Angewandte Chemie
Eine Zeitschrift der Gesellschaft Deutscher Chemiker

Supporting Information

69451 Weinheim, Germany

Catalytic Enantioselective Trapping of Alcoholic Oxonium Ylide with Aldehydes: Rh(II) and Zr(IV) Catalyzed Three-Component Reactions of Aryl Diazoacetates, Benzyl Alcohol and Aldehydes

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Supporting Information

Table of Contents

General Information. Melting points were uncorrected. All ^{1}H NMR, and ^{13}C NMR spectra were recorded using a Brucker-300 MHz (^{1}H 300 MHz, ^{13}C 75 MHz) spectrometer in $CDCl_3$ unless otherwise noted. Tetramethylsilane (TMS) served as internal standard (δ= 0) for ^{1}HNMR, and $CDCl_3$ was used as internal standard (δ = 77.0) for ^{13}C NMR. Chemical shifts are reported in parts per million as follows: chemical shift, multiplicity (s = singlet, d = doublet, t = triplet, q = quartet, m = multiplet, br =broad). Optical rotations were measured on a Perkin-Elmer 241 Polarimeter at λ = 589 nm and were reported as $[\alpha]_D^{20}$ (concentration in grams/100 mL solvent). HRMS (ESI) Mass spectra were recorded on BRUKER FT-MS. HPLC analysis was performed on Waters- Breeze (2487 Dual λ Absorbance Detector and 1525 Binary HPLC Pump). Chiral columns include Chiralcel® OD-H (Chiral Technologies Inc., 24cm×4.6mm I.D.) and Chiralcel® AS-H (Chiral Technologies Inc., 24cm×4.6mm I.D.) columns. Solvents were distilled and dried over MS 4Å. $Zr(O^nBu)_4$ was purchased from Aldrich. Employed aldehydes were purchased from Aldrich and were purified by usual methods. (*S*)-3, 3'-2-BrBINOL, and (*S*)-3, 3'-2-IBINOL were prepared according to the literature.[1] (*S*)-6, 6'-2-BrBINOL was prepared according to the literature.[2] All reactions were carried out under argon atmosphere in well-dried glassware.

Experimental Section:

Preparation of (*S*)-Zr-6d-MS Catalyst: The catalyst was prepared according to a literature procedure.[3] To a suspension of (*S*)-3, 3'-diiodo-BINOL (123 mg, 0.22 mmol) in toluene (4 ml) was added $Zr(O^nBu)_4$ (0.11 mmol) at room temperature, and the solution was stirred for 3h at the same temperature. To the mixture was added 5Å molecular services (MS) (0.5 g), which contain 10% (wt/wt) H_2O and stirred for additional 10 min. After removal of the solvents under reduced pressure (0.2 mmHg), the resulting solid was dried at room temperature under the vacuum for 1 h (0.65 g, containing 0.11 mmol Zr).

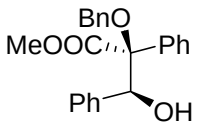
Typical experimental procedure for the asymmetric three component reactions using (*S*)-Zr-6-MS Catalyst.

To the mixture of (*S*)-Zr-**6d**-MS catalyst (0.015 mmol) in $(CH_2)_2Cl_2$ (1.00 mL) was added BnOH (12.5 μl, 0.12 mmol) at room temperature. The mixture was stirred for additional 1 h at the same temperature. The solution of benzadehyde (0.11 mmol) and $Rh_2(OAc)_4$ (0.5 mg, 1 mol%) in $(CH_2)_2Cl_2$ (0.50 mL) were added successively. The resulting mixture was stirred for 5 min at room temperature, then cooled to 0 °C for 10 min. To the mixture was added methyl phenyldiazoacetate **1a** (17.6 mg, 0.10 mmol) in 1 mL of $(CH_2)_2Cl_2$. The reaction mixture was stirred for 3-4 h at the same temperature, until completion determined by TLC. The reaction mixture was subsequently quenched via addition of a saturated aqueous solution of $NaHCO_3$. After removing the organic layer, the aqueous layer was extracted with CH_2Cl_2 (2×10 mL). The organic fractions were then combined, dried over anhydrous Na_2SO_4, and filtered. After filtration and concentration of solvents under reduced pressure, the crude product was subjected to ^{1}H-NMR analysis for the determination of diastereoselectivity. The crude product was purified by flash chromatography on silica gel (eluent: EtOAc /light petroleum = 1:15) to give **4a** (29.3 mg, 81%). The optical purity was determined by HPLC analysis using a Chiral Daicel Chirapak OD-H column. Products **4b**~**4n** were prepared using the same procedure.

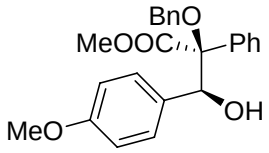
Table 1 The diagnostic ^{1}H NMR assignments of *erythro*- and *threo*-**4** ($\delta(J_{CH\text{-}OH})$)to determine dr[a]

	erythro-**4** $\delta(J_{CH\text{-}OH}$ Hz)	*threo*-**4** $\delta(J_{CH\text{-}OH}$ Hz)
4a	5.38 (4.6)	5.28 (4.2)
4b	5.31 (4.6)	5.22 (4.2)
4c	5.36 (4.2)	5.24 (4.2)
4d	5.38 (4.3)	5.26 (3.6)
4e	5.47 (3.5)	5.46(4.0)
4f	5.30 (4.6)	5.18 (4.5)
4j	6.35 (5.6)	6.23(8.4)
4h	4.95 (6.4)	4.91 (br s)
4I	5.43 (6.2)	5.36 (6.6)
4J	5.37 (4.5)	5.15 (5.3)
4k	5.31 (4.4)	5.14 (5.1)
4l	5.34 (4.7)	5.45 (6.7)
4m	5.29 (4.7)	5.31 (4.7)
4n	5.29 (4.3)	5.36 (4.0)

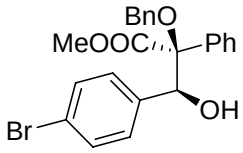
[a] The chemical shifts and the coupling constants were determined by ^{1}HNMR of the crude reaction mixture.



4a (2*S*, 3*S*)-methyl 2- benzyloxy -3-hydroxy-2, 3-diphenylpropanoate $[\alpha]_D^{20}$= -36.7 ° (*c* = 1.10, EtOAc); Yellow oil; ee = 98% was determined by HPLC with a chiral Daicel Chirapak OD-H column (5 % *i*PrOH in hexane at 1.0 mL/min, 254nm); Retention time: t_{major} = 8.6 min, and t_{minor} = 14.3 min.^{1}H NMR (300 MHz, $CDCl_3$) δ 7.29-7.36 (m, 10H), 6.97-7.16 (m, 2H), 6.97 (d, 2H), 5.38 (d, 1H, *J*=4.6Hz), 4.67 (d, 1H, *J*=11.5Hz), 4.45 (d, 1H, *J*=11.5Hz), 3.78 (s, 3H), 3.42 (m, 1H); ^{13}C NMR (75MHz, $CDCl_3$) δ 171.6, 138.1, 138.0, 134.7, 128.5, 128.4, 128.3, 128.2, 128.0, 127.9, 127.8, 127.7, 127.6, 127.5, 127.3, 127.2, 127.1, 126.9, 87.9, 78.6, 67.9, 52.1; HRMS: calcd for $C_{23}H_{22}O_4$: 385.1410; found: 385.1407$[M+Na]^+$

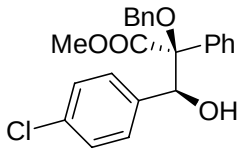


4b (2*S*, 3*S*)-methyl -benzyloxy -3- hydroxy-3- (4-methoxyphenyl) -2-phenylpropanoate $[\alpha]_D^{20}$ = -19.8 ° (*c* = 0.51, CH_2Cl_2); Yellow oil; ee = 96% was determined by HPLC with a chiral Daicel Chirapak OD-H column (5 % *i*PrOH in hexane at 1.0 mL/min, 254nm); Retention time: t_{major} = 12.1 min, and t_{minor} = 19.0 min.^{1}H NMR (300 MHz, $CDCl_3$) δ 7.29-7.41 (m, 9H), 6.92 (d, 2H *J*=8.9Hz), 6.72 (d, 2H *J*=8.9Hz), 5.35 (br, 1H), 4.70 (d, 1H, *J*=11.45Hz), 4.47 (d, 1H, *J*=11.4Hz), 3.80 (s, 3H), 3.36 (br, 1H); ^{13}C NMR (75MHz, $CDCl_3$) δ 171.6, 159.1, 138.1, 134.9, 130.4, 129.1, 128.5, 128.3, 128.2, 127.6, 127.5, 127.2, 112.5, 88.0, 78.3, 67.9, 55.1, 52.1; HRMS: calcd for $C_{24}H_{24}O_5$: 415.1516 ; found: 415.1528 $[M+Na]^+$

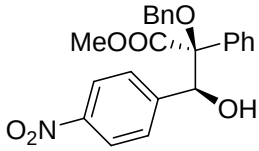


4c (2*S*, 3*S*)-methyl 2- benzyloxy -3-(4-bromophenyl)-3-hydroxy-2- phenylpropanoate $[\alpha]_D^{20}$ = -11.0 ° (*c* = 0.50, CH_2Cl_2); Yellow oil; ee = 94% was determined by HPLC with a chiral Daicel Chirapak OD-H column (5 % *i*PrOH in hexane at 1.0 mL/min, 254nm); Retention time: t_{major} = 9.7 min, and t_{minor} = 13.2 min. ^{1}H NMR (300 MHz, $CDCl_3$) δ 7.29-7.43 (m, 12H), 6.83 (d, 2H), 5.36 (d, 1H, *J*=4.2Hz), 4.69 (d, 1H, *J*=11.5Hz), 4.47 (d, 1H, *J*=11.5Hz), 3.83 (s, 3H), 3.45 (d, 1H, *J*=4.2Hz); ^{13}C NMR (75MHz, $CDCl_3$) δ 171.5, 137.9, 137.1, 134.3, 130.2, 129.6, 128.6, 128.5, 128.3, 127.7, 127.6, 127.2, 121.8, 87.8, 77.9, 68.0, 52.2; HRMS: calcd for $C_{23}H_{21}BrO_4$: 463.0515;

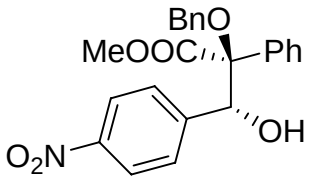
found: 463.0521$[M+Na]^+$



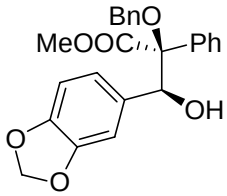
4d (2*S*, 3*S*)-methyl 2-benzyloxy-3-(4-chlorophenyl)-3-hydroxy-2-phenylpropanoate $[\alpha]_D^{20}$ = -18.8 ° (*c* = 0.52, CH_2Cl_2); Yellow oil; ee = 95% was determined by HPLC with a chiral Daicel Chirapak OD-H column (5 % *i*PrOH in hexane at 1.0 mL/min, 254nm); Retention time: t_{major} = 9.2 min, and t_{minor} = 12.2 min.^{1}H NMR (300 MHz, $CDCl_3$) δ 7.20-7.40 (m, 10H), 7.13 (d, 2H, *J*=8.4Hz), 6.89 (d, 2H, *J*=8.4Hz), 5.38 (d, 1H, *J*=4.3Hz), 4.69 (d, 1H, *J*=11.5Hz), 4.48(d, 1H, *J*=11.5Hz), 3.80 (s, 3H), 3.45 (d, 1H, *J*=4.3Hz); ^{13}C NMR (75MHz, $CDCl_3$) δ 171.5, 137.9, 136.6, 134.3, 133.5, 129.3, 128.4, 128.37, 128.33, 127.7, 127.6, 127.2, 87.9, 77.9, 68.0, 52.2; HRMS: calcd for $C_{23}H_{21}ClO_4$: 419.1021 ; found: 419.1028 $[M+Na]^+$



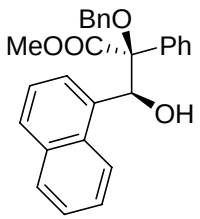
erythro-**4e** (2*S*, 3*S*)-methyl 2- benzyloxy- 3- hydroxy- 3- (4-nitrophenyl)- 2-phenylpropanoate $[\alpha]_D^{20}$ = -3.7 ° (*c* = 0.5, CH_2Cl_2); Yellow oil; ee = 60% was determined by HPLC with a chiral Daicel Chirapak OD-H column (5 % *i*PrOH in hexane at 1.0 mL/min, 254nm); Retention time: t_{major} = 19.3 min, and t_{minor} = 23.8 min. ^{1}H NMR (500 MHz, $CDCl_3$) δ 7.96 (d, 2H, *J*=9.0Hz), 7.32-7.39 (m, 5H), 7.05-7.26 (m, 2H), 7.21-7.22(d, 2H, *J*=7.5Hz), 7.07-7.08(d, 2H, *J*=8.5Hz), 5.47 (d, 1H, *J*=3.5Hz), 4.66 (d, 1H, *J*=11.5Hz), 4.47 (d, 1H, *J*=11.5Hz), 3.80 (s, 3H), 3.5 (d, 1H, *J*=4.0Hz); ^{13}C NMR (125MHz, $CDCl_3$) δ 171.3, 147.4, 145.3, 137.6, 133.8, 128.7, 128.5, 128.4, 128.1, 127.9, 127.2, 122.1, 87.9, 77.6, 68.1, 52.4; HRMS: calcd for $C_{23}H_{21}NO_6$: 407.1369; found: 407.1358$[M+NH_4]^+$



threo-**4e**[4] (2S, 3R)-methyl 2- benzyloxy-3- hydroxy-3- (4-nitrophenyl) -2-phenylpropanoate Yellow oil; ^{1}H NMR (500 MHz, $CDCl_3$) δ 8.01 (d, 2H, *J*=9.0Hz), 7.31-7.37 (m, 8H), 7.24-7.32 (m, 4H), 5.46 (d, 1H, *J*=4.0Hz), 4.93 (d, 1H, *J*=11.5Hz), 4.49 (d, 1H, *J*=11.5Hz), 3.80 (s, 3H), 3.67 (br, 1H); ^{13}C NMR (125MHz, $CDCl_3$) δ 172.2, 147.4, 145.6, 138.1, 135.3, 129.0, 128.8, 128.7, 128.5,128.4, 127.7, 127.3, 127.2, 122.4, 87.9, 79.1, 69.2, 52.6;

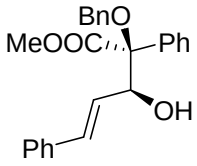


4f (2*S*, 3*S*)-methyl 3- (benzo[d] [1,3] dioxol-5-yl) -2-(benzyloxy)- 3- hydroxy - 2-phenylpropanoate $[\alpha]_D^{20}$ = -23.3 ° (*c* = 0.51, CH_2Cl_2); Yellow oil; ee = 96% was determined by HPLC with a chiral Daicel Chirapak OD-H column (5 % *i*PrOH in hexane at 1.0 mL/min, 254nm); Retention time: t_{major} = 13.6 min, and t_{minor} = 21.1 min. ^{1}H NMR (300 MHz, $CDCl_3$) δ 7.30-7.43 (m, 10H), 6.63 (br, 1H), 6.47 (m, 2H), 5.92 (br, 1H), 5.30 (d, 1H, *J*=4.6Hz), 4.72 (d, 1H, *J*=11.5Hz), 4.46 (d, 1H, *J*=11.5Hz), 3.80 (s, 3H), 3.38 (d, 1H, *J*=4.6Hz); ^{13}C NMR (75MHz, $CDCl_3$) δ 171.5, 147.0, 146.7, 138.1, 134.8, 132.1, 128.6, 128.4, 128.36, 128.34, 127.7, 127.6, 127.2, 127.0, 121.6, 108.5, 107.0, 100.8, 87.9, 78.4, 67.9, 52.2; HRMS: calcd for $C_{24}H_{22}O_6$: 429.1309; found: 429.1297$[M+Na]^+$

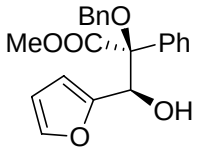


4g (2*S*, 3*S*)-methyl 2- benzyloxy -3-hydroxy-3-(naphthalen-1-yl)-2- phenylpropanoate $[\alpha]_D^{20}$ = -28.1 ° (*c* = 0.5, CH_2Cl_2); Yellow oil; ee = 78% was determined by HPLC with a chiral Daicel Chirapak OD-H column (5 % *i*PrOH in hexane at 1.0 mL/min, 254nm); Retention time: t_{major} = 14.7 min, and t_{minor} = 27.7 min. ^{1}H NMR (300 MHz, $CDCl_3$) δ 8.19 (d, 1H), 7.82 (d, 1H), 7.72 (d, 1H), 7.34-7.40 (m, 5H), 7.19-7.25 (m, 5H), 7.09-7.12 (m, 2H), 6.96 (d , 1H), 6.35 (d, 1H, *J*=5.6Hz), 5.30 (br, 1H), 4.69 (d, 1H, *J*=11.9Hz), 4.43 (d, 1H, *J*=11.9Hz), 3.71 (s, 3H), 3.12 (d, 1H, *J*=5.6Hz); ^{13}C NMR (75MHz, $CDCl_3$) δ 171.9, 138.0, 135.1, 134.3,

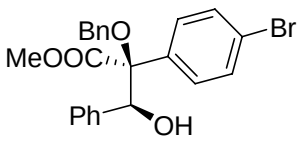
133.2, 129.0, 128.4, 128.3, 128.1, 127.4, 127.2, 127.1, 126.9, 126.8, 125.9, 125.5, 125.1, 124.6, 124.5, 88.6, 73.6, 73.2, 67.9, 52.2; HRMS: calcd for $C_{27}H_{24}O_4$: 435.1567 ; found: 435. 1567$[M+Na]^+$



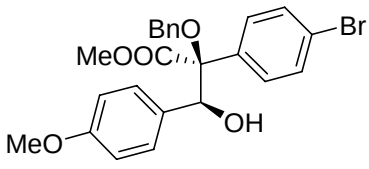
4h (2*S*, 3*S*, *E*)-methyl 2- benzyloxy -3-hydroxy-2, 5-diphenylpent-4-enoate $[\alpha]_D^{20}$ = -5.4 ° (*c* = 0.50, CH_2Cl_2); Yellow oil; ee = 94% was determined by HPLC with a chiral Daicel Chirapak OD-H column (5 % *i*PrOH in hexane at 1.0 mL/min, 254nm); Retention time: t_{major} = 12.0 min, and t_{minor} = 15.6 min. ^{1}H NMR (300 MHz, $CDCl_3$) δ 7.54-7.57 (m, 2H,), 7.32-7.54 (m, 8H), 7.25-7.27 (m, 5H), 6.47 (d, 1H, *J*=16.0Hz), 6.11 (d, 1H, $J_{1\text{-}3}$=16.0Hz , $J_{1\text{-}2}$=6.2Hz), 4.95 (d, 1H, *J*=6.4Hz), 4.73 (d, 1H, *J*=11.3Hz),4.39 (d, 1H, *J*=11.3Hz), 3.85 (s, 3H), 3.12 (br, 1H); ^{13}C NMR (75MHz, $CDCl_3$) δ 171.5, 138.1, 136.8, 135.3, 132.6, 128.5, 128.4, 128.3, 128.2, 127.9, 127.6, 127.5, 127.4, 125.9, 126.5, 126.1, 87.9, 77.6, 68.1, 52.2; HRMS: calcd for $C_{25}H_{24}O_4$: 411.1567 ; found: 411.1565 $[M+Na]^+$



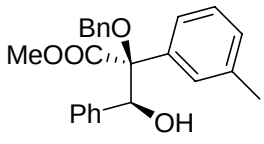
4i (2*S*, 3*S*)-methyl 2- benzyloxy -3-(furan-2-yl)-3-hydroxy-2-phenylpropanoate $[\alpha]_D^{20}$ =-17.2 ° (*c* = 0.46, CH_2Cl_2); Yellow oil; ee = 92% was determined by HPLC with a chiral Daicel Chirapak OD-H column (5 % *i*PrOH in hexane at 1.0 mL/min, 254nm); Retention time: t_{major} = 8.9 min, and t_{minor} = 15.3 min. ^{1}H NMR (300 MHz, $CDCl_3$) δ 7.43-7.44 (m, 2H), 7.26-7.36(m, 8H), 6.26 (d, 1H, *J*=1.4Hz), 6.07 (d, 1H, *J*=1.4Hz), 5.43 (d, 1H, *J*=6.2Hz), 4.74 (d, 1H, *J*=11.3Hz), 4.46 (d, 1H, *J*=11.3Hz), 3.79 (s, 3H), 3.26 (br, 1H, *J*=6.4Hz); ^{13}C NMR (75MHz, $CDCl_3$) δ 171.6, 151.9, 141.6, 138.1, 135.2, 128.5, 128.3, 127.9, 127.5, 127.3, 127.0, 110.2, 108.3, 86.8, 72.8, 68.0, 52.3; HRMS: calcd for $C_{21}H_{20}O_5$: 375.1203; found: 375.1193 $[M+Na]^+$



4j (2*S*, 3*S*)-methyl 2- benzyloxy -2-(4-bromophenyl)-3- hydroxy-3-phenylpropanoate $[\alpha]_D^{20}$ = -5.8 ° (*c* = 0.52, CH_2Cl_2); Yellow oil; ee = 96% was determined by HPLC with a chiral Daicel Chirapak OD-H column (5 % *i*PrOH in hexane at 1.0 mL/min, 254nm); Retention time: t_{major} = 9.4 min, and t_{minor} = 13.6 min. ^{1}H NMR (300 MHz, $CDCl_3$) δ 7.32-7.41 (m, 10H), 7.16-7.22 (m, 2H), 6.94 (m, 2H), 5.37 (br, 1H), 4.62 (d, 1H, *J*=11.5Hz), 4.43 (d, 1H, *J*=11.5Hz), 3.78 (s, 3H), 3.26 (br , 1H); ^{13}C NMR (75MHz, $CDCl_3$) δ 171.3, 137.8, 137.6, 133.7, 130.5, 130.3, 128.5, 128.4, 127.9, 127.8, 127.6, 127.2, 127.1, 127.0, 122.5, 87.5, 78.1, 67.9, 52.4; HRMS: calcd for $C_{23}H_{21}BrO_4$: 463.0515; found: 463.0533$[M+Na]^+$

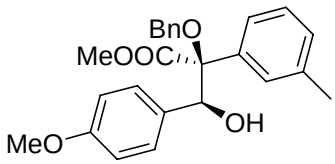


4k (2*S*, 3*S*) -methyl 2- benzyloxy -2- (4-bromophenyl)-3- hydroxy-3-(4-methoxyphenyl) propanoate $[\alpha]_D^{20}$ = -17 ° (*c* = 0.43, CH_2Cl_2); Yellow oil; ee = 93% was determined by HPLC with a chiral Daicel Chirapak OD-H column (5 % *i*PrOH in hexane at 1.0 mL/min, 254nm); Retention time: t_{major} = 12.6 min, and t_{minor} = 19.0 min. ^{1}H NMR (300 MHz, $CDCl_3$) δ 7.30-7.41 (m, 8H), 7.17-7.20 (m, 2H), 6.85 (d, 2H, *J*=8.8Hz), 6.69 (d, 2H, *J*=8.8Hz), 5.31 (d, 1H, *J,* =4.3Hz), 4.60 (d, 1H, *J*=11.5Hz), 4.40 (d, 1H, *J*=11.5Hz), 3.80 (s, 3H), 3.78 (s, 3H), 3.14 (d, 1H, *J*=4.3Hz); ^{13}C NMR (75MHz, $CDCl_3$) δ 171.4, 159.3, 137.8, 133.9, 130.6, 130.3, 130.0, 129.0, 128.9, 128.4, 127.6, 127.1, 122.5, 112.7, 87.6, 77.8, 67.9, 55.2, 52.3; HRMS: calcd for $C_{24}H_{23}BrO_5$: 493.0621 ; found: 493.0516 $[M+Na]^+$

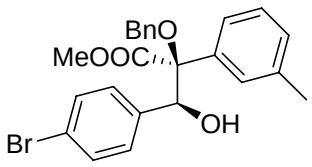


4l (2*S*, 3*S*)-methyl 2-benzyloxy-3-hydroxy-3-phenyl-2-m-tolylpropanoate $[\alpha]_D^{20}$ = -35.5 ° (*c* = 0.51, CH_2Cl_2); Yellow oil; ee = 96% was determined by HPLC with a chiral Daicel Chirapak OD-H column (5% *i*PrOH in hexane at 1.0 mL/min, 254nm);

Retention time: t_{major} = 7.3 min, and t_{minor} = 12.5 min. ^{1}H NMR (300 MHz, $CDCl_3$) δ 7.31-7.37(m, 5H), 7.13-7.22 (m, 7H), 6.99 (d, 2H), 5.34 (d, 1H, *J*=4.7Hz), 4.68 (d, 1H, *J*=11.4Hz), 4.43 (d, 1H, *J*=11.4Hz), 3.74 (s, 3H), 3.42 (d, 1H, *J*=4.3Hz), 2.31 (s, 3H); ^{13}C NMR (75MHz, $CDCl_3$) δ 171.6, 138.3, 138.2, 137.2, 134.8, 129.2, 129.1, 128.3, 128.0, 127.7, 127.6, 127.5, 127.3, 127.1, 125.5, 88.0, 78.7, 68.0, 52.0, 21.6; HRMS: calcd for $C_{24}H_{24}O_4$: 399.1567 ; found: 399.1555 $[M+Na]^+$



4m (2*S*, 3*S*)- methyl-2- benzyloxy-3- hydroxy-3- (4-methoxyphenyl) -2-m-tolylpropanoate $[\alpha]_D^{20}$ = -17.0 ° (*c* = 0.47, CH_2Cl_2); Yellow oil; ee = 97% was determined by HPLC with a chiral Daicel Chirapak OD-H column (5 % *i*PrOH in hexane at 1.0 mL/min, 254nm); Retention time: t_{major} = 10.0 min, and t_{minor} = 16.0 min. ^{1}H NMR (300 MHz, $CDCl_3$) δ 7.30-7.36 (m, 5H), 7.17-7.20 (m, 4H), 6.92 (d, 2H, *J*=8.8Hz), 6.70 (d, 2H, *J*=8.8Hz), 5.29 (d, 1H, *J*=4.7Hz), 4.68 (d, 1H, *J*=11.4Hz), 4.42 (d, 1H, *J*=11.4Hz), 3.78 (s, 3H), 3.74(s, 3H), 3.36 (d, 1H, *J*=4.7Hz), 2.32 (s, 3H); ^{13}C NMR (75MHz, $CDCl_3$) δ 171.7, 159.1, 138.3, 137.2, 134.9, 130.5, 129.2, 129.1, 129.0, 128.3, 127.6, 127.5, 127.3, 125.6, 112.5, 88.1, 78.3, 67.9, 55.1, 52.0, 21.6; HRMS: calcd for $C_{25}H_{26}O_5$: 429.1672 ; found: 429.1693 $[M+Na]^+$

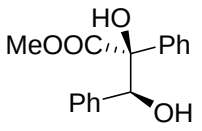


4n (2*S*, 3*S*)- methyl 2- benzyloxy -3- (4-bromophenyl)-3- hydroxy-2- m-tolylpropanoate $[\alpha]_D^{20}$ = -8.1 ° (*c* = 0.52, CH_2Cl_2); Yellow oil; ee = 89% was determined by HPLC with a chiral Daicel Chirapak OD-H column (5 % *i*PrOH in hexane at 1.0 mL/min, 254nm); Retention time: t_{major} = 8.0 min, and t_{minor} = 11.7 min. ^{1}H NMR (300 MHz, $CDCl_3$) δ 7.25-7.37 (m, 8H), 7.10-7.20 (m, 4H), 6.83 (d, 2H, *J*=8.6Hz), 5.29 (d, 1H, *J*=4.3Hz), 4.66 (d, 1H, *J*=11.4Hz), 4.42 (d, 1H, *J*=11.4Hz), 3.76 (s, 3H), 3.45 (d, 1H, *J*=4.3Hz), 2.32 (s, 3H); 13C NMR (75MHz, CDCl3) δ 171.5, 138.0, 137.4, 137.2, 134.3, 130.1, 129.7, 129.2, 129.0, 128.4, 127.7, 127.6, 127.3, 125.4, 121.8, 88.0, 78.1, 68.1, 52.1, 21.6; HRMS: calcd for $C_{24}H_{23}BrO_4$: 477.0672 ; found: 477.0637 $[M+Na]^+$

Determination of absolute configuration of adduct 4a

Procedure for the preparation of 8:

To a solution of **4a** (30 mg, 0.91mmol) in EtOH (2 ml) was added 10% Pd on carbon (10 mg), and catalytic amount of HCl. The reaction mixture was charged with an atmosphere of H_2 and stirred at r.t. for 48 h. The catalyst was filtered off, and the solvent was removed under reduced pressure. The crude product was purified by flash chromatography on silica gel eluting with EtOAc:light petroleum = 1:8 to give (2*S*,3*S*)-methyl 2,3-dihydroxy-2,3-diphenylpropanoate (**8**) (11.9mg, 50%).



8 (2*S*, 3*S*)-methyl 2,3-dihydroxy-2,3-diphenylpropanoate white solid mp.=166℃ $[\alpha]_D^{20}$ = -5.8 ° (c = 0.50, CH_2Cl_2); ee = 63% was determined by HPLC with a chiral Daicel Chirapak AS-H column (20% *i*PrOH in hexane at 1.0 mL/min, 220nm); Retention time: t_{major} = 9.1 min, and t_{minor} = 11.3 min. ^{1}H NMR (300 MHz, $CDCl_3$) δ 7.78-7.81(m, 2H), 7.32-7.45 (m, 8H), 5.43 (s, 1H), 3.67 (s, 1H), 3.65 (s, 3H), 2.65 (br,1H); ^{13}C NMR (75MHz, $CDCl_3$) δ 173.0,138.4, 138.2, 128.43, 128.40, 128.3, 128.1, 127.6, 126.6, 81.3, 77.8, 53.1; HRMS: calcd for $C_{16}H_{16}O_4$: 295.0941 ; found: 295.0931 $[M+Na]^+$. [lit: $[\alpha]_D^{20}$ = -8.5 ° (*c* =0.5, CH_2Cl_2) for (*S, S*)].[5]

References

[1] P. J. Cox, W. Wang, V. Snieckus, *Tetrahedron Lett.* **1992**, 17, 2253.

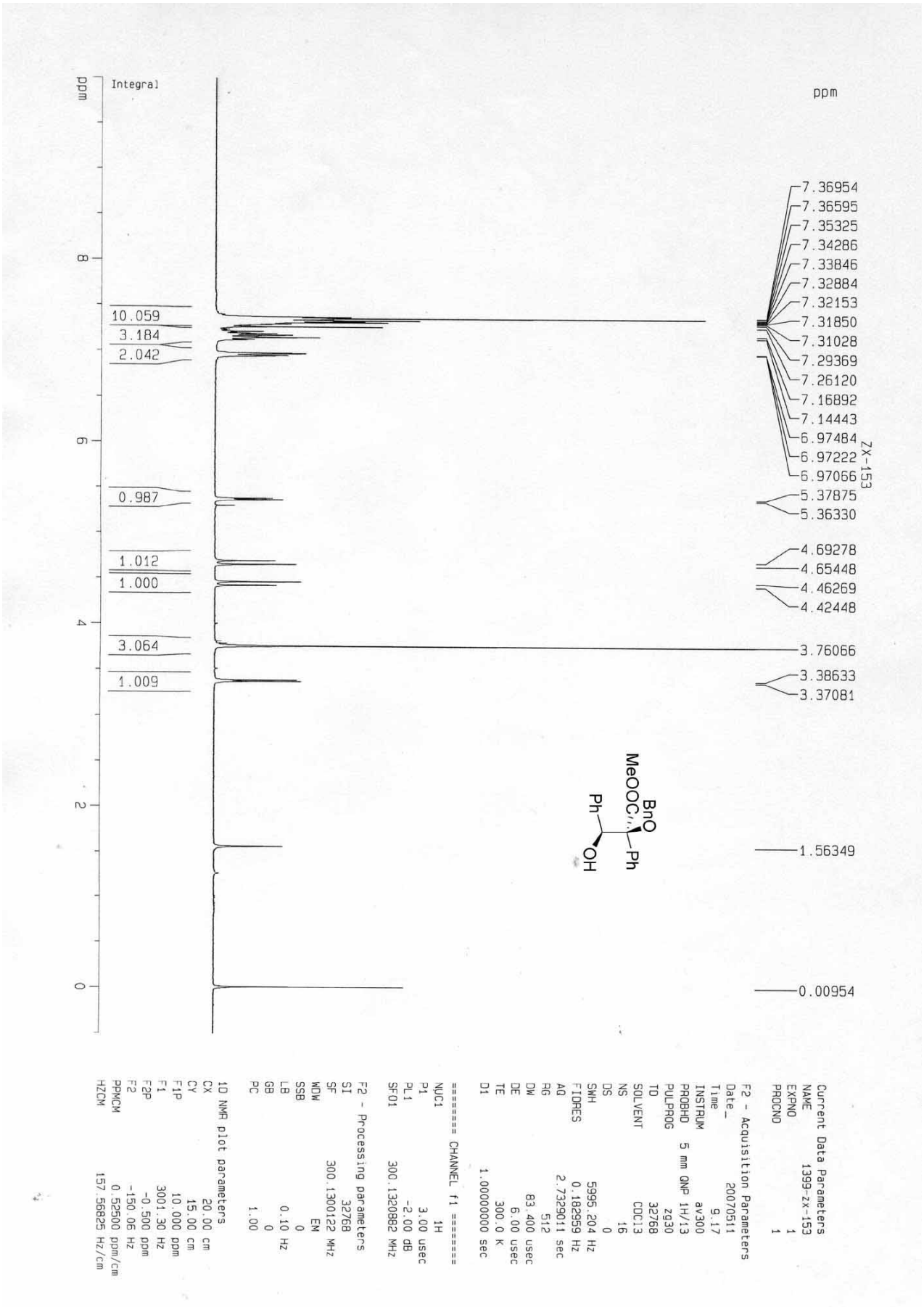
[2] G. D. Y. Sogah, D. J. Cram, *J. Am. Chem. Soc.* **1979**, 101, 3035.

[3] H. Ishitani, M. Ueno, S. Kobayashi, *J. Am. Chem.* Soc. **1997**, 119, 7153.

[4] Authentic samples of *threo*-**4e** was prepared by preparative TLC seperation. C. Lu, H. Liu, Z . Chen, W. Hu,; A. Mi, *Org. Lett*. **2005**, 7, 83.

[5] S. Scholtis, A. Ido, R. Mahrwald, *Org. Lett.* **2006**, 23, 5353.

