Supporting Information

Construction of Chiral *N*,*O*-Hemiaminals via Copper-Catalyzed Enantioselective Michael/*N*-Hemiacetalization Cascade Reaction

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Part I Experimental Section

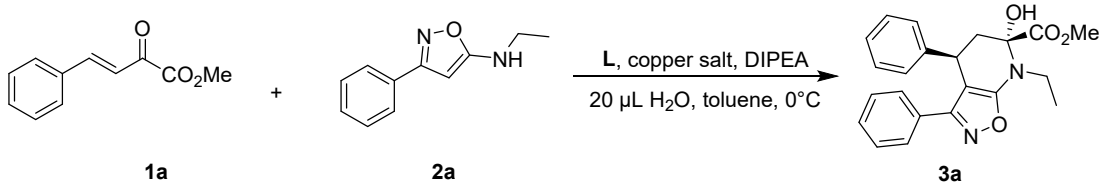
1.1 General information

^{1}H NMR and ^{13}C NMR were recorded on Bruker-500 MHz Spectrometer (^{1}H NMR: 500MHz, ^{13}C NMR: 125MHz, ^{19}F NMR: 470MHz) using TMS as internal reference. The chemical shifts (δ) and coupling constants (J) were expressed in ppm and Hz respectively. Uv-Vis Spectrophotometry was carried out on Shimadzu UV-3000. HPLC analysis was carried out on an Agilent 1260 series HPLC with a multiple wavelength detector. Chiralpak AD-H, IC were purchased form Daicel Chemical Industries, LTD. Optical rotations were measured on a PerKinElmer^{TM} Polarimeter (Model 343). Commercially available compounds were used without further purification. All solvents were purified according to the standard procedures unless otherwise noted. 2-hydroxy-3-(trifluoromethyl)benzaldehyde[1a], Ligands **L_1-L_6**[1b], **L_1'**[1c], β,γ-unsaturated α-ketoesters[1c], 5-aminoisoxazoles[1d] were prepared according to the literature procedures.

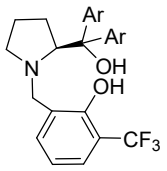
[1] (a) Daly, A.; Renehan, M. D.; Gilheany, D. G. High Enantioselectivities in an(E)-Alkene Epoxidation by CatalyticallyActive Chromium Salen Complexes. Insight into the Catalytic Cycle. *Org*. *Lett*., 2001, **3**, 663-666; (b) Lai, G. Y.; Guo, F. F.; Zheng, Y. Q.; Fang, Y.; Song, H. G.; Xu, K.; Wang, S. J.; Zha, Z. G.; Wang, Z. Y. Enantioselective and Regioselective Friedel–Crafts Alkylation of Pyrroles with Nitroalkenes Catalyzed by a Tridentate Schiff Base–Copper Complex. *Chem*. *Eur*. *J*., 2011, **17**, 1114-1117; (c) Zhang, S.; Xu, K.; Guo, F. F.; Hu, Y. B.; Zha, Z. G.; Wang, Z. Y. Enantioselective Copper(I/II)-Catalyzed Conjugate Addition of Nitro Esters to β,γ-Unsaturated α-Ketoesters. *Chem*. *Eur*. *J*., 2014, **20**, 979-982; (d) Liu, H,; Yan, Y. K.; Li, M.; Zhang, X. M.; An enantioselective aza-Friedel–Crafts reaction of 5-aminoisoxazoles with isatin-derived *N*-Boc ketimines. *Org. Biomol. Chem.*, 2021, **19**, 3820-3824.

1.2 Optimization of reaction conditions

Table 1. Effects of copper salts and ligand [a]



1a **2a** **3a**



L_1 Ar=Ph
L_2 Ar=*p*-MeC_6H_4
L_3 Ar=*p*-$MeOC_6H_4$
L_4 Ar=*p*-$CF_3C_6H_4$
L_5 Ar=3,5-ditrifluoromethylphenyl
L_6 Ar=3,5-dimethylphenyl

Entry	Ligand	Copper salt	Yield (%)[b]	*ee* (%)[d]
1	L_1	$Cu(OTf)_2$	95%	96%
2	L_1	$CuBr_2$	94%	94%
3	L_1	$Cu(CH_3COO)_2 \cdot H_2O$	91%	90%
4	L_1	$CuSO_4 \cdot 5H_2O$	95%	95%
5	L_2	$Cu(OTf)_2$	94%	91%
6	L_3	$Cu(OTf)_2$	87%	86%
7	L_4	$Cu(OTf)_2$	68%	57%
8	L_5	$Cu(OTf)_2$	20%	43%
9	L_6	$Cu(OTf)_2$	84%	81%

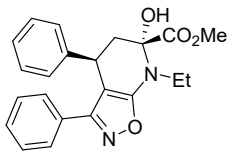
[a]Unless otherwise noted, the reaction of **1a** (0.1 mmol) and **2a** (0.15 mmol) was performed in the presence of **L** (10 mol %), DIPEA (10 mol %), copper salt (10 mol %) and 20 μL H_2O in toluene (1.0 mL) for 48 h. All *dr* = 7:1. dr was determined by ^1H NMR of the crude product. [b]Isolated yield. [c]Determined by chiral HPLC analysis.

1.3 General working procedure

A mixture of $Cu(OTf)_2$ (3.6 mg, 0.01 mmol) and the ligand (**L_1**, 4.3 mg, 0.01 mmol) in toluene (1 mL) with DIPEA (1.74 μL, 0.01 mmol) and 20 μL H_2O was stirred at room temperature for 2 h. β, γ-unsaturated α-ketoester **1a** (19.0 mg, 0.1 mmol) was then added and the resulting mixture was cooled to 0℃. After stirring the mixture for 0.5 h, 5-aminoisoxazole **2a** (28.2 mg, 0.15 mmol) was added in one portion. After the reaction was complete (monitored by TLC), the reaction mixture was evaporated in vacuo. Purification of the residue by column chromatography afforded the desired product **3a** (35.9 mg, 95% yield) as a white solid.

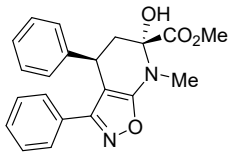
1.4 Experimental data of products

methyl(4*R*,6*R*)-7-ethyl-6-hydroxy-3,4-diphenyl-4,5,6,7-tetrahydroisoxazolo[5,4-b]pyridine-6-carboxylate（3a）



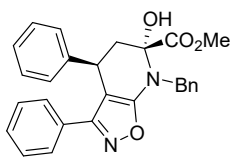
The title compound was prepared according to the general working procedure and purified by column chromatography (ethyl acetate/petroleum ether) to give the product as white solid (35.9 mg, 95% yield). $[\alpha]_D^{20}$ -26.1 (*c* = 0.2, $CHCl_3$, 96% *ee*); MP: 135-137°C; HPLC: Daicel Chiralpak IC, hexane: 2-propanol = 90:10, flow rate = 1.0 mL/min, T = 30°C, UV = 254 nm, t_R = 14.3 min (minor), t_R = 20.0 min (major); ^{1}H NMR (500 MHz, Acetone-d_6) δ 7.41 – 7.36 (m, 2H), 7.20 – 7.09 (m, 7H), 7.08 – 6.99 (m, 1H), 5.87 (s, 0.7H, major), 5.69 (s, 0.1H, minor), 4.41 – 4.35 (m, 1H), 3.84 (s, 0.4H, minor), 3.56 (s, 2.6H, major), 3.53 – 3.37 (m, 2H), 2.66 (dd, *J* = 13.6, 6.1 Hz, 0.13H, minor), 2.40 – 2.34 (m, 1.74H, major), 2.26 (dd, *J* = 13.6, 8.5 Hz, 0.13H, minor), 1.35 – 1.31 (m, 3H). ^{13}C NMR (125 MHz, Acetone-d_6) δ 171.1, 167.1, 160.7, 142.4, 130.0, 128.7, 128.1, 127.9, 127.9, 127.6, 126.4, 88.5, 86.4, 52.3, 44.5, 40.3, 34.4, 15.0. HRMS (ESI) m/z calcd for $C_{22}H_{22}N_2O_4$ $[M+H]^+$ 379.1652, found 379.1660.

methyl(4*R*,6*R*)-6-hydroxy-7-methyl-3,4-diphenyl-4,5,6,7-tetrahydroisoxazolo[5,4-b]pyridine-6-carboxylate（3b）



The title compound was prepared according to the general working procedure and purified by column chromatography (ethyl acetate/petroleum ether) to give the product as white solid (34.9 mg, 96% yield). $[\alpha]_D^{20}$ -1.6 (*c* = 0.5, $CHCl_3$, 96% *ee*); MP: 139-141°C; HPLC: Daicel Chiralpak AD-H, hexane: 2-propanol = 80:20, flow rate = 1.0 mL/min, T = 30°C, UV = 254 nm, t_R = 8.0 min (minor), t_R = 9.9 min (major); ^{1}H NMR (500 MHz, Acetone-d_6) δ 7.41 – 7.36 (m, 2H), 7.20 – 7.11 (m, 7H), 7.07 – 7.01 (m, 1H), 5.95 (s, 0.75H, major), 5.73 (s, 0.15H, minor), 4.43 – 4.35 (m, 1H), 3.84 (s, 0.5H, minor), 3.57 (s, 2.5H, major), 3.06 (s, 0.5H, minor), 3.04 (s, 2.5H, major), 2.42 – 2.34 (m, 2H). ^{13}C NMR (125 MHz, Acetone-d_6) δ 170.7, 167.2, 161.0, 142.5, 129.9, 128.8, 128.2, 127.9, 127.9, 127.6, 126.4, 88.9, 85.9, 52.4, 44.1, 34.4, 29.5. HRMS (ESI) m/z calcd for $C_{21}H_{20}N_2O_4$ $[M+H]^+$ 365.1496, found 365.1496.

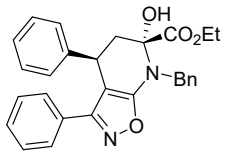
methyl(4*R*,6*R*)-7-benzyl-6-hydroxy-3,4-diphenyl-4,5,6,7-tetrahydroisoxazolo[5,4-b]pyridine-6-carboxylate（3c）



The title compound was prepared according to the general working procedure and purified by column chromatography (ethyl acetate/petroleum ether) to give the product as white solid (42.2 mg, 96% yield). $[\alpha]_D^{20}$ -25.4 (*c* = 0.5, $CHCl_3$, 97% *ee*); MP: 63-65°C;HPLC: Daicel Chiralpak IC, hexane: 2-propanol = 80:20, flow rate = 1.0 mL/min, T = 30°C, UV = 254 nm, t_R = 8.4 min (minor), t_R = 14.5 min (major); ^{1}H NMR (500 MHz, Acetone-d_6) δ 7.51 – 7.45 (m, 2H), 7.44 – 7.38 (m, 2H),

7.38 – 7.33 (m, 2H), 7.29 – 7.24 (m, 1H), 7.22 – 7.02 (m, 8H), 6.27 (s, 0.28H, major), 6.19 (s, 0.04H, minor), 4.76 – 4.55 (m, 2H), 4.50 – 4.37 (m, 1H), 3.70 (s, 0.38H, minor), 3.25 (s, 2.62H, major), 2.78 (dd, *J* = 13.6, 6.1 Hz, 0.12H, minor), 2.62 – 2.46 (m, 1.76H, major), 2.37 (dd, *J* = 13.6, 9.4 Hz, 0.12H, minor). ^{13}C NMR (125 MHz, Acetone-d_6) δ 170.7, 167.3, 160.8, 142.4, 138.7, 129.9, 128.8, 128.2, 128.2, 128.0, 127.9, 127.6, 127.5, 127.0, 126.4, 88.9, 85.9, 52.0, 48.3, 44.1, 34.3. HRMS (ESI) m/z calcd for $C_{27}H_{24}N_2O_4$ $[M+H]^+$ 441.1809, found 441.1810.

ethyl(4*R*,6*R*)-7-benzyl-6-hydroxy-3,4-diphenyl-4,5,6,7-tetrahydroisoxazolo[5,4-b]pyridine-6-carboxylate（3d）



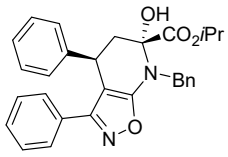
The title compound was prepared according to the general working procedure and purified by column chromatography (ethyl acetate/petroleum ether) to give the product as white solid (42.2 mg, 93% yield). $[\alpha]_D^{20}$ -19.0 (*c* = 0.5, $CHCl_3$, 97% *ee*); HPLC: Daicel Chiralpak IC, hexane: 2-propanol = 80:20, flow rate = 1.0 mL/min, T = 30°C, UV = 254 nm, t_R = 8.6 min (minor), t_R = 16.7 min (major); ^{1}H NMR (500 MHz, Acetone-d_6) δ 7.54 – 7.47 (m, 2H), 7.41 – 7.33 (m, 4H), 7.29 – 7.26 (m, 1H), 7.21 – 7.11 (m, 7H), 7.08 – 7.02 (m, 1H), 6.08 (s, 0.48H, major), 5.98 (s, 0.16H, minor), 4.82 – 4.56 (m, 2H), 4.50 – 4.39 (m, 1H), 4.25 – 4.17 (m, 0.25H, minor), 3.91 – 3.86 (m, 0.25H, minor), 3.91 – 3.86 (m, 0.75H, major), 3.63 – 3.55 (m, 0.75H, major), 2.79 (dd, J = 13.6, 6.1 Hz, 0.25H, minor), 2.60 – 2.43 (m, 1.5H, major), 2.37 (dd, *J* = 13.6, 9.0 Hz, 0.25H, minor), 1.24 (t, *J* = 7.1 Hz, 0.75H, minor), 0.96 (t, *J* = 7.1 Hz, 2.25H, major).

major ^{13}C NMR (125 MHz, Acetone-d_6) δ 170.3, 167.3, 160.8, 142.5, 138.7, 129.9, 128.8, 128.2, 127.9, 127.9, 127.9, 127.6, 127.5, 127.0, 126.4, 89.1, 86.0, 61.9, 48.4, 44.3, 34.5, 13.0.

minor ^{13}C NMR (125 MHz, Acetone-d_6) δ 170.6, 167.4, 160.7, 143.0, 139.0, 130.0, 128.7, 128.2, 127.9, 127.9, 127.8, 127.7, 127.6, 127.0, 126.3, 89.0, 86.5, 62.0, 47.1, 45.3, 35.4, 13.4.

HRMS (ESI) m/z calcd for $C_{28}H_{26}N_2O_4$ $[M+Na]^+$ 477.1785, found 477.1790.

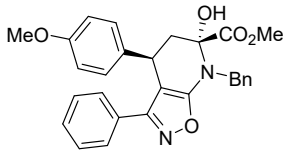
isopropyl(4*R*,6*R*)-7-benzyl-6-hydroxy-3,4-diphenyl-4,5,6,7-tetrahydroisoxazolo[5,4-b]pyridine-6-carboxylate（3e）



The title compound was prepared according to the general working procedure and purified by column chromatography (ethyl acetate/petroleum ether) to give the product as white solid (40.7 mg, 87% yield). $[\alpha]_D^{20}$ -16.8 (*c* = 0.5, $CHCl_3$, 93% *ee*); MP: 149-151°C; HPLC: Daicel Chiralpak IC, hexane: 2-propanol = 80:20, flow rate = 1.0 mL/min, T = 30°C, UV = 254 nm, t_R = 8.5 min (minor), t_R = 17.5 min (major); ^{1}H NMR (500 MHz, Acetone-d_6) δ 7.54 – 7.47 (m, 2H), 7.40 – 7.33 (m, 4H), 7.31 – 7.27 (m, 1H), 7.21 – 7.16 (m, 3H), 7.15 – 7.09 (m, 4H), 7.08 – 7.03 (m, 1H), 6.04 (s, 0.66H, major), 5.99 (s, 0.13H, minor), 4.90 – 4.54 (m, 3H), 4.47 (dd, *J* = 9.0, 6.4 Hz, 0.84H, major), 4.41 (dd, *J* = 9.1, 6.1 Hz, 0.16H, minor), 2.79 (dd, *J* = 13.6, 6.3 Hz, 0.16H, minor), 2.53 – 2.40 (m, 1.68H, major), 2.37 (dd, *J* = 13.8, 9.1, 0.16H,

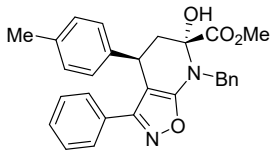
minor), 1.28 (d, *J* = 6.2 Hz, 0.5H, minor), 1.22 (d, *J* = 6.2 Hz, 0.5H, minor), 1.13 (d, *J* = 6.3 Hz, 2.5H, major), 0.86 (d, *J* = 6.3 Hz, 2.5H, major).
major ^{13}C NMR (125 MHz, Acetone-d_6) 170.0, 167.3, 160.8, 142.5, 138.6, 129.9, 128.7, 128.2, 128.2, 127.9, 127.8, 127.7, 127.4, 127.0, 126.5, 89.6, 86.4, 70.4, 48.7, 44.5, 34.7, 21.0, 20.8.
minor ^{13}C NMR (125 MHz, Acetone-d_6) 170.1, 167.5, 160.7, 143.0, 139.1, 130.0, 128.7, 128.2, 128.2, 127.9, 127.8, 127.7, 127.5, 126.9, 126.3, 89.1, 86.7, 70.1, 47.2, 45.4, 35.5, 20.7, 20.4.
HRMS (ESI) m/z calcd for $C_{29}H_{28}N_2O_4$ $[M+H]^+$ 469.2122, found 469.2122.

methyl(4*R*,6*R*)-7-benzyl-6-hydroxy-4-(4-methoxyphenyl)-3-phenyl-4,5,6,7-tetrahydroisoxazolo[5,4-b]pyridine-6-carboxylate（3f）



The title compound was prepared according to the general working procedure and purified by column chromatography (ethyl acetate/petroleum ether) to give the product as white solid (42.3 mg, 90% yield). $[\alpha]_D^{20}$ -29.6 (*c* = 1.0, $CHCl_3$, 91% *ee*); MP: 65-67℃; HPLC: Daicel Chiralpak AD-H, hexane: 2-propanol = 80:20, flow rate = 1.0 mL/min, T = 30°C, UV = 254 nm, t_R = 12.2 min (major), t_R = 19.8 min (minor); ^{1}H NMR (500 MHz, Acetone-d_6) δ 7.51 – 7.46 (m, 2H), 7.45 – 7.38 (m, 2H), 7.35 (t, *J* = 7.6 Hz, 2H), 7.30 – 7.25 (m, 1H), 7.24 – 7.13 (m, 3H), 7.11 – 7.05 (m, 2H), 6.74 – 6.70 (m, 1.67H, major), 6.69 – 6.66 (m, 0.33H, minor), 6.10 (s, 1H), 4.74 – 4.58 (m, 2H), 4.44 – 4.33 (m, 1H), 3.69 (s, 0.5H, minor), 3.67 (s, 2.5H, major), 3.65 (s, 0.5H, minor), 3.28 (s, 2.5H, major), 2.75 (dd, *J* = 13.6, 6.1 Hz, 0.17H, minor), 2.61 – 2.45 (m, 1.66H, major), 2.34 (dd, *J* = 13.6, 9.1 Hz, 0.17H, minor). ^{13}C NMR (125 MHz, Acetone-d_6) δ 170.7, 167.2, 160.8, 158.4, 138.8, 134.2, 130.0, 128.9, 128.8, 128.2, 128.0, 127.6, 127.6, 127.0, 113.5, 89.1, 85.9, 54.6, 52.0, 48.2, 44.3, 33.5. HRMS (ESI) m/z calcd for $C_{28}H_{26}N_2O_5$ $[M+H]^+$ 471.1914, found 493.1920.

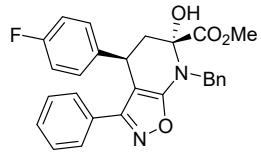
methyl(4*R*,6*R*)-7-benzyl-6-hydroxy-3-phenyl-4-(p-tolyl)-4,5,6,7-tetrahydroisoxazolo[5,4-b]pyridine-6-carboxylate（3g）



The title compound was prepared according to the general working procedure and purified by column chromatography (ethyl acetate/petroleum ether) to give the product as pale yellow solid (41.3 mg, 91% yield). $[\alpha]_D^{20}$ -36.3 (*c* = 1.0, $CHCl_3$, 95% *ee*); MP: 88-90℃; HPLC: Daicel Chiralpak IC, hexane: 2-propanol = 80:20, flow rate = 1.0 mL/min, T = 30°C, UV = 254 nm, t_R = 9.5 min (minor), t_R = 16.0 min (major); ^{1}H NMR (500 MHz, Acetone-d_6) δ 7.49 – 7.40 (m, 4H), 7.35 (t, *J* = 7.6 Hz, 2H), 7.26 (t, *J* = 7.3 Hz, 1H), 7.23 – 7.13 (m, 3H), 7.04 (d, *J* = 8.1 Hz, 2H), 6.99 – 6.92 (m, 2H), 6.15 (s, 0.9H, major), 6.03 (s, 0.1H, minor), 4.71 – 4.59 (m, 2H), 4.45 – 4.38 (m, 1H), 3.69 (s, 0.3H, minor), 3.25 (s, 2.7H, major), 2.76 (dd, *J* = 13.6, 6.2 Hz, 0.1H, minor), 2.60 – 2.48 (m, 1.8H, major), 2.35 (dd, *J* = 13.6, 9.1 Hz, 0.1H, minor), 2.18 (s, 2.7H, major), 2.16 (s, 0.3H, minor). ^{13}C NMR (125 MHz, Acetone-d_6) δ 170.7, 167.3, 160.7, 139.4, 138.8, 135.7, 130.0, 128.9,

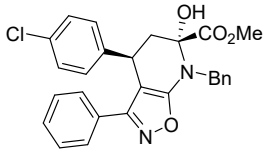
128.8, 128.2, 128.0, 127.8, 127.6, 127.5, 127.0, 88.9, 85.9, 52.0, 48.3, 44.2, 33.9, 20.1. HRMS (ESI) m/z calcd for $C_{28}H_{26}N_2O_4$ $[M+H]^+$ 455.1965, found 455.1979.

methyl(4*R*,6*R*)-7-benzyl-4-(4-fluorophenyl)-6-hydroxy-3-phenyl-4,5,6,7-tetrahydroisoxazolo[5,4-b]pyridine-6-carboxylate（3h）



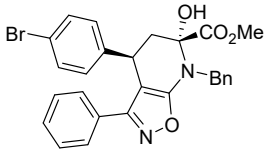
The title compound was prepared according to the general working procedure and purified by column chromatography (ethyl acetate/petroleum ether) to give the product as white solid (44.0 mg, 96% yield). $[\alpha]_D^{20}$ -35.6 (*c* = 1.0, $CHCl_3$, 96% *ee*); MP: 55-57℃; HPLC: Daicel Chiralpak IC, hexane: 2-propanol = 80:20, flow rate = 1.0 mL/min, T = 30°C, UV = 254 nm, t_R = 7.8 min (minor), t_R = 12.6 min (major); ^{1}H NMR (500 MHz, Acetone-d_6) δ 7.50 – 7.45 (m, 2H), 7.41 – 7.34 (m, 4H), 7.30 – 7.25 (m, 1H), 7.23 – 7.14 (m, 5H), 6.93 – 6.84 (m, 2H), 6.20 (s, 0.8H, major), 6.10 (s, 0.1H, minor), 4.75 – 4.59 (m, 2H), 4.51 – 4.43 (m, 1H), 3.69 (s, 0.33H, minor), 3.31 (s, 1.67H, major), 2.77 (dd, *J* = 13.7, 6.1 Hz, 0.11H, minor), 2.55 – 2.48 (m, 1.78H, major), 2.36 (dd, *J* = 13.7, 9.0 Hz, 0.11H, minor). ^{13}C NMR (125 MHz, Acetone-d_6) δ 170.7, 167.2, 161.4 (d, *J* = 243.3 Hz), 160.8, 138.6, 138.4 (d, *J* = 3.5 Hz), 129.8, 129.8 (d, *J* = 8.4 Hz), 128.9, 128.2, 128.0, 127.6, 127.6, 127.1, 114.8 (d, *J* = 21.2 Hz), 89.0, 85.9, 52.1, 48.3, 44.1, 33.6. ^{19}F NMR (471 MHz, Acetone-d_6) δ -117.9.
HRMS (ESI) m/z calcd for $C_{27}H_{23}FN_2O_4$ $[M+H]^+$ 459.1715, found 459.1718.

methyl(4*R*,6*R*)-7-benzyl-4-(4-chlorophenyl)-6-hydroxy-3-phenyl-4,5,6,7-tetrahydroisoxazolo[5,4-b]pyridine-6-carboxylate（3i）



The title compound was prepared according to the general working procedure and purified by column chromatography (ethyl acetate/petroleum ether) to give the product as white solid (45.0 mg, 95% yield). $[\alpha]_D^{20}$ -38.9 (*c* = 1.0, $CHCl_3$, 90% *ee*); MP: 146-148℃; HPLC: Daicel Chiralpak IC, hexane: 2-propanol = 80:20, flow rate = 1.0 mL/min, T = 30°C, UV = 254 nm, t_R = 8.0 min (minor), t_R = 12.2 min (major); ^{1}H NMR (500 MHz, Acetone-d_6) δ 7.47 (d, *J* = 7.5 Hz, 2H), 7.43 – 7.39 (m, 2H), 7.36 (t, *J* = 7.6 Hz, 2H), 7.27 (t, *J* = 7.3 Hz, 1H), 7.24 – 7.21 (m, 1H), 7.20 – 7.11 (m, 6H), 6.23 (s, 1H), 4.70 (d, *J* = 16.3 Hz, 1H), 4.61 (d, *J* = 16.3 Hz, 1H), 4.49 (t, *J* = 7.1 Hz, 1H), 3.30 (s, 3H), 2.52 (d, *J* = 7.1 Hz, 2H). ^{13}C NMR (125 MHz, Acetone-d_6) δ 170.6, 167.3, 160.7, 141.4, 138.5, 131.6, 129.8, 129.7, 129.0, 128.2, 128.1, 128.1, 127.6, 127.6, 127.1, 88.6, 85.8, 52.1, 48.2, 43.9, 33.7. HRMS (ESI) m/z calcd for $C_{27}H_{23}ClN_2O_4$ $[M+Na]^+$ 497.1239, found 497.1241.

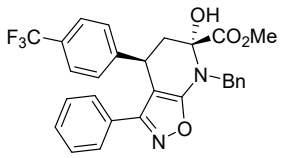
methyl(4*R*,6*R*)-7-benzyl-4-(4-bromophenyl)-6-hydroxy-3-phenyl-4,5,6,7-tetrahydroisoxazolo[5,4-b]pyridine-6-carboxylate（3j）



The title compound was prepared according to the general working procedure and purified by column chromatography (ethyl acetate/petroleum ether) to give the product as white solid (49.3 mg, 95% yield). $[\alpha]_D^{20}$ -49.3 (*c* = 1.0, $CHCl_3$, 97% *ee*); MP: 73-75℃; HPLC: Daicel Chiralpak IC, hexane: 2-propanol = 80:20, flow rate

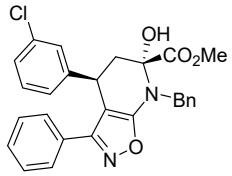
= 1.0 mL/min, T = 30°C, UV = 254 nm, t_R = 8.0 min (minor), t_R = 12.4 min (major); ^{1}H NMR (500 MHz, Acetone-d_6) δ 7.47 (d, *J* = 7.4 Hz, 2H), 7.43 – 7.39 (m, 2H), 7.38 – 7.30 (m, 4H), 7.29 – 7.21 (m, 2H), 7.21 – 7.16 (m, 2H), 7.13 (d, *J* = 8.3 Hz, 2H), 6.23 (s, 1H), 4.70 (d, *J* = 16.3 Hz, 1H), 4.61 (d, *J* = 16.3 Hz, 1H), 4.48 (t, *J* = 7.0 Hz, 1H), 3.30 (s, 3H), 2.52 (d, *J* = 7.1 Hz, 2H). ^{13}C NMR (125 MHz, Acetone-d_6) δ 170.6, 167.3, 160.7, 141.9, 138.5, 131.1, 130.1, 129.8, 129.0, 128.2, 128.1, 127.6, 127.5, 127.1, 119.7, 88.5, 85.8, 52.1, 48.2, 43.8, 33.8. HRMS (ESI) m/z calcd for $C_{27}H_{23}BrN_2O_4$ $[M+H]^+$ 519.0914, found 519.0912.

methyl(4*R*,6*R*)-7-benzyl-6-hydroxy-3-phenyl-4-(4-(trifluoromethyl)phenyl)-4,5,6,7-tetrahydroisoxazolo[5,4-b]pyridine-6-carboxylate（3k）



The title compound was prepared according to the general working procedure and purified by column chromatography (ethyl acetate/petroleum ether) to give the product as amorphous solid. (48.3 mg, 95% yield). $[\alpha]_D^{20}$ -23.9 (*c* = 0.5, $CHCl_3$, 97% *ee*); HPLC: Daicel Chiralpak AD-H, hexane: 2-propanol = 80:20, flow rate = 1.0 mL/min, T = 30°C, UV = 254 nm, t_R = 7.7 min (major), t_R = 12.4 min (minor); ^{1}H NMR (500 MHz, Acetone-d_6) δ 7.51 – 7.46 (m, 4H), 7.42 – 7.34 (m, 6H), 7.28 (t, *J* = 7.4 Hz, 1H), 7.23 – 7.13 (m, 3H), 6.25 (s, 0.83H, major), 6.08 (s, 0.17H, minor), 4.73 – 4.57 (m, 3H), 3.67 (s, 0.5H, minor), 3.29 (s, 2.5H, major), 2.83 (dd, *J* = 13.7, 6.2 Hz, 0.17H, minor), 2.58 – 2.53 (m, 1.66H, major), 2.41 (dd, *J* = 13.7, 8.3 Hz, 0.17H, minor). ^{13}C NMR (125 MHz, Acetone-d_6) δ 170.6, 167.3, 160.8, 147.2, 138.5, 129.7, 128.9, 128.8, 128.2, 128.1 (q, *J* = 31.4 Hz), 128.1, 127.6, 127.5, 127.1, 125.0 (q, *J* = 4.0 Hz), 124.4(q, *J*=271.2 Hz), 88.4, 85.8, 52.0, 48.3, 43.7, 34.2. ^{19}F NMR (470 MHz, Acetone-d_6) δ -62.9. HRMS (ESI) m/z calcd for $C_{28}H_{23}F_3N_2O_4$ $[M+H]^+$ 509.1683, found 509.1693.

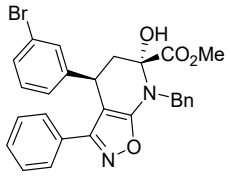
methyl(4*R*,6*R*)-7-benzyl-4-(3-chlorophenyl)-6-hydroxy-3-phenyl-4,5,6,7-tetrahydroisoxazolo[5,4-b]pyridine-6-carboxylate（3l）



The title compound was prepared according to the general working procedure and purified by column chromatography (ethyl acetate/petroleum ether) to give the product as colorless oil. (44.2 mg, 93% yield). $[\alpha]_D^{20}$ -33.1 (*c* = 1.0, $CHCl_3$, 95% *ee*); HPLC: Daicel Chiralpak IC, hexane: 2-propanol = 80:20, flow rate = 1.0 mL/min, T = 30°C, UV = 254 nm, t_R = 9.4 min (major), t_R = 13.8 min (minor); ^{1}H NMR (500 MHz, Acetone-d_6) δ 7.50 – 7.44 (m, 2H), 7.44 – 7.33 (m, 4H), 7.27 (td, *J* = 7.2, 1.5 Hz, 1H), 7.25 – 7.05 (m, 7H), 6.21 (s, 0.6H, major), 6.06 (s, 0.2H, minor), 4.83 – 4.58 (m, 2H), 4.54 – 4.45 (m, 1H), 3.68 (s, 0.8H, minor), 3.31 (s, 2.15H, major), 2.80 (dd, *J* = 13.7, 6.2 Hz, 0.27H, minor), 2.60 – 2.49 (m, 1.46H, major), 2.39 (dd, *J* = 13.7, 8.4 Hz, 0.27H, minor).

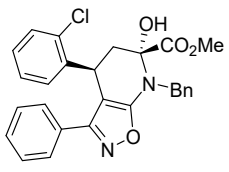
major ^{13}C NMR (125 MHz, Acetone-d_6) δ 170.6, 167.3, 160.8, 144.9, 138.5, 133.5, 129.8, 129.8, 129.0, 128.2, 128.1, 128.0, 127.6, 127.5, 127.0, 126.5, 126.5, 88.4, 85.8, 52.1, 48.2, 43.7, 34.0.
minor ^{13}C NMR (125 MHz, Acetone-d_6) δ 171.0, 167.3, 160.7, 145.5, 138.7, 133.4, 129.8, 129.8, 129.0, 128.2, 128.0, 127.9, 127.8, 127.5, 127.0, 126.4, 126.3, 88.5, 86.4, 52.5, 47.2, 44.5, 34.8.
HRMS (ESI) m/z calcd for $C_{27}H_{23}ClN_2O_4$ $[M+H]^+$ 475.1419, found 475.1432.

methyl(4*R*,6*R*)-7-benzyl-4-(3-bromophenyl)-6-hydroxy-3-phenyl-4,5,6,7-tetrahydroisoxazolo[5,4-b]pyridine-6-carboxylate（3m）



The title compound was prepared according to the general working procedure and purified by column chromatography (ethyl acetate/petroleum ether) to give the product as colorless oil (48.8 mg, 94% yield). $[\alpha]_D^{20}$ -45.2 (*c* = 1.0, $CHCl_3$, 95% *ee*); MP: 53-55°C; HPLC: Daicel Chiralpak IC, hexane: 2-propanol = 80:20, flow rate = 1.0 mL/min, T = 30°C, UV = 254 nm, t_R = 7.7 min (minor), t_R = 12.2 min (major); ^{1}H NMR (500 MHz, Acetone-d_6) δ 7.47 (d, *J* = 7.6 Hz, 2H), 7.43 – 7.33 (m, 5H), 7.29 – 7.15 (m, 6H), 7.12 – 7.04 (m, 1H), 6.23 (s, 0.8H, major), 6.08 (s, 0.2H, minor), 4.74 – 4.59 (m, 2H), 4.53 – 4.44 (m, 1H), 3.67 (s, 0.6H, minor), 3.30 (s, 2.4H, major), 2.80 (dd, *J* = 13.7, 6.2 Hz, 0.2H, minor), 2.59 – 2.52 (m, 1.6H, major), 2.39 (dd, *J* = 13.7, 8.4 Hz, 0.2H, minor).
major: ^{13}C NMR (125 MHz, Acetone-d_6) δ 170.6, 167.3, 160.8, 145.2, 138.5, 131.0, 130.1, 129.8, 129.5, 129.0, 128.2, 128.1, 127.6, 127.5, 127.1, 127.0, 121.8, 88.4, 85.8, 52.1, 48.2, 43.7, 34.0.
minor: ^{13}C NMR (125 MHz, Acetone-d_6) δ 171.0, 167.3, 160.7, 145.8, 138.7, 130.9, 130.1, 129.8, 129.3, 129.0, 128.1, 128.1, 127.8, 127.5, 127.1, 126.7, 121.7, 88.5, 86.5, 52.5, 47.2, 44.5, 34.8.
HRMS (ESI) m/z calcd for $C_{27}H_{23}BrN_2O_4$ $[M+H]^+$ 519.0914, found 519.0927.

