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Highly Enantioselective [3+3]- Cycloaddition with Nitrones Catalyzed by Copper(I) with Chiral Box Ligands *via* *Z*-γ-Substituted Metallo-enolcarbene Intermediates

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Supporting Information

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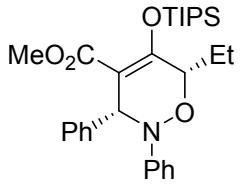
1. General Information.

Unless otherwise noted, all reactions were performed in 10 mL oven-dried (120 °C) glassware under a dinitrogen atmosphere. Solvents were dried using a JC Meyer solvent purification system. Analytical thin-layer chromatography was performed using glass plates pre-coated with 200−300 mesh silica gel impregnated with a fluorescent indicator (254 nm). Column chromatography was performed on CombiFlash® Rf200 and Rf+ purification systems using normal phase silica gel columns (300−400 mesh). High-resolution mass spectra (HRMS) were performed on a Bruker MicroTOF-ESI mass spectrometer with an ESI resource using CsI or LTQ ESI Positive Ion Calibration Solution as the standard. Accurate masses were reported for the molecular ions $[M+H]^+$. ^1H and ^{13}C NMR spectra were recorded on Bruker 300 MHz and 500 MHz spectrometers. ^1H NMR spectra were recorded in $CDCl_3$ at 300 or 500 MHz with residual $CHCl_3$ (δ 7.26 ppm) and H_2O (δ 1.56 ppm). Chemical shifts are reported in ppm with the residual solvent signals as reference, and coupling constants (*J*) are given in Hertz. Peak information is described as: s = singlet, d = doublet, dd = doublet of doublets, td = triplet of doublets, t = triplet, m = multiplet, comp = composite of magnetically non-equivalent protons. ^{13}C NMR spectra were recorded in $CDCl_3$ at 75 or 126 MHz with the central resonance of $CDCl_3$ of δ 77.16 ppm. Enantiomeric excess HPLC analyses were carried out at 25 °C on Agilent 1260 Infinity HPLC System. Chiralpak AD-H (0.46 mm x 250 mm), Chiralcel OD-H (0.46 mm x 250 mm), Chiralpak IC-3 (0.46 mm x 250 mm) columns were obtained from Daicel Chiral Technologies, Japan. HPLC-grade *n*-hexane and 2- propanol were obtained from Fisher Scientific, USA. Chiral HPLC separation conditions were determined by obtaining an optimum separation for standard racemic samples prepared using $[Cu(CH_3CN)_4]PF_6$. Staring martials TIPS-protected enoldiazoacetates 1 and nitrones 2 were prepared according to the literature[1]

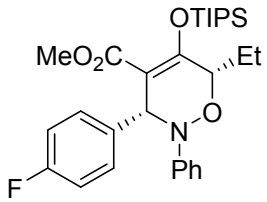
2. Procedure for Copper(I)-Catalyzed [3 + 3]-Cycloaddition Reaction with Chiral BOX Ligand

The chiral catalyst was prepared by stirring $[Cu(MeCN)_4]PF_6$ (3.7 mg, 0.010 mmol, 5.0 mol %) and the chiral bisoxazoline ligand (4.3 mg, 0.012 mmol, 6.0 mol %) in dry chloroform (2.0 mL) in an oven-dried 8.0 mL Schlenk tube for 1 h under N_2 at room temperature, then chloroform was removed and dry toluene (2.0 mL) was added. A solution of nitrone **2** (0.20 mmol, 1.0 equiv.) in dry toluene (1.0 mL) was introduced to the reaction mixture. Then TIPS-protected enoldiazoacetate **1** (0.30 mmol, 1.5 equiv.) in dry toluene (1.0 mL) was added dropwise over 5 min. The reaction solution was stirred at room temperature for 12 h. Subsequently, solvent was then removed under reduced pressure, and the residue was purified by silica gel column chromatography using a 20:1 to 15:1 gradient of hexane/ethyl acetate (v/v) as the eluent to afford **3.**



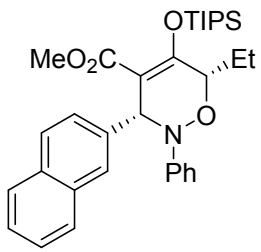
Methyl (3*S*,6*R*)-6-ethyl-2,3-diphenyl-5-[(triisopropylsilyl)oxy]-3,6-dihydro-2*H*-1,2-oxazine-4-carboxylate (3a)

colorless oil; 92 mg, 93% yield, $[\alpha]_D^{20}$ = + 129° (*c* = 1.0, $CHCl_3$), 93% *ee,* [HPLC: Chiralpak AD-H column, 1% IPA in hexane (v/v), 1.0 mL/min, 254 nm, t_1= 4.6 min (*major*), t_2= 4.9 min (*minor*)]. ^{1}H NMR (500 MHz, $CDCl_3$) δ 7.31 – 7.25 (comp, 2H), 7.23 – 7.13 (comp, 5H), 7.02 (d, *J* = 7.7 Hz, 2H), 6.89 (t, *J* = 7.3 Hz, 1H), 5.68 (d, *J* = 1.7 Hz, 1H), 4.41 (td, *J* = 8.7, 1.7 Hz, 1H), 3.62 (s, 3H), 2.19 – 2.04 (m, 1H), 1.92 – 1.74 (m, 1H), 1.20 – 1.13 (comp, 3H), 1.12 – 1.05 (comp, 21H), ^{13}C NMR (125 MHz, $CDCl_3$) δ 166.1, 161.7, 148.1, 138.1, 129.5, 128.7, 127.7, 127.5, 122.1, 117.0, 110.0, 78.9, 63.6, 51.4, 24.4, 18.0, 17.9, 13.8, 10.4, HRMS (ESI) *m/z* calc. for $C_{29}H_{42}NO_4Si$ $(M+H)^+$: 496.2878, found: 496.2872.



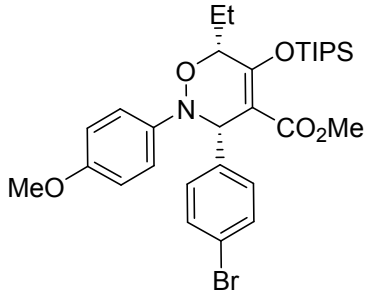
Methyl (3*R*,6*S*)-6-ethyl-3-(4-fluorophenyl)-2-phenyl-5-[(triisopropylsilyl)oxy]-3,6-dihydro-2*H*-1,2-oxazine-4-carboxylate (3b)

colorless oil; 89 mg, 87 % yield, $[\alpha]_D^{20}$ = + 182° (*c* = 1.0, $CHCl_3$), 91% *ee,* [HPLC: Chiralpak ADH column, 1% IPA in hexane (v/v), 1.0 mL/min, 250 nm, t_1= 4.8 min (*major*), t_2= 5.6 min (*minor*)], ^{1}H NMR (500 MHz, $CDCl_3$) δ 7.26 – 7.18 (comp, 4H), 7.00 (d, *J* = 7.8 Hz, 2H), 6.91 (t, *J* = 7.3 Hz, 1H), 6.88 – 6.83 (comp, 2H), 5.65 (d, *J* = 1.5 Hz, 1H), 4.44 (td, *J* = 8.7, 1.5 Hz, 1H), 3.63 (s, 3H), 2.20 – 2.09 (m, 1H), 1.90 – 1.80 (m, 1H), 1.21 – 1.10 (comp, 24H), ^{13}C NMR (125 MHz, $CDCl_3$) δ 166.0, 162.3 (d, *J* = 245.4 Hz), 162.1, 148.0, 133.8 (d, *J* = 2.9 Hz), 131.1 (d, *J* = 8.0 Hz), 128.7, 122.3, 117.0, 114.5 (d, *J* = 21.2 Hz), 111.0, 79.2, 63.3, 51.3, 24.4, 18.0, 17.9, 13.8, 10.4, ^{19}F NMR (500 MHz, $CDCl_3$) δ -115.3. HRMS (ESI) *m/z* calc. for $C_{29}H_{41}FNO_4Si$ $(M+H)^+$: 514.2783, found: 514.2779.



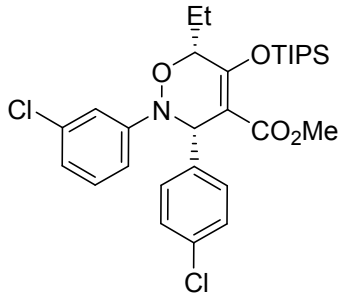
Methyl (3*R*,6*S*)-6-ethyl-3-(naphthalen-2-yl)-2-phenyl-5-[(triisopropylsilyl)oxy] -3,6-dihydro-2*H*-1,2-oxazine-4-carboxylate (3c)

colorless oil; 98 mg, 89 % yield, $[\alpha]_D^{20}$ = + 181° (*c* = 1.0, $CHCl_3$), 91% *ee,* [HPLC: Chiralpak ADH column, 1% IPA in hexane (v/v), 1.0 mL/min, 250 nm, t_1= 5.7 min (*major*), t_2= 7.0 min (*minor*)], ^{1}H NMR (500 MHz, $CDCl_3$) δ 7.79 – 7.70 (comp, 3H), 7.65 (d, *J* = 8.5 Hz, 1H), 7.46 – 7.36 (comp, 3H), 7.23 – 7.16 (comp, 2H), 7.06 (d, *J* = 7.8 Hz, 2H), 6.88 (t, *J* = 7.3 Hz, 1H), 5.86 (d, *J* = 1.6 Hz, 1H), 4.46 (td, *J* = 8.5, 1.6 Hz, 1H), 3.60 (s, 3H), 2.22 – 2.10 (m, 1H), 1.98 – 1.85 (m, 1H), 1.23 – 1.10 (comp, 24H), ^{13}C NMR (125 MHz, $CDCl_3$) δ 166.1, 161.8, 148.0, 135.8, 133.0, 133.0, 128.8, 128.7, 128.3, 127.7, 127.6, 127.2, 125.7, 125.6, 122.1, 117.0, 111.0, 78.8, 63.5, 51.4, 24.5, 18.0, 17.95, 13.8, 10.4, HRMS (ESI) *m/z* calc. for $C_{33}H_{44}NO_4Si$ $(M+H)^+$: 546.3034, found: 546.3031.



Methyl (3*R*,6*S*)-3-(4-bromophenyl)-6-ethyl-2-(4-methoxyphenyl)-5- [(triisopropylsilyl)oxy]-3,6-dihydro-2*H*-1,2-oxazine-4-carboxylate (3d)

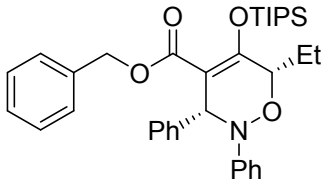
colorless oil; 104 mg, 86 % yield, $[\alpha]_D^{20}$ = +139° (*c* = 1.0, $CHCl_3$), 96% *ee,* [HPLC: Chiralpak ADH column, 3% IPA in hexane (v/v), 1.0 mL/min, 250 nm, t_1= 5.6 min (*major*), t_2= 7.8 min (*minor*)], ^{1}H NMR (500 MHz, $CDCl_3$) δ 7.27 (t, *J* = 5.6 Hz, 2H), 7.05 (d, *J* = 8.4 Hz, 2H), 6.91 – 6.86 (comp, 2H), 6.77 – 6.72 (comp, 2H), 5.42 (s, 1H), 4.36 (d, *J* = 8.7 Hz, 1H), 3.74 (s, 3H), 3.59 (s, 3H), 2.14 – 2.04 (m, 1H), 1.91 – 1.80 (m, 1H), 1.21 – 1.15 (comp, 3H), 1.13 – 1.08 (comp, 21H), ^{13}C NMR (125 MHz, $CDCl_3$) δ 166.0, 162.4, 155.7, 141.5, 137.0, 131.3, 130.8, 121.6, 119.6, 114.0, 109.7, 79.4, 64.8, 55.6, 51.3, 24.4, 18.1, 18.0, 13.8, 10.4, HRMS (ESI) *m/z* calc. for $C_{30}H_{43}BrNO_5Si$ $(M+H)^+$: 604.2088, found: 604.2085.



Methyl (3*R*,6*S*)-2-(3-chlorophenyl)-3-(4-chlorophenyl)-6-ethyl-5- [(triisopropylsilyl)oxy]-3,6-dihydro-2*H*-1,2-oxazine-4-carboxylate (3e)

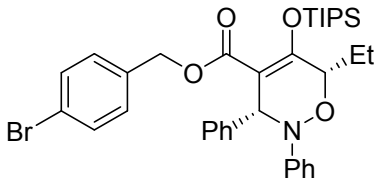
colorless oil; 98 mg, 87 % yield, $[\alpha]_D^{20}$ = + 184° (*c* = 1.0, $CHCl_3$), 82% *ee,* [HPLC:

Chiralpak ADH column, 1% IPA in hexane (v/v), 1.0 mL/min, 250 nm, t_1= 5.6 min (*major*), t_2= 4.9 min (*minor*)], ^{1}H NMR (500 MHz, $CDCl_3$) δ 7.20 (d, *J* = 8.5 Hz, 2H), 7.15 (d, *J* = 8.5 Hz, 2H), 7.12 (t, *J* = 8.1 Hz, 1H), 6.99 (t, *J* = 2.0 Hz, 1H), 6.88 – 6.84 (comp, 2H), 5.60 (d, *J* = 1.7 Hz, 1H), 4.43 (td, *J* = 8.5, 1.7 Hz, 1H), 3.62 (s, 3H), 2.18 – 2.09 (m, 1H), 1.90 – 1.78 (m, 1H), 1.20 – 1.09 (comp, 24H), ^{13}C NMR (125 MHz, $CDCl_3$) δ 165.8, 162.1, 149.1, 136.1, 134.7, 133.6, 130.8, 129.8, 128.0, 122.0, 116.8, 114.8, 109.6, 79.8, 63.2, 51.4, 24.3, 18.0, 17.9, 13.8, 10.3, HRMS (ESI) *m/z* calc. for $C_{29}H_{40}Cl_2NO_4Si$ $(M+H)^+$: 564.2098, found: 564.2097.



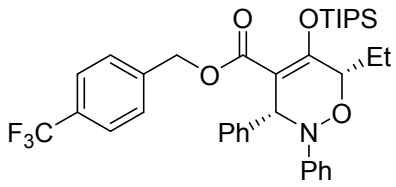
Benzyl (3*R*,6*S*)-6-ethyl-2,3-diphenyl-5-((triisopropylsilyl)oxy)-3,6-dihydro-2*H*-1,2-oxazine-4-carboxylate (3f)

colorless oil; 104 mg, 91 % yield, $[\alpha]_D^{20}$ = + 155° (*c* = 1.0, $CHCl_3$), 98% *ee,* [HPLC: Chiralpak AD-H column, 1% IPA in hexane (v/v), 1.0 mL/min, 254 nm, t_1= 4.5 min (*major*), t_2= 5.7 min (*minor*)]. ^{1}H NMR (500 MHz, $CDCl_3$) δ 7.28 – 7.23 (comp, 5H), 7.22 – 7.15 (comp, 5H),– 7.01 (comp, 4H), 6.91 (t, *J* = 7.3 Hz, 1H), 5.70 (d, *J* = 1.5 Hz, 1H), 5.12 (d, *J* = 12.5 Hz, 1H), 5.03 (d, *J* = 12.5 Hz, 1H), 4.46 (td, *J* = 8.7, 1.5 Hz, 1H), 2.22 – 2.11 (m, 1H), 1.95 – 1.87 (m, 1H), 1.22 – 1.15 (comp, 6H), 1.13 – 1.09 (comp, 18H), ^{13}C NMR (125 MHz, $CDCl_3$) δ 164.8, 162.5, 148.1, 138.0, 136.2, 129.7, 128.7, 128.4, 128.1, 127.9, 127.7, 127.5, 122.1, 117.2, 109.6, 79.2, 65.8, 63.9, 24.4, 18.1, 18.0, 13.9, 10.4, HRMS (ESI) *m/z* calc. for $C_{35}H_{46}NO_4Si$ $(M+H)^+$: 572.3191, found: 572.3179.



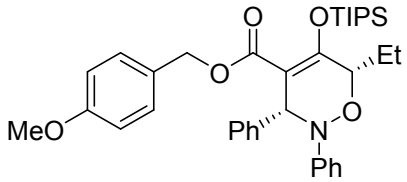
4-Bromobenzyl (3*R*,6*S*)-6-ethyl-2,3-diphenyl-5-[(triisopropylsilyl)oxy]-3,6-dihydro-2*H*-1,2-oxazine-4-carboxylate (3g)

colorless oil; 113 mg, 87 % yield, $[\alpha]_D^{20}$ = + 108° (*c* = 1.0, $CHCl_3$), 99% *ee,* [HPLC: Chiralpak ADH column, 1% IPA in hexane (v/v), 1.0 mL/min, 250 nm, t_1= 5.2 min (*major*)], ^{1}H NMR (500 MHz, $CDCl_3$) δ 7.30 (d, *J* = 8.4 Hz, 2H), 7.22 – 7.12 (comp, 7H), 6.99 (d, *J* = 7.7 Hz, 2H), 6.90 (t, *J* = 7.3 Hz, 1H), 6.83 (d, *J* = 8.4 Hz, 2H), 5.62 (d, *J* = 1.5 Hz, 1H), 4.98 (s, 2H), 4.43 (td, *J* = 8.6, 1.5 Hz, 1H), 2.19 – 2.08 (m, 1H), 1.94 – 1.82 (m, 1H), 1.21 – 1.11 (comp, 6H), 1.10 – 1.07 (m, 18H), ^{13}C NMR (125 MHz, $CDCl_3$) δ 164.6, 163.0, 148.1, 137.9, 135.3, 131.5, 129.7, 129.6, 128.7, 127.7, 127.5, 122.3, 121.9, 117.3, 109.4, 79.5, 64.9, 64.1, 24.4, 18.1, 18.0, 13.9, 10.4, HRMS (ESI) *m/z* calc. for $C_{35}H_{45}BrNO_4Si$ $(M+H)^+$: 650.2296, found: 650.2287.



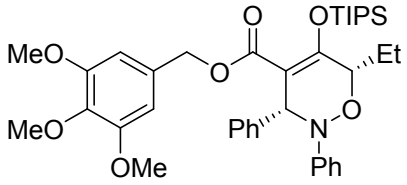
4-(Trifluoromethyl)benzyl (3*R*,6*S*)-6-ethyl-2,3-diphenyl-5-[(triisopropylsilyl)oxy] -3,6-dihydro-2*H*-1,2-oxazine-4-carboxylate (3h)

colorless oil; 113 mg, 88 % yield, $[\alpha]_D^{20}$ = + 154° (*c* = 1.0, $CHCl_3$), 97% *ee,* [HPLC: Chiralpak ADH column, 1% IPA in hexane (v/v), 1.0 mL/min, 250 nm, t_1= 3.8 min (*major*), t_2= 8.0 min (*minor*)], ^{1}H NMR (500 MHz, $CDCl_3$) δ 7.44 (d, *J* = 8.1 Hz, 2H), 7.25 – 7.14 (comp, 7H), 7.07 – 6.99 (comp, 4H), 6.92 (t, *J* = 7.3 Hz, 1H), 5.66 (s, 1H), 5.13 (d, *J* = 13.0 Hz, 1H), 5.08 (d, *J* = 13.0 Hz, 1H), 4.47 (d, *J* = 8.7 Hz, 1H), 2.23 – 2.10 (m, 1H), 1.97 – 1.84 (m, 1H), 1.25 – 1.15 (comp, 6H), 1.14 – 1.10 (m, 18H), ^{13}C NMR (125 MHz, $CDCl_3$) δ 164.5, 163.4, 148.1, 140.3, 137.8, 130.0 (q, *J* = 32.2 Hz), 129.7, 128.7, 127.9, 127.7, 127.6, 125.3 (q, *J* = 3.8 Hz), 122.3, 119.4 (q, *J* = 246.8Hz), 117.3, 109.3, 79.6, 64.7, 64.3, 24.4, 18.1, 18.0, 13.9, 10.4, ^{19}F NMR (500 MHz, $CDCl_3$) δ -62.60, HRMS (ESI) *m/z* calc. for $C_{36}H_{45}F_3NO_4Si$ $(M+H)^+$: 640.3064, found: 640.3053.



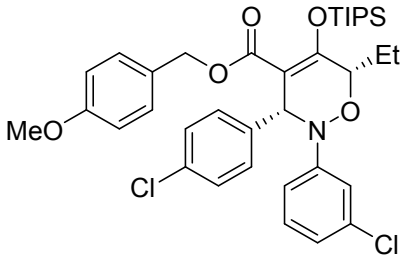
4-Methoxybenzyl(3*R*,6*S*)-6-ethyl-2,3-diphenyl-5-[(triisopropylsilyl)oxy]-3,6-dihydro-2*H*-1,2-oxazine-4-carboxylate (3i)

colorless oil; 108 mg, 90 % yield, $[\alpha]_D^{20}$ = + 155°(*c* = 1.0, $CHCl_3$), 98% *ee,* [HPLC: Chiralpak ADH column, 1% IPA in hexane (v/v), 1.0 mL/min, 254 nm, t_1= 4.5 min (*major*), t_2= 7.4 min (*minor*)], ^{1}H NMR (500 MHz, $CDCl_3$) δ 7.26 – 7.14 (comp, 7H), 7.02 (d, *J* = 8.6 Hz, 4H), 6.91 (t, *J* = 7.3 Hz, 1H), 6.82 – 6.76 (comp, 2H), 5.66 (d, *J* = 1.1 Hz, 1H), 5.04 (d, *J* = 12.1 Hz, 1H), 4.95 (d, *J* = 12.1 Hz, 1H), 4.43 (td, *J* = 8.7, 1.1 Hz, 1H), 3.82 (s, 3H), 2.20 – 2.09 (m, 1H), 1.95 – 1.83 (m, 1H), 1.19 – 1.12 (comp, 6H), 1.11 – 1.08 (m, 18H), ^{13}C NMR (125 MHz, $CDCl_3$) δ 165.0, 159.5, 148.1, 138.1, 130.0, 129.7, 128.7, 128.4, 127.6, 127.4, 122.1, 117.2, 113.7, 109.7, 79.2, 65.7, 63.8, 55.4, 24.4, 18.1, 18.0, 13.9, 10.4, HRMS (ESI) *m/z* calc. for $C_{36}H_{48}NO_5Si$ $(M+H)^+$: 602.3296, found: 602.3289.



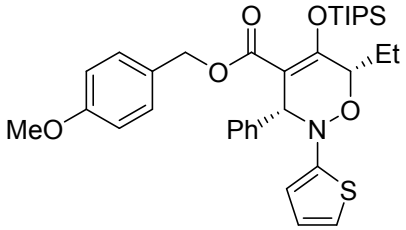
3,4,5-Trimethoxybenzyl (3*R*,6*S*)-6-ethyl-2,3-diphenyl-5-[(triisopropylsilyl)oxy] -3,6-dihydro-2*H*-1,2-oxazine-4-carboxylate (3j)

colorless oil; 122 mg, 92 % yield, $[\alpha]_D^{20}$ = + 156° (*c* = 1.0, $CHCl_3$), 99% *ee,* [HPLC: Chiralpak ADH column, 1% IPA in hexane (v/v), 1.0 mL/min, 250 nm, t_1= 8.0 min (*major*), t_2= 12.4 min (*minor*)], ^{1}H NMR (500 MHz, $CDCl_3$) δ 7.23 – 7.16 (comp, 4H), 7.15 – 7.10 (comp, 3H), 7.02 – 6.98 (comp, 2H), 6.89 (s, 1H), 6.39 (s, 2H), 5.67 (d, *J* = 1.5 Hz, 1H), 5.03 (d, *J* = 12.2 Hz, 1H), 4.93 (d, *J* = 12.2 Hz, 1H), 4.41 (td, *J* = 8.7, 1.5 Hz, 1H), 3.83 (s, 3H), 3.75 (s, 6H), 2.16 – 2.05 (m, 1H), 1.93 – 1.81 (m, 1H), 1.17 – 1.10 (comp, 6H), 1.09 – 1.05 (comp, 18H), ^{13}C NMR (125 MHz, $CDCl_3$) δ 164.9, 162.4, 153.2, 148.0, 138.1, 137.8, 131.8, 129.4, 128.7, 127.6, 127.4, 122.2, 117.1, 109.5, 105.7, 78.9, 66.2, 63.5, 60.9, 56.1, 24.3, 18.1, 17.9, 13.9, 10.3, HRMS (ESI) *m/z* calc. for $C_{38}H_{52}NO_7Si$ $(M+H)^+$: 662.3508, found: 662.3492.



4-Methoxybenzyl (3*R*,6*S*)-2-(3-chlorophenyl)-3-(4-chlorophenyl)-6-ethyl-5-[(triisopropylsilyl)oxy]-3,6-dihydro-2*H*-1,2-oxazine-4-carboxylate (3k)

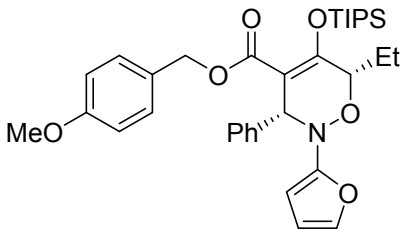
colorless oil; 114 mg, 85 % yield, $[\alpha]_D^{20}$ = + 149° (*c* = 1.0, $CHCl_3$), 90% *ee,* [HPLC: Chiralpak ADH column, 1% IPA in hexane (v/v), 1.0 mL/min, 250 nm, t_1= 4.5 min (*major*), t_2= 6.0 min (*minor*)], ^{1}H NMR (500 MHz, $CDCl_3$) δ 7.18 – 7.09 (comp, 5H), 7.05 – 7.00 (comp, 3H), 6.91 – 6.87 (comp, 2H), 6.81 (d, *J* = 8.6 Hz, 2H), 5.60 (d, *J* = 1.4 Hz, 1H), 5.02 (s, 2H), 4.47 (td, *J* = 8.6, 1.4 Hz, 1H), 3.83 (s, 3H), 2.24 – 2.14 (m, 1H), 1.94 – 1.83 (m, 1H), 1.23 – 1.18 (comp, 3H), 1.16 – 1.10 (comp, 21H), ^{13}C NMR (125 MHz, $CDCl_3$) δ 164.5, 162.5, 159.6, 149.1, 136.1, 134.6, 133.5, 130.9, 130.1, 129.7, 128.1, 127.9, 122.1, 116.9, 115.0, 113.7, 109.3, 80.0, 65.7, 63.4, 55.3, 24.2, 18.1, 18.0, 13.9, 10.3, HRMS (ESI) *m/z* calc. for $C_{36}H_{46}Cl_2NO_5Si$ $(M+H)^+$: 670.2517, found: 670.2517.



4-Methoxybenzyl (3*R*,6*S*)-6-ethyl-3-phenyl-2-(thiophen-2-yl)-5-[(triisopropylsilyl)oxy]-3,6-dihydro-2*H*-1,2-oxazine-4-carboxylate (3l)

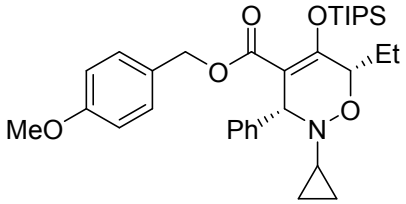
colorless oil; 106 mg, 87 % yield, $[\alpha]_D^{20}$ = + 152° (*c* = 1.0, $CHCl_3$), 92% *ee,* [HPLC: Chiralpak ADH column, 1% IPA in hexane (v/v), 1.0 mL/min, 250 nm, t_1= 4.6 min (*major*), t_2= 8.1 min (*minor*)], ^{1}H NMR (500 MHz, $CDCl_3$) δ 7.22 (t, *J* = 7.9 Hz, 2H), 7.11 (d, *J* = 8.6 Hz, 2H), 7.08 (d, *J* = 5.0 Hz, 1H), 7.03 (d, *J* = 7.9 Hz, 2H), 6.91 (t, *J* = 7.4 Hz, 1H), 6.81 (d, *J* = 8.6 Hz, 2H), 6.77 – 6.70 (comp, 2H), 5.89 (d, *J* = 1.3 Hz,

1H), 5.08 (d, *J* = 12.1 Hz, 1H), 5.00 (d, *J* = 12.1 Hz, 1H), 4.5 (td, *J* = 8.6, 1.3 Hz, 1H), 3.80 (s, 3H), 2.17 – 2.07 (m, 1H), 1.94 – 1.83 (m, 1H), 1.20 – 1.14 (comp, 6H), 1.09 (d, *J* = 5.9 Hz, 18H), ^{13}C NMR (125 MHz, $CDCl_3$) δ 164.8, 162.7, 159.5, 148.0, 140.4, 130.2, 128.7, 128.4, 127.7, 125.7, 125.4, 122.2, 116.7, 113.8, 110.9, 80.5, 65.8, 60.2, 55.4, 24.3, 18.1, 18.0, 13.9, 10.3, HRMS (ESI) *m/z* calc. for $C_{34}H_{46}NO_5SSi$ $(M+H)^+$: 608.2860, found: 608.2862.