4a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FIDRES 0.182959 Hz
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RG 512
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DE 6.00 usec
TE 300.0 K
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LB 0.10 Hz
GB 0
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CY 15.00 cm
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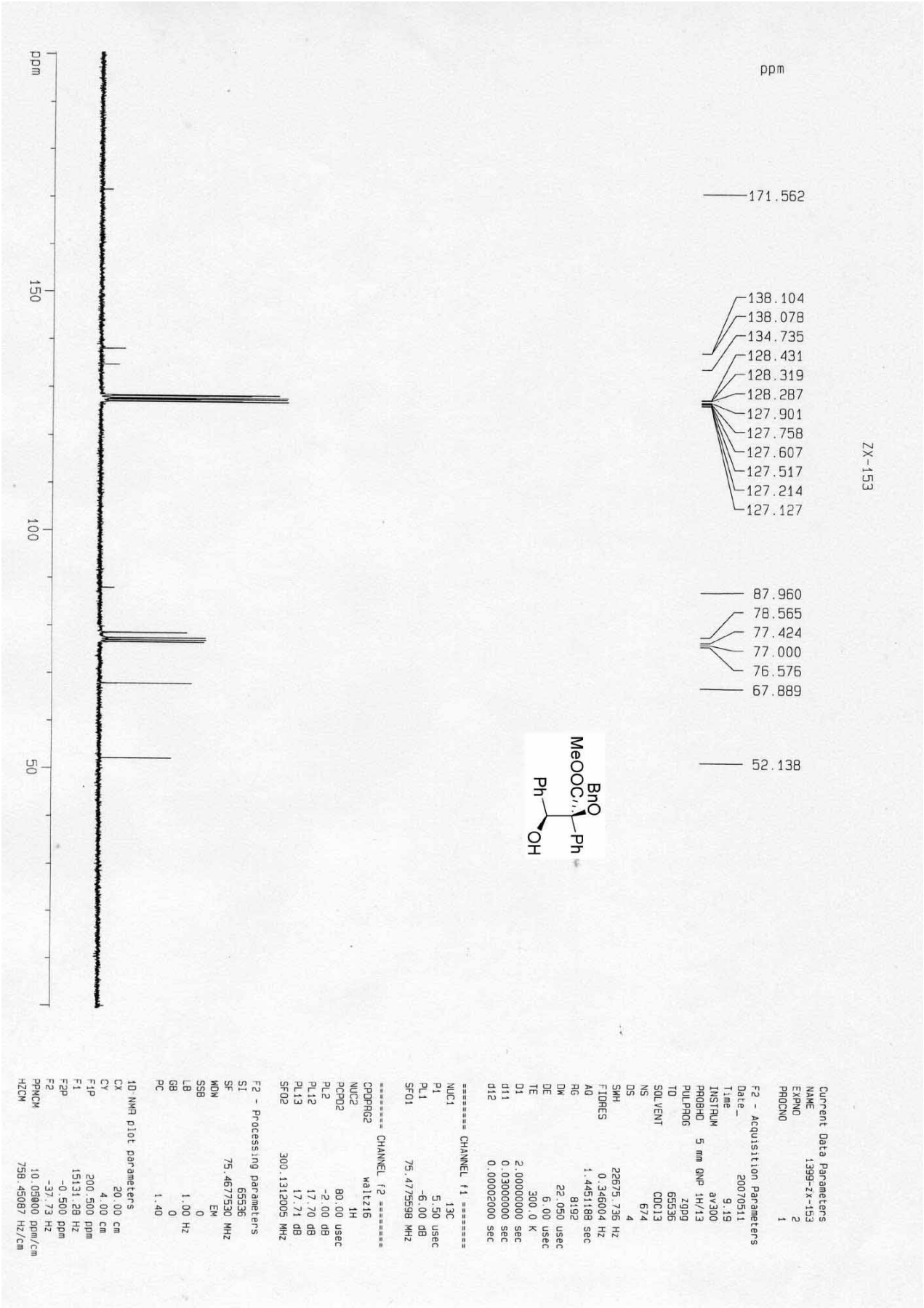
HZCM 157.56825 Hz/cm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Ph
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WDW EM
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LB 1.00 Hz
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CY 4.00 cm
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PPMCM 10.05000 ppm/cm
HZCM 758.45087 Hz/cm
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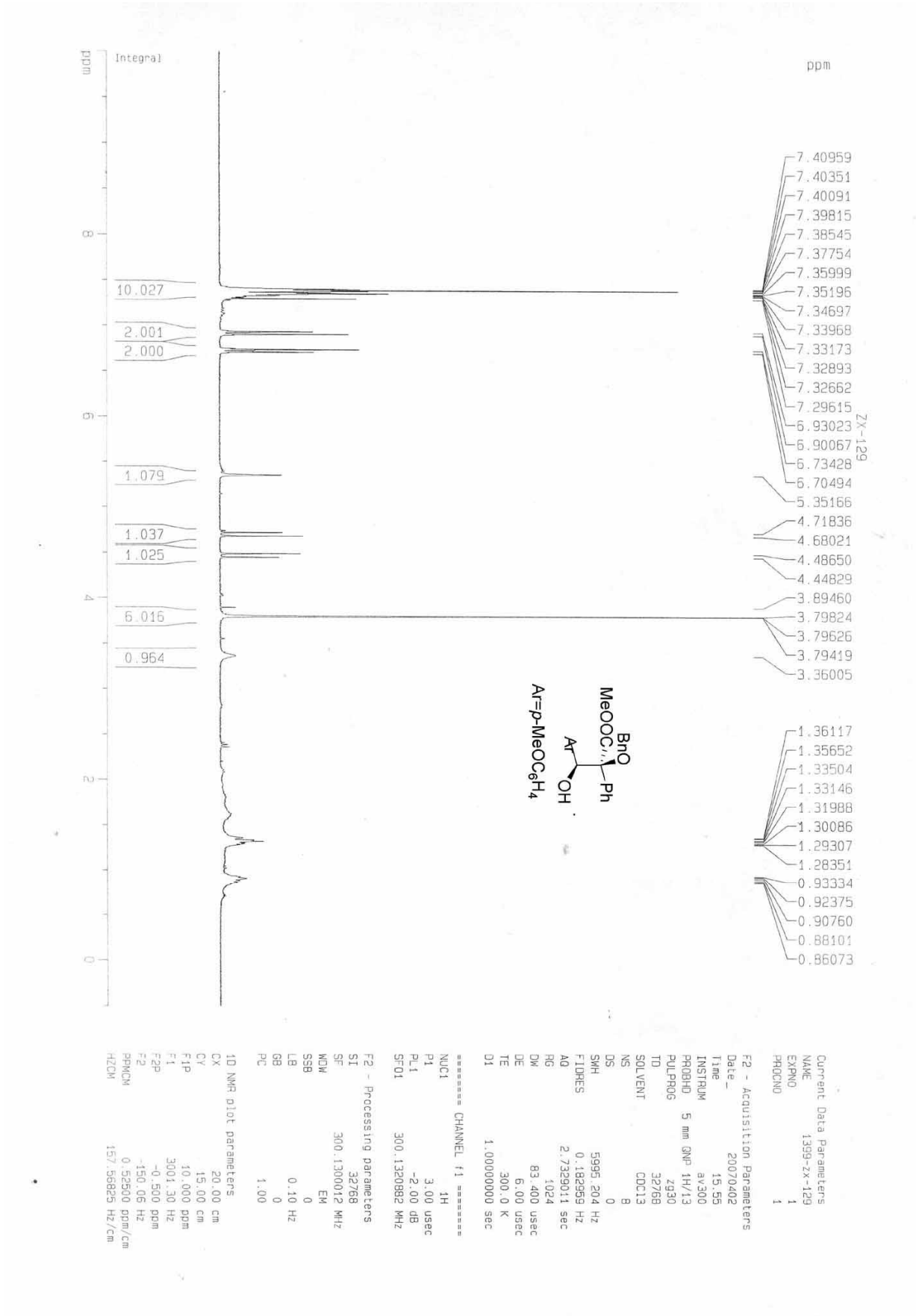
50

4b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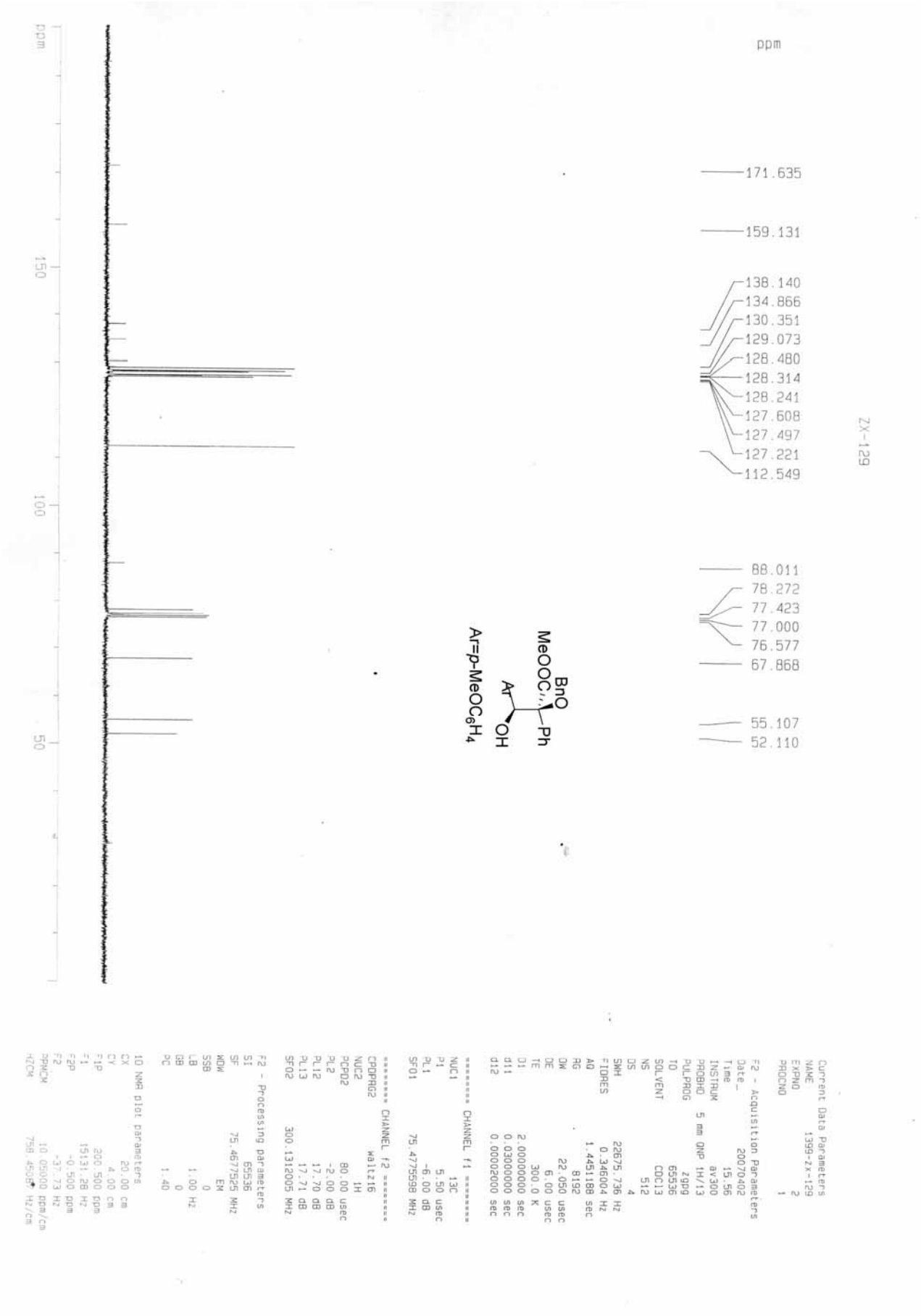
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Ph
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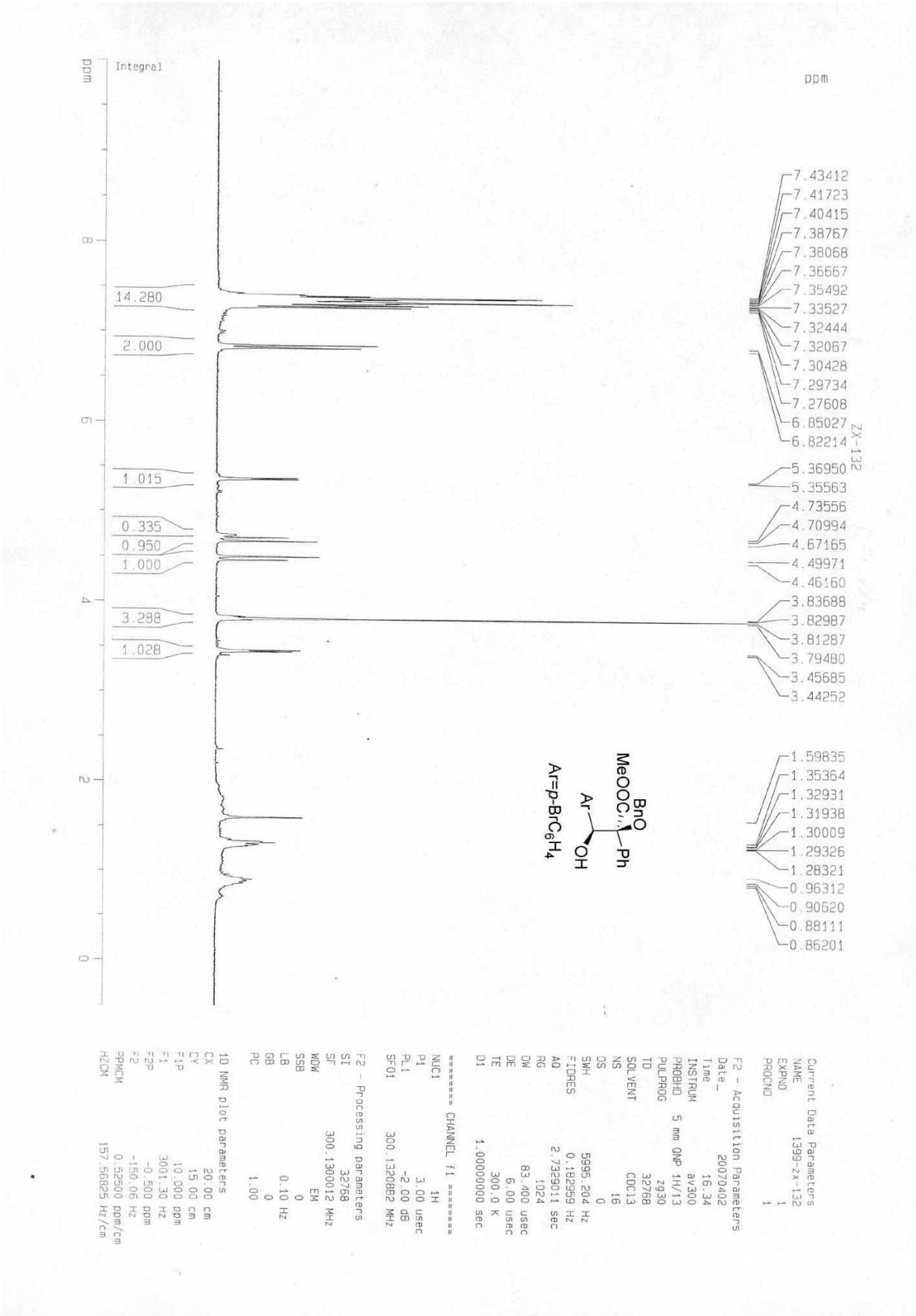
4c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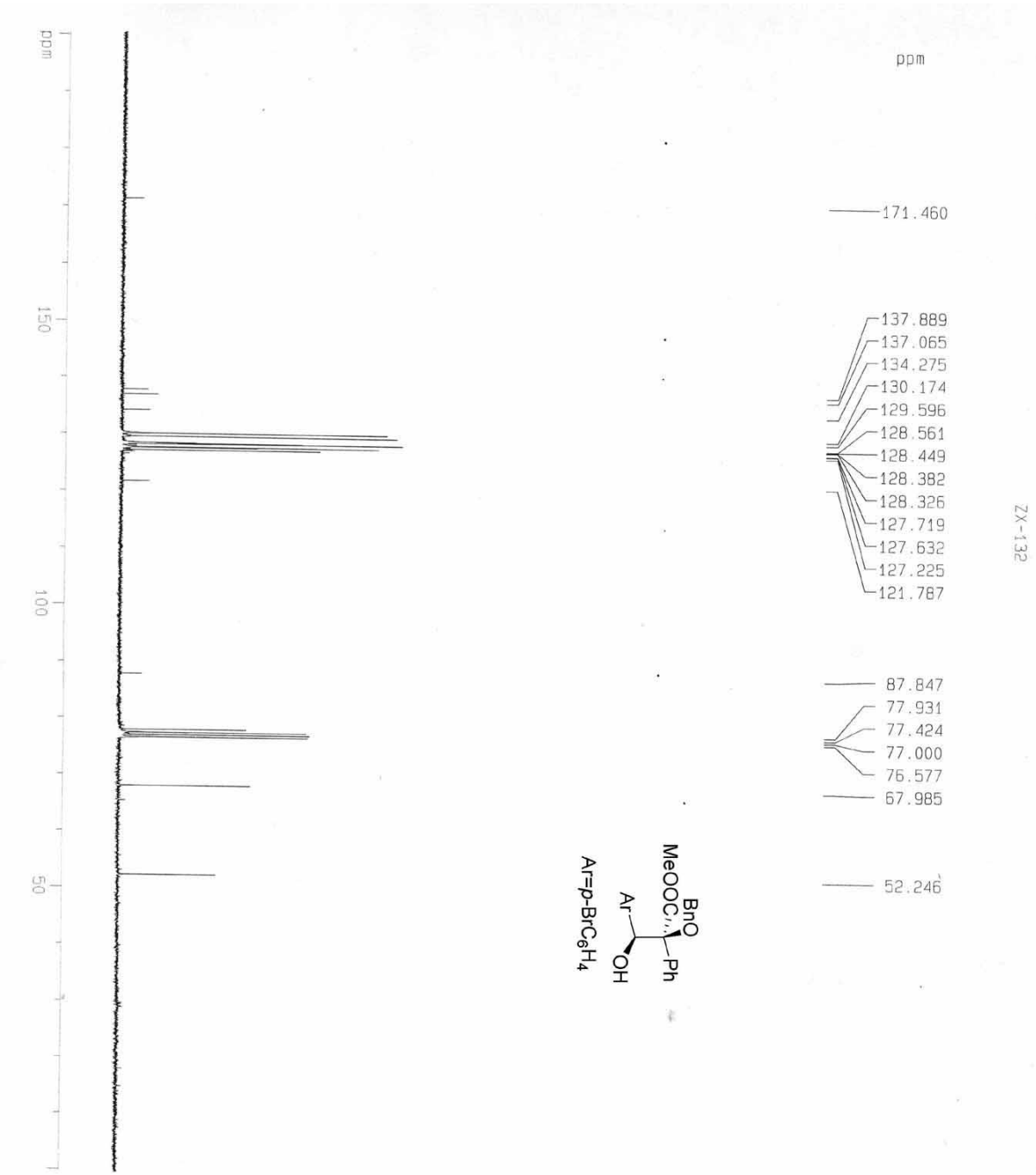


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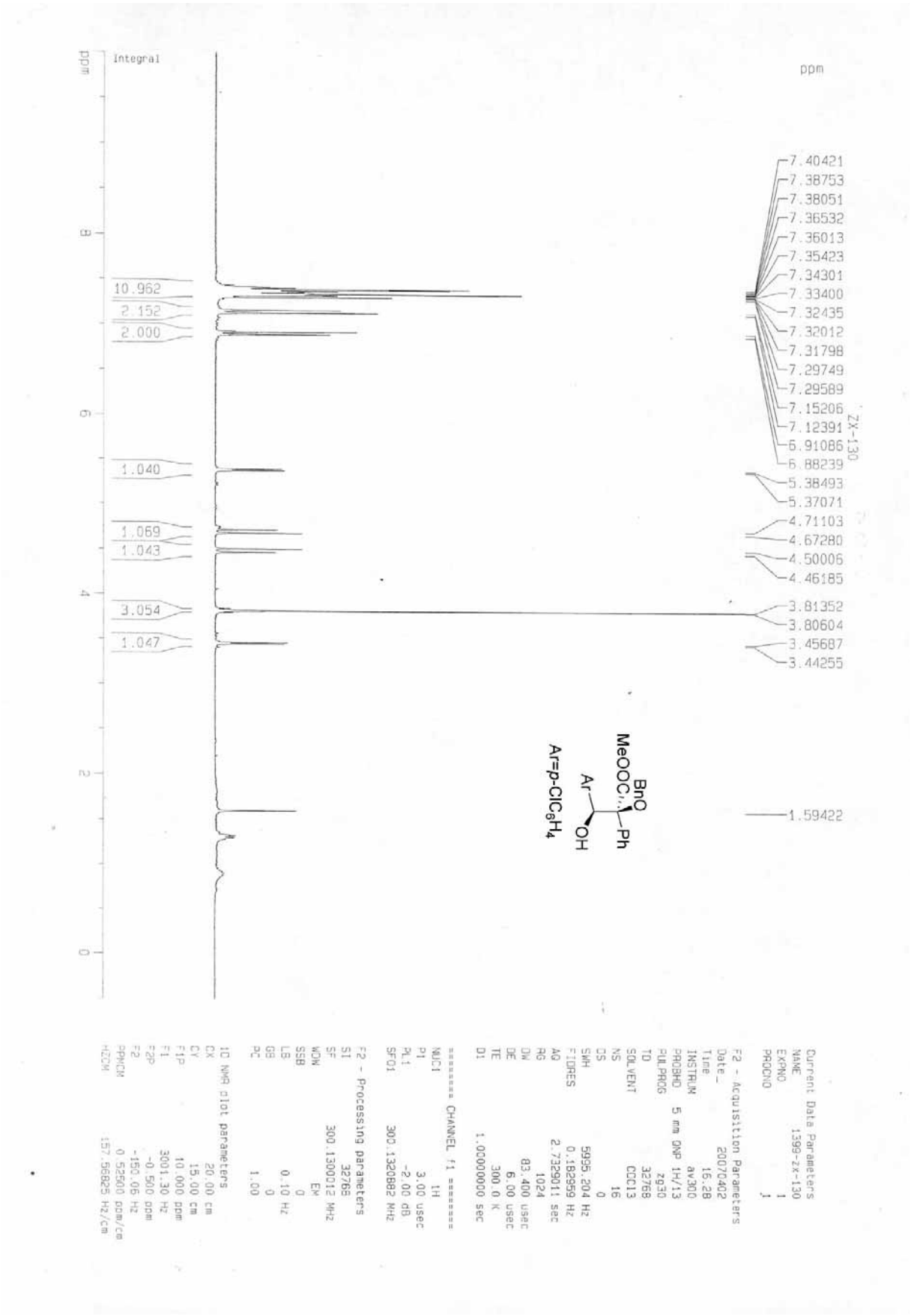
4d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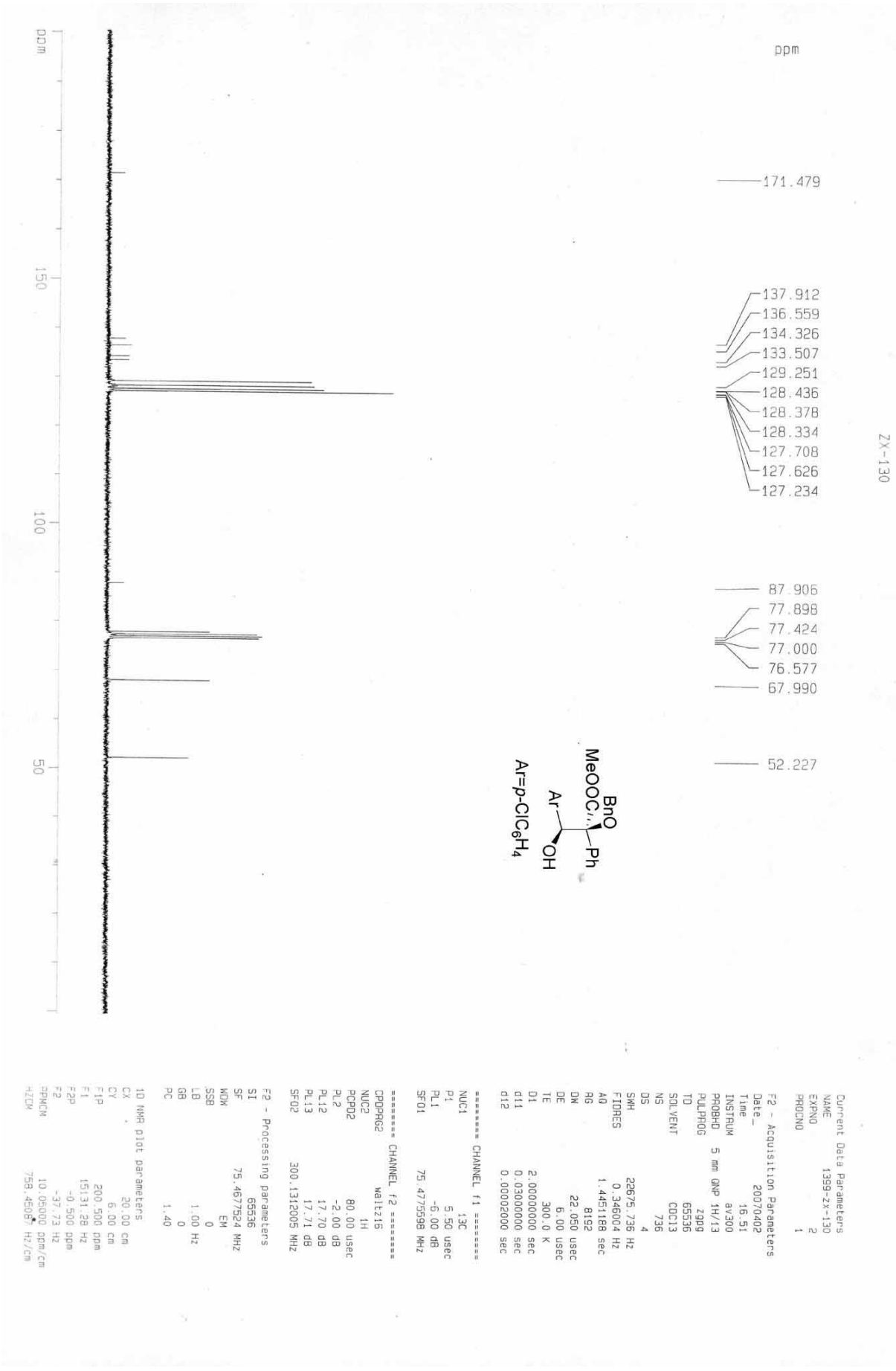


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NS                       736
DS                         4
SWH                22675.736 Hz
FIDRES             0.346004 Hz
AQ                 1.445118 sec
RG                       8192
DW                   22.050 usec
DE                    6.00 usec
TE                     300.0 K
D1                 2.00000000 sec
d11                0.03000000 sec
d12                0.00002000 sec

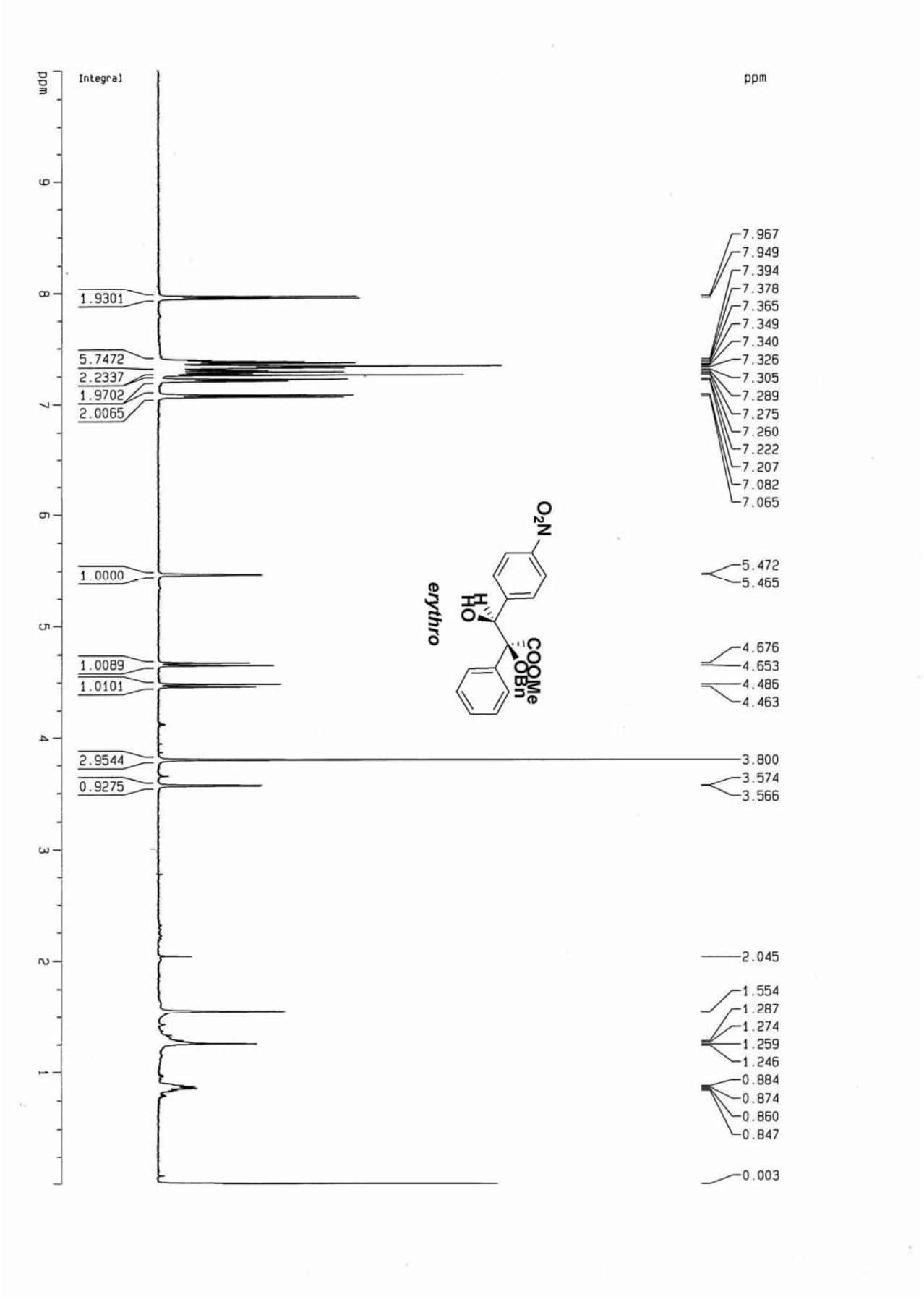
======== CHANNEL f1 ========
NUC1                      13C
P1                       5.50 usec
PL1                     -6.00 dB
SFO1           75.4775598 MHz

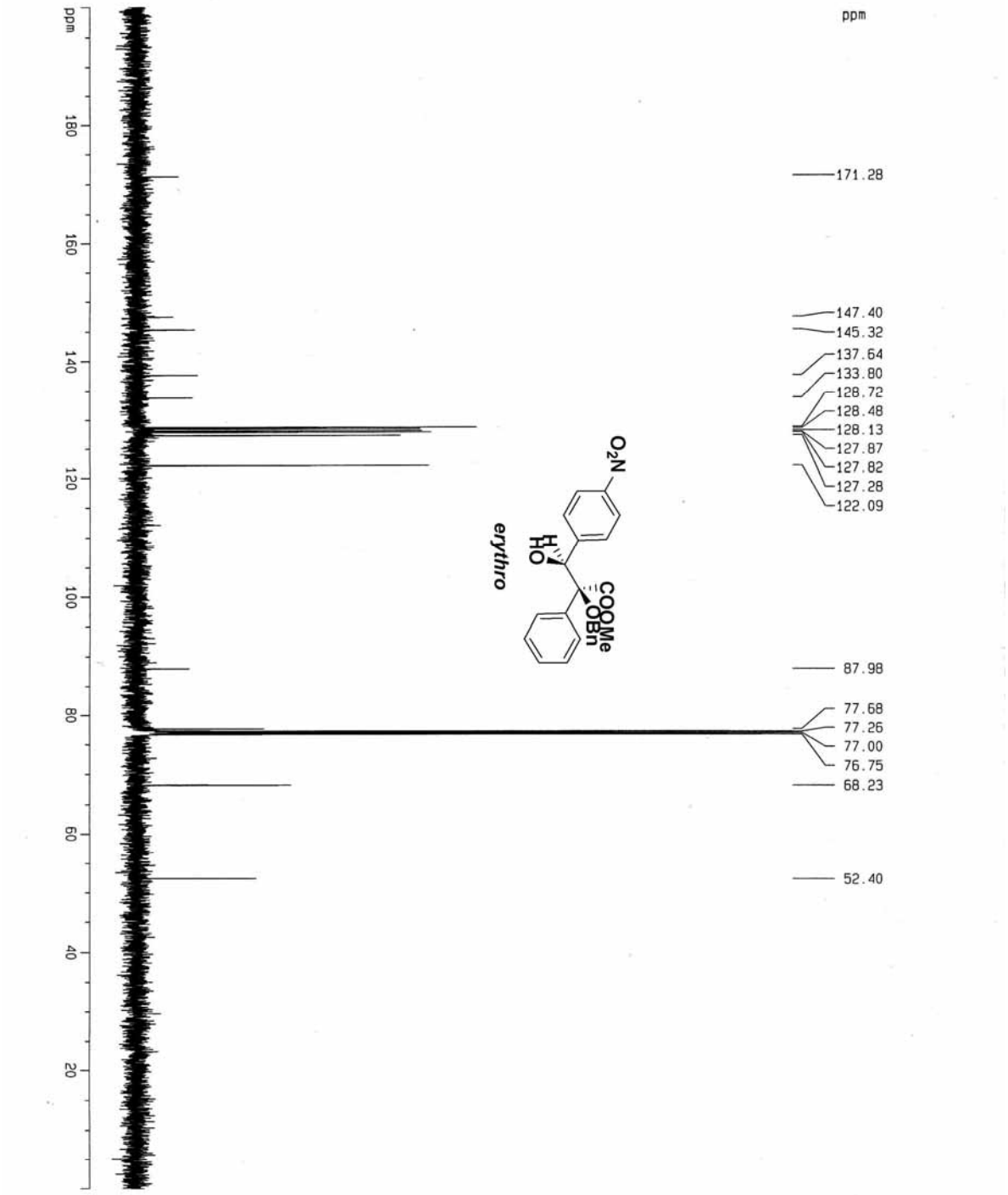
======== CHANNEL f2 ========
CPDPRG2                waltz16
NUC2                       1H
PCPD2                 80.00 usec
PL2                    -2.00 dB
PL12                   17.70 dB
PL13                   17.71 dB
SFO2          300.1312005 MHz

F2 - Processing parameters
SI                        65536
SF             75.4677524 MHz
WDW                        EM
SSB                         0
LB                       1.00 Hz
GB                          0
PC                       1.40