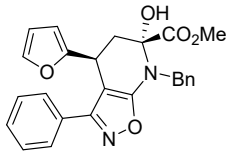
methyl(4*S*,6*R*)-7-benzyl-4-(2-chlorophenyl)-6-hydroxy-3-phenyl-4,5,6,7-tetrahydroisoxazolo[5,4-b]pyridine-6-carboxylate（3n）



The title compound was prepared according to the general working procedure and purified by column chromatography (ethyl acetate/petroleum ether) to give the product as pale yellow oil. (43.2 mg, 91% yield). $[\alpha]_D^{20}$ -45.0 (*c* = 1.0, $CHCl_3$, 80% *ee*); HPLC: Daicel Chiralpak IC, hexane: 2-propanol = 80:20, flow rate = 1.0 mL/min, T = 30°C, UV = 254 nm, t_R = 8.0 min (minor), t_R = 10.4 min. ^{1}H NMR (500 MHz, Acetone-d_6) δ 7.51 – 7.46 (m, 2H), 7.38 – 7.35 (m, 4H), 7.32 – 7.15 (m, 5H), 7.12 – 6.98 (m, 3H), 4.90 – 4.61 (m, 3H), 3.32 (s, 3H), 2.69 – 2.50 (m, 2H).
major ^{13}C NMR (125 MHz, Acetone-d_6) 170.6, 167.5, 160.5, 139.3, 138.6, 133.0, 129.8, 129.5, 129.1 129.0, 128.2, 128.2, 127.6, 127.2, 126.9, 88.2, 86.5, 52.1, 48.3, 41.4, 32.0.
minor ^{13}C NMR (125 MHz, Acetone-d_6) 170.9, 167.5, 160.4, 139.6, 138.7, 132.9, 129.8, 129.3, 129.1, 129.0, 128.2, 128.1, 127.8, 127.2, 127.1, 88.2, 86.0, 52.5, 47.2,

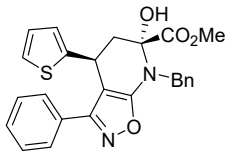
41.9, 31.2.
HRMS (ESI) m/z calcd for $C_{27}H_{23}ClN_2O_4$ $[M+H]^+$ 475.1419, found 475.1427.

methyl(4*S*,6*R*)-7-benzyl-4-(furan-2-yl)-6-hydroxy-3-phenyl-4,5,6,7-tetrahydroisoxazolo[5,4-b]pyridine-6-carboxylate（3o）



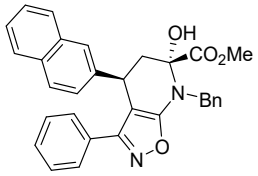
The title compound was prepared according to the general working procedure and purified by column chromatography (ethyl acetate/petroleum ether) to give the product as pale yellow oil. (40.9 mg, 95% yield). $[\alpha]_D^{20}$ +9.6 (*c* = 1.0, $CHCl_3$, 95% *ee*); HPLC: Daicel Chiralpak IC, hexane: 2-propanol = 80:20, flow rate = 1.0 mL/min, T = 30°C, UV = 254 nm, t_R = 8.0 min (minor), t_R = 11.6 min (major); ^{1}H NMR (500 MHz, Acetone-d_6) δ 7.53 – 7.49 (m, 2H), 7.48 – 7.45 (m, 2H), 7.36 – 7.25 (m, 7H), 6.19 – 6.14 (m, 1H), 5.84 – 5.79 (m, 1H), 4.74 – 4.61 (m, 2H), 4.46 (t, *J* = 5.8 Hz, 1H), 3.37 (s, 3H), 2.85 (dd, *J* = 13.5, 5.9 Hz, 1H), 2.52 (dd, *J* = 13.4, 5.9 Hz, 1H). ^{13}C NMR (125 MHz, Acetone-d_6) δ 170.4, 167.0, 160.6, 154.7, 141.7, 138.9, 130.0, 129.1, 128.2, 128.2, 127.6, 127.3, 127.0, 110.0, 107.7, 86.8, 85.6, 52.3, 47.8, 39.9, 28.2. HRMS (ESI) m/z calcd for $C_{25}H_{22}N_2O_5$ $[M+H]^+$ 431.1601, found 431.1605.

methyl(4*S*,6*R*)-7-benzyl-6-hydroxy-3-phenyl-4-(thiophen-2-yl)-4,5,6,7-tetrahydroisoxazolo[5,4-b]pyridine-6-carboxylate（3p）



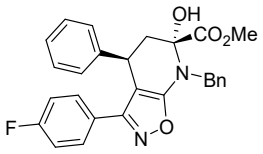
The title compound was prepared according to the general working procedure and purified by column chromatography (ethyl acetate/petroleum ether) to give the product as amorphous solid. (42.4 mg, 95% yield). $[\alpha]_D^{20}$ -4.8 (*c* = 1.0, $CHCl_3$, 96% *ee*); HPLC: Daicel Chiralpak IC, hexane: 2-propanol = 80:20, flow rate = 1.0 mL/min, T = 30°C, UV = 254 nm, t_R = 8.4 min (minor), t_R = 13.1 min (major); ^{1}H NMR (500 MHz, Acetone-d_6) δ 7.55 – 7.49 (m, 2H), 7.46 (d, *J* = 7.5 Hz, 2H), 7.39 – 7.32 (m, 2H), 7.30 – 7.21 (m, 4H), 7.18 – 7.06 (m, 1H), 6.80 – 6.71 (m, 2H), 6.25 (s, 0.7H), 6.09 (s, 0.1H), 4.81 – 4.58 (m, 3H), 3.67 (s, 0.4H), 3.32 (s, 2.6H), 2.84 (dd, *J* = 13.7, 6.1 Hz, 0.13H), 2.72 – 2.58 (m, 1.74H), 2.48 (dd, *J* = 13.7, 8.7 Hz, 0.13H). ^{13}C NMR (125 MHz, Acetone-d_6) δ 170.5, 166.8, 160.6, 146.5, 138.7, 130.0, 129.0, 128.2, 128.1, 127.6, 127.4, 127.0, 126.3, 125.7, 124.2, 89.3, 85.8, 52.1, 48.1, 44.5, 29.8. HRMS (ESI) m/z calcd for $C_{25}H_{22}N_2O_4S$ $[M+H]^+$ 447.1373, found 447.1383.

methyl(4*R*,6*R*)-7-benzyl-6-hydroxy-4-(naphthalen-2-yl)-3-phenyl-4,5,6,7-tetrahydroisoxazolo[5,4-b]pyridine-6-carboxylate（3q）



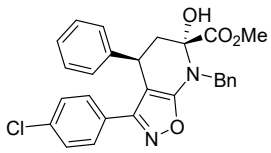
The title compound was prepared according to the general working procedure and purified by column chromatography (ethyl acetate/petroleum ether) to give the product as white solid. (45.6 mg, 93% yield). $[\alpha]_D^{20}$ -44.9 (*c* = 1.0, $CHCl_3$, 91% *ee*); MP: 78-80°C; HPLC: Daicel Chiralpak AD-H, hexane: 2-propanol = 80:20, flow rate = 1.0 mL/min, T = 30°C, UV = 254 nm, t_R = 13.2 min (major), t_R = 15.9 min (minor); ^{1}H NMR (500 MHz, Acetone-d_6) δ 7.55 – 7.44 (m, 3H), 7.43 – 7.32 (m, 6H), 7.30 – 7.15 (m, 7H), 7.12 – 7.04 (m, 1H), 6.23 (s, 0.8H, major), 6.08 (s, 0.2H, minor), 4.73 – 4.58 (m, 2H), 4.52 – 4.44 (m, 1H), 3.67 (s, 0.6H, minor), 3.30 (s, 2.4H, major), 2.80 (dd, *J* = 13.7, 6.2 Hz, 0.2H, minor), 2.59 – 2.48 (m, 1.6H, major), 2.39 (dd, *J* = 13.7, 8.4 Hz, 0.2H, minor). ^{13}C NMR (125 MHz, Acetone-d_6) δ 170.6, 167.3, 160.8, 145.2, 138.5, 131.0, 130.1, 129.8, 129.5, 129.3, 129.0, 128.2, 128.1, 128.1, 127.8, 127.6, 127.5, 127.1, 127.0, 126.7, 121.8, 88.4, 85.8, 52.1, 48.2, 43.7, 34.0. HRMS (ESI) m/z calcd for $C_{31}H_{26}N_2O_4$ $[M+H]^+$ 491.1965, found 491.1971.

methyl(4*R*,6*R*)-7-benzyl-3-(4-fluorophenyl)-6-hydroxy-4-phenyl-4,5,6,7-tetrahydroisoxazolo[5,4-b]pyridine-6-carboxylate（3r）



The title compound was prepared according to the general working procedure and purified by column chromatography (ethyl acetate/petroleum ether) to give the product as white solid (44.0 mg, 96% yield). $[\alpha]_D^{20}$ -26.9 (*c* = 1.0, $CHCl_3$, 75% *ee*); MP: 135-137°C; HPLC: Daicel Chiralpak AD-H, hexane: 2-propanol = 80:20, flow rate = 1.0 mL/min, T = 30°C, UV = 254 nm, t_R = 8.0 min (major), t_R = 11.4 min (minor); ^{1}H NMR (500 MHz, Acetone-d_6) δ 7.51 – 7.45 (m, 2H), 7.45 – 7.40 (m, 2H), 7.38 – 7.33 (m, 2H), 7.30 – 7.25 (m, 1H), 7.18 – 7.04 (m, 5H), 6.95 – 6.86 (m, 2H), 6.17 (s, 1H), 4.74 – 4.57 (m, 2H), 4.49 – 4.38 (m, 1H), 3.71 (s, 0.5H, minor), 3.29 (s, 2.5H, major), 2.78 (dd, *J* = 13.6, 6.0 Hz, 0.17H, minor), 2.57 – 2.47 (m, 1.66H, major), 2.37 (dd, *J* = 13.6, 9.7 Hz, 0.17H, minor). ^{13}C NMR (125 MHz, Acetone-d_6) δ 170.7, 167.3, 162.9 (d, *J* = 246.6 Hz), 160.0, 142.2, 138.5, 129.8 (d, *J* = 8.5 Hz), 128.2, 128.2, 128.0, 127.6, 127.1, 126.5, 126.3 (d, *J* = 3.0 Hz), 114.8 (d, *J* = 21.7 Hz), 89.1, 85.9, 52.1, 48.3, 44.1, 34.3. ^{19}F NMR (470 MHz, Acetone) δ -113.7. HRMS (ESI) m/z calcd for $C_{27}H_{23}FN_2O_4$ $[M+H]^+$ 459.1715, found 459.1720.

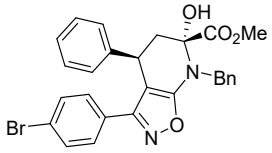
methyl(4*R*,6*R*)-7-benzyl-3-(4-chlorophenyl)-6-hydroxy-4-phenyl-4,5,6,7-tetrahydroisoxazolo[5,4-b]pyridine-6-carboxylate（3s）



The title compound was prepared according to the general working procedure and purified by column chromatography (ethyl acetate/petroleum ether) to give the product as white solid. (45.1 mg, 95% yield). $[\alpha]_D^{20}$ -24.7 (*c* = 1.0, $CHCl_3$, 96% *ee*); MP: 126-128°C; HPLC: Daicel Chiralpak IC, hexane: 2-propanol = 80:20, flow rate = 1.0 mL/min, T = 30°C, UV = 254 nm, t_R =6.6 min (minor), t_R = 8.4 min (major); ^{1}H NMR (500 MHz, Acetone-d_6) δ 7.51 – 7.45 (m, 2H), 7.42 – 7.38 (m, 2H), 7.38 – 7.33 (m, 2H), 7.30 – 7.25 (m, 1H), 7.20 – 7.12 (m, 6H),

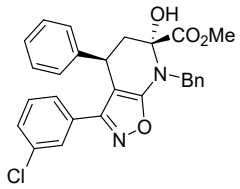
7.12 – 7.04 (m, 1H), 6.20 (s, 1H), 4.76 – 4.57 (m, 2H), 4.46 (dd, *J* = 8.3, 6.1 Hz, 1H), 3.28 (s, 3H), 2.58 – 2.47 (m, 2H). ^{13}C NMR (125 MHz, Acetone-d_6) δ 170.7, 167.4, 159.8, 142.2, 138.5, 134.3, 129.2, 128.7, 128.3, 128.2, 128.1, 128.0, 127.6, 127.1, 126.6, 89.2, 85.9, 52.1, 48.3, 44.1, 34.2. HRMS (ESI) m/z calcd for $C_{27}H_{23}ClN_2O_4$ $[M+H]^+$ 475.1419, found 475.1420.

methyl(4*R*,6*R*)-7-benzyl-3-(4-bromophenyl)-6-hydroxy-4-phenyl-4,5,6,7-tetrahydroisoxazolo[5,4-b]pyridine-6-carboxylate（3t）



The title compound was prepared according to the general working procedure and purified by column chromatography (ethyl acetate/petroleum ether) to give the product as white solid. (49.8 mg, 96% yield). $[\alpha]_D^{20}$ -19.8 (*c* = 1.0, $CHCl_3$, 95% *ee*); MP: 123-125℃; HPLC: Daicel Chiralpak IC, hexane: 2-propanol = 80:20, flow rate = 1.0 mL/min, T = 30°C, UV = 254 nm, t_R = 6.7 min (minor), t_R = 8.4 min (major); ^{1}H NMR (500 MHz, Acetone-d_6) δ 7.49 – 7.45 (m, 2H), 7.38 – 7.26 (m, 7H), 7.18 – 7.14 (m, 4H), 7.11 – 7.06 (m, 1H), 6.19 (s, 1H), 4.73 – 4.58 (m, 2H), 4.45 (dd, *J* = 8.3, 6.1 Hz, 1H), 3.28 (s, 3H), 2.58 – 2.47 (m, 2H). ^{13}C NMR (125 MHz, Acetone-d_6) δ 170.7, 167.5, 159.9, 142.2, 138.5, 131.1, 129.5, 129.1, 128.3, 128.2, 128.0, 127.6, 127.1, 126.6, 122.6, 89.2, 85.9, 52.1, 48.3, 44.1, 34.2. HRMS (ESI) m/z calcd for $C_{27}H_{23}BrN_2O_4$ $[M+H]^+$ 519.0914, found 519.0920.

methyl(4*R*,6*R*)-7-benzyl-3-(3-chlorophenyl)-6-hydroxy-4-phenyl-4,5,6,7-tetrahydroisoxazolo[5,4-b]pyridine-6-carboxylate（3u）



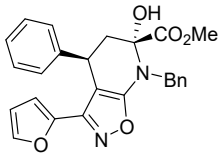
The title compound was prepared according to the general working procedure and purified by column chromatography (ethyl acetate/petroleum ether) to give the product as colorless oil. (44.2 mg, 93% yield). $[\alpha]_D^{20}$ -19.9 (*c* = 1.0, $CHCl_3$, 92% *ee*); HPLC: Daicel Chiralpak AD-H, hexane: 2-propanol = 80:20, flow rate = 1.0 mL/min, T = 30°C, UV = 254 nm, t_R = 6.4 min (major), t_R = 12.8 min (minor); ^{1}H NMR (500 MHz, Acetone-d_6) δ 7.51 – 7.45 (m, 2H), 7.39 – 7.25 (m, 5H), 7.25 – 7.21 (m, 1H), 7.20 – 7.13 (m, 5H), 7.12 – 7.04 (m, 1H), 6.17 (s, 1H), 4.74 – 4.58 (m, 2H), 4.52 – 4.38 (m, 1H), 3.72 (s, 0.6H, minor), 3.30 (s, 2.4H, major), 2.78 (dd, *J* = 13.6, 6.0 Hz, 0.2H, minor), 2.58 – 2.47 (m, 1.6H, major), 2.39 (dd, *J* = 13.6, 9.9 Hz, 0.2H, minor).

major: ^{13}C NMR (125 MHz, Acetone-d_6) δ 170.7, 167.4, 159.7, 142.1, 138.4, 133.4, 131.8, 129.7, 128.8, 128.3, 128.2, 127.9, 127.7, 127.6, 127.1, 126.6, 126.1, 89.4, 86.6, 52.1, 48.3, 44.0, 34.2.

minor: ^{13}C NMR (125 MHz, Acetone-d_6) δ 171.0, 167.6, 159.6, 142.7, 138.8, 133.3, 131.7, 129.6, 128.7, 128.3, 128.2, 127.8, 127.6, 127.5, 127.0, 126.6, 126.1, 89.3, 85.9, 52.5, 46.9, 45.5, 35.2.

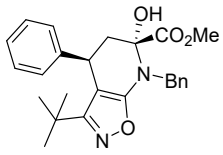
HRMS (ESI) m/z calcd for $C_{27}H_{23}ClN_2O_4$ $[M+H]^+$ 475.1419, found 475.1422.

methyl(4*R*,6*R*)-7-benzyl-3-(furan-2-yl)-6-hydroxy-4-phenyl-4,5,6,7-tetrahydroisoxazolo[5,4-b]pyridine-6-carboxylate（3v）



The title compound was prepared according to the general working procedure and purified by column chromatography (ethyl acetate/petroleum ether) to give the product as colorless oil. (40.5 mg, 94% yield). $[\alpha]_D^{20}$ +4.6 (*c* = 0.5, $CHCl_3$, 97% *ee*); HPLC: Daicel Chiralpak AD-H, hexane: 2-propanol = 80:20, flow rate = 1.0 mL/min, T = 30°C, UV = 254 nm, t_R = 12.4 min (minor), t_R = 19.4 min (major); ^{1}H NMR (500 MHz, Acetone-d_6) δ 7.49 – 7.44 (m, 2H), 7.42 – 7.38 (m, 1H), 7.37 – 7.32 (m, 2H), 7.28 – 7.24 (m, 3H), 7.22 – 7.15 (m, 3H), 6.33 – 6.25 (m, 1H), 6.24 – 6.07 (m, 2H), 4.74 – 4.58 (m, 2H), 4.39 – 4.27 (m, 1H), 3.66 (s, 0.35H, minor), 3.21 (s, 2.65H, major), 2.80 (dd, *J* = 13.7, 6.4 Hz, 0.11H, minor), 2.72 – 2.54 (m, 1.78H, major), 2.38 (dd, *J* = 13.7, 8.9 Hz, 0.11H, minor). ^{13}C NMR (125 MHz, Acetone-d_6) δ 170,5, 167.2，153.0, 144.4, 143.5, 142.7, 138.7, 128.3, 128.2, 127.8, 127.6, 127.0, 127.0, 126.5, 111.0, 87.9, 85.9, 51.9, 48.1, 43.8, 33.8. HRMS (ESI) m/z calcd for $C_{25}H_{22}N_2O_5$ $[M+H]^+$ 431.1601, found 431.1606.

methyl(4*R*,6*R*)-7-benzyl-3-(tert-butyl)-6-hydroxy-4-phenyl-4,5,6,7-tetrahydroisoxazolo[5,4-b]pyridine-6-carboxylate（3w）



The title compound was prepared according to the general working procedure and purified by column chromatography (ethyl acetate/petroleum ether) to give the product as white solid. (40.4 mg, 96% yield). $[\alpha]_D^{20}$ -16.9 (*c* = 0.5, $CHCl_3$, 98% *ee*); MP: 76-78°C; HPLC: Daicel Chiralpak AD-H, hexane: 2-propanol = 80:20, flow rate = 1.0 mL/min, T = 30°C, UV = 254 nm, t_R = 4.8 min (major), t_R = 5.5 min (minor); ^{1}H NMR (500 MHz, Acetone-d_6) δ 7.50 – 7.41 (m, 2H), 7.38 – 7.29 (m, 4H), 7.29 – 7.17 (m, 4H), 6.05 (s, 1H), 4.69 – 4.48 (m, 2H), 4.30 – 4.24 (m, 1H), 3.55 (s, 0.5H, minor), 3.16 (s, 2.5H, major), 2.78 – 2.70 (m, 1H), 2.62 – 2.57 (m, 0.83H, major), 2.38 (dd, *J* = 13.8, 5.5 Hz, 0.17H, minor), 1.02 (s, 7.5H, major), 1.00 (s, 1.5H, minor). ^{13}C NMR (125 MHz, Acetone-d_6) δ 170.5, 168.5, 166.8, 144.1, 139.6, 128.7, 128.1, 128.1, 127.6, 126.8, 126.6, 87.3, 85.5, 51.6, 48.0, 43.8, 34.8, 32.8, 28.5. HRMS (ESI) m/z calcd for $C_{25}H_{28}N_2O_4$ $[M+H]^+$ 421.2122, found 421.2126.

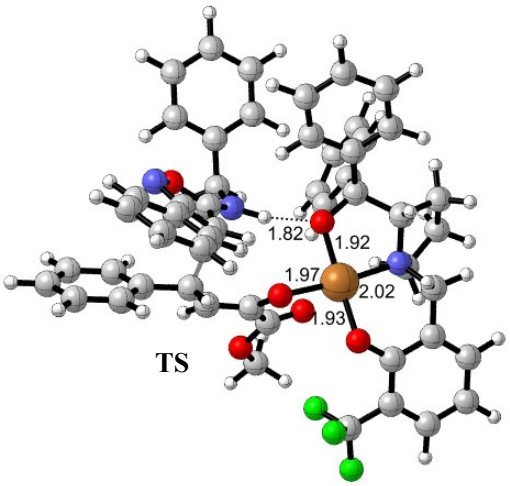
1.5 A plausible structure of the transition state and DFT calculations.

All the calculations were performed using Gaussian 16 software packages.[1] The geometry of all reactants and transition states were optimized using the (U)B3LYP[2]-D3(Becke-Johnson damping function)[3] in toluene (using SMD solvation model[4]). In these geometry optimizations, a mixed basis set of SDD[5] for Cu, while 6-31G(d)[6] for all the other atoms was used. Vibrational frequency analysis was calculated at the same level of theory to validate each structure as either a minimum or a transition state and to evaluate its zero-point energy and thermal corrections at 298 K. The wavefunction stability determination was done for open-shell calculations. It's found that the wavefunction is stable under the perturbations considered. For each transition state, the intrinsic reaction coordinate (IRC) analysis was conducted to ensure that it connects the right reactant and product.[7] To obtain more accurate energies, solution-

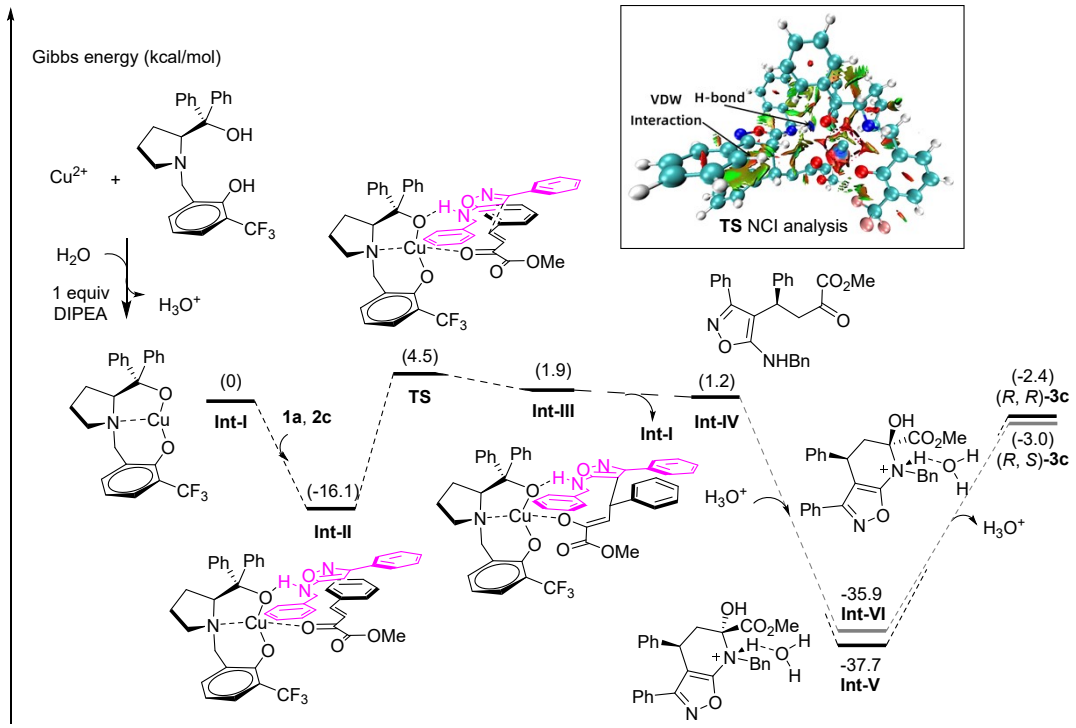
phase single point energy calculations were performed at the (U)B3LYP-D3(BJ)/6-311+G(d,p)-SDD level.

Table 1. Thermal correction of Gibbs free energy (TCG, hartree) and single point energies (SP, hartree) in toluene for all species involved in this study

Compounds	TCG	SP	Compounds	TCG	SP
Int-I	0.364875	-1668.583003	**Int-IV**	0.396274	-1454.227987
1a	0.14554	-651.087685	**Int-V**	0.438813	-1531.120973
2c	0.221059	-803.112483	**Int-VI**	0.436012	-1531.115342
Int-II	0.783441	-3122.860782	(*R*,*R*)-**3c**	0.39871	-1454.236033
TS	0.78712	-3122.831592	(*R*,*S*)-**3c**	0.398003	-1454.236391
Int-III	0.786949	-3122.835627	H_3O^+	0.01485	-76.803372



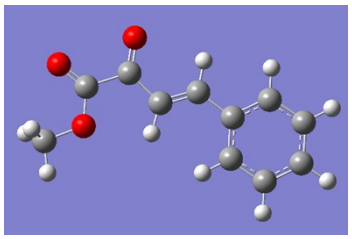
Scheme 1. 3D structures were generated by CYLview,[8] key bond distances shown in units of Å.



Scheme 2. (a) Gibbs energy profiles for the Cu-catalyzed Michael/*N*-hemiacetalization cascade reaction of **1a** with **2c**. Free energies in solution (in kcal/mol) at the (U)B3LYP-D3(BJ)/6-311+G(d,p)-SDD/SMD(Toluene)//(U)B3LYP-D3(BJ)/6-31G(d)-SDD/SMD(Toluene) level are displayed. [b] The NCI analysis was obtained by VMD software.[9]

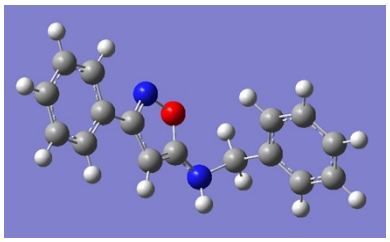
Cartesian coordinates:

1a



C	3.52279500	1.62414100	0.00057000
C	2.22671400	1.12376200	0.00038800
C	1.99592100	-0.26647000	-0.00006800
C	3.10682900	-1.13066900	-0.00033600
C	4.40505700	-0.62805900	-0.00014800
C	4.61646900	0.75128900	0.00030700
H	3.68596200	2.69798900	0.00091700
H	1.38794900	1.81258900	0.00059800
H	2.93829600	-2.20428500	-0.00070000
H	5.24993300	-1.31051000	-0.00035100
H	5.62778600	1.14767200	0.00045200
C	0.66333400	-0.85330000	-0.00028200
H	0.62701400	-1.94181800	-0.00067300
C	-0.52456700	-0.20847000	-0.00004300
H	-0.59767800	0.87180100	0.00034500
C	-1.77384000	-0.97750400	-0.00025000
O	-1.84155900	-2.19722000	-0.00085300
C	-3.11065100	-0.19862900	0.00049000
O	-4.19101000	-0.73988000	0.00231100
O	-2.92533300	1.13387100	-0.00119900
C	-4.12956800	1.92494500	-0.00074300
H	-4.72329400	1.71248700	0.89211300
H	-3.79821300	2.96350300	-0.00249300
H	-4.72549300	1.71018500	-0.89158100

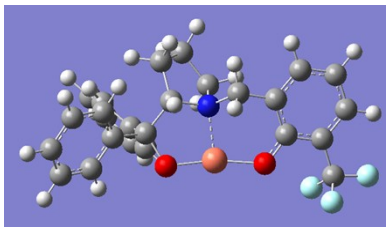
2c



C	0.38095900	-1.35926500	0.07751900
C	-0.72871100	-1.00124700	0.80204300
C	-1.64408600	-0.53361800	-0.18260100
H	-0.85462700	-1.04668900	1.87200400

O	0.16553200	-1.13108900	-1.23377800
N	-1.13836700	-0.59498500	-1.40285100
C	-3.00580800	-0.00989700	0.02217900
C	-3.71124000	0.57320400	-1.04299000
C	-3.61798500	-0.08673000	1.28082700
C	-4.99817100	1.06557900	-0.84906400
H	-3.23850200	0.63625600	-2.01737600
C	-4.90664100	0.40913900	1.47250200
H	-3.09010000	-0.54243100	2.11270800
C	-5.60097100	0.98679800	0.40917000
H	-5.53235000	1.51501800	-1.68150200
H	-5.36826200	0.34127400	2.45358500
H	-6.60518900	1.37341100	0.55852400
N	1.57294200	-1.92998000	0.42471800
H	1.74334800	-1.89447200	1.42374300
C	2.77852800	-1.69817700	-0.39102700
H	3.48992300	-2.48815400	-0.13498300
H	2.49510100	-1.83732700	-1.43620100
C	3.40135600	-0.33545100	-0.16827500
C	2.86029800	0.80724200	-0.77412000
C	4.49624900	-0.19185200	0.69110300
C	3.40304700	2.06571500	-0.51901400
H	2.01257300	0.70777100	-1.44569800
C	5.04255800	1.06706900	0.94598600
H	4.92698000	-1.07379500	1.16051700
C	4.49481100	2.19927800	0.34216900
H	2.97587100	2.94320000	-0.99657200
H	5.89541500	1.16213200	1.61257300
H	4.91837600	3.18055100	0.53738200

Int-I



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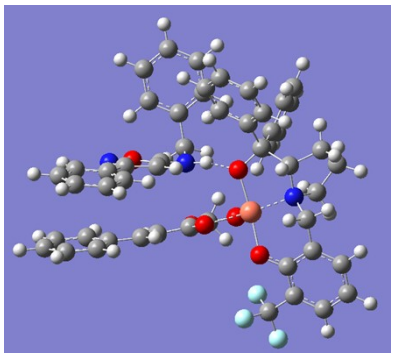
C	-1.77863600	-0.04861300	2.44384500
C	-0.88809800	1.20135200	2.65371300
H	1.18902900	1.33972100	1.86515500
H	-0.06978900	1.86331400	0.74038700
H	-1.34376700	-1.74206100	1.11158300

H	-2.83969900	0.19505300	2.46441200
H	-1.60276400	-0.78300100	3.23624600
H	-1.46917000	2.12299000	2.57815300
H	-0.41718700	1.18394900	3.64046400
N	0.09187200	-0.22567000	0.95991100
C	1.03471200	-1.17103000	1.63907200
H	0.79330300	-1.22484100	2.70773700
H	0.84063600	-2.15919800	1.20620700
C	2.47784100	-0.77477300	1.46629400
C	3.01353400	-0.55958000	0.16659500
C	3.30107600	-0.63109200	2.58436400
C	4.38167500	-0.20624100	0.06180300
C	4.65087100	-0.29925600	2.46506200
H	2.87189800	-0.78987200	3.57129900
C	5.18412200	-0.08690700	1.19596800
H	5.27432400	-0.20045800	3.34753700
H	6.22774000	0.18308600	1.07907700
O	2.29822200	-0.68121300	-0.93925400
C	4.94531900	0.05531100	-1.30249800
F	4.31215700	1.07517900	-1.93494200
F	4.86163400	-1.01882600	-2.12109000
F	6.25802500	0.39637100	-1.25044300
C	-2.12942800	-0.25181800	-0.21095000
C	-2.50643100	1.24694500	-0.25046600
C	-1.79846300	2.13154900	-1.07179700
C	-3.57226500	1.75670700	0.50565600
C	-2.10217400	3.49438300	-1.09293400
H	-1.01240200	1.74257300	-1.70938100
C	-3.87834100	3.11738000	0.48968200
H	-4.18935500	1.08256400	1.09026800
C	-3.13604100	3.99600400	-0.30220200
H	-1.53448500	4.16092800	-1.73678400
H	-4.70711300	3.48804200	1.08690300
H	-3.37526800	5.05562700	-0.31800200
C	-3.42340800	-1.07271200	-0.33939700
C	-4.10444400	-0.99810600	-1.56387900
C	-3.96317400	-1.86856900	0.67534100
C	-5.28649400	-1.70245800	-1.76942800
H	-3.69095500	-0.38176900	-2.35513800
C	-5.15434300	-2.57474500	0.47260400
H	-3.47234200	-1.95360300	1.63842400
C	-5.81965600	-2.49521500	-0.74800700
H	-5.79566000	-1.63245500	-2.72689100
H	-5.55626500	-3.18683400	1.27566000

H	-6.74446600	-3.04330300	-0.90536800
O	-1.31669700	-0.58363200	-1.31395800
Cu	0.46935600	-0.49166900	-0.98515600

