Electronic Supplementary Material (ESI) for Organic Chemistry Frontiers.

Supporting Information

General Information

Proton (^{1}H NMR) and carbon (^{13}C NMR) nuclear magnetic resonance spectra were recorded at 500 MHz and 126 MHz, respectively. The chemical shifts are given in parts per million (ppm) on the delta (δ) scale. The solvent peak was used as a reference value, for ^{1}H NMR: $CDCl_3$ = 7.26 ppm, for ^{13}C NMR: $CDCl_3$ = 77.23. Analytical TLC was performed on precoated silica gel GF254 plates. Column chromatography was carried out on silica gel (200–300 mesh). Optical rotations were measured using a 2.5 mL cell with a 10 cm path length on Hanon P850 Automatic Polarimeter and concentrations (c) were reported in g×(100 mL)$^{-1}$. Enantiomeric excesses weredetermined by HPLC using a Daicel Chiralpak and Chiralcel column withhexane/*i*-PrOH as the eluent on Dionex instrument. All the substrates adopted in this work were known and prepared following established procedure.[1]

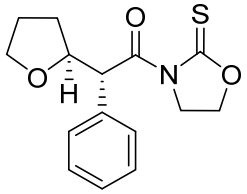
General Procedure

To a solution of **2** (1 mmol, 1.0 equiv) in THF/CH_2Cl_2 (1.5 mL/0.5 mL) was added **L**/$Ni(OTf)_2$ (0.1 mmol, 10 mol%) at -40 ºC. Then a solution of 2,4,6-collidine (0.396 mL, 3 mmol, 3.0 equiv) and $BF_3 \cdot OEt_2$ (0.495 mL, 4 mmol, 4.0 equiv) were added to the reaction mixture, and it was allowed to warm to rt in 5 min. After that, **1ab** (0.41 mL, 2.5 mmol, 2.5 equiv) was added and the resulting mixture was stirred for another 2h. The solvent was removed and the residue was purified by silica gel chromatography to give the desired product.

Analytical Data for Substrates and Products

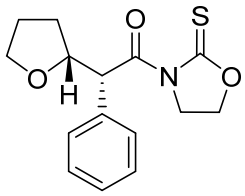
Preparation of L/Ni(OTf)$_2$

To a suspension of **L** (0.5 mmol) in acetonitrile (10 mL) was added anhydrous $NiBr_2$ (109 mg, 0.5 mmol) and one drop of water. The mixture was stirred at reflux overnight before the solvent was removed. The residue was triturated with toluene, followed by filtration to afford a violet solid. To a stirred suspension of the solid (0.4 mmol) in CH_2Cl_2 (4 mL) was added anhydrous AgOTf (204 mg, 0.8 mmol). After filtration through celite, the solvent was removed under reduced pressure to afford the expected **L/Ni(OTf)$_2$**.



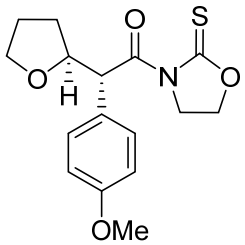
(*R*)-2-Phenyl-2-((*S*)-tetrahydrofuran-2-yl)-1-(2-thioxooxazolidin-3-yl)ethanone (3a)

The compounds were prepared according to general procedure and purified by silica gel chromatography (CH_2Cl_2/EtOAc 100:0 to 99:1) affording **3a** in 56% yield (164.6 mg) and **3a'** in 30% yield (86.1 mg), corresponding to a combined yield of 86% (250.7 mg) and a 1.9:1 d.r.. ^{1}H NMR (500 MHz, $CDCl_3$) δ 7.47 (dd, *J* = 5.2, 3.3 Hz, 2H), 7.37–7.30 (m, 2H), 7.28 (dt, *J* = 4.8, 1.9 Hz, 1H), 6.29 (d, *J* = 8.3 Hz, 1H), 4.58–4.47 (m, 2H), 4.43–4.34 (m, 1H), 4.25 (ddd, *J* = 11.3, 9.5, 8.6 Hz, 1H), 4.13 (ddd, *J* = 11.3, 9.3, 6.4 Hz, 1H), 3.87–3.80 (m, 1H), 3.73 (td, *J* = 7.9, 6.2 Hz, 1H), 2.12 (m, 1H), 1.98–1.82 (m, 2H), 1.71 (ddt, *J* = 12.3, 8.6, 6.9 Hz, 1H); ^{13}C NMR (126 MHz, $CDCl_3$) δ 185.4, 173.7, 136.1, 129.8, 128. 7, 127.9, 81.1, 68.5, 66.2, 52.9, 47.7, 30.5, 25.8; HPLC: the ee value was determined by HPLC analysis (Chiralpak AD-H, *i*-PrOH/Hexane = 5/95, 1.0 mL/min, 277 nm), retention time: t_{major} = 27.170 min, t_{minor} = 29.370 min, ee = 98%. The NMR spectral data is consistent with reported literature values.[2]



(*R*)-2-Phenyl-2-((*R*)-tetrahydrofuran-2-yl)-1-(2-thioxooxazolidin-3-yl)ethanone (3a')

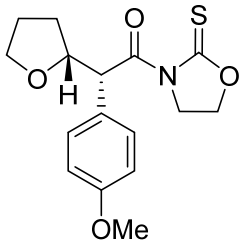
^{1}H NMR (500 MHz, $CDCl_3$) δ 7.50 (dt, *J* = 3.3, 2.0 Hz, 2H), 7.35–7.30 (m, 2H), 7.30–7.26 (m, 1H), 6.29 (d, *J* = 9.8 Hz, 1H), 4.67 (dt, *J* = 9.8, 6.5 Hz, 1H), 4.48 (ddd, *J* = 9.4, 8.9, 7.5 Hz, 1H), 4.40 (td, *J* = 9.1, 7.5 Hz, 1H), 4.33 (ddd, *J* = 11.2, 9.5, 7.4 Hz, 1H), 4.14 (ddd, *J* = 11.2, 9.3, 7.5 Hz, 1H), 3.94 (dt, *J* = 13.9, 7.0 Hz, 1H), 3.83 (td, *J* = 7.9, 6.0 Hz, 1H), 2.02–1.91 (m, 1H), 1.90–1.80 (m, 1H), 1.74–1.64 (m, 1H), 1.63–1.52 (m, 1H); ^{13}C NMR (126 MHz, $CDCl_3$) δ 185.6, 174.1, 135.1, 129.6, 128.7, 127.9, 81.9, 68.6, 66.2, 52.9, 47.5, 29.4, 25.5; HPLC: the ee value was determined by HPLC analysis (Chiralpak AD-H, *i*-PrOH/Hexane = 25/75, 1.0 mL/min, 275 nm), retention time: t_{minor} = 8.327 min, t_{major} = 12.540 min, ee = 96%. The NMR spectral data is consistent with reported literature values.[2]



(*R*)-2-(4-Methoxyphenyl)-2-((*S*)-tetrahydrofuran-2-yl)-1-(2-thioxooxazolidin-3-yl)ethan-1-one (3b)

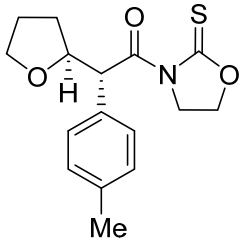
The compounds were prepared according to general procedure and purified by silica gel chromatography (CH_2Cl_2/EtOAc100:0 to 99:1) affording **3b** in 47% yield (149.7 mg) and **3b'** in 23% yield (74.3 mg), corresponding to a combined yield of 70% (224.0 mg) and a 2:1 d.r. ^{1}H NMR (500 MHz, $CDCl_3$) δ 7.44–7.36 (m, 2H), 6.90–6.82 (m, 2H), 6.21 (d, *J* = 8.2 Hz, 1H), 4.51 (m,2H), 4.40 (q, *J* = 9.0 Hz, 1H), 4.29–4.22 (m, 1H), 4.12 (ddd, *J* = 11.3, 9.3, 6.4 Hz, 1H), 3.85–3.78 (m, 1H), 3.79 (d, *J* = 7.1 Hz, 3H), 3.72 (dd, *J* = 14.2, 7.8 Hz, 1H), 2.15–2.07 (m, 1H), 1.93–1.84 (m, 2H), 1.72–1.66 (m,

1H); ^{13}C NMR (126 MHz, $CDCl_3$) δ 185.4, 174.0, 159.3, 130.9, 128.1, 114.2, 81.1, 68.5, 66.2, 55.4, 52.2, 47.7, 30.5, 29.9, 25.8; HPLC: the ee value was determined by HPLC analysis (Chiralpak AD-H, *i*-PrOH/Hexane = 25/75, 1.0 mL/min, 276 nm), retention time: t_{minor} = 15.447 min, t_{major} = 16.733 min, ee = 97%. The NMR spectral data is consistent with reported literature values.[2]



(*R*)-2-(4-Methoxyphenyl)-2-((*R*)-tetrahydrofuran-2-yl)-1-(2-thioxooxazolidin-3-yl)ethan-1-one (3b')

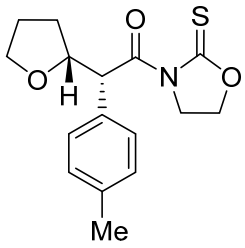
^{1}H NMR (500 MHz, $CDCl_3$) δ 7.51–7.35 (m, 2H), 6.92–6.80 (m, 2H), 6.20 (d, *J* = 9.9 Hz, 1H), 4.63 (dt, *J* = 9.9, 6.5 Hz, 1H), 4.49 (td, *J* = 9.2, 7.6 Hz, 1H), 4.42 (m, 1H), 4.34 (ddd, *J* = 11.2, 9.6, 7.4 Hz, 1H), 4.14 (ddd, *J* = 11.2, 9.3, 7.5 Hz, 1H), 3.92 (dt, *J* = 13.9, 7.0 Hz, 1H), 3.84–3.80 (m, 1H), 3.78 (s, 3H), 1.98–1.90 (m, 1H), 1.87–1.79 (m, 1H), 1.72–1.66 (m, 1H), 1.59–1.51 (m, 1H); ^{13}C NMR (126 MHz, $CDCl_3$) δ 185.6, 174.5, 159.4, 130.7, 127.3, 114.2, 81.9, 68.8, 66.2, 55.4, 52.2, 47.6, 29.5, 25.6; HPLC: the ee value was determined by HPLC analysis (Chiralpak AD-H, *i*-PrOH/Hexane = 25/75, 1.0 mL/min, 276 nm), retention time: t_{major} = 11.373 min, t_{minor} = 15.463 min, ee = 96%. The NMR spectral data is consistent with reported literature values.[2]



(*R*)-2-((*S*)-Tetrahydrofuran-2-yl)-1-(2-thioxooxazolidin-3-yl)-2-(p-tolyl)ethanone (3c)

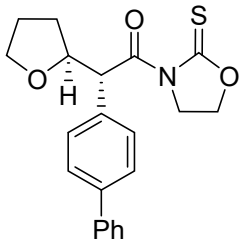
The compounds were prepared according to general procedure and purified by silica gel chromatography (CH_2Cl_2/EtOAc 100:0 to 99:1) affording **3c** in 51% yield (154.8 mg) and **3c'** in 24% yield (73.4 mg), corresponding to a combined yield of 75% (228.2 mg) and a 2.1:1 d.r. ^{1}H NMR (500 MHz, $CDCl_3$) δ 7.36 (d, *J* = 8.1 Hz, 2H),

7.14 (d, *J* = 7.9 Hz, 2H), 6.23 (d, *J* = 8.4 Hz, 1H), 4.56–4.46 (m, 2H), 4.38 (q, *J* = 8.9 Hz, 1H), 4.29–4.20 (m, 1H), 4.11 (ddd, *J* = 11.3, 9.3, 6.3 Hz, 1H), 3.87–3.80 (m, 1H), 3.72 (td, *J* = 7.8, 6.3 Hz, 1H), 2.31 (s, 3H), 2.16–2.08 (m, 1H), 1.95–1.82 (m, 2H), 1.74–1.66 (m, 1H); ^{13}C NMR (126 MHz, $CDCl_3$) δ 185.4, 173.9, 137.6, 133.1, 129.6, 129.4, 81.2, 68.5, 66.2, 52.7, 47.7, 30.6, 25.8, 21.4; HPLC: the ee value was determined by HPLC analysis (Chiralcel OD-H, *i*-PrOH/Hexane = 30/70, 1.0 mL/min, 274 nm), retention time: t_{minor} = 10.793 min, t_{major} = 23.550 min, ee = 91%. The NMR spectral data is consistent with reported literature values.[2]



(*R*)-2-((*R*)-Tetrahydrofuran-2-yl)-1-(2-thioxooxazolidin-3-yl)-2-(p-tolyl)ethanone (3c')

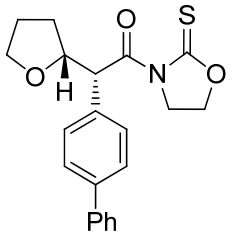
^{1}H NMR (500 MHz, $CDCl_3$) δ 7.31 (d, *J* = 8.1 Hz, 2H), 7.06 (d, *J* = 7.9 Hz, 2H), 6.16 (d, *J* = 9.9 Hz, 1H), 4.58 (dt, *J* = 9.8, 6.5 Hz, 1H), 4.46–4.39 (m, 1H), 4.37–4.31 (m, 1H), 4.27 (ddd, *J* = 11.2, 9.5, 7.5 Hz, 1H), 4.07 (ddd, *J* = 11.2, 9.2, 7.4 Hz, 1H), 3.89–3.83 (m, 1H), 3.75 (td, *J* = 7.9, 6.0 Hz, 1H), 2.25 (s, 3H), 1.91–1.83 (m, 1H), 1.81–1.72 (m, 1H), 1.65–1.59 (m, 1H), 1.53–1.48 (m, 1H); ^{13}C NMR (126 MHz, $CDCl_3$) δ 185.6, 174.4, 137.8, 132.2, 129.6, 129.6, 81.9, 68.8, 66.2, 52.7, 47.7, 29.5, 25.7, 21.3; HPLC: the ee value was determined by HPLC analysis (Chiralpak AD-H, *i*-PrOH/Hexane = 20/80, 1.0 mL/min, 274 nm), retention time: t_{minor} = 9.020 min, t_{major} = 11.583 min, ee = 97%. The NMR spectral data is consistent with reported literature values.[2]



(*R*)-2-([1,1'-Biphenyl]-4-yl)-2-((*S*)-tetrahydrofuran-2-yl)-1-(2-thioxooxazolidin-3-

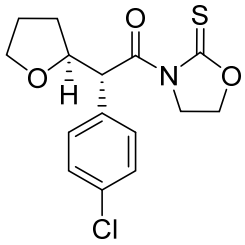
yl)ethan-1-one (3d)

The compounds were prepared according to general procedure and purified by silica gel chromatography (CH_2Cl_2/EtOAc 100:0 to 99:1) affording **3d** in 56% yield (207.2 mg) and **3d'** in 28% yield (101.3 mg), corresponding to a combined yield of 86% (308.5 mg) and a 2:1 d.r. ^{1}H NMR (500 MHz, $CDCl_3$) δ 7.61–7.53 (m, 6H), 7.42 (t, *J* = 7.7 Hz, 2H), 7.33 (t, *J* = 7.4 Hz, 1H), 6.35 (d, *J* = 8.4 Hz, 1H), 4.64–4.56 (m, 1H), 4.51 (td, *J* = 9.3, 6.5 Hz, 1H), 4.40 (q, *J* = 9.0 Hz, 1H), 4.30–4.23 (m, 1H), 4.15 (ddd, *J* = 11.3, 9.3, 6.5 Hz, 1H), 3.87 (dd, *J* = 15.0, 6.9 Hz, 1H), 3.76 (dd, *J* = 14.1, 7.8 Hz, 1H), 2.20–2.12 (m, 1H), 1.98–1.87 (m, 2H), 1.78–1.71 (m, 1H); ^{13}C NMR (126 MHz, $CDCl_3$) δ 185.4, 173.7, 141.0, 140.8, 135.2, 130.2, 128.9, 127.4, 127.3, 81.2, 68.6, 66.2, 52.7, 47.7, 30.6, 25.8; HPLC: the ee value was determined by HPLC analysis (Chiralcel OD-H, *i*-PrOH/Hexane = 35/65, 1.0 mL/min, 278 nm), retention time: t_{minor} = 21.160 min, t_{major} = 29.237 min, ee = 97%. The NMR spectral data is consistent with reported literature values.[2]



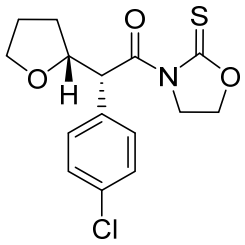
(*R*)-2-([1,1'-Biphenyl]-4-yl)-2-((*R*)-tetrahydrofuran-2-yl)-1-(2-thioxooxazolidin-3-yl)ethan-1-one (3d')

^{1}H NMR (500 MHz, $CDCl_3$) δ 7.57–7.43 (m, 6H), 7.37 (dd, *J* = 10.4, 4.8 Hz, 2H), 7.30–7.25 (m, 1H), 6.26 (d, *J* = 9.8 Hz, 1H), 4.64 (dt, *J* = 9.8, 6.5 Hz, 1H), 4.48–4.41 (m, 1H), 4.38 (m, 1H), 4.30 (ddd, *J* = 11.2, 9.6, 7.3 Hz, 1H), 4.11 (ddd, *J* = 11.2, 9.3, 7.6 Hz, 1H), 3.91–3.86 (m, 1H), 3.78 (td, *J* = 7.8, 6.0 Hz, 1H), 1.96–1.87 (m, 1H), 1.84–1.75 (m, 1H), 1.71–1.64 (m, 1H), 1.59–1.54 (m, 1H); ^{13}C NMR (126 MHz, $CDCl_3$) δ 185.7, 174.3, 140.9, 140.8, 134.2, 130.1, 129.0, 127.6, 127.6, 127.2, 82.1, 68.8, 66.3, 52.8, 47.7, 29.7, 25.7; HPLC: the ee value was determined by HPLC analysis (Chiralpak AD-H, *i*-PrOH/Hexane = 5/95, 1.0 mL/min, 268 nm), retention time: t_{minor} = 49.057 min, t_{major} = 51.497 min, ee = 96%. The NMR spectral data is consistent with reported literature values.[2]



(*R*)-2-(4-Chlorophenyl)-2-((*S*)-tetrahydrofuran-2-yl)-1-(2-thioxooxazolidin-3-yl)ethan-1-one (3e)

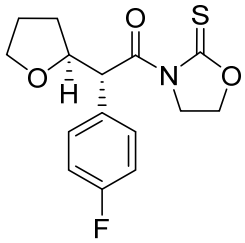
The compounds were prepared according to general procedure and purified by silica gel chromatography (CH_2Cl_2/EtOAc 100:0 to 99:1) affording **3e** in 55% yield (179.1 mg) and **3d'** in 25% yield (80.9 mg), corresponding to a combined yield of 80% (260 mg) and a 2.2:1 d.r. ^{1}H NMR (500 MHz, $CDCl_3$) δ 7.44–7.38 (m, 2H), 7.32–7.27 (m, 2H), 6.25 (d, *J* = 8.1 Hz, 1H), 4.54–4.46 (m, 2H), 4.46–4.38 (m, 1H), 4.25 (ddd, *J* = 11.3, 9.5, 8.3 Hz, 1H), 4.14 (ddd, *J* = 11.4, 9.4, 6.8 Hz, 1H), 3.84–3.79 (m, 1H), 3.75–3.69 (m, 1H), 2.16–2.07 (m, 1H), 1.92–1.84 (m, 2H), 1.70–1.62 (m, 1H); ^{13}C NMR (126 MHz, $CDCl_3$) δ 185.3, 173.3, 134.5, 133.9, 131.2, 128.8, 80.9, 68.5, 66.3, 52.4, 47.6, 30.5, 25.8; HPLC: the ee value was determined by HPLC analysis (Chiralpak AS-H, *i*-PrOH/Hexane = 20/80, 1.0 mL/min, 274 nm), retention time: t_{minor} = 20.097 min, t_{major} = 22.007 min, ee = 95%. The NMR spectral data is consistent with reported literature values.[2]



(*R*)-2-(4-Chlorophenyl)-2-((*R*)-tetrahydrofuran-2-yl)-1-(2-thioxooxazolidin-3-yl)ethan-1-one (3e')

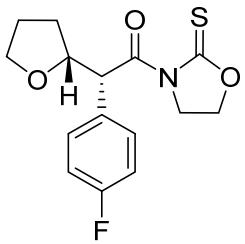
^{1}H NMR (500 MHz, $CDCl_3$) δ 7.43–7.33 (m, 2H), 7.23 (d, *J* = 8.5 Hz, 2H), 6.18 (d, *J* = 9.8 Hz, 1H), 4.54 (dt, *J* = 9.8, 6.5 Hz, 1H), 4.47–4.36 (m, 2H), 4.28 (ddd, *J* = 11.3, 9.6, 7.1 Hz, 1H), 4.12–4.06 (m, 1H), 3.88–3.82 (m, 1H), 3.76 (td, *J* = 7.9, 5.9 Hz, 1H), 1.92–1.83 (m, 1H), 1.81–1.74 (m, 1H), 1.66–1.59 (m, 1H), 1.48–1.42 (m, 1H); ^{13}C NMR (126 MHz, $CDCl_3$) δ 185.4, 173.8, 133.9, 133.5, 130.8, 128.8, 81.8, 68.6, 66.2, 52.3, 47.5, 29.4, 25.5; HPLC: the ee value was determined by HPLC analysis

(Chiralpak AD-H, *i*-PrOH/Hexane = 20/80, 1.0 mL/min, 273 nm), retention time: t_{minor} = 9.977 min, t_{major} = 11.700 min, ee = 97%. The NMR spectral data is consistent with reported literature values.[2]



(*R*)-2-(4-Fluorophenyl)-2-((*S*)-tetrahydrofuran-2-yl)-1-(2-thioxooxazolidin-3-yl)ethan-1-one (3f)

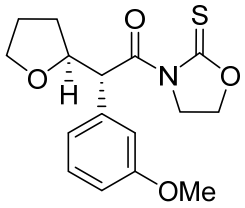
The compounds were prepared according to general procedure and purified by silica gel chromatography (CH_2Cl_2/EtOAc 100:0 to 99:1) affording **3f** in 56% yield (172.6 mg) and **3f'** in 25% yield (75.3 mg), corresponding to a combined yield of 81% (248 mg) and a 2.3:1 d.r. ^{1}H NMR (500 MHz, $CDCl_3$) δ 7.51–7.39 (m, 2H), 7.08–6.96 (m, 2H), 6.27 (d, *J* = 8.1 Hz, 1H), 4.56–4.46 (m, 2H), 4.46–4.38 (m, 1H), 4.26 (ddd, *J* = 11.3, 9.5, 8.3 Hz, 1H), 4.14 (ddd, *J* = 11.4, 9.4, 6.8 Hz, 1H), 3.86–3.79 (m, 1H), 3.76–3.69 (m, 1H), 2.16–2.07 (m, 1H), 1.93–1.84 (m, 2H), 1.71–1.63 (m, 1H); ^{13}C NMR (126 MHz, $CDCl_3$) δ 185.4, 173.6, 162.6 (d, *J* = 246.3 Hz), 131.8 (d, *J* = 3.2 Hz), 131.5 (d, *J* = 8.0 Hz), 115.6 (d, *J* = 21.3 Hz), 81.1, 68.5, 66.2, 52.2, 47.6, 30.5, 25.8; HPLC: the ee value was determined by HPLC analysis (Chiralpak AD-H, *i*-PrOH/Hexane = 20/80, 1.0 mL/min, 290 nm), retention time: t_{minor} = 11.230 min, t_{major} = 12.700 min, ee = 95%. The NMR spectral data is consistent with reported literature values.[2]



(*R*)-2-(4-Fluorophenyl)-2-((*R*)-tetrahydrofuran-2-yl)-1-(2-thioxooxazolidin-3-yl)ethan-1-one (3f')

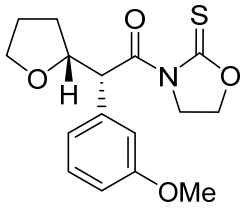
^{1}H NMR (500 MHz, $CDCl_3$) δ 7.49–7.35 (m, 2H), 7.03–6.87 (m, 2H), 6.19 (d, *J* = 9.8 Hz, 1H), 4.55 (dt, *J* = 9.8, 6.5 Hz, 1H), 4.48–4.34 (m, 2H), 4.28 (ddd, *J* = 11.3, 9.6,

7.1 Hz, 1H), 4.09 (ddd, *J* = 11.3, 9.4, 7.9 Hz, 1H), 3.85 (dt, *J* = 14.0, 7.0 Hz, 1H), 3.75 (td, *J* = 7.8, 6.0 Hz, 1H), 1.92–1.83 (m, 1H), 1.82–1.73 (m, 1H), 1.66–1.58 (m, 1H), 1.50–1.42 (m, 1H); ^{13}C NMR (126 MHz, $CDCl_3$) δ 185.4, 173.6, 162.4 (d, *J* = 246.9 Hz), 131.8 (d, *J* = 8.0 Hz), 131.5 (d, *J* = 3.1 Hz), 115.5 (d, *J* = 21.3 Hz), 81.1, 68.5, 66.2, 52.1, 47.6, 30.5, 25.8; HPLC: the ee value was determined by HPLC analysis (Chiralpak AD-H, *i*-PrOH/Hexane = 20/80, 1.0 mL/min, 277 nm), retention time: t_{minor} = 8.967 min, t_{major} = 11.777 min, ee = 98%. The NMR spectral data is consistent with reported literature values.[2]



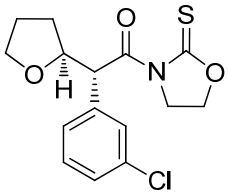
(*R*)-2-(3-Methoxyphenyl)-2-((*S*)-tetrahydrofuran-2-yl)-1-(2-thioxooxazolidin-3-yl)ethan-1-one (3g)

The compounds were prepared according to general procedure and purified by silica gel chromatography (CH_2Cl_2/EtOAc 100:0 to 99:1) affording **3g** in 47% yield (150.2 mg) and **3g'** in 23% yield (74.1 mg), corresponding to a combined yield of 70% (224.3 mg) and a 2:1 d.r. ^{1}H NMR (500 MHz, $CDCl_3$) δ 7.23 (t, *J* = 8.0 Hz, 1H), 7.05 (t, *J* = 4.3 Hz, 2H), 6.83–6.79 (m, 1H), 6.27 (d, *J* = 8.4 Hz, 1H), 4.56–4.46 (m, 2H), 4.38 (q, *J* = 9.0 Hz, 1H), 4.26–4.20 (m, 1H), 4.11 (ddd, *J* = 11.3, 9.3, 6.4 Hz, 1H), 3.87–3.82 (m, 1H), 3.79 (s, 3H), 3.73 (td, *J* = 7.9, 6.2 Hz, 1H), 2.16–2.07 (m, 1H), 1.96–1.84 (m, 2H), 1.75–1.68 (m, 1H); ^{13}C NMR (126 MHz, $CDCl_3$) δ 185.4, 173.6, 159.7, 137.6, 129.5, 122.2, 115.5, 113.4, 81.1, 68.5, 66.2, 55.4, 52.8, 47.6, 30.5, 25.7; HPLC: the ee value was determined by HPLC analysis (Chiralpak AD-H, *i*-PrOH/Hexane = 20/80, 1.0 mL/min, 277 nm), retention time: t_{major} = 11.743 min, t_{minor} = 17.243 min, ee = 97%. The NMR spectral data is consistent with reported literature values.[2]



(*R*)-2-(3-Methoxyphenyl)-2-((*R*)-tetrahydrofuran-2-yl)-1-(2-thioxooxazolidin-3-yl)ethan-1-one (3g')

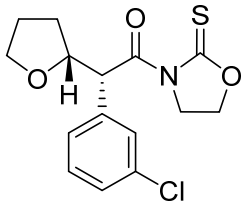
^{1}H NMR (500 MHz, $CDCl_3$) δ 7.25–7.19 (m, 1H), 7.07 (dd, *J* = 4.9, 3.2 Hz, 2H), 6.86–6.77 (m, 1H), 6.25 (d, *J* = 9.8 Hz, 1H), 4.66 (dt, *J* = 9.8, 6.4 Hz, 1H), 4.49 (td, *J* = 9.2, 7.5 Hz, 1H), 4.45–4.39 (m, 1H), 4.34 (ddd, *J* = 11.2, 9.6, 7.5 Hz, 1H), 4.15 (ddd, *J* = 11.3, 9.3, 7.5 Hz, 1H), 3.96–3.90 (m, 1H), 3.85–3.81 (m, 1H), 3.80 (s, 3H), 2.00–1.90 (m, 1H), 1.88–1.80 (m, 1H), 1.74–1.66 (m, 1H), 1.62–1.53 (m, 1H); ^{13}C NMR (126 MHz, $CDCl_3$) δ 185.68, 174.1, 159.9, 136.7, 129.7, 122.1, 115.3, 113.5, 81.9, 68.7, 66.2, 55.5, 52.9, 47.7, 29.5, 25.6; HPLC: the ee value was determined by HPLC analysis (Chiralpak AD-H, *i*-PrOH/Hexane = 25/75, 1.0 mL/min, 277 nm), retention time: t_{minor} = 9.200 min, t_{major} = 16.480 min, ee = 97%. The NMR spectral data is consistent with reported literature values.[2]



(*R*)-2-(3-Chlorophenyl)-2-((*S*)-tetrahydrofuran-2-yl)-1-(2-thioxooxazolidin-3-yl)e than-1-one (3h)

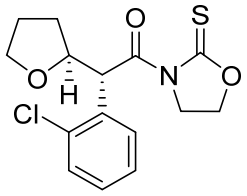
The compounds were prepared according to general procedure and purified by silica gel chromatography (CH_2Cl_2/EtOAc 100:0 to 99:1) affording **3h** in 58% yield (187.5 mg) and **3h'** in 23% yield (75.8 mg), corresponding to a combined yield of 81% (263.3 mg) and a 2.5:1 d.r. ^{1}H NMR (500 MHz, $CDCl_3$) δ 7.47 (d, *J* = 0.8 Hz, 1H), 7.40–7.35 (m, 1H), 7.26 (dd, *J* = 4.1, 2.0 Hz, 2H), 6.29 (d, *J* = 8.2 Hz, 1H), 4.56–4.49 (m, 2H), 4.48–4.40 (m, 1H), 4.30–4.23 (m, 1H), 4.20–4.13 (m, 1H), 3.86–3.80 (m, 1H), 3.77–3.70 (m, 1H), 2.17–2.08 (m, 1H), 1.95–1.85 (m, 2H), 1.72–1.65 (m, 1H); ^{13}C NMR (126 MHz, $CDCl_3$) δ 185.4, 173.1, 138.0, 134.4, 129.8, 129.7, 128.4, 128.1, 81.0, 68.5, 66.3, 52.5, 47.6, 30.5, 25.7; HPLC: the ee value was determined by HPLC

analysis (Chiralpak AD-H, *i*-PrOH/Hexane = 20/80, 1.0 mL/min, 273 nm), retention time: t_{major} = 9.283min, t_{minor} = 9.893 min, ee = 98%. The NMR spectral data is consistent with reported literature values.[2]



(*R*)-2-(3-Chlorophenyl)-2-((*R*)-tetrahydrofuran-2-yl)-1-(2-thioxooxazolidin-3-yl)ethan-1-one (3h')

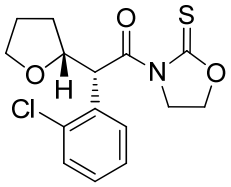
^{1}H NMR (500 MHz, $CDCl_3$) δ 7.50 (s, 1H), 7.42–7.37 (m, 1H), 7.29–7.24 (m, 2H), 6.27 (d, *J* = 9.8 Hz, 1H), 4.62 (dt, *J* = 9.8, 6.5 Hz, 1H), 4.55–4.43 (m, 2H), 4.39–4.32 (m, 1H), 4.21–4.14 (m, 1H), 3.92 (dd, *J* = 14.6, 7.5 Hz, 1H), 3.82 (td, *J* = 7.8, 6.2 Hz, 1H), 1.99–1.90 (m, 1H), 1.90–1.82 (m, 1H), 1.75–1.68 (m, 1H), 1.59–1.51 (m, 1H); ^{13}C NMR (126 MHz, $CDCl_3$) δ 185.7, 173.8, 137.2, 134.7, 130.0, 129.6, 128.3, 128.1, 82.0, 68.8, 66.4, 52.6, 47.6, 29.6, 25.6; HPLC: the ee value was determined by HPLC analysis (Chiralpak AD-H, *i*-PrOH/Hexane = 25/75, 1.0 mL/min, 275 nm), retention time: t_{minor} = 7.303 min, t_{major} = 11.403 min, ee = 99%. The NMR spectral data is consistent with reported literature values.[2]



(*R*)-2-(2-Chlorophenyl)-2-((*S*)-tetrahydrofuran-2-yl)-1-(2-thioxooxazolidin-3-yl)ethan-1-one (3i)

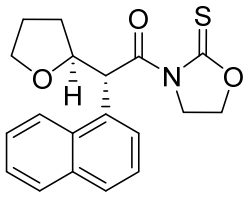
The compounds were prepared according to general procedure and purified by silica gel chromatography (CH_2Cl_2/EtOAc 100:0 to 99:1) affording **3i** in 61% yield (197.5 mg) and **3i'** in 22% yield (72.0 mg), corresponding to a combined yield of 83% (269.5 mg) and a 2.7:1 d.r. ^{1}H NMR (500 MHz, $CDCl_3$) δ 7.69 (dd, *J* = 7.6, 1.9 Hz, 1H), 7.38 (dd, *J* = 7.7, 1.6 Hz, 1H), 7.26–7.18 (m, 2H), 6.58 (d, *J* = 6.3 Hz, 1H), 4.70–4.59 (m, 1H), 4.57–4.43 (m, 2H), 4.28–4.17 (m, 2H), 3.85 (dt, *J* = 13.4, 6.7 Hz, 1H), 3.74

(dt, *J* = 8.3, 6.6 Hz, 1H), 2.08–2.00 (m, 1H), 1.88–1.75 (m, 3H); ^{13}C NMR (126 MHz, $CDCl_3$) δ 185.1, 172.9, 135.7, 133.5, 131.3, 129.8, 128.9, 126.9, 80.5, 69.0, 66.4, 49.4, 47.9, 29.7, 25.9; HPLC: the ee value was determined by HPLC analysis (Chiralpak AS-H, *i*-PrOH/Hexane = 25/75, 1.0 mL/min, 272 nm), retention time: t_{minor} = 17.197 min, t_{major} = 21.880 min, ee = 98%. The NMR spectral data is consistent with reported literature values.[2]



(*R*)-2-(2-Chlorophenyl)-2-((*R*)-tetrahydrofuran-2-yl)-1-(2-thioxooxazolidin-3-yl)ethan-1-one (3i')

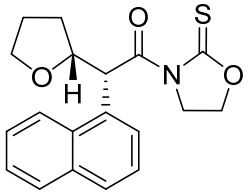
^{1}H NMR (500 MHz, $CDCl_3$) δ 7.69 (dd, *J* = 7.7, 1.9 Hz, 1H), 7.39 (dd, *J* = 7.7, 1.6 Hz, 1H), 7.26–7.19 (m, 2H), 6.60 (d, *J* = 9.6 Hz, 1H), 4.64 (dt, *J* = 9.6, 6.0 Hz, 1H), 4.52 (td, *J* = 9.2, 6.8 Hz, 1H), 4.47–4.39 (m, 1H), 4.36–4.26 (m, 1H), 4.21–4.14 (m, 1H), 4.03 (td, *J* = 7.7, 5.7 Hz, 1H), 3.84–3.77 (m, 1H), 2.12–2.05 (m, 1H), 1.90–1.84 (m, 1H), 1.82–1.74 (m, 2H); ^{13}C NMR (126 MHz, $CDCl_3$) δ 185.2, 174.0, 135.2, 133.6, 130.4, 130.3, 129.0, 127.2, 83.1, 69.3, 66.2, 49.7, 47.9, 29.3, 25.8; HPLC: the ee value was determined by HPLC analysis (Chiralpak AD-H, *i*-PrOH/Hexane = 25/75, 1.0 mL/min, 281 nm), retention time: t_{minor} = 11.260 min, t_{major} = 17.353 min, ee = 97%. The NMR spectral data is consistent with reported literature values.[2]



(*R*)-2-(Naphthalen-1-yl)-2-((*S*)-tetrahydrofuran-2-yl)-1-(2-thioxooxazolidin-3-yl)ethan-1-one (3j)

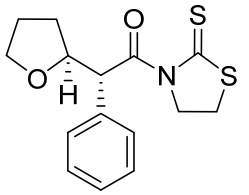
The compounds were prepared according to general procedure and purified by silica gel chromatography (CH_2Cl_2/EtOAc 100:0 to 99:1) affording **3j** in 59% yield (200.3 mg) and **3j'** in 22% yield (76.2 mg), corresponding to a combined yield of 81% (276.5 mg) and a 2.6:1 d.r. ^{1}H NMR (500 MHz, $CDCl_3$) δ 8.34 (d, *J* = 8.6 Hz, 1H), 7.84 (d, *J* = 8.0 Hz, 1H), 7.79 (d, *J* = 8.2 Hz, 1H), 7.71 (d, *J* = 7.3 Hz, 1H), 7.56 (ddd,

J = 8.4, 6.8, 1.2 Hz, 1H), 7.50–7.42 (m, 2H), 7.08 (d, *J* = 7.4 Hz, 1H), 4.68 (q, *J* = 6.8 Hz, 1H), 4.47 (td, *J* = 8.9, 6.3 Hz, 1H), 4.32 (dd, *J* = 17.5, 8.7 Hz, 1H), 4.29–4.22 (m, 1H), 4.12 (ddd, *J* = 11.1, 9.0, 6.3 Hz, 1H), 3.91–3.85 (m, 1H), 3.72 (td, *J* = 8.0, 5.6 Hz, 1H), 2.07–1.95 (m, 3H), 1.92–1.84 (m, 1H); ^{13}C NMR (126 MHz, $CDCl_3$) δ 185.5, 173.9, 134.2, 132.9, 132.5, 128.9, 128.6, 126.4, 126.3, 125.8, 125.5, 124.8, 81.8, 68.9, 66.3, 48.3, 47.9, 30.2, 26.0; HPLC: the ee value was determined by HPLC analysis (Chiralpak AD-H, *i*-PrOH/Hexane = 25/75, 1.0 mL/min, 279 nm), retention time: t_{major} = 11.733 min, t_{minor} = 14.167 min, ee = 95%. The NMR spectral data is consistent with reported literature values.[2]



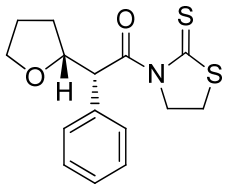
(*R*)-2-(Naphthalen-1-yl)-2-((*R*)-tetrahydrofuran-2-yl)-1-(2-thioxooxazolidin-3-yl) ethan-1-one (3j')

^{1}H NMR (500 MHz, $CDCl_3$) δ 8.54 (d, *J* = 8.6 Hz, 1H), 7.85 (d, *J* = 8.1 Hz, 1H), 7.82–7.76 (m, 2H), 7.58 (dd, *J* = 11.2, 4.1 Hz, 1H), 7.53–7.43 (m, 2H), 7.08 (d, *J* = 9.5 Hz, 1H), 4.85–4.76 (m, 1H), 4.55–4.46 (m, 1H), 4.40–4.31 (m, 2H), 4.17–4.10 (m, 1H), 4.09–4.03 (m, 1H), 3.88–3.82 (m, 1H), 2.03–1.97 (m, 1H), 1.89–1.79 (m, 1H), 1.71–1.64 (m, 1H), 1.60–1.53 (m, 1H); ^{13}C NMR (126 MHz, $CDCl_3$) δ 185.8, 174.9, 134.9, 132.6, 132.1, 129.0, 128.6, 126.6, 125.9, 125.6, 125.0, 83.5, 69.2, 66.3, 48.1, 29.6, 25.9; HPLC: the ee value was determined by HPLC analysis (Chiralpak AD-H, *i*-PrOH/Hexane = 25/75, 1.0 mL/min, 279 nm), retention time: t_{minor} = 10.623 min, t_{major} = 18.690 min, ee = 97%. The NMR spectral data is consistent with reported literature values.[2]



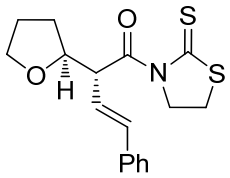
(*R*)-2-Phenyl-2-((*S*)-tetrahydrofuran-2-yl)-1-(2-thioxothiazolidin-3-yl)ethan-1-one (3l)

The compounds were prepared according to general procedure and purified by silica gel chromatography (CH_2Cl_2/EtOAc 100:0 to 99:1) affording **3l** in 51% yield (156.4 mg) and **3l'** in 28% yield (86.1 mg), corresponding to a combined yield of 79% (242.5 mg) and a 1.8:1 d.r. ^{1}H NMR (500 MHz, $CDCl_3$) δ 7.44–7.38 (m, 2H), 7.36–7.30 (m, *J* = 10.0, 4.7 Hz, 2H), 7.30–7.27 (m, 1H), 6.08 (d, *J* = 8.1 Hz, 1H), 4.59–4.43 (m, *J* = 11.6, 10.9, 5.7 Hz, 3H), 3.80 (dd, *J* = 11.0, 4.1 Hz, 1H), 3.72 (dd, *J* = 14.2, 7.6 Hz, 1H), 3.16 (dd, *J* = 8.2, 6.8 Hz, 2H), 2.16–2.09 (m, *J* = 12.3, 6.6 Hz, 1H), 1.91–1.85 (m, *J* = 10.3, 3.0 Hz, 2H), 1.80–1.74 (m, 1H); ^{13}C NMR (126 MHz, $CDCl_3$) δ 201.8, 174.5, 136.4, 129.6, 128.7, 127.8, 81.0, 68.5, 56.9, 54.9, 30.5, 28.3, 25.8; HPLC: the ee value was determined by HPLC analysis (Chiralpak AD-H, *i*-PrOH/Hexane = 5/95, 1.0 mL/min, 311 nm), retention time: t_{major} = 20.240 min, t_{minor} = 22.417 min, ee = 95%. The NMR spectral data is consistent with reported literature values.[2]



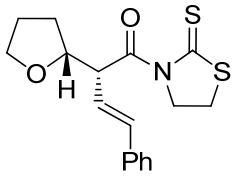
(*R*)-2-Phenyl-2-((*R*)-tetrahydrofuran-2-yl)-1-(2-thioxothiazolidin-3-yl)ethan-1-one (3l')

^{1}H NMR (500 MHz, $CDCl_3$) δ 7.45 (dd, *J* = 5.2, 3.3 Hz, 2H), 7.34–7.30 (m, 2H), 7.29–7.26 (m, 1H), 5.97 (d, *J* = 9.7 Hz, 1H), 4.72–4.66 (m, 1H), 4.62 (dt, *J* = 9.7, 6.5 Hz, 1H), 4.50 (dt, *J* = 12.1, 7.7 Hz, 1H), 3.91 (dt, *J* = 14.0, 7.0 Hz, 1H), 3.82 (td, *J* = 7.9, 6.0 Hz, 1H), 3.31–3.23 (m, 1H), 3.20–3.12 (m, 1H), 1.94–1.87 (m, 1H), 1.85–1.79 (m, 1H), 1.69–1.62 (m, 1H), 1.56–1.49 (m, 1H); ^{13}C NMR (126 MHz, $CDCl_3$) δ 202.0, 174.9, 135.4, 129.6, 128.7, 127.9, 82.5, 68.7, 56.9, 54.9, 29.6, 28.4, 25.6; HPLC: the ee value was determined by HPLC analysis (Chiralpak AD-H, *i*-PrOH/Hexane = 25/75, 1.0 mL/min, 310 nm), retention time: t_{minor} = 8.010 min, t_{major} = 11.423 min, ee = 97%. The NMR spectral data is consistent with reported literature values.[2]



(*R*,*E*)-4-Phenyl-2-((*S*)-tetrahydrofuran-2-yl)-1-(2-thioxothiazolidin-3-yl)but-3-en-1-one (3m)

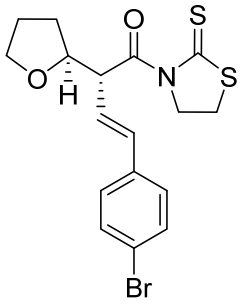
The compounds were prepared according to general procedure using $CH_3CO_2CH_3/CH_2Cl_2$ (3:1, v/v) as solvent and **L4**/$Ni(OTf)_2$ as catalyst and purified by silica gel chromatography (CH_2Cl_2/EtOAc 99:1) affording **3m** in 36% yield (120.3 mg) and **3m'** in 30% yield (99.7 mg), corresponding to a combined yield of 66% (220.0 mg) and a 1.2:1 d.r. ^{1}H NMR (500 MHz, $CDCl_3$) δ 7.43–7.38 (m, 2H), 7.31 (dd, *J* = 10.3, 4.8 Hz, 2H), 7.25–7.20 (m, 1H), 6.61–6.50 (m, 1H), 6.45–6.34 (m, 1H), 5.62 (dd, *J* = 9.0, 5.3 Hz, 1H), 4.64–4.54 (m, 2H), 4.45–4.40 (m, 1H), 3.88–3.83 (m, 1H), 3.80–3.75 (m, 1H), 3.33–3.22 (m, 2H), 2.08–2.02 (m, 1H), 1.90–1.83 (m, 2H), 1.80–1.73 (m, 1H); ^{13}C NMR (126 MHz, $CDCl_3$) δ 202.1, 174.5, 136.9, 134.8, 128.7, 127.9, 126.7, 124.4, 80.1, 69.0, 56. 9, 52.8, 29.7, 28.4, 25.9; HPLC: the ee value was determined by HPLC analysis (Chiralpak AD-H, *i*-PrOH/Hexane = 25/75, 1.0 mL/min, 311 nm), retention time: t_{minor} = 12.590 min, t_{major} = 18.423 min, ee = 95%. The NMR spectral data is consistent with reported literature values.[2]



(*R*,*E*)-4-Phenyl-2-((*R*)-tetrahydrofuran-2-yl)-1-(2-thioxothiazolidin-3-yl)but-3-en-1-one (3m')

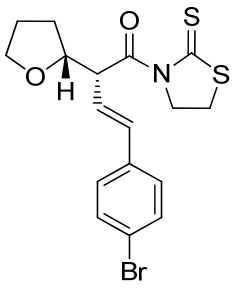
^{1}H NMR (500 MHz, $CDCl_3$) δ 7.40–7.36 (m, 2H), 7.34–7.29 (m, *J* = 7.5 Hz, 2H), 7.27 – 7.21 (m, 1H), 6.64 (d, *J* = 16.1 Hz, 1H), 6.21 (dd, *J* = 16.0, 9.0 Hz, 1H), 5.58–5.45 (m, *J* = 9.1 Hz, 1H), 4.71 (ddd, *J* = 12.2, 7.8, 5.5 Hz, 1H), 4.51 (ddd, *J* = 12.1, 8.9, 7.8 Hz, 1H), 4.44 (dt, *J* = 9.3, 6.3 Hz, 1H), 3.89 (dt, *J* = 13.3, 6.8 Hz, 1H), 3.80 (dt, *J* = 14.2, 7.0 Hz, 1H), 3.34 (ddd, *J* = 11.0, 8.9, 7.9 Hz, 1H), 3.21 (ddd, *J* = 11.0, 7.7, 5.5 Hz, 1H), 2.02–1.85 (m, 3H), 1.76 (ddd, *J* = 10.9, 7.3, 5.8 Hz, 1H); ^{13}C NMR (126 MHz, $CDCl_3$) δ 202.2, 175.1, 136.8, 134.8, 128.8, 128.1, 126.6, 124.2,

81.4, 68.7, 56.7, 53.2, 29.6, 28.6, 25.7; HPLC: the ee value was determined by HPLC analysis (Chiralpak AD-H, *i*-PrOH/Hexane = 20/80, 1.0 mL/min, 310 nm), retention time: t_{minor} = 12.850 min, t_{major} = 14.733 min, ee = 90%. The NMR spectral data is consistent with reported literature values.[2]



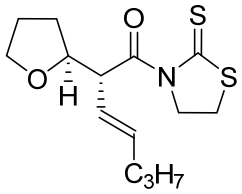
(*R*,*E*)-4-(4-Bromophenyl)-2-((*S*)-tetrahydrofuran-2-yl)-1-(2-thioxothiazolidin-3-yl)but-3-en-1-one (3n)

The compounds were prepared according to general procedure using $CH_3CO_2CH_3/CH_2Cl_2$ (3:1, v/v) as solvent and **L4**/$Ni(OTf)_2$ as catalyst and purified by silica gel chromatography (CH_2Cl_2/EtOAc 99:1) affording **3n** in 52% yield (246.9 mg) and **3n'** in 25% yield (122.1 mg), corresponding to a combined yield of 77% (369.0 mg) and a 2:1 d.r. ^{1}H NMR (500 MHz, $CDCl_3$) δ 7.45–7.39 (m, 2H), 7.28–7.25 (m, 2H), 6.54–6.46 (m, 1H), 6.43–6.34 (m, 1H), 5.62 (dd, *J* = 8.8, 5.4 Hz, 1H), 4.65–4.51 (m, 2H), 4.40 (td, *J* = 7.0, 5.6 Hz, 1H), 3.88–3.81 (m, 1H), 3.80–3.74 (m, 1H), 3.34–3.22 (m, 2H), 2.08–2.01 (m, 1H), 1.90–1.83 (m, 2H), 1.77–1.70 (m, 1H); ^{13}C NMR (126 MHz, $CDCl_3$) δ 202.2, 174.2, 135.8, 133.5, 131.8, 128.3, 125.4, 121.7, 80.1, 69.0, 56.8, 52.7, 29.7, 28.4, 25.8; HPLC: the ee value was determined by HPLC analysis (Chiralpak AD-H, *i*-PrOH/Hexane = 25/75, 1.0 mL/min, 271 nm), retention time: t_{minor} = 17.247 min, t_{major} = 29.000 min, ee = 97%. The NMR spectral data is consistent with reported literature values.[2]



（*R*,*E*)-4-(4-Bromophenyl)-2-((*R*)-tetrahydrofuran-2-yl)-1-(2-thioxothiazolidin-3-yl)but-3-en-1-one (3n')

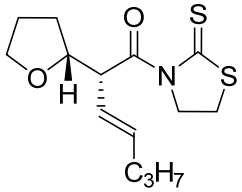
^{1}H NMR (500 MHz, $CDCl_3$) δ 7.43 (d, *J* = 8.4 Hz, 2H), 7.23 (d, *J* = 8.4 Hz, 2H), 6.57 (d, *J* = 16.0 Hz, 1H), 6.20 (dd, *J* = 16.0, 9.0 Hz, 1H), 5.50 (t, *J* = 9.1 Hz, 1H), 4.72 (ddd, *J* = 12.6, 7.8, 5.1 Hz, 1H), 4.51 (ddd, *J* = 12.0, 9.3, 7.8 Hz, 1H), 4.42 (dt, *J* = 9.2, 6.3 Hz, 1H), 3.88 (dt, *J* = 13.5, 6.9 Hz, 1H), 3.80 (dd, *J* = 14.0, 7.5 Hz, 1H), 3.37 (ddd, *J* = 10.7, 9.4, 8.0 Hz, 1H), 3.22 (ddd, *J* = 11.1, 7.7, 5.1 Hz, 1H), 2.03–1.87 (m, *J* = 27.3, 19.5, 9.8, 5.3 Hz, 3H), 1.76–1.69 (m, 1H); ^{13}C NMR (126 MHz, $CDCl_3$) δ 202.3, 174.9, 135.7, 133.5, 131.6, 128.2, 125.1, 121.8, 81.5, 68.7, 56.7, 53.2, 29.6, 28.7, 25.7; HPLC: the ee value was determined by HPLC analysis (Chiralpak AS-H, *i*-PrOH/Hexane = 25/75, 1.0 mL/min, 268 nm), retention time: t_{minor} = 18.823 min, t_{major} = 28.987 min, ee = 92%. The NMR spectral data is consistent with reported literature values.[2]



(*R*,*E*)-2-((*S*)-Tetrahydrofuran-2-yl)-1-(2-thioxothiazolidin-3-yl)hept-3-en-1-one (3o)

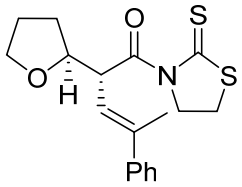
The compounds were prepared according to general procedure using $CH_3CO_2CH_3/CH_2Cl_2$ (3:1, v/v) as solvent and **L4**/$Ni(OTf)_2$ as catalyst and purified by silica gel chromatography (CH_2Cl_2/petroleum ether 75:25 to 100:0) affording **3o** in 42% yield (125.9 mg) and **3o'** in 28% yield (83.1 mg), corresponding to a combined yield of 70% (209.0 mg) and a 1.5:1 d.r. ^{1}H NMR (500 MHz, $CDCl_3$) δ 5.68–5.55 (m, 2H), 5.36 (dd, *J* = 7.9, 5.5 Hz, 1H), 4.59–4.49 (m, 2H), 4.29 (td, *J* = 7.0, 5.6 Hz, 1H), 3.84–3.79 (m, 1H), 3.76–3.71 (m, 1H), 3.31–3.20 (m, 2H), 2.06–2.01 (m, 2H), 2.01–1.95 (m, 1H), 1.88–1.81 (m, 2H), 1.75–1.67 (m, 1H), 1.43–1.35 (m, 2H), 0.88 (t, *J* = 7.4 Hz, 3H); ^{13}C NMR (126 MHz, $CDCl_3$) δ 201.8, 175.0, 136.4, 124.4, 79.9, 68.9, 56.9, 52.5, 34.9, 29.5, 28.46, 25.8, 22.4, 13.8; HPLC: the ee value was determined by HPLC analysis (Chiralpak AD-H, *i*-PrOH/Hexane = 10/90, 1.0 mL/min, 279 nm),

retention time: t_{minor} = 17.057 min, t_{major} = 21.230 min, ee = 90%. The NMR spectral data is consistent with reported literature values.[2]



(*R*,*E*)-2-((*R*)-Tetrahydrofuran-2-yl)-1-(2-thioxothiazolidin-3-yl)hept-3-en-1-one (3o')

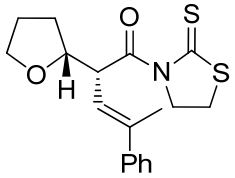
^{1}H NMR (500 MHz, $CDCl_3$) δ 5.72–5.61 (m, 1H), 5.42–5.33 (m, 1H), 5.24 (t, *J* = 9.1 Hz, 1H), 4.69–4.61 (m, 1H), 4.51–4.44 (m, 1H), 4.27 (dt, *J* = 9.3, 6.3 Hz, 1H), 3.81 (dt, *J* = 13.4, 6.9 Hz, 1H), 3.73 (td, *J* = 7.6, 6.1 Hz, 1H), 3.33–3.28 (m, 1H), 3.22–3.16 (m, 1H), 1.99–1.81 (m, 5H), 1.68–1.62 (m, 1H), 1.39–1.32 (m, 2H), 0.84 (t, *J* = 7.4 Hz, 3H); ^{13}C NMR (126 MHz, $CDCl_3$) δ 201.9, 175.6, 136.4, 124.5, 81.3, 68.5, 56.7, 53.1, 34.8, 29.4, 28.6, 25.5, 22.3, 13.7; HPLC: the ee value was determined by HPLC analysis (Chiralpak AD-H, *i*-PrOH/Hexane = 5/95, 1.0 mL/min, 309 nm), retention time: t_{minor} = 10.003 min, t_{major} = 13.390 min, ee = 86%. The NMR spectral data is consistent with reported literature values.[2]



(*R*,*E*)-4-Phenyl-2-((*S*)-tetrahydrofuran-2-yl)-1-(2-thioxothiazolidin-3-yl)pent-3-en-1-one (3p)