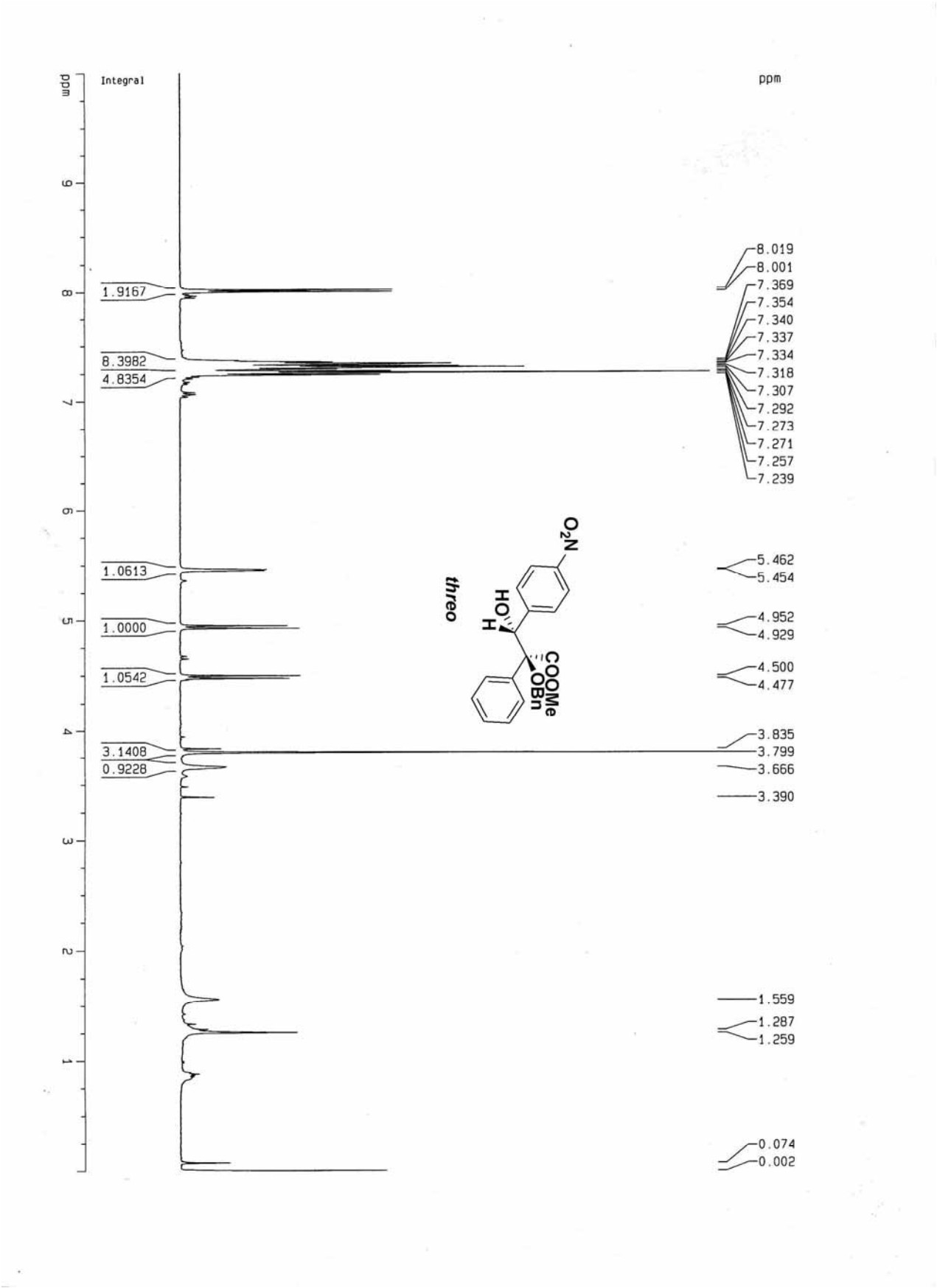
1D NMR plot parameters
CX                      20.00 cm
CY                       6.00 cm
F1P                  200.500 ppm
F1                   15131.28 Hz
F2P                   -0.500 ppm
F2                    -37.73 Hz
PPMCM                10.05000 ppm/cm
HZCM                 758.45087 Hz/cm
```

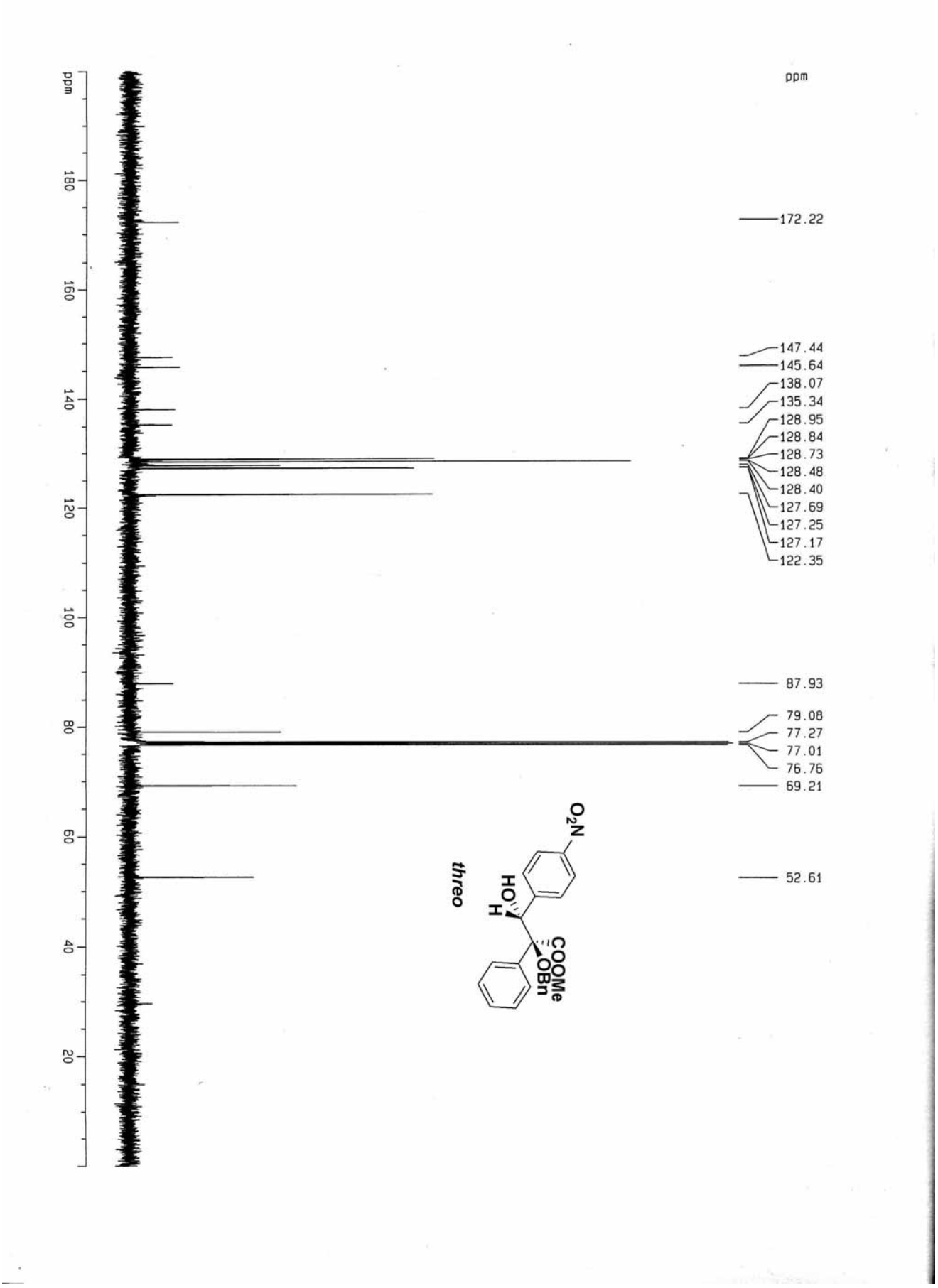
***erythro*-4e**


Integral
ppm
1.9301
5.7472
2.2337
1.9702
2.0065
1.0000
1.0089
1.0101
2.9544
0.9275
7.967
7.949
7.394
7.378
7.365
7.349
7.340
7.326
7.305
7.289
7.275
7.260
7.222
7.207
7.082
7.065
5.472
5.465
4.676
4.653
4.486
4.463
3.800
3.574
3.566
2.045
1.554
1.287
1.274
1.259
1.246
0.884
0.874
0.860
0.847
0.003
O2N
H
HO
COOMe
OBn
erythro

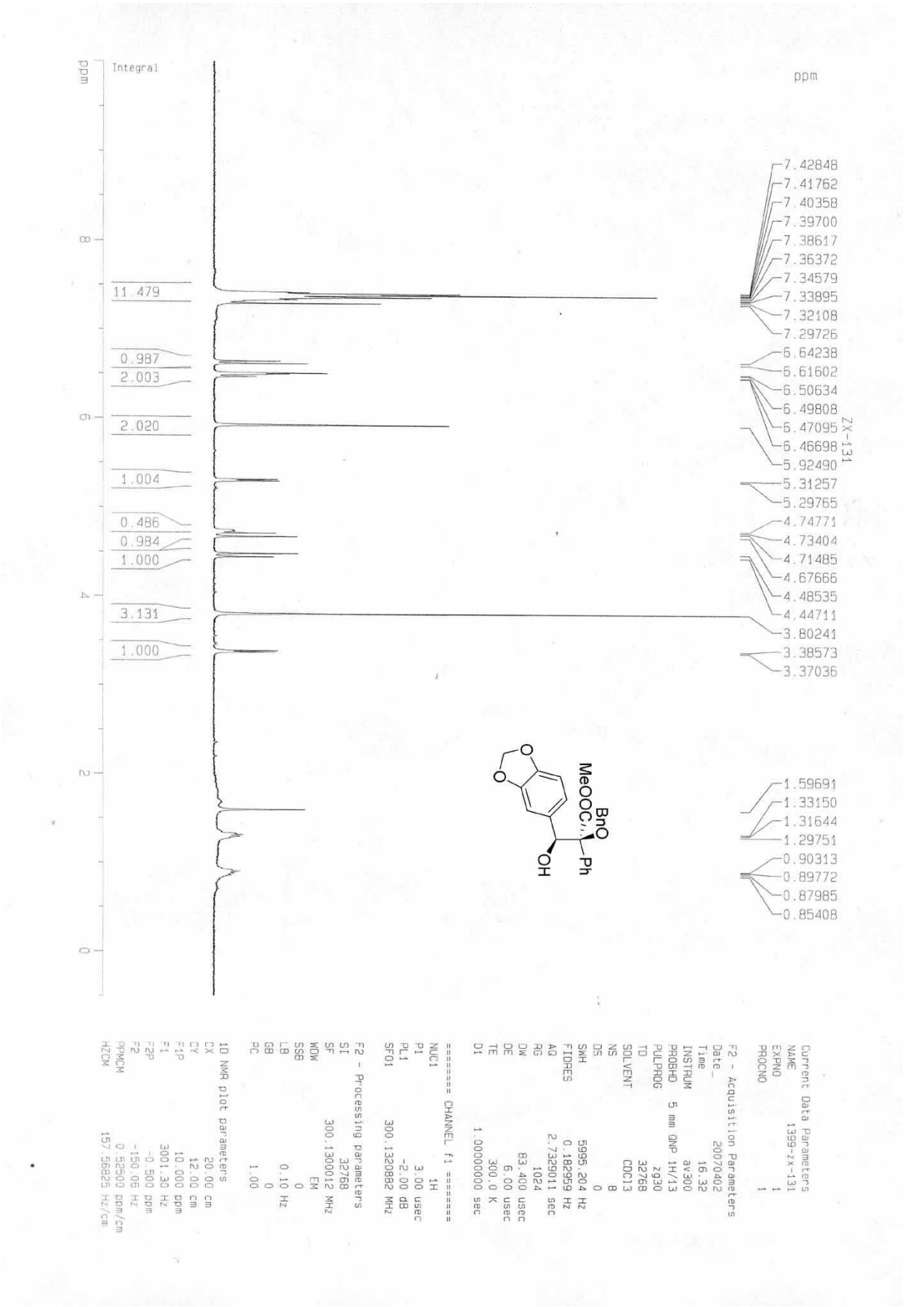

ppm
180
160
140
120
100
80
60
40
20
ppm
171.28
147.40
145.32
137.64
133.80
128.72
128.48
128.13
127.87
127.82
127.28
122.09
87.98
77.68
77.26
77.00
76.75
68.23
52.40
O2N
H
HO
COOMe
OBn
erythro

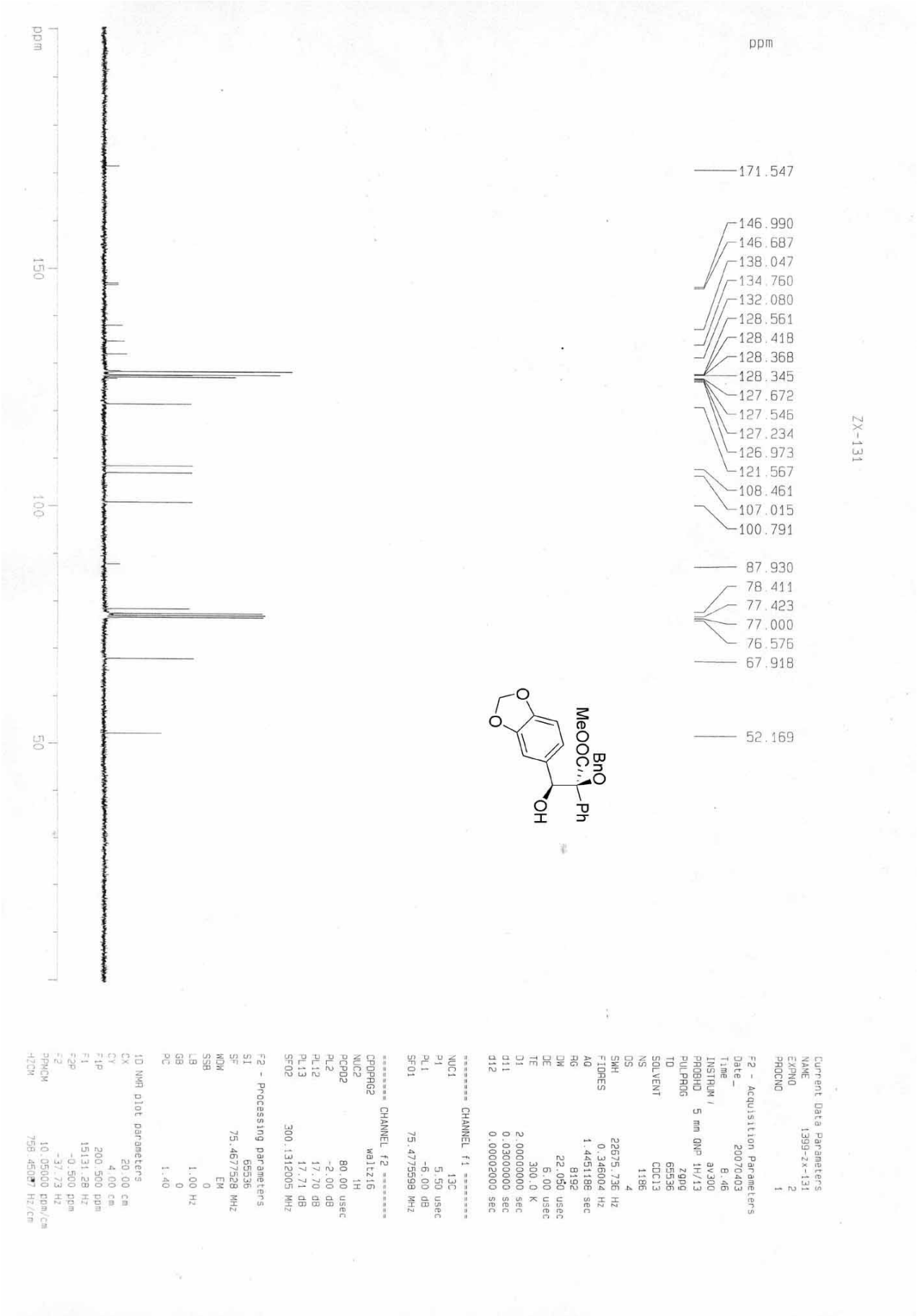
***threo*-4e**


Integral
ppm
1.9167
8.3982
4.8354
1.0613
1.0000
1.0542
3.1408
0.9228
8.019
8.001
7.369
7.354
7.340
7.337
7.334
7.318
7.307
7.292
7.273
7.271
7.257
7.239
5.462
5.454
4.952
4.929
4.500
4.477
3.835
3.799
3.666
3.390
1.559
1.287
1.259
0.074
0.002
threo
O2N
HO
H
COOMe
OBn

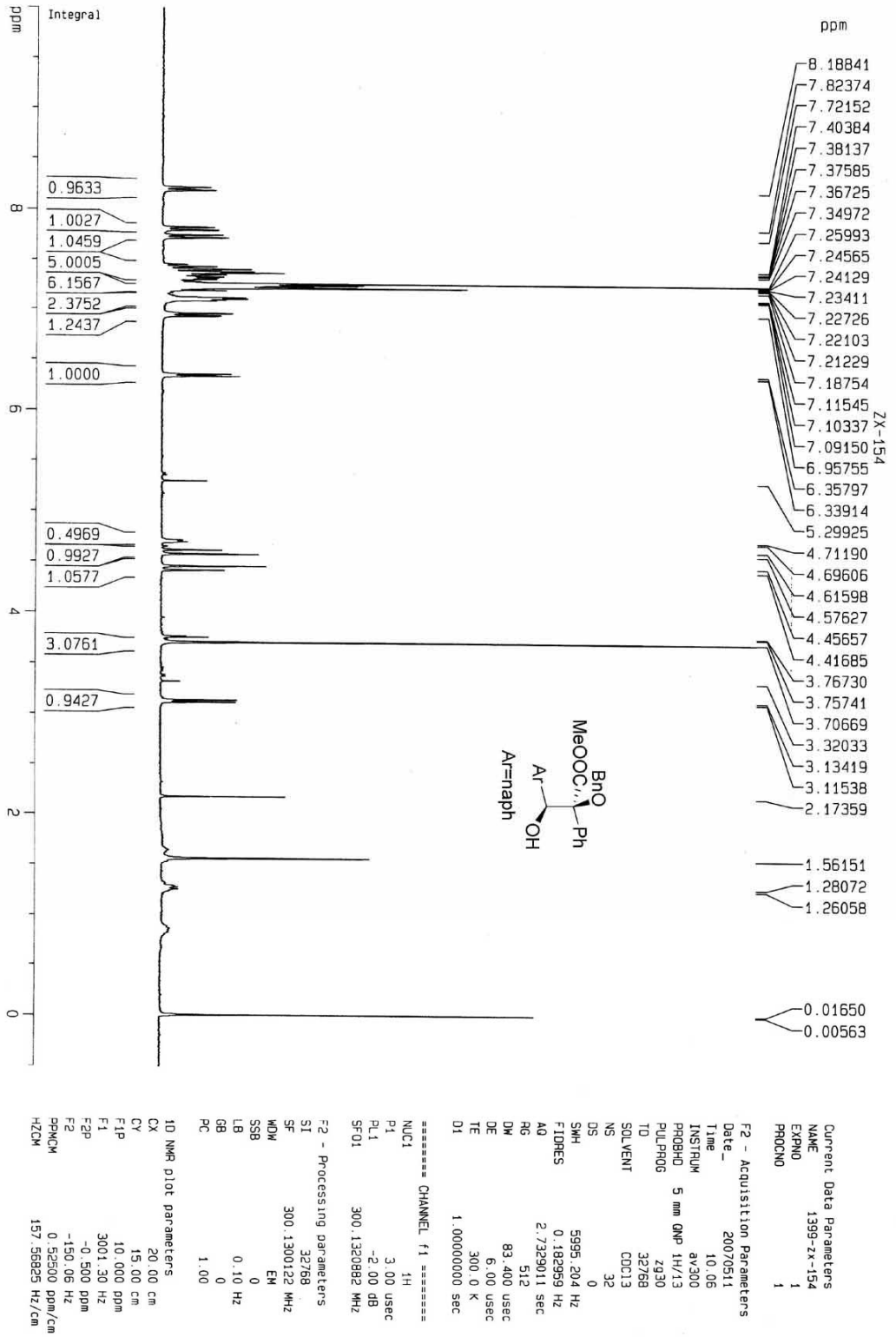

ppm
180
160
140
120
100
80
60
40
20
ppm
172.22
147.44
145.64
138.07
135.34
128.95
128.84
128.73
128.48
128.40
127.69
127.25
127.17
122.35
87.93
79.08
77.27
77.01
76.76
69.21
52.61
threo
O2N
HO
H
COOMe
OBn

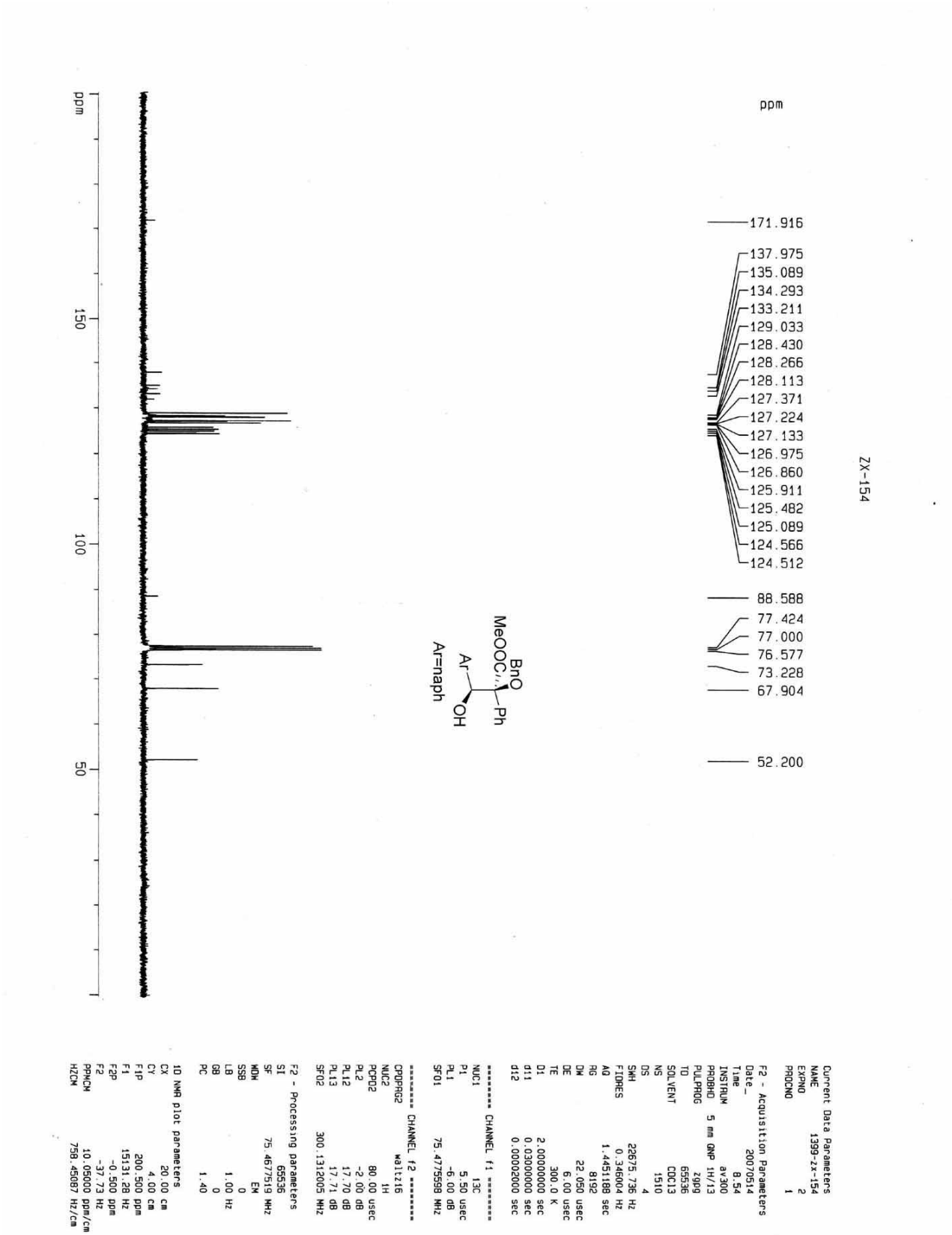
4f


ppm
Integral
11.479
0.987
2.003
2.020
1.004
0.486
0.984
1.000
3.131
1.000
7.42848
7.41762
7.40358
7.39700
7.38617
7.36372
7.34579
7.33895
7.32108
7.29726
6.64238
6.61602
6.50634
6.49808
6.47095
6.46698
5.92490
5.31257
5.29765
4.74771
4.73404
4.71485
4.67666
4.48535
4.44711
3.80241
3.38573
3.37036
1.59691
1.33150
1.31644
1.29751
0.90313
0.89772
0.87985
0.85408
ZX-131
BnO
MeOOC
Ph
OH
Current Data Parameters
NAME 1399-zx-131
EXPNO 1
PROCNO 1
F2 - Acquisition Parameters
Date_ 20070402
Time 16.32
INSTRUM av300
PROBHD 5 mm QNP 1H/13
PULPROG zg30
TD 32768
SOLVENT CDCl3
NS 8
DS 0
SWH 5995.204 Hz
FIDRES 0.182959 Hz
AQ 2.7329011 sec
RG 1024
DW 83.400 usec
DE 6.00 usec
TE 300.0 K
D1 1.00000000 sec
======== CHANNEL f1 ========
NUC1 1H
P1 3.00 usec
PL1 -2.00 dB
SF01 300.1320882 MHz
F2 - Processing parameters
SI 32768
SF 300.1300012 MHz
WDW EM
SSB 0
LB 0.10 Hz
GB 0
PC 1.00
1D NMR plot parameters
CX 20.00 cm
CY 12.00 cm
F1P 10.000 ppm
F1 3001.30 Hz
F2P -0.500 ppm
F2 -150.06 Hz
PPMCM 0.52500 ppm/cm
HZCM 157.56825 Hz/cm

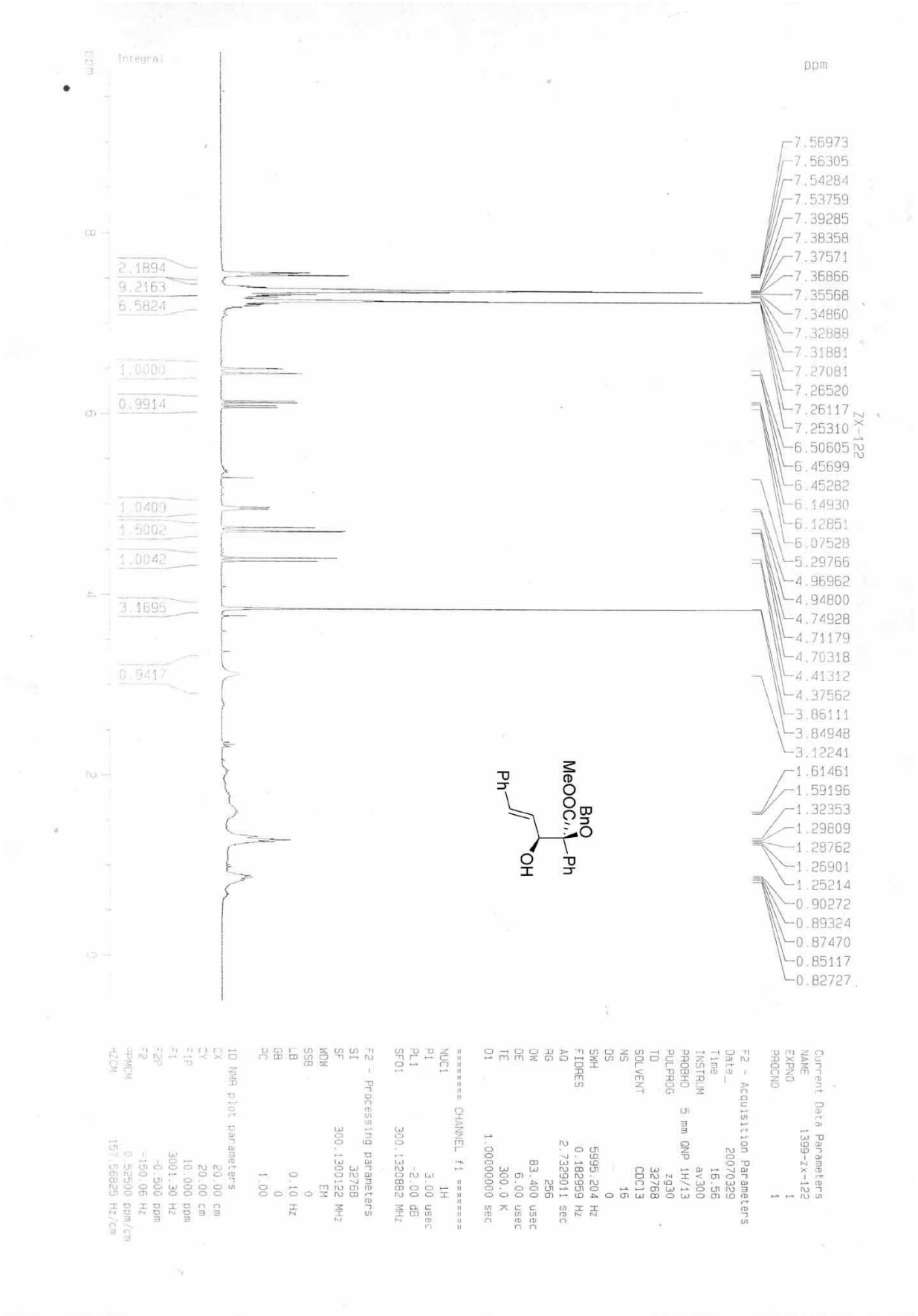

ppm
171.547
146.990
146.687
138.047
134.760
132.080
128.561
128.418
128.368
128.345
127.672
127.546
127.234
126.973
121.567
108.461
107.015
100.791
87.930
78.411
77.423
77.000
76.576
67.918
52.169
ZX-131
BnO
MeOOC
Ph
OH
Current Data Parameters
NAME t399-zx-131
EXPNO 2
PROCNO 1
F2 - Acquisition Parameters
Date_ 20070403
Time_ 8.46
INSTRUM av300
PROBHD 5 mm QNP 1H/13
PULPROG zgpg
TD 65536
SOLVENT CDCl3
NS 1186
DS 4
SWH 22675.736 Hz
FIDRES 0.346004 Hz
AQ 1.445186 sec
RG 8192
DW 22.050 usec
DE 6.00 usec
TE 300.0 K
D1 2.00000000 sec
D11 0.03000000 sec
D12 0.00002000 sec
======== CHANNEL f1 ========
NUC1 13C
P1 5.50 usec
PL1 -6.00 dB
SFO1 75.4775598 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 -2.00 dB
PL12 17.70 dB
PL13 17.71 dB
SFO2 300.1312005 MHz
F2 - Processing parameters
SI 65536
SF 75.4677528 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
1D NMR plot parameters
CX 20.00 cm
CY 4.00 cm
F1P 200.500 ppm
F1 15131.28 Hz
F2P -0.500 ppm
F2 -37.73 Hz
PPMCM 10.05000 ppm/cm
HZCM 758.45087 Hz/cm

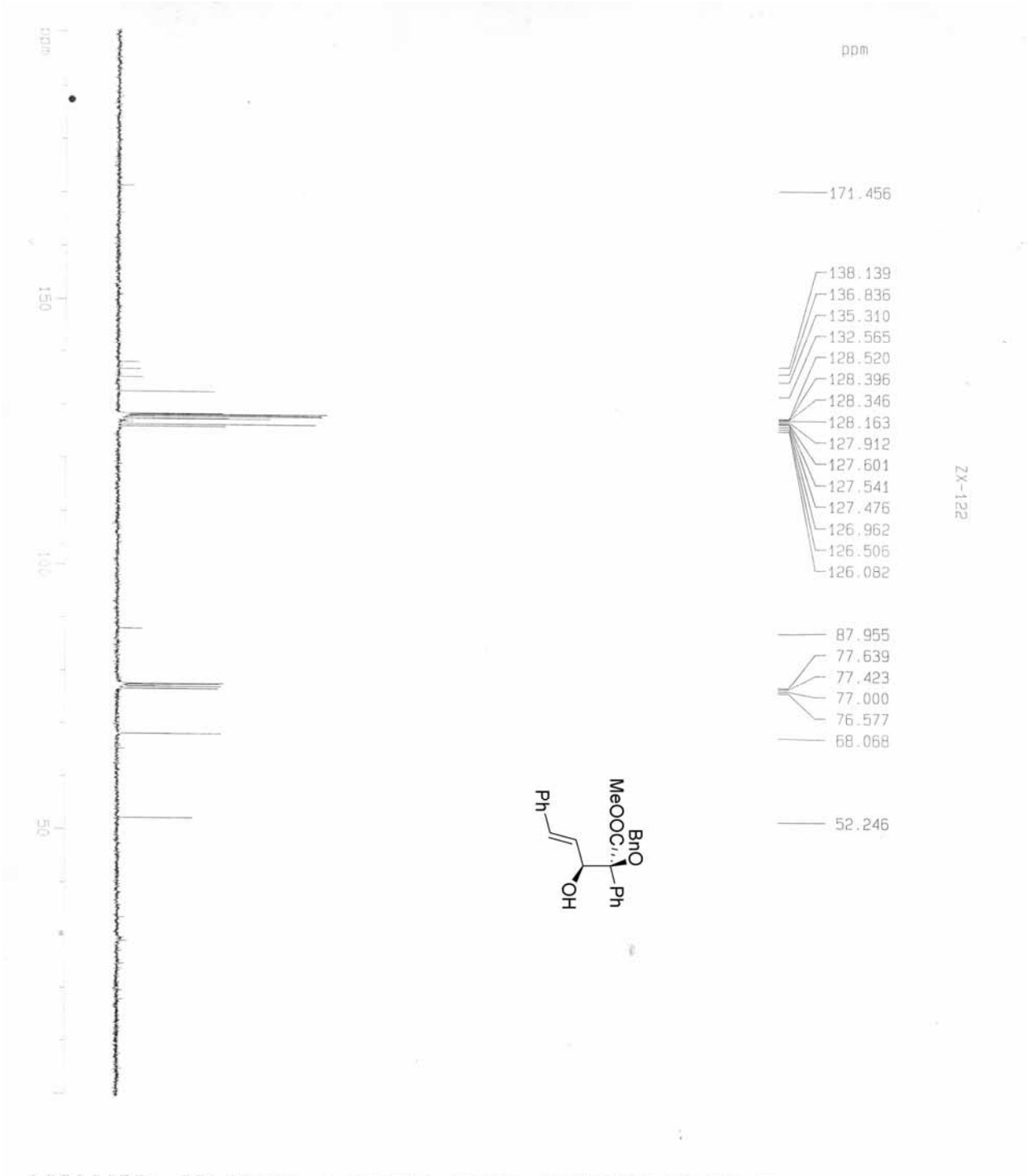
4g


ppm
Integral
0.9633
1.0027
1.0459
5.0005
6.1567
2.3752
1.2437
1.0000
0.4969
0.9927
1.0577
3.0761
0.9427
8.18841
7.82374
7.72152
7.40384
7.38137
7.37585
7.36725
7.34972
7.25993
7.24565
7.24129
7.23411
7.22726
7.22103
7.21229
7.18754
7.11545
7.10337
7.09150
6.95755
6.35797
6.33914
5.29925
4.71190
4.69606
4.61598
4.57627
4.45657
4.41685
3.76730
3.75741
3.70669
3.32033
3.13419
3.11538
2.17359
1.56151
1.28072
1.26058
0.01650
0.00563
ZX-154
BnO
MeOOC
Ph
Ar
OH
Ar=naph
Current Data Parameters
NAME 1399-zx-154
EXPNO 1
PROCNO 1
F2 - Acquisition Parameters
Date_ 20070511
Time 10.06
INSTRUM av300
PROBHD 5 mm QNP 1H/13
PULPROG zg30
TD 32768
SOLVENT CDCl3
NS 32
DS 0
SWH 5995.204 Hz
FIDRES 0.182959 Hz
AQ 2.7329011 sec
RG 512
DW 83.400 usec
DE 6.00 usec
TE 300.0 K
D1 1.00000000 sec
======== CHANNEL f1 ========
NUC1 1H
P1 3.00 usec
PL1 -2.00 dB
SFO1 300.1320882 MHz
F2 - Processing parameters
SI 32768
SF 300.1300122 MHz
WDW EM
SSB 0
LB 0.10 Hz
GB 0
PC 1.00
1D NMR plot parameters
CX 20.00 cm
CY 15.00 cm
F1P 10.000 ppm
F1 3001.30 Hz
F2P -0.500 ppm
F2 -150.06 Hz
PPMCM 0.52500 ppm/cm
HZCM 157.56825 Hz/cm


ppm
150
100
50
ppm
171.916
137.975
135.089
134.293
133.211
129.033
128.430
128.266
128.113
127.371
127.224
127.133
126.975
126.860
125.911
125.482
125.089
124.566
124.512
88.588
77.424
77.000
76.577
73.228
67.904
52.200
BnO
MeOOC
Ph
Ar
OH
Ar=naph
ZX-154
Current Data Parameters
NAME 1399-zx-154
EXPNO 2
PROCNO 1
F2 - Acquisition Parameters
Date_ 20070514
Time 8.54
INSTRUM av300
PROBHD 5 mm QNP 1H/13
PULPROG zgpg
TD 65536
SOLVENT CDCl3
NS 1510
DS 4
SWH 22675.736 Hz
FIDRES 0.346004 Hz
AQ 1.445188 sec
RG 8192
DW 22.050 usec
DE 6.00 usec
TE 300.0 K
D1 2.00000000 sec
D11 0.03000000 sec
D12 0.00002000 sec
======== CHANNEL f1 ========
NUC1 13C
P1 5.50 usec
PL1 -6.00 dB
SFO1 75.4775598 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 -2.00 dB
PL12 17.70 dB
PL13 17.71 dB
SFO2 300.1312005 MHz
F2 - Processing parameters
SI 65536
SF 75.4677519 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
1D NMR plot parameters
CX 20.00 cm
CY 4.00 cm
F1P 200.500 ppm
F1 15131.28 Hz
F2P -0.500 ppm
F2 -37.73 Hz
PPMCM 10.05000 ppm/cm
HZCM 758.45087 Hz/cm

4h


ppm
Integral
7.56973
7.56305
7.54284
7.53759
7.39285
7.38358
7.37571
7.36866
7.35568
7.34860
7.32888
7.31881
7.27081
7.26520
7.26117
7.25310
6.50605
6.45699
6.45282
6.14930
6.12851
6.07528
5.29766
4.96962
4.94800
4.74928
4.71179
4.70318
4.41312
4.37562
3.86111
3.84948
3.12241
1.61461
1.59196
1.32353
1.29809
1.28762
1.26901
1.25214
0.90272
0.89324
0.87470
0.85117
0.82727
2.1894
9.2163
6.5824
1.0000
0.9914
1.0409
1.5002
1.0042
3.1695
0.9417
ZX-122
BnO
MeOOC
Ph
OH
Ph
Current Data Parameters
NAME 1399-zx-122
EXPNO 1
PROCNO 1
F2 - Acquisition Parameters
Date_ 20070329
Time 16.56
INSTRUM av300
PROBHD 5 mm QNP 1H/13
PULPROG zg30
TD 32768
SOLVENT CDCl3
NS 16
DS 0
SWH 5995.204 Hz
FIDRES 0.182959 Hz
AQ 2.7329011 sec
RG 256
DW 83.400 usec
DE 6.00 usec
TE 300.0 K
D1 1.00000000 sec
======== CHANNEL f1 ========
NUC1 1H
P1 3.00 usec
PL1 -2.00 dB
SFO1 300.1320882 MHz
F2 - Processing parameters
SI 32768
SF 300.1300122 MHz
WDW EM
SSB 0
LB 0.10 Hz
GB 0
PC 1.00
1D NMR plot parameters
CX 20.00 cm
CY 20.00 cm
F1P 10.000 ppm
F1 3001.30 Hz
F2P -0.500 ppm
F2 -150.06 Hz
PPMCM 0.52500 ppm/cm
HZCM 157.56825 Hz/cm