Int-II

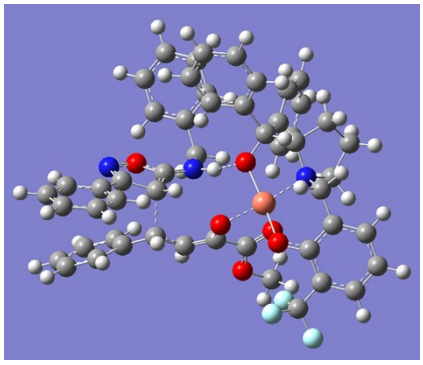


C	4.42929100	0.94763400	0.31254100
C	2.76509700	1.60946400	1.89227200
C	3.94131500	2.58318800	2.08944800
C	4.91897500	2.27779200	0.92957500
H	5.21425100	0.20087200	0.19603700
H	3.97747100	1.11257100	-0.66260300
H	2.35383200	1.25789200	2.84028900
H	3.61954200	3.62482600	2.09081200
H	4.41652200	2.39100700	3.05678200
H	4.89687000	3.06946900	0.17690700
H	5.94699100	2.19492400	1.29352100
N	3.38517900	0.41127100	1.23793000
C	3.99537700	-0.49979500	2.26556300
H	4.71907900	0.05699500	2.87391400
H	3.17442100	-0.80949000	2.92219100
C	4.66655800	-1.68782800	1.63748000
C	3.90294600	-2.52807500	0.77955700
C	6.01254700	-1.96512700	1.86883300
C	4.56910100	-3.62324100	0.16686100
C	6.64493900	-3.06474600	1.28259000
H	6.57799600	-1.30528400	2.52424500
C	5.91430900	-3.88608300	0.42596600
H	7.69224300	-3.26913400	1.48032200
H	6.39068300	-4.73345500	-0.05552100
O	2.62841000	-2.33280900	0.55199100
C	3.78884200	-4.47694700	-0.78240000
F	3.28495100	-3.76932700	-1.82812700
F	2.73497100	-5.09730000	-0.19961400
F	4.55360300	-5.46004700	-1.32799200
C	1.53707100	2.12740800	1.05825400

C	1.96249400	3.04791700	-0.10968800
C	2.16429600	4.42410000	0.06473600
C	2.13017700	2.51455800	-1.39362900
C	2.55236200	5.23578700	-1.00313500
H	1.99254000	4.87372600	1.03709000
C	2.52637200	3.32057900	-2.46247300
H	1.93915100	1.46204300	-1.55779100
C	2.74166500	4.68644100	-2.27260300
H	2.69651000	6.30081900	-0.84244400
H	2.65320800	2.87988500	-3.44815900
H	3.03836000	5.31781900	-3.10532500
C	0.57710500	2.91633900	1.97282400
C	-0.69934500	3.20847700	1.46909400
C	0.89763900	3.37295100	3.25595000
C	-1.62984000	3.91725900	2.22241600
H	-0.96650700	2.88118300	0.47373700
C	-0.03430800	4.08774400	4.01745800
H	1.87573300	3.18611400	3.68530100
C	-1.30116200	4.36079700	3.50670100
H	-2.61010900	4.12365400	1.80181000
H	0.23904100	4.42883900	5.01260700
H	-2.02458900	4.91413300	4.09918000
O	0.84455600	1.01116100	0.56558900
C	-5.85936000	-3.71275500	-1.66631700
C	-4.55575600	-3.23439300	-1.66363100
C	-3.77518600	-3.30237200	-0.49203500
C	-4.34790000	-3.84653000	0.67422000
C	-5.65208400	-4.32952400	0.66798100
C	-6.40948000	-4.26431600	-0.50308800
H	-6.45634300	-3.64767600	-2.57107900
H	-4.14542000	-2.78098300	-2.55956700
H	-3.76083700	-3.87470400	1.58712600
H	-6.08199300	-4.73861100	1.57675100
H	-7.43203200	-4.63095400	-0.50958600
C	-2.42485400	-2.78574800	-0.41768200
H	-1.99248500	-2.73937400	0.57861500
C	-1.64002200	-2.34955300	-1.43973800
H	-1.95379700	-2.37972600	-2.47465100
C	-0.36903700	-1.74963900	-1.12934500
O	0.05268200	-1.61206700	0.03195000
C	0.53084600	-1.23392200	-2.24944600
O	1.61518800	-0.72316300	-2.02580100
O	0.02490000	-1.41877200	-3.46554400
Cu	1.81804700	-0.61435200	0.44197400

C	-2.34249200	0.60599700	-0.71143200
C	-2.62640100	0.26930900	0.59127800
C	-4.00461000	-0.08579900	0.55615700
H	-1.94192000	0.29936300	1.42213600
O	-3.45099000	0.47574000	-1.47107700
N	-4.52221300	0.03553800	-0.65570000
C	-4.83557700	-0.60424300	1.65407600
C	-6.20436600	-0.84513100	1.45663800
C	-4.26021300	-0.91869200	2.89330900
C	-6.97620700	-1.39316400	2.47624100
H	-6.64578700	-0.61548400	0.49302800
C	-5.03632000	-1.46810500	3.91358600
H	-3.20162900	-0.74336500	3.05775000
C	-6.39583400	-1.70860400	3.70844900
H	-8.03343400	-1.57942900	2.30890400
H	-4.57668600	-1.70921500	4.86800400
H	-6.99995500	-2.13793700	4.50290500
N	-1.18025200	0.91927900	-1.34090100
H	-0.39420100	1.09534100	-0.68645500
C	-1.20199600	1.68004100	-2.60015500
H	-0.16070800	1.75676900	-2.91987500
H	-1.74136200	1.09137000	-3.34806400
C	-1.81671900	3.06141000	-2.46913400
C	-3.15416000	3.28503500	-2.81667400
C	-1.06519700	4.12275400	-1.94836800
C	-3.73272200	4.54272400	-2.63805900
H	-3.74686200	2.46677800	-3.21363000
C	-1.64249700	5.37873100	-1.76539400
H	-0.02811500	3.96474300	-1.67978600
C	-2.97935300	5.59204700	-2.10840700
H	-4.77313600	4.70056000	-2.90895800
H	-1.04433700	6.18749900	-1.35497900
H	-3.43099400	6.57003100	-1.96550000
C	0.84522600	-0.96730200	-4.56450000
H	1.79071100	-1.51462200	-4.57479700
H	0.26675000	-1.17996500	-5.46286800
H	1.03998200	0.10404100	-4.47649100

TS



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C	4.52406000	2.88220700	0.23179700
H	4.96178500	0.77932300	-0.34566300
H	3.48502800	1.43619700	-1.03970100
H	2.37980000	1.84090200	2.59933200
H	3.21608600	4.21470100	1.39485800
H	4.28126200	3.22568900	2.38109900
H	4.31790700	3.56759000	-0.59399800
H	5.59179600	2.94975700	0.45964800
N	3.32738700	0.91002800	0.99168500
C	4.22843700	0.27357200	2.01327400
H	4.93506200	1.01489400	2.40611800
H	3.57764100	-0.04295300	2.83567600
C	4.97847000	-0.89073500	1.43445000
C	4.22052600	-1.96172200	0.88075400
C	6.36992900	-0.92480200	1.40083300
C	4.93803900	-3.02642100	0.26955900
C	7.06033900	-1.99901500	0.83058000
H	6.92586700	-0.09223000	1.82857500
C	6.33362200	-3.04143500	0.25823100
H	8.14550800	-2.01426000	0.81923200
H	6.85063300	-3.87187900	-0.21098200
O	2.91561800	-1.98356400	0.92761300
C	4.15522600	-4.12094900	-0.38282500
F	3.33973900	-3.66600000	-1.37673700
F	3.35896900	-4.79793700	0.47630300
F	4.96336500	-5.04791100	-0.96397700
C	1.23247100	2.33959200	0.84158500
C	1.38023500	3.24086400	-0.40899600
C	1.40965400	4.64065700	-0.33137700
C	1.45817600	2.64976600	-1.67666900
C	1.53602100	5.42366300	-1.48049900
H	1.30033000	5.12907100	0.63096100

C	1.58687300	3.42884500	-2.82806500
H	1.41535000	1.56964900	-1.75233400
C	1.62688800	4.82117900	-2.73610900
H	1.54835900	6.50669300	-1.39277300
H	1.64986500	2.94462900	-3.79936100
H	1.71691300	5.42914300	-3.63181900
C	0.27749800	3.03873800	1.83698300
C	-1.10260900	2.90764500	1.63557800
C	0.70815400	3.82843800	2.91176100
C	-2.02242400	3.54240200	2.46681600
H	-1.45711900	2.30371000	0.81429700
C	-0.21018100	4.46372600	3.75338300
H	1.76530500	3.96252600	3.11206900
C	-1.57980700	4.32601800	3.53470100
H	-3.08570400	3.42564500	2.27494800
H	0.15306200	5.06654000	4.58167700
H	-2.29344100	4.82111800	4.18745700
O	0.68399400	1.10635400	0.46718100
C	-5.34559000	-2.98378800	-2.60871900
C	-4.11587100	-2.50519200	-2.16333300
C	-3.54984100	-2.98543600	-0.97243900
C	-4.24755800	-3.95528000	-0.23853600
C	-5.47517300	-4.44039400	-0.68645000
C	-6.02925300	-3.95338900	-1.87120100
H	-5.77301600	-2.59783600	-3.52981700
H	-3.59450300	-1.74591400	-2.73783600
H	-3.82369600	-4.32836700	0.68878500
H	-5.99961300	-5.19428200	-0.10641500
H	-6.98877600	-4.32592200	-2.21871400
C	-2.24389000	-2.47403600	-0.47332500
H	-1.92231100	-2.97184400	0.44147800
C	-1.18576800	-2.31130600	-1.44701800
H	-1.38476600	-2.47178600	-2.49777800
C	0.05106800	-1.87937400	-1.03201900
O	0.31095600	-1.58318200	0.19287400
C	1.14454200	-1.62280400	-2.04404200
O	2.04352700	-0.81415100	-1.85422200
O	1.03465900	-2.34927700	-3.15611600
Cu	1.86196400	-0.41378200	0.54513400
C	-2.59416000	0.19631600	-0.54098300
C	-2.51896200	-0.82777300	0.46028900
C	-3.90900600	-0.87784000	0.91744100
H	-1.65490000	-0.85006000	1.11271700
O	-3.87013100	0.42748000	-0.85451800

N	-4.71632700	-0.22991900	0.12514600
C	-4.41742900	-1.67682900	2.03371900
C	-5.79430000	-1.92398100	2.16782200
C	-3.52088400	-2.23767300	2.95514800
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H	-6.48112000	-1.50553800	1.44022100
C	-3.99378800	-3.03868300	3.99394000
H	-2.45646100	-2.04647800	2.86513300
C	-5.36174900	-3.28207800	4.12129700
H	-7.32461500	-2.91311500	3.30228800
H	-3.29246500	-3.47032800	4.70162200
H	-5.72919000	-3.90858800	4.92896500
N	-1.62114400	0.80054100	-1.18092700
H	-0.69440300	0.83406800	-0.69363700
C	-1.86499400	1.68112000	-2.34339700
H	-0.87728600	1.91084000	-2.74296200
H	-2.40798200	1.09434000	-3.09006500
C	-2.62004500	2.95803600	-2.03029100
C	-3.98228100	3.07355300	-2.32801200
C	-1.95654300	4.04172800	-1.44548700
C	-4.67370400	4.24888200	-2.03342900
H	-4.50489300	2.23697500	-2.78204500
C	-2.64684800	5.21472200	-1.14379100
H	-0.90110600	3.96755400	-1.22077300
C	-4.00790700	5.32104400	-1.43567700
H	-5.73199000	4.32486200	-2.26708900
H	-2.11639500	6.04269600	-0.68223700
H	-4.54713200	6.23498400	-1.20188600
C	2.09568400	-2.18217600	-4.11780800
H	3.05228200	-2.44684300	-3.66261800
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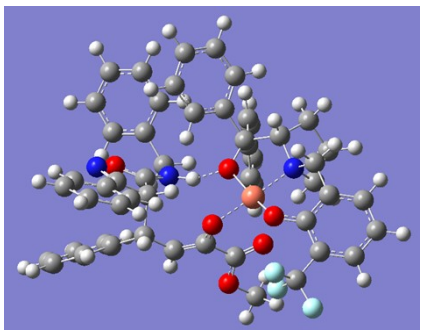
Int-III



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C	1.99597700	2.63594100	1.23963200

C	2.62465800	4.02063500	0.98156700
C	3.52762900	3.82951900	-0.26091800
H	4.58537000	1.91358700	-0.66111600
H	2.97509700	2.01592200	-1.35239100
H	1.89655300	2.43427900	2.30706300
H	1.87607700	4.79672400	0.82134300
H	3.21858700	4.31853500	1.85108400
H	3.10872700	4.33151300	-1.13694100
H	4.52467400	4.24500900	-0.08829400
N	3.00436500	1.66493200	0.72180900
C	4.06723400	1.41504900	1.75384200
H	4.54349700	2.36201500	2.03812900
H	3.54678500	1.01912400	2.63246100
C	5.10064000	0.44546900	1.26325800
C	4.66033300	-0.85479100	0.88518400
C	6.44522500	0.79184500	1.15924300
C	5.63515100	-1.75154600	0.36917200
C	7.39688500	-0.11664700	0.68597500
H	6.75419600	1.79303800	1.45530300
C	6.97872600	-1.38414300	0.28405900
H	8.44298500	0.16457900	0.61751800
H	7.69760200	-2.09468600	-0.11019300
O	3.41213900	-1.22473000	1.00827400
C	5.17377000	-3.08817200	-0.11893500
F	4.27120300	-2.99027200	-1.12933900
F	4.59162900	-3.83990200	0.84504600
F	6.20374900	-3.83318400	-0.60797600
C	0.55326700	2.37828600	0.61643400
C	0.27944000	3.23652500	-0.65090400
C	-0.29542800	4.51463900	-0.64765300
C	0.58766400	2.67107500	-1.89994900
C	-0.54036900	5.20478500	-1.83825100
H	-0.58884400	4.98186600	0.28271500
C	0.35770200	3.36022800	-3.08996100
H	0.99410600	1.66947000	-1.93097500
C	-0.21107900	4.63536900	-3.06705600
H	-1.00070500	6.18820500	-1.79771600
H	0.61184200	2.89221600	-4.03765500
H	-0.40304700	5.17152300	-3.99221600
C	-0.43921100	2.68891700	1.76518000
C	-1.28854800	1.67277200	2.21650400
C	-0.48840500	3.92222300	2.43615300
C	-2.20722400	1.89028700	3.24315000
H	-1.20481700	0.70110200	1.75403500

C	-1.40553700	4.14710100	3.46482800
H	0.19957600	4.71902900	2.17707400
C	-2.28195400	3.13655700	3.86424500
H	-2.86530700	1.08296600	3.55325100
H	-1.42591500	5.11445300	3.95976600
H	-3.00022300	3.31440700	4.65955300
O	0.42548000	1.03827900	0.24296400
C	-4.79935300	-2.55816100	-3.19166800
C	-3.59362800	-2.18207000	-2.60139800
C	-2.99822800	-2.98089200	-1.61569400
C	-3.63527600	-4.16935600	-1.23983000
C	-4.84079900	-4.54999700	-1.82978500
C	-5.42800000	-3.74361500	-2.80564800
H	-5.24733200	-1.92664300	-3.95394000
H	-3.10570000	-1.26259100	-2.91380000
H	-3.18300800	-4.79815500	-0.47830100
H	-5.31955900	-5.47693800	-1.52675500
H	-6.36726800	-4.03793200	-3.26529500
C	-1.71599200	-2.55823800	-0.93528200
H	-1.32362500	-3.40328800	-0.35847000
C	-0.67088200	-2.04996700	-1.86556500
H	-0.87184200	-2.03942600	-2.92762400
C	0.53852100	-1.63865900	-1.39383300
O	0.87623600	-1.63694900	-0.13405000
C	1.54681300	-1.06610500	-2.35669100
O	2.44500600	-0.31046700	-2.00563500
O	1.37545200	-1.44047500	-3.62973400
Cu	1.99443900	-0.08463300	0.37686400
C	-2.65346400	-0.27333000	-0.25752900
C	-2.00400100	-1.48462400	0.26792900
C	-3.10953100	-1.99657700	1.12919500
H	-1.01940500	-1.31654000	0.71484900
O	-3.95826400	-0.31116900	-0.02796000
N	-4.23522200	-1.39259200	0.91919200
C	-3.00397900	-3.14027200	2.03403800
C	-4.15817100	-3.75155900	2.55526500
C	-1.73685100	-3.64438700	2.37051300
C	-4.04057800	-4.84628100	3.40319900
H	-5.13412900	-3.36661400	2.27927600
C	-1.62813800	-4.74422700	3.22012200
H	-0.83770200	-3.18283600	1.97426100
C	-2.77637600	-5.34511400	3.73708900
H	-4.93418000	-5.31770700	3.80130900
H	-0.64536200	-5.12840900	3.47517400

H	-2.68949300	-6.20302900	4.39750100
N	-2.08004600	0.70187700	-0.89839100
H	-1.04619400	0.78843600	-0.71866000
C	-2.79497600	1.77111700	-1.63022000
H	-2.02074300	2.47563900	-1.93142100
H	-3.20603300	1.31809800	-2.53818600
C	-3.89592700	2.47050300	-0.86235500
C	-5.23000700	2.30241400	-1.24646200
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H	-5.46864800	1.64415200	-2.07801900
C	-4.61826300	3.95837500	0.90810200
H	-2.56779900	3.44683300	0.52182500
C	-5.94859200	3.78645300	0.51979000
H	-7.28555500	2.81779600	-0.86937200
H	-4.36959100	4.59694100	1.75041600
H	-6.74426000	4.29436200	1.05783500
C	2.31031700	-0.88701700	-4.57376500
H	3.33103000	-1.17916600	-4.31471100
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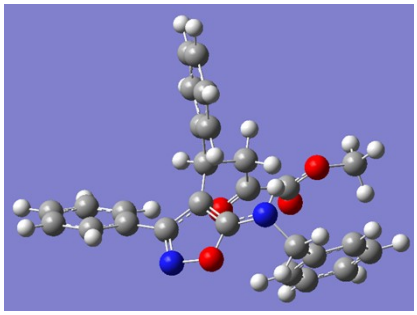
H	2.23844500	0.20429600	-4.59192700

Int-IV



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C	2.54639400	4.18270800	1.18961900
C	2.67050100	4.74890100	-0.08140600
H	2.35473100	4.44926600	-2.19184200
H	1.41397900	2.19102800	-1.93099400
H	1.92000300	2.46900900	2.32655200
H	2.87895800	4.73103600	2.06689200
H	3.09489600	5.74197800	-0.19935900
C	0.95537500	0.79239900	0.45430000
H	1.55582100	0.31226800	1.23131900

C	-1.04276300	-0.28754800	1.66243400
O	-0.44905500	-1.33479300	1.79797200
C	-2.47501000	-0.19079700	2.24641800
O	-2.94520200	-1.02225300	2.98562000
O	-3.08506000	0.93890500	1.86020800
C	0.20843100	-0.09520400	-1.87941400
C	0.98309600	-0.12164300	-0.74184100
C	1.86545700	-1.22660700	-0.98047400
O	0.56130000	-1.09532900	-2.71231700
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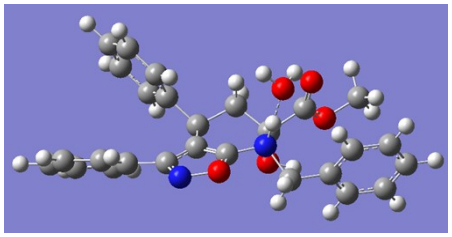
Int-V



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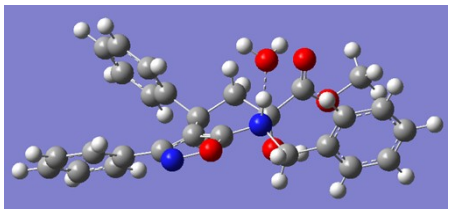
Int-VI



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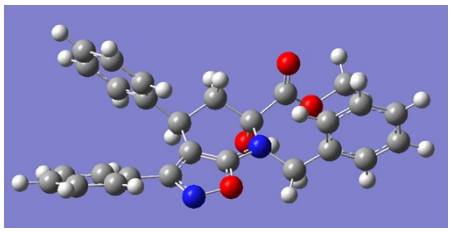
(*R*, *R*)-3c



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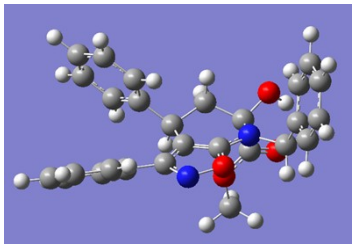

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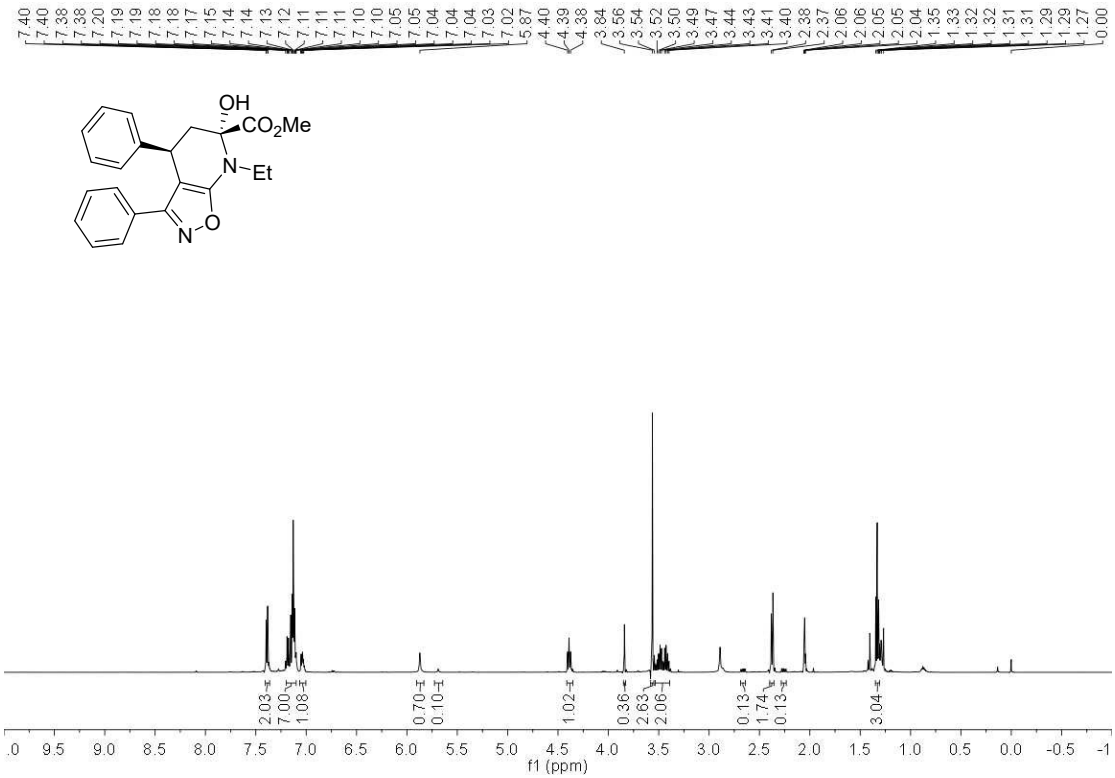
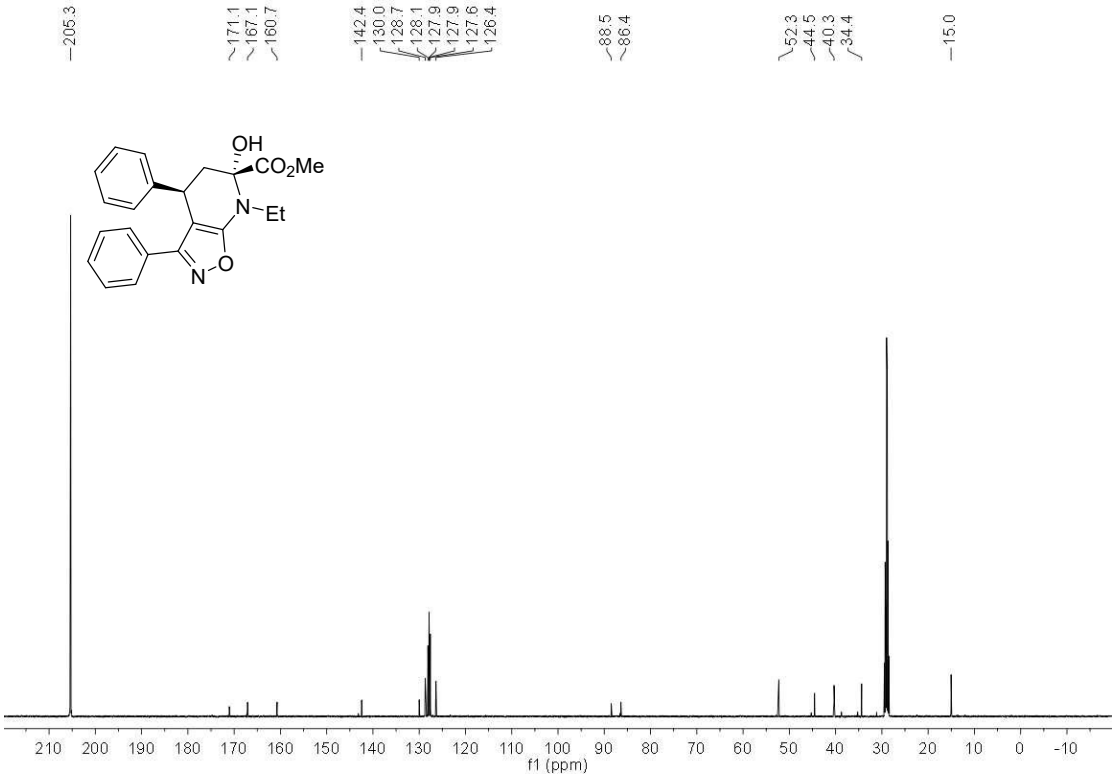
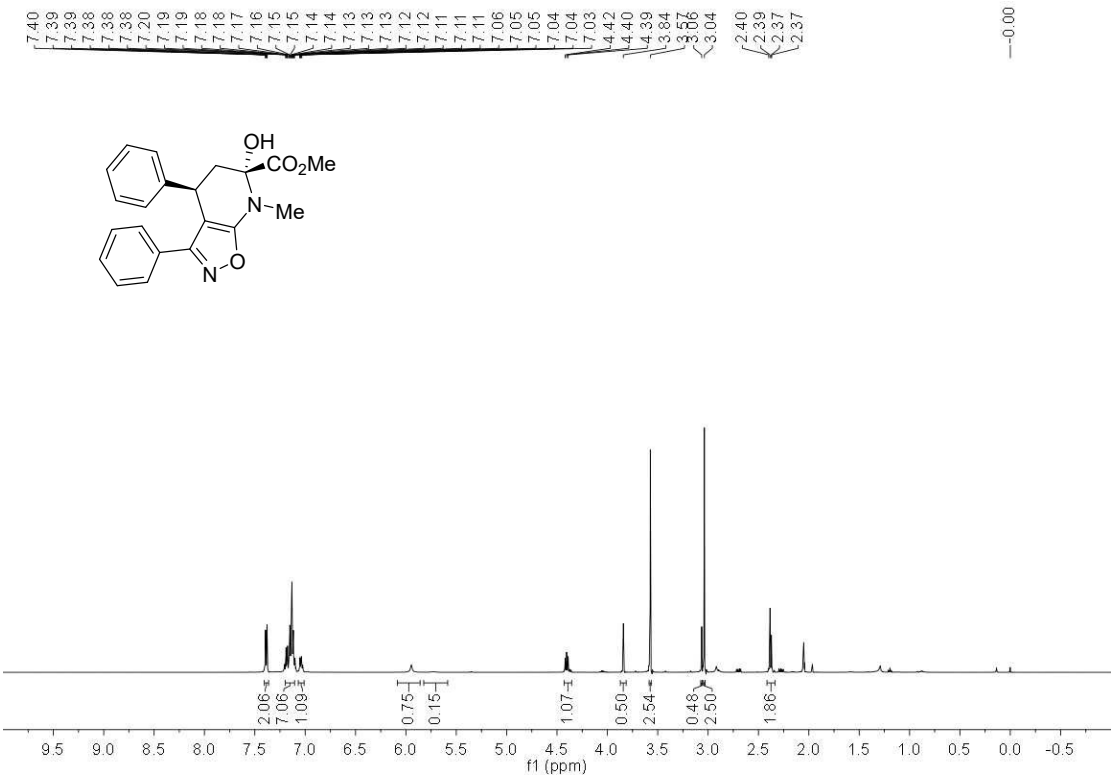
Part II NMR spectra