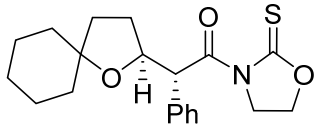
The compounds were prepared according to general procedure using $CH_3CO_2CH_3/CH_2Cl_2$ (3:1, v/v) as solvent and **L4**/$Ni(OTf)_2$ as catalyst and purified by silica gel chromatography (CH_2Cl_2/EtOAc 99:1) affording **3p** in 45% yield (157.9 mg) and **3p'** in 21% yield (71.0 mg), corresponding to a combined yield of 66% (228.9 mg) and a 2.2:1 d.r. ^{1}H NMR (500 MHz, $CDCl_3$) δ 7.46–7.39 (m, 2H), 7.34–7.29 (m, 2H), 7.26–7.23 (m, 1H), 6.01 (d, *J* = 2.3 Hz, 2H), 4.64–4.51 (m, 2H), 4.44–4.39 (m, 1H), 3.85 (dt, *J* = 13.8, 6.9 Hz, 1H), 3.81–3.75 (m, 1H), 3.32 (dt, *J* = 11.0, 8.0 Hz, 1H), 3.28–3.21 (m, 1H), 2.10 (s, 3H), 2.05–1.98 (m, 1H), 1.90–1.82 (m, 2H), 1.82–1.75 (m,

1H); ^{13}C NMR (126 MHz, $CDCl_3$) δ 202.3, 174.9, 143.1, 139.9, 128.3, 127.4, 126.2, 122.2, 80.3, 69.2, 57.0, 48.9, 29.3, 28.5, 26.1, 17.5; HPLC: the ee value was determined by HPLC analysis (Chiralpak OD-H, *i*-PrOH/Hexane = 25/75, 1.0 mL/min, 310 nm), retention time: t_{minor} = 10.013 min, t_{major} =13.200 min, ee = 97%. The NMR spectral data is consistent with reported literature values.[2]



(*R*,*E*)-4-Phenyl-2-((*R*)-tetrahydrofuran-2-yl)-1-(2-thioxothiazolidin-3-yl)pent-3-en-1-one (3p')

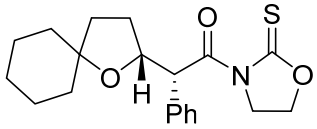
^{1}H NMR (500 MHz, $CDCl_3$) δ 7.43–7.38 (m, 2H), 7.33 (dd, *J* = 10.2, 4.8 Hz, 2H), 7.27–7.24 (m, *J* = 6.4, 4.1 Hz, 1H), 5.93 (t, *J* = 9.5 Hz, 1H), 5.84–5.76 (m, *J* = 10.0, 1.2 Hz, 1H), 4.66 (ddd, *J* = 12.1, 7.6, 6.6 Hz, 1H), 4.55 (dt, *J* = 12.1, 7.8 Hz, 1H), 4.41–4.35 (m, 1H), 3.97–3.91 (m, 1H), 3.80 (dd, *J* = 14.3, 7.3 Hz, 1H), 3.33 (dt, *J* = 10.9, 7.9 Hz, 1H), 3.25 (ddd, *J* = 11.0, 7.6, 6.6 Hz, 1H), 2.17 (d, *J* = 1.2 Hz, 3H), 2.01–1.88 (m, 3H), 1.78–1.72 (m, 1H); ^{13}C NMR (126 MHz, $CDCl_3$) δ 202.4, 175.9, 143.0, 140.0, 128.4, 127.6, 126.1, 122.9, 82.5, 68.9, 56.9, 50.4, 29.6, 28.7, 25.6, 18.1; HPLC: the ee value was determined by HPLC analysis (Chiralpak AD-H, *i*-PrOH/Hexane = 25/75, 1.0 mL/min, 309 nm), retention time: t_{minor} = 7.030 min, t_{major} = 14.483 min, ee = 93%. The NMR spectral data is consistent with reported literature values.[2]



(*R*)-2-Phenyl-2-((*S*)-1-oxaspiro[4.5]decan-2-yl)-1-(2-thioxooxazolidin-3-yl)ethan-1-one (3q)

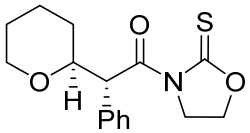
The compounds were prepared according to general procedure and purified by silica gel chromatography (CH_2Cl_2/petroleum ether 75:25 to 100:0) affording **3q** in 57% yield (205.8 mg) and **3q'** in 18% yield (63.7 mg), corresponding to a combined yield of 75% (269.5 mg) and a 3.2:1 d.r. ^{1}H NMR (500 MHz, $CDCl_3$) δ 7.48 (dd, *J* = 5.2,

3.3 Hz, 2H), 7.34–7.29 (m, 2H), 7.28–7.24 (m, 1H), 6.31 (d, *J* = 8.2 Hz, 1H), 4.59 (dt, *J* = 8.1, 6.4 Hz, 1H), 4.49 (td, *J* = 9.3, 6.8 Hz, 1H), 4.43–4.35 (m, 1H), 4.26–4.20 (m, 1H), 4.17–4.10 (m, 1H), 2.16–2.08 (m, 1H), 1.89–1.81 (m, 1H), 1.80–1.69 (m, 2H), 1.58–1.26 (m, 10H); ^{13}C NMR (126 MHz, $CDCl_3$) δ 185.5, 173.9, 136.2, 130.0, 128.4, 127.6, 83.8, 80.4, 66.1, 53.5, 47.6, 38.6, 37.7, 35.6, 30.3, 25.8, 24.1, 24.1; HPLC: the ee value was determined by HPLC analysis (Chiralpak IB-H, *i*-PrOH/Hexane = 10/90, 1.0 mL/min, 275 nm), retention time: t_{minor} = 13.317 min, t_{major} = 14.720 min, ee = 97%. The NMR spectral data is consistent with reported literature values.[2]



(*R*)-2-Phenyl-2-((*R*)-1-oxaspiro[4.5]decan-2-yl)-1-(2-thioxooxazolidin-3-yl)ethan-1-one (3q')

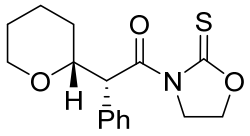
^{1}H NMR (500 MHz, $CDCl_3$) δ 7.51 (dd, *J* = 5.2, 3.3 Hz, 2H), 7.34–7.29 (m, 2H), 7.26 (ddd, *J* = 5.7, 3.7, 1.2 Hz, 1H), 6.23 (d, *J* = 9.7 Hz, 1H), 4.74–4.64 (m, 1H), 4.50–4.41 (m, 2H), 4.38–4.31 (m, 1H), 4.20–4.13 (m, 1H), 1.78–1.65 (m, 4H), 1.65–1.32 (m, 10H); ^{13}C NMR (126 MHz, $CDCl_3$) δ 185.7, 174.6, 135.5, 129.7, 128.7, 127.8, 84.2, 81.5, 66.3, 54.1, 47.7, 38.8, 37.6, 35.2, 29.2, 25.8, 24.3, 24.1; HPLC: the ee value was determined by HPLC analysis (Chiralpak IB-H, *i*-PrOH/Hexane = 10/90, 1.0 mL/min, 278 nm), retention time: t_{major} = 9.807 min, t_{minor} = 18.560 min, ee = 97%. The NMR spectral data is consistent with reported literature values.[2]



(*R*)-2-Phenyl-2-((*S*)-tetrahydro-2H-pyran-2-yl)-1-(2-thioxooxazolidin-3-yl)ethan-1-one (3r)

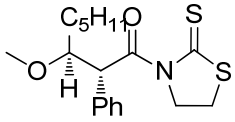
The compounds were prepared according to general procedure using CH_2Cl_2 as solvent and purified by silica gel chromatography (CH_2Cl_2/EtOAc 99:1) affording **3r** in 38% yield (116.0 mg) and **3r'** in 25% yield (76.0 mg), corresponding to a combined yield of 63% (192.0 mg) and a 1.5:1 d.r. ^{1}H NMR (500 MHz, $CDCl_3$) δ

7.53–7.47 (m, 2H), 7.35–7.30 (m, 2H), 7.29–7.26 (m, 1H), 6.39 (d, *J* = 8.3 Hz, 1H), 4.49 (td, *J* = 9.3, 6.9 Hz, 1H), 4.43–4.36 (m, 1H), 4.26–4.19 (m, 1H), 4.15–4.09 (m, 1H), 4.00 (dd, *J* = 13.3, 5.1 Hz, 1H), 3.94–3.88 (m, 1H), 3.32 (td, *J* = 11.5, 2.3 Hz, 1H), 1.87–1.80 (m, 1H), 1.73–1.66 (m, 1H), 1.57–1.45 (m, 4H); ^{13}C NMR (126 MHz, $CDCl_3$) δ 185.4, 173.5, 135.9, 130.0, 128.5, 127.7, 79.6, 69.0, 66.1, 53.3, 47.7, 29.8, 25.9, 23.5; HPLC: the ee value was determined by HPLC analysis (Chiralpak AD-H, *i*-PrOH/Hexane = 10/90, 1.0 mL/min, 275 nm), retention time: t_{major} = 17.003 min, t_{minor} = 21.647 min, ee = 96%. The NMR spectral data is consistent with reported literature values.[2]



(*R*)-2-Phenyl-2-((*R*)-tetrahydro-2H-pyran-2-yl)-1-(2-thioxooxazolidin-3-yl)ethan-1-one (3r')

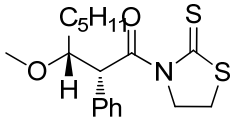
^{1}H NMR (500 MHz, $CDCl_3$) δ 7.54–7.45 (m, 2H), 7.34–7.29 (m, 2H), 7.28–7.26 (m, 1H), 6.19 (d, *J* = 9.9 Hz, 1H), 4.50–4.38 (m, 2H), 4.34–4.28 (m, 1H), 4.19–4.11 (m, 1H), 4.07–4.00 (m, 1H), 3.98–3.91 (m, 1H), 3.51–3.40 (m, 1H), 1.78–1.72 (m, 1H), 1.60–1.52 (m, 1H), 1.50–1.44 (m, 1H), 1.42–1.32 (m, 1H), 1.26–1.14 (m, 2H); ^{13}C NMR (126 MHz, $CDCl_3$) δ 185.4, 174.2, 134.5, 129.9, 128.7, 127.9, 80.6, 68.7, 66.2, 53.8, 47.6, 29.1, 25.9, 23.3; HPLC: the ee value was determined by HPLC analysis (Chiralpak AD-H, *i*-PrOH/Hexane = 10/90, 1.0 mL/min, 274 nm), retention time: t_{minor} = 10.083 min, t_{major} = 11.173 min, ee = 95%. The NMR spectral data is consistent with reported literature values.[2]



(2*R*,3*S*)-3-Methoxy-2-phenyl-1-(2-thioxothiazolidin-3-yl)octan-1-one (3s)

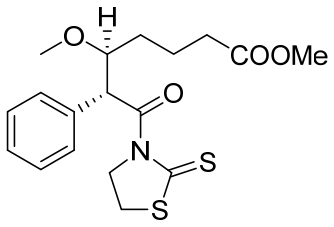
The compounds were prepared according to general procedure using CH_2Cl_2 as solvent and purified by silica gel chromatography (CH_2Cl_2/petroleum ether 75:25 to 100:0) affording **3s** in 27% yield (95.9 mg) and **3s'** in 27% yield (94.1 mg),

corresponding to a combined yield of 54% (190.0 mg) and a 1:1 d.r. ^{1}H NMR (500 MHz, $CDCl_3$) δ 7.45–7.40 (m, 2H), 7.32 (dd, *J* = 11.4, 4.4 Hz, 2H), 7.29–7.26 (m, 1H), 6.10 (d, *J* = 7.8 Hz, 1H), 4.59–4.47 (m, 2H), 3.84–3.77 (m, 1H), 3.24–3.14 (m, 2H), 3.07 (s, 3H), 1.58– 1.43 (m, 3H), 1.34–1.25 (m, 5H), 0.88 (t, *J* = 6.9 Hz, 3H); ^{13}C NMR (126 MHz, $CDCl_3$) δ 201.5, 174.5, 135.8, 130.1, 128.4, 127.6, 84.0, 58.9, 56.9, 54.5, 33.2, 32.0, 28.3, 25.4, 22.7, 14.2; HPLC: the ee value was determined by HPLC analysis (Chiralpak IB-H, *i*-PrOH/Hexane = 5/95, 1.0 mL/min, 312 nm), retention time: t_{minor} = 27.060 min, t_{major} = 29.807 min, ee = 95%. The NMR spectral data is consistent with reported literature values.[2]



(2*R*,3*R*)-3-Methoxy-2-phenyl-1-(2-thioxothiazolidin-3-yl)octan-1-one (3s')

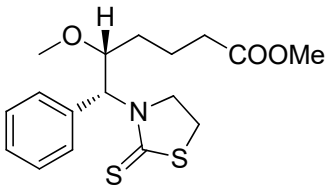
^{1}H NMR (500 MHz, $CDCl_3$) δ 7.45 (dt, *J* = 3.4, 2.0 Hz, 2H), 7.33–7.28 (m, 2H), 7.28–7.26 (m, 1H), 6.04 (d, *J* = 9.9 Hz, 1H), 4.66–4.58 (m, 1H), 4.48 (dt, *J* = 12.1, 7.9 Hz, 1H), 4.00–3.92 (m, 1H), 3.38 (s, 3H), 3.27 (dt, *J* = 11.0, 7.9 Hz, 1H), 3.18–3.12 (m, 1H), 1.42–1.30 (m, 2H), 1.26–1.09 (m, 6H), 0.82 (t, *J* = 7.2 Hz, 3H); ^{13}C NMR (126 MHz, $CDCl_3$) δ 201.7, 175.5, 135.5, 129.8, 128.6, 127.8, 84.5, 58.1, 56.9, 53.8, 32.1, 30.4, 28.5, 23.9, 22.7, 14.7; HPLC: the ee value was determined by HPLC analysis (Chiralpak IB-H, *i*-PrOH/Hexane = 5/95, 1.0 mL/min, 317 nm), retention time: t_{minor} = 16.240 min, t_{major} = 18.000 min, ee = 94%. The NMR spectral data is consistent with reported literature values.[2]



Methyl (5*R*,6*R*)-5-methoxy-7-oxo-6-phenyl-7-(2-thioxothiazolidin-3-yl) heptanoate (3t)

The compounds were prepared according to general procedure using CH_2Cl_2 as

solvent and purified by silica gel chromatography (CH_2Cl_2/EtOAc 100:0 to 99:1) affording **3t** in 24% yield (90.3 mg) and **3t'** in 23% yield (88.2 mg), corresponding to a combined yield of 47% (178.5 mg, yellow oil) and a 1:1 d.r. ^{1}H NMR (500 MHz, $CDCl_3$) δ 7.45–7.40 (m, 2H), 7.34–7.30 (m, 2H), 7.30–7.27 (m, 1H), 6.12 (d, *J* = 8.0 Hz, 1H), 4.57 (dt, *J* = 12.1, 7.7 Hz, 1H), 4.48 (ddd, *J* = 12.1, 7.6, 6.9 Hz, 1H), 3.81 (td, *J* = 7.3, 3.7 Hz, 1H), 3.66 (s, 3H), 3.24 (dt, *J* = 11.3, 7.2 Hz, 1H), 3.15 (dt, *J* = 11.0, 7.7 Hz, 1H), 3.06 (s, 3H), 2.36–2.29 (m, *J* = 7.5, 2.9 Hz, 2H), 1.86–1.79 (m, 1H), 1.70–1.57 (m, 3H); ^{13}C NMR (126 MHz, $CDCl_3$) δ 201.6, 174.2, 174.1, 135.7, 130.0, 128.5, 127.7, 83.8, 59.0, 56.9, 54.3, 51.7, 34.0, 32.5, 28.3, 21.2; HRMS (ESI) m/z [M + H]$^+$ calculated for $C_{17}H_{24}NO_3S_2$: 354.1192, found 354.1194; HPLC: the ee value was determined by HPLC analysis (Chiralcel IB-H, *i*-PrOH/Hexane = 20/80, 1.0 mL/min, 329 nm), retention time: t_{minor} = 8.780 min, t_{major} = 9.187 min, ee = 94%; $[\alpha]_D^{23}$ = +16.0 (c = 0.20, THF).



Methyl (5*S*,6*R*)-5-methoxy-6-phenyl-6-(2-thioxothiazolidin-3-yl)hexanoate (3t')

^{1}H NMR (500 MHz, $CDCl_3$) δ 7.50–7.42 (m, 2H), 7.35–7.29 (m, *J* = 12.9, 7.6 Hz, 2H), 7.29–7.26 (m, 1H), 6.09 (d, *J* = 9.9 Hz, 1H), 4.62 (ddd, *J* = 12.1, 7.7, 6.8 Hz, 1H), 4.49 (dt, *J* = 12.1, 7.8 Hz, 1H), 3.99 (ddd, *J* = 9.7, 5.8, 3.8 Hz, 1H), 3.60 (s, 3H), 3.39 (s, 3H), 3.27 (dt, *J* = 11.0, 7.8 Hz, 1H), 3.19–3.12 (m, 1H), 2.24–2.16 (m, *J* = 11.8, 4.4 Hz, 2H), 1.70–1.57 (m, 2H), 1.48–1.41 (m, 1H), 1.18 (ddt, *J* = 14.6, 10.9, 5.4 Hz, 1H); ^{13}C NMR (126 MHz, $CDCl_3$) δ 201.8, 175.2, 174.0, 135.3, 129.7, 128.8, 128.0, 84.0, 58.1, 56.9, 53.6, 51.6, 34.2, 29.7, 28.5, 19.8; HRMS (ESI) m/z [M + H]$^+$ calculated for $C_{17}H_{24}NO_3S_2$: 354.1192, found 354.1190; HPLC: the ee value was determined by HPLC analysis (Chiralcel IB-H, *i*-PrOH/Hexane = 20/80, 1.0 mL/min, 321 nm), retention time: t_{minor} = 7.767 min, t_{major} = 8.323 min, ee = 94%; $[\alpha]_D^{23}$ = – 42.7 (c = 0.18, THF).

Gram-scale Reaction

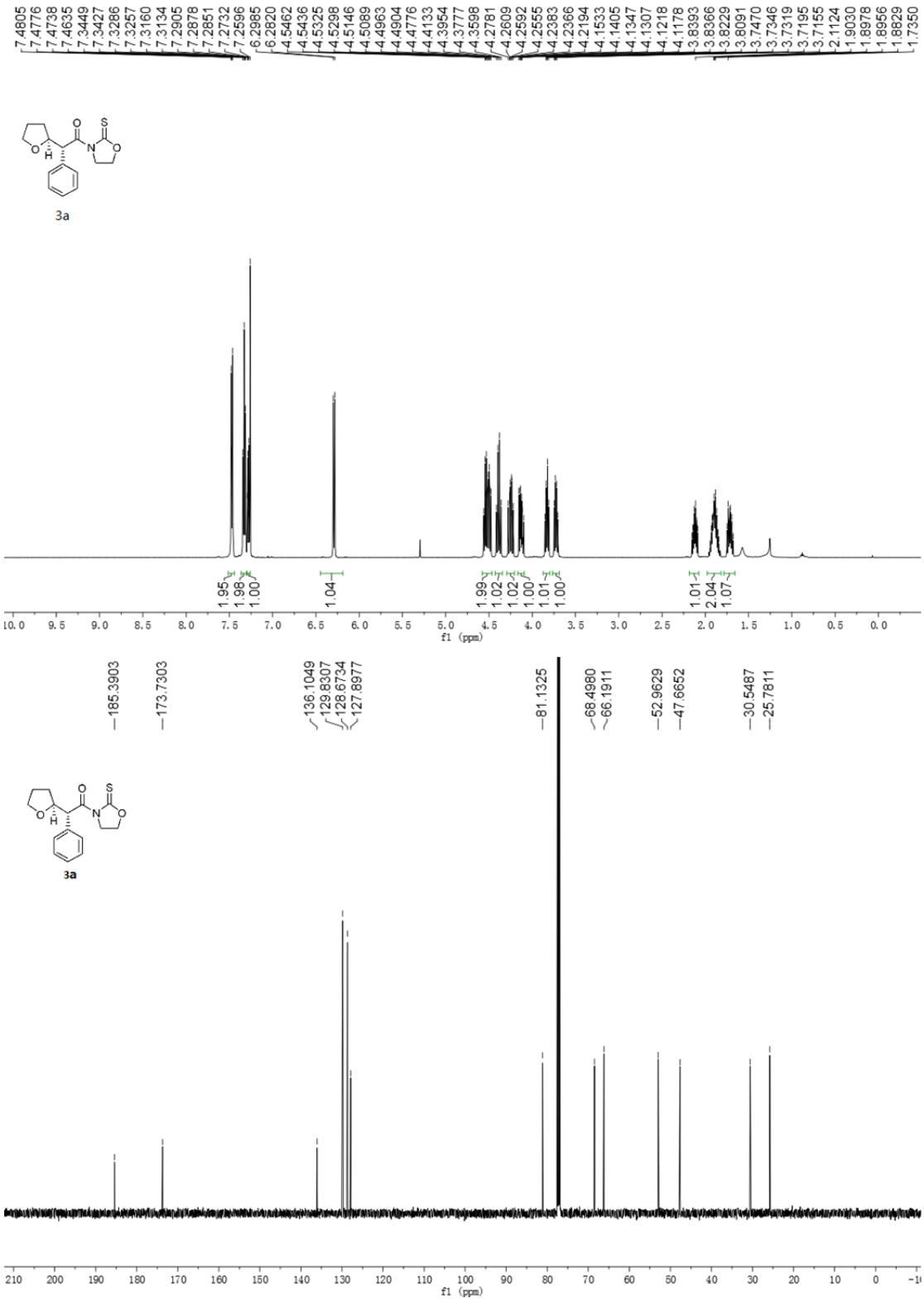
To a solution of **2a** (1.0 g, 4.5 mmol) in THF/CH_2Cl_2 (6.8 mL/2.3 mL) was added **L5**/$Ni(OTf)_2$ (420 mg, 0.45 mmol) at -40 ºC. Then a solution of 2,4,6-collidine (1.78 mL, 13.6 mmol) and $BF_3 \cdot OEt_2$ (2.24 mL, 18.1 mmol) were added to the reaction mixture, and it was allowed to warm to rt in 5 min. After that, **1ab** (1.85 mL, 11.3 mmol) was added and the resulting mixture was stirred for another 2h. The solvent was removed and the residue was purified by silica gel chromatography (CH_2Cl_2/EtOAc 100:0 to 99:1) to give **3a** in 47% yield (614 mg, 96% ee) and **3a'** in 31% yield (408 mg, 94% ee), corresponding to a combined yield of 78% and a 1.5:1 d.r.

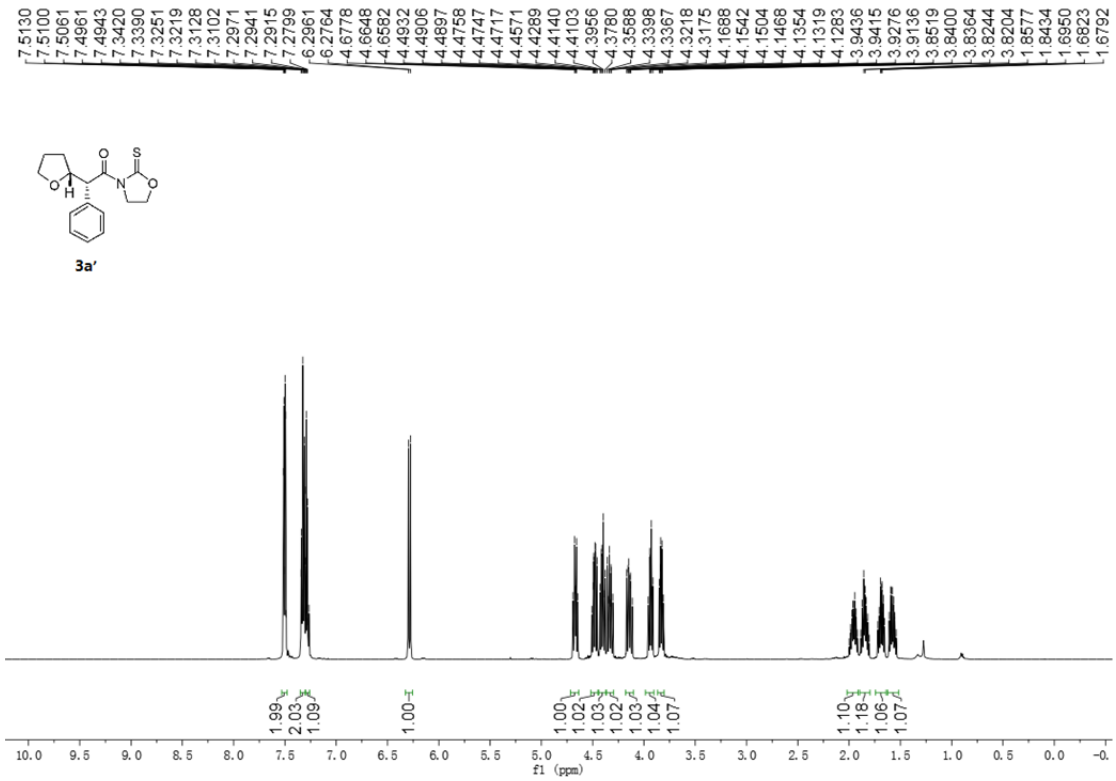
References

1.(a) Fujioka, H.; Ohnak, T.; Okitsu, T. *Heterocycles* **2007**, *72*, 529; (b) Coric, I.; Vellalath, S.; List, B. *J. Am. Chem. Soc* **2010**, *132*, 8536; (c) De, S. K.; Gibbs, R. A. *Tetrahedron Lett.* **2004**, *45*, 8141.

2. G. Wang, X. Xin, Z. Wang, G. Lu, Y. Ma and L. Liu, *Nature Commun.* 2019, **10**, 559.

^{1}H and ^{13}C NMR Spectra

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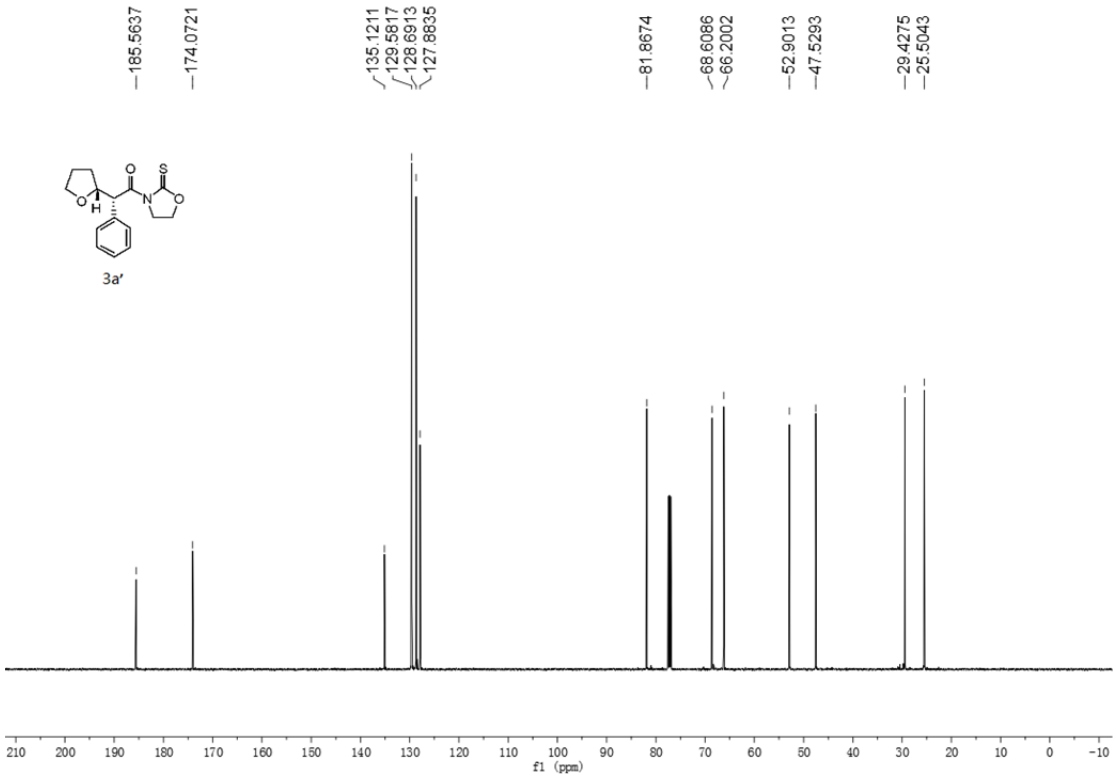
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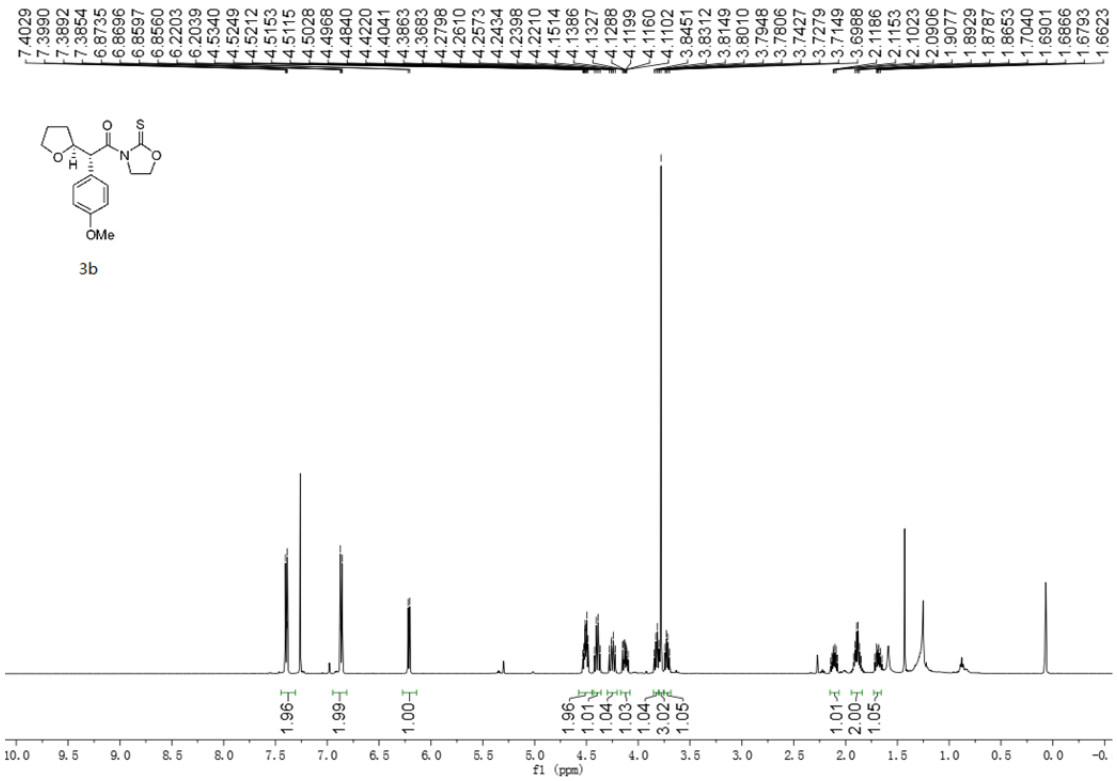
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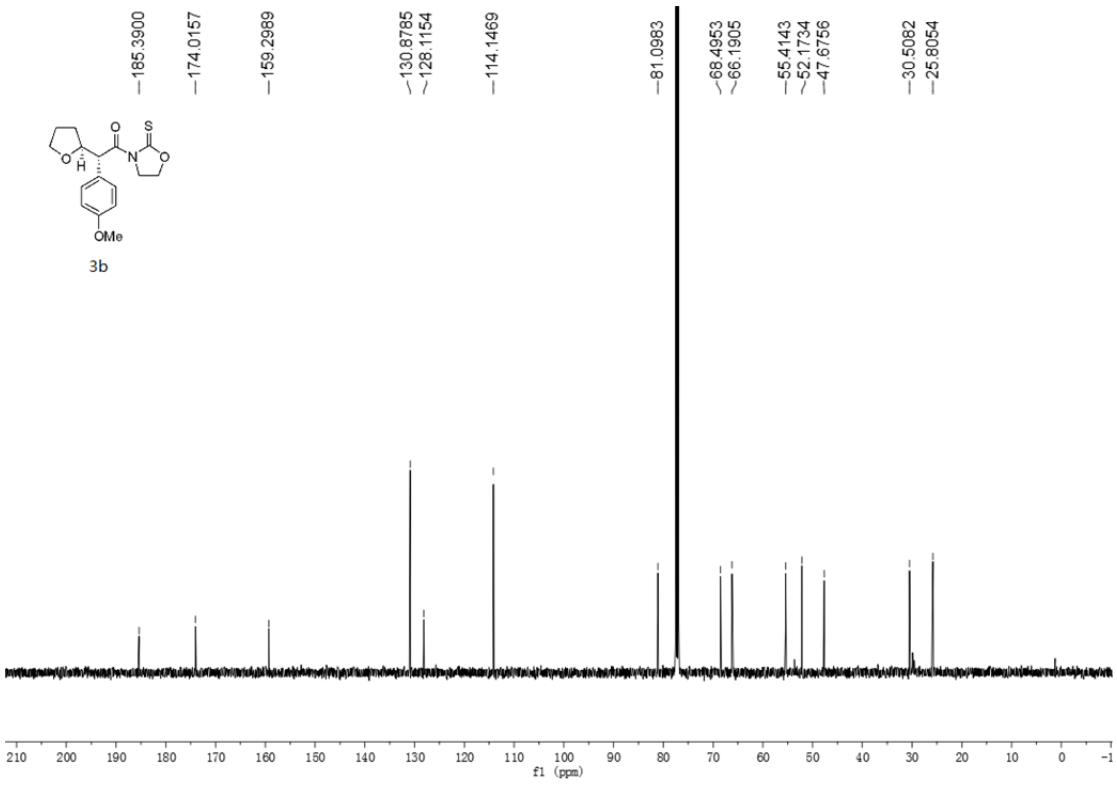
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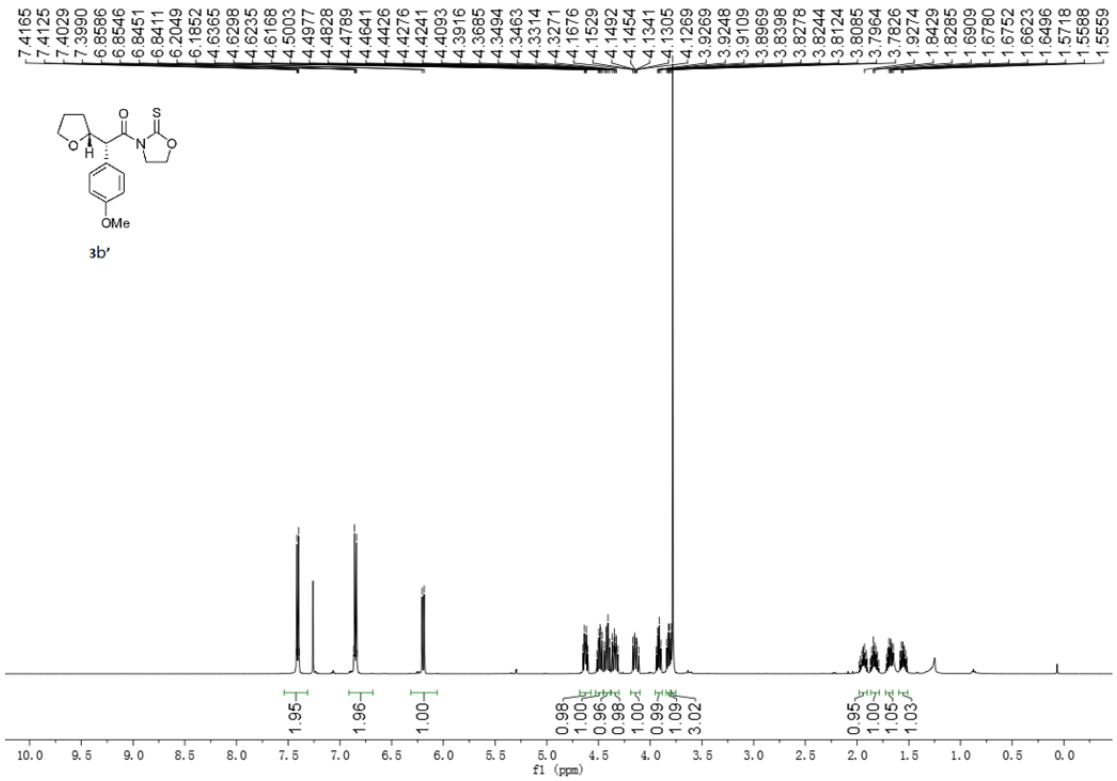
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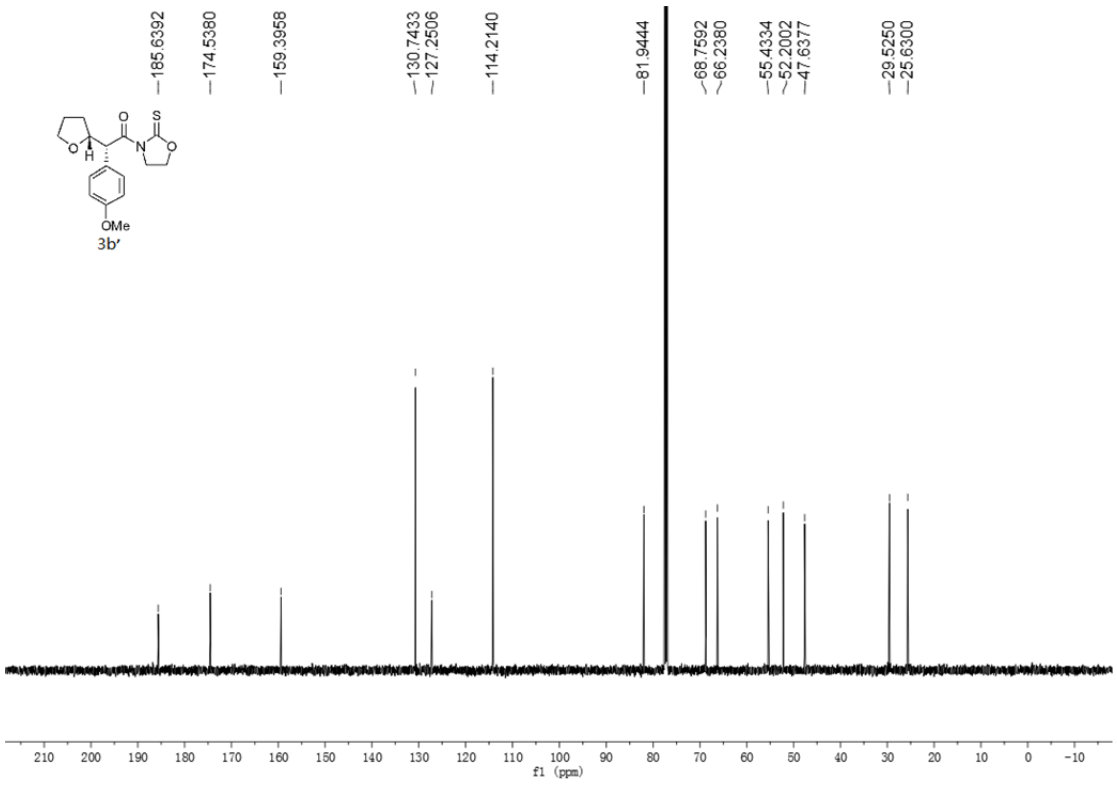
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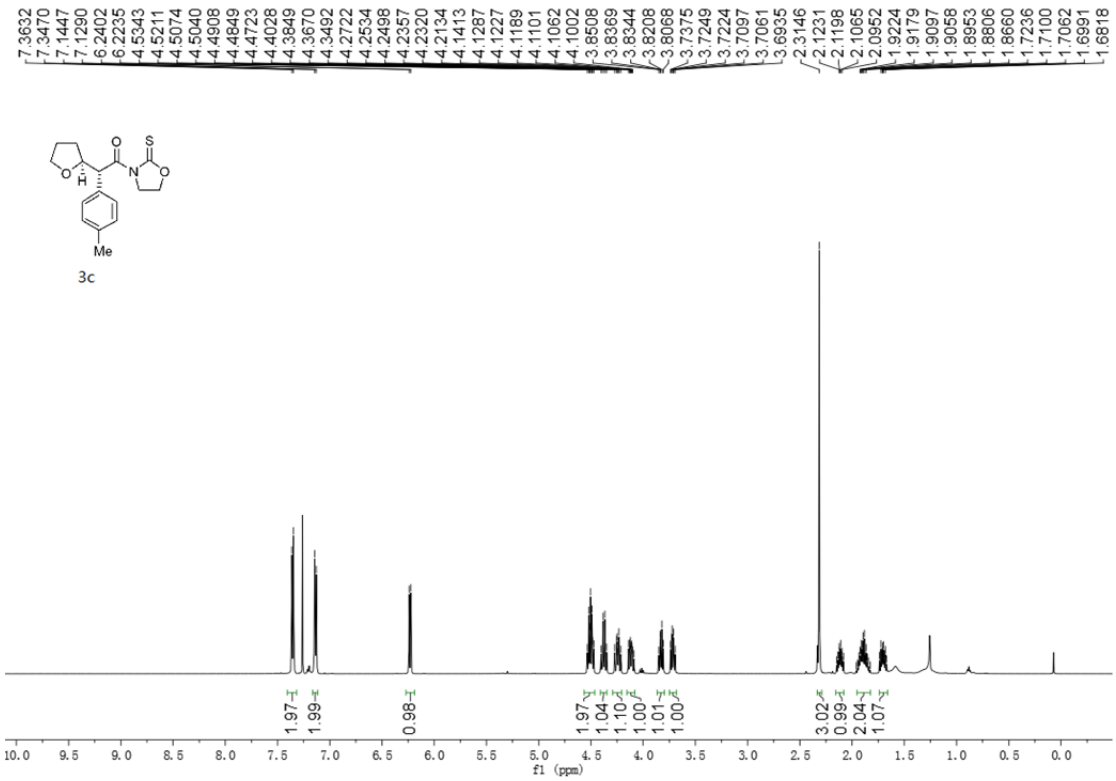
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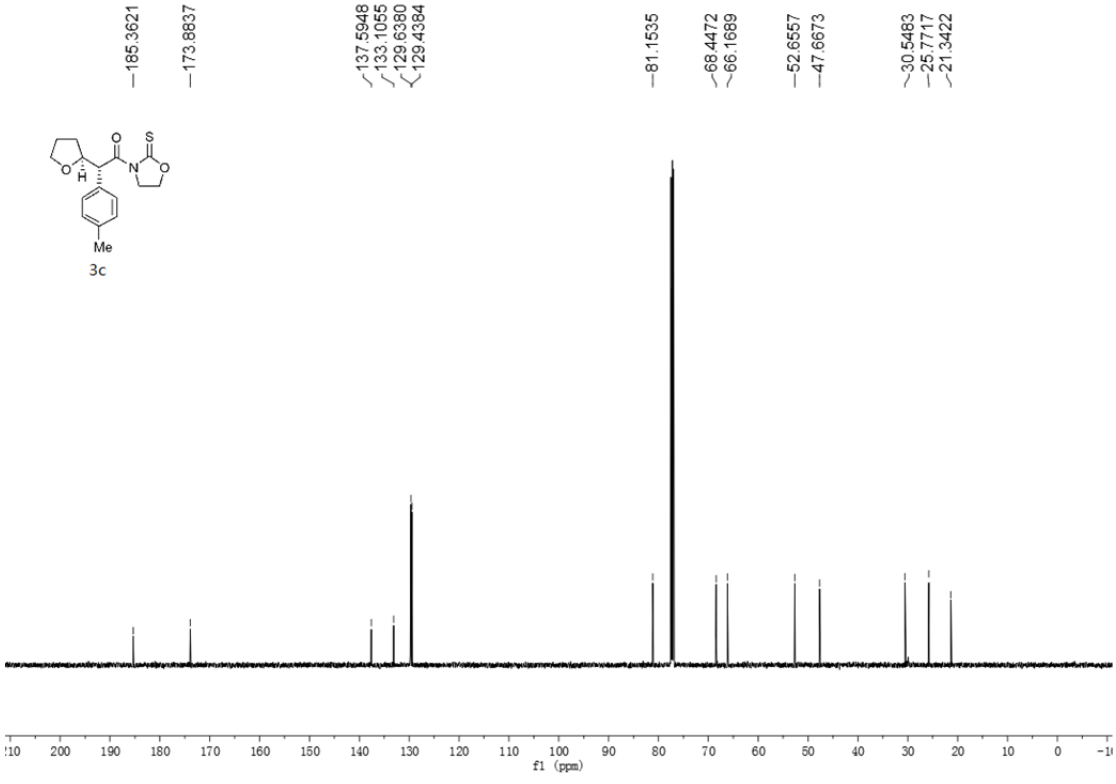
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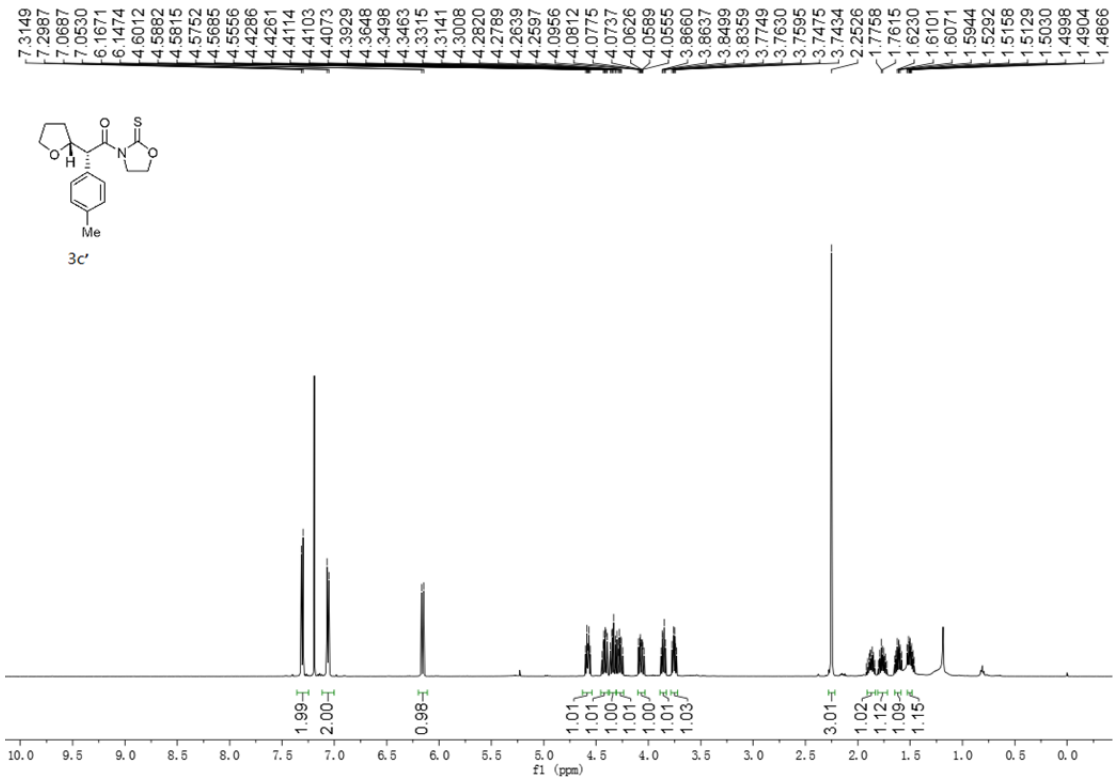
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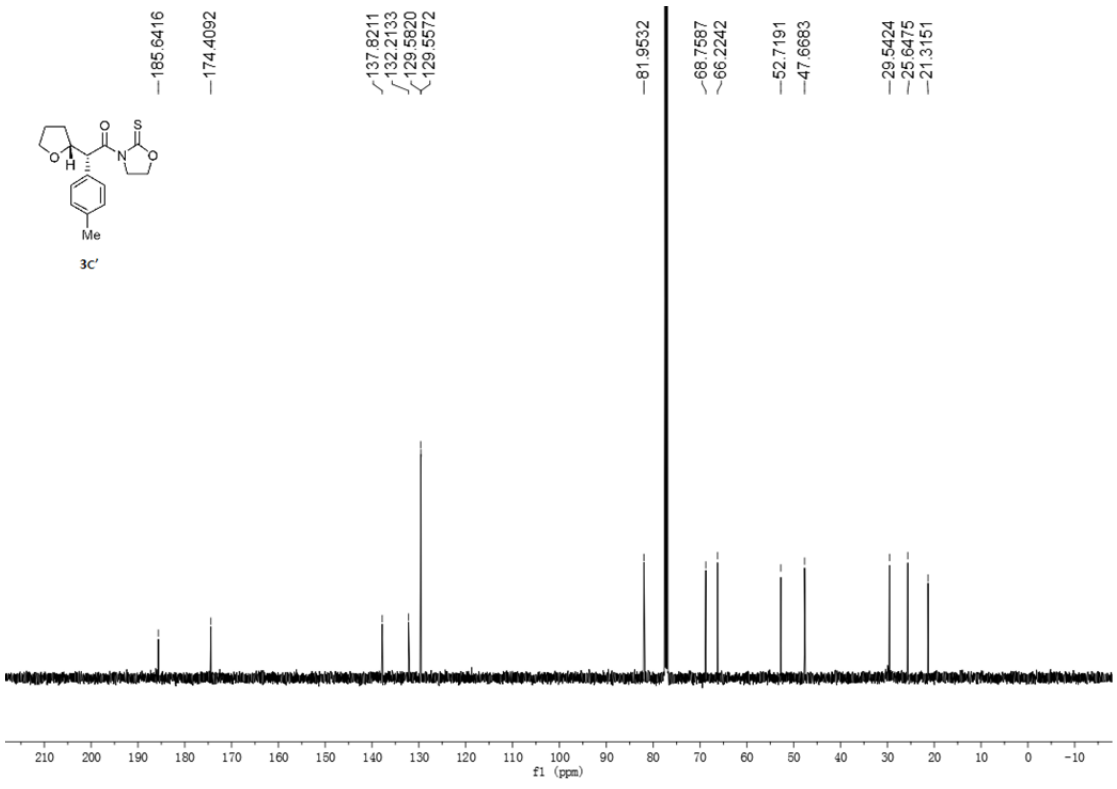
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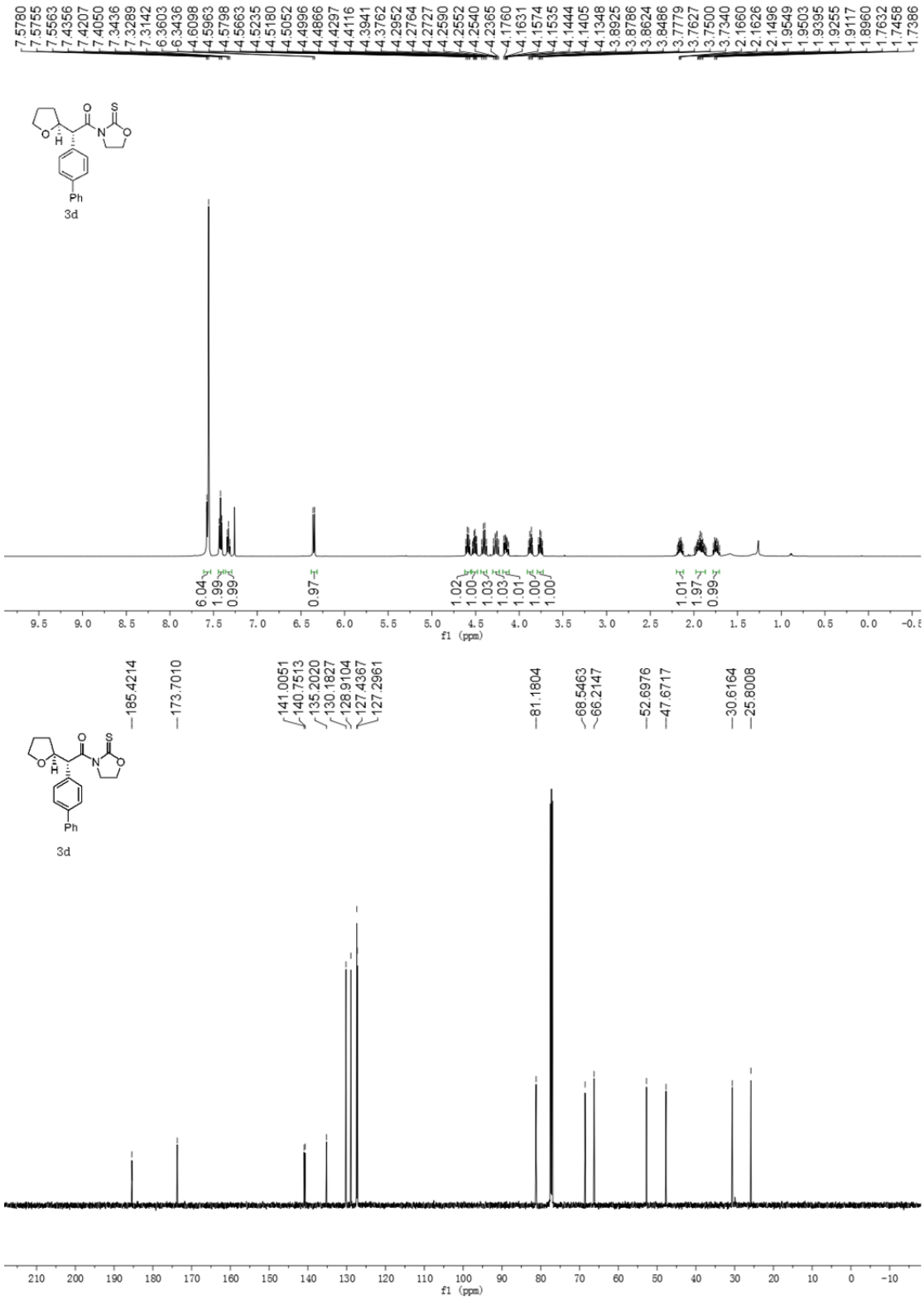
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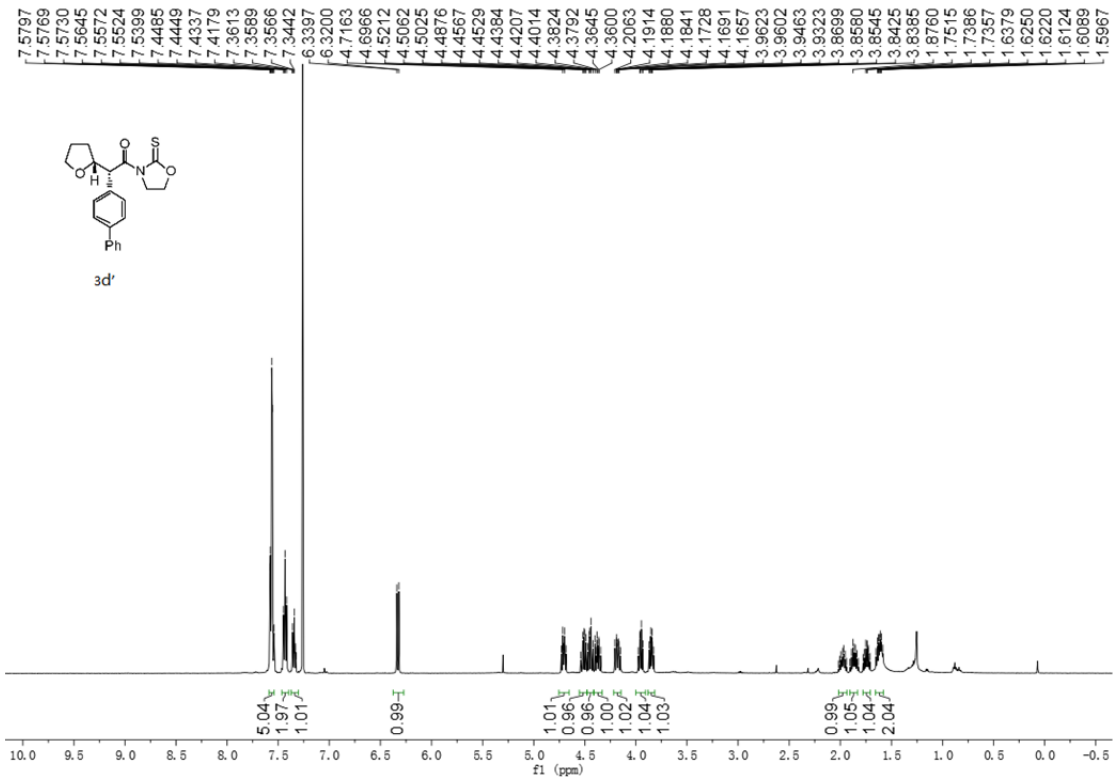
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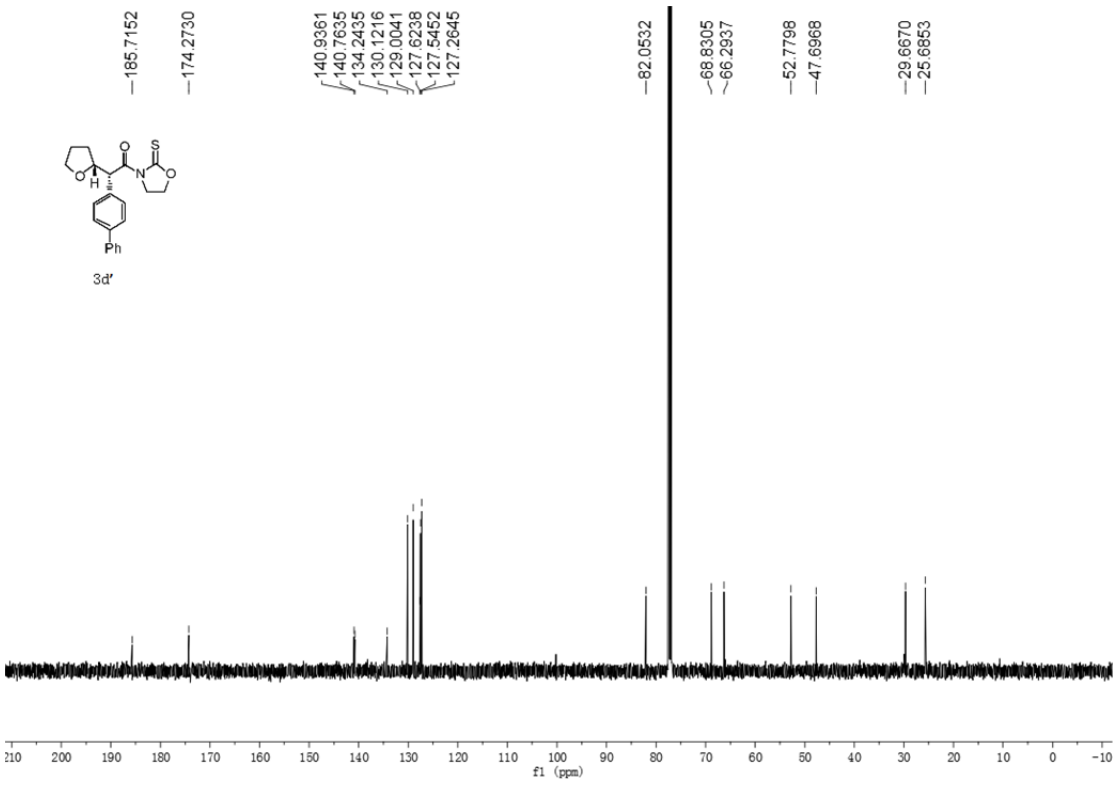
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47.6968
29.6670
25.6853
O
S
O
N
O
H
Ph
3d'
f1 (ppm)