```
Current Data Parameters
NAME                  1399-zx-122
EXPNO                           2
PROCNO                          1

F2 - Acquisition Parameters
Date_              20070330
Time                       9.01
INSTRUM                   av300
PROBHD     5 mm QNP 1H/13
PULPROG                   zppg
TD                       65536
SOLVENT                  CDCl3
NS                         842
DS                           4
SWH                  22675.736 Hz
FIDRES                0.346004 Hz
AQ                    1.4451188 sec
RG                         8192
DW                       22.050 usec
DE                        6.00 usec
TE                       300.0 K
D1                    2.00000000 sec
d11                   0.03000000 sec
d12                   0.00002000 sec

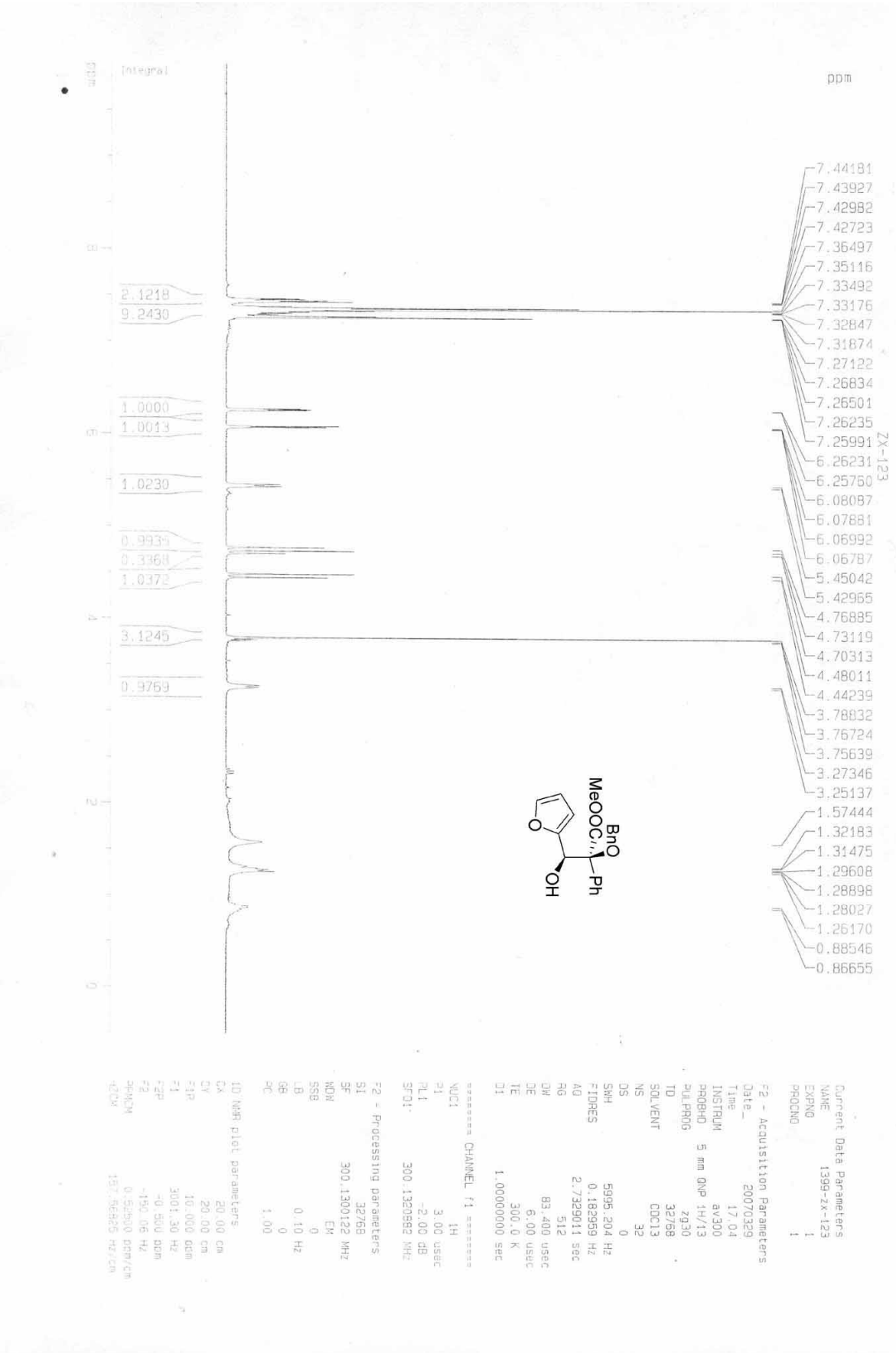
======== CHANNEL f1 ========
NUC1                        13c
P1                         5.50 usec
PL1                       -6.00 dB
SFO1                75.4775598 MHz

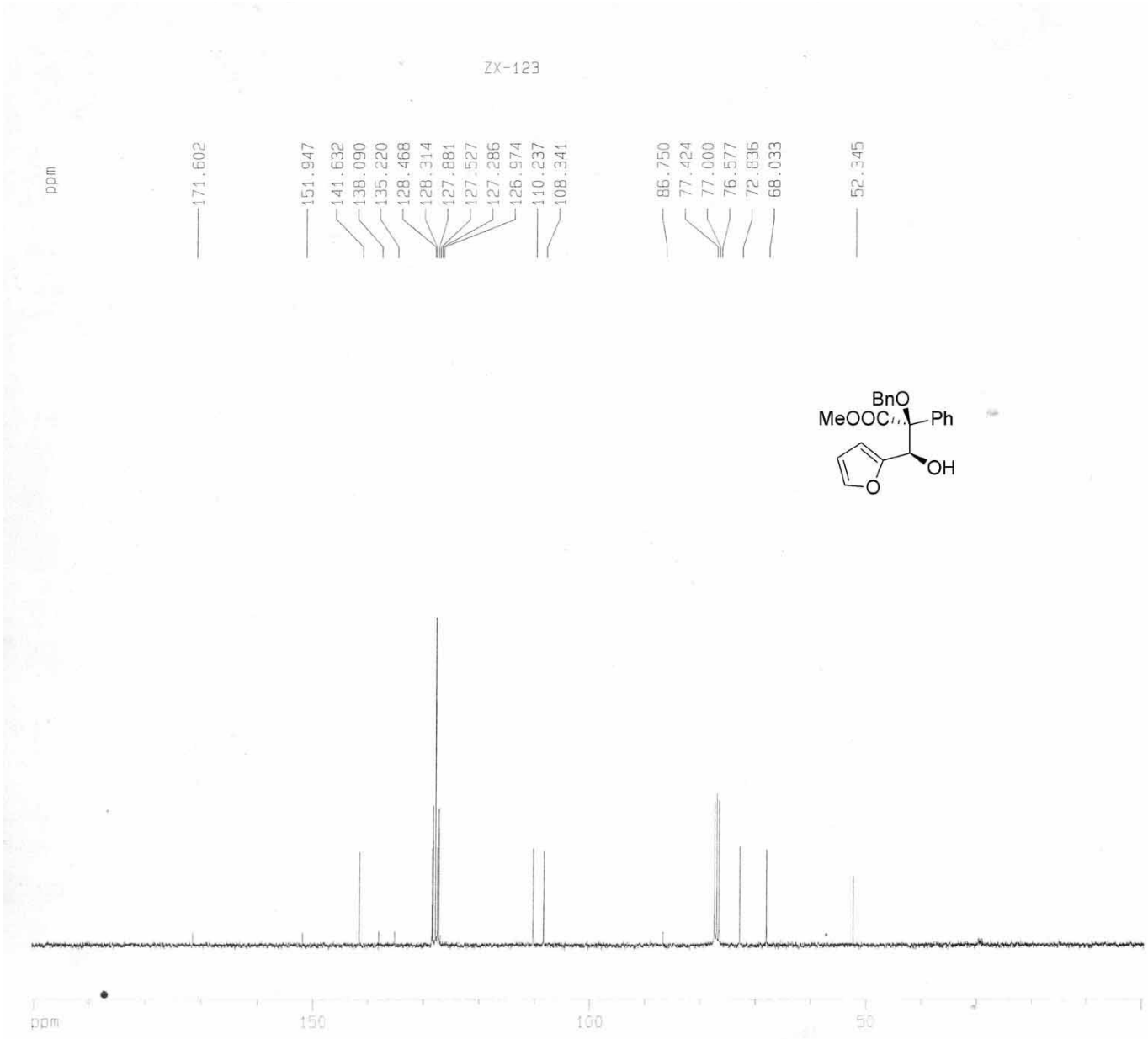
======== CHANNEL f2 ========
CPDPRG2                 waltz16
NUC2                        1H
PCPD2                     80.00 usec
PL2                       -2.00 dB
PL12                      17.70 dB
PL13                      17.71 dB
SFO2                300.1312005 MHz

F2 - Processing parameters
SI                         65536
SF                  75.4677535 MHz
WDW                            EM
SSB                             0
LB                           1.00 Hz
GB                              0
PC                           1.40

1D NMR plot parameters
CX                         20.00 cm
CY                          4.00 cm
F1P                       200.500 ppm
F1                     15131.28 Hz
F2P                       -0.500 ppm
F2                      -37.73 Hz
PPMCM                  10.05000 ppm/cm
HZCM                  758.45867 Hz/cm
```

4i


ppm
Integral
7.44181
7.43927
7.42982
7.42723
7.36497
7.35116
7.33492
7.33176
7.32847
7.31874
7.27122
7.26834
7.26501
7.26235
7.25991
6.26231
6.25760
6.08087
6.07881
6.06992
6.06787
5.45042
5.42965
4.76885
4.73119
4.70313
4.48011
4.44239
3.78832
3.76724
3.75639
3.27346
3.25137
1.57444
1.32183
1.31475
1.29608
1.28898
1.28027
1.26170
0.88546
0.86655
2.1218
9.2430
1.0000
1.0013
1.0230
0.9934
0.3368
1.0372
3.1245
0.9769
ZX-123
BnO
MeOOC
Ph
OH
Current Data Parameters
NAME 1399-zx-123
EXPNO 1
PROCNO 1
F2 - Acquisition Parameters
Date_ 20070329
Time 17.04
INSTRUM av300
PROBHD 5 mm QNP 1H/13
PULPROG zg30
TD 32768
SOLVENT CDCl3
NS 32
DS 0
SWH 5995.204 Hz
FIDRES 0.182959 Hz
AQ 2.7329011 sec
RG 512
DW 83.400 usec
DE 6.00 usec
TE 300.0 K
D1 1.00000000 sec
======== CHANNEL f1 ========
NUC1 1H
P1 3.00 usec
PL1 -2.00 dB
SFO1 300.1320892 MHz
F2 - Processing parameters
SI 32768
SF 300.1300122 MHz
WDW EM
SSB 0
LB 0.10 Hz
GB 0
PC 1.00
1D NMR plot parameters
CX 20.00 cm
CY 20.00 cm
F1P 10.000 ppm
F1 3001.30 Hz
F2P -0.500 ppm
F2 -150.06 Hz
PPMCM 0.55500 ppm/cm
HZCM 167.56826 Hz/cm



Current Data Parameters
NAME 1399-zx-123
EXPNO 2
PROCNO 1

F2 - Acquisition Parameters
Date_ 20070330
Time 10.37
INSTRUM av300
PROBHD 5 mm QNP 1H/13
PULPROG zgpg
TD 65536
SOLVENT CDCl3
NS 1270
DS 4
SWH 22675.736 Hz
FIDRES 0.346004 Hz
AQ 1.4451188 sec
RG 8192
DW 22.050 usec
DE 6.00 usec
TE 300.0 K
D1 2.00000000 sec
d11 0.03000000 sec
d12 0.00002000 sec

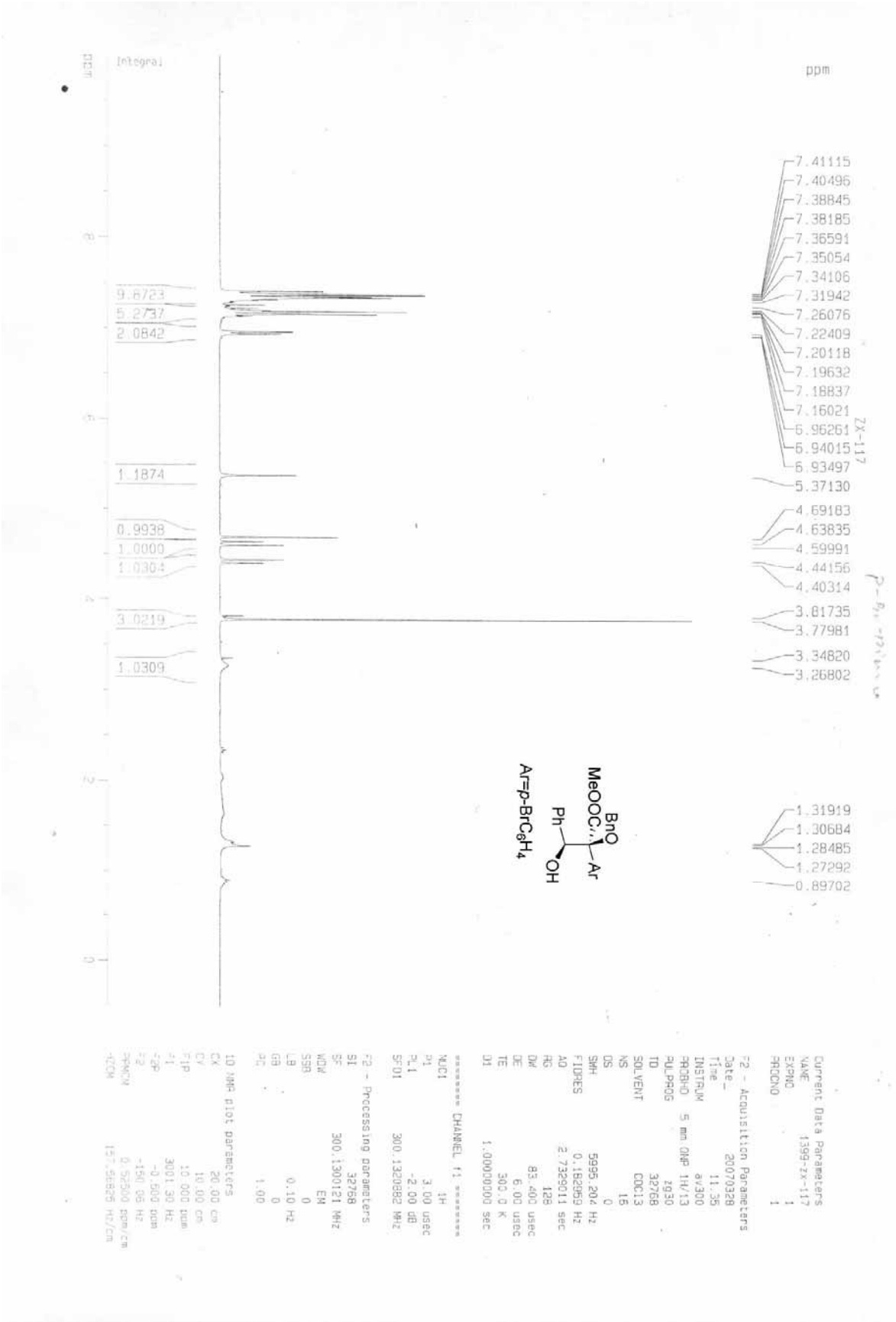
======== CHANNEL f1 ========
NUC1 13C
P1 5.50 usec
PL1 -6.00 dB
SFO1 75.4775598 MHz

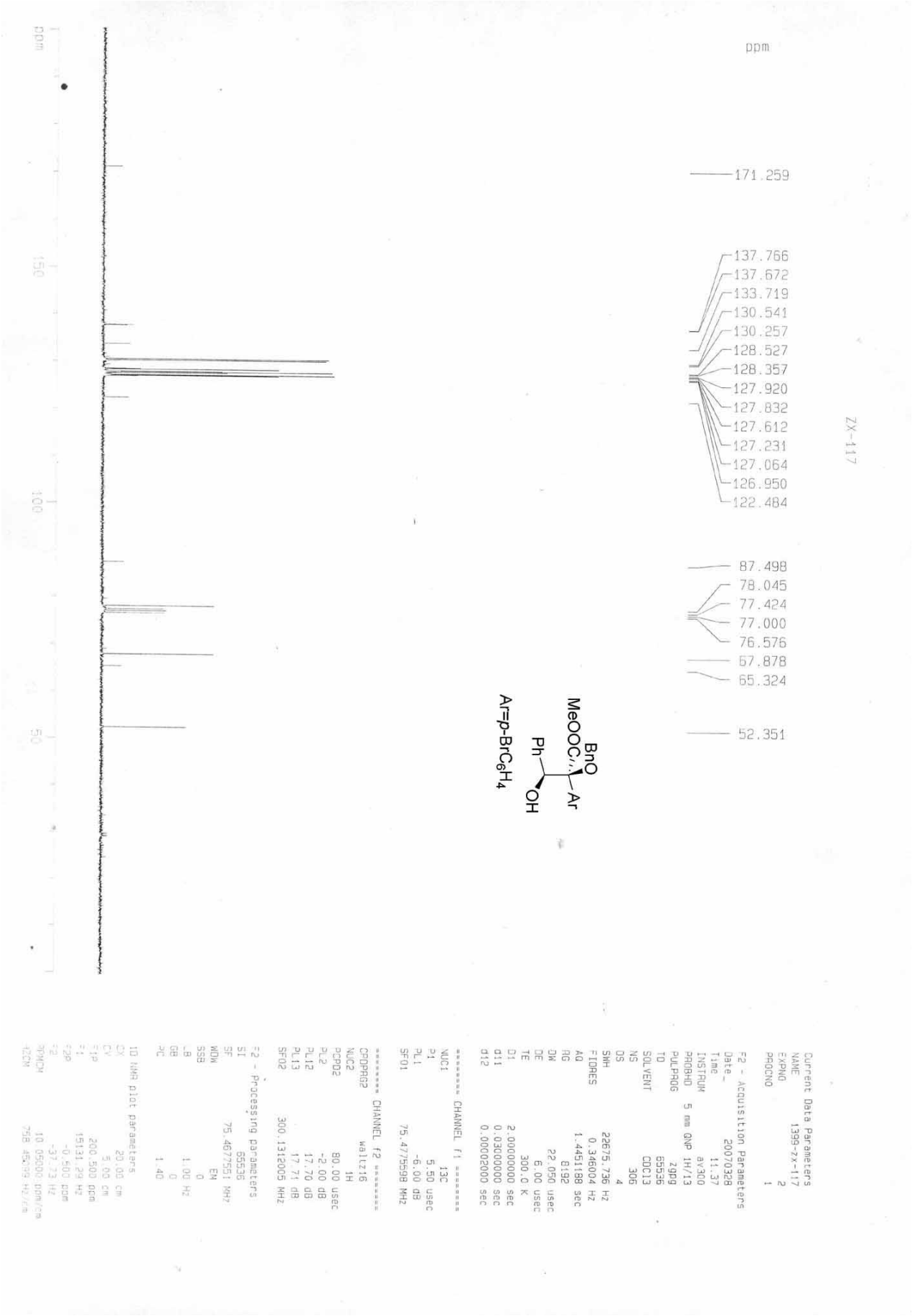
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 -2.00 dB
PL12 17.70 dB
PL13 17.71 dB
SFO2 300.1312005 MHz

F2 - Processing parameters
SI 65536
SF 75.4677524 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

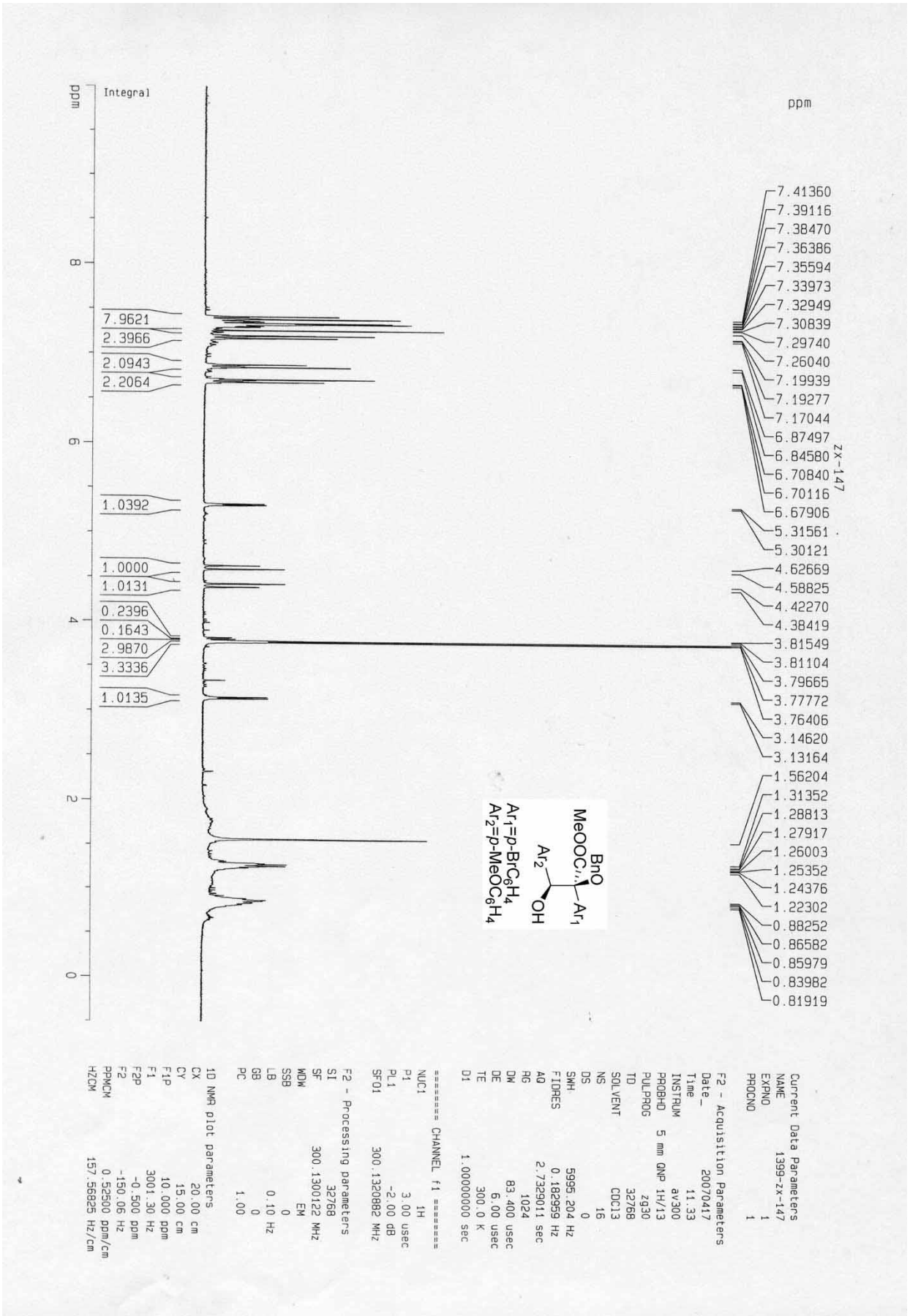
1D NMR plot parameters
CX 20.00 cm
CY 6.00 cm
F1P 200.500 ppm
F1 15131.28 Hz
F2P -0.500 ppm
F2 -37.73 Hz
PPMCM 10.05000 ppm/cm
HZCM 758.45087 Hz/cm

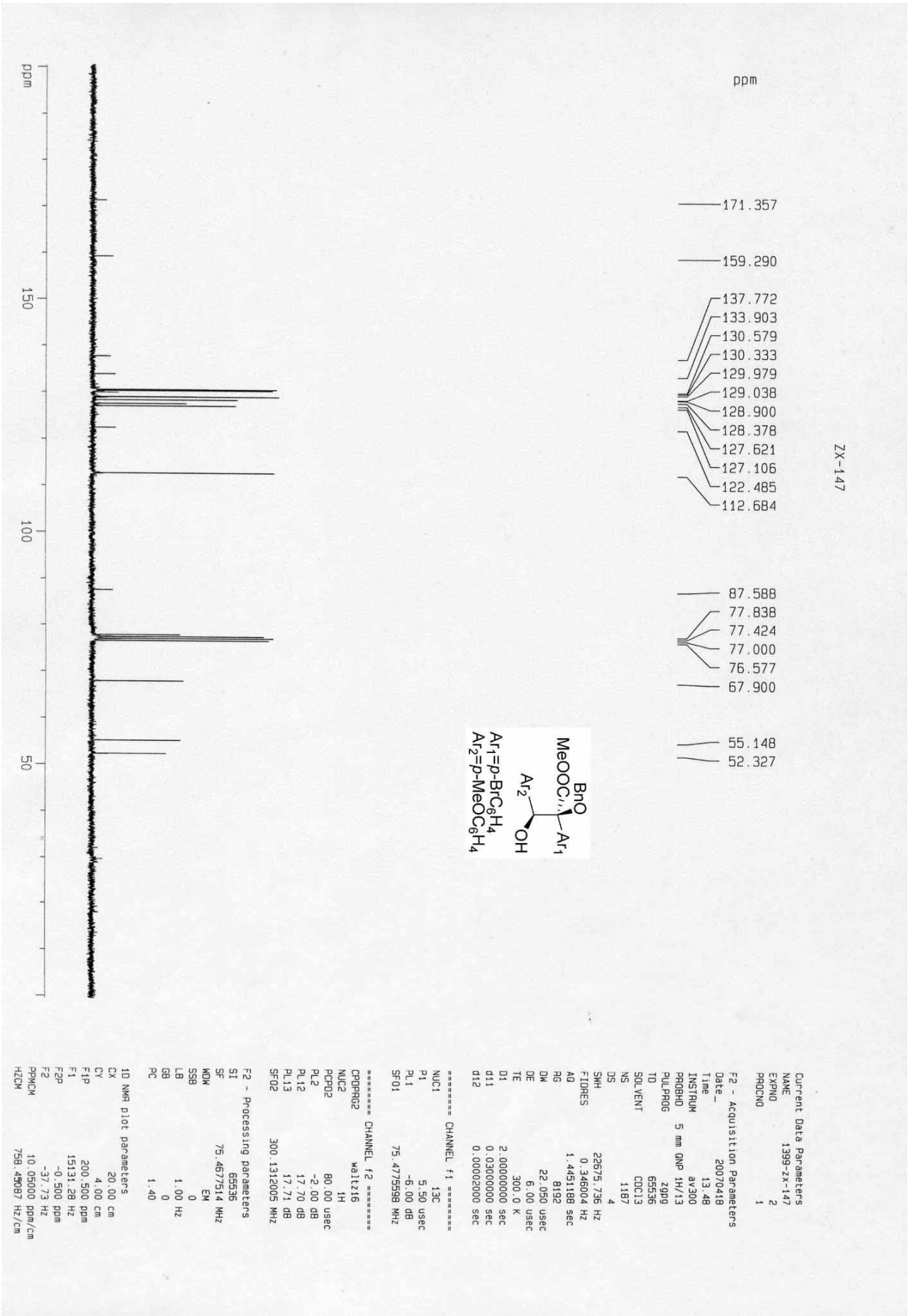
4j


Integral
ppm
9.6723
5.2737
2.0842
1.1874
0.9938
1.0000
1.0304
3.0219
1.0309
7.41115
7.40496
7.38845
7.38185
7.36591
7.35054
7.34106
7.31942
7.26076
7.22409
7.20118
7.19632
7.18837
7.16021
6.96261
6.94015
6.93497
5.37130
4.69183
4.63835
4.59991
4.44156
4.40314
3.81735
3.77981
3.34820
3.26802
1.31919
1.30684
1.28485
1.27292
0.89702
ZX-117
BnO
MeOOC
Ar
Ph
OH
Ar=p-BrC6H4
Current Data Parameters
NAME 1399-zx-117
EXPNO 1
PROCNO 1
F2 - Acquisition Parameters
Date_ 20070328
Time 11.35
INSTRUM av300
PROBHD 5 mm DUP 1H/13
PULPROG zg30
TD 32768
SOLVENT CDCl3
NS 16
DS 0
SWH 5995.204 Hz
FIDRES 0.182959 Hz
AQ 2.7329011 sec
RG 128
DW 83.400 usec
DE 6.00 usec
TE 300.0 K
D1 1.00000000 sec
======== CHANNEL f1 ========
NUC1 1H
P1 3.00 usec
PL1 -2.00 dB
SFO1 300.1320882 MHz
F2 - Processing parameters
SI 32768
SF 300.1300121 MHz
WDW EM
SSB 0
LB 0.10 Hz
GB 0
PC 1.00
1D NMR plot parameters
CX 20.00 cm
CY 10.00 cm
F1P 10.000 ppm
F1 3001.30 Hz
F2P -0.000 ppm
F2 -150.06 Hz
PPMCM 0.52500 ppm/cm
HZCM 157.56825 Hz/cm

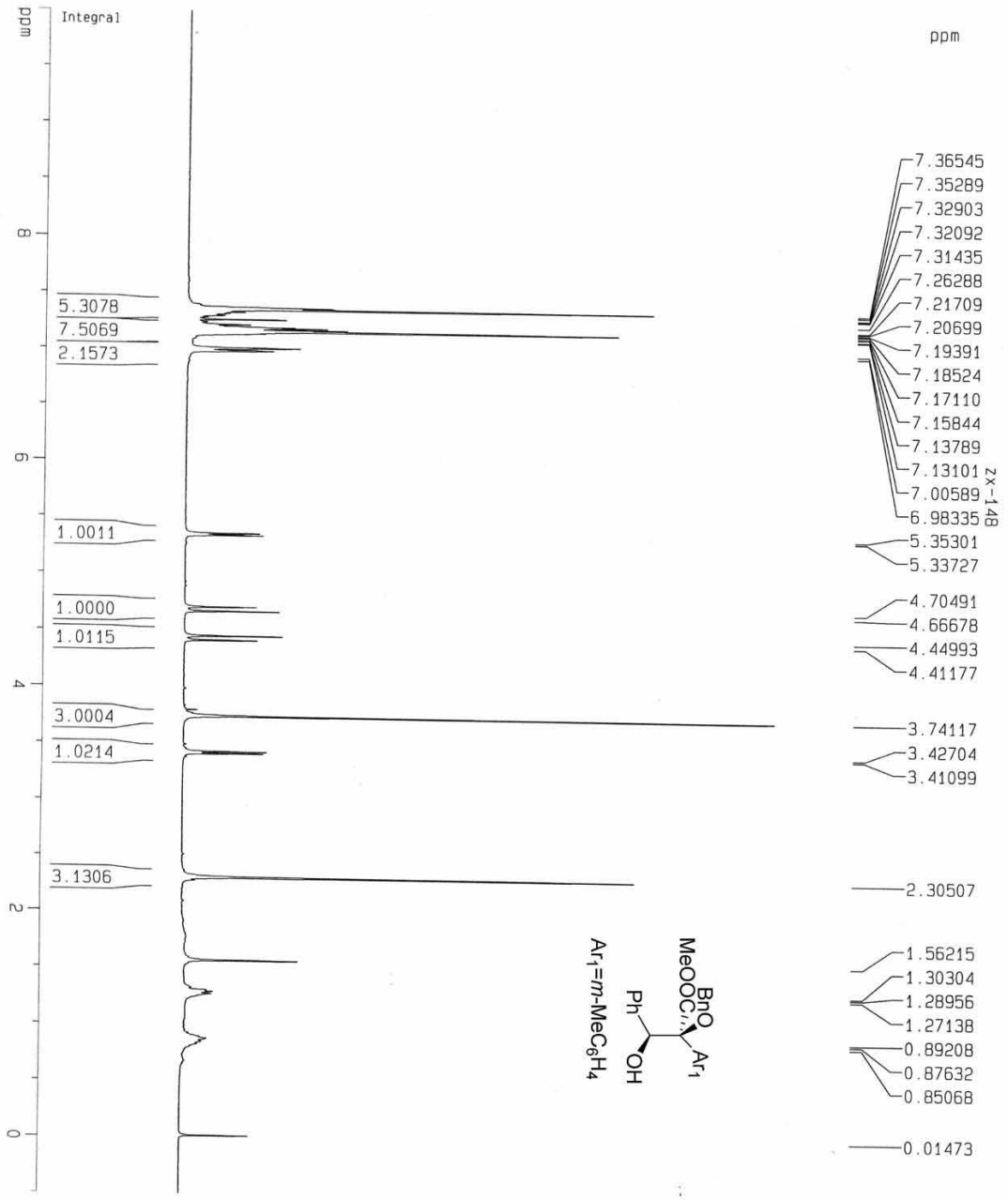

ppm
171.259
137.766
137.672
133.719
130.541
130.257
128.527
128.357
127.920
127.832
127.612
127.231
127.064
126.950
122.484
87.498
78.045
77.424
77.000
76.576
67.878
65.324
52.351
ZX-117
BnO
MeOOC
Ar
Ph
OH
Ar=p-BrC6H4
Current Data Parameters
NAME 1399-zx-117
EXPNO 2
PROCNO 1
F2 - Acquisition Parameters
Date_ 20070328
Time 11.37
INSTRUM av300
PROBHD 5 mm QNP 1H/13
PULPROG zgpg
TD 65536
SOLVENT CDCl3
NS 306
DS 4
SWH 22675.736 Hz
FIDRES 0.346004 Hz
AQ 1.4451188 sec
RG 8192
DW 22.050 usec
DE 6.00 usec
TE 300.0 K
D1 2.00000000 sec
D11 0.03000000 sec
D12 0.00002000 sec
======== CHANNEL f1 ========
NUC1 13C
P1 5.50 usec
PL1 -6.00 dB
SF01 75.4775998 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 -2.00 dB
PL12 17.70 dB
PL13 17.71 dB
SF02 300.1312005 MHz
F2 - Processing parameters
SI 65536
SF 75.4677551 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
1D NMR plot parameters
CX 20.00 cm
CY 5.00 cm
F1P 200.500 ppm
F1 15131.29 Hz
F2P -0.500 ppm
F2 -37.72 Hz
PPMCM 10.05000 ppm/cm
HZCM 758.45349 Hz/cm

4k


ppm
Integral
7.9621
2.3966
2.0943
2.2064
1.0392
1.0000
1.0131
0.2396
0.1643
2.9870
3.3336
1.0135
7.41360
7.39116
7.38470
7.36386
7.35594
7.33973
7.32949
7.30839
7.29740
7.26040
7.19939
7.19277
7.17044
6.87497
6.84580
6.70840
6.70116
6.67906
5.31561
5.30121
4.62669
4.58825
4.42270
4.38419
3.81549
3.81104
3.79665
3.77772
3.76406
3.14620
3.13164
1.56204
1.31352
1.28813
1.27917
1.26003
1.25352
1.24376
1.22302
0.88252
0.86582
0.85979
0.83982
0.81919
zx-147
BnO
MeOOC
Ar1
Ar2
OH
Ar1=p-BrC6H4
Ar2=p-MeOC6H4
Current Data Parameters
NAME 1399-zx-147
EXPNO 1
PROCNO 1
F2 - Acquisition Parameters
Date_ 20070417
Time 11.33
INSTRUM av300
PROBHD 5 mm QNP 1H/13
PULPROG zg30
TD 32768
SOLVENT CDCl3
NS 16
DS 0
SWH 5995.204 Hz
FIDRES 0.182959 Hz
AQ 2.7329011 sec
RG 1024
DW 83.400 usec
DE 6.00 usec
TE 300.0 K
D1 1.00000000 sec
======== CHANNEL f1 ========
NUC1 1H
P1 3.00 usec
PL1 -2.00 dB
SFO1 300.1320882 MHz
F2 - Processing parameters
SI 32768
SF 300.1300122 MHz
WDW EM
SSB 0
LB 0.10 Hz
GB 0
PC 1.00
1D NMR plot parameters
CX 20.00 cm
CY 15.00 cm
F1P 10.000 ppm
F1 3001.30 Hz
F2P -0.500 ppm
F2 -150.06 Hz
PPMCM 0.52500 ppm/cm
HZCM 157.56825 Hz/cm


ppm
171.357
159.290
137.772
133.903
130.579
130.333
129.979
129.038
128.900
128.378
127.621
127.106
122.485
112.684
87.588
77.838
77.424
77.000
76.577
67.900
55.148
52.327
ZX-147
BnO
MeOOC
Ar1
Ar2
OH
Ar1=p-BrC6H4
Ar2=p-MeOC6H4
ppm
150
100
50
Current Data Parameters
NAME 1399-zx-147
EXPNO 2
PROCNO 1
F2 - Acquisition Parameters
Date_ 20070418
Time 13.48
INSTRUM av300
PROBHD 5 mm QNP 1H/13
PULPROG zgpg
TD 65536
SOLVENT CDCl3
NS 1187
DS 4
SWH 22675.736 Hz
FIDRES 0.346004 Hz
AQ 1.445118B sec
RG 8192
DW 22.050 usec
DE 6.00 usec
TE 300.0 K
D1 2.00000000 sec
d11 0.03000000 sec
d12 0.00002000 sec
======== CHANNEL f1 ========
NUC1 13C
P1 5.50 usec
PL1 -6.00 dB
SFO1 75.4775598 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 -2.00 dB
PL12 17.70 dB
PL13 17.71 dB
SFO2 300.1312005 MHz
F2 - Processing parameters
SI 65536
SF 75.4677514 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
1D NMR plot parameters
CX 20.00 cm
CY 4.00 cm
F1P 200.500 ppm
F1 15131.28 Hz
F2P -0.500 ppm
F2 -37.73 Hz
PPMCM 10.05000 ppm/cm
HZCM 758.45087 Hz/cm

4l



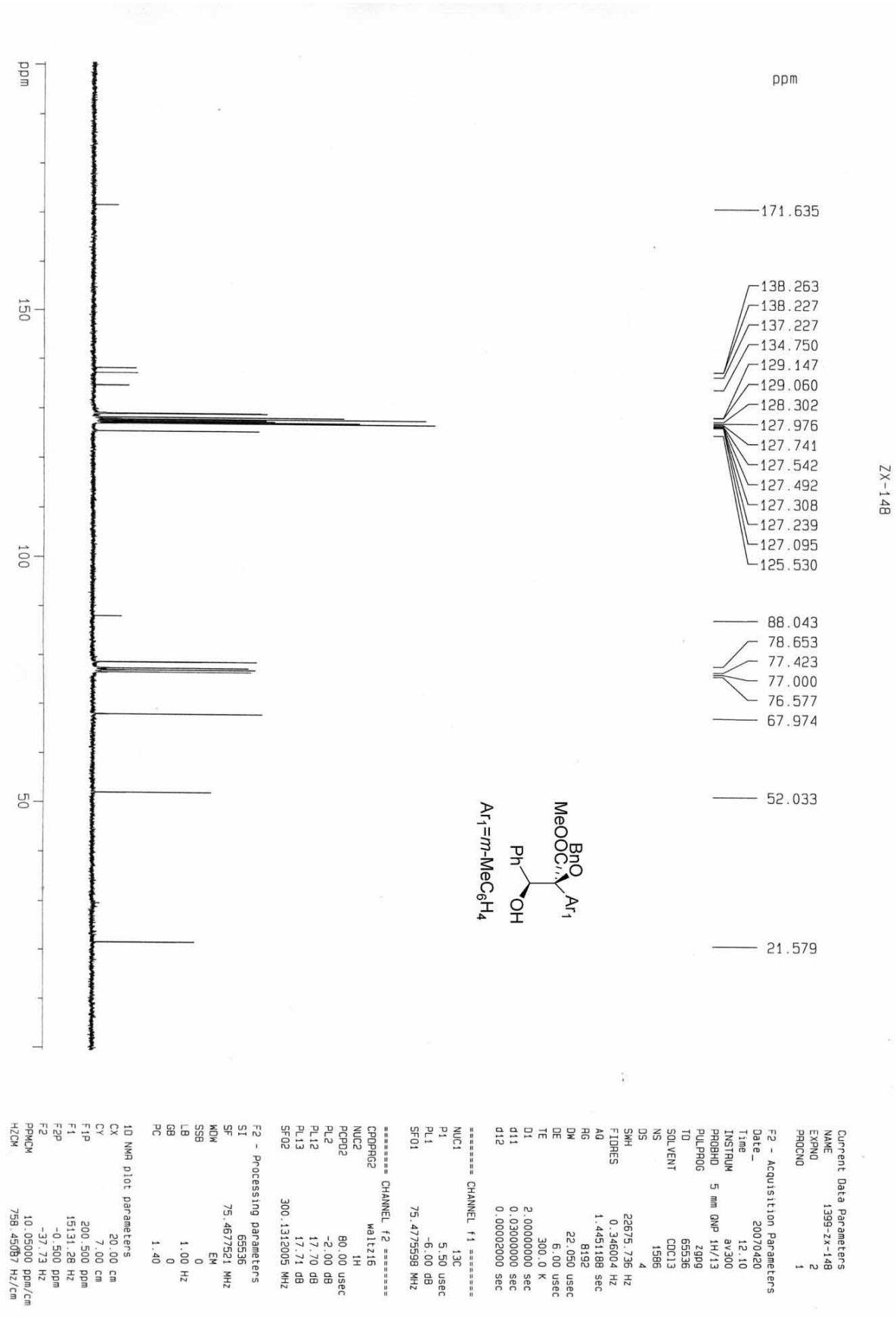