4-Methoxybenzyl (3*R*,6*S*)-6-ethyl-2-(furan-2-yl)-3-phenyl-5-[(triisopropylsilyl)oxy]-3,6-dihydro-2*H*-1,2-oxazine-4-carboxylate (3m)

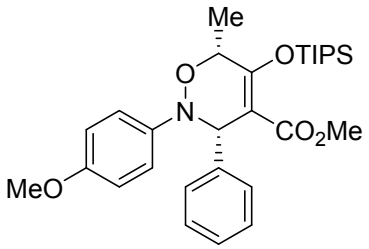
colorless oil; 104 mg, 88 % yield, $[\alpha]_D^{20}$ = + 162° (*c* = 1.0, $CHCl_3$), 98% *ee,* [HPLC: Chiralpak ADH column, 1% IPA in hexane (v/v), 1.0 mL/min, 250 nm, t_1= 4.3 min (*major*), t_2= 5.1 min (*minor*)], ^{1}H NMR (500 MHz, $CDCl_3$) δ 7.27 – 7.22 (comp, 2H), 7.20 – 7.17 (m, 1H), 7.13 (d, *J* = 8.6 Hz, 2H), 7.09 (d, *J* = 7.8 Hz, 2H), 6.94 (t, *J* = 7.3 Hz, 1H), 6.83 (d, *J* = 8.6 Hz, 2H), 6.22 – 6.17 (m, 1H), 6.12 (d, *J* = 3.2 Hz, 1H), 5.76 (d, *J* = 1.6 Hz, 1H), 5.06 (dd, *J* =17.1, 12.1Hz, 1H), 4.43 (td, *J* = 7.9, 1.6 Hz, 1H), 3.80 (s, 3H), 2.13 – 2.02 (m, 1H), 1.90 – 1.79 (m, 1H), 1.19 – 1.11 (comp, 6H), 1.09 – 1.05 (comp, 18H), ^{13}C NMR (125 MHz, $CDCl_3$) δ 164.6, 163.1, 159.5, 152.5, 148.0, 141.8, 130.0, 128.7, 128.5, 122.2, 116.7, 113.8, 110.0, 109.4, 108.2, 79.3, 65.7, 57.6, 55.4, 24.2, 18.1, 18.0, 13.9, 10.0, HRMS (ESI) *m/z* calc. for $C_{34}H_{46}NO_6Si$ $(M+H)^+$: 592.3089, found: 592.3081.



4-Methoxybenzyl (3*R*,6*S*)-2-cyclopropyl-6-ethyl-3-phenyl-5-[(triisopropylsilyl)oxy]-3,6-dihydro-2*H*-1,2-oxazine-4-carboxylate (3n)

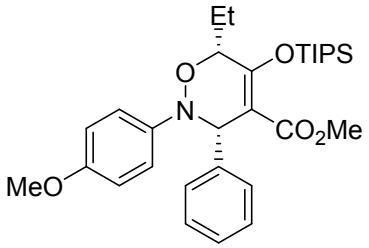
colorless oil; 93 mg, 82 % yield, $[\alpha]_D^{20}$ = + 134° (*c* = 1.0, $CHCl_3$), 90 % *ee,* [HPLC: Chiralpak ADH column, 1% IPA in hexane (v/v), 1.0 mL/min, 250 nm, t_1= 3.9 min (*major*), t_2= 5.2 min (*minor*)], ^{1}H NMR (500 MHz, $CDCl_3$) δ 7.36 (d, *J* = 8.6 Hz, 2H), 7.26 – 7.20 (comp, 2H), 7.06 (d, *J* = 7.8 Hz, 2H), 6.93 – 6.87 (comp, 3H), 5.28 (d, *J* = 11.9 Hz, 1H), 5.02 (d, *J* = 11.9 Hz, 1H, 4.24 (td, *J* = 7.3, 1.1 Hz, 1H), 4.04 (dd, *J* = 8.5, 1.1 Hz, 1H), 3.81 (s, 3H), 2.07 – 1.94 (m, 1H), 1.84 – 1.71 (m, 1H), 1.30 – 1.21 (m, 1H), 1.17 – 1.03 (comp, 6H), 0.96 (d, *J* = 3.6 Hz, 18H), 0.34 – 0.26 (comp, 3H), 0.11 – 0.03 (m, 1H), ^{13}C NMR (125 MHz, $CDCl_3$) δ 166.2, 159.7, 158.5, 148.3, 130.7, 128.9, 128.4, 121.7, 116.6, 113.9, 111.2, 76.5, 65.9, 62.4, 55.4, 24.4, 17.9,

17.8, 13.9, 13.7, 9.8, 3.9, 2.4, HRMS (ESI) *m/z* calc. for $C_{33}H_{48}NO_5Si$ $(M+H)^+$: 566.3296, found: 566.3288.



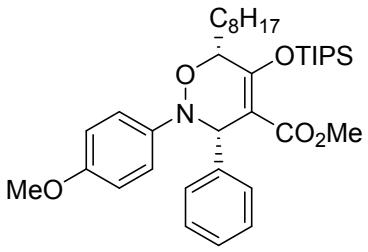
Methyl 3S,6*R*)-2-(4-methoxyphenyl)-6-methyl-3-phenyl-5-[(triisopropylsilyl)oxy]-3,6-dihydro-2*H*-1,2-oxazine-4-carboxylate (3o)

colorless oil; 89 mg, 87 % yield, $[\alpha]_D^{20}$ = + 174° (*c* = 1.0, $CHCl_3$), 83% *ee,* [HPLC: Chiralpak ADH column, 1% IPA in hexane (v/v), 1.0 mL/min, 250 nm, t_1= 9.3 min (*major*), t_2= 11.5 min (*minor*)], ^{1}H NMR (500 MHz, $CDCl_3$) δ 7.20 – 7.13 (comp, 5H), 6.90 (d, *J* = 9.0 Hz, 2H), 6.73 (d, *J* = 9.0 Hz, 2H), 5.46 (d, *J* = 1.4 Hz, 1H), 4.55 (qd, *J* = 6.6, 1.4 Hz, 1H), 3.73 (s, 3H), 3.59 (s, 3H), 1.56 (d, *J* = 6.6 Hz, 3H), 1.22 – 1.16 (comp, 3H), 1.12 (t, *J* = 6.2 Hz, 18H), ^{13}C NMR (125 MHz, $CDCl_3$) δ 166.1, 162.6, 155.6, 141.7, 137.6, 129.7, 127.6, 127.5, 119.7, 113.9, 109.5, 74.4, 55.6, 51.3, 18.1, 18.0, 17.9, 17.0, 13.8, HRMS (ESI) *m/z* calc. for $C_{29}H_{42}NO_5Si$ $(M+H)^+$: 512.2827, found: 512.2829.



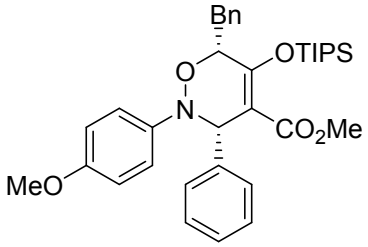
Methyl (3*R*,6*S*)-6-ethyl-2-(4-methoxyphenyl)-3-phenyl-5-[(triisopropylsilyl)oxy] -3,6-dihydro-2*H*-1,2-oxazine-4-carboxylate (3p)

colorless oil; 96 mg, 91 % yield, $[\alpha]_D^{20}$ = + 203° (*c* = 1.0, $CHCl_3$), 96% *ee,* [HPLC: Chiralpak ADH column, 1% IPA in hexane (v/v), 1.0 mL/min, 250 nm, t_1= 5.8 min (*major*), t_2= 6.9 min (*minor*)], ^{1}H NMR (500 MHz, $CDCl_3$) δ 7.23 – 7.18 (comp, 2H), 7.18 – 7.12 (comp, 3H), 6.92 (d, *J* = 9.0 Hz, 2H), 6.74 (d, *J* = 9.0 Hz, 2H), 5.50 (s, 1H), 4.35 (d, *J* = 8.8 Hz, 1H), 3.73 (s, 3H), 3.59 (s, 3H), 2.14 – 2.03 (m, 1H), 1.96 – 1.81 (m, 1H), 1.22 – 1.14 (comp, 3H), 1.14 – 1.08 (comp, 21H), ^{13}C NMR (125 MHz, $CDCl_3$) δ 166.2, 161.7, 155.5, 141.8, 138.0, 129.7, 127.6, 127.4, 119.6, 113.9, 110.0, 79.0, 65.0, 55.6, 51.3, 24.4, 18.0, 17.95, 17.8, 13.8, 10.4, HRMS (ESI) *m/z* calc. for $C_{30}H_{44}NO_5Si$ $(M+H)^+$: 526.2983, found: 526.2985.



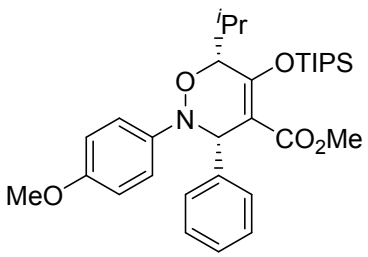
Methyl (3*S*,6*R*)-2-(4-methoxyphenyl)-6-octyl-3-phenyl-5-[(triisopropylsilyl) oxy]-3,6-dihydro-2*H*-1,2-oxazine-4-carboxylate (3q)

colorless oil; 101 mg, 83 % yield, $[\alpha]_D^{20}$ = + 234° (*c* = 1.0, $CHCl_3$), 93% *ee,* [HPLC: Chiralpak ADH column, 1% IPA in hexane (v/v), 1.0 mL/min, 250 nm, t_1= 4.8 min (*major*), t_2= 5.3 min (*minor*)], ^{1}H NMR (500 MHz, $CDCl_3$) δ 7.22 – 7.12 (comp, 5H), 6.91 (d, *J* = 9.0 Hz, 2H), 6.73 (d, *J* = 9.0 Hz, 2H), 5.48 (s, 1H), 4.38 (d, *J* = 9.1 Hz, 1H), 3.73 (s, 3H), 3.58 (s, 3H), 2.08 – 2.00 (m, 1H), 1.83 (m, 1H), 1.66 – 1.59 (m, 1H), 1.50 – 1.39 (m, 1H), 1.28 (comp, 12H), 1.17 – 1.05 (comp, 21H), 0.88 (t, *J* = 6.9 Hz, 3H), ^{13}C NMR (125 MHz, $CDCl_3$) δ 166.2, 162.0, 155.5, 141.8, 138.0, 129.7, 127.6, 127.4, 119.6, 113.9, 109.8, 78.2, 65.0, 55.6, 51.3, 32.0, 31.2, 29.8, 30.0, 29.4, 26.0, 22.8, 18.1, 18.0, 14.3, 13.8., HRMS (ESI) *m/z* calc. for $C_{36}H_{56}NO_5Si$ $(M+H)^+$: 610.3922, found: 610.3927.



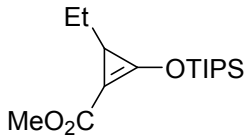
Methyl (3*S*,6*R*)-6-benzyl-2-(4-methoxyphenyl)-3-phenyl-5-[(triisopropylsilyl) oxy]-3,6-dihydro-2*H*-1,2-oxazine-4-carboxylate (3r)

colorless oil; 100 mg, 85 % yield, $[\alpha]_D^{20}$ = + 183° (*c* = 1.0, $CHCl_3$), 96% *ee,* [HPLC: Chiralpak ADH column, 1% IPA in hexane (v/v), 1.0 mL/min, 250 nm, t_1= 5.4 min (*major*), t_2= 7.2 min (*minor*)], ^{1}H NMR (500 MHz, $CDCl_3$) δ 7.35 – 7.27 (comp, 4H), 7.07 (t, *J* = 7.3 Hz, 1H), 6.99 (t, *J* = 7.5 Hz, 2H), 6.78 (comp, 4H), 6.67 (d, *J* = 8.8 Hz, 2H), 5.35 (s, 1H), 4.68 (t, *J* = 4.3 Hz, 1H), 3.70 (s, 3H), 3.55 (s, 3H), 3.31 (d, *J* = 4.6 Hz, 2H), 1.30 – 1.13 (comp, 21H)., ^{13}C NMR (125 MHz, $CDCl_3$) δ 165.9, 161.0, 155.6, 141.7, 137.4, 137.1, 130.0, 129.8, 128.5, 127.5, 127.3, 126.7, 120.0, 113.8, 111.3, 79.1, 66.3, 55.6, 51.3, 36.8, 18.2, 18.1, 17.9, 14.0, HRMS (ESI) *m/z* calc. for $C_{35}H_{46}NO_5Si$ $(M+H)^+$: 588.3140, found: 588.3143.



Methyl (3*S*,6*R*)-6-isopropyl-2-(4-methoxyphenyl)-3-phenyl-5-[(triisopropylsilyl) oxy]-3,6-dihydro-2*H*-1,2-oxazine-4-carboxylate (3s)

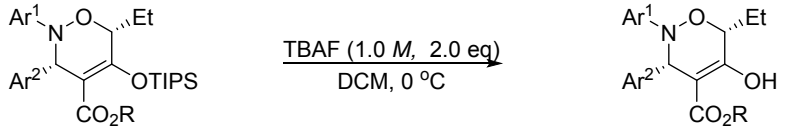
colorless oil; 83 mg, 77 % yield, $[\alpha]_D^{20}$ = + 263° (*c* = 1.0, $CHCl_3$), 99% *ee,* [HPLC: Chiralpak IC-3 column, 1% IPA in hexane (v/v), 1.0 mL/min, 250 nm, t_1= 5.8 min (*major*), t_2= 7.5 min (*minor*)], ^{1}H NMR (500 MHz, $CDCl_3$) δ 7.24 (d, *J* = 1.5 Hz, 2H), 7.18 – 7.12 (comp, 3H), 6.92 (d, *J* = 9.0 Hz, 2H), 6.75 (d, *J* = 9.0 Hz, 2H), 5.56 (d, *J* = 1.4 Hz, 1H), 4.31 (t, *J* = 2.0 Hz, 1H), 3.73 (s, 3H), 3.60 (s, 3H), 2.49 – 2.40 (m, 1H), 1.13 (d, *J* = 7.2 Hz, 6H), 1.11 – 1.04 (comp, 21H)., ^{13}C NMR (125 MHz, $CDCl_3$) δ 166.4, 161.6, 155.2, 141.8, 138.6, 129.5, 127.6, 127.3, 118.9, 114.0, 110.3, 81.1, 64.0, 55.7, 51.3, 29.2, 19.7, 18.1, 18.0, 16.4, 13.9, HRMS (ESI) *m/z* calc. for $C_{31}H_{46}NO_5Si$ $(M+H)^+$: 540.3140, found: 540.3144.



Methyl 3-ethyl-2-[(triisopropylsilyl)oxy]cycloprop-1-ene-1-carboxylate (4a)

colorless oil; 58 mg, 97 % yield, ^{1}H NMR (500 MHz, $CDCl_3$) δ ^{1}H NMR (500 MHz, $CDCl_3$) δ 3.73 (s, 3H), 2.39 – 2.30 (m, 1H), 2.17 (s, 2H), 1.73 – 1.60 (m, 1H), 1.52 – 1.36 (comp, 4H), 1.10-1.18 (comp, 18H), 0.94 (t, *J* = 7.5 Hz, 3H), ^{13}C NMR (125 MHz, $CDCl_3$) δ 207.1, 160.5, 148.4, 76.1, 51.5, 31.4, 26.9, 17.6, 12.4, 12.1, HRMS (ESI) *m/z* calc. for $C_{16}H_{31}O_3Si$ $(M+H)^+$: 299.2037, found: 299.2035.

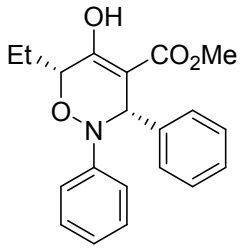
3. General Procedure for TIPS-Group Removal Reactions



(***S,R***)**-3a**, Ar^1 = Ar^2 = Ph, R = Me, **92% *ee***
(***S,R***)**-3i**, Ar^1 = Ar^2 = Ph, R = 4-OMeBn, **98% *ee***
(***S,R***)**-3k**, Ar^1 = 3-ClC_6H_4, Ar^1 = 4-ClC_6H_4, R = 4-OMeBn, **90% *ee***

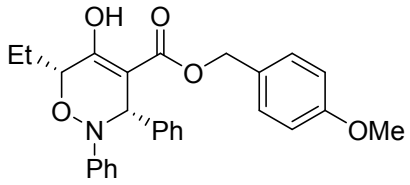
(***S,R***)**-5a**, 97% yield, 92% *ee*
(***S,R***)**-5i**, 95% yield, 98% *ee*
(***S,R***)**-5k**, 98% yield, 90% *ee*

To a solution of the TIPS-protected 6-ethyl-3,6-dihydro-2*H*-1,2-oxazine derivative **3** (1.0 equiv.) in dry dichloromethane stirred at 0 °C under N_2 was added tetra-*n*-butylammonium fluoride (1.0 M in THF, 2.0 equiv.) dropwise *via* syringe over 5 min. The reaction solution was then allowed to stir at room temperature for 1 hour. The reaction solvent was then removed under reduced pressure, and the residue was purified by column chromatography on silica gel using a 10:1 mixture of hexane/ethyl acetate as the eluent to afford the corresponding TIPS-deprotected compound **5**.



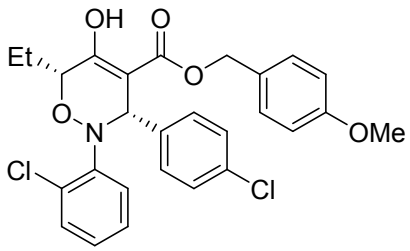
Methyl (3*S*,6*R*)-6-ethyl-5-hydroxy-2,3-diphenyl-3,6-dihydro-2*H*-1,2-oxazine -4-carboxylate (5a)

colorless oil; 33 mg, 97 % yield, $[\alpha]_D^{20}$ = + 134° (*c* = 1.0, $CHCl_3$), 92% *ee,* [HPLC: Chiralpak ADH column, 2% IPA in hexane (v/v), 1.0 mL/min, 250 nm, t_1= 6.2 min (*major*), t_2= 5.6 min (*minor*)], ^{1}H NMR (500 MHz, $CDCl_3$) δ 12.22 (br, 1H), 7.21 – 7.12 (comp, 7H), 6.95 (d, *J* = 8.0 Hz, 2H), 6.90 (t, *J* = 7.3 Hz, 1H), 5.38 (d, *J* = 0.8 Hz, 1H), 4.62 (dd, *J* = 8.4, 2.5 Hz, 1H), 3.66 (s, 3H), 2.21 – 2.12 (m, 1H), 1.94 – 1.84 (m, 1H), 1.16 (t, *J* = 7.5 Hz, 3H), ^{13}C NMR (125 MHz, $CDCl_3$) δ 172.3, 148.2, 137.7, 129.5, 128.7, 127.6, 127.5, 122.4, 117.2, 99.4, 78.3, 62.9, 51.9, 23.5, 10.2, HRMS (ESI) *m/z* calc. for $C_{20}H_{22}NO_4$ $(M+H)^+$: 340.1543, found: 340.1539.



4-Methoxybenzyl (3*S*,6*R*)-6-ethyl-5-hydroxy-2,3-diphenyl-3,6-dihydro-2*H*-1,2-oxazine-4-carboxylate (5i)

colorless oil; 42 mg, 95 % yield, $[\alpha]_D^{20}$ = + 134° (*c* = 1.0, $CHCl_3$), 98% *ee,* [HPLC: Chiralpak ADH column, 10% IPA in hexane (v/v), 1.0 mL/min, 250 nm, t_1= 4.6 min (*major*), t_2= 7.7 min (*minor*)], ^{1}H NMR (500 MHz, $CDCl_3$) δ 12.17 (br, 1H), 7.20 – 7.11 (comp, 7H), 6.93 (d, *J* = 7.7 Hz, 2H), 6.90 – 6.83 (comp, 3H), 6.74 (d, *J* = 8.7 Hz, 2H), 5.36 (d, *J* = 1.2 Hz, 1H), 5.05 (d, *J* = 12.2 Hz, 1H), 4.99 (d, *J* = 12.2 Hz, 1H), 4.62 (dd, *J* = 8.4, 2.2 Hz, 1H), 3.79 (s, 3H), 2.22 – 2.10 (m, 1H), 1.96 – 1.83 (m, 1H), 1.17 (t, *J* = 7.4 Hz, 3H), ^{13}C NMR (125 MHz, $CDCl_3$) δ 172.4, 170.6, 159.6, 148.2, 137.8, 129.8, 129.4, 128.6, 127.6, 127.5, 122.4, 117.3, 113.9, 99.6, 78.4, 66.2, 63.1, 55.4, 23.5, 10.2, HRMS (ESI) *m/z* calc. for $C_{27}H_{28}NO_5$ $(M+H)^+$: 446.1962, found: 446.1963.



4-Methoxybenzyl (3*S*,6*R*)-2-(2-chlorophenyl)-3-(4-chlorophenyl)-6-ethyl-5-

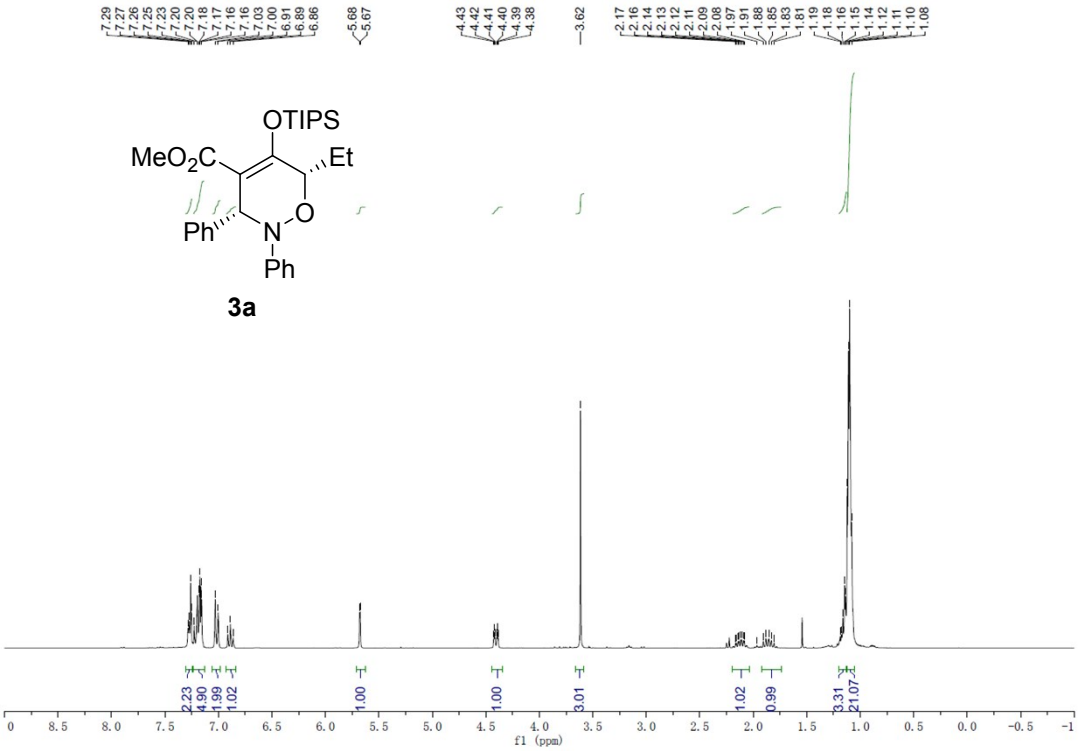
hydroxy-3,6-dihydro-2*H*-1,2-oxazine-4-carboxylate (5k)

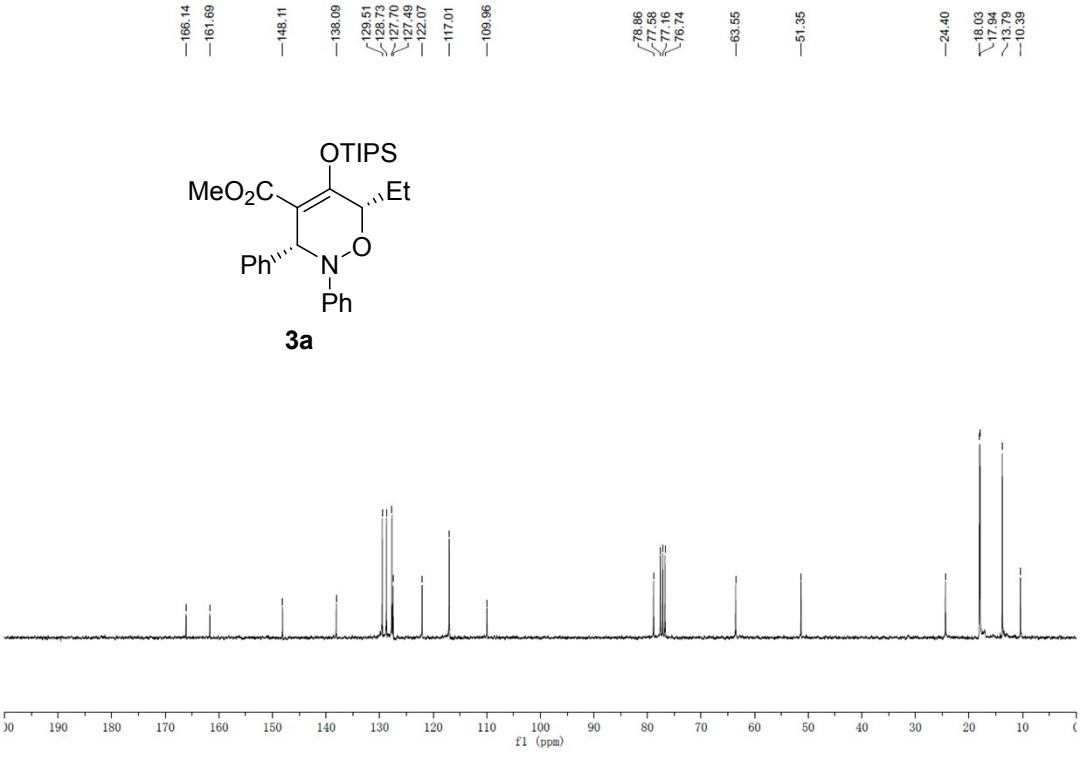
colorless oil; 50 mg, 98 % yield, $[\alpha]_D^{20}$ = + 134° (*c* = 1.0, $CHCl_3$), 90% *ee,* [HPLC: Chiralpak ADH column, 10% IPA in hexane (v/v), 1.0 mL/min, 250 nm, t_1= 4.9 min (*major*), t_2= 6.3 min (*minor*)], ^{1}H NMR (500 MHz, $CDCl_3$) δ 12.18 (br, 1H), 7.13 – 7.03 (comp, 5H), 6.93 (t, *J* = 2.0 Hz, 1H), 6.90 – 6.83 (comp, 3H), 6.81 – 6.75 (comp, 3H), 5.30 (d, *J* = 1.1 Hz, 1H), 5.09 (d, *J* = 12.1 Hz, 1H), 4.96 (d, *J* = 12.1 Hz, 1H), 4.65 – 4.60 (m, 1H), 3.80 (s, 3H), 2.22 – 2.11 (m, 1H), 1.94 – 1.83 (m, 1H), 1.17 (t, *J* = 7.5 Hz, 3H), ^{13}C NMR (125 MHz, $CDCl_3$) δ 172.4, 170.3, 159.8, 149.1, 136.0, 134.7, 133.6, 131.0, 129.7, 127.9, 127.3, 122.4, 117.0, 115.0, 113.9, 99.3, 79.0, 66.4, 62.4, 55.4, 23.3, 10.1, HRMS (ESI) *m/z* calc. for $C_{27}H_{26}Cl_2NO_5$ $(M+H)^+$: 514.1183, found: 514.1177.

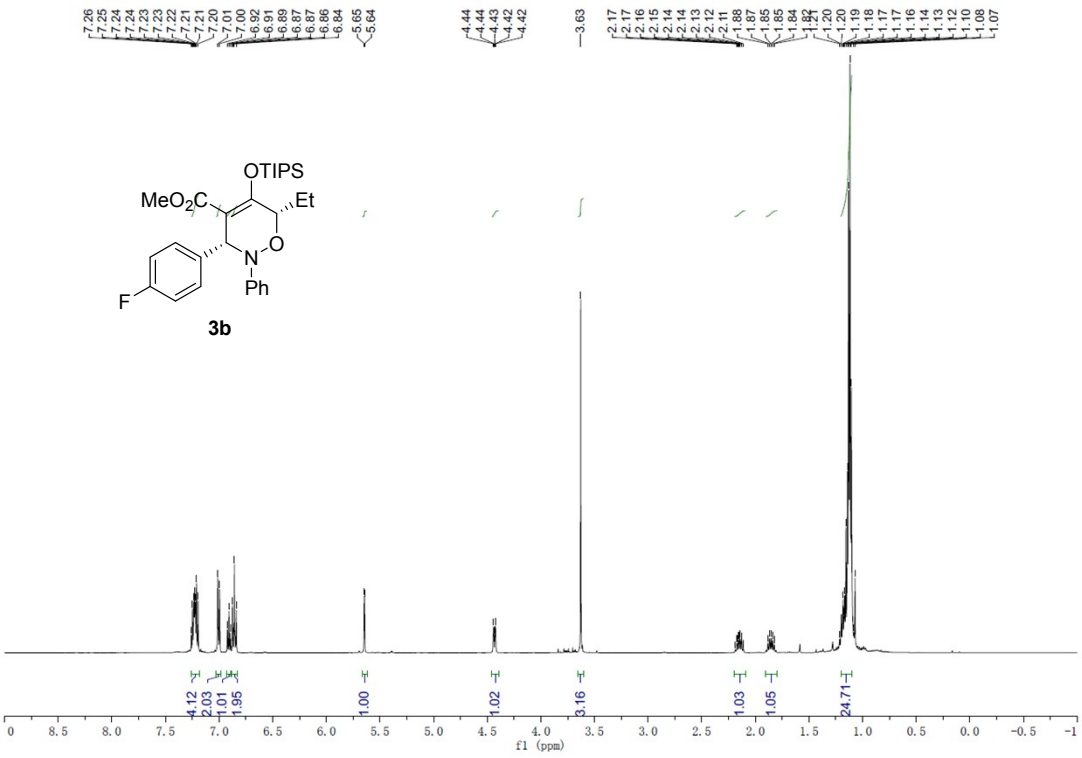
4. Reference

1. K. Dong, K., Marichev, X. Xu, and M. P. Doyle, High Stereocontrol in the Preparation of Silyl-Protected γ-Substituted Enoldiazoacetates, *Synlett.,* 2019, **30**, 1457-1461.
2. (a) L. Zheng, F. Gao, C. Yang, G. L. Gao, Y. Zhao, Y. Gao, W. Xia, Visible-Light Mediated Anti-Regioselective Nitrone 1,3-Dipolar Cycloaddition Reaction and Synthesis of Bisindolylmethanes. *Org. Lett.,* 2017, **19**, 5086−5089. (b) M. M. Lo and G. C. Fu, Cu(I)/Bis(azaferrocene)-Catalyzed Enantioselective Synthesis of β-Lactams *via* Couplings of Alkynes with Nitrones, *J. Am. Chem. Soc.*, 2002, **124**, 4572-4573.