7.4190
7.4152
7.4059
7.4020
7.3090
7.3039
7.2999
7.2907
7.2869
6.2567
6.2404
4.5258
4.5209
4.5156
4.5076
4.5022
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4.4860
4.4724
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4.2810
4.2644
4.2619
4.2583
4.2417
4.2393
4.2227
4.1634
4.1499
4.1447
4.1407
4.1312
4.1272
4.1220
3.8220
3.8191
3.8053
3.7917
3.7405
3.7262
3.7132
3.7113
2.1238
2.1080
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1.8819
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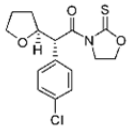
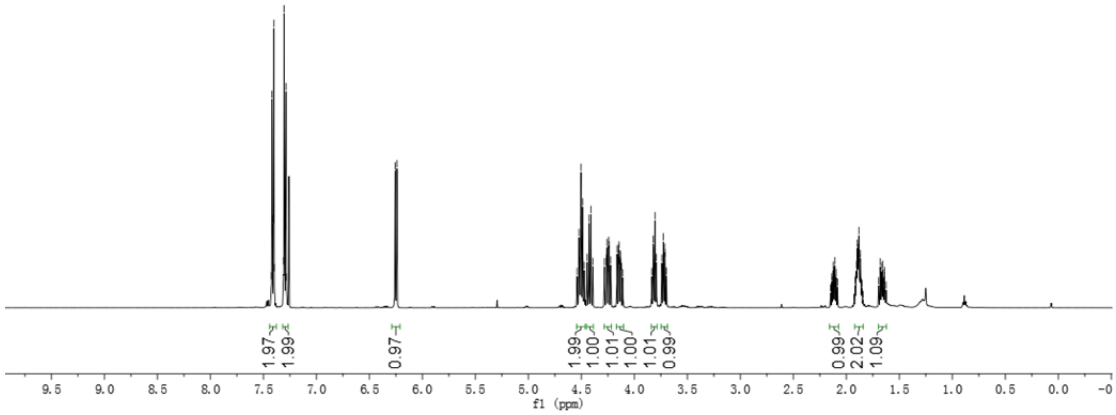
1.8671
1.8611
1.6639
1.6563



3e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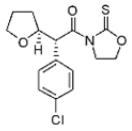
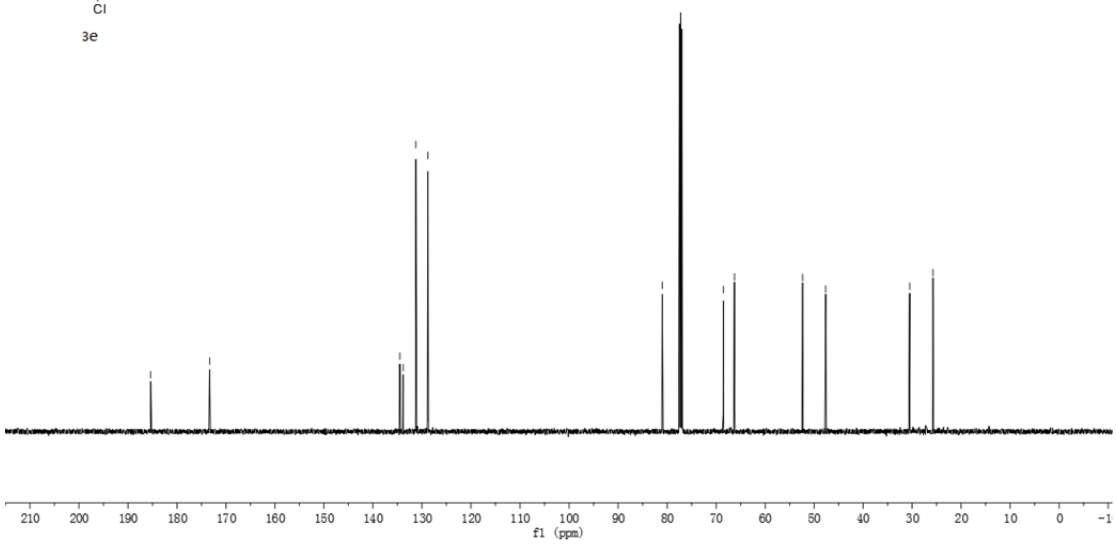
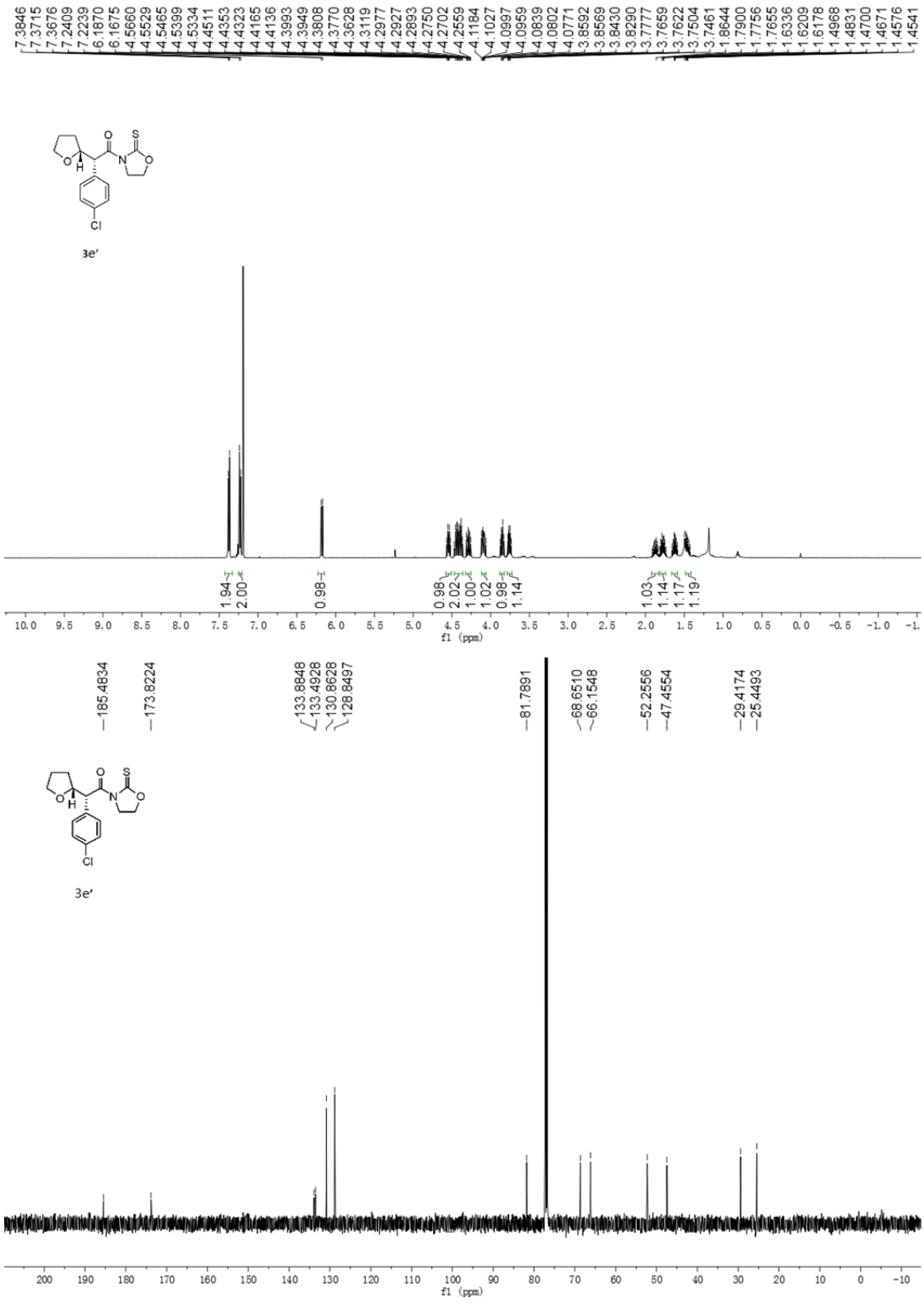
1.00
1.01
0.99
0.99
2.02
1.09
f1 (ppm)


185.3363
173.3397
134.5266
133.8667
131.2449
128.8066
80.9813
68.5258
66.2669
52.3603
47.6261
30.5068
25.7498



3e


f1 (ppm)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7.2239
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6.1675
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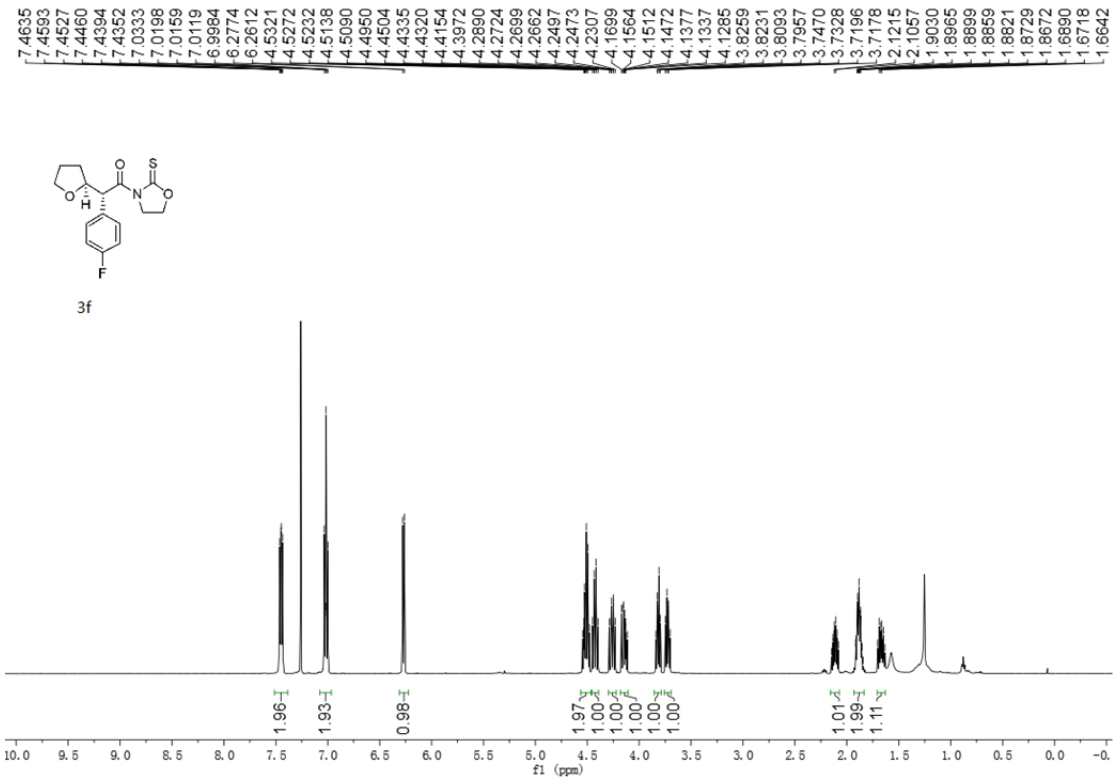
4.5529
4.5465
4.5399
4.5334
4.4511
4.4353
4.4323
4.4165
4.4136
4.3993
4.3949
4.3808
4.3770
4.3628
4.3119
4.2977
4.2927
4.2893
4.2750
4.2702
4.2559
4.1184
4.1027
4.0997
4.0959
4.0839
4.0802
4.0771
3.8592
3.8569
3.8430
3.8290
3.7777
3.7659
3.7622
3.7504
3.7461
1.8644
1.7900
1.7756
1.7655
1.6336
1.6209
1.6178
1.4968
1.4831
1.4700
1.4671
1.4576
1.4541
3e'
1.94
2.00
0.98
0.98
2.02
1.00
1.02
0.98
1.14
1.03
1.14
1.17
1.19
f1 (ppm)
185.4834
173.8224
133.8848
133.4928
130.8628
128.8497
81.7891
68.6510
66.1548
52.2556
47.4554
29.4174
25.4493
3e'
f1 (ppm)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7.0333
7.0198
7.0159
7.0119
6.9984
6.2774
6.2612
4.5321
4.5272
4.5232
4.5138
4.5090
4.4950
4.4504
4.4335
4.4320
4.4154
4.3972
4.2890
4.2724
4.2699
4.2662
4.2497
4.2473
4.2307
4.1699
4.1564
4.1512
4.1472
4.1377
4.1337
4.1285
3.8259
3.8231
3.8093
3.7957
3.7470
3.7328
3.7196
3.7178
2.1215
2.1057
1.9030
1.8965
1.8899
1.8859
1.8821
1.8729
1.8672
1.6890
1.6718
1.6642
3f
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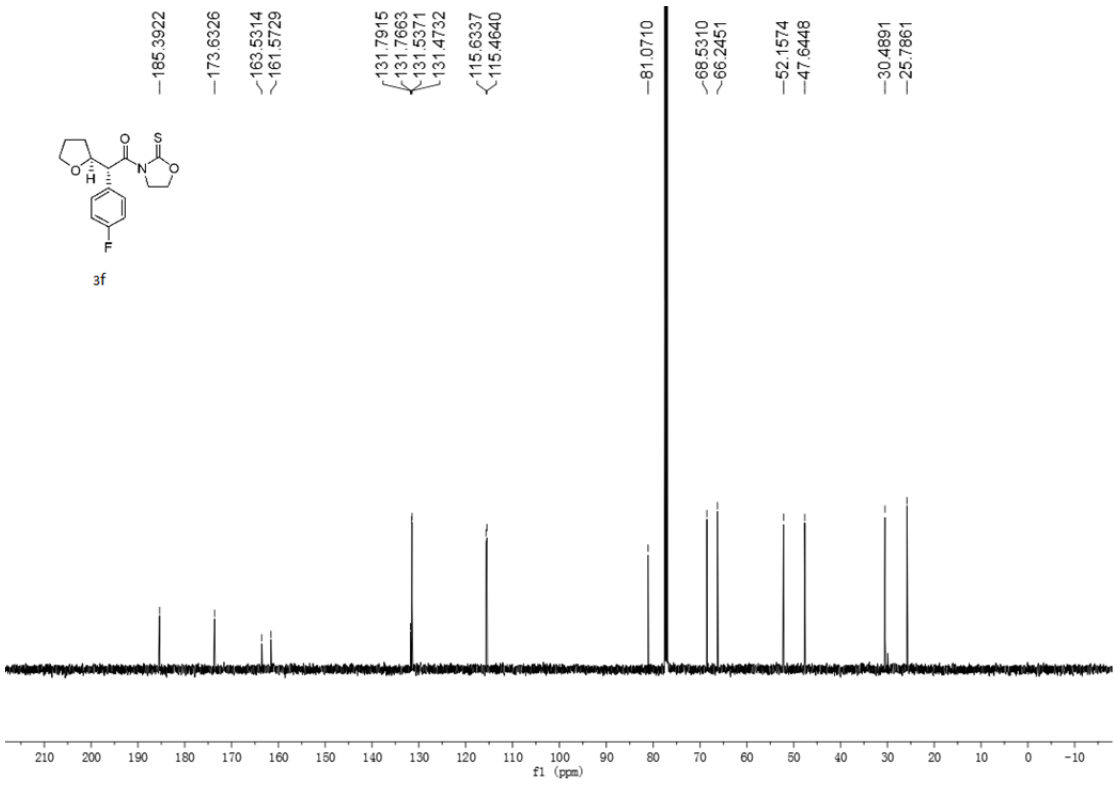
1.93
0.98
1.97
1.00
1.00
1.00
1.00
1.01
1.99
1.11
f1 (ppm)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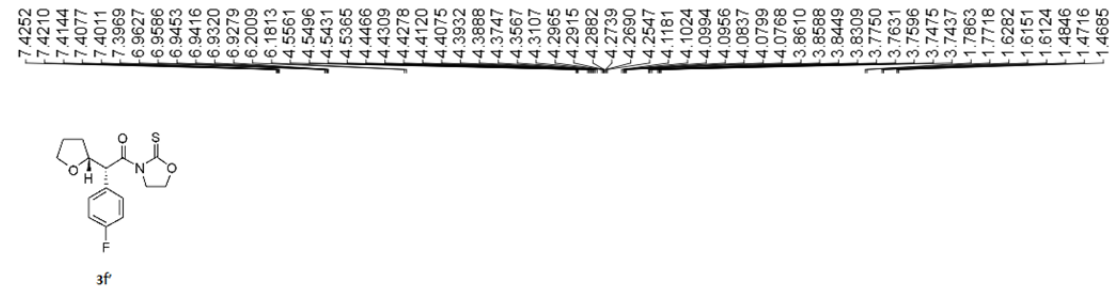
163.5314
161.5729
131.7915
131.7663
131.5371
131.4732
115.6337
115.4640
81.0710
68.5310
66.2451
52.1574
47.6448
30.4891
25.7861
3f
f1 (ppm)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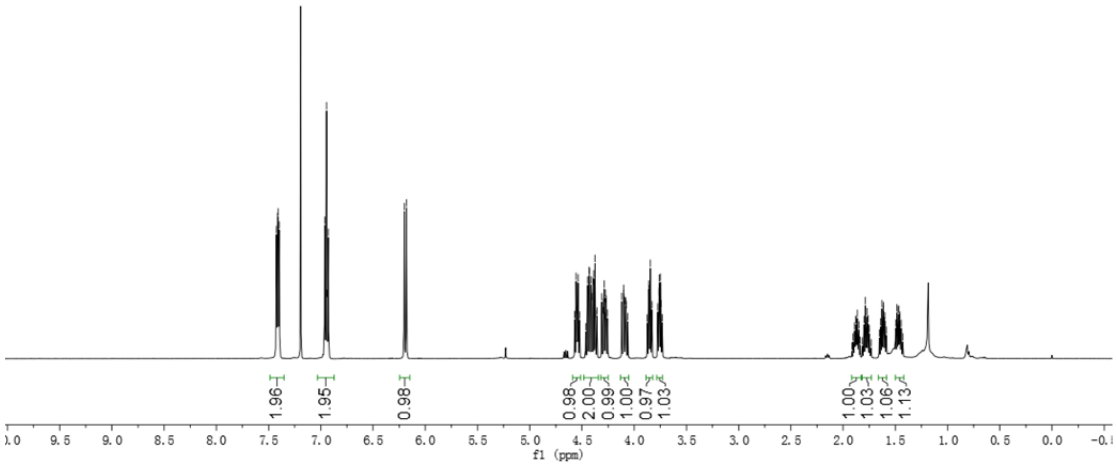
7.4210
7.4144
7.4077
7.4011
7.3969
6.9627
6.9586
6.9453
6.9416
6.9320
6.9279
6.2009
6.1813
4.5561
4.5496
4.5431
4.5365
4.4466
4.4309
4.4278
4.4120
4.4075
4.3932
4.3888
4.3747
4.3567
4.3107
4.2965
4.2915
4.2882
4.2739
4.2690
4.2547
4.1181
4.1024
4.0994
4.0956
4.0837
4.0799
4.0768
3.8610
3.8588
3.8449
3.8309
3.7750
3.7631
3.7596
3.7475
3.7437
1.7863
1.7718
1.6282
1.6151
1.6124
1.4846
1.4716
1.4685

O
S
O
N
O
H
F

3f'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0.98
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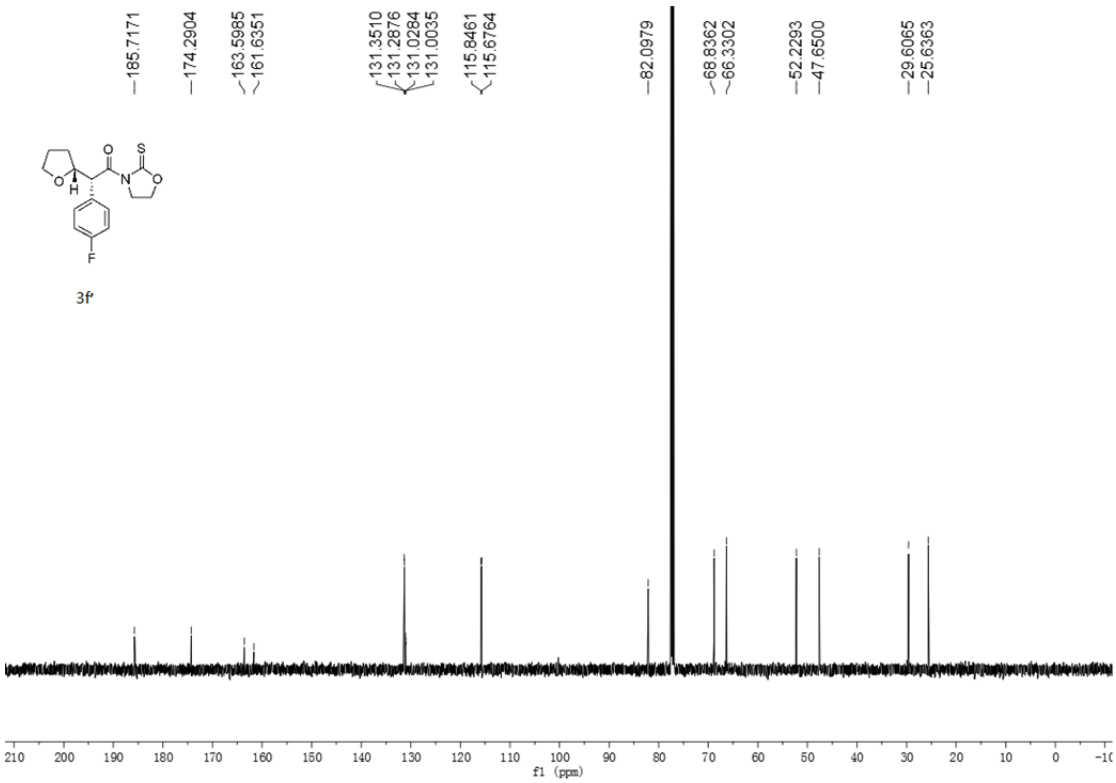
0.99
1.00
0.97
1.03
1.00
1.03
1.06
1.13
f1 (ppm)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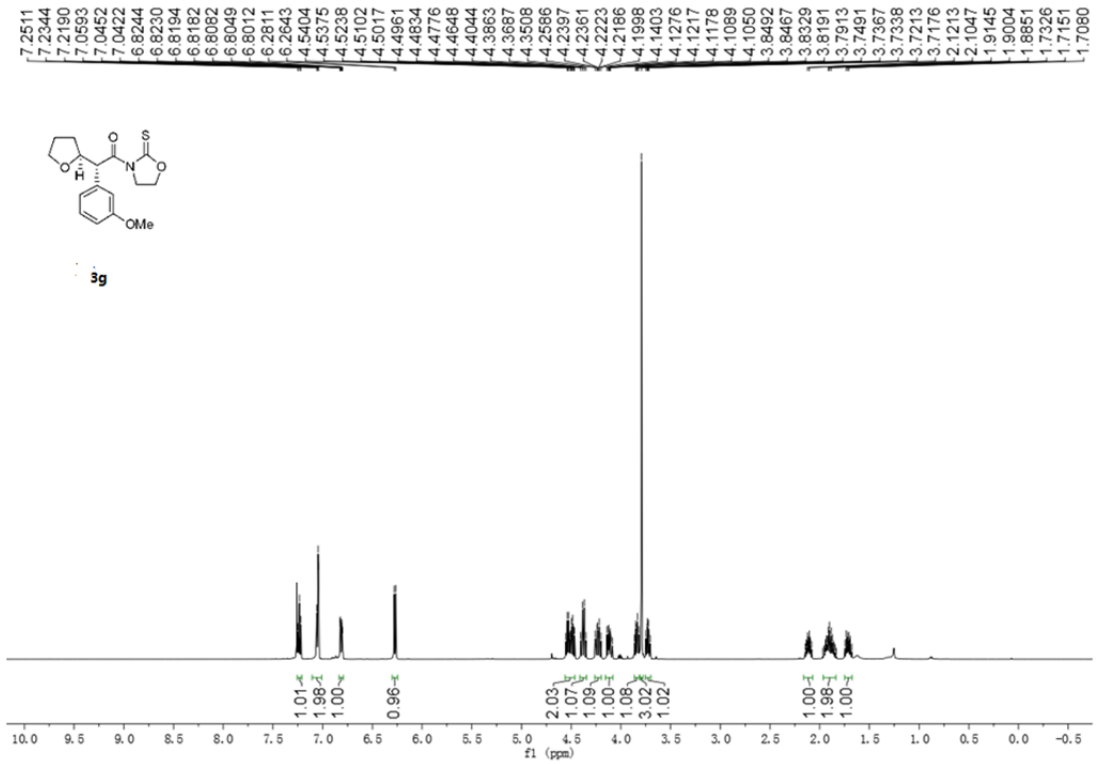
174.2904
163.5985
161.6351
131.3510
131.2876
131.0284
131.0035
115.8461
115.6764
82.0979
68.8362
66.3302
52.2293
47.6500
29.6065
25.6363
f1 (ppm)

O
S
O
N
O
H
F

3f'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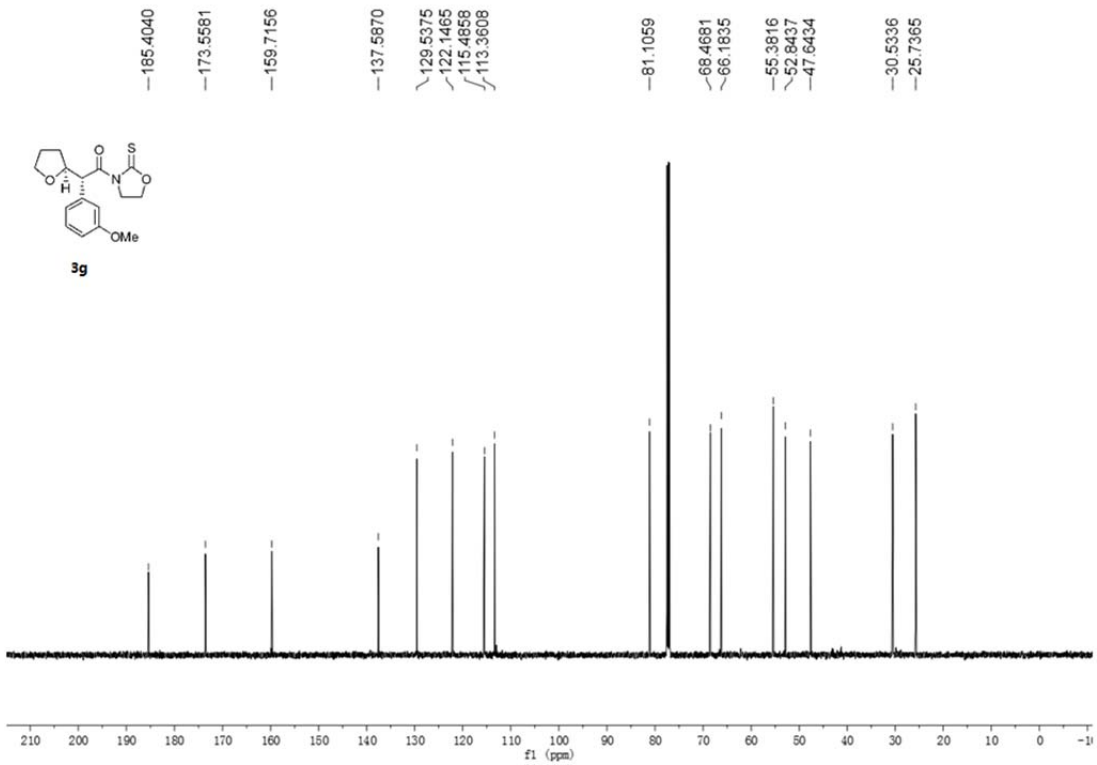
7.2344
7.2190
7.0593
7.0452
7.0422
6.8244
6.8230
6.8194
6.8182
6.8082
6.8049
6.8012
6.2811
6.2643
4.5404
4.5375
4.5238
4.5102
4.5017
4.4961
4.4834
4.4776
4.4648
4.4044
4.3863
4.3687
4.3508
4.2586
4.2397
4.2361
4.2223
4.2186
4.1998
4.1403
4.1276
4.1217
4.1178
4.1089
4.1050
3.8492
3.8467
3.8329
3.8191
3.7913
3.7491
3.7367
3.7338
3.7213
3.7176
2.1213
2.1047
1.9145
1.9004
1.8851
1.7326
1.7151
1.7080
O
S
N
O
H
OMe
3g
1.01
1.98
1.00
0.96
2.03
1.07
1.09
1.00
1.08
3.02
1.02
1.00
1.98
1.00
f1 (ppm)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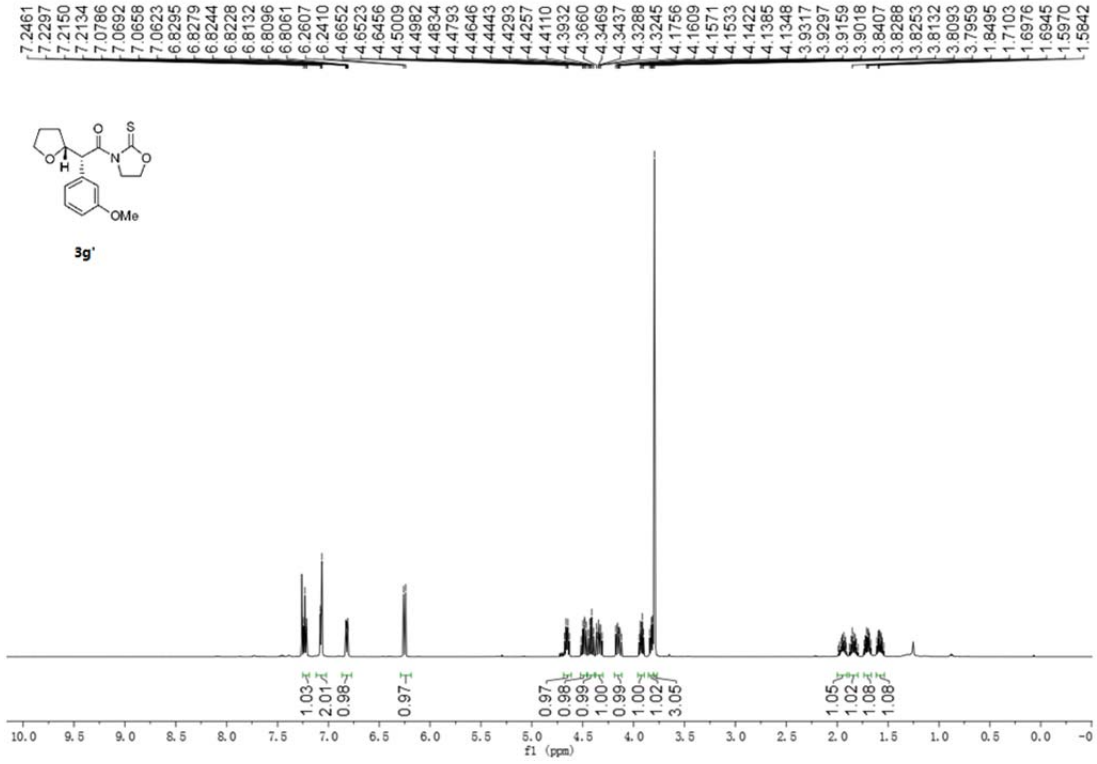
137.5870
129.5375
122.1465
115.4858
113.3608
81.1059
68.4681
66.1835
55.3816
52.8437
47.6434
30.5336
25.7365
O
S
N
O
H
OMe
3g
f1 (ppm)


7.2461
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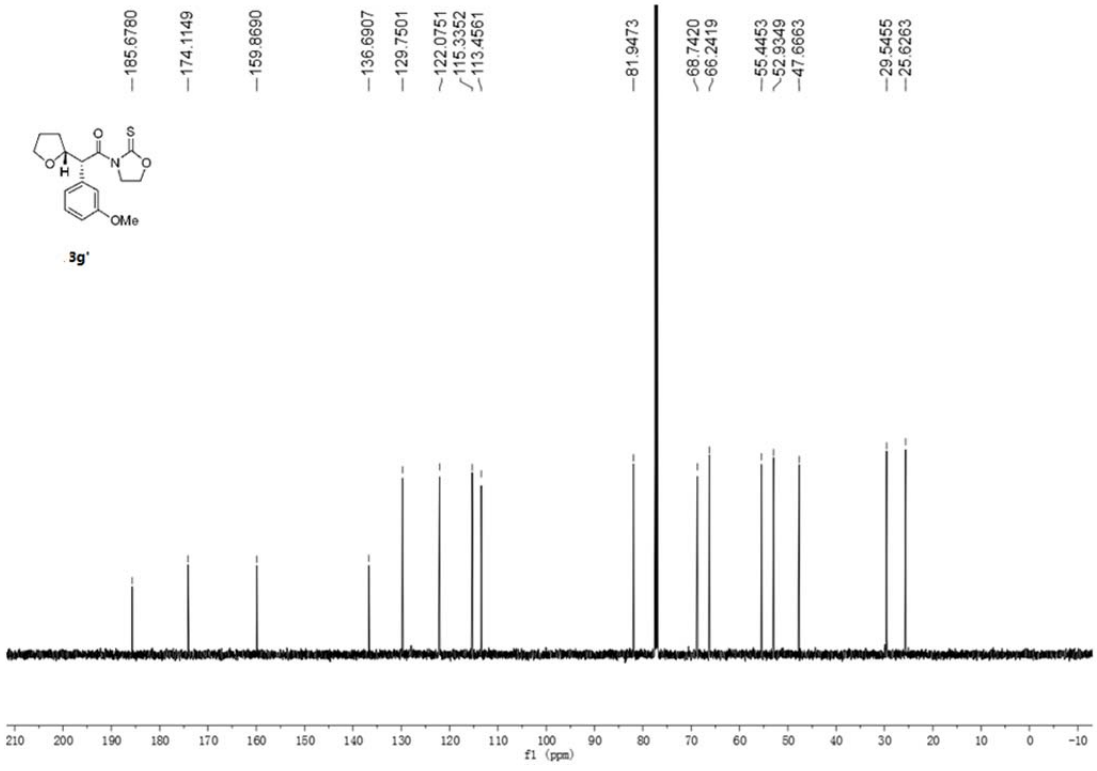
7.2134
7.0786
7.0692
7.0658
7.0623
6.8295
6.8279
6.8244
6.8228
6.8132
6.8096
6.8061
6.2607
6.2410
4.6652
4.6523
4.6456
4.5009
4.4982
4.4834
4.4793
4.4646
4.4443
4.4293
4.4257
4.4110
4.3932
4.3660
4.3469
4.3437
4.3288
4.3245
4.1756
4.1609
4.1571
4.1533
4.1422
4.1385
4.1348
3.9317
3.9297
3.9159
3.9018
3.8407
3.8288
3.8253
3.8132
3.8093
3.7959
1.8495
1.7103
1.6976
1.6945
1.5970
1.5842
OMe
3g'
1.03
2.01
0.98
0.97
0.97
0.98
0.99
1.00
0.99
1.00
1.02
3.05
1.05
1.02
1.08
1.08
f1 (ppm)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122.0751
115.3352
113.4561
81.9473
68.7420
66.2419
55.4453
52.9349
47.6663
29.5455
25.6263
OMe
3g'
f1 (ppm)


7.4743
7.4726
7.3827
7.3794
7.3730
7.3682
7.3651
7.3618
7.2660
7.2603
7.2562
7.2538
6.2972
6.2807
4.5358
4.5307
4.5230
4.5202
4.5173
4.5119
4.5097
4.5068
4.4985
4.4615
4.4447
4.4431
4.4265
4.4084
4.2868
4.2702
4.2678
4.2640
4.2475
4.2451
4.2286
4.1888
4.1752
4.1701
4.1660
4.1565
4.1525
3.8452
3.8424
3.8286
3.8148
3.7590
3.7464
3.7442
3.7315
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2.1300
2.1137
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1.8940
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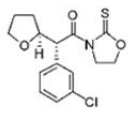
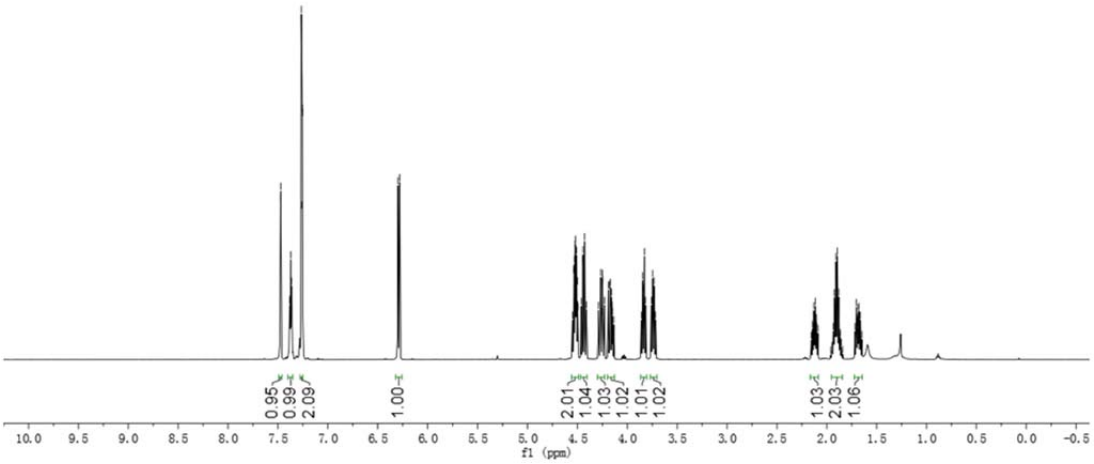
1.7043
1.6795



3h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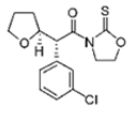
0.99
2.09
1.00
2.01
1.04
1.03
1.02
1.01
1.02
1.03
2.03
1.06
f1 (ppm)


185.3716
173.1310
138.0395
134.4386
129.7816
129.7509
128.3789
128.1088
81.0244
68.5547
66.2791
52.5530
47.6266
30.5255
25.7569



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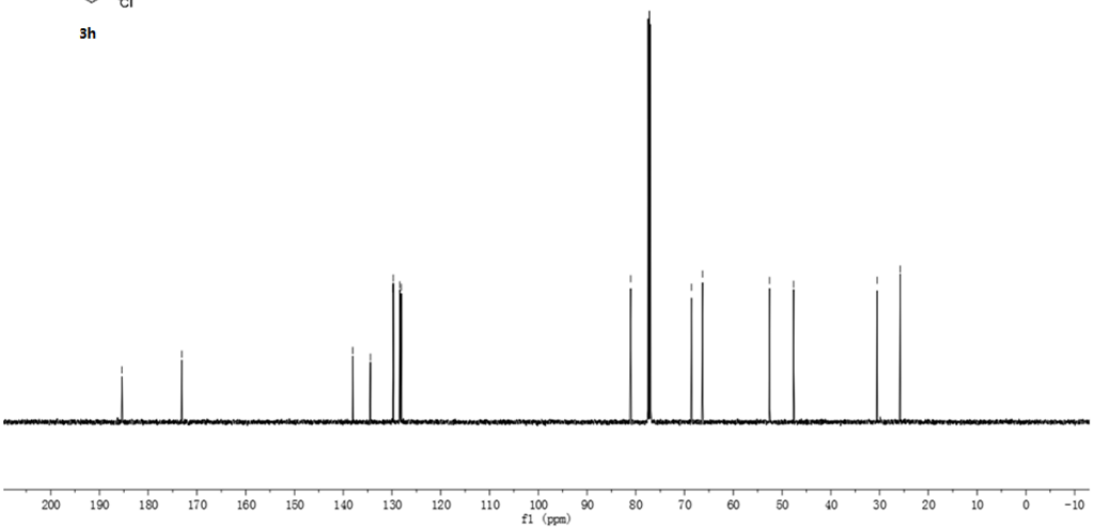
f1 (ppm)


7.5033
7.4069
7.4038
7.4006
7.3959
7.3895
7.3864
7.2664
7.2603
7.2557
6.2811
6.2615
4.6430
4.6300
4.6236
4.6171
4.6105
4.5209
4.5045
4.5025
4.4868
4.4728
4.4686
4.4543
4.3792
4.3650
4.3600
4.3567
4.3424
4.3376
4.2033
4.1874
4.1847
4.1809
4.1688
4.1651
4.1621
3.9278
3.9136
3.8997
3.8438
3.8316
3.8285
3.8162
3.8130
1.9537
1.9410
1.8781
1.8638
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1.7208
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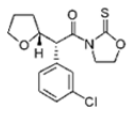
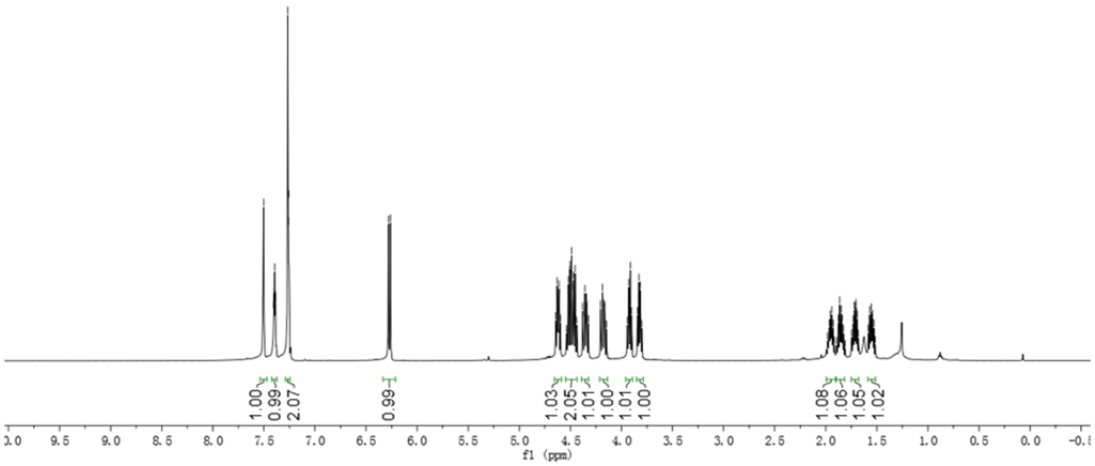
1.7054
1.6924
1.5695
1.5540
1.5440
1.5410



3h'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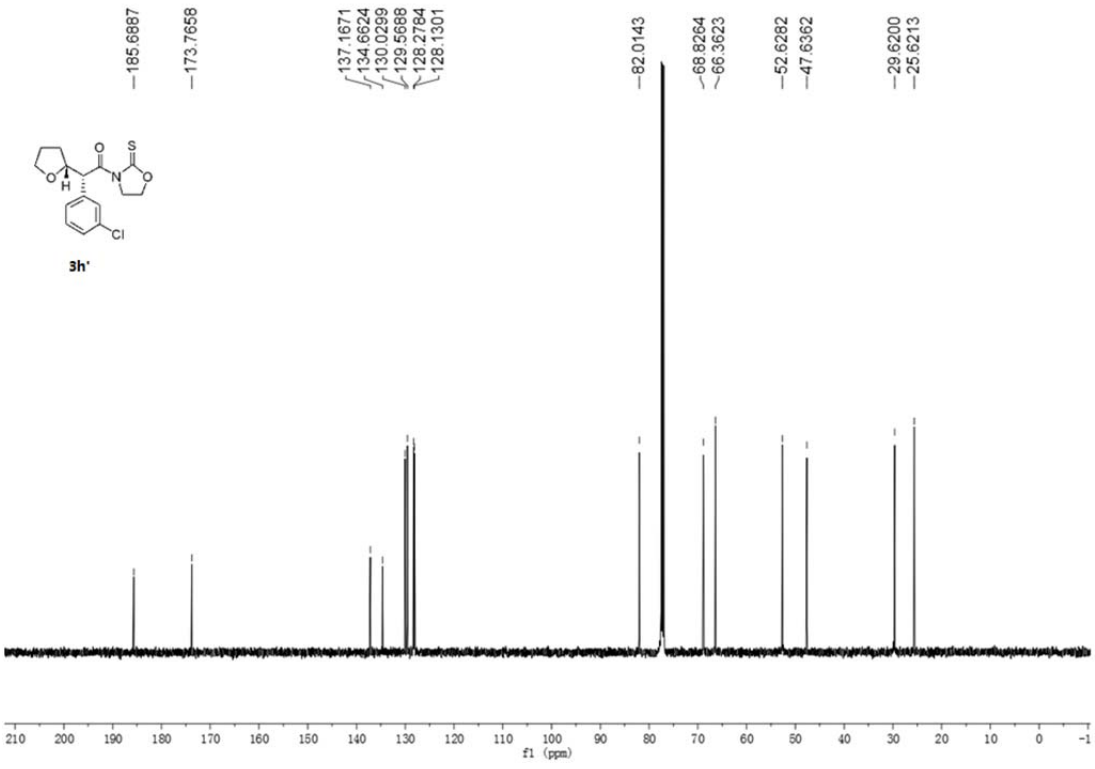
0.99
1.03
2.05
1.01
1.00
1.01
1.00
1.08
1.06
1.05
1.02
f1 (ppm)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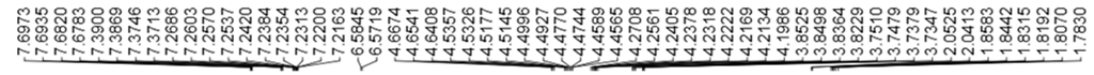
137.1671
134.6624
130.0299
129.5688
128.2784
128.1301
82.0143
68.8264
66.3623
52.6282
47.6362
29.6200
25.6213
f1 (ppm)

3h'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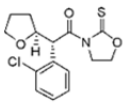
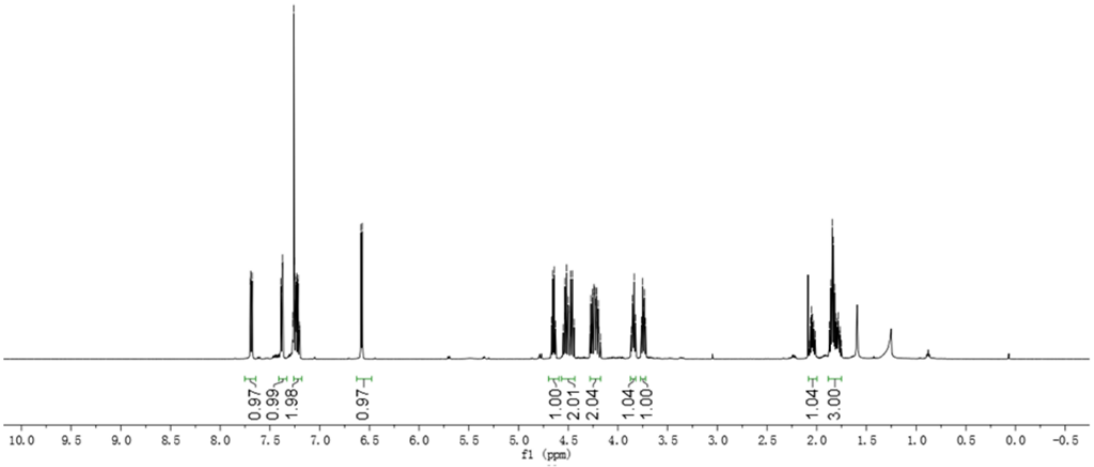
7.6820
7.6783
7.3900
7.3869
7.3746
7.3713
7.2686
7.2603
7.2570
7.2537
7.2420
7.2384
7.2354
7.2313
7.2200
7.2163
6.5845
6.5719
4.6674
4.6541
4.6408
4.5357
4.5326
4.5177
4.5145
4.4996
4.4927
4.4770
4.4744
4.4589
4.4565
4.2708
4.2561
4.2405
4.2378
4.2318
4.2222
4.2169
4.2134
4.1986
3.8525
3.8498
3.8364
3.8229
3.7510
3.7479
3.7379
3.7347
2.0525
2.0413
1.8583
1.8442
1.8315
1.8192
1.8070
1.7830



3i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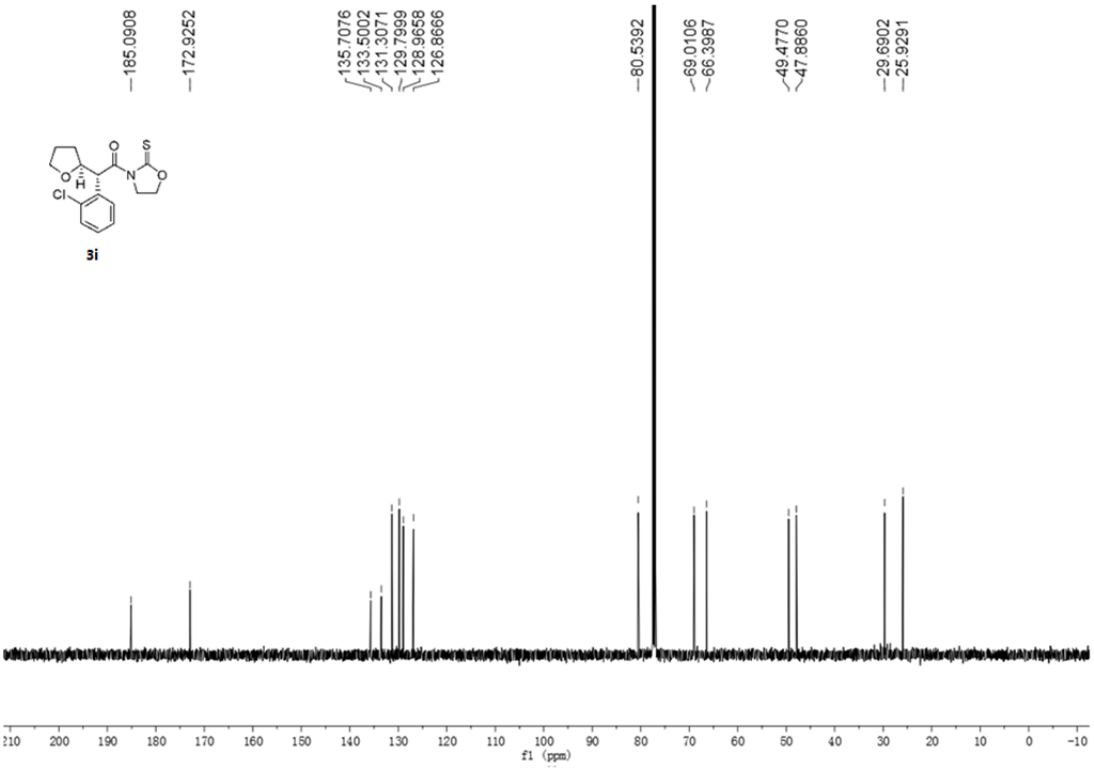
0.97
1.00
2.01
2.04
1.04
1.00
1.04
3.00
f1 (ppm)


185.0908
172.9252
135.7076
133.5002
131.3071
129.7999
128.9658
126.8666
80.5392
69.0106
66.3987
49.4770
47.8860
29.6902
25.9291
f1 (ppm)

3i


7.6965
7.6928
7.6812
7.6775
7.4022
7.3992
7.3868
7.3836
7.2660
7.2597
7.2544
7.2512
7.2394
7.2358
7.2322
7.2281
7.2168
7.2131
6.6143
6.5951
4.6453
4.6261
4.5237
4.5103
4.5051
4.4917
4.4609
4.4444
4.4427
4.4264
4.4086
4.3506
4.3317
4.3283
4.3120
4.3094
4.2078
4.1944
4.1895
4.1856
4.1760
4.1721
4.0357
4.0316
4.0199
4.0161
4.0047
3.8136
3.7978
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2.0711
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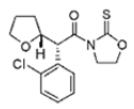
1.8696
1.8008
1.7964
1.7871
1.7827
1.7735



