m, 1H), 7.16 (dd, *J* = 6.4, 1.3 Hz, 1H), 7.10 (dd, *J* = 9.6, 5.8 Hz, 1H), 6.12 (dt, *J* = 21.0, 10.5 Hz, 1H), 5.90 (dt, *J* = 18.3, 9.2 Hz, 1H), 5.71 – 5.56 (m, 1H), 5.41 (dt, *J* = 14.9, 7.4 Hz, 1H), 3.29 (d, *J* = 13.8 Hz, 1H), 3.19 (d, *J* = 13.8 Hz, 1H), 2.81 (dd, *J* = 14.2, 7.1 Hz, 1H), 2.71 (dd, *J* = 14.2, 7.8 Hz, 1H), 2.01 (q, *J* = 7.0 Hz, 2H), 1.29 (ddd, *J* = 22.6, 10.6, 3.8 Hz, 8H), 0.90 – 0.80 (m, 3H). **^{13}C NMR** (101 MHz, $CDCl_3$) δ 195.1, 194.4, 137.6, 136.3, 135.6, 135.0, 133.4, 132.1, 130.5, 129.8, 129.2, 128.9, 128.8, 123.0, 122.1, 70.5, 43.6, 41.9, 32.5, 31.6, 29.1, 28.8, 22.5, 14.0. **IR** (KBr) γ 3465, 3018, 2956, 2923, 2852, 1719, 1511, 1484, 1446, 1260, 1164, 989, 796 771, 685 cm^{-1}. **HRMS** (ESI): m/z [M + H] $^+$ calcd for $[C_{27}H_{31}BrNOS]^+$ requires 496.1304, found 496.1316. The absolute configuration was assigned tentatively by analogy.

(*R*)-5-(4-bromobenzyl)-2-phenyl-5-((*2E, 4E*)-undeca-2, 4-dien-1-yl) thiazol-4(5H)-one (3na)

Colorless oil. Yield: 92 %, 45.5 mg; l/b: 20:1. Enantiomeric excess: 91%, determined by HPLC (CHIRALPAK IC, hexane/alchol = 97/3, flow rate 1.0 mL/min, T = 30 ℃, 254 nm): t_R= 13.261 min (minor), t_R= 14.027 min (major). $[\alpha]_D^{20}$ = -22.6 (c 0.75, $CHCl_3$). **^{1}H NMR** (400 MHz, $CDCl_3$) δ 8.04 – 7.98 (m, 2H), 7.63 (t, *J* = 7.4 Hz, 1H), 7.46 (t, *J* = 7.8 Hz, 2H), 7.34 (d, *J* = 8.3 Hz, 2H), 7.09 (d, *J* = 8.3 Hz, 2H), 6.13 (dd, *J* = 15.0, 10.4 Hz, 1H), 5.91 (dd, *J* = 15.1, 10.4 Hz, 1H), 5.69 – 5.58 (m, 1H), 5.42 (dt, *J* = 14.9, 7.4 Hz, 1H), 3.28 (d, *J* = 13.9 Hz, 1H), 3.17 (d, *J* = 13.9 Hz, 1H), 2.80 (dd, *J* = 14.1, 7.0 Hz, 1H), 2.72 (dd, *J* = 14.1, 7.8 Hz, 1H), 2.01 (q, *J* = 7.0 Hz, 1H), 1.41 – 1.11 (m, 8H), 0.86 (t, *J* = 6.7 Hz, 3H). **^{13}C NMR** (101 MHz, $CDCl_3$) δ 194.1, 193.4, 135.2, 134.6, 133.9, 133.2, 131.0, 130.3, 128.2, 127.9, 127.8, 122.0, 120.4, 69.5, 42.3, 41.1, 31.5, 30.6, 28.0, 27.8, 21.5, 13.0. **IR** (KBr) γ 2956, 2925, 2853, 1719, 1512, 1485, 1446, 1260, 1249, 1165, 1073, 1027, 1012, 988, 800, 685 cm^{-1} **HRMS** (ESI): m/z [M + H] $^+$ calcd for $[C_{27}H_{31}BrNOS]^+$ requires 496.1304, found 496.1306. The absolute configuration was assigned tentatively by analogy.

(*S*)-5-methyl-2-phenyl-5-((*2E, 4E*)-undeca-2, 4-dien-1-yl) thiazol-4(5H)-one (3oa)

Colorless oil. 94 %, 32.1 mg; l/b: 30:1. Enantiomeric excess: 83%, determined by HPLC (CHIRALPAK ID, hexane/isopropanol = 99/1, flow rate 1.0 mL/min, T = 30 ℃, 254 nm): t_R= 27.172 min (major), t_R= 30.835 min (minor). $[\alpha]_D^{20}$ = -65.2 (c 0.30, $CHCl_3$). **^{1}H NMR** (400 MHz, $CDCl_3$) δ 8.13 (d, *J* = 7.4 Hz, 2H), 7.67 (t, *J* = 7.4 Hz, 1H), 7.52 (t, *J* = 7.8 Hz, 2H), 6.14 (dd, *J* = 14.8, 10.3 Hz, 1H), 5.94 (dd, *J* = 15.0, 10.7 Hz, 1H), 5.70 – 5.58 (m, 1H), 5.46 (dt, *J* = 14.9, 7.4 Hz, 1H), 2.68 (d, *J* = 7.6 Hz, 2H), 2.03 (q, *J* = 7.1 Hz, 2H), 1.69 (s, 3H), 1.35 – 1.16 (m, 8H), 0.87 (t, *J* = 6.7 Hz, 3H). **^{13}C NMR** (101 MHz, $CDCl_3$) δ 195.5, 194.9, 135.9, 135.5, 134.9, 132.3, 129.3, 129.0, 128.8, 123.9, 64.9, 42.9, 32.6, 31.7, 29.1, 28.9, 25.1, 22.6, 14.1. **IR**: γ 2960, 2925, 2854, 1515, 1261, 1089, 801 cm^{-1}. **HRMS** (ESI): m/z [M + H] $^+$ calcd for $[C_{21}H_{28}NOS]^+$ requires 342.1886, found 342.1892. The absolute configuration was assigned tentatively by analogy.

4-(((*R*)-5-((*2E, 4E*)-hexa-2, 4-dien-1-yl)-4-oxo-2-phenyl-4, 5-dihydrothiazol-5-yl) methyl) benzonitrile (3db)

Colorless oil. Yield: 95 %, 35.4 mg; l/b: 20:1. Enantiomeric excess: 92%, determined by HPLC (CHIRALPAK IC, hexane/isopropanol = 70/30, flow rate 1.0 mL/min, T = 30 ℃, 254 nm): t_R= 19.626 min (major), t_R= 23.835 min (minor). $[\alpha]_D^{20}$ = -21.6 (c 0.32, $CHCl_3$). **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.98 (d, *J* = 7.5 Hz, 2H), 7.64 (t, *J* = 7.4 Hz, 1H), 7.48 (dd, *J* = 17.7, 8.0 Hz, 4H), 7.32 (d, *J* = 8.1 Hz, 2H), 6.16 (dd, *J* = 14.9, 10.4 Hz, 1H), 5.93 (dd, *J* = 26.2, 15.2 Hz, 1H), 5.67 (dq, *J* = 13.6, 6.7 Hz, 1H), 5.45 (tt, *J* = 14.9, 7.4 Hz, 1H), 3.46 – 3.34 (m, 1H), 3.27 (t, *J* = 13.7 Hz, 1H), 2.79 (qd, *J* = 14.1, 7.5 Hz, 2H), 1.68 (t, *J* = 17.6 Hz, 3H).

^{13}C NMR (101 MHz, $CDCl_3$) δ 195.1, 194.1, 140.7, 136.4, 135.2, 131.9, 131.8, 131.2, 130.6, 130.3, 129.0, 128.8, 122.6, 118.6, 111.3, 70.2, 43.7, 42.4, 18.0. **IR** (KBr) γ 3465, 2924, 2853, 2228, 1719, 1597, 1510, 1484, 1445, 1261, 1167, 1097, 1025, 800, 685 cm^{-1}. **HRMS** (ESI): m/z $[M + H]^+$ calcd for $[C_{23}H_{21}N_2OS]^+$ requires 373.1369, found 373.1374. The absolute configuration was assigned tentatively by analogy.

4-(((*R*)-5-((*2E, 4E*)-octa-2, 4-dien-1-yl)-4-oxo-2-phenyl-4, 5-dihydrothiazol-5-yl) methyl) benzonitrile (3dc)

Colorless oil. Yield: 91 %, 36.4 mg; l/b: 23:1. Enantiomeric excess: 91%, determined by HPLC (CHIRALPAK IC, hexane/isopropanol = 70/30, flow rate 1.0 mL/min, T = 30 ℃, 254 nm): t_R= 17.887 min (major), t_R= 21.645 min (minor). $[\alpha]_D^{20}$ = -30.4 (c 0.38, $CHCl_3$). **^{1}H NMR** (400 MHz, $CDCl_3$) δ 8.01 – 7.94 (m, 2H), 7.66 – 7.59 (m, 1H), 7.53 – 7.42 (m, 4H), 7.31 (d, *J* = 8.4 Hz, 2H), 6.15 (dt, *J* = 18.5, 9.3 Hz, 1H), 5.93 (dd, *J* = 15.1, 10.4 Hz, 1H), 5.70 – 5.60 (m, 1H), 5.43 (dq, *J* = 14.5, 7.2 Hz, 1H), 3.40 (d, *J* = 13.7 Hz, 1H), 3.27 (t, *J* = 13.4 Hz, 1H), 2.79 (qd, *J* = 14.1, 7.4 Hz, 2H), 2.01 (q, *J* = 7.2 Hz, 2H), 1.45 – 1.30 (m, 2H), 0.86 (t, *J* = 7.4 Hz, 3H). **^{13}C NMR** (101 MHz, $CDCl_3$) δ 195.1, 194.1, 140.7, 136.5, 135.7, 135.2, 131.9, 131.8, 131.1, 129.3, 129.0, 128.8, 122.8, 118.6, 111.3, 70.2, 43.6, 42.4, 34.6, 22.3, 13.7. **IR** (KBr) γ 3018, 2960, 2926, 2870, 2228, 1716, 1597, 1510, 1484, 1445, 1315, 1261, 1167, 1096, 1025, 990, 802, 772, 686 cm^{-1}. **HRMS** (ESI): m/z $[M + H]^+$ calcd for $[C_{25}H_{25}N_2OS]^+$ requires 401.1682, found 401.1686. The absolute configuration was assigned tentatively by analogy.

4-(((*R*)-4-oxo-2-phenyl-5-((*2E, 4E*)-tetradeca-2, 4-dien-1-yl)-4, 5-dihydrothiazol-5-yl) methyl) benzonitrile (3dd)

Colorless oil. Yield: 90 %, 43.6 mg; l/b: 38:1. Enantiomeric excess: 93%, determined by HPLC (CHIRALPAK IC, hexane/isopropanol = 70/30, flow rate 1.0 mL/min, T = 30 ℃, 254 nm): t_R= 14.042 min (major), t_R= 16.300 min (minor). $[\alpha]_D^{20}$ = -20.3 (c 0.26, $CHCl_3$). **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.98 (d, *J* = 7.6 Hz, 2H), 7.64 (t, *J* = 7.4 Hz, 1H), 7.47 (dd, *J* = 17.6, 8.0 Hz, 4H), 7.32 (d, *J* = 8.1 Hz, 2H), 6.16 (dd, *J* = 15.0, 10.4 Hz, 1H), 5.93 (dd, *J* = 15.0, 10.4 Hz, 1H), 5.71 – 5.60 (m, 1H), 5.44 (dt, *J* = 14.9, 7.4 Hz, 1H), 3.40 (d, *J* = 13.7 Hz, 1H), 3.26 (d, *J* = 13.7 Hz, 1H), 2.79 (qd, *J* = 14.1, 7.5 Hz, 2H), 2.02 (q, *J* = 7.1 Hz, 2H), 1.38 – 1.14 (m, 14H), 0.87 (t, *J* = 6.7 Hz, 3H). **^{13}C NMR** (101 MHz, $CDCl_3$) δ 195.0, 194.1, 140.6, 136.6, 136.0, 135.2, 131.9, 131.8, 131.2, 129.1, 129.0, 128.8, 122.8, 118.6, 111.3, 70.3, 43.6, 42.4, 32.6, 31.9, 29.5, 29.4, 29.3, 29.2, 29.1, 22.6, 14.1. **IR** (KBr) γ 3442, 2960, 2925, 2853, 2228, 1719, 1597, 1511, 1484, 1446, 1315, 1261, 1154, 1097, 1025, 990, 801, 773, 686 cm^{-1}. **HRMS** (ESI): m/z $[M + H]^+$ calcd for $[C_{31}H_{37}N_2OS]^+$ requires 485.2621, found 485.2622. The absolute configuration was assigned tentatively by analogy.

4-(((*R*)-4-oxo-2-phenyl-5-((*2E, 4E*)-5-(p-tolyl) penta-2, 4-dien-1-yl)-4, 5-dihydrothiazol-5-yl) methyl) benzonitrile (3de)

Colorless oil. Yield: 91 %, 42.1 mg; l/b: 20:1. Enantiomeric excess: 93%, determined by HPLC (CHIRALPAK IC, hexane/isopropanol = 70/30, flow rate 1.0 mL/min, T = 30 ℃, 254 nm): t_R= 23.393 min (major), t_R= 28.100 min (minor). $[\alpha]_D^{20}$ = -23.8 (c 0.73, $CHCl_3$). **^{1}H NMR** (400 MHz, $CDCl_3$) δ 8.03 – 7.95 (m, 2H), 7.65 (t, *J* = 7.4 Hz, 1H), 7.49 (dd, *J* = 16.2, 7.9 Hz, 4H), 7.33 (d, *J* = 8.1 Hz, 2H), 7.27 (d, *J* = 4.4 Hz, 1H), 7.24 (s, 1H), 7.16 (t, *J* = 8.6 Hz, 3H), 7.16 (t, *J* = 8.6 Hz, 1H), 6.17 (dd, *J* = 14.9, 10.4 Hz, 1H), 5.96 (dt, *J* = 22.9, 11.5 Hz, 1H), 5.76 – 5.65 (m, 1H), 5.46 (dt, *J* = 14.8, 7.4 Hz, 1H), 3.41 (d, *J* = 13.7 Hz, 1H), 3.26 (d, *J* = 13.7 Hz, 1H), 2.80 (ddd, *J* = 32.6, 14.1, 7.4 Hz,2H), 2.67 (t, *J* = 7.8 Hz, 2H), 2.36 (dd, *J* = 15.0, 7.2 Hz, 2H). **^{13}C NMR** (101 MHz, $CDCl_3$) δ 195.1, 194.1, 141.6, 140.6, 136.3, 135.3, 134.5, 131.9, 131.8, 131.2, 129.8, 129.0, 128.8, 128.4, 128.3, 125.9, 123.4, 118.6, 111.4, 70.2, 43.7, 42.4, 35.5, 34.4. **IR** (KBr) γ 3023, 2924, 2853, 2228, 1716, 1510, 1484, 1445, 1414, 1251, 1156, 1027, 991, 699, 686 cm^{-1}. **HRMS** (ESI): m/z $[M + H]^+$ calcd for $[C_{30}H_{27}N_2OS]^+$ requires 463.1839, found 463.1846. The absolute configuration was assigned tentatively by analogy.

4-(((*R*)-5-((*2E, 4E*)-8-chloroocta-2, 4-dien-1-yl)-4-oxo-2-phenyl-4, 5-dihydrothiazol-5-yl) methyl) benzonitrile (3df)

Colorless oil. Yield: 81 %, 35.2 mg; l/b: 21:1. Enantiomeric excess: 89%, determined by HPLC (CHIRALPAK IC, hexane/isopropanol = 70/30, flow rate 1.0 mL/min, T = 30 ℃, 254 nm): t_R= 29.384 min (major), t_R= 34.417 min (minor). $[\alpha]_D^{20}$ =

-17.7 (c 0.28, $CHCl_3$). **^{1}H NMR** (400 MHz, $CDCl_3$) δ 8.01 – 7.94 (m, 2H), 7.69 – 7.61 (m, 1H), 7.53 – 7.42 (m, 4H), 7.32 (d, *J* = 8.3 Hz, 2H), 6.16 (dd, *J* = 15.0, 10.4 Hz, 1H), 5.98 (dd, *J* = 15.1, 10.5 Hz, 1H), 5.66 – 5.56 (m, 1H), 5.47 (dt, *J* = 14.9, 7.4 Hz, 1H), 3.49 (t, *J* = 6.6 Hz, 2H), 3.40 (d, *J* = 13.7 Hz, 1H), 3.26 (d, *J* = 13.7 Hz, 1H), 2.79 (ddd, *J* = 32.3, 14.2, 7.5 Hz, 2H), 2.19 (dd, *J* = 14.5, 7.5 Hz, 2H), 1.87 – 1.78 (m, 2H). **^{13}C NMR** (101 MHz, $CDCl_3$) δ 194.0, 193.0, 139.6, 135.0, 134.2, 132.2, 130.9, 130.8, 130.1, 129.5, 128.0, 127.8, 122.8, 117.5, 110.3, 69.1, 43.2, 42.7, 41.3, 30.8, 28.5. **IR** (KBr) γ 2960, 2924, 2853, 2228, 1713, 1658, 1608, 1597, 1505, 1483, 1445, 1414, 1310, 1260, 1154, 1097, 1074, 1025, 801, 772, 685 cm^{-1}. **HRMS** (ESI): m/z [M + H] $^+$ calcd for $[C_{25}H_{24}ClN_2OS]^+$ requires 435.1292, found 435.1294. The absolute configuration was assigned tentatively by analogy.

4-(((*R*)-5-((*2E, 4E*)-hexa-2, 4-dien-1-yl)-4-oxo-2-phenyl-4, 5-dihydrothiazol-5-yl) methyl) benzonitrile (3dg)

Colorless oil. Yield: 94 %, 35.0 mg; l/b: 34:1. Enantiomeric excess: 83%, determined by HPLC (CHIRALPAK IC, hexane/isopropanol = 70/30, flow rate 1.0 mL/min, T = 30 ℃, 254 nm): t_R= 19.351min (major), t_R= 23.854 min (minor). $[\alpha]_D^{20}$ = -28.3 (c 0.55, $CHCl_3$). **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.98 (d, *J* = 7.5 Hz, 2H), 7.64 (t, *J* = 7.4 Hz, 1H), 7.47 (dd, *J* = 17.7, 8.0 Hz, 4H), 7.31 (d, *J* = 8.1 Hz, 2H), 6.15 (dd, *J* = 14.9, 10.4 Hz, 1H), 6.00 – 5.90 (m, 1H), 5.66 (dq, *J* = 13.6, 6.7 Hz, 1H), 5.42 (dt, *J* = 14.9, 7.4 Hz, 1H), 3.40 (d, *J* = 13.7 Hz, 1H), 3.25 (d, *J* = 13.7 Hz, 1H), 2.78 (qd, *J* = 14.1, 7.5 Hz, 2H), 1.71 (d, *J* = 6.7 Hz, 3H). **^{13}C NMR** (101 MHz, $CDCl_3$) δ 195.0, 194.1, 140.7, 136.4, 135.2, 131.9, 131.8, 131.2, 130.6, 130.3, 129.0, 128.8, 122.6, 118.6, 111.3, 70.2, 43.7, 42.4, 18.0. **IR** (KBr) γ 2924, 2851, 2228, 1719, 1597, 1510, 1484, 1446, 1315, 1250, 1166, 1097, 1026, 990, 801, 757, 685 cm^{-1}. **HRMS** (ESI): m/z [M + H] $^+$ calcd for $[C_{23}H_{21}N_2OS]^+$ requires 373.1369, found 373.1374. The absolute configuration was assigned tentatively by analogy.

4-(((*R*)-4-oxo-2-phenyl-5-((*2E, 4E*)-5-phenylpenta-2, 4-dien-1-yl)-4, 5-dihydrothiazol-5-yl) methyl) benzonitrile (3dh)

Colorless oil. Yield: 81 %, 35.2 mg; l/b: 24:1. Enantiomeric excess: 90%, determined by HPLC (CHIRALPAK IC, hexane/isopropanol = 70/30, flow rate 1.0 mL/min, T = 30 ℃, 254 nm): t_R= 29.282 min (major), t_R= 32.718 min (minor). $[\alpha]_D^{20}$ = -36.3 (c 0.39, $CHCl_3$). **^{1}H NMR** (400 MHz, $CDCl_3$) δ 8.01 – 7.94 (m, 2H), 7.67 – 7.60 (m, 1H), 7.54 – 7.49 (m, 2H), 7.49 – 7.43 (m, 2H), 7.37 – 7.31 (m, 4H), 7.31 – 7.26 (m, 2H), 7.24 – 7.17 (m, 1H), 6.66 (dd, *J* = 15.6, 10.4 Hz, 1H), 6.50 (d, *J* = 15.7 Hz, 1H), 6.36 (dd, *J* = 14.9, 10.4 Hz, 1H), 5.68 (dt, *J* = 15.0, 7.5 Hz, 1H), 3.44 (d, *J* = 13.7 Hz, 1H), 3.29 (d, *J* = 13.7 Hz, 1H), 2.93 (dd, *J* = 14.7, 7.1 Hz, 1H), 2.84 (dd, *J* = 14.3, 8.1 Hz, 1H). **^{13}C NMR** (101 MHz, $CDCl_3$) δ 195.1, 194.0, 140.5, 136.9, 136.4, 135.3, 133.0, 132.0, 131.8, 131.2, 129.0, 128.8, 128.6, 127.9, 127.7, 126.4, 126.0, 118.6, 111.4, 70.1, 43.8, 42.5. **IR** (KBr) γ 2960, 2924, 2853, 2228, 1713, 1658, 1608, 1597, 1505, 1483, 1445, 1414, 1310, 1260, 1154, 1097, 1074, 1025, 801, 772, 685 cm^{-1}. **HRMS** (ESI): m/z [M + H] $^+$ calcd for $[C_{28}H_{23}N_2OS]^+$ requires 435.1526, found 435.1535. The absolute configuration was assigned tentatively by analogy.

4-(((*R*)-4-oxo-2-phenyl-5-((*2E, 4E*)-5-(p-tolyl) penta-2, 4-dien-1-yl)-4, 5-dihydrothiazol-5-yl) methyl) benzonitrile (3di)

Colorless oil. Yield: 54 %, 24.2 mg; l/b: 22:1. Enantiomeric excess: 91%, determined by HPLC (CHIRALPAK IC, hexane/isopropanol = 70/30, flow rate 1.0 mL/min, T = 30 ℃, 254 nm): t_R= 28.446 min (major), t_R= 34.048 min (minor). $[\alpha]_D^{20}$ = -39.4 (c 0.28, $CHCl_3$). **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.99 (d, *J* = 7.6 Hz, 2H), 7.63 (t, *J* = 7.4 Hz, 1H), 7.51 (d, *J* = 8.1 Hz, 2H), 7.46 (t, *J* = 7.8 Hz, 2H), 7.33 (d, *J* = 8.1 Hz, 2H), 7.24 (d, *J* = 8.0 Hz, 2H), 7.09 (d, *J* = 7.9 Hz, 2H), 6.62 (dd, *J* = 15.6, 10.3 Hz, 1H), 6.48 (d, *J* = 15.6 Hz, 1H), 6.35 (dd, *J* = 14.9, 10.4 Hz, 1H), 5.66 (dt, *J* = 15.0, 7.5 Hz, 1H), 3.44 (d, *J* = 13.7 Hz, 1H), 3.29 (d, *J* = 13.7 Hz, 1H), 2.88 (ddd, *J* = 35.6, 14.1, 7.6 Hz, 2H), 2.32 (s, 3H). **^{13}C NMR** (101 MHz, $CDCl_3$) δ 195.1, 194.0, 140.6, 137.6, 136.6, 135.3, 134.1, 133.0, 132.0, 131.8, 131.2, 129.3, 129.0, 128.8, 126.9, 126.3, 125.4, 118.6, 111.4, 70.1, 43.8, 42.5, 21.2. **IR** (KBr) γ 3021, 2962, 2924, 2854, 2228, 1716, 1608, 1597, 1510, 1484, 1445, 1414, 1315, 1261, 1166, 1022, 939, 851, 801, 758, 686 cm^{-1}. **HRMS** (ESI): m/z [M + H] $^+$ calcd for $[C_{29}H_{25}N_2OS]^+$ requires 449.1682, found 449.1686. The absolute configuration was assigned tentatively by analogy.

4-(((*R*)-5-((*2E, 4E*)-5-(4-methoxyphenyl) penta-2, 4-dien-1-yl)-4-oxo-2-phenyl-4, 5-dihydrothiazol-5-yl) methyl)

benzonitrile (3dj)

Colorless oil. Yield: 50 %, 23.2 mg; l/b: 17:1. Enantiomeric excess: 92%, determined by HPLC (CHIRALPAK IC, hexane/isopropanol = 70/30, flow rate 1.0 mL/min, T = 30 ℃, 254 nm): t_R= 54.883min (major), t_R= 63.218 min (minor). $[\alpha]_D^{20}$ = -33.5 (c 0.16, $CHCl_3$). **^{1}H NMR** (400 MHz, $CDCl_3$) δ 8.03 – 7.95 (m, 2H), 7.68 – 7.60 (m, 1H), 7.55 – 7.42 (m, 4H), 7.35 (t, *J* = 10.2 Hz, 2H), 7.30 – 7.27 (m, 2H), 6.88 – 6.76 (m, 2H), 6.51 (dt, *J* = 31.7, 12.8 Hz, 2H), 6.39 – 6.22 (m, 1H), 5.63 (dt, *J* = 15.0, 7.5 Hz, 1H), 3.79 (s, 3H), 3.43 (dd, *J* = 13.7, 5.1 Hz, 1H), 3.33 – 3.25 (m, 1H), 3.04 – 2.67 (m, 2H). **^{13}C NMR** (101 MHz, $CDCl_3$) δ 195.1, 194.1, 159.4, 140.6, 136.7, 135.3, 132.5, 132.0, 131.8, 131.2, 129.7, 129.0, 128.8, 127.6, 125.9, 124.8, 118.6, 114.1, 111.4, 70.2, 55.3, 43.8, 42.5. **IR** (KBr) γ 3462, 2959, 2923, 2854, 1715, 1602, 1510, 1484, 1467, 1445, 1258, 1173, 1097, 1028, 803, 759, 686 cm^{-1}. **HRMS** (ESI): m/z $[M + H]^+$ calcd for $[C_{29}H_{25}N_2O_2S]^+$ requires 465.1631, found 465.1638. The absolute configuration was assigned tentatively by analogy.

4-(((*R*)-5-((*2E, 4E*)-5-(3-chlorophenyl) penta-2, 4-dien-1-yl)-4-oxo-2-phenyl-4, 5-dihydrothiazol-5-yl) methyl) benzonitrile (3dk)

Colorless oil. Yield: 86 %, 40.3 mg; l/b: 40:1. Enantiomeric excess: 93%, determined by HPLC (CHIRALPAK IC, hexane/isopropanol = 70/30, flow rate 1.0 mL/min, T = 30 ℃, 254 nm): t_R= 72.866min (major), t_R= 80.912 min (minor). $[\alpha]_D^{20}$ = -29.8 (c 0.31, $CHCl_3$). **^{1}H NMR** (400 MHz, $CDCl_3$) δ 8.04 – 7.95 (m, 2H), 7.64 (t, *J* = 7.5 Hz, 1H), 7.56 – 7.43 (m, 2H), 7.33 (d, *J* = 8.3 Hz, 2H), 7.22 – 7.13 (m, 3H), 6.65 (dd, *J* = 15.6, 10.5 Hz, 3H), 6.42 (d, *J* = 15.6 Hz, 1H), 6.34 (dd, *J* = 14.9, 10.5 Hz, 1H), 5.71 (dt, *J* = 14.9, 7.5 Hz, 1H), 3.44 (d, *J* = 13.7 Hz, 1H), 3.28 (d, *J* = 13.7 Hz, 1H), 2.89 (ddd, *J* = 41.4, 14.1, 7.5 Hz, 2H). **^{13}C NMR** (101 MHz, $CDCl_3$) δ 195.0, 193.9, 140.5, 138.8, 136.0, 135.4, 134.6, 132.0, 131.7, 131.4, 131.2, 129.8, 129.3, 129.0, 128.9, 127.5, 127.2, 126.1, 124.6, 118.5, 111.4, 70.0, 43.9, 42.3. **IR** (KBr) γ 3018, 2961, 2925, 2854, 1713, 1608, 1504, 1483, 1482, 1445, 1415, 1260, 1094, 1022, 850, 799, 683, 667 cm^{-1} **HRMS** (ESI): m/z $[M + H]^+$ calcd for $[C_{28}H_{22}ClN_2OS]^+$ requires 469.1136, found 469.1139. The absolute configuration was assigned tentatively by analogy.

(*R, E*)-4-((4-oxo-5-(penta-2, 4-dien-1-yl)-2-phenyl-4, 5-dihydrothiazol-5-yl) methyl) benzo-nitrile (3dl)

Colorless oil. Yield: 73 %, 26.1 mg; *E/Z*: 5:1. Enantiomeric excess: 84%/70%, determined by HPLC (CHIRALPAK IC, hexane/isopropanol = 70/30, flow rate 1.0 mL/min, T = 30 ℃, 254 nm): $t_{R,E}$= 39.786 min (major), t_{RZ}= 41.761 min (major), $t_{R,E}$= 48.924 min (minor), $t_{R,Z}$= 51.992 min (minor). $[\alpha]_D^{20}$ = -22.4 (c 0.23, $CHCl_3$). **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.98 (d, *J* = 7.4 Hz, 2H), 7.64 (t, *J* = 7.4 Hz, 1H), 7.54 – 7.43 (m, 4H), 7.32 (d, *J* = 8.1 Hz, 2H), 6.60 (dt, *J* = 16.6, 10.6 Hz, 1H), 6.31 – 6.11 (m, 1H), 5.57 (td, *J* = 14.5, 7.4 Hz, 1H), 5.37 (dd, *J* = 18.4, 8.0 Hz, 1H), 5.25 (d, *J* = 5.5 Hz, 1H), 5.23 – 5.13 (m, 1H), 5.06 (d, *J* = 9.5 Hz, 1H), 3.43 (dd, *J* = 13.7, 8.3 Hz, 1H), 3.28 (t, *J* = 12.3 Hz, 1H), 2.94 (t, *J* = 6.7 Hz, 1H), 2.86 (dd, *J* = 14.1, 6.9 Hz, 1H), 2.78 (dd, *J* = 14.1, 7.9 Hz, 1H). **^{13}C NMR** (101 MHz, $CDCl_3$) δ 195.0, 194.0, 140.5, 136.8, 136.0, 135.3, 134.3, 131.9, 131.8, 131.3, 131.2, 129.0, 128.8, 126.1, 123.6, 119.9, 118.6, 117.9, 111.4, 69.9, 43.8, 43.7, 42.2, 37.1. **IR** (KBr) γ 3436, 3013, 2961, 2924, 2854, 2228, 1715, 1597, 1505, 1483, 1445, 1414, 1314, 1260, 1153, 1097, 1022, 801, 773, 685 cm^{-1}. **HRMS** (ESI): m/z $[M + H]^+$ calcd for $[C_{22}H_{19}N_2OS]^+$ requires 359.1213, found 359.1219. The absolute configuration was assigned tentatively by analogy.

Ethyl (*4E, 6E*)-8-((*R*)-5-(4-cyanobenzyl)-4-oxo-2-phenyl-4, 5-dihydrothiazol-5-yl)octa-4,6-dienoate (3dm)

Colorless oil. Yield: 91 %, 41.7 mg; l/b: 11:1. Enantiomeric excess: 84%, determined by HPLC (CHIRALPAK AD, hexane/isopropanol = 70/30, flow rate 1 mL/min, T = 30 ℃, 254 nm): t_R= 12.533 min (major), t_R= 14.512 min (minor). $[\alpha]_D^{20}$ = -17.1 (c 0.69, $CHCl_3$). **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.97 (dd, *J* = 8.3, 1.1 Hz, 2H), 7.71 – 7.61 (m, 1H), 7.53 – 7.38 (m, 4H), 7.31 (d, *J* = 8.3 Hz, 2H), 6.12 (dt, *J* = 21.9, 10.9 Hz, 1H), 5.94 (dt, *J* = 19.0, 9.5 Hz, 1H), 5.69 – 5.57 (m, 1H), 5.45 (dt, *J* = 14.9, 7.4 Hz, 1H), 4.09 (p, *J* = 7.1 Hz, 2H), 3.45 – 3.35 (m, 1H), 3.28 – 3.16 (m, 1H), 2.82 (dd, *J* = 14.2, 7.1 Hz, 1H), 2.74 (dd, *J* = 14.2, 7.8 Hz, 1H), 2.34 (d, *J* = 2.9 Hz, 3H). **^{13}C NMR** (101 MHz, $CDCl_3$) δ 195.0, 194.0, 172.8, 140.6, 136.0, 135.3, 132.9, 131.9, 131.8, 131.1, 130.3, 129.0, 128.8, 123.9, 118.6, 111.3, 70.1, 60.3, 43.7, 42.3, 33.7, 27.8, 14.2. **IR** (KBr) γ 2979, 2924, 2228, 1720, 1597, 1509, 1484, 1445, 1415, 1372, 1311, 1250, 1165, 1097, 1027, 992, 939, 803, 772, 758, 687 cm^{-1}. **HRMS** (ESI): m/z $[M + H]^+$ calcd for $[C_{27}H_{27}N_2O_2S]^+$ requires 459.1742, found 459.1741. The absolute configuration was assigned tentatively by analogy.

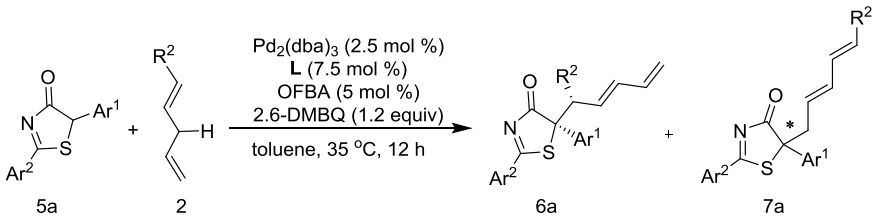
(*4E, 6E*)-N-benzyl-8-((*R*)-5-(4-cyanobenzyl)-4-oxo-2-phenyl-4, 5-dihydrothiazol-5-yl) octa-4,6-dienamide (3dn)

Colorless oil. Yield: 79 %, 41.0 mg; l/b: 11:1. Enantiomeric excess: 83%, determined by HPLC (CHIRALPAK AD, hexane/isopropanol = 70/30, flow rate 0.5 mL/min, T = 30 ℃, 254 nm): t_R= 33.442 min (major), t_R= 44.467 min (minor). $[\alpha]_D^{20}$ = -3.9 (c 0.63, $CHCl_3$). **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.88 (ddd, *J* = 6.8, 5.6, 1.2 Hz, 2H), 7.56 (ddd, *J* = 8.6, 2.3, 1.2 Hz, 1H), 7.39 (ddd, *J* = 10.6, 6.5, 4.8 Hz, 4H), 7.26 – 7.20 (m, 4H), 7.19 – 7.12 (m, 3H), 6.06 (dd, *J* = 15.0, 10.4 Hz, 1H), 5.89 (dd, *J* = 15.1, 10.4 Hz, 1H), 5.78 (t, *J* = 5.1 Hz, 1H), 5.62 – 5.51 (m, 1H), 5.44 – 5.31 (m, 1H), 4.35 – 4.27 (m, 2H), 3.33 (dd, *J* = 13.7, 6.6 Hz, 1H), 3.18 (dd, *J* = 13.7, 6.5 Hz, 1H) 2.75 (dd, *J* = 14.2, 7.0 Hz, 1H), 2.68 (dd, *J* = 14.2, 7.8 Hz, 1H), 2.33 (h, *J* = 8.2 Hz, 2H), 2.18 (t, *J* = 7.3 Hz, 2H). **^{13}C NMR** (101 MHz, $CDCl_3$) δ 195.1, 194.0, 171.9, 140.6, 138.2, 136.0, 135.3, 133.2, 131.9, 131.7, 131.1, 130.4, 129.0, 128.8, 128.7, 127.8, 127.5, 124.0, 118.6, 111.3, 70.1, 43.7, 43.5, 42.3, 35.9, 28.5. **IR** (KBr) γ 3311, 2921, 2228, 1716, 1650, 1597, 1509, 1483, 1445, 1314, 1250, 1165, 991, 850, 823, 798, 773, 737, 700, 686, 668, 631, 572, 496 cm^{-1}. **HRMS** (ESI): m/z $[M + H]^+$ calcd for $[C_{32}H_{30}N_3O_2S]^+$ requires 520.2059, found 520.2056. The absolute configuration was assigned tentatively by analogy.

(*4E, 6E*)-8-((*R*)-5-(4-cyanobenzyl)-4-oxo-2-phenyl-4, 5-dihydrothiazol-5-yl) octa-4,6-dien-1-yl 4-methylbenzene sulfonate (3do)

Colorless oil. Yield: 92 %, 52.4 mg; l/b: 17:1. Enantiomeric excess: 90%, determined by HPLC (CHIRALPAK AD, hexane/isopropanol = 70/30, flow rate 1.0 mL/min, T = 30 ℃, 254 nm): t_R= 40.762 min (major), t_R= 49.287 min (minor). $[\alpha]_D^{20}$ = -18.6 (c 0.77, $CHCl_3$). **^{1}H NMR** (400 MHz, $CDCl_3$) δ 8.08 – 7.90 (m, 2H), 7.83 – 7.72 (m, 2H), 7.69 – 7.58 (m, 1H), 7.55 – 7.41 (m, 4H), 7.37 – 7.31 (m, 4H), 6.10 (dt, *J* = 22.4, 11.2 Hz, 1H), 5.86 (dd, *J* = 15.1, 10.4 Hz, 1H), 5.62 – 5.47 (m, 1H), 5.42 (dd, *J* = 15.0, 7.4 Hz, 1H), 4.01 (dt, *J* = 19.5, 6.3 Hz, 2H), 3.47 – 3.36 (m, 1H), 3.27 (dd, *J* = 18.7, 10.7 Hz, 1H), 2.83 (dd, *J* = 14.2, 7.1 Hz, 1H), 2.75 (dd, *J* = 14.3, 7.8 Hz, 1H), 2.44 (s, 3H), 2.10 (dt, *J* = 13.5, 5.0 Hz, 2H), 1.81 – 1.58 (m, 2H). **^{13}C NMR** (101 MHz, $CDCl_3$) δ 195.1, 194.0, 144.7, 140.6, 135.9, 135.3, 133.1, 132.8, 131.9, 131.8, 131.2, 130.6, 129.8, 129.0, 128.8, 127.8, 123.9, 118.6, 111.3, 70.1, 69.7, 43.7, 42.3, 28.2, 28.2, 21.6. **IR** (KBr) γ 2961, 2924, 2228, 1716, 1597, 1509, 1484, 1445, 1358, 1309, 1261, 1188, 1175, 1097, 1020, 993, 962, 925, 815, 773, 738, 687, 664, 574, 555 cm^{-1}. **HRMS** (ESI): m/z $[M + H]^+$ calcd for $[C_{32}H_{31}N_2O_4S_2]^+$ requires 571.1725, found 571.1727. The absolute configuration was assigned tentatively by analogy.

Table S2. Re-optimization of the Allylic C-H Alkylation Reaction of 1, 4- Pentadiene 2a with 2,5-diphenylthiazol-4(*5H*)-ones 6a



entry	[Pd]	L	OFBA	dr [c]	yield (%)[b]	6a/7a [c]	ee (%)[d]
1	$Pd_2(dba)_3$	PPh_3	5%	-	trace	-	–
2	$Pd_2(dba)_3$	**L7**	5%	-	trace	-	–
3	$Pd_2(dba)_3$	**L6**	5%	-	n.r	-	-
4	$Pd_2(dba)_3$	**L5**	5%	6:1	60	6:1	0
5	$Pd_2(dba)_3$	**L2**	5%	5:1	88	8:1	41
6	$Pd_2(dba)_3$	**L1**	5%	3.6:1	91	10:1	84
7	$Pd_2(dba)_3$	**L1**	none	-	n.r	-	-
8	$Pd_2(dba)_3$	**L1**	10%	-	trace	-	-
9[e]	$Pd_2(dba)_3$	**L1**	5%	2.6:1	88	8:1	73
10[e,f]	$Pd_2(dba)_3$	**L1**	5%	3.7:1	92	13:1	87
11[f]	$Pd_2(dba)_3$	**L1**	5%	4.5:1	90	11:1	87

[a]Reaction conditions: Unless indicated otherwise, reactions of **1a** (0.10 mmol), **2a** (0.20 mmol), Pd (0.005 mmol), ligand (0.0075 mmol), OFBA (0.005 mmol), and 2,6-DMBQ (0.12 mmol) were carried out in toluene (2 mL) for 16 h. [b]Isolated yields of **6** with the ratios of E/Z >20:1. [c]The dr and ratios of **6**/**7** were determined by ^{1}H NMR analysis of the crude reaction mixture. [d]The ee value was determined by chiral HPLC analysis. [e]2,5-DMBQ (0.12 mmol) was used instead of 2,6-DMBQ. [f]The reaction was carried out at 25 ℃. 2,5(6)-DMBQ = 2,5(6)-dimethylquinone, OFBA = 2-fluorobenzoic acid, dba = dibenzylidene acetone.

General experimental procedures for the control experiment of 1,4-pentadienes with 2,5-diarylthiazol-4(*5H*)-ones

To a flame-dried and Ar-purged Schlenk tube (10 mL) were added 2,5-diarylthiazol-4(*5H*)-ones (0.10 mmol), $Pd_2(dba)_3$ (0.0025 mmol), phosphoramidite **L1** (0.0075 mmol), OFBA (0.005 mmol), 2,6-DMBQ (0.12 mmol) and a stirring bar. The schlenk tube was then evacuated and filled with argon. This cycle was repeated three times and followed by the addition of toluene (2 mL) and 1, 4-pentadienes (0.20 mmol) via a syringe. The mixture was stirred at 25 ℃ for 16 h. The reaction mixture was purified by column chromatography on silica gel (petroleum/ethyl acetate = 20/1) to provide product **6**.

(*S*)-5-((*R, E*)-hexa-3, 5-dien-2-yl)-2, 5-diphenylthiazol-4(5H)-one (6aa)

Colorless oil. Yield: 90 %, 30.0 mg; diastereomeric ratio: 5:1. Enantiomeric excess: 87%, determined by HPLC (CHIRALPAK IE, hexane/isopropanol = 80/20, flow rate 1.0 mL/min, T = 30 ℃, 254 nm): t_R= 19.443 min (minor), t_R= 21.758 min (major). $[\alpha]_D^{20}$ = 164.9 (c 0.28, $CHCl_3$). **^{1}H NMR** (400 MHz, $CDCl_3$) δ 8.22 – 8.15 (m, 2H), 7.79 – 7.76 (m, 2H), 7.71 – 7.64 (m, 2H), 7.57 – 7.50 (m, 2H), 7.42 – 7.28 (m, 4H), 6.28 – 6.10 (m, 2H), 5.67 – 5.58 (m, 1H), 5.17 – 5.08 (m, 1H), 5.02 – 4.96 (m, 1H), 3.48 (p, *J* = 7.1 Hz, 1H), 1.08 (t, *J* = 5.6 Hz, 3H). **^{13}C NMR** (101 MHz, $CDCl_3$) δ 194.1, 192.6, 137.2, 136.5, 135.0, 134.4, 132.6, 132.1, 129.0, 128.8, 128.6, 128.3, 127.5, 117.3, 78.0, 46.5, 17.6. **IR** (KBr) γ 2963, 2925, 2854, 1719, 1596, 1517, 1486, 1446, 1376, 1250, 1153, 1098, 1027, 1003, 946, 908, 801, 773, 686 cm^{-1}. **HRMS** (ESI): m/z $[M + H]^+$ calcd for $[C_{21}H_{20}NOS]^+$ requires 334.1266, found 334.1260. The absolute configuration was assigned tentatively by analogy.

(*S*)-5-((*R, E*)-hexa-3, 5-dien-2-yl)-5-phenyl-2-(m-tolyl) thiazol-4(5H)-one (6ba)

Colorless oil. Yield: 70 %, 24.3 mg; diastereomeric ratio: 6:1. Enantiomeric excess: 91%, determined by HPLC (CHIRALPAK IE, hexane/isopropanol = 90/10, flow rate 1.0 mL/min, T = 30 ℃, 254 nm): t_R= 22.936 min (minor), t_R= 33.535 min (major). $[\alpha]_D^{20}$ = 112.5 (c 0.46, $CHCl_3$). **^{1}H NMR** (400 MHz, $CDCl_3$) δ 8.02 (d, *J* = 7.9 Hz, 1H), 7.97 (d, *J* = 7.7 Hz, 1H), 7.78 – 7.73 (m, 2H), 7.52 – 7.46 (m, 1H), 7.41 (dd, *J* = 7.2, 5.3 Hz, 1H), 7.35 (dd, *J* = 6.2, 1.6 Hz, 2H), 7.33 – 7.30 (m, 1H), 6.34 – 6.09 (m, 2H), 5.77 – 5.57 (m, 1H), 5.22 – 5.09 (m, 1H), 4.98 (dt, *J* = 10.5, 4.5 Hz, 1H), 3.48 (p, *J* = 7.3 Hz, 1H), 2.44 (s, 3H), 1.06 (dd, *J* = 11.4, 6.7 Hz, 3H). **^{13}C NMR** (101 MHz, $CDCl_3$) δ 194.3, 192.6, 139.0, 137.3, 136.6, 135.9, 134.3, 132.7, 132.1, 129.4, 128.9, 128.6, 128.5, 128.3, 127.6, 127.5, 126.0, 117.3, 77.8, 46.5, 21.2, 17.6. **IR** (KBr) γ 2910, 1572, 1491, 1456, 1405, 1345, 1215, 1061, 784, 756, 683 cm^{-1}. **HRMS** (ESI): m/z [M + H] $^+$ calcd for $[C_{22}H_{22}NOS]^+$ requires 348.1422, found 348.1425. The absolute configuration was assigned tentatively by analogy.

(*S*)-2-(4-bromophenyl)-5-((*R, E*)-hexa-3, 5-dien-2-yl)-5-phenylthiazol-4(5H)-one (6ca)

Colorless oil. Yield: 87 %, 35.8 mg; diastereomeric ratio: 4:1. Enantiomeric excess: 88%, determined by HPLC (CHIRALPAK IE, hexane/EtOH = 90/10, flow rate 1.0 mL/min, T = 30 ℃, 254 nm): t_R= 16.621 min (minor), t_R= 17.829 min (major). $[\alpha]_D^{20}$ = 153.5 (c 0.24, $CHCl_3$). **^{1}H NMR** (400 MHz, $CDCl_3$) δ 8.08 – 7.98 (m, 2H), 7.76 – 7.73 (m, 1H), 7.70 – 7.64 (m, 2H), 7.39 – 7.28 (m, 3H), 6.26 – 6.09 (m, 2H), 5.68 – 5.52 (m, 1H), 5.18 – 5.10 (m, 1H), 4.99 (dt, *J* = 9.3, 4.6 Hz, 1H), 3.52 – 3.33 (m, 1H), 1.06 (dd, *J* = 11.3, 6.7 Hz, 3H). **^{13}C NMR** (101 MHz, $CDCl_3$) δ 192.9, 192.4, 136.9, 136.4, 134.5, 132.4, 130.9, 130.3, 130.0, 128.7, 128.6, 128.4, 127.4, 117.5, 78.5, 46.6, 17.5. **IR** (KBr) γ 2965, 1572, 1557, 1489, 1409, 1388, 1048, 819, 753, 685 cm^{-1}. **HRMS** (ESI): m/z [M + H] $^+$ calcd for $[C_{21}H_{19}BrNOS]^+$ requires 412.0371, found 412.0367. The absolute configuration was assigned tentatively by analogy.

(*S*)-2-(4-fluorophenyl)-5-((*R, E*)-hexa-3, 5-dien-2-yl)-5-phenylthiazol-4(5H)-one (6da)

Colorless oil. Yield: 80 %, 29.9 mg; diastereomeric ratio: 5:1. Enantiomeric excess: 88%, determined by HPLC (CHIRALPAK IE, hexane/EtOH = 90/10, flow rate 1.0 mL/min, T = 30 ℃, 254 nm): t_R= 14.929 min (minor), t_R= 15.846 min (major). $[\alpha]_D^{20}$ = 169.2 (c 0.36, $CHCl_3$). **^{1}H NMR** (400 MHz, $CDCl_3$) δ 8.26 – 8.11 (m, 2H), 7.81 – 7.74 (m, 2H), 7.42 – 7.30 (m, 3H), 7.24 – 7.11 (m, 2H), 6.33 – 6.05 (m, 2H), 5.69 – 5.54 (m, 1H), 5.26 – 5.10 (m, 1H), 4.99 (dt, *J* = 10.4, 4.4 Hz, 1H), 1.10 – 1.02 (m, 3H). **^{13}C NMR** (101 MHz, $CDCl_3$) δ 192.5, 192.4, 137.0, 136.4, 134, 131.4 (d, *J* = 9.6 Hz), 131.4, 128.7, 128.6, 128.3, 127.5, 127.4, 117.4, 116.3 (d, *J* = 22.2 Hz), 78.5, 46.5, 17.5. **IR** (KBr) γ 2964, 2564, 1597, 1572, 1517, 1493, 1414, 1240, 1218, 1159, 1049, 830, 756, 686 cm^{-1}. **HRMS** (ESI): m/z [M + Na] $^+$ calcd for $[C_{21}H_{19}NaFNOS]^+$ requires 374.0991, found 374.0991. The absolute configuration was assigned tentatively by analogy.

(*S, E*)-5-(penta-2, 4-dien-1-yl)-2, 5-diphenylthiazol-4(5H)-one (6ab)

Yellow oil. Yield: 92 %, 31.4 mg; *E/Z*: 13:1. Enantiomeric excess: 89%, determined by HPLC (CHIRALPAK IE, hexane/isopropanol = 90/10, flow rate 1.0 mL/min, T = 30 ℃, 254 nm): t_R= 19.176 min (minor), t_R= 20.432 min (major). $[\alpha]_D^{20}$ = -2.7 (c 0.55, $CHCl_3$). **^{1}H NMR** (400 MHz, $CDCl_3$) δ 8.17 (dt, *J* = 8.5, 1.5 Hz, 2H), 7.71 – 7.64 (m, 1H), 7.57 – 7.49 (m, 4H), 7.39 – 7.29 (m, 3H), 6.28 – 6.01 (m, 2H), 5.61 – 5.48 (m, 1H), 5.19 – 5.10 (m, 1H), 5.06 – 4.98 (m, 1H), 3.35 – 3.21 (m, 1H), 3.14 (dd, *J* = 14.3, 7.1 Hz, 1H). **^{13}C NMR** (101 MHz, $CDCl_3$) δ 194.7, 192.9, 143.3, 138.0, 136.3, 136.2, 135.2, 132.1, 129.0, 128.9, 128.9, 128.3, 127.0, 117.5, 71.7, 42.9. **IR** (KBr) γ 2924, 1716, 1597, 1509, 1483, 1445, 1309, 1260, 1145, 1097, 1001, 904, 760, 685 cm^{-1}. **HRMS** (ESI): m/z [M + Na] $^+$ calcd for $[C_{20}H_{17}NaNOS]^+$ requires 342.0929, found 342.0925. The absolute configuration was assigned tentatively by analogy.

(*S*)-5-((*R,E*)-deca-1,3-dien-5-yl)-5-phenyl-2-(m-tolyl)thiazol-4(5H)-one(6bc)

Colorless oil. Yield: 57 %, 23.4 mg; diastereomeric ratio: 3:1. Enantiomeric excess: 91%, determined by HPLC (CHIRALPAK IE, hexane/isopropanol = 90/10, flow rate 1.0 mL/min, T = 30 ℃, 254 nm): t_R= 7.870 min (minor), t_R= 9.978 min (major). $[\alpha]_D^{20}$ = 114.0 (c 0.26, $CHCl_3$). **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.98 (dd, *J* = 17.2, 9.5 Hz, 2H), 7.73 (t, *J* = 9.0 Hz, 2H), 7.48 (d, *J* = 7.6 Hz, 1H), 7.42 (dd, *J* = 7.6, 2.9 Hz, 1H), 7.39 – 7.33 (m, 2H), 7.33 – 7.27 (m, 1H), 6.32 – 6.09 (m, 2H), 5.48 (dd, *J* = 14.8, 9.0 Hz, 1H), 5.19 –

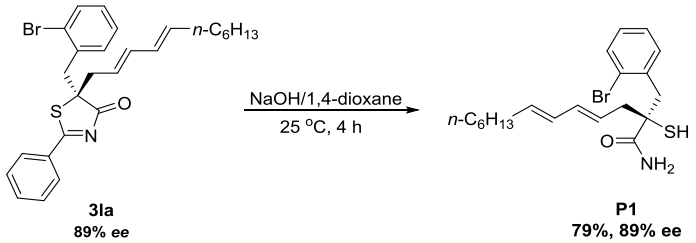
5.07 (m, 1H), 5.01 – 4.89 (m, 1H), 3.30 – 3.20 (m, 1H), 2.44 (s, 3H), 1.46 (ddd, *J* = 9.2, 6.9, 3.1 Hz, 1H), 1.35 – 1.19 (m, 3H), 1.17 – 1.06 (m, 2H), 0.78 (t, *J* = 6.8 Hz, 3H). **^{13}C NMR** (101 MHz, $CDCl_3$) ^{13}C NMR (101 MHz, $CDCl_3$) δ 194.1, 192.6, 139.0, 137.3, 136.4, 136.4, 135.8, 131.3, 129.3, 128.9, 128.6, 128.2, 127.4, 127.0, 126.1, 117.3, 77.5, 51.8, 31.4, 29.6, 22.2, 21.2, 13.8. **IR** (KBr) γ 2959, 2927, 1720, 1517, 1477, 1444, 1267, 1181, 1150, 1003, 796, 758, 693 cm^{-1}. **HRMS** (ESI): m/z [M + H] $^+$ calcd for $[C_{25}H_{27}NNaOS]^+$ requires 412.1711, found 412.1711. The absolute configuration was assigned tentatively by analogy.

(*S*)-5-((*R, E*)-nona-1, 3-dien-5-yl)-5-phenyl-2-(m-tolyl) thiazol-4(5H)-one (6bd)

Colorless oil. Yield: 75 %, 29.8 mg; diastereomeric ratio: 9:1. Enantiomeric excess: 91%, determined by HPLC (CHIRALPAK IE, hexane/isopropanol = 90/10, flow rate 1.0 mL/min, T = 30 ℃, 254 nm): t_R= 12.092 min (minor), t_R= 15.939 min (major). $[\alpha]_D^{20}$ = 153.0 (c 0.34, $CHCl_3$). **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.98 (dd, *J* = 17.2, 9.6 Hz, 2H), 7.81 – 7.70 (m, 2H), 7.49 (d, *J* = 7.6 Hz, 1H), 7.44 – 7.41 (m, 1H), 7.39 – 7.33 (m, 2H), 7.31 (dt, *J* = 5.0, 2.0 Hz, 1H), 6.19 (ddt, *J* = 20.5, 16.7, 10.4 Hz, 2H), 5.54 – 5.42 (m, 1H), 5.19 – 5.11 (m, 1H), 4.98 (dd, *J* = 9.6, 1.4 Hz, 1H), 3.37 – 3.22 (m, 1H), 2.44 (s, 3H), 1.48 – 1.32 (m, 2H), 1.28 – 1.06 (m, 2H), 0.78 (t, *J* = 7.1 Hz, 3H). **^{13}C NMR** (101 MHz, $CDCl_3$) δ 194.1, 192.6, 139.0, 137.2, 136.4, 136.4, 135.8, 132.1, 131.2, 129.4, 128.9, 128.6, 128.2, 127.5, 126.1, 117.3, 77.5, 51.6, 33.8, 21.2, 20.5, 13.6. **IR** (KBr) γ 2959, 2927, 1720, 1517, 1477, 1444, 1267, 1181, 1150, 1003, 796, 758, 693 cm^{-1}. **HRMS** (ESI): m/z [M + H] $^+$ calcd for $[C_{24}H_{25}NNaOS]^+$ requires 398.1555, found 398.1554. The absolute configuration was assigned tentatively by analogy.

Chemical Transformations of 3la and 6ba

4. 1 Chemical Transformations of 3la

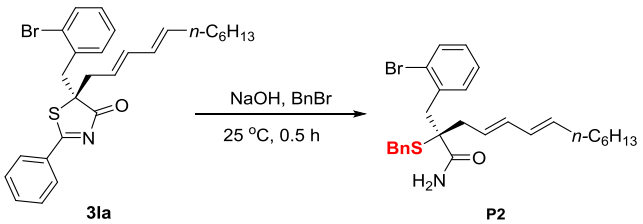


3la 89% *ee*

P1 79%, 89% ee

To a solution of (R)-5-(4-bromobenzyl)-2-phenyl-5-((2E, 4E)-undeca-2, 4-dien-1-yl) thiazol-4(5H)-one [3] **3la** (1.0 eq, 49.6 mg, 0.10 mmol) in dioxane (1 mL) at 0 ℃ was added dropwise aqueous solution of NaOH (2.5 M, 0.1 mL, 0.25 mmol). The resulting mixture was stirred at room temperature for 4 h and afterwards the reaction was quenched with 2 M aq. $NaHSO_4$. The combined organic phases were washed with an aqueous solution of saturated $NaHCO_3$, and brine and dried over $MgSO_4$. Evaporation of the solvent under reduced pressure gave 32.4 mg (0.08 mmol, yield: 79%) of the pure product as a colorless oil.

(*S, 4E, 6E*)-2-(2-bromobenzyl)-2-mercaptotrideca-4, 6-dienamide (P1): Enantiomeric excess: 89%, determined by HPLC (CHIRALPAK OD-H, hexane/isopropanol = 97/3, flow rate 1.0 mL/min, T = 30 ℃, 210 nm): t_R= 8.295 min (major), t_R= 9.103 min (minor). $[\alpha]_D^{20}$ = -22.7 (c 0.17, $CHCl_3$). **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.57 (dd, *J* = 8.0, 1.3 Hz, 1H), 7.35 (dd, *J* = 7.7, 1.7 Hz, 1H), 7.23 (td, *J* = 7.5, 1.3 Hz, 1H), 7.14 – 7.08 (m, 1H), 6.17 (dd, *J* = 15.0, 10.4 Hz, 1H), 6.02 (dd, *J* = 15.0, 10.4 Hz, 1H), 5.73 – 5.62 (m, 2H), 5.50 (ddd, *J* = 15.0, 9.0, 6.0 Hz, 1H), 3.59 (d, *J* = 14.0 Hz, 1H), 3.38 (d, *J* = 14.0 Hz, 1H), 3.08 (dt, *J* = 16.6, 8.3 Hz, 1H), 2.44 (dd, *J* = 13.8, 9.1 Hz, 1H), 2.06 (dd, *J* = 14.0, 7.0 Hz, 2H), 1.36 (dd, *J* = 13.7, 6.5 Hz, 2H), 1.32 – 1.22 (m, 6H), 0.88 (t, *J* = 6.9 Hz, 3H). **^{13}C NMR** (101 MHz, $CDCl_3$) δ 175.8, 136.3, 135.9, 135.3, 133.2, 131.7, 129.5, 128.7, 127.4, 126.4, 124.6, 58.0, 45.4, 44.5, 32.6, 31.7, 29.2, 28.9, 22.6, 14.1. **IR** (KBr) γ 3444, 3333, 2925, 2854, 1671, 1566, 1466, 1439, 1377, 1261, 1093, 1025, 863, 800, 725, 659 cm^{-1}. **HRMS** (ESI): m/z [M + Na] $^+$ calcd for $[C_{23}H_{21}N_2OS]^+$ requires432.0967, found 432.0975.The absolute configuration was assigned tentatively by analogy.



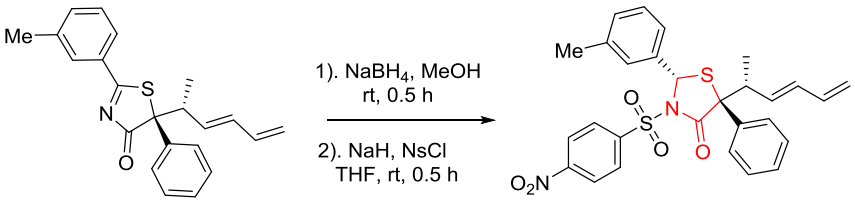
3Ia **89% *ee***

P2 **84%, 83% *ee***

(*R*)-5-(4-bromobenzyl)-2-phenyl-5-((2E, 4E)-undeca-2, 4-dien-1-yl) thiazol-4(5H)-one [4] (0.1 mmol) was dissolved in EtOH (1 mL). Then benzyl bromide (0.25 mmol) and 2.5 N NaOH (0.05 mL) were added to the reaction vessel. The reaction was complete after stirring for 0.5 hour at rt. After adjusting pH to 2 with 1 N $KHSO_4$, extraction with DCM followed. The combined organic layers were then dried over $NaSO_4$. After removal of the solvent, the residue was subjected to flash chromatography (1:2 EA/hexane) to afford the titled product as colorless oil (41.9 mg, 84% yield).

(*S, 4E, 6E*)-2-(benzylthio)-2-(2-bromobenzyl) trideca-4, 6-dienamide (P2): Enantiomeric excess: 83%, determined by HPLC (CHIRALPAK OD-H, hexane/isopropanol = 85/15, flow rate 1.0 mL/min, T = 30 ℃, 210 nm): t_R= 8.295 min (major), t_R= 9.103 min (minor). $[\alpha]_D^{20}$ = -23.8 (c 0.17, $CHCl_3$). **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.60 – 7.45 (m, 1H), 7.45 – 7.36 (m, 1H), 7.32 – 7.26 (m, 2H), 7.26 – 7.18 (m, 4H), 7.08 (td, *J* = 7.7, 1.7 Hz, 1H), 6.20 – 5.98 (m, 1H), 5.74 (dt, *J* = 14.5, 7.2 Hz, 1H), 5.64 (dt, *J* = 13.9, 6.9 Hz, 1H), 3.77 (d, *J* = 11.5 Hz, 1H), 3.64 (d, *J* = 11.5 Hz, 1H), 3.41 (q, *J* = 14.5 Hz, 2H), 2.76 (qd, *J* = 15.4, 7.3 Hz, 2H), 2.07 (dd, *J* = 14.1, 7.0 Hz, 2H), 1.37 (dd, *J* = 13.4, 6.4 Hz, 2H), 1.33 – 1.24 (m, 6H), 0.88 (t, *J* = 6.8 Hz, 3H). **^{13}C NMR** (101 MHz, $CDCl_3$) δ 174.8, 136.6, 136.1, 134.7, 134.5, 133.0, 132.2, 129.8, 129.1, 128.7, 128.5, 127.4, 127.0, 126.5, 125.5, 59.2, 41.5, 39.0, 34.5, 32.6, 31.7, 29.2, 28.9, 22.6, 14.1. **IR** (KBr) γ 3443, 3025, 2924, 2853, 1676, 1585, 1496, 1453, 1437, 1376, 1260, 1095, 1026, 989, 800, 749, 709 cm^{-1}. **HRMS** (ESI): m/z $[M + H]^+$ calcd for $[C_{23}H_{21}N_2OS]^+$ requires 500.1617, found 500.1621.The absolute configuration was assigned tentatively by analogy.

4.2 Chemical Transformations of 6ba



6ba **P3**

99.5% ee after recrystallization

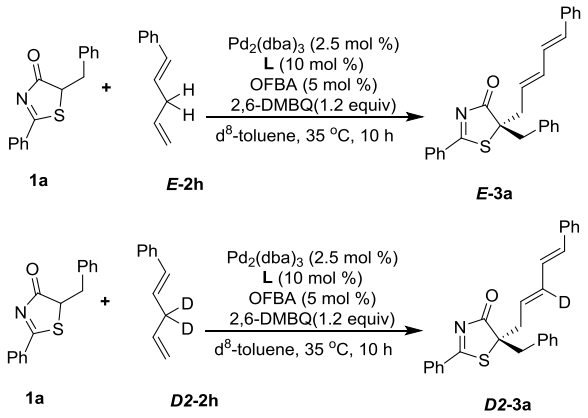
A solution of **(*S*)-5-((*R, E*)-hexa-3, 5-dien-2-yl)-5-phenyl-2-(m-tolyl) thiazol-4(5H)-one 6ba** [5] (347 mg, 1 mmol) in methanol (5 mL) was added to an ice-cooled solution of $NaBH_4$ (0.02 g, 0.53 mmol) in methanol (10 mL) with stirring. The reaction mixture was stirred for 0.5 h at room temperature, concentrated under reduced pressure, and then extracted with $CHCl_3$. The $CHCl_3$ layer was dried over K_2CO_3, filtered, and concentrated. The residue was dissolved in dried THF (1 mL) and dropwise to an ice-cooled solution of NaH (40 mg, 60% in oil, 1.5 mmol). After reaction 5 min at 0 °C, the NsCl (331.5 mg, 1.5 mmol) in THF (1 mL) was added dropwise to the mixture at 0 °C. The reaction mixture was stirred for 0.5 h at room temperature. And quenched by NH_4Cl (sat), extracted with $CHCl_3$, dried over Na_2SO_4. After removal of the solvent, the residue was subjected to flash chromatography (1:10 EA/hexane) and recrystallization from the mixture solvent of ($CHCl_3$/MeOH) to afford the titled product as a white solid (368 mg, 69% yield, 99.5% ee).

(*2S, 5S*)-5-((*R,E*)-hexa-3,5-dien-2-yl)-3-((4-nitrophenyl)sulfonyl)-2,5-diphenylthiazolidin-4-one (P3): Enantiomeric excess: 99.5%, determined by HPLC (CHIRALPAK IC, hexane/isopropanol = 90/10, flow rate 1.0 mL/min, T = 30 ℃, 210 nm): t_R= 15.228 min (major), t_R=28.315 min (minor). $[\alpha]_D^{25}$ = -61.1 (c 0.17, CHCl3).**^{1}H NMR** (400 MHz, $CDCl_3$) δ 8.12 – 7.98 (m, 2H), 7.84 – 7.69 (m, 2H), 7.71 – 7.61 (m, 2H), 7.41 – 7.34 (m, 3H), 7.23 – 7.13 (m, 2H), 7.11 (d, *J* = 7.0 Hz, 1H), 7.01 (s, 1H), 6.34 – 6.11 (m, 2H),

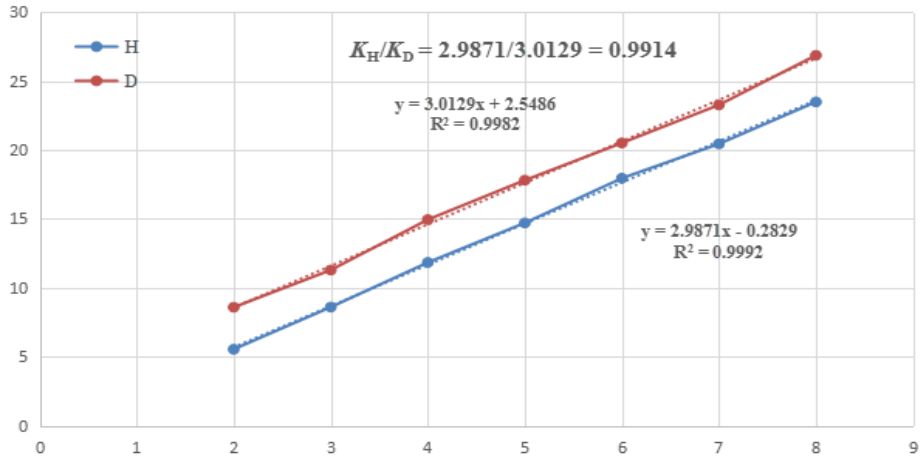
5.85 (s, 1H), 5.83 – 5.71 (m, 1H), 5.15 (dd, *J* = 11.8, 5.1 Hz, 1H), 5.09 – 5.01 (m, 1H), 3.37 – 3.25 (m, 1H), 2.22 (d, *J* = 11.1 Hz, 3H), 0.76 (d, *J* = 6.9 Hz, 3H).**^{13}C NMR** (101 MHz, $CDCl_3$) δ 171.7, 150.4, 143.0, 138.3, 137.3, 136.6, 135.9, 135.0, 133.7, 130.3, 129.4, 128.8, 128.7, 128.5, 128.5, 127.2, 125.6, 123.4, 117.3, 69.0, 60.0, 44.6, 21.3, 16.0. **IR** (KBr) γ 3729, 3427, 3106, 2962, 2924, 2853, 2358, 1722, 1605, 1531, 1379, 1347, 1260, 1181, 1150, 1087, 1013, 796, 422 cm^{-1}. **HRMS** (ESI): m/z [M + H] $^+$ calcd for $[C_{28}H_{26}N_2O_2S_2Na]^+$ requires 557.1181, found 557.1178.

5. Mechanistic studies

5.1 Kinetic Isotope Effect (KIE)



General procedure: To a Ar-purged NMR tube were added $Pd_2(dba)_3$ (0.58 mg), L5 (2.4 mg), OFBA (0.2 mg), DMBQ (4.1 mg) and degased d8 -toluene (0.6 mL). Then *E*-2h or *D2*-2h (0.05 mmol) was added and the NMR tube was immediately placed at 35 ℃, ^{1}H-NMR scan was conducted every 1 hours for 9 hours.



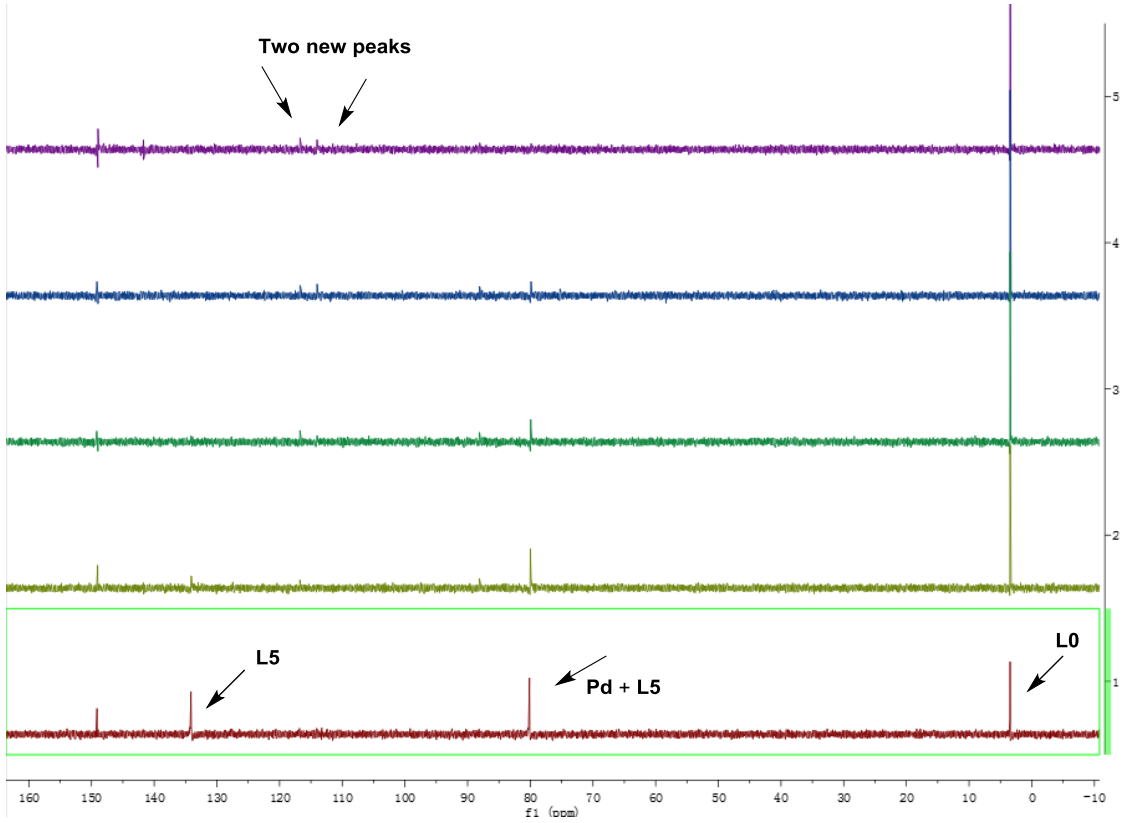
***R*-5-benzyl-2-phenyl-5-((*2E, 4E*)-5-phenylpenta-2, 4-dien-1-yl-3-d) thiazol-4(5H)-one (*D2*-3a).**

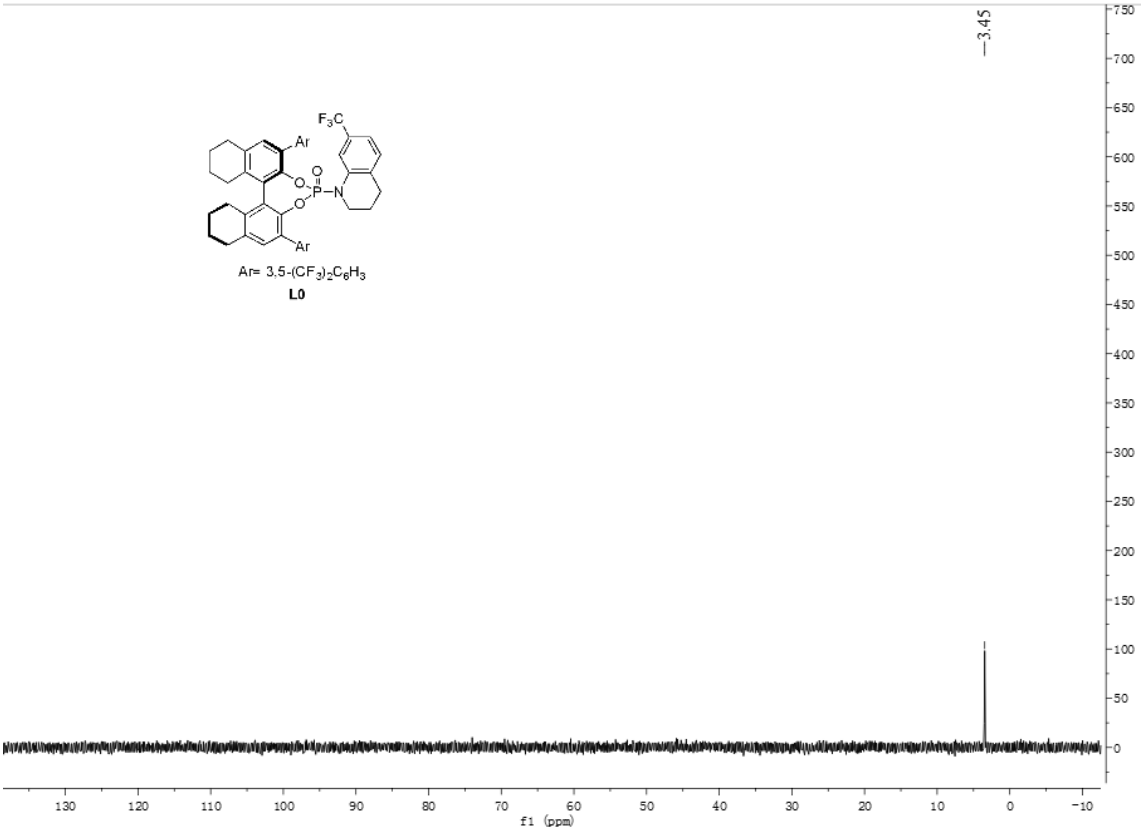
^{1}H NMR (400 MHz, $CDCl_3$) δ 8.12 – 7.97 (m, 1H), 7.76 – 7.58 (m, 1H), 7.54 – 7.41 (m, 1H), 7.36 – 7.31 (m, 1H), 7.28 (dd, *J* = 7.1, 1.7 Hz, 1H), 7.25 – 7.13 (m, 2H), 3.45 – 3.31 (m, 1H), 3.26 (d, *J* = 13.8 Hz, 1H), 2.93 (dd, *J* = 14.2, 7.1 Hz, 1H), 2.80 (dd, *J* = 14.1, 7.9 Hz, 1H). **^{13}C NMR** (101 MHz, $CDCl_3$) δ 195.3, 194.7, 137.0, 135.3, 134.9, 132.4, 132.1, 130.4, 128.9, 128.8, 128.5, 128.3, 128.1, 127.5, 127.4, 126.5, 126.3, 70.8, 44.5, 41.7. **HRMS** (ESI): m/z [M + H] $^+$ calcd for $[C_{27}H_{23}DNOS]^+$ requires 411.1641, found 411.1642.