5. NMR Spectra of New Compounds



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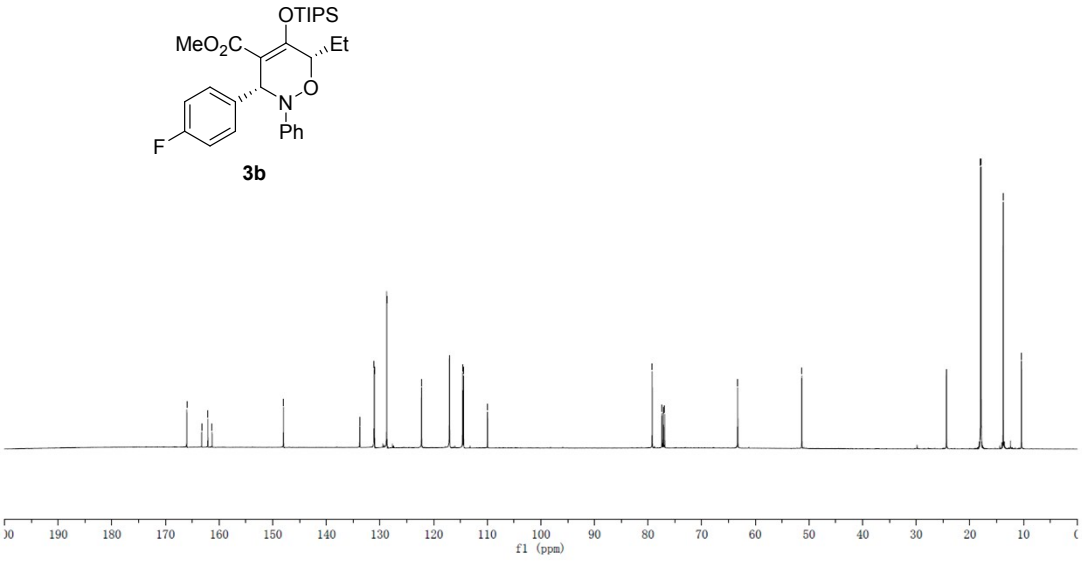
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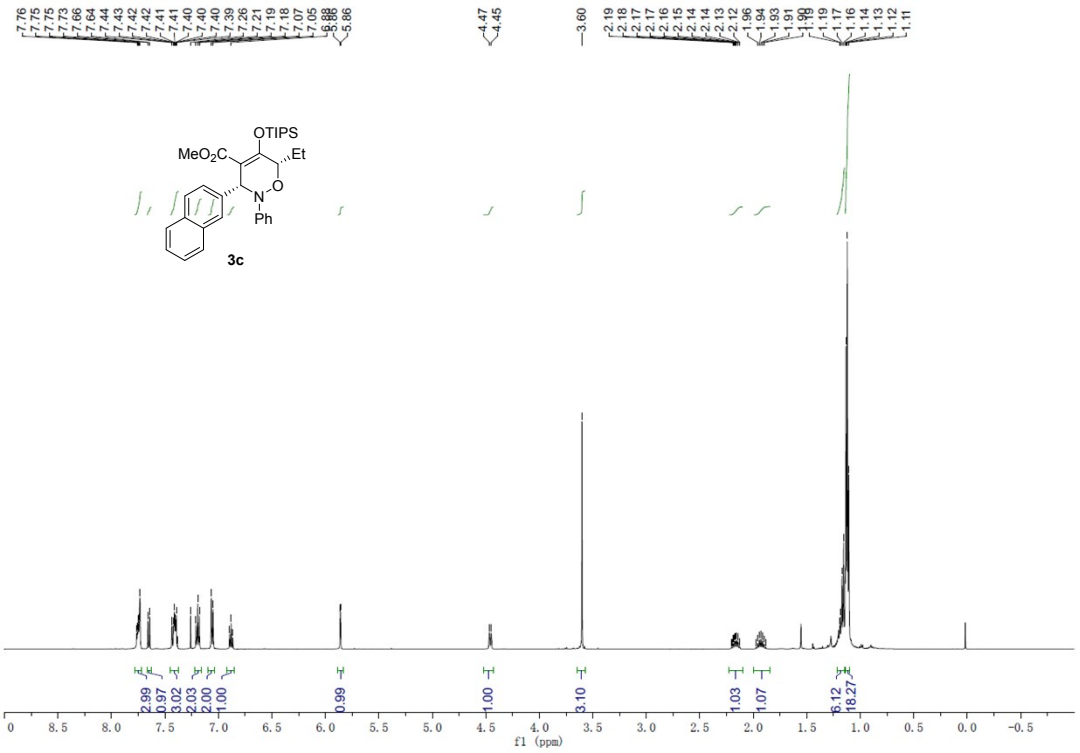
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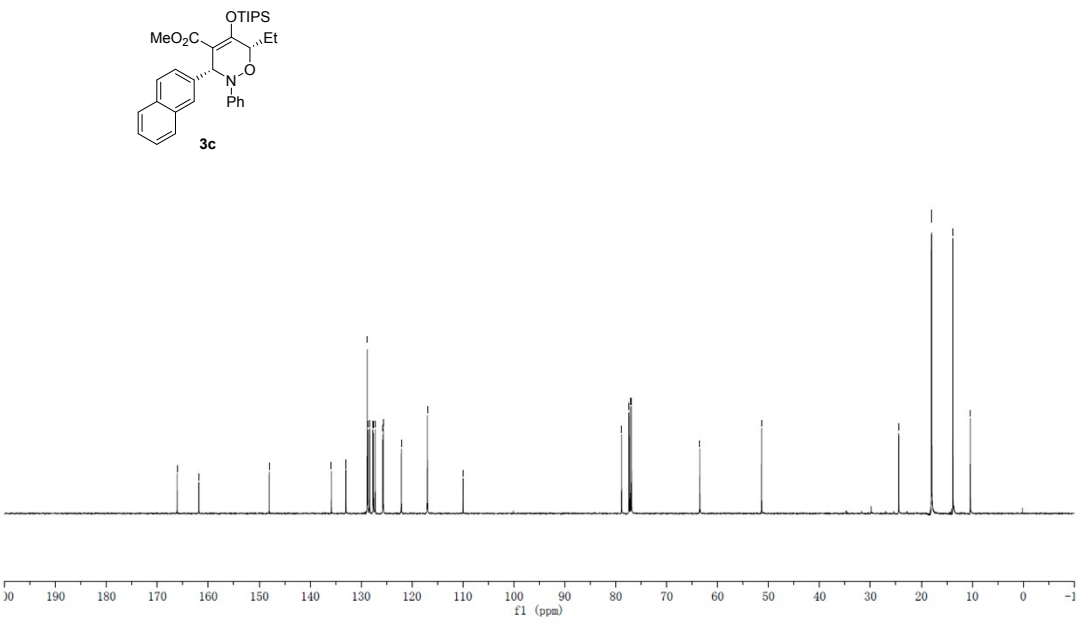
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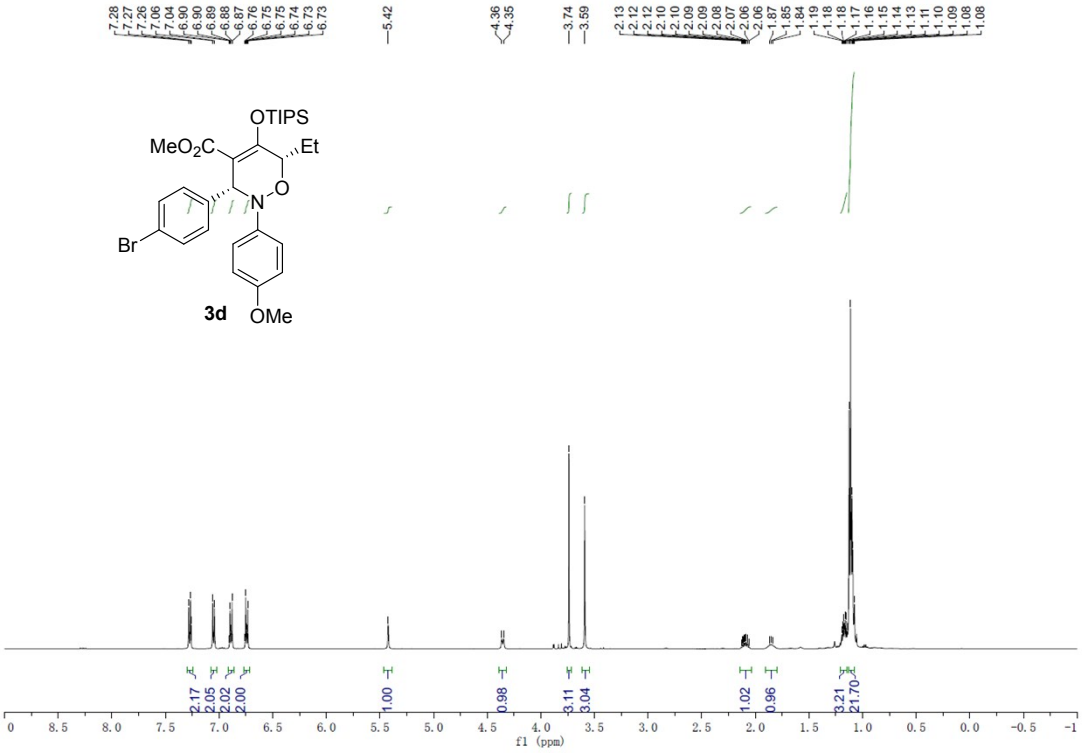
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2.12
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2.10
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2.08
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2.06
2.06
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1.14
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1.11
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1.09
1.08
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N
O
Br
OMe
3d
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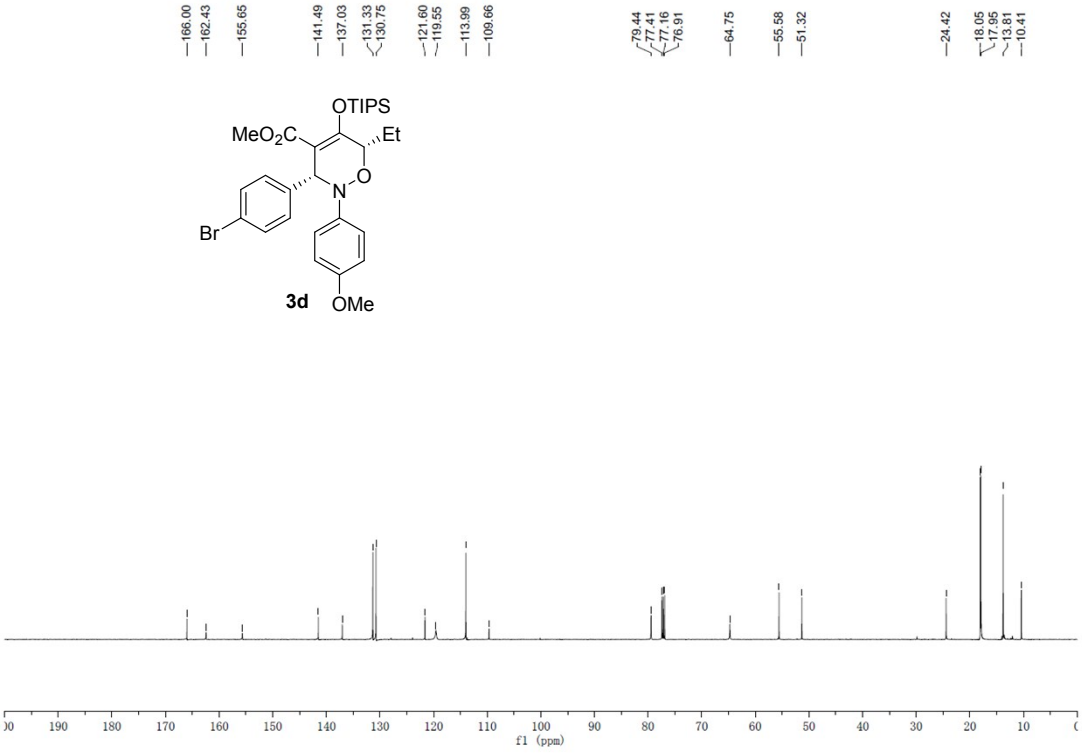
f1 (ppm)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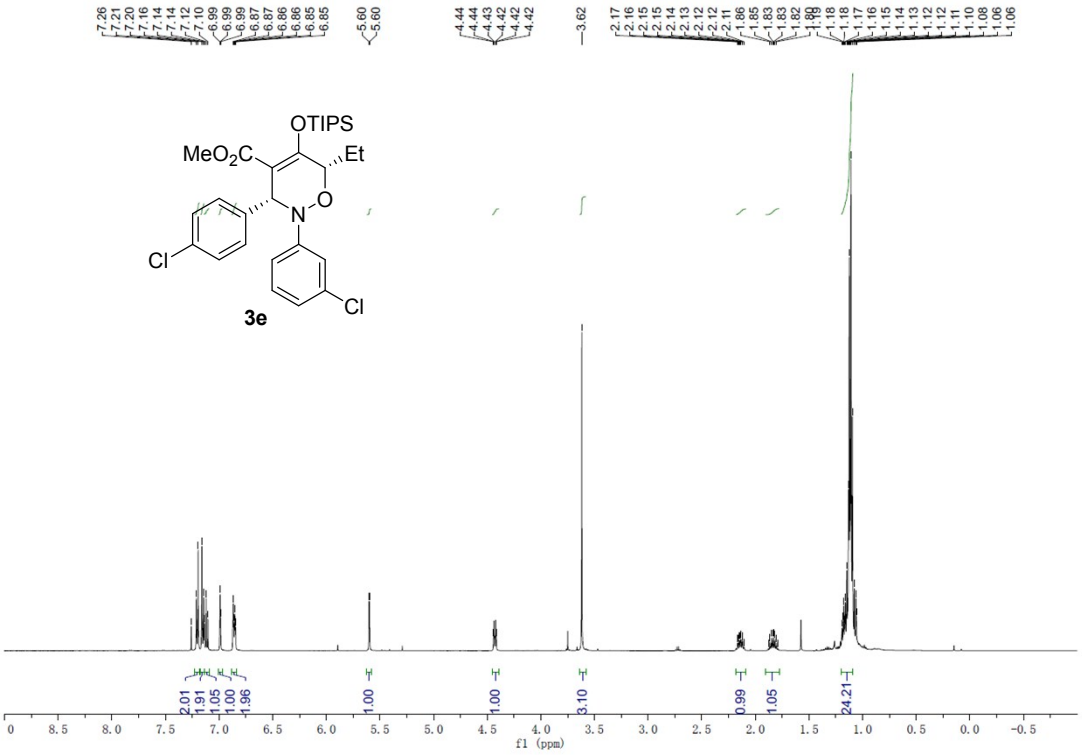
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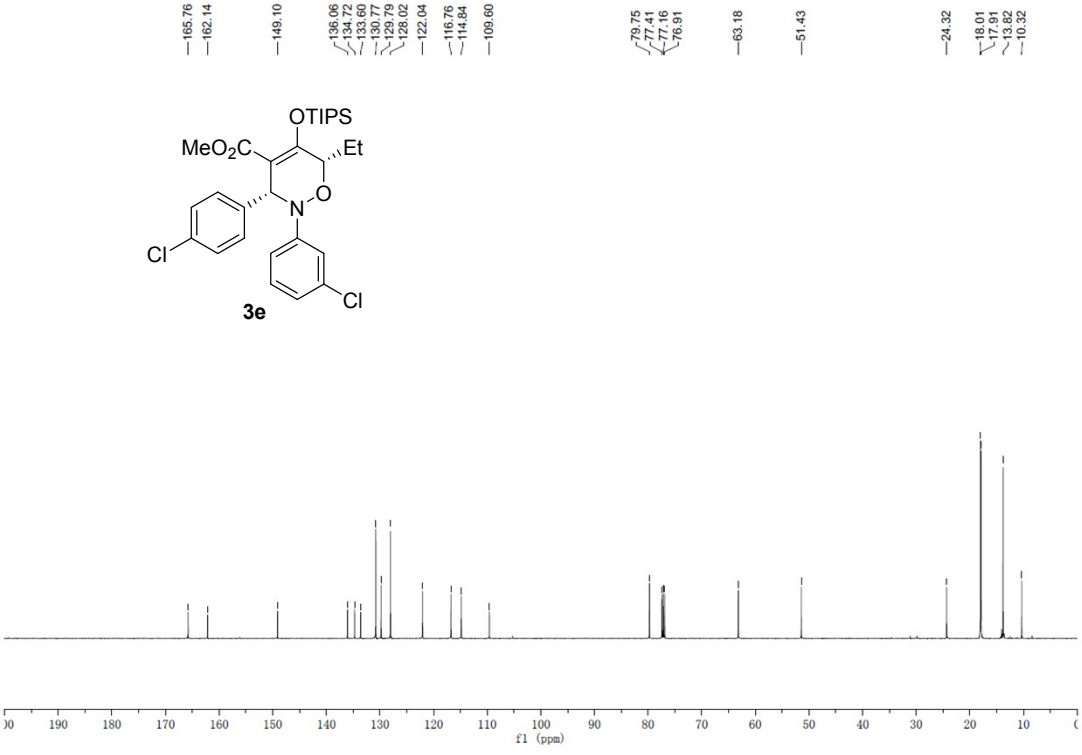
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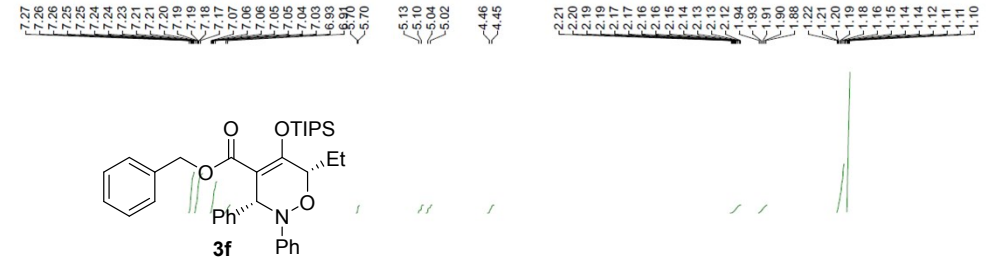
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7.05
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6.91
5.70
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5.04
5.02
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2.17
2.17
2.16
2.16
2.15
2.14
2.13
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1.91
1.90
1.88
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1.15
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Ph
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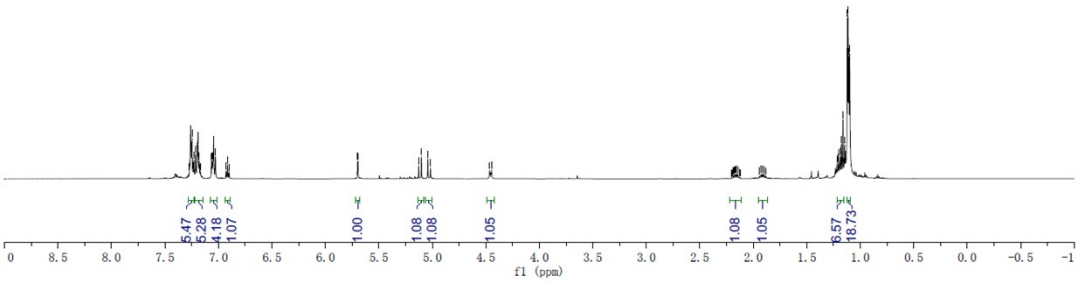
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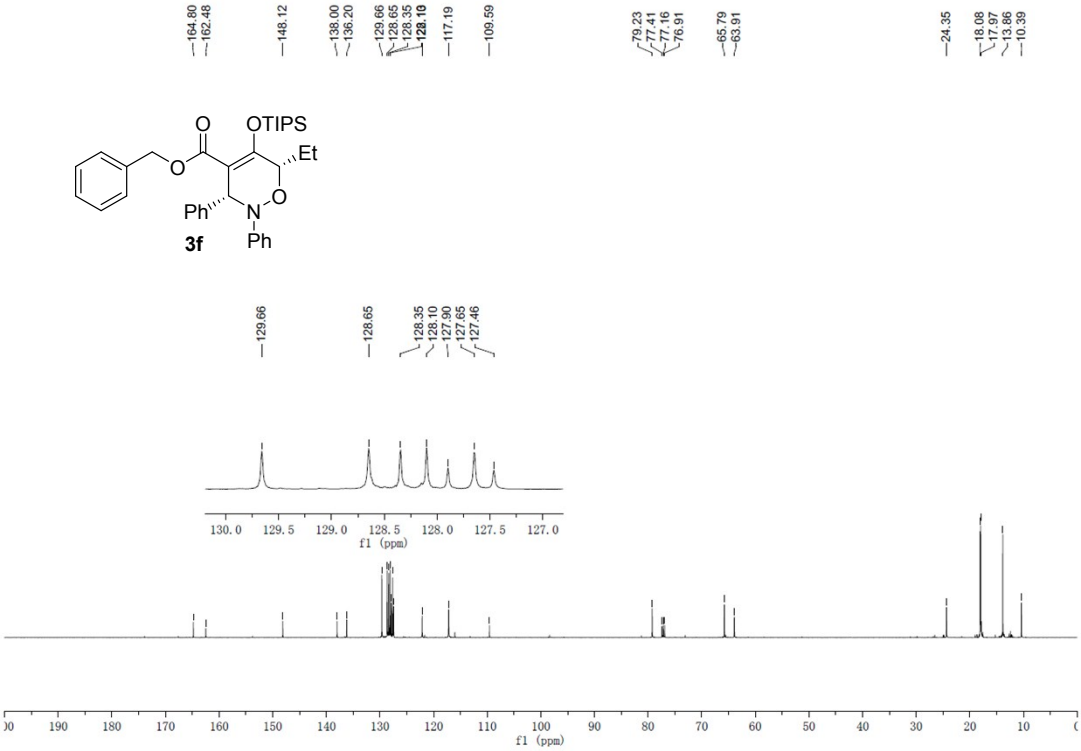
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N
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Ph
3f
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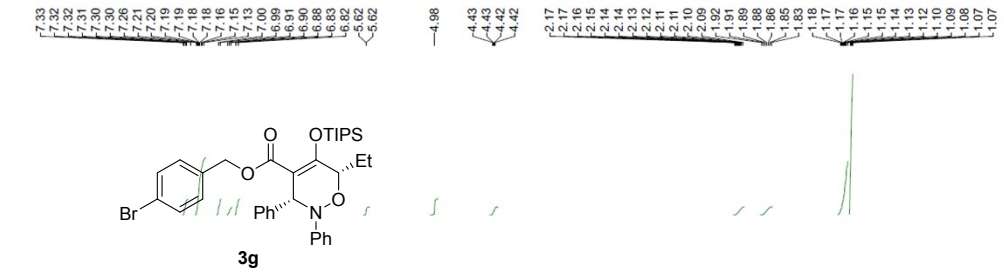
f1 (ppm)
f1 (ppm)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5.62
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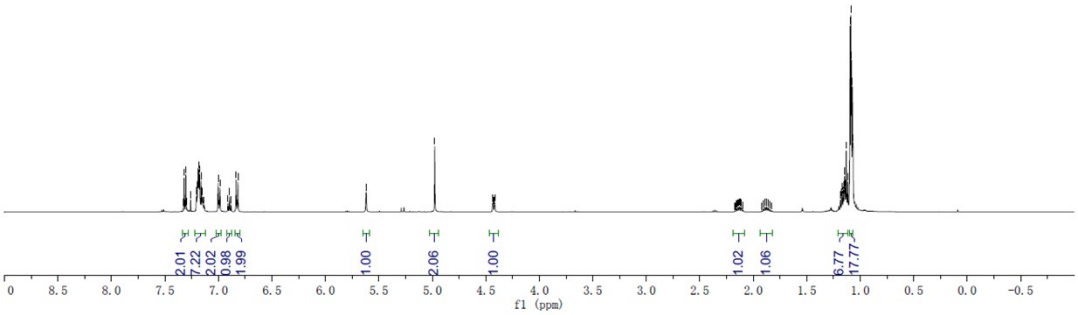
Ph

3g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6.0
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2.5
2.0
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1.0
0.5
0.0
-0.5
f1 (ppm)


164.59
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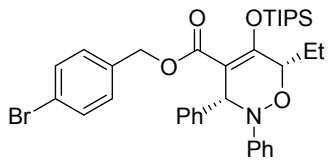
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Br
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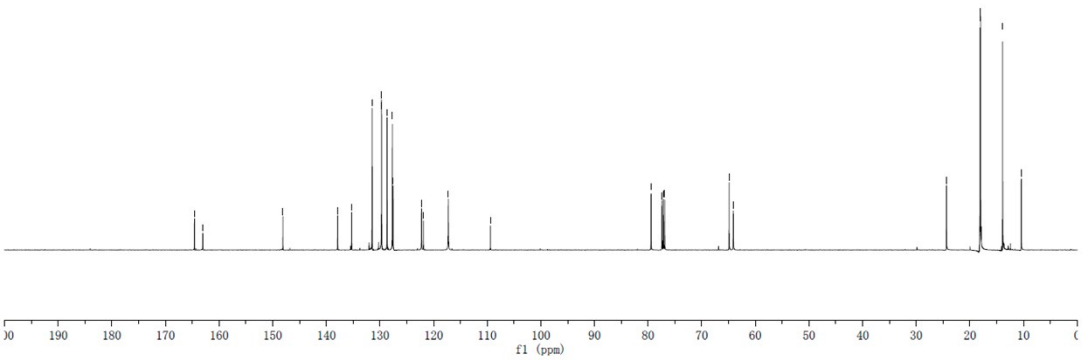
N
O
Ph

3g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20
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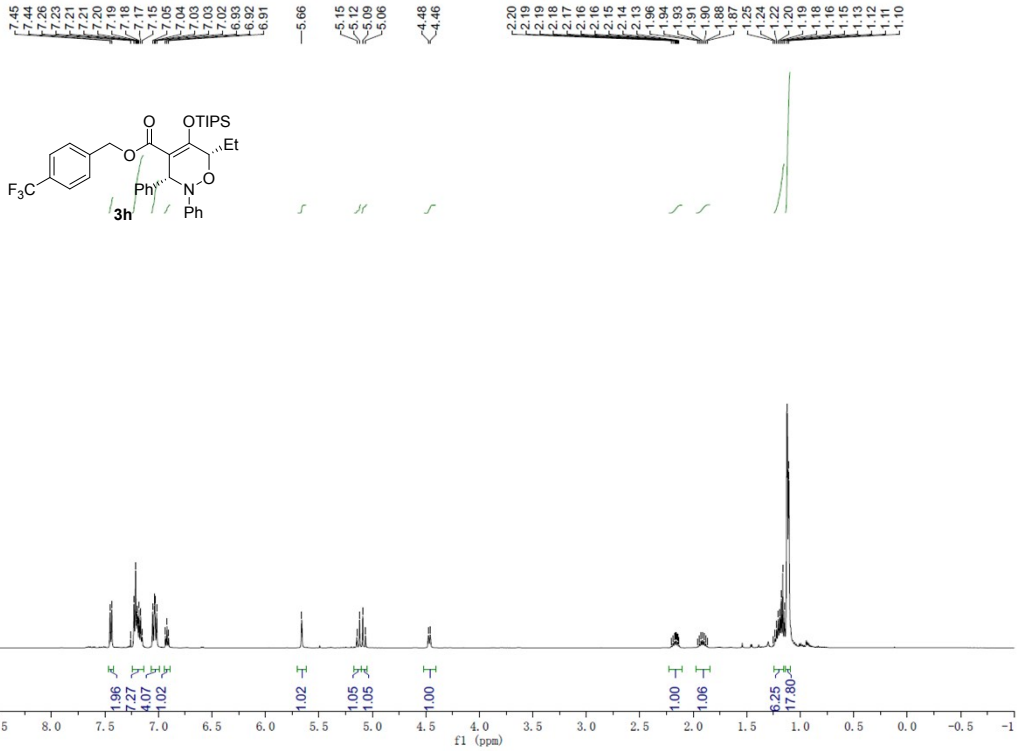
f1 (ppm)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5.15 5.12 5.09 5.06
4.48 4.46
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O
OTIPS
Et
O
F3C
Ph
N
O
Ph
3h
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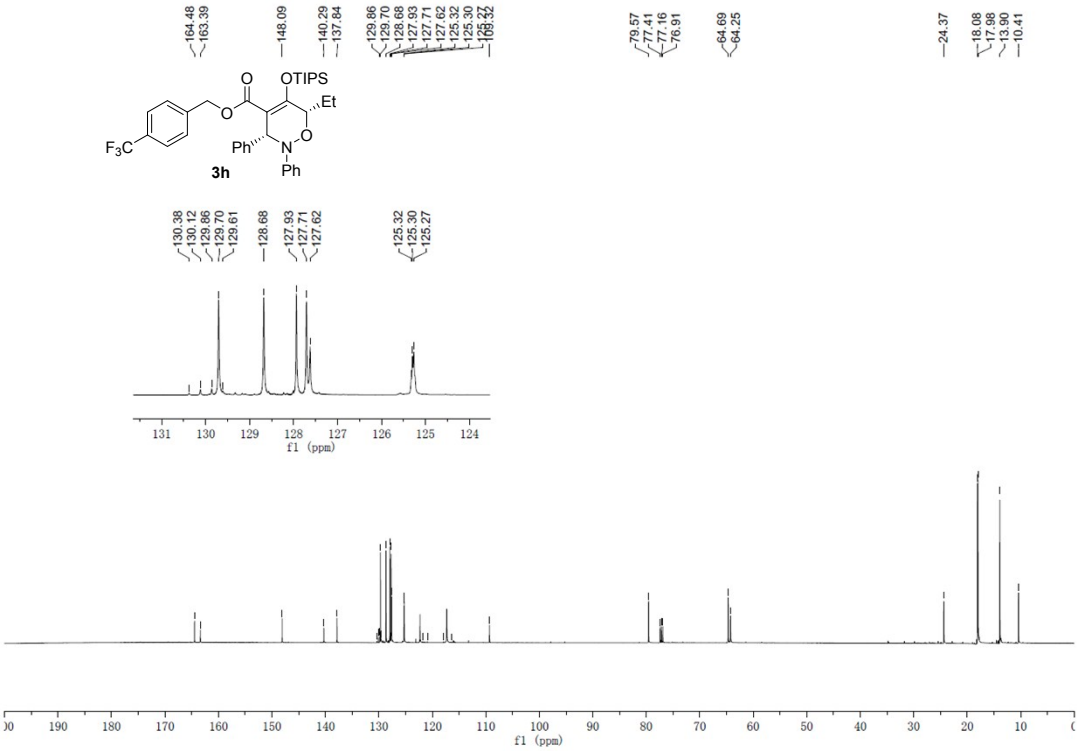
f1 (ppm)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24.37
18.08 17.98 13.90 10.41
O
OTIPS
Et
O
F3C
Ph
N
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Ph
3h
130.38 130.12 129.86 129.70 129.61
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127.93 127.71 127.62
125.32 125.30 125.27
f1 (ppm)
f1 (ppm)