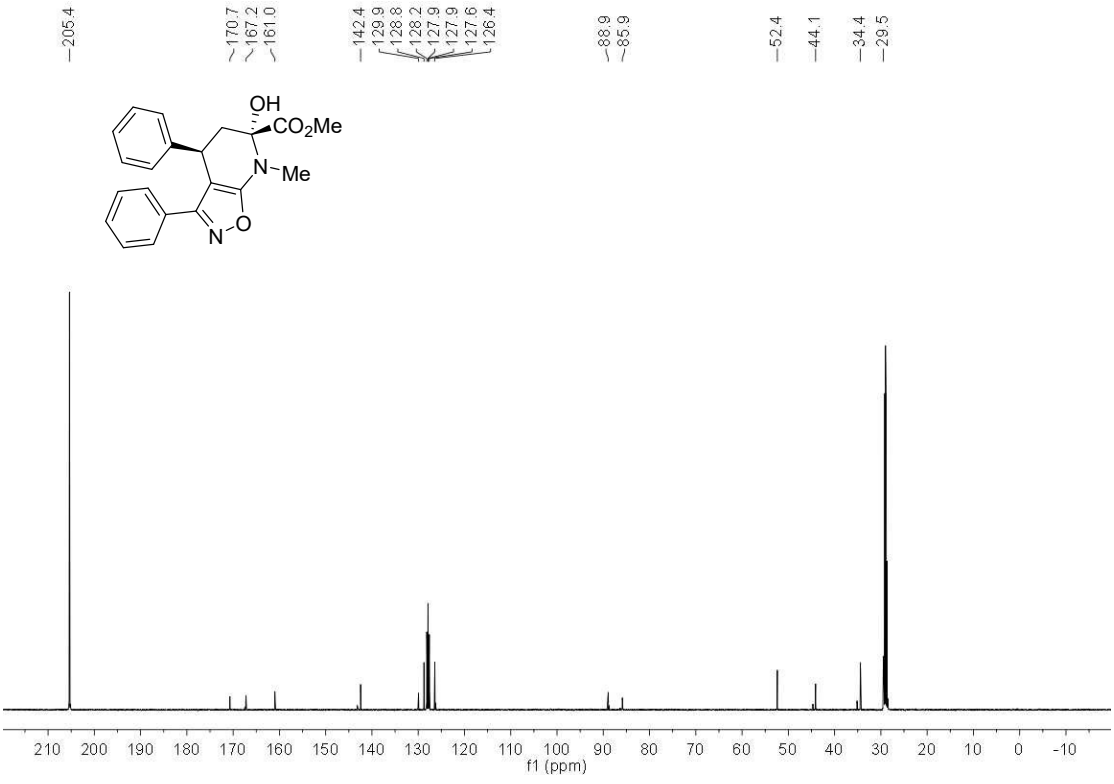
^{1}H NMR and ^{13}C NMR of **3a**



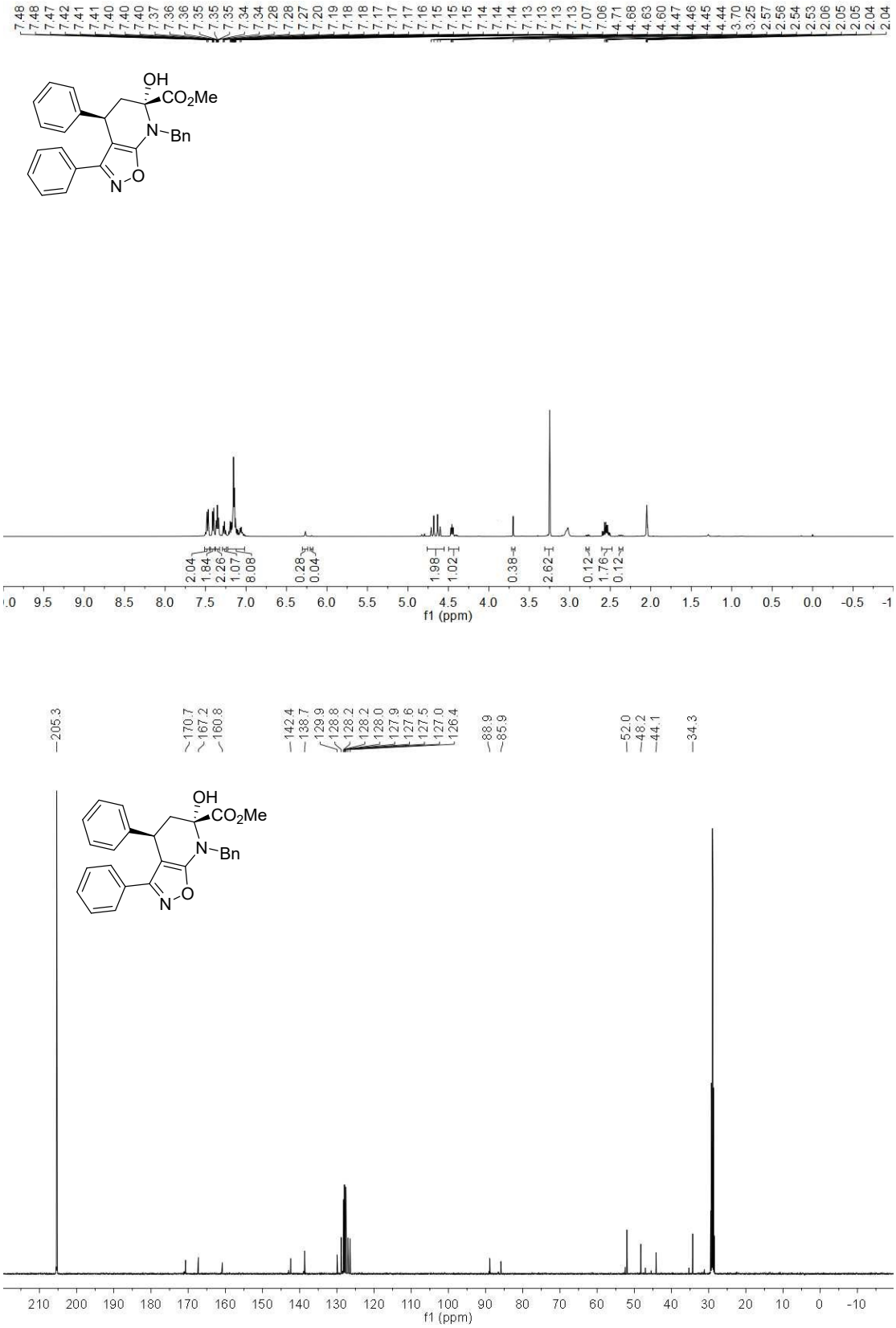


^{1}H NMR and ^{13}C NMR of **3b**

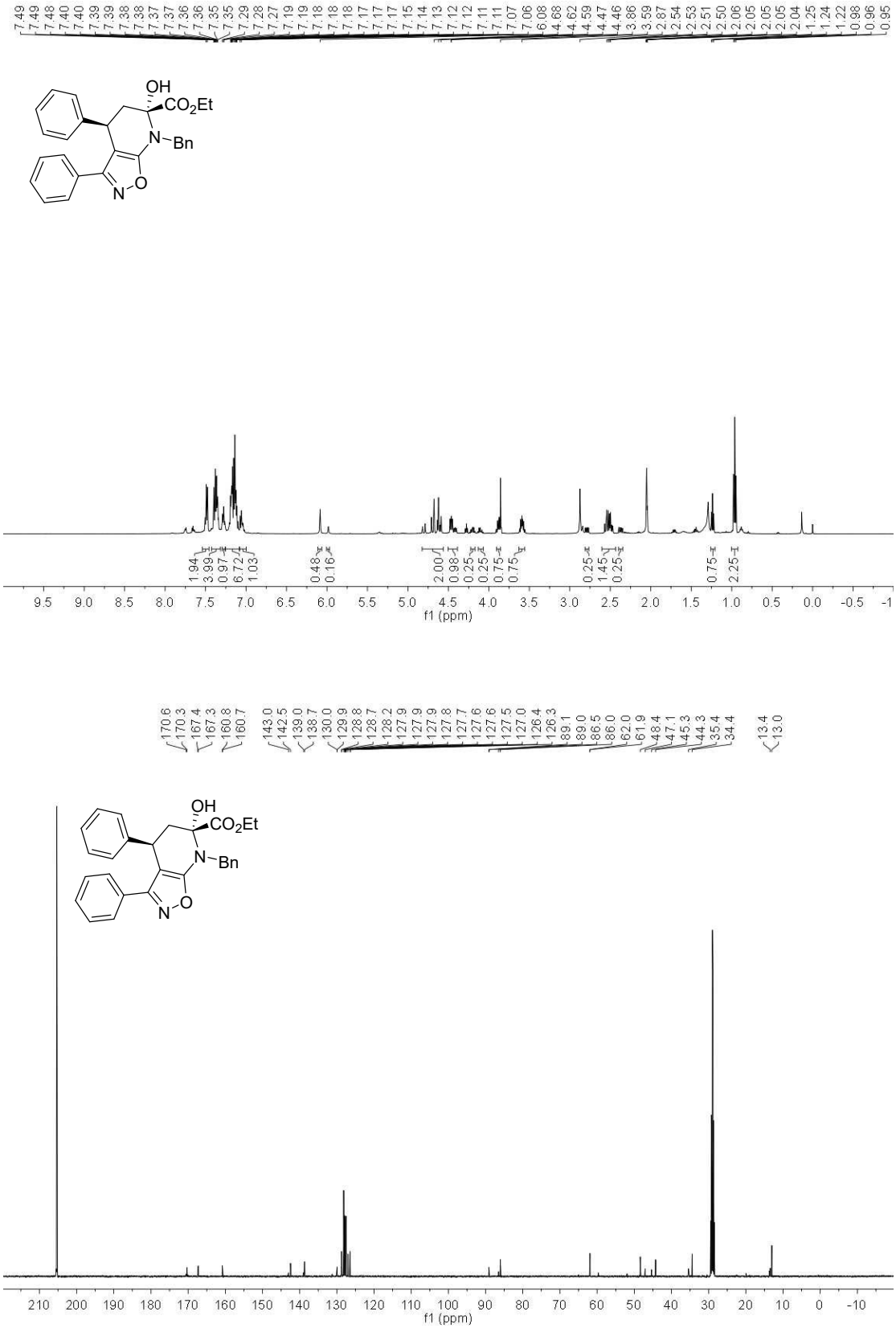




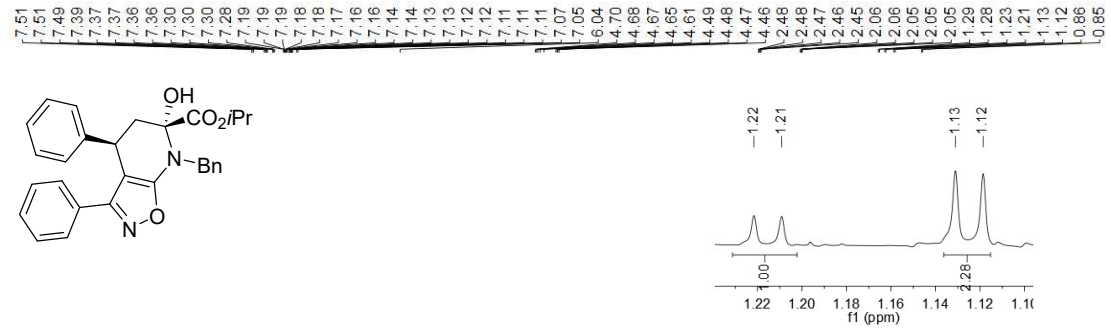
^{1}H NMR and ^{13}C NMR of **3c**



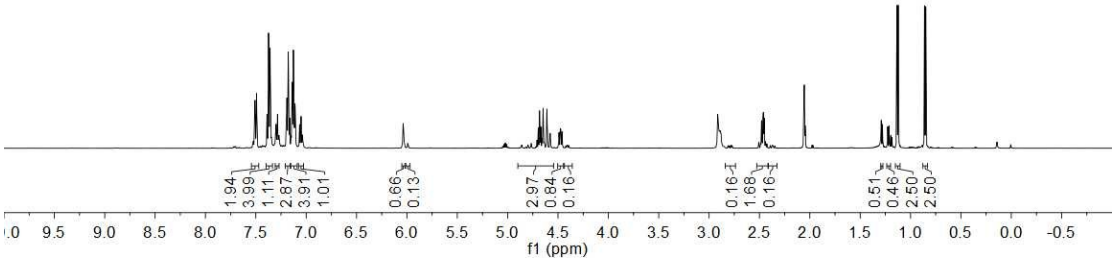
^{1}H NMR and ^{13}C NMR of **3d**

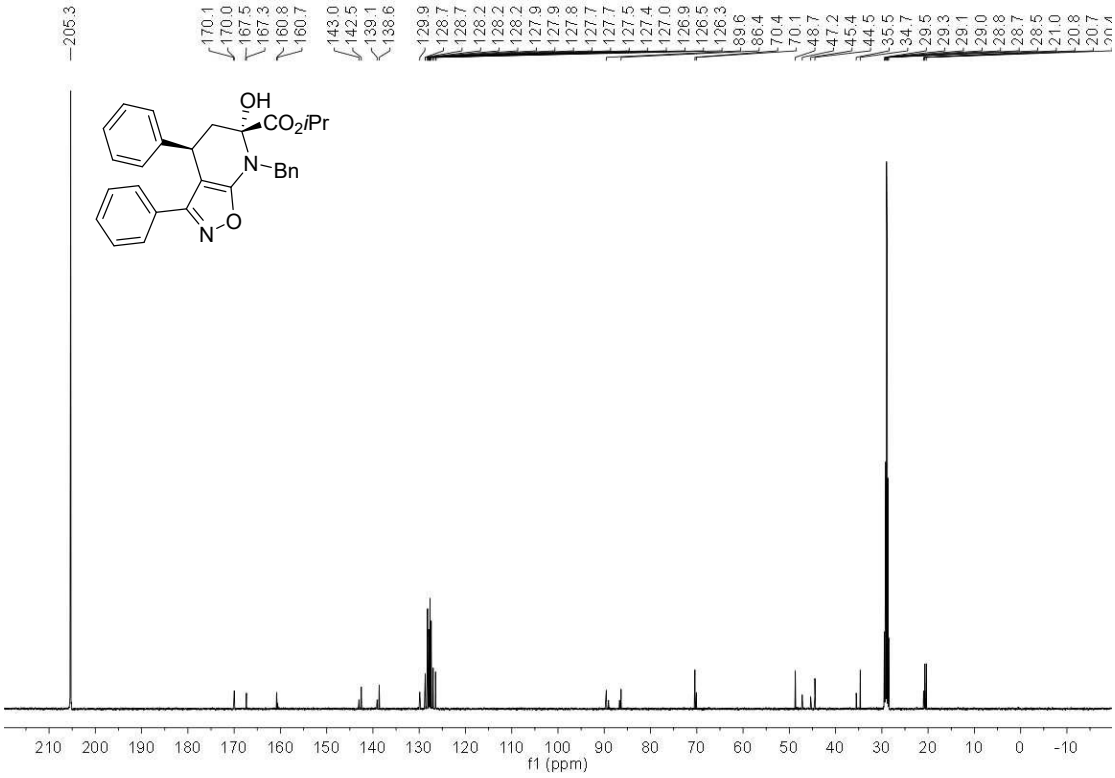


^{1}H NMR and ^{13}C NMR of **3e**

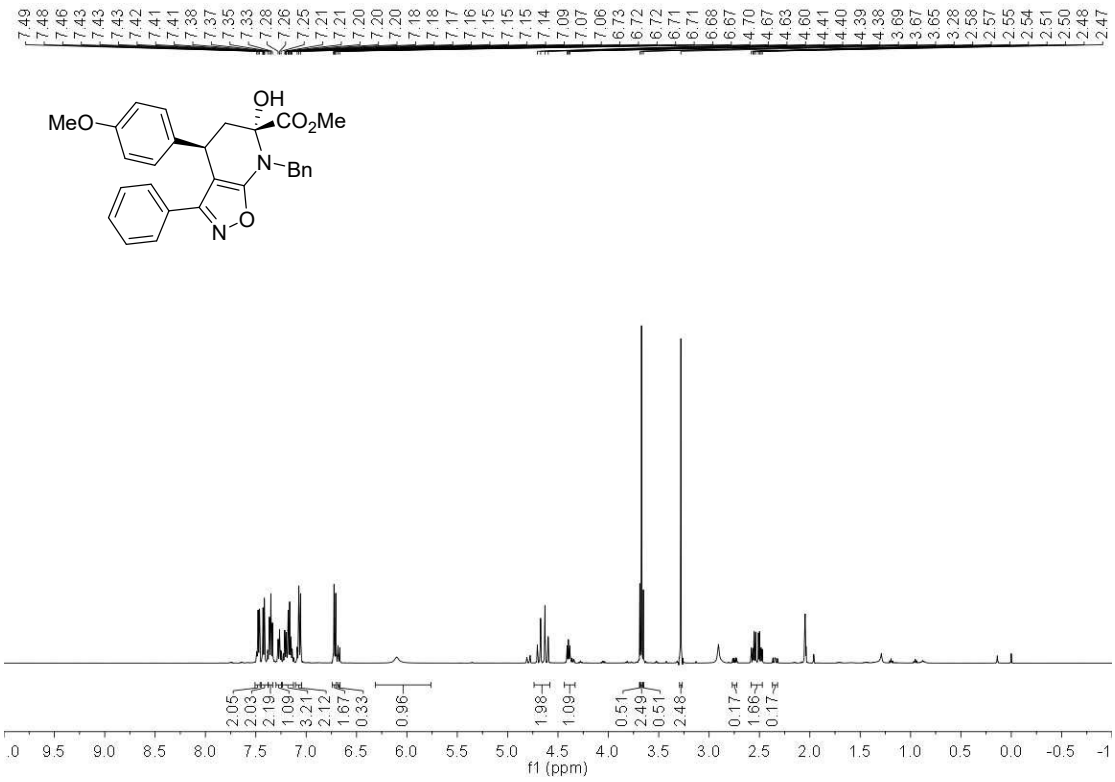


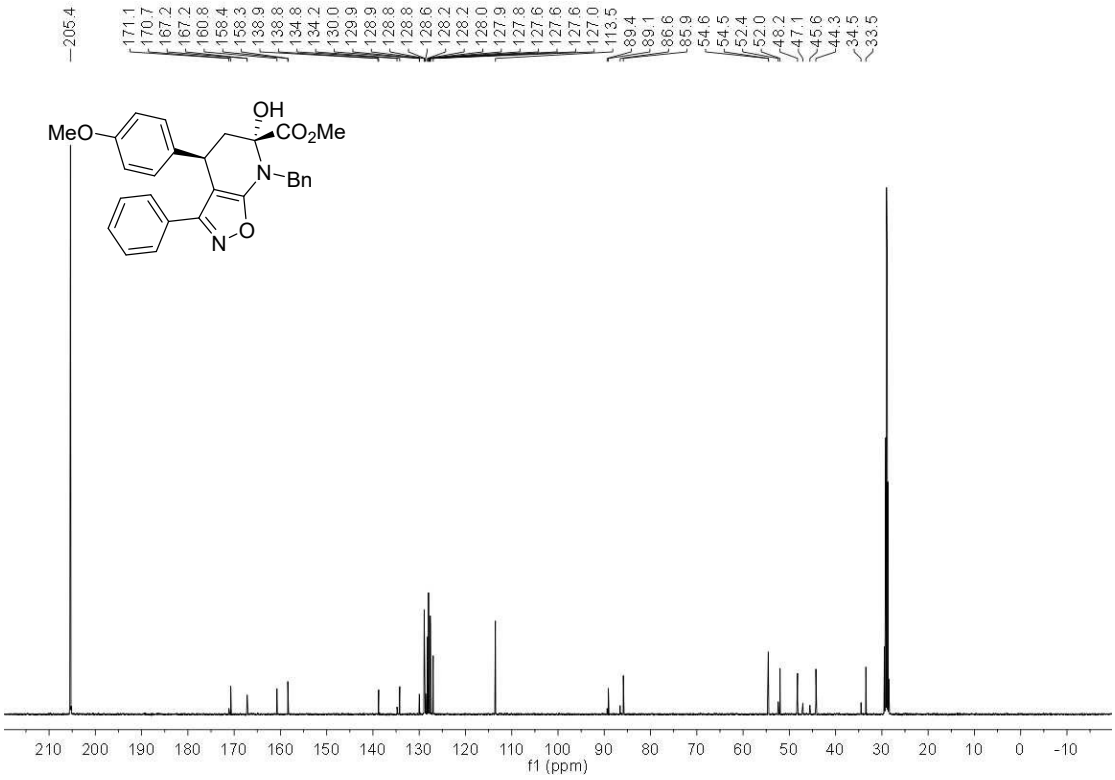
^{1}H NMR of the crude product



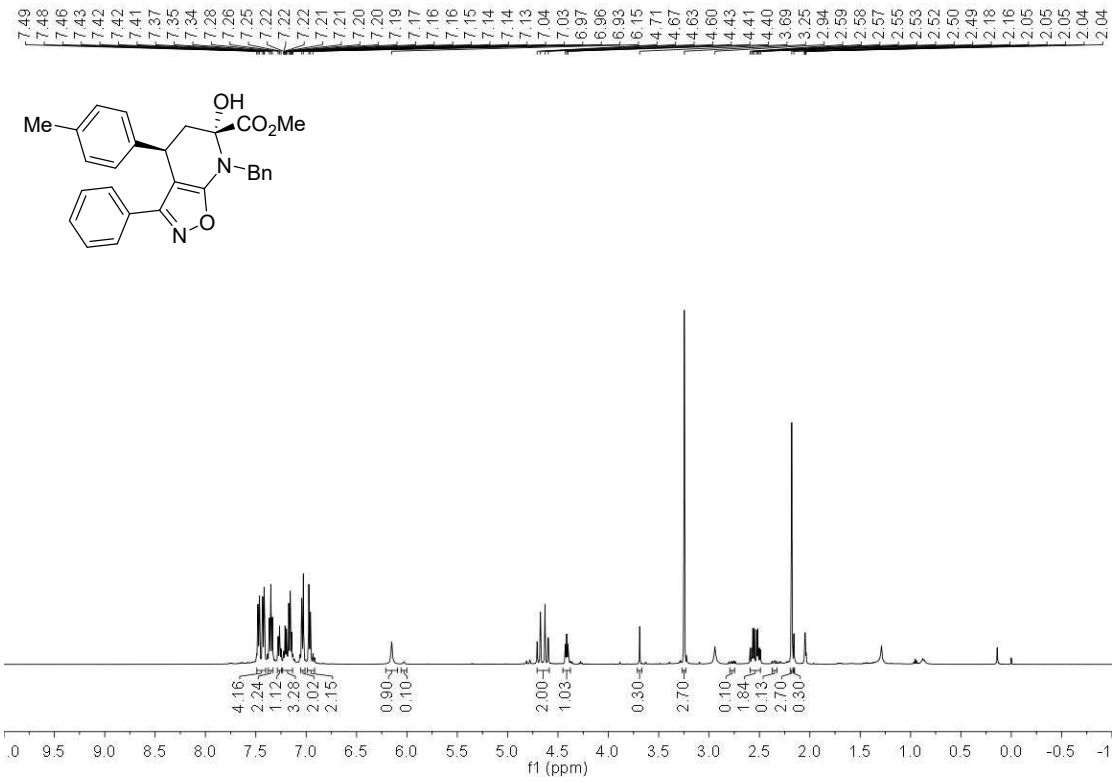


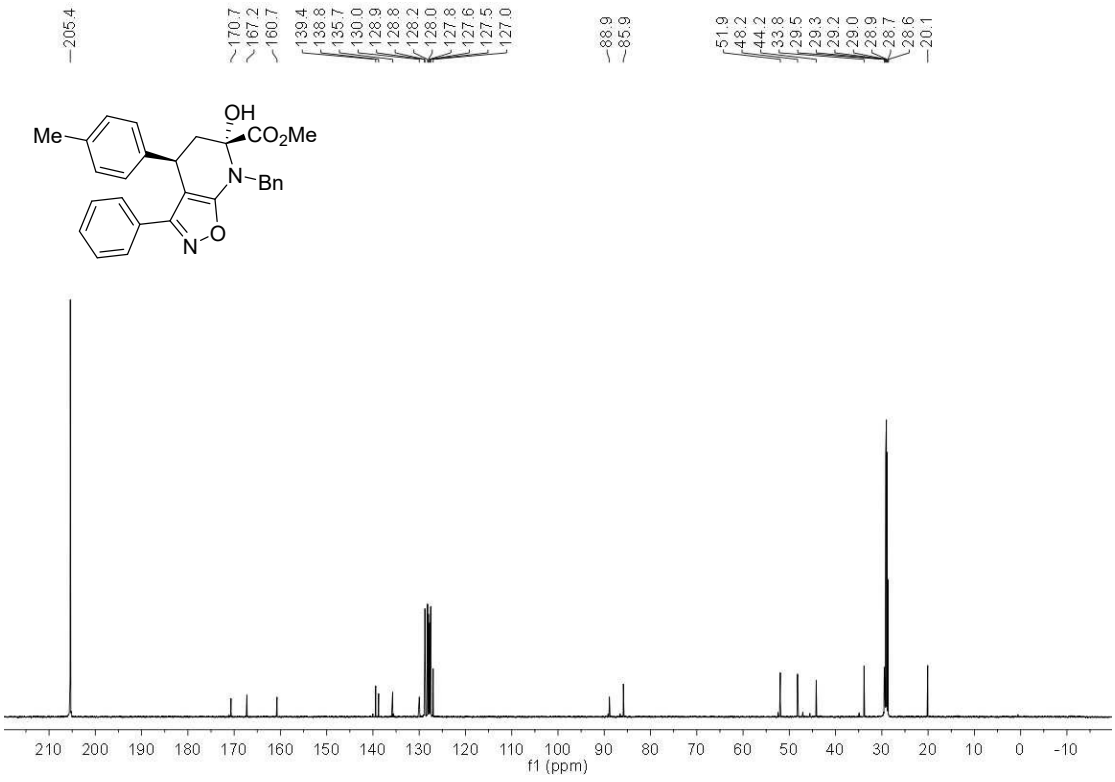
^{1}H NMR and ^{13}C NMR of **3f**



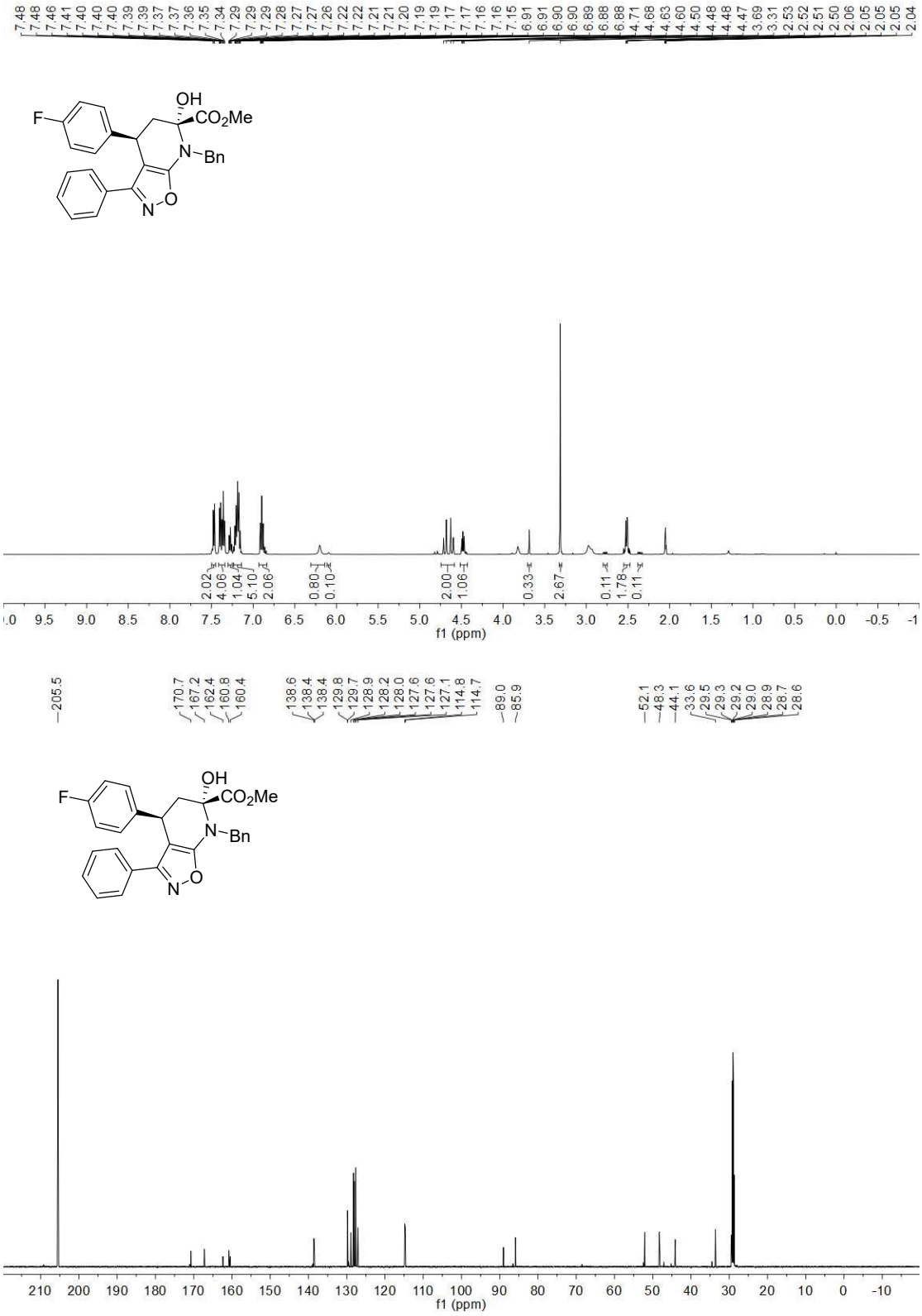


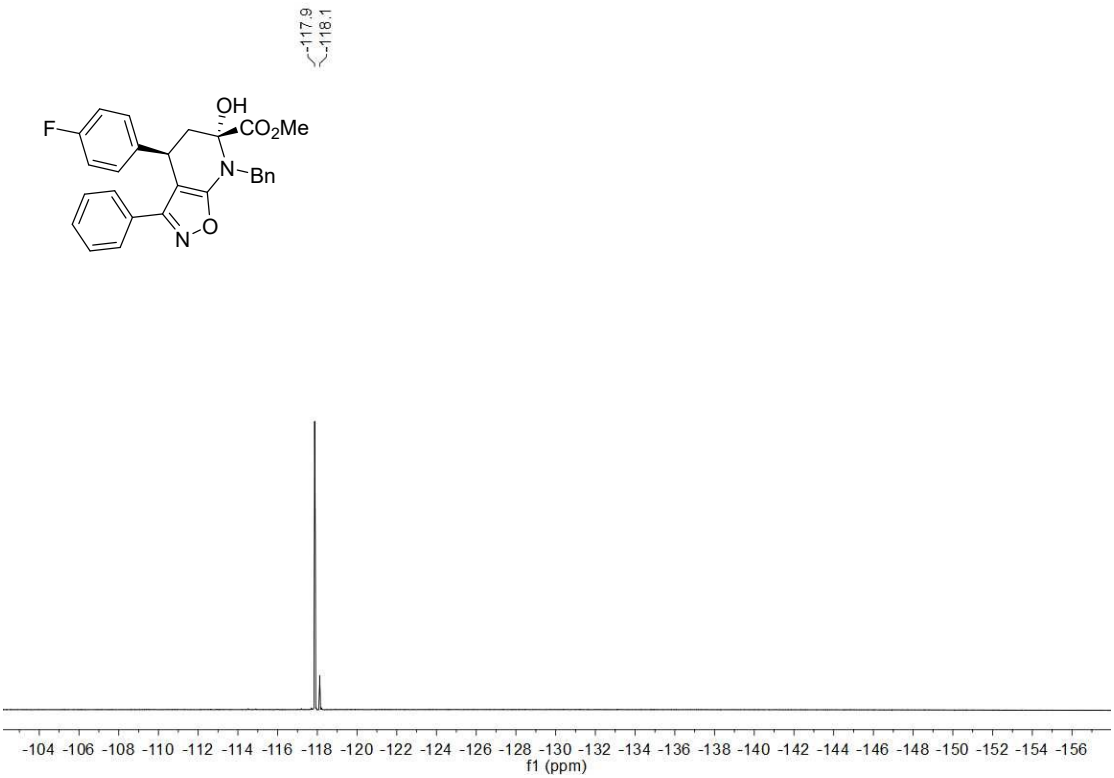
^{1}H NMR and ^{13}C NMR of **3g**



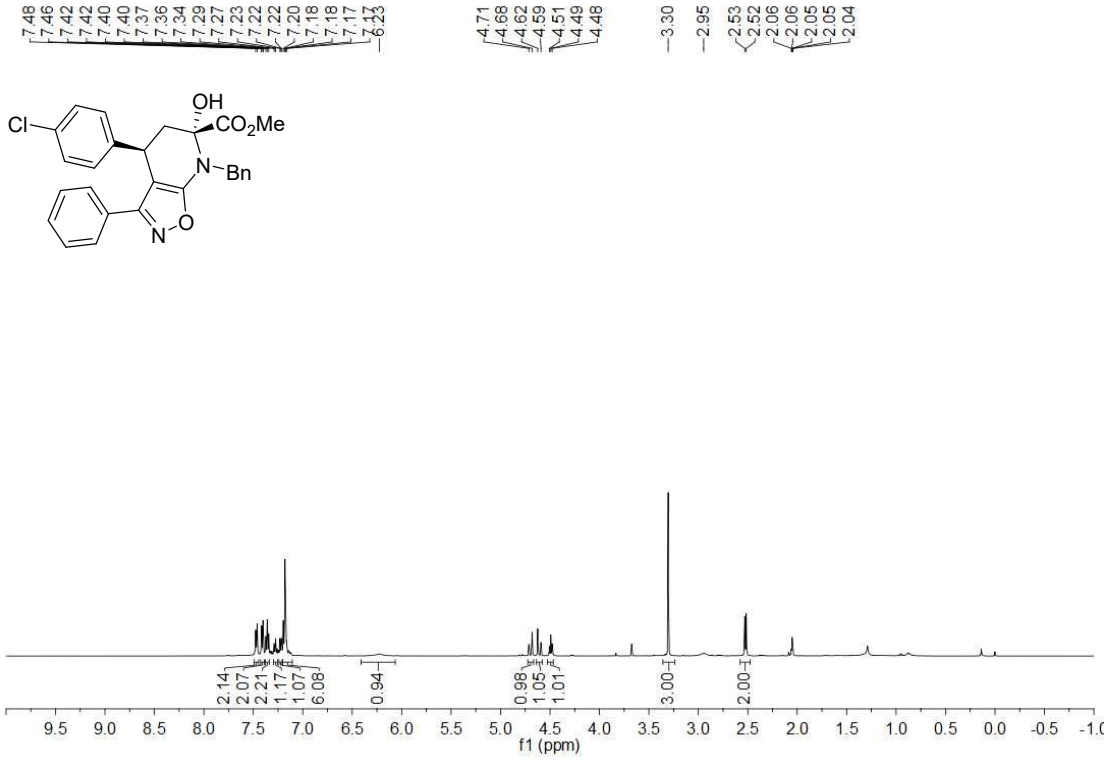


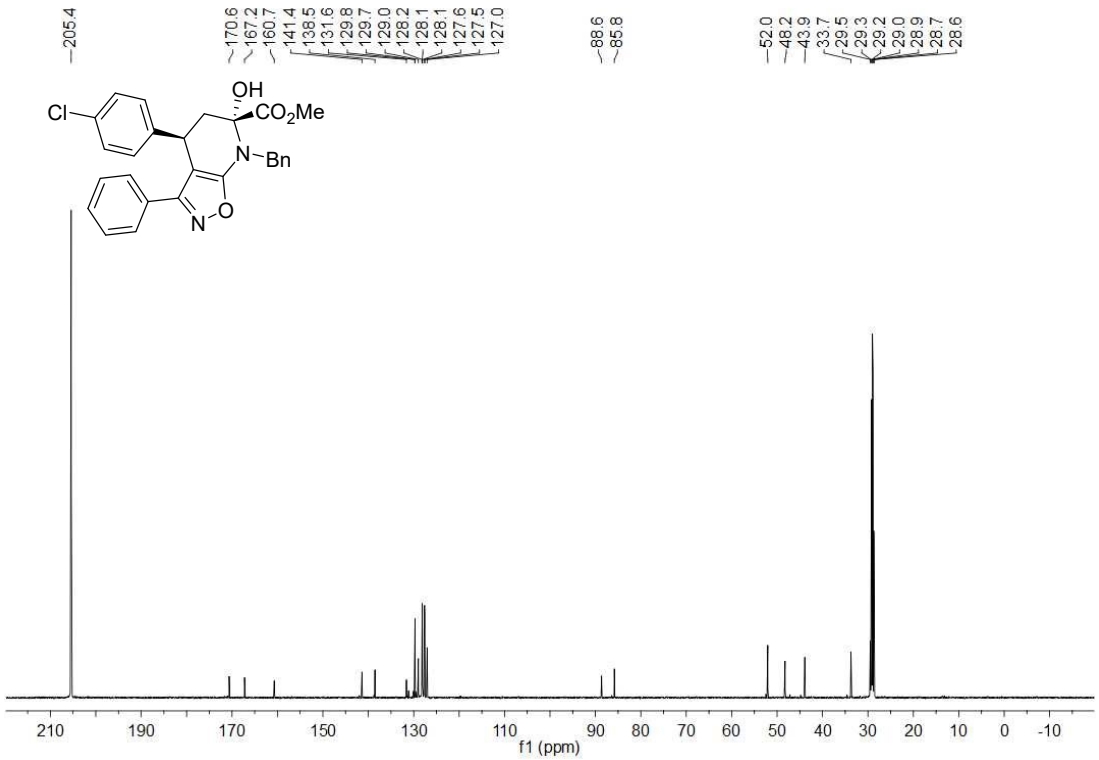
^{1}H NMR, ^{13}C NMR and ^{19}F NMR of **3h**