5.2 ^{31}P NMR and HRMS Studies

5.2.1 ^{31}P NMR Studies:

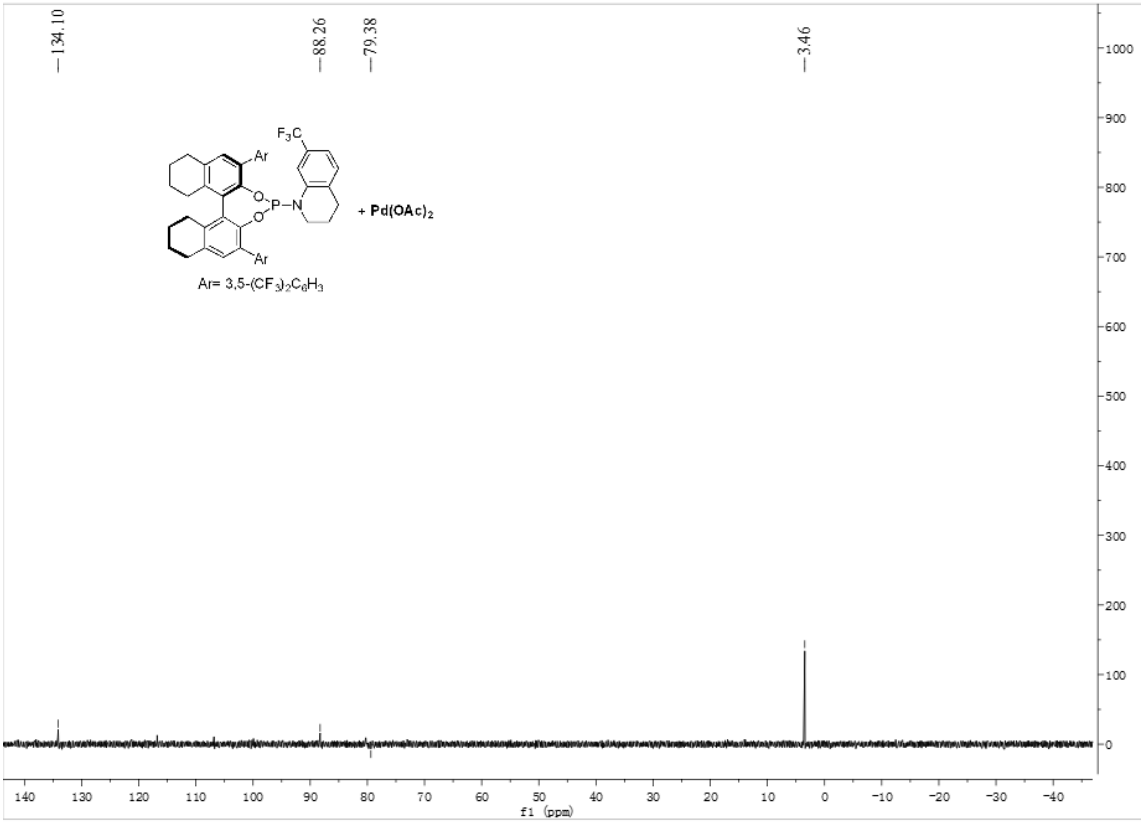
Under an atmosphere of N_2, $Pd(OAc)_2$ (2.4 mg, 0.02 mmol, 1 equiv), L5(19.2 mg, 0.02 mmol, 1 equiv) and the 1,4-hexadiene (8.2 mg, 0.1 mmol, 5 eq.) were added to a glass vial, then Acetone-d6 (0.50 mL) was added and the NMR tube was immediately placed at 25 °C, ^{31}P-NMR scan was conducted every 15 mins for 1 hours.

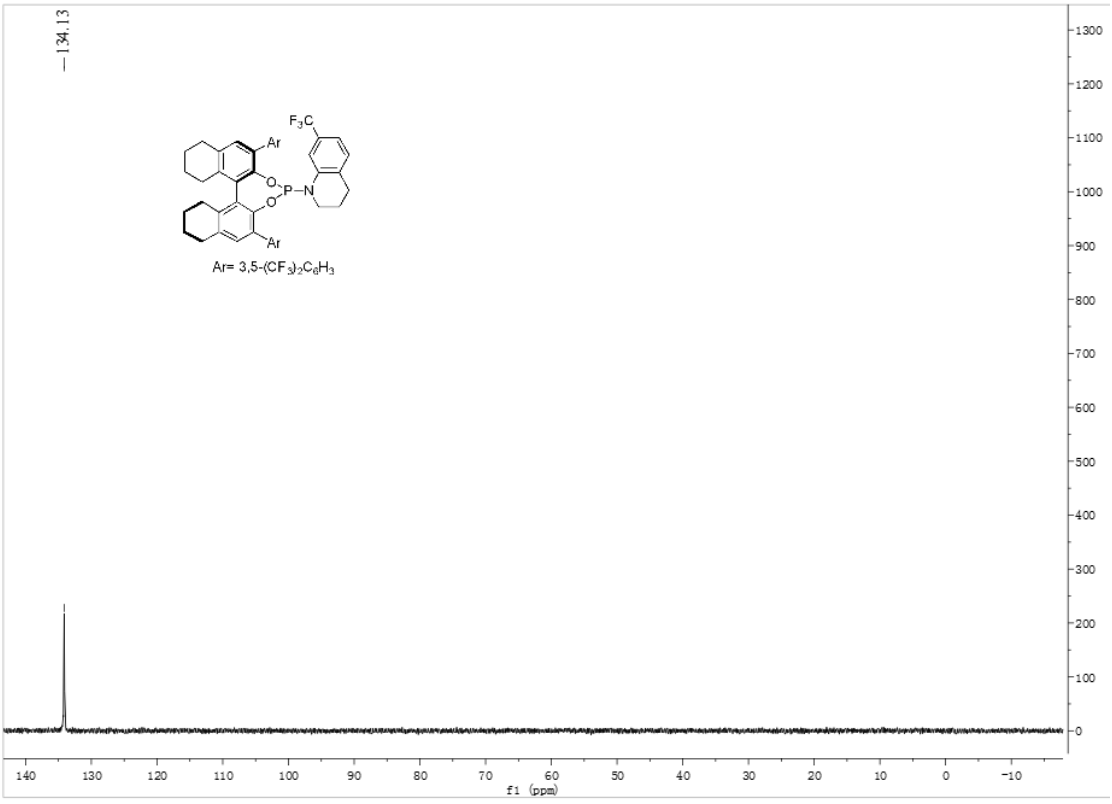




Ar= 3,5-$(CF_3)_2C_6H_3$

L0

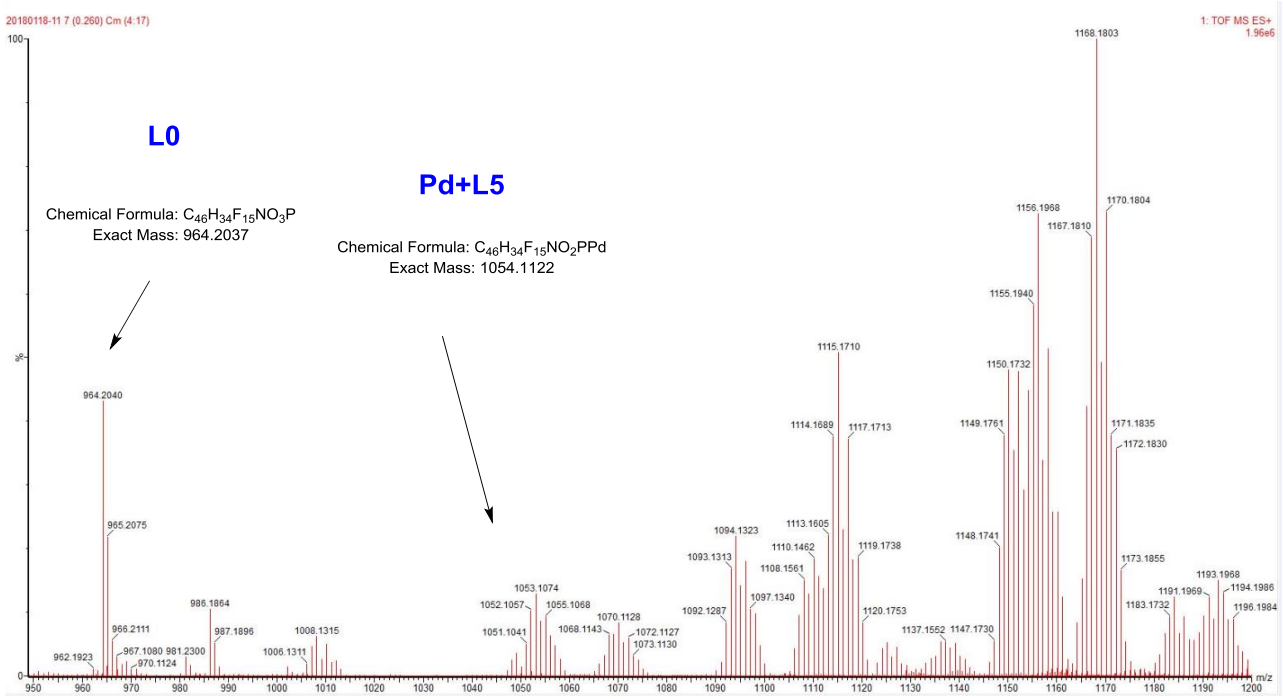


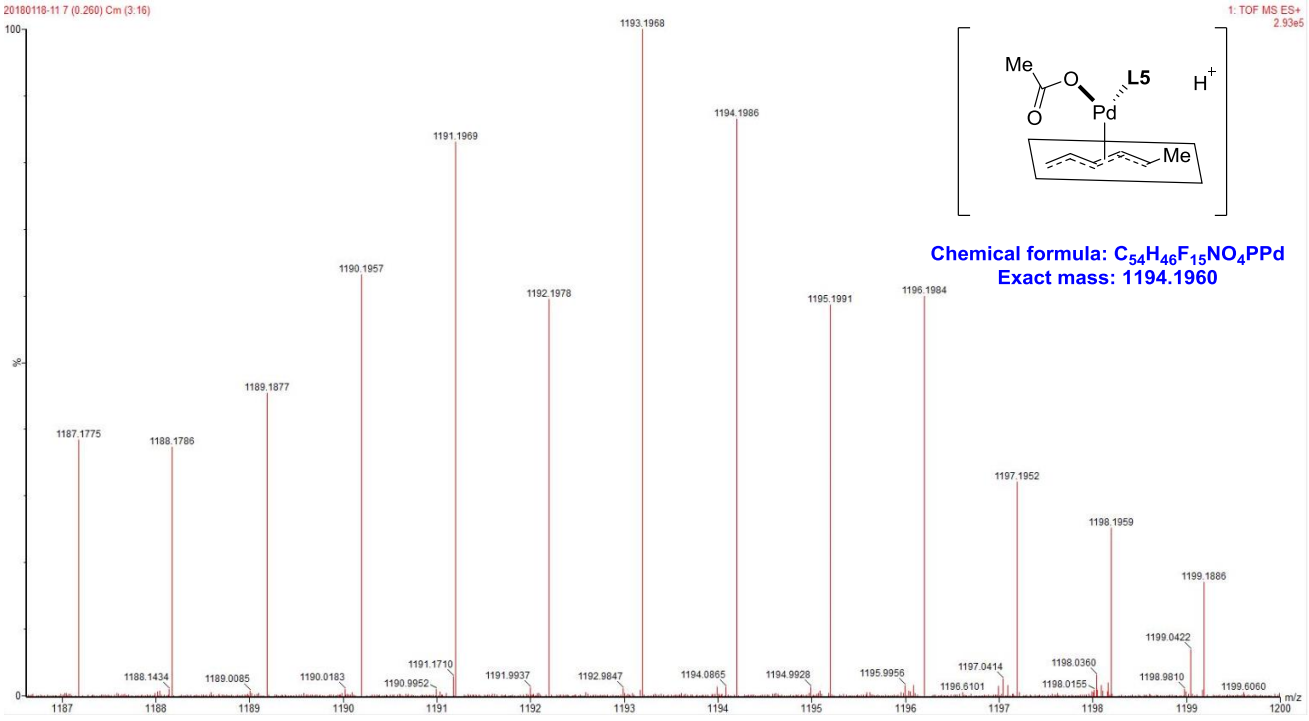


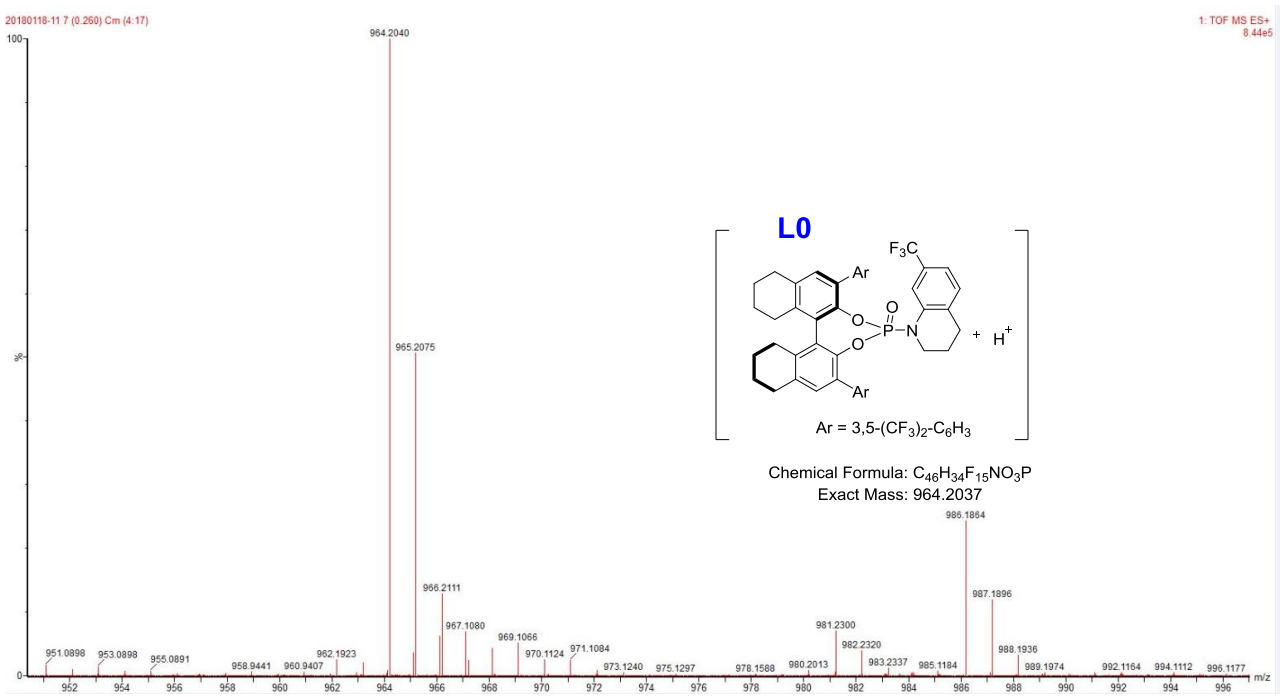
5.2.2 HRMS Studies

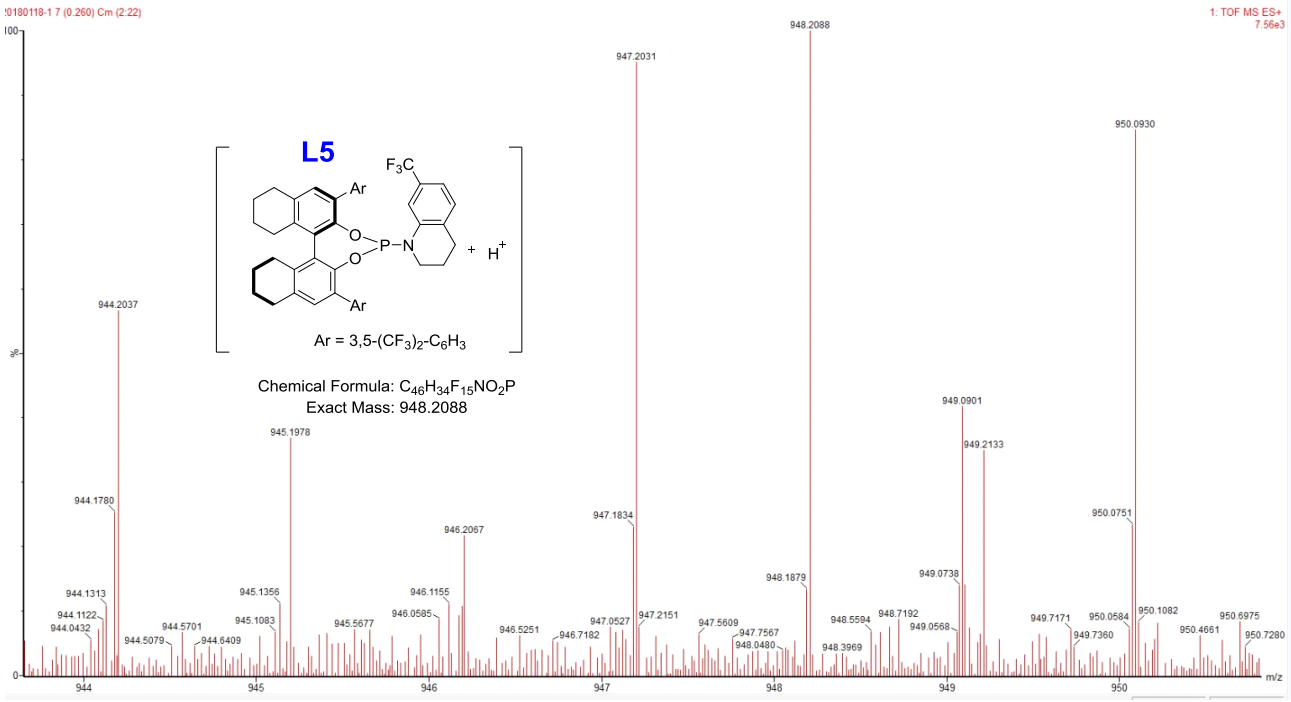
Under an atmosphere of N_2, $Pd(OAc)_2$ (2.4 mg, 0.02 mmol, 1 equiv), L5(19.2 mg, 0.02 mmol, 1 equiv) and the 1,4-hexadiene (8.2 mg, 0.1 mmol, 5 eq.) were added to a glass vial, then Acetone-d6 (0.50 mL) was added and the mixture was stirred for 30 min at 25

°C . Then the solution (0.01 mL) was diluted with CH_3CN (1.0 mL) and the diluted solution was subjected to run ESI-MS analysis. Middle peaks corresponding to Allylic Pd^{II} intermediate were observed.






20180118-11 7 (0.260) Cm (4:17)
1: TOF MS ES+
8.44e5
L0
Ar = 3,5-(CF3)2-C6H3
Chemical Formula: C46H34F15NO3P
Exact Mass: 964.2037


20180118-1 7 (0.260) Cm (2:22)
1: TOF MS ES+
7.56e3
L5
Ar = 3,5-(CF3)2-C6H3
Chemical Formula: C46H34F15NO2P
Exact Mass: 948.2088

X-ray Single Crystal Data - Determination of the Absolute Configuration

(1) Determination of the Absolute Configuration of Product 3da and P3.

CCDC Number：1836280

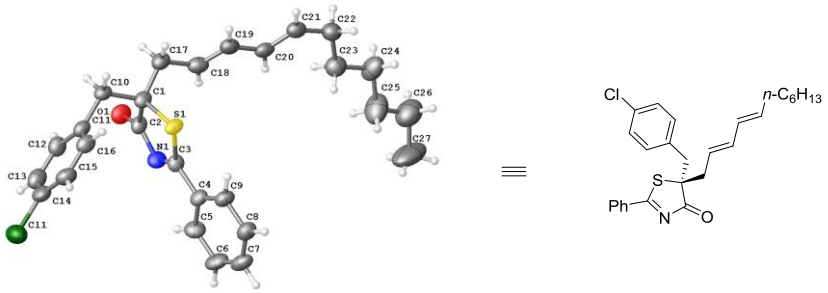


Table 1. Crystal data and structure refinement for cu_dm17049_0m.	
Identification code	cu_dm17049_0m
Empirical formula	C27 H30 Cl N O S
Formula weight	452.03
Temperature	130 K
Wavelength/Å	1.54178
Crystal system	Orthorhombic
Space group	P 21 21 21
a/Å	5.9641(4)
b/Å	17.2956(13)
c/ Å	24.3231(16)
α/ °	90
β/ °	90
γ/ °	90
Volume/ $Å^3$	2509.0(3)
Z	4
Density (calculated) / mg/cm^3	1.197
μ/ mm^{-1}	2.253
F(000)	960
Crystal size/ mm^3	0.15 x 0.1 x 0.06
2Θ range for data collection/ °	3.135 to 69.650
Index ranges	-6<=h<=5, -20<=k<=20, -28<=l<=29
Reflections collected	15303
Independent reflections	4410 [R(int) = 0.1048]
Data / restraints / parameters	4410 / 12 / 281
Goodness-of-fit on F^2	1.051
Final R indices [I>2sigma(I)]	R1 = 0.0703, wR2 = 0.1843
R indices (all data)	R1 = 0.0941, wR2 = 0.2025
Extinction coefficient	n/a
Largest diff. peak and hole/ $e.Å^{-3}$	0.714 and -0.499

(2) Determination of the Absolute Configuration of Product P3.

CCDC Number：1836281

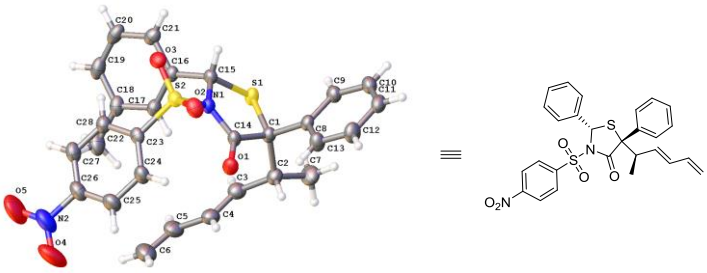


Table 2. Crystal data and structure refinement for cu_dm17049_0m.	
Identification code	wmj18024_0m
Empirical formula	C28 H26 N2 O5 S2
Formula weight	534.63
Temperature	306.49 K
Wavelength	1.34139 Å
Crystal system	Monoclinic
Space group	P 1 21 1
Unit cell dimensions	a = 11.1699(2) Å
	b = 8.2022(2) Å
	c = 14.7242(3) Å
Volume	1321.78(5) $Å^3$
Z	2
Density (calculated)	1.343 Mg/m^3
Absorption coefficient	1.408 mm^{-1}
F(000)	560
Crystal size	0.1 x 0.08 x 0.06 mm^3
Theta range for data collection	7.013 to 57.027 °.
Index ranges	-13<=h<=13, -10<=k<=9, -18<=l<=18
Reflections collected	13543
Independent reflections	5024 [R(int) = 0.0349]
Completeness to theta = 53.594 °	96.2 %
Absorption correction	Semi-empirical from equivalents
Max. and min. transmission	0.7512 and 0.5842
Refinement method	Full-matrix least-squares on F^2
Data / restraints / parameters	5024 / 1 / 336
Goodness-of-fit on F^2	1.053
Final R indices [I>2sigma(I)]	R1 = 0.0279, wR2 = 0.0770
R indices (all data)	R1 = 0.0285, wR2 = 0.0777
Absolute structure parameter	0.048(6)

1. (a) Lynd, R. A.; Zweifel, G. *Synthesis* **1974**, 658. (b) Wang, P.-S.; Lin, H.-C.; Zhou, X.-L.; Gong, L.-Z. *Org. Lett*. **2014**, *16*, 3332.

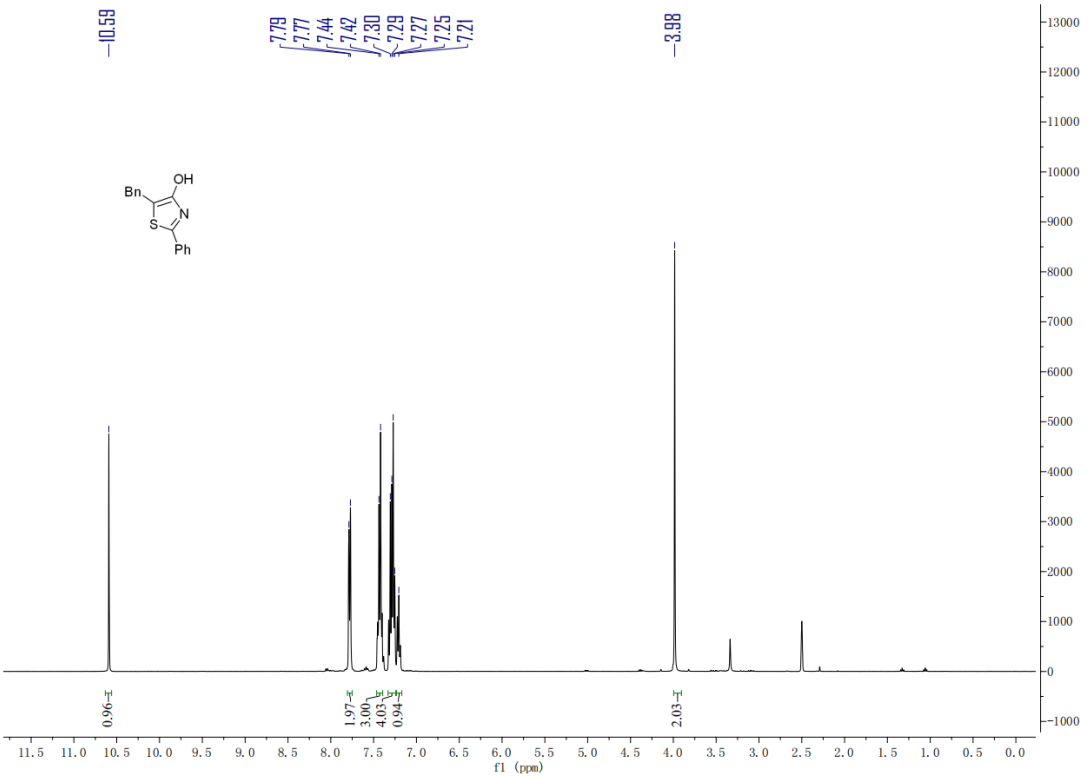
2. Kerdesky, F. A. J.; Holms, J. H.; Moore, J. L.; Bell, R. L.; Dyer, R. D.; Carter, G. W.; Brooks , D. W. *J. Med. Chem.*,**1991**, *34*, 2158.

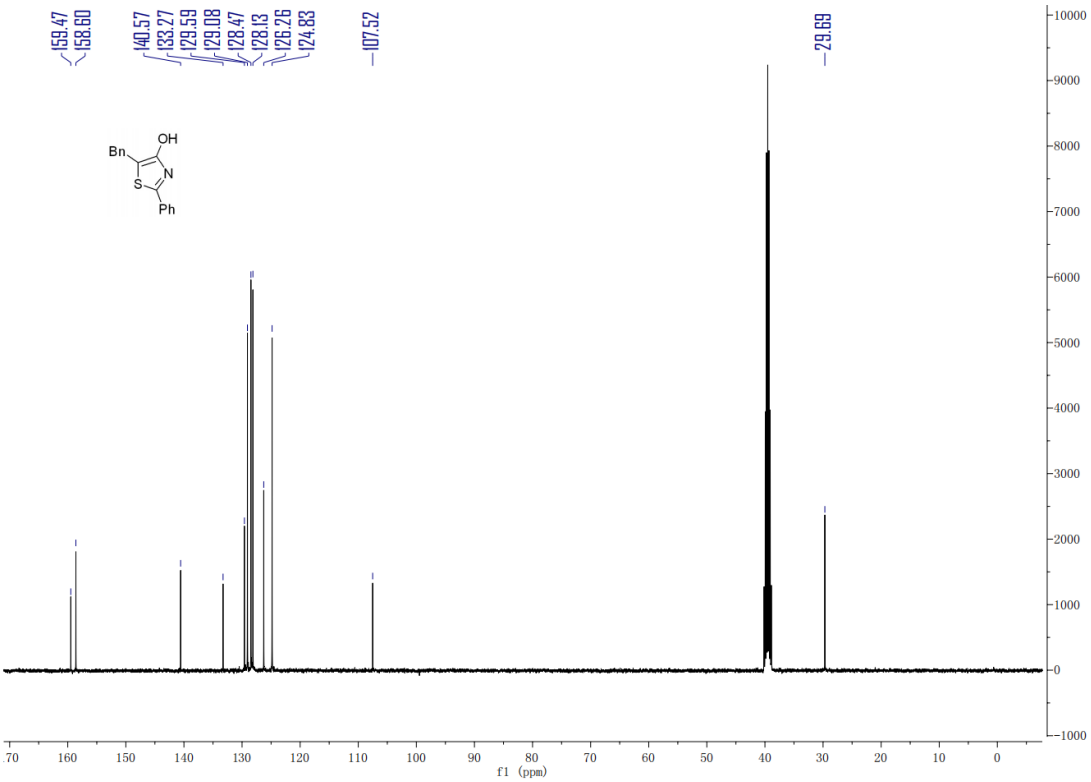
3. Diosdado, S.; Etxabe, J.; Izquierdo, J.; Landa, A.; Mielgo, A.; Olaizola, I.; L-pez, R.; Palomo, C. *Angew. Chem. Int. Ed*. **2013**, *52*, 11846.

4. Chen, W.; Hartwig, J. F. *J. Am. Chem. Soc*. **2014**, *136*, 377.

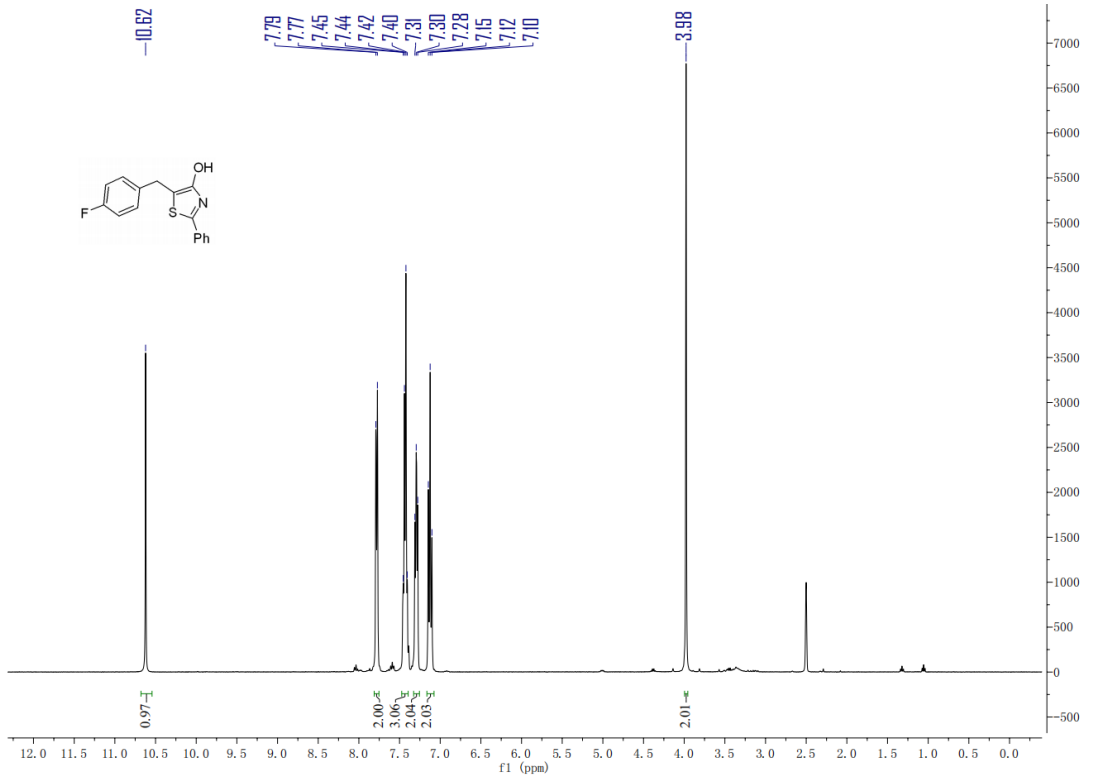
5. Yamamoto, Y.; Ohnishi, S.; Azuma, Y. *Pharmaceutical Bulletin*, **1983**, *31*, 6, 1929 .

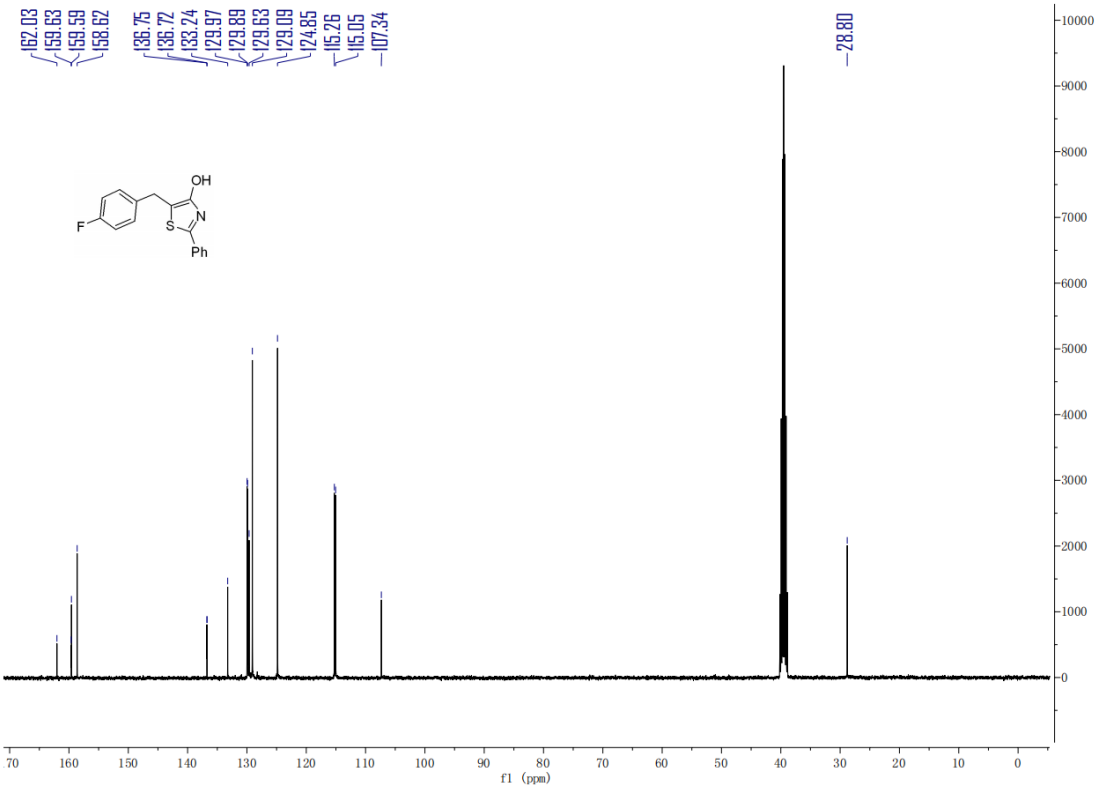
5-benzyl-2-phenylthiazol-4-ol (1a)



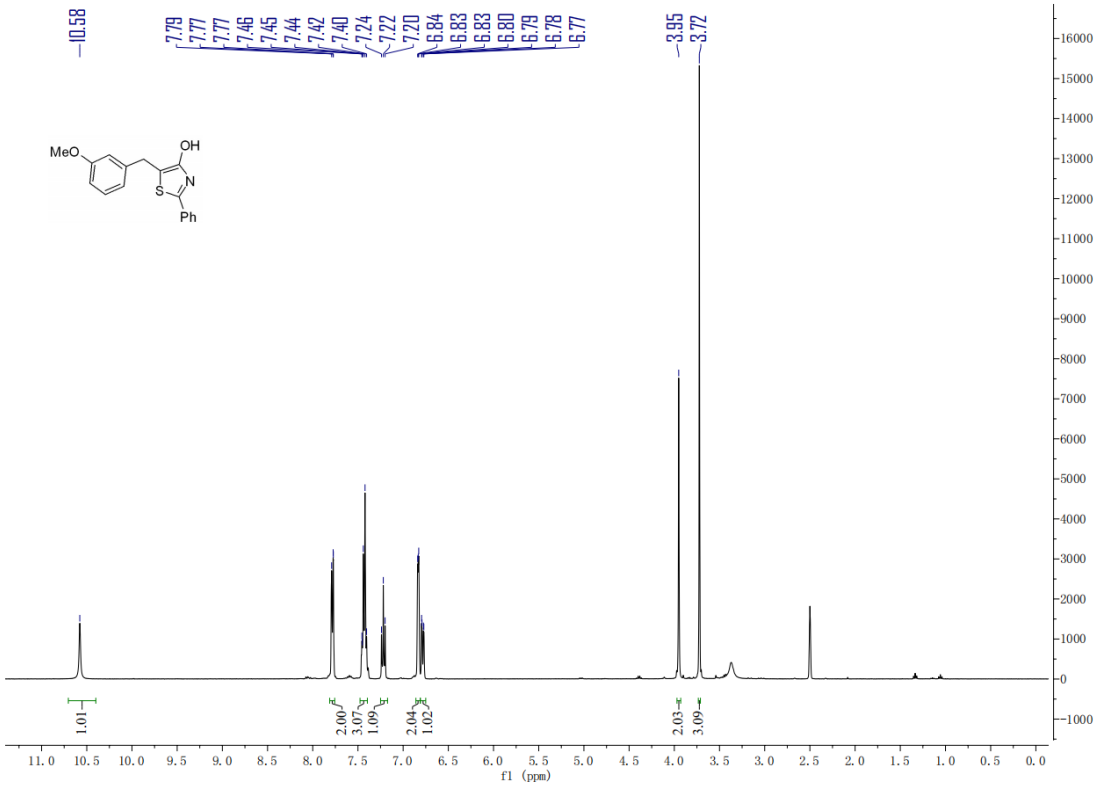


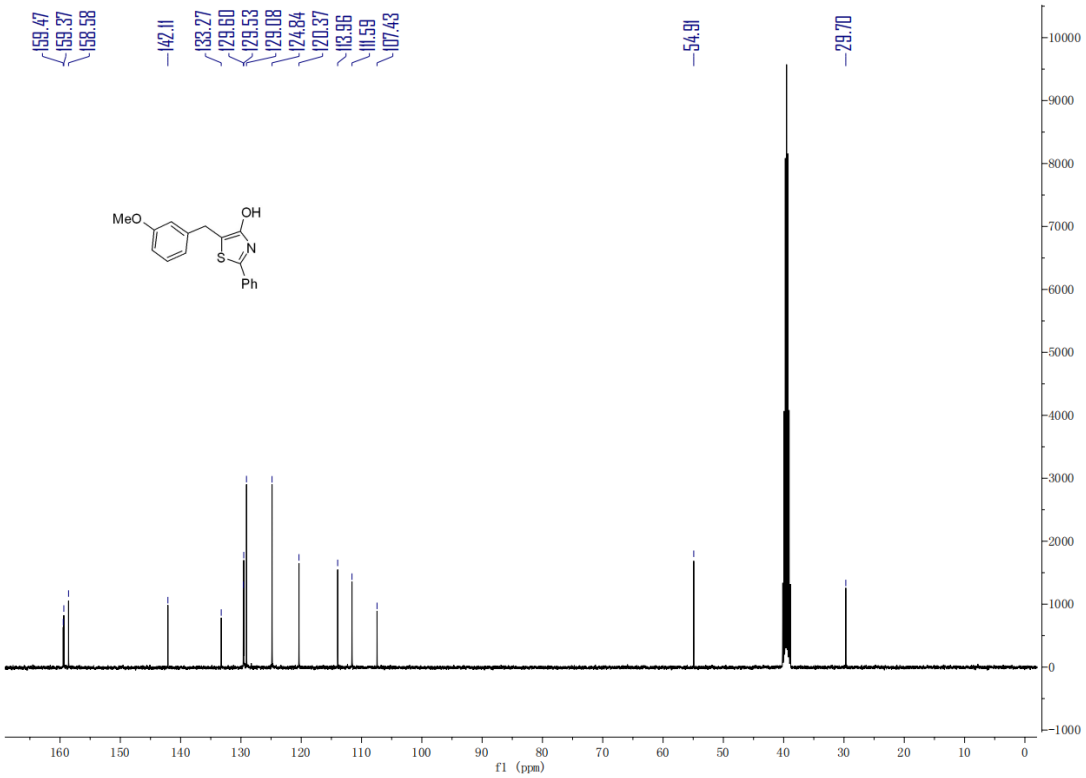
5-(4-fluorobenzyl)-2-phenylthiazol-4-ol (1b)



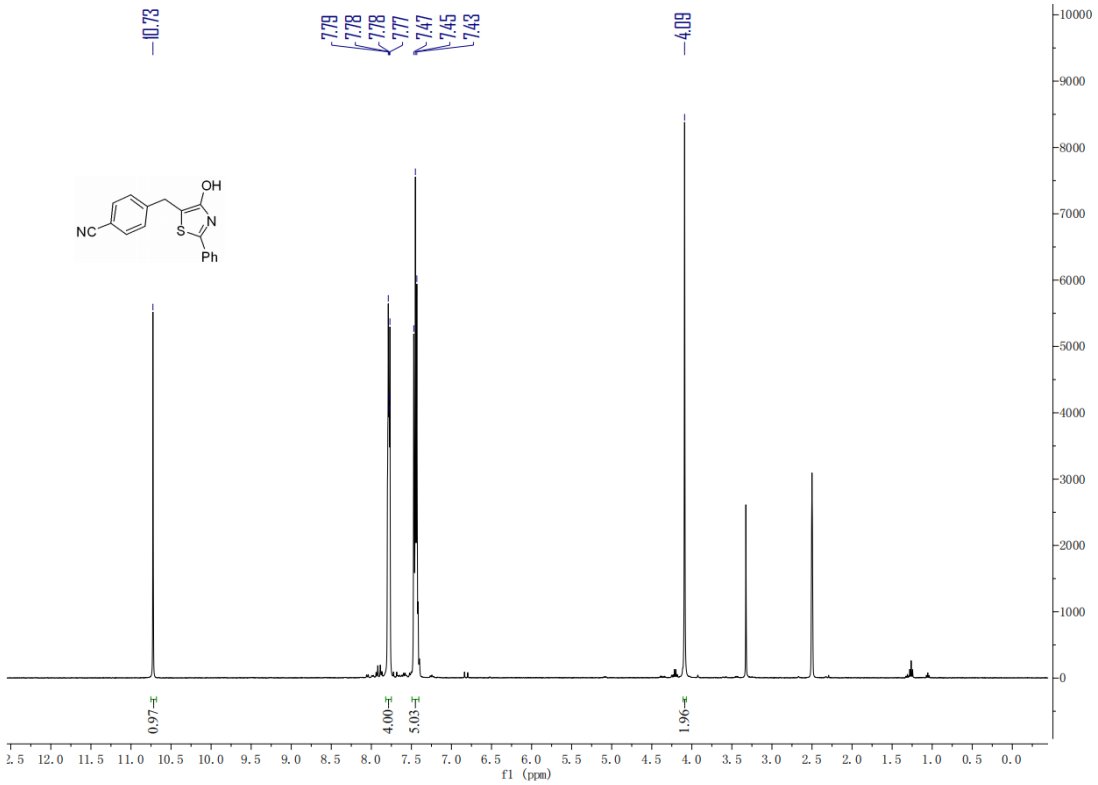


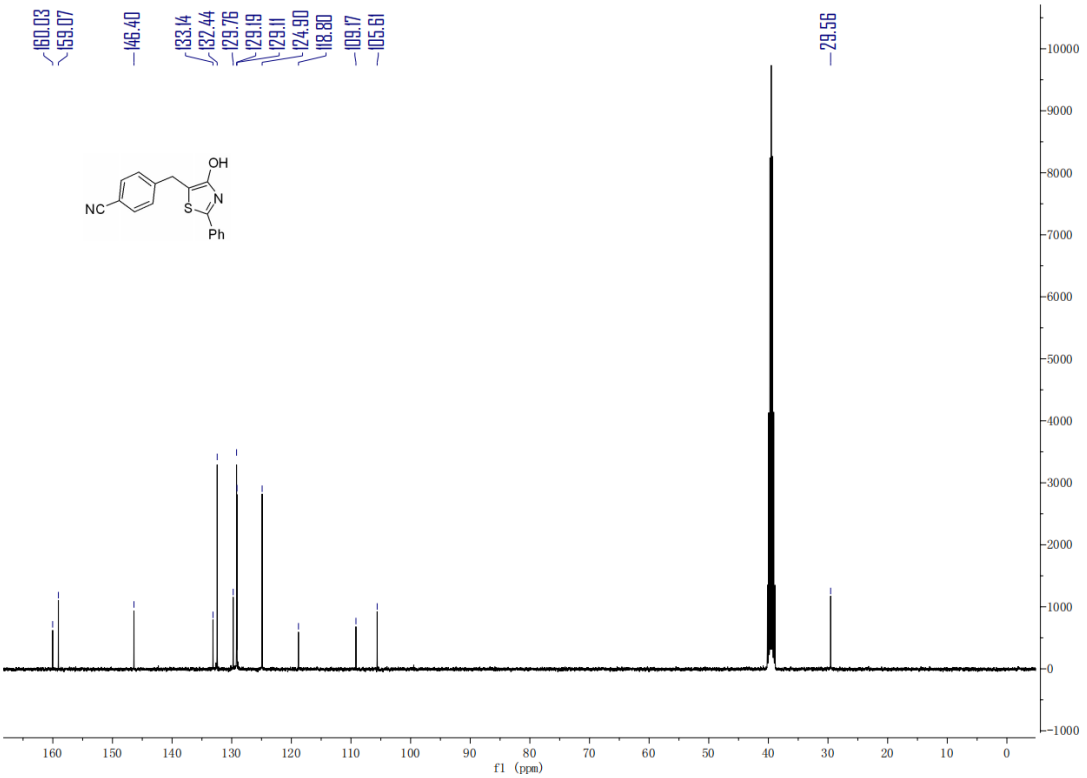
5-(3-methoxybenzyl)-2-phenylthiazol-4-ol (1c)



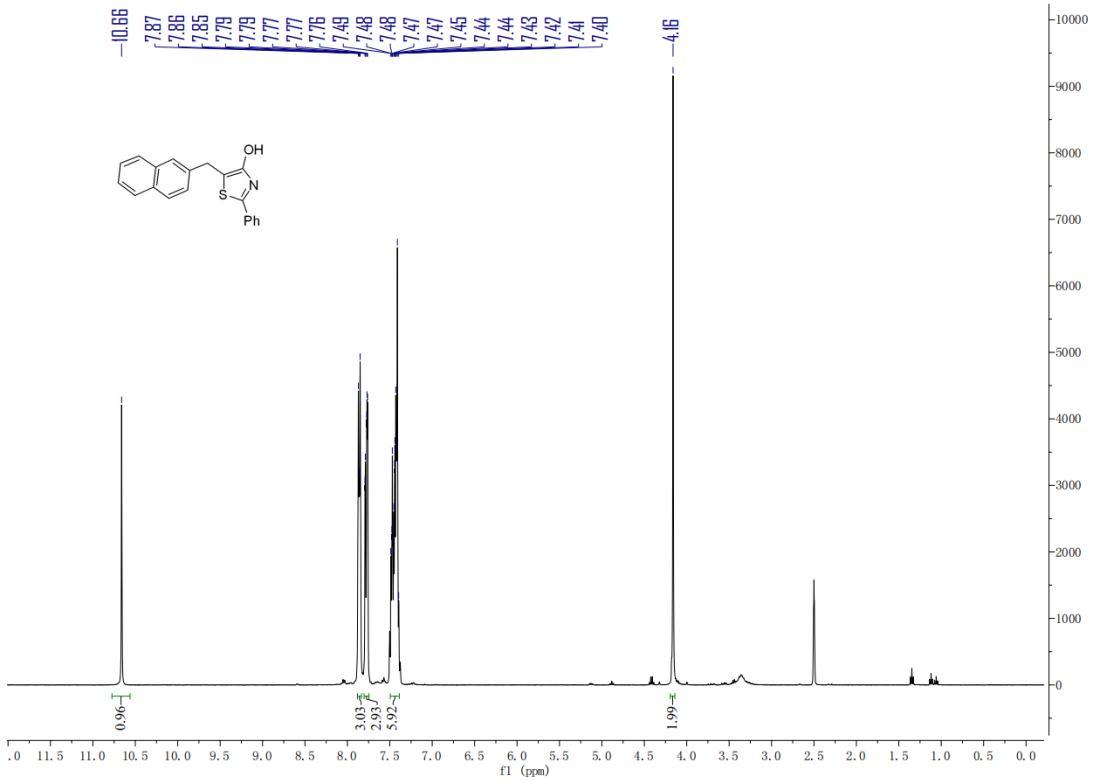


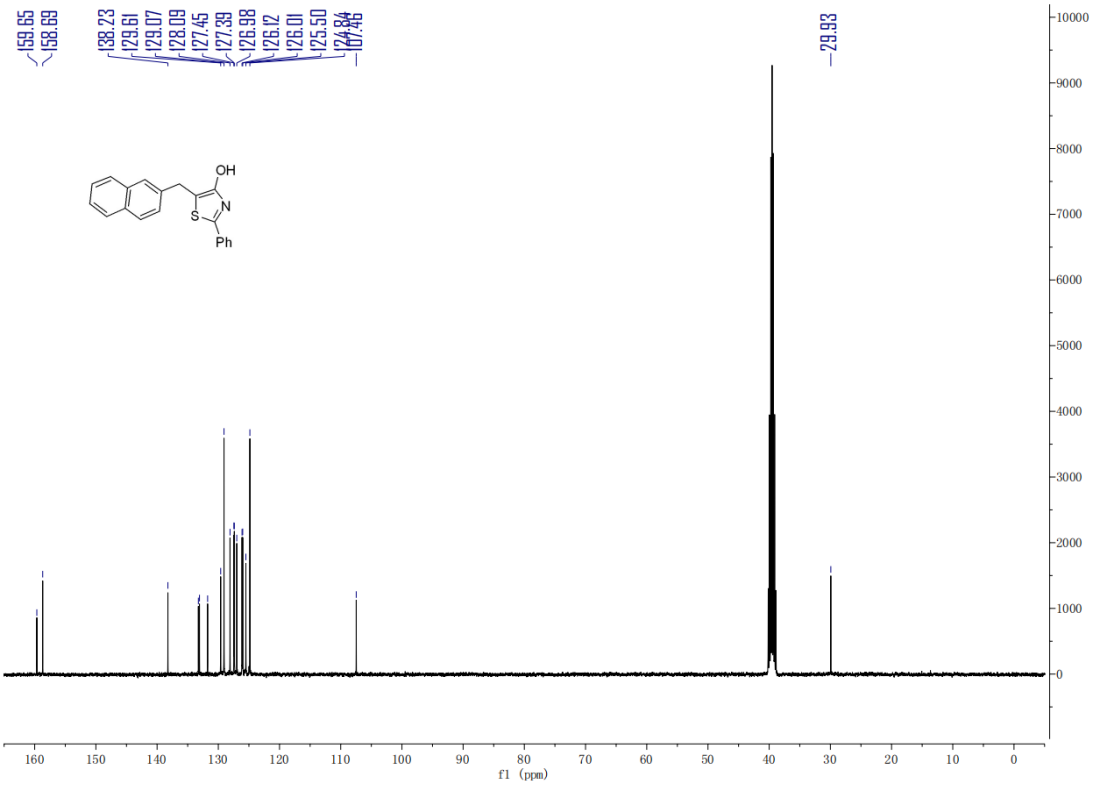
4-((4-hydroxy-2-phenylthiazol-5-yl) methyl) benzonitrile (1d)



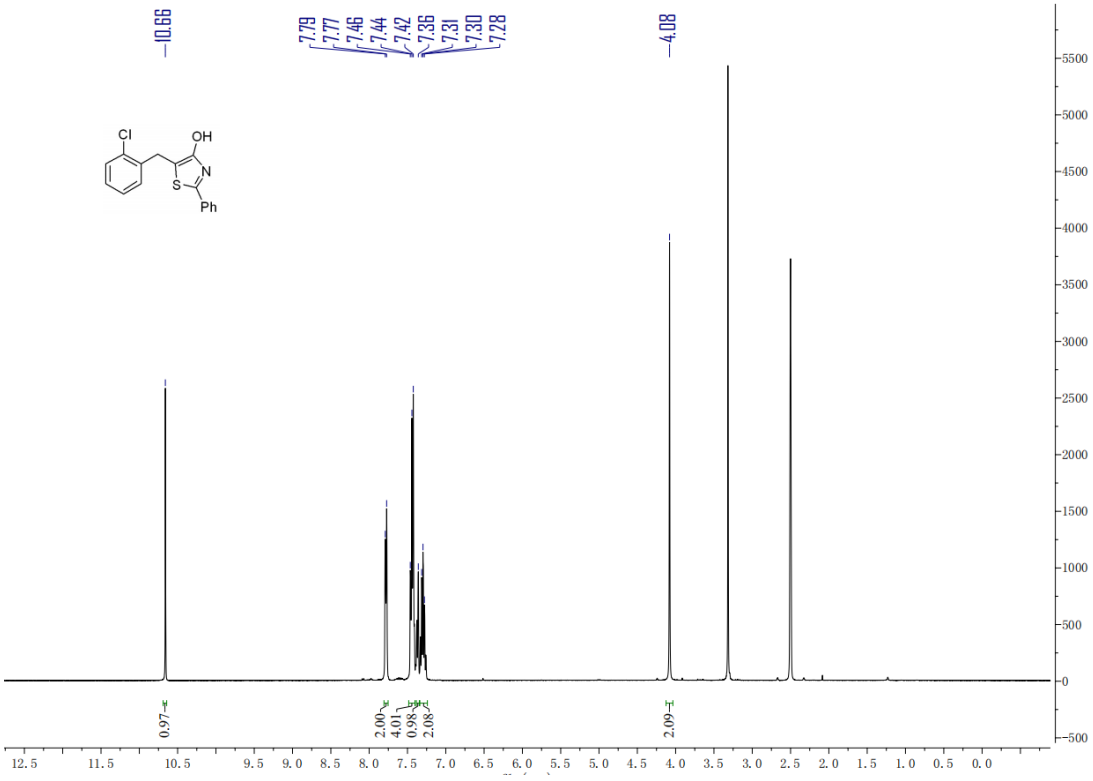


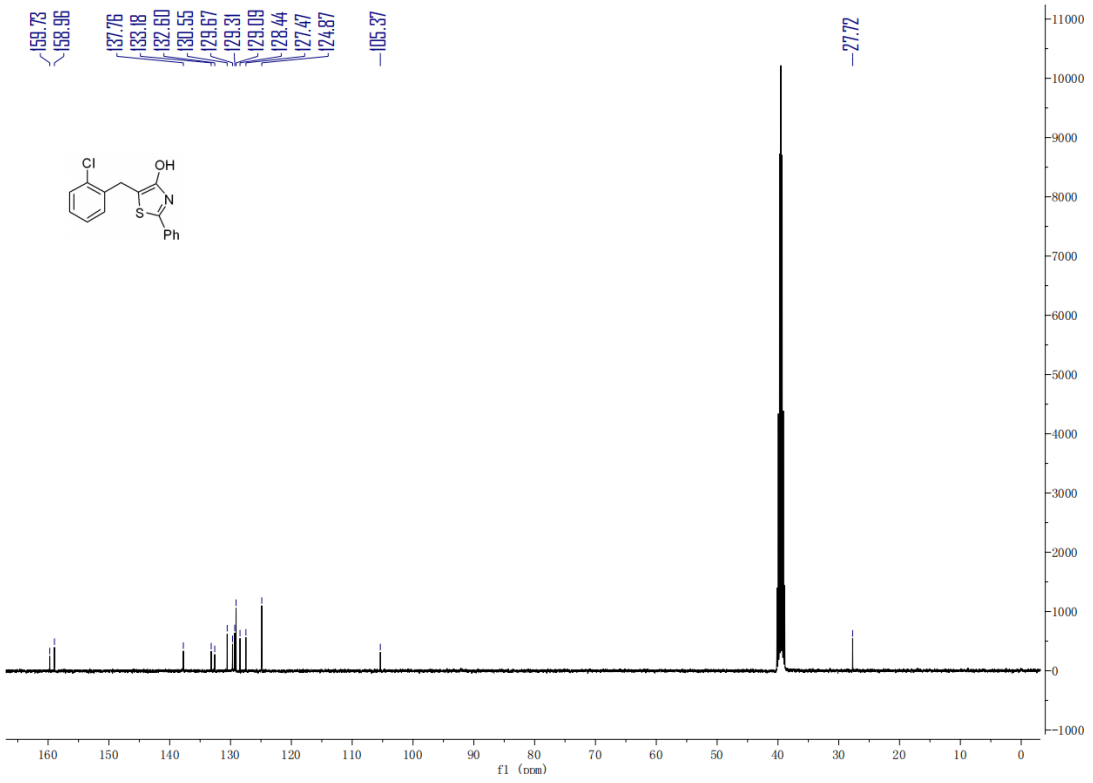
5-(naphthalen-2-ylmethyl)-2-phenylthiazol-4-ol (1e)



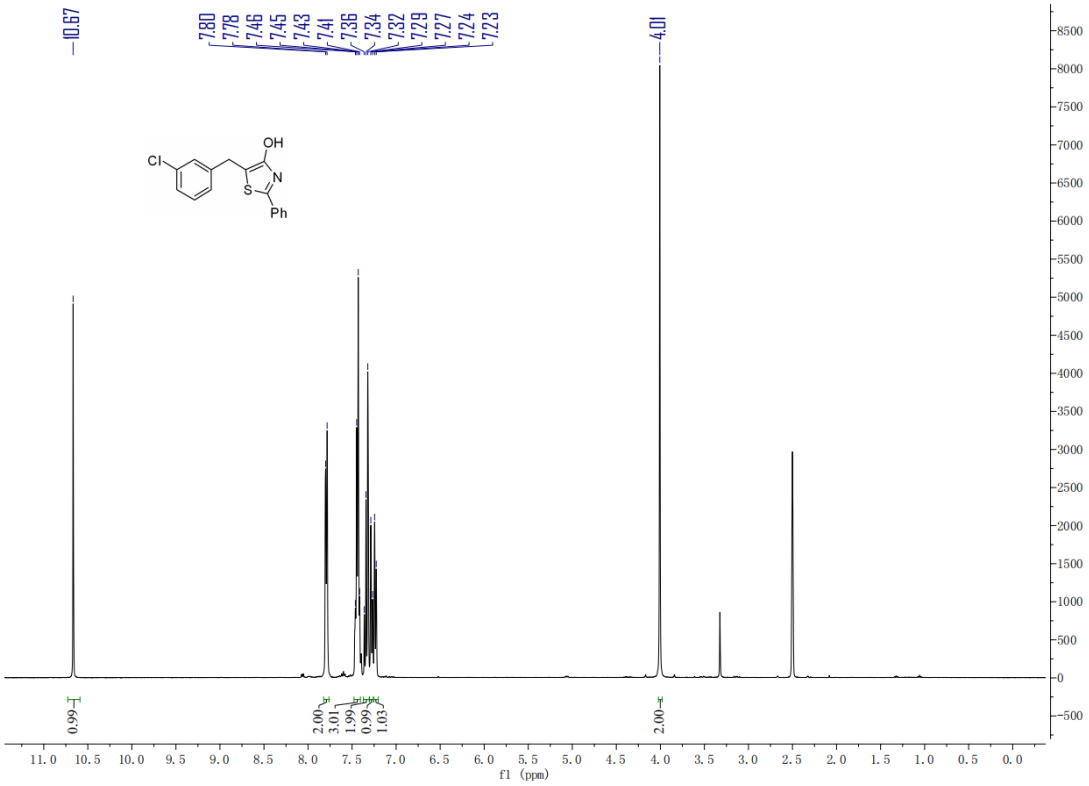


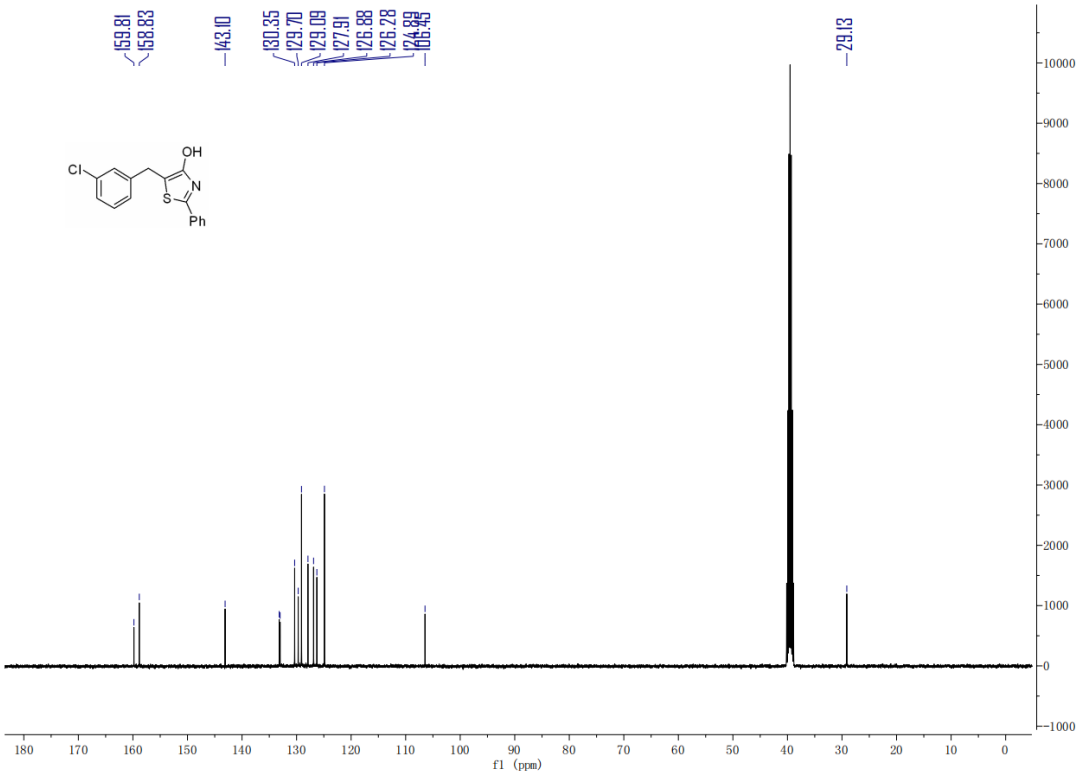
5-(2-chlorobenzyl)-2-phenylthiazol-4-ol (1f)



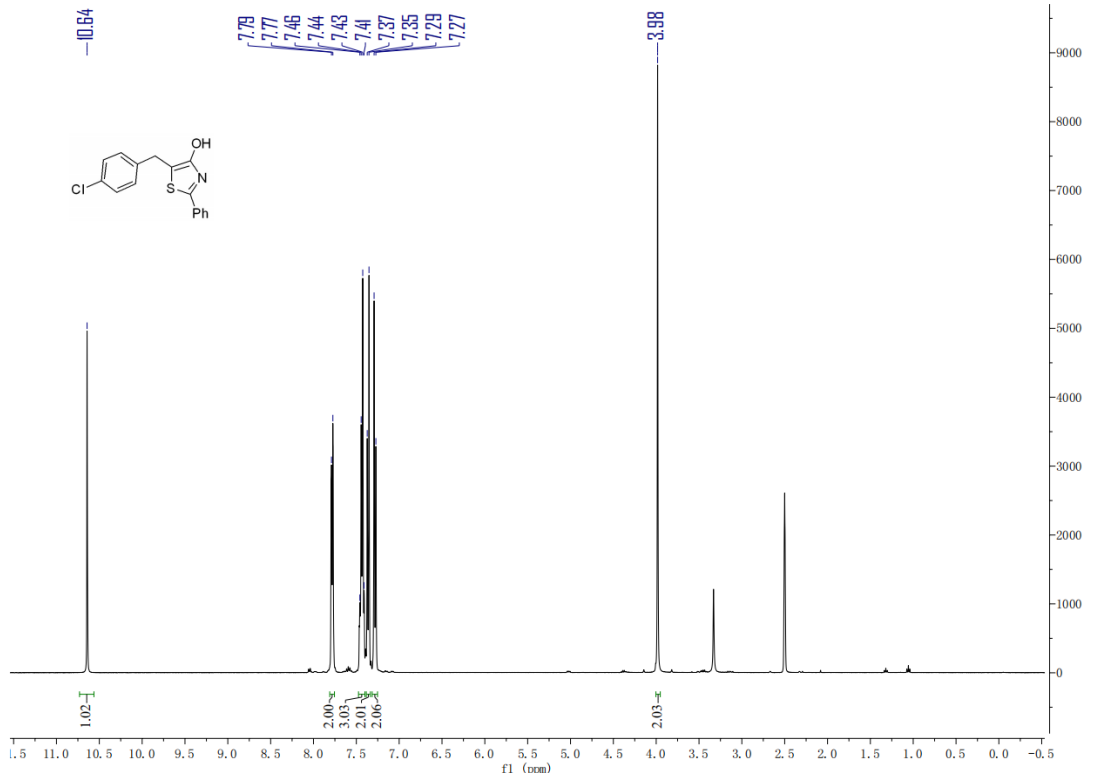


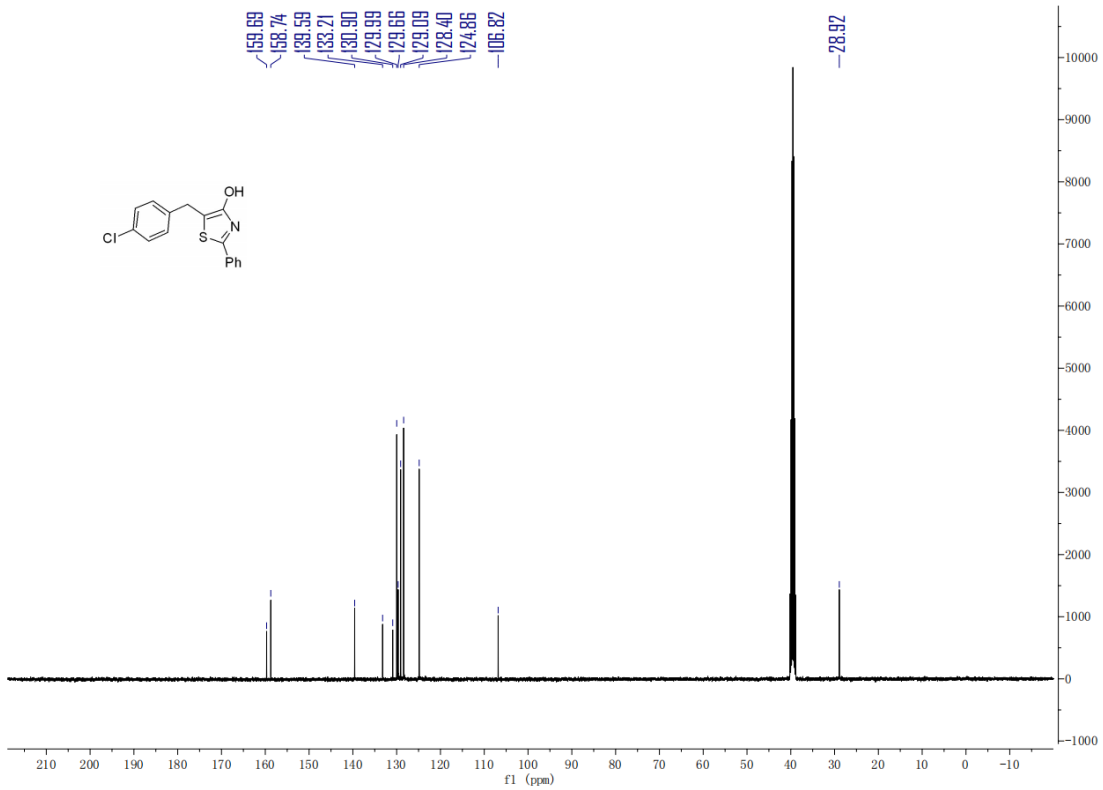
5-(3-chlorobenzyl)-2-phenylthiazol-4-ol (1g)



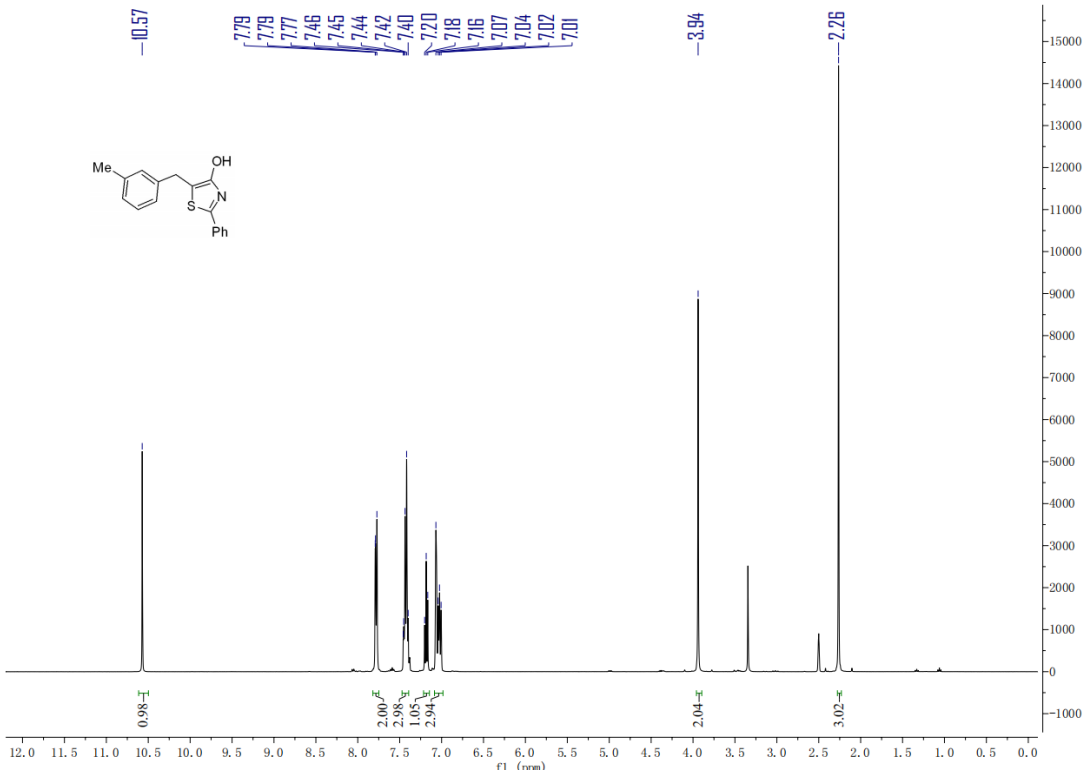


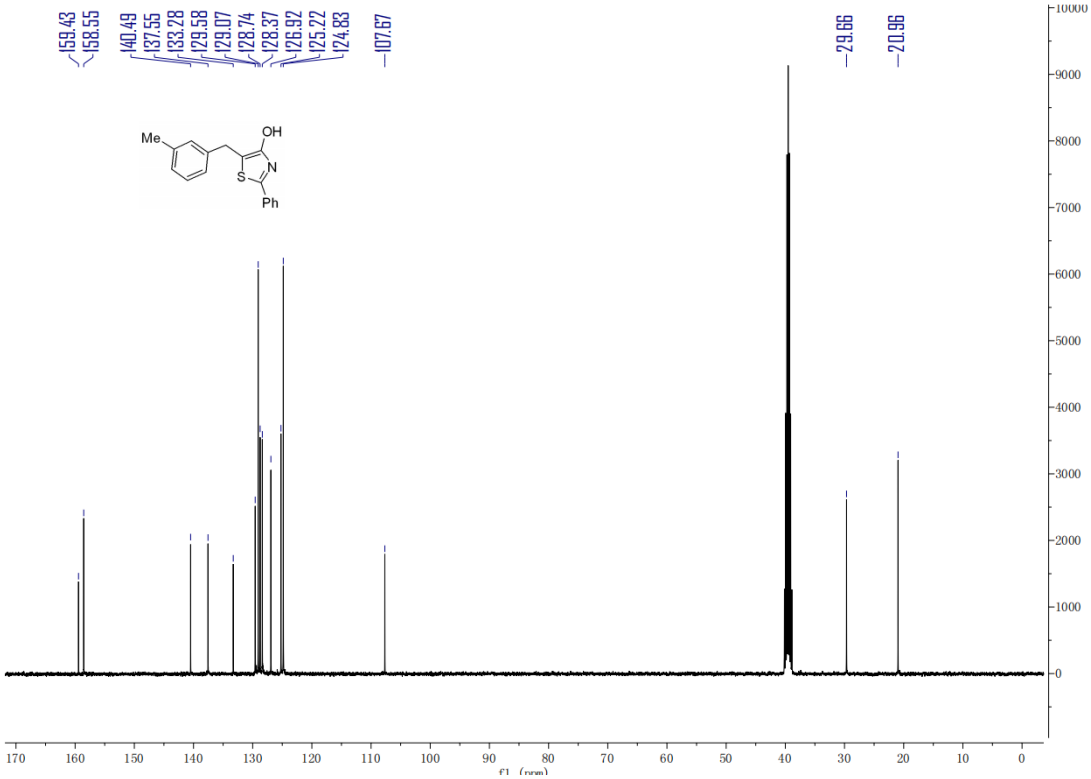
5-(4-chlorobenzyl)-2-phenylthiazol-4-ol (1h)



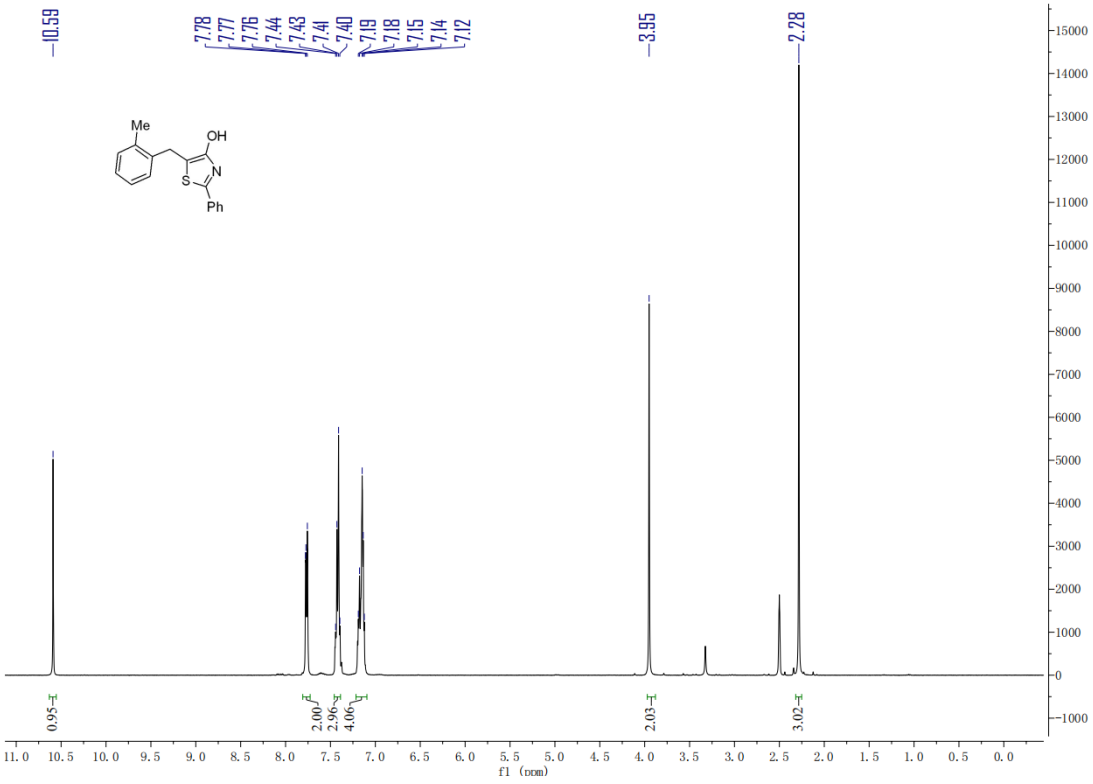


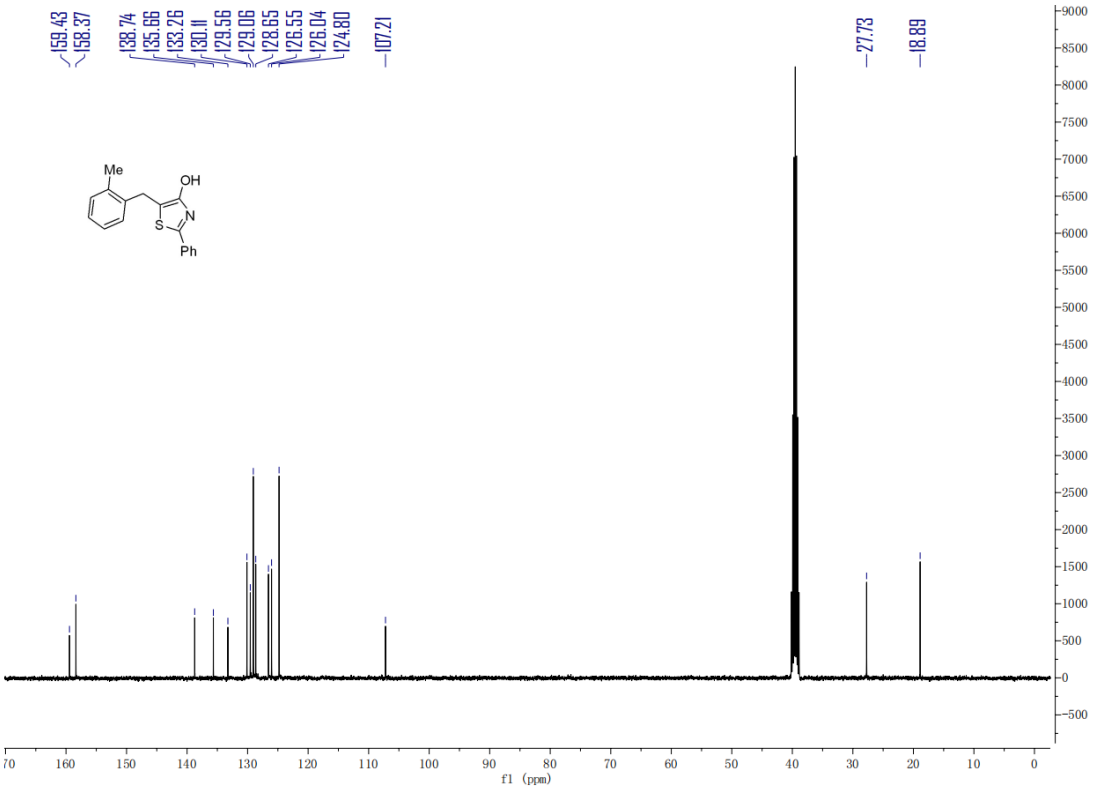
5-(3-methylbenzyl)-2-phenylthiazol-4-ol (1i)