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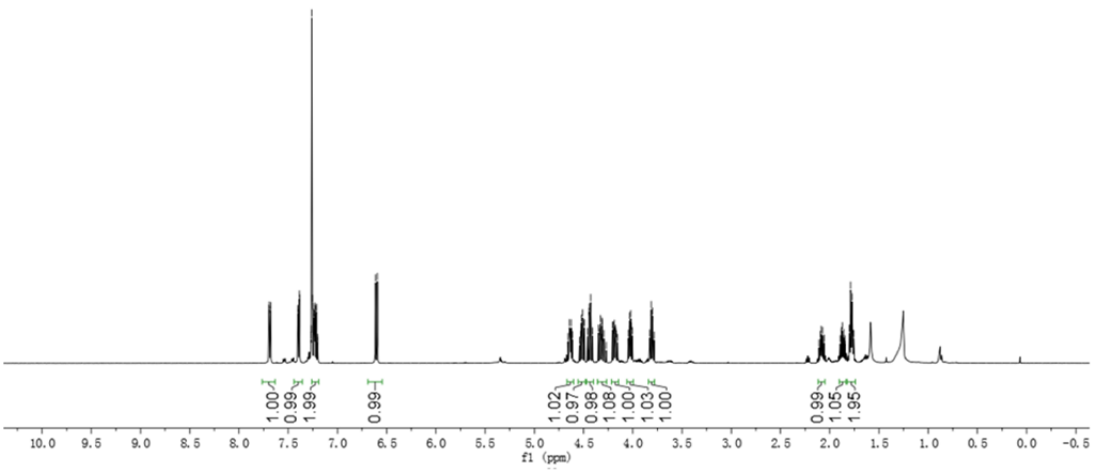
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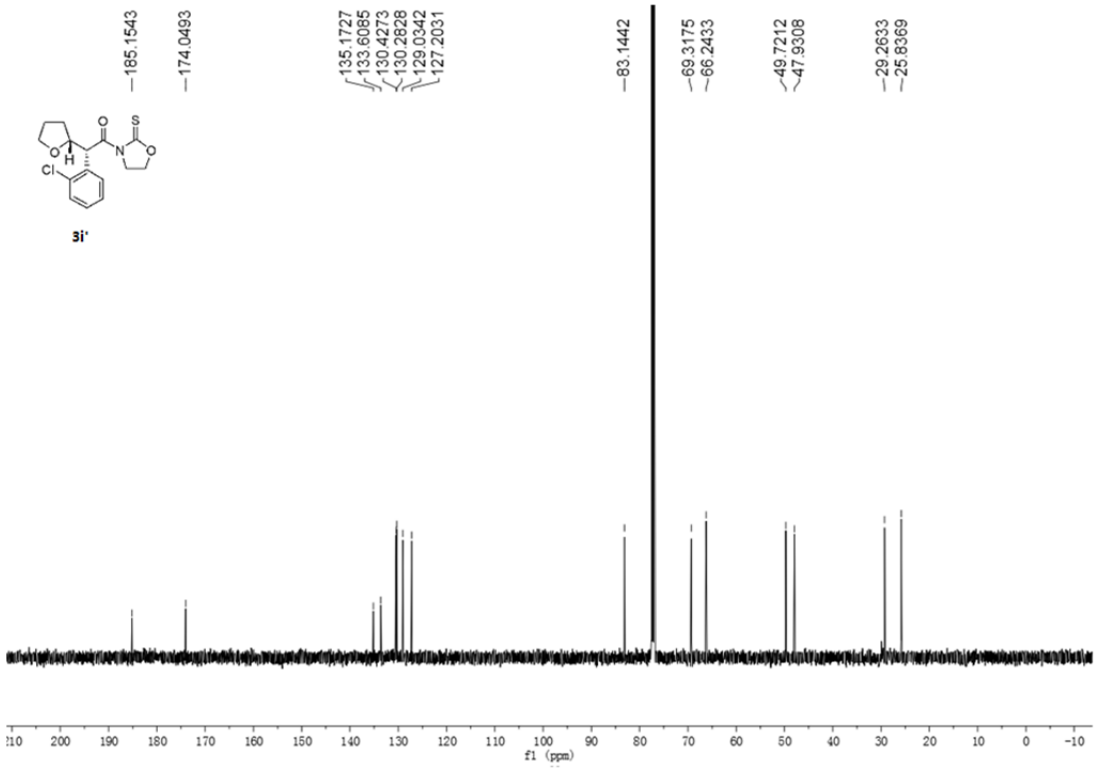
1.99
0.99
1.02
0.97
0.98
1.08
1.00
1.03
1.00
0.99
1.05
1.95
10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5
f1 (ppm)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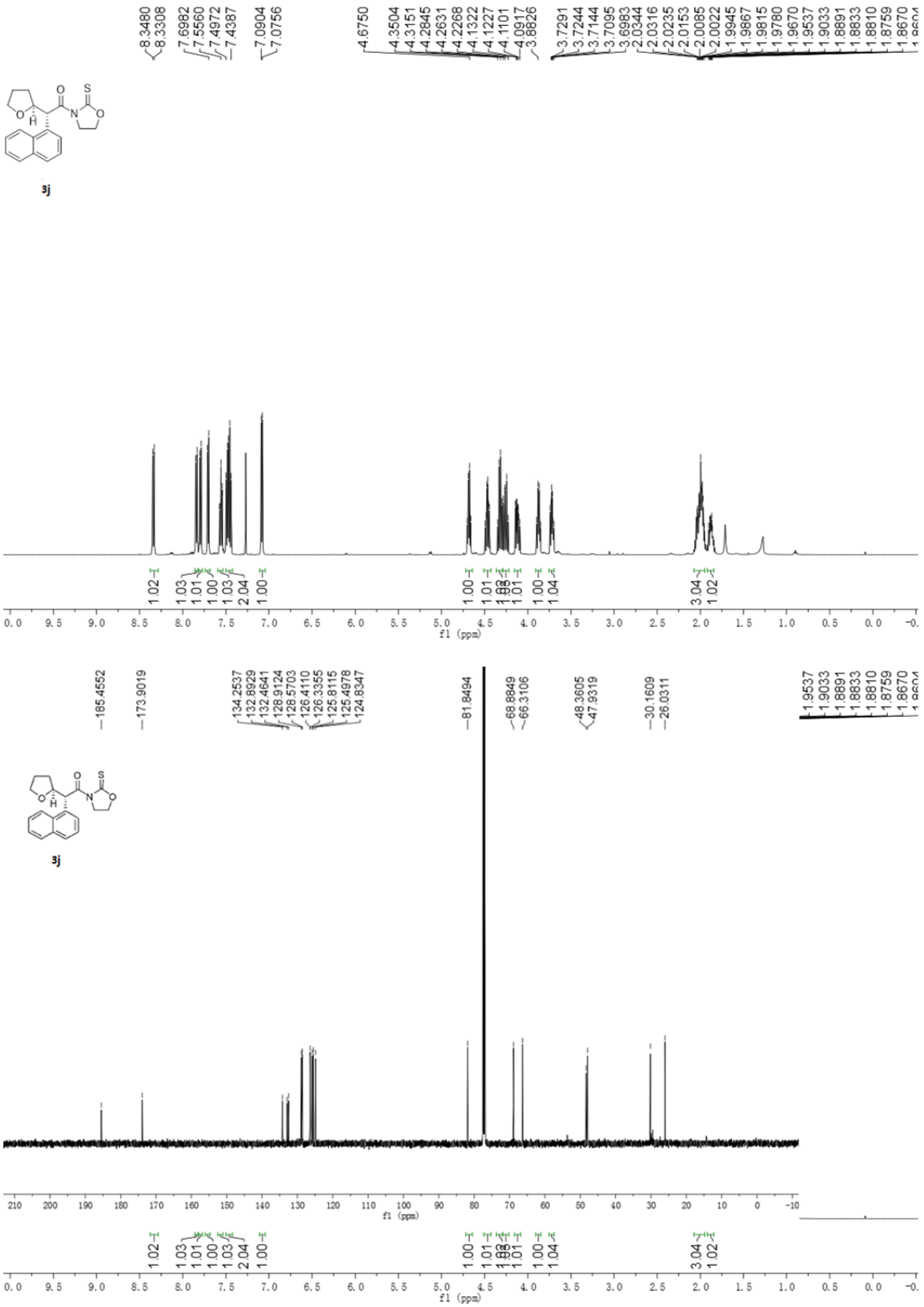
174.0493
135.1727
133.6085
130.4273
130.2828
129.0342
127.2031
83.1442
69.3175
66.2433
49.7212
47.9308
29.2633
25.8369
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10
f1 (ppm)

3i'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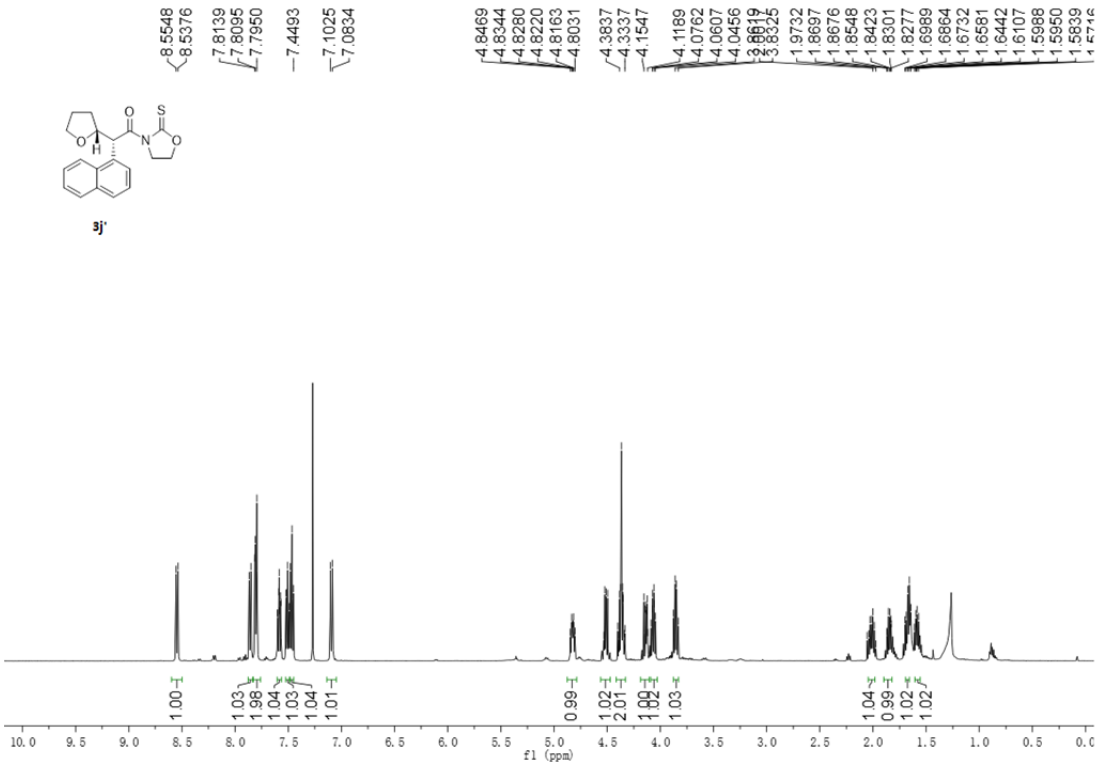
8.3308
7.6982
7.5560
7.4972
7.4387
7.0904
7.0756
4.6750
4.3504
4.3151
4.2845
4.2631
4.2268
4.1322
4.1227
4.1101
4.0917
3.8826
3.7291
3.7244
3.7144
3.7095
3.6983
2.0344
2.0316
2.0235
2.0153
2.0085
2.0022
1.9945
1.9867
1.9815
1.9780
1.9670
1.9537
1.9033
1.8891
1.8833
1.8810
1.8759
1.8670
3j
1.02
1.03
1.01
1.00
1.03
2.04
1.00
1.00
1.01
1.01
1.00
1.04
3.04
1.02
f1 (ppm)
185.4552
173.9019
134.2537
132.8929
132.4641
128.9124
128.5703
126.4110
126.3355
125.8115
125.4978
124.8347
81.8494
68.8849
66.3106
48.3605
47.9319
30.1609
26.0311
1.9537
1.9033
1.8891
1.8833
1.8810
1.8759
1.8670
3j
f1 (ppm)
1.02
1.03
1.01
1.00
1.03
2.04
1.00
1.00
1.01
1.01
1.00
1.04
3.04
1.02
f1 (ppm)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7.7950
7.4493
7.1025
7.0834
4.8469
4.8344
4.8280
4.8220
4.8163
4.8031
4.3837
4.3337
4.1547
4.1189
4.0762
4.0607
4.0456
3.8619
3.8325
1.9732
1.8697
1.8676
1.8548
1.8423
1.8301
1.8277
1.6989
1.6864
1.6732
1.6581
1.6442
1.6107
1.5988
1.5950
1.5839
1.00
1.03
1.98
1.04
1.03
1.04
1.01
0.99
1.02
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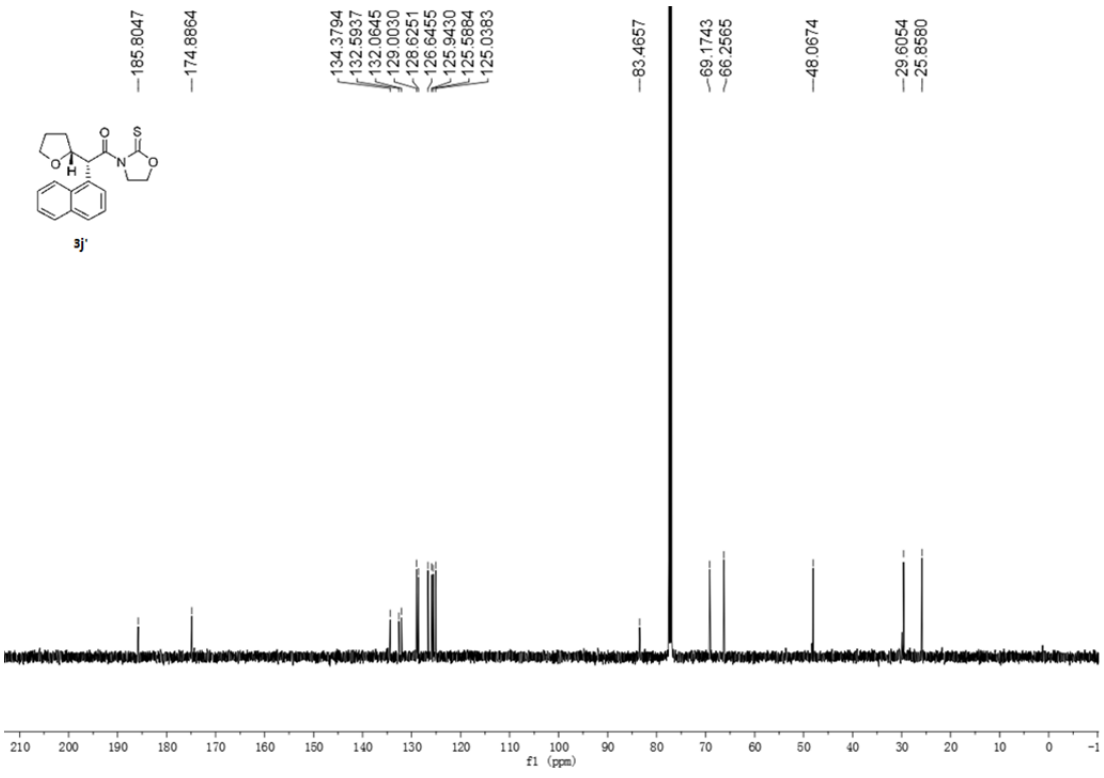
1.00
1.02
1.03
1.04
0.99
1.02
1.02
f1 (ppm)
3j'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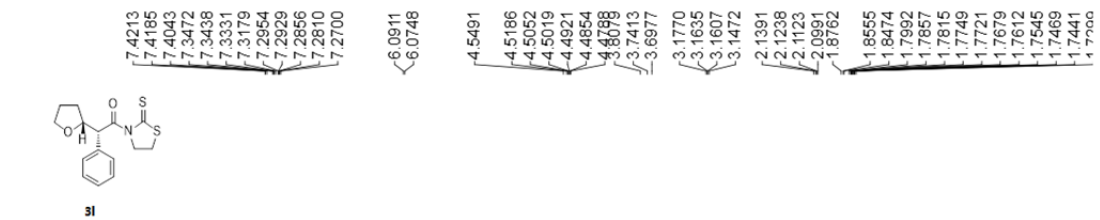
132.0645
129.0030
128.6251
126.6455
125.9430
125.5884
125.0383
83.4657
69.1743
66.2565
48.0674
29.6054
25.8580
f1 (ppm)
3j'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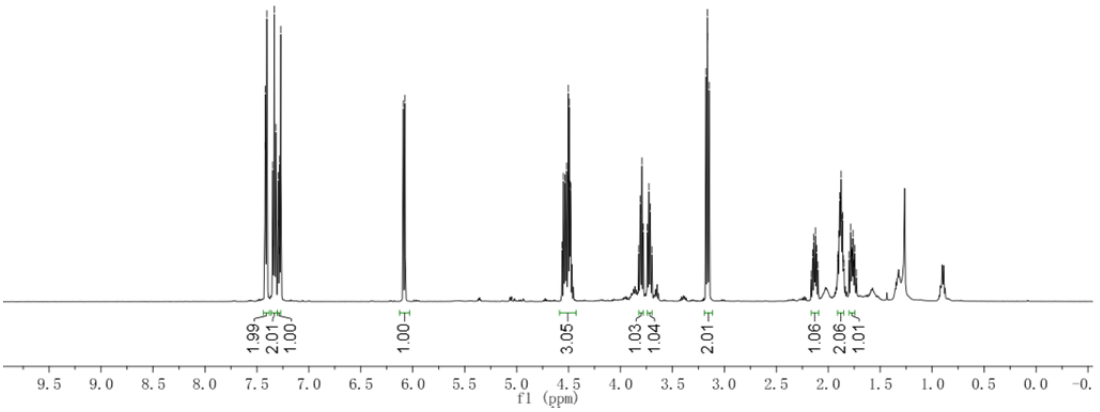
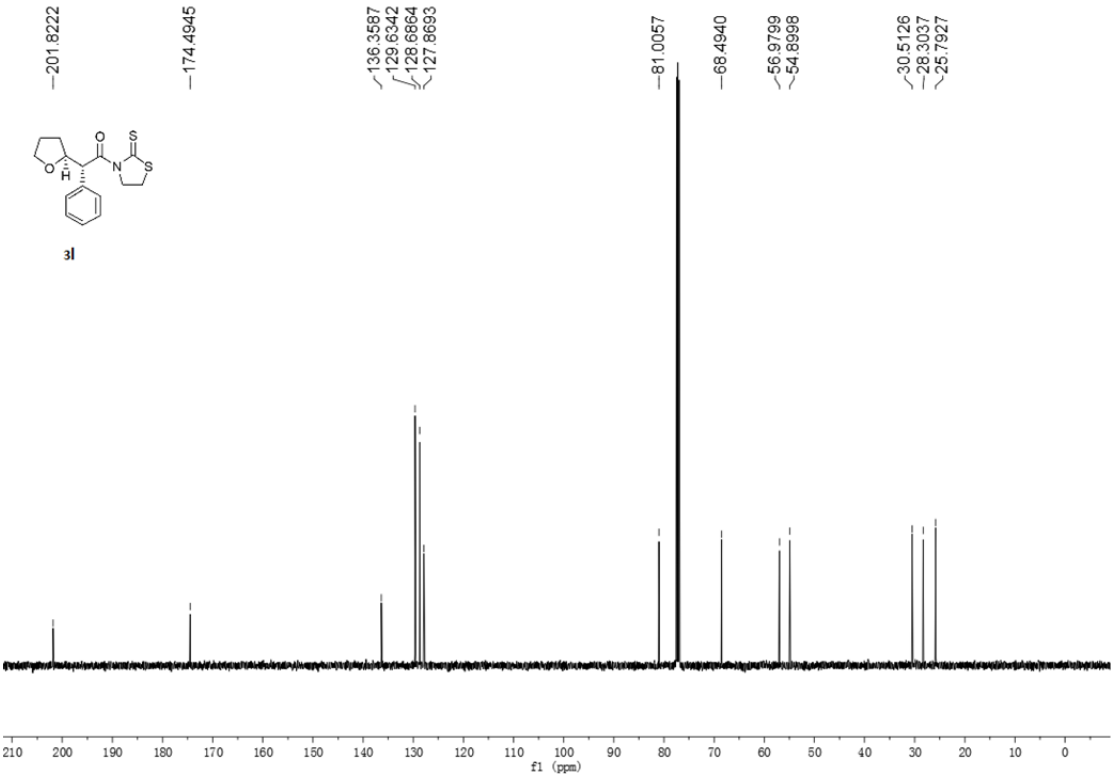
7.4185
7.4043
7.3472
7.3438
7.3331
7.3179
7.2954
7.2929
7.2856
7.2810
7.2700
6.0911
6.0748
4.5491
4.5186
4.5052
4.5019
4.4921
4.4854
3.7413
3.6977
3.1770
3.1635
3.1607
3.1472
2.1391
2.1238
2.1123
2.0991
1.8762
1.8555
1.8474
1.7992
1.7857
1.7815
1.7749
1.7721
1.7679
1.7612
1.7545
1.7469
1.7441

3l


1.99
2.01
1.00
1.00
3.05
1.03
1.04
2.01
1.06
2.06
1.01
9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.
f1 (ppm)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136.3587
129.6342
128.6864
127.8693
81.0057
68.4940
56.9799
54.8998
30.5126
28.3037
25.7927
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
f1 (ppm)

3l


7.4571
7.4541
7.4502
7.4402
7.3333
7.3303
7.3164
7.3133
7.3015
7.2890
7.2862
7.2834
7.2720
7.2630
5.9801
5.9607
4.7003
4.6986
4.6898
4.6849
4.6761
4.6744
4.6606
4.6304
4.6174
4.6110
4.5281
4.5127
4.5038
4.4973
4.4884
4.4730
3.9194
3.9174
3.9035
3.8894
3.8448
3.8328
3.8293
3.8173
3.2816
3.2750
3.2596
3.2441
3.1826
3.1688
3.1672
3.1606
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3.1452
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1.8179
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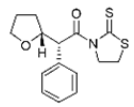
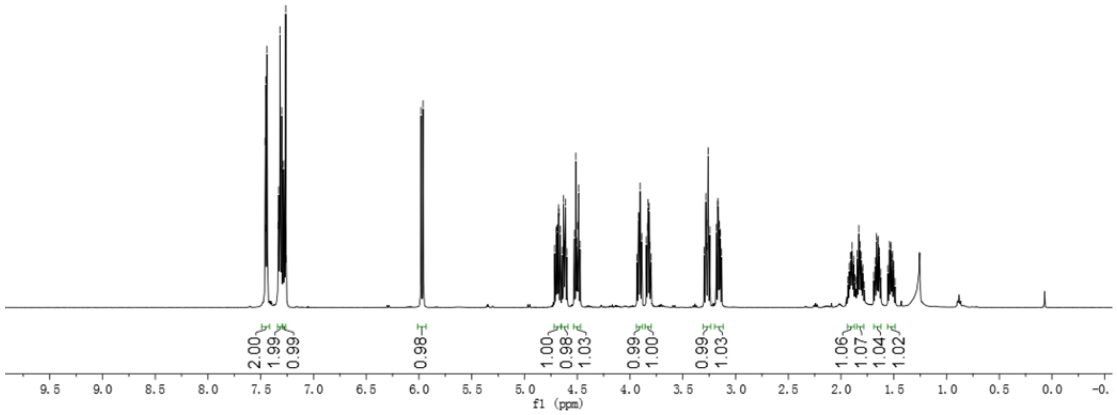
1.6515
1.6485
1.5423
1.5261



3l'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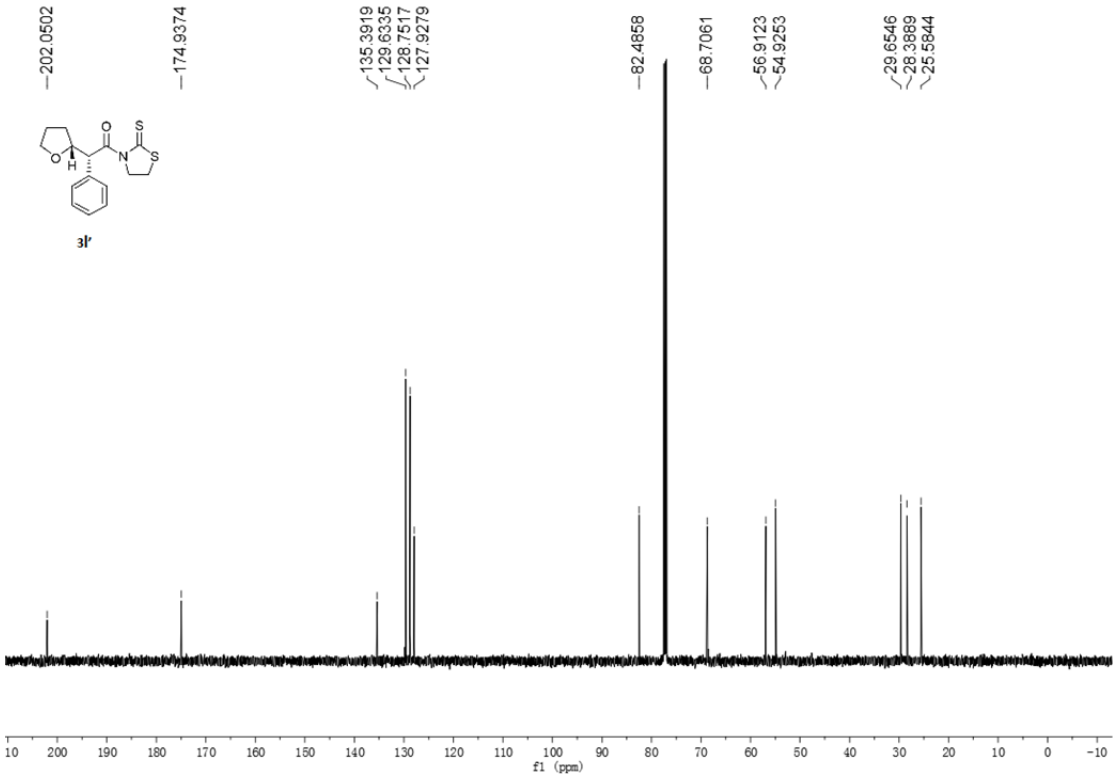
1.99
0.99
0.98
1.00
0.98
1.03
0.99
1.00
0.99
1.03
1.06
1.07
1.04
1.02
9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.
f1 (ppm)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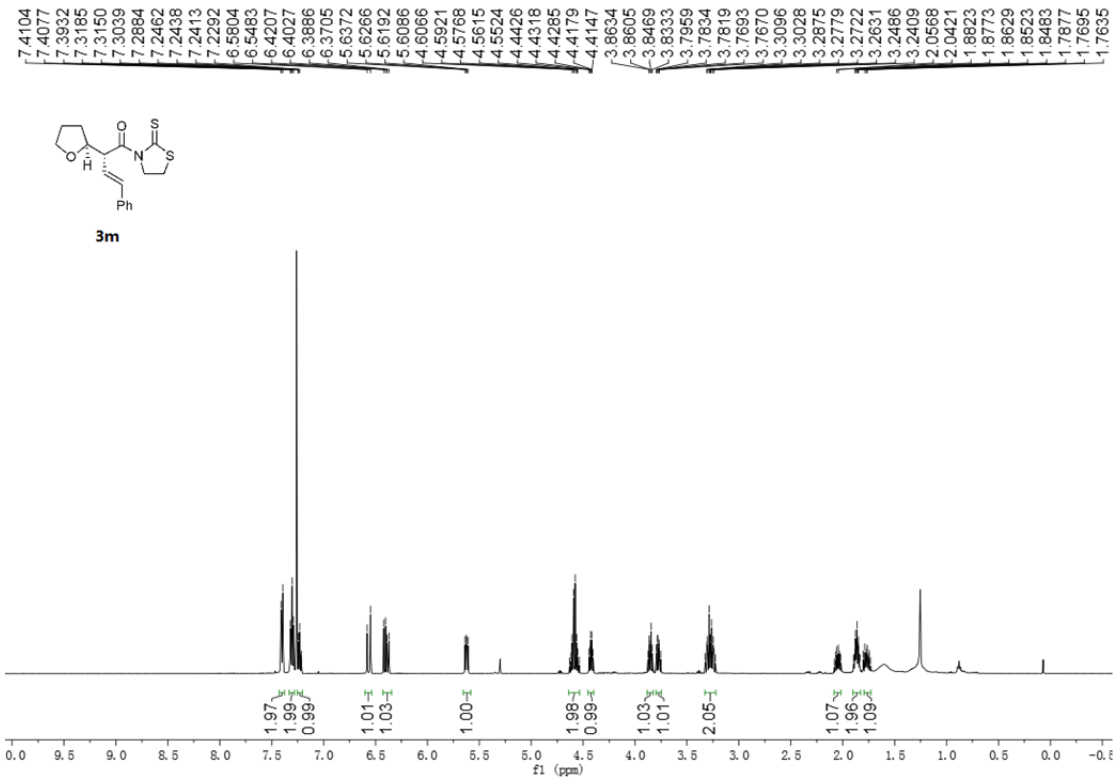
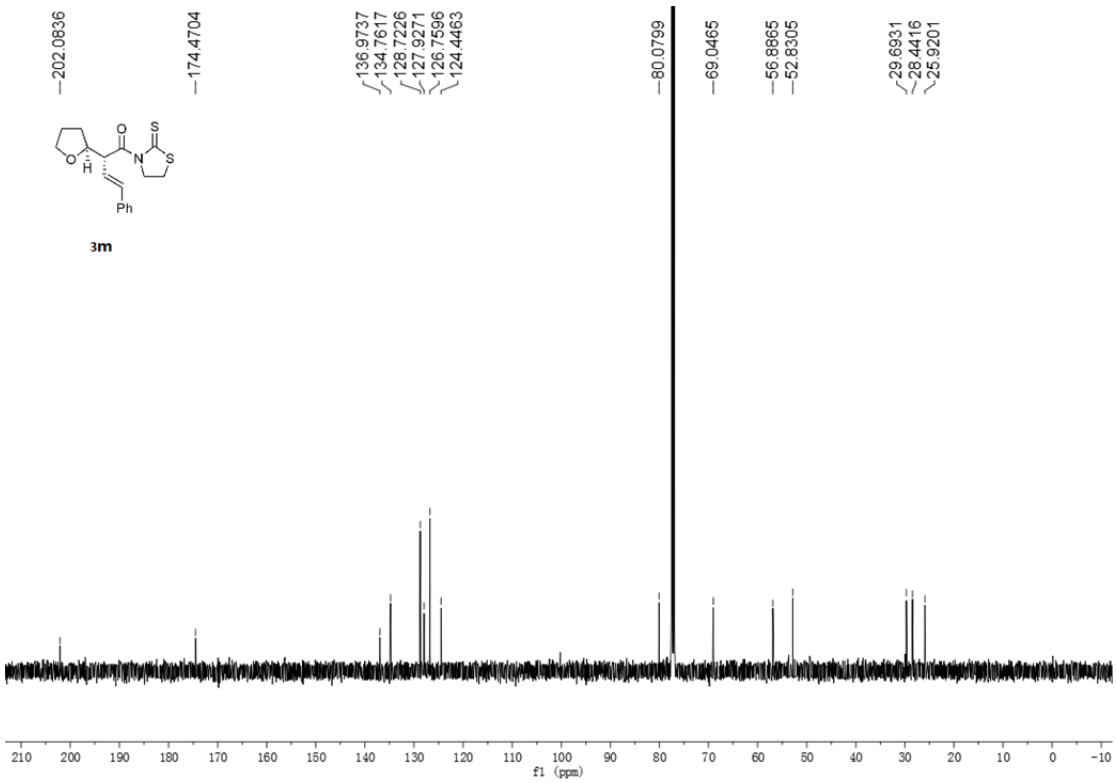
135.3919
129.6335
128.7517
127.9279
82.4858
68.7061
56.9123
54.9253
29.6546
28.3889
25.5844
10 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10
f1 (ppm)

3l'


7.4104
7.4077
7.3932
7.3185
7.3150
7.3039
7.2884
7.2462
7.2438
7.2413
7.2292
6.5804
6.5483
6.4207
6.4027
6.3886
6.3705
5.6372
5.6266
5.6192
5.6086
4.6066
4.5921
4.5768
4.5615
4.5524
4.4426
4.4318
4.4285
4.4179
4.4147
3.8634
3.8605
3.8469
3.8333
3.7959
3.7834
3.7819
3.7693
3.7670
3.3096
3.3028
3.2875
3.2779
3.2722
3.2631
3.2486
3.2409
2.0568
2.0421
1.8823
1.8773
1.8629
1.8523
1.8483
1.7877
1.7695
1.7635
O
S
N
S
H
Ph
3m
1.97
1.99
0.99
1.01
1.03
1.00
1.98
0.99
1.03
1.01
2.05
1.07
1.96
1.09
f1 (ppm)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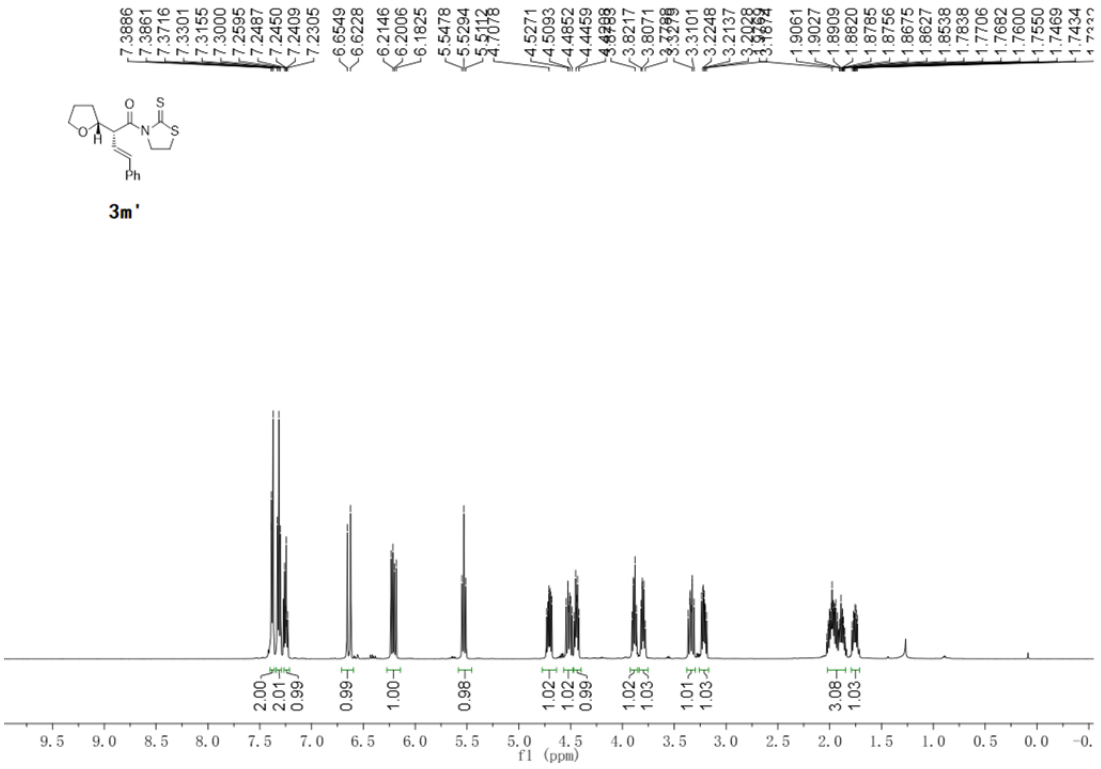
134.7617
128.7226
127.9271
126.7596
124.4463
80.0799
69.0465
56.8865
52.8305
29.6931
28.4416
25.9201
O
S
N
S
H
Ph
3m
f1 (ppm)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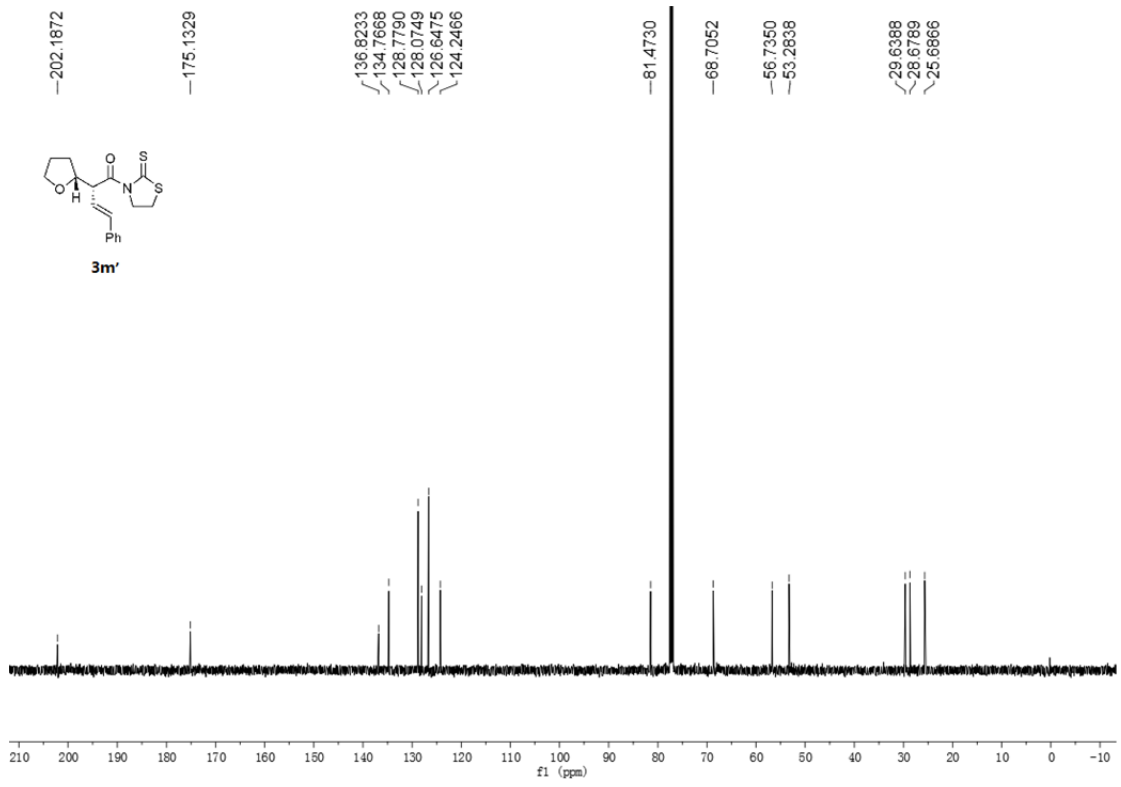
7.3000
7.2595
7.2487
7.2450
7.2409
7.2305
6.6549
6.6228
6.2146
6.2006
6.1825
5.5478
5.5294
5.5112
5.4978
4.5271
4.5093
4.4852
4.4459
3.8217
3.8071
3.3101
3.2248
3.2137
1.9061
1.9027
1.8909
1.8820
1.8785
1.8756
1.8675
1.8627
1.8538
1.7838
1.7706
1.7682
1.7600
1.7550
1.7469
1.7434
O
S
N
S
O
H
Ph
3m'
2.00
2.01
0.99
0.99
1.00
0.98
1.02
1.02
0.99
1.02
1.03
1.01
1.03
3.08
1.03
f1 (ppm)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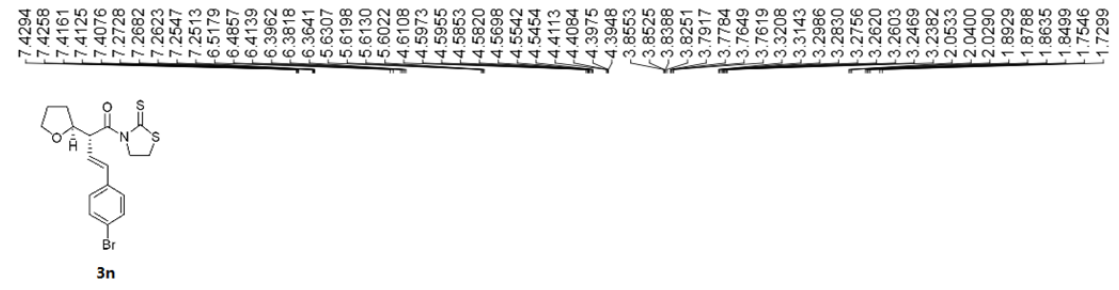
128.7790
128.0749
126.6475
124.2466
81.4730
68.7052
56.7350
53.2838
29.6388
28.6789
25.6866
O
S
N
S
O
H
Ph
3m'
f1 (ppm)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7.2728
7.2682
7.2623
7.2547
7.2513
6.5179
6.4857
6.4139
6.3962
6.3818
6.3641
5.6307
5.6198
5.6130
5.6022
4.6108
4.5973
4.5955
4.5853
4.5820
4.5698
4.5542
4.5454
4.4113
4.4084
4.3975
4.3948
3.8553
3.8525
3.8388
3.8251
3.7917
3.7784
3.7649
3.7619
3.3208
3.3143
3.2986
3.2830
3.2756
3.2620
3.2603
3.2469
3.2382
2.0533
2.0400
2.0290
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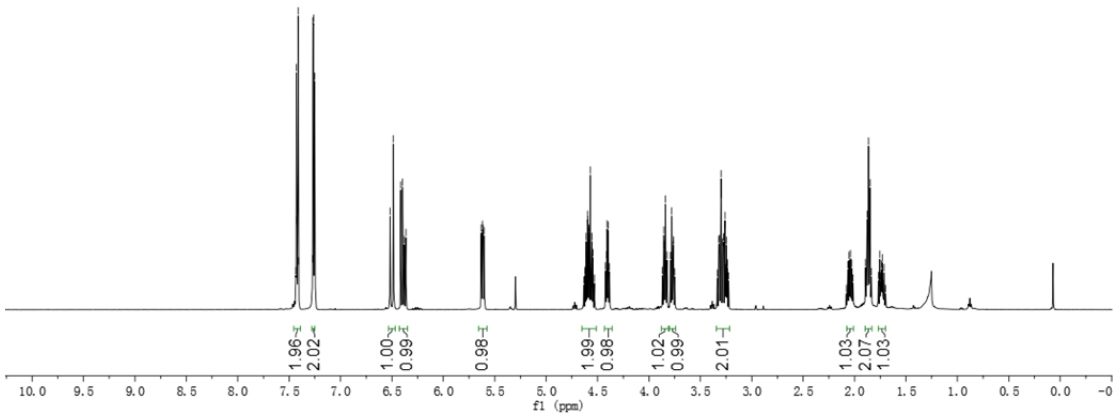
1.8788
1.8635
1.8499
1.7546
1.7299

O
S
N
S
H
Br

3n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2.02
1.00
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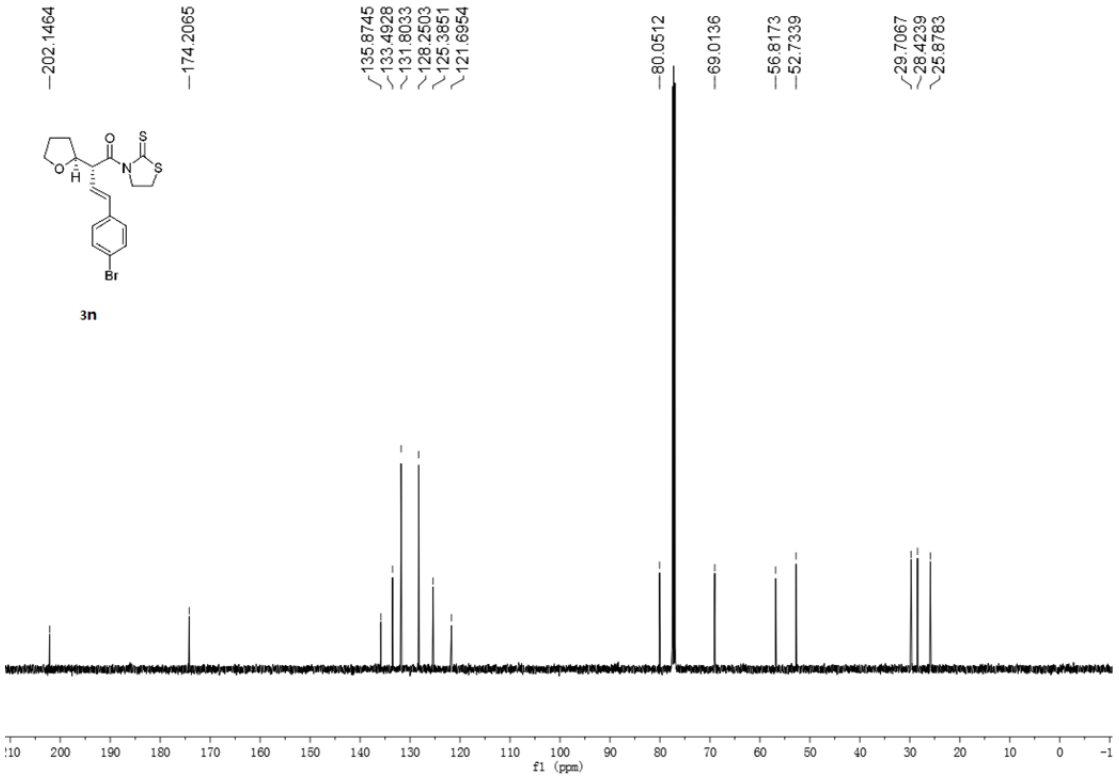
0.98
1.99
0.98
1.02
0.99
2.01
1.03
2.07
1.03
10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0
f1 (ppm)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128.2503
125.3851
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80.0512
69.0136
56.8173
52.7339
29.7067
28.4239
25.8783
O
S
N
S
H
Br
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -1
f1 (ppm)

3n


7.4381
7.4213
7.2426
7.2257
6.5870
6.5549
6.2054
6.1733
5.5207
5.5024
5.4842
4.7048
4.5194
4.5009
4.4768
4.4194
3.8560
3.8018
3.7734
3.3570
3.3385
3.2348
3.2226
3.2128
1.9695
1.9617
1.9573
1.9484
1.9462
1.9337
1.9217
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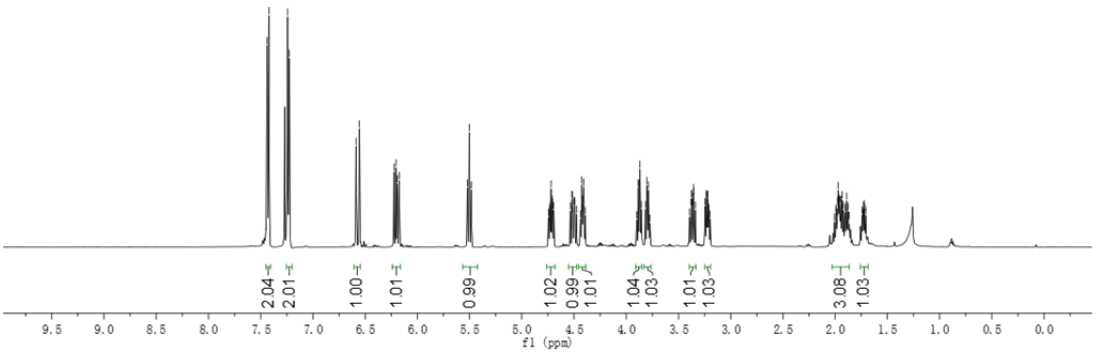
1.8754
1.8672
1.7421
1.7336
1.7286
1.7202
1.7172

3n '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2.01
1.00
1.01
0.99
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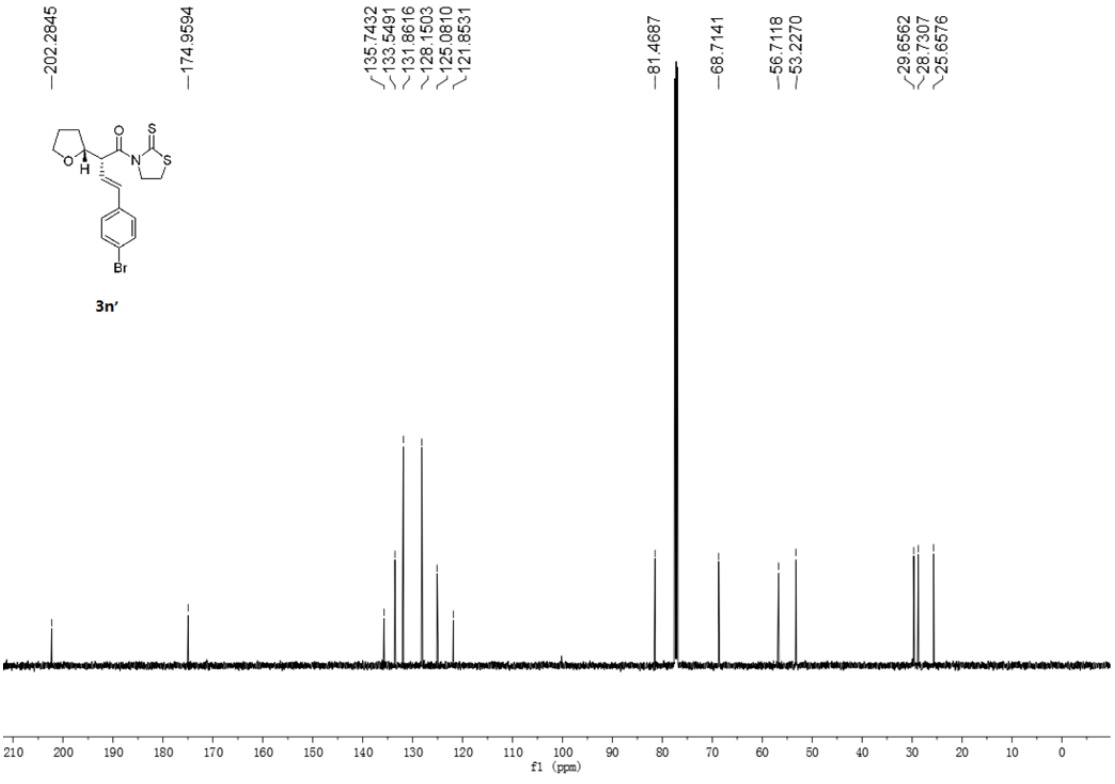
0.99
1.01
1.04
1.03
1.01
1.03
3.08
1.03
f1 (ppm)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131.8616
128.1503
125.0810
121.8531
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68.7141
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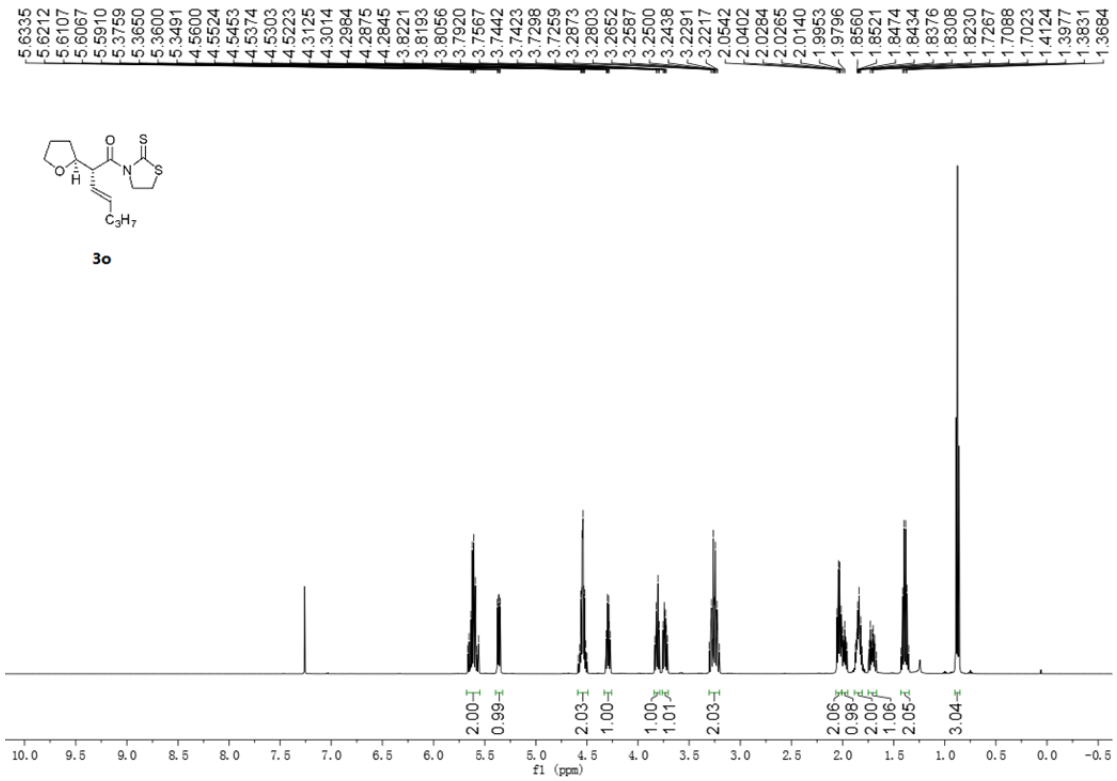
29.6562
28.7307
25.6576
f1 (ppm)

3n'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5.3650
5.3600
5.3491
4.5600
4.5524
4.5453
4.5374
4.5303
4.5223
4.3125
4.3014
4.2984
4.2875
4.2845
3.8221
3.8193
3.8056
3.7920
3.7567
3.7442
3.7423
3.7298
3.7259
3.2873
3.2803
3.2652
3.2587
3.2500
3.2438
3.2291
3.2217
2.0542
2.0402
2.0284
2.0265
2.0140
1.9953
1.9796
1.8560
1.8521
1.8474
1.8434
1.8376
1.8308
1.8230
1.7267
1.7088
1.7023
1.4124
1.3977
1.3831
1.3684
O
S
H
O
N
S
C3H7
3o
2.00
0.99
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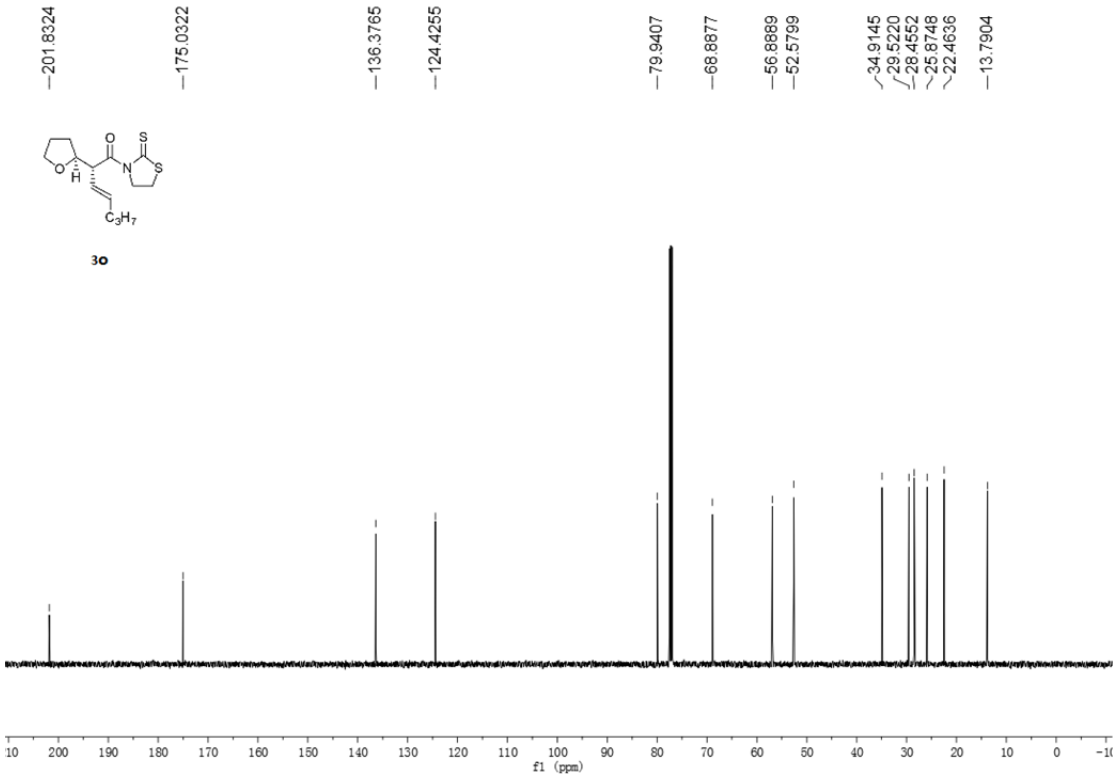
1.00
1.00
1.01
2.03
2.06
0.98
2.00
1.06
2.05
3.04
f1 (ppm)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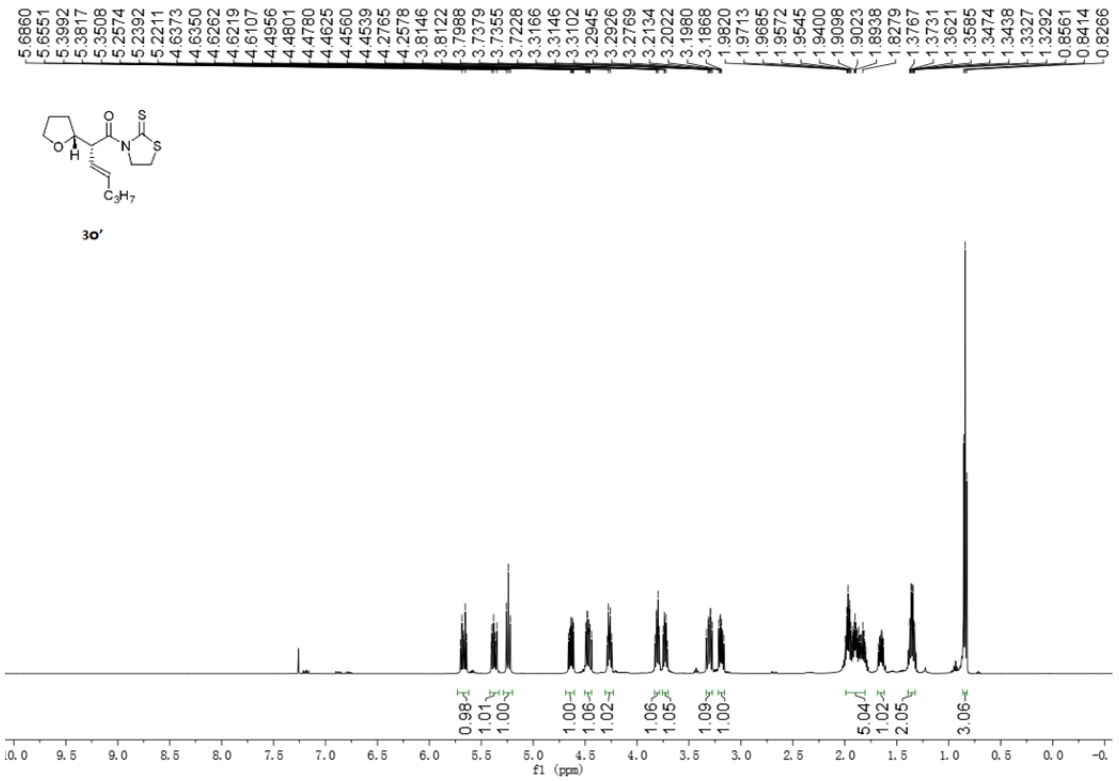
124.4255
79.9407
68.8877
56.8889
52.5799
34.9145
29.5220
28.4552
25.8748
22.4636
13.7904
O
S
H
O
N
S
C3H7
3o
f1 (ppm)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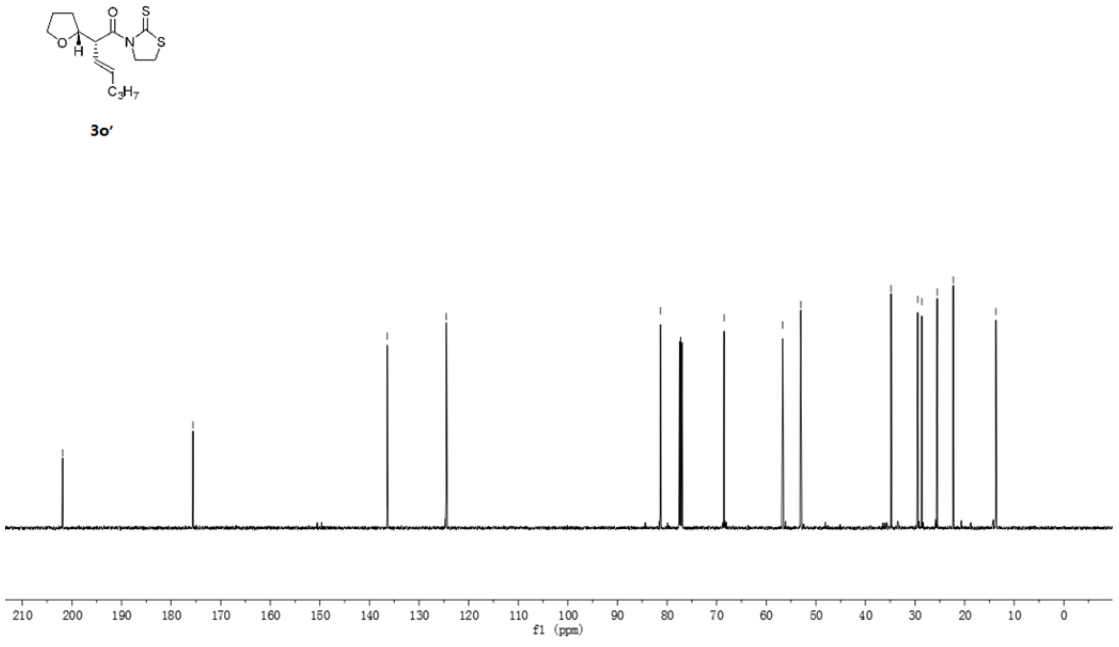
5.3992
5.3817
5.3508
5.2574
5.2392
5.2211
4.6373
4.6350
4.6262
4.6219
4.6107
4.4956
4.4801
4.4780
4.4625
4.4560
4.4539
4.2765
4.2578
4.8146
3.8122
3.7988
3.7379
3.7355
3.7228
3.3166
3.3146
3.3102
3.2945
3.2926
3.2769
3.2134
3.2022
3.1980
3.1868
1.9820
1.9713
1.9685
1.9572
1.9545
1.9400
1.9098
1.9023
1.8938
1.8279
1.3767
1.3731
1.3621
1.3585
1.3474
1.3438
1.3327
1.3292
0.8561
0.8414
0.8266
O
S
N
S
H
O
C3H7
0.98
1.01
1.00
1.00
1.06
1.02
1.06
1.05
1.09
1.00
5.04
1.02
2.05
3.06
f1 (ppm)