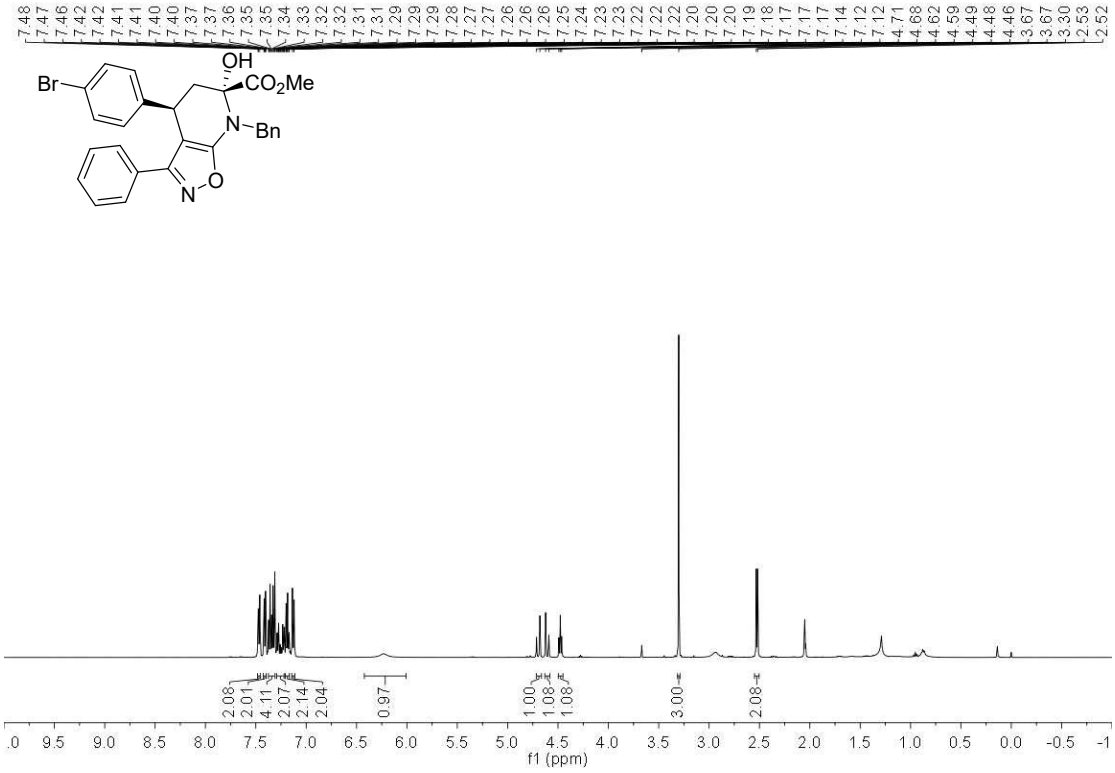


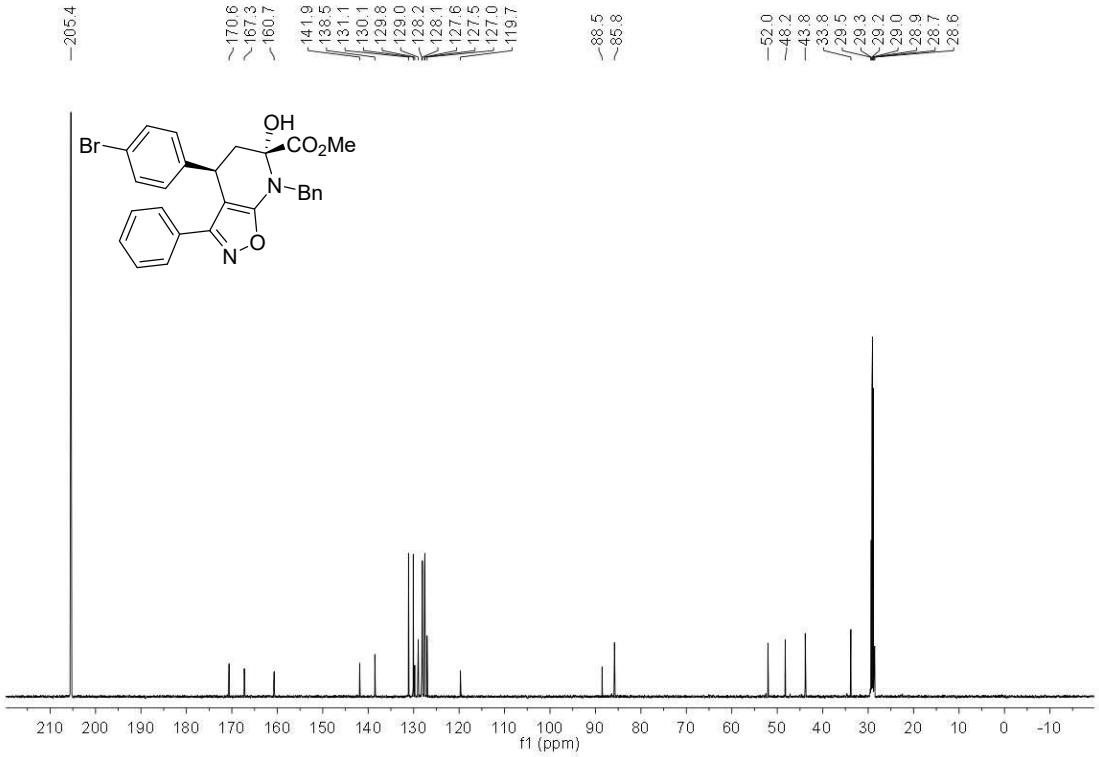
^{1}H NMR and ^{13}C NMR of **3i**



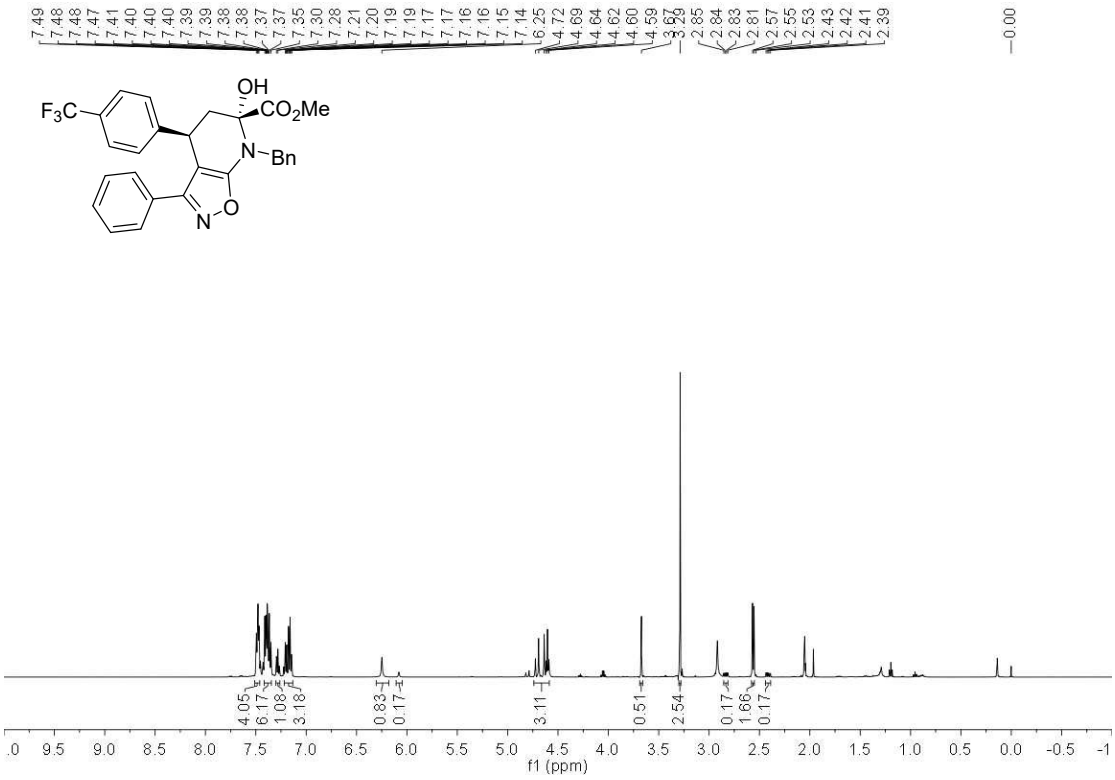


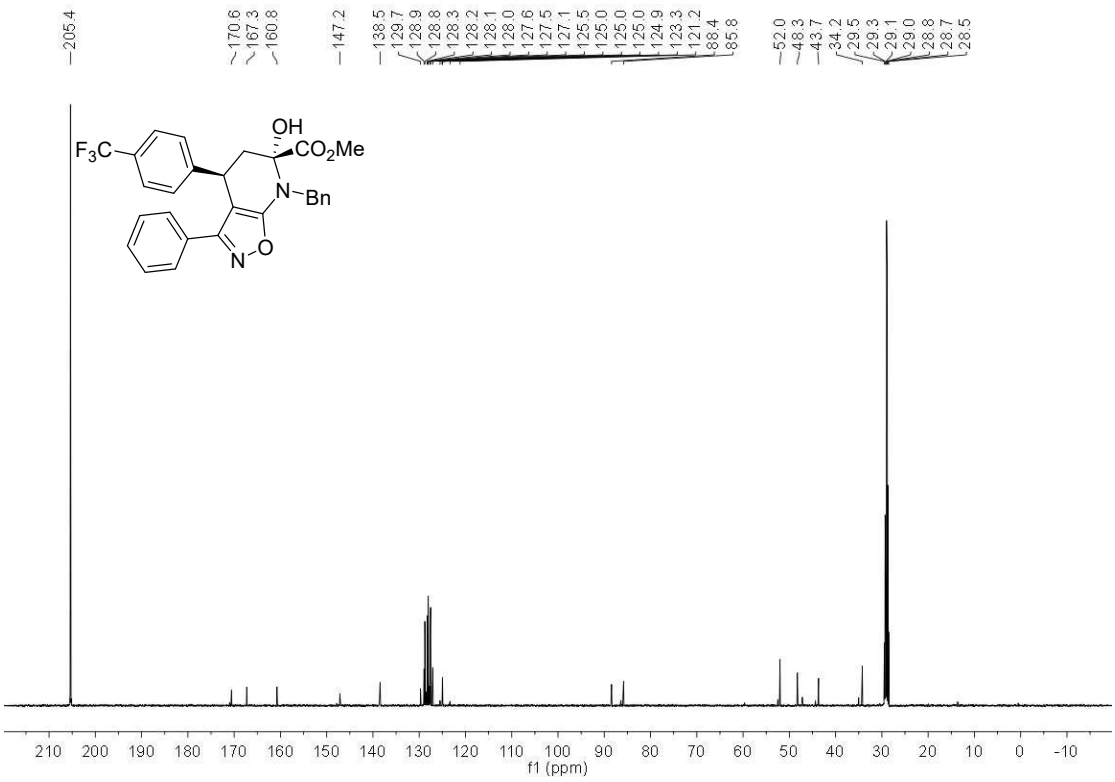
^{1}H NMR and ^{13}C NMR of **3j**





^{1}H NMR, ^{13}C NMR and ^{13}F NMR of **3k**

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128.0
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127.1
125.5
125.0
125.0
125.0
124.9
123.3
121.2
88.4
85.8
52.0
48.3
43.7
34.2
29.5
29.3
29.1
29.0
28.8
28.7
28.5
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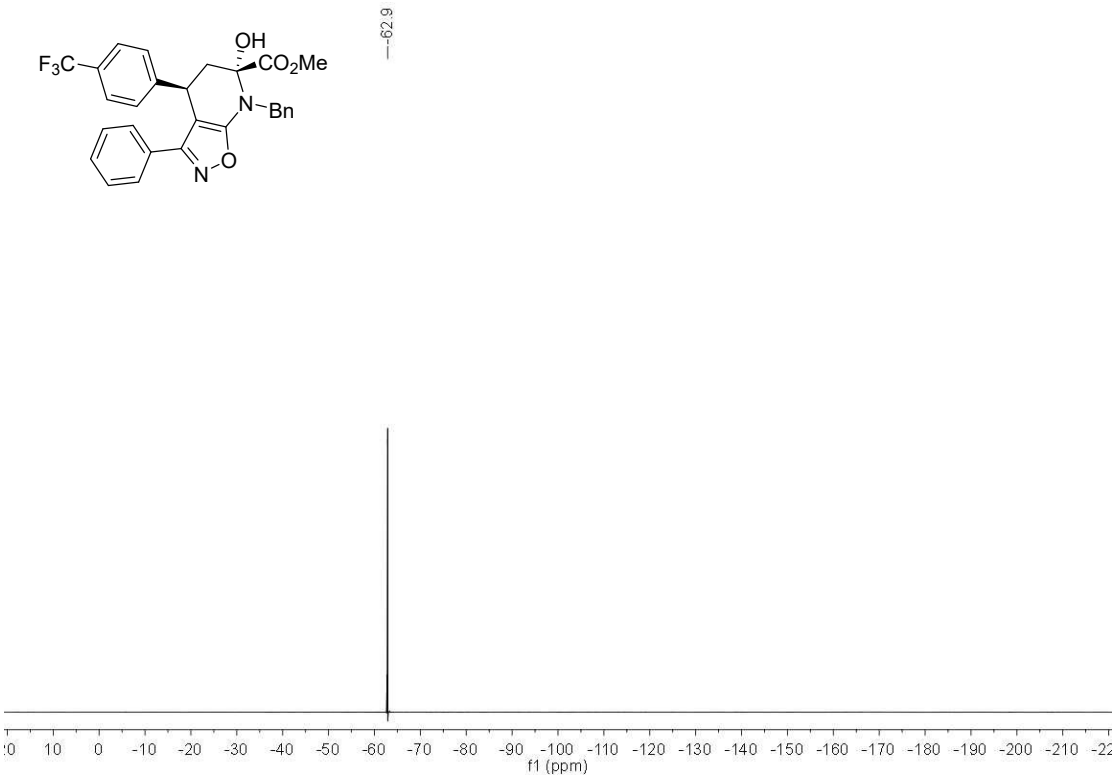
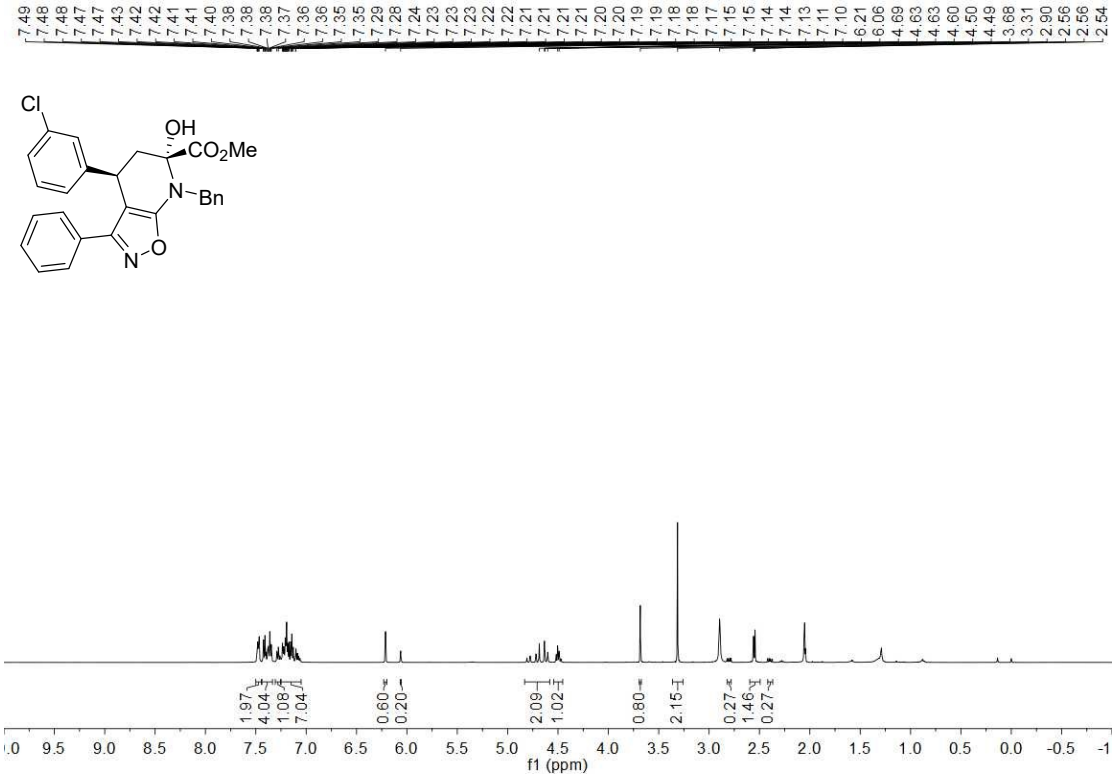
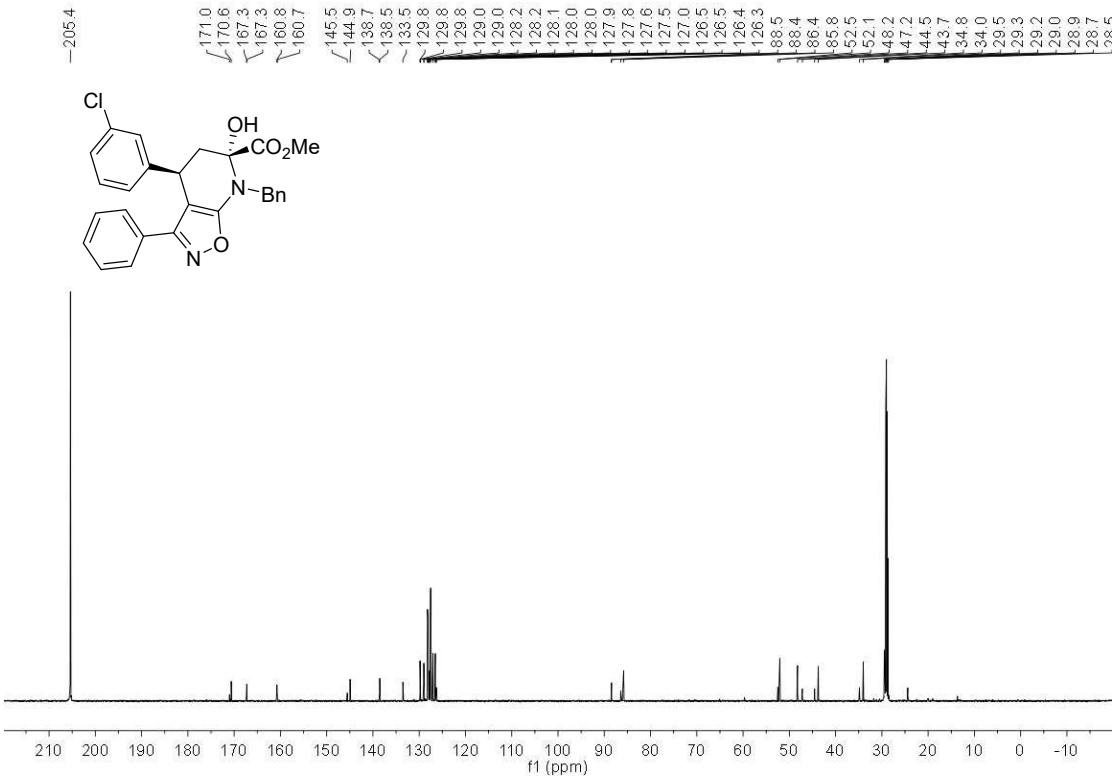
f1 (ppm)

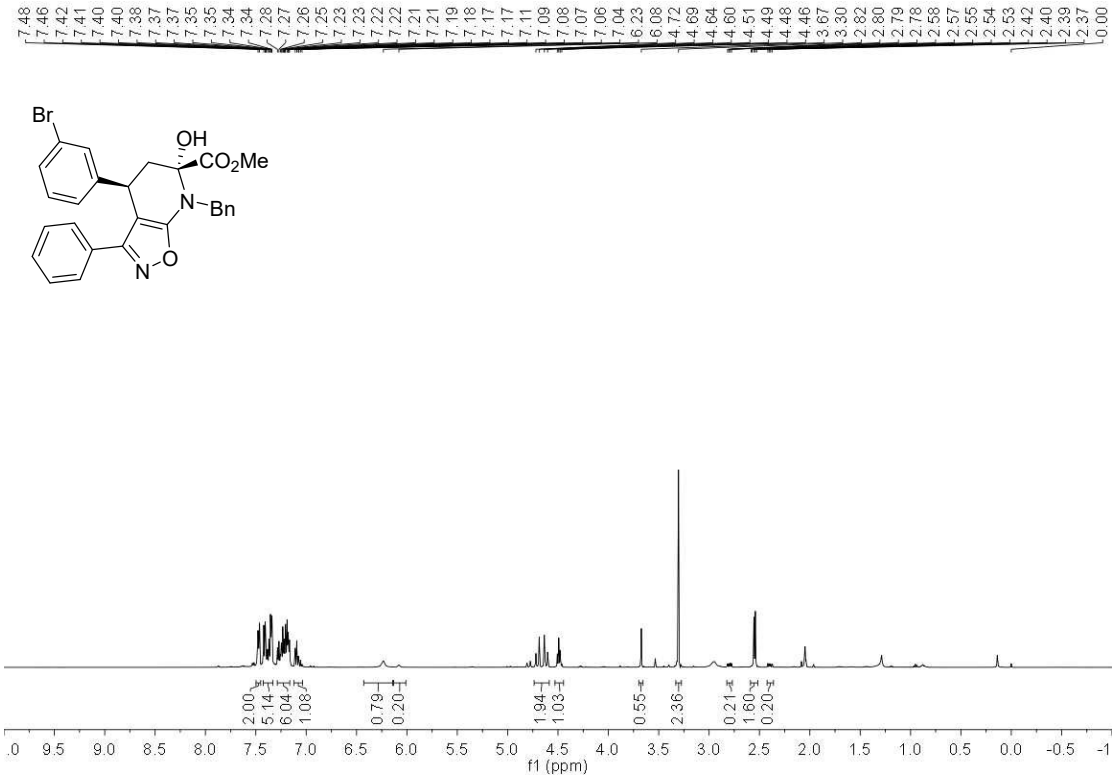

62.9
OH
CO2Me
F3C
N
Bn
O
N
10 0 -10 -20 -30 -40 -50 -60 -70 -80 -90 -100 -110 -120 -130 -140 -150 -160 -170 -180 -190 -200 -210
f1 (ppm)