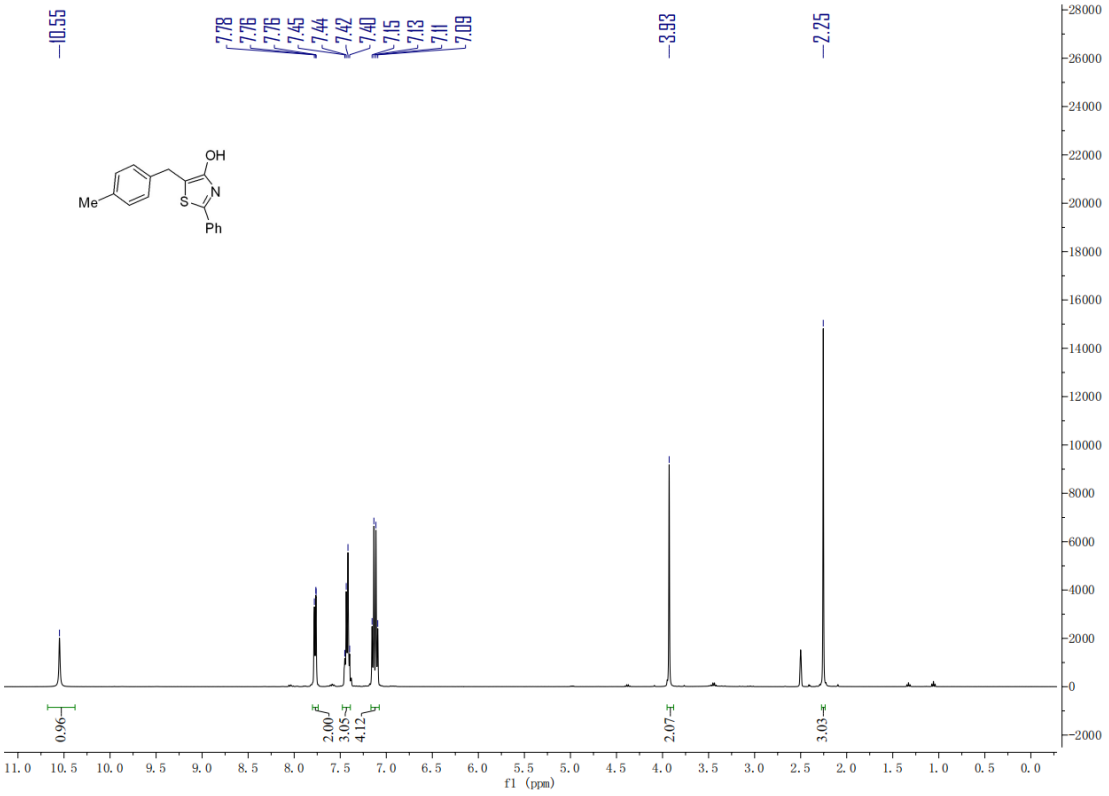


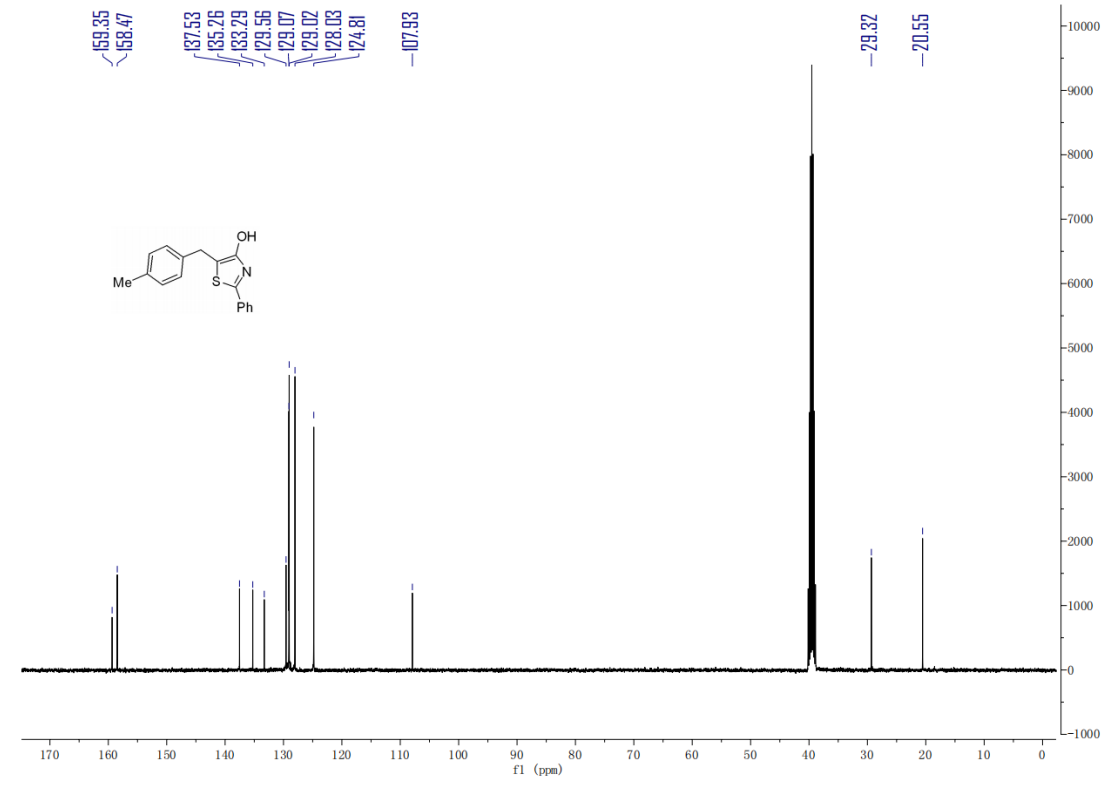
5-(2-methylbenzyl)-2-phenylthiazol-4-ol (1j)



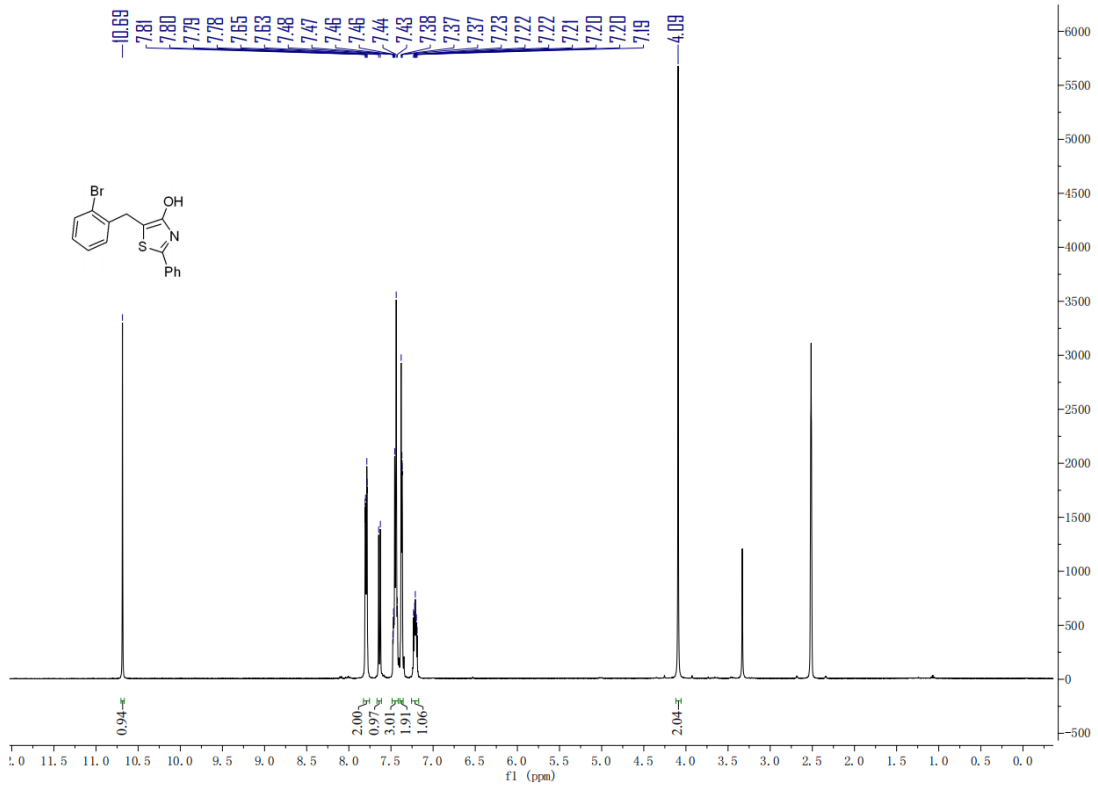


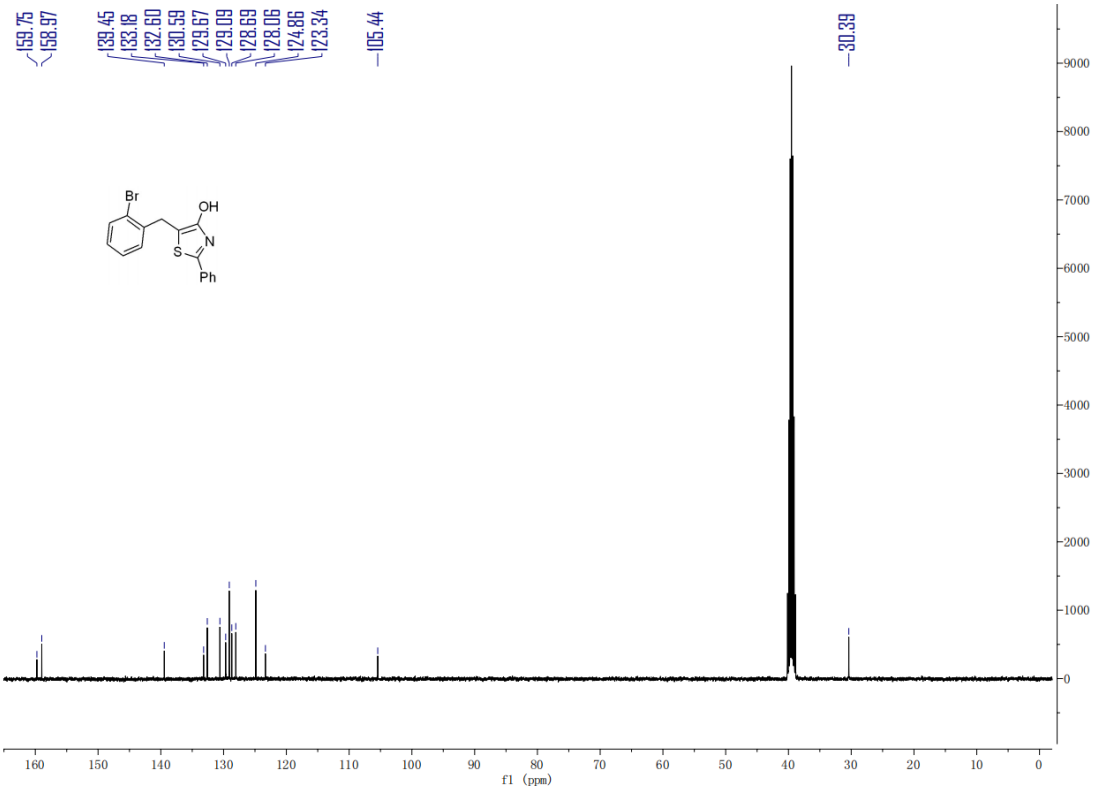
5-(4-methylbenzyl)-2-phenylthiazol-4-ol (1k)



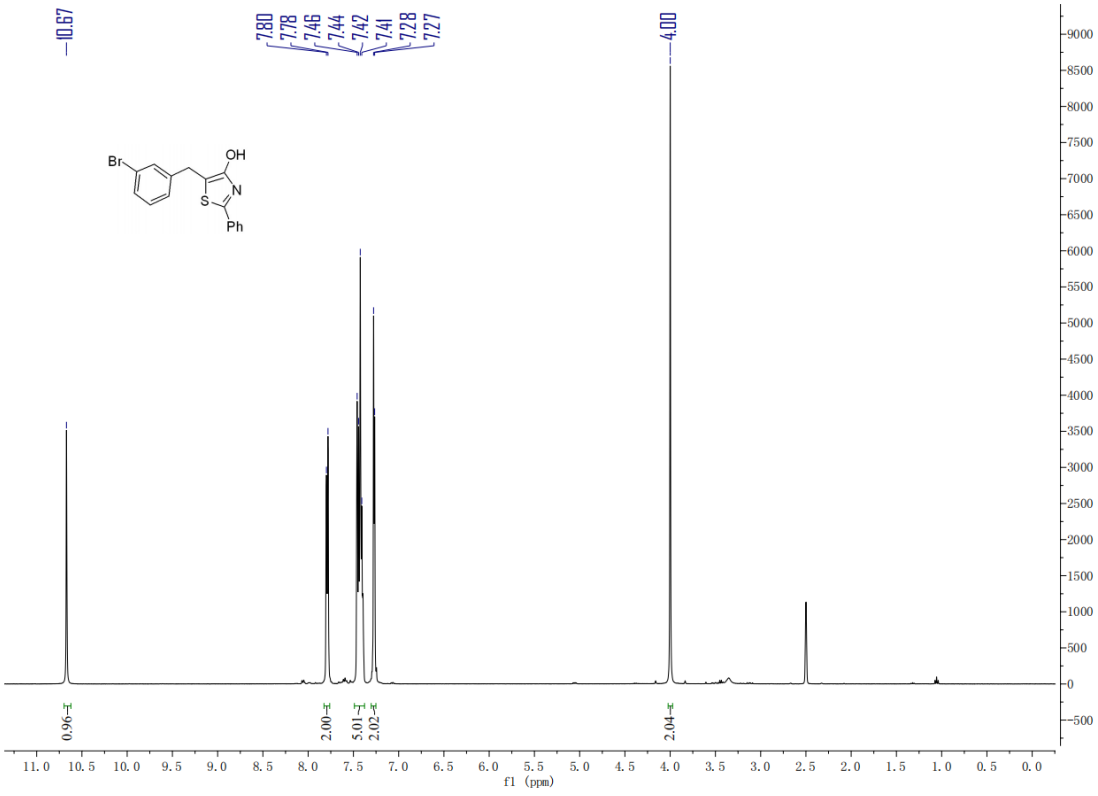


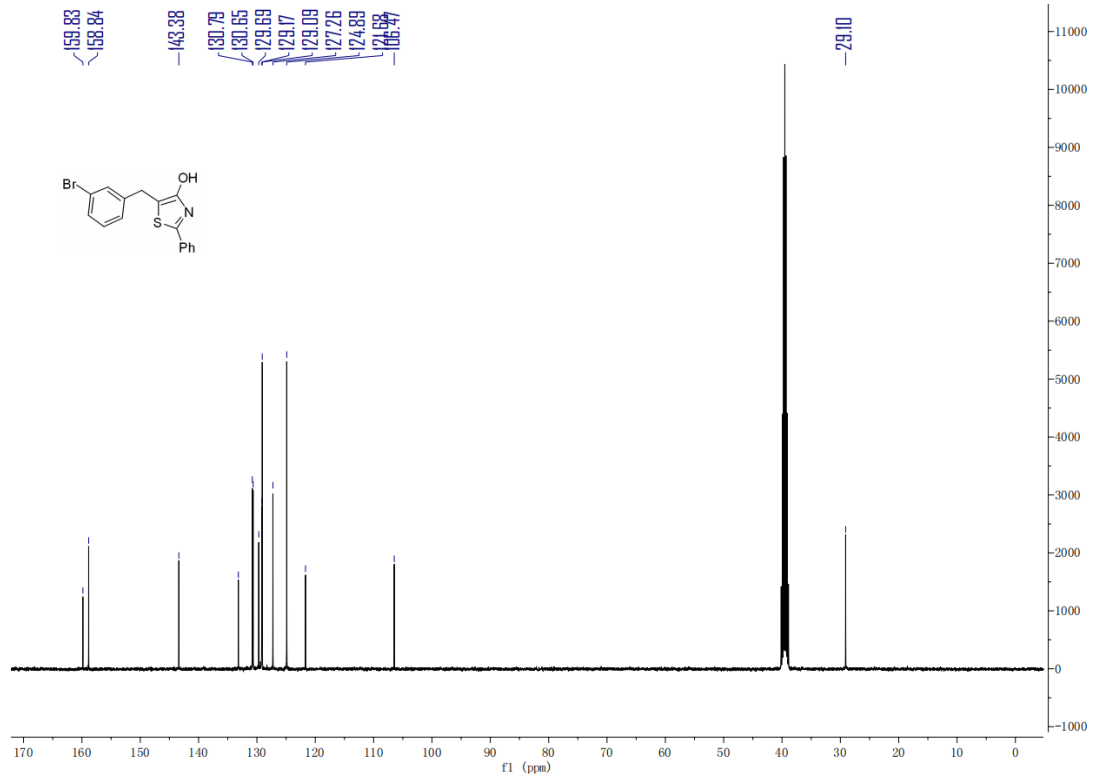
5-(2-bromobenzyl)-2-phenylthiazol-4-ol (1l)



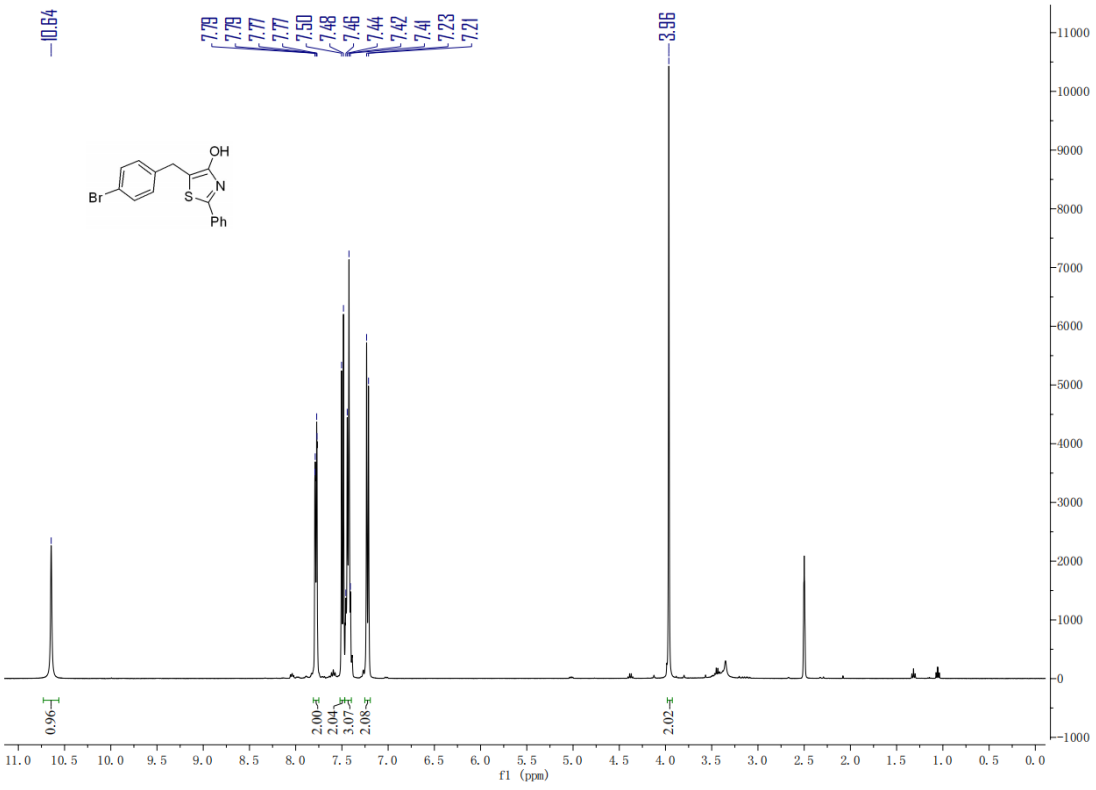


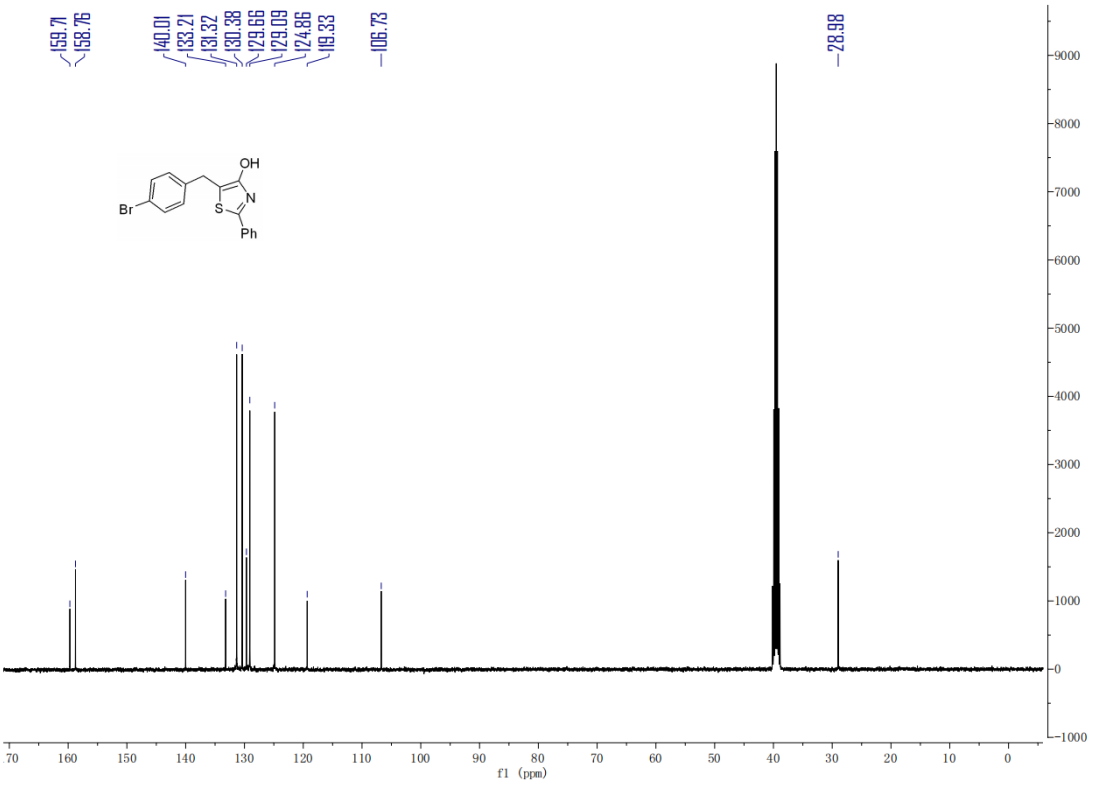
5-(3-bromobenzyl)-2-phenylthiazol-4-ol (1m)



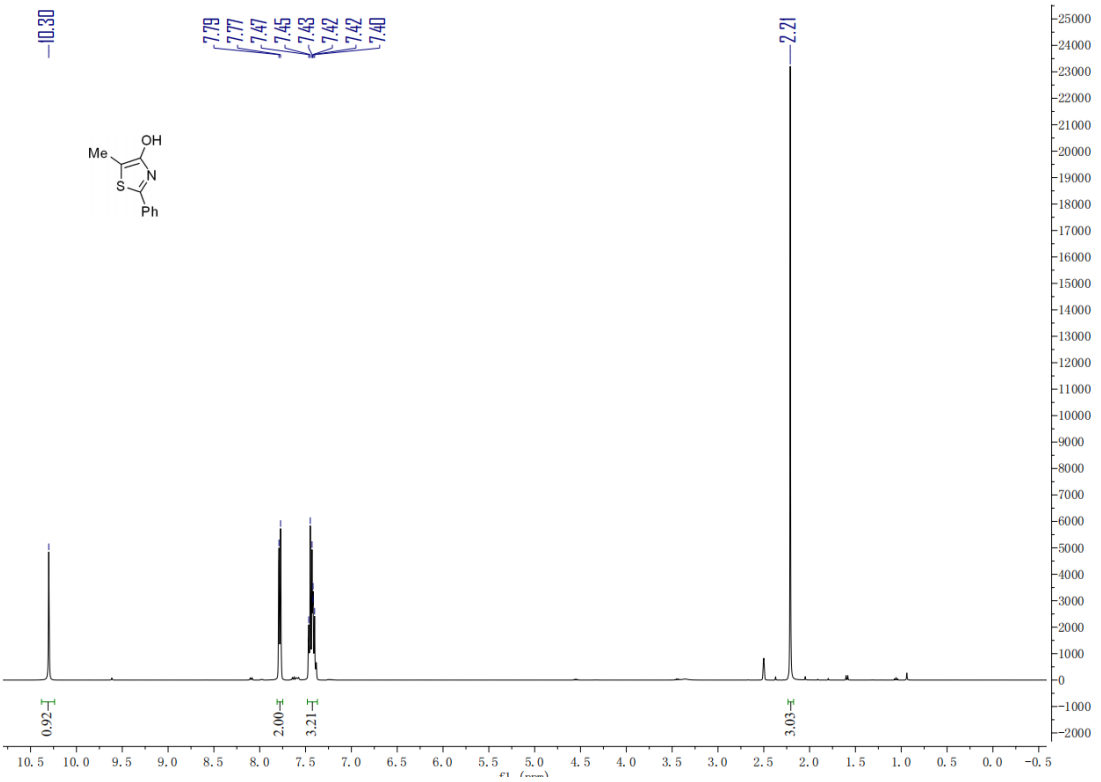


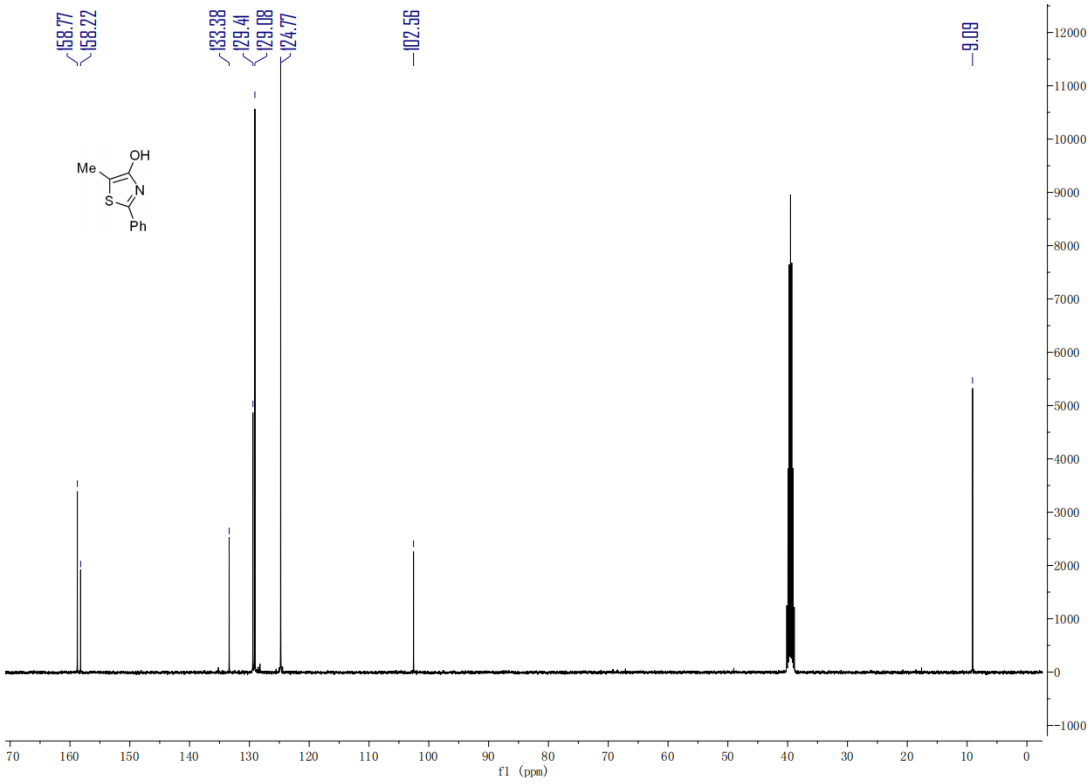
5-(4-bromobenzyl)-2-phenylthiazol-4-ol (1n)



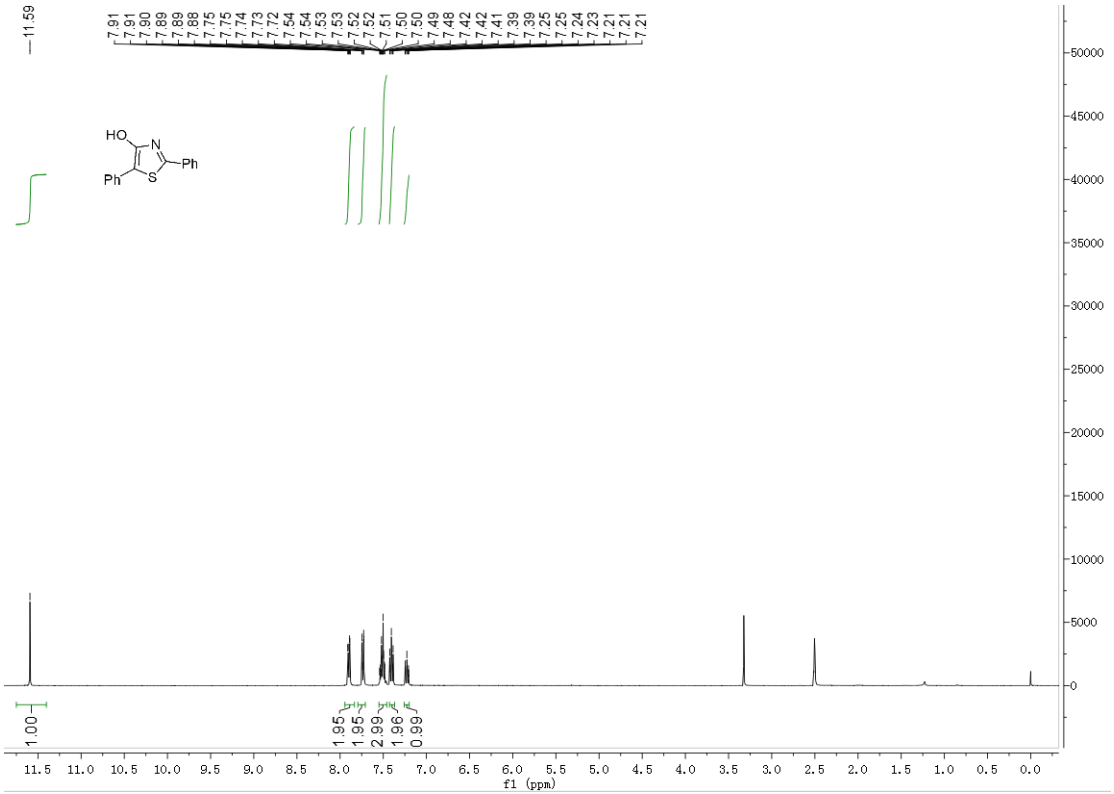


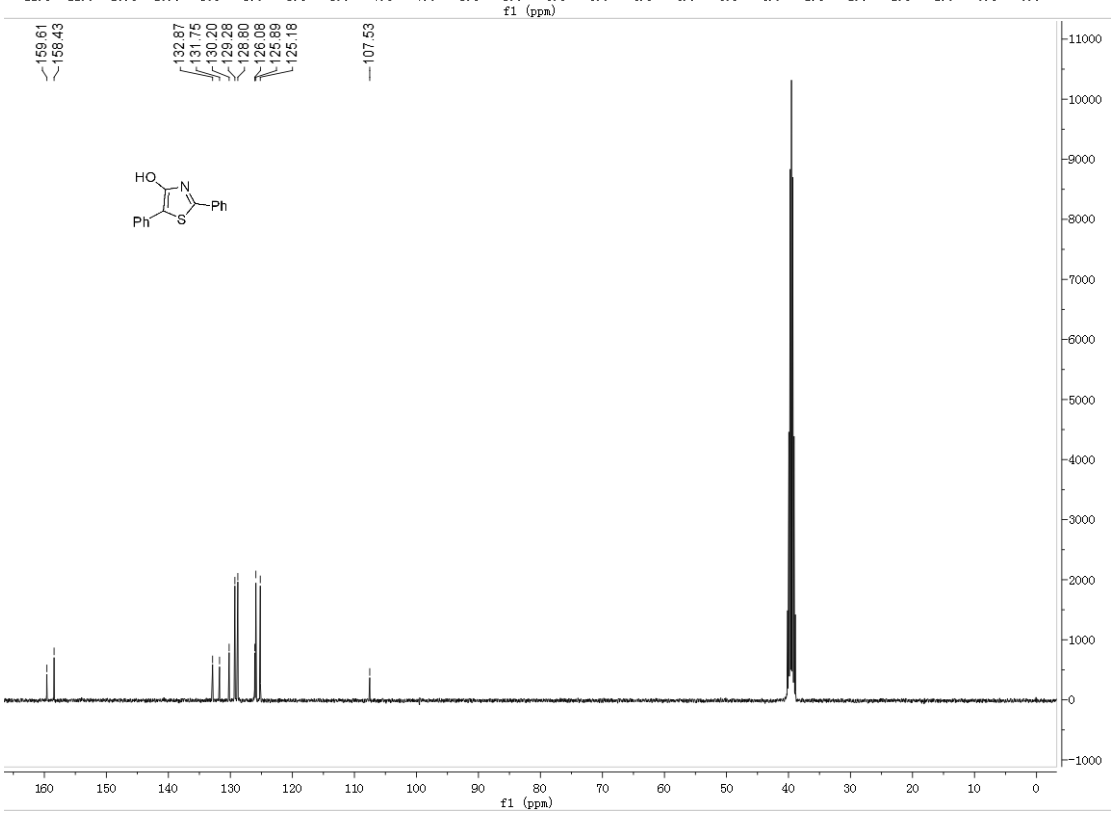
5-methyl-2-phenylthiazol-4-ol (1o)



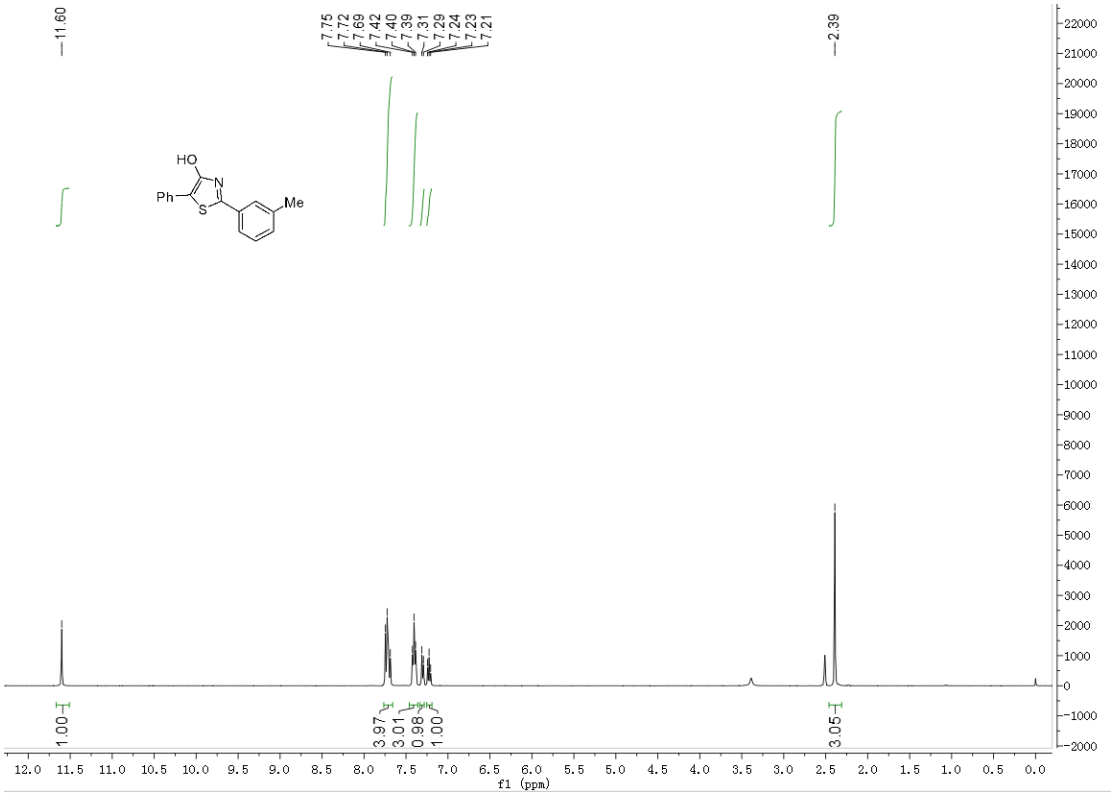


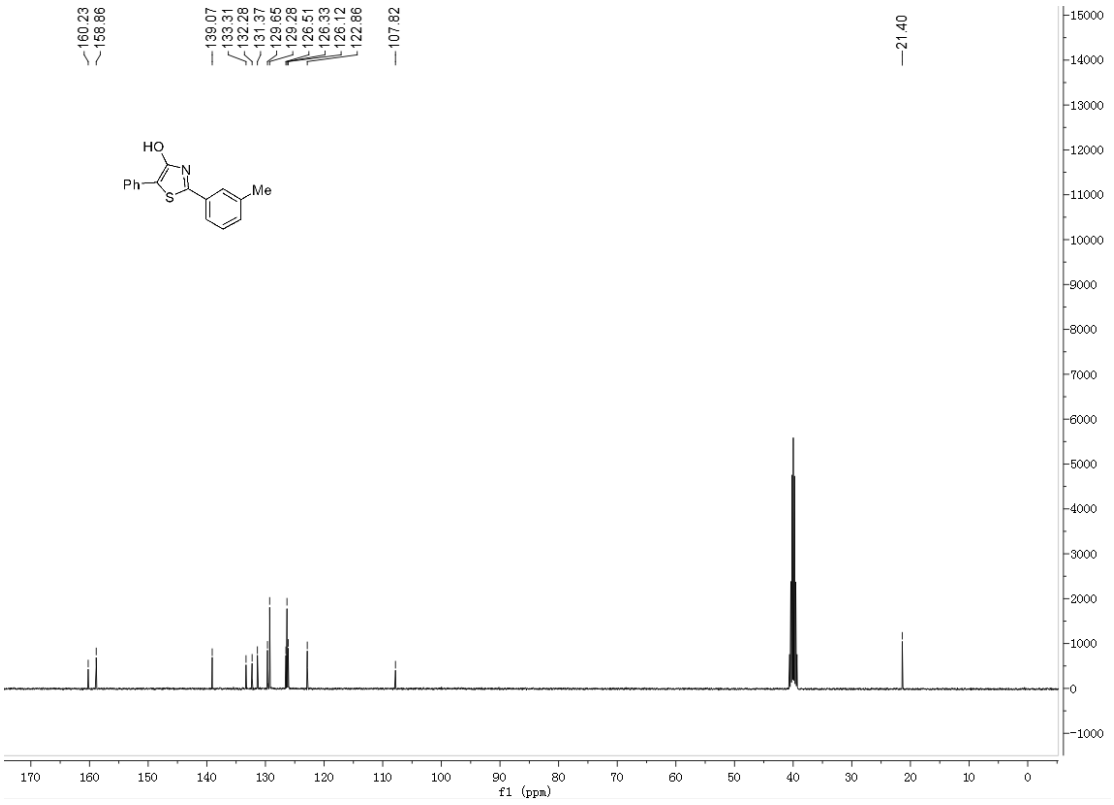
2,5-diphenylthiazol-4-ol (5a)



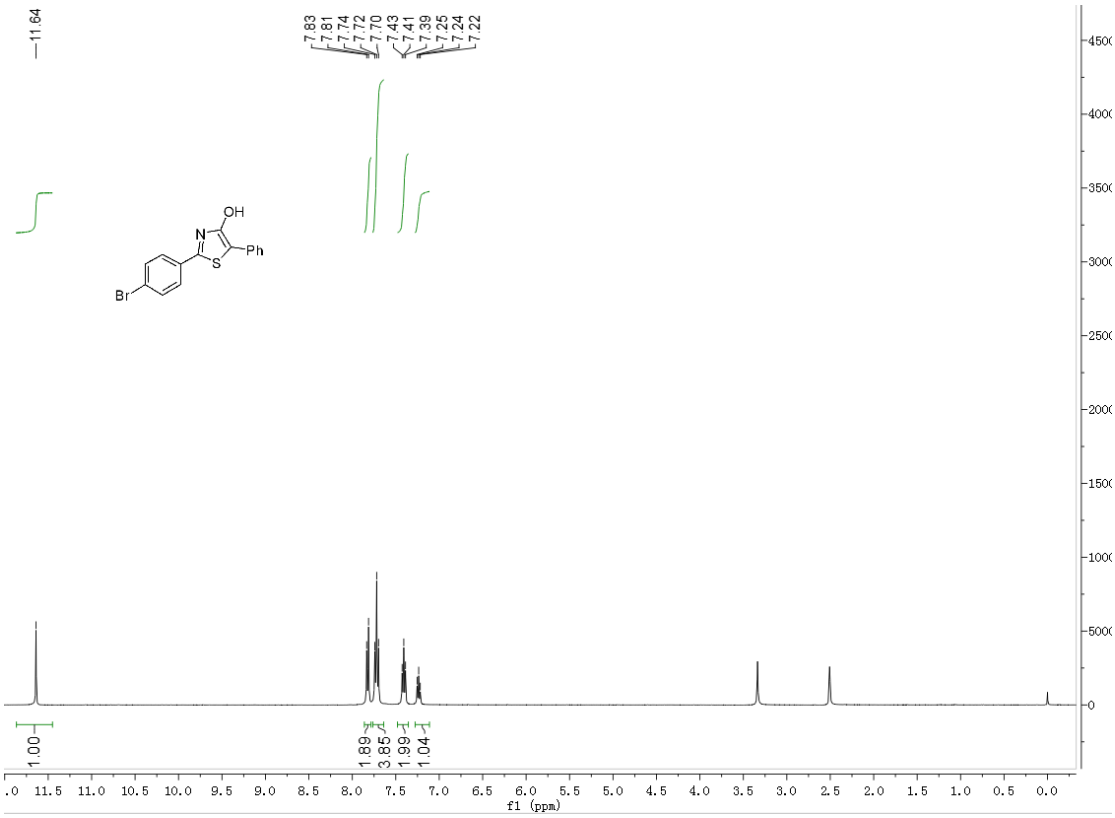


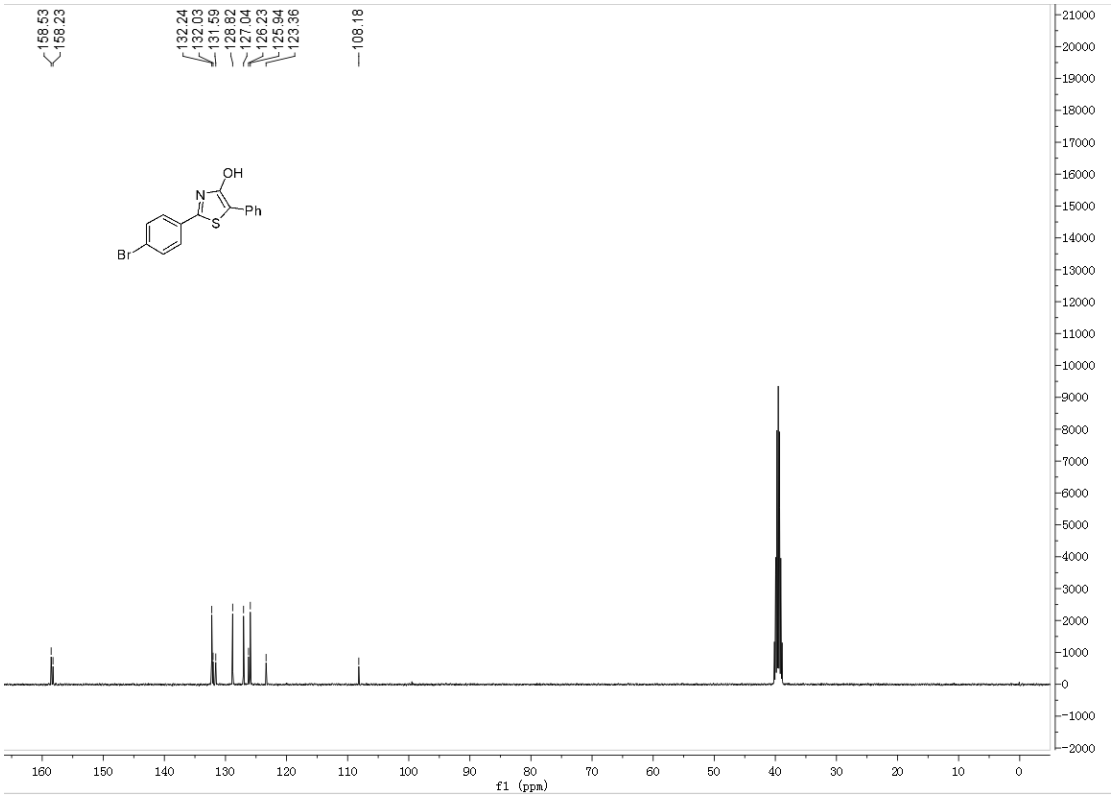
5-phenyl-2-(m-tolyl) thiazol-4-ol (5b)



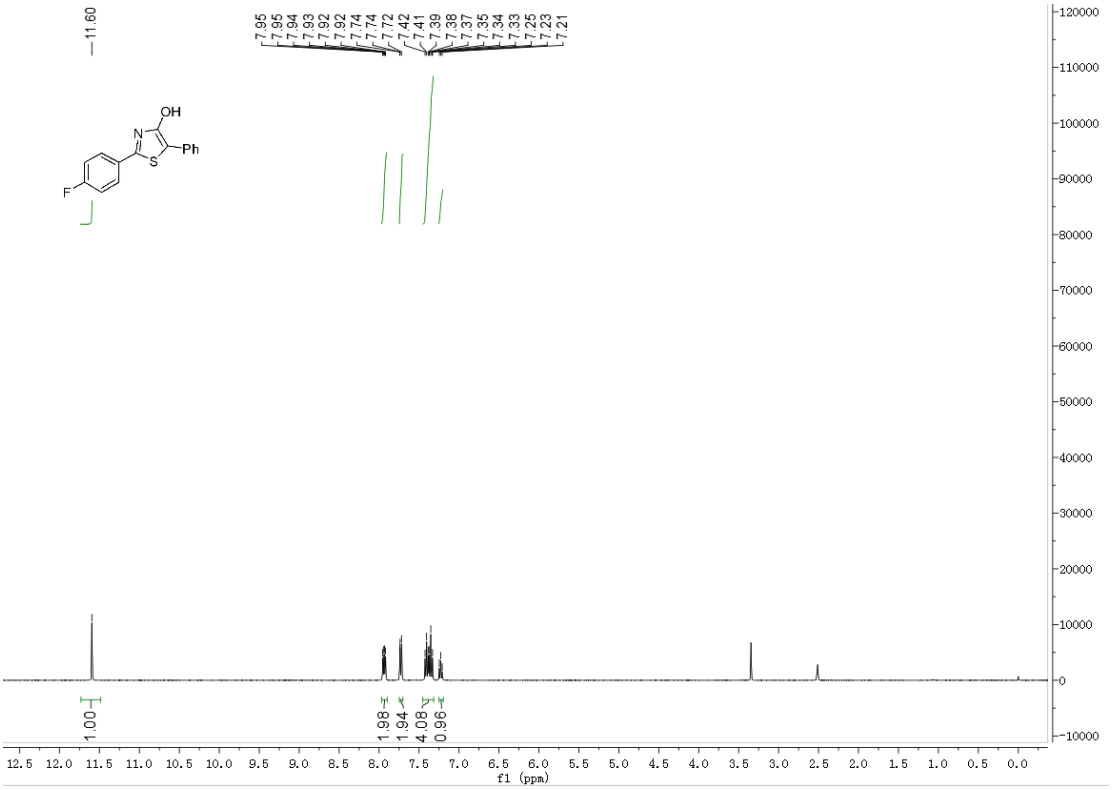


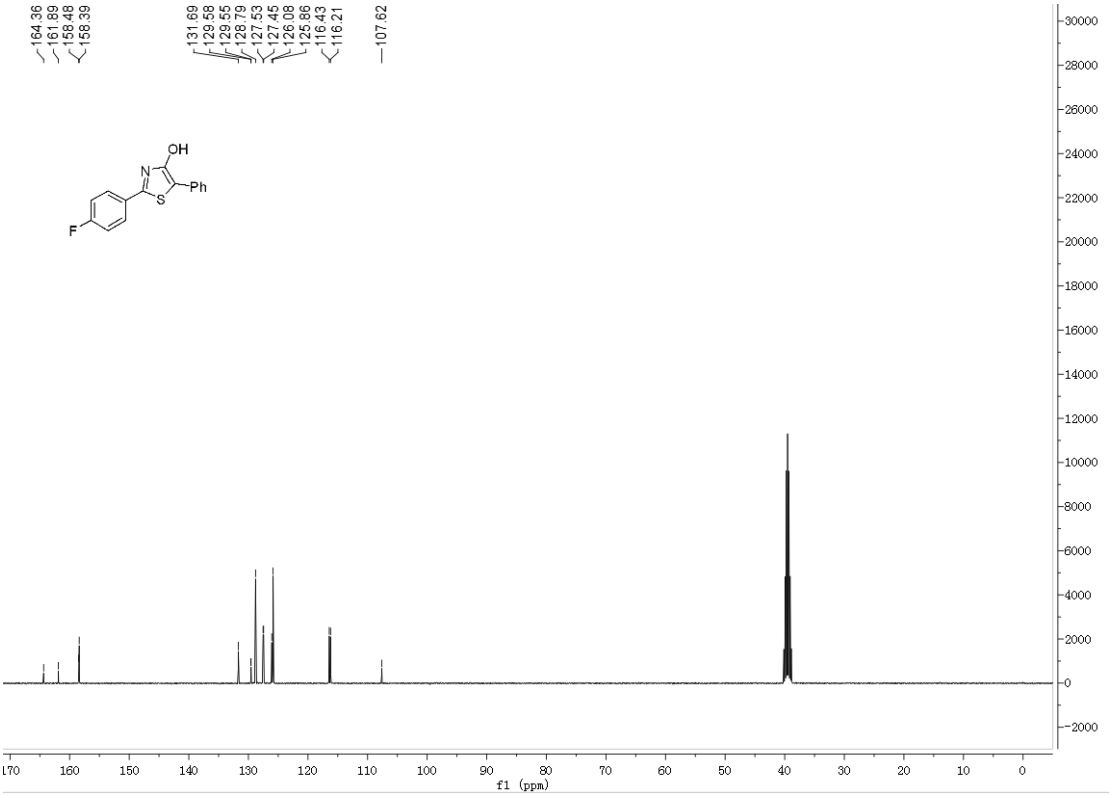
2-(4-bromophenyl)-5-phenylthiazol-4-ol (5c)



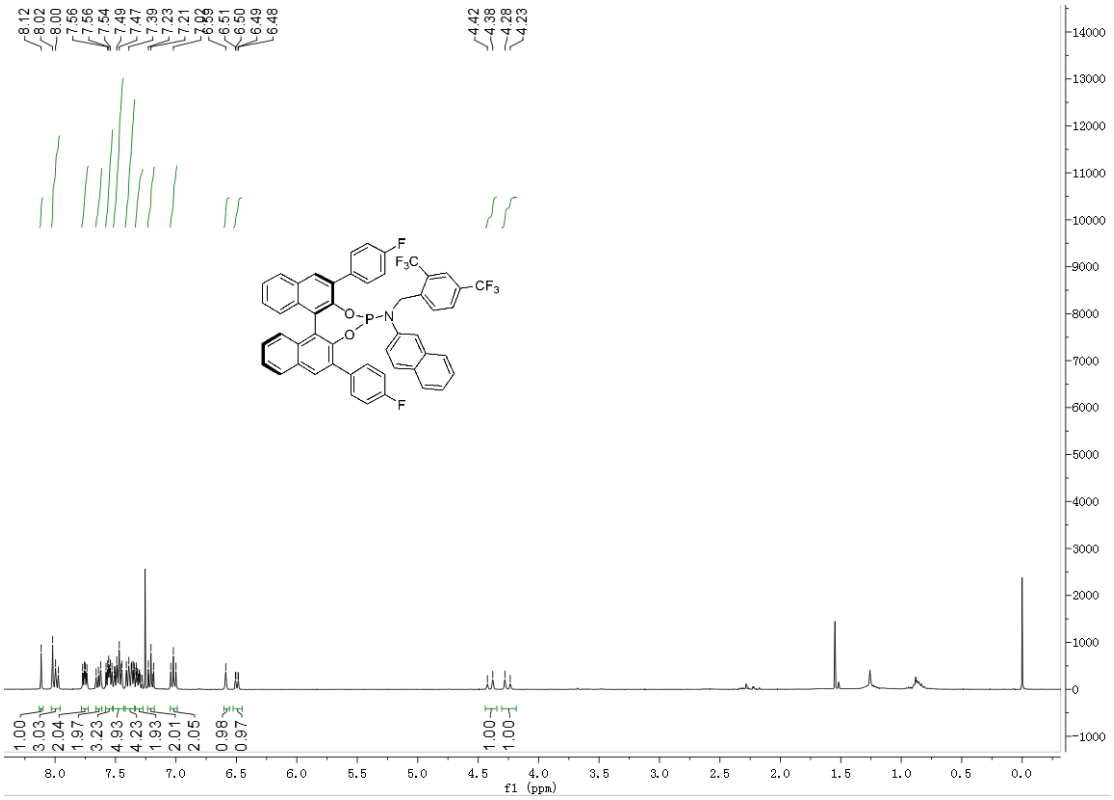


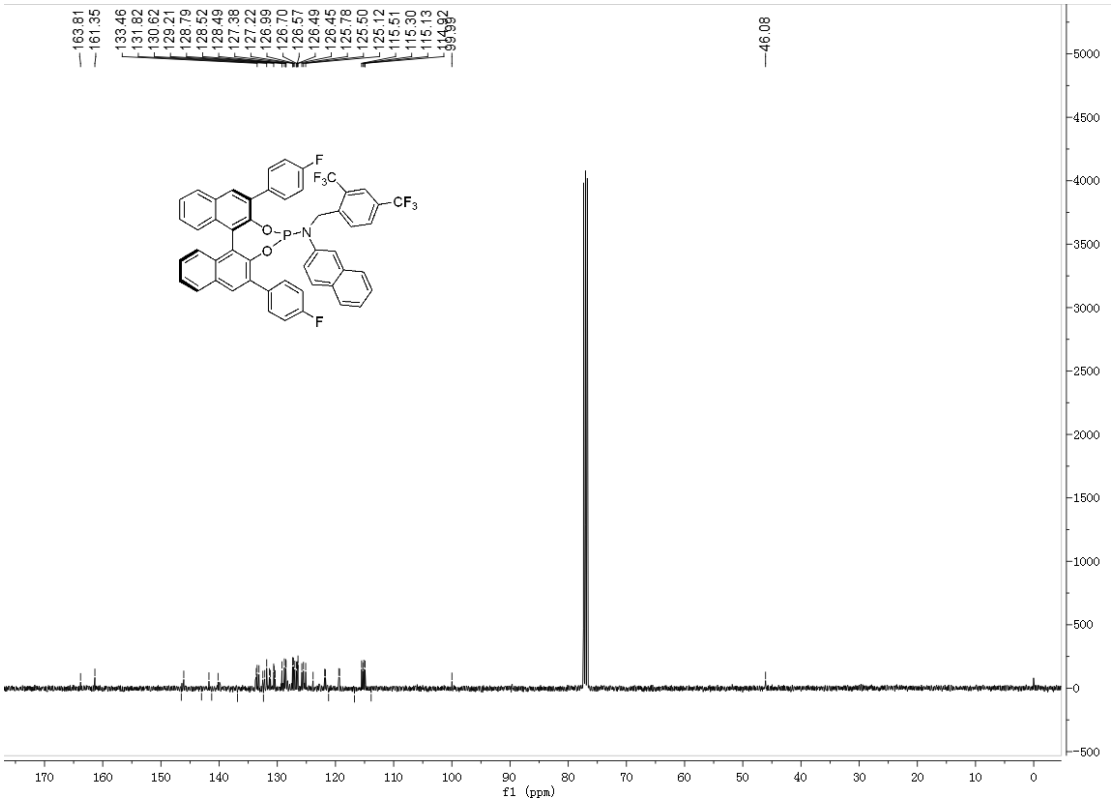
2-(4-fluorophenyl)-5-phenylthiazol-4-ol (5d)

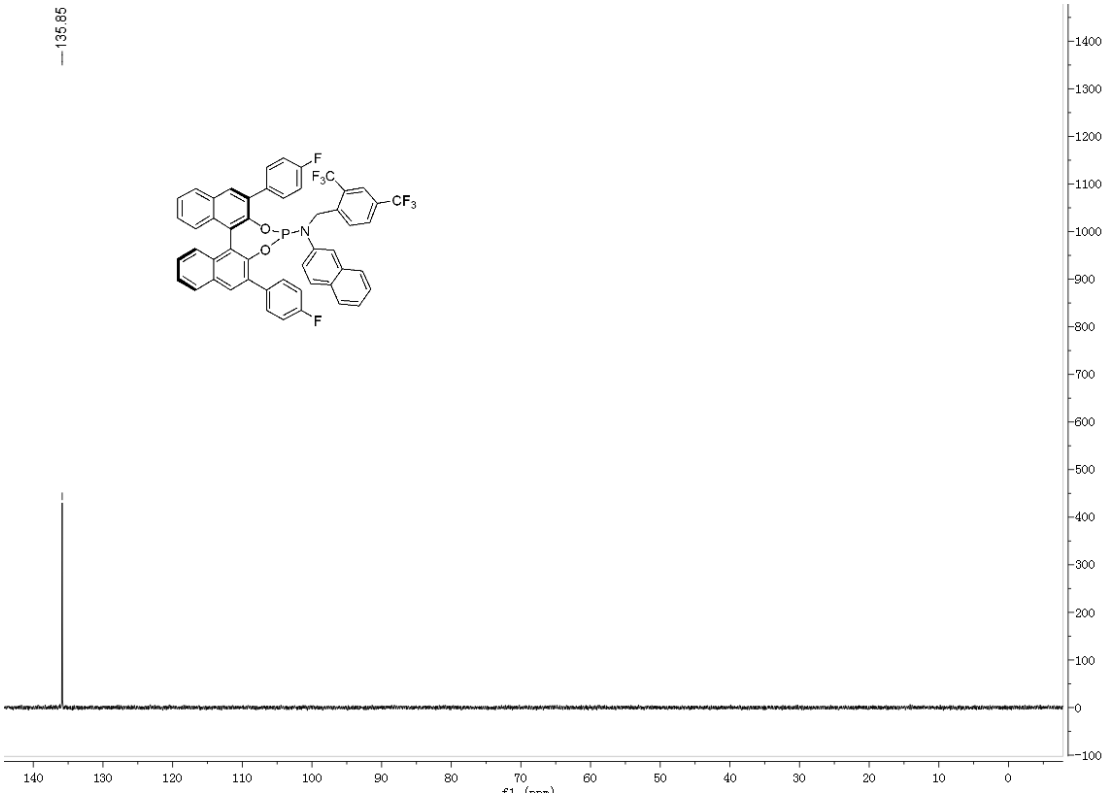


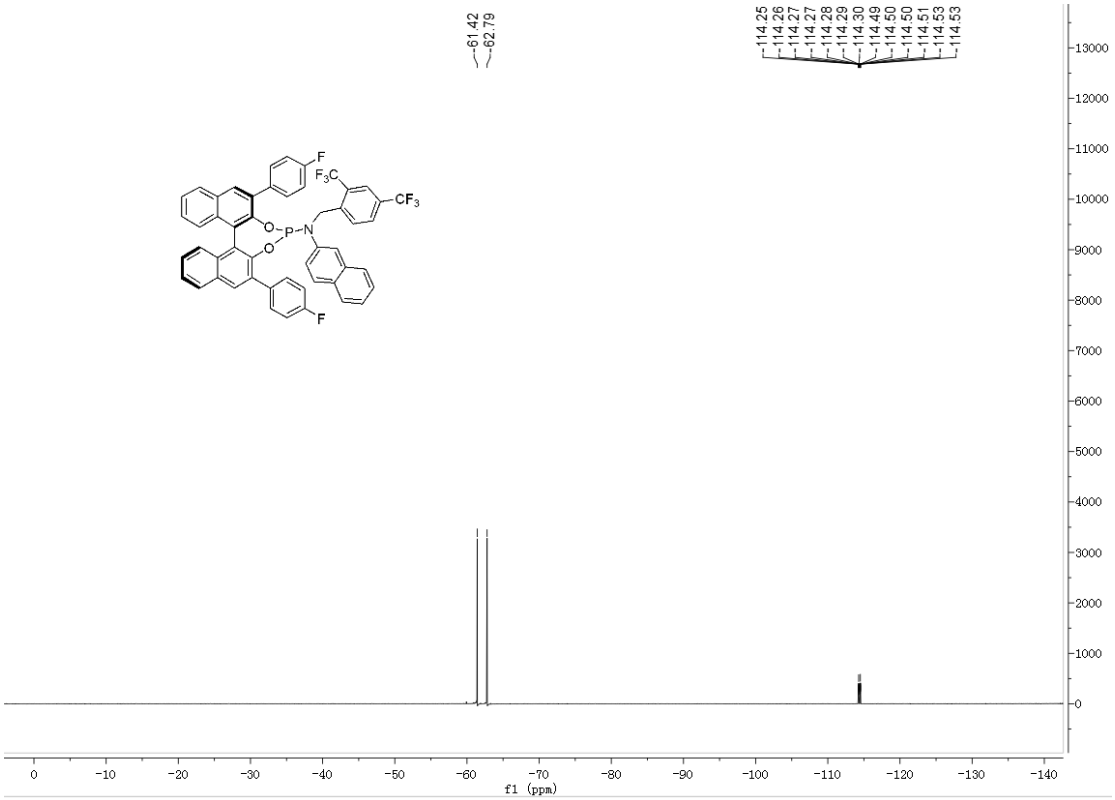


N-(2,4-bis(trifluoromethyl)benzyl)-2,6-bis(4-fluorophenyl)-N-(naphthalen-2-yl)dinaphtho[2,1-d:1',2'-f][1,3,2]dioxaphosphepin-4-amine (L1)

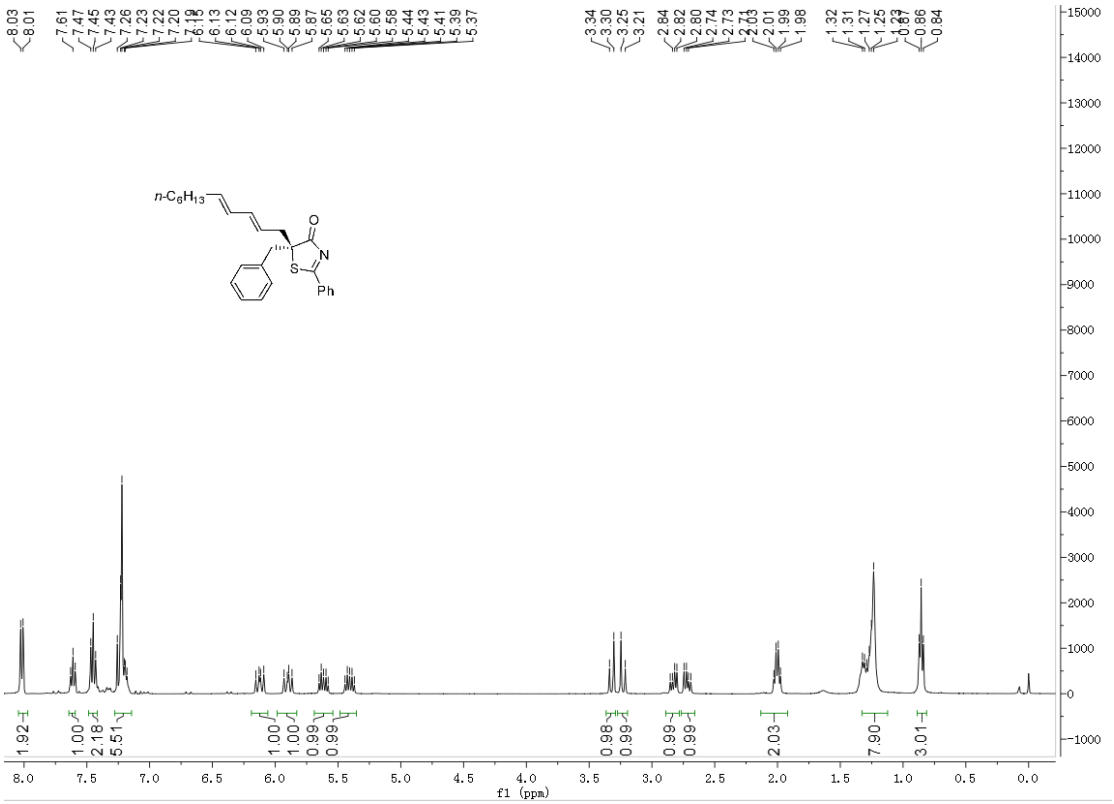


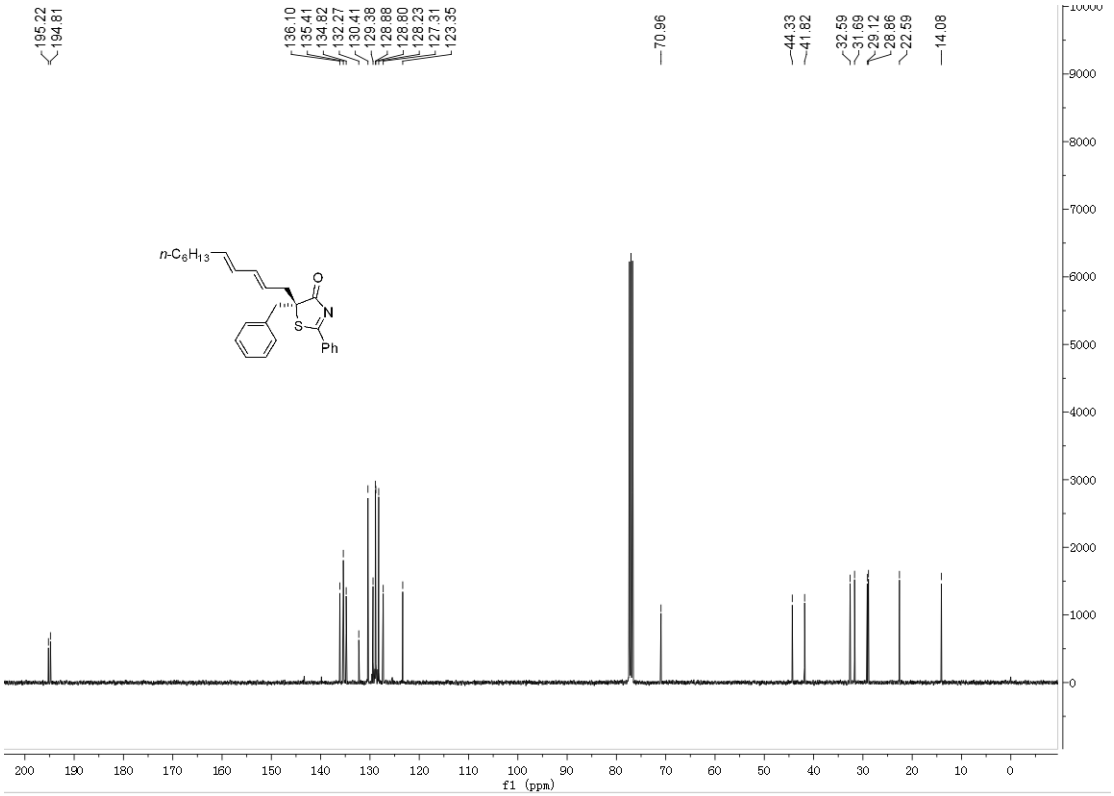



135.85
F
F3C
CF3
O
P
N
O
F
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0

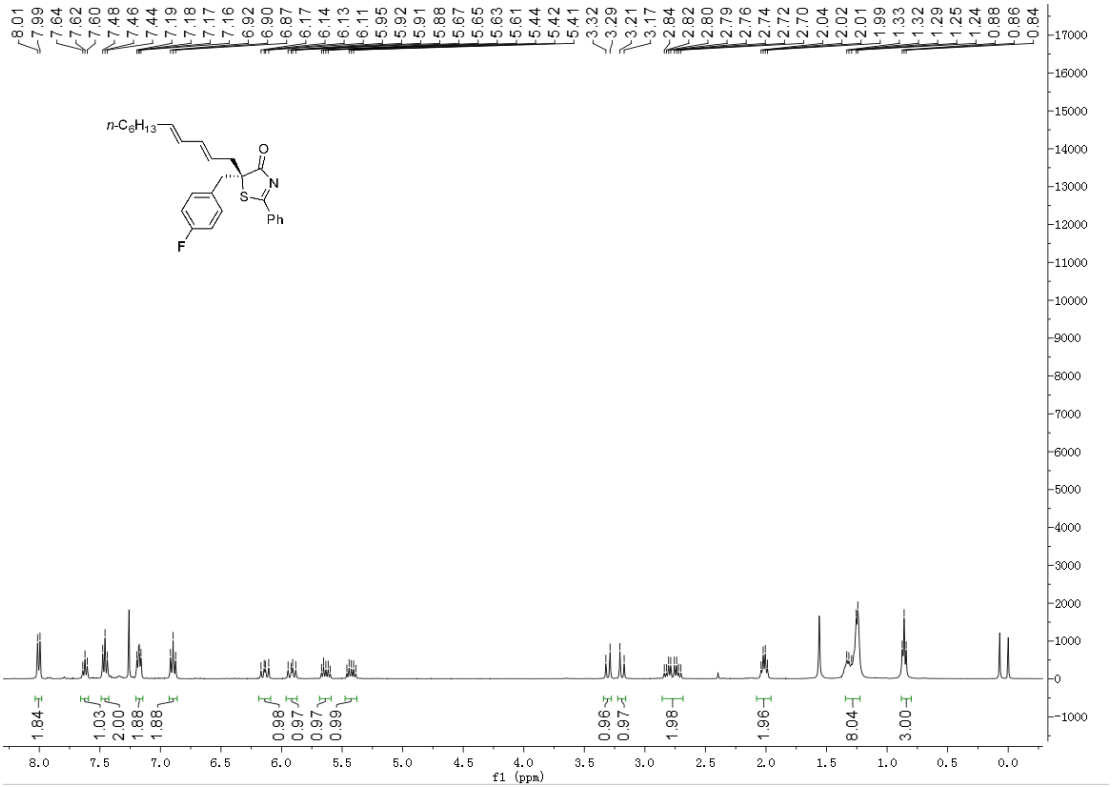

61.42
62.79
114.25
114.26
114.27
114.27
114.28
114.29
114.30
114.49
114.50
114.50
114.51
114.53
114.53
F
F3C
CF3
O
P
N
O
F
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110
-120
-130
-140
f1 (ppm)

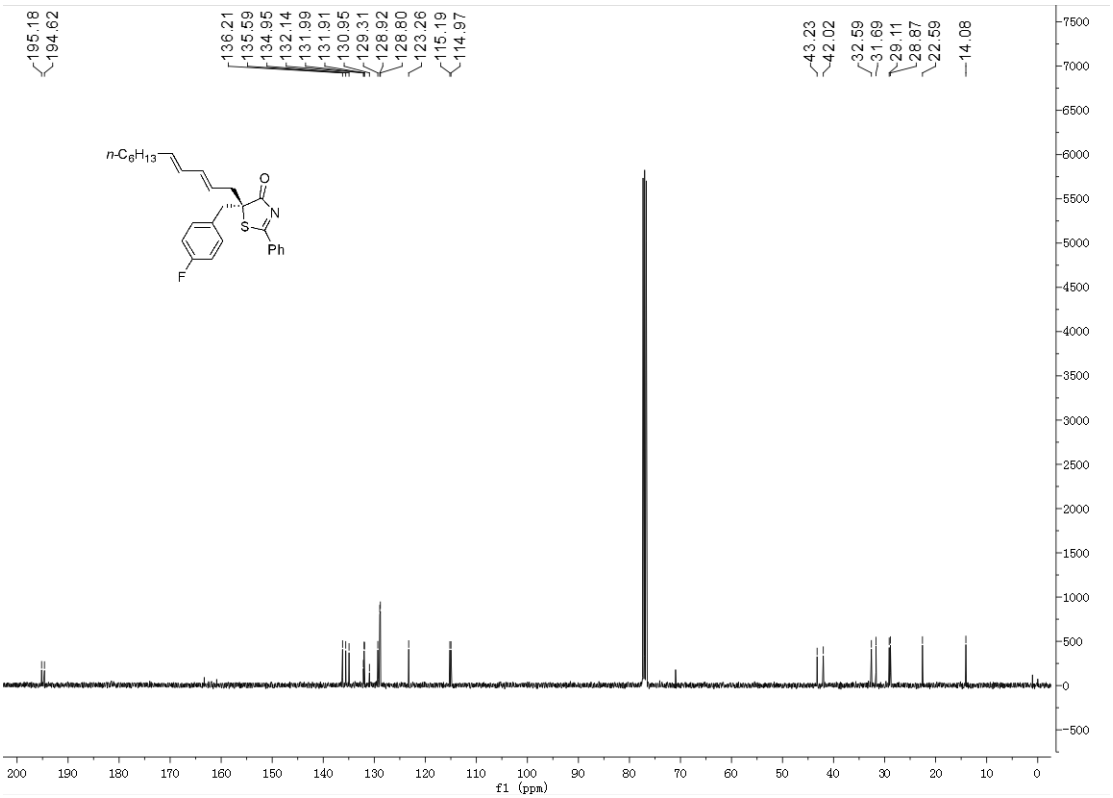
(*R*)-5-benzyl-2-phenyl-5-((*2E, 4E*)-undeca-2, 4-dien-1-yl) thiazol-4(5H)-one (3aa)



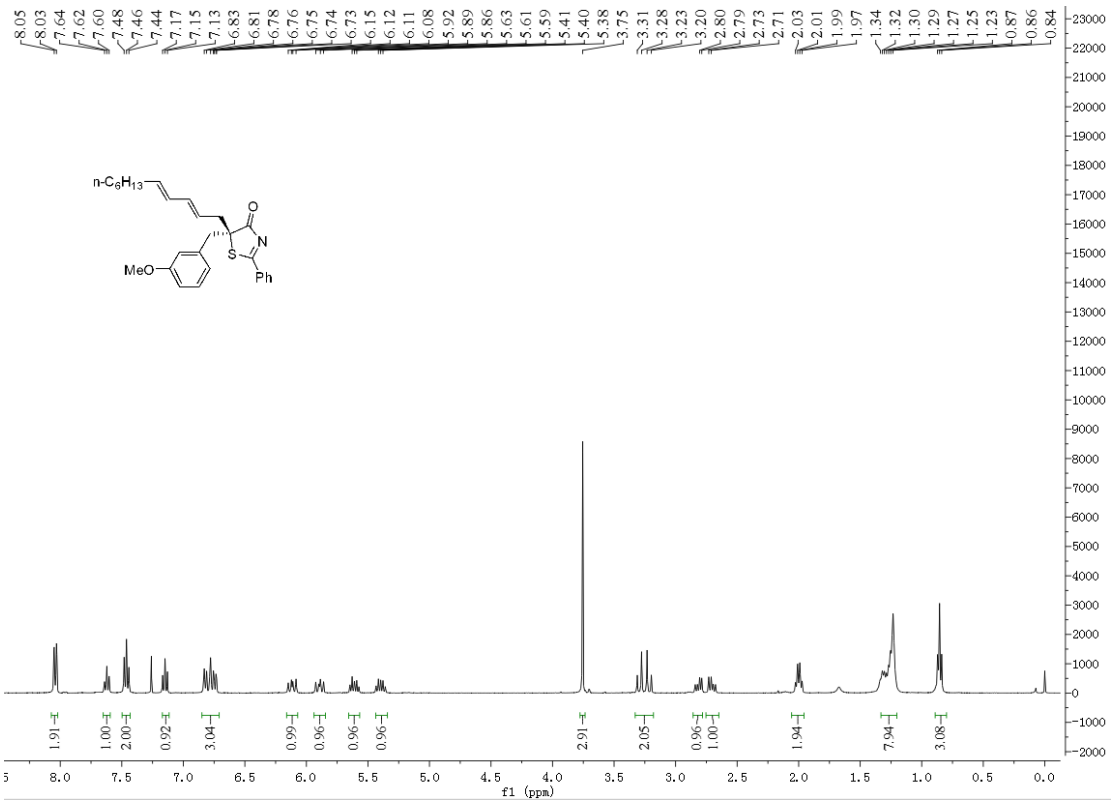


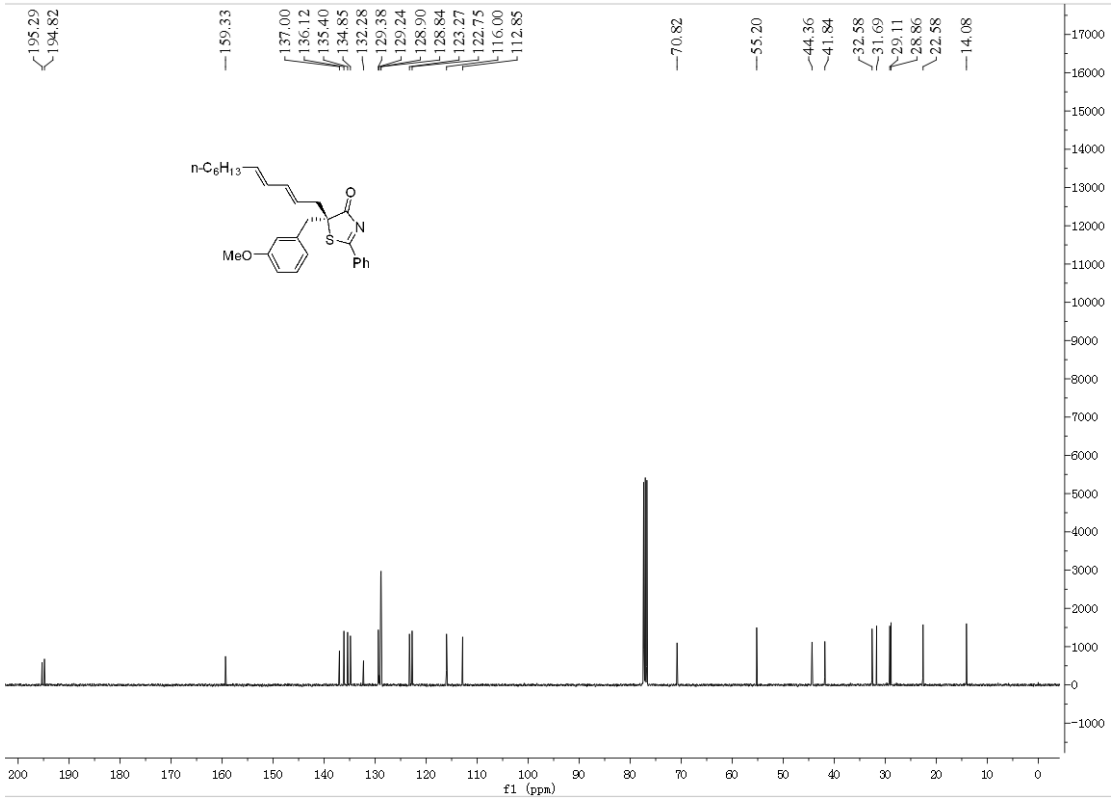
(*R*)-5-(4-fluorobenzyl)-2-phenyl-5-((*2E, 4E*)-undeca-2, 4-dien-1-yl) thiazol-4(5H)-one (3ba)



