N-Heterocyclic carbene-catalyzed [3 + 3] cyclocondensation of bromoenals with aldimines: Highly enantioselective synthesis of dihydropyridinones

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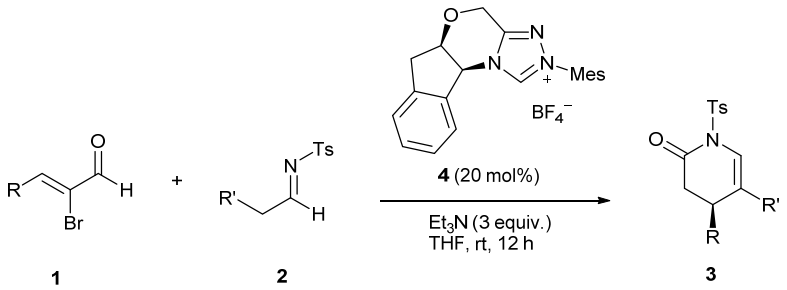
Part I General information

Unless otherwise indicated, all reactions were carried out under N_2 atmosphere at room temperature with magnetic stirring. Anhydrous THF and toluene were distilled from sodium and benzophenone. Anhydrous CH_2Cl_2 was distilled from CaH_2. Chiral triazolium salts **4-5**[1], aldimines[2] and α-bromoenals[3] were prepared according to literatures. Column chromatography was performed on silica gel 200~300 mesh. All ^1H NMR (300 and 400 MHz), ^{13}C NMR (75 and 100 MHz) spectra were recorded on a Bruker-DMX 300 and Bruker Avance 400 spectrometer in $CDCl_3$, with tetramethylsilane as an internal standard and reported in parts per million (ppm, δ). ^1H NMR Spectroscopy splitting patterns were designated as singlet (s), doublet (d), triplet (t), quartet (q). Splitting patterns that could not be interpreted or easily visualized were designated as multiplet (m) or broad (br). Infrared spectra were recorded on a JASCO FT/IR-480 spectrophotometer and reported as wave number (cm^{-1}). Optical rotations were measured on Perkin Elmer/Model-343 digital polarimeter operating at the sodium D line with a 100 mm path cell, and are reported as follows: $[\alpha]_D^T$ (concentration (g/100 mL), solvent).

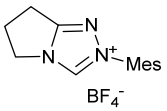
Part II Experimental part

1. NHC catalyzed [3+3] annulation of α-bromoenal 1 and aldimine 2

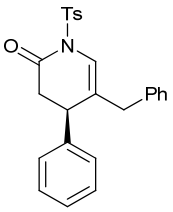


To the solution of α-bromoenal **1** (0.6 mmol, 3 equiv.), NHC precursor **4** (0.04 mmol, 16.8 mg, 0.2 equiv.), and Et_3N (0.6 mmol, 60.6 mg, 3.0 equiv.) in THF (1 mL), was slowly added aldimine **2** (0.2 mmol, 1 equiv., 2 mL in THF) via a syringe pump in 6 h. The reaction mixture was stirred at room temperature until the full consumption of the aldimine **2** (typically, 12 h). The reaction mixture was concentrated under reduced pressure, and the residue was purified by column chromatography on silica gel (petroleum ether/EtOAc = 40:1-10:1) to furnish the corresponding product **3.**

Racemic samples for the chiral phase HPLC analysis were prepared using triazolium **S1** as the NHC pre-catalyst under the same conditions.



S1

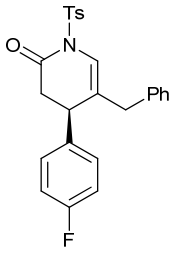


3a

(*R*)-5-benzyl-4-phenyl-1-tosyl-3,4-dihydropyridin-2(1*H*)-one (GZH-281B)

59.0 mg, 71% yield. White solid, mp. 148-149 ^{o}C; R_f = 0.2 (petroleum ether/ethyl acetate 5:1); $[\alpha]_D^{25}$ -148 (*c* 0.1, CH_2Cl_2); HPLC analysis: 95% ee [Daicel CHIRALPAK OD-H column, 20 ^{o}C, 254 nm, hexane/*i*-PrOH = 80:20, 1.0 mL /min,

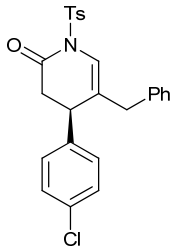
254 nm, 11.3 min (minor), 23.3 min (major)]; ^{1}H NMR (300 MHz, $CDCl_3$) δ 7.87 (d, *J* = 8.3 Hz, 2H), 7.27 (d, *J* = 8.3 Hz, 2H), 7.20 (d, *J* = 6.8 Hz, 2H), 7.18 (t, *J* = 6.8 Hz, 1H), 7.08-6.98 (m, 6H), 6.71 (d, *J* = 7.4 Hz, 2H), 3.38 (d, *J* = 15.2 Hz, 1H), 3.26 (dd, *J* = 7.7, 2.6 Hz, 1H), 3.10 (d, *J* = 15.2 Hz, 1H), 2.76 (dd, *J* = 15.6, 7.7 Hz, 1H), 2.46-2.39 (m, 4H). ^{13}C NMR (75 MHz, $CDCl_3$) δ 167.0, 163.4, 160.9, 145.3, 139.6, 138.3, 135.1, 129.5, 128.9, 128.8, 128.8, 128.7, 127.4, 127.0, 126.8, 124.6, 121.0, 41.1, 40.1, 38.9, 21.7. IR (KBr) 2920, 1721, 1266, 1173; HRMS (ESI) calcd for $C_{25}H_{23}NSO_3Na$ $[M+Na]^+$ 440.12909, found 440.12851.



3b

(*R*)-5-benzyl-4-(4-fluorophenyl)-1-tosyl-3,4-dihydropyridin-2(1*H*)-one (GZH-296A)

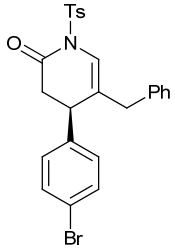
60.4 mg, 69% yield. Colorless oil; R_f = 0.2 (petroleum ether/ethyl acetate 5:1); $[\alpha]_D^{25}$ = -72 (*c* 0.1, CH_2Cl_2); HPLC analysis: 98% ee [Daicel CHIRALPAK OD-H column, 20 ^{o}C, 254 nm, hexane/*i*-PrOH = 90:10, 1.0 mL /min, 254 nm, 22.5 min (minor), 35.7 min (major)]; ^{1}H NMR (300 MHz, $CDCl_3$) δ 7.94 (d, *J* = 8.3 Hz, 2H), 7.37-7.24 (m, 5H), 7.12 (d, *J* = 6.8 Hz, 2H), 7.07 (s, 1H), 6.81-6.67 (m, 4H), 3.47 (d, *J* = 15.1 Hz, 1H), 3.33 (dd, *J* = 7.6, 2.7 Hz, 1H), 3.18 (d, *J* = 15.1 Hz, 1H), 2.83 (dd, *J* = 15.6, 7.6 Hz, 1H), 2.54-2.41 (m, 4H). ^{13}C NMR (100 MHz) δ 166.7, 149.7, 145.6, 141.9, 138.2, 135.2, 135.0, 130.4, 130.0, 129.9, 129.4, 129.0, 128.8, 128.7, 127.9, 127.8, 127.3, 127.2, 127.0, 125.9, 125.6, 123.7, 121.8, 115.8, 41.4, 39.6, 39.2, 21.9. IR (KBr) 2919, 1732, 1339, 1196; HRMS (ESI) calcd for $C_{25}H_{22}NSO_3FNa$ $[M+Na]^+$ 448.11966, found 458.11914.



3c

(*R*)-5-benzyl-4-(4-chlorophenyl)-1-tosyl-3,4-dihydropyridin-2(1*H*)-one (GZH-297B)

62.4 mg, 69% yield. Colorless oil. R_f = 0.2 (petroleum ether/ethyl acetate 5:1); $[\alpha]_D^{25}$ -81 (*c* 0.1, CH_2Cl_2); HPLC analysis: 97% ee [Daicel CHIRALPAK OD-H column, 20 ^oC, 254 nm, hexane/*i*-PrOH = 90:10, 1.0 mL /min, 254 nm, 25.4 min (minor), 37.3 min (major)]; ^1H NMR (300 MHz, $CDCl_3$) δ 7.93 (d, *J* = 8.3 Hz, 2H), 7.37-7.24 (m, 5H), 7.17-6.97 (m, 5H), 6.71 (d, *J* = 8.4 Hz, 2H), 3.47 (d, *J* = 15.2 Hz, 1H), 3.32 (dd, *J* = 7.6, 2.6 Hz, 1H), 3.17 (d, *J* = 15.2 Hz, 1H), 2.83 (dd, *J* = 15.6, 7.6 Hz, 1H), 2.57-2.36 (m, 4H). ^{13}C NMR (75 MHz, $CDCl_3$) δ 166.7, 145.5, 138.0, 135.0, 133.2, 129.5, 129.0, 128.3, 126.9, 124.3, 121.4, 41.0, 39.5, 39.0, 21.7. IR (KBr) 2919, 1722, 1396, 1196; HRMS (ESI) calcd for $C_{25}H_{22}NSO_3ClNa$ $[M+Na]^+$ 474.09011, found 474.08946.

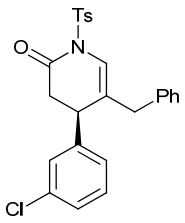


3d

(*R*)-5-benzyl-4-(4-bromophenyl)-1-tosyl-3,4-dihydropyridin-2(1*H*)-one (GZH-297A)

70.3 mg, 78% yield. Colorless oil. R_f = 0.2 (petroleum ether/ethyl acetate 5:1); $[\alpha]_D^{25}$ -87 (*c* 0.1, CH_2Cl_2); HPLC analysis: 97% ee [Daicel CHIRALPAK OD-H column, 20 ^oC, 254 nm, hexane/*i*-PrOH = 90:10, 1.0 mL /min, 254 nm, 26.9 min (minor), 39.3 min (major)]; ^1H NMR (300 MHz, $CDCl_3$) δ 7.93 (d, *J* = 8.3 Hz, 2H), 7.37-7.23 (m, 5H), 7.18 (d, *J* = 8.3 Hz, 2H), 7.12-7.07 (m, 3H), 6.65 (d, *J* = 8.3 Hz, 2H), 3.47 (d, *J* =

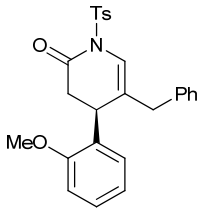
15.2 Hz, 1H), 3.30 (dd, *J* = 7.6, 2.6 Hz, 1H), 3.17 (d, *J* = 14.3 Hz, 1H), 2.82 (dd, *J* = 15.2, 7.6 Hz, 1H), 2.56-2.38 (m, 4H). ^{13}C NMR (75 MHz, $CDCl_3$) δ 166.7, 145.5, 138.6, 138.0, 135.0, 132.0, 129.5, 128.8, 128.7, 126.9, 124.2, 121.4, 121.2, 40.9, 39.5, 39.0, 21.7. IR (KBr) 2919, 1722, 1361, 1173; HRMS (ESI) calcd for $C_{25}H_{22}NSO_3BrNa$ $[M+Na]^+$ 518.03960, found 513.03884.



3e

(*R*)-5-benzyl-4-(3-chlorophenyl)-1-tosyl-3,4-dihydropyridin-2(1*H*)-one (GZH-391A)

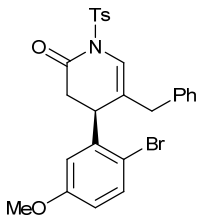
58.0 mg, 64% yield. White solid, mp. 92-93 ^{o}C. R_f = 0.2 (petroleum ether/ethyl acetate 5:1); $[\alpha]_D^{25}$ -84 (*c* 0.1, CH_2Cl_2); HPLC analysis: 97% ee [Daicel CHIRALPAK OD-H column, 20 ^{o}C, 254 nm, hexane/*i*-PrOH/MeOH = 90:6:4, 1.0 mL /min, 254 nm, 16.8 min (minor), 19.4 min (minor)]; ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.93 (d, *J* = 8.2 Hz, 2H), 7.34 (d, *J* = 8.2 Hz, 2H), 7.29 (t, *J* = 7.2 Hz, 2H), 7.23 (d, *J* = 5.6 Hz, 1H), 7.11 (d, *J* = 7.0 Hz, 2H), 7.06 (s, 1H), 6.80 – 6.69 (m, 3H), 3.45 (d, *J* = 15.1 Hz, 1H), 3.32 (dd, *J* = 7.6, 2.7 Hz, 1H), 3.16 (d, *J* = 15.1 Hz, 1H), 2.81 (dd, *J* = 15.6, 7.6 Hz, 1H), 2.55–2.36 (m, 4H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 166.7, 145.6, 141.9, 138.2 135.0, 130.4, 130.0, 129.0, 129.0, 128.9, 128.7, 127.9, 127.2, 125.9, 115.9, 41.0, 40.0, 39.2, 22.0. IR (KBr) 2919, 1722, 1362, 1173; HRMS (ESI) calcd for $C_{25}H_{22}NSO_3ClNa$ $[M+Na]^+$ 474.09011, found 474.08953.



3f

(*S*)-5-benzyl-4-(2-methoxyphenyl)-1-tosyl-3,4-dihydropyridin-2(1*H*)-one (GZH-295A)

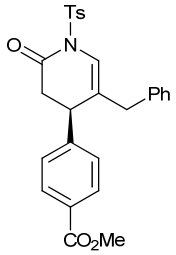
72.7 mg, 81% yield. White solid, mp. 95-96 ^{o}C. R_f = 0.3 (petroleum ether/ethyl acetate 5:1); $[\alpha]_D^{25}$ -77 (*c* 0.1, CH_2Cl_2); HPLC analysis: 97% ee [Daicel CHIRALPAK OD-H column, 20 ^{o}C, 254 nm, hexane/*i*-PrOH = 90:10, 1.0 mL /min, 254 nm, 17.8 min (minor), 29.3 min (major)]; ^{1}H NMR (300 MHz, $CDCl_3$) δ 7.86 (d, *J* = 8.3 Hz, 2H), 7.26-7.13 (m, 5H), 7.09-7.04 (m, 3H), 6.99 (s, 1H), 6.70 (d, *J* = 8.2 Hz, 2H), 6.62 (dd, *J* = 7.5, 1.6 Hz, 1H), 6.55 (t, *J* = 7.3 Hz, 1H), 3.65 (dd, *J* = 8.2, 2.2 Hz, 1H), 3.54 (s, 3H), 3.33 (t, *J* = 15.0 Hz, 1H), 3.07 (d, *J* = 15.0 Hz, 1H), 2.68 (dd, *J* = 15.9, 8.2 Hz, 1H), 2.49 (dd, *J* = 15.9, 2.4 Hz, 1H), 2.37 (s, 3H). ^{13}C NMR (75 MHz, $CDCl_3$) δ 167.6, 157.1, 145.1, 138.6, 135.4, 129.4, 128.8, 128.8, 128.6, 127.8, 127.2, 126.7, 123.2, 121.4, 120.4, 110.8, 54.9, 39.1, 38.9, 34.8, 21.7. IR (KBr) 2920, 1716, 1361, 1174; HRMS (ESI) calcd for $C_{26}H_{25}NSO_4Na$ $[M+Na]^+$ 474.13965, found 470.13913.



3g

(*S*)-5-benzyl-4-(2-bromo-5-methoxyphenyl)-1-tosyl-3,4-dihydropyridin-2(1*H*)-one (GZH-295C)

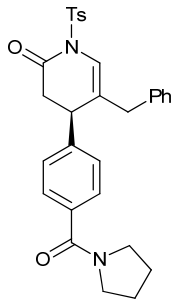
81.0 mg, 77% yield. White crystal, mp. 115-116 ^{o}C. R_f = 0.3 (petroleum ether/ethyl acetate 5:1); $[\alpha]_D^{25}$ -115 (*c* 0.1, CH_2Cl_2); HPLC analysis: 95% ee [Daicel CHIRALPAK OD-H column, 20 ^{o}C, 254 nm, hexane/*i*-PrOH = 90:10, 1.0 mL /min, 254 nm, 14.1 min (minor), 23.5 min (major)]; ^{1}H NMR (300 MHz, $CDCl_3$) δ 7.94 (d, *J* = 8.4 Hz, 2H), 7.38 (d, *J* = 8.7 Hz, 1H), 7.35-7.19 (m, 5H), 7.18 (s, 1H), 7.13 (d, *J* = 6.8 Hz, 2H), 6.60 (dd, *J* = 8.8, 3.0 Hz, 1H), 6.48 (d, *J* = 3.0 Hz, 1H), 3.87 (dd, *J* = 8.0, 2.5 Hz, 1H), 3.63 (s, 3H), 3.43 (d, *J* = 4.8 Hz, 1H), 3.18 (d, *J* = 14.8 Hz, 1H), 2.79 (dd, *J* = 15.9, 8.1 Hz, 1H), 2.58 (dd, *J* = 15.9, 2.5 Hz, 1H), 2.43 (s, 3H). ^{13}C NMR (75 MHz, $CDCl_3$) δ 166.7, 159.4, 145.2, 138.7, 137.9, 135.2, 134.0, 129.6, 128.9, 128.8, 128.7, 126.9, 123.4, 122.1, 114.5, 114.4, 114.0, 55.3, 39.5, 39.2, 39.1, 21.7. IR (KBr) 2919, 1722, 1362, 1174; HRMS (ESI) calcd for $C_{26}H_{24}NSO_4BrNa$ $[M+Na]^+$ 550.04866, found 550.04738.



3h

(*R*)-methyl 4-(5-benzyl-2-oxo-1-tosyl-1,2,3,4-tetrahydropyridin-4-yl)benzoate (GZH-392A)

27.2 mg, 57% yield. Colorless oil. R_f = 0.3 (petroleum ether/ethyl acetate 5:1); $[\alpha]_D^{25}$ -94 (*c* 0.1, CH_2Cl_2); HPLC analysis: 92% ee [Daicel CHIRALPAK OD-H column, 20 ^oC, 254 nm, hexane/*i*-PrOH/MeOH = 90:6:4, 1.0 mL /min, 254 nm, 25.2 min (minor), 31.9 min (major)]; ^1H NMR (400 MHz, $CDCl_3$) δ 7.94 (d, *J* = 8.0 Hz, 2H), 7.72 (d, *J* = 8.0 Hz, 1H), 7.34 (d, *J* = 8.0 Hz, 1H), 7.32-7.26 (m, 3H), 7.13 – 7.11 (m, 2H), 6.82 (d, *J* = 8.0 Hz, 1H), 3.92 (s, 3H), 3.50-3.39 (m, 2H), 3.17 (d, *J* = 15.1 Hz, 1H), 2.87 (dd, *J* = 15.1, 7.7 Hz, 1H), 2.52-2.48 (m, 4H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 166.6, 166.5, 145.6, 144.7, 137.9, 134.9, 130.2, 129.6, 129.3, 128.8, 127.0, 127.0, 124.0, 121.6, 52.2, 40.8, 40.0, 39.1, 21.7. IR (KBr) 2920, 1722, 1361, 751; HRMS (ESI) calcd for $C_{27}H_{25}NSO_5Na$ $[M+Na]^+$ 498.13456, found 498.13464.

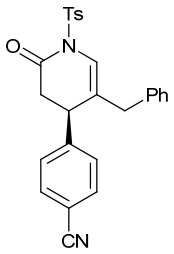


3i

(*R*)-5-benzyl-4-(4-(pyrrolidine-1-carbonyl)phenyl)-1-tosyl-3,4-dihydropyridin-2(1*H*)-one (GZH-395C)

71.8 mg, 70% yield. White solid, mp. 72-74 ^oC. R_f = 0.2 (petroleum ether/ethyl acetate 1:1); $[\alpha]_D^{25}$ -105 (*c* 0.1, CH_2Cl_2); HPLC analysis: 99% ee [Daicel CHIRALPAK OD-H column, 20 ^oC, 254 nm, hexane/*i*-PrOH/MeOH = 70:20:10, 1.0 mL /min, 254 nm, 15.2 min (minor), 23.9 min (major)]; ^{13}C NMR (100 MHz, $CDCl_3$) δ 169.1, 166.8, 145.4, 141.5, 138.1, 136.4, 135.0, 129.5, 128.8, 128.7, 127.8, 126.9,

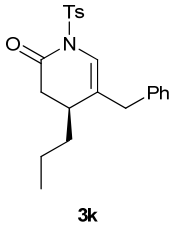
126.9, 124.0, 121.3, 49.6, 46.2, 40.8, 40.0, 38.9, 26.4, 24.4, 21.8. IR (KBr) 2920, 1716, 1623, 1173; HRMS (ESI) calcd for $C_{30}H_{30}N_2SO_4Na$ $[M+Na]^+$ 537.18185, found 537.18060.



3j

(*R*)-4-(5-benzyl-2-oxo-1-tosyl-1,2,3,4-tetrahydropyridin-4-yl)benzonitrile (GZH-395A)

69.1 mg, 78% yield. White solid, mp. 56-57 ^oC. R_f = 0.3 (petroleum ether/ethyl acetate 5:1); $[\alpha]_D^{25}$ -94 (*c* 0.1, CH_2Cl_2); HPLC analysis: 91% ee [Daicel CHIRALPAK OD-H column, 20 ^oC, 254 nm, hexane/*i*-PrOH/MeOH = 90:6:4, 1.0 mL /min, 254 nm, 37.3 min (minor), 55.5 min (major)]; ^1H NMR (400 MHz, $CDCl_3$) δ 7.94 (d, *J* = 8.2 Hz, 1H), 7.38-7.35 m, 3H), 7.31-7.22 (m, 4H), 7.15 (s, 1H), 7.10 (d, *J* = 7.1 Hz, 1H), 6.89 (d, *J* = 8.1 Hz, 1H), 3.49 (d, *J* = 15.2 Hz, 1H), 3.40 (dd, *J* = 7.6, 2.4 Hz, 1H), 3.18 (d, *J* = 15.2 Hz, 1H), 2.88 (dd, *J* = 15.7, 7.6 Hz, 1H), 2.54-2.43 (m, 4H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 166.3, 145.7, 145.1, 137.6, 134.9, 132.7, 129.6, 128.8, 128.7, 127.8, 127.1, 123.3, 121.9, 118.4, 111.4, 40.6, 40.1, 39.1, 21.8. IR (KBr) 2920, 2850, 2228, 1717, 1633, 1173; HRMS (ESI) calcd for $C_{26}H_{22}N_2SO_3Na$ $[M+Na]^+$ 465.12433, found 465.12404.

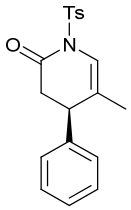


3k

(*S*)-5-benzyl-4-propyl-1-tosyl-3,4-dihydropyridin-2(1*H*)-one (GZH-296C)

16.7 mg, 22% yield. Colorless oil. R_f = 0.6 (petroleum ether/ethyl acetate 5:1); $[\alpha]_D^{25}$ -6 (*c* 0.1, CH_2Cl_2); HPLC analysis: 90% ee [Daicel CHIRALPAK OD-H column, 20 ^oC, 254 nm, hexane/*i*-PrOH = 90:10, 1.0 mL /min, 254 nm, 19.7 min (minor), 21.7 min (major)]; ^1H NMR (400 MHz, $CDCl_3$) δ 7.89 (d, *J* = 8.0 Hz, 2H), 7.33-7.30 (m,

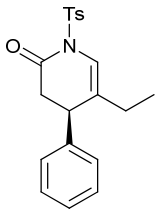
4H), 7.24-7.21 (m, 3H), 6.83 (s, 1H), 3.50 (d, *J* = 15.2 Hz, 1H), 3.34 (d, *J* = 15.2 Hz, 1H), 2.50-2.43 (m, 4H), 2.32 (dd, *J* = 15.5, 2.0 Hz, 1H), 2.11 (m, 1H), 1.18-1.13 (m, 2H), 1.00-0.98 (m, 2H), 0.72 (t, *J* = 6.3 Hz, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 168.3, 145.1, 138.5, 135.3, 129.3, 128.7, 128.7, 128.6, 127.0, 126.8, 119.9, 39.4, 38.2, 34.1, 33.4, 21.7, 19.4, 13.9. IR (KBr) 2922, 1722, 1362, 1174; HRMS (ESI) calcd for $C_{22}H_{25}NSO_3Na$ $[M+Na]^+$ 406.14474, found 406.14450.



3l

(*R*)-5-methyl-4-phenyl-1-tosyl-3,4-dihydropyridin-2(1*H*)-one (GZH-292A)

48.1 mg, 71% yield. Colorless oil. R_f = 0.2 (petroleum ether/ethyl acetate 10:1); $[\alpha]_D^{25}$ -143 (*c* 0.1, CH_2Cl_2); HPLC analysis: 97% ee [Daicel CHIRALPAK OD-H column, 20 ^{o}C, 254 nm, hexane/*i*-PrOH = 90:10, 1.0 mL /min, 254 nm, 17.4 min (minor), 45.7 min (major)]; ^{1}H NMR (300 MHz, $CDCl_3$) δ 7.93 (d, *J* = 8.4 Hz, 2H), 7.33 (d, *J* = 8.4 Hz, 2H), 7.21-7.03 (m, 3H), 6.95 (d, *J* = 1.4 Hz, 1H), 6.91-6.80 (m, 2H), 3.39 (dd, *J* = 7.6, 3.5 Hz, 1H), 2.96 (dd, *J* = 15.6, 7.6 Hz, 1H), 2.58 (dd, *J* = 15.6, 3.5 Hz, 1H), 2.45 (s, 3H), 1.74 (d, *J* = 1.2 Hz, 3H). ^{13}C NMR (75 MHz, $CDCl_3$) δ 167.1, 145.2, 139.7, 135.2, 129.4, 128.8, 128.7, 127.3, 126.9, 121.0, 119.6, 42.9, 40.8, 21.7, 19.0. IR (KBr) 2920, 1716, 1355, 1170; HRMS (ESI) calcd for $C_{19}H_{19}NSO_3Na$ $[M+Na]^+$ 364.09779, found 364.09732.

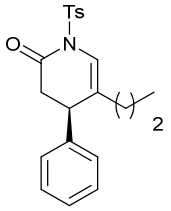


3m

(*R*)-5-ethyl-4-phenyl-1-tosyl-3,4-dihydropyridin-2(1*H*)-one (GZH-292C)

57.1 mg, 80% yield. Colorless oil. R_f = 0.2 (petroleum ether/ethyl acetate 5:1); $[\alpha]_D^{25}$ -164 (*c* 0.1, CH_2Cl_2); HPLC analysis: 98% ee [Daicel CHIRALPAK OD-H column,

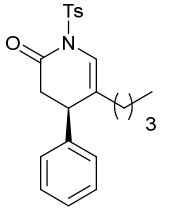
20 °C, 254 nm, hexane/*i*-PrOH = 90:10, 1.0 mL /min, 254 nm, 14.5 min (minor), 54.1 min (major)]; ^{1}H NMR (300 MHz, $CDCl_3$) δ 7.93 (d, *J* = 8.3 Hz, 2H), 7.33 (d, *J* = 8.3 Hz, 1H), 7.19-7.00 (m, 3H), 6.95 (s, 1H), 6.84 (d, *J* = 7.0 Hz, 2H), 3.46 (dd, *J* = 7.6, 2.9 Hz, 1H), 2.94 (dd, *J* = 15.5, 7.6 Hz, 1H), 2.55 (dd, *J* = 15.5, 2.9 Hz, 1H), 2.45 (s, 2H), 2.19-1.94 (m, 2H), 1.04 (t, *J* = 7.4 Hz, 3H). ^{13}C NMR (75 MHz, $CDCl_3$) δ 167.2, 145.1, 140.0, 135.2, 129.4, 128.8, 128.7, 127.3, 126.9, 126.7, 119.0, 41.4, 41.2, 26.0, 21.7, 12.4. IR (KBr) 2919, 1716, 1362, 1171; HRMS (ESI) calcd for $C_{20}H_{21}NSO_3Na$ $[M+Na]^+$ 378.11344, found 378.11289.



3n

(*R*)-5-propyl-4-phenyl-1-tosyl-3,4-dihydropyridin-2(1*H*)-one (GZH-291A)

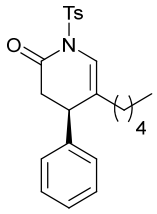
44.7 mg, 61% yield. Colorless oil. R_f = 0.3 (petroleum ether/ethyl acetate 10:1); $[\alpha]_D^{25}$ -115 (*c* 0.1, CH_2Cl_2); HPLC analysis: 96% ee [Daicel CHIRALPAK OD-H column, 20 °C, 254 nm, hexane/*i*-PrOH = 80:20, 1.0 mL /min, 254 nm, 8.4 min (minor), 26.9 min (major)]; ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.93 (d, *J* = 8.4 Hz, 2H), 7.33 (d, *J* = 8.4 Hz, 2H), 7.16-7.12 (m, 3H), 6.96 (s, 1H), 6.83 (d, *J* = 7.2 Hz, 2H), 3.45 (dd, *J* = 7.2, 2.8 Hz, 1H), 2.93 (dd, *J* = 15.6, 7.6 Hz, 1H), 2.54 (dd, *J* = 15.6, 2.8 Hz, 1H), 2.46 (s, 3H), 2.03 (t, *J* = 7.2 H), 1.50-1.38 (m, 2H), 0.89 (t, *J* = 7.4 Hz, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 167.2, 145.2, 139.9, 135.1, 129.4, 128.8, 128.7, 127.3, 126.9, 125.1, 119.7, 41.3, 41.2, 35.0, 21.7, 21.0, 13.7. IR (KBr) 2920, 1722, 1362, 1172; HRMS (ESI) calcd for $C_{21}H_{23}NSO_3Na$ $[M+Na]^+$ 392.12909, found 392.12842.



3o

(*R*)-5-butyl-4-phenyl-1-tosyl-3,4-dihydropyridin-2(1*H*)-one (GZH-293D)

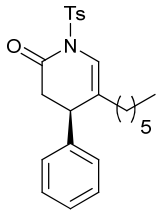
51.0 mg, 67% yield. White solid, mp. 120-121 ^{o}C. R_f = 0.3 (petroleum ether/ethyl acetate 10:1); $[\alpha]_D^{25}$ -85 (*c* 0.1, CH_2Cl_2); HPLC analysis: 98% ee [Daicel CHIRALPAK OD-H column, 20 ^{o}C, 254 nm, hexane/*i*-PrOH = 90:10, 1.0 mL /min, 254 nm, 12.4 min (minor), 51.8 min (major)]; ^{1}H NMR (300 MHz, $CDCl_3$) δ 7.93 (d, *J* = 8.3 Hz, 2H), 7.32 (t, *J* = 7.7 Hz, 2H), 7.17-7.05 (m, 3H), 6.96 (s, 1H), 6.83 (d, *J* = 7.2 Hz, 2H), 3.46 (dd, *J* = 7.5, 2.8 Hz, 1H), 2.93 (dd, *J* = 15.5, 7.6 Hz, 1H), 2.56 (dd, *J* = 15.5, 2.8 Hz, 1H), 2.46 (s, 3H), 2.13-1.94 (m, 2H), 1.52-1.08 (m, 4H), 0.87 (t, *J* = 7.1 Hz, 3H). ^{13}C NMR (75 MHz, $CDCl_3$) δ 167.2, 145.1, 139.9, 135.2, 129.4, 128.8, 128.7, 127.3, 126.9, 125.3, 119.6, 41.3, 41.2, 32.6, 29.9, 22.3, 21.7, 13.8. IR (KBr) 2920, 1716, 1362, 1195; HRMS (ESI) calcd for $C_{22}H_{25}NSO_3Na$ $[M+Na]^+$ 406.14474, found 406.14423.



3p

(*R*)-5-pentyl-4-phenyl-1-tosyl-3,4-dihydropyridin-2(*1*H)-one (GZH-292E)

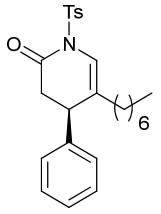
57.1 mg, 72% yield. Colorless oil. R_f = 0.4 (petroleum ether/ethyl acetate 10:1); $[\alpha]_D^{25}$ -84 (*c* 0.1, CH_2Cl_2); HPLC analysis: 98% ee [Daicel CHIRALPAK OD-H column, 20 ^{o}C, 254 nm, hexane/*i*-PrOH/MeOH = 90:6:4, 0.5 mL /min, 254 nm, 16.7 min (minor), 39.0 min (major)]; ^{1}H NMR (300 MHz, $CDCl_3$) δ 7.93 (d, *J* = 8.3 Hz, 2H), 7.33 (d, *J* = 8.3 Hz, 2H), 7.10 (m, 3H), 6.95 (s, 1H), 6.88-6.75 (m, 2H), 3.45 (dd, *J* = 7.5, 2.9 Hz, 1H), 2.93 (dd, *J* = 15.5, 7.6 Hz, 1H), 2.55 (dd, *J* = 15.5, 2.9 Hz, 1H), 2.46 (s, 3H), 2.11-1.94 (m, 2H), 1.53-1.09 (m, 6H), 0.86 (t, *J* =8.1 Hz, 3H). ^{13}C NMR (75 MHz, $CDCl_3$) δ 167.2, 145.1, 139.9, 135.2, 129.4, 128.8, 128.7, 127.3, 126.9, 125.3, 119.6, 41.3, 41.2, 32.9, 31.4, 27.4, 22.4, 21.7, 14.0. IR (KBr) 2920, 1716, 1362, 1172; HRMS (ESI) calcd for $C_{23}H_{27}NSO_3Na$ $[M+Na]^+$ 420.16039, found 420.15991.



3q

(*R*)-5-hexyl-4-phenyl-1-tosyl-3,4-dihydropyridin-2(1*H*)-one (GZH-282C)

52.6 mg, 64% yield. Colorless oil. R_f = 0.5 (petroleum ether/ethyl acetate 5:1); $[\alpha]_D^{25}$ -59 (*c* 0.1, CH_2Cl_2); HPLC analysis: 96% ee [Daicel CHIRALPAK OD-H column, 20 ^oC, 254 nm, hexane/*i*-PrOH/MeOH = 90:6:4, 0.5 mL /min, 254 nm, 16.1 min (minor), 36.7 min (major)]; ^1H NMR (400 MHz, $CDCl_3$) δ 7.93 (d, *J* = 8.3 Hz, 2H), 7.33 (d, *J* = 8.3 Hz, 2H), 7.14 (t, *J* = 7.3 Hz, 1H), 7.07 (t, *J* = 7.4 Hz, 2H), 6.95 (s, 1H), 6.82 (d, *J* = 7.2 Hz, 2H), 3.45 (dd, *J* = 7.5, 2.8 Hz, 1H), 2.93 (dd, *J* = 15.5, 7.6 Hz, 1H), 2.56 (dd, *J* = 15.5, 2.8 Hz, 1H), 2.46 (s, 3H), 2.11-1.97 (m, 2H), 1.49-1.12 (m, 8H), 0.87 (t, *J* = 6.9 Hz, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 167.2, 145.1, 139.9, 135.2, 129.4, 128.8, 128.7, 127.3, 126.9, 125.3, 119.6, 41.3, 41.2, 32.9, 31.5, 28.8, 27.7, 22.6, 21.7, 14.1. IR (KBr) 2921, 1717, 1362, 1172; HRMS (ESI) calcd for $C_{24}H_{29}NSO_3Na$ $[M+Na]^+$ 434.17604, found 434.17566.

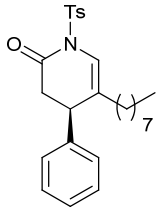


3r

(*R*)-5-heptyl-4-phenyl-1-tosyl-3,4-dihydropyridin-2(1*H*)-one (GZH-391B)

55.5 mg, 65% yield. Colorless oil. R_f = 0.5 (petroleum ether/ethyl acetate 5:1); $[\alpha]_D^{25}$ -46 (*c* 0.1, CH_2Cl_2); HPLC analysis: 98% ee [Daicel CHIRALPAK OD-H column, 20 ^oC, 254 nm, hexane/*i*-PrOH/MeOH = 90:6:4, 0.5 mL /min, 254 nm, 15.6 min (minor), 34.4 min (major)]; ^1H NMR (300 MHz, $CDCl_3$) δ 7.93 (d, *J* = 8.3 Hz, 2H), 7.33 (d, *J* = 8.3 Hz, 2H), 7.18-7.01 (m, 3H), 6.95 (s, 1H), 6.86-6.75 (m, 2H), 3.45 (dd, *J* = 7.5, 2.9 Hz, 1H), 2.93 (dd, *J* = 15.5, 7.6 Hz, 1H), 2.56 (dd, *J* = 15.5, 2.9 Hz, 1H), 2.46 (s, 3H), 2.11-1.96 (m, 2H), 1.52-1.12 (m, 10H), 0.88 (t, *J* = 6.8 Hz, 3H). ^{13}C NMR (75 MHz, $CDCl_3$) δ 167.2, 145.1, 139.9, 135.2, 129.4, 128.8, 128.7, 127.2, 126.9, 125.3,

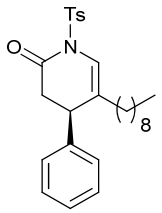
119.6, 41.3, 41.2, 32.9, 31.8, 29.1, 29.0, 27.7, 22.6, 21.7, 14.1. IR (KBr) 2921, 1717, 1362, 1172; HRMS (ESI) calcd for $C_{25}H_{31}NSO_3Na$ $[M+Na]^+$ 448.19169, found 448.119125.



3s

(*R*)-5-octyl-4-phenyl-1-tosyl-3,4-dihydropyridin-2(1*H*)-one (GZH-294C)

68.2 mg, 78% yield. Colorless oil. R_f = 0.5 (petroleum ether/ethyl acetate 5:1); $[\alpha]_D^{25}$ -112 (*c* 0.1, CH_2Cl_2); HPLC analysis: 98% ee [Daicel CHIRALPAK OD-H column, 20 ^oC, 254 nm, hexane/*i*-PrOH = 90:10, 1.0 mL /min, 254 nm, 10.0 min (minor), 33.0 min (major)]; ^1H NMR (300 MHz, $CDCl_3$) δ 7.93 (d, *J* = 8.3 Hz, 2H), 7.33 (d, *J* = 8.3 Hz, 2H), 7.20-6.99 (m, 3H), 6.95 (s, 1H), 6.87-6.75 (m, 2H), 3.45 (dd, *J* = 7.5, 2.8 Hz, 1H), 2.93 (dd, *J* = 15.5, 7.6 Hz, 1H), 2.56 (dd, *J* = 15.5, 2.9 Hz, 1H), 2.45 (s, 3H), 2.04 (t, *J* = 7.7 Hz, 2H), 1.54-1.10 (m, 12H), 0.88 (t, *J* = 6.7 Hz, 3H). ^{13}C NMR (75 MHz, $CDCl_3$) δ 167.2, 145.1, 139.9, 135.2, 129.4, 128.8, 128.7, 127.2, 126.9, 125.3, 119.6, 41.3, 41.2, 32.9, 31.8, 29.3, 29.2, 29.2, 27.7, 22.7, 21.7, 14.1. IR (KBr) 2920, 1716, 1362, 1173; HRMS (ESI) calcd for $C_{26}H_{33}NSO_3Na$ $[M+Na]^+$ 462.20734, found 462.20674.

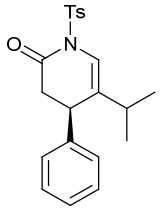


3t

(*R*)-5-nonyl-4-phenyl-1-tosyl-3,4-dihydropyridin-2(1*H*)-one (GZH-294E)

73.3 mg, 81% yield. Colorless oil. R_f = 0.5 (petroleum ether/ethyl acetate 5:1); $[\alpha]_D^{25}$ -42 (*c* 0.1, CH_2Cl_2); HPLC analysis: 97% ee [Daicel CHIRALPAK OD-H column, 20 ^oC, 254 nm, hexane/*i*-PrOH = 90:10, 1.0 mL /min, 254 nm, 9.6 min (minor), 33.6 min (major)]; ^1H NMR (300 MHz, $CDCl_3$) δ 7.93 (d, *J* = 8.3 Hz, 2H), 7.34 (t, *J* = 8.3 Hz,

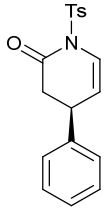
2H), 7.15-7.04 (m, 3H), 6.95 (s, 1H), 6.82 (d, *J* = 7.0 Hz, 1H), 3.45 (dd, *J* = 7.5, 2.8 Hz, 1H), 2.93 (dd, *J* = 15.5, 7.6 Hz, 1H), 2.56 (dd, *J* = 15.5, 2.9 Hz, 1H), 2.45 (s, 3H), 2.04 (t, *J* = 7.7 Hz, 2H), 1.53-1.11 (m, 14H), 0.88 (t, *J* = 6.7 Hz, 3H). ^{13}C NMR (75 MHz, $CDCl_3$) δ 167.2, 145.1, 139.9, 135.2, 129.4, 128.8, 128.7, 127.2, 126.9, 125.3, 119.6, 41.3, 41.2, 32.9, 31.9, 29.5, 29.3, 29.3, 29.2, 27.7, 22.7, 21.7, 14.1. IR (KBr) 2922, 1716, 1362, 1172; HRMS (ESI) calcd for $C_{27}H_{35}NSO_3Na$ $[M+Na]^+$ 476.22299, found 476.22263.



3u

(*R*)-5-isopropyl-4-phenyl-1-tosyl-3,4-dihydropyridin-2(1*H*)-one (GZH-293A)

54.9 mg, 74% yield. Colorless oil. R_f = 0.3 (petroleum ether/ethyl acetate 10:1); $[\alpha]_D^{25}$ -97 (*c* 0.1, CH_2Cl_2); HPLC analysis: 95% ee [Daicel CHIRALPAK OD-H column, 20 ^{o}C, 254 nm, hexane/*i*-PrOH = 90:10, 1.0 mL /min, 254 nm, 12.6 min (minor), 63.0 min (major)]; ^{1}H NMR (300 MHz, $CDCl_3$) δ 7.94 (d, *J* = 8.3 Hz, 2H), 7.33 (d, *J* = 8.3 Hz, 2H), 7.17-6.96 (m, 4H), 6.88-6.76 (m, 2H), 3.54 (dd, *J* = 7.3, 2.2 Hz, 1H), 2.90 (dd, *J* = 15.4, 7.3 Hz, 1H), 2.52 (dd, *J* = 15.4, 2.2 Hz, 1H), 2.45 (s, 3H), 2.34 (m, 1H), 1.07 (d, *J* = 6.8 Hz, 3H), 1.01 (t, *J* = 6.8 Hz, 3H). ^{13}C NMR (75 MHz, $CDCl_3$) δ 167.2, 145.1, 140.1, 135.2, 131.1, 129.4, 128.8, 128.7, 127.2, 126.8, 119.1, 41.9, 39.9, 31.8, 22.0, 21.7, 21.5. IR (KBr) 2920, 1720, 1361, 1173; HRMS (ESI) calcd for $C_{21}H_{23}NSO_3Na$ $[M+Na]^+$ 392.12909, found 392.12869.