```
Current Data Parameters
NAME                  1399-zx-14B
EXPNO                           1
PROCNO                          1

F2 - Acquisition Parameters
Date_                    20070420
Time                         9.36
INSTRUM                    av300
PROBHD     5 mm QNP 1H/13
PULPROG                    zg30
TD                        32768
SOLVENT                   CDCl3
NS                           32
DS                            0
SWH                    5995.204 Hz
FIDRES                 0.182959 Hz
AQ                     2.7329011 sec
RG                         1024
DW                       83.400 usec
DE                        6.00 usec
TE                       300.0 K
D1                     1.00000000 sec

======== CHANNEL f1 ========
NUC1                         1H
P1                         3.00 usec
PL1                       -2.00 dB
SFO1              300.1320882 MHz

F2 - Processing parameters
SI                        32768
SF                300.1300115 MHz
WDW                          EM
SSB                           0
LB                         0.10 Hz
GB                            0
PC                         1.00

1D NMR plot parameters
CX                        20.00 cm
CY                        10.00 cm
F1P                     10.000 ppm
F1                    3001.30 Hz
F2P                     -0.500 ppm
F2                    -150.06 Hz
PPMCM                  0.52500 ppm/cm
HZCM                157.56825 Hz/cm
```




```
Current Data Parameters
NAME                  1399-zx-14B
EXPNO                          2
PROCNO                         1

F2 - Acquisition Parameters
Date_               20070420
Time                    12.10
INSTRUM                 av300
PROBHD     5 mm QNP 1H/13
PULPROG                 zgpg
TD                     65536
SOLVENT                CDCl3
NS                      1586
DS                         4
SWH                 22675.736 Hz
FIDRES              0.346004 Hz
AQ                  1.445188 sec
RG                       8192
DW                     22.050 usec
DE                      6.00 usec
TE                     300.0 K
D1                  2.00000000 sec
d11                 0.03000000 sec
d12                 0.00002000 sec

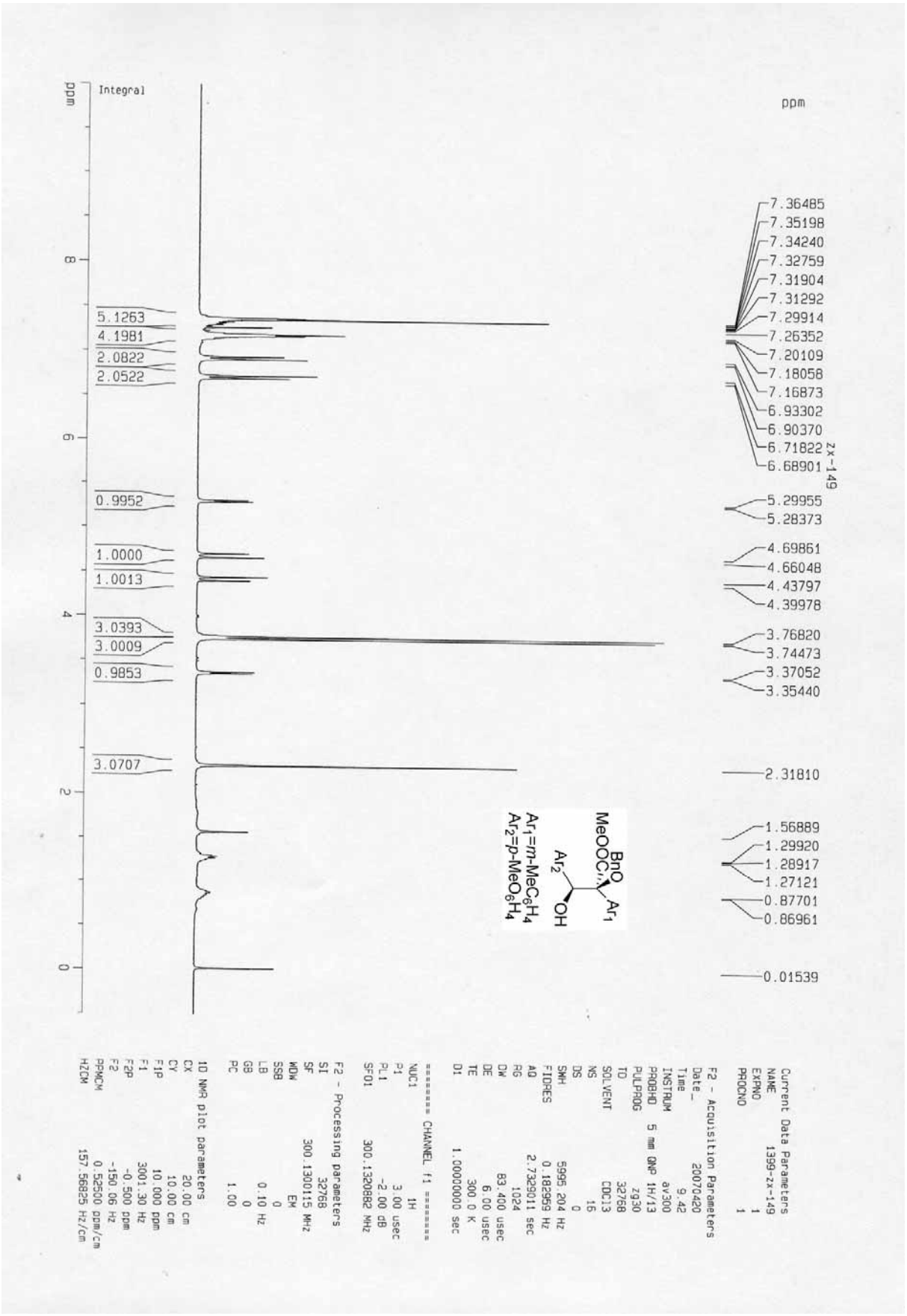
======== CHANNEL f1 ========
NUC1                      13C
P1                       5.50 usec
PL1                     -6.00 dB
SFO1               75.4775598 MHz

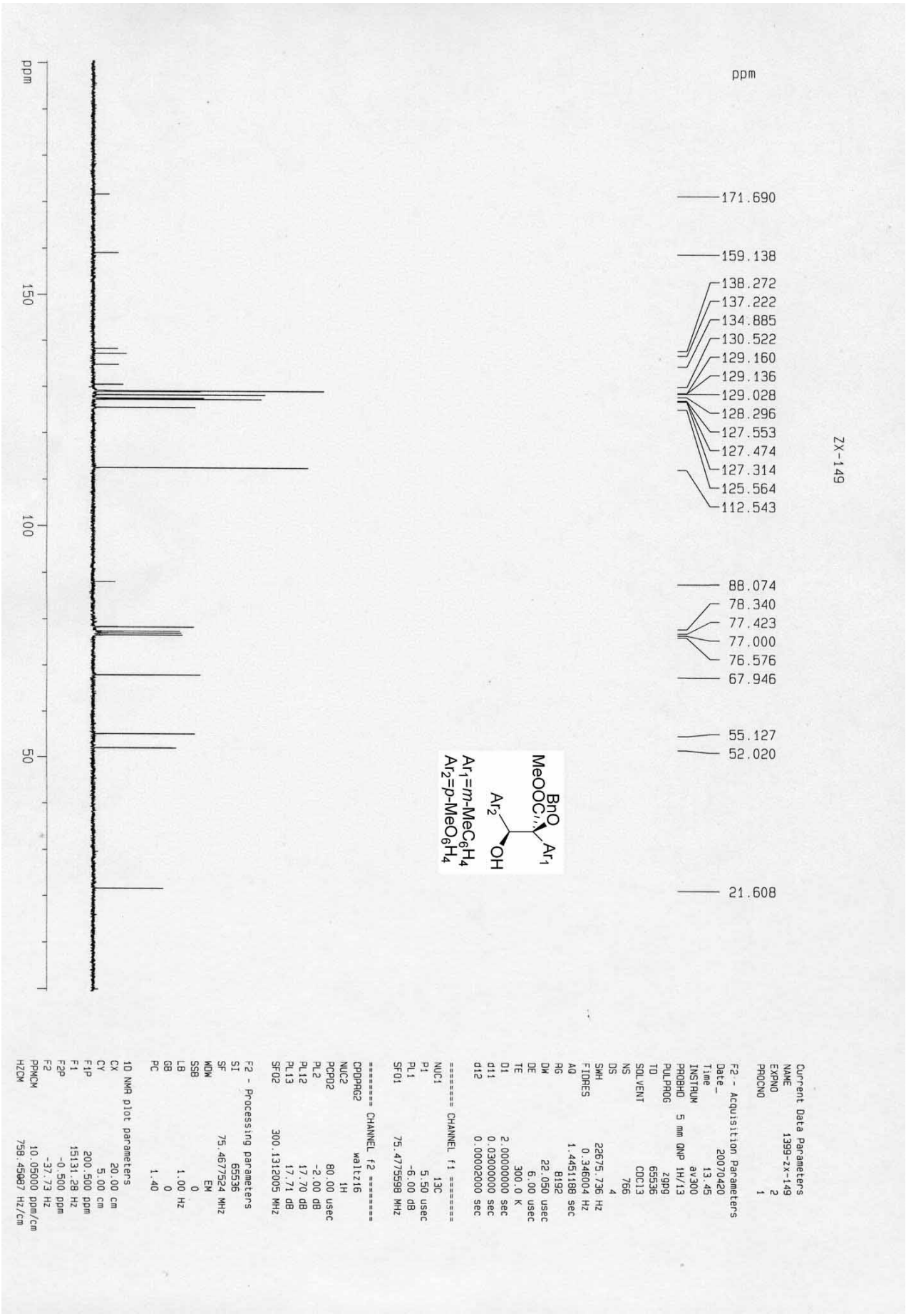
======== CHANNEL f2 ========
CPDPRG2                waltz16
NUC2                       1H
PCPD2                  80.00 usec
PL2                     -2.00 dB
PL12                    17.70 dB
PL13                    17.71 dB
SFO2               300.1312005 MHz

F2 - Processing parameters
SI                         65536
SF                 75.4677521 MHz
WDW                           EM
SSB                            0
LB                          1.00 Hz
GB                             0
PC                          1.40

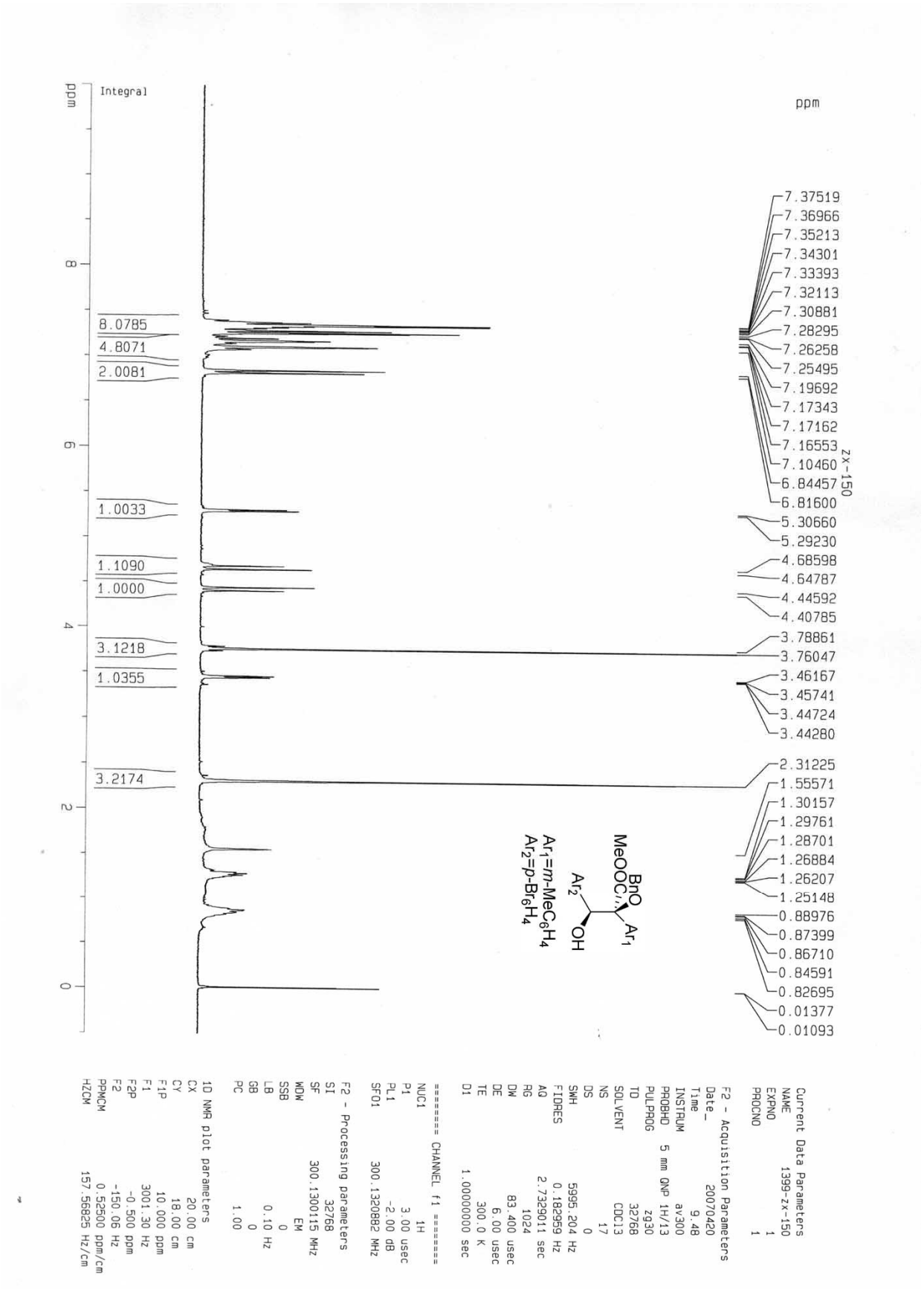
1D NMR plot parameters
CX                         20.00 cm
CY                          7.00 cm
F1P                       200.500 ppm
F1                      15131.28 Hz
F2P                        -0.500 ppm
F2                       -37.73 Hz
PPMCM                     10.05000 ppm/cm
HZCM                   758.45087 Hz/cm
```

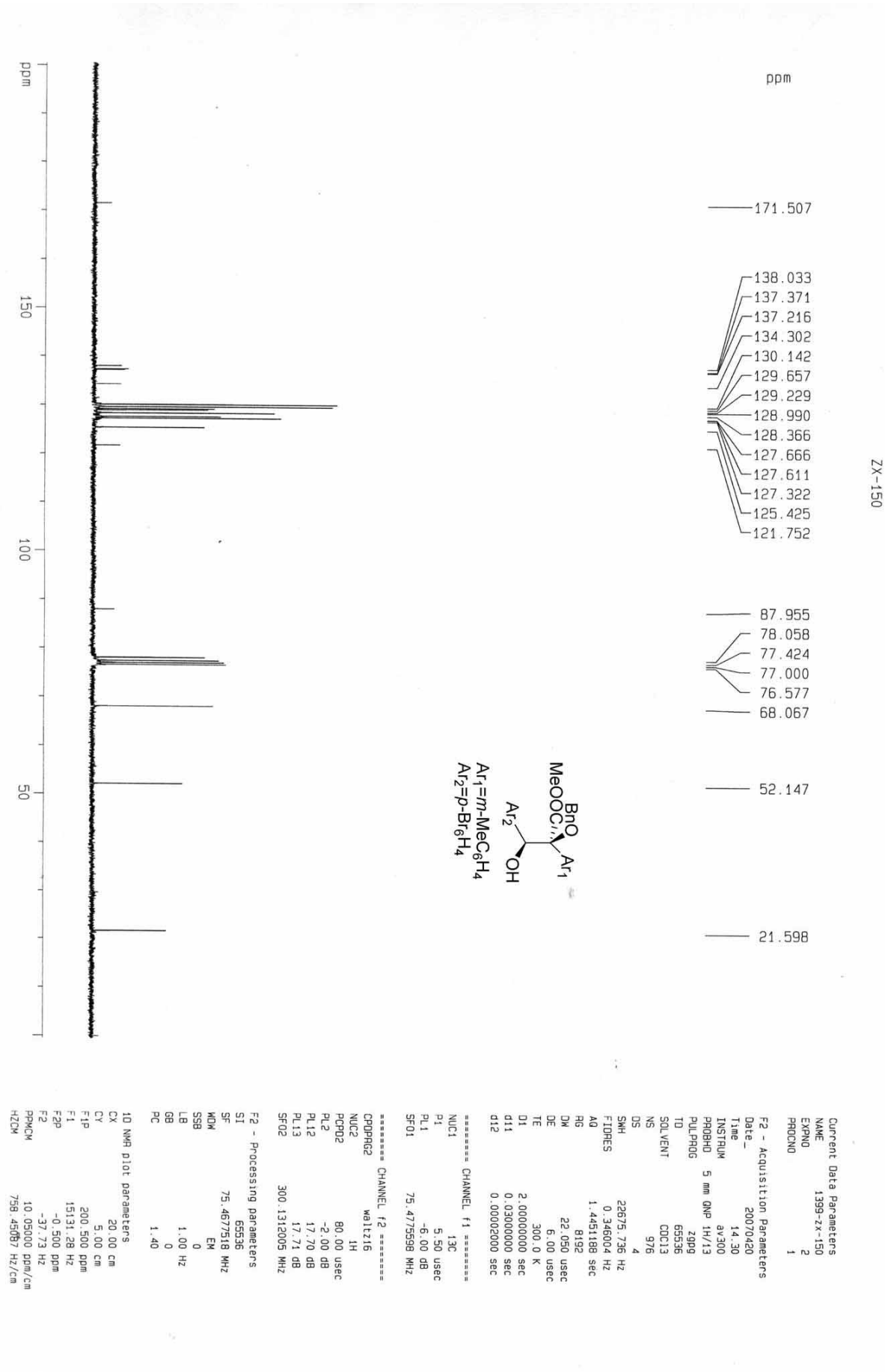
4m


Integral
ppm
5.1263
4.1981
2.0822
2.0522
0.9952
1.0000
1.0013
3.0393
3.0009
0.9853
3.0707
7.36485
7.35198
7.34240
7.32759
7.31904
7.31292
7.29914
7.26352
7.20109
7.18058
7.16873
6.93302
6.90370
6.71822
6.68901
zx-149
5.29955
5.28373
4.69861
4.66048
4.43797
4.39978
3.76820
3.74473
3.37052
3.35440
2.31810
1.56889
1.29920
1.28917
1.27121
0.87701
0.86961
0.01539
BnO
MeOOC
Ar1
Ar2
OH
Ar1=m-MeC6H4
Ar2=p-MeO6H4
Current Data Parameters
NAME 1399-zx-149
EXPNO 1
PROCNO 1
F2 - Acquisition Parameters
Date_ 20070420
Time 9.42
INSTRUM av300
PROBHD 5 mm QNP 1H/13
PULPROG zg30
TD 32768
SOLVENT CDCl3
NS 16
DS 0
SWH 5995.204 Hz
FIDRES 0.182959 Hz
AQ 2.7329011 sec
RG 1024
DW 83.400 usec
DE 6.00 usec
TE 300.0 K
D1 1.00000000 sec
======== CHANNEL f1 ========
NUC1 1H
P1 3.00 usec
PL1 -2.00 dB
SFO1 300.1320882 MHz
F2 - Processing parameters
SI 32768
SF 300.1300115 MHz
WDW EM
SSB 0
LB 0.10 Hz
GB 0
PC 1.00
1D NMR plot parameters
CX 20.00 cm
CY 10.00 cm
F1P 10.000 ppm
F1 3001.30 Hz
F2P -0.500 ppm
F2 -150.06 Hz
PPMCM 0.52500 ppm/cm
HZCM 157.56825 Hz/cm

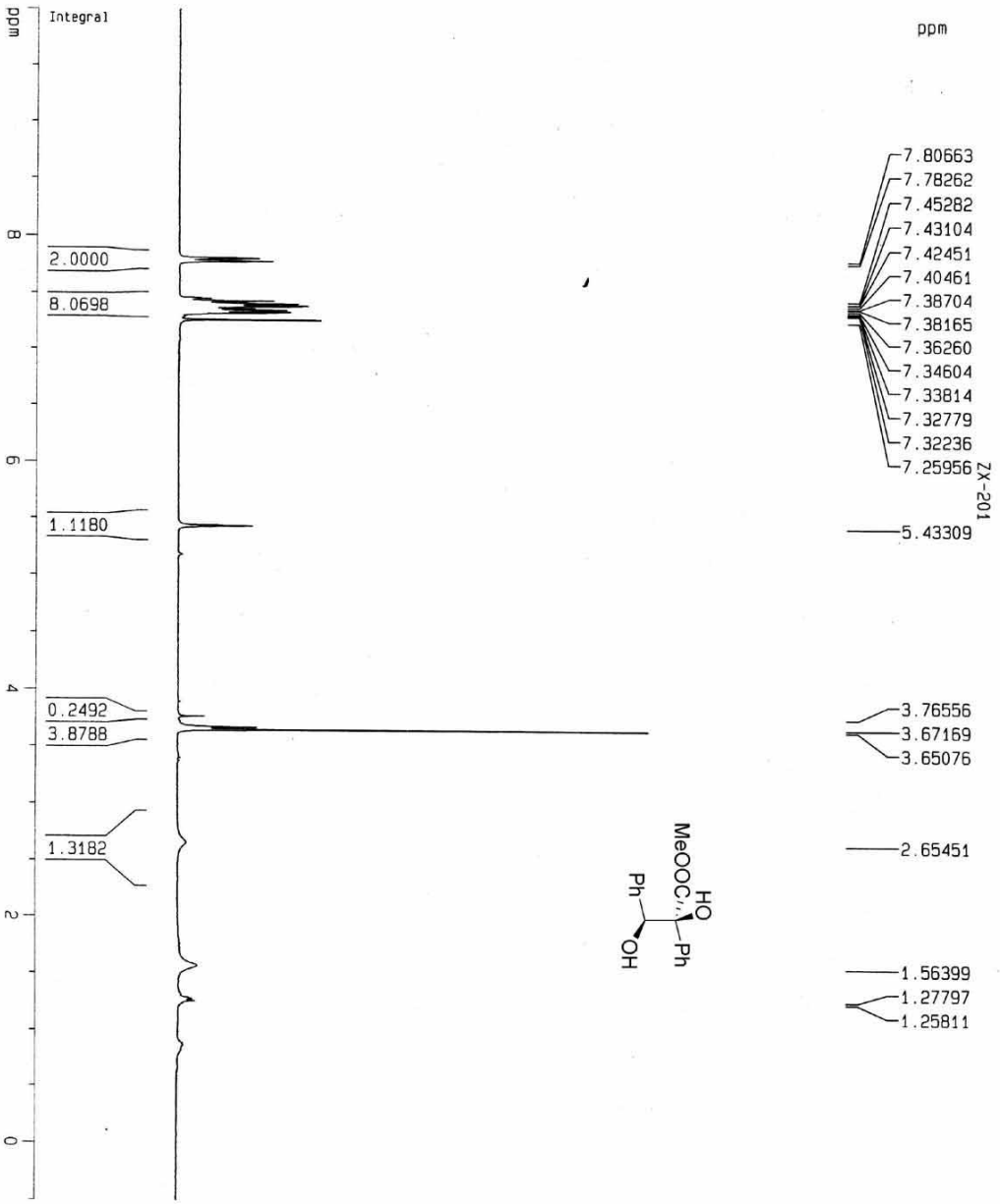

ZX-149
ppm
171.690
159.138
138.272
137.222
134.885
130.522
129.160
129.136
129.028
128.296
127.553
127.474
127.314
125.564
112.543
88.074
78.340
77.423
77.000
76.576
67.946
55.127
52.020
21.608
BnO
MeOOC
Ar1
Ar2
OH
Ar1=m-MeC6H4
Ar2=p-MeO6H4
ppm
150
100
50
Current Data Parameters
NAME 1399-zx-149
EXPNO 2
PROCNO 1
F2 - Acquisition Parameters
Date_ 20070420
Time 13.45
INSTRUM av300
PROBHD 5 mm QNP 1H/13
PULPROG zgpg
TD 65536
SOLVENT CDCl3
NS 766
DS 4
SWH 22675.736 Hz
FIDRES 0.346004 Hz
AQ 1.445118B sec
RG B192
DW 22.050 usec
DE 6.00 usec
TE 300.0 K
D1 2.00000000 sec
D11 0.03000000 sec
D12 0.00002000 sec
======== CHANNEL f1 ========
NUC1 13C
P1 5.50 usec
PL1 -6.00 dB
SFO1 75.4775598 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 -2.00 dB
PL12 17.70 dB
PL13 17.71 dB
SFO2 300.1312005 MHz
F2 - Processing parameters
SI 65536
SF 75.4677524 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
1D NMR plot parameters
CX 20.00 cm
CY 5.00 cm
F1P 200.500 ppm
F1 15131.28 Hz
F2P -0.500 ppm
F2 -37.73 Hz
PPMCM 10.05000 ppm/cm
HZCM 758.45087 Hz/cm

4n


ppm
Integral
8.0785
4.8071
2.0081
1.0033
1.1090
1.0000
3.1218
1.0355
3.2174
7.37519
7.36966
7.35213
7.34301
7.33393
7.32113
7.30881
7.28295
7.26258
7.25495
7.19692
7.17343
7.17162
7.16553
7.10460
6.84457
6.81600
5.30660
5.29230
4.68598
4.64787
4.44592
4.40785
3.78861
3.76047
3.46167
3.45741
3.44724
3.44280
2.31225
1.55571
1.30157
1.29761
1.28701
1.26884
1.26207
1.25148
0.88976
0.87399
0.86710
0.84591
0.82695
0.01377
0.01093
zx-150
BnO
MeOOC
Ar1
Ar2
OH
Ar1=m-MeC6H4
Ar2=p-Br6H4
Current Data Parameters
NAME 1399-zx-150
EXPNO 1
PROCNO 1
F2 - Acquisition Parameters
Date_ 20070420
Time 9.48
INSTRUM av300
PROBHD 5 mm QNP 1H/13
PULPROG zg30
TD 32768
SOLVENT CDCl3
NS 17
DS 0
SWH 5995.204 Hz
FIDRES 0.182959 Hz
AQ 2.7329011 sec
RG 1024
DW 83.400 usec
DE 6.00 usec
TE 300.0 K
D1 1.00000000 sec
======== CHANNEL f1 ========
NUC1 1H
P1 3.00 usec
PL1 -2.00 dB
SFO1 300.1320882 MHz
F2 - Processing parameters
SI 32768
SF 300.1300115 MHz
WDW EM
SSB 0
LB 0.10 Hz
GB 0
PC 1.00
1D NMR plot parameters
CX 20.00 cm
CY 18.00 cm
F1P 10.000 ppm
F1 3001.30 Hz
F2P -0.500 ppm
F2 -150.06 Hz
PPMCM 0.52500 ppm/cm
HZCM 157.56825 Hz/cm


ppm
171.507
138.033
137.371
137.216
134.302
130.142
129.657
129.229
128.990
128.366
127.666
127.611
127.322
125.425
121.752
87.955
78.058
77.424
77.000
76.577
68.067
52.147
21.598
ZX-150
BnO
MeOOC
Ar1
Ar2
OH
Ar1=m-MeC6H4
Ar2=p-Br6H4
Current Data Parameters
NAME 1399-zx-150
EXPNO 2
PROCNO 1
F2 - Acquisition Parameters
Date_ 20070420
Time 14.30
INSTRUM av300
PROBHD 5 mm QNP 1H/13
PULPROG zgpg
TD 65536
SOLVENT CDCl3
NS 976
DS 4
SWH 22675.736 Hz
FIDRES 0.346004 Hz
AQ 1.445188 sec
RG 8192
DW 22.050 usec
DE 6.00 usec
TE 300.0 K
D1 2.00000000 sec
d11 0.03000000 sec
d12 0.00002000 sec
======== CHANNEL f1 ========
NUC1 13C
P1 5.50 usec
PL1 -6.00 dB
SFO1 75.4775598 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 -2.00 dB
PL12 17.70 dB
PL13 17.71 dB
SFO2 300.1312005 MHz
F2 - Processing parameters
SI 65536
SF 75.4677518 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
1D NMR plot parameters
CX 20.00 cm
CY 5.00 cm
F1P 200.500 ppm
F1 15131.28 Hz
F2P -0.500 ppm
F2 -37.73 Hz
PPMCM 10.05000 ppm/cm
HZCM 758.45087 Hz/cm

8



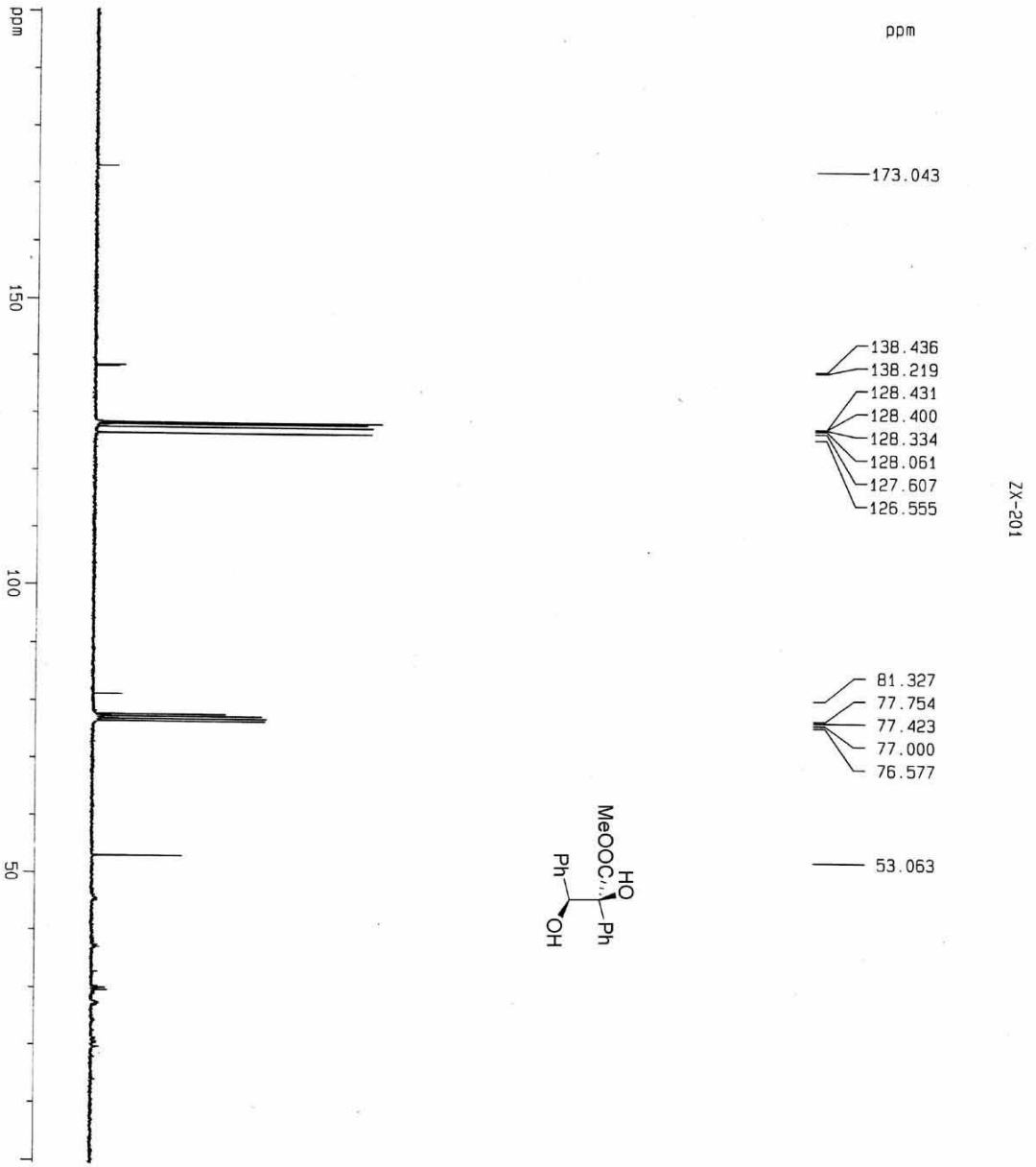