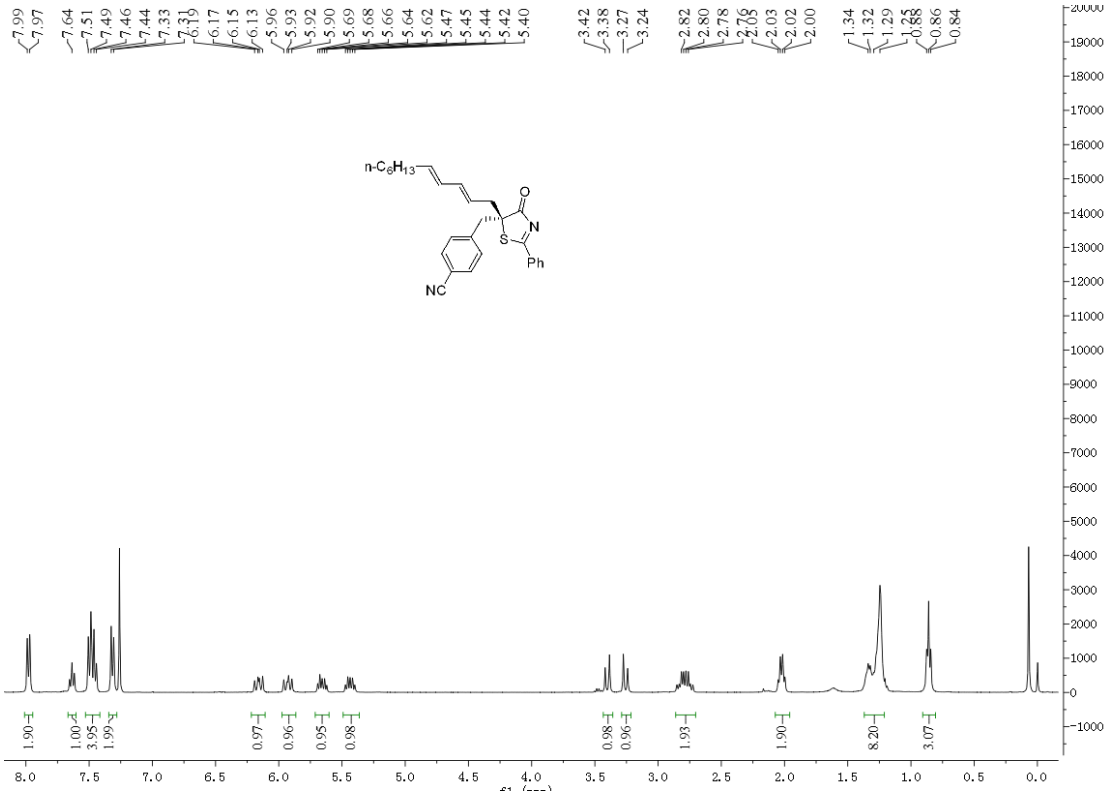


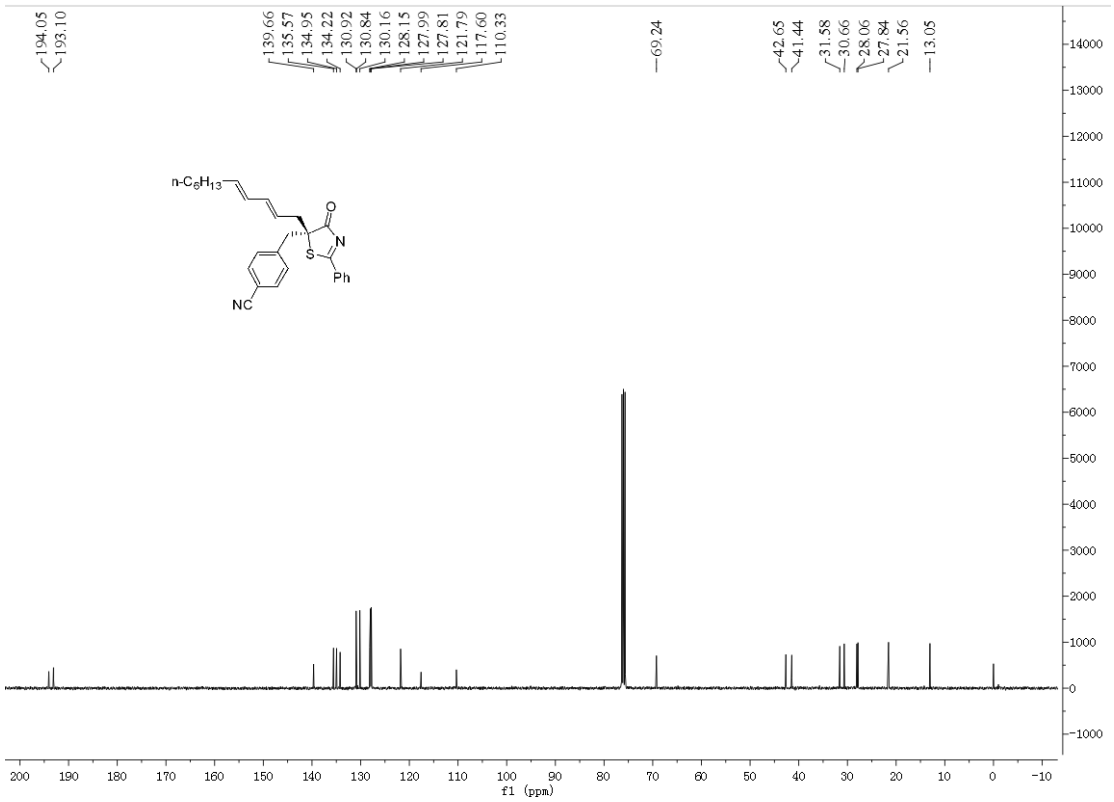
(*R*)-5-(3-methylbenzyl)-2-phenyl-5-((*2E, 4E*)-undeca-2, 4-dien-1-yl) thiazol-4(5H)-one (3ca)



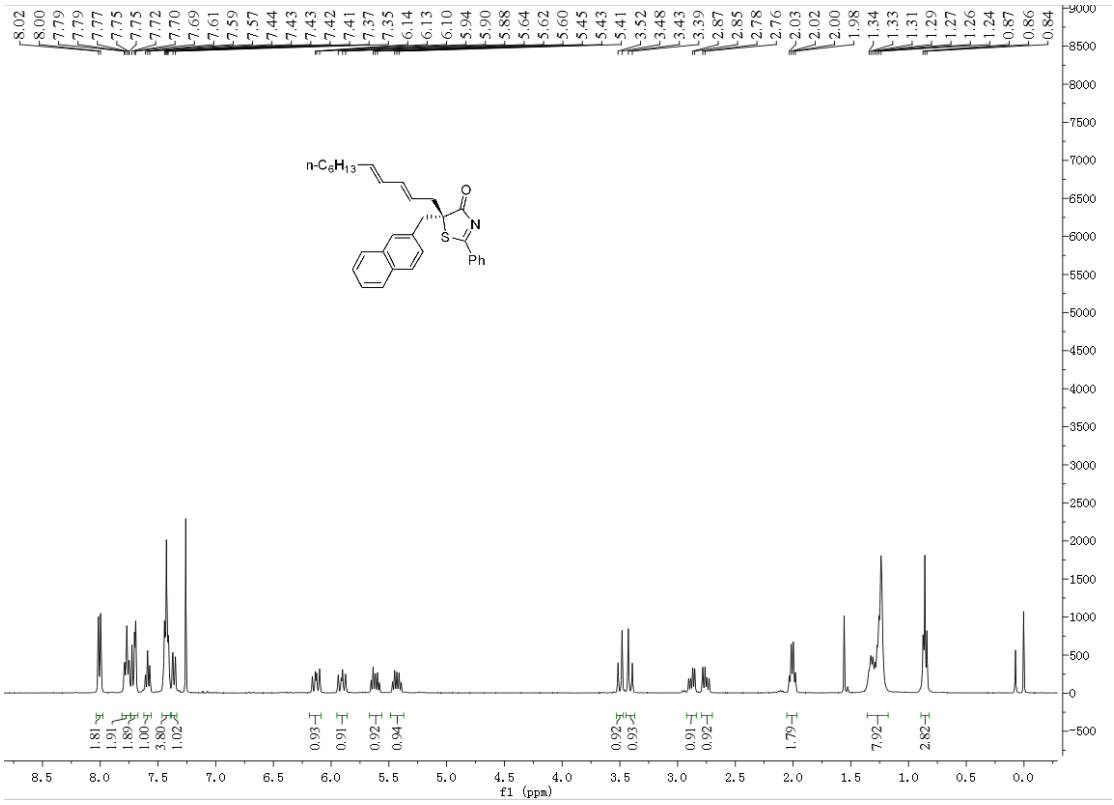


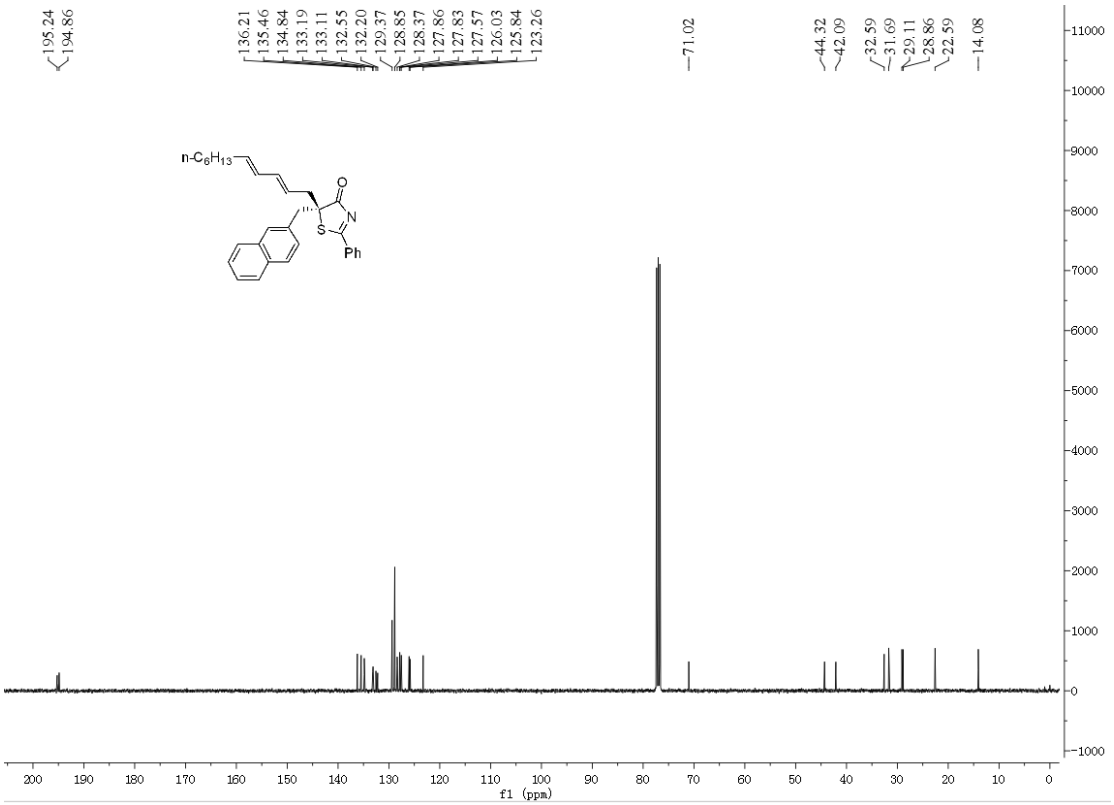
4-(((*R*)-4-oxo-2-phenyl-5-((*2E, 4E*)-undeca-2, 4-dien-1-yl)-4, 5-dihydrothiazol-5-yl) methyl) Benzonitrile (3da)



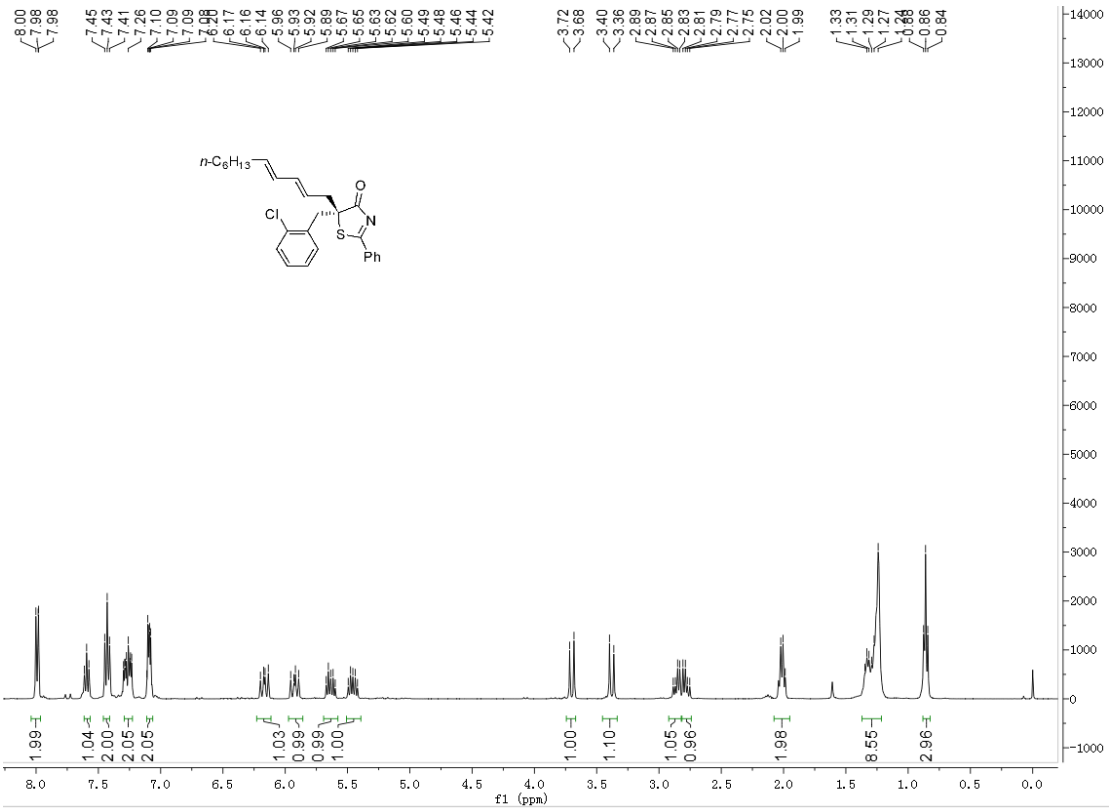


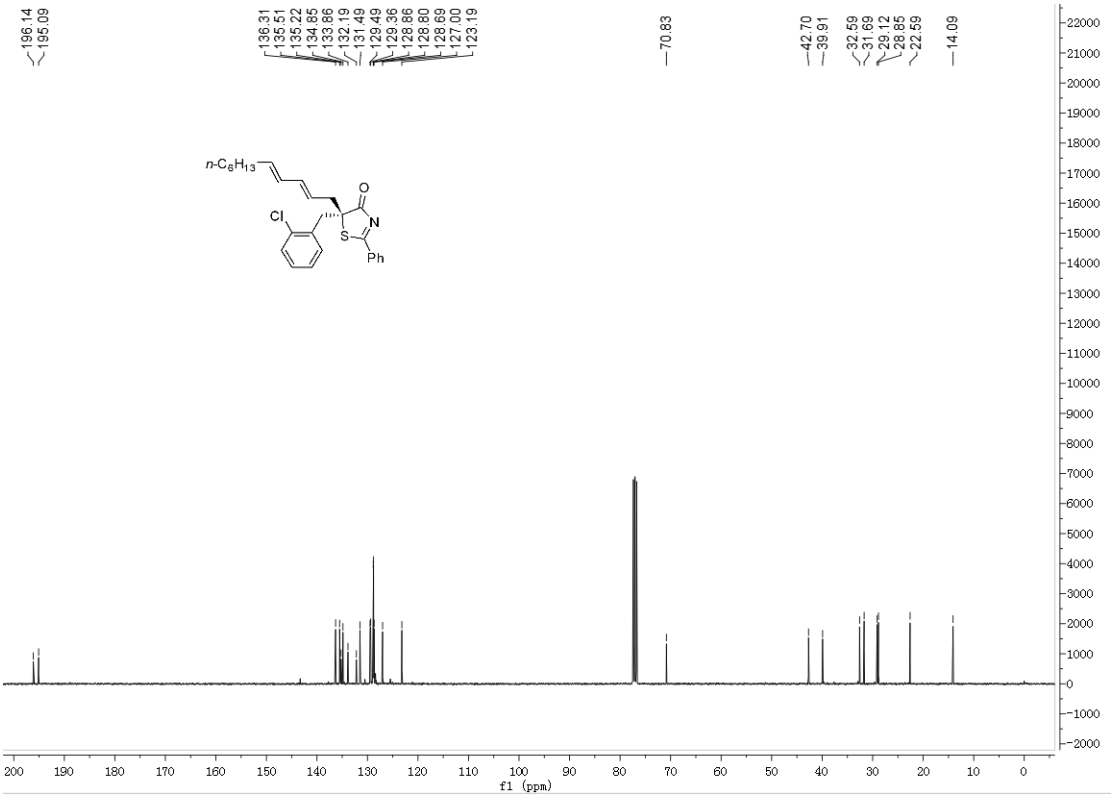
(*R*)-5-(naphthalen-2-ylmethyl)-2-phenyl-5-((*2E, 4E*)-undeca-2, 4-dien-1-yl) thiazol-4(5H)-one (3ea)



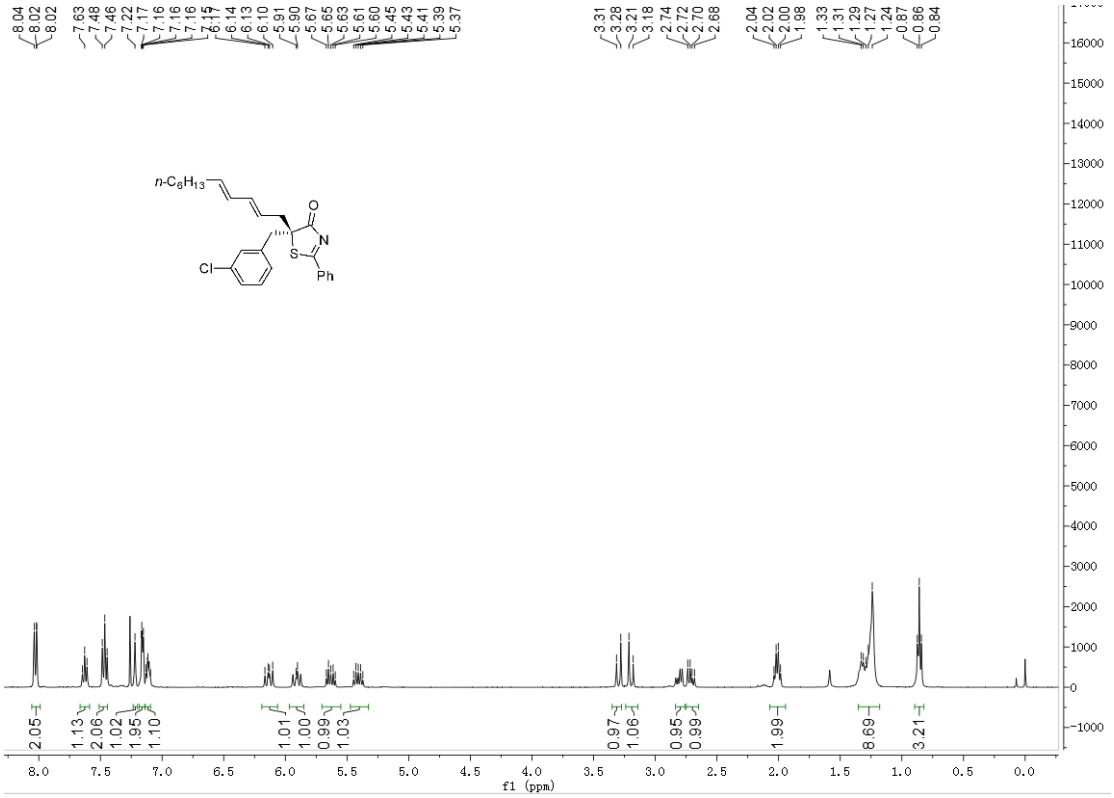


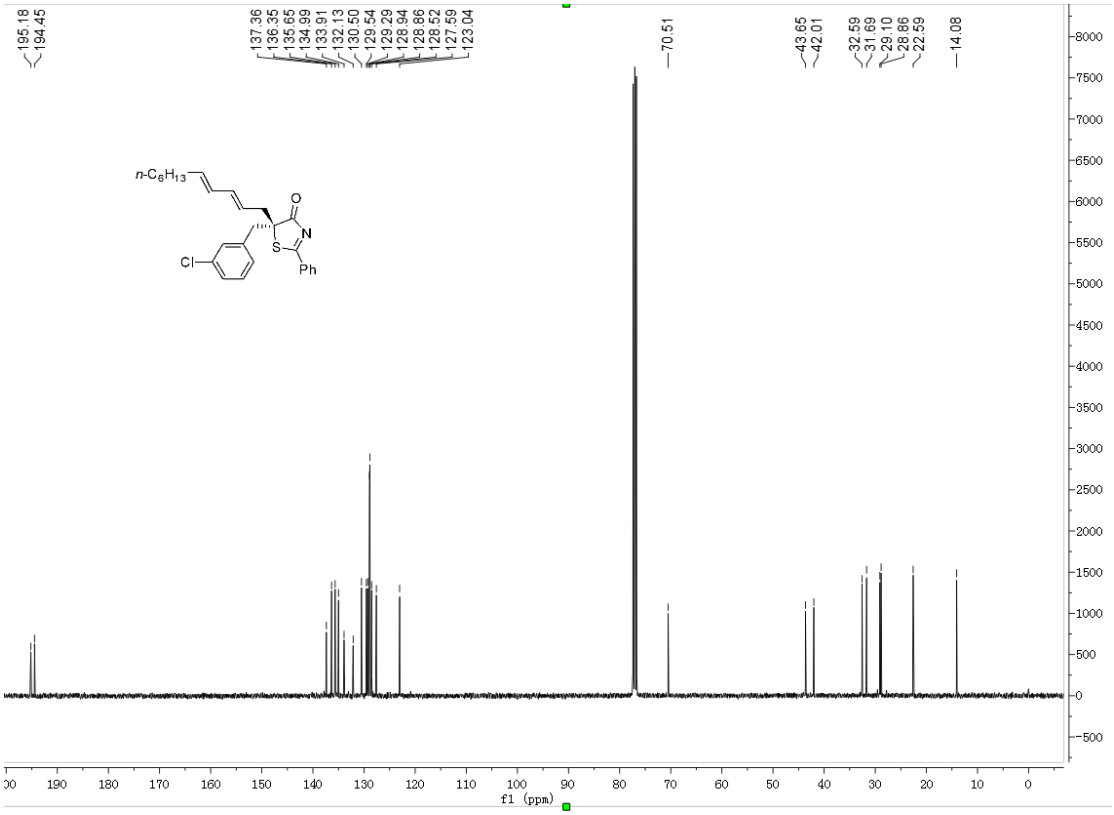
(*R*)-5-(2-chlorobenzyl)-2-phenyl-5-((*2E, 4E*)-undeca-2, 4-dien-1-yl) thiazol-4(5H)-one (3fa)



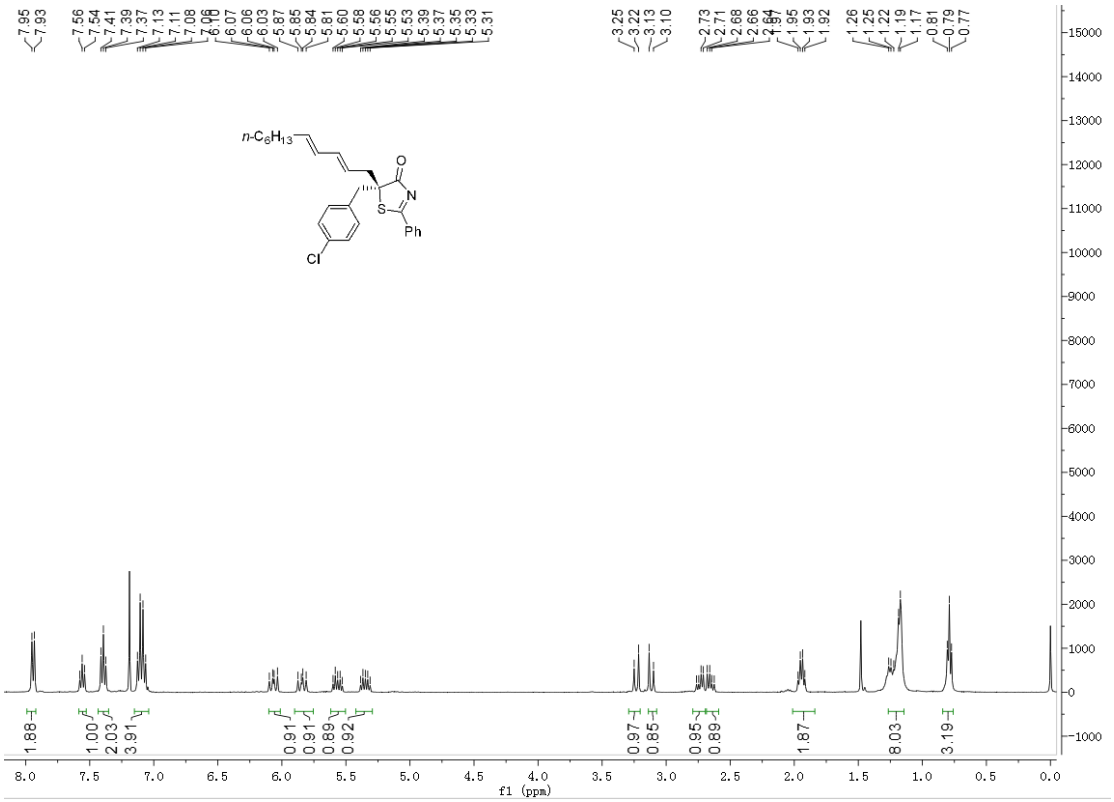


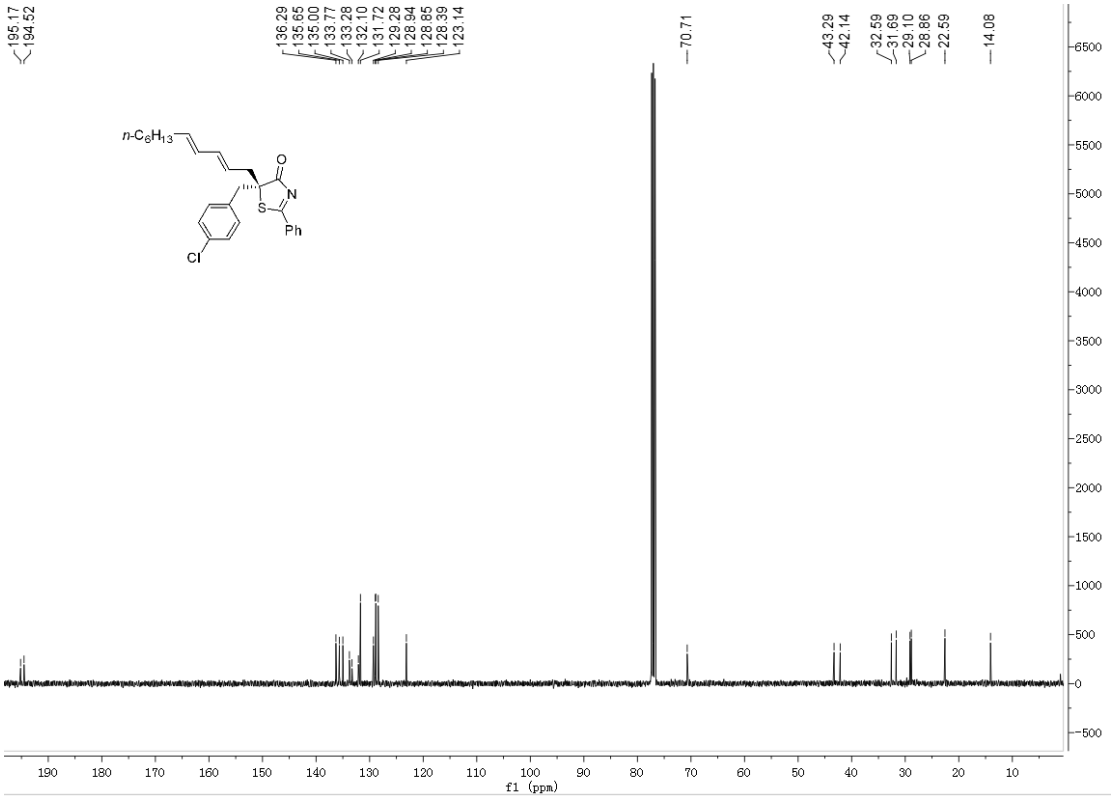
(*R*)-5-(3-chlorobenzyl)-2-phenyl-5-((*2E, 4E*)-undeca-2, 4-dien-1-yl) thiazol-4(5H)-one (3ga)



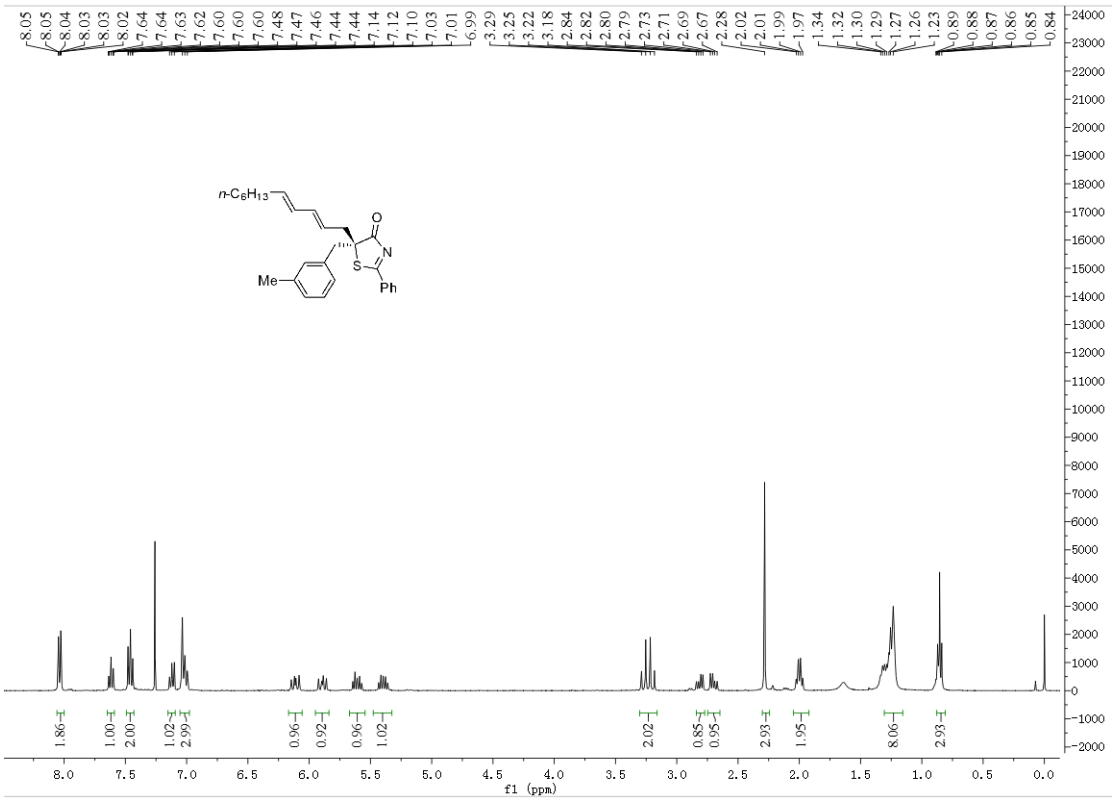


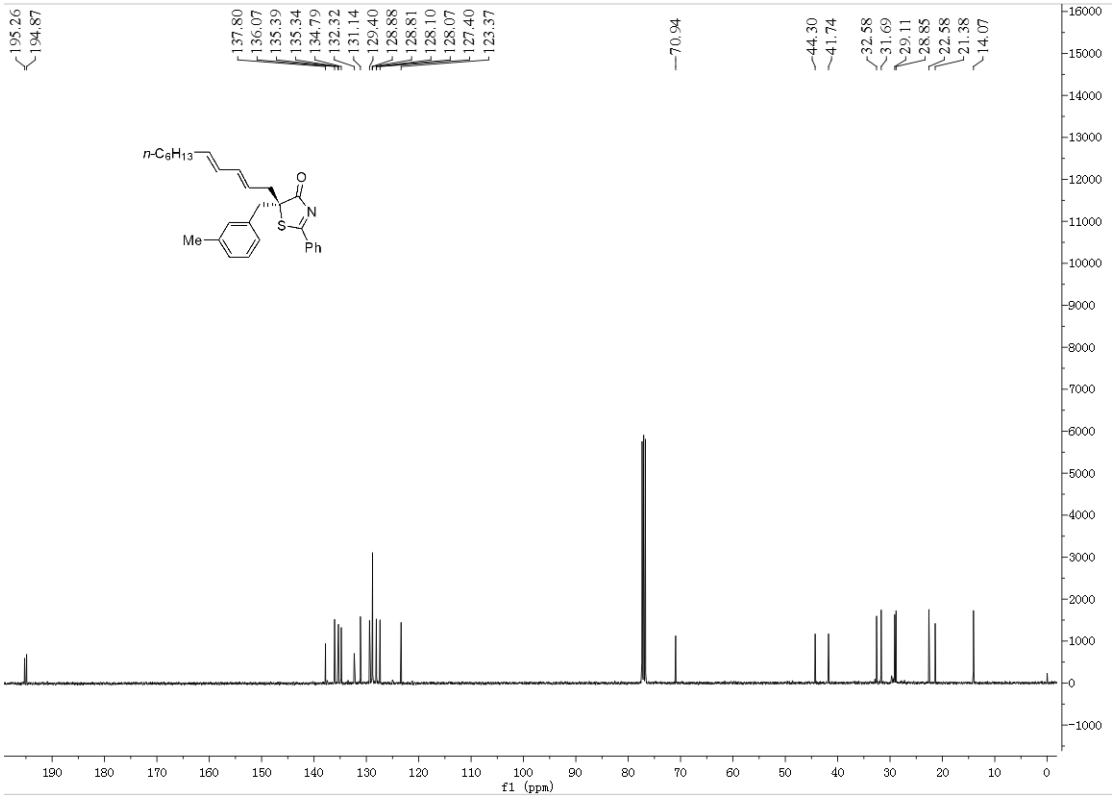
(*R*)-5-(4-chlorobenzyl)-2-phenyl-5-((*2E, 4E*)-undeca-2, 4-dien-1-yl) thiazol-4(5H)-one (3ha)



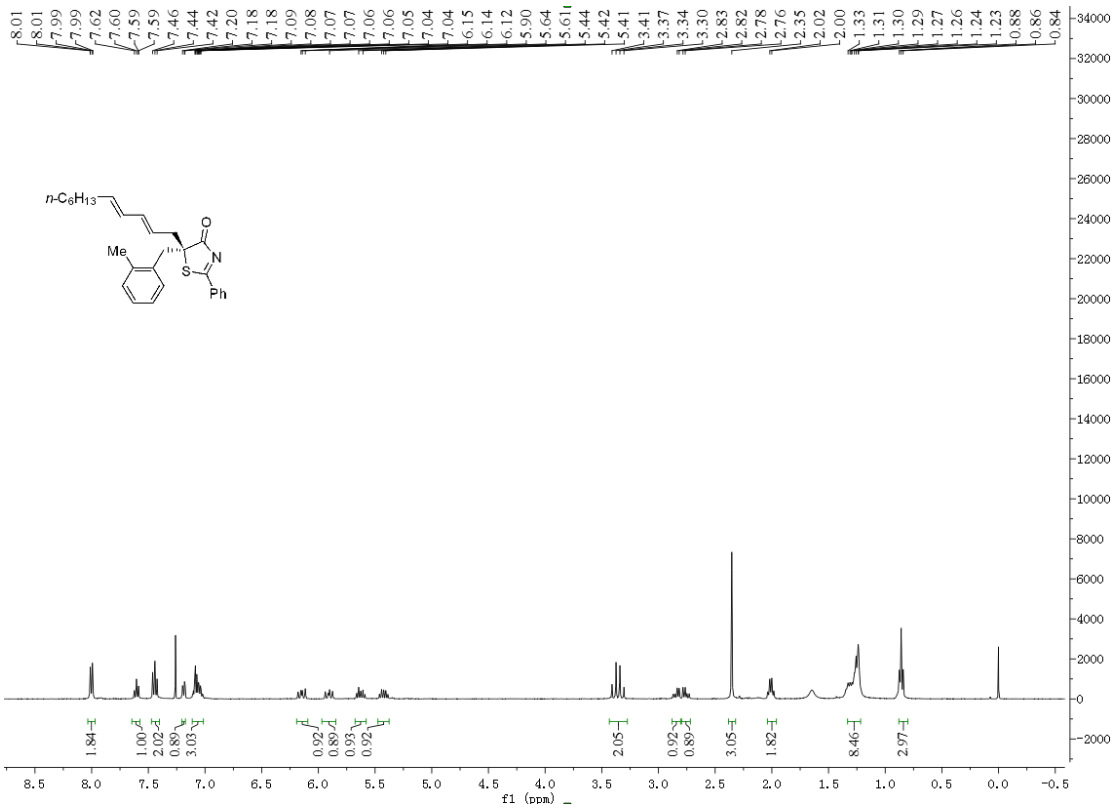


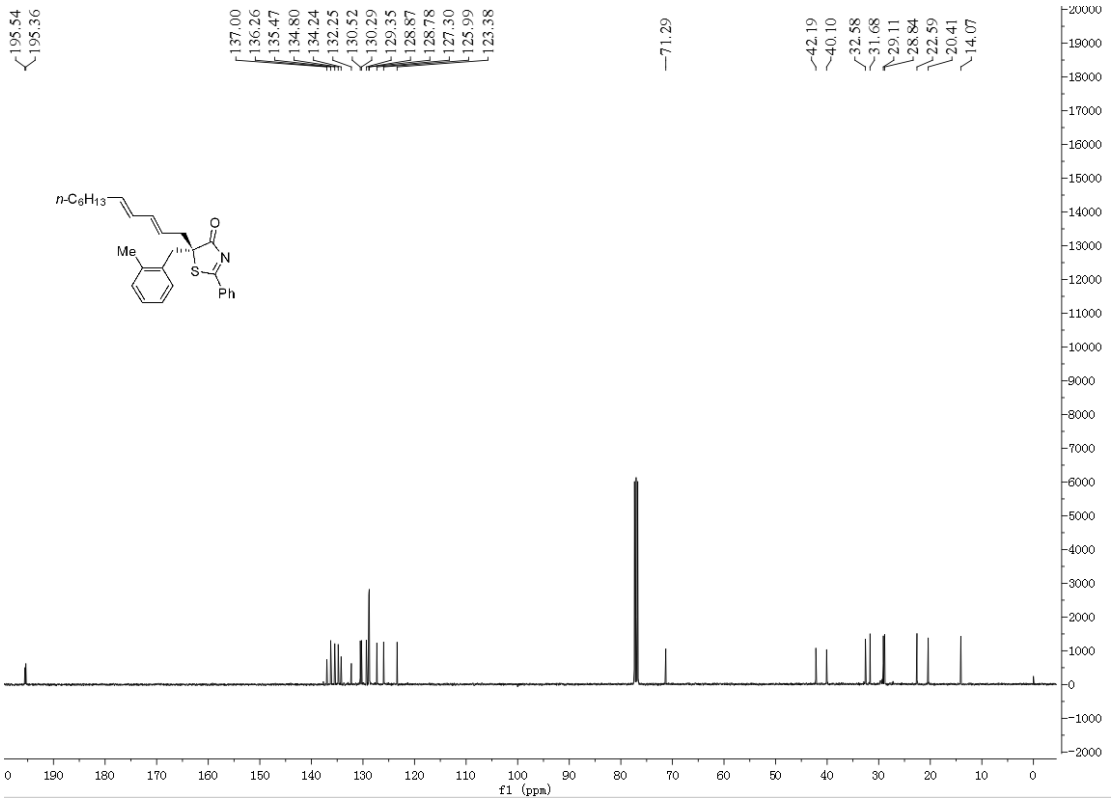
(*R*)-5-(3-methylbenzyl)-2-phenyl-5-((*2E, 4E*)-undeca-2, 4-dien-1-yl) thiazol-4(5H)-one (3ia)



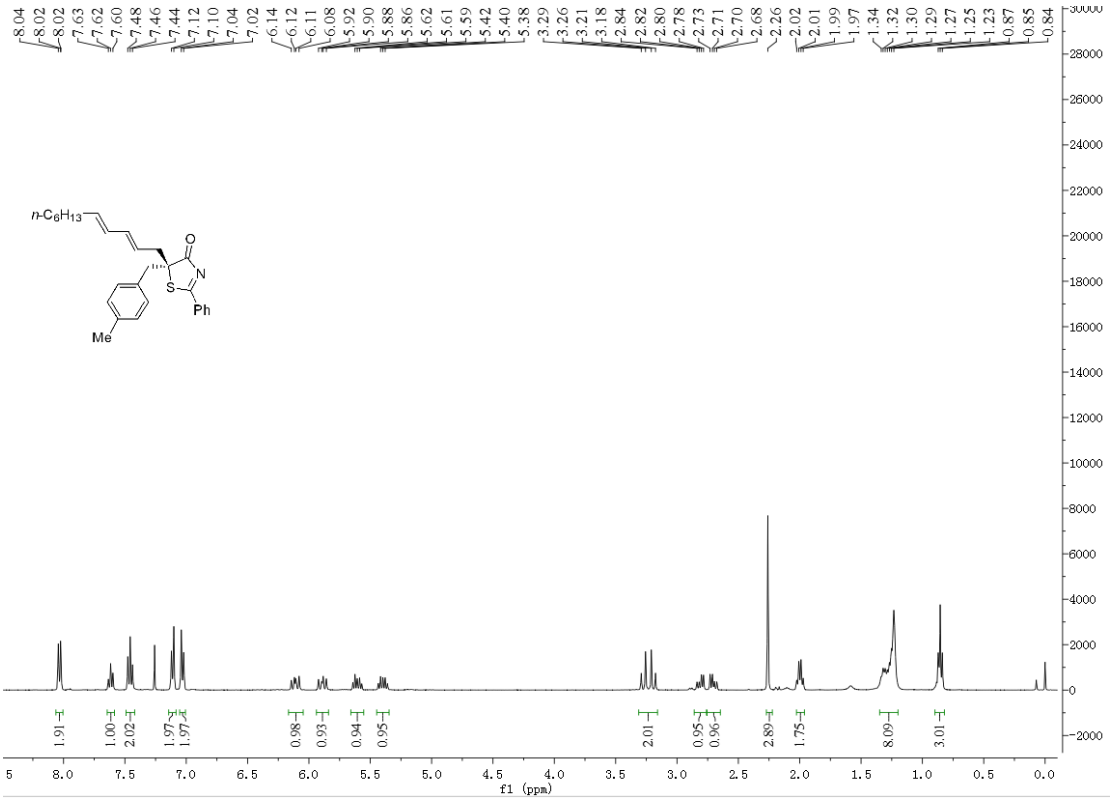


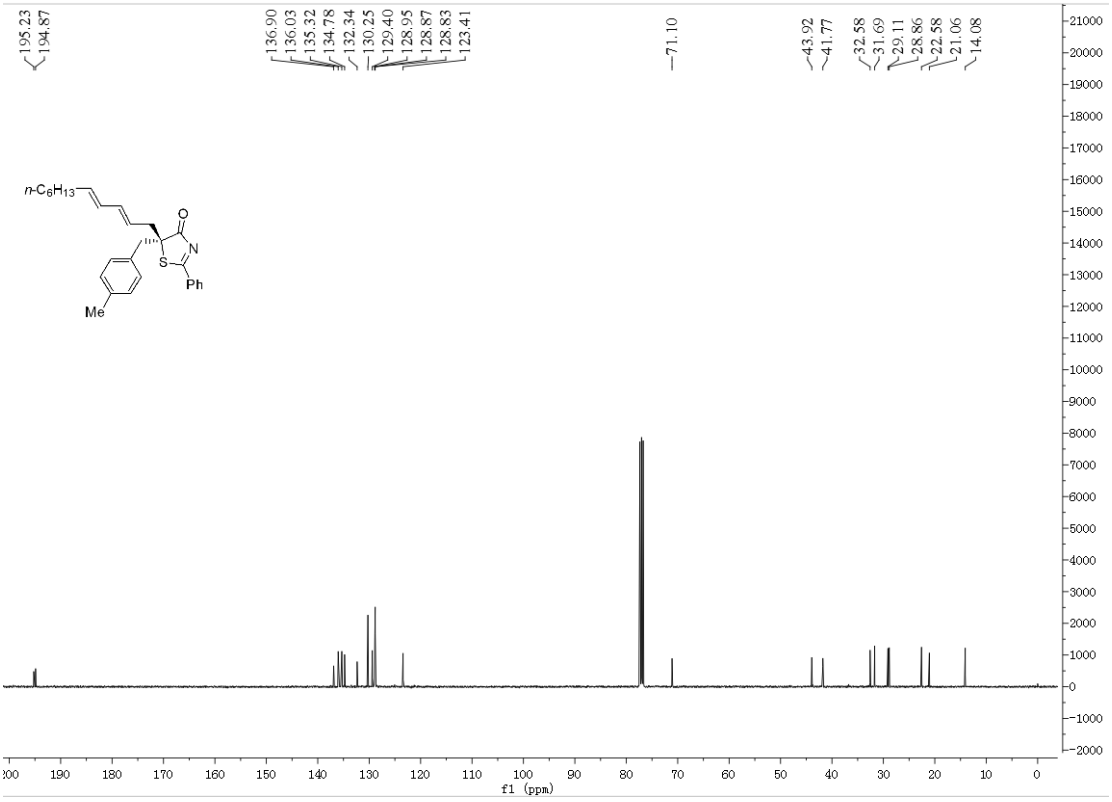
(*R*)-5-(2-methylbenzyl)-2-phenyl-5-((*2E, 4E*)-undeca-2, 4-dien-1-yl) thiazol-4(5H)-one (3ja)



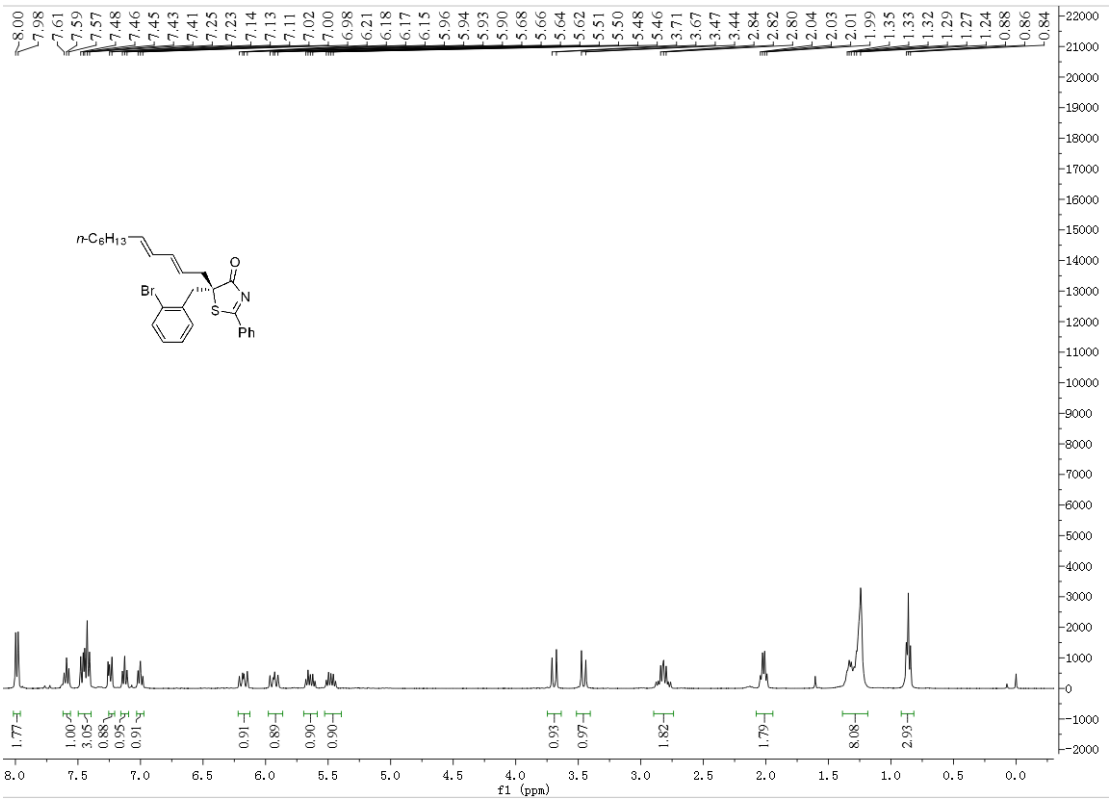


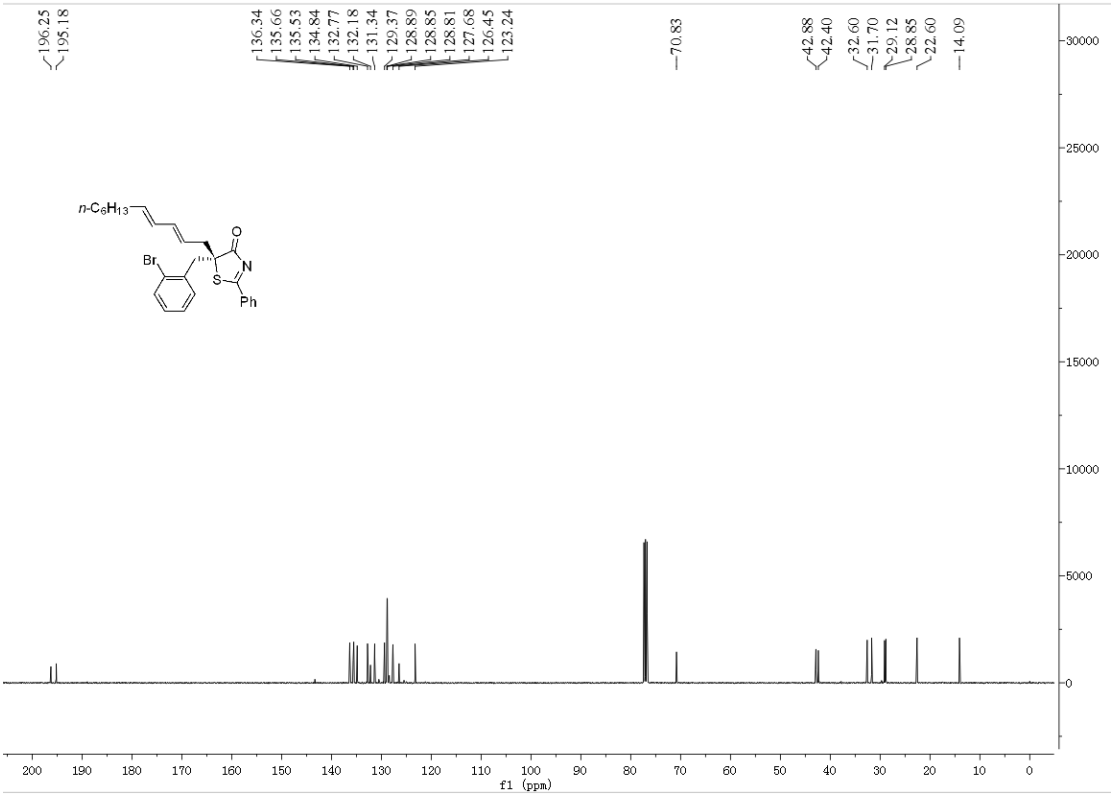
(*R*)-5-(4-methylbenzyl)-2-phenyl-5-((*2E, 4E*)-undeca-2, 4-dien-1-yl) thiazol-4(5H)-one (3ka)



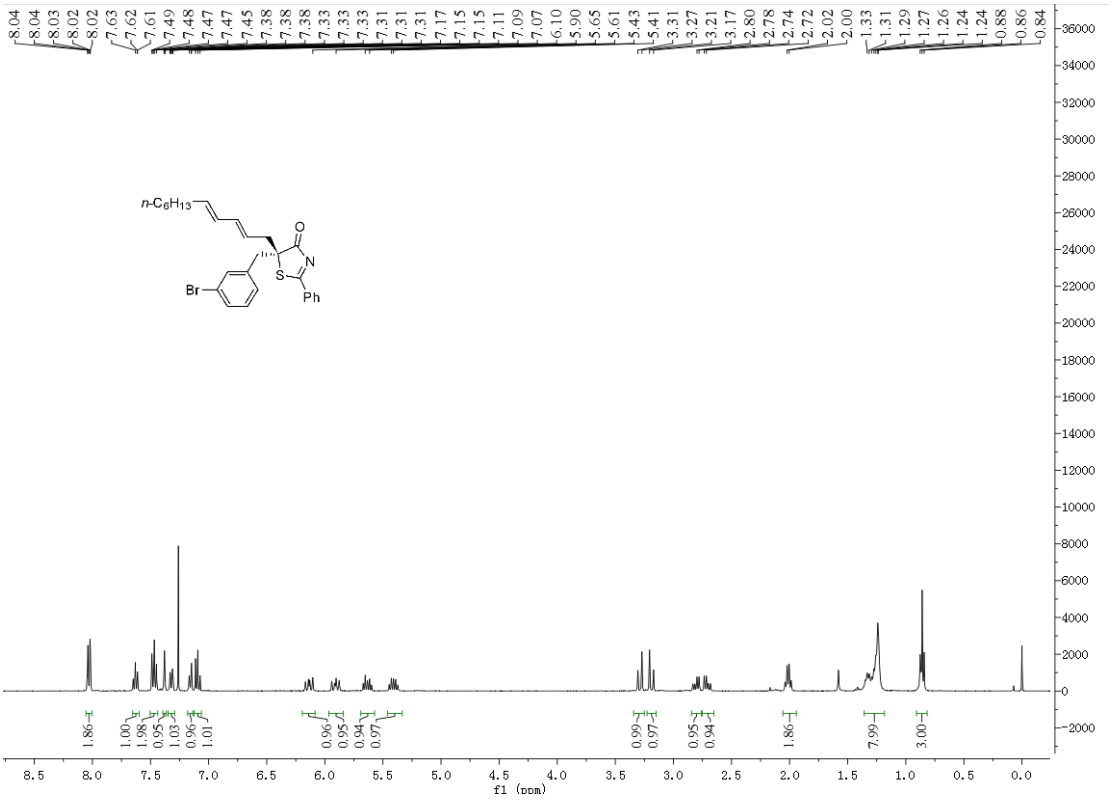


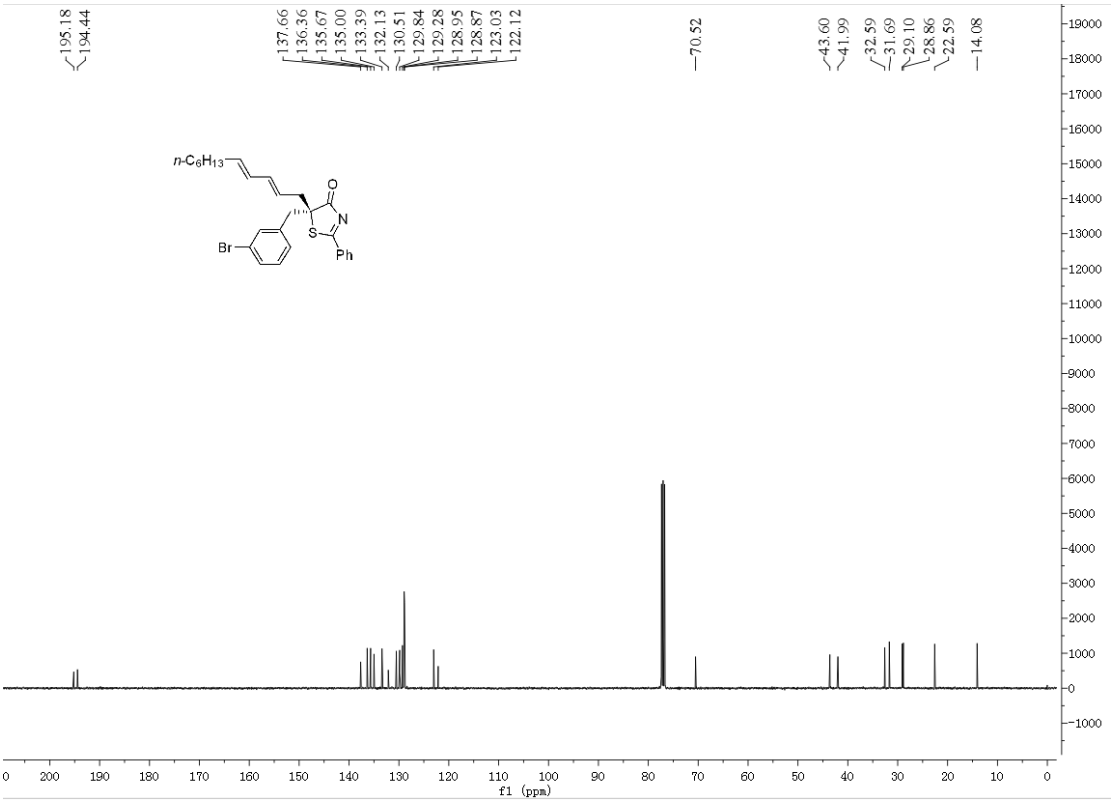
(*R*)-5-(2-bromobenzyl)-2-phenyl-5-((*2E, 4E*)-undeca-2, 4-dien-1-yl) thiazol-4(5H)-one (3la)



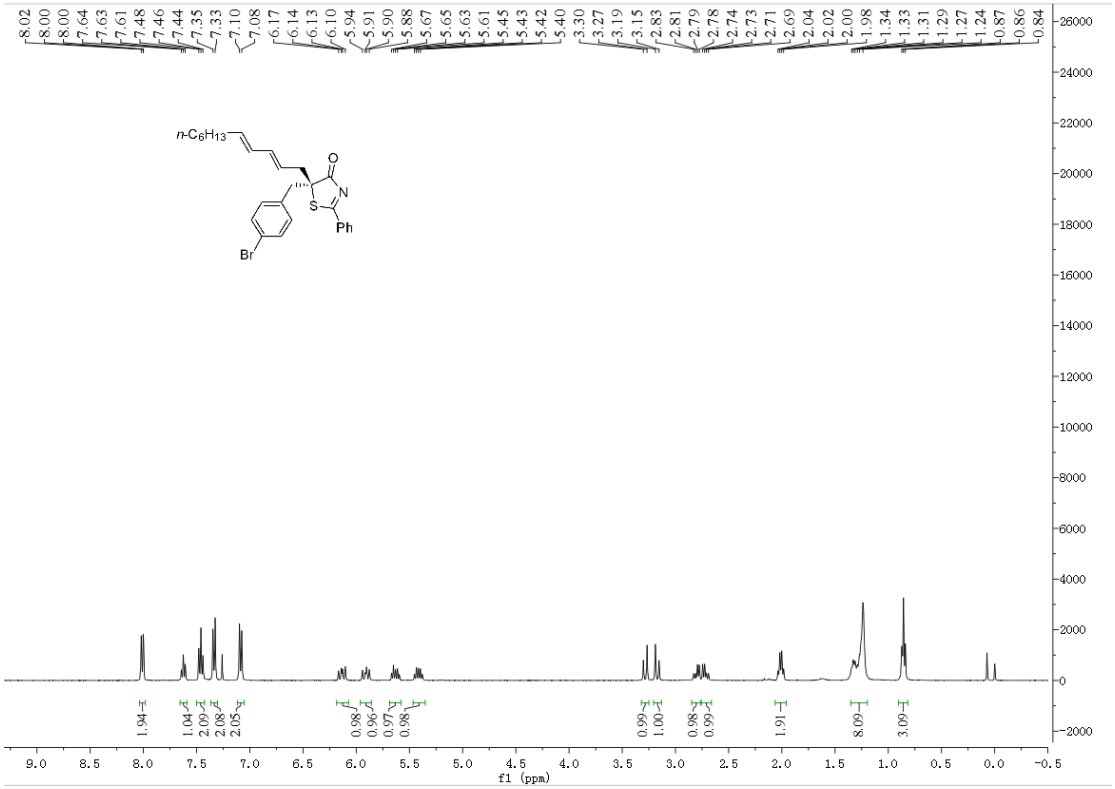


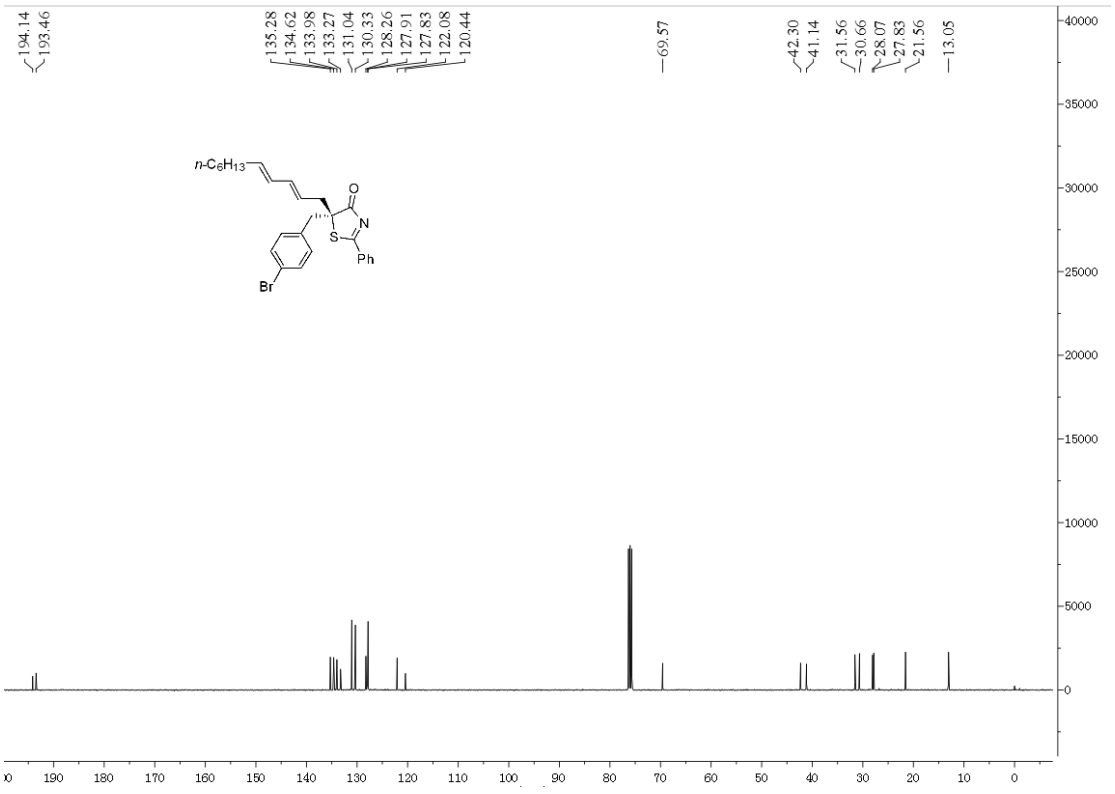
(*R*)-5-(3-bromobenzyl)-2-phenyl-5-((*2E, 4E*)-undeca-2, 4-dien-1-yl) thiazol-4(5H)-one (3ma)





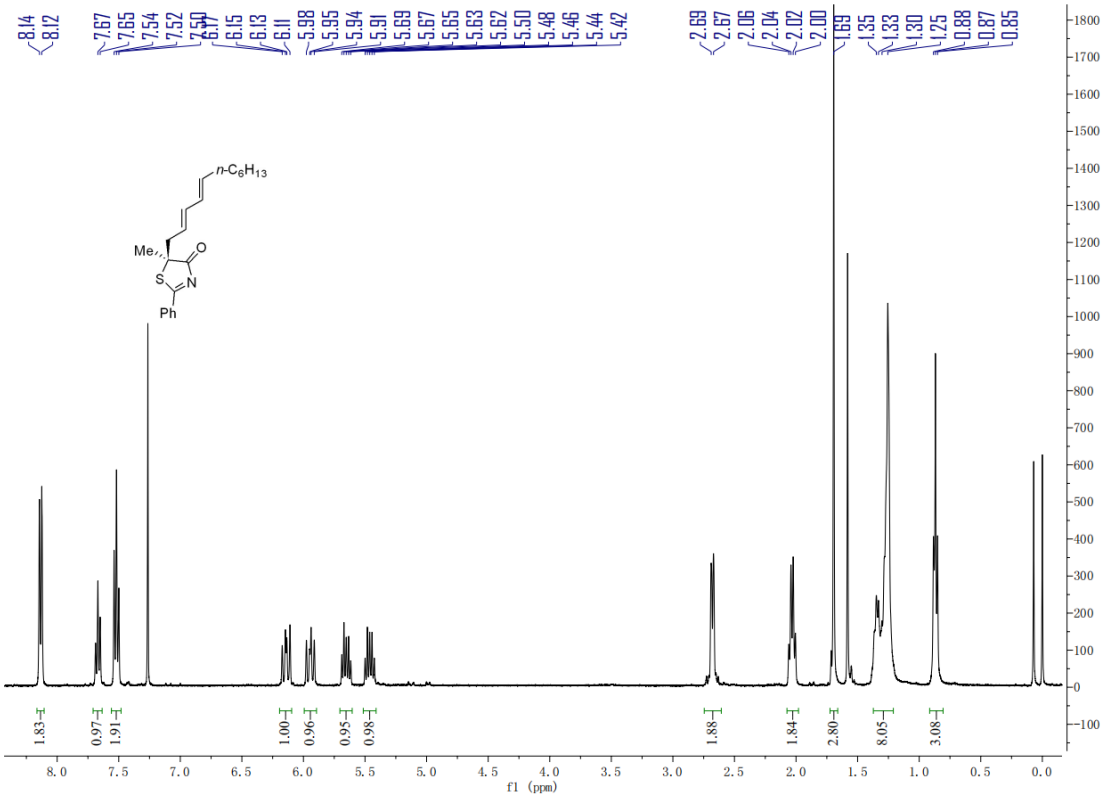
(*R*)-5-(4-bromobenzyl)-2-phenyl-5-((*2E, 4E*)-undeca-2, 4-dien-1-yl) thiazol-4(5H)-one (3na)

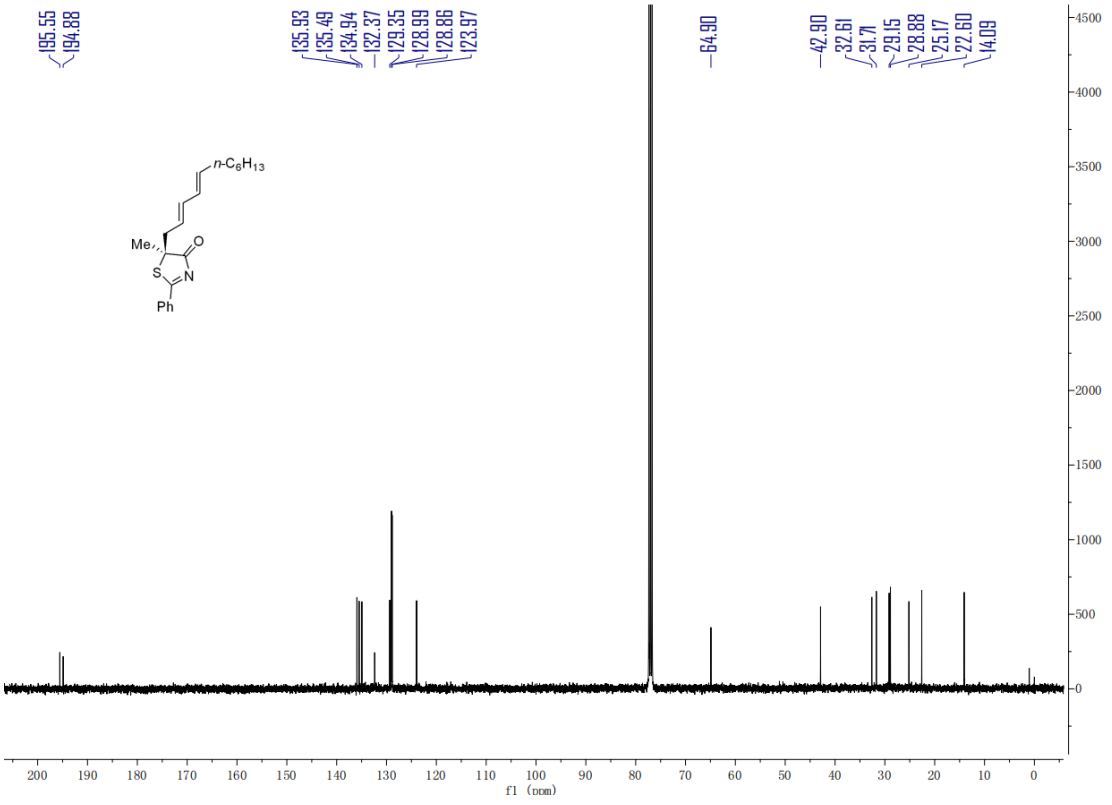




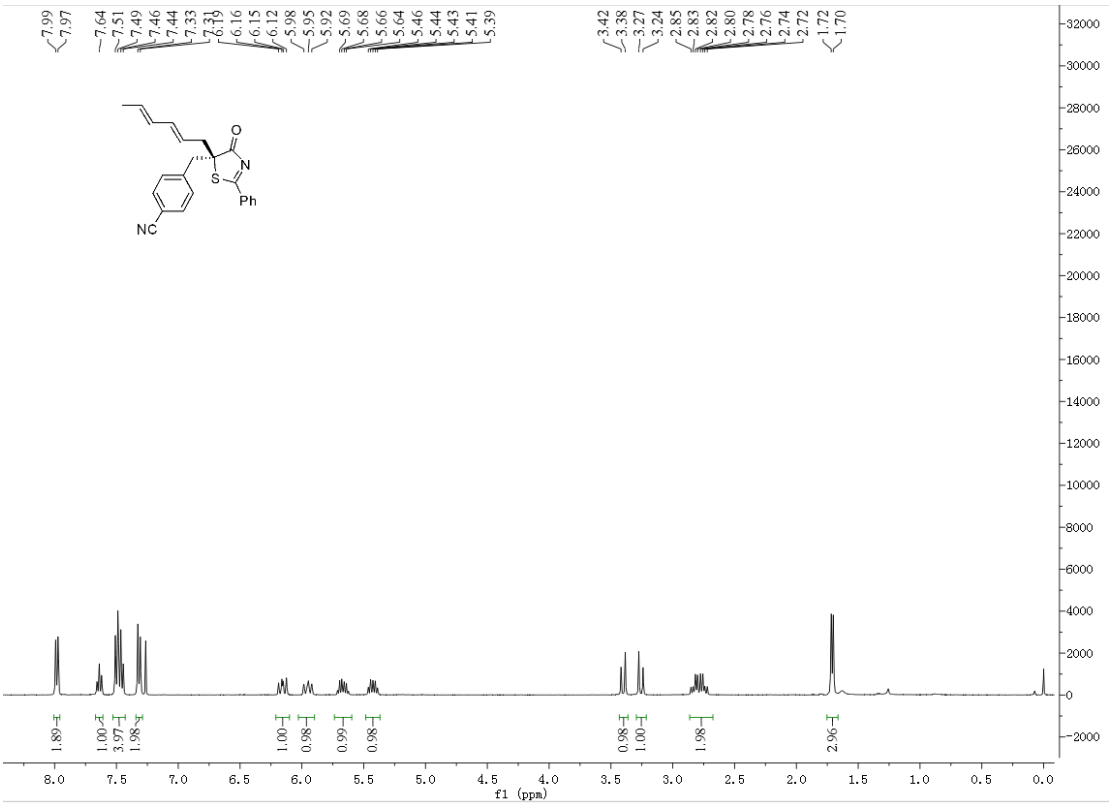
(*S*)-5-methyl-2-phenyl-5-((*2E*, *4E*)-undeca-2, 4-dien-1-yl) thiazol-4(5H)-one

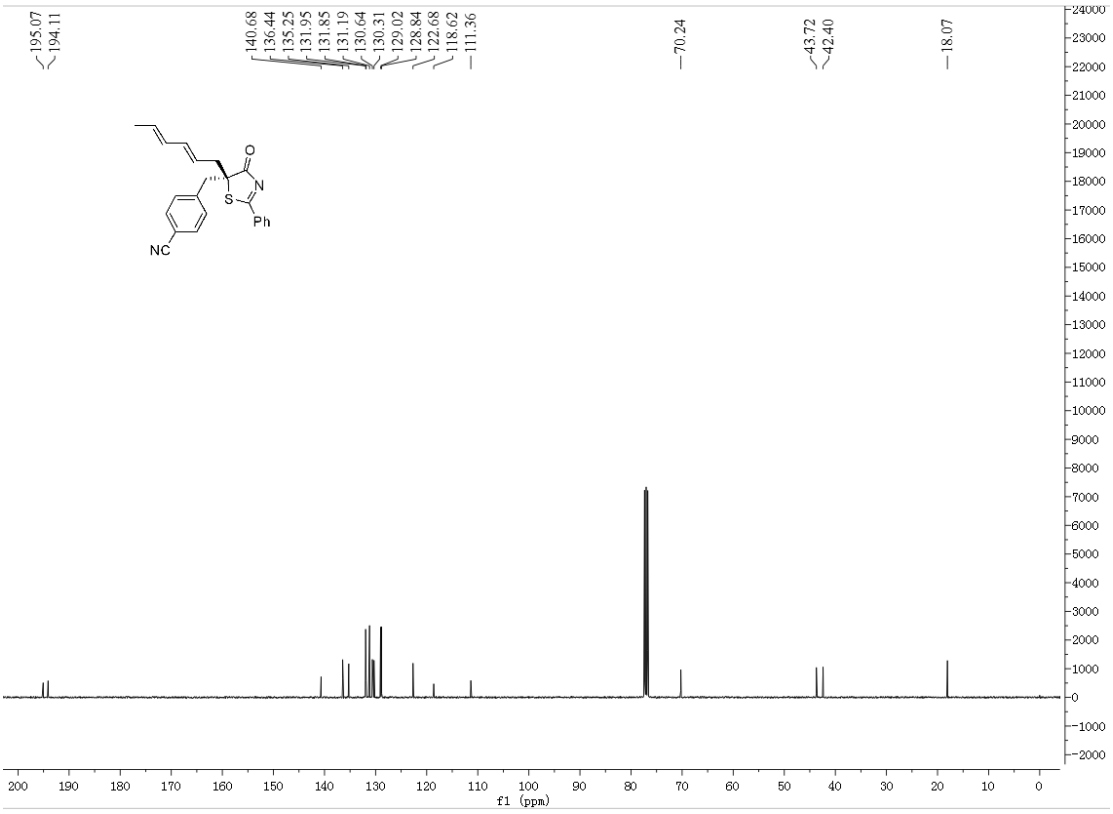
(3oa)



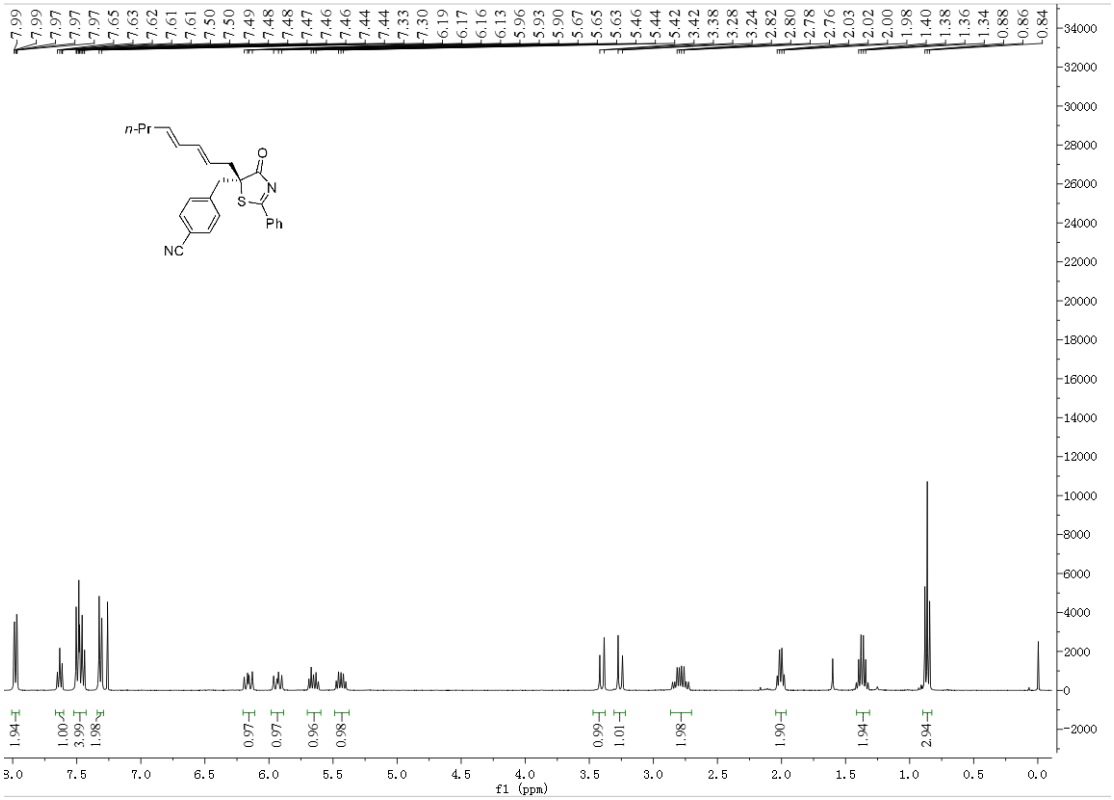


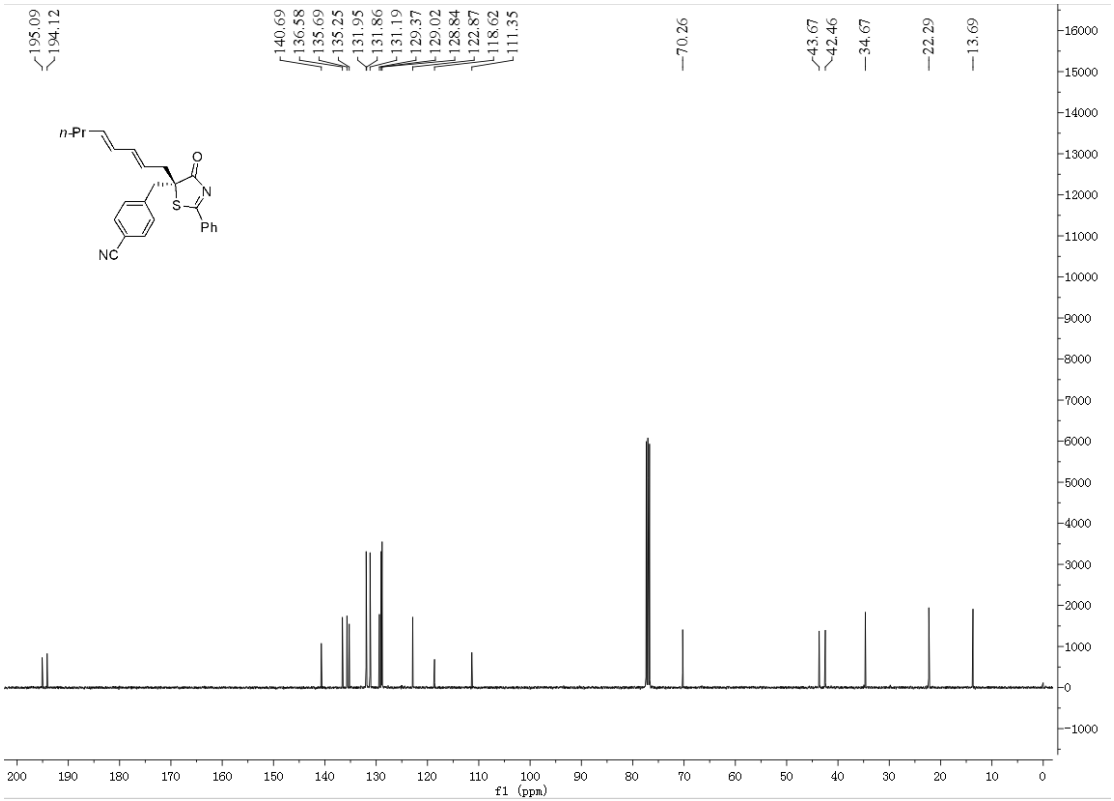
4-(((*R*)-5-((*2E, 4E*)-hexa-2, 4-dien-1-yl)-4-oxo-2-phenyl-4, 5-dihydrothiazol-5-yl) methyl) benzonitrile (3db)