7.28 7.24 7.24 7.23 7.23 7.22 7.21 7.21 7.19 7.18 7.17 7.16 7.16 7.03 7.01 6.92 6.91 6.89 6.80 6.80 6.79 6.78 6.77 5.66 5.66
5.05 5.03 4.96 4.94
4.44 4.42
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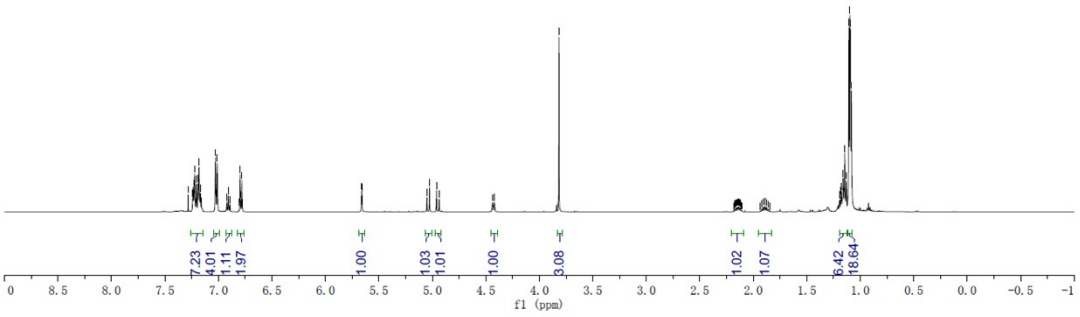
Ph

3i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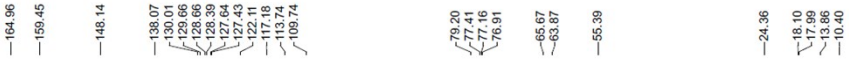
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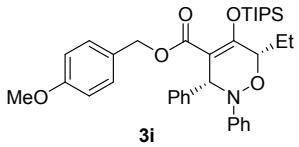
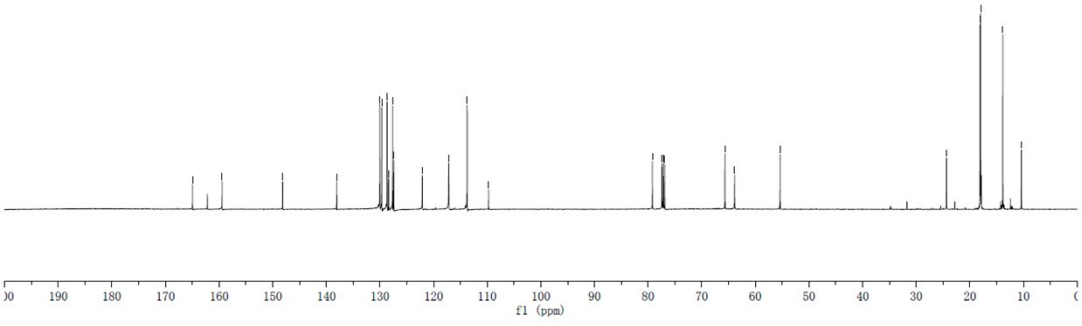
55.39
24.36
18.10 17.99 13.86 10.40


O
OTIPS
Et
O
MeO
Ph
N
O
Ph

3i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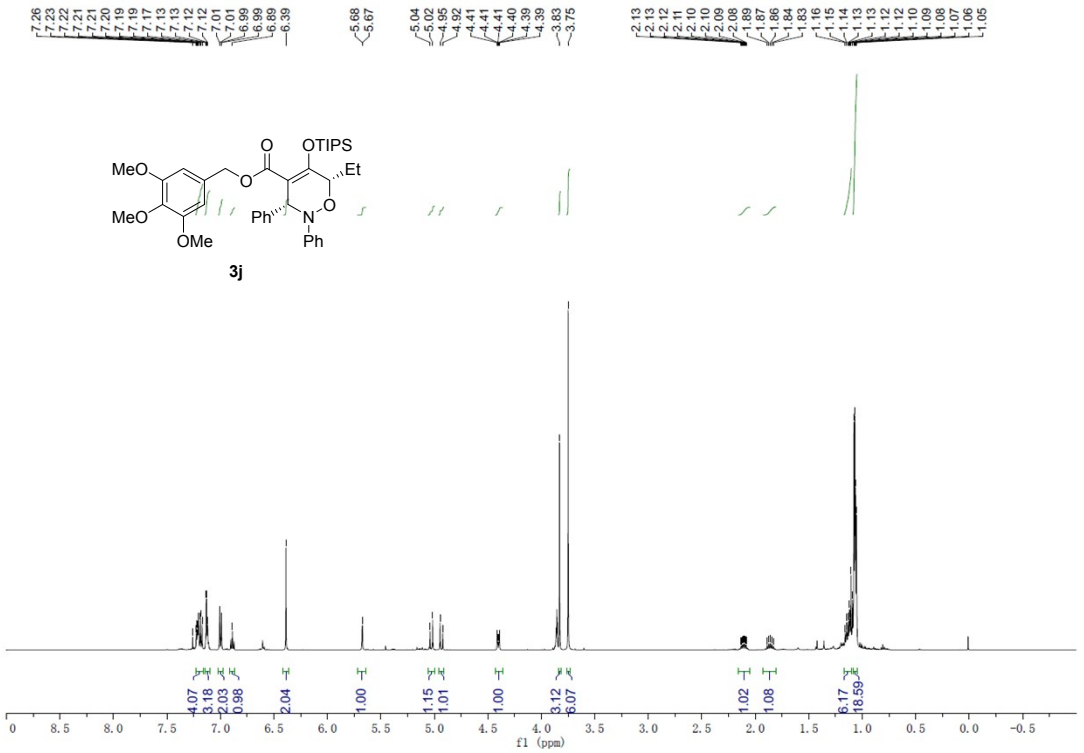

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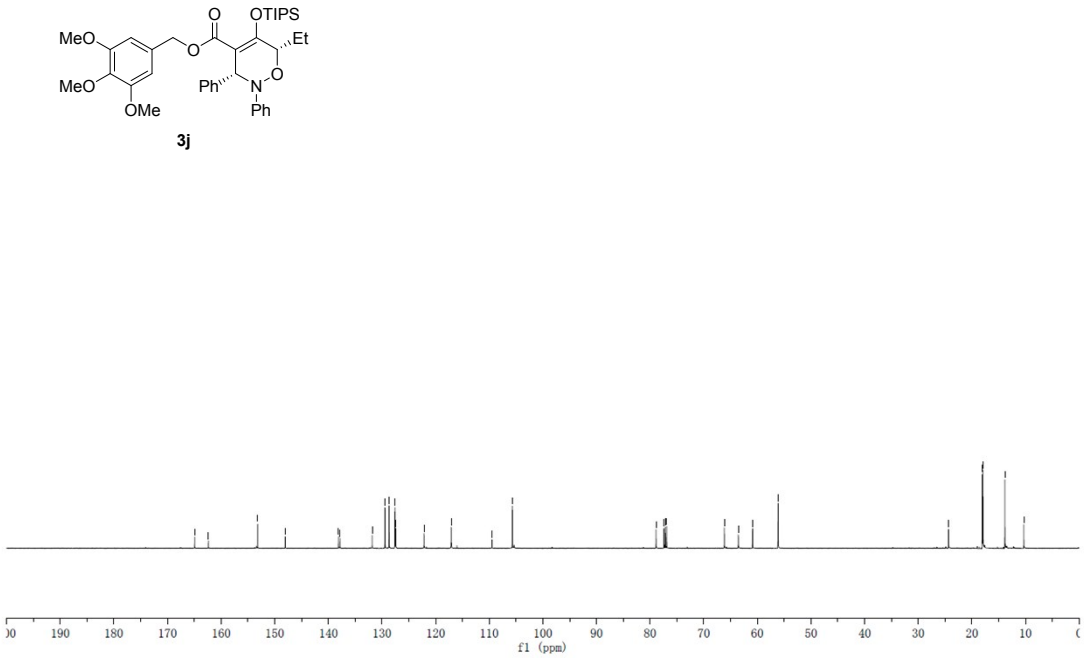

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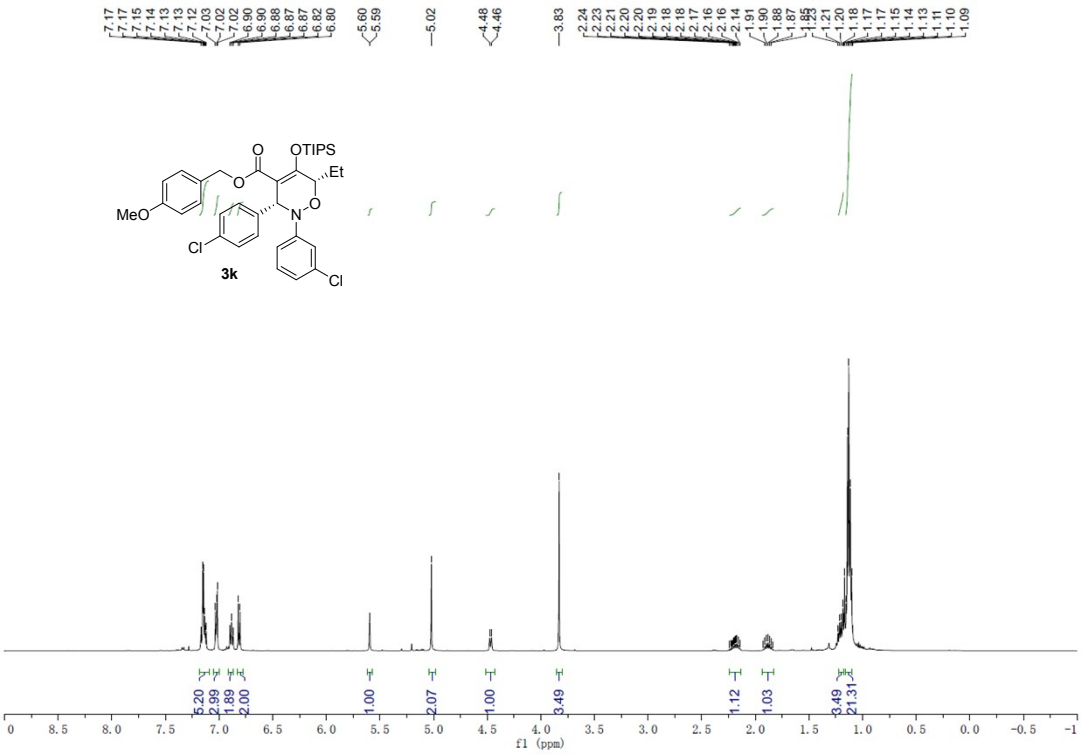
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7.17
7.15
7.14
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7.13
7.12
7.03
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7.02
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6.90
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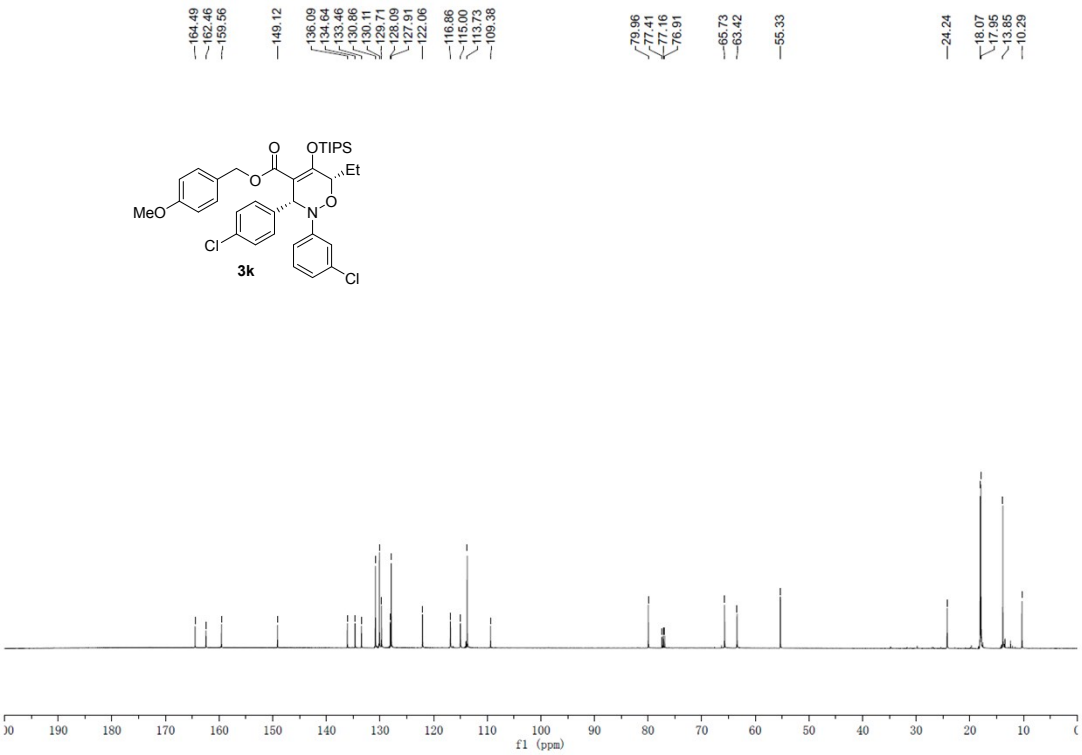
21.31
f1 (ppm)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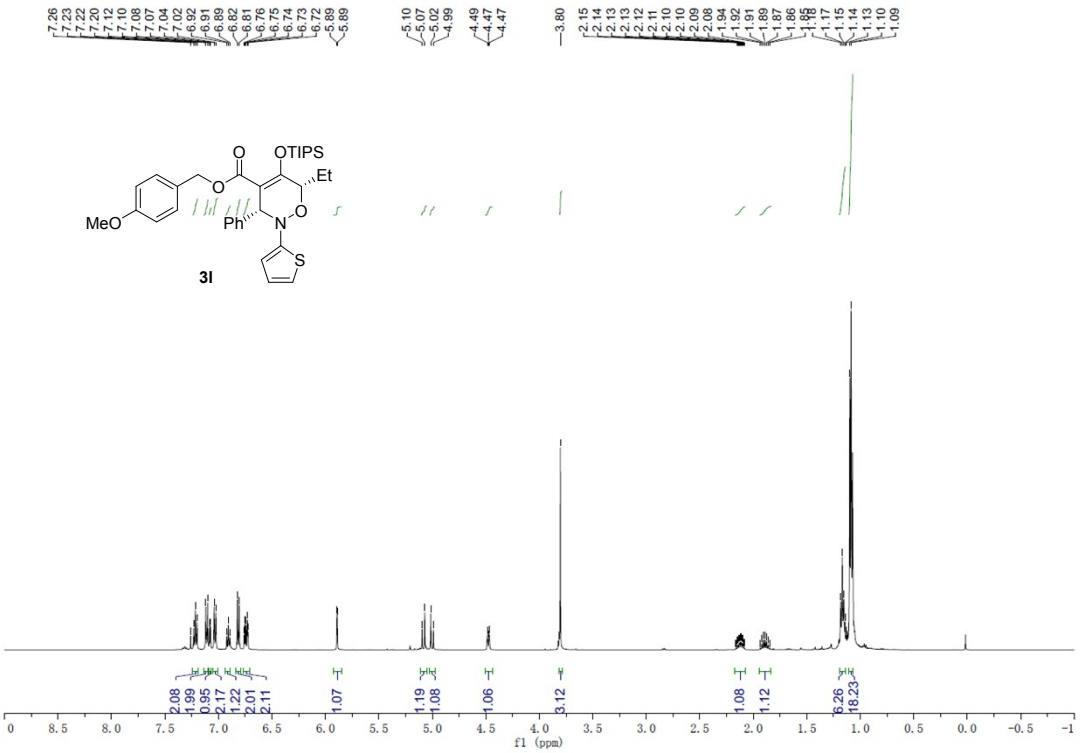
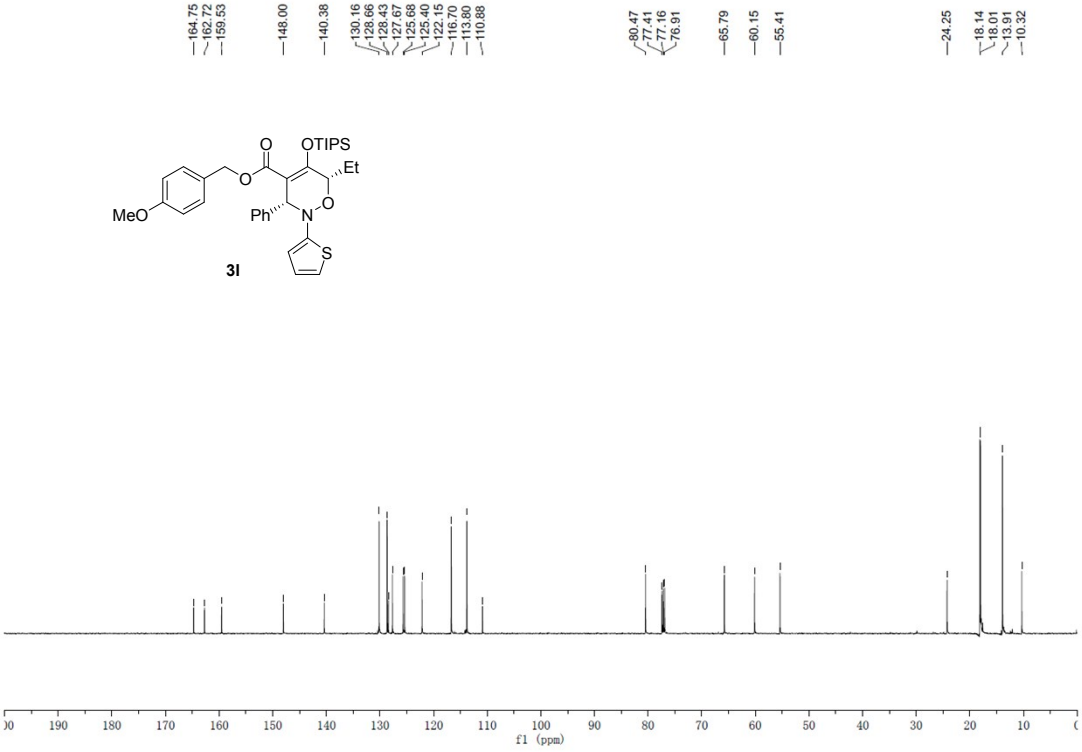
159.56
149.12
136.09
134.64
133.46
130.86
130.11
129.71
128.09
127.91
122.06
116.86
115.00
113.73
109.38
79.96
77.41
77.16
76.91
65.73
63.42
55.33
24.24
18.07
17.95
13.85
10.29
O
OTIPS
Et
O
O
MeO
N
Cl
Cl
3k
f1 (ppm)


7.26
7.23
7.22
7.20
7.12
7.10
7.08
7.07
7.04
7.02
6.92
6.91
6.89
6.82
6.81
6.76
6.75
6.74
6.73
6.72
5.89
5.89
5.10
5.07
5.02
4.99
4.49
4.47
4.47
3.80
2.15
2.14
2.13
2.13
2.12
2.11
2.10
2.10
2.09
2.08
1.94
1.92
1.91
1.89
1.87
1.86
1.85
1.18
1.17
1.15
1.14
1.13
1.10
1.09
O
OTIPS
Et
O
MeO
Ph
N
O
S
3l
2.08
1.99
0.95
2.17
1.22
2.01
2.11
1.07
1.19
1.08
1.06
3.12
1.08
1.12
6.26
18.23
f1 (ppm)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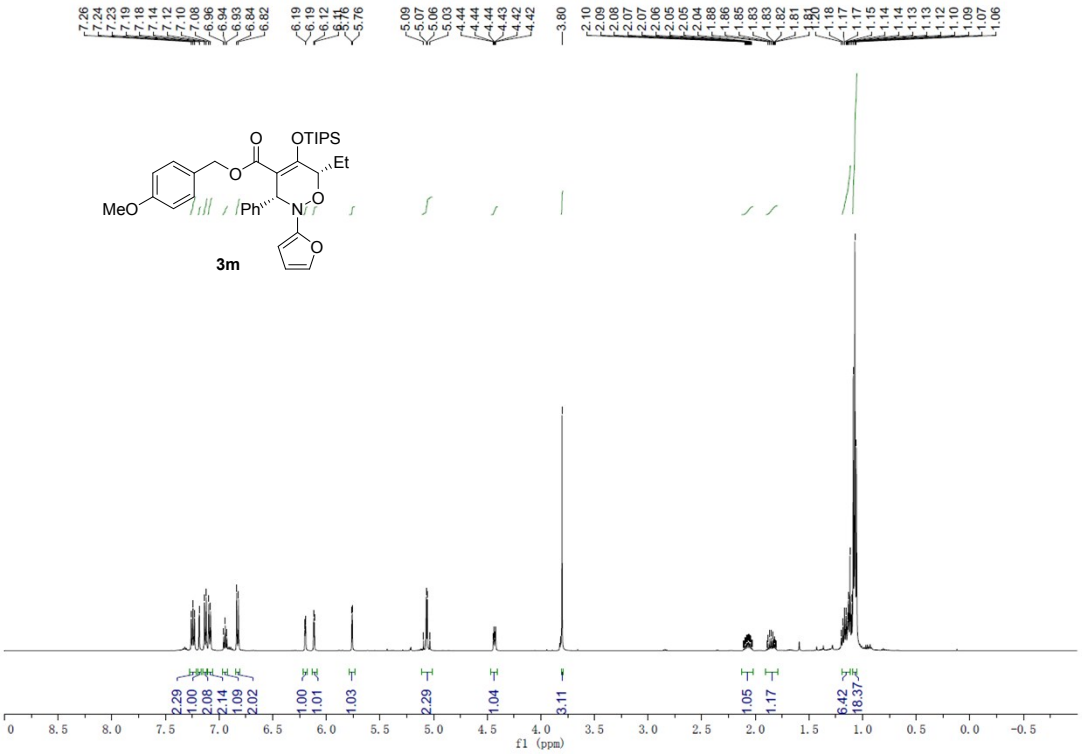
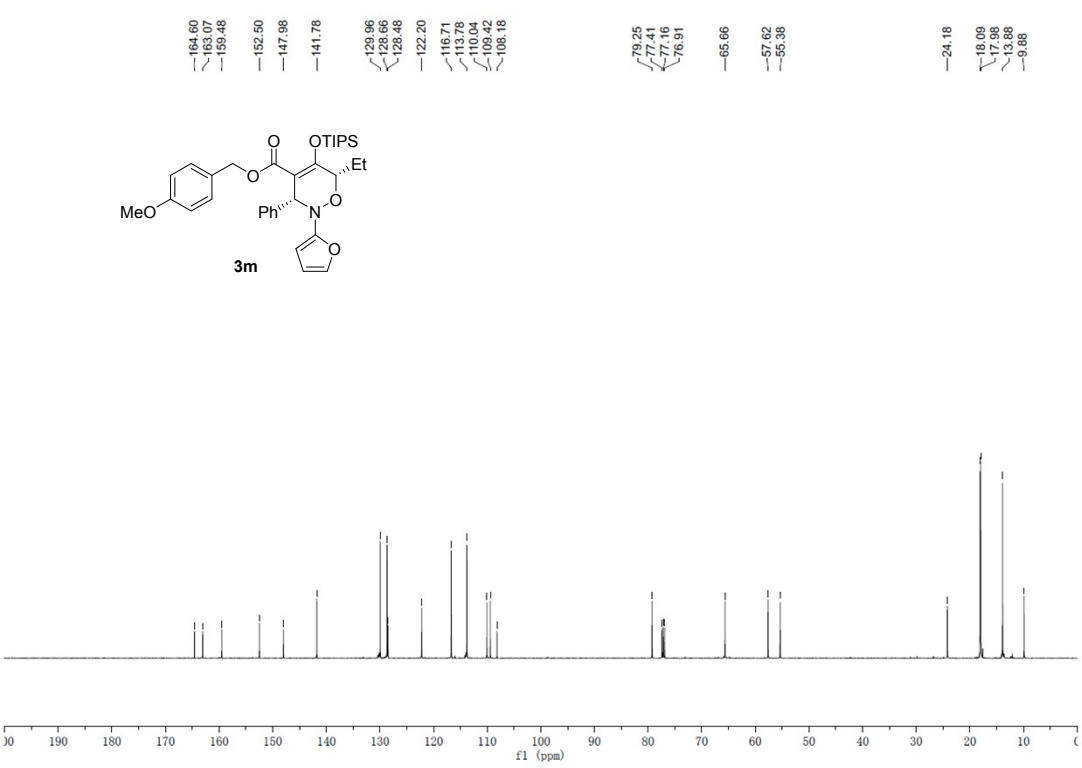
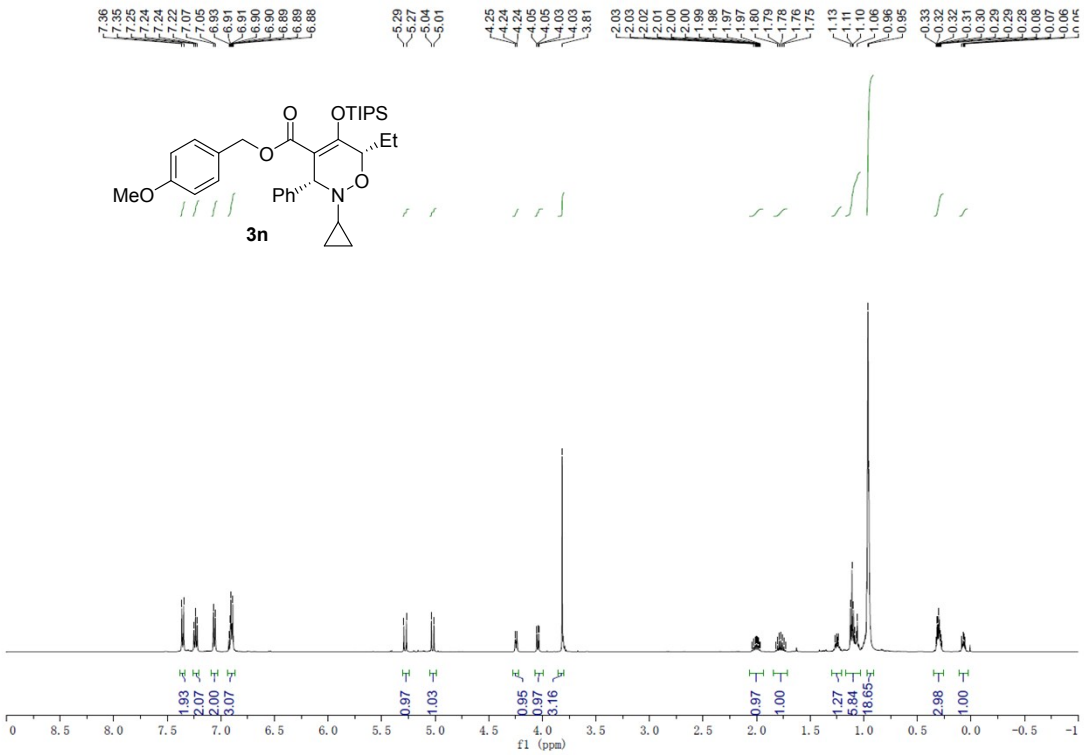
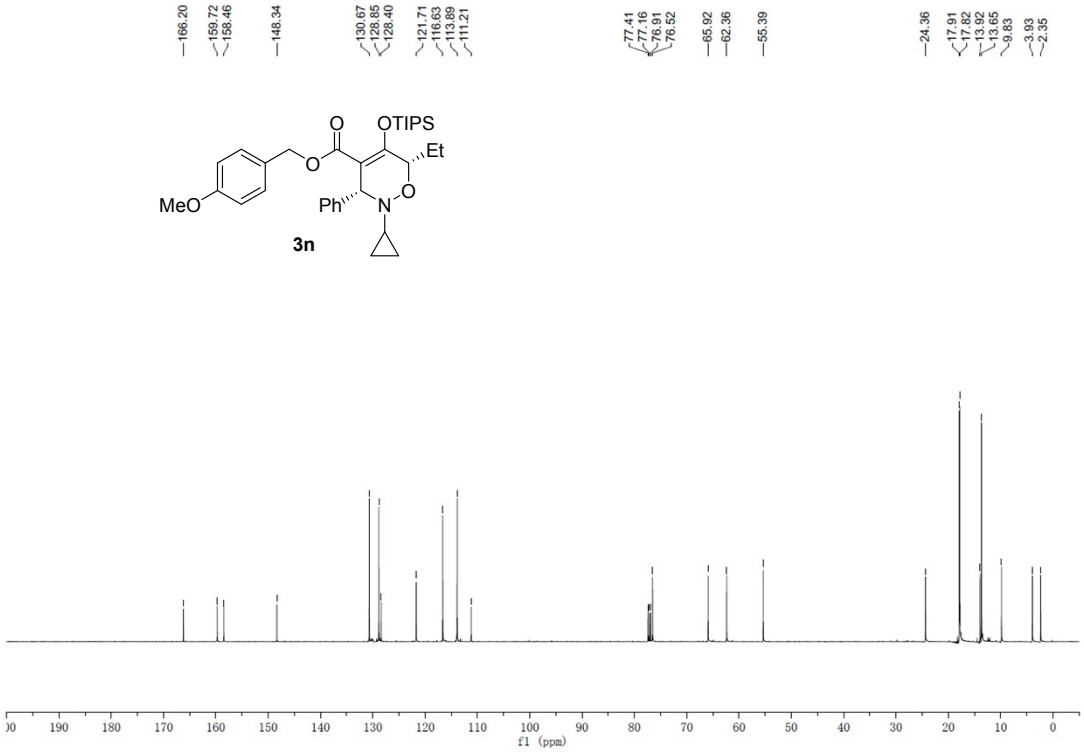
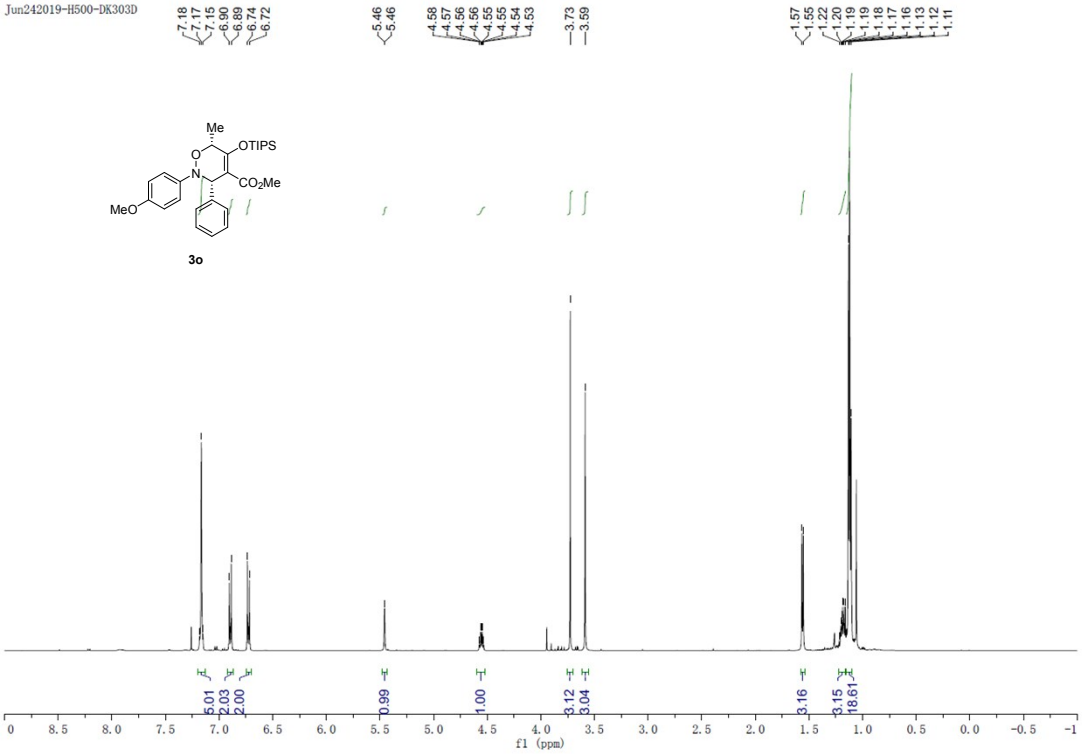
148.00
140.38
130.16
128.66
128.43
127.67
125.68
125.40
122.15
116.70
113.80
110.88
80.47
77.41
77.16
76.91
65.79
60.15
55.41
24.25
18.14
18.01
13.91
10.32
O
OTIPS
Et
O
MeO
Ph
N
O
S
3l
f1 (ppm)