3o'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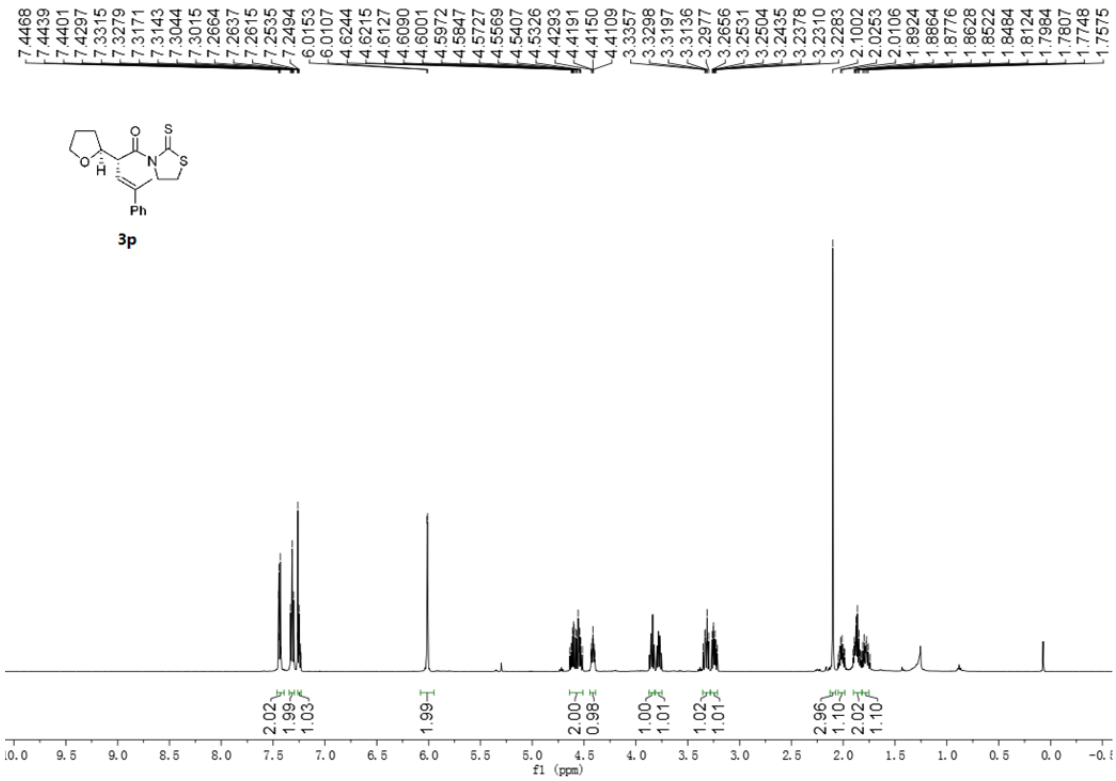
136.4043
124.4966
81.3130
68.5009
56.6742
53.0652
34.8285
29.4610
28.6338
25.5413
22.2837
13.6826
O
S
N
S
H
O
C3H7
f1 (ppm)

3o'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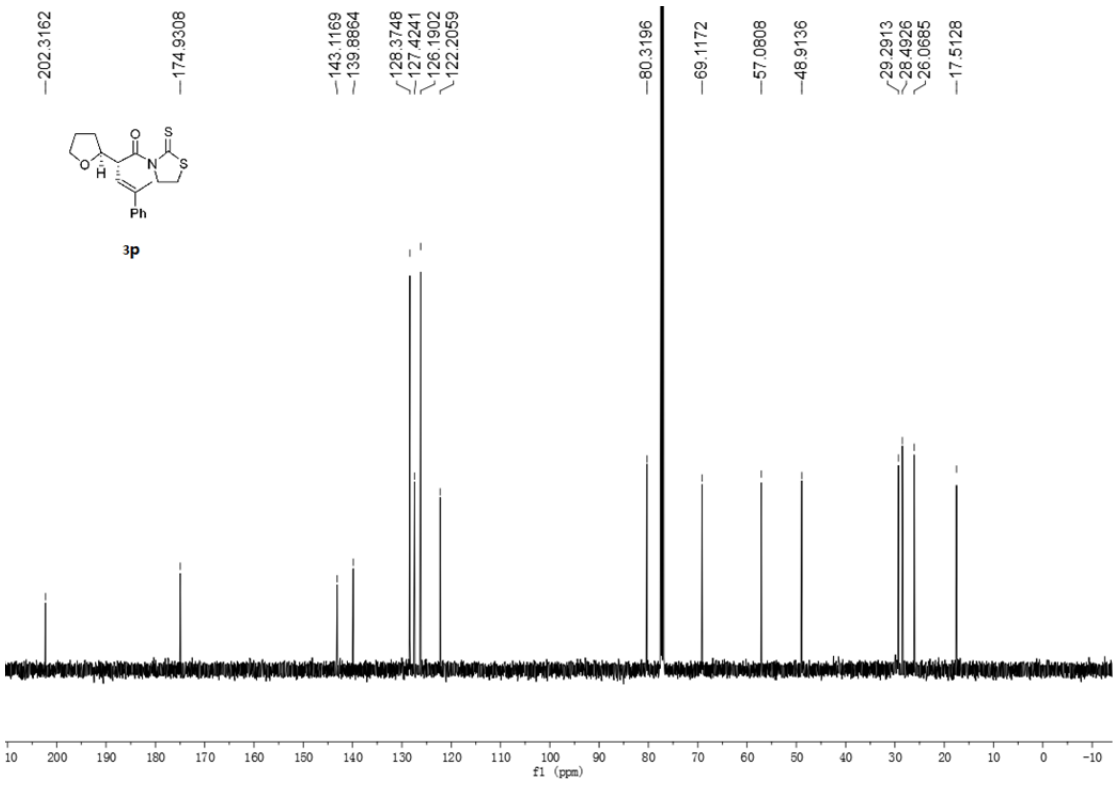
7.4439
7.4401
7.4297
7.3315
7.3279
7.3171
7.3143
7.3044
7.3015
7.2664
7.2637
7.2615
7.2535
7.2494
6.0153
6.0107
4.6244
4.6215
4.6127
4.6090
4.6001
4.5972
4.5847
4.5727
4.5569
4.5407
4.5326
4.4293
4.4191
4.4150
4.4109
3.3357
3.3298
3.3197
3.3136
3.2977
3.2656
3.2531
3.2504
3.2435
3.2378
3.2310
3.2283
2.1002
2.0253
2.0106
1.8924
1.8864
1.8776
1.8628
1.8522
1.8484
1.8124
1.7984
1.7807
1.7748
1.7575
O
S
N
S
O
H
Ph
3p
2.02
1.99
1.03
1.99
2.00
0.98
1.00
1.01
1.02
1.01
2.96
1.10
2.02
1.10
f1 (ppm)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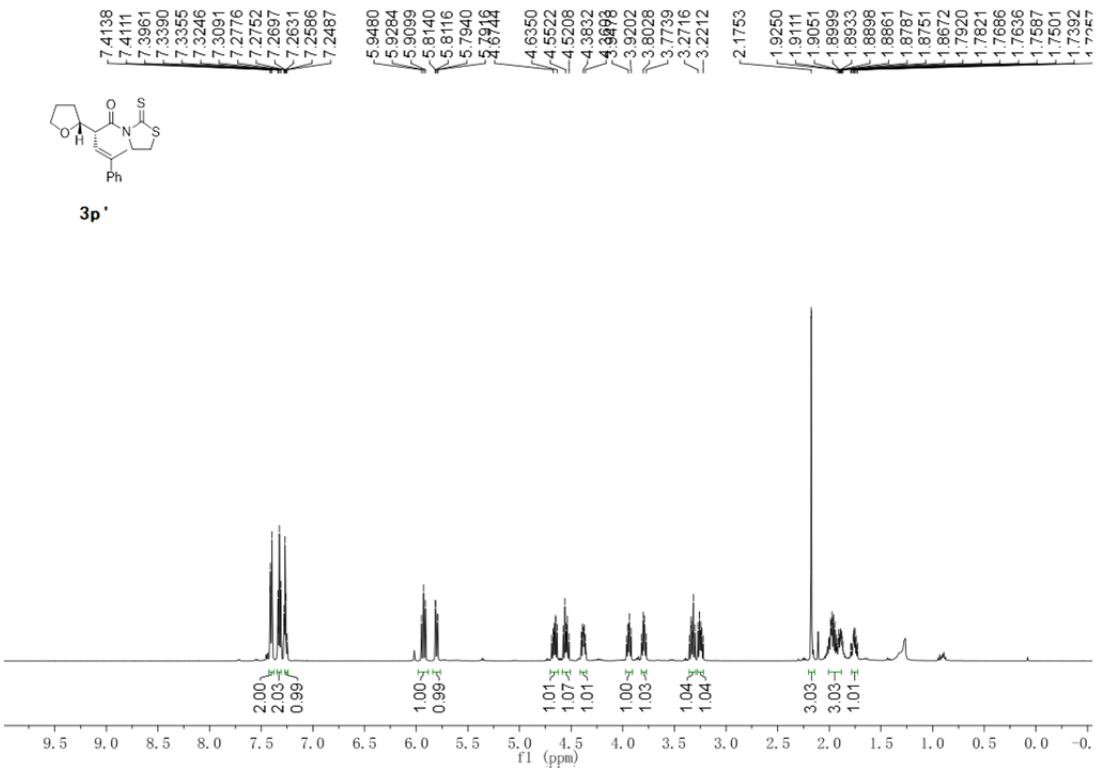
143.1169
139.8864
128.3748
127.4241
126.1902
122.2059
80.3196
69.1172
57.0808
48.9136
29.2913
28.4926
26.0685
17.5128
O
S
N
S
O
H
Ph
3p
f1 (ppm)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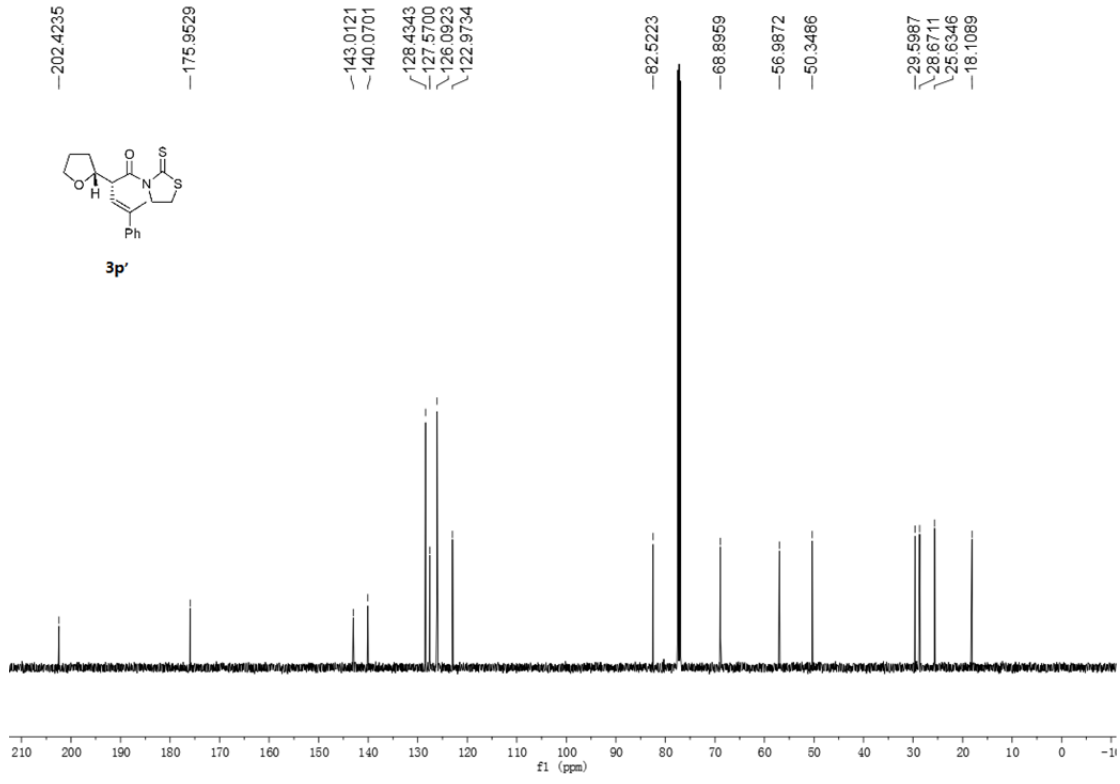
7.4111
7.3961
7.3390
7.3355
7.3246
7.3091
7.2776
7.2752
7.2697
7.2631
7.2586
7.2487
5.9480
5.9284
5.9099
5.8140
5.8116
5.7940
4.6350
4.5522
4.5208
4.3832
3.9202
3.8028
3.7739
3.2716
3.2212
2.1753
1.9250
1.9111
1.9051
1.8999
1.8933
1.8898
1.8861
1.8787
1.8751
1.8672
1.7920
1.7821
1.7686
1.7636
1.7587
1.7501
2.00
2.03
0.99
1.00
0.99
1.01
1.07
1.01
1.00
1.03
1.04
1.04
3.03
3.03
1.01
f1 (ppm)

3p'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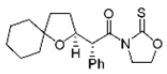
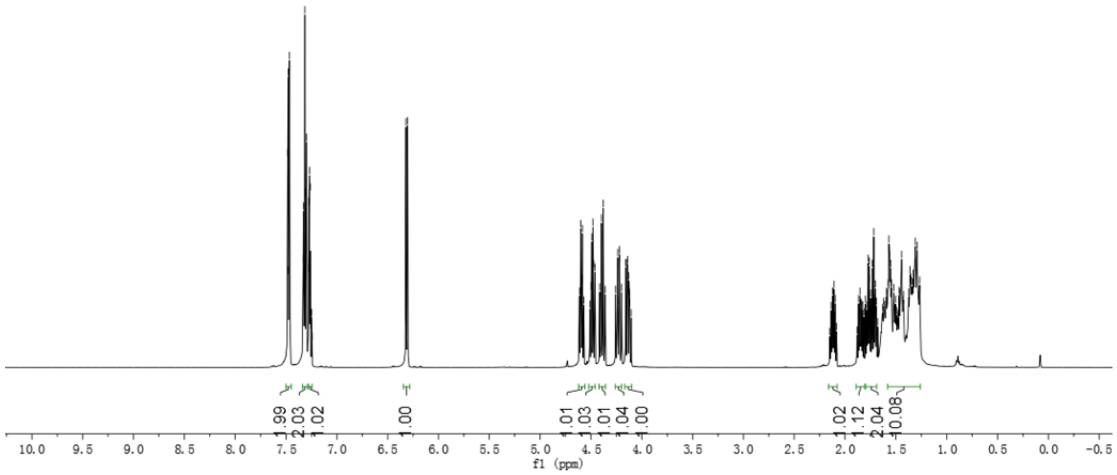
143.0121
140.0701
128.4343
127.5700
126.0923
122.9734
82.5223
68.8959
56.9872
50.3486
29.5987
28.6711
25.6346
18.1089
f1 (ppm)

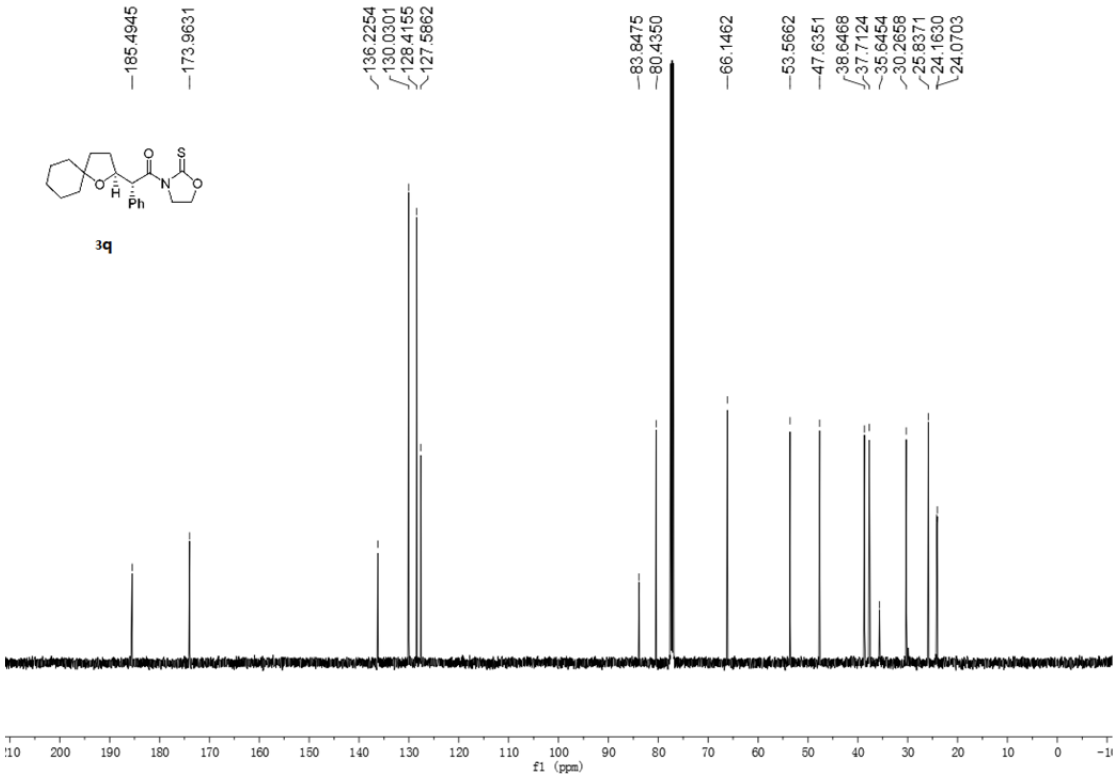
3p'


7.4827
7.4797
7.4758
7.4657
7.3306
7.3283
7.3142
7.3112
7.3016
7.2991
7.2786
7.2759
7.2732
7.2691
7.2614
6.3202
6.3038
4.6004
4.5969
4.5873
4.5841
4.4925
4.4791
4.4741
4.4605
4.3973
4.3956
4.3791
4.2385
4.2348
4.2184
4.2159
4.1588
4.1452
4.1401
4.1265
2.1088
1.7745
1.7625
1.7587
1.7327
1.7173
1.7023
1.5759
1.5679
1.5602
1.5515
1.5437
1.4442
1.3608
1.3537
1.3464
1.3366
1.3293
1.3219
1.3078
1.2916
1.2656


O
S
N
O
O
H
Ph

3q


1.99
2.03
1.02
1.00
1.01
1.03
1.01
1.04
1.00
1.02
1.12
2.04
10.08
10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5
f1 (ppm)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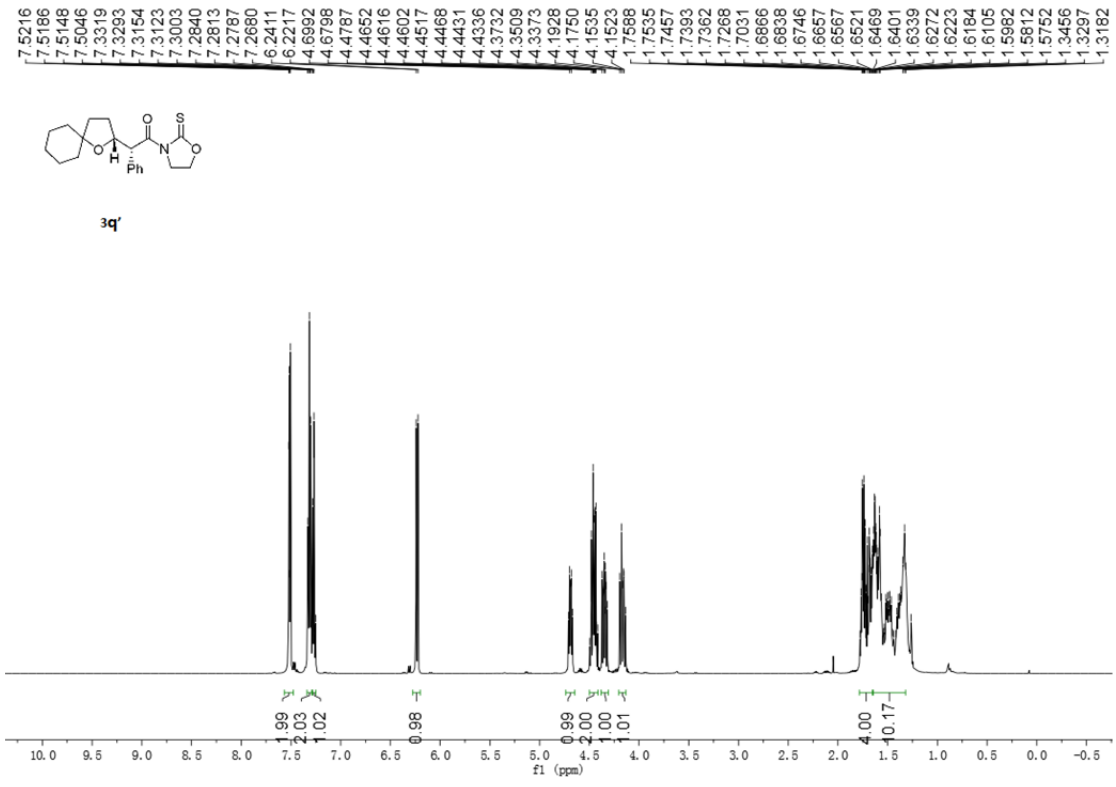
136.2254
130.0301
128.4155
127.5862
83.8475
80.4350
66.1462
53.5662
47.6351
38.6468
37.7124
35.6454
30.2658
25.8371
24.1630
24.0703
O
S
N
O
O
H
Ph
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10
f1 (ppm)

3q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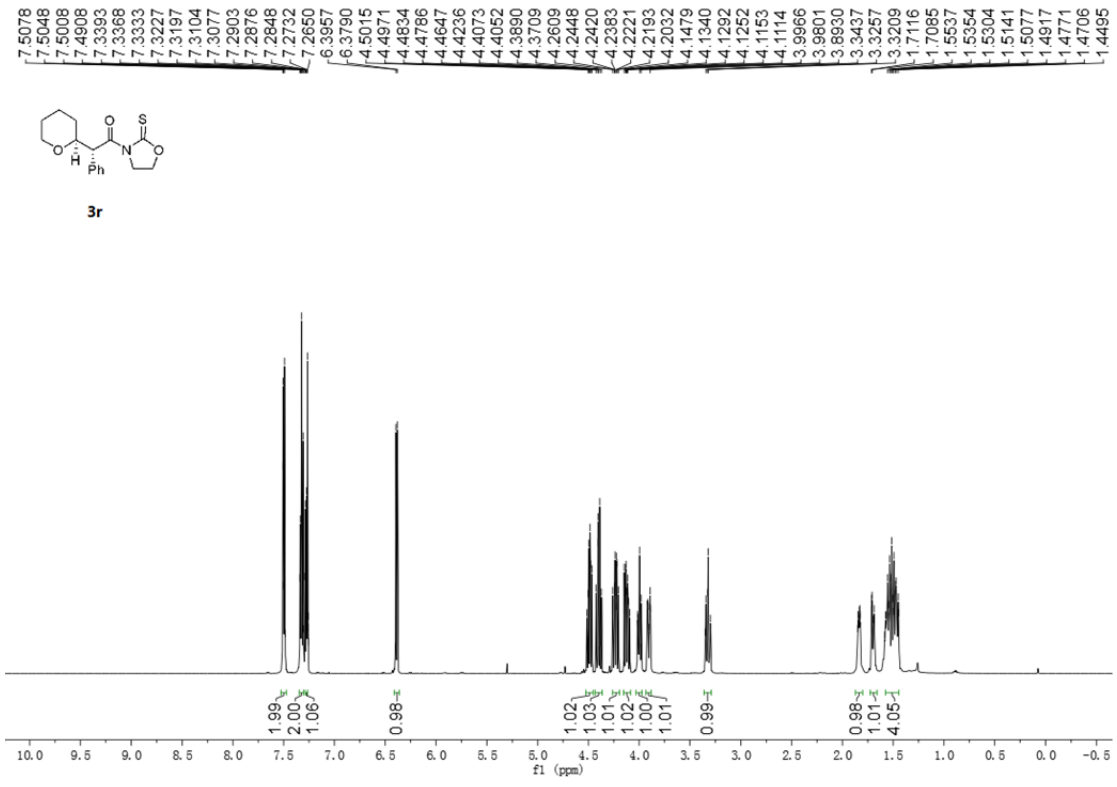
7.5148
7.5046
7.3319
7.3293
7.3154
7.3123
7.3003
7.2840
7.2813
7.2787
7.2680
6.2411
6.2217
4.6992
4.6798
4.4787
4.4652
4.4616
4.4602
4.4517
4.4468
4.4431
4.4336
4.3732
4.3509
4.3373
4.1928
4.1750
4.1535
4.1523
1.7588
1.7535
1.7457
1.7393
1.7362
1.7268
1.7031
1.6866
1.6838
1.6746
1.6657
1.6567
1.6521
1.6469
1.6401
1.6339
1.6272
1.6223
1.6184
1.6105
1.5982
1.5812
1.5752
1.3456
1.3297
1.3182
O
S
O
N
O
H
Ph
3q'
1.99
2.03
1.02
0.98
0.99
2.00
1.00
1.01
4.00
10.17
f1 (ppm)
185.6804
174.5937
135.4451
129.7158
128.7005
127.8541
84.1486
81.5243
66.2981
54.0857
47.7173
38.7794
37.6648
35.2052
29.1913
25.8478
24.3345
24.1374
3q'
f1 (ppm)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7.5048
7.5008
7.4908
7.3393
7.3368
7.3333
7.3227
7.3197
7.3104
7.3077
7.2903
7.2876
7.2848
7.2732
7.2650
6.3957
6.3790
4.5015
4.4971
4.4834
4.4786
4.4647
4.4236
4.4073
4.4052
4.3890
4.3709
4.2609
4.2448
4.2420
4.2383
4.2221
4.2193
4.2032
4.1479
4.1340
4.1292
4.1252
4.1153
4.1114
3.9966
3.9801
3.8930
3.3437
3.3257
3.3209
1.7116
1.7085
1.5537
1.5354
1.5304
1.5141
1.5077
1.4917
1.4771
1.4706
1.4495
O
S
N
O
H
Ph
3r
1.99
2.00
1.06
0.98
1.02
1.03
1.01
1.02
1.00
1.01
0.99
0.98
1.01
4.05
10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5
f1 (ppm)
185.4055
173.5515
135.9556
130.0420
128.4950
127.7422
79.6419
69.0790
66.1046
53.3223
47.6910
29.8642
25.9743
23.4905
O
S
N
O
H
Ph
3r
200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10
f1 (ppm)


7.4975
7.4945
7.4904
7.4805
7.4785
7.3314
7.3286
7.3146
7.3115
7.3023
7.2997
7.2842
7.2813
7.2785
7.2718
7.2690
7.2672
6.1960
6.1762
4.4793
4.4631
4.4620
4.4605
4.4443
4.4412
4.4273
4.4224
4.4086
4.3908
4.3357
4.3220
4.3167
4.3134
4.2995
4.2943
4.2804
4.1776
4.1614
4.1588
4.1552
4.1426
4.1391
4.1363
4.0345
4.0281
3.9484
3.4798
3.4613
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1.4806
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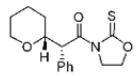
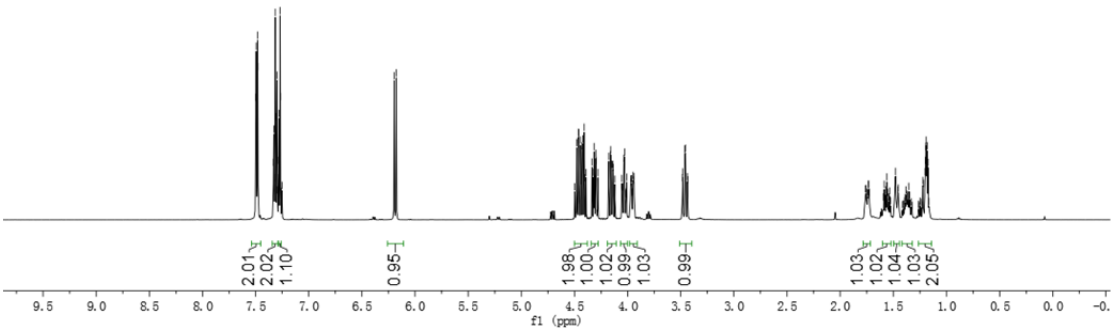
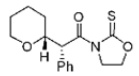
1.1994
1.1941
1.1919
1.1872
1.1815
1.1739



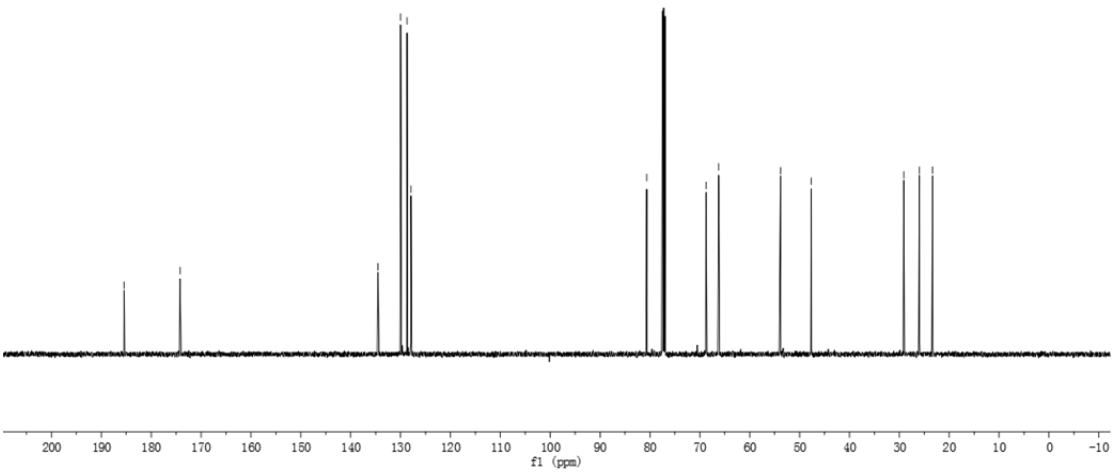
3r'

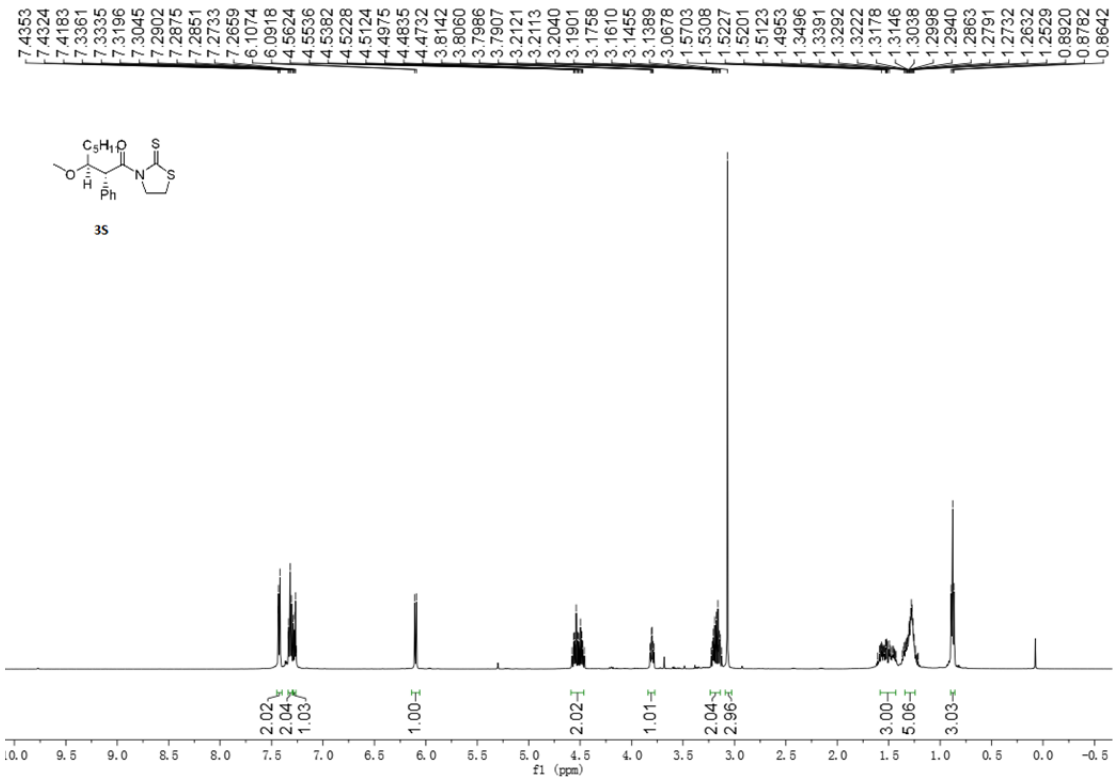

2.01
2.02
1.10
0.95
1.98
1.00
1.02
0.99
1.03
0.99
1.03
1.02
1.04
1.03
2.05
f1 (ppm)


185.4140
174.2286
134.5320
129.9819
128.7089
127.9177
80.6562
68.7636
66.2106
53.8088
47.6473
29.1198
25.9705
23.3167



3r'


f1 (ppm)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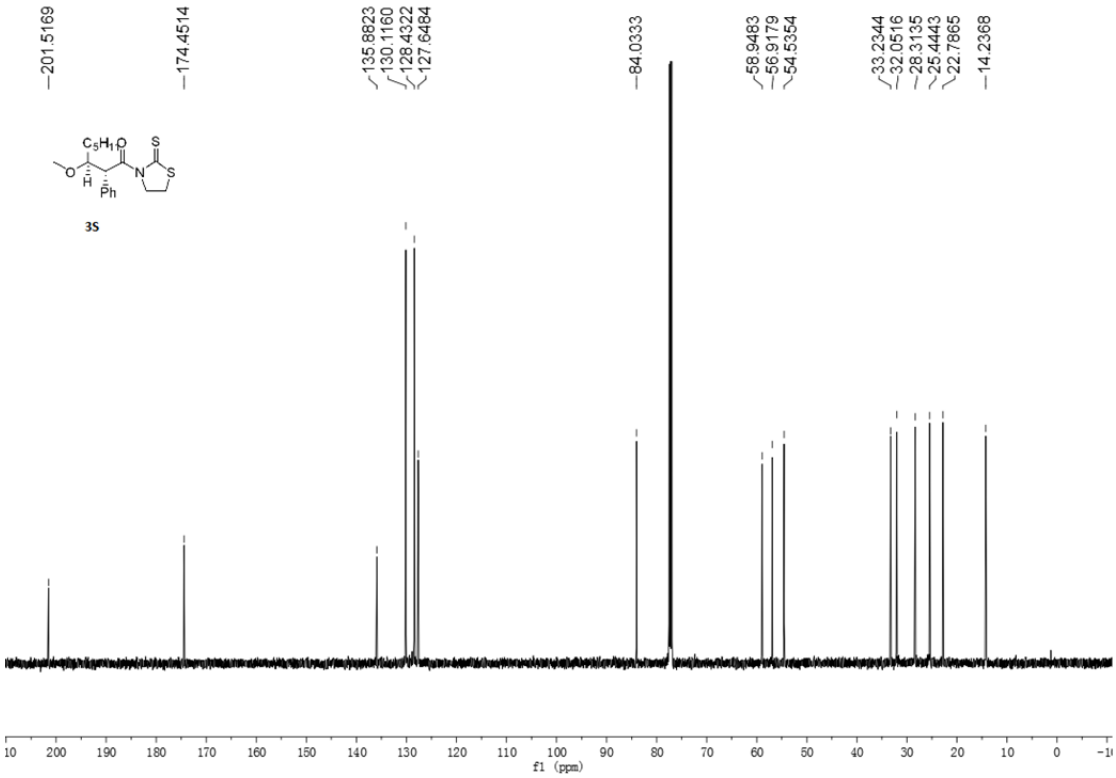
7.4183
7.3361
7.3335
7.3196
7.3045
7.2902
7.2875
7.2851
7.2733
7.2659
6.1074
6.0918
4.5624
4.5536
4.5382
4.5228
4.5124
4.4975
4.4835
4.4732
3.8142
3.8060
3.7986
3.7907
3.2121
3.2113
3.2040
3.1901
3.1758
3.1610
3.1455
3.1389
3.0678
1.5703
1.5308
1.5227
1.5201
1.5123
1.4953
1.3496
1.3391
1.3292
1.3222
1.3178
1.3146
1.3038
1.2998
1.2940
1.2863
1.2791
1.2732
1.2632
1.2529
0.8920
0.8782
0.8642
3S
2.02
2.04
1.03
1.00
2.02
1.01
2.04
2.96
3.00
5.06
3.03
f1 (ppm)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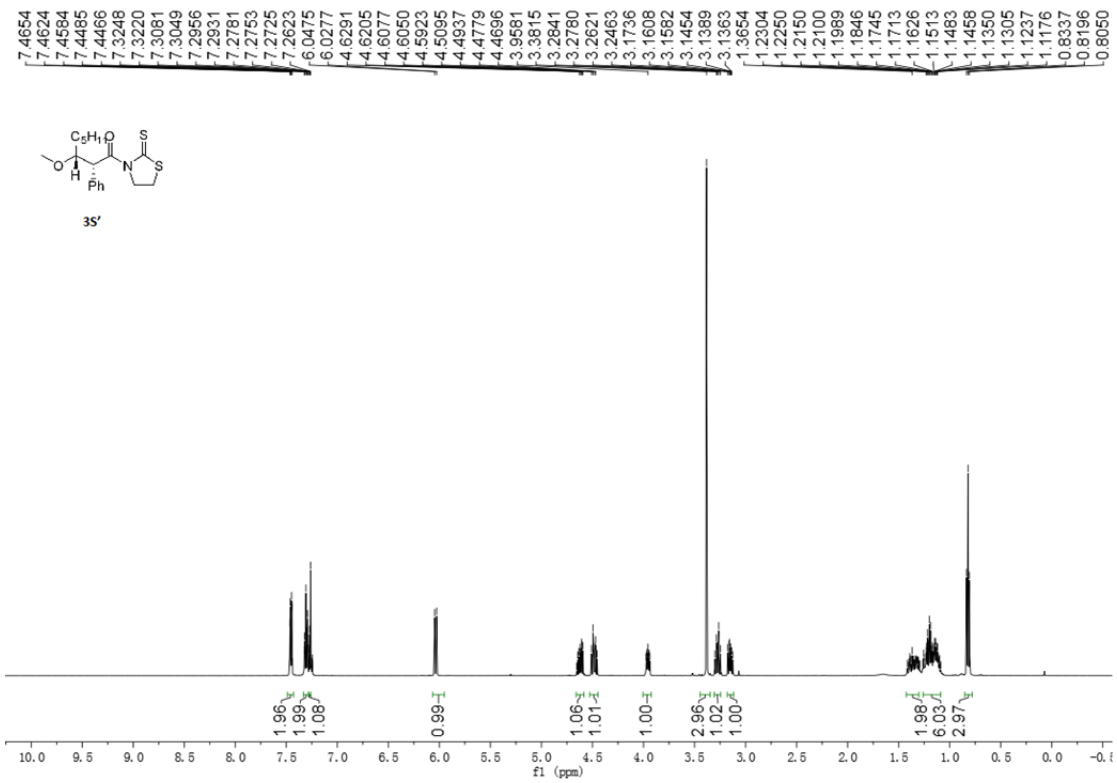
135.8823
130.1160
128.4322
127.6484
84.0333
58.9483
56.9179
54.5354
33.2344
32.0516
28.3135
25.4443
22.7865
14.2368
3S
f1 (ppm)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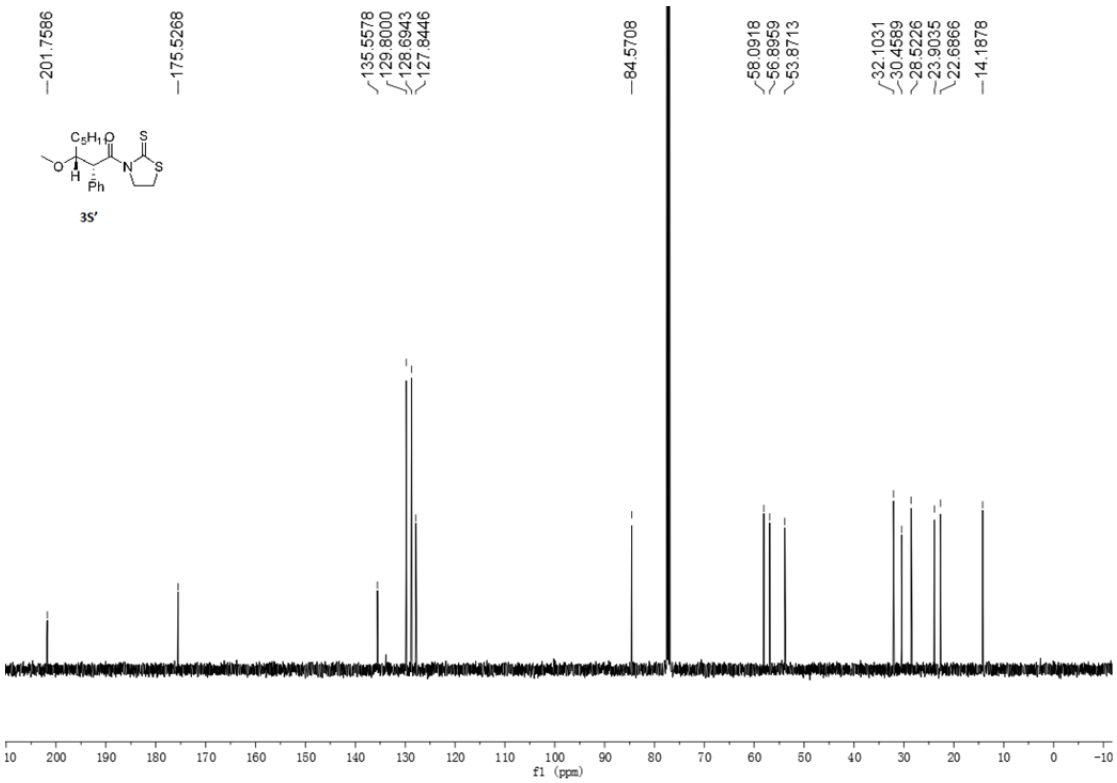
7.4624
7.4584
7.4485
7.4466
7.3248
7.3220
7.3081
7.3049
7.2956
7.2931
7.2781
7.2753
7.2725
7.2623
6.0475
6.0277
4.6291
4.6205
4.6077
4.6050
4.5923
4.5095
4.4937
4.4779
4.4696
3.9581
3.3815
3.2841
3.2780
3.2621
3.2463
3.1736
3.1608
3.1582
3.1454
3.1389
3.1363
1.3654
1.2304
1.2250
1.2150
1.2100
1.1989
1.1846
1.1745
1.1713
1.1626
1.1513
1.1483
1.1458
1.1350
1.1305
1.1237
1.1176
0.8337
0.8196
0.8050
3S'
1.96
1.99
1.08
0.99
1.06
1.01
1.00
2.96
1.02
1.00
1.98
6.03
2.97
f1 (ppm)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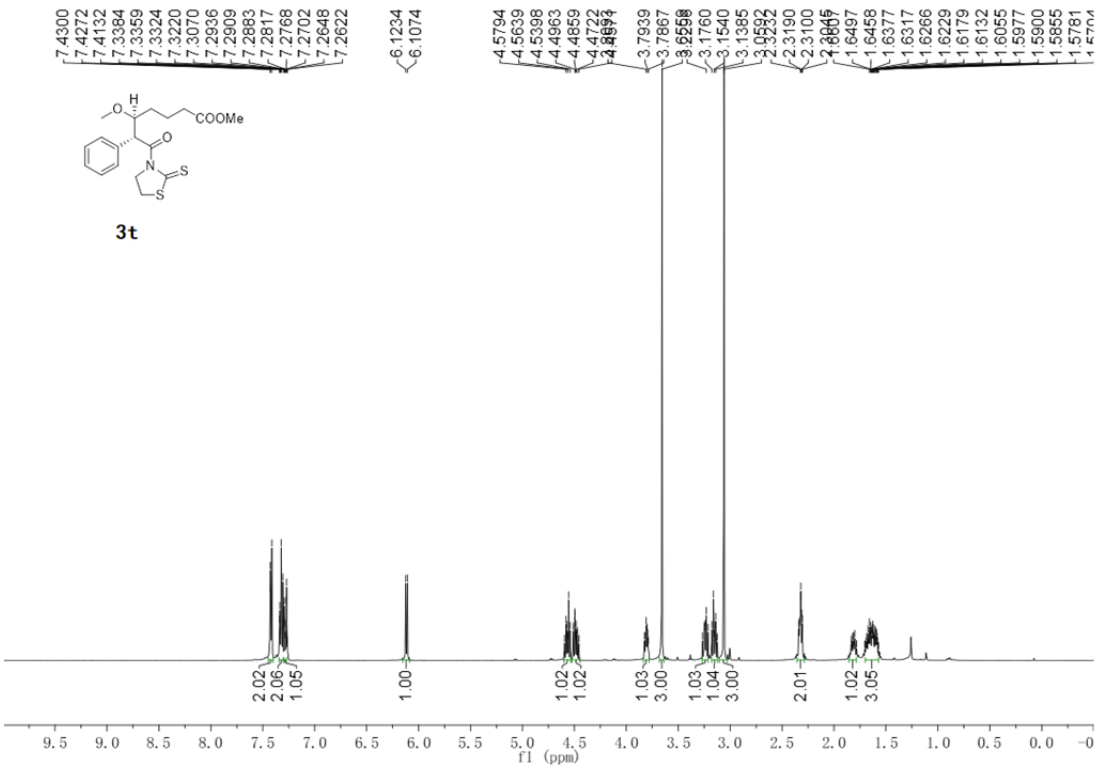
135.5578
129.8000
128.6943
127.8446
84.5708
58.0918
56.8959
53.8713
32.1031
30.4589
28.5226
23.9035
22.6866
14.1878
3S'
f1 (ppm)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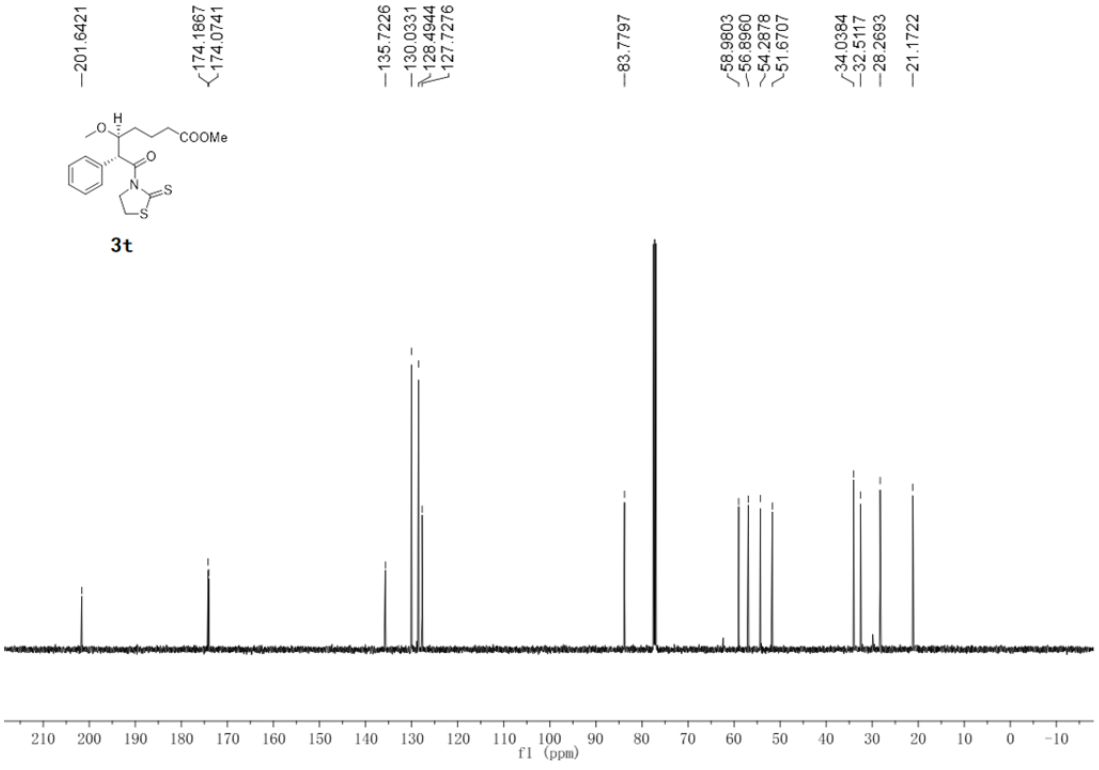
7.4132
7.3384
7.3359
7.3324
7.3220
7.3070
7.2936
7.2909
7.2883
7.2817
7.2768
7.2702
7.2648
7.2622
6.1234
6.1074
4.5794
4.5639
4.5398
4.4963
4.4859
3.7939
3.7867
3.1760
3.1540
3.1385
2.3190
2.3100
1.6497
1.6458
1.6377
1.6317
1.6266
1.6229
1.6179
1.6132
1.6055
1.5977
1.5900
1.5855
1.5781
COOMe
3t
2.02
2.06
1.05
1.00
1.02
1.02
1.03
3.00
1.03
1.04
3.00
2.01
1.02
3.05
f1 (ppm)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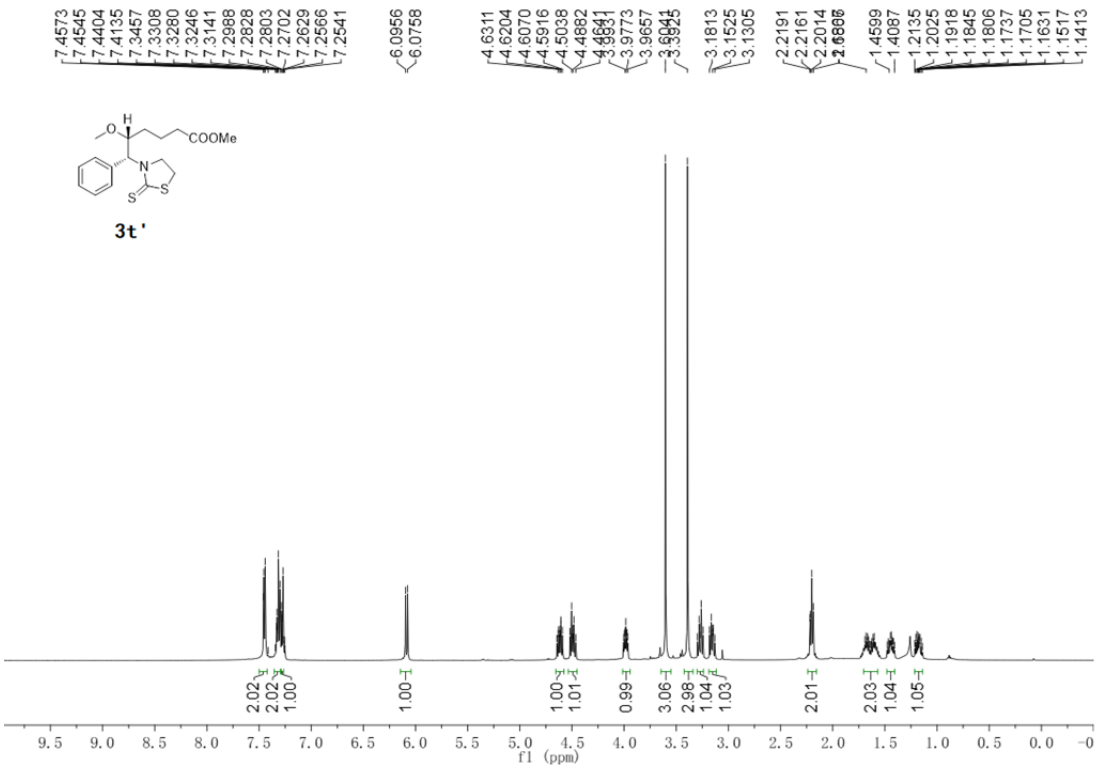
21.1722
COOMe
3t
f1 (ppm)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3t'
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2.02
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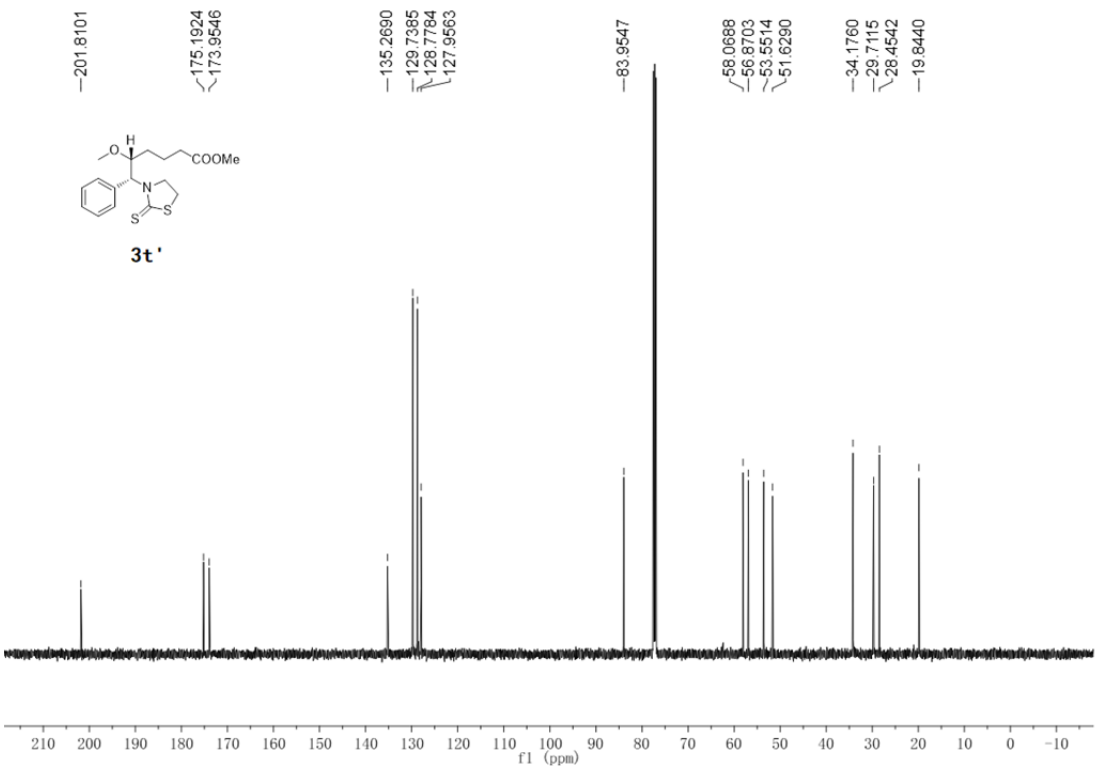
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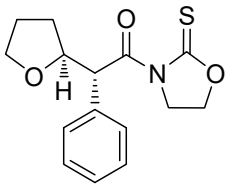
3t'
f1 (ppm)