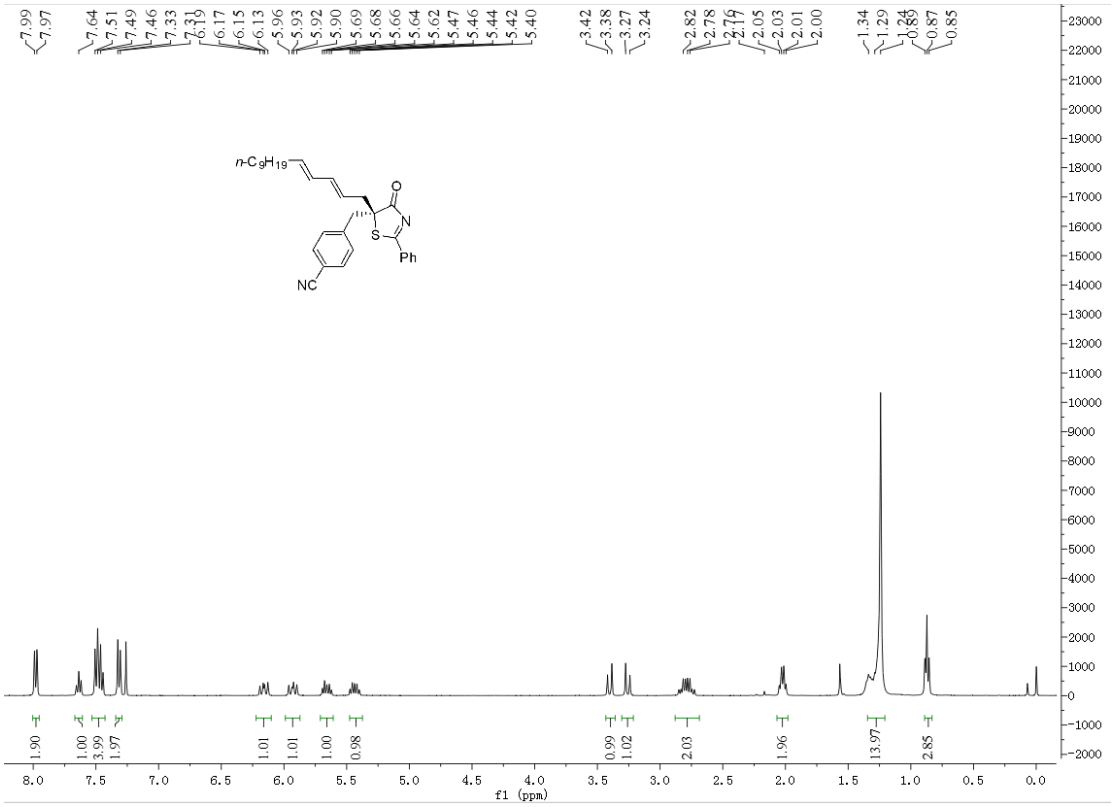


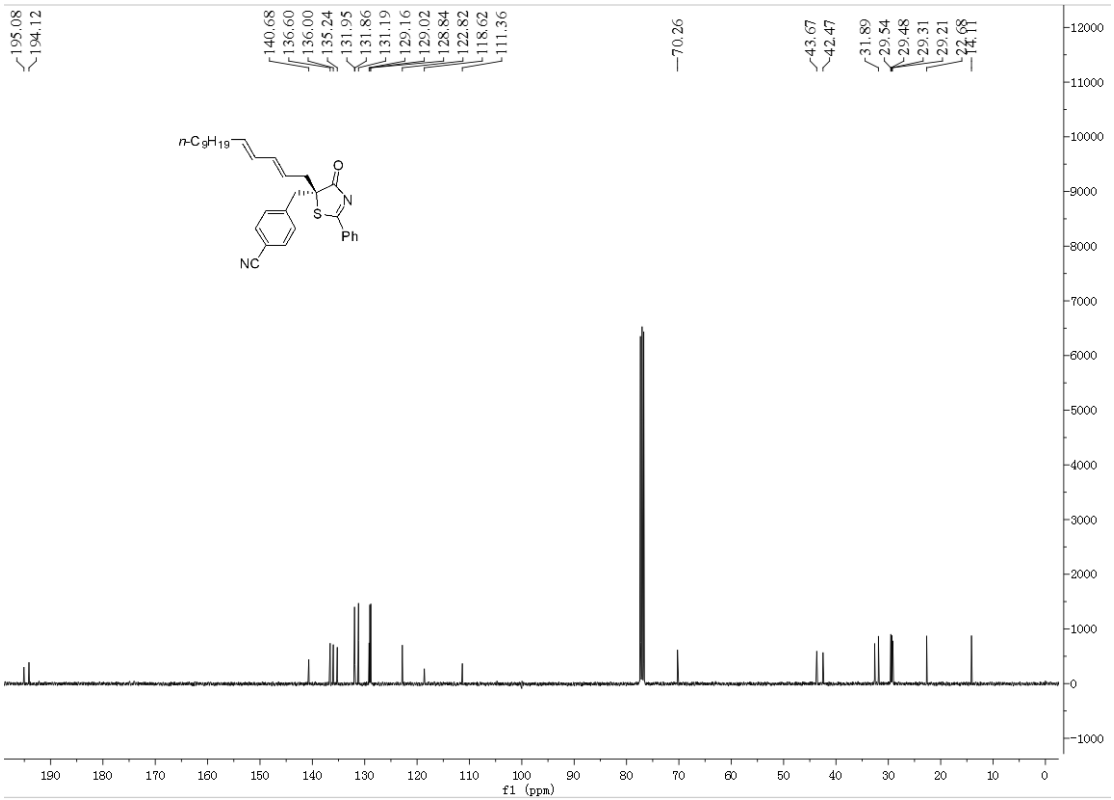
4-(((*R*)-5-((*2E, 4E*)-octa-2, 4-dien-1-yl)-4-oxo-2-phenyl-4, 5-dihydrothiazol-5-yl) methyl) benzonitrile (3dc)



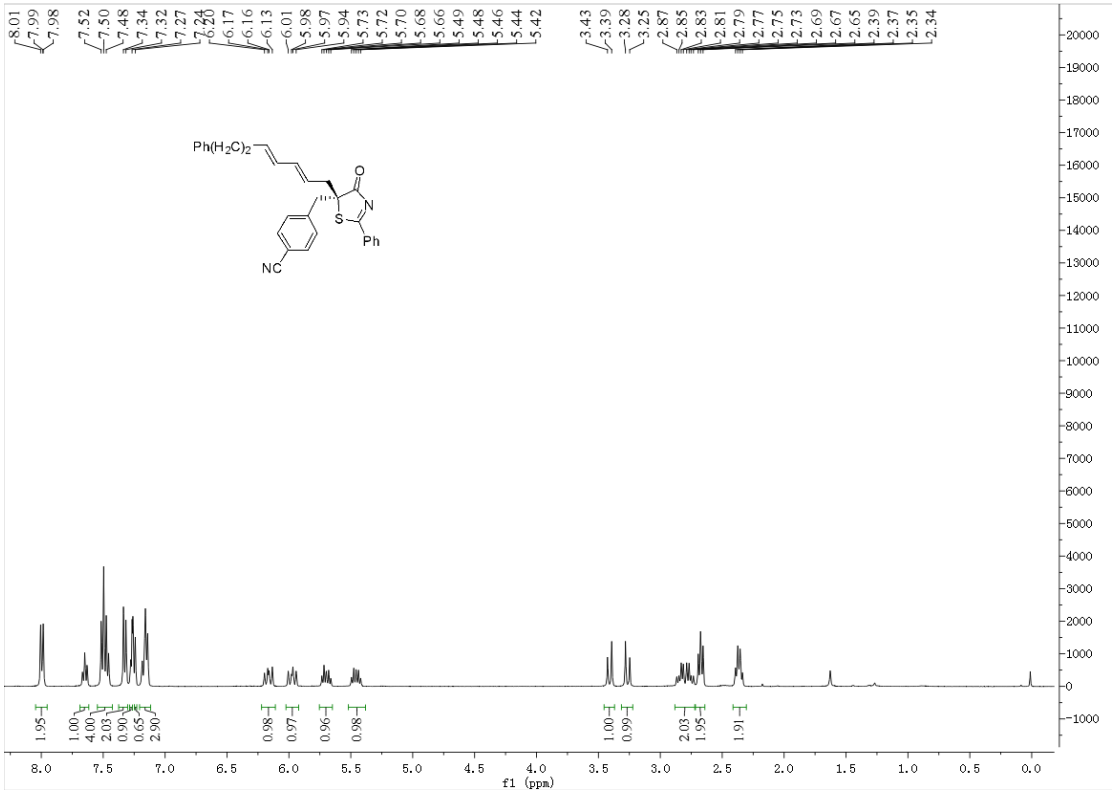


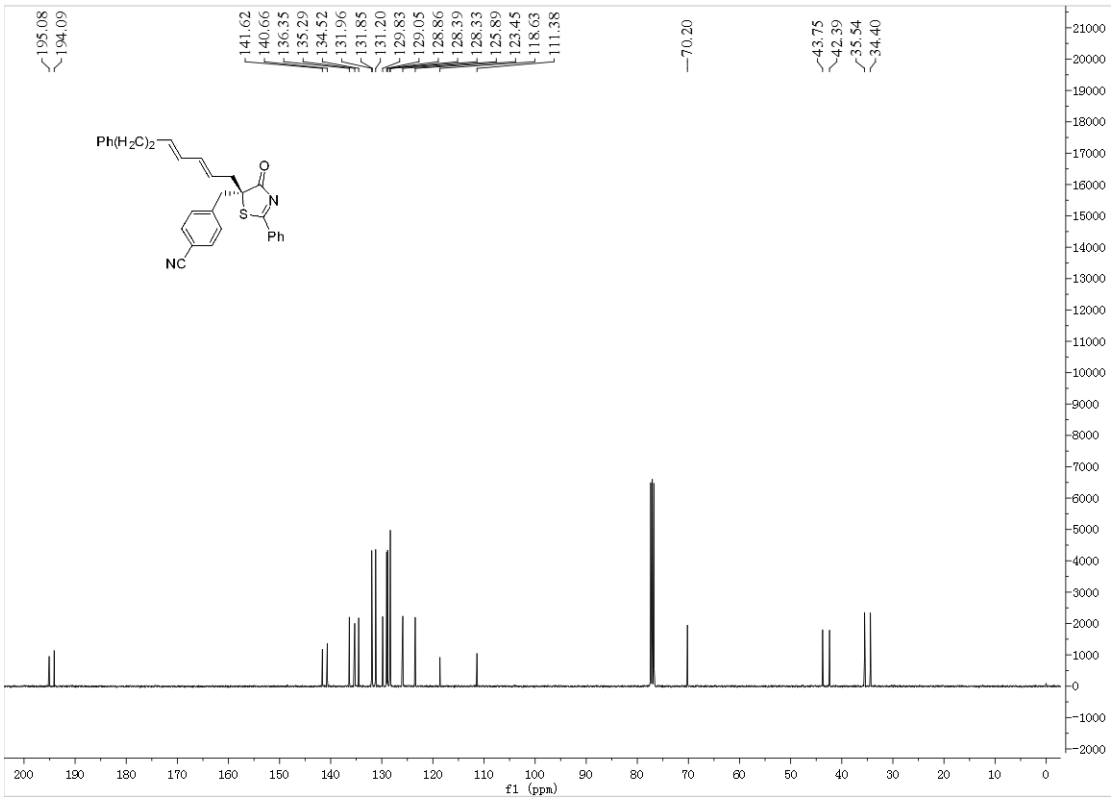
4-(((*R*)-4-oxo-2-phenyl-5-((*2E, 4E*)-tetradeca-2, 4-dien-1-yl)-4, 5-dihydrothiazol-5-yl) methyl) benzonitrile (3dd)



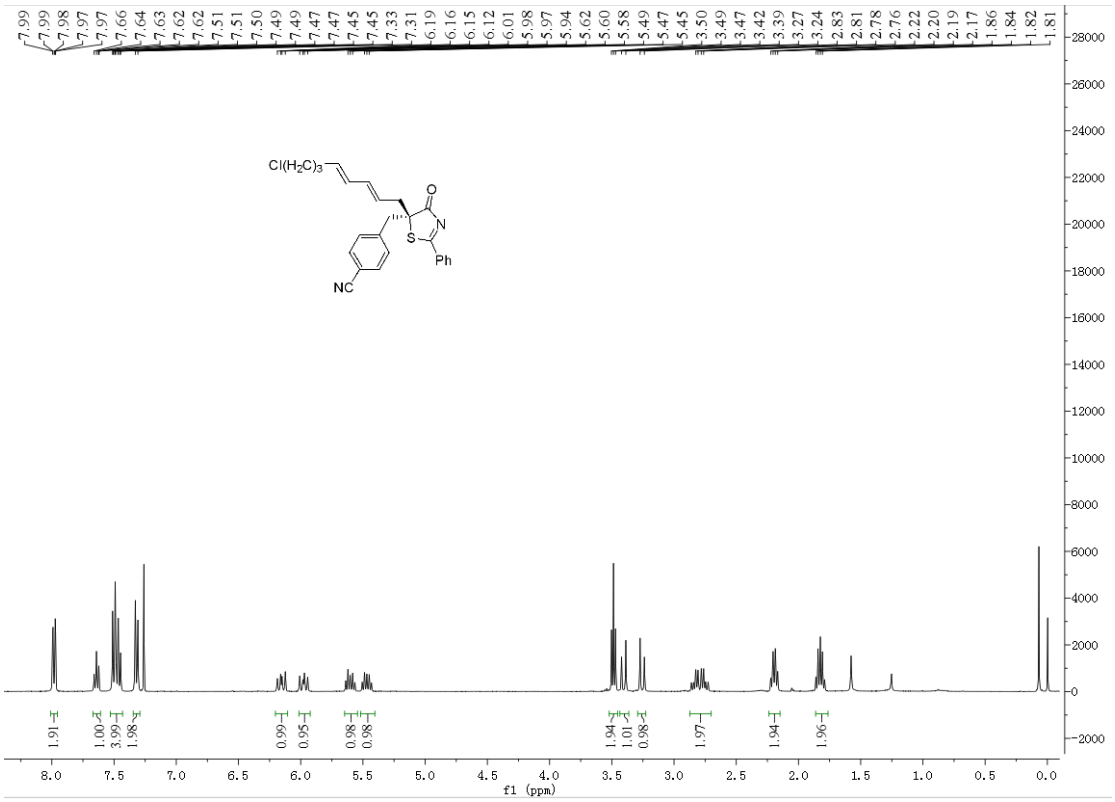


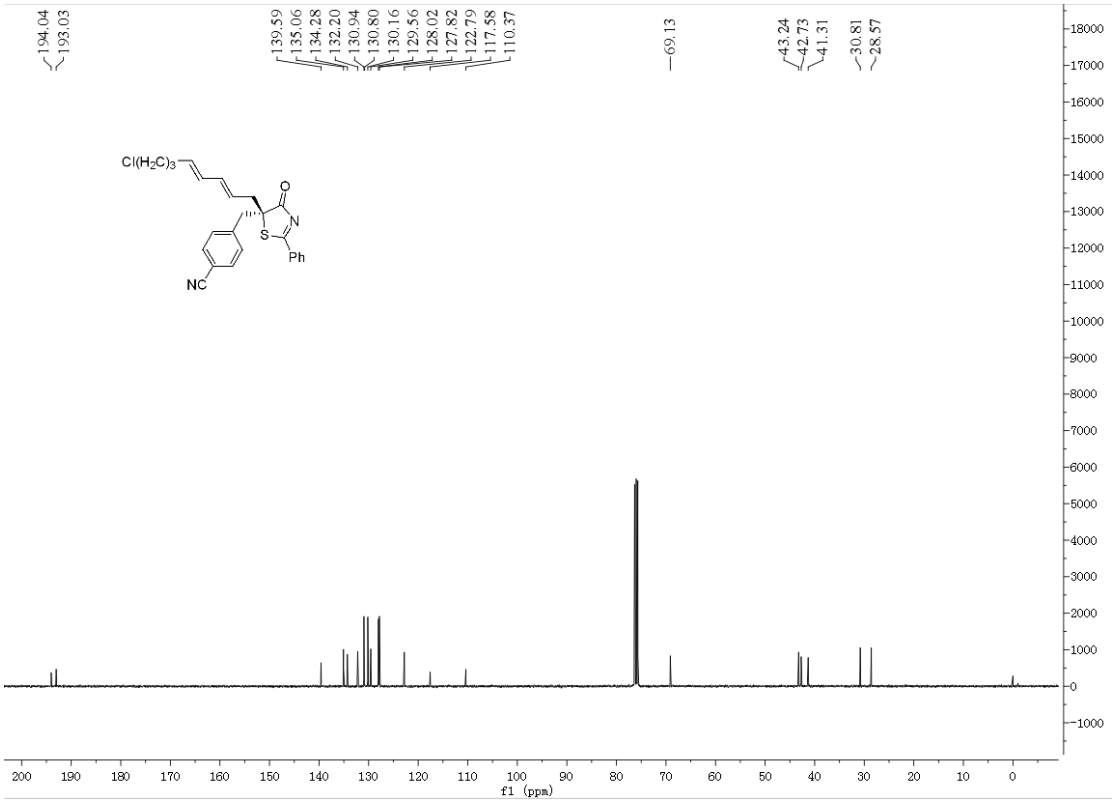
4-(((*R*)-4-oxo-2-phenyl-5-((*2E, 4E*)-5-(p-tolyl) penta-2, 4-dien-1-yl)-4, 5-dihydrothiazol-5-yl) methyl) benzonitrile (3de)



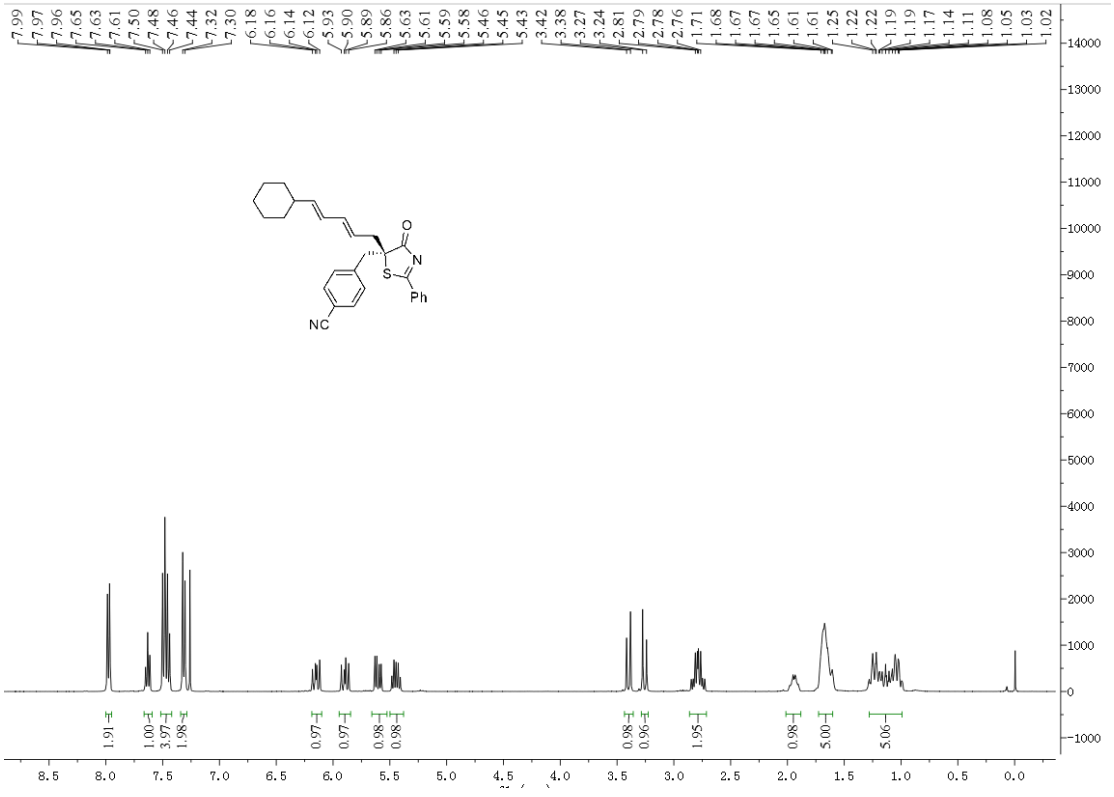


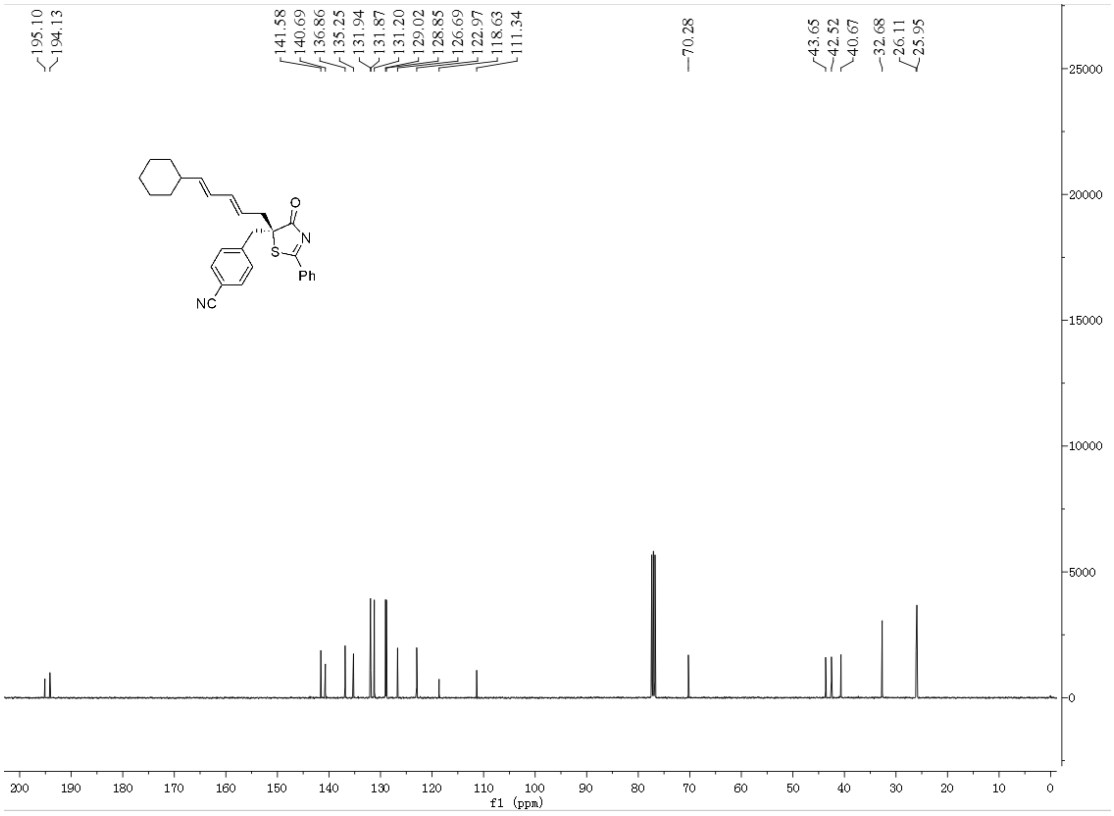
4-(((*R*)-5-((*2E, 4E*)-8-chloroocta-2, 4-dien-1-yl)-4-oxo-2-phenyl-4, 5-dihydrothiazol-5-yl) methyl) benzonitrile (3df)



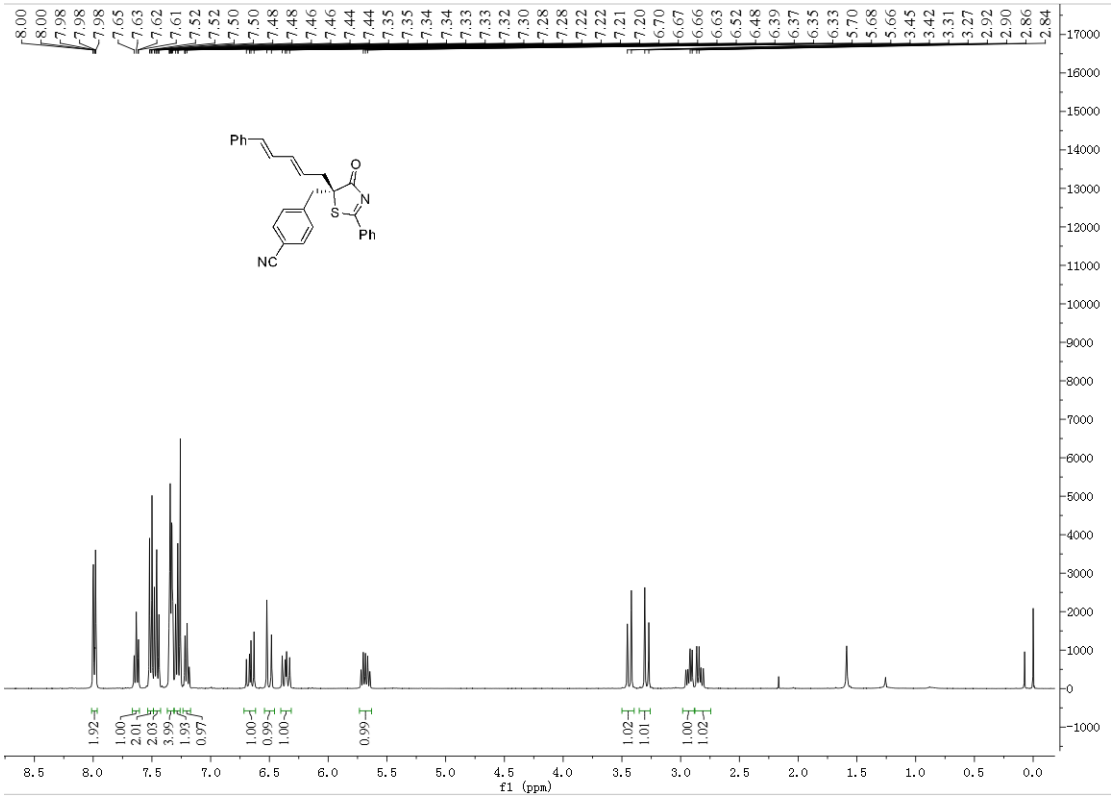


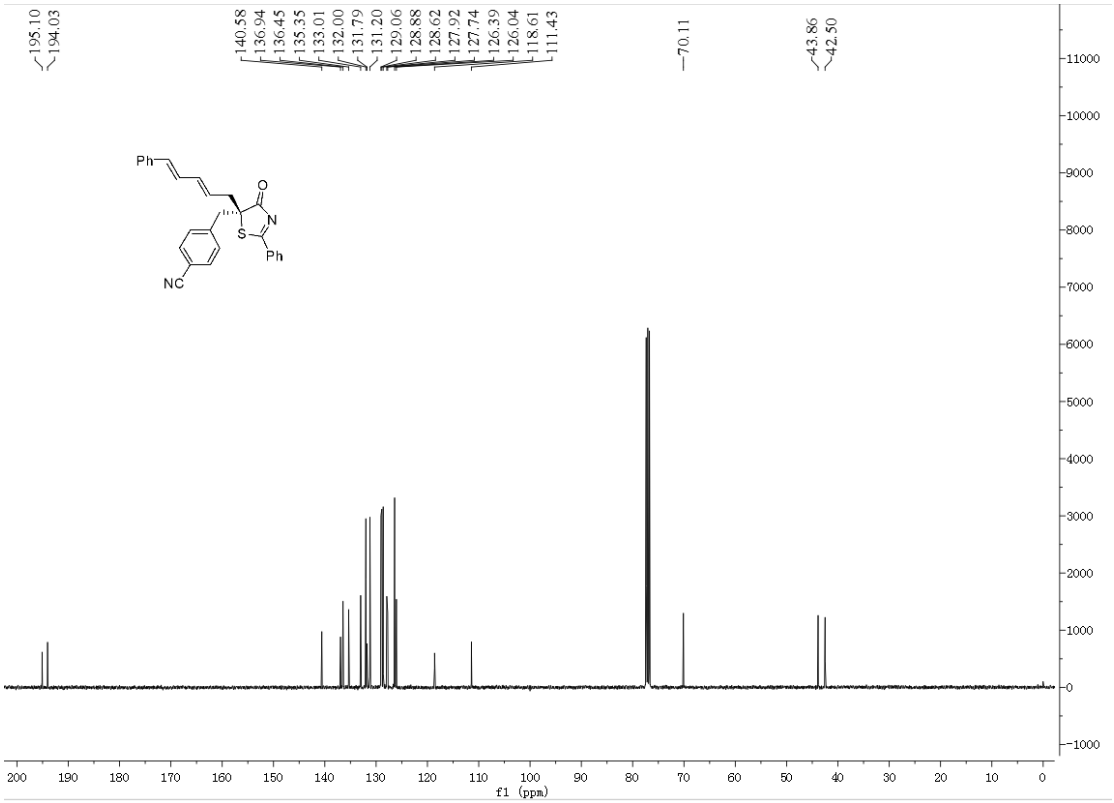
4-(((*R*)-5-((*2E, 4E*)-hexa-2, 4-dien-1-yl)-4-oxo-2-phenyl-4, 5-dihydrothiazol-5-yl) methyl) benzonitrile (3dg)



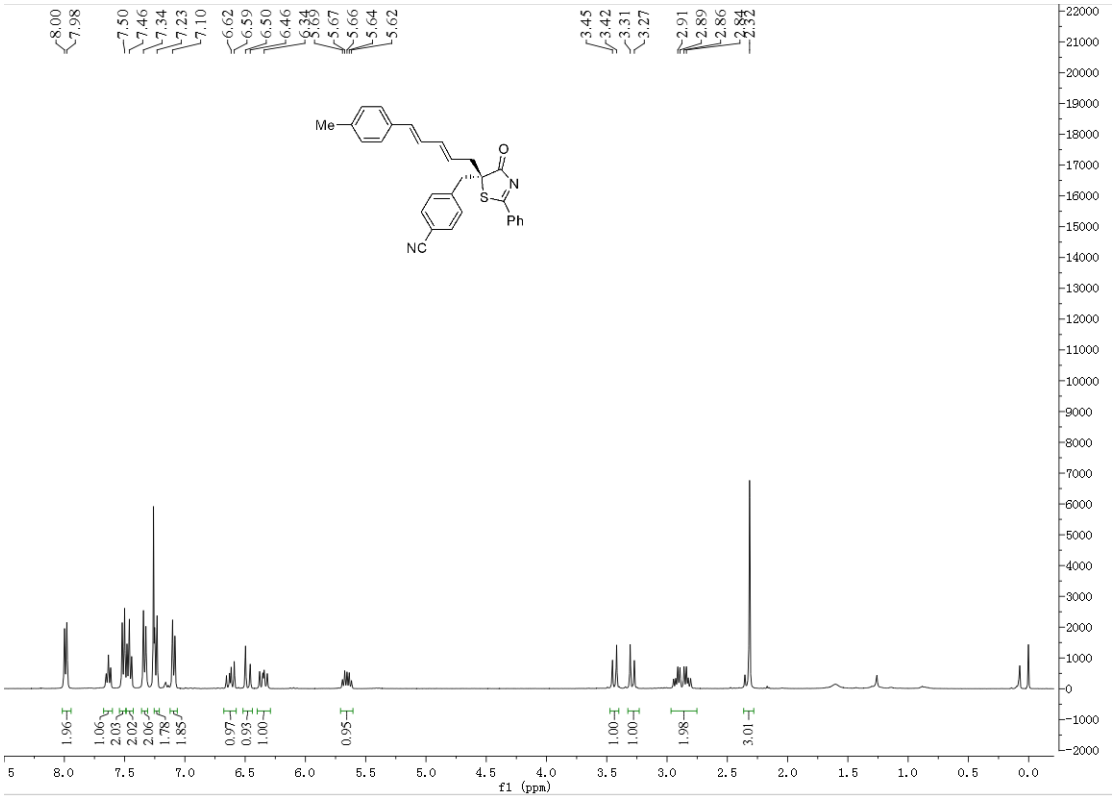


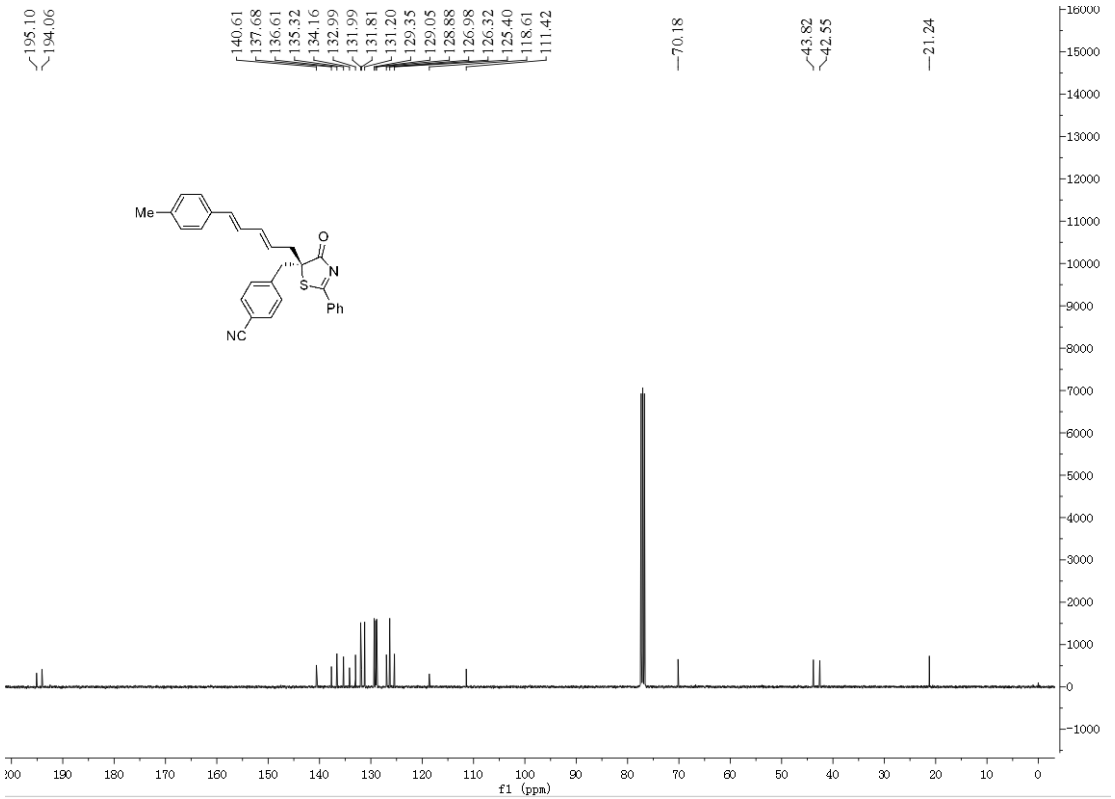
4-(((*R*)-4-oxo-2-phenyl-5-((*2E, 4E*)-5-phenylpenta-2, 4-dien-1-yl)-4, 5-dihydrothiazol-5-yl) methyl) benzonitrile (3dh)



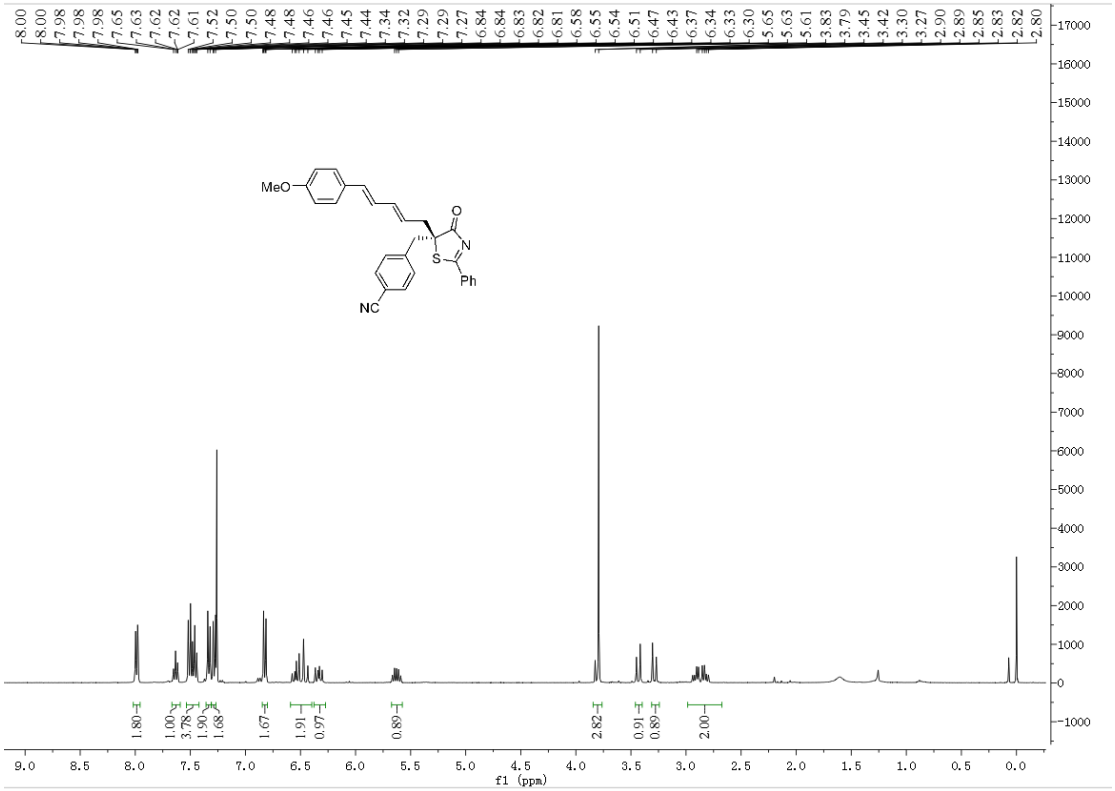


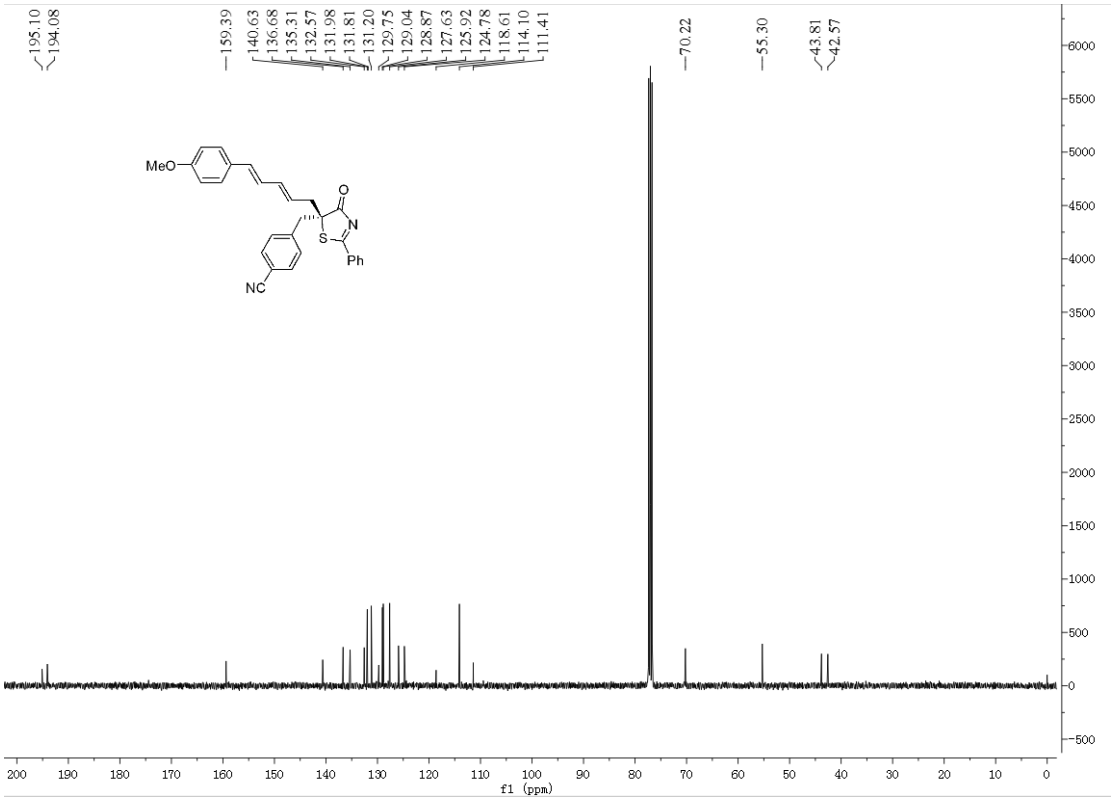
4-(((*R*)-4-oxo-2-phenyl-5-((*2E, 4E*)-5-(p-tolyl) penta-2, 4-dien-1-yl)-4, 5-dihydrothiazol-5-yl) methyl) benzonitrile (3di)



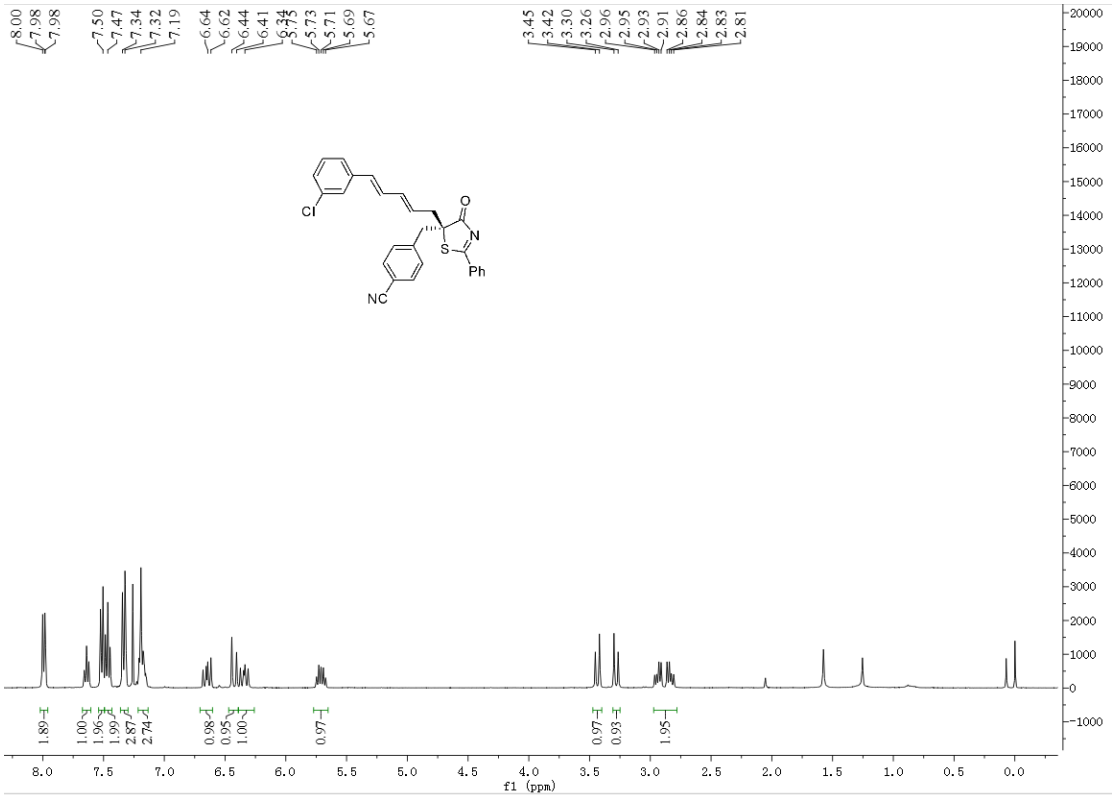


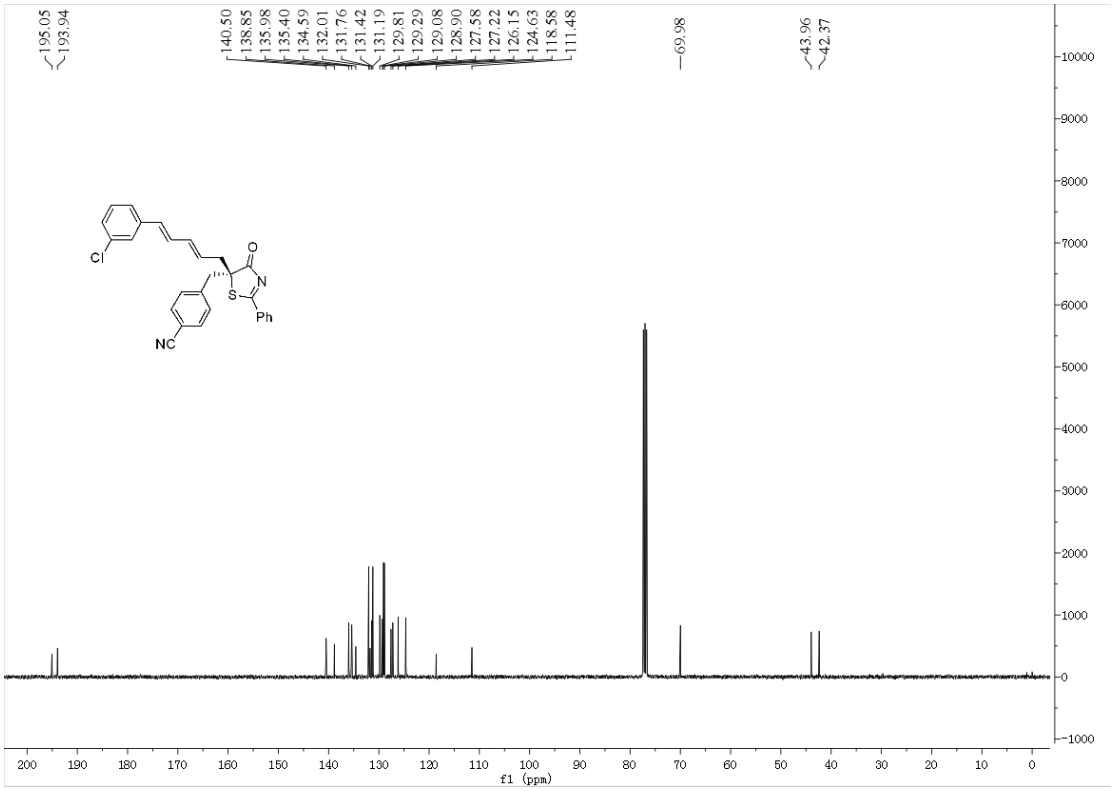
4-(((*R*)-5-((*2E, 4E*)-5-(4-methoxyphenyl) penta-2, 4-dien-1-yl)-4-oxo-2-phenyl-4, 5-dihydrothiazol-5-yl) methyl) benzonitrile (3dj)



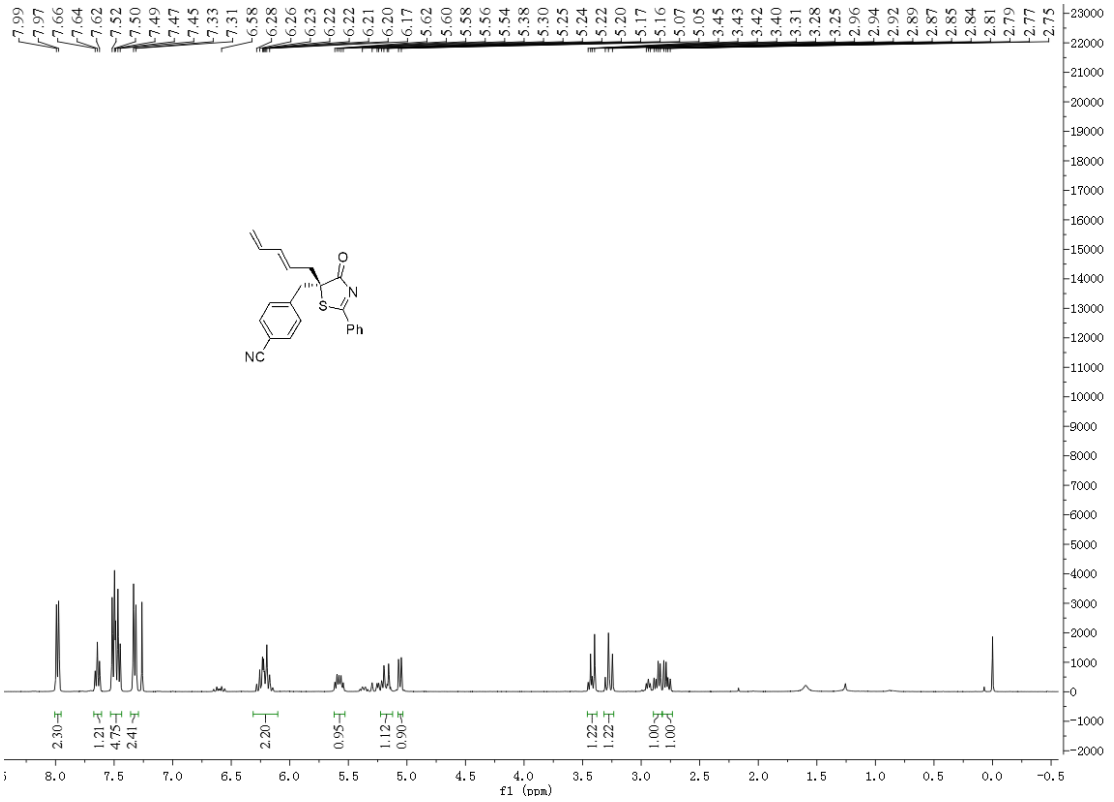


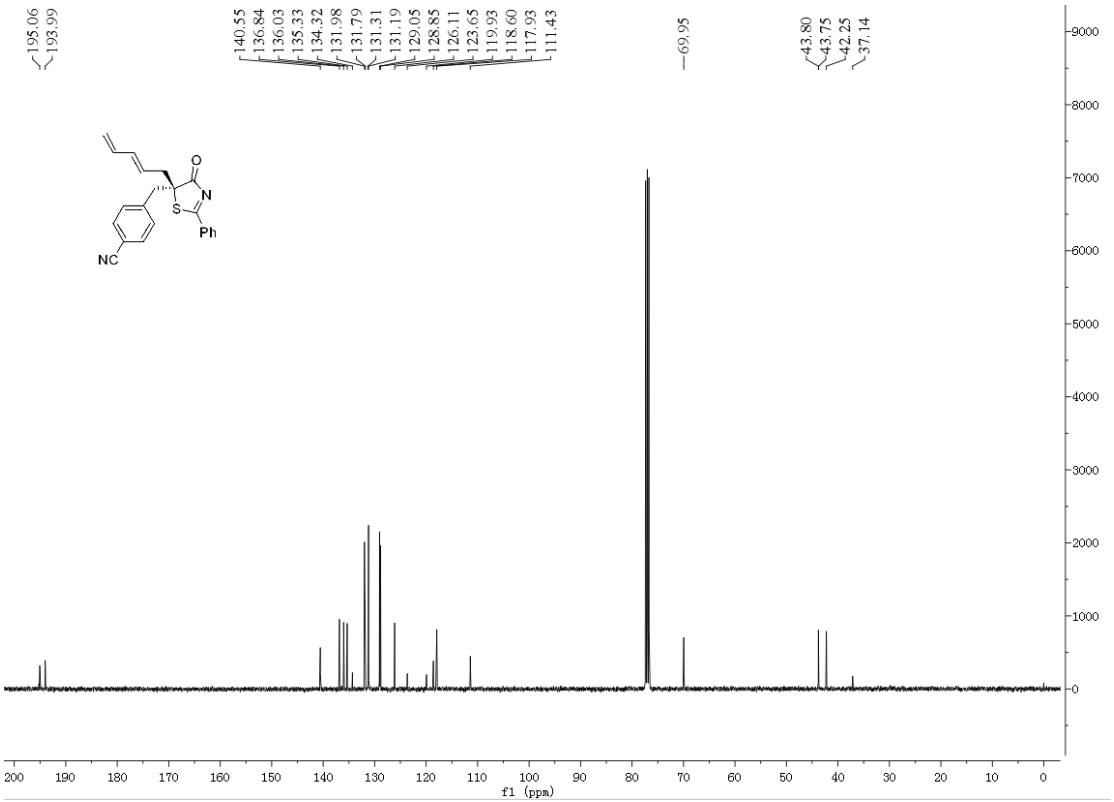
4-(((*R*)-5-((*2E, 4E*)-5-(3-chlorophenyl) penta-2, 4-dien-1-yl)-4-oxo-2-phenyl-4, 5-dihydrothiazol-5-yl) methyl) benzonitrile (3dk)



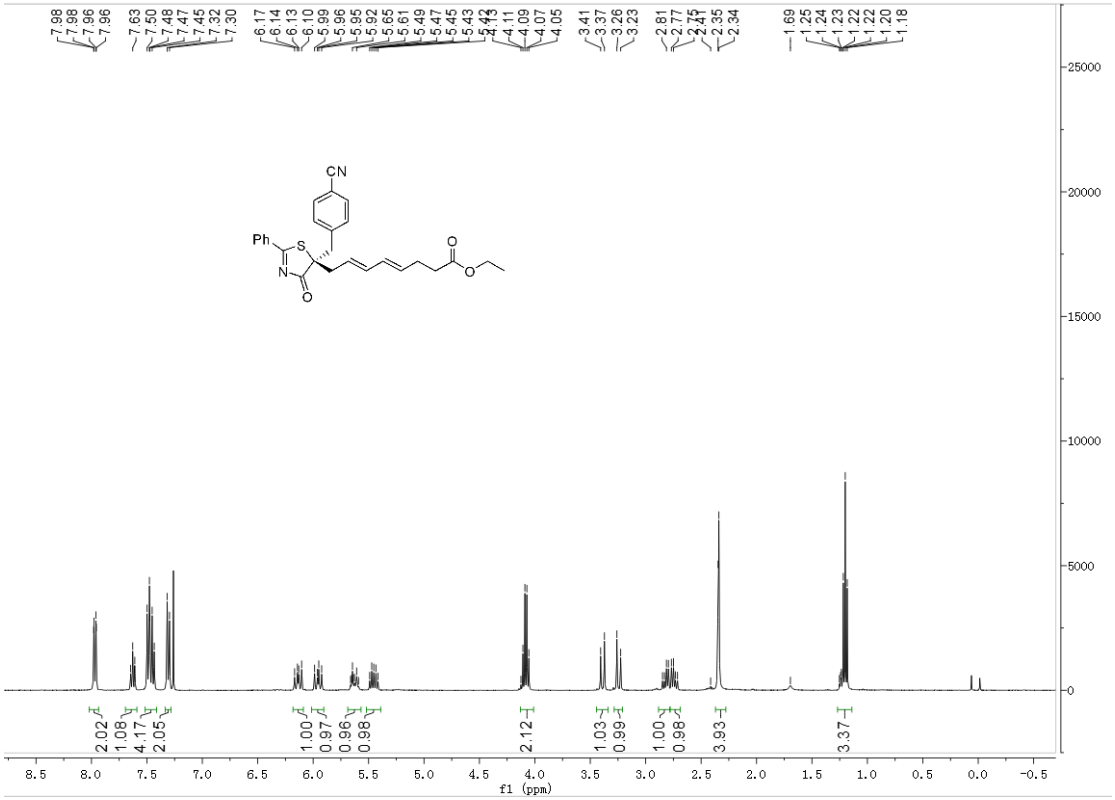


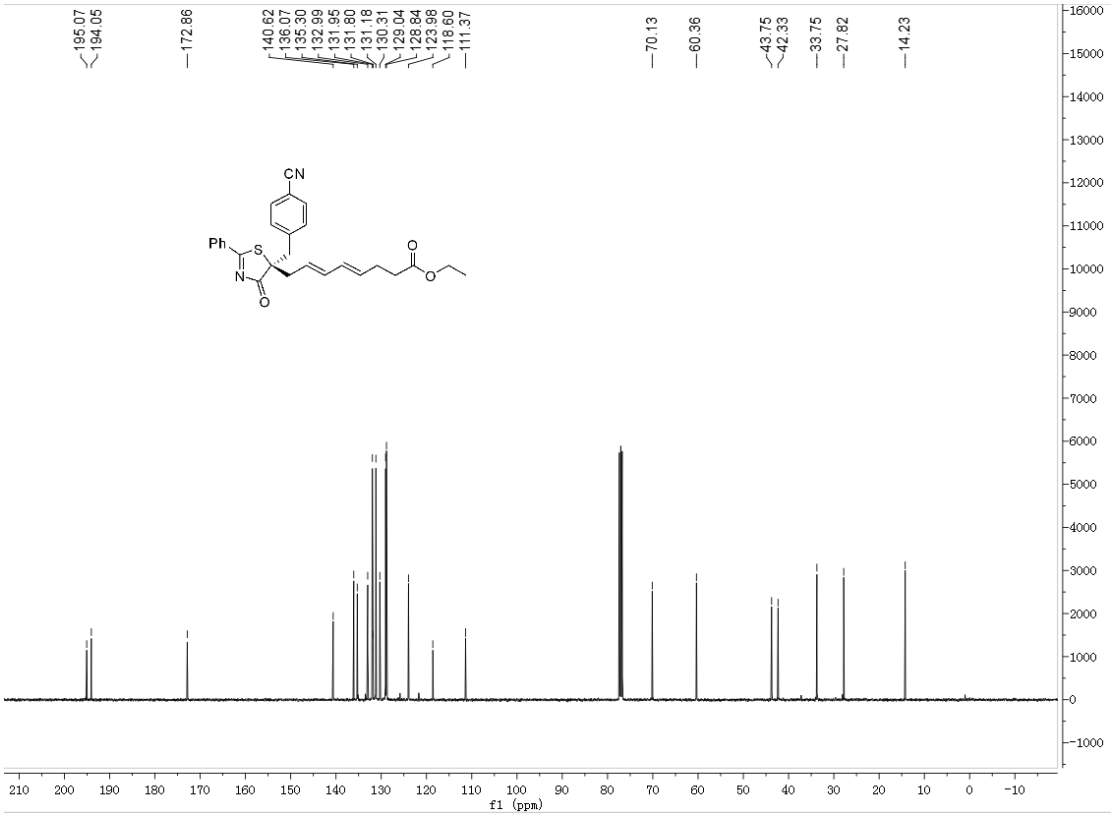
(*R*, *E*)-4-((4-oxo-5-(penta-2, 4-dien-1-yl)-2-phenyl-4, 5-dihydrothiazol-5-yl) methyl) benzo-nitrile (3dl)



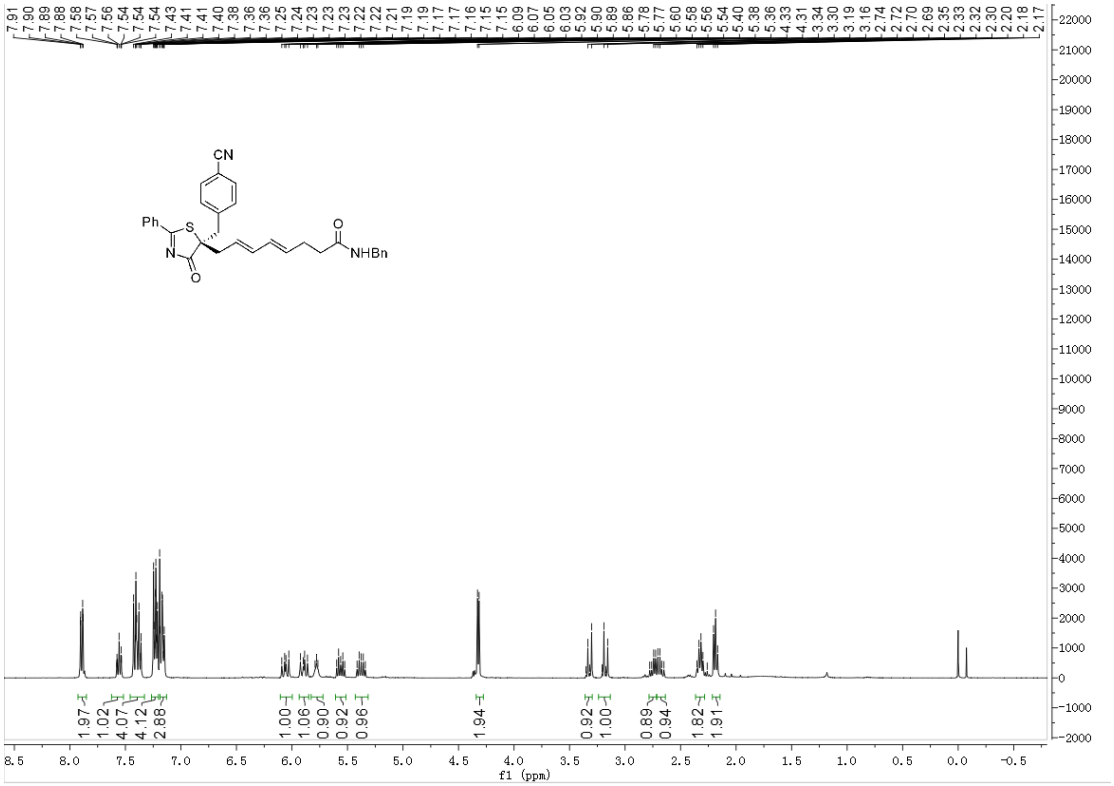


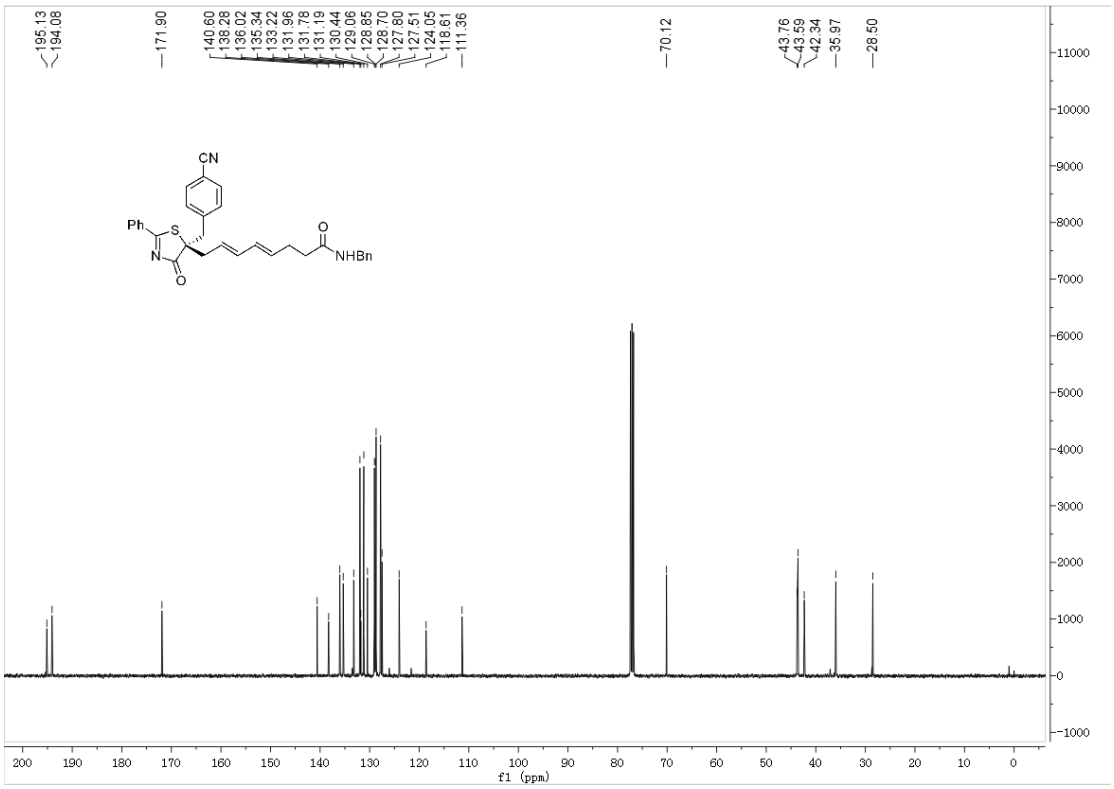
Ethyl (*4E, 6E*)-8-((*R*)-5-(4-cyanobenzyl)-4-oxo-2-phenyl-4, 5-dihydrothiazol-5-yl)octa-4,6-dienoate (3dm)



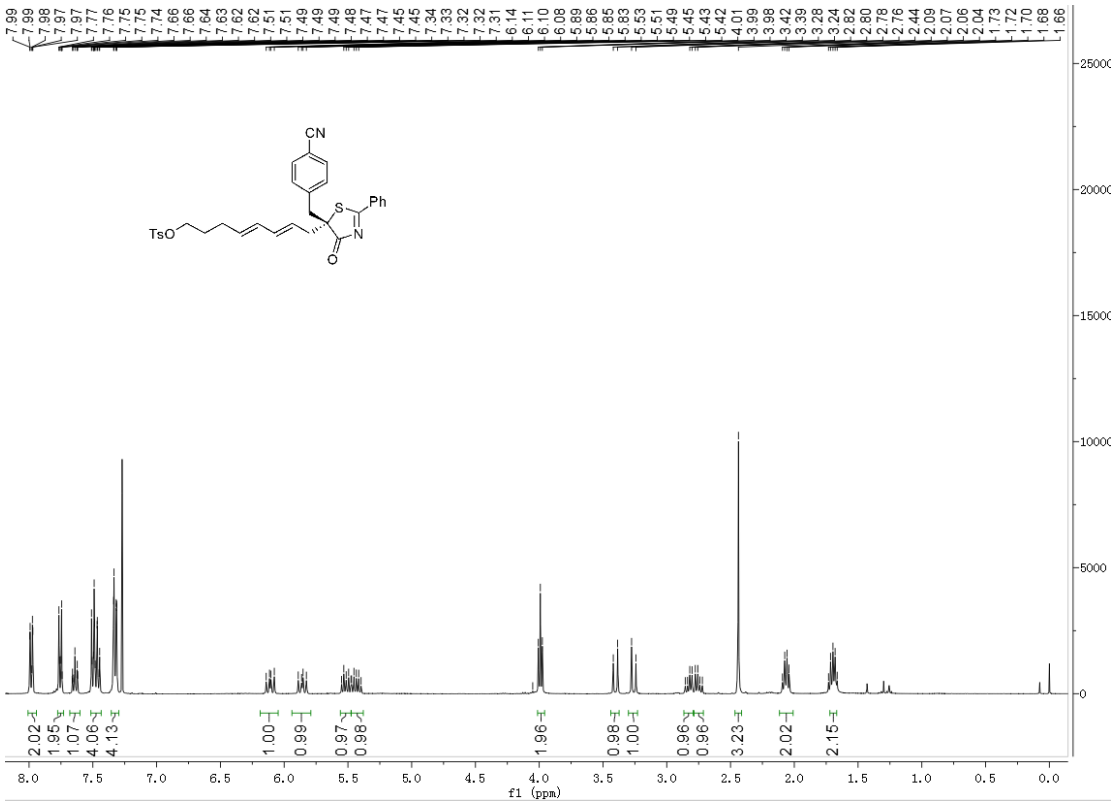


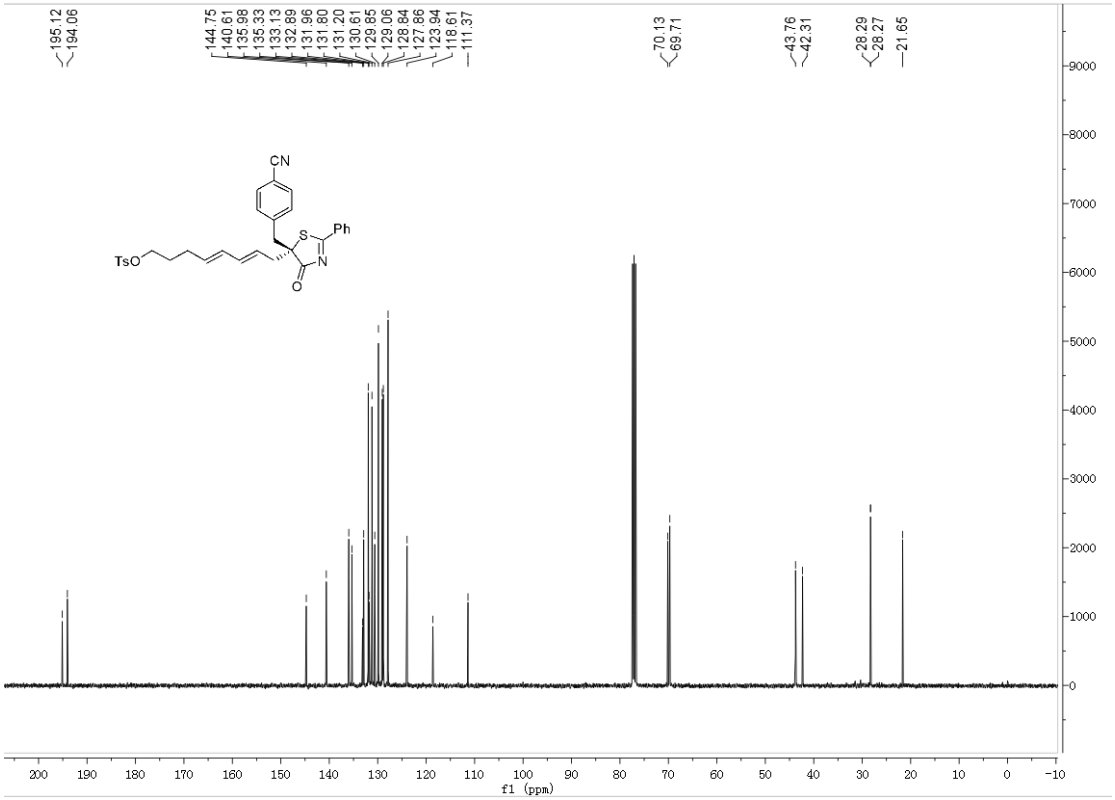
(*4E*, *6E*)-N-benzyl-8-((*R*)-5-(4-cyanobenzyl)-4-oxo-2-phenyl-4, 5-dihydrothiazol-5-yl) octa-4,6-dienamide (3dn)



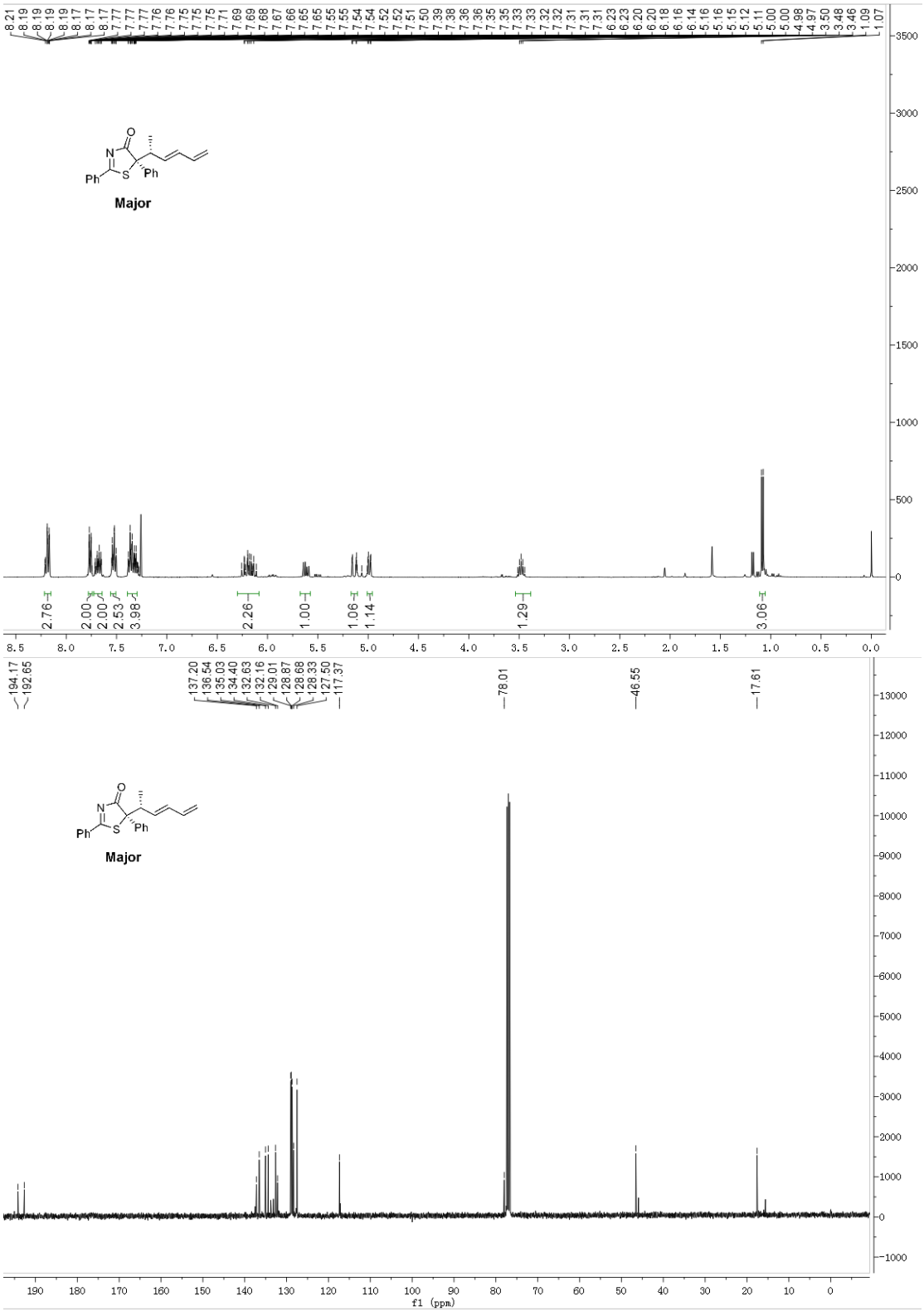


(*4E*, *6E*)-8-((*R*)-5-(4-cyanobenzyl)-4-oxo-2-phenyl-4, 5-dihydrothiazol-5-yl) octa-4,6-dien-1-yl 4-methylbenzene sulfonate (3do)