```
Current Data Parameters
NAME                  1399-zx-201
EXPNO                           1
PROCNO                          1

F2 - Acquisition Parameters
Date_                    20070626
Time                         9.53
INSTRUM                      av300
PROBHD     5 mm QNP 1H/13
PULPROG                      zg30
TD                           32768
SOLVENT                      CDCl3
NS                              32
DS                               0
SWH                    5995.204 Hz
FIDRES                 0.182959 Hz
AQ                     2.7329011 sec
RG                             512
DW                        83.400 usec
DE                         6.00 usec
TE                        300.0 K
D1                     1.00000000 sec

========== CHANNEL f1 ========
NUC1                           1H
P1                         3.00 usec
PL1                       -2.00 dB
SFO1                 300.1320882 MHz

F2 - Processing parameters
SI                           32768
SF                   300.1300122 MHz
WDW                             EM
SSB                              0
LB                            0.10 Hz
GB                               0
PC                            1.00

1D NMR plot parameters
CX                           20.00 cm
CY                            8.00 cm
F1P                         10.000 ppm
F1                        3001.30 Hz
F2P                        -0.500 ppm
F2                        -150.06 Hz
PPMCM                      0.52500 ppm/cm
HZCM                 157.56825 Hz/cm
```




```
Current Data Parameters
NAME                  1399-zx-201
EXPNO                           2
PROCNO                          1

F2 - Acquisition Parameters
Date_              20070626
Time                   11.24
INSTRUM                av300
PROBHD     5 mm QNP 1H/13
PULPROG                zgpg
TD                     65536
SOLVENT                CDCl3
NS                      2048
DS                         4
SWH               22675.736 Hz
FIDRES             0.346004 Hz
AQ                 1.445188 sec
RG                       8192
DW                 22.050 usec
DE                  6.00 usec
TE                     300.0 K
D1                 2.00000000 sec
D11                0.03000000 sec
D12                0.00002000 sec

======== CHANNEL f1 ========
NUC1                       13C
P1                        5.50 usec
PL1                      -6.00 dB
SFO1              75.4775598 MHz

======== CHANNEL f2 ========
CPDPRG2                waltz16
NUC2                       1H
PCPD2                 80.00 usec
PL2                      -2.00 dB
PL12                     17.70 dB
PL13                     17.71 dB
SFO2              300.1312005 MHz

F2 - Processing parameters
SI                         65536
SF                75.4677508 MHz
WDW                           EM
SSB                            0
LB                      1.00 Hz
GB                             0
PC                          1.40