HPLC Data



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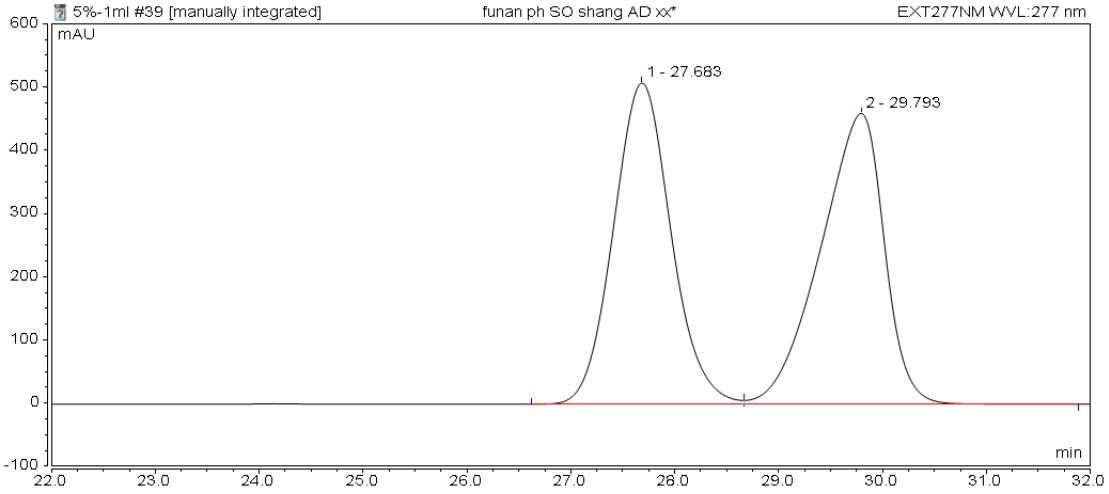
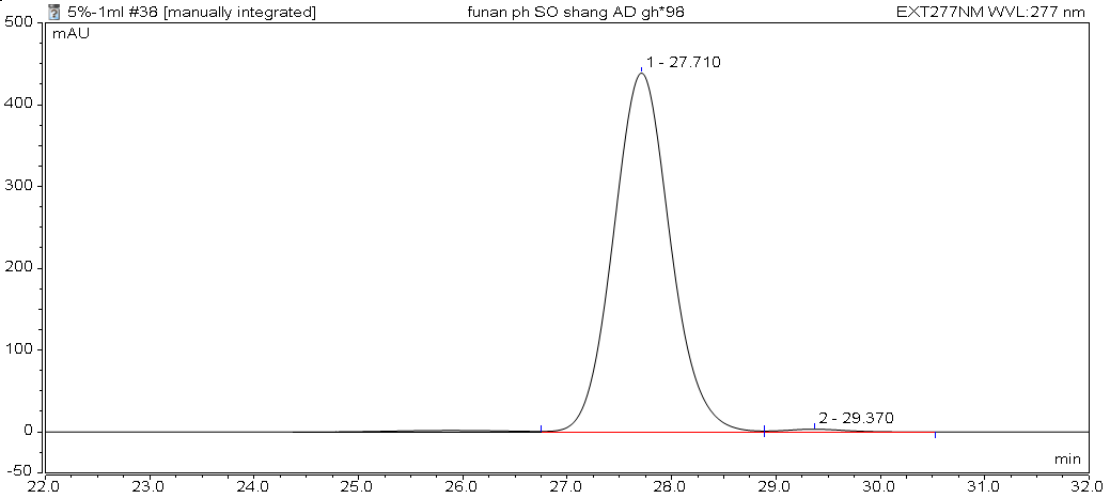
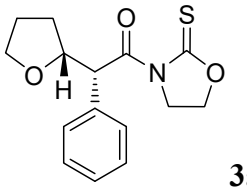


Integration Results					
No.	Peak Name	Retention Time min	Area mAU*min	Relative Area %	Amount n.a.
1		27.683	315.697	49.98	n.a.
2		29.793	315.939	50.02	n.a.
Total:			**631.636**	**100.00**	



Integration Results					
No.	Peak Name	Retention Time min	Area mAU*min	Relative Area %	Amount n.a.
1		27.710	277.695	99.17	n.a.
2		29.370	2.325	0.83	n.a.
Total:			**280.020**	**100.00**	



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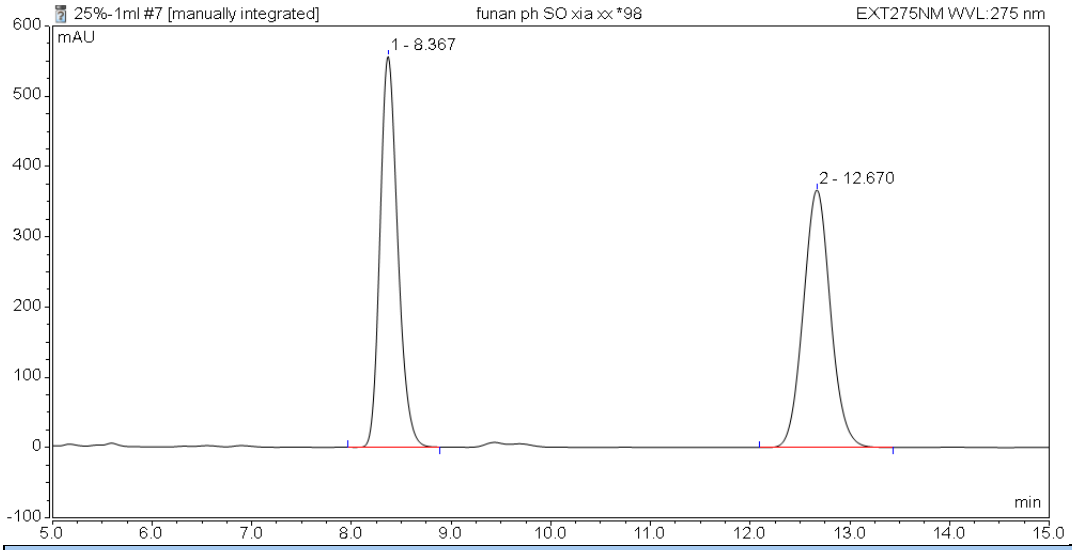
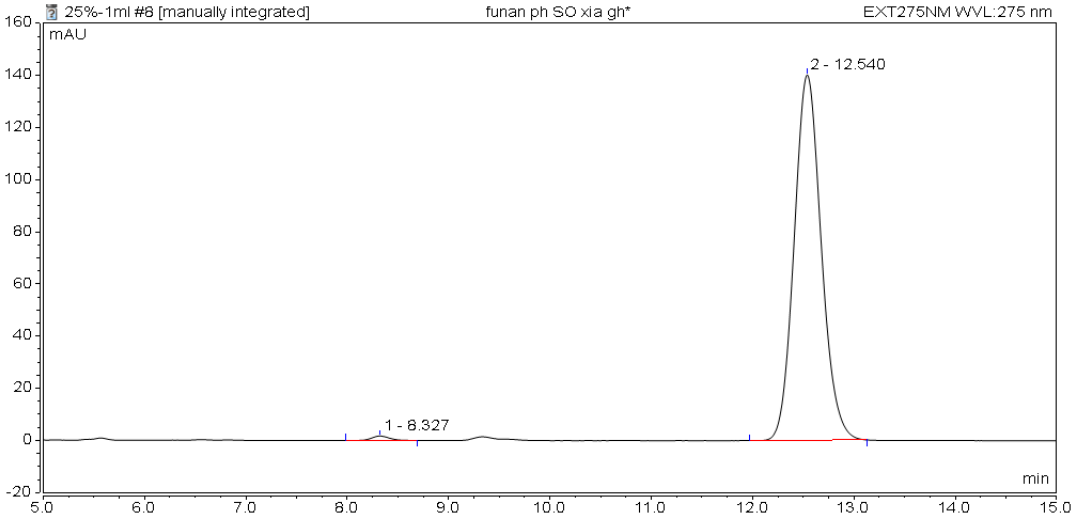
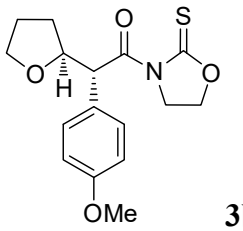


Integration Results					
No.	Peak Name	Retention Time min	Area mAU*min	Relative Area %	Amount n.a.
1		8.367	111.703	49.71	n.a.
2		12.670	113.008	50.29	n.a.
Total:			**224.711**	**100.00**	



Integration Results					
No.	Peak Name	Retention Time min	Area mAU*min	Relative Area %	Amount n.a.
1		8.327	0.348	0.79	n.a.
2		12.540	43.541	99.21	n.a.
Total:			**43.888**	**100.00**	



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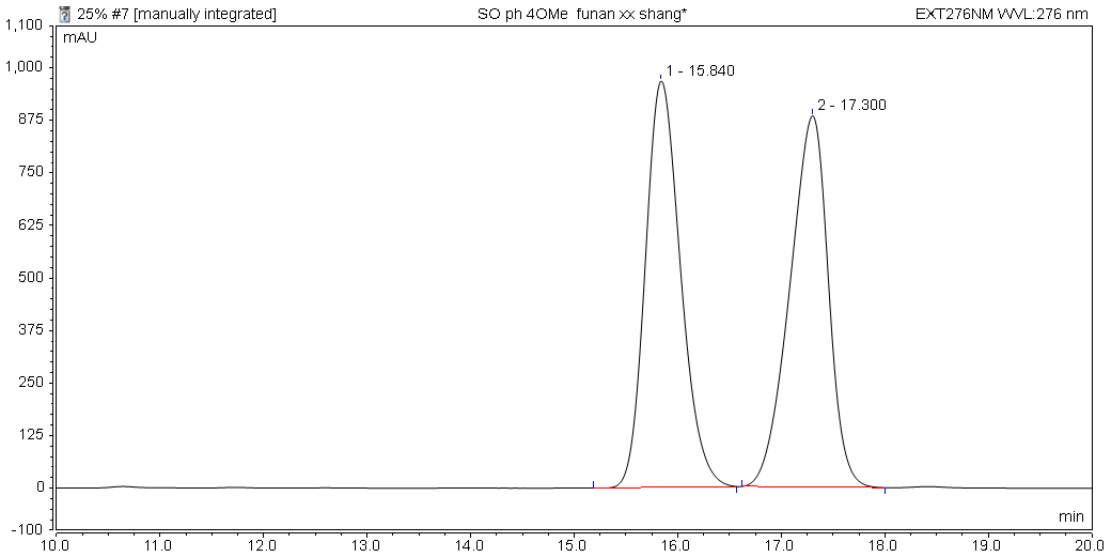
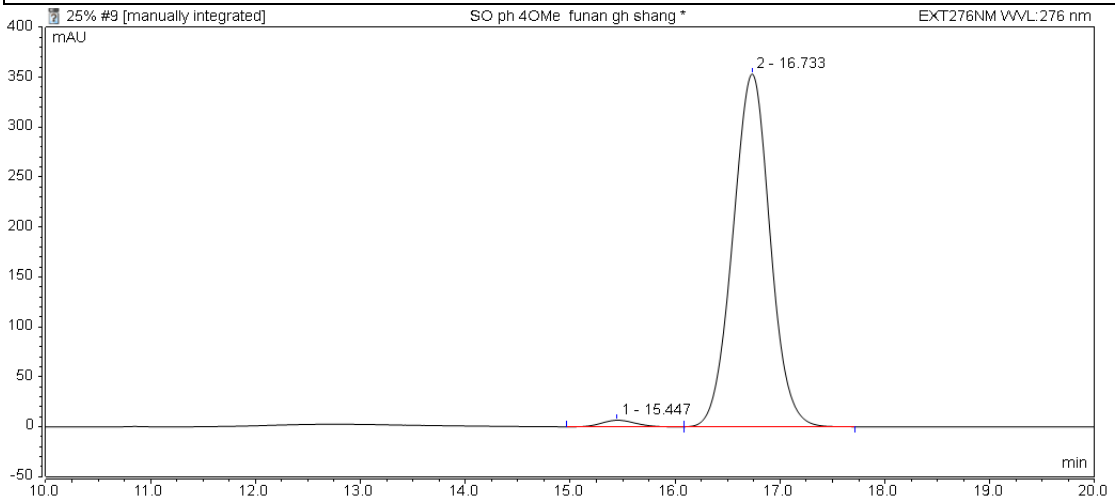
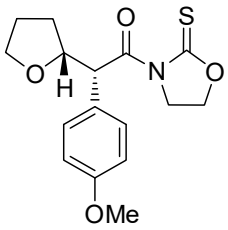


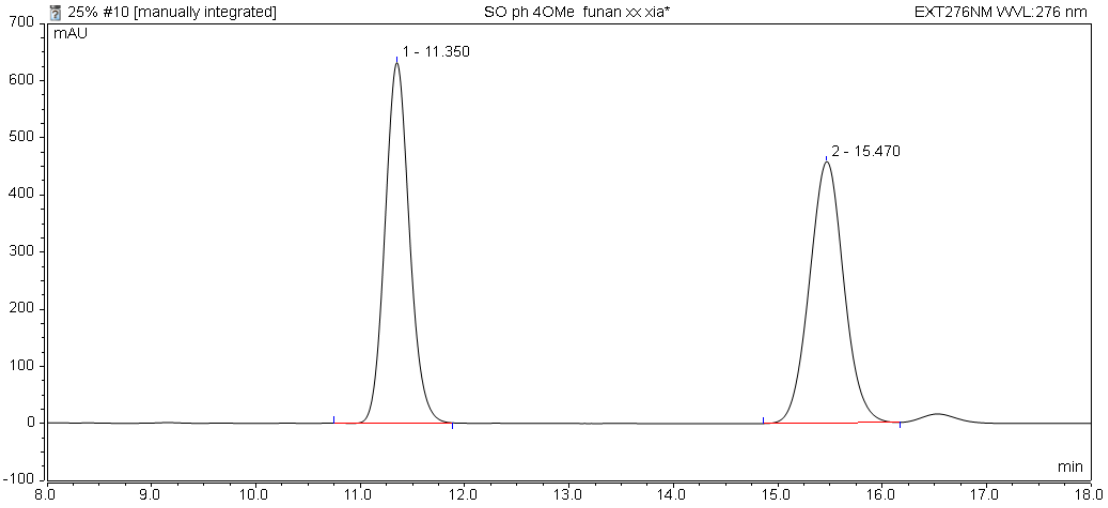
Integration Results					
No.	Peak Name	Retention Time min	Area mAU*min	Relative Area %	Amount n.a.
1		15.840	374.096	49.87	n.a.
2		17.300	376.104	50.13	n.a.
Total:			**750.200**	**100.00**	



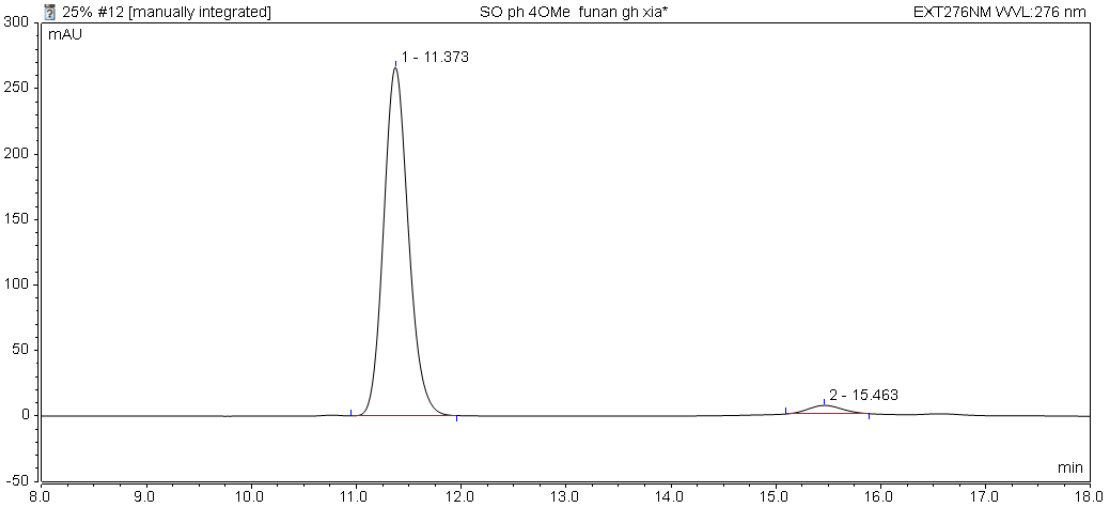
Integration Results					
No.	Peak Name	Retention Time min	Area mAU*min	Relative Area %	Amount n.a.
1		15.447	2.451	1.66	n.a.
2		16.733	145.574	98.34	n.a.
Total:			**148.025**	**100.00**	



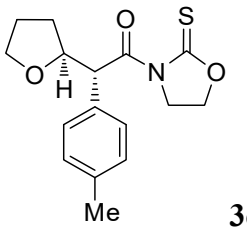
3b'



Integration Results					
No.	Peak Name	Retention Time min	Area mAU*min	Relative Area %	Amount n.a.
1		11.350	128.791	49.37	n.a.
2		15.470	132.093	50.63	n.a.
Total:			**260.884**	**100.00**	



Integration Results					
No.	Peak Name	Retention Time min	Area mAU*min	Relative Area %	Amount n.a.
1		11.373	73.103	97.44	n.a.
2		15.463	1.917	2.56	n.a.
Total:			**75.020**	**100.00**	



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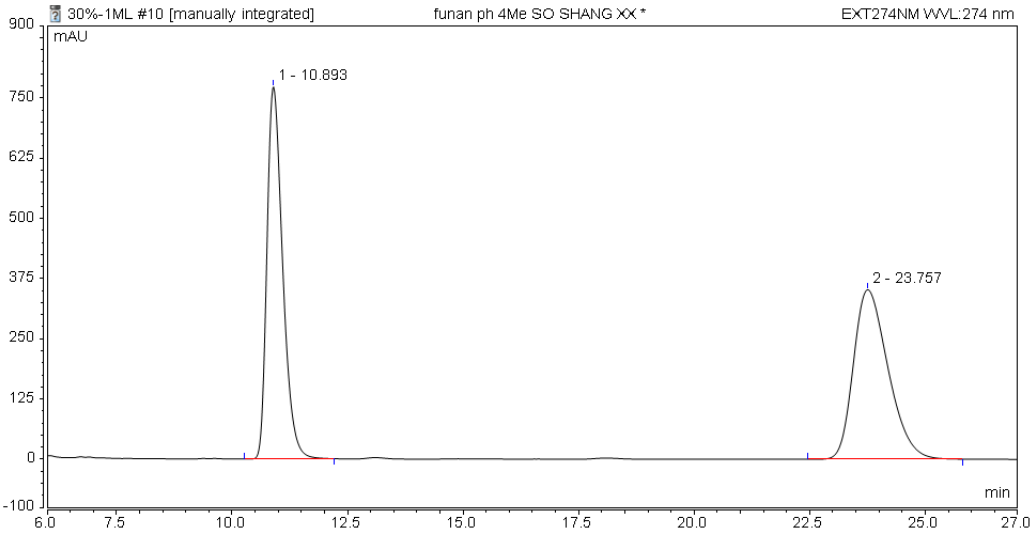
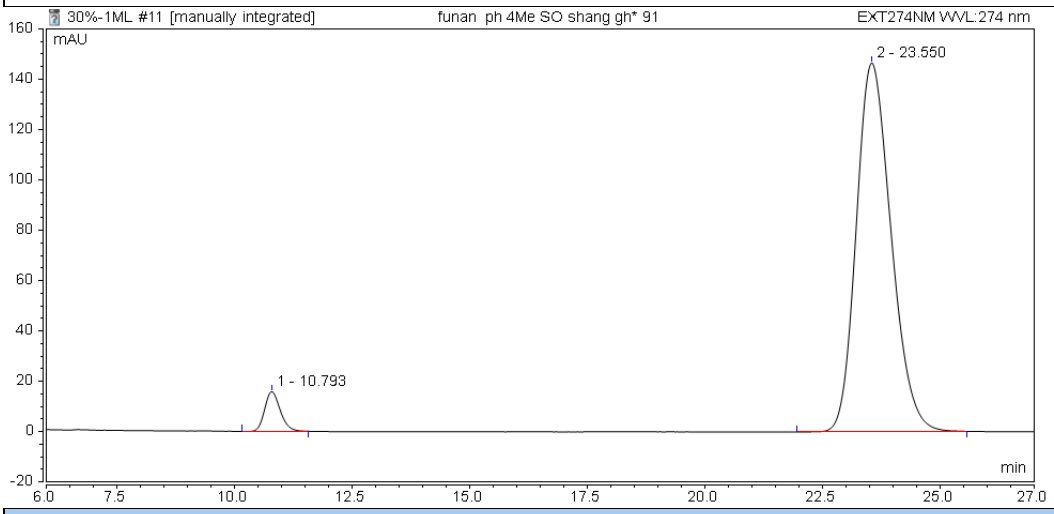
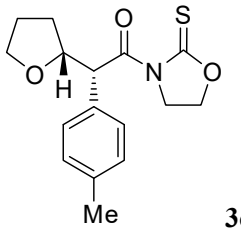


Integration Results					
No.	Peak Name	Retention Time min	Area mAU*min	Relative Area %	Amount n.a.
1		10.893	302.479	49.84	n.a.
2		23.757	304.461	50.16	n.a.
Total:			**606.940**	**100.00**	



Integration Results					
No.	Peak Name	Retention Time min	Area mAU*min	Relative Area %	Amount n.a.
1		10.793	5.531	4.21	n.a.
2		23.550	125.892	95.79	n.a.
Total:			**131.423**	**100.00**	



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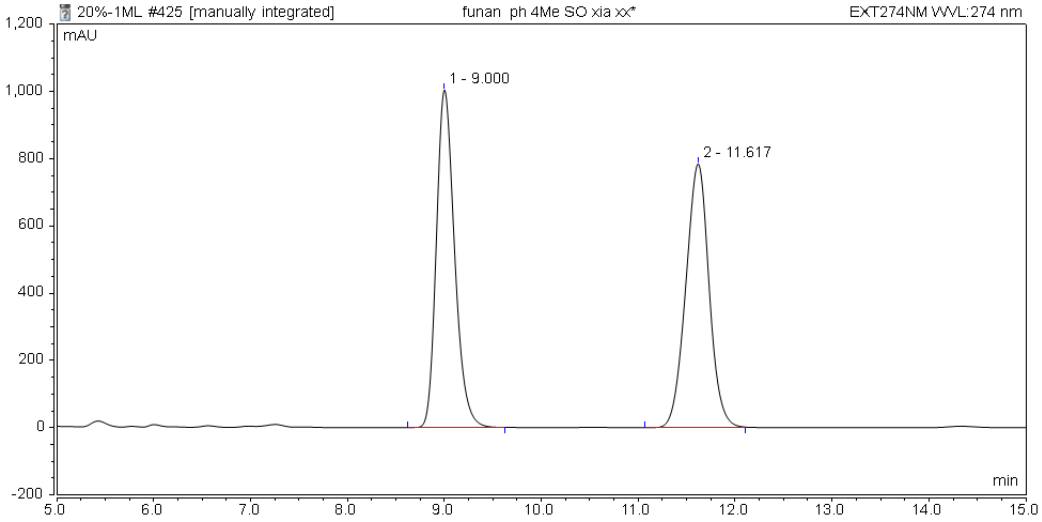
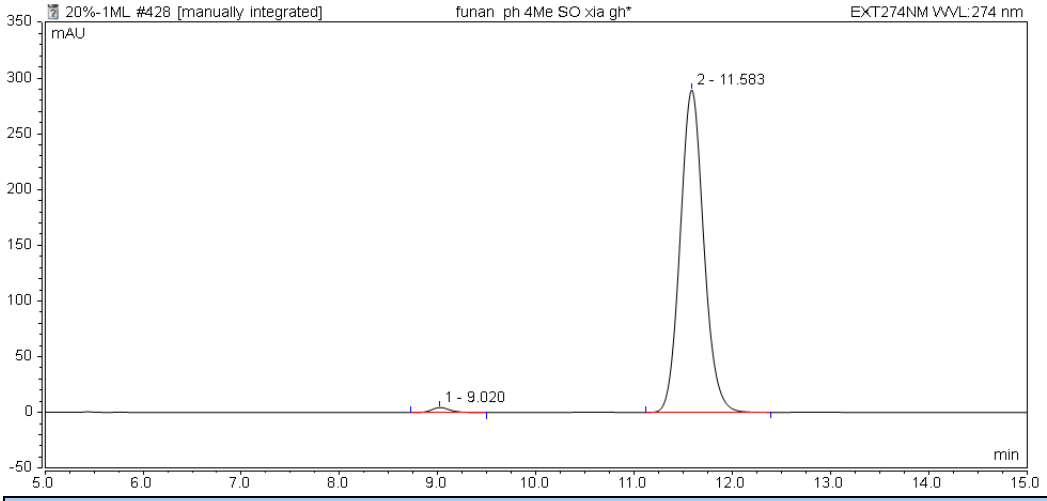
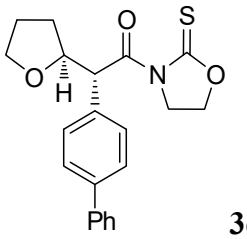


Integration Results					
No.	Peak Name	Retention Time min	Area mAU*min	Relative Area %	Amount n.a.
1		9.000	198.864	49.96	n.a.
2		11.617	199.158	50.04	n.a.
Total:			**398.022**	**100.00**	



Integration Results					
No.	Peak Name	Retention Time min	Area mAU*min	Relative Area %	Amount n.a.
1		9.020	0.985	1.21	n.a.
2		11.583	80.479	98.79	n.a.
Total:			**81.464**	**100.00**	



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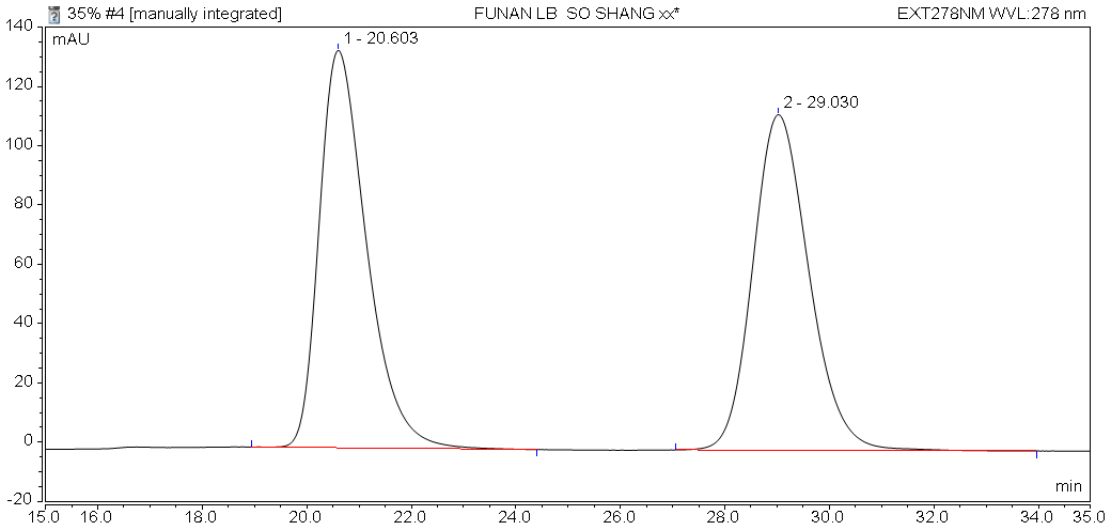
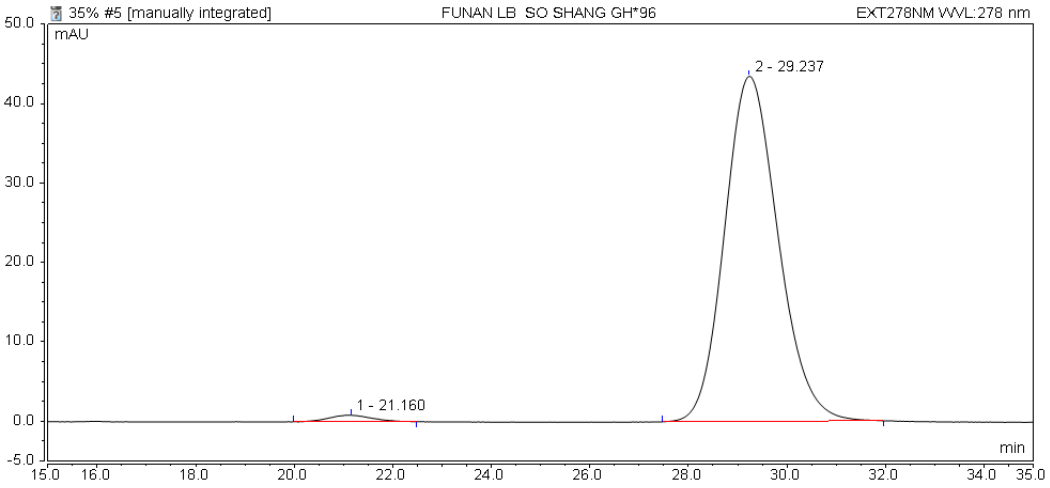
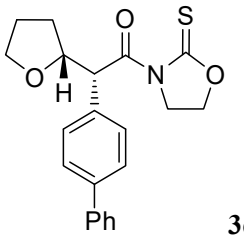


Integration Results					
No.	Peak Name	Retention Time min	Area mAU*min	Relative Area %	Amount n.a.
1		20.603	164.236	49.70	n.a.
2		29.030	166.202	50.30	n.a.
Total:			**330.438**	**100.00**	



Integration Results					
No.	Peak Name	Retention Time min	Area mAU*min	Relative Area %	Amount n.a.
1		21.160	0.774	1.40	n.a.
2		29.237	54.710	98.60	n.a.
Total:			**55.484**	**100.00**	



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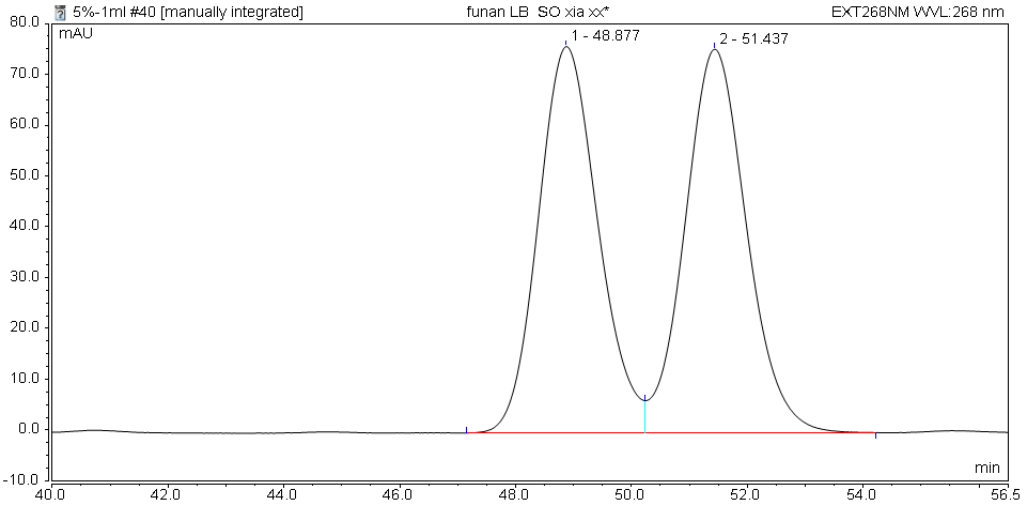
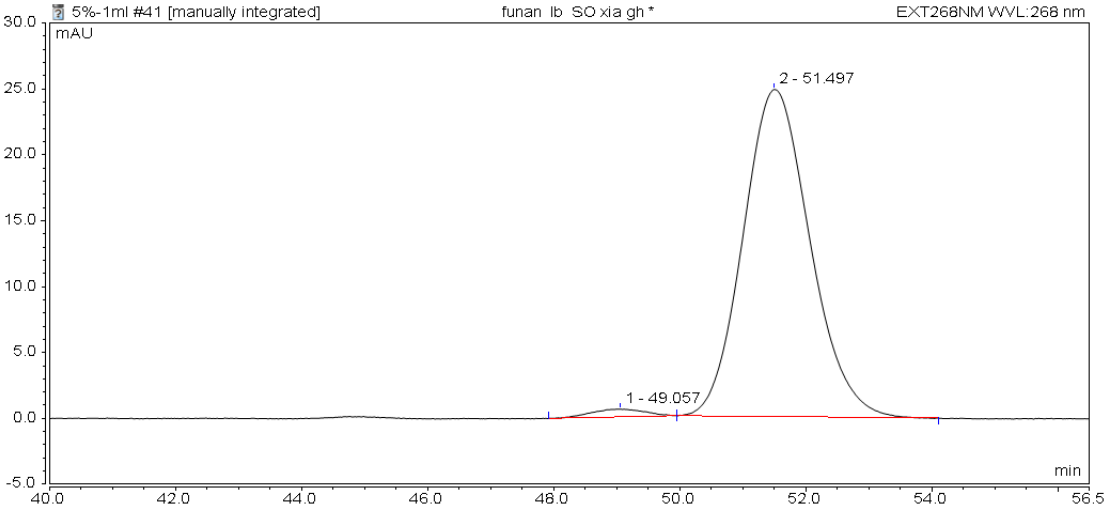
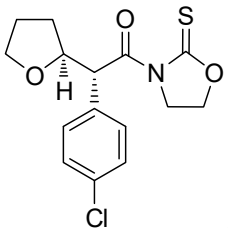


Integration Results					
No.	Peak Name	Retention Time min	Area mAU*min	Relative Area %	Amount n.a.
1		48.877	71.460	49.30	n.a.
2		51.437	73.500	50.70	n.a.
Total:			**144.959**	**100.00**	



Integration Results					
No.	Peak Name	Retention Time min	Area mAU*min	Relative Area %	Amount n.a.
1		49.057	0.575	1.85	n.a.
2		51.497	30.494	98.15	n.a.
Total:			**31.069**	**100.00**	



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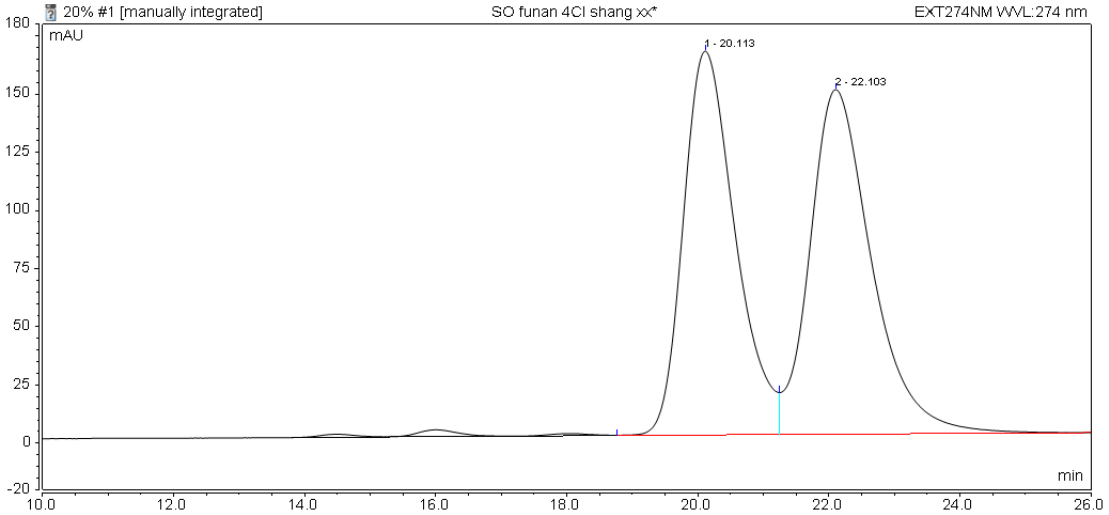
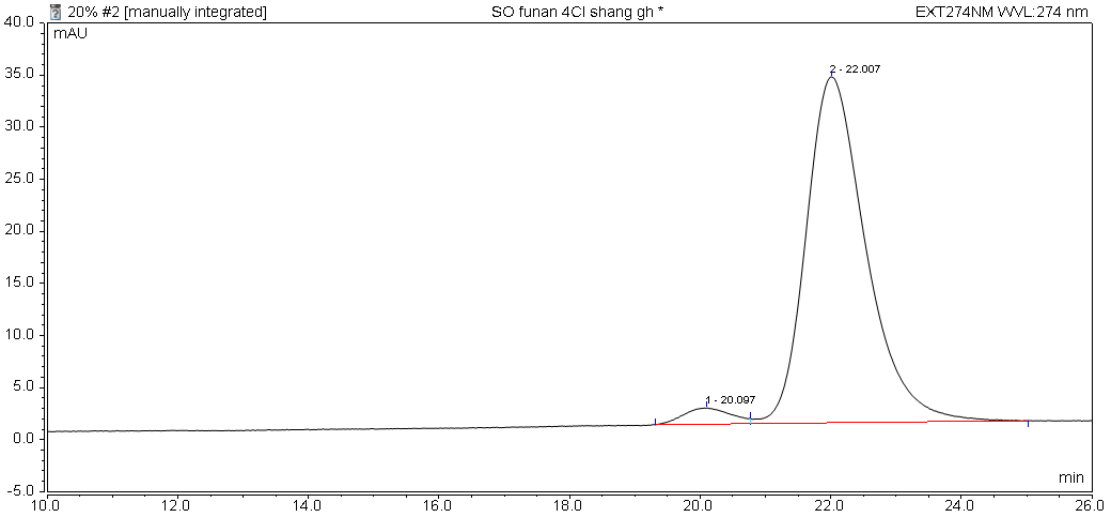
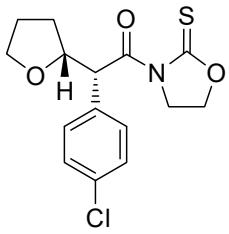


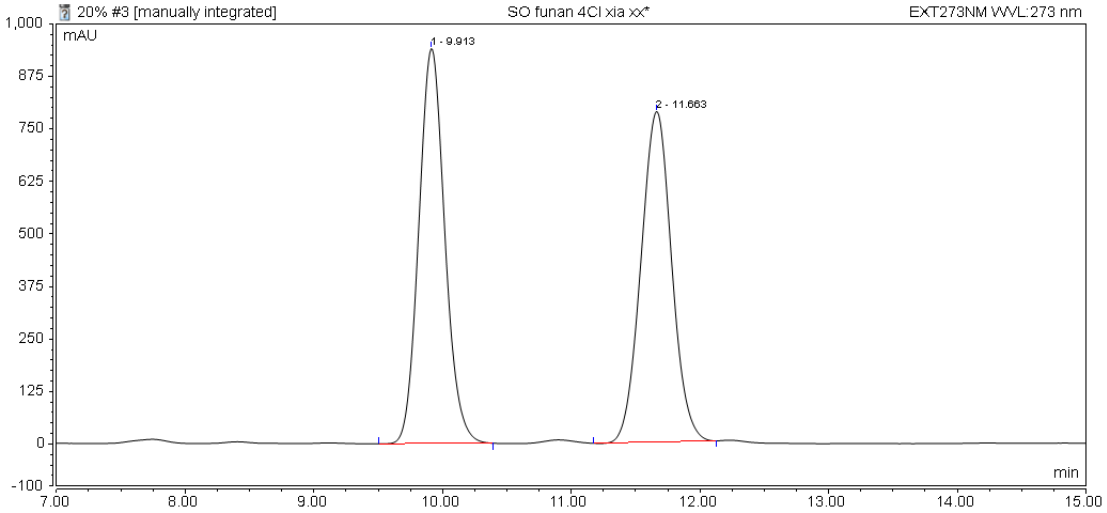
Integration Results					
No.	Peak Name	Retention Time min	Area mAU*min	Relative Area %	Amount n.a.
1		20.113	145.406	49.51	n.a.
2		22.103	148.266	50.49	n.a.
Total:			**293.672**	**100.00**	



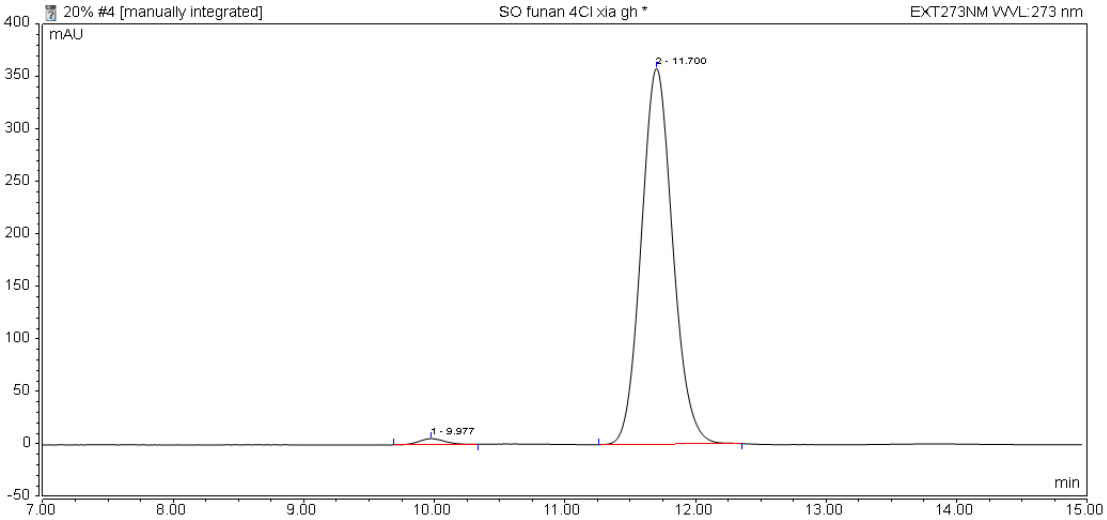
Integration Results					
No.	Peak Name	Retention Time min	Area mAU*min	Relative Area %	Amount n.a.
1		20.097	0.923	2.62	n.a.
2		22.007	34.274	97.38	n.a.
Total:			**35.197**	**100.00**	



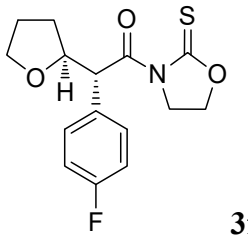
3e'



Integration Results					
No.	Peak Name	Retention Time min	Area mAU*min	Relative Area %	Amount n.a.
1		9.913	214.722	49.97	n.a.
2		11.663	215.001	50.03	n.a.
Total:			**429.723**	**100.00**	



Integration Results					
No.	Peak Name	Retention Time min	Area mAU*min	Relative Area %	Amount n.a.
1		9.977	1.280	1.26	n.a.
2		11.700	100.398	98.74	n.a.
Total:			**101.679**	**100.00**	



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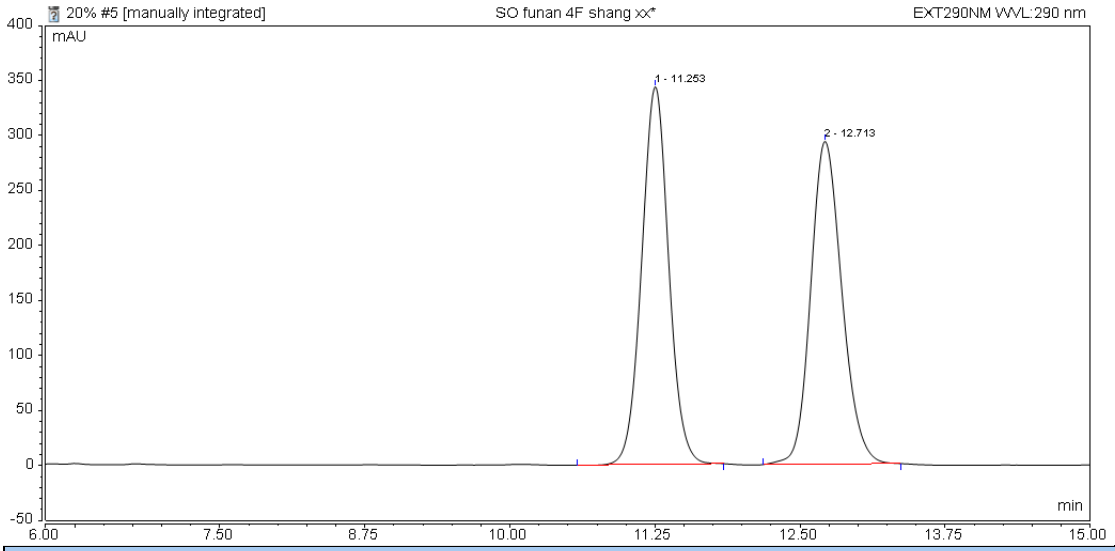
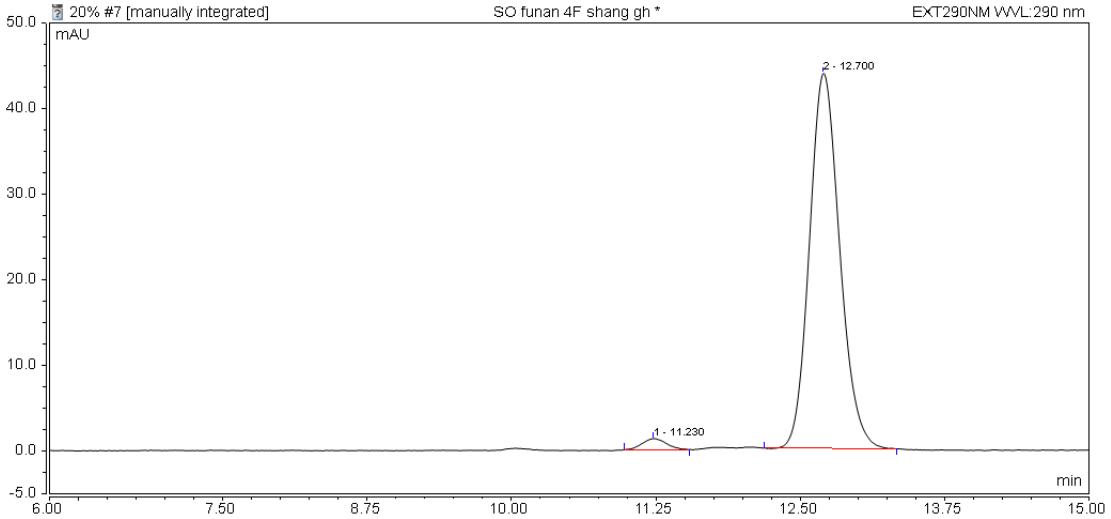
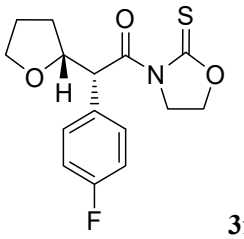


Integration Results					
No.	Peak Name	Retention Time min	Area mAU*min	Relative Area %	Amount n.a.
1		11.253	179.914	50.24	n.a.
2		12.713	178.180	49.76	n.a.
Total:			**358.095**	**100.00**	



Integration Results					
No.	Peak Name	Retention Time min	Area mAU*min	Relative Area %	Amount n.a.
1		11.230	0.305	2.24	n.a.
2		12.700	13.308	97.76	n.a.
Total:			**13.613**	**100.00**	



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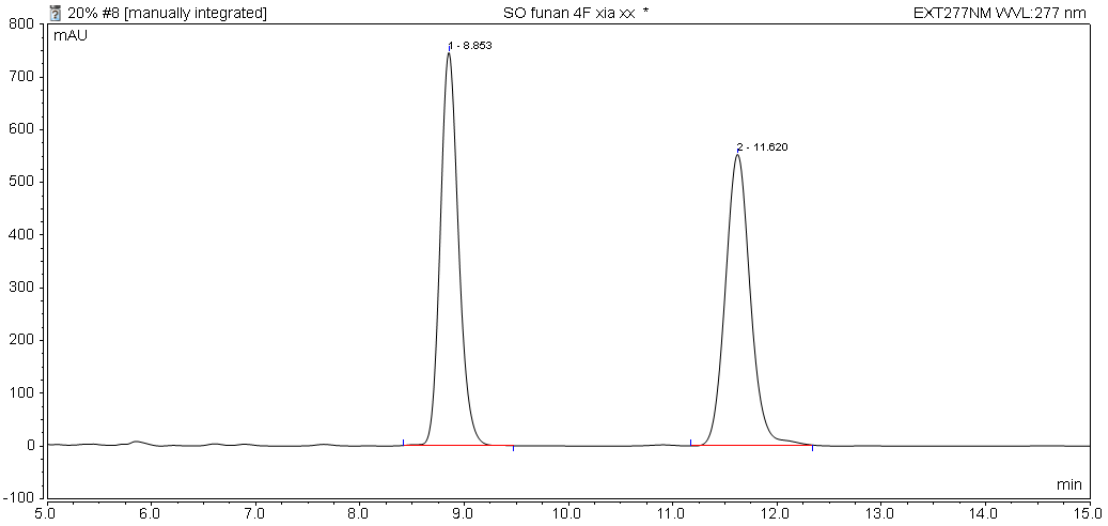
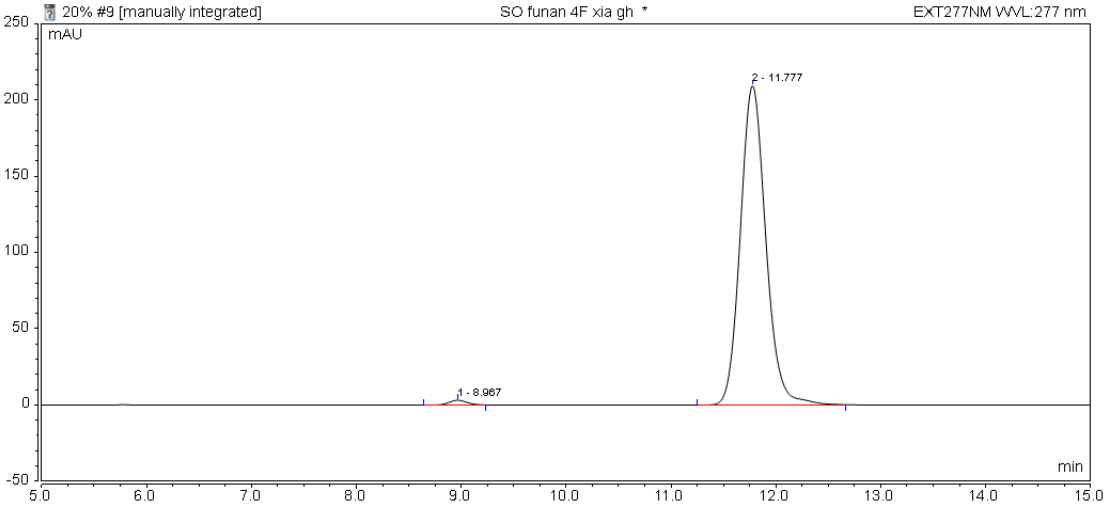
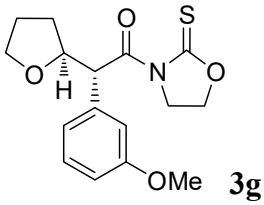


Integration Results					
No.	Peak Name	Retention Time min	Area mAU*min	Relative Area %	Amount n.a.
1		8.853	140.410	49.85	n.a.
2		11.620	141.248	50.15	n.a.
Total:			**281.657**	**100.00**	



Integration Results					
No.	Peak Name	Retention Time min	Area mAU*min	Relative Area %	Amount n.a.
1		8.967	0.640	1.09	n.a.
2		11.777	58.283	98.91	n.a.
Total:			**58.924**	**100.00**	