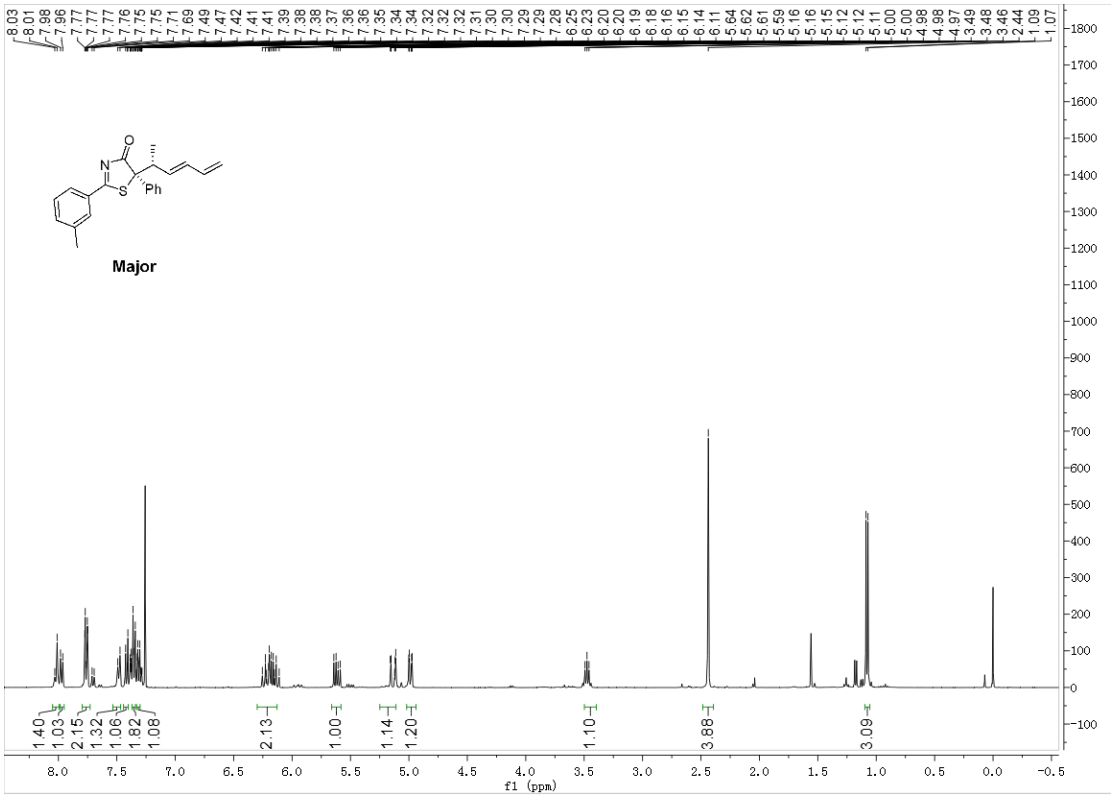


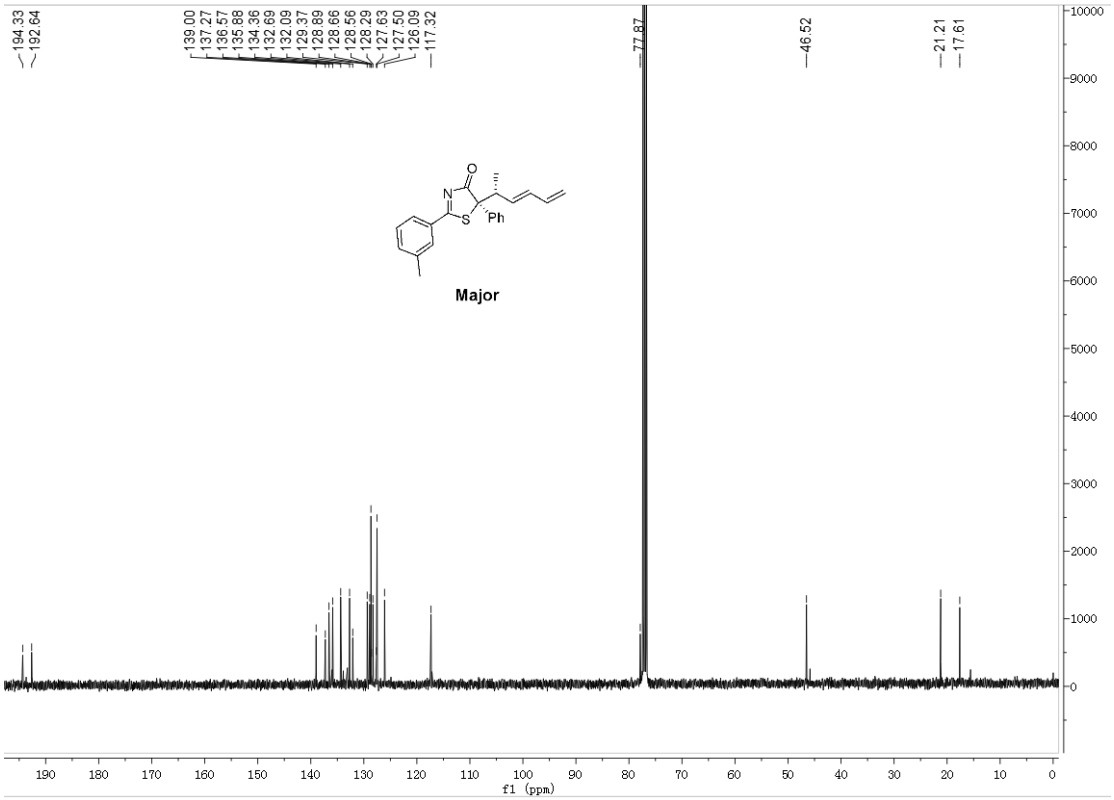


***(S)*-5-((*R, E*)-hexa-3, 5-dien-2-yl)-2, 5-diphenylthiazol-4(5H)-one (6aa)**

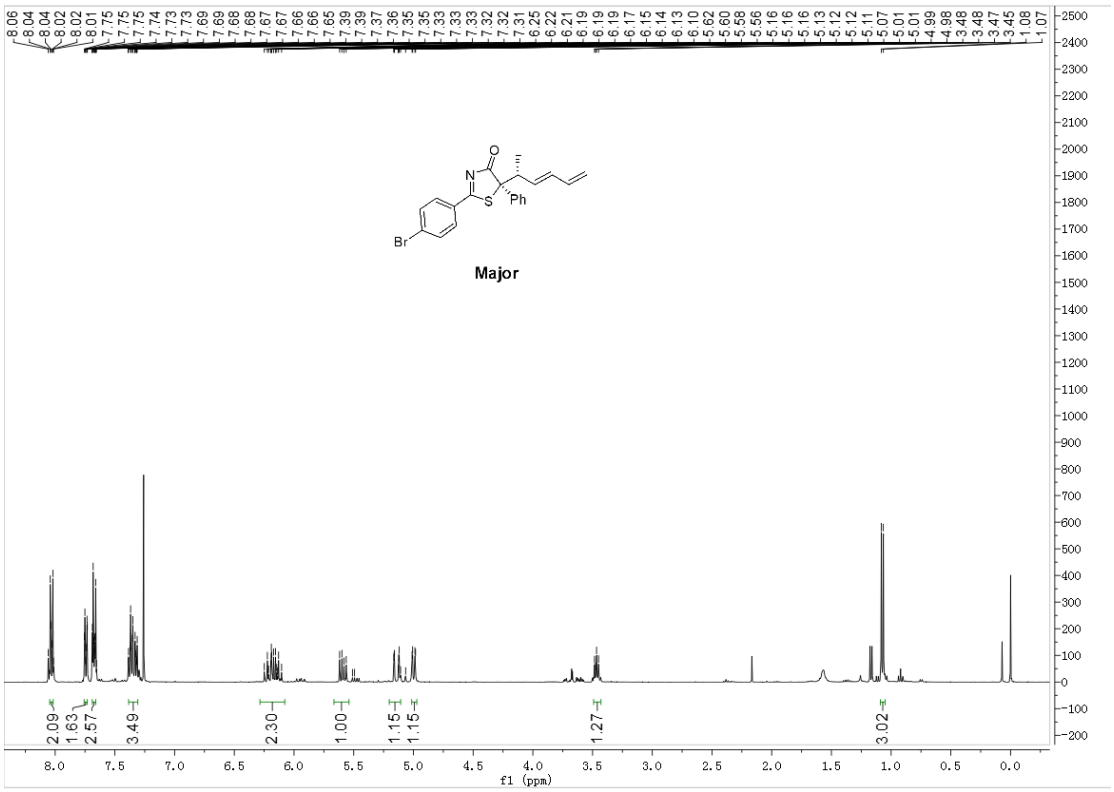


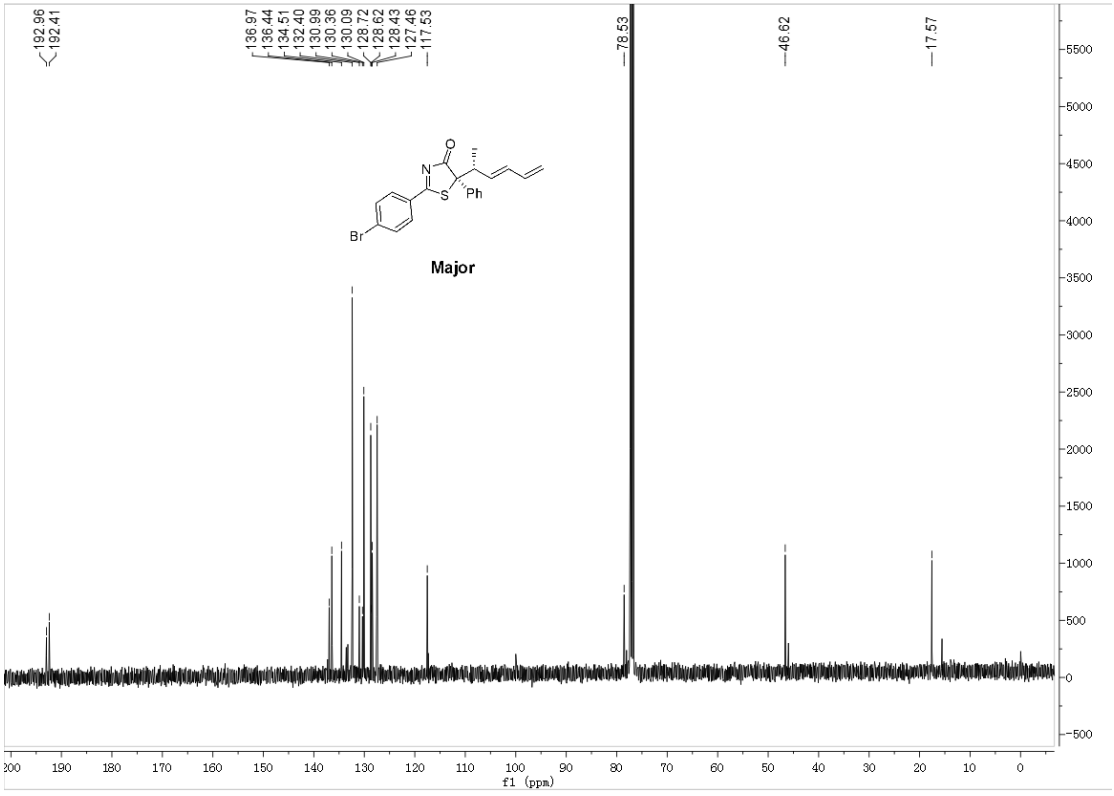
(*S*)-5-((*R, E*)-hexa-3, 5-dien-2-yl)-5-phenyl-2-(m-tolyl) thiazol-4(5H)-one (6ba)



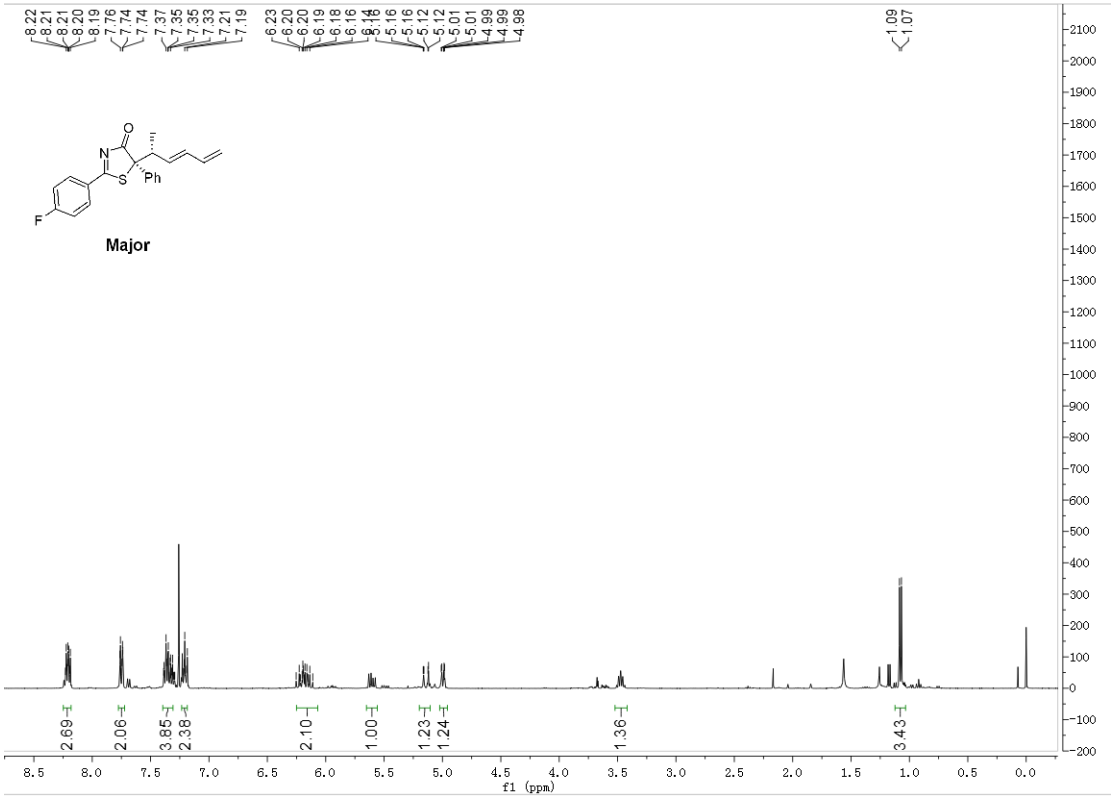


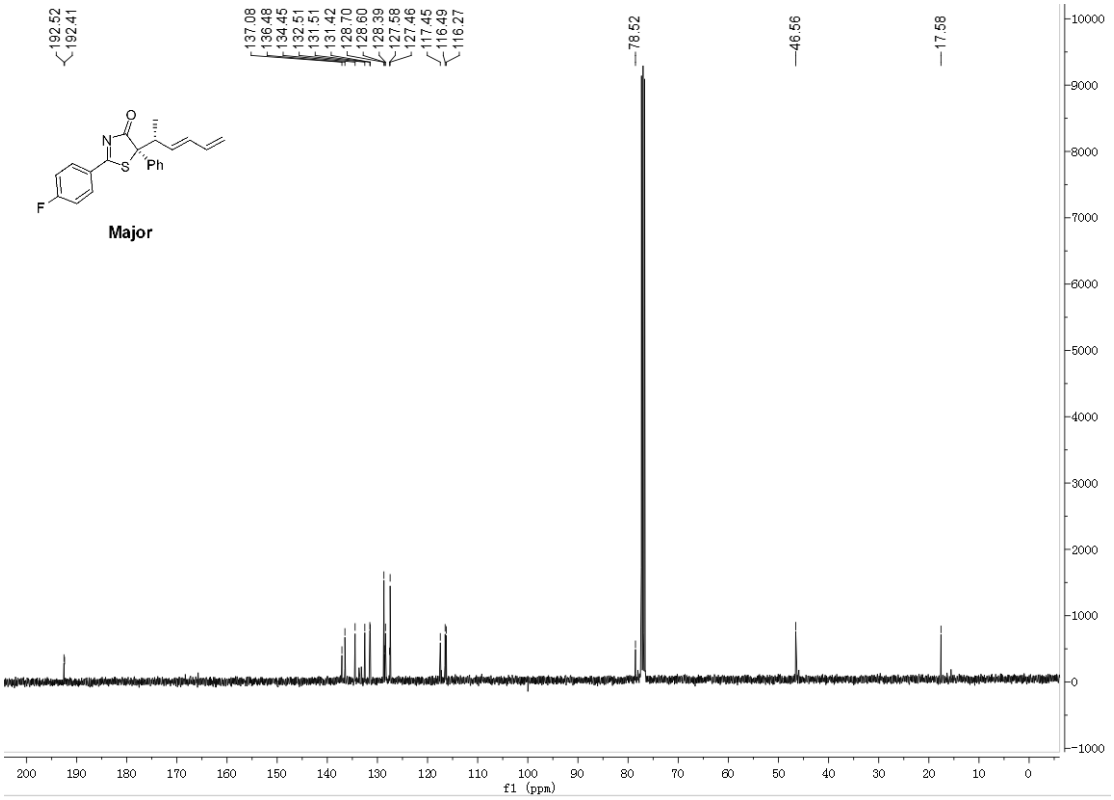
(*S*)-2-(4-bromophenyl)-5-((*R*, *E*)-hexa-3, 5-dien-2-yl)-5-phenylthiazol-4(5H)-one (6ca)



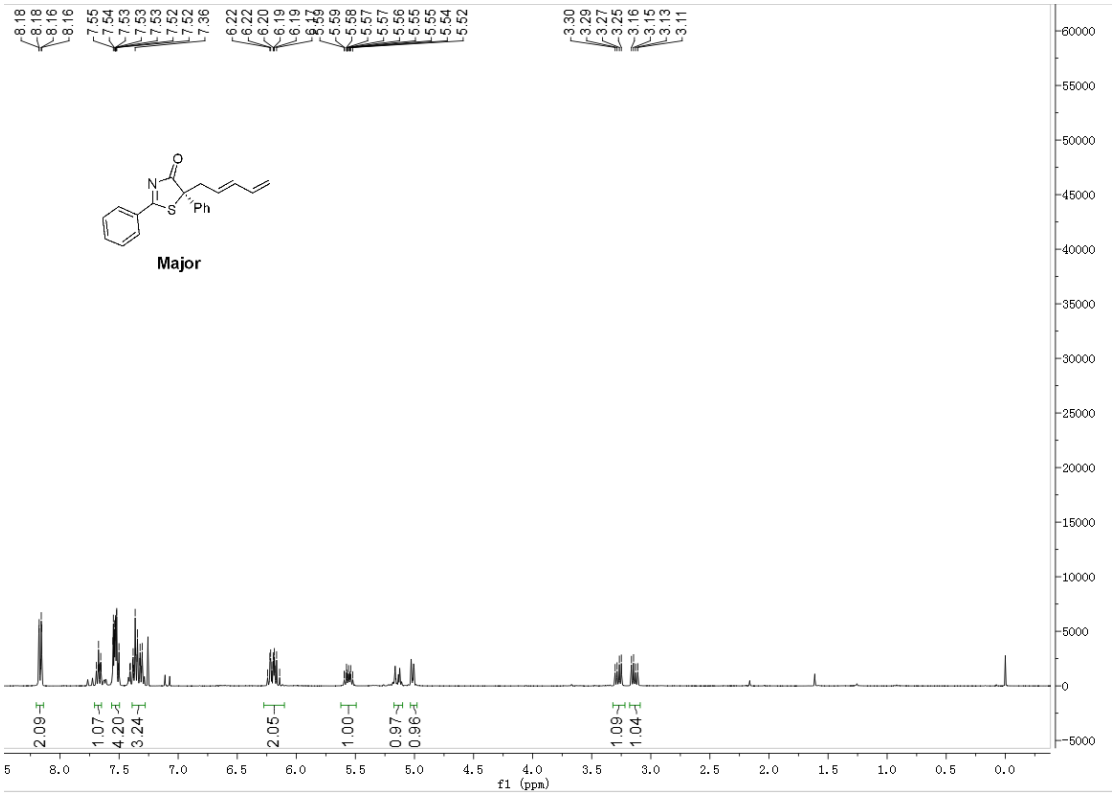


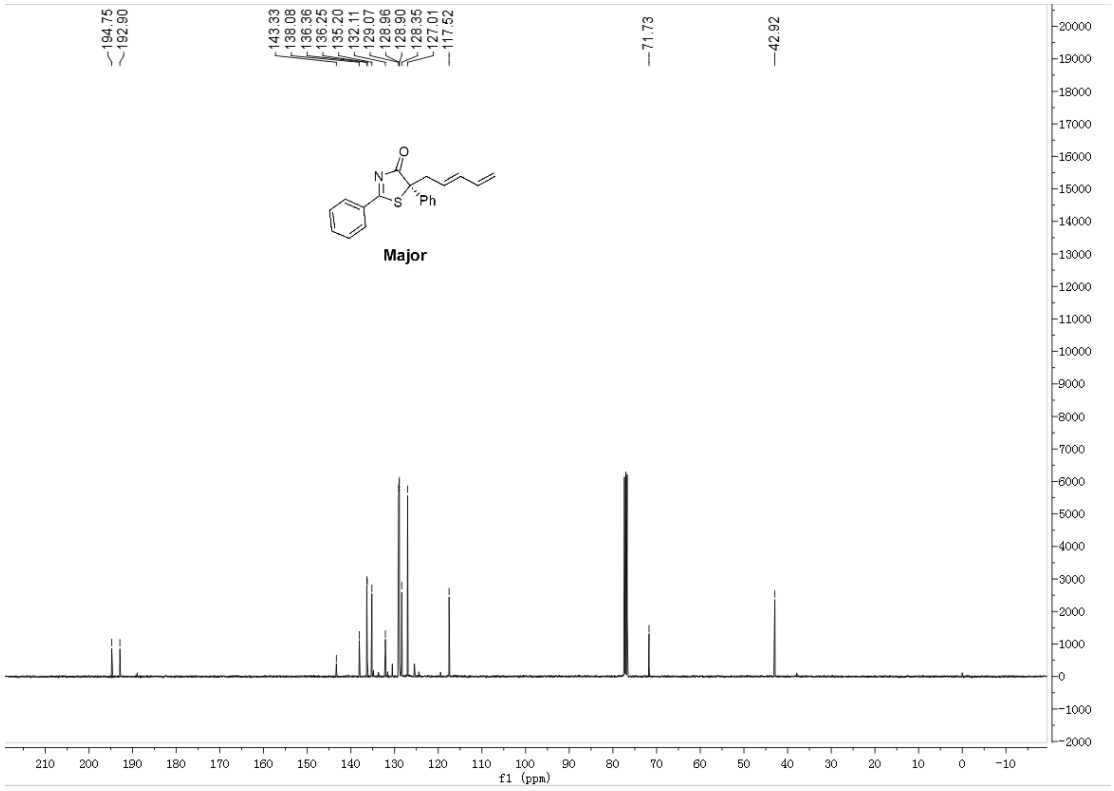
(*S*)-2-(4-fluorophenyl)-5-((*R*, *E*)-hexa-3, 5-dien-2-yl)-5-phenylthiazol-4(5H)-one (6da)



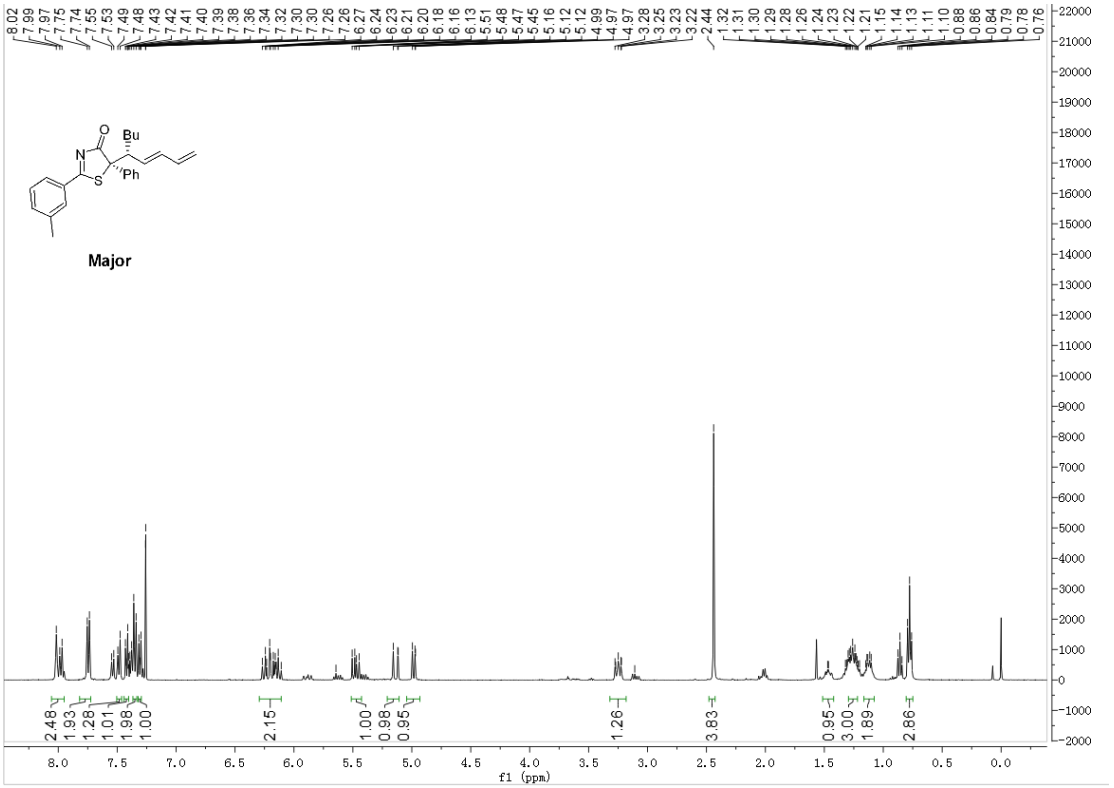


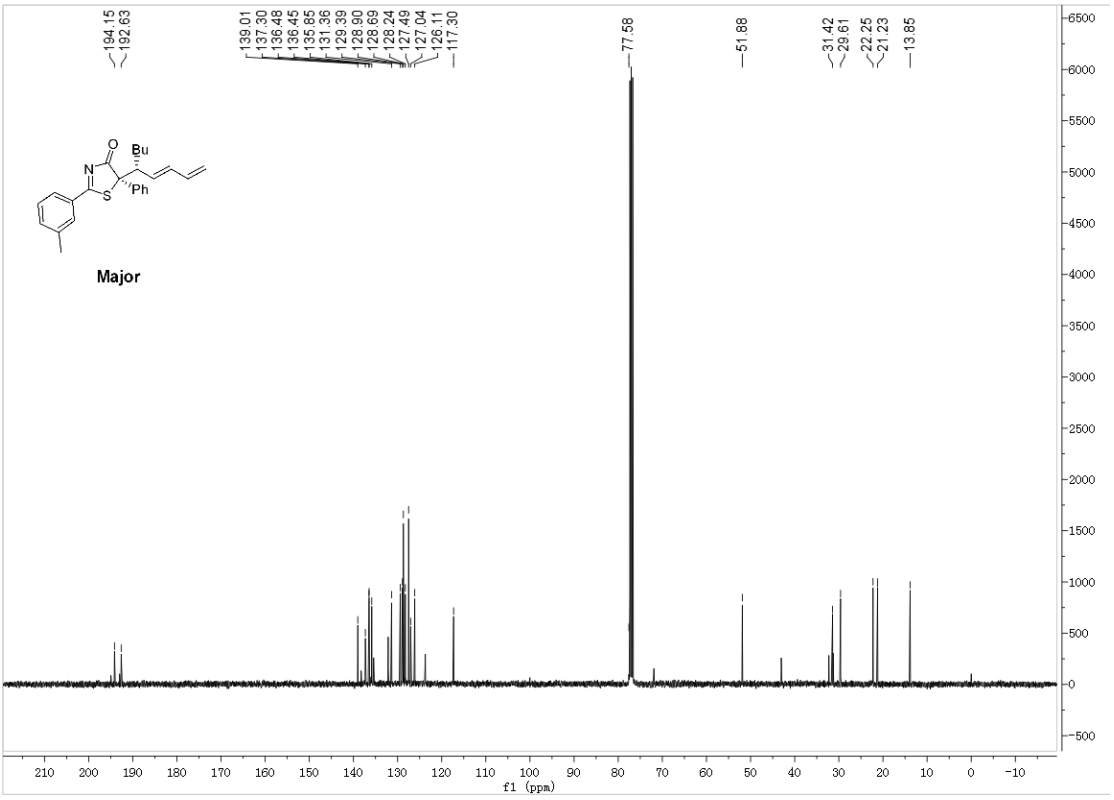
(*S*,*E*)-5-(penta-2,4-dien-1-yl)-2,5-diphenylthiazol-4(5H)-one (6ab)



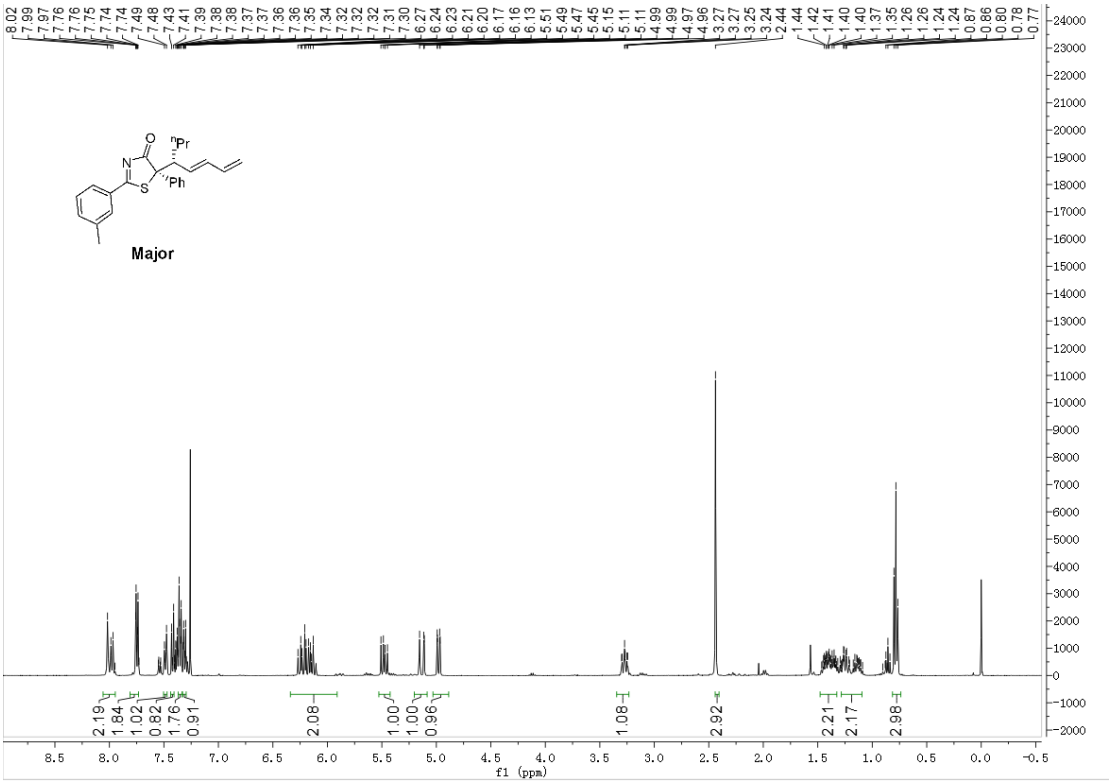


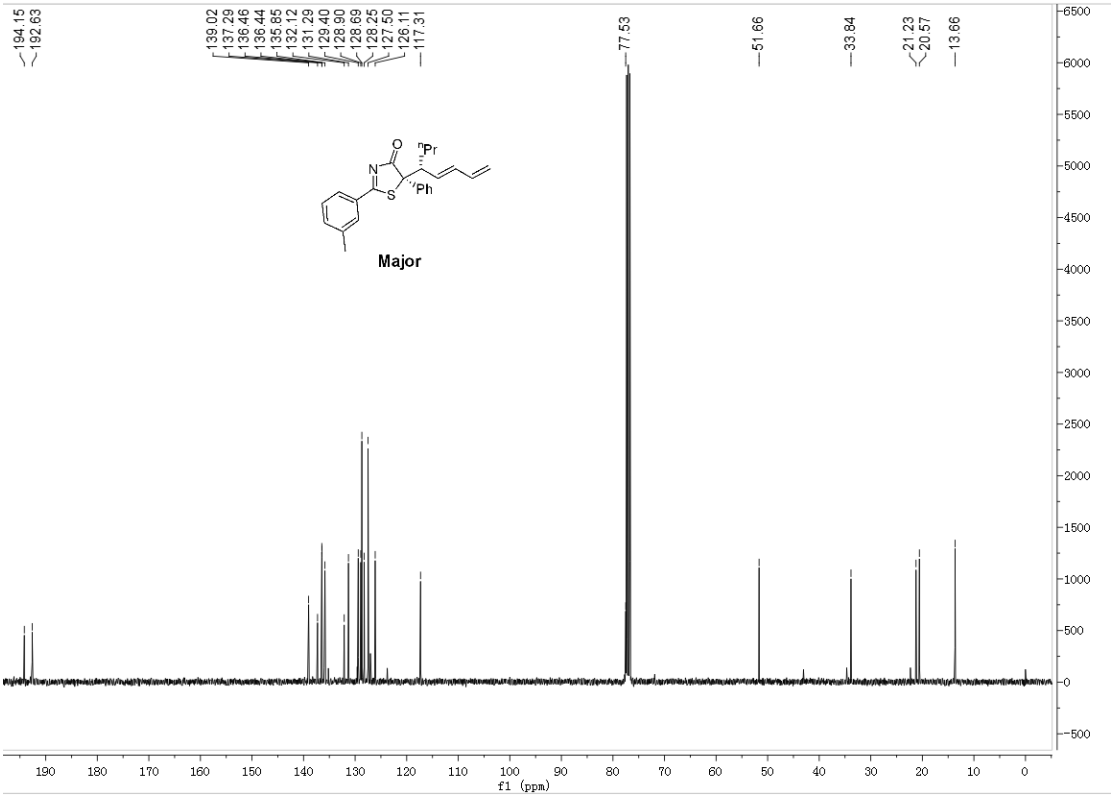
(*S*)-5-((*R*,*E*)-deca-1,3-dien-5-yl)-5-phenyl-2-(m-tolyl)thiazol-4(5H)-one(6bc)



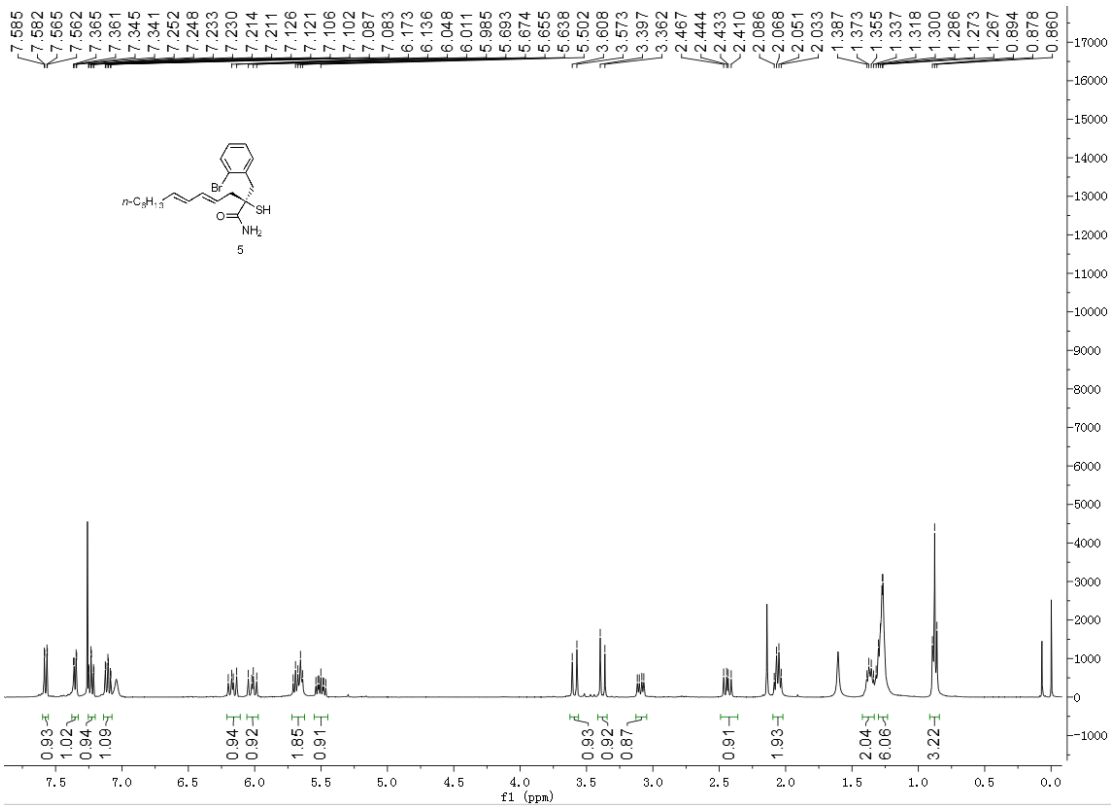


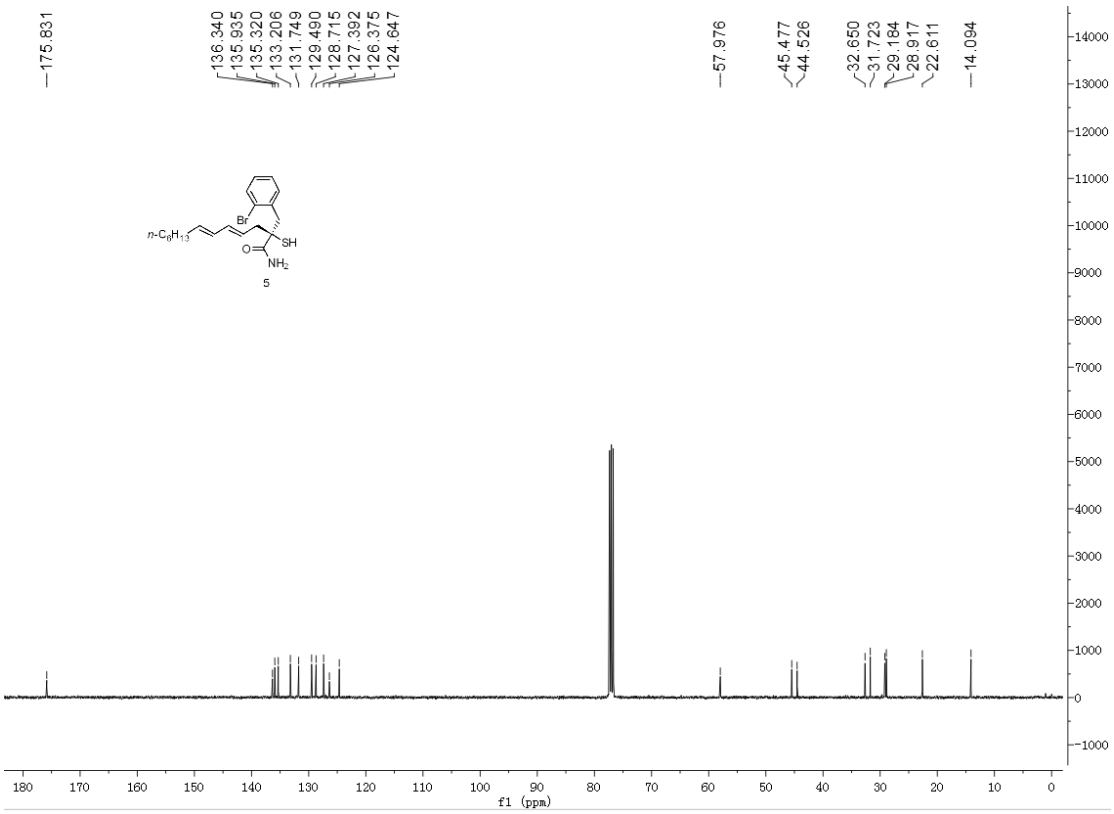
***(S)*-5-((*R, E*)-nona-1, 3-dien-5-yl)-5-phenyl-2-(m-tolyl) thiazol-4(5H)-one (6bd)**



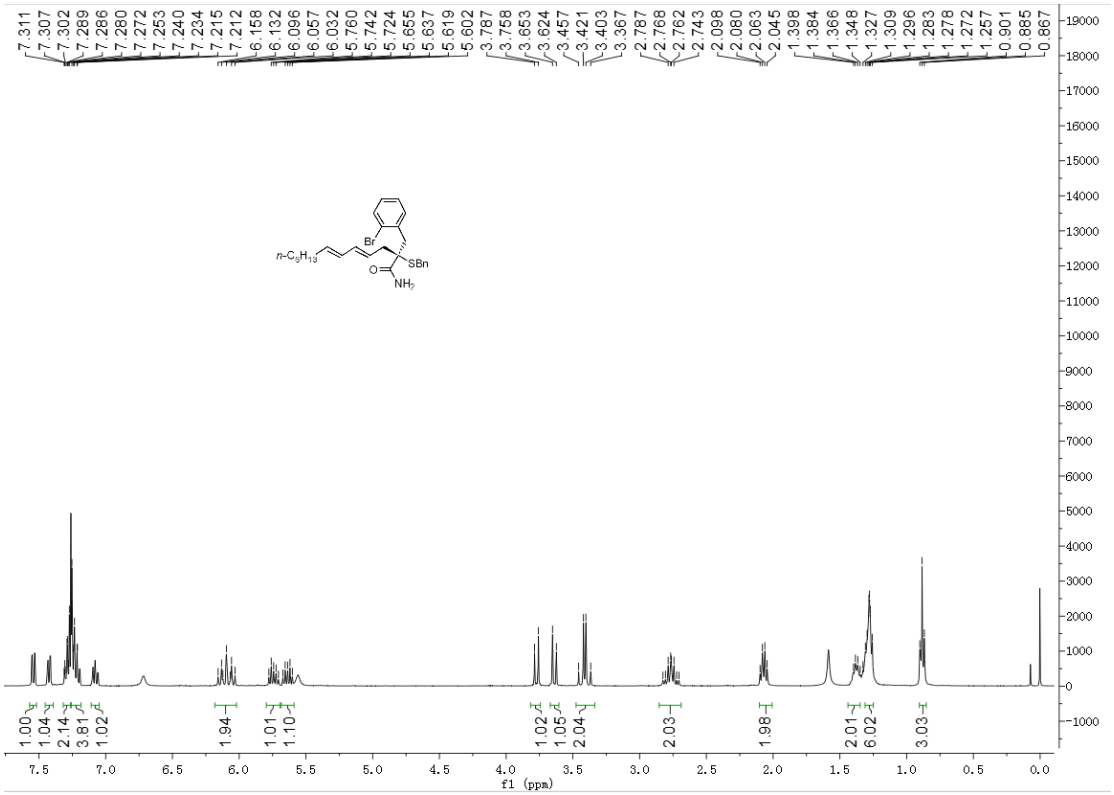


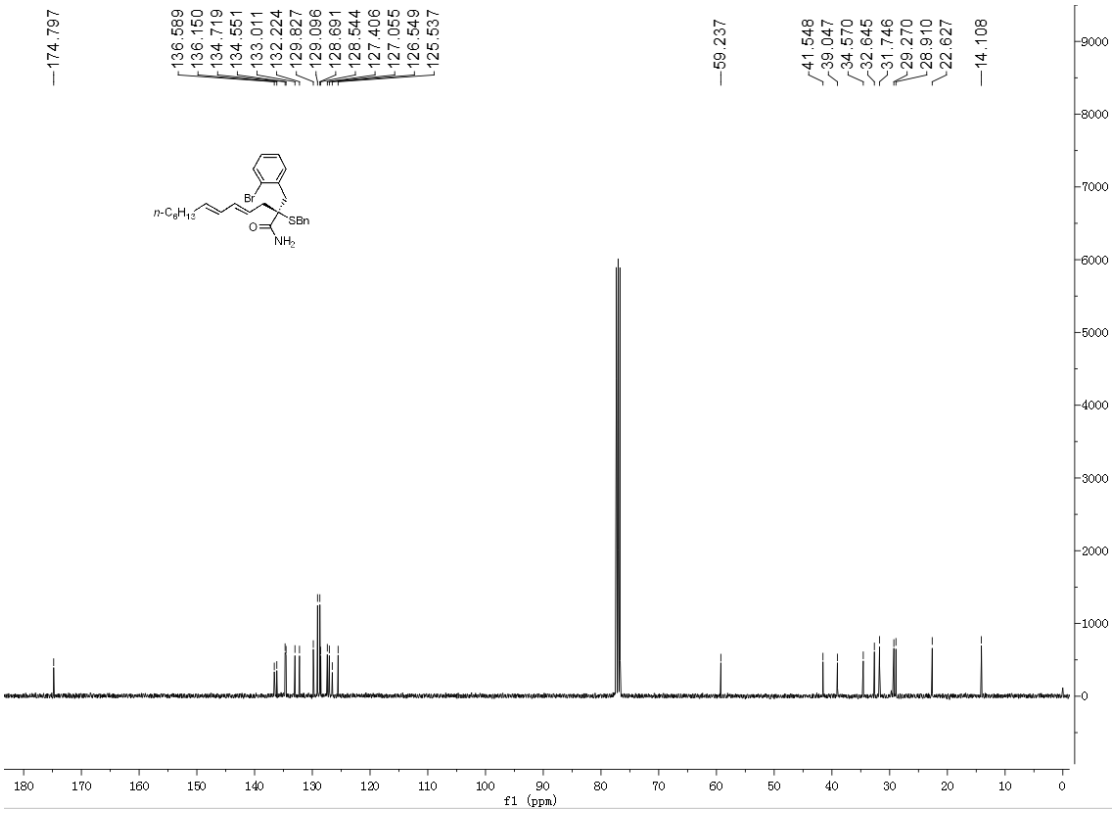
(*S, 4E, 6E*)-2-(2-bromobenzyl)-2-mercaptotrideca-4, 6-dienamide (P1)



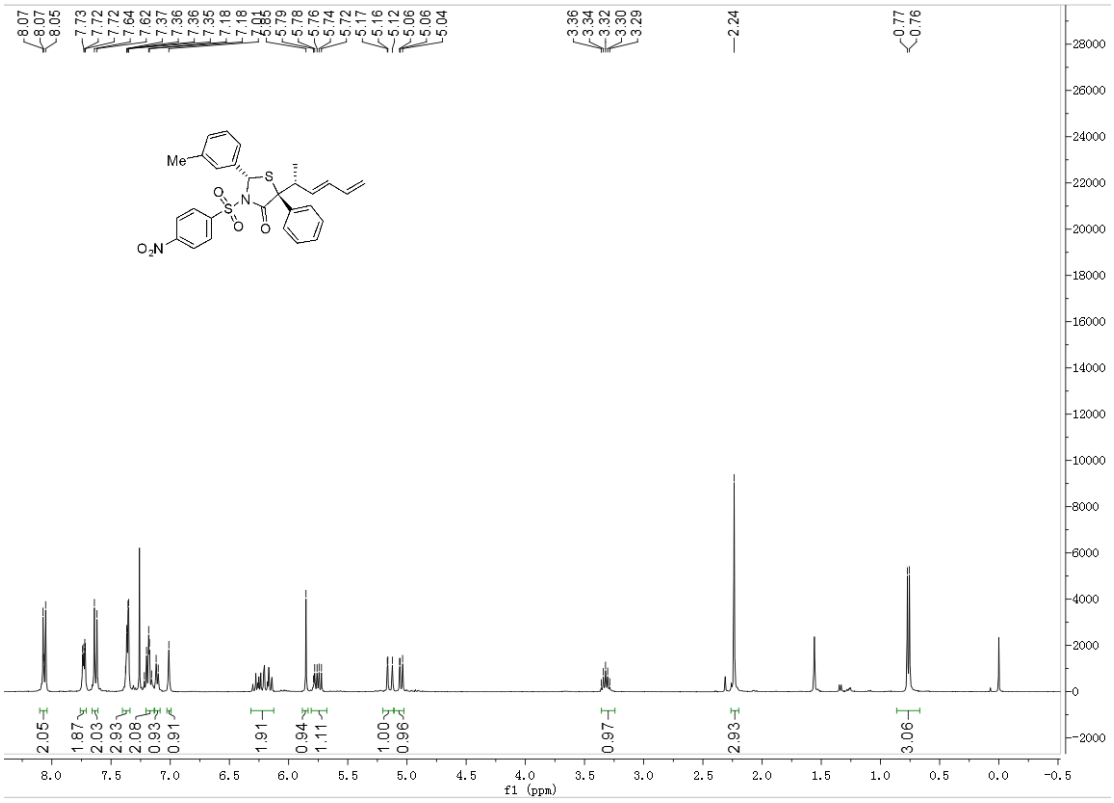


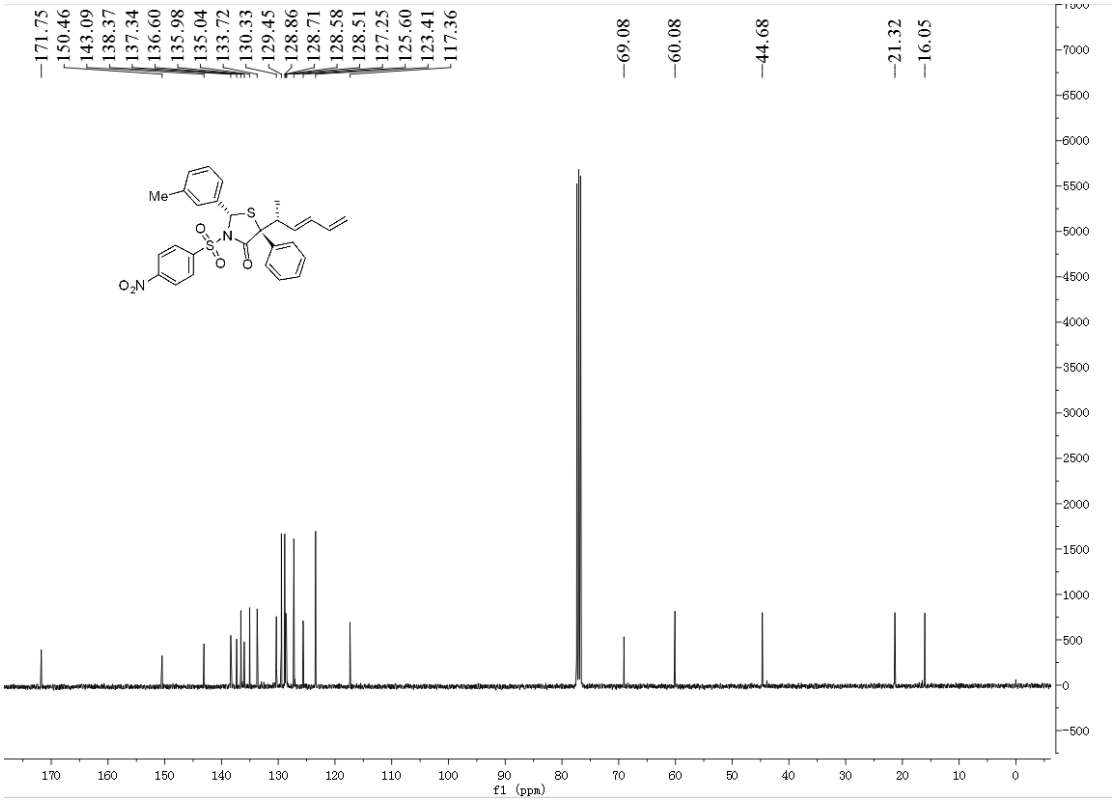
(*S, 4E, 6E*)-2-(benzylthio)-2-(2-bromobenzyl) trideca-4, 6-dienamide (P2)



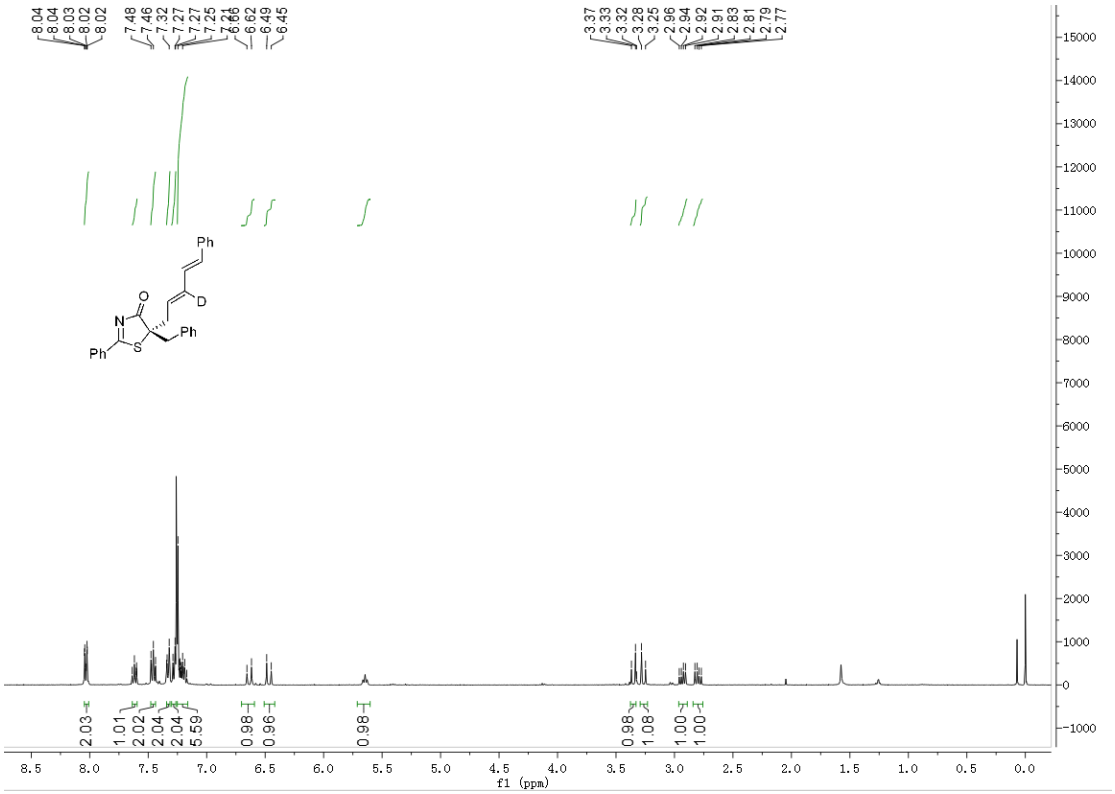


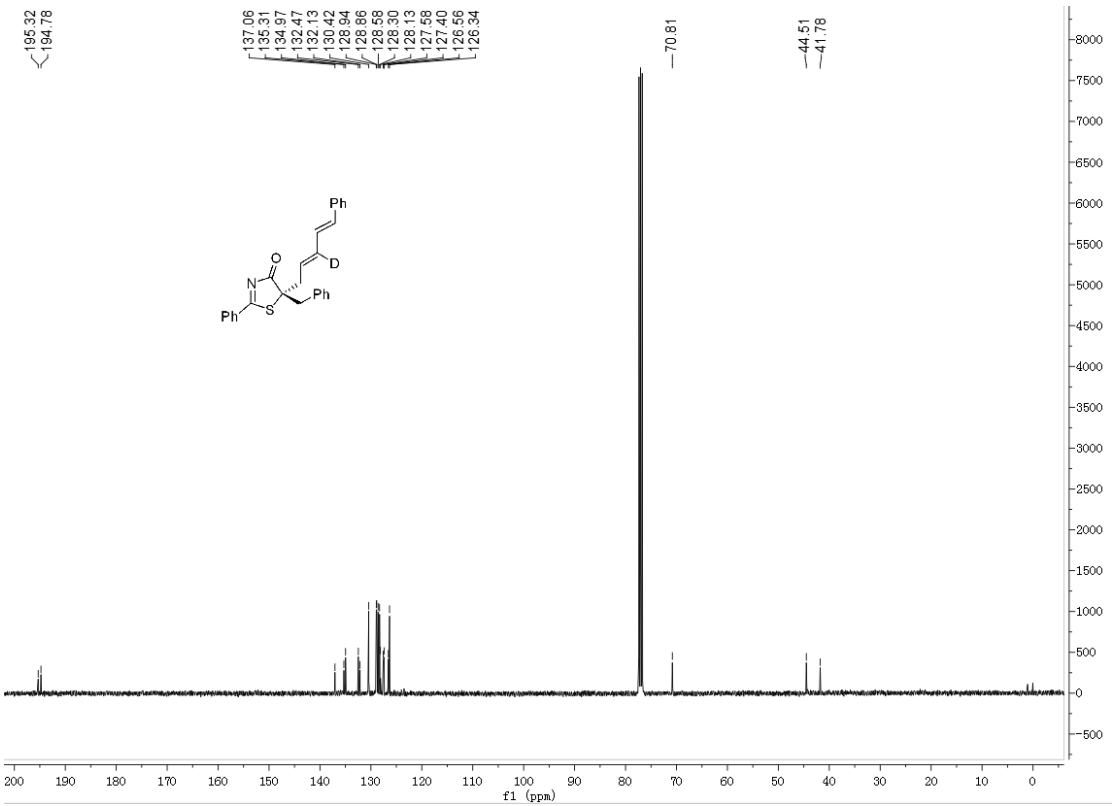
(*2S, 5S*)-5-((*R,E*)-hexa-3,5-dien-2-yl)-3-((4-nitrophenyl)sulfonyl)-2,5-diphenylthiazolidin-4-one (P3)



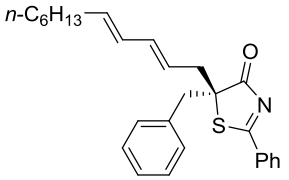


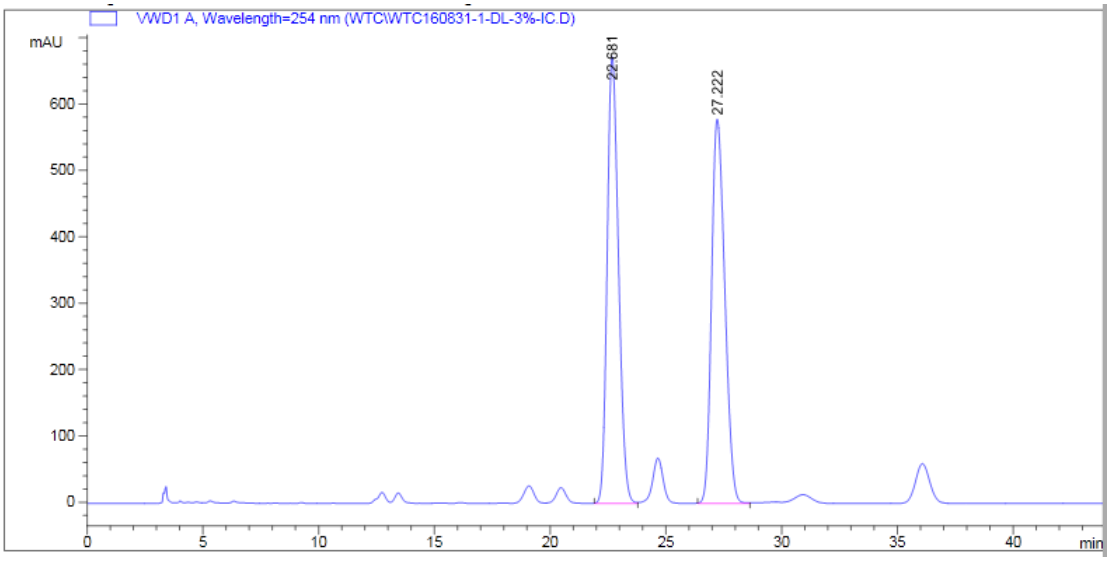
***R*-5-benzyl-2-phenyl-5-((*2E, 4E*)-5-phenylpenta-2, 4-dien-1-yl-3-d) thiazol-4(5H)-one (*D2*-3a)**





(R) -5-benzyl-2-phenyl-5-((*2E*, *4E*)-undeca-2, 4-dien-1-yl) thiazol-4(5H)-one (3aa)





Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
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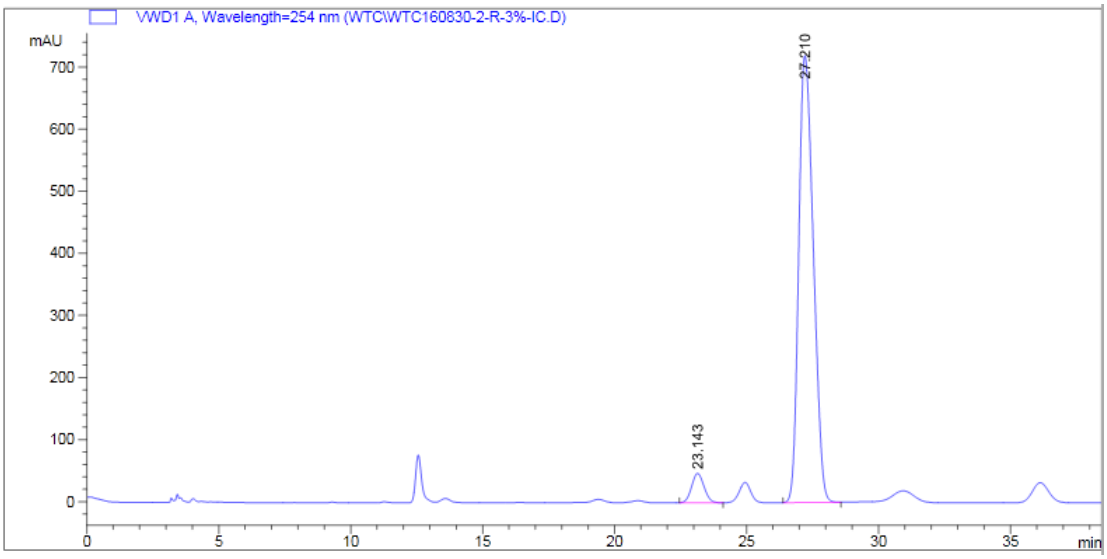
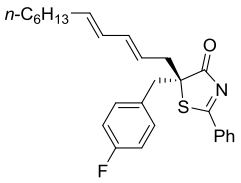
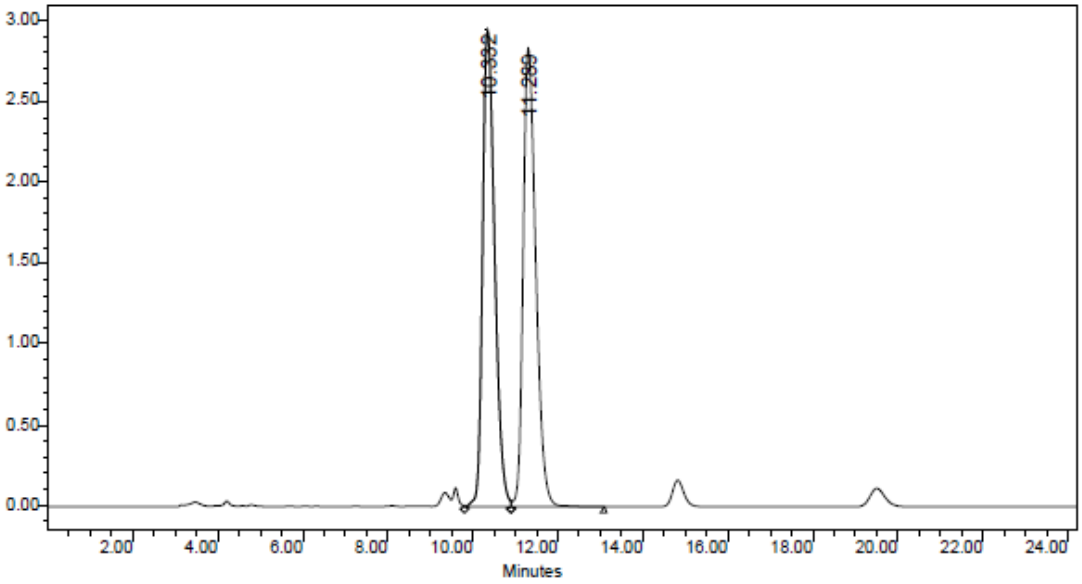
2	27.222	BB	0.6128	2.28786e4	578.53204	50.0400



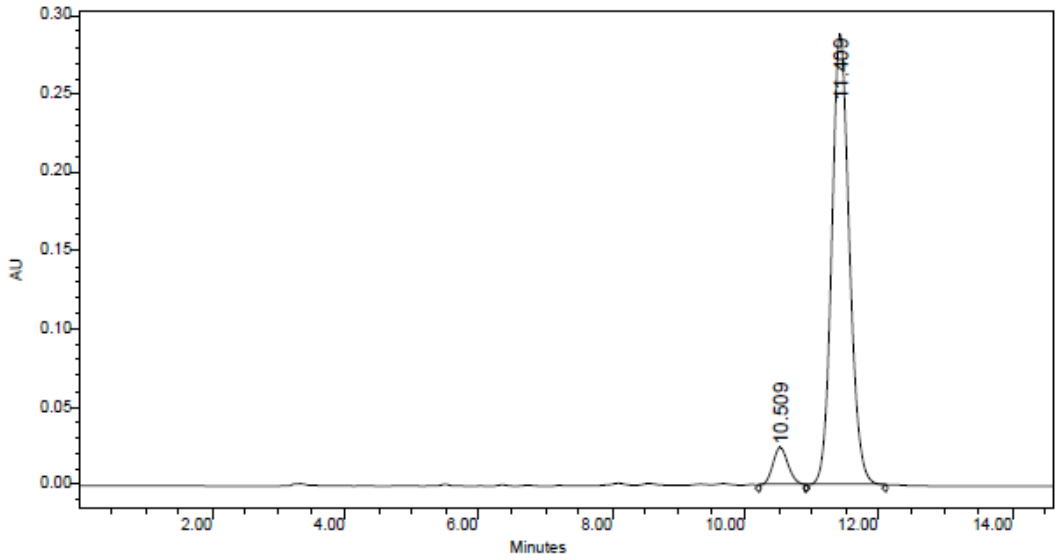
Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	23.143	BB	0.5145	1558.59753	47.42194	5.3335
2	27.210	BB	0.6057	2.76640e4	719.67236	94.6665

(*R*)-5-(4-fluorobenzyl)-2-phenyl-5-((*2E, 4E*)-undeca-2, 4-dien-1-yl) thiazol-4(5H)-one (3ba)



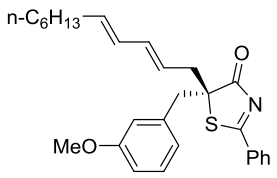


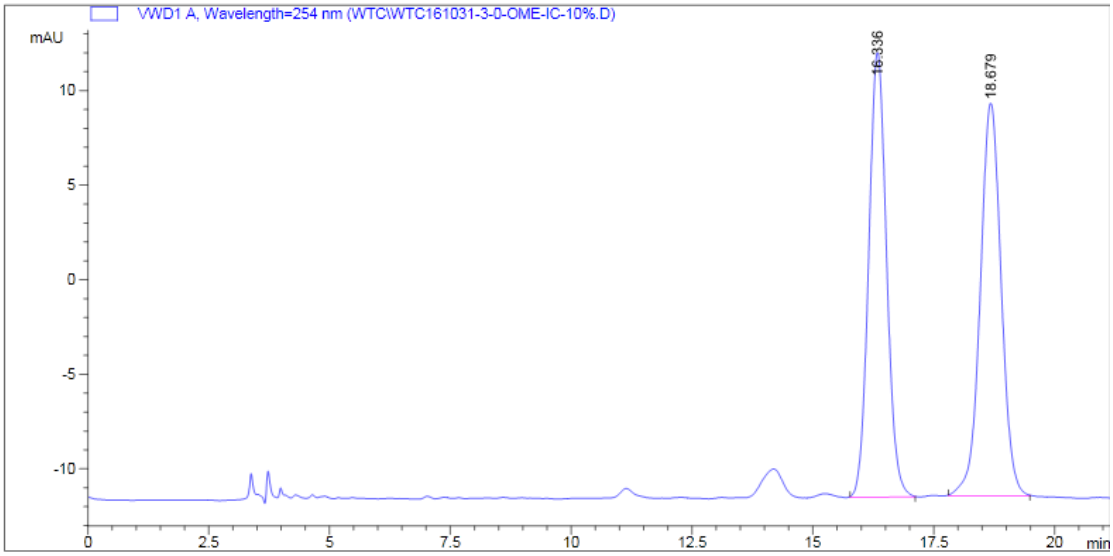
	RT (min)	Area (μV*sec)	% Area	Height (μV)	% Height
1	10.332	58052710	49.84	2943305	50.98
2	11.289	58417133	50.16	2830351	49.02



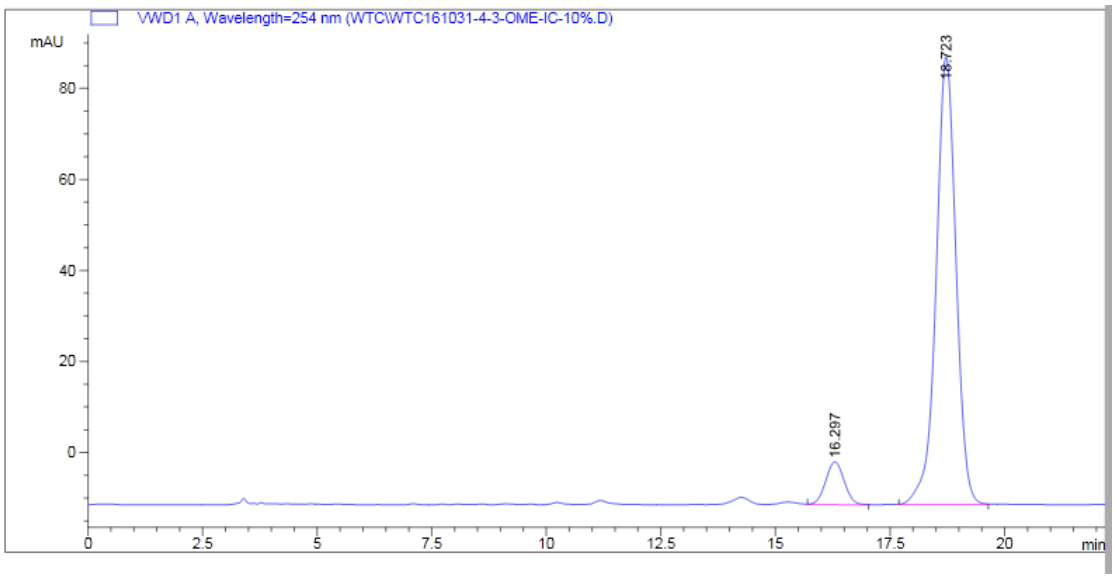
	RT (min)	Area (μV*sec)	% Area	Height (μV)	% Height
1	10.509	408232	7.08	24544	7.82
2	11.409	5358564	92.92	289296	92.18

(*R*)-5-(3-methoxybenzyl)-2-phenyl-5-((*2E, 4E*)-undeca-2, 4-dien-1-yl) thiazol-4(5H)-one (3ca)



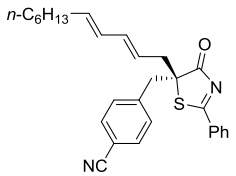


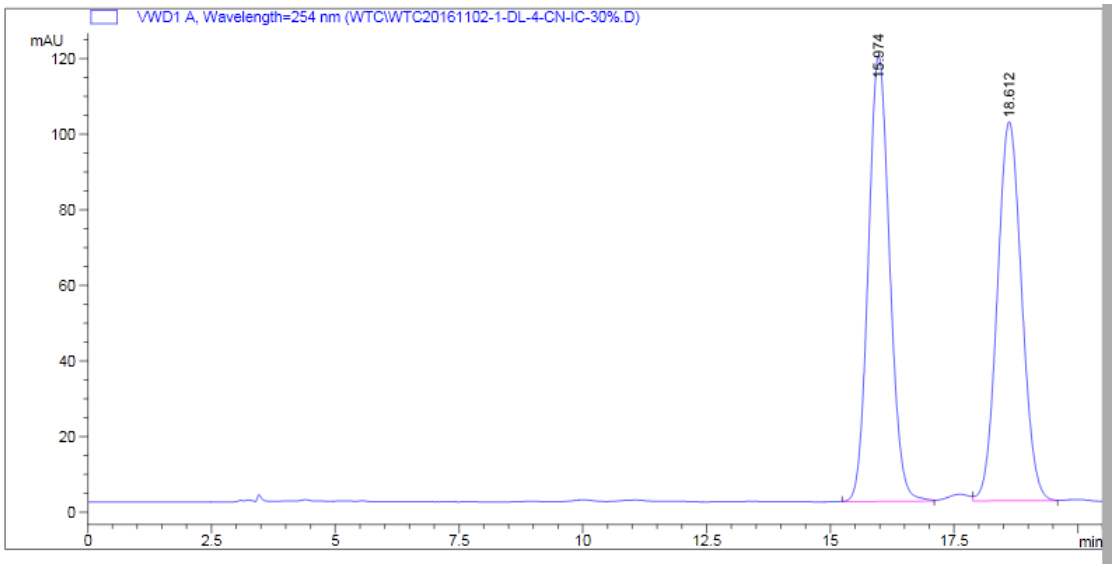
Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	16.336	BB	0.3972	603.47925	23.49958	49.1203
2	18.679	BB	0.4662	625.09436	20.76644	50.8797



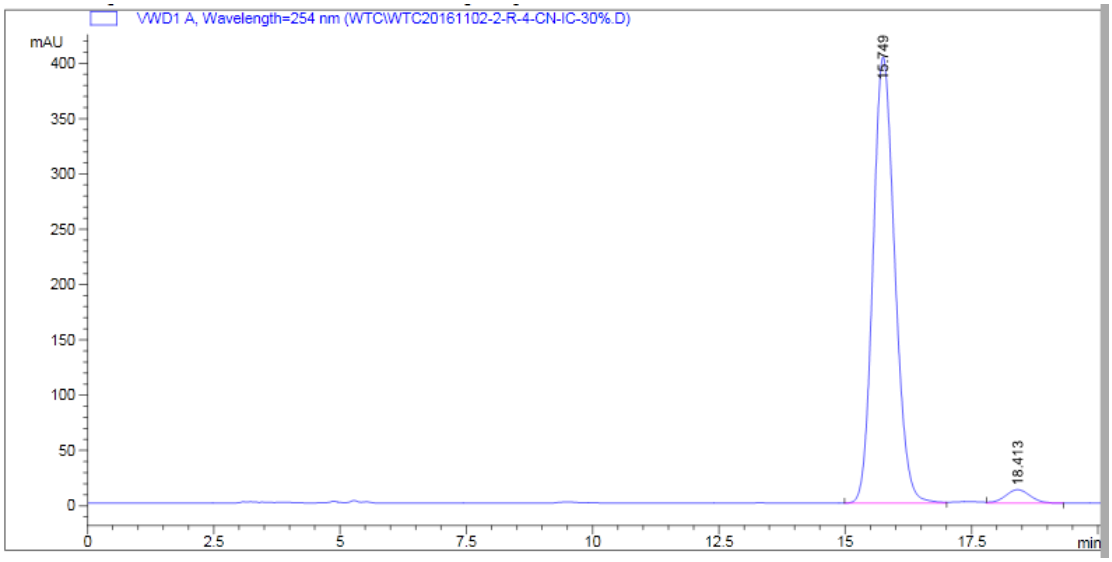
Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	16.297	VB	0.4355	262.27512	9.37853	8.1256
2	18.723	BB	0.4640	2965.48535	98.31659	91.8744

4-(((*R*)-4-oxo-2-phenyl-5-((*2E, 4E*)-undeca-2, 4-dien-1-yl)-4, 5-dihydrothiazol-5-yl) methyl) Benzonitrile (3da)



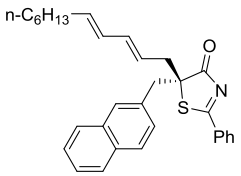


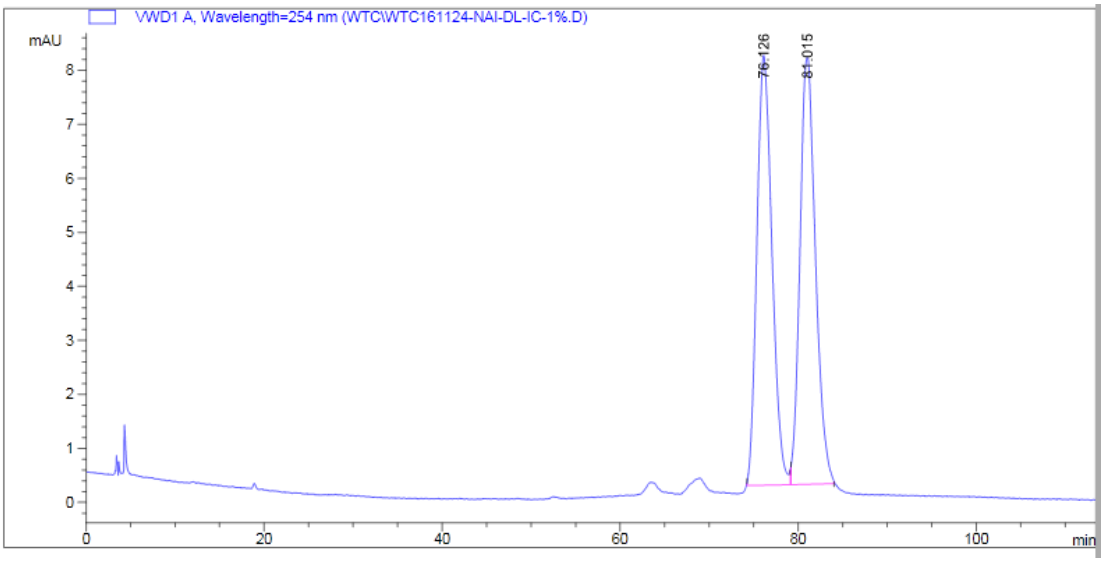
Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	15.974	BB	0.4656	3529.66943	117.95927	50.7021
2	18.612	VB	0.5319	3431.91309	100.24349	49.2979



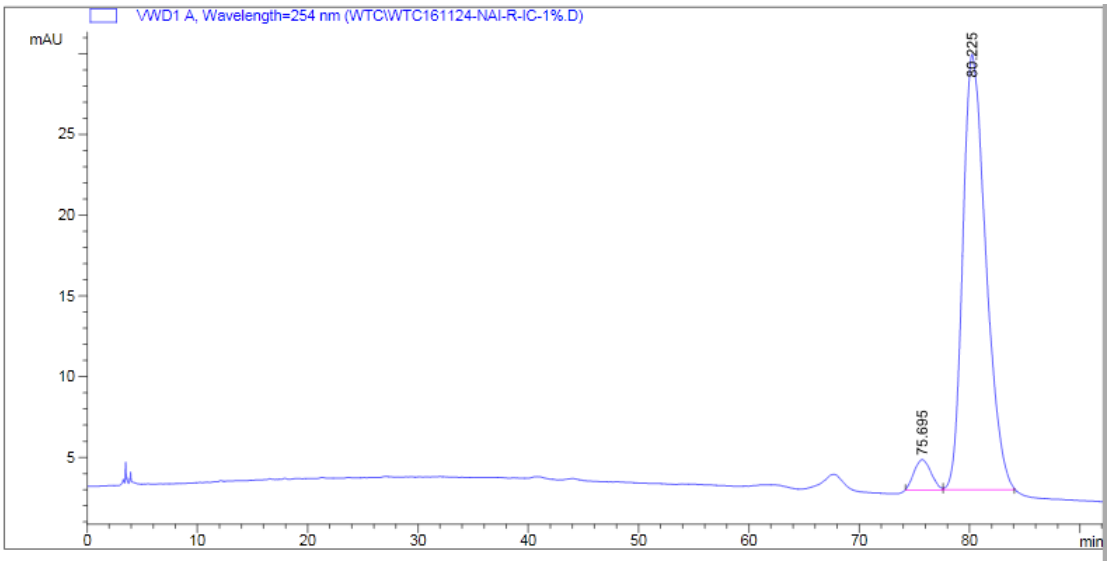
Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	15.749	BB	0.4642	1.20747e4	403.38535	96.6750
2	18.413	VB	0.5338	415.29031	12.16227	3.3250