1D NMR plot parameters
CX                       20.00 cm
CY                        5.00 cm
F1P                     200.500 ppm
F1                    15131.28 Hz
F2P                      -0.500 ppm
F2                     -37.73 Hz
PPMCM                 10.05000 ppm/cm
HZCM                  758.45087 Hz/cm
```

HPLC trace

4a

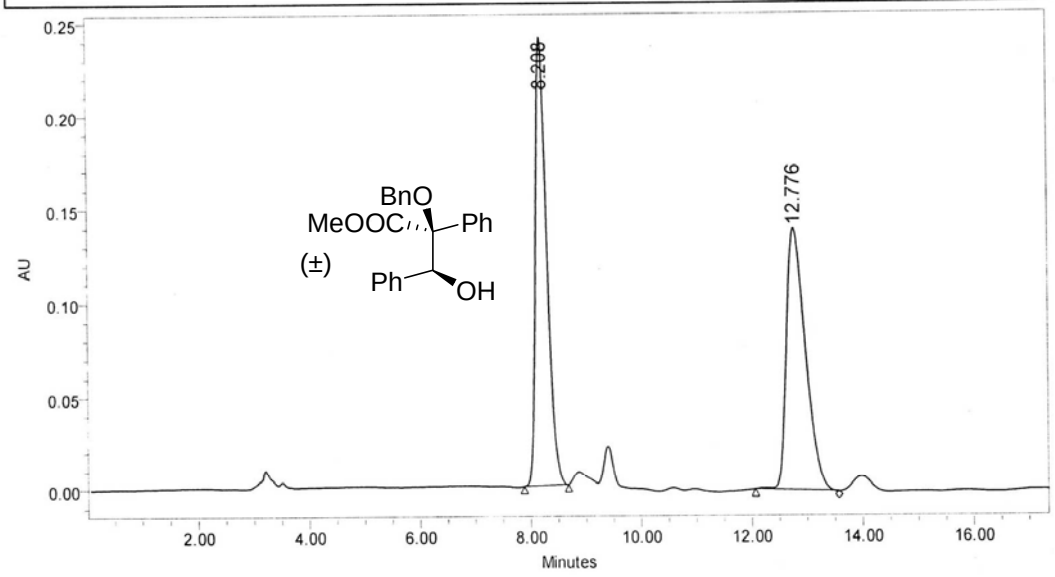
ulas

Project Name: Defaults
Reported by User: Cunlinfeng

Breeze

SAMPLE INFORMATION

Sample Name:	zxlc414	Acquired By:	Cunlinfeng
Sample Type:	Unknown	Date Acquired:	6/28/07 5:18:45 PM
Vial:	1	Acq. Method:	100A
Injection #:	1	Date Processed:	6/28/07 5:37:00 PM
Injection Volume:	20.00 ul	Channel Name:	2487Channel 1
Run Time:	60.00 Minutes	Sample Set Name:	



	RT (min)	Area (μV*sec)	% Area	Height (μV)	% Height
1	8.208	3401970	50.54	240950	63.26
2	12.776	3328851	49.46	139918	36.74

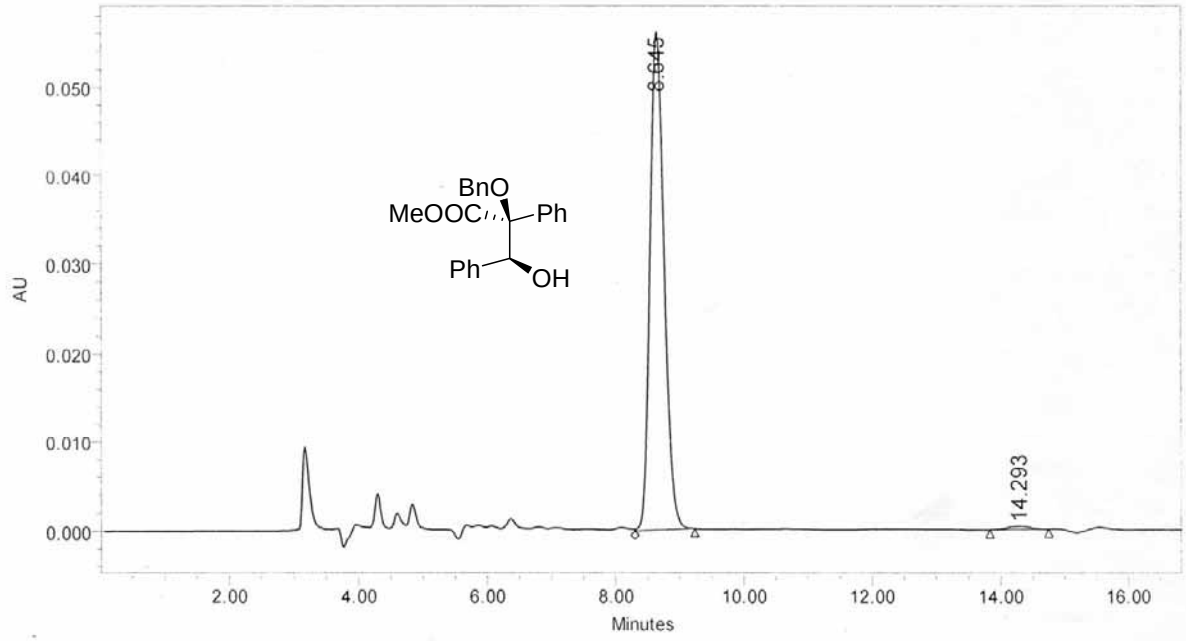
ulas

Project Name: Defaults
Reported by User: Cunlinfeng

Breeze

SAMPLE INFORMATION

Sample Name:	zxlc42	Acquired By:	Cunlinfeng
Sample Type:	Unknown	Date Acquired:	3/19/07 2:34:19 PM
Vial:	1	Acq. Method:	100A
Injection #:	3	Date Processed:	3/19/07 2:51:35 PM
Injection Volume:	20.00 ul	Channel Name:	2487Channel 1
Run Time:	60.00 Minutes	Sample Set Name:	



	RT (min)	Area (μV*sec)	% Area	Height (μV)	% Height
1	8.645	859871	99.00	56118	99.35
2	14.293	8671	1.00	366	0.65

4b

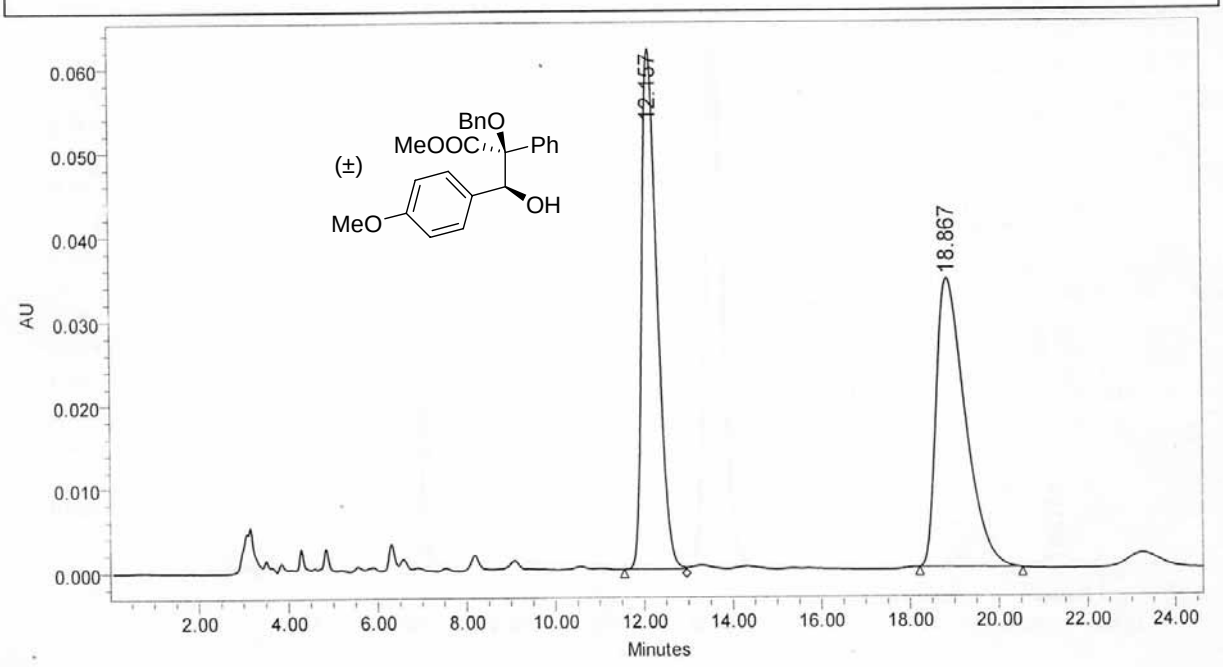
ulas

Project Name: Defaults
Reported by User: Cunlinfeng

Breeze

SAMPLE INFORMATION

Sample Name:	zxlc71	Acquired By:	Cunlinfeng
Sample Type:	Unknown	Date Acquired:	4/18/07 11:41:16 AM
Vial:	1	Acq. Method:	100A
Injection #:	5	Date Processed:	4/18/07 12:06:07 PM
Injection Volume:	20.00 ul	Channel Name:	2487Channel 1
Run Time:	60.00 Minutes	Sample Set Name:	



	RT (min)	Area (μV*sec)	% Area	Height (μV)	% Height
1	12.157	1498481	49.10	62031	64.37
2	18.867	1553188	50.90	34341	35.63

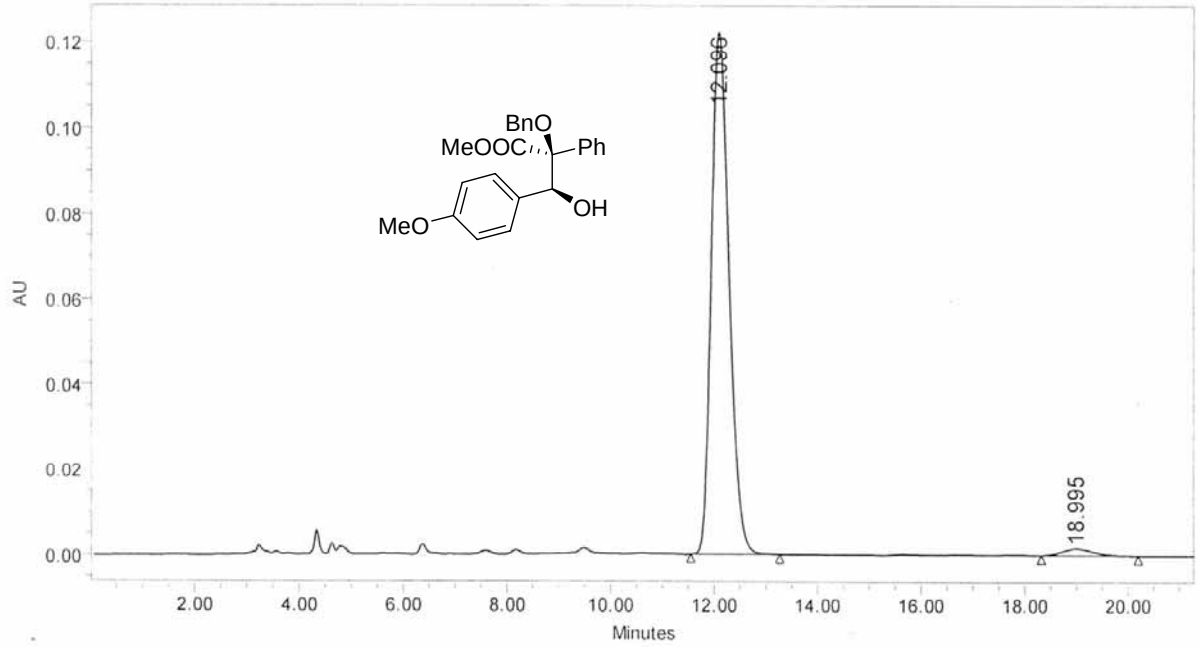
ulas

Project Name: Defaults
Reported by User: Cunlinfeng

Breeze

SAMPLE INFORMATION

Sample Name:	zxlc110	Acquired By:	Cunlinfeng
Sample Type:	Unknown	Date Acquired:	6/12/07 4:25:22 PM
Vial:	1	Acq. Method:	100A
Injection #:	2	Date Processed:	6/12/07 4:46:53 PM
Injection Volume:	20.00 ul	Channel Name:	2487Channel 1
Run Time:	60.00 Minutes	Sample Set Name:	



	RT (min)	Area (μV*sec)	% Area	Height (μV)	% Height
1	12.096	2913019	97.79	122097	98.70
2	18.995	65770	2.21	1606	1.30

4c

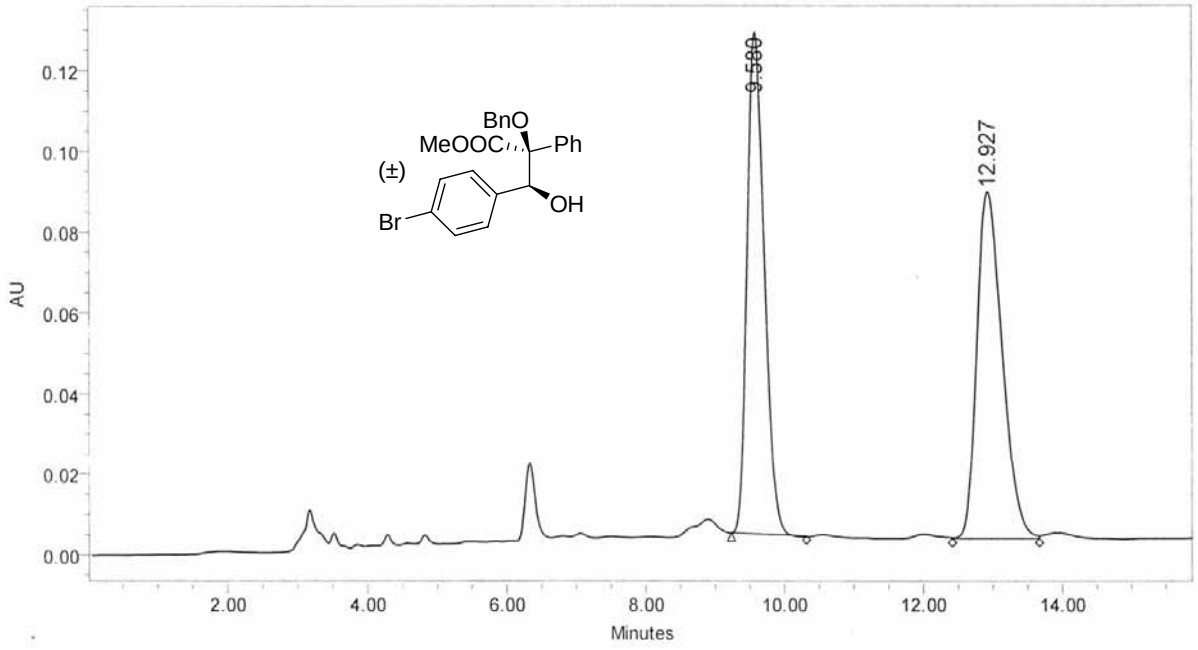
ulas

Project Name: Defaults
Reported by User: Cunlinfeng

Breeze

SAMPLE INFORMATION

Sample Name:	zxlc92	Acquired By:	Cunlinfeng
Sample Type:	Unknown	Date Acquired:	6/1/07 10:48:09 AM
Vial:	1	Acq. Method:	100A
Injection #:	1	Date Processed:	6/1/07 11:04:22 AM
Injection Volume:	20.00 ul	Channel Name:	2487Channel 1
Run Time:	60.00 Minutes	Sample Set Name:	



	RT (min)	Area (μV*sec)	% Area	Height (μV)	% Height
1	9.580	2134661	49.57	124233	59.14
2	12.927	2171797	50.43	85818	40.86

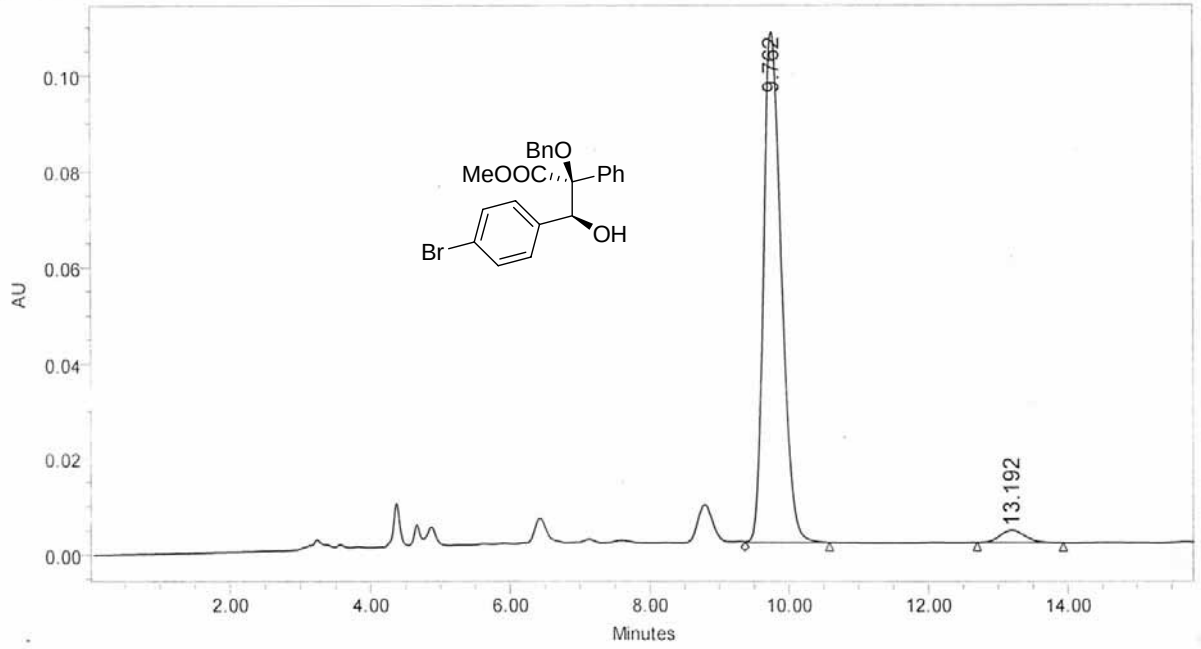
ulas

Project Name: Defaults
Reported by User: Cunlinfeng

Breeze

SAMPLE INFORMATION

Sample Name:	zxlc109	Acquired By:	Cunlinfeng
Sample Type:	Unknown	Date Acquired:	6/12/07 4:08:04 PM
Vial:	1	Acq. Method:	100A
Injection #:	1	Date Processed:	6/12/07 4:24:14 PM
Injection Volume:	20.00 ul	Channel Name:	2487Channel 1
Run Time:	60.00 Minutes	Sample Set Name:	



	RT (min)	Area (μV*sec)	% Area	Height (μV)	% Height
1	9.762	1892850	96.87	106450	97.70
2	13.192	61084	3.13	2506	2.30

4d

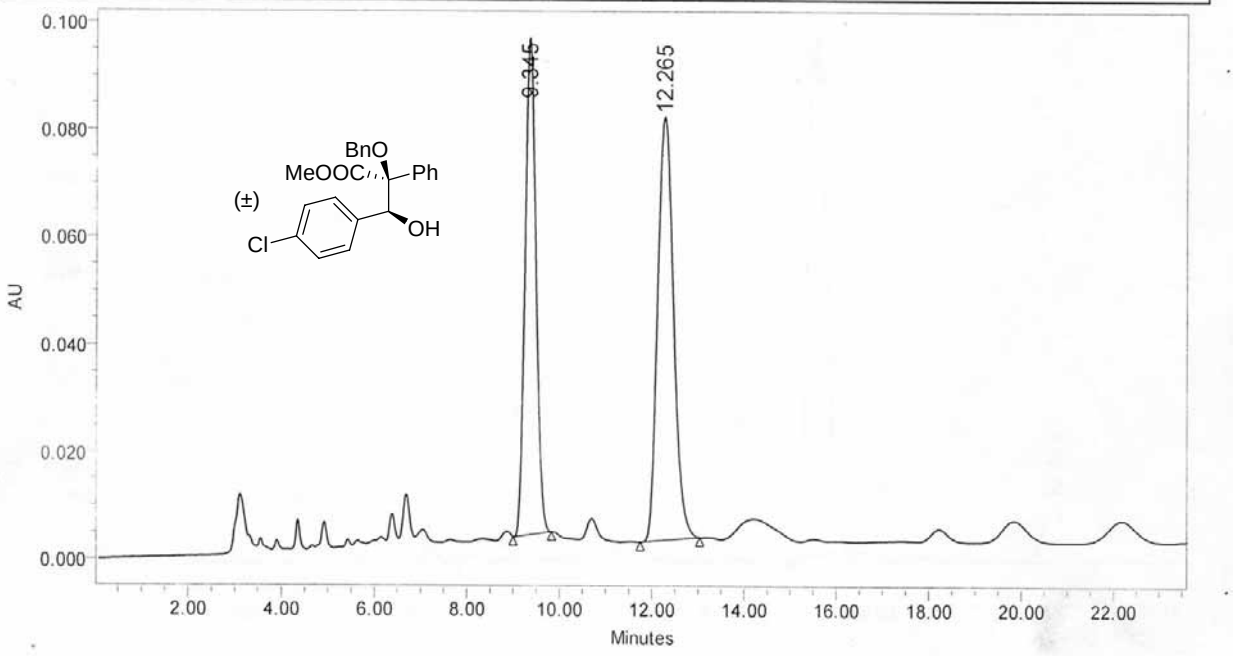
ulas

Project Name: Defaults
Reported by User: Cunlinfeng

Breeze

SAMPLE INFORMATION

Sample Name:	zxlc61	Acquired By:	Cunlinfeng
Sample Type:	Unknown	Date Acquired:	4/12/07 3:55:54 PM
Vial:	1	Acq. Method:	100A
Injection #:	1	Date Processed:	4/12/07 4:19:52 PM
Injection Volume:	20.00 ul	Channel Name:	2487Channel 1
Run Time:	60.00 Minutes	Sample Set Name:	



	RT (min)	Area (μV*sec)	% Area	Height (μV)	% Height
1	9.345	1518595	44.63	92679	54.04
2	12.265	1884169	55.37	78831	45.96

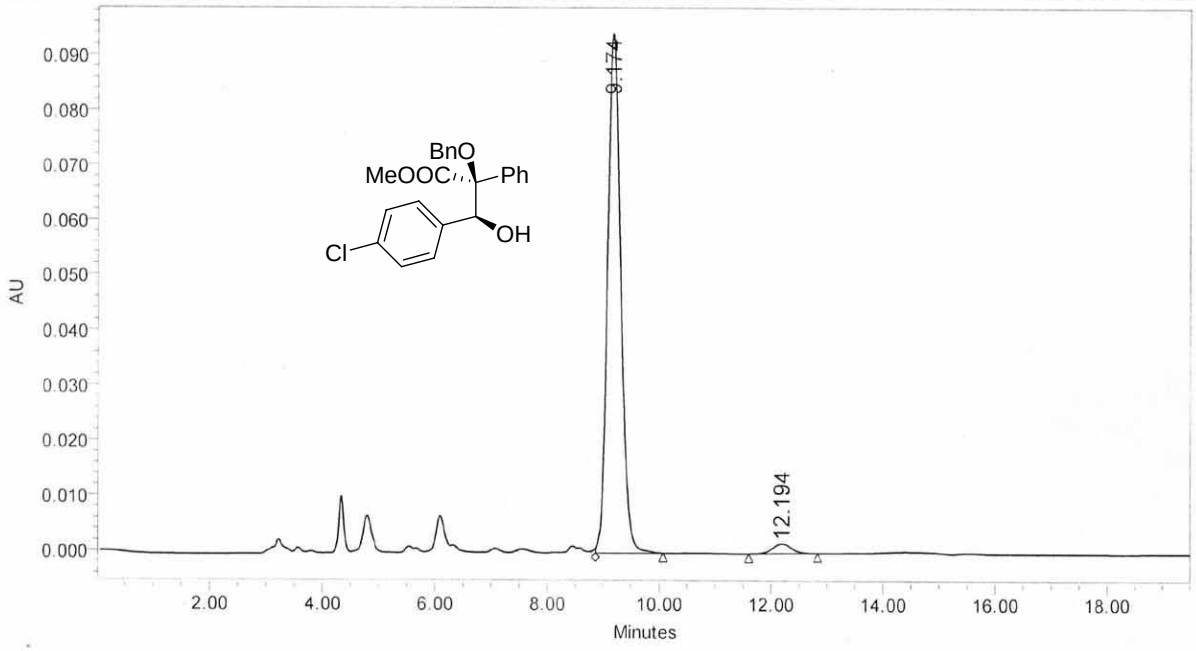
ulas

Project Name: Defaults
Reported by User: Cunlinfeng

Breeze

SAMPLE INFORMATION

Sample Name:	zxlc112	Acquired By:	Cunlinfeng
Sample Type:	Unknown	Date Acquired:	6/12/07 5:16:48 PM
Vial:	1	Acq. Method:	100A
Injection #:	4	Date Processed:	6/12/07 5:36:34 PM
Injection Volume:	20.00 ul	Channel Name:	2487Channel 1
Run Time:	60.00 Minutes	Sample Set Name:	



	RT (min)	Area (μV*sec)	% Area	Height (μV)	% Height
1	9.174	1532840	97.35	94384	98.15
2	12.194	41721	2.65	1777	1.85

4e

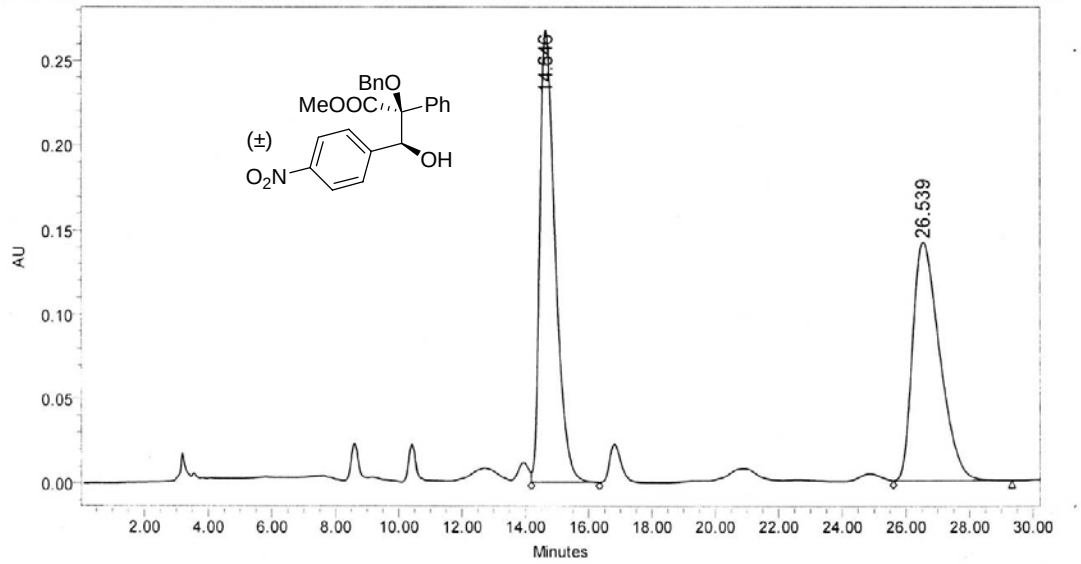
ulas

Project Name: Defaults
Reported by User: Cunlinfeng

Breeze

SAMPLE INFORMATION

Sample Name:	zxlc94	Acquired By:	Cunlinfeng
Sample Type:	Unknown	Date Acquired:	6/5/07 11:58:41 AM
Vial:	1	Acq. Method:	100A
Injection #:	3	Date Processed:	6/5/07 12:29:30 PM
Injection Volume:	20.00 ul	Channel Name:	2487Channel 1
Run Time:	40.00 Minutes	Sample Set Name:	



	RT (min)	Area (μV*sec)	% Area	Height (μV)	% Height
1	14.646	9003575	51.76	267796	65.36
2	26.539	8390957	48.24	141941	34.64

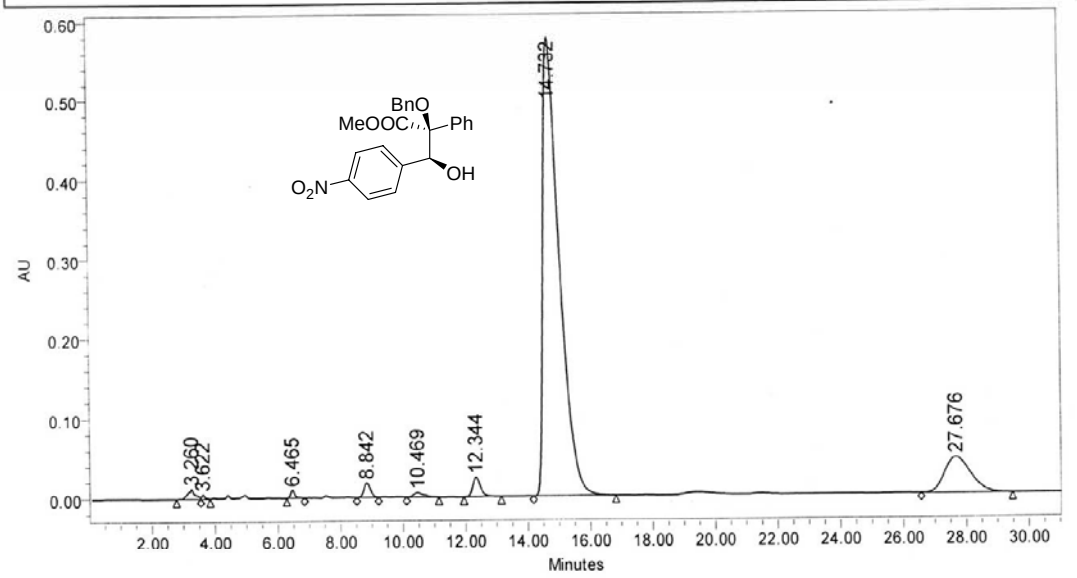
ulas

Project Name: Defaults
Reported by User: Cunlinfeng

Breeze

SAMPLE INFORMATION

Sample Name:	zxlc76	Acquired By:	Cunlinfeng
Sample Type:	Unknown	Date Acquired:	4/20/07 10:02:16 AM
Vial:	1	Acq. Method:	100A
Injection #:	3	Date Processed:	4/20/07 10:33:28 AM
Injection Volume:	20.00 ul	Channel Name:	2487Channel 1
Run Time:	60.00 Minutes	Sample Set Name:	



	RT (min)	Area (μV*sec)	% Area	Height (μV)	% Height
1	3.260	193195	0.78	12085	1.73
2	3.622	36885	0.15	5083	0.73
3	6.465	90873	0.37	10080	1.44
4	8.842	269065	1.09	18178	2.60
5	10.469	134123	0.54	5634	0.81
6	12.344	419562	1.70	24356	3.49
7	14.732	20915503	84.89	578319	82.81
8	27.676	2580126	10.47	44643	6.39

4f

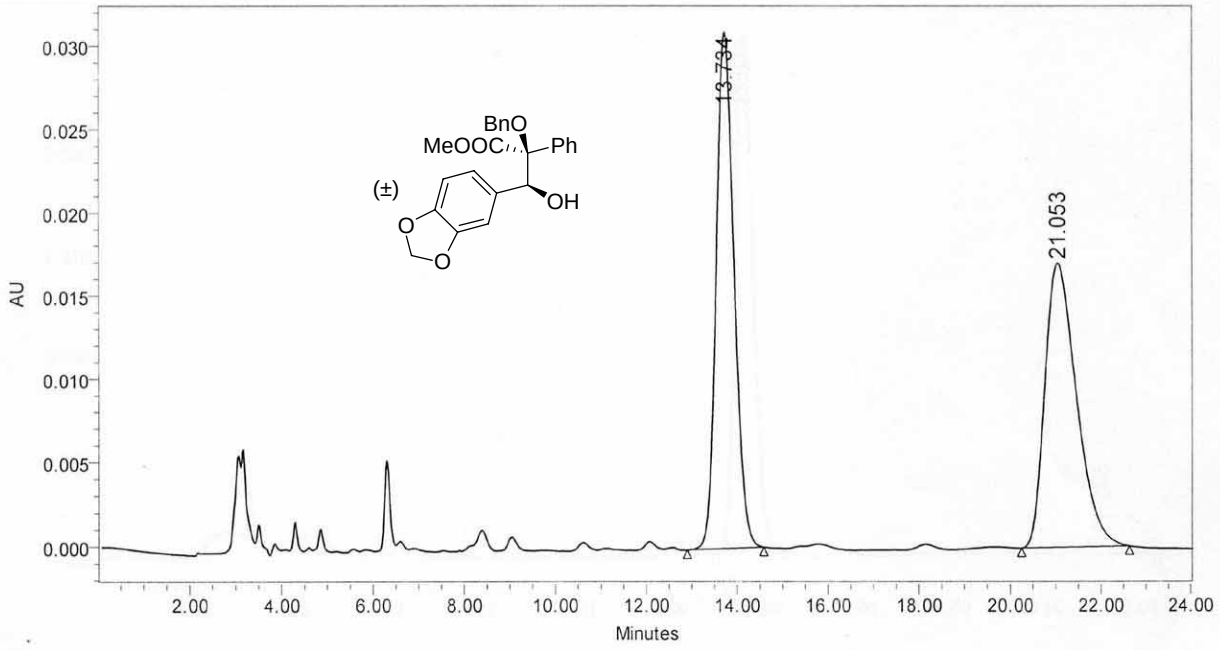
ulas

Project Name: Defaults
Reported by User: Cunlinfeng

Breeze

SAMPLE INFORMATION

Sample Name:	zxlc69	Acquired By:	Cunlinfeng
Sample Type:	Unknown	Date Acquired:	4/18/07 10:52:07 AM
Vial:	1	Acq. Method:	100A
Injection #:	3	Date Processed:	4/18/07 11:16:20 AM
Injection Volume:	20.00 ul	Channel Name:	2487Channel 1
Run Time:	60.00 Minutes	Sample Set Name:	



	RT (min)	Area (μV*sec)	% Area	Height (μV)	% Height
1	13.734	843194	50.73	30939	64.55
2	21.053	818997	49.27	16990	35.45

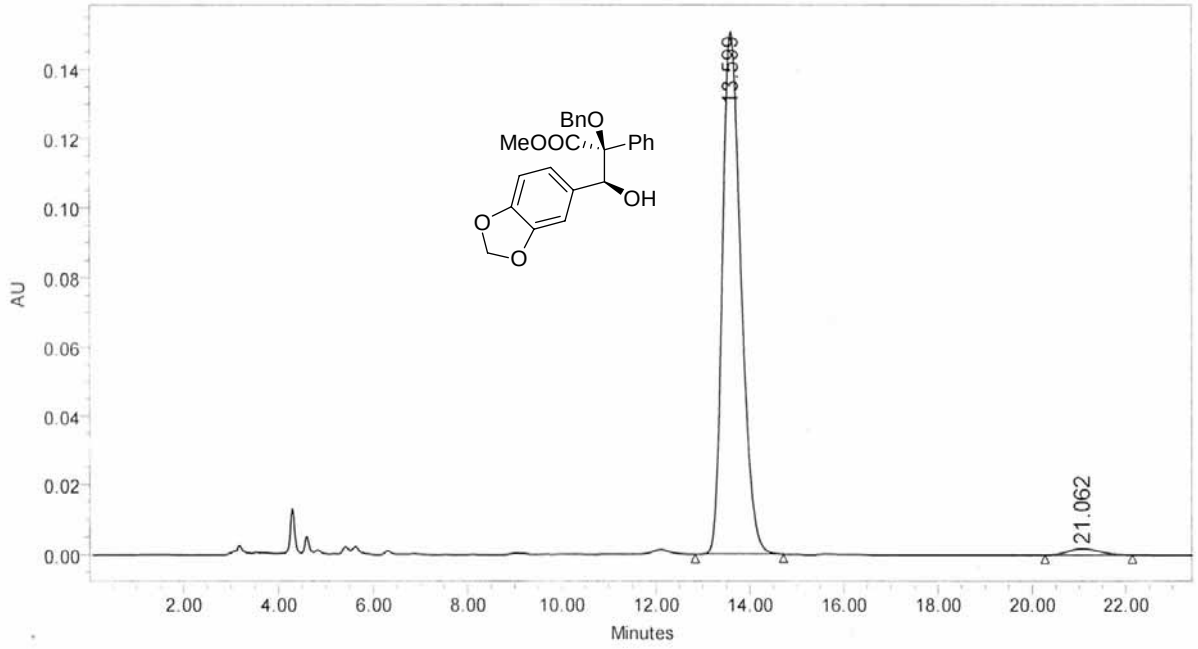
ulas

Project Name: Defaults
Reported by User: Cunlinfeng

Breeze

SAMPLE INFORMATION

Sample Name:	zxlc106	Acquired By:	Cunlinfeng
Sample Type:	Unknown	Date Acquired:	6/11/07 4:22:38 PM
Vial:	1	Acq. Method:	100A
Injection #:	4	Date Processed:	6/11/07 4:46:17 PM
Injection Volume:	20.00 ul	Channel Name:	2487Channel 1
Run Time:	60.00 Minutes	Sample Set Name:	



	RT (min)	Area (μV*sec)	% Area	Height (μV)	% Height
1	13.599	4136570	98.08	150665	98.84
2	21.062	81062	1.92	1766	1.16

4g

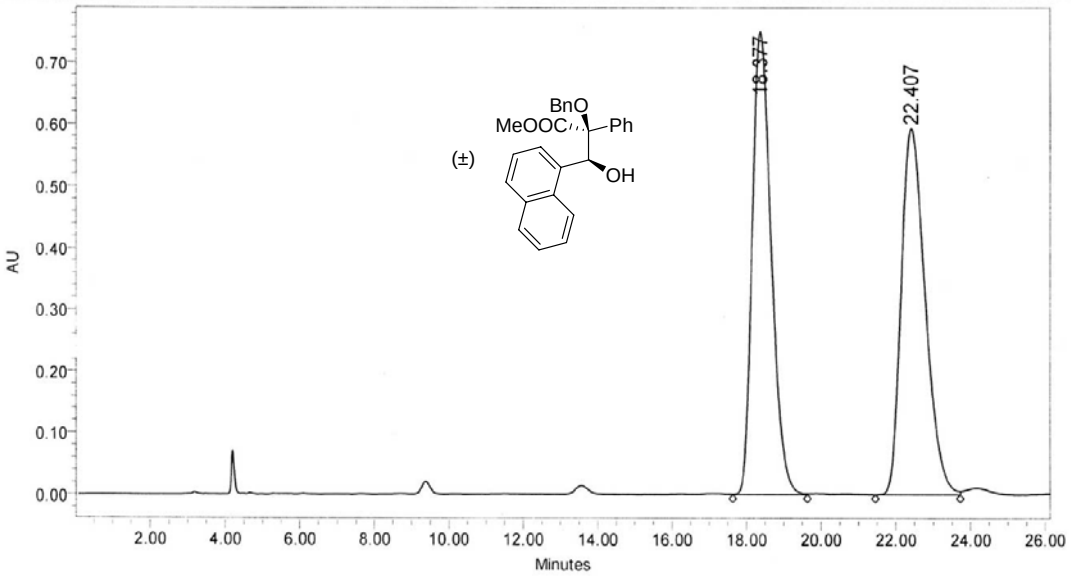
ulas

Project Name: Defaults
Reported by User: Cunlinfeng

Breeze

SAMPLE INFORMATION

Sample Name:	zxlc113	Acquired By:	Cunlinfeng
Sample Type:	Unknown	Date Acquired:	6/28/07 2:03:55 PM
Vial:	1	Acq. Method:	100A
Injection #:	1	Date Processed:	6/28/07 2:30:20 PM
Injection Volume:	20.00 ul	Channel Name:	2487Channel 1
Run Time:	60.00 Minutes	Sample Set Name:	



	RT (min)	Area (μV*sec)	% Area	Height (μV)	% Height
1	18.377	26504018	49.96	751023	55.87
2	22.407	26542619	50.04	593321	44.13

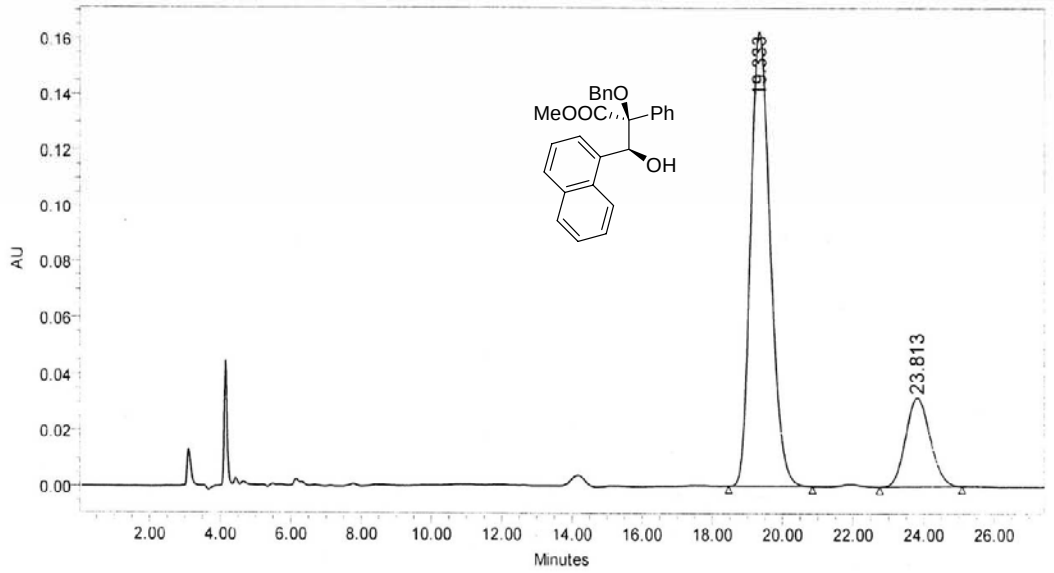
ulas

Project Name: Defaults
Reported by User: Cunlinfeng

Breeze

SAMPLE INFORMATION

Sample Name:	zxlc53	Acquired By:	Cunlinfeng
Sample Type:	Unknown	Date Acquired:	3/26/07 3:16:29 PM
Vial:	1	Acq. Method:	100A
Injection #:	8	Date Processed:	3/26/07 3:44:10 PM
Injection Volume:	20.00 ul	Channel Name:	2487Channel 1
Run Time:	60.00 Minutes	Sample Set Name:	



	RT (min)	Area (μV*sec)	% Area	Height (μV)	% Height
1	19.333	6284148	80.39	162453	83.62
2	23.813	1532898	19.61	31825	16.38

4h

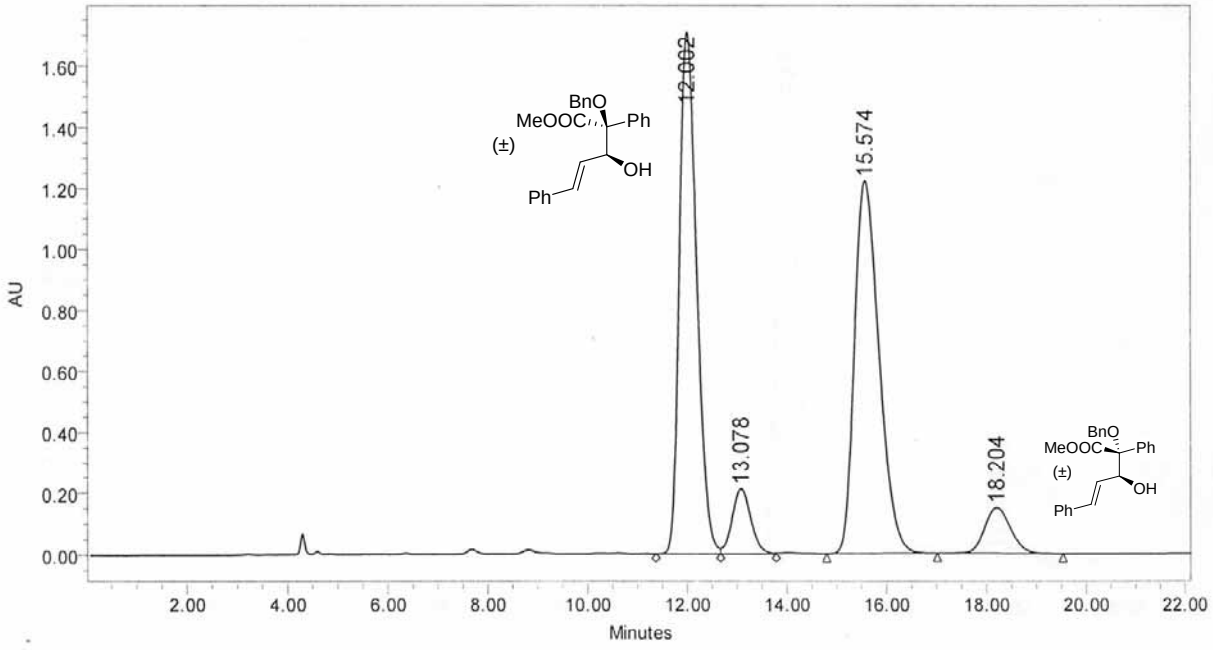
ulas

Project Name: Defaults
Reported by User: Cunlinfeng

Breeze

SAMPLE INFORMATION

Sample Name:	zxlc67	Acquired By:	Cunlinfeng
Sample Type:	Unknown	Date Acquired:	4/18/07 10:07:53 AM
Vial:	1	Acq. Method:	100A
Injection #:	1	Date Processed:	4/18/07 10:30:14 AM
Injection Volume:	20.00 ul	Channel Name:	2487Channel 1
Run Time:	60.00 Minutes	Sample Set Name:	



	RT (min)	Area (μV*sec)	% Area	Height (μV)	% Height
1	12.002	41179690	43.97	1708193	51.97