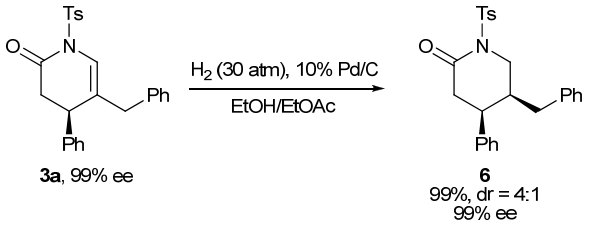


3v

(*S*)-4-phenyl-1-tosyl-3,4-dihydropyridin-2(1*H*)-one (GZH-391C)

55.4 mg, 57% yield. Colorless oil. R_f = 0.3 (petroleum ether/ethyl acetate 5:1); $[\alpha]_D^{25}$ -107 (*c* 0.1, CH_2Cl_2); HPLC analysis: 99% ee [Daicel CHIRALPAK OD-H column, 20 °C, 254 nm, hexane/*i*-PrOH/MeOH = 90:6:4, 1.0 mL /min, 254 nm, 15.8 min (minor), 18.0 min (major)]; ^{1}H NMR (300 MHz, $CDCl_3$) δ 7.93 (d, *J* = 8.4 Hz, 2H), 7.34 (d, *J* = 8.4 Hz, 2H), 7.24-7.17 (m, 2H), 7.15 (dd, *J* = 8.2, 1.7 Hz, 1H), 7.08-6.97 (m, 2H), 5.48 (dd, *J* = 8.2, 4.2 Hz, 1H), 3.80-3.59 (m, 1H), 2.84 (dd, *J* = 15.7, 6.7 Hz, 1H), 2.63 (dd, *J* = 15.7, 8.6 Hz, 1H), 2.45 (s, 3H). ^{13}C NMR (75 MHz, $CDCl_3$) δ 167.4, 145.3, 141.1, 135.2, 129.5, 128.9, 128.7, 127.3, 126.8, 124.7, 112.6, 41.3, 37.8, 21.7. IR (KBr) 2920, 1730, 1362, 1172; HRMS (ESI) calcd for $C_{18}H_{17}NSO_3Na$ $[M+Na]^+$ 350.08214, found 350.08176.

2. Chemical transformations of compound 3a



3a, 99% ee

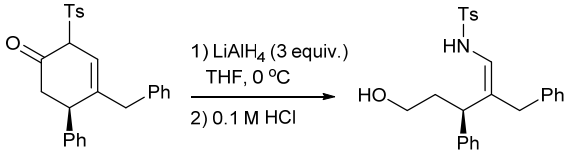
6
99%, dr = 4:1
99% ee

To a stirred solution of **3a** (208.5 mg, 0.5 mmol) in ethanol/ethyl acetate (1:1, 4 ml) was added Pd/C (10 mol%), H_2 (30 atm). After stirring for 24 h, the solvent was removed in vacuo and the product re-dissolved in ethyl acetate. Then, the solvent was filtered through a plug of celite, evaporated, and purified by column chromatography to afford **6** (209 mg, 99%) as an inseparable *cis* (major) and *trans* (minor) mixture[4] in 99% ee (major isomer) and 4:1 dr.

(4*S*,5*S*)-5-benzyl-4-phenyl-1-tosylpiperidin-2-one (GZH-393A)

209 mg, 99% yield. White solid, mp. > 250 °C. R_f = 0.1 (petroleum ether/ethyl acetate 5:1); $[\alpha]_D^{25}$ = -8 (*c* 0.1, CH_2Cl_2); HPLC analysis: 99% ee [Daicel CHIRALPAK IC column, 20 °C, 254 nm, hexane/*i*-PrOH/MeOH = 60:30:10, 1.0 mL /min, 254 nm, 13.0 min (minor), 21.3 min (major)]; ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.88 (d, *J* = 8.3 Hz, 2H), 7.33-7.25 (m, 8H), 7.09 (t, *J* = 8.2 Hz, 4H), 4.02 (dd, *J* = 12.6, 4.1 Hz, 1H), 3.61-3.47 (m, 1H), 2.89-2.77 (m, 1H), 2.74-2.68 (m, 2H), 2.66-2.59

(m, 1H), 2.44-2.32 (m, 5H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 169.8, 144.9, 141.8, 138.4, 135.8, 129.4, 129.3, 129.1, 128.8, 128.7, 127.4, 127.2, 126.7, 49.5, 44.0, 42.3, 41.0, 37.9, 21.7. IR (KBr) 2921, 1635, 1454; 1169. HRMS (ESI) calcd for $C_{25}H_{25}NSO_3Na$ $[M+Na]^+$ 442.14474, found 442.14398.



3a, 99% ee **7**, 99%, 99% ee

To a stirred solution of **3a** (41.7 mg, 0.1 mmol) in THF (1.0 mL) at 0 °C, under N_2 atmosphere, was dropwise added $LiAlH_4$ (300 μL, 1 M in THF, 0.3 mmol, 3 equiv.). The reaction was stirred at 0 °C for 1 h. Then the solution was quenched with 0.1 M HCl solution. The aqueous phase was extracted three times with DCM. The combined organic phases were dried over Na_2SO_4, filtered, and concentrated under reduced pressure. The residue was purified *via* silica gel flash chromatography (petroleum ether/ethyl acetate 8:1-3:1) to afford **7** (41.5 mg, 99%) as a white solid.

(*R*,*Z*)-*N*-(2-benzyl-5-hydroxy-3-phenylpent-1-enyl)-4-methylbenzenesulfonamide (GZH-S230A)

41.5 mg, 99% yield. White solid, 106-107 °C. R_f = 0.1 (petroleum ether/ethyl acetate 5:1); $[\alpha]_D^{25}$ = -39 (*c* 0.1, CH_2Cl_2); HPLC analysis: 99% ee [Daicel CHIRALPAK IA column, 20 °C, 254 nm, hexane/*i*-PrOH = 90:10, 1.0 mL /min, 254 nm, 13.8 min (minor), 15.3 min (major)]; ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.17 (d, *J* = 9.1 Hz, 1H), 7.72 (d, *J* = 8.1 Hz, 2H), 7.32 (d, *J* = 8.0 Hz, 2H), 7.17-7.12 (m, 5H), 6.87 (d, *J* = 6.6 Hz, 2H), 6.72 (m, 2H), 5.96 (d, *J* = 9.3 Hz, 1H), 3.90 (dd, *J* = 12.0, 3.7 Hz, 1H), 3.61 (m, 1H), 3.40-3.13 (m, 1H), 2.86 (d, *J* = 15.2 Hz, 1H), 2.77 (d, *J* = 15.2 Hz, 1H), 2.48 (s, 3H), 2.14 (brs, 1H), 1.98-1.81 (m, 1H), 1.48 (t, *J* = 13.0 Hz, 1H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 143.4, 141.6, 139.2, 137.3, 129.7, 129.0, 128.2, 128.2, 128.0, 127.3, 127.0, 126.5, 126.3, 122.1, 59.4, 39.4, 37.1, 31.9, 21.6. IR (KBr) 3446, 2922, 2851, 1633, 1162. HRMS (ESI) calcd for $C_{25}H_{27}NSO_3Na$ $[M+Na]^+$ 444.15970, found 444.16039.

3. X-ray structure of compound 3g

The crystal of compound **3g** was prepared from its solution in petroleum ether/CH_2Cl_2 by slow evaporation. The structure of compound **3g** was established by the X-ray analysis of its crystal (Figure S1).

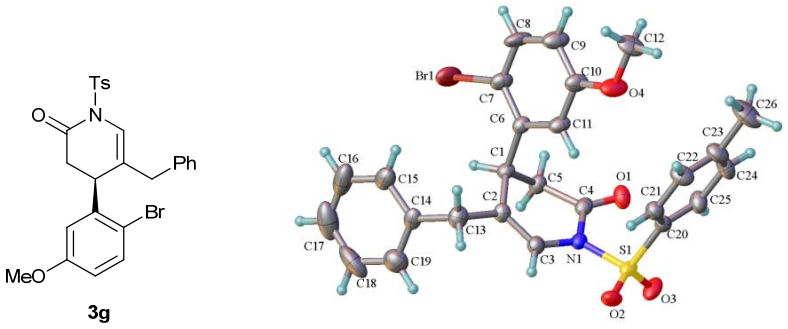


Figure S1. X-ray structure of **3g**.

4. References

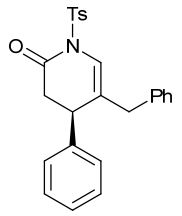
1 (a) M. He, J. R. Struble and J. W. Bode, *J. Am. Chem. Soc.*, 2006, **128**, 8418; (b) Y.-R. Zhang, L. He, X. Wu, P.-L. Shao and S. Ye, *Org. Lett.*, 2008, **10**, 277; (c) H.-M. Zhang, Z.-H. Gao and S. Ye, *Org. Lett.*, 2014, **16**, 3079.

2 Z. Cui, H.-J. Yu, R.-F. Yang, W.-Y. Gao, C.-G. Feng and G.-Q. Lin, *J. Am. Chem. Soc.*, 2011, **133**, 12394.

3 (a) F.-G. Sun, L.-H. Sun and S. Ye, *Adv. Synth. Catal.*, 2011, **353**, 3134; (b) Y.-H. Wu, W.-J. Yao, L.-J. Pan, Y.-P. Zhang and C. Ma, *Org. Lett.*, 2010, **12**, 640.

4 H. Rao, P. Surya and B. Bharathi, *J. Chem. Res. Syn.*, 1994, **3**, 87.

Part III NMR Spectra



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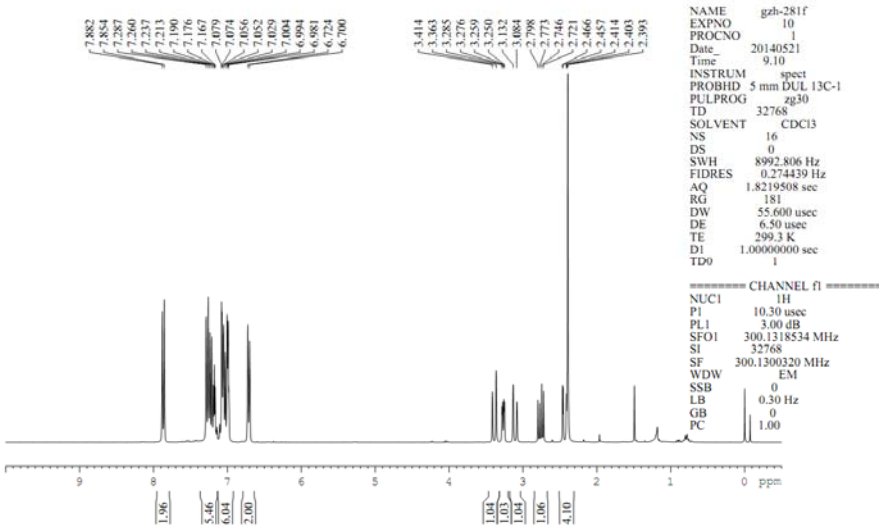
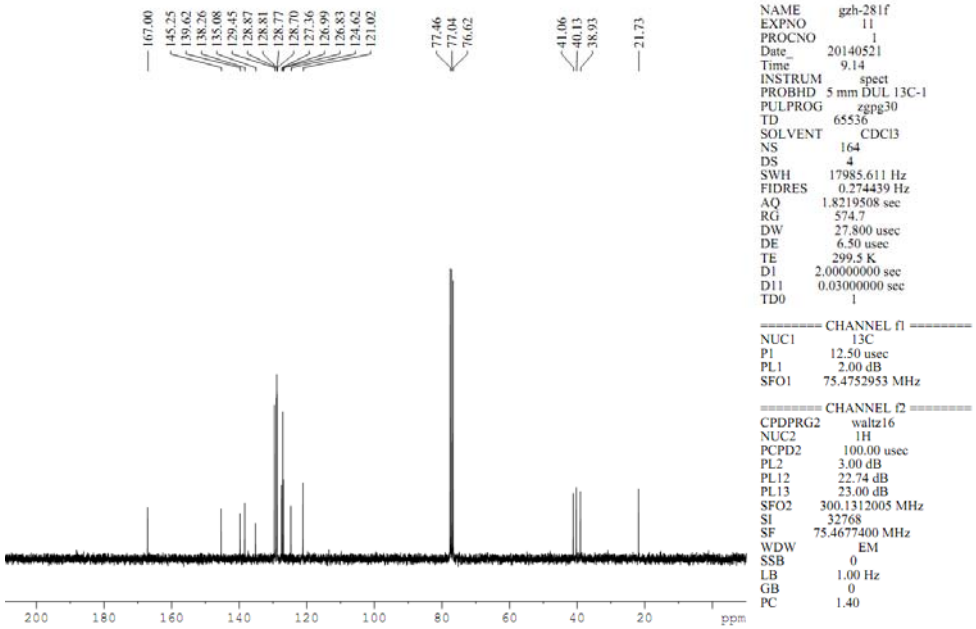
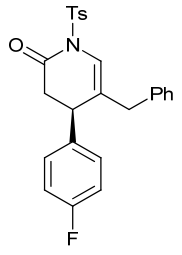
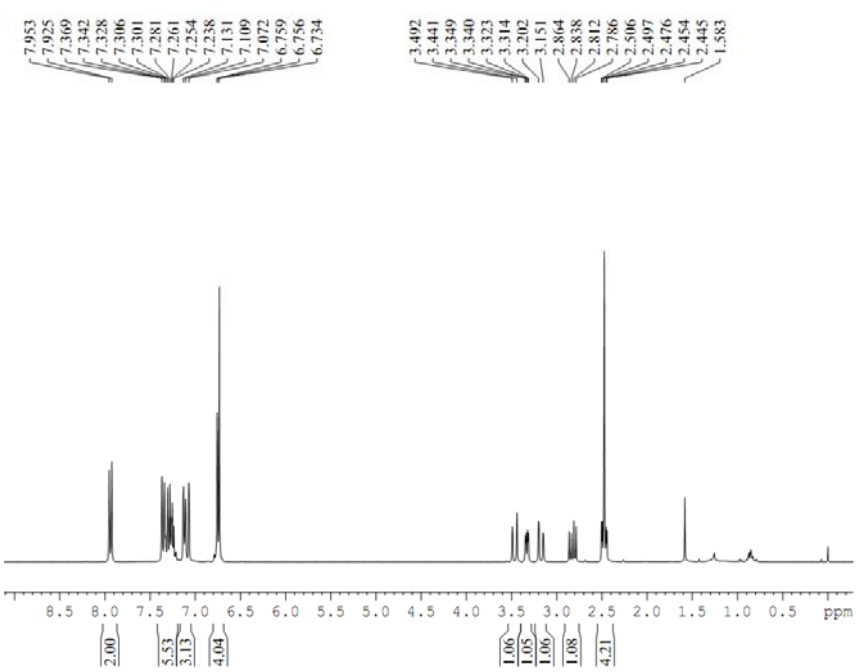






3b



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FIDRES 0.274439 Hz
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RG 181
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DE 6.50 usec
TE 298.7 K
D1 1.00000000 sec
TD0 1

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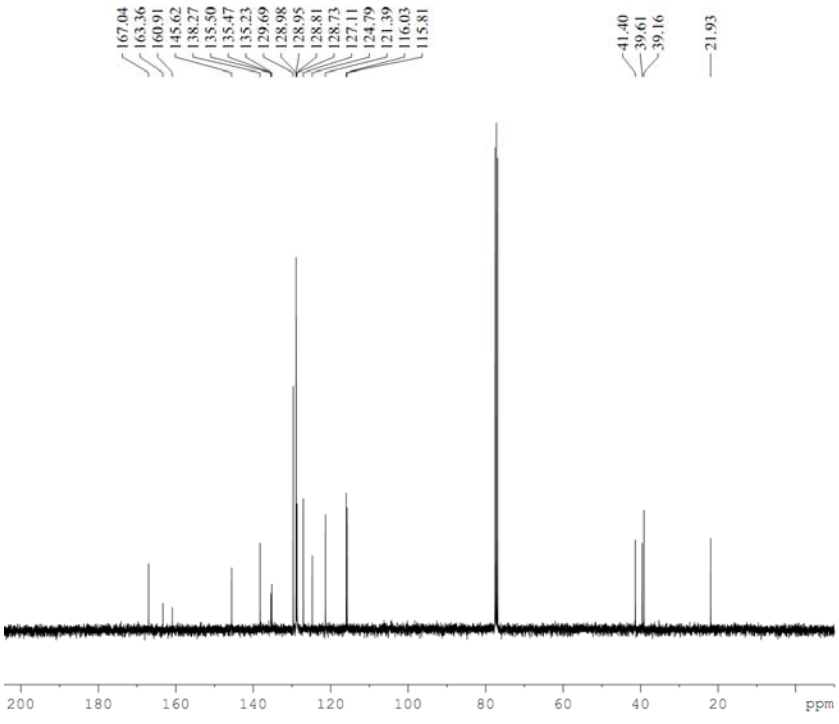

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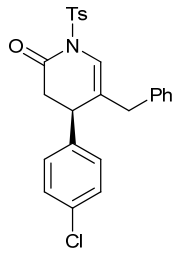
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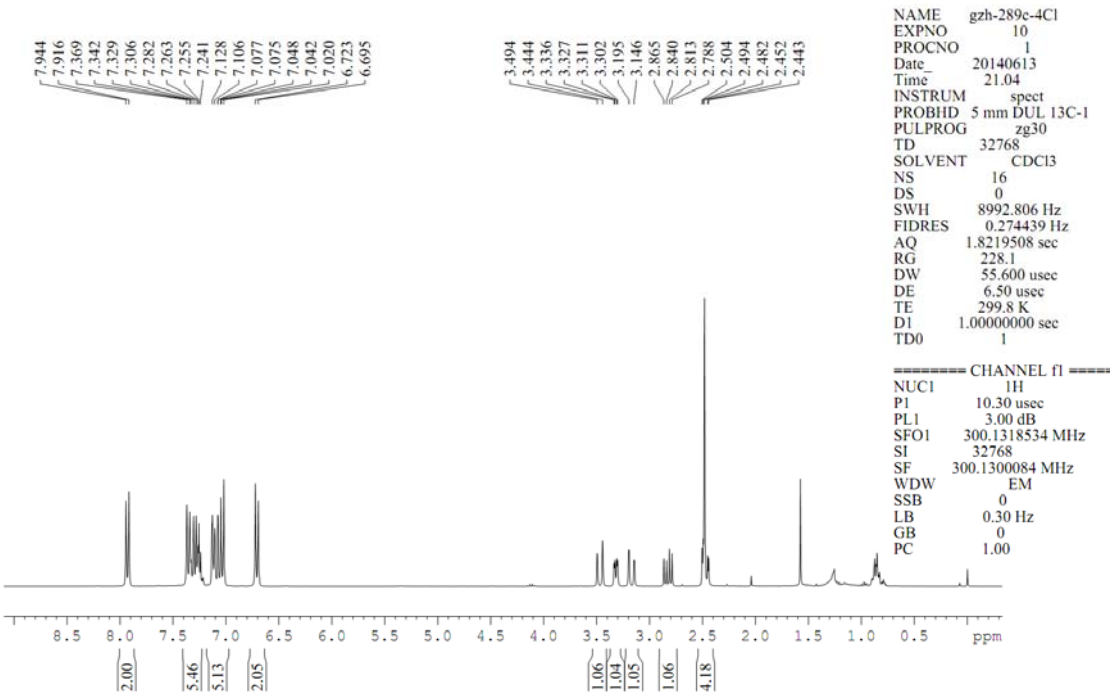
Cl

3c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7.075
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7.020
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3.336
3.327
3.311
3.302
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SOLVENT CDCl3
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FIDRES 0.274439 Hz
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LB 0.30 Hz
GB 0
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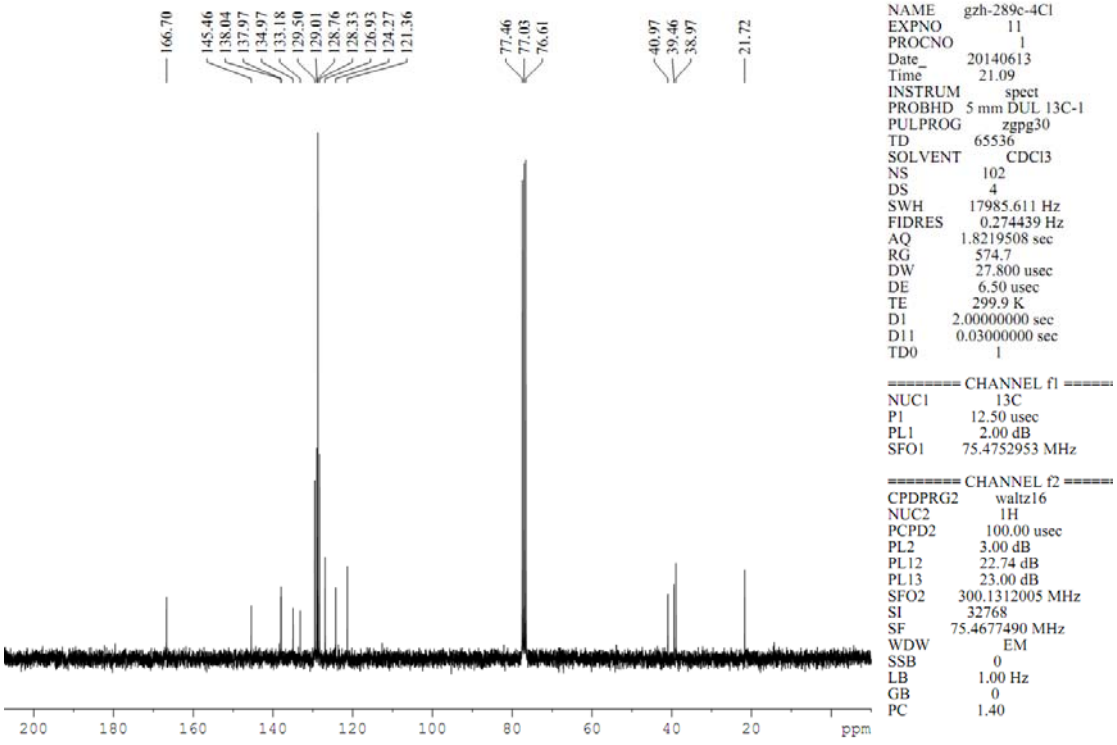
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77.03
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38.97
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PROCNO 1
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PULPROG zgpg30
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SOLVENT CDCl3
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FIDRES 0.274439 Hz
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PL1 2.00 dB
SFO1 75.4752953 MHz
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PCPD2 100.00 usec
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PL12 22.74 dB
PL13 23.00 dB
SFO2 300.1312005 MHz
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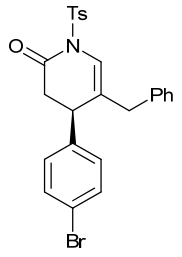
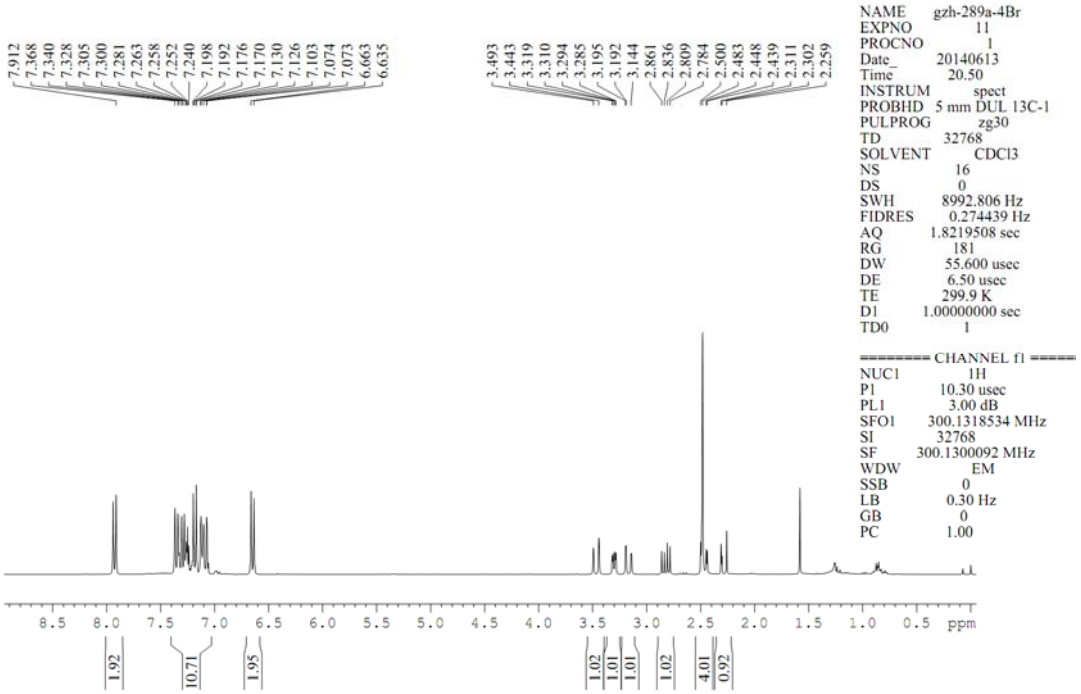

Ts
O
N
Ph
Br

3d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D1 1.00000000 sec
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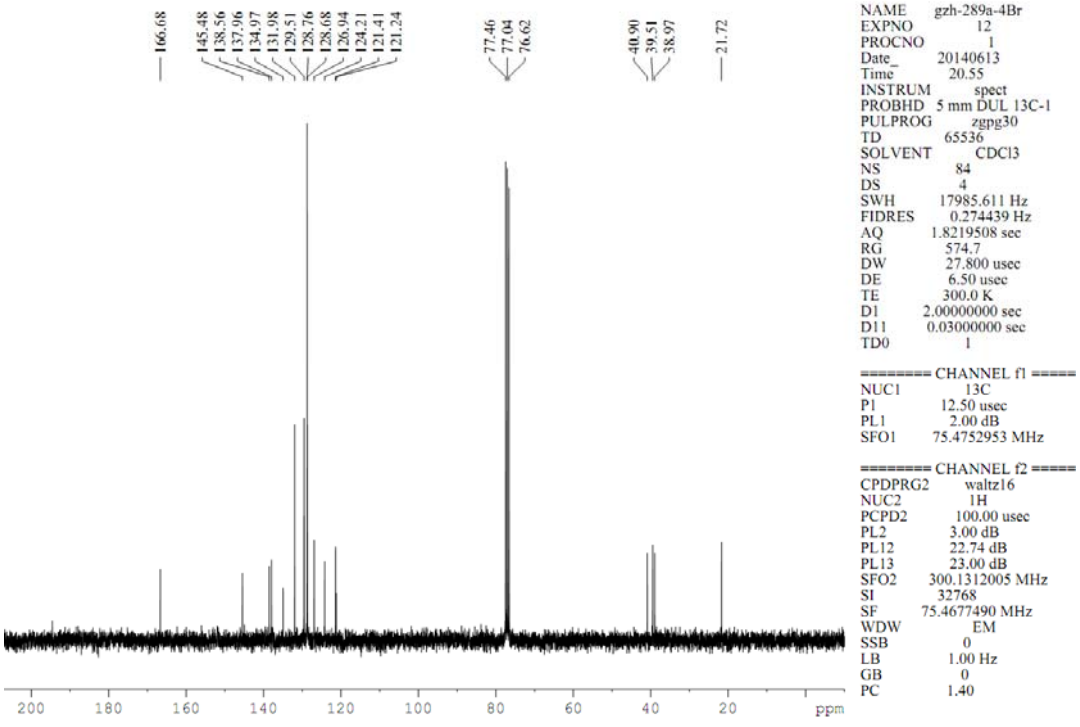
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SOLVENT CDCl3
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FIDRES 0.274439 Hz
AQ 1.8219508 sec
RG 574.7
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DE 6.50 usec
TE 300.0 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1
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P1 12.50 usec
PL1 2.00 dB
SFO1 75.4752953 MHz
======== CHANNEL f2 =====
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NUC2 1H
PCPD2 100.00 usec
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PL12 22.74 dB
PL13 23.00 dB
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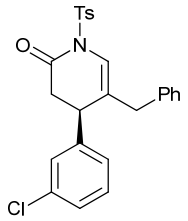
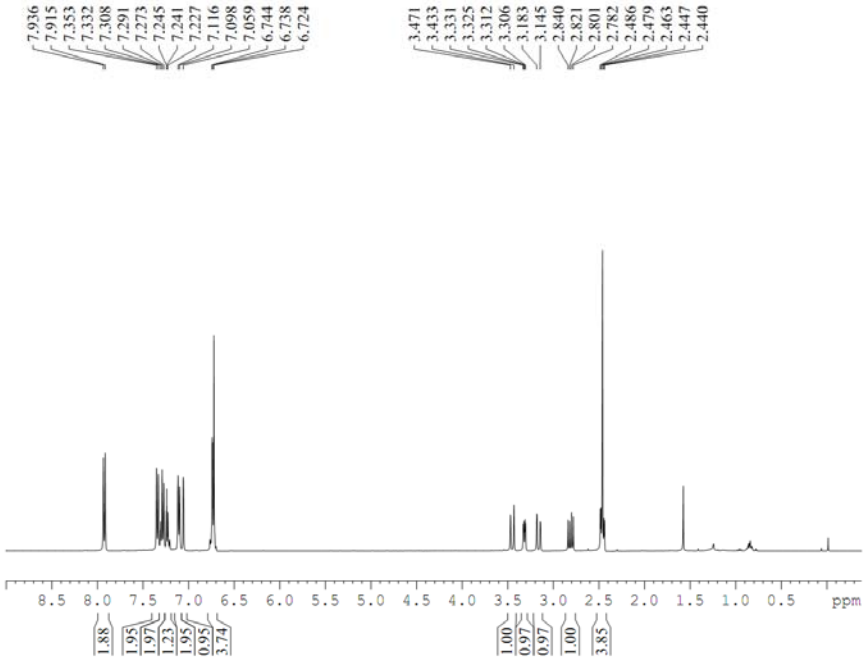


3e



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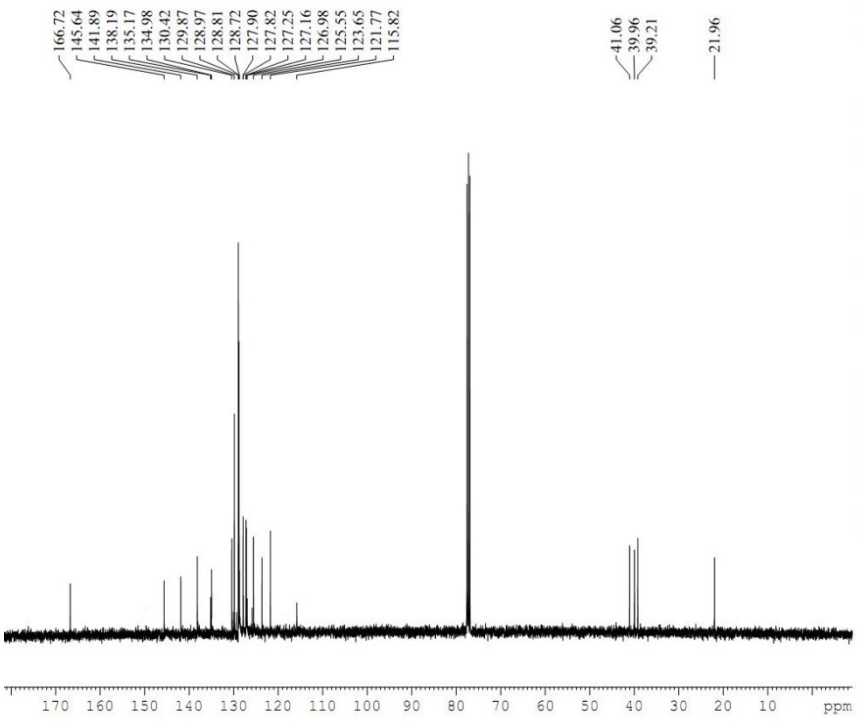

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DW 20.800 usec
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TE 300.0 K
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D11 0.03000000 sec
TD0 1

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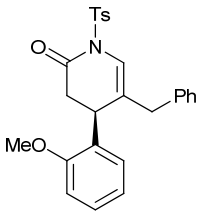

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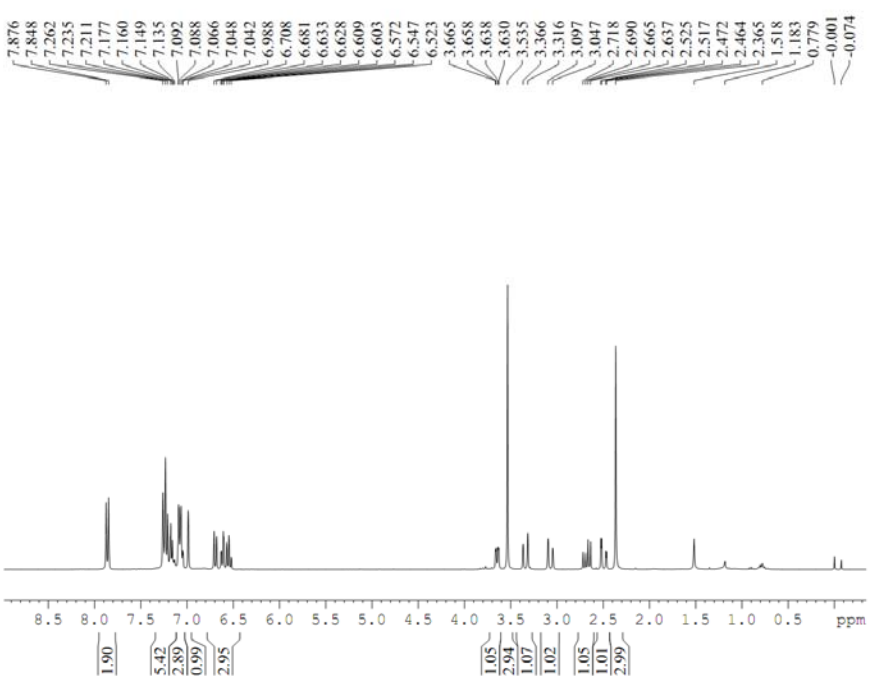

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FIDRES 0.274439 Hz
AQ 1.8219508 sec
RG 181
DW 55.600 usec
DE 6.50 usec
TE 298.5 K
D1 1.00000000 sec
TD0 1

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P1 10.30 usec
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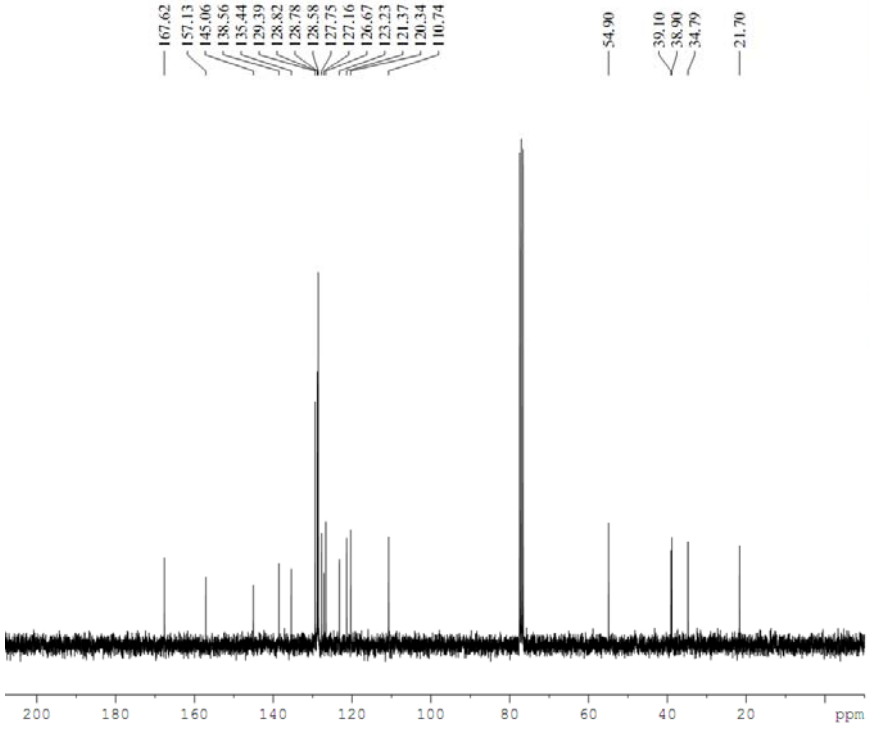

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FIDRES 0.274439 Hz
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RG 574.7
DW 27.800 usec
DE 6.50 usec
TE 298.8 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1

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P1 12.50 usec
PL1 2.00 dB
SFO1 75.4752953 MHz

======== CHANNEL f2 ======
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PCPD2 100.00 usec
PL2 3.00 dB
PL12 22.74 dB
PL13 23.00 dB
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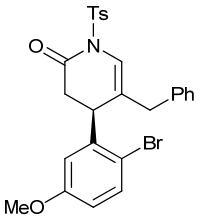
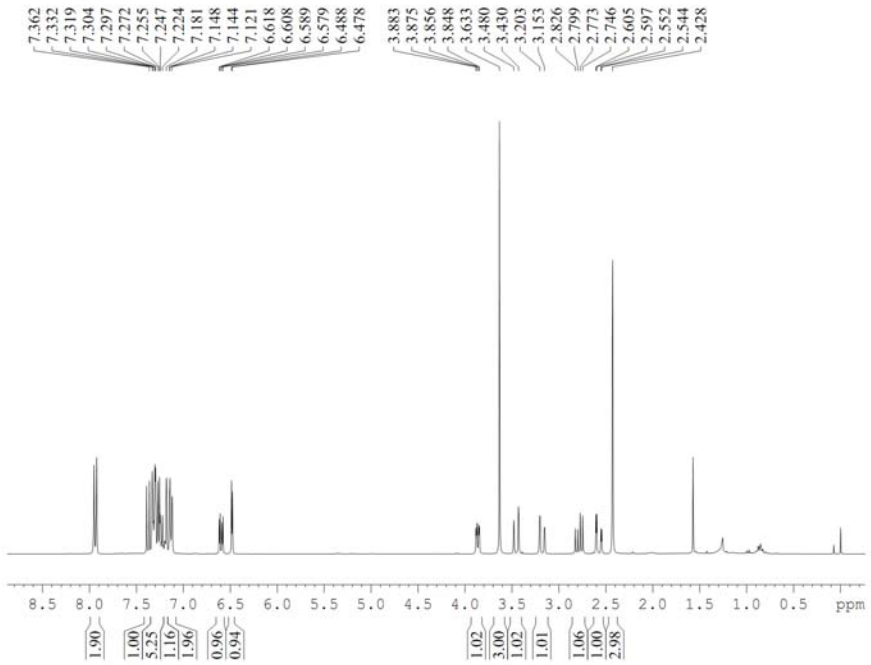


3g



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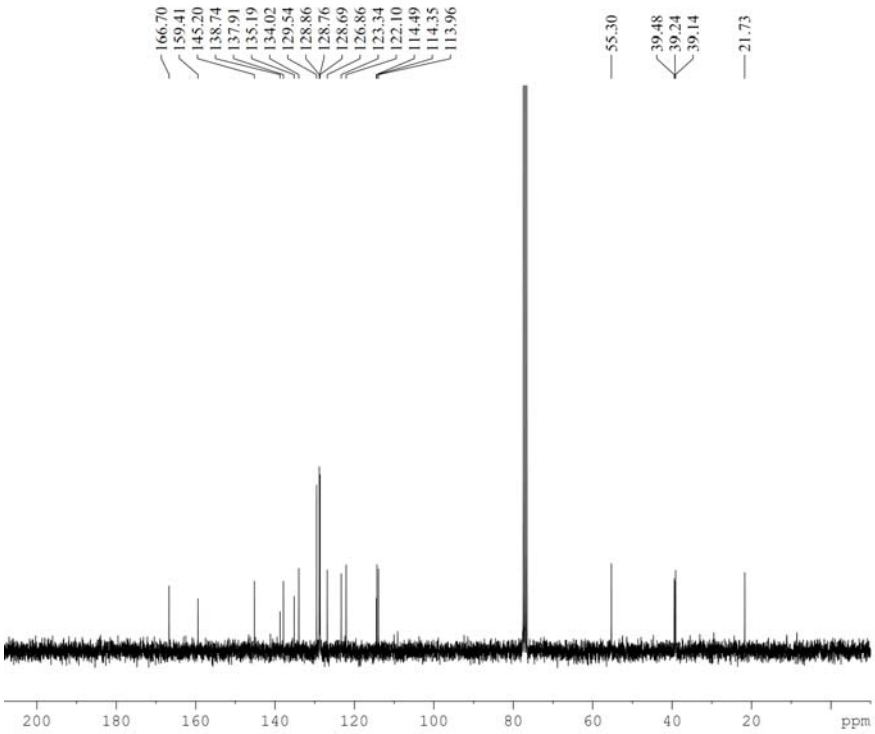
PROBHD 5 mm DUL 13C-1
PULPROG zg30
TD 32768
SOLVENT CDCl3
NS 16
DS 0
SWH 8992.806 Hz
FIDRES 0.274439 Hz
AQ 1.8219508 sec
RG 228.1
DW 55.600 usec
DE 6.50 usec
TE 298.8 K
D1 1.00000000 sec
TD0 1

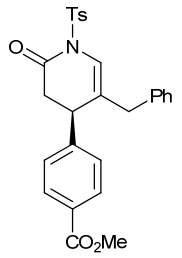
======== CHANNEL f1 ======
NUC1 1H
P1 10.30 usec
PL1 3.00 dB
SFO1 300.1318534 MHz
SI 32768
SF 300.1300084 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00