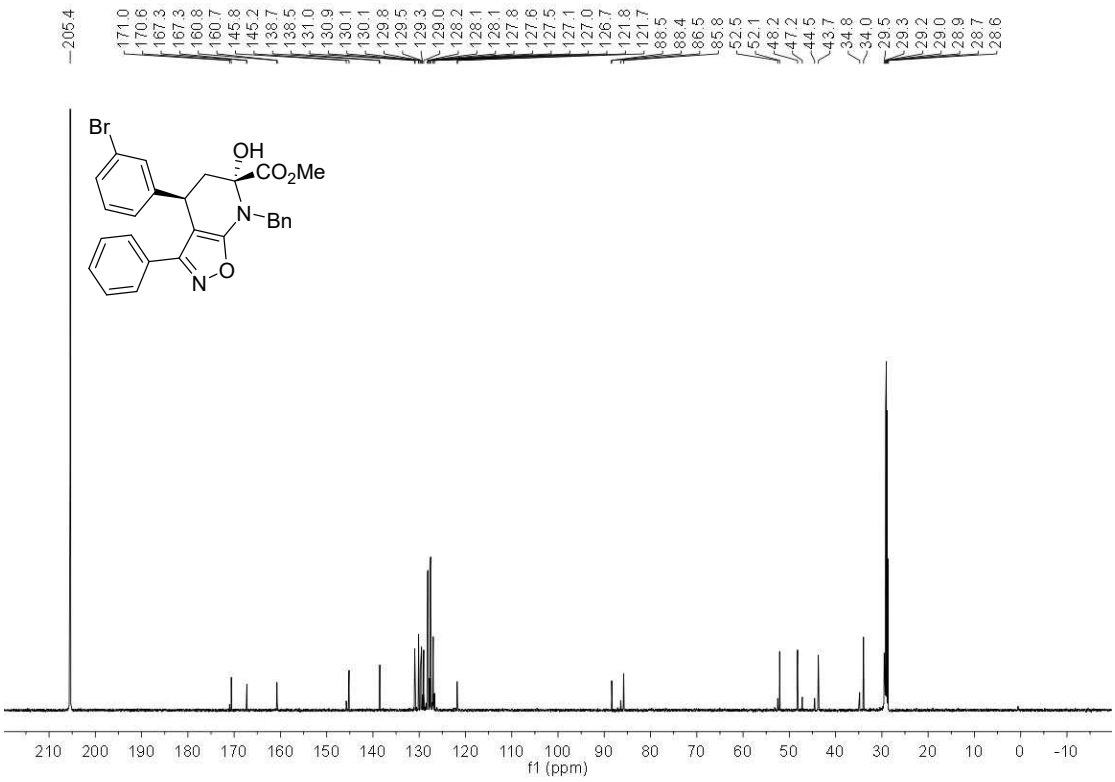
^{1}H NMR and ^{13}C NMR of **3l**



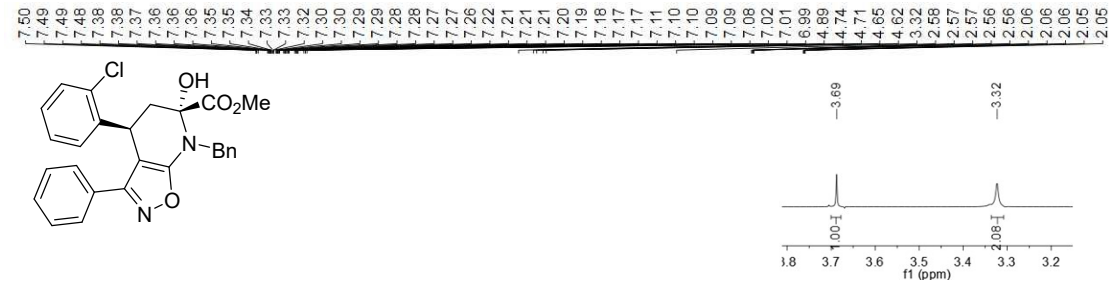


^{1}H NMR and ^{13}C NMR of **3m**

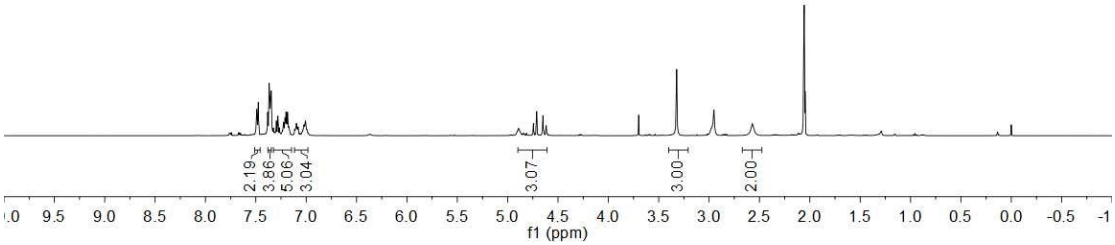


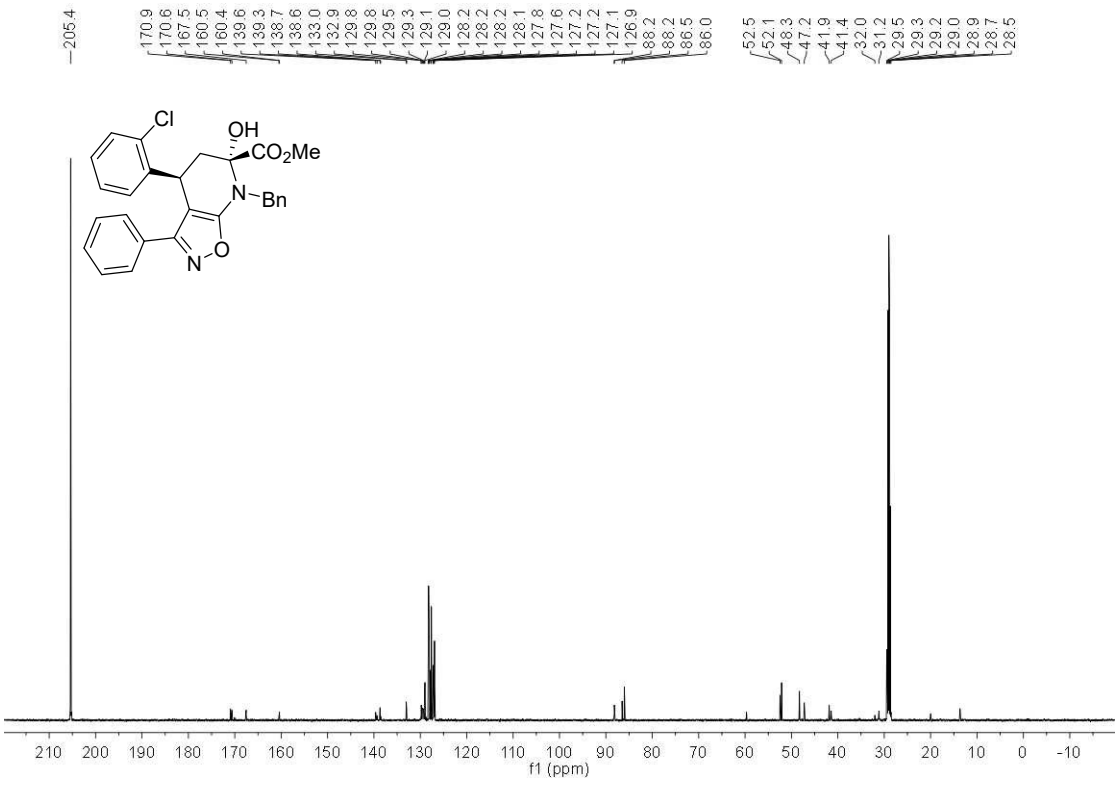


^{1}H NMR and ^{13}C NMR of **3n**

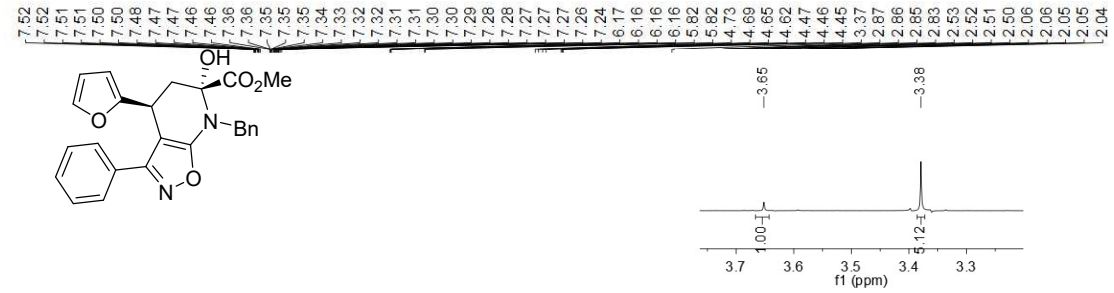


^{1}H NMR of the crude product

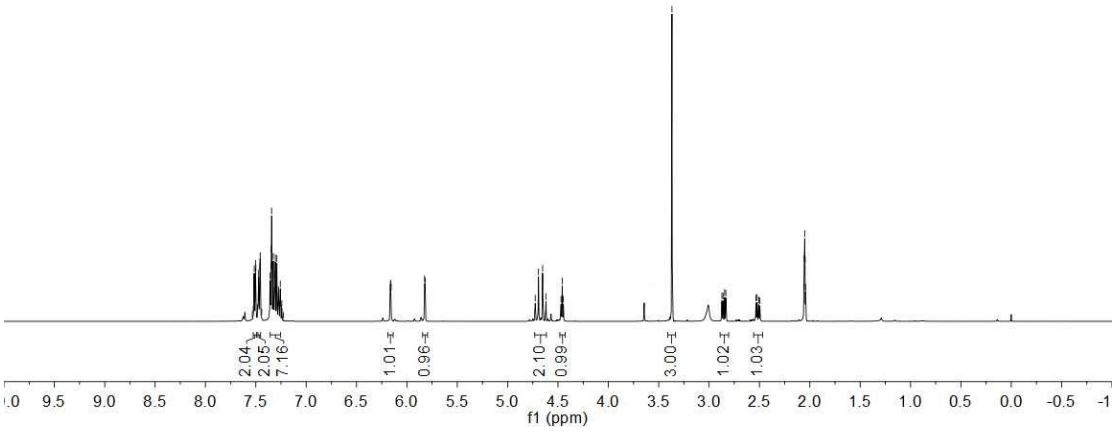


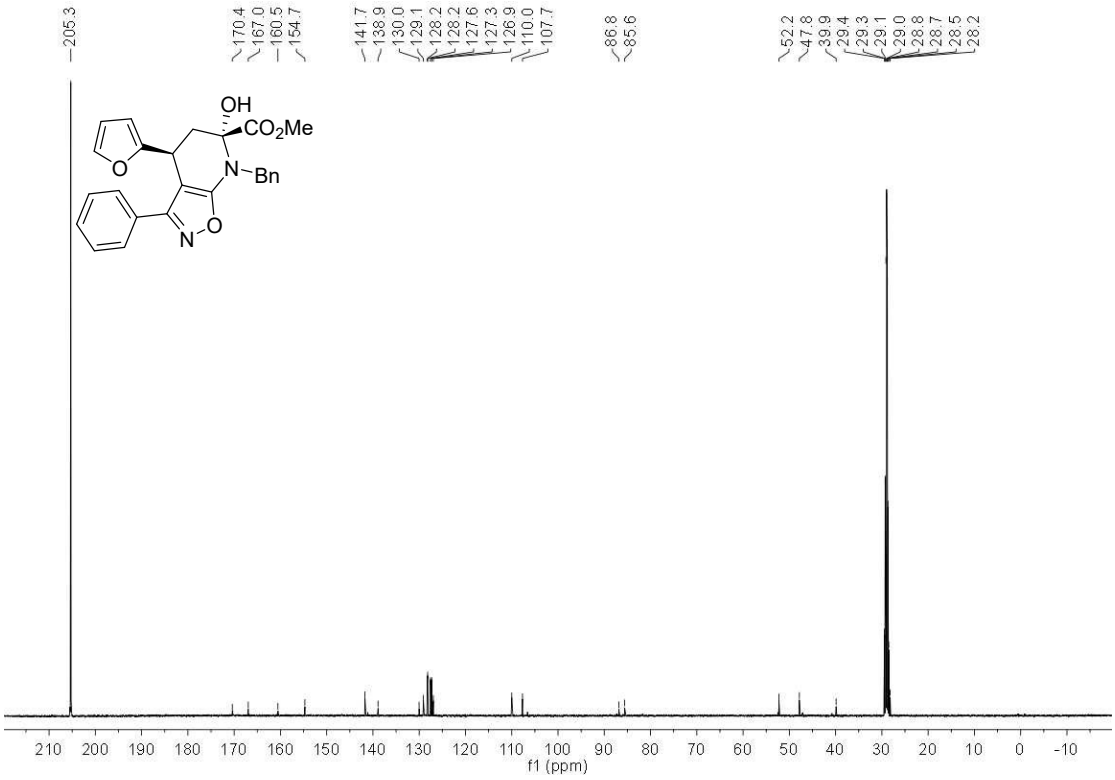


^{1}H NMR and ^{13}C NMR of **3o**

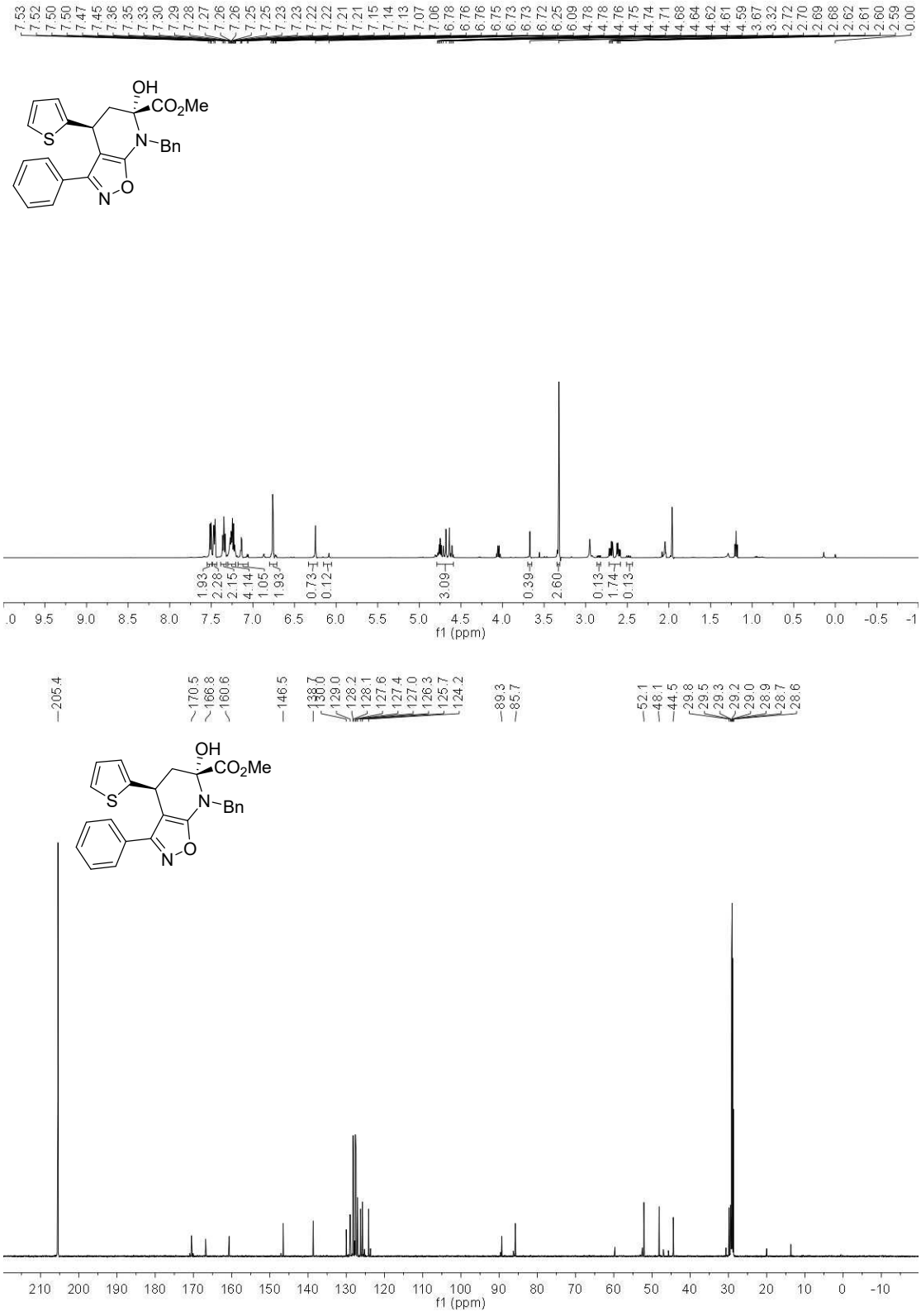


^{1}H NMR of the crude product

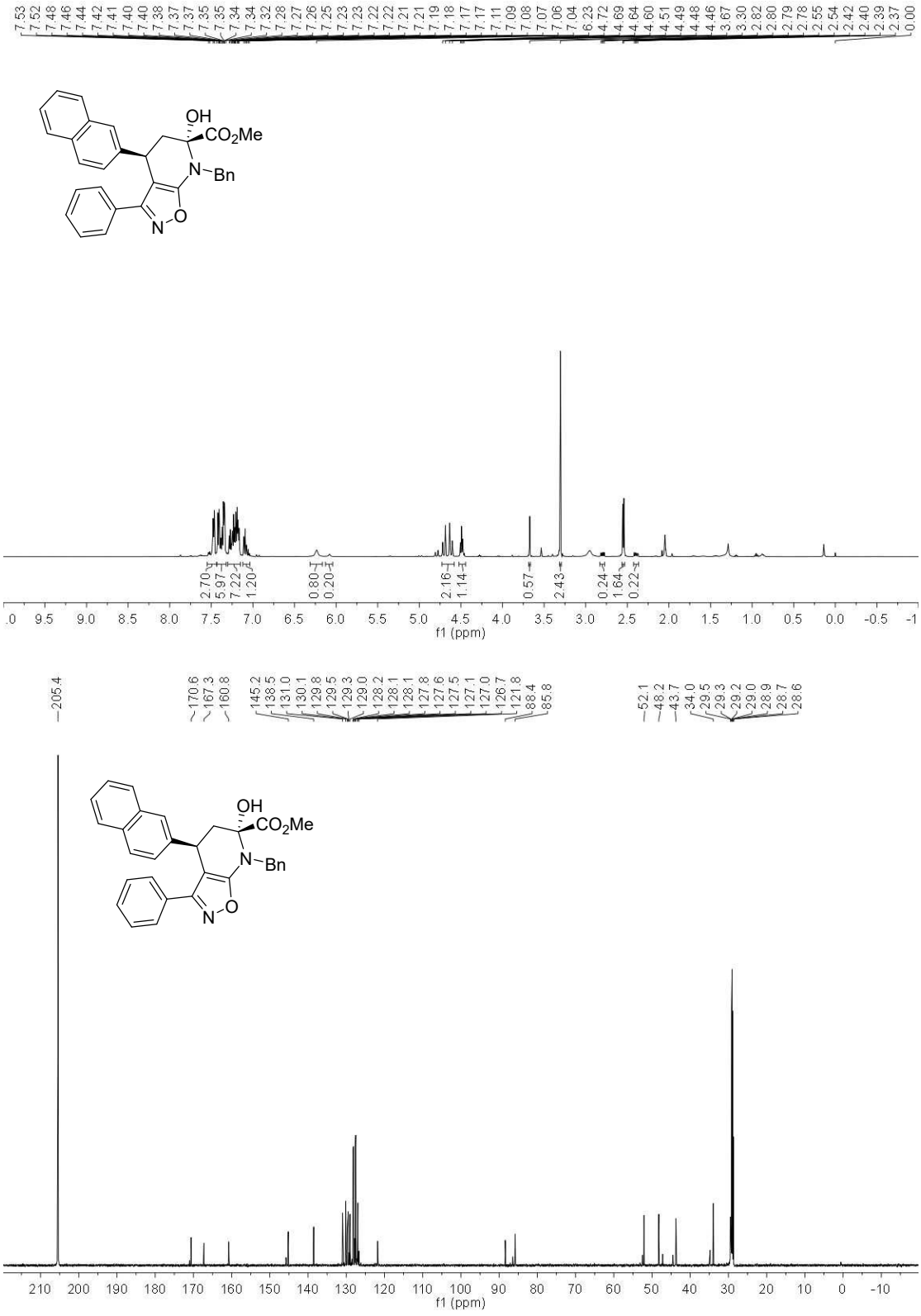




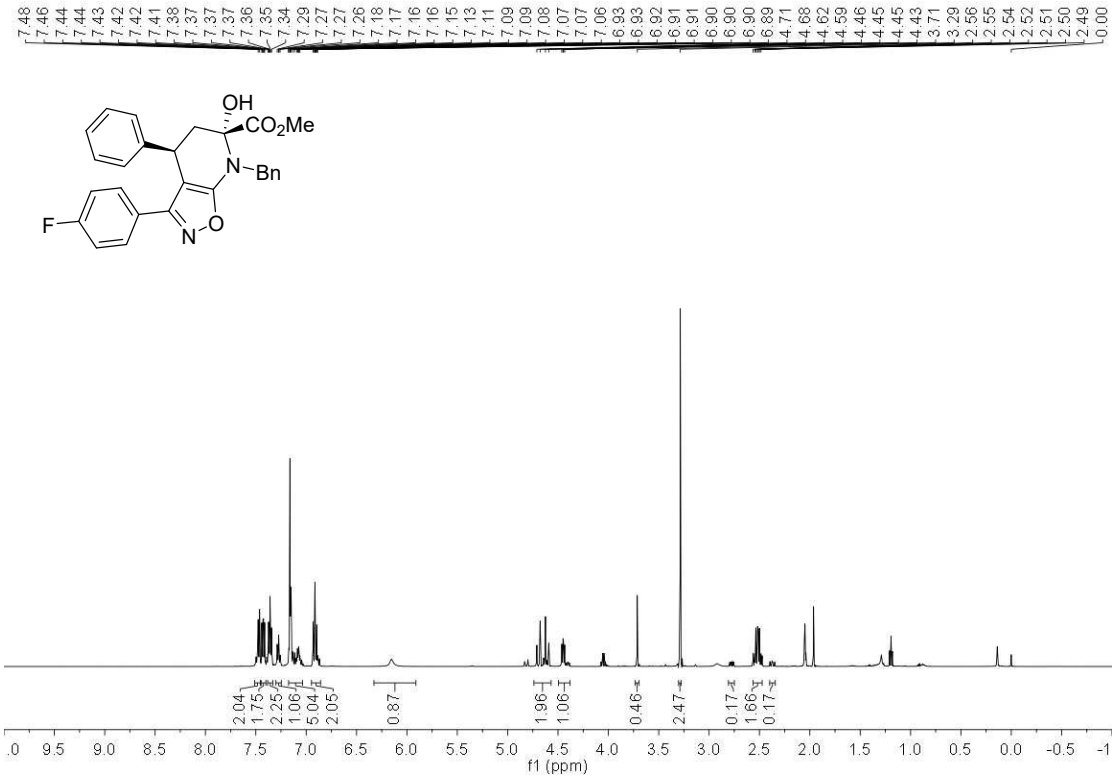
^{1}H NMR and ^{13}C NMR of **3p**

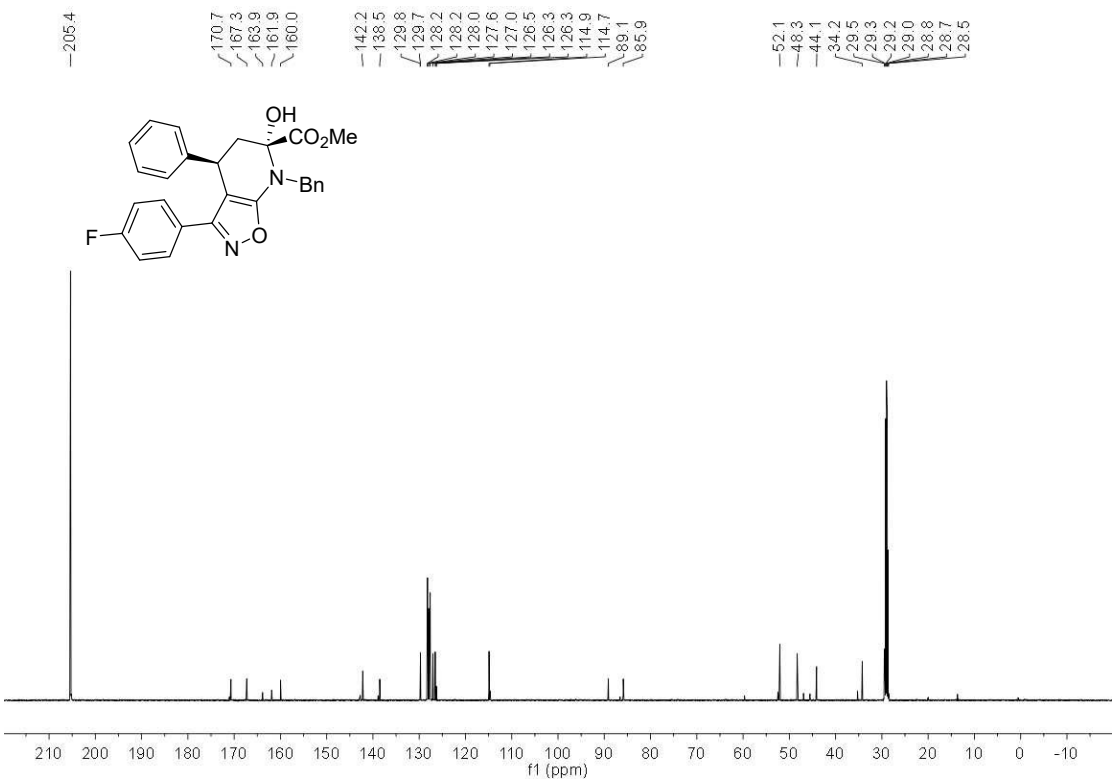


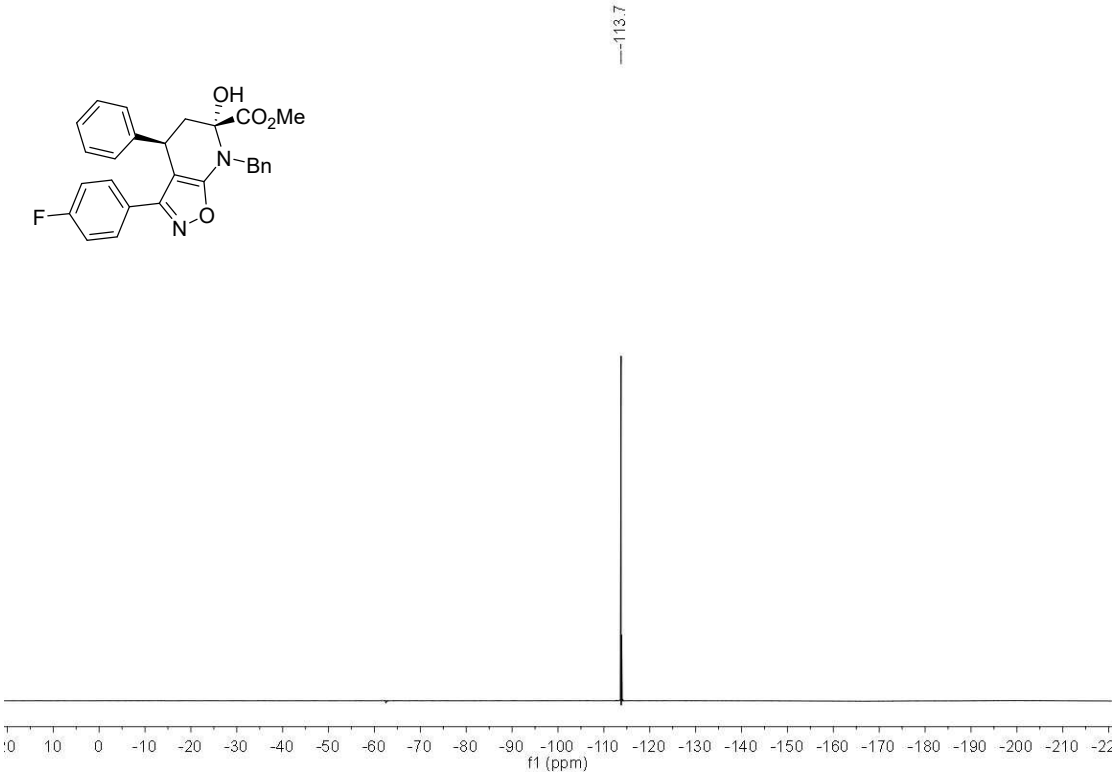
^{1}H NMR and ^{13}C NMR of **3q**



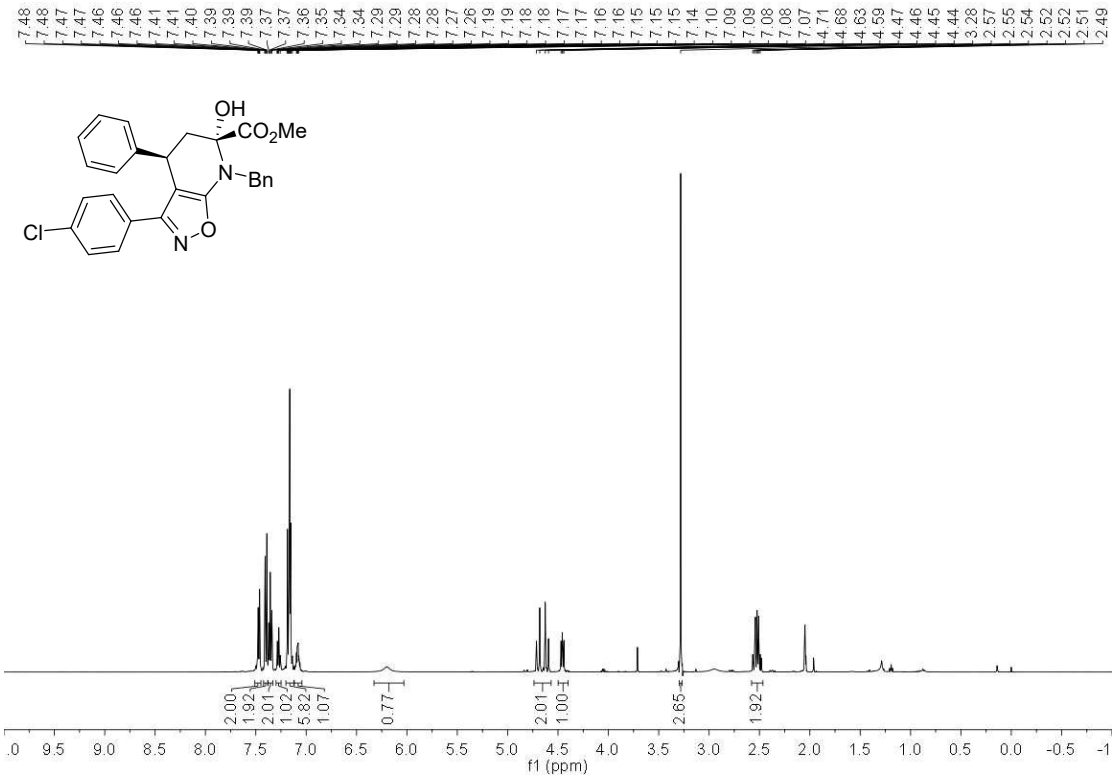
^{1}H NMR, ^{13}C NMR and ^{13}F NMR of **3r**