(*R*)-5-(naphthalen-2-ylmethyl)-2-phenyl-5-((*2E*, *4E*)-undeca-2, 4-dien-1-yl) thiazol-4(5H)-one (3ea)



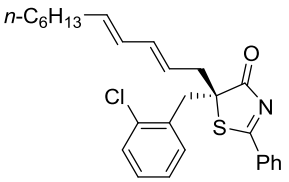


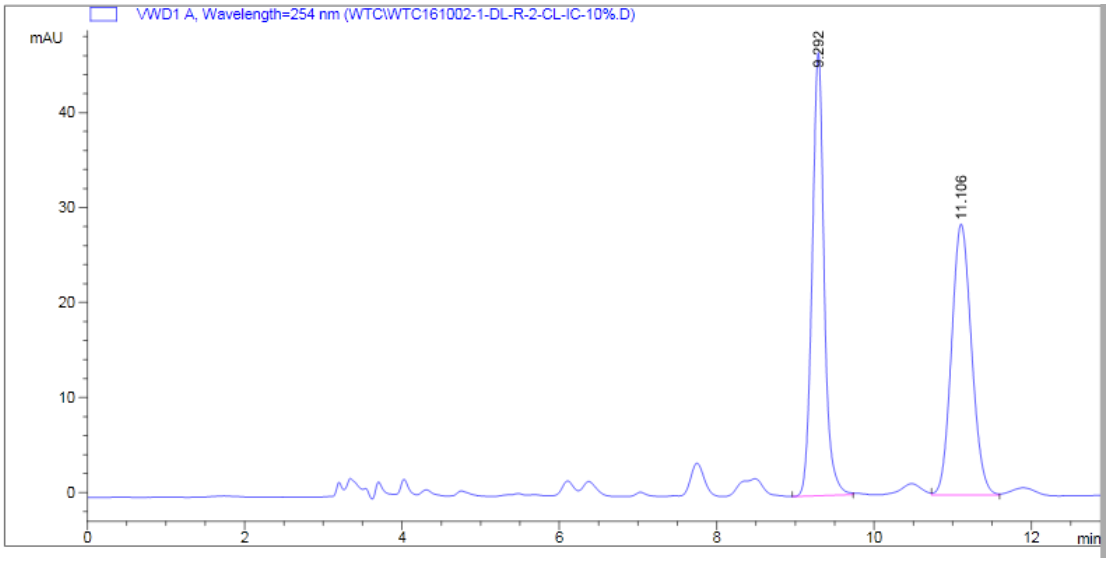
Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	76.126	BB	1.4912	938.59900	7.95692	49.5329
2	81.015	BB	1.4328	956.29938	7.89911	50.4671



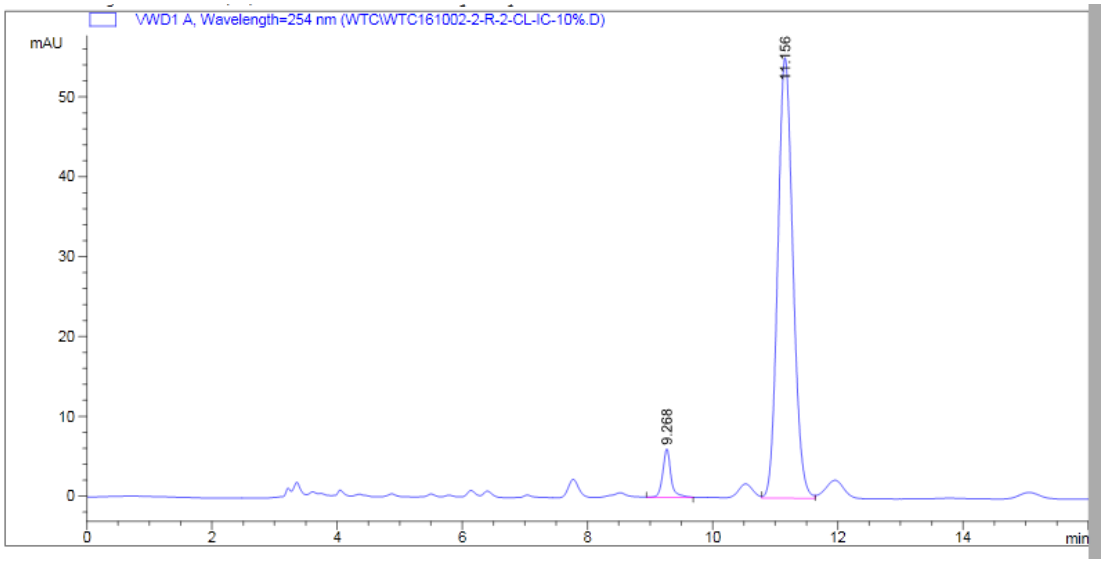
Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	75.695	BV	1.2533	201.56993	1.89618	4.8818
2	80.225	VB	2.0140	3927.42578	26.98469	95.1182

(*R*)-5-(2-chlorobenzyl)-2-phenyl-5-((*2E, 4E*)-undeca-2, 4-dien-1-yl) thiazol-4(5H)-one (3fa)



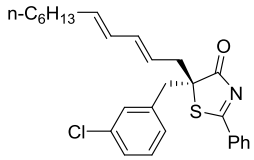


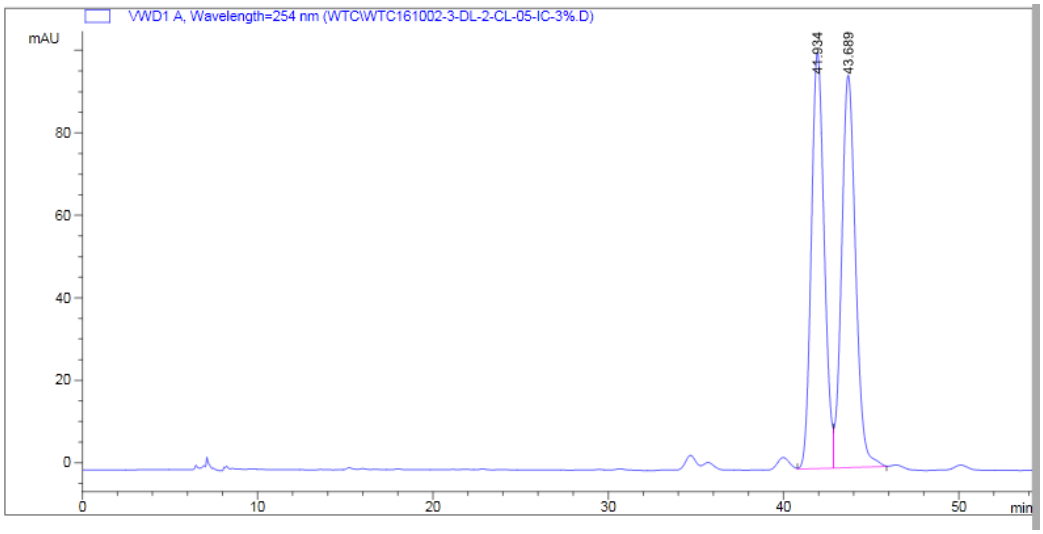
Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	9.292	VB	0.1615	494.70270	46.66285	49.5108
2	11.106	VV	0.2748	504.47910	28.51573	50.4892



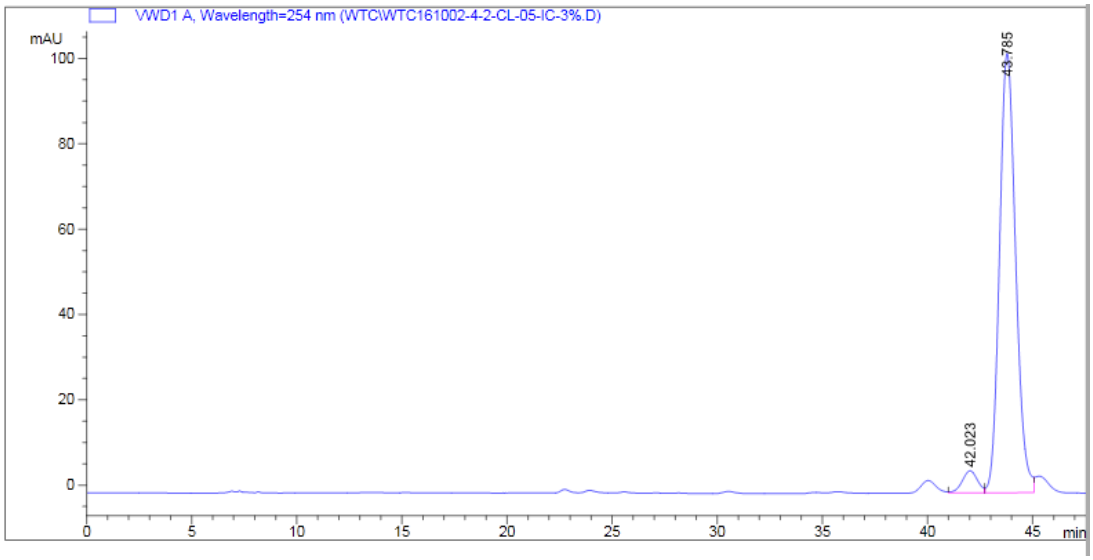
Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	9.268	VB	0.1388	56.45404	6.08844	5.7236
2	11.156	VV	0.2623	929.87781	55.14408	94.2764

(*R*)-5-(3-chlorobenzyl)-2-phenyl-5-((*2E, 4E*)-undeca-2, 4-dien-1-yl) thiazol-4(5H)-one (3ga)



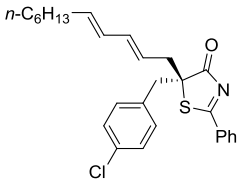


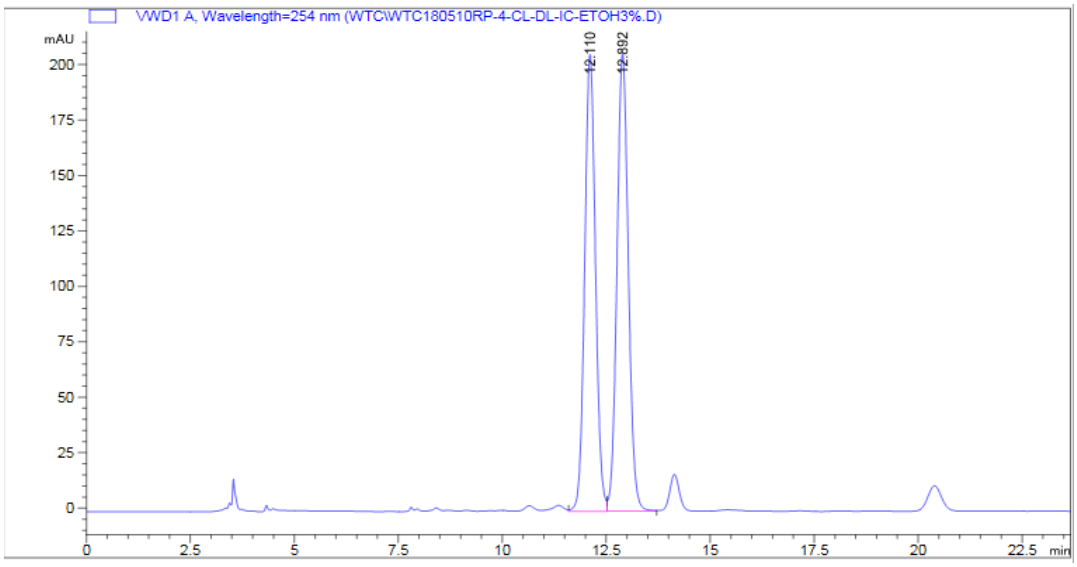
Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	41.934	VV	0.7804	5151.51025	100.93130	49.3594
2	43.689	VB	0.8344	5285.22168	95.15025	50.6406



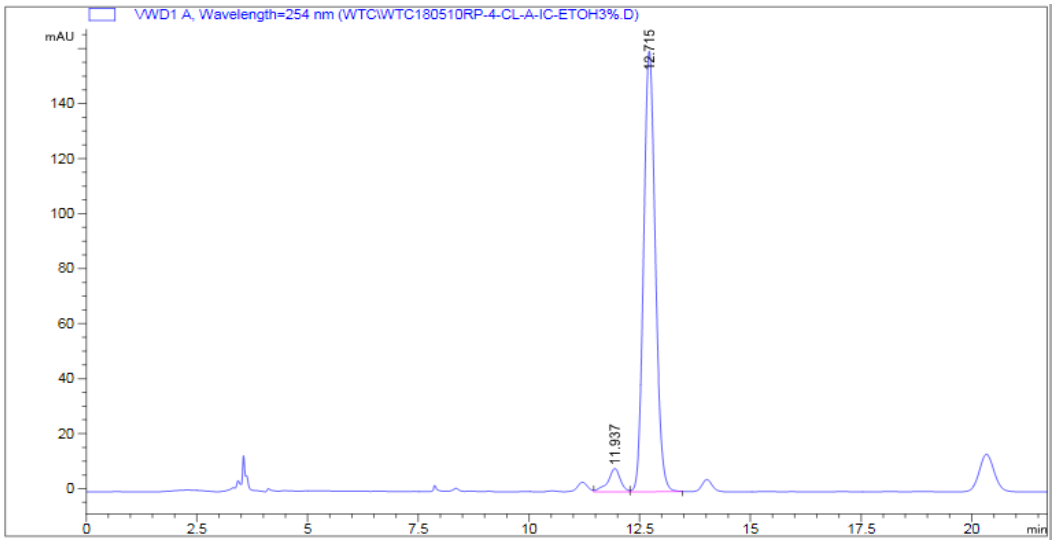
Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	42.023	VV	0.7373	263.40503	5.16804	4.5708
2	43.785	VV	0.7922	5499.38037	102.93120	95.4292

(*R*)-5-(4-chlorobenzyl)-2-phenyl-5-((*2E, 4E*)-undeca-2, 4-dien-1-yl) thiazol-4(5H)-one (3ha)



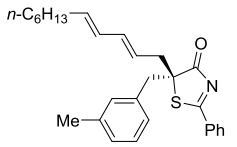


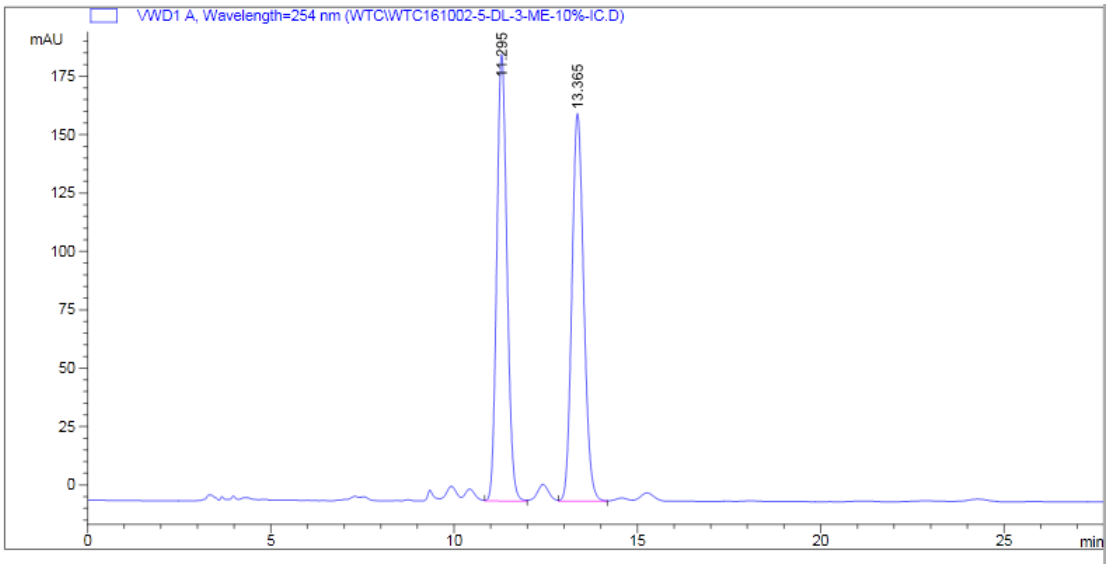
Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	12.110	VV	0.2795	3713.27173	205.93370	48.6040
2	12.892	VB	0.2944	3926.57056	206.00824	51.3960



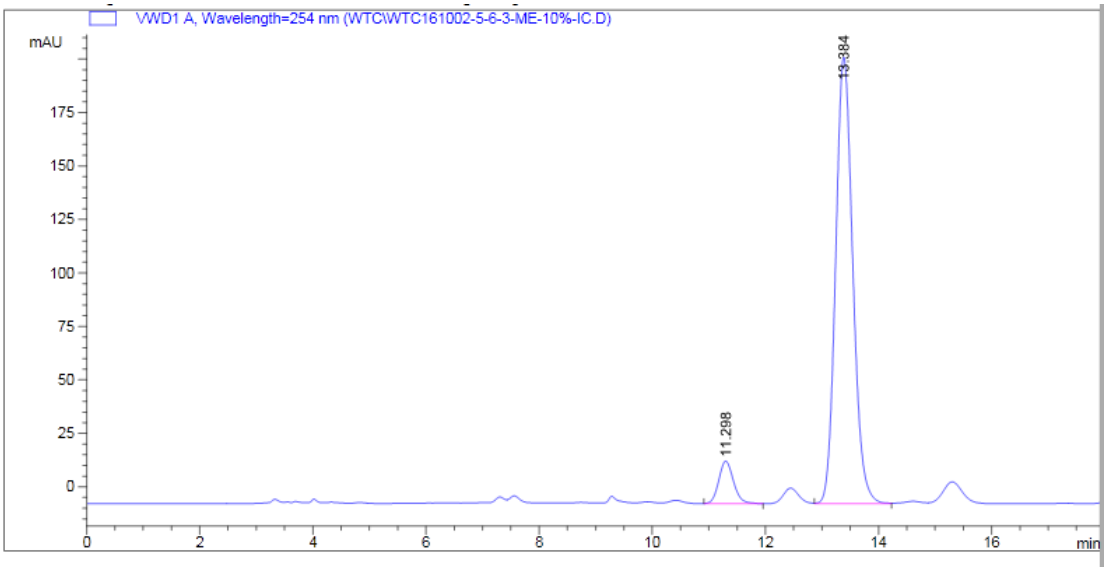
Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	11.937	VV	0.2917	165.37163	8.39105	5.3465
2	12.715	VB	0.2825	2927.71924	160.10959	94.6535

(*R*)-5-(3-methylbenzyl)-2-phenyl-5-((*2E, 4E*)-undeca-2, 4-dien-1-yl) thiazol-4(5H)-one (3ia)



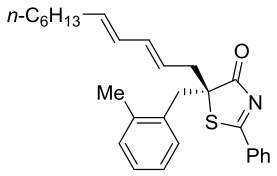


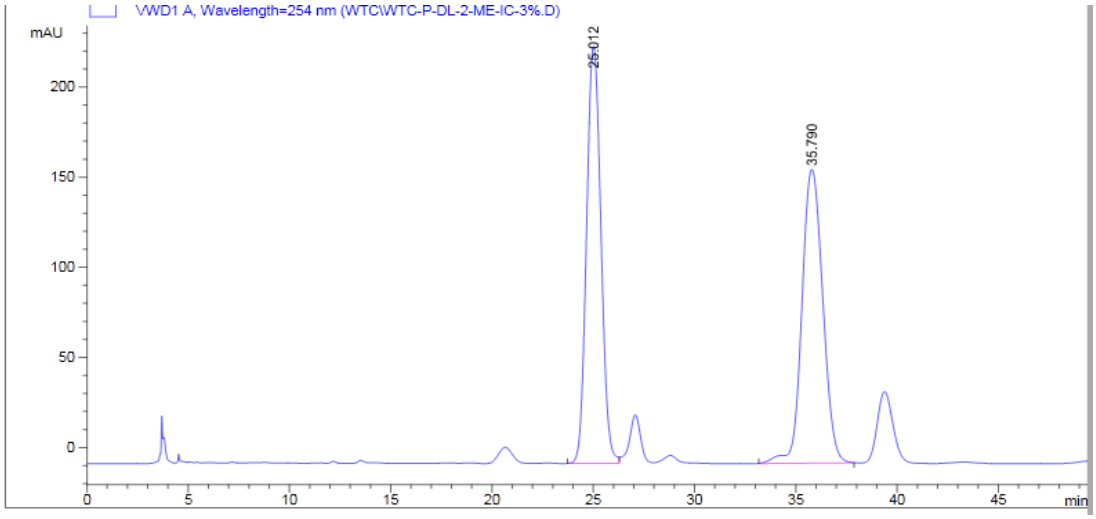
Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	11.295	VB	0.3000	3701.59424	191.28378	49.8466
2	13.365	VB	0.3505	3724.38208	166.04782	50.1534



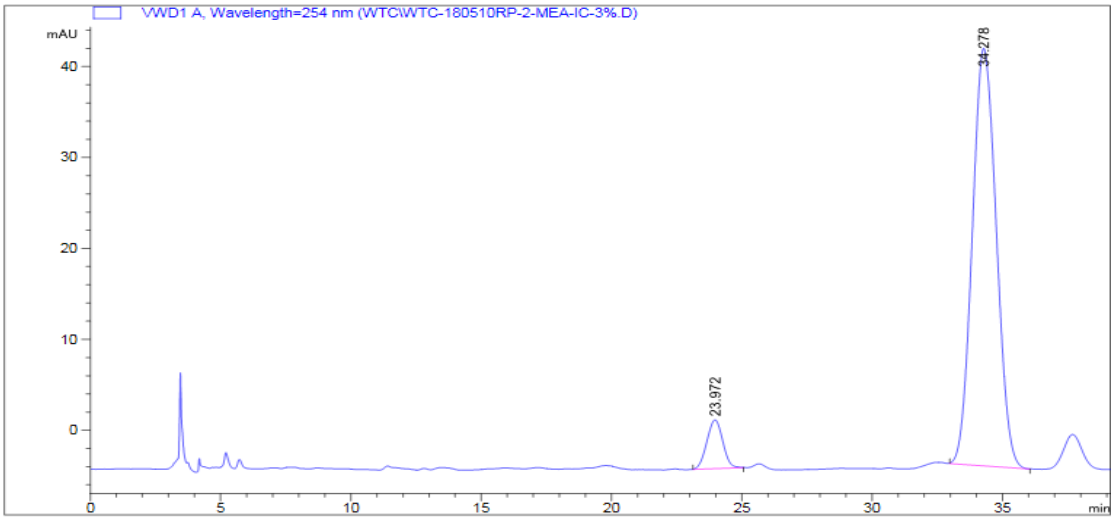
Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	11.298	BB	0.2779	359.50476	19.88188	7.5657
2	13.384	VB	0.3255	4392.26807	208.81711	92.4343

(*R*)-5-(2-methylbenzyl)-2-phenyl-5-((*2E, 4E*)-undeca-2, 4-dien-1-yl) thiazol-4(5H)-one (3ja)



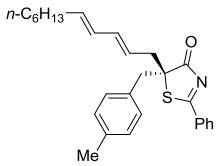


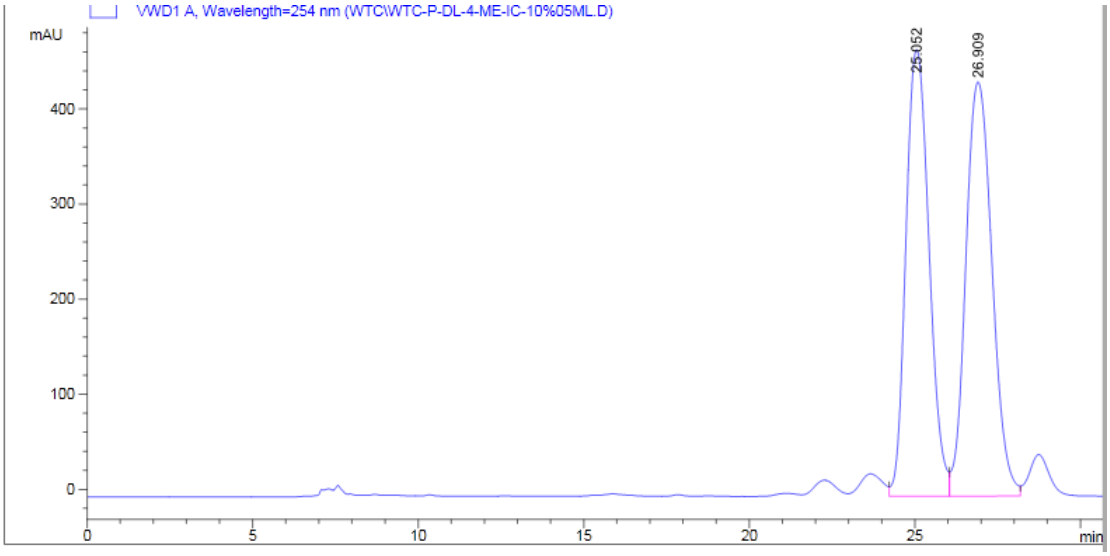
Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	25.012	BV	0.7748	1.13993e4	231.16779	49.3762
2	35.790	BB	1.1169	1.16873e4	162.82964	50.6238



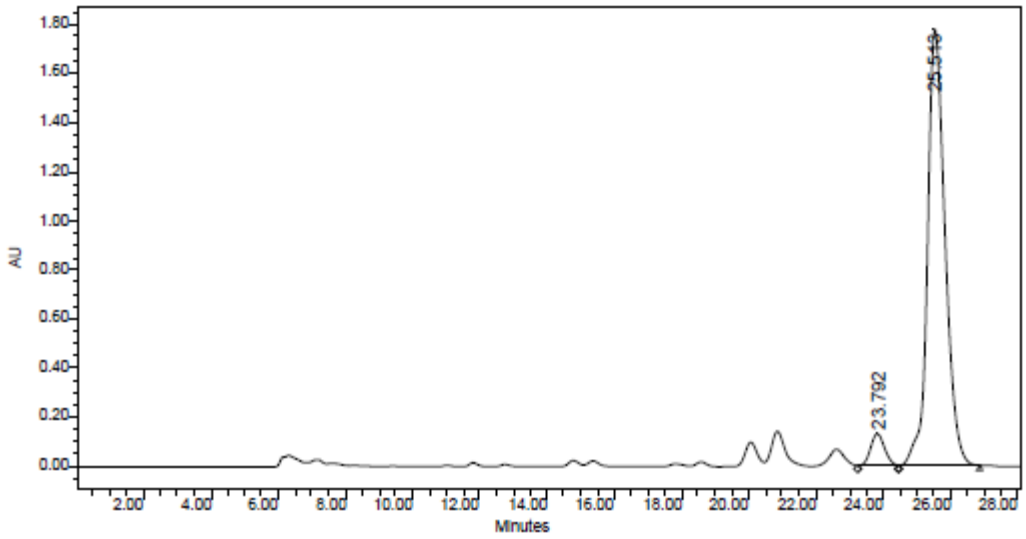
Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	23.972	BB	0.6299	227.21492	5.35935	7.1917
2	34.278	BB	1.0111	2932.20679	45.92244	92.8083

(*R*)-5-(4-methylbenzyl)-2-phenyl-5-((*2E, 4E*)-undeca-2, 4-dien-1-yl) thiazol-4(5H)-one (3ka)



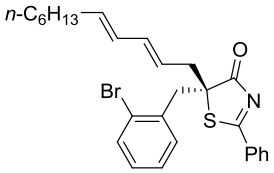


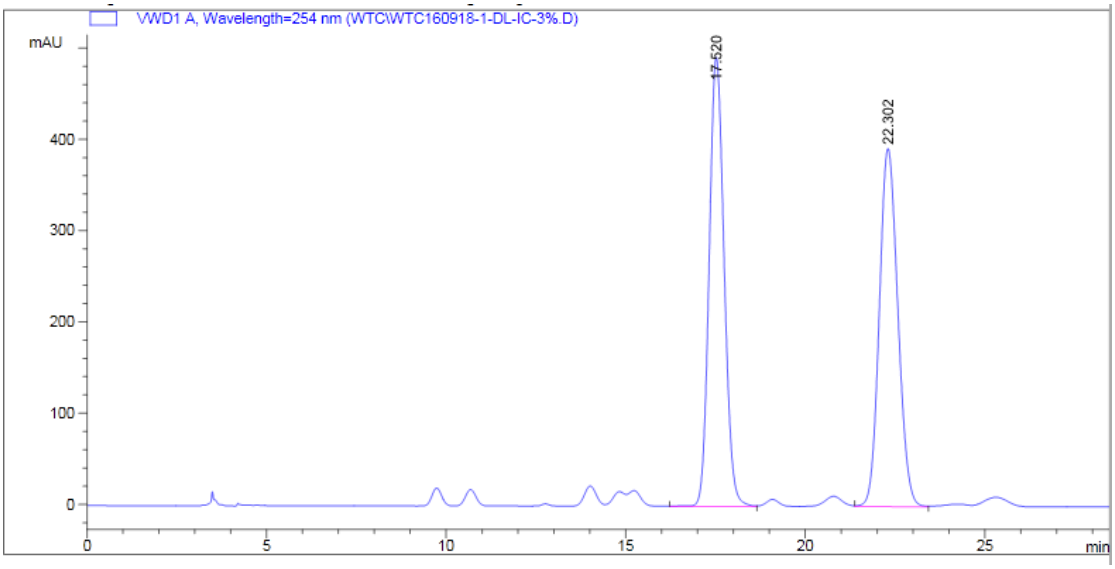
Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	25.052	VV	0.7716	2.28474e4	469.47720	48.7522
2	26.909	VV	0.8518	2.40169e4	435.39377	51.2478



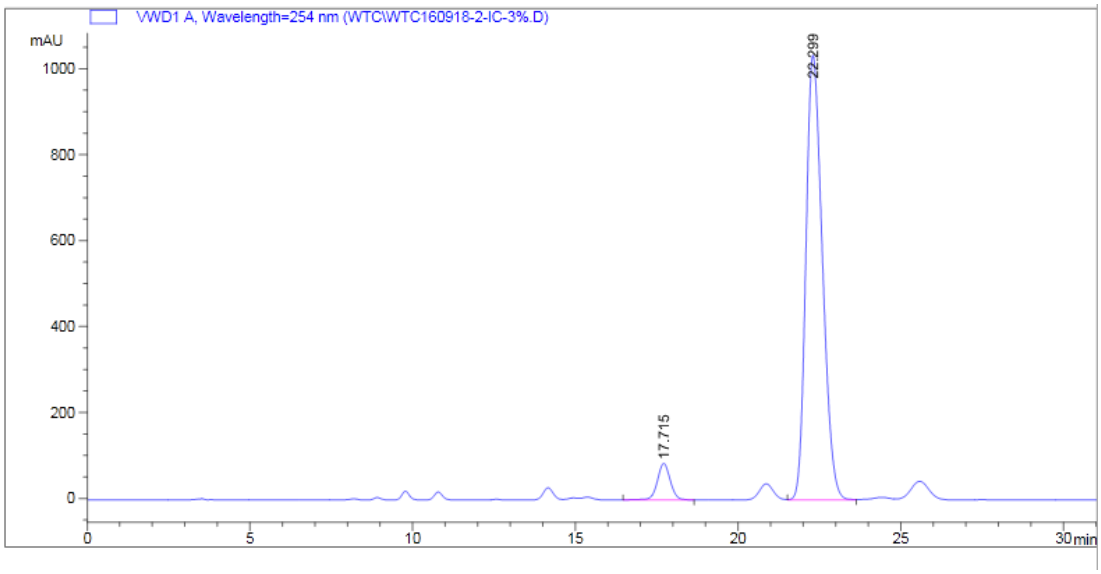
	RT (min)	Area (µV*sec)	% Area	Height (µV)	% Height
1	23.792	3865785	5.64	131686	6.90
2	25.513	64627226	94.36	1777987	93.10

(*R*)-5-(2-bromobenzyl)-2-phenyl-5-((*2E, 4E*)-undeca-2, 4-dien-1-yl) thiazol-4(5H)-one (3la)



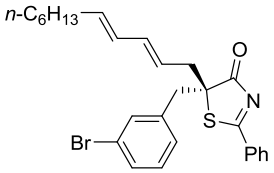


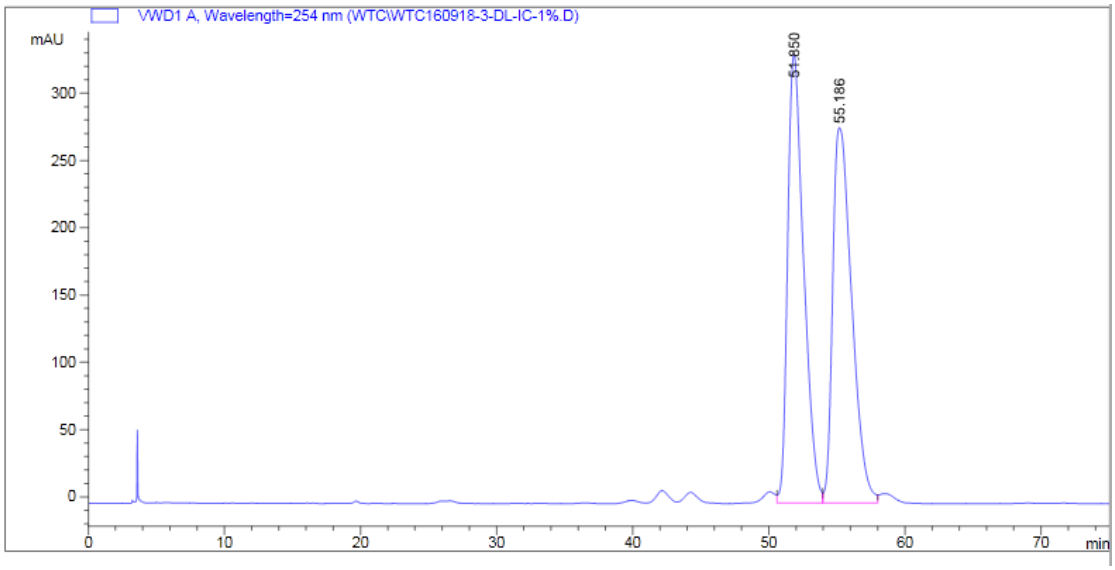
Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	17.520	BB	0.4508	1.42200e4	491.88846	50.3212
2	22.302	VB	0.5588	1.40385e4	392.21106	49.6788



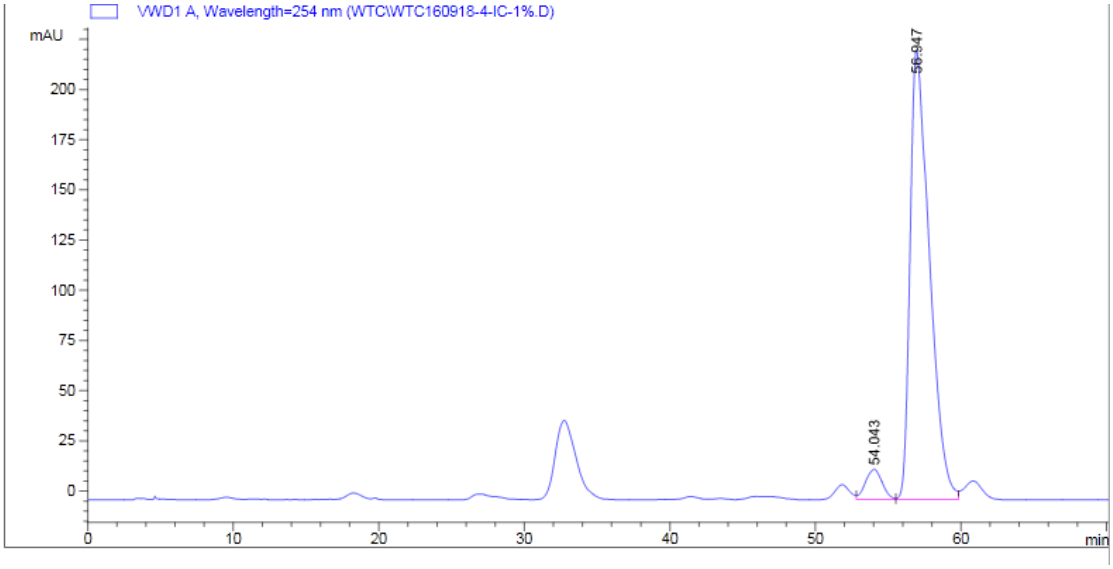
Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	17.715	BB	0.4260	2343.76318	84.75859	6.0526
2	22.299	VB	0.5501	3.63796e4	1034.46301	93.9474

(*R*)-5-(3-bromobenzyl)-2-phenyl-5-((*2E, 4E*)-undeca-2, 4-dien-1-yl) thiazol-4(5H)-one (3ma)



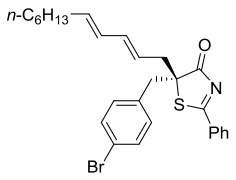


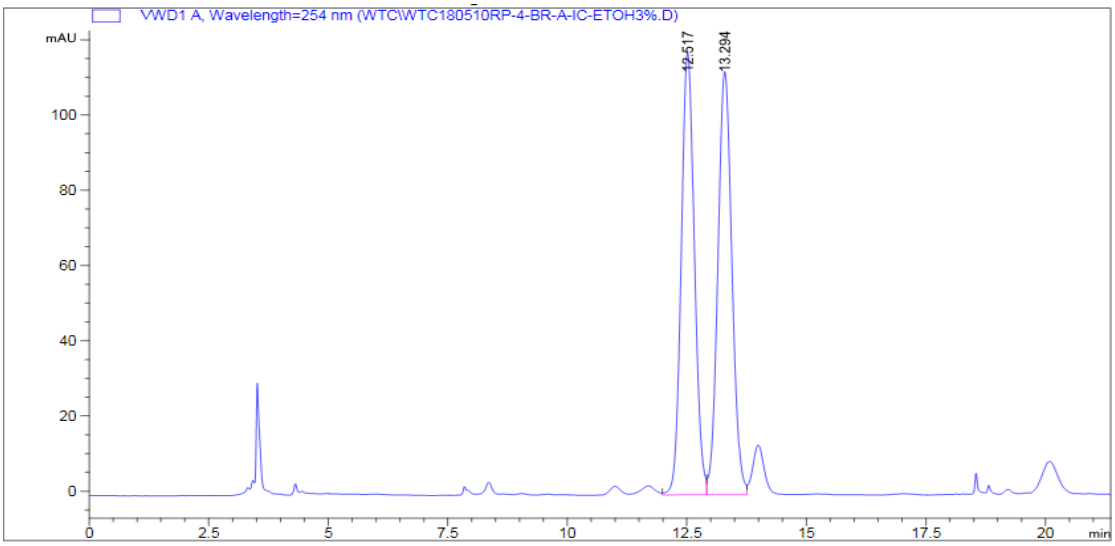
Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	51.850	VV	1.2259	2.72380e4	333.24374	50.0430
2	55.186	VB	1.4537	2.71913e4	278.81604	49.9570



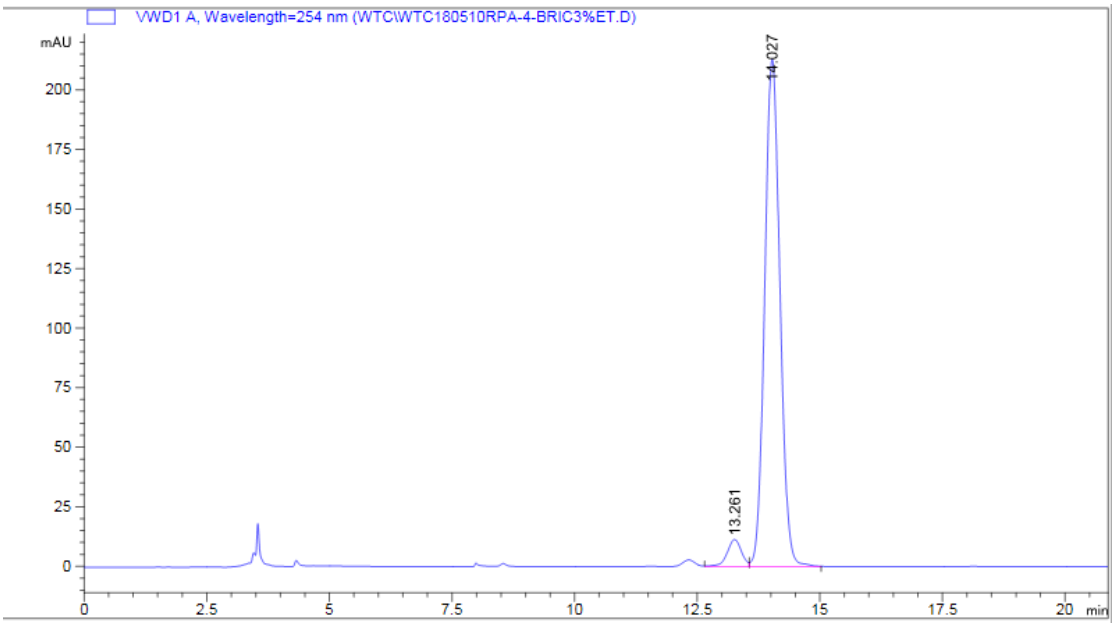
Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	54.043	VV	1.2186	1209.70911	15.10001	5.5003
2	56.947	VB	1.3071	2.07839e4	223.91344	94.4997

(*R*)-5-(4-bromobenzyl)-2-phenyl-5-((*2E, 4E*)-undeca-2, 4-dien-1-yl) thiazol-4(5H)-one (3na)



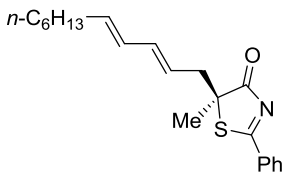


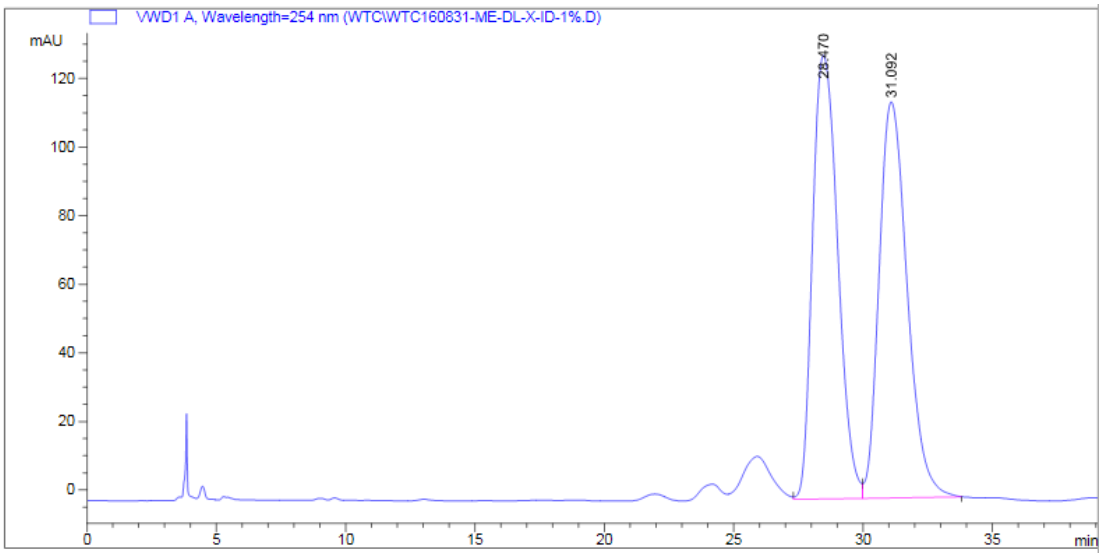
Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	12.517	VV	0.2965	2245.89233	117.52109	49.3524
2	13.294	VV	0.3185	2304.83716	112.46737	50.6476



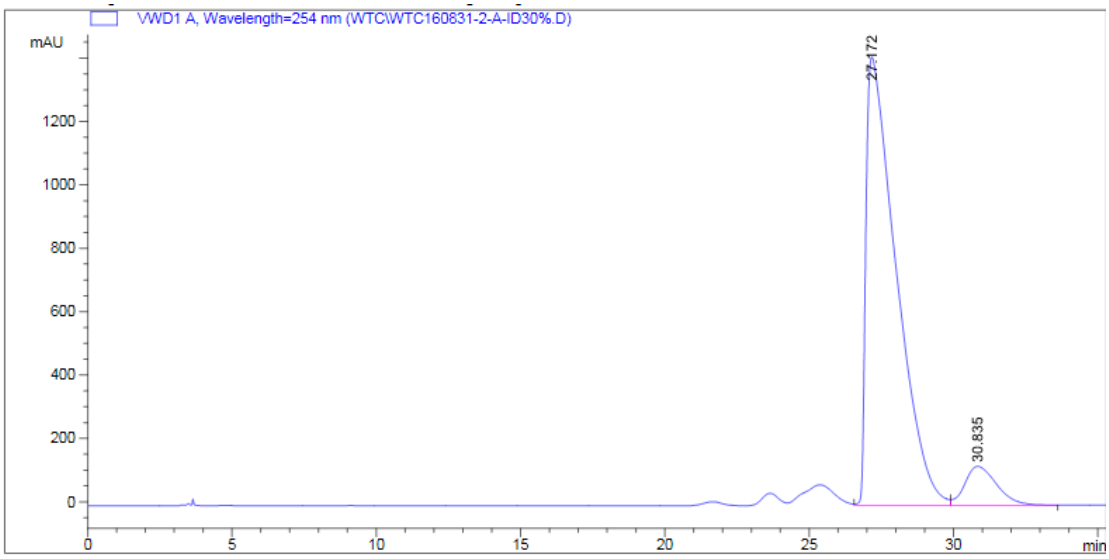
Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	13.261	VV	0.3137	231.78992	11.32977	4.7984
2	14.027	VB	0.3373	4598.79492	212.90508	95.2016

(*S*)-5-methyl-2-phenyl-5-((*2E, 4E*)-undeca-2, 4-dien-1-yl) thiazol-4(5H)-one (3oa)



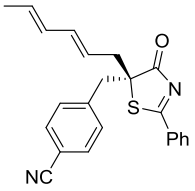


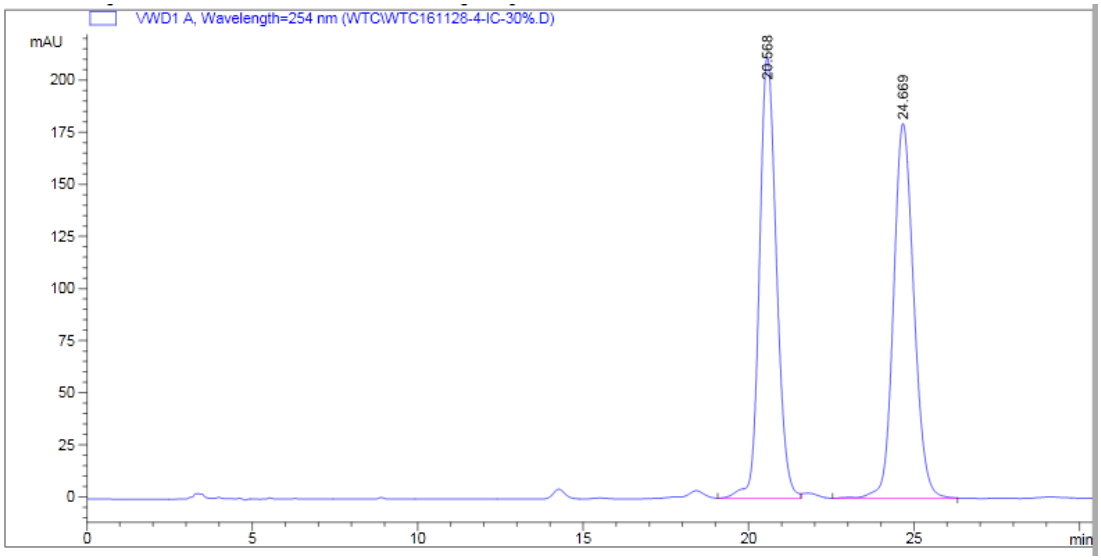
Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	28.470	VV	1.0854	8770.12793	129.30923	50.1285
2	31.092	VB	1.1246	8725.16016	115.47954	49.8715



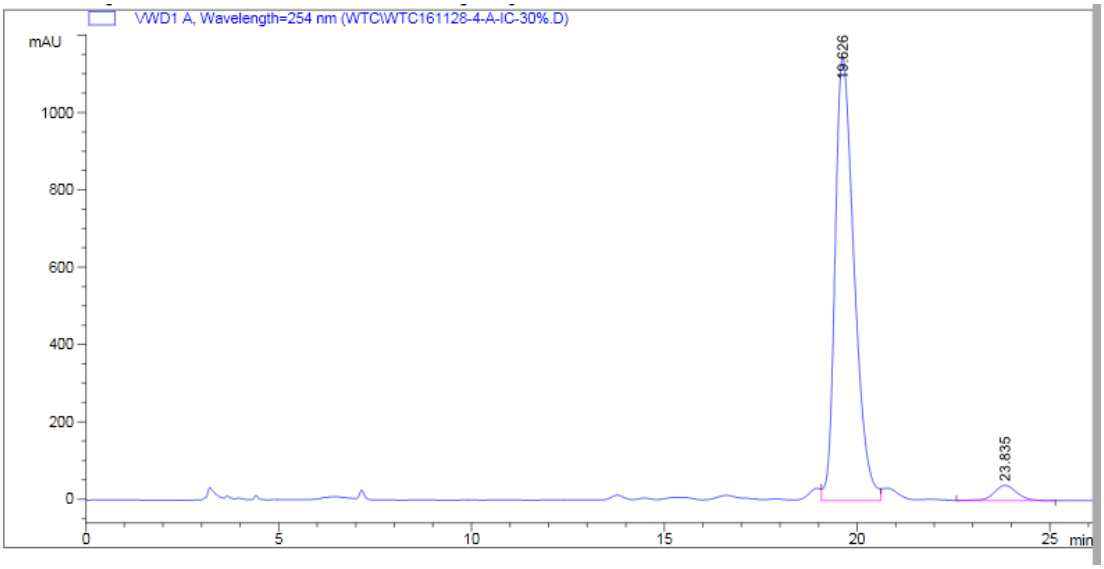
Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	27.172	VV	1.0684	1.02520e5	1414.33789	91.5552
2	30.835	VB	1.2008	9456.18359	123.06231	8.4448

4-(((*R*)-5-((*2E, 4E*)-hexa-2, 4-dien-1-yl)-4-oxo-2-phenyl-4, 5-dihydrothiazol-5-yl) methyl) benzonitrile (3db)



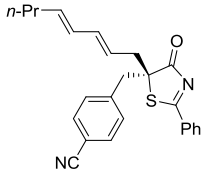


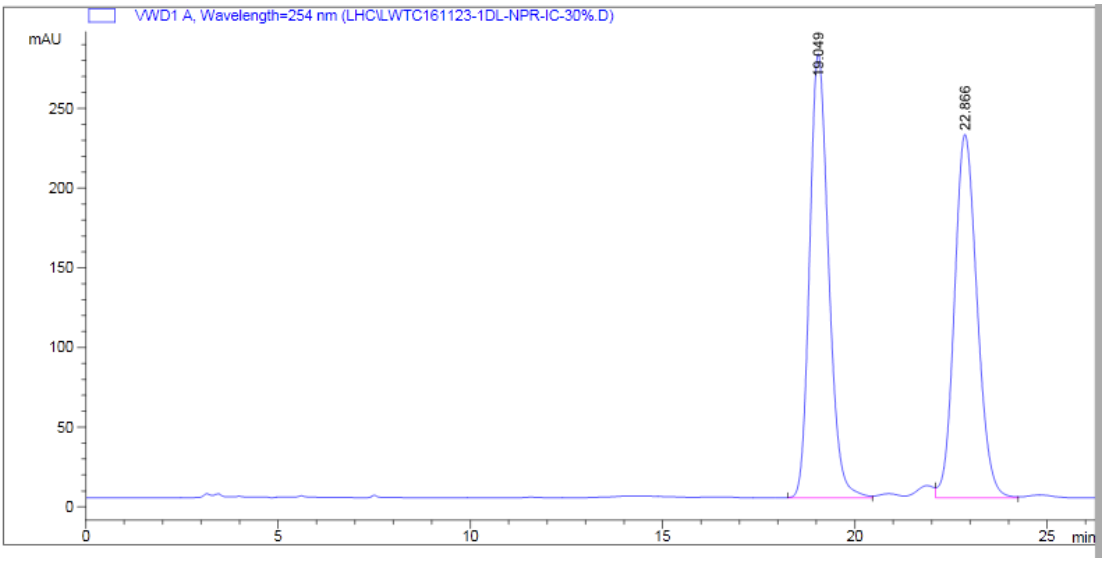
Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	20.568	VB	0.5511	7580.79590	212.00339	49.6748
2	24.669	VB	0.6599	7680.05225	179.81985	50.3252



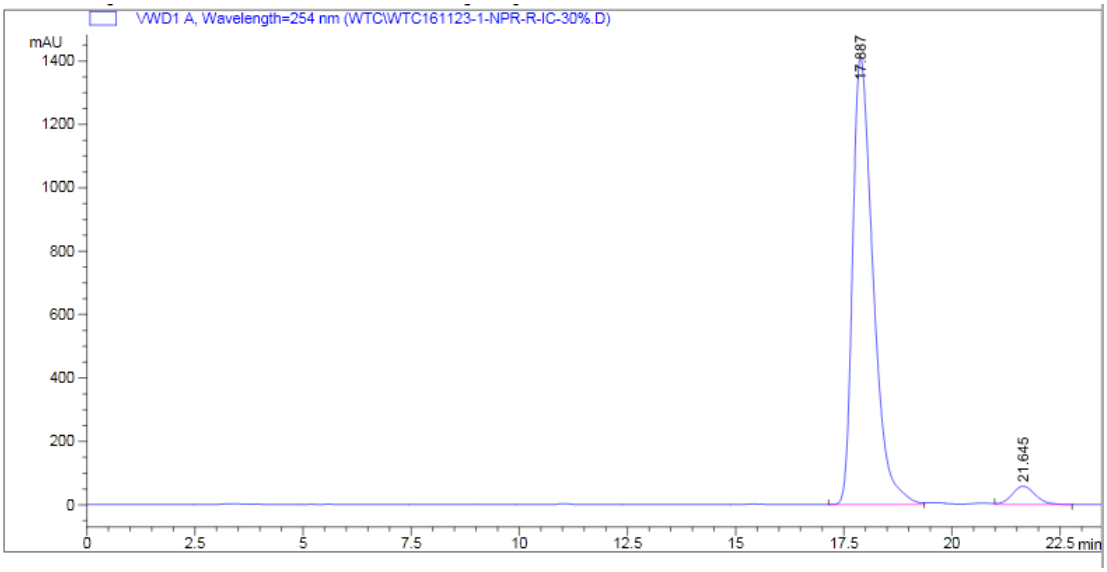
Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	19.626	VV	0.5265	3.94812e4	1147.86877	96.0322
2	23.835	VB	0.6380	1631.25378	39.34922	3.9678

4-(((*R*)-5-((*2E, 4E*)-octa-2, 4-dien-1-yl)-4-oxo-2-phenyl-4, 5-dihydrothiazol-5-yl) methyl) benzonitrile (3dc)



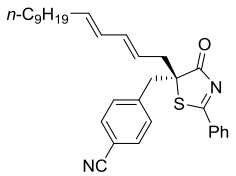


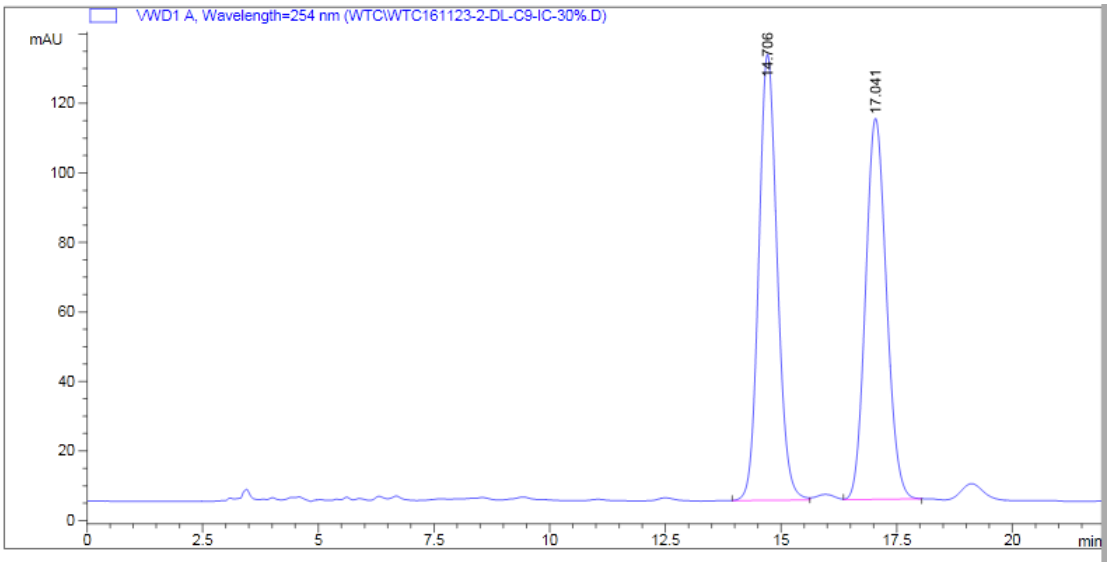
Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	19.049	BB	0.5297	9549.64941	278.48404	50.5711
2	22.866	VB	0.6348	9333.94922	228.02597	49.4289



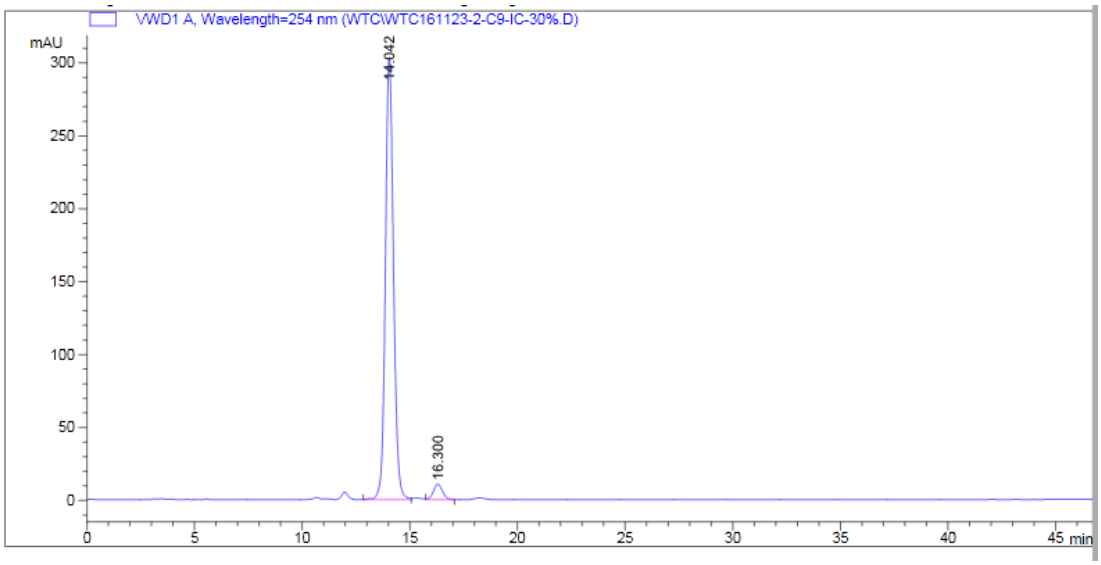
Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	17.887	BV	0.5025	4.63500e4	1411.45483	95.5517
2	21.645	VB	0.5788	2157.76587	57.91301	4.4483

4-(((*R*)-4-oxo-2-phenyl-5-((*2E, 4E*)-tetradeca-2, 4-dien-1-yl)-4, 5-dihydrothiazol-5-yl) methyl) benzonitrile (3dd)



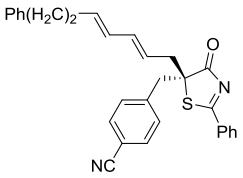


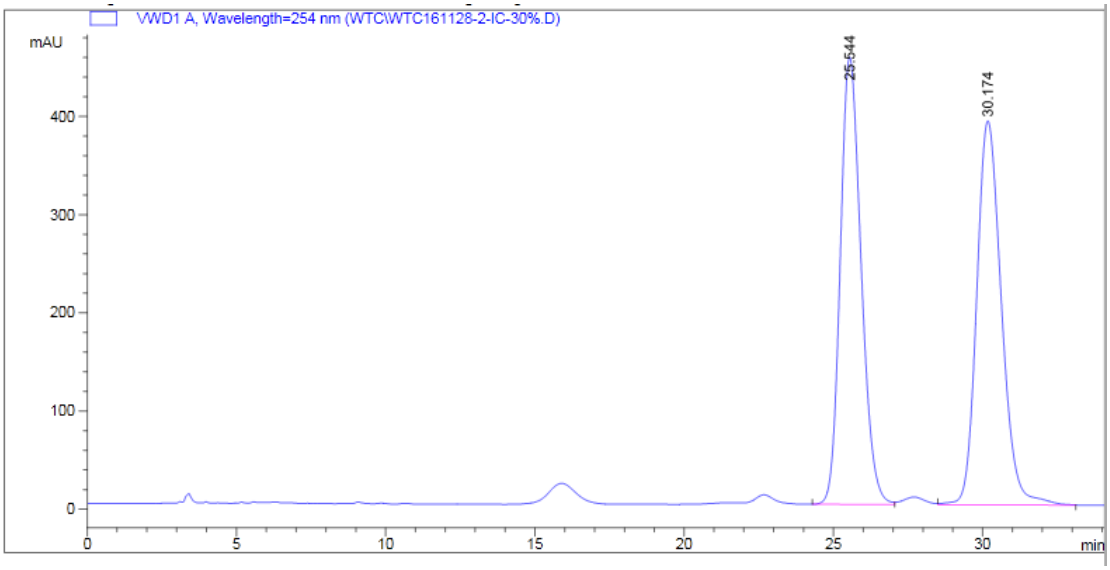
Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	14.706	BV	0.4307	3569.37671	128.36626	50.8540
2	17.041	VB	0.4894	3449.48853	109.61617	49.1460



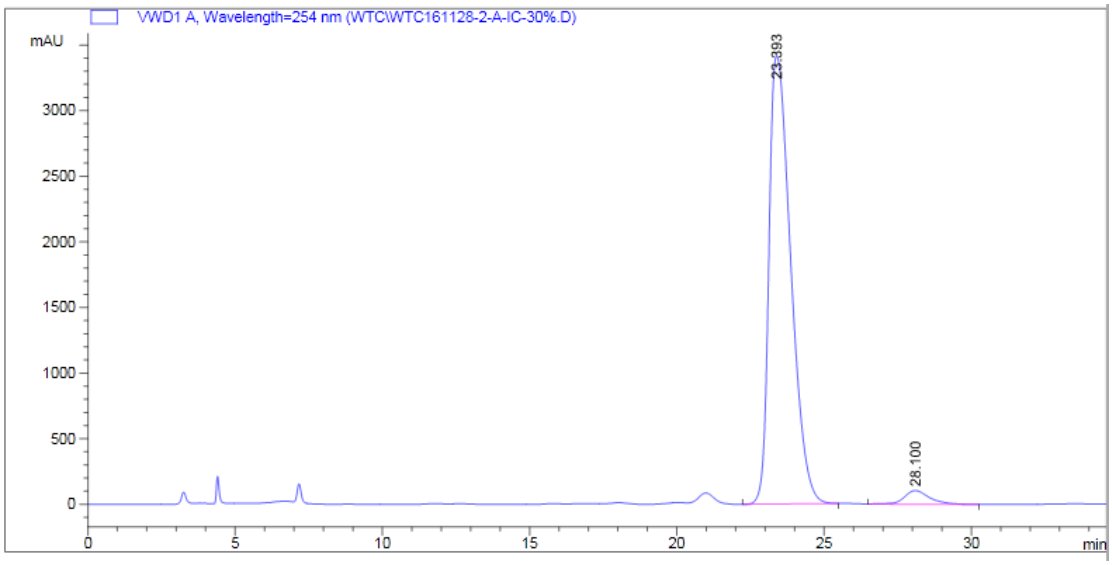
Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	14.042	BB	0.4018	7908.01416	303.25076	96.2432
2	16.300	VB	0.4545	308.68170	10.60820	3.7568

4-(((*R*)-4-oxo-2-phenyl-5-((*2E, 4E*)-5-(p-tolyl) penta-2, 4-dien-1-yl)-4, 5-dihydrothiazol-5-yl) methyl) benzonitrile (3de)



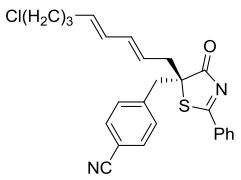


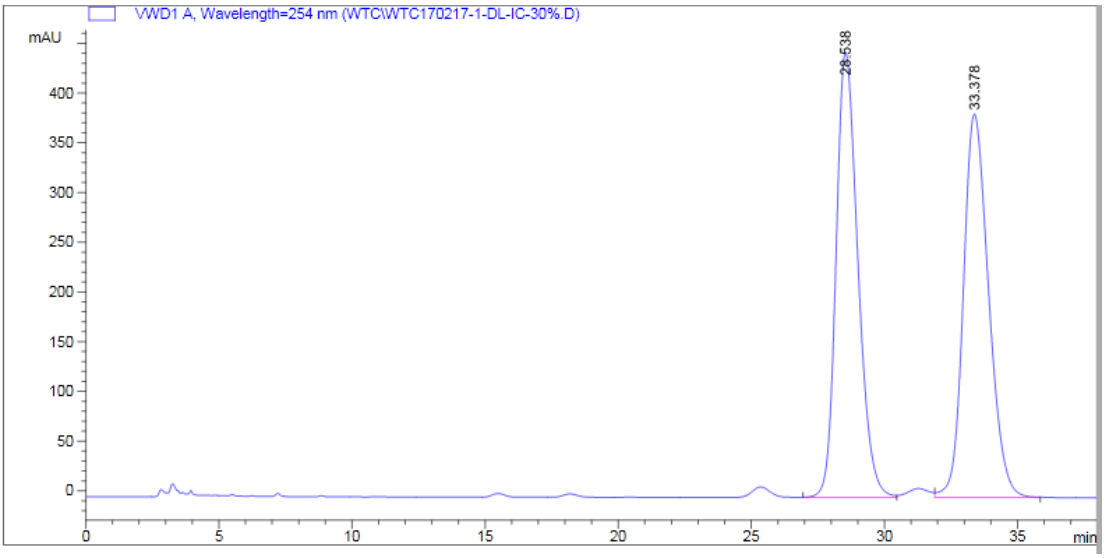
Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	25.544	BV	0.7505	2.20830e4	455.47836	49.5745
2	30.174	VB	0.8889	2.24621e4	390.84323	50.4255



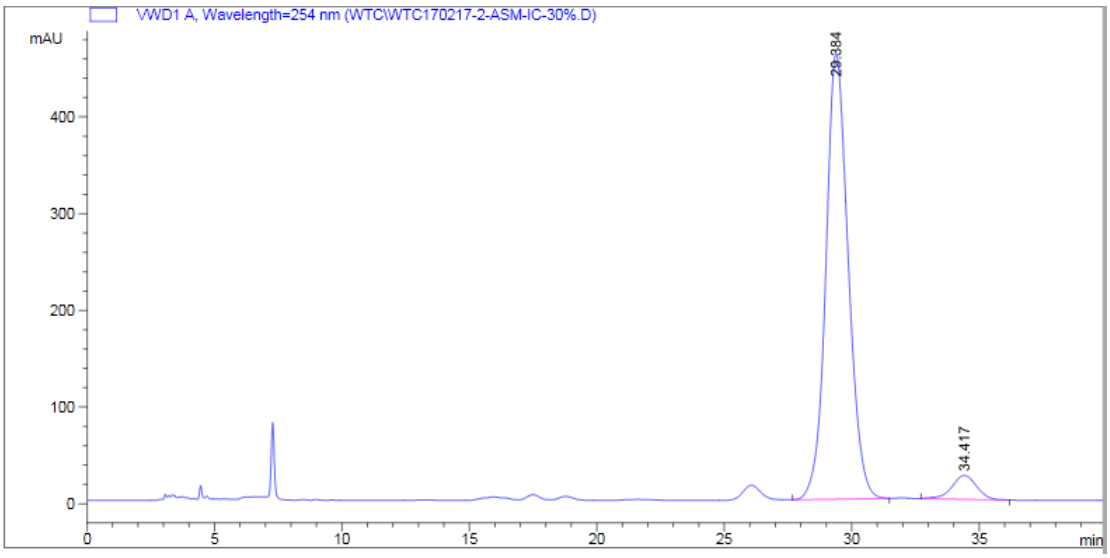
Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	23.393	BB	0.7891	1.75243e5	3416.59863	96.5698
2	28.100	BB	0.8898	6224.71631	104.76301	3.4302

4-(((*R*)-5-((*2E, 4E*)-8-chloroocta-2, 4-dien-1-yl)-4-oxo-2-phenyl-4, 5-dihydrothiazol-5-yl) methyl) benzonitrile (3df)



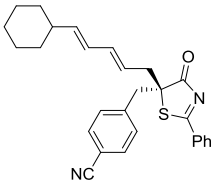


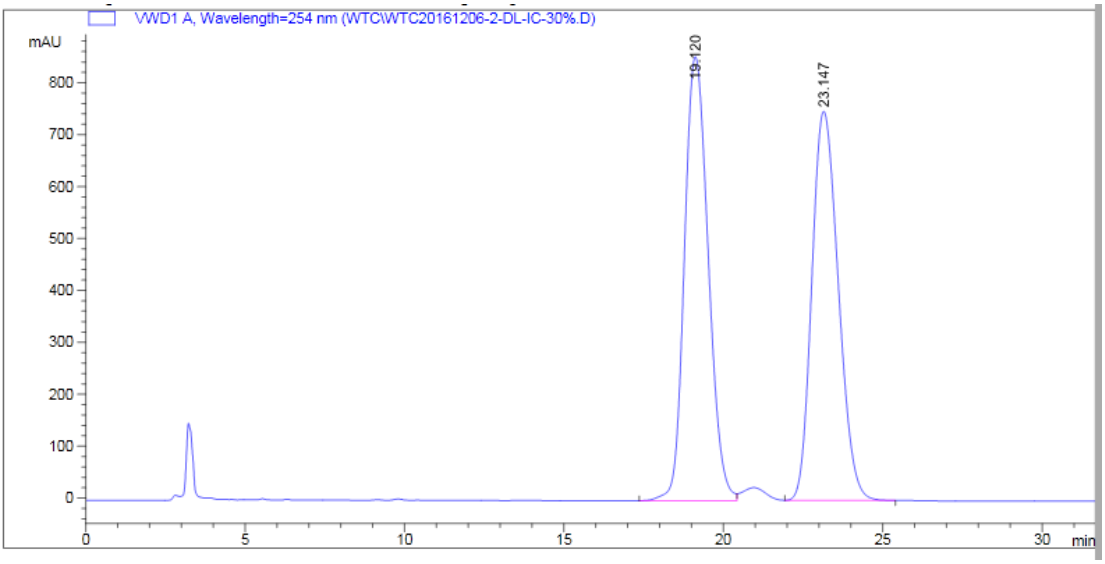
Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	28.538	BB	0.8749	2.54745e4	447.73935	50.0961
2	33.378	VB	1.0141	2.53767e4	385.47574	49.9039



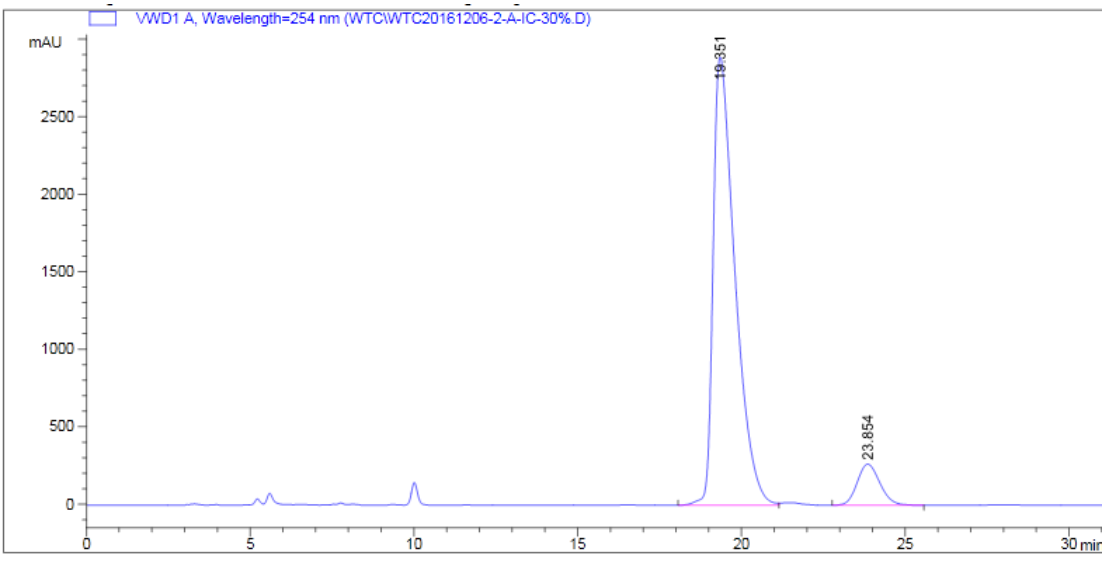
Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	29.384	BB	0.9320	2.80793e4	460.93951	94.3964
2	34.417	BB	1.0219	1666.84253	24.78593	5.6036

4-(((*R*)-5-((*2E, 4E*)-hexa-2, 4-dien-1-yl)-4-oxo-2-phenyl-4, 5-dihydrothiazol-5-yl) methyl) benzonitrile (3dg)



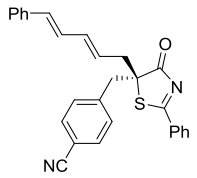


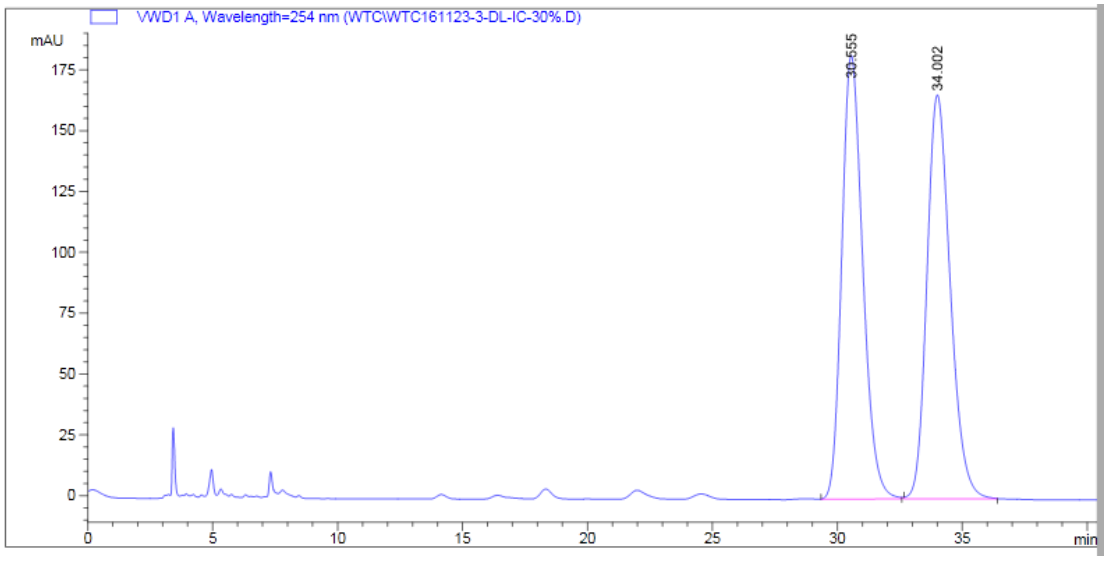
Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	19.120	BV	0.8184	4.44109e4	855.17413	50.6468
2	23.147	VB	0.9108	4.32766e4	749.69403	49.3532



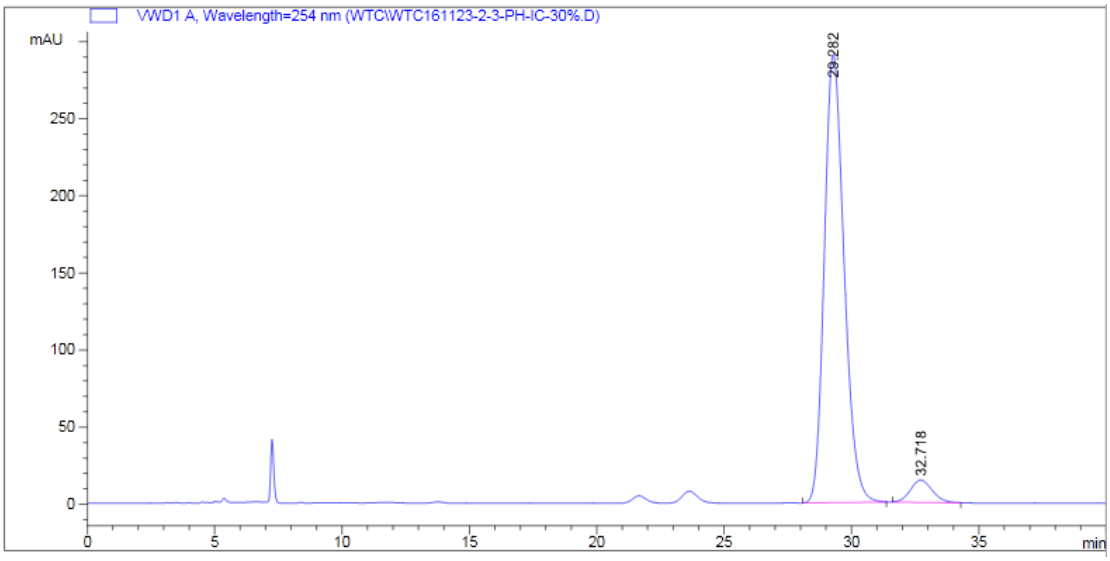
Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	19.351	BV	0.6944	1.34173e5	2890.55981	91.3432
2	23.854	BB	0.7478	1.27159e4	264.90570	8.6568