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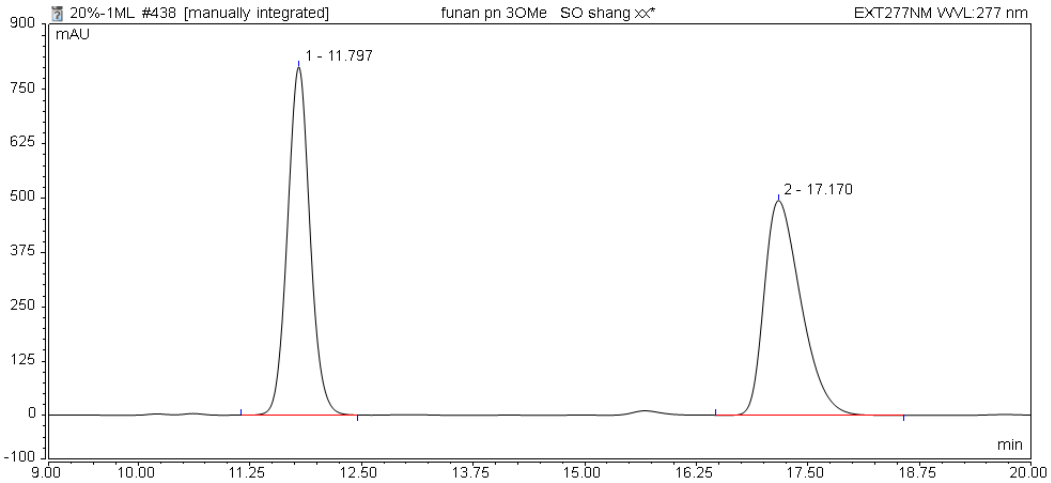
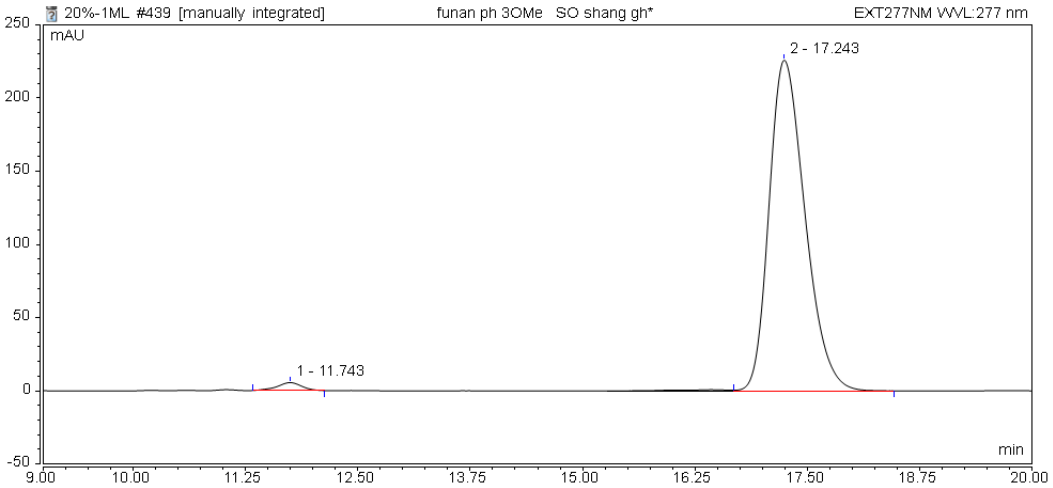
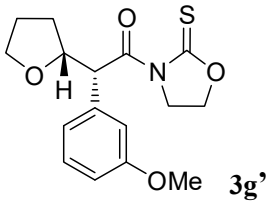


Integration Results					
No.	Peak Name	Retention Time min	Area mAU*min	Relative Area %	Amount n.a.
1		11.797	235.824	49.99	n.a.
2		17.170	235.957	50.01	n.a.
Total:			**471.782**	**100.00**	



Integration Results					
No.	Peak Name	Retention Time min	Area mAU*min	Relative Area %	Amount n.a.
1		11.743	1.744	1.65	n.a.
2		17.243	104.158	98.35	n.a.
Total:			**105.902**	**100.00**	



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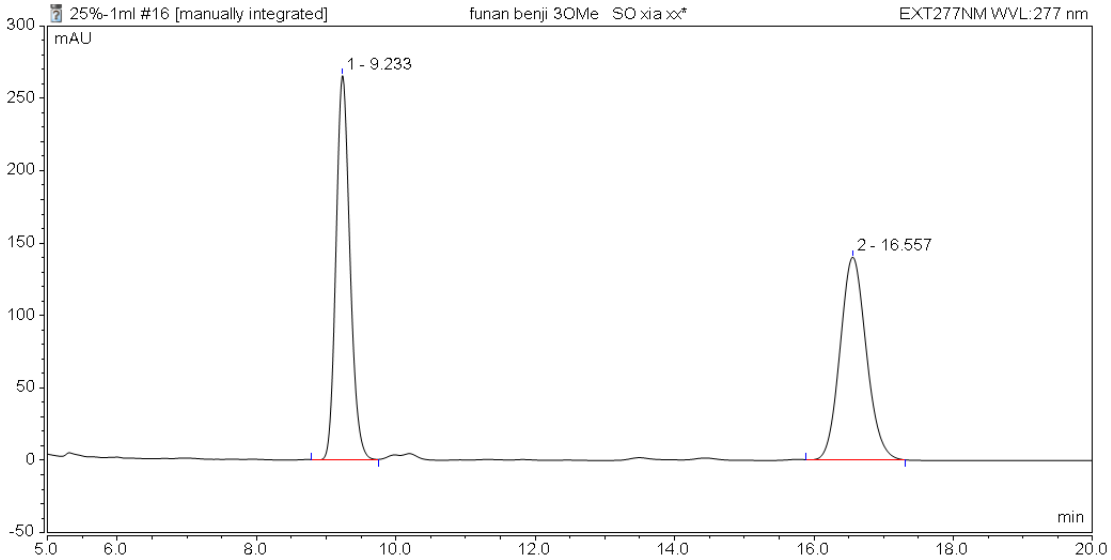
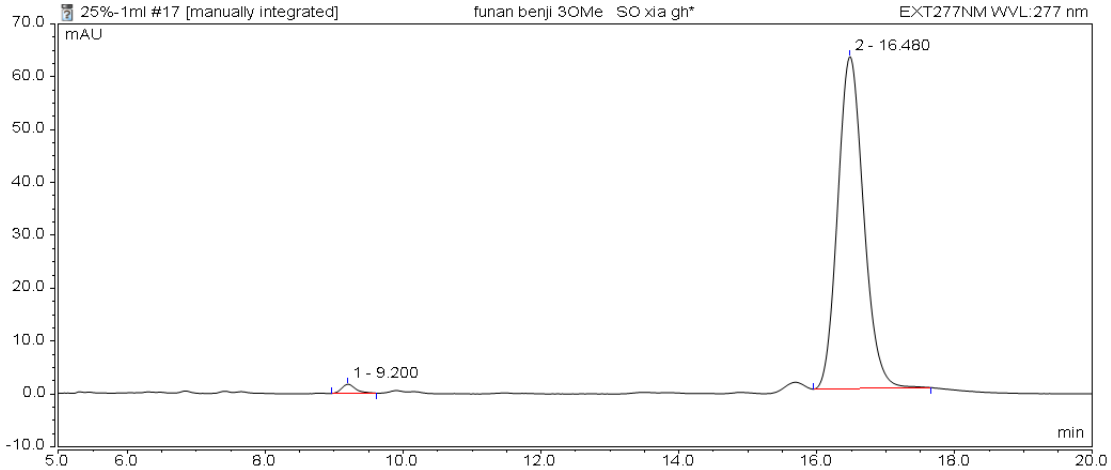
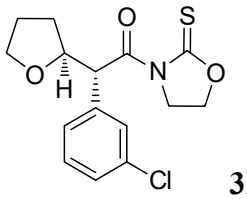


Integration Results					
No.	Peak Name	Retention Time min	Area mAU*min	Relative Area %	Amount n.a.
1		9.233	55.133	50.12	n.a.
2		16.557	54.862	49.88	n.a.
Total:			**109.995**	**100.00**	



Integration Results					
No.	Peak Name	Retention Time min	Area mAU*min	Relative Area %	Amount n.a.
1		9.200	0.403	1.45	n.a.
2		16.480	27.435	98.55	n.a.
Total:			**27.838**	**100.00**	



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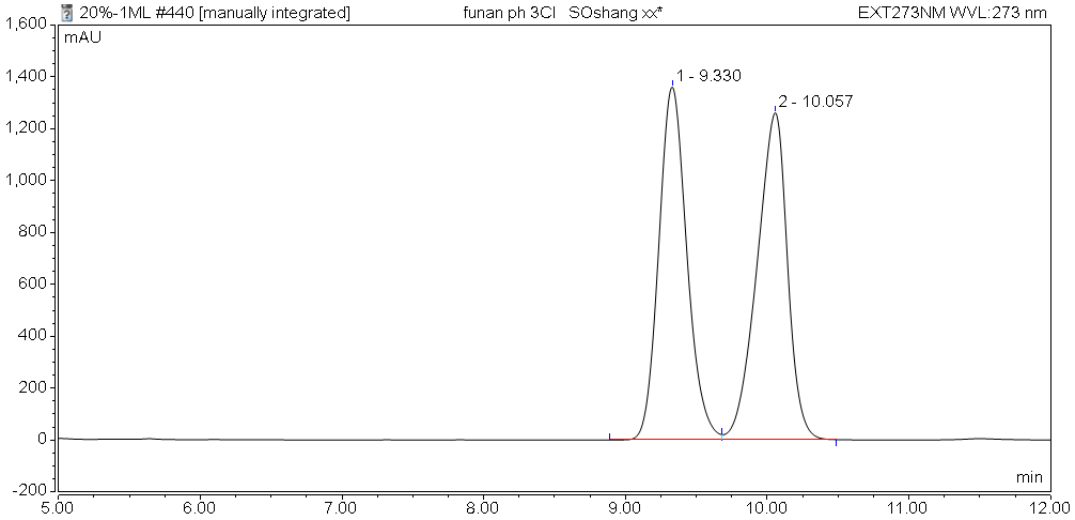
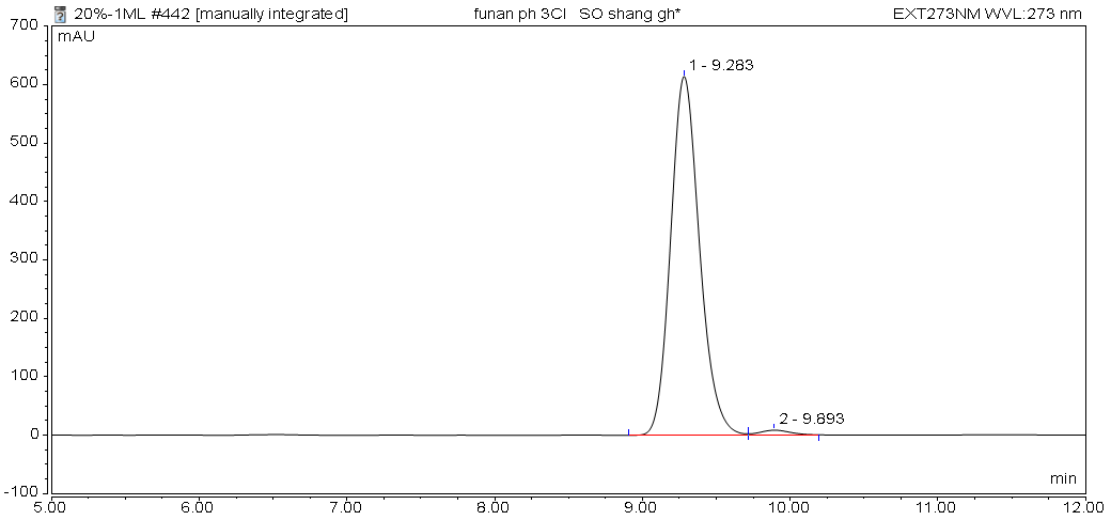
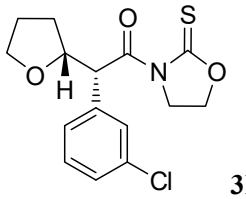


Integration Results					
No.	Peak Name	Retention Time min	Area mAU*min	Relative Area %	Amount n.a.
1		9.330	277.653	49.83	n.a.
2		10.057	279.563	50.17	n.a.
Total:			**557.216**	**100.00**	



Integration Results					
No.	Peak Name	Retention Time min	Area mAU*min	Relative Area %	Amount n.a.
1		9.283	139.293	98.44	n.a.
2		9.893	2.206	1.56	n.a.
Total:			**141.499**	**100.00**	



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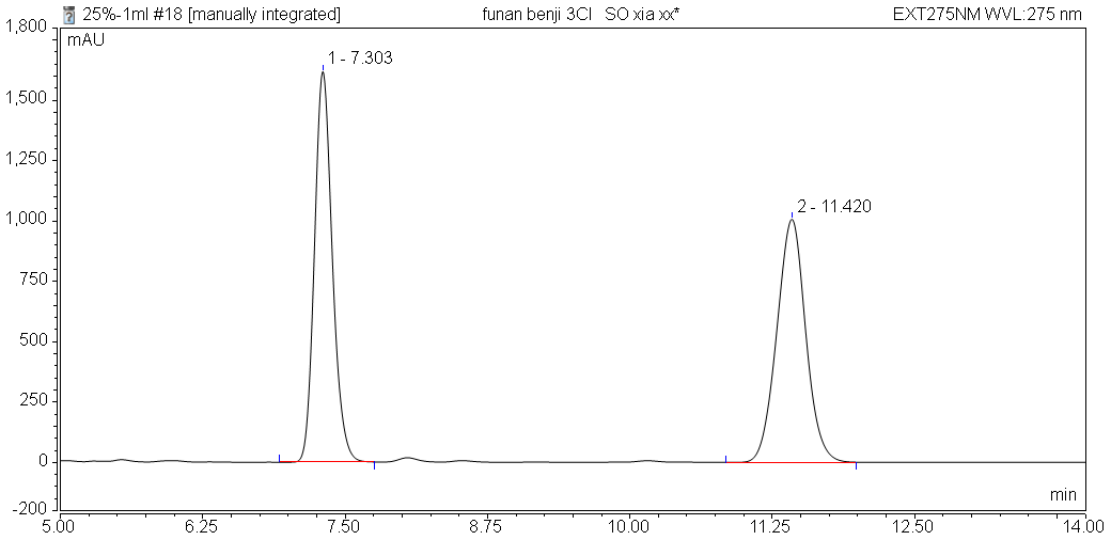
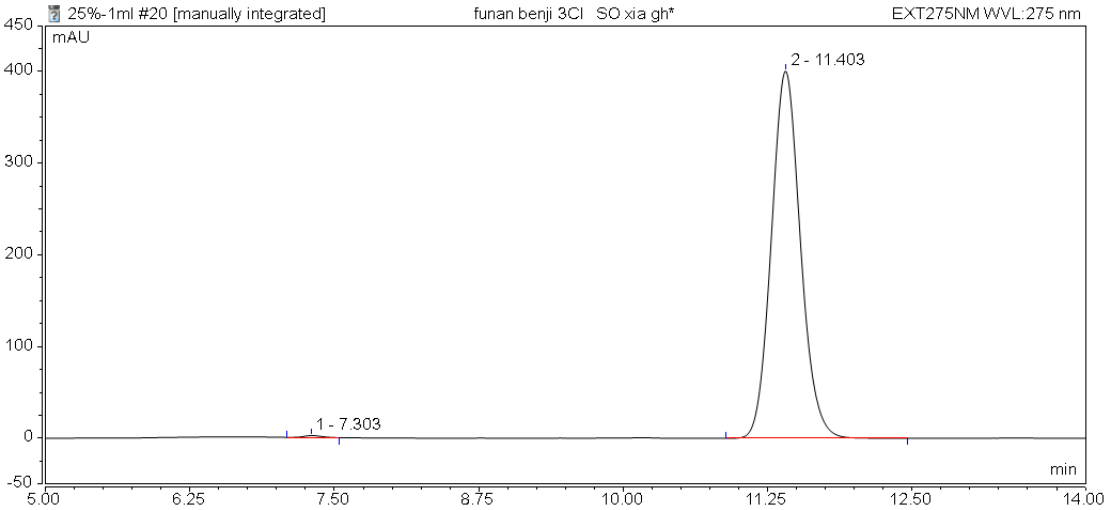
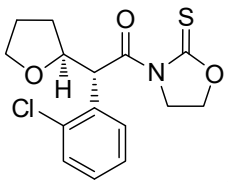


Integration Results					
No.	Peak Name	Retention Time min	Area mAU*min	Relative Area %	Amount n.a.
1		7.303	292.973	49.85	n.a.
2		11.420	294.688	50.15	n.a.
Total:			**587.661**	**100.00**	



Integration Results					
No.	Peak Name	Retention Time min	Area mAU*min	Relative Area %	Amount n.a.
1		7.303	0.385	0.33	n.a.
2		11.403	117.026	99.67	n.a.
Total:			**117.412**	**100.00**	



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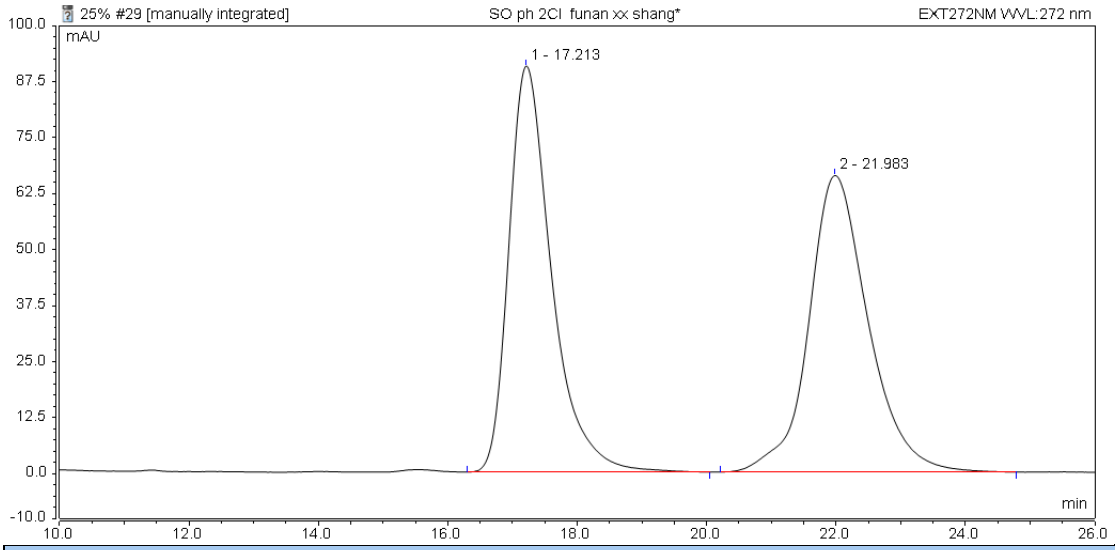
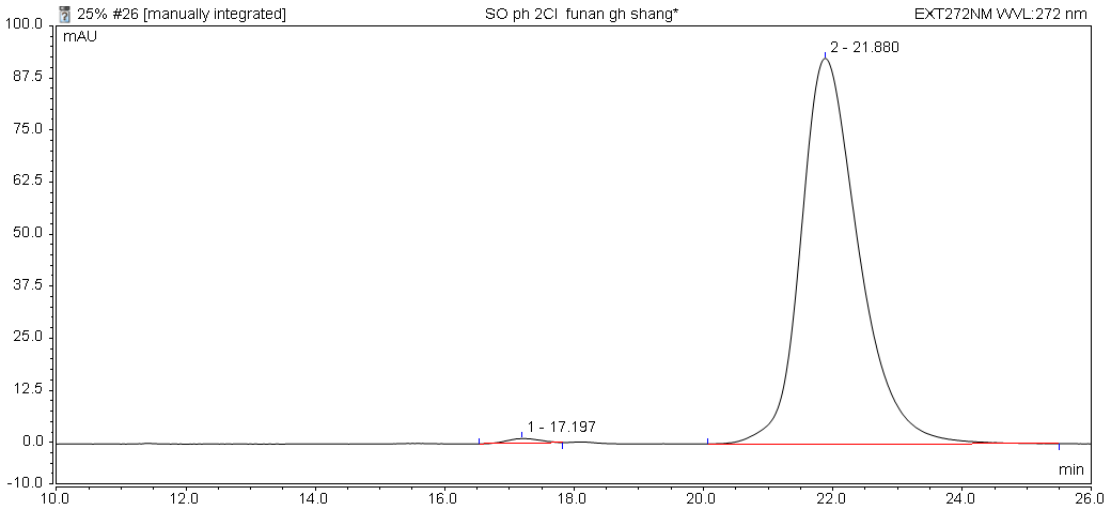
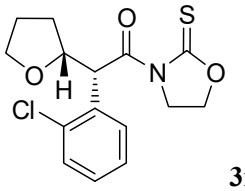


Integration Results					
No.	Peak Name	Retention Time min	Area mAU*min	Relative Area %	Amount n.a.
1		17.213	69.250	50.44	n.a.
2		21.983	68.037	49.56	n.a.
Total:			**137.287**	**100.00**	



Integration Results					
No.	Peak Name	Retention Time min	Area mAU*min	Relative Area %	Amount n.a.
1		17.197	0.630	0.66	n.a.
2		21.880	95.468	99.34	n.a.
Total:			**96.098**	**100.00**	



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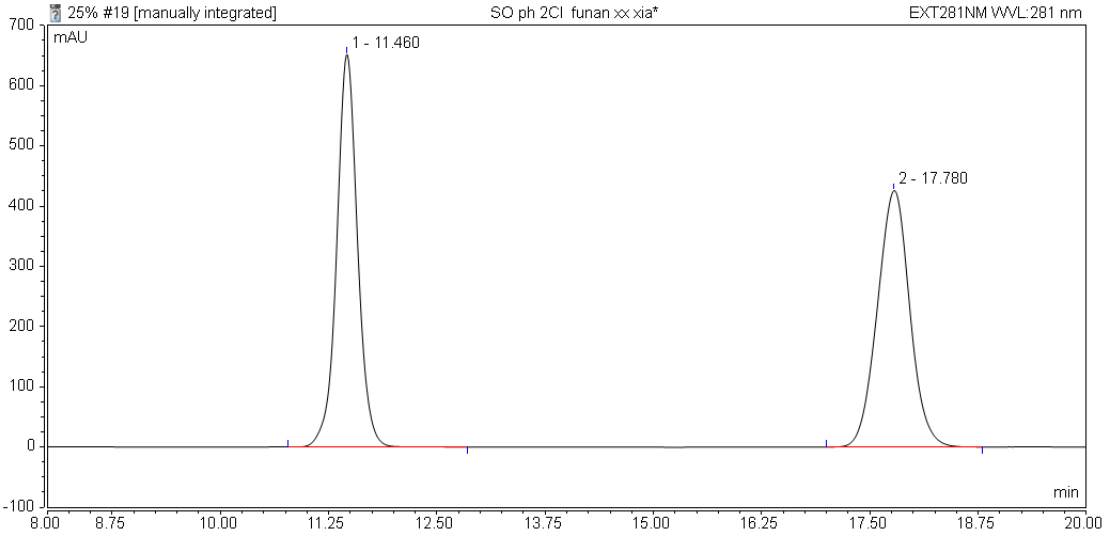
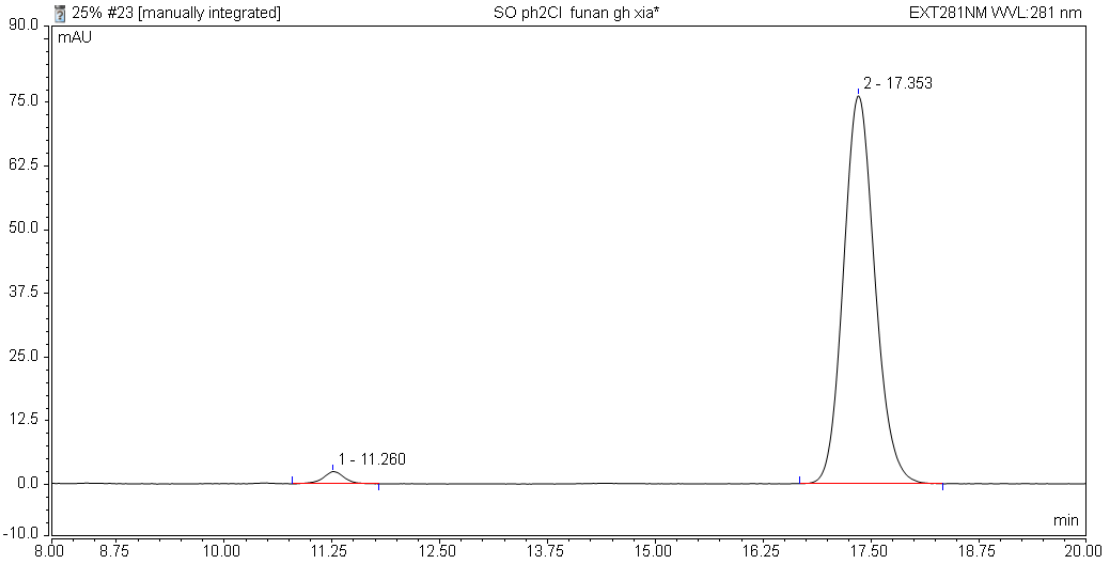
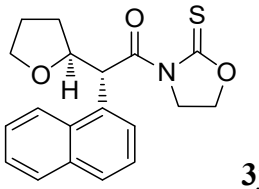


Integration Results					
No.	Peak Name	Retention Time min	Area mAU*min	Relative Area %	Amount n.a.
1		11.460	187.509	49.70	n.a.
2		17.780	189.738	50.30	n.a.
Total:			**377.246**	**100.00**	



Integration Results					
No.	Peak Name	Retention Time min	Area mAU*min	Relative Area %	Amount n.a.
1		11.260	0.523	1.60	n.a.
2		17.353	32.205	98.40	n.a.
Total:			**32.727**	**100.00**	



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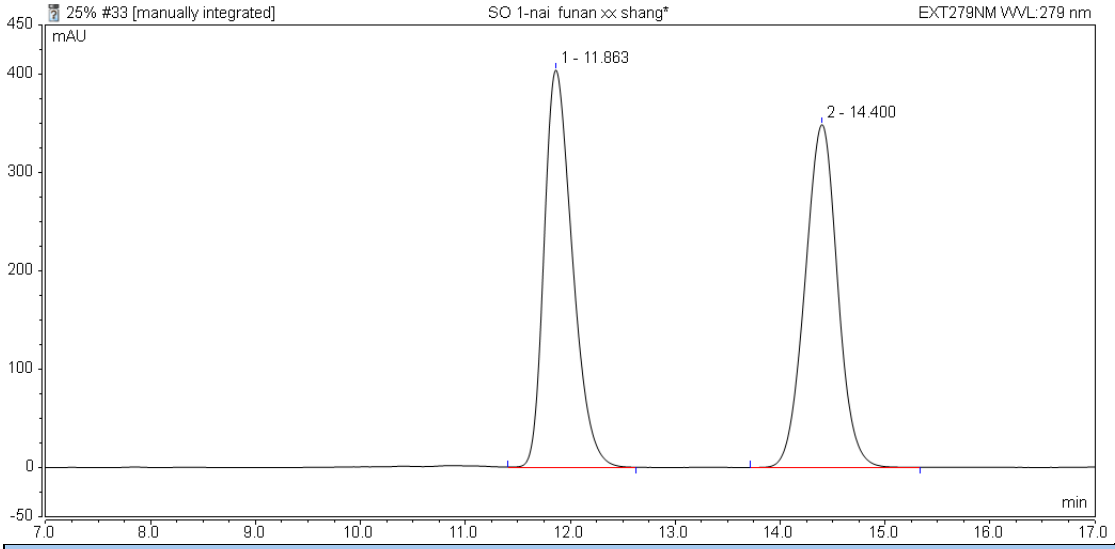
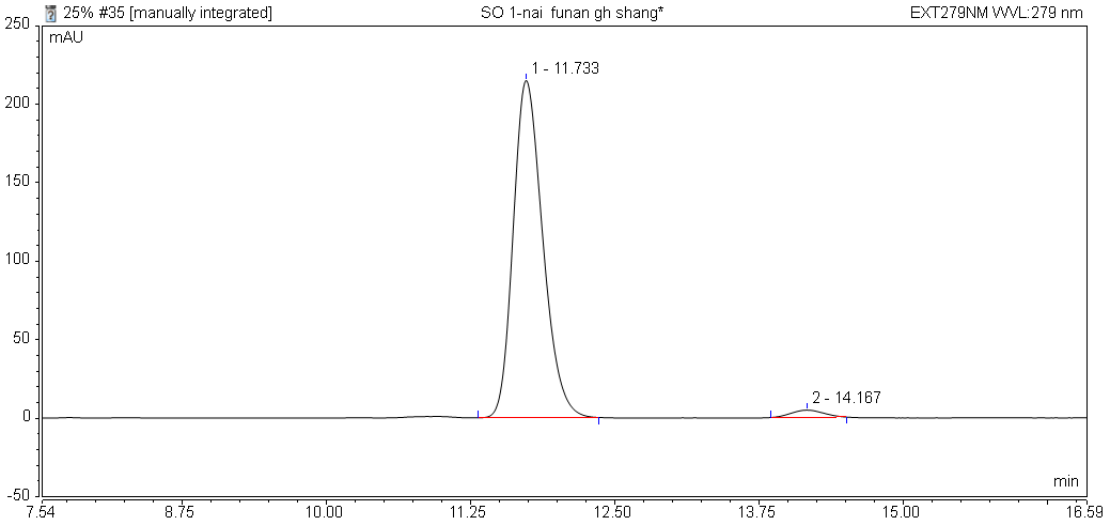
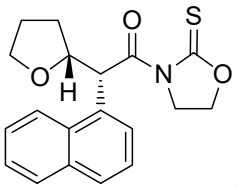


Integration Results					
No.	Peak Name	Retention Time min	Area mAU*min	Relative Area %	Amount n.a.
1		11.863	126.149	50.15	n.a.
2		14.400	125.414	49.85	n.a.
Total:			**251.562**	**100.00**	



Integration Results					
No.	Peak Name	Retention Time min	Area mAU*min	Relative Area %	Amount n.a.
1		11.733	63.852	98.03	n.a.
2		14.167	1.284	1.97	n.a.
Total:			**65.136**	**100.00**	



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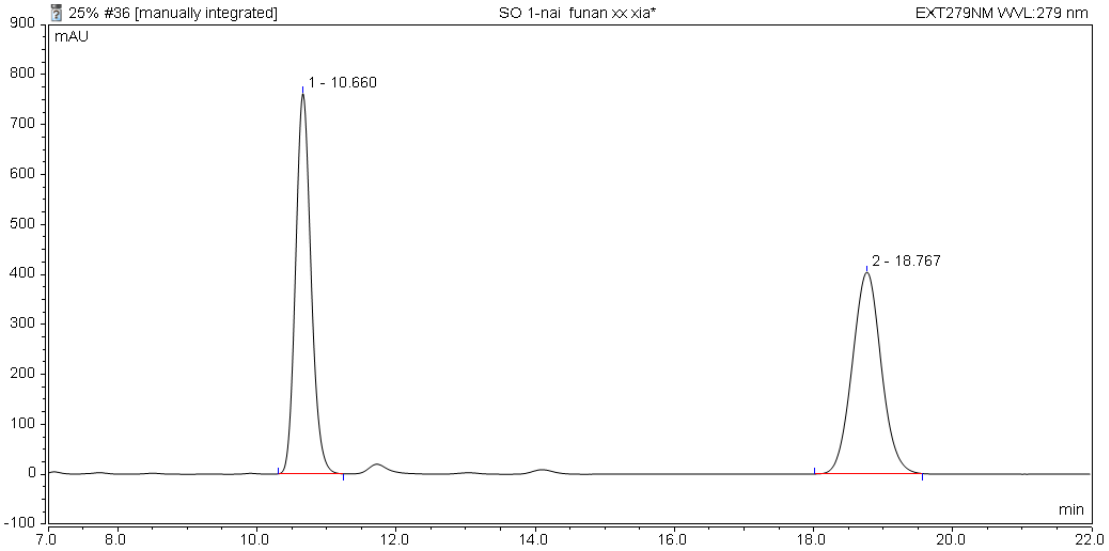
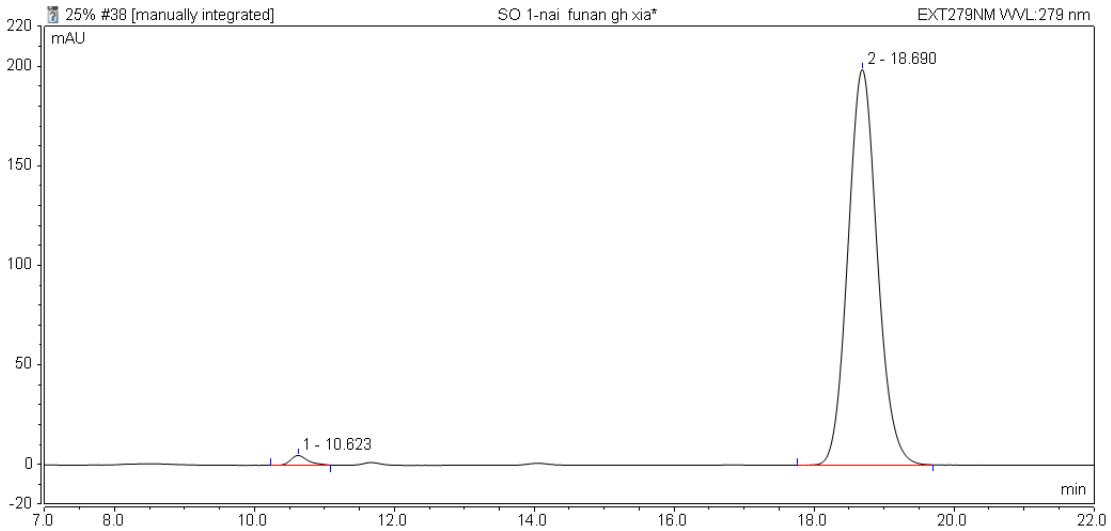
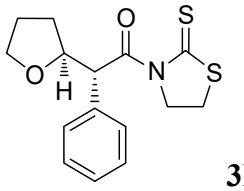


Integration Results					
No.	Peak Name	Retention Time min	Area mAU*min	Relative Area %	Amount n.a.
1		10.660	193.042	50.10	n.a.
2		18.767	192.302	49.90	n.a.
Total:			**385.345**	**100.00**	



Integration Results					
No.	Peak Name	Retention Time min	Area mAU*min	Relative Area %	Amount n.a.
1		10.623	1.322	1.35	n.a.
2		18.690	96.589	98.65	n.a.
Total:			**97.911**	**100.00**	



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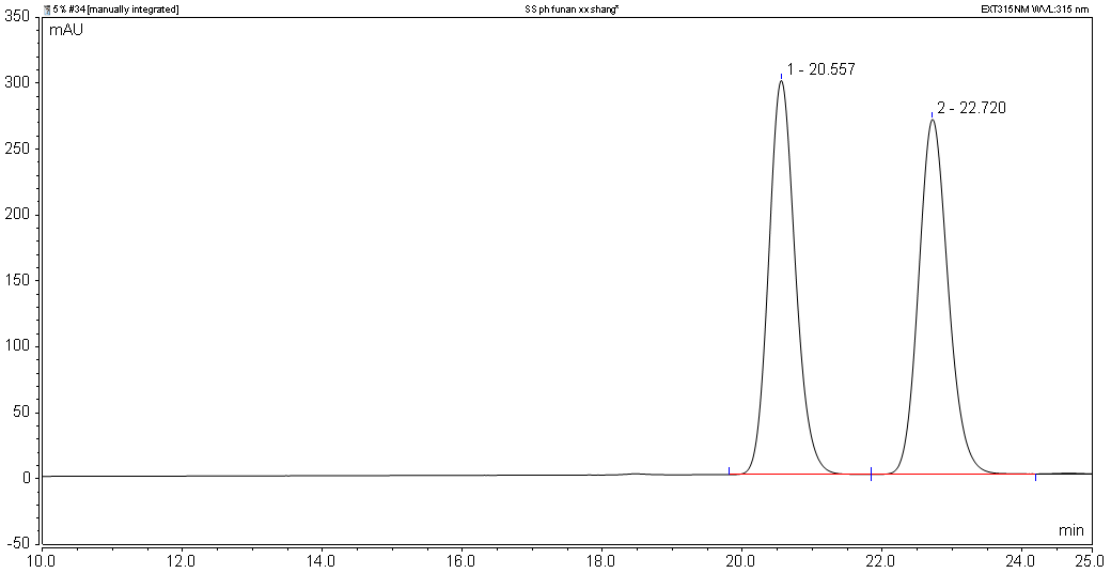
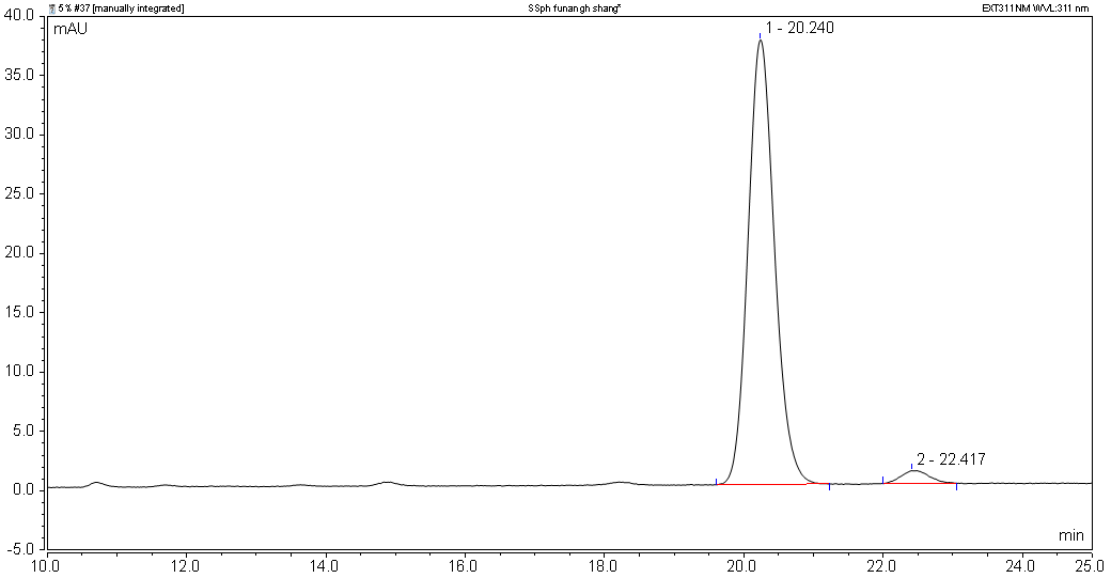
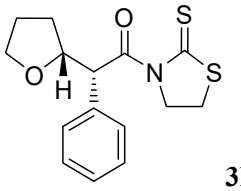


No.	Peak Name	Retention Time min	Area mAU*min	Relative Area %	Amount n.a.
1		20.557	131.955	50.00	n.a.
2		22.720	131.971	50.00	n.a.
Total:			**263.926**	**100.00**	



Integration Results					
No.	Peak Name	Retention Time min	Area mAU*min	Relative Area %	Amount n.a.
1		20.240	16.582	97.49	n.a.
2		22.417	0.428	2.51	n.a.
Total:			**17.010**	**100.00**	



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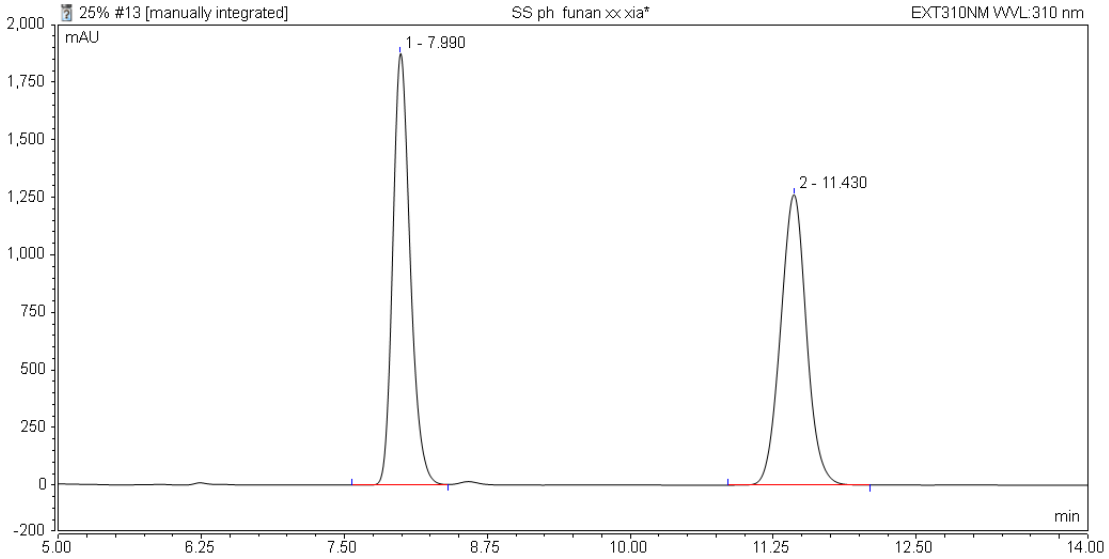
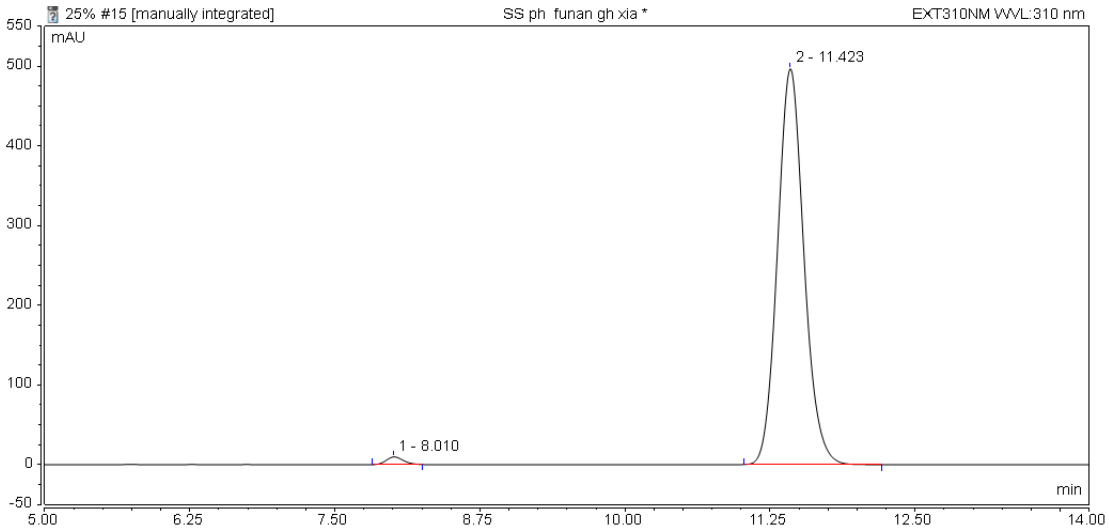
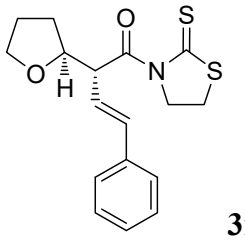


Integration Results					
No.	Peak Name	Retention Time min	Area mAU*min	Relative Area %	Amount n.a.
1		7.990	332.454	50.04	n.a.
2		11.430	331.978	49.96	n.a.
Total:			**664.431**	**100.00**	



Integration Results					
No.	Peak Name	Retention Time min	Area mAU*min	Relative Area %	Amount n.a.
1		8.010	1.747	1.31	n.a.
2		11.423	131.394	98.69	n.a.
Total:			**133.141**	**100.00**	



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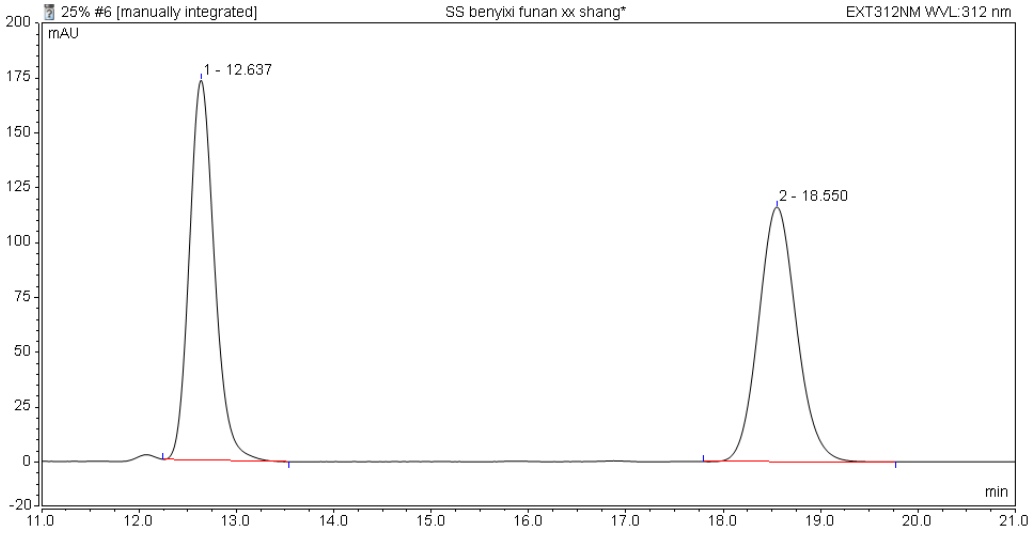
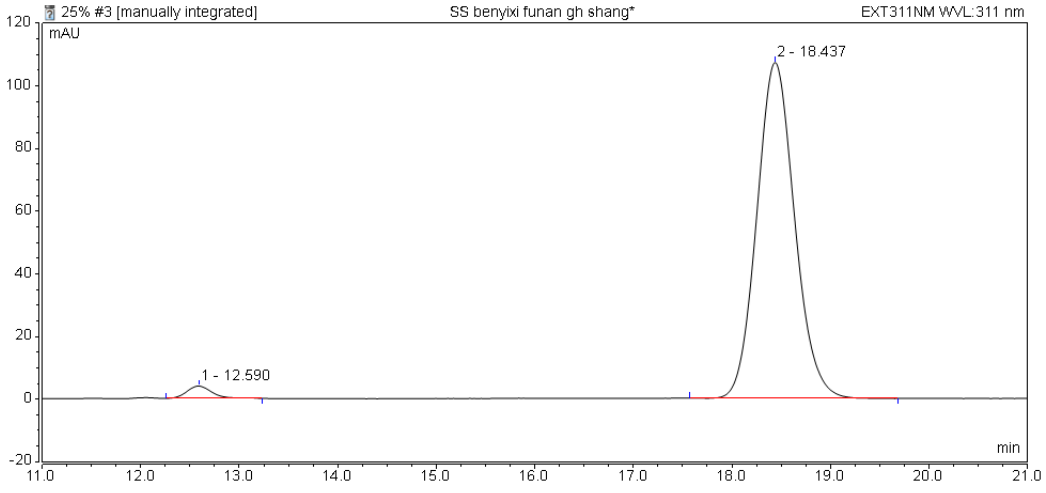
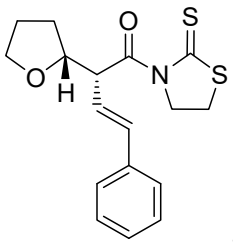


Integration Results					
No.	Peak Name	Retention Time min	Area mAU*min	Relative Area %	Amount n.a.
1		12.637	52.320	49.94	n.a.
2		18.550	52.437	50.06	n.a.
Total:			**104.757**	**100.00**	



Integration Results					
No.	Peak Name	Retention Time min	Area mAU*min	Relative Area %	Amount n.a.
1		12.590	1.226	2.51	n.a.
2		18.437	47.651	97.49	n.a.
Total:			**48.877**	**100.00**	



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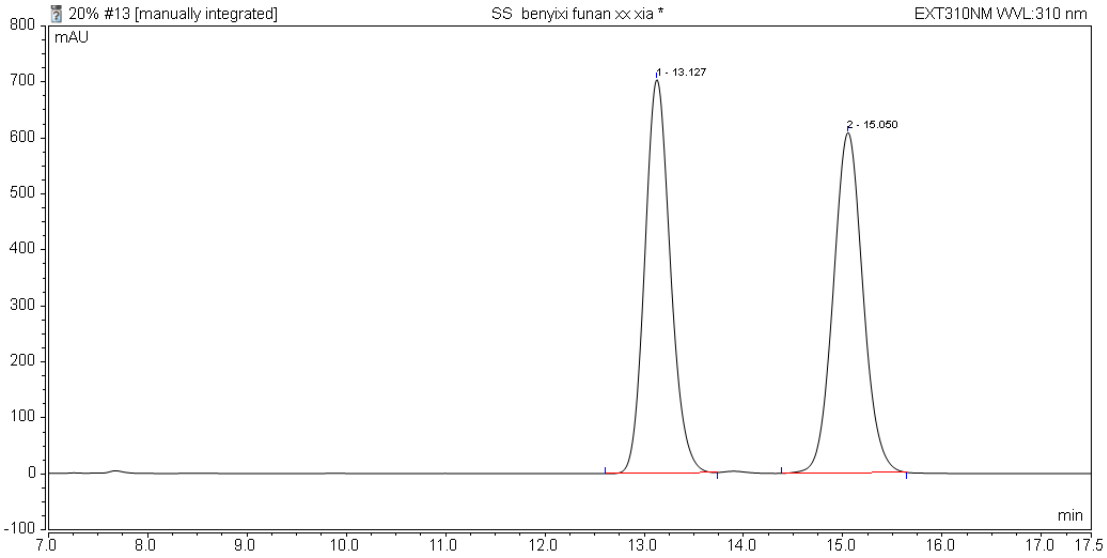
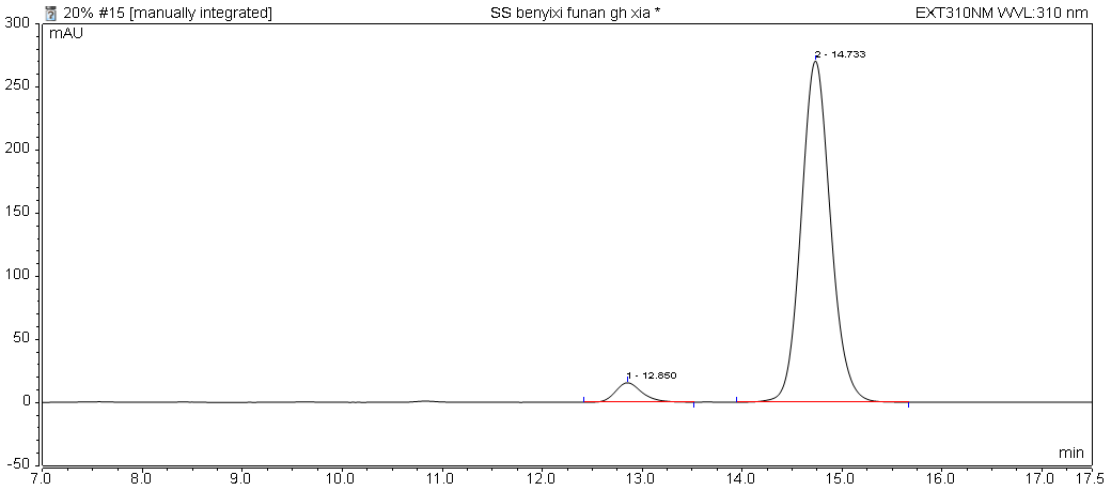
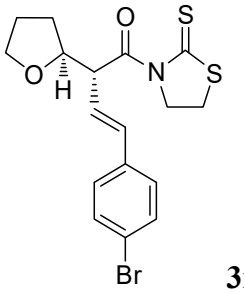


Integration Results					
No.	Peak Name	Retention Time min	Area mAU*min	Relative Area %	Amount n.a.
1		13.127	210.494	49.77	n.a.
2		15.050	212.466	50.23	n.a.
Total:			**422.960**	**100.00**	



Integration Results					
No.	Peak Name	Retention Time min	Area mAU*min	Relative Area %	Amount n.a.
1		12.850	4.768	4.91	n.a.
2		14.733	92.277	95.09	n.a.
Total:			**97.045**	**100.00**	



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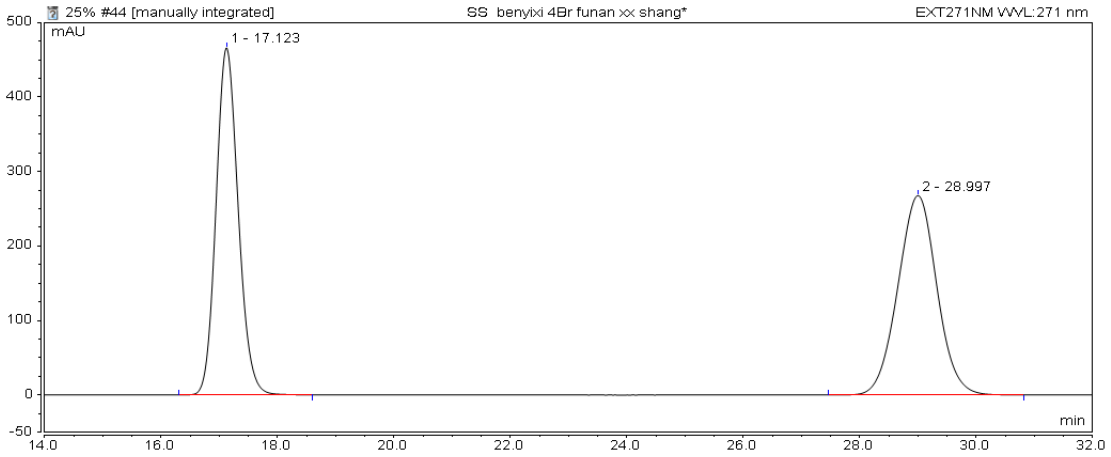
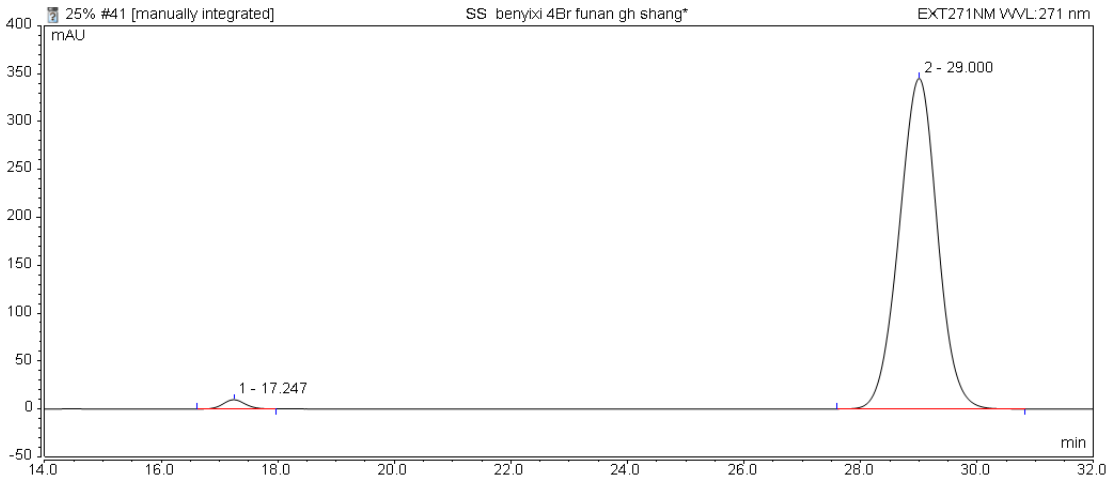
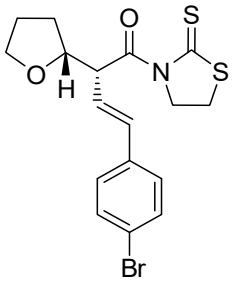


Integration Results					
No.	Peak Name	Retention Time min	Area mAU*min	Relative Area %	Amount n.a.
1		17.123	202.132	49.72	n.a.
2		28.997	204.396	50.28	n.a.
Total:			**406.528**	**100.00**	



Integration Results					
No.	Peak Name	Retention Time min	Area mAU*min	Relative Area %	Amount n.a.
1		17.247	4.227	1.58	n.a.
2		29.000	262.548	98.42	n.a.
Total:			**266.774**	**100.00**	