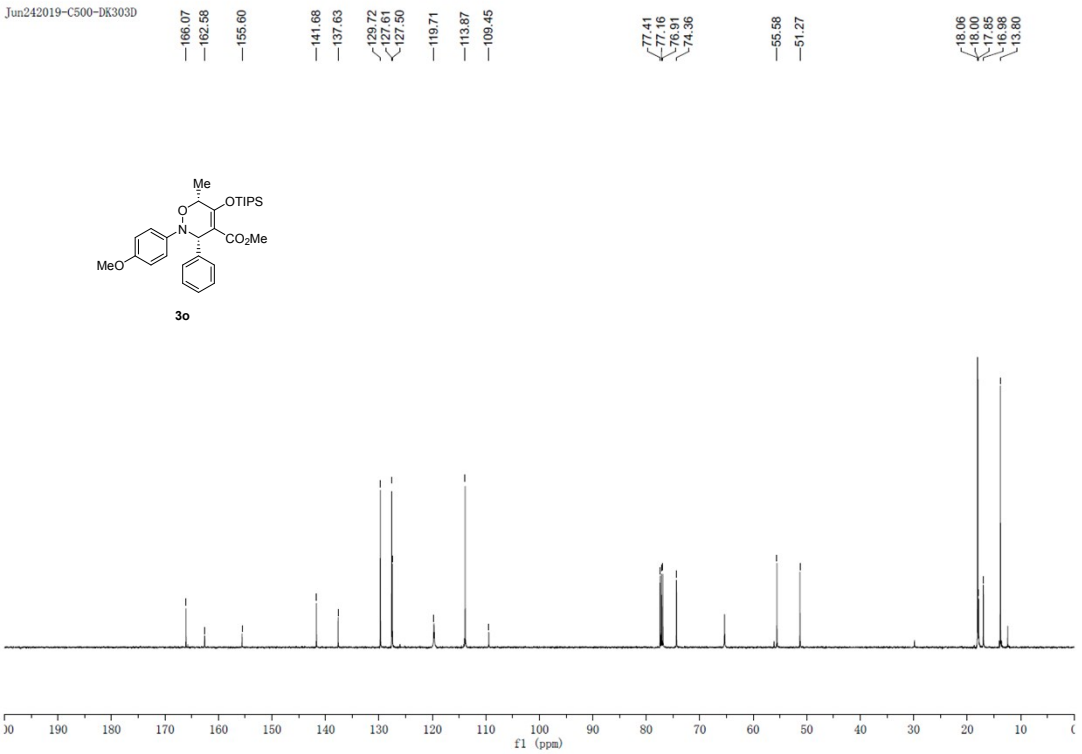

OTIPS
Et
MeO
Ph
N
O
3m
f1 (ppm)

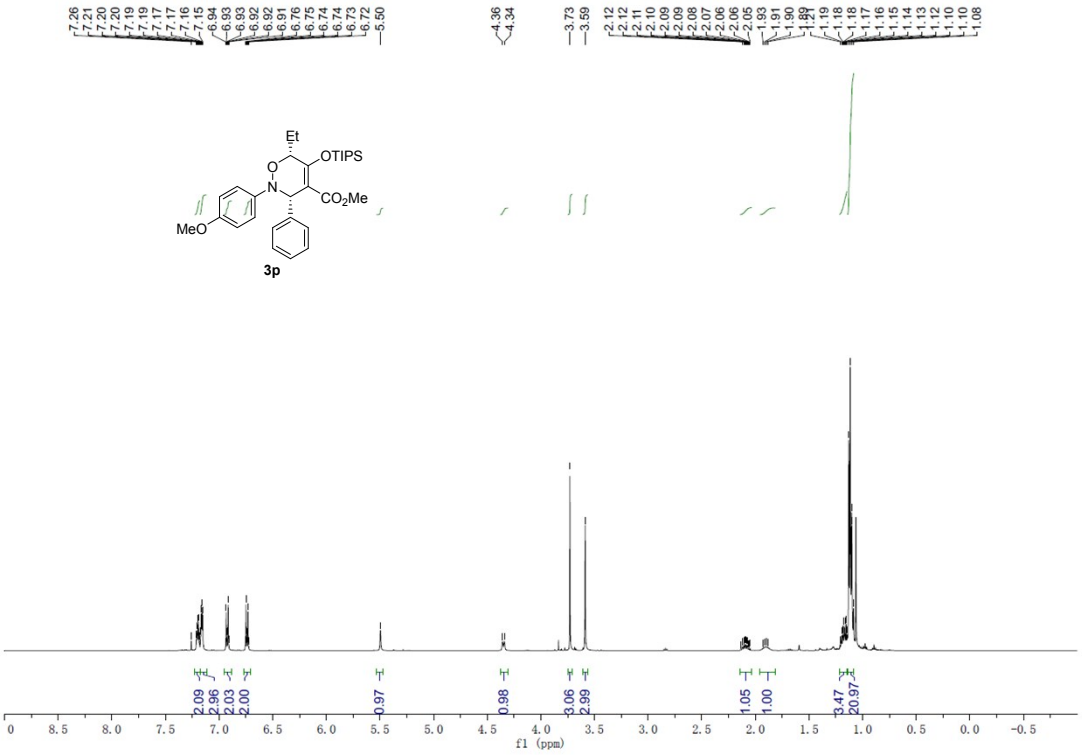

OTIPS
Et
MeO
Ph
N
O
3m
f1 (ppm)

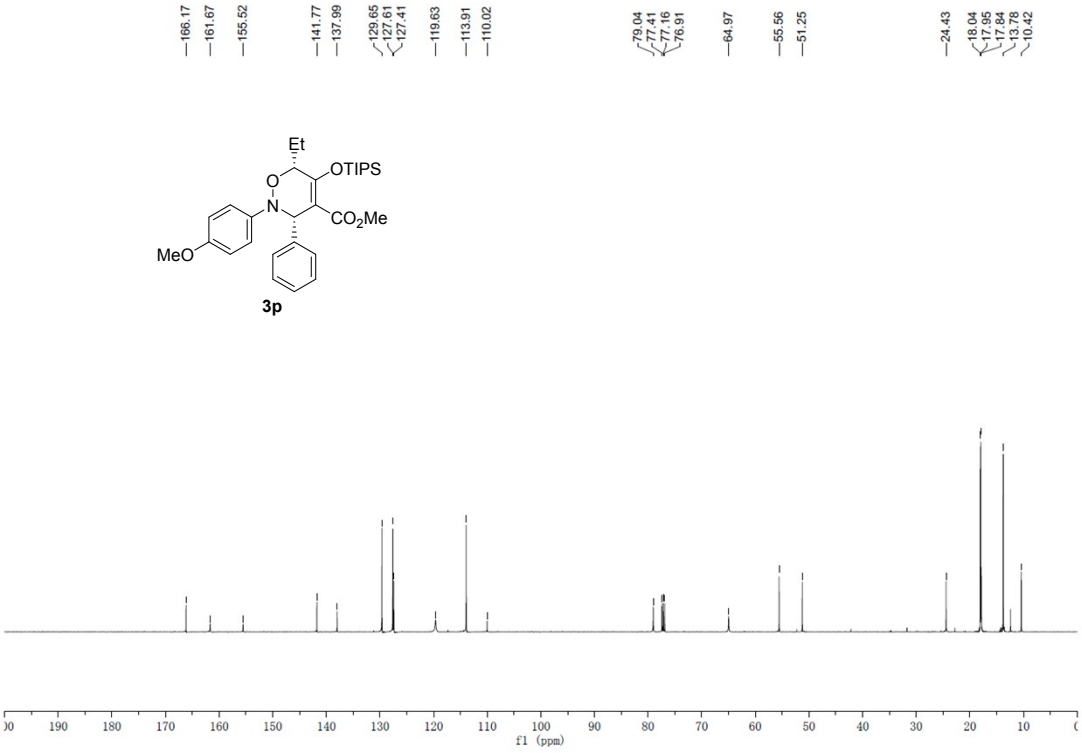

OTIPS
O
Et
MeO
Ph
N
O
3n
f1 (ppm)

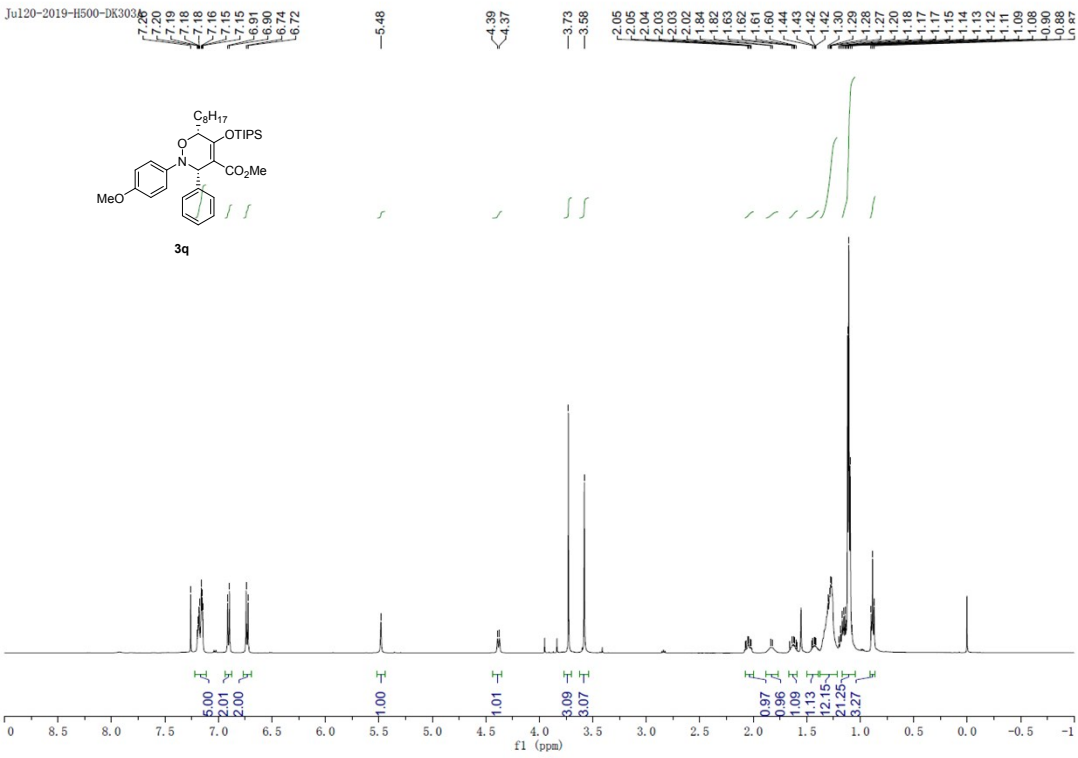

OTIPS
O
Et
MeO
Ph
N
O
3n
f1 (ppm)

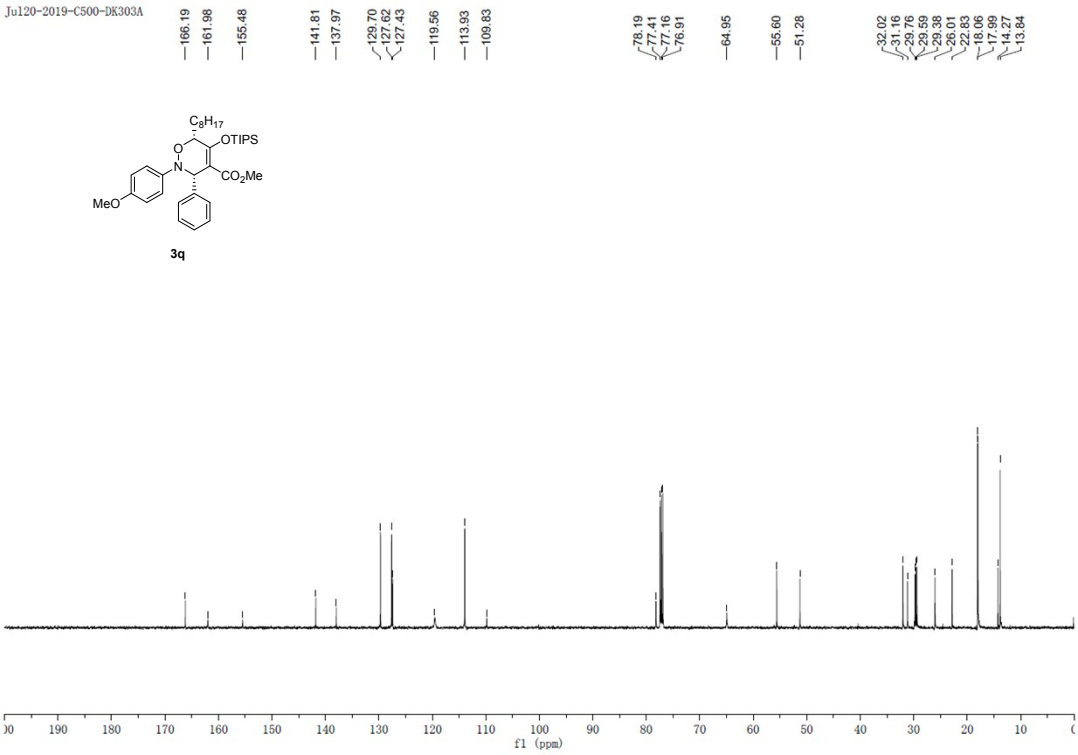

Jun242019-H500-DK303D
7.18
7.17
7.15
6.90
6.89
6.74
6.72
5.46
5.46
4.58
4.57
4.56
4.56
4.55
4.55
4.54
4.53
3.73
3.59
1.57
1.55
1.22
1.20
1.19
1.19
1.18
1.17
1.16
1.13
1.12
1.11
Me
OTIPS
CO2Me
MeO
3o
5.01
2.03
2.00
0.99
1.00
3.12
3.04
3.16
3.15
18.61
f1 (ppm)

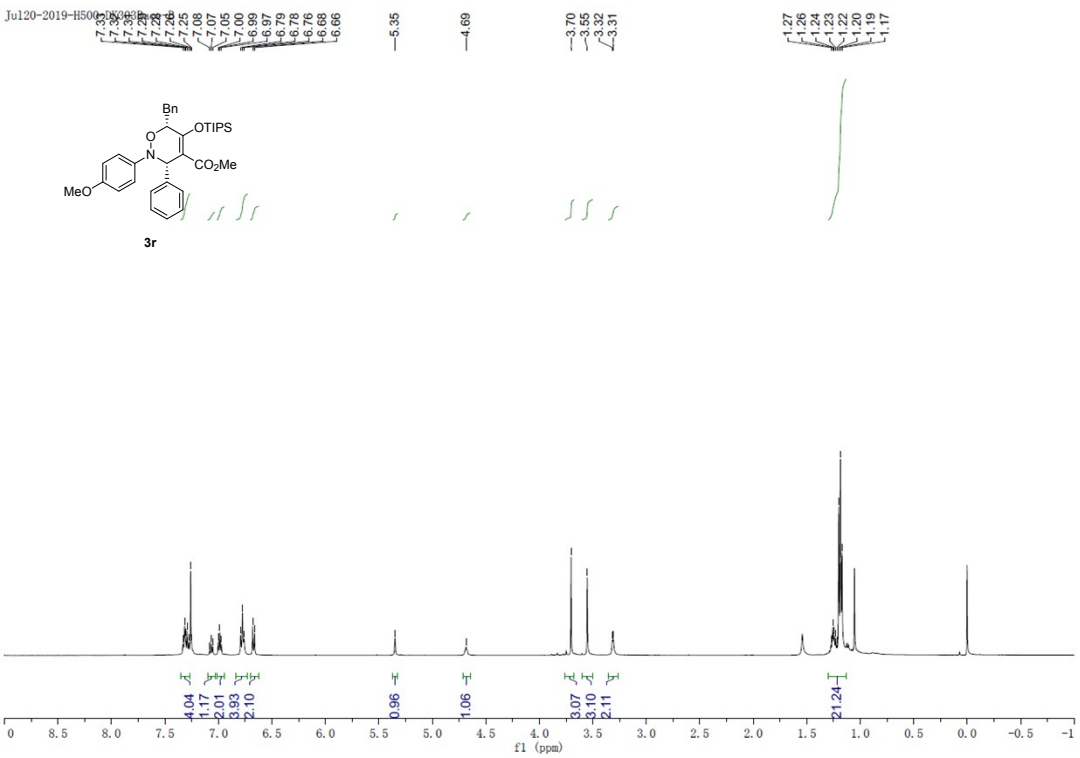

Jun242019-C500-DK303D
166.07
162.58
155.60
141.68
137.63
129.72
127.61
127.50
119.71
113.87
109.45
77.41
77.16
76.91
74.36
55.58
51.27
18.06
18.00
17.85
16.98
13.80
Me
OTIPS
CO2Me
MeO
3o
f1 (ppm)

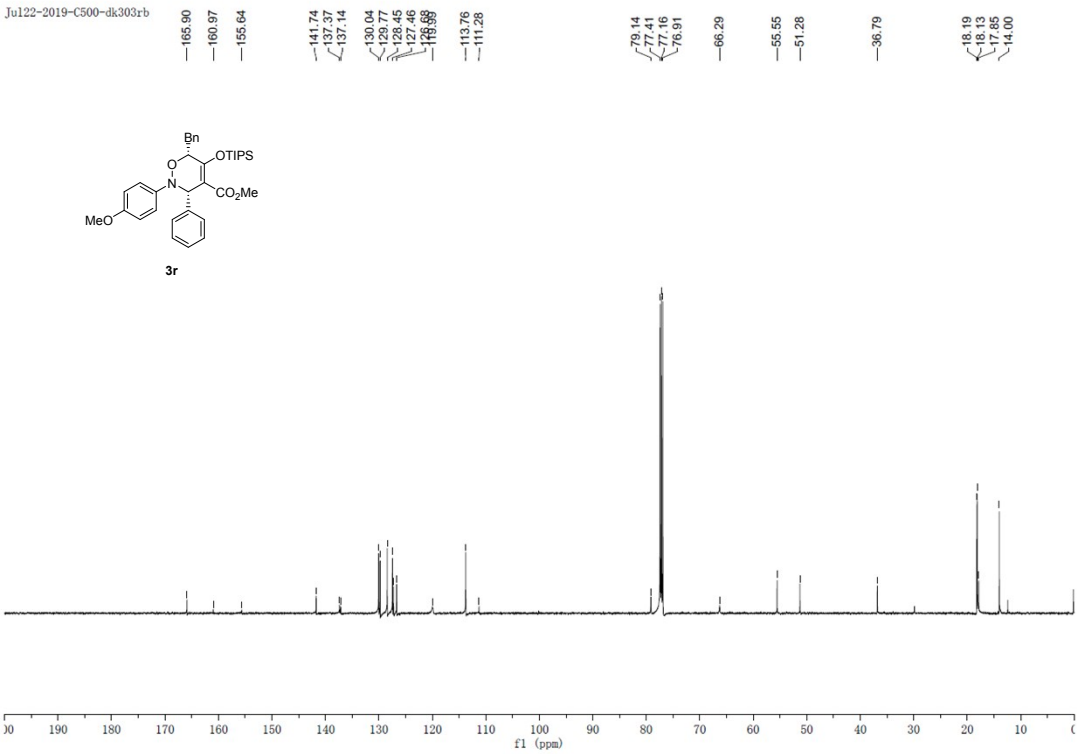

Et
OTIPS
O
N
CO2Me
MeO
3p
f1 (ppm)

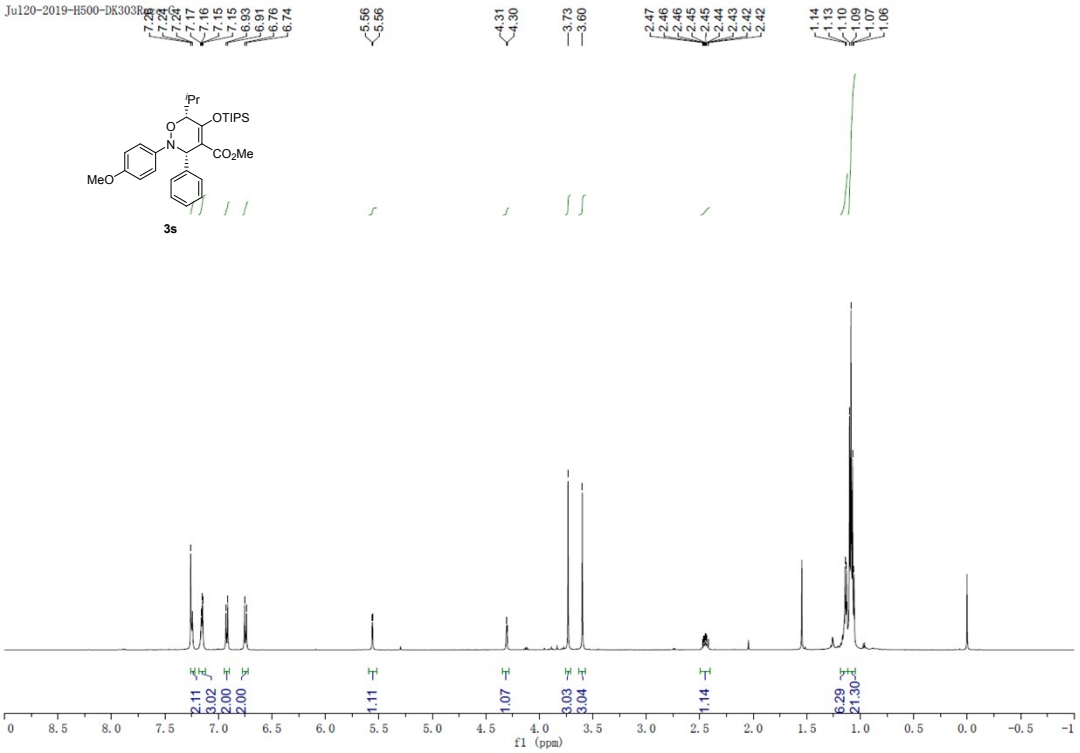

Et
OTIPS
O
N
CO2Me
MeO
3p
f1 (ppm)

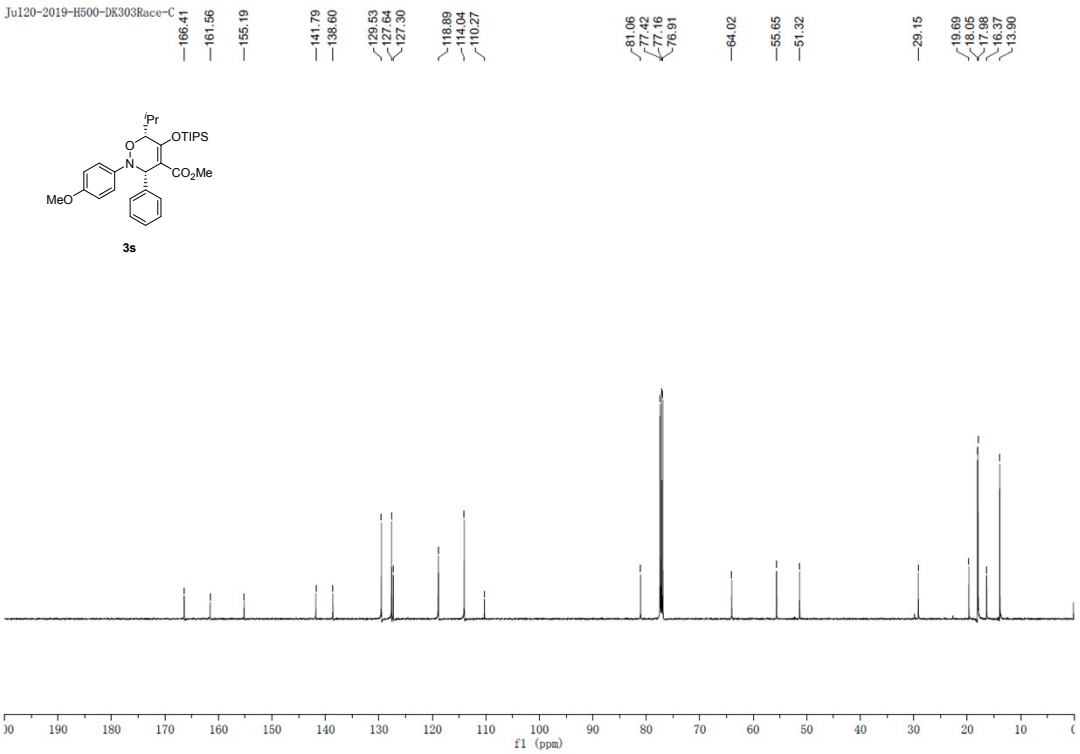

Jul20-2019-H500-DK303A
7.26
7.20
7.19
7.18
7.18
7.16
7.15
7.15
6.91
6.90
6.74
6.72
5.48
4.39
4.37
3.73
3.58
2.05
2.05
2.04
2.03
2.02
1.84
1.82
1.63
1.62
1.61
1.60
1.44
1.43
1.42
1.30
1.29
1.28
1.27
1.20
1.18
1.17
1.15
1.14
1.13
1.12
1.11
1.09
1.08
0.90
0.88
C8H17
OTIPS
CO2Me
MeO
3q
5.00
2.01
2.00
1.00
1.01
3.09
3.07
0.97
0.96
1.09
1.13
12.15
21.25
3.27
f1 (ppm)