4-(((*R*)-4-oxo-2-phenyl-5-((*2E, 4E*)-5-phenylpenta-2, 4-dien-1-yl)-4, 5-dihydrothiazol-5-yl) methyl) benzonitrile (3dh)



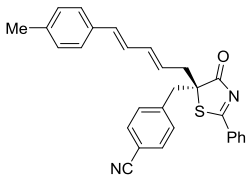


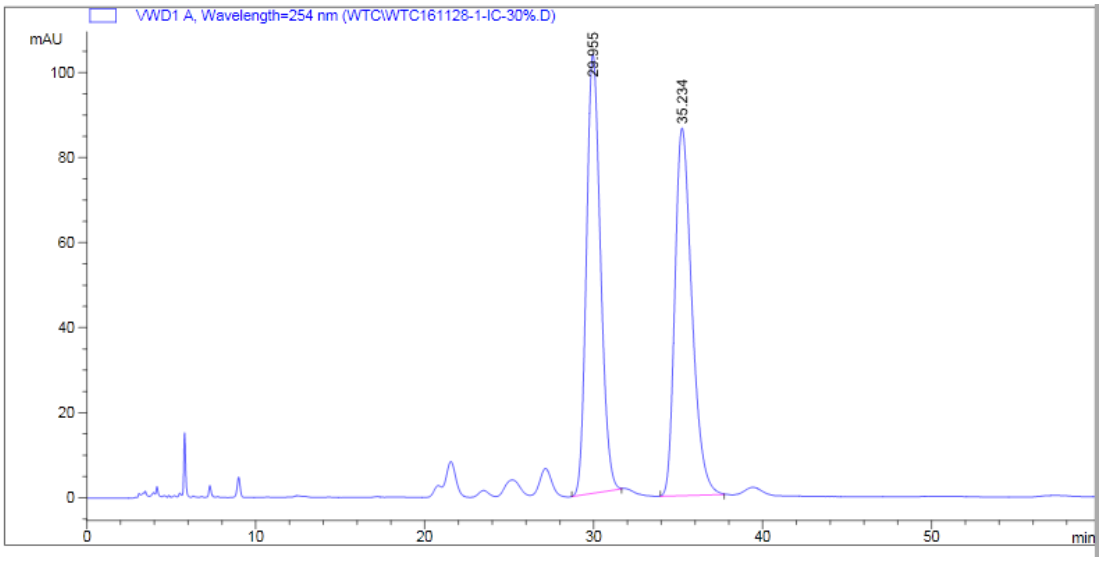
Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	30.555	BB	0.8986	1.06310e4	182.34328	49.7063
2	34.002	BB	0.9962	1.07566e4	166.00945	50.2937



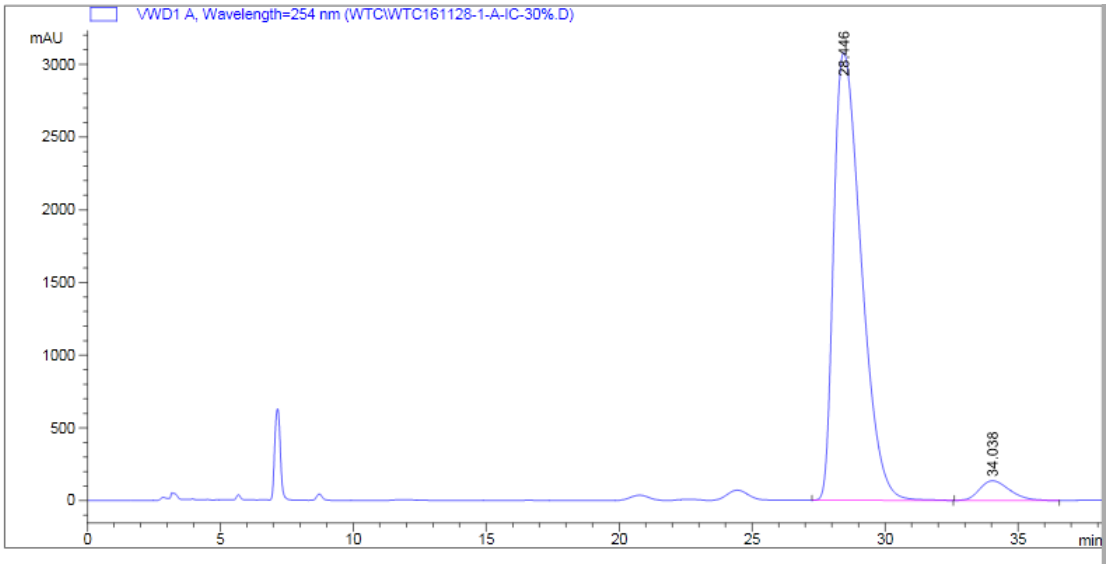
Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	29.282	BB	0.8349	1.56472e4	290.59613	94.8104
2	32.718	BB	0.9230	856.47491	14.36026	5.1896

4-(((*R*)-4-oxo-2-phenyl-5-((*2E, 4E*)-5-(p-tolyl) penta-2, 4-dien-1-yl)-4, 5-dihydrothiazol-5-yl) methyl) benzonitrile (3di)



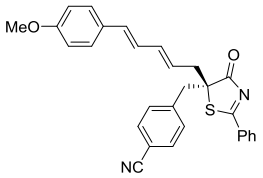


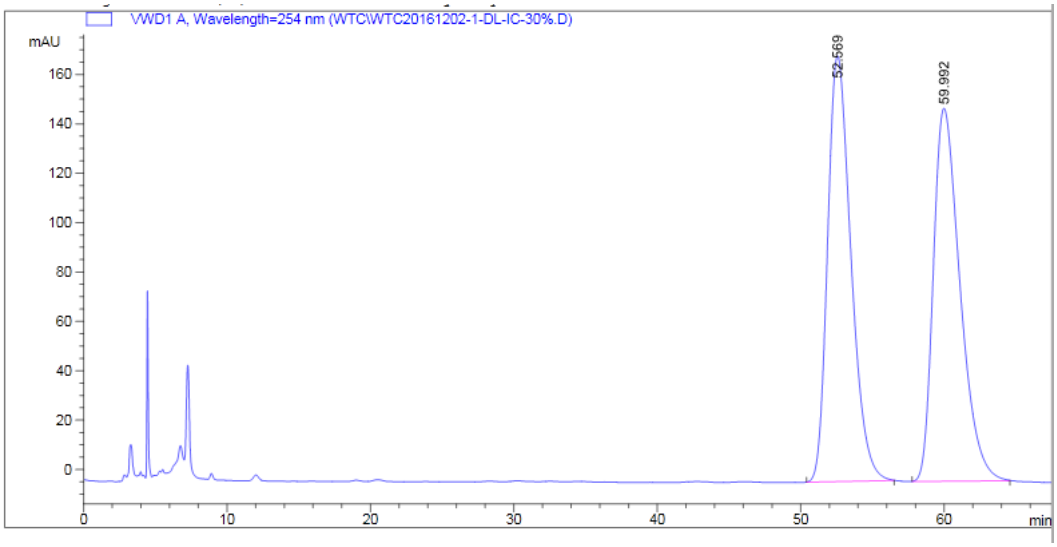
Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	29.955	BB	0.8943	5960.58984	103.32975	49.6284
2	35.234	BB	1.0726	6049.84766	86.45821	50.3716



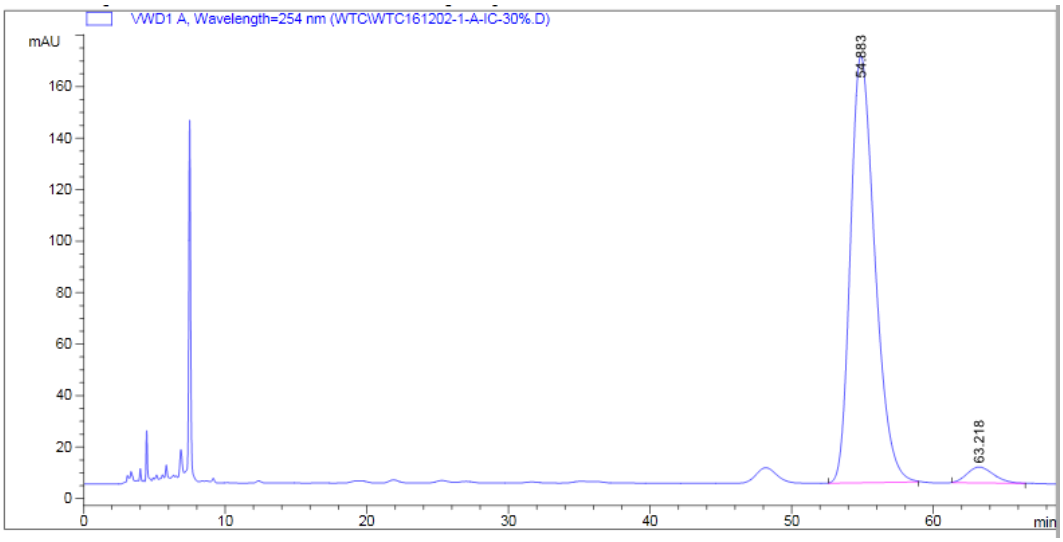
Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	28.446	BB	1.1163	2.21006e5	3076.11890	95.4130
2	34.038	BB	1.2177	1.06250e4	135.27673	4.5870

4-(((*R*)-5-((*2E, 4E*)-5-(4-methoxyphenyl) penta-2, 4-dien-1-yl)-4-oxo-2-phenyl-4, 5-dihydrothiazol-5-yl) methyl) benzonitrile (3dj)



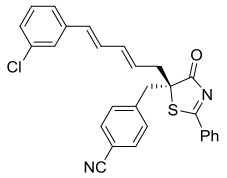


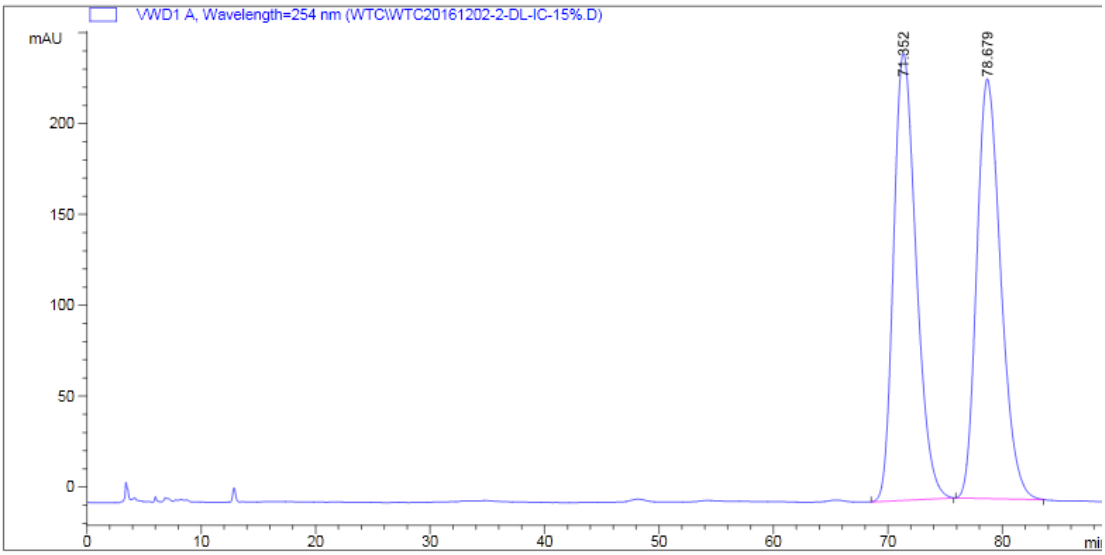
Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	52.569	BB	1.7443	1.95184e4	172.43236	50.0283
2	59.992	BB	1.9607	1.94963e4	150.99286	49.9717



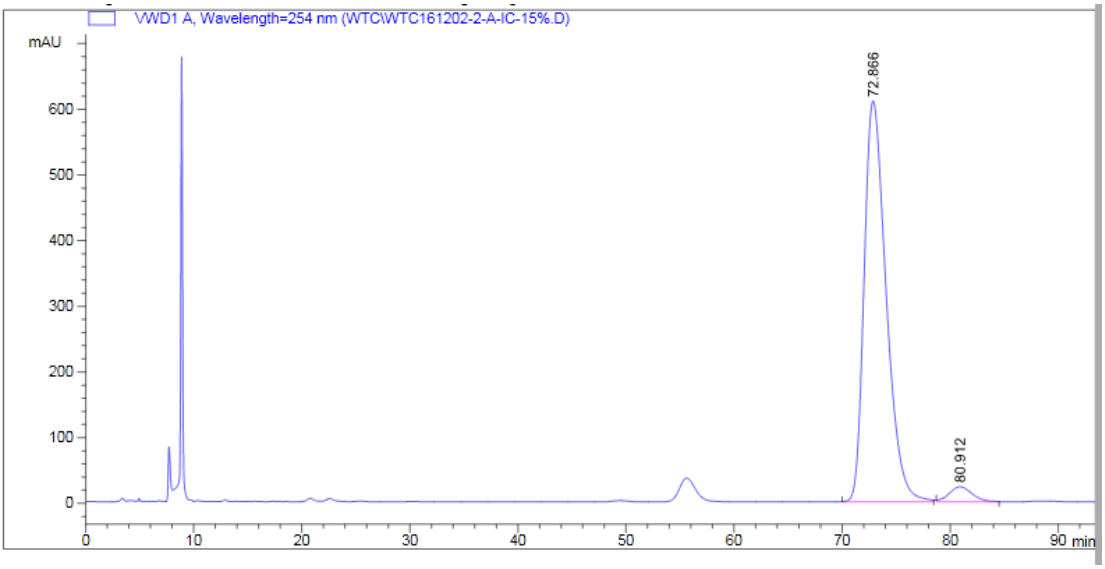
Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	54.883	BB	1.8409	1.98565e4	165.85239	96.1369
2	63.218	BB	1.5351	797.90570	6.15135	3.8631

4-(((*R*)-5-((*2E, 4E*)-5-(3-chlorophenyl) penta-2, 4-dien-1-yl)-4-oxo-2-phenyl-4, 5-dihydrothiazol-5-yl) methyl) benzonitrile (3dk)



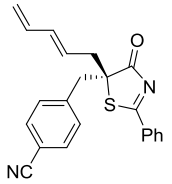


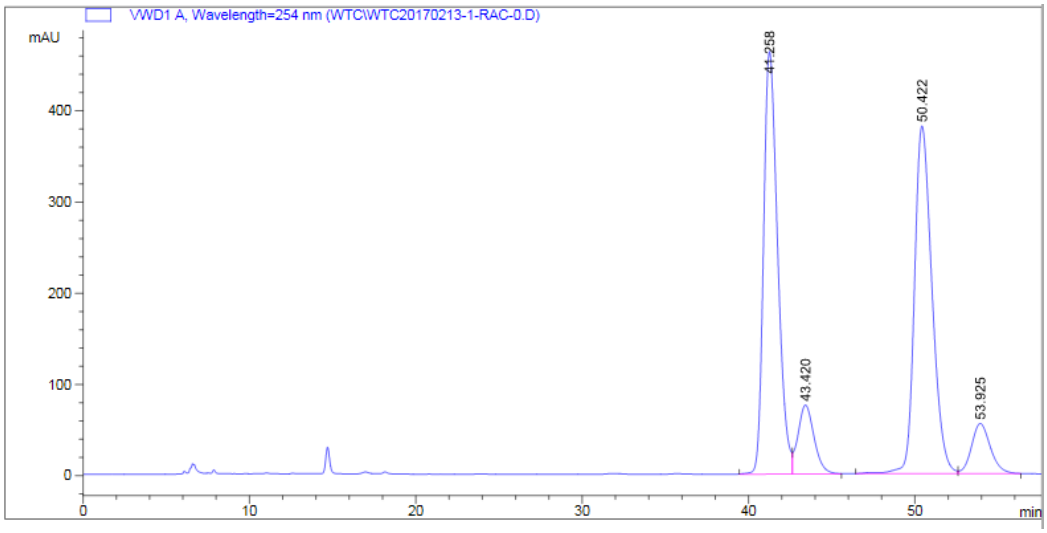
Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	71.352	BB	2.0604	3.37124e4	245.99713	50.0045
2	78.679	BB	2.1091	3.37063e4	231.12048	49.9955



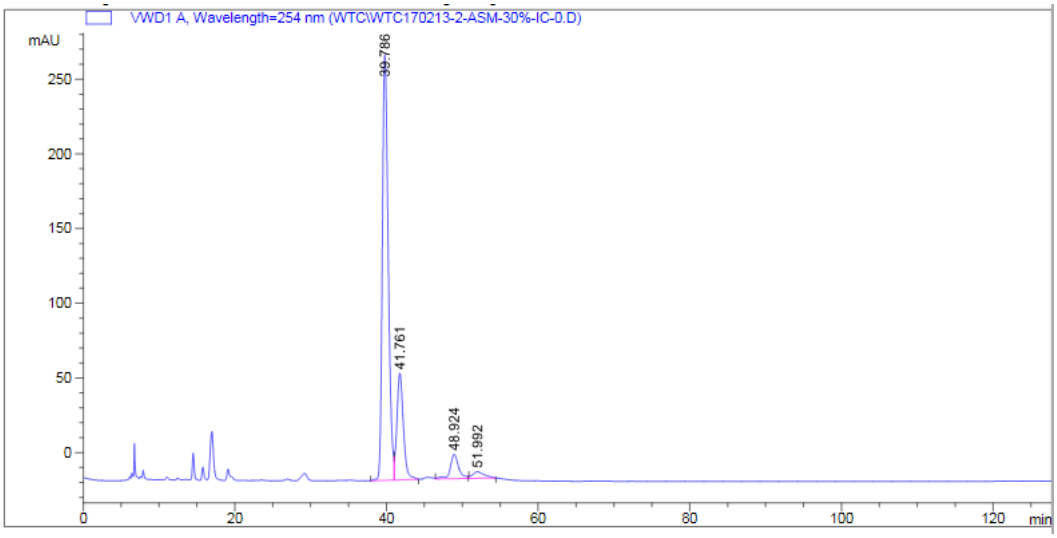
Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	72.866	BB	2.1343	8.60345e4	610.13934	96.2899
2	80.912	BB	2.0211	3314.91943	22.54658	3.7101

(*R*, *E*)-4-((4-oxo-5-(penta-2, 4-dien-1-yl)-2-phenyl-4, 5-dihydrothiazol-5-yl) methyl) benzo-nitrile (3dl)



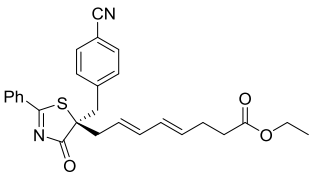


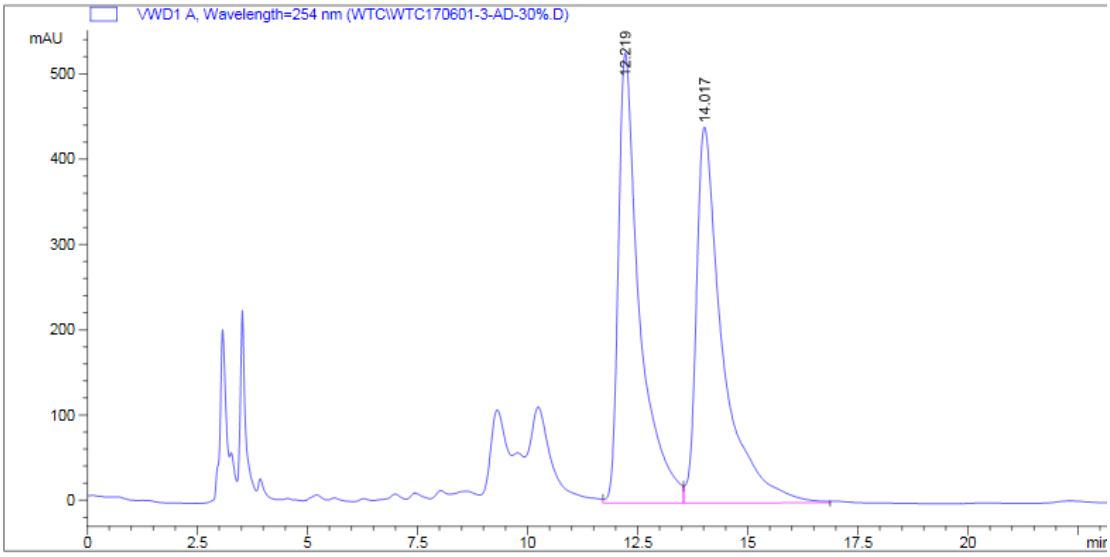
Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	41.258	BV	0.9049	2.71982e4	463.21030	42.1105
2	43.420	VB	1.0313	5089.74121	75.47625	7.8804
3	50.422	BV	1.1262	2.79479e4	381.19403	43.2712
4	53.925	VB	1.2151	4351.94287	54.95567	6.7380



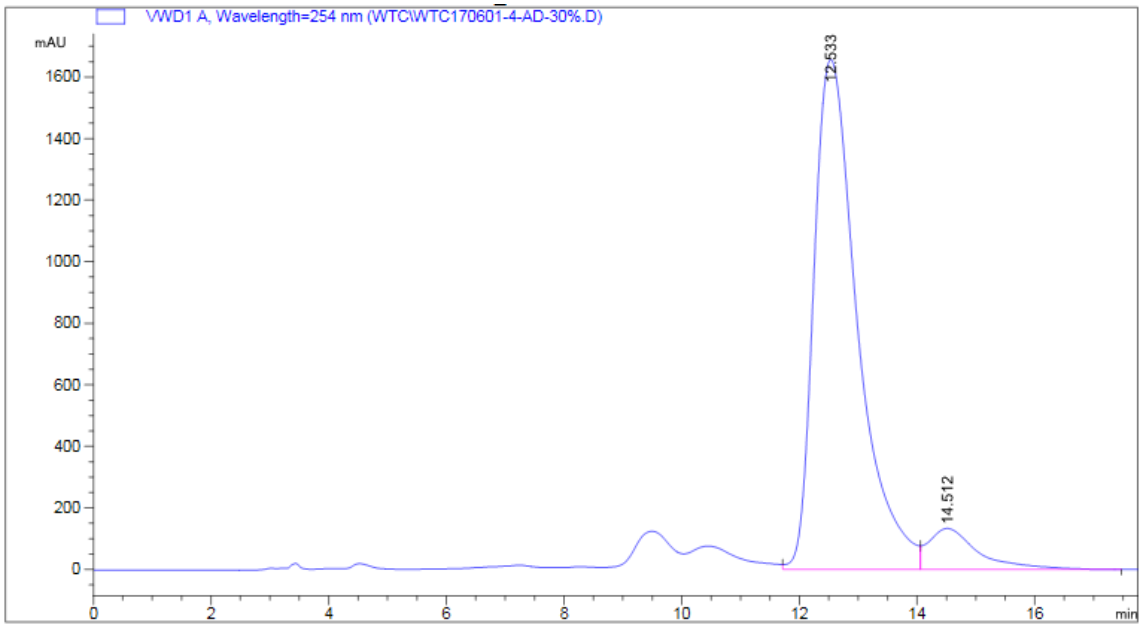
Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	39.786	BV	0.8270	1.53303e4	285.01675	71.8635
2	41.761	VB	0.9064	4274.27783	71.42735	20.0364
3	48.924	VB	1.1231	1249.63354	16.29781	5.8579
4	51.992	BB	1.3783	478.32056	4.35721	2.2422

Ethyl (*4E, 6E*)-8-((*R*)-5-(4-cyanobenzyl)-4-oxo-2-phenyl-4, 5-dihydrothiazol-5-yl)octa-4,6-dienoate (3dm)



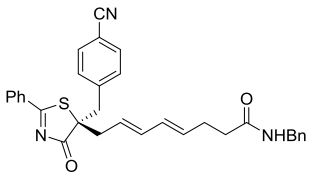


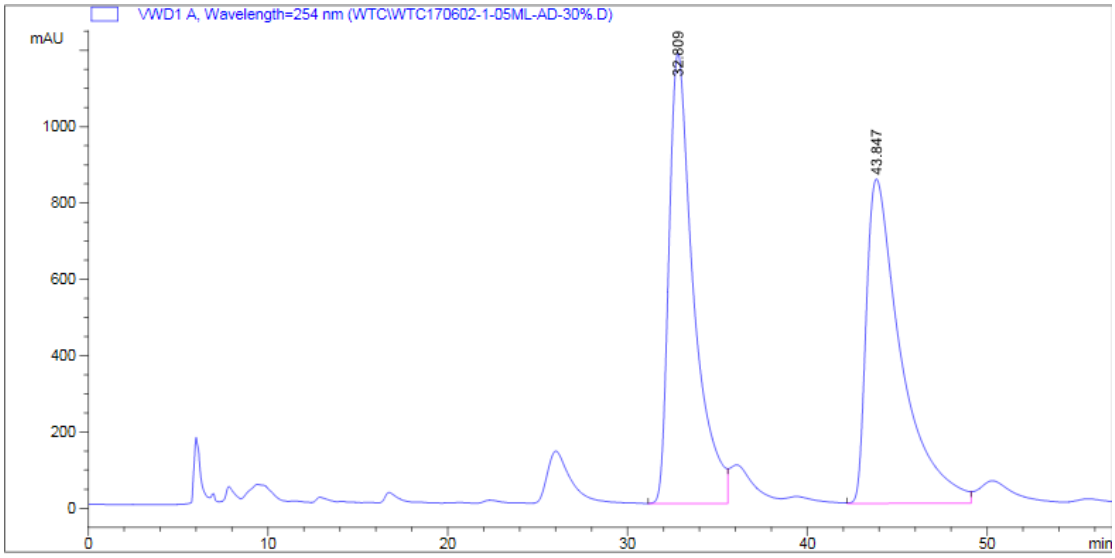
Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	12.219	VV	0.4813	1.76830e4	527.59277	49.1703
2	14.017	VB	0.5914	1.82797e4	440.89505	50.8297



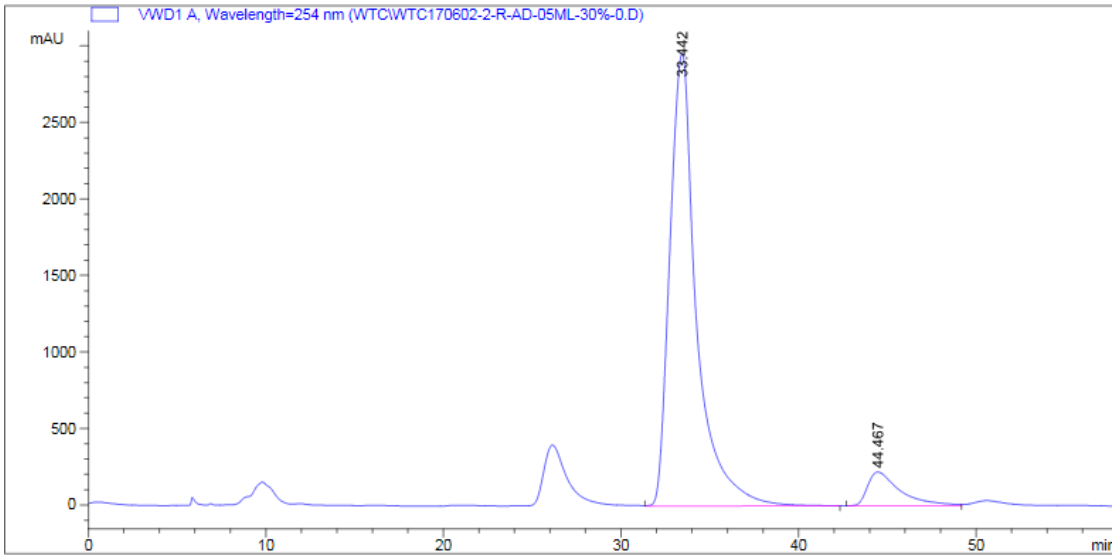
Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	12.533	VV	0.7827	8.51152e4	1657.07507	91.5145
2	14.512	VB	0.8585	7892.10986	133.24010	8.4855

(*4E, 6E*)-N-benzyl-8-((*R*)-5-(4-cyanobenzyl)-4-oxo-2-phenyl-4, 5-dihydrothiazol-5-yl) octa-4,6-dienamide (3dn)



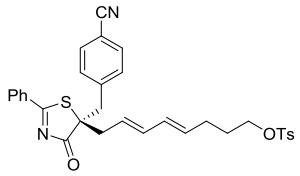


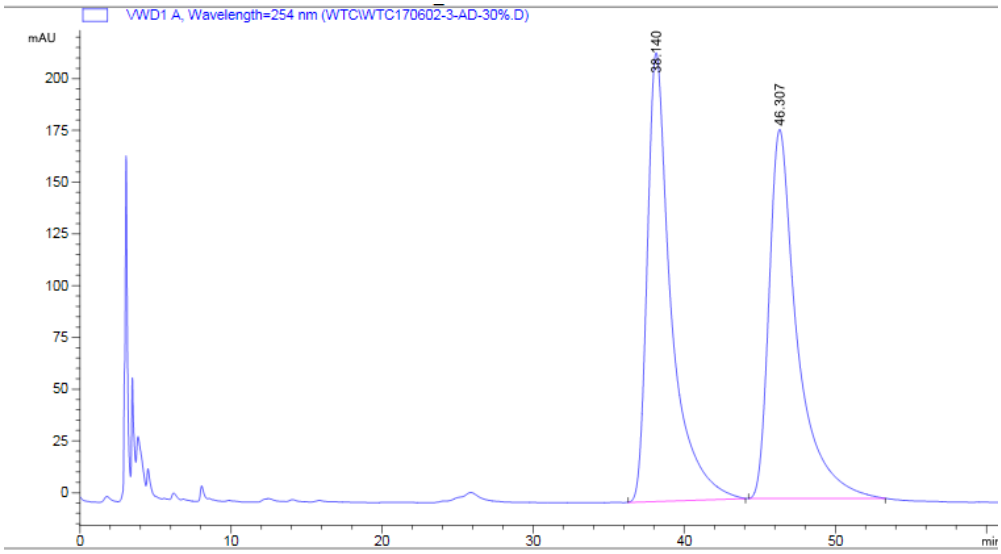
Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	32.809	BV	1.4064	1.12157e5	1179.49414	49.6006
2	43.847	VV	1.9380	1.13963e5	849.43475	50.3994



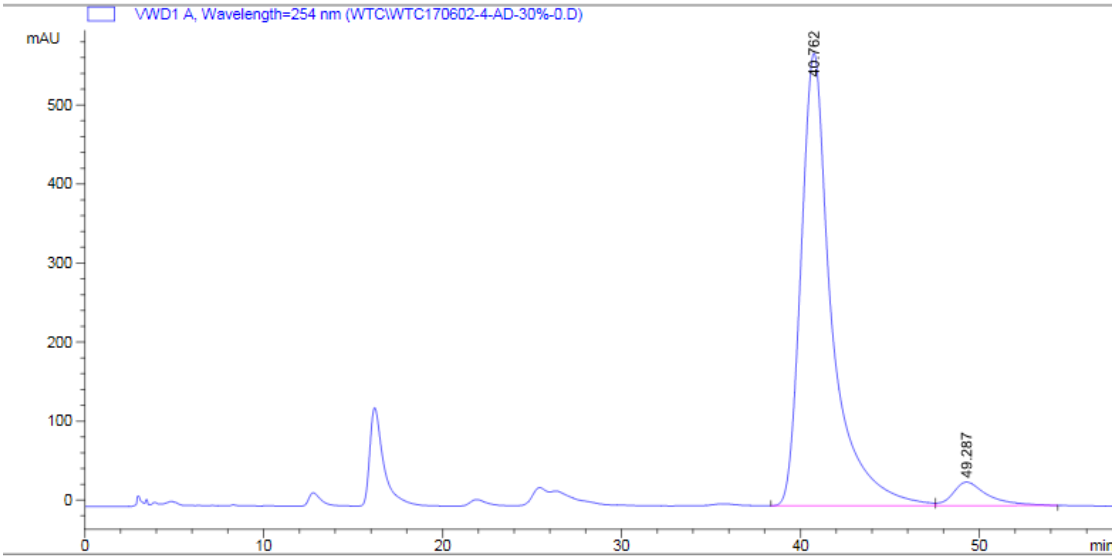
Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	33.442	VB	1.5698	3.07893e5	2957.48608	91.5561
2	44.467	BV	1.8461	2.83957e4	221.35519	8.4439

(*4E*, *6E*)-8-((*R*)-5-(4-cyanobenzyl)-4-oxo-2-phenyl-4, 5-dihydrothiazol-5-yl) octa-4,6-dien-1-yl 4-methylbenzenesulfonate (3 do)



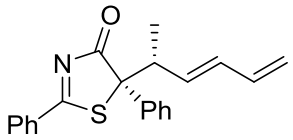


Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	38.140	BB	1.5878	2.37886e4	216.73013	50.7934
2	46.307	BB	1.8751	2.30454e4	178.26566	49.2066

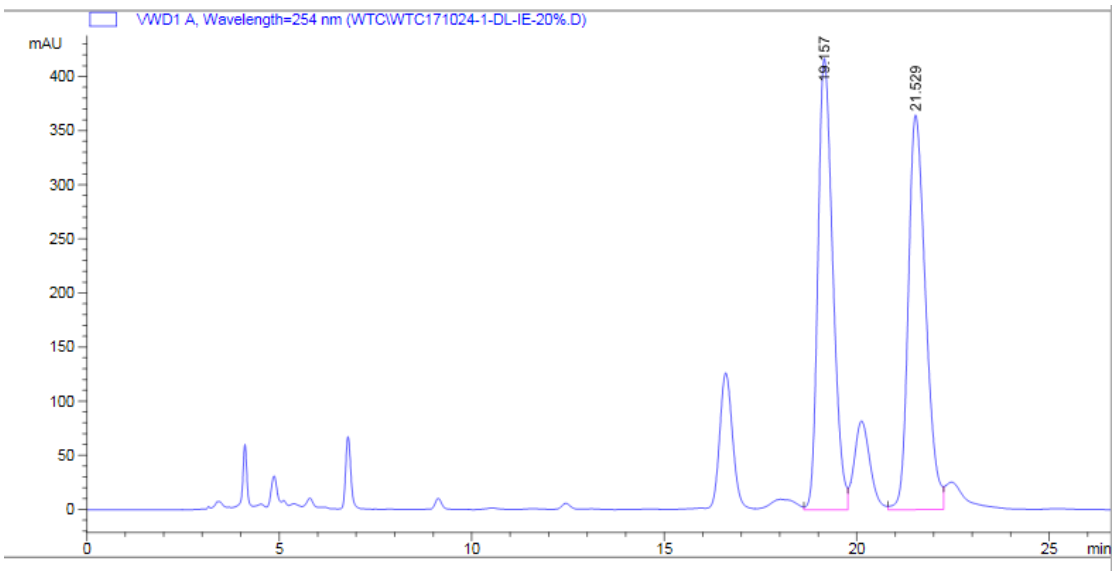


Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	40.762	BB	1.7458	6.81650e4	573.12109	94.4432
2	49.287	BB	1.9447	4010.65942	29.76505	5.5568

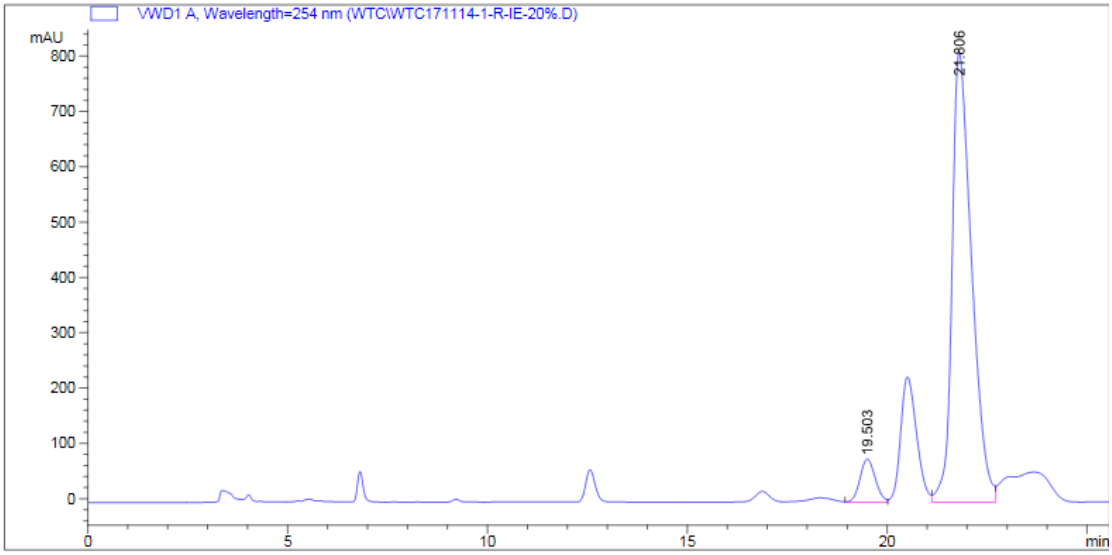
(*S*)-5-((*R*, *E*)-hexa-3, 5-dien-2-yl)-2, 5-diphenylthiazol-4(5H)-one (6aa)



Major

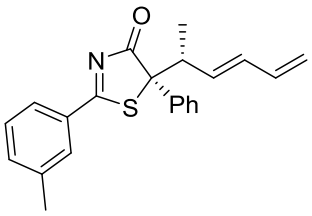


Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	19.157	VV	0.4116	1.11681e4	416.87454	49.4961
2	21.529	VV	0.4813	1.13955e4	364.37421	50.5039

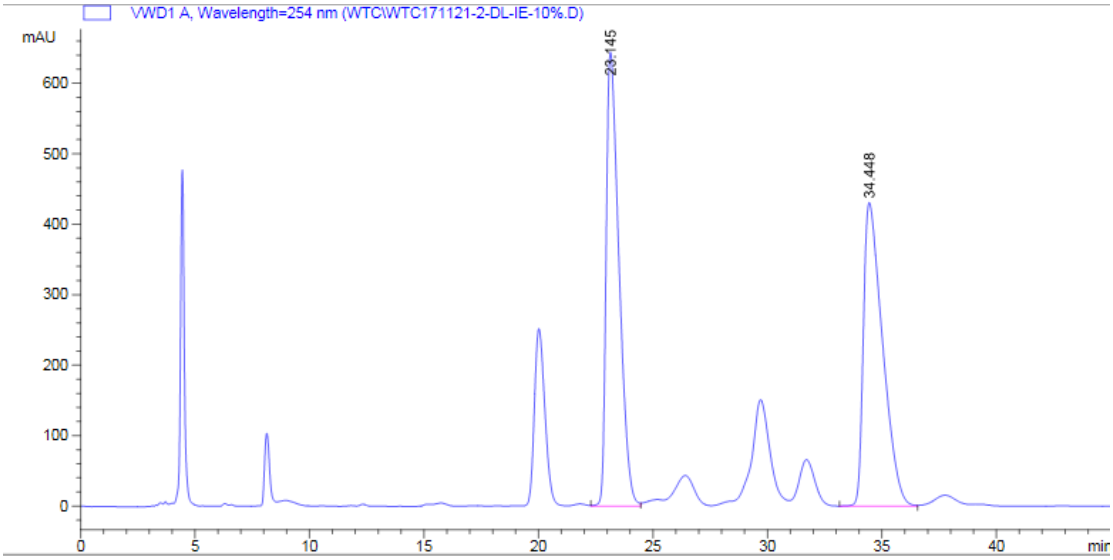


Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	19.503	VV	0.4166	2083.39551	77.95871	6.9888
2	21.806	VV	0.5146	2.77273e4	812.55750	93.0112

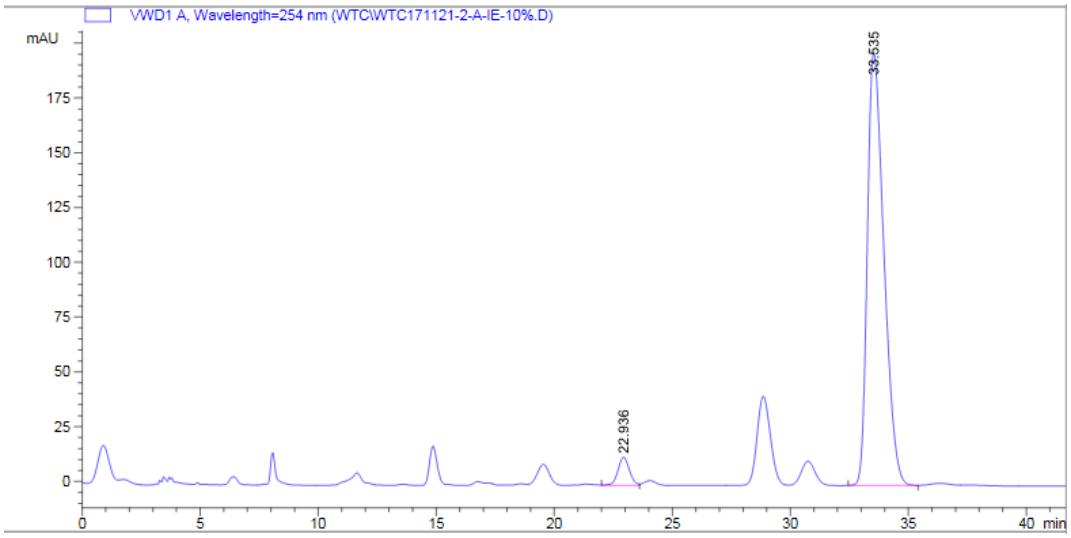
(*S*)-5-((*R, E*)-hexa-3, 5-dien-2-yl)-5-phenyl-2-(m-tolyl) thiazol-4(5H)-one (6ba)



Major

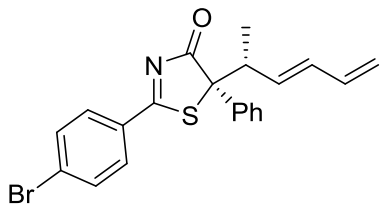


Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	23.145	VV	0.5938	2.50870e4	644.70264	49.9701
2	34.448	VV	0.8836	2.51170e4	431.06577	50.0299

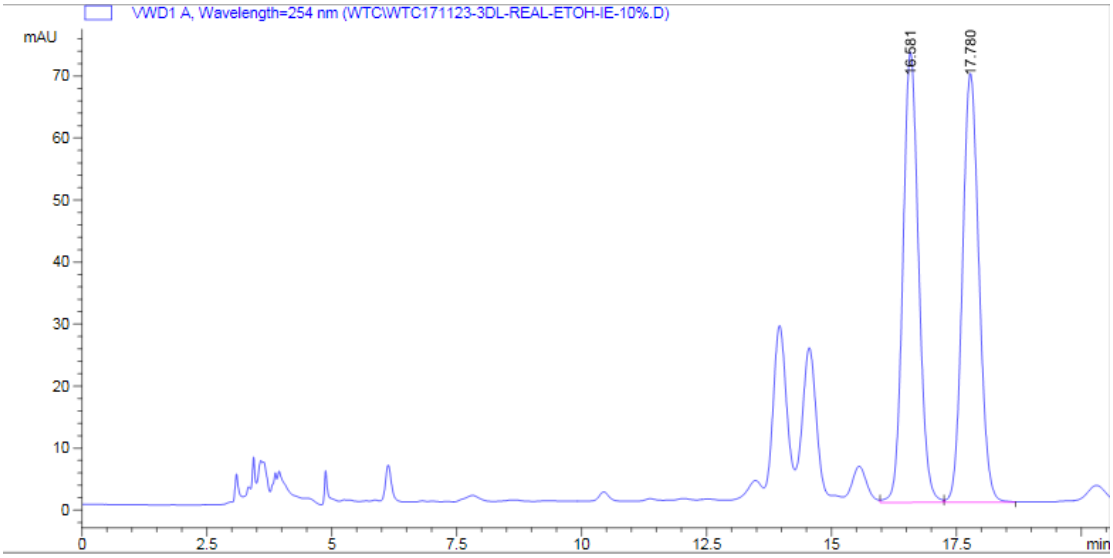


Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	22.936	VV	0.5291	439.34167	12.87673	4.3742
2	33.535	BB	0.7534	9604.63574	197.60728	95.6258

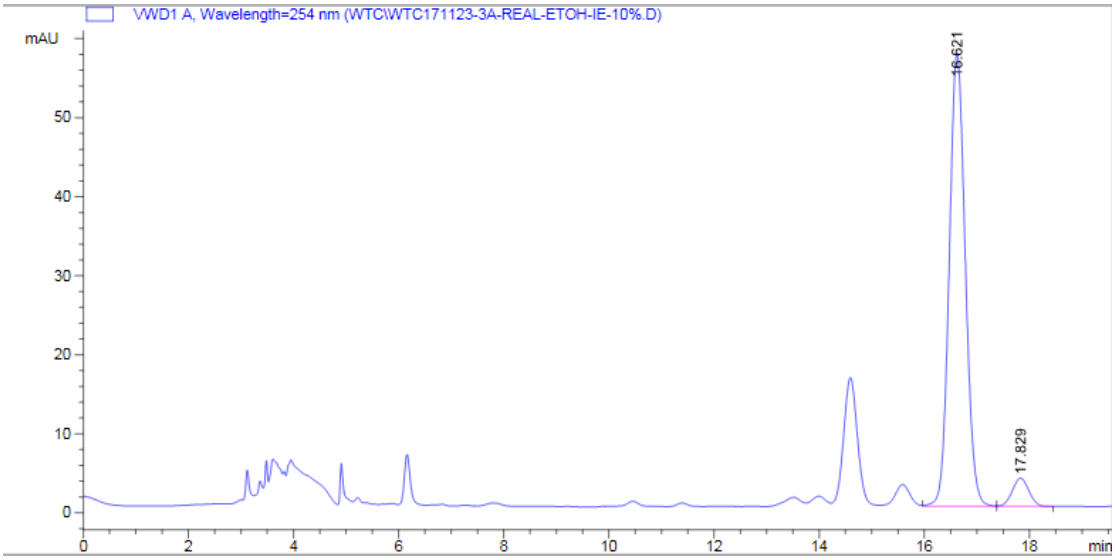
(*S*)-2-(4-bromophenyl)-5-((*R*, *E*)-hexa-3, 5-dien-2-yl)-5-phenylthiazol-4(5H)-one (6ca)



Major

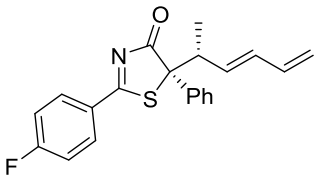


Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	16.581	VV	0.3390	1585.05713	72.65476	49.9347
2	17.780	VB	0.3584	1589.20129	69.15379	50.0653

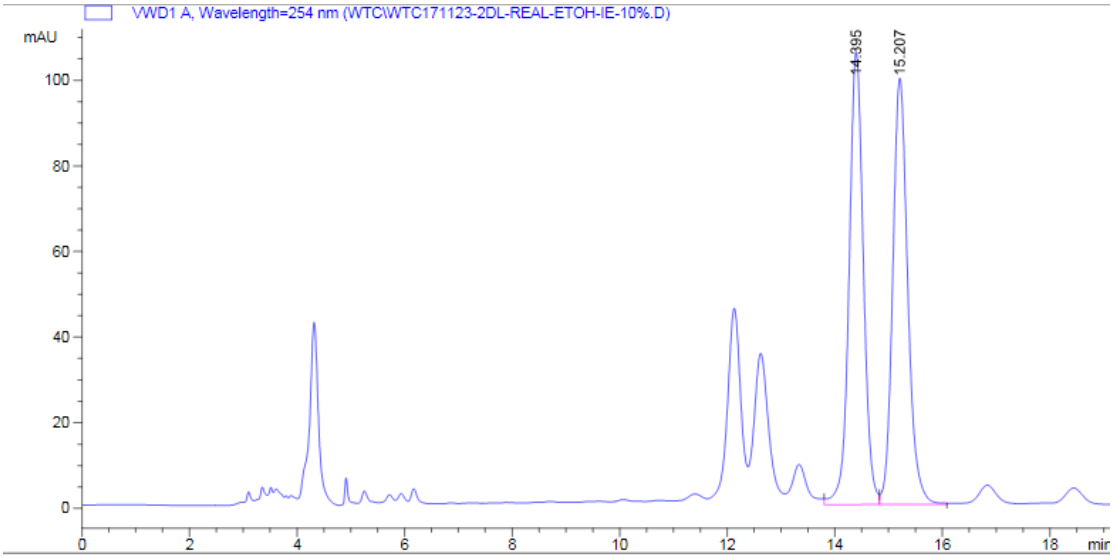


Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	16.621	VV	0.3327	1219.98889	57.32504	93.8867
2	17.829	VB	0.3458	79.43822	3.58579	6.1133

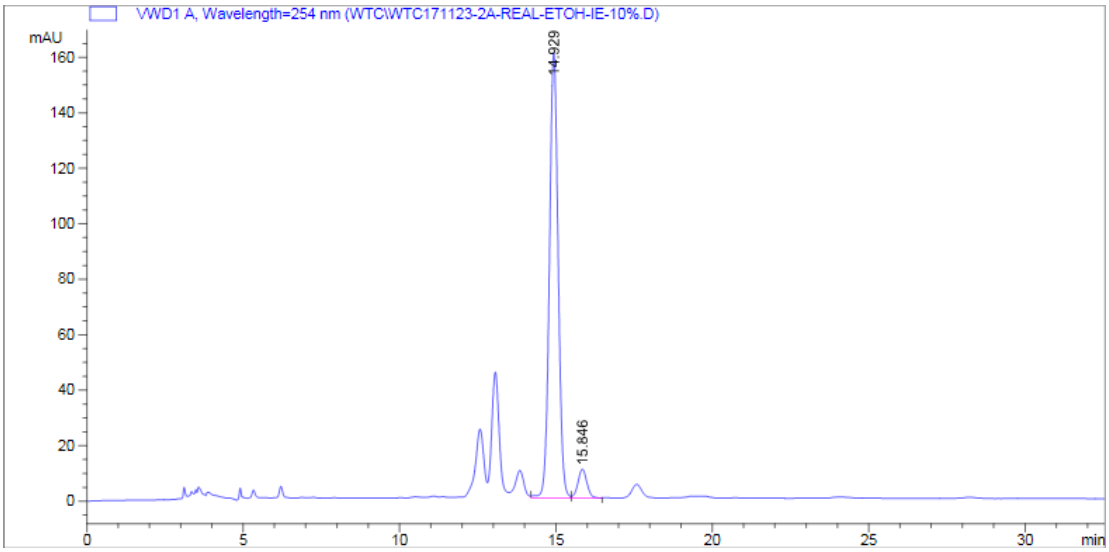
(*S*)-2-(4-fluorophenyl)-5-((*R*, *E*)-hexa-3, 5-dien-2-yl)-5-phenylthiazol-4(5H)-one (6da)



Major

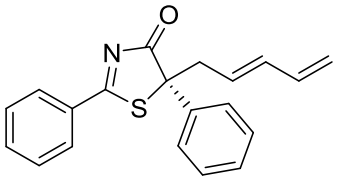


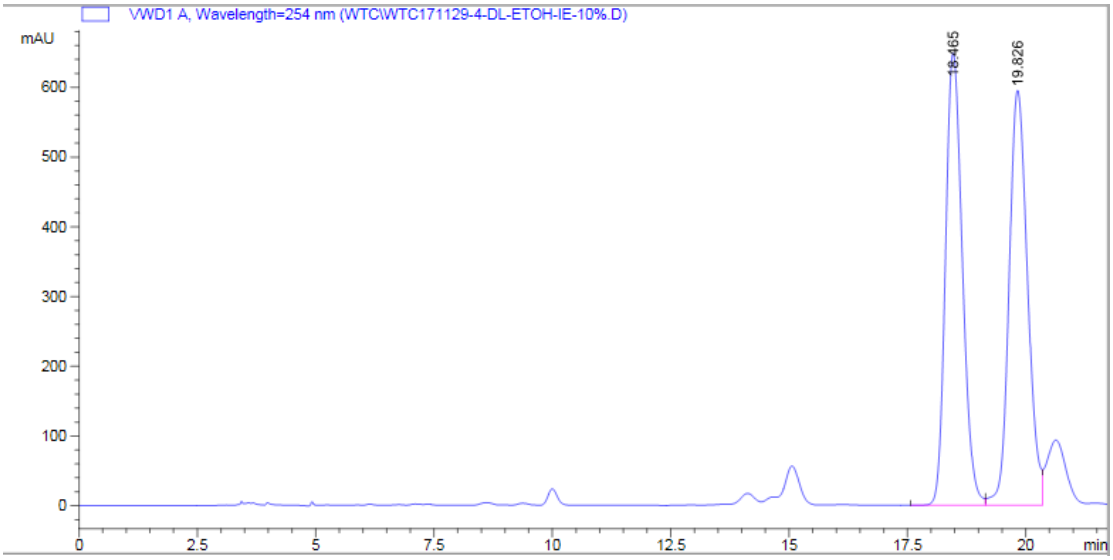
Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	14.395	VV	0.2827	1954.97241	105.71167	50.2616
2	15.207	VB	0.2965	1934.62073	99.58411	49.7384



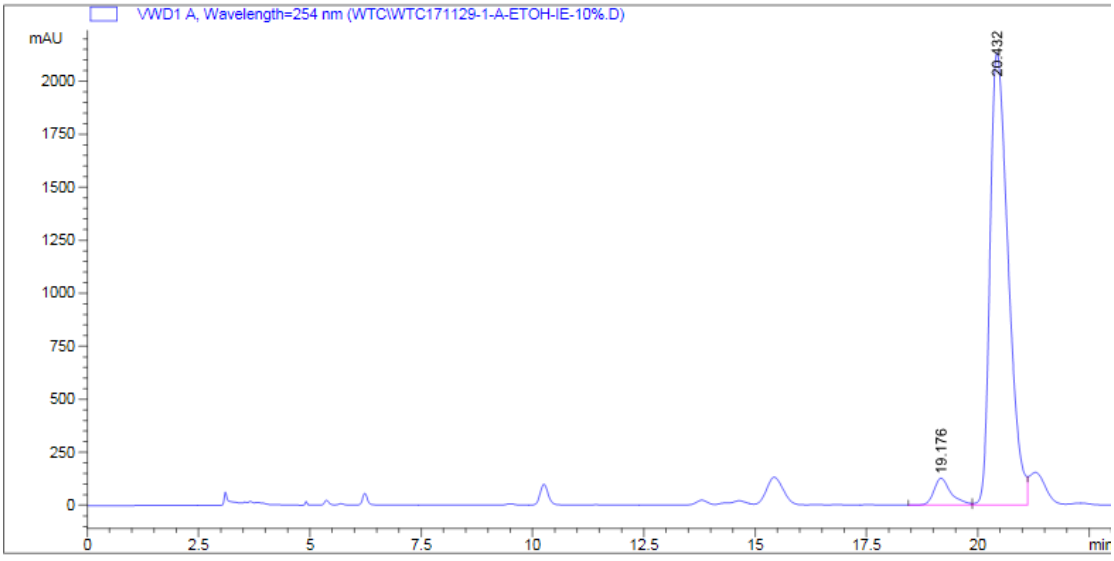
Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	14.929	VV	0.2992	3116.13037	160.60559	93.7998
2	15.846	VB	0.3071	205.97571	10.38609	6.2002

(*S*, *E*)-5-(penta-2, 4-dien-1-yl)-2, 5-diphenylthiazol-4(5H)-one (6ab)



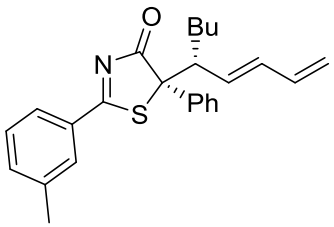


Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	18.465	VV	0.3817	1.60382e4	648.51019	49.8331
2	19.826	VV	0.4214	1.61456e4	595.05988	50.1669

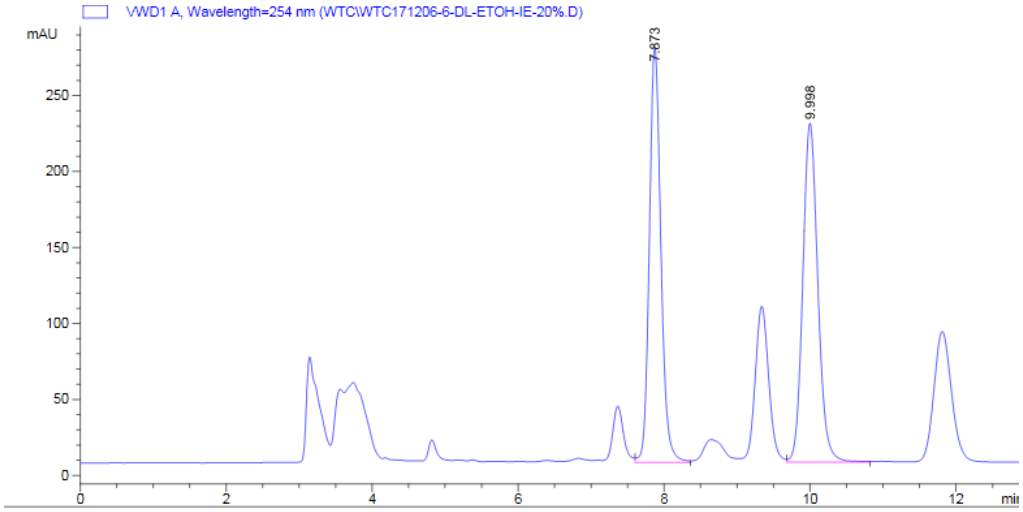


Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	19.176	VV	0.3959	3421.10962	126.97567	5.3362
2	20.432	VV	0.4429	6.06906e4	2131.24463	94.6638

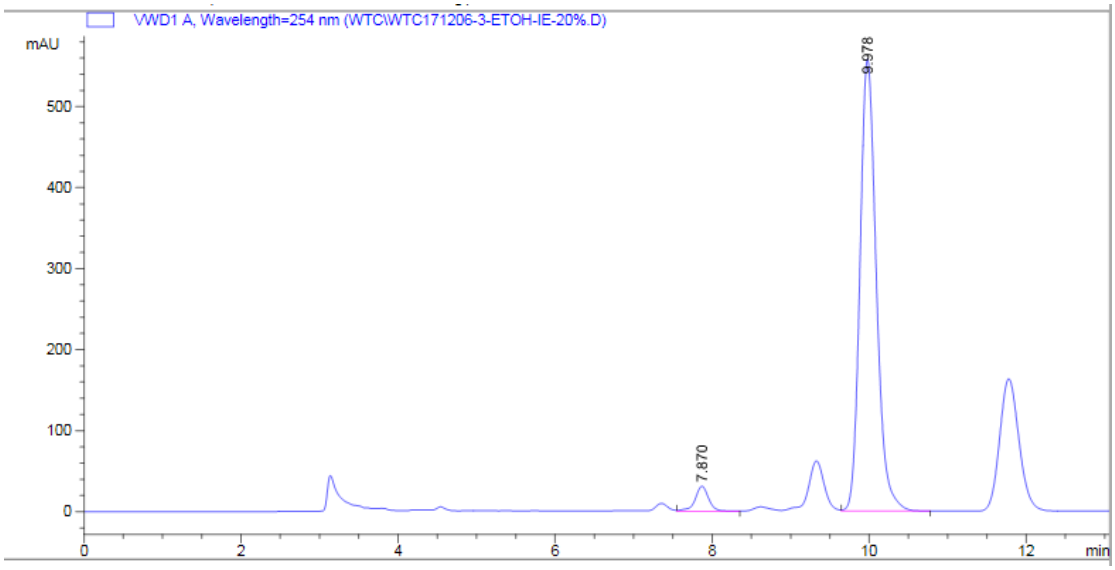
(*S*)-5-((*R*,*E*)-deca-1,3-dien-5-yl)-5-phenyl-2-(m-tolyl)thiazol-4(5H)-one (6bc)



Major

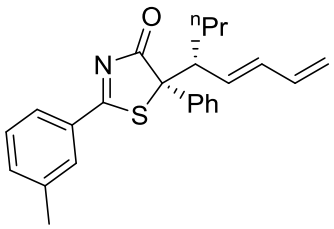


Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	7.873	VV	0.1689	2997.06763	272.86258	48.3287
2	9.998	VV	0.2200	3204.36206	223.08243	51.6713

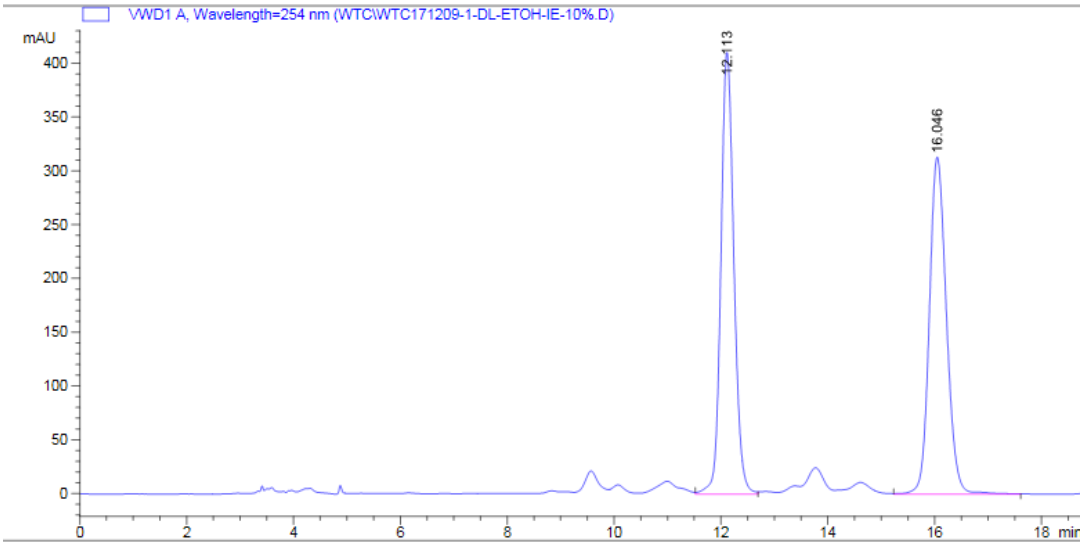


Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	7.870	VV	0.1819	373.96054	30.91031	4.4256
2	9.978	VB	0.2241	8075.94141	558.10651	95.5744

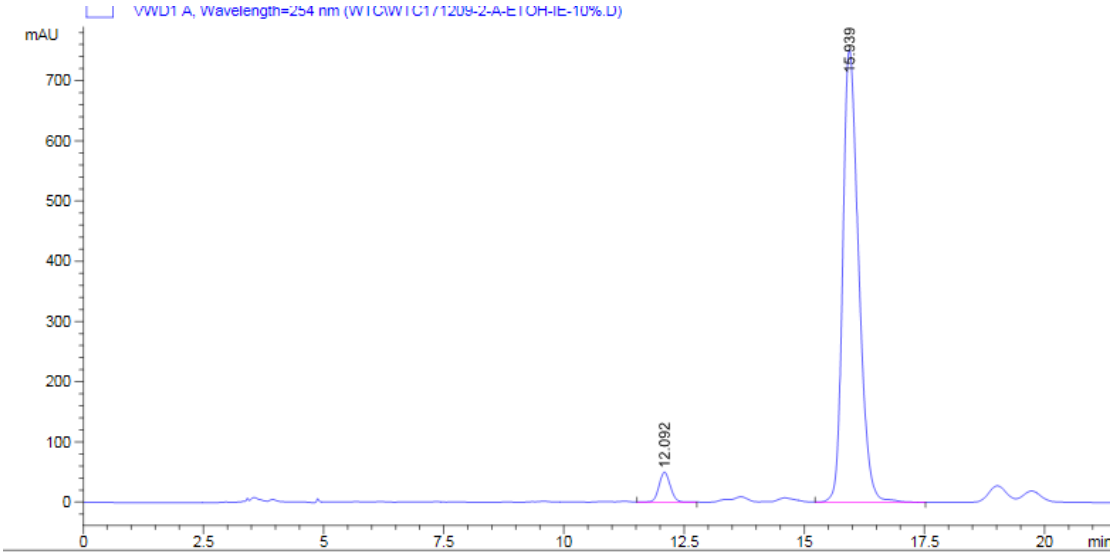
(*S*)-5-((*R, E*)-nona-1, 3-dien-5-yl)-5-phenyl-2-(m-tolyl) thiazol-4(5H)-one (6bd)



Major

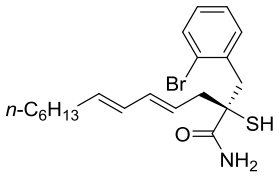


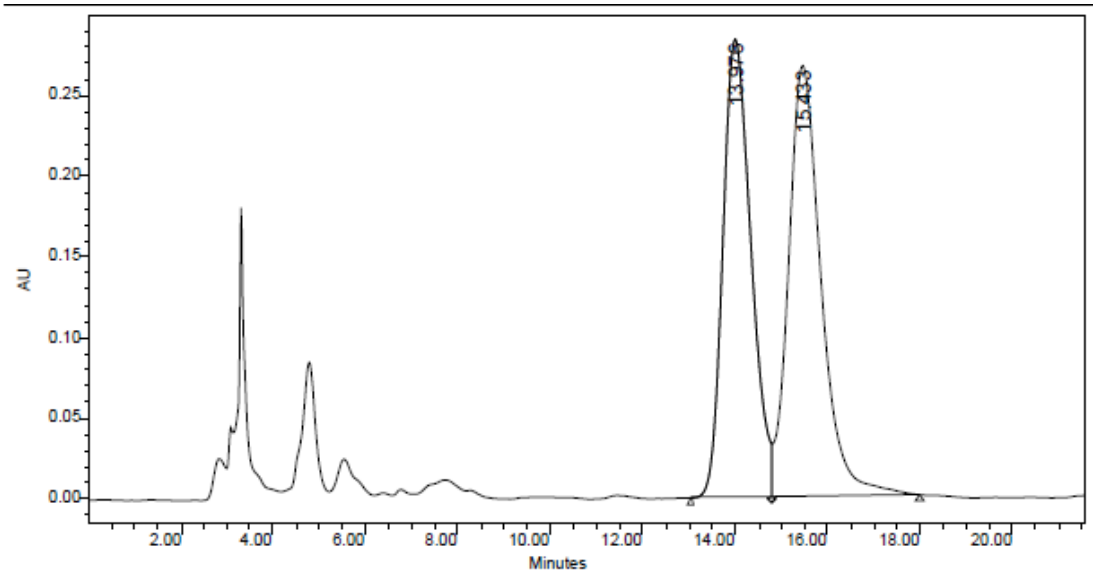
Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	12.113	VV	0.2611	6932.89551	410.42548	49.9950
2	16.046	VB	0.3427	6934.28906	313.19989	50.0050



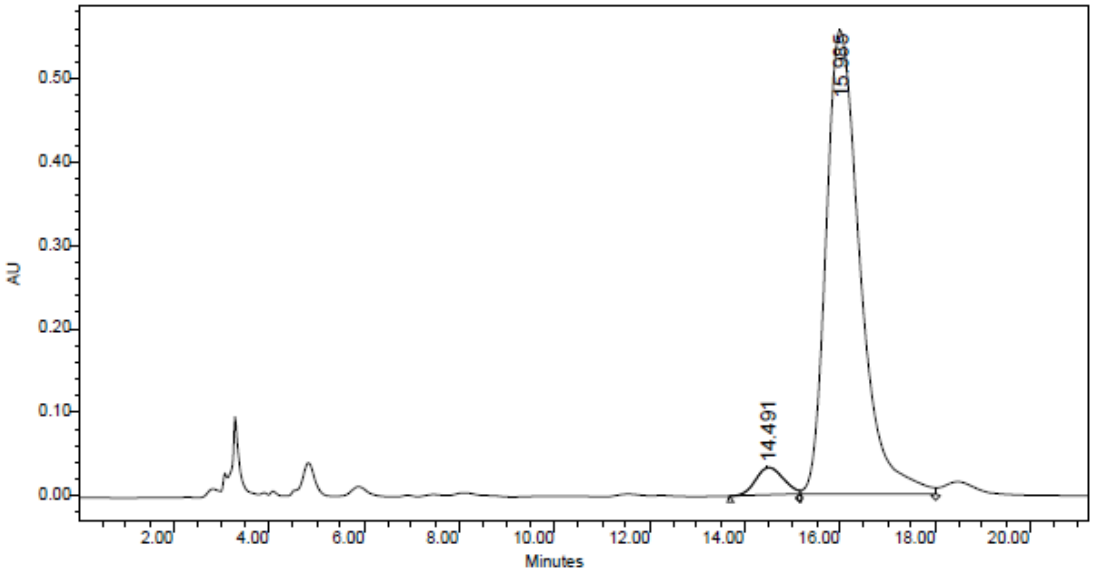
Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	12.092	VB	0.2606	846.65155	50.26263	4.6761
2	15.939	VB	0.3551	1.72593e4	752.01715	95.3239

(*S*, *4E*, *6E*)-2-(2-bromobenzyl)-2-mercaptotrideca-4, 6-dienamide (P1)



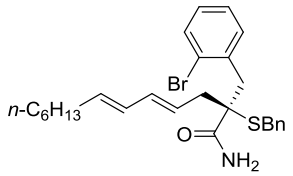


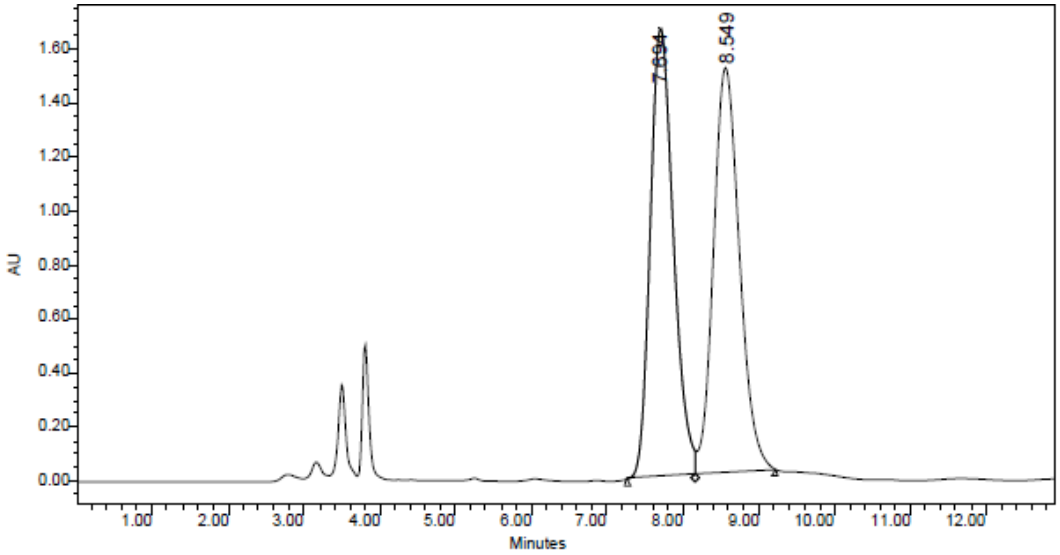
	RT (min)	Area (μV*sec)	% Area	Height (μV)	% Height
1	13.976	11996006	47.82	283611	51.52
2	15.433	13091085	52.18	266886	48.48



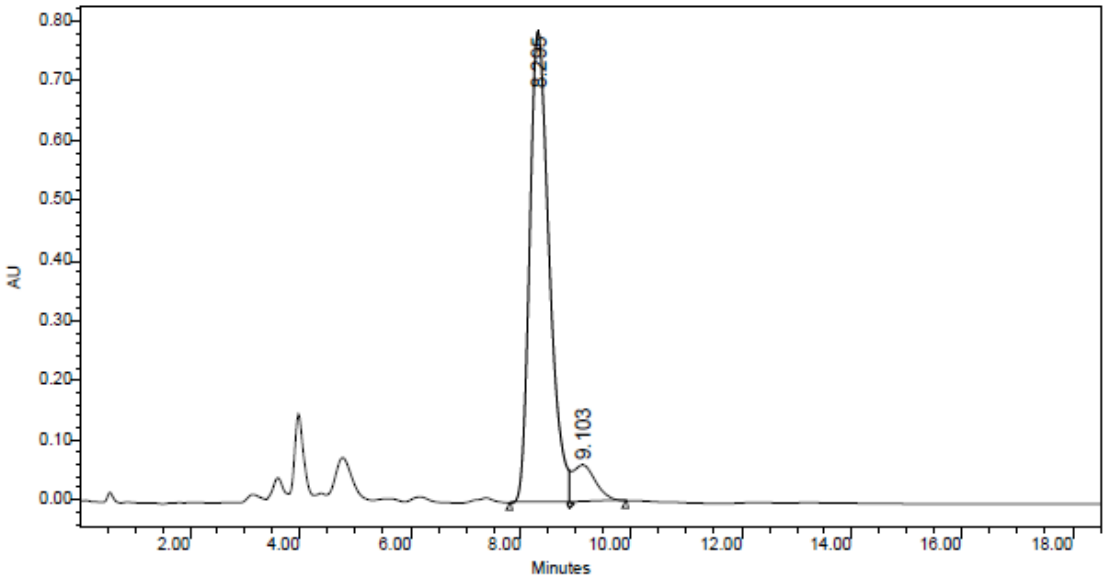
	RT (min)	Area (μV*sec)	% Area	Height (μV)	% Height
1	14.491	1399413	4.80	33481	5.67
2	15.985	27752708	95.20	556649	94.33

(*S, 4E, 6E*)-2-(benzylthio)-2-(2-bromobenzyl) trideca-4, 6-dienamide (P2)



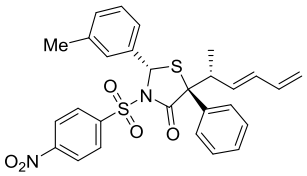


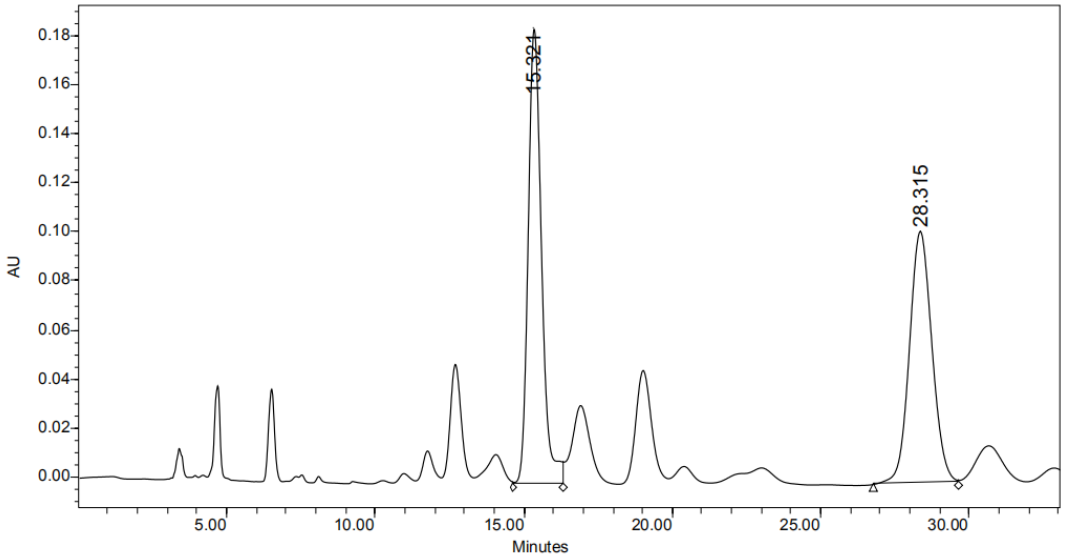
	RT (min)	Area (μV*sec)	% Area	Height (μV)	% Height
1	7.694	35279328	49.62	1661220	52.54
2	8.549	35818056	50.38	1500424	47.46



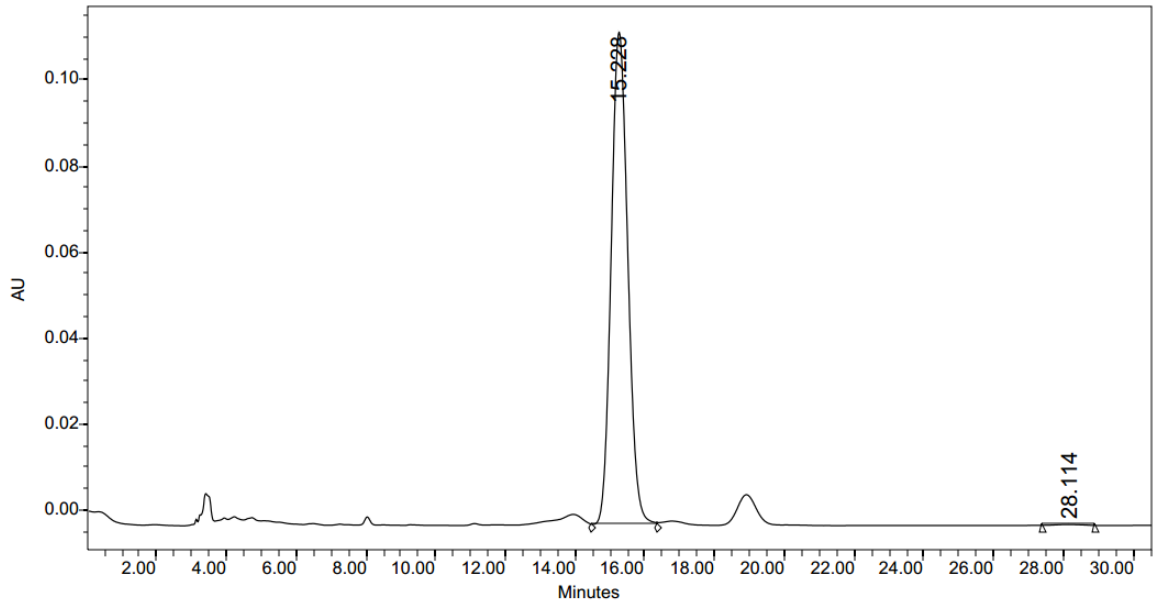
	RT (min)	Area (μV*sec)	% Area	Height (μV)	% Height
1	8.295	19505474	91.88	788190	92.76
2	9.103	1723058	8.12	61528	7.24

(*2S, 5S*)-5-((*R,E*)-hexa-3,5-dien-2-yl)-3-((4-nitrophenyl)sulfonyl)-2,5-diphenylthiazolidin-4-one (P3)





	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	15.321	5815763	51.71	185402	64.34
2	28.315	5431897	48.29	102777	35.66



	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	15.228	3813179	99.75	114660	99.83
2	28.114	9644	0.25	196	0.17