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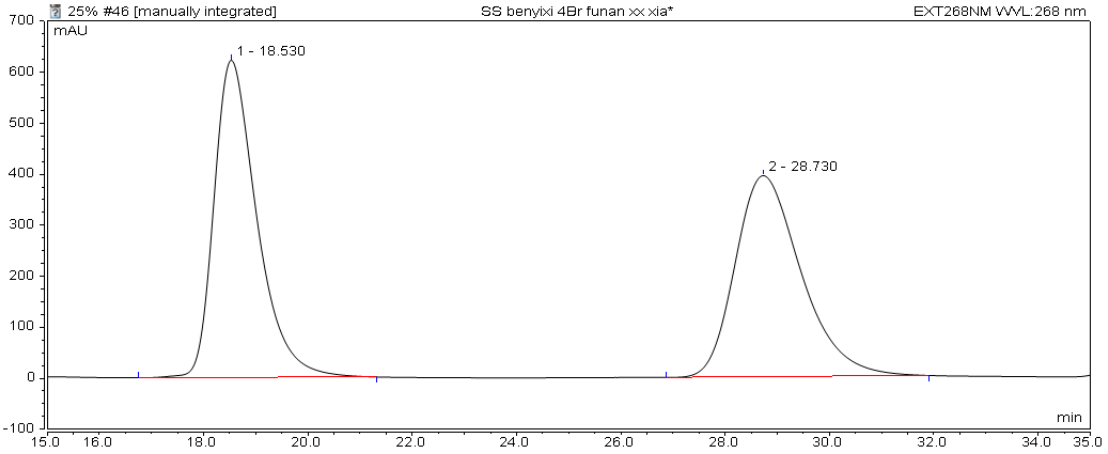
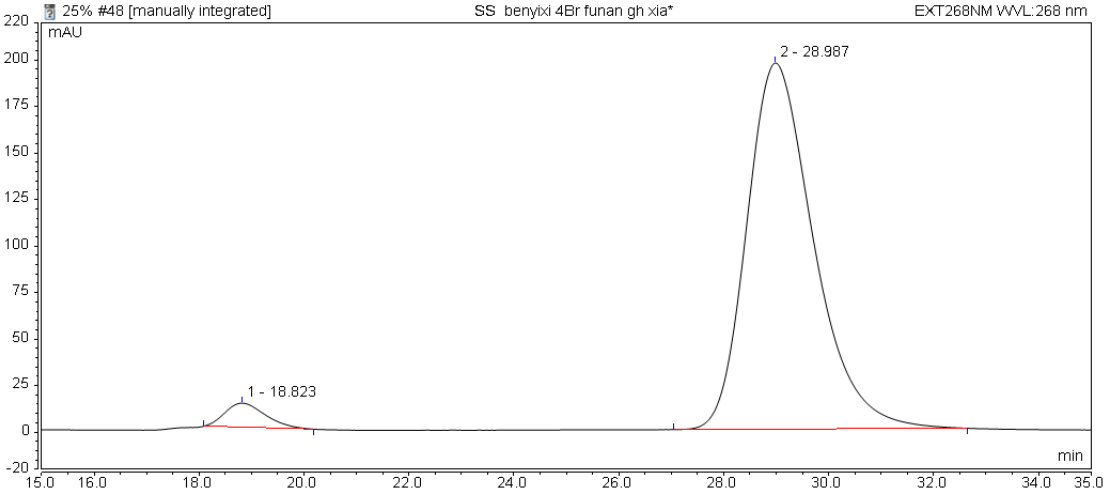
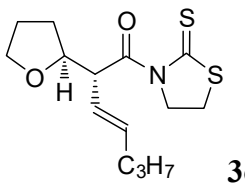


Integration Results					
No.	Peak Name	Retention Time min	Area mAU*min	Relative Area %	Amount n.a.
1		18.530	588.280	50.37	n.a.
2		28.730	579.653	49.63	n.a.
Total:			**1167.933**	**100.00**	



Integration Results					
No.	Peak Name	Retention Time min	Area mAU*min	Relative Area %	Amount n.a.
1		18.823	11.474	3.79	n.a.
2		28.987	291.192	96.21	n.a.
Total:			**302.666**	**100.00**	



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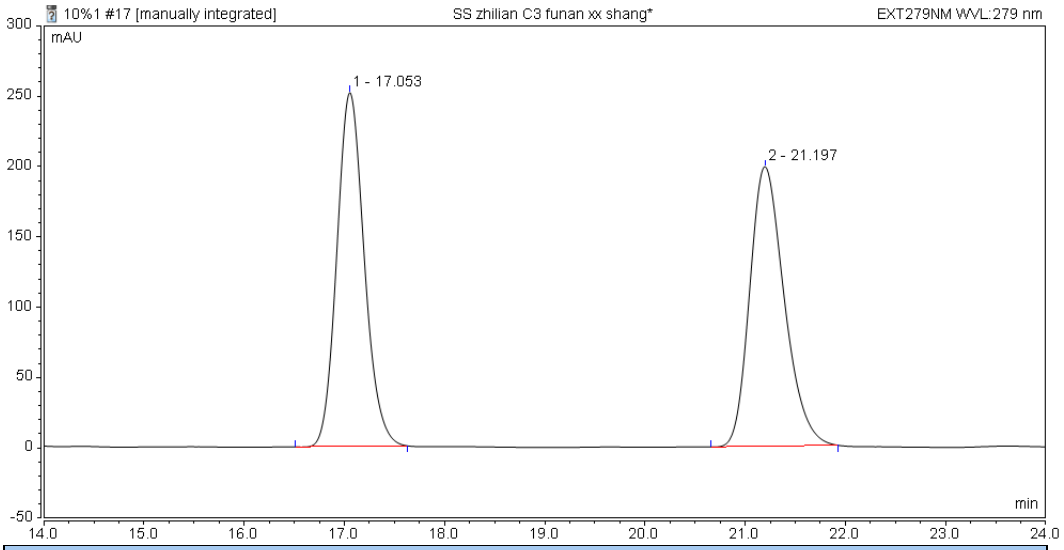
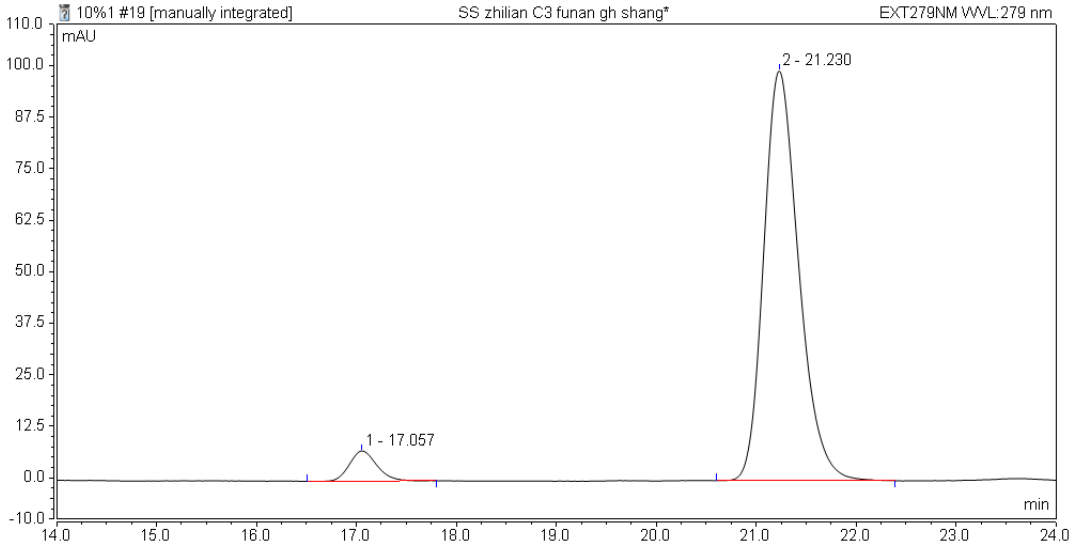
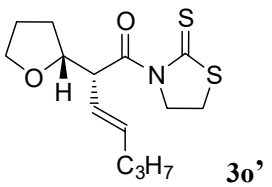


Integration Results					
No.	Peak Name	Retention Time min	Area mAU*min	Relative Area %	Amount n.a.
1		17.053	66.082	49.77	n.a.
2		21.197	66.699	50.23	n.a.
Total:			**132.781**	**100.00**	



Integration Results					
No.	Peak Name	Retention Time min	Area mAU*min	Relative Area %	Amount n.a.
1		17.057	2.094	4.93	n.a.
2		21.230	40.375	95.07	n.a.
Total:			**42.469**	**100.00**	



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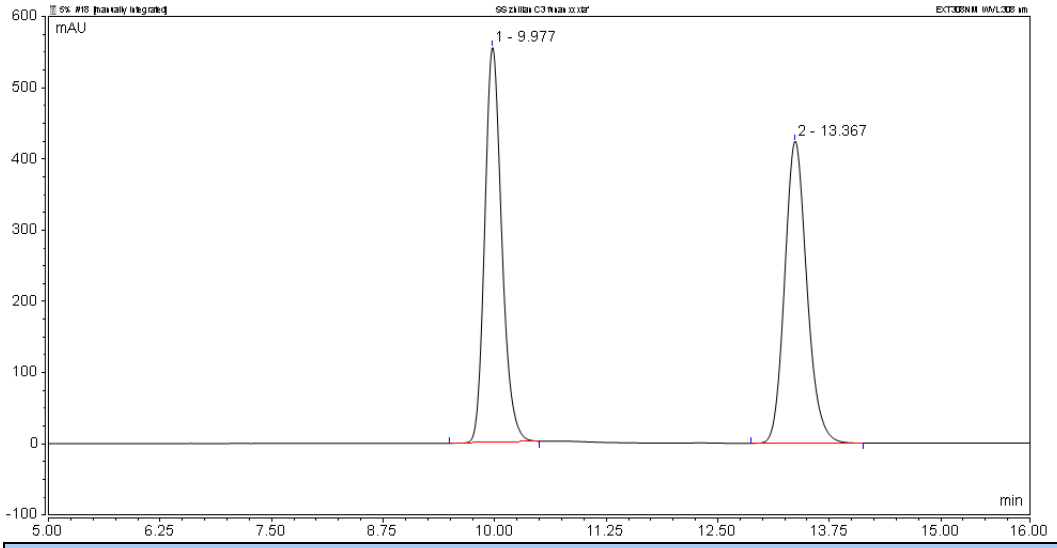
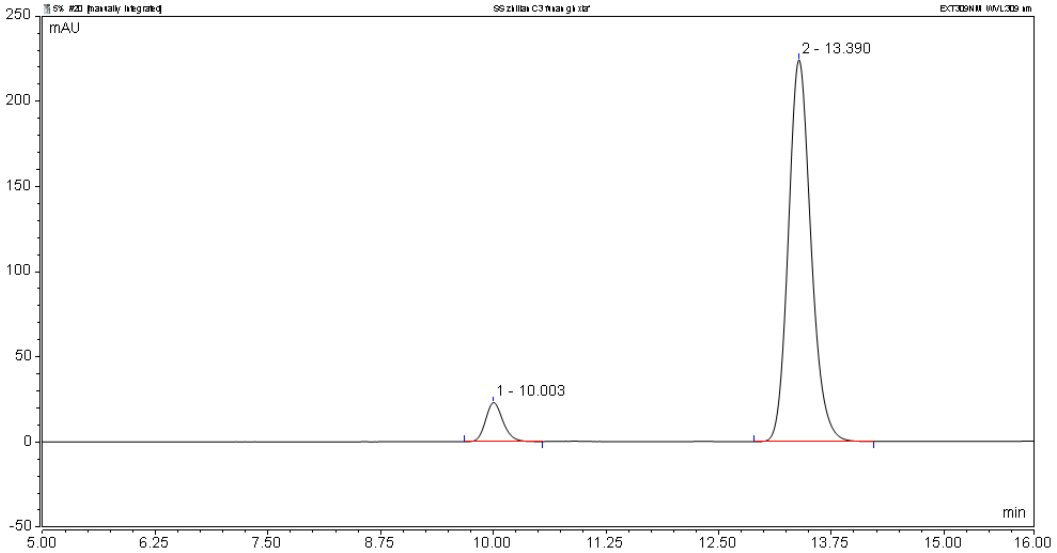
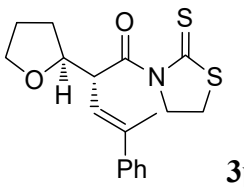


Integration Results					
No.	Peak Name	Retention Time min	Area mAU*min	Relative Area %	Amount n.a.
1		9.977	122.683	50.01	n.a.
2		13.367	122.631	49.99	n.a.
Total:			**245.315**	**100.00**	



Integration Results					
No.	Peak Name	Retention Time min	Area mAU*min	Relative Area %	Amount n.a.
1		10.003	5.147	7.31	n.a.
2		13.390	65.233	92.69	n.a.
Total:			**70.380**	**100.00**	



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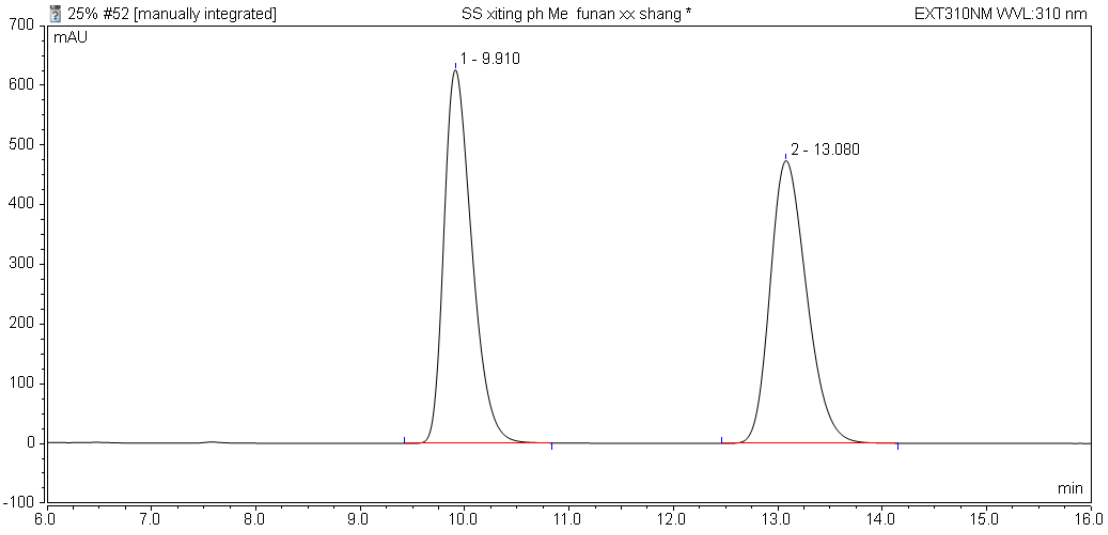
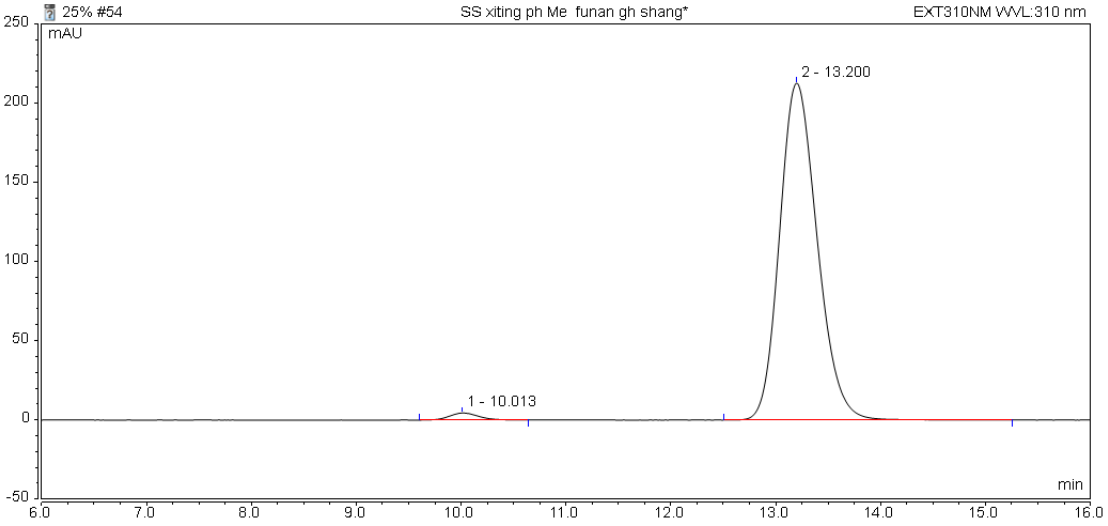
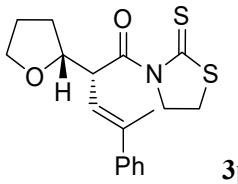


Integration Results					
No.	Peak Name	Retention Time min	Area mAU*min	Relative Area %	Amount n.a.
1		9.910	194.347	50.29	n.a.
2		13.080	192.091	49.71	n.a.
Total:			**386.438**	**100.00**	



Integration Results					
No.	Peak Name	Retention Time min	Area mAU*min	Relative Area %	Amount n.a.
1		10.013	1.464	1.63	n.a.
2		13.200	88.322	98.37	n.a.
Total:			**89.786**	**100.00**	



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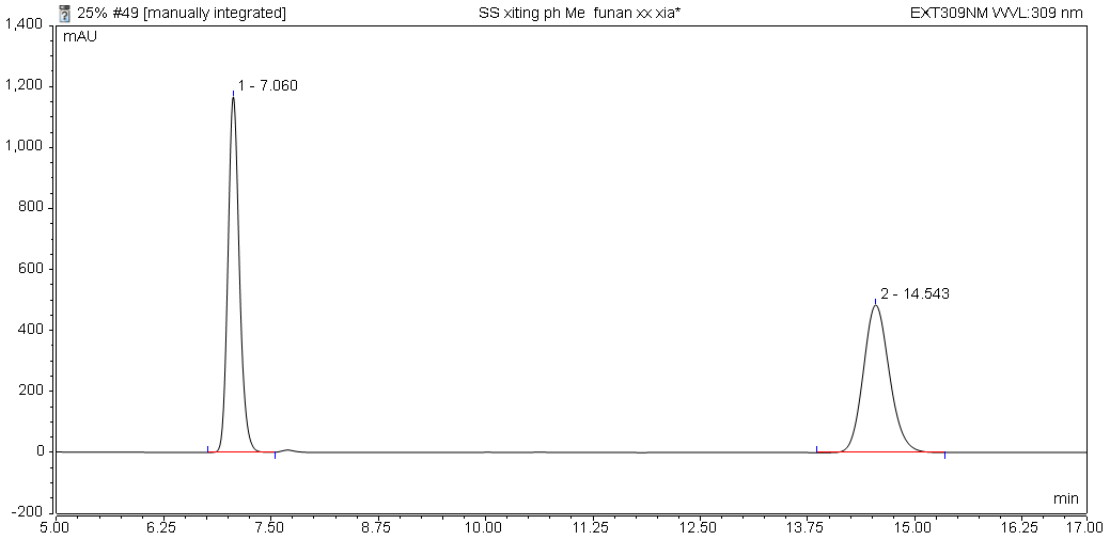
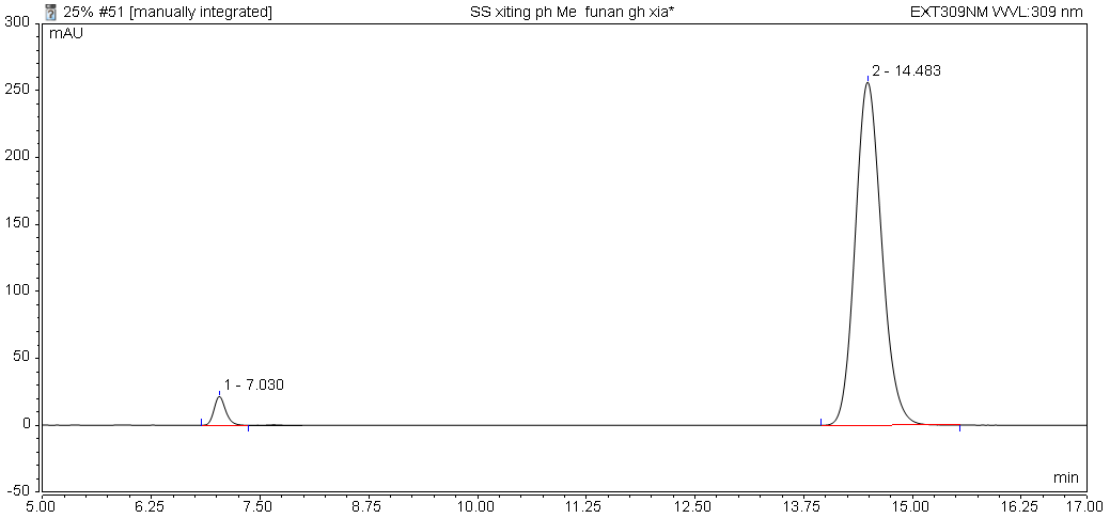
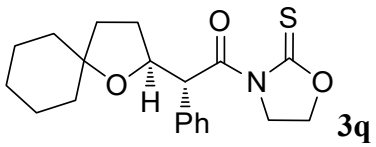


Integration Results					
No.	Peak Name	Retention Time min	Area mAU*min	Relative Area %	Amount n.a.
1		7.060	177.028	50.90	n.a.
2		14.543	170.754	49.10	n.a.
Total:			**347.782**	**100.00**	



Integration Results					
No.	Peak Name	Retention Time min	Area mAU*min	Relative Area %	Amount n.a.
1		7.030	3.353	3.57	n.a.
2		14.483	90.660	96.43	n.a.
Total:			**94.013**	**100.00**	



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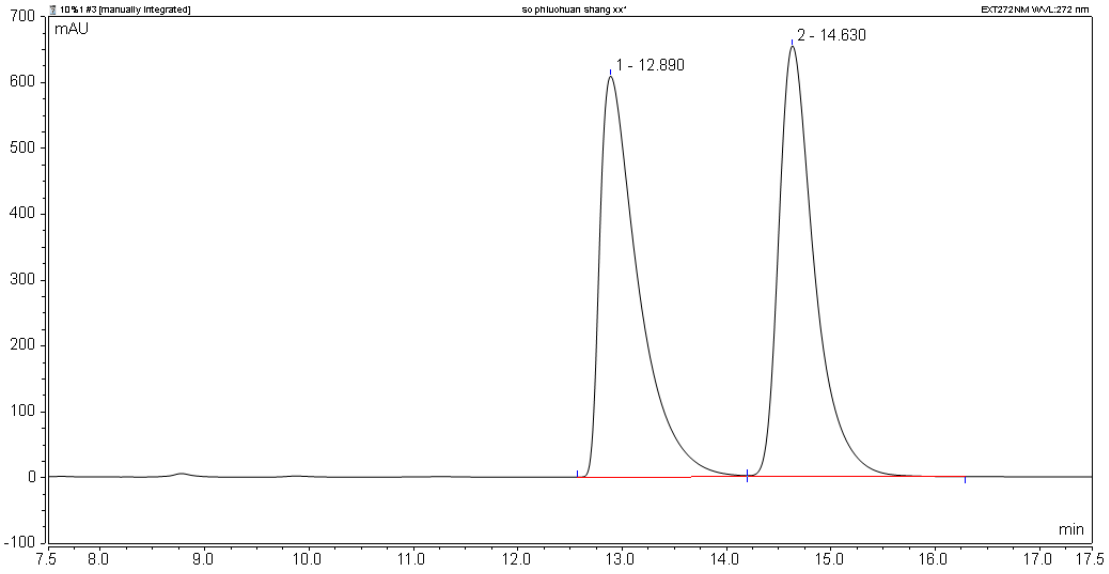
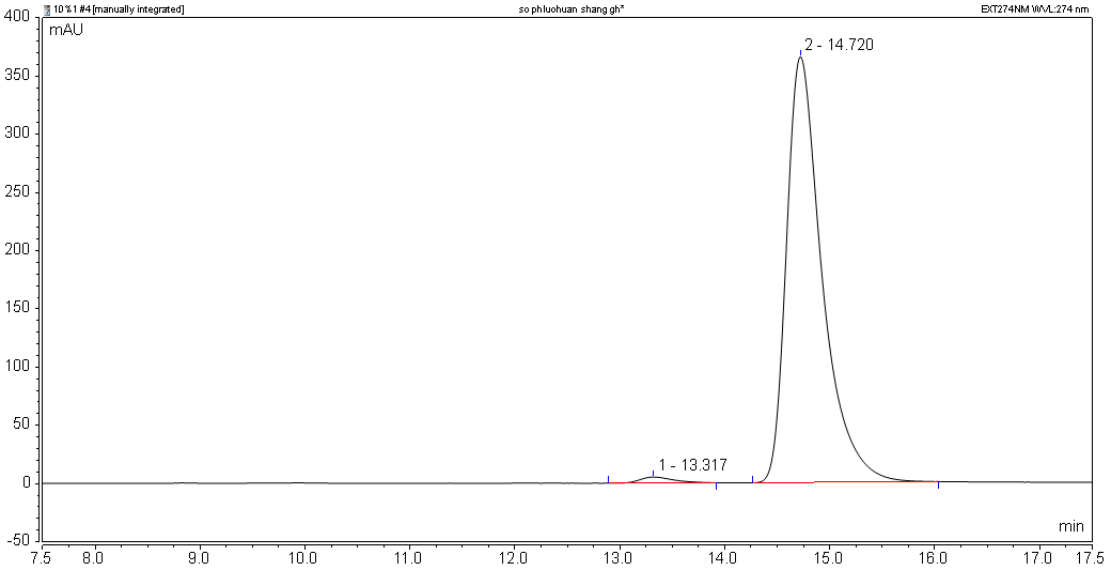
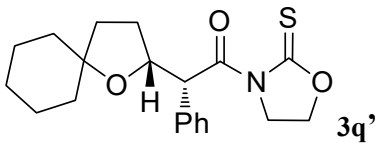


Integration Results					
No.	Peak Name	Retention Time min	Area mAU*min	Relative Area %	Amount n.a.
1		12.890	259.853	50.00	n.a.
2		14.630	259.880	50.00	n.a.
Total:			**519.734**	**100.00**	



Integration Results					
No.	Peak Name	Retention Time min	Area mAU*min	Relative Area %	Amount n.a.
1		13.317	2.023	1.37	n.a.
2		14.720	145.230	98.63	n.a.
Total:			**147.253**	**100.00**	



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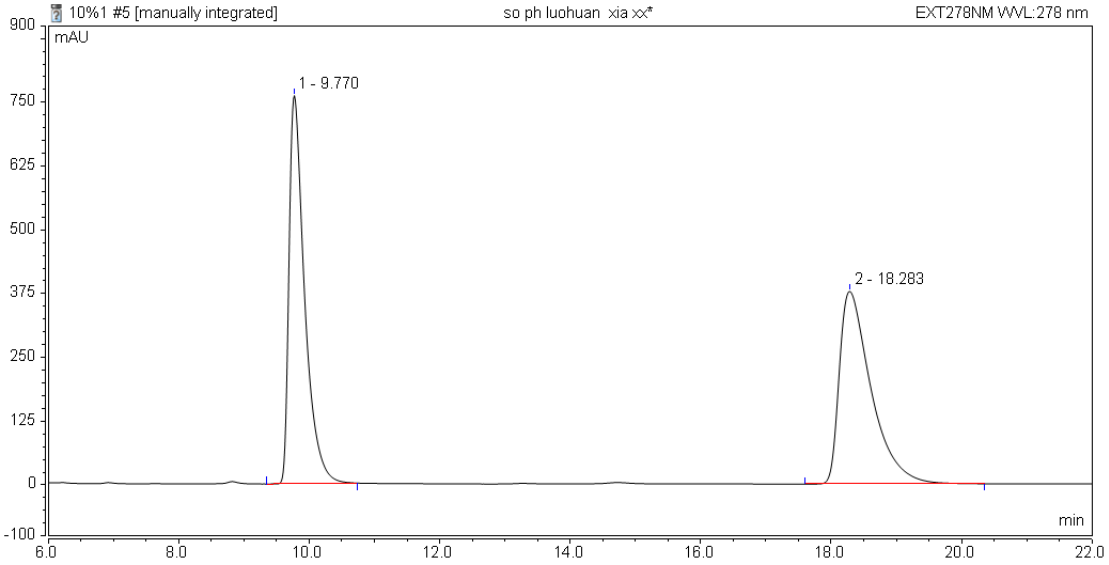
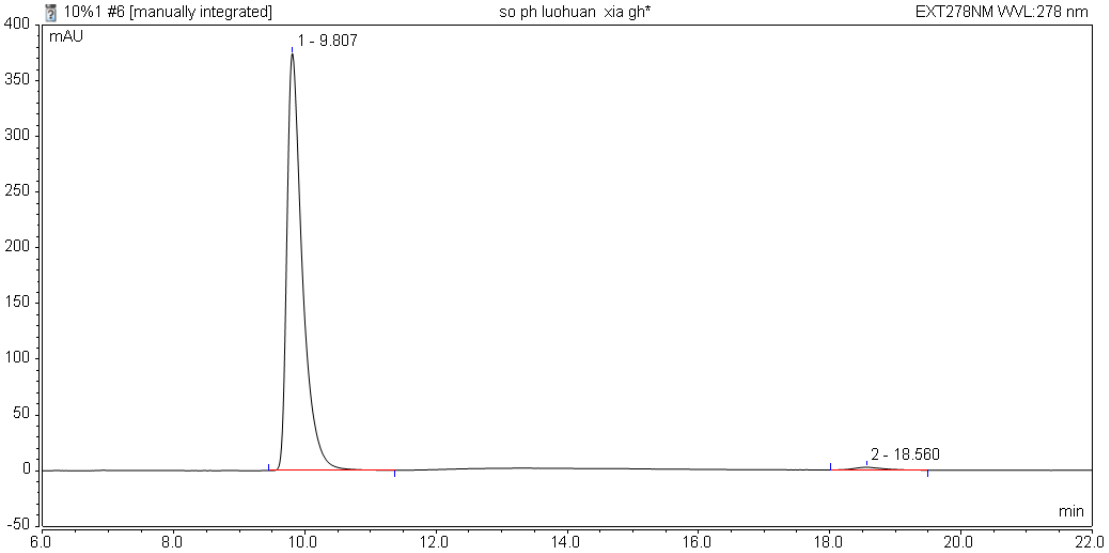
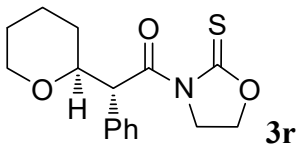


Integration Results					
No.	Peak Name	Retention Time min	Area mAU*min	Relative Area %	Amount n.a.
1		9.770	186.055	49.85	n.a.
2		18.283	187.141	50.15	n.a.
Total:			**373.196**	**100.00**	



Integration Results					
No.	Peak Name	Retention Time min	Area mAU*min	Relative Area %	Amount n.a.
1		9.807	102.406	98.77	n.a.
2		18.560	1.278	1.23	n.a.
Total:			**103.684**	**100.00**	



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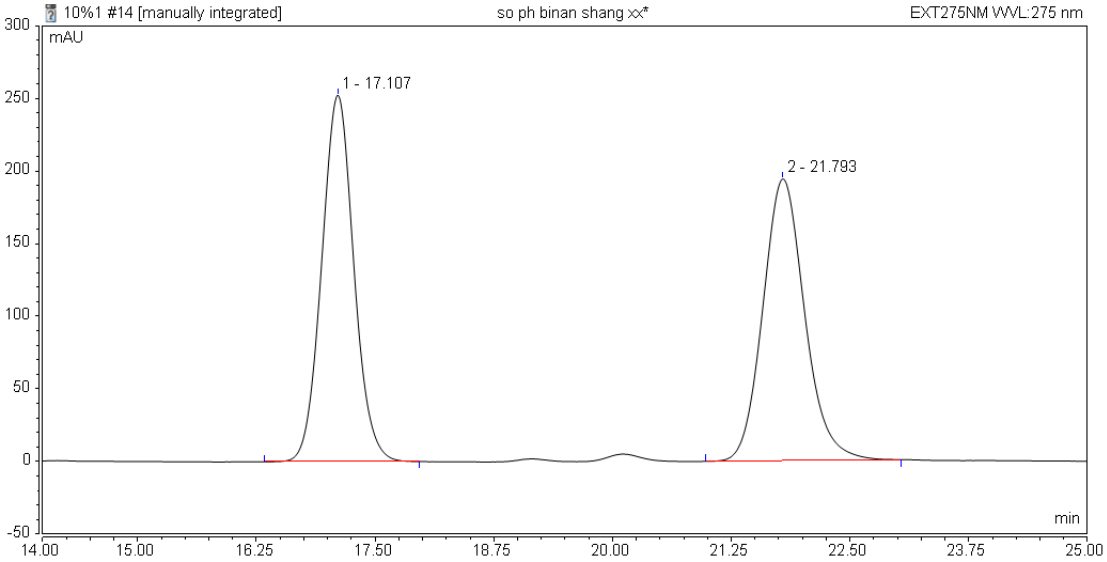
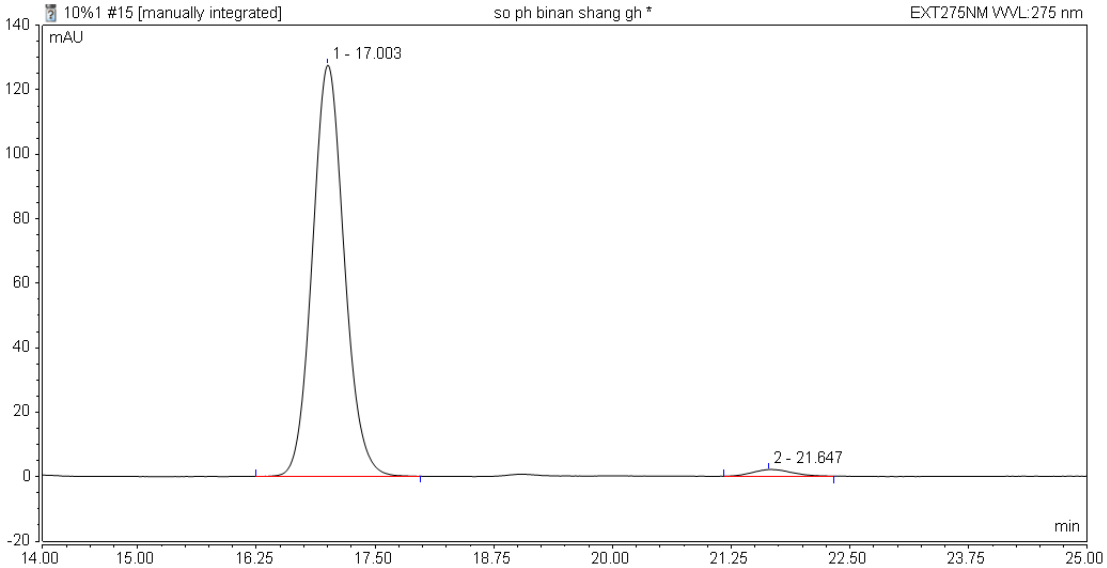
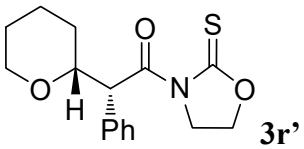


Integration Results					
No.	Peak Name	Retention Time min	Area mAU*min	Relative Area %	Amount n.a.
1		17.107	99.570	49.77	n.a.
2		21.793	100.478	50.23	n.a.
Total:			**200.049**	**100.00**	



Integration Results					
No.	Peak Name	Retention Time min	Area mAU*min	Relative Area %	Amount n.a.
1		17.003	49.649	98.09	n.a.
2		21.647	0.964	1.91	n.a.
Total:			**50.613**	**100.00**	



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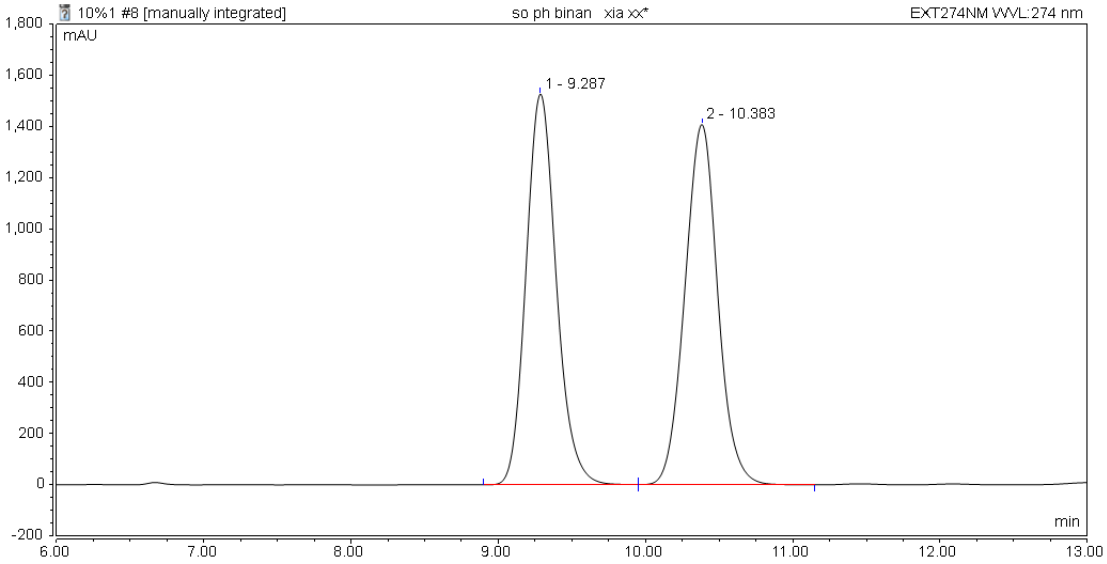
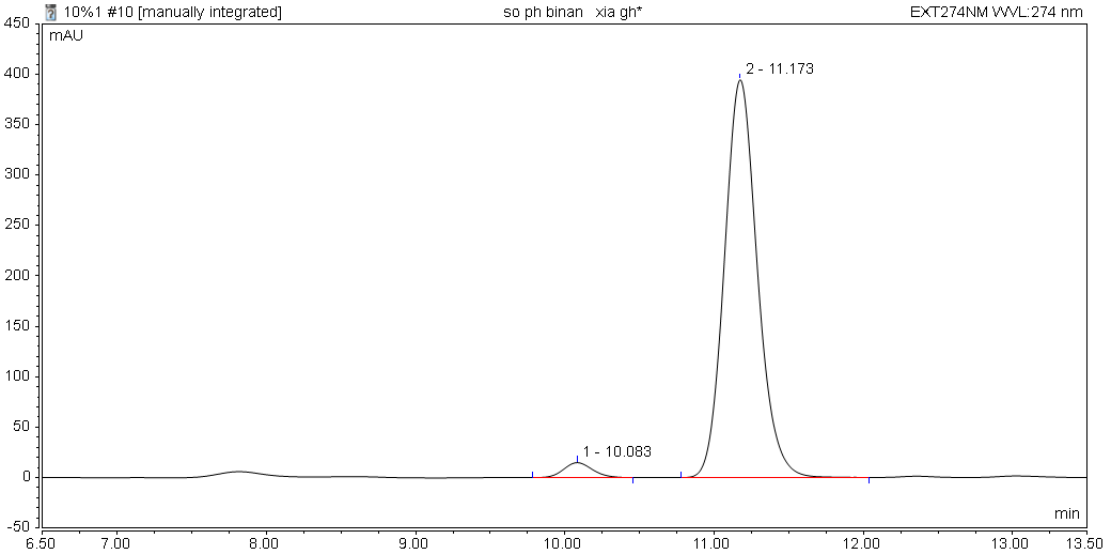
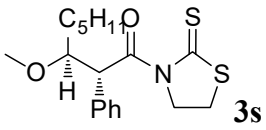


Integration Results					
No.	Peak Name	Retention Time min	Area mAU*min	Relative Area %	Amount n.a.
1		9.287	298.565	49.99	n.a.
2		10.383	298.704	50.01	n.a.
Total:			**597.269**	**100.00**	



Integration Results					
No.	Peak Name	Retention Time min	Area mAU*min	Relative Area %	Amount n.a.
1		10.083	3.289	3.16	n.a.
2		11.173	100.911	96.84	n.a.
Total:			**104.200**	**100.00**	



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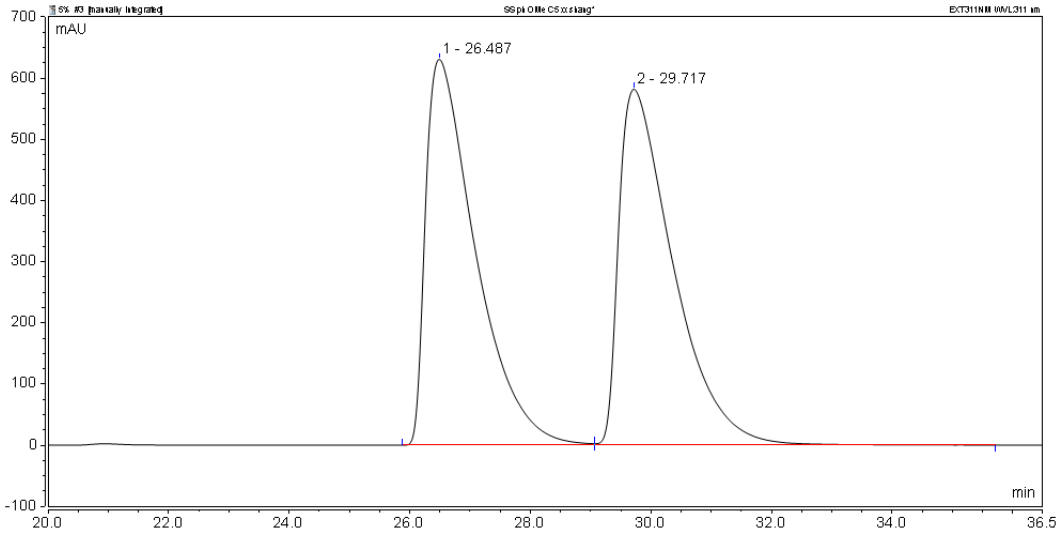
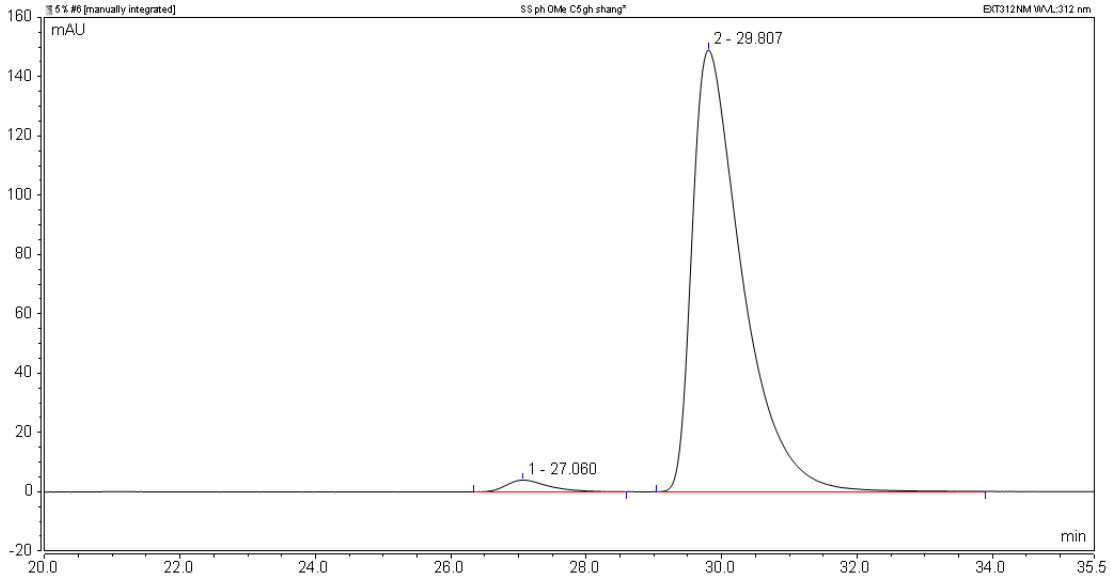
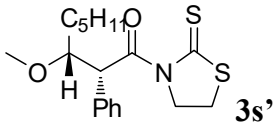


Integration Results					
No.	Peak Name	Retention Time min	Area mAU*min	Relative Area %	Amount n.a.
1		26.487	601.684	49.98	n.a.
2		29.717	602.223	50.02	n.a.
Total:			**1203.907**	**100.00**	



Integration Results					
No.	Peak Name	Retention Time min	Area mAU*min	Relative Area %	Amount n.a.
1		27.060	2.848	2.22	n.a.
2		29.807	125.491	97.78	n.a.
Total:			**128.340**	**100.00**	



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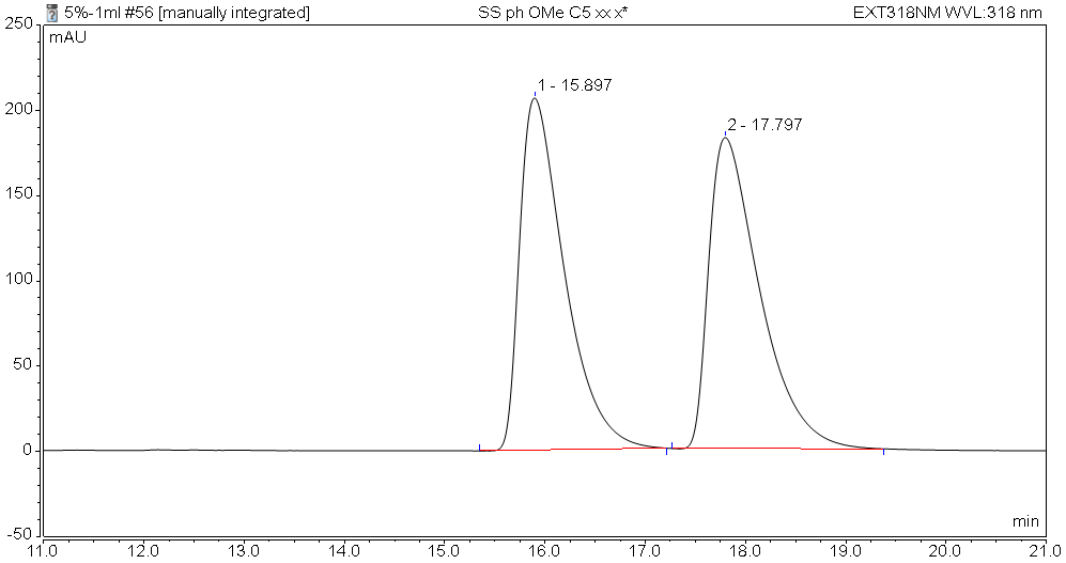
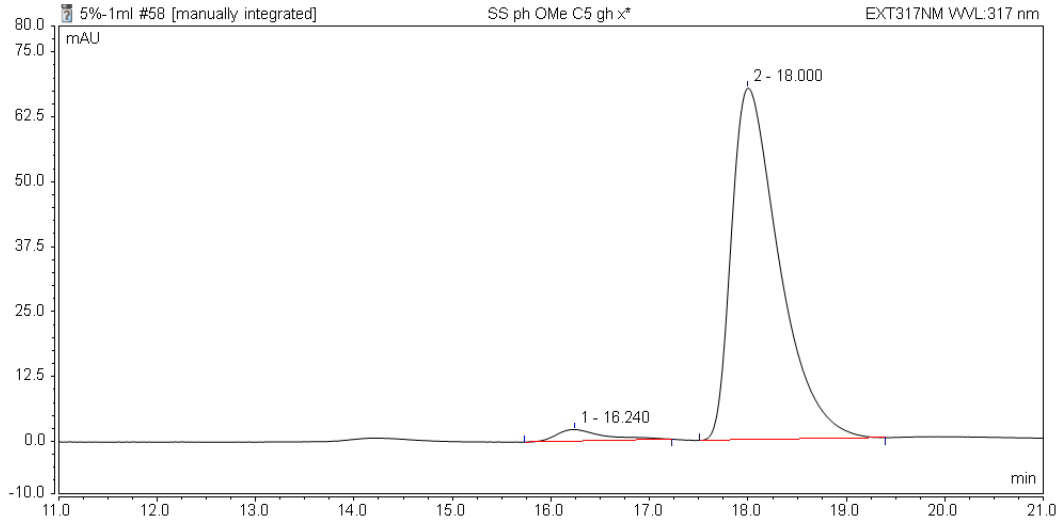
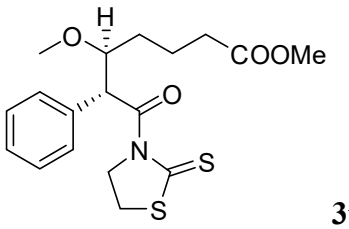


Integration Results					
No.	Peak Name	Retention Time min	Area mAU*min	Relative Area %	Amount n.a.
1		15.897	135.206	49.61	n.a.
2		17.797	137.347	50.39	n.a.
Total:			**272.553**	**100.00**	



Integration Results					
No.	Peak Name	Retention Time min	Area mAU*min	Relative Area %	Amount n.a.
1		16.240	1.267	3.24	n.a.
2		18.000	37.878	96.76	n.a.
Total:			**39.145**	**100.00**	



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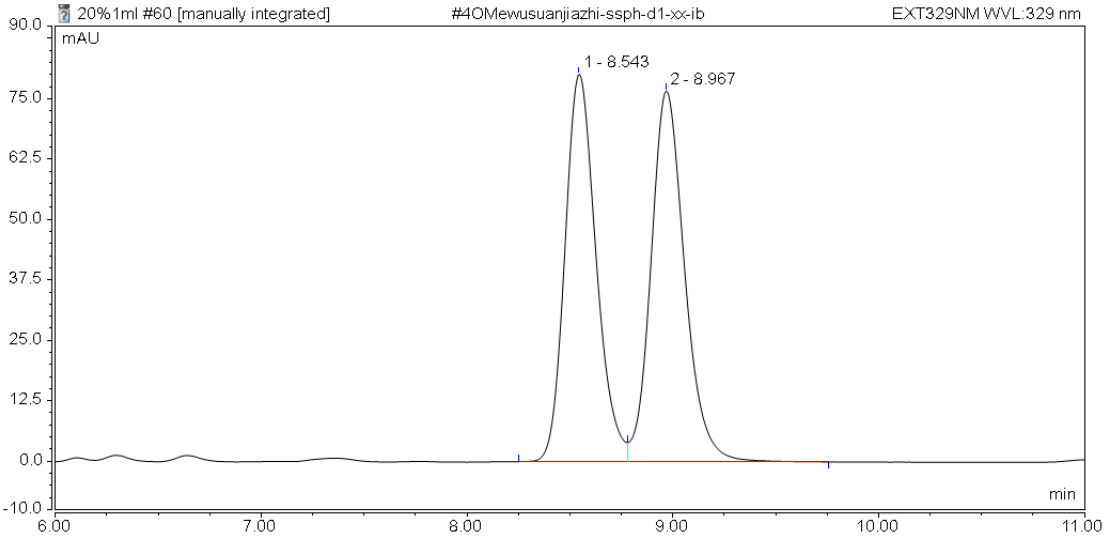
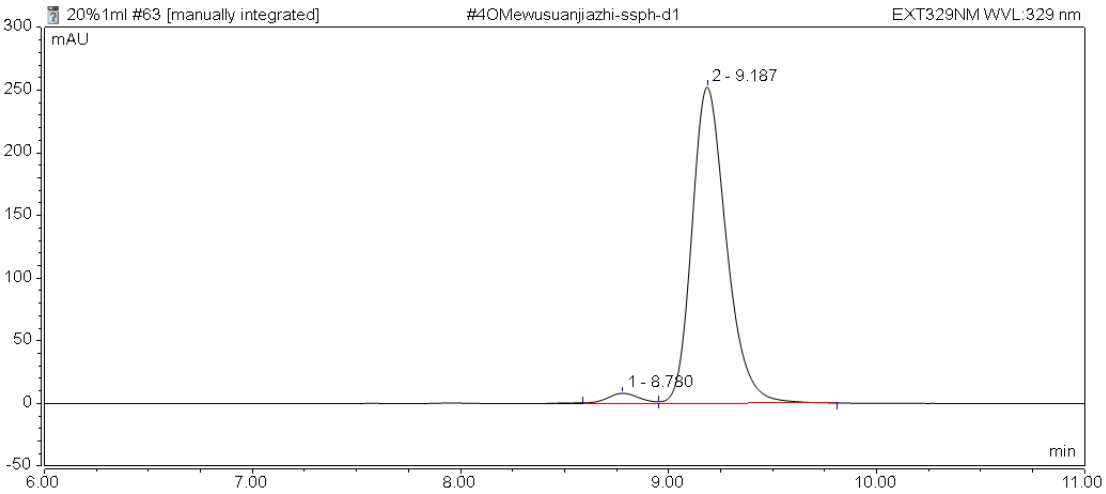
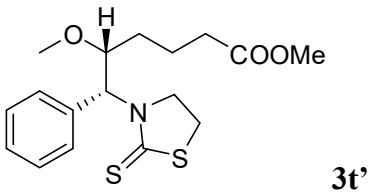


Integration Results					
No.	Peak Name	Retention Time min	Area mAU*min	Relative Area %	Amount n.a.
1		8.543	42.316	49.22	n.a.
2		8.967	43.655	50.78	n.a.
Total:			**85.971**	**100.00**	



Integration Results					
No.	Peak Name	Retention Time min	Area mAU*min	Relative Area %	Amount n.a.
1		8.780	1.476	2.95	n.a.
2		9.187	48.607	97.05	n.a.
Total:			**50.083**	**100.00**	



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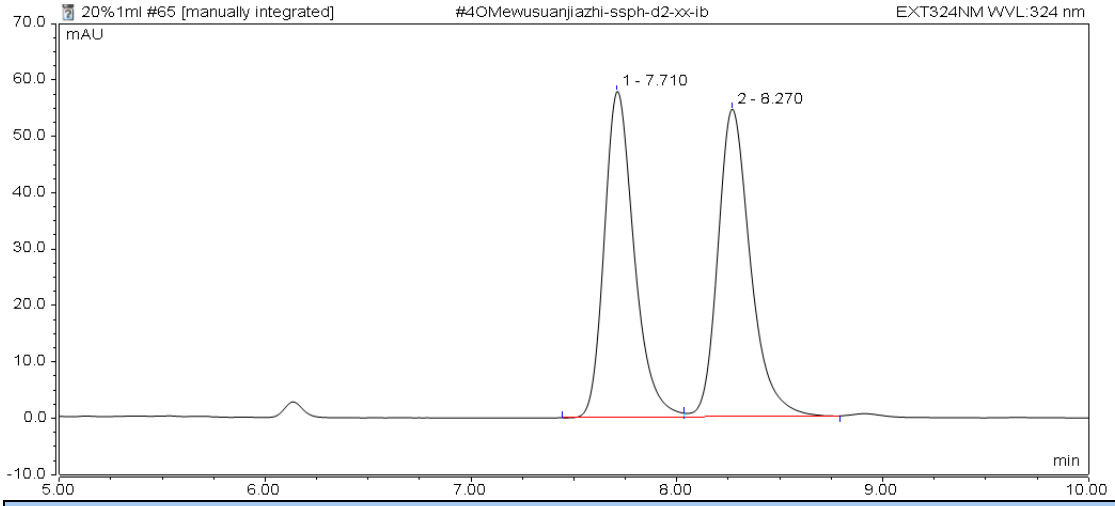
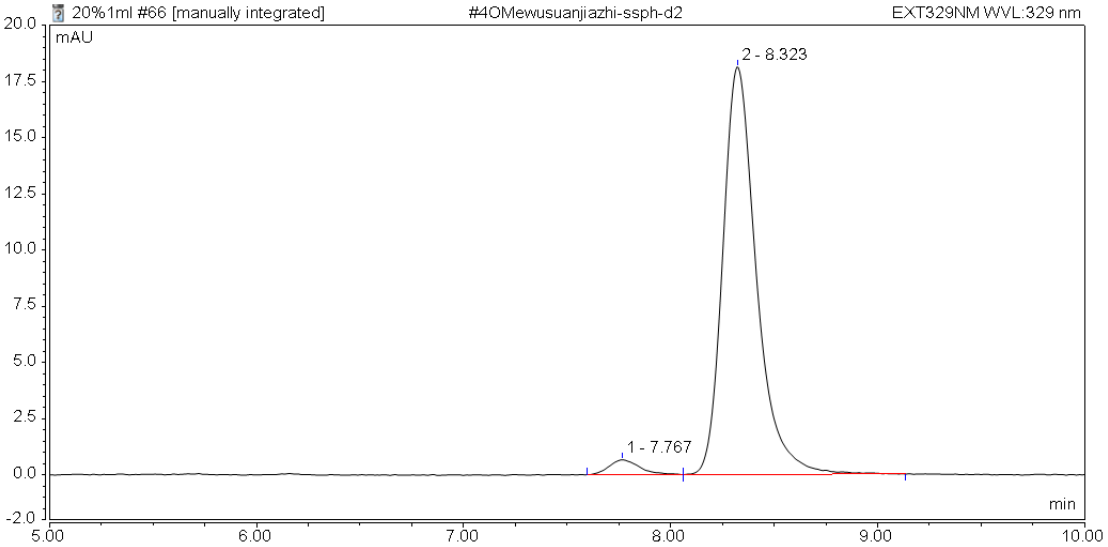


Integration Results					
No.	Peak Name	Retention Time min	Area mAU*min	Relative Area %	Amount n.a.
1		7.710	9.705	49.30	n.a.
2		8.270	9.981	50.70	n.a.
Total:			**19.686**	**100.00**	



Integration Results					
No.	Peak Name	Retention Time min	Area mAU*min	Relative Area %	Amount n.a.
1		7.767	0.264	3.19	n.a.
2		8.323	8.010	96.81	n.a.
Total:			**8.274**	**100.00**	