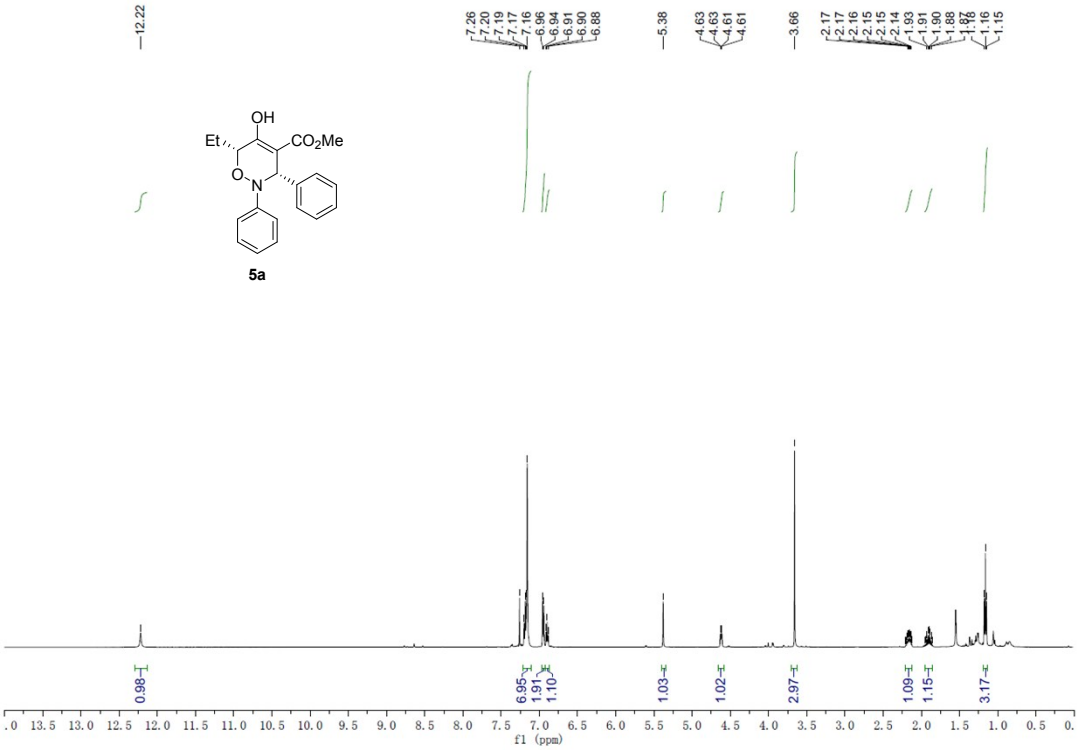

Jul20-2019-C500-DK303A
166.19
161.98
155.48
141.81
137.97
129.70
127.62
127.43
119.56
113.93
109.83
78.19
77.41
77.16
76.91
64.95
55.60
51.28
32.02
31.16
29.76
29.59
29.38
26.01
22.83
18.06
17.99
14.27
13.84
C8H17
OTIPS
CO2Me
MeO
3q
f1 (ppm)


Jul20-2019-H500-DK303
7.35
7.34
7.33
7.32
7.31
7.30
7.29
7.28
7.27
7.26
7.25
7.08
7.07
7.05
7.00
6.99
6.97
6.79
6.78
6.76
6.68
6.66
5.35
4.69
3.70
3.55
3.32
3.31
1.27
1.26
1.24
1.23
1.22
1.20
1.19
1.17
Bn
OTIPS
O
N
CO2Me
MeO
3r
4.04
1.17
2.01
3.93
2.10
0.96
1.06
3.07
3.10
2.11
21.24
f1 (ppm)

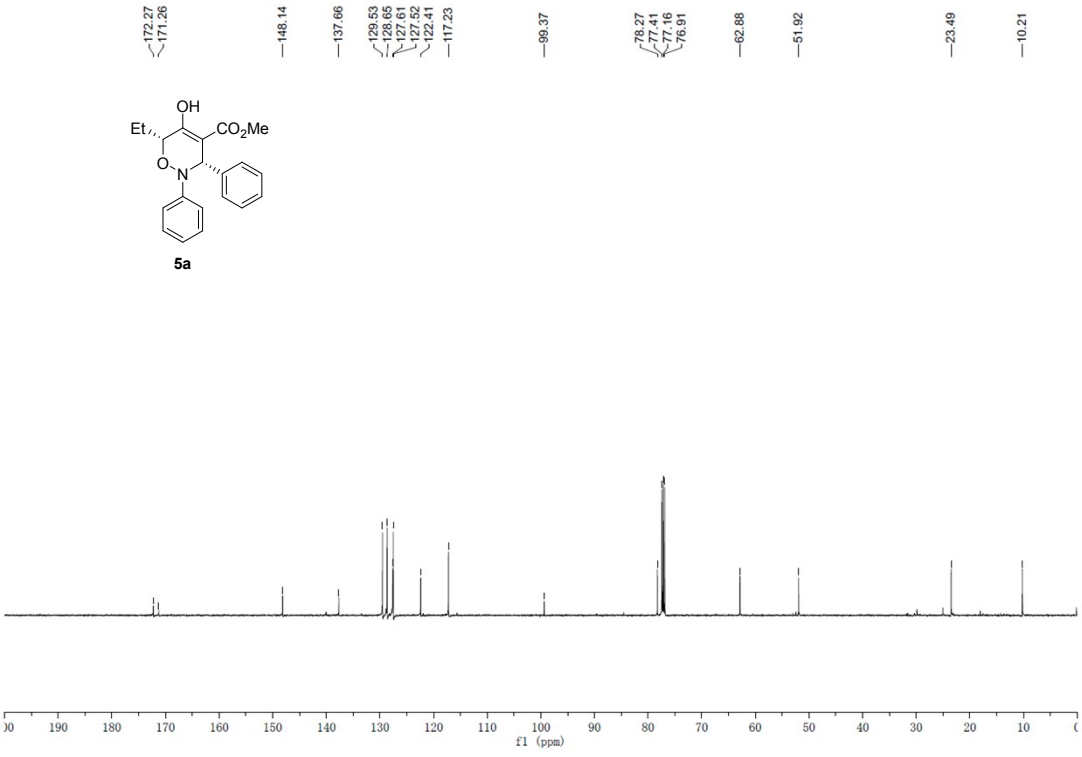

Jul22-2019-C500-dk303rb
165.90
160.97
155.64
141.74
137.37
137.14
130.04
129.77
128.45
127.46
113.76
111.28
79.14
77.41
77.16
76.91
66.29
55.55
51.28
36.79
18.19
18.13
17.85
14.00
Bn
OTIPS
O
N
CO2Me
MeO
3r
f1 (ppm)


Jul20-2019-H500-DK303Race-H
7.29
7.24
7.17
7.16
7.15
6.93
6.91
6.76
6.74
5.56
5.56
4.31
4.30
3.73
3.60
2.47
2.46
2.46
2.45
2.45
2.44
2.43
2.42
2.42
1.14
1.13
1.10
1.09
1.07
1.06
iPr
OTIPS
CO2Me
MeO
3s
2.11
3.02
2.00
2.00
1.11
1.07
3.03
3.04
1.14
6.29
21.30
f1 (ppm)

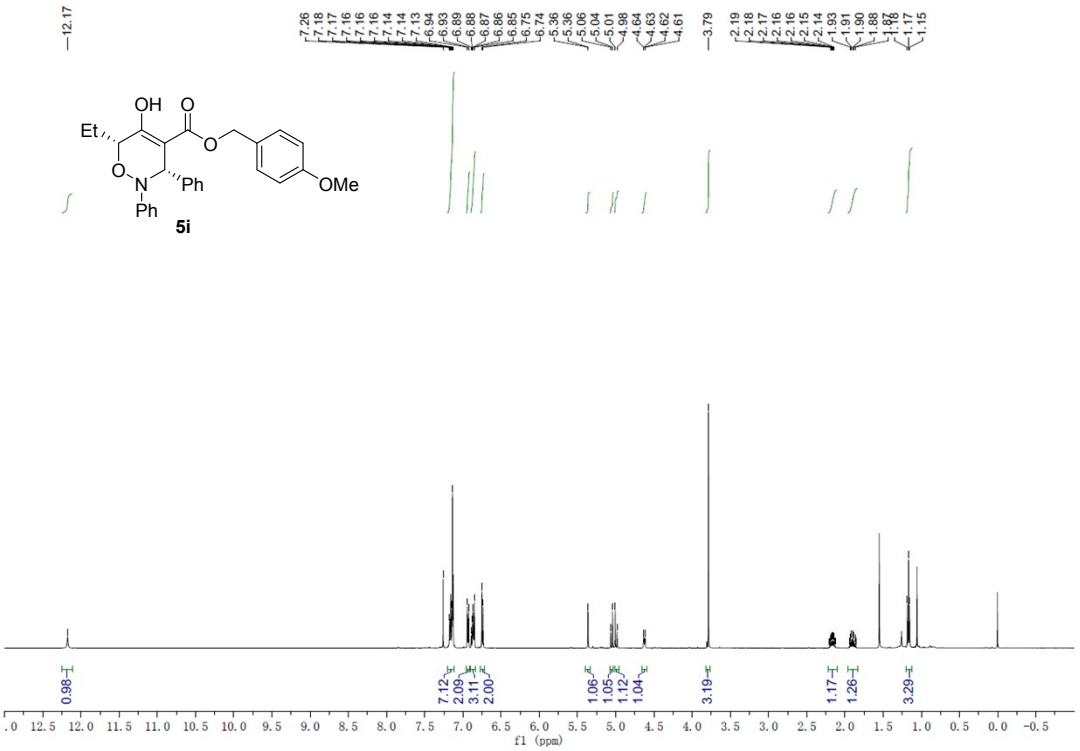

Jul20-2019-H500-DK303Race-C
166.41
161.56
155.19
141.79
138.60
129.53
127.64
127.30
118.89
114.04
110.27
81.06
77.42
77.16
76.91
64.02
55.65
51.32
29.15
19.69
18.05
17.98
16.37
13.90
iPr
OTIPS
CO2Me
MeO
3s
f1 (ppm)

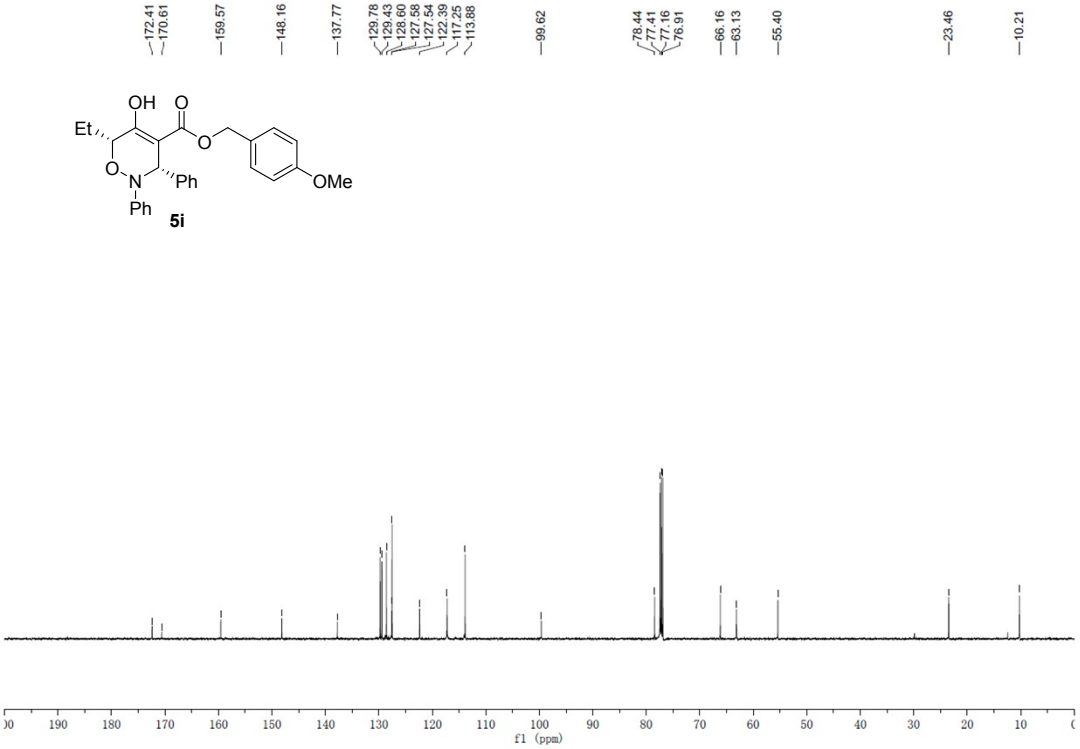

12.22
7.26
7.20
7.19
7.17
7.16
6.96
6.94
6.91
6.90
6.88
5.38
4.63
4.63
4.61
4.61
3.66
2.17
2.17
2.16
2.15
2.15
2.14
1.93
1.91
1.90
1.88
1.17
1.16
1.15
OH
Et
CO2Me
O
N
0.98
6.95
1.91
1.10
1.03
1.02
2.97
1.09
1.15
3.17
f1 (ppm)

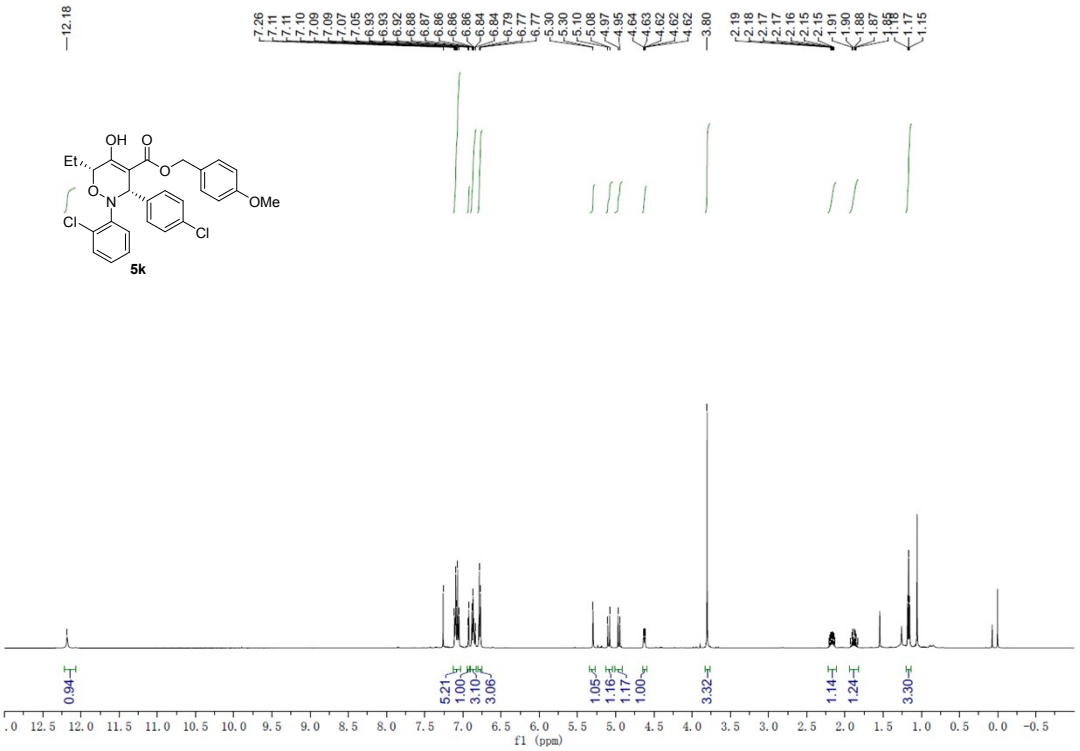
5a

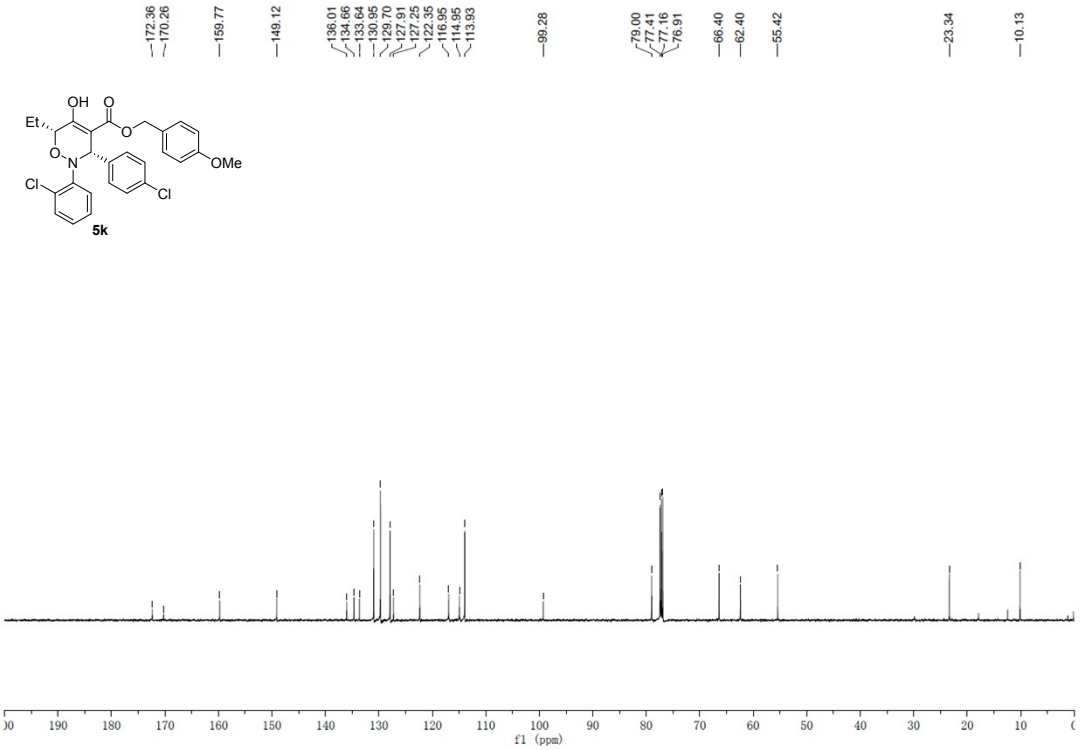

172.27
171.26
148.14
137.66
129.53
128.65
127.61
127.52
122.41
117.23
99.37
78.27
77.41
77.16
76.91
62.88
51.92
23.49
10.21
OH
Et
CO2Me
O
N
f1 (ppm)

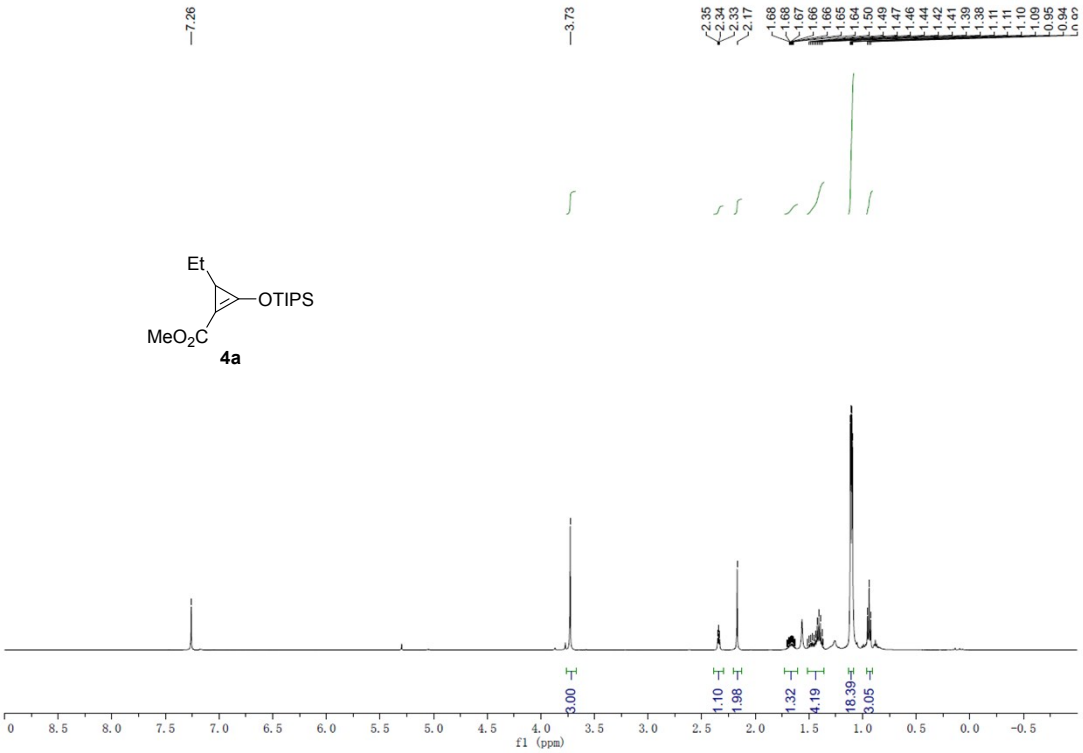
5a

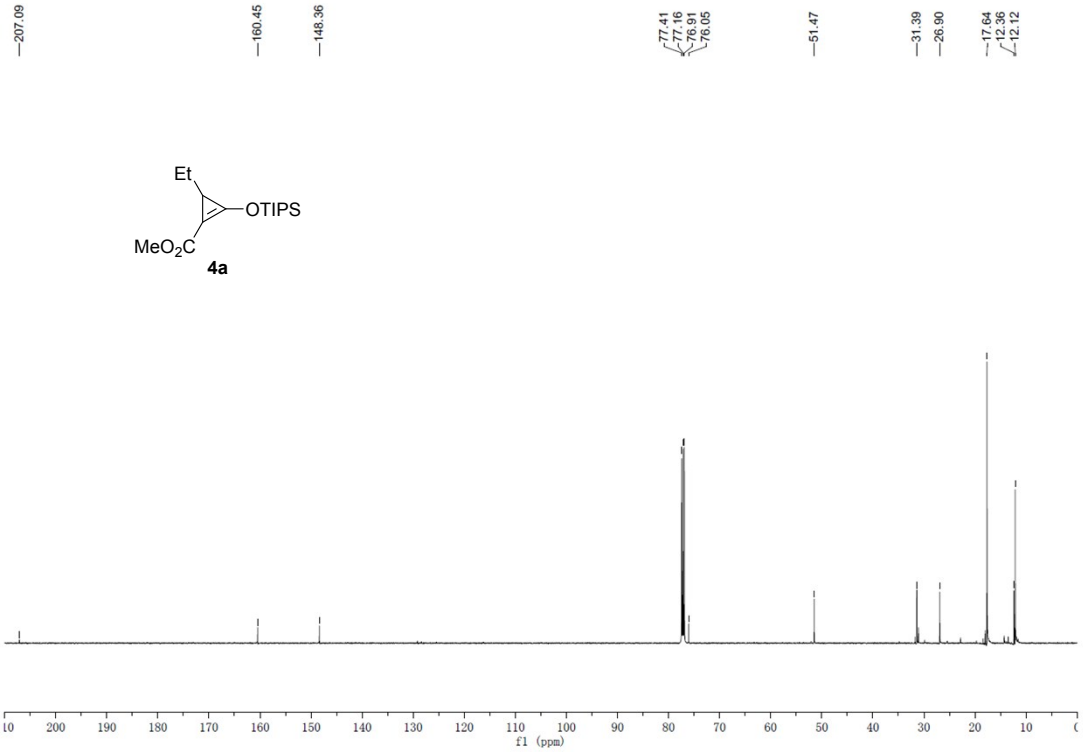

12.17
7.26
7.18
7.17
7.16
7.16
7.16
7.14
7.14
7.13
6.94
6.93
6.89
6.88
6.87
6.86
6.85
6.75
6.74
5.36
5.36
5.06
5.04
5.01
4.98
4.64
4.63
4.62
4.61
3.79
2.19
2.18
2.17
2.16
2.16
2.15
2.14
1.93
1.91
1.90
1.88
1.87
1.18
1.17
1.15
OH
O
Et
O
O
N
Ph
Ph
OMe
5i
0.98
7.12
2.09
3.11
2.00
1.06
1.05
1.12
1.04
3.19
1.17
1.26
3.29
f1 (ppm)


172.41
170.61
159.57
148.16
137.77
129.78
129.43
128.60
127.58
127.54
122.39
117.25
113.88
99.62
78.44
77.41
77.16
76.91
66.16
63.13
55.40
23.46
10.21
OH
O
Et
O
O
N
Ph
Ph
OMe
5i
f1 (ppm)


12.18
7.26
7.11
7.10
7.09
7.07
7.05
6.93
6.92
6.88
6.87
6.86
6.84
6.79
6.77
5.30
5.10
5.08
4.97
4.95
4.64
4.63
4.62
4.62
3.80
2.19
2.18
2.17
2.16
2.15
1.91
1.90
1.88
1.87
1.17
1.15
OH
O
Et
O
N
OMe
Cl
Cl
5k
0.94
5.21
1.00
3.10
3.06
1.05
1.16
1.17
1.00
3.32
1.14
1.24
3.30
f1 (ppm)

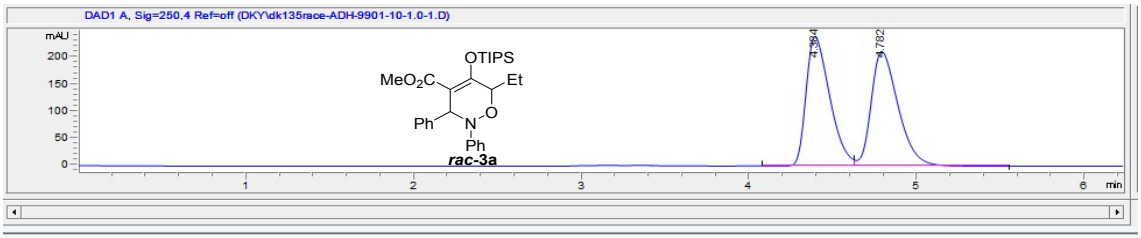

172.36
170.26
159.77
149.12
136.01
134.66
133.64
130.95
129.70
127.91
127.25
122.35
116.95
114.95
113.93
99.28
79.00
77.41
77.16
76.91
66.40
62.40
55.42
23.34
10.13
OH
O
Et
O
N
OMe
Cl
Cl
5k
f1 (ppm)


7.26
3.73
2.35
2.34
2.33
2.17
1.68
1.68
1.67
1.66
1.66
1.65
1.64
1.50
1.49
1.47
1.46
1.44
1.42
1.41
1.39
1.38
1.11
1.11
1.10
1.09
0.95
0.94
Et
OTIPS
MeO2C
4a
3.00
1.10
1.98
1.32
4.19
18.39
3.05
f1 (ppm)


207.09
160.45
148.36
77.41
77.16
76.91
76.05
51.47
31.39
26.90
17.64
12.36
12.12
Et
OTIPS
MeO2C
4a
f1 (ppm)

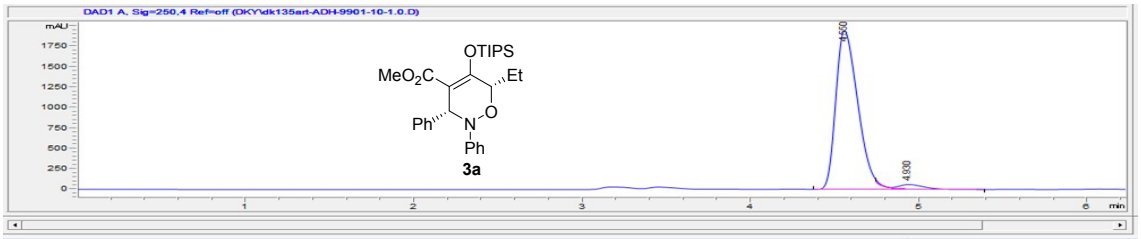
6. HPLC Traces for Racemic and Chiral Compounds

Methyl-6-ethyl-2,3-diphenyl-5-[(triisopropylsilyl)oxy]-3,6-dihydro-2*H*-1,2-oxazine-4-carboxylate (*rac*-3a)



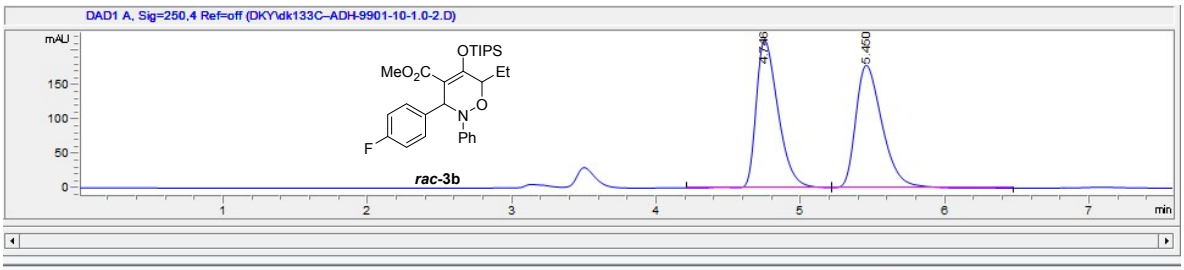
#	Time	Area	Height	Width	Area%	Symmetry
1	4.384	2347.7	239.4	0.1524	49.831	0.572
2	4.782	2363.6	212.3	0.1699	50.169	0.607

Methyl (3*S*,6*R*)-6-ethyl-2,3-diphenyl-5-[(triisopropylsilyl)oxy]-3,6-dihydro-2*H*-1,2-oxazine-4-carboxylate (3a)