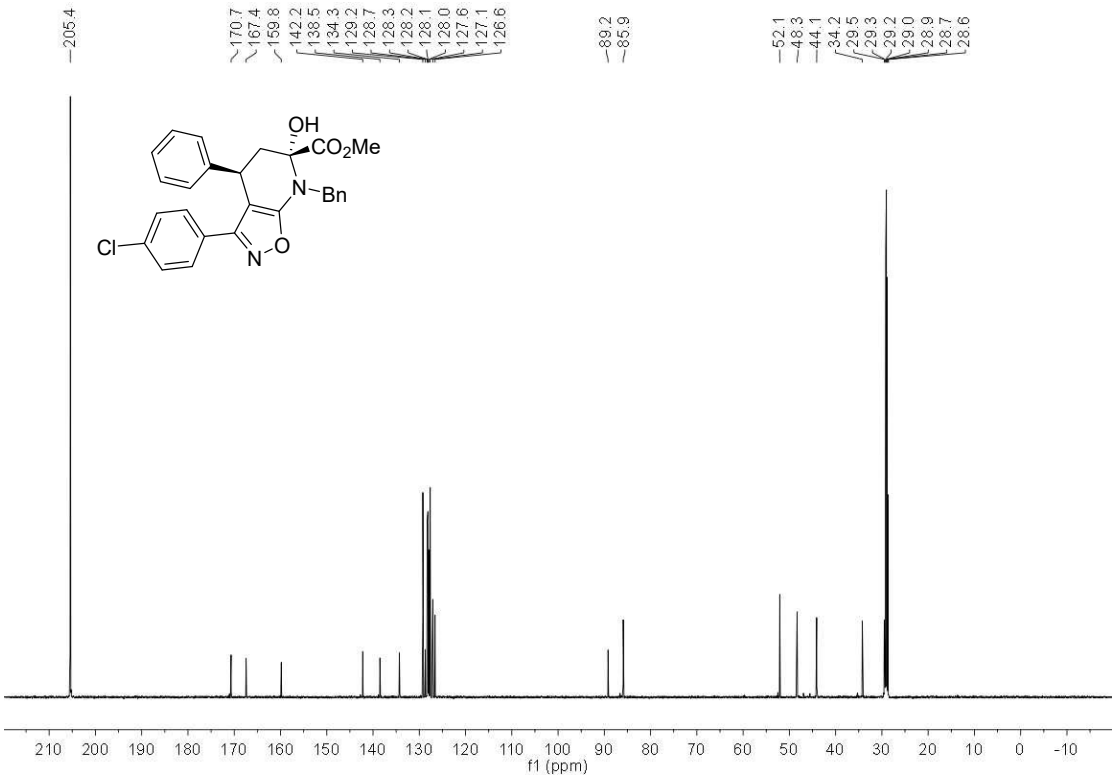




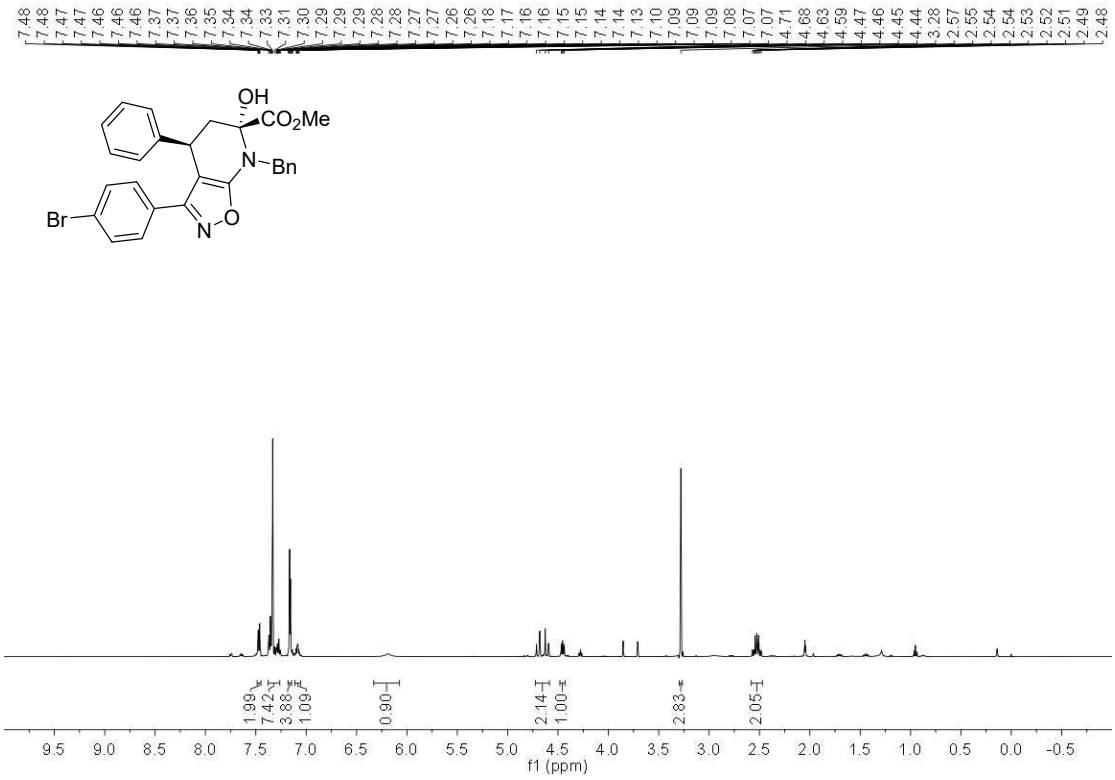


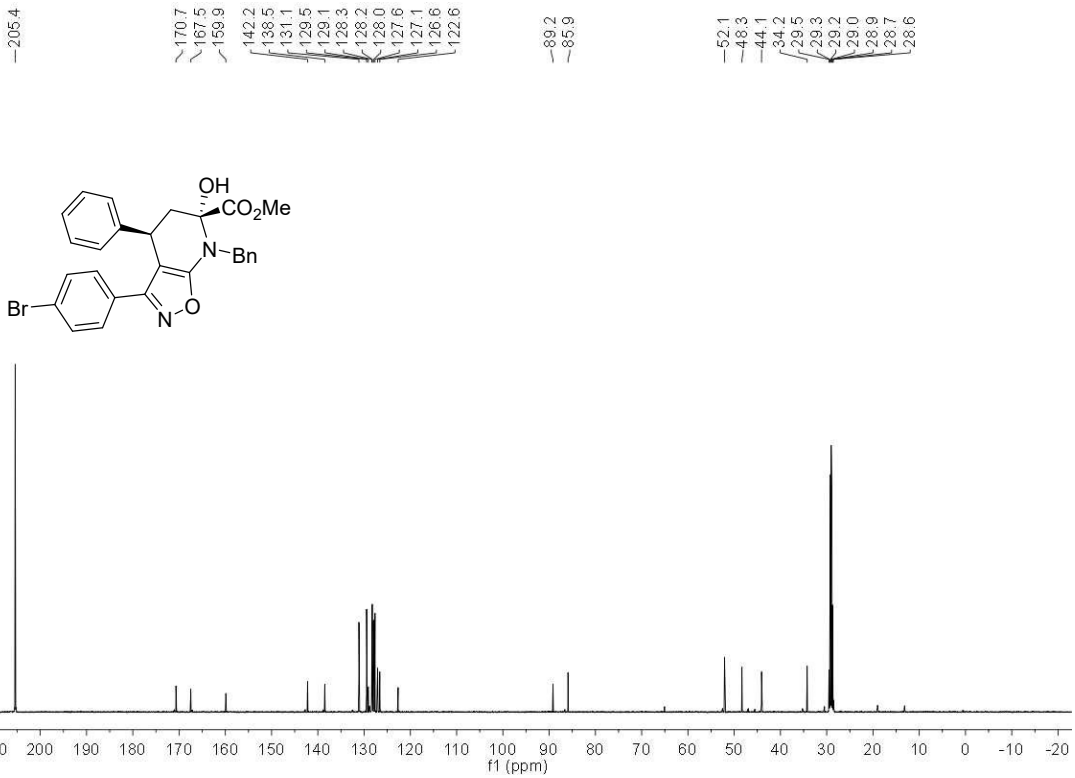
^{1}H NMR and ^{13}C NMR of **3s**



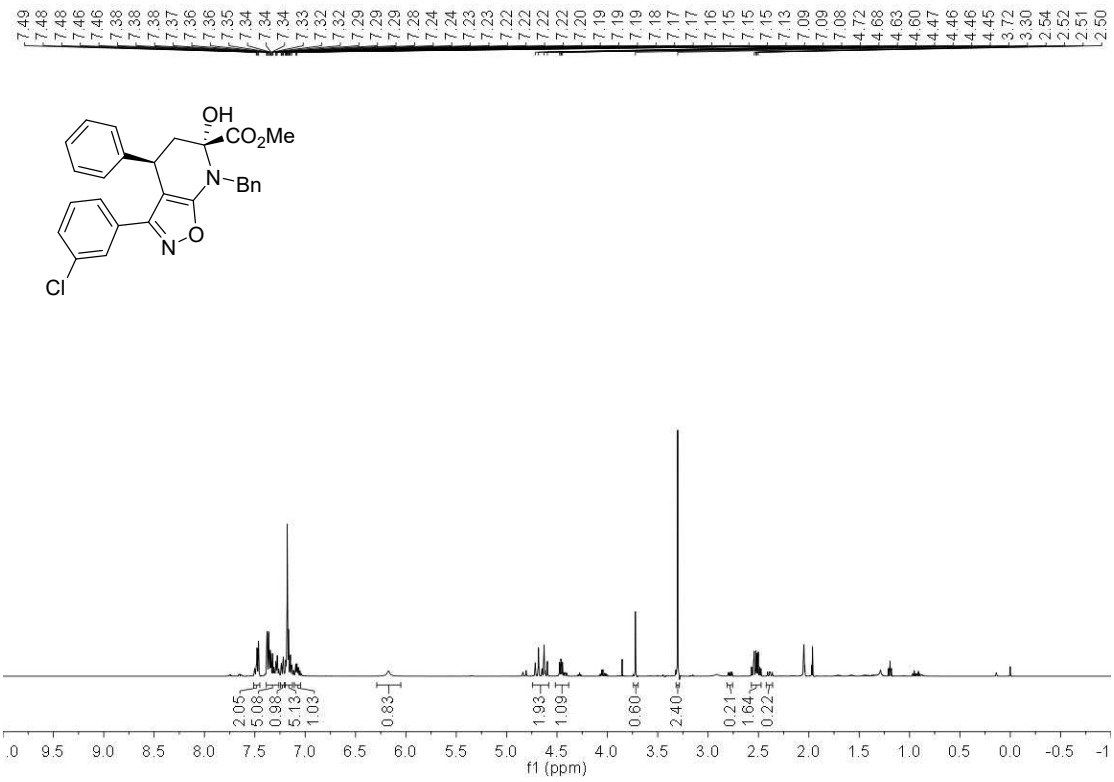


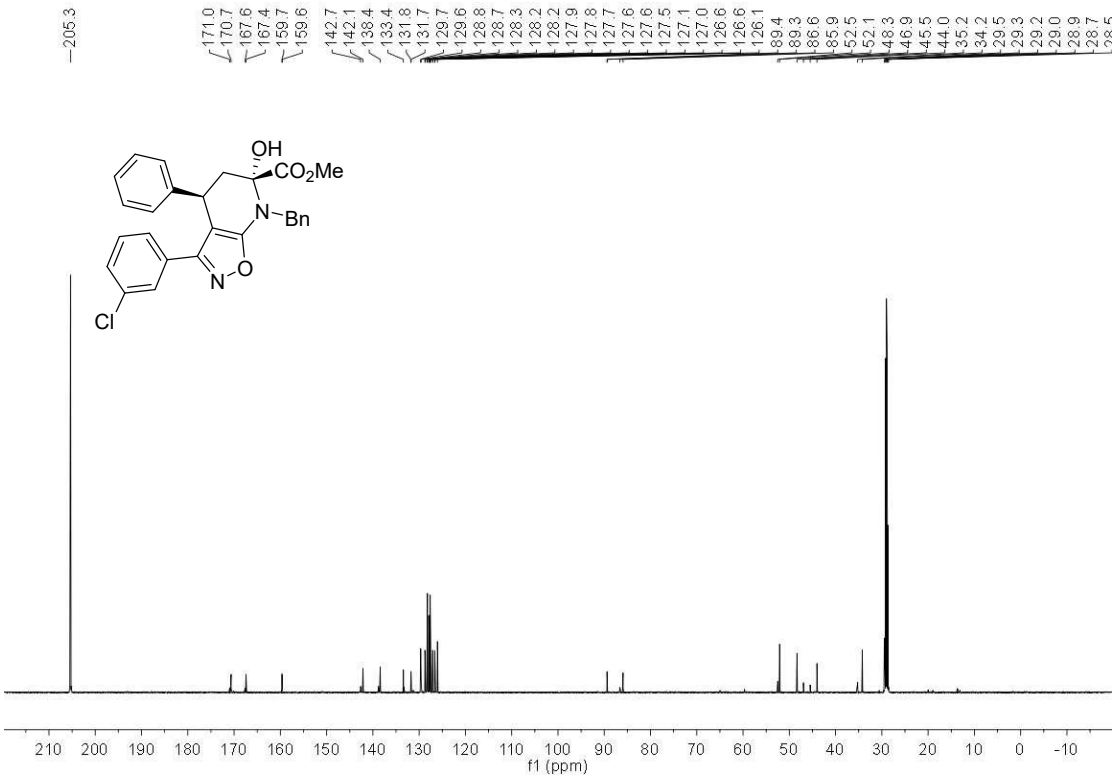
^{1}H NMR and ^{13}C NMR of **3t**



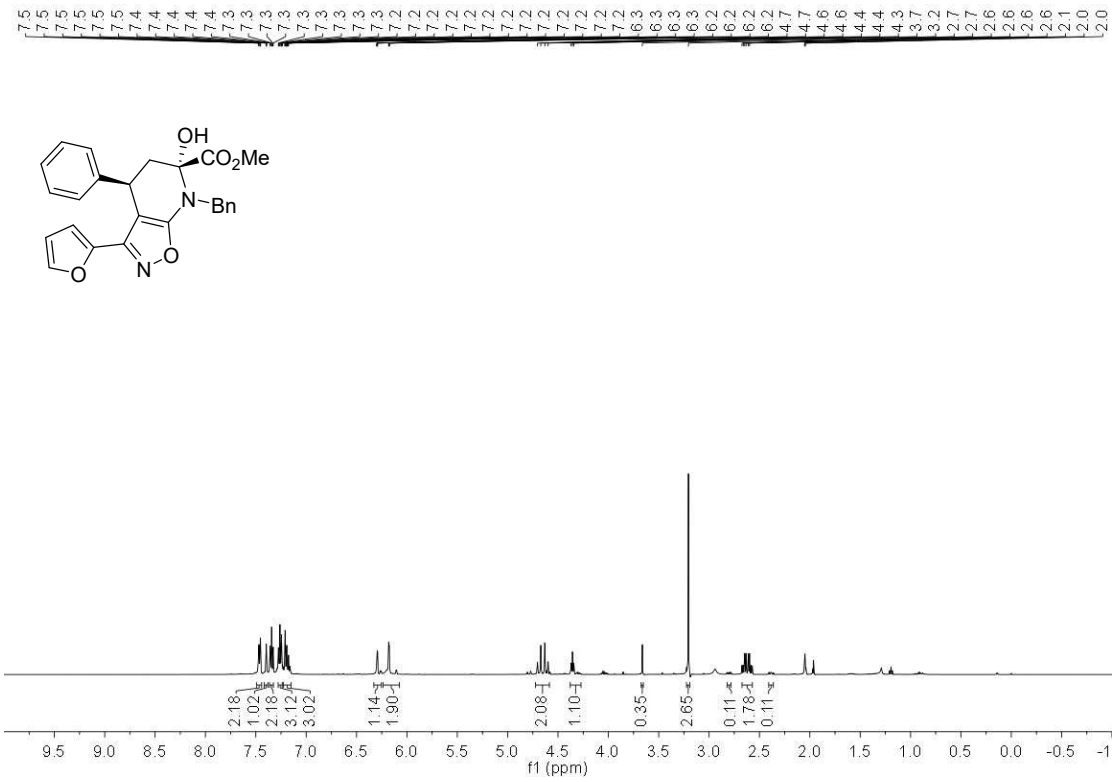


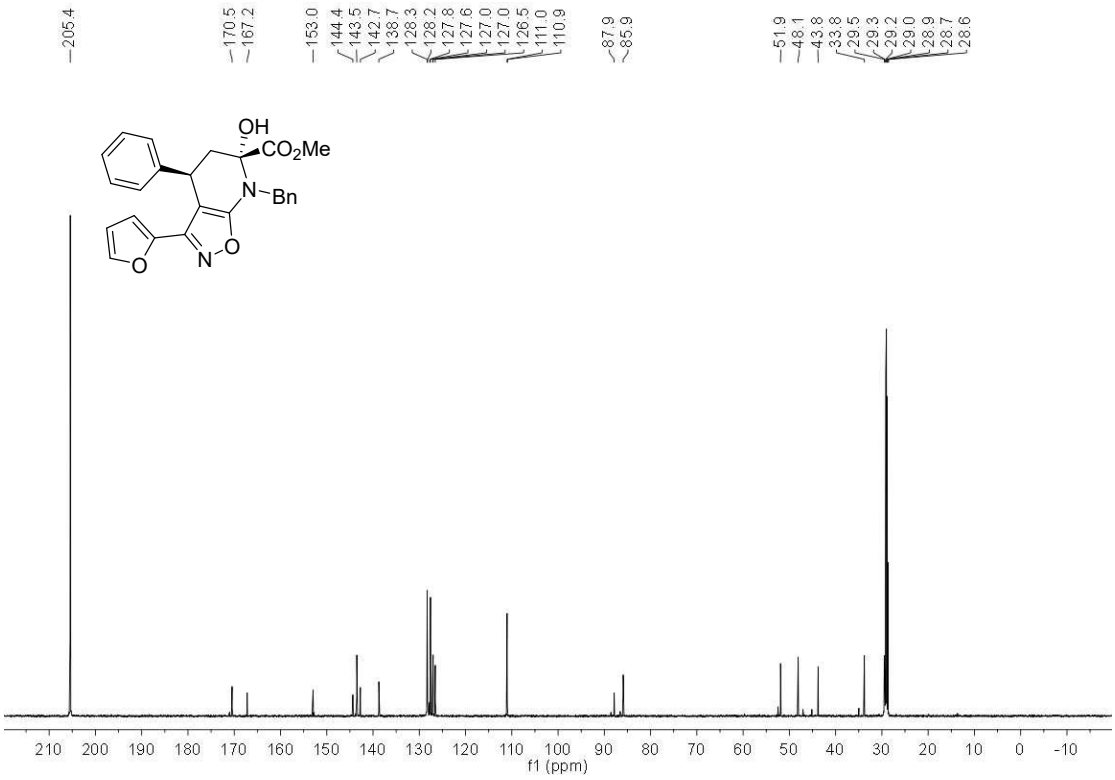
^{1}H NMR and ^{13}C NMR of **3u**



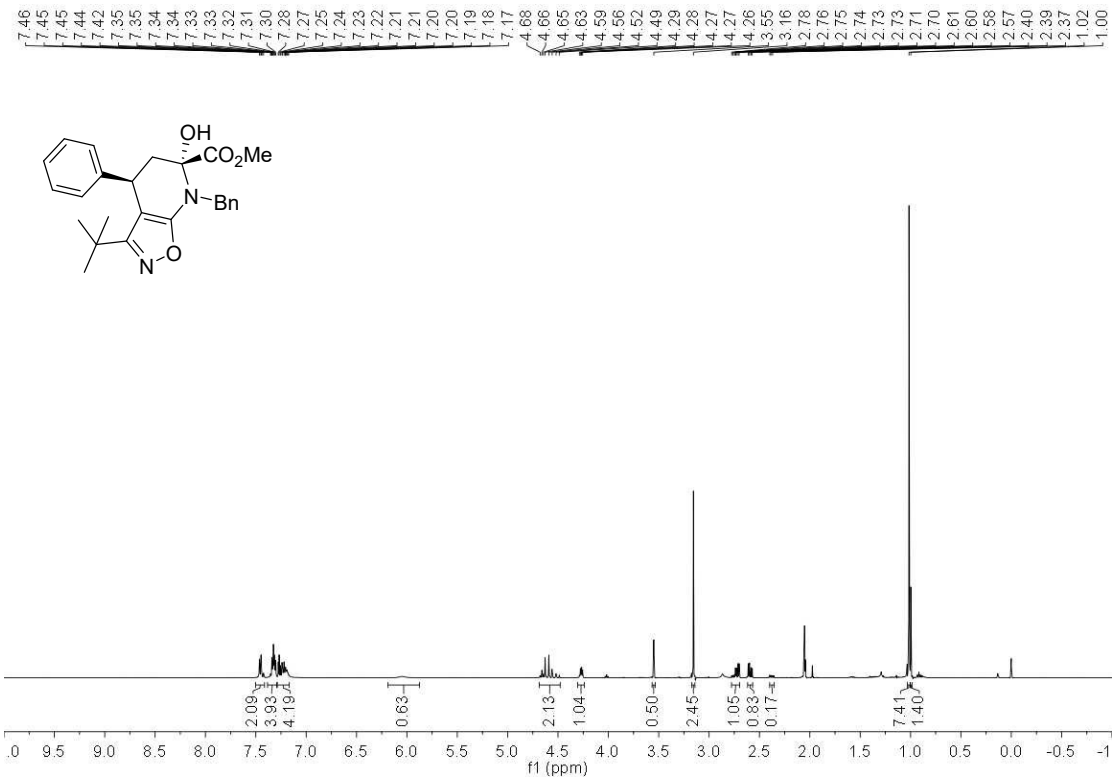


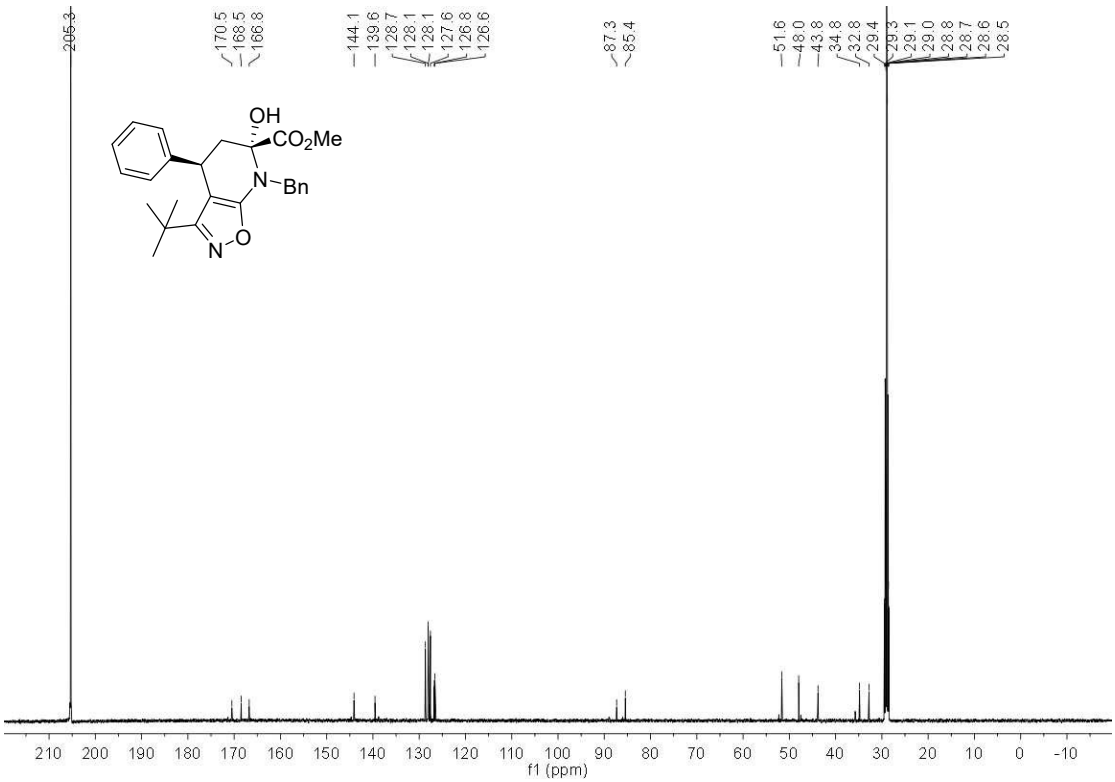
^{1}H NMR and ^{13}C NMR of **3v**





^{1}H NMR and ^{13}C NMR of **3w**

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127.6
126.8
126.6
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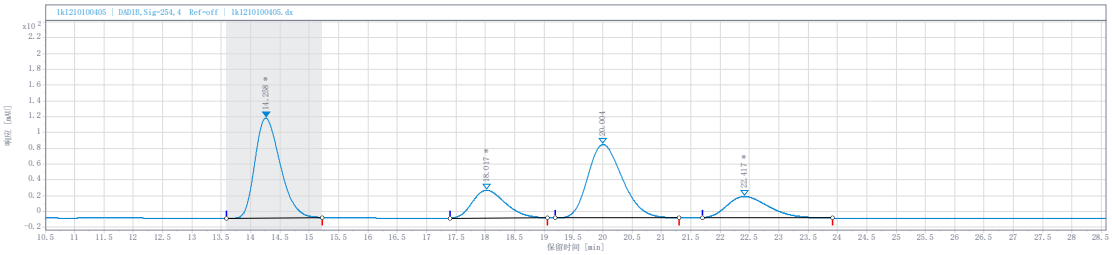
85.4
51.6
48.0
43.8
34.8
32.8
29.4
29.3
29.1
29.0
28.8
28.7
28.6
28.5
OH
CO2Me
N
Bn
N
O
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10
f1 (ppm)

Part III HPLC Spectra

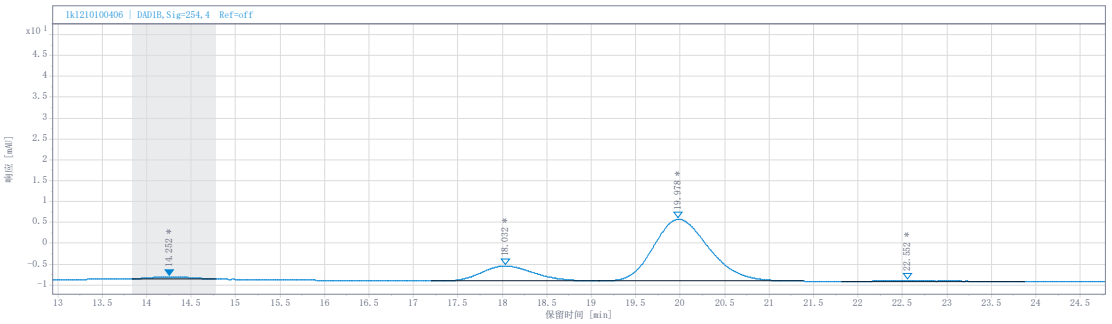
3a racemic mixture:



Signal: DAD1B, Sig=254, 4 Ref=off

RetTime [min]	width [min]	Arer [mAU*s]	Height [mAU]	Area%
14.3	1.63	3769.73	126.44	36.82
18.0	1.67	1359.23	35.15	13.27
20.0	2.12	3788.32	92.86	37.00
22.4	2.23	1322.12	27.05	12.91

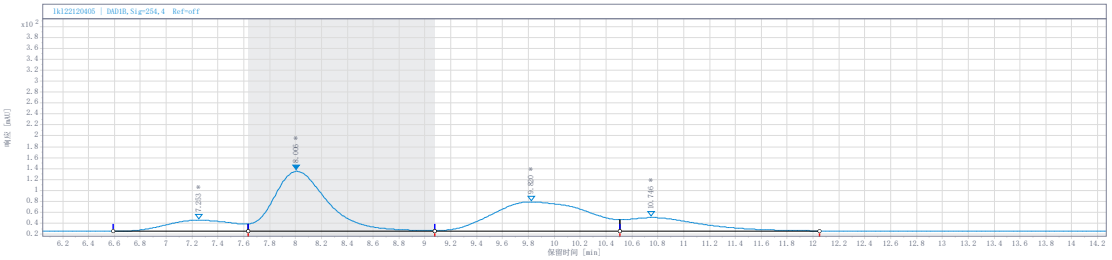
3a



Signal: DAD1B, Sig=254, 4 Ref=off

RetTime [min]	width [min]	Arer [mAU*s]	Height [mAU]	Area%
14.3	0.93	15.29	0.52	1.90
18.0	1.87	146.95	3.59	18.28
20.0	2.30	637.71	14.79	79.31
22.6	2.05	4.09	0.09	0.51

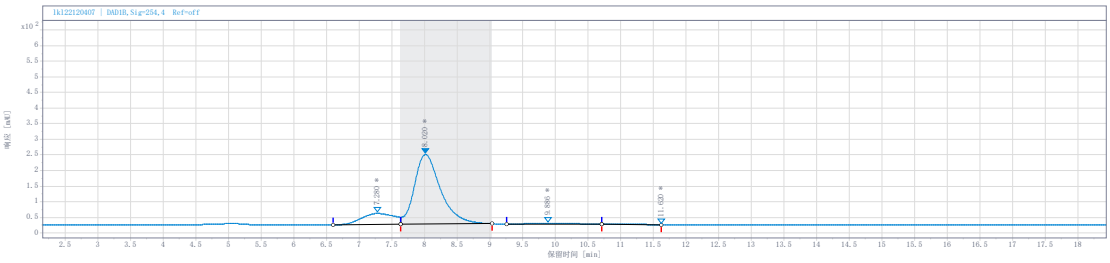
3b racemic mixture:



Signal: DAD1B, Sig=254, 4 Ref=off

RetTime [min]	width [min]	Arer [mAU*s]	Height [mAU]	Area%
7.25	1.04	728.29	20.19	9.51
8.01	1.44	3178.80	109.66	41.49
9.82	1.43	2757.13	53.69	35.99
10.7	1.54	996.55	24.52	13.01

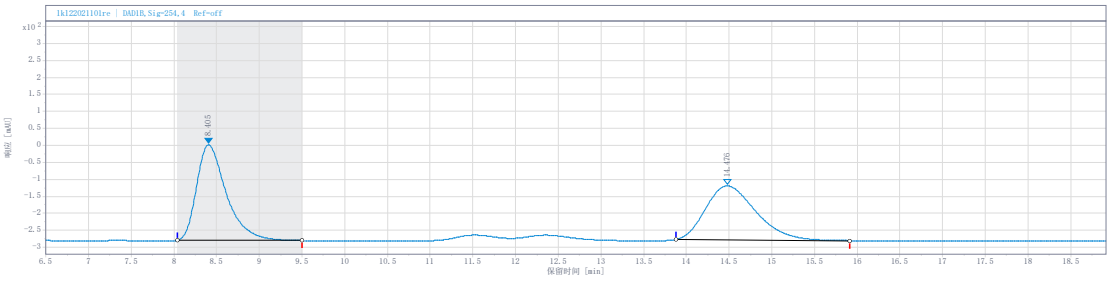
3b



Signal: DAD1B, Sig=254, 4 Ref=off

RetTime [min]	width [min]	Arer [mAU*s]	Height [mAU]	Area%
7.28	1.03	1207.75	34.99	15.99
8.02	1.39	6185.44	223.18	81.90
9.89	1.46	141.86	3.35	1.88
11.6	0.90	17.43	0.00	0.23

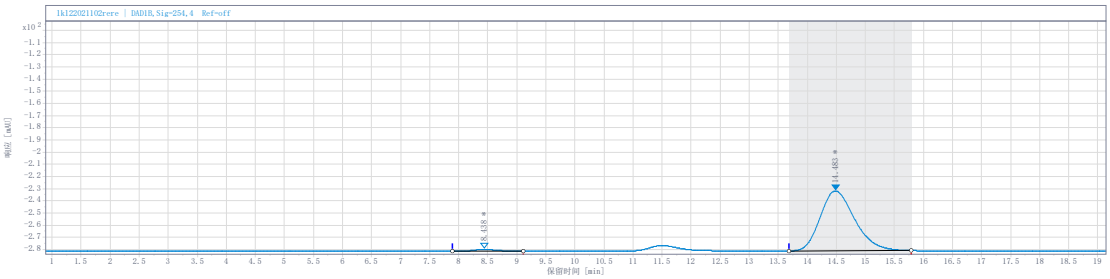
3c racemic mixture：



Signal: DAD1B, Sig=254, 4 Ref=off

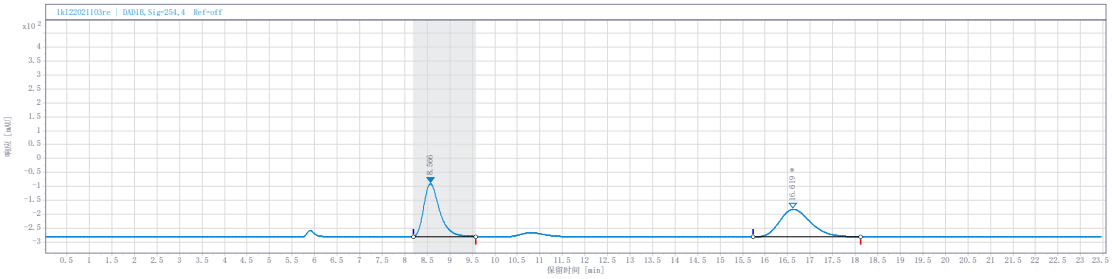
RetTime [min]	width [min]	Arer [mAU*s]	Height [mAU]	Area%
8.40	1.46	6785.08	281.27	51.18
14.5	2.03	6471.04	158.53	48.82

3c



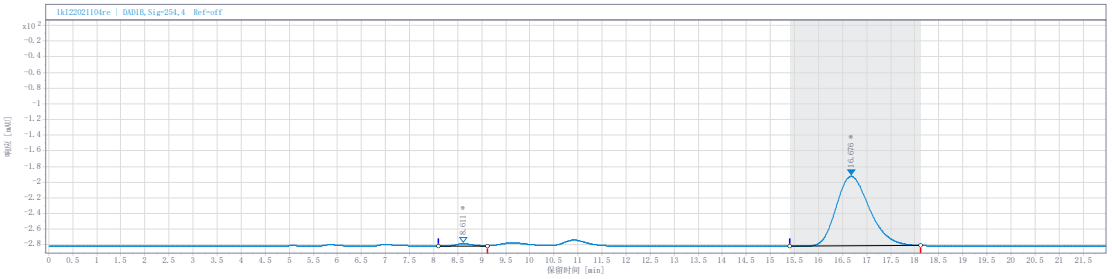
Signal:	DAD1B, Sig=254, 4	Ref=off		
RetTime [min]	width [min]	Arer [mAU*s]	Height [mAU]	Area%
8.44	1.22	36.22	1.54	1.74
14.5	2.10	2042.33	49.25	98.26

3d racemic mixture：



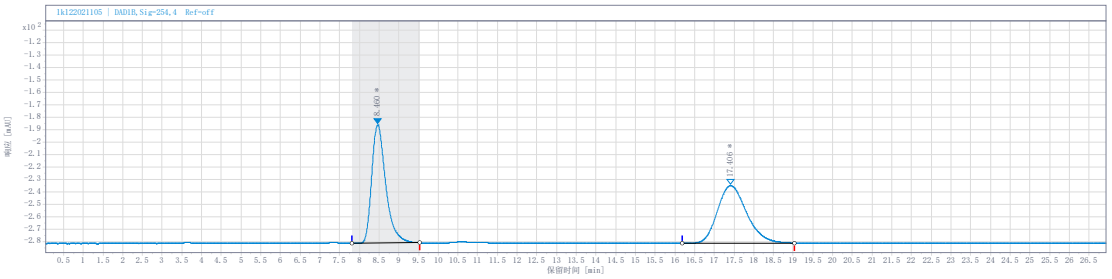
Signal:	DAD1B, Sig=254, 4	Ref=off		
RetTime [min]	width [min]	Arer [mAU*s]	Height [mAU]	Area%
8.57	1.38	4562.50	189.28	49.11
16.6	2.38	4728.74	98.96	50.89

3d



Signal:	DAD1B, Sig=254, 4	Ref=off		
RetTime [min]	width [min]	Arer [mAU*s]	Height [mAU]	Area%
8.61	1.03	66.23	2.99	1.53
16.7	2.71	4271.59	88.79	98.47

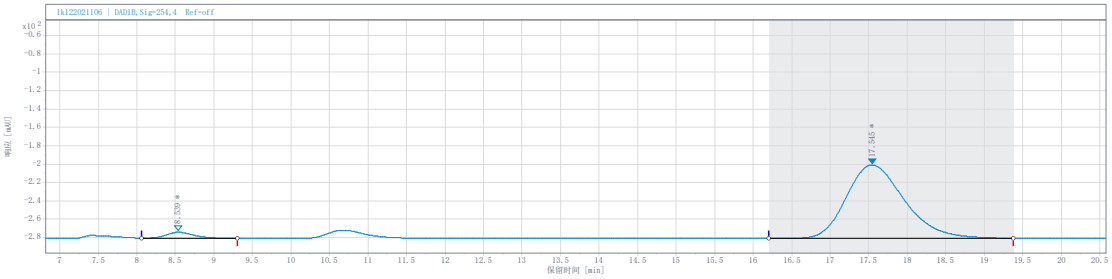
3e racemic mixture：



Signal: DAD1B, Sig=254, 4 Ref=off

RetTime [min]	width [min]	Arer [mAU*s]	Height [mAU]	Area%
8.46	1.72	2340.84	95.22	49.70
17.4	2.85	2369.03	46.25	50.30

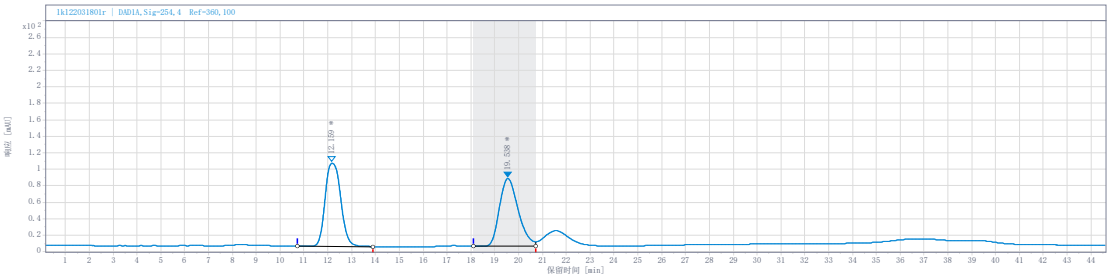
3e



Signal: DAD1B, Sig=254, 4 Ref=off

RetTime [min]	width [min]	Arer [mAU*s]	Height [mAU]	Area%
8.54	1.24	162.34	6.49	3.74
17.5	3.18	4174.34	79.91	96.26

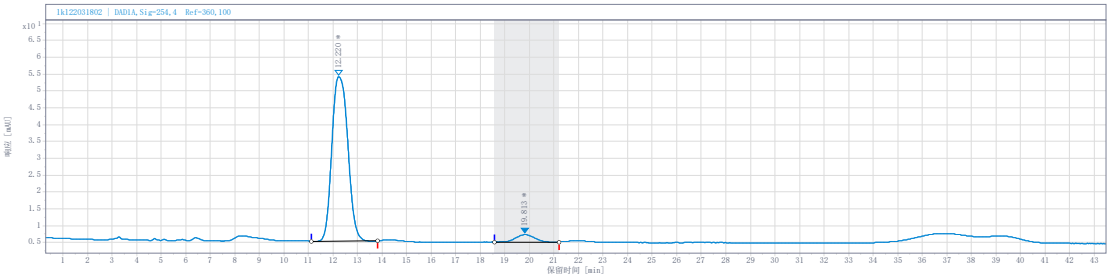
3f racemic mixture：



Signal: DAD1A, Sig=254, 4 Ref=360, 100

RetTime [min]	width [min]	Arer [mAU*s]	Height [mAU]	Area%
12.2	3.18	4564.22	100.77	50.47
19.5	2.59	4479.65	82.15	49.53

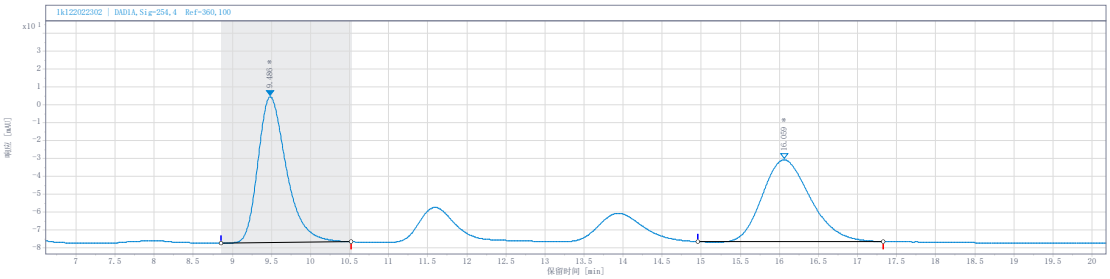
3f



Signal: DAD1A, Sig=254, 4 Ref=360, 100

RetTime [min]	width [min]	Arer [mAU*s]	Height [mAU]	Area%
12.2	2.70	2201.26	48.80	95.27
19.8	2.62	109.30	2.14	4.73

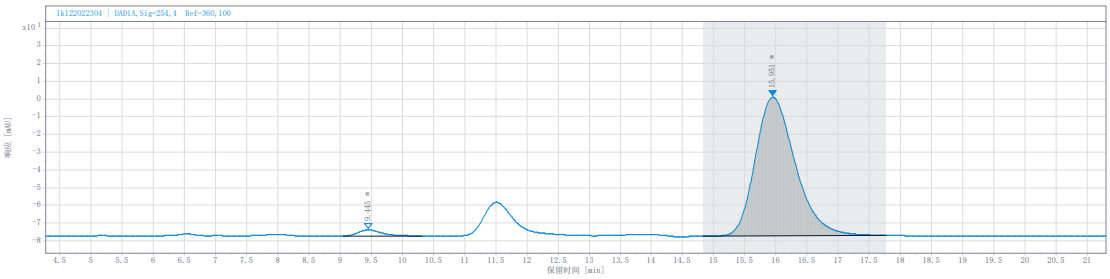
3g racemic mixture:



Signal: DAD1A, Sig=254, 4 Ref=360, 100

RetTime [min]	width [min]	Arer [mAU*s]	Height [mAU]	Area%
9.49	1.66	2067.65	81.63	51.44
16.1	2.37	1952.00	45.80	48.56

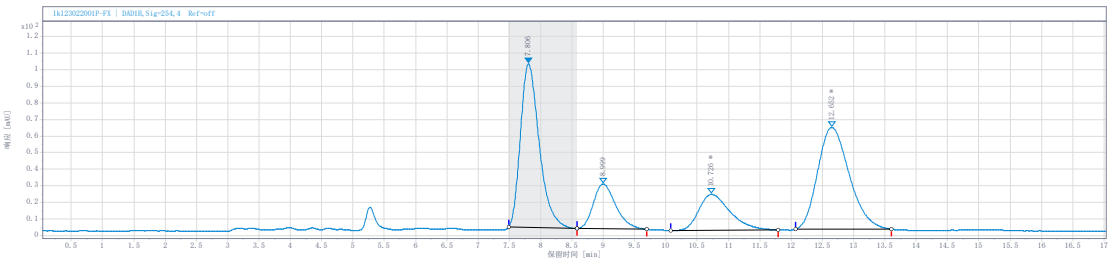
3g



Signal: DAD1A, Sig=254, 4 Ref=360, 100

RetTime [min]	width [min]	Arer [mAU*s]	Height [mAU]	Area%
9.45	1.25	89.08	3.45	2.49
16.0	2.94	3492.77	78.27	97.51

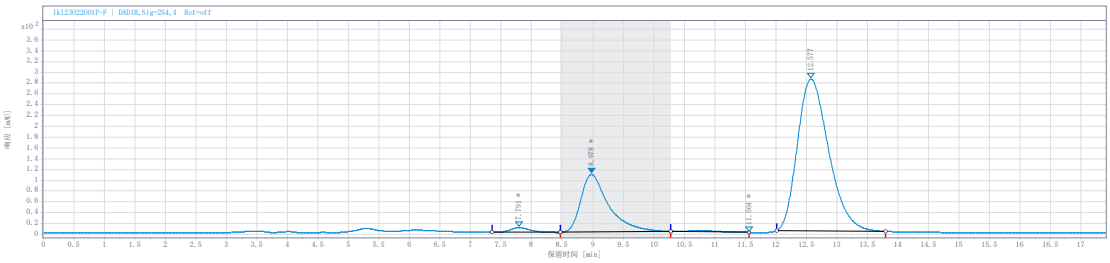
3h racemic mixture:



Signal: DAD1B, Sig=254, 4 Ref=off

RetTime [min]	width [min]	Arer [mAU*s]	Height [mAU]	Area%
7.81	1.09	2043.02	98.20	36.48
9.00	1.11	668.40	27.00	11.93
10.7	1.71	744.33	21.50	13.29
12.7	1.54	2144.88	61.27	38.30

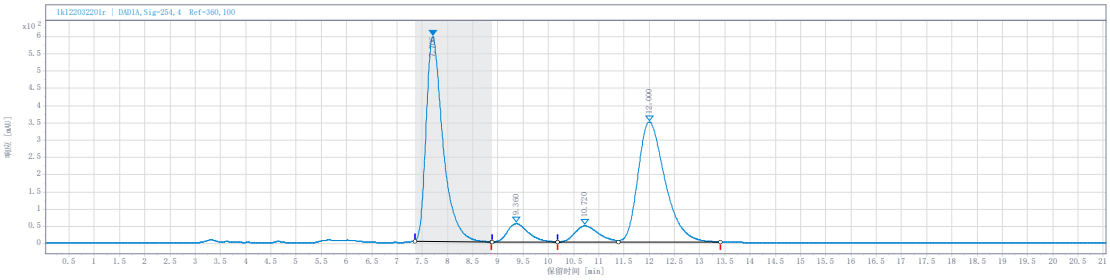
3h



Signal: DAD1B, Sig=254, 4 Ref=off

RetTime [min]	width [min]	Arer [mAU*s]	Height [mAU]	Area%
7.79	1.12	189.95	8.80	1.39
8.98	1.81	3375.89	106.87	24.72
11.6	1.29	59.19	0.00	0.43
12.6	1.79	10032.61	281.24	73.46

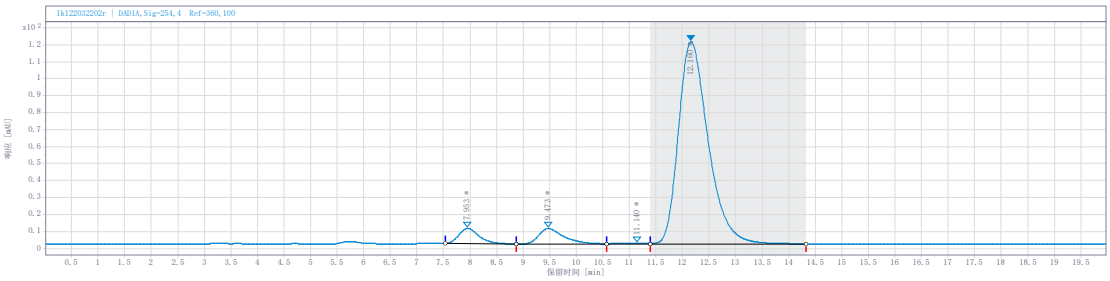
3i racemic mixture:



Signal: DAD1A, Sig=254, 4 Ref=360, 100

RetTime [min]	width [min]	Arer [mAU*s]	Height [mAU]	Area%
7.71	1.51	13693.00	591.53	46.30
9.36	1.30	1498.37	52.70	5.07
10.7	1.20	1510.07	46.43	5.11
12.0	2.03	12874.78	347.14	43.53

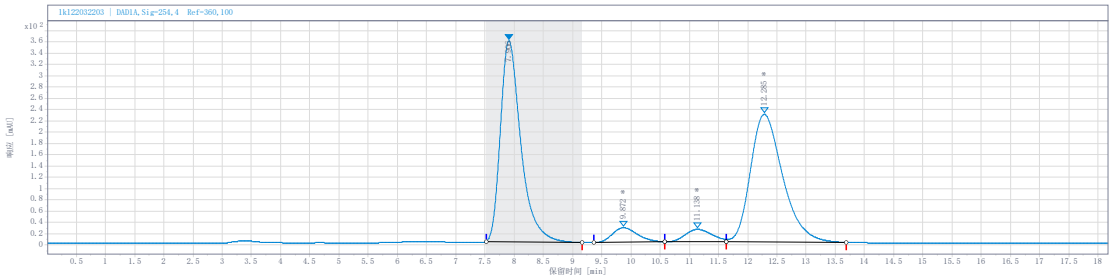
3i



Signal: DAD1A, Sig=254, 4 Ref=360, 100

RetTime [min]	width [min]	Arer [mAU*s]	Height [mAU]	Area%
7.95	1.34	239.80	9.04	4.64
9.47	1.70	295.03	9.10	5.71
11.1	0.83	15.43	0.49	0.30
12.2	2.92	4617.20	119.22	89.35

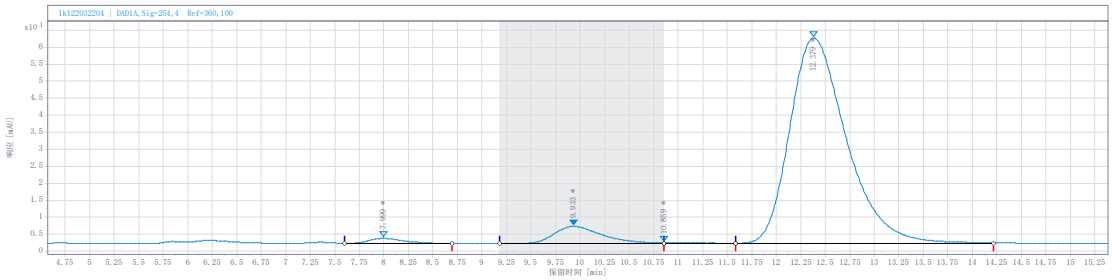
3j racemic mixture:



Signal: DAD1A, Sig=254, 4 Ref=360, 100

RetTime [min]	width [min]	Arer [mAU*s]	Height [mAU]	Area%
7.91	1.65	8646.12	356.05	46.03
9.87	1.21	770.79	25.89	4.10
11.1	1.05	697.94	21.92	3.72
12.3	2.06	8670.44	226.03	46.16

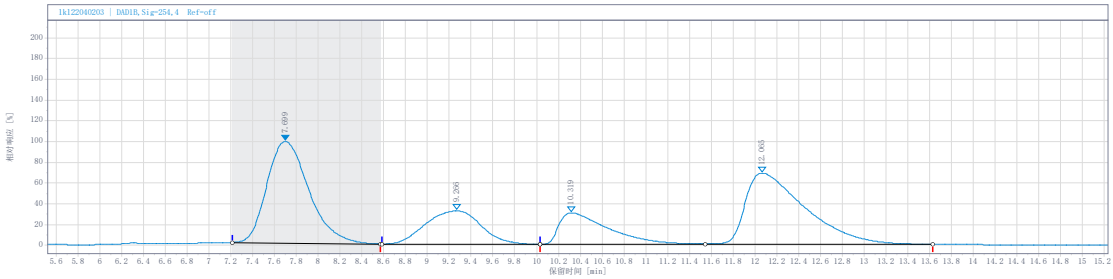
3j



Signal: DAD1A, Sig=254, 4 Ref=360, 100

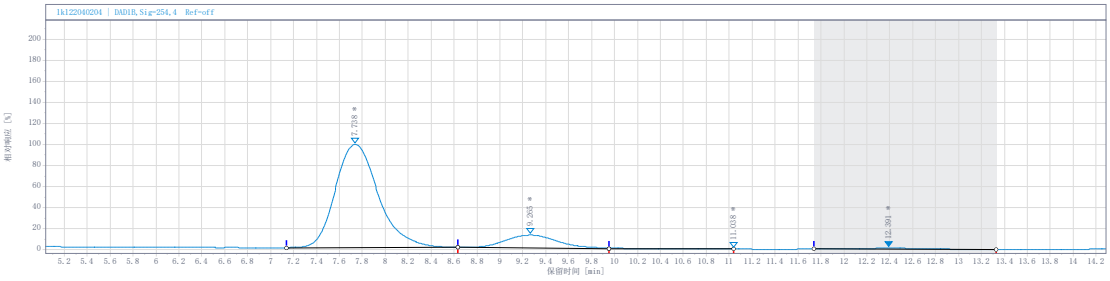
RetTime [min]	width [min]	Arer [mAU*s]	Height [mAU]	Area%
8.00	1.10	36.12	1.49	1.37
9.93	1.68	170.79	5.02	6.49
10.9	0.73	5.08	0.18	0.19
12.4	2.63	2417.59	60.32	91.94

3k racemic mixture:



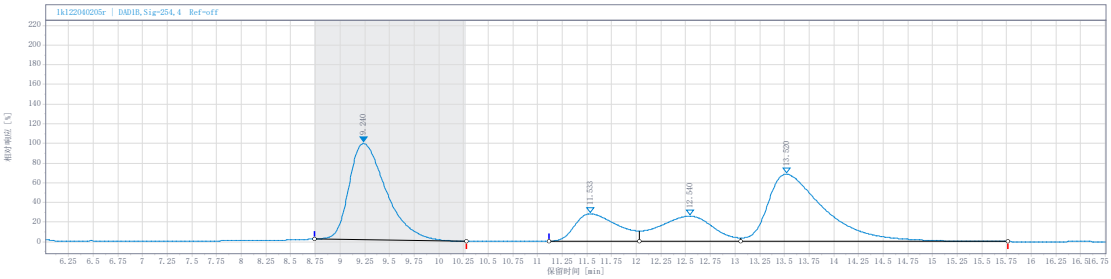
Signal:	DAD1B, Sig=254, 4	Ref=off		
RetTime [min]	width [min]	Arer [mAU*s]	Height [mAU]	Area%
7.70	1.36	23653.86	886.73	35.75
9.27	1.45	10246.86	291.17	15.49
10.3	1.51	8726.17	275.90	13.19
12.1	2.08	23538.93	621.79	35.58