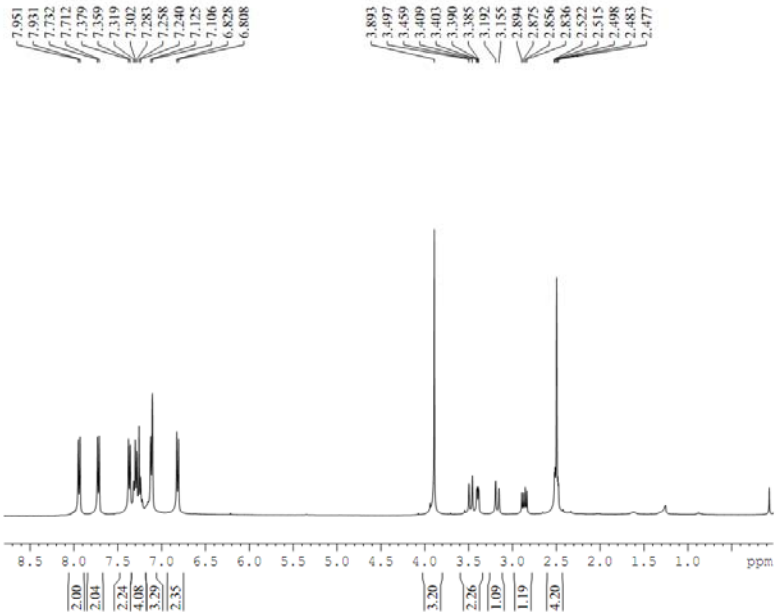
NAME gzh-295C
EXPNO 11
PROCNO 1
Date_ 20140630
Time 9.47
INSTRUM spect
PROBHD 5 mm DUL 13C-1
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 81
DS 4
SWH 17985.611 Hz
FIDRES 0.274439 Hz
AQ 1.8219508 sec
RG 645.1
DW 27.800 usec
DE 6.50 usec
TE 298.9 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1

======== CHANNEL f1 ======
NUC1 13C
P1 12.50 usec
PL1 2.00 dB
SFO1 75.4752953 MHz

======== CHANNEL f2 ======
CPDPRG2 waltz16
NUC2 1H
PCPD2 100.00 usec
PL2 3.00 dB
PL12 22.74 dB
PL13 23.00 dB
SFO2 300.1312005 MHz
SI 32768
SF 75.4677490 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

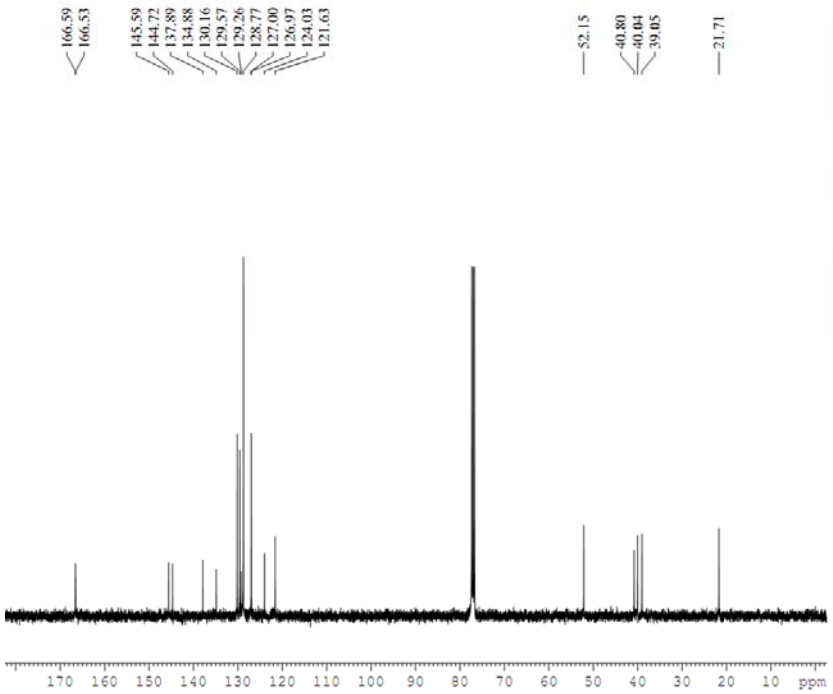


3h



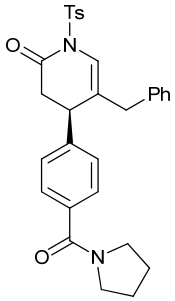
NAME Gao-NMR
EXPNO 236
PROCNO 1
Date_ 20150506
Time 8.57
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zg30
TD 32768
SOLVENT CDCl3
NS 16
DS 0
SWH 8012.820 Hz
FIDRES 0.244532 Hz
AQ 2.0447731 sec
RG 116.67
DW 62.400 usec
DE 6.50 usec
TE 298.2 K
D1 2.00000000 sec
TD0 1

======== CHANNEL f1 ========
SFO1 400.2424716 MHz
NUC1 1H
P1 14.80 usec
SI 65536
SF 400.2400104 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

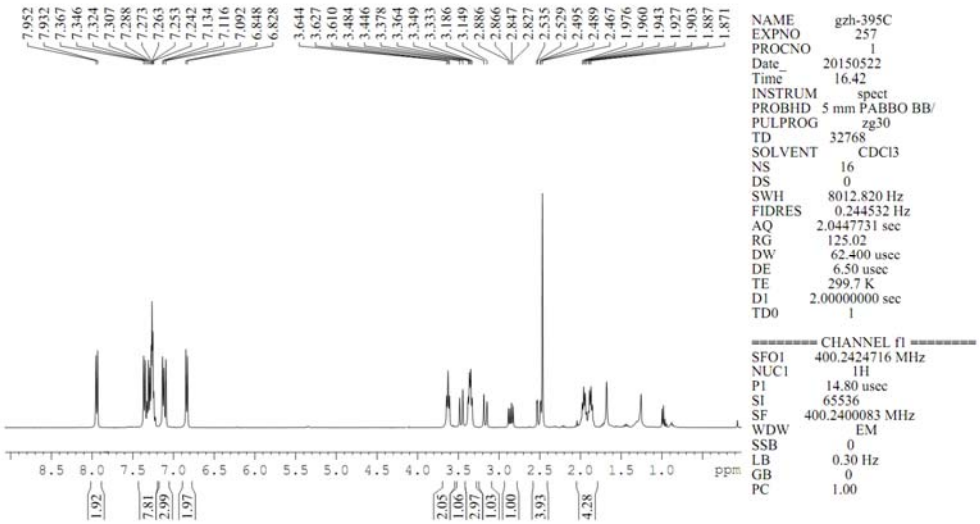


NAME Gao-NMR
EXPNO 237
PROCNO 1
Date_ 20150506
Time 9.04
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 141
DS 4
SWH 24038.461 Hz
FIDRES 0.366798 Hz
AQ 1.3631988 sec
RG 206.33
DW 20.800 usec
DE 6.50 usec
TE 298.9 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1

======== CHANNEL f1 ========
SFO1 100.6504916 MHz
NUC1 13C
P1 10.00 usec
SI 32768
SF 100.6404280 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

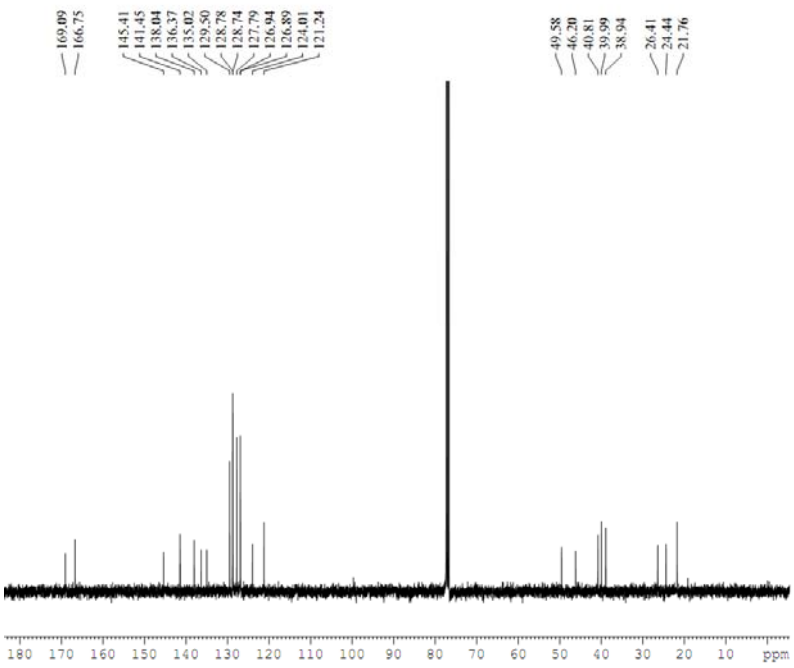


3i



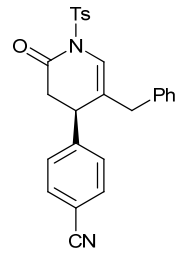
NAME gzh-395C
EXPNO 257
PROCNO 1
Date_ 20150522
Time 16.42
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zg30
TD 32768
SOLVENT CDCl3
NS 16
DS 0
SWH 8012.820 Hz
FIDRES 0.244532 Hz
AQ 2.0447731 sec
RG 125.02
DW 62.400 usec
DE 6.50 usec
TE 299.7 K
D1 2.00000000 sec
TD0 1

======== CHANNEL f1 ========
SFO1 400.2424716 MHz
NUC1 1H
P1 14.80 usec
SI 65536
SF 400.2400083 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

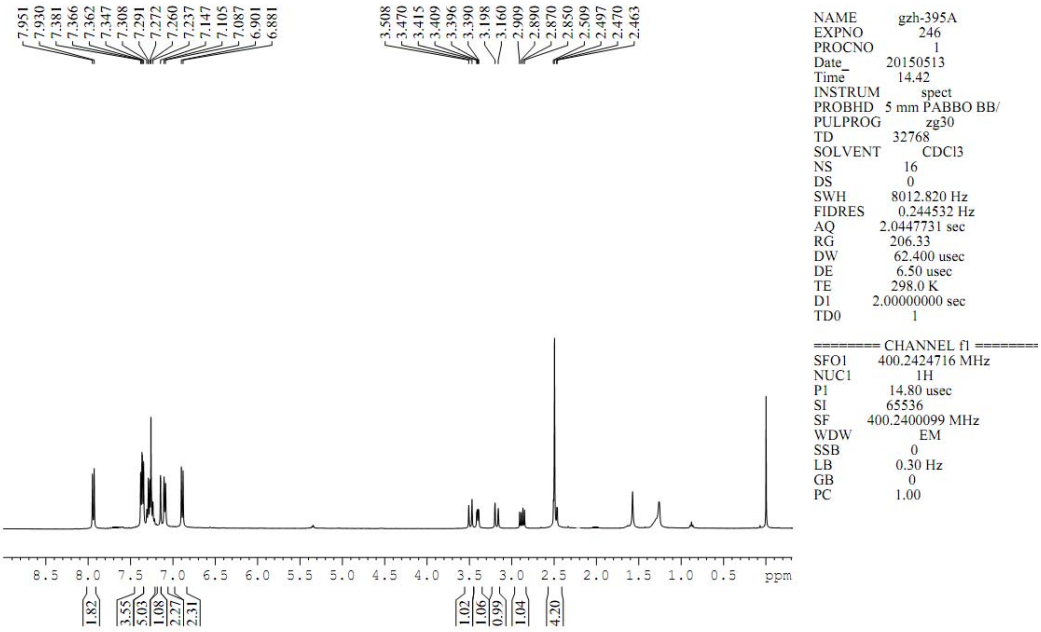


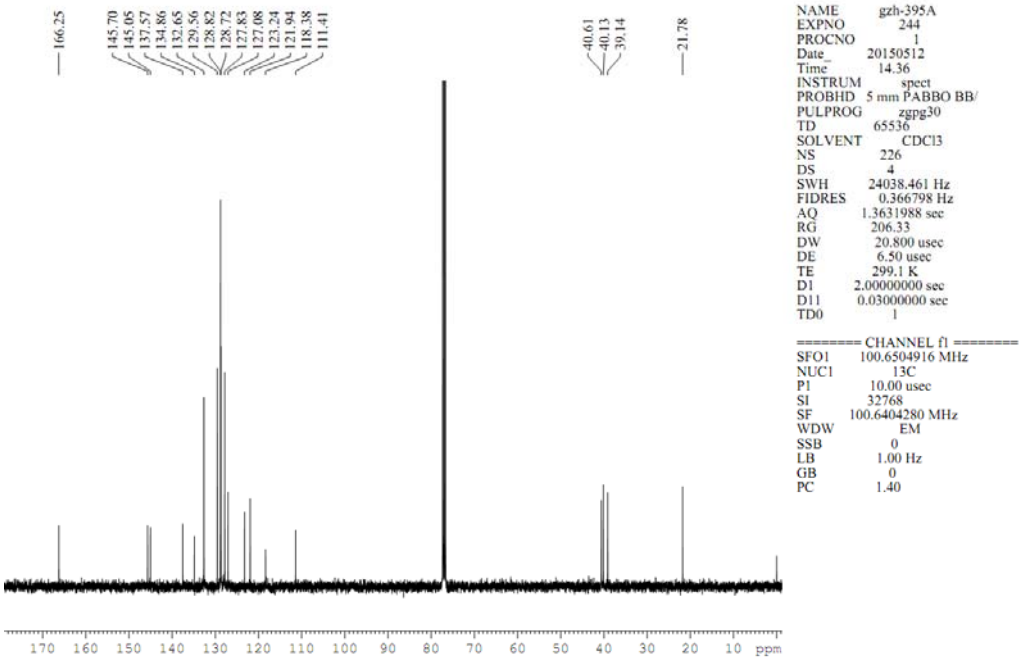
NAME gzh-395C
EXPNO 258
PROCNO 1
Date_ 20150522
Time 16.44
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 111
DS 4
SWH 24038.461 Hz
FIDRES 0.366798 Hz
AQ 1.3631988 sec
RG 206.33
DW 20.800 usec
DE 6.50 usec
TE 300.4 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1

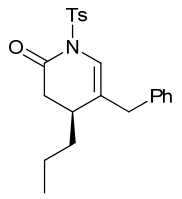
======== CHANNEL f1 ========
SFO1 100.6504916 MHz
NUC1 13C
P1 10.00 usec
SI 32768
SF 100.6404280 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40


Ts
N
O
Ph
CN

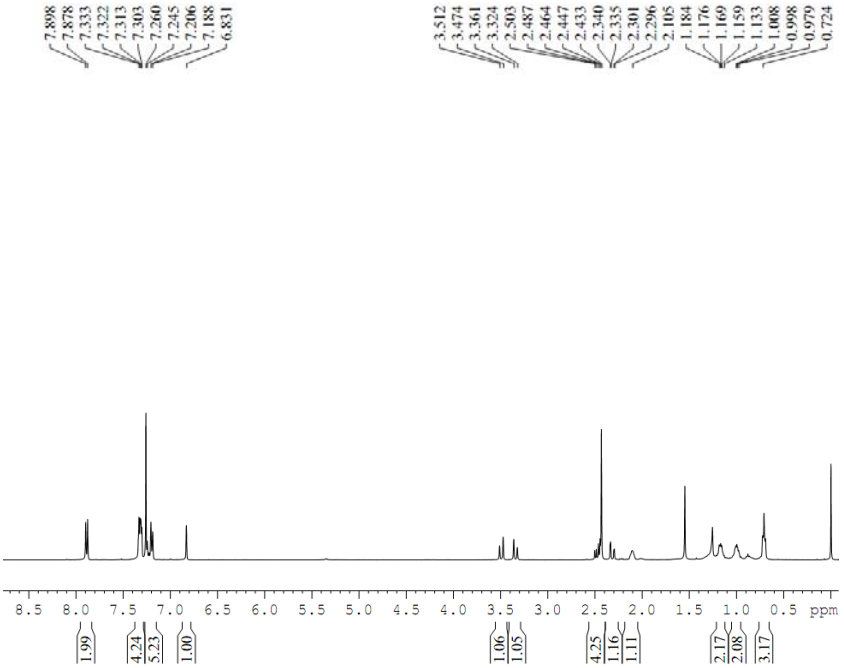
3j


7.951
7.930
7.381
7.366
7.362
7.347
7.308
7.291
7.272
7.260
7.237
7.147
7.105
7.087
6.901
6.881
3.508
3.470
3.415
3.409
3.396
3.390
3.198
3.160
2.909
2.890
2.870
2.850
2.509
2.497
2.470
2.463
NAME gzh-395A
EXPNO 246
PROCNO 1
Date_ 20150513
Time 14.42
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zg30
TD 32768
SOLVENT CDCl3
NS 16
DS 0
SWH 8012.820 Hz
FIDRES 0.244532 Hz
AQ 2.0447731 sec
RG 206.33
DW 62.400 usec
DE 6.50 usec
TE 298.0 K
D1 2.00000000 sec
TD0 1
======== CHANNEL f1 ========
SFO1 400.2424716 MHz
NUC1 1H
P1 14.80 usec
SI 65536
SF 400.2400099 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 ppm
1.82
3.55
5.03
1.08
2.27
2.31
1.02
1.06
0.99
1.04
4.20


166.25
145.70
145.05
137.57
134.86
132.65
129.56
128.82
128.72
127.83
127.08
123.24
121.94
118.38
111.41
40.61
40.13
39.14
21.78
NAME gzh-395A
EXPNO 244
PROCNO 1
Date_ 20150512
Time 14.36
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 226
DS 4
SWH 24038.461 Hz
FIDRES 0.366798 Hz
AQ 1.3631988 sec
RG 206.33
DW 20.800 usec
DE 6.50 usec
TE 299.1 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1
======== CHANNEL f1 ========
SFO1 100.6504916 MHz
NUC1 13C
P1 10.00 usec
SI 32768
SF 100.6404280 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm

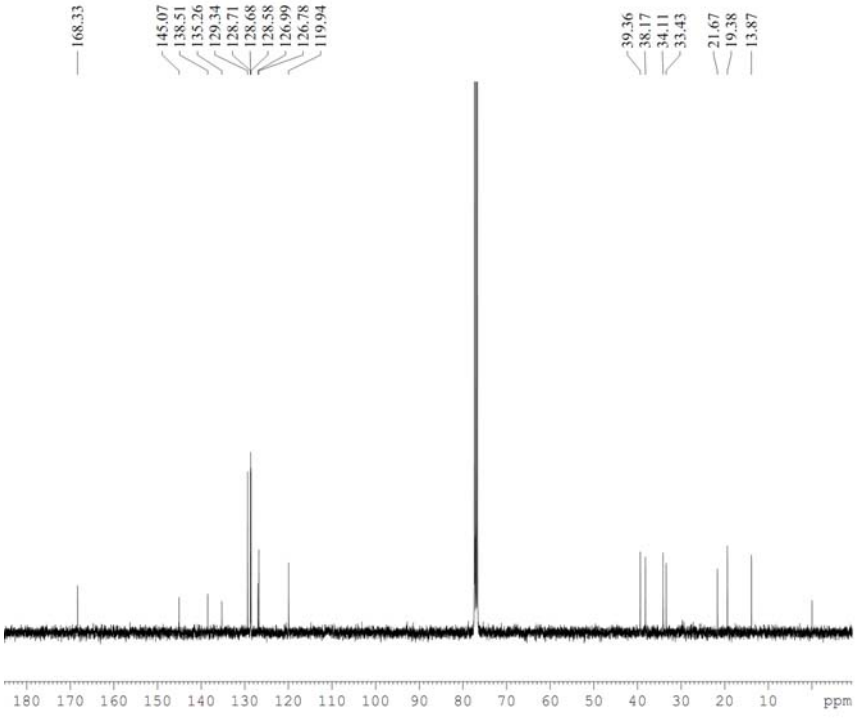


3k



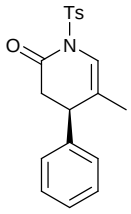
NAME gzh-296cc
EXPNO 254
PROCNO 1
Date_ 20150522
Time 16.29
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zg30
TD 32768
SOLVENT CDCl3
NS 16
DS 0
SWH 8012.820 Hz
FIDRES 0.244532 Hz
AQ 2.0447731 sec
RG 206.33
DW 62.400 usec
DE 6.50 usec
TE 299.9 K
D1 2.00000000 sec
TD0 1

======== CHANNEL f1 ========
SFO1 400.2424716 MHz
NUC1 1H
P1 14.80 usec
SI 65536
SF 400.2400100 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

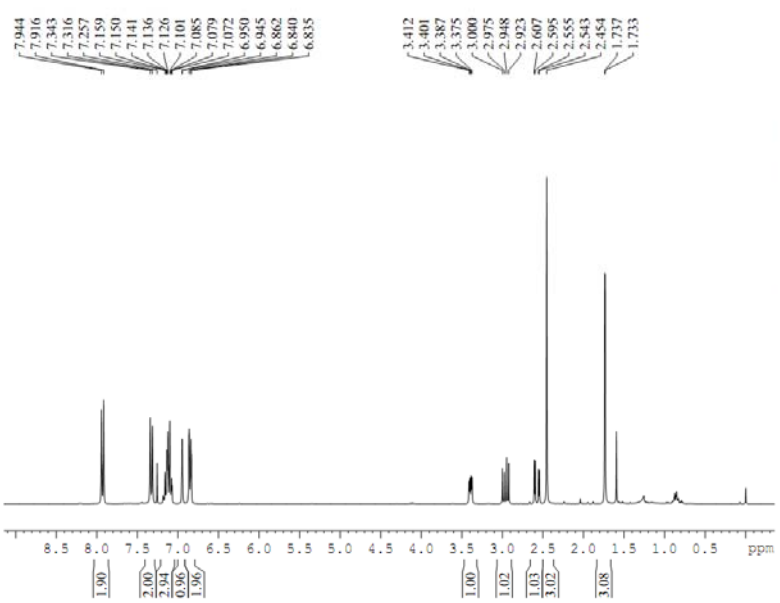


NAME gzh-296cc
EXPNO 259
PROCNO 1
Date_ 20150522
Time 16.54
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 1024
DS 4
SWH 24038.461 Hz
FIDRES 0.366798 Hz
AQ 1.3631988 sec
RG 206.33
DW 20.800 usec
DE 6.50 usec
TE 300.4 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1

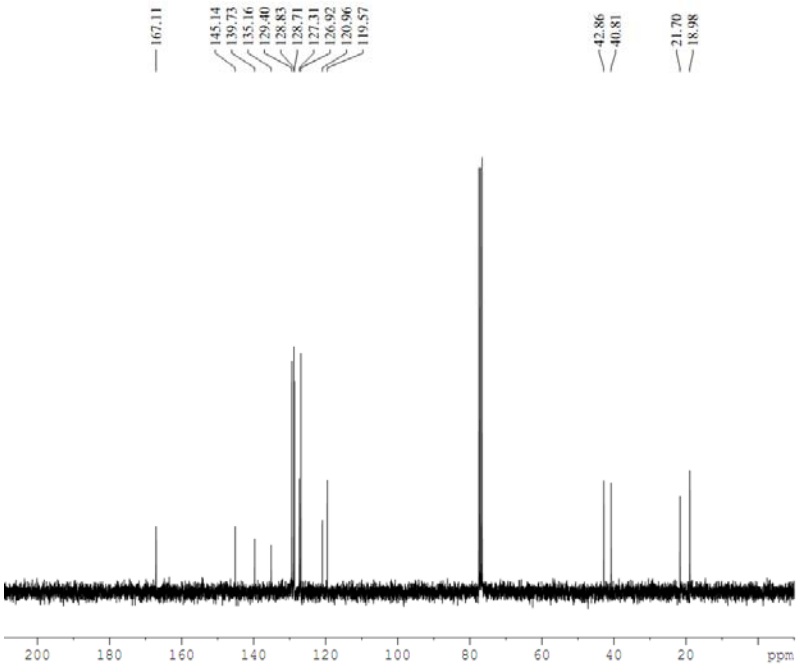
======== CHANNEL f1 ========
SFO1 100.6504916 MHz
NUC1 13C
P1 10.00 usec
SI 32768
SF 100.6404280 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40



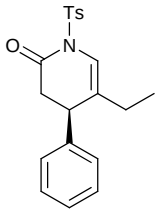
3l




```
NAME          gzh-292a
EXPNO            10
PROCNO            1
Date_         20140621
Time             21.04
INSTRUM          spect
PROBHD   5 mm DUL 13C-1
PULPROG          zg30
TD              32768
SOLVENT          CDCl3
NS                16
DS                 0
SWH           8992.806 Hz
FIDRES        0.274439 Hz
AQ            1.8219508 sec
RG               181
DW            55.600 usec
DE             6.50 usec
TE             299.4 K
D1            1.00000000 sec
TD0                1

======== CHANNEL f1 ========
NUC1              1H
P1            10.30 usec
PL1            3.00 dB
SFO1       300.1318534 MHz
SI             32768
SF         300.1300076 MHz
WDW               EM
SSB                0
LB              0.30 Hz
GB                 0
PC              1.00
```




```
NAME          gzh-292a
EXPNO            11
PROCNO            1
Date_         20140621
Time             21.08
INSTRUM          spect
PROBHD   5 mm DUL 13C-1
PULPROG         zgpg30
TD              65536
SOLVENT          CDCl3
NS                64
DS                 4
SWH           17985.611 Hz
FIDRES        0.274439 Hz
AQ            1.8219508 sec
RG               574.7
DW            27.800 usec
DE             6.50 usec
TE             299.6 K
D1            2.00000000 sec
D11           0.03000000 sec
TD0                1

======== CHANNEL f1 ========
NUC1             13C
P1            12.50 usec
PL1            2.00 dB
SFO1       75.4752953 MHz

======== CHANNEL f2 ========
CPDPRG2       waltz16
NUC2              1H
PCPD2        100.00 usec
PL2            3.00 dB
PL12          22.74 dB
PL13          23.00 dB
SFO2       300.1312005 MHz
SI             32768
SF         75.4677490 MHz
WDW               EM
SSB                0
LB              1.00 Hz
GB                 0
PC              1.40
```



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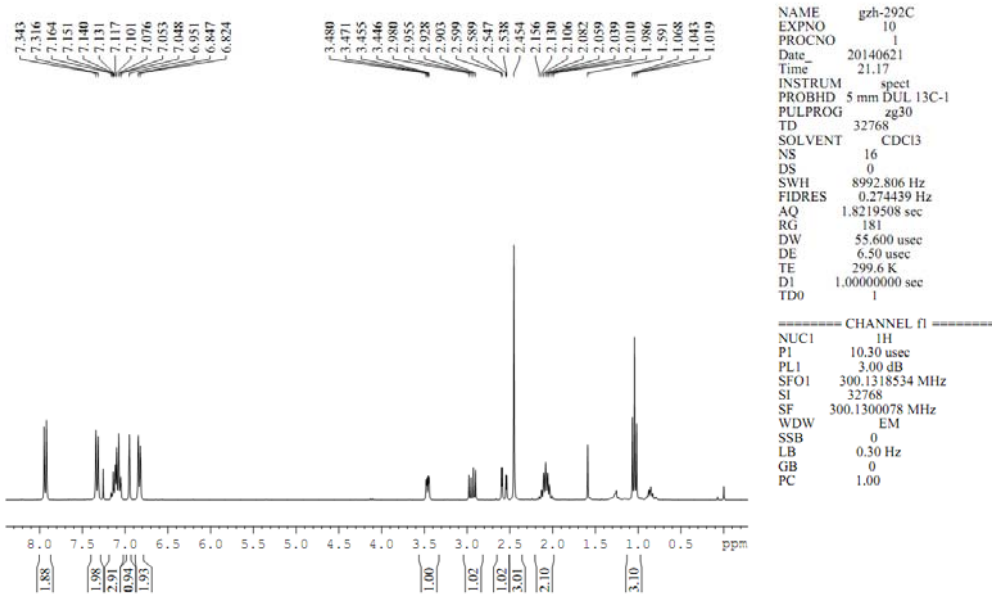
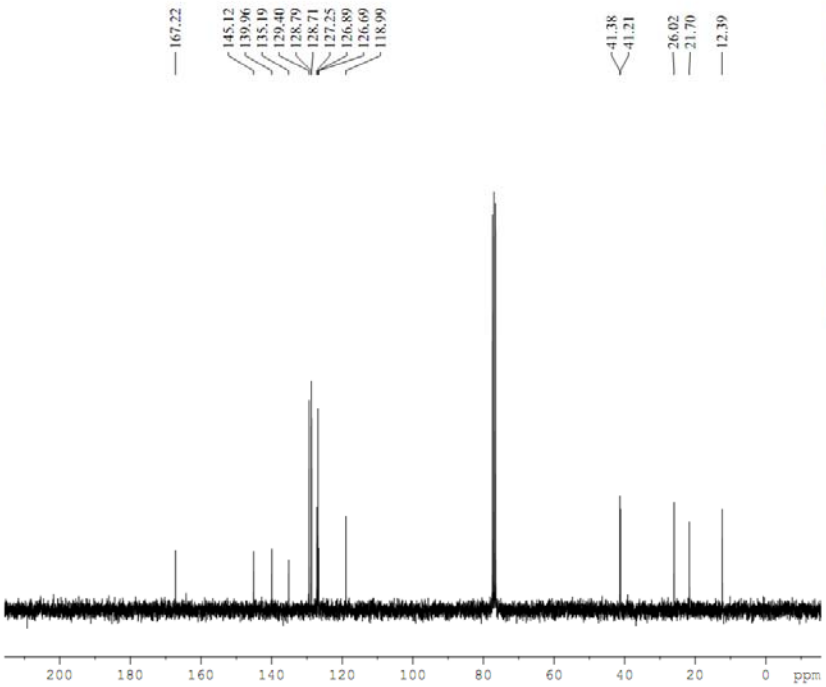
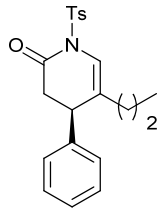



```
NAME          gzh-292C
EXPNO            10
PROCNO            1
Date_         20140621
Time             21.17
INSTRUM          spect
PROBHD   5 mm DUL 13C-1
PULPROG          zg30
TD              32768
SOLVENT          CDCl3
NS                16
DS                 0
SWH          8992.806 Hz
FIDRES       0.274439 Hz
AQ           1.8219508 sec
RG               181
DW            55.600 usec
DE             6.50 usec
TE             299.6 K
D1          1.00000000 sec
TD0               1

======== CHANNEL f1 ========
NUC1             1H
P1            10.30 usec
PL1            3.00 dB
SFO1     300.1318534 MHz
SI              32768
SF       300.1300078 MHz
WDW              EM
SSB               0
LB             0.30 Hz
GB                0
PC             1.00
```




```
NAME          gzh-292C
EXPNO            11
PROCNO            1
Date_         20140621
Time             21.21
INSTRUM          spect
PROBHD   5 mm DUL 13C-1
PULPROG         zgpg30
TD              65536
SOLVENT          CDCl3
NS                61
DS                 4
SWH          17985.611 Hz
FIDRES       0.274439 Hz
AQ           1.8219508 sec
RG             574.7
DW            27.800 usec
DE             6.50 usec
TE             299.6 K
D1          2.00000000 sec
D11         0.03000000 sec
TD0               1

======== CHANNEL f1 ========
NUC1             13C
P1            12.50 usec
PL1            2.00 dB
SFO1     75.4752953 MHz

======== CHANNEL f2 ========
CPDPRG2        waltz16
NUC2             1H
PCPD2        100.00 usec
PL2            3.00 dB
PL12          22.74 dB
PL13          23.00 dB
SFO2     300.1312005 MHz
SI              32768
SF       75.4677490 MHz
WDW              EM
SSB               0
LB             1.00 Hz
GB                0
PC             1.40
```



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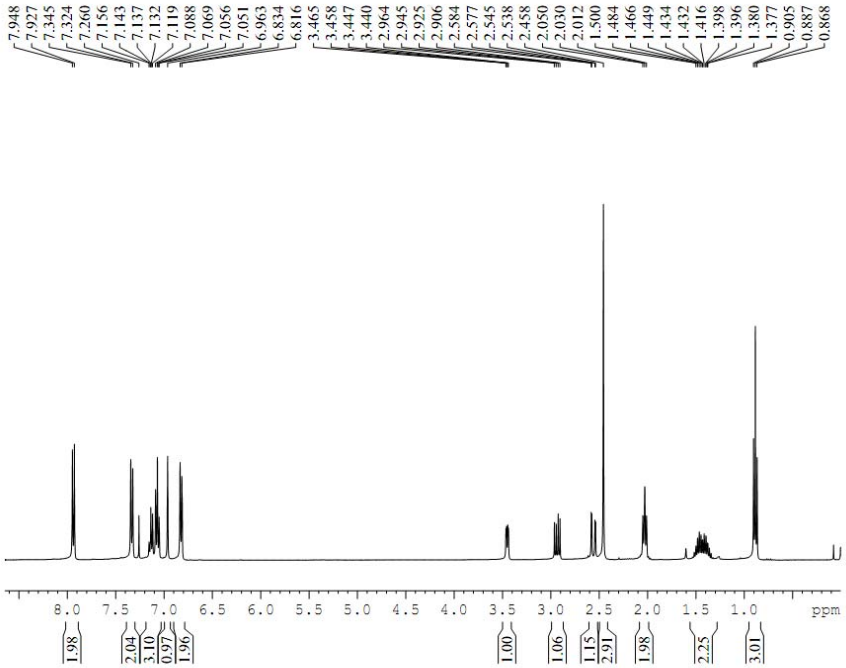
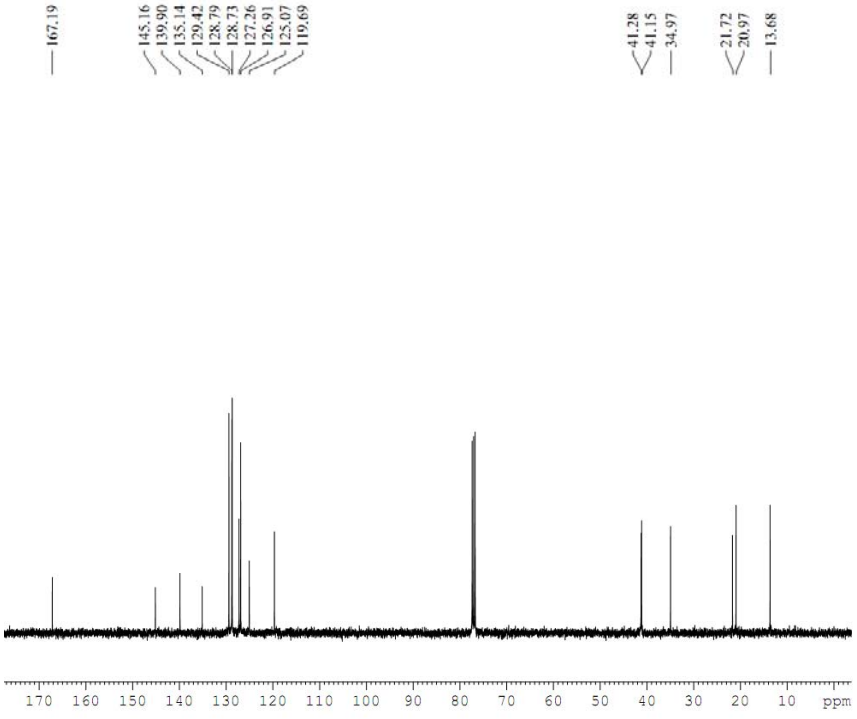


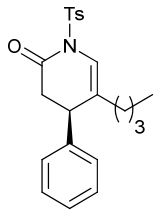
NAME gzh-293C C-5
EXPNO 227
PROCNO 1
Date_ 20150422
Time 18.31
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zg30
TD 32768
SOLVENT CDCl3
NS 16
DS 0
SWH 8012.820 Hz
FIDRES 0.244532 Hz
AQ 2.0447731 sec
RG 80.72
DW 62.400 usec
DE 6.50 usec
TE 298.0 K
D1 2.00000000 sec
TD0 1

======== CHANNEL f1 ========
SFO1 400.2424716 MHz
NUC1 1H
P1 14.80 usec
SI 65536
SF 400.2400101 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

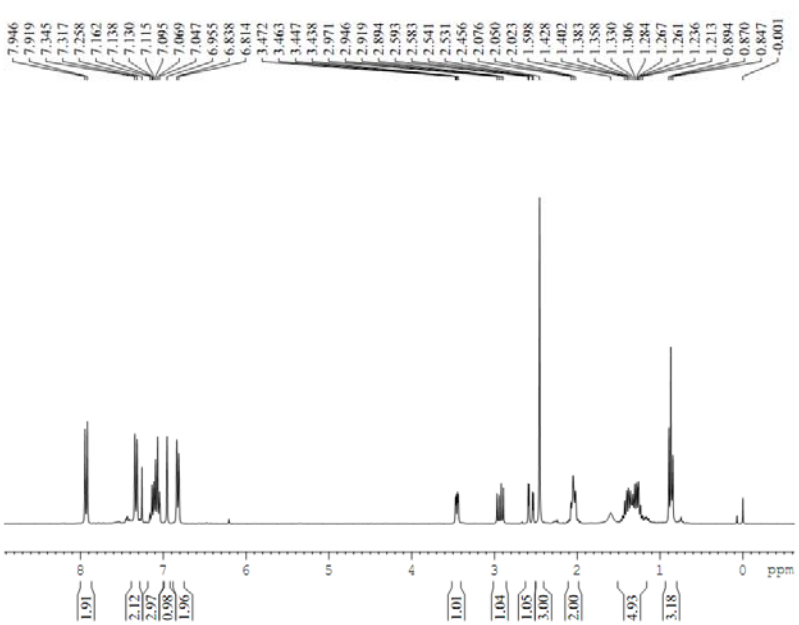


NAME gzh-293C C-5
EXPNO 228
PROCNO 1
Date_ 20150422
Time 18.34
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 53
DS 4
SWH 24038.461 Hz
FIDRES 0.366798 Hz
AQ 1.3631988 sec
RG 206.33
DW 20.800 usec
DE 6.50 usec
TE 298.5 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1

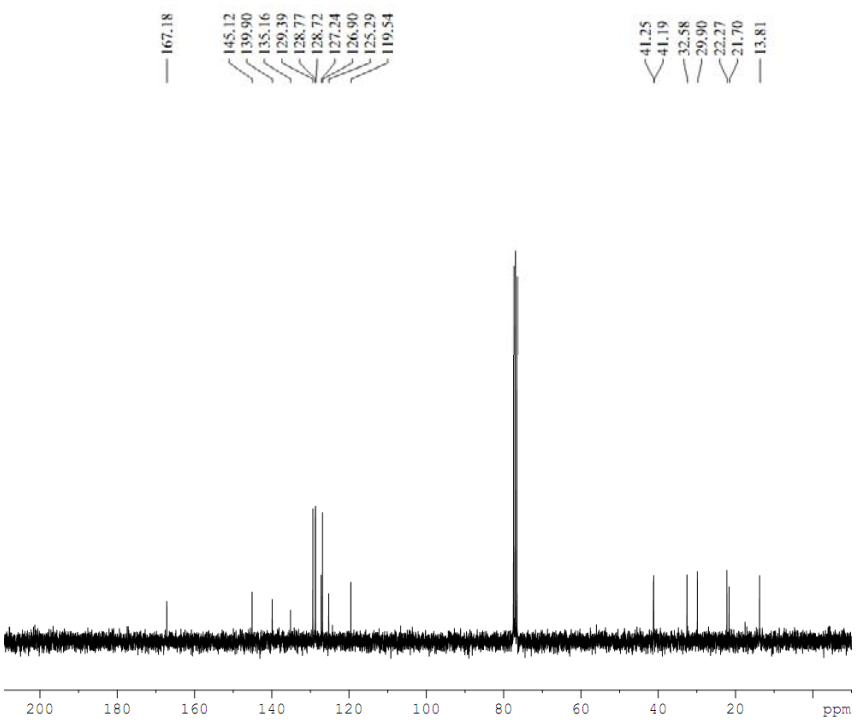
======== CHANNEL f1 ========
SFO1 100.6504916 MHz
NUC1 13C
P1 10.00 usec
SI 32768
SF 100.6404280 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40



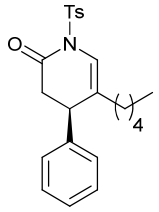
3o



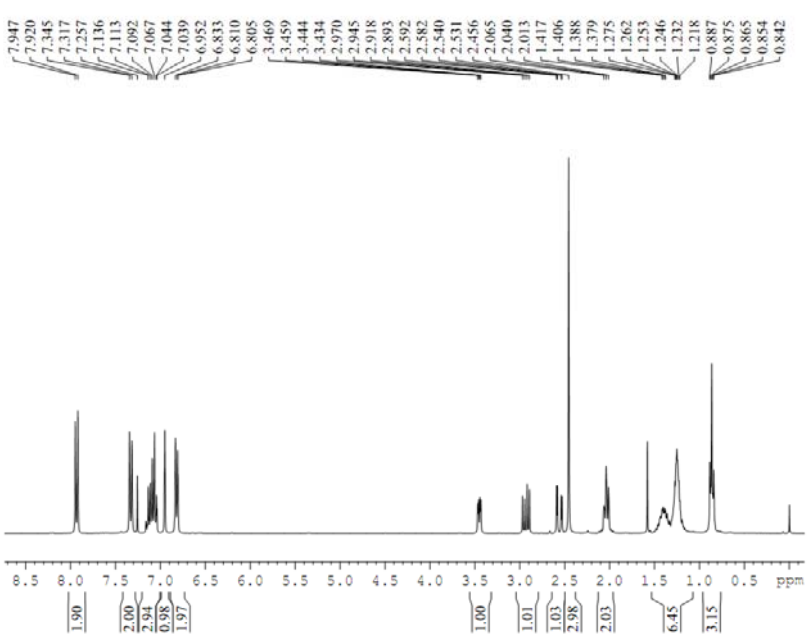

```
NAME          GZH-291C
EXPNO             10
PROCNO             1
Date_         20140621
Time              16.54
INSTRUM           spect
PROBHD   5 mm DUL 13C-1
PULPROG          zg30
TD               32768
SOLVENT          CDCl3
NS                13
DS                 0
SWH           8992.806 Hz
FIDRES        0.274439 Hz
AQ            1.8219508 sec
RG                228.1
DW               55.600 usec
DE                6.50 usec
TE               300.0 K
D1            1.00000000 sec
TD0                1

======== CHANNEL f1 ========
NUC1              1H
P1            10.30 usec
PL1            3.00 dB
SFO1     300.1318534 MHz
SI               32768
SF       300.1300074 MHz
WDW               EM
SSB                0
LB              0.30 Hz
GB                 0
PC              1.00
```