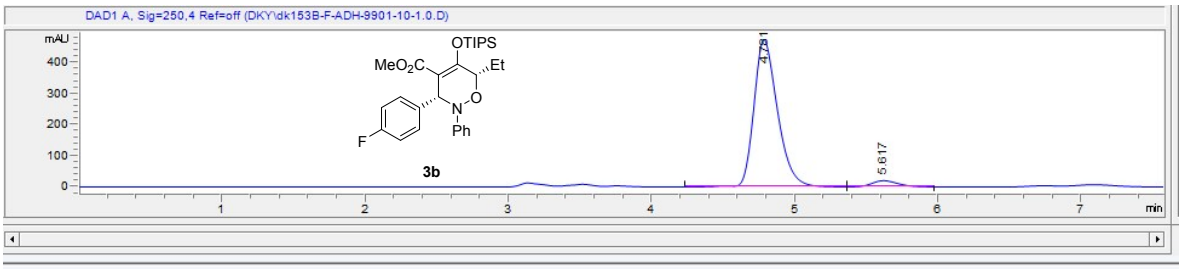
#	Time	Area	Height	Width	Area%	Symmetry
1	4.55	17708	1940.8	0.1424	96.644	0.631
2	4.93	614.9	57.7	0.1603	3.356	0.64

Methyl-6-ethyl-3-(4-fluorophenyl)-2-phenyl-5-[(triisopropylsilyl)oxy]-3,6-dihydro-2*H*-1,2-oxazine-4-carboxylate (*rac*-3b)



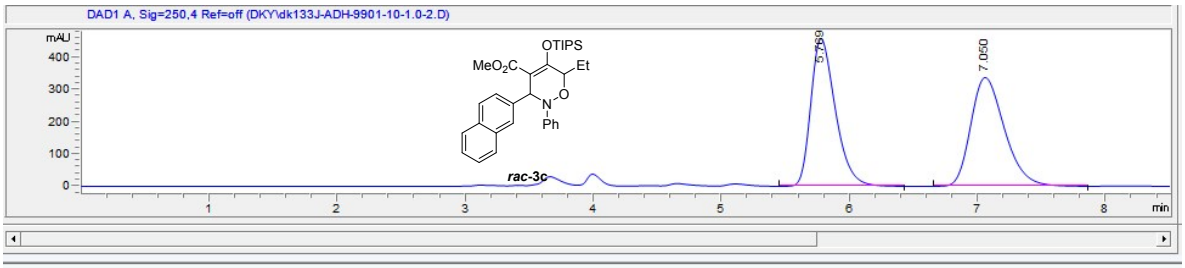
#	Time	Area	Height	Width	Area%	Symmetry
1	4.746	2281.9	215.5	0.1629	49.906	0.603
2	5.45	2290.5	178.9	0.1974	50.094	0.613

Methyl (3*R*,6*S*)-6-ethyl-3-(4-fluorophenyl)-2-phenyl-5-[(triisopropylsilyl)oxy]-3,6-dihydro-2*H*-1,2-oxazine-4-carboxylate (3b)



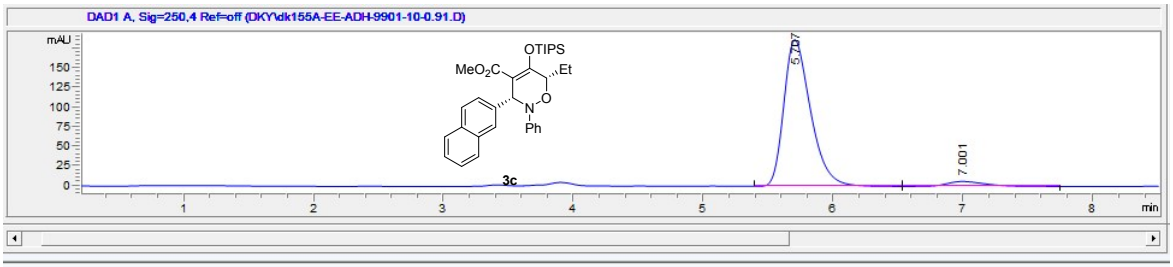
#	Time	Area	Height	Width	Area%	Symmetry
1	4.781	5393.8	473.1	0.1744	95.574	0.707
2	5.617	249.8	19.9	0.1944	4.426	0.783

Methyl-6-ethyl-3-(naphthalen-2-yl)-2-phenyl-5-[(triisopropylsilyl)oxy]-3,6-dihyd ro-2*H*-1,2-oxazine-4-carboxylate (*rac*-3c)



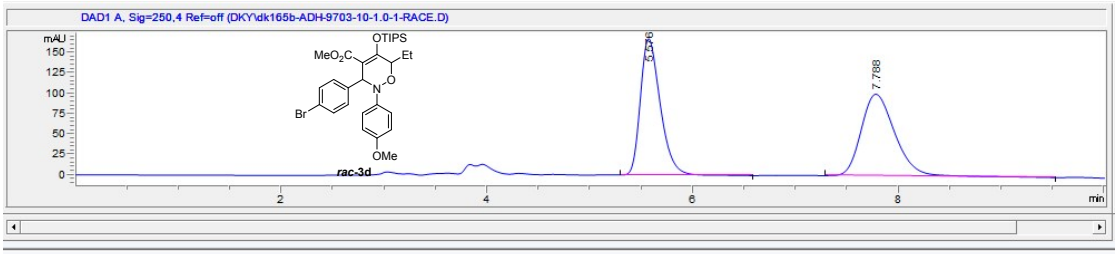
#	Time	Area	Height	Width	Area%	Symmetry
1	5.769	6098.4	457.5	0.2035	49.673	0.668
2	7.05	6178.8	337.2	0.2838	50.327	0.705

Methyl (3*R*,6*S*)-6-ethyl-3-(naphthalen-2-yl)-2-phenyl-5-[(triisopropylsilyl)oxy] -3,6-dihydro-2*H*-1,2-oxazine-4-carboxylate (3c)



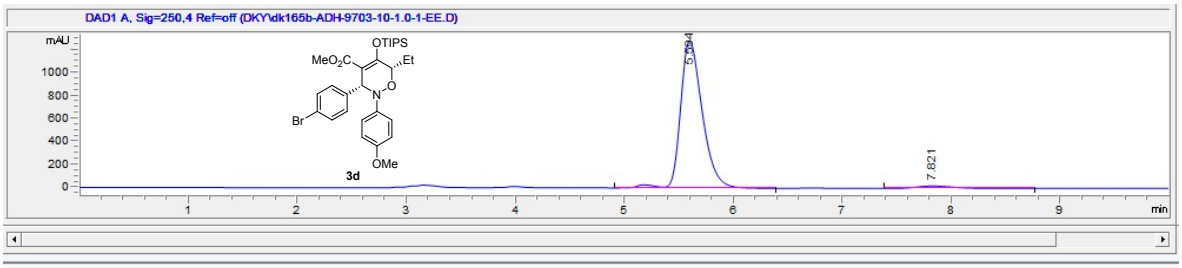
#	Time	Area	Height	Width	Area%	Symmetry
1	5.707	2656.5	185.7	0.2169	95.458	0.652
2	7.001	126.4	6.2	0.3066	4.542	0.667

Methyl-3-(4-bromophenyl)-6-ethyl-2-(4-methoxyphenyl)-5-[(triisopropylsilyl)oxy]-3,6-dihydro-2*H*-1,2-oxazine-4-carboxylate (*rac*-3d)



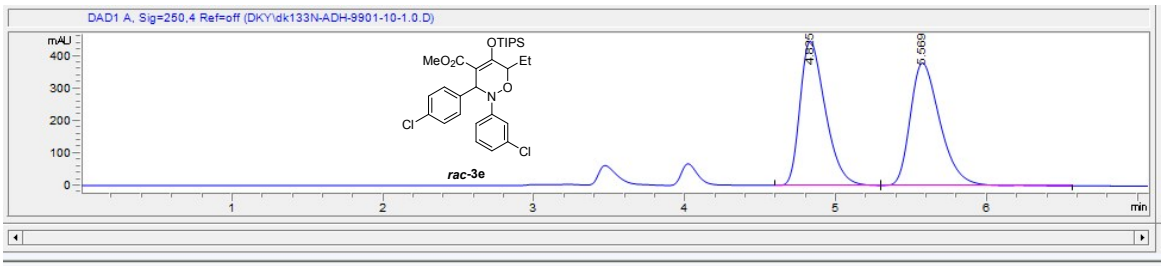
#	Time	Area	Height	Width	Area%	Symmetry
1	5.576	2233.6	166	0.2049	49.313	0.666
2	7.788	2295.8	99.5	0.3551	50.687	0.709

Methyl (3*R*,6*S*)-3-(4-bromophenyl)-6-ethyl-2-(4-methoxyphenyl)-5-[(triisopropylsilyl)oxy]-3,6-dihydro-2*H*-1,2-oxazine-4-carboxylate (3d)



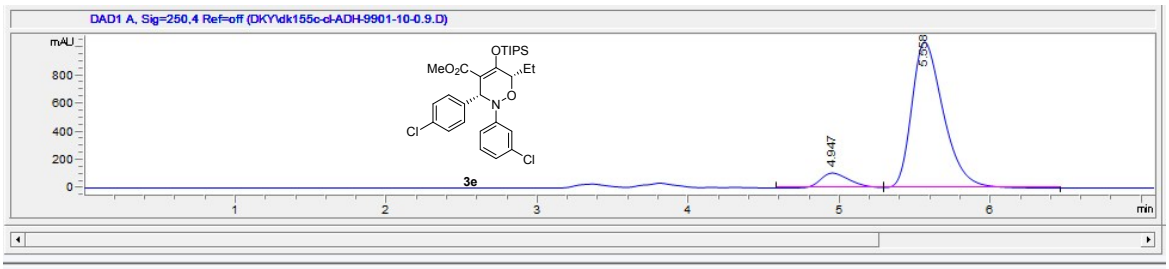
#	Time	Area	Height	Width	Area%	Symmetry
1	5.594	17665.6	1276.2	0.2087	97.382	0.723
2	7.821	474.9	21	0.3518	2.618	0.739

Methyl-2-(3-chlorophenyl)-3-(4-chlorophenyl)-6-ethyl-5-[(triisopropylsilyl)oxy]-3,6-dihydro-2*H*-1,2-oxazine-4-carboxylate (*rac*-3e)



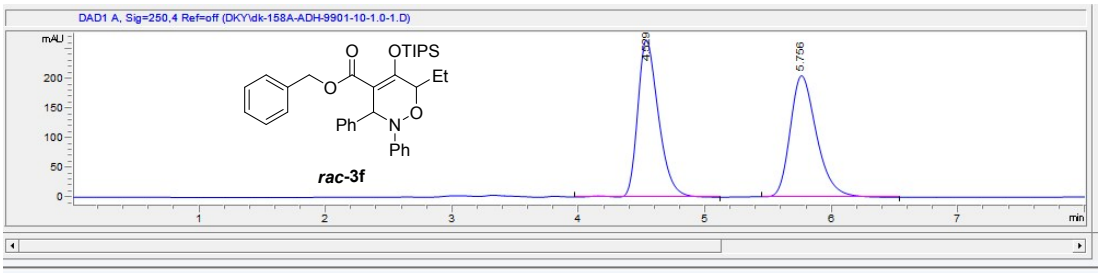
#	Time	Area	Height	Width	Area%	Symmetry
1	4.825	5151.4	444.1	0.1773	49.920	0.631
2	5.569	5168	376.9	0.2095	50.080	0.659

Methyl-(3*R*,6*S*)-2-(3-chlorophenyl)-3-(4-chlorophenyl)-6-ethyl-5-[(triisopropylsilyl)oxy]-3,6-dihydro-2*H*-1,2-oxazine-4-carboxylate (3e)



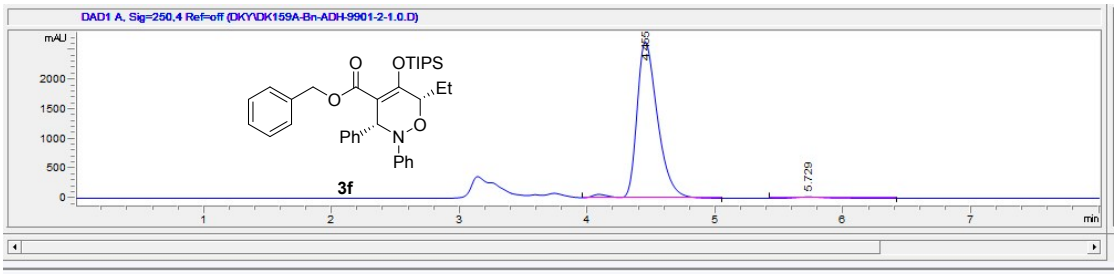
#	Time	Area	Height	Width	Area%	Symmetry
1	4.947	1437.9	105.4	0.2091	8.728	0.645
2	5.558	15036.7	1031.1	0.2241	91.272	0.648

Benzyl-6-ethyl-2,3-diphenyl-5-[(triisopropylsilyl)oxy]-3,6-dihydro-2*H*-1,2-oxazine-4-carboxylate (*rac*-3f)



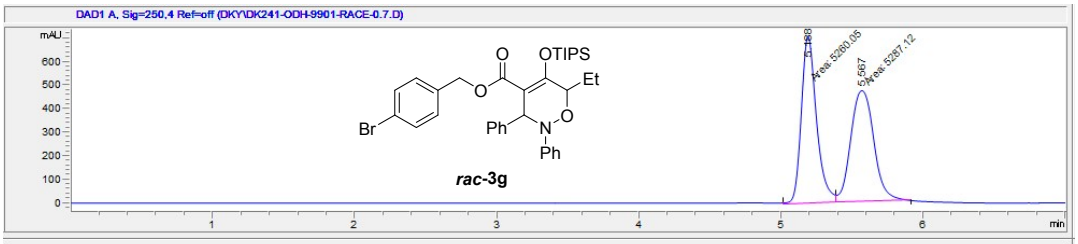
#	Time	Area	Height	Width	Area%	Symmetry
1	4.529	3001.2	263.5	0.1742	50.499	0.685
2	5.756	2941.9	203.2	0.2209	49.501	0.712

Benzyl (3*R*,6*S*)-6-ethyl-2,3-diphenyl-5-[(triisopropylsilyl)oxy]-3,6-dihydro-2*H*-1,2-oxazine-4-carboxylate (3f)



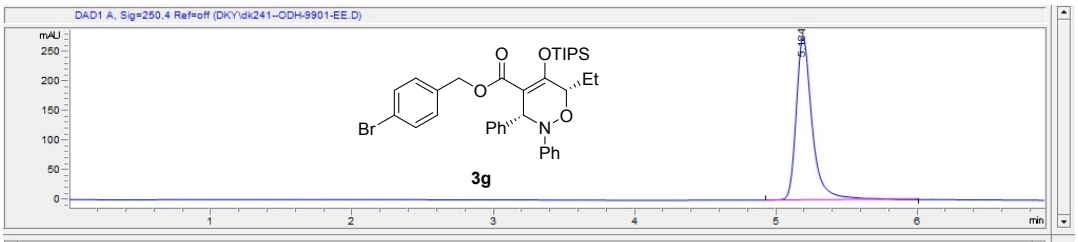
#	Time	Area	Height	Width	Area%	Symmetry
1	4.455	30003.5	2660.7	0.1674	98.744	0.686
2	5.729	381.7	22.9	0.2527	1.256	0.602

4-Bromobenzyl-6-ethyl-2,3-diphenyl-5-[(triisopropylsilyl)oxy]-3,6-dihydro-2*H*-1,2-oxazine-4-carboxylate (*rac*-3g)



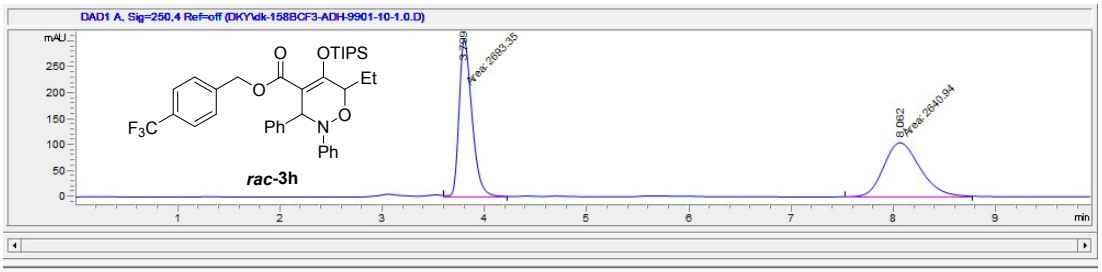
#	Time	Area	Height	Width	Area%	Symmetry
1	5.188	5260.1	705.5	0.1243	49.872	0.755
2	5.567	5287.1	468.6	0.188	50.128	0.904

4-Bromobenzyl 3*R*,6*S*)-6-ethyl-2,3-diphenyl-5-[(triisopropylsilyl)oxy]-3,6-dihydro -2*H*-1,2-oxazine-4-carboxylate (3g)



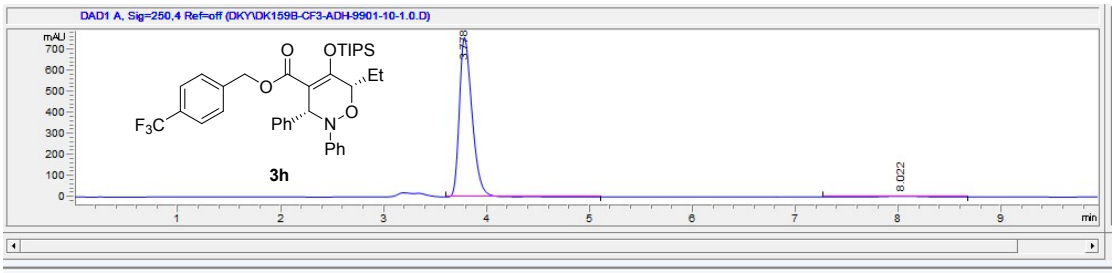
#	Time	Area	Height	Width	Area%	Symmetry
1	5.184	2176.4	275	0.1183	100.000	0.669

4-(Trifluoromethyl)benzyl-6-ethyl-2,3-diphenyl-5-[(triisopropylsilyl)oxy] -3,6-dihydro-2*H*-1,2-oxazine-4-carboxylate (*rac*-3h)



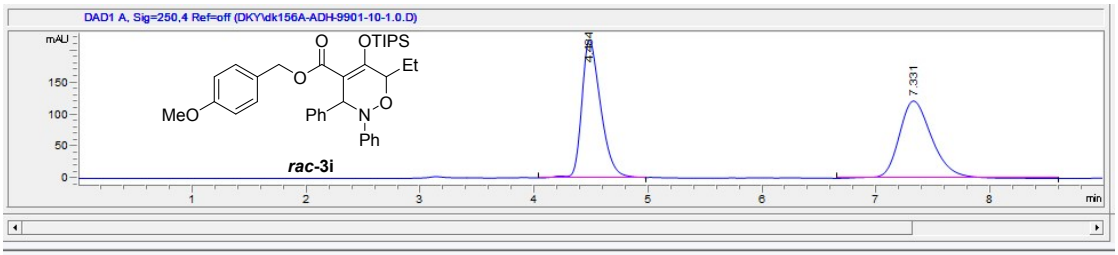
#	Time	Area	Height	Width	Area%	Symmetry
1	3.799	2693.4	303.6	0.1478	50.491	0.653
2	8.062	2640.9	104.8	0.4201	49.509	0.779

4-(Trifluoromethyl)benzyl (3*R*,6*S*)-6-ethyl-2,3-diphenyl-5-[(triisopropylsilyl)oxy] -3,6-dihydro-2*H*-1,2-oxazine-4-carboxylate (3h)



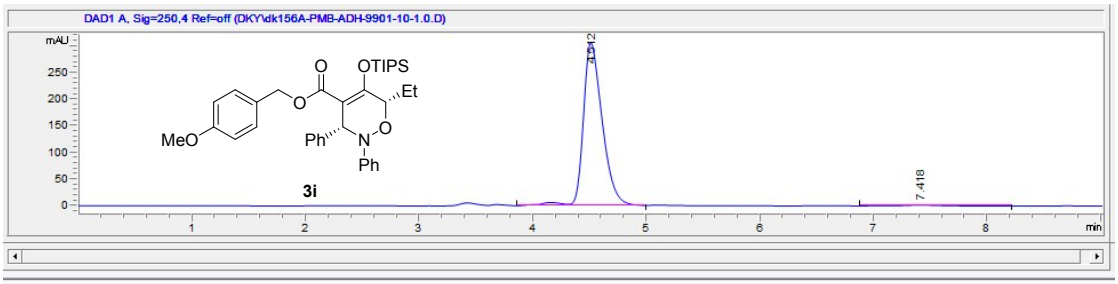
#	Time	Area	Height	Width	Area%	Symmetry
1	3.778	6486.4	750.9	0.1305	98.700	0.624
2	8.022	85.5	3.5	0.3744	1.300	0.934

4-Methoxybenzyl-6-ethyl-2,3-diphenyl-5-[(triisopropylsilyl)oxy]-3,6-dihydro-2*H*-1,2-oxazine-4-carboxylate (*rac*-3i)



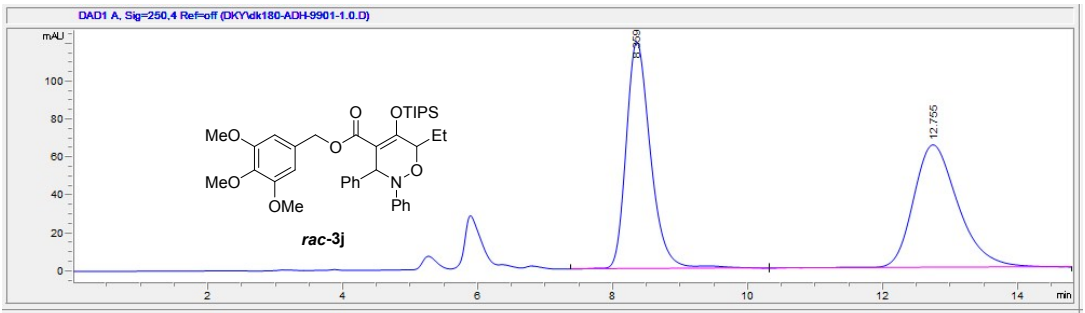
#	Time	Area	Height	Width	Area%	Symmetry
1	4.484	2465.1	215.4	0.1745	50.247	0.662
2	7.331	2440.9	120.8	0.3078	49.753	0.74

4-Methoxybenzyl (3*R*,6*S*)-6-ethyl-2,3-diphenyl-5-[(triisopropylsilyl)oxy]-3,6-dihydro-2H-1,2-oxazine-4-carboxylate (3i)



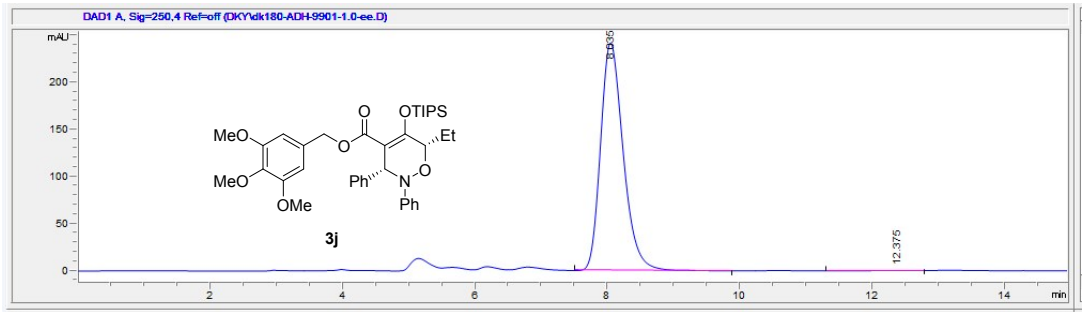
#	Time	Area	Height	Width	Area%	Symmetry
1	4.512	3548.5	306.3	0.1721	99.056	0.69
2	7.418	33.8	1.5	0.3234	0.944	0.996

3,4,5-Trimethoxybenzyl-6-ethyl-2,3-diphenyl-5-[(triisopropylsilyl)oxy] -3,6-dihydro-2*H*-1,2-oxazine-4-carboxylate (*rac*-3j)



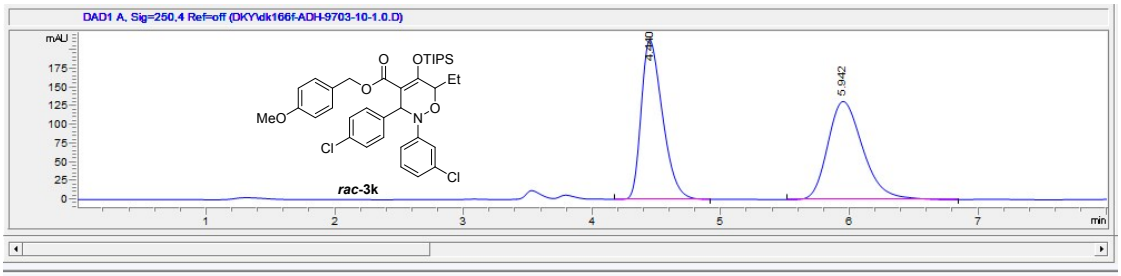
#	Time	Area	Height	Width	Area%	Symmetry
1	8.359	3021.5	119.6	0.3821	50.178	0.735
2	12.755	3000	64.7	0.709	49.822	0.742

3,4,5-Trimethoxybenzyl (3*R*,6*S*)-6-ethyl-2,3-diphenyl-5-[(triisopropylsilyl)oxy] -3,6-dihydro-2*H*-1,2-oxazine-4-carboxylate (3j)



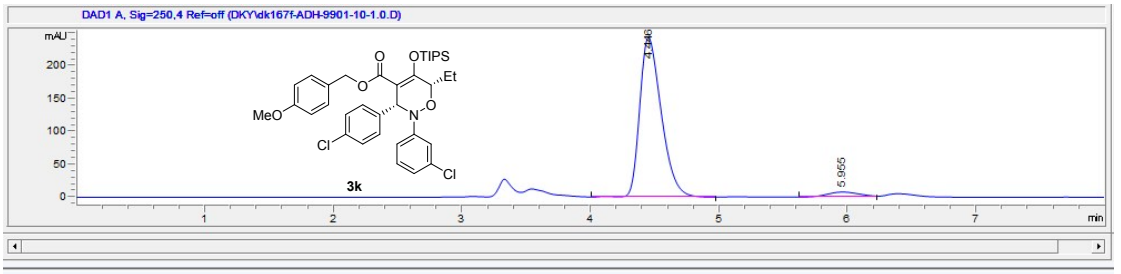
#	Time	Area	Height	Width	Area%	Symmetry
1	8.035	5742.5	241.3	0.3697	99.617	0.733
2	12.375	22.1	4.6E-1	0.6956	0.383	1.434

4-Methoxybenzyl-2-(3-chlorophenyl)-3-(4-chlorophenyl)-6-ethyl-5-[(triisopropylsilyl)oxy]-3,6-dihydro-2*H*-1,2-oxazine-4-carboxylate (*rac*-3k)



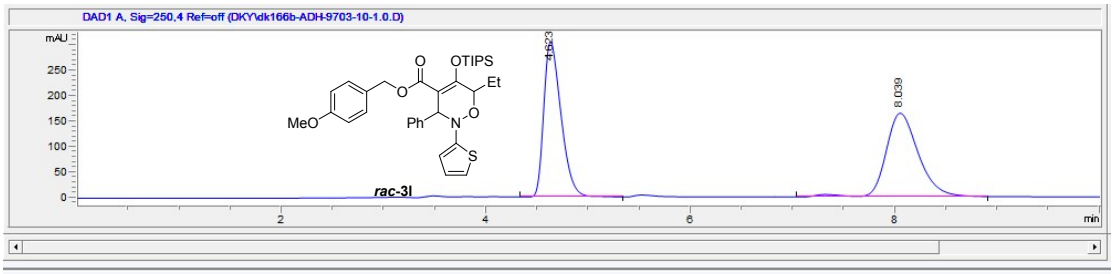
#	Time	Area	Height	Width	Area%	Symmetry
1	4.44	2441.5	212.5	0.178	49.614	0.632
2	5.942	2479.4	130.9	0.293	50.386	0.736

4-Methoxybenzyl (3*R*,6*S*)-2-(3-chlorophenyl)-3-(4-chlorophenyl)-6-ethyl-5-[(triisopropylsilyl)oxy]-3,6-dihydro-2*H*-1,2-oxazine-4-carboxylate (3k)



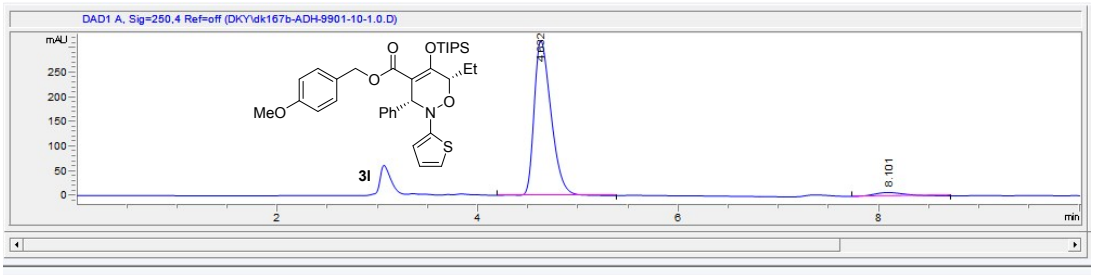
#	Time	Area	Height	Width	Area%	Symmetry
1	4.446	2820.6	241.9	0.18	95.362	0.643
2	5.955	137.2	7.6	0.2839	4.638	0.823

4-Methoxybenzyl-6-ethyl-3-phenyl-2-(thiophen-2-yl)-5-[(triisopropylsilyl)oxy]-3,6-dihydro-2*H*-1,2-oxazine-4-carboxylate (*rac*-3l)