3k



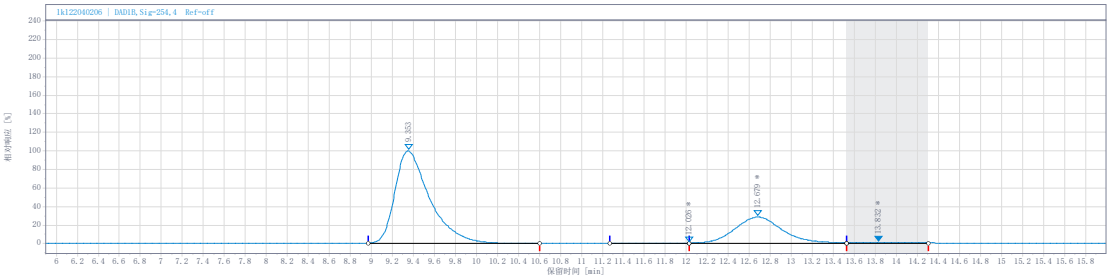
Signal:	DAD1B, Sig=254, 4	Ref=off		
RetTime [min]	width [min]	Arer [mAU*s]	Height [mAU]	Area%
7.74	1.49	3122.02	120.00	85.92
9.26	1.32	466.38	14.89	12.84
11.0	1.08	4.58	0.00	0.13
12.4	1.59	40.53	1.14	1.12

3l racemic mixture:



Signal:	DAD1B, Sig=254, 4	Ref=off		
RetTime [min]	width [min]	Arer [mAU*s]	Height [mAU]	Area%
9.24	1.54	30030.26	1152.54	35.90
11.5	0.92	10060.49	329.44	12.03
12.5	1.03	11495.49	302.00	13.74
13.5	2.70	32055.35	805.30	38.32

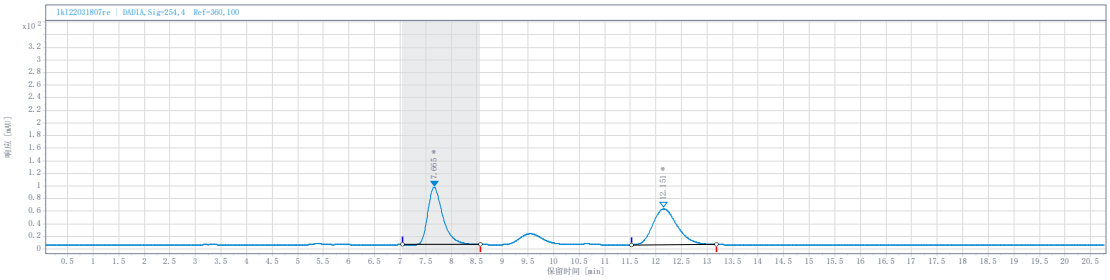
3l



Signal: DAD1B, Sig=254, 4 Ref=off

RetTime [min]	width [min]	Arer [mAU*s]	Height [mAU]	Area%
9.35	1.63	15353.29	667.80	69.99
12.0	0.76	47.75	3.29	0.22
12.7	1.50	6158.42	191.67	28.08
13.8	0.78	375.67	10.16	1.71

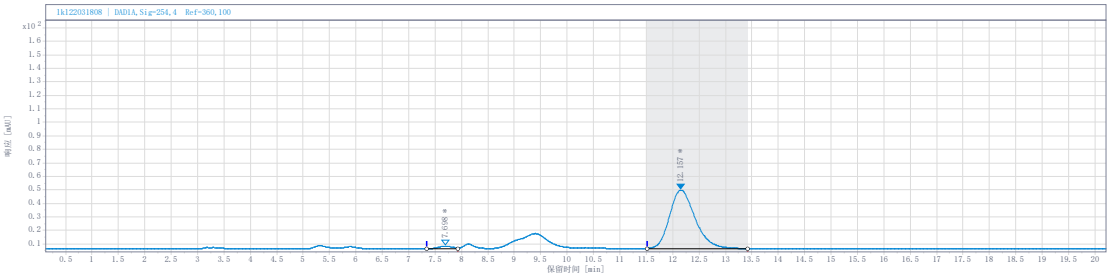
3m racemic mixture:



Signal: DAD1A, Sig=254, 4 Ref=360, 100

RetTime [min]	width [min]	Arer [mAU*s]	Height [mAU]	Area%
7.67	1.52	1852.36	90.79	49.60
12.2	1.66	1882.23	56.82	50.40

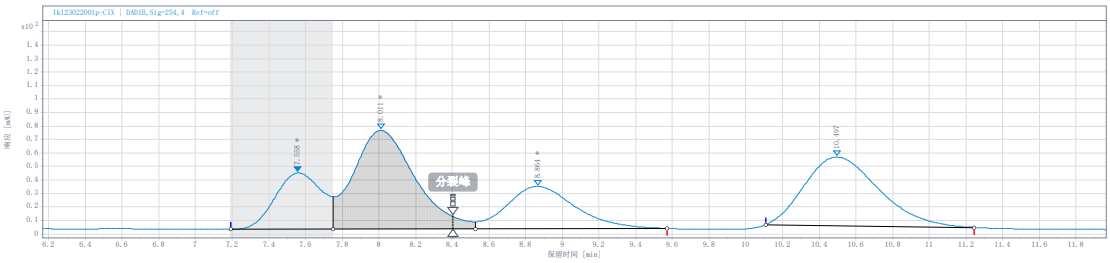
3m



Signal: DAD1A, Sig=254, 4 Ref=360, 100

RetTime [min]	width [min]	Arer [mAU*s]	Height [mAU]	Area%
7.70	0.59	36.23	1.93	2.43
12.2	1.90	1451.94	43.28	97.57

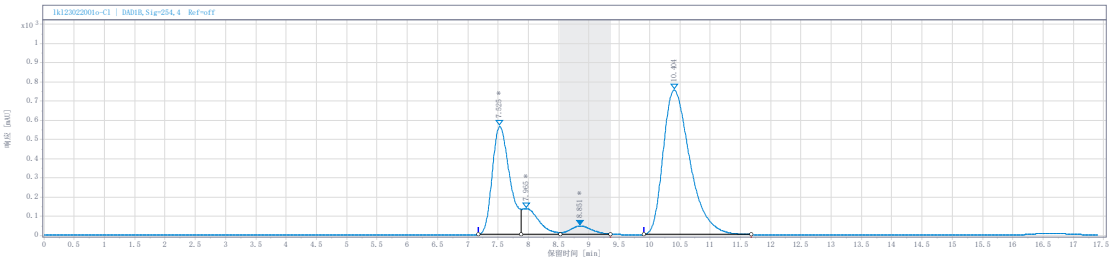
3n racemic mixture:



Signal: DAD1B, Sig=254, 4 Ref=off

RetTime [min]	width [min]	Arer [mAU*s]	Height [mAU]	Area%
7.56	0.56	739.68	41.71	15.79
8.01	0.77	1707.86	73.25	36.45
8.86	1.04	814.10	31.45	17.37
10.5	1.13	1423.98	50.78	30.39

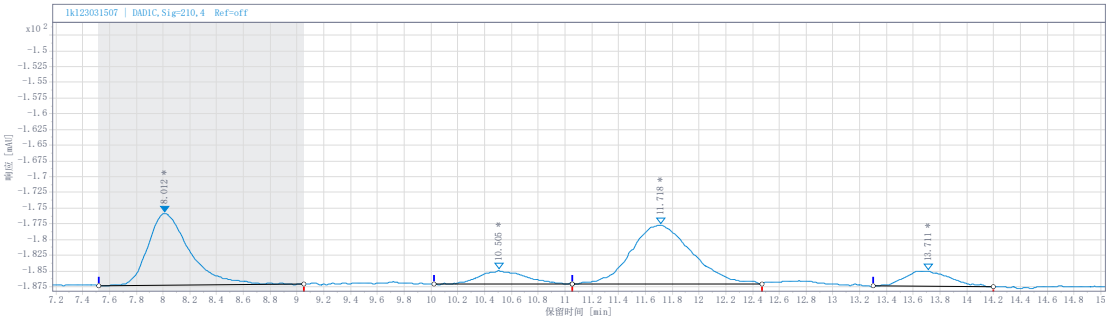
3n



Signal: DAD1B, Sig=254, 4 Ref=off

RetTime [min]	width [min]	Arer [mAU*s]	Height [mAU]	Area%
7.53	0.71	11366.72	560.92	29.88
7.96	0.64	2563.18	133.03	6.74
8.85	0.83	1032.25	42.33	2.71
10.4	1.77	23078.40	751.06	60.67

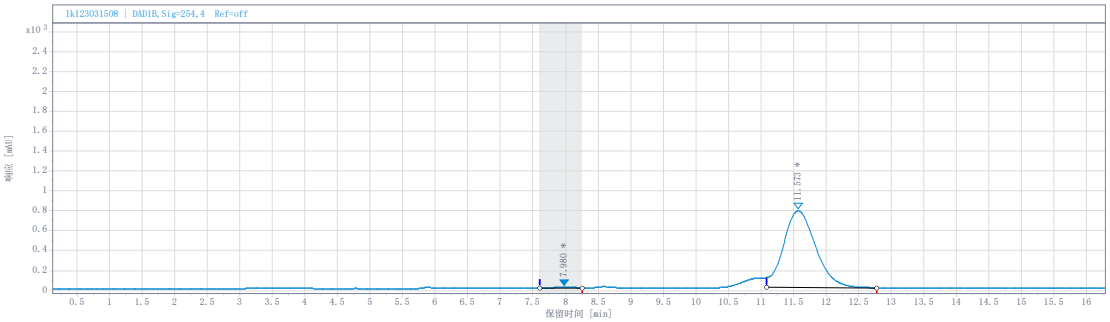
3o racemic mixture:



Signal: DAD1C, Sig=210, 4 Ref=off

RetTime [min]	width [min]	Arer [mAU*s]	Height [mAU]	Area%
8.01	1.53	245.24	11.40	38.25
10.5	1.03	47.89	2.07	7.47
11.7	1.42	291.93	9.27	45.53
13.7	0.90	56.14	2.40	8.76

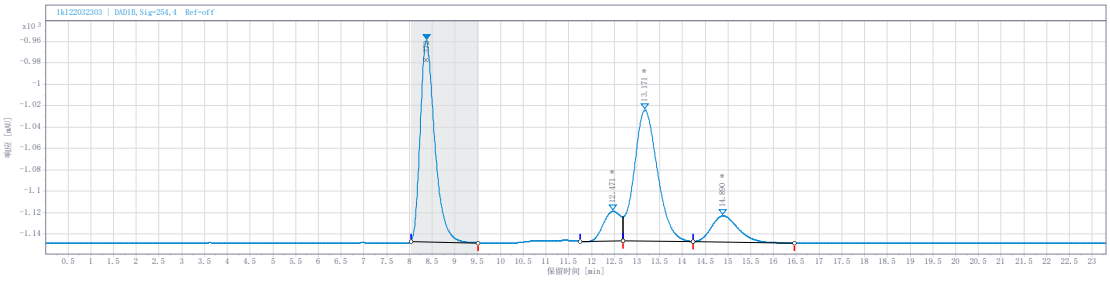
3o



Signal: DAD1B, Sig=254, 4 Ref=off

RetTime [min]	width [min]	Arer [mAU*s]	Height [mAU]	Area%
7.98	0.65	330.16	16.38	1.24
11.6	1.68	26330.13	769.10	98.76

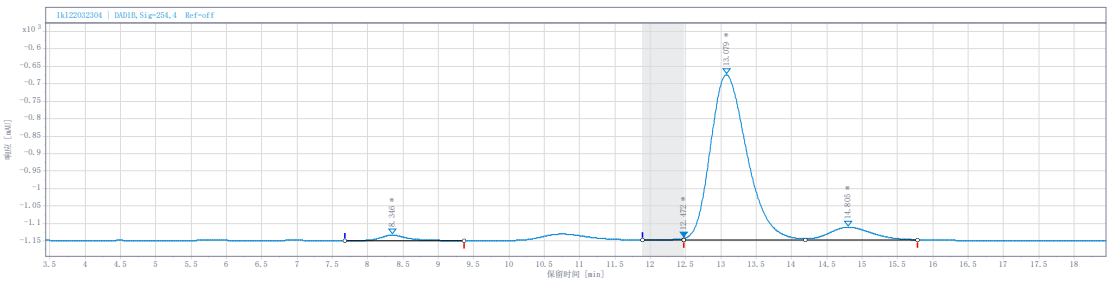
3p racemic mixture:



Signal: DAD1B, Sig=254, 4 Ref=off

RetTime [min]	width [min]	Arer [mAU*s]	Height [mAU]	Area%
8.37	1.48	4148.22	188.17	40.59
12.5	0.94	715.43	27.66	7.00
13.2	1.55	4374.80	122.40	42.80
14.9	2.22	982.02	24.40	9.61

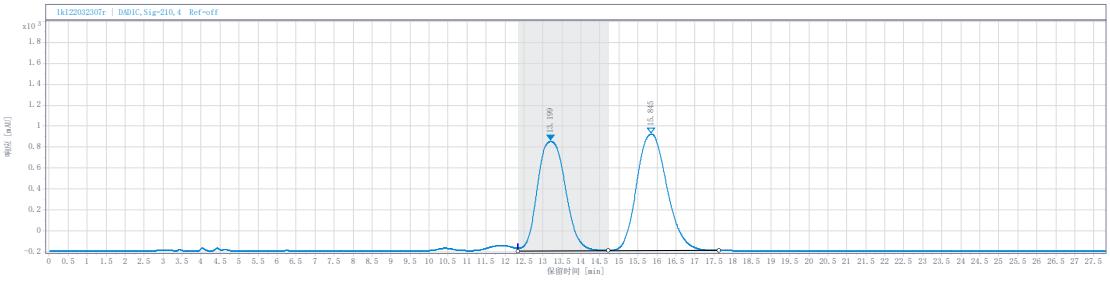
3p



Signal: DAD1B, Sig=254, 4 Ref=off

RetTime [min]	width [min]	Arer [mAU*s]	Height [mAU]	Area%
8.35	1.68	383.41	15.27	2.04
12.5	0.58	20.72	3.81	0.11
13.1	1.72	16871.65	472.28	89.90
14.8	1.59	1491.78	36.18	7.95

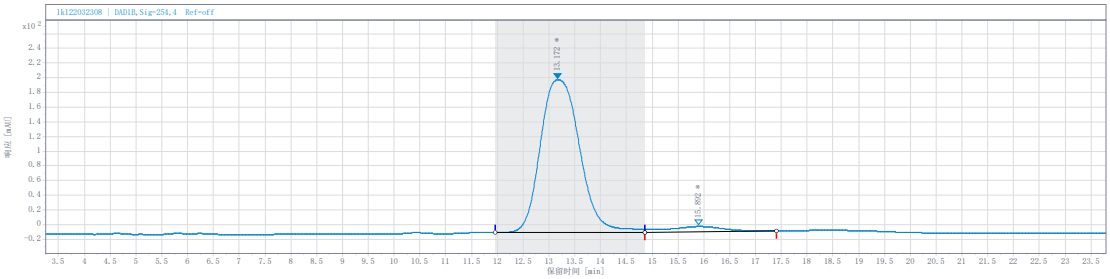
3q racemic mixture:



Signal: DAD1C, Sig=210, 4 Ref=off

RetTime [min]	width [min]	Arer [mAU*s]	Height [mAU]	Area%
13.2	2.37	53252.84	1040.37	46.44
15.8	2.93	61415.27	1112.18	53.56

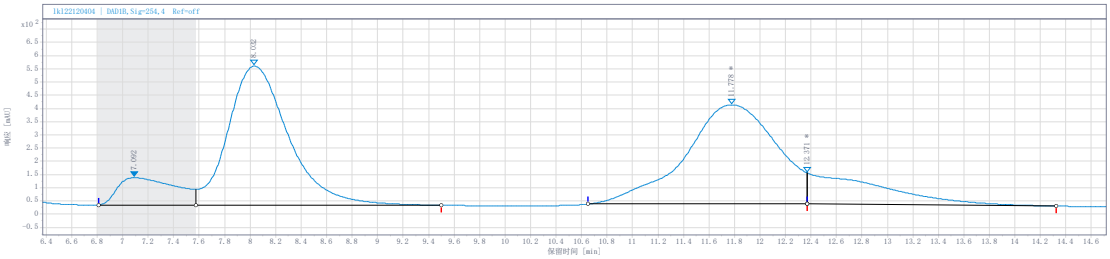
3q



Signal: DAD1B, Sig=254, 4 Ref=off

RetTime [min]	width [min]	Arer [mAU*s]	Height [mAU]	Area%
13.2	2.90	10982.99	207.98	95.28
15.9	2.55	543.88	7.12	4.72

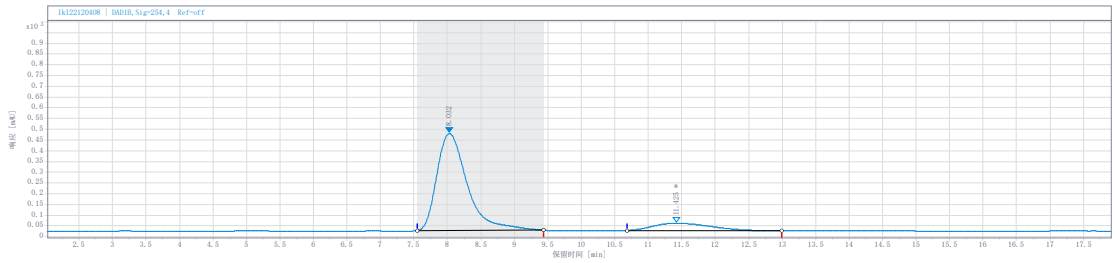
3r racemic mixture:



Signal: DAD1B, Sig=254, 4 Ref=off

RetTime [min]	width [min]	Arer [mAU*s]	Height [mAU]	Area%
7.09	0.76	3255.45	102.80	7.42
8.03	1.93	17271.63	525.82	39.37
11.8	1.72	18584.56	374.04	42.37
12.4	1.96	4753.80	115.56	10.84

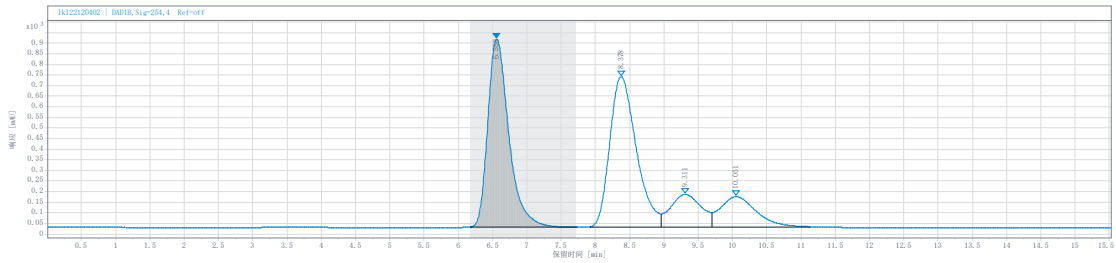
3r



Signal: DAD1B, Sig=254, 4 Ref=off

RetTime [min]	width [min]	Arer [mAU*s]	Height [mAU]	Area%
8.03	1.89	14250.66	450.35	87.56
11.4	2.31	2024.81	33.96	12.44

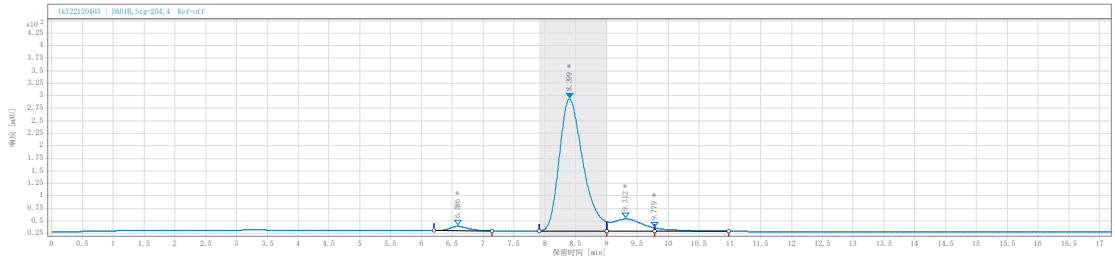
3s racemic mixture:



Signal: DAD1B, Sig=254, 4 Ref=off

RetTime [min]	width [min]	Arer [mAU*s]	Height [mAU]	Area%
6.56	1.54	18863.27	887.30	39.45
8.38	1.05	19010.20	708.20	39.76
9.31	0.73	4775.13	152.50	9.99
10.1	1.43	5167.71	142.21	10.81

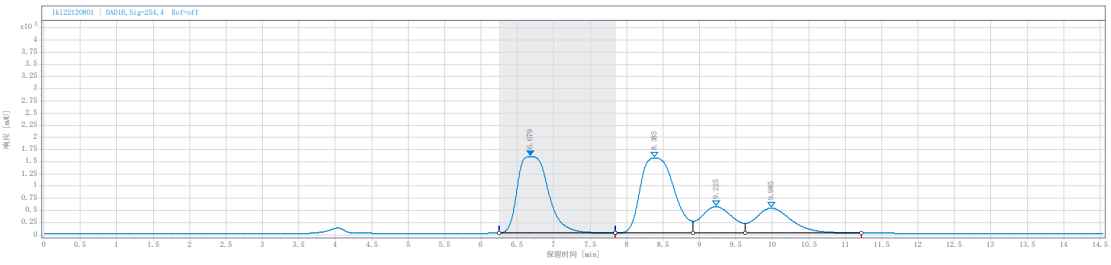
3s



Signal: DAD1B, Sig=254, 4 Ref=off

RetTime [min]	width [min]	Arer [mAU*s]	Height [mAU]	Area%
6.59	0.94	157.94	8.24	1.93
8.40	1.09	7059.59	263.94	86.26
9.31	0.78	839.78	24.49	10.26
9.78	1.20	126.46	6.64	1.55

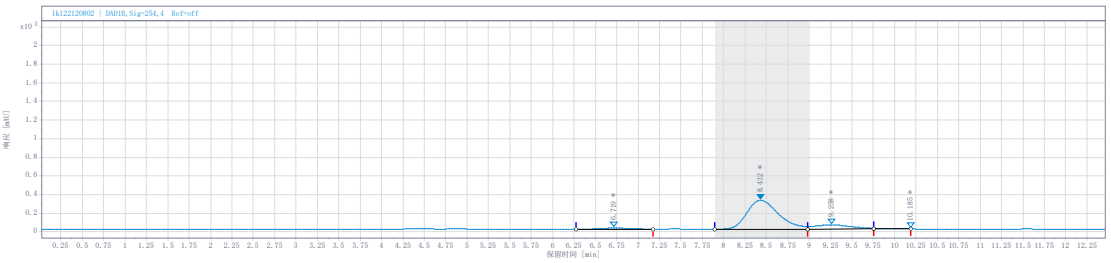
3t racemic mixture:



Signal: DAD1B, Sig=254, 4 Ref=off

RetTime [min]	width [min]	Arer [mAU*s]	Height [mAU]	Area%
6.68	1.59	45985.39	1573.76	35.47
8.39	1.07	49651.47	1544.82	38.30
9.23	0.71	16338.79	545.20	12.60
9.98	1.59	17674.72	511.92	13.63

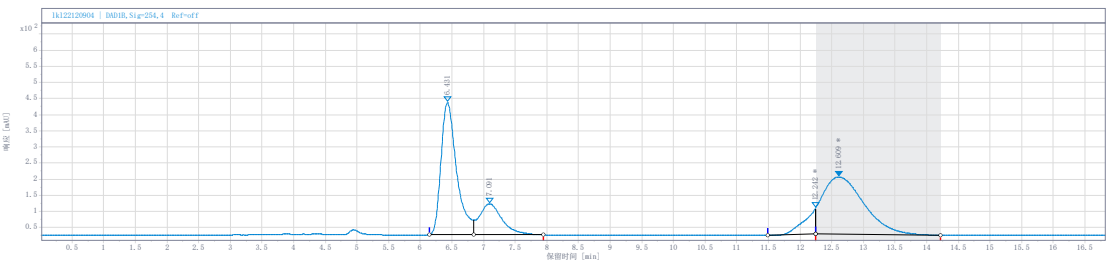
3t



Signal: DAD1B, Sig=254, 4 Ref=off

RetTime [min]	width [min]	Arer [mAU*s]	Height [mAU]	Area%
6.72	0.89	208.40	10.76	2.21
8.43	1.09	7999.87	311.20	84.72
9.26	0.77	1211.32	42.20	12.83
10.2	0.43	23.47	0.01	0.25

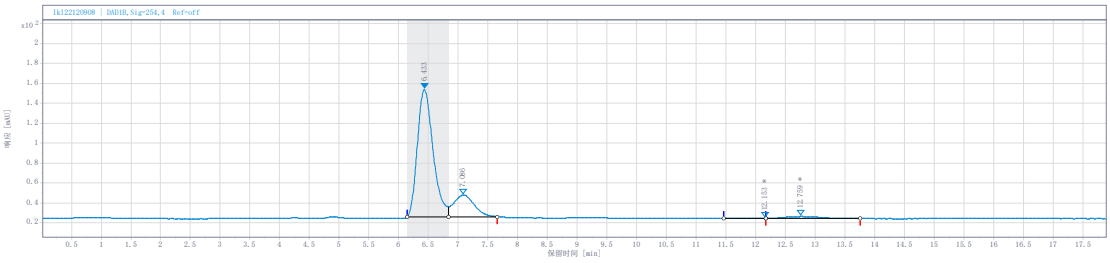
3u racemic mixture:



Signal: DAD1B, Sig=254, 4 Ref=off

RetTime [min]	width [min]	Arer [mAU*s]	Height [mAU]	Area%
6.43	0.70	7013.79	408.34	38.25
7.09	1.10	2375.80	95.77	12.96
12.2	0.75	960.92	77.28	5.24
12.6	1.98	7986.09	176.05	43.55

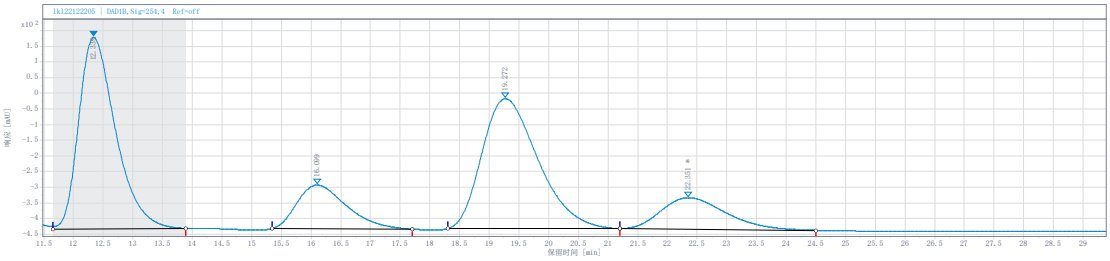
3u



Signal: DAD1B, Sig=254, 4 Ref=off

RetTime [min]	width [min]	Arer [mAU*s]	Height [mAU]	Area%
6.43	0.69	2337.77	127.86	79.01
7.09	0.83	526.58	21.88	17.80
12.2	0.71	1.08	0.18	0.04
12.8	1.58	93.30	2.19	3.15

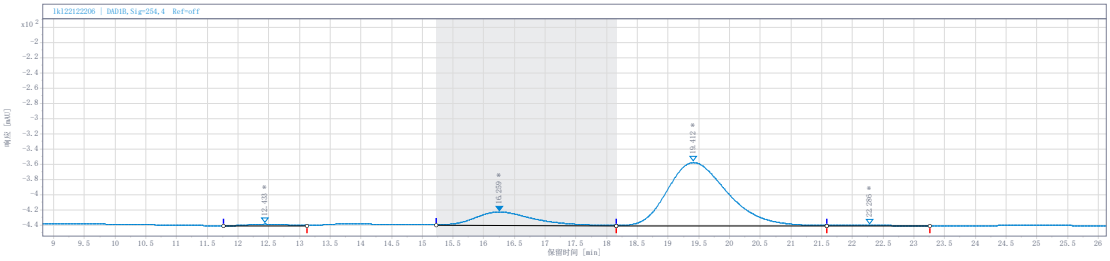
3v racemic mixture:



Signal: DAD1B, Sig=254, 4 Ref=off

RetTime [min]	width [min]	Arer [mAU*s]	Height [mAU]	Area%
12.3	2.23	26251.32	611.50	38.01
16.1	2.36	8070.48	139.37	11.69
19.3	2.91	27160.38	415.10	39.33
22.4	3.29	7573.87	100.57	10.97

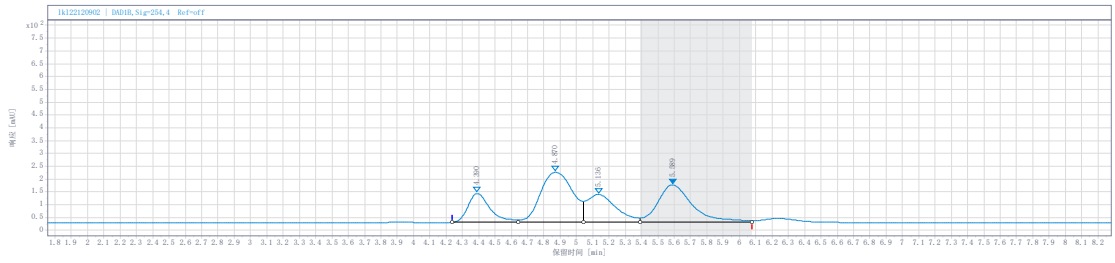
3v



Signal: DAD1B, Sig=254, 4 Ref=off

RetTime [min]	width [min]	Arer [mAU*s]	Height [mAU]	Area%
12.4	1.35	90.57	2.13	1.30
16.3	2.93	1207.90	17.93	17.38
19.4	3.43	5605.39	83.05	80.65
22.3	1.68	46.52	0.90	0.67

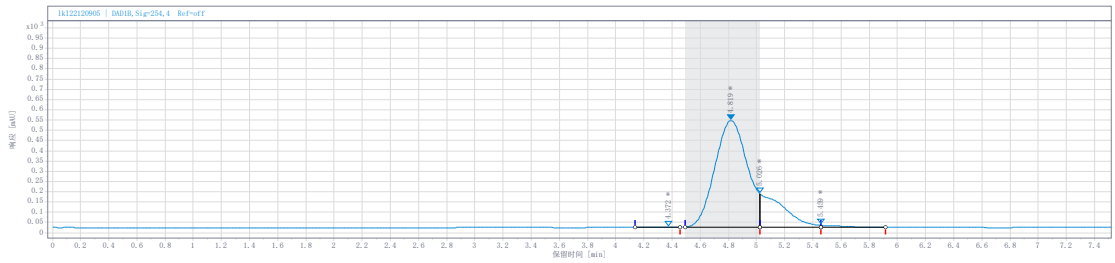
3w racemic mixture:



Signal: DAD1B, Sig=254, 4 Ref=off

RetTime [min]	width [min]	Arer [mAU*s]	Height [mAU]	Area%
4.39	0.41	1056.67	112.58	14.58
4.87	0.40	2684.27	194.79	37.04
5.14	0.35	1360.42	108.38	18.77
5.59	0.69	2145.81	146.15	29.61

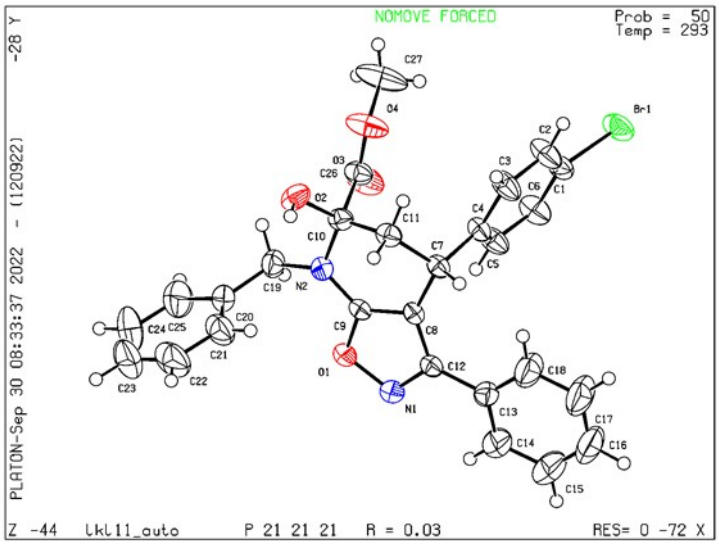
3w

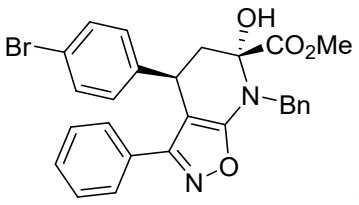


Signal: DAD1B, Sig=254, 4 Ref=off

RetTime [min]	width [min]	Arer [mAU*s]	Height [mAU]	Area%
4.37	0.32	15.45	1.23	0.15
4.82	0.53	8307.80	520.11	80.48
5.03	0.43	1918.13	160.71	18.58
5.46	0.46	81.46	8.30	0.79

Part IV Crystal data





(*R*,*R*)-**3j**

CCDC- 2247659

Bond precision:	C-C = 0.0059 A		Wavelength=1.54184
Cell:	a=10.19020(11)	b=11.29931(13)	c=21.3624(3)
	alpha=90	beta=90	gamma=90
Temperature:	293 K		
	Calculated		Reported
Volume	2459.71(5)		2459.72(5)
Space group	P 21 21 21		P 21 21 21
Hall group	P 2ac 2ab		P 2ac 2ab
Moiety formula	$C_{27}H_{23}BrN_2O_4$		$C_{27}H_{23}BrN_2O_4$
Sum formula	$C_{27}H_{23}BrN_2O_4$		$C_{27}H_{23}BrN_2O_4$
Mr	519.37		519.38
Dx,g cm^{-3}	1.403		1.403

Z	4	4
Mu (mm^{-1})	2.570	2.570
F000	1064.0	1064.0
F000’	1064.14	
h,k,lmax	12,14,26	12,13,26
Nref	4919 [2792]	4766
Tmin,Tmax	0.567,0.598	0.825,1.000
Tmin’	0.514	

Correction method= # Reported T Limits: Tmin=0.825 Tmax=1.000
AbsCorr = MULTI-SCAN
Data completeness= 1.71/0.97 Theta(max)= 72.992

R(reflections)= 0.0322(4696) wR2(reflections)= 0.0820(4766)

S = 1.074 Npar= 309