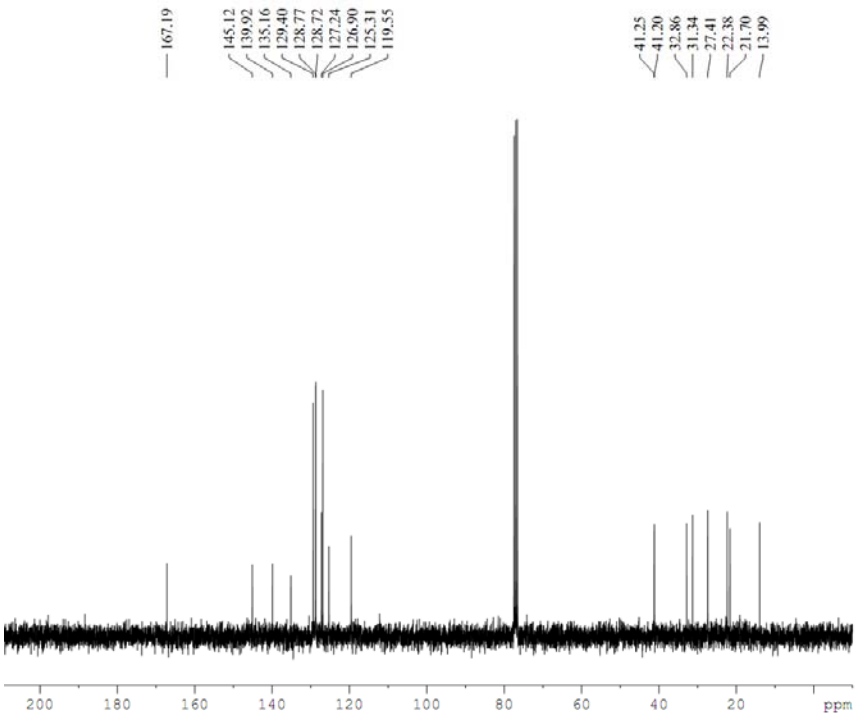

```
NAME          GZH-291C
EXPNO             11
PROCNO             1
Date_         20140621
Time              16.59
INSTRUM           spect
PROBHD   5 mm DUL 13C-1
PULPROG         zgpg30
TD               65536
SOLVENT          CDCl3
NS                46
DS                 4
SWH          17985.611 Hz
FIDRES        0.274439 Hz
AQ            1.8219508 sec
RG                574.7
DW               27.800 usec
DE                6.50 usec
TE               300.0 K
D1            2.00000000 sec
D11           0.03000000 sec
TD0                1

======== CHANNEL f1 ========
NUC1             13C
P1            12.50 usec
PL1            2.00 dB
SFO1     75.4752953 MHz

======== CHANNEL f2 ========
CPDPRG2       waltz16
NUC2              1H
PCPD2        100.00 usec
PL2            3.00 dB
PL12          22.74 dB
PL13          23.00 dB
SFO2     300.1312005 MHz
SI               32768
SF       75.4677490 MHz
WDW               EM
SSB                0
LB             1.00 Hz
GB                 0
PC              1.40
```



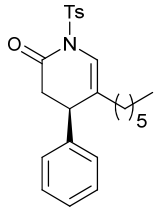
3p



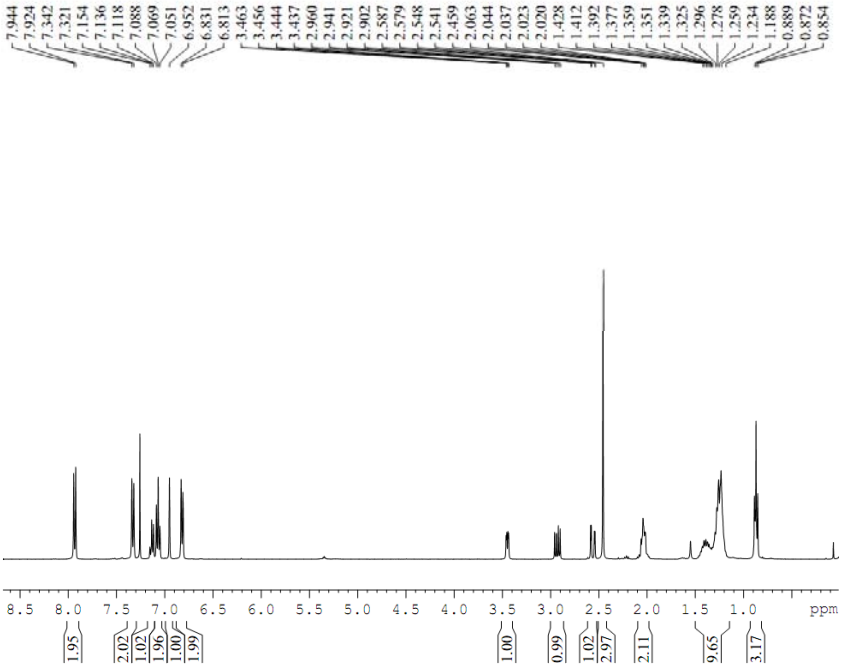

```
NAME          gzh-292E
EXPNO            10
PROCNO            1
Date_         20140621
Time             21.30
INSTRUM          spect
PROBHD   5 mm DUL 13C-1
PULPROG          zg30
TD              32768
SOLVENT          CDCl3
NS                16
DS                 0
SWH          8992.806 Hz
FIDRES       0.274439 Hz
AQ           1.8219508 sec
RG               181
DW            55.600 usec
DE             6.50 usec
TE             299.6 K
D1          1.00000000 sec
TD0               1

======== CHANNEL f1 ========
NUC1             1H
P1            10.30 usec
PL1            3.00 dB
SFO1       300.1318534 MHz
SI              32768
SF         300.1300076 MHz
WDW              EM
SSB               0
LB             0.30 Hz
GB                0
PC             1.00
```




```
NAME          gzh-292E
EXPNO            11
PROCNO            1
Date_         20140621
Time             21.37
INSTRUM          spect
PROBHD   5 mm DUL 13C-1
PULPROG        zgpg30
TD              65536
SOLVENT          CDCl3
NS                56
DS                 4
SWH         17985.611 Hz
FIDRES       0.274439 Hz
AQ           1.8219508 sec
RG             574.7
DW            27.800 usec
DE             6.50 usec
TE             299.6 K
D1          2.00000000 sec
D11         0.03000000 sec
TD0               1

======== CHANNEL f1 ========
NUC1            13C
P1            12.50 usec
PL1            2.00 dB
SFO1       75.4752953 MHz

======== CHANNEL f2 ========
CPDPRG2       waltz16
NUC2             1H
PCPD2         100.00 usec
PL2            3.00 dB
PL12          22.74 dB
PL13          23.00 dB
SFO2       300.1312005 MHz
SI              32768
SF         75.4677490 MHz
WDW              EM
SSB               0
LB             1.00 Hz
GB                0
PC             1.40
```

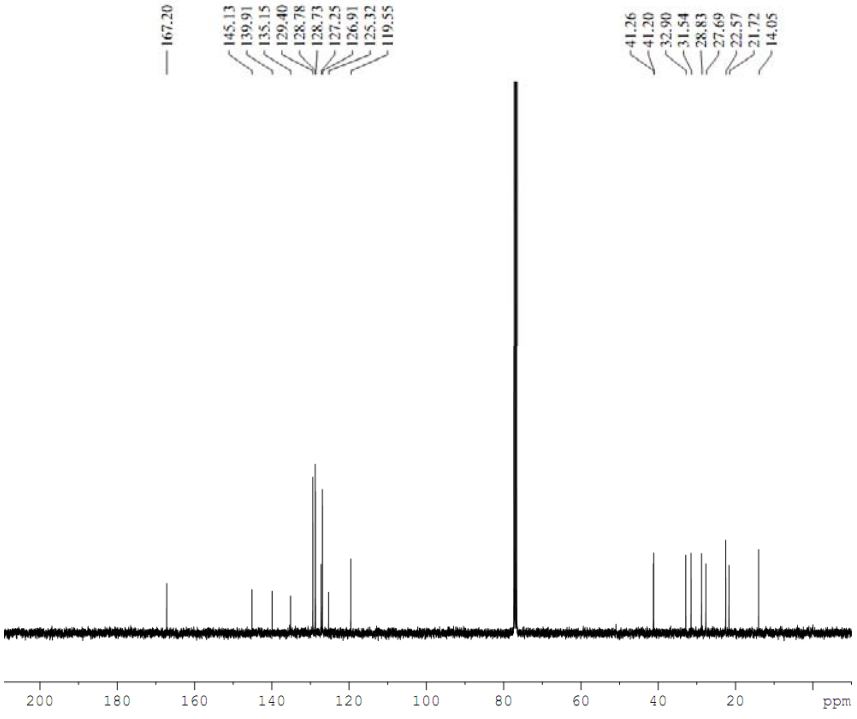


3q



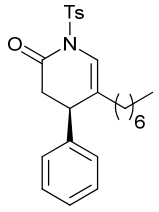
NAME gzh-282C C-8
EXPNO 229
PROCNO 1
Date_ 20150423
Time 16.14
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zg30
TD 32768
SOLVENT CDCl3
NS 16
DS 0
SWH 8012.820 Hz
FIDRES 0.244532 Hz
AQ 2.0447731 sec
RG 206.33
DW 62.400 usec
DE 6.50 usec
TE 299.8 K
D1 2.00000000 sec
TD0 1

======== CHANNEL f1 ========
SFO1 400.2424716 MHz
NUC1 1H
P1 14.80 usec
SI 65536
SF 400.2400105 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00



NAME gzh-282C C-8
EXPNO 225
PROCNO 1
Date_ 20150421
Time 18.32
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 248
DS 4
SWH 24038.461 Hz
FIDRES 0.366798 Hz
AQ 1.3631988 sec
RG 206.33
DW 20.800 usec
DE 6.50 usec
TE 298.3 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1

======== CHANNEL f1 ========
SFO1 100.6504916 MHz
NUC1 13C
P1 10.00 usec
SI 32768
SF 100.6404280 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40



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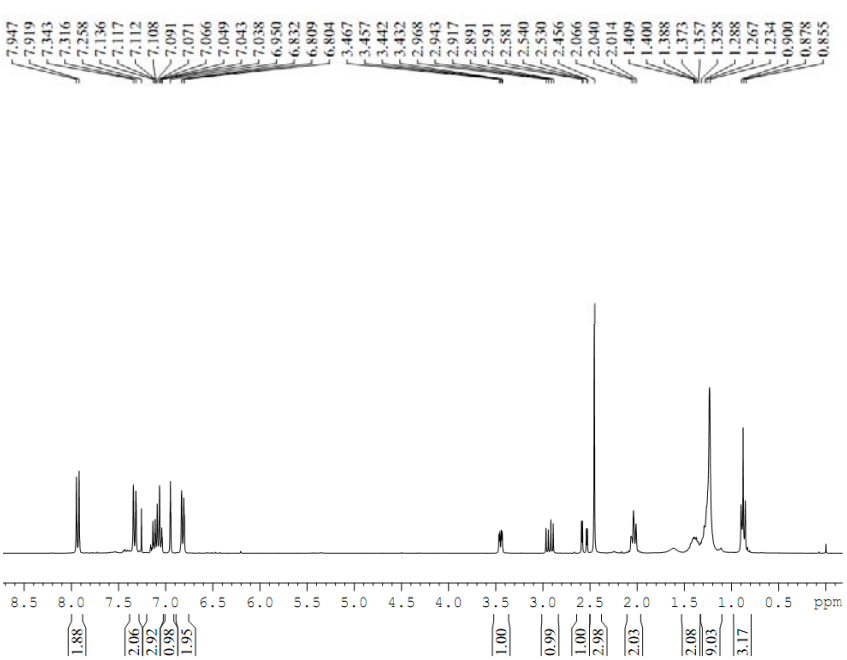
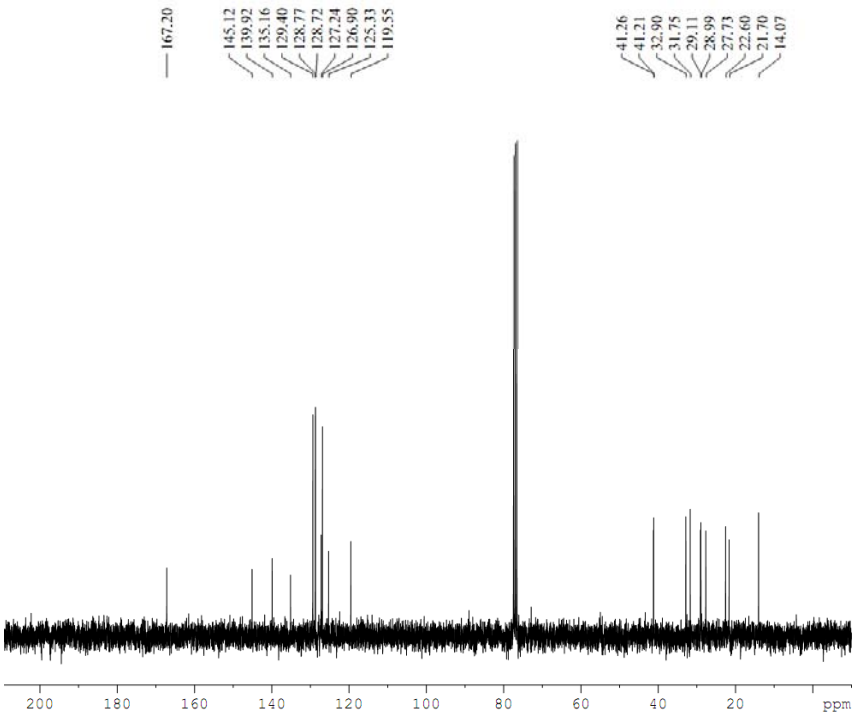


NAME	GZH-291E
EXPNO	10
PROCNO	1
Date_	20140621
Time	16.43
INSTRUM	spect
PROBHD	5 mm DUL 13C-1
PULPROG	zg30
TD	32768
SOLVENT	CDCl3
NS	13
DS	0
SWH	8992.806 Hz
FIDRES	0.274439 Hz
AQ	1.8219508 sec
RG	161.3
DW	55.600 usec
DE	6.50 usec
TE	300.0 K
D1	1.00000000 sec
TD0	1

======== CHANNEL f1 ========

NUC1	1H
P1	10.30 usec
PL1	3.00 dB
SFO1	300.1318534 MHz
SI	32768
SF	300.1300074 MHz
WDW	EM
SSB	0
LB	0.30 Hz
GB	0
PC	1.00



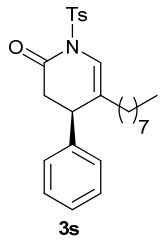
NAME	GZH-291E
EXPNO	11
PROCNO	1
Date_	20140621
Time	16.49
INSTRUM	spect
PROBHD	5 mm DUL 13C-1
PULPROG	zgpg30
TD	65536
SOLVENT	CDCl3
NS	38
DS	4
SWH	17985.611 Hz
FIDRES	0.274439 Hz
AQ	1.8219508 sec
RG	574.7
DW	27.800 usec
DE	6.50 usec
TE	300.0 K
D1	2.00000000 sec
D11	0.03000000 sec
TD0	1

======== CHANNEL f1 ========

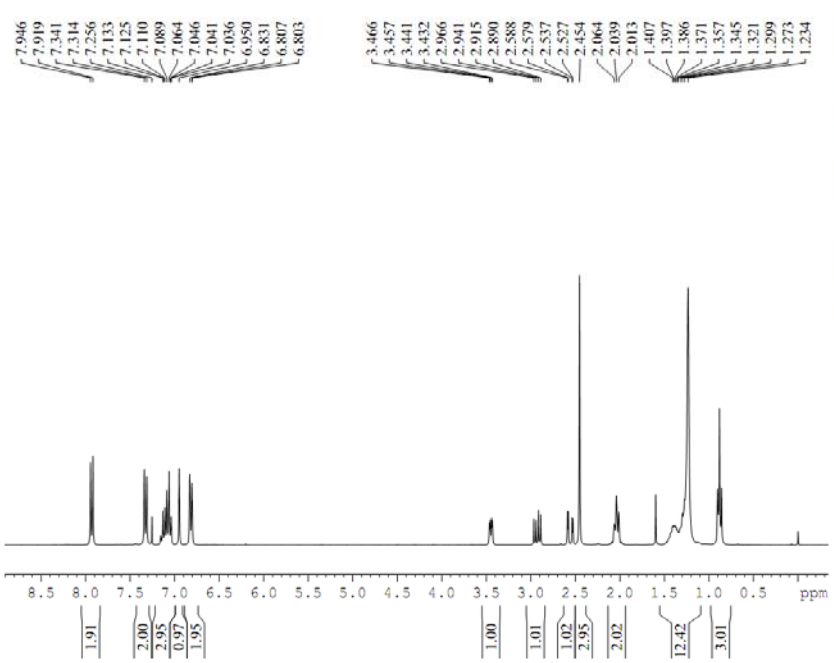
NUC1	13C
P1	12.50 usec
PL1	2.00 dB
SFO1	75.4752953 MHz

======== CHANNEL f2 ========

CPDPRG2	waltz16
NUC2	1H
PCPD2	100.00 usec
PL2	3.00 dB
PL12	22.74 dB
PL13	23.00 dB
SFO2	300.1312005 MHz
SI	32768
SF	75.4677490 MHz
WDW	EM
SSB	0
LB	1.00 Hz
GB	0
PC	1.40



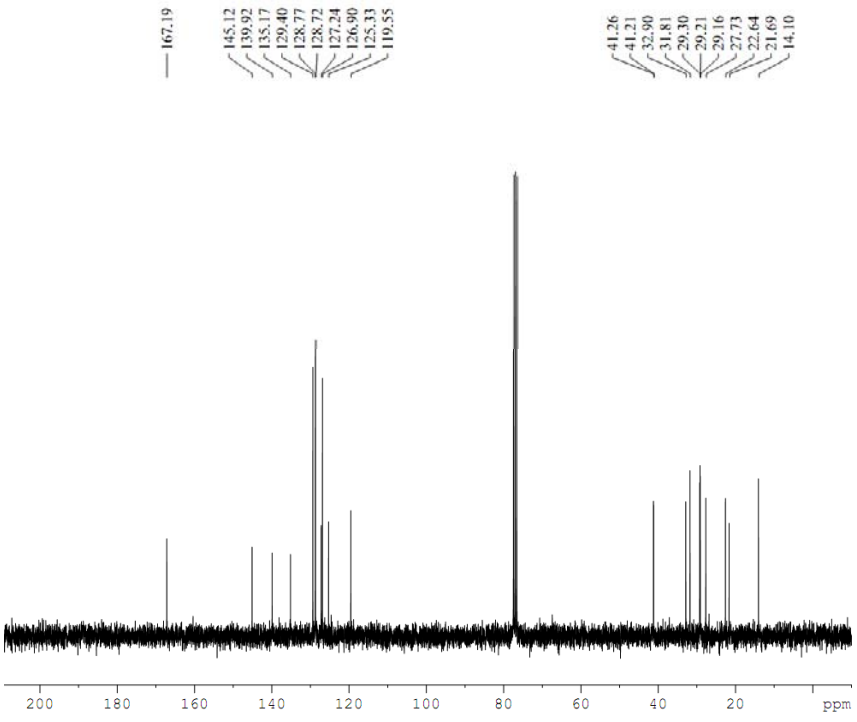
3s



NAME	gzh-294C
EXPNO	10
PROCNO	1
Date_	20140626
Time	21.22
INSTRUM	spect
PROBHD	5 mm DUL 13C-1
PULPROG	zg30
TD	32768
SOLVENT	CDCl3
NS	16
DS	0
SWH	8992.806 Hz
FIDRES	0.274439 Hz
AQ	1.8219508 sec
RG	90.5
DW	55.600 usec
DE	6.50 usec
TE	300.2 K
D1	1.00000000 sec
TD0	1

======== CHANNEL f1 ========

NUC1	1H
P1	10.30 usec
PL1	3.00 dB
SFO1	300.1318534 MHz
SI	32768
SF	300.1300081 MHz
WDW	EM
SSB	0
LB	0.30 Hz
GB	0
PC	1.00



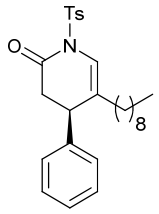
NAME	gzh-294C
EXPNO	11
PROCNO	1
Date_	20140626
Time	21.27
INSTRUM	spect
PROBHD	5 mm DUL 13C-1
PULPROG	zgpg30
TD	65536
SOLVENT	CDCl3
NS	45
DS	4
SWH	17985.611 Hz
FIDRES	0.274439 Hz
AQ	1.8219508 sec
RG	645.1
DW	27.800 usec
DE	6.50 usec
TE	300.4 K
D1	2.00000000 sec
D11	0.03000000 sec
TD0	1

======== CHANNEL f1 ========

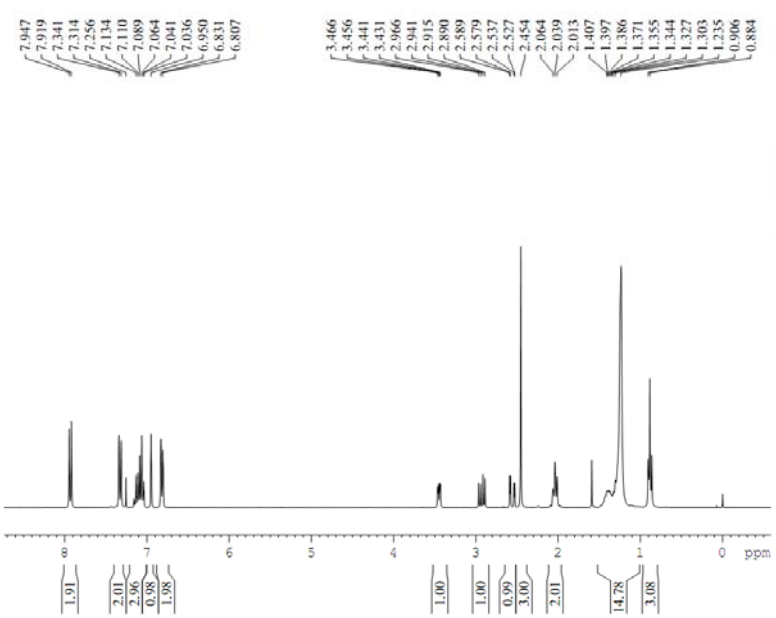
NUC1	13C
P1	12.50 usec
PL1	2.00 dB
SFO1	75.4752953 MHz

======== CHANNEL f2 ========

CPDPRG2	waltz16
NUC2	1H
PCPD2	100.00 usec
PL2	3.00 dB
PL12	22.74 dB
PL13	23.00 dB
SFO2	300.1312005 MHz
SI	32768
SF	75.4677490 MHz
WDW	EM
SSB	0
LB	1.00 Hz
GB	0
PC	1.40



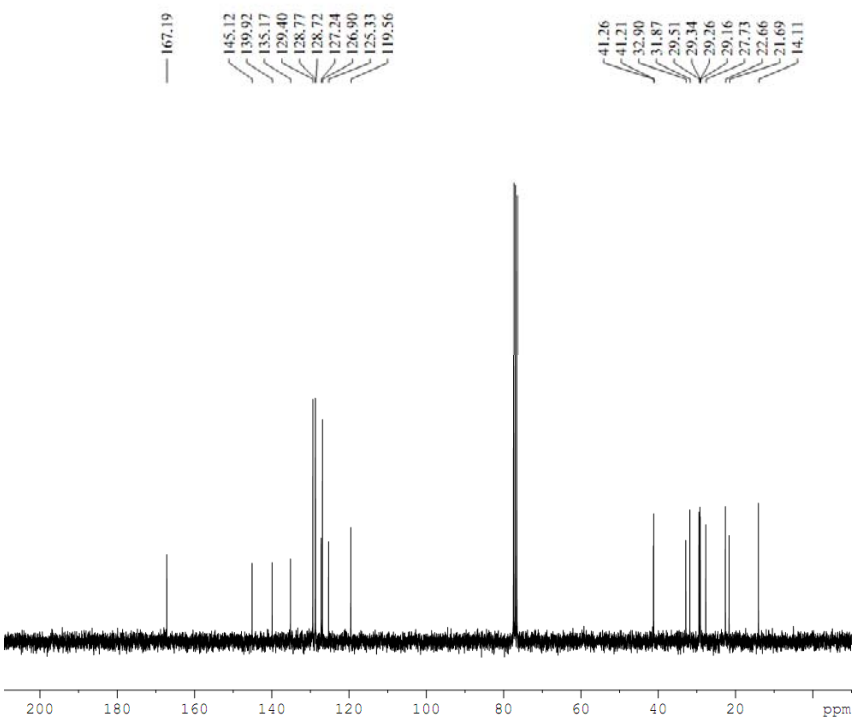
3t



NAME	gzh-294E
EXPNO	10
PROCNO	1
Date_	20140626
Time	21.43
INSTRUM	spect
PROBHD	5 mm DUL 13C-1
PULPROG	zg30
TD	32768
SOLVENT	CDCl3
NS	16
DS	0
SWH	8992.806 Hz
FIDRES	0.274439 Hz
AQ	1.8219508 sec
RG	90.5
DW	55.600 usec
DE	6.50 usec
TE	300.1 K
D1	1.00000000 sec
TD0	1

======== CHANNEL f1 ========

NUC1	1H
P1	10.30 usec
PL1	3.00 dB
SFO1	300.1318534 MHz
SI	32768
SF	300.1300082 MHz
WDW	EM
SSB	0
LB	0.30 Hz
GB	0
PC	1.00



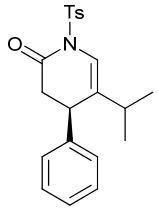
NAME	gzh-294E
EXPNO	11
PROCNO	1
Date_	20140626
Time	21.50
INSTRUM	spect
PROBHD	5 mm DUL 13C-1
PULPROG	zgpg30
TD	65536
SOLVENT	CDCl3
NS	64
DS	4
SWH	17985.611 Hz
FIDRES	0.274439 Hz
AQ	1.8219508 sec
RG	812.7
DW	27.800 usec
DE	6.50 usec
TE	300.4 K
D1	2.00000000 sec
D11	0.03000000 sec
TD0	1

======== CHANNEL f1 ========

NUC1	13C
P1	12.50 usec
PL1	2.00 dB
SFO1	75.4752953 MHz

======== CHANNEL f2 ========

CPDPRG2	waltz16
NUC2	1H
PCPD2	100.00 usec
PL2	3.00 dB
PL12	22.74 dB
PL13	23.00 dB
SFO2	300.1312005 MHz
SI	32768
SF	75.4677490 MHz
WDW	EM
SSB	0
LB	1.00 Hz
GB	0
PC	1.40



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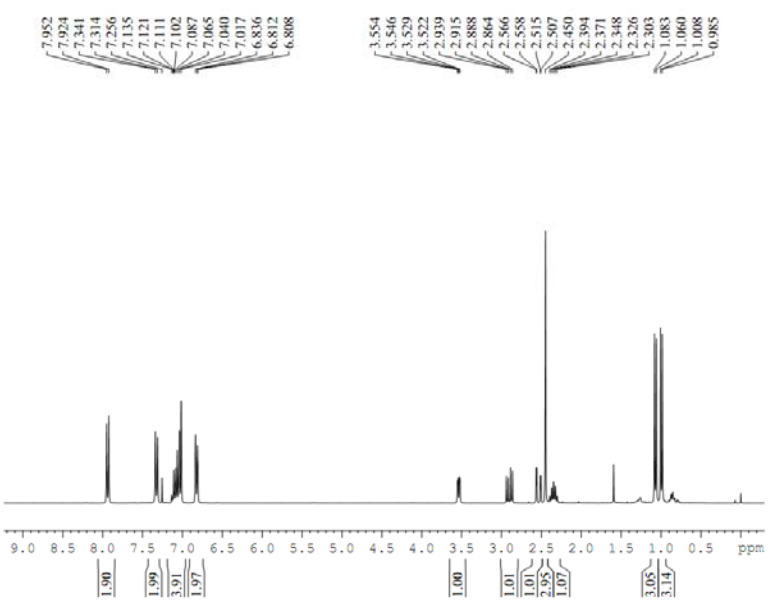
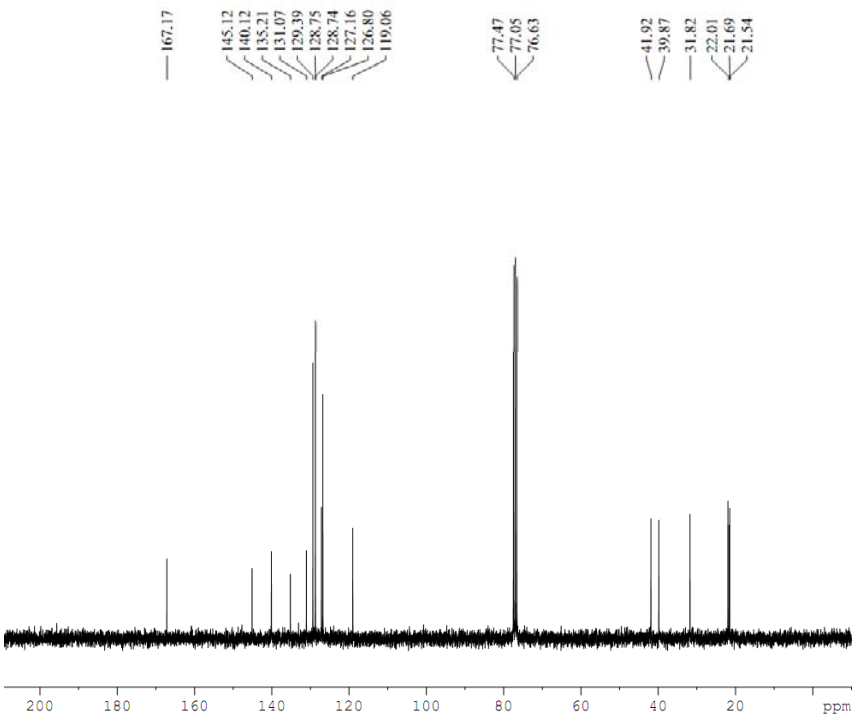


NAME gzh-293a
EXPNO 10
PROCNO 1
Date_ 20140624
Time 18.38
INSTRUM spect
PROBHD 5 mm DUL 13C-1
PULPROG zg30
TD 32768
SOLVENT CDCl3
NS 16
DS 0
SWH 8992.806 Hz
FIDRES 0.274439 Hz
AQ 1.8219508 sec
RG 128
DW 55.600 usec
DE 6.50 usec
TE 299.7 K
D1 1.00000000 sec
TD0 1

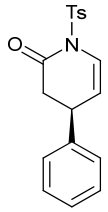
======== CHANNEL f1 ========
NUC1 1H
P1 10.30 usec
PL1 3.00 dB
SFO1 300.1318534 MHz
SI 32768
SF 300.1300080 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00



NAME gzh-293a
EXPNO 11
PROCNO 1
Date_ 20140624
Time 18.43
INSTRUM spect
PROBHD 5 mm DUL 13C-1
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 60
DS 4
SWH 17985.611 Hz
FIDRES 0.274439 Hz
AQ 1.8219508 sec
RG 645.1
DW 27.800 usec
DE 6.50 usec
TE 300.1 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1

======== CHANNEL f1 ========
NUC1 13C
P1 12.50 usec
PL1 2.00 dB
SFO1 75.4752953 MHz

======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 100.00 usec
PL2 3.00 dB
PL12 22.74 dB
PL13 23.00 dB
SFO2 300.1312005 MHz
SI 32768
SF 75.4677490 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40



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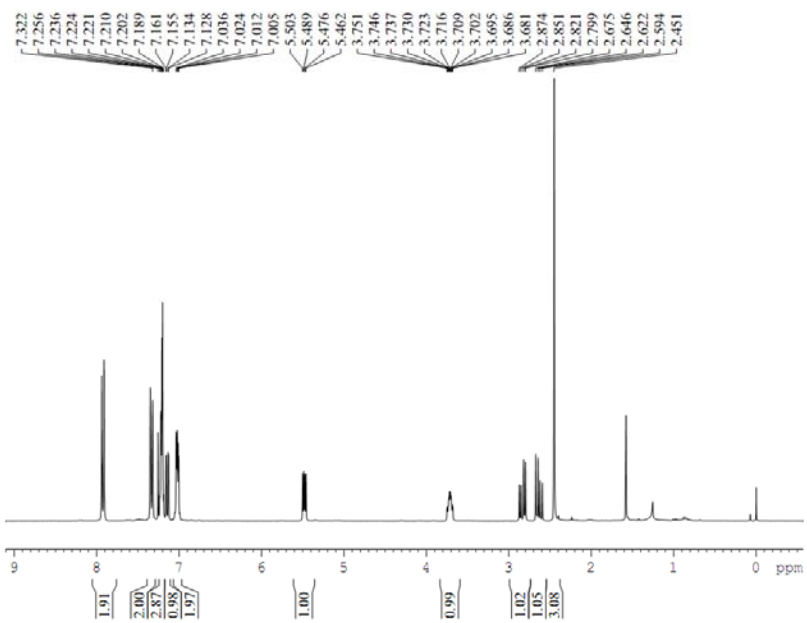
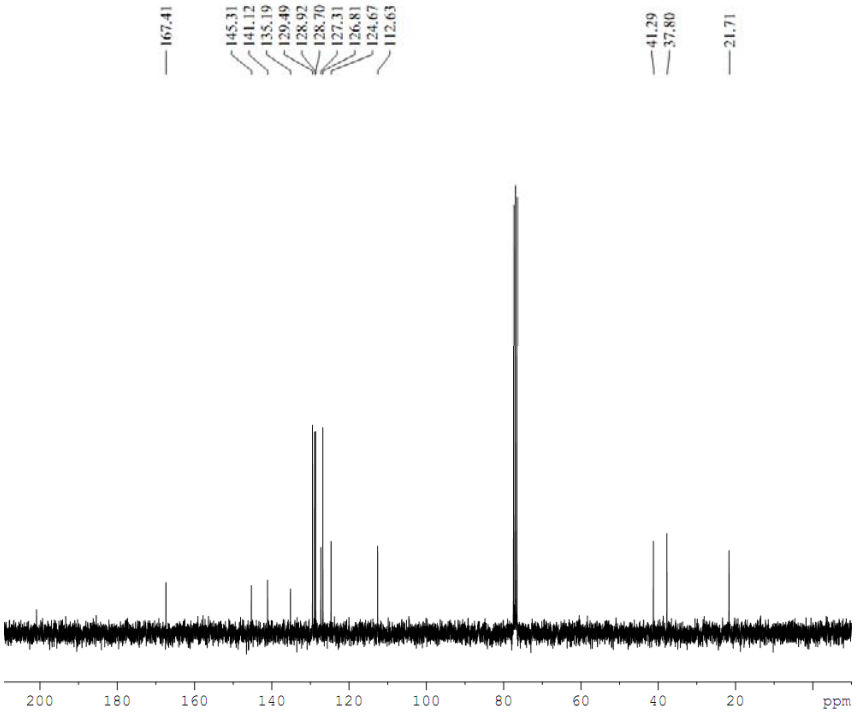
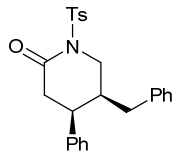


NAME	gzh-294a
EXPNO	20
PROCNO	1
Date_	20140626
Time	21.08
INSTRUM	spect
PROBHD	5 mm DUL 13C-1
PULPROG	zg30
TD	32768
SOLVENT	CDCl3
NS	16
DS	0
SWH	8992.806 Hz
FIDRES	0.274439 Hz
AQ	1.8219508 sec
RG	256
DW	55.600 usec
DE	6.50 usec
TE	300.2 K
D1	1.00000000 sec
TD0	1
======== CHANNEL f1 ========	
NUC1	1H
P1	10.30 usec
PL1	3.00 dB
SFO1	300.1318534 MHz
SI	32768
SF	300.1300080 MHz
WDW	EM
SSB	0
LB	0.30 Hz
GB	0
PC	1.00



NAME	gzh-294a
EXPNO	21
PROCNO	1
Date_	20140626
Time	21.16
INSTRUM	spect
PROBHD	5 mm DUL 13C-1
PULPROG	zgpg30
TD	65536
SOLVENT	CDCl3
NS	52
DS	4
SWH	17985.611 Hz
FIDRES	0.274439 Hz
AQ	1.8219508 sec
RG	812.7
DW	27.800 usec
DE	6.50 usec
TE	300.2 K
D1	2.00000000 sec
D11	0.03000000 sec
TD0	1
======== CHANNEL f1 ========	
NUC1	13C
P1	12.50 usec
PL1	2.00 dB
SFO1	75.4752953 MHz
======== CHANNEL f2 ========	
CPDPRG2	waltz16
NUC2	1H
PCPD2	100.00 usec
PL2	3.00 dB
PL12	22.74 dB
PL13	23.00 dB
SFO2	300.1312005 MHz
SI	32768
SF	75.4677490 MHz
WDW	EM
SSB	0
LB	1.00 Hz
GB	0
PC	1.40



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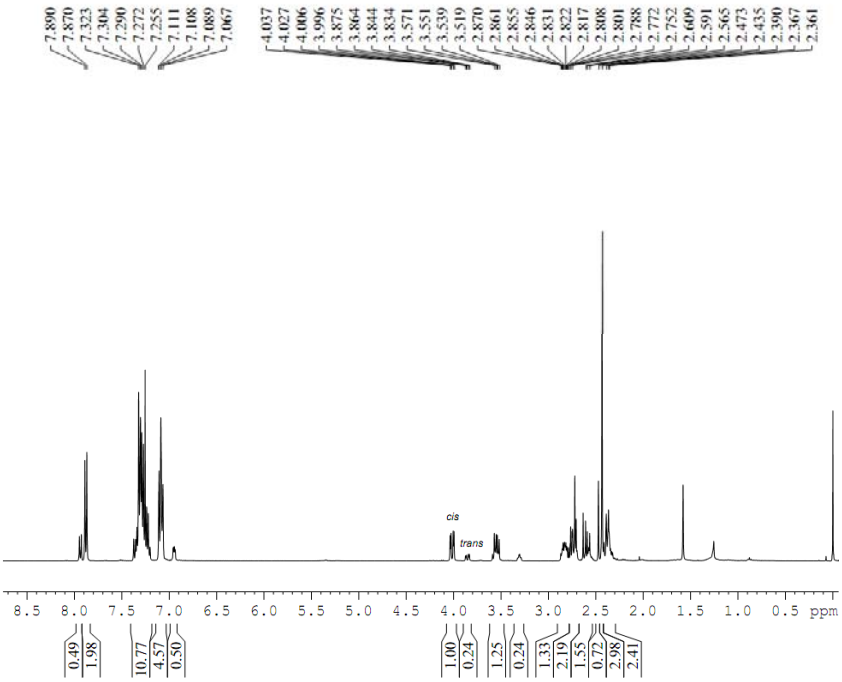
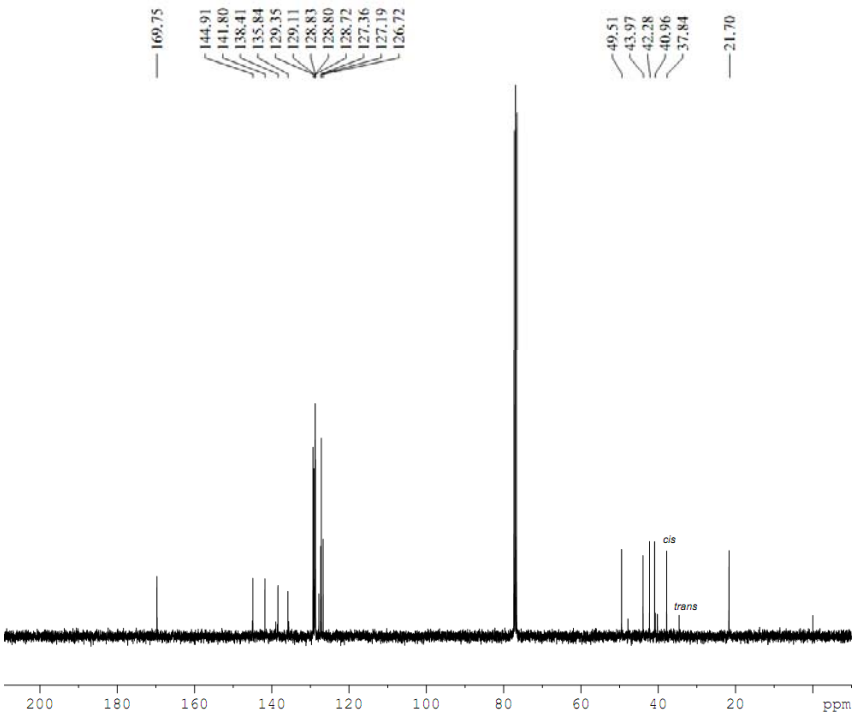


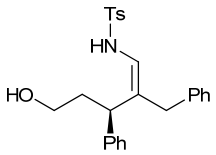
NAME gzh-393A
EXPNO 241
PROCNO 1
Date_ 20150508
Time 21.26
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zg30
TD 32768
SOLVENT CDCl3
NS 16
DS 0
SWH 8012.820 Hz
FIDRES 0.244532 Hz
AQ 2.0447731 sec
RG 125.02
DW 62.400 usec
DE 6.50 usec
TE 298.3 K
D1 2.00000000 sec
TD0 1

======== CHANNEL f1 ========
SFO1 400.2424716 MHz
NUC1 1H
P1 14.80 usec
SI 65536
SF 400.2400118 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

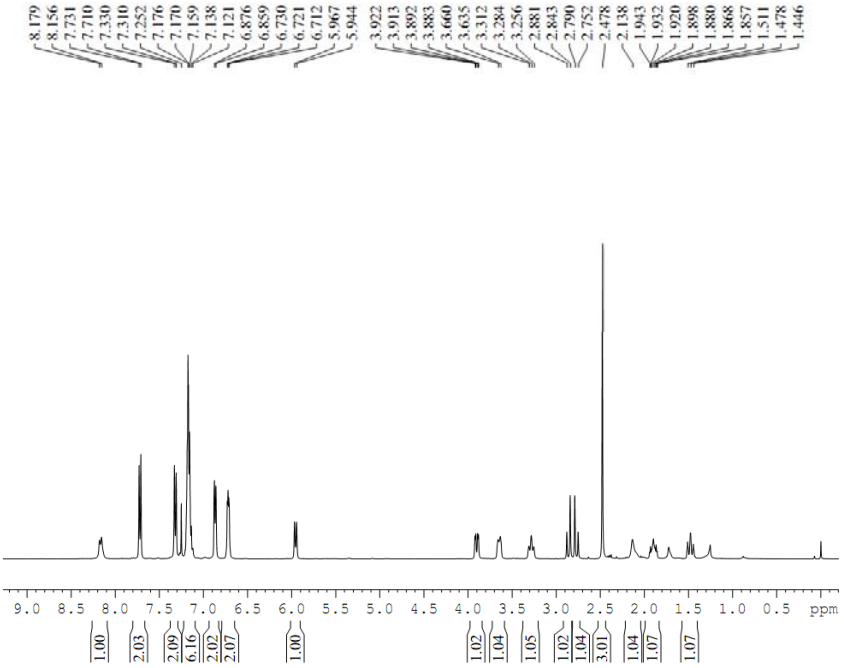


NAME gzh-393A
EXPNO 242
PROCNO 1
Date_ 20150508
Time 21.30
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 156
DS 4
SWH 24038.461 Hz
FIDRES 0.366798 Hz
AQ 1.3631988 sec
RG 206.33
DW 20.800 usec
DE 6.50 usec
TE 299.2 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1

======== CHANNEL f1 ========
SFO1 100.6504916 MHz
NUC1 13C
P1 10.00 usec
SI 32768
SF 100.6404280 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40



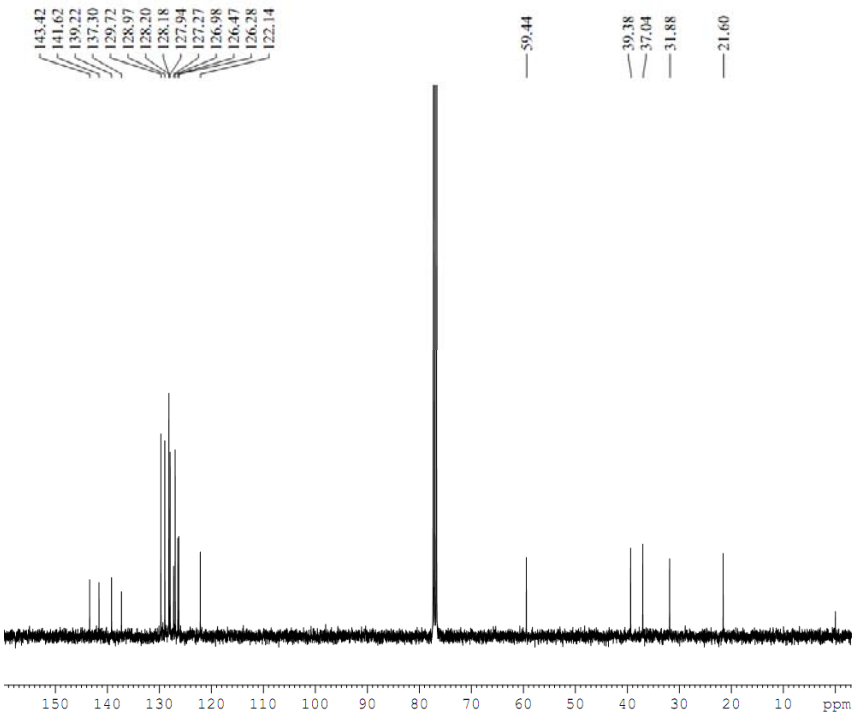
7



NAME	gzh-s230A
EXPNO	251
PROCNO	1
Date_	20150521
Time	20.48
INSTRUM	spect
PROBHD	5 mm PABBO BB/
PULPROG	zg30
TD	32768
SOLVENT	CDCl3
NS	16
DS	0
SWH	8012.820 Hz
FIDRES	0.244532 Hz
AQ	2.0447731 sec
RG	102.73
DW	62.400 usec
DE	6.50 usec
TE	298.0 K
D1	2.00000000 sec
TD0	1

======== CHANNEL f1 ========

SFO1	400.2424716 MHz
NUC1	1H
P1	14.80 usec
SI	65536
SF	400.2400129 MHz
WDW	EM
SSB	0
LB	0.30 Hz
GB	0
PC	1.00

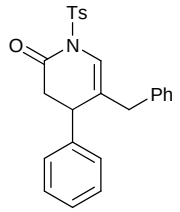


NAME	gzh-s230A
EXPNO	248
PROCNO	1
Date_	20150517
Time	19.29
INSTRUM	spect
PROBHD	5 mm PABBO BB/
PULPROG	zgpg30
TD	65536
SOLVENT	CDCl3
NS	250
DS	4
SWH	24038.461 Hz
FIDRES	0.366798 Hz
AQ	1.3631988 sec
RG	206.33
DW	20.800 usec
DE	6.50 usec
TE	299.0 K
D1	2.00000000 sec
D11	0.03000000 sec
TD0	1

======== CHANNEL f1 ========

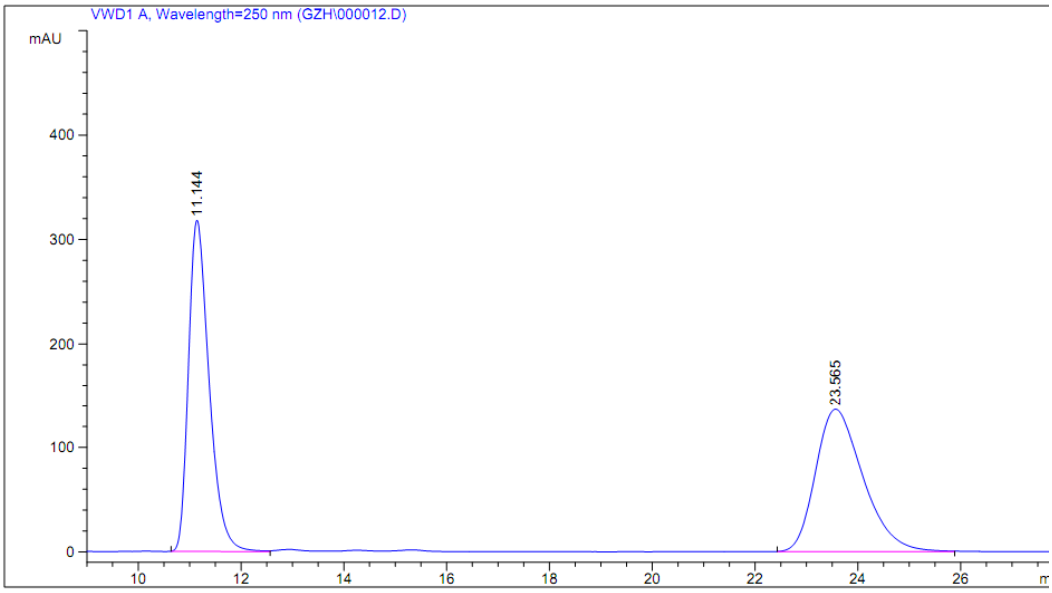
SFO1	100.6504916 MHz
NUC1	13C
P1	10.00 usec
SI	32768
SF	100.6404280 MHz
WDW	EM
SSB	0
LB	1.00 Hz
GB	0
PC	1.40

Part IV HPLC Spectra

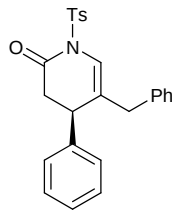


***rac*-3a**

```
======================================================================
Acq. Operator   : gzh
Acq. Instrument : Instrument 1                    Location : Vial 1
Injection Date  : 2014-4-30 9:05:45
Acq. Method     : C:\CHEM32\1\METHODS\JWQ20121205.M
Last changed    : 2014-4-30 8:45:52  by gzh
                  (modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\JWQ20121205.M
Last changed    : 2014-9-6 15:41:57  by ckq
                  (modified after loading)
Sample Info     :
                  OD-H H:I=80:20 1.0ml\min  250nm
```

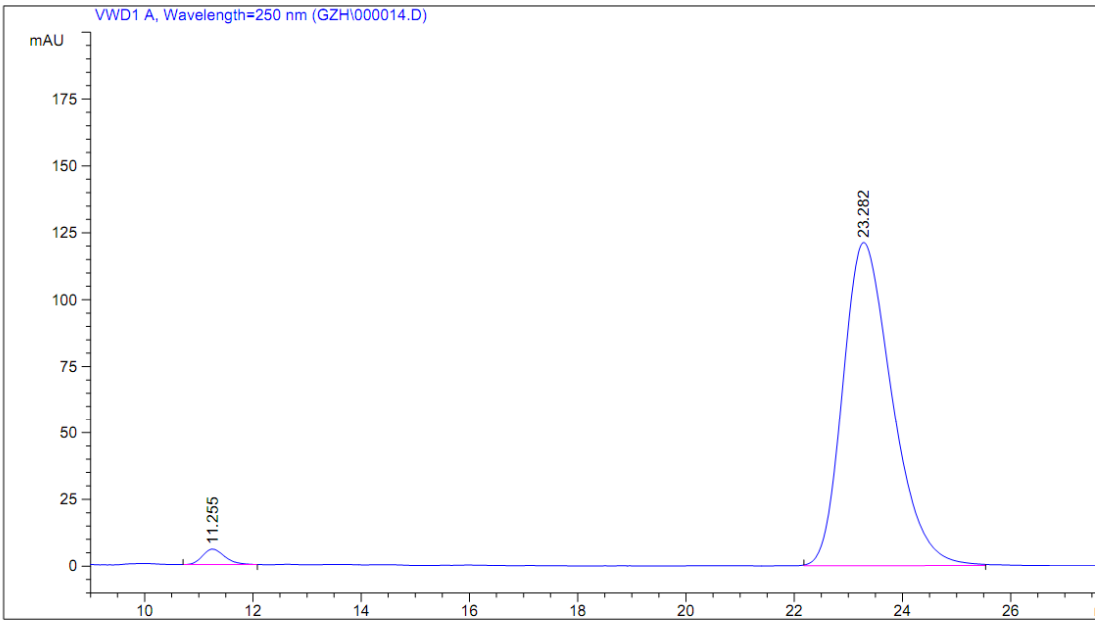



```
======================================================================
                        Area Percent Report
======================================================================

Sorted By             :      Signal
Multiplier            :      1.0000
Dilution              :      1.0000
Use Multiplier & Dilution Factor with ISTDs


Signal 1: VWD1 A, Wavelength=250 nm

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]  mAU   *s    [mAU   ]      %
----|-------|----|-------|----------|---------|--------|
   1  11.144 BB    0.4302 8862.30859  317.76782  50.3474
   2  23.565 BB    0.9800 8739.99316  136.49770  49.6526

Totals :                  1.76023e4   454.26552

======================================================================
                        *** End of Report ***
```

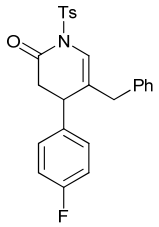


3a

```
======================================================================
Acq. Operator   : gzh
Acq. Instrument : Instrument 1                    Location : Vial 1
Injection Date  : 2014-4-30 10:21:39
Acq. Method     : C:\CHEM32\1\METHODS\JWQ20121205.M
Last changed    : 2014-4-30 8:45:52  by gzh
                  (modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\JWQ20121205.M
Last changed    : 2014-9-6 15:47:14  by ckq
                  (modified after loading)
Sample Info     :
                  OD-H H:I=80:20 1.0ml\min  250nm
```

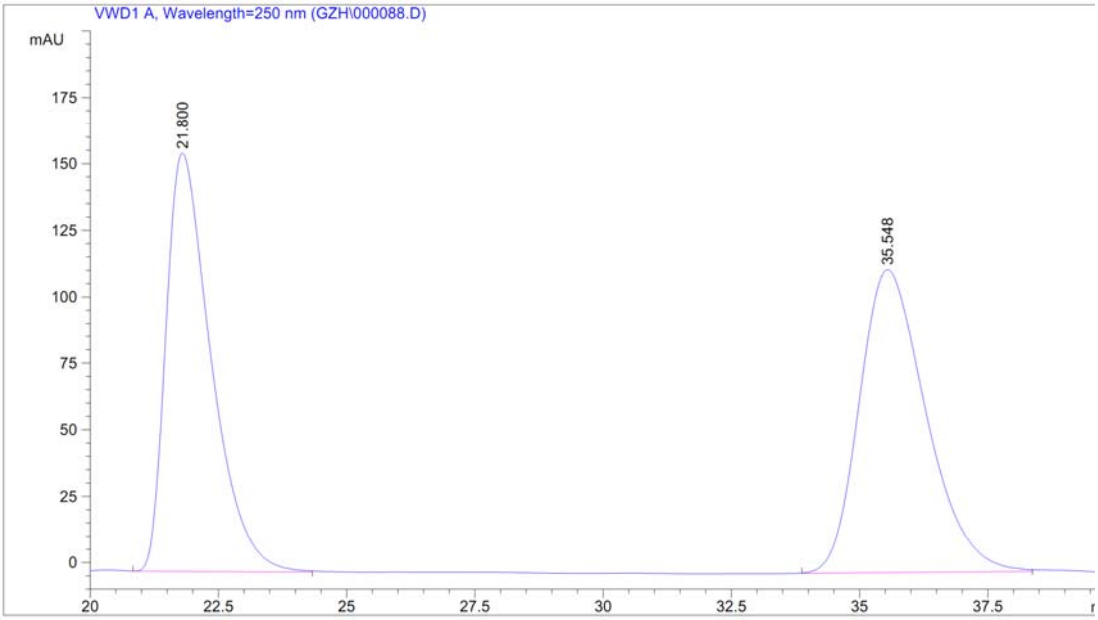



```
======================================================================
                          Area Percent Report
======================================================================

Sorted By             :      Signal
Multiplier            :      1.0000
Dilution              :      1.0000
Use Multiplier & Dilution Factor with ISTDs


Signal 1: VWD1 A, Wavelength=250 nm

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]  mAU   *s   [mAU   ]      %
----|-------|----|-------|----------|----------|--------|
   1  11.255 BB    0.4446  165.32083    5.77603   2.1238
   2  23.282 BB    0.9722 7618.93408  121.19239  97.8762

Totals :                  7784.25491  126.96842

======================================================================
                          *** End of Report ***
```

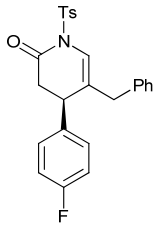


***rac*-3b**

```
======================================================================
Acq. Operator   : gzh
Acq. Instrument : Instrument 1                    Location : Vial 1
Injection Date  : 2014-6-30 19:47:34
Acq. Method     : C:\CHEM32\1\METHODS\JWQ20121205.M
Last changed    : 2014-6-30 19:48:48  by gzh
                  (modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\JWQ20121205.M
Last changed    : 2014-9-6 16:57:17  by ckq
                  (modified after loading)
Sample Info     : OD-H  H/I=90:10 1.0ml/min  250nm
```

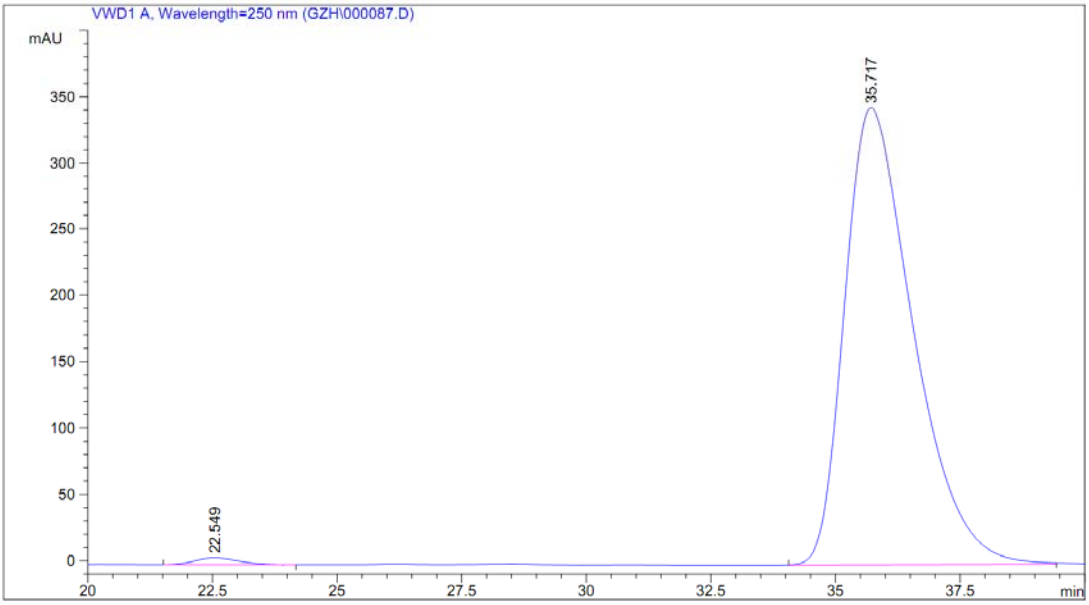



```
======================================================================
                        Area Percent Report
======================================================================

Sorted By             :      Signal
Multiplier            :      1.0000
Dilution              :      1.0000
Use Multiplier & Dilution Factor with ISTDs


Signal 1: VWD1 A, Wavelength=250 nm

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]  mAU   *s   [mAU   ]      %
----|-------|----|-------|----------|----------|--------|
   1  21.800 BB    0.9211 9588.48340  157.24026  48.2268
   2  35.548 BB    1.3848 1.02936e4   114.06869  51.7732

Totals :                  1.98821e4   271.30895

======================================================================
                        *** End of Report ***
```

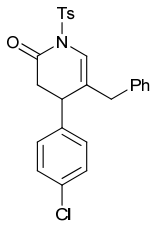


3b

```
======================================================================
Acq. Operator   : gzh
Acq. Instrument : Instrument 1                    Location : Vial 1
Injection Date  : 2014-6-30 19:05:17
Acq. Method     : C:\CHEM32\1\METHODS\JWQ20121205.M
Last changed    : 2014-6-30 19:06:03  by gzh
                  (modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\JWQ20121205.M
Last changed    : 2014-9-6 16:57:56  by ckq
                  (modified after loading)
Sample Info     : OD-H  H/I=90:10 1.0ml/min  250nm
```

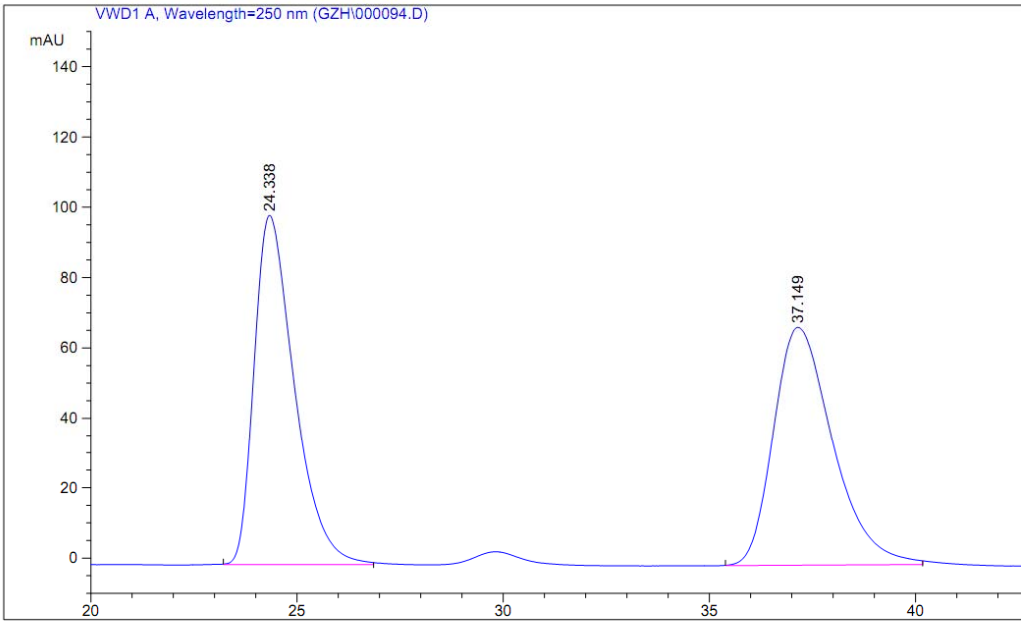



```
======================================================================
                        Area Percent Report
======================================================================

Sorted By             :      Signal
Multiplier            :      1.0000
Dilution              :      1.0000
Use Multiplier & Dilution Factor with ISTDs


Signal 1: VWD1 A, Wavelength=250 nm

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]  mAU   *s   [mAU   ]      %
----|-------|----|-------|----------|---------|--------|
   1  22.549 BB    0.9072  318.03244    5.36396   0.9582
   2  35.717 BB    1.4500 3.28737e4   344.84567  99.0418

Totals :                  3.31917e4   350.20963

======================================================================
                        *** End of Report ***
```

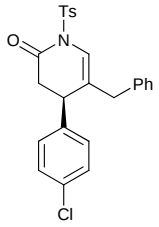


***rac*-3c**

```
======================================================================
Acq. Operator   : gzh
Acq. Instrument : Instrument 1                    Location : Vial 1
Injection Date  : 2014-7-1 21:19:44
Acq. Method     : C:\CHEM32\1\METHODS\JWQ20121205.M
Last changed    : 2014-7-1 19:01:51  by gzh
                  (modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\JWQ20121205.M
Last changed    : 2014-9-6 17:09:12  by ckq
                  (modified after loading)
Sample Info     : OD-H  H/I=90:10 1.0ml/min  250nm
```

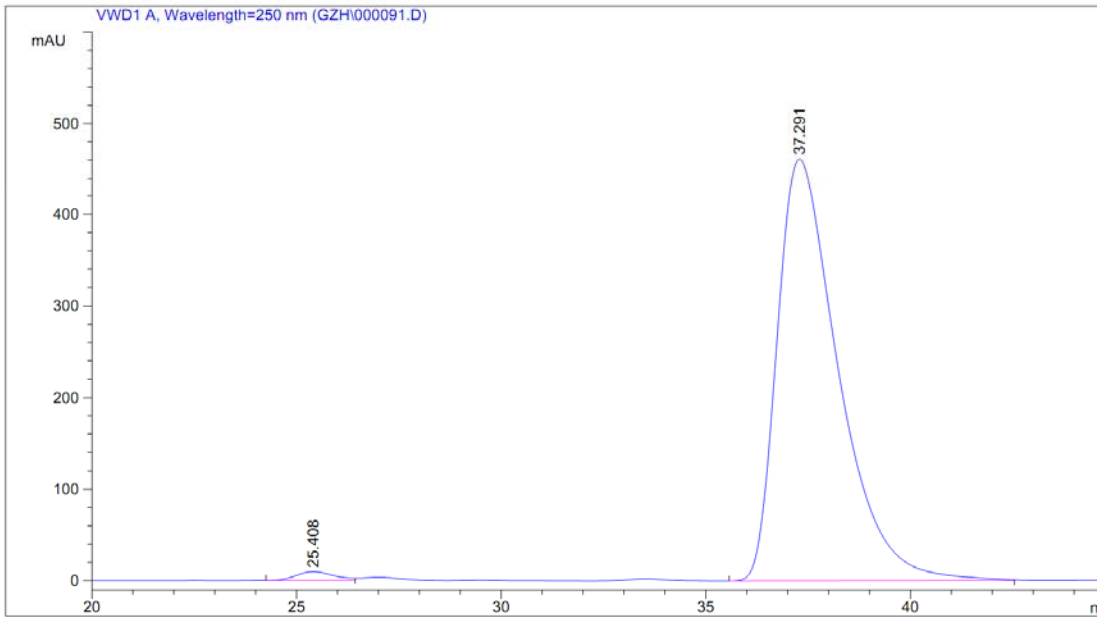



```
======================================================================
                        Area Percent Report
======================================================================

Sorted By             :      Signal
Multiplier            :      1.0000
Dilution              :      1.0000
Use Multiplier & Dilution Factor with ISTDs


Signal 1: VWD1 A, Wavelength=250 nm

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]  mAU   *s    [mAU   ]      %
----|-------|----|-------|----------|----------|--------|
   1  24.338 BB    1.0225 6735.62842   99.52602  49.8837
   2  37.149 BB    1.5250 6767.04785   67.83276  50.1163

Totals :                  1.35027e4   167.35877

======================================================================
                        *** End of Report ***
```

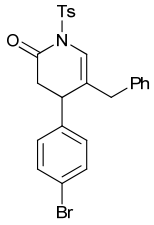


3c

```
==========================================================================
Acq. Operator   : gzh
Acq. Instrument : Instrument 1                    Location : Vial 1
Injection Date  : 2014-7-1 17:10:33
Acq. Method     : C:\CHEM32\1\METHODS\JWQ20121205.M
Last changed    : 2014-7-1 17:12:10  by gzh
                  (modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\JWQ20121205.M
Last changed    : 2014-9-6 17:07:07  by ckq
                  (modified after loading)
Sample Info     : OD-H  H/I=90:10 1.0ml/min  250nm
```

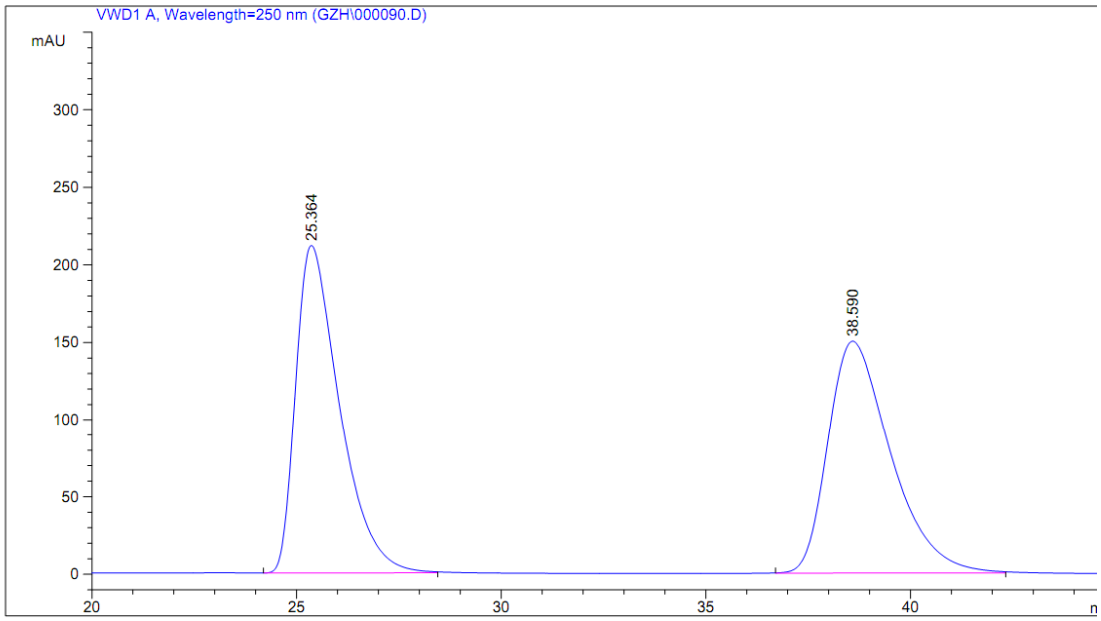



```
==========================================================================
                        Area Percent Report
==========================================================================

Sorted By             :      Signal
Multiplier            :      1.0000
Dilution              :      1.0000
Use Multiplier & Dilution Factor with ISTDs


Signal 1: VWD1 A, Wavelength=250 nm

Peak RetTime Type  Width     Area      Height     Area
  #   [min]       [min]  mAU   *s   [mAU   ]      %
----|-------|----|-------|----------|----------|--------|
   1  25.408 BV    0.9998  632.42487    9.69557   1.3082
   2  37.291 BB    1.5618 4.77120e4   461.36832  98.6918

Totals :                  4.83444e4   471.06388

==========================================================================
                        *** End of Report ***
```

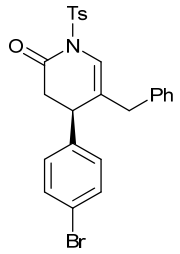


***rac*-3d**

```
======================================================================
Acq. Operator   : gzh
Acq. Instrument : Instrument 1                    Location : Vial 1
Injection Date  : 2014-7-1 16:15:14
Acq. Method     : C:\CHEM32\1\METHODS\JWQ20121205.M
Last changed    : 2014-7-1 16:16:38  by gzh
                  (modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\JWQ20121205.M
Last changed    : 2014-9-6 17:03:53  by ckq
                  (modified after loading)
Sample Info     : OD-H  H/I=90:10 1.0ml/min  250nm
```

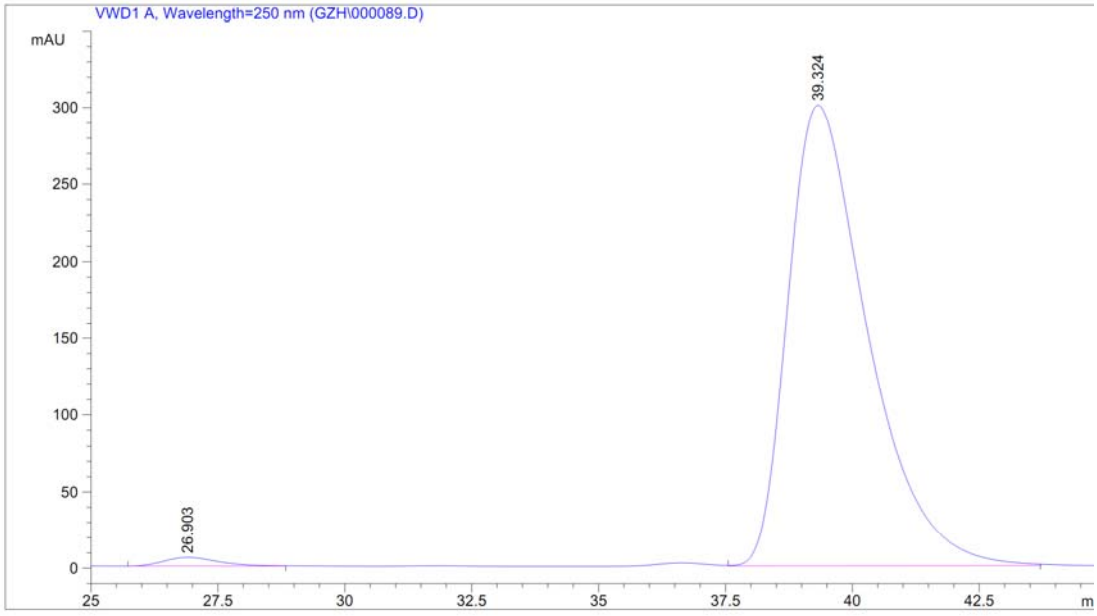



```
======================================================================
                          Area Percent Report
======================================================================

Sorted By             :      Signal
Multiplier            :      1.0000
Dilution              :      1.0000
Use Multiplier & Dilution Factor with ISTDs


Signal 1: VWD1 A, Wavelength=250 nm

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]  mAU   *s   [mAU   ]      %
----|-------|----|-------|----------|----------|--------|
   1  25.364 BB    1.1255 1.57761e4   211.73230  49.7148
   2  38.590 BB    1.6422 1.59571e4   150.09341  50.2852

Totals :                  3.17332e4   361.82571

======================================================================
                          *** End of Report ***
```

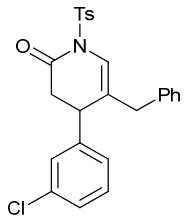


3d

```
====================================================================
Acq. Operator   : gzh
Acq. Instrument : Instrument 1                    Location : Vial 1
Injection Date  : 2014-7-1 15:27:59
Acq. Method     : C:\CHEM32\1\METHODS\JWQ20121205.M
Last changed    : 2014-7-1 15:24:52  by gzh
                  (modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\JWQ20121205.M
Last changed    : 2014-9-6 17:01:43  by ckq
                  (modified after loading)
Sample Info     : OD-H  H/I=90:10 1.0ml/min  250nm
```

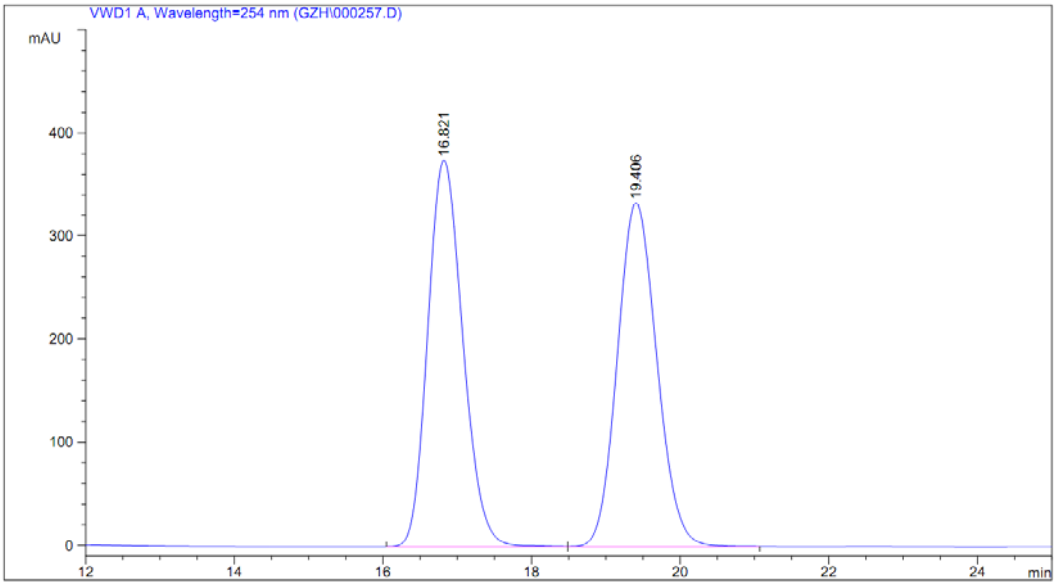



```
====================================================================
                      Area Percent Report
====================================================================

Sorted By             :      Signal
Multiplier            :      1.0000
Dilution              :      1.0000
Use Multiplier & Dilution Factor with ISTDs


Signal 1: VWD1 A, Wavelength=250 nm

Peak RetTime Type  Width     Area      Height     Area
  #   [min]       [min]  mAU   *s   [mAU   ]      %
----|-------|----|-------|----------|----------|--------|
   1  26.903 BB    1.1558  426.71927    5.71926   1.2842
   2  39.324 VB    1.6597 3.28019e4   300.08530  98.7158

Totals :                  3.32286e4   305.80455

====================================================================
                      *** End of Report ***
```

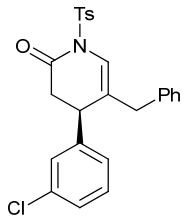


***rac*-3e**

```
Data File C:\CHEM32\1\DATA\GZH\000257.D
 Sample Name: GZH-290B 3-Cl racemic

    ======================================================================
    Acq. Operator    : gzh
    Acq. Instrument  : Instrument 1                    Location : Vial 1
    Injection Date   : 2015-5-4 20:48:09
    Acq. Method      : C:\CHEM32\1\METHODS\JWQ20121205.M
    Last changed     : 2015-5-4 20:13:32  by gzh
                       (modified after loading)
    Analysis Method  : C:\CHEM32\1\METHODS\JWQ20121205.M
    Last changed     : 2015-5-4 21:36:45  by gzh
                       (modified after loading)
    Sample Info      : OD-H H/I/M=90:6:4  1 ml/min 254 nm
```

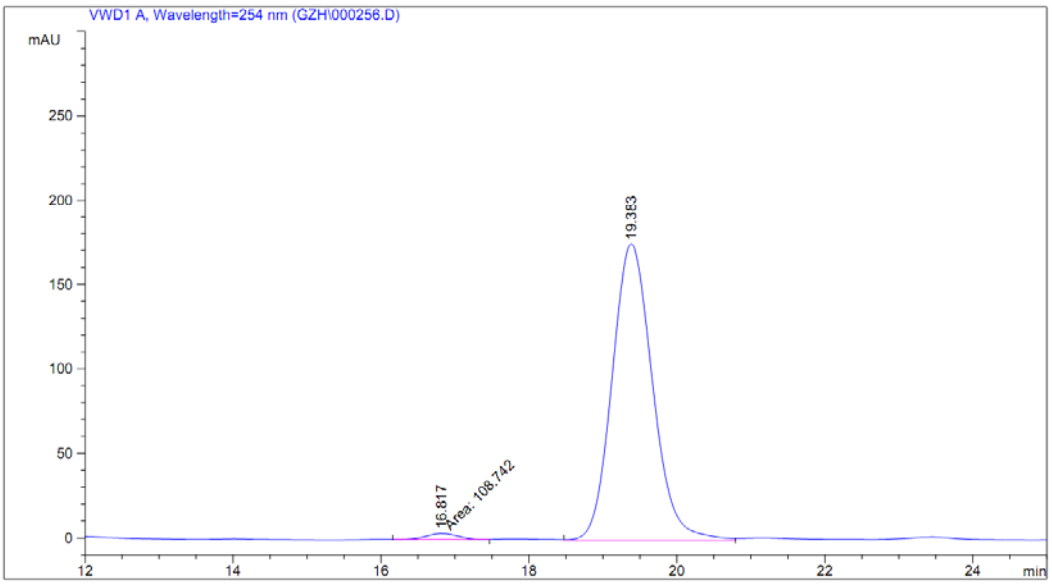



```
    ======================================================================
                              Area Percent Report
    ======================================================================

    Sorted By             :      Signal
    Multiplier            :      1.0000
    Dilution              :      1.0000
    Use Multiplier & Dilution Factor with ISTDs


    Signal 1: VWD1 A, Wavelength=254 nm

    Peak RetTime Type  Width     Area      Height     Area
      #   [min]        [min]  mAU   *s   [mAU   ]      %
    ----|-------|----|-------|----------|----------|--------|
       1  16.821 BV    0.5065 1.22560e4   375.01669  49.9466
       2  19.406 VB    0.5757 1.22822e4   333.19418  50.0534

    Totals :                  2.45381e4   708.21088

    ======================================================================
                              *** End of Report ***
```

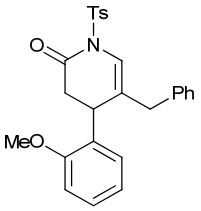


3e

```
Data File C:\CHEM32\1\DATA\GZH\000256.D
 Sample Name: GZH-391B 3-Cl

    ======================================================================
    Acq. Operator   : gzh
    Acq. Instrument : Instrument 1                    Location : Vial 1
    Injection Date  : 2015-5-4 20:18:24
    Acq. Method     : C:\CHEM32\1\METHODS\JWQ20121205.M
    Last changed    : 2015-5-4 20:13:32  by gzh
                      (modified after loading)
    Analysis Method : C:\CHEM32\1\METHODS\JWQ20121205.M
    Last changed    : 2015-5-4 21:34:53  by gzh
                      (modified after loading)
    Sample Info     : OD-H H/I/M=90:6:4  1 ml/min 254 nm
```

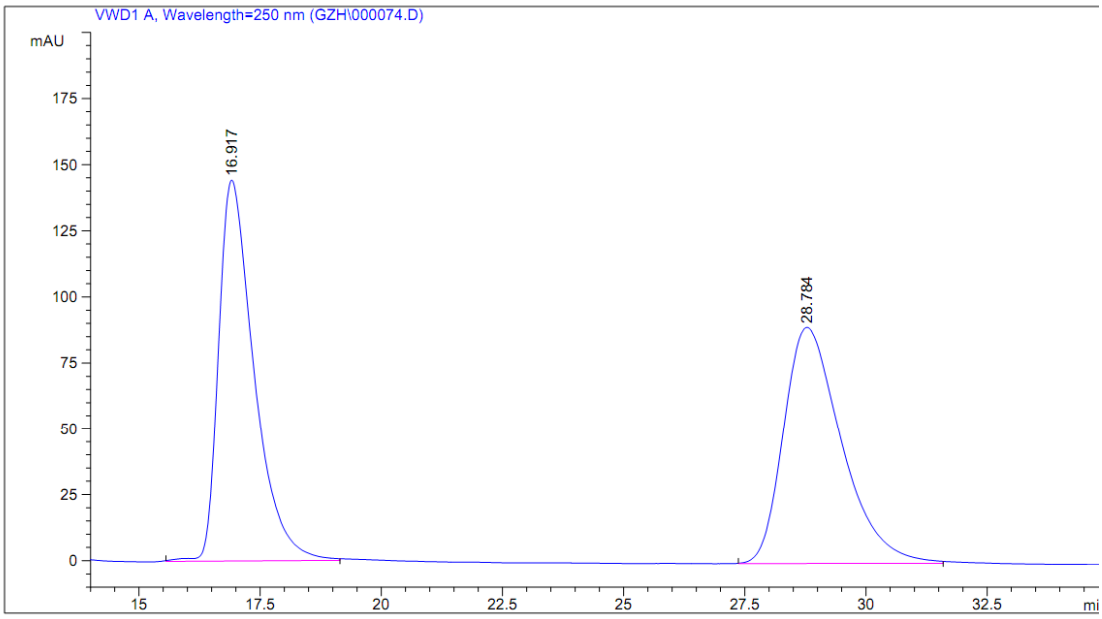



```
    ======================================================================
                              Area Percent Report
    ======================================================================

    Sorted By             :      Signal
    Multiplier            :      1.0000
    Dilution              :      1.0000
    Use Multiplier & Dilution Factor with ISTDs


    Signal 1: VWD1 A, Wavelength=254 nm

    Peak RetTime Type  Width     Area      Height     Area
      #   [min]        [min]  mAU   *s   [mAU   ]      %
    ----|-------|----|-------|----------|----------|--------|
       1  16.817 MM    0.4937  108.74156    3.67069   1.6089
       2  19.383 VV    0.5940 6650.06201  175.29417  98.3911

    Totals :                  6758.80357  178.96487

    ======================================================================
                              *** End of Report ***
```

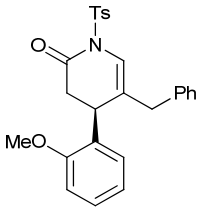


***rac*-3f**

```
======================================================================
Acq. Operator   : gzh
Acq. Instrument : Instrument 1                    Location : Vial 1
Injection Date  : 2014-6-27 20:20:31
Acq. Method     : C:\CHEM32\1\METHODS\JWQ20121205.M
Last changed    : 2014-6-27 16:55:36  by gzh
                  (modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\JWQ20121205.M
Last changed    : 2014-9-6 16:49:41  by ckq
                  (modified after loading)
Sample Info     : OD-H  H/I=90:10 1.0ml/min  250nm
```



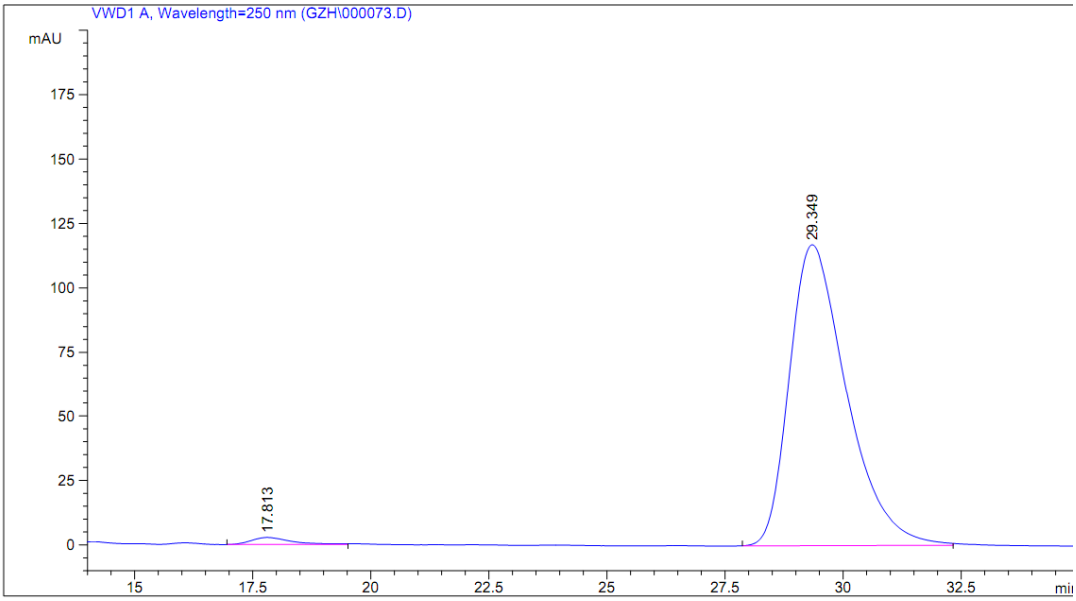

```
======================================================================
                        Area Percent Report
======================================================================

Sorted By             :      Signal
Multiplier            :      1.0000
Dilution              :      1.0000
Use Multiplier & Dilution Factor with ISTDs


Signal 1: VWD1 A, Wavelength=250 nm

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]  mAU   *s    [mAU   ]      %
----|------|----|-------|----------|----------|-------|
   1  16.917 BB    0.7668 7321.96143  144.28807  49.6161
   2  28.784 BB    1.2653 7435.25830   89.58654  50.3839

Totals :                 1.47572e4   233.87461

======================================================================
                        *** End of Report ***
```



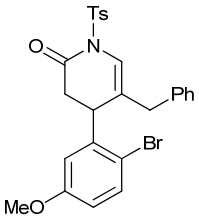
3f

Sample Name: gzh-295a

```
==================================================================
Acq. Operator   : gzh
Acq. Instrument : Instrument 1                    Location : Vial 1
Injection Date  : 2014-6-27 19:40:15
Acq. Method     : C:\CHEM32\1\METHODS\JWQ20121205.M
Last changed    : 2014-6-27 16:55:36  by gzh
                  (modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\JWQ20121205.M
Last changed    : 2014-9-6 16:50:39  by ckq
                  (modified after loading)
Sample Info     : OD-H  H/I=90:10 1.0ml/min  250nm
```

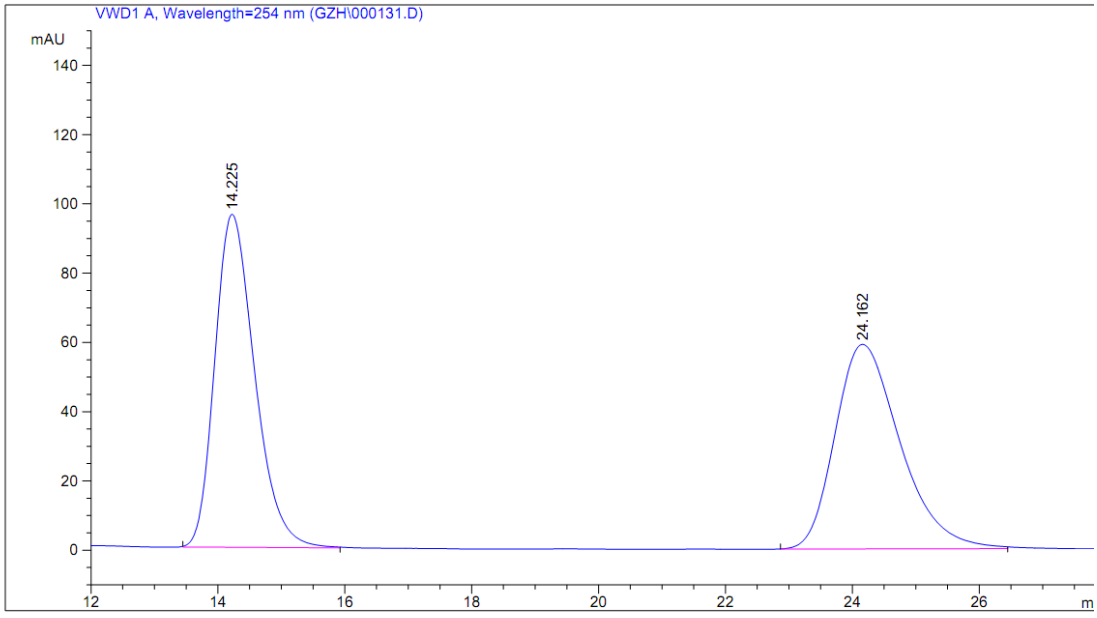



```
==================================================================
                        Area Percent Report
==================================================================

Sorted By             :      Signal
Multiplier            :      1.0000
Dilution              :      1.0000
Use Multiplier & Dilution Factor with ISTDs


Signal 1: VWD1 A, Wavelength=250 nm

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]  mAU   *s   [mAU   ]      %
----|-------|----|-------|----------|----------|--------|
   1  17.813 BB    0.8932  163.39636    2.74198   1.6347
   2  29.349 BB    1.2825 9832.20703  117.09649  98.3653

Totals :                  9995.60339  119.83847


==================================================================
                        *** End of Report ***
```

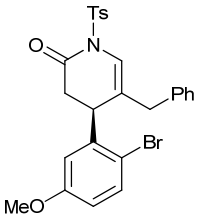


***rac*-3g**

```
==================================================================
Acq. Operator   : gzh
Acq. Instrument : Instrument 1                    Location : Vial 1
Injection Date  : 2014-9-11 10:35:54
Acq. Method     : C:\CHEM32\1\METHODS\JWQ20121205.M
Last changed    : 2014-9-11 10:28:54  by gzh
                  (modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\JWQ20121205.M
Last changed    : 2014-9-11 15:28:36  by cjt
                  (modified after loading)
Sample Info     : OD-H H/I=90:10  1mL/min  254nm
```

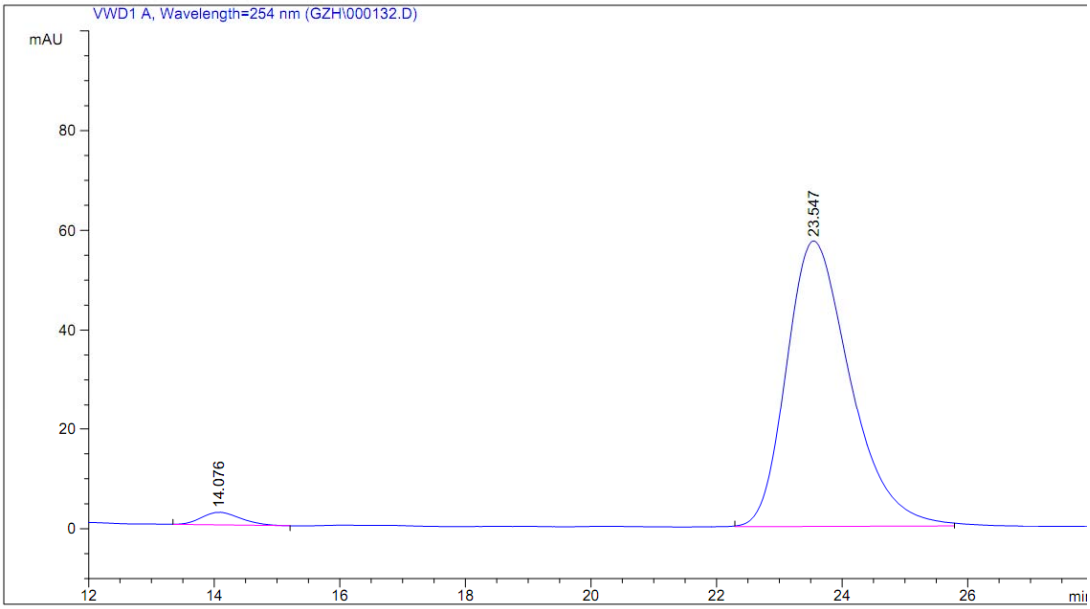



```
==================================================================
                        Area Percent Report
==================================================================

Sorted By             :      Signal
Multiplier            :      1.0000
Dilution              :      1.0000
Use Multiplier & Dilution Factor with ISTDs


Signal 1: VWD1 A, Wavelength=254 nm

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]  mAU   *s   [mAU   ]      %
----|-------|----|-------|----------|----------|--------|
   1  14.225 BB    0.6728 4200.18213   96.13531  49.9606
   2  24.162 BB    1.0930 4206.79932   59.06753  50.0394

Totals :                  8406.98145  155.20284

==================================================================
                        *** End of Report ***
```

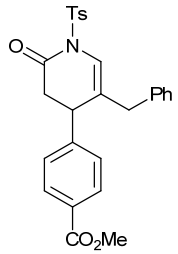


3g

```
======================================================================
Acq. Operator   : gzh
Acq. Instrument : Instrument 1                    Location : Vial 1
Injection Date  : 2014-9-11 11:15:32
Acq. Method     : C:\CHEM32\1\METHODS\JWQ20121205.M
Last changed    : 2014-9-11 10:28:54  by gzh
                  (modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\JWQ20121205.M
Last changed    : 2014-9-11 15:27:03  by cjt
                  (modified after loading)
Sample Info     : OD-H H/I=90:10  1mL/min  254nm
```

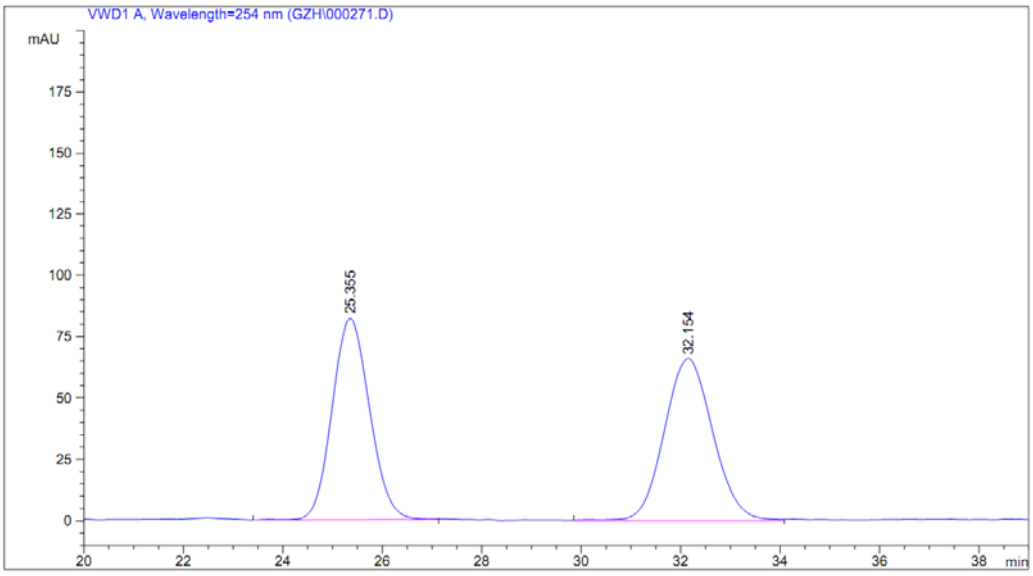



```
======================================================================
                        Area Percent Report
======================================================================

Sorted By             :      Signal
Multiplier            :      1.0000
Dilution              :      1.0000
Use Multiplier & Dilution Factor with ISTDs


Signal 1: VWD1 A, Wavelength=254 nm

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]  mAU   *s   [mAU   ]      %
----|-------|----|-------|----------|----------|--------|
   1  14.076 BB    0.6656  108.17165    2.51140   2.6053
   2  23.547 BB    1.0781 4043.85938   57.40792  97.3947

Totals :                  4152.03102   59.91932

======================================================================
                        *** End of Report ***
```

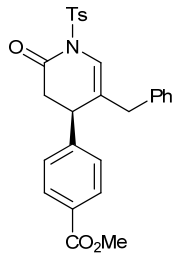


***rac*-3h**

```
Data File C:\CHEM32\1\DATA\GZH\000271.D
 Sample Name: gzh-392B 4-CO2Me racemic

    ========================================================================
    Acq. Operator    : gzh
    Acq. Instrument : Instrument 1                    Location : Vial 1
    Injection Date   : 2015-5-18 15:48:41
    Acq. Method      : C:\CHEM32\1\METHODS\JWQ20121205.M
    Last changed     : 2015-5-18 15:45:56  by gzh
                       (modified after loading)
    Analysis Method : C:\CHEM32\1\METHODS\JWQ20121205.M
    Last changed     : 2015-5-18 16:29:23  by gzh
                       (modified after loading)
    Sample Info      : OD-H H/I/M=90:6:4 1.0 ml/min 254 nm
```

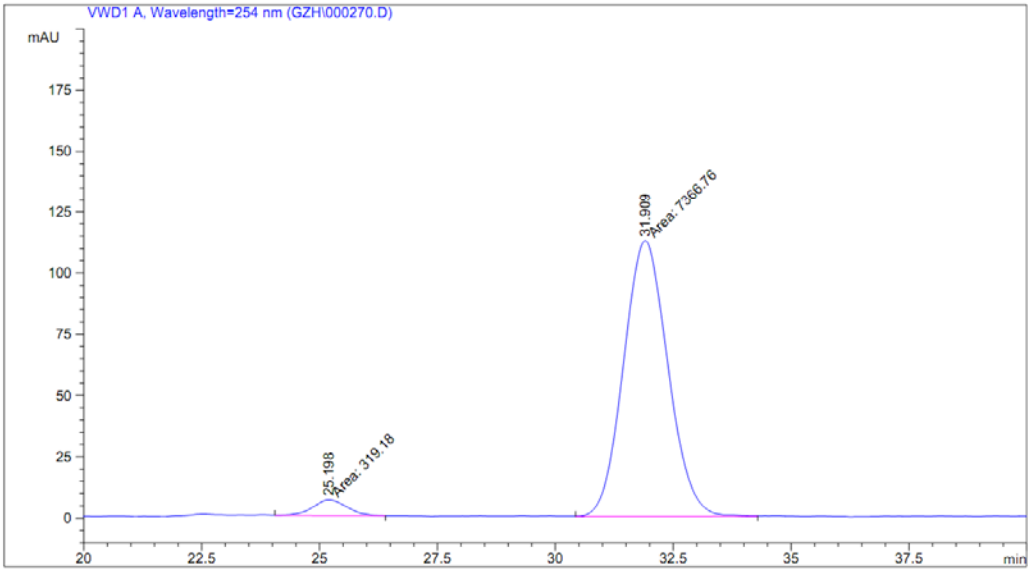



```
    ========================================================================
                              Area Percent Report
    ========================================================================

    Sorted By             :      Signal
    Multiplier            :      1.0000
    Dilution              :      1.0000
    Use Multiplier & Dilution Factor with ISTDs


    Signal 1: VWD1 A, Wavelength=254 nm

    Peak RetTime Type  Width     Area      Height     Area
      #   [min]        [min]  mAU   *s    [mAU   ]      %
    ----|-------|----|-------|----------|----------|--------|
       1  25.355 VB    0.8175 4295.43604   82.05760  49.0972
       2  32.154 BB    1.0624 4453.40625   65.87552  50.9028

    Totals :                  8748.84229  147.93312

    ========================================================================
                              *** End of Report ***


Instrument 1 2015-5-18 16:29:29  gzh                          Page   1 of 1
```

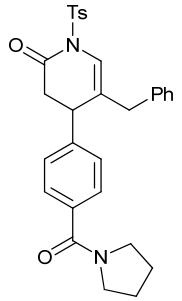


3h

```
Data File C:\CHEM32\1\DATA\GZH\000270.D
 Sample Name: gzh-392A 4-CO2Me

    ========================================================================
    Acq. Operator   : gzh
    Acq. Instrument : Instrument 1                    Location : Vial 1
    Injection Date  : 2015-5-18 15:03:01
    Acq. Method     : C:\CHEM32\1\METHODS\JWQ20121205.M
    Last changed    : 2015-5-18 15:02:58  by gzh
                      (modified after loading)
    Analysis Method : C:\CHEM32\1\METHODS\JWQ20121205.M
    Last changed    : 2015-5-18 15:45:56  by gzh
                      (modified after loading)
    Sample Info     : OD-H H/I/M=90:6:4 1.0 ml/min 254 nm
```

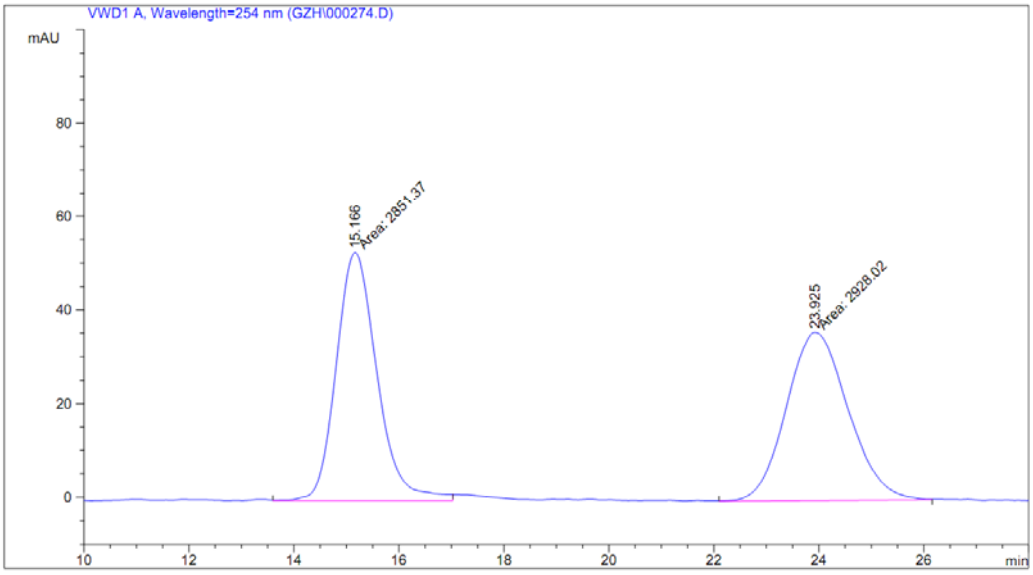



```
    ========================================================================
                              Area Percent Report
    ========================================================================

    Sorted By             :      Signal
    Multiplier            :      1.0000
    Dilution              :      1.0000
    Use Multiplier & Dilution Factor with ISTDs


    Signal 1: VWD1 A, Wavelength=254 nm

    Peak RetTime Type  Width     Area      Height     Area
      #   [min]        [min]  mAU   *s    [mAU   ]      %
    ----|-------|----|-------|----------|----------|--------|
       1  25.198 MM    0.8423  319.17950    6.31592   4.1528
       2  31.909 MM    1.0910 7366.76270  112.53877  95.8472

    Totals :                  7685.94220  118.85469

    ========================================================================
                              *** End of Report ***
```

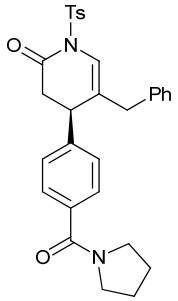


***rac*-3i**

```
Data File C:\CHEM32\1\DATA\GZH\000274.D
 Sample Name: gzh-395D 4-amide racemic

    ====================================================================
    Acq. Operator   : gzh
    Acq. Instrument : Instrument 1                    Location : Vial 1
    Injection Date  : 2015-5-18 19:04:00
    Acq. Method     : C:\CHEM32\1\METHODS\JWQ20121205.M
    Last changed    : 2015-5-18 18:44:21  by gzh
                      (modified after loading)
    Analysis Method : C:\CHEM32\1\METHODS\JWQ20121205.M
    Last changed    : 2015-5-18 19:34:43  by gzh
                      (modified after loading)
    Sample Info     : OD-H H/I/M=70:20:10 1.0 ml/min 254 nm
```

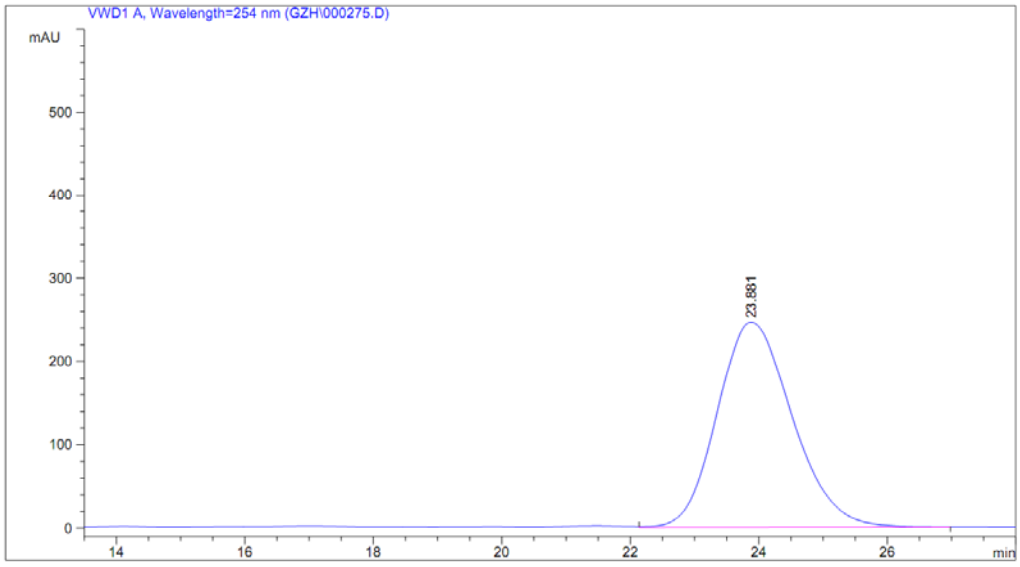



```
    ====================================================================
                            Area Percent Report
    ====================================================================

    Sorted By             :      Signal
    Multiplier            :      1.0000
    Dilution              :      1.0000
    Use Multiplier & Dilution Factor with ISTDs


    Signal 1: VWD1 A, Wavelength=254 nm

    Peak RetTime Type  Width     Area      Height     Area
      #   [min]        [min]  mAU   *s    [mAU   ]      %
    ----|-------|----|-------|----------|----------|--------|
       1  15.166 MM    0.8989 2851.37305   52.86636  49.3369
       2  23.925 MM    1.3614 2928.02173   35.84447  50.6631

    Totals :                  5779.39478   88.71083


    ====================================================================
                            *** End of Report ***
```

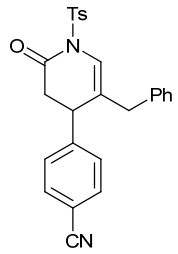


3i

```
Data File C:\CHEM32\1\DATA\GZH\000275.D
 Sample Name: gzh-395C 4-amide

    ====================================================================
    Acq. Operator    : gzh
    Acq. Instrument  : Instrument 1                    Location : Vial 1
    Injection Date   : 2015-5-18 19:39:53
    Acq. Method      : C:\CHEM32\1\METHODS\JWQ20121205.M
    Last changed     : 2015-5-18 20:06:09  by gzh
                       (modified after loading)
    Analysis Method  : C:\CHEM32\1\METHODS\JWQ20121205.M
    Last changed     : 2015-5-18 22:07:53  by gzh
                       (modified after loading)
    Sample Info      : OD-H H/I/M=70:20:10 1.0 ml/min 254 nm
```

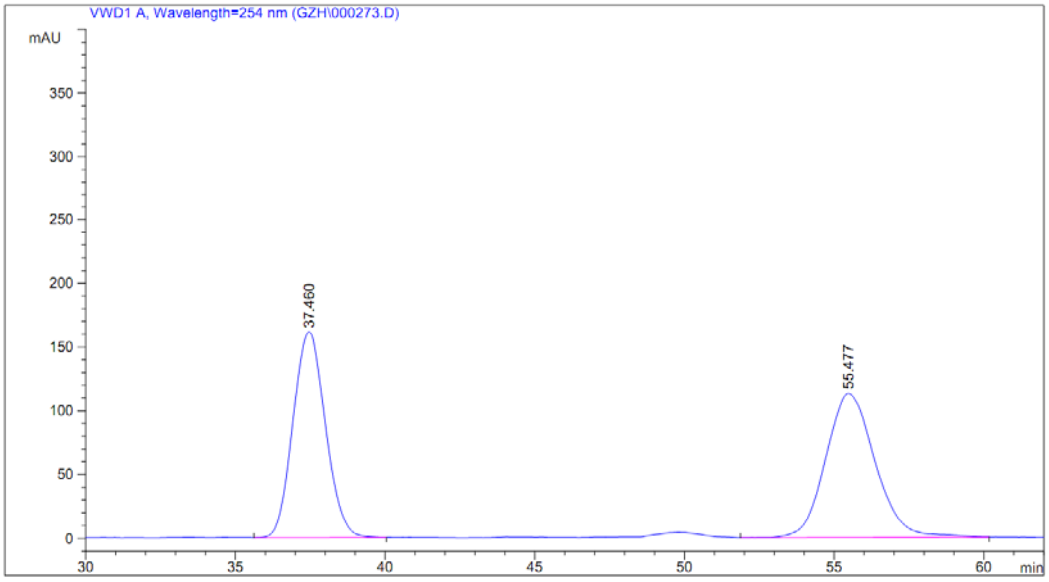



```
    ====================================================================
                              Area Percent Report
    ====================================================================

    Sorted By             :      Signal
    Multiplier            :      1.0000
    Dilution              :      1.0000
    Use Multiplier & Dilution Factor with ISTDs


    Signal 1: VWD1 A, Wavelength=254 nm

    Peak RetTime Type  Width     Area      Height     Area
      #   [min]        [min]  mAU   *s    [mAU   ]      %
    ----|-------|----|-------|----------|----------|--------|
       1  23.881 VB    1.2164 1.99884e4   245.85287 100.0000

    Totals :                  1.99884e4   245.85287

    ====================================================================
                              *** End of Report ***
```

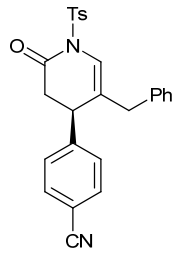


***rac*-3j**

```
Data File C:\CHEM32\1\DATA\GZH\000273.D
 Sample Name: gzh-395B 4-CN racemic

    ========================================================================
    Acq. Operator   : gzh
    Acq. Instrument : Instrument 1                    Location : Vial 1
    Injection Date  : 2015-5-18 17:37:54
    Acq. Method     : C:\CHEM32\1\METHODS\JWQ20121205.M
    Last changed    : 2015-5-18 18:40:16  by gzh
                      (modified after loading)
    Analysis Method : C:\CHEM32\1\METHODS\JWQ20121205.M
    Last changed    : 2015-5-18 18:42:42  by gzh
                      (modified after loading)
    Sample Info     : OD-H H/I/M=90:6:4 1.0 ml/min 254 nm
```

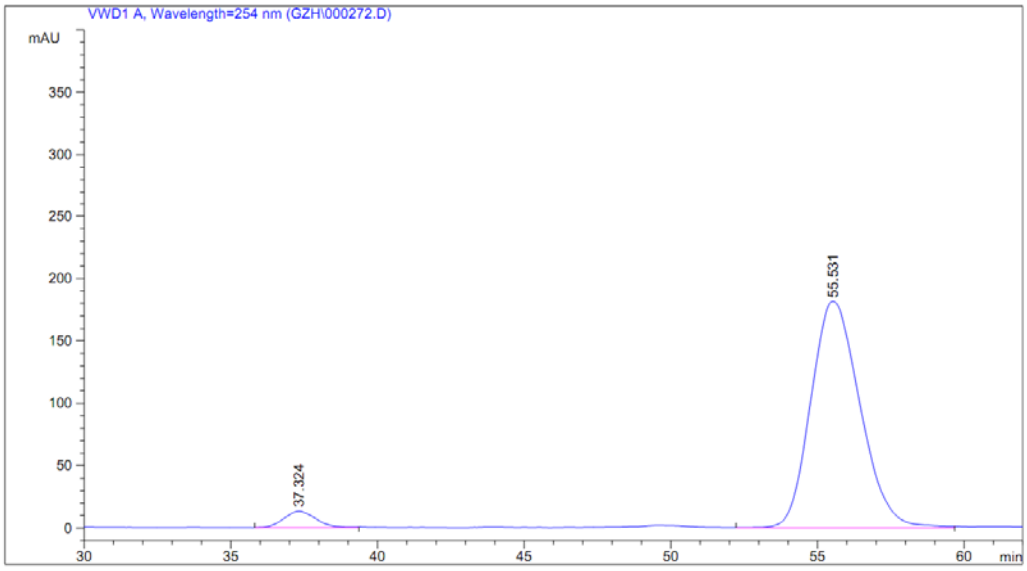



```
    ========================================================================
                           Area Percent Report
    ========================================================================

    Sorted By             :      Signal
    Multiplier            :      1.0000
    Dilution              :      1.0000
    Use Multiplier & Dilution Factor with ISTDs


    Signal 1: VWD1 A, Wavelength=254 nm

    Peak RetTime Type  Width     Area      Height     Area
      #   [min]        [min]  mAU   *s   [mAU   ]      %
    ----|-------|----|-------|----------|----------|--------|
       1  37.460 VB    1.2090 1.21496e4   161.08290  48.4187
       2  55.477 VB    1.7379 1.29431e4   113.02414  51.5813

    Totals :                  2.50927e4   274.10704

    ========================================================================
                           *** End of Report ***
```

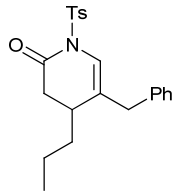


3j

```
Data File C:\CHEM32\1\DATA\GZH\000272.D
 Sample Name: gzh-395A 4-CN

    ========================================================================
    Acq. Operator    : gzh
    Acq. Instrument  : Instrument 1                    Location : Vial 1
    Injection Date   : 2015-5-18 16:31:30
    Acq. Method      : C:\CHEM32\1\METHODS\JWQ20121205.M
    Last changed     : 2015-5-18 16:29:23  by gzh
                       (modified after loading)
    Analysis Method  : C:\CHEM32\1\METHODS\JWQ20121205.M
    Last changed     : 2015-5-18 18:44:21  by gzh
                       (modified after loading)
    Sample Info      : OD-H H/I/M=90:6:4 1.0 ml/min 254 nm
```



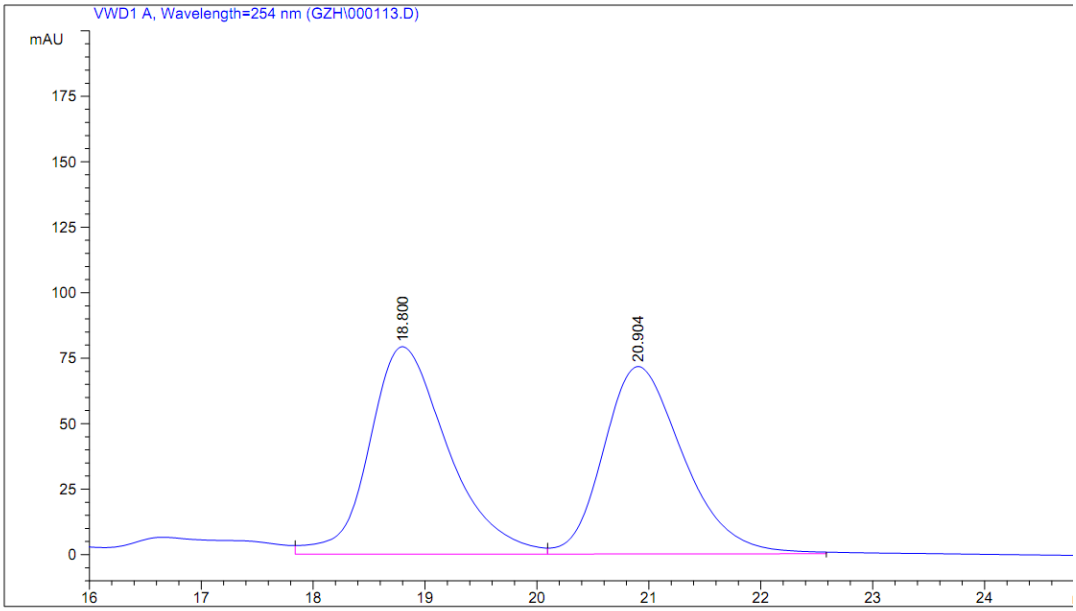

```
    ========================================================================
                              Area Percent Report
    ========================================================================

    Sorted By             :      Signal
    Multiplier            :      1.0000
    Dilution              :      1.0000
    Use Multiplier & Dilution Factor with ISTDs


    Signal 1: VWD1 A, Wavelength=254 nm

    Peak RetTime Type  Width     Area      Height     Area
      #   [min]       [min]  mAU   *s    [mAU   ]      %
    ----|-------|----|-------|----------|----------|--------|
       1  37.324 BB    1.0276  981.05664   13.06371   4.4331
       2  55.531 VB    1.6696 2.11494e4   181.30486  95.5669

    Totals :                  2.21304e4   194.36856

    ========================================================================
                              *** End of Report ***


Instrument 1 2015-5-18 18:44:24  gzh                          Page   1 of 1
```



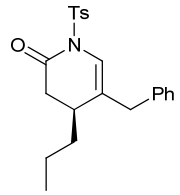
***rac*-3k**

Sample Name: gzh-296D racemic

```
==========================================================================
Acq. Operator    : gzh
Acq. Instrument : Instrument 1                    Location : Vial 1
Injection Date   : 2014-8-23 18:28:39
Acq. Method      : C:\CHEM32\1\METHODS\JWQ20121205.M
Last changed     : 2014-8-23 18:19:42  by gzh
                   (modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\JWQ20121205.M
Last changed     : 2014-9-6 16:59:28  by ckq
                   (modified after loading)
Sample Info      : OD-H H/I/M=95:5:0   1mL/min  254nm
```



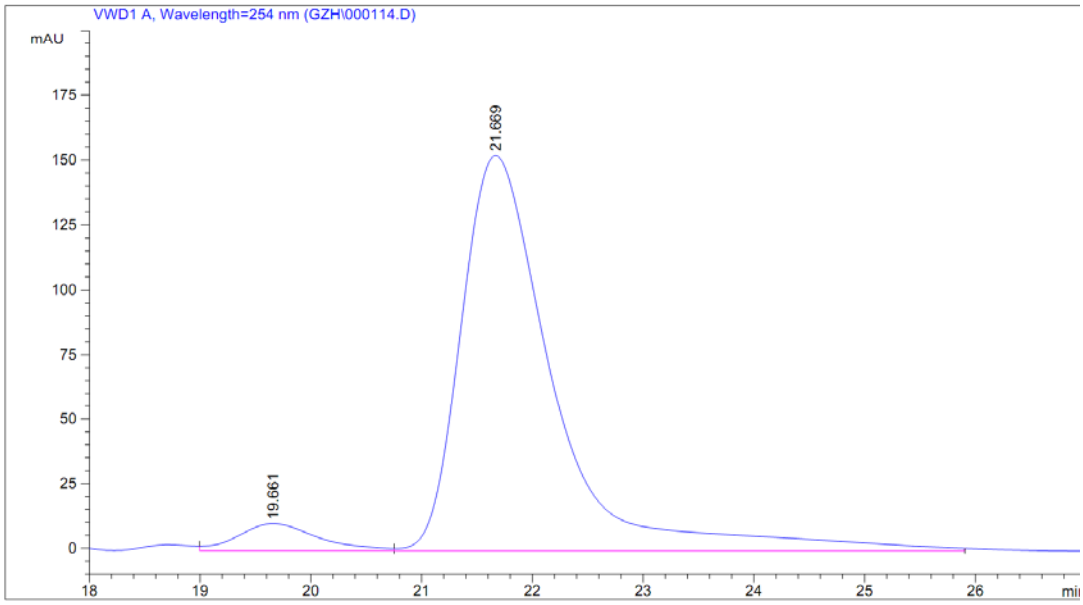

```
==========================================================================
                        Area Percent Report
==========================================================================

Sorted By             :      Signal
Multiplier            :      1.0000
Dilution              :      1.0000
Use Multiplier & Dilution Factor with ISTDs


Signal 1: VWD1 A, Wavelength=254 nm

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]  mAU   *s   [mAU   ]      %
----|-------|----|-------|----------|----------|--------|
   1  18.800 VV    0.7440 3865.22583   79.21175  52.1514
   2  20.904 VB    0.7646 3546.31958   71.55048  47.8486

Totals :                 7411.54541  150.76224

==========================================================================
                        *** End of Report ***
```



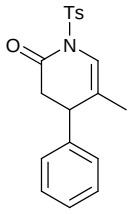
3k

Sample Name: gzh-296C

```
==========================================================================
Acq. Operator   : gzh
Acq. Instrument : Instrument 1                    Location : Vial 1
Injection Date  : 2014-8-23 19:05:36
Acq. Method     : C:\CHEM32\1\METHODS\JWQ20121205.M
Last changed    : 2014-8-23 18:19:42  by gzh
                  (modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\JWQ20121205.M
Last changed    : 2014-9-6 17:00:41  by ckq
                  (modified after loading)
Sample Info     : OD-H H/I/M=95:5:0   1mL/min  254nm
```



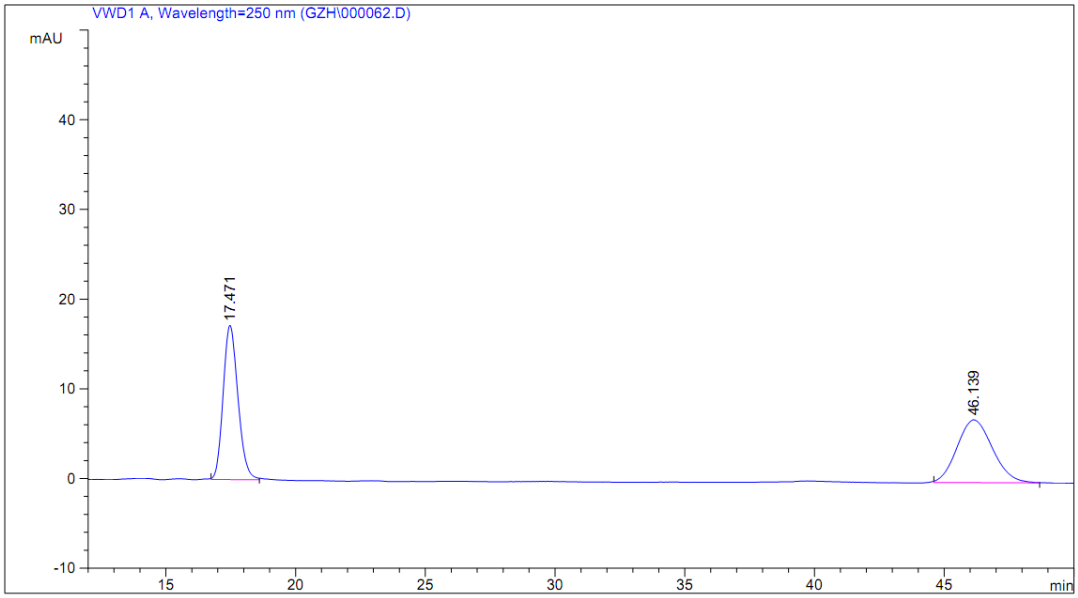

```
==========================================================================
                        Area Percent Report
==========================================================================

Sorted By             :      Signal
Multiplier            :      1.0000
Dilution              :      1.0000
Use Multiplier & Dilution Factor with ISTDs


Signal 1: VWD1 A, Wavelength=254 nm

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]  mAU   *s   [mAU   ]      %
----|-------|----|-------|----------|----------|--------|
   1  19.661 VV    0.7577  522.25433   10.45223   5.5787
   2  21.669 VB    0.8678 8839.24805  152.62944  94.4213

Totals :                  9361.50238  163.08167

==========================================================================
                          *** End of Report ***
```



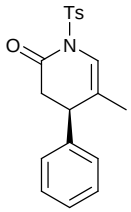
***rac*-3l**

Sample Name: gzh-292b

```
==================================================================
Acq. Operator   : gzh
Acq. Instrument : Instrument 1                    Location : Vial 1
Injection Date  : 2014-6-25 22:02:57
Acq. Method     : C:\CHEM32\1\METHODS\JWQ20121205.M
Last changed    : 2014-6-25 22:44:13  by gzh
                  (modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\JWQ20121205.M
Last changed    : 2014-9-6 16:22:37  by ckq
                  (modified after loading)
Sample Info     : OD-H  H/I=90:10 1.0ml/min  250nm
```



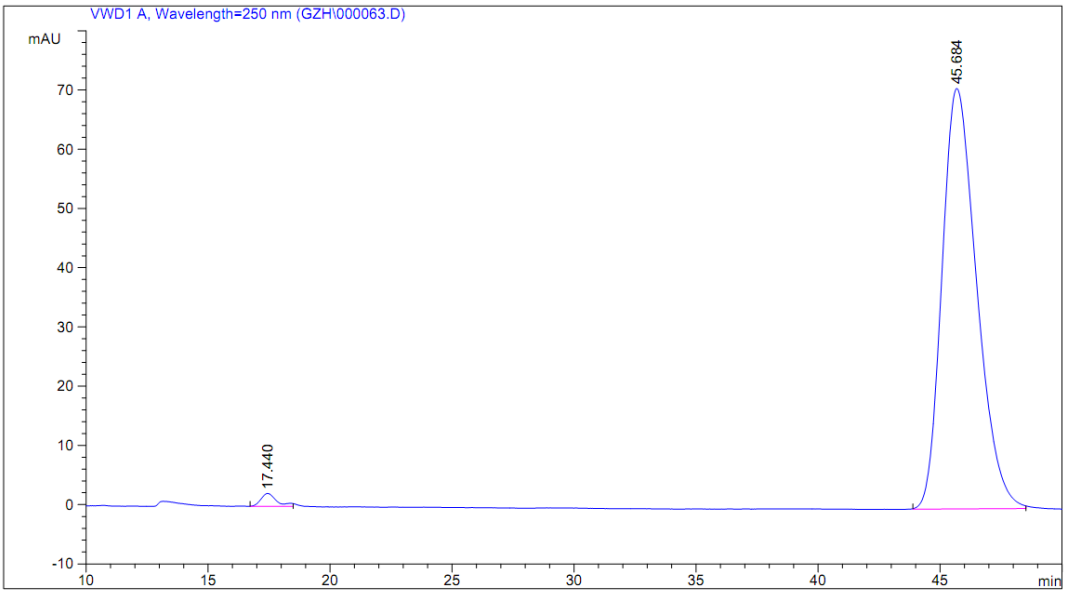

```
==================================================================
                        Area Percent Report
==================================================================

Sorted By             :      Signal
Multiplier            :      1.0000
Dilution              :      1.0000
Use Multiplier & Dilution Factor with ISTDs


Signal 1: VWD1 A, Wavelength=250 nm

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]  mAU   *s   [mAU   ]      %
----|-------|----|-------|----------|----------|--------|
   1  17.471 BB    0.6132  680.26324   17.18647  50.6892
   2  46.139 BB    1.4837  661.76538    6.98578  49.3108

Totals :                  1342.02863   24.17225

==================================================================
                        *** End of Report ***
```



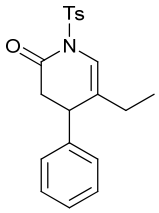
3l

Sample Name: gzh-292a

```
==========================================================================
Acq. Operator   : gzh
                                                    Location : Vial 1
Injection Date  : 25-Jun-14, 22:55:54
Acq. Method     : JWQ20121205.M
Analysis Method : C:\CHEM32\1\METHODS\JWQ20121205.M
Last changed    : 2014-9-6 16:24:05  by ckq
                  (modified after loading)
Sample Info     : OD-H  H/I=90:10 1.0ml/min  250nm
```

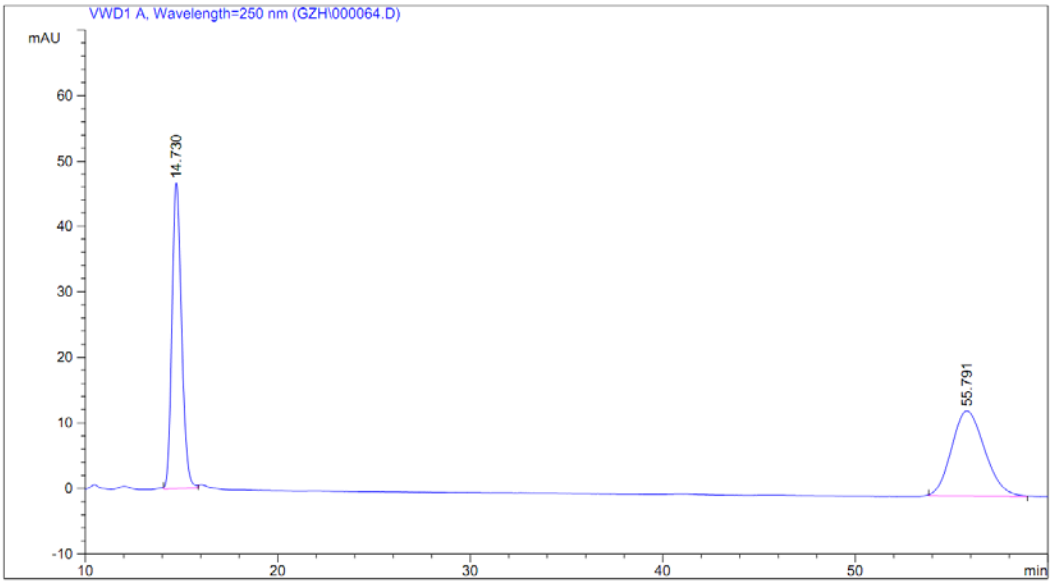



```
==========================================================================
                        Area Percent Report
==========================================================================

Sorted By             :      Signal
Multiplier            :      1.0000
Dilution              :      1.0000
Use Multiplier & Dilution Factor with ISTDs


Signal 1: VWD1 A, Wavelength=250 nm

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]  mAU   *s    [mAU   ]      %
----|-------|----|-------|----------|----------|--------|
   1  17.440 BB    0.6866   98.73258    2.17613   1.3914
   2  45.684 BB    1.5176 6997.31641   70.94755  98.6086

Totals :                  7096.04899   73.12368

==========================================================================
                        *** End of Report ***
```

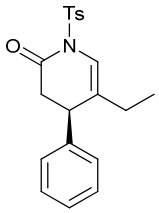


***rac*-3m**

```
Data File C:\CHEM32\1\DATA\GZH\000064.D
 Sample Name: gzh-292d

    ========================================================================
    Acq. Operator   : gzh
    Acq. Instrument : Instrument 1                    Location : Vial 1
    Injection Date  : 2014-6-26 9:56:35
    Acq. Method     : C:\CHEM32\1\METHODS\JWQ20121205.M
    Last changed    : 2014-6-26 10:49:29  by gzh
                      (modified after loading)
    Analysis Method : C:\CHEM32\1\METHODS\JWQ20121205.M
    Last changed    : 2014-9-6 16:32:46  by ckq
                      (modified after loading)
    Sample Info     : OD-H  H/I=90:10 1.0ml/min  250nm
```

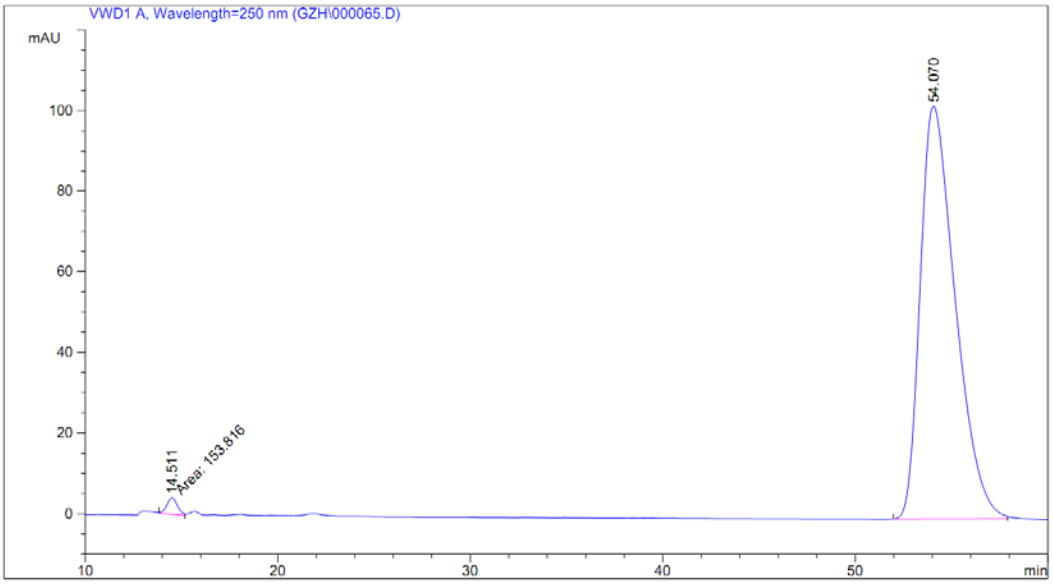



```
    ========================================================================
                              Area Percent Report
    ========================================================================

    Sorted By             :      Signal
    Multiplier            :      1.0000
    Dilution              :      1.0000
    Use Multiplier & Dilution Factor with ISTDs


    Signal 1: VWD1 A, Wavelength=250 nm

    Peak RetTime Type  Width     Area      Height     Area
      #   [min]        [min]  mAU   *s   [mAU   ]      %
    ----|-------|----|-------|----------|----------|--------|
       1  14.730 BB    0.5373 1615.14099   46.72260  50.9912
       2  55.791 BB    1.8656 1552.34961   12.99282  49.0088

    Totals :                  3167.49060   59.71542

    ========================================================================
                              *** End of Report ***


Instrument 1 2014-9-6 16:32:52  ckq                          Page   1 of 1
```

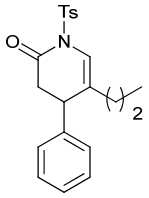


3m

```
Data File C:\CHEM32\1\DATA\GZH\000065.D
 Sample Name: gzh-292c

    ========================================================================
    Acq. Operator   : gzh
    Acq. Instrument : Instrument 1                    Location : Vial 1
    Injection Date  : 2014-6-26 11:07:11
    Acq. Method     : C:\CHEM32\1\METHODS\JWQ20121205.M
    Last changed    : 2014-6-26 12:06:29  by gzh
                      (modified after loading)
    Analysis Method : C:\CHEM32\1\METHODS\JWQ20121205.M
    Last changed    : 2014-9-6 16:26:46  by ckq
                      (modified after loading)
    Sample Info     : OD-H  H/I=90:10 1.0ml/min  250nm
```



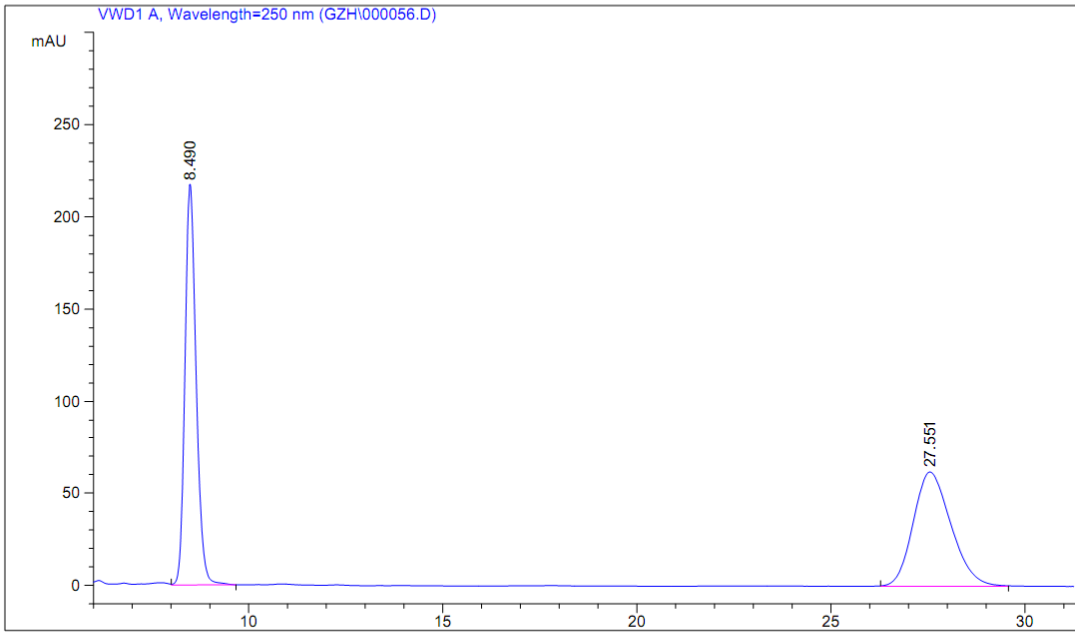

```
    ========================================================================
                              Area Percent Report
    ========================================================================

    Sorted By             :      Signal
    Multiplier            :      1.0000
    Dilution              :      1.0000
    Use Multiplier & Dilution Factor with ISTDs


    Signal 1: VWD1 A, Wavelength=250 nm

    Peak RetTime Type  Width     Area      Height      Area
      #   [min]        [min]  mAU   *s   [mAU   ]       %
    ----|-------|----|-------|----------|----------|--------|
       1  14.511 MM    0.6333  153.81580    4.04805   1.1777
       2  54.070 BB    1.8674 1.29064e4   102.33591  98.8223

    Totals :                  1.30603e4   106.38396

    ========================================================================
                              *** End of Report ***
```



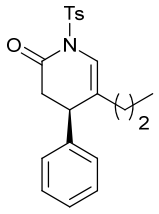
***rac*-3n**

Sample Name: gzh-291b

```
==========================================================================
Acq. Operator   : gzh
Acq. Instrument : Instrument 1                    Location : Vial 1
Injection Date  : 2014-6-25 16:44:56
Acq. Method     : C:\CHEM32\1\METHODS\JWQ20121205.M
Last changed    : 2014-6-25 15:41:19  by lzq
                  (modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\JWQ20121205.M
Last changed    : 2014-9-6 16:07:06  by ckq
                  (modified after loading)
Sample Info     : OD-H  H/I=80:20 1.0ml/min  250nm
```



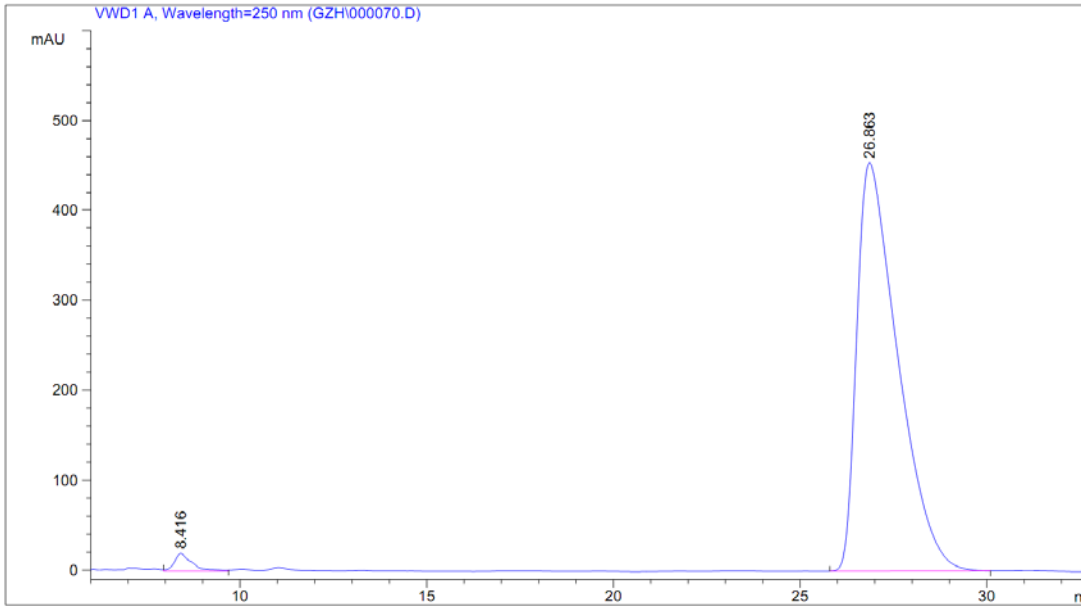

```
==========================================================================
                        Area Percent Report
==========================================================================

Sorted By             :      Signal
Multiplier            :      1.0000
Dilution              :      1.0000
Use Multiplier & Dilution Factor with ISTDs


Signal 1: VWD1 A, Wavelength=250 nm

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]  mAU   *s   [mAU   ]      %
----|-------|----|-------|----------|----------|--------|
   1   8.490 VB    0.3093 4349.66016  217.28871  50.9927
   2  27.551 BB    1.0445 4180.30713   61.87226  49.0073

Totals :                  8529.96729  279.16098


==========================================================================
                        *** End of Report ***
```



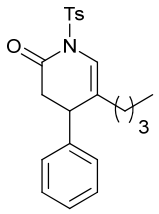
3n

Sample Name: gzh-293b

```
==========================================================================
Acq. Operator   : gzh
                                                    Location : Vial 1
Injection Date  : 26-Jun-14, 20:33:34
Acq. Method     : JWQ20121205.M
Analysis Method : C:\CHEM32\1\METHODS\JWQ20121205.M
Last changed    : 2014-9-6 16:12:00  by ckq
                  (modified after loading)
Sample Info     : OD-H  H/I=80:20 1.0ml/min  250nm
```



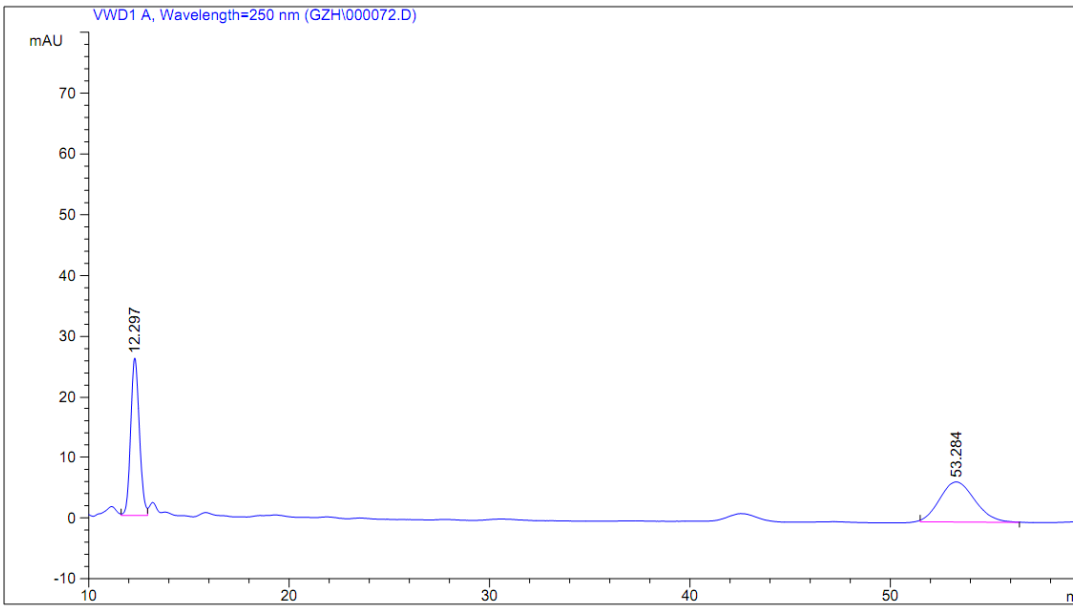

```
==========================================================================
                        Area Percent Report
==========================================================================

Sorted By             :      Signal
Multiplier            :      1.0000
Dilution              :      1.0000
Use Multiplier & Dilution Factor with ISTDs


Signal 1: VWD1 A, Wavelength=250 nm

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]  mAU   *s   [mAU   ]      %
----|-------|----|-------|----------|----------|--------|
   1   8.416 VB    0.4704  669.62103   19.79294   1.9014
   2  26.863 BB    1.1492 3.45478e4   454.35645  98.0986

Totals :                  3.52174e4   474.14939

==========================================================================
                        *** End of Report ***
```



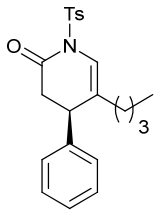
***rac*-3o**

Sample Name: gzh-291d

```
==========================================================================
Acq. Operator    : gzh
Acq. Instrument : Instrument 1                    Location : Vial 1
Injection Date   : 2014-6-27 16:55:48
Acq. Method      : C:\CHEM32\1\METHODS\JWQ20121205.M
Last changed     : 2014-6-27 16:55:36  by gzh
                   (modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\JWQ20121205.M
Last changed     : 2014-9-6 16:17:16  by ckq
                   (modified after loading)
Sample Info      : OD-H  H/I=90:10 1.0ml/min  250nm
```



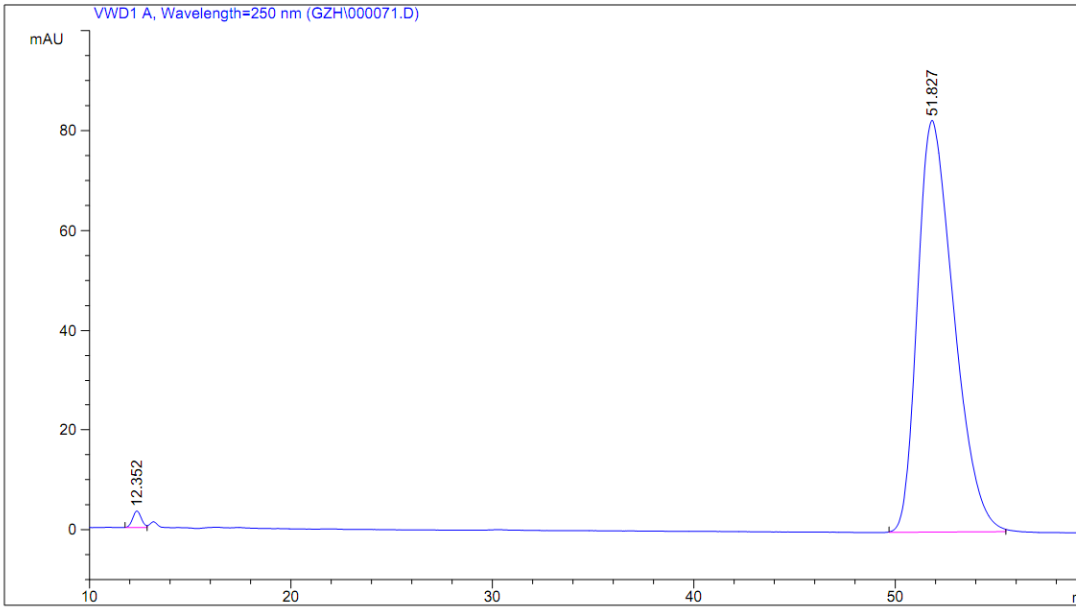

```
==========================================================================
                        Area Percent Report
==========================================================================

Sorted By             :      Signal
Multiplier            :      1.0000
Dilution              :      1.0000
Use Multiplier & Dilution Factor with ISTDs


Signal 1: VWD1 A, Wavelength=250 nm

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]  mAU   *s   [mAU   ]      %
----|-------|----|-------|----------|----------|--------|
   1  12.297 VV    0.4680  784.77808   26.04533  49.3015
   2  53.284 BB    1.9000  807.01434    6.59215  50.6985

Totals :                  1591.79242   32.63747

==========================================================================
                          *** End of Report ***
```



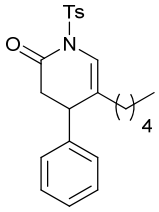
3o

Sample Name: gzh-293d (291c)

```
==========================================================================
Acq. Operator   : gzh
Acq. Instrument : Instrument 1                    Location : Vial 1
Injection Date  : 2014-6-27 10:42:03
Acq. Method     : C:\CHEM32\1\METHODS\JWQ20121205.M
Last changed    : 2014-6-27 10:30:09  by gzh
                  (modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\JWQ20121205.M
Last changed    : 2014-9-6 16:19:26  by ckq
                  (modified after loading)
Sample Info     : OD-H  H/I=90:10 1.0ml/min  250nm
```



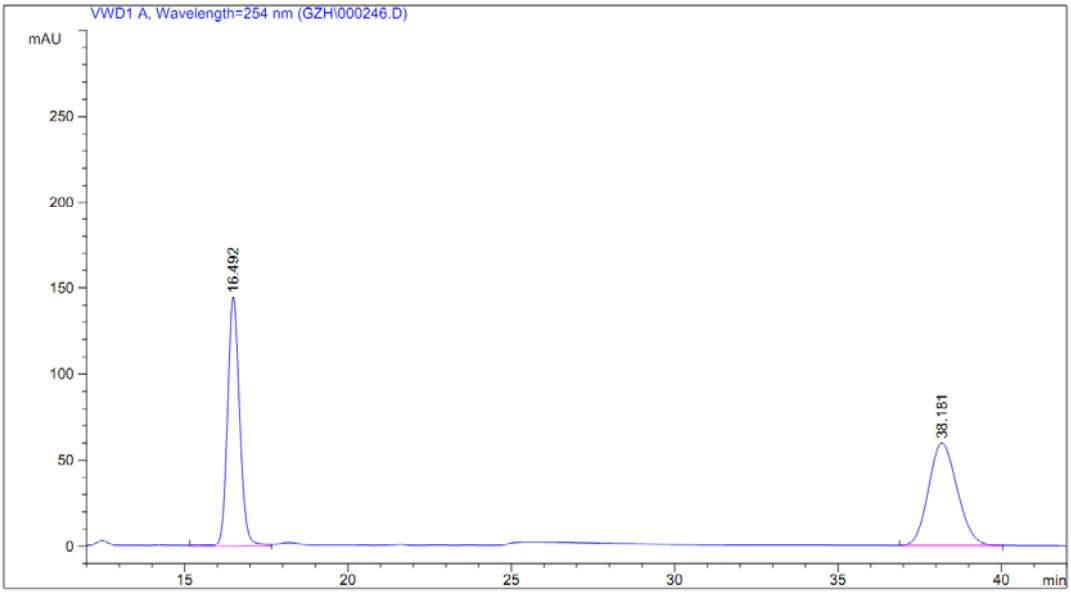

```
==========================================================================
                        Area Percent Report
==========================================================================

Sorted By             :      Signal
Multiplier            :      1.0000
Dilution              :      1.0000
Use Multiplier & Dilution Factor with ISTDs


Signal 1: VWD1 A, Wavelength=250 nm

Peak RetTime Type  Width     Area      Height     Area
  #   [min]       [min]  mAU   *s   [mAU   ]      %
----|-------|----|-------|----------|----------|--------|
   1  12.352 BV    0.4752   99.84826    3.30137   0.9561
   2  51.827 BB    1.9163 1.03440e4    82.54314  99.0439

Totals :                  1.04438e4    85.84452

==========================================================================
                          *** End of Report ***
```



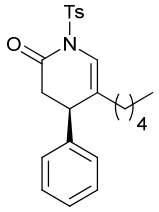
***rac*-3p**

Data File C:\CHEM32\1\DATA\GZH\000246.D
Sample Name: GZH-292F C7 racemic

```
==========================================================================
Acq. Operator   : gzh
Acq. Instrument : Instrument 1                    Location : Vial 1
Injection Date  : 2015-5-4 11:46:07
Acq. Method     : C:\CHEM32\1\METHODS\JWQ20121205.M
Last changed    : 2015-5-4 11:46:55  by gzh
                  (modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\JWQ20121205.M
Last changed    : 2015-5-4 21:53:03  by gzh
                  (modified after loading)
Sample Info     : OD-H H/I/M=90:6:4  0.5 ml/min 254 nm
```



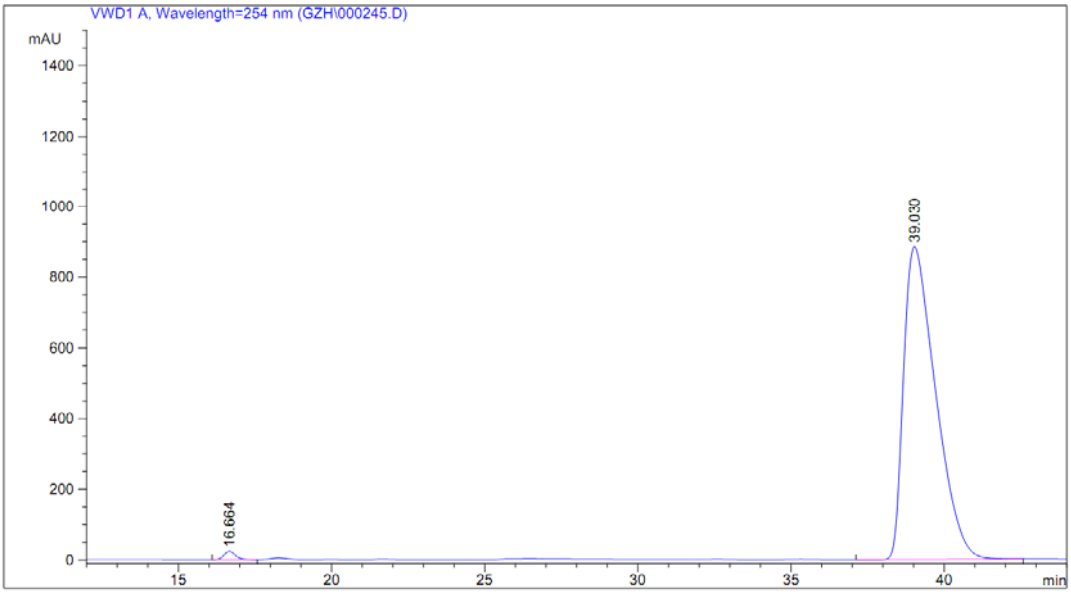

```
==========================================================================
                          Area Percent Report
==========================================================================

Sorted By             :      Signal
Multiplier            :      1.0000
Dilution              :      1.0000
Use Multiplier & Dilution Factor with ISTDs


Signal 1: VWD1 A, Wavelength=254 nm

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]  mAU   *s    [mAU   ]      %
----|-------|----|-------|----------|----------|--------|
   1  16.492 BV    0.4005 3739.93677  144.70047  50.7704
   2  38.181 BB    0.9318 3626.43164   59.54635  49.2296

Totals :                  7366.36841  204.24682

==========================================================================
                          *** End of Report ***
```



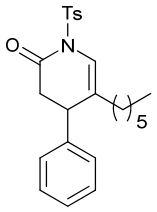
3p

Data File C:\CHEM32\1\DATA\GZH\000245.D
Sample Name: GZH-292E C7

```
==========================================================================
Acq. Operator    : gzh
Acq. Instrument : Instrument 1                    Location : Vial 1
Injection Date   : 2015-5-4 10:58:15
Acq. Method      : C:\CHEM32\1\METHODS\JWQ20121205.M
Last changed     : 2015-5-4 10:36:59  by gzh
                   (modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\JWQ20121205.M
Last changed     : 2015-5-4 21:54:20  by gzh
                   (modified after loading)
Sample Info      : OD-H H/I/M=90:6:4  0.5 ml/min 254 nm
```



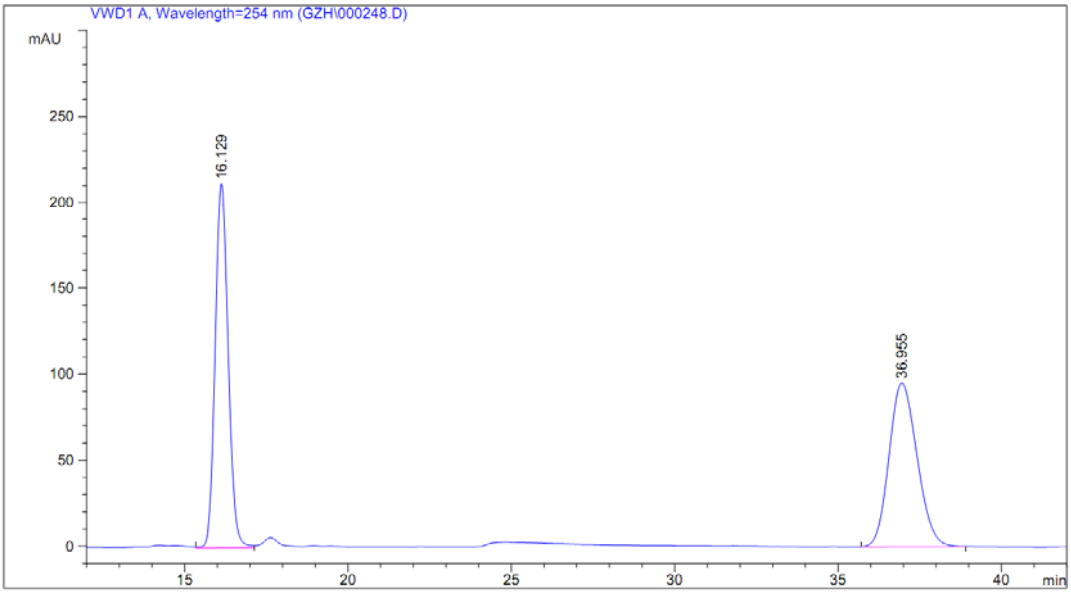

```
==========================================================================
                          Area Percent Report
==========================================================================

Sorted By             :      Signal
Multiplier            :      1.0000
Dilution              :      1.0000
Use Multiplier & Dilution Factor with ISTDs


Signal 1: VWD1 A, Wavelength=254 nm

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]  mAU   *s    [mAU   ]      %
----|-------|----|-------|----------|----------|--------|
   1  16.664 VV    0.4118  644.17499   24.02332   0.9939
   2  39.030 VB    1.1144 6.41668e4   884.41174  99.0061

Totals :                  6.48110e4   908.43506

==========================================================================
                          *** End of Report ***
```



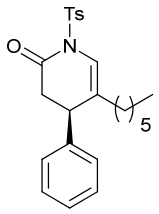
***rac*-3q**

Data File C:\CHEM32\1\DATA\GZH\000248.D
Sample Name: GZH-282D C8 racemic

```
======================================================================
Acq. Operator   : gzh
Acq. Instrument : Instrument 1                    Location : Vial 1
Injection Date  : 2015-5-4 15:07:58
Acq. Method     : C:\CHEM32\1\METHODS\JWQ20121205.M
Last changed    : 2015-5-4 15:12:58  by gzh
                  (modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\JWQ20121205.M
Last changed    : 2015-5-4 21:50:02  by gzh
                  (modified after loading)
Sample Info     : OD-H H/I/M=90:6:4  0.5 ml/min 254 nm
```



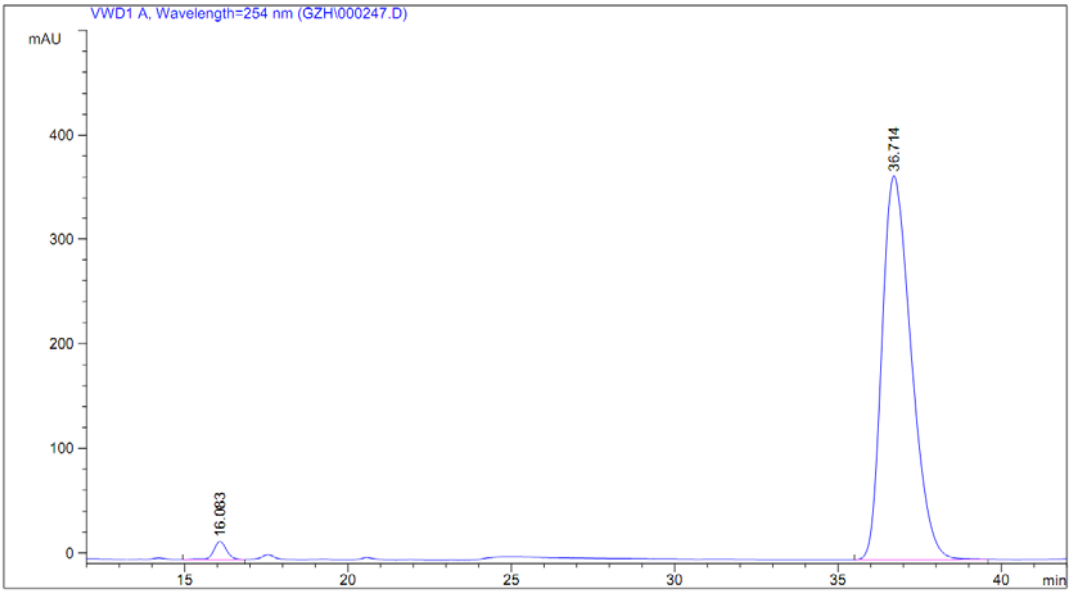

```
======================================================================
                        Area Percent Report
======================================================================

Sorted By             :      Signal
Multiplier            :      1.0000
Dilution              :      1.0000
Use Multiplier & Dilution Factor with ISTDs


Signal 1: VWD1 A, Wavelength=254 nm

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]  mAU   *s    [mAU   ]      %
----|-------|----|-------|----------|----------|--------|
   1  16.129 VV    0.4332 5859.62402  211.96620  50.8031
   2  36.955 BB    0.9286 5674.35498   95.16013  49.1969

Totals :                  1.15340e4   307.12634

======================================================================
                        *** End of Report ***
```



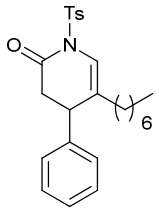
3q

Data File C:\CHEM32\1\DATA\GZH\000247.D
Sample Name: GZH-282C C8

```
==========================================================================
Acq. Operator   : gzh
Acq. Instrument : Instrument 1                    Location : Vial 1
Injection Date  : 2015-5-4 14:16:48
Acq. Method     : C:\CHEM32\1\METHODS\JWQ20121205.M
Last changed    : 2015-5-4 14:13:34  by gzh
                  (modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\JWQ20121205.M
Last changed    : 2015-5-4 21:51:53  by gzh
                  (modified after loading)
Sample Info     : OD-H H/I/M=90:6:4  0.5 ml/min 254 nm
```



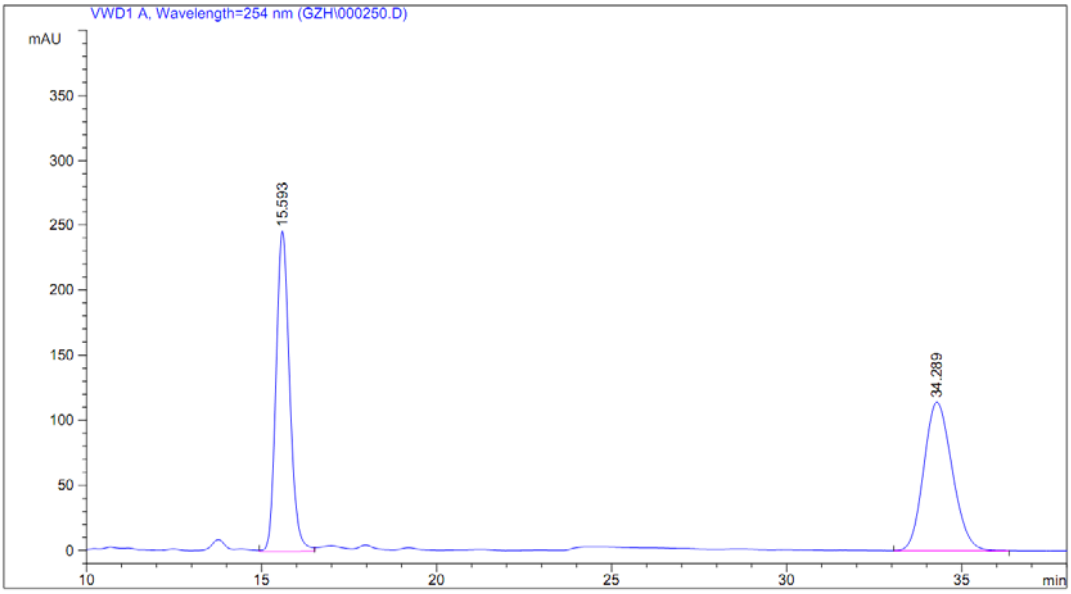

```
==========================================================================
                          Area Percent Report
==========================================================================

Sorted By             :      Signal
Multiplier            :      1.0000
Dilution              :      1.0000
Use Multiplier & Dilution Factor with ISTDs


Signal 1: VWD1 A, Wavelength=254 nm

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]  mAU   *s    [mAU   ]      %
----|-------|----|-------|----------|----------|--------|
   1  16.083 VV    0.4258  480.09085   17.45236   2.0665
   2  36.714 BB    0.9608 2.27515e4   367.62164  97.9335

Totals :                  2.32316e4   385.07400

==========================================================================
                          *** End of Report ***
```



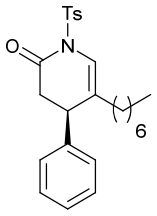
***rac*-3r**

Data File C:\CHEM32\1\DATA\GZH\000250.D
Sample Name: GZH-291F C9 racemic

```
======================================================================
Acq. Operator   : gzh
Acq. Instrument : Instrument 1                    Location : Vial 1
Injection Date  : 2015-5-4 16:35:40
Acq. Method     : C:\CHEM32\1\METHODS\JWQ20121205.M
Last changed    : 2015-5-4 15:12:58  by gzh
                  (modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\JWQ20121205.M
Last changed    : 2015-5-4 21:46:16  by gzh
                  (modified after loading)
Sample Info     : OD-H H/I/M=90:6:4  0.5 ml/min 254 nm
```

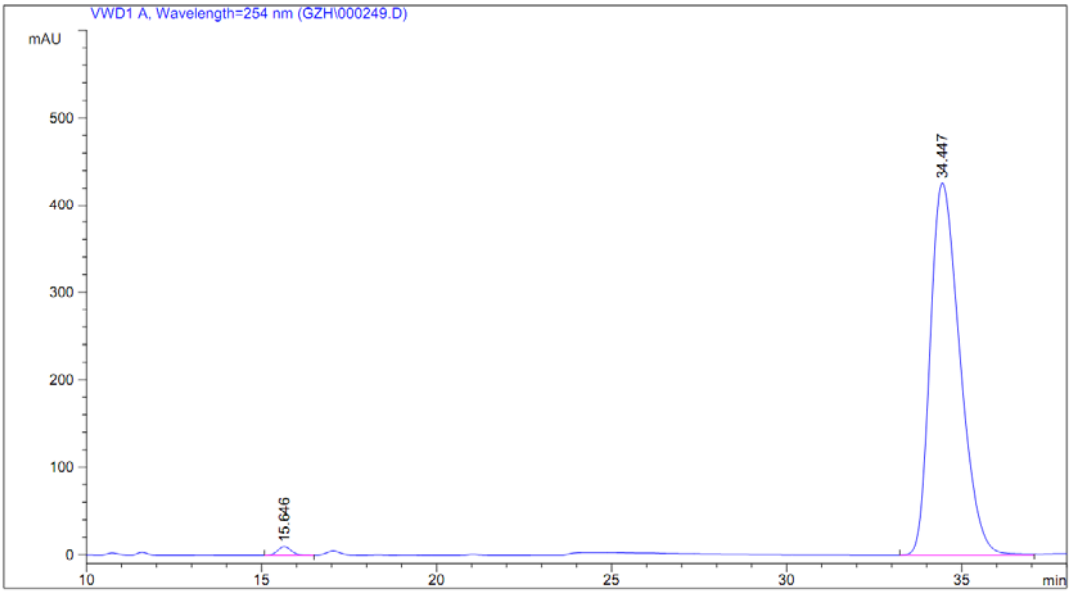



```
======================================================================
                        Area Percent Report
======================================================================

Sorted By             :      Signal
Multiplier            :      1.0000
Dilution              :      1.0000
Use Multiplier & Dilution Factor with ISTDs


Signal 1: VWD1 A, Wavelength=254 nm

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]  mAU   *s    [mAU   ]      %
----|-------|----|-------|----------|----------|--------|
   1  15.593 VV    0.4142 6643.55322  245.91225  50.6811
   2  34.289 BB    0.8933 6464.99072  114.22908  49.3189

Totals :                  1.31085e4   360.14133

======================================================================
                          *** End of Report ***
```

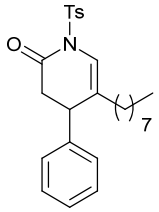


3r

```
Data File C:\CHEM32\1\DATA\GZH\000249.D
 Sample Name: GZH-391B C9

    ========================================================================
    Acq. Operator    : gzh
    Acq. Instrument : Instrument 1                    Location : Vial 1
    Injection Date   : 2015-5-4 15:51:23
    Acq. Method      : C:\CHEM32\1\METHODS\JWQ20121205.M
    Last changed     : 2015-5-4 15:12:58  by gzh
                       (modified after loading)
    Analysis Method : C:\CHEM32\1\METHODS\JWQ20121205.M
    Last changed     : 2015-5-4 21:47:39  by gzh
                       (modified after loading)
    Sample Info      : OD-H H/I/M=90:6:4  0.5 ml/min 254 nm
```



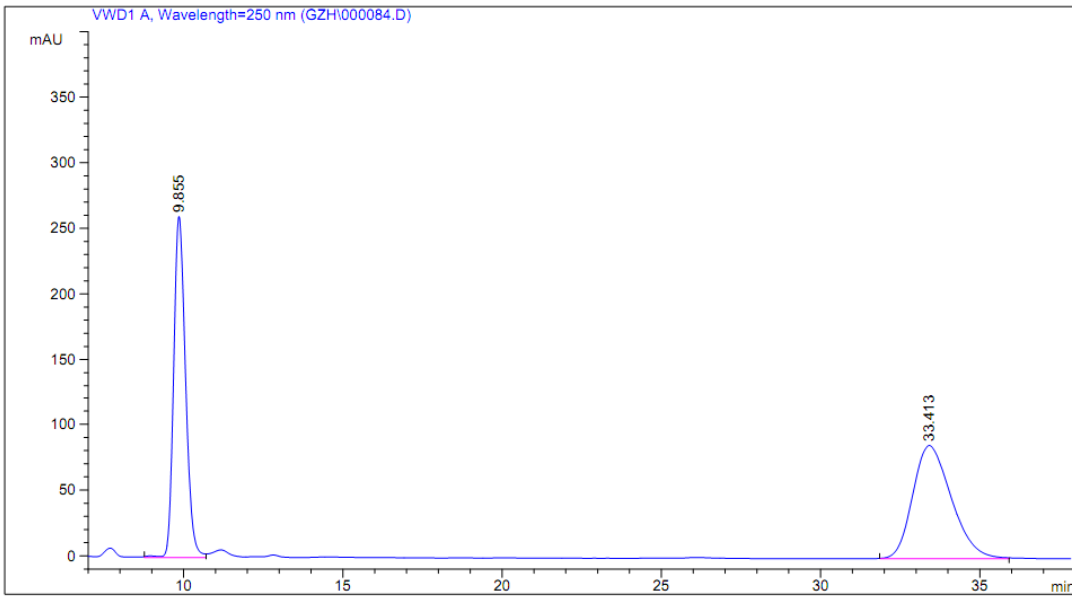

```
    ========================================================================
                              Area Percent Report
    ========================================================================

    Sorted By             :      Signal
    Multiplier            :      1.0000
    Dilution              :      1.0000
    Use Multiplier & Dilution Factor with ISTDs


    Signal 1: VWD1 A, Wavelength=254 nm

    Peak RetTime Type  Width     Area      Height     Area
      #   [min]        [min]  mAU   *s    [mAU   ]      %
    ----|-------|----|-------|----------|----------|--------|
       1  15.646 BB    0.4145  265.77414   10.01220   1.0510
       2  34.447 BB    0.9182 2.50227e4   426.05383  98.9490

    Totals :                  2.52884e4   436.06603

    ========================================================================
                              *** End of Report ***
```



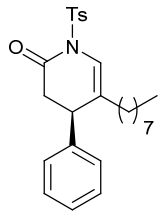
***rac*-3s**

Sample Name: gzh-294D

```
==========================================================================
Acq. Operator   : gzh
Acq. Instrument : Instrument 1                    Location : Vial 1
Injection Date  : 2014-6-30 16:54:53
Acq. Method     : C:\CHEM32\1\METHODS\JWQ20121205.M
Last changed    : 2014-6-30 17:30:49  by gzh
                  (modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\JWQ20121205.M
Last changed    : 2014-9-6 16:46:40  by ckq
                  (modified after loading)
Sample Info     : OD-H  H/I=90:10 1.0ml/min  250nm
```



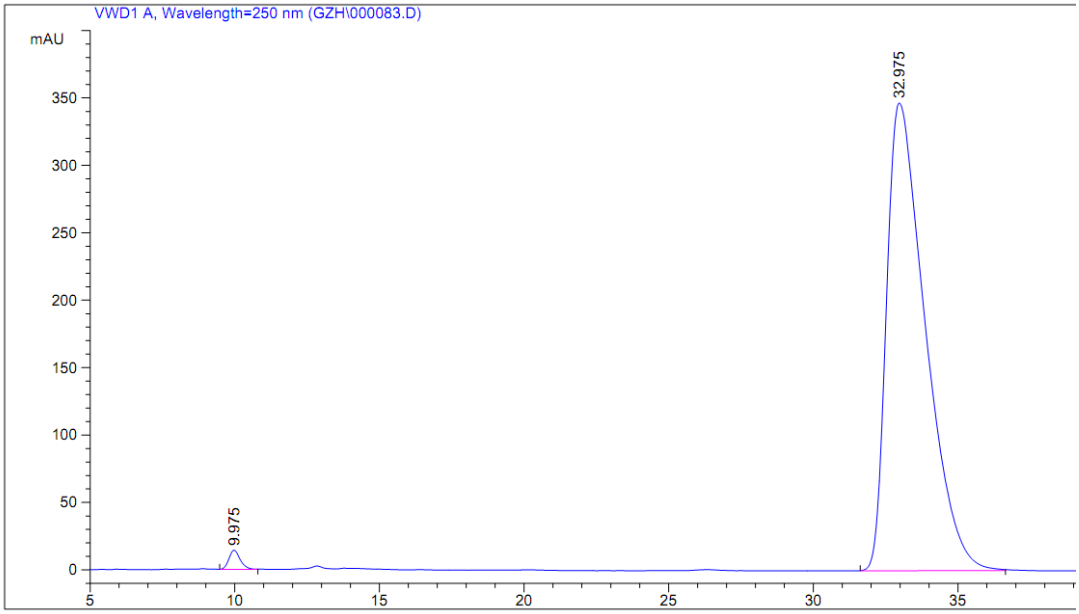

```
==========================================================================
                        Area Percent Report
==========================================================================

Sorted By             :      Signal
Multiplier            :      1.0000
Dilution              :      1.0000
Use Multiplier & Dilution Factor with ISTDs


Signal 1: VWD1 A, Wavelength=250 nm

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]  mAU   *s    [mAU   ]      %
----|-------|----|-------|----------|----------|--------|
   1   9.855 BV    0.4005 6726.27002  260.26773  48.2242
   2  33.413 BB    1.2834 7221.64209   85.92634  51.7758

Totals :                  1.39479e4   346.19407

==========================================================================
                        *** End of Report ***
```



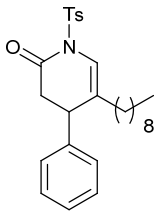
3s

Sample Name: gzh-294C

```
==========================================================================
Acq. Operator   : gzh
Acq. Instrument : Instrument 1                    Location : Vial 1
Injection Date  : 2014-6-30 16:05:29
Acq. Method     : C:\CHEM32\1\METHODS\JWQ20121205.M
Last changed    : 2014-6-30 16:30:48  by gzh
                  (modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\JWQ20121205.M
Last changed    : 2014-9-6 16:45:33  by ckq
                  (modified after loading)
Sample Info     : OD-H  H/I=90:10 1.0ml/min  250nm
```



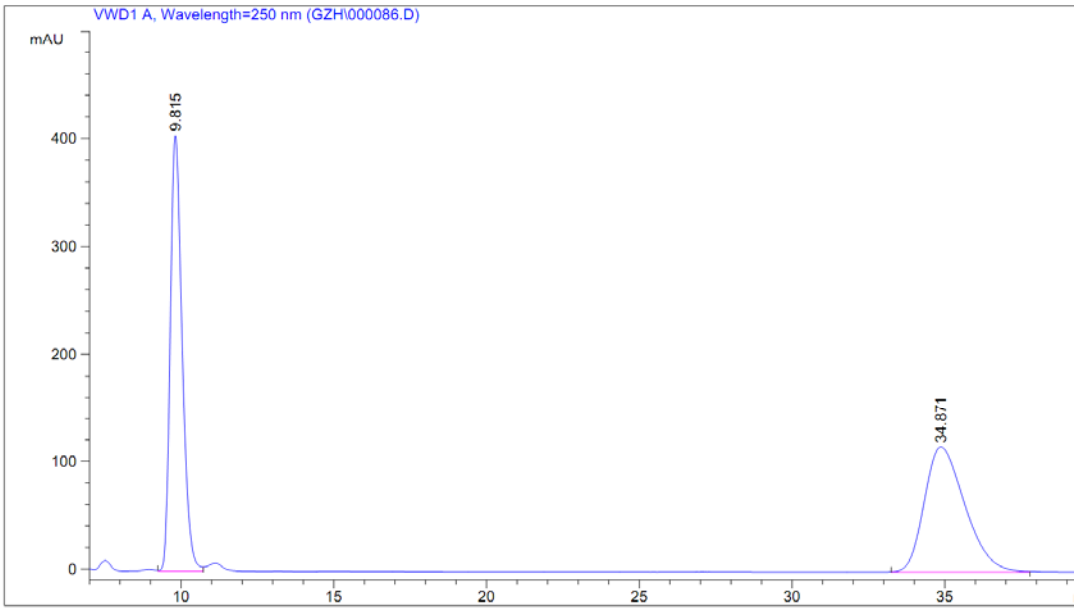

```
==========================================================================
                        Area Percent Report
==========================================================================

Sorted By             :      Signal
Multiplier            :      1.0000
Dilution              :      1.0000
Use Multiplier & Dilution Factor with ISTDs


Signal 1: VWD1 A, Wavelength=250 nm

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]  mAU   *s   [mAU   ]      %
----|-------|----|-------|----------|----------|--------|
   1   9.975 BB    0.4116  379.36035   14.15743   1.1670
   2  32.975 BB    1.3427 3.21271e4   346.83667  98.8330

Totals :                  3.25064e4   360.99410

==========================================================================
                          *** End of Report ***
```



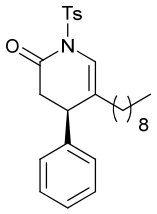
***rac*-3t**

Sample Name: gzh-294F

```
==========================================================================
Acq. Operator    : gzh
Acq. Instrument : Instrument 1                    Location : Vial 1
Injection Date   : 2014-6-30 18:24:39
Acq. Method      : C:\CHEM32\1\METHODS\JWQ20121205.M
Last changed     : 2014-6-30 18:33:42  by gzh
                   (modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\JWQ20121205.M
Last changed     : 2014-9-6 16:47:40  by ckq
                   (modified after loading)
Sample Info      : OD-H  H/I=90:10 1.0ml/min  250nm
```



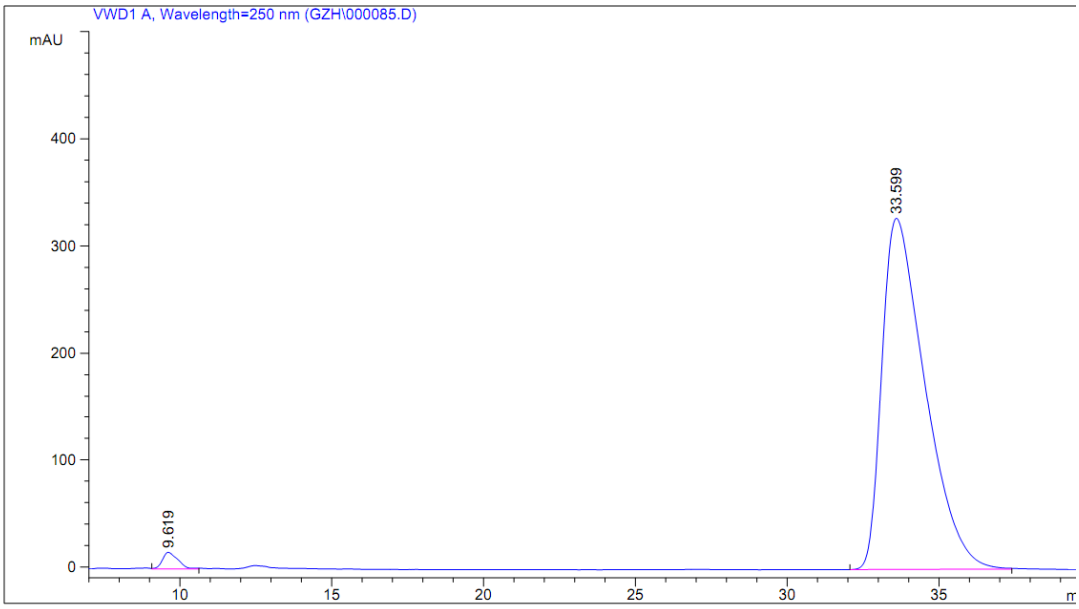

```
==========================================================================
                        Area Percent Report
==========================================================================

Sorted By             :      Signal
Multiplier            :      1.0000
Dilution              :      1.0000
Use Multiplier & Dilution Factor with ISTDs


Signal 1: VWD1 A, Wavelength=250 nm

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]  mAU   *s   [mAU   ]      %
----|-------|----|-------|----------|----------|--------|
   1   9.815 VV    0.4194 1.09079e4   404.61176  50.4017
   2  34.871 BB    1.4438 1.07340e4   116.28735  49.5983

Totals :                  2.16419e4   520.89911


==========================================================================
                        *** End of Report ***
```



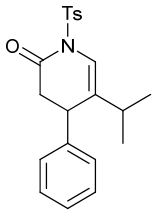
3t

Sample Name: gzh-294E

```
==========================================================================
Acq. Operator   : gzh
Acq. Instrument : Instrument 1                    Location : Vial 1
Injection Date  : 2014-6-30 17:33:50
Acq. Method     : C:\CHEM32\1\METHODS\JWQ20121205.M
Last changed    : 2014-6-30 17:30:49  by gzh
                  (modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\JWQ20121205.M
Last changed    : 2014-9-6 16:48:19  by ckq
                  (modified after loading)
Sample Info     : OD-H  H/I=90:10 1.0ml/min  250nm
```



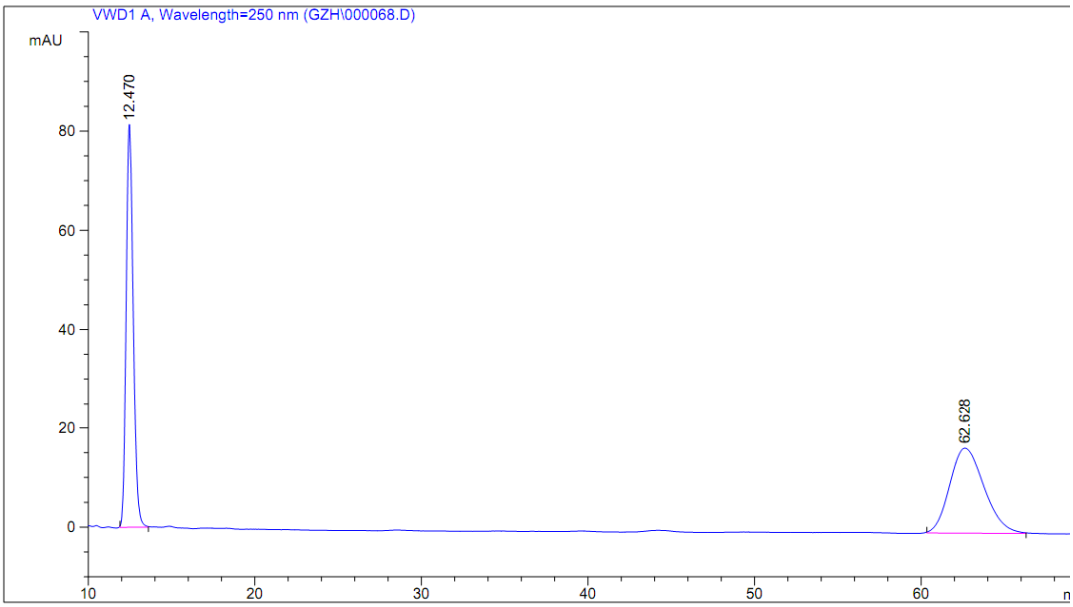

```
==========================================================================
                        Area Percent Report
==========================================================================

Sorted By             :      Signal
Multiplier            :      1.0000
Dilution              :      1.0000
Use Multiplier & Dilution Factor with ISTDs


Signal 1: VWD1 A, Wavelength=250 nm

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]  mAU   *s   [mAU   ]      %
----|-------|----|-------|----------|----------|--------|
   1   9.619 VB    0.5091  543.08521   15.45102   1.6534
   2  33.599 BB    1.4865 3.23039e4   328.10052  98.3466

Totals :                  3.28469e4   343.55155

==========================================================================
                        *** End of Report ***
```



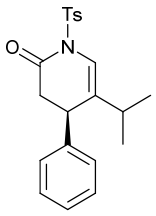
***rac*-3u**

Sample Name: gzh-293b

```
==========================================================================
Acq. Operator    : gzh
Acq. Instrument : Instrument 1                    Location : Vial 1
Injection Date   : 2014-6-26 19:08:57
Acq. Method      : C:\CHEM32\1\METHODS\JWQ20121205.M
Last changed     : 2014-6-26 20:30:56  by gzh
                   (modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\JWQ20121205.M
Last changed     : 2014-9-6 16:38:02  by ckq
                   (modified after loading)
Sample Info      : OD-H  H/I=90:10 1.0ml/min  250nm
```



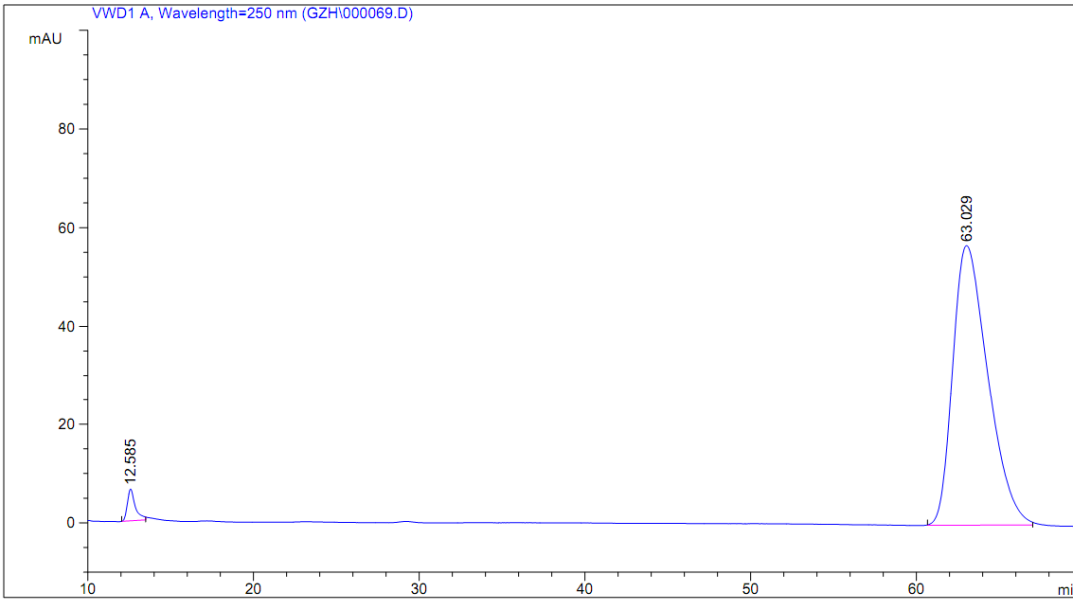

```
==========================================================================
                          Area Percent Report
==========================================================================

Sorted By             :      Signal
Multiplier            :      1.0000
Dilution              :      1.0000
Use Multiplier & Dilution Factor with ISTDs


Signal 1: VWD1 A, Wavelength=250 nm

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]  mAU   *s   [mAU   ]      %
----|-------|----|-------|----------|----------|--------|
   1  12.470 BB    0.4540 2394.19214   81.35685  49.3999
   2  62.628 BB    2.1436 2452.36499   17.11348  50.6001

Totals :                  4846.55713   98.47033

==========================================================================
                          *** End of Report ***
```



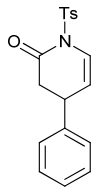
3u

Sample Name: gzh-293a

```
==========================================================================
Acq. Operator   : gzh
Acq. Instrument : Instrument 1                    Location : Vial 1
Injection Date  : 2014-6-26 17:51:33
Acq. Method     : C:\CHEM32\1\METHODS\JWQ20121205.M
Last changed    : 2014-6-26 17:52:06  by gzh
                  (modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\JWQ20121205.M
Last changed    : 2014-9-6 16:39:02  by ckq
                  (modified after loading)
Sample Info     : OD-H  H/I=90:10 1.0ml/min  250nm
```

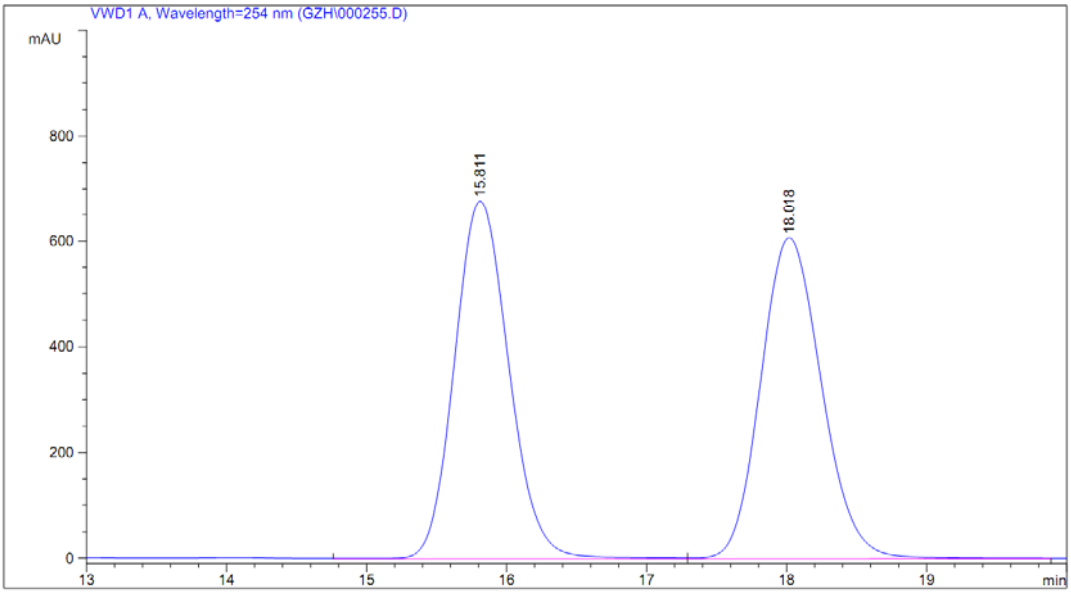



```
==========================================================================
                          Area Percent Report
==========================================================================

Sorted By             :      Signal
Multiplier            :      1.0000
Dilution              :      1.0000
Use Multiplier & Dilution Factor with ISTDs


Signal 1: VWD1 A, Wavelength=250 nm

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]  mAU   *s    [mAU   ]      %
----|-------|----|-------|----------|----------|--------|
   1  12.585 BB    0.4862  213.54277    6.43353   2.4870
   2  63.029 BB    2.2018 8372.86426   56.84404  97.5130

Totals :                  8586.40703   63.27758

==========================================================================
                          *** End of Report ***
```

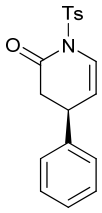


***rac*-3v**

```
Data File C:\CHEM32\1\DATA\GZH\000255.D
 Sample Name: GZH-294B C-2 racemic

    ========================================================================
    Acq. Operator    : gzh
    Acq. Instrument : Instrument 1                    Location : Vial 1
    Injection Date   : 2015-5-4 19:51:55
    Acq. Method      : C:\CHEM32\1\METHODS\JWQ20121205.M
    Last changed     : 2015-5-4 17:17:41  by gzh
                       (modified after loading)
    Analysis Method : C:\CHEM32\1\METHODS\JWQ20121205.M
    Last changed     : 2015-5-4 21:37:50  by gzh
                       (modified after loading)
    Sample Info      : OD-H H/I/M=90:6:4  1 ml/min 254 nm
```

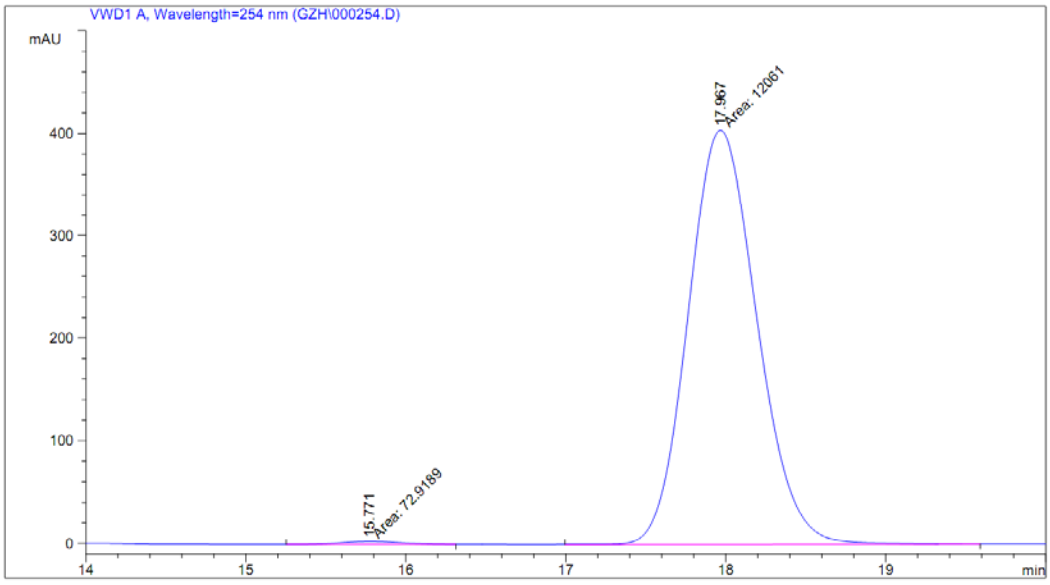



```
    ========================================================================
                              Area Percent Report
    ========================================================================

    Sorted By             :      Signal
    Multiplier            :      1.0000
    Dilution              :      1.0000
    Use Multiplier & Dilution Factor with ISTDs


    Signal 1: VWD1 A, Wavelength=254 nm

    Peak RetTime Type  Width     Area      Height     Area
      #   [min]        [min]  mAU   *s    [mAU   ]      %
    ----|-------|----|-------|----------|----------|--------|
       1  15.811 VV    0.4205 1.83534e4   678.21521  49.9221
       2  18.018 VV    0.4758 1.84107e4   607.65411  50.0779

    Totals :                  3.67641e4  1285.86932

    ========================================================================
                              *** End of Report ***


Instrument 1 2015-5-4 21:37:58  gzh                          Page   1 of 1
```

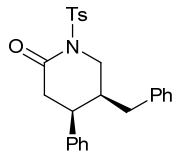


3v

```
Data File C:\CHEM32\1\DATA\GZH\000254.D
 Sample Name: GZH-391C C-2

    ======================================================================
    Acq. Operator   : gzh
    Acq. Instrument : Instrument 1                    Location : Vial 1
    Injection Date  : 2015-5-4 19:22:03
    Acq. Method     : C:\CHEM32\1\METHODS\JWQ20121205.M
    Last changed    : 2015-5-4 17:17:41  by gzh
                      (modified after loading)
    Analysis Method : C:\CHEM32\1\METHODS\JWQ20121205.M
    Last changed    : 2015-5-4 21:41:23  by gzh
                      (modified after loading)
    Sample Info     : OD-H H/I/M=90:6:4  1 ml/min 254 nm
```

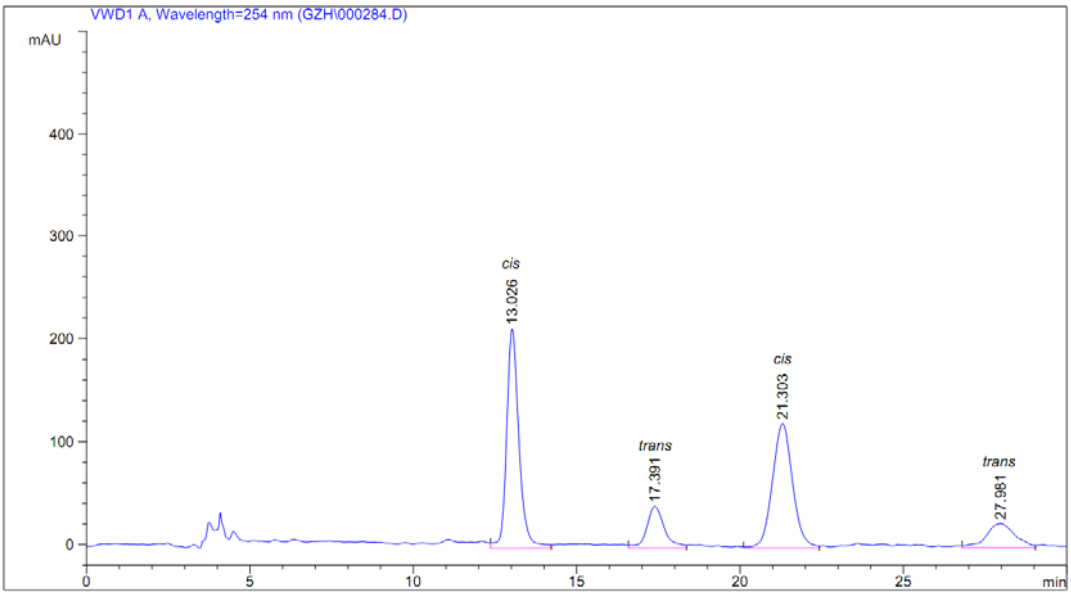



```
    ======================================================================
                              Area Percent Report
    ======================================================================

    Sorted By             :      Signal
    Multiplier            :      1.0000
    Dilution              :      1.0000
    Use Multiplier & Dilution Factor with ISTDs


    Signal 1: VWD1 A, Wavelength=254 nm

    Peak RetTime Type  Width     Area      Height     Area
      #   [min]        [min]  mAU   *s    [mAU   ]      %
    ----|-------|----|-------|----------|----------|--------|
       1  15.771 MM    0.4200   72.91888    2.89385   0.6010
       2  17.967 MM    0.4970 1.20610e4   404.47421  99.3990

    Totals :                  1.21339e4   407.36806

    ======================================================================
                              *** End of Report ***
```

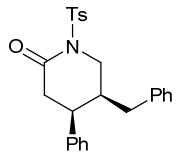


***rac*-6**

```
Data File C:\CHEM32\1\DATA\GZH\000284.D
 Sample Name: gzh-393B

    ========================================================================
    Acq. Operator    : gzh
    Acq. Instrument : Instrument 1                    Location : Vial 1
    Injection Date   : 2015-5-19 20:48:41
    Acq. Method      : C:\CHEM32\1\METHODS\JWQ20121205.M
    Last changed     : 2015-5-19 20:47:18  by gzh
                       (modified after loading)
    Analysis Method : C:\CHEM32\1\METHODS\JWQ20121205.M
    Last changed     : 2015-5-19 22:11:12  by gzh
                       (modified after loading)
    Sample Info      : IC H/I/M=60:30:10 1 ml/min 254 nm
```

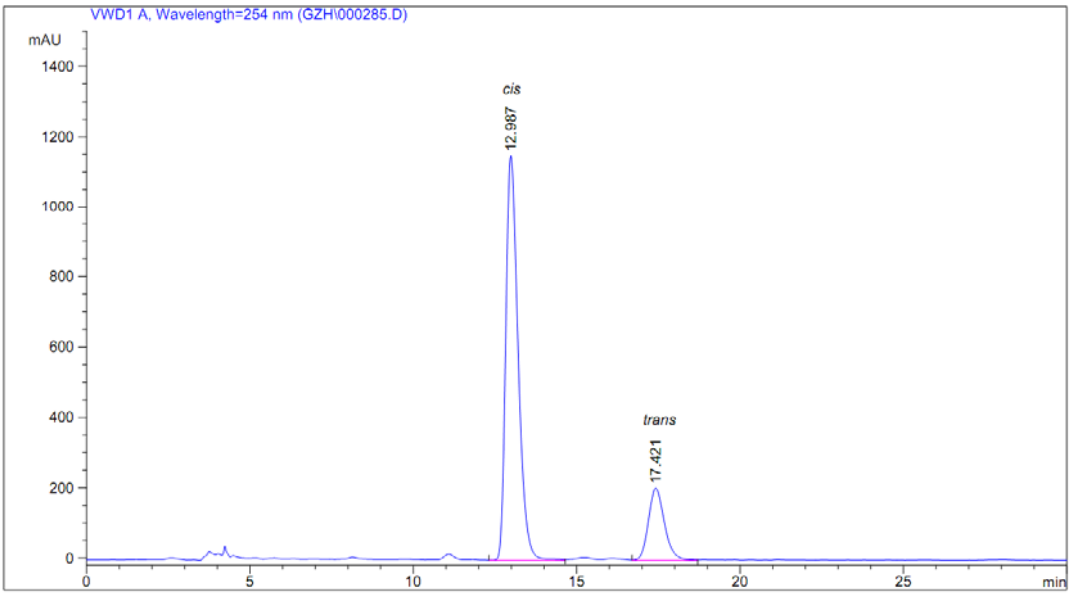



```
    ========================================================================
                            Area Percent Report
    ========================================================================

    Sorted By             :      Signal
    Multiplier            :      1.0000
    Dilution              :      1.0000
    Use Multiplier & Dilution Factor with ISTDs


    Signal 1: VWD1 A, Wavelength=254 nm

    Peak RetTime Type  Width     Area      Height     Area
      #   [min]        [min]  mAU   *s   [mAU   ]      %
    ----|-------|----|-------|----------|----------|--------|
       1  13.026 VV    0.3992 5588.03223  213.01646  40.4765
       2  17.391 VV    0.5810 1532.55859   40.52419  11.1010
       3  21.303 VV    0.6535 5209.58789  121.04330  37.7352
       4  27.981 VV    0.9485 1475.45422   23.66994  10.6873

    Totals :                  1.38056e4   398.25391

    ========================================================================
                            *** End of Report ***


Instrument 1 2015-5-19 22:11:19  gzh                          Page   1 of 1
```

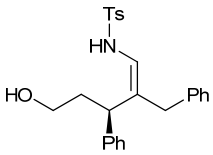


6

```
Data File C:\CHEM32\1\DATA\GZH\000285.D
 Sample Name: gzh-393A

    ========================================================================
    Acq. Operator    : gzh
    Acq. Instrument : Instrument 1                    Location : Vial 1
    Injection Date   : 2015-5-19 21:34:44
    Acq. Method      : C:\CHEM32\1\METHODS\JWQ20121205.M
    Last changed     : 2015-5-19 21:20:43  by gzh
                       (modified after loading)
    Analysis Method : C:\CHEM32\1\METHODS\JWQ20121205.M
    Last changed     : 2015-5-19 22:08:32  by gzh
                       (modified after loading)
    Sample Info      : IC H/I/M=60:30:10 1 ml/min 254 nm
```

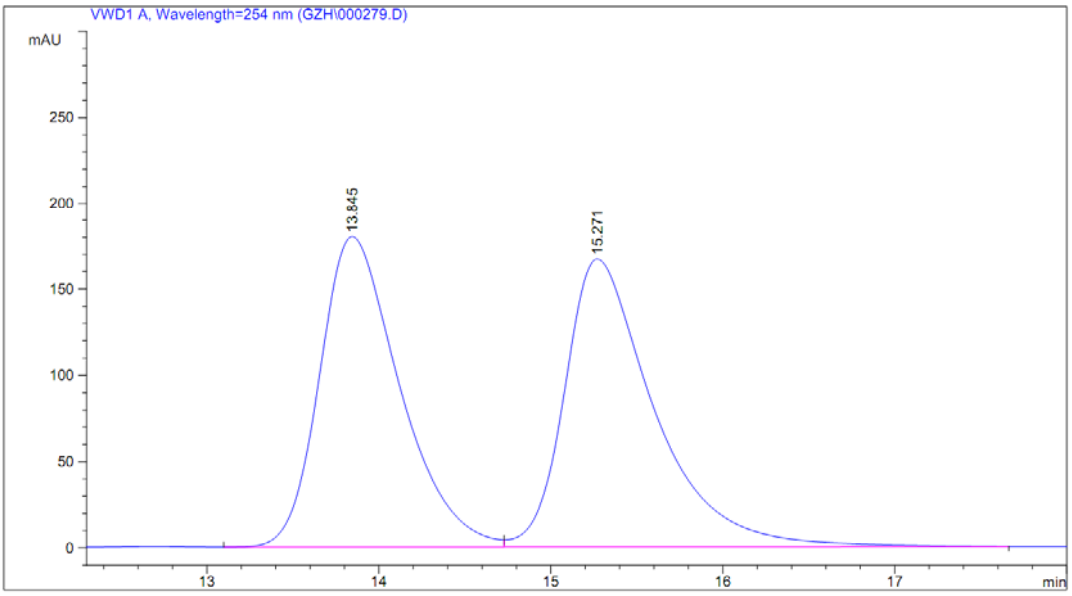



```
    ========================================================================
                              Area Percent Report
    ========================================================================

    Sorted By             :      Signal
    Multiplier            :      1.0000
    Dilution              :      1.0000
    Use Multiplier & Dilution Factor with ISTDs


    Signal 1: VWD1 A, Wavelength=254 nm

    Peak RetTime Type  Width     Area      Height     Area
      #   [min]        [min]  mAU   *s   [mAU   ]      %
    ----|-------|----|-------|----------|----------|--------|
       1  12.987 VV    0.4044 3.01796e4  1153.05273  81.1159
       2  17.421 VV    0.5221 7025.93066  205.03394  18.8841

    Totals :                  3.72055e4  1358.08667


    ========================================================================
                              *** End of Report ***
```

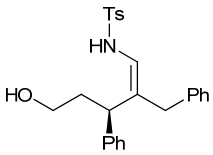


***rac*-7**

```
Data File C:\CHEM32\1\DATA\GZH\000279.D
 Sample Name: gzh-S230C LiAlH4 racemic

    ========================================================================
    Acq. Operator   : gzh
    Acq. Instrument : Instrument 1                    Location : Vial 1
    Injection Date  : 2015-5-19 11:18:15
    Acq. Method     : C:\CHEM32\1\METHODS\JWQ20121205.M
    Last changed    : 2015-5-19 11:38:17  by gzh
                      (modified after loading)
    Analysis Method : C:\CHEM32\1\METHODS\JWQ20121205.M
    Last changed    : 2015-5-19 11:40:16  by gzh
                      (modified after loading)
    Sample Info     : IA H/I=90:10 1.0 ml/min 254 nm
```

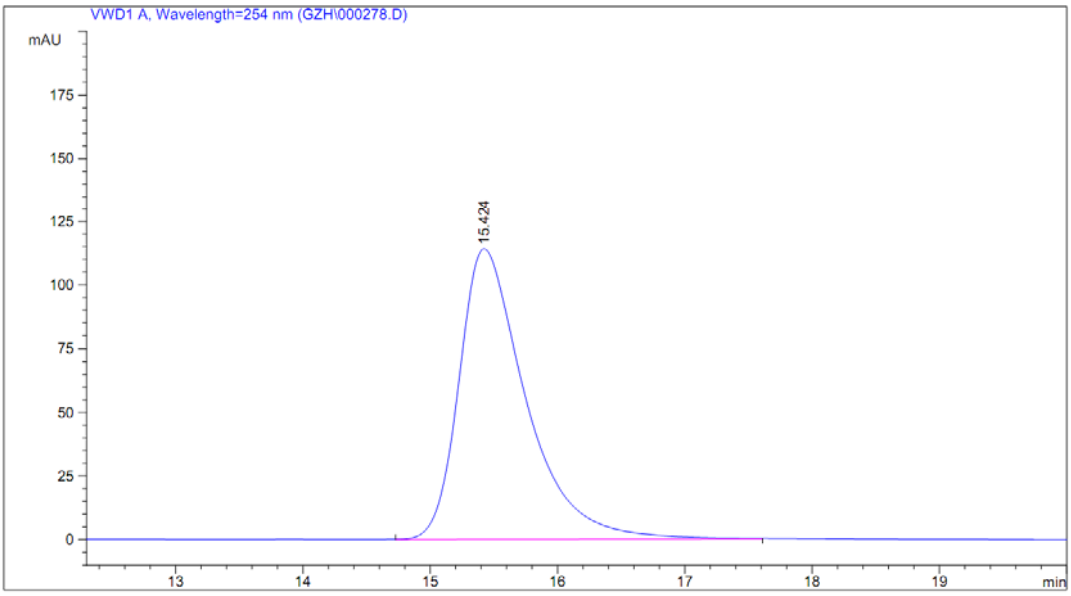



```
    ========================================================================
                            Area Percent Report
    ========================================================================

    Sorted By             :      Signal
    Multiplier            :      1.0000
    Dilution              :      1.0000
    Use Multiplier & Dilution Factor with ISTDs


    Signal 1: VWD1 A, Wavelength=254 nm

    Peak RetTime Type  Width     Area      Height     Area
      #   [min]        [min]  mAU   *s    [mAU   ]      %
    ----|-------|----|-------|----------|----------|--------|
       1  13.845 VV    0.4879 5818.49268  179.95856  49.0179
       2  15.271 VB    0.5341 6051.63672  166.74712  50.9821

    Totals :                  1.18701e4   346.70567


    ========================================================================
                            *** End of Report ***
```



7

```
Data File C:\CHEM32\1\DATA\GZH\000278.D
 Sample Name: gzh-S230A LiAlH4

    ========================================================================
    Acq. Operator    : gzh
    Acq. Instrument : Instrument 1                    Location : Vial 1
    Injection Date   : 2015-5-19 10:49:42
    Acq. Method      : C:\CHEM32\1\METHODS\JWQ20121205.M
    Last changed     : 2015-5-19 10:29:10  by gzh
                       (modified after loading)
    Analysis Method : C:\CHEM32\1\METHODS\JWQ20121205.M
    Last changed     : 2015-5-19 11:38:17  by gzh
                       (modified after loading)
    Sample Info      : IA H/I=90:10 1.0 ml/min 254 nm
```




```
    ========================================================================
                            Area Percent Report
    ========================================================================

    Sorted By             :      Signal
    Multiplier            :      1.0000
    Dilution              :      1.0000
    Use Multiplier & Dilution Factor with ISTDs


    Signal 1: VWD1 A, Wavelength=254 nm

    Peak RetTime Type  Width     Area      Height     Area
      #   [min]        [min]  mAU   *s    [mAU   ]      %
    ----|-------|----|-------|----------|----------|--------|
       1  15.424 BB    0.5424 4164.68945  114.07838 100.0000

    Totals :                  4164.68945  114.07838

    ========================================================================
                            *** End of Report ***
```