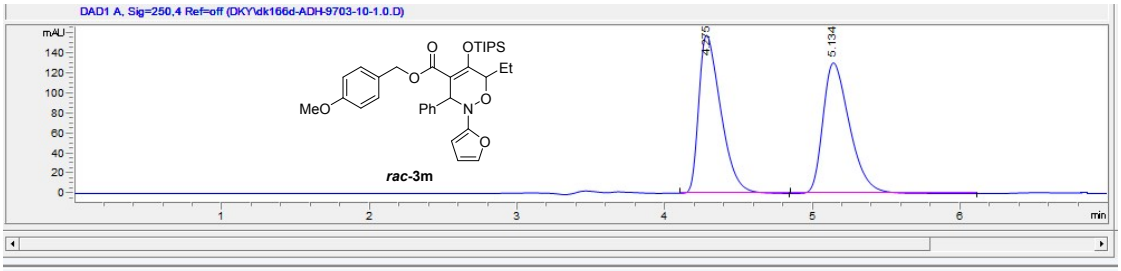
#	Time	Area	Height	Width	Area%	Symmetry
1	4.623	3606.7	307.8	0.1807	49.691	0.603
2	8.039	3651.6	165.4	0.332	50.309	0.806

4-Methoxybenzyl (3*R*,6*S*)-6-ethyl-3-phenyl-2-(thiophen-2-yl)-5-[(triisopropylsilyl)oxy]-3,6-dihydro-2*H*-1,2-oxazine-4-carboxylate (3l)



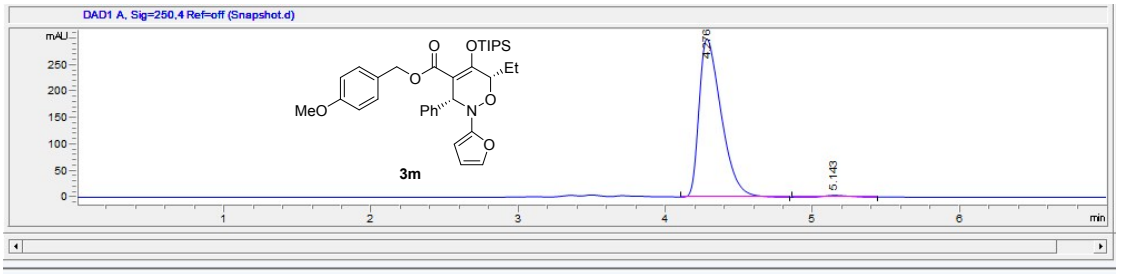
#	Time	Area	Height	Width	Area%	Symmetry
1	4.632	3674.8	312.4	0.1813	95.800	0.615
2	8.101	161.1	7.4	0.3348	4.200	0.751

4-Methoxybenzyl)-6-ethyl-2-(furan-2-yl)-3-phenyl-5-[(triisopropylsilyl)oxy]-3,6-dihydro-2*H*-1,2-oxazine-4-carboxylate (*rac*-3m)



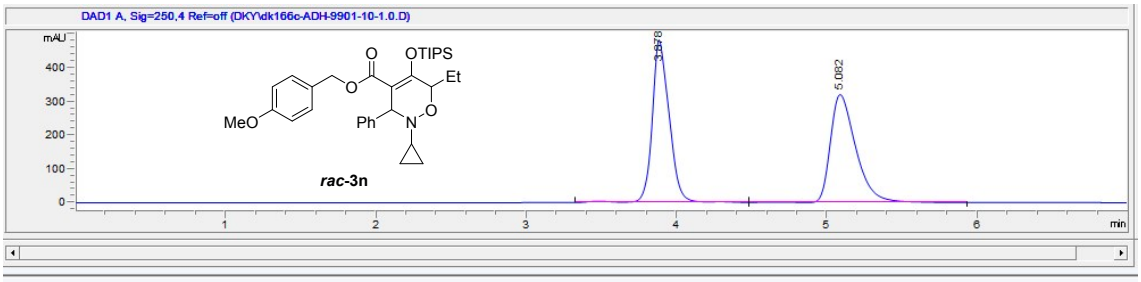
#	Time	Area	Height	Width	Area%	Symmetry
1	4.275	1630.9	157.9	0.1605	49.958	0.517
2	5.134	1633.7	130.4	0.1922	50.042	0.615

(3*R*,6*S*)-4-Methoxybenzyl-6-ethyl-2-(furan-2-yl)-3-phenyl-5-[(triisopropylsilyl)oxy]-3,6-dihydro-2*H*-1,2-oxazine-4-carboxylate (3m)



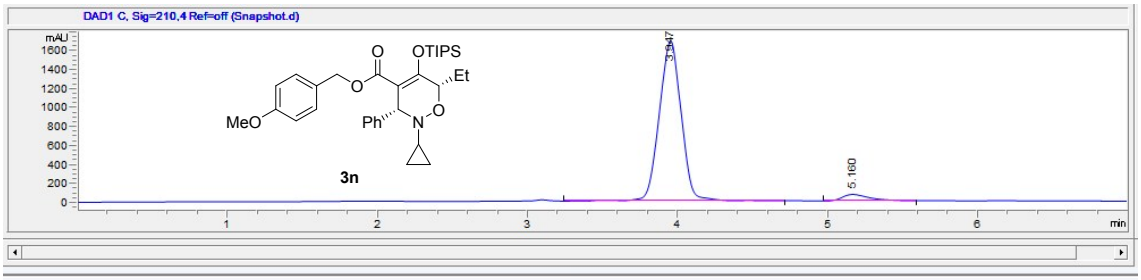
#	Time	Area	Height	Width	Area%	Symmetry
1	4.276	3141	300.8	0.1598	98.755	0.515
2	5.143	39.6	3.3	0.1891	1.245	0.697

4-Methoxybenzyl-2-cyclopropyl-6-ethyl-3-phenyl-5-[(triisopropylsilyl)oxy]-3,6-dihydro-2*H*-1,2-oxazine-4-carboxylate (*rac*-3n)



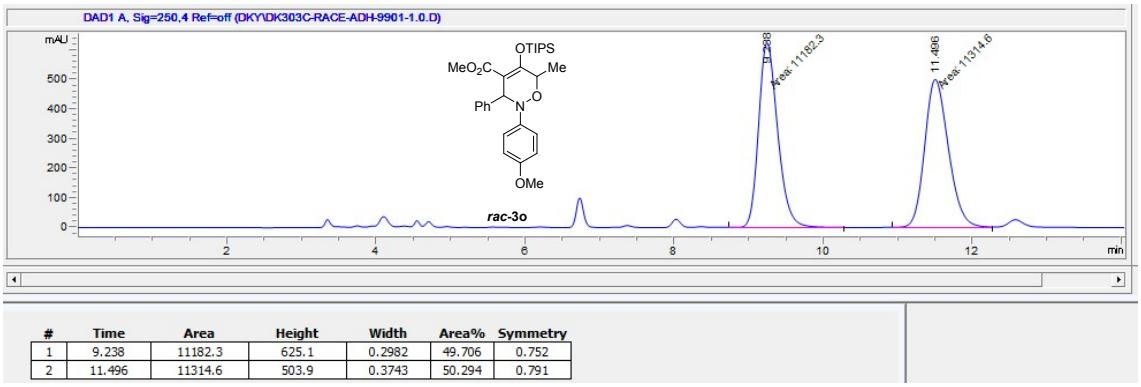
#	Time	Area	Height	Width	Area%	Symmetry
1	3.878	3786.4	482	0.1101	50.156	0.703
2	5.082	3762.8	320.2	0.1786	49.844	0.592

4-Methoxybenzyl (3*S*,6*R*)-2-cyclopropyl-6-ethyl-3-phenyl-5-[(triisopropylsilyl)oxy]-3,6-dihydro-2*H*-1,2-oxazine-4-carboxylate (3n)



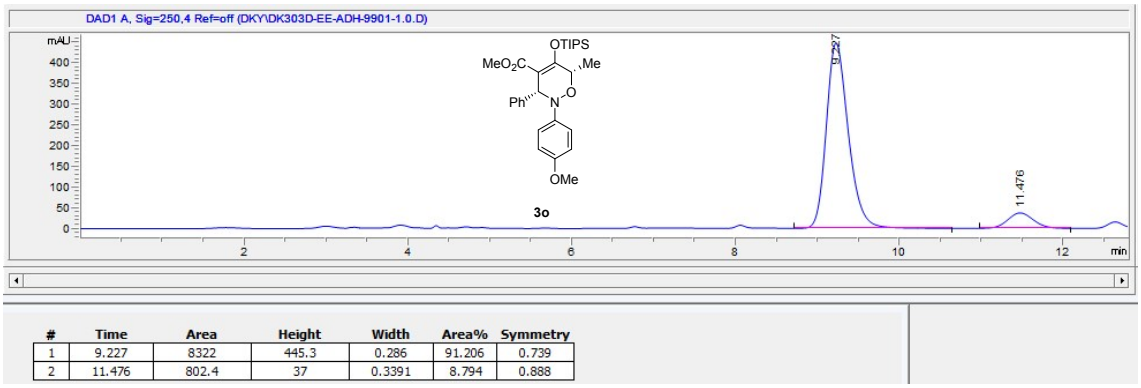
#	Time	Area	Height	Width	Area%	Symmetry
1	3.947	17232.9	1698.8	0.1536	95.272	1.057
2	5.16	855.3	68.1	0.1905	4.728	0.567

Methyl -2-(4-methoxyphenyl)-6-methyl-3-phenyl-5-[(triisopropylsilyl)oxy]-3,6-dihydro-2*H*-1,2-oxazine-4-carboxylate (*rac*-3o)



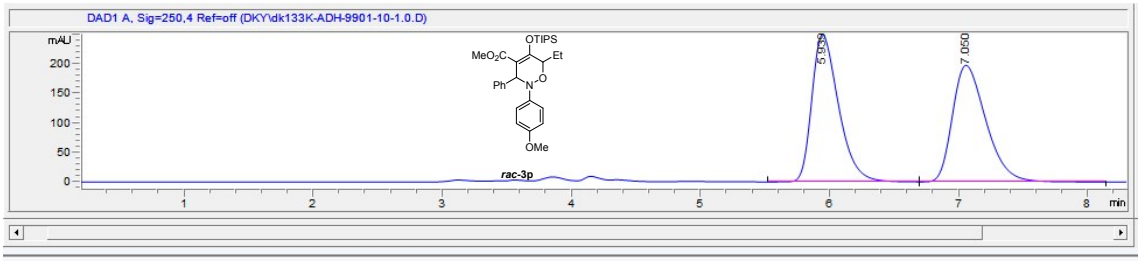
#	Time	Area	Height	Width	Area%	Symmetry
1	9.238	11182.3	625.1	0.2982	49.706	0.752
2	11.496	11314.6	503.9	0.3743	50.294	0.791

Methyl (3*R*,6*S*)-2-(4-methoxyphenyl)-6-methyl-3-phenyl-5-[(triisopropylsilyl)oxy]-3,6-dihydro-2*H*-1,2-oxazine-4-carboxylate (3o)



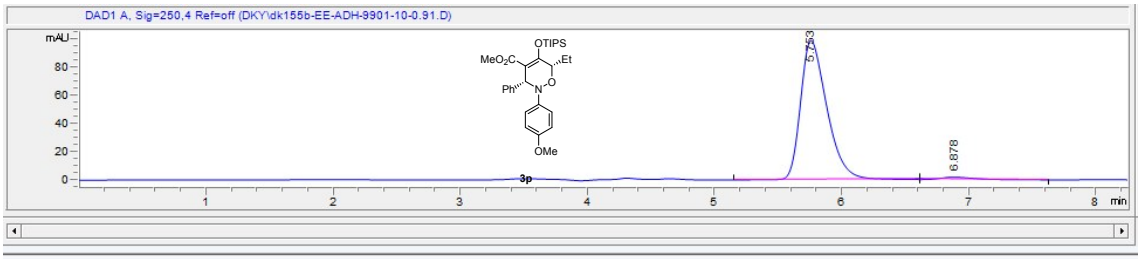
#	Time	Area	Height	Width	Area%	Symmetry
1	9.227	8322	445.3	0.286	91.206	0.739
2	11.476	802.4	37	0.3391	8.794	0.888

Methyl-6-ethyl-2-(4-methoxyphenyl)-3-phenyl-5-[(triisopropylsilyl)oxy] -3,6-dihydro-2*H*-1,2-oxazine-4-carboxylate (*rac*-3p)



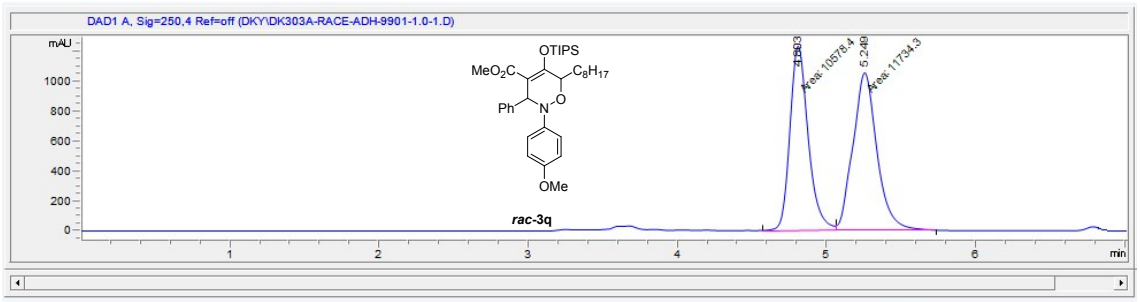
#	Time	Area	Height	Width	Area%	Symmetry
1	5.939	3606.6	250.5	0.222	50.238	0.628
2	7.05	3572.4	198.2	0.2783	49.762	0.643

Methyl (3*R*,6*S*)-6-ethyl-2-(4-methoxyphenyl)-3-phenyl-5-[(triisopropylsilyl)oxy] -3,6-dihydro-2*H*-1,2-oxazine-4-carboxylate (3p)



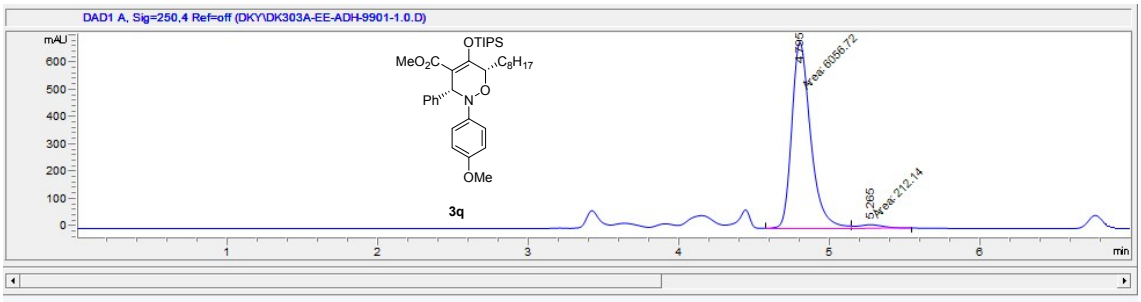
#	Time	Area	Height	Width	Area%	Symmetry
1	5.753	1446.6	100.4	0.2201	97.882	0.621
2	6.878	31.3	1.7	0.2737	2.118	0.588

Methyl -2-(4-methoxyphenyl)-6-octyl-3-phenyl-5-[(triisopropylsilyl)oxy] -3,6-dihydro-2*H*-1,2-oxazine-4-carboxylate (*rac*-3q)



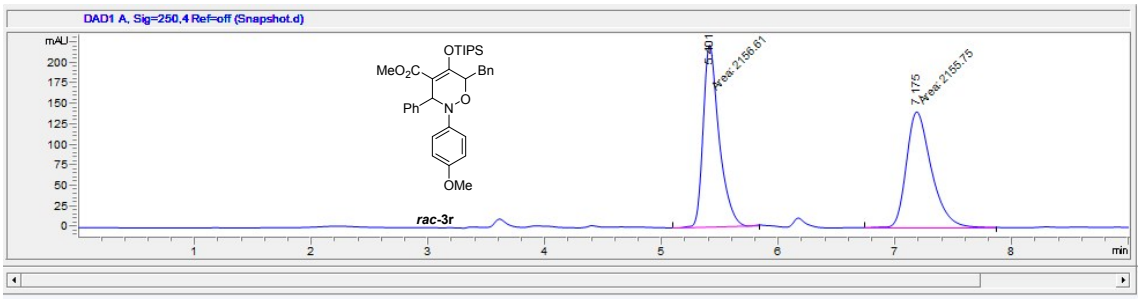
#	Time	Area	Height	Width	Area%	Symmetry
1	4.803	10578.4	1232.9	0.143	47.410	0
2	5.249	11734.3	1052.2	0.1859	52.590	0.917

Methyl (3*R*,6*S*)-2-(4-methoxyphenyl)-6-octyl-3-phenyl-5-[(triisopropylsilyl)oxy] -3,6-dihydro-2*H*-1,2-oxazine-4-carboxylate (3q)



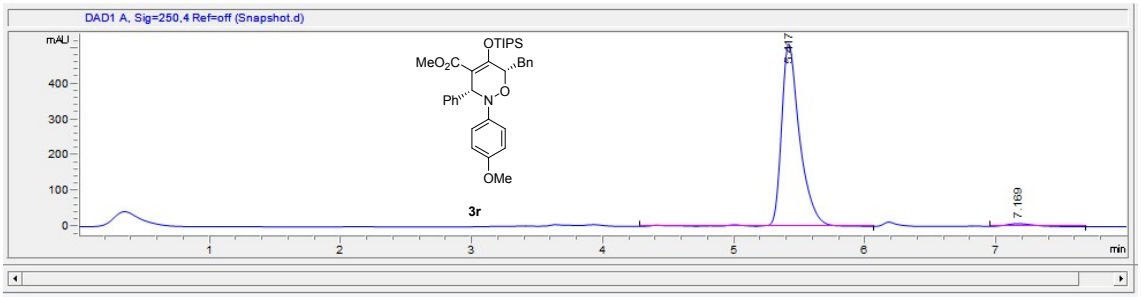
#	Time	Area	Height	Width	Area%	Symmetry
1	4.795	6056.7	684.4	0.1475	96.616	0.731
2	5.265	212.1	15.6	0.2273	3.384	0.788

Methyl-6-benzyl-2-(4-methoxyphenyl)-3-phenyl-5-[(triisopropylsilyl)oxy] -3,6-dihydro-2*H*-1,2-oxazine-4-carboxylate (*rac*-3r)



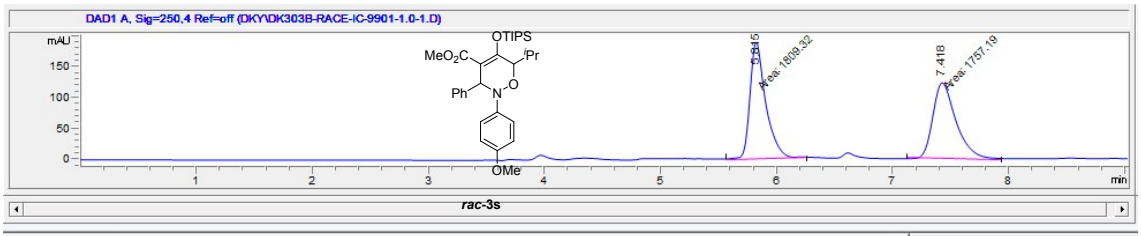
#	Time	Area	Height	Width	Area%	Symmetry
1	5.401	2156.6	224.2	0.1604	50.010	0.645
2	7.175	2155.7	142.7	0.2518	49.990	0.686

Methyl (3*R*,6*S*)-6-benzyl-2-(4-methoxyphenyl)-3-phenyl-5-[(triisopropylsilyl)oxy] -3,6-dihydro-2*H*-1,2-oxazine-4-carboxylate (3r)



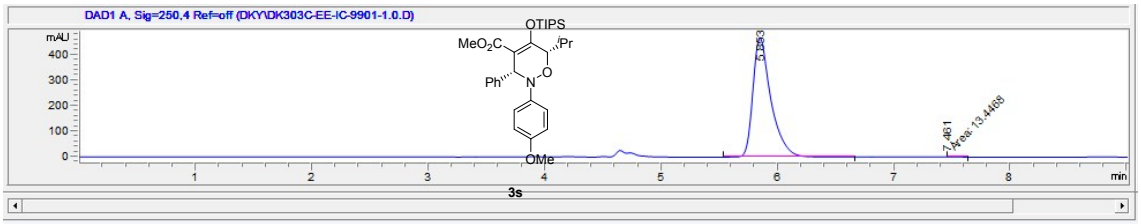
#	Time	Area	Height	Width	Area%	Symmetry
1	5.417	5018.3	513.2	0.1419	97.854	0.661
2	7.169	110	7.9	0.2135	2.146	0.672

Methyl -6-isopropyl-2-(4-methoxyphenyl)-3-phenyl-5-[(triisopropylsilyl)oxy]-3,6-dihydro-2*H*-1,2-oxazine-4-carboxylate (*rac*-3s)



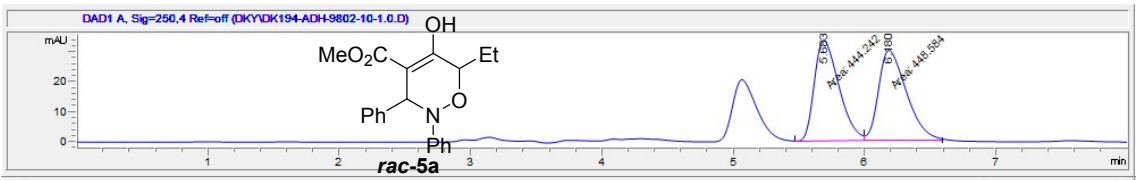
#	Time	Area	Height	Width	Area%	Symmetry
1	5.815	1809.3	191.5	0.1575	50.731	0.634
2	7.418	1757.2	124.8	0.2346	49.269	0.65

Methyl (3*R*,6*S*)-6-isopropyl-2-(4-methoxyphenyl)-3-phenyl-5-[(triisopropylsilyl)oxy]-3,6-dihydro-2*H*-1,2-oxazine-4-carboxylate (3s)



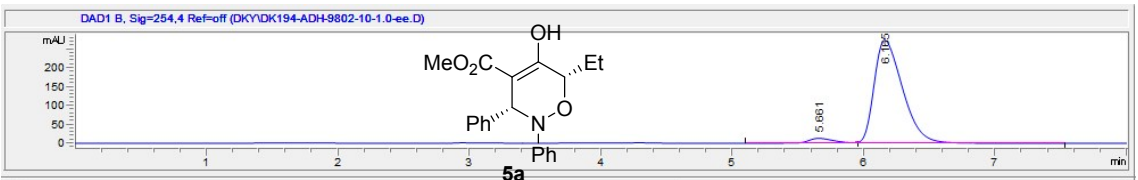
#	Time	Area	Height	Width	Area%	Symmetry
1	5.853	5069.1	470.4	0.1597	99.735	0.585
2	7.461	13.4	1.4	0.1597	0.265	0

Methyl-6-ethyl-5-hydroxy-2,3-diphenyl-3,6-dihydro-2*H*-1,2-oxazine-4-carboxylate (*rac*-5a)



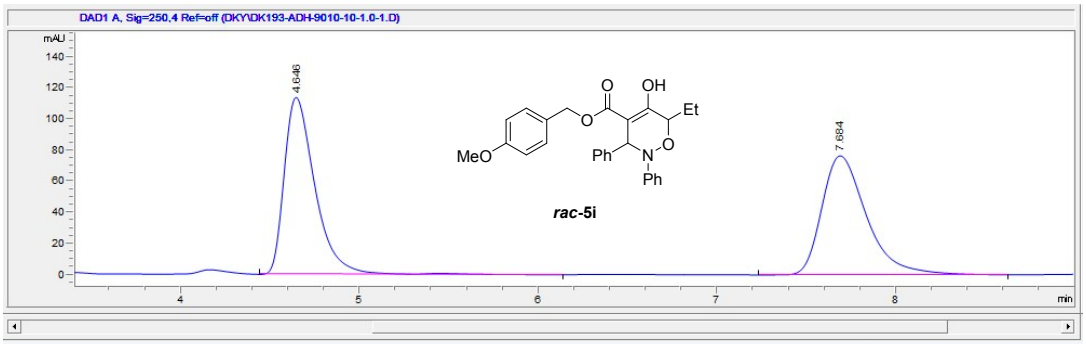
#	Time	Area	Height	Width	Area%	Symmetry
1	5.683	444.2	33.9	0.2182	49.757	0.604
2	6.18	448.6	30.3	0.2468	50.243	0.563

Methyl (3*R*,6*S*)-6-ethyl-5-hydroxy-2,3-diphenyl-3,6-dihydro-2*H*-1,2-oxazine-4-carboxylate (5a)



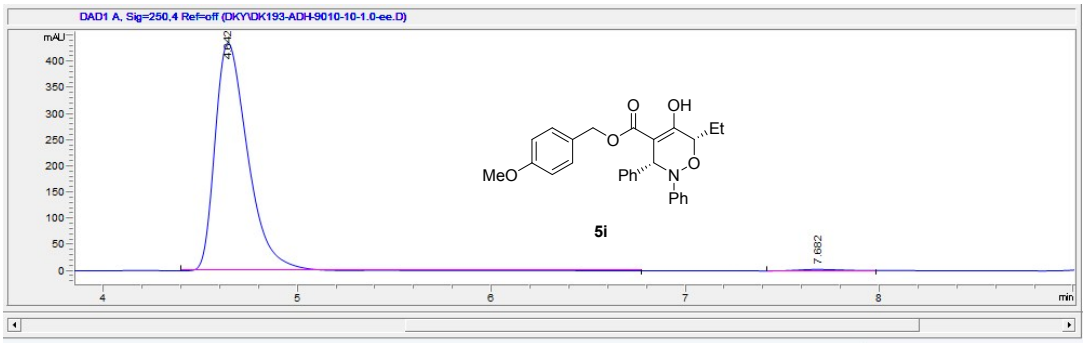
#	Time	Area	Height	Width	Area%	Symmetry
1	5.661	176.3	13.1	0.2068	4.091	0.669
2	6.165	4134.6	275.1	0.2334	95.909	0.7

4-Methoxybenzyl-6-ethyl-5-hydroxy-2,3-diphenyl-3,6-dihydro-2*H*-1,2-oxazine-4-carboxylate (*rac*-5i)



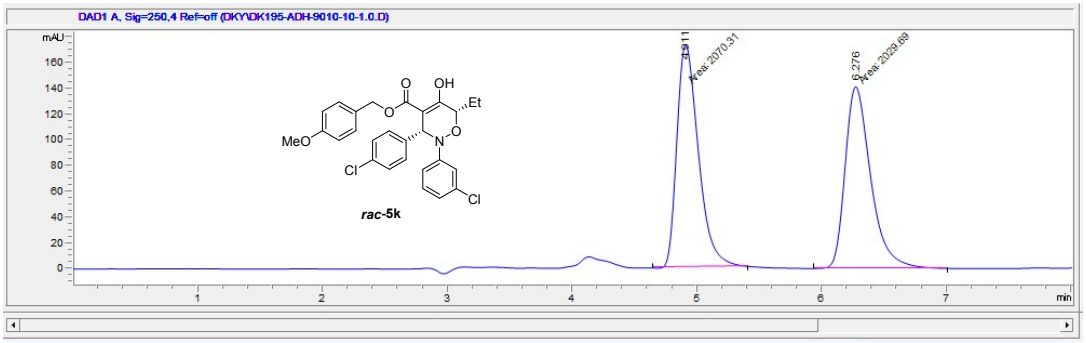
#	Time	Area	Height	Width	Area%	Symmetry
1	4.646	1358.8	113.3	0.1828	50.683	0.593
2	7.684	1322.2	76.2	0.2664	49.317	0.656

4-Methoxybenzyl (3*R*,6*S*)-6-ethyl-5-hydroxy-2,3-diphenyl-3,6-dihydro-2*H*-1,2-oxazine-4-carboxylate (5i)



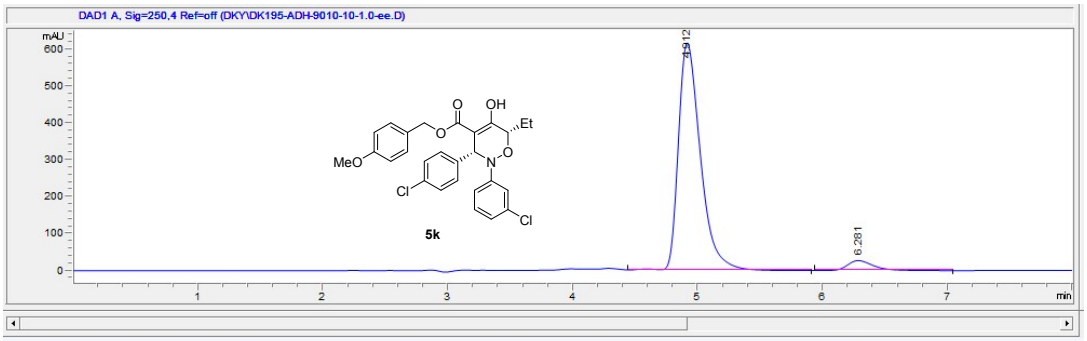
#	Time	Area	Height	Width	Area%	Symmetry
1	4.642	5156.2	434.5	0.1812	99.096	0.608
2	7.682	47	2.7	0.2653	0.904	0.655

4-Methoxybenzyl-(3-chlorophenyl)-3-(4-chlorophenyl)-6-ethyl-5-hydroxy-3,6-dihydro-2*H*-1,2-oxazine-4-carboxylate (5k)



#	Time	Area	Height	Width	Area%	Symmetry
1	4.911	2070.3	173.6	0.1988	50.495	0.698
2	6.276	2029.7	141.8	0.2386	49.505	0.677

4-Methoxybenzyl (3*R*,6*S*) (3-chlorophenyl)-3-(4-chlorophenyl)-6-ethyl-5-hydroxy-3,6-dihydro-2*H*-1,2-oxazine-4-carboxylate (5k)



#	Time	Area	Height	Width	Area%	Symmetry
1	4.912	7537.9	617.4	0.186	95.060	0.632
2	6.281	391.7	27.1	0.2206	4.940	0.659