2	13.078	5446469	5.82	210461	6.40
3	15.574	41670176	44.50	1219367	37.10
4	18.204	5347798	5.71	148573	4.52

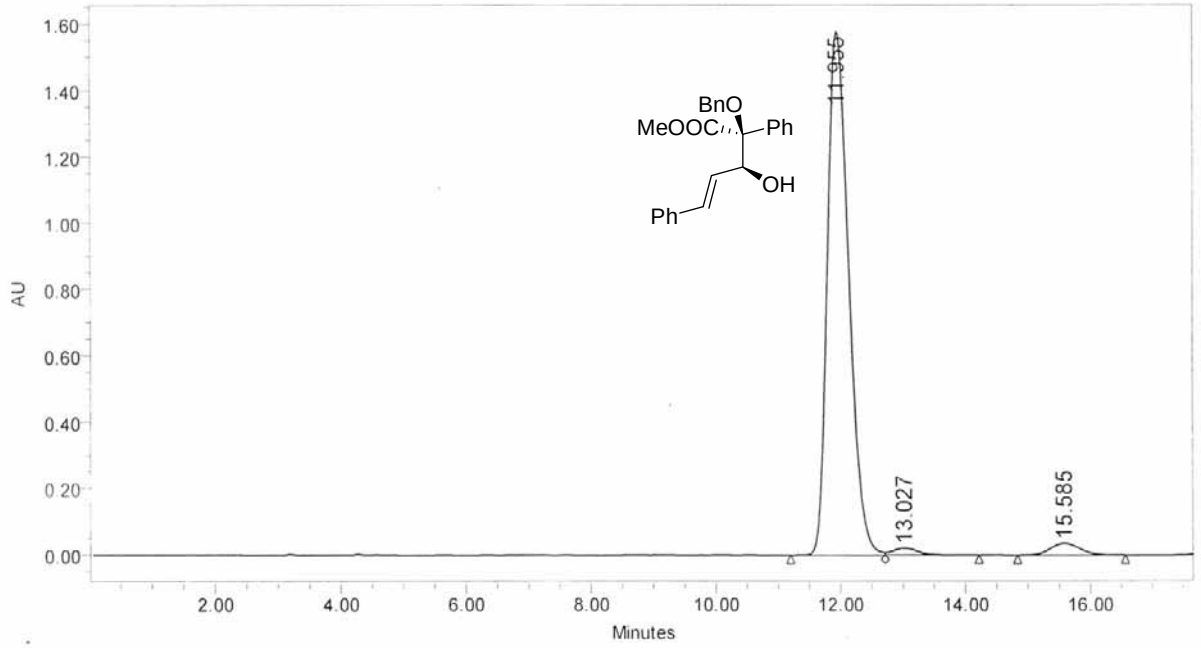
ulas

Project Name: Defaults
Reported by User: Cunlinfeng

Breeze

SAMPLE INFORMATION

Sample Name:	zxlc107	Acquired By:	Cunlinfeng
Sample Type:	Unknown	Date Acquired:	6/11/07 4:02:34 PM
Vial:	1	Acq. Method:	100A
Injection #:	3	Date Processed:	6/11/07 4:20:23 PM
Injection Volume:	20.00 ul	Channel Name:	2487Channel 1
Run Time:	60.00 Minutes	Sample Set Name:	



	RT (min)	Area (μV*sec)	% Area	Height (μV)	% Height
1	11.955	37464208	95.68	1578047	96.59
2	13.027	571052	1.46	20733	1.27
3	15.585	1122490	2.87	34984	2.14

4i

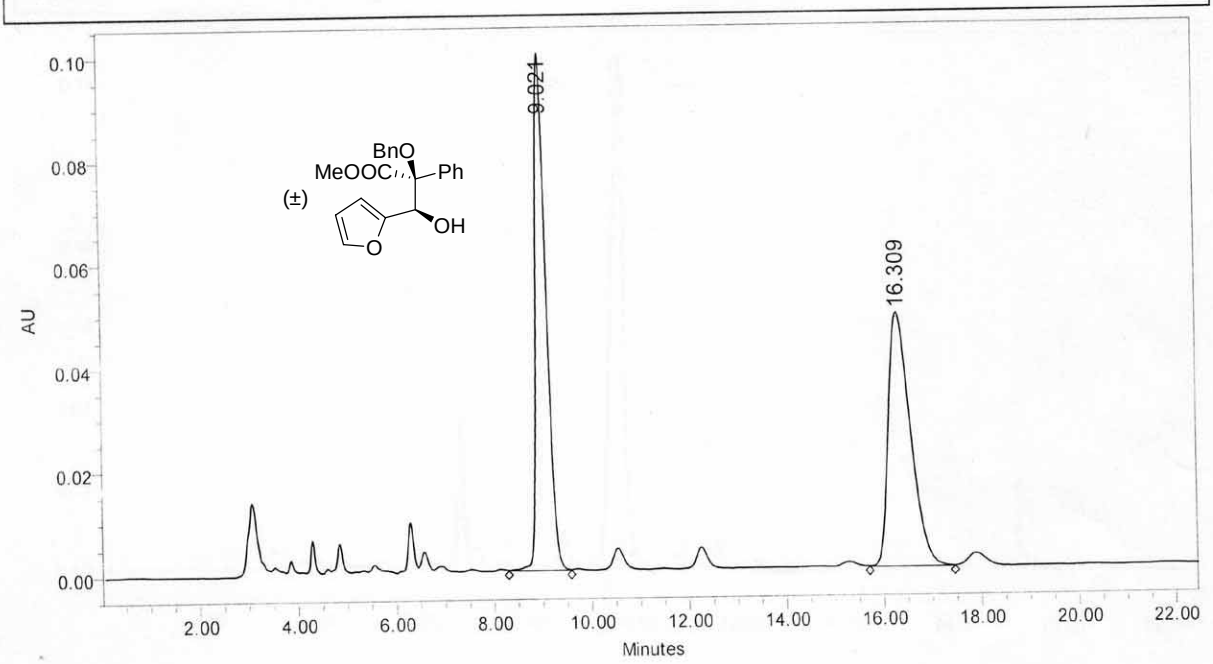
ulas

Project Name: Defaults
Reported by User: Cunlinfeng

Breeze

SAMPLE INFORMATION

Sample Name:	zxlc65	Acquired By:	Cunlinfeng
Sample Type:	Unknown	Date Acquired:	4/12/07 5:17:58 PM
Vial:	1	Acq. Method:	100A
Injection #:	5	Date Processed:	4/12/07 5:41:28 PM
Injection Volume:	20.00 ul	Channel Name:	2487Channel 1
Run Time:	60.00 Minutes	Sample Set Name:	



	RT (min)	Area (μV*sec)	% Area	Height (μV)	% Height
1	9.021	1554429	50.23	99912	67.10
2	16.309	1540199	49.77	48981	32.90

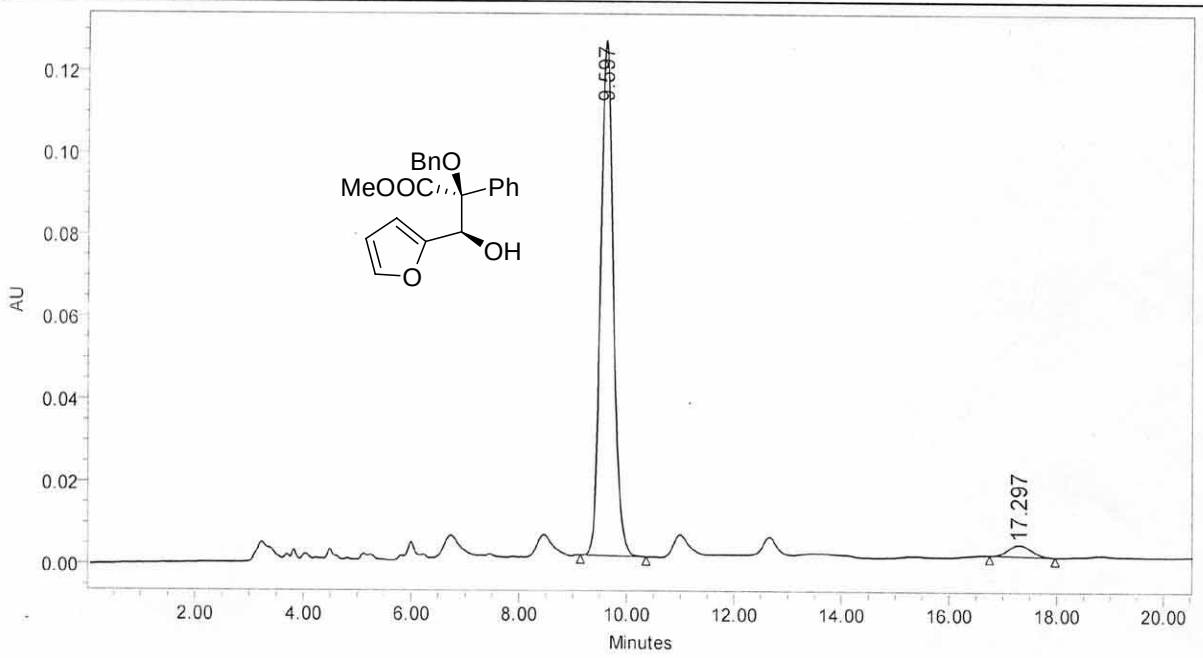
ulas

Project Name: Defaults
Reported by User: Cunlinfeng

Breeze

SAMPLE INFORMATION

Sample Name:	zxlc66	Acquired By:	Cunlinfeng
Sample Type:	Unknown	Date Acquired:	4/13/07 9:00:45 AM
Vial:	1	Acq. Method:	100A
Injection #:	1	Date Processed:	4/13/07 9:22:22 AM
Injection Volume:	20.00 ul	Channel Name:	2487Channel 1
Run Time:	60.00 Minutes	Sample Set Name:	



	RT (min)	Area (μV*sec)	% Area	Height (μV)	% Height
1	9.597	2079610	96.20	125779	97.84
2	17.297	82164	3.80	2778	2.16

4j

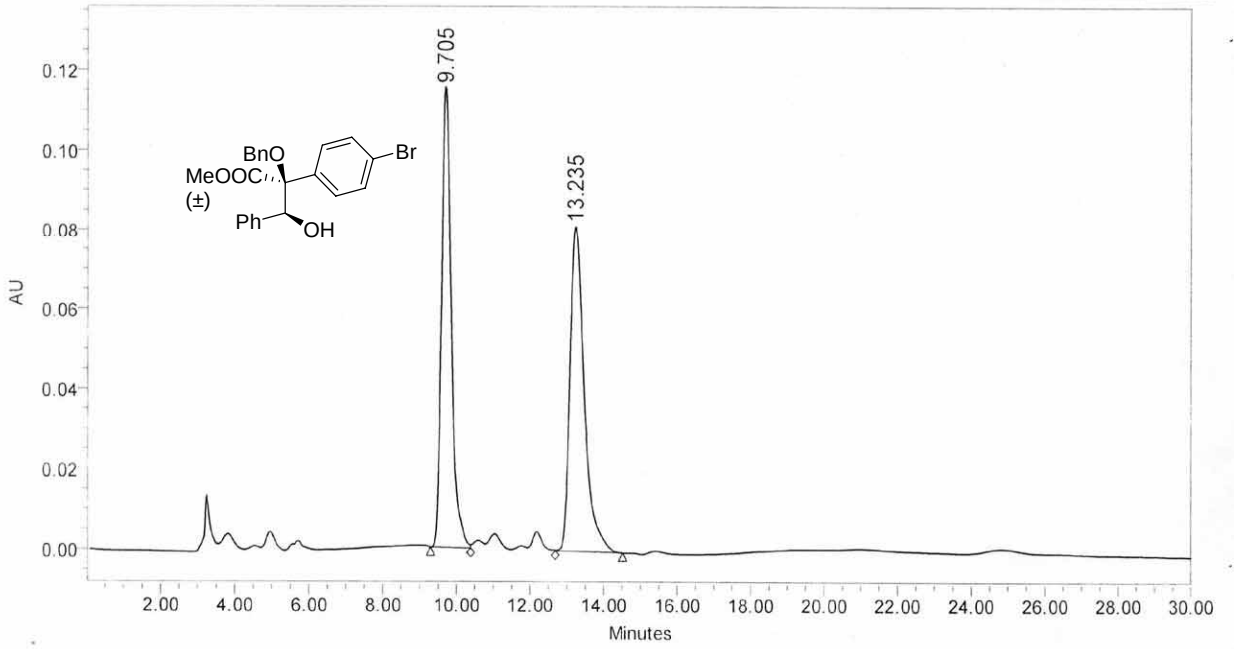
ulas

Project Name: Defaults
Reported by User: Cunlinfeng

Breeze

SAMPLE INFORMATION

Sample Name:	zxlc95	Acquired By:	Cunlinfeng
Sample Type:	Unknown	Date Acquired:	6/5/07 12:30:17 PM
Vial:	1	Acq. Method:	100A
Injection #:	4	Date Processed:	6/5/07 1:59:26 PM
Injection Volume:	20.00 ul	Channel Name:	2487Channel 1
Run Time:	30.00 Minutes	Sample Set Name:	



	RT (min)	Area (μV*sec)	% Area	Height (μV)	% Height
1	9.705	2123581	49.32	115416	58.64
2	13.235	2182310	50.68	81413	41.36

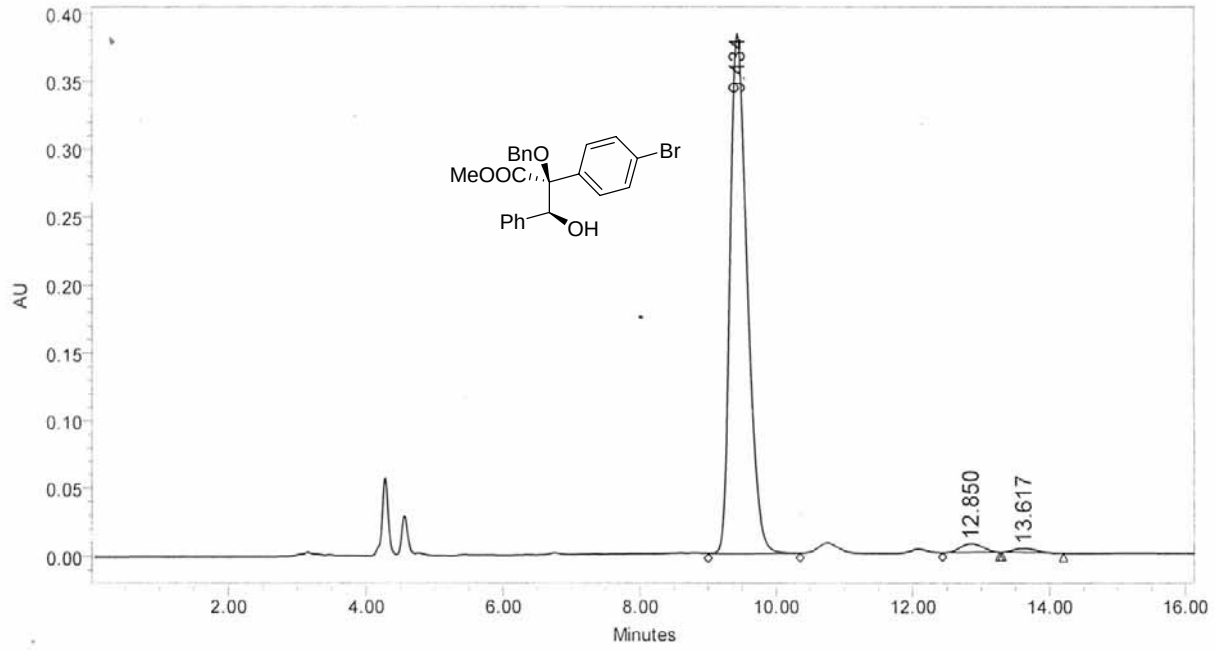
ulaś

Project Name: Defaults
Reported by User: Cunlinfeng

Breeze

SAMPLE INFORMATION

Sample Name:	zxlc98	Acquired By:	Cunlinfeng
Sample Type:	Unknown	Date Acquired:	6/6/07 4:21:15 PM
Vial:	1	Acq. Method:	100A
Injection #:	1	Date Processed:	6/6/07 4:37:58 PM
Injection Volume:	20.00 ul	Channel Name:	2487Channel 1
Run Time:	40.00 Minutes	Sample Set Name:	



	RT (min)	Area (μV*sec)	% Area	Height (μV)	% Height
1	9.434	6743506	96.98	383261	97.56
2	12.850	142513	2.05	6495	1.65
3	13.617	67583	0.97	3090	0.79

4k

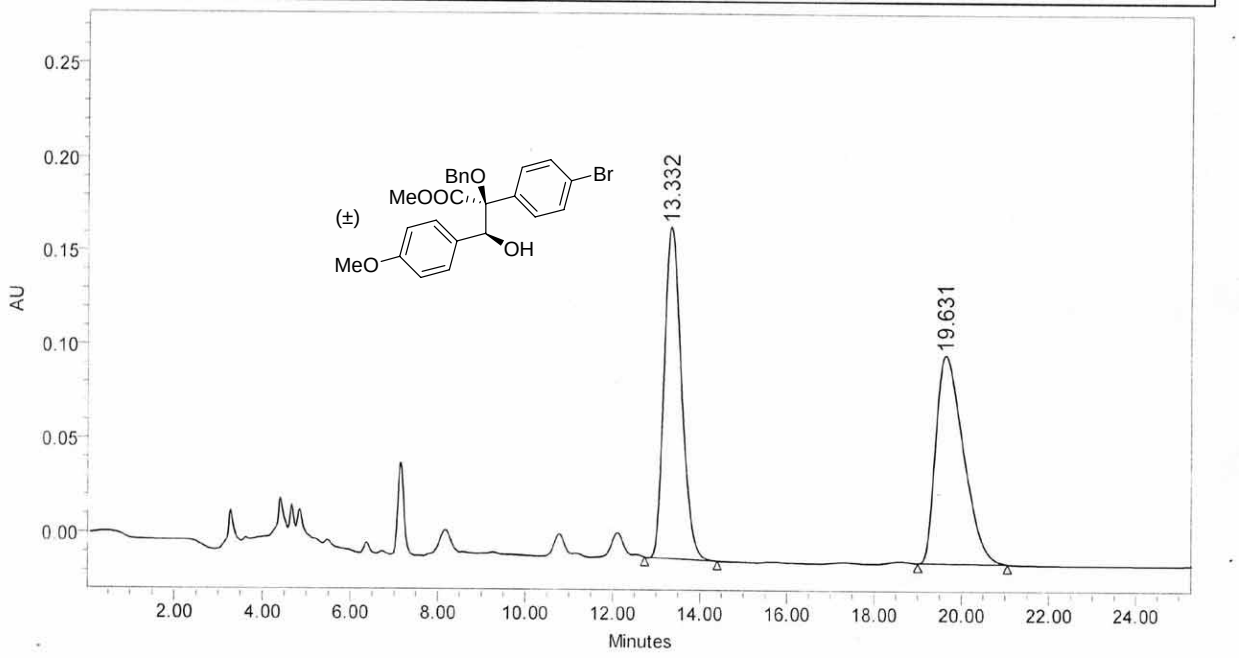
ulas

Project Name: Defaults
Reported by User: Cunlinfeng

Breeze

SAMPLE INFORMATION

Sample Name:	zxlc97	Acquired By:	Cunlinfeng
Sample Type:	Unknown	Date Acquired:	6/5/07 11:10:05 AM
Vial:	1	Acq. Method:	100A
Injection #:	1	Date Processed:	6/5/07 11:35:36 AM
Injection Volume:	20.00 ul	Channel Name:	2487Channel 1
Run Time:	60.00 Minutes	Sample Set Name:	



	RT (min)	Area (μV*sec)	% Area	Height (μV)	% Height
1	13.332	4863044	50.03	176907	61.56
2	19.631	4856592	49.97	110454	38.44

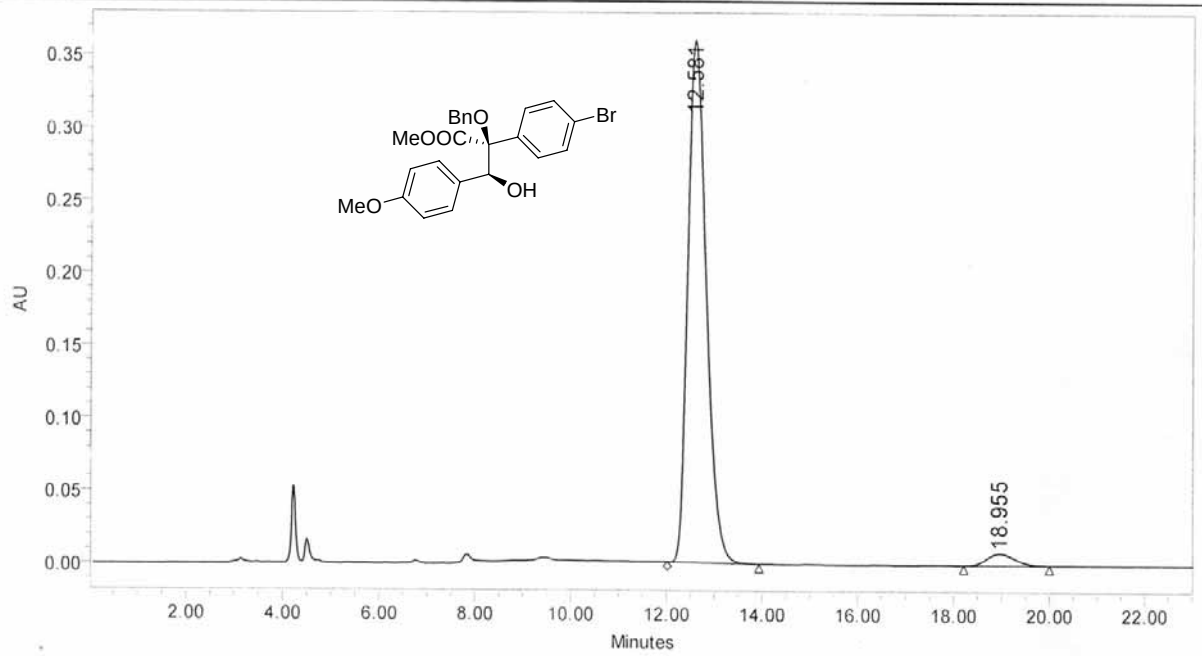
ulas

Project Name: Defaults
Reported by User: Cunlinfeng

Breeze

SAMPLE INFORMATION

Sample Name:	zxlc99	Acquired By:	Cunlinfeng
Sample Type:	Unknown	Date Acquired:	6/6/07 4:38:38 PM
Vial:	1	Acq. Method:	100A
Injection #:	2	Date Processed:	6/6/07 5:01:51 PM
Injection Volume:	20.00 ul	Channel Name:	2487Channel 1
Run Time:	40.00 Minutes	Sample Set Name:	



	RT (min)	Area (μV*sec)	% Area	Height (μV)	% Height
1	12.581	9644107	96.72	359877	97.78
2	18.955	327452	3.28	8163	2.22

4l

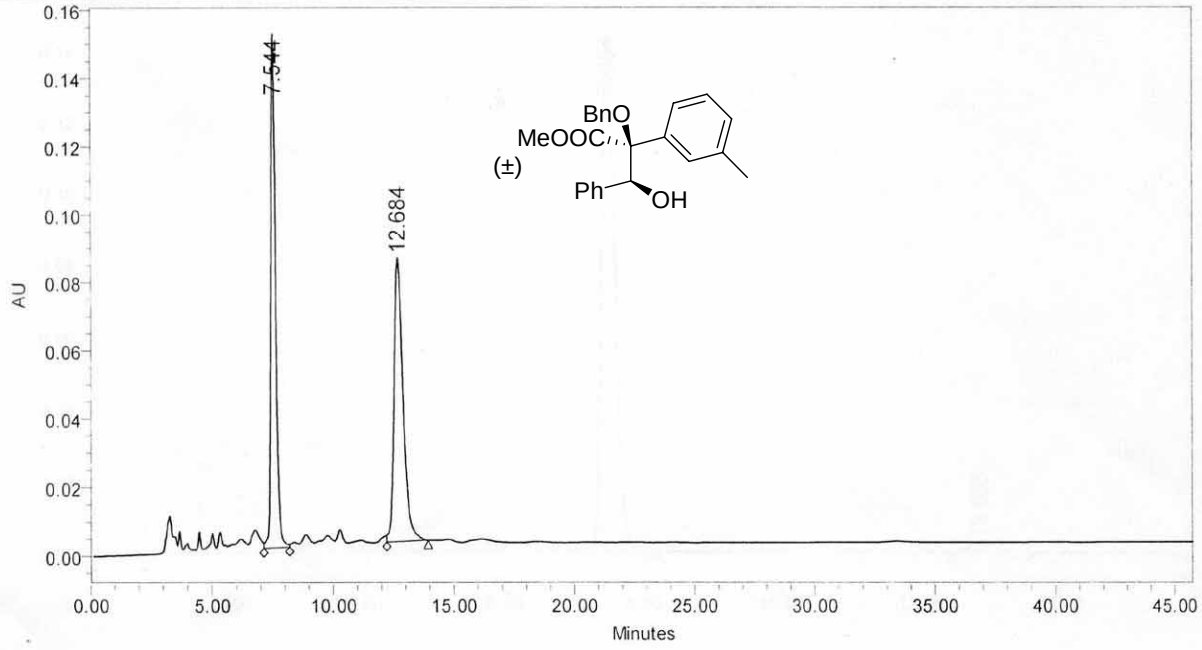
ulas

Project Name: Defaults
Reported by User: Cunlinfeng

Breeze

SAMPLE INFORMATION

Sample Name:	zxlc81	Acquired By:	Cunlinfeng
Sample Type:	Unknown	Date Acquired:	4/23/07 11:58:36 AM
Vial:	1	Acq. Method:	100A
Injection #:	1	Date Processed:	4/23/07 12:44:59 PM
Injection Volume:	20.00 ul	Channel Name:	2487Channel 1
Run Time:	60.00 Minutes	Sample Set Name:	



	RT (min)	Area (µV*sec)	% Area	Height (µV)	% Height
1	7.544	2056391	48.70	150802	64.49
2	12.684	2166314	51.30	83039	35.51

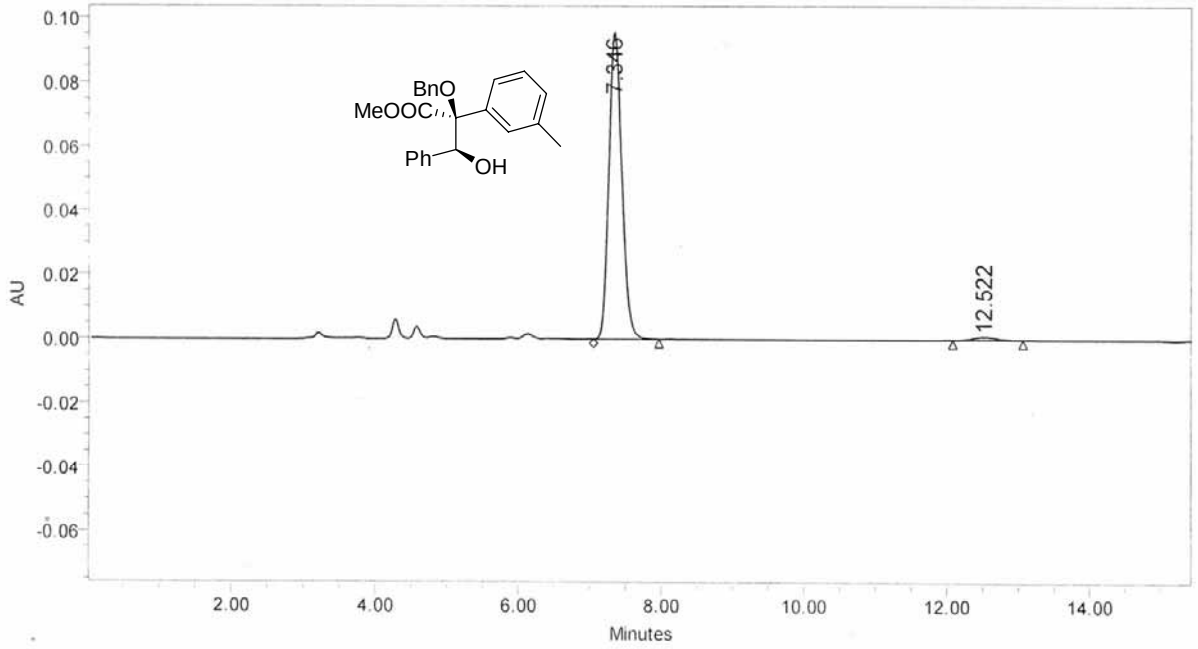
ulas

Project Name: Defaults
Reported by User: Cunlinfeng

Breeze

SAMPLE INFORMATION

Sample Name:	zxlc104	Acquired By:	Cunlinfeng
Sample Type:	Unknown	Date Acquired:	6/8/07 2:20:55 PM
Vial:	1	Acq. Method:	100A
Injection #:	1	Date Processed:	6/8/07 2:36:35 PM
Injection Volume:	20.00 ul	Channel Name:	2487Channel 1
Run Time:	60.00 Minutes	Sample Set Name:	



	RT (min)	Area (μV*sec)	% Area	Height (μV)	% Height
1	7.346	1207823	98.09	95489	98.94
2	12.522	23533	1.91	1025	1.06

4m

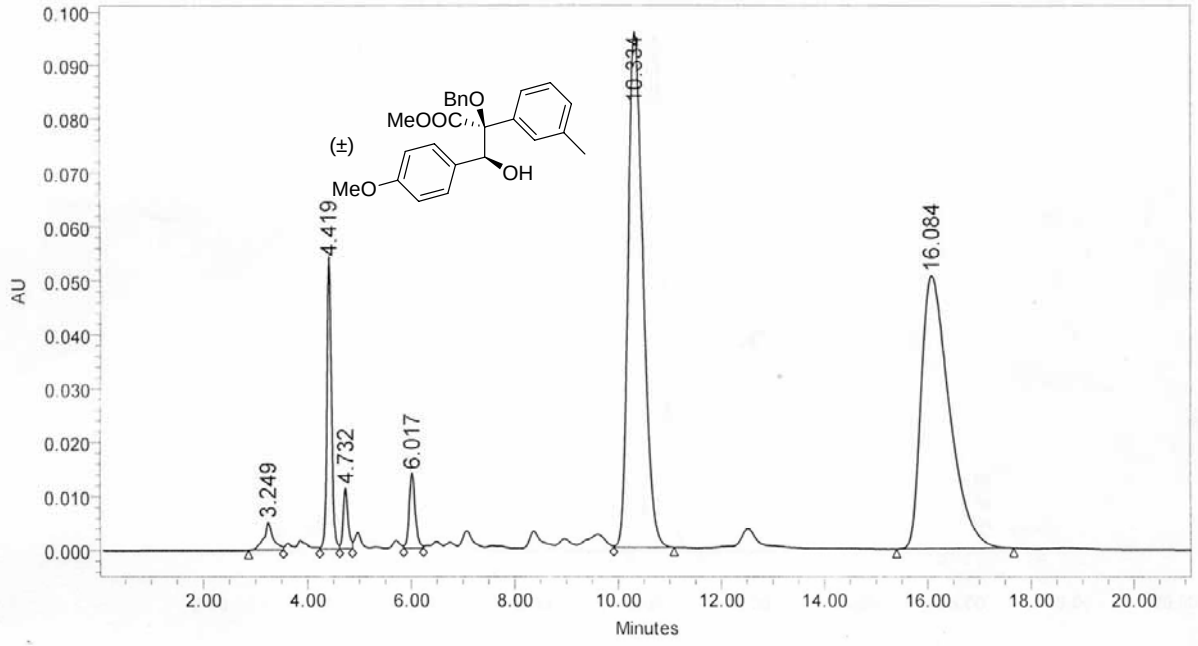
ulas

Project Name: Defaults
Reported by User: Cunlinfeng

Breeze

SAMPLE INFORMATION

Sample Name:	zxlc83	Acquired By:	Cunlinfeng
Sample Type:	Unknown	Date Acquired:	4/23/07 1:03:46 PM
Vial:	1	Acq. Method:	100A
Injection #:	3	Date Processed:	4/23/07 1:24:58 PM
Injection Volume:	20.00 ul	Channel Name:	2487Channel 1
Run Time:	60.00 Minutes	Sample Set Name:	



	RT (min)	Area (μV*sec)	% Area	Height (μV)	% Height
1	3.249	62073	1.40	5204	2.26
2	4.419	327832	7.41	53769	23.30
3	4.732	73955	1.67	11283	4.89
4	6.017	113660	2.57	13894	6.02
5	10.334	1927285	43.56	95905	41.57
6	16.084	1919438	43.38	50673	21.96

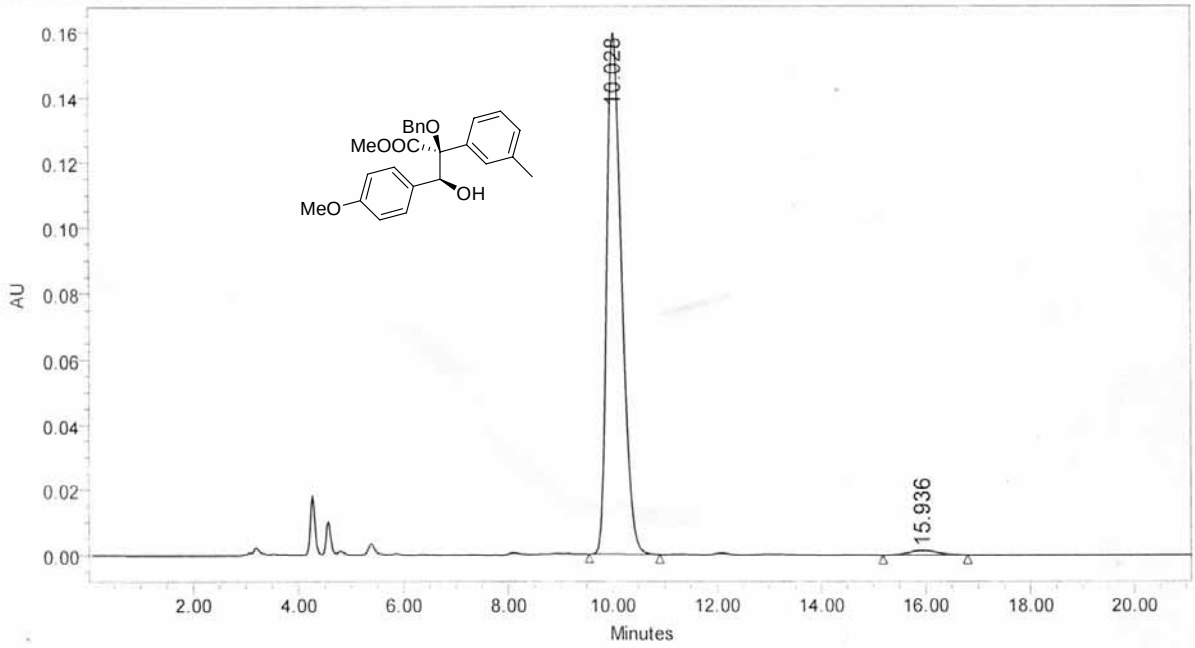
ulas

Project Name: Defaults
Reported by User: Cunlinfeng

Breeze

SAMPLE INFORMATION

Sample Name:	zxlc105	Acquired By:	Cunlinfeng
Sample Type:	Unknown	Date Acquired:	6/8/07 2:37:23 PM
Vial:	1	Acq. Method:	100A
Injection #:	2	Date Processed:	6/8/07 2:58:39 PM
Injection Volume:	20.00 ul	Channel Name:	2487Channel 1
Run Time:	60.00 Minutes	Sample Set Name:	



	RT (min)	Area (μV*sec)	% Area	Height (μV)	% Height
1	10.028	3153534	98.27	159528	99.10
2	15.936	55463	1.73	1445	0.90

4n

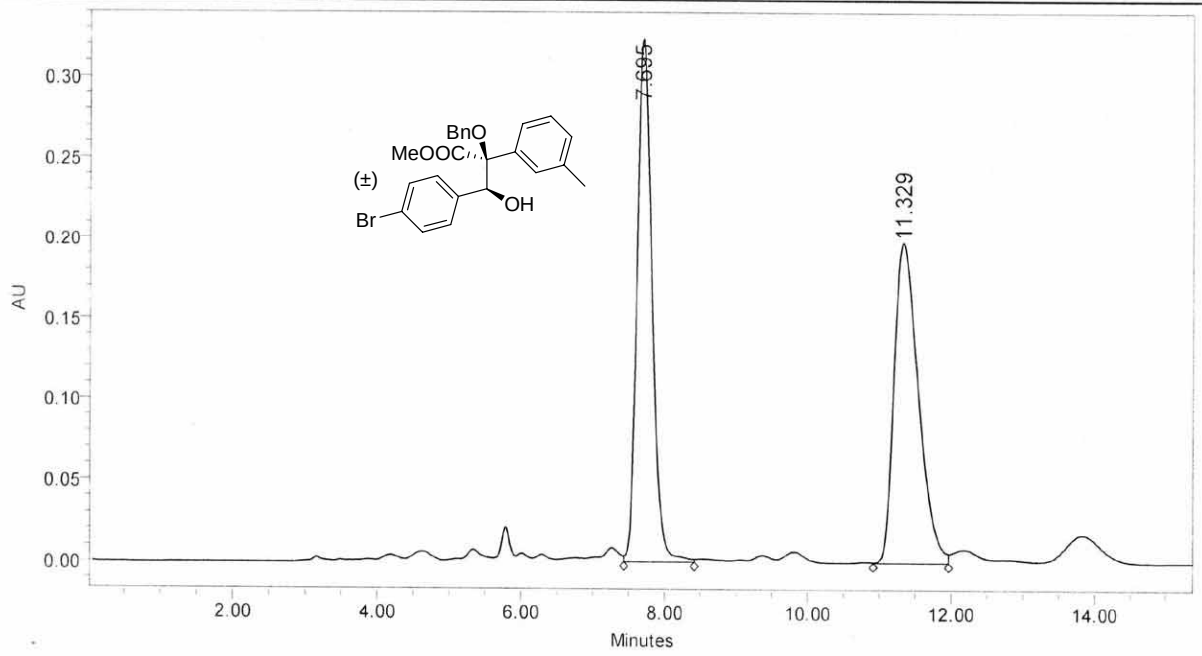
ulas

Project Name: Defaults
Reported by User: Cunlinfeng

Breeze

SAMPLE INFORMATION

Sample Name:	zxlc101	Acquired By:	Cunlinfeng
Sample Type:	Unknown	Date Acquired:	6/8/07 4:02:20 PM
Vial:	1	Acq. Method:	100A
Injection #:	6	Date Processed:	6/8/07 4:18:05 PM
Injection Volume:	20.00 ul	Channel Name:	2487Channel 1
Run Time:	60.00 Minutes	Sample Set Name:	



	RT (min)	Area (μV*sec)	% Area	Height (μV)	% Height
1	7.695	4666301	50.11	323787	62.07
2	11.329	4645843	49.89	197870	37.93

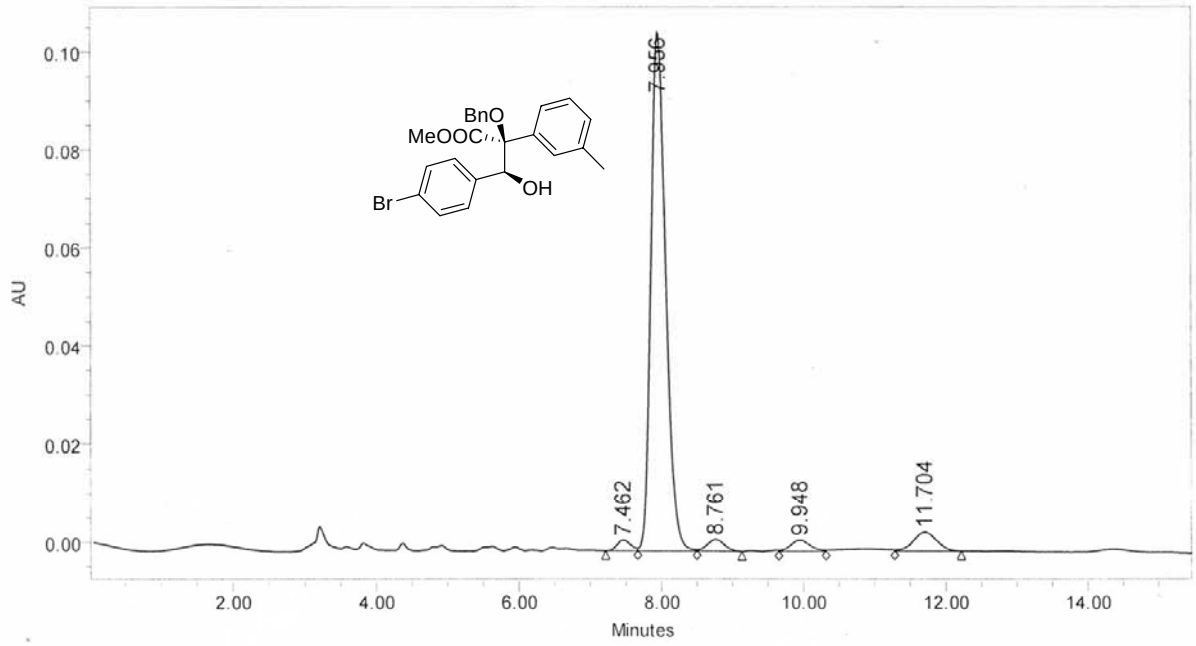
ulas

Project Name: Defaults
Reported by User: Cunlinfeng

Breeze

SAMPLE INFORMATION

Sample Name:	zxlc86	Acquired By:	Cunlinfeng
Sample Type:	Unknown	Date Acquired:	4/23/07 2:10:51 PM
Vial:	1	Acq. Method:	100A
Injection #:	6	Date Processed:	4/23/07 2:26:44 PM
Injection Volume:	20.00 ul	Channel Name:	2487Channel 1
Run Time:	60.00 Minutes	Sample Set Name:	



	RT (min)	Area (μV*sec)	% Area	Height (μV)	% Height
1	7.462	28524	1.65	2205	1.89
2	7.956	1525451	88.44	106112	90.82
3	8.761	40314	2.34	2407	2.06
4	9.948	43690	2.53	2277	1.95
5	11.704	86888	5.04	3839	3.29

Determination of absolute configuration of adduct 4a

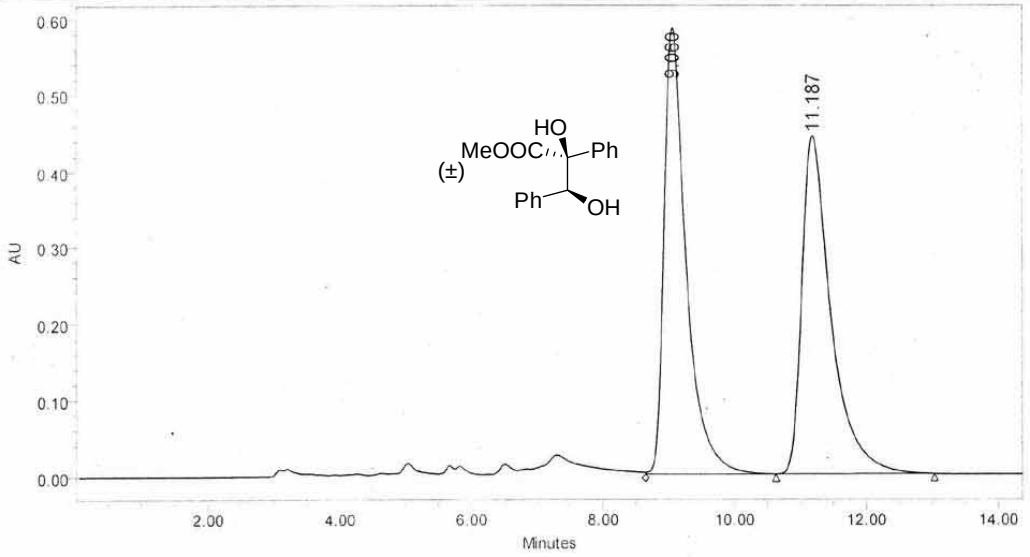
ulas

Project Name: Defaults
Reported by User: System

Breeze

SAMPLE INFORMATION

Sample Name:	zx-0	Acquired By:	System
Sample Type:	Unknown	Date Acquired:	7/18/07 11:13:13 AM
Vial:	1	Acq. Method:	100A220
Injection #:	1	Date Processed:	7/18/07 11:27:46 AM
Injection Volume:	20.00 ul	Channel Name:	2487Channel 1
Run Time:	60.00 Minutes	Sample Set Name:	



	RT (min)	Area (μV*sec)	% Area	Height (μV)	% Height
1	9.060	13648281	50.18	585560	56.94
2	11.187	13548103	49.82	442768	43.06

Report Method: Untitled Printed 5:37:33 PM 8/28/07 Page: 1 of 1

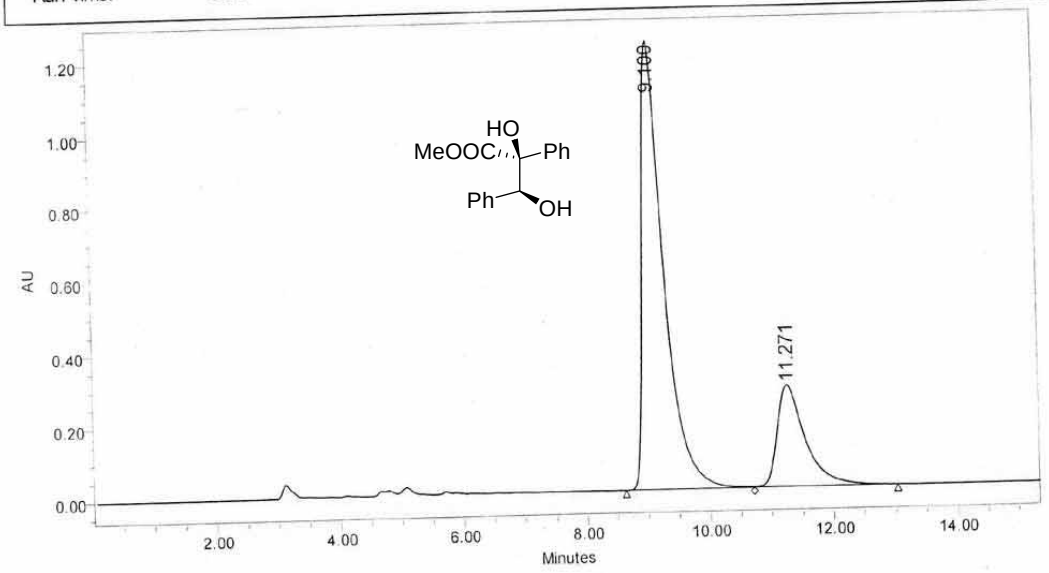
ulas

Project Name: Defaults
Reported by User: System

Breeze

SAMPLE INFORMATION

Sample Name:	zx	Acquired By:	System
Sample Type:	Unknown	Date Acquired:	7/18/07 11:31:00 AM
Vial:	1	Acq. Method:	100A220
Injection #:	2	Date Processed:	7/18/07 11:46:35 AM
Injection Volume:	20.00 ul	Channel Name:	2487Channel 1
Run Time:	60.00 Minutes	Sample Set Name:	



	RT (min)	Area (µV*sec)	% Area	Height (µV)	% Height
1	9.100	29901938	77.58	1232273	81.63
2	11.271	8640622	22.42	277